PROJECT MANUAL

YORK COUNTY– PHASE 1
NORTH-SOUTH WATER TRANSMISSION MAIN HARPER ROAD

October 2023

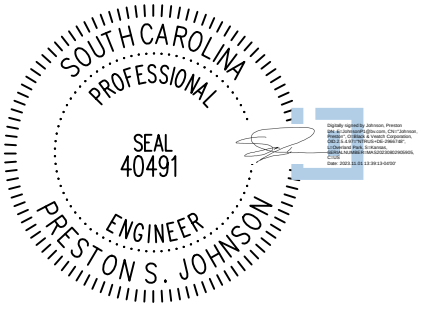
OWNER:

YORK COUNTY, ENGINEERING DEPARTMENT
PO BOX 148
6 SOUTH CONGRESS STREET
YORK, SOUTH SC 29745
(803) 684-8571
(803) 684-8596 FAX

ENGINEER:

BLACK & VEATCH INTERNATIONAL COMPANY
10925 DAVID TAYLOR DRIVE STE 280
CHARLOTTE, NC 28262
(704) 548-8461

FOR BIDDING ONLY
NOT RELEASED FOR
CONSTRUCTION



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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:

Phase 1 North-South Water Transmission Main Harper Road

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 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

Section 00 51 00

NOTICE OF AWARD

TO: _____ FROM: York County Engineering

_____ P.O. Box 148

_____ York, SC 29745

PROJECT TITLE: Phase 1 North-South Water Transmission Main Harper Road

PROJECT DESCRIPTION
The Owner has considered the Bid submitted by you for the above described work in response to its Advertisement for Bids dated _____ 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: County Engineer

ACCEPTANCE OF NOTICE

Receipt of the above Notice of Award is hereby acknowledged

By:_____

Title:_____

This _____day of _____,20___.

END OF SECTION

Section 00 52 00

AGREEMENT

THIS AGREEMENT, made and entered into this _____ day of _____, 2020 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:

Phase 1 North-South Water Transmission Main Harper Road

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 completed and ready for final payment within ***425 Calendar*** days after commencement date fixed in the Notice to Proceed.

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 two years 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	Contractor
By:_____	By:_____
[Corporate Seal]	[Corporate Seal]
Attest:_____	Attest:_____
Address for giving notices:	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

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NOTICE TO PROCEED

Date: _____

To: _____

_____

_____

Project:

Phase 1 North – South Water Transmission Main Harper Road

You are hereby notified to commence work in accordance with the Agreement dated on or before _____, and you are to complete the work within 425 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: _____

END OF SECTION

Section 00 61 13.13

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:

Phase 1 North-South Water Transmission Main Harper Road

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 two (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

Section 00 61 13.16

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:

Phase 1 North-South Water Transmission Main Harper Road

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

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

Section 00 61 33

CONTRACT CHANGE ORDER

CHANGE ORDER NO:_____

PROJECT: Phase 1 North-South Water Transmission Main Harper Road

DATE OF ISSUANCE: _____

DESCRIPTION OF CHANGE:

_____

_____

_____

CONTRACT AMOUNT		CONTRACT TIME (Calendar Days)	
Original	$ _____	Original Durations	___ Days
Previous Change Orders (Add/Deduct)	$ _____	Previous Change Order (Add/Deduct)	___ Days
This Change Order (Add/Deduct)	$ _____	This Change Order (Add/Deduct)	___ Days
Revised Contract Amount	$ _____	Revised Contract Time	___ Days
REVISED CONTRACT COMPLETION DATE IS:			

OWNER	CONTRACTOR	ENGINEER

Attest

Section 00 62 16

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	_____	_____

Types of Coverage	Forms of Coverage	Minimum Limits of Liability
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

Section 00 62 76

APPLICATION FOR PAYMENT

APPLICATION FOR PAYMENT No. _____

Date: _____ Contractor: _____

Project: Phase 1 North-South Water Transmission Main Harper Road

Project 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. _____	**4.** _____	**7.** _____	**10.** _____
2. _____	**5.** _____	**8.** _____	**11.** _____
3. _____	**6.** _____	**9.** _____	**12.** _____

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:_____

Signed By:_____

Date: _____

Notarized:_____ (affix seal)

My Commision Expires: _____

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: _____

Section 00 63 49

WORK CHANGE DIRECTIVE FORM

WORK CHANGE DIRECTIVE FORM INSTRUCTIONS

A. GENERAL INFORMATION

This document was developed for use in situations involving changes in the Work which, if not processed expeditiously, might delay the Project. These changes are often initiated in the field and may affect the Contract Price or the Contract Times. This is not a Change Order, but only a directive to proceed with Work that may be included in a subsequent Change Order. Contract Price and Contract Times may only be changed by Change Order signed by Owner and Contractor.

For supplemental instructions and minor changes not involving a change in the Contract Price or the Contract Times, a Field Order should be used.

B. COMPLETING THE WORK CHANGE DIRECTIVE FORM

If requested by Owner, Engineer initiates the form, including a description of the items involved and attachments.

Based on conversations among Owner, Engineer and Contractor; Engineer completes the following:

> METHOD OF DETERMINING CHANGE, IF ANY, IN CONTRACT PRICE: Mark the method to be used in determining the final cost of Work involved and the estimated net effect on the Contract Price. If the change involves an increase in the Contract Price and the estimated amount is approached before the additional or changed Work is completed, another Work Change Directive must be issued to change the estimated price or Contractor may stop the changed Work when the estimated cost is reached. If the Work Change Directive is not likely to change the Contract Price, the space for estimated increase (decrease) should be marked "Not Applicable".

Once Engineer has completed development of the form, all copies should be sent to Owner for authorization and execution. (Engineer has no authority to authorize changes that may affect Price or Times.) Once authorized by Owner, a copy should be sent to Engineer and to Contractor.

Paragraph 11.07.A.1 of the General Conditions requires that a Change Order be initiated and executed to cover any undisputed sum or amount of time for Work actually performed pursuant to this Work Change Directive.

Once the Work covered by such directive is completed or final cost and times are determined, Contractor should submit documentation for inclusion in a Change Order.

THIS IS A DIRECTIVE TO PROCEED WITH A CHANGE THAT MAY AFFECT THE CONTRACT PRICE OR CONTRACT TIMES. A CHANGE ORDER SHOULD BE CONSIDERED PROMPTLY.

WORK CHANGE DIRECTIVE

No. _____

DATE OF ISSUANCE _____ EFFECTIVE DATE_____

Owner: _____

Contractor: _____

Contract:_____

Project: _____

Owner's Contract No.: _____ Contract Name: _____

Contractor is directed to proceed promptly with the following change(s):
Description:

Attachments: *[List documents supporting change]*

Purpose for Work Change Directive:
Directive to proceed promptly with the Work described herein, prior to agreeing to changes in Contract Price and Contract Times, is issued due to:

- ☐ Non-Agreement on pricing of proposed change.
- ☐ Necessity to proceed for schedule or other Project reasons.

_____

Estimated Change in Contract Price and Contract Times (non-binding, preliminary):

Estimated increase (decrease) in Contract Price:

$ _____.

If the change involves an increase, the estimated amount is not to be exceeded without further authorization.

Estimated increase (decrease) in Contract Times:
Substantial Completion:_____ days; Ready for final payment: _____ days.

Basis of estimated change in Contract Price:

☐ Unit Price
☐ Lump Sum
☐ Cost of the Work
☐ Other

AUTHORIZED BY:

_____
Owner (Authorized Signature)

Title:_____

Date:_____

END OF SECTION

Section 00 65 19

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 ***Phase 1 North-South Water Transmission Main Harper Road*** 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: _____

END OF SECTION

Section 00 72 00

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. O*WNER* - 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 bureaus, laboratories, or agencies approved by the OWNER. The cost of such inspection and testing shall be paid by the CONTRACTOR. The CONTRACTOR shall furnish evidence satisfactory to the OWNER 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 two years 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, it’s 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 15 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

EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

CERTIFICATE OF SUBSTANTIAL COMPLETION

Owner:	York County, South Carolina	Owner's Contract No.:	19298
Contractor:		Contractor's Project No.:	
Engineer:	Black & Veatch International Company	Engineer's Project No.:	
Project:	Phase 1 N-S Water Transmission Main – Harper Road	Contract Name:	

This [preliminary] [final] Certificate of Substantial Completion applies to:

☐ All Work ☐ The following specified portions of the Work:

Date of Substantial Completion

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor, and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Work or portion thereof designated above is hereby established, subject to the provisions of the Contract pertaining to Substantial Completion. The date of Substantial Completion in the final Certificate of Substantial Completion marks the commencement of the contractual correction period and applicable warranties required by the Contract.

A punch list of items to be completed or corrected is attached to this Certificate. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract.

The responsibilities between Owner and Contractor for security, operation, safety, maintenance, heat, utilities, insurance, and warranties upon Owner's use or occupancy of the Work shall be as provided in the Contract, except as amended as follows: *[Note: Amendments of contractual responsibilities recorded in this Certificate should be the product of mutual agreement of Owner and Contractor; see General Conditions.]*

Amendments to Owner's responsibilities: ☐ None ☐ As follows

Amendments to Contractor's responsibilities: ☐ None ☐ As follows:

The following documents are attached to and made a part of this Certificate: *[punch list; others]*

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents, nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract.

EXECUTED BY ENGINEER:	RECEIVED:	RECEIVED:
By: _____ (Authorized signature)	By: _____ Owner (Authorized Signature)	By: _____ Contractor (Authorized Signature)
Title: _____	Title: _____	Title: _____
Date: _____	Date: _____	Date: _____

NOTICE OF ACCEPTABILITY OF WORK

PROJECT: Phase 1 North-South Water Transmission Main – Harper Road

OWNER: York County, South Carolina

CONTRACTOR:

OWNER'S CONSTRUCTION CONTRACT IDENTIFICATION:

EFFECTIVE DATE OF THE CONSTRUCTION CONTRACT:

ENGINEER: Black & Veatch International Company

NOTICE DATE:

To: _____
Owner

And To: _____
Contractor

From: _____
Engineer

The Engineer hereby gives notice to the above Owner and Contractor that Engineer has recommended final payment of Contractor, and that the Work furnished and performed by Contractor under the above Construction Contract is acceptable, expressly subject to the provisions of the related Contract Documents, the Agreement between Owner and Engineer for Professional Services dated _____, and the following terms and conditions of this Notice:

CONDITIONS OF NOTICE OF ACCEPTABILITY OF WORK

The Notice of Acceptability of Work ("Notice") is expressly made subject to the following terms and conditions to which all those who receive said Notice and rely thereon agree:

1. This Notice is given with the skill and care ordinarily used by members of the engineering profession practicing under similar conditions at the same time and in the same locality.

2. This Notice reflects and is an expression of the Engineer's professional opinion.

3. This Notice is given as to the best of Engineer's knowledge, information, and belief as of the Notice Date.

4. This Notice is based entirely on and expressly limited by the scope of services Engineer has been employed by Owner to perform or furnish during construction of the Project (including observation of the Contractor's work) under Engineer's Agreement with Owner, and applies only to facts that are within Engineer's knowledge or could reasonably have been ascertained by Engineer as a result of carrying out the responsibilities specifically assigned to Engineer under such Agreement.

5. This Notice is not a guarantee or warranty of Contractor's performance under the Construction Contract, an acceptance of Work that is not in accordance with the related Contract Documents, including but not limited to defective Work discovered after final inspection, nor an assumption of responsibility for any failure of Contractor to furnish and perform the Work thereunder in accordance with the Construction Contract Documents, or to otherwise comply with the Construction Contract Documents or the terms of any special guarantees specified therein.

6. This Notice does not relieve Contractor of any surviving obligations under the Construction Contract, and is subject to Owner's reservations of rights with respect to completion and final payment.

7.

By: _____

Title: _____

Dated: _____

Section 01 11 13

PROJECT REQUIREMENTS

1. GENERAL DESCRIPTION OF WORK. The Work to be performed under these Contract Documents is generally described as follows:

The construction of 15,100 linear feet of 20-inch transmission main from the existing 18-inch water main at Old York Rd with the route following Harper and Parham Roads, and approximately 2,900 linear feet of 8-inch water main along Campbell Road connecting to the existing water main.

2. OFFSITE STORAGE. Offsite storage arrangements shall be approved by Owner for all materials and equipment not incorporated into the Work but included in Applications for Payment. Such offsite storage arrangements shall be presented in writing and shall afford adequate and satisfactory security and protection. Offsite storage facilities shall be accessible to Owner and Engineer.

3. SUBSTITUTES AND "OR-EQUAL" ITEMS. Whenever a material or article is specified or described by using the name of a proprietary product or the name of a particular manufacturer or vendor, the specified item shall be understood as establishing the type, function, and quality desired. Requests for review of equivalency will not be accepted from anyone except Contractor, and such requests will not be considered until after the Contract has been awarded. Other manufacturers' products may be accepted, provided sufficient information is submitted to allow Engineer to determine that the products proposed are equivalent to those named. Such items shall be submitted for review by the procedure set forth in the Submittals Procedures section.

4. PREPARATION FOR SHIPMENT. All materials shall be suitably packaged to facilitate handling and protect against damage during transit and storage. Painted surfaces shall be protected against impact, abrasion, discoloration, and other damage. All painted surfaces which are damaged prior to acceptance of equipment shall be repainted to the satisfaction of Engineer.

Each item, package, or bundle of material shall be tagged or marked as identified in the delivery schedule or on the Shop Drawings. Complete packing lists and bills of material shall be included with each shipment.

5. EASEMENTS AND RIGHTS-OF-WAY. The easements and rights-of-way for the pipelines will be provided by Owner. Contractor shall confine its construction operations within the limits indicated on the Drawings. Contractor shall use due care in placing construction tools, equipment, excavated materials, and pipeline materials and supplies in order to avoid damage to property and interference with traffic.

5.01. On Private Property. Easements across private property are indicated on the Drawings. Contractor shall set stakes to mark the boundaries of construction easements across private property. The stakes shall be protected and maintained until completion of construction and cleanup.

5.02. Work Within Highway and Railroad Rights-of-Way. Permits shall be obtained by Owner. All Work performed and all operations of Contractor, its employees, or Subcontractors within the limits of railroad and highway rights-of-way shall be in conformity with the requirements and be under the control (through Owner) of the railroad or highway authority owning, or having jurisdiction over and control of, the right-of-way in each case.

6. LINES AND GRADES. All Work shall be done to the lines, grades, and elevations indicated on the Drawings.

Basic horizontal and vertical control points will be established or designated by Engineer to be used as datums for the Work. All additional survey, layout, and measurement work shall be performed by Contractor as a part of the Work.

Contractor shall provide an experienced instrument person, competent assistants, and such instruments, tools, stakes, and other materials required to complete the survey, layout, and measurement work. In addition, Contractor shall furnish, without charge, competent persons and such tools, stakes, and other materials as Engineer may require in establishing or designating control points, in establishing construction easement boundaries, or in checking survey, layout, and measurement work performed by Contractor.

Contractor shall keep Engineer informed, a reasonable time in advance, of the times and places at which it wishes to do Work, so that horizontal and vertical control points may be established and any checking deemed necessary by Engineer may be done with minimum inconvenience to Engineer and minimum delay to Contractor.

Contractor shall remove and reconstruct work which is improperly located.

7. CONNECTIONS TO EXISTING FACILITIES. Unless otherwise specified or indicated, Contractor shall make all necessary connections to existing facilities, including structures, drain lines, and utilities such as water, sewer, gas, telephone, and electric. In each case, Contractor shall receive permission from Owner or the owning utility prior to undertaking connections. Contractor shall protect facilities against deleterious substances and damage.

Connections to existing facilities which are in service shall be thoroughly planned in advance, and all required equipment, materials, and labor shall be on hand at the time of undertaking the connections. Work shall proceed continuously (around the clock) if necessary to complete connections in the minimum time. Operation of valves or other

appurtenances on existing utilities, when required, shall be by or under the direct supervision of the owning utility.

8. UNFAVORABLE CONSTRUCTION CONDITIONS. During unfavorable weather, wet ground, or other unsuitable construction conditions, Contractor shall confine its operations to work which will not be affected adversely by such conditions. No portion of the Work shall be constructed under conditions which would affect adversely the quality or efficiency thereof, unless special means or precautions are taken by Contractor to perform the Work in a proper and satisfactory manner.

9. CUTTING AND PATCHING. As provided in General Conditions, Contractor shall perform all cutting and patching required for the Work and as may be necessary in connection with uncovering Work for inspection or for the correction of defective Work.

Contractor shall provide all shoring, bracing, supports, and protective devices necessary to safeguard all Work during cutting and patching operations. Contractor shall not undertake any cutting or demolition which may affect the structural stability of the Work without Engineer's concurrence.

Materials shall be cut and removed to the extent indicated on the Drawings or as required to complete the Work. Materials shall be removed in a careful manner, with no damage to adjacent facilities or materials. Materials which are not salvable shall be removed from the site by Contractor.

All Work and existing facilities affected by cutting operations shall be restored with new materials, or with salvaged materials acceptable to Engineer, to obtain a finished installation with the strength, appearance, and functional capacity required. If necessary, entire surfaces shall be patched and refinished.

10. HAZARDOUS ENVIRONMENTAL CONDITIONS AT SITE. No Hazardous Environmental Conditions at the Site in areas that will be affected by the Work are known to the Owner.

11. CLEANING UP. Contractor shall keep the premises free at all times from accumulations of waste materials and rubbish. Contractor shall provide adequate trash receptacles about the Site and shall promptly empty the containers when filled.

Construction materials, such as concrete forms and scaffolding, shall be neatly stacked by Contractor when not in use. Contractor shall promptly remove splattered concrete, asphalt, oil, paint, corrosive liquids, and cleaning solutions from surfaces to prevent marring or other damage.

Volatile wastes shall be properly stored in covered metal containers and removed daily.

Wastes shall not be buried or burned on the Site or disposed of into storm drains, sanitary sewers, streams, or waterways. All wastes shall be removed from the Site and disposed of in a manner complying with local ordinances and antipollution laws.

Adequate cleanup will be a condition for recommendation of progress payment applications.

12. APPLICABLE CODES. References in the Contract Documents to local codes mean the following:

- South Carolina Department Health and Environmental Control (SCDHEC) Drinking Water Regulations
- South Carolina Department Health and Environmental Control (SCDHEC) Erosion and Sediment Control standards
- South Carolina Department of Transportation (SCDOT) Standard Specifications
- South Carolina Department of Transportation (SCDOT) Utilities Accommodation Manual
- York County Standard Specifications and Details
- York County Stormwater Management and Sediment Control Ordinance
- South Carolina Occupational Safety and Health Administration (OSHA) Standards

Other standard codes which apply to the Work are designated in the Specifications.

13. REFERENCE STANDARDS. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to the laws or regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard specification, manual, code, or laws or regulations in effect at the time of opening of Bids (or on the effective date of the Contract or Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents. However, no provision of any referenced standard, specification, manual, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees from those set forth in the Contract Documents, nor shall any such provision or instruction be effective to assign to Owner, Engineer, or any of Engineer's Consultants, agents, or employees, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

14. PRECONSTRUCTION CONFERENCE. Prior to the commencement of Work at the Site, a preconstruction conference will be held at a mutually agreed time and place. The conference shall be attended by:

Contractor and its superintendent.

Principal Subcontractors.

Representatives of principal Suppliers and manufacturers as appropriate.

Engineer and its Resident Project Representative.

Representatives of Owner.

Government representatives as appropriate.

Others as requested by Contractor, Owner, or Engineer.

Unless previously submitted to Engineer, Contractor shall bring to the conference a preliminary schedule for each of the following:

Progress Schedule.

Procurement schedule.

Schedule of Shop Drawings and other submittals.

The purpose of the conference is to designate responsible personnel and establish a working relationship. Matters requiring coordination will be discussed and procedures for handling such matters established. The agenda will include:

Contractor's preliminary schedules.

Transmittal, review, and distribution of Contractor's submittals.

Processing Applications for Payment.

Maintaining record documents.

Critical Work sequencing.

Field decisions and Change Orders.

Use of premises, office and storage areas, security, housekeeping, and Owner's needs.

Major equipment deliveries and priorities.

Contractor's assignments for safety and first aid.

Engineer will preside at the conference and will arrange for keeping the minutes and distributing the minutes to all persons in attendance.

15. PROGRESS MEETINGS. Contractor shall schedule and hold regular progress meetings at least monthly and at other times as requested by Engineer or required by progress of the Work. Contractor, Engineer, and all Subcontractors active on the Site shall be represented at each meeting. Contractor may at its discretion request attendance by representatives of its Suppliers, manufacturers, and other Subcontractors.

Contractor shall preside at the meetings. Meeting minutes shall be prepared and distributed by Engineer . The purpose of the meetings will be to review the progress of the Work, maintain coordination of efforts, discuss changes in scheduling, and resolve other problems which may develop.

16. PERMITS. Contractor shall comply with all permits and encroachment agreements obtained by the Contractor and Owner. The following permits have been submitted, approved, and shall be displayed at the jobsite. The supporting documents are on the following pages:

US Army Corps of Engineers Nationwide Permit

SCDHEC Water Quality Certification

SCDHEC ATC Permit

SCDHEC NPDES Permit & CSWPPP

SCDOT Encroachment Permit

York Co. Soil & Water Conservation District Board Approval Minutes

Norfolk Southern Railroad Encroachment

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, CHARLESTON DISTRICT
69A HAGOOD AVENUE
CHARLESTON, SC 29403-5107

August 14, 2023

Regulatory Division

Ms. Lisa Hagood
York County Government
6 South Congress St
York, South Carolina 29745
lisa.hagood@yorkcountygov.com

Dear Ms. Hagood:

This is in response to a Pre-Construction Notification (PCN) (SAC-2019-01862) received on February 10, 2023, and considered complete on July 20, 2023. In submitting the PCN, you requested verification the proposed project is authorized by a Department of the Army (DA) Nationwide Permit (NWP).

The work affecting waters of the United States is part of an overall project known as Harper Road Water Main, to place temporary fill material and to excavate and place backfill material in two tributaries to construct coffer dams with by-pass pumps to facilitate construction in dry conditions and to construct a water main to provide safe and sanitary drinking water service to homes and businesses and to provide reinforcement and dependability to the York County water system. The activities in waters of the United States include constructing a water main line under two tributaries of 30 linear feet each with a total temporary discharge of dirt/topsoil material of 100 cubic yards. The project involves impacts to not more than .014 acre of waters of the United States. Specifically, this letter authorizes impacts of .008 acres and .006 acres, totaling .014 acre of tributary impacts. Located within portions of 26 TMS tracts and SCDOT right of way near Harper Road in York County, South Carolina (Latitude: 35.01734 °, Longitude: -81.13815°). The PCN also includes the following supplemental information:

a. Drawing sheets 1-5 titled “PERMITTED PLANS" and dated July 20,2023.

b. A mitigation plan/statement comprised of avoidance and minimization as described in the project narrative.

c. A delineation of wetlands, other special aquatic sites, and other waters.

Based on a review of the PCN, including the supplemental information indicated above, the Corps has determined the proposed activity will result in minimal individual and cumulative adverse environmental effects and is not contrary to the public interest.

Furthermore, the activity meets the terms and conditions of NWP 58 Utility Line Activities for Water and Other Substances.

For this authorization to remain valid, the project must comply with the enclosed NWP General Conditions, Charleston District Regional Conditions, and the following special conditions:

a. **That impacts to aquatic areas do not exceed those specified in the above mentioned PCN, including any supplemental information or revised permit drawings that were submitted to the Corps by the permittee.**

b. **That the construction, use, and maintenance of the authorized activity is in accordance with the information given in the PCN, including the supplemental information listed above, and is subject to any conditions or restrictions imposed by this letter.**

c. **That the permittee shall submit the attached signed compliance certification to the Corps within 30 days following completion of the authorized work.**

This verification is valid until March 14, 2026, unless the district engineer modifies, suspends, or revokes the NWP authorization in accordance with 33 CFR 330.5(d). If prior to this date, the NWP authorization is reissued without modification or the activity complies with any subsequent modification of the NWP authorization, the verification continues to remain valid until March 14, 2026. If you commence, or are under contract to commence this activity before the NWP expires, or the NWP is modified, suspended, or revoked by the Chief of Engineers or division engineer in accordance with 33 CFR 330.5(b) or (c), respectively, in such a way that the activity would no longer comply with the terms and conditions of the NWP, you will have 12 months after the date the NWP expires or is modified, suspended, or revoked, to complete the activity under the present terms and conditions of this NWP.

This NWP is verified based on information you provided. It is your responsibility to read the attached NWP(s) along with the General, Regional, and Special Conditions before you begin work. If you determine your project will not be able to meet the NWP and the conditions, you must contact the Corps before you proceed. Enclosed you will also find a copy of the Section 401 Water Quality Certification. If you have questions concerning compliance with the conditions of the 401 certification, you should contact the South Carolina Department of Health and Environmental Control (SCDHEC).

In all future correspondence, please refer to file number SAC-2019-01862. A copy of this letter is forwarded to State and/or Federal agencies for their information. If you have any questions, please contact Rebecca Downey, Project Manager, at 803-253-3444, or by email at Rebecca.m.Downey@usace.army.mil.

Sincerely,

Laura Boos
Team Leader, Northwest Branch

Attachments
Permit Drawings
NWP 58 Utility Line Activities for Water and Other Substances
Nationwide Permit General Conditions
Nationwide Permit Regional Condition
401 Water Quality Certification
Compliance Certification Form

Copies Furnished:

Mr.Thomas Ballou
Ballou Associates
6326 Saint Andrews Road
Columbia , South Carolina 29212
tballou@usit.net

SC DHEC - Bureau of Water
2600 Bull Street
Columbia, South Carolina 29201
WQCWetlands@dhec.sc.gov

May 16, 2023

Ms. Lisa Hagood
York County Government
6 South Congress Street
York, South Carolina 29745
Lisa.Hagood@yorkcountygov.com

Re: 401 Certification for Authorization Pursuant to Nationwide Permit 58 (Utility Line Activities for Water and Other Substances)

Applicant Permit ID No.: SAC 2019-01862

Applicant: York County Government

County: York

Project: Harper Road Water Main

Dear Ms. Hagood:

On September 15, 2020, the U.S. Army Corps of Engineers (Corps) issued a proposed rule in the Federal Register (85 FR 57298) that announced the reissuance of all the existing NWPs and the proposal to issue five new NWPs. In response to the September 15th proposed rule, the South Carolina Department of Health and Environmental Control (Department) initiated actions to certify the proposed NWPs and on December 14, 2020, the Department issued a final certification in accordance with Section 401 of the Federal Clean Water Act (CWA), as amended, and a certification of consistency with the Coastal Zone Management Act (48-39-10 et.seq.).

On January 13, 2021, the Corps published a final rule in the Federal Register (86 FR 2744). In this notice, the Corps announced that it was reissuing only 12 of the existing NWPs and four new NWPs.

On March 8, 2021, the Corps' Charleston District issued their Final Regional Conditions for the 16 NWPs. In that notice, the Charleston District denied the Section 401 Water Quality Certification (401 Certification) for NWP 12, 29, 39, 44, 57 and 58 as well as the Coastal Zone Consistency (CZC) for NWPs 12, 29, 39, 42, 44, 51, 57 and 58. Subsequently, on February 7, 2022 the Corps' Charleston District denied the WQCs for NWP 14, 23, and 46. As a result, the Department is proposing to revise the

Individual State Certification for the NWPs that were denied by the Corps Regional conditions to include NWP 14, 23, and 46.

On September 16, 2022, a General State Certification to authorize activities in accordance with S.C. Code Ann. §§ 48-1-10 et seq. and S.C. Code Ann. Regulation 61-101, and S.C. Code Ann. § 48-39-10 et seq. and the S.C. Coastal Zone Management Program document was issued by the South Carolina Department of Health and Environmental Control (DHEC or the Department) for the Nationwide Permits (NWPs) 12, 14, 23, 29, 39, 44, 46, 57, and 58.

The Department has reviewed the above-reference project in accordance with the September 16, 2022 general certification and, provided the applicant adheres to the certification conditions outlined in the attached document, the Department has determined that there is a reasonable assurance that the work authorized will be conducted in a manner consistent with the certification requirements of Section 401 of the Clean Water Act.

If any questions arise please contact me at (803) 898-4179 or amedeemd@dhec.sc.gov.

Sincerely,

Morgan Amedee

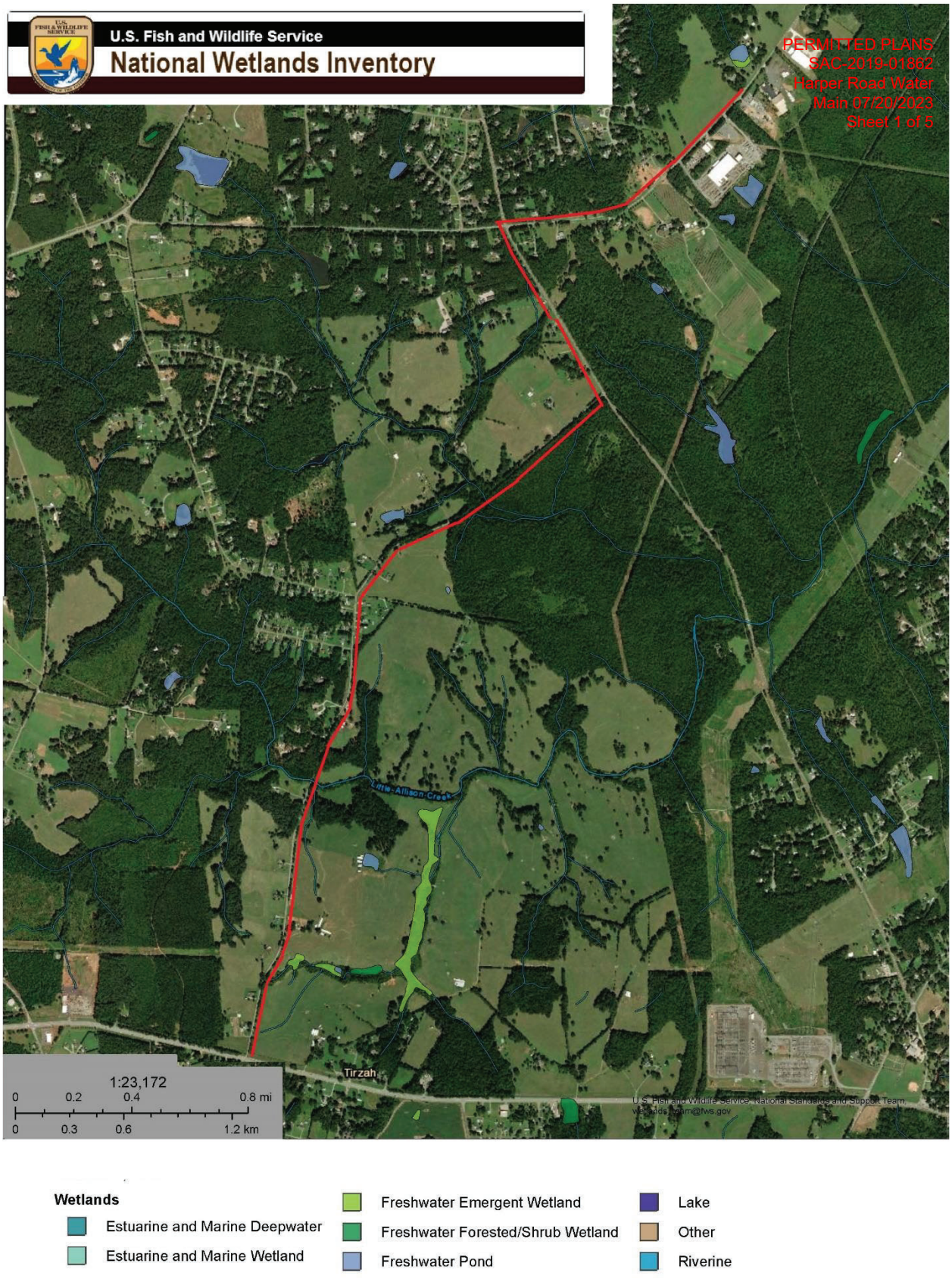
Morgan D. Amedee
Water Quality Certification and Wetlands Section

cc: USACE Columbia Regulatory Office
Mr. Thomas G. Ballou

Nationwide Permit Number 58: Utility Line Activities of Water and Other Substances

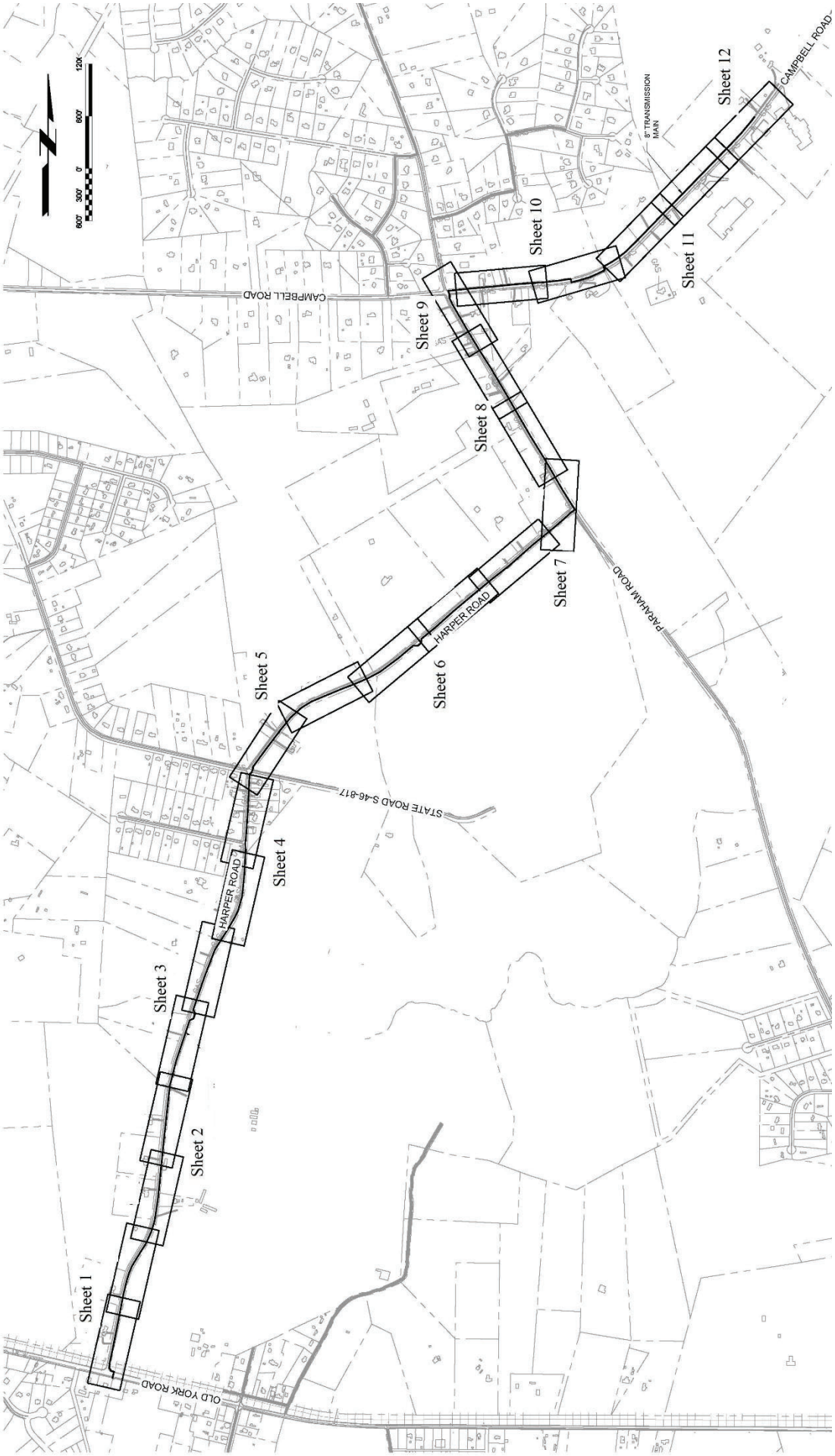
Proposed Conditions for the 401 Water Quality Certification:

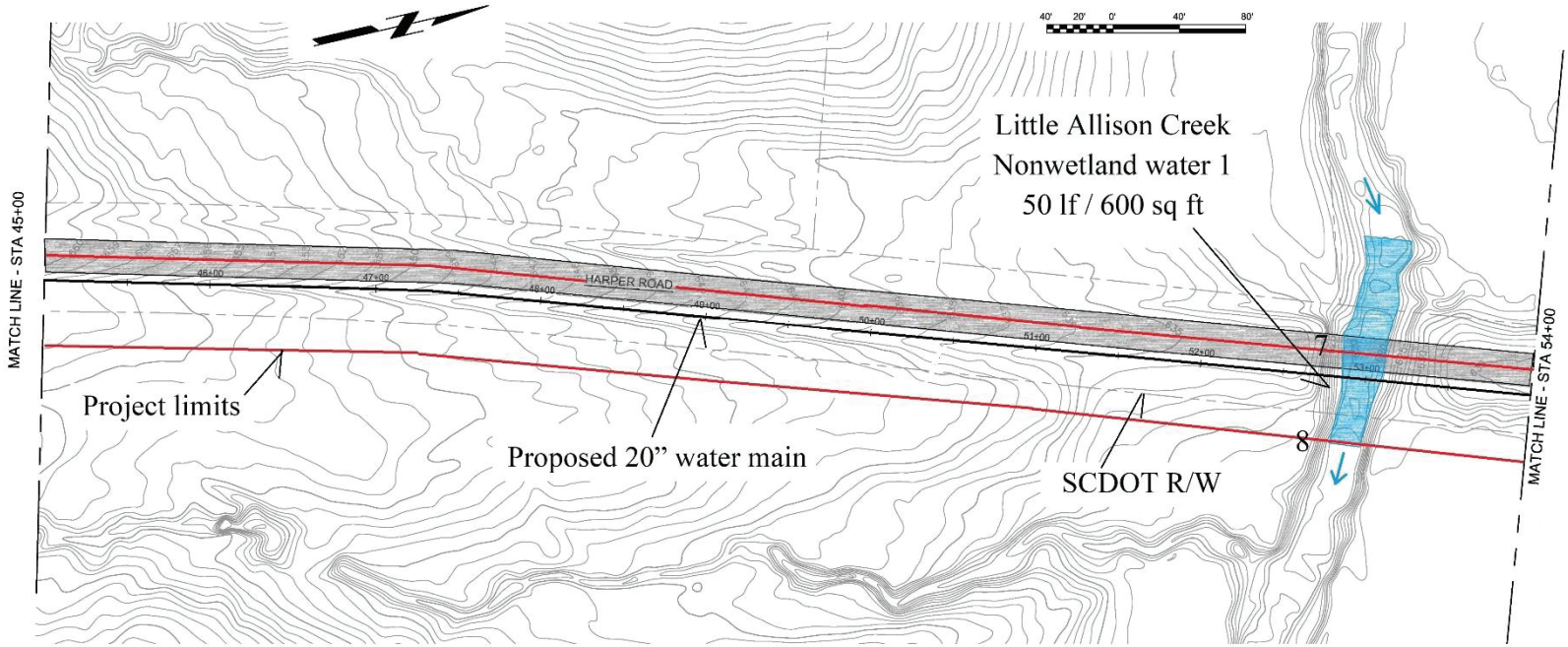
1. This NWP is not certified for pipelines with more than 10 aquatic site crossings (not including directionally bored crossings).
2. This NWP is not certified for activities located in or adjacent to (as determined by SCDHEC) waters defined (as per Regulation 61-68) as Outstanding National Resource Waters (ONRW), Outstanding Resource Waters (ORW), Trout Waters or, SCDNR designated State Scenic Rivers.
3. This NWP is not certified or activities that cause the loss of more than 300 linear feet of stream bed.

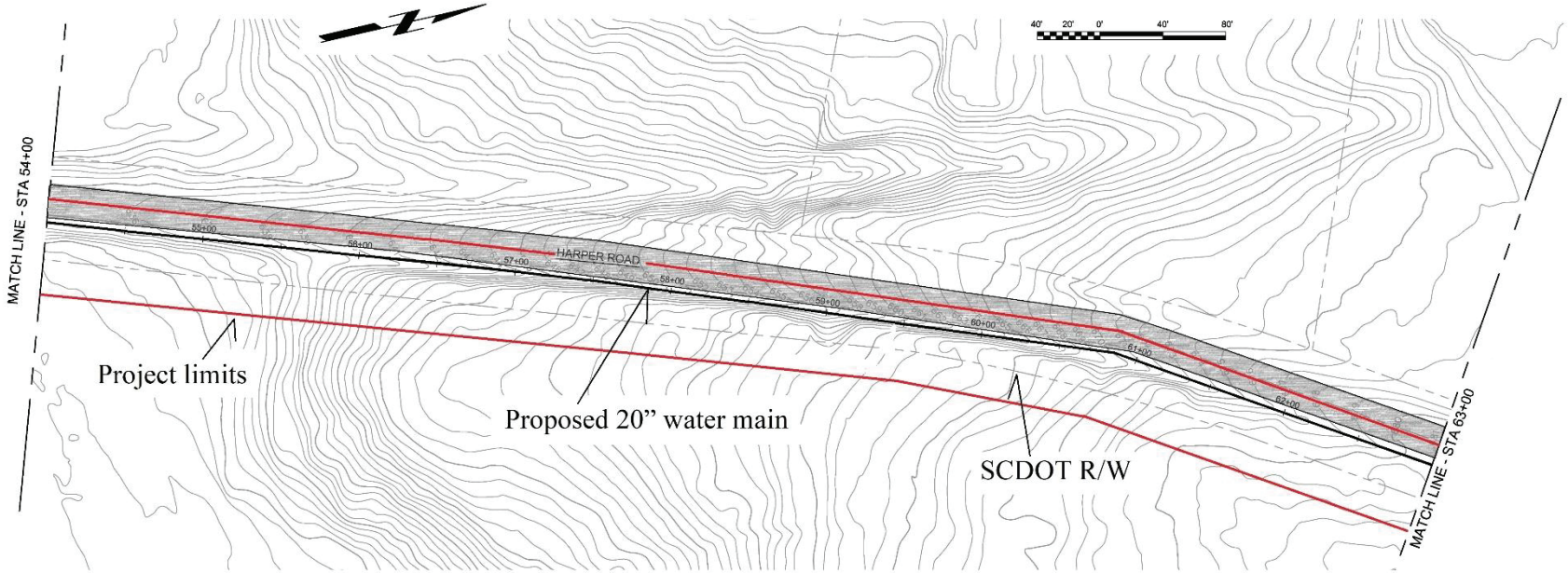


National Wetland Inventory map showing the alignment of the Harper Road Water Main project.

PERMITTED PLANS
SAC-2019-01862
Harper Road Water
Main 07/20/2023
Sheet 2 of 5







Sheet 3

PERMITTED PLANS
SAC-2019-01862
Harper Road Water
Main 07/20/2023
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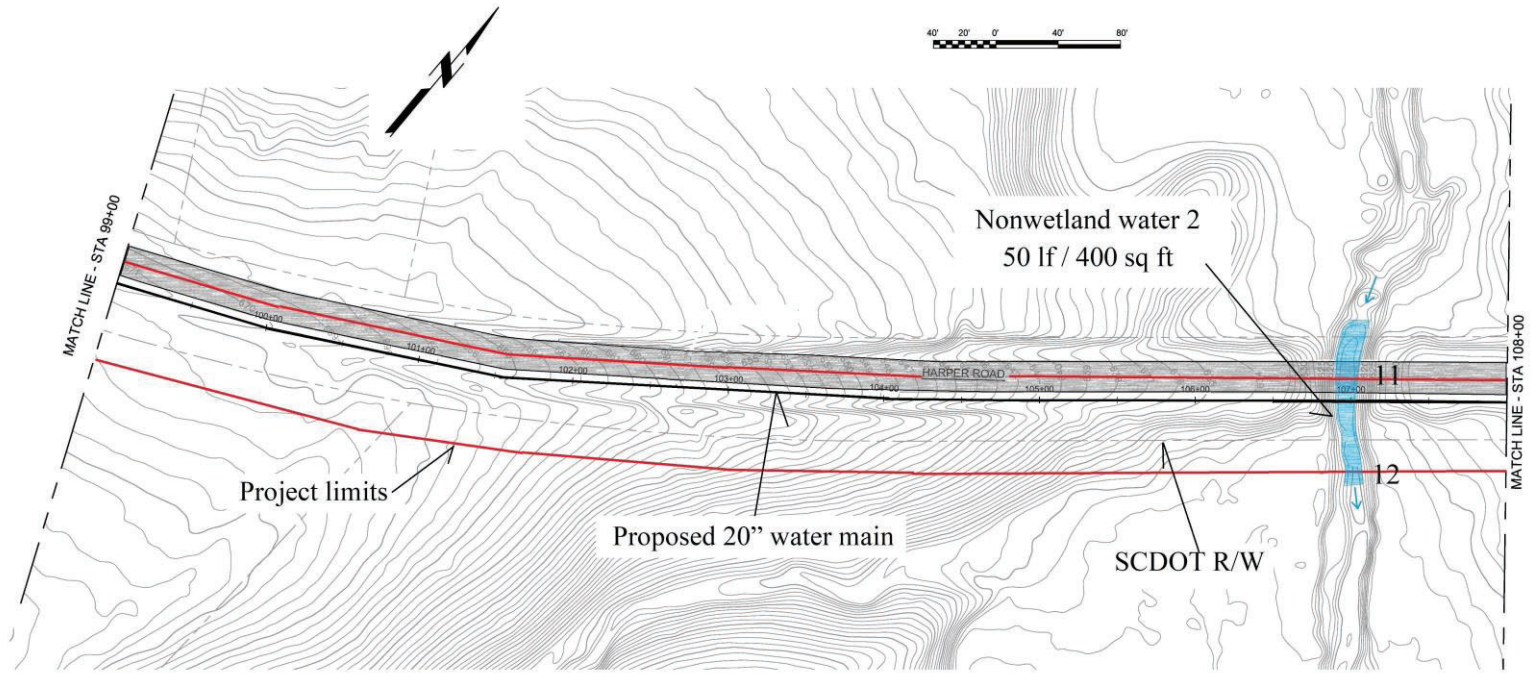
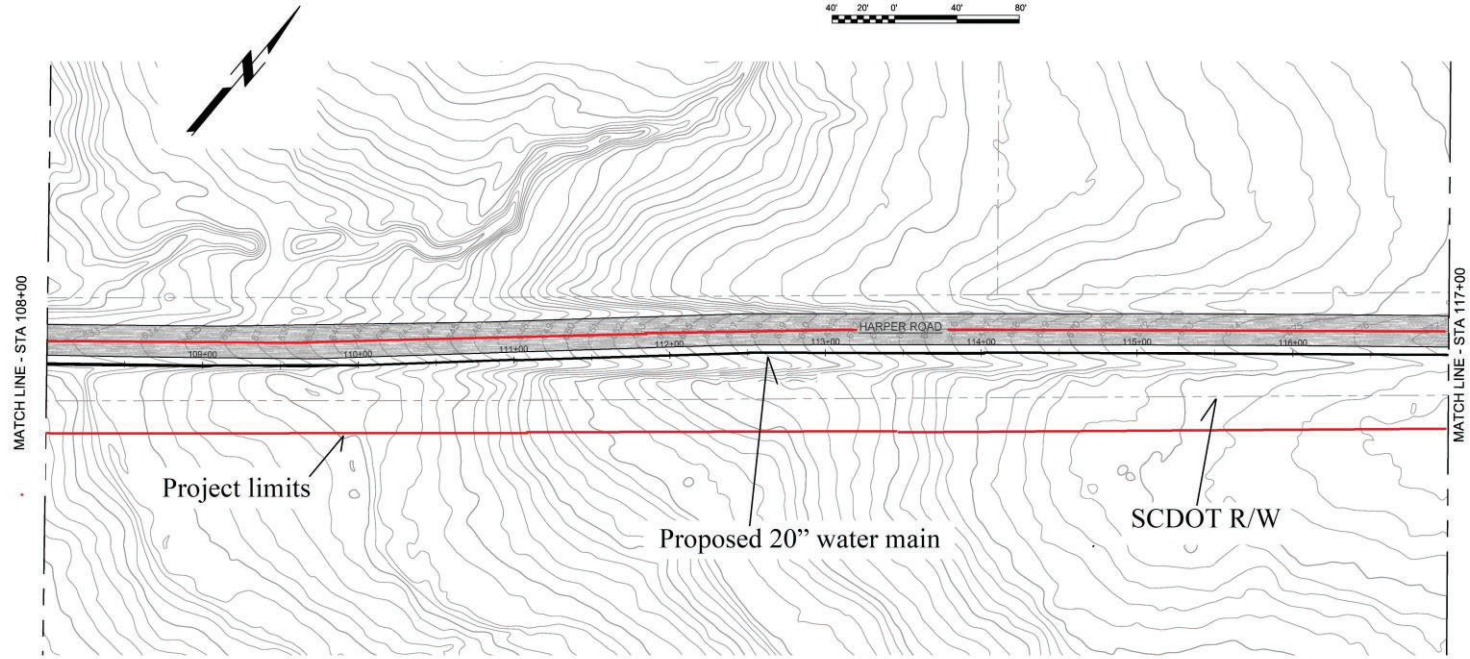
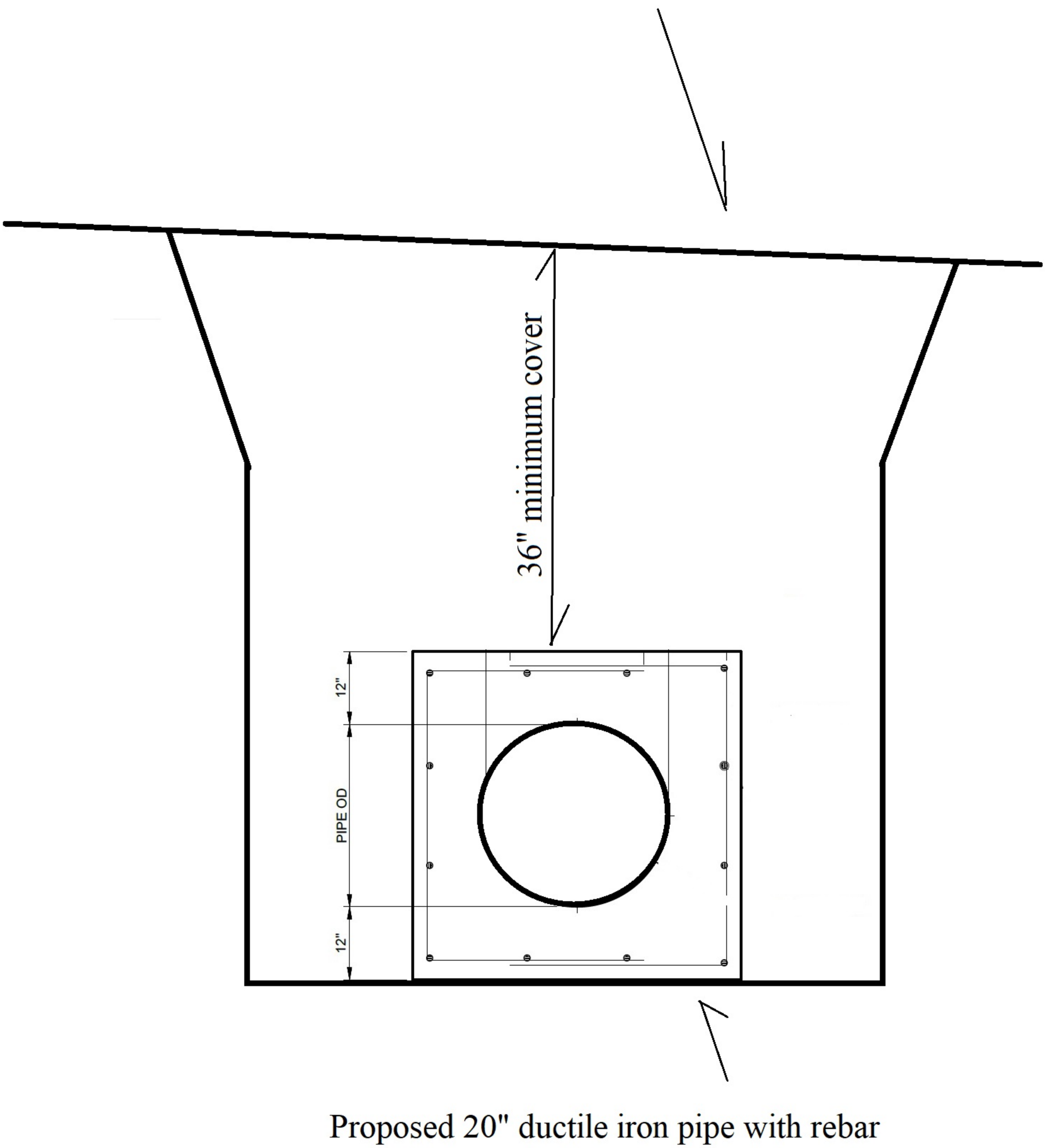




Existing and proposed grade of stream bed



Proposed 20" ductile iron pipe with rebar reinforced 3000 psi concrete encasement

Nationwide Permit General Conditions

Note: To qualify for NWP authorization, the prospective permittee must comply with the following general conditions, as applicable, in addition to any regional or case-specific conditions imposed by the division engineer or district engineer. Prospective permittees should contact the appropriate Corps district office to determine if regional conditions have been imposed on an NWP. Prospective permittees should also contact the appropriate Corps district office to determine the status of Clean Water Act Section 401 water quality certification and/or Coastal Zone Management Act consistency for an NWP. Every person who may wish to obtain permit authorization under one or more NWPs, or who is currently relying on an existing or prior permit authorization under one or more NWPs, has been and is on notice that all of the provisions of 33 CFR 330.1 through 330.6 apply to every NWP authorization. Note especially 33 CFR 330.5 relating to the modification, suspension, or revocation of any NWP authorization.

1. Navigation. (a) No activity may cause more than a minimal adverse effect on navigation.

(b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States.

(c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his or her authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

2. Aquatic Life Movements. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species. If a bottomless culvert cannot be used, then the crossing should be designed and constructed to minimize adverse effects to aquatic life movements.

3. Spawning Areas. Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

4. Migratory Bird Breeding Areas. Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

5. Shellfish Beds. No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48, or is a shellfish seeding or habitat restoration activity authorized by NWP 27.

6. Suitable Material. No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see section 307 of the Clean Water Act).

7. Water Supply Intakes. No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

8. Adverse Effects From Impoundments. If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

9. Management of Water Flows. To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization, storm water management activities, and temporary and permanent road crossings, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

10. Fills Within 100-Year Floodplains. The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

11. Equipment. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

12. Soil Erosion and Sediment Controls. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow, or during low tides.

13. Removal of Temporary Structures and Fills. Temporary structures must be removed, to the maximum extent practicable, after their use has been discontinued.

Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

14. Proper Maintenance. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable NWP general conditions, as well as any activity-specific conditions added by the district engineer to an NWP authorization.

15. Single and Complete Project. The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

16. Wild and Scenic Rivers. (a) No NWP activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status.

(b) If a proposed NWP activity will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, the permittee must submit a pre-construction notification (see general condition 32). The district engineer will coordinate the PCN with the Federal agency with direct management responsibility for that river. Permittees shall not begin the NWP activity until notified by the district engineer that the Federal agency with direct management responsibility for that river has determined in writing that the proposed NWP activity will not adversely affect the Wild and Scenic River designation or study status.

(c) Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency responsible for the designated Wild and Scenic River or study river (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service). Information on these rivers is also available at: http://www.rivers.gov/.

17. Tribal Rights. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

18. Endangered Species. (a) No activity is authorized under any NWP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify designated critical habitat or critical habitat proposed for such designation. No activity is authorized under any NWP which "may affect" a listed species or critical habitat, unless ESA section 7 consultation addressing the consequences of the proposed activity on listed species or critical habitat has been completed. See 50 CFR

402.02 for the definition of “effects of the action” for the purposes of ESA section 7 consultation, as well as 50 CFR 402.17, which provides further explanation under ESA section 7 regarding “activities that are reasonably certain to occur” and “consequences caused by the proposed action.”

(b) Federal agencies should follow their own procedures for complying with the requirements of the ESA (see 33 CFR 330.4(f)(1)). If pre-construction notification is required for the proposed activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation has not been submitted, additional ESA section 7 consultation may be necessary for the activity and the respective federal agency would be responsible for fulfilling its obligation under section 7 of the ESA.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if any listed species (or species proposed for listing) or designated critical habitat (or critical habitat proposed such designation) might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat or critical habitat proposed for such designation, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species (or species proposed for listing) or designated critical habitat (or critical habitat proposed for such designation), the pre-construction notification must include the name(s) of the endangered or threatened species (or species proposed for listing) that might be affected by the proposed activity or that utilize the designated critical habitat (or critical habitat proposed for such designation) that might be affected by the proposed activity. The district engineer will determine whether the proposed activity “may affect” or will have “no effect” to listed species and designated critical habitat and will notify the non-Federal applicant of the Corps’ determination within 45 days of receipt of a complete pre-construction notification. For activities where the non-Federal applicant has identified listed species (or species proposed for listing) or designated critical habitat (or critical habitat proposed for such designation) that might be affected or is in the vicinity of the activity, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification that the proposed activity will have “no effect” on listed species (or species proposed for listing or designated critical habitat (or critical habitat proposed for such designation), or until ESA section 7 consultation or conference has been completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(d) As a result of formal or informal consultation or conference with the FWS or NMFS the district engineer may add species-specific permit conditions to the NWPs.

(e) Authorization of an activity by an NWP does not authorize the “take” of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with “incidental take”

provisions, etc.) from the FWS or the NMFS, the Endangered Species Act prohibits any person subject to the jurisdiction of the United States to take a listed species, where "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The word “harm” in the definition of “take" means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

(f) If the non-federal permittee has a valid ESA section 10(a)(1)(B) incidental take permit with an approved Habitat Conservation Plan for a project or a group of projects that includes the proposed NWP activity, the non-federal applicant should provide a copy of that ESA section 10(a)(1)(B) permit with the PCN required by paragraph (c) of this general condition. The district engineer will coordinate with the agency that issued the ESA section 10(a)(1)(B) permit to determine whether the proposed NWP activity and the associated incidental take were considered in the internal ESA section 7 consultation conducted for the ESA section 10(a)(1)(B) permit. If that coordination results in concurrence from the agency that the proposed NWP activity and the associated incidental take were considered in the internal ESA section 7 consultation for the ESA section 10(a)(1)(B) permit, the district engineer does not need to conduct a separate ESA section 7 consultation for the proposed NWP activity. The district engineer will notify the non-federal applicant within 45 days of receipt of a complete pre-construction notification whether the ESA section 10(a)(1)(B) permit covers the proposed NWP activity or whether additional ESA section 7 consultation is required.

(g) Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the FWS and NMFS or their world wide web pages at http://www.fws.gov/ or http://www.fws.gov/ipac and http://www.nmfs.noaa.gov/pr/species/esa/ respectively.

19. Migratory Birds and Bald and Golden Eagles. The permittee is responsible for ensuring that an action authorized by an NWP complies with the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. The permittee is responsible for contacting the appropriate local office of the U.S. Fish and Wildlife Service to determine what measures, if any, are necessary or appropriate to reduce adverse effects to migratory birds or eagles, including whether "incidental take" permits are necessary and available under the Migratory Bird Treaty Act or Bald and Golden Eagle Protection Act for a particular activity.

20. Historic Properties. (a) No activity is authorized under any NWP which may have the potential to cause effects to properties listed, or eligible for listing, in the National Register of Historic Places until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.

(b) Federal permittees should follow their own procedures for complying with the requirements of section 106 of the National Historic Preservation Act (see 33 CFR

330.4(g)(1)). If pre-construction notification is required for the proposed NWP activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation is not submitted, then additional consultation under section 106 may be necessary. The respective federal agency is responsible for fulfilling its obligation to comply with section 106.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if the NWP activity might have the potential to cause effects to any historic properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the pre-construction notification must state which historic properties might have the potential to be affected by the proposed NWP activity or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of, or potential for, the presence of historic properties can be sought from the State Historic Preservation Officer, Tribal Historic Preservation Officer, or designated tribal representative, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). When reviewing pre-construction notifications, district engineers will comply with the current procedures for addressing the requirements of section 106 of the National Historic Preservation Act. The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts commensurate with potential impacts, which may include background research, consultation, oral history interviews, sample field investigation, and/or field survey. Based on the information submitted in the PCN and these identification efforts, the district engineer shall determine whether the proposed NWP activity has the potential to cause effects on the historic properties. Section 106 consultation is not required when the district engineer determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR 800.3(a)). Section 106 consultation is required when the district engineer determines that the activity has the potential to cause effects on historic properties. The district engineer will conduct consultation with consulting parties identified under 36 CFR 800.2(c) when he or she makes any of the following effect determinations for the purposes of section 106 of the NHPA: no historic properties affected, no adverse effect, or adverse effect.

(d) Where the non-Federal applicant has identified historic properties on which the proposed NWP activity might have the potential to cause effects and has so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects to historic properties or that NHPA section 106 consultation has been completed. For non-federal permittees, the district engineer will notify the prospective permittee within 45 days of receipt of a complete pre-construction notification whether NHPA section 106 consultation is required. If NHPA section 106 consultation is required, the district engineer will notify the non-Federal applicant that he or she cannot begin the activity until section 106

consultation is completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(e) Prospective permittees should be aware that section 110k of the NHPA (54 U.S.C. 306113) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

21. Discovery of Previously Unknown Remains and Artifacts. Permittees that discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by an NWP, they must immediately notify the district engineer of what they have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal, and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

22. Designated Critical Resource Waters. Critical resource waters include, NOAA-managed marine sanctuaries and marine monuments, and National Estuarine Research Reserves. The district engineer may designate, after notice and opportunity for public comment, additional waters officially designated by a state as having particular environmental or ecological significance, such as outstanding national resource waters or state natural heritage sites. The district engineer may also designate additional critical resource waters after notice and opportunity for public comment.

(a) Discharges of dredged or fill material into waters of the United States are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, 50, 51, 52, 57 and 58 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters.

(b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, 38, and 54, notification is required in accordance with general condition 32, for any activity proposed by permittees in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWPs only

after she or he determines that the impacts to the critical resource waters will be no more than minimal.

23. Mitigation. The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal:

(a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site).

(b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating for resource losses) will be required to the extent necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal.

(c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10-acre and require pre-construction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse environmental effects of the proposed activity are no more than minimal, and provides an activity-specific waiver of this requirement. For wetland losses of 1/10-acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in only minimal adverse environmental effects.

(d) Compensatory mitigation at a minimum one-for-one ratio will be required for all losses of stream bed that exceed 3/100-acre and require pre-construction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse environmental effects of the proposed activity are no more than minimal, and provides an activity-specific waiver of this requirement. This compensatory mitigation requirement may be satisfied through the restoration or enhancement of riparian areas next to streams in accordance with paragraph (e) of this general condition. For losses of stream bed of 3/100-acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in only minimal adverse environmental effects. Compensatory mitigation for losses of streams should be provided, if practicable, through stream rehabilitation, enhancement, or preservation, since streams are difficult-to-replace resources (see 33 CFR 332.3(e)(3)).

(e) Compensatory mitigation plans for NWP activities in or near streams or other open waters will normally include a requirement for the restoration or enhancement, maintenance, and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, the restoration or maintenance/protection of riparian areas may be the only compensatory mitigation required. If restoring riparian areas involves planting vegetation, only native species should be planted. The width of the

required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. If it is not possible to restore or maintain/protect a riparian area on both sides of a stream, or if the waterbody is a lake or coastal waters, then restoring or maintaining/protecting a riparian area along a single bank or shoreline may be sufficient. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of minimization or compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses.

(f) Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of 33 CFR part 332.

(1) The prospective permittee is responsible for proposing an appropriate compensatory mitigation option if compensatory mitigation is necessary to ensure that the activity results in no more than minimal adverse environmental effects. For the NWPs, the preferred mechanism for providing compensatory mitigation is mitigation bank credits or in-lieu fee program credits (see 33 CFR 332.3(b)(2) and (3)). However, if an appropriate number and type of mitigation bank or in-lieu credits are not available at the time the PCN is submitted to the district engineer, the district engineer may approve the use of permittee-responsible mitigation.

(2) The amount of compensatory mitigation required by the district engineer must be sufficient to ensure that the authorized activity results in no more than minimal individual and cumulative adverse environmental effects (see 33 CFR 330.1(e)(3)). (See also 33 CFR 332.3(f).)

(3) Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, aquatic resource restoration should be the first compensatory mitigation option considered for permittee-responsible mitigation.

(4) If permittee-responsible mitigation is the proposed option, the prospective permittee is responsible for submitting a mitigation plan. A conceptual or detailed mitigation plan may be used by the district engineer to make the decision on the NWP verification request, but a final mitigation plan that addresses the applicable requirements of 33 CFR 332.4(c)(2) through (14) must be approved by the district engineer before the permittee begins work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation (see 33 CFR 332.3(k)(3)). If permittee-responsible mitigation is the proposed option, and the proposed compensatory mitigation site is located on land in which another federal agency holds an easement, the district engineer will coordinate with that federal agency

to determine if proposed compensatory mitigation project is compatible with the terms of the easement.

(5) If mitigation bank or in-lieu fee program credits are the proposed option, the mitigation plan needs to address only the baseline conditions at the impact site and the number of credits to be provided (see 33 CFR 332.4(c)(1)(ii)).

(6) Compensatory mitigation requirements (e.g., resource type and amount to be provided as compensatory mitigation, site protection, ecological performance standards, monitoring requirements) may be addressed through conditions added to the NWP authorization, instead of components of a compensatory mitigation plan (see 33 CFR 332.4(c)(1)(ii)).

(g) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWPs. For example, if an NWP has an acreage limit of 1/2-acre, it cannot be used to authorize any NWP activity resulting in the loss of greater than 1/2-acre of waters of the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to ensure that an NWP activity already meeting the established acreage limits also satisfies the no more than minimal impact requirement for the NWPs.

(h) Permittees may propose the use of mitigation banks, in-lieu fee programs, or permittee-responsible mitigation. When developing a compensatory mitigation proposal, the permittee must consider appropriate and practicable options consistent with the framework at 33 CFR 332.3(b). For activities resulting in the loss of marine or estuarine resources, permittee-responsible mitigation may be environmentally preferable if there are no mitigation banks or in-lieu fee programs in the area that have marine or estuarine credits available for sale or transfer to the permittee. For permittee-responsible mitigation, the special conditions of the NWP verification must clearly indicate the party or parties responsible for the implementation and performance of the compensatory mitigation project, and, if required, its long-term management.

(i) Where certain functions and services of waters of the United States are permanently adversely affected by a regulated activity, such as discharges of dredged or fill material into waters of the United States that will convert a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse environmental effects of the activity to the no more than minimal level.

24. Safety of Impoundment Structures. To ensure that all impoundment structures are safely designed, the district engineer may require non-Federal applicants to demonstrate that the structures comply with established state or federal, dam safety criteria or have been designed by qualified persons. The district engineer may also require documentation that the design has been independently reviewed by similarly qualified persons, and appropriate modifications made to ensure safety.

25. Water Quality. (a) Where the certifying authority (state, authorized tribe, or EPA, as appropriate) has not previously certified compliance of an NWP with CWA section 401, a CWA section 401 water quality certification for the proposed discharge must be obtained or waived (see 33 CFR 330.4(c)). If the permittee cannot comply with all of the conditions of a water quality certification previously issued by certifying authority for the issuance of the NWP, then the permittee must obtain a water quality certification or waiver for the proposed discharge in order for the activity to be authorized by an NWP.

(b) If the NWP activity requires pre-construction notification and the certifying authority has not previously certified compliance of an NWP with CWA section 401, the proposed discharge is not authorized by an NWP until water quality certification is obtained or waived. If the certifying authority issues a water quality certification for the proposed discharge, the permittee must submit a copy of the certification to the district engineer. The discharge is not authorized by an NWP until the district engineer has notified the permittee that the water quality certification requirement has been satisfied by the issuance of a water quality certification or a waiver.

(c) The district engineer or certifying authority may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

26. Coastal Zone Management. In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). If the permittee cannot comply with all of the conditions of a coastal zone management consistency concurrence previously issued by the state, then the permittee must obtain an individual coastal zone management consistency concurrence or presumption of concurrence in order for the activity to be authorized by an NWP. The district engineer or a state may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

27. Regional and Case-By-Case Conditions. The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its CWA section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

28. Use of Multiple Nationwide Permits. The use of more than one NWP for a single and complete project is authorized, subject to the following restrictions:

(a) If only one of the NWPs used to authorize the single and complete project has a specified acreage limit, the acreage loss of waters of the United States cannot exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank

stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1⁄3-acre.

(b) If one or more of the NWPs used to authorize the single and complete project has specified acreage limits, the acreage loss of waters of the United States authorized by those NWPs cannot exceed their respective specified acreage limits. For example, if a commercial development is constructed under NWP 39, and the single and complete project includes the filling of an upland ditch authorized by NWP 46, the maximum acreage loss of waters of the United States for the commercial development under NWP 39 cannot exceed 1/2-acre, and the total acreage loss of waters of United States due to the NWP 39 and 46 activities cannot exceed 1 acre.

29. Transfer of Nationwide Permit Verifications. If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature:

"When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below."

_____
(Transferee)

_____
(Date)

30. Compliance Certification. Each permittee who receives an NWP verification letter from the Corps must provide a signed certification documenting completion of the authorized activity and implementation of any required compensatory mitigation. The success of any required permittee-responsible mitigation, including the achievement of ecological performance standards, will be addressed separately by the district engineer. The Corps will provide the permittee the certification document with the NWP verification letter. The certification document will include:

(a) A statement that the authorized activity was done in accordance with the NWP authorization, including any general, regional, or activity-specific conditions;

(b) A statement that the implementation of any required compensatory mitigation was completed in accordance with the permit conditions. If credits from a mitigation bank or in-lieu fee program are used to satisfy the compensatory mitigation requirements, the certification must include the documentation required by 33 CFR 332.3(l)(3) to confirm that the permittee secured the appropriate number and resource type of credits; and

(c) The signature of the permittee certifying the completion of the activity and mitigation.

The completed certification document must be submitted to the district engineer within 30 days of completion of the authorized activity or the implementation of any required compensatory mitigation, whichever occurs later.

31. Activities Affecting Structures or Works Built by the United States. If an NWP activity also requires review by, or permission from, the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers (USACE) federally authorized Civil Works project (a "USACE project"), the prospective permittee must submit a pre-construction notification. See paragraph (b)(10) of general condition 32. An activity that requires section 408 permission and/or review is not authorized by an NWP until the appropriate Corps office issues the section 408 permission or completes its review to alter, occupy, or use the USACE project, and the district engineer issues a written NWP verification.

32. Pre-Construction Notification. (a) *Timing*. Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, if the PCN is determined to be incomplete, notify the prospective permittee within that 30 day period to request the additional information necessary to make the PCN complete. The request must specify the information needed to make the PCN complete. As a general rule, district engineers will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity until either:

(1) He or she is notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or

(2) 45 calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 18 that listed species or critical habitat might be affected or are in the vicinity of the activity, or to notify the Corps pursuant to general condition 20 that the activity might have the potential to cause effects to historic properties, the permittee

cannot begin the activity until receiving written notification from the Corps that there is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or section 106 of the National Historic Preservation Act (see 33 CFR 330.4(g)) has been completed. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee may not begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) *Contents of Pre-Construction Notification*: The PCN must be in writing and include the following information:

(1) Name, address and telephone numbers of the prospective permittee;

(2) Location of the proposed activity;

(3) Identify the specific NWP or NWP(s) the prospective permittee wants to use to authorize the proposed activity;

(4) (i) A description of the proposed activity; the activity's purpose; direct and indirect adverse environmental effects the activity would cause, including the anticipated amount of loss of wetlands, other special aquatic sites, and other waters expected to result from the NWP activity, in acres, linear feet, or other appropriate unit of measure; a description of any proposed mitigation measures intended to reduce the adverse environmental effects caused by the proposed activity; and any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity, including other separate and distant crossings for linear projects that require Department of the Army authorization but do not require pre-construction notification. The description of the proposed activity and any proposed mitigation measures should be sufficiently detailed to allow the district engineer to determine that the adverse environmental effects of the activity will be no more than minimal and to determine the need for compensatory mitigation or other mitigation measures.

(ii) For linear projects where one or more single and complete crossings require pre-construction notification, the PCN must include the quantity of anticipated losses of wetlands, other special aquatic sites, and other waters for each single and complete crossing of those wetlands, other special aquatic sites, and other waters (including those single and complete crossings authorized by an NWP but do not require PCNs). This information will be used by the district engineer to evaluate the cumulative adverse environmental effects of the proposed linear project, and does not change those non-PCN NWP activities into NWP PCNs.

(iii) Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the activity and when provided results in a quicker decision. Sketches should contain sufficient detail to provide an illustrative description of the proposed activity (e.g., a conceptual plan), but do not need to be detailed engineering plans);

(5) The PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial and intermittent streams, on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters on the project site, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many wetlands, other special aquatic sites, and other waters. Furthermore, the 45-day period will not start until the delineation has been submitted to or completed by the Corps, as appropriate;

(6) If the proposed activity will result in the loss of greater than 1/10-acre of wetlands or 3/100-acre of stream bed and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied, or explaining why the adverse environmental effects are no more than minimal and why compensatory mitigation should not be required. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan.

(7) For non-federal permittees, if any listed species (or species proposed for listing) or designated critical habitat (or critical habitat proposed for such designation) might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat (or critical habitat proposed for such designation), the PCN must include the name(s) of those endangered or threatened species (or species proposed for listing) that might be affected by the proposed activity or utilize the designated critical habitat (or critical habitat proposed for such designation) that might be affected by the proposed activity. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with the Endangered Species Act;

(8) For non-federal permittees, if the NWP activity might have the potential to cause effects to a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, the PCN must state which historic property might have the potential to be affected by the proposed activity or include a vicinity map indicating the location of the historic property. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with section 106 of the National Historic Preservation Act;

(9) For an activity that will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a “study river” for possible

inclusion in the system while the river is in an official study status, the PCN must identify the Wild and Scenic River or the "study river" (see general condition 16); and

(10) For an NWP activity that requires permission from, or review by, the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers federally authorized civil works project, the pre-construction notification must include a statement confirming that the project proponent has submitted a written request for section 408 permission from, or review by, the Corps office having jurisdiction over that USACE project.

(c) *Form of Pre-Construction Notification*: The nationwide permit pre-construction notification form (Form ENG 6082) should be used for NWP PCNs. A letter containing the required information may also be used. Applicants may provide electronic files of PCNs and supporting materials if the district engineer has established tools and procedures for electronic submittals.

(d) *Agency Coordination*: (1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the activity's adverse environmental effects so that they are no more than minimal.

(2) Agency coordination is required for: (i) all NWP activities that require pre-construction notification and result in the loss of greater than 1/2-acre of waters of the United States; (ii) NWP 13 activities in excess of 500 linear feet, fills greater than one cubic yard per running foot, or involve discharges of dredged or fill material into special aquatic sites; and (iii) NWP 54 activities in excess of 500 linear feet, or that extend into the waterbody more than 30 feet from the mean low water line in tidal waters or the ordinary high water mark in the Great Lakes.

(3) When agency coordination is required, the district engineer will immediately provide (e.g., via e-mail, facsimile transmission, overnight mail, or other expeditious manner) a copy of the complete PCN to the appropriate Federal or state offices (FWS, state natural resource or water quality agency, EPA, and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will have 10 calendar days from the date the material is transmitted to notify the district engineer via telephone, facsimile transmission, or e-mail that they intend to provide substantive, site-specific comments. The comments must explain why the agency believes the adverse environmental effects will be more than minimal. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the pre-construction notification. The district engineer will fully consider agency comments received within the specified time frame concerning the proposed activity's compliance with the terms and conditions of the NWPs, including the need for mitigation to ensure that the net adverse environmental effects of the proposed activity are no more than minimal. The district engineer will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each pre-construction notification that the resource agencies' concerns were

considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5.

(4) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act.

(5) Applicants are encouraged to provide the Corps with either electronic files or multiple copies of pre-construction notifications to expedite agency coordination.

District Engineer's Decision

1. In reviewing the PCN for the proposed activity, the district engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. If a project proponent requests authorization by a specific NWP, the district engineer should issue the NWP verification for that activity if it meets the terms and conditions of that NWP, unless he or she determines, after considering mitigation, that the proposed activity will result in more than minimal individual and cumulative adverse effects on the aquatic environment and other aspects of the public interest and exercises discretionary authority to require an individual permit for the proposed activity. For a linear project, this determination will include an evaluation of the single and complete crossings of waters of the United States that require PCNs to determine whether they individually satisfy the terms and conditions of the NWP(s), as well as the cumulative effects caused by all of the crossings of waters of the United States authorized by an NWP. If an applicant requests a waiver of an applicable limit, as provided for in NWPs 13, 36, or 54, the district engineer will only grant the waiver upon a written determination that the NWP activity will result in only minimal individual and cumulative adverse environmental effects.

2. When making minimal adverse environmental effects determinations the district engineer will consider the direct and indirect effects caused by the NWP activity. He or she will also consider the cumulative adverse environmental effects caused by activities authorized by an NWP and whether those cumulative adverse environmental effects are no more than minimal. The district engineer will also consider site specific factors, such as the environmental setting in the vicinity of the NWP activity, the type of resource that will be affected by the NWP activity, the functions provided by the aquatic resources that will be affected by the NWP activity, the degree or magnitude to which the aquatic resources perform those functions, the extent that aquatic resource functions will be lost as a result of the NWP activity (e.g., partial or complete loss), the duration of the adverse effects (temporary or permanent), the importance of the aquatic resource

functions to the region (e.g., watershed or ecoregion), and mitigation required by the district engineer. If an appropriate functional or condition assessment method is available and practicable to use, that assessment method may be used by the district engineer to assist in the minimal adverse environmental effects determination. The district engineer may add case-specific special conditions to the NWP authorization to address site-specific environmental concerns.

3. If the proposed activity requires a PCN and will result in a loss of greater than 1/10-acre of wetlands or 3/100-acre of stream bed, the prospective permittee should submit a mitigation proposal with the PCN. Applicants may also propose compensatory mitigation for NWP activities with smaller impacts, or for impacts to other types of waters. The district engineer will consider any proposed compensatory mitigation or other mitigation measures the applicant has included in the proposal in determining whether the net adverse environmental effects of the proposed activity are no more than minimal. The compensatory mitigation proposal may be either conceptual or detailed. If the district engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse environmental effects are no more than minimal, after considering mitigation, the district engineer will notify the permittee and include any activity-specific conditions in the NWP verification the district engineer deems necessary. Conditions for compensatory mitigation requirements must comply with the appropriate provisions at 33 CFR 332.3(k). The district engineer must approve the final mitigation plan before the permittee commences work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the district engineer will expeditiously review the proposed compensatory mitigation plan. The district engineer must review the proposed compensatory mitigation plan within 45 calendar days of receiving a complete PCN and determine whether the proposed mitigation would ensure that the NWP activity results in no more than minimal adverse environmental effects. If the net adverse environmental effects of the NWP activity (after consideration of the mitigation proposal) are determined by the district engineer to be no more than minimal, the district engineer will provide a timely written response to the applicant. The response will state that the NWP activity can proceed under the terms and conditions of the NWP, including any activity-specific conditions added to the NWP authorization by the district engineer.

4. If the district engineer determines that the adverse environmental effects of the proposed activity are more than minimal, then the district engineer will notify the applicant either: (a) that the activity does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (b) that the activity is authorized under the NWP subject to the applicant’s submission of a mitigation plan that would reduce the adverse environmental effects so that they are no more than minimal; or (c) that the activity is authorized under the NWP with specific modifications or conditions. Where the district engineer determines that mitigation is required to ensure no more than minimal adverse environmental effects, the activity will be authorized within the 45-day PCN period (unless additional time is

required to comply with general conditions 18, 20, and/or 31), with activity-specific conditions that state the mitigation requirements. The authorization will include the necessary conceptual or detailed mitigation plan or a requirement that the applicant submit a mitigation plan that would reduce the adverse environmental effects so that they are no more than minimal. When compensatory mitigation is required, no work in waters of the United States may occur until the district engineer has approved a specific mitigation plan or has determined that prior approval of a final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation.

Further Information

1. District engineers have authority to determine if an activity complies with the terms and conditions of an NWP.

2. NWPs do not obviate the need to obtain other federal, state, or local permits, approvals, or authorizations required by law.

3. NWPs do not grant any property rights or exclusive privileges.

4. NWPs do not authorize any injury to the property or rights of others.

5. NWPs do not authorize interference with any existing or proposed Federal project (see general condition 31).

Nationwide Permit Definitions

Best management practices (BMPs): Policies, practices, procedures, or structures implemented to mitigate the adverse environmental effects on surface water quality resulting from development. BMPs are categorized as structural or non-structural.

Compensatory mitigation: The restoration (re-establishment or rehabilitation), establishment (creation), enhancement, and/or in certain circumstances preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.

Currently serviceable: Useable as is or with some maintenance, but not so degraded as to essentially require reconstruction.

Direct effects: Effects that are caused by the activity and occur at the same time and place.

Discharge: The term “discharge” means any discharge of dredged or fill material into waters of the United States.

Ecological reference: A model used to plan and design an aquatic habitat and riparian area restoration, enhancement, or establishment activity under NWP 27. An ecological reference may be based on the structure, functions, and dynamics of an aquatic habitat type or a riparian area type that currently exists in the region where the proposed NWP 27 activity is located. Alternatively, an ecological reference may be based on a conceptual model for the aquatic habitat type or riparian area type to be restored, enhanced, or established as a result of the proposed NWP 27 activity. An ecological reference takes into account the range of variation of the aquatic habitat type or riparian area type in the region.

Enhancement: The manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but may also lead to a decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area.

Establishment (creation): The manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Establishment results in a gain in aquatic resource area.

High Tide Line: The line of intersection of the land with the water's surface at the maximum height reached by a rising tide. The high tide line may be determined, in the absence of actual data, by a line of oil or scum along shore objects, a more or less continuous deposit of fine shell or debris on the foreshore or berm, other physical markings or characteristics, vegetation lines, tidal gages, or other suitable means that delineate the general height reached by a rising tide. The line encompasses spring high tides and other high tides that occur with periodic frequency but does not include storm surges in which there is a departure from the normal or predicted reach of the tide due to the piling up of water against a coast by strong winds such as those accompanying a hurricane or other intense storm.

Historic Property: Any prehistoric or historic district, site (including archaeological site), building, structure, or other object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria (36 CFR part 60).

Independent utility: A test to determine what constitutes a single and complete non-linear project in the Corps Regulatory Program. A project is considered to have independent utility if it would be constructed absent the construction of other projects in the project area. Portions of a multi-phase project that depend upon other phases of the project do not have independent utility. Phases of a project that would be constructed even if the other phases were not built can be considered as separate single and complete projects with independent utility.

Indirect effects: Effects that are caused by the activity and are later in time or farther removed in distance, but are still reasonably foreseeable.

Loss of waters of the United States: Waters of the United States that are permanently adversely affected by filling, flooding, excavation, or drainage because of the regulated activity. The loss of stream bed includes the acres of stream bed that are permanently adversely affected by filling or excavation because of the regulated activity. Permanent adverse effects include permanent discharges of dredged or fill material that change an aquatic area to dry land, increase the bottom elevation of a waterbody, or change the use of a waterbody. The acreage of loss of waters of the United States is a threshold measurement of the impact to jurisdictional waters or wetlands for determining whether a project may qualify for an NWP; it is not a net threshold that is calculated after considering compensatory mitigation that may be used to offset losses of aquatic functions and services. Waters of the United States temporarily filled, flooded, excavated, or drained, but restored to pre-construction contours and elevations after construction, are not included in the measurement of loss of waters of the United States. Impacts resulting from activities that do not require Department of the Army authorization, such as activities eligible for exemptions under section 404(f) of the Clean Water Act, are not considered when calculating the loss of waters of the United States.

Navigable waters: Waters subject to section 10 of the Rivers and Harbors Act of 1899. These waters are defined at 33 CFR part 329.

Non-tidal wetland: A non-tidal wetland is a wetland that is not subject to the ebb and flow of tidal waters. Non-tidal wetlands contiguous to tidal waters are located landward of the high tide line (i.e., spring high tide line).

Open water: For purposes of the NWPs, an open water is any area that in a year with normal patterns of precipitation has water flowing or standing above ground to the extent that an ordinary high water mark can be determined. Aquatic vegetation within the area of flowing or standing water is either non-emergent, sparse, or absent. Vegetated shallows are considered to be open waters. Examples of “open waters” include rivers, streams, lakes, and ponds.

Ordinary High Water Mark: The term ordinary high water mark means that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

Perennial stream: A perennial stream has surface water flowing continuously year-round during a typical year.

Practicable: Available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.

Pre-construction notification: A request submitted by the project proponent to the Corps for confirmation that a particular activity is authorized by nationwide permit. The request may be a permit application, letter, or similar document that includes information about the proposed work and its anticipated environmental effects. Pre-construction notification may be required by the terms and conditions of a nationwide permit, or by regional conditions. A pre-construction notification may be voluntarily submitted in cases where pre-construction notification is not required and the project proponent wants confirmation that the activity is authorized by nationwide permit.

Preservation: The removal of a threat to, or preventing the decline of, aquatic resources by an action in or near those aquatic resources. This term includes activities commonly associated with the protection and maintenance of aquatic resources through the implementation of appropriate legal and physical mechanisms. Preservation does not result in a gain of aquatic resource area or functions.

Re-establishment: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and functions.

Rehabilitation: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area.

Restoration: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. For the purpose of tracking net gains in aquatic resource area, restoration is divided into two categories: re-establishment and rehabilitation.

Riffle and pool complex: Riffle and pool complexes are special aquatic sites under the 404(b)(1) Guidelines. Riffle and pool complexes sometimes characterize steep gradient sections of streams. Such stream sections are recognizable by their hydraulic characteristics. The rapid movement of water over a course substrate in riffles results in a rough flow, a turbulent surface, and high dissolved oxygen levels in the water. Pools are deeper areas associated with riffles. A slower stream velocity, a streaming flow, a smooth surface, and a finer substrate characterize pools.

Riparian areas: Riparian areas are lands next to streams, lakes, and estuarine-marine shorelines. Riparian areas are transitional between terrestrial and aquatic ecosystems, through which surface and subsurface hydrology connects riverine, lacustrine, estuarine, and marine waters with their adjacent wetlands, non-wetland waters, or uplands. Riparian areas provide a variety of ecological functions and services and help improve or maintain local water quality. (See general condition 23.)

Shellfish seeding: The placement of shellfish seed and/or suitable substrate to increase shellfish production. Shellfish seed consists of immature individual shellfish or individual shellfish attached to shells or shell fragments (i.e., spat on shell). Suitable substrate may consist of shellfish shells, shell fragments, or other appropriate materials placed into waters for shellfish habitat.

Single and complete linear project: A linear project is a project constructed for the purpose of getting people, goods, or services from a point of origin to a terminal point, which often involves multiple crossings of one or more waterbodies at separate and distant locations. The term "single and complete project" is defined as that portion of the total linear project proposed or accomplished by one owner/developer or partnership or other association of owners/developers that includes all crossings of a single water of the United States (i.e., a single waterbody) at a specific location. For linear projects crossing a single or multiple waterbodies several times at separate and distant locations, each crossing is considered a single and complete project for purposes of NWP authorization. However, individual channels in a braided stream or river, or individual arms of a large, irregularly shaped wetland or lake, etc., are not separate waterbodies, and crossings of such features cannot be considered separately.

Single and complete non-linear project: For non-linear projects, the term "single and complete project" is defined at 33 CFR 330.2(i) as the total project proposed or accomplished by one owner/developer or partnership or other association of owners/developers. A single and complete non-linear project must have independent utility (see definition of "independent utility"). Single and complete non-linear projects may not be "piecemealed" to avoid the limits in an NWP authorization.

Stormwater management: Stormwater management is the mechanism for controlling stormwater runoff for the purposes of reducing downstream erosion, water quality degradation, and flooding and mitigating the adverse effects of changes in land use on the aquatic environment.

Stormwater management facilities: Stormwater management facilities are those facilities, including but not limited to, stormwater retention and detention ponds and best management practices, which retain water for a period of time to control runoff and/or improve the quality (i.e., by reducing the concentration of nutrients, sediments, hazardous substances and other pollutants) of stormwater runoff.

Stream bed: The substrate of the stream channel between the ordinary high water marks. The substrate may be bedrock or inorganic particles that range in size from clay to boulders. Wetlands contiguous to the stream bed, but outside of the ordinary high water marks, are not considered part of the stream bed.

Stream channelization: The manipulation of a stream's course, condition, capacity, or location that causes more than minimal interruption of normal stream processes. A channelized jurisdictional stream remains a water of the United States.

Structure: An object that is arranged in a definite pattern of organization. Examples of structures include, without limitation, any pier, boat dock, boat ramp, wharf, dolphin, weir, boom, breakwater, bulkhead, revetment, riprap, jetty, artificial island, artificial reef, permanent mooring structure, power transmission line, permanently moored floating vessel, piling, aid to navigation, or any other manmade obstacle or obstruction.

Tidal wetland: A tidal wetland is a jurisdictional wetland that is inundated by tidal waters. Tidal waters rise and fall in a predictable and measurable rhythm or cycle due to the gravitational pulls of the moon and sun. Tidal waters end where the rise and fall of the water surface can no longer be practically measured in a predictable rhythm due to masking by other waters, wind, or other effects. Tidal wetlands are located channelward of the high tide line.

Tribal lands: Any lands title to which is either: 1) held in trust by the United States for the benefit of any Indian tribe or individual; or 2) held by any Indian tribe or individual subject to restrictions by the United States against alienation.

Tribal rights: Those rights legally accruing to a tribe or tribes by virtue of inherent sovereign authority, unextinguished aboriginal title, treaty, statute, judicial decisions, executive order or agreement, and that give rise to legally enforceable remedies.

Vegetated shallows: Vegetated shallows are special aquatic sites under the 404(b)(1) Guidelines. They are areas that are permanently inundated and under normal circumstances have rooted aquatic vegetation, such as seagrasses in marine and estuarine systems and a variety of vascular rooted plants in freshwater systems.

Waterbody: For purposes of the NWPs, a waterbody is a “water of the United States.” If a wetland is adjacent to a waterbody determined to be a water of the United States, that waterbody and any adjacent wetlands are considered together as a single aquatic unit (see 33 CFR 328.4(c)(2)).

58. Utility Line Activities for Water and Other Substances. Activities required for the construction, maintenance, repair, and removal of utility lines for water and other substances, excluding oil, natural gas, products derived from oil or natural gas, and electricity. Oil or natural gas pipeline activities or electric utility line and telecommunications activities may be authorized by NWPs 12 or 57, respectively. This NWP also authorizes associated utility line facilities in waters of the United States, provided the activity does not result in the loss of greater than 1/2-acre of waters of the United States for each single and complete project.

Utility lines: This NWP authorizes discharges of dredged or fill material into waters of the United States and structures or work in navigable waters for crossings of those waters associated with the construction, maintenance, or repair of utility lines for water and other substances, including outfall and intake structures. There must be no change in pre-construction contours of waters of the United States. A "utility line" is defined as any pipe or pipeline for the transportation of any gaseous, liquid, liquescent, or slurry substance, for any purpose that is not oil, natural gas, or petrochemicals. Examples of activities authorized by this NWP include utility lines that convey water, sewage, stormwater, wastewater, brine, irrigation water, and industrial products that are not petrochemicals. The term "utility line" does not include activities that drain a water of the United States, such as drainage tile or french drains, but it does apply to pipes conveying drainage from another area.

Material resulting from trench excavation may be temporarily sidecast into waters of the United States for no more than three months, provided the material is not placed in such a manner that it is dispersed by currents or other forces. The district engineer may extend the period of temporary side casting for no more than a total of 180 days, where appropriate. In wetlands, the top 6 to 12 inches of the trench should normally be backfilled with topsoil from the trench. The trench cannot be constructed or backfilled in such a manner as to drain waters of the United States (e.g., backfilling with extensive gravel layers, creating a french drain effect). Any exposed slopes and stream banks must be stabilized immediately upon completion of the utility line crossing of each waterbody.

Utility line substations: This NWP authorizes the construction, maintenance, or expansion of substation facilities associated with a utility line in non-tidal waters of the United States, provided the activity, in combination with all other activities included in one single and complete project, does not result in the loss of greater than 1/2-acre of waters of the United States. This NWP does not authorize discharges of dredged or fill material into non-tidal wetlands adjacent to tidal waters of the United States to construct, maintain, or expand substation facilities.

Foundations for above-ground utility lines: This NWP authorizes the construction or maintenance of foundations for above-ground utility lines in all waters of the United States, provided the foundations are the minimum size necessary.

Access roads: This NWP authorizes the construction of access roads for the construction and maintenance of utility lines, including utility line substations, in non-tidal waters of the United States, provided the activity, in combination with all other activities included in one single and complete project, does not cause the loss of greater than 1/2-acre of non-tidal waters of the United States. This NWP does not authorize discharges of dredged or fill material into non-tidal wetlands adjacent to tidal waters for access roads. Access roads must be the minimum width necessary (see Note 2, below). Access roads must be constructed so that the length of the road minimizes any adverse effects on waters of the United States and must be as near as possible to pre-construction contours and elevations (e.g., at grade corduroy roads or geotextile/gravel roads). Access roads constructed above pre-construction contours and elevations in waters of the United States must be properly bridged or culverted to maintain surface flows.

This NWP may authorize utility lines in or affecting navigable waters of the United States even if there is no associated discharge of dredged or fill material (see 33 CFR part 322). Overhead utility lines constructed over section 10 waters and utility lines that are routed in or under section 10 waters without a discharge of dredged or fill material require a section 10 permit.

This NWP authorizes, to the extent that Department of the Army authorization is required, temporary structures, fills, and work necessary for the remediation of inadvertent returns of drilling fluids to waters of the United States through sub-soil fissures or fractures that might occur during horizontal directional drilling activities conducted for the purpose of installing or replacing utility lines. These remediation activities must be done as soon as practicable, to restore the affected waterbody. District engineers may add special conditions to this NWP to require a remediation plan for addressing inadvertent returns of drilling fluids to waters of the United States during horizontal directional drilling activities conducted for the purpose of installing or replacing utility lines.

This NWP also authorizes temporary structures, fills, and work, including the use of temporary mats, necessary to conduct the utility line activity. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges of dredged or fill material, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. After construction, temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The areas affected by temporary fills must be revegetated, as appropriate.

Notification: The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity if: (1) a section 10 permit is required; or (2) the discharge will result in the loss of greater than 1/10-acre of waters of the United States. (See general condition 32.) (Authorities: Sections 10 and 404)

Note 1: Where the utility line is constructed, installed, or maintained in navigable waters of the United States (i.e., section 10 waters) within the coastal United States, the Great Lakes, and United States territories, a copy of the NWP verification will be sent by the Corps to the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service (NOS), for charting the utility line to protect navigation.

Note 2: For utility line activities crossing a single waterbody more than one time at separate and distant locations, or multiple waterbodies at separate and distant locations, each crossing is considered a single and complete project for purposes of NWP authorization. Utility line activities must comply with 33 CFR 330.6(d).

Note 3: Access roads used for both construction and maintenance may be authorized, provided they meet the terms and conditions of this NWP. Access roads used solely for construction of the utility line must be removed upon completion of the work, in accordance with the requirements for temporary fills.

Note 4: Pipes or pipelines used to transport gaseous, liquid, liquescent, or slurry substances over navigable waters of the United States are considered to be bridges, not utility lines, and may require a permit from the U.S. Coast Guard pursuant to the General Bridge Act of 1946. However, any discharges of dredged or fill material into waters of the United States associated with such pipelines will require a section 404 permit (see NWP 15).

Note 5: This NWP authorizes utility line maintenance and repair activities that do not qualify for the Clean Water Act section 404(f) exemption for maintenance of currently serviceable fills or fill structures.

Note 6: For activities that require pre-construction notification, the PCN must include any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity, including other separate and distant crossings that require Department of the Army authorization but do not require pre-construction notification (see paragraph (b)(4) of general condition 32). The district engineer will evaluate the PCN in accordance with Section D, “District Engineer’s Decision.” The district engineer may require mitigation to ensure that the authorized activity results in no more than minimal individual and cumulative adverse environmental effects (see general condition 23).

Nationwide Permit General Conditions

Note: To qualify for NWP authorization, the prospective permittee must comply with the following general conditions, as applicable, in addition to any regional or case-specific conditions imposed by the division engineer or district engineer. Prospective permittees should contact the appropriate Corps district office to determine if regional conditions have been imposed on an NWP. Prospective permittees should also contact the appropriate Corps district office to determine the status of Clean Water Act Section 401 water quality certification and/or Coastal Zone Management Act consistency for an NWP. Every person who may wish to obtain permit authorization under one or more NWPs, or who is currently relying on an existing or prior permit authorization under one or more NWPs, has been and is on notice that all of the provisions of 33 CFR 330.1 through 330.6 apply to every NWP authorization. Note especially 33 CFR 330.5 relating to the modification, suspension, or revocation of any NWP authorization.

1. Navigation. (a) No activity may cause more than a minimal adverse effect on navigation.

(b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States.

(c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his or her authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

2. Aquatic Life Movements. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species. If a bottomless culvert cannot be used, then the crossing should be designed and constructed to minimize adverse effects to aquatic life movements.

3. Spawning Areas. Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

4. Migratory Bird Breeding Areas. Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

5. Shellfish Beds. No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48, or is a shellfish seeding or habitat restoration activity authorized by NWP 27.

6. Suitable Material. No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see section 307 of the Clean Water Act).

7. Water Supply Intakes. No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

8. Adverse Effects From Impoundments. If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

9. Management of Water Flows. To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization, storm water management activities, and temporary and permanent road crossings, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

10. Fills Within 100-Year Floodplains. The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

11. Equipment. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

12. Soil Erosion and Sediment Controls. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow, or during low tides.

13. Removal of Temporary Structures and Fills. Temporary structures must be removed, to the maximum extent practicable, after their use has been discontinued.

Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

14. Proper Maintenance. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable NWP general conditions, as well as any activity-specific conditions added by the district engineer to an NWP authorization.

15. Single and Complete Project. The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

16. Wild and Scenic Rivers. (a) No NWP activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status.

(b) If a proposed NWP activity will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, the permittee must submit a pre-construction notification (see general condition 32). The district engineer will coordinate the PCN with the Federal agency with direct management responsibility for that river. Permittees shall not begin the NWP activity until notified by the district engineer that the Federal agency with direct management responsibility for that river has determined in writing that the proposed NWP activity will not adversely affect the Wild and Scenic River designation or study status.

(c) Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency responsible for the designated Wild and Scenic River or study river (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service). Information on these rivers is also available at: http://www.rivers.gov/.

17. Tribal Rights. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

18. Endangered Species. (a) No activity is authorized under any NWP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify designated critical habitat or critical habitat proposed for such designation. No activity is authorized under any NWP which "may affect" a listed species or critical habitat, unless ESA section 7 consultation addressing the consequences of the proposed activity on listed species or critical habitat has been completed. See 50 CFR

402.02 for the definition of “effects of the action” for the purposes of ESA section 7 consultation, as well as 50 CFR 402.17, which provides further explanation under ESA section 7 regarding “activities that are reasonably certain to occur” and “consequences caused by the proposed action.”

(b) Federal agencies should follow their own procedures for complying with the requirements of the ESA (see 33 CFR 330.4(f)(1)). If pre-construction notification is required for the proposed activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation has not been submitted, additional ESA section 7 consultation may be necessary for the activity and the respective federal agency would be responsible for fulfilling its obligation under section 7 of the ESA.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if any listed species (or species proposed for listing) or designated critical habitat (or critical habitat proposed such designation) might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat or critical habitat proposed for such designation, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species (or species proposed for listing) or designated critical habitat (or critical habitat proposed for such designation), the pre-construction notification must include the name(s) of the endangered or threatened species (or species proposed for listing) that might be affected by the proposed activity or that utilize the designated critical habitat (or critical habitat proposed for such designation) that might be affected by the proposed activity. The district engineer will determine whether the proposed activity “may affect” or will have “no effect” to listed species and designated critical habitat and will notify the non-Federal applicant of the Corps’ determination within 45 days of receipt of a complete pre-construction notification. For activities where the non-Federal applicant has identified listed species (or species proposed for listing) or designated critical habitat (or critical habitat proposed for such designation) that might be affected or is in the vicinity of the activity, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification that the proposed activity will have “no effect” on listed species (or species proposed for listing or designated critical habitat (or critical habitat proposed for such designation), or until ESA section 7 consultation or conference has been completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(d) As a result of formal or informal consultation or conference with the FWS or NMFS the district engineer may add species-specific permit conditions to the NWPs.

(e) Authorization of an activity by an NWP does not authorize the “take” of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with “incidental take”

provisions, etc.) from the FWS or the NMFS, the Endangered Species Act prohibits any person subject to the jurisdiction of the United States to take a listed species, where "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The word “harm” in the definition of “take" means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

(f) If the non-federal permittee has a valid ESA section 10(a)(1)(B) incidental take permit with an approved Habitat Conservation Plan for a project or a group of projects that includes the proposed NWP activity, the non-federal applicant should provide a copy of that ESA section 10(a)(1)(B) permit with the PCN required by paragraph (c) of this general condition. The district engineer will coordinate with the agency that issued the ESA section 10(a)(1)(B) permit to determine whether the proposed NWP activity and the associated incidental take were considered in the internal ESA section 7 consultation conducted for the ESA section 10(a)(1)(B) permit. If that coordination results in concurrence from the agency that the proposed NWP activity and the associated incidental take were considered in the internal ESA section 7 consultation for the ESA section 10(a)(1)(B) permit, the district engineer does not need to conduct a separate ESA section 7 consultation for the proposed NWP activity. The district engineer will notify the non-federal applicant within 45 days of receipt of a complete pre-construction notification whether the ESA section 10(a)(1)(B) permit covers the proposed NWP activity or whether additional ESA section 7 consultation is required.

(g) Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the FWS and NMFS or their world wide web pages at http://www.fws.gov/ or http://www.fws.gov/ipac and http://www.nmfs.noaa.gov/pr/species/esa/ respectively.

19. Migratory Birds and Bald and Golden Eagles. The permittee is responsible for ensuring that an action authorized by an NWP complies with the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. The permittee is responsible for contacting the appropriate local office of the U.S. Fish and Wildlife Service to determine what measures, if any, are necessary or appropriate to reduce adverse effects to migratory birds or eagles, including whether "incidental take" permits are necessary and available under the Migratory Bird Treaty Act or Bald and Golden Eagle Protection Act for a particular activity.

20. Historic Properties. (a) No activity is authorized under any NWP which may have the potential to cause effects to properties listed, or eligible for listing, in the National Register of Historic Places until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.

(b) Federal permittees should follow their own procedures for complying with the requirements of section 106 of the National Historic Preservation Act (see 33 CFR

330.4(g)(1)). If pre-construction notification is required for the proposed NWP activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation is not submitted, then additional consultation under section 106 may be necessary. The respective federal agency is responsible for fulfilling its obligation to comply with section 106.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if the NWP activity might have the potential to cause effects to any historic properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the pre-construction notification must state which historic properties might have the potential to be affected by the proposed NWP activity or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of, or potential for, the presence of historic properties can be sought from the State Historic Preservation Officer, Tribal Historic Preservation Officer, or designated tribal representative, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). When reviewing pre-construction notifications, district engineers will comply with the current procedures for addressing the requirements of section 106 of the National Historic Preservation Act. The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts commensurate with potential impacts, which may include background research, consultation, oral history interviews, sample field investigation, and/or field survey. Based on the information submitted in the PCN and these identification efforts, the district engineer shall determine whether the proposed NWP activity has the potential to cause effects on the historic properties. Section 106 consultation is not required when the district engineer determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR 800.3(a)). Section 106 consultation is required when the district engineer determines that the activity has the potential to cause effects on historic properties. The district engineer will conduct consultation with consulting parties identified under 36 CFR 800.2(c) when he or she makes any of the following effect determinations for the purposes of section 106 of the NHPA: no historic properties affected, no adverse effect, or adverse effect.

(d) Where the non-Federal applicant has identified historic properties on which the proposed NWP activity might have the potential to cause effects and has so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects to historic properties or that NHPA section 106 consultation has been completed. For non-federal permittees, the district engineer will notify the prospective permittee within 45 days of receipt of a complete pre-construction notification whether NHPA section 106 consultation is required. If NHPA section 106 consultation is required, the district engineer will notify the non-Federal applicant that he or she cannot begin the activity until section 106

consultation is completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(e) Prospective permittees should be aware that section 110k of the NHPA (54 U.S.C. 306113) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

21. Discovery of Previously Unknown Remains and Artifacts. Permittees that discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by an NWP, they must immediately notify the district engineer of what they have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal, and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

22. Designated Critical Resource Waters. Critical resource waters include, NOAA-managed marine sanctuaries and marine monuments, and National Estuarine Research Reserves. The district engineer may designate, after notice and opportunity for public comment, additional waters officially designated by a state as having particular environmental or ecological significance, such as outstanding national resource waters or state natural heritage sites. The district engineer may also designate additional critical resource waters after notice and opportunity for public comment.

(a) Discharges of dredged or fill material into waters of the United States are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, 50, 51, 52, 57 and 58 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters.

(b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, 38, and 54, notification is required in accordance with general condition 32, for any activity proposed by permittees in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWPs only

after she or he determines that the impacts to the critical resource waters will be no more than minimal.

23. Mitigation. The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal:

(a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site).

(b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating for resource losses) will be required to the extent necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal.

(c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10-acre and require pre-construction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse environmental effects of the proposed activity are no more than minimal, and provides an activity-specific waiver of this requirement. For wetland losses of 1/10-acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in only minimal adverse environmental effects.

(d) Compensatory mitigation at a minimum one-for-one ratio will be required for all losses of stream bed that exceed 3/100-acre and require pre-construction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse environmental effects of the proposed activity are no more than minimal, and provides an activity-specific waiver of this requirement. This compensatory mitigation requirement may be satisfied through the restoration or enhancement of riparian areas next to streams in accordance with paragraph (e) of this general condition. For losses of stream bed of 3/100-acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in only minimal adverse environmental effects. Compensatory mitigation for losses of streams should be provided, if practicable, through stream rehabilitation, enhancement, or preservation, since streams are difficult-to-replace resources (see 33 CFR 332.3(e)(3)).

(e) Compensatory mitigation plans for NWP activities in or near streams or other open waters will normally include a requirement for the restoration or enhancement, maintenance, and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, the restoration or maintenance/protection of riparian areas may be the only compensatory mitigation required. If restoring riparian areas involves planting vegetation, only native species should be planted. The width of the

required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. If it is not possible to restore or maintain/protect a riparian area on both sides of a stream, or if the waterbody is a lake or coastal waters, then restoring or maintaining/protecting a riparian area along a single bank or shoreline may be sufficient. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of minimization or compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses.

(f) Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of 33 CFR part 332.

(1) The prospective permittee is responsible for proposing an appropriate compensatory mitigation option if compensatory mitigation is necessary to ensure that the activity results in no more than minimal adverse environmental effects. For the NWPs, the preferred mechanism for providing compensatory mitigation is mitigation bank credits or in-lieu fee program credits (see 33 CFR 332.3(b)(2) and (3)). However, if an appropriate number and type of mitigation bank or in-lieu credits are not available at the time the PCN is submitted to the district engineer, the district engineer may approve the use of permittee-responsible mitigation.

(2) The amount of compensatory mitigation required by the district engineer must be sufficient to ensure that the authorized activity results in no more than minimal individual and cumulative adverse environmental effects (see 33 CFR 330.1(e)(3)). (See also 33 CFR 332.3(f).)

(3) Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, aquatic resource restoration should be the first compensatory mitigation option considered for permittee-responsible mitigation.

(4) If permittee-responsible mitigation is the proposed option, the prospective permittee is responsible for submitting a mitigation plan. A conceptual or detailed mitigation plan may be used by the district engineer to make the decision on the NWP verification request, but a final mitigation plan that addresses the applicable requirements of 33 CFR 332.4(c)(2) through (14) must be approved by the district engineer before the permittee begins work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation (see 33 CFR 332.3(k)(3)). If permittee-responsible mitigation is the proposed option, and the proposed compensatory mitigation site is located on land in which another federal agency holds an easement, the district engineer will coordinate with that federal agency

to determine if proposed compensatory mitigation project is compatible with the terms of the easement.

(5) If mitigation bank or in-lieu fee program credits are the proposed option, the mitigation plan needs to address only the baseline conditions at the impact site and the number of credits to be provided (see 33 CFR 332.4(c)(1)(ii)).

(6) Compensatory mitigation requirements (e.g., resource type and amount to be provided as compensatory mitigation, site protection, ecological performance standards, monitoring requirements) may be addressed through conditions added to the NWP authorization, instead of components of a compensatory mitigation plan (see 33 CFR 332.4(c)(1)(ii)).

(g) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWPs. For example, if an NWP has an acreage limit of 1/2-acre, it cannot be used to authorize any NWP activity resulting in the loss of greater than 1/2-acre of waters of the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to ensure that an NWP activity already meeting the established acreage limits also satisfies the no more than minimal impact requirement for the NWPs.

(h) Permittees may propose the use of mitigation banks, in-lieu fee programs, or permittee-responsible mitigation. When developing a compensatory mitigation proposal, the permittee must consider appropriate and practicable options consistent with the framework at 33 CFR 332.3(b). For activities resulting in the loss of marine or estuarine resources, permittee-responsible mitigation may be environmentally preferable if there are no mitigation banks or in-lieu fee programs in the area that have marine or estuarine credits available for sale or transfer to the permittee. For permittee-responsible mitigation, the special conditions of the NWP verification must clearly indicate the party or parties responsible for the implementation and performance of the compensatory mitigation project, and, if required, its long-term management.

(i) Where certain functions and services of waters of the United States are permanently adversely affected by a regulated activity, such as discharges of dredged or fill material into waters of the United States that will convert a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse environmental effects of the activity to the no more than minimal level.

24. Safety of Impoundment Structures. To ensure that all impoundment structures are safely designed, the district engineer may require non-Federal applicants to demonstrate that the structures comply with established state or federal, dam safety criteria or have been designed by qualified persons. The district engineer may also require documentation that the design has been independently reviewed by similarly qualified persons, and appropriate modifications made to ensure safety.

25. Water Quality. (a) Where the certifying authority (state, authorized tribe, or EPA, as appropriate) has not previously certified compliance of an NWP with CWA section 401, a CWA section 401 water quality certification for the proposed discharge must be obtained or waived (see 33 CFR 330.4(c)). If the permittee cannot comply with all of the conditions of a water quality certification previously issued by certifying authority for the issuance of the NWP, then the permittee must obtain a water quality certification or waiver for the proposed discharge in order for the activity to be authorized by an NWP.

(b) If the NWP activity requires pre-construction notification and the certifying authority has not previously certified compliance of an NWP with CWA section 401, the proposed discharge is not authorized by an NWP until water quality certification is obtained or waived. If the certifying authority issues a water quality certification for the proposed discharge, the permittee must submit a copy of the certification to the district engineer. The discharge is not authorized by an NWP until the district engineer has notified the permittee that the water quality certification requirement has been satisfied by the issuance of a water quality certification or a waiver.

(c) The district engineer or certifying authority may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

26. Coastal Zone Management. In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). If the permittee cannot comply with all of the conditions of a coastal zone management consistency concurrence previously issued by the state, then the permittee must obtain an individual coastal zone management consistency concurrence or presumption of concurrence in order for the activity to be authorized by an NWP. The district engineer or a state may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

27. Regional and Case-By-Case Conditions. The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its CWA section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

28. Use of Multiple Nationwide Permits. The use of more than one NWP for a single and complete project is authorized, subject to the following restrictions:

(a) If only one of the NWPs used to authorize the single and complete project has a specified acreage limit, the acreage loss of waters of the United States cannot exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank

stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1⁄3-acre.

(b) If one or more of the NWPs used to authorize the single and complete project has specified acreage limits, the acreage loss of waters of the United States authorized by those NWPs cannot exceed their respective specified acreage limits. For example, if a commercial development is constructed under NWP 39, and the single and complete project includes the filling of an upland ditch authorized by NWP 46, the maximum acreage loss of waters of the United States for the commercial development under NWP 39 cannot exceed 1/2-acre, and the total acreage loss of waters of United States due to the NWP 39 and 46 activities cannot exceed 1 acre.

29. Transfer of Nationwide Permit Verifications. If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature:

"When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below."

_____
(Transferee)

_____
(Date)

30. Compliance Certification. Each permittee who receives an NWP verification letter from the Corps must provide a signed certification documenting completion of the authorized activity and implementation of any required compensatory mitigation. The success of any required permittee-responsible mitigation, including the achievement of ecological performance standards, will be addressed separately by the district engineer. The Corps will provide the permittee the certification document with the NWP verification letter. The certification document will include:

(a) A statement that the authorized activity was done in accordance with the NWP authorization, including any general, regional, or activity-specific conditions;

(b) A statement that the implementation of any required compensatory mitigation was completed in accordance with the permit conditions. If credits from a mitigation bank or in-lieu fee program are used to satisfy the compensatory mitigation requirements, the certification must include the documentation required by 33 CFR 332.3(l)(3) to confirm that the permittee secured the appropriate number and resource type of credits; and

(c) The signature of the permittee certifying the completion of the activity and mitigation.

The completed certification document must be submitted to the district engineer within 30 days of completion of the authorized activity or the implementation of any required compensatory mitigation, whichever occurs later.

31. Activities Affecting Structures or Works Built by the United States. If an NWP activity also requires review by, or permission from, the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers (USACE) federally authorized Civil Works project (a "USACE project"), the prospective permittee must submit a pre-construction notification. See paragraph (b)(10) of general condition 32. An activity that requires section 408 permission and/or review is not authorized by an NWP until the appropriate Corps office issues the section 408 permission or completes its review to alter, occupy, or use the USACE project, and the district engineer issues a written NWP verification.

32. Pre-Construction Notification. (a) *Timing*. Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, if the PCN is determined to be incomplete, notify the prospective permittee within that 30 day period to request the additional information necessary to make the PCN complete. The request must specify the information needed to make the PCN complete. As a general rule, district engineers will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity until either:

(1) He or she is notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or

(2) 45 calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 18 that listed species or critical habitat might be affected or are in the vicinity of the activity, or to notify the Corps pursuant to general condition 20 that the activity might have the potential to cause effects to historic properties, the permittee

cannot begin the activity until receiving written notification from the Corps that there is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or section 106 of the National Historic Preservation Act (see 33 CFR 330.4(g)) has been completed. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee may not begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) *Contents of Pre-Construction Notification*: The PCN must be in writing and include the following information:

(1) Name, address and telephone numbers of the prospective permittee;

(2) Location of the proposed activity;

(3) Identify the specific NWP or NWP(s) the prospective permittee wants to use to authorize the proposed activity;

(4) (i) A description of the proposed activity; the activity's purpose; direct and indirect adverse environmental effects the activity would cause, including the anticipated amount of loss of wetlands, other special aquatic sites, and other waters expected to result from the NWP activity, in acres, linear feet, or other appropriate unit of measure; a description of any proposed mitigation measures intended to reduce the adverse environmental effects caused by the proposed activity; and any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity, including other separate and distant crossings for linear projects that require Department of the Army authorization but do not require pre-construction notification. The description of the proposed activity and any proposed mitigation measures should be sufficiently detailed to allow the district engineer to determine that the adverse environmental effects of the activity will be no more than minimal and to determine the need for compensatory mitigation or other mitigation measures.

(ii) For linear projects where one or more single and complete crossings require pre-construction notification, the PCN must include the quantity of anticipated losses of wetlands, other special aquatic sites, and other waters for each single and complete crossing of those wetlands, other special aquatic sites, and other waters (including those single and complete crossings authorized by an NWP but do not require PCNs). This information will be used by the district engineer to evaluate the cumulative adverse environmental effects of the proposed linear project, and does not change those non-PCN NWP activities into NWP PCNs.

(iii) Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the activity and when provided results in a quicker decision. Sketches should contain sufficient detail to provide an illustrative description of the proposed activity (e.g., a conceptual plan), but do not need to be detailed engineering plans);

(5) The PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial and intermittent streams, on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters on the project site, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many wetlands, other special aquatic sites, and other waters. Furthermore, the 45-day period will not start until the delineation has been submitted to or completed by the Corps, as appropriate;

(6) If the proposed activity will result in the loss of greater than 1/10-acre of wetlands or 3/100-acre of stream bed and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied, or explaining why the adverse environmental effects are no more than minimal and why compensatory mitigation should not be required. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan.

(7) For non-federal permittees, if any listed species (or species proposed for listing) or designated critical habitat (or critical habitat proposed for such designation) might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat (or critical habitat proposed for such designation), the PCN must include the name(s) of those endangered or threatened species (or species proposed for listing) that might be affected by the proposed activity or utilize the designated critical habitat (or critical habitat proposed for such designation) that might be affected by the proposed activity. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with the Endangered Species Act;

(8) For non-federal permittees, if the NWP activity might have the potential to cause effects to a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, the PCN must state which historic property might have the potential to be affected by the proposed activity or include a vicinity map indicating the location of the historic property. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with section 106 of the National Historic Preservation Act;

(9) For an activity that will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a “study river” for possible

inclusion in the system while the river is in an official study status, the PCN must identify the Wild and Scenic River or the "study river" (see general condition 16); and

(10) For an NWP activity that requires permission from, or review by, the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers federally authorized civil works project, the pre-construction notification must include a statement confirming that the project proponent has submitted a written request for section 408 permission from, or review by, the Corps office having jurisdiction over that USACE project.

(c) *Form of Pre-Construction Notification*: The nationwide permit pre-construction notification form (Form ENG 6082) should be used for NWP PCNs. A letter containing the required information may also be used. Applicants may provide electronic files of PCNs and supporting materials if the district engineer has established tools and procedures for electronic submittals.

(d) *Agency Coordination*: (1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the activity's adverse environmental effects so that they are no more than minimal.

(2) Agency coordination is required for: (i) all NWP activities that require pre-construction notification and result in the loss of greater than 1/2-acre of waters of the United States; (ii) NWP 13 activities in excess of 500 linear feet, fills greater than one cubic yard per running foot, or involve discharges of dredged or fill material into special aquatic sites; and (iii) NWP 54 activities in excess of 500 linear feet, or that extend into the waterbody more than 30 feet from the mean low water line in tidal waters or the ordinary high water mark in the Great Lakes.

(3) When agency coordination is required, the district engineer will immediately provide (e.g., via e-mail, facsimile transmission, overnight mail, or other expeditious manner) a copy of the complete PCN to the appropriate Federal or state offices (FWS, state natural resource or water quality agency, EPA, and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will have 10 calendar days from the date the material is transmitted to notify the district engineer via telephone, facsimile transmission, or e-mail that they intend to provide substantive, site-specific comments. The comments must explain why the agency believes the adverse environmental effects will be more than minimal. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the pre-construction notification. The district engineer will fully consider agency comments received within the specified time frame concerning the proposed activity's compliance with the terms and conditions of the NWPs, including the need for mitigation to ensure that the net adverse environmental effects of the proposed activity are no more than minimal. The district engineer will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each pre-construction notification that the resource agencies' concerns were

considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5.

(4) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act.

(5) Applicants are encouraged to provide the Corps with either electronic files or multiple copies of pre-construction notifications to expedite agency coordination.

District Engineer's Decision

1. In reviewing the PCN for the proposed activity, the district engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. If a project proponent requests authorization by a specific NWP, the district engineer should issue the NWP verification for that activity if it meets the terms and conditions of that NWP, unless he or she determines, after considering mitigation, that the proposed activity will result in more than minimal individual and cumulative adverse effects on the aquatic environment and other aspects of the public interest and exercises discretionary authority to require an individual permit for the proposed activity. For a linear project, this determination will include an evaluation of the single and complete crossings of waters of the United States that require PCNs to determine whether they individually satisfy the terms and conditions of the NWP(s), as well as the cumulative effects caused by all of the crossings of waters of the United States authorized by an NWP. If an applicant requests a waiver of an applicable limit, as provided for in NWPs 13, 36, or 54, the district engineer will only grant the waiver upon a written determination that the NWP activity will result in only minimal individual and cumulative adverse environmental effects.

2. When making minimal adverse environmental effects determinations the district engineer will consider the direct and indirect effects caused by the NWP activity. He or she will also consider the cumulative adverse environmental effects caused by activities authorized by an NWP and whether those cumulative adverse environmental effects are no more than minimal. The district engineer will also consider site specific factors, such as the environmental setting in the vicinity of the NWP activity, the type of resource that will be affected by the NWP activity, the functions provided by the aquatic resources that will be affected by the NWP activity, the degree or magnitude to which the aquatic resources perform those functions, the extent that aquatic resource functions will be lost as a result of the NWP activity (e.g., partial or complete loss), the duration of the adverse effects (temporary or permanent), the importance of the aquatic resource

functions to the region (e.g., watershed or ecoregion), and mitigation required by the district engineer. If an appropriate functional or condition assessment method is available and practicable to use, that assessment method may be used by the district engineer to assist in the minimal adverse environmental effects determination. The district engineer may add case-specific special conditions to the NWP authorization to address site-specific environmental concerns.

3. If the proposed activity requires a PCN and will result in a loss of greater than 1/10-acre of wetlands or 3/100-acre of stream bed, the prospective permittee should submit a mitigation proposal with the PCN. Applicants may also propose compensatory mitigation for NWP activities with smaller impacts, or for impacts to other types of waters. The district engineer will consider any proposed compensatory mitigation or other mitigation measures the applicant has included in the proposal in determining whether the net adverse environmental effects of the proposed activity are no more than minimal. The compensatory mitigation proposal may be either conceptual or detailed. If the district engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse environmental effects are no more than minimal, after considering mitigation, the district engineer will notify the permittee and include any activity-specific conditions in the NWP verification the district engineer deems necessary. Conditions for compensatory mitigation requirements must comply with the appropriate provisions at 33 CFR 332.3(k). The district engineer must approve the final mitigation plan before the permittee commences work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the district engineer will expeditiously review the proposed compensatory mitigation plan. The district engineer must review the proposed compensatory mitigation plan within 45 calendar days of receiving a complete PCN and determine whether the proposed mitigation would ensure that the NWP activity results in no more than minimal adverse environmental effects. If the net adverse environmental effects of the NWP activity (after consideration of the mitigation proposal) are determined by the district engineer to be no more than minimal, the district engineer will provide a timely written response to the applicant. The response will state that the NWP activity can proceed under the terms and conditions of the NWP, including any activity-specific conditions added to the NWP authorization by the district engineer.

4. If the district engineer determines that the adverse environmental effects of the proposed activity are more than minimal, then the district engineer will notify the applicant either: (a) that the activity does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (b) that the activity is authorized under the NWP subject to the applicant’s submission of a mitigation plan that would reduce the adverse environmental effects so that they are no more than minimal; or (c) that the activity is authorized under the NWP with specific modifications or conditions. Where the district engineer determines that mitigation is required to ensure no more than minimal adverse environmental effects, the activity will be authorized within the 45-day PCN period (unless additional time is

required to comply with general conditions 18, 20, and/or 31), with activity-specific conditions that state the mitigation requirements. The authorization will include the necessary conceptual or detailed mitigation plan or a requirement that the applicant submit a mitigation plan that would reduce the adverse environmental effects so that they are no more than minimal. When compensatory mitigation is required, no work in waters of the United States may occur until the district engineer has approved a specific mitigation plan or has determined that prior approval of a final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation.

Further Information

1. District engineers have authority to determine if an activity complies with the terms and conditions of an NWP.

2. NWPs do not obviate the need to obtain other federal, state, or local permits, approvals, or authorizations required by law.

3. NWPs do not grant any property rights or exclusive privileges.

4. NWPs do not authorize any injury to the property or rights of others.

5. NWPs do not authorize interference with any existing or proposed Federal project (see general condition 31).

Nationwide Permit Definitions

Best management practices (BMPs): Policies, practices, procedures, or structures implemented to mitigate the adverse environmental effects on surface water quality resulting from development. BMPs are categorized as structural or non-structural.

Compensatory mitigation: The restoration (re-establishment or rehabilitation), establishment (creation), enhancement, and/or in certain circumstances preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.

Currently serviceable: Useable as is or with some maintenance, but not so degraded as to essentially require reconstruction.

Direct effects: Effects that are caused by the activity and occur at the same time and place.

Discharge: The term “discharge” means any discharge of dredged or fill material into waters of the United States.

Ecological reference: A model used to plan and design an aquatic habitat and riparian area restoration, enhancement, or establishment activity under NWP 27. An ecological reference may be based on the structure, functions, and dynamics of an aquatic habitat type or a riparian area type that currently exists in the region where the proposed NWP 27 activity is located. Alternatively, an ecological reference may be based on a conceptual model for the aquatic habitat type or riparian area type to be restored, enhanced, or established as a result of the proposed NWP 27 activity. An ecological reference takes into account the range of variation of the aquatic habitat type or riparian area type in the region.

Enhancement: The manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but may also lead to a decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area.

Establishment (creation): The manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Establishment results in a gain in aquatic resource area.

High Tide Line: The line of intersection of the land with the water's surface at the maximum height reached by a rising tide. The high tide line may be determined, in the absence of actual data, by a line of oil or scum along shore objects, a more or less continuous deposit of fine shell or debris on the foreshore or berm, other physical markings or characteristics, vegetation lines, tidal gages, or other suitable means that delineate the general height reached by a rising tide. The line encompasses spring high tides and other high tides that occur with periodic frequency but does not include storm surges in which there is a departure from the normal or predicted reach of the tide due to the piling up of water against a coast by strong winds such as those accompanying a hurricane or other intense storm.

Historic Property: Any prehistoric or historic district, site (including archaeological site), building, structure, or other object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria (36 CFR part 60).

Independent utility: A test to determine what constitutes a single and complete non-linear project in the Corps Regulatory Program. A project is considered to have independent utility if it would be constructed absent the construction of other projects in the project area. Portions of a multi-phase project that depend upon other phases of the project do not have independent utility. Phases of a project that would be constructed even if the other phases were not built can be considered as separate single and complete projects with independent utility.

Indirect effects: Effects that are caused by the activity and are later in time or farther removed in distance, but are still reasonably foreseeable.

Loss of waters of the United States: Waters of the United States that are permanently adversely affected by filling, flooding, excavation, or drainage because of the regulated activity. The loss of stream bed includes the acres of stream bed that are permanently adversely affected by filling or excavation because of the regulated activity. Permanent adverse effects include permanent discharges of dredged or fill material that change an aquatic area to dry land, increase the bottom elevation of a waterbody, or change the use of a waterbody. The acreage of loss of waters of the United States is a threshold measurement of the impact to jurisdictional waters or wetlands for determining whether a project may qualify for an NWP; it is not a net threshold that is calculated after considering compensatory mitigation that may be used to offset losses of aquatic functions and services. Waters of the United States temporarily filled, flooded, excavated, or drained, but restored to pre-construction contours and elevations after construction, are not included in the measurement of loss of waters of the United States. Impacts resulting from activities that do not require Department of the Army authorization, such as activities eligible for exemptions under section 404(f) of the Clean Water Act, are not considered when calculating the loss of waters of the United States.

Navigable waters: Waters subject to section 10 of the Rivers and Harbors Act of 1899. These waters are defined at 33 CFR part 329.

Non-tidal wetland: A non-tidal wetland is a wetland that is not subject to the ebb and flow of tidal waters. Non-tidal wetlands contiguous to tidal waters are located landward of the high tide line (i.e., spring high tide line).

Open water: For purposes of the NWPs, an open water is any area that in a year with normal patterns of precipitation has water flowing or standing above ground to the extent that an ordinary high water mark can be determined. Aquatic vegetation within the area of flowing or standing water is either non-emergent, sparse, or absent. Vegetated shallows are considered to be open waters. Examples of “open waters” include rivers, streams, lakes, and ponds.

Ordinary High Water Mark: The term ordinary high water mark means that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

Perennial stream: A perennial stream has surface water flowing continuously year-round during a typical year.

Practicable: Available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.

Pre-construction notification: A request submitted by the project proponent to the Corps for confirmation that a particular activity is authorized by nationwide permit. The request may be a permit application, letter, or similar document that includes information about the proposed work and its anticipated environmental effects. Pre-construction notification may be required by the terms and conditions of a nationwide permit, or by regional conditions. A pre-construction notification may be voluntarily submitted in cases where pre-construction notification is not required and the project proponent wants confirmation that the activity is authorized by nationwide permit.

Preservation: The removal of a threat to, or preventing the decline of, aquatic resources by an action in or near those aquatic resources. This term includes activities commonly associated with the protection and maintenance of aquatic resources through the implementation of appropriate legal and physical mechanisms. Preservation does not result in a gain of aquatic resource area or functions.

Re-establishment: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and functions.

Rehabilitation: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area.

Restoration: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. For the purpose of tracking net gains in aquatic resource area, restoration is divided into two categories: re-establishment and rehabilitation.

Riffle and pool complex: Riffle and pool complexes are special aquatic sites under the 404(b)(1) Guidelines. Riffle and pool complexes sometimes characterize steep gradient sections of streams. Such stream sections are recognizable by their hydraulic characteristics. The rapid movement of water over a course substrate in riffles results in a rough flow, a turbulent surface, and high dissolved oxygen levels in the water. Pools are deeper areas associated with riffles. A slower stream velocity, a streaming flow, a smooth surface, and a finer substrate characterize pools.

Riparian areas: Riparian areas are lands next to streams, lakes, and estuarine-marine shorelines. Riparian areas are transitional between terrestrial and aquatic ecosystems, through which surface and subsurface hydrology connects riverine, lacustrine, estuarine, and marine waters with their adjacent wetlands, non-wetland waters, or uplands. Riparian areas provide a variety of ecological functions and services and help improve or maintain local water quality. (See general condition 23.)

Shellfish seeding: The placement of shellfish seed and/or suitable substrate to increase shellfish production. Shellfish seed consists of immature individual shellfish or individual shellfish attached to shells or shell fragments (i.e., spat on shell). Suitable substrate may consist of shellfish shells, shell fragments, or other appropriate materials placed into waters for shellfish habitat.

Single and complete linear project: A linear project is a project constructed for the purpose of getting people, goods, or services from a point of origin to a terminal point, which often involves multiple crossings of one or more waterbodies at separate and distant locations. The term "single and complete project" is defined as that portion of the total linear project proposed or accomplished by one owner/developer or partnership or other association of owners/developers that includes all crossings of a single water of the United States (i.e., a single waterbody) at a specific location. For linear projects crossing a single or multiple waterbodies several times at separate and distant locations, each crossing is considered a single and complete project for purposes of NWP authorization. However, individual channels in a braided stream or river, or individual arms of a large, irregularly shaped wetland or lake, etc., are not separate waterbodies, and crossings of such features cannot be considered separately.

Single and complete non-linear project: For non-linear projects, the term "single and complete project" is defined at 33 CFR 330.2(i) as the total project proposed or accomplished by one owner/developer or partnership or other association of owners/developers. A single and complete non-linear project must have independent utility (see definition of "independent utility"). Single and complete non-linear projects may not be "piecemealed" to avoid the limits in an NWP authorization.

Stormwater management: Stormwater management is the mechanism for controlling stormwater runoff for the purposes of reducing downstream erosion, water quality degradation, and flooding and mitigating the adverse effects of changes in land use on the aquatic environment.

Stormwater management facilities: Stormwater management facilities are those facilities, including but not limited to, stormwater retention and detention ponds and best management practices, which retain water for a period of time to control runoff and/or improve the quality (i.e., by reducing the concentration of nutrients, sediments, hazardous substances and other pollutants) of stormwater runoff.

Stream bed: The substrate of the stream channel between the ordinary high water marks. The substrate may be bedrock or inorganic particles that range in size from clay to boulders. Wetlands contiguous to the stream bed, but outside of the ordinary high water marks, are not considered part of the stream bed.

Stream channelization: The manipulation of a stream's course, condition, capacity, or location that causes more than minimal interruption of normal stream processes. A channelized jurisdictional stream remains a water of the United States.

Structure: An object that is arranged in a definite pattern of organization. Examples of structures include, without limitation, any pier, boat dock, boat ramp, wharf, dolphin, weir, boom, breakwater, bulkhead, revetment, riprap, jetty, artificial island, artificial reef, permanent mooring structure, power transmission line, permanently moored floating vessel, piling, aid to navigation, or any other manmade obstacle or obstruction.

Tidal wetland: A tidal wetland is a jurisdictional wetland that is inundated by tidal waters. Tidal waters rise and fall in a predictable and measurable rhythm or cycle due to the gravitational pulls of the moon and sun. Tidal waters end where the rise and fall of the water surface can no longer be practically measured in a predictable rhythm due to masking by other waters, wind, or other effects. Tidal wetlands are located channelward of the high tide line.

Tribal lands: Any lands title to which is either: 1) held in trust by the United States for the benefit of any Indian tribe or individual; or 2) held by any Indian tribe or individual subject to restrictions by the United States against alienation.

Tribal rights: Those rights legally accruing to a tribe or tribes by virtue of inherent sovereign authority, unextinguished aboriginal title, treaty, statute, judicial decisions, executive order or agreement, and that give rise to legally enforceable remedies.

Vegetated shallows: Vegetated shallows are special aquatic sites under the 404(b)(1) Guidelines. They are areas that are permanently inundated and under normal circumstances have rooted aquatic vegetation, such as seagrasses in marine and estuarine systems and a variety of vascular rooted plants in freshwater systems.

Waterbody: For purposes of the NWPs, a waterbody is a “water of the United States.” If a wetland is adjacent to a waterbody determined to be a water of the United States, that waterbody and any adjacent wetlands are considered together as a single aquatic unit (see 33 CFR 328.4(c)(2)).

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, CHARLESTON DISTRICT
69A HAGOOD AVENUE
CHARLESTON, SOUTH CAROLINA 29403-5107

FINAL REGIONAL CONDITIONS FOR THE 2021 NATIONWIDE PERMITS IN CHARLESTON DISTRICT (SAC)

Effective Date for Modified Regional Conditions for 16 NWPs: January 19, 2022
Effective Date for Regional Conditions for 41 NWPs: February 25, 2022
Expiration Date for Regional Conditions for All NWPs: March 14, 2026

This Regional Condition document supersedes all prior Regional Condition documents for the Charleston District.

A. BACKGROUND/APPLICABILITY

1. The following regional conditions have been approved by the Division Engineer for the South Atlantic Division (SAD) for use in the Charleston District (SAC) for the following Nationwide Permits (NWPs):

   a. The NWPs published in the January 13, 2021 Federal Register (86 FR 2744) announcing the reissuance of twelve (12) existing NWPs (that is, NWPs 12, 21, 29, 39, 40, 42, 43, 44, 48, 50, 51, and 52) and issuance of four (4) new NWPs (that is, NWPs 55, 56, 57, and 58), as well as the reissuance of NWP general conditions and definitions with some modifications. These 16 NWPs were effective on March 15, 2021 and will expire on March 14, 2026; and

   b. The NWPs published in the December 27, 2021 Federal Register (86 FR 73522) announcing the reissuance of the remaining unmodified forty (40) existing NWPs (that is, NWPs 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18, 19, 20, 22, 23, 24, 25, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, 41, 45, 46, 49, 53, and 54) and issuance of one (1) new NWP (that is, NWP 59). At this time, NWPs 26 and 47 are reserved. These 41 NWPs will be effective as of February 25, 2022 and will expire on March 14, 2026.

2. Status of Activities Under Prior NWPs and/or Regional Conditions.

   i. 16 NWPs: The modified regional conditions that were issued on January 19, 2022 and are incorporated in this document **supersede** the previous regional conditions that were approved for the 16 NWPs that went into effect on March 15, 2021, **except** for the following scenarios:

      1. NWP verification letters for one or more of the 16 NWPs that were issued **prior** to January 19, 2022; or

2. NWP activities that do not require a pre-construction notification (PCN)[1], are covered by one or more of the 16 NWPs, and have either commenced, are under contract to commence, or have been completed **prior** to January 19, 2022.

ii. 40 NWPs: For information about whether an activity can continue under the 2017 versions of the 40 existing NWPs (for example, the status of prior permit verifications and pre-construction notifications) and, accordingly, the 2017 Regional Conditions, see the discussion in the Reissuance and Modification of Nationwide Permits at 86 FR 73522 in Section I.D. on page 73525 or contact the Charleston District Regulatory Office directly.

3. The following regional conditions will provide additional protection for the aquatic environment that is necessary to ensure that the NWPs authorize only those activities with no more than minimal adverse environmental effects.

4. As specified, under NWP General Condition 27, Regional and Case-By-Case Conditions: The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case-specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its Section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

B. EXCLUDED WATERS AND/OR AREAS

Not applicable.

C. REGIONAL CONDITIONS APPLICABLE TO <u>ALL</u> NWPs

1. Use of nationwide permits does not preclude requirements to obtain all other applicable Federal, State, county, and local government authorizations.

2. NWP activities are not authorized in areas known or suspected to have sediment contamination, with the exception of the following: (1) activities authorized by NWP 38; (2) activities authorized by NWP 53 when used in combination with NWP 38; (3) sediment sampling for dredging projects authorized by NWP 6; and (4) activities authorized by NWP 20.

3. For all proposed activities, both temporary and permanent, that would be located within a FEMA designated floodway, the prospective permittee must submit a PCN to the District Engineer in accordance with General Condition 32.

[1] The acronym “PCN” used throughout this document refers to *Pre-Construction Notification*, as defined in NWP General Condition 32.

4. For all NWPs, the prospective permittee must submit a PCN to the District Engineer in accordance with General Conditions 31 and 32, for any activity that would be located in or adjacent to an authorized USACE Civil Works project, including Federal Navigation projects:

    a. **USACE Civil Works projects:** Buck Creek in Horry County, Eagle Creek in Dorchester County, Kingstree Branch in Williamsburg County, Sawmill Branch in Berkeley and Dorchester Counties, Scotts Creek in Newberry County, Socastee Creek in Horry County and Turkey Creek in Sumter County, Wilson Branch in Chesterfield County, Edisto River in Orangeburg and Dorchester Counties, North Edisto River in Aitken and Orangeburg Counties, Folly Beach in Charleston County, Hunting Island Beach, waste water treatment plant and water line in Beaufort County, Myrtle Beach in Georgetown and Horry County, Pawleys Island Beach in Georgetown County, Edisto Island Beach in Charleston County, Crab Bank in Charleston County, Morris Island Lighthouse in Charleston County, Miller Corner Disposal area Phragmites Control in Georgetown County, Cape Marsh Management area (Santee Coastal Reserve) in Charleston County, Murphy Island in Charleston County, Pocotaligo River and Swamp in Clarendon and Sumter Counties, Pinopolis Dam in Berkeley County, Battery Pringle in Charleston County, Castle Pinckney in Charleston County, Pompion Hill Chapel along the Cooper River in Berkeley County, Drayton Hall in Charleston County, Indian Bluff in Orangeburg County, Singleton Swash at Shore Drive in Horry County, Turkey Creek Bridge at Pineview Drive in Lancaster, Big Dutchman Creek Bridge at West Oak Drive in Rock Hill, SC, Calabash Branch Bridge at Tom Joye Road in Clover, Blue Branch Bridge at Fortanberry Road in Gaffney, Glenn Creek Bridge at Sulphur Springs Road in Spartanburg County, Cow Castle Creek (Bowman) in Orangeburg County, Cowpen Swamp at Simpson Creek in Horry County, Crabtree Swamp in Horry County, Saluda River (North, South, and Middle Fork) in Greenville County, Shot Pouch Creek in Sumter County, Simpson Creek in Horry County, and Todd Swamp in Horry County.

    b. **Defined Federal Navigation projects:** Ashley River (0.5 miles east of Hwy 7 bridge downstream to the Atlantic Intracoastal Waterway (AIWW)), Atlantic Intracoastal Waterway ((AIWW) GA/SC line to SC/NC line), Brookgreen Garden Canal, Calabash Creek, Charleston Harbor (including the Cooper River, Town Creek, Shem Creek to Coleman Blvd and Mount Pleasant Channel), Folly River, Georgetown Harbor (Winyah Bay, Sampit River and Bypass Channel), Jeremy Creek, Little River Inlet, Murrells Inlet (Main Creek), Port Royal Harbor, Shipyard River, Savannah River (Below Augusta) and Town Creek McClellanville (i.e., Five Fathoms Creek, AIWW to Bulls Bay).

    c. **Undefined Federal Navigation projects**: Adams Creek, Archers Creek (From intersection with Beaufort River for 2 miles), Edisto River (River mile 0.00 to 175.0), Great Pee Dee River (Waccamaw River via Bull Creek then to

Smith Mills, then to Cheraw), Lynches River/Clark Creek (Clark Creek to Lynches River, River Mile 0.0 to 56.0), Mingo Creek (to Hemmingway Bridge), Salkehatchie River (5 miles above Toby's Bluff to Hickory Hill, River mile 20.4 to 62.3), Santee River (Closed to navigation at mile 87 (Santee Dam)), Waccamaw River (river mile 0.0 to 90 (state line)), Wateree River (Mouth to Camden), and Village Creek (Morgan River to Porpoise Fish Co., 2.2 miles).

5. For all proposed activities that would be located in or adjacent to an authorized Federal Navigation project, as referenced in Regional Condition C.4.b, the project drawings must include the following information: (1) State Plane Coordinates (NAD 1983) for a minimum of two corners of each structure or fill where it is closest to the Federal channel; (2) the distance from the watermost edge of the proposed structure or fill to the nearest edge of the Federal channel; and (3) Mean Low Water line and the Mean High Water line.

6. For all NWPs requiring a PCN and when the activity involves the discharge of dredged or fill material into waters of the U.S. associated with mechanized land clearing that results in the permanent conversion of forested or scrub-shrub wetlands to herbaceous wetlands, the PCN should include the following information: (1) a written description and/or drawings of the proposed conversion activity and (2) acreage of the permanent conversion.

D. REGIONAL CONDITIONS APPLICABLE TO <u>SPECIFIC</u> NWPs

1. For NWP 3, paragraph (a) activities, the prospective permittee must submit a PCN to the District Engineer in accordance with General Condition #32 for the repair, rehabilitation or replacement of existing utility lines, which include electric lines and/or telecommunication lines, constructed over navigable waters of the United States (i.e., Section 10 waters), and existing utility lines, electric lines, telecommunication lines and/or pipelines routed in or under navigable waters of the United States (i.e., Section 10 waters), even if no discharge of dredged or fill material occurs.

2. For NWP 3, the prospective permittee must submit a PCN to the District Engineer in accordance with General Condition 32, for maintenance activities related to stormwater management that would occur in tidal waters, including tidal wetlands.

3. For NWPs 3, 11, 12, 13, 14, 15, 20, 22, 33, 57, 58, and 59, temporary structures, fills, and/or work, including the use of temporary mats, are authorized for the minimum amount of time necessary to accomplish the work, which shall not exceed a period of 180 days without additional Corps approval. **However, temporary sidecast material authorized by NWPs 12, 57, or 58 cannot ever exceed a period of 180 days.** The temporary structures, fills, and/or work, including the use of temporary mats, shall be removed as soon as the work is

complete and the disturbed areas be restored to pre-construction contours and conditions. The temporary mats include timber mats, metal, synthetic and/or artificial mats, or other materials that may serve the purpose of mats.

4. For NWPs 3, 11, 12, 13, 14, 15, 20, 22, 33, 57, 58 and 59 that require PCNs and when the activity involves temporary structures, fills, and/or work, including the use of temporary mats, the PCN should include the following information: (1) a written description and/or drawings of the proposed temporary activities that will be used during project construction; (2) the timeframe that the proposed temporary activities will be in place; and (3) specifications of how pre-construction contours will be re-established and verified after construction. Temporary mats include timber mats, metal, synthetic and/or artificial mats, or other materials that may serve the purpose of mats.

5. For NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, 50, 51, 52, 57 and 58 in accordance with General Condition 22(a) and for NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, 38 and 54, in accordance with General Condition 22(b), the ACE Basin National Estuarine Research Reserve and the North Inlet Winyah Bay National Estuarine Research Reserve are Designated Critical Resource Waters. Activities described in the NWPs listed herein are subject to the limitations and/or PCN requirements listed in General Condition 22 (a) and (b).

6. For NWPs 7 and 58 activities that involve intake structures, the associated intake structure must be screened to prevent entrainment of juvenile and larval organisms, and the inflow velocity of the associated intake structures cannot exceed 0.5 feet/second.

7. For NWPs 12, 57 and 58 activities that involve horizontal directional drilling beneath navigable waters of the United States (i.e., Section 10 waters), the PCN should include a proposed remediation plan (i.e., frac-out plan).

8. For NWPs 12, 14, 29, 39, 46, 51, 52, 57 and 58 activities that involve crossings, all culverts must be adequately sized to maintain flow. For these activities that require submittal of a PCN, the PCN should include the minimum size of and number of culvert/pipes that are proposed.

9. For NWPs 12, 14, 18, 43, 51, 57 and 58, the prospective permittee must submit a PCN to the District Engineer in accordance with General Condition #32, for activities that involve the loss of greater than 0.005 acre of stream bed.

10. For NWPs 12, 14, 18, 21, 29, 39, 40, 42, 43, 44, 50, 51, 52, 57, 58 and 59, activities that involve the loss of greater than 0.005 acre of stream bed, compensatory mitigation will be required and the PCN should include a compensatory mitigation plan.

11. For NWPs 12, 14, 18, 21, 27, 29, 39, 40, 42, 43, 44, 50, 51, 52, 57, 58, and 59, the discharge cannot cause the loss of greater than 0.05 acre of stream bed.

12. For NWPs 29 and 39, the discharges of dredged or fill material for the construction of stormwater management facilities in perennial streams are not authorized.

13. For NWP 33, the prospective permittee must submit a PCN to the District Engineer, in accordance with General Condition #32, for temporary construction, access, and dewatering activities that impact greater than 0.1 acre of non-tidal waters of the United States, including wetlands. In addition, the PCN should include a restoration plan.

14. For existing NWP 48 activities that involve changing from bottom culture to floating or suspended culture OR proposed NWP 48 activities that involve floating or suspended culture, the prospective permittee must submit a PCN to the District Engineer in accordance with General Condition #32.

15. For proposed NWP 48 activities involving floating or suspended culture and/or proposed NWPs 55 and 56 activities that will occur adjacent to property that is not owned by the prospective permittee, the PCN should include the following information:

    a. A map or depiction that shows the adjacent property(ies) and adjacent property owners' contact information. Note: This information may be obtained online from the applicable county's tax information pages.

    b. A signed letter(s) of "no objection" to the proposed mariculture activity from each of the adjacent property owner(s). Each letter shall include the name, mailing address, property address, property Tax Map Parcel (TMS) number, and signature of the property owner. Or, if the prospective permittee is unable to obtain a letter(s) of "no objection", the Corps will notify the adjacent property owner(s) of the proposed project by letter wherein the adjacent property owner will be given 15 days to provide comments.

16. For NWP 53, the PCN should include a Tier I evaluation, in accordance with the Inland Testing Manual, for the project area immediately upstream of the low-head dam. If the Tier I evaluation indicates contaminated sediments are present, a Tier II evaluation may be required.

17. The prospective permittee is advised of the following for activities under any NWP for which (1) the 401 Water Quality Certifications (WQC) were denied (see F.1.a), and/or (2) activities under the NWP were found to be inconsistent with the S.C. Coastal Zone Management Program and, therefore, concurrence with the Coastal Zone Consistency determination was denied (see F.2.a), and/or (3) the

proposed activity is located in one of the “Critical Areas” of the Coastal Zone (see F.3):

a. For NWPs 12, 14, 16, 17, 21, 23, 29, 34, 39, 44, 46, 49, 50, 54, 57, 58 and 59 where WQC was denied, the prospective permittee should provide to the Corps a copy of the Individual WQC or evidence demonstrating a waiver was granted.

b. For NWPs 12, 14, 16, 17, 21, 23, 24, 29, 34, 35, 39, 42, 44, 46, 49, 50, 51, 55, 56, 57, 58 and 59 where concurrence with the Coastal Zone Consistency was denied, the prospective permittee should provide to the Corps a copy of the Individual CZC Concurrence or presumed concurrence for the proposed activity.

c. For all NWPs in any of the “Critical Areas” of the Coastal Zone, an Individual Critical Area permit is required (see F.3). Therefore, the prospective permittee should provide a copy of the Individual Critical Area permit to the Corps for the proposed activity.

Note: For WQC conditions on activities under NWPs 43, 51, and 52, see F.1.b. For Coastal Zone Consistency conditions on activities under NWPs 43 and 52, see F.2.b.

18. For NWPs 12, 57 and 58, the prospective permittee must submit a PCN to the District Engineer in accordance with General Condition 32 if the activity involves the discharge of dredged or fill material into waters of the U.S. associated with mechanized land clearing that results in the permanent conversion of forested or scrub-shrub wetlands to herbaceous wetlands for a maintained right-of-way.

E. ACTIVITY SPECIFIC REGIONAL CONDITIONS

Not applicable.

F. SECTION 401 WATER QUALITY CERTIFICATION (WQC) AND/OR COASTAL ZONE MANAGEMENT ACT (CZMA) CONSISTENCY DETERMINATION SUMMARY AND APPLICABLE CONDITIONS

1. Water Quality Certification (WQC)

a. WQC Denied

The Water Quality Certifications (WQC) for the following NWPs are denied; therefore, an Individual WQC, or evidence demonstrating a waiver was granted, from the South Carolina Department of Health and Environmental Control (SCDHEC) will be required for authorization under these NWPs:

NWPs 12, 14, 16, 17, 21, 23, 29, 34, 39, 44, 46, 49, 50, 54, 57, 58 and 59.

b. **WQC Granted With Conditions**

The following WQC Conditions, as stated in the SCDHEC's Notice of Department Decision dated November 25, 2020, are also considered 2021 NWP Regional Conditions:

i. For NWP 43, "Activities authorized by this certification are limited to maintenance of existing facilities, such as stormwater ponds, detention and retention basins, water control structures, outfall structures, emergency spillways, and existing ponds, that are proposed for use as water quantity or volume control. This NWP cannot be used for existing ponds that are proposed to be converted into water quality treatment facilities, such as sediment basins, sediment traps, or other similar structures."

ii. For NWP 51, "This NWP is not certified for activities that cause the loss of more than 300 linear feet of stream bed."

iii. For NWP 52, "This NWP is not certified for activities that cause the loss of more than 300 linear feet of stream bed."

c. **WQC Granted Without Conditions**

The WQCs for NWPs 3, 4, 5, 6, 7, 13, 15, 18, 19, 20, 22, 25, 27, 30, 31, 32, 33, 36, 37, 38, 40, 41, 42, 45, 48 and 53 were granted without conditions.

d. **No WQC Required**
NWPs 1, 2, 8, 9, 10, 11, 24, 28, 35, 55 and 56 do not require WQCs.

2. **Coastal Zone Consistency (CZC)**

a. **CZC Concurrence Denied**

The following NWPs were found to be inconsistent with the S.C. Coastal Zone Management Program; thus, the CZC concurrence is denied and an Individual CZC concurrence, or presumed concurrence for the proposed activity, will be required for these NWPs:

NWPs 12, 14, 16, 17, 21, 23, 24, 29, 34, 35, 39, 42, 44, 46, 49, 50, 51, 54, 55, 56, 57, 58 and 59.

b. **CZC Concurrence Granted With Conditions**

The following CZC Conditions, as stated in the SCDHEC's Notice of Department Decision dated November 25, 2020, are also considered 2021 NWP Regional Conditions:

i. For NWP 43, "Activities authorized by this certification are limited to maintenance of existing facilities, such as stormwater ponds, detention and retention basins, water control structures, outfall structures, emergency spillways, and existing ponds that are proposed for use as water quantity or volume control. This NWP cannot be used for existing ponds that are proposed to be converted into water quality treatment facilities such as sediment basins, sediment traps, or other similar structures."

ii. For NWP 52, "This NWP is not certified for activities that cause the loss of more than 300 linear feet of stream bed."

c. **CZC Concurrence Granted Without Conditions**

The CZCs for NWPs 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 15, 18, 19, 20, 22, 25, 27, 28, 30, 31, 32, 33, 36, 37, 38, 40, 41, 45, 48 and 53 were granted without conditions.

d. **No CZC required**

Not applicable.

3. Coastal Zone Consistency (CZC) General Condition

The following CZC General Condition, as stated in the SCDHEC 401/CZC Letter dated December 14, 2020, is considered a 2021 NWP Regional Condition:

For all NWPs, "Activities in the Critical Areas (as defined in 48-39-10, R 30.1(D) and R 30.10) require a direct permit from SCDHEC OCRM. SCDHEC OCRM's action on direct critical areas permits will serve as the consistency determination for the critical area activity."

G. DISTRICT POINT OF CONTACT

Tracy D. Sanders
USACE- Charleston District
69A Hagood Avenue
Charleston, South Carolina 29403
843-329-8044
Tracy.d.sanders@usace.army.mil
SAC.RD.Charleston@usace.army.mil

Permit Number: _____

Name of Permittee: _____

Date of Issuance: _____

Upon completion of the activity authorized by this permit and any mitigation required by the permit, sign this certification and return it to the following address:

U.S. Army Corps of Engineers
Regulatory Division
69A Hagood Avenue
Charleston, South Carolina 29403-5107

Please note that your permitted activity is subject to a compliance inspection by an U.S. Army Corps of Engineers representative. If you fail to comply with this permit you are subject to permit suspension, modification, or revocation.

==========

I hereby certify that the work authorized by the above referenced permit has been completed in accordance with the terms and conditions of the said permit, and required mitigation was completed in accordance with the permit conditions.

_____
Signature of Permittee

May 16, 2023

Ms. Lisa Hagood
York County Government
6 South Congress Street
York, South Carolina 29745
Lisa.Hagood@yorkcountygov.com

Re: 401 Certification for Authorization Pursuant to Nationwide Permit 58 (Utility Line Activities for Water and Other Substances)

Applicant Permit ID No.: SAC 2019-01862

Applicant: York County Government

County: York

Project: Harper Road Water Main

Dear Ms. Hagood:

On September 15, 2020, the U.S. Army Corps of Engineers (Corps) issued a proposed rule in the Federal Register (85 FR 57298) that announced the reissuance of all the existing NWPs and the proposal to issue five new NWPs. In response to the September 15th proposed rule, the South Carolina Department of Health and Environmental Control (Department) initiated actions to certify the proposed NWPs and on December 14, 2020, the Department issued a final certification in accordance with Section 401 of the Federal Clean Water Act (CWA), as amended, and a certification of consistency with the Coastal Zone Management Act (48-39-10 et.seq.).

On January 13, 2021, the Corps published a final rule in the Federal Register (86 FR 2744). In this notice, the Corps announced that it was reissuing only 12 of the existing NWPs and four new NWPs.

On March 8, 2021, the Corps' Charleston District issued their Final Regional Conditions for the 16 NWPs. In that notice, the Charleston District denied the Section 401 Water Quality Certification (401 Certification) for NWP 12, 29, 39, 44, 57 and 58 as well as the Coastal Zone Consistency (CZC) for NWPs 12, 29, 39, 42, 44, 51, 57 and 58. Subsequently, on February 7, 2022 the Corps' Charleston District denied the WQCs for NWP 14, 23, and 46. As a result, the Department is proposing to revise the

Individual State Certification for the NWPs that were denied by the Corps Regional conditions to include NWP 14, 23, and 46.

On September 16, 2022, a General State Certification to authorize activities in accordance with S.C. Code Ann. §§ 48-1-10 et seq. and S.C. Code Ann. Regulation 61-101, and S.C. Code Ann. § 48-39-10 et seq. and the S.C. Coastal Zone Management Program document was issued by the South Carolina Department of Health and Environmental Control (DHEC or the Department) for the Nationwide Permits (NWPs) 12, 14, 23, 29, 39, 44, 46, 57, and 58.

The Department has reviewed the above-reference project in accordance with the September 16, 2022 general certification and, provided the applicant adheres to the certification conditions outlined in the attached document, the Department has determined that there is a reasonable assurance that the work authorized will be conducted in a manner consistent with the certification requirements of Section 401 of the Clean Water Act.

If any questions arise please contact me at (803) 898-4179 or amedeemd@dhec.sc.gov.

Sincerely,

Morgan Amedee

Morgan D. Amedee
Water Quality Certification and Wetlands Section

cc: USACE Columbia Regulatory Office
Mr. Thomas G. Ballou

Nationwide Permit Number 58: Utility Line Activities of Water and Other Substances

Proposed Conditions for the 401 Water Quality Certification:

1. This NWP is not certified for pipelines with more than 10 aquatic site crossings (not including directionally bored crossings).
2. This NWP is not certified for activities located in or adjacent to (as determined by SCDHEC) waters defined (as per Regulation 61-68) as Outstanding National Resource Waters (ONRW), Outstanding Resource Waters (ORW), Trout Waters or, SCDNR designated State Scenic Rivers.
3. This NWP is not certified or activities that cause the loss of more than 300 linear feet of stream bed.

Water Supply Construction Permit
Bureau of Water

S.C. Department of Health and Environmental Control

Permission is Hereby Granted To: **YORK COUNTY**
6 S CONGRESS ST
YORK SC 29745

for the construction of a distribution system in accordance with the construction plans, specifications, design calculations and the SCDHEC Construction Permit Application signed by Charles E Shue, Professional Engineer, S.C. Registration Number: 9464.

Project Name: **PHASE 1 NORTH-SOUTH WATER TRANSMISSION MAIN - HARPER ROAD**
County: York
Location: HARPER RD, PARAHAM RD, AND CAMPBELL RD IN YORK

Project Description: Installation of approximately 15,100 LF-20" water main following Harper and Parham Roads , 2,900 LF-8" water main along Campbell Road, 19 fire hydrants, two blow-offs, and all necessary appurtenances.

Service By: Water will be provided by the York County Public Works (System Number: 4620003).

Permit Conditions: All products used for water disinfection must be properly registered for use in compliance with the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). Questions related to the FIFRA registration in labeling in South Carolina must be directed to the Department of Pesticide Regulation administered by the Clemson University Office of Regulatory Services.

Special Conditions:
1. All construction and materials for this project must conform to the Standard Specifications for York County.

In accepting this permit, the owner agrees to the admission of properly authorized persons at all reasonable hours for the purpose of sampling and inspection.

NOTE: This is a permit for construction only and does not constitute State Department of Health and Environmental Control approval, temporary or otherwise, to place the system in operation. No written approval shall be issued to place a drinking water project into operation until approval is obtained to place any associated wastewater project into operation. An Approval to Place in Operation is required and can be obtained following the completion of construction by contacting the LANCASTER EQC OFFICE at 803-285-7461. Additional permits may be required prior to construction (e.g., stormwater).

Permit Number: **35287-WS**
Date of Issue: **August 17, 2021**
Expiration Date: Construction must be completed and the Approval to Place in Operation granted prior to **August 17, 2024** or this permit will expire.

Douglas B. Kinard P.E, Director
Drinking Water and Recreational Waters Protection Division

MPM

S.C. Department of Health and Environmental Control
2600 Bull Street, Columbia, SC 29201 (803) 898-3432 www.scdhec.gov

Healthy People. Healthy Communities.

January 20, 2022

Lisa Hagood
York County, South Carolina
6 S Congress St
York, SC 29745

RE: Phase 1 N-S Water Transmission Main - Harper Rd, York County
NPDES Coverage Number: SCR10Z9PT

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 **January 20, 2022**. This project's general permit coverage number is **SCR10Z9PT**. The total disturbed area for this site is **10.4 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, SC 29720
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 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 803-898-3973.

Sincerely,

Eve Leitzsey

Eve I Leitzsey
Stormwater Permitting Section

CC: Charles Shue, Black & Veatch International Company
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.

YORK COUNTY GOVERNMENT

Planning & Development Services
(803) 909-7200

November 22, 2021

Lisa Hagood
York County
6 S. Congress St
York, SC 29745

Subj: NOTICE OF APPROVAL
STORMWATER MANAGEMENT AND SEDIMENT & EROSION CONTROL PLAN
PROJECT: Phase 1 N-S Water Transmission Main – Harper Rd
ADDRESS: Harper Rd, S Paraham Rd, Campbell Rd
PERMIT #21-186, TAX MAP #448-029, 495-001, 495-062, 450-042, 450-048, 491-003, 492-009, 489-012, 489-088, 489-056, 489-014, & 489-013

Dear Lisa Hagood,

This office has reviewed the Stormwater Management and Sediment Control plan for the subject project. We have found the plan to be acceptable in general compliance with York County Code of Ordinances, Chapter 152 – *Stormwater Management and Sediment Control*, and hereby issue this Notice of Approval. 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 copy of the approved plan bearing the York County approval stamp must be kept on the job site. Also, 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.

It is also emphasized that the preliminary land disturbance permit will not be issued and a Pre-construction Conference cannot be scheduled until the financially responsible person has received the NPDES General Construction Permit for the project. 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 South Carolina NPDES Construction General Permit, **please email the assigned environmental inspector below (York County Environmental Compliance) to schedule a Pre-construction Conference for this project.** The inspector will respond to all e-mail inquiries within 24-hours of your e-mail request during York County business hours. All e-mail requests should have "***Pre-Construction Meeting Request***" in the subject line and include the site address, permit number and relevant contact information. Pre-Construction meetings will be scheduled based

on availability. This meeting will occur on-site with a member from our office, the financially responsible party, the contractor, the site engineer and the financially responsible party's certified construction inspector. Your preliminary land disturbance permit will be issued at the Pre-construction Meeting. This land disturbance permit must also be posted at the job site prior to beginning land disturbance.

York County Environmental Compliance Inspector	**Click on the Email Link Below to Schedule your Pre-Construction Conference**
Ryan Singletary, CEPSCI	Ryan.Singletary@yorkcountygov.com

Following the Pre-Construction Conference, your assigned Environmental Compliance 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 is a pre-requisite before commencing any grading work.

Additionally, **this office must be contacted in writing should the plans require revision for any reason**. Plan revisions may require additional review and approval, and shall be submitted prior to commencement of construction work. If, following the commencement of this project, the Stormwater Management and Sediment Control plan is inadequate to meet the requirements of the Ordinance and/or the NPDES Construction General Permit, this office may require revisions to the plan and implementation of the revisions to insure compliance with the Ordinance and/or General Permit.

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 or Agencies. Stormwater management and sediment control review and approval does not guarantee nor imply subdivision, zoning, or building and code review or approval.

Sincerely,

Will Johnson, CSPR, CEPSCI
Environmental Compliance
Planning & Development Department

cc: **Lisa Hagood, P.E.**
Charles Shue, P.E.

NOTICE OF INTENT (NOI)
For Coverage(s) of Primary Permittees Under South Carolina NPDES General Permit For Stormwater Discharges From Construction Activities SCR100000
(Maintain As Part of On-Site SWPPP)

dhec

For Official Use Only
File Number: ____
Permit Number: SCR10 29PT
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 #: SCR10 29PT
FILE #: ____
DATE ISSUED: 1-20-2022
BY: ____

Date: 10/08/2021
Project/Site Name: Phase 1 N-S Water Transmission Main - Harper Rd **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: ____

A. **Primary Permittee Name:** York County, South Carolina
Mailing Address: 6 S Congress St City: York State: SC Zip: 29745
Phone: 803-818-5733 Fax: ____ Email Address: Lisa.Hagood@yorkcountygov.com

B. **Contact /ODSA Name** (If different from above OR if owner is a company): Lisa Hagood
Mailing Address: 6 S Congress St 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): ____
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:** Charles Shue
B. **Registered Professional** ☑ Engineer ☐ Landscape Architect ☐ Tier B Land Surveyor **S. C. Registration #:** 9464
C. **Company/Firm Name:** Black & Veatch International Company **S. C. COA # :** C01918
Mailing Address: 10925 David Taylor Drive Suite 280 City: Charlotte State: NC Zip: 28262
Phone: 704-510-8452 Fax: 704-548-8640 Email Address: ShueC@BV.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.) See attached drawings for map of pipe alignment
City/Town (If in limits): ____ Zip Code: 29745
Latitude: 35 ° 0 ' 19 " N Longitude: - 81 ° 8 ' 43 " W (Source): ☐ GPS ☑ Web Site: Google Earth
Tax Map Number (s) (List all): See attachment - Tax Map Numbers

C. Is this site located on **Indian Land**? ☐ Yes ☑ No

D. **Proposed Start Date**: 01/15/2022 **Proposed Completion Date**: 07/15/2023

E. **Disturbed Area** (nearest tenth of an acre): 10.4 **Total Area** (acres): 10.4

F. **Modification Only:**(nearest tenth of an acre): **Disturbed Area: Current (Approved) Area:** _____
Disturbed Area Change (Increase Only): _____ **Total Disturbed Area (After Change):** _____

G. Is this project part of a **Larger Common Plan for Development or Sale (LCP)**? ☐ Yes ☑ No
LCP/ Overall Development Name: _____ Check here if this is the **First Phase.** ☐

Previous State Permit/File Number: _____ **Previous NPDES Coverage Number:** SCR10 _____

H. Any **Flooding Problems** exist downstream of or adjacent to this site? ☐ Yes ☑ No (If yes, provide detailed description of flooding problems and applicable floodway/flood zone information in the C-SWPPP).

I. Active **S.C. DHEC Warning Notice, Notice to Comply or Notice of Violation** for this site or LCP? ☐ Yes ☑ No

J. List Relevant **State and Federal Environmental Permits or Approvals** applied for or obtained for this site (e.g., **RCRA, USACOE, Nationwide**, etc.). **If None, list None.**
Nationwide Permit 12, General Construction Permit for Public Water Systems

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: Little Allison Creek to Lake Wylie/Catawba (Pipe crosses Little Allison Creek)	8500' to Lake Wylie	FW
b. Next Nearest: Tributaries to Allison Creek (Pipe crosses branch Tributaries)	8500' to Lake Wylie	FW
c. Coastal Zone ONLY: Coastal Receiving Water (CRW): Not Applicable	Not Applicable	Not Applicable
d. Other Waterbodies: Not Applicable	Not Applicable	Not Applicable

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	0.014 Ac
b. Non-jurisdictional wetlands	☐ Yes ☑ No	☐ Yes ☑ No	☐ Yes ☑ No	_____ Ac
c. Other Water(s): _____	☐ Yes ☑ No	☐ Yes ☑ No	☐ Yes ☑ No	_____ Ac _____ Feet
d. Coastal Zone ONLY: Direct Critical Area	☐ Yes ☑ No	☐ Yes ☑ No	☐ Yes ☑ No	_____ Ac _____ Feet

5. If yes for impacts in B.3, describe each impact and activity, and list all permits (e.g., USACOE Nationwide Permit, DHEC General Permit) and certifications that have been applied for or obtained for each impact:
~~See attachment - Waters of the U.S. / State Information~~

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	NONE	NONE
b. USACOE **404 Permit or 401 Certification**	NWP12/SAC 2019-01862	
c. **SCNW Permit** If applied for or issued, identify **Date applied for or issued:** _____	NONE	☐ **All Activities** or ☐ **Some Activities (Describe):**

d. If a SCNW Permit has NOT been applied for provide an additional plan sheet that shows plan and profile views (drawn to scale) of the SCNW and associated activities. Include a description of all proposed activities on this plan.

D. **Impaired Waterbodies Information** (Attach additional sheet(s) as needed)

1. 303(d) Listed Impaired Waterbodies

a. Name of **Nearest DHEC Water Quality Monitoring Stations (WQMS)(s)** that receives stormwater from your construction site and/or thru an MS4 and the **Name of the Corresponding Waterbody?**		b. **Is this WQMS(s) listed on the most current 303(d) List? If No, proceed to Section 2 of this table. If Yes, complete items c thru f.**	c. List the pollutant(s) identified as **"CAUSES"** of the impairment	d. Will any pollutants causing the impairment be present in your site's construction stormwater discharges?	e. If **yes for d**, list the **"USE SUPPORT"** impairment(s) affected by the pollutant(s) identified in c.
Nearest DHEC WQMS(s)	**Corresponding Waterbody**				
CW-201	Lake Wylie	☑ Yes ☐ No	PCB	☐ Yes ☑ No	
CW-200	Lake Wylie	☐ Yes ☑ No		☐ Yes ☑ No	
		☐ Yes ☐ No		☐ Yes ☐ No	

f. If **yes for d** above, **will use of the BMPs proposed for your project ensure the site's discharges will NOT contribute to or cause further WQS violations for the impairment(s) listed in c?** ☐ Yes ☐ No
(NOTE: If no for f, this site is NOT eligible for coverage under the CGP). See Instructions.

2. TMDL Impaired Waterbodies

a. Name of **Nearest DHEC Water Quality Monitoring Stations (WQMS)(s)** that receives stormwater from your construction site and/or thru an MS4?	b. Has a TMDL(s) been developed for this WQMS(s)? **If No, identify as such below and proceed to Section VI. If Yes, complete items c thru f of this table.**	c. If **yes for b**, what pollutants are listed as "CAUSES" or causing the impairment?	d. If **yes for b**, has the standard been **"ATTAINED" or " Fully Supported"** for the impairment(s)?	e. If **no for d (Not Attained)**, will any pollutants causing the impairment be present in your site's construction stormwater discharges?
CW-201	☐ Yes ☑ No		☐ Yes ☐ No	☐ Yes ☐ No
CW-200	☐ Yes ☑ No		☐ Yes ☐ No	☐ Yes ☐ No
	☐ Yes ☐ No		☐ Yes ☐ No	☐ Yes ☐ No

f. If **yes for e** above, **are your discharges consistent with the assumptions and requirements of the TMDL(s)?** ☐ Yes ☐ No
(NOTE: If no for f, this site is NOT eligible for coverage under the CGP). See Instructions.

VI. Signatures and Certifications

DO **NOT** SIGN IN BLACK INK! **Read the Certifications below (in entirety). Provide date, printed name, and signatures below.** If you are a **New Owner/Operator**, as Primary Permittee you must also sign and date the applicable Comprehensive SWPPP Acceptance & Compliance Agreement below.

C-SWPPP PREPARER: "One copy of the C-SWPPP, all specifications and supporting calculations, forms, and reports are herewith submitted and made a part of this application. I have placed my signature and seal on the design documents submitted signifying that I accept responsibility for the design of the system. Further, I certify to the best of my knowledge and belief that the design is consistent with the requirements of Title 48, Chapter 14 of the Code of Laws of SC, 1976 as amended, pursuant to Regulation 72-300 et seq. (if applicable), and in accordance with the terms and conditions of SCR100000." **(This should be the person identified in Section III).**

Charles Shue — **Printed Name of C-SWPPP Preparer**

Charles E. Shue — **Signature of C-SWPPP Preparer**

9464 — **S. C. Registration #**

PRIMARY PERMITTEE: "I or I (on behalf of my company and its contractors and agents), as the case may be, certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I understand that DHEC enforcement actions may be taken if the terms and conditions of the C-SWPPP are not met and I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

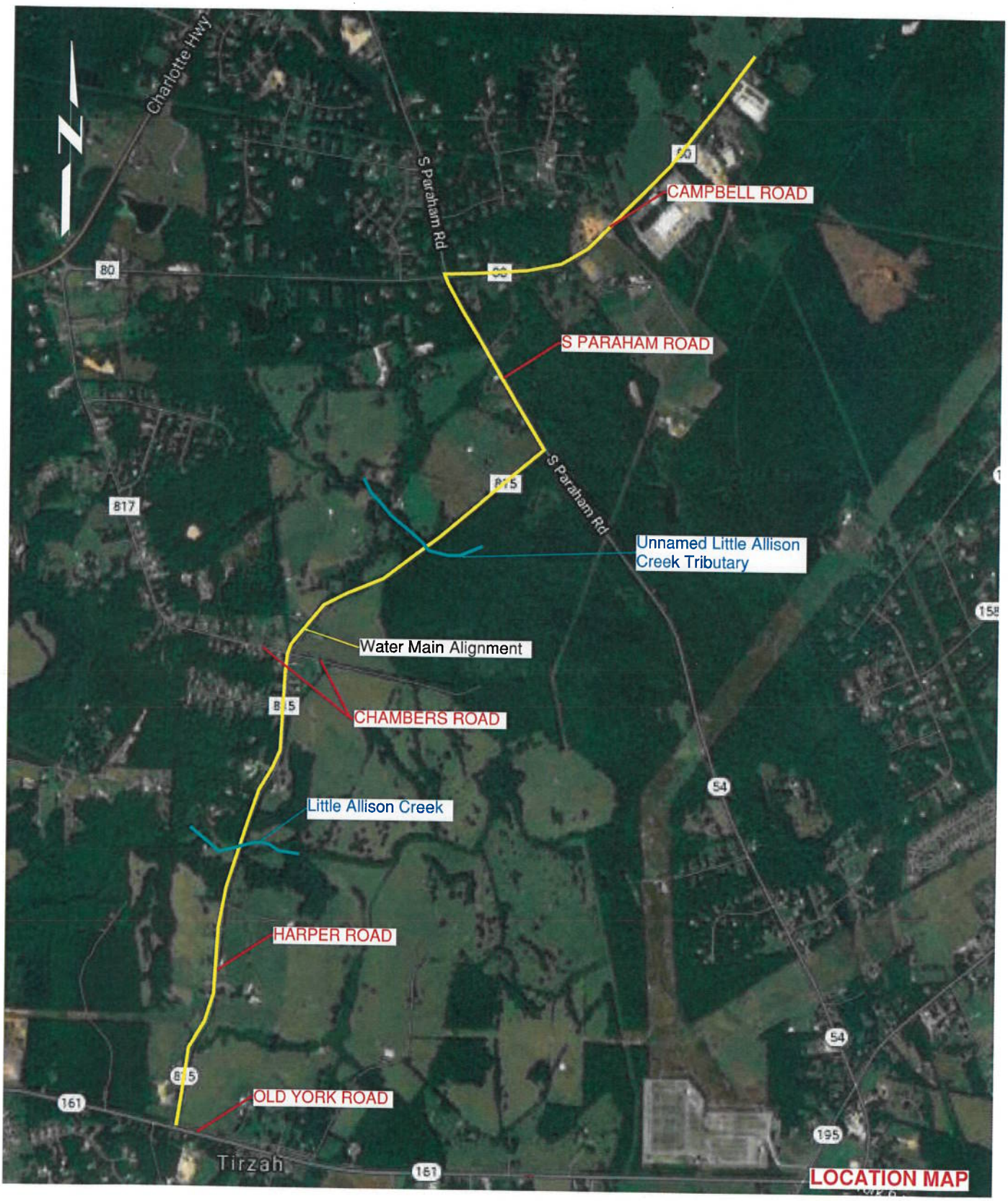
"I or I (on behalf of my company and its contractors and agents), as the case may be, also hereby certify that all land-disturbing construction and associated activity pertaining to this site shall be accomplished pursuant to and in keeping with the terms and conditions of the approved plans and SCR100000. I also certify that a responsible person will be assigned to the project for day-to-day control. I hereby grant authorization to the to S. C. Department of Health and Environmental Control (DHEC) and/or the local implementing agency the right of access to the site at all times for the purpose of on site inspections during the course of construction and to perform maintenance inspections following the completion of the land-disturbing activity." **(See Section 122.22 of S.C. Reg. 61-9 for signatory authority information.)** Having understood the above information, I am signing this certification as Primary Permittee to the aforementioned NPDES general permit."

Lisa Hagood — **Printed Name of Primary Permittee**

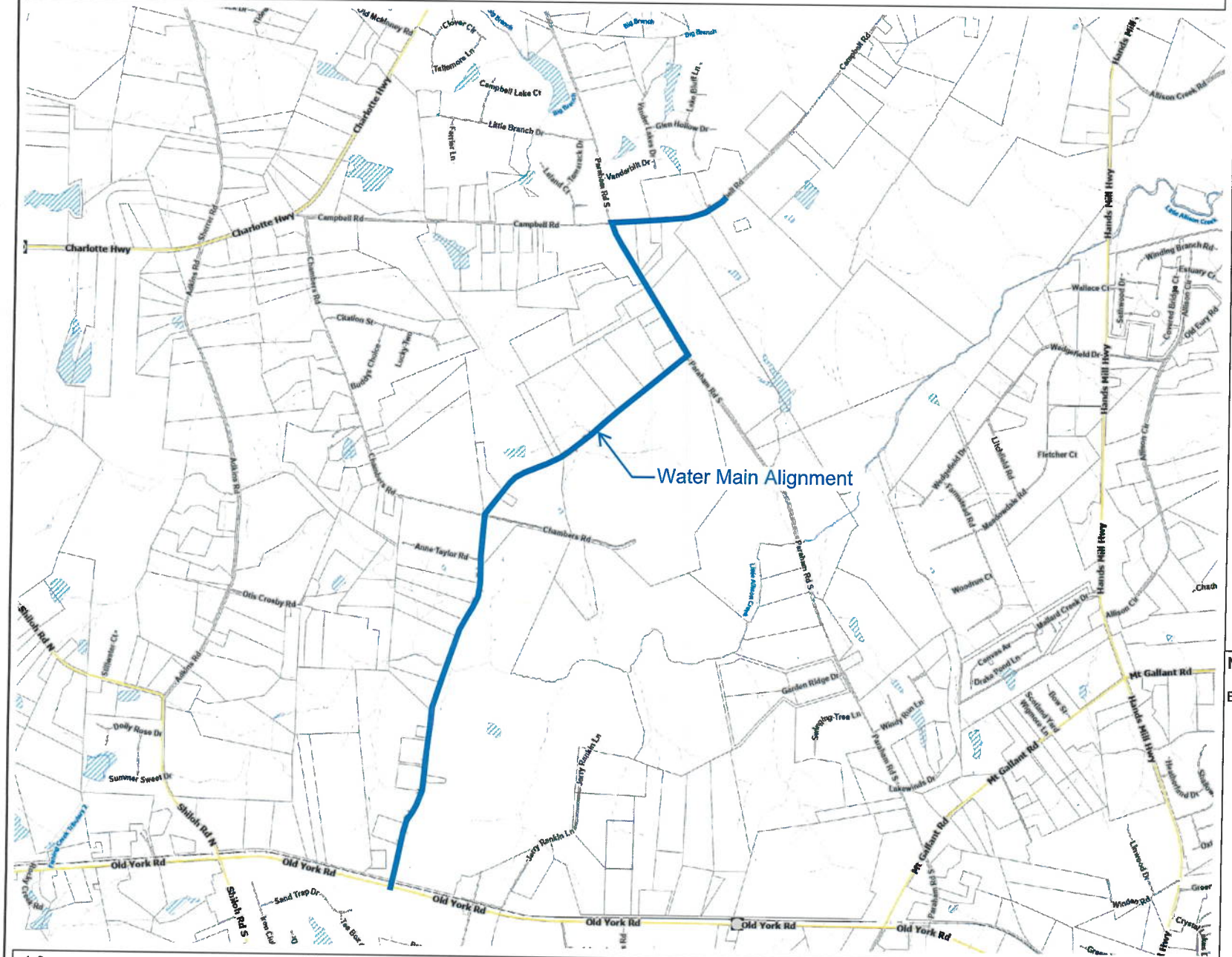
Lisa Hagood — **Signature of Primary Permittee**

County Engineer — **Title/Position**

10-14-2021 — **Date Signed**


Charlotte Hwy
S Paraham Rd
CAMPBELL ROAD
80
S PARAHAM ROAD
S Paraham Rd
817
Unnamed Little Allison Creek Tributary
Water Main Alignment
CHAMBERS ROAD
Little Allison Creek
54
HARPER ROAD
OLD YORK ROAD
161
Tirzah
195
LOCATION MAP

Phase 1 North South Water Transmission Main - Harper Road



Legend

Address
- Occupied
- Meter
- Vacant

1: 32,000

Notes

Enter Map Description

1.0 0 0.51 1.0 Miles

NAD_1983_StatePlane_South_Carolina_FIPS_3900_Feet_Intl
GIS@YorkCountyGov.com

Printed: 6/25/2020

Attachment - Tax Map Numbers

Phase 1 North-South Water Transmission Main
Harper Road
York County, SC

Tax Map Numbers	
Tax Map Numbers	**Owner**
4480000029	WILLIAM D. JOHNSON DENISE L. JOHNSON
4950000001	RICHARD C. HARPER, JR. M. CRAIG HARPER
4950000062	JONATHAN WESLEY BLANCHARD CARRIE HARPER
4500000042 4500000048	ROY KARNAP II CLINTON H. DOVER
4910000003	WUSF 4 YORK FARM, LLC
4920000009	WUSF 4 YORK FARM, LLC
4890000012	JOHN REID SMITH KAREN S. SMITH
4890000088	ORANGE BANK AND TRUST CO.
4890000056	RON KIEU CHANSY LACH
4890000014	KAY K. MCCUTCHEON
4890000013	TERRY V. WALLACE, JR. JACLYN WALLACE

Attachment - Waters of the U.S / State Information

Application section V. Water Body Information, sub-section B. Waters of the U.S. / State Information, item 5. – Impacts descriptions and permits

The 20-inch and 8-inch water transmission main alignments cross 3 wetlands/streams. The water main will be installed in the stream crossing by open-cut installation, creating temporary impacts. Following the installation of the water main in the wetland/stream areas, the stream banks will be stabilized and restored. Measures were taken in design to minimize the disturbance within the wetland/stream areas and limit disturbance to 0.014 acres.

Permit applications have been submitted to the USACOE for a Nationwide Permit 12 and to SCDHEC for a General Permit. Approval from the USACOE was issued on January 13, 2020.

Comprehensive Stormwater Pollution Prevention Plan (C-SWPPP) For Construction Activities:

Project/Site Name:

Phase 1 North-South Water Transmission Main – Harper Road

Project Address/Location:
Old York Rd, Harper Rd, Paraham Rd, Campbell Rd, Chambers Rd
York, SC 29745
803-818-5733
Lisa.Hagood@yorkcountygov.com

Primary Permittee:

York County, SC

Permittee/Owner Contact:
6 S Congress St
York, SC 29745
803-818-5733
Lisa.Hagood@yorkcountygov.com

SWPPP Preparer:

Black & Veatch International Company
Charles Shue
10925 David Taylor Dr, Suite 280
Charlotte, NC 28262
704-510-8452
ShueC@BV.com

Day-to-Day Operator:

York County, SC
Lisa Hagood
6 S Congress St
York, SC 29745
803-818-5733
Lisa.Hagood@yorkcountygov.com

(Leave Blank if not known.)

C-SWPPP Preparation Date:

06 / 25 / 2020

Modification Dates:
Modification I: __ __ / __ __ / __ __ __ __
Modification II: __ __ / __ __ / __ __ __ __

Table of Contents

Section 1 *PROJECT OVERVIEW*

Section 2 *SITE FEATURES AND SENSITIVE AREAS*

Section 3 *COMPLIANCE REQUIREMENTS*

Appendices *REFERENCE MATERIAL*

C-SWPPP is acronym for Comprehensive Storm Water Pollution Prevention Plan
****OS-SWPPP is acronym for On-Site Storm Water Pollution Prevention Plan***

Section 1 PROJECT OVERVIEW

1.1 Narrative (CGP Section 3.2.1)

Construction Activities and BMP Summary

The Phase 1 North-South Transmission Main project has been identified as an improvement to the existing York County, SC, water distribution system that will increase capacity to meet growth on the west side of the retail service area and to increase system resiliency. This project includes the installation of approximately 15,100 linear feet of 20-inch transmission main from the existing 18-inch water main at Old York Rd with the route following Harper and Parham Roads, and approximately 2,900 linear feet of 8-inch water main along Campbell Road connecting to the existing water main.

Sediment run-off will primarily be controlled through the use of silt fence along the pipe alignment on the downhill side of the disturbed area. Additionally, erosion control matting, sediment logs, and rip-rap storm drain outlet protection will be installed to stabilize stream banks and steep slopes, slow sediment-laden run-off and allow for settling, and filter out sediment particles. Erosion control BMPs are to be installed prior to any land disturbing activities. Once the water line has been installed and the excavation filled in, all disturbed areas will be seeded.

Construction of the water main and installation of erosion control measures will be completed in a progressive manner. As the water main is constructed in one location, subsequent sections will be excavated in preparation of pipe installation and previous sections will be filled and seeded. Erosion control BMPs are to be installed prior to land disturbing activities and are to remain until the area is stabilized with vegetation.

Pre-Development Conditions

The water main will be installed along existing paved roads in a rural area. Run-off from the site currently discharges into drainage channels along the road which discharge to additional pervious areas for infiltration or to existing streams and creek tributaries.

Post-Development Conditions

Following the installation of the water main, surface conditions will be restored to pre-construction conditions. No additional impervious surfaces will be created as part of this project. Post-construction stormwater drainage will match pre-construction conditions.

Flooding Issues

No existing flooding problems exist at the site due to pre-construction drainage conditions. Following construction, pre-construction conditions will be restored, and no potential flooding issues will be created.

Residential Subdivision Information (Not Applicable)

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. 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 the Owner's Site Engineer 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: silt fence, rip rap outlets, erosion control matting, and sediment logs. 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.

Any Structural Control BMPs that are being proposed within the 100-yr floodplains will require approval from the local regulating agency, since SC DHEC does not have the authority to regulate within the associated flood plains. Approvals from the local agency will be located in Appendix C, Additional Approvals/Certifications of this SWPPP. If the required approval is not located in this SWPPP, please contact the Primary Permittee listed on the title sheet of this SWPPP before performing work within the 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

No water quality BMPs during construction are proposed or required.

Post-Construction Water Quality

The disturbed area for the construction site is less than 5 acres. The post-construction conditions will match pre-construction. Permanent water quality controls and BMPs are not required.

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 form 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 the 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 C-60 of the construction site plans. Each item/step of that construction sequence has been listed is the sequence that they should be implemented.

For additional information or questions on the sequencing please contact the SWPPP Preparer or the Permittee referenced on the cover of this SWPPP.

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

Buffer Zone Narrative (Compliance Option A)

Per Section 3.2.4.C of the CGP, a buffer zone has been proposed along the Little Allison Creek and the unnamed tributary of Little Allison Creek. The creek and tributary are shown on sheets C-05 and C-11 of the construction site plans. A buffer zone width of 30-ft will be maintained along this surface water, as directed by Compliance Option A from the CGP, except for the installation of the pipe within the buffer zone crossing the creek and tributary. Efforts will be made to the maximum extent practical to reduce disturbance within the buffer zone. All equipment stockpiling and staging will be located outside of the buffer zone.

This 30-ft buffer zone is to be identified on the site by flagging, installation of tree protection fence or other practices to make it readily identifiable prior to the implementation of other perimeter BMPs and commencement of construction activities.

All perimeter BMPs and sediment control BMPs, as shown on sheets C-05 and C-11 of the construction site plans, are to be installed prior to the discharge of stormwater runoff into the buffer zone from disturbed areas.

Inspection and maintenance of the buffer zone is to be conducted until final stabilization is reached, or as otherwise approved. All maintenance procedures and inspection requirements for the provided buffer zones can be found on plan sheets C-05 and C-11.

Additional Buffer Zone Information

All construction sites that contain or are adjacent to surface waters must provide a vegetated buffer of at least 30 linear feet, or 45 linear feet when the surface water is classified as a Sensitive Waters (Section 3.2.4.C of South Carolina's CGP). This requirement is only applicable during construction. Work may be conducted within the buffer area once all disturbed areas discharging towards the buffer zone have had final stabilization measures implemented. This work must have been included within the SWPPP at the time of coverage approval.

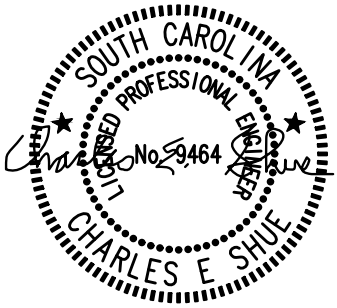
Buffer Zones Requirements should be explained in detail during the Pre-Construction Conference. These details should include the outlining of the exact location of where the buffer starts and ends, the sediment and erosion controls precluding the buffer and all other general information pertinent to maintaining the buffer zone area during construction.

All contractors and sub-contractors shall be made aware of the buffer zones and establish a work procedure that preserves and protects these areas. The buffer zones should be flagged prior to any perimeter control placement and, most importantly, before mass clearing and grubbing. These areas must also be inspected during construction for areas of excessive sediment impacts, which may need to be removed if sediment impacts are evident within the buffer zone.

In the event that a portion of a buffer is accidentally disturbed, the contractor shall temporarily stabilize the area as soon as possible and consult with the construction site's inspector, permittee, and/or engineer on the installation of any additional sediment control or erosion prevention measure to protect the portion of the buffer still undisturbed.

1.6 Certification Statement

"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."



(Signature and Seal)

Name Charles Shue

Title Engineering Manager

Date February 24, 2021

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 it's 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

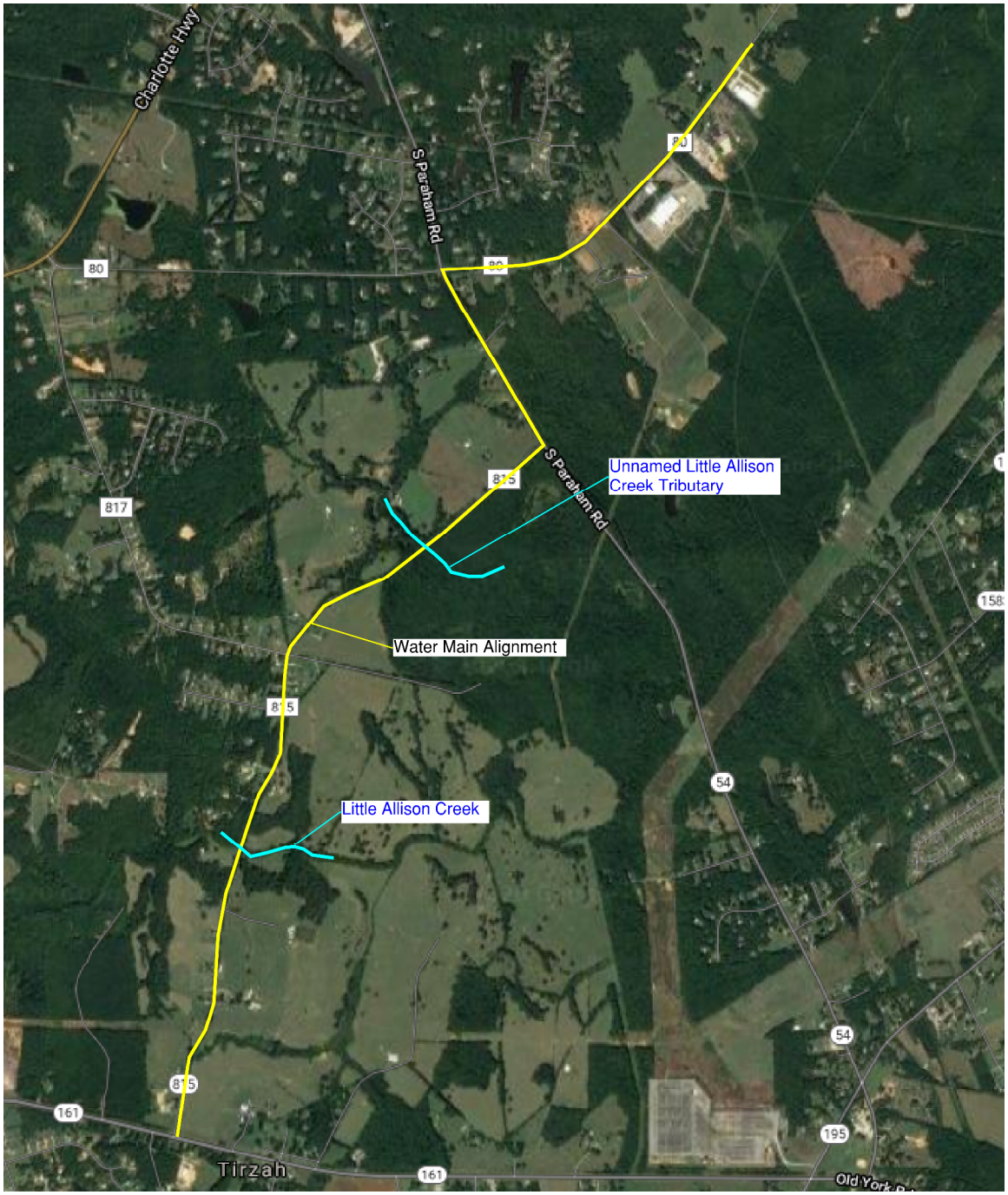
***Area where material/chemical is used on site.**

2.2 Surface Waters

Stormwater runoff from the proposed construction sites discharges from along the water main alignment to Little Allison Creek and an unnamed tributary of Little Allison Creek, both of which are located in the southern half of the pipe alignment. Little Allison Creek discharges to Lake Wylie in the Catawba River system. No stormwater collection system or discharge outfalls will be provided. The site will continue to drain as done currently in the pre-construction conditions.

Approximately 0.014 AC of the stream crossings at Little Allison Creek and its unnamed tributary have been identified as jurisdictional wetlands. This area proposed to be temporarily disturbed for installation of the water main. The stream crossings are shown in Figure 2.2. A 404 permit has been approved the USACOE and a DHEC 401 Water Quality Certification. All permit approvals are to be included in Appendix L.

Figure 2.2: Stream Crossings



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 heath 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 heath 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 contributes to each of the above listed impairments.

Site-Specific Requirements

This construction site's discharges drain into WoS, Lake Wylie, that is Impaired for the following impairments: Total Phosphorus, Chlorophyll-a, PCB. 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:

- Employee training/acknowledgement during the Pre-Construction Meeting;
- Installation of additional BMPs to meet the water quality standards (as directed by the SWPPP preparer and as approved by the regulating agency); and
- All sediment control BMPs have been designed reduce run-off from the site.

2.4 Critical Areas (CZC only) (Not Applicable)

The project is not located within the coastal zone.

Section 3

Compliance Requirements

3.1 SWPPP Availability

A copy of the SWPPP shall be retained on-site at all times during land disturbing activities and shall be made available to all parties associated with any land disturbing activities, including Contractor, sub-contractors, Engineer, Owner, and all regulatory officials for their records and retention throughout the construction period.

3.2 Pre-Construction Conferences

A pre-construction conference shall be held prior to any land disturbing activities. The responsibilities and requirements of the SWPPP shall be relayed by the SWPPP preparer or their designee to those responsible for performing construction activities at the site. The date and location of the pre-construction conference shall be determined following the selection of the Contractor. The attendance of the pre-construction conference shall be recorded in Appendix G.

3.3 Inspection Requirements

All erosion control BMPs shall be inspected every seven (7) days or after each rainfall occurrence that exceed ½-inch, in accordance with the construction sequence on sheet C-60. Additional site and BMP inspections shall be performed as needed in between scheduled inspections. All inspections shall be documented in Appendix E. Rain gauges shall be used to document rainfall quantities and all rainfalls shall be documented in Appendix F.

3.4 Maintenance Requirements

All damaged, ineffective, or sediment-loaded BMPs shall be repaired or replaced as needed immediately. All erosion control BMPs shall be properly maintained during all phases of construction until the completion of all construction activities and disturbed areas have been stabilized. Maintenance requirements for all BMPs are located on sheet C-60.

No permanent BMPs are to be installed as part of this project.

3.5 Record Keeping

Additional records shall be kept in Appendix G. These records include the following:

- Pre-Construction Attendance Roster
- Contractor and Sub-Contractor Log – record of contact information for all those engaging in land disturbing activities, dates on-site, and work performed.
- SWPPP Modification Log – record of all revisions to the approved SWPPP.
- Soil Stabilization Log – record of the start of land disturbing activities and the date of stabilization.

3.6 Final Stabilization

All disturbed areas shall be stabilized following the permanent or temporary completion of work. Stabilization measures shall be initiated as soon as practical in areas of the site where construction activities have temporarily or permanently ceased, but in no case more than 15 days after work has ceased. Stabilization can be achieved through the use of seeding, matting, rip rap, or other methods. Refer to the erosion control drawings, details, construction sequence and the environmental protection specifications for additional information regarding stabilization methods and requirements.

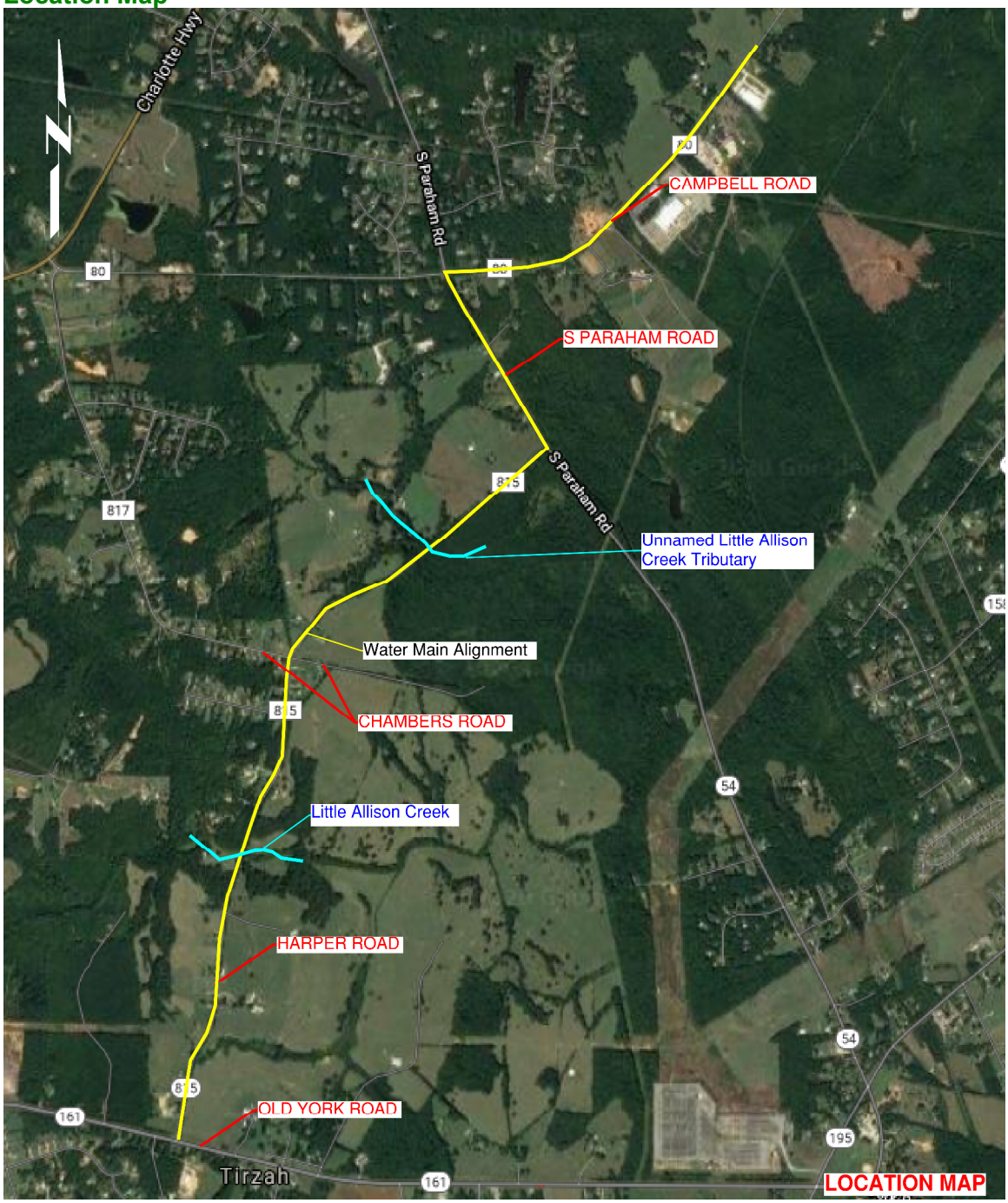
Once all disturbed areas have been permanently stabilized, the Notice of Termination is to be submitted.

Appendix A

Site Maps

The maps located in this appendix have been obtained from various sources or have been developed by the SWPPP Preparer.

Location Map



Additional location maps are located in the construction drawings.

Site Maps

See the construction drawings for enlarged site drawings with limits of disturbance and all applicable erosion control BMPs.

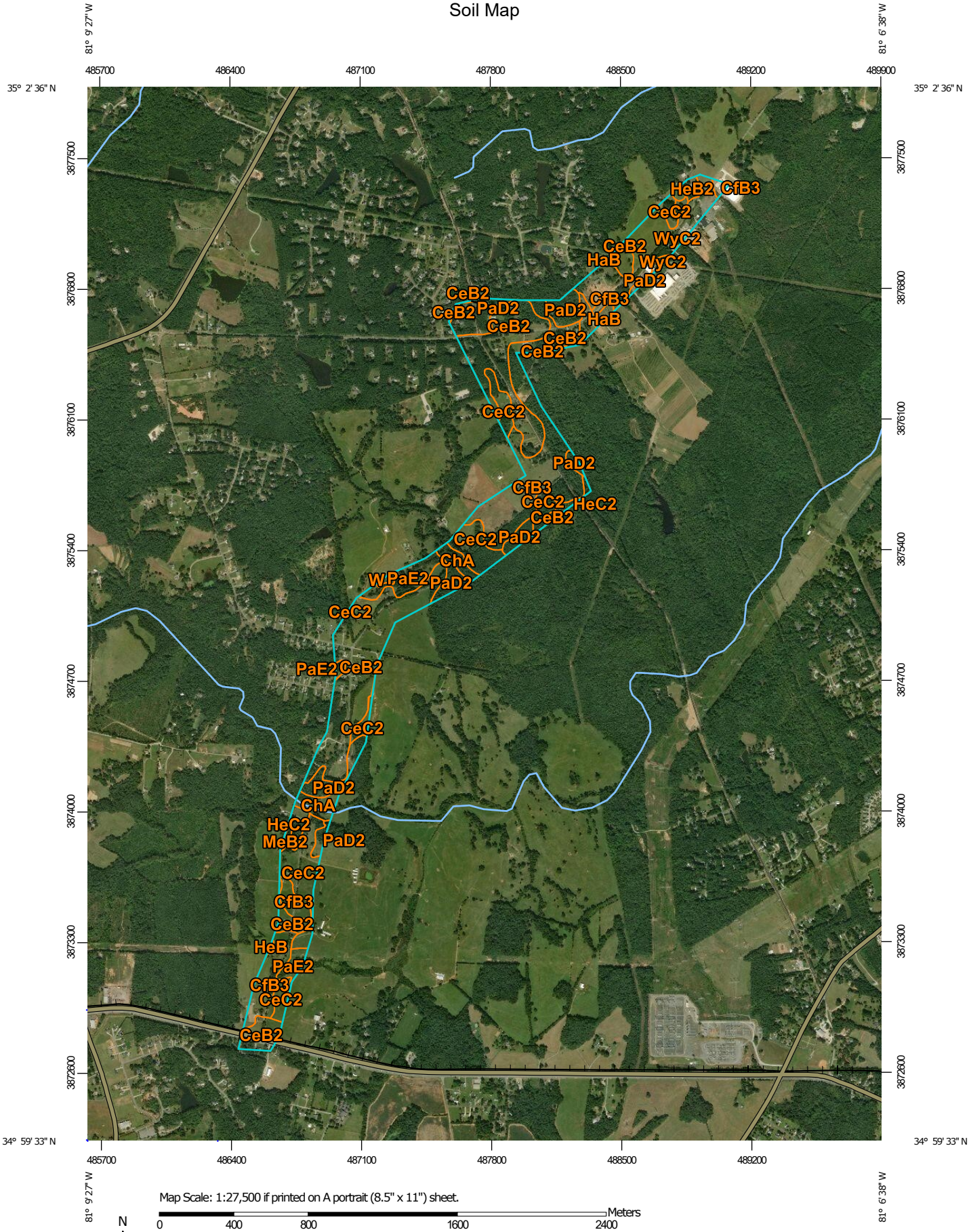
Topographic Maps

See the construction drawings for enlarged site drawings with 1-ft contours gathered through site survey, project boundaries, road names, and other geographic features.

Soils Maps

See the attached NRCS Soil Map on the following page showing the soil types in the vicinity of the water main alignment.

Soil Map



Map Scale: 1:27,500 if printed on A portrait (8.5" x 11") sheet.

N

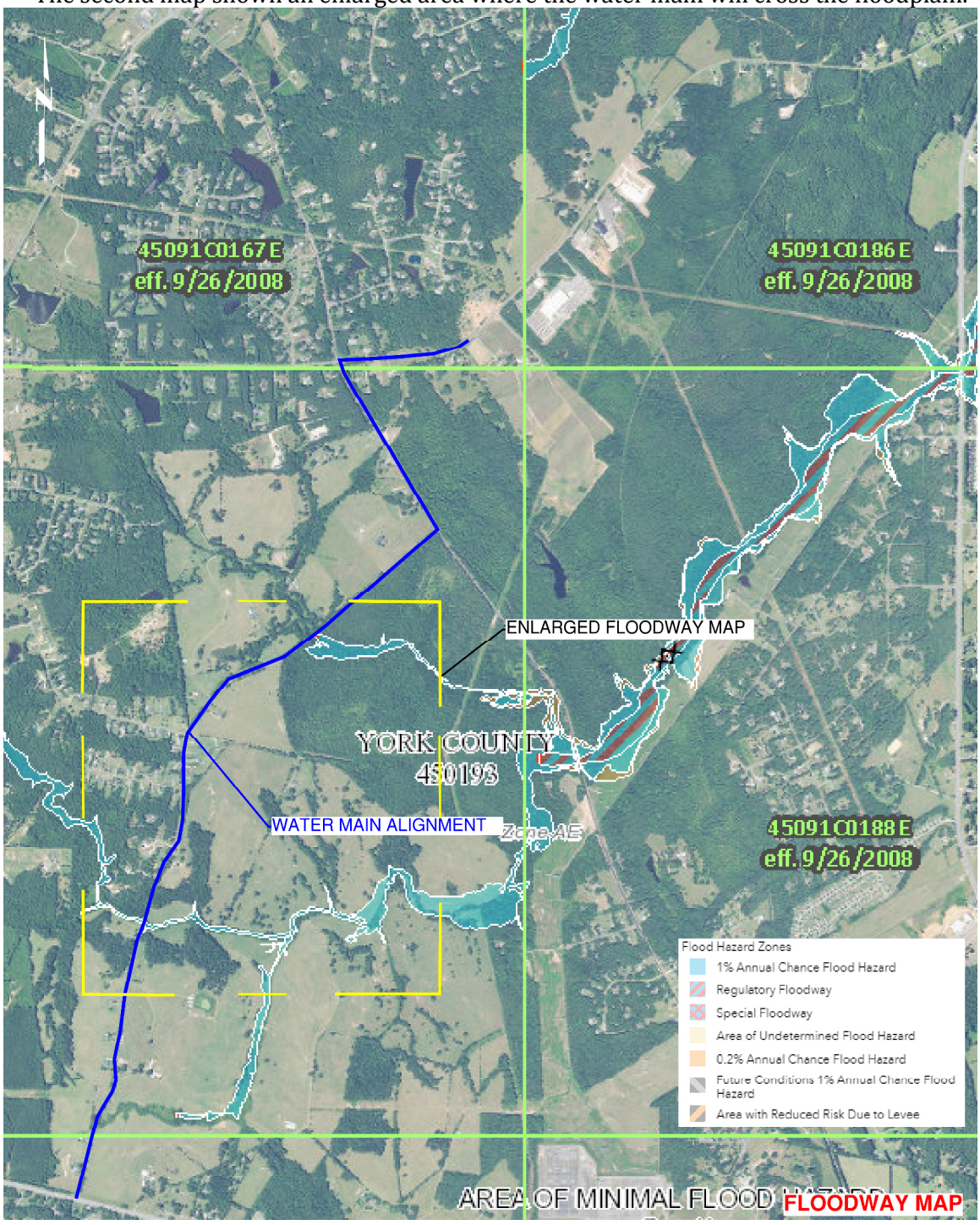
Meters: 0 400 800 1600 2400

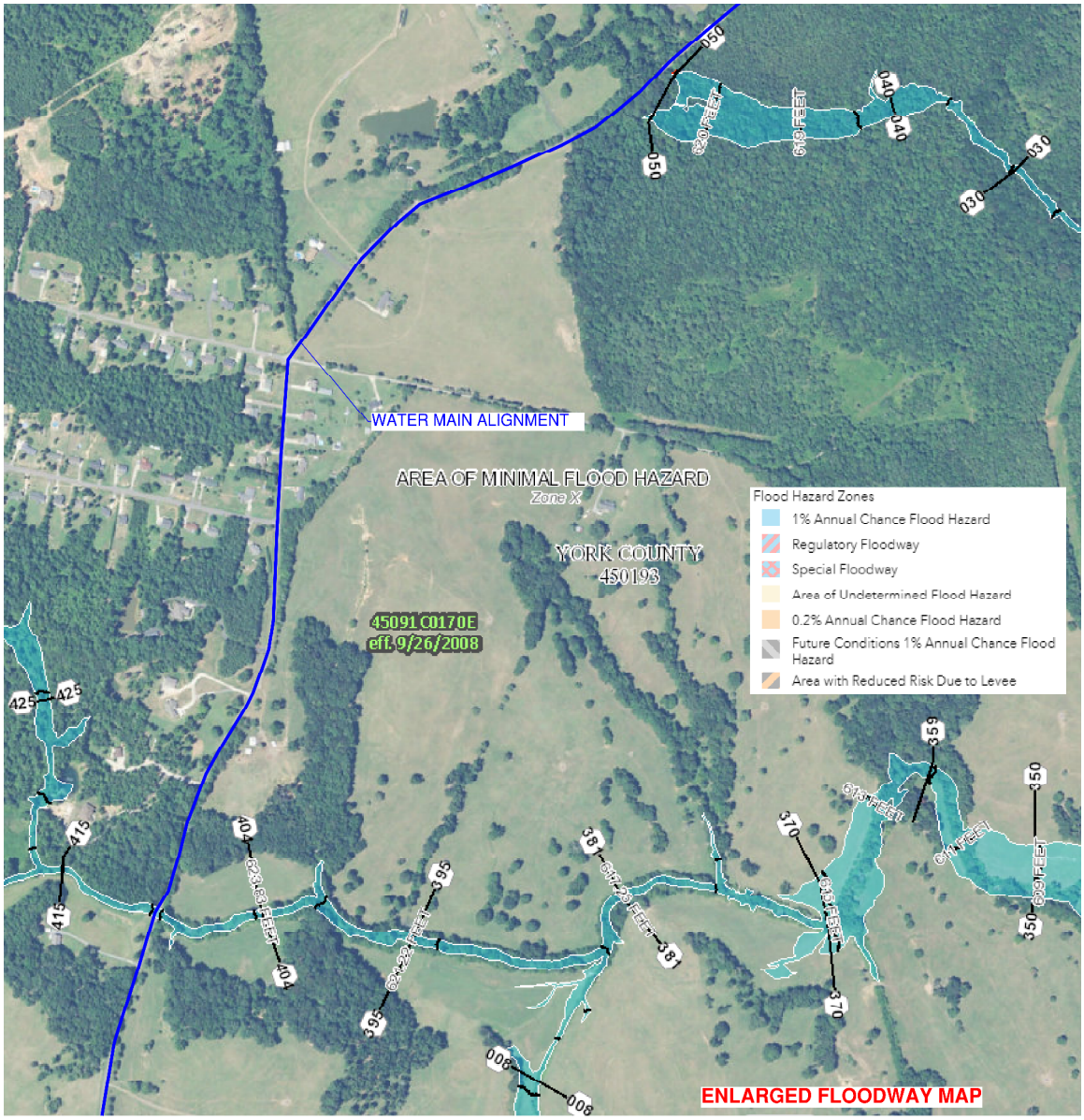
Feet: 0 1000 2000 4000 6000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

Floodway Maps

See the floodway maps below. The first map shows the full extents of the water main. The second map shown an enlarged area where the water main will cross the floodplain.




WATER MAIN ALIGNMENT
AREA OF MINIMAL FLOOD HAZARD
Zone X
YORK COUNTY
450193
45091C0170E
eff. 9/26/2008
Flood Hazard Zones
1% Annual Chance Flood Hazard
Regulatory Floodway
Special Floodway
Area of Undetermined Flood Hazard
0.2% Annual Chance Flood Hazard
Future Conditions 1% Annual Chance Flood Hazard
Area with Reduced Risk Due to Levee
ENLARGED FLOODWAY MAP

Appendix B

Drainage Maps

Drainage Maps

See the construction drawings for maps that include an overall site plan, enlarged site plans (1"=40' scale), 1-ft contours, all existing stormwater structures, erosion control BMPs, and additional information for pre-construction and post-construction conditions. For this project, a water main will be installed in an excavated trench and buried. The site will then be restored to the pre-construction conditions. No new impervious surfaces will be added as part of the project, all site and stream disturbances are temporary, and no new grading will be done. Therefore, the post-construction conditions will match those pre-construction. All drainage from the site flows to Little Allison Creek or unnamed tributaries, all of which discharge to Lake Wylie in the Catawba River system, located to the east of the site.

Appendix C

Additional Approvals/Certifications

USACE's Jurisdictional Determinations, Section 404 Permits, Nationwide Permit 12 Approvals and Applications, and SC DHEC 401 Water Quality Certification

See the attached application and US Army Corp of Engineers Nationwide Permit 12 approval on the following pages. The attached documents include the jurisdictional determination for the projects and all documents were approved by USACE Section 404 and SCDHEC for 401 Water Quality Certification as part of the USACE's permit approval.

Joint Federal and State Application Form
For Activities Affecting Waters of the United States
Or Critical Areas of the State of South Carolina

This Space for Official Use Only
Application No._____
Date Received_____
Project Manager_____
Watershed # _____

Authorities: 33 USC 401, 33 USC 403, 33 USC 407, 33 USC 408, 33 USC 1341, 33 USC 1344, 33 USC 1413 and Section 48-39-10 et. Seq of the South Carolina Code of Laws. These laws require permits for activities in, or affecting, navigable waters of the United States, the discharge of dredged or fill material into waters of the United States, and the transportation of dredged material for the purpose of dumping it into ocean waters. The Corps of Engineers and the State of South Carolina have established a joint application process for activities requiring both Federal and State review or approval. Under this joint process, you may use this form, together with the required drawings and supporting information, to apply for both the Federal and/or State permit(s).

Drawings and Supplemental Information Requirements: In addition to the information on this form, you must submit a set of drawings and, in some cases, additional information. A completed application form together with all required drawings and supplemental information is required before an application can be considered complete. See the attached instruction sheets for details regarding these requirements. You may attach additional sheets if necessary to provide complete information.

1. Applicant Last Name: Hagood	11. Agent Last Name (agent is not required): Ballou
2. Applicant First Name: Lisa	12. Agent First Name: Thomas G.
3. Applicant Company Name: York County Government	13. Agent Company Name: Ballou Associates
4. Applicant Mailing Address: 6 South Congress Street	14. Agent Mailing Address: 6326 Saint Andrews Road
5. Applicant City: York	15. Agent City: Columbia
6. Applicant State: SC / 7. Applicant Zip: 29745	16. Agent State: SC / 17. Agent Zip: 29212
8. Applicant Area Code and Phone No.: 803-818-5733	18. Agent Area Code and Phone No.: 803 331-9371
9. Applicant Fax No.:	19. Agent Fax No.:
10. Applicant E-mail: Lisa.Hagood@yorkcountygov.com	20. Agent E-mail: tballou@usit.net

21. Project Name: Harper Road Water Main	22. Project Street Address: Harper Road, Paraham Road, and Campbell Road
23. Project City: York / 24. Project County: York	25. Project Zip Code: 28715 / 26. Nearest Waterbody: Unnamed trib to Sugar Creek
27. Tax Parcel ID: The project limits includes portions of 26 TMS tracts and SCDOT right of way.	28. Property Size (acres): 23.43
29. Latitude: 34.997481, -81.147365 to 35.037430, -81.122201	30. Longitude:

31. Directions to Project Site (Include Street Numbers, Street Names, and Landmarks and attach additional sheet if necessary):

From Columbia, take I-77 north to SC 901 north to SC 161 west to Harper Road at the southern end of the project.

32. Description of the Overall Project and of Each Activity in or Affecting U.S. Waters or State Critical Areas (attach additional sheets if needed)

See attached sheet

33. Overall Project Purpose and the Basic Purpose of Each Activity In or Affecting U.S. Waters (attach additional sheets if needed):

The overall purpose of the project is construct to provide safe and sanitary drinking water service to homes and businesses in the project area and to provide reinforcement and dependability to the County's water system. The basic purpose of each activity in US waters is to construct a water main line.

34. Type and quantity of Materials to Be Discharged

Dirt or Topsoil:	110	■ cubic yards
Clean Sand:		☐ cubic yards
Mud:		☐ cubic yards
Clay:		☐ cubic yards
Gravel, Rock, or Stone:		■ cubic yards
Concrete:		☐ cubic yards
Other (describe):		☐ cubic yards
TOTAL:	110	cubic yards

35. Type and Quantity of Impacts to U.S. Waters (including wetlands).

Filling:		☐ acres	☐ sq.ft.		☐ cubic yards
Backfill & Bedding:	0.01	■ acres	■ sq.ft	600	■ cubic yards
Landclearing:		☐ acres	☐ sq.ft		☐ cubic yards
Dredging:		☐ acres	☐ sq.ft.		☐ cubic yards
Flooding:		☐ acres	☐ sq.ft.		☐ cubic yards
Draining/Excavation:		☐ acres	☐ sq.ft.		☐ cubic yards
Shading:		☐ acres	☐ sq.ft.		☐ cubic yards
TOTALS:	0.01	acres	600	sq.ft.	110 cubic yards

36. Individually list wetland impacts including mechanized clearing, fill, excavation, flooding, draining, shading, etc. and attach a site map with location of each impact (attach additional sheets if needed).

Impact No.	Wetland Type	Distance to Receiving Water body (LF)	Purpose of Impact (road crossing, impoundment, flooding, etc)	Impact Size (acres)
			Total Wetland Impacts (acres)	

37. Individually list all seasonal and perennial stream impacts and attach a site map with location of each impact (attach additional sheets)

Impact No.	Seasonal or Perennial Flow	Average Stream Width (LF)	Impact Type (road crossing, impoundment, flooding, etc)	Impact Length (LF)
1	Perennial	12	Water main crossing	30
2	Perennial	8	Water main crossing	30
			Total Stream Impacts (Linear Feet)	60 lf temporary

38. Have you commenced work on the project site? ☐ YES ■ NO If yes, describe all work that has occurred and provide dates.

39. Describe measures taken to avoid and minimize impacts to Waters of the United States:

Each of the proposed stream crossings is perpendicular to the channel, and the excavated trench is the smallest needed to construct the proposed water main. A stream crossing at Station 178 was eliminated by crossing over Campbell Road, reducing impacts to about 25 lf of stream at that location. *All impacts will be temporary*.

40. Provide a brief description of the proposed mitigation plan to compensate for impacts to aquatic resources or provide justification as to why mitigation should not be required (Attach a copy of the proposed mitigation plan for review).

The applicant requests that no compensatory mitigation be required. All affected streams will be restored to the original grades. Temporary stream diversions will be accomplished using woven plastic sandbags. The proposed project is a York County public works project.

41. See the attached sheet to list the names and addresses of adjacent property owners.

42. List all Corps Permit Authorizations and other Federal , State, or Local Certifications, Approvals, Denials received for work described in this application.

43. Authorization of Agent. I hereby authorize the agent whose name is given on page one of this application to act in my behalf in the processing of this application and to furnish supplemental information in support of this application. [1]

Hagood, Lisa Digitally signed by Hagood, Lisa Date: 2019.11.05 11:54:04 -05'00'

Applicant's Signature Date

44. Certification. Application is hereby made for a permit or permits to authorize the work and uses of the work as described in this application. I certify that the information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent for the applicant. [1]

Hagood, Lisa Digitally signed by Hagood, Lisa Date: 2019.11.05 11:54:28 -05'00'

Applicant's Signature Date

Thomas G. Ballou Digitally signed by Thomas G. Ballou DN: cn=Thomas G. Ballou, o=Ballou Associates, ou, email=tballou@usit.net, c=US Date: 2019.10.24 16:38:32 -04'00'

Agent's Signature Date

[1]The application must be signed by the person who desires to undertake the proposed activity or it may be signed by a duly authorized agent if the authorization statement in blocks 11 and 43 have been completed and signed. 18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

32. Description of the Overall Project and of Each Activity in or Affecting U.S. Waters

or State Critical Areas

The overall project consists of constructing a 20” water main from the intersection of Harper Road and SC 161 north along Harper Road and then west on Paraham Road, and an 8” water main from there to a point on Campbell Road near the CM Steel plant.

This work will require crossing nonwetland waters of the US (streams) at two locations, temporarily affecting a total of 60 linear feet / 600 square feet of stream bed within a 30’ wide construction area. Each of these nonwetland waters will be affected by temporary excavation and then backfilling to existing grades. There will be no permanent fills in or loss of US waters and all affected areas will be restored to their original grades.

There will be no temporary sidecasting in the streams. All temporary fills in uplands will be in place no more than 5 days at any one location. The excavated streambed sediments will be returned to the trench, and any remaining excess material be relocated and retained on an upland disposal site.

The proposed crossing of Nonwetland waters 1 and 2 will require construction of a temporary diversion dam made of woven plastic sandbags, with a pump around system to maintain normal downstream flow during construction (see Sheet 7 for details). This system will be in place no more than 1 week.

The streambanks at the nonwetland water crossings will be cleared of vegetation. Upon completion of the water line construction, the streambanks will be stabilized using erosion control blankets as shown on Sheet 7.

Anti-seep collars will not be necessary to prevent drainage of affected waters because the proposed water line will follow the local topographic contours, which change by about 15 to 20 feet on either side of the affected waters as shown on Sheets 4-6.

DEPARTMENT OF THE ARMY
CHARLESTON DISTRICT, CORPS OF ENGINEERS
1835 ASSEMBLY STREET ROOM 865 B1
COLUMBIA, SOUTH CAROLINA 29201

January 13, 2020

Regulatory Division

Ms. Lisa Hagood
York County Government
6 South Congress St
York, South Carolina 29745
lisa.hagood@yorkcountygov.com

Dear Ms. Hagood:

This is in response to a Pre-Construction Notification (PCN) (SAC-2019-01862) received on November 6, 2019, and considered complete on December 2, 2019. In submitting the PCN, you requested verification the proposed project is authorized by a Department of the Army (DA) Nationwide Permit (NWP).

The work affecting waters of the United States is part of an overall project known as Harper Road Water Main, to place temporary fill material and to excavate and place backfill material in two tributaries to construct coffer dams with by-pass pumps to facilitate construction in dry conditions and to construct a water main to provide safe and sanitary drinking water service to homes and businesses and to provide reinforcement and dependability to the County water system. The activities in waters of the United States include the placement of fill material in 30 linear feet of Non-wetland water 1 and 30 linear feet of Non-wetland water 2. The project involves temporary impacts to not more than 0.014 acre of waters of the United States. Specifically, this letter authorizes temporary impacts to 60 linear feet (0.014 acre) of tributaries. The project is located on Little Allison Creek and on an unnamed tributary to Little Allison Creek at two sites east of Harper Road, York, York County, South Carolina (Latitude: 35.0173 °, Longitude: -81.1382 °). The PCN also includes the following supplemental information:

a. Drawing sheets 1-7 of 7 titled “Harper Road Water Main" and dated October 25, 2019.

b. A mitigation plan/statement consisting of avoidance and minimization.

c. A delineation of wetlands, other special aquatic sites, and other waters.

Based on a review of the PCN, including the supplemental information indicated above, the Corps has determined the proposed activity will result in minimal individual and cumulative adverse environmental effects and is not contrary to the public interest. Furthermore, the activity meets the terms and conditions of NWP 12 Utility Line Activities.

For this authorization to remain valid, the project must comply with the enclosed NWP General Conditions, Charleston District Regional Conditions, and the following special conditions:

a. That prior to beginning the authorized work the permittee must obtain and provide the Corps with a copy of all appropriate state certifications and/or authorizations (e.g., 401 Water Quality Certification, Coastal Zone Management Act concurrence, State Navigable Waters Permit, etc.). This PROVISIONAL NWP is NOT VALID until the permittee obtains and provides the requisite state certification(s) and/or authorization(s) in accordance with this special condition.

b. That impacts to aquatic areas do not exceed those specified in the above mentioned PCN, including any supplemental information or revised permit drawings that were submitted to the Corps by the permittee.

c. That the construction, use, and maintenance of the authorized activity is in accordance with the information given in the PCN, including the supplemental information listed above, and is subject to any conditions or restrictions imposed by this letter.

d. That the permittee shall submit the attached signed compliance certification to the Corps within 30 days following completion of the authorized work.

e. That the permittee shall use only clean fill material obtained from an upland source.

f. That the permittee shall incorporate Best Management Practices (BMPs) during construction to protect adjacent wetlands and Waters of the United States from sediment and erosion during construction. BMPs to be utilized, independently or in combination, may include but are not limited to; erosion control matting, mulch, silt fences, sediment tubes, and other devices. BMPs shall be maintained until the fill material is stabilized.

g. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. Temporary fills must be removed in their entirety and the affected areas returned to preconstruction elevations. The areas affected by temporary fills must be revegetated, as appropriate.

h. Prior to beginning the authorized work, the permittee must coordinate with the local NFIP flood plain manager and comply with FEMA requirements. A list of NFIP floodplain managers may be found at: http://www.dnr.sc.gov/water/flood/index.html.

This verification is valid until March 18, 2022, unless the district engineer modifies, suspends, or revokes the NWP authorization in accordance with 33 CFR 330.5(d). If prior to this date, the NWP authorization is reissued without modification or the activity complies with any subsequent modification of the NWP authorization, the verification continues to remain valid

until March 18, 2022. If you commence, or are under contract to commence this activity before the NWP expires, or the NWP is modified, suspended, or revoked by the Chief of Engineers or division engineer in accordance with 33 CFR 330.5(b) or (c), respectively, in such a way that the activity would no longer comply with the terms and conditions of the NWP, you will have 12 months after the date the NWP expires or is modified, suspended, or revoked, to complete the activity under the present terms and conditions of this NWP.

This NWP is verified based on information you provided. It is your responsibility to read the attached NWP(s) along with the General, Regional, and Special Conditions before you begin work. If you determine your project will not be able to meet the NWP and the conditions, you must contact the Corps before you proceed.

In all future correspondence, please refer to file number SAC-2019-01862. A copy of this letter is forwarded to State and/or Federal agencies for their information. If you have any questions, please contact Amy Cappellino, Project Manager, at (803) 253-3992, or by email at Amy.e.Cappellino@usace.army.mil.

Sincerely,

Laura M. Boos

Digitally signed by BOOS.LAURA.M.1289642036
Date: 2020.01.13 16:28:37 -05'00'

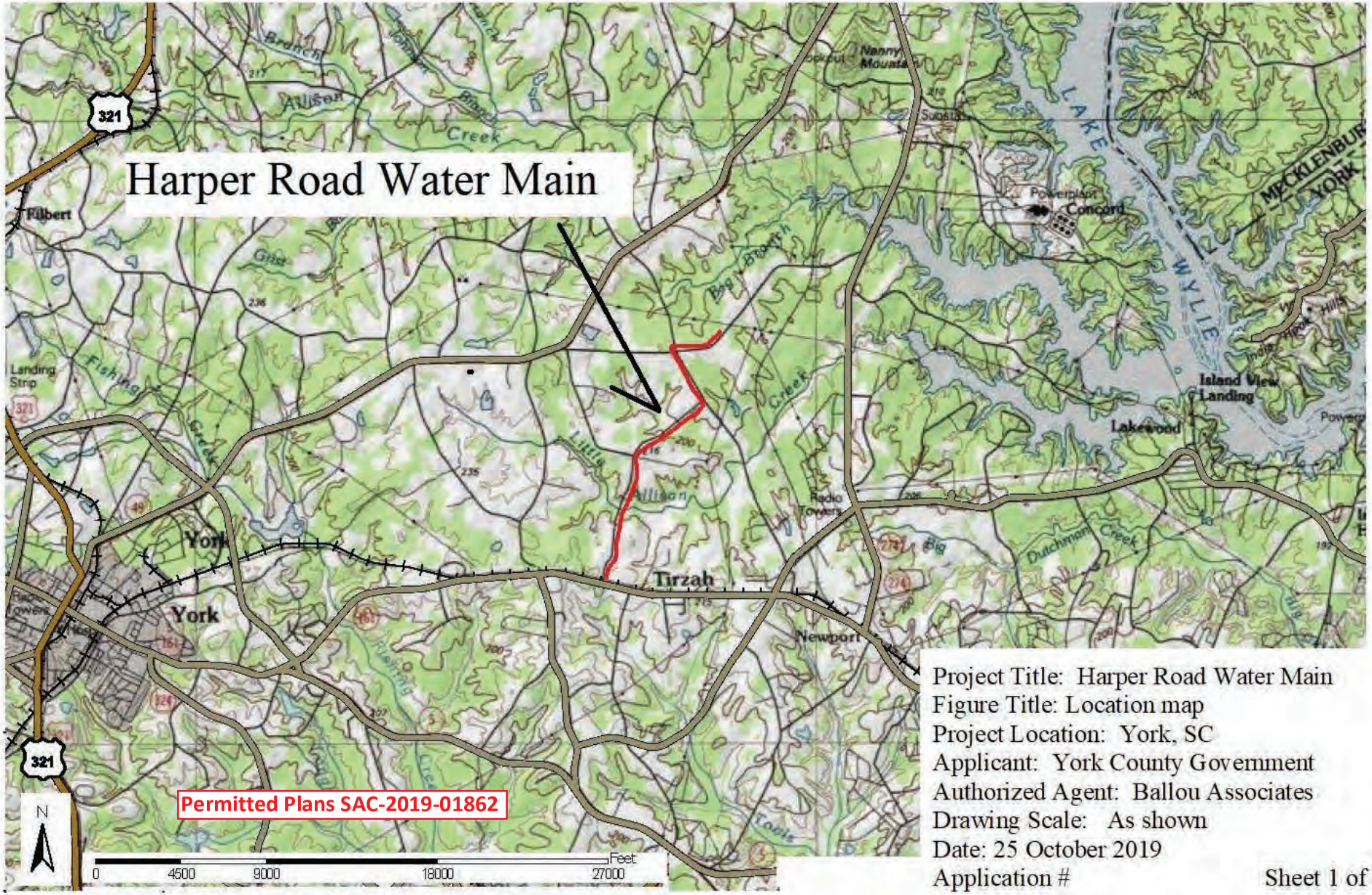
Laura M. Boos
Team Leader

Attachments
Permit Drawings
NWP 12 Utility Line Activities
Nationwide Permit General Conditions
Nationwide Permit Regional Conditions
Compliance Certification Form

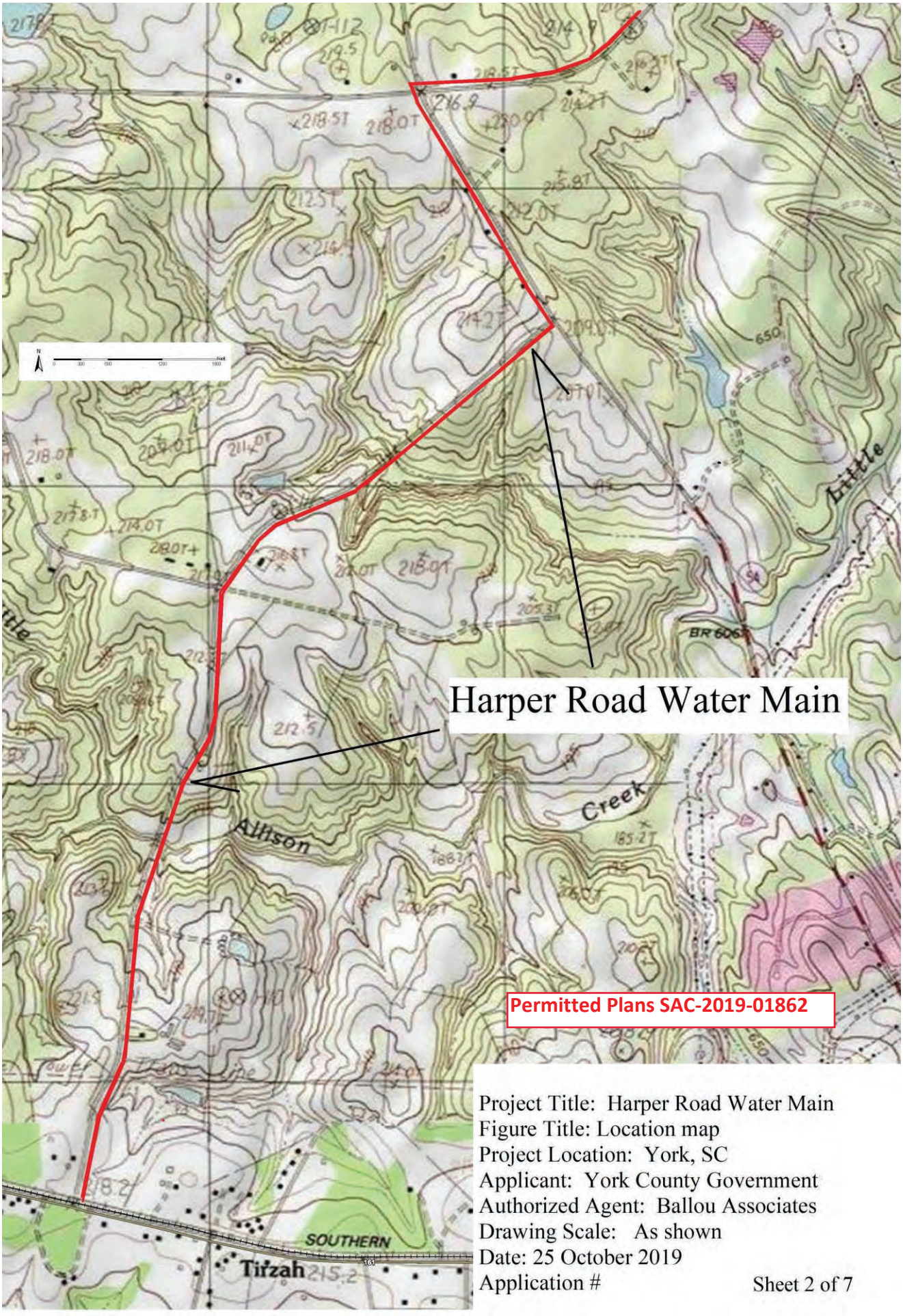
Copies Furnished:

Mr. Thomas Ballou
Ballou Associates
6326 Saint Andrews Road
Columbia, South Carolina 29212
tballou@usit.net

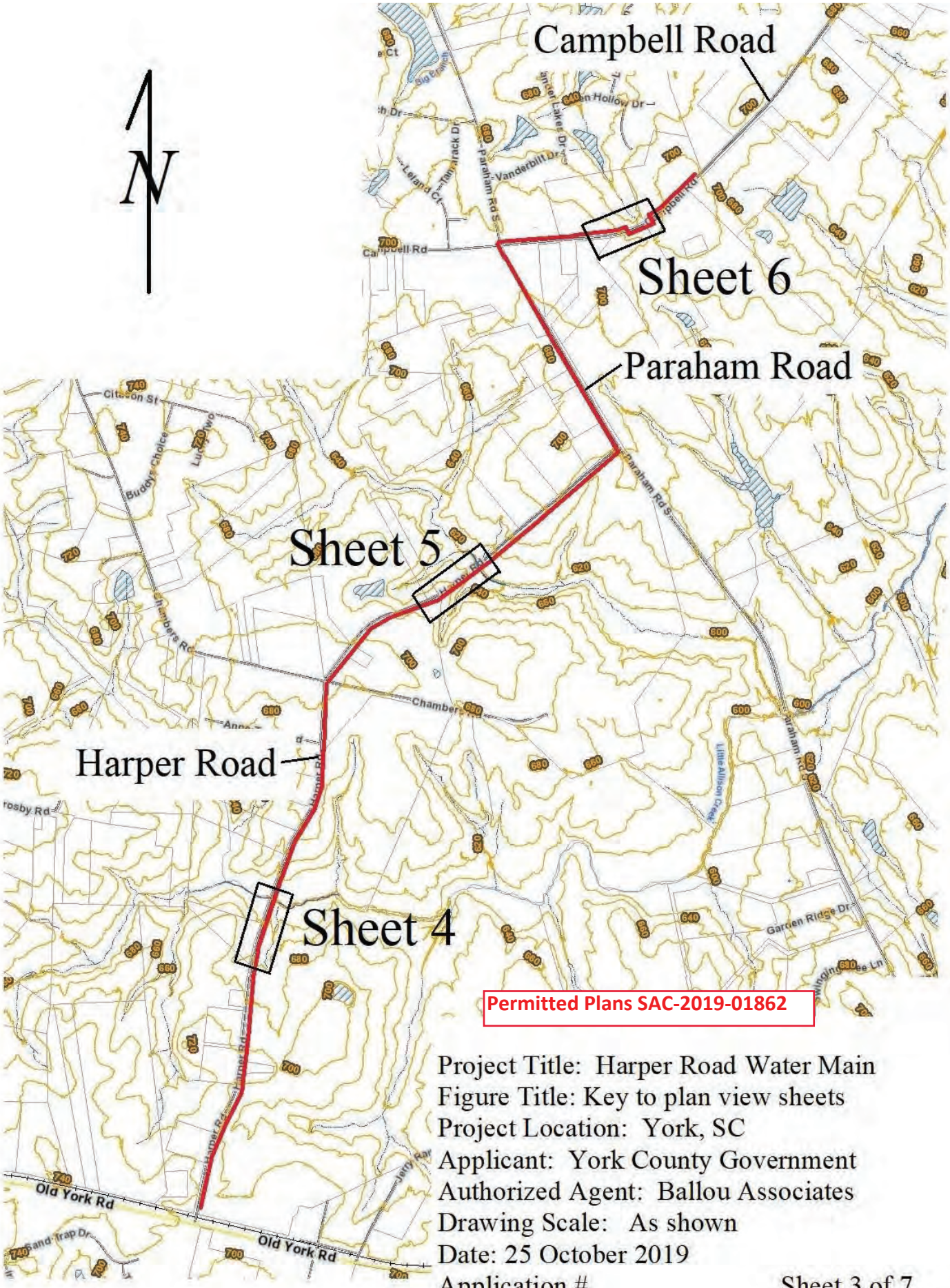
SC DHEC - Bureau of Water
2600 Bull Street
Columbia, South Carolina 29201
WQCWetlands@dhec.sc.gov



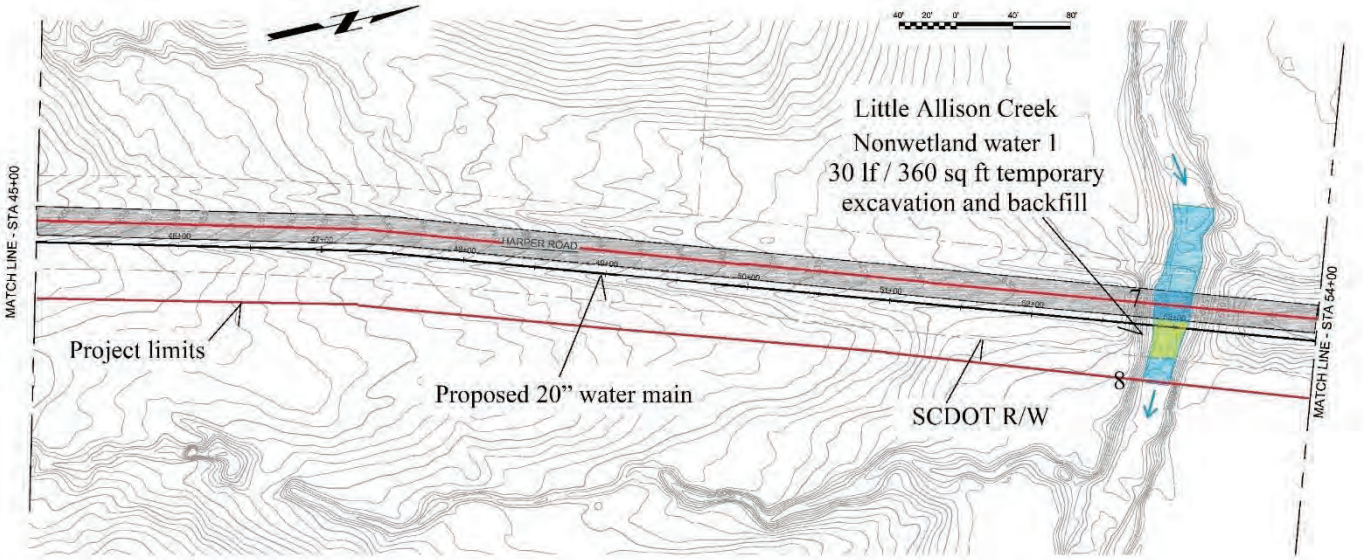
Project Title: Harper Road Water Main
Figure Title: Location map
Project Location: York, SC
Applicant: York County Government
Authorized Agent: Ballou Associates
Drawing Scale: As shown
Date: 25 October 2019
Application #

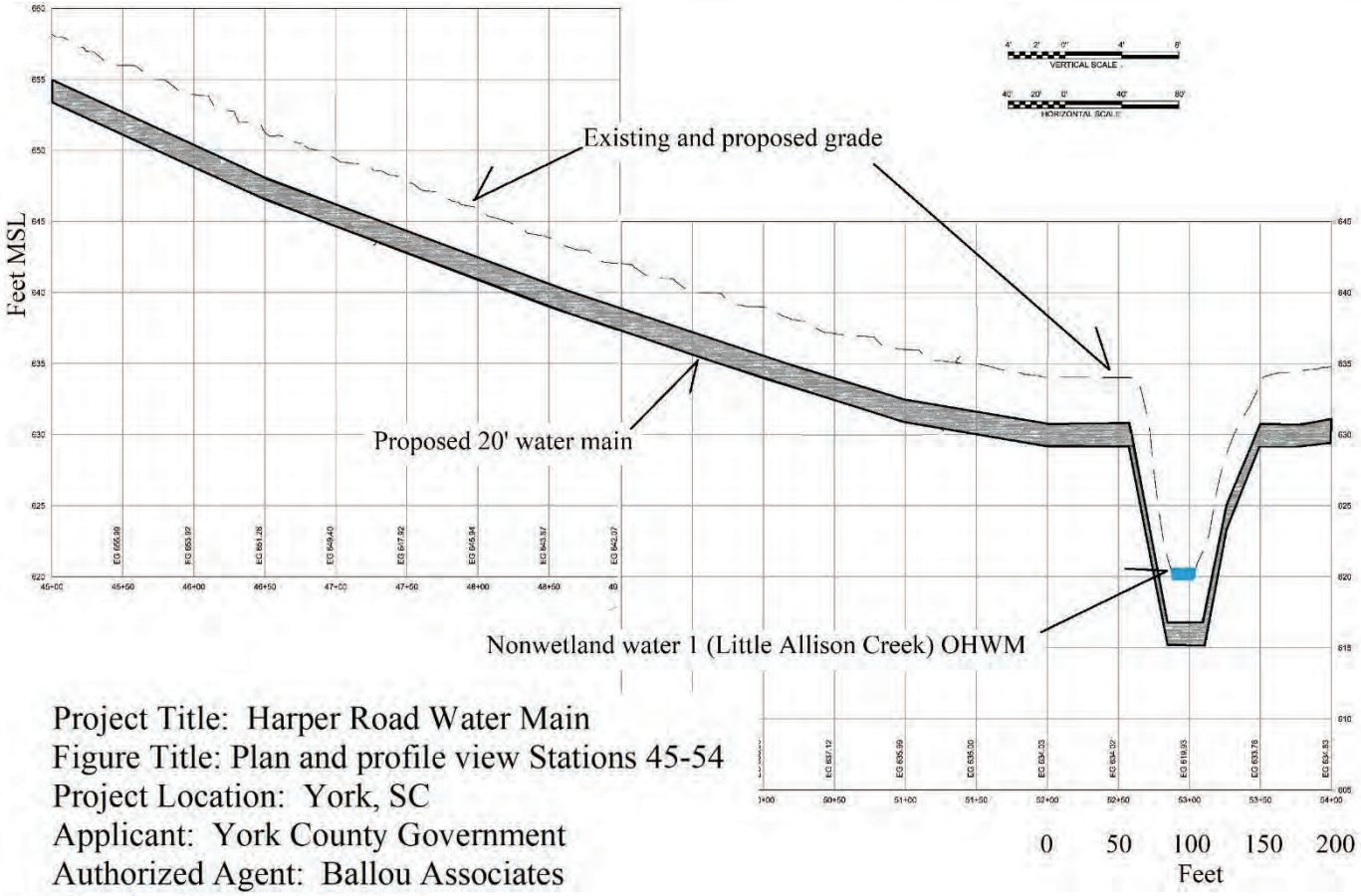


Project Title: Harper Road Water Main
Figure Title: Location map
Project Location: York, SC
Applicant: York County Government
Authorized Agent: Ballou Associates
Drawing Scale: As shown
Date: 25 October 2019
Application #



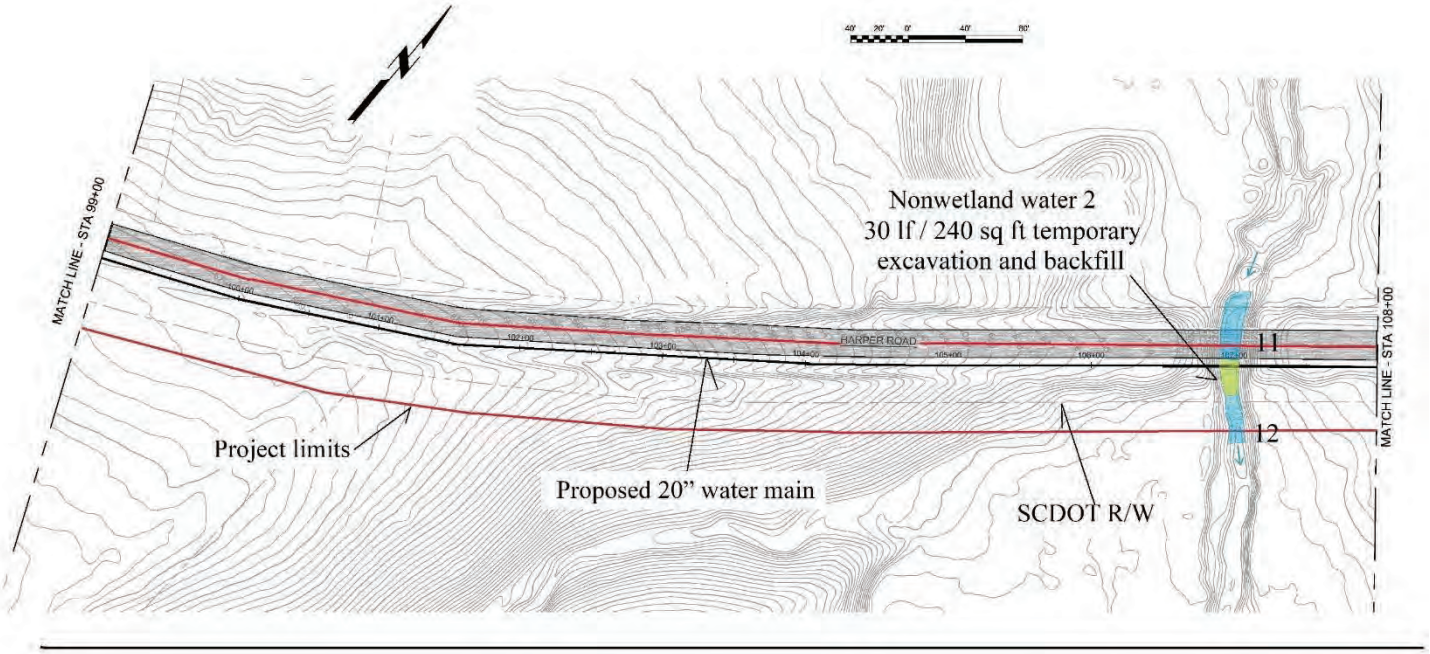
Project Title: Harper Road Water Main
Figure Title: Key to plan view sheets
Project Location: York, SC
Applicant: York County Government
Authorized Agent: Ballou Associates
Drawing Scale: As shown
Date: 25 October 2019
Application #

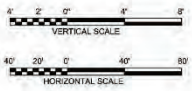


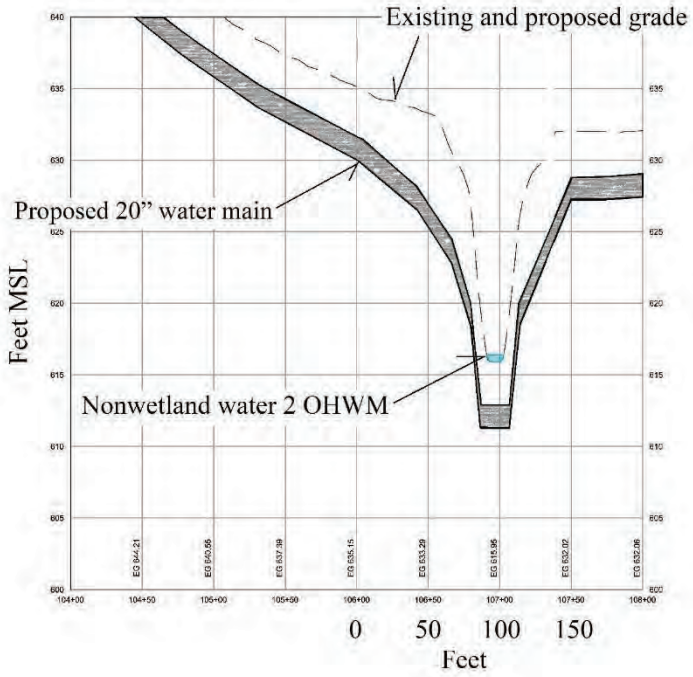


Project Title: Harper Road Water Main
Figure Title: Plan and profile view Stations 45-54
Project Location: York, SC
Applicant: York County Government
Authorized Agent: Ballou Associates
Drawing Scale: As shown
Date: 25 October 2019
Application #

Permitted Plans SAC-2019-01862

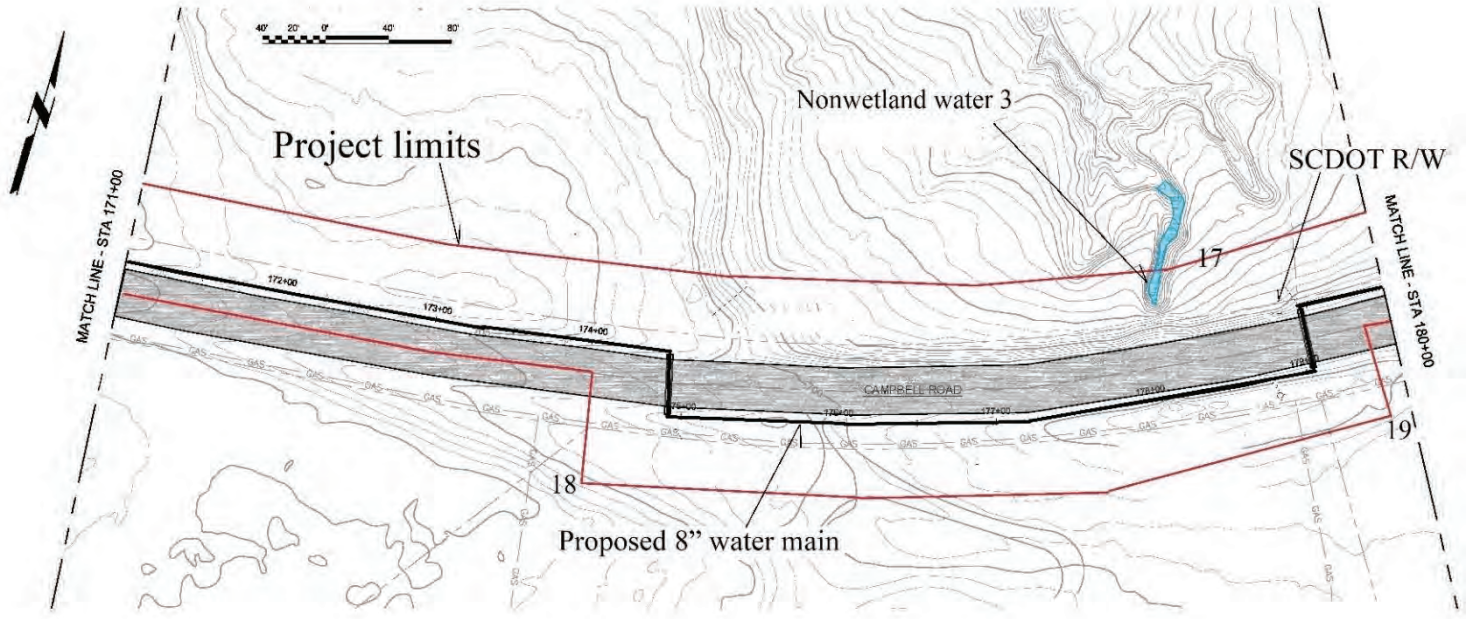






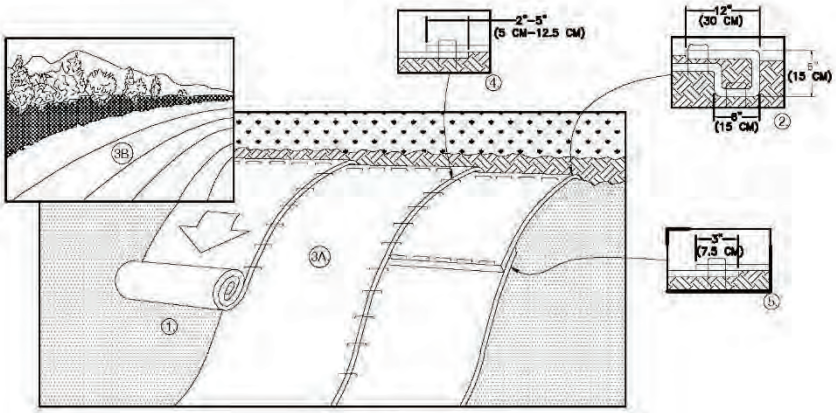
Permitted Plans SAC-2019-01862

Project Title: Harper Road Water Main
Figure Title: Plan and profile view Stations 100-108
Project Location: York, SC
Applicant: York County Government
Authorized Agent: Ballou Associates
Drawing Scale: As shown
Date: 25 October 2019
Application # Sheet 5 of 7



Permitted Plans SAC-2019-01862

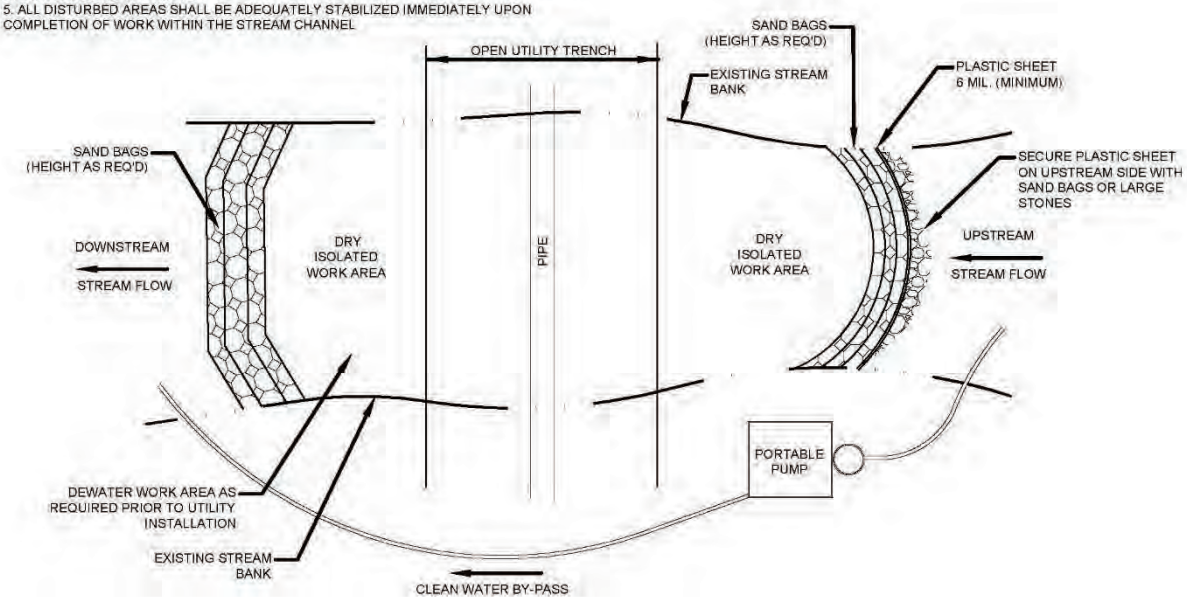
Project Title: Harper Road Water Main
Figure Title: Plan view Stations 172-179
Project Location: York, SC
Applicant: York County Government
Authorized Agent: Ballou Associates
Drawing Scale: As shown
Date: 25 October 2019
Application # Sheet 6 of 7



1. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED. NOTE: WHEN USING CELL-O-SEED DO NOT SEED PREPARED AREA. CELL-O-SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.
2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE BLANKET IN A 6" (15 CM) DEEP X 6" (15 CM) WIDE TRENCH WITH APPROXIMATELY 12" (30cm) OF BLANKET EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE BLANKET WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30 CM) APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" (30 CM) PORTION OF BLANKET BACK OVER SEED AND COMPACTED SOIL. SECURE BLANKET OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" (30 CM) APART ACROSS THE WIDTH OF THE BLANKET.
3. ROLL THE BLANKETS (A.) DOWN OR (B.) HORIZONTALLY ACROSS THE SLOPE. BLANKETS WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL BLANKETS MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING THE DOT SYSTEM™, STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
4. THE EDGES OF PARALLEL BLANKETS MUST BE STAPLED WITH APPROXIMATELY 2" – 5" (5 CM – 12.5 CM) OVERLAP DEPENDING ON BLANKET TYPE.
5. CONSECUTIVE BLANKETS SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" (7.5 CM) OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" (30 CM) APART ACROSS ENTIRE BLANKET WIDTH.
NOTE:
*IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 8" (15 CM) MAY BE NECESSARY TO PROPERLY SECURE THE BLANKETS.

NOTES:

1. PORTABLE PUMP CAPACITY SHALL BE SUFFICIENT TO HANDLE HIGH WATER FLOWS WITHIN THE STREAM CHANNEL.
2. THE WORK AREA SHALL BE DE-WATERED PRIOR TO OPEN TRENCH EXCAVATION AND UTILITY INSTALLATION.
3. PUMPING SHALL BE MONITORED AT ALL TIMES DURING STREAM CHANNEL DIVERSION.
4. STREAM CHANNEL SHALL BE RETURNED TO EXISITING CONDITIONS UPON COMPLETION OF CONSTRUCTION ACTIVITIES.
5. ALL DISTURBED AREAS SHALL BE ADEQUATELY STABILIZED IMMEDIATELY UPON COMPLETION OF WORK WITHIN THE STREAM CHANNEL



Permitted Plans SAC-2019-01862

Project Title: Harper Road Water Main
Figure Title: Detail of bank stabilization (top) and stream diversion (bottom)
Project Location: York, SC
Applicant: York County Government
Authorized Agent: Ballou Associates
Drawing Scale: As shown
Date: 25 October 2019
Application # Sheet 7 of 7

12. *Utility Line Activities.* Activities required for the construction, maintenance, repair, and removal of utility lines and associated facilities in waters of the United States, provided the activity does not result in the loss of greater than 1/2-acre of waters of the United States for each single and complete project.

Utility lines: This NWP authorizes discharges of dredged or fill material into waters of the United States and structures or work in navigable waters for crossings of those waters associated with the construction, maintenance, or repair of utility lines, including outfall and intake structures. There must be no change in pre-construction contours of waters of the United States. A ''utility line'' is defined as any pipe or pipeline for the transportation of any gaseous, liquid, liquescent, or slurry substance, for any purpose, and any cable, line, or wire for the transmission for any purpose of electrical energy, telephone, and telegraph messages, and internet, radio, and television communication. The term ''utility line'' does not include activities that drain a water of the United States, such as drainage tile or french drains, but it does apply to pipes conveying drainage from another area.

Material resulting from trench excavation may be temporarily sidecast into waters of the United States for no more than three months, provided the material is not placed in such a manner that it is dispersed by currents or other forces. The district engineer may extend the period of temporary side casting for no more than a total of 180 days, where appropriate. In wetlands, the top 6 to 12 inches of the trench should normally be backfilled with topsoil from the trench. The trench cannot be constructed or backfilled in such a manner as to drain waters of the United States (*e.g.,* backfilling with extensive gravel layers, creating a french drain effect). Any exposed slopes and stream banks must be stabilized immediately upon completion of the utility line crossing of each waterbody.

Utility line substations: This NWP authorizes the construction, maintenance, or expansion of substation facilities associated with a power line or utility line in non-tidal waters of the United States, provided the activity, in combination with all other activities included in one single and complete project, does not result in the loss of greater than 1/2-acre of waters of the United States. This NWP does not authorize discharges into non-tidal wetlands adjacent to tidal waters of the United States to construct, maintain, or expand substation facilities.

Foundations for overhead utility line towers, poles, and anchors: This NWP authorizes the construction or maintenance of foundations for overhead utility line towers, poles, and anchors in all waters of the United States, provided the foundations are the minimum size necessary and separate footings for each tower leg (rather than a larger single pad) are used where feasible.

Access roads: This NWP authorizes the construction of access roads for the construction and maintenance of utility lines, including overhead power lines and utility line substations, in non-tidal waters of the United States, provided the activity, in combination with all other activities included in one single and complete project, does not cause the loss of greater than 1/2-acre of non-tidal waters of the United States. This NWP does not authorize discharges into non-tidal wetlands adjacent to tidal waters for access roads. Access roads must be the minimum width necessary (see Note 2, below). Access roads must be constructed so that the length of the road minimizes any adverse effects on waters of the United States and must be as near as possible to pre-construction contours and elevations (*e.g.,* at grade corduroy roads or geotextile/gravel roads). Access roads constructed above pre-construction contours and elevations in waters of the United States must be properly bridged or culverted to maintain surface flows.

This NWP may authorize utility lines in or affecting navigable waters of the United States even if there is no associated discharge of dredged or fill material (See 33 CFR part 322). Overhead

utility lines constructed over section 10 waters and utility lines that are routed in or under section 10 waters without a discharge of dredged or fill material require a section 10 permit.

This NWP authorizes, to the extent that Department of the Army authorization is required, temporary structures, fills, and work necessary for the remediation of inadvertent returns of drilling fluids to waters of the United States through sub-soil fissures or fractures that might occur during horizontal directional drilling activities conducted for the purpose of installing or replacing utility lines. These remediation activities must be done as soon as practicable, to restore the affected waterbody. District engineers may add special conditions to this NWP to require a remediation plan for addressing inadvertent returns of drilling fluids to waters of the United States during horizontal directional drilling activities conducted for the purpose of installing or replacing utility lines.

This NWP also authorizes temporary structures, fills, and work, including the use of temporary mats, necessary to conduct the utility line activity. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. After construction, temporary fills must be removed in their entirety and the affected areas returned to preconstruction elevations. The areas affected by temporary fills must be revegetated, as appropriate.

Notification: The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity if any of the following criteria are met: (1) The activity involves mechanized land clearing in a forested wetland for the utility line right-of-way; (2) a section 10 permit is required; (3) the utility line in waters of the United States, excluding overhead lines, exceeds 500 feet; (4) the utility line is placed within a jurisdictional area (*i.e.,* water of the United States), and it runs parallel to or along a stream bed that is within that jurisdictional area; (5) discharges that result in the loss of greater than 1/10- acre of waters of the United States; (6) permanent access roads are constructed above grade in waters of the United States for a distance of more than 500 feet; or (7) permanent access roads are constructed in waters of the United States with impervious materials. (See general condition 32.)

(**Authorities:** Sections 10 and 404)

Note 1: Where the utility line is constructed or installed in navigable waters of the United States (*i.e.,* section 10 waters) within the coastal United States, the Great Lakes, and United States territories, a copy of the NWP verification will be sent by the Corps to the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service (NOS), for charting the utility line to protect navigation.

Note 2: For utility line activities crossing a single waterbody more than one time at separate and distant locations, or multiple waterbodies at separate and distant locations, each crossing is considered a single and complete project for purposes of NWP authorization. Utility line activities must comply with 33 CFR 330.6(d).

Note 3: Utility lines consisting of aerial electric power transmission lines crossing navigable waters of the United States (which are defined at 33 CFR part 329) must comply with the applicable minimum clearances specified in 33 CFR 322.5(i).

Note 4: Access roads used for both construction and maintenance may be authorized, provided they meet the terms and conditions of this NWP. Access roads used solely for construction of the

utility line must be removed upon completion of the work, in accordance with the requirements for temporary fills.

Note 5: Pipes or pipelines used to transport gaseous, liquid, liquescent, or slurry substances over navigable waters of the United States are considered to be bridges, not utility lines, and may require a permit from the U.S. Coast Guard pursuant to section 9 of the Rivers and Harbors Act of 1899. However, any discharges of dredged or fill material into waters of the United States associated with such pipelines will require a section 404 permit (see NWP 15).

Note 6: This NWP authorizes utility line maintenance and repair activities that do not qualify for the Clean Water Act section 404(f) exemption for maintenance of currently serviceable fills or fill structures.

Note 7: For overhead utility lines authorized by this NWP, a copy of the PCN and NWP verification will be provided to the Department of Defense Siting Clearinghouse, which will evaluate potential effects on military activities.

Note 8: For NWP 12 activities that require pre-construction notification, the PCN must include any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity, including other separate and distant crossings that require Department of the Army authorization but do not require preconstruction notification (see paragraph (b) of general condition 32). The district engineer will evaluate the PCN in accordance with Section D, ‘‘District Engineer’s Decision.’’ The district engineer may require mitigation to ensure that the authorized activity results in no more than minimal individual and cumulative adverse environmental effects (see general condition 23).

C. Nationwide Permit General Conditions

Note: To qualify for NWP authorization, the prospective permittee must comply with the following general conditions, as applicable, in addition to any regional or case-specific conditions imposed by the division engineer or district engineer. Prospective permittees should contact the appropriate Corps district office to determine if regional conditions have been imposed on an NWP. Prospective permittees should also contact the appropriate Corps district office to determine the status of Clean Water Act Section 401 water quality certification and/or Coastal Zone Management Act consistency for an NWP. Every person who may wish to obtain permit authorization under one or more NWPs, or who is currently relying on an existing or prior permit authorization under one or more NWPs, has been and is on notice that all of the provisions of 33 CFR 330.1 through 330.6 apply to every NWP authorization. Note especially 33 CFR 330.5 relating to the modification, suspension, or revocation of any NWP authorization.

1. *Navigation.* (a) No activity may cause more than a minimal adverse effect on navigation. (b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States. (c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

2. *Aquatic Life Movements.* No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species. If a bottomless culvert cannot be used, then the crossing should be designed and constructed to minimize adverse effects to aquatic life movements.

3. *Spawning Areas.* Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (*e.g.*, through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

4. *Migratory Bird Breeding Areas.* Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

5. *Shellfish Beds.* No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48, or is a shellfish seeding or habitat restoration activity authorized by NWP 27.

6. *Suitable Material.* No activity may use unsuitable material (*e.g.*, trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see section 307 of the Clean Water Act).

7. *Water Supply Intakes.* No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

8. *Adverse Effects From Impoundments.* If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

9. *Management of Water Flows.* To the maximum extent practicable, the preconstruction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization, storm water management activities, and temporary and permanent road crossings, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the preconstruction course, condition, capacity, and location of open waters if it benefits the aquatic environment (*e.g.*, stream restoration or relocation activities).

10. *Fills Within 100-Year Floodplains.* The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

11. *Equipment.* Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

12. *Soil Erosion and Sediment Controls.* Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow, or during low tides.

13. *Removal of Temporary Fills.* Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

14. *Proper Maintenance.* Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable NWP general conditions, as well as any activity-specific conditions added by the district engineer to an NWP authorization.

15. *Single and Complete Project.* The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

16. *Wild and Scenic Rivers.* (a) No NWP activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a ''study river'' for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status. (b) If a proposed NWP activity will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a ''study river'' for possible inclusion in the system while the river is in an official study status, the permittee must submit a pre-construction notification (see general condition 32). The district engineer will coordinate the PCN with the Federal agency with direct management responsibility for that river. The permittee shall not begin the NWP activity until notified by the district engineer that the Federal agency with direct management responsibility for that river has determined in writing that the proposed NWP activity will not adversely affect the Wild and Scenic River designation or study status. (c) Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency responsible for the designated Wild and Scenic River or study river (*e.g.*, National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service). Information on these rivers is also available at: *http://www.rivers.gov/.*

17. *Tribal Rights.* No NWP activity may cause more than minimal adverse effects on tribal rights (including treaty rights), protected tribal resources, or tribal lands.

18. *Endangered Species.* (a) No activity is authorized under any NWP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify the critical habitat of such species. No activity is authorized under any NWP which ''may affect'' a listed species or critical habitat, unless ESA section 7consultation addressing the effects of the proposed activity has been completed. Direct effects are the immediate effects on listed species and critical habitat caused by the NWP activity. Indirect effects are those effects on listed species and critical habitat that are caused by the NWP activity and are later in time, but still are reasonably certain to occur. (b) Federal agencies should follow their own procedures for complying with the requirements of the ESA. If preconstruction notification is required for the proposed activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation has not been submitted, additional ESA section 7 consultation may be necessary for the activity and the respective federal agency would be responsible for fulfilling its obligation under section 7 of the ESA. (c) Non-federal permittees must submit a pre-construction notification to the district engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species or designated critical habitat, the pre-construction notification must include the name(s) of the endangered or threatened species that might be affected by the proposed activity or that utilize the designated critical habitat that might be affected by the proposed activity. The district

engineer will determine whether the proposed activity ‘‘may affect’’ or will have ‘‘no effect’’ to listed species and designated critical habitat and will notify the non-Federal applicant of the Corps’ determination within 45 days of receipt of a complete pre-construction notification. In cases where the non-Federal applicant has identified listed species or critical habitat that might be affected or is in the vicinity of the activity, and has so notified the Corps, he applicant shall not begin work until the Corps has provided notification that the proposed activity will have ‘‘no effect’’ on listed species or critical habitat, or until ESA section 7 consultation has been completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps. (d) As a result of formal or informal consultation with the FWS or NMFS the district engineer may add species specific permit conditions to the NWPs. (e) Authorization of an activity by an NWP does not authorize the ‘‘take’’ of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (*e.g.,* an ESA Section 10 Permit, a Biological Opinion with ‘‘incidental take’ provisions, etc.) from the FWS or the NMFS, the Endangered Species Act prohibits any person subject to the jurisdiction of the United States to take a listed species, where ‘‘take’’ means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The word ‘‘harm’’ in the definition of ‘‘take’’ means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering. (f) If the non-federal permittee has a valid ESA section 10(a)(1)(B) incidental take permit with an approved Habitat Conservation Plan for a project or a group of projects that includes the proposed NWP activity, the non-federal applicant should provide a copy of that ESA section 10(a)(1)(B) permit with the PCN required by paragraph (c) of this general condition. The district engineer will coordinate with the agency that issued the ESA section 10(a)(1)(B) permit to determine whether the proposed NWP activity and the associated incidental take were considered in the internal ESA section 7 consultation conducted for the ESA section 10(a)(1)(B) permit. If that coordination results in concurrence from the agency that the proposed NWP activity and the associated incidental take were considered in the internal ESA section 7 consultation for the ESA section 10(a)(1)(B) permit, the district engineer does not need to conduct a separate ESA section 7 consultation for the proposed NWP activity. The district engineer will notify the non-federal applicant within 45 days of receipt of a complete pre-construction notification whether the ESA section 10(a)(1)(B) permit covers the proposed NWP activity or whether additional ESA section 7 consultation is required. (g) Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the FWS and NMFS or their worldwide Web pages at *http://www.fws.gov/* or *http://www.fws.gov/ipac* and *http://www.nmfs.noaa.gov/pr/species/esa/* respectively.

19. *Migratory Birds and Bald and Golden Eagles.* The permittee is responsible for ensuring their action complies with the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. The permittee is responsible for contacting appropriate local office of the U.S. Fish and Wildlife Service to determine applicable measures to reduce impacts to migratory birds or eagles, including whether ‘‘incidental take’’ permits are necessary and available under the Migratory Bird Treaty Act or Bald and Golden Eagle Protection Act for a particular activity.

20. *Historic Properties.* (a) In cases where the district engineer determines that the activity may have the potential to cause effects to properties listed, or eligible for listing, in the National Register of Historic Places, the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied. (b) Federal permittees should follow their own procedures for complying with the requirements of section 106 of the National Historic Preservation Act. If pre-construction notification is required for the proposed NWP activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation is not submitted, then additional consultation under section 106 may be necessary. The respective federal agency is responsible for fulfilling its obligation to comply with section 106. (c) Non-federal permittees must submit a pre-construction notification to the district engineer if the NWP activity might have the potential to cause effects to any historic properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the preconstruction notification must state which historic properties might have the potential to be affected by the proposed NWP activity or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of, or potential for, the presence of historic properties can be sought from the State Historic Preservation Officer, Tribal Historic Preservation Officer, or designated tribal representative, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). When reviewing pre-construction notifications, district engineers will comply with the current procedures for addressing the requirements of section 106 of the National Historic Preservation Act. The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Based on the information submitted in the PCN and these identification efforts, the district shall determine whether the proposed NWP activity has the potential to cause effects on the historic properties. Section 106 consultation is not required when the district engineer determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR 800.3(a)). Section 106 consultation is required when the district engineer determines that the activity has the potential to cause effects on historic properties. The district engineer will conduct consultation with consulting parties identified under 36 CFR 800.2(c) when he or she makes any of the following effect determinations for the purposes of section 106 of the NHPA: no historic properties affected, no adverse effect, or adverse effect. Where the non-Federal applicant has identified historic properties on which the activity might have the potential to cause effects and so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects to historic properties or that NHPA section 106 consultation has been completed. (d) For non-federal permittees, the district engineer will notify the prospective permittee within 45 days of receipt of a complete pre-construction notification whether NHPA section 106 consultation is required. If NHPA section 106 consultation is required, the district engineer will notify the non-Federal applicant that he or she cannot begin the activity until section 106consultation is completed. If the non- Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps. (e) Prospective permittees should be aware that section 110k of the

NHPA (54 U.S.C. 306113) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

21. *Discovery of Previously Unknown Remains and Artifacts.* If you discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by this permit, you must immediately notify the district engineer of what you have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal, and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

22. *Designated Critical Resource Waters.* Critical resource waters include, NOAA-managed marine sanctuaries and marine monuments, and National Estuarine Research Reserves. The district engineer may designate, after notice and opportunity for public comment, additional waters officially designated by a state as having particular environmental or ecological significance, such as outstanding national resource waters or state natural heritage sites. The district engineer may also designate additional critical resource waters after notice and opportunity for public comment. (a) Discharges of dredged or fill material into waters of the United States are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, 50, 51, and 52 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters. (b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, 38, and 54, notification is required in accordance with general condition 32, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWPs only after it is determined that the impacts to the critical resource waters will be no more than minimal.

23. *Mitigation.* The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal: (a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (*i.e.,* on site). (b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating for resource losses) will be required to the extent necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal. (c) Compensatory

mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1⁄10-acre and require preconstruction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse environmental effects of the proposed activity are no more than minimal, and provides an activity-specific waiver of this requirement. For wetland losses of 1⁄10-acre or less that require preconstruction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in only minimal adverse environmental effects. (d) For losses of streams or other open waters that require pre-construction notification, the district engineer may require compensatory mitigation to ensure that the activity results in no more than minimal adverse environmental effects. Compensatory mitigation for losses of streams should be provided, if practicable, through stream rehabilitation, enhancement, or preservation, since streams are difficult to-replace resources (see 33 CFR 332.3(e)(3)). (e) Compensatory mitigation plans for NWP activities in or near streams or other open waters will normally include a requirement for the restoration or enhancement, maintenance, and legal protection (*e.g.,* conservation easements) of riparian areas next to open waters. In some cases, the restoration or maintenance/protection of riparian areas may be the only compensatory mitigation required. Restored riparian should consist of native species. The width of the required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. If it is not possible to restore or maintain/protect a riparian area on both sides of a stream, or if the waterbody is a lake or coastal waters, then restoring or maintaining/protecting riparian area along a single bank or shoreline may be sufficient. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (*e.g.,* riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of minimization or compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses. (f) Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of 33 CFR part 332. (1) The prospective permittee is responsible for proposing an appropriate compensatory mitigation if compensatory mitigation is necessary to ensure that the activity results in no more than minimal adverse environmental effects. For the NWPs, the preferred mechanism for providing compensatory mitigation is mitigation bank credits or in-lieu fee program credits (see 33 CFR 332.3(b)(2) and (3)). However, if an appropriate number and type of mitigation bank or in-lieu credits are not available at the time the PCN is submitted to the district engineer, the district engineer may approve the use of permittee-responsible mitigation. (2) The amount of compensatory mitigation required by the district engineer must be sufficient to ensure that the authorized activity results in no more than minimal individual and cumulative adverse environmental effects (see 33 CFR 330.1(e)(3)). (See also 33 CFR 332.3(f)). (3) Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, aquatic resource restoration should be the first compensatory mitigation option considered for permittee-responsible mitigation. (4) If permittee-responsible mitigation is the proposed option, the prospective permittee is responsible for submitting a mitigation plan. A conceptual or detailed mitigation plan may be used by the district engineer to make the decision on the NWP verification request, but a final mitigation plan that addresses the applicable requirements of 33

CFR 332.4(c)(2) through (14) must be approved by the district engineer before the permittee begins work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation (see 33 CFR 332.3(k)(3)). (5) If mitigation bank or in-lieu fee program credits are the proposed option, the mitigation plan only needs to address the baseline conditions at the impact site and the number of credits to be provided. (6) Compensatory mitigation requirements (*e.g.*, resource type and amount to be provided as compensatory mitigation, site protection, ecological performance standards, monitoring requirements) may be addressed through conditions added to the NWP authorization, instead of components of a compensatory mitigation plan (see 33CFR 332.4(c)(1)(ii)). (g) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWPs. For example, if an NWP has an acreage limit of 1/2-acre, it cannot be used to authorize any NWP activity resulting in the loss of greater than 1/2- acre of waters of the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to ensure that an NWP activity already meeting the established acreage limits also satisfies the no more than minimal impact requirement for the NWPs. (h) Permittees may propose the use of mitigation banks, in-lieu fee programs, or permittee-responsible mitigation. When developing a compensatory mitigation proposal, the permittee must consider appropriate and practicable options consistent with the framework at 33 CFR 332.3(b). For activities resulting in the loss of marine or estuarine resources, permittee responsible mitigation may be environmentally preferable if there are no mitigation banks or in-lieu fee programs in the area that have marine or estuarine credits available for sale or transfer to the permittee. For permittee responsible mitigation, the special conditions of the NWP verification must clearly indicate the party or parties responsible for the implementation and performance of the compensatory mitigation project, and, if required, its long-term management. (i) Where certain functions and services of waters of the United States are permanently adversely affected by a regulated activity, such as discharges of dredged or fill material into waters of the United States that will convert a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse environmental effects of the activity to the no more than minimal level.

24. *Safety of Impoundment Structures.* To ensure that all impoundment structures are safely designed, the district engineer may require non-Federal applicants to demonstrate that the structures comply with established state dam safety criteria or have been designed by qualified persons. The district engineer may also require documentation that the design has been independently reviewed by similarly qualified persons, and appropriate modifications made to ensure safety.

25. *Water Quality.* Where States and authorized Tribes, or EPA where applicable, have not previously certified compliance of an NWP with CWA section 401, individual 401 Water Quality Certification must be obtained or waived (see 33 CFR 330.4(c)). The district engineer or State or Tribe may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

26. *Coastal Zone Management.* In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). The district engineer or a State may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

27. *Regional and Case-By-Case Conditions.* The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

28. *Use of Multiple Nationwide Permits.* The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the United States authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1/3-acre.

29. *Transfer of Nationwide Permit Verifications.* If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature: When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

_____

(Transferee)

_____

(Date)

30. *Compliance Certification.* Each permittee who receives an NWP verification letter from the Corps must provide a signed certification documenting completion of the authorized activity and implementation of any required compensatory mitigation. The success of any required permittee-responsible mitigation, including the achievement of ecological performance standards, will be addressed separately by the district engineer. The Corps will provide the permittee the certification document with the NWP verification letter. The certification document will include: (a) A statement that the authorized activity was done in accordance with the NWP authorization, including any general, regional, or activity-specific conditions; (b) A statement that the implementation of any required compensatory mitigation was completed in accordance with the

permit conditions. If credits from a mitigation bank or in-lieu fee program are used to satisfy the compensatory mitigation requirements, the certification must include the documentation required by 33 CFR 332.3(l)(3) to confirm that the permittee secured the appropriate number and resource type of credits; and (c) The signature of the permittee certifying the completion of the activity and mitigation. The completed certification document must be submitted to the district engineer within 30 days of completion of the authorized activity or the implementation of any required compensatory mitigation, whichever occurs later.

31. *Activities Affecting Structures or Works Built by the United States.* If an NWP activity also requires permission from the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers (USACE) federally authorized Civil Works project (a‘ ‘USACE project’’), the prospective permittee must submit a preconstruction notification. See paragraph (b)(10) of general condition 32. An activity that requires section 408 permission is not authorized by NWP until the appropriate Corps office issues the section 408 permission to alter, occupy, or use the USACE project, and the district engineer issues a written NWP verification.

32. *Pre-Construction Notification.* (a) *Timing.* Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, if the PCN is determined to be incomplete, notify the prospective permittee within that 30 day period to request the, additional information necessary to make the PCN complete. The request must specify the information needed to make the PCN complete. As a general rule, district engineers will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity until either: (1) He or she is notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or (2) 45 calendar days have passed from the district engineer’s receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 18 that listed species or critical habitat might be affected or are in the vicinity of the activity, or to notify the Corps pursuant to general condition 20 that the activity might have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that there is ‘‘no effect’’ on listed species or ‘‘no potential to cause effects’’ on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or section 106 of the National Historic Preservation Act (see 33 CFR 330.4(g)) has been completed. Also, work cannot begin under NWPs 21, 49, or 50 until the permittee has received written approval from the Corps. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee may not begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee’s

right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2). (b) *Contents of Pre-Construction Notification:* The PCN must be in writing and include the following information:
(1) Name, address and telephone numbers of the prospective permittee;
(2) Location of the proposed activity;
(3) Identify the specific NWP or NWP(s) the prospective permittee wants to use to authorize the proposedactivity;
(4) A description of the proposed activity; the activity's purpose; direct and indirect adverse environmental effects the activity would cause, including the anticipated amount of loss of wetlands, other special aquatic sites, and other waters expected to result from the NWP activity, in acres, linear feet, or other appropriate unit of measure; a description of any proposed mitigation measures intended to reduce the adverse environmental effects caused by the proposed activity; and any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity, including other separate and distant crossings for linear projects that require Department of the Army authorization but do not require pre-construction notification. The description of the proposed activity and any proposed mitigation measures should be sufficiently detailed to allow the district engineer to determine that the adverse environmental effects of the activity will be no more than minimal and to determine the need for compensatory mitigation or other mitigation measures. For single and complete linear projects, the PCN must include the quantity of anticipated losses of wetlands, other special aquatic sites, and other waters for each single and complete crossing of those wetlands, other special aquatic sites, and other waters. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the activity and when provided results in a quicker decision. Sketches should contain sufficient detail to provide an illustrative description of the proposed activity (*e.g.,* a conceptual plan), but do not need to be detailed engineering plans); (5) The PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial, intermittent, and ephemeral streams, on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters on the project site, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many wetlands, other special aquatic sites, and other waters. Furthermore, the 45 day period will not start until the delineation has been submitted to or completed by the Corps, as appropriate; (6) If the proposed activity will result in the loss of greater than 1⁄10-acre of wetlands and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied, or explaining why the adverse environmental effects are no more than minimal and why compensatory mitigation should not be required. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan. (7) For non-Federal permittees, if any listed species or designated critical habitat might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat, the PCN must include the name(s) of those endangered or threatened species that might be affected by the proposed activity or utilize the designated critical habitat that might be affected by the proposed activity. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with the Endangered Species Act; (8) For non-Federal permittees, if the NWP activity might have the potential to cause effects to a historic property listed on, determined to be eligible for listing on, or potentially eligible for

listing on, the National Register of Historic Places, the PCN must state which historic property might have the potential to be affected by the proposed activity or include a vicinity map indicating the location of the historic property. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with section 106 of the National Historic Preservation Act; (9) For an activity that will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a ''study river'' for possible inclusion in the system while the river is in an official study status, the PCN must identify the Wild and Scenic River or the ''study river'' (see general condition 16); and (10) For an activity that requires permission from the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers federally authorized civil works project, the pre-construction notification must include a statement confirming that the project proponent has submitted a written request for section 408 permission from the Corps office having jurisdiction over that USACE project. (c) *Form of Pre-Construction Notification:* The standard individual permit application form (Form ENG 4345) may be used, but the completed application form must clearly indicate that it is an NWP PCN and must include all of the applicable information required in paragraphs (b)(1) through (10) of this general condition. A letter containing the required information may also be used. Applicants may provide electronic files of PCNs and supporting materials if the district engineer has established tools and procedures for electronic submittals. (d) *Agency Coordination:* (1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the activity's adverse environmental effects so that they are no more than minimal. (2) Agency coordination is required for: (i) All NWP activities that require pre-construction notification and result in the loss of greater than 1/2-acre of waters of the United States; (ii) NWP 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52 activities that require pre-construction notification and will result in the loss of greater than 300 linear feet of streambed; (iii) NWP 13 activities in excess of 500 linear feet, fills greater than one cubic yard per running foot, or involve discharges of dredged or fill material into special aquatic sites; and (iv) NWP 54 activities in excess of 500 linear feet, or that extend into the waterbody more than 30 feet from the mean low water line in tidal waters or the ordinary high water mark in the Great Lakes. (3) When agency coordination is required, the district engineer will immediately provide (*e.g.*, via email, facsimile transmission, overnight mail, or other expeditious manner) a copy of the complete PCN to the appropriate Federal or state offices (FWS, state natural resource or water quality agency, EPA, and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will have 10 calendar days from the date the material is transmitted to notify the district engineer via telephone, facsimile transmission, or email that they intend to provide substantive, site-specific comments. The comments must explain why the agency believes the adverse environmental effects will be more than minimal. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the preconstruction notification. The district engineer will fully consider agency comments received within the specified time frame concerning the proposed activity's compliance with the terms and conditions of the NWPs, including the need for mitigation to ensure the net adverse environmental effects of the proposed activity are no more than minimal. The district engineer will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each pre-construction notification that the resource agencies' concerns were

considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5. (4) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act. (5) Applicants are encouraged to provide the Corps with either electronic files or multiple copies of preconstruction notifications to expedite agency coordination.

2017 APPROVED
NATIONWIDE PERMIT REGIONAL GENERAL CONDITIONS
FOR SOUTH CAROLINA (REVISED)

The following Regional Conditions have been approved by the Charleston District for the Nationwide Permits (NWP) published in the January 6, 2017, Federal Register as authorized under General Condition #27. Regional conditions are authorized to modify NWPs by adding conditions on a generic basis applicable to certain activities or specific geographic areas. Certain terminologies used in the following conditions are identified in *italics* and are defined in the above referenced Federal Register under Definitions.

Note: The acronym "*PCN*" used throughout the Regional Conditions refers to *Pre-Construction Notification*.

For All Nationwide Permits:

1. The applicant must implement *best management practices* during and after all construction to minimize erosion and migration of sediments off site. These practices may include use of devices capable of preventing erosion and migration of sediments in waters of the United States., including wetlands. These devices must be maintained in a functioning capacity until the area is permanently stabilized. All disturbed land surfaces must be stabilized upon project completion. Stabilization refers to the minimization of erosion and migration of sediments off site.

2. All wetland and stream crossings must be stabilized immediately following completion of construction/installation and must be aligned and designed to minimize the *loss of waters of the United States.*

3. Necessary measures must be taken to prevent oil, tar, trash, debris and other pollutants from entering waters of the United States, including wetlands that are adjacent to the authorized activity.

4. Any excess excavated materials not utilized as authorized back fill must be placed and contained on uplands and permanently stabilized to prevent erosion into waters of the United States, including wetlands.

5. Placement and/or stockpiling (double handling) of excavated material in waters of the United States, including wetlands, is prohibited unless specifically authorized in the nationwide permit verification. Should double handling be authorized, the material must be placed in a manner that does not impede circulation of water and will not be dispersed by currents or other erosive forces.

6. Once project construction is initiated, it must be carried to completion in an expeditious manner in order to minimize the period of disturbance to aquatic resources and the surrounding environment.

7. If you discover any previously unknown historic, cultural or archeological remains and

artifacts while accomplishing the activity authorized by this permit, you must immediately notify the district engineer of what you have found, and to the maximum extent *practicable*, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal, and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places. Archeological remains consist of any materials made or altered by man, which remain from past historic or prehistoric times (i.e., older than 50 years). Examples include old pottery fragments, metal, wood, arrowheads, stone implements or tools, human burials, historic docks, *structure*s, or non-recent (i.e., older than 100 years) vessel ruins.

8. Use of nationwide permits does not obviate requirements to obtain all other applicable Federal, State, county, and local government authorizations.

9. No NWP is authorized in areas known or suspected to have sediment contamination, with the exception of NWP 38, and NWP 53 when used in combination with NWP 38.

10. In accordance with General Condition #31, "Activities Affecting *Structure*s or Works Built by the United States," a *PCN* must be submitted if a NWP activity also requires permission from the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers (USACE) federally authorized Civil Works project (a "USACE" project"). See General Condition #32 for *PCN* content and timing requirements and particularly paragraph (b)(10) for an activity that requires permission from the Corps pursuant to 33 U.S.C. 408. An activity in South Carolina that requires section 408 permission is not authorized by a NWP until the Charleston District issues the section 408 permission to alter, occupy, or use the USACE project, and the District Engineer issues a written NWP verification.

11. For all proposed activities that would be located in or adjacent to an authorized Federal Navigation project, as listed in Regional Condition #18, the *PCN* must include project drawings that have the following information: a) location of the edges of the Federal channel; b) setback distances from the edge of the channel; c) the distance from watermost edge of the proposed *structure* or fill to the nearest edge of the channel and the Mean High and Mean Low water lines; and d) coordinates of both ends of the watermost edge of the proposed *structure* or fill (NAD 83 State Plane Coordinates in decimal degrees). This notification requirement is in addition to the *PCN* requirements listed in General Condition #32.

12. For all proposed activities that would be located in waters that are designated critical habitat under section 7 of the Endangered Species Act, and waters that are proposed critical habitat, the prospective permittee must submit a *PCN* to the District Engineer in accordance with General Condition #32. Refer to the following National Oceanic and Atmospheric Administration (NOAA) Fisheries website for the most up-to-date information regarding Critical Habitat designations under the jurisdiction of the National Marine Fisheries Service (NMFS):
http://sero.nmfs.noaa.gov/protected_resources/section_7/threatened_endangered/

13. For all proposed activities that would be located within a FEMA designated floodway, the prospective permittee must submit a *PCN* to the District Engineer in accordance with General Condition #32.

14. The permittee must comply with all FEMA regulations and requirements. The permittee is advised that the National Flood Insurance Program (NFIP) prohibits any development within a designated floodway within the FEMA Special Flood Hazard Area (SFHA), including placement of fill, without a "No Impact Certification" approved by the local NFIP flood plain manager. If the proposed action is located in a designated FEMA SFHA (e.g.,100 year flood plain), the permittee must coordinate with the local NFIP flood plain manager and comply with FEMA requirements prior to initiating construction. A list of NFIP floodplain managers may be found at: http://www.dnr.sc.gov/water/flood/index.html.

15. The permittee must comply with all FEMA regulations and requirements. The permittee is advised that development activities in a designated FEMA Special Flood Hazard Area (SFHA) are subject to the floodplain management regulations of the National Flood Insurance Program (NFIP). If the proposed action is located in a designated FEMA SFHA (e.g.,100 year flood plain), the permittee must coordinate with the local NFIP flood plain manager and comply with FEMA requirements prior to initiating construction. A list of NFIP floodplain managers may be found at: http://www.dnr.sc.gov/water/flood/index.html.

For Specific Nationwide Permits:

16. **For NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, 50, 51 and 52,** in accordance with General Condition # 22(a), Designated Critical Resource Waters, the discharges of dredged or fill material into waters of the United States within, or directly affecting, critical resource waters, including wetlands adjacent to such waters, are NOT authorized by these NWPs. Note: The ACE Basin National Estuarine Research Reserve and the North Inlet Winyah Bay National Estuarine Research Reserve are Designated Critical Resource Waters.

17. **For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, 38 and 54,** in accordance with General Condition # 22(b), Designated Critical Resource Waters, a *PCN* is required for any activity proposed in designated critical resource waters including wetlands adjacent to those waters. Refer to General Condition #32 for *PCN* requirements. Note: The ACE Basin National Estuarine Research Reserve and the North Inlet Winyah Bay National Estuarine Research Reserve are Designated Critical Resource Waters.

18. **For NWPs 1, 3, 5, 7, 8, 10, 11, 12, 13, 14, 15, 19 and 36,** the prospective permittee must submit a *PCN* to the District Engineer for any activity that would be located in or adjacent to an authorized Federal Navigation project. These Federal navigation areas include Adams Creek, Atlantic Intracoastal Waterway (AIWW), Ashley River, Brookgreen Garden Canal, Calabash Creek Charleston Harbor (including the Cooper River and Town Creek), Folly River, Georgetown Harbor (Winyah Bay, Sampit River, and Bypass Canal), Jeremy Creek, Little River Inlet, Murrells Inlet (Main Creek), Port Royal Harbor, Savannah River, Shem Creek

(including Hog Island Channel & Mount Pleasant Channel), Shipyard Creek, Village Creek and the Wando River.

19. **For NWPs 3, 11, 12, 13, 14, 15, 20, 22 and 33,** temporary *structure*s, fills, and/or work, including the use of temporary mats, are only authorized for a period of 90 days per temporary impact area and/or phase of the overall project. The permittee may submit a written request at least 15 days prior to the expiration of the original period of 90 days requesting an extension of up to an additional 90 days. The Charleston District Engineer may extend the 90-day period up to an additional 90 days, not to exceed more than a total of 180 days, where appropriate. After expiration of the authorized period (i.e., initial 90 days or up to an additional 90 days), all temporary *structure*s, fills, and/or work, including the use of temporary mats, for the temporary impact area and/or phase of the overall project must be removed and the disturbed areas restored to pre-disturbance conditions. Activities that require the use of temporary *structure*s, fills, and/or work, including the use of temporary mats, in excess of 180 days will require Individual Permit authorization from the Corps prior to construction.

20. **For NWPs 3, 11, 12, 13, 14, 15, 20, 22 and 33,** that require *PCN*s and that involve temporary *structure*s, fills, and/or work, including the use of temporary mats, the *PCN* must include a written description and/or drawings of the proposed temporary activities that will be used during project construction. This requirement is in addition to the *PCN* requirements listed in General Condition #32.

21. **For NWPs 29, 39, 40, 42, 43, 44, 51 and 52,** impacts to stream beds** must be provided in both linear feet and acreage.

22. **NWPs 12, 14, 29, 39, 43, 51 and 52,** will not be used in conjunction with one another for an activity that is considered a *single and complete project.*

23. **For NWPs 12, 14, 29, 39, 46, 51 and 52,** all *PCN*s must include appropriately sized and positioned culverts that meet the requirements of General Conditions #2, #9 and #10 for each individual crossing of waters of the United States. This requirement is in addition to the *PCN* requirements listed in General Condition #32.

24. **For NWPs 12, 14, 29, 39, 46, 51 and 52,** that include the new construction and/or replacement of culverted road crossings, at a minimum, the width of the base flow culvert(s) shall be approximately equal to the average channel width and will not reduce or increase stream depth. This is a minimum requirement that does not replace local and State requirements for roadway design.

25. **For NWPs 12, 14, 18 and 27,** the *discharge* must not cause the *loss* of more than 300 linear feet of stream bed**, unless for *intermittent* and *ephemeral* stream beds the District Engineer waives the 300 linear foot limit by making a written determination concluding that the *discharge* will result in no more than minimal adverse environmental effects.

26. **For NWPs 12, 14, 18 and 27,** the *discharge* cannot cause the *loss* of more than 300 linear feet

of *perennial stream* beds**.

27. **For NWPs 12, 14, and 18,** the prospective permittee must submit a *PCN* to the District Engineer in accordance with General Condition #32, prior to commencing the activity if the proposed *discharge* will impact more than 25 linear feet of streambed. This notification requirement is in addition to the *PCN* requirements listed in General Condition #32.

28. **For NWP 3,** paragraph (a) and (c) activities, the prospective permittee must submit a *PCN* to the District Engineer in accordance with General Condition # 32, if the proposed *discharge* of dredged or fill material will cause the loss of greater than 1/10-acre of waters of the United States or if the proposed *discharge* of dredged or fill material will be located within a special aquatic site, which includes but is not limited to, wetlands, mudflats, vegetated shallows, *riffle and pool complex*es, sanctuaries, and refuges.

29. **For NWP 3,** paragraph (a) activities, the prospective permittee must submit a *PCN* to the District Engineer in accordance with General Condition # 32, for the repair, rehabilitation or replacement of existing utility lines constructed over *navigable waters* of the United States (i.e., Section 10 waters) and existing utility lines routed in or under *navigable waters* of the United States (i.e., Section 10 waters), even if no *discharge* of dredged or fill material occurs.

30. **For NWP 3,** paragraph (b) activities, excavation of accumulated sediment or other material is not authorized in areas within the immediate vicinity of existing *structure*s (e.g., private or commercial dock facilities, piers, canals dug for boating access, marinas, boat slips, etc.).

31. **For NWPs 7 and 12,** the associated intake *structure* must be screened to prevent entrainment of juvenile and larval organisms, and the inflow velocity of the associated intake *structure*s cannot exceed 0.5 feet/second.

32. Activities authorized by **NWP 7** must occur in the immediate vicinity of the outfall, and must be necessary for the overall construction or modification of the outfall. **NWP 7** shall not be used to authorize ancillary activities such as construction of access roads, installation of utility lines leading to or from the outfall or intake *structure*s, construction of buildings, distant activities, etc.

33. **For utility line activities authorized by NWP 12** (**as well as utility lines associated with projects authorized by NWP 29 and 39)** that involve horizontal directional drilling beneath *navigable waters* of the United States (i.e., section 10 waters), the *PCN* must include a proposed remediation plan (i.e., frac-out plan). This requirement is in addition to the *PCN* requirements listed in General Condition #32.

34. **For utility line activities authorized by NWP 12 (as well as utility lines associated with projects authorized by NWP 29 and 39),** excavated material shall be returned to the trench and any remaining material shall be relocated and retained on an upland disposal site. Substrate containing roots, rhizomes, seeds, and other natural material must be kept viable and replaced at the surface of the excavated site. Impacted wetlands will be replanted with native wetland

species or allowed to naturally re-vegetate from the replaced substrate, as long as the resulting vegetation is native.

35. **For utility line activities authorized by NWP 12 (as well as utility lines associated with projects authorized by NWP 29 and 39),** stream banks that are cleared of vegetation will be stabilized using bioengineering techniques and/ or the planting of deep-rooted native species.

36. **For utility line activities authorized by NWP 12 (as well as utility lines associated with projects authorized by NWP 29 and 39),** construction techniques to prevent draining, such as anti-seep collars, will be required for utility lines buried in waters of the United States when necessary. If no construction techniques to prevent draining are proposed, the prospective permittee must provide appropriate documentation to support that such techniques are not required to prevent drainage of waters of the United States.

37. **For NWP 12,** the prospective permittee must submit a *PCN* to the District Engineer in accordance with General Condition #32 prior to commencing the activity if the activity will involve temporary *structure*s, fills, and/or work. To be complete, the *PCN* must also include the specifications of how pre-construction contours will be re-established and verified after construction. This notification requirement is in addition to the notification criteria listed for this NWP.

38. **For utility line activities authorized by NWP 12, (as well as utility lines associated with projects authorized by NWP 29 and 39),** the prospective permittee must submit a *PCN* to the District Engineer in accordance with General Condition #32, prior to commencing the activity if the activity will involve maintained utility crossings. To be complete, the *PCN* must also include a justification for the required width of the maintained crossing that impacts waters of the United States. This notification requirement is in addition to the notification criteria listed for this NWP.

39. **For NWP 12,** the prospective permittee must submit a *PCN* to the District Engineer in accordance with General Condition #32 prior to commencing the activity if the activity will involve the construction of a sub-station in waters of the United States. To be complete, the *PCN* must also include a statement of avoidance and minimization for the *loss of waters of the United States* impacted by the utility line sub-station. This requirement is in addition to the *PCN* requirements listed in General Condition #32.

40. **For NWP 12,** the prospective permittee must submit a *PCN* to the District Engineer in accordance with General Condition #32 prior to commencing the activity if the activity will involve the permanent conversion of forested wetlands to herbaceous wetlands. To be complete, the *PCN* must also include the acreage of conversion impacts of waters of the United States and a *compensatory mitigation* proposal or a statement of why *compensatory mitigation* should not be required. This requirement is in addition to the *PCN* requirements listed in General Condition #32.

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41. **For NWP 13 activities, NWP 54 activities, and living shoreline projects authorized by NWP 27** that require submittal of a *PCN*, the *PCN* must include the following information:

    a. Habitat type along the shoreline;
    b. The presence of stabilization *structure*s in the vicinity of the project;
    c. Cause/s, extent, and approximate rate of erosion (if known);
    d. Site specific information which may include: shoreline orientation, slope, bank height, tidal range, nearshore bathymetry, fetch, substrate stability, etc.;
    e. Rationale for selecting the preferred stabilization technique;
    f. A statement that structural materials toxic to aquatic organisms will not be used and if stone is proposed, a statement that only clean stone, free of exposed rebar, asphalt, plastic, soil, etc., will be used; and
    g. A statement that filter fabric will be used as appropriate when stone or other heavy material is proposed.

    These requirements are in addition to the *PCN* requirements listed in General Condition #32.

42. Projects qualifying for **NWP 27 and/or NWP 54** will require coordination with appropriate Federal, State, and local agencies. The coordination activity will be conducted by the Corps of Engineers. Agencies will generally be granted 15 days to review and provide comments unless the District Engineer determines that an extension of the coordination period is reasonable and prudent.

43. **For NWP 29,** the *loss of waters of the United States* is limited to a maximum of ¼-acre for a single family residence.

44. **For NWPs 29 and 39,** the *discharge*s of dredged or fill material for the construction of *stormwater management facilities* in *perennial streams* are not authorized.

45. **For NWP 33,** the prospective permittee must submit a *PCN* to the District Engineer in accordance with General Condition #32, for temporary construction, access, and dewatering activities that occur in non-tidal waters of the United States, including wetlands. In addition, the *PCN* shall include a restoration plan.

46. **For NWP 36,** only one boat ramp may be constructed on a single lot or tract of land (e.g., each lot within a subdivision).

47. **For NWP 38,** the *PCN* must contain the following information:

    a. documentation that the specific activities are required to effect the containment, stabilization, or removal of hazardous or toxic waste materials as performed, ordered, or sponsored by a government agency with established legal or regulatory authority;

    b. a narrative description indicating the size and location of the areas to be restored, the work involved and a description of the anticipated results from the restoration; and

c. a plan for the monitoring, operation, or maintenance of the restored area.

This requirement is in addition to the *PCN* requirements listed in General Condition #32.

48. **For NWP 41,** a *PCN* must be submitted to the District Engineer for projects that require mechanized land clearing in waters of the United States, including wetlands, in order to access or perform reshaping activities.

49. **NWP 41** is prohibited in channelized streams or stream relocation projects that exhibit natural stream characteristics and/or perform natural stream functions.

50. **For NWP 48,** changing from bottom culture to floating or suspended culture will require submittal of a *PCN* to the District Engineer. Additionally, new aquaculture activities involving suspended or floating culture will require submittal of a *PCN* to the District Engineer. Refer to the *PCN* requirements listed in General Condition #32. Note: If the District Engineer determines that the proposed floating or suspended culture will result in more than minimal adverse environmental effects, an Individual Permit will be required for the proposed activity.

51. **For NWP 48,** when a new commercial shellfish aquaculture activity will occur adjacent to property that is not owned by the prospective permittee, the activity will require submittal of a *PCN* to the District Engineer. The *PCN* must include the following information in addition to the *PCN* requirements listed in General Condition #32:

    a. A map or depiction that shows the adjacent property(ies) and adjacent property owners' contact information. Note: This information may be obtained online from the applicable county's tax information pages.

    b. A signed letter(s) of "no objection" to the proposed commercial shellfish activity from each of the adjacent property owner(s). Each letter shall include the name, mailing address, property address, property Tax Map Parcel (TMS) number, and signature of the property owner.

52. **For NWP 53,** the *PCN* must include a Tier I evaluation, in accordance with the Inland Testing Manual, for the project area immediately upstream of the low-head dam. If the Tier I evaluation indicates contaminated sediments are present, a Tier II evaluation may be required.

53. **For NWP 54 projects and living shoreline and/or oyster restoration projects authorized by NWP 27,** the *PCN* must include the following information in addition to the *PCN* requirements listed in General Condition #32:

    a. A plan view project sketch that shows the proposed project footprint; the Mean High Water (MHW) Line; the Mean Low Water (MLW) Line; marsh line (if applicable); shoreline; width of the waterway at the project location; location of adjacent *structure*s,

such as docks and boat ramps (if applicable); distance of the project footprint from the MHW line; distance of the project footprint from adjacent *structure*s; and proposed location of informational or navigation markers. Refer to c. and d. below, if applicable. Note: Refer to Regional Condition #11 if the proposed project is located in or adjacent to an authorized Federal Navigation project for the additional information that will be required.

b. A cross-section sketch that shows the height of the proposed project above substrate and the water depth at MHW Line and MLW Line in relation to the proposed project.

c. For projects that are 18 inches or less in height above substrate AND consist of hard *structure*s or fill material, such as, but not limited to, riprap, oyster castles, bagged oyster shell and wooden sills, informational signs to alert boaters to the presence of the project area will be required. The *PCN* must include a depiction and description of proposed informational signs. The signs must be made of reflective material or must include reflective tape on the sign or sign post. The signs must be located at each end of the project area and at 100-foot increments along the project area, if applicable. Note 1: Projects that include ONLY the use of loose shell will not require the installation of informational or navigational signs. Note 2: The prospective permittee shall be made aware that the U.S. Coast Guard (USCG) may require the project area to be marked. Prior to commencing work, the permittee shall contact the USCG at U. S. Coast Guard Charleston District Seven, Waterways Management Branch, 909 SE 1st Ave, Suite 406, Miami, FL 33131, or by phone at 305-415-6755 or 305-415-6750, regarding possible markers and/or lighting requirements. The permittee shall install all markers and/or lighting as required by the USCG. In the event that the USCG does not require markers or lighting, the permittee shall mark the project area with Corps approved informational signs as described above. Note 3: These requirements will be added to the NWP verification as special conditions.

d. For projects that are more than 18 inches in height above substrate AND consist of hard *structure*s or fill material, such as, but not limited to, riprap, oyster castles, bagged oyster shell, and wooden sills, the prospective permittee must mark the project area with diamond-shaped white day markers with orange border and black print stating “Danger Obstruction”. The signs shall be located at each end of the project area and at 100-foot increments along the project area, if applicable. Note 1: Projects that include ONLY the use of loose shell will not require the installation of informational or navigational signs. Note 2: Prior to commencing work, the permittee shall contact the USCG at U. S. Coast Guard Charleston District Seven, Waterways Management Branch, 909 SE 1st Ave, Suite 406, Miami, FL 33131, or by phone at 305-415-6755 or 305-415-6750, regarding potential project specific approval of the markers. The permittee shall install all markers and/or lighting as required by the USCG. In the event the USCG does not require these or other markers and/or lighting, the “Danger Obstruction” markers are still required by the Corps. Note 3: These requirements will be added to the NWP verification as special conditions.

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** For the purpose of these regional conditions, the term “stream bed” also includes features determined to be a “tributary” and a “relatively permanent water.”

Note 1: For the purpose of these regional conditions, bankfull is defined as the top-of-bank to top-of bank of the channel in a cross-sectional view.

Note 2: Regional conditions # 14, #15, and #53d were revised on September 7, 2017.

Permit Number: _____

Name of Permittee: _____

Date of Issuance: _____

Upon completion of the activity authorized by this permit and any mitigation required by the permit, sign this certification and return it to the following address:

U.S. Army Corps of Engineers
Regulatory Division
Northwest Branch
1835 Assembly Street, Room 865-B-1
Columbia, South Carolina 29201

Please note that your permitted activity is subject to a compliance inspection by a U.S. Army Corps of Engineers representative. If you fail to comply with this permit you are subject to permit suspension, modification, or revocation.

==========

***I hereby certify that the work authorized by the above referenced permit has been completed in accordance with the terms and conditions of the said permit, and required mitigation was completed in accordance with the permit conditions*.**

_____
Signature of Permittee

South Carolina Department of Transportation (SCDOT)

Right-of-Way (ROW) Encroachment Permit applications were submitted to SCDOT for approval to install the water main within the SCDOT ROW. Encroachment permit documents from SCDOT will be appended to the document on the following pages following approval.

Appendix D

Engineering Reports

Hydrologic Analysis (Not Applicable)

Because of the nature of the project, the post-construction conditions will match the pre-construction conditions. No new grading, impervious areas, stormwater control measures, or permanent disturbances will be created. Therefore, no new outfalls will be added and no discharges will be modified and post-development run-off peak discharges match those pre-development.

Detention Analysis (Not Applicable)

No detention structures are proposed to be installed as part of this project.

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

Appendix F

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	
Date & Time	**Description/Outline and Name of the Presenter of SWPPP and Site Requirements**

Name	Company	Signature

SWPPP Pre-Construction Conference Attendance Log (Continued)

Name	Company	Signature

SWPPP Contractor & Sub-Contractor Log

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:	

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:	

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:	

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

NOTE TO ON SITE CONTRACTOR

PLEASE READ THE SPECIAL PROVISIONS ATTACHED TO THE PERMIT. ON-SITE CONTRACTOR IS RESPONSIBLE FOR ENSURING THE SCDOT IS NOTIFIED WHEN WORK DEFINED IN THIS PERMIT STARTS AS WELL AS WHEN THE WORK IS COMPLETE.

PRIOR TO STARTING ANY WORK ON THE SCDOT ROADWAY AND/OR RIGHT-OF-WAY PLEASE CALL SCDOT INSPECTOR RONNIE WRIGHT AT 803-327-6186 OR EMAIL wrightrh@scdot.org TWENTY-FOUR HOURS BEFORE WORK BEGINS.

PLEASE CALL WHEN WORK WITHIN THE RIGHT-OF-WAY IS COMPLETED FOR FINAL INSPECTION TO CLOSE OUT THE PERMIT.

If applicable, send as-builds and/or bore logs to:

Attention: Ronnie Wright

SCDOT

338 Robertson Road West

Rock Hill, South Carolina 29730

The SCDOT (pursuant to Sections 57-3-110, 57-5-1080 and 57-5-1090 of the Codes of Laws of South Carolina) reserves the right to deny or revoke any encroachment permit.

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
Encroachment Permit

Permit No : 235957
Permit Decision Date : 7/20/2020
Expiration Date : 7/20/2021

Type Permit : WATER

Location:

District	Work County	Type	Route	Aux	Begin MP	End MP
4	York, SC	S-	817	None	0.183	0.972
4	York, SC	SC	161	None	18.224	18.626
4	York, SC	S-	54	None	8.815	5.091
4	York, SC	S-	815	None	1.539	0.094
4	York, SC	S-	80	None	2.950	3.312

Contact Information

Applicant: LisaHagood Phone:
Contact: Lisa Hagood
Address: 6 South Congress Street,
City: York State: SC Zip: 29745

Comments

The 18"-20" water main alignment begins just south of Old York Road and crosses under Old York Road through jack and bore installation methods. It then continues north along the east side of Harper Road in the SCDOT Right of Way (ROW), crosses Chambers Road, and continues to the intersection of Harper Road and Paraham Road. The pipe alignment crosses under Paraham Road through jack and bore and continues northwest along the north side Paraham Road in the ROW to the intersection of Paraham Road and Campbell Road. The 20" water main crosses under Campbell Road and Paraham Road through jack and bore and terminates for future connection along Paraham Road. The 8" water main taps off of the 20" water main on the north side of Campbell Road and continues southeast along Campbell Road in the ROW. The 8" water main will cross under Campbell Road twice through jack and bore before terminating at the connection to an existing water main in the ROW on the north side of Campbell Road.

Special Provisions:

0004 - SCDOT SHALL BE NOTIFIED WHEN WORK DEFINED IN THE PERMIT STARTS AS WELL AS WHEN THE WORK IS COMPLETED. REFERENCE SHALL BE

MADE BY PERMIT NUMBER.

0101 - SHOULDER SOD DESTROYED BY THIS INSTALLATION TO BE REPLACED FOR THE ENTIRE AREA. THE AREA SHALL BE RE-SHAPED AND ROLLED TO THE CROSS SECTION EXISTING PRIOR TO THIS WORK.

0102 - BORE PITS SHALL BE CLOSED IMMEDIATELY AFTER INSTALLATION.

0103 - THE PROPOSED ENCROACHMENT SHALL BE TRENCHED TO A MINIMUM DEPTH OF 42" BELOW THE CROSS SECTION AS ORIGINALLY CONSTRUCTED.

0107 - TRENCH TO BE PROPERLY BACK-FILLED AND THOROUGHLY TAMPED. THE ENTIRE DISTURBED AREA SHALL BE RE-SHAPED AND DRESSED OUT IN A WORKMANSHIP LIKE MANNER.

0109 - THE BORE SHALL BE MADE BY THE DRY BORE METHOD IN SUCH A MANNER AS NOT TO DISTURB THE PAVEMENT. THE BORE PIT MUST NOT BE CLOSER THAN FIVE (5) FEET FROM THE EDGE OF PAVEMENT. THE BORE DEPTH SHALL BE NOT LESS THAN 48" DEEP AT ANY POINT IN THE BORE. NOTICE SHALL BE GIVEN TO THE DEPARTMENT IMMEDIATELY IF THE BORE TURNS AND DAMANGES THE ROAD.

0112 - ALL WATER METERS, AIR VALVES, ELECTRIC TRANSFORMERS, CATV CONNECTION BOXES, TELEPHONE PEDESTALS, AND/OR OTHER UTILITY/SPLICE BOXES SHALL BE PLACED AT THE RIGHT-OF-WAY LINE.

0120 - RESTORATION OF PAVEMENT, SHOULDERS, DITCHES, ETC., TO BE PERFORMED AS SOON AS POSSIBLE AFTER CONSTRUCTION, OR SCHEDULED SO THAT THE CONSTRUCTION IS NO FURTHER THAN 2,000 L.F. AHEAD OF COMPLETE RESTORATION.

0123 - ALL WORK PERFORMED IN CONNECTION WITH THIS PERMIT SHALL CONFORM TO THE SCDOT "A POLICY FOR ACCOMODATING UTILITIES ON HIGHWAY RIGHT-OF-WAY" MOST CURRENT EDITION.

0125 - ALL CROSSLINE PIPES ARE TO BE LOCATED AND FLAGGED PRIOR TO BEGINNING OPERATION.

0209 - DISTURBED VEGETATION SHALL BE RESEEDED ACCORDING TO THE SPECIFICAION FOR HIGHWAY CONSTRUCTION.

0301 - THE DITCHES AND/OR SHOULDERS DISTURBED DURING THE INSTALLATION SHALL BE RE-ESTABLISHED TO PROPER GRADE, ORIGINAL CROSS SECTION, STABILIZED, AND ALL DRAIN PIPES CLEARED.

0302 - NO EXCAVATION SHALL BE LEFT OPEN ALONG HIGHWAY.

0306 - TRAFFIC CONTROL, LIGHTS, SIGNS AND FLAG-MEN WILL BE FURNISHED BY APPLICANT AND WILL CONFORM TO PART VI OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

0308 - WORK SHALL NOT BE PERFORMED DURING THE HOURS OF 7-9 AM OR 4-6 PM.

0310 - FIELD CHANGES, IF NECESSARY, MUST BE APPROVED IN WRITING BEFORE ACTUAL CONSTRUCTION OF PROPOSED CHANGES.

0311 - SEDIMENT AND EROSION CONTROL DEVICES SHALL BE USED TO MINIMIZE THE MOVEMENT OF SEDIMENT.

0312 - THE PERMITTEE SHALL HOLD THE DEPARTMENT HARMLESS FOR DAMAGES TO BOTH UPSTREAM AND DOWNSTREAM PROPERTIES.

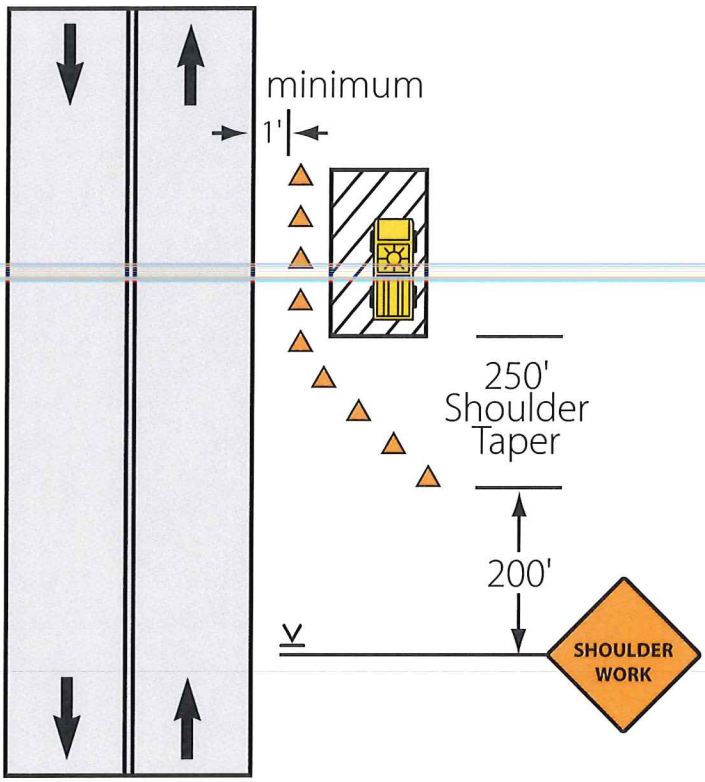
0318 - THE APPLICANT SHALL BE RESPONSIBLE FOR IMMEDIATE REMOVAL

OF SUCH TRAFFIC HAZARDS AS MUD, DEBRIS, LOOSE STONE, AND TRASH AS MAY BE WASHED OR SPILLED ON THE TRAVELED ROADWAY AS A RESULT OF THE PROPOSED WORK.

Shoulder Work

(1' – 15' From the Edge of Pavement)

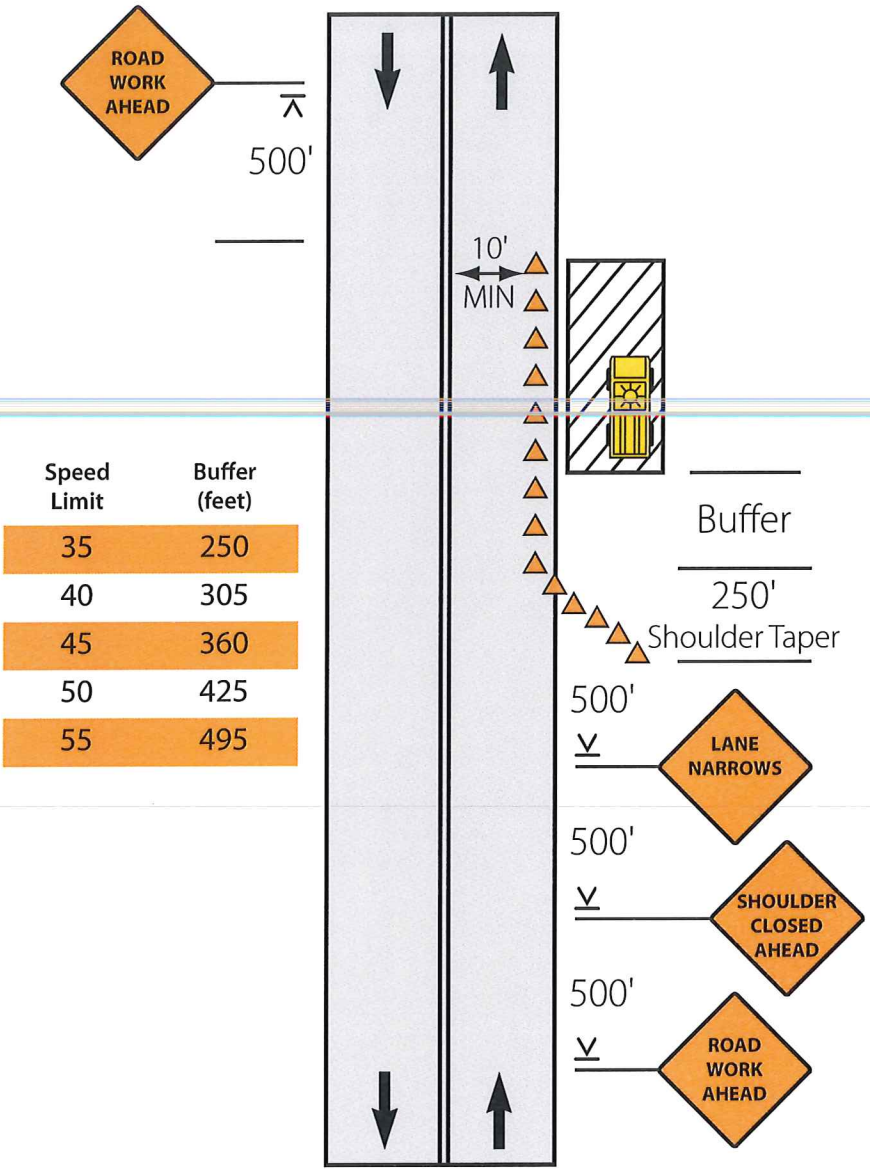
(Short-Term Stationary — 1 to 2 Hours)



Notes:

1. For intermediate speed conditions (40 to 50 MPH), a 350-foot sign spacing may be used, and for high speed conditions (55 to 60 MPH), use a 500-foot sign spacing.
2. For short-term stationary work zones in a shoulder area, an array of advance warning signs is required. Install these advance warning sign arrays as follows:
   a. Low Speed Conditions (35 MPH or less) – this sign array will include "Shoulder Work".
   b. Intermediate Speed Conditions (40 to 50 MPH) – this sign array will include "Road Work Ahead", "Right (Left) Shoulder Closed Ahead", and "Shoulder Work".
   c. High Speed Conditions (55 to 60 MPH) – this sign array will include "Road Work 1500 FT", "Right (Left) Shoulder Closed 1000 FT", and "Right (Left) Shoulder Closed 500 FT".
3. "Utility Work Ahead" or "Workers" symbol signs may be used instead of the "Shoulder Work" sign.

Shoulder Work with Minor Encroachment



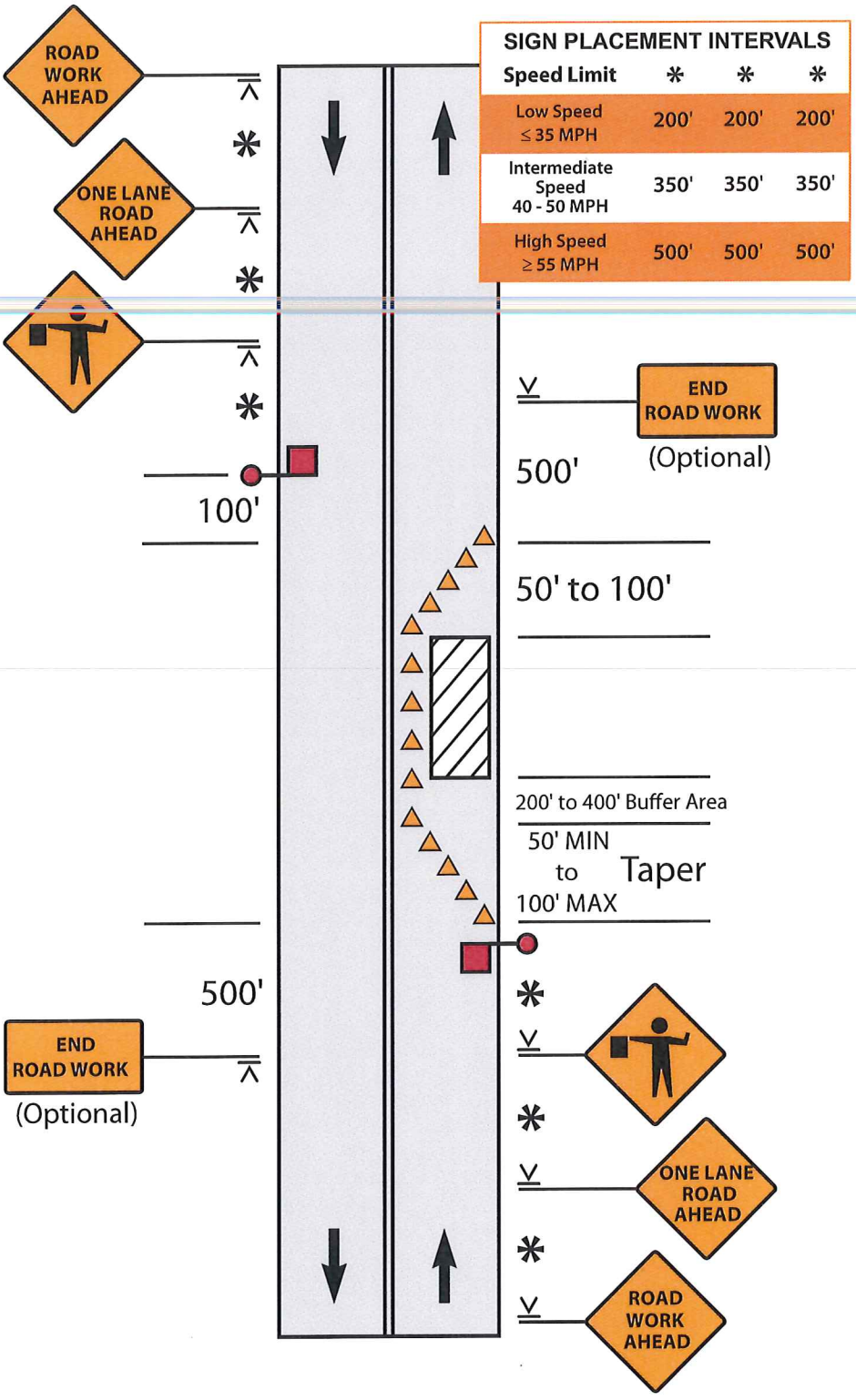
Speed Limit	Buffer (feet)
35	250
40	305
45	360
50	425
55	495

Notes:

1. This typical application applies to roadways with posted speed limits of 55 MPH or less .
2. Maintain a minimum lane width of 10', however, on a low volume roadway, a minimum lane width of 9' is acceptable if traffic does not include wide loads.
3. For low speed conditions (35 MPH or less), a 200-foot sign spacing may be used and for intermediate speed conditions (40 to 50 MPH), a 350-foot sign spacing may be used.
4. An array of 3 advance warning signs is required. This sign array will include "Road Work Ahead", "Right (Left) Shoulder Closed Ahead", and "Lane Narrows".

Lane Closure on a Two-Lane Road

(Two-Flagger Operation – Daytime ONLY)



SIGN PLACEMENT INTERVALS			
Speed Limit	*	*	*
Low Speed ≤ 35 MPH	200'	200'	200'
Intermediate Speed 40 - 50 MPH	350'	350'	350'
High Speed ≥ 55 MPH	500'	500'	500'

Notes: see page 22.

York Soil & Water Conservation District
Board of Commissioners
Minutes of the August 23rd, 2022

Commissioners	Associate Commissioners
Beth White, Chairperson	Martha Dial (A)
C. W. Senn, Jr., Treasurer	Tom Dissington (A)
Peggy Palmer, Vice-Chairperson	Duane Christopher (A)
Bennie Copeland	
Michael Nance (A)	
YSWCD & NRCS Personnel	
Chasity Jones, District Coordinator	Tyler Brown, SCDNR
Tria Yang, NRCS	Kayla Silva
Catherine White	Barry McKinnon
	Dickie Harper

The meeting of the YSWCD Board of Commissioners was held at 1460 East Alexander Love Hwy, York, South Carolina 29745.

I. Call to Order

The meeting was called to order at 5:06 pm by Commissioner White with invocation by Commissioner Palmer.

II. Adoption of Minutes

The minutes of the June 15, 2022, and July 22, 2022, meeting(s) was approved as previously distributed via email.

III. Treasurer's Report

Commissioner Senn presented the checkbook register report for 06/15/2022 through 06/22/22, the budget comparison for the Fiscal Year 2021-2022 and Fiscal Year 2022-2023.

IV. Commissioners' Reports

- **Commissioner Nance-** no report
- **Commissioner Copeland-** no report
- **Commissioner Senn-** closed CD with Farm Bureau Bank, check was mailed to YSWCD.
- **Commissioner Palmer-** no report
- **Commissioner Beth White-** attended York County Stormwater appeals meeting. The county is approving a lot of development, and this is causing bigger issues.

V. Associate Commissioner Reports

- **Commissioner Dial-** no report
- **Commissioner Dissington-** no report
- **Commissioner Christopher-** no report

VI. Staff Reports

a) NRCS Report – Submitted by: Tria Yang - District Conservationists
July to August 2022

- **EQIP – York County has 14 applications.**
  6 applications-obligated
- **Cover Crop Initiative – No report**
- **Conservation Stewardship Program (CSP)**
  6 applications
  3 approved and will be obligated
  3 – ineligible status

- **CSP-Grasslands Conservation Initiative (GCI) – No Report**

- **Conservation Innovation Grant (CIG) – No report.**

1. I have accepted a position in Smithfield, Virginia. My last day here in York, South Carolina will be September 2nd. I will be starting my new position on September 26.

Thank you all for giving me the opportunity to work you. The producers, landowners, and partners I have worked with are all wonderful group of people and will always cherish the friendship I have made here in South Carolina. Thank you.

2. York position for District Conservationist has been advertised. It is opened from 8/12/2022 to 9/2/2022. Altogether, there are 6 District Conservationist positions opened for South Carolina. There's a $7,000 relocation incentive. Please go to www.usajobs.gov to apply for any of these opened positions. Please see the attached positions advertisement for more information.

End of report.

b) Fishing Creek Watershed Board- Chasity Jones- Admin.

- Meeting was held August 22, 2022. All dams are functioning as intended with no issues needing to be resolved.
- Millage request was submitted to York County Auditor, no change was made.

c) YSWCD- Chasity Jones- District Coordinator

d) SCDNR- Tyler Brown

- **"James Tillman, Southeast Regional Conservationist who supervises Ann English visited in late July. He visited districts facing NRCS service issues to get direct feedback. He promised to resolve the staffing issues and to dig deeper into some other issues. Congressional and Senate staffers were there to represent the federal delegations.**

- **Aid to Conservation Districts is being dispersed right now and with the legislature's support we've been able to grow the aid funding from $15,000 to $25,000 per district".**

Administrative

- **Paid monthly federal and state taxes, as well as monthly retirement payment each month.**
- **Reconciled checking account to monthly bank statements.**
- **Received, processed, and sent thank you letters for affiliate donations. We have received $4420 in affiliate donations for 2022.**
- **Paid Visa bill.**
- **Sold $899 in Filter Fabric for 2022.**

Fishing Creek Watershed

- **Reconciled checking account to monthly bank statement.**
- **Received tax funds through July and deposited them into the bank.**

Education/Outreach

- **District Coordinator Jones and T.J. Peeler (York County) attended the Back-to-School Brunch at The Recycling Center and made several connections with teachers/school staff.**
- **District Coordinator Jones finished up presenting the Enviroscape demonstration at Bethelwoods.**
- **District Coordinator Jones and T.J. Peeler (York County) met with Fort Mill Stormwater in hopes to join an upcoming project that they are developing in Kingsley.**

VII. Agency Reports

a) SC Dept. of Natural Resources – DNR monthly report was emailed to commissioners previously.
b) SC Association of Conservation Districts
c) National Association of Conservation Districts

VIII. Old Business

a) Local WorkGroup Meeting- the official date for the LWGM will be October 3rd, 2022, from 11-1 at Black's Peaches. It will be a drop-in

luncheon with a budget of $1000. Commissioner Senn made the motion to approve, Commissioner Catherine White 2nd, motion carried.

IX. New Business

a) **News Briefs- emailed to each board member**

b) **York County Waterline (Harper Easement)- Barry McKinnon provided information regarding placement of proposed waterline. As long as the waterline is not in violation of the Clean Water Act and with approval from Dickie Harper about waterline addition, Commissioner Senn made a motion to approve the waterline, Commissioner Palmer 2nd, motion carried.**

c) **Oath of Office- Tyler Brown, SCDNR, completed the appointment process for Commissioners Catherine White and Peggy Palmer.**

d) **Budget- Commissioner Senn made the motion to approve the proposed budget, Commissioner Palmer 2nd, motion carried.**

e) **Audit- to be completed by Commissioners Palmer and Catherine White on 08/31/2022 @ 9:30 a.m.**

f) **SC Conservation Districts Foundation- it was proposed to donate in Commissioner Bennie Copeland's honor. Commissioner Senn made the motion to approve a $100 donation, Commissioner Palmer 2nd, motion carried.**

X. Next Meeting Date: 09/13/2022 at YSWCD

XI. Adjourn

There being no further business, the meeting was adjourned at 6:54 p.m.

Submitted by Chasity Jones, District Coordinator

_____ _____

Beth White, Chairperson C.W. Senn, Treasurer

RAILPROS

June 19, 2023

Lisa Hagood
YORK COUNTY
6 S Congress St
York, SC 29745

RE: Proposed installation of Transverse Crossing Only of a Water pipeline

Coastal Division, at Mile Post R-27.02
York, York, South Carolina
Latitude 34.99766, Longitude -81.14697 To Latitude 34.99766, Longitude -81.14697
NS Activity No. 1292819

Dear Lisa Hagood:

RailPros, as consultant for Norfolk Southern Railway Company ("Railway"), has reviewed the above-referenced request. Based on the information and documentation presented, Railway has no objections to the proposed work.

Attached you will find the requested offer of agreement for execution, by an official authorized to execute contract agreements on behalf of the Licensee. Please have the agreement executed via DocuSign. Note, however, that the attached offer of agreement does not constitute a binding contract, unless or until it is executed by both the Licensee and Railway.

NOTE: **No work shall be permitted on or about the Railway's property until the agreement becomes binding, and the Division Engineer or their authorized representative has reviewed and approved field services** for the project, such as *flagging protection*, *construction monitoring*, and *post-construction inspection services*. Once the above items are received, the fully executed agreement will be sent, along with the name and contact information for field service coordination.

If we have not received the executed agreement and corresponding payments and/or documents within sixty (60) days from the date of this letter, we reserve the right to cancel this request.

If you have any questions, please contact me in the portal.

Sincerely,

Laura Wilburn

Laura Wilburn
Real Estate Specialist

PO Box 642270
Omaha, NE 68164

P: (402) 965-0539 **F**: (866) 762 - 7619
www.railpros.com

PIPE DATA SHEET

	CARRIER PIPE	CASING PIPE
CONTENTS TO BE HANDLED	Water	
MAX. ALLOWABLE OPERATING PRESSURE	250 psi	
NOMINAL SIZE OF PIPE	18 in DIP	36 in Steel
OUTSIDE DIAMETER	19.5 in	37.063 in
INSIDE DIAMETER	18 in	36 in
WALL THICKNESS	0.31 in MIN	0.532 in MIN
WEIGHT PER FOOT	57.2 lbs/ft	236.3 lbs/ft
MATERIAL	Ductile Iron	Steel
PROCESS OF MANUFACTURE	Cast	Smooth Wall or Spiral Welded
SPECIFICATION	AWWA C150/A21.50 & C151/A21.51	ASTM A-139
GRADE OR CLASS (Specified Minimum Yield Strength)	Pressure Class 250	Grade "B" Steel
TEST PRESSURE	250 psi	N/A
TYPE OF JOINT	Restrained	Welded
TYPE OF COATING	Bituminous	Coal-tar primer coat with hot coal-tar enamel and asbestos felt wrap
DETAILS OF CATHODIC PROTECTION	None	None
DETAILS OF SEALS OR PROTECTION AT END OF CASING		Refer to detail in Plans
CHARACTER OF SUBSURFACE MATERIAL	Sandy Silt	Sandy Silt
APPROXIMATE GROUND WATER LEVEL	Greater than 10' below Ground Surface	Greater than 10' below Ground Surface
SOURCE OF INFORMATION ON SUBSURFACE CONDITIONS	Boring Log along Harper Rd	Boring Log along Harper Rd

Proposed method of installation (refer to NSCE-8 Specification):

- [X] Bore & Jack
- [ ] Jacking
- [ ] Tunneling (with Tunnel Liner Plate)
- [ ] Directional Bore/Horizontal Direction Drilling – Method A
- [ ] Directional Bore/Horizontal Direction Drilling – Method B
- [ ] Open Cut – *All installations directly under any track must be designed as a bored installation. Open cut installations will be considered on a case-by-case basis by Norfolk Southern's Division Superintendent at the time of installation.*
- [ ] Other – Please Specify: _____

LICENSE AGREEMENT

THIS LICENSE AGREEMENT (this "Agreement"), dated as of June 19, 2022 (the "Effective Date") is made and entered into by and between

NORFOLK SOUTHERN RAILWAY COMPANY, a Virginia corporation, whose mailing address is Three Commercial Place, Norfolk, Virginia, 23510 (hereinafter called "Railway"), and YORK COUNTY, a(n) South Carolina Government Entity, whose mailing address is 6 S Congress St, York, South Carolina (hereinafter called "Licensee").

W I T N E S S E T H

WHEREAS, Licensee has submitted to Railway an Application (as defined herein) related to the proposed installation and construction of **propose to install an underground transverse crossing consisting of one (1) 36-inch steel casing, by bore and jack, containing one (1) 18-inch ductile iron water main** (hereinafter called the "Facilities") located in, over or under, and across the right-of-way or property and any tracks of Railway at or near:

- Milepost R-27.02, Coastal Division
- Latitude 34.99766 To 34.99766, Longitude -81.14697 To -81.14697
- York, York County, South Carolina

the same to be located in accordance with and limited to the installation shown on the diagram set forth in **EXHIBIT A** attached hereto and made a part hereof (such right-of-way or property of Railway, collectively, the "Premises"); and

WHEREAS, Railway has approved the Application for the initial installation and construction of the Facilities; and

WHEREAS, Licensee desires a license to use such right-of-way or property of Railway for the installation and construction, as well as the subsequent maintenance, operation and removal, of the Facilities.

NOW, THEREFORE, Railway and Licensee agree as follows:

1. Grant; Consideration; Term. Subject to Section 2(b) below, Railway hereby grants to Licensee, insofar as Railway has the right to do so, without warranty and subject to all encumbrances, covenants and easements to which the Railway's title may be subject, the right to use and occupy so much of the Premises as may be necessary for the installation, construction, maintenance, operation and removal of the Facilities (collectively, "Operate" or "Operations"). Upon execution of this Agreement, Licensee shall pay to Railway (i) a non-refundable, non-assignable, one-time license fee in the amount of **TWENTY-NINE THOUSAND ONE HUNDRED AND 00/100 DOLLARS ($29,100.00)**, and (ii) if applicable as determined by Railway pursuant to Section 12 below, the Risk Financing Fee (as defined in Section 12). The term of this Agreement shall commence on the Effective Date and shall continue for a period of twenty (20) years, subject to prior termination as hereinafter described (the "Term").

2. Use and Condition of the Premises.

(a) The Premises shall be used by Licensee only for Operations and for no other purpose. Licensee accepts the Premises in their current "as is" condition, as suited for Operations, and without the benefit of any improvements to be constructed by Railway.

(b) With respect to each Operations project that requires access to the Premises after the initial installation and construction of the Facilities, Licensee shall submit to Railway an application conforming to Railway's then-current standards and procedures (an "Application") for review and approval.

3. Installation of the Facilities; Railway Support. Licensee shall, at its expense, Operate the Facilities (i) on a lien-free basis and in such a manner as will not interfere with the operations of Railway, or endanger persons or property of Railway and (ii) in accordance with (a) the plans and specifications (if any) shown on the prints attached hereto and any other specifications prescribed by Railway, (b) applicable laws, regulations, ordinances and other requirements of federal, state and local governmental authorities, and (c) applicable specifications adopted by the American Railway Engineering and Maintenance-of-Way Association, when not in conflict with the applicable plans, specifications, laws, regulations, ordinances or requirements mentioned in clauses (a) and (b) above. All underground pipes must have secondary pipe containment if the material flowing through the pipeline poses a safety or environmental hazard. Any change to the character, capacity or use of the Facilities shall require execution of a new agreement. In the event it becomes necessary for Licensee to deviate from the approved plans and specifications, Licensee shall seek prior approval from Railway's Division Engineer or his or her authorized representative and, when applicable, an authorized representative of the Division Engineer in the field during Construction Monitoring. Licensee shall provide Railway with complete as-built drawings of the Facilities in an electronic format within thirty (30) days of (i) completion of the initial installation and construction of the Facilities and (ii) completion of any material change to the Facilities.

4. Railway Support. With respect to each Operations project that requires access to the Premises, Railway shall, at Railway's option, furnish, at the sole expense of Licensee, Support Services. The term "Support Services" means such materials and services as necessary, in Railway's sole judgment, to support Railway's tracks and to protect Railway's traffic, including without limitation flagging services and Construction Monitoring during Operations that require access to the Premises. Support Services shall be provided unless Railway's Division Engineer or his or her authorized representative provides to Licensee a written waiver of Support Services, whether in whole or in any part, in a given instance. The term "Construction Monitoring" means services comprised of one or more Railway representatives being assigned and present to monitor construction activities of Licensee, which may include a preconstruction site assessment and a post-construction site assessment.

5. Electronic Interference. If the Facilities cause degradation of Railway's signal, communications and other electronic systems (hereinafter collectively called the "Electronic Systems") or endanger Railway's personnel or other individuals entitled to be on or about the Premises, through inductive or electrostatic interference or otherwise, Licensee, at its expense, will

modify the Facilities to the satisfaction of Railway so as to eliminate such degradation or danger. Such modifications may include, without limiting the generality of the foregoing, transposing circuits or providing additional shielding, reactance or other corrective measures deemed necessary by Railway. The provisions of this Section 5 shall apply to the Electronic Systems existing as of the date of this Agreement and to any Electronic Systems that Railway may install in the future.

6. Corrective Measures. If Licensee fails to take any corrective measures requested by Railway in a timely manner, or if an emergency situation is presented which, in Railway's judgment, requires immediate repairs to the Facilities, Railway, at Licensee's expense, may undertake such corrective measures or repairs as it deems necessary or desirable.

7. Railway Changes. If Railway shall make any changes, alterations or additions to the line, grade, tracks, structures, roadbed, installations, right-of-way or works of Railway, or to the character, height or alignment of the Electronic Systems, at or near the Facilities, Licensee shall, upon not less than thirty (30) days prior written notice from Railway and at Licensee's sole expense, make such changes in the location and character of the Facilities as, in the opinion of the chief engineering officer of Railway, shall be necessary or appropriate to accommodate any construction, improvements, alterations, changes or additions of Railway.

8. Assumption of Risk. Unless caused solely by the negligence of Railway or caused solely by the willful misconduct of Railway, Licensee hereby assumes all risk of damage to the Facilities and Licensee's other property relating to its use and occupation of the Premises or business carried on the Premises and any defects to the Premises; and Licensee hereby indemnifies Railway, its officers, directors, agents and employees from and against any liability for such damage.

9. Entry Upon Premises. Licensee shall enter the Premises in any given instance only pursuant to an approved Application. Prior to commencement of any work to be performed on or about the Premises, Licensee shall notify the appropriate Division Engineer or their authorized representative for the scheduling of Support Services as determined pursuant to Section 4 above. Within seventy-two (72) hours after the Division Engineer's actual receipt of such notification, the Division Engineer shall review the necessity and availability of flagmen for the proposed work and advise Licensee of such matters and the estimated cost of Support Services. No work shall be permitted on or about the Premises without the presence of Railway's flagman or the Division Engineer's waiver of the requirement for flag protection. Entry on or about the Premises or any other Railway right-of-way without the Division Engineer's prior approval shall be deemed trespassing. Licensee agrees to pay Railway, within thirty (30) days after delivery of an invoice therefor, for the cost of Support Services provided by or on behalf of Railway.

10. Liens; Taxes. Licensee will not permit any mechanic's liens or other liens to be placed upon the Premises, and nothing in this Agreement shall be construed as constituting the consent or request of Railway, express or implied, to any person for the performance of any labor or the furnishing of any materials to the Premises, nor as giving Licensee any right, power or authority to contract for or permit the rendering of any services or the furnishing of any materials that could give rise to any mechanic's liens or other liens against the Premises. In addition,

Licensee shall be liable for all taxes levied or assessed against the Facilities and any other equipment or other property placed by Licensee within the Premises. In the event that any such lien shall attach to the Premises or Licensee shall fail to pay such taxes, then, in addition to any other right or remedy available to Railway, Railway may, but shall not be obligated to, discharge the same. Any amount paid by Railway for any of the aforesaid purposes, together with related court costs, attorneys' fees, fines and penalties, shall be paid by Licensee to Railway within ten (10) days after Railway's demand therefor.

11. Indemnification. Licensee hereby agrees to indemnify (to the extent allowed by law) and save harmless Railway, its officers, directors, agents and employees, from and against any and all liabilities, claims, losses, damages, expenses (including attorneys' fees) or costs for personal injuries (including death) and property damage to whomsoever or whatsoever occurring (hereinafter collectively, "Losses") that arise in any manner from (a) the presence of the Facilities on or about the Premises, (b) any Operations or any failure to conduct Operations properly, or (c) any act, omission or neglect of Licensee, its agents, servants, employees or contractors in connection therewith, unless caused solely by the negligence of Railway or caused solely by the willful misconduct of Railway.

12. Insurance.

(a) Insurance Requirements. Without limiting in any manner the liability and obligations assumed by Licensee under any other provision of this Agreement, and as additional protection to Railway, Licensee shall comply with the following provisions:

(i) Subject to subsection (ii) below, upon execution of this Agreement, Licensee shall pay Railway a risk financing fee of $1,900 (the "Risk Financing Fee") to provide Railroad Protective Liability Insurance or such supplemental insurance (which may be self-insurance) as Railway, in its sole discretion, deems to be necessary or appropriate with respect to the initial construction and installation of the Facilities.

(ii) Prior to commencement of each Operations project that requires access to the Premises, unless Railway elects to make available and Licensee pays the then-current Risk Financing Fee for a given Operations project, Licensee shall furnish Railway with an original Railroad Protective Liability (“RPL”) Insurance Policy naming Railway as the named insured and having a limit of (1) not less than a combined single limit of $2,000,000 each occurrence and $6,000,000 aggregate, or (2) if the value of a given operations project exceeds $350,000, not less than a combined single limit of $5,000,000 per occurrence and $10,000,000 in the aggregate. Each RPL policy shall conform to CG 00 34 04 13 or equivalent and include coverage for Terrorism and the Physical Damage to Property Endorsement and shall name Norfolk Southern Corporation and its affiliates and subsidiaries as the insured. Licensee shall ensure that the project location, Licensee identification and work description appear on the declaration pages of a given RPL policy. Licensee shall provide an electronic copy of each RPL policy (and not merely the binder) to Railway at ns.permitting@railpros.com for review and approval prior to commencing any work on the associated Operations project. Licensee may submit inquiries about RPL issues at ns.permitting@railpros.com.

(iii) Licensee shall maintain a Commercial General Liability ("CGL") policy containing products and completed operations and contractual liability coverage, with a combined single limit of not less than $2,000,000 for each occurrence. Any portion of this requirement may be satisfied by a combination of General Liability and/or Excess/Umbrella Liability Coverage. The policy shall not deny any obligation of any insured under the Federal Employer's Liability Act, as amended. The CGL policy shall provide additional insuredcoverage equivalent to ISO CG 20 10 11/85.

(iv) Licensee shall maintain Automobile Liability Insurance with a current ISO occurrence form policy (or equivalent) and apply on an "any auto" (Symbol 1) basis, including coverage for all vehicles used in connection with the Work or Services on the leased property, providing annual limits of at least $1,000,000 per occurrence for bodily injury and property damage combined including uninsured and underinsured motorist coverage, medical payment protection, and loading and unloading.

(v) Licensee shall maintain Workers' Compensation Insurance to meet fully the requirement of any compensation act, plan or legislative enactment applicable in connection with the death, disability or injury of Licensee's officers, agents, servants or employees arising directly or indirectly out of the performance of this Agreement;

(vi) Licensee shall maintain Employers' Liability Insurance with limits of not less than $1,000,000 eachaccident $1,000,000 policy limit for disease, and $1,000,000 each employee for disease;

(b) General Insurance Requirements. Each insurance policy referred to in subsection (a) above shall also comply with the following requirements:

(i) Additional Insureds. Each insurance policy (excluding any RPL policy and Workers' Compensation policy) shall name Railway and its parent, subsidiary and affiliated companies as additional insureds with an appropriate endorsement to each policy.

(ii) Licensee's Coverage Primary and Without Right to Contribution. All policies secured by Licensee, whether primary, excess, umbrella or otherwise, and providing coverage to the Railway as an additional insured (1) are intended to take priority in responding and to pay before any insurance policies Railway may have secured for itself must respond or pay and (2) may not seek contribution from any policies the Railway may have secured for itself.

(iii) Severability of Interests (Cross Liability). No cross-liability exclusions are permitted that would apply to the additional insureds, and there may not be any restrictions in any policy that limits coverage for a claim brought by an additional insured against a named insured.

(iv) Waiver of Subrogation. To the fullest extent permitted by law, all

insurance furnished by Licensee pursuant to this Agreement shall include a waiver of subrogation in favor of Railway with an appropriate endorsement to each policy.

(v) Notice of Cancellation, Modification or Termination. Each insurance policy shall not be subject to cancellation, termination, modification, changed, or non-renewed except upon thirty (30) days' prior written notice to the additional insureds.

(vi) No Limitation. Each insurance policy shall not limit any of Licensee's indemnity obligations or other liabilities under this Agreement. The insurance available to Railway and its parent, subsidiary and affiliated companies asadditional insureds shall not be limited by these requirements should Licensee maintain higher coverage limits.

(vii) Any deductibles or self-insured retentions of Licensee over $50,000 must be declared and approved by Railway. Approval of such requests shall not be unreasonably withheld.

(viii) Licensee shall require all subcontractors who are not covered by the insurance carried by Licensee to maintain the insurance coverages set forth in subsection (a) above, except for the RPL insurance, including but not limited to additional insured status for Railway and its parent, subsidiary and affiliated companies.

(ix) Licensee shall furnish their memorandum of insurance and the RPL Insurance Policy to Railway's Managing Agent prior to execution of this Agreement at ns.permitting@railpros.com. The insurance coverage required herein shall in no way limit Licensee's liability under this Agreement.

13. Environmental Matters. Licensee assumes all responsibility for any environmental obligations imposed under applicable laws, regulations, ordinances or other requirements of federal, state and local governmental authorities relating to (a) any Operations, including notification and reporting of any releases, and (b) any contamination of any property, water, air or groundwater arising or resulting, in whole or in part, from Licensee's operation or use of the Premises pursuant to this Agreement. In addition, Licensee shall obtain any necessary permits to conduct Operations. Licensee agrees to indemnify (to the extent allowed by law) and hold harmless Railway from and against any and all fines, penalties, demands or other Losses (including attorneys' fees) incurred by Railway or claimed by any person, company or governmental entity relating to (a) any contamination of any property, water, air or groundwater due to the use or presence of the Facilities on the Premises, (b) Licensee's violation of any laws, regulations or other requirements of federal, state or local governmental authorities in connection with the use or presence of the Facilities on the Premises or (c) any violation of Licensee's obligations imposed under this Section. Without limitation, this indemnity provision shall extend to any cleanup and investigative costs relating to any contamination of the Premises arising or resulting from, in whole or in part, Licensee's use of the Facilities or any other activities by or on behalf of Licensee occurring on or about the Premises. Licensee further agrees not to dispose of any trash, debris or wastes, including hazardous waste, on the Premises and will not conduct any activities on the Premises which would require a hazardous waste treatment, storage or disposal permit.

14. Assignments and Other Transfers.

(a) Licensee shall not assign, transfer, sell, mortgage, encumber, sublease or otherwise convey (whether voluntarily, involuntarily or by operation of law) this Agreement or any interest therein, nor license, mortgage, encumber or otherwise grant to any other person or entity (whether voluntarily, involuntarily or by operation of law) any right or privilege in or to the Premises (or any interest therein), in whole or in part, without the prior written consent of Railway, which consent may be withheld by Railway in its sole discretion. Any such assignment or other transfer made without Railway's prior written consent shall be null and void and, at Railway's option, shall constitute an immediate default of this Agreement. Notwithstanding the foregoing, upon prior written notice to Railway, Licensee may assign this Agreement to a parent, a wholly-owned subsidiary of Licensee or a wholly-owned subsidiary of Licensee's parent without Railway's consent; provided, however, that no such assignment shall relieve Licensee of its obligations under this Agreement.

(b) Railway shall have the right to transfer and assign, in whole or in part, all its rights and obligations hereunder and in or to the Premises. From and after the effective date of any such assignment or transfer, Railway shall be released from any further obligations hereunder; and Licensee shall look solely to such successor-in-interest of Railway for the performance of the obligations of "Railway" hereunder.

15. Meaning of "Railway". The word "Railway" as used herein shall include any other company whose property at the aforesaid location may be leased or operated by Railway. Said term also shall include Railway's officers, directors, agents and employees, and any parent company, subsidiary or affiliate of Railway and their respective officers, directors, agents and employees.

16. Default; Remedies.

(a) The following events shall be deemed to be events of default by Licensee under this Agreement:

(i) Licensee shall fail to pay the Fee or any other sum of money due hereunder and such failure shall continue for a period of ten (10) days after the due date thereof;

(ii) Licensee shall fail to comply with any provision of this Agreement not requiring the payment of money, all of which terms, provisions and covenants shall be deemed material, and such failure shall continue for a period of thirty (30) days after written notice of such default is delivered to Licensee;

(iii) Licensee shall become insolvent or unable to pay its debts as they become due, or Licensee notifies Railway that it anticipates either condition;

(iv) Licensee takes any action to, or notifies Railway that Licensee intends to file a petition under any section or chapter of the United States Bankruptcy Code, as

amended from time to time, or under any similar law or statute of the United States or any State thereof; or a petition shall be filed against Licensee under any such statute; or

(v) A receiver or trustee shall be appointed for Licensee's license interest hereunder or for all or a substantial part of the assets of Licensee, and such receiver or trustee is not dismissed within sixty (60) days of the appointment.

(b) Upon the occurrence of any event or events of default by Licensee, whether enumerated in this Section or not, Railway shall have the option to pursue any remedies available to it at law or in equity without any additional notices to Licensee. Railway's remedies shall include, but not be limited to, the following: (i) termination of this Agreement, in which event Licensee shall immediately surrender the Premises to Railway; (ii) entry into or upon the Premises to do whatever Licensee is obligated to do under the terms of this License, in which event Licensee shall reimburse Railway on demand for any expenses which Railway may incur in effecting compliance with Licensee's obligations under this License, but without rendering Railway liable for any damages resulting to Licensee or the Facilities from such action; and (iii) pursuit of all other remedies available to Railway at law or in equity, including, without limitation, injunctive relief of all varieties.

17. Railway Termination Right. Notwithstanding anything to the contrary in this Agreement, Railway shall have the right to terminate this Agreement and the rights granted hereunder, after delivering to Licensee written notice of such termination no less than sixty (60) days prior to the effective date thereof, upon the occurrence of any one or more of the following events:

(a) If Licensee shall fail to install the Facilities within one (1) year from the date of the Agreement, or if Licensee shall discontinue the use or operations of the Facilities for one (1) year; or

(b) If Railway shall be required by any governmental authority having jurisdiction over the Premises to remove, relocate, reconstruct or discontinue operation of its railroad on or about the Premises; or

(c) If Railway, in the good faith judgment of its Superintendent, shall require a change in the location or elevation of its railroad on or about the location of the Facilities or the Premises that might effectively prohibit the use or operation of the Facilities; or

(d) If Railway, in the good faith judgment of its Superintendent, determines that one or more aspects of Operations unduly interfere with the operation and maintenance of the facilities of Railway, or with the present or future use of such property by Railway, its lessees, affiliates, successors or assigns, for their respective purposes.

18. Condemnation. If the Premises or any portion thereof shall be taken or condemned in whole or in part for public purposes, or sold in lieu of condemnation, then this Agreement and the rights granted to Licensee hereunder shall, at the sole option of Railway, forthwith cease and terminate. All compensation awarded for any taking (or sale proceeds in lieu thereof) shall be the

property of Railway, and Licensee shall have no claim thereto, the same being hereby expressly waived by Licensee.

19. Removal of Facilities; Survival. The Facilities are and shall remain the personal property of Licensee. Upon the expiration or termination of this Agreement, Licensee shall remove the Facilities from the Premises within thirty (30) days after the effective date thereof. In performing such removal, unless otherwise directed by Railway, Licensee shall restore the Premises to the same condition as existed prior to the installation or placement of Facilities, reasonable wear and tear excepted. In the event Licensee shall fail to so remove the Facilities or restore the Premises, the Facilities shall be deemed to have been abandoned by Licensee, and the same shall become the property of Railway for Railway to use, remove, destroy or otherwise dispose of at its discretion and without responsibility for accounting to Licensee therefor; provided, however, in the event Railway elects to remove the Facilities, Railway, in addition to any other legal remedy it may have, shall have the right to recover from Licensee all costs incurred in connection with such removal and the restoration of the Premises. Notwithstanding anything to the contrary contained in this Agreement, the expiration or termination of this Agreement, whether by lapse of time or otherwise, shall not relieve Licensee from Licensee's obligations accruing prior to the expiration or termination date, and such obligations shall survive any such expiration or other termination of this Agreement.

20. Entire Agreement. This Agreement contains the entire agreement of Railway and Licensee and supersedes any prior understanding or agreement between Railway and Licensee respecting the subject matter hereof, and no representations, warranties, inducements, promises or agreements, oral or otherwise, between the parties not embodied in this Agreement shall be of any force or effect.

21. Attorneys' Fees. If Railway should bring any action under this Agreement or consult or place the Agreement or any amount payable by Licensee hereunder, with an attorney concerning or for the enforcement of any of Railway's rights hereunder, then Licensee agrees in each and any such case to pay to Railway all costs, including but not limited to court costs and attorneys' fees (to the extent allowed by law), incurred in connection therewith.

22. Severability. If any clause or provision of this Agreement is illegal, invalid or unenforceable under present or future laws effective during the Term, then and in that event, it is the intention of the parties hereto that the remainder of this Agreement shall not be affected thereby; and it is also the intention of the parties to this Agreement that in lieu of each clause or provision of this Agreement that is illegal, invalid or unenforceable, there be added as a part of this Agreement a clause or provision as similar in terms to such illegal, invalid or unenforceable clause or provision as may be possible and be legal, valid and enforceable.

23. Modifications; Waiver; Successors and Assigns. This Agreement may not be altered, changed or amended, except by instrument in writing signed by both parties hereto. No provision of this Agreement shall be deemed to have been waived by Railway unless such waiver shall be in a writing signed by Railway and addressed to Licensee, nor shall any custom or practice that may evolve between the parties in the administration of the terms hereof be construed to waive or lessen the right of Railway to insist upon the performance by Licensee in strict accordance with

the terms hereof. The terms and conditions contained in this Agreement shall apply to, inure to the benefit of, and be binding upon the parties hereto, and upon their respective successors in interest and legal representatives, except as otherwise herein expressly provided. If there shall be more than one Licensee, the obligations hereunder imposed upon Licensee shall be joint and several.

24. Notice. Any and all other notices, demands or requests by or from Railway to Licensee, or Licensee to Railway, shall be in writing and shall be sent by (a) postage paid, certified mail, return receipt requested, or (b) a reputable national overnight courier service with receipt therefor, or (c) personal delivery, and addressed in each case as follows:

If to Railway:
c/o Norfolk Southern Corporation
650 West Peachtree Street, Box 22
Atlanta, Georgia 30308
Attention: Director Real Estate

If to Licensee:
YORK COUNTY,
6 S Congress St,
York, South Carolina
Attention: Lisa Hagood

Either party may, by notice in writing, direct that future notices or demands be sent to a different address. All notices hereunder shall be deemed given upon receipt (or, if rejected, upon rejection).

25. Miscellaneous. Time is of the essence with regard to each provision of this Agreement. This Agreement shall be construed and interpreted in accordance with and governed by the laws of the State in which the Premises are located. Each covenant of Railway and Licensee under this Agreement is independent of each other covenant under this Agreement. No default in performance of any covenant by a party shall excuse the other party from the performance of any other covenant. The provisions of this Agreement that, by their nature, are intended to survive the expiration or earlier termination of this Agreement, including Sections 8, 10, 11, 13 and 19, shall so survive.

26. Limitations of Grant. Licensee acknowledges that the license granted hereunder is a quitclaim grant, made without covenants, representations or warranties with respect to Railway's (a) right to make the grant, (b) title in the Premises, or (c) right to use or make available to others the Premises for the purposes contemplated herein. Railway is the owner and/or holder of the Premises subject to the terms and limitations under which it is owned or held, including without limitation conditions, covenants, restrictions, easements (including any pre-existing fiber optic easements or licenses), encroachments, leases, licenses, permits, mortgages, indentures, reversionary interests, fee interests, zoning restrictions and other burdens and limitations, of record and not of record, and to rights of tenants and licensees in possession, and Licensee agrees that the rights licensed hereunder are subject and subordinate to each and all of the foregoing. Licensee

accepts this grant knowing that others may claim that Railway has no right to make it, and Licensee agrees to release, hold harmless and indemnify (to the extent allowed by law) (and, at Railway's election, defend, at Licensee's sole expense, with counsel approved by Railway) Railway, its affiliated companies, and its and their respective officers, directors, agents and employees, from and against any detriments to, or liabilities of, any type or nature arising from such claims, including punitive damages and any forfeitures declared or occurring as a result of this grant.

27. Limitations Upon Damages. Notwithstanding any other provision of this Agreement, Railway shall not be liable for breach of this Agreement or under this Agreement for any consequential, incidental, exemplary, punitive, special, business damages or lost profits, as well as any claims for death, personal injury, and property loss and damage which occurs by reason of, or arises out of, or is incidental to the interruption in or usage of the Facilities placed upon or about the Premises by Licensee, including without limitation any damages under such claims that might be considered consequential, incidental, exemplary, punitive, special, business damages or loss profits. It is understood and agreed by Licensee that Railway cannot and will not make any warranties, representations or guarantees that Licensee's communication system (if any), as located on Railway's property, will not be interrupted.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement in duplicate, each part being an original, as of the date first above written.

Witness:

DocuSigned by:
Kayna Holloway
953F8C948034405...

As to Railway

NORFOLK SOUTHERN RAILWAY COMPANY

DocuSigned by:
ECFF11FBD73C464...

By: _____

Real Estate Manager

Witness:

_____

As to Licensee

YORK COUNTY

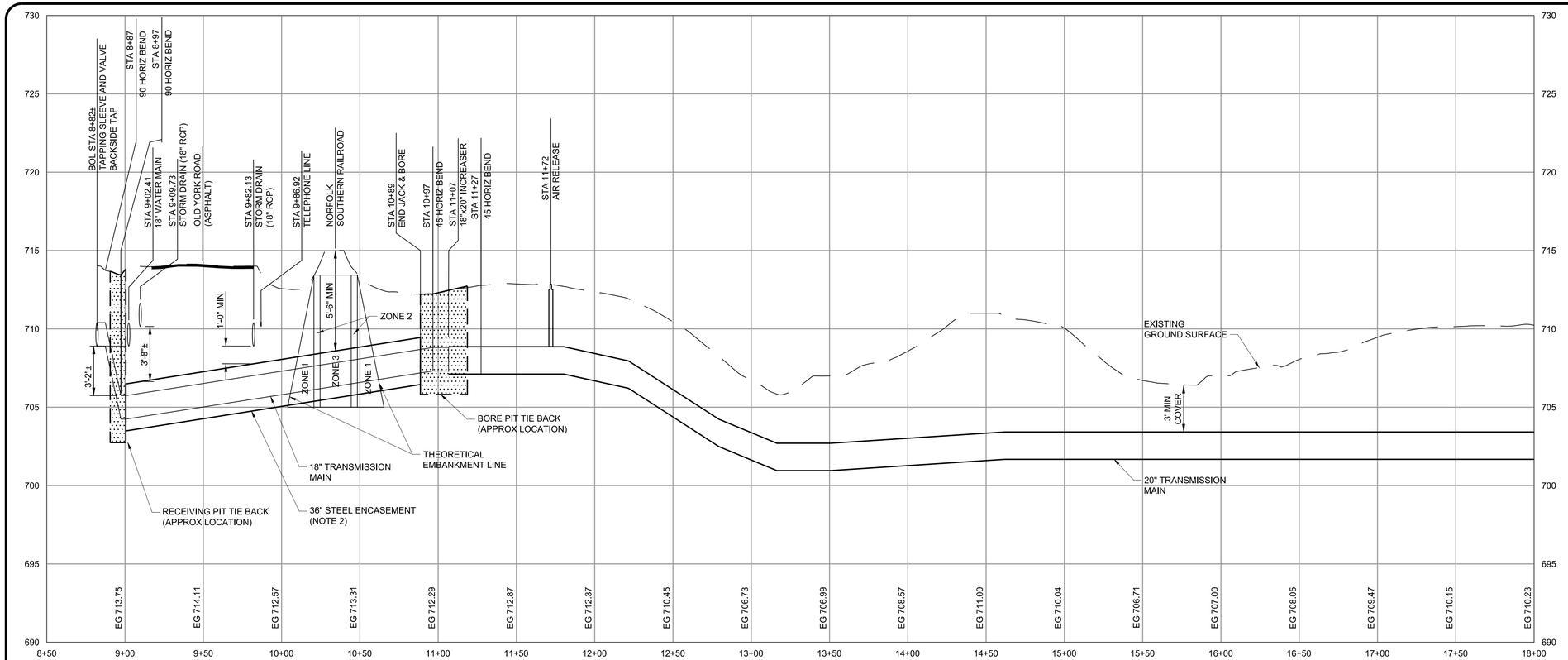
DocuSigned by:
Lisa Hagood (Licensee/Facility Owner)
4B24F1D72B4A474...

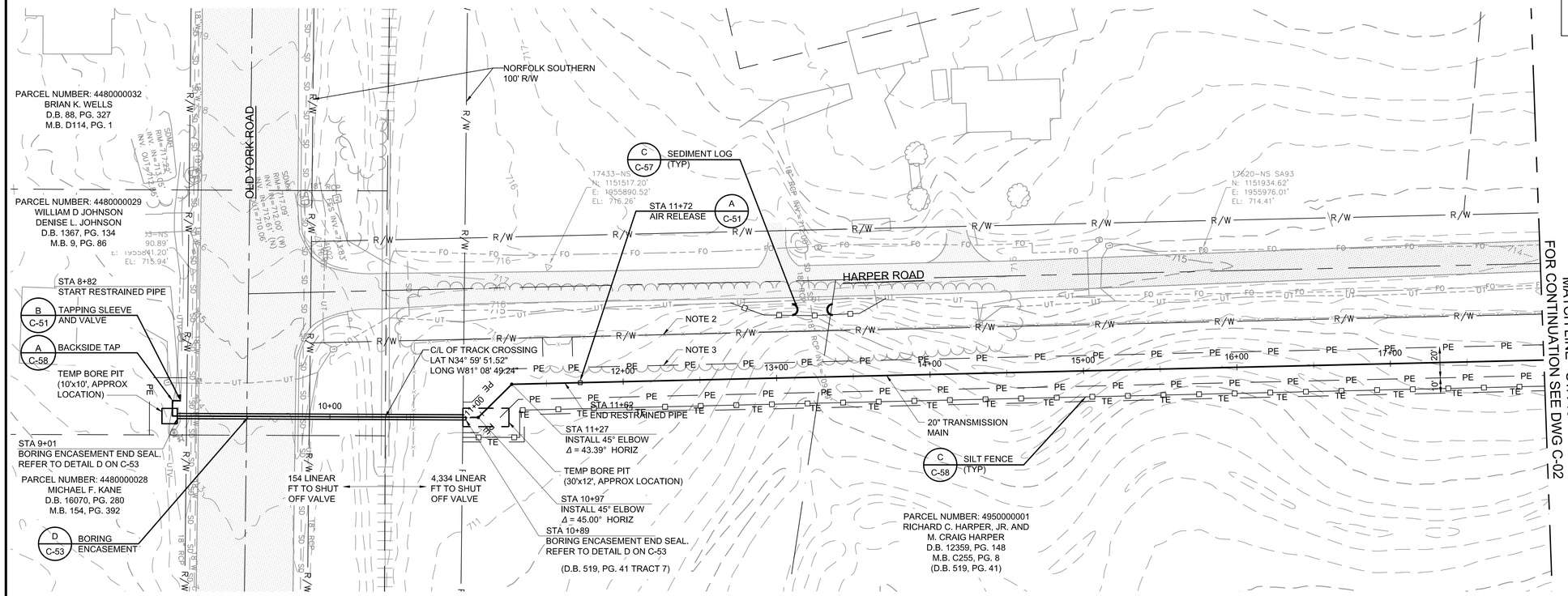
By: _____

Title: County Engineer

Activity Number: 1292819
SJS: 11-9-22

DS
JJS





GENERAL NOTES:

1. 36-INCH STEEL ENCASEMENT PIPE SHALL HAVE A MINIMUM NOMINAL THICKNESS OF 0.532.
2. CONTRACTOR SHALL REPLACE OR REPAIR FENCE TO EXISTING OR BETTER CONDITION IF DAMAGED DURING CONSTRUCTION.
3. INSIDE BOUNDARY OF LIMITS OF DISTURBANCE SHALL ALIGN WITH DRIP LINE OF TREES LINING HARPER ROAD. CONTRACTOR SHALL ADJUST ALIGNMENT AND LIMITS OF DISTURBANCE ACCORDINGLY.
4. ANY EXCAVATION THAT ENCROACHES ZONE 1 OR 2 OF ROADBED PROFILE (NSCE-8 PLATE VIII) WILL REQUIRE SHORING FOR PROTECTION OF THE RAILROAD).
5. PER NSCE-8, ALL PIPE JACKING OPERATIONS MUST BE EXECUTED ON A CONTINUOUS, NON-STOP, 24/7 BASIS UNTIL COMPLETE.
6. TRACK MONITORING WILL BE REQUIRED FOR PROPOSED INSTALLATION AND IF SETTLEMENT OCCURS DURING INSTALLATION, NORFOLK SOUTHERN MAY EXERCISE THEIR RIGHTS TO REQUIRE ADDITIONAL MONITORING POST CONSTRUCTION UP TO 30 DAYS FOR PROTECTION OF THE RAILROAD.
7. AS-BUILTS WILL BE REQUIRED UPON COMPLETION OF CONSTRUCTION TO BE SENT VIA EMAIL TO S.PERMITTING@RAILPROS.COM. PLEASE COORDINATE WITH PROTECTION SERVICES IF FURTHER ASSISTANCE IS NEEDED.

EXHIBIT A

Norfolk Southern Railway Company
Accompanying Agreement With
York County

Activity No.:	1292819	**E.S.:**	5744+09
Division:	Coastal	**Mile Post:**	R-27.02
Val Sec:	42	**Map No.:**	18
City:	York	**County:**	York
State:	South Carolina		
Lat:	34.99766, 34.99766	**Long:**	-81.14697, -81.14697

All work to be performed in accordance with the latest approved Norfolk Southern NSCE-4 and NSCE-8 Specifications **dated 5/10/21**

BLASTING NOT PERMITTED

DATE	REVISIONS AND RECORD OF USE	NO.	BY	CHK	APP

NORTH CAROLINA CERTIFICATE OF AUTHORIZATION BLACK & VEATCH CORPORATION No. C01938

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 035001 CHARLES E. SMITH 4/30/2021

BLACK & VEATCH

Black & Veatch International Company
Black & Veatch Building, Kansas
10925 David Taylor Drive, Suite 280
Charlotte, North Carolina 28262

YORK COUNTY, SOUTH CAROLINA
PHASE 1 NORTH-SOUTH WATER TM
HARPER ROAD

CIVIL
PLAN AND PROFILE
STA 10+00 TO STA 18+00

DESIGNED:	RGW
DETAILED:	WMT
CHECKED:	CES
APPROVED:	JMO
DATE:	APRIL 2021

4' 2' 0" 4' 8'
VERTICAL SCALE 1"=4'

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

40' 20' 0' 40' 80'
HORIZONTAL SCALE 1"=40'

PROJECT NO.
402615

C-01
SHEET
5 OF 35

FOR PERMITTING ONLY - NOT RELEASED FOR CONSTRUCTION

FD10000
D10000
PLOTTED: 4/29/2021 9:11 AM FILE: C:\pw_working\bvw_americas\d0868754\C-01 - EOL.dwg

End of Section

Section 01 29 76

MEASUREMENT AND PAYMENT

1. SCOPE. This section covers methods of measurement and payment for items of Work under this Contract.

2. GENERAL. The Contract Price shall cover all Work required by the Contract Documents. All costs in connection with the proper and successful completion of the Work, including furnishing all materials, equipment, supplies, and appurtenances; providing all construction plant, equipment, and tools; and performing all necessary labor and supervision to fully complete the Work, shall be included in the unit and lump sum prices bid. All Work not specifically set forth as a pay item in the Bid Form shall be considered a subsidiary obligation of Contractor and all costs in connection therewith shall be included in the prices bid.

References to details are for convenience only. Contractor is required to adhere to all details included in the Drawings regardless of whether they are listed herein.

3. ESTIMATED QUANTITIES. All estimated quantities stipulated in the Bid or other Contract Documents are approximate and are to be used only (a) as a basis for estimating the probable cost of the Work and (b) for the purpose of comparing the Bids submitted for the Work. The actual amounts of work done and materials furnished under unit price items may differ from the estimated quantities. The basis of payment for work and materials will be the actual amount of work done and materials furnished. Contractor agrees that it will make no claim for damages, anticipated profits, or otherwise on account of any difference between the amounts of work actually performed and materials actually furnished and the estimated amounts therefor.

4. EXCAVATION AND TRENCHING. Except where otherwise specified, the unit or lump sum price bid for each item of Work which involves excavation or trenching shall include all costs for such Work. No separate payment shall be made for excavation or trenching. All trenching shall be unclassified as to materials which may be encountered, and trenches shall be unclassified as to depth. All excavation work required for structures shall be unclassified as to materials which may be encountered; such excavation work shall be considered to be a subsidiary obligation of Contractor and the cost of such excavation shall be included in the prices bid for the structures.

4.01. TRENCHING.

a. For Transmission Mains. No separate payment shall be made for depths of trenching work required for water mains. All such work shall

be considered a subsidiary obligation of Contractor and all costs in connection therewith shall be included in the unit price bid per linear foot of pipe in place.

4.02. Resodding. No separate payment shall be made in connection with resodding as specified or required. All costs in connection with resodding shall be included in the cost of trenching.

5. UTILITY LOCATIONS & RELOCATIONS. No separate payment will be made for relocation of power poles, telephone poles, fiber optic, underground telephone or any other existing utilities. All such work shall be considered as included in the price of the Work. Additionally, no separate payment will be made for the location of any utilities.

6. DEWATERING. No separate payment shall be made in connection with dewatering of the pipeline trench as specified or required. All costs in connection with dewatering shall be included in the cost of the pipeline.

7. WORK WITHIN ROADWAY RIGHT-OF-WAY. No separate payment shall be made in connection with any insurance, training, coordination, traffic control, flagging, inspections or other permitting requirements associated with Work within roadway rights-of-way. All such costs associated with Work within roadway rights-of-way shall be included in the cost of the pipeline.

8. WORK WITHIN RAILROAD RIGHT-OF-WAY. No separate payment shall be made in connection with any insurance, training, coordination, traffic control, flagging, inspections or other permitting requirements associated with Work within railroad right-of-way. All such costs associated with Work within railroad right-of-way shall be included in the cost of the railroad crossing bore & jack.

9. UNIT PRICE. The item numbers listed in Specification Section 00 41 00, Bid Form, are described and referenced below.

Item No. 1 – Mobilization. The lump sum price for mobilization shall include Contractor's preparatory work and operations, including but not limited to those necessary for the movement of personnel, equipment, supplies, and incidentals to the project site; demobilization; and other work and operations which must be performed, or cost incurred, prior to beginning work and at the completion of work at the Site. The lump sum price shall not exceed 3% of the Total Bid.

Item No. 2 – Construction Staking. The lump sum price for construction staking shall include furnishing all materials, equipment, and labor required to provide survey staking and maintaining staking to include but not limited to the pipeline alignments, grades, easements, and all other necessary items for a

complete design in accordance with the drawings and specifications. Payment shall be based on the percentage of pipeline installed and in place.

Item No. 3 – Traffic Control. The lump sum price for traffic control shall include furnishing, installing, and maintaining traffic control for the duration of the project as specified and shown in the drawings as well as any additional traffic control measures deemed required by the Contractor to perform the work. Payment shall constitute full compensation for all labor, materials, equipment, permits, together with all other appurtenant work and miscellaneous costs required to complete the work. Payment shall be based on the percentage of pipeline installed and in place.

Items No. 4 thru 7 – Pipeline. Pipe that is to be paid for on a unit price basis shall be measured for payment on a horizontal plane after installation of the pipe. Where lines are laid to conform to stationed profiles, payment shall be made on linear quantities based on the pipeline stationing as determined by surveys made after installation. No payment will be made for restrained joint pipe installed outside the limits indicated on the Drawings.

The measurement of the length of each line or run of pipe of each size will begin and end at:

a. The end of the pipe where connected to an existing pipe, fitting, or valve; or at the end of a dead-end run.

b. The center line intersection of run and branch on tees, crosses, or laterals where a branch line connecting therewith is constructed under this Contract. Where a branch fitting is installed under this Contract, and the branch or connecting line is to be constructed by others at some future date or under another contract, the pay measurement will include the entire laying length of the branch or branches of such fitting.

c. The measurement of each line of pipe of each size which is to be paid for on a unit price basis will be continuous through, and shall include the full laying lengths of, all fittings and valves installed between the ends of each line; except that the laying lengths of reducers and increasers will be divided equally between the connected pipe sizes. Connected piping for fire hydrants will be measured for payment from the center of the main to the center of the auxiliary gate valve.

Pipeline pay items shall include furnishing all materials, equipment, and labor required to install the pipelines complete, as specified and as shown on the Drawings and not included in a separate pay item. This item shall also include, but not be limited to, the cost of the following:

a. All excavation required for pipe installation.

b. All necessary and/or required taps, plugs, encasement, conductive tracer, and all other appurtenances not covered under another pay item to properly install and completely test the pipe.

c. Pipe embedment.

d. Furnishing, placing, and compacting suitable backfill materials as required.

e. All erosion control measures for which there is no separate pay item, including temporary fertilizing, seeding, and mulching.

f. Correcting any damage which may occur when there is no separate pay item.

g. Restoring the Site to a condition equal to or better than original condition.

h. Temporary patching of driveways, walkways, roadways, parking lots etc., immediately following construction and maintaining same until permanent repairs are made and maintenance of access throughout construction.

i. Locating and working around existing utility locations including removing and replacing existing utility services impacted by the Work and/or as noted on the Drawings.

j. Protecting existing curb and gutter and asphalt pavement from surface scars or damage. Any damage shall be repaired at no cost to Owner.

k. All required project signs and removal and replacement of all signage impacted by the Work.

l. Sheeting and shoring for trench or excavations.

m. All required easement provisions noted on the Contract Drawings including sign removal, stockpile and replacement; mailbox removal and replacement; temporary gravel parking area; temporary gravel walkway; topsoil removal, stockpile and replacement; additional clearing area outside of easement areas; relocated sheds and doghouses and any associated fencing;

temporary fencing for dog containment; location, protection, and repair of existing irrigation systems; tree protection with one-year inspection and replacement if needed; and removal and replacement of existing backflow preventer and associated piping for which there is no separate pay item.

n. All other items required that are not included in a separate pay item.

Item No. 8 – Ductile Iron Fittings. Ductile iron fittings shall be paid for at the unit price bid per pound of weight, including accessories, for each size. The unit price shall include all costs incurred in completing the fitting installation over and above the amount paid for piping in place. The unit price shall include furnishing and installing the fitting, blocking and restraint as required, excavation and backfill not included under piping, and all other costs not included under other Bid items.

Item No. 9 – Butterfly Valves. Butterfly valves in water mains will be paid for at the unit price bid. The unit price shall include all costs incurred in completing the butterfly valve installation over and above the amount paid for piping in place. The unit price shall include furnishing and installing the butterfly valve, valve boxes, flushing connections and valves, concrete stabilization pads and collars; all appurtenances; excavation and backfill not included under piping; and all other costs not included under other bid items.

Items No. 10 and 11 – Gate Valves. Gate valves in water mains will be paid for at the unit price bid for each size. The unit price shall include all costs incurred in completing the gate valve installation over and above the amount paid for piping in place. The unit price shall include furnishing and installing the gate valve, valve boxes, flushing connections and valves, concrete stabilization pads and collars; all appurtenances; excavation and backfill not included under piping; and all other costs not included under other bid items.

Items No. 12 thru 17 – Bore & Jack Crossings. Where trenchless installation is required, each crossing shall be measured for payment horizontally along the longitudinal center line of the casing pipe or pipe installed therein, from end to end of the casing pipe. The unit price bid for casing installed trenchless shall include all costs in connection with excavation and backfilling, casing, jointing materials, installing casing, pits, grouting, casing pipe, restrained carrier pipe, spacers, end closures, geotechnical instrumentation and monitoring where indicated on the Drawings, and all other work for and in connection with the crossings and casing installation, not paid for separately. In addition, all cost in connection with any insurance, training, coordination, traffic control, flagging, or other permitting requirements, including but not limited to railroad track monitoring and railroad as-built surveys, associated with Work within roadway or

railroad rights-of-way shall be included in the unit price along with all costs associated with any Work within railroad rights-of-way.

If bore is unsuccessful or unacceptable, the casing pipe will be grouted with an approved portland cement concrete and no payment of any type will be made for the unsuccessful or unacceptable bore. The Contractor shall shift bore location and submit revised bore alignment to Engineer for approval.

No separate payment will be made for work associated with excavating, uncovering, or supporting existing sanitary sewer pipelines, water mains, gas pipelines, fiber optic, or any other utilities as required for verification of separation from water transmission mains or installation of casing pipe.

Items No. 18 – Open Cut Stream Crossing. The unit price bid for ditch, stream and creek crossings shall apply when concrete encasement and rip-rap and/or erosion control matting are required and shall include all costs of materials and labor for installing the pipelines beneath the streams/creeks over and above the amount paid for piping in place. The cost shall include temporary stream diversion, temporary stream pump around, excavation, backfill, dewatering, riprap, concrete encasement around the pipe, rebar, formwork, jointing materials, erosion control matting, removal of all diversion materials, and restoration and stabilization of any disturbed areas within confines of stream or stream banks. Unit price shall also include all costs associated with the construction of temporary stream crossings installed per the Drawing details.

Measurement for creek crossing payment shall be made along a horizontal plane stationing along the pipeline to the extents of the concrete encased pipe indicated on the Drawings.

Item No. 19 – Air Release Valve Manholes. The unit price bid for air release valve manholes shall include furnishing all materials, equipment, and labor required to install the air release valve and manhole including excavation and backfill, precast cast iron and concrete meter box and cast iron lid as indicated on the Drawings, all piping, fittings, isolation valves, pipe supports, air release valve, vent piping, stone, filter fabric, stabilizing pads, and all other appurtenances necessary for a complete system as specified and as shown on the Drawings. The unit price bid shall be for each ARV manhole installed and shall be over and above that paid for piping in place.

Item No. 20– Blow Offs. The unit price bid blow offs shall include furnishing all materials, equipment, and labor required to install the blow offs including excavation and backfill, tangential outlet or tapped plug, valves, restrained blow off piping, concrete pad, and riprap drainage channel, and all other appurtenances necessary for a complete blow off as specified and as shown on the Drawings.

Item No. 21 – Connection to Existing 18” Water Main (STA 8+82). Connection to existing 18 inch water main shall be paid for at the lump sum price bid. The lump sum price shall include all costs incurred for making the connection over and above the price of the connecting piping in place and restraint which will be paid for separately. The lump sum price shall include all excavation and backfilling work, tapping sleeve and valve (refer to Detail B on Sheet C-51), backside tap (refer to Detail A on Sheet C-58) and all other costs not included under other bid items.

Item No. 22 – Connection to Existing 8” Water Main (STA 202+98). Connection to existing 8 inch water main shall be paid for at the lump sum price bid. The lump sum price shall include all costs incurred for making the connection over and above the price of the connecting piping in place and restraint which will be paid for separately. The lump sum price shall include all excavation and backfilling work, removal of existing end of line plug an blow-off, standard jumper connection (refer to Detail B on Sheet C-56), concrete blocking, and all other costs not included under other bid items.

Item No. 23 – Fire Hydrant Assembly. The unit price for fire hydrant assembly shall include furnishing all materials, equipment, and labor required to install the fire hydrant including excavation and backfill, 6” piping, valves, restraints and blocking, hydrant, connection to and including the mainline tee, and all other appurtenances necessary for a complete fire hydrant assembly as specified and as shown on the Drawings.

Item No. 24 – Asphalt Pavement Removal and Replacement. Pavement removal and replacement shall be measured for payment horizontally along the center line of the pipe to the edges of the existing pavement; or, where the edge of the existing pavement is not clearly defined, to the edge of the pavement replacement. Where centerline of pipe is more than 4 feet horizontally from edge of pavement and not beneath pavement, no payment will be made under this item.

The Unit Prices Bid for pavement removal and replacement shall include all costs in connection therewith, including cutting, removal, and disposal of old pavement; construction of new pavement; and all extmera compaction effort required for backfill beneath pavement. Cost shall also include temporary and permanent stripping where needed. Refer to Details B and C on Sheet C-55.

Item No. 25 – Gravel Driveway Repair. Gravel driveway repair shall be measured for payment horizontally along the center line of the pipe to the edges of the existing driveway; or, where the edge of the existing driveway is not clearly defined, to the edge of the driveway replacement. Where centerline of pipe is more than 4 feet horizontally from edge of driveway and not beneath driveway, no payment will be made under this item.

The Unit Prices Bid for driveway repair shall include all costs in connection therewith, including gravel removal; repair and/or replacement of new gravel driveway to existing grade; and all extra compaction effort required for backfill beneath gravel as required.

Item No. 26 – Concrete Driveway Repair. Concrete driveway repair shall be measured for payment horizontally along the center line of the pipe to the edges of the existing driveway; or, where the edge of the existing driveway is not clearly defined, to the edge of the driveway replacement. Where centerline of pipe is more than 4 feet horizontally from edge of driveway and not beneath driveway, no payment will be made under this item.

The unit price bid for concrete driveway repair shall include all costs involved in cutting and removing existing concrete and all labor and materials including, but not limited to, subgrade, stone, base courses, expansion joint material, and new concrete, required to replace the concrete driveway. Refer to Detail C on Sheet C-56.

Item No. 27 thru 30 – Erosion Control – Silt Fence and Sediment Log and Construction Entrance and Storm Drain Outlet Protection. Erosion control shall include the cost of all erosion control measures required. The unit prices bid shall include providing and installing the measures prior to the start of any land disturbance, maintenance of the measures until the disturbed areas are stabilized with permanent ground cover or grass, and removal of the temporary measures. Costs shall be paid on a unit price basis for each item providing controls as shown on the Drawings or have been approved by Engineer.

27. Construction Entrances. Payment for this item shall be per entrance constructed in accordance with the detail on the Drawings including concrete washout pits.

28. Silt Fence. Payment for this item shall be per linear foot of silt fence installed in accordance with the detail on the Drawings.

29. Half-Ring Inlet Protection. Payment for this item shall be per inlet pipe protected in accordance with the detail on the Drawings.

30. Erosion Control Matting. Payment for this item shall be per square yard of matting required other than that indicated as a part of the stream crossings.

31. Wattle. Payment for this item shall for each wattle installed in accordance with the detail on the Drawings.

Item No. 32 – Restore Area Adjacent Conservation Easement (STA ~21+30 to STA ~22+51). Restoring the area adjacent to the conservation easement shall be paid for at the lump sum price bid. The lump sum price shall include restoring the area to existing grade [including required compaction] and topping with 2 inches of No. 57 stone as indicated by the Drawings. The lump sum price shall include all costs in connection with all work for and in connection with the restoration not paid for separately. The lump sum price shall not include the restrained pipe beneath the area to be restored.

Item No. 33 – Rock Embankment Stabilization and Restoration (STA ~43+80 to STA ~44+00). Rock embankment stabilization and restoration shall be paid for at the lump sum price bid. The lump sum price shall include the cost for the stabilization and restoration of the rock embankment as detailed on the Drawings and to match existing grade and material. The lump sum price shall include all costs in connection with all work for and in connection with the stabilization and restoration not paid for separately. The lump sum price shall not include the restrained pipe beneath the area to be restored.

Item No. 34 thru 35– Fencing. Fencing shall include the cost of all fencing removal, demolition, replacement, and temporary fencing required as detailed on the Drawings. Payment for this item shall be per linear foot of fencing removed or installed in accordance with the Drawings.

34. Repair/Replace Fence. The unit prices bid shall be per linear foot of fencing to be repaired/replaced as a result of the Work. Repaired/replaced fence shall be in equal or better condition than the original fence. Repaired/replaced fencing shall be to the same height and in the same locations as the original fence.

35. Temporary Fencing. The unit prices bid shall be per linear foot of temporary fencing to be utilized as a result of the Work. Temporary fence shall be of typical metallic materials capabable of containing livestock and preventing general access to the work area and approved by the Owner prior to installation. Cost shall include providing and installing the temporary measures prior to the start of work in the affected area, maintenance of the measures until the disturbed areas are restored to original grade/condition, and removal of the temporary measures when livestock, etc. are permanently contained.

Item No. 36 – Guardrail Replacement. Guardrail replacement shall include the cost of all guardrail removal, demolition, and replacement as detailed on the Drawings. Guardrail replacement shall be in equal or better condition than the original and satisfy SCDOT requirements for guardrails. Payment for this item shall be per linear foot of guardrail removed and replaced in accordance with the Drawings.

Item No. 37 – Tree Protection Fence. The unit prices bid shall be per linear foot of tree protection fencing to be utilized as a result of the Work. Cost shall include providing and installing the temporary measures prior to the start of work in the affected area, maintenance of the measures until the disturbed areas are restored to original grade/condition, and removal of the temporary measures when livestock, etc. are permanently contained.

Item No. 38 – Pipeline Pressure Leakage Testing. The unit prices bid for pipeline testing shall include all costs associated with pressure testing of the pipeline as required by the Contract Documents. This payment shall be made on a linear foot basis along the pipeline route. Measurements shall be consistent with the description of measurement for the length of pipeline installed contained elsewhere in this section. All costs associated with pipeline testing including, but not limited to, connections required for filling, special fittings, pressure gauges, additional blow offs, water required for filling pipeline, and pressurizing the pipeline shall be included in this unit price.

Item No. 39 – Cleaning and Disinfection of Pipelines. The lump sum price for cleaning and disinfection of pipelines shall include all costs associated with cleaning and disinfection of the pipeline in accordance with the Contract Documents and all Laws and Regulations governing potable water supply. All costs associated with cleaning and disinfection including, but not limited to, connections required for filling not already covered in this section, special fittings for sample collection and chlorine injection, water required for filling pipeline not already covered in this section, sufficient quantities of chlorine disinfectant, all costs associated with bacteriological testing to ensure proper disinfection, and any costs associated with de-chlorination of water prior to discharge shall be included in this lump sum price. Payment for this bid item shall be made as a percentage of the total pipeline cleaned and disinfected.

Item No. 40 – Fertilizing and Seeding. Fertilizing and seeding shall include furnishing all materials, equipment, and labor required to prepare the seed bed, fertilize, seed, and mulch the entire width of the easement, plant site, and any other disturbed areas. Payment will be made on a linear foot of pipeline basis for all areas that pipeline crosses requiring seeding. Generally, this should exclude the paved and graveled areas and creeks.

Item No. 41 – Clearing & Grubbing. The lump sum for Clearing and Grubbing shall include the removal and disposal of all trees, stumps, brush, and shrubs within the permanent and temporary easements shown on the Drawings and/or as specifically noted on the Drawings as required for the construction of the Work. Clearing and Grubbing in temporary easement areas shall be limited to the area necessary to perform the Work. This bid item shall also include protection of trees and shrubs noted on the plans to be saved and protection of

all trees, shrubs and plants outside the permanent and temporary easement areas

Item No. 42 – Curb & Gutter Replacement. Measurement for Curb & Gutter Replacement shall be on a linear foot basis. The work includes but is not limited to removal of existing curb and gutter and disposal in approved landfills, finish grading for replacement of curb and gutter, forming and furnish, place, and finish concrete as shown and to match existing or better conditions.

Item 43 – Trench Stabilization Stone Contingency. Trench stabilization stone is to be used when excavated material is unsuitable for backfill. Trench stabilization stone shall include furnishing all materials, equipment, and labor required to install stabilization stone as required and approved by Engineer.

Cost for stabilization stone includes removal and disposal of any unsuitable material from beneath the pipe and replacement with stabilization stone material as required by Engineer. Embedment material is paid elsewhere and is not a part of this unit price item.

Quantities for payment shall be approved by the Engineer's representative at the time the work is done.

Item 44 – Rock Excavation. The price bid for each item of work involving excavation shall be based on and shall include earth excavation throughout. The unit price bid for each item of rock excavation shall include the additional cost only of the removal and subsequent handling of such rock, over and above that of earth excavation. Rock excavation shall be measured within and to pay limits as follows, and payment shall be made at the applicable unit price;

a. Below the top rock surface, as determined by surveys or other measurements made after stripping and before blasting, or, when preshooting is permitted, as determined and agreed to by Contractor and Engineer after preshooting and stripping.
b. Above the bottom surface of rock, where such surface is above the specified bottom pay limits.
c. Above planes which are the following distances below and parelllel to the bottom of the pipe:

Pipe Size Inches [mm]	Pipe Clearance feet [mm]
12 or smaller [300 or smaller]	0.50 [150]
14 to 27 [350 to 675]	0.75 [225]

30 to 60 [750 to 1500]	1.00 [300]
66 or larger [1650 or larger]	1.25 [375]

d. Above authorized structure subgrades.
e. Between vertical planes separated by a horizontal distance equal to the minimum trench width permitted for the size and type of pipe being installed.
f. To vertical surfaces 12 inches outside the outer faces of masonry manholes, 2 feet outside the outer faces of structures poured again forms, and to the pay limits for concrete on oncrete items poured directly against the excvation faces.

All rock excavation pay quantities shall be based on the volume of the excavated material in its original and undisturbed condition.

END OF SECTION

Section 01 32 00

CONSTRUCTION PROGRESS DOCUMENTATION

1. GENERAL.

1.01. Units of Measurement. When both inch-pound (English) and SI (metric) units of measurement are specified herein, the values expressed in inch-pound units shall govern.

2. SCHEDULE OF PAYMENTS. Within 30 days after award of contract, Contractor shall furnish to Engineer a schedule of estimated monthly payments. The schedule shall be revised and resubmitted each time an Application for Payment varies more than 10 percent from the estimated payment schedule.

3. LAYOUT DATA. Contractor shall keep neat and legible notes of measurements and calculations made in connection with the layout of the Work. Copies of such data shall be furnished to the Resident Project Representative for use in checking Contractor's layout as provided in the project requirements section. All such data considered of value to Owner will be transmitted to Owner by Engineer with other records upon completion of the Work.

End of Section

Section 01 32 16

CONSTRUCTION PROGRESS SCHEDULE

1. GENERAL OVERVIEW. A Progress Schedule shall be used to control the Work and to provide a definitive basis for determining project progress. The Progress Schedule shall be prepared, maintained and updated by Contractor and historical dates agreed monthly with Engineer. Contractor shall submit a preliminary Progress Schedule and a Progress Schedule for acceptance by Engineer. These schedules shall be Contractor's working schedules and shall be used to plan, organize and execute the Work, record and report actual performance and progress, and show how Contractor plans to complete all remaining Work as of the end of each progress report period.

The Progress Schedule shall comprise all the detailed construction-related activities using the critical path method (CPM). The Progress Schedule shall provide sufficient detail and clarity to reflect the intricacies and interdependencies of activities so Contractor can plan, schedule, monitor, control and report on the progress of his work. In addition, it shall provide Engineer and Owner a tool to monitor and follow the progress for all phases of the Work.

2. PRE-CONSTRUCTION SCHEDULING CONFERENCE. Engineer will conduct a pre-construction scheduling conference with Contractor to review requirements for the schedules and schedule configuration. The conference shall be conducted sufficiently early to allow Contractor to submit the preliminary Progress Schedule within ten days of the Effective Date of the Contract.

At this meeting, Contractor shall explain in detail the procedure to be used to develop the schedule activity cost-loading or Schedule of Values and cash flow. This procedure is subject to the review and acceptance of Engineer.

3. PRELIMINARY PROGRESS SCHEDULE. Following the pre-construction scheduling conference but within ten calendar days after the Effective Date of the Contract, Contractor shall submit a preliminary Progress Schedule for review by Engineer. The preliminary Progress Schedule shall show detailed construction-related activities for the first 45 days of the project. The remainder of the Contract activities shall be shown as summary bars within the milestones of the Work. If Engineer has comments on the preliminary Progress Schedule, Contractor shall make the necessary changes and resubmit it within ten calendar days. No progress payments will be made during the period specified above for the preliminary Progress Schedule until the preliminary Progress Schedule has been accepted by Engineer.
The preliminary Progress Schedule shall:

a. Illustrate a feasible schedule for completion of the Work within the Contract Times and Milestones specified.

b. Provide an elementary example of the schedule in the format to be used for the Progress Schedule.

c. Include the activity code structure as described in Paragraph 19 of this specification.

3.01. Preliminary Progress Schedule Submittal Format: Contractor shall submit two compact disks of the preliminary Progress Schedule. Compact disks shall be read-write and enable the use of the schedule as an executable file as described herein. A brief narrative shall accompany the submittal, describing Contractor's scheduling approach to the project. The narrative shall include a description of the Contract milestones, approach for construction activities during the period of the preliminary Progress Schedule, description of the general approach of the activities for the work beyond the preliminary Progress Schedule period, a description of the project's critical path, identification of critical long-lead submittals, and planned outages. The narrative shall also incorporate activity codes, calendars, weather days, milestone constraints, and work breakdown structure in accordance with the requirements specified herein.

4. PROGRESS SCHEDULE. The Progress Schedule comprises all the construction-related activities for the Work and shall show the order in which Contractor proposes to carry out the work. Contractor shall include milestones, coordination necessitated by limited access and available work areas, and the availability and use of manpower, material and equipment. Contractor shall use the Progress Schedule to plan, schedule and coordinate the Work including activities of subcontractors, equipment vendors, and suppliers.

The Progress Schedule shall be to the level of detail acceptable to Engineer, and shall include the following:

a. Organization and structural breakdown of the Project;

b. Milestones and completion dates;

c. Type of work to be performed and the labor trades involved;

d. Purchase, manufacture and delivery activities for major materials and equipment;

e. Preparation, submittal, and acceptance of shop drawings and material samples;

f. Deliveries of owner-furnished equipment and/or materials;

g. Acceptances required by regulatory agencies and/or other third parties;

h. Assignment of responsibility for each activity;

i. Access requirements to work areas;

j. Identification of interfaces and dependencies with preceding, concurrent and follow-on contractors;

k. Tests, submittal of test reports and acceptance of test results;

l. Planning for phased or total acceptance by Owner; including start up and commissioning;

m. Identification of any manpower, material and equipment restrictions.

n. Sequence of construction to maintain plant operations;

o. Planned outages.

The activities included in the Progress Schedule shall be defined in work days. Durations shall be based on the labor (crafts), equipment, and materials required to perform each activity on a normal workday basis. Activity durations shall be 20 working days or less except in the case of non-construction activities such as procurement of materials, delivery of equipment, and concrete curing. All durations shall be the result of definitive manpower and resource planning by Contractor to perform the Work, in consideration of contractually defined on-site work conditions and Contractor's planned means and methods.

When the Progress Schedule is accepted by Engineer, Engineer will save a copy of the Progress Schedule as the baseline schedule, and will use it for analysis of Contractor's progress.

Contractor shall update the Progress Schedule monthly.

5. ELECTRONIC PROGRESS SCHEDULE FORMAT AND REPORTING. The Progress Schedule shall be created using Primavera P6 scheduling software. Contractor shall use Engineer's file-naming format throughout the project.

a. Electronic schedule files shall be saved with .XML or .XER file extensions.

b. Primavera Project Manager settings for "Baseline Type" shall be used in the following manner:

i. Select <None> as the baseline type for the preliminary Progress Schedule submittal.

ii. Once the preliminary and Progress Schedule are accepted, the baseline type shall be named <Initial Plan>.

iii. Each subsequent Progress Schedule update shall set the baseline type to <Last Performance Update>.

c. The data date for schedule calculation in the preliminary Progress Schedule and Progress Schedule shall be set as the date of the Notice to Proceed unless otherwise specified by Engineer.

6. COST-LOADING. Not used.

7. RESOURCE-LOADING. Not used.

8. COORDINATING PROGRESS SCHEDULE WITH OTHER CONTRACT SCHEDULES. Not used.

9. SUBMITTALS. The Progress Schedule and associated reports shall be submitted to Engineer for acceptance within the period of the preliminary Progress Schedule specified herein. If the Progress Schedule is not submitted, no progress payments will be made after the due date until the Progress Schedule has been submitted.

Printouts and electronic layouts required as part of the Progress Schedule submittal and monthly updates are as follows:

a. Summary Schedule: one page milestone and summary schedule, sorted by total Float, early-start, early-finish;

b. Detailed Project Schedule: organized by Work Breakdown Structure (WBS) or area of work; sorted by total Float, early-start, early-finish;

c. Critical Path Schedule: sorted based on the total Float, early-start, early-finish;

d. 60-Day Look Ahead Schedule: sorted by total Float, early-start, early-finish;

e. Activities in Progress: organized by WBS or area of work; sorted by total Float, early-start, early-finish;

f. Cash Flow Trending Report: presented in an S-Curve format based on original planned early start and late start forecasted expenditures. In addition, the historical actual data point(s) are to be graphed within the S-Curve graphic report;

g. Monthly payment projections;

h. Out-of-sequence Report: tabular report showing work performed out-of-sequence.

Contractor shall submit additional layouts if directed by Engineer.

The submittal shall include the following:

a. Narrative report summarizing the milestones, critical path, project approach including phasing or use of crews, significant submittal and fabrication items, coordination or interface requirements, Owner-provided items, and list of subcontractors and vendors.

b. Graphic reports including critical path report (longest path), summary schedule report, total Float report by early-start early-finish, look-ahead report grouped by work breakdown structure or project phasing, and cash flow projection. Cash flow projections include estimated cumulative cost curves based on early and late start dates and projection of monthly payments over the life of the project

The schedule, critical path, and look-ahead schedules shall be submitted on E (34”x44”) size paper or 36” wide plots;

The Progress Schedule file shall be submitted in an executable format, using Primavera Project Manager (P6) format on a read-write compact disk.

The narrative and graphic reports shall be provided on 8”x11” paper and E-size plots respectively.

Contractor shall submit 4 copies of each deliverable.

10. MONTHLY SCHEDULE UPDATES. Monthly Progress Schedule updates shall be submitted for the duration of the Contract on a date agreed to by Owner, Engineer, and Contractor. If monthly Progress Schedule updates are not submitted by the due date, progress payments will be withheld until the required information is submitted.

The updated schedule shall be reviewed each month in a meeting with Engineer to verify:

a. Actual start dates,

b. Actual completion dates,

c. Activity percent completion,

d. Revised logic (as-built and projected) and changes in activity durations, cost assigned,

e. Cost influence of change orders, if any,

f. Revisions due to extension of time.

Prior to each meeting, Contractor shall prepare a complete and accurate report of current procurement and construction progress through the end of the update period, and a depiction of how Contractor plans to continue the Work to meet all contract completion dates. All network changes and status data agreed to during each update meeting shall be considered as accepted by both parties unless written notice of any exceptions is given within five calendar days after the meeting.

For major network changes that cannot be agreed to during an updating meeting, Contractor shall submit the proposed changes for Engineer's acceptance prior to inserting such changes into the network. Submittals may be in the form of marked-up networks, fragnets, or schedule abstracts, provided they are submitted with a letter of transmittal. A fragnet is defined as a sequence of new activities and/or activity revisions that are proposed to be added to the existing schedule to demonstrate how project events have an impact on the schedule.

11. DATA DATE. The data date is the re-settable date in P6 that serves as the end of a reporting period. The reporting period will be recorded on a monthly basis, e.g., January 1st through January 31st with the 31st as the data date. If required for coordination purposes by Owner, Engineer will provide specific data dates to be used by Contractor.

12. REVIEW PROCESS. Engineer will review Contractor's preliminary Progress Schedule and full Progress Schedule submittals within 15 calendar days after receipt of all required information.

At the request of Owner or Engineer, Contractor shall participate in any meetings necessary to reach a mutual agreement and acceptance of the preliminary Progress Schedule, Progress Schedules, or Cash Flow Projections.

If any of the required submittals are returned to Contractor for corrections or revisions, they shall be resubmitted within ten calendar days after the return mailing date. Resubmittals shall include all information and media included in the first submittal. Review and response by Engineer will be given within 10 calendar days after receipt of each resubmittal.

Schedules shall show contract completion of the Work on the Contract completion date and with zero or positive total Float even if Contractor plans to finish early. In no event shall acceptance of the Progress Schedule be a basis for a claim for delay against Owner or Engineer by Contractor for an early finish. A Progress Schedule containing activities with negative Float or that extend beyond the date that the Work is completed and ready for final payment will not be acceptable.

Acceptance of the Progress Schedule by Engineer does not relieve Contractor of responsibility for accomplishing the Work by the Contract completion date. Omissions

and errors in the accepted Progress Schedule shall not relieve Contractor of obligations under the Contract. Acceptance by Engineer in no way makes Engineer or Owner an ensurer of the Progress Schedule's success or liable for time or cost overruns. Engineer and Owner hereby disclaim any obligation or liability by reason of acceptance of the Progress Schedule by Engineer.

13. RESPONSIBILITY FOR SCHEDULE COMPLIANCE. Whenever it becomes apparent from the current Progress Schedule that the critical path is delayed and the contract completion date will not be met, Contractor shall mitigate the delay by taking some or all of the following actions at no additional cost to Owner.

a. Increase construction manpower in such quantities and crafts as will bring the project back on schedule within the completion dates and milestones.

b. Increase the number of working hours per shift, shifts per day, working days per week, and the amount of construction equipment, or any combination of the foregoing, to substantially eliminate the backlog of work.

c. Re-schedule activities to achieve maximum practical concurrence of activities and to comply with the schedule date(s).

Within ten calendar days of Engineer’s request, Contractor shall submit a recovery schedule and written statement of the steps intended to remove or arrest the delay to the critical path in the schedule. If Contractor fails to submit the required information or should fail to take measures acceptable to Engineer, Engineer with Owner concurrence may direct Contractor to increase man-power, equipment and scheduled work hours to remove or arrest the delay to the critical path and Contractor shall promptly provide such level of effort at no additional cost to Owner.

In the event Contractor fails to follow the updated or revised recovery schedule, Owner may elect to withhold progress payments until Contractor complies with the revised schedule.

Should Contractor’s efforts not remove or arrest the delay to the critical path of the accepted schedule, then Owner shall be entitled to supplement Contractor’s work-force and equipment to remove and arrest any delay, and shall be entitled to deduct all costs and expenses associated therewith from payments due to Contractor. If insufficient Contract funds remain, Owner may recover such funds from Contractor and its Surety.

14. CHANGES IN THE WORK, DELAYS, AND EXTENSIONS OF TIME. When changes in the Work or delays are experienced by Contractor and Contractor requests an extension of time, Contractor shall submit a written time impact analysis to Engineer illustrating the influence of each change or delay to the current Contract Times. Each time impact analysis shall include a fragnet incorporating the change or delay into the Progress Schedule to demonstrate how Contractor was delayed.

Each time impact analysis shall demonstrate the estimated time impact based on the events of the change or the delay; the date the change was given to Contractor or the delay incurred, the status of construction at that point in time, and the event time computation of all activities affected by the change or delay. The event times used in the analysis shall be those included in the latest update of the Progress Schedule or as adjusted for the events of delay.

Three copies of the time impact analysis and an electronic copy on compact disk shall be submitted within seven calendar days of delay occurrence or direction to proceed with a change is given to Contractor. No time extensions will be considered if the time impact analysis is not submitted within the specified time.

Engineer will review Contractor's time impact analysis. Contractor shall furnish such justification and supporting evidence as Engineer deems necessary to determine whether Contractor is entitled to an extension of time. Engineer's review of each time impact analysis will be made within five working days of receipt of the time impact analysis and additional information as required by Engineer, unless subsequent meetings and negotiations are necessary.

The Contract Times will be adjusted only for causes specified in paragraph 15. Time extensions will be granted only to the extent that equitable time adjustments for the activity or activities affected exceed the total or remaining Float along the critical path at the time of actual delay. Delays in activities which are not on the critical path and do not affect Contract Times, will not be considered for an extension of time.

15. CAUSES FOR EXTENSIONS OF TIME. Additional positive total Float in the Progress Schedule generated by efficiencies of Owner or Contractor is a shared commodity to be reasonably used by either party, and belongs exclusively to the Project. Contractor is not entitled to any additional compensation for completion of the project prior to expiration of the Contract Times.

15.01. Owner-Initiated Changes. Owner initiated changes to the Work that absorb Float time will not be considered for an extension of time. Owner-initiated changes that affect the critical path of the Progress Schedule shall be grounds for extending or shortening completion dates. Use of Float time for Contractor initiated changes will require Owner's concurrence. Contractor's changes, however, shall give way to Owner-initiated changes competing for the same Float time.

15.02. Outside Contractor's Control. Events outside of Contractor's control that affect the critical path of the Progress Schedule will be considered for an extension or reduction of the Contract Times.

15.03. Weather Delays. Engineer will obtain weather data during construction from a reputable source, and will maintain weather records.

Engineer will determine Contractor's entitlement to an extension of the Contract Times as a result of weather delays, based on the flow chart in Figure 1-01 32 16 and the data included in Tables 1, 2 and 3 . Extensions of time will be granted at the discretion of Engineer for circumstances not covered by the flow chart.

Any weather-related extension of Contract Times shall be non-compensable. Efficiencies gained as a result of favorable weather within a calendar month, where the number of days of normally anticipated weather days is less than expected, shall contribute to the project Float and shall not affect the Contract Times.

Application for a weather related extension of time shall be submitted to Engineer, using form 1-01 32 16, and shall state the extension requested and be supported by the relevant weather data.

Contractor shall include the number of days, for each calendar period, from Tables 2 and 3 in the Project Schedule. Days shall be labeled as Extreme Weather Float. Extreme Weather Conditions that affect the Critical Path of the Progress Schedule, in excess of the Extreme Weather Float, will be considered for an extension or reduction of the Contract Times. Notification for all extreme weather related events must be submitted no later than 72 hours after the weather impact date.

Table 1
Average Monthly Precipitation
(inches)
10 year average 2010 – 2020
NOAA National Centers for Environmental Information, Annual Climatological Summaries

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3.16	2.53	2.99	3.85	3.81	3.89	4.16	3.60	3.08	2.74	3.26	4.31

Table 2
Average Number of Calendar Days
with Precipitation of 0.25 Inches
or More in a Single 24-hour Period
10 year average 2010 – 2020
NOAA National Centers for Environmental Information, Annual Climatological Summaries

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
5	5	6	5	5	5	6	5	5	4	5	6

Table 3 Average Number of Calendar Days with greater than 90 °F 10 year average 2010 – 2020 NOAA National Centers for Environmental Information, Annual Climatological Summaries											
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
			1	3	13	21	15	20	1		

Table 3 includes historical weather data for the average number of days recorded where temperature could be considered extreme. Not every day listed in Table 3 will result in an Extreme Weather Condition. A subsequent determination shall be done based on the Heat Index Apparent Temperature or Wind Chill Index.

Justification for an extension or reduction of the Contract Times as a result of extreme temperature shall be determined based on the Heat Index Apparent Temperature or Wind Chill Index using formulas below. The Heat Index and Wind Chill Temperature limits for determining the extreme temperature event shall be those listed in Figure 1-01 32 16.

Heat Index:

$$HI = -42.379 + 2.04901523 \times T + 10.14333127 \times RH - 0.22475541 \times T \times RH - 0.00683783 \times T \times T - 0.05481717 \times RH \times RH + 0.00122874 \times T \times T \times RH + 0.00085282 \times T \times RH \times RH - 0.00000199 \times T \times T \times RH \times RH$$

Where:
HI = Heat Index Expressed as an Apparent Temperature in Degrees Fahrenheit (°F)
T = Average Day Temperature in Degrees Fahrenheit (°F)
RH = Average Day Relative Humidity in Percent (%)

If the RH is less than 13% and the temperature is between 80 and 112 degrees Fahrenheit (°F), then the following adjustment is subtracted from HI:

$$ADJUSTMENT = [(13 - RH)/4] \times SQRT\{[17 - ABS(T - 95)]/17\}$$

Where:
HI = Heat Index Expressed as an Apparent Temperature in Degrees Fahrenheit (°F)
T = Average Day Temperature in Degrees Fahrenheit (°F)
RH = Average Day Relative Humidity in Percent (%)
SQRT = Square Root Function

If the RH is greater than 85% and the temperature is between 80 and 87 degrees Fahrenheit (°F), then the following adjustment is added to HI:

$$ADJUSTMENT = [(RH - 85)/10] \times [(87 - T)/5]$$

Where:
HI = Heat Index Expressed as an Apparent Temperature in Degrees Fahrenheit (°F)
T = Average Day Temperature in Degrees Fahrenheit (°F)
RH = Average Day Relative Humidity in Percent (%)

Wind Chill Index:

$$WC = 35.74 + 0.6215 \times T - 35.75 \times V^{0.16} + 0.4275 \times T \times V^{0.16}$$

Where:
WC = Wind Chill Index Expressed as a Temperature in Degrees Fahrenheit (°F)
T = Average Day Temperature in Degrees Fahrenheit (°F)
V = Wind Speed in Miles per Hour (mph)

16. AS-BUILT SCHEDULE. As a condition precedent to release of final payment, the last update to the Progress Schedule submitted shall be identified by Contractor as the "As-Built Schedule". The "As-Built Schedule" shall reflect the exact manner in which the project was actually constructed (including actual start and completion dates, activities, sequences, and logic) and shall be signed and certified by Contractor's project manager.

17. SCHEDULING SOFTWARE APPLICATION. Scheduling software shall be Primavera Project Manager (P6) without exception.

18. SCHEDULE SOFTWARE SETTINGS AND RESTRICTIONS: Contractor shall consult with Engineer for acceptable Primavera Project Manager software settings and restrictions. The following shall apply unless otherwise directed by Engineer.

a. Schedule Options:

i. Shall be defined only to "Use expected finish dates";

ii. Scheduling progressed activities to be set to "Use only retained logic", not progress override option;

iii. Critical Path activities defined as total Float less than or equal to zero;

iv. Calculating start-to-start lag from "early start" dates; and computing total Float as "finish Float = late finish – early finish";

v. Calendar to be set for scheduling relationship lag as “Predecessor Activity Calendar.”

b. Activity progress shall be shown using Remaining Duration. Date format shall be DDMMYY.

c. Default activity type shall be set to “Independent Task”.

d. Date/time activity constraint(s), other than those required by the Contract, will not be allowed unless accepted by Engineer. Contractor shall identify proposed constraints and explain the constraint purpose in the Narrative Report.

e. Lags shall not be used in the creation of an activity that will perform the same function, e.g., concrete cure time. Lag durations contained in the Progress Schedule shall not have a negative value. Contractor shall identify any lag proposed and explain the purpose of the lag in the Narrative Report.

f. Actual Start and Finish dates shall not be automatically updated by default mechanism that may be included in the CPM scheduling software system. Actual Start and Actual Finish dates on the CPM schedule shall be updated by actual work progression.

19. ACTIVITY CODES. The Primavera (P6) activity codes and work breakdown structure (WBS) to be confirmed or revised by Engineer are listed below. Confirmation or revision of the activity codes and WBS will be provided to Contractor within three workdays of the Effective Date of the Contract. Use of Engineer prescribed activity codes and WBS is mandatory.

“Project Codes” as defined by Primavera P6 is reserved for Owner. Only “Activity Codes” at Project Level will be permitted for Contractor use.

Activity Code	Code Value	Description
Phase	0005	Construction Phase
Construction Phase	A	Milestones
	BC	Administrative
	D	Submittals
	E	Construction Activities
		Closeout Phase
Submittals	SUB	Submittals
	R&A	Review & Approve
	F&D	Fabricate & Deliver
Other Codes to be prescribed by Engineer or requested by Contractor for project specific criteria.		

20. ACTIVITY RELATIONSHIPS. Relationships between activities shall be identified with the following information:

a. Predecessor and successor activity ID.

b. Relationship types:

i. FS - Finish to start

ii. SS - Start to start

iii. FF - Finish to finish

iv. SF - Start to finish – This relationship is not allowed, unless authorized by Engineer.

21. PROJECT CALENDARS. Project Calendars shall use workdays and calendar days as the planning unit for the schedule. Use of Global Calendars is reserved for Owner. Each calendar shall be set to start on Mondays with holidays in accordance with Owner policy. The following calendars shall be used for each activity except as otherwise accepted by Engineer:

a. 5-Day x 8 Hour Workweek (with holidays) shall be used for 5-day 40-hour workweek activities: Monday through Friday. All holidays and non-work days shall be assigned to this calendar. This calendar shall be used for all

normal work activities, submittals, and fabricate and delivery activities. This calendar shall be the default calendar for the project unless otherwise specified.

b. 5-Day x 10-Hour Workweek (with holidays) shall be used for 5-day 50-hour workweek activities: Monday through Friday. All holidays and non-work days shall be assigned to this calendar.

c. 6-Day x 10-Hour Workweek (with holidays) shall be used for 6-day 60-hour workweek activities. Monday through Saturday. All holiday and non-work days shall be assigned to this calendar.

d. 7-Day Calendar (no holidays) shall be used for 7-day workweek activities. No non-work days shall be entered into this calendar.

e. Additional Calendars may be assigned depending on need. However, Contractor shall consult with Engineer before other calendars are entered and/or used in the Progress Schedule.

The work day to calendar day correlation shall be based on a single shift and 5-day work week with adequate allowance for holidays, adverse weather and all other special requirements of the Work. Contractor may, at his option, propose alternate baseline calendars to allow a second shift and/or a single shift on Saturdays subject to the concurrence and acceptance of Owner. Under no circumstances will a schedule be accepted which allows regularly scheduled work on Sundays.

The holidays observed by Owner are as follows:

New Year's Day
Martin Luther King Jr. Day
Memorial Day
July 4th
Labor Day
Thanksgiving Day
Firday after Thanksgiving Day
Christmas Eve
Christmas Day

22. FLOAT. Contractor shall not use Float suppression techniques, including preferential sequencing (arranging critical path through activities more susceptible to Owner caused delay); lag logic restraints; zero total or free Float constraints; extended activity times; or imposing constraint dates other than as required by the Contract. Float suppression will be cause for rejection of the preliminary Progress Schedule or full Progress Schedule and its updates.

23. MANDATORY MILESTONES. The Contract duration shall be equal to the time period between the Notice to Proceed and the completion of the Work in readiness for final payment. The following milestones are mandatory.

a. Notice to Proceed

c. Milestones, if any, as indicated in Contractor's Bid

c. Substantial Completion as indicated in Contractor's Bid

d. Completion and readiness for final payment, as indicated in Contractor's Bid

The following additional milestones are to be considered and incorporated into the Progress Schedule in accordance with the Contract, if applicable.

a. Permit constraints

b. Facility shut down or outage milestone requirements

c. Applicable phasing milestones

d. Other milestones deemed appropriate by Engineer

END OF SECTION

BLACK & VEATCH

Weather Delay Claim

Owner: York County, South Carolina
Project Title: Phase 1 North-South Transmission Main - Harper Road
Project Limits:
Location: Harper Rd/Paraham Rd/Campbell Rd, York, South Carolina

B&V Project No.: 402615
B&V File No.:
Date†:
Prepared By:
Claim Number:

General Contractor:	**Sub-Contractor(s) On-Site:**
Tel: Fax:	

Normal Work Hours:

Impact Date: Click here to enter a date.	Start Time:	End Time:	Total: Hrs.

Weather Conditions: *(Weather Data, Wind Chill, Heat Index, River Data)*

Weather Condition and Duration:	Type of Impact:

Period:					
Temperature:	°F	°F	°F	°F	°F
Heat Index/Wind Chill:	°F	°F	°F	°F	°F
Dew Point:	°F	°F	°F	°F	°F
Humidity:	%	%	%	%	%
Pressure:	in	in	in	in	in
Visibility:	mi	mi	mi	mi	mi
Wind Direction:					
Wind Speed:	mph	mph	mph	mph	mph
Wind Gust:	mph	mph	mph	mph	mph
Precipitation:	in	in	in	in	in
Event:					
Conditions:					
River Level *(Datum)*: *Stage: Action: , Flood:*	ft	ft	ft	ft	ft
	Low Temp.	High Temp.	Ave. Wind Speed	Total Prec.	Total Snow
Daily Observation:	°F	°F	mph	in	in

Schedule Impact:

Schedule Data Date: Click here to enter a date.

Activity ID	Activity Description	Critical Path	Anticipated Delay Day	Time Extension Requested
		☐ 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

Request:

Comments:

Contractor's Representative: _____ (Project Manager) _____ Date

Acceptance:

Received: Click here to enter a date. ☐ Acknowledge ☐ Deny

Remarks:

Engineer / CM Representative: _____ (Resident Project Representative) _____ Date

Owner's Representative: _____ (Project Administrator) _____ Date

† Claim must be submitted no later than 72 hours after the weather impact date.

Section 01 32 33

PHOTOGRAPHIC DOCUMENTATION

1. CONSTRUCTION PHOTOGRAPHS BY CONTRACTOR. Contractor shall be responsible for the production of construction photographs as provided herein. Engineer shall designate the subject of each photograph.

For pipeline projects, photographs shall be taken along the route of the pipeline before the commencement of Work, and promptly submitted to Engineer. The photographs shall be at intervals of 200 feet. The same views shall be rephotographed upon completion of construction activities on any section of the pipeline, and submitted with Contractor's Application for Payment for Work on that section.

All photographs shall be color digital, produced by a competent photographer experienced in takin photographs documenting construction progress. Contractor shall submit the photographs electronically. Digital images shall be posted to the Project site and provided with a descriptive index of the images.

Engineer will transmit the digital files and one copy of the prints to Owner.

END OF SECTION

Section 01 33 00

SUBMITTAL PROCEDURES

1. SHOP DRAWINGS AND ENGINEERING DATA.

1.01. General. Shop Drawings and engineering data (submittals) covering all equipment and all fabricated components and building materials which will become a permanent part of the Work under this Contract shall be submitted to Engineer for review, as required. Submittals shall verify compliance with the Contract Documents, and shall include drawings and descriptive information in sufficient detail to show the kind, size, arrangement, and the operation of component materials and devices; the external connections, anchorages, and supports required; the performance characteristics; and dimensions needed for installation and correlation with other materials and equipment.

Each submittal shall cover items from only one section of the specification unless the item consists of components from several sources. Contractor shall submit a complete initial submittal including all components. When an item consists of components from several sources, Contractor's initial submittal shall be complete including all components.

All submittals, regardless of origin, shall be approved by Contractor and clearly identified with the name and number of this Contract, Contractor's name, and references to applicable specification paragraphs and Contract Drawings. Each copy of all submittals, regardless of origin, shall be stamped or affixed with an approval statement of Contractor. Each submittal shall indicate the intended use of the item in the Work. When catalog pages are submitted, applicable items shall be clearly identified and inapplicable data crossed out. The current revision, issue number, and date shall be indicated on all drawings and other descriptive data.

Contractor shall be solely responsible for the completeness of each submittal. Contractor's stamp or affixed approval statement of a submittal, per Figure 1-013300, is a representation to Owner and Engineer that Contractor accepts sole responsibility for determining and verifying all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto, and that Contractor has reviewed and coordinated each submittal with other Shop Drawings and with the requirements of the Work and the Contract Documents.

All deviations from the requirements of the Contract Documents shall be identified as deviations on each submittal and shall be tabulated in Contractor's letter of transmittal using Figure 2-013300. Such submittals shall, as pertinent to the deviation, indicate essential details of all changes proposed by Contractor (including modifications to other

facilities that may be a result of the deviation) and all required piping and wiring diagrams.

For electronic submittals, drawings and the necessary data shall be submitted electronically to Engineer as specified below. Submittal documents shall be in color to facilitate use of red line markups. All electronic files shall be in Portable Document Format (PDF) as generated by Adobe Acrobat Professional Version 7.0 or higher. The PDF file(s) shall be fully indexed using the Table of Contents, searchable with thumbnails generated. PDF images must be at a readable resolution. For most documents, they should be scanned or generated at 300 dots per inch (dpi). Use of higher resolution is acceptable with Owner and Engineer approval. Optical Character Recognition (OCR) capture must be performed on these images so that text can be searched, selected and copied from the generated PDF file. The PDF documents shall have a bookmark created in the navigation frame for each major entry ("Section" or "Chapter") in the Table of Contents. Thumbnails shall be generated for each page or graphic in the PDF file.

The opening view for each PDF document shall be as follows:

Initial View: Bookmarks and Page

Magnification: Fit In Window

The file shall open to Contractor's transmittal letter, with bookmarks to the left. The first bookmark shall be linked to the Table of Contents.

PDF document properties shall include the submittal number for the document title and Contractor's name for the author.

Electronic submittal file sizes shall be limited to 10 MB. When multiple files are required for a submittal the least number of files possible shall be created.

Contractor shall post submittals and retrieve Engineer's submittal review comments through the Project website accessible through the Internet. Instruction on procedures for posting and retrieving submittals will be provided after award of the Contract.

Facsimiles (fax) will not be acceptable. Submittals will not be accepted from anyone but Contractor. Submittals shall be consecutively numbered in direct sequence of submittal and without division by subcontracts or trades.

1.02. Engineer's Review of Submittals. Engineer's review of submittals covers only general conformity to the Drawings and Specifications, external connections, and dimensions that affect the layout; it does not indicate thorough review of all dimensions, quantities, and details of the material, equipment, device, or item covered. Engineer's review shall not relieve Contractor of sole responsibility for errors, omissions, or

deviations in the drawings and data, nor of Contractor's sole responsibility for compliance with the Contract Documents.

Engineer's submittal review period shall be 21 consecutive calendar days and shall commence on the first calendar day following receipt of the submittal or resubmittal in Engineer's office.

When the drawings and data are returned with review status "NOT ACCEPTABLE" or "RETURNED FOR CORRECTION", the corrections shall be made as instructed by Engineer. The corrected drawings and data shall be resubmitted through the Project website. Resubmittals by facsimile or e-mail will not be accepted. When the drawings and data are returned with review status "EXCEPTIONS NOTED", "NO EXCEPTIONS NOTED", or "RECORD COPY", no additional copies need be furnished unless specifically requested by Engineer.

1.03. Resubmittal of Shop Drawings and Data. Contractor shall accept full responsibility for the completeness of each resubmittal. Contractor shall verify that all corrected data and additional information previously requested by Engineer are provided on the resubmittal. Resubmittals shall be in an organized and consistent format.

When corrected copies are resubmitted, Contractor shall direct specific attention to all revisions in writing and shall list separately any revisions made other than those called for by Engineer on previous submittals. Requirements specified for initial submittals shall also apply to resubmittals. Resubmittals shall bear the number of the first submittal followed by a letter (A, B, etc.) or a unique identification that indicates the initial submittal and correct sequence of each resubmittal.

If more than one resubmittal is required because of failure of Contractor to provide all previously requested corrected data or additional information, Contractor shall reimburse Owner for the charges of Engineer for review of the additional resubmittals. This does not include initial submittal data such as shop tests and field tests that are submitted after initial submittal.

Resubmittals shall be made within 30 days of the date of the letter returning the material to be modified or corrected, unless within 14 days Contractor submits an acceptable request for an extension of the stipulated time period, listing the reasons the resubmittal cannot be completed within that time.

The need for more than one resubmittal, or any other delay in obtaining Engineer's review of submittals, will not entitle Contractor to extension of the Contract Times unless delay of the Work is the direct result of a change in the Work authorized by a Change Order or failure of Engineer to review and return any submittal to Contractor within the specified review period.

2. OPERATION AND MAINTENANCE DATA AND MANUALS. Adequate operation and maintenance information shall be supplied for all equipment requiring maintenance or other attention. The equipment Supplier shall prepare a Project specific operation and maintenance manual for each type of equipment indicated in the individual equipment sections or the equipment schedule.

Unless otherwise agreed by Engineer, the operation and maintenance manual for each type of equipment shall only be submitted for review following completion of review of all shop drawings and engineering data pertaining to that equipment.

Parts lists and operating and maintenance instructions shall be furnished for other equipment not listed in the individual equipment sections or the equipment schedule.

Operation and maintenance manuals shall include the following:

a. Equipment function, normal operating characteristics, and limiting conditions.

b. Assembly, installation, alignment, adjustment, and checking instructions.

c. Operating instructions for startup, routine and normal operation, regulation and control, shutdown, and emergency conditions.

d. Lubrication and maintenance instructions.

e. Guide to troubleshooting.

f. Parts lists and predicted life of parts subject to wear.

g. Outline, cross section, and assembly drawings; engineering data; and wiring diagrams.

h. Test data and performance curves, where applicable.

The operation and maintenance manuals shall be in addition to any instructions or parts lists packed with or attached to the equipment when delivered, or which may be required by Contractor.

Manuals shall be submitted in electronic format to Engineer prior to the date of shipment of the equipment. The manuals shall be submitted and Engineer's review comments retrieved, through the Project website accessible through the Internet. Instruction on procedures for posting and retrieving O&M submittals and review comments will be provided after award of the Contract. When the O&M manuals are returned with the review status "RETURNED FOR CORRECTION", the corrections shall be made as instructed by Engineer, and corrected manuals resubmitted to Engineer. When review by Engineer is complete, a PDF of each electronic O&M manual shall be posted to the Project website. The completed O&M manual shall also be filed to the Project website.

Delivery of the final O&M shall be made 30 days prior to placing the equipment in operation.

All material shall be marked with Project identification, and inapplicable information shall be marked out or deleted.

Shipment of equipment will not be considered complete until all required manuals and data have been received.

2.01. Electronic Operation and Maintenance Manuals. Electronic manuals shall be in Adobe Acrobat's Portable Document Format (PDF), and shall be prepared at a resolution between 300 and 600 dots per inch (dpi), depending on document type. Optical Character Recognition (OCR) capture shall be performed on these documents. OCR settings shall be performed with the "original image with hidden text" option in Adobe Acrobat Exchange.

File size shall be limited to 10 MB. A single PDF file greater than 10 MB may only be submitted if acceptable to Owner. When multiple files are required the least number of files possible shall be created. File names shall be in the format OMXXXXX-YYYZ-V.pdf, where XXXXX is the five digit number corresponding to the specification section, YYY is a three digit O&M manual number, e.g. 001, Z is the letter signifying a resubmittal, A, B, C, etc., and V is a number used only when more than one 10 MB file is required for an O&M manual.

Documents prepared in PDF format shall be processed as follows:

1. Pages shall be searchable (processed for optical character recognition) and indexed when multiple files are required.
2. Pages shall be rotated for viewing in proper orientation.
3. A bookmark shall be provided in the navigation frame for each entry in the Table of Contents.
4. Embedded thumbnails shall be generated for each completed PDF file.
5. The opening view for PDF files shall be as follows:
   Initial View: Bookmarks and Page
   Page Number: Title Page (usually Page 1)
   Magnification: Set to Fit in Window
   Page: Single Page
6. Where the bookmark structure is longer than one page the bookmarks shall be collapsed to show the chapter headings only.
7. When multiple files are required the first file of the series (the parent file) shall list every major topic in the Table of Contents. The parent file shall also include minor headings bookmarked based on the Table of Contents. Major headings, whose content is contained in subsequent files (children) shall be linked to be called from the parent to the specific location in the child file. The child file shall contain bookmark entries for both major and minor headings contained in the child file. The first bookmark of any child file shall link back to the parent file

and shall read as follows "Return to the *Equipment Name* Table of Contents", e.g. Return to the Polymer Feed System Table of Contents.

8. Drawings shall be bookmarked individually.
9. Files shall be delivered without security settings to permit editing, insertion and deletion of material to update the manual provided by the manufacturer.

2.02. Labeling. As a minimum, the following information shall be included on all final O&M manual materials, including CD-ROM disks, jewel cases, and hard copy manuals:

Equipment name and/or O&M title spelled out in complete words.
Project Name.
Owner Project/Contract Number.
Specification Section Number. Example: “Section 15500”
Manufacturer’s name.
File Name and Date.

For example:

Backwash Pump Operation and Maintenance Manual
Somewhere Plant Expansion
Project/Contract No. ____
Specification Section 11110
Manufacturer
OM11110-001.pdf, 5/05/07

END OF SECTION

SUBMITTAL No. _____
SECTION _____
Do not combine multiple sections together unless required by specifications.

(Contractor's Letterhead)

SUBMITTAL IDENTIFICATION & CONTRACTOR'S APPROVAL STATEMENT

DATE: _____ COPIES _____ DRAWING SHEET NO._____

Description submittal contents: _____
Location: _____
Manufacturer_____
Subcontractor or Supplier (Optional) _____

REMARKS: _____
_____
_____
_____

CONTRACTOR'S APPROVAL

(Construction Company) has reviewed and coordinated the submitted documentation and verifies that the equipment and material meet the requirements of the Work and the Contract Documents. We accept sole responsibility for determining and verifying all quantities, dimensions, field construction criteria, materials, catalog numbers, and similar data contained in the submittal as required by the Contract Documents.

Deviations: □ None □ Yes (See attached Figure 2-01 33 00 for written description)

Approved By: _____ Date: _____

This approval does not release subcontractor / vendor from the contractual responsibilities.

Black & Veatch
Project No. 402615
Contract No. 19298
Project Description: Phase 1 North-South Transmission Main – Harper Road

SUBMITTAL No. _____
SECTION _____
Do not combine multiple sections together unless required by specifications.

(Contractor's Letterhead)

SUBMITTAL IDENTIFICATION & CONTRACTOR'S APPROVAL STATEMENT

DATE: _____ COPIES _____ DRAWING SHEET NO._____

Description submittal contents: _____
Location: _____
Manufacturer_____
Subcontractor or Supplier (Optional) _____

DEVIATIONS

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Black & Veatch
Project No. 402615
Contract No. 19298
Project Description: Phase 1 North-South Transmission Main – Harper Road

Section 01 50 00

TEMPORARY FACILITIES AND CONTROLS

1. UNITS OF MEASUREMENT. When both inch-pound (English) and SI (metric) units of measurement are specified herein, the values expressed in inch-pound units shall govern.

2. OFFICE AT SITE OF WORK. During the performance of this Contract, Contractor shall maintain a suitable office at or near the Site which shall be the headquarters of its representative authorized to receive drawings, instructions, or other communication or articles. Any communication given to the said representative or delivered at Contractor's office at the Site in the representative's absence shall be deemed to have been delivered to Contractor.

Copies of the Drawings, Specifications, and other Contract Documents shall be kept at Contractor's office at the Site and available for use at all times.

3. WATER. All water required for and in connection with the Work to be performed shall be furnished by and at the expense of Contractor through meters installed on hydrants. Contractor shall supply all necessary tools, hose, and pipe, or otherwise transport the water to the point of use, and shall make its own arrangements with the York County as to the amount of water required and the time when the water will be needed. Indiscriminate use of water so furnished will not be permitted. Special hydrant wrenches shall be used for opening and closing fire hydrants. In no case shall pipe wrenches be used for this purpose.

4. POWER. Contractor shall provide all power for heating, lighting, operation of Contractor's plant or equipment, or for any other use by Contractor. Temporary heat and lighting shall be maintained until the Work is accepted.

5. SANITARY FACILITIES. Contractor shall furnish temporary sanitary facilities at the Site, as provided herein, for the needs of all construction workers and others performing work or furnishing services on the Project.

Sanitary facilities shall be of reasonable capacity, properly maintained throughout the construction period, and obscured from public view to the greatest practical extent. If toilets of the chemically treated type are used, at least one toilet will be furnished for each 20 persons. Contractor shall enforce the use of such sanitary facilities by all personnel at the Site.

6. CONSTRUCTION AIDS. Contractor shall furnish, install, maintain, and operate all construction aids required by it and its Subcontractors in the performance of the Work, except as otherwise provided herein.

Construction aids shall be furnished without charge to the other contractors, and all necessary erection, maintenance, and operating personnel shall be included. In the event of conflict, the contractor furnishing the equipment shall determine priorities in the best interest of the Project.

7. MAINTENANCE OF TRAFFIC. Contractor shall conduct its work to interfere as little as possible with public travel, whether vehicular or pedestrian. Whenever it is necessary to cross, obstruct, or close roads, driveways, and walks, whether public or private, Contractor shall provide and maintain suitable and safe bridges, detours, or other temporary expedients for the accommodation of public and private travel, and shall give reasonable notice to owners of private drives before interfering with them. Such maintenance of traffic will not be required when Contractor has obtained permission from the owner and tenant of private property, or from the authority having jurisdiction over public property involved, to obstruct traffic at the designated point.

In making open-cut street crossings, Contractor shall not block more than one-half of the street at a time. Whenever possible, Contractor shall widen the shoulder on the opposite side to facilitate traffic flow. Temporary surfacing shall be provided as necessary on shoulders.

7.01. Temporary Bridges. Contractor shall construct substantial bridges at all points where it is necessary to maintain traffic across pipeline construction. Bridges in public streets, roads, and highways shall be acceptable to the authority having jurisdiction. Bridges erected in private roads and driveways shall be adequate for the service to which they will be subjected. Bridges shall be provided with substantial guardrails and with suitably protected approaches. Foot bridges shall be at least 4 feet wide, provided with handrails and uprights of dressed lumber. Bridges shall be maintained in place as long as the conditions of the Work require their use for safety of the public. When necessary for the proper prosecution of the Work in the immediate vicinity of a bridge, the bridge may be relocated or temporarily removed for such period as Engineer may permit.

7.02. Detours. Where required by the authority having jurisdiction that traffic be maintained over any construction work in a public street, road, or highway, and the traffic cannot be maintained on the alignment of the original roadbed or pavement, Contractor shall, at its own expense, construct and maintain a detour around the construction work. Each detour shall include a bridge across the pipe trench and all necessary barricades, guardrails, approaches, lights, signals, signs, and other devices and precautions necessary for protection of the Work and safety of the public.

8. BARRICADES AND LIGHTS. All streets, roads, highways, and other public thoroughfares which are closed to traffic shall be protected by effective barricades on which shall be placed acceptable warning signs. Barricades shall be located at the nearest intersecting public highway or street on each side of the blocked section.

All open trenches and other excavations shall have suitable barricades, signs, and lights to provide adequate protection to the public. Obstructions, such as material piles and equipment, shall be provided with similar warning signs and lights.

All barricades and obstructions shall be illuminated with warning lights from sunset to sunrise. Material storage and conduct of the Work on or alongside public streets and highways shall cause the minimum obstruction and inconvenience to the traveling public.

All barricades, signs, lights, and other protective devices shall be installed and maintained in conformity with applicable statutory requirements and, where within railroad and highway rights-of-way, as required by the authority having jurisdiction.

9. FENCES. All existing fences affected by the Work shall be maintained by Contractor until completion of the Work. Fences which interfere with construction operations shall not be relocated or dismantled until written permission is obtained from the owner of the fence, and the period the fence may be left relocated or dismantled has been agreed upon. Where fences must be maintained across the construction easement, adequate gates shall be installed. Gates shall be kept closed and locked at all times when not in use.

On completion of the Work across any tract of land, Contractor shall restore all fences to their original or to a better condition and to their original locations.

10. PROTECTION OF PUBLIC AND PRIVATE PROPERTY. Contractor shall protect, shore, brace, support, and maintain all underground pipes, conduits, drains, and other underground construction uncovered or otherwise affected by its construction operations. All pavement, surfacing, driveways, curbs, walks, buildings, utility poles, guy wires, fences, and other surface structures affected by construction operations, together with all sod and shrubs in yards, parkways, and medians, shall be restored to their original condition, whether within or outside the easement. All replacements shall be made with new materials.

No trees shall be removed outside the permanent easement, except where authorized by Engineer. Whenever practicable, Contractor shall tunnel beneath trees in yards and parking when on or near the line of trench. Hand excavation shall be employed as necessary to prevent injury to trees. Trees left standing shall be adequately protected against damage from construction operations.

Contractor shall be responsible for all damage to streets, roads, highways, shoulders, ditches, embankments, culverts, bridges, and other public or private property, regardless of location or character, which may be caused by transporting equipment, materials, or workers to or from the Work or any part or site thereof, whether by Contractor of its Subcontractors. Contractor shall make satisfactory and acceptable arrangements with the owner of, or the agency or authority having jurisdiction over, the

damaged property concerning its repair or replacement or payment of costs incurred in connection with the damage.

All fire hydrants and water control valves shall be kept free from obstruction and available for use at all times.

11. PARKING. Contractor shall provide and maintain suitable parking areas for the use of all workers and others performing work or furnishing services in connection with the Project, as required to avoid any need for parking personal vehicles where they may interfere with public traffic, Owner's operations, or construction activities.

12. NOISE CONTROL. Contractor shall take reasonable measures to avoid unnecessary noise. Such measures shall be appropriate for the normal ambient sound levels in the area during working hours. All construction machinery and vehicles shall be equipped with practical sound-muffling devices, and operated in a manner to cause the least noise consistent with efficient performance of the Work.

During construction activities on or adjacent to occupied buildings, and when appropriate, Contractor shall erect screens or barriers effective in reducing noise in the building and shall conduct its operations to avoid unnecessary noise which might interfere with the activities of building occupants.

13. DUST CONTROL. Contractor shall take reasonable measures to prevent unnecessary dust. Earth surfaces subject to dusting shall be kept moist with water or by application of a chemical dust suppressant. When practicable, dusty materials in piles or in transit shall be covered to prevent blowing dust.

Buildings or operating facilities which may be affected adversely by dust shall be adequately protected from dust. Existing or new machinery, motors, instrument panels, or similar equipment shall be protected by suitable dust screens. Proper ventilation shall be included with dust screens.

14. TEMPORARY DRAINAGE PROVISIONS. Contractor shall provide for the drainage of storm water and such water as may be applied or discharged on the Site in performance of the Work. Drainage facilities shall be adequate to prevent damage to the Work, the Site, and adjacent property.

Existing drainage channels and conduits shall be cleaned, enlarged, or supplemented as necessary to carry all increased runoff attributable to Contractor's operations. Dikes shall be constructed as necessary to divert increased runoff from entering adjacent property (except in natural channels), to protect Owner's facilities and the Work, and to direct water to drainage channels or conduits. Ponding shall be provided as necessary to prevent downstream flooding.

15. EROSION CONTROL. Contractor shall prevent erosion of soil on the Site and adjacent property resulting from its construction activities. Effective measures shall be

initiated prior to the commencement of clearing, grading, excavation, or other operation that will disturb the natural protection.

Work shall be scheduled to expose areas subject to erosion for the shortest possible time, and natural vegetation shall be preserved to the greatest extent practicable. Temporary storage and construction buildings shall be located, and construction traffic routed, to minimize erosion. Temporary fast-growing vegetation or other suitable ground cover shall be provided as necessary to control runoff.

16. POLLUTION CONTROL. Contractor shall prevent the pollution of drains and watercourses by sanitary wastes, sediment, debris, and other substances resulting from construction activities. No sanitary wastes shall be permitted to enter any drain or watercourse other than sanitary sewers. No sediment, debris, or other substance shall be permitted to enter sanitary sewers, and reasonable measures shall be taken to prevent such materials from entering any drain or watercourse.

END OF SECTION

Section 01 65 00

PRODUCT DELIVERY REQUIREMENTS

1. SCOPE. This section covers packaging and shipping of materials and equipment.

2. PREPARATION FOR SHIPMENT. All equipment shall be suitably packaged to facilitate handling and to protect against damage during transit and storage. All equipment shall be boxed, crated, or otherwise completely enclosed and protected during shipment, handling, and storage. All equipment shall be protected from exposure to the elements and shall be kept dry at all times.

Painted and coated surfaces shall be protected against impact, abrasion, discoloration, and other damage. Painted and coated surfaces which are damaged prior to acceptance of equipment shall be repainted to the satisfaction of Engineer.

Grease and lubricating oil shall be applied to all bearings and similar items.

3. SHIPPING. Before shipping each item of equipment shall be tagged or marked as identified in the delivery schedule or on the Shop Drawings. Complete packing lists and bills of material shall be included with each shipment.

END OF SECTION

Section 01 66 00

PRODUCT STORAGE AND HANDLING REQUIREMENTS

1. SCOPE. This section covers delivery, storage, and handling of materials and equipment.

2. DELIVERY. Contractor shall bear the responsibility for delivery of equipment, spare parts, special tools, and materials to the site and shall comply with the requirements specified herein and shall provide required information concerning the shipment and delivery of the materials specified in this Contract. These requirements also apply to any subsuppliers making direct shipments to the Site.

Contractor shall, either directly or through contractual arrangements with others, accept responsibility for the safe handling and protection of the equipment and materials furnished under this Contract before and after receipt at the port of entry. Acceptance of the equipment shall be made after it is installed, tested, placed in operation and found to comply with all the specified requirements.

All items shall be checked against packing lists immediately on delivery to the site for damage and for shortages. Damage and shortages shall be remedied with the minimum of delay.

Delivery of portions of the equipment in several individual shipments shall be subject to review of Engineer before shipment. When permitted, all such partial shipments shall be plainly marked to identify, to permit easy accumulation, and to facilitate eventual installation.

3. STORAGE. Upon delivery, all equipment and materials shall immediately be stored and protected until installed in the Work.

Stacked items shall be suitably protected from damage by spacers or load distributing supports that are safely arranged. No metalwork (miscellaneous steel shapes and reinforcing steel) shall be stored directly on the ground. Masonry products shall be handled and stored in a manner to hold breakage, chipping, cracking, and spalling to a minimum. Cement, lime, and similar products shall be stored off the ground on pallets and shall be covered and kept completely dry at all times. Pipe, fittings, and valves may be stored out of doors, but must be placed on wooden blocking. PVC pipe, geomembranes, plastic liner, and other plastic materials shall be stored off the ground on pallets and protected from direct sunlight.

Equipment and materials shall not show any pitting, rust, decay, or other deleterious effects of storage when installed in the Work.

In addition to the protection specified for prolonged storage, the packaging of spare units and spare parts shall be for export packing and shall be suitable for long-term storage in a damp location. Each spare item shall be packed separately and shall be completely identified on the outside of the container.

4. HANDLING. Stored items shall be laid out to facilitate their retrieval for use in the Work. Care shall be taken when removing the equipment for use to ensure the precise piece of equipment is removed and that it is handled in a manner that does not damage the equipment.

During handling, carbon steel constructed material including chains, straps, and forks on lifting equipment shall not directly contact any equipment or material constructed of stainless steel. It shall be the Contractor's responsibility to correct any carbon steel contamination of stainless steel.

END OF SECTION

WATER AND SEWER

Technical Specifications

June, 2021

These technical specifications include references to construction, testing and materials standards of various organizations. Note that all references, herein, apply unless they are superseded by any relevant or applicable requirements of SCDOT, SCDHEC, York County or any other Authorities having jurisdiction where the work is taking place.

dhec

DRINKING WATER AND RECREATIONAL WATER PROTECTION
WATER AND SEWER CONSTRUCTION ONLY
(Subject to any provisions which may appear in the construction permit)

Final written approval for operation must be obtained from DHEC after completion of construction.

Approved for:

Water Permit SS-000106
Wastewater Permit SS-02164
Date 6/08/2021
Reviewer Maia Milenkova

TABLE OF CONTENTS

SPECIFICATIONS

* Denotes Pump Station Standard Specifications.
SC DHEC requires the submission of a separate set of project specific Pump Station Specifications for each project. Division 43 represent York County's Specifications for Sewer Pump Stations but they are not part of the overall SC DHEC approved Specifications.

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 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 Surfacings, 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	Uncracked Concrete		Cracked Concrete	
Rod Diameter / Dowel Size	**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
7/8inch / #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. 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 50 13

MISCELLANEOUS METAL FABRICATIONS

PART 1 GENERAL

1.1 DESCRIPTION

A. Scope:
   1. Provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish miscellaneous metal fabrications including surface preparation and shop priming.
   2. The Work also includes:
      a. Providing openings in miscellaneous metal fabrications to accommodate the Work under this and other Sections, and attaching to miscellaneous metal fabrications all items such as sleeves, bands, studs, fasteners, and all items required for which provision is not specifically included under other Sections.

B. Coordination:
   1. Review installation procedures under this and other Sections and coordinate the Work to be installed with, or attached to, miscellaneous metal fabrications Work.
   2. Hot-dip Galvanizing: Coordinate with steel fabricator detailing for and fabrication of assemblies to be hot-dip galvanized, to minimize distortion during galvanizing process.

C. Related Sections:
   1. Section 03 00 05, Concrete.

1.2 REFERENCES

A. Standards referenced in this Section are:
   1. ANSI A14.3, Ladders – Fixed –Safety Requirements.
   2. ANSI Z359.1, Safety Requirements for Personal Fall Arrest Systems, Subsystems, and Components.
   3. ASTM A36/A36M, Specification for Carbon Structural Steel.
   4. ASTM A53/A53M, Specification for Pipe Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
   5. ASTM A123/A123M, Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
   6. ASTM A153/A153M, Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
   7. ASTM A240/A240M, Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet and Strip for Pressure Vessels and for General Applications.
   8. ASTM A320/A320M, Specification for Alloy-Steel and Stainless Steel Bolting Materials for Low-Temperature Service.
   9. ASTM A384/A384M Standard Practice for Safeguarding Against Warpage and Distortion During Hot-Dip Galvanizing of Steel Assemblies.
   10. ASTM A500, Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
   11. ASTM A572/A572M, Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
   12. ASTM A793, Specification for Rolled Floor Plate, Stainless Steel.
   13. ASTM A992/A992M, Specification for Structural Steel Shapes.

14. ASTM A1011/A1011M, Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
15. ASTM B209, Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
16. ASTM B211, Specification for Aluminum and Aluminum-Alloy Bar, Rod and Wire.
17. ASTM B221, Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
18. ASTM B308/B308M, Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles.
19. ASTM B429, Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.
20. ASTM B632/B632M, Specification for Aluminum-Alloy Rolled Tread Plate.
21. AWS D1.1/D1.1M, Structural Welding Code – Steel.
22. AWS D1.2/D1.2M, Structural Welding Code – Aluminum.
23. AWS D1.6, Structural Welding Code – Stainless Steel.
24. NAAMM, Metal Finishes Manual.

1.3 QUALITY ASSURANCE

A. Qualifications:
   1. Welding:
      a. Qualify welding processes and welding operators in accordance with AWS D1.1/D1.1M, D1.2/D1.2M, or D1.6, as applicable.
      b. When requested by ENGINEER, provide certification that each welder employed on or to be employed for the Work have satisfactorily passed AWS qualification tests within previous 12 months. Ensure that all certifications are current.

B. Regulatory Requirements: Conform to the following:
   1. 29 CFR 1910, Occupational Health and Safety Standards.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:
   1. Shop Drawings:
      a. Fabrication and erection details for assemblies of miscellaneous metal Work. Include plans, elevations, and details of sections and connections. Show anchorage and accessory items. Include setting drawings and templates for locating and installing miscellaneous metal items and anchorage devices.
   2. Product Data:
      a. Copies of manufacturer's specifications, load tables, dimension diagrams, anchor details, and installation instructions for products to be used in miscellaneous metal Work.

B. Informational Submittals: Submit the following:
   1. Test and Evaluation Reports:
      a. Mill test report that indicate chemical and physical properties of each type of material, when requested by ENGINEER.
   2. Qualifications Statements:
      a. Copies of welder's certifications, when requested by ENGINEER.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packing, Shipping, Handling and Unloading:
   1. Deliver products to Site to ensure uninterrupted progress of the Work. Deliver anchorage materials to be embedded in other construction in ample time to prevent delaying the Work.

PART 2 PRODUCTS

2.1 MATERIALS

A. Steel:
   1. W-Shapes and WT-Shapes: ASTM A992/A992M.
   2. S-Shapes and Channels: ASTM A572/A572M, Grade 50.
   3. Hollow Structural Sections: ASTM A500, Grade B.
   4. Angles, Plates, Bars: ASTM A36/A36M.
   5. Steel Pipe: ASTM A53/A53M, Grade B.

B. Aluminum:
   1. Aluminum Shapes: ASTM B308/B308M, Alloy 6061-T6, ASTM B 221, Alloy 6061-T6.
   2. Aluminum Tubes and Pipes: ASTM B429, Alloy 6061-T6.
   3. Aluminum Bars and Rod: ASTM B211, Alloy 6061-T6.
   4. Aluminum Plates: ASTM B209, Alloy 6061-T6.

C. Stainless Steel:
   1. Plates and Sheets: ASTM A240/A240M, Type 304L or Type 316 stainless steel.
   2. Submerged or Intermittently Submerged: Type 316 stainless steel.
   3. Non-submerged: Type 304L stainless steel.

D. Stainless Steel Fasteners and Fittings: ASTM A 320/A 320M, Type 304L or Type 316 Stainless Steel.

E. Zinc-coated Hardware: ASTM A153/A153M.

2.2 MISCELLANEOUS METAL ITEMS

A. Shop Assembly:
   1. Pre-assemble items in the shop to the greatest extent possible to minimize field-splicing and field-assembly of units at the Site. Disassemble units only to extent necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

B. Aluminum Ladders:
   1. Fabricate ladders for locations shown or indicated with dimensions, spacing, details, and anchorages as shown and specified. Comply with OSHA 29 CFR 1910 and ANSI A14.3, except as otherwise shown or specified.
      a. Unless otherwise shown, provide 1.5-inch diameter continuous side rails, spaced at least 1.5 feet apart.
      b. Provide extruded square rungs, spaced maximum of 12 inches on centers, with non-slip surface on top of each rung. Adhesive strips for non-slip surfaces are not acceptable.

2. Fit rungs in centerline of side rails, plug weld, and grind smooth on outer rail faces.
3. Support each ladder at top and bottom and at intermediate points spaced not more than five feet on centers.
4. Use welded or bolted brackets, designed for adequate support and anchorage, and to hold ladder clear of wall surface with minimum of seven inches between wall and centerline of rungs.
5. Unless otherwise shown or approved by ENGINEER, extend rails 3.5 feet above top rung, and return rails to wall or structure, unless other secure handholds are provided. If adjacent structure does not extend above top rung, goose-neck extended rails back to structure to provide secure ladder access.
6. Use extruded aluminum conforming to alloy and temper 6061-T6.

C. Shelf Angles:
1. Provide structural steel shelf angles of sizes shown, for attachment to concrete or masonry construction. Provide slotted holes to receive 3/4-inch bolts, spaced not more than six inches from ends and not more than 2.0 feet on centers, unless otherwise shown.
   a. Provide galvanized shelf angles on outdoor construction.
2. Provide wedge-type concrete inserts, complete with fasteners, for attachment of shelf angles to cast-in-place concrete.

D. Aluminum Stair Nosings:
1. Manufacturers: Provide products of one of the following:
   a. Supergrit Type 241BF by Wooster Products, Inc.
   b. Or equal.
2. Fabricate extruded aluminum nosing of sizes and configurations as shown on the Drawings.
   a. Unless otherwise shown, provide ribbed abrasive filled type, using black abrasive filler.
3. Provide anchors for embedding in concrete, either integral or applied to treads, as standard with manufacturer.

E. Bollards:
1. Provide Schedule 80 galvanized steel pipe filled with concrete as shown on the Drawings. Paint as required in accordance with manufacturer's paint standards. Unless otherwise shown or specified, finish-paint bollard "Safety Yellow."

F. Miscellaneous Framing and Supports:
1. Provide miscellaneous metal framing and supports that are not part of structural steel framework and are required to complete the Work.
2. Fabricate miscellaneous units to sizes, shapes, and profiles shown on the Drawings or, if not shown, of required dimensions to receive adjacent grating, plates, tanks, doors, and other work to be retained by the framing.
3. Except as otherwise shown, fabricate from structural shapes, plates, and bars, of all-welded construction using mitered corners, welded brackets, and splice plates and minimum number of joints for field connection.
4. Cut, drill, and tap units to receive hardware and similar items to be anchored to the Work.
5. Furnish units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units are to be installed after concrete is placed.
   a. Except as otherwise shown, space anchors, 2.0 feet on centers, and provide units the equivalent of 1.25-inch by 1/4-inch by eight-inch strips.
   b. Galvanize exterior miscellaneous frames and supports.

c. Where shown or indicated, galvanize miscellaneous frames and supports that are not to be installed outdoors.

6. Miscellaneous steel framing and supports shall be hot-dip galvanized and finish-painted, unless otherwise shown or indicated.
7. Surface preparation and painting of galvanized surface shall conform to manufacturer's painting standards.

G. Fasteners and Hardware: Provide Type 316 stainless steel fasteners for aluminum fabrications and zinc-coated hardware for galvanized fabrications, unless otherwise shown or specified.

2.3 FINISHING

A. Surface Preparation and Shop Priming: Perform surface preparation and apply primer coat to miscellaneous metal fabrications in the shop. Conform surface preparation and shop priming to manufacturer's standards.

B. Galvanizing:
1. Galvanizing of fabricated steel items shall comply with ASTM A123/A123M.
2. Details of fabrication of steel items and assemblies to be hot-dip galvanized shall conform to recommendations of ASTM A384/A384M to minimize the potential for distortion.

C. Aluminum Finish: Provide an Architectural Class 1 anodized finish, AA-M32C22-A41, as specified in NAAMM Metal Finishes Manual. Color of finish shall be as approved by ENGINEER.

2.4 SOURCE QUALITY CONTROL

A. Tests and Inspections:
1. Materials and fabrication procedures shall be subject to inspection and tests in the mill, shop, and field, conducted by a qualified inspection agency. Such inspections and tests will not relieve CONTRACTOR of responsibility for providing materials and fabrication procedures complying with the Contract Documents.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine conditions under which the 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 are corrected.

3.2 INSTALLATION

A. Install miscellaneous metal fabrications accurately in location, alignment, and elevation, plumb, level, true, and free of rack, measured from established lines and levels. Brace temporarily or anchor temporarily in formwork where fabrications are to be built into concrete, masonry, or other construction.

B. Anchor securely as shown and as required for the intended use, using concealed anchors where possible.

C. Fit exposed connections accurately together to form tight, hairline joints. Field-weld steel connections that are not to be exposed joints and cannot be shop-welded because of shipping size limitations. Comply with AWS D1.1/D1.1M, D1.2/D1.2M and D1.6, as applicable to the material being welded. Grind steel joints smooth and touch-up shop paint coat. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.

D. Protection of Aluminum from Dissimilar Materials:
   1. Coat surfaces of aluminum that will contact dissimilar materials such as concrete, masonry, and steel, in accordance with manufacturer's coating standards.

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 07 92 00

JOINT SEALANTS

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 joint sealants.
   2. Extent of each type of calking and sealant is shown or indicated and includes the following:
      a. Interior and exterior joints in equipment and construction systems not filled by another material, and that are not required to be open for operation.
      b. Exposed-to-view joints of all fire-rated sealants.
      c. Joints specified to be recalked.

B. Coordination:
   1. Review installation procedures under other Sections and coordinate installation of items to be installed with or before joint sealants.
   2. Coordinate final selection of joint sealants so that materials are compatible with all calking and sealant substrates specified.

C. Related Sections:
   1. Section 03 00 05, Concrete.

1.2 REFERENCES

A. Standards referenced in this Section are:
   1. ASTM C510, Test Method for Staining and Color Change of Single- or Multicomponent Joint Sealants.
   2. ASTM C661, Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer.
   3. ASTM C793, Test Method for Effects of Accelerated Weathering on Elastomeric Joint Sealants.
   4. ASTM C794, Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants.
   5. ASTM C920, Specification for Elastomeric Joint Sealants.
   6. ASTM C1021, Practice for Laboratories Engaged in Testing Building Sealants.
   7. ASTM C1087, Test method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems.
   8. ASTM C1193, Guide for Use of Joint Sealants.
   9. ASTM C1247, Practice for Durability of Sealants Exposed to Continuous Immersion in Liquids.
   10. BAAQMD Regulation 8, Rule 51.
   11. FS TT-S-00227, Sealing Compound: Elastomeric Type, Multi-component (for Calking, Sealing, and Glazing in Buildings and Other Structures).
   12. FS TT-S-00230 Sealing Compound: Elastomeric Type, Single Component (for Calking, Sealing, and Glazing in Buildings and Other Structures).
   13. NSF/ANSI Standard 61, Drinking Water System Components - Health Effects.
   14. SCAQMD Rule 1168.

1.3 QUALITY ASSURANCE

A. Qualifications:
   1. Installer:
      a. Engage a single installer, approved by product manufacturer, regularly engaged in calking and sealant installation and with successful experience in applying types of products required, and who employs only tradesmen with specific skill and successful experience in the type of Work required.
   2. Testing Laboratory:
      a. Furnish services of independent testing laboratory qualified according to ASTM C1021, for conducting testing required.

B. Component Supply and Compatibility:
   1. Obtain materials only from manufacturers who will, if required:
      a. Test joint sealants for compatibility with substrates for conformance with FS-TT-S-00227, and recommend remedial procedures as required.
   2. Before purchasing each sealant, investigate its compatibility with joint surfaces, joint fillers, and other materials in joint system. Provide products that are fully compatible with actual installation condition, verified by manufacturer's published data or certification, and as shown on approved Shop Drawings and other approved submittals.

C. Product Testing: Provide test results of laboratory pre-construction compatibility and adhesion testing, as specified in Article 3.1 of this Section, by qualified testing laboratory, based on testing of current sealant formulations within a 36-month period preceding the Notice to Proceed for the Work.
   1. Test elastomeric joint sealants for compliance with requirements specified by reference to ASTM C920 and, where applicable, to other standard test methods.
   2. Test other joint sealants for compliance using specified post-construction field adhesion test.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:
   1. Shop Drawings:
      a. Schedule of joint sealants installation, indication each specific surface where calking or sealants are to be provided and the material proposed for each application.
   2. Product Data:
      a. Copies of manufacturer's data sheets including color charts, specifications, recommendations, and installation instructions for each type of sealant, calking compound, and associated miscellaneous material required. Include manufacturer's published data, indicating that each product complies with the Contract Documents and is intended for the applications shown or indicated.
      b. Product test reports.
   3. Samples:
      a. Each type of actual cured material of each calking and sealant specified, in each of manufacturer's standard colors.
      b. Samples will be reviewed by ENGINEER for color and texture only. Compliance with other requirements is responsibility of CONTRACTOR.

B. Informational Submittals: Submit the following:
   1. Certificates:

a. Certify that materials are suitable for intended use and materials meet or exceed requirements of the Contract Documents.
b. Certification from manufacturer that products furnished are appropriate for surfaces and conditions to which they will be applied.
c. Certify that applicator is approved by manufacturer.

2. Field Quality Control Submittals:
   a. Results of tests on job mock-ups.
   b. Pre-construction and post-construction field test reports.
   c. Compatibility and adhesion test reports.
   d. Contractor's Field Test Report Logs:
      1) Indicate time present at the Site.
      2) Include observations and results of field tests, and document compliance with manufacturer's installation instructions and supplemental instructions provided to installers.
3. Qualifications: Submit qualifications for:
   a. Installer.
   b. Testing laboratory (if not already submitted under Section 01 45 29, Testing Laboratory Services).

C. Closeout Submittals: Submit the following:
1. Operation and Maintenance Data:
   a. Recommended inspection intervals.
   b. Instructions for repairing and replacing failed sealant joints.
2. Warranty: Submit written warranties as specified in this Section.

1.5 DELIVERY, STORAGE AND HANDLING

A. Comply with Section 01 65 00, Product Delivery Requirements, and Section 01 66 00, Product Storage and Handling Requirements, and the following:
1. Delivery of Products:
   a. Deliver products in calking and sealant manufacturer's original unopened, undamaged containers, indicating compliance with approved Shop Drawings and approved Sample color selections.
   b. Include the following information on label:
      1) Name of material and Supplier.
      2) Formula or Specification Section number, lot number, color and date of manufacture.
      3) Mixing instructions, shelf life, and curing time, when applicable.
2. Storage of Products:
   a. Do not store or expose materials to temperature above 90 degrees F or store in direct sunlight.
   b. Do not use materials that are outdated as indicated by shelf life.
   c. Store sealant tape in manner that will not deform tape.
   d. In cool or cold weather, store containers for sixteen hours before using in temperature of approximately 75 degrees F.
   e. When high temperatures prevail, store mixed sealants in a cool place.
3. Handling:
   a. Do not open containers or mix components until necessary preparatory Work and priming are complete.

1.6 JOB CONDITIONS

A. Environmental Conditions:
   1. Do not install joint sealants under adverse weather conditions, or when temperatures are below or above manufacturer's recommended limitations for installation.
   2. Proceed with the Work when forecasted weather conditions are favorable for proper cure and development of high-early bond strength.
   3. Where joint width is affected by ambient temperature variations, install elastomeric sealants when temperatures are in the lower third of manufacturer's recommended installation temperature range, so that sealant will not be subjected to excessive elongation and bond stress at subsequent low temperatures.
   4. When high temperatures prevail, avoid mixing sealants in direct sunlight.
   5. Supplemental heat sources required to maintain both ambient and surface temperatures within the range recommended by manufacturer for material applications are not available at the Site.
   6. Provide supplemental heat and energy sources, power, equipment, and operating, maintenance, and temperature monitoring personnel.
   7. Do not use heat sources that emit carbon dioxide or carbon monoxide into areas of calking, sealants, and painting Work, and areas where OWNER's personnel or construction personnel may work. Properly locate and vent such heat sources to outdoors so that joint sealants and other Work are unaffected by exhaust.

1.7 WARRANTY

A. Provide written warranty, signed by manufacturer and CONTRACTOR, agreeing to repair or replace sealants that fail to perform as air-tight and watertight joints; or fail in joint adhesion, cohesion, abrasion resistance, weather resistance, extrusion resistance, migration resistance, stain resistance, or general durability; or appear to deteriorate in any other manner not clearly specified in approved Shop Drawings and other submittals, as an inherent quality of material for exposure indicated.
   1. Provide manufacturer warranty for period of one year from date of Substantial Completion of joint sealants Work.
   2. Provide installer warranty for period of two years from date of Substantial Completion of joint sealants Work.

PART 2 PRODUCTS

2.1 SYSTEM PERFORMANCE

A. Provide elastomeric joint sealants for interior and exterior joint applications that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.

B. VOC Performance Criteria:
   1. VOC content of sealants used shall comply with current VOC content limits of SCAQMD Rule 1168. Sealants used as fillers shall comply with or exceed requirements of BAAQMD Regulation 8, Rule 51.
      a. Sealants: 250 g/L.
      b. Sealant Primers for Nonporous Substrates: 250 g/L.
      c. Sealant Primers for Porous Substrates: 775 g/L.

C. Provide colors selected by ENGINEER from calking and sealant manufacturer's standard and custom color charts. "Or equal" manufacturers shall provide same generic products and colors as available from manufacturers specified.

2.2 MATERIALS

A. Exterior and Interior Horizontal and Vertical Joints; Submerged and Intermittently Submerged in Potable Water or Water That Will be Treated to Become Potable:
   1. Two-component Polyurethane Sealant:
      a. Products and Manufacturers: Provide one of the following:
         1) Sikaflex- 2c NS by Sika Corporation.
         2) Or equal.
      b. Two-component, moisture cured, gun grade, polyurethane sealant, complying with:
         1) FS TT-S-00227E, Type II, Class A; ASTM C920, Type M, Grade NS, Class 25.
         2) Adhesion-in-Peel, FS TT-S-00227E, ASTM C794 (Minimum five pounds per linear inch with no adhesion failure): 18 pounds.
         3) Hardness (Standard Conditions), ASTM C661: 25 (Shore A).
         4) Stain and Color Change, FS TT-S-00227E and ASTM C510: No discoloration or stain.
         5) Accelerated Aging, ASTM C793: No change in sealant characteristics after 250 hours in weatherometer.
         6) Rheological Vertical Displacement at 120 degrees F, FS TT-S-00227E: No sag.
         7) VOC Content: 220 g/L, maximum.
         8) Listed in NSF/ANSI 61

B. Exterior and Interior Horizontal and Vertical Joints; Submerged and Intermittently Submerged in Wastewater:
   1. Two-component Polyurethane Sealant:
      a. Products and Manufacturers: Provide one of the following:
         1) Sikaflex- 2c NS by Sika Corporation.
         2) Vulkem 227 by Tremco Sealant/Waterproofing Division of RPM International, Inc.
         3) Or equal.
      b. Polyurethane based, two-component elastomeric sealant complying with:
         1) FS TT-S-00227E: Type II (non-sag) Class A and ASTM C920, Type M, Grade NS, Class 25.
         2) Adhesion-in-Peel, FS TT-S-00227E and ASTM C794: (Minimum five pounds per linear inch with no adhesion failure): 18 lbs.
         3) Hardness (Standard Conditions), ASTM C661: 25 (Shore A).
         4) Stain and color change, FS TT-S-00227E and ASTM C510: No discoloration or stain.
         5) Accelerated Aging, ASTM C793: No change in sealant characteristics after 250 hours in weatherometer.
         6) Rheological Vertical Displacement at 120 degrees F, FS TT-S-00227E: No sag.
         7) VOC Content: 220 grams per liter, maximum.

C. Exterior and Interior Vertical Joints; Non-submerged:
   1. Two-component Polyurethane Sealant:
      a. Products and Manufacturers: Provide one of the following:
         1) Sikaflex- 2c NS by Sika Corporation.
         2) Dymeric 240 FC by Tremco Sealant/Waterproofing Division of RPM International, Inc.

3) Or equal.

b. Polyurethane based, two-component elastomeric sealant complying with:
   1) FS TT-S-00227E: Type II (non-sag) Class A and ASTM C920, Type M, Grade NS, Class 25.
   2) Adhesion-in-Peel, FS TT-S-00227E and ASTM C794: (Minimum five pounds per linear inch with no adhesion failure): 10 pounds.
   3) Hardness (Standard Conditions), ASTM C661: 25 to 35 (Shore A).
   4) Stain and color change, FS TT-S-00227E and ASTM C510: No discoloration or stain.
   5) Accelerated Aging, ASTM C793: No change in sealant characteristics after 250 hours in weatherometer.
   6) Rheological Vertical Displacement at 120 degrees F, FS TT-S-00227E: No sag.
   7) VOC Content: 100 g/L, maximum.

D. Exterior and Interior Horizontal Joints; Non-submerged:
   1. Two-component Polyurethane Sealant:
      a. Products and Manufacturers: Provide one of the following:
         1) Sikaflex- 2c SL by Sika Corporation.
         2) THC/900 by Tremco Sealant/Waterproofing Division of RPM International, Inc.
         3) Or equal.
      b. Polyurethane based, two-component elastomeric, self-leveling sealant complying with the following:
         1) FS TT-S-00227E, Type I (self-leveling) Class A. and ASTM C920, Type M, Grade P, Class 25
         2) Water Immersion Bond, FS TT-S-00227E: Elongation of 50 percent with no adhesive failure.
         3) Hardness (Standard Conditions), ASTM C661: 35 to 45.
         4) Stain and Color Change, FS TT-S-00227E and ASTM C510: No discoloration or stain.
         5) Accelerated Aging, ASTM C793: No change in sealant characteristics after 250 hours in weatherometer.
         6) VOC Content: 165 g/L, maximum.

E. Miscellaneous Materials:
   1. Joint Cleaner: As recommended by calking and sealant manufacturer.
   2. Joint Primer and Sealer: As recommended for compatibility with calking and sealant by calking and sealant manufacturer.
   3. Bond Breaker Type: Polyethylene tape or other plastic tape as recommended for compatibility with calking and sealant by calking and sealant manufacturer, to be applied to sealant-contact surfaces where bond to substrate or joint filler must be avoided for proper performance of calking and sealant. Provide self-adhesive tape where applicable.
   4. Sealant Backer Rod: Compressible rod stock polyethylene foam, polyethylene jacketed polyurethane foam, butyl rubber foam, neoprene foam or other flexible, permanent, durable nonabsorptive material as recommended for compatibility with calking and sealant by calking and sealant manufacturer. Provide size and shape of rod that will control joint depth for sealant placement, break bond of sealant at bottom of joint, form optimum shape of sealant bead on back side, and provide highly-compressible backer to minimize possibility of sealant extrusion when joint is compressed.
   5. Low-temperature Catalyst: As recommended by calking and sealant manufacturer.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine joint surfaces, substrates, backing, and anchorage of units forming sealant rabbet, and conditions under which calking and sealant Work will be performed, and notify ENGINEER in writing of conditions detrimental to proper and timely completion of the Work and performance of sealants. Do not proceed with calking and sealant Work until unsatisfactory conditions are corrected.

3.2 PREPARATION

A. Protection: Do not allow joint sealants to overflow or spill onto adjoining surfaces, or to migrate into voids of adjoining surfaces including rough textured materials. Use masking tape or other precautionary devices to prevent staining of adjoining surfaces, by either the primer/sealer or calking and sealant materials.

B. Joint Surface Preparation:
   1. Clean joint surfaces immediately before installing sealant compound. Remove dirt, weakly adhering coatings, moisture and other substances that would interfere with bonds of sealant compound as recommended in sealant manufacturer's written instructions as shown on approved Shop Drawings.
   2. If necessary, clean porous materials by grinding, sandblasting, or mechanical abrading. Blow out joints with oil-free compressed air or by vacuuming joints prior to applying primer or sealant.
   3. Roughen joint surfaces on vitreous coated and similar non-porous materials, when sealant manufacturer's data indicates lower bond strength than for porous surfaces. Rub with fine abrasive cloth or steel wool to produce a dull sheen.
   4. Concrete Joint Preparation: Refer to Section 03 00 05, Concrete.

C. Mixing:
   1. Comply with sealant manufacturer's written instructions for mixing multi-component sealants.
   2. Thoroughly mix components before use.
   3. Add entire contents of activator can to base container. Do not mix partial units.
   4. Mix contents for minimum of five minutes or as recommended by sealant manufacturer, until color and consistency are uniform.

3.3 INSTALLATION

A. Install joint sealants after adjacent areas have been cleaned and before joint has been cleaned and primed, to ensure calking and sealant joints will not be soiled. Replace calking and sealant joints soiled after installation.

B. Comply with sealant manufacturer's written instructions except where more stringent requirements are shown or indicated in the Contract Documents.

C. Prime or seal joint surfaces as shown on approved Shop Drawings and approved other submittals. Do not allow primer or sealer to spill or migrate onto adjoining surfaces. Allow primer to dry prior to applying sealants.

D. Apply masking tape before installing primer, in continuous strips in alignment with joint edge to produce sharp, clean interface with adjoining materials. Remove tape immediately after joints have been sealed and tooled as directed.

E. Confirm that compressible filler is installed before installing sealants.

F. Do not install sealants without backer rods and bond breaker tape.

G. Roll back-up rod stock into joint to avoid lengthwise stretching. Do not twist, braid, puncture, or prime backer rods.

H. Employ only proven installation techniques that will ensure that sealants are deposited in uniform, continuous ribbons without gaps or air pockets, with complete "wetting" of joint bond surfaces equally on opposite sides. Except as otherwise indicated, fill sealant rabbet to a slightly concave surface slightly below adjoining surfaces. Where horizontal joints are between a horizontal surface and a vertical surface, fill joint to form a slight cove, so that joint will not trap moisture and dirt.

I. Install sealants to depths recommended by sealant manufacturer but within the following general limitations, measured at the center (thin) section of bead.
   1. For horizontal joints in sidewalks, pavements, and similar locations sealed with elastomeric sealants and subject to traffic and other abrasion and indentation exposures, fill joints to depth equal to 75 percent of joint width, but not more than 5/8-inch deep or less than 3/8-inch deep.
   2. For vertical joints subjected to normal movement and sealed with elastomeric sealants and not subject to traffic, fill joints to a depth equal to 50 percent of joint width, but not more than 1/2-inch deep or less than 1/4-inch deep.

J. Remove excess and spillage of compounds promptly as the Work progresses.

K. Cure calking and sealant compounds in compliance with manufacturer's instructions and recommendations, to obtain high-early bond strength, internal cohesive strength, and surface durability.

3.4 EXISTING JOINTS

A. Mechanically remove existing sealant and backer rod.

B. Clean joint surfaces of residual sealant and other contaminates capable of affecting sealant bond to joint surface.

C. Conduct laboratory pre-construction compatibility and adhesion testing on joint surfaces in accordance with Part 3 of this Section.

D. Allow joint surfaces to dry before installing new sealants.

3.5 FIELD QUALITY CONTROL

A. Water Leak Testing: Field test for water leaks as follows:
   1. Flood the joint exposure with water directed from a 3/4-inch diameter garden hose, without nozzle, held perpendicular to wall face, two feet from joint and connected to water system

with 30 psi minimum normal water pressure. Move stream of water along joint at an approximate rate of 20 feet per minute.

2. Test approximately five percent of total joint system, in locations that are typical of every joint condition, and that can be inspected easily for leakage on opposite face. Conduct test in presence of ENGINEER, who will determine actual percentage of joints to be tested and actual period of exposure to water from hose, based on extent of observed leakage or lack of observed leakage.
3. Where nature of observed leaks indicates potential of inadequate joint bond strength, ENGINEER may direct that additional testing be performed at a time when joints are fully cured, and before Substantial Completion.

3.6 ADJUSTING AND CLEANING

A. Where leaks and lack of adhesion are evident, replace sealant.

B. Clean adjacent surfaces of sealant and soiling resulting from the Work. Use solvent or cleaning agent recommended by sealant manufacturer. Leave all finish Work in neat, clean condition.

C. Protect sealants during construction so that they will be without deterioration, soiling, or damage at time of readiness for final payment of the Contract.

3.7 PROTECTION

A. During and after curing period, protect joint sealants from contact with contaminating substances and from damage resulting from construction operations or other causes, so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original Work.

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/ft^3 (600 kN-m/m^3)).
   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/ft^3 (2,700 kN-m/m^3)).
   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) Sheeting 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 sheeting, 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 ¾ 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. Televise 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 31 37 00

RIPRAP

PART 1 GENERAL

1.1 DESCRIPTION

A. Scope:
   1. Provide all labor, materials, equipment, and incidentals required to furnish and install riprap at locations shown or indicated in the Contract Documents.

B. Coordination:
   1. Review procedures under this and other Sections and coordinate the Work that must be performed with or before riprap.

C. Related Sections:
   1. Section 03 00 05, Concrete.
   2. Section 31 11 00, Clearing and Grubbing.
   3. Section 31 23 05, Excavation and Fill.

1.2 REFERENCES

A. Standards referenced in this Section are:
   1. ASTM C127, Test Method for Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate.
   2. NSSGA-293, Aggregate Handbook.
   3. South Carolina Department of Transportation (SCDOT) Qualified Products Listings and Policies for Construction and Maintenance Materials.
   4. South Carolina Department of Transportation Standard Specifications for Highway Construction.

1.3 QUALITY ASSURANCE

A. Qualifications:
   1. Riprap Supplier:
      a. Supplier of riprap and other materials furnished under this Section shall be certified by the SCDOT for furnishing such materials for SCDOT highways.

B. Regulatory Requirements:
   1. Reference Specifications and Details:
      a. Comply with applicable requirements of SCDOT Standard Specifications for Highway Construction.

1.4 SUBMITTALS

A. Acton Submittals: Submit the following:
   1. Product Data:
      a. Source or quarry name, gradation, and other information required by ENGINEER. Submit for each source of material proposed.

B. Informational Submittals: Submit the following:
   1. Certificates:
      a. Where material is specified according to reference specification item number, submit copy of Supplier's valid certification from entity issuing the reference specification, and associated certification of material conformance with the reference specifications.

PART 2 PRODUCTS

2.1 MATERIAL

A. Riprap: Material shall comply with Section 804 of SCDOT Standard Specifications for Highway Construction, Class B and shall be obtained from sources listed on the most recent edition of SCDOT Qualified Products List 2.

B. Width and thickness of each stone shall not be less than one-third the length of the stone.

PART 3 EXECUTION

3.1 PREPARATION

A. Clear ground surface of brush, trees, stumps, and other objectionable material, and dress to a smooth surface. Clearing and grubbing, where required, shall comply with Section 33 11 00, Clearing and Grubbing.

B. Remove all soft or spongy material to depth shown or indicated on the Drawings or as directed by ENGINEER, and replace with acceptable material. Excavation, removal of unsuitable material if any, and backfilling shall comply with Section 31 23 05, Excavation and Fill.

3.2 INSTALLATION

A. Riprap Placing:
   1. Minimum total thickness of riprap shall be as specified in Article 2.1 of this Section.
   2. Place riprap stones so that weight of stone is carried by underlying material and not by adjacent stones. Carefully place the stones on geosynthetics, where required, to produce an even distribution of pieces, with minimum of voids and without damaging the geosynthetic. Place the full-course thickness in one operation while preventing segregation and avoiding displacing of underlying material. Do not place stones in layers, by dumping into chutes, or by other methods that cause segregation or damage to geosynthetic, if any. When necessary, rearrange individual stones for uniform distribution.
   3. Riprap may be placed using equipment, and placing shall produce an installation of firm and solid riprap. Level the top surface of riprap to required alignment and slope by hand-placing stones to fill large voids and to make surface even.
   4. On slopes, place the largest stones at the bottom. Riprap shall be properly sized to form compact, solid blanket to protect the slope or channel, as applicable.
   5. Rip-rap shall be installed no steeper than a 2:1 slope except when specifically approved by the Engineer. On such slopes, do not use rounded boulders or cobbles without grouting stones in place.

6. Grouting: Where grouting of riprap is required, comply with the following:
   a. When stones are in place, completely fill spaces between stones with “grout fill” material in accordance with Section 03 00 05, Concrete.
   b. ENGINEER may direct that occasional spaces be left ungrouted for relief of hydrostatic pressure. Chink ungrouted spaces with spalls of suitable size.
   c. Do not grout riprap in freezing weather.
   d. Clean exposed surface of stones to remove accumulation of grout.
   e. Keep grouted riprap moist for seven days after grouting. Suitable grout curing compound may be employed when approved by ENGINEER.
7. When existing riprap is in proximity to riprap provided under this Section, place riprap to conform as closely as practicable in size and character to existing riprap.
8. Unless otherwise indicated, existing riprap removed to facilitate other Work shall be reinstalled or replaced at no additional cost to OWNER.
9. In locations where a creek bank is eroded near a sewer line, before placing riprap, place compacted fill material along the creek bank in order to maintain 3 feet of cover over the sewer line.

END OF SECTION

SECTION 31 62 16.16

STEEL H-SECTION PILES

PART 1 GENERAL

1.1 DESCRIPTION

A. Scope:
   1. Provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish, install, and test steel H-section piles.
   2. Extent of steel H-section piling is shown on the Drawings.
   3. Included are:
      a. Furnishing, driving, cutting off, and all other steel H-section piling Work.
      b. Providing openings in and attachments to steel H-section piling to accommodate the Work under this and other Sections, and providing for steel H-section piling all items required for which provision is not specifically included under other Sections.

B. Coordination:
   1. Review installation procedures under this and other Sections and coordinate installation of items to be installed with or before steel H-section piling Work.

C. Related Sections:
   1. Section 31 23 05, Excavation and Fill.

1.2 REFERENCES

A. Standards referenced in this Section are:
   1. ASTM A572/A572M, Specification for High-Strength Low-Alloy Columbium- Vanadium Structural Steel.
   2. ASTM D1143/D1143M, Test Method for Deep Foundations Under Static Axial Compressive Load.
   3. ASTM D3689, Test Methods for Deep Foundations Under Static Axial Tensile Load.
   4. ASTM D3966, Test Methods for Deep Foundations Under Lateral Load.
   5. ASTM D4945, Test Method for High-Strain Dynamic Testing of Piles.
   6. ASTM D7091, Practice for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to Ferrous Metals and Nonmagnetic, Nonconductive Coatings Applied to Non-Ferrous Metals.
   7. ASTM E329, Specification for Agencies Engaged in Construction Inspection and/or Testing.
   8. ASTM E376, Practice for Measuring Coating Thickness by Magnetic-Field or Eddy-Current (Electromagnetic) Examination Methods.
   9. AWS D1.1/D1.1M, Structural Welding Code – Steel.
   10. International Building Code.
   11. Ozone Transport Commission (OTC) Architectural and Industrial Maintenance Coatings.
   12. SSPC-PS 11.01, Black (or Dark Red) Coal Tar Epoxy Polyamide Painting System.
   13. SSPC-SP 1, Solvent Cleaning.
   14. SSPC-SP 10/NACE No. 2, Near White Blast Cleaning.

1.3 QUALITY ASSURANCE

A. Qualifications:
   1. Welders and Welding Processes:
      a. Qualify welding processes and welding operators in accordance with AWS D1.1/D1.1M, Section 5, Qualification.
      b. Each welder employed on or to be employed for the Work shall possess current AWS certification in the welding process with which welder will be working. Certifications shall be current and valid throughout the Work.
   2. Surveyor:
      a. Engage a registered professional land surveyor legally qualified to practice in the same jurisdiction as the Site, and experienced in providing surveying services of the kind indicated.
      b. Responsibilities include but are not necessarily limited to:
         1) Performing or supervising performance of field survey work to check lines and elevations of steel H-section piling, before proceeding with construction of pile caps.
         2) Submit to CONTRACTOR field survey reports.
   3. Professional Engineer:
      a. Retain the services of a registered professional engineer, legally qualified to practice in the same jurisdiction as the Site, to design all required static load-testing apparatus, including loaded members, support frames, loading procedures, and test movement recording devices. Test beams, load platforms, and support structures, as required, shall have sufficient size, strength, and stiffness to prevent excessive deflection and instability up to the maximum anticipated load.
      b. Responsibilities include but are not necessarily limited to:
         1) Reviewing load testing criteria stated in the Contract Documents.
         2) Preparing or supervising preparation of design calculations and related drawings, Shop Drawings, and loading procedures.
         3) Signing and sealing all calculations, design drawings, and Shop Drawings.
         4) Certifying that:
            a) it has performed the design of the loading apparatus in accordance with design criteria stated in the Contract Documents, and
            b) said design complies with Laws and Regulations, and complies with prevailing standards of practice.
   4. Dynamic Pile Testing Consultant:
      a. Retain the services of a dynamic pile testing consultant to provide necessary equipment, and perform dynamic testing and wave equation analysis to determine the ultimate pile capacity of dynamically-tested piles as indicated in the Contract Documents.
      b. Dynamic pile testing consultant shall be a professional engineer legally qualified to practice in same state as the Site and shall have a minimum of five years experience with dynamic pile testing, data interpretation, and wave equation analysis.
      c. Responsibilities include but are not necessarily limited to:
         1) Preparing or supervising preparation of the dynamic pile testing plan.
         2) Preparing or supervising the preparation of test set-ups.
         3) Performing or supervising performance of testing, interpretation, and engineering analysis of test data, and preparing test reports.
         4) Signing and sealing the dynamic pile testing report.
   5. Pile Installer:
      a. Engage an experienced pile installer possessing a minimum of five years experience installing piles similar to those required in this Section, to perform all H-section pile driving indicated in the Contract Documents.

6. Static Load Test Application and Recording of Data:
    a. Maintain presence of experienced employees at all times during steel H-section pile Work to perform the required loading and recording of data during static load testing. Individuals responsible for the Work shall have a minimum of five years of experience in similar projects.

B. Regulatory Requirements:
1. If coatings are required, comply with VOC content limits of OTC Model Rule for Architectural and Industrial Maintenance Coatings:
    a. Industrial Maintenance Coatings: 340 grams per liter.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:
1. Shop Drawings: Submit the following in advance of start of pile driving:
    a. Drawings showing location of all piles. Assign an identification number to each pile coinciding with identification number used in driving record of each pile. Shop Drawings shall include anticipated driving sequence for the Work.
    b. Complete data on type of pile proposed, including pile installation procedures.
    c. Submit detailed drawings of pile splices. Clearly indicate welds using standard AWS notations and symbols, and clearly show or indicate size, length, and type of each weld, as applicable.
    d. Submit detail of pile tension connection. Clearly indicate welds using standard AWS notations and symbols, and clearly show or indicate size, length, and type of each weld, as applicable.
2. Product Data:
    a. Copies of manufacturer's specifications and installation instructions for products listed below.
        1) Welding electrodes and rods.
        2) Protective coating manufacturer's technical information and test performance data, including paint analysis, VOC and chemical component content in comparison to maximum allowed by the Contract Documents, and application instructions. Submit proof of acceptability of proposed application techniques by paint manufacturer selected.

B. Informational Submittals: Submit the following:
1. Certificates.
    a. Welders' certifications.
    b. Laboratory test reports and other data as required to demonstrate compliance with these Specifications for the products listed below:
        1) Structural steel of each type, including certified copies of mill reports covering chemical and physical properties.
2. Complete data on hammer and other driving equipment to be utilized, including results of drivability studies.
3. Pile Load Test Plan:
    a. Submit pile load test plan, including complete data on test pile instrumentation, load application, apparatus for recording movement, and protection of testing apparatus, at least 30 days prior to installing the first test pile. ENGINEER's acceptance of pile load test plan shall not relieve CONTRACTOR of responsibility for structural and operational adequacies of the testing system.

1) Dynamic load test requirements included in the pile load test plan shall be prepared by CONTRACTOR's dynamic pile load testing consultant.

b. Calibration curve for jack and gauge to be used for static load testing, to demonstrate compliance with required ASTM standards, certified by testing laboratory.

c. Calibration statements for equipment to be used to obtain dynamic measurements, record, reduce and display data to demonstrate compliance with ASTM D4945, certified by testing laboratory.

4. Field Quality Control Submittals:
   a. Static Load Test Reports: Within two days of completing test, submit test report for each pile test, in accordance with Article 3.6 of this Section.
   b. Dynamic Test Report: Submit dynamic test report, including wave equation analysis, within seven days after completing tests.
   c. Coating Test Reports: Submit test report within two days of completing holiday tests and dry film thickness tests.
5. Driving Records:
   a. Within two days of driving, submit copies of driving record of each pile, including the following information:
      1) Project name, Contract number, report date, date of pile driving.
      2) CONTRACTOR and Subcontractor names.
      3) Pile location and number.
      4) Pile section designation.
      5) Starting and finishing driving times.
      6) Type and size of hammer.
      7) Pile driving cap type.
      8) Ground, tip, and butt elevation. Indicate butt elevation before and after cut-off.
      9) Total pile pay length.
      10) Locations of splices, if any.
      11) Continuous record of number of blows for each foot of penetration and for each inch of penetration in the last foot of penetration.
      12) Data on and description of unusual occurrences, if any, during pile driving.
6. Qualifications Statements.
   a. Land surveyor.
   b. Professional engineer.
   c. Dynamic pile testing consultant.
   d. Pile installer.
   e. Qualifications of each individual employed to perform static load test application and recording of data.

C. Closeout Submittals: Submit the following:
   1. Field survey reports showing exact location of each steel H-section pile as driven, including record drawings and data showing final position of top of each pile. Include location of rejected piles.

1.5 DELIVERY, STORAGE AND HANDLING

A. Delivery:
   1. Except for piles to be used for testing, materials ordered or delivered to the Site prior to verification of assumed pile length are at CONTRACTOR's risk.
   2. After pile lengths are verified, deliver materials to Site in such quantities and at such times to ensure continuity of pile driving operations in accordance with the Progress Schedule accepted by ENGINEER.

B. Storage: Store piles in orderly groups above ground on blocks to minimize potential for distortion.

C. Handling:
   1. Lift piles using a cradle or multiple point pick-up to ensure that the maximum permissible camber or sweep is not exceeded due to insufficient support. Point pick-up devices shall be of the type that clamps to both pile flanges at each pick-up point.
   2. Holes may be burned in the flanges or webs of piles above the cut off length for lifting piles into the leads.
   3. Do not drag piles across the ground.
   4. Piles with excessive camber or sweep will be rejected.

1.6 SITE CONDITIONS

A. Site Information:
   1. Information on subsurface conditions is available in the reports listed in the Supplementary Conditions.
   2. Additional test borings and other exploratory operations may be made by CONTRACTOR at no additional cost to OWNER, provided such operations are acceptable to ENGINEER.

B. Line and Level:
   1. Using reference points and engineering surveys provided by OWNER, establish and locate all other lines and levels and is responsible for the correct location and deviation of all piles.
   2. Install piles at the proper locations and orientation shown or indicated in the Contract Documents.

PART 2 PRODUCTS

2.1 MATERIALS

A. H-Section Piles:
   1. Provide structural H-section shapes, complying with ASTM A572/A572M, Grade 50, of the sizes shown or indicated on the Drawings.

2.2 PROTECTIVE COATINGS

A. Coating Material:
   1. Surface Preparation: Refer to Paragraph 3.2.A of this Section.
   2. Shop Applied Coating and Field Touch-Up Materials:
      a. Coal Tar Epoxy Polyamide:
         1) System: SSPC-PS 11.01.
         2) Material: SSPC Paint 16.
      b. Products and Manufacturers: Provide one of the following:
         1) Hi-Mil Sher-Tar Epoxy B69B40/B60V40, manufactured by Sherwin Williams Company.
         2) Hi-Build Tneme-Tar, Series 46H-413, manufactured by Tnemec Company, Inc.
         3) Or equal.

2.3 PILE TENSION CONNECTIONS

A. Provide steel H-section piling with tension connections to the pile cap as shown on the Drawings.

B. Pile tension connections shall comply with the details on the Drawings.

2.4 DRIVING EQUIPMENT

A. General:
   1. Drive piles with a drop, single- or double-acting steam, air, or diesel hammer. Use a hammer with sufficient energy to drive piling to required tip elevation without damaging the pile. Operate double-acting hammer, if used, at full-rated pressure and speed during final driving of pile. When using single-acting hammer, maintain valve mechanism as recommended by manufacturer so that length of stroke is maintained. Equip diesel hammers, when used, with chambers and gages arranged so that precise energy information can be read and recorded. Hammer shall be in good operating condition at all times during driving.
      a. Size or capacity of hammers shall be as recommended by hammer manufacturer for the total pile mass weight and character of soil formation to be penetrated.
      b. Perform drivability studies that are based on wave equation analysis. Drivability study shall demonstrate hammer can successfully drive the piles to the anticipated pile tip elevations and with sufficient energy to produce design pile capacity without damage to the pile and without excessive blow count.
      c. Provide further wave equation analysis at no cost to OWNER if hammer system is replaced or modified.

B. Driving Caps:
   1. Equip hammer with cushioned or blocked driving cap, conforming to pile shape, with loss of hammer energy kept to a minimum. Keep bearing surfaces of driving cap true and smooth.
      a. Driving cap shall be consistent with the wave equation analysis.

C. Pile Driving Leads:
   1. Use fixed or rigid type pile driving leads that will hold pile firmly in position and in axial alignment with hammer. Free-swinging leads are unacceptable. Extend leads to within two feet of elevation at which pile enters ground.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine areas and conditions under which steel H-section piling will be installed and notify ENGINEER in writing of conditions detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions are corrected.

B. Inspect piles for excessive camber and sweep, and for damage before transporting pile materials from storage area to driving location, and inspect immediately prior to placing pile material in the driving leads. Measure camber and curvature in the pile in direction normal to the

pile flanges, with the pile flange laying on the surface; measure the distance between the flange base at mid-length of pile and the flat surface. Measure sweep and curvature in the pile in direction parallel to the pile flanges with the pile flange tips laying on a flat surface; measure the distance between flange tips at mid-length of the pile and the flat surface. Maximum acceptable camber or sweep is two inches over the length of the pile.

3.2 PROTECTIVE COATINGS

A. Provide protective coating for pilings in corrosive soils, pilings exposed above-ground or if otherwise indicated in the Drawings.

B. Cleaning and Preparation of Coated or Painted Surfaces:
   1. Solvent Cleaning:
      Remove visible oil, grease and other contaminants by solvent cleaning in accordance with SSPC-SP 1.
   2. Blast Cleaning:
      a. After solvent cleaning, complete surface preparation by near-white blast cleaning in accordance with SSPC-SP 10/NACE No. 2. Remove residual dust from blasted surface by blowing with dry, oil-free air, vacuuming, or sweeping.
      b. Comply with paint manufacturer's recommendations for type and size of abrasive to provide surface profile that complies with manufacturer's painting system requirements.

C. Mixing:
   1. Mix and prepare paint products in accordance with paint manufacturer's product literature and manufacturer's preparation instructions.

D. Application:
   1. Apply coating to blast-cleaned steel in accordance with paint manufacturer's written instructions.
   2. Coal-tar Epoxy: Apply by spraying one coat to total minimum dry film thickness of 16 mils and maximum dry film thickness of 20 mils.
   3. Provide finish coating that is generally smooth and free of projections that can be removed by abrasion. Remove sharp edges and repair areas in accordance with paint manufacturer's directions.

E. Field Touch-Up:
   1. Touch-up damaged shop-applied paint using materials as specified under Article 2.2 of this Section in accordance with paint manufacturer's instructions.

3.3 PREPARATION FOR PILE INSTALLATION

A. Preparation of Site:
   1. Do not drive piles until earthwork in the area where piles will be installed has been performed as follows:
      a. Excavation, fill, and earthwork shall be in accordance with Section 31 23 05, Excavation and Fill.
      b. Excavation: Stop excavating at elevation six inches to twelve inches above bottom of footing before piles are driven. Final excavation to required elevation of footing bottoms shall be after piles are installed and tested.
      c. Fills: Construct and compact fills to elevation shown.

2. Do not drive pile within 15 feet of concrete or masonry structure that has not attained its full design strength.

B. Pile Length Markings:
   1. Mark length of pile by painting the number of feet from pile tip at five foot intervals and painting a horizontal line, at 12-inch intervals, starting 15 feet below pile cut-off.

C. Welding:
   1. Perform manual arc welding using shielded metal arc method or submerged arc method complying with AWS D1.1/D1.1M.
   2. Use oxygen-gas or oxygen-arc methods for field cutting steel, complying with AWS D1.1/D1.1M.

D. Splices:
   1. In general, use only one splice per length of pile.
      a. Piles that have not reached required tip elevation or refusal blow count when the top has been driven to cutoff elevation shall be spliced as shown and driven to sufficient depth to develop the required tip elevation or refusal blow count.
   2. Clean surfaces to be welded of rust, scale, oil, paint, and foreign material. Use only pile members with identical cross-sections for splicing.
   3. When possible, make splices before starting driving operations. If welded splice is required during driving operation, make splice when top of driven pile portion is at least three feet above ground, to allow inspection of welded connection during welding and during subsequent driving. Length of pile to be spliced shall be secured in proper alignment to avoid eccentricity.
   4. Splices shall be 100 percent butt welded, producing a straight pile alignment through splice and developing full bending strength and axial load strength of pile.
   5. After splices are made, inspected, and acceptable to ENGINEER, touch-up and repair protective coatings on piles using same material used in shop-applied paint or coating systems, in accordance with manufacturer's instructions.

E. Pre-drilling:
   1. Pre-drilled holes for pile installation are allowed only when approved by geotechnical engineer or ENGINEER of record.

F. Jetting:
   1. Jetting and spudding of piles is not allowed.

3.4 DRIVING PILES

A. Protection:
   1. Protect structures, Underground Facilities, and other construction from damage caused by pile driving operations.
   2. When structures are adjacent to pile driving operations, before commencing pile driving, provide surveyed elevation benchmarks on structure at locations directed by ENGINEER. Record and report the elevation of each benchmark after driving each pile and at least twice a day while pile driving is in progress. Should benchmark readings indicate displacement, halt pile driving operations until corrective action is provided acceptable to ENGINEER.

B. General:

1. Provide written notice prior to beginning construction on steel piles to OWNER and ENGINEER. Don't perform any pile driving without Inspector present.
2. Perform pile driving in an orderly sequence, progressing in one direction across each foundation element. Do not install piles in area surrounded by previously driven piles. Drive piles only in ENGINEER's presence.
3. Continuously drive each pile at location indicated, to the required tip elevation and driving resistance established by driving and loading of test piles and load testing analysis.
    a. Piles shall be driven to resistance or pile refusal criteria provided by the geotechnical engineer or as indicated on the Drawings.
4. Carefully maintain center of gravity for each group or cluster of piles to comply with locations shown.
5. Carefully plumb leads and pile before driving. During driving prevent and correct tendency of piles to twist or rotate.
6. When handling and driving long piles, take special precautions to prevent overstress or leading away from true position.

C. Obstructions:
1. Should an obstruction including, but not limited to, boulders, rock, rubble, fill, or existing foundations be encountered that prevents driving of pile to its required tip elevation or final driving resistance, threaten pile damage, or cause pile to drift from required location, cease driving operation and contact ENGINEER immediately. ENGINEER will determine corrective measures, including, but not necessarily limited to, pile relocation and pile cap design modifications required to accommodate the obstruction. Corrective measures due to obstructions, including cost of redesign, will be paid by OWNER via a Change Order or other method in accordance with the Contract Documents.

D. Driving Tolerances:
1. Drive piles within the following maximum tolerances:
    a. Location: Three inches from location indicated for center of gravity of each single pile or pile groups; one inch for piles under walls.
    b. Plumbness: Maintain one inch in ten feet from vertical, or a maximum of four inches, measured when the pile is above ground, in the leads.
    c. Batter Angle: Maximum one inch in ten feet from required angle as shown on the Drawings, measured when pile is above ground and in the leads.

E. Cutting-Off:
1. Cut off tops of driven piles square with pile axis and at elevations indicated, using cutting torch or other acceptable method.
2. Piles driven below required cutoff elevation are not acceptable and shall be replaced at no additional cost to OWNER.
3. Recoat cut off tops of piles that have protective coating. Touch-up and repair protective coatings on piles using same material used in shop-applied coating systems, in accordance with paint manufacturer's instructions.

3.5 REPAIRS AND CORRECTIONS

A. Corrective Action:
1. ENGINEER may survey piles at any time. If heave or other discrepancy is detected, re-drive or replace the pile or piles at no additional cost to OWNER.

2. As soon as possible after completing pile driving, prepare an accurate survey by licensed surveyor. Partial surveys of piles at cutoff elevation can be submitted as driving proceeds to expedite the Work.
3. ENGINEER will check piling and determine acceptability. If unacceptable, ENGINEER will advise CONTRACTOR what additional piles shall be provided or other corrective measures to be taken.
4. ENGINEER will provide redesign, as required, for corrections required for piles driven out of location. Corrective measures, including cost of redesign, shall be paid by CONTRACTOR via Change Order.

B. Damaged or Misdriven Piles:
1. Damaged piles and piles driven outside required driving tolerances, piles that are too short to develop the required final driving resistance or required tip elevation, or that otherwise do not comply with the Contract Documents, are considered defective and are unacceptable.
2. Damaged piles shall include, but not necessarily be limited to, piles that are bent, buckled, fabricated without complying with tolerances in the Contract Documents, or piles fabricated with defects that may weaken the pile, as determined by ENGINEER.
3. Replace damaged or misdriven piles as directed by ENGINEER at no additional cost to OWNER. ENGINEER will provide redesign, as required, for corrections required for damaged or misdriven piles. Corrective measures, including cost of redesign, shall be paid by CONTRACTOR via Change Order
    a. When possible, withdraw rejected piles and replace with new piles. Withdrawal method shall be submitted to ENGINEER for approval.
    b. If withdrawal of damaged or misdriven pile is impossible or impractical, cut off pile below the limits of the structure, and install required additional piles and other corrective measures, such as modifications to the cast-in-place concrete pile cap, as required by ENGINEER's redesign.

C. Heaved Piles:
1. Using data provided by CONTRACTOR, ENGINEER will determine whether a driven pile has lifted from its original seat during driving of adjacent piles. If uplift occurs, re-drive affected piles to a tip elevation at least as deep as original tip elevation with a driving resistance at least as great as original driving resistance.

D. Cost of ENGINEER's Redesign:
1. Piling driven incorrectly, or in position other than that shown on the Contract Documents ("out of position"), or that is otherwise defective, shall be corrected as directed by ENGINEER and as described in this Section. For such piles, CONTRACTOR shall pay OWNER for cost of engineering, Resident Project Representative, and inspection services associated with evaluating and correcting incorrectly installed, out-of-position, or defective piles.
2. ENGINEER will record time of ENGINEER and ENGINEER's consultants and expenses required, if any, for evaluating defective piles and redesigning piling, foundations, and other related structural elements and in making revisions to the Contract Documents.
3. Cost of services of ENGINEER and ENGINEER's consultants shall be based on a charge of 3.0 times direct salary cost of each employee and 1.1 times the cost of expenses.

3.6 FIELD QUALITY CONTROL

A. Furnish, install, and load-test piles to verify design pile lengths and loads to be tested by the specified test method indicated by the geotechnical engineer. Provide complete testing materials and equipment as required. Perform tests in presence of ENGINEER.

B. Test piles used for determining lengths of piles may be located, cut off, and become part of the foundation system if test piles comply with requirements of the Contract Documents. Test piles which aren't to be incorporated in the completed structure shall be removed to at least 2 feet below the surface of the ground or the stream bed, and the remaining hole backfilled with earth or other suitable material.

C. Test Piles shall be as shown on the Drawings.

D. Driving Test Piles:
   1. Use test piles of same size and design as required, and drive with appropriate pile driving equipment operating at rated driving energy required for driving permanent piles.
   2. Drive test piles at locations designated by ENGINEER in the same manner as required for permanent piles.

E. Pile Design Load:
   1. Design load per pile shall be as shown on the Drawings.

F. Dynamic Testing of Piles (Bearing):
   1. CONTRACTOR's dynamic pile testing consultant shall perform dynamic pile testing in accordance with ASTM D4945.
   2. Perform dynamic pile testing using a pile driving analyzer (PDA) on three bearing piles. Perform dynamic testing as a minimum during the final five feet of piling driving.
   3. Restrike test piles with concurrent PDA testing after a minimum waiting period as approved by the ENGINEER.
   4. Perform wave equation analysis (two, minimum) using the field-measured data from the three test piles.
   5. CONTRACTOR's dynamic pile testing consultant shall certify that all dynamic testing was performed correctly and submit a signed and sealed written report upon the completion of testing. Submitted dynamic testing report shall include field information required for driving reports under the Submittals Article of this Section, detailed test procedures, dynamic pile test results, including results from wave equation analyses, and provide recommendations for production pile installation.
   6. Dynamic testing report prepared by CONTRACTOR's dynamic pile testing consultant shall be submitted for review by the ENGINEER not less than 10 days prior to commencing production pile Work.
   7. Based on observations and results of dynamic testing, ENGINEER will indicate minimum pile tip elevations or blow count criteria to be used during driving of production piles.

G. Static Test Loads:
   1. Static tension, compression, and lateral test load for individual piles shall be two times the required design load.

H. Static Compression Load Testing:
   1. Load and test piles to determine and record the load-movement relationship of the test piles under vertical compression load complying with ASTM D1143/D1143M.
   2. Apply compression load by hydraulic jacks acting against anchored reaction frame. Testing apparatus shall comply with ASTM D1143/D1143M. Provide the necessary framing at each

load test to allow ENGINEER unrestricted safe access to pile instrumentation at all times during the load test. Hydraulic jacks, gauges, transducers, and load cells shall comply with ASTM D1143/D1143M. Submit certified calibration curve for the jack and gauge to be used in the testing.

3. Apply minimum specified test load in accordance with Procedure B of ASTM D1143/D1143M.
4. Record pile movement using a reference system constructed independently of the pile and loading apparatus and firmly embedded in the ground at locations clear of load supports, and clear of the zone of influence of the pile loadings and reaction supports. Apparatus for measuring movement shall comply with ASTM D1143/D1143M. Provide equipment and personnel required to obtain the level observations required by the Contract Documents.
5. Protect load test set-up from inclement weather by tarpaulins and protective ditches and, if protection from freezing weather is necessary, provide temporary space heaters.

I. Static Tension Load Testing:
1. Load and test piles to determine and record the load-movement relationship of the test piles under vertical tension load in accordance with ASTM D 3689.
2. Apply tensile load by hydraulic jacks supported on test beams. Testing apparatus shall comply with ASTM D3689. Provide necessary framing at each load test to allow ENGINEER unrestricted safe access to pile instrumentation at all times during load test. Hydraulic jacks, gauges, transducers, and load cells shall comply with ASTM D3689. Submit certified calibration curve for the jack and gauge to be used during testing.
3. Apply the minimum specified test load in accordance with Procedure B of ASTM D3689.
4. Record pile movement using a reference system constructed independently of the pile and loading apparatus and firmly embedded in the ground at locations clear of load supports, and clear of zone of influence of pile loadings and reaction supports. Apparatus for measuring movement shall comply with ASTM D3689. Provide equipment and personnel necessary to obtain the level observations required by the Contract Documents.
5. Protect load test set-up from inclement weather by tarpaulins and protective ditches and, if protection from freezing weather is necessary, provide temporary space heaters.

J. Static Lateral Load Testing:
1. Load and test piles to determine and record the load-movement relationship of test piles under lateral load, complying with ASTM D3966.
2. Apply lateral load by hydraulic jacks acting against a reaction system. Testing apparatus shall comply with ASTM D3966. Provide the necessary framing at each load test to allow ENGINEER unrestricted safe access to pile instrumentation at all times during load test. Hydraulic jacks, gauges, transducers, and load cells shall comply with ASTM D3966. Submit certified calibration curve for the jack and gauge to be used during testing.
3. Test piles as free-head piles. Apply minimum specified test load in accordance with Procedure A of ASTM D3966. Direction of test for the H-piles shall be in the weak axis.
4. Record pile movement using reference system constructed independently of the pile and loading apparatus, firmly embedded in the ground at locations clear of load supports and clear of zone of influence of pile loadings and reaction supports. Apparatus for measuring movement shall comply with ASTM D3966. Provide equipment and personnel necessary to obtain the level observations required by the Contract Documents.
5. Protect load test set-up from inclement weather by tarpaulins and protective ditches and, if protection from freezing weather is necessary, provide temporary space heaters.

K. Static Load Test Reports:

1. Prepare reports for each test pile. Reports shall indicate results of load testing and include all field information required for pile driving reports under the Submittals Article of this Section.

L. Static Load Test Acceptance Criteria:
   1. Static tests shall be acceptable when results indicate compliance with acceptance criteria in the International Building Code, Section 1810.3.3.1.3, Load Test Evaluation Methods.

M. Engage an independent testing and inspection agency to inspect welded splices and to perform tests and prepare test reports.
   1. Testing agency shall conduct and interpret tests, prepare and state in each report of results whether test specimens comply with the Contract Documents and specifically state all deviations.
   2. Welded splices: Notify testing agency three days in advance of starting driving operations. Testing agency will be present on Site for the first day of driving operations to visually inspect field welded splices. Frequency and number of subsequent visits shall be determined by ENGINEER.
      a. Where visually-defective welds are evident, further test welds using non-destructive methods. If welds are determined to be acceptable, CONTRACTOR shall pay for non-destructive testing. When welds are defective, CONTRACTOR shall pay for non-destructive testing.
      b. Correct, or remove and replace, defective Work as directed by ENGINEER.
      c. CONTRACTOR shall pay for corrections and subsequent tests required to determine weld compliance with the Contract Documents.

N. Prior to pile driving, test the coating system for presence of holidays. Use low-voltage holiday detector of less than 90 volts in accordance with manufacturer's instructions.
   1. If holidays are detected, repair by surface treatment and application if additional paint in accordance with paint system manufacturer's recommendations. Retest coating after repair.
   2. After repair of holidays, measure dry film thickness using magnetic dry film thickness gauge in accordance with ASTM D7091 and ASTM E376.

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 to 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 collodial 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 ovendry 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-feet 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-A, BURIED PIPING SCHEDULE

Service	Diameter (inch)	Material	Interior Lining	Exterior Coating	Pressure Class/ Thickness	Joint	Test	Remarks
POTABLE WATER	8"	DI	CL	AC	PC 350	POJ/RPOJ	HYD/DBT	RJ REQUIREMENTS SHOWN ON PLANS
POTABLE WATER	18", 20"	DI	CL	AC	PC 250	POJ/RPOJ	HYD/DBT	RJ REQUIREMENTS SHOWN ON PLANS

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 ¾", 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 ¾", 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 Saueriesen 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 $1/12^{th}$ 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-feet 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 11 00

WATER SERVICES

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 domestic water piping systems complete with accessories.

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 domestic water piping systems Work.

C. Related Sections:
   1. Section 33 05 05, Buried Piping Installation.
   2. Section 40 05 19, Ductile Iron Process Pipe.

1.2 REFERENCES

A. Standards referenced in this Section are listed below:
   1. ANSI A13.1, Scheme for Identification of Piping Systems.
   2. ANSI B16.15, Cast Copper Alloy Threaded Fittings: Classes 125 and 150.
   3. ANSI B16.18, Cast Copper Alloy Solder Joint Pressure Fittings.
   4. ANSI B16.22, Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings (ASME B16.22).
   5. ANSI B16.23, Cast Copper Alloy Solder Joint Drainage Fittings: DWV.
   6. ANSI B16.26, Cast Copper Alloy Fittings for Flared Copper Tubes.
   7. ANSI B16.29, Wrought Copper and Copper Alloy Solder-Joint Drainage Fittings: DWV.
   8. ANSI B16.39, Malleable Iron Threaded Pipe Unions: Classes 150, 250 and 350.
   9. ANSI B40.1, Gages – Pressure Indicating Dial - Elastic Element.
   10. ANSI H 23.1, Seamless Copper Water Tube, (ASTM B 88).
   11. ASSE 1013, Performance Requirements for Reduced Pressure Principle Backflow Preventers and Reduced Pressure Fire Protection Principle Backflow Preventers.
   12. ASSE 1018, Trap Seal Primer Valves – Water Supply Fed.
   13. ASTM A 307, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
   14. ASTM B 32, Specification for Solder Metal.
   15. ASTM B 62, Specification for Composition Bronze or Ounce Metal Castings.
   16. ASTM B 88, Specification for Seamless Copper Water Tube.
   17. ASTM B 251, Specification for General Requirements for Wrought Seamless Copper and Copper-Alloy Tube.
   18. ASTM B 302, Specification for Threadless Copper Pipe, Standard Sizes.
   19. ASTM D 638, Test Method for Tensile Properties of Plastics.
   20. ASTM D 696, Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics between - 30°C and 30°C with a Vitreous Silica Dilatometer.

21. ASTM D 746, Test Method for Brittleness Temperature of Plastics and Elastomers by Impact.
22. ASTM D 790, Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
23. ASTM D 1238, Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer.
24. ASTM D 1248, Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable.
25. ASTM D 1330, Specification for Rubber-Sheet Gaskets.
26. ASTM D 1505, Test Method for Density of Plastics by the Density-Gradient Technique.
27. ASTM D 1525, Test Method for Vicat Softening Temperature of Plastics.
28. ASTM D 1598, Test Method for Time-to-Failure of Plastic Pipe under Constant Internal Pressure.
29. ASTM D 1603, Test Method for Carbon Black in Olefin Plastics.
30. ASTM D 1693, Test Method for Environmental Stress-Cracking of Ethylene Plastics.
31. ASTM D 2240, Test Method for Rubber Property-Durometer Hardness.
32. ASTM D 2774, Practice for Underground Installation of Thermoplastic Pressure Piping.
33. ASTM D 3261, Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
34. ASTM D 3350, Specification for Polyethylene Plastics Pipe and Fittings Materials.
35. ASTM F 1248, Test Method for Determination of Environmental Stress Crack Resistance (ESCR) of Polyethylene Pipe.
36. AWWA C511, Reduced-Pressure Principle Backflow Prevention Assembly.
37. AWWA C701, Cold-Water Meters – Turbine Type, for Customer Service.
38. AWWA C703, Cold-Water Meters – Fire-Service Type.
39. AWWA C901, Polyethylene (PE) Pressure Pipe and Tubing, 1/2-inch through 3-inch, for Water Service.
40. FS O-F-506, Flux, Soldering: Paste and Liquid.
41. FS WW-U-516, Unions, Brass or Bronze, Threaded Pipe Connections and Solder-Joint Tube Connections.
42. NSF/ANSI 14, Plastics Piping Components and Related Materials.
43. NSF/ANSI 61, Drinking Water System Components – Health Effects.
44. South Carolina Department of Health and Environmental Control (SCDHEC), Notice of Approved Backflow Prevention Assemblies.
45. SCDHEC, State Primary Drinking Water Regulation 61-58.

1.3 QUALITY ASSURANCE

A. Installer's Qualifications:
   1. Engage a single installer regularly engaged in domestic water piping installation and with experience in the installation of the types of materials required; and who agrees to employ only tradesmen with specific skill and experience in this type of Work. Submit name and qualifications to ENGINEER.
   2. Engage a single installer for the entire domestic water piping system with undivided responsibility for performance and other requirements.

B. Regulatory Requirements: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.
   1. National Electrical Code, (NEC).
   2. South Carolina Department of Health and Environmental Control (SCDHEC).

C. Component Supply and Compatibility:
   1. Obtain all equipment included in this Section regardless of the component manufacturer from a single domestic water piping systems manufacturer.
   2. The domestic water piping systems manufacturer to review and approve or to prepare all Shop Drawings and other submittals for all components furnished under this Section.
   3. All components shall be specifically constructed for the specified service conditions and shall be integrated into the overall assembly by the domestic water piping systems manufacturer.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:
   1. Product Data:
      a. Manufacturer's literature, illustrations, specifications and engineering data.
      b. Flexible connections.
      c. Other technical data related to the specified material and equipment as requested by ENGINEER.
      d. Gasket material.

B. Informational Submittals: Submit the following:
   1. Qualifications Statements:
      a. Installer’s qualifications.

C. Project Closeout Submittals: Submit the following:
   1. Record Documentation:
      a. During progress of the Work keep an up-to-date set of the Drawings showing field and Shop Drawing modifications.

1.5 DELIVERY, STORAGE AND HANDLING

A. Packing, Shipping Handling and Unloading:
   1. Deliver materials to the Site to ensure uninterrupted progress of the Work. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete, in ample time to prevent delay of the Work.

B. Storage and Protection:
   1. Store materials to permit easy access for inspection and identification. Keep all material off the ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.
   2. Store all equipment in covered storage off the ground and prevent condensation and in accordance with the manufacturer’s recommendations for long-term storage.

C. Acceptance at Site:
   1. All boxes, crates and packages shall be inspected by CONTRACTOR upon delivery to the Site. CONTRACTOR shall notify ENGINEER, in writing, if any loss or damage exists to equipment or components. Replace lost equipment or components and repair damage to new condition, in accordance with manufacturer’s instructions.

PART 2 PRODUCTS

2.1 MATERIALS

A. Copper Water Tube:
   1. Tube:
      a. Reference: ANSI H23.1, ASTM B 88.
      b. Type: K or L.
      c. Temper: Hard-drawn or soft-annealed.
   2. Fittings:
      a. Soldered, reference: ANSI B16.18 for cast copper alloy or ANSI B16.22 for wrought copper and copper alloy.
      b. Soldered, drainage, reference: ANSI B16.23 for cast copper alloy or ANSI B16.29 for wrought copper and copper alloy.
      c. Flared, reference: ANSI B16.26.
      d. Threaded, reference: ANSI B16.15.
   3. Joints:
      a. Sweat:
         1) Solder Metal: ASTM B 32, Type 95-5TA.
         2) Flux: FS O-F-506, Type 1.
   4. Unions:
      a. Reference: FS WW-U-516.
      b. Material: Bronze.
      c. Rating: 250 lb. W.O.G.

B. High-Density Polyethylene (HDPE) Piping:
   1. HDPE piping system shall be specifically designed, constructed and installed for the potable water service.
   2. Physical Properties:
      a. Materials used for the manufacture of polyethylene pipe and fittings shall meet the following physical property requirements:

Property	Unit	Test Procedure	Value
Material Designation	-	PPI/ASTM	-
PPI Material Listing	-	PPI TR-4	PE 3408
Material Classification	-	ASTM D 1248	III C 5 P34
Cell Classification	-	ASTM D 3350	345434C or 355434C
Density	g/cm3	ASTM D 1505	>0.941
Melt Index (E)	g/10 min	ASTM D 1238	<0.15
Flexural Modulus	psi	ASTM D 790	>110,000
Tensile Strength	psi	ASTM D 638	<160,000
ESCR (C)	hours	ASTM D 1693	3,000 to 3,500
HDB	psi	ASTM D 2837	1,600 @ 23°C
UV Stabilizer (C)	percent carbon black	ASTM D 1603	2 to 3
Elastic Modulus	psi	ASTM D 638	110,000
Brittleness Temperature F		ASTM D 746	<-180
Vicat Softening Temp F		ASTM D 1525	255
Thermal Expansion in/in/ F		ASTM D 696	8 x 10E-5
Hardness	Shore D	ASTM D 2240	64
Molecular Weight Category	-	-	Extra-High

b. There shall be no evidence of splitting, cracking or breaking when the pipe is tested in accordance with Article 2.1.B.4, below.
c. Ring Stiffness Constant (RSC) values for the pipe can be directly related to the pipe's class designation. (Nominal RSC of Class 40 pipe = 40, etc.). The minimum RSC is 90 percent of the nominal.
d. The HDPE pipe and fittings shall be homogeneous throughout and free from visible cracks, holes, foreign inclusions or other injurious defects. The pipe shall be as uniform as commercially practical in color, opacity, density and other physical properties.
e. Clean rework or recycled material generated by the manufacturer's own production may be used as long as the pipe or fittings produced meet all the requirements of this Section.

3. Pipe and Fittings:
   a. Dimensions:
      1) Pipe Dimensions: The nominal inside diameter of the pipe shall be true to the specified pipe size in accordance with AWWA C901. Standard laying lengths shall be 50 feet ± 2-inches.

2) Fitting Dimensions: Fittings such as couplings, wyes, tees, adapters, etc. for use in laying pipe shall have standard dimensions that conform to ASTM D 3261.

b. Pipe and fittings shall be produced from identical materials, meeting the requirements of this Section, by the same manufacturer. Special or custom fittings may be exempted from this requirement.

c. Pipe and fittings shall be pressure rated to meet the service pressure requirements specified by ENGINEER. Whether molded or fabricated, fittings shall be fully pressure rated to at least the same service pressure rating as the pipe to which joining is intended.

d. Molded fittings shall meet the requirements of ASTM D 3261 and this Section. At the point of fusion, the outside diameter and minimum wall thickness of fitting butt fusion outlets shall meet the diameter and wall thickness specifications of the mating system pipe. Fitting markings shall include a production code from which the location and date of manufacture can be determined. The manufacturer shall provide an explanation of the production codes used.

e. Reducing tees with branch diameters of 16-inches or less shall be saddle tees.

f. Marking:

1) Each standard and random length of pipe and fitting in compliance with this standard shall be clearly marked with the following information.

a) ASTM or AWWA Standard Designation.
b) Pipe Size.
c) Class and Profile Number.
d) Production Code.
e) Standard Dimension Ratio (SDR).

4. Source Quality Control:

a. At a minimum, incoming polyethylene materials shall be inspected for density in accordance with ASTM D 1505 and melt flow rate in accordance with ASTM D 1238. All incoming polyethylene materials shall be certified by the supplier. Certification shall be verified by CONTRACTOR and ENGINEER. Incoming materials shall be approved by Manufacturer's Quality Assurance Program before processing into finished goods.

b. Representative samples of polyethylene materials shall be tested against the physical property requirements required herein. Each extrusion line and molding machine shall be qualified to produce pressure rated products by taking representative production samples and performing sustained pressure tests in accordance with ASTM D 1598.

c. Quality Assurance test for representative pipe and fitting samples shall include:

Test	Standard	Pipe	Fittings
Ring ESCR	ASTM F 1248	Yes	Not Applicable
Sustained pressure at 176°F/725 psi hoop stress (fo>100 h):	ASTM D 1598	Yes	Yes
Sustained pressure at 73°F/1,600 psi hoop stress (fo>1000 h):	ASTM D 1598	Yes	Yes

C. Dielectric Couplings:
    a. Refer to Section 33 05 06, Couplings, Adapters and Specials.

2.2 VALVES

A. Bronze Body Check Valves:
    1. Manufacturers: Provide products of one of the following:
        a. Ford Meter Box Company, Inc.
        b. Stockham Valves and Fittings Company.
        c. Lunkenheimer Company.
        d. Or equal.
    2. Type: Swing, regrinding bronze disc, screw-in cap.
    3. Materials: Brass and bronze.
    4. Rating: 150 lb. SWP.
    5. End Connections: Solder joint.

B. Bronze Body Ball Valves:
    1. Manufacturers: Provide products of one of the following:
        a. Stockham Valves and Fittings Company.
        b. Lunkenheimer Company.
        c. Or equal.
    2. Type: Non-blowout stem, adjustable packing gland, quarter turn, full port ball valve.
    3. Materials:
        a. Body: Cast bronze.
        b. Ball: Chrome plated brass.
        c. Packing and Seats: Teflon.
    4. Rating: 150 lb. SWP.
    5. End Connections: Screwed. Provide screwed to sweat adapters, where required.

C. Iron Body Gate Valves:
    1. Products and Manufacturers: Provide one of the following:
        a. Stockham Valves and Fittings, Fig. No. G-623.
        b. Lunkenheimer Company, Fig. No. 1430.
        c. American Cast Iron Pipe Company, Series 2500.
        d. M&H Valve Company, C509, C515.
        e. Mueller Company, LLC, 2360 Series.
        f. Or equal.
    2. Type: Rising stem, outside screw and yoke, solid wedge.
    3. Materials: Iron with bronze trim.
    4. Rating: 125 lb. SWP.
    5. End Connections: Threaded.

2.3 EQUIPMENT

A. Post Hydrants:
    1. Exposed Hose Connection, Non-Freeze Type:
        a. Manufacturers: Provide products of one of the following:
            1) Zurn Industries.

2) Or equal.
b. Type: Anti-siphon.
c. Materials:
1) Casing: Bronze.
2) Vacuum Breaker: Integral.
3) Threads: Two-inch hose thread outlet.
4) Wall Clamp: Adjustable with set screw.
5) Key: Removable tee handle type.
d. Connection: Two-inch sweat end inlet and 2-inch hose thread outlet, universal type.
e. Drain: 1/8-inch NPT drain hole.
f. Post Height to Hose Connection: 36-inches above finished ground elevation.

B. Backflow Preventers: 3/4-Inch to 2-Inches: Reduced Pressure Principle (RPP):
1. Products and Manufacturers: Provide from the most recent edition of SCDHEC List of Approved Backflow Prevention Devices, Reduced Pressure Principle Assemblies.
2. Type: Reduced pressure zone device with two independently acting check valves, together with an automatically operated pressure differential relief valve located between the two check valves.
3. Materials:
a. Body: Bronze.
b. Valve Discs: BUNA-N rubber.
c. Diaphragm: Silicone rubber or Buna-N rubber.
d. Springs: Stainless steel.
e. Screws: Stainless steel.
4. Maximum Working Pressure: 150 psi.
5. End Connections: Threaded.
6. Accessories:
a. Strainer with blow-off on inlet.
b. Ball valves on inlet and outlet.
c. Reduced pressure principle backflow preventer test kit for each unit furnished, provided in molded plastic carrying case with foam inserts.
7. References: ASSE 1013, AWWA C511 and authority having jurisdiction at the Site.

C. Backflow Preventers: 3-Inches and Larger: RPP:
1. Products and Manufacturers: Provide from the most recent edition of SCDHEC List of Approved Backflow Prevention Devices, Reduced Pressure Principle Assemblies.
2. Type: Reduced pressure zone device with two independently acting check valves, together with an automatically operated pressure differential relief valve located between the two check valves.
3. Materials:
a. Body: Bronze or cast-iron.
b. Valve Discs: Buna-N rubber.
c. Diaphragm: Silicon rubber or Buna-N rubber.
4. Maximum Working Pressure: 175 psi.
5. End Connections: Threaded or flanged.
6. Accessories:
a. Strainer with blow-off on inlet.
b. Outside screw and yoke gate valves on inlet and outlet.

c. Reduced pressure principle backflow preventer test kit for each unit furnished with carrying case, provided in molded plastic carrying case with foam inserts.

7. References: ASSE 1013, AWWA C511 and authority having jurisdiction at the Site

D. Backflow Preventers: DCV:
1. Products and Manufacturers: Provide from the most recent edition of SCDHEC List of Approved Backflow Prevention Devices, Double Check Valve Assemblies.
2. Type: Assembly of two single independently acting check valves with tight closing shut off valves at each end and suitable connections for testing the water tightness of each check valve.
3. Materials:
   a. Body: Bronze.
   b. Valve Discs: Silicon rubber.
   c. Springs: Stainless steel.
   d. Poppets: Glass-filled Celcon.
   e. Replaceable Seats: Glass-filled Noryl.
   f. Fasteners: Stainless steel.
   g. Test cocks: Bronze, four required.
4. Maximum Working Pressure: 150 psi.
5. End Connections: Threaded or Flanged.
6. Accessories:
   a. Ball valves or gate valves as shown on the drawings, on inlet and outlet with UL listed, FM approved tamper switches.
   b. DCV backflow preventer test kit provided in molded plastic carrying case with foam inserts for each unit furnished to be turned over to the OWNER.
      1) Products and Manufacturers: Provide one of the following:
         a) CMB Industries, Inc., Febco Division, Double Check Valve Backflow Prevention Assembly Differential Pressure Test Kit with carrying case.
         b) Watts Regulator, Backflow Preventer Test Kit with carrying case.
         c) Or equal.
7. Reference: Underwriters Laboratory listed, Factory Mutual approved.
8. Fire protection system backflow preventers shall be provided with a bypass assembly consisting of a water meter, approved double check valve backflow prevention assembly with shut-off valves and test cocks.

E. Water Meters for 3/4 - to 2-inch Water Services:
1. Type: Magnetic drive, disk water meter.
2. Products and Manufacturers: Provide one of the following:
   a. Mueller Systems LLC, MVR series.
   b. Neptune Technology Group Inc, T-10.
   c. Or equal.
3. Materials:
   a. Body: Bronze.
   b. Register: Brass.
4. Maximum Working Pressure: 150 psi.
5. End Connections: Threaded.
6. Meters shall conform to AWWA C701.

F. Water Meters for 3- and 4-inch Water Services:
1. Type: Magnetic drive, disk water meter.

a. Products and Manufacturers: Provide one of the following:
   1) Mueller Systems LLC, MVR series.
   2) Or equal.
b. Materials:
   1) Body: Bronze.
   2) Register: Brass.
c. Maximum Working Pressure: 150 psi.
d. End Connections: Flanged.
e. Meters shall conform to AWWA C701.

G. Water Meters for Fire-Services:
   1. Products and Manufacturers: Provide one of the following:
      a. Mueller Systems LLC, Model FM3.
      b. Or equal.
   2. Type: Magnetic drive, disk water meter.
   3. Materials:
      a. Body: Ductile iron or bronze.
   4. Size: 3-, 4-, 6-, 8- and 10-inch.
   5. Maximum Working Pressure: 175 psi.
   6. End Connections: Flanged.
   7. Meters shall conform to AWWA C703.

2.4 PIPE MARKING

A. Mark or label all materials with the following:
   1. Metal or alloy designation.
   2. Temper.
   3. Size and schedule.
   4. ASTM reference standard number.
   5. Name and location of supplier.

2.5 PAINTING

A. Piping and accessories shall be painted in accordance with manufacturer's recommendations.

PART 3 EXECUTION

3.1 INSTALLATION

A. General:
   1. Install all items as shown, specified, and as recommended by the manufacturers.
   2. Request instructions from ENGINEER, in writing, when there is a conflict between the manufacturer's recommendations and the Contract Documents.
   3. Present conflicts between piping systems and/or equipment and/or structures to ENGINEER, in writing, who will determine corrective measures to be taken.
   4. Do not modify structures to facilitate installation of piping, unless specifically approved by ENGINEER.

5. Installation shall conform to requirements of all local and state codes.
6. Properly plug or cap the open ends of all piping at the end of each day's Work or other stopping point through construction. Equipment shall be tightly covered and protected against dirt, water, and chemical or mechanical damage.
7. Refer to Section 33 05 05, Buried Piping Installation.

B. HDPE Piping:
   1. Heat Fusion of Pipe:
      a. HDPE pipe and fittings joints shall be heat fused by a qualified technician; trained by the manufacturer's representative in accordance with the manufacturer's recommended fusion procedures. Training must have occurred within the previous 12 months, or submittals verifying experience within the previous 12 months for all technicians performing heat fusion on polyethylene pipe and fittings.
      b. Weld in accordance with manufacturer's recommendation for butt fusion methods. Personnel operating fusion equipment shall be certified by the HDPE pipe manufacturer.
      c. The first butt fusion weld of each day's production welding and for each separate operator shall be tested by bent strap test method. No production welds shall be performed until successful completion of bent strap test.
      d. Butt fusion equipment for joining procedures shall be capable of meeting conditions recommended by HDPE pipe manufacturer including, but not limited to, temperature requirements, alignment, and fusion pressures. The equipment used for the heat fusion joints shall be capable of recording the heating and fusion pressures used to join the HDPE pipe, recording heater temperature, and storing this information for future retrieval (data logger). Each field fusion shall be recorded by such equipment and this information shall be made compiled into daily log reports. Log reports shall be submitted to CONTRACTOR and ENGINEER daily. Reports shall also include the results of the bent strap tests.
      e. For cleaning pipe ends, solutions such as detergents and solvents, when required, shall be used in accordance with manufacturer's recommendations.
      f. Do not bend pipe to greater degree than minimum radius recommended by manufacturer for type and grade. Shop Drawings shall address locations and deflections of required fittings to prevent installation that exceeds a greater degree of bending than the manufacturer's recommended minimum bending radius for each size and class of HDPE pipe.
      g. Do not subject pipe to strains that will overstress or buckle piping or impose excessive stress on joints.
      h. Branch saddle fusions shall be joined in accordance with manufacturer's recommendations and procedures. Branch saddle fusion equipment shall be of size to facilitate saddle fusion within trench.
      i. Before butt fusing pipe, inspect each length for presence of dirt, sand, mud, shavings, and other debris or animals. Remove debris from pipe.
      j. Cover open ends of fused pipe at the end of each day's Work. Cap to prevent entry by animals or debris.
   2. Flange Jointing:
      a. Use on flanged pipe connection sections.
      b. Connect slip-on Type 316 stainless steel backup flanges with Type 316 stainless steel nuts and bolts.
      c. Butt fuse fabricated flange adapters to pipe.
      d. Observe following precautions in connection of flange joints.

1) Align flanges or flange/valve connections to provide tight seal. Require nitrile-butadiene gaskets if needed to achieve seal. Integral flange adapters and gaskets are required for flange/valve connections.
2) Place U.S. Standard round washers as may be required on some flanges in accordance with manufacturer's recommendations. Bolts shall be lubricated in accordance with manufacturer's recommendations.
3) Tighten flange bolts in sequence and accordance with manufacturer's recommendations. CAUTION: Do not over-torque bolts.

e. Pull bolt down by degrees to uniform torque in accordance with manufacturer's recommendation.
f. Install electrofusion couplers, where used, in accordance with manufacturer's specifications.

3. Pipe Placement:
a. Grade control equipment shall be of type to accurately maintain design grades and slopes during installation of pipe.
b. Dewatering: Remove standing water in trench before pipe installation.
c. Unless otherwise specifically stated, install pipe in accordance with manufacturer's recommendations.
d. Maximum lengths of fused pipe to be handled as one section shall be placed according to manufacturer's recommendations as to pipe size, pipe SDR, and topography so as not to cause excessive gouging or surface abrasion, but shall not exceed 400 feet.
e. Cap pipe sections longer than single joining (usually 50 feet) on both ends during placement, except during fusing operations.
f. Notify ENGINEER prior to installing pipe into trench and allow time for ENGINEER'S inspection.
1) Correct irregularities found during inspection.
g. Complete tie-ins within trench whenever possible to prevent overstressed connections.
h. Allow pipe sufficient time to adjust to trench temperature prior to testing, segment tie-ins or backfilling activity.
i. Pipe shall be snaked in trench to allow a minimum of 12-inches/100 feet for thermal contraction and expansion.
j. Allow extra length at future connection points to be cut to fit after backfill and prior to tie-in.

3.2 REDUCED PRESSURE ZONE BACKFLOW PREVENTION

A. Provide RPZ-BFP devices or air gap separation for high hazard cross connections, as defined by SCDHEC 61-58.7.

3.3 FIELD QUALITY CONTROL

A. Field Tests:
1. Fill all systems and fully test all equipment, valves, etc. in operation.
2. Check for excessive vibration while all systems are operating.
3. Installed systems and components shall not be released to OWNER, unless all systems have been tested by the CONTRACTOR and approved by the ENGINEER.
4. Refer to 33 05 05, Buried Piping Installation, for buried piping disinfection and testing.

B. Inspection:
   1. Examine areas to receive piping, valves and accessories for:
      a. Defects that adversely affect execution and quality of the Work.
      b. Deviations beyond allowable tolerances for piping, valves and accessories.
      c. Start the Work only when conditions are satisfactory.
   2. The ENGINEER reserves the right to reject or authorize replacement of piping and accessories found to defective.

3.4 ADJUSTING AND CLEANING

A. Adjusting:
   1. Adjust all controls for proper settings.
   2. While system is operable balance all equipment, valves, etc. to achieve design conditions.

B. Cleaning:
   1. Thoroughly clean all piping, fittings, valves, and accessories prior to installation.
   2. Remove all dirt, rust, dust, etc. from piping in preparation for painting.
   3. Remove and dispose of all debris and waste from the Site resulting from installation.

C. Refer to Section 33 05 05, Buried Piping Installation.

3.5 MATERIAL SCHEDULES

A. Piping:
   1. Use types of pipe and fittings as specified below, unless otherwise specified or shown.
   2. All potable water piping 2-1/2-inches and smaller run underground shall be soft-annealed copper Type “K” copper tubing.
   3. All underground water piping 3-inches and larger shall be cement-lined ductile iron pipe with mechanical joints.
   4. All valves for copper or brass piping shall be bronze bodied, unless otherwise specified.
   5. All valves for ductile iron piping shall be iron bodied, unless otherwise specified.
   6. Use “wrought copper” fittings for copper tubing.
   7. Use “butt welded” fittings for welded steel pipe connections.

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

SECTION 40 05 05

EXPOSED 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 exposed piping, fittings, and specials. The Work includes the following:
      a. All types and sizes of exposed piping, except where exposed piping installations are specified under other Sections.
      b. Unless otherwise shown or specified, this Section includes all piping beginning at the outside face of structures or structure foundations and extending into the structure. Piping embedded in concrete within a structure or foundation shall be considered as exposed and is included herein. Piping that is permanently or intermittently submerged, or installed in sub-aqueous environments, is considered as exposed and is included in this Section.
      c. Work on or affecting existing exposed piping.
      d. Installation of all jointing and gasket materials, specials, flexible couplings, mechanical couplings, harnessed and flanged adapters, sleeves, tie rods, and all Work required for a complete exposed piping installation.
      e. Supports, restraints, and other anchors.
      f. Field quality control, including testing.
      g. Cleaning.
      h. Incorporation of valves, meters, and special items shown or specified into the piping systems per the Contract Documents and as required

B. Coordination:
   1. Review installation procedures under this and other Sections and coordinate installation of items that must be installed with or before exposed piping Work.
   2. Coordinate with appropriate piping Sections of Division 40.

C. Related Sections:
   1. Section 40 05 07, Pipe Hangers and Supports.
   2. Section 40 05 08, Wall Pipes, Floor Pipes and Pipe Sleeves.

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 A380, Standard Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems.
   5. ASTM B32, Specification for Solder Metal.
   6. ASTM D4174, Standard Practice for Cleaning, Flushing, and Purification of Petroleum Fluid Hydraulic Systems.
   7. ANSI/AWWA C111, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

8. ANSI/AWWA C600, Installation of Ductile Iron Water Mains and Their Appurtenances.
9. AWWA M41, Ductile-Iron Pipe and Fittings.

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.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:
   1. Shop Drawings:
      a. Detailed drawings in plan and, as applicable, section.
      b. Details of piping, valves, supports, accessories, specials, joints, harnessing, and main anchor supports, and connections to existing piping, structures, equipment, and appurtenances.
      c. Laying schedules for piping with restrained joints.
   2. Testing Plans, Procedures, and Testing Limitations:
      a. Submit description of proposed testing methods, procedures, and apparatus, and obtain ENGINEER's approval prior to testing.

B. Informational Submittals: Submit the following:
   1. Certificates:
      a. Submit a certificate, signed by manufacturer of each product, certifying that product complies with applicable referenced standards.
   2. Source Quality Control Submittals:
      a. Submit copies of testing report for each test.
   3. Site Quality Control Reports:
      a. Submit copies of testing report for each test.

C. Closeout Submittals: Submit the following:
   1. Record Documentation:
      a. Maintain accurate and up-to-date record documents showing field and Shop Drawing modifications. Record documents for exposed piping Work shall show actual location of all piping and appurtenances on a copy of the Drawings, unless otherwise approved by ENGINEER.
      b. Record documents shall show piping with elevations referenced to the project datum and dimensions from permanent structures. For straight runs of pipe provide offset dimensions as required to document pipe location.
      c. Include section drawings with exposed piping record documents when the Contract Documents include section Drawings.
      d. Conform to Section 01 78 39, Project Record Documents.

1.5 DELIVERY, STORAGE AND HANDLING

A. Delivery:
   1. Deliver products to Site to ensure uninterrupted progress of the Work.

2. Upon delivery, inspect pipe and appurtenances for cracked, gouged, chipped, dented, and other damage and immediately remove damaged products from Site.
3. Conform to requirements of Section 01 65 00, Product Delivery Requirements.

B. Storage:
1. Store products for convenient access for inspection and identification. Store products off the ground using pallets, platforms, or other supports. Protect packaged products from corrosion and deterioration.
2. Pipe and fittings materials may be stored outdoors without cover.
3. Conform to requirements of Section 01 66 00, Product Storage and Handling Requirements.

C. Handling:
1. Handle pipe, fittings, specials, and accessories carefully with approved handling devices. Do not drop or roll material of delivery vehicles. Do not otherwise drop, roll, or skid piping.
2. Avoid unnecessary handling of pipe.
3. Keep pipe interiors free of 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. Repair damaged coatings.
5. Conform to requirements of Section 01 65 00, Product Delivery Requirements.

PART 2 PRODUCTS

2.1 MATERIALS

A. Piping materials are specified in the Exposed Piping Schedule at the end of this Section. Piping materials shall conform to Specification for each type of pipe and piping appurtenances in applicable sections of Division 40, Process Integration.

B. Markings and Identification:
1. Pipe Markings:
a. Clearly mark each piece of pipe or fitting with a designation conforming to that shown on the approved Shop Drawings.
b. Manufacturer shall cast or paint on each length of pipe and each fitting the pipe material, diameter, and pressure or thickness class.
2. Pipe Identification Markers and Arrows: Refer to Section 40 05 19, Ductile Iron Process Pipe.

C. Appurtenances: Provide products that comply with:
1. Section 40 05 07, Pipe Hangers and Supports.
2. Section 40 05 08, Wall Pipes, Floor Pipes and Pipe Sleeves.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine conditions under which the Work is to be installed 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.

3.2 INSTALLATION

A. General:
   1. Install piping as shown, specified and as recommended by the pipe and fittings manufacturer.
   2. If there is a conflict between manufacturer's recommendations and the Contract Documents, request in writing instructions from ENGINEER before proceeding.
   3. Provide pipe manufacturer's installation specialist at Site as specified on this Section.

B. Temporary Blind Flanges, Plugs, Caps, and Bulkheads:
   1. Temporarily plug installed pipe at the end of each day of work 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 all bells at dead ends, tees, and crosses. Cap all spigot and plain ends.
   3. Fully secure and block blind flanges, plugs, caps, and bulkheads installed for testing, designed to withstand specified test pressure.
   4. Where plugging is required for phasing of Work or subsequent connection of piping, install watertight, permanent type blind flanges, plugs, caps, or bulkhead acceptable to ENGINEER.

C. Piping Installation:
   1. Conform to manufacturer's instructions and requirements of standards and manuals listed in this Section, as applicable:
      a. Ductile Iron Pipe: ANSI/AWWA C600, AWWA M41.
   2. Install straight runs true to line and elevation.
   3. Install vertical pipe truly plumb in all directions.
   4. Install piping parallel or perpendicular to walls of structures. Piping at angles and 45 degree runs across corners of structures will not be accepted unless specifically shown on the Contract Documents or approved by the ENGINEER.
   5. Install small diameter piping generally as shown when specific locations and elevations are not indicated. Locate such piping as required to avoid ducts, equipment, beams, and other obstructions.
   6. Install piping to leave all corridors, walkways, work areas, and similar spaces unobstructed. Unless otherwise approved by ENGINEER provide a minimum headroom clearance under piping and pipe supports of 7.5 feet. Clearances beneath piping shall be measured from the outermost edge of piping, flanges or other type of joint that extends beyond the nominal outside diameter of piping.
   7. Cutting: Cut pipe from measurements verified at Site. Field cut pipe, where required, with a machine specially designed for cutting type of pipe being installed. Make cuts carefully without damage to pipe, coating, or lining, and with a smooth end at right angles to axis of pipe. Cut ends of push-on joint type pipe shall be tapered and sharp edges filed off smooth. Do not flame-cut pipe.

D. Jointing Pipe:
   1. General:

a. Make joints in accordance with pipe manufacturer's recommendations and Contract Documents.
b. Cut piping accurately and squarely and install without forcing or springing.
c. Ream out pipes and tubing to full inside diameter after cutting. Remove all sharp edges on end cuts.
d. Remove all cuttings and foreign matter from inside of pipe and tubing before installation. Thoroughly clean all pipe, fittings, valves, specials, and accessories before installing.

2. Ductile Iron Flanged Joints:
   a. Assemble flanged joints using ring-type gaskets, with thickness as recommended by pipe manufacturer but not less than 1/8-inch thick, for raised-face flanges. Use full-face gaskets for flat-face flanges, unless otherwise approved by ENGINEER or recommended by pipe manufacturer. Gaskets shall be suitable for the service intended in accordance with the manufacturer's ratings and instructions. Gaskets shall be properly centered.
   b. Tighten bolts in a sequence that provides equal distribution of bolt loads.
   c. Length of bolts shall be uniform. Bolts shall not project beyond the nut more than 1/4-inch or fall short of the nut when fully taken up. Machine-cut ends of bolts to be neatly rounded. Do not use washers.
   d. Prior to assembly of flanged joints, lubricate bolt threads and gasket faces.
   e. Alternately tighten bolts 180 degrees apart to compress the gasket evenly.
   f. After assembly, coat all bolts and nuts, except stainless steel bolts and nuts, with coating appropriate for pipe and fittings being joined, as recommended by manufacturer.
3. 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) Cut end of tube square and ream to remove burrs.
      5) Resize back to round tube that is out-of-round.
      6) Clean and polish contact surfaces of joints using an abrasive cloth.
      7) Place flare nut over end of tube with threads closest to end being flared.
      8) Insert appropriate length of tube between flaring bar of flaring tool and position 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.

4. Mechanical Coupling Joints:
   a. Mechanical couplings include sleeve-type flexible couplings, split flexible couplings, and other mechanical couplings used.
   b. Prior to installing and assembling mechanical couplings, thoroughly clean joint ends with a wire brush to remove foreign matter.
   c. For mechanical couplings that incorporate gaskets, after cleaning apply lubricant to rubber gasket or inside of coupling housing and to joint ends. After lubrication, install gasket around joint end of previously installed piece and mate joint end of subsequent piece to installed piece. Position gasket and place coupling housing around gasket. Insert bolts and install nuts tightly by hand. Tighten bolts uniformly to produce an equal pressure on all parts of housing. When housing clamps meet metal to metal, joint is complete and further tightening is not required.

E. Installing Valves and Accessories:
   1. Provide supports for large valves, flow meters, and other heavy items as shown or required to prevent strain on adjoining piping.
   2. Position flow measuring devices in pipe lines so that they have the amount of straight upstream and downstream runs recommended by the flow measuring device manufacturer, unless specific location dimensions are shown.
   3. Position swing check valves and butterfly valves so that they do not conflict with upstream and downstream elements of the piping system.

F. Unions:
   1. Install dielectric unions as specified in Section 33 05 06, Couplings, Adapters, and Specials**,** where dissimilar metals are connected, except for bronze or brass valves in ferrous piping.
   2. Provide a union downstream of each valve with screwed connections.
   3. Provide screwed or flanged unions at each piece of equipment, where shown, and where necessary to install or dismantle piping.

G. 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.

H. Closures:
   1. Provide closure pieces, such as blind flanges and caps, shown or required to complete the Work.

3.3 THRUST RESTRAINT

A. Provide thrust restraint on all pressure piping systems and where otherwise shown or specified.

B. Thrust restraints shall be designed for axial thrust exerted by test pressure specified in the Exposed Piping Schedule at end of this Section.

3.4 WORK AFFECTING EXISTING PIPING

A. Location of Existing Piping:
   1. Locations of existing piping shown on Drawings is approximate.

2. Determine the true location of existing piping to which connections are to be made, crossed, and that could be disturbed, and determine location of other facilities that could be affected by the Work.

B. Taking Existing Pipelines Out of Service:
   1. Conform to Section 01 14 16, Coordination with Owner's Operations.

C. Work on Existing Pipelines:
   1. Cut or tap pipes as shown or required with machines and tools specifically designed for cutting or tapping pipelines.
   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.

3.5 PAINTING

A. Surface preparation, priming, finish painting, and touch-up painting shall conform to the manufacturer's paint standards.

3.6 FIELD QUALITY CONTROL

A. Testing, General:
   1. Test all piping, except as exempted in the Exposed Piping Schedule.
   2. Notification:
      a. Notify ENGINEER at least 48 hours prior to testing.
      b. 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 the pipe 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 ENGINEER or OWNER. Repair of existing piping will be paid as extra work unless otherwise specified.

B. Test Schedule:
   1. Refer to the Exposed Piping Schedule for type of test required and required test pressure.
   2. Unless otherwise specified, the required test pressures are at lowest elevation of pipeline segment being tested.

3. For piping not listed in Exposed Piping Schedule:
    a. Hydrostatically test pipe that will convey liquid at a pressure greater than five psig.
4. Test Pressure:
    a. Use test pressures listed in Exposed Piping Schedule.
    b. If test pressure is not listed in Exposed Piping Schedule, or if a test is required for piping not listed in the Exposed Piping Schedule, test pressure will be determined by the ENGINEER based on the maximum anticipated sustained operating pressure and the methods described in the applicable ANSI/AWWA manual or standard that applies to the piping system.

C. Hydrostatic Testing:
1. Preparation for Testing:
    a. Follow procedures described in AWWA Manual M9. A wetting period is not required for pipe that is not cement mortar-lined.
    b. Prior to testing, ensure that adequate thrust protection is in place and all joints are properly installed.
    c. Piping for Hydraulic Fluid, Lube Oil, and Diesel Fuel: Hydrostatically test system using the fluid with which system will function permanently. Allowable leakage is zero. For fluid power systems, manufacturer shall supervise installation and testing of system components, including field piping.
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 the pipe being tested.
    b. Expel air from pipe as required. Obtain approval of ENGINEER prior to tapping pipe for expelling air.
    c. Examine 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 the pipe has been filled, exposed to the required wetting period, air has been expelled, and pressure stabilized.
    f. Timed Test Period: After the 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. The test pressure shall then remain steady for one hour, indicating no leakage.
    g. Pump from a 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 fifteen 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 the test pressure during timed test period. Allowable leakage rates for piping are:
    a. No Leakage: Pipe with flanged, threaded, soldered, or brazed joints.
    b. Rates based on formula or table in AWWA Manual M41:
        1) Metal and fiberglass pipe joined with rubber gaskets as sealing members, including the following joint types:
            a) Bolted sleeve type couplings.

D. Process Air Pipe Testing:
1. General:
    a. Required test pressure is listed in Exposed Piping Schedule.
2. Preparation for Testing:

a. Provide temporary tie rods at expansion joints as required.
b. Verify that pipe supports, where present, are secure.
c. Test one pipe segment at a time. Use temporary blind flanges and isolators as required.
d. Install corporation cocks for filling and relieving air. Provide temporary automatic pressure relief valve and pressure gauge with range suitable for test pressure.

3. Test Procedure:
   a. Pressurize pipe segment being tested with air to the required test pressure. Maintain pressure for at least two hours.
   b. Apply a soapy water solution to all joints to check for leakage, indicated by presence of bubbles, while test pressure is maintained.
   c. Allowable Leakage: Zero
4. Repair and retest pipelines that fail the test.
5. After testing is complete remove temporary measures provided for testing and provide Type 304 stainless steel threaded plugs at taps used for testing.

3.7 CLEANING

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 a manner approved by ENGINEER, prior to placing in service.
   2. Piping 24-inch diameter and larger shall be inspected from inside and debris, dirt and foreign matter removed.

B. Cleaning of Hydraulic and Fluid Power Oil Systems: Upon completion of field piping, but before connection to control components, hydraulic and fluid power oil systems shall be flushed and cleaned by circulating special flushing oil through the system. Flushing oil and procedures shall comply with ASTM D4174. System shall be cleaned such that internal contamination of system, when tested using procedures specified in SAE J1227, Section 2.3, shall not exceed the Allowable Cleanliness Level (ACL). Unless otherwise specified, ACL value shall be established by manufacturer of major hydraulic system components in accordance with SAE J1227, Section 9.1.

3.8 EXPOSED PIPING SCHEDULE

A. The schedules listed below, following the “End of Section” designation, are a part of this Specification section.
   1. Table 40 05 05-A, Exposed Piping Schedule.

END OF SECTION

TABLE
40 05 05-A, EXPOSED PIPING SCHEDULE

Service	Diameter (inch)	Material	Interior Lining	Exterior Coating	Pressure Class/ Thickness	Joint	Test	Remarks

The following abbreviations are used in the Exposed Piping Schedule.

A. Service Abbreviations

Service	Abbrev.		Service	Abbrev.
Sanitary Force Main	SFM		Fuel Oil	FO
Wastewater	WW			

B. Material Abbreviations

Material	Abbrev		Material	Abbrev.
Ductile Iron	DI			
Copper	C			

C. Lining/Coating Abbreviations

Lining	Abbrev		Coating	Abbrev.
Cement Mortar Lined	CL		Painted	P
Ceramic Epoxy	CE			

D. Joint Abbreviations

Joint Type	Abbrev		Joint Type	Abbrev.
Soldered	Sd		Flanged	Flg
Brazed	Bz		Flanged Adapter	FA

E. Test Abbreviations

Test	Abbrev		Test	Abbrev.
Hydrostatic Test (test pressure in psig)	HYD ( )		Exfiltration Test	EX

SECTION 40 05 07

PIPE HANGERS AND SUPPORTS

PART 1 GENERAL

1.1 DESCRIPTION

A. Scope:
   1. Provide all labor, materials, equipment, and incidentals as shown, specified and required to design, furnish, and install all hangers, supports and appurtenances necessary to complete the Work.

B. Coordination:
   1. Review installation procedures under other Sections and coordinate the installation of items that must be installed with the pipe hangers and supports Work.

C. Related Sections:
   1. Section 03 00 05, Concrete.
   2. Section 05 50 13, Miscellaneous Metal Fabrications.

1.2 REFERENCES

A. Standards referenced in this Section are listed below:
   1. American Society for Testing and Materials, (ASTM).
      a. ASTM A 575, Specification for Steel Bars Carbon, Merchant Quality, M-Grades.
      b. ASTM E 84, Test Method for Surface Burning Characteristics of Building Materials.
   2. Federal Specification, (FS).
      a. S A-A-1192, Hangers, Pipe.
   3. Manufacturers Standardization Society of the Valve and Fittings Industry, (MSS).
      a. MSS SP 58, Pipe Hangers and Supports-Materials, Design and Manufacture.
      b. MSS SP 69, Pipe Hangers and Supports - Selection and Application.
   4. Underwriters' Laboratories, Inc., (UL).
      a. UL 203, Pipe Hanger Equipment for Fire Protection Service.

1.3 QUALITY ASSURANCE

A. Each type of pipe hanger or support shall be the product of one manufacturer.

B. Component Supply and Compatibility:
   1. Obtain all equipment included in this Section regardless of the component manufacturer from a single pipe hangers and supports manufacturer.
   2. The pipe hangers and supports equipment manufacturer to review and approve or to prepare all Shop Drawings and other submittals for all components furnished under this Section.
   3. All components shall be specifically constructed for the specified service conditions and shall be integrated into the overall assembly by the pipe hangers and supports equipment manufacturer.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:
   1. Shop Drawings:
      a. Detailed drawings showing all hangers and supports for each piping system specified. Shop Drawings shall show location, installation, material, loads or forces, and deflection of all hangers and supports.
      b. Each pipe system shall be analyzed for all loads and forces on the hangers and supports. Provide calculations of reaction forces to the structure to which they are fastened. Provide confirmation that hanger systems comply with support requirements and codes.
      c. Submit and coordinate these with Shop Drawings required for all piping systems.
   2. Product Data:
      a. Submit manufacturers' catalogs, literature, and engineering data on all hangers and supports. Load ratings, materials and installation shall be consistent with the recommendations of the MSS SP 58, MSS SP 69 and Federal Specification A-A-1192.

1.5 DELIVERY, STORAGE AND HANDLING

A. Packing, Shipping, Handling and Unloading:
   1. Deliver materials to the Site to ensure uninterrupted progress of the Work. Deliver anchor bolts and anchorage devices which are to be embedded in cast-in-place concrete in ample time to prevent delay of that Work.

B. Storage and Protection:
   1. Store materials to permit easy access for inspection and identification. Keep all material off the ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.
   2. Store materials in covered storage off the ground and prevent condensation.

C. Acceptance at Site:
   1. All boxes, crates and packages shall be inspected by CONTRACTOR upon delivery to the Site. CONTRACTOR shall notify ENGINEER, in writing, if any loss or damage exists to equipment or components. Replace loss and repair damage to new condition in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 GENERAL

A. Hangers and supports shall meet with the following requirements:
   1. Standard and fabricated hangers and supports shall be furnished complete with necessary inserts, bolts, nuts, rods, washers, and other accessories.
   2. Generally, run piping in groups where practicable and parallel to building wall. Provide minimum clearance of 1-inch between pipe and other work.
   3. Install hangers or supports at all locations where pipe changes direction.
   4. All hangers and supports shall be capable of adjustment after placement of piping.

5. Different types of hangers or supports shall be kept to a minimum.
6. All suspended or supported ductile iron pipe shall have a hanger or support adjacent to each hub.
7. Support vertical piping at each floor and between floors by stays or braces to prevent rattling and vibration.
8. Hanger rods shall be straight and vertical. Chain, wire, strap or perforated bar hangers shall not be used. Hangers shall not be suspended from piping.
9. Maximum support spacing unless otherwise shown or approved for standard weight ductile iron pipe shall be as follows:
    a. Exposed pressure pipe shall not span longer than 12-feet without appropriate support.
    b. Exposed soil pipe shall not span longer than 10-feet without appropriate support.
    c. Pipe shall not have pockets formed in the span due to sagging of the pipe between supports caused by the weight of the pipe, medium in the pipe, insulation, valves and fittings.
    d. Pipe hanger and support selection shall be as shown and in this Section.
10. Where proper hanger or support spacing does not correspond with joist or rib spacing, structural steel channels may be attached to joists or ribs and pipes suspended there from.
11. Supports and hangers shall be of a material that is compatible with the fluid being conveyed in such pipe being supported.
12. Anchors for pipe support systems shall be compatible or protected by a coating system which is compatible with the fluid being conveyed in such pipe being supported.

B. Expansion compensation shall be designed for individual exposed piping systems with the following Design Criteria:
1. $\Delta L = L \times \Delta T \times \alpha$
    a. Where ΔL = pipe length change (inches).
    b. L = pipe length between anchors (inches).
    c. ΔT = 100 (F).
    d. α = coefficient of thermal expansion (inches/inches/F).
2. Expansion compensation shall be designed as an integral part of the piping hanger, support and anchorage system.
3. Expansion compensation shall be achieved via expansion joints.

2.2 HANGERS AND SUPPORTS

A. Hangers and supports where shown shall be in accordance with detail drawings. Hangers and supports not shown shall be in accordance with MSS SP 58.

B. Products and Manufacturers: Provide products from one of the following:
1. Anvil International, Inc.
2. Elcen Metal Products Co.
3. Cooper Industries, B-Line.
4. Unistrut Corporation.
5. Or equal.

2.3 ACCESSORIES

A. Hanger rods shall be made from ASTM A 575, with square head nut on top and running thread on bottom end.

B. Concrete Inserts:
   1. Concrete inserts shall be MSS SP 58 malleable Type 18.
   2. Concrete inserts shall be of the continuous type capable of supporting the amount of force as shown on the Drawings.
   3. Manufacturers: Provide products of one of the following:
      a. Unistrut Corporation, Wayne, Michigan.
      b. Elcan Metal Products, Company, Franklin Park, Illinois.
      c. B-Line.
      d. Anvil International, Inc.
      e. Or equal.

C. Steel Beam Clamps:
   1. Steel beam clamps shall be of malleable iron and conform to MSS SP 58.

D. Inserts for Pipe Insulation:
   1. Insulated pipe, larger than 1-1/2-inches in diameter, shall be supported by a rigid insert to protect the insulation. A steel metal saddle of sufficient gauge to carry the weight of the pipe and its fluid without deforming shall extend 2-inches minimum on each side of the rigid insert. The joints between insert and insulation shall be sealed before saddle is installed. Sizes up to 6-inches IPS shall be MSS SP 58, Type 40, and for sizes over 10-inches shall be MSS SP 58, Type 39.

E. Brackets:
   1. Brackets for wall mounting shall conform to: MSS SP 58 Type 32 for medium welded steel bracket, Type 33 for heavy welded steel bracket and Type 34 for side beam support.

F. Fabricated Pipe Rack:
   1. Pipes shall be supported and anchored to the fabricated pipe rack as shown. Clamps, rollers, and supports for piping shall conform to the general requirements of MSS SP 69.

2.4 PAINTING

A. Clean and prime ferrous metal surfaces in the shop.

B. Field painting shall conform to manufacturer recommendations.

PART 3 EXECUTION

3.1 INSTALLATION

A. Locate hangers, supports, and accessories to support piping, valves, and at all concentrated loads.

B. Locate hangers, supports, and accessories within maximum span lengths specified to support continuous pipeline runs unaffected by concentrated loadings.

C. Locate hanger, supports to prevent vibration or swaying and to provide for expansion and contraction.
   1. Temperature differential specified in this Section.
   2. Support piping independently so that equipment is not stressed by piping weight or expansion.
   3. Uncoated Hangers, Rods and Supports: Dip in zinc chromate primer before installation.
   4. Hanger types for horizontal piping, except as noted and shown:
      a. Forged steel adjustable clevis type, rod support for all services.
      b. Slide Bases:
         1) Pipe stand, brackets, trapeze or other equivalent structural support.
         2) For piping 2-inches or larger.
      c. For pipe and covering provide:
         1) Saddles for rollers or slide bases.
         2) Protective shields or saddles for all other types of supports.
      d. Threaded Steel Rods:
         1) Two inch vertical adjustment with two nuts each end for positioning and locking.
         2) Size hanger rods according to the schedule below, unless otherwise noted:

Nominal Pipe (Inches)	Rod Diameter (Inches)
2 and less	3/8
2-1/2 to 3-1/2	1/2
4	5/8
6	3/4
8 through 12	7/8
14 through 18	1
20 through 30	1-1/4

         3) For Double Rod Hangers: One size smaller than above.
         4) Connection to Structure for Piping to 2-Inches: Concrete inserts, or expansion shields in shear into sides of beams.
         5) Connection to Structure for Piping 2-1/2-Inch or Larger: Concrete inserts, beam clamps or suitable bridging.
   5. Vertical Piping:
      a. Base Support: Base elbow or welded equivalent.
         1) Bearing plate on structural support.
      b. Guides not to exceed:
         1) 25 feet for piping to 2-inches.
         2) 36 feet for piping 2-1/2-inches or larger.
      c. Top Support:
         1) Special hanger or saddle in horizontal connection.
         2) Provisions for expansion.
      d. Intermediate Supports: Steel pipe clamp at floor.
         1) Bolted and welded to pipe.

2) Extension ends bearing on structural steel or bearing plates.

e. For Multiple Pipes: Coordinate guides, bearing plates and accessory steel.

D. Install items to be embedded before concrete placement.

E. Fasten embedded items securely to prevent movement during concrete placement.

F. Install hangers and support units on piping systems in accordance with manufacturer's recommendations.

G. Adjust hangers and supports and place grout for concrete supports to bring pipelines to specified elevations.

H. Bring all pipe systems up to operating pressures and temperatures. Cycle systems to duplicate operating conditions. Correct all support malfunctions.

END OF SECTION

SECTION 40 05 08

WALL PIPES, FLOOR PIPES, AND PIPE SLEEVES

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 all floor pipes, pipe sleeves, wall pipes, other wall pieces, and escutcheons to complete the Work.

B. Coordination:
   1. Review installation procedures under this and other Sections and coordinate with the installation of floor pipes, pipe sleeves, wall pipes, other wall pieces and escutcheons that must be installed with or within formwork, walls, partitions, ceilings and panels.

C. Related Sections:
   1. Section 03 00 05, Concrete.
   2. Section 07 92 00, Joint Sealants.
   3. Section 33 05 05, Buried Piping Installation.
   4. Section 40 05 05, Exposed Piping Installation.

1.2 REFERENCES

A. Standards referenced in this Section are listed below:
   1. American National Standards Institute, (ANSI).
      a. ANSI B16.1, Cast-Iron Pipe Flanges and Flanged Fittings.
      b. ANSI B16.4, Gray-Iron Threaded Fittings.
   2. American Water Works Association, (AWWA).
      a. AWWA C104 (ANSI A21.4), Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
      b. AWWA C110 (ANSI A21.10), Ductile-Iron and Gray-Iron Fittings, for Water.
      c. AWWA C111 (ANSI A21.11), Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
      d. AWWA C115 (ANSI A21.15), Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.
      e. AWWA C151 (ANSI A21.51), Ductile-Iron Pipe, Centrifugally Cast, for Water.
      f. AWWA C200, Steel Water Pipe 6-Inches and Larger.

1.3 QUALITY ASSURANCE

A. Component Supply and Compatibility:
   1. Obtain all equipment included in this Section regardless of the component manufacturer from a single wall pipes, floor pipes and pipe sleeves manufacturer.
   2. The wall pipes, floor pipes and pipe sleeves manufacturer to review and approve or to prepare all Shop Drawings and other submittals for all components furnished under this Section.

3. All components shall be specifically constructed for the specified service conditions and shall be integrated into the overall assembly by the wall pipes, floor pipes and pipe sleeves manufacturer.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:
   1. Shop Drawings:
      a. Detailed drawings and data on all wall and floor pipe, and pipe sleeves. Submit and coordinate these with Shop Drawings required for all piping systems.

1.5 DELIVERY, STORAGE AND HANDLING

A. Comply with the requirements of Section 33 05 05, Buried Piping Installation, and Section 40 05 05, Exposed Piping Installation.

PART 2 PRODUCTS

2.1 MATERIALS

A. Wall and Floor Pipes:
   1. Material: Same as specified for the piping connected to wall or floor pipe, unless otherwise approved by ENGINEER.
   2. End Connections: As shown.
   3. Thickness: Same as specified for the piping connected to wall or floor pipe.
   4. Collars: Provide collars at mid-point of wall for anchorage and watertightness.
   5. Pipes ends shall be flush with wall face, unless otherwise shown.
   6. Drill and tap flanged ends and mechanical joint bells for studs. Provide studs of same material as connected piping, except submerged and buried studs shall be of Type 316 stainless steel.

B. Pipe Sleeves:
   1. Ferrous and Plastic Pipe: Use standard weight stainless steel pipe, unless otherwise shown.
   2. Copper Pipe: Use Type K hard drawn copper pipe, unless otherwise shown.

C. Cast Wall Sleeves:
   1. Material: Ductile iron furnished with integral wall collar.
   2. Dimensions: As required for mechanical joint pipe to pass through sleeve. Length as required.

D. Link Seals: Provide link type mechanical seals suitable for 20 psi working pressure, corrosive service and accessible from one side, with glass-reinforced nylon pressure plate and stainless steel bolts and nuts.
   1. Products and Manufacturers: Provide one of the following:
      a. Link-Seal, as manufactured by Thunderline Corporation.
      b. Or equal.

PART 3 EXECUTION

3.1 INSTALLATION

A. Wall and Floor Pipes: Install as shown and in accordance with approved Shop Drawings.

B. Pipe Sleeves:
1. Use sleeves wherever pipes pass through walls, partitions, floors, and roofs, unless otherwise shown.
2. Extend all sleeves through floor slabs a minimum of 2-inches above finished floor.
3. Anchor sleeves to concrete and masonry walls as shown or otherwise approved.
4. All sleeves through walls shall be flush with wall face.
5. All pipe joints and annular spaces in exterior walls or walls subjected to hydrostatic pressure shall be completely watertight.
6. Use link type seals to seal sleeve against hydrostatic pressure. Size sleeves to provide annular space required to suit the link type mechanical seals that are used.
7. Do not install sleeves and pipes through structural members, unless specifically shown and approved by ENGINEER.
8. Size sleeves to provide annular space as follows:

Pipe Size	Sleeve ID Minus Pipe Or Insulation OD
Less than 2-inches	1/2-inches to 3/4-inches
2-inches to 4-inches	3/4 inches to 1-1/4-inches.
6-inches to 12-inches	1-1/4 inches to 2-inches
Over 12-inches	2-inches to 3-inches

END OF SECTION

SECTION 40 05 19

DUCTILE IRON PROCESS PIPE

PART 1 GENERAL

1.1 DESCRIPTION

A. Scope:
   1. Provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish ductile iron pipe and fittings.
   2. Extent of piping is shown on the Drawings. Piping schedules in Section 33 05 05, Buried Piping Installation, and Section 40 05 05, Exposed Piping Installation, specify pipe service, diameter, material, lining, coating, pressure rating, joint type, and testing required.

B. Coordination:
   1. Review installation procedures under this and other Sections and coordinate installation of items to be installed with or before ductile iron pipe Work.

C. Related Sections:
   1. Section 31 23 05, Excavation and Fill.
   2. Section 33 05 05, Buried Piping Installation.
   3. Section 40 05 05, Exposed Piping Installation.

1.2 REFERENCES

A. Standards referenced in this Section are:
   1. ANSI B18.2.1, Square and Hex Bolts and Screws Inch Series.
   2. ANSI B18.2.2, Square and Hex Nuts. (Inch Series).
   3. ASTM A193, Alloy Steel and Stainless Steel Bolting Materials for High-Temperature Service.
   4. ASTM A194, Specification for Carbon Steel and Alloy Steel Nuts for Bolts for High-Pressure or High-Temperature Service, or Both.
   5. ASTM A307, Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
   6. ASTM A354, Specification for Quenched and Tempered Alloy Steel Bolts, Studs and Other Externally Threaded Fasteners.
   7. ASTM A563, Specification for Carbon and Alloy Steel Nuts.
   8. ASTM B117, Practice for Operating Salt Spray (Fog) Apparatus.
   9. ASTM C283, Test Methods for Resistance of Porcelain Enameled Utensils to Boiling Acid.
   10. ASTM D714, Test Method for Evaluating Degree of Blistering of Paints.
   11. ASTM D792, Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement.
   12. ASTM D5162, Discontinuity (Holiday) Testing of Non-Conductive Protective Coating on Metallic Substrates.
   13. ASTM E96, Test Methods for Water Vapor Transmission of Materials.
   14. ASTM G14, Test Method for Impact Resistance of Pipeline Coatings (Falling Weight Test).
   15. ASTM G62, Test Methods for Holiday Detection in Pipeline Coatings.
   16. ASTM G95, Test Methods for Cathodic Disbondment Test of Pipeline Coatings (Attached Cell Method).
   17. ANSI/AWWA C104, Cement-Mortar Lining for Ductile Iron Pipe and Fittings for Water.
   18. ANSI/AWWA C110, Ductile Iron and Gray Iron Fittings for Water.

19. ANSI/AWWA C111, Rubber-Gasket Joints for Ductile Iron Pressure Pipe and Fittings.
20. ANSI/AWWA C115, Flanged Ductile Iron Pipe with Ductile Iron or Gray Iron Threaded Flanges.
21. ANSI/AWWA C151, Ductile Iron Pipe, Centrifugally Cast, for Water.
22. ANSI/AWWA C153, Ductile Iron Compact Fittings, 3 inch through 24 inch and 54 inch through 64 inch for Water Service.
23. ANSI/AWWA C606, Grooved and Shouldered Type Joints.
24. European Standard (EN), EN 598: Ductile Iron Pipe, Fittings, Accessories and Their Joints for Sewerage Applications.
25. MSS-SP 60, Connecting Flange Joint Between Tapping Sleeves and Tapping Valves.
26. NACE RP0188, Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates.
27. NAPF 500-03, Surface Preparation Standard for Ductile Iron Pipe and Fittings Receiving Special External Coatings and/or Special Internal Linings.
28. NSF/ANSI 61, Drinking Water System Components - Health Effects.
29. SSPC PA 2, Measurement of Dry Coating Thickness with Magnetic Gages.
30. SSPC Painting Manual, Volume 1, Para. XIV.
31. SCDHEC, State Primary Drinking Water Regulation 61-58.

1.3 QUALITY ASSURANCE

A. Qualifications:
   1. Manufacturer:
      a. Manufacturer shall have a minimum of five years successful experience producing ductile iron pipe and fittings and shall be able to show evidence of at least five installations in satisfactory operation in the United States that are similar applications to the specified service.
      b. Lining and coating products shall be manufactured by a firm with a minimum of five years successful experience in protecting pipelines exposed to the specified service conditions, and shall be able to show evidence of at least five installations in satisfactory operation in the United States that are similar applications to the specified service.
      c. When not applied by the manufacturer, lining and coating Subcontractor shall have a minimum of five years successful experience in the application of the specified linings and coatings for similar applications for the specified service, and shall be able to show evidence of at least five installations in satisfactory operation in the United States.

B. Supply and Compatibility:
   1. Unless otherwise approved, obtain all pipe, fittings, and appurtenances included in this Section from a single ductile iron pipe manufacturer.
   2. Ductile iron pipe manufacturer shall review and approve or prepare all Shop Drawings and other submittals for pipe, fittings, and appurtenances furnished under this Section.
   3. Pipe, fittings, and appurtenances shall be suitable for the specified service and shall be integrated into overall piping system by ductile iron pipe manufacturer.
   4. Ductile iron pipe manufacturer shall be responsible for all products and all factory-applied linings and coatings, whether installed at pipe manufacturer's facility or at manufacturer's Supplier's facility.

C. Regulatory Requirements:

1. Pipe and fittings, including linings and coatings, that will convey potable water or water that will be treated to become potable, shall be certified by an accredited organization in accordance with NSF/ANSI 61 as being suitable for contact with potable water, and shall comply with requirements of authorities having jurisdiction at Site.

1.4 SUBMITTALS

A. Action Submittals: Submit the following with Shop Drawings required under Section 33 05 05, Buried Piping Installation, and Section 40 05 05, Exposed Piping Installation:
   1. Shop Drawings:
      a. Detailed drawings and data for pipe, fittings, gaskets, appurtenances, linings, and coatings.
   2. Samples:
      a. Submit Sample of pipe and fitting with each type of lining, for use at the Site to verify continuity, surface gloss, and color, as applicable, via visual inspection.
   3. Test Procedures: For linings and coatings in pipe and fittings.

B. Informational Submittals: Submit the following:
   1. Certificates:
      a. Submit certificate signed by manufacturer of each product that product conforms to applicable referenced standards and the Contract Documents.
   2. Source Quality Control Submittals:
      a. Submit results of specified shop tests for pipe, fittings, linings, and coatings.
      b. Lining and coating test coupons.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Refer to Section 33 05 05, Buried Piping Installation, and Section 40 05 05, Exposed Piping Installation.

B. Handling of Pipe and Fittings Lined with Ceramic Epoxy: Lifting devices shall not come into contact with lined surfaces. Use hooks, forks, chains, straps, and other lifting devices only on exterior of pipe and fittings. Pipe and fittings with damaged lining shall be replaced regardless of cause of damage.

PART 2 PRODUCTS

2.1 MATERIALS

A. General:
   1. Piping systems shall be suitable for their intended use.
   2. Joints shall be as specified in Section 33 05 05, Buried Piping Installation and Section 40 05 05, Exposed Piping Installation. If not specified, provide flanged joints for exposed piping and push-on or mechanical joints for buried piping. Provide couplings on pipe with plain or grooved ends where shown or where approved by ENGINEER.

B. Ductile Iron Pipe, Joints, and Fittings:
   1. Flanged Pipe: Fabricate in accordance with ANSI/AWWA C115.
      a. Pressure Rating: As specified in piping schedule in Section 40 05 05, Exposed Piping Installation. If not otherwise specified, use Special Thickness Class 53 for three-inch

to 54-inch diameter pipe and Pressure Class 350 for 60-inch and 64-inch diameter pipe.

2. Non-Flanged Pipe: Conform to ANSI/AWWA C151 for material, pressure, dimensions, tolerances, tests, markings, and other requirements.
   a. Pressure Class: As specified in piping schedules in Section 33 05 05, Buried Piping Installation and Section 40 05 05, Exposed Piping Installation. If not otherwise specified, use Pressure Class 350 for 12-inch and smaller diameter pipe and Pressure Class 250 for 16-inch and larger diameter pipe .
   b. Special Thickness Class: As specified in piping schedules in Section 33 05 05, Buried Piping Installation and Section 40 05 05, Exposed Piping Installation.
3. Pipe Joints:
   a. Flanged Joints: Conform to ANSI/AWWA C110 and ANSI/AWWA C111 capable of meeting the pressure rating or special thickness class, and test pressure specified in piping schedule in Section 40 05 05, Exposed Piping Installation.
      1) Gaskets: Unless otherwise specified, gaskets shall be at least 1/8-inch thick, ring or full-face as required for the pipe, of synthetic rubber compound containing not less than 50 percent by volume nitrile or neoprene, and shall be free from factice, reclaimed rubber, and other deleterious substances. Gaskets shall be suitable for the service conditions specified, specifically designed for use with ductile iron pipe and fittings.
      2) Bolts: Comply with ANSI B18.2.1.
         a) Exposed: ASTM A307, Grade B.
         b) Buried or Submerged: ASTM A193, Grade B8M, Class 2, Heavy hex, Type 316 stainless steel.
      3) Nuts: Comply with ANSI B18.2.2.
         a) Exposed: ASTM A563, Grade A, Heavy hex.
         b) Buried or Submerged: ASTM A194, Grade B8M, Heavy hex, Type 316 stainless steel.
   b. Mechanical Joints: Comply with ANSI/AWWA C111 and ANSI/AWWA C151, capable of meeting pressure rating or special thickness class, and test pressure specified in piping schedules in Section 33 05 05, Buried Piping Installation, and Section 40 05 05, Exposed Piping Installation.
      1) Glands: Ductile iron.
      2) Gaskets: Plain tip.
      3) Bolts and Nuts: High strength, low alloy steel.
      4) Manufacturers: Provide products of one of the following:
         a) Clow Water Systems Company.
         b) Atlantic States Cast Iron Pipe Company.
         c) Canada Pipe Company, Ltd.
         d) McWane Cast Iron Pipe Company.
         e) Pacific States Cast Iron Pipe Company.
         f) Griffin Pipe Products Co.
         g) American Cast Iron Pipe Co.
         h) U.S. Pipe and Foundry Co.
         i) Or equal.
   c. Push-On Joints: Comply with ANSI/AWWA C111 and ANSI/AWWA C151, capable of meeting pressure class or special thickness class, and test pressure specified in piping schedules in Section 33 05 05, Buried Piping Installation, and Section 40 05 05, Exposed Piping Installation.
      1) Gaskets: Vulcanized SBR, unless otherwise specified.

2) Stripes: Each plain end shall be painted with a circular stripe to provide a guide for visual check that joint is properly assembled.
3) Products and Manufacturers: Provide one of the following:
    a) Tyton or Fastite Joint by Clow Water Systems, Atlantic States Cast Iron Pipe Company, Canada Pipe Company, Ltd., McWane Cast Iron Pipe Company, Pacific States Cast Iron Pipe Company, and Griffin Pipe Products Company.
    b) Fastite Joint by American Cast Iron Pipe Company.
    c) Tyton Joint by U.S. Pipe and Foundry Company.
    d) Or equal.

d. Grooved End Joints: Comply with ANSI/AWWA C606.
1) Gaskets: Flush seal type designed for ductile iron that complies with or exceeds requirements of ASTM D2000
2) Bolts and nuts: As specified for flanged joints.
3) Unless otherwise specified, grooved end couplings shall be rigid joint for exposed service and flexible joint for buried service.
4) Products and Manufacturers: Provide one of the following:
    a) Victaulic, Style 31.
    b) Or equal.

e. Restrained Joints: Restrained push-on joints shall be capable of being deflected after full assembly. Field cuts of restrained pipe are not allowed without approval of ENGINEER.
1) Products and Manufacturers: Provide restrained joints for mechanical joint piping by one of the following:
    a) Megalug, Series 1100, by EBBA Iron Sales, Inc.
    b) MJ Coupled Joint, by American Cast Iron Pipe Co.
    c) MJ Field Lok, by U.S. Pipe and Foundry Co.
    d) Or equal.
2) Products and Manufacturers: Provide restrained joints for push-on joint piping by one of the following:
    a) Lok-Ring Joint, or Flex-Ring Joint, by American Cast Iron Pipe Co.
    b) TR Flex Joint, by U.S. Pipe and Foundry Co.
    c) Or equal.

4. Flanged and Push-On Joint Fittings: Comply with ANSI/AWWA C110 and ANSI/AWWA C111. For compact fittings, comply with ANSI/AWWA C153.
    a. Material: Ductile iron.
    b. Pressure rating, gaskets, bolts, and nuts shall be as specified for flanged joints. Pressure rating of fittings shall meet, but not exceed, specified pressure rating or special thickness class of the connected pipe. All fittings, including glands and bolts, shall be manufactured in domestic foundries.
5. Mechanical Joint Fittings: Comply with ANSI/AWWA C110 and ANSI/AWWA C111. For compact fittings, comply with ANSI/AWWA C153.
    a. Material: Ductile iron.
    b. Glands: Ductile iron.
    c. Pressure rating, gaskets, bolts, and nuts shall be as specified for mechanical joints. Pressure rating of fittings shall meet, but not exceed, specified pressure rating or special thickness class of connected pipe.
    d. Mechanical Joint Bolt Holes: Orient bolt holes to straddle vertical centerline of fittings as shown on the Drawings.
    e. All fittings, including glands and bolts, shall be manufactured in domestic foundries.

C. Lining, General:
   1. Typical Service Conditions:

Property	Buried Water	Buried Sanitary	Force Mains
Fluid(s) Conveyed Through Pipe	Potable Water	Sanitary Waste Water	Sanitary Waste Water
Lining Type	Cement Mortar	Cement Mortar	Ceramic Epoxy

   2. Surface Preparation:
      a. Surface Preparation: Prepare surface in accordance with recommended method.
      b. Finished Surface Inspection: Lining applicator shall inspect finished surface prior to application to determine acceptability. If surface is unacceptable, repeat surface preparation as necessary.

D. Cement-mortar Lining:
   1. Where specified in piping schedules included with Section 33 05 05, Buried Piping Installation and Section 40 05 05, Exposed Piping Installation, pipe and fittings shall be lined with bituminous seal coated cement-mortar lining in accordance with ANSI/AWWA C104.

E. Ceramic Quartz-Filled, Amine-Cured Novalac Epoxy Lining:
   1. Where specified in piping schedules included with Section 33 05 05, Buried Piping Installation and Section 40 05 05, Exposed Piping Installation, pipe and fittings shall be factory lined with a quartz-filled, amine-cured, novalac, epoxy containing at least twenty percent by volume of ceramic quartz pigment.
   2. Ceramic epoxy lining shall have a permeability rating of zero when tested according to Method A of ASTM E96, Procedure A, with a test duration of thirty days.
   3. Conduct the following tests on coupons from factory lined ductile iron pipe:
      a. ASTM B117 Salt Spray (scribed panel): Results to equal zero undercutting after two years.
      b. ASTM G95 Cathodic Disbondment 1.5 volts at 77 degrees F: Results to equal no more than 0.5 mm undercutting after thirty days.
      c. Immersion Testing rated using ASTM D714.
         1) Twenty Percent Sulfuric Acid: No effect after two years.
         2) Twenty-five Percent Sodium Hydroxide at 140 degrees F: No effect after two years.
         3) Distilled Water at 160 degrees F: No effect after two years.
         4) Tap Water at 120 degrees F (scribed panel): Zero undercutting after two years, with no effect.
   4. Ceramic epoxy lining shall have abrasion resistance of no more than four mils loss after one million cycles, in accordance with ES EN 598, Section 7.8, Abrasion Resistance.
   5. Within eight hours of surface preparation, interior of pipe and fittings shall receive 40 mils dry film thickness, utilizing method recommended by lining manufacturer that will comply with requirements of this Section. Number of coats applied shall be as recommended by lining manufacturer. Minimum substrate and ambient temperature for lining application shall be 40 degrees F.
   6. Inspection and Certification:
      a. Check all ductile iron pipe and fitting linings for thickness using magnetic film thickness gage in accordance with method in SSPC PA 2 Film Thickness Rating.

b. Test interior lining of pipe barrels and fittings for pinholes with non-destructive, 2,500-volt test. Defects found shall be repaired in accordance with lining manufacturer's recommendations prior to shipment from lining applicator's factory.
c. Mark each pipe and fitting with date of application and its numerical sequence of application.

7. Products and Manufacturers: Provide one of the following:
   a. Protecto 401 Ceramic Epoxy.
   b. Tnemec Perma-Shield 431.
   c. Or equal.

F. Couplings:
1. Refer to Section 33 05 06, Couplings, Adapters and Specials.

G. Specials:
1. Transition Pieces:
   a. Provide suitable transition pieces (adapters) for connecting to existing piping.
   b. Unless otherwise shown or indicated, expose existing piping to determine material, dimensions, and other data required for transition pieces.
2. Taps:
   a. Provide taps where shown or required for small-diameter piping or instrumentation connections.
   b. Provide corporation stops where shown or required.
   c. Allowable tap sizes are shown in Table 40 05 19-A. Provide tapping saddle with outlet joints conforming to requirements of this Section.

Table 40 05 19-A, Allowable Direct Tapping

Size (inch)	Pressure Class				
	150	200	250	300	350
	Maximum Allowed Direct Tap Size (inch)				
3	-	-	-	-	0.75
4	-	-	-	-	0.75
6	-	-	-	-	1
8	-	-	-	-	1
10	-	-	-	-	1
12	-	-	-	-	1.25
14	-	-	1.25	1.5	1.5
16	-	-	1.5	2	2
18	-	-	2	2	2
20	-	-	2	2	2
24	-	2	2	2	2

   d. For flanged connections on tapping saddle outlet branch, counterbore flange in accordance with MSS SP-60 dimensions. Inside diameter of outlet shall be 1/4-inch greater than nominal diameter.
3. Tangential Outlets:
   a. Provide tangential outlet fittings where shown or indicated.
   b. Weld-on fittings are acceptable.
   c. Flanged and grooved end joints are not allowed.

2.2 MARKING FOR IDENTIFICATION

A. In addition to identification markings specified in Section 33 05 05, Buried Piping Installation, and Section 40 05 05, Exposed Piping Installation, also stamp, mark, and identify push-on joint and mechanical joint pipe with:
   1. Name or trademark of manufacturer.
   2. Weight, class or nominal thickness, and casting period.
   3. Country where cast.
   4. Year the pipe was produced.
   5. Letters “DI” or “Ductile” shall be cast or metal stamped

B. In addition to identification markings specified in Section 33 05 05, Buried Piping Installation, and Section 40 05 05, Exposed Piping Installation, also stamp, mark, and identify flanged pipe with:
   1. Flange manufacturer’s mark, size, and letters “DI” cast or stamped on the flanges.
   2. Fabricator’s mark if other than flange manufacturer.
   3. Length and weight.

C. In addition to identification markings specified in Section 33 05 05, Buried Piping Installation, and Section 40 05 05, Exposed Piping Installation, also stamp, mark, and identify fittings with:
   1. Manufacturer’s identification.
   2. Pressure rating.
   3. Nominal diameters of openings.
   4. Country where cast.
   5. Number of degrees or fraction of the circle on bends.
   6. Letters “DI” or “Ductile” cast on them.

2.3 EXTERIOR SURFACE PREPARATION AND COATINGS

A. General Coating Requirements:
   1. Coating types are specified in piping schedules in Section 33 05 05, Buried Piping Installation, and Section 40 05 05, Exposed Piping Installation.

B. Exposed Pipe and Fittings:
   1. Surface Preparation:
      a. Initial Surface Inspection: Pipe and fitting manufacturer and coating applicator shall inspect surface to be coated and mutually determine recommended NAPF 500-03 surface preparation method.
      b. Surface Preparation: Prepare surface in accordance with recommended NAPF 500-03 method.
      c. Finished Surface Inspection: Prepared surfaces shall be inspected by coating applicator prior to application to determine acceptability of finished surface. If surface is unacceptable, repeat surface preparation and re-application as necessary.
   2. After recommended surface preparation, prime coat exterior ferrous metal surfaces of pipe and fittings in the shop.

C. Buried Pipe and Fittings:
   1. Asphaltic Coating: Where specified in piping schedule in Section 33 05 05, Buried Piping Installation, coat pipe and fittings with an asphaltic coating approximately one-mil thick, in accordance with ANSI/AWWA C151, ANSI/AWWA C115, ANSI/AWWA C110, and ANSI/AWWA C153, as applicable.

PART 3 EXECUTION

3.1 INSPECTION

A. Inspect piping to assure that piping is free from defects in material and workmanship. Verify compatibility of pipe, fittings, gaskets, linings, and coatings.

3.2 INSTALLATION AND FIELD QUALITY CONTROL

A. For buried piping installation and testing, refer to Section 33 05 05, Buried Piping Installation.

B. For exposed piping installation and testing, refer to Section 40 05 05, Exposed Piping Installation.

END OF SECTION

SECTION 40 05 31

THERMOPLASTIC PROCESS PIPE

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 thermoplastic piping and fittings.
   2. Extent of piping is shown and shall be in accordance with piping schedules in Section 33 05 05, Buried Piping Installation.

B. Coordination:
   1. Review installation procedures under this and other Sections and coordinate installation of items to be installed with or before thermoplastic piping Work.

C. Related Sections:
   1. Section 33 05 05, Buried Piping Installation.

1.2 REFERENCES

A. Standards referenced in this Section are:
   1. AASHTO, Standard Specifications for Highway Bridges.
   2. ASTM D1784, Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
   3. ASTM D1785, Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80 and 120.
   4. ASTM D2464, Specification for Threaded Poly (Vinyl Chlorinated) (PVC) Plastic Pipe Fittings, Schedule 80.
   5. ASTM D2466, Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
   6. ASTM D2467, Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
   7. ASTM D2513, Specification for Thermoplastic Gas Pressure Pipe, Tubing, and Fittings.
   8. ASTM D2564, Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
   9. ASTM D2665, Specification for Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings.
   10. ASTM D3034, Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
   11. ASTM D3139, Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
   12. ASTM D3212, Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.
   13. ASTM D3222, Unmodified Poly (Vinylidene Fluoride) (PVDF) Molding Extrusion and Coating Materials.
   14. ASTM D3311, Specification for Drain, Waste and Vent (DWV) Plastic Fittings Patterns.
   15. ASTM D4101, Specification for Polypropylene Injection and Extrusion Materials.

16. ASTM F437, Specification for Threaded Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.
17. ASTM F439, Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.
18. ASTM F441, Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80.
19. ASTM F477, Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
20. ASTM F656, Specification for Primers for Use in Solvent Cement Joints of Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings.
21. ASTM F679, Specification for Poly (Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings.
22. ASTM F1336, Specification for Poly (Vinyl Chloride) (PVC) Gasketed Sewer Fittings.
23. ASTM F1674, Standard Test Method for Joint Restraint Products for Use with PVC Pipe.
24. ASTM F1760, Specification for Coextruded Poly (Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content.
25. AWWA C900, Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In.-12 In. (100 mm-300 mm), for Water Transmission and Distribution
26. AWWA C905, Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 In.-48 In. (350 mm-1,200 mm).
27. AWWA C907, Injection-Molded Polyvinyl Chloride (PVC) Pressure Fittings, 4 In. Through 12 In. (100 mm Through 300 mm).
28. NSF 14, Plastic Piping Systems Components and Related Material.
29. ANSI/NSF 61, Drinking Water System Components - Health Effects.
30. Standards of U.S. Food and Drug Administration.
31. SCDHEC, State Primary Drinking Water Regulation 61-58.

1.3 QUALITY ASSURANCE

A. Qualifications:
   1. Manufacturer: Shall have a minimum of five years experience producing thermoplastic pipe and fittings substantively similar to the materials specified, and shall be able to submit documentation of satisfactory service in at least five completed installations in operation for at least five years each.
   2. Installer:
      a. Engage a single pipe installer who shall be responsible for all thermoplastic pipe Work, and who shall employ only tradesmen with specific skills and experience in the type of Work required.
      b. Installer shall have a minimum of five years experience installing thermoplastic pipe and fittings substantively similar to the materials specified and substantively similar to or larger than the scope of thermoplastic piping Work on the Project, and shall be able to submit documentation of satisfactory experience in at least five completed installations in operation for at least five years each.

B. Component Supply and Compatibility:
   1. Obtain all materials included in this Section, regardless of component Supplier, from a single thermoplastic pipe Supplier. All pipe of each material type shall be furnished by the same manufacturer.
   2. Thermoplastic pipe Supplier shall review and approve to prepare all Shop Drawings and other submittals for all materials furnished under this Section.
   3. Materials shall be suitable for specified service conditions and shall be integrated into overall assembly by thermoplastic pipe 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.
   2. Product Data:
      a. Submit product data on pipe, fittings, gaskets, hardware, and appurtenances sufficient to demonstrate compliance with the Contract Documents.

B. Informational Submittals: Submit the following:
   1. Certificates:
      a. Submit manufacturer's certificate of compliance standards referenced in this Section.
   2. Source Quality Control Submittals:
      a. When requested by ENGINEER, submit results of source quality control tests.
   3. Qualifications Statements:
      a. Submit qualifications of manufacturer when requested by ENGINEER.
      b. Submit qualifications of installer 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 SERVICE CONDITIONS

A. General:
   1. Pipe materials shall be suitable for services intended. Refer to piping schedules in Section 33 05 05, Buried Piping Installation.
   2. Pipe shall be homogeneous throughout and free of visible cracks, holes, foreign inclusions, and other defects. Unless otherwise shown or indicated, pipe shall be uniform in color, opacity, density, and other physical properties.
   3. Comply with NSF 14.
   4. Buried pipe shall be capable of withstanding external live load, including impact, equal to AASHTO H-20 loading, with cover shown or indicated on the Drawings.
   5. Pipe, fittings, and appurtenances in contact with potable water or water that will be treated to become potable shall be listed in ANSI/NSF 61 as being suitable for contact with potable water, and shall comply with requirements of the authorities having jurisdiction at the Site.

2.2 POLYVINYL CHLORIDE (PVC) PIPING

A. Buried PVC Gravity Sewer Pipe.
   1. Manufacturers: Provide products of one of the following:
      a. Ipex, Inc.
      b. Diamond Plastics Corp.
      c. Or equal.
   2. Material:
      a. Pipe shall comply with ASTM D3034 or ASTM F679 (as applicable).

b. Wall Thickness and Pipe Stiffness: Pipe stiffness shall be determined in accordance with test methods in ASTM D3034 or ASTM F679 (as applicable).
   1) Main Line: SDR 35, with minimum ring stiffness of 46 psi.
   2) Service Laterals: As specified in Section 33 31 01.

3. Fittings:
   a. Injection-molded, gasketed fittings shall comply with ASTM F1336, and ASTM D3034 or ASTM F679 (as applicable).
   b. Fabricated fittings shall comply with ASTM F1336.
   c. Unless otherwise shown or indicated, saddle wyes are unacceptable.
4. Joints:
   a. Provide bell and spigot joints. Bell shall consist of an integral wall section to hold securely in place (and prevent displacement during assembly of joint) elastomeric O-ring gasket.
   b. Jointing lubricant shall be as recommended by pipe manufacturer.
   c. Provide elastomeric gaskets complying with ASTM F477, and ASTM D3139 or ASTM D3212.

B. Buried PVC Pressure Pipe:
1. Manufacturers: Provide products of one of the following:
   a. Ipex, Inc.
   b. Diamond Plastics Corp.
   c. Or equal.
2. Material:
   a. Pipe shall comply with AWWA C900 or AWWA C905 (as applicable).
   b. Material shall comply with ASTM D1784.
   c. Wall Thickness:
      1) SDR 14 for 4-inch to 12-inch diameter pipe.
      2) SDR 21 for 14-inch to 48-inch diameter pipe.
   d. Fabricate pipe with cast-iron pipe equivalent outside diameter.
3. Fittings:
   a. Comply with AWWA C900, AWWA C905, or AWWA C907, as applicable.
4. Joints:
   a. Provide bell and spigot joints. Bell shall consist of an integral wall section to hold securely in place (and prevent displacement during assembly of joint) elastomeric O-ring gasket.
   b. Jointing lubricant shall be as recommended by pipe manufacturer.
   c. Provide elastomeric gaskets complying with ASTM F477 and ASTM D3139.
   d. Restrained Joints: Provide restrained joints where shown or indicated.
      1) Comply with Section 33 05 05, Buried Piping Installation.
      2) Proprietary Joint Systems: Comply with ASTM F1674. Provide restrained joint system by one of the following for bell and spigot joint PVC piping:
         a) Ebaa Iron Sales, Inc.: Series 1500 and Series 1600 Restraint Harness for C900 Pipe; Megalug Series 2500, 2800, and 1100HV Restraint Harness for C905 Pipe.
         b) PV-LOK Series, by Sigma Corp.
         c) Or equal.

C. PVC Drain, Waste, and Vent (PVC-DWV) Pipe.
1. Manufacturers: Provide products of one of the following:
   a. Chemtrol, manufactured by Nibco, Inc.
   b. Spears Manufacturing Company.

c. Or equal.
2. Material: In accordance with ASTM D1784. Unless otherwise shown or indicated, PVC-DWV pipe shall be:
   a. Type and Grade: Type 1, Grade 1.
   b. Wall Thickness: Schedule 40.
   c. Color: White.
3. Fittings: Manufactured in accordance with ASTM D2665 and ASTM D3311.
   a. Solvent weld.
   b. Spigot.
4. Joints:
   a. Solvent weld.
   b. Threaded.

2.3 CHLORINATED POLYVINYL CHLORIDE (CPVC) PIPING

A. CPVC Pipe – General Applications: Unless otherwise shown or indicated, CPVC pipe shall comply with the following:
   1. Manufacturers: Provide products of one of the following:
      a. Ipex, Inc.
      b. Spears Manufacturing Company.
      c. Or equal.
   2. Material: Comply with ASTM F441/F441M as having same outside diameter as iron pipe. Comply with the following:
      a. Type and Grade: Type IV, Grade 1.
      b. Wall Thickness: Schedule 80.
      c. Temperature Rating: Rated to 210 degrees F.
      d. Color: Gray.
      e. Manufacture pipe and fittings with minimum of two percent of titanium oxide for ultraviolet protection.
   3. Fittings: Type, grade, schedule, and color of fittings shall match the associated pipe.
      a. Solvent Welded: Fittings shall comply with F439 for socket type.
      b. Threaded: Shall comply with ASTM F437.
   4. Joints:
      a. Solvent Welded: Use primer and solvent cement recommended by CPVC pipe manufacturer. Primer shall be in accordance with ASTM F656, and solvent cement shall be in accordance with ASTM D2564.
      b. Threaded: Use 100 percent virgin polytetrafluoroethylene (Teflon or PTFE) tape for threaded fittings. Pipe shall not be threaded.

2.4 IDENTIFICATION

A. Pipe material identification requirements are in Section 33 05 05, Buried Piping Installation.

2.5 SOURCE QUALITY CONTROL

A. Shop Tests:
   1. Pipe manufacturer shall maintain continuous quality control program.
   2. Where applicable and when requested by ENGINEER, submit results of source quality control tests specified in reference standards.

PART 3 EXECUTION

3.1 INSPECTION

A. Inspect pipe materials for defects in material and workmanship. Verify compatibility of pipe and fittings.

3.2 INSTALLATION

A. For buried piping installation, refer to Section 33 05 05, Buried Piping Installation.

END OF SECTION

SECTION 40 05 53

PROCESS VALVES

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 process valves and appurtenances, complete and operational.

B. Coordination:
   1. Review installation procedures under this and other Sections and coordinate installation of items that must be installed with or before process valves Work.

C. Related Sections:
   1. Section 33 05 05, Buried Piping Installation.
   2. Section 40 05 05, Exposed Piping Installation.

1.2 REFERENCES

A. Standards referenced in this Section are listed below:
   1. American Bearing Manufacturers Association (ABMA).
   2. ANSI B16.1, Cast-Iron Pipe Flanges and Flanged Fittings.
   3. ANSI B16.34, Valves-Flanged, Threaded and Welding end. (ASME B16.34).
   4. ANSI/NSF 61 Drinking Water Components – Health Effects.
   5. API STD 594, Check Valves, Flanged Lug, Wafer and Butt-Welding.
   6. API STD 598, Valve Inspection and Testing.
   7. API STD 609, Butterfly Valves: Double Flanged, Lug-Type and Wafer-Type.
   8. ASTM A126, Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings.
   9. ASTM A193/A193M, Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service.
   10. ASTM A194/A194M, Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure and High Temperature Service, or Both.
   11. ASTM A240/A240M, Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
   12. ASTM A276, Specification for Stainless Steel Bars and Shapes.
   13. ASTM A307, Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
   14. ASTM A351/A351M, Specification for Castings, Austenitic, Austenitic-Ferritic (Duplex), for Pressure-Containing Parts.
   15. ASTM A380, Practice for Cleaning, Descaling and Passivation of Stainless Steel Parts, Equipment and Systems.
   16. ASTM A536, Specification for Ductile Iron Castings.
   17. ASTM A564/A564M, Specification for Hot-Rolled and Cold-Finished Age-Hardening Stainless Steel Bars and Shapes.

18. ASTM A743/A743 M, Specification for Castings, Iron-Chromium, Iron-Chromium-Nickel, Corrosion Resistant, for General Application.
19. ASTM B62, Specification for Composition Bronze or Ounce Metal Castings.
20. ASTM B98/B98M, Specification for Copper-Silicon Alloy Rod, Bar, and Shapes.
21. ASTM B138/B138M, Specification for Manganese Bronze Rod, Bar and Shapes.
22. ASTM B265, Specification for Titanium and Titanium Alloy Strip, Sheet and Plate.
23. ASTM B584, Specification for Copper Alloy Sand Castings for General Applications.
24. ASTM D429, Test Methods for Rubber Property - Adhesion to Rigid Substrates.
25. AWWA C502, Dry-Barrel Fire Hydrants.
26. AWWA C504, Rubber-Seated Butterfly Valves.
27. AWWA C508, Swing-Check Valves for Waterworks Service, 2-inch through 24-inch NPS.
28. AWWA C509, Resilient-Seated Gate Valves for Water Supply Service.
29. AWWA C515, Reduced-Wall, Resilient-Seated Gate Valves for Water Supply Service.
30. AWWA C550, Protective Interior Coatings for Valves and Hydrants.
31. AWWA Manual M49, Butterfly Valves: Torque, Head Loss, and Cavitation Analysis.
32. FS TT-C-494, Coating Compound, Bituminous, Solvent Type, Acid-Resistant.
33. NEMA MG 1, Motors and Generators.
34. MSS SP-60, Connecting Flange Joints Between Tapping Sleeves and Tapping Valves.

1.3 QUALITY ASSURANCE

A. Manufacturer's Qualifications:
   1. Manufacturer shall have minimum of five years of experience producing substantially similar materials and equipment to that required and be able to provide evidence of at least five installations in satisfactory operation for at least five years.

B. Component Supply and Compatibility:
   1. Obtain each type of equipment and appurtenances included in this Section, regardless of the component manufacturer, from a single manufacturer of the type of process valve. For each type of valve, do not furnish valves of more than one manufacturer.
   2. Supplier of each type of equipment specified shall review and approve or prepare all Shop Drawings and other submittals for all components associated with the type of process valve Supplier is furnishing.
   3. Components shall be suitable for use in the specified service conditions. Components shall be integrated into the overall assembly by the process valve manufacturer.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:
   1. Shop Drawings:
      a. Installation drawings showing orientation of valve in both plan and elevation view. Drawings shall clearly identify valve and its appurtenances, including controls, actuators, valve stems, and other components. Show dimensions of valves and appurtenances in relation to piping and structural and architectural components, where applicable.
      b. Controls for and control characteristics of modulating valves.
      c. Calculations for sizing of operating mechanism with extension stems.
      d. Calculations for sizing of gear actuators.
   2. Product Data:

a. Product data sheets.
b. Complete catalog information, including dimensions, weight, specifications, and identification of materials of construction of all parts.
c. Corrosion resistance information to confirm suitability of valve materials for the application. Furnish information on chemical resistance of elastomers from elastomer manufacturer.
d. Cv values and hydraulic headloss curves.

3. Testing Plans:
   a. Submit plan for shop testing of each valve for which shop testing is specified, including testing plan's and test facility's limitations proposed.

B. Informational Submittals: Submit the following:
1. Certificates:
   a. Certificates of compliance with referenced standards, where applicable, including those of AWWA, NSF, and others required by ENGINEER.
2. Manufacturer Instructions:
   a. Submit manufacturer's instructions for handling, storing, and installing valves and appurtenances. Provide templates and setting drawings for valves and appurtenances that require anchor bolts or similar anchorages.
3. Source Quality Control Submittals:
   a. Submit copies of shop test results and inspection data, certified by manufacturer.
4. Field Quality Control Submittals:
   a. Submit results of field tests required.
5. Supplier's Reports:
   a. When requested by ENGINEER, submit written report of results of each visit to Site by Supplier's serviceman, including purpose and time of visit, tasks performed and results obtained.
6. Qualifications Statements:
   a. When requested by ENGINEER, submit manufacturer's qualifications demonstrating compliance with the Specifications, including list of existing installations with contact names and telephone number(s) for each.

C. Closeout Submittals: Submit the following:
1. Operations and Maintenance Data:
   a. Furnish operation and maintenance manuals in accordance with Section 01 78 23, Operations and Maintenance Data.
   b. Furnish in operations and maintenance manuals complete nameplate data for each valve.

D. Maintenance Material Submittals: Submit the following:
1. Spare Parts, Extra Stock Materials, and Tools:
   a. Spare Parts and Extra Stock Materials: Furnish as specified for each valve type.

1.5 DELIVERY, STORAGE AND HANDLING

A. Packing, Shipping, Handling, and Unloading:
1. Deliver materials and equipment to Site to ensure uninterrupted progress of the Work. Deliver anchorage products that are to be embedded in concrete in ample time to prevent delaying the Work.

2. Inspect boxes, crates, and packages upon delivery to Site and notify ENGINEER in writing of loss or damage to materials and equipment. Promptly remedy loss and damage to new condition in accordance with manufacturer's instructions.
3. Conform to Section 01 65 00, Product Delivery Requirements.

B. Storage and Protection:
1. Keep products off ground using pallets, platforms, or other supports. Store equipment in covered storage and prevent condensation and damage by extreme temperatures. Store in accordance with manufacturer's recommendations. Protect steel, packaged materials, and electronics from corrosion and deterioration.
2. Conform to Section 01 66 00, Product Storage and Handling Requirements.

PART 2 PRODUCTS

2.1 GENERAL

A. Valves, General:
1. Provide each valve with manufacturer's name and rated pressure cast in raised letters on valve body.
2. Provide valves with brass or Type 316 stainless steel nameplate attached with Type 316 stainless steel screws. Nameplates shall have engraved letters displaying the following minimum information:
a. Valve size.
b. Pressure and temperature ratings.
c. Application (other than water and wastewater).
d. Date of manufacture.
e. Manufacturer's name.
3. Provide hydrants, gate valves larger than 6-inches and butterfly valves to turn counter-clockwise to open, unless otherwise specified. Provide gate valves smaller than 3-inches to turn clockwise to open.
4. Provide valves with permanent markings for direction to open.
5. Manually operated valves, with or without extension stems, shall require not more than 40-pound pull on manual operator to open or close valve against specified criteria. Gear actuator and valve components shall be able to withstand minimum pull of 200 pounds on manual operator and input torque of 300-foot pounds to actuator nut. Manual operators include handwheel, chainwheel, crank, lever, and T-handle wrench.

B. Valve Materials:
1. Valve materials shall be suitable for the associated valve's service or application, as shown.
2. Protect wetted parts from galvanic corrosion caused by contact of different metals.
3. Wetted components and wetted surfaces of valves used with potable water or water that will be treated to become potable shall conform to ANSI/NSF 61.
4. Clean and descale fabricated stainless steel items in accordance with ASTM A380 and the following:
a. Passivate all stainless steel welded fabricated items after manufacture by immersing in pickling solution of six percent nitric acid and three percent hydrofluoric acid. Temperature and detention time shall be sufficient for removing

oxidation and ferrous contamination without etching surface. Perform complete neutralizing operation by immersing in trisodium phosphate rinse followed by clean water wash.

b. Scrub welds with same pickling solution or pickling paste and clean with stainless steel wire brushes or by grinding with non-metallic abrasive tools to remove weld discoloration, and then neutralize and wash clean.

C. Valve Joints:
1. Exposed Valves: Unless otherwise specified, provide with flanged ends conforming to ANSI B16.1. Pressure class of flanges shall be equal to or greater than specified pressure rating of the associated valve.
2. Buried Valves: Unless otherwise specified, provide with mechanical joints, restrained or unrestrained, as required by piping with which valve is installed.
3. For stainless steel bolting, except where nitrided nuts are required, use graphite-free anti-seize compound to prevent galling. Strength of joint shall not be affected by using anti-seize compound.

2.2 RESILIENT-SEATED GATE VALVES

A. Manufacturers: Provide products of one of the following:
1. American Cast Iron Pipe Company, Series 2500 RW.
2. Clow Valve Co., Model 2638, Model 2639 or Model 2640.
3. Kennedy Valve Co., Model KS-FW or Model KS-RW.
4. M&H Valve Co., Style 4067 or Style 7000.
5. Mueller Co., 2361 Series or 2362 Series.
6. Or equal.

B. General:
1. Provide valves conforming to AWWA C509 or C515 and as specified in this Section.
2. Type:
a. Provide non-rising stem (NRS) valves for buried service.
b. Provide NRS valves for exposed service unless specified otherwise.
c. Provide position indicators for NRS valves used in exposed service.
3. Stem seals shall be of the “O” ring type, only.
4. Minimum Rated Working Pressure: 200 psig.
5. Maximum Fluid Temperature: 150 degrees F.
6. Provide valves with fully encapsulated resilient wedges, unless otherwise specified.
7. Gate valves on water mains shall be direct bury gate valves and shall be furnished with standard valves boxes set in concrete pads as specified in Section 03 00 05, Concrete.
8. Valve ends for buried valves shall be mechanical joint with necessary glands, gaskets and bolts furnished with the valve.
9. Valve ends for exposed valves shall be flange joint.

C. Materials of Construction: Shall conform to AWWA C509 or AWWA C515 and shall be as follows:
1. Valve Body, Bonnet, and Stuffing Box: Cast-iron.
2. Wedge: Cast-iron, symmetrically and fully encapsulated with molded rubber having minimum 1/8-inch thickness.
3. Stem: Manganese bronze.
4. Rubber Items: Buna-N or other synthetic rubber suitable for the application.

5. Internal and external bolting and other hardware including pins, set screws, plug, studs, bolts, nuts, and washers shall be Type 316 stainless steel.
6. Valves 3-inch and smaller may be of all bronze construction with iron pipe thread and screw ends and comply with AWWA C509 or C515 and ASTM B62.

D. Interior Coating:
1. Valves shall be coated inside. Steel, cast-iron and ductile iron surfaces, except machined surfaces, shall be epoxy coated in accordance with AWWA C550.

E. Testing:
1. Test valves in valve manufacturer's shop in accordance with AWWA C509 or AWWA C515.

F. Gear Actuators for Manually-operated Valves:
1. Provide valves with gear actuators conforming to AWWA C509 or AWWA C515.
2. Size gear actuators for maximum differential pressures of service requirements.
3. Valves 6-inches and larger shall be furnished with 2-inch square operating nuts.
4. Valves 3-inch and smaller shall be furnished with T-Head operating nuts, unless a hand wheel is specified.

2.3 BUTTERFLY VALVES

A. Manufacturers: Provide products of one of the following:
1. American Cast Iron Pipe Co.
2. Clow Valve Co.
3. Kennedy Valve Co.
4. Mueller Co.
5. Henry Pratt Co.
6. Or equal.

B. General:
1. Provide butterfly valves conforming to AWWA C504 and as specified herein.
2. Rated Working Pressure: 150 psig, Class 150B.
3. Maximum Fluid Temperature: 150 degrees F.
4. Valves shall provide drip-tight bi-directional shutoff at rated pressures.
5. Mount valve seats in valve body. Rubber seats for 24-inch diameter and larger valves shall be replaceable in the field.
6. Valves shall be capable of being maintained in open or partially open position for manual operation, and for automatic operation. When valve disc is maintained, there shall be no chatter or vibration of disc or operating mechanism.
7. Valve packing shall be replaceable without dismantling valve.
8. Disc shall be offset from shaft to provide uninterrupted 360-degree seat seal.

C. Materials of Construction: materials of construction shall conform to AWWA C504 and shall be as follows:
1. Body: Cast-iron, ductile iron, or alloy cast-iron.
2. Shaft: Type 316 stainless steel.
3. Discs:
   a. Valves Smaller than 30-inch Diameter: Cast-iron.
   b. Valves 30-inch Diameter and Larger: Ductile iron.

4. Seats: Buna-N or other synthetic rubber suitable for the application.
5. Seating Surfaces: Type 316 stainless steel.
6. Bearings:
   a. Valves Smaller than 24-inch Diameter: Nylon.
   b. Valves 24-inch Diameter and Larger: Fiberglass with Teflon lining.
7. Shaft Seals: Externally adjustable, material same as for seats. For services that are either buried or submerged, self-adjusting V-type chevron, material same as for seats.
8. Tapered Pins for Attachment of Shaft to Disc: Type 316 stainless steel.
9. Internal and external bolting and other hardware; including pins, set screws, studs, bolts, nuts, and washers shall be Type 316 stainless steel.

D. Interior Coating:
1. Valves shall be coated inside. Steel, cast-iron, and ductile iron surfaces, except machined surfaces, shall be epoxy-coated in accordance with AWWA C550.

E. Testing:
1. Test each valve in the manufacturer's shop in accordance with AWWA C504.

F. Gear Actuators for Manual Valves:
1. Provide gear actuators conforming to AWWA C540.
2. Gear actuators for valves 20-inch diameter and smaller shall be constructed for 150 psi differential pressure and 16 feet per second port velocity.
3. Gear actuators for valves 24-inch diameter and larger shall be constructed for maximum differential pressures and velocities as scheduled.
4. Butterfly valves shall be furnished with a manual operator equipped with a 2-inch square operating nut. The valve and operator shall be assembled for installation in a horizontal line with the main valve shaft horizontal and the operator shaft and operating nut aligned vertically to accept a valve key operated form the surface.

2.4 DETECTOR CHECK VALVES

A. Manufacturers: Provide products of one of the following:
1. Ames Co., Model 3000SS.
2. Febco, Model 800.
3. Watts, 007 Series.
4. Or equal.

B. General:
1. Provide valves conforming to AWWA C508 and as specified herein.
2. Type: Resilient-seated.
3. Rated Working Pressure: 175 psig.
4. Provide valves suitable for horizontal or vertical mounting.
5. Check valves shall have clear waterway with full-open area equal to nominal pipe size.
6. Provide check valves with outside adjustable weight and lever.
7. Provide valves larger than six-inch diameter with adjustable air cushion chambers.
8. Valve seats shall be mechanically attached and shall be field replaceable.
9. Four-inch through ten-inch detector check valves shall have flanged ends per ANSI B16.1, Class 125.
10. Valves shall be furnished with two tapped bosses on each side to permit installation of a metered bypass.

C. Materials of Construction: All materials of construction shall conform to AWWA C508 and shall be as follows:
   1. Body, Disc, Cover and Gland: Cast-iron or ductile iron.
   2. Disc Arm: Ductile iron.
   3. Hinge Shaft: Type 316 stainless steel or bronze.
   4. Hinge Shaft Bushings: Bronze, or Type 316 stainless steel for sewage service.
   5. Shaft End Plate: Type 316 stainless steel or bronze.
   6. Body Seat: Bronze.
   7. Follower Ring for Rubber Seat on Disc: Type 316 stainless steel or bronze.
   8. Disc Center Pin Assembly: Type 316 stainless steel or bronze.
   9. Air Cushion Chamber:
      a. Chamber and Plunger: Bronze.
      b. Linkages and Pins: Type 316 stainless steel or bronze.
      c. Air Check Valve and Tubing: Brass or stainless steel.
   10. Rubber Items:
      a. Applications Up to 180-degree F Fluid Temperature: Buna-N or other synthetic rubber suitable for the application.
      b. Applications 180-degrees F and Greater Fluid Temperature: Viton, or other synthetic rubber suitable for the application.
   11. Internal and external bolting and other hardware; including pins, set screws, studs, bolts, nuts, and washers shall be Type 316 stainless steel.
   12. Gland Packing: Graphite and Kevlar.

D. Interior Coating:
   1. Valves shall be coated inside. Cast-iron and ductile iron surfaces, except machined surfaces, shall be fusion-bonded epoxy coated in accordance with AWWA C550. Steel surfaces shall be hot-dip zinc galvanized or fusion-bonded epoxy coated.

E. Testing:
   1. Test each valve in manufacturer's shop in accordance with AWWA C508.
   2. Allowable Leakage at Rated Pressures: Zero.

2.5 FIRE HYDRANTS

A. Products and Manufacturers: Provide one of the following:
   1. Mueller, Model: Super Centurion 250 A-421.
   2. Or equal.

B. General:
   1. Provide fire hydrants conforming to AWWA C502, Underwriters' Laboratories-listed and Factory Mutual approved, and as specified herein.
   2. Rated Working Pressure: 175 psig, minimum.
   3. Rated Hydrostatic Test Pressure: 400 psig, minimum.
   4. Depth of Cover: Minimum 3-feet.
   5. Inlet: 6-inch mechanical joint.

C. Construction:
   1. Type: Three-way fire hydrants with two hose nozzles and one pumper nozzle.
   2. Nozzles:

a. Provide one minimum 5-inch Storz pumper nozzle and two 2.5-inch diameter hose nozzles with NFPA threads.
b. Nozzles shall be O-ring sealed, threaded, and retained with stainless steel locks. Nozzles shall be field replaceable.

3. Main Valve and Drainage Assembly:
   a. Opening: 4.5-inch minimum diameter.
   b. Main valve shall be compression type provided with upper and lower metal plates and lower valve plate nut.
   c. Barrel drainage shall be through dual drain valves. Opening and closing of main valve shall cause force-flush of dual drain ports.
   d. Main valve seat ring shall be easily replaceable from above-ground.
4. Provide an oil filled reservoir for lubrication of stem threads and bearing surfaces. Oil shall be U.S. Food and Drug Administration approved and ANSI/NSF 61-listed, and shall flow freely in temperature range of -60 to 158 degrees F.
5. Provide traffic flange in barrel and safety coupling in stem.
6. Inlet Connection: Six-inch diameter mechanical joint, restrained.
7. Operating Nut: 1.25-inch and pentagon-shaped.

D. Materials of Construction: Materials of construction shall conform to the requirements of AWWA C502 and shall be as follows:
   1. Upper and Lower Barrels, Shoe, and Bonnet: Cast-iron.
   2. Stem and Accessories:
      a. Upper and Lower Stems: Steel.
      b. Operating Nut: Bronze.
      c. Safety Coupling: Stainless steel.
   3. Nozzles:
      a. Pumper and Hose Nozzles: Bronze.
      b. Nozzle Caps: Cast-iron.
      c. Cap Chains: Steel.
   4. Main Valve Assembly:
      a. Main Valve: Rubber.
      b. Upper Valve Plate: Bronze.
      c. Lower Valve Plate and Nut: Cast-iron.
      d. Seat and receiving connection at base of hydrant: Bronze.
   5. Drain Valves:
      a. Drain Ring Housing: Cast-iron.
      b. Drain Ring: Bronze.
   6. O-ring Gaskets: Rubber.
   7. External Assembly Bolts: Steel.
   8. Internal Pins and Other Hardware: Stainless steel, ASTM A276.

E. Testing:
   1. Test each fire hydrant in manufacturer's shop in conformance with AWWA C502.

F. Interior Coating:
   1. Hydrants shall be coated on the interior. Steel, cast-iron, and ductile iron surfaces, except machined surfaces, shall be epoxy coated in accordance with AWWA C550.

G. Exterior Painting:

1. All hydrants and any portion of hydrant assembly exposed to view shall be painted with minimum 2 even coats of white hydrant enamel paint.
2. Below- and above-ground painting shall be as specified under Article 2.11 of this Section and Article 2.12 of this Section.

H. Appurtenances for Hydrants:
1. Fire hydrant tees shall be Griffin Swivel hydrant Tee, Tyler 5-125 swivel hydrant tee or approved equal.
2. Piping extension for hydrant installations may be made with 6-inch ductile iron nipples with Tyler long swivel hydrant adapters, Megalug MJ Restraint, U.S. Pipe Field Lok Gaskets, Romac Grip Ring, or other approved method.

2.6 APPURTENANCES FOR EXPOSED METALLIC VALVES

A. General:
1. For valves located less than five feet above operating floor, provide levers on four-inch diameter quarter-turn valves, and provide handwheels on all other valves, unless otherwise shown or specified.
2. For valves located five feet or more above operating floor, provide chain operators.
3. Where indicated, provide extension stems and floorstands.

B. Handwheels:
1. Conform to applicable AWWA standards.
2. Material of Construction: Ductile iron or cast aluminum.
3. Arrow indicating direction of opening and word “OPEN” shall be cast on trim of handwheel.
4. Maximum Handwheel Diameter: 2.5 feet.

C. Crank Operator:
1. Crank operator shall be removable and fitted with rotating handle.
2. Maximum Radius of Crank: 15 inches.
3. Materials:
   a. Crank: Cast-iron or ductile iron.
   b. Handle: Type 304 stainless steel.
   c. Hardware: Type 304 stainless steel.

D. Extension Stems and Floor Stands for Gate Valves:
1. Conform to the applicable requirements of AWWA C501 for sizing of complete lifting mechanism.
2. Bench and Pedestal Floor Stands:
   a. For valves requiring extension stems, provide bench or pedestal floor stands with handwheel or crank as indicated. Provide provisions for using portable electric actuator for opening and closing of valves.
   b. Type: Heavy-duty with tapered roller bearings enclosed in a weatherproof housing, provided with positive mechanical seals around lift nut and pinion shaft to prevent loss of lubrication and to prevent moisture from entering housing. Provide lubrication fitting for grease. For valves conveying water that is potable or that will be treated to become potable, grease shall be food-grade and ANSI/NSF 61-listed. Base shall be machined.
   c. Materials of Construction:

1) Housing: Cast-iron, ASTM A126, Class B.
2) Lift Nut: Cast bronze, ASTM B98/B98M.
3) Grease Fitting: Stainless steel.
4) Bolting: Type 316 stainless steel.

3. Wall brackets for floor stands shall be Type 316L stainless steel construction.
4. Extension Stems:
   a. Materials of Stems and Stem Couplings: Type 316 stainless steel.
   b. Maximum Slenderness Ratio (L/R): 100.
   c. Minimum Diameter: 1.5-inch.
   d. Threads: Acme.
   e. Provide stem couplings where stems are furnished in more than one piece. Couplings shall be threaded and keyed or threaded and bolted and shall be of greater strength than the stem.
   f. Weld to bottom of extension stem a Type 316 stainless steel cap suitable for square end of valve stem.
5. Bottom Couplings: Ductile iron with Type 316 stainless steel pin and set screw.
6. Stem Guides:
   a. Material: Type 316 cast stainless steel with bronze bushing for stem. For submerged service, Type 316 cast stainless steel with stainless steel bushing for stem.
   b. Maximum Stem Length Between Guides: Seven feet.
   c. Stem guides shall be adjustable in two directions.
7. Furnish stem cover of clear butyrate plastic or Grade 153 Lexan with cast adapter for mounting cover to bench and floor stands. Provide stem cover with gasketing and breathers to eliminate water intrusion into operator and condensation within cover. Provide stem cover with mylar tape with legible markings showing valve position at one-inch intervals and open and close limits of valve.

E. Floor Boxes: Provide cast-iron floor boxes for valves that are to be operated from floor above valve. Boxes shall be equal in depth to floor slab. Boxes shall have cast-iron covers and be fitted with bronze bushing.

2.7 APPURTENANCES FOR BURIED METALLIC VALVES

A. Wrench Nuts:
   1. Provide wrench nuts on buried valves of nominal two-inch size, in accordance with AWWA C509.
   2. Arrow indicating direction of opening the valve shall be cast on the nut along with the word “OPEN”.
   3. Material: Cast-iron.
   4. Secure nut to stem by mechanical means.

B. Extension Stems for Non-Rising Stem Gate Valves and Quarter-turn Buried Valves:
   1. Provide extension stems to bring operating nut to six inches below valve box cover.
   2. Materials of Stems and Stem Couplings: Type 316 stainless steel.
   3. Maximum Slenderness Ratio (L/R): 100
   4. Provide top nut and bottom coupling of ductile iron or cast-iron with pins and set screws of Type 316 stainless steel.

C. Valve Boxes:

1. Valve boxes shall be as indicated and as required.
2. Type: Heavy-duty, suitable for highway loading, two-piece telescopic, and adjustable. Lower section shall enclose valve operating nut and stuffing box and rest on valve bonnet.
3. Material: Cast-iron.
4. Coating: Two coats of asphalt varnish conforming to FS TT-C-494.
5. Marking: As required for service.

2.8 TAPPING SLEEVES

A. Products and Manufacturers: Provide one of the following:
   a. Ford Fast.
   b. Romac STS420.
   c. Smith-Blair Model 663.
   d. JCM Industries Model 432.
   e. PowerSeal 3480AS.
   f. PowerSeal 3490AS.
   g. Or approved equal.

B. General:
   1. Application: Potable water service distribution water line.
   2. Tapping sleeves shall be stainless steel or epoxy-coated steel full gasket with wedge gaskets around tap openings.
   3. Stainless steel sleeves shall be 18/8, Type 304 stainless steel.
   4. Tapping sleeves shall include test plugs.
   5. Tapping sleeves 12-inch and smaller shall meet minimum working pressure requirement of 200 psi.
   6. Tapping sleeves 14-inch and larger shall meet minimum working pressure requirement of 150 psi.

C. Construction:
   1. Sleeve outlet flange shall be stainless steel and be Class D per AWWA C207 ANSI 150 pound drilling compatible with approved tapping valves.
   2. Flanged end shall feature lip in accordance with MSS SP-60.
   3. Sleeve gasket shall be of a grid pattern design and shall provide full circumferential sealing around the tapped pipe.
   4. All welds of tapping sleeve shall be passivated.
   5. Tapping valves shall conform to the specifications and approved brands as outlined in this Section.
   6. Tapping valves shall have oversized seat rings and feature one flanged end and one standard mechanical joint.

2.9 ANCHORAGES AND MOUNTING HARDWARE

A. General:
   1. Bolts, nuts, and washers shall be of ample size and strength for purpose intended. Anchorages in concrete shall be at least 5/8-inch diameter.
   2. Provide stem guide anchorages of required strength to prevent twisting and sagging of guides under load.

3. Materials: Provide bolts and washers of Type 316 stainless steel and nitrided nuts. Bolts shall have rolled threads. Bolts and nuts shall be electropolished to remove burrs.

2.10 TOOLS, LUBRICANTS, AND SPARE PARTS

A. Provide T-handle operating wrenches for buried valves as required by the County.

B. Lubricants: For valves, actuators, and appurtenances requiring lubricants, provide suitable lubricants for initial operation and for first year of use following Substantial Completion. Lubricants for equipment associated with conveying potable water or water that will be treated to become potable shall be food-grade and ANSI/NSF 61-listed.

C. Provide tools, spare parts, and maintenance materials.

2.11 PAINTING OF EXPOSED VALVES, HYDRANTS, AND APPURTENANCES

A. Exterior steel, cast-iron, and ductile iron surfaces, except machined surfaces of exposed valves and appurtenances, shall be finish painted in manufacturer's shop. Surface preparation, priming, finish painting, and field touch-up painting shall conform to the manufacturer's paint standards.

2.12 PAINTING OF BURIED VALVES

A. Exterior steel, cast-iron, and ductile iron surfaces, except machined or bearing surfaces of buried valves, shall be painted in valve manufacturer's shop with two coats of asphalt varnish conforming to FS TT-C 494.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine conditions under which materials and equipment are to be installed and notify ENGINEER in writing of conditions detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General:
   1. Install valves and appurtenances in accordance with:
      a. Supplier's instructions and the Contract Documents.
      b. Requirements of applicable AWWA standards.
      c. Applicable requirements of Section 33 05 05, Buried Piping Installation, and Section 40 05 05, Exposed Piping Installation.
   2. Install valves plumb and level. Install all valves to be free from distortion and strain caused by misaligned piping, equipment, and other causes.

3. Position detector check valves and butterfly valves so that, when valve is fully open, valve disc does not conflict with piping system elements upstream and downstream of valve.

B. Exposed Valves:
   1. Provide supports for large or heavy valves and appurtenances as shown or required to prevent strain on adjoining piping.
   2. Operators:
      a. Install valves so that operating handwheels or levers can be conveniently turned from operating floor without interfering with access to other valves, piping, structure, and equipment, and as approved by ENGINEER.
      b. Avoid placing operators at angles to floors or walls.
      c. Orient chain operators out of way of walking areas.
      d. Install valves so that indicator arrows are visible from floor level.
      e. For motor-operated valves located lower than five feet above operating floor, orient motor actuator to allow convenient access to pushbuttons and handwheel.
   3. Floor Stands and Stems:
      a. Install floor stands as shown and as recommended by manufacturer.
      b. Provide lateral restraints for extension bonnets and extension stems as shown and as recommended by manufacturer.
      c. Provide sleeves where operating stems pass through floor. Extend sleeves two inches above floor.

C. Buried Valves:
   1. Install valve boxes plumb and centered, with soil carefully tamped to a lateral distance of four feet on all sides of box, or to undisturbed trench face if less than four feet.

D. Hydrants:
   1. Hydrant drains shall not be connected to, or located within 10 feet of, sanitary sewer systems.
   2. Install tracer wire per fire hydrant detail.

E. Tapping Sleeves:
   1. Place the lower half of the tapping sleeve under the pipe to be tapped. Support sleeve with blocks and place the gaskets. Place the upper half of the sleeve over the pipe, insert the bolts, rotate the sleeve to proper position and tighten the nuts evenly. Bolt tapping valve to the sleeve outlet, attach tapping machine to the valve, drill and tap central hole and cut outlet in main. After opening has been made, withdraw the drill, cut-out portion of pipe wall and the cutter and close tapping valve. Remove and temporary extension piping used to make connection.
   2. Coat threads on tapping sleeve bolts with anti-gall coating prior to installation.
   3. Leave newly-installed tapping sleeve and valve exposed for a minimum period of 24 hours to permit inspection of the joints and valve for leaks. Test at same hydrostatic pressure as that present in existing main.
   4. Correct all visible leaks, if any, at no additional cost to Owner. After such leaks have been sealed, again leave sleeve and valve exposed for a minimum period of 24 hours. Repeat this procedure until Engineer accepts installation and then commence backfilling.

3.3 FIELD QUALITY CONTROL

A. Field Tests:
   1. Adjust all parts and components as required to provide correct operation of valves.
   2. Conduct functional field test on each valve in presence of ENGINEER to demonstrate that each valve operates correctly.
   3. Verify satisfactory operation and controls of motor operated valves.
   4. Demonstrate satisfactory opening and closing of valves at specified criteria requiring not more than 40 pounds effort on manual actuators.
   5. Test ten percent of valves of each type by applying 200 pounds effort on manual operators. There shall be no damage to gear actuator or valve.

B. Tests for Tapping Sleeves
   1. Perform hydrostatic and leakage tests on tapping sleeves in accordance with AWWA C600.
   2. All leaks and any defective material shall be repaired or replaced to the satisfaction of the Engineer and the tests repeated until the requirements of this specification are met.
   3. Furnish any special equipment required to conduct the test.
   4. If hydrants or other openings are not available for the purpose of expelling air, provide air releases of sufficient size (as determined by the Engineer) in accordance with the Drawings at the Contractor's expense.
   5. Test pressure shall be held for at least 2 hours at minimum 150% the maximum working pressure at the low point of the section being tested. If testing against butterfly valves, the differential pressure must not exceed 150 psi for valves rated at 150 psi.
   6. If the test cannot be executed with differential pressure of 150 psi, a 250 psi valve shall be specified.
   7. Differential test pressures against gate valves shall not exceed 200 psi.
   8. Allowable leakage shall be determined by AWWA C600.

END OF SECTION

SECTION 40 05 86

AIR VALVES FOR WATER AND WASTEWATER SERVICE

PART 1 GENERAL

1.1 DESCRIPTION

A. Scope:
   1. Provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish, install, and test Air Valves for water and wastewater service complete with appurtenances.
   2. This Section does not include:
      a. Valves specified in other Sections
      b. Valves furnished with equipment
      c. Non-metallic valves.

B. Coordination:
   1. Review installation procedures for this and other Specification sections and coordinate Work that must be installed with or before Work under this Section.
   2. If this is a multiple-prime contract project, provide timely advance notification of schedule of work to other contractors who may need to install items at same time or before Work included in this Section.

C. Related Sections:
   1. Section 40 05 53, Process Valves

1.2 REFERENCES

A. Standards referenced in this Section are:
   1. ANSI/AWWA C512, Air Release, Air Vacuum and Combination Air Valves for Waterworks Service
   2. ANSI/AWWA C550, Protective Interior Coatings for Valves and Hydrants.
   3. ANSI/NSF 61 Drinking Water Components – Health Effects

1.3 DEFINITIONS

A. The following definitions apply to this Section.
   1. Air Release Valve: A hydromechanical device designed to automatically release to atmosphere small pockets of air as they accumulate in a pipeline when pipeline system is full and operating under pressure.
   2. Air/Vacuum Valve: Direct-acting, float-operated, hydromechanical device designed to automatically release or admit large volumes of air during filling or draining of a pipeline or piping system. Valve will open to relieve negative pressures and will not reopen to vent air when system is full and under pressure.
   3. Air Valve: Valve of one of the following types: Air Release Valve, Air/Vacuum Valve, or Combination Air Valve.
   4. Maximum and Minimum Working Pressure: Pressure range at which valve is designed to function.

5. Orifice: Opening in valve mechanism through which air is expelled from or admitted into pipeline or piping system.
6. Valve Design Pressure: Maximum pressure to which a valve may be subjected without exceeding allowable stress of its components.

1.4 QUALITY ASSURANCE

A. Manufacturer's Qualifications:
   1. Manufacturer shall be able to provide documentation of at least five installations of substantially similar equipment to that specified, in satisfactory operation for at least five years.

B. Component Supply and Compatibility:
   1. Valves of the same type, including specified accessories, shall be products of or furnished by a single air valve manufacturer.

C. Regulatory Requirements.
   1. Drinking Water Requirements: Valves that will be in contact with potable water or water that will be treated to become potable shall comply with ANSI/NSF 61 and the Safe Drinking Water Act.

1.5 SUBMITTALS

A. Action Submittals.
   1. Product Data: Submit the following for each type and size of valve specified:
      a. Product data sheet.
      b. Complete catalog information, including dimensions, weight, performance data, Orifice size, specifications, and identification of materials of each part.

B. Informational Submittals:
   1. Certifications:
      a. Submit a certificate signed by manufacturer of each product stating that product conforms to applicable referenced standards and specified requirements.
   2. Test Reports:
      a. Provide results of successful factory tests prior to shipping products to the Site.
   3. Manufacturer's Reports:
      a. Submit written report of results of each visit to Site by a manufacturer's serviceman, including purpose and time of visit, tasks performed, and results obtained.

C. Closeout Submittals.
   1. Operation and Maintenance Data:
      a. Submit complete operation and maintenance manual for all Air Valves in the Contract, including maintenance data and schedules in sufficient detail for disassembly and assembly of valve, and identifying parts that can be replaced.
      b. Furnish operation and maintenance manuals per Section 01 78 23, Operations and Maintenance Data.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Packing, Shipping, Handling, and Unloading:
   1. Prepare valves for shipping per Section 6.2 of ANSI/AWWA C512.
   2. Conform to Section 01 65 00, Product Delivery Requirements.

B. Acceptance at Site:
   1. Inspect all boxes, crates, and packages upon delivery to Site and notify ENGINEER in writing of loss or damage to products. Promptly remedy loss and damage to new condition per manufacturer's instructions.

C. Storage and Protection:
   1. Keep all products off ground using pallets, platforms, or other supports. Protect products from corrosion and deterioration.
   2. Conform to Section 01 66 00, Product Storage and Handling Requirements.

1.7 MAINTENANCE

A. Extra Materials (for capital projects):
   1. Furnish complete valves or sets of field replaceable parts for each type and size of valve installed, tagged and boxed for long-term storage as follows:

Quantity of Valves Installed	**Spare Valves (1) or Sets of Spare Parts (2)**
1 to 5	1
6 to 10	2
11 to 15	3
16 or more	5

Notes:
(1) For valves smaller than 4-inch diameter furnish complete valve instead of sets of spare parts. Complete valve does not include accessories that are not typically furnished with valve model.
(2) Set of field-replaceable spare parts includes one gasket and all field-replaceable seats and bushings.

PART 2 PRODUCTS

2.1 GENERAL

A. Extent:
   1. Provide valves included in this Section and as shown on the Drawings.

B. Requirements:
   1. Size: Air valve shall be sized per manufacturer's recommendations.
   2. Valve Design Pressure: Unless otherwise specified, Valve Design Pressure shall be equal to or exceed design pressure of pipe or equipment on which the valve is installed.
   3. Valve Type, Service, Inlet Size, Orifice Size, Accessories, and Required Features: Provide per the Drawings.

4. Materials: Air Valve materials shall be suitable for long-term use in the service specified.
5. Ends:
   a. Provide per the Drawings.
   b. Comply with valve connection requirements in Section 4.3 of ANSI/AWWA C512.
6. Operating Pressure Range: Valve Design Pressure shall be greater than the valve's Maximum and Minimum Working Pressure.
7. Air Valves in water service shall comply with ANSI/AWWA C512 unless otherwise shown or specified.
8. Air/ Vacuum Valves in wastewater service to be long body type, furnished with back flushing attachments.

C. Markings:
1. Mark valves per Section 6.1 of ANSI/AWWA C512.

D. Manufacturers:
1. Apco Valves.
2. Crispin Valves.
3. GA Industries.
4. Val-Matic Valve & Manufacturing Corporation.
5. Henry Pratt.
6. Or equal.

2.2 ACCESSORIES

A. Isolating Valves:
1. Provide isolating valves as shown in the Drawings.

B. Anti-Slam Devices for Water Service:
1. Provide anti-slam devices on inlet to air/vacuum valves where indicated.
2. Pressure rating of anti-slam device shall equal or exceed Valve Design Pressure of connected Air Valve.
3. Ends shall be as required for connecting to Air Valve.
4. Anti-slam devices shall be as normally furnished by specified Air Valve manufacturers and be cast iron or ductile iron with bronze or stainless steel disc and trim.

C. Back-flush Attachments for Wastewater Service:
1. Unless otherwise indicated, provide back-flush attachment for Air Valves.
2. Back-flush attachments shall be as normally furnished by specified Air Valve manufacturer. Provide ports in the Air Valve body for flushing and discharge, each with an isolating valve and quick-connect for attaching hoses.
3. Provide five-foot length of rubber hose with quick-connect for connecting to flushing discharge port.
4. Provide a plugged 2-inch diameter NPT port at bottom of Air Valve body for removal of solids.

D. Vacuum Check Valves:
1. Provide vacuum check valves for Air Release Valves where indicated.
2. Vacuum check valves shall be as normally furnished by Air Valve manufacturer.

E. Throttling Devices
   1. Provide throttling device on discharges of Air/Vacuum Valves where indicated.
   2. Throttling device shall have a field-adjustable Orifice and be as normally furnished by Air Valve manufacturer.

F. Inflow Prevention Devices for Water Service:
   1. Extent: Provide where indicated.
   2. Design: System shall allow connected Air Valve to function normally under normal (non-flooded) conditions.
   3. Size: Venting capacity shall be equal to or greater than connected Air Valve:
   4. Connections: Provide female threaded connections for Air Valve of 1 to 4 inches, and flat faced flanges drilled per ANSI B16.1 Class 125 for larger sizes.
   5. Products and Manufacturers: Provide products of one of the following:
      a. Val-Matic, Series 1300.
      b. Or equal.

2.3 FACTORY PAINTING

A. Interior Surfaces
   1. Extent: Paint ferrous surfaces except stainless steel surfaces.
   2. Paint: Paint shall be as normally provided by Air Valve manufacturer for the specified application, except for potable water service valves which shall be coated with paint complying with ANSI/AWWA C550 and ANSI/NSF-61.

B. Exterior Surfaces
   1. Exterior surfaces of cast-iron, ductile iron, and steel other than stainless steel, except machined surfaces of valves and appurtenances, shall be finish painted.
   2. Surface preparation, painting, and field touch-up painting shall be per manufacturer's paint standards.
   3. Furnish valve with only a prime coat if so indicated.

2.4 SOURCE QUALITY CONTROL

A. Test and inspect Air Valves per Section 5 of ANSI/AWWA C512. Do not ship valves that are not successfully tested.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine conditions under which Work is to be installed and notify ENGINEER in writing of conditions detrimental to proper and timely completion of Work. Do not proceed with Work until unsatisfactory conditions have been corrected.

B. Examine valves and remove packing and foreign materials from interior of valve. Report defects to ENGINEER

3.2 INSTALLATION

A. Install valves and appurtenances as shown on the Drawings and per Air Valve manufacturer's recommendations, approved Shop Drawings, and applicable codes and standards.

B. Install valves plumb and vertical.

C. Install with an isolating valve. Remove isolating valve's operating handle or lever and deliver to OWNER.

D. Adjust throttling devices, if provided, for smooth, non-slam and waterhammer-free operation.

END OF SECTION

SECTION 43 21 39

PUMPING STATION – SUBMERSIBLE TYPE WITH VALVE VAULT

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 submersible type pumping station with valve vault, complete and operational.

B. Related Sections:
   1. Section 03 00 05, Concrete.
   2. Section 31 23 05, Excavation and Fill.
   3. Section 32 12 00, Flexible Paving.
   4. Section 32 92 00, Lawns and Meadows.
   5. Section 40 05 05, Exposed Piping Installation.
   6. Section 40 05 08, Wall Pipes, Floor Pipes and Pipe Sleeves.
   7. Section 40 05 19, Ductile Iron Process Pipe.
   8. Section 40 05 53, Process Valves.
   9. Section 43 21 39.13, Submersible Pumps.

1.2 SECTION INCLUDES

A. Submersible type pumping station with valve vault, and including:
   1. Excavating and backfilling.
   2. Wet well with resilient connectors, steel supports, electrical handhole, and vent.
   3. Valve vault with floor door, manhole steps, and vent.
   4. Anchor bolts and anchors.
   5. Submersible pumps with pump guide assemblies, pump access doors, and pump controls.
   6. Piping for pump discharges and drains.
   7. Asphalt pavement.
   8. Electrical.
   9. Painting.
   10. Landscaping.

1.3 SUBMITTALS

A. Provide Manufacturer Standard Submittal Drawings, Operating and Maintenance Instruction Manuals and Parts List to the Engineer. Standard Submittals shall consist of:
   1. Pump Performance Curves.
   2. Pump Outline Drawing.
   3. Station Drawing for Accessories.
   4. Electrical Motor Data.
   5. Control Drawing and Data.
   6. Access Cover Dimensions Minimum.
   7. Typical Installation Guides.

8. Technical Manuals.
9. Operation and Maintenance Manual.
10. Parts List.
11. Printed Warranty.
12. Manufacturer's Equipment Storage Recommendations.
13. Manufacturer's Standard Recommended Start-Up Form.
14. Certified Factory Test Pump Curve.

B. Furnish a manufacturer's affidavit indicating that the pipe, fittings, and valves have been manufactured and tested in accordance with requirements of the applicable referenced Standards, and the Project on which the material is to be used prior to construction.

1.4 DESIGN REQUIREMENTS

A. Design precast structures to meet loading requirements of AASHTO Classification H-20.

B. Minimum Lateral Earth Pressure: 60 pcf.

C. Design for groundwater level no more than 5 feet below grade.

1.5 QUALITY ASSURANCE

A. Precast Concrete Structures:
   1. Qualifications: The precaster shall be PCI-certified; design shall be sealed by a Professional Engineer licensed to practice in the State of South Carolina.
   2. Inspections: ENGINEER reserves the right to inspect the precasting facility prior to and during fabrication, and to collect samples of materials during the fabrication process for testing. Manufacturer shall accommodate facility inspection and sample collection.

B. Piping:
   1. Pipe and fittings to be appropriately marked for identification purposes.
   2. The materials and methods of manufacture, and completed pipes, fittings, and valves are subject to inspection and rejection at all times. OWNER and ENGINEER have the right to make inspections.
   3. Valve manufacturer's name, valve size, pressure rating, and direction of opening to be marked on valve.

PART 2 PRODUCTS

2.1 EXCAVATION AND FILL

A. Fill Materials: Follow Section 31 23 05, Excavation and Fill.

2.2 WET WELL

A. Walls:
   1. Precast reinforced concrete sections; comply with ASTM C478.
   2. Joints: Tongue and groove with rubber gaskets; comply with ASTM C443.

3. Flexible Plastic Gasket Material: Federal Specification SS-S-210A and AASHTO M-198B; Hamilton-Kent Manufacturing Company, Concrete Sealants, Inc., or as approved.

B. Top and Bottom Slabs: Class I concrete; follow Section 03 00 05, Concrete.

C. Concrete Fill: Class II concrete; follow Section 03 00 05, Concrete.

D. Resilient Connector: Comply with ASTM C923.
   1. Manufacturers:
      a. A-Lok Products, Inc., A-Lok Connector.
      b. National Pollution Control Systems, Inc., Kor-N-Seal.
      c. Or as approved.

E. Pipe Brace and Concrete Pipe Support Beam Angle:
   1. Structural steel; ASTM A36.
   2. Type 316 stainless steel expansion anchors.

F. Vent:
   1. Schedule 40 black steel pipe, ASTM A53, Grade B with welded or flanged joints; or ductile iron pipe, AWWA C150 and C151, Class 50 with flange joints. Provide required wall casting. Provide outlet with a bronze wire screen, 0.063-inch diameter wire, 2 mesh size, mechanically held in place between two flanges.

2.3 VALVE VAULT

A. Walls, Top and Bottom Slabs:
   1. Minimum compressive strength 5,000 psi at 28 days; air entrainment of 6 percent, ±1 percent; follow Section 03 00 05, Concrete.
   2. Reinforcing steel meeting ASTM A615 or A616, certified Grade 60.
   3. Welded wire fabric conforming to ASTM A185.
   4. Poured and vibrated and constructed using steel forms.
   5. Wall joints with tongue and groove design; sealed water-tight with gasket and polyurethane sealant.
   6. Wall penetrations for drain piping field-cored.

B. Floor Door and Drain Piping:
   1. Manufacturers:
      a. Babcock-Davis Hatchways, Series B-FGA-H.
      b. The Bilco Company, Type J-AL, H-20.
      c. Halliday Products, Inc., Series H1W.
      d. Or as approved.
   2. Load Rating: AASHTO H-20 wheel loading.
   3. Frame:
      a. Material: Extruded aluminum sections shaped to serve as a continuous drainage gutter with a 1-1/2 inch drain coupling.
      b. Anchors: Continuous anchor flange.
      c. Apply manufacturer's standard protective coating to surfaces of frame that will be in contact with concrete.
   4. Cover:

a. Material: 1/4 inch mill finish aluminum diamond plate, reinforced with stiffening ribs.
b. Hinges: Stainless steel; butt type with compression spring operators enclosed in telescopic tubes.
c. Hold Open Arm: Stainless steel; automatically locks door at 90 degree position; provide vinyl grip handle to release door for closing.
d. Lock: Stainless steel; slam type with fixed handle inside and removable key wrench outside.

5. Hardware and Fasteners: Type 316 stainless steel.
6. Accessories: Provide one key wrench for each door supplied.
7. Drain Piping: Follow paragraph 2.6.C in this Section.

C. Manhole Steps:
1. 1/2 inch diameter steel reinforcing rod continuous through entire length of legs and tread, encapsulated in a copolymer polypropylene plastic.
2. Provide steps with notched tread ridge and retainer lugs on each side of tread ridge.
3. Provide grab bar where indicated.

D. Vent: Schedule 40 black steel pipe, ASTM A53, Grade B, with welded or flange joints; or ductile iron pipe, AWWA C150 and C151, Class 50 with flange joints. Provide required wall casting. Provide outlet with a bronze wire screen, 0.063 inch diameter wire, No. 2 mesh size, mechanically held in place between two flanges.

E. Sump Drain Piping: Follow paragraph 2.6.C in this Section.

2.4 ANCHOR BOLTS AND EXPANSION ANCHORS

A. Anchor Bolts Cast-In-Concrete:
1. Comply with ASTM F593, Type 316 stainless steel.
2. 4 inch minimum hook.

B. Expansion Anchors:
1. Manufacturers:
a. Hilti Corporation, Kwik Bolt II.
b. ITW Ramset/Red Head, Trubolt Wedge Anchor.
c. The Powers Rawl Company, Inc., Power-Stud.
d. Or as approved.
2. Expansion Type: Comply with Federal Specification FF-S-325 Group II, Type 4, Class I.
3. Type 316 stainless steel.
4. Minimum Embedment: 4 inches, unless otherwise indicated.

2.5 SUBMERSIBLE PUMPS

A. Follow Section 43 21 39.13, Submersible Pumps; includes submersible pumps, pump guide assemblies, pump access doors, and pump controls.

2.6 PIPING

A. Piping Schedule:

Application	Material
Submersible pumps discharge to and including connection with force main	Ductile Iron
Valve Vault floor door drain to the sump	PVC
Valve Vault gravity sump drain to wet well	PVC

B. Ductile Iron Pipe and Fittings: Follow Section 40 05 19, Ductile Iron Process Pipe.
   1. Pipe:
      a. Buried: Designed in accordance with AWWA C150 and manufactured in accordance with AWWA C151; minimum Thickness Class 52, with polyethylene encasement; mechanical joint or push-on joint.
      b. Exposed: AWWA C115 flanged joint.
   2. Fittings: AWWA C110.
   3. Exterior Coating: Asphaltic material for buried and within wet well; factory-applied prime coat for all other. Buried fittings may be coated with a fusion-bonded epoxy coating in accordance with AWWA C116.
   4. Interior Lining: Ceramic epoxy lining, Protecto 401 Ceramic Epoxy.
   5. Joints:
      a. Mechanical and Push-On: AWWA C111, rubber gasket, with restrained joints.
         1) Restrained Push-On: Completely boltless; McWane Push-On Restrained Joint Pipe, U.S. Pipe TR Flex, American Flex-Ring, or as approved.
         2) Restrained Mechanical: EBAA Iron, Inc. MEGALUG with Mega-Bond Coating System, or as approved, of ductile iron, and with a working pressure of at least 250 psi, and a minimum safety factor of 2:1.
      b. Flanged: Appendix A of AWWA C115, and ANSI B16.1, Class 125; ductile iron flanges; zinc-plated bolts and nuts.
      c. Bolted Joints: Bolt length shall be such that all threads of the nut will be engaged.
   6. Wall Castings:
      a. Ductile iron; AWWA C110; coated and lined as specified for pipe.
      b. Provide with integral water stop.
      c. End Connections: As indicated on Drawings.
      d. Length: As required for wall thickness.
   7. Polyethylene Encasement: AWWA C105 polyethylene tube; 2 inch wide, plastic-backed adhesive tape, bond to both metal surfaces and polyethylene tube.
   8. Pipe, Fittings, and Appurtenances: Manufactured in United States.

C. PVC Pipe and Fittings:
   1. Pipe: ASTM D1785, Schedule 80.
   2. Joints:
      a. Socket: Solvent-welded.
      b. Threaded: Taper pipe threads.
      c. Flanged: One-piece solid design; compatible with ANSI B16.5, Class 160 metal flanges.
   3. Fittings:
      a. Socket: ASTM D2467.
      b. Threaded: ASTM D2464.
   4. Unions: O-ring seal type; transition type for joining dissimilar materials.

D. Valves:
   1. Plug Valves:
      a. Type: Non-lubricated eccentric plug with resilient plug facings.
      b. Body: Cast iron; ASTM A126, Class B.
      c. Seat: Raised seat with 1/8-inch welded overlay of 90 percent pure nickel. Screw-in seats are not acceptable.
      d. Plug: Cast iron; ASTM A126, Class B; cylindrical seating surface, faced with chloroprene or neoprene, as instructed by manufacturer based on type of service.
      e. Bearings: Stainless steel sleeve type, permanently lubricated. Non-metallic bearings are not acceptable.
      f. Shaft Seals: Multiple V-ring type, externally adjustable and repackable without removing bonnet.
      g. Operator: Valves less than 6 inches, lever actuator. Equip valves 6 inches and larger with gear actuators and handwheel. Enclose gearing in semi-steel housing; provide seals on all shafts; support actuator shaft on permanently lubricated bronze bearings.
      h. Manufacturers: DeZurik, PEC, or as approved.
   2. Swing Check Valves:
      a. Type: Full opening swing type with outside lever and weight, suitable for horizontal or vertical installation. Clapper to swing completely clear of waterway.
      b. Body: Cast Iron; ASTM A126, Class B.
      c. Clapper: For valve sizes as follows:
         1) 4 Inches and Smaller: Bronze.
         2) 6 Inches through 12 Inches: Cast iron with bronze face.
         3) 14 Inches and Larger: Cast iron with rubber face.
      d. Hinge Pin: Stainless steel.
      e. Outside Lever and Weight: Cast iron.
      f. Manufacturers:
         1) M&H Valve Company.
         2) Mueller Company.
         3) Or as approved.
   3. Ball Check Valves, Plastic:
      a. Type: True union design; suitable for horizontal or vertical installation.
      b. Body and Ball: PVC.
      c. Seats and Seals: EPDM or Viton as instructed by manufacturer for intended service.
      d. Manufacturers:
         1) Asahi/America.
         2) Chemtrol.
         3) Or as approved.

E. Pipe Sleeves:
   1. Material: Standard weight steel pipe or 18 gage galvanized steel.
   2. Integral waterstop collar.
   3. Size:
      a. Diameter: Large enough to allow for movement due to expansion and contraction. Allow for continuous insulation wrap.
      b. Length: Flush with wall or floor, unless otherwise indicated.

F. Mechanical Type Seal:

1. Manufacturers: Pipe Seal International, Link-Seal, service designation S; or as approved.
2. Design: Modular mechanical type, consisting of interlocking synthetic rubber links, shaped to fill the annular space between the pipe and sleeve.
3. Size: As instructed by manufacturer based on pipe size and opening size.
4. Sealing Element: EPDM rubber.
5. Pressure Plate: Glass-reinforced nylon plastic.
6. Bolts and Nuts: Type 304 stainless steel.

G. Pipe Couplings for Ductile Iron Pipe:
1. Manufacturers:
   a. Baker Coupling Company, Inc., Series 200.
   b. Dresser Industries, Style 38.
   c. Smith-Blair, Inc., 411.
   d. Or as approved.
2. Type: AWWA C219, bolted-gasketed sleeve type.
3. Components:
   a. Steel middle ring.
   b. Two steel followers.
   c. Two-rubber compound, wedge-shaped gaskets suitable for service intended.
   d. Track-head steel bolts and nuts.
4. Size: As instructed by manufacturer based on pipe diameter.
5. Finish: Factory-applied primer exterior; factory-applied epoxy coating interior.

H. Pipe Supports:
1. Concrete Beams: Follow Section 03 00 05, Concrete.
2. Concrete Piers: Class I concrete; follow Section 03 00 05, Concrete.

2.7 ASPHALT PAVEMENT

A. Comply with Section 32 12 00, Flexible Paving.

2.8 PAINTING

A. Manufacturers:
1. Carboline Company.
2. ICI Paints (Devoe Coatings).
3. The Sherwin-Williams Company.
4. Tnemec Company, Inc.
5. Or as approved.

B. Materials:
1. Coatings: Ready-mixed, except field-catalyzed coatings. Process pigments to a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating; good flow and brushing properties; capable of drying or curing free of streaks or sags.
2. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified, of commercial quality. Use products compatible with painting materials and approved by paint manufacturer.

3. Paint materials and equipment shall be compatible in use.
4. Primer, Intermediate, and Finish coats shall all be from the same coatings manufacturer. Prime coats shall be compatible with and appropriate for use on surface to be coated.

C. Colors:
1. Colors will be selected by OWNER from manufacturer's standard colors.

D. Paint Systems: Paint systems of The Sherwin-Williams Company are listed. Equivalent systems of other manufacturers previously specified are acceptable.
1. Metal - Non-Submerged:
   a. Prime Coat: Recoatable Epoxy Primer B67 Series, B67V5 Hardener, 3-6 mils dft.
   b. First Coat: Hi-Solids Polyurethane B65-300 Series Color, B60V30 Hardener, 3-4 mils dft.
   c. Second Coat: Hi-Solids Polyurethane B65-300 Series Color, B60V30 Hardener, 3-4 mils dft.
2. Metal - Submerged:
   a. Prime Coat: Targuard Coal Tar Epoxy B69B60 / B69V60, 8-12 mils dft.
   b. First Coat: Targuard Coal Tar Epoxy B69B60 / B69V60, 8-12 mils dft.
3. Plastic and Fiberglass:
   a. Prime Coat: DTM Acrylic Gloss Coating B66-100 Series, 2.5-4 mils dft.
   b. First Coat: DTM Acrylic Gloss Coating B66-100 Series, 2.5-4 mils dft.
4. Concrete: Interior surfaces of the wet well shall be coated with a heavy duty, chemical resistant epoxy resin coating, suitable for raw wastewater service in accordance with coating manufacturer recommendations. Use bitumastic 300M by Carboline Company, TNEMEC Vinister Series 120-5001, or approved equal.

2.9 LANDSCAPING

A. Follow Section 32 92 00, Lawns and Meadows.

PART 3 EXECUTION

3.1 EXCAVATION AND FILL

A. Follow Section 31 23 05, Excavation and Fill.

3.2 WET WELL

A. Construct base; follow Section 03 00 05, Concrete.

B. Install wall sections plumb and level. Provide flexible plastic gasket material on the outside shoulder of all wall joints; install so as not to interfere with proper sealing of the rubber gaskets.

C. Place concrete fill in bottom of wet well.

D. Construct top slab; follow Section 03 00 05, Concrete.

E. Install pipe brace and concrete pipe support beam angle.

F. Install electrical handhole. Coat surfaces in contact with concrete with bituminous coating.

G. Install vent plumb and level.

3.3 VALVE VAULT

A. Place precast vault on original earth sub-base with a 6 inch stone leveling course, plumb and level.

B. Place concrete fill in bottom of vault and slope to sump.

C. Vent: Install plumb and level.

D. Floor Door:
   1. Comply with manufacturer's instructions.
   2. Install drain piping; follow paragraph 3.6 in this Section.

E. Install sump drain piping; follow paragraph 3.6 in this Section.

3.4 ANCHORS AND ANCHOR BOLTS

A. Use expansion anchors in precast and cast-in-place concrete.

3.5 SUBMERSIBLE PUMPS

A. Install pumps, guide assemblies, access doors, and controls; follow Section 43 21 39.13, Submersible Pumps.

3.6 PIPING

A. Examination:
   1. Verify location and elevation of wall castings and supports.
   2. Inspect linings for damage.
   3. Verify that polyethylene encasement is in place, where required, before backfilling.

B. Preparation:
   1. Clean gaskets and all surfaces in contact with gaskets; comply with manufacturer's instructions.
   2. Keep interior of pipe and fittings clean.
   3. Prepare piping connections to equipment with flanges.

C. Pipe, Fittings, Valves and Accessories:
   1. Install in accordance with manufacturer's instructions.
   2. Pipe Supports: Follow Sections 03 00 05, Concrete and as indicated on Drawings.
   3. Install wall castings in proper location and elevation before concrete and piping are in place. Boxing out of forms for later placement will not be permitted.
   4. Install bell and spigot pipe with bell end in the direction of laying the pipe.
   5. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

6. Provide access to valves and fittings.
7. Tighten flanged joints with all bolts taking equal stress.
8. Install valves plumb and level, free from distortion and strain from misaligned piping or equipment.
9. Install polyethylene encasement for all buried ductile iron pipe, fittings, and appurtenances. Comply with AWWA C105 Method A and manufacturer's instructions. Completely tape all overlaps and seams. Repair all rips, punctures, and other damage to the polyethylene.

D. Pressure and Leakage Tests: Provide all labor and equipment and clean water to complete the following piping testing:
   1. Submersible Pump Discharge: Follow Section 40 05 05, Exposed Piping Installation.
   2. Drains: Demonstrate free to drain; correct for free drainage.

3.7 ASPHALT PAVEMENT

A. Prepare subgrade per Specification Section 31 23 05, Excavation and Fill.

B. Base Course: 8 inches thick of stabilized aggregate after compaction; two equal courses.

C. Surface Course: 2 inches of Asphaltic Concrete Surface Course (Type 1).

D. Pavement may be installed per alternate design if approved by ENGINEER.

3.8 PAINTING

A. Examination:
   1. Verify that surfaces are ready for application of materials in accordance with the product manufacturer's instructions.
   2. Examine surfaces scheduled to be finished prior to commencement of Work. Report any condition that may potentially affect proper application.
   3. Measure moisture content of surfaces using appropriate method as instructed by the coating manufacturer. Do not apply finishes unless moisture content of surfaces are below the coating manufacturer's acceptable maximums.

B. Preparation:
   1. Mask nameplates, descriptive data on pumps, motors and other equipment.
   2. Correct defects and clean surfaces which affect the Work.
   3. Seal marks which may bleed through surface finishes with sealer instructed by paint manufacturer.
   4. If mildew is encountered, remove by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
   5. Where surfaces are coated with bituminous coating that is not compatible with paint material, remove bituminous coating with abrasive blasting.
   6. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply manufacturer's required primer.
   7. Uncoated Steel and Iron Surfaces:
      a. Welded areas shall be ground smooth per NACE Standard RP 0178.
      b. Use abrasives for blast cleaning that are clean, uniformly graded, and free of oil, soluble salts, chlorides, or foreign matter which could contaminate the blasted

surface. Size the abrasive to produce an anchor pattern profile height as required by the coating manufacturer.

c. Metal surfaces to be painted, and not factory-primed, shall be field-abrasive blasted in accordance with NACE-3 (SSPC-SP6), commercial blast, for non-immersion service; and in accordance with NACE-2 (SSPC-SP10), near-white blast, for immersion service, unless a higher degree of surface preparation is required by the manufacturer.

8. Shop-Primed Steel Surfaces:
   a. Remove loose primer and rust in accordance with SSPC-SP2 Hand Tool Cleaning or SSPC-SP3 Power Tool Cleaning. Feather edges to make touch-up patches inconspicuous. Clean surfaces in accordance with SSPC-SP1 Solvent Cleaning. Prime bare steel surfaces.
   b. Retouch damaged areas of shop-primed items with compatible primer.
   c. CONTRACTOR responsible for compatibility of shop primer with field-finish coats.
   d. Plastic and Fiberglass: Solvent-wipe and scuff sand; apply test sample prior to application to ensure adhesion.

C. Application:
1. Comply with manufacturer's instructions.
2. Do not thin materials, except to comply with manufacturer's instructions.
3. Apply coatings to all surfaces with special attention to hard-to-reach areas such as between the legs of back-to-back angles. Apply each coat to achieve the specified dry film thickness.
4. Do not apply finishes to surfaces that are not dry.
5. Deficiencies in film or coating thickness shall be corrected by the application of an additional coat(s) of material at the expense of CONTRACTOR.
6. Apply each coat to a uniform smooth finish.
7. Special attention shall be given to ensure that edges, corners, crevices and welds receive a film or coating thickness equivalent to that of adjacent surfaces. At no time will wet-on-wet applications be permitted. The finished surfaces shall be free from runs, drips, ridges, waves, laps, brush marks and variations in color, texture and finish.
8. Apply each coat of paint slightly darker than the preceding coat unless otherwise approved.
9. Sand surfaces lightly between coats as required to achieve required finish.
10. Vacuum clean surfaces free of loose particles. Use tack cloth just prior to applying next coat.

D. Painting Schedule:
1. Exposed piping, except not within wet well.
2. Structural steel.
3. Vents.
4. Wet well.

3.9 LANDSCAPING

A. Follow Section 32 92 00, Lawns and Meadows.

3.10 FIELD QUALITY CONTROL

A. Operational Test: Demonstrate that all pumping station equipment is electrically, mechanically, structurally, and otherwise acceptable, and that it is safe, in optimum working condition, and conforms to the specified operating conditions by supplying sufficient clear water and operating station through several pumping cycles. During operation 1) observe and record operation of pumps, discharge gage readings, amperage draw, pump controls and liquid level controls, 2) check calibration of instrumentation equipment, test manual control devices, and automatic control systems, and 3) be alert to any undue noise, vibration, or other operational problems.

END OF SECTION

SECTION 43 21 39.13

SUBMERSIBLE PUMPS

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 submersible pump system, complete and operational.

B. Related Sections:
   1. Section 43 21 39, Pumping Station – Submersible Type with Valve Vault.

1.2 SECTION INCLUDES

A. Submersible pumps.

B. Pump guide assemblies.

C. Pump access doors.

D. Pump controls.

E. Standby generator.

1.3 REFERENCES

A. Standards referenced in this section are:
   1. International Standards Organization (ISO), ISO 8528, Reciprocating Internal Combustion Engine Driven Alternating Current Generator Sets.
   2. ISO 9001, Quality Management Systems – Requirements.
   3. NEMA MG-1, Motors and Generators.
   4. NFPA 30, Flammable and Combustible Liquids Code.
   5. NFPA 37, Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines.
   6. NFPA 70, National Electrical Code.
   7. NFPA 70E, Electrical Safety in the Workplace.
   8. NFPA 110, Standard for Emergency and Standby Power Systems.
   9. UL 142, Steel Aboveground Tanks for Flammable and Combustible Liquids.
   10. UL 508, Safety Standard for Industrial Control Equipment.
   11. UL 2200, Standard for Safety Stationary Engine Generator Assemblies (rated 600 volts or less).

1.4 PERFORMANCE CRITERIA

A. Pumps must be designed to handle raw, unscreened, domestic sanitary sewage. Each pump shall be selected to perform under operating conditions based on, but not limited to:
   1. Capacity (GPM).
   2. Total Dynamic Head (ft).

3. Total Discharge Static Head (ft).

B. Site power furnished to pumping station shall be three phase, 60 hertz, 480 volts, four wire maintained within industry standards. Voltage tolerance shall be plus or minus 10 percent. Control voltage shall not exceed 120 volts nominal.

1.5 SUBMITTALS

A. Product Data
   1. Prior to fabrication, the project's contractor or developer's representative, shall submit three copies of the pumping station manufacturer's data for review and approval.
      a. Submittal shall include shop drawings, electrical ladder logic drawings, and support data as follows: Catalog cut sheets reflecting characteristics for major items of equipment, materials of construction, major dimensions, motor data, pump characteristic curves showing the design duty point capacity (GPM), head (ft), net positive suction head required (NPSHr), and hydraulic brake power (BHP). Electrical components used in the motor branch and liquid level control shall be fully described.
   2. Prior to fabrication, the project's contractor or developer's representative, shall submit three copies of the on-site generator manufacturer's data for review and approval.
   3. Prior to fabrication, the project's contractor or developer's representative, shall submit three copies of the SCADA system manufacturer's data for review and approval. The submittal data shall include, but not limited to, the RTU Communication's Study.

B. Operations and Maintenance Manuals
   1. Installation shall be in accordance with written instruction provided by the pumping station manufacturer. Comprehensive instructions supplied at time of shipment shall enable personnel to properly operate and maintain all equipment supplied. Content and instructions shall assume operating personnel are familiar with pumps, motors, piping and valves, but lack experience on exact equipment supplied.
   2. Electrical Documentation shall be specific to the pumping station and collated in functional sections. Each section shall combine to form a complete system manual covering all aspects of equipment supplied by the station manufacturer. Support data for any equipment supplied by others, even if mounted or included in overall station design, shall be provided by those supplying the equipment. Instructions shall include the following as a minimum:
      a. Functional description of each major component, complete with operating instructions.
      b. Instructions for operating pumps and pump controls in all modes of operation.
      c. Calibration and adjustment of equipment for initial start-up, replacement of level control components, or as required for routine maintenance.
      d. Support data for commercially available components not produced by the station manufacturer, but supplied in accordance with the specifications, shall be supported by literature from the prime manufacturer and incorporated as appendices.
      e. Schematic diagram of the pump station circuits shall be in accordance with NMTBA and JIC standards. Schematics shall illustrate, to the extent of authorized repair, pump motor branch, control and alarm system circuits including interconnections. Wire numbers and legend symbols shall be shown. Schematic diagrams for individual components, not normally repairable by the station

operator, need not to be included. Details for such parts shall not be substituted for an overall system schematic. Partial schematics, block diagrams, and simplified schematics shall not be provided in lieu of an overall system diagram.

f. Mechanical layout drawing of the pumping station and components, prepared in accordance with good commercial practice, shall provide installation dimensions and location of all pumps, motors, valves and piping.

3. Operation and maintenance instructions, which rely on vendor cut-sheets and literature, which include general configurations, or require operating personnel to selectively read portions of the manual shall not be acceptable. Operation and maintenance instructions must be specific to equipment supplied in accordance with these specifications.

1.6 QUALITY ASSURANCE

A. Upon request from the Engineer, the pumping station manufacturer shall prove financial stability and ability to produce the station within the specified delivery schedules. Evidence of facilities, equipment, and expertise shall demonstrate the manufacturer's commitment to long term customer service and product support.

B. The pumps shall be heavy duty, electric submersible centrifugal non-clog units designed for handling raw, unscreened sewage and wastewater. The pumps shall be capable of pumping a 3.0" spherical solid.

C. The pumps provided shall be capable of operating in an ambient liquid temperature of 104° F as specified by the National Electrical Manufacturers Association (NEMA) and Factory Mutual (FM).

D. The pump and motor unit shall be suitable for continuous operation at full nameplate load while the motor is completely submerged, partially submerged or totally non-submerged. The use of shower systems, secondary pumps or cooling fans to cool the motor shall not be acceptable.

E. The pump, mechanical seals and motor unit provided under this specification shall be from the same manufacturer in order to achieve standardization of operation, maintenance, spare parts, manufacturer's service and warranty.

F. The manufacturer's technical representative shall inspect the completed installation, correct or supervise the correction of any defect or malfunction, and instruct operating personnel in the proper operation and maintenance of the equipment.

1.7 MANUFACTURER'S WARRANTY

A. The pumping station manufacturer shall warrant all equipment to be of quality construction, free of defects in material and workmanship. A written warranty shall include specific details described below:

1. All equipment, apparatus, and parts furnished shall be warranted for one year, excepting only those items normally consumed in service, such as light bulbs, oils, grease, packing, gaskets, O-rings, etc. The pumping station manufacturer shall be solely responsible for warranty of the station and all components.

2. The pump shaft seal shall be warranted for a minimum of four years from date of shipment. Should the seal fail within the first year, the manufacturer shall furnish a new seal, without charge to the Owner, F.O.B factory. The warranty replacement cost for seals after the first year will be pro-rated as follows:

Failure Within	Percent New Price
2 Years	25%
3 Years	50%
4 Years	75%

3. Components failing to perform as specified by the Engineer, or as represented by the manufacturer, or as proven defective in service during the warranty period, shall be replaced, repaired, or satisfactorily modified by the manufacturer without cost of parts or labor to the Owner.

B. The warranty provided by the CONTRACTOR to the County shall become effective upon the issuance of a Permit to Operate by the SC DHEC.

1.8 UNITARY RESPONSIBILITY

A. In order to unify responsibility for proper operation of the complete pumping station, it is the intent of these specifications that all system components be furnished by a single supplier (unitary source) approved by the County. The pumping station must be of standard catalog design, totally warranted by the manufacturer. Under no circumstances will a system consisting of parts compiled and assembled by a manufacturer's representative or distributor be accepted.

1.9 DELIVERY, STORAGE AND HANDLING

A. Delivery:
1. Cover all generator air and exhaust openings with vapor inhibiting and water repellent material.
2. Deliver anchorage devices that are to be embedded in cast-in-place concrete in ample time to prevent delaying the Work.
3. Inspect equipment for shipping damage or loose parts upon delivery. Check for evidence of water that may have entered equipment during transit.
4. Notify ENGINEER of loss or damage to equipment or components. Replace loss and repair damage to new condition in accordance with manufacturer's instructions.

B. Handle equipment in accordance with manufacturer's instructions. Furnish at least one copy of instructions with equipment at time of shipment.

C. Storage:
1. Store equipment in a clean, dry location with controls for uniform temperature and humidity. Protect equipment with coverings and maintain environmental controls.
2. Store materials for easy access for inspection and identification. Keep all materials off the ground, using pallets, platforms or other supports. Protect equipment from corrosion and deterioration.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Provide pumps and appurtenances as manufactured by Xylem Flygt Company.

2.2 SUBMERSIBLE PUMPS

A. Unit Base:
   1. The unit base shall comprise of a base plate, perimeter flange, and reinforcements. Base plate shall be fabricated of steel not less than 3-inch thick, and shall incorporate openings for access to all internal cavities to permit complete grouting of unit base after installation. Perimeter flange and reinforcements shall be designed to prevent flexing or warping under operating conditions. Base plate and/or flange shall be drilled for hardware used to secure unit base to concrete pad as shown on the contract drawings. Unit base shall contain provisions for lifting the complete pump unit during shipping and installation.

B. Pump Design:
   1. The pumps shall be automatically and firmly connected to the discharge connection, guided by no less than two guide bars extending from the top of the station to the discharge connection. There should be no need for personnel to enter the wet-well.
   2. Sealing of the pumping unit to the discharge connection shall be accomplished by a machined metal to metal watertight contact.

C. Pump Construction:
   1. Major pump components shall be of gray cast iron, ASTM-48, Class 35B, with smooth surfaces devoid of blow holes or other irregularities.
   2. All exposed nuts or bolts shall be AISI type 304 stainless steel construction. All metal surfaces coming into contact with the pumpage, other than stainless steel or brass, shall be protected by a factory applied spray coating of acrylic dispersion zinc phosphate primer with a polyester resin paint finish on the exterior of the pump.
   3. Critical mating surfaces where watertight sealing is required shall be machined and fitted with Nitrile or Viton rubber O-rings. Fittings will be the result of controlled compression of rubber O-rings in two planes and O-ring contact of four sides without the requirement of a specific torque limit.
   4. The cable entry shall consist of a single cylindrical elastomer grommet, flanked by washers, all having a close tolerance fit against the cable outside diameter and the entry inside diameter and compressed by the body containing a strain relief function, separate from the function of sealing the cable.

D. Impeller:
   1. The impeller shall be semi-open, high efficiency multi-vane design with back swept non-clog design. Impeller material shall be 25% High Chrome Iron (ASTM A-532) (Alloy III A). The leading edge of the semi-open impeller shall be hardened to Rc60 or 650Brinell. It shall be balanced to ISO1940 Grade G6.3.
   2. Enclosed impeller shall be of gray cast iron, Class 35B, dynamically balanced to ISO1940 Grade G6.3, double shrouded non-clogging design having a long through-let

with out acute turns. Enclosed impeller shall be supplied with wear ring system to provide sufficient sealing between the volute and suction inlet.
3. The impeller shall be capable of handling 3-inch spherical solids, fibrous materials, heavy sludge and other matter found in wastewater.
4. Enclosed impellers shall be coated with acrylic dispersion zinc phosphate primer.

E. Motor
1. The pump motor shall be induction type with a squirrel cage rotor, shell type design, housed in an air filled, watertight chamber, NEMA B type.
2. The stator windings and stator leads shall be insulated with moisture resistant Class H insulation rated for 180° C (356° F). The stator shall be dipped and baked three times or use trickle impregnation method to achieve Class H insulation and shall be heat-shrink fitted in to the stator housing.
3. The motor shall be designed for continuous duty handling pumped media of 40° C (104° F) and capable of up to 15 evenly spaced starts per hour.
4. The motor and pump shall be designed and assembled by the same manufacturer.
5. The motor horsepower shall be adequate so that the pump is non-overloading throughout the entire pump performance curve from shut-off through run-out.

F. Data Plate: Fabricate data plate from corrosion-resistant metal and mechanically attach to pump. Engrave the plate with the following:
1. Manufacturer's name.
2. Pump size.
3. Serial number.
4. Motor horsepower, speed, and electrical information.
5. Impeller diameter.
6. Capacity and head.

2.3 PUMP GUIDE ASSEMBLIES

A. Pump guide assembly to consist of either guide rails, a self-aligning sliding bracket, upper guide bracket, intermediate guide brackets (as required by manufacturer), lifting chain, and discharge elbow.
1. Guide Rails and Guide Brackets: Type 304 stainless steel; rails designed to mount directly to discharge elbow at the floor and to the upper guide bracket at the top. Provide intermediate guide brackets for rail lengths over 15 feet.
2. Self-Aligning Sliding Bracket: Mounted on pump discharge with a machined mating flange which matches the discharge elbow. Sealing of the discharge connection is accomplished by a simple linear downward motion of the pump, culminating with the entire weight of the pumping unit supported entirely by the discharge elbow.
3. Lifting Rope: Stainless steel cable of sufficient length to extend from the pump in the lowest position in the wet well to the connection at the top of the wet well. Provide a device at the top of the wet well to attach the cable to when not in use. Size cable according to pump weight. Coordinate upper cable end terminating device with requirements for connecting to Owner's lifting equipment.
4. Discharge Elbow: Gray cast iron, ASTM A48, Class 30, designed to mount directly to wet well floor and to anchor and align guide rails with ANSI B16.1, Class 125 flange and a machined mating surface such that the pump to discharge connection is made without the need for nuts or bolts.

2.4 PUMP ACCESS DOORS

A. Load Rating: AASHTO H-20 wheel loading.

B. Frame:
   1. Material: Extruded aluminum sections shaped to serve as a continuous drainage gutter with a 1-1/2-inch drain coupling.
   2. Anchors: Continuous anchor flange.
   3. Apply manufacturer's standard protective coating to surfaces of frame that will be in contact with concrete.

C. Cover:
   1. Material: 1/4-inch mill finish aluminum diamond plate, reinforced with stiffening ribs.
   2. Hinges: Stainless steel; butt type with compression spring operators enclosed in telescopic tubes.
   3. Hold Open Arm: Stainless steel; automatically locks door at 90-degree position; provide vinyl grip handle to release door for closing.
   4. Lock: Stainless steel; slam type with fixed handle inside and removable key wrench outside.
   5. Protective Grating: Aluminum protective grating panel shall be a minimum of 3 inch (76mm) aluminum "I" bar grating with Safety Orange powder-coated finish. Grating shall be hinged with tamper proof stainless steel bolts, and shall be supplied with a positive latch to maintain unit in an upright position. Grating shall have a 6-in. (152mm) viewing area on each lateral unhinged side for visual observation and limited maintenance. A padlock hasp for owner-supplied padlock shall be provided.

D. Hardware and Fasteners: Type 316 stainless steel.

E. Accessories: Provide one key wrench for each door supplied.

2.5 PUMP CONTROLS

A. Control Panel:
   1. Electrical control equipment shall be mounted within a NEMA 4X stainless steel, dead front type, control enclosure. Door shall be hinged and sealed with a neoprene gasket and equipped with captive closing hardware. Control components shall be mounted on a removable steel back panel secured to enclosure with collar studs. All control devices and instruments shall be mounted using threaded fasteners, and shall be clearly labeled to indicate function.
   2. Front panel mounted devices shall be rated NEMA 4X and shall not compromise the NEMA 4X panel rating.
   3. Pump station controls shall conform to third party safety certification. The enclosure and all components mounted on the subpanel or control cover shall conform to UL descriptions and procedures. Control panel assembly panel shall be constructed in conformance with UL 508 and bear the UL seal confirming the construction.
   4. Control panel components to be of highest industrial quality, secured to the back panel with machine screws and lock washers. Mounting holes shall be drilled and tapped; Self- tapping screws shall not be used to mount any component.
   5. A properly sized heavy-duty circuit breaker, with a minimum RMS interrupting rating of 14,000 amperes at 460 volts, shall be furnished for each pump motor. The circuit

breakers must be sealed by the manufacturer after calibration to prevent tampering. An operating mechanism installed on each motor circuit breaker shall penetrate the control panel door. A pad-lockable operator handle shall be secured on the exterior surface. Mechanical interlocks must prevent opening the door until circuit breakers are in the "OFF" position.

6. An open frame, across-the-line, NEMA rated magnetic starter with under-voltage release, and overload protection on all three phases, shall be furnished for each pump motor. Starters of NEMA size 1 and above shall allow addition of at least two auxiliary contacts. Starters rated "0", "00", or fractional sizes are not acceptable. Power contacts to be double-break type made of cadmium oxide silver. Coils to be epoxy molded for protection from moisture and corrosive atmospheres. Contacts and coils to be easily replaceable without removing the starter from its mounted position. Each starter shall have a metal mounting plate for durability. Overload relays to be block-type with melting alloy spindles, having visual trip indication with trip free operation. Pressing the overload-reset lever shall not actuate the control contact until after the overload spindle has reset. Resetting the overload reset lever will cause a snap-action control and not convertible to automatic reset. Trip settings shall be governed by the heater element only, and not by adjustable settings. Heater elements must provide NEMA Class 20 trip times, selected in accordance with actual motor nameplate data. An overload-reset pushbutton, mounted through the control panel door, shall permit resetting the overload relays without opening the control panel door.
7. The control panel shall be equipped with a secondary lightning arrestor to minimize damage to the pump motors and control from transient voltage surges. The arrestor shall utilize silicon-oxide varistors encapsulated in a non-conductive housing. The arrestor shall have a current rating of 60,000 Amps, a Joule rating of 1500.
8. The control panel shall be equipped to monitor the incoming power and shut down the pump motors when required to protect the motor(s) from damage caused by phase reversal, phase loss, low voltage, and voltage unbalance. An integral time delay shall be provided to minimize nuisance trips. The motor(s) shall automatically restart when power conditions return to normal.
9. Control Circuits
    a. A normal duty thermal-magnetic circuit breaker shall protect all control circuits by interrupting control power.
    b. Pump mode selector switches shall permit manual start or stop of each pump set individually, or permit automatic operation under control of the liquid level control system. Manual operation shall override all shutdown systems, except the motor overload relays. Selector switches to be heavy duty, oil-tight design with contacts rated NEMA A300 minimum.
    c. Pump alternator relay to be electro-mechanical industrial design. Relay contacts to be rated 10 amperes minimum at 120 volts non-inductive. A switch shall permit the station operator to select automatic alteration of pumps, to select pump set number one to be "lead" for each pumping cycle, or to select pump set number two to be "lead" pump for each pumping cycle.
    d. Six-digit elapsed time meter (non-reset type) shall be provided for each pump set to indicate total running time of each pump set in "hours" and "tenths of hours." A pilot light shall be wired in parallel to indicate that the motor is energized and should be running.
    e. A high pump temperature protection circuit shall override the level control and shutdown the pump motor(s) when required to protect the pump from excessive temperature. A thermostat shall be mounted on each pump casing and connected

to a high pump temperature shutdown circuit. If casing temperature rises to a level sufficient to cause damage, the thermostat causes the pump shutdown circuit to interrupt power to the motor. A visible indicator located on the control panel door shall indicate motor stopped due to high pump temperature. The motor shall remain locked out until the pump has cooled and circuit has been manually reset. Automatic reset of the circuit is not acceptable.

f. A duplex ground fault receptacle providing 115 VAC, 60 Hz, single phase current, will be mounted on the side of the control enclosure. Receptacle circuit shall be protected by a 15-ampere thermal-magnetic circuit breaker.

2.6 AUXILIARY POWER TRANSFORMER CONTROLS AND ACCESSORIES

A. The lift station shall be equipped with a 3 KVA step-down transformer to supply 115-volt, AC, Single phase for the control and auxiliary equipment. The primary and secondary side of the transformer are to be protected by a thermal magnetic circuit breaker sized to meet the power requirements of the transformer. An operating mechanism shall penetrate the control panel door, and a padlockable operator handle shall be secured on the exterior surface. Interlocks must prevent opening the door until circuit breakers are in “OFF” position.

B. All wiring, workmanship, and schematic wiring diagrams shall comply with Applicable standards and specifications of the National Electric Code (NEC). All user serviceable wiring shall be type MTW or THW, 600 volts, color coded as follows:

1.	Line and Load Circuits, AC or DC power	Black
2.	AC Control Circuit Less Than Line Voltage	Red
3.	DC Control Circuit	Blue
4.	Interlock Control Circuit from external source	Yellow
5.	Equipment Grounding Conductor	Green
6.	Current Carrying Ground	White
7.	How With Circuit Breaker Open	Orange

C. Control circuit wiring inside the panel, with exception of internal wiring of individual components, shall be 16-gauge minimum, type MTW or THW, 600 volts. Power wiring to be 14-gauge minimum. Motor branch wiring shall be 10-gauge minimum. Motor branch and other power conductors shall not be loaded above 60 degrees Celsius temperature rating, on circuits of 100 amperes or less, nor above 75 degrees Celsius on circuits over 100 amperes. Wires must be clearly numbered at each end in conformance with applicable standards. All wire connectors in the control panel shall be ring tongue type with nylon-insulated shanks. All wires on the back panel shall be bundled and tied. All wires extending from components mounted on door shall terminate at a terminal block mounted on the back panel.

D. All wiring outside the panel shall be routed through conduit. Control wires connected to door mounted components must be tied and bundled in accordance with good commercial practice. Bundles shall be made flexible at the hinged side of the enclosure. Adequate length and flex shall allow the door to swing full open without undue stress or abrasion. Bundles shall be held on each side of hinge by mechanical fastening devices. Factory installed conduit shall conform to following requirements:

1. All conduit and fittings to be UL listed.

2. Use PVC-coated rigid steel for exterior conduit runs in hazardous, wet, and corrosive locations.
3. Use PVC-coated rigid steel conduit for individual conduits direct buried in the ground.
4. Liquid tight flexible metal conduit to be constructed of smooth, flexible galvanized steel core with smooth abrasion resistant, liquid tight polyvinyl chloride cover.
5. Conduit to be supported in accordance with articles 344 and 350 of the National Electric Code.
6. Conduit shall be sized according to the National Electric Code.

E. Station manufacturer shall ground all electrical equipment inside the pump station to the panel powering the equipment. The CONTRACTOR shall provide a minimum of one earth driven ground rod connection at the service entrance equipment in accordance with the National Electric Code (NEC) and local requirements.

F. Permanent corrosion resistant name plate(s) shall be attached to the control and include following information:
1. Equipment serial number
2. Supply voltage, phase and frequency
3. Current rating of the minimum main conductor
4. Electrical wiring diagram number
5. Motor horsepower and full load current
6. Motor overload heater element
7. Motor circuit breaker trip current rating
8. Name and location of equipment manufacturer

G. Control components shall be permanently marked using the same identification keys shown on the electrical diagram. Labels shall be mounted adjacent to device being identified. Switches indicators, and instruments mounted through the control panel door shall be labeled to indicate function, position, etc. Labels shall be mounted adjacent to, or above the device.

H. Liquid Level Monitoring and Control
1. The level monitoring and control system shall start and stop the pump motors in response to changes in wet well level, as set forth herein.
2. The level monitoring and control system shall be capable of operating as a conductivity probe-type system for liquid level control and with a float-ball system for high and low level alarms, as manufactured by ITT Flygt, DEVAR Inc., or manufacturer approved equal by York County.
3. The level control system shall utilize the alternator relay to select first one pump set, then the second pump set, to run as lead pump for a pumping cycle. Alternation shall occur at the end of a pumping cycle.
4. The level control system shall be provided with pump start and stop delays to prevent simultaneous motor starts and to reduce the potential of hydraulic surges during motor shutdown. Motor starts shall also be sequenced to provide step loads on the generator.
5. The level control system shall utilize the conductivity probe-type system which shall continuously, monitor the wet well level, permitting the operator to read wet well level at any time. Upon operator selection of automatic operation, the conductivity probe-type system shall start the motor for one pump set when the liquid level in the wet well rises to the “lead pump start level”. When the liquid is lowered to the “lead pump stop level”, the conductivity probe-type system shall stop these pumps. These actions shall

constitute one pumping cycle. Should the wet well level continue to rise, the conductivity probe-type system shall start the second pump set when the liquid reaches the “lag pump start level” so that all pumps are operating. These levels shall be adjustable as described below.

6. The conductivity probe-type system shall include integral components to perform all pressure sensing, signal conditioning. EMI and RFI suppression. DC power supply and 120 volt outputs. Components shall be solid state and shall be integrated with other components to perform as described below.
7. The conductivity probe-type system shall be capable of operating on a supply voltage of 108 volts to 132 volts AC, 60 hertz, in an ambient temperature range of –10 degrees Celsius (14 degrees Fahrenheit) through +55 degrees Celsius (131 degrees Fahrenheit). Control range shall be 0 to -----.0 feet of water with an overall repeat accuracy of (plus/minus) 0.1 feet of water. Memory shall be retained using a non-volatile lithium battery backup.
8. The conductivity probe-type system shall consist of the following integral components: display, output relays:
    a. The conductivity probe-type system shall incorporate a digital back-lighted LCD panel display which, upon operator selection, shall indicate liquid level in the wet-well, and the preset start and stop level for both lead and lag pump. The display shall include 20, 0.19 inch high alphanumeric characters calibrated to read out directly in feet of water, accurate to within one-tenth foot (0.1 foot), with a full-scale indication of not less than 12 feet. The display shall be easily convertible to indicate English or metric units.
    b. Level adjustments shall be electronic comparator set points to control the levels at which the lead and lag pumps start and stop. Each of the level settings shall be adjustable and accessible to the operator without opening the cover panel. Controls shall be provided to permit the operator to read the selected levels on the display. Such adjustments shall not require hard wiring, the use of electronic test equipment, artificial level simulation.
    c. An alarm silence pushbutton and relay shall be provided to permit maintenance personnel to de-energize the audible alarm device while corrective actions are under way. After silencing the alarm device, manual reset of the alarm condition shall clear the alarm silence relay automatically. The pushbutton shall be oil tight design with contacts rated NEMA A300 minimum.
    d. Station manufacturer will supply one 115-volt AC alarm light fixture with vapor-tight red glove, guard, conduit box, and mounting base. The design must prevent rain water from collecting in the gasketed area of the fixture, between the base and globe. The alarm light will be shipped loose for installation by the CONTRACTOR.
    e. Station manufacturer will supply one 115-volt AC weatherproof alarm horn with projector, conduit box, and mounting base. The design must prevent rainwater from collecting in any part of the horn. The alarm horn will be shipped loose for installation by the CONTRACTOR.

2.7 TELEMETRY

A. Each pump station shall be supplied with a Supervisory Control and Data Acquisition (SCADA) Remote Terminal Unit (RTU). The work to be accomplished under this specification shall consist of furnishing the equipment necessary for modifying the existing automatic control and monitoring system. The equipment shall be designed, fabricated, programmed, tested, started-up, and warranted by a single supplier.

2.8 ON-SITE GENERATOR SYSTEM

A. General:
   1. All pump stations shall have an automatic standby power generation system conforming to these specifications.
   2. The system shall consist of a diesel-fueled standby generator in a weatherproof enclosure complete with all equipment and accessories required to automatically supply power to the pump station during a utility power failure.

> As an alternate to a diesel-fueled standby generator, the County may request the use of a natural gas fueled standby generator. The natural gas fueled standby generator shall meet all the following requirements as appropriate for a natural gas fueled engine.

B. Engine:

1. Engine block material	Cast Iron
2. Cylinder head material	Cast Iron
3. Crankshaft material	Hardened Steel
4. Pistons	Aluminum Alloy
5. Valve seats	Replaceable
6. Maximum Rated RPM	1800

C. Engine Governor:

1. Type	Mechanical
2. No-load to full load frequency regulation	5.0%
3. Steady state regulation	+/-0.33%
4. Overspeed shutdown	Automatic solid state

D. Engine Lubrication System:

1. Oil pump	Gear type
2. Oil filter	Full flow, cartridge
3. Low oil pressure shutdown	Automatic

E. Engine Cooling System:

1. Type of system	Pressurized, closed recovery
2. High temperature shutdown	Automatic
3. Low coolant level shutdown	Automatic
4. Fan	Pusher type with guard
5. Engine block heater	1,000 watts (min), 120 VAC, thermostatically controlled
6. Coolant	Water/ethylene glycol (-34° protection)

F. Engine Fuel System:

1. Fuel	#2 Diesel
2. Fuel filter	5 micron
3. Injection type	Direct
4. Fuel pump	Mechanical, engine driven
5. Fuel tank	integral, UL listed, double-walled, steel fuel storage
6. Fuel tank capacity	24 (min.) hours @ rated load

7. Fuel tank accessories — Fuel level indicator
8. Low fuel indicator switch (on at 20% capacity), Screened vent for double wall cavity, Drain port

G. Engine Exhaust System:
1. Silencer — Critical
2. Mounting — External with weather cap
3. Connection — Flexible stainless steel pipe

H. Engine Combustion Air Intake:
1. Air cleaner — Replaceable dry cartridge

I. Engine Electrical:
1. Starter motor — 12 or 24 volt
2. Battery charge alternator — 30 amps (min)
3. Crank limiter — Solid state
4. Battery — 2 - 12 volt (series or parallel, as appropriate)
5. Battery mounting — Rack inside enclosure
6. Polarity — Negative ground
7. Standby charger — 10 amp, automatic float

J. Generator:
1. The generator shall meet the following requirements:
   a. Generator Specifications**:**
      1) Generator type — 4 pole, revolving field
      2) Output — 12 lead, reconnectable
      3) Stator — "Skewed" design
      4) Housing — Drip proof design, self-ventilated
      5) Rotor insulation — Class F
      6) Stator insulation — Class F
      7) Bearings — Sealed, pre-lubed
      8) Engine coupling — Direct, flexible disc
      9) Protection — Output circuit breaker (manual reset)
   b. Excitation:
      1) Exciter type — Brushless
      2) Protection — Manual circuit breaker
   c. Regulation:
      1) Type — Solid state
      2) Regulation — +/-2% steady state
      3) Voltage adjustment — 5% - manual rheostat

K. Generator Set Controls
1. The engine-generator set shall be equipped with a control panel having the following features:
   a. Engine Controls & Indicators:
      1) Engine Gauges: — Oil pressure
         Coolant temperature
         Battery charging ammeter
      2) Annunciator: — Low oil pressure shutdown
         High temperature/low coolant

	level shutdown
	Overcrank shutdown
	Overspeed shutdown
	Low fuel
3) Engine hour meter	99,999.0 hour
4) Remote engine hour meter located at transfer switch	99,999.0 hour
5) Engine control switch	Off/Manual/Automatic

L. Generator Controls & Indicators:

1. Gauges	AC frequency
	Output voltage
	Output current
2. Gauge Selector switch	3 position with "off"
3. Manual voltage adjustment	Rheostat, 5% adj. range

M. Alarm Output Contacts
1. Generator Fail
2. Generator Operating
3. Low Fuel
4. Alarm output contacts are to be wired to the local monitoring RTU.

N. Generator Set Enclosure & Mounting
1. The engine-generator set shall be enclosed in a weatherproof housing which meets the following specifications:

a. Access panels	Lockable (keyed alike), hinged and removable
b. Hardware	Stainless steel
c. Finish	Baked enamel over zinc coated steel
d. Mounting	Welded steel base with vibration isolators
e. Mounting location	Top of fuel tank

O. Automatic Transfer Switch:
1. The automatic transfer switch to be supplied as part of the standby power system shall meet all applicable requirements set forth by the National Electrical Code and OSHA. The transfer switch shall also conform to the requirements as specified below:

a. Enclosure:	
1) Mounting type	Surface
2) Enclosure type	NEMA 3R, lockable
b. Electrical Ratings:	
1) Operating voltage	Compatible with station voltage
2) Operating current	No less than main disconnect
3) Withstand and closing rating	10,000 Amps, RMS, Symm. (min.)
4) Normal input connection	Service entrance rated
c. Transfer Switch:	
1) Operating mechanism	Single solenoid
2) Holding mechanism	Mechanical
3) Interlock	Mechanical and electrical
4) Contact material	Silver alloy
5) Neutral delay	0.1 – 10 sec.

d. Timer Setting Ranges:

1)	Utility dropout	70-95%
2)	Utility pick-up	70-95%
3)	Utility interrupt delay	0.1 – 10 sec.
4)	Engine min. run	5 – 30 min.
5)	Engine warm-up	5 – 180 sec.
6)	Return to utility delay	1 – 30 min.
7)	Engine cool-down	1 – 30 min.
8)	Standby voltage	70 – 90%
9)	Standby frequency	80 – 90%
10)	Exerciser	Once/week

e. Operation Selectors:

1)	Exercise	With/Without load
2)	Engine warm-up bypass	On/Off
3)	Neutral delay	On/Off
4)	Mode selector	Manual Test/Standby/Off

P. Standby Power System Capacity:

1. The standby power system shall be capable of providing continuous standby power for the wastewater pumping station. The generator set shall be capable of starting the two pump motor loads sequentially with the full miscellaneous load applied, with no more than 30% dip. **The *minimum* acceptable generator set rating shall be 25 KW for any station.** The CONTRACTOR shall coordinate the starting requirements of the exact pumps being furnished on the project with the generator set supplier to ensure the generator set has adequate motor starting capability.

Q. Installation:

1. The generator set shall be mounted and anchored to a reinforced concrete pad, located to provide adequate access for fueling and servicing. The exact dimensions of the pad, conduit entries and anchor bolts shall be based on the manufacturer's shop drawings. The pad shall have outer dimensions 1 foot greater than the footprint of the base tank, to provide 6 inch of exposure on all sides. The minimum thickness of the pad shall be 12 inch, with a single mat of #6 rebar, 12 inch OCEW and located in the lower third of the concrete thickness. The weight of the mounting pad shall be equal to or greater than the weight of the generator set. All exposed edges shall be chamfered or rounded with an edging tool.

R. Field Tests:

1. The CONTRACTOR shall provide start-up and testing services utilizing personnel specifically authorized to perform such services by the standby power system manufacturer. The start-up services shall be scheduled with the COUNTY with no less than three days notice. The start-up and testing service shall include a complete inspection of the installation, initial break-in of the engine, testing the system performance, and servicing the engine. The following tests shall be performed in the presence of the COUNTY or its representative:
   a. Generator output voltage unloaded and loaded, each phase, based on 2-hour load bank test.
   b. Voltage dip as loads are applied.
   c. Complete operating sequence (simulated utility power failure and restoration).
   d. Pressure test engine cooling system for leaks.

e. Test battery charging systems.
f. Test operation of all safety systems.
g. Upon completion of break-in and testing, the engine shall be serviced as follows:
1) Change engine oil and filter.
2) Verify anti-freeze protection (-34° F).
3) Refill fuel tank (tank shall be left full).
4) Check belt tension.
5) Check battery connections and state of charge.

2. During this start-up period, the COUNTY'S maintenance personnel shall be fully instructed in the proper maintenance of the standby power system.
3. All equipment and supplies for testing and service shall be provided by the CONTRACTOR.

S. Manufacturer:
1. The generator set, controls, and transfer switch shall be furnished by a single supplier. The generator set and accessory equipment shall be supplied by Caterpillar/Olympian, Onan/Cummings, Kohler, or approved equal.
2. The supplier shall be the authorized dealer of the engine-generator set manufacturer, and shall be fully qualified and authorized to provide service and parts for the engine and generator at any time during the day or night. Parts and service shall be available 24 hours per day 7 days a week, from a location within a 100-mile radius of the location of the installed generator set.

T. Shop Drawings:
1. Prior to purchase of stand-by power generation equipment, the CONTRACTOR shall submit not less than four (5) sets of data to the County Representative for approval, including equipment data, accessories, sizing calculations, etc., as may be appropriate to determine compliance with these Specifications.

U. Operating Instructions:
1. Six (6) complete copies of operating instructions and parts list shall be provided prior to acceptance of the unit. Parts list shall include schedule of type and quantity of parts recommended for stock.

V. Spare Parts:
1. The following spare parts shall be furnished:
a. Engine Fan & Accessory Drive Belts 1 sets
b. Oil, Fuel & Air Filters 2 sets
c. Spare Indicator Lamps & Fuses of each type used 2 sets
2. Spare parts shall be boxed and labeled with the pumping station identification.

W. Warranty:
1. The complete standby power generating system shall be warranted for one year after the acceptance of the sewer pump station by the COUNTY. The warranty shall cover all defects in equipment, parts, assembly and installation. The warranty shall be issued in writing by the supplier and delivered to the COUNTY Representative.

2.9 FACTORY INSPECTION

A. Perform motor and cable insulation test for moisture content and insulation defects.

B. Run pump dry to check for proper rotation and mechanical integrity.

C. Run pump submerged for 30 minutes in water.

D. Remove pump from water; perform motor and cable insulation test.

E. A written report on the above shall be prepared by the test engineer, certified and submitted to ENGINEER.

2.10 FACTORY PERFORMANCE TEST

A. Test each pump at the factory; submit certified performance curves to ENGINEER prior to shipment.

B. Test each pump at no less than three head conditions including shut-off head and design head.

C. Provide a standard NPSH curve based on testing of standard test pump.

2.11 SPARE PARTS

A. One spare fuse for each fuse in pump control panel.

B. One spare pilot light for each pilot light in pump control panel.

C. One spare float switch with length of integral cord sufficient to replace longest provided.

PART 3 EXECUTION

3.1 INSTALLATION

A. Comply with manufacturer's instructions.

B. Float Switches:
   1. Install float switches at elevations indicated.
   2. Install stainless steel cable and anchor assembly so that anchor freely hangs within 6 inches of well bottom, and so that float switches will be easily accessible for cleaning and replacement.
   3. Attach float switch cord to cable with nylon wire ties spaced 12 inches apart and starting 6 to 8 inches above top of switch.
   4. Terminate float wiring using normally open or normally closed configuration as required for proper operation. Cap the unused third wire in the junction box.

3.2 MANUFACTURER'S START-UP SERVICES

A. Provide a minimum of one 8-hour day of service.

END OF SECTION