

Project Manual
For

Pennies for Progress 3
SC 160 East (Tom Hall Road) Widening
From Mimosa Lane to Hensley Road

June 2023

County Management

David Hudspeth, County Manager
Michael Moore, Assistant County Manager
Kevin Madden, Assistant County Manager

County Council

District 1: Tom Audette
District 2: Allison Love
District 3: Tommy Adkins
District 4: William "Bump" Roddey
District 5: Christi Cox, Chairwoman
District 6: Watts Huckabee
District 7: Debi Cloninger

York County Engineering Reference No. 11149-010
SCDOT Project No. P029536

Prepared for:

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PROCUREMENT DEPARTMENT

Teria G. Sheffield
Procurement Director

SOLICITATION TYPE: Invitation for Bid **DATE:** June X, 2023

ID Number: XXXX **Title:** SC 160 East (Tom Hall Road) Widening

Due Date/Time: XXXday, XXXX ##, 2023 at 3:00 p.m.

LATE SUBMITTALS WILL NOT BE ACCEPTED

Opening Location:

Government Center Building

Room 3401

6 S. Congress St., York, SC 29745

Point of Contact: Bryant Cook, Procurement Manager
Email: procurement@yorkcountygov.com

Questions Deadline: No later than XXX ##, 2023 at 3:00 p.m.

Email: procurement@yorkcountygov.com

Tentative Date of Council Approval: XXXday, XXXX ##, 2023

INFORMATION TO BIDDERS

1. PROJECT DESCRIPTION

1.1. The Work of this project consists of furnishing all labor, materials, equipment, tools, transportation, services and incidentals; and of performing all work necessary to complete all specified work in accordance with the Contract Documents prepared therefore and entitled **SC 160 East (Tom Hall Rd) Widening**. The work generally consists of clearing and grubbing, widening of SC 160, extension of a 5'x5' concrete box and associated storm drainage pipes, boxes and inlets, etc; and performing all work necessary to complete all specified work in accordance with the Contract Documents prepared therefore and entitled **SC 160 East (Tom Hall Rd) Widening**.

1.2. Completion time for the project will be **660 calendar** days as set forth in the Agreement. The contractor will start the work covered by The Department of the Army Regional General Permit **SAC# 2011-00476** as soon as possible from the Notice to Proceed.

2. DEFINED TERMS

2.1. Terms used in the Information to Bidders are defined and have the meanings assigned to them in the General Conditions.

3. COPIES OF BIDDING DOCUMENTS

3.1. Only complete sets of Bidding Documents will be issued and shall be used in preparing Bids. Neither the OWNER nor the ENGINEER assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

3.2. Complete sets of Bidding Documents may be obtained in the manner and at the location stated in the Invitation for Bids.

4. QUALIFICATIONS OF BIDDERS

4.1. Each Bid must contain evidence of the Bidder's qualifications to do business in the area where the project is located.

4.2. To demonstrate qualifications to perform the Work, each Bidder must be prepared to submit, within five days of OWNER's request, a Statement of Qualifications providing written evidence as to the financial status; previous successful contractual and technical experience in similar work including references, description and volume of present commitments, evidence of possession of valid state, county, and local licenses; Certificates of Competency covering all operations and all areas of political jurisdiction involved in the work of this project; and such other data as may be requested by the OWNER.

4.3. Statement of Bidders Qualifications

If requested by the OWNER, Bidder must submit a Statement of Qualifications (the Qualifications) to include the following information. Bidder must provide all requested information in the Qualifications, and the data given must be clear and comprehensive. This statement shall be notarized and furnished to the OWNER, within five days of OWNER's request. If necessary, the Qualifications questions may be answered on separate, attached sheets. The Bidder may submit any additional information the Bidder desires.

4.3.1. Name of Bidder.

4.3.2. Name(s), address(es), & social security number(s) of company principal(s).

4.3.3. Permanent main office address.

4.3.4. When organized.

4.3.5. If a corporation or company, list the State where incorporated or registered, year incorporated or registered, and the location of the principal place of business.

4.3.6. How many years has your organization been engaged in the contracting business under your present firm or trade name?

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

4.3.8. Under what other and former names has your organization operated?

4.3.9. General character of work performed by your company.

4.3.10. Has your company ever failed to complete any work awarded to you?

4.3.11. Have you ever defaulted on a contract?

4.3.12. List the more important projects completed by your company in the last five (5) years, the approximate cost for each project, and the month and year completed.

4.3.13. List your major equipment available for this contract.

4.3.14. Experience in construction work similar in importance to this project.

4.3.15. Background and experience of the principal members of your organization, including officers.

4.3.16. Credit available: \$

4.3.17. Give bank references:

4.3.18. Will you, upon request, fill out a detailed financial statement and furnish any other information that may be required by the OWNER?

The following statement shall appear on the submitted Statement of Bidder Qualifications: "The undersigned hereby certifies that information furnished is true and accurate and further authorizes and requests all persons, firms, and corporations to furnish all information requested by the OWNER to allow verification of the information requested in this Statement of Bidder's Qualifications."

5. DISQUALIFICATION OF BIDDERS

5.1. One Bid: Only one Bid from an individual firm, partnership, company, or corporation under the same or under different names will be considered. If OWNER believes that a Bidder submitted more than one Bid for the work involved, all Bids submitted by that Bidder will be rejected.

5.2. Collusion Among Bidders: If OWNER believes that collusion exists among the Bidders, the Bids of all participants in such collusion will be rejected, and no participants in such collusion will be considered in future Bids for the same work.

6. EXAMINATION OF SITE CONDITIONS

6.1. Each Bidder, by and through the submission of a Bid, agrees to have examined the site, the location of all proposed work, and is satisfied through personal knowledge and experience or professional advice as to the character and location of the site, surface and subsurface conditions, elevations, locations of underground utilities and structures, and any other conditions and obstructions affecting the work, the nature of any existing construction, and other physical characteristics of the job, in order that the prices which the Bidder bids include all costs required for satisfactory completion of the work, including the removal, relocation, or replacement of any objects or obstructions which may be encountered in doing the proposed work.

6.2. Reports and records of obstructions and subsurface investigations shown on the Drawings or included in the Bid Documents were made solely for design purposes. The OWNER and ENGINEER do not warrant, guarantee or represent that said data is accurate or complete with respect to actual subsurface conditions throughout the site. Therefore, the Bidder, by and through the submission of a Bid, affirms satisfaction in respect to such site conditions, and, should the Bidder be awarded the Contract, the Bidder agrees to make no claims against the OWNER or ENGINEER if, in carrying out the work, the Bidder finds that the actual conditions do not conform to those indicated. The OWNER will, upon request, provide each Bidder with reasonable access to the site to conduct such tests and investigations as each Bidder deems necessary for submission of a Bid. If a Bidder obtains such access, the Bidder shall restore the site to the condition existing prior to conducting said tests and investigations.

6.2.1. In reference to those reports of explorations and tests of subsurface conditions at the site which have been utilized by ENGINEER in preparation of the Contract Documents, Bidder may rely upon the accuracy of the technical data contained in such reports but not upon non-technical data, interpretations or opinions contained therein or for the completeness thereof for the purpose of bidding or construction.

6.2.2. In reference to those drawings of physical conditions in or relating to existing surface and subsurface conditions (except Underground Facilities) which are at or contiguous to the site which

has been utilized by ENGINEER in preparation of the Contract Documents, Bidder may rely upon the accuracy of the technical data contained in such drawings, but not upon the completeness for the purpose of bidding or construction.

Copies of such reports and drawings will be made available by OWNER to any Bidder upon request. Those reports and drawings are not part of the Contract Documents, but the technical data contained therein upon which Bidder is entitled to rely as provided in Paragraphs 6.2.1 and 6.2.2 are incorporated into the Contract Documents by reference.

6.3. Information and data reflected in the Contract Documents with respect to Underground Facilities at or contiguous to the site is based upon information and data furnished to OWNER and ENGINEER by owners of such Underground Facilities or others, and OWNER does not assume responsibility for the accuracy or completeness thereof.

6.4. Should a Bidder find that any subsurface conditions, Underground Facilities or other physical conditions at or contiguous to the site is of such a nature as to require a change in the Contract Documents due to differing conditions, Bidder shall at once notify the ENGINEER in writing.

6.5. The land upon which the work is to be performed, rights-of-way and easements for access thereto, and other lands designated for use by OWNER in performing the Work are identified in the Bid Documents. All additional lands and access thereto required for temporary construction facilities or storage of materials and equipment are to be provided by the successful Bidder. Easements for permanent structures or permanent changes in existing structures are to be obtained and/or paid for by OWNER unless otherwise provided in the Contract Documents.

7. EXAMINATION OF CONTRACT DOCUMENTS

7.1. Each Bidder shall carefully examine the Contract Documents and become thoroughly informed regarding any and all conditions and requirements that may in any manner affect cost, progress or performance of the Work to be performed under the Contract. Ignorance on the part of the Bidder will in no way relieve the Bidder of the obligations and responsibilities assumed under the Contract.

7.2. Should a Bidder find discrepancies, ambiguities, or omissions in the Bid Documents or Contract Documents or doubt as their meaning, the Bidder shall at once notify the ENGINEER in writing.

7.3. The Submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of Articles 6 and 7; without exception the Bid is premised upon performing and furnishing the Work required by the Contract Document; and such means, methods, techniques, sequences, or procedures of construction as may be indicated in or required by the Contract Documents; and the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

8. INTERPRETATIONS, CLARIFICATIONS AND ADDENDA

8.1. All questions about the meaning or intent of the Contract Documents or about the bid process must be written. No oral interpretations will be made to any Bidder as to the meaning of the Contract Documents or the bid process. Any inquiry or request for interpretation received five (5) or more days prior to the date fixed for opening of Bids will be given consideration unless otherwise specified on cover page. Any changes or interpretations will be made in writing in the form of an addendum and, if issued, posted on the County's website www.yorkcountygov.com and notification will be sent by available means to all known prospective Bidders prior to the established bid opening date. Each Bidder shall acknowledge receipt of such addenda in the space provided on the Bid Form. In case any Bidder fails to acknowledge receipt of such addenda, submission of the bid constitutes acknowledgement of the receipt of all addenda. All addenda are a part of the Contract Documents and each Bidder will be bound by such addenda, whether or not received by the Bidder. It is the responsibility of each Bidder to verify that the Bidder has received all addenda issued before Bids are opened. Questions received less than five (5) Calendar days prior to the date for opening of Bids may not be answered unless otherwise specified on cover page. Only questions answered by formal written addenda will be binding. Oral and other interpretations or clarifications will have no legal effect.

8.2. Addenda may also be issued to modify the Bidding Documents as deemed advisable by OWNER or ENGINEER.

8.3. Inquiries regarding interpretation or additional information concerning the County's requirements or stipulations concerning this request can be made via email as listed below.

8.4. Send questions regarding the project via the Q&A icon found through the link to the solicitation on the county website.

9. INTERPRETATION OF QUANTITIES

9.1. The quantities of work to be performed and materials to be furnished under unit price items, as given in the Bid Form, shall be considered as approximate only and will be used solely for the comparison of Bids received. The OWNER and/or ENGINEER do not expressly or by implication represent that the actual quantities involved will correspond exactly with the quantities on the Bid Form. The Bidder may not plead misunderstanding or deception because of such estimate or quantities or of the character, location or other conditions pertaining to the work. Payment to the CONTRACTOR under unit price items will be made only for the actual measured quantities of work performed and materials furnished in accordance with the Contract Documents, and it is understood that the quantities may be increased or decreased at the OWNER's option, as provided in the General Conditions, without in any way invalidating any of the unit or lump sum prices Bid.

10. ALTERNATES

10.1. When certain items of equipment or materials are specified or described as the product of a particular manufacturer - together with any required additional information such as model number, size or catalog number - only such specific items may be used in preparing the Bid, except as hereinafter provided.

10.2. A Bidder proposing to seek approval for the use of alternate, substitute, or "equal" items must do so in accordance with the provisions of Section 12 of the General Conditions and must determine that such proposed equipment is of comparable character and quality to that specified. The OWNER or the ENGINEER will not discuss, approve, or disapprove any alternate or substitution of equipment or materials before execution of the Contract. The cost of changes in related work and additional drawings, which may be required to illustrate or define the alternate or substitute equipment and its relation to the other parts or portions of the work, shall be paid by the Bidder. Substitution of equipment or materials will cause no change in the Contract Time or in the amount of liquidated damages in the Contract Documents.

11. GOVERNING LAWS AND REGULATIONS

11.1. Upon award of a contract under this request the successful Bidder must comply with the laws of South Carolina including obtaining authorization or licensure to do business with this State if required.

11.2. Notwithstanding the fact that applicable statutes may exempt or exclude the successful Bidder from authorization or licensure requirements, by submission of this signed Bid, the Bidder agrees to be subject to the jurisdiction and process of the courts of the State of South Carolina as to all matters and disputes arising under the Contract Documents and the performance thereof, including any questions as to the liability for taxes, licenses, or fees levied by the State.

11.3. The Bidder is required to be familiar with and shall be responsible for complying with all federal, State and local laws, ordinances, rules, and regulations that in any manner affect the work.

11.4. The bid prices shall include all sales, consumer, use, and other taxes required to be paid in accordance with the law of the place of the project.

12. PREPARATION OF BIDS

12.1. Signature of the Bidder: Each Bidder shall sign the Bid Form in the space provided for the signature. If the Bidder is an individual, the words "doing business as", or "Sole Owner" must appear beneath such signature. In the case of a partnership, the signature of at least one of the partners must follow the firm name and the words "Member of the Firm" should be written beneath such signature. If the Bidder is company, either a member or the managing member must sign the Bid on behalf of the company and provide evidence of the authority to sign the bid. If the Bidder is a corporation, the title of the officer signing the Bid on behalf of the corporation must be stated and evidence of the Bidders authority to sign the Bid must be submitted. Bids not signed may be automatically rejected.

12.2. The Bidder shall show valid South Carolina Contractor's License Number on the Bid Form. Failure to show this required information in the proper place may cause the Bid to be automatically rejected. All Bidders shall hold a valid and current South Carolina General Contractor's License, with the appropriate classifications and limitations to satisfy the proposed scope of work and bid amount.

12.3. Basis for Bidding: The price bid for each item shall be on a lump sum or unit price basis as specified in the Bid Form. The bid prices shall remain unchanged for the duration of the Contract and no claims for cost escalation during the progress of the work will be considered. All blanks on the Bid Form must be completed in black ink or typewritten.

12.4. Price Bid: The total price bid for the work shall be the aggregate of the lump sum prices bid and unit prices multiplied by the appropriate estimated quantities for the individual items and shall be stated in figures in the appropriate place on the Bid Form. In the event that there is a discrepancy on the Bid Form due to unit price extensions or additions, the corrected extensions and additions shall be used to determine the project bid amount. Written values (in words) shall supersede numerical values, when discrepancies exist.

13. SUBMISSION OF BIDS

13.1 Online submittal: Electronic submittals shall be uploaded in PDF format via the Getall portal which can be accessed at <https://www.yorkcountygov.com/217/Procurement> under Active Bids. To ensure that an electronic submittal is received by the due date and time, it is recommended that submittals are uploaded allowing sufficient time prior to deadline. An email confirmation of submittal will be received after clicking on the Confirm Bid button in the GetAll system. If confirmation email is not received, contact GetAll support at support@getall.com to confirm submittal was successful. The Offeror shall be responsible for confirming that submittal is received by the deadline. Any submittal received after the closing date and time deadline will not be considered.

For step by step instructions on how to submit a response select Help and then Quick Reference in the Getall portal:

13.2. Each bid shall be submitted on the Bid Form as furnished, together with a suitable bid security as herein described.

13.3. The Bid, accompanied by bid security, as described in Section 14, and other required documents, shall be submitted

13.4. If requested by the OWNER, Bidder shall submit, within five days of OWNER's request, a list of the names and addresses of the major subcontractors together with the services they will supply. These subcontractors will be subject to review as to their competency by the OWNER prior to award of Contract and shall be one of the considerations in determining the successful Bidder. After award of Contract, no change in subcontractors shall be made unless approved by the OWNER after a request for such a change, including the reasons therefore, has been submitted in writing by the CONTRACTOR.

13.5 CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY, AND VOLUNTARY EXCLUSION: The Bidder certifies, by submission of this document or acceptance

of a contract, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any State, Federal department, or agency. It further agrees by submitting this qualification statement that it will include this clause without modification in all lower tier transactions, solicitations, Bids, contracts, and subcontracts. Where the Bidder or any lower tier participant is unable to certify to this statement, it shall attach an explanation to the Bid Form.

14. BID SECURITY

14.1. Each Bid must be accompanied by a cashier's check or Bid Bond made payable to the OWNER in an amount not less than five percent (5%) of the total amount of the Bid if the total amount of the bid exceeds \$30,000. Generally, the bid security of all Bidders, including the three (3) lowest responsible Bidders, will be returned within ten (10) days after the OWNER and the accepted Bidder have executed the written Contract and the accepted Bidder has filed acceptable Performance and Indemnity and Payment Bonds. Upon request and no earlier than thirty (30) days after the formal opening of bids, the County will return the bid security of any Bidder.

14.2. Attorneys in Fact who sign Bid Bonds shall file with such bonds a certified copy of their Power of Attorney to sign said Bonds.

14.3. Failure of the accepted Bidder to execute a Contract and file acceptable bonds within ten (10) days after a written Notice of Award has been given shall be just cause for the annulment of the award and the forfeiture of the bid security to the OWNER as liquidated damages for damages sustained by OWNER. Award may then be made to the next lowest responsible Bidder or all Bids may be rejected.

15. WITHDRAWAL OF BID

15.1. Any Bid may be withdrawn prior to the time scheduled in Invitation for Bids for the receipt thereof. A Bid may also be withdrawn within twenty-four (24) hours after the date of the receipt of the Bids, provided that the Bidder files a duly signed, written notice with OWNER and promptly there after demonstrates, to the reasonable satisfaction of OWNER, that there was a material and substantial mistake in the preparation of its Bid. The Bid security will be returned and the Bidder will be disqualified from further bidding on the work to be provided under the Contract Documents.

16. MODIFICATION OF BIDS

16.1. York County does not allow modification of bids after deadline for submittal.

17. RECEIPT AND OPENING OF BIDS

17.1. Bids will be received until the designated time and will be publicly opened and (unless non-responsive) read aloud at the appointed time and place stated in the Invitation for Bids. The person whose duty it is to open the Bids will decide when the specified time has arrived and no Bids received thereafter will be considered. No responsibility will be attached to anyone for the

premature opening of a Bid not properly addressed and identified. Bidders or their authorized agents are invited to be present. An abstract of the amounts of the base Bids and major alternates (if any) will be available to Bidders after the opening of Bids.

18. DETERMINATION OF SUCCESSFUL BIDDER

18.1. For the purpose of award, the correct summation of the lump sum prices and/or of the products of the estimated quantities shown in the Bid and the unit prices will be considered the Bid. Until the final award of the Contract, the OWNER is not bound to accept the minimum Bid stated herein but reserves the right to reject any and all Bids and to waive technical errors and irregularities as may be deemed best for the interests of the OWNER. Bids containing modifications that are incomplete, unbalanced, conditional, and obscure; containing additions not requested or irregularities of any kind; not complying in every respect with the Information to Bidders and the Bid Documents, may be rejected at the option of the OWNER.

18.2. In evaluating Bids, OWNER will consider the qualifications of the Bidders, whether or not the Bids comply with the prescribed requirements, alternates (if any), unit prices, and other data, as may be requested in the Bid Form or prior to the Notice of Award.

18.3. OWNER may conduct such investigations as OWNER deems necessary to assist in the evaluation of any Bid and to establish the qualifications to perform and furnish the Work in accordance with the Contract Documents to OWNER's satisfaction within the prescribed time.

18.4. The Bids of the three (3) lowest responsible Bidders will remain subject to acceptance for a maximum of one hundred twenty (120) days after the day of the Bid opening, but OWNER may, at its sole discretion, release any Bid and return the bid security prior to that date.

19. AWARD OF CONTRACT

19.1. The OWNER reserves the right to reject any or all Bids or any part of any Bid, to waive any informality in any Bid, or to re-advertise for all or part of the work contemplated. If Bids are found to be acceptable by the OWNER, written Notice of Award will be given to the lowest responsible Bidder of the acceptance of the Bid and of the award of the Contract.

19.2. If a Bidder to whom a Contract is awarded forfeits the bid security and the award of the Contract is annulled, the OWNER may either award the Contract to the next lowest responsible Bidder or re-advertise the work.

19.3. The Contract will be awarded to the lowest responsible Bidder complying with the applicable conditions of the Contract Documents.

19.4. The ability of a Bidder to obtain Performance and Indemnity and Payment Bonds shall not be regarded as the sole test of such Bidder's competence or responsibility.

19.5. The OWNER also reserves the right to reject the Bid of a Bidder who has previously failed to perform properly or to complete Contracts of a similar nature on time.

20. EXECUTION OF CONTRACT

20.1. The Bidder to whom a Contract is awarded will be required to return to the OWNER a minimum of three (3) executed counterparts of the prescribed Contract or Agreement together with the required Performance and Indemnity and Payment Bonds and the required Certificates of Insurance within ten (10) days from the date of Notice of Award. Within ten (10) days thereafter, OWNER shall deliver one fully signed counterpart to CONTRACTOR. Each counterpart is to be accompanied by a complete set of Drawings with appropriate identification.

21. PERFORMANCE AND PAYMENT BONDS

21.1. Simultaneously with delivery of the executed Contract to the OWNER, a Bidder to whom a Contract has been awarded must deliver to the OWNER executed Performance and Indemnity and Payment Bonds on the prescribed forms each in an amount equal to one hundred percent (100%) of the total amount of the Contract Amount, as security for the faithful performance of the Contract and for the payment of all persons performing labor or furnishing materials in connection therewith. The Performance and Indemnity and Payment Bonds shall have as the surety thereon only such surety company or companies as are authorized to write bonds of such character and amount under the laws of the State of South Carolina and with a resident agent in the county in which the project is located. The Attorney in Fact or other officer who signs the Performance and Indemnity and Payment Bonds for a surety company must file with such bonds a certified copy of the Power of Attorney authorizing the Bidder to do so.

21.2. The Performance and Indemnity and Payment Bonds shall remain in force for two (2) year from the date of final payment of the Work as a protection to the OWNER against losses resulting from latent defects in materials or improper performance of work under the Contract, which may appear or be discovered during the one (1) year warranty period.

21.3. Qualification of Sureties shall be as described in the General Conditions.

22. GENERAL REQUIREMENTS

22.1 All Bidders including the employees of the Bidder must comply with all applicable Federal, State, and County laws pertaining to contracts entered into by governmental agencies, including non-discrimination employment. Contracts entered into on the basis of submitted Bid responses are revocable if contrary to law. Contracts for work resulting from this request will obligate the Bidder to not discriminate on the basis of race, color, creed, religion, handicap, or national origin in their employment practices.

23. TITLE VI OF CIVIL RIGHTS ACT OF 1964

23.1 Bidders shall comply with Title VI of the Civil Rights Act of 1964. York County strongly encourages the use of and involvement of Disadvantaged Business Enterprises (DBE) on this project.

24. CONFLICT OF INTEREST

24.1 The successful Bidder shall not knowingly employ, during the period of a contract, or any extensions to it, any professional personnel who are also in the employ of York County and who are providing services involving this request or services similar in nature to the scope of this request to the County. Furthermore, the Bidder shall not knowingly employ, during the period of a contract or any extensions to it, any York County employee who has participated in the making of a contract until at least two years after the termination of employment of that individual with York County.

25. INDEMNIFICATION AND HOLD HARMLESS

25.1 The successful firm shall agree to protect, defend, indemnify, and forever hold harmless, the County, its agents, officers, and employees, from and against any and all claims, liabilities, damages, costs, actions, proceedings, of any nature whatsoever, however alleged or termed, or in any lawsuits, arising in any manner out of any action or failure to act, by the firm, its officers, agents, and employees, or relating to or arising out of the performance or failure to perform, by the firm, its officers, agents, and employees, any obligations arising under its agreement with the County, or any other type claim/lawsuit whatsoever, however alleged or termed, which may arise at any time as a result of or related to the provision of service(s) for the County by the successful firm, without regard to the source, nature, or validity of the claim/lawsuit. Losses, liabilities, expenses and claims for damages shall include, but not be limited to, civil and criminal fines and penalties, loss of use and/or services, claims for injury, damage, disability, property damage, or death, injury to real or personal property, and attorneys' fees, costs, and expenses incurred by the County or any of its agents, officers, and employees. The County shall not be precluded from receiving the benefits of any insurance the firm may carry which provides for indemnification for any loss or damage to property in the firm's custody and control, where such loss or destruction is to County property. The firm shall do nothing to prejudice the County's right to recover against third parties for any loss, destruction or damage to County property.

26. DRUG-FREE WORKPLACE

26.1 During the performance of this request, the firm agrees to provide a drug-free workplace for employees of that firm; post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in the workplace and specify the actions that will be taken against employees for violations of such prohibition; and state in all solicitations or advertisements for employees placed by or on behalf of the firm that the firm maintains a drug-free workplace. For the purposes of this section, "drug-free workplace" means a site for the performance of work done in connection with a specific contract awarded to a contractor/firm in accordance with this chapter, the employees of whom are prohibited from engaging in the unlawful manufacture, sale, distribution, dispensation, possession or use of any controlled substance or marijuana during the performance of the request.

27. APPLICABILITY/JURISDICTION OF SOUTH CAROLINA LAW AND COURTS

27.1 Upon award of a contract under this request the person, partnership, association or corporation to whom the award is made must comply with the laws of South Carolina which require such person or entity to be authorized and/or licensed to do business with this State. Notwithstanding the fact that applicable statutes may exempt or exclude the successful firm from requirements that it be authorized and/or licensed to do business in this State, by submission of this signed Bid, the firm agrees to subject itself to the jurisdiction and process of the courts of the State of South Carolina as to all matters and disputes arising or to arise under the contract and the performance thereof, including any questions as to the liability for taxes, licenses, or fees levied by the State.

28. CERTIFICATE OF INSURANCE

28.1 Once selected, the successful firm will be required to provide proof of insurance to include professional liability; workers compensation, employer's liability and general liability prior to commencing work.

29. ASSIGNMENT

29.1 No contract or its provisions may be assigned, sublet, or transferred without the written consent of the County.

30. OWNERSHIP OF MATERIAL

30.1 All Bids and supporting materials (including all data, material, and documentation) originated and prepared for York County pursuant to this SOLICITATION and including correspondences relating to this SOLICITATION shall, belong exclusively to York County.

31. PRIME RESPONSIBILITIES

31.1 The successful firm will be required to assume sole responsibility for the complete effort as required by this solicitation. York County will consider the successful firm to be the sole point of contact with regard to contractual matters.

32. SUBCONTRACTING

32.1 If any part of the work covered by this solicitation is to be subcontracted, the successful firm shall identify the subcontracting organization and the contractual arrangements made therewith. All subcontractors must be approved by York County. The successful firm will also furnish the corporate or company name.

33. RECORDS RETENTION AND RIGHT TO AUDIT

33.1 The County shall have the right to audit books and records of the successful firm as they pertain to this contract. Such books and records shall be maintained for a period of three (3) years from the date of final payment under the contract. The County may conduct, or have conducted, performance audits of the successful firm. The County may conduct, or have conducted, audits of specific requirements of this solicitation as determined necessary by the County. Pertaining to all audits, successful firm shall make available to the County access to its computer files containing the history of contract performance and all other documents related to the audit. Additionally, any software used by the successful firm shall be made available for auditing purposes at no cost to the County.

34. PUBLIC ACCESS TO PROCUREMENT INFORMATION

34.1 Subject to the requirements of the Freedom of Information Act, commercial or financial information obtained in response to this SOLICITATION which is deemed privileged and confidential by the Bidder, will not be disclosed. Such privileged and confidential information should be clearly marked as such and includes information which if disclosed, might cause harm to the competitive position of the Bidder supplying the information. All Bidders, therefore, must visibly mark as "CONFIDENTIAL" each specific part of their Bid which such Bidders consider to contain proprietary or other privileged information. Additionally, all Bidders shall be solely responsible for identifying as exempt from the Freedom of Information Act and for visibly marking as "EXEMPT FROM FREEDOM OF INFORMATION ACT" each specific part of their Bid which Bidders deem to be so exempt and shall further be solely responsible for any consequences that might arise from the nondisclosure of any information that is subsequently determined not to have such an exemption. York County hereby disclaims any responsibility for not disclosing information identified by any Bidder as exempt from the Freedom of Information Act and further hereby disclaims any responsibility for any information which is disclosed as a result of Bidder's failure to visibly mark it as "CONFIDENTIAL" or to improperly mark it as "confidential". Bidder must identify specific parts of the Bid package as confidential. Failure to do so or to mark the entire Bid package as confidential may result in disclosure of that information.

35. NON-COLLUSION BIDDING CERTIFICATION AND DISQUALIFICATION

35.1 By submission of a bid, each Bidder and each person signing on behalf of any Bidder certifies, and in the case of a joint bid each party certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief.

35.2 The prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other proposer or with any competitor.

35.3 Unless otherwise required by law, the prices which have been quoted in this bid have not knowingly been disclosed by the Bidder and will not knowingly be disclosed prior to the bid opening, directly or indirectly, to any other Bidder or to any competitor.

35.4 No attempt has been or will be made by the Bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition

35.5 One Bid: Only one Bid from an individual firm, partnership, company, or corporation under the same or under different names will be considered. If OWNER believes that a Bidder submitted more than one Bid for the work involved, all Bids submitted by that Bidder will be rejected.

36. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY, AND VOLUNTARY EXCLUSION

36.1 The Bidder certifies, by submission of this document or acceptance of a contract, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any State, Federal department, or agency. It further agrees by submitting this qualification statement (if applicable) that it will include this clause without modification in all lower tier transactions, solicitations, Bids, contracts, and subcontracts. Where the Bidder or any lower tier participant is unable to certify to this statement, it must attach an explanation to this solicitation/bid.

37. CERTIFICATION REGARDING IMMIGRATION REFORM AND CONTROL

37.1 The Bidder certifies, by submission of this document or acceptance of a contract, that all Contractors are expected to comply with the Immigration and Reform Control Act of 1986 (IRCA), as may be amended from time to time. This Act, with certain limitations, requires the verification of the employment status of all individuals who were hired on or after November 6, 1986, by the Contractor as well as any subcontractor or sub-subcontractor. The usual method of verification is through the Employment Verification (I-9) Form. With the submission of this bid, the Contractor hereby certifies without exception that Contractor has complied with all federal and state laws relating to immigration and reform. Any misrepresentation in this regard or any employment of persons not authorized to work in the United States constitutes a material breach and, at the State's option, may subject the contract to termination and any applicable damages. The Contractor certifies that, should it be awarded a contract by the County, the Contractor will comply with all applicable federal and state laws, standards, orders and regulations affecting a person's participation and eligibility in any program or activity undertaken by the Contractor pursuant to this contract. The Contractor further certifies that it will remain in compliance throughout the term of the contract. At the County's request, the Contractor is expected to produce to the County any documentation or other such evidence to verify the Contractor's compliance with any provision, duty, certification, or the like under the contract. The Contractor agrees to include this Certification in contracts between itself and any subcontractors in connection with the services performed under this contract.

38. CHAIN OF COMMUNICATION

38.1 To ensure the integrity of the competitive process, a strict chain of communication shall apply to each Invitation for Bids, Request for Proposals, Request for Qualifications, or any other competitive solicitation during the period between publication of the solicitation and final award.

Bidders or its agents may not communicate by any means, directly or indirectly, with York County public officials, employees, its agents, or representatives or any person not otherwise listed on this document, regarding any aspect of this procurement activity. All communications must be solely with the Procurement Officer. In the sole determination of the Procurement Officer and/or York County, violation of these restrictions may result in disqualification of your offer, suspension or debarment, and may constitute a violation of law.

39. PROHIBITION OF DONATIONS AND GRATUITIES

39.1 Bidders are restricted from making donations to any York County governmental entity with whom they have or seek to have a contract. The Bidder represents that an offer discloses any gifts made, directly or through an intermediary, by the Bidder or the Bidder's named subcontractors or subconsultants to or for the benefit of York County, its agents, or representatives during the period beginning eighteen months prior to the Opening Date. No Bidder, or any person, firm, or corporation employed by the Bidder in the performance of this request, may offer or give any gift, money or anything of value or any promise for future reward or compensation to any York County employee.

40. YORK COUNTY RESERVES THE RIGHT TO REJECT ANY AND/OR ALL BIDS AND TO WAIVE ANY AND ALL TECHNICALITIES

Signature, Title of CONTRACTOR

BID FORM

Pennies for Progress - SC 160 East (Tom Hall Rd) Widening Project # 11149-010 – Project ID P029536

Submitted: _____, 2023

York County Government
6 South Congress Street
York, SC 29745

Sir or Madam:

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

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

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

The Bidder further proposes and agrees to commence substantial work on this project within 15 days of a Notice to Proceed and agrees that the Work will be completed and ready for final payment **within 660 days** of the Notice to Proceed.

The Bidder further agrees that the deductions for liquidated damages, as stated in the Agreement and General Conditions, constitute fixed, agreed, and liquidated damages to reimburse the OWNER for additional costs to the OWNER resulting from the Work not being completed within the time limit stated in the Contract Form. The liquidated damages shall be **\$1,200.00** for each consecutive calendar day thereafter.

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

ACKNOWLEDGEMENT OF ADDENDA

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

Addendum No. _____	Dated: _____

Company _____

Authorized Signature _____

Print Name _____

Email Address _____

(Please print clearly)

Note:

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

**SC 160 East (Tom Hall Road) Widening
 BID SCHEDULE - ROADWAY**

All work performed by the Contractor as essential to the completion of the intent of the Contract Documents shall be paid for in accordance with the Bid Schedule. No direct payment will be made for work performed which is not shown as a separate Bid Item. All costs shall be included in the various pay items in the Bid Schedule or an amount shown as Total Bid Amount for the work shown on the proposed project plans.

ITEM #	DESCRIPTION	QTY	UNIT	UNIT PRICE (\$)	TOTAL AMOUNT (\$)
1031000	MOBILIZATION	NEC.	LS		
1031100	MOBILIZATION - SUBCONTRACTOR	NEC.	LS		
1032010	BONDS AND INSURANCE	NEC.	LS		
1050800	CONSTRUCTION STAKES, LINES & GRADES	1.000	EA		
1052001	UTILITY STAKING	NEC.	LS		
1071000	TRAFFIC CONTROL	NEC.	LS		
1080300	CPM PROGRESS SCHEDULE	NEC.	LS		
2012000	CLEARING & GRUBBING WITHIN ROADWAY	NEC.	LS		
2021010	REMOVAL & DISPOSAL OF EXISTING DROP INLET	1.000	EA		
2027801	REMOVAL OF EXIST. GUARDRAIL	456.000	LF		
2028605	CULVERT EXTENSION PREPARATION	1.000	EA		
2031000	UNCLASSIFIED EXCAVATION	5,828.000	CY		
2033000	BORROW EXCAVATION	11,781.000	CY		
2036020	GEOTEXTILE, SEPARATION	1,375.100	SY		
2037030	GEOGRID STABILIZATION	690.000	SY		
2041000	STRUCTURE EXCAVATION FOR CULVERTS	18.000	CY		
2041010	DEWATERING SYSTEM NO.	NEC.	LS		
2047000	TEMPORARY SHORING WALL	100.000	LF		
2052000	NO. 57 STONE FOR BACKFILL	1,060.100	TON		
2081001	FINE GRADING	11,208.000	SY		
2103000	FLOWABLE FILL	100.000	CY		
3050199	GRADED AGGREGATE BASE COURSE	2,645.000	TON		
3063242	CEMENT MODIFIED RECYCLED BASE (12" UNIF)- CURING METHOD B	14,260.000	SY		
3064000	PORTLAND CEMENT FOR CEMENT MODIFIED RECYCLED BASE COURSE	805.000	TON		
3069900	MAINTENANCE STONE	401.000	TON		

**SC 160 East (Tom Hall Road) Widening
 BID SCHEDULE - ROADWAY**

ITEM #	DESCRIPTION	QTY	UNIT	UNIT PRICE (\$)	TOTAL AMOUNT (\$)
3100310	HOT MIX ASPHALT BASE COURSE - TYPE A	670.000	TON		
4011004	LIQUID ASPHALT BINDER PG64-22	530.000	TON		
4012120	FULL DEPTH ASPH. PAV. PATCHING 12"UNIF	425.000	SY		
4013200	MILLING EXISTING ASPHALT PAVEMENT 2.0"	7,359.000	SY		
4013990	MILLING EXISTING ASPHALT PAVEMENT (VARIABLE)	170.000	SY		
4020320	HOT MIX ASPHALT INTERMEDIATE COURSE TYPE B	1,590.000	TON		
4030320	HOT MIX ASPHALT SURFACE COURSE TYPE B	6,884.000	TON		
4030360	HOT MIX ASPHALT SURFACE COURSE TYPE E	340.000	TON		
4037221	DRIVEWAY PAVING-SURFACE TYPE C NON-RESURFACING PROJECT	240.000	TON		
4100100	HIGH PERFORMANCE CHIP SEAL APPLICATION (INCLUDING AGGREGATE)	14,260.000	SY		
4100105	EMULSION FOR HIGH PERFORMANCE CHIP SEAL	5,704.000	GAL		
6021120	PERMANENT CONSTRUCTION SIGNS (GROUND MOUNTED)	304.000	SF		
6052121	PORTABLE TERMINAL IMPACT ATTENUATOR-TEST LEVEL 2	4.000	EA		
605212A	ANCHOR KIT - PORT. ATTENUATOR(TEST LEVEL 2)	4.000	EA		
6053110	TEMPORARY CONCRETE BARRIER	980.000	LF		
6092100	TEMPORARY CLEAR PAVEMENT MARKERS MONO-DIR.- 4"X4"	12.000	EA		
6092155	TEMPORARY YELLOW PAVEMENT MARKERS BI-DIR.- 4"X4"	516.000	EA		
6250005	4" WHITE BROKEN LINES -(GAPS EXCLUDED)-FAST DRY PAINT	416.000	LF		
6250010	4" WHITE SOLID LINES (PVT. EDGE LINES)-FAST DRY PAINT	20,881.000	LF		
6250025	24" WHITE SOLID LINES (STOP/DIAGONAL LINES)-FAST DRY PAINT	409.000	LF		
6250105	4" YELLOW BROKEN LINES(GAPS EXC) - FAST DRY PAINT	3,558.000	LF		
6250110	4"YELLOW SOLID LINE(PVT.EDGE&NO PASSING ZONE)-FAST DRY PAINT	23,407.000	LF		
6271005	4" WHITE BROKEN LINES(GAPS EXCL.)THERMOPLASTIC- 90 MIL.	486.000	LF		
6271010	4" WHITE SOLID LINES (PVT. EDGE LINES) THERMO.- 90 MIL.	9,116.000	LF		
6271025	24" WHITE SOLID LINES (STOP/DIAG LINES)-THERMO.-125 MIL	223.000	LF		
6271030	WHITE SINGLE ARROWS (LT, STRGHT, RT) THERMO.-125 MIL.	4.000	EA		
6271035	WHITE WORD MESSAGE "ONLY" - THERMOPLASTIC - 125 MIL.	3.000	EA		

**SC 160 East (Tom Hall Road) Widening
 BID SCHEDULE - ROADWAY**

ITEM #	DESCRIPTION	QTY	UNIT	UNIT PRICE (\$)	TOTAL AMOUNT (\$)
6271064	4" YELLOW BROKEN LINES(GAPS EXC)THERMOPLASTIC - 90 MIL.	1,883.000	LF		
6271074	4" YELLOW SOLID LINES(PVT.EDGE LINES) THERMO-90 MIL.	9,903.000	LF		
6300005	PERMANENT CLEAR PAVEMENT MARKERS-MONO-DIR.- 4"X4"	4.000	EA		
6301100	PERMANENT YELLOW PAVEMENT MARKERS BI-DIR.- 4"X4"	172.000	EA		
6510105	FLAT SHEET, TYPE III, FIXED SZ. & MSG. SIGN	89.980	SF		
6510106	FLAT SHEET, TYPE III, SIZE DETERMINED BY MSG	12.500	SF		
6531210	U-SECTION POST FOR SIGN SUPPORTS - 3P	252.000	LF		
6770389	FURNISH & INSTALL NO. 14 COPPER WIRE, 4 CONDUCTOR - GRAY	882.000	LF		
6770394	FURNISH & INSTALL NO. 14 COPPER WIRE, 8 CONDUCTOR (GRAY)	707.000	LF		
6770413	FURNISH & INSTL NO. 14 COPPER WIRE,1- CONDUCTOR FOR LOOP WIRE	1,989.000	LF		
6780495	SAWCUT FOR LOOP DETECTOR	687.000	LF		
6800518	F&I-13"X24"X18"D.ELEC.FLUSH UNDGRD.ENCLOS-(STR.POLY.CONC.)HD	2.000	EA		
6885992	TEMPORARY ADJUSTMENT OF TRAFFIC SIGNAL EQUIPMENT	NEC.	LS		
7011402	CONC. FOR STRUCTURES - CLASS 4000(CULVERT)	18.470	CY		
7031100	REINF. STEEL FOR STRUCTURES (ROADWAY)	2,369.000	LB		
7143618	18" SMOOTH WALL PIPE	1,560.000	LF		
7143624	24" SMOOTH WALL PIPE	364.000	LF		
7191205	CATCH BASIN -TYPE 9	1.000	EA		
7192020	DROP INLET (24" X 36")	5.000	EA		
7192105	MANHOLE	5.000	EA		
7198740	PIPE END STRUCTURE - 24"	1.000	EA		
7199100	BEVELING OF PIPE END	28.000	EA		
8041010	RIP-RAP (CLASS A)	380.000	TON		
8041020	RIP-RAP (CLASS B)	674.000	TON		
8042800	GEOTEXTILE FABRIC FOR EROSION CONTROL UNDER RIPRAP (CLASS 2)	1,241.000	SY		
8051151	MT3 LEADING END TREATMENT TL3	2.000	EA		
8051710	MB TRAILING END TREATMENT	2.000	EA		

**SC 160 East (Tom Hall Road) Widening
 BID SCHEDULE - ROADWAY**

ITEM #	DESCRIPTION	QTY	UNIT	UNIT PRICE (\$)	TOTAL AMOUNT (\$)
8052100	MGS3 GR STANDARD SHOULDER	637.000	LF		
8081000	MOVING ITEM NO. 1 THRU 3	NEC.	LS		
8091010	RIGHT OF WAY MARKER(REBAR AND CAP)	63.000	EA		
8091050	RIGHT OF WAY PLAT	NEC.	LS		
8100100	PERMANENT COVER	7.848	ACRE		
8100200	TEMPORARY COVER	3.924	ACRE		
8101100	SELECT MATERIAL	3,170.000	CY		
8104005	FERTILIZER (NITROGEN)	784.800	LB		
8104010	FERTILIZER (PHOSPHORIC ACID)	784.800	LB		
8104015	FERTILIZER (POTASH)	784.800	LB		
8105005	AGRICULTURAL GRANULAR LIME	15,695.800	LB		
8109050	SELECTIVE WATERING	135,750.000	GAL		
8109901	MOWING	23.544	ACRE		
8151101	TURF REINFORCEMENT MATTING (TRM) TYPE 1	1.330	MSY		
8151111	TEMPORARY EROSION CONTROL BLANKET (CLASS A)	16.611	MSY		
8151203	HYDRAULIC EROSION CONTROL PRODUCT (HECP) - TYPE 3	15.696	ACRE		
8152004	INLET STRUCTURE FILTER - TYPE F (WEIGHTED)	40.000	LF		
8153000	SILT FENCE	3,500.000	LF		
8153090	REPLACE/REPAIR SILT FENCE	350.000	LF		
8154010	CLEANING SILT BASINS	572.000	CY		
8154050	REMOVAL OF SILT RETAINED BY SILT FENCE	875.000	LF		
8154155	INLET FILTER CLEANING	13.000	EA		
8156210	INLET STRUCTURE FILTER - TYPE B	13.000	EA		
8156410	AGGREGATE NO.5 OR 57 FOR EROSION CONTROL	134.000	TON		
8156490	STABILIZED CONSTRUCTION ENTRANCE	550.000	SY		

Roadway Base Bid Subtotal

\$0.00

BID FORM

SC 160 East (Tom Hall Road) Widening

Base Bid List

(The base bid of this bid document shall include all costs to provide each line item described to the roads contained within this bid and as outlined in this bid document.)

Roadway Base Bid Subtotal \$ _____

10% for Allowance (Total Cost X 10%) \$ _____

Total Project Bid: \$ _____

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

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

_____ L.S.
(Signature of Officer)

_____ L.S.
(Title of Officer)

Address:

P.O. Box _____ Street: _____

City: _____ State, Zip Code: _____

Telephone: _____ Fax: _____

Federal ID#: _____

Email address: _____

Contractor License type: _____ Contractor License number: _____

License status: _____ Expiration: _____

Classification: _____

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

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

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

END OF SECTION

BID BOND

STATE OF SOUTH CAROLINA
COUNTY OF YORK

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

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal has submitted to the
OWNER the accompanying bid, dated _____, 2023, for:

**York County No 11149-010 SCDOT Proj ID P029536
SC 160 East (Tom Hall Road) Widening**

NOW, THEREFORE,

- A. If said Bid shall be rejected, or
- B. If the principal shall not withdraw said Bid within twenty-four (24) hours after date of opening of the same, and shall within ten (10) days after the prescribed forms are presented to him for signature, enter into a written contract with the OWNER in accordance with the Bid as accepted, and give bonds with good and sufficient surety or sureties, as may be required, for the faithful performance and proper fulfillment of such contract, then the above obligations shall be void and of no effect, otherwise to remain in full force and effect.
- C. In the event of the withdrawal of said Bid within the period specified, or the failure to enter into such contract and give such bonds within the time specified, if the principal shall pay the OWNER the difference between the amount specified in said bid and the amount for which the OWNER may procure the required work and supplies, if the latter amount be in excess of the former, then the above obligations shall be void and of no effect, otherwise to remain in full force and effect.

IN WITNESS WHEREOF, the above bounded parties have executed this instrument under their several seals, this ____ day of _____, A.D., 2023, 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 _____, 2023, A.D.

(Attach Power of Attorney
to original Bid Bond)

Notary Public
State of South Carolina-at-Large

My Commission Expires: _____

END OF SECTION

AGREEMENT

THIS AGREEMENT, made and entered into this _____ day of _____, 2023 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:

***Pennies for Progress Project 3
SC 160 East (Tom Hall Road) Widening
York County No 11149-010 SCDOT Proj ID P029536***

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 **660 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 **One Thousand, Two Hundred Dollars (\$1,200.00)** 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 **One Thousand, Two Hundred Dollars (\$1,200.00)** per 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 five percent (5%) of the amount of such estimate which is to be retained by the OWNER until all Work has been performed strictly in accordance with this Agreement and until such Work has been accepted by the OWNER.

6.1.2. Upon submission by the CONTRACTOR of evidence satisfactory to the OWNER that all payrolls, material bills and other costs incurred by the CONTRACTOR in connection with the construction of the Work have been paid in full, including all retainage to subcontractors on the project, and also after all guarantees that may be required in the specifications have been furnished and are found acceptable by the OWNER, final payment on account of this Agreement shall be made within sixty (60) days after completion by the CONTRACTOR of all Work covered by this Agreement and acceptance of such Work by the OWNER.

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

7. ADDITIONAL BOND

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

8. CONTRACT DOCUMENTS

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

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

Owner
By: _____

Contractor
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

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, Instruction 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, Instructions 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 (as listed in the Index of 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. These Drawings are listed in the Index of Drawings.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

2. CONTRACTOR'S OBLIGATIONS

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

3. LANDS BY CONTRACTOR

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

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

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

4. SURVEYS BY CONTRACTOR

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

5. PUBLIC UTILITIES

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

6. SUPERINTENDENT

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

7. SUBCONTRACTORS

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

8. ASSIGNMENTS

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

9. MUTUAL RESPONSIBILITY OF CONTRACTORS

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

10. ORAL AGREEMENTS

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

11. MATERIALS, SERVICE AND FACILITIES

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

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

12. MATERIALS AND EQUIPMENT

The materials and equipment installed in the work shall meet the requirements of the Contract Documents and no materials or equipment shall be ordered until reviewed by the ENGINEER. The CONTRACTOR shall furnish all materials and equipment not otherwise specifically indicated or provided by the OWNER.

The CONTRACTOR shall guarantee all materials and equipment he provides in accordance with Section 16 of these GENERAL CONDITIONS.

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

12.1.1. Whenever it is indicated in the Drawings or specified in the specifications that a substitute or "or-equal" item of material or equipment may be furnished or used by the CONTRACTOR, application for such acceptance will not be considered by the ENGINEER until after the Effective Date of the agreement. The CONTRACTOR shall furnish the complete list of proposed desired substitutions, together with such engineering and catalog data as the ENGINEER may require. All proposals for substitutions shall be submitted in writing by the General Contractor and not by individual trades or material suppliers. The ENGINEER will review proposed substitutions and make his recommendations in writing within reasonable time.

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

12.2. Space Requirements: It shall be the responsibility of the CONTRACTOR to insure 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 insure 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 one 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, its successors and assigns, the ENGINEER, their consultants, and each of their officers and employees and agents, from any and all liability claims, losses or damage arising or alleged to arise from the performance of the work described herein, but not including the sole negligence of the OWNER or the ENGINEER.

21. PATENTS AND ROYALTIES

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

22. PERMITS

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

23. LAWS TO BE OBSERVED

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

24. WARNING SIGNS AND BARRICADES

24.1. The CONTRACTOR shall provide adequate signs, barricades, red lights and watchmen and take all necessary precautions for the protection of the work and the safety of the public. All barricades and obstructions shall be kept burning from sunset to sunrise. Barricades shall be of substantial construction and shall be placed and illuminated at night as to show in advance where construction, barricades, or detours exist.

25. PUBLIC CONVENIENCE

25.1. The CONTRACTOR shall at all times so conduct his work as to insure the least possible obstruction to traffic and inconvenience to the general public and the residents in the vicinity of the work, and to insure 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 insure 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 only 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 uninterrupted 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 uninterrupted at such rate of progress as will insure 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 retainage as stated in Special Provisions 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.

47. CONTRACTOR'S/SUBCONTRACTOR'S PERSONNEL

47.1 Contractor warrants that all Contractor/Subcontractor personnel engaged in the performance of Work under this Contract shall possess sufficient experience and/education to perform the services requested by the County. County expressly retains the right to have any of the Contractor/Subcontractor personnel removed from performing services under this Contract. Contractor shall effectuate the removal of the specified Contractor/Subcontractor personnel from providing any services to the County under this Contract within one business day of notification by County. County shall submit the request in writing to the Contractor's Project Manager. The County is not required to provide any reason, rationale or additional factual information if it elects to request any specific Contractor personnel be removed from performing services under this Contract.

END OF SECTION



slab upon written notice from York County to remove said contents and clear the structure from the proposed right of way. In the event the storage building/well house and concrete slab are not clear of the proposed right of way when construction of the project begins, the Grantor shall permit the general contractor or his assigns to enter onto the property to clear the structure and the slab foundation and shall reimburse York County for the cost of removing the structure and foundation. It is further understood and agreed that if the drain field lines located left of approximate survey station 85+75, and on the property of the Grantor, are disturbed during construction, they shall be repaired by the general contractor or his assigns at no cost to the Grantor. (END OF SPECIAL PROVISIONS)

This conveyance is made subject to existing easements and rights-of-way appearing in the chain of title, and to restrictions of record, which restrictions are not intended to be reimposed hereby.

TOGETHER with all and singular the hereditaments, rights, members and appurtenances whatsoever to the said property belonging or in any wise incident or appertaining;

TO HAVE AND TO HOLD the said property, with its hereditaments, privileges and appurtenances, unto the said grantee, **YORK COUNTY, a body politic and political subdivision of the State of South Carolina**, its successors and assigns, forever.

AND the said Grantor does hereby bind itself, its successors and assigns, to warrant and forever defend, all and singular, the said premises unto the said **YORK COUNTY, a body politic and political subdivision of the State of South Carolina**, its successors and assigns, against it and its successors and assigns, and all persons whomsoever lawfully claiming, or to claim the same or any part thereof.

*****THIS AREA IS INTENTIONALLY BLANK*****

IN WITNESS WHEREOF, the said Grantor has caused these presents to be executed by themselves, their hand(s) and seal(s), this 12th day of September, in the year of our Lord Two Thousand Nineteen, and in the two hundred and forty-third year of the sovereignty and independence of the United States of America.

SIGNED, SEALED AND DELIVERED
IN THE PRESENCE OF:

Guadalupe Hernandez Ortiz
1ST Witness

Laura M. O'Donnell
Laura M. O'Donnell Grantor (L.S.)

Robbin Dawkins
2nd Witness

STATE OF SOUTH CAROLINA)
) Acknowledgement
COUNTY OF YORK)

I, **Robbin Dawkins**, do hereby certify that **Laura M. O'Donnell**, personally appeared before me this day and acknowledged the due execution of the foregoing instrument.

Witness my hand and official seal this the 12th day of September, 2019.

Robbin Dawkins (L.S.)

Robbin Dawkins
(Printed Name)

Notary public for SOUTH CAROLINA

My commission expires: February 21, 2024

EXHIBIT "A"

THIS EXHIBIT IS A GRAPHIC REPRESENTATION OF THE "AREA OF ACQUISITION" AND IS IN DIRECT REFERENCE TO ENGINEERING PLANS, A COPY OF WHICH CAN BE OBTAINED FROM SCDOT HEADQUARTERS; 955 PARK STREET, COLUMBIA, SC 29201. ADDITIONALLY, UPON COMPLETION OF CONSTRUCTION, A RECORDABLE RIGHT OF WAY PLAT SHALL BE SUBMITTED TO THE REGISTER OF DEEDS IN COMPLIANCE WITH SCDOT STANDARD DRAWING 809-105-00.



37

TIE EQUALITY:
 POC 88+15.41 @ SURVEY S.C. RTE. 160 =
 POT 50+00.00 @ SLEEPY HOLLOW RD.

TIE EQUALITY:

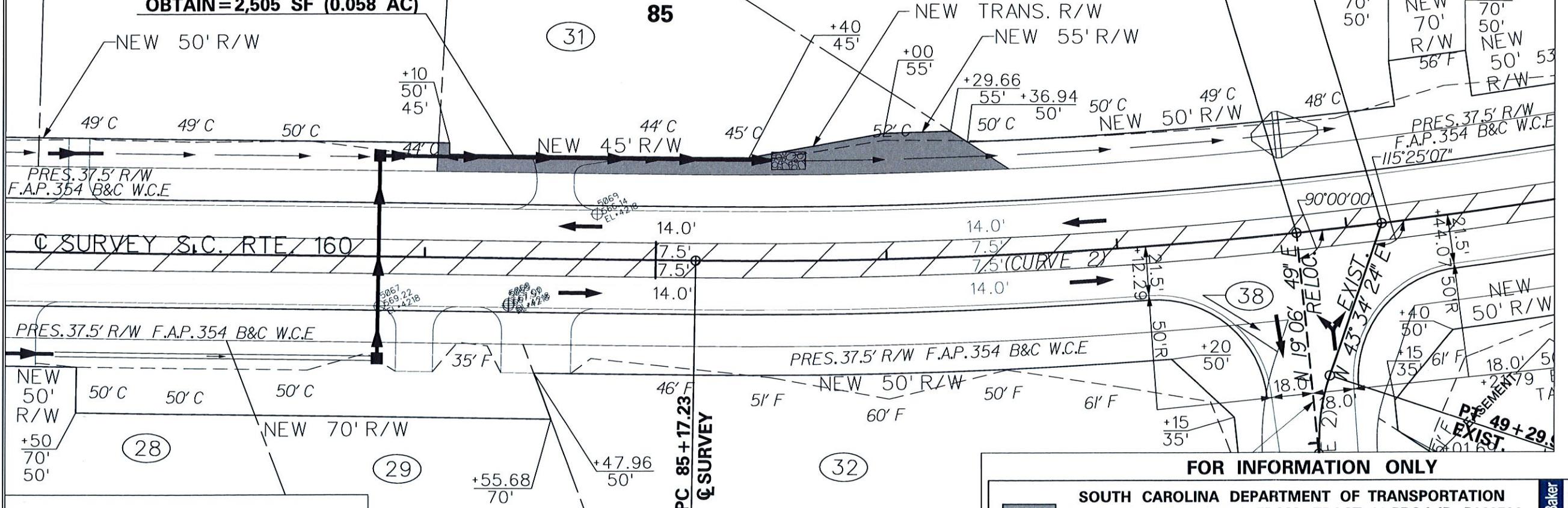
POC 87+78.18 @ SURVEY S.C. RTE. 160 =
 POT 49+92.29 @ SLEEPY HOLLOW RD. RELOC.

30

OBTAIN = 2,505 SF (0.058 AC)

31

85



YORK COUNTY TAX MAP #: 737-00-00-098
 PROPERTY OWNER: LAURA M. O'DONNELL

FOR INFORMATION ONLY

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
 AREA OF ACQUISITION FROM TRACT 31 PROJ ID P029536
 YORK COUNTY



ORIGINAL PREPARED: 09-11-2019

Michael Baker INTERNATIONAL

THE STATE OF SOUTH CAROLINA

COUNTY OF YORK

PERMISSION FOR:

Construction Slopes

NPDES (Erosion Control)

Project No. 11149-010
Project Name: SC 160 (Tom Hall Road)
Tract No. 37 & 37P
Project ID No. P029536

KNOW ALL MEN BY THESE PRESENTS, That I (or we) Springland Associates, LLC, a South Carolina limited liability company ("Licensor"), 164 Skipper Street, Fort Mill, SC 29715 in consideration of the sum of One Dollar (\$1.00), to me (or us) in hand paid, and other valuable consideration at and before the sealing and delivering hereof, do, subject to the terms and conditions of this instrument (this "Agreement"), hereby grant to the County of York ("Licensee") permission and a license (the "License") to do the work as outlined below, with the understanding that this work is to be done on property of the Grantor outside of the right of way, it being fully understood and agreed that no right of way is being granted to the County for the purpose of this construction.

SPECIAL PROVISIONS:

Subject to the conditions below, herein granted is permission for construction slopes to extend beyond the right of way on the left between approximate survey stations 88 + 10 and 93 + 87 of SC 160 (Tom Hall Road) (the "Slope Area") with the understanding that no additional property is granted for construction slopes, during this construction. The Slope Area is shown on Exhibit A attached hereto and incorporated herein by this reference.

Subject to the conditions below, also, herein granted is permission to use heavy equipment within the Slope Area for clearing, placement, maintenance, and access for the purpose of construction of a silt fence for NPDES (National Pollutant Discharge Elimination System) to extend beyond the right of way left of SC 160 (Tom Hall Road) between approximate survey stations 88 + 61.71 and 89 + 00; also, on the left between approximate survey stations 91+10 and 93 + 92, as shown on the plans for this project and on Exhibit A, with the understanding no additional property is granted for the permission, in accordance with County standards.

As a covenant and condition that shall survive expiration or termination of this Agreement for one (1) year, upon completion of the work, Licensee shall cause its contractor to (a) reseed the Slope Area with grass and (b) repair and restore any other part of Licensor's property outside of the Slope Area damaged or disturbed by Licensee, or its employees, agents or contractors, to a condition reasonably satisfactory to Licensor. All work shall be performed in a good and workmanlike manner, in accordance with applicable laws and SCDOT standards.

This Agreement and the License shall expire and terminate (except as provided above with respect to Licensee's obligation to repair or restore) upon the earlier of (a) the date that is eighteen (18) months after Licensee commences its work under this Agreement or (b) the date that is three (3) years after the date Licensor executes this Agreement.

Checked _____ By _____

Recorded _____ By _____

Project _____ File _____ Tract 37 & 37P

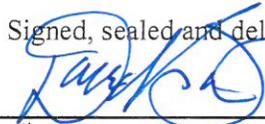
TO HAVE AND TO HOLD, all and singular, the said Permission hereinbefore granted, unto the said County of York.

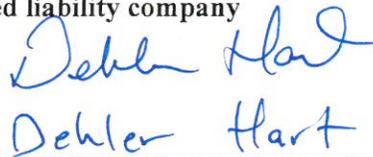
IN WITNESS WHEREOF, I (or we) have hereunto set my (or our) hand(s) and seal(s) this 07th day of AUGUST, in the year of our Lord, Two Thousand and Nineteen.

Springland Associates, LLC, a South Carolina limited liability company

Signed, sealed and delivered in the presence of:

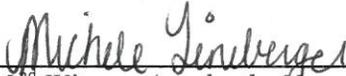
BY:





1st Witness (*cannot be the Notary*)

Printed Name: _____ (L.S.)



ITS: President

2nd Witness (*can be the Notary*)

NOTE: All right-of-way agreements or easements must be in writing and are subject to rejection by the County of York.

THE STATE OF SOUTH CAROLINA)
)
COUNTY OF YORK)

Acknowledgement

Personally appeared before me the above named Grantor(s) and acknowledged the due execution of the foregoing instrument.

Witness my hand and seal this 7th day of August, 2019


Signature of Notary Public


Printed Name of Notary Public

NOTARY PUBLIC FOR THE STATE OF SOUTH CAROLINA

My Commission Expires: 6/4/2022

(Affix seal if outside SC)

Checked _____ By _____

Recorded _____ By _____

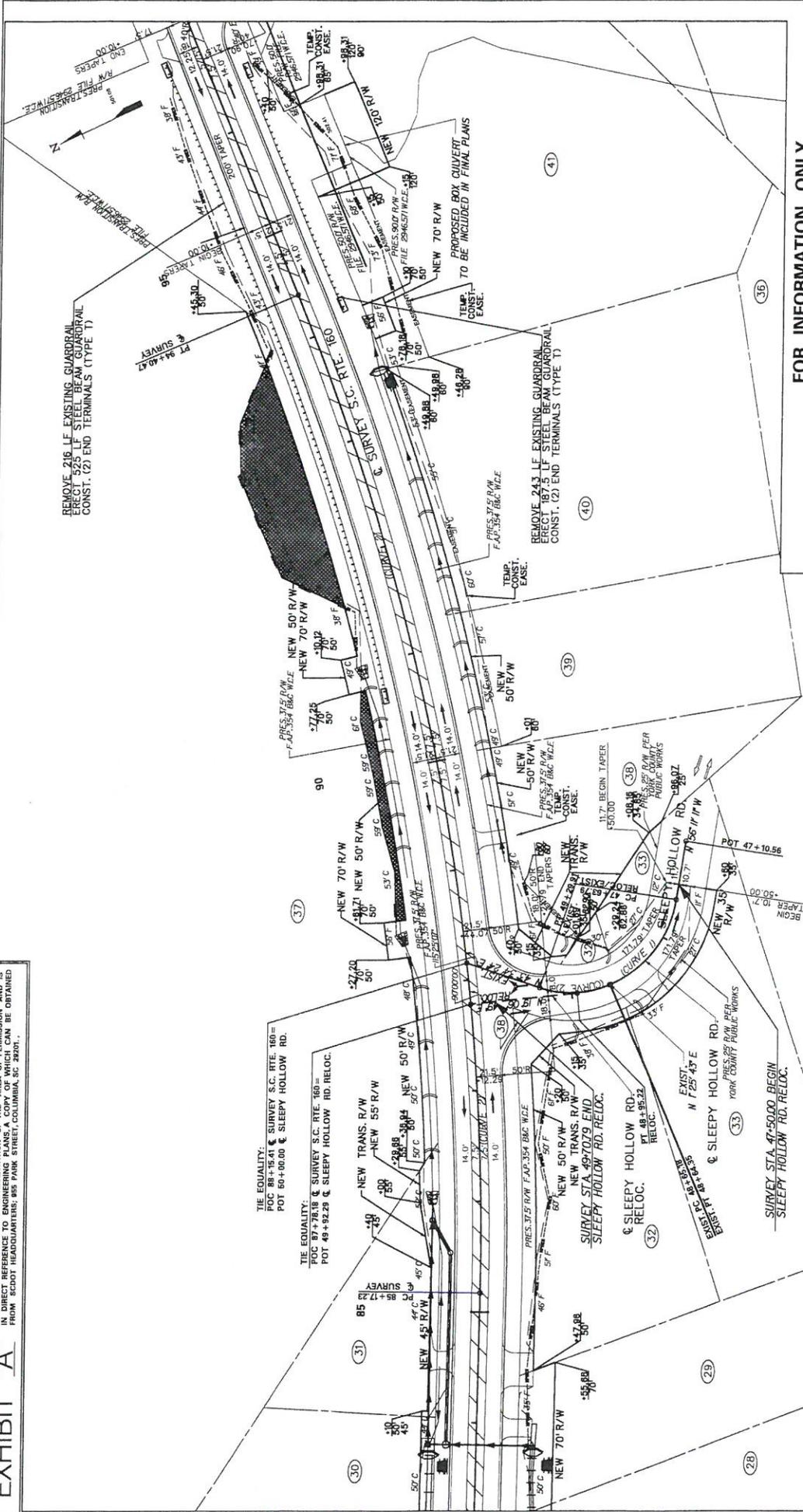
Project _____ File _____ Tract 37 & 37P

EXHIBIT A

[SLOPE AREA]

EXHIBIT 'A'

THIS EXHIBIT IS A GRAPHIC REPRESENTATION OF THE "AREA OF PERMISSION" AND IS NOT A CONTRACT. ANY AND ALL CONDITIONS OF THE "AREA OF PERMISSION" CAN BE OBTAINED FROM ECDOT HEADQUARTERS, 865 PARK STREET, COLUMBIA, SC 29201.



REMOVE 216 LF EXISTING GUARDRAIL ERECT 525 LF STEEL BEAM GUARDRAIL CONST. (2) END TERMINALS (TYPE T)

REMOVE 243 LF EXISTING GUARDRAIL ERECT 187.5 LF STEEL BEAM GUARDRAIL CONST. (2) END TERMINALS (TYPE T)

FOR INFORMATION ONLY

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
 AREA OF PERMISSION FROM TRACT 37 PROJ ID P027116
 CHEROKEE COUNTY

100 50 0 100
 GRAPHIC SCALE F = 100'

ORIGINAL PREPARED: 07-11-2019

THE EQUALITY:
 PDC 88+15.41 @ SURVEY S.C. RTE. 160 =
 POT 50+00.00 @ SLEEPY HOLLOW RD.

THE EQUALITY:
 PDC 49+92.25 @ SURVEY S.C. RTE. 160 =
 POT 49+92.25 @ SLEEPY HOLLOW RD. RELOC.

SURVEY STA. 47+50.00 BEGIN
 SLEEPY HOLLOW RD. RELOC.

YORK COUNTY TAX MAP #: 020-08-01-011
 PROPERTY OWNER: SPRINGLAND ASSOCIATES, LLC

Michael Baker



2019048280

RIGHT OF WAY NC
RECORDING FEES

\$0.00

PRESENTED & RECORDED:

11-05-2019 08:50:06 AM

BK: RB 17886

DAVID HAMILTON
CLERK OF COURT

PG: 223 - 226

YORK COUNTY, SC
BY: HEATHER CHAPMAN CLERK

**THE STATE OF SOUTH CAROLINA
COUNTY OF YORK**

**TEMPORARY
RIGHT OF WAY/EASEMENT**

Approximate Survey Stations

Road/Route **SC 160 (Tom Hall Road)**
Project ID No. **P029536**
Tract **39/40**
Tax Map No. **737-00-00-143**

90+00 To 94+00 Right
SC 160 (Tom Hall Road)

KNOW ALL MEN BY THESE PRESENTS, That I (or we) **Renee Watts and Denise Watts, P.O. Box 1353, Fort Mill, SC 29716**, (Grantor), in consideration of the sum of **Two Thousand Two Hundred and 00/100 Dollars (\$2,200.00)**, to me (or us) in hand paid, and other valuable consideration at and before the sealing and delivering thereof, by **York County**, a body politic and political subdivision of the State of South Carolina, receipt of which is hereby acknowledged, have granted, bargained, sold and released, and by these presents do grant, give, bargain, sell and release, unto the said York County, its successors and assigns, a temporary easement or right of way for the construction, improvement, operation, and maintenance of a public road known as **SC 160 (Tom Hall Road)** (the Project), State and County aforesaid, as shown on plans prepared by York County, upon and across the land which I (or we) may own, in whole or in part, between the survey stations referenced above and as depicted and described on the above reference plans.

SPECIAL PROVISIONS:

1. Grantor grants this temporary easement over the certain strip of land containing **3,566 square feet**, more or less, as more particularly described on **Exhibit "A", South Carolina**

Department of Transportation Area of Temporary Construction Easement from Tract 39/40, attached and incorporated herein, and referred to as the "Easement Area".

2. Grantor grants York County the right to go on, in, through, under, and along the Easement Area to construct the backslope of the ditch which is needed to carry water away from the roadway and the adjacent property. The work is necessary for the furtherance of the Project, and to perform any and all activities associated within the Easement Area for construction of the roadway.

3. Grantor grants York County the right to temporarily remove any fences, signs, or other obstructions blocking York County's access to or work within the Easement Area.

4. Upon completion of the Project, York County agrees to restore the Easement Area to a condition as reasonably close to the original condition as possible. York County agrees to grade disturbed areas to a smooth surface with a uniform slope; seed; and replace any fences, signs, or other obstructions removed from the Easement Area.

5. This temporary easement shall expire upon the earlier of **July 31, 2023** or final completion of the Project.

TO HAVE AND TO HOLD, all and singular, the said temporary easement or right of way and the rights, members, hereditaments, and appurtenances hereinabove granted, unto York County, its successors and assigns forever for the uses permitted within and in conjunction with highway rights of way.

IN WITNESS WHEREOF, I (or we) have hereunto set my (or our) hand(s) and seal(s) this 7th day of October, in the year of our Lord, Two Thousand and **Nineteen**.

Signed, sealed and delivered in the presence of:

Emanuel Alencar
1st Witness

Robert Sawyer
2nd Witness

Renee Watts
Renee Watts Grantor (L.S.)

Denise Watts
Denise Watts Grantor (L.S.)

THE STATE OF SOUTH CAROLINA)
)
COUNTY OF YORK)

ACKNOWLEDGEMENT

Personally appeared before me the above named Grantor(s) and acknowledged the due execution of the foregoing instrument.

Witness my hand and seal this 7th day of October, 2019.

Robbin Dawkins
Signature of Notary Public

Robbin Dawkins

Printed Name of Notary Public

NOTARY PUBLIC FOR THE STATE OF SOUTH CAROLINA

My Commission Expires: February 21, 2024
(Affix seal if outside SC)



2019043906

EASEMENT NC
RECORDING FEES

\$0.00

PRESENTED & RECORDED:

10-09-2019 12:10:36 PM

BK: RB 17832

PG: 440 - 443

DAVID HAMILTON
CLERK OF COURT
YORK COUNTY, SC

BY: REGINA PRUITT CLERK

**THE STATE OF SOUTH CAROLINA
COUNTY OF YORK**

**TEMPORARY
RIGHT OF WAY/EASEMENT**

Approximate Survey Stations

Road/Route **SC 160 (Tom Hall Road)**
Project ID No. **P029536**
Tract **41**
Tax Map No. **737-00-00-077**

93+00 To 103+00 Right
SC 160 (Tom Hall Road)

KNOW ALL MEN BY THESE PRESENTS, That I (or we) **Kenneth W. McKinney, Sr.** aka **Kenneth Wayne McKinney, Sr., 2395 Vacation Street, Supply, NC 28462**, (Grantor), in consideration of the sum of **Four Thousand Two Hundred and 00/100 Dollars (\$4,200.00)**, to me (or us) in hand paid, and other valuable consideration at and before the sealing and delivering thereof, by **York County**, a body politic and political subdivision of the State of South Carolina, receipt of which is hereby acknowledged, have granted, bargained, sold and released, and by these presents do grant, give, bargain, sell and release, unto the said York County, its successors and assigns, a temporary easement or right of way for the construction, improvement, operation, and maintenance of a public road known as **SC 160 (Tom Hall Road)** (the Project), State and County aforesaid, as shown on plans prepared by York County, upon and across the land which I (or we) may own, in whole or in part, between the survey stations referenced above and as depicted and described on the above reference plans.

SPECIAL PROVISIONS:

1. Grantor grants this temporary easement over the certain strip of land containing **7,759 square feet**, more or less, as more particularly described on **Exhibit "A", South Carolina**

Department of Transportation Area of Temporary Construction Easement from Tract 41, attached and incorporated herein, and referred to as the "Easement Area".

2. Grantor grants York County the right to go on, in, through, under, and along the Easement Area to construct the fill slopes of the roadway and the of use heavy equipment, as needed, for clearing, placement, maintenance, and access for the purpose of construction and installation of a silt fencing for NPDES (National Pollutant Discharge Elimination System) in furtherance of the Project, and perform any and all activities associated within the Easement Area for construction of the roadway.

3. Grantor grants York County the right to temporarily remove any fences, signs, or other obstructions blocking York County's access to or work within the Easement Area.

4. Upon completion of the Project, York County agrees to restore the Easement Area to a condition as reasonably close to the original condition as possible. York County agrees to grade disturbed areas to a smooth surface with a uniform slope; seed; and replace any fences, signs, or other obstructions removed from the Easement Area.

5. This temporary easement shall expire upon the earlier of **July 31, 2023** or final completion of the Project.

TO HAVE AND TO HOLD, all and singular, the said temporary easement or right of way and the rights, members, hereditaments, and appurtenances hereinabove granted, unto York County, its successors and assigns forever for the uses permitted within and in conjunction with highway rights of way.

IN WITNESS WHEREOF, I (or we) have hereunto set my (or our) hand(s) and seal(s) this 27th day of September, in the year of our Lord, Two Thousand and Nineteen.

Signed, sealed and delivered in the presence of:

Justin M Brooks
1st Witness

Clare D
2nd Witness

Kenneth W McKinney, Sr
Kenneth W. McKinney, Sr. aka Grantor (L.S.)
Kenneth Wayne McKinney, Sr.

THE STATE OF NORTH CAROLINA)
)
COUNTY OF Brunswick)

ACKNOWLEDGEMENT

Personally appeared before me the above named Grantor(s) and acknowledged the due execution of the foregoing instrument.

Witness my hand and seal this 27th day of September, 2019.

LISA M HESTER
Notary Public
Brunswick Co., North Carolina
My Commission Expires April 11, 2023

Lisa M. Hester

Signature of Notary Public

Lisa M. Hester

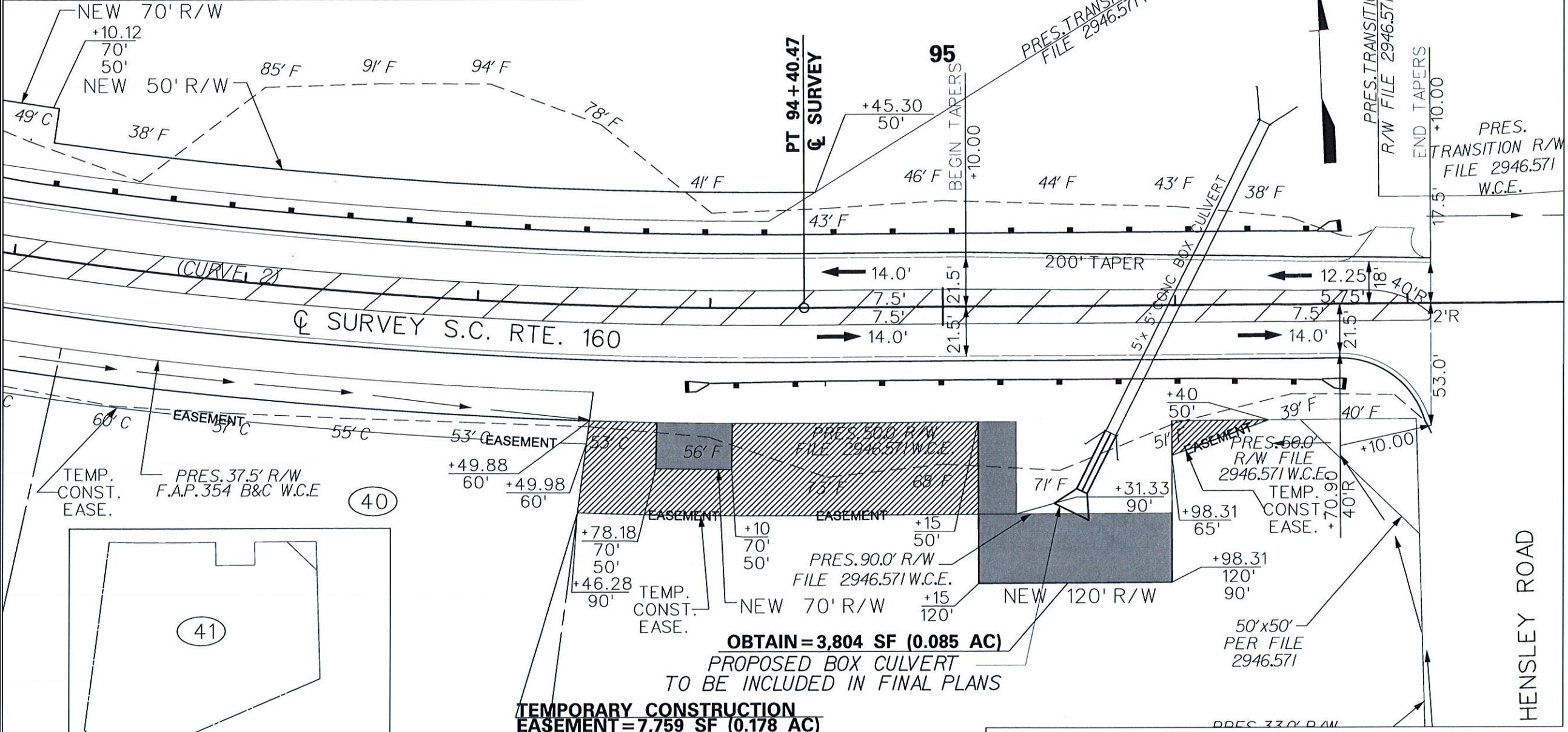
Printed Name of Notary Public

NOTARY PUBLIC FOR THE STATE OF NORTH CAROLINA

My Commission Expires: April 11, 2023
(Affix seal if outside SC)

EXHIBIT "A"

THIS EXHIBIT IS A GRAPHIC REPRESENTATION OF THE "AREA OF ACQUISITION" AND IS IN DIRECT REFERENCE TO ENGINEERING PLANS, A COPY OF WHICH CAN BE OBTAINED FROM SCDOT HEADQUARTERS; 955 PARK STREET, COLUMBIA, SC 29201. ADDITIONALLY, UPON COMPLETION OF CONSTRUCTION, A RECORDABLE RIGHT OF WAY PLAT SHALL BE SUBMITTED TO THE REGISTER OF DEEDS IN COMPLIANCE WITH SCDOT STANDARD DRAWING 809-105-00.



YORK COUNTY TAX MAP #: 737-00-00-077
PROPERTY OWNER: KENNETH WAYNE MCKINNEY, SR.

FOR INFORMATION ONLY
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
AREA OF ACQUISITION FROM TRACT 41 PROJ ID P029536
TEMPORARY CONSTRUCTION EASEMENT
YORK COUNTY
ORIGINAL PREPARED: 09-09-2019

Michael Baker INTERNATIONAL

SPECIAL CONDITIONS

1. All work performed by the Contractor must be in accordance with the South Carolina Department of Transportation (SCDOT) 2007 Standard Specification for Highway Construction and SCDOT Traffic Signals Material Specifications (latest edition), unless directed otherwise in the plans or by the Engineer. A full version of the 2007 Edition SCDOT Standard Specifications for Highway Construction may be viewed or downloaded on SCDOT's website at www.scdot.org.
2. All work performed by the Contractor shall be constructed using the SCDOT'S Current Standard Drawings with all updates effective at the time of the letting, unless directed otherwise in the plans or by the Engineer. The Standard Drawings are available for download on SCDOT's website www.scdot.org. All drawings that are updated are labeled with their effective letting date in red.
3. There are no known underground storage tanks within the (present/new) right-of-way. However, it is the Contractor's responsibility to investigate the project site prior to bidding to determine all structures and obstructions requiring removal.

Any additional items including tanks or contaminated soils encountered within the construction limits will be removed and payment shall be included in a lump sum price as a change order.

All work shall be performed in accordance with the Department of Health and Environmental Control (DHEC) requirements by contracting personnel certified by DHEC. The Contractor will be required to obtain all permits and provide the required closure reports for all tank removals.

4. The Contractor shall be liable and responsible for payment of fines assessed by any regulatory agency due to non-compliance with applicable permit requirements and/or regulations by the Contractor. In the event that Owner is fined due to non-compliance with permit requirements, the Owner will charge the Contractor the cost of the fine by deducting an equal amount from the next progress pay estimate.
5. In the Bid Proposal Form and Schedule, Division I-Section 3, contract items given a unique seven (7) digit Item Number shall be constructed in accordance with SCDOT Standard Specifications. The first three (3) digits correspond to sections of the SCDOT Standard Specifications. The remaining four (4) digits are for individual identification of each contract item. Contract items that are identified with Item Numbers beginning with W, S, F, and SP shall be constructed in accordance with specifications contained within this document.
6. Construction conditions requiring minor vertical adjustments (0-2 ft.) to existing water line valve boxes, sanitary sewer manholes, and other minor appurtenances shall be the responsibility of the Contractor. The costs for the adjustments shall be the Contractor's responsibility and shall be included in Bid Item, Mobilization. Other utilities requiring relocation or adjustment for construction activities will be the responsibility of the utility owner.
7. Reconstruction of driveways and other special provisions on properties, included in the right-of-way acquisition, shall be coordinated with the Engineer. Contractor shall notify Engineer prior to construction of driveways.
8. The Owner will obtain the South Carolina Department of Health and Environmental Control (DHEC) Notice of Intent (NOI) for the project. The Contractor's signature is required on several documents necessary for obtaining the permit including, but not limited to, the NOI application, weekly inspection reports and Co-Permittee Agreements. The Contractor shall cooperate with the Owner in providing the required signatures. The Contractor shall be responsible for posting at the project site and keeping on file, permit approvals and other notices as required by permits for the project. The NOI also requires that on-site preconstruction conferences be held for the Prime Contractor and all subcontractors. The Contractor shall participate in these meetings as required by the NOI.
9. Testing shall be conducted by the Owner/Engineer in accordance with the procedures defined in the SCDOT Standard Specifications, and applicable Supplemental Specifications.
10. The Contractor shall provide all record drawing information to the Engineer prior to final approval.

11. Commercial advertising signs (realtor signs) within the construction limits should be removed and left on adjacent property - Do not reinstall. No direct payment will be made for removing these signs as the work is considered incidental to the item of clearing and grubbing.
12. Mailboxes are to be relocated at the direction of the Engineer. No direct payment will be made for the relocation of mailboxes.
13. The removal or relocation of billboards is not the Contractor's responsibility.
14. Non-conforming signs that are not to be relocated shall be removed and placed on the property beyond the construction limits.
15. In the interest of closing out this project in a prompt and timely manner, the Contractor shall complete item 1090200 (as-built construction plans) within 30 days of the substantial completion or final acceptance of the project. The final pay request as required in Section 4.37 of the General Conditions shall be submitted within 120 calendar days of the Owner's final acceptance of the project. The Owner shall impose a \$200 per calendar day penalty for failure on the Contractor's part to complete and submit final closeout documents including the final pay request within the required 120 days. This late penalty shall be deducted from the project retainage for each calendar day beyond the allowed 120 days.
16. Temporary lane closure shall be conducted in accordance with SCDOT standard details and as directed by the Engineer. The Contractor shall submit a lane closure plan to the Engineer seven (7) calendar days prior to a lane closure. The Contractor shall notify all agencies responsible for emergency services of the lane closure schedule seven (7) calendar days prior to closure.
17. Partial Payments – The following retainage will be withheld pending final completion and final payment. A percentage based on the amount of the contract completed, shall be retained on each estimate until payment of the final estimate. The retainage shall be 5 percent until the project is 75 percent complete, at which time the retainage will be reduced to 2.5 percent. However, when the Contractor has completed at least 99 percent of the work, the Owner may, at his discretion, further reduce the retainage to an amount which will be adequate to complete the remaining work plus any anticipated liquidated damage. The Contractor may be required to furnish consent of surety before the retained amount is reduced to less than 2.5 percent.
18. The Geotechnical Reports included as part of this manual were prepared to assist the Owner in preparing the project design. The reports have been included for general information and are not intended to be used to determine the nature of the unclassified materials on the project. The Owner, STV Inc., nor S&ME Inc. guarantee the accuracy or accept liability for information contained there-in. Any use of the geotechnical reports shall be at the Contractor's own risk as it is the Contractor's responsibility to make his own investigations and determinations.
19. The Contractor shall develop and submit prior to beginning construction, a schedule of work which will allow construction of the project while maintaining vehicular access to all adjacent parcels during the construction period.
20. The Contractor shall be responsible for abandoning wells, septic tanks and drain fields in accordance with DHEC and other applicable requirements. Payment for all work associated with the abandonment removal and capping of wells and septic tanks and drain fields shall be included in the clearing and grubbing pay item.
21. The Contractor shall be aware of the following special conditions related to right-of-way settlements with property owners adjacent to the project limits. The Contractor shall be responsible for coordinating with property owners to meet the conditions stipulated below:

**2021 YORK COUNTY CAPITAL PROJECTS SALES AND USE TAX PROGRAM
11149-010: SC 160 (Tom Hall Road) PROJECT
RIGHT-OF-WAY SPECIAL CONDITIONS**

Tract	OWNER/CONTACT INFO	CONDITIONS
31	Laura M. O'Donnell PO Box 1064 Fort Mill, NC 29716; 803-371-7020	85+00, Lt., S-160 It is understood and agreed that the Grantor will remove the contents of the storage building/well house located left of the approximate survey station 84+25. Also, it is understood and agreed that the Grantor will remove the storage building/Well house clear of the proposed right of way, including the concrete foundation slab upon written notice from York County to remove said contents and clear the structure from the proposed right of way. In the event the storage building/well house and concrete slab are not clear of the proposed right of way when construction of the project begins, the Grantor shall permit the general contractor or his assigns to enter onto the property to clear the structure and the slab foundation and shall reimburse York County for the cost of removing the structure and foundation. It is further understood and agreed that if the drain field lines located left of approximate survey station 85+75, and on the property of the Grantor, are disturbed during construction, they shall be repaired by the general contractor or his assigns at no cost to the Grantor. The approximate location of these lines are shown in an exhibit in the appendices. (See Right-of-way special conditions – Attachments)
37	Springland Associates, LLC 164 Skipper Street Fort Mill, SC 29715; 803-548-6880 803-367-3028	88+10 to 93+92, Lt., S-160 Permission is granted to use heavy equipment within the Slope Area for clearing, placement, maintenance, and access for the purpose of construction of a silt fence for NPDES to extend beyond the right of way left of SC 160 (Tom Hall Road) between approximate survey stations 88+61.71 and 89+00, also on the left between approximate survey stations 91+10 and 93+92, as shown on the plans for this project and on Exhibit A, with the understanding no additional property is granted for the permission, in accordance with County standards. As a covenant and condition that shall survive expiration or termination of this Agreement for one (1) year, upon completion of the work, County shall cause its contractor to (a) reseed the Slope Area with grass and (b) repair and restore any other part of the owner's property outside of the Slope Area damaged or disturbed to a condition reasonably satisfactory to the owner. (See Right-of-way special conditions – Attachments)
39/40	Renee and Denise Watts P.O. Box 1353 Fort Mill, SC 29716; 803-616-9076	90+01 to 93+50, Rt., S-160 Permission is granted for a temporary easement over a certain strip of land containing 3,566 square feet Within this easement permission is granted to construct the fill slopes of the roadway and the use of heavy equipment, as needed, for clearing, placement, maintenance, and access for the purpose of construction and installation of a silt fencing for NPDES in furtherance of the project and perform any and all activities associated within the Easement Area for construction of the roadway. Permission is granted to temporarily remove any fences, signs, or other obstructions blocking access to or work within the Easement Area. (See Right-of-way special conditions – Attachments)
41	Kenneth W. McKinney, Sr. 2395 Vacation Street Supply, NC 28462; 910-269-7615	93+50 to 95+15, Rt., S-160 Permission is granted for a temporary easement over a certain strip of land containing 7,759 square feet Within this easement permission is granted to construct the fill slopes of the roadway and the use of heavy equipment, as needed, for clearing, placement, maintenance, and access for the purpose of construction and installation of a silt fencing for NPDES in furtherance of the project and perform any and all activities

Tract	OWNER/CONTACT INFO	CONDITIONS
		associated within the Easement Area for construction of the roadway. Permission is granted to temporarily remove any fences, signs, or other obstructions blocking access to or work within the Easement Area. (See Right-of-way special conditions – Attachments)

22. A summary of the known utilities within the project limits of the project is included in Section 4D: Utilities Special Conditions. While the Owner has coordinated utility relocation work with the utilities prior to the letting of this contract, it will be the successful low bidder's responsibility to coordinate the construction work with the utilities work during construction. The contractor shall provide Utility Staking for all utilities within the project limits to eliminate conflict between the utility and construction activities which will be paid for as pay item 1052001 Utility Staking.
23. For this project, the following will be eligible for adjustments:
- A.C. Binder Adjustments for Liquid Asphalt Binder (PG 64-22)
- Base date for adjustment will be determined at the Preconstruction meeting dependent on the bid date for this project.
24. Contractor shall comply with all general and regional conditions identified in the nationwide permit.
25. The Contractor shall be liable and responsible for payment of fines assessed by any regulatory agency due to non-compliance with applicable permit requirements and/or regulations by the Contractor. In the event the Owner is fined due to non-compliance with permit requirements, the Owner will charge the Contractor the cost of the fine by deducting the fine amount from the next month's progress pay estimate.
26. The Roadway Boring Logs included as part of the attached Geotechnical Report were prepared to assist the Owner with preparing the project design. They have been included for general information and are not intended to be used to determine the nature of the unclassified materials on the project. The Owner, STV Inc., and S&ME, Inc. does not guarantee the accuracy or accept liability for information contained there-in. This information shall be used at the Contractor's own risk as it is the Contractor's responsibility to make his own investigation and determination of unclassified excavation material.
27. Moving Items – Certain items will need to be moved from within the project limits to allow for the construction of the project. It is the Contractor's responsibility to investigate the various project sites prior to bidding to determine the items requiring removal.
28. Mobilization shall be paid in accordance with Section 103.11 of the SCDOT 2007 Standard Specifications for Highway Construction.
29. The Contractor shall be responsible for abandoning wells, septic tanks and drain fields in accordance with DHEC and other applicable requirements. Payment for all work associated with the abandonment, removal and capping of wells, septic tanks and drain fields shall be included in the Clearing and Grubbing pay item, unless it is provided by other pay items included in this contract.
30. The contractor shall read the Section 404 General Permit included in this Project Manual and comply with all appropriate conditions during construction.
31. The typical pavement section used for the construction of temporary pavement during construction operations shall include the following assumptions:

H/M ASPHALT SURFACE COURSE TYPE B (200 LB/SY)
H/M ASPHALT BASE COURSE TYPE A (1150 LB/SY)

Quantities for temporary pavement are shown on the General Construction Notes sheet 5 in the plans if noted in the Traffic Control Plans. Should the Contractor determine additional temporary pavement is required it shall be included in the Lum Sum pay item 1071000 Traffic Control.

32. PAYMENT FOR MATERIAL TO BE USED IN THE WORK

Material Delivered on the Project

When so authorized by York County/SCDOT, partial payments will be made up to 95% of the delivered cost of materials on hand that are to be incorporated in the work, provided that such materials have been delivered on or in close proximity to the project and stored in an acceptable manner. Material payments will be allowed when 95% of the accumulated costs of unpaid invoices are equal to or greater than \$10,000, materials have been inspected and approved by York County/SCDOT

Material Stored at Fabricator's Facilities or Contractor's Facilities

When so authorized by York County/SCDOT, partial payments will be made up to 95% of the invoiced cost, exclusive of delivery cost, for bulky materials requiring fabrication at an offsite location that are durable in nature and represent a significant portion of the project cost, if it has been determined by York County/SCDOT, that the material cannot be reasonably stockpiled in the vicinity of the work. Material payments will be allowed when the materials have been inspected and approved by York County/SCDOT

Materials with Delayed Delivery to the Project

When so authorized by York County/SCDOT, partial payments will be made up to 95% of the invoiced cost of materials that have been ordered by the contractor but will be more than 45 days before being delivered to the project.

Required Documents

- (1) Written consent of surety to make such partial payments,
- (2) Bill of Sale from the Contractor to the Department, and
- (3) Copy of invoice from material supplier verifying the cost of the material.

General Requirements

The partial payments will be made on the conditional basis that the material meets the requirements of the contract and will be incorporated into the project. The Contractor shall reimburse the Department for all partial payments for material paid, but not incorporated into the project.

Partial payments for materials on hand or already ordered but not yet delivered to the project will not constitute acceptance, and any faulty material will be rejected even though previous payment may have been made for same in the estimates.

Partial payment will not be made for fuel, supplies, form lumber, falsework, or used materials.

Partial payments will not be made on seed or any living or perishable plant materials except that when such materials have been planted or otherwise incorporated in the work, payment may be made, not as materials, but as work done as part of a contract item for which a contract unit or lump sum price has been established.

Partial payments will not exceed 95% of the contract unit or lump sum prices for the work.

33. For the Contractor's own liability, the Contractor should inspect and document, with the property owners, the two structures listed in Final Roadway Geotechnical Report Revision 2, Section 8.8 on Tract 13 and Tract 14 prior to construction for existing cracks, etc.

34. Right-of-way special conditions – Attachments

UTILITY SPECIAL PROVISIONS/CONDITIONS
COORDINATION OF RELOCATION WORK WITH HIGHWAY CONSTRUCTION

SC-160 (Tom Hall Road) WIDENING YORK COUNTY, SC
YORK COUNTY PROJECT – 11149-010 SCDOT PROJECT ID 029536

There is a need to establish small Utility Windows, during construction:

Due to the extensive embankment along SC-160, several of the Utility Companies may need to work with the contractor to relocate temporarily, either before or after grading is completed. Some clearing and grubbing may be necessary. Coordination with the embankment work is necessary as far existing utilities currently in place.

The following Utility Companies may need help defining the locations for the clearing and time constraints needed to complete their work:

- Comporium
- Duke Energy
- YCNGA
- Charter/Spectrum

The utilities anticipate that the areas within the NPDES limits will be cleared by the time they begin their work. In some cases the contractor will be expected to locate where a proposed drainage facility will occur or define the NPDES line as well as the right of way.

There is a need to protect the utilities from vibration during construction:

Although the utilities will not have direct impact, they have requested notification such that they may monitor their facilities for vibration where they are staying in place.

- Provide minimum 72-hour notice to SCDOT, prior to any excavation:
District 4 Utility Coordinator - Mr. Jake Gaston 803-374-6312
And call
District 4 Resident Construction Engineer - Mr. Jared Bragg 803-324-3545;
- Provide minimum 72-hour notice to the Utility Contacts noted in this report;
- Locate underground lines, by SC811 or Utility Company and reference U-Sheets.

Utility As-Builts:

The roadway contractor shall be responsible for the collection and incorporation of the utility as-builts in their final submittal. all existing, proposed, and abandon lines must be shown.

Utility Staking:

Contractor shall be aware on as needed basis; utilities may request staking of construction items and right-of-way to help facilitate relocations and to avoid potential conflict with roadway construction and other utilities.

Utility Relocation Incidentals:

For the relocation of services, adjustments of valve covers and/or manhole lids, adjustments for point conflicts, and any other utility appurtenances adjustments, the contractor shall notify the utility owner 14 days prior to needing adjust and allow 1 weeks to complete.

Utility Relocation Window & Sequence:

Temporary Suspension for Utility Work and Utility Window:

The department has determined that in the best interest of the traveling public, the contractor shall perform the clearing and grubbing operations as soon as possible after the award of the contract to allow for utilities to relocate within a specified 90-day utility window. Once the notice to proceed has been established, the contractor shall begin associated clearing and staking operations on SC 160 (Tom Hall Rd). Upon completion of the clearing and grubbing and construction staking, the contractor shall notify the RCE by letter. Once the REC has been notified that clearing and grubbing, erosion control, and staking operations on the are road are complete, the utility window shall begin. The REC shall establish the beginning and end date of the utility windows.

During the utility window, the contractor will not be allowed to perform any work activities unless approved by the RCE. If work activities are approved, they should in no way hinder or interfere with the utility relocations during the utility window provided. If work activities interfere with utility relocations, all work by the prime contractor and subcontractors will be suspended until the end of the utility window.

The contractor shall be responsible for maintaining all erosion control measures on the project. The department will not compensate the contractor for any additional mobilization other than the bid amount for mobilization.

This provision in no way provides a guarantee that all utility relocations will be completed during the utility window.

Utility Window & Relocation Sequence:

It is the intention of the utilities to relocate according to the following construction sequence. If the contractor plans to deviate from the proposed phasing, then it is the responsibility of the contractor to coordinate any changes and account for any potential delays.

This provision in no way provides a guarantee that all utility relocations will be completed during the utility window.

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 _____, 2023, entered
into a Contract with Owner for:

***Pennies for Progress Project 3
SC 160 East (Tom Hall Road) Widening***

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 two (2) years 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) years 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 (2) years.
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. After the one year warranty period and after all warranty work has
been completed satisfactorily to the Owner, the Contractor may request that this Bond be terminated.

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 _____ 2023, 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 _____, 2023 A.D.

(Attach Power of Attorney)

Notary Public
State of South Carolina-at-Large

My Commission Expires:

END OF SECTION

PAYMENT BOND

STATE OF SOUTH CAROLINA
COUNTY OF YORK

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

WHEREAS, CONTRACTOR has by written agreement dated _____, 2023, entered
into a Contract with OWNER for:

***Pennies for Progress Project 3
SC 160 East (Tom Hall Road) Widening***

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 _____ 2023, A.D., the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

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

PRINCIPAL:

Signature of Authorized Officer
(Affix Seal)

WITNESSES:

Title

Business Address

City

State

WITNESS:

SURETY:

Corporate Surety

Attorney-in-Fact
(Affix Seal)

Business Address

City

State

Name of Local Insurance Agency

CERTIFICATES AS TO CORPORATE PRINCIPAL

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

Secretary

Corporate
Seal

STATE OF SOUTH CAROLINA
COUNTY OF YORK

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

Subscribed and sworn to before me this ____ day of _____, 2023, A.D.

(Attach Power of Attorney)

Notary Public
State of South Carolina-at-Large
My Commission Expires: _____

END OF SECTION

NOTICE OF AWARD

TO: _____

FROM: York County Engineering _____
P.O. Box 148 _____
York, SC 29745 _____

PROJECT TITLE: Pennies for Progress Project 3, SC 160 East (Tom Hall Road) Widening

PROJECT DESCRIPTION: SC 160 East (Tom Hall Road) Widening. The total estimated length of roadway is 0.884 miles.

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 _____, 2023.

On behalf of the York County Council

By: _____

Title: _____

ACCEPTANCE OF NOTICE

Receipt of the above Notice of Award is hereby acknowledged

By: _____

Title: _____

This _____ day of _____, 2022

NOTICE TO PROCEED

Date: _____

To: _____

Project:

***Pennies for Progress Project 3
SC 160 East (Tom Hall Road) Widening***

You are hereby notified to commence work in accordance with the Agreement dated _____ on or before _____, and you are to complete the work within **660** consecutive calendar days thereafter. The date of completion of all work is therefore _____.

On behalf of the

YORK COUNTY GOVERNMENT

By: _____

Title: York County Engineer

ACCEPTANCE OF NOTICE

Receipt of the above Notice to Proceed is hereby acknowledged by _____, this the _____ day of _____, **2023**.

By: _____

Title: _____

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

<u>Forms of Coverage</u>	<u>Policy Number</u>	<u>Expiration Date</u>
*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 non-owned automotive equipment used in connection with work done for the Owner.	_____	_____
4. Contractual Liability	_____	_____
5. Damage caused by explosion, collapse or structural injury, and damage to underground utilities.	_____	_____
6. Products/Completed Operations	_____	_____
7. Owners and Contractors Protective Liability	_____	_____
8. Personal Injury Liability	_____	_____
9. ***Excess Liability applies excess of:		
(a) Employers' Liability	_____	_____
(b) Comprehensive General Liability	_____	_____
(c) Comprehensive Automobile Liability	_____	_____

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

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

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

Date _____ (SEAL) _____
Insurance Company

Issued at _____
Authorized Representative

Insurance Agent or Company

- Send original and one copy to:

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

END OF SECTION

APPLICATION FOR PAYMENT No. _____

Date: _____ Contractor: _____

Project: _____

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 Commission 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: _____

CONTRACT CHANGE ORDER

CHANGE ORDER NO: _____

PROJECT: _____

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: _____, 20__			

	OWNER	CONTRACTOR	ENGINEER
SIGNATURE			
PRINT NAME			
COMPANY			
DATE			

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

Know all men by these presents that the undersigned, _____ of _____ 20__ 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 ***Pennies for Progress Project 3: SC 160 East (Tom Hall Road) Widening*** located in York County, 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: _____

VALUE ENGINEERING INCENTIVE

INTENT AND OBJECTIVE

- (1) This Subarticle applies to any cost reduction proposal (hereinafter referred to as a Value Engineering Change Proposal or VECP) initiated and developed by the Contractor for the purpose of refining the contract documents so as to contribute to design cost effectiveness or significantly improve the quality of the end result. This Subarticle does not, however, apply to any such proposal unless it is identified by the Contractor, at the time of its submission to the County, as a proposal submitted pursuant to this Subarticle.
- (2) VECPs contemplated are those that would result in net savings to the County by providing either: (A) a decrease in the cost of performance of the Contract, or; (B) a reduction in cost of ownership (hereinafter referred to as collateral costs) of the work provided by this Contract, regardless of acquisition costs. VECPs must result in savings without impairing essential functions and characteristics such as safety, service, life, reliability, economy of operation, ease of maintenance, aesthetics and necessary standard design features. However, nothing herein prohibits the submittal of VECPs where the required functions and characteristics could be combined, reduced or eliminated as being nonessential or excessive. Plan errors which are identified by the Contractor and which result in a cost reduction, will not qualify for submittal as a VECP.
- (3) The County reserves the right to reject at its discretion any VECP submitted which proposes a change in the design of the pavement system or which would require additional right-of-way. Substitution of another design alternate, which is detailed in the plans, for the one on which the Contractor bid, will not be allowed under this Subarticle. Pending execution of a formal supplemental agreement, implementing an approved VECP, the Contractor shall remain obligated to perform in accordance with the terms of the existing contract. No time extensions will be granted due to the time required to review a VECP.

SUBCONTRACTORS

- (1) The Contractor is encouraged to include the provisions of this Subarticle in contracts with subcontractors. The Contractor shall encourage submission of VECPs from subcontractors, however, it is not mandatory that VECPs be submitted nor is it mandatory that the Contractor accept or transmit to the County VECPs proposed by his subcontractors.

DATA REQUIREMENTS

- (1) A description of the difference between the existing contract requirement and the proposed change, and the comparative advantages and disadvantages.
- (2) Separate detailed cost estimates for both the existing contract requirement and the proposed change. The cost estimates shall be broken down by contract item numbers indicating quantity increases or decreases and deleted pay items. Additional proposed work, not covered by contract items, shall be identified by current County pay item numbers. In preparing the estimate, the Contractor shall include overhead, profit, and bond. No separate pay item(s) for these costs will be allowed.

- (3) An itemization of plan details, plan sheets, design standards and Specifications that must be changed or added if the VECP is adopted. Preliminary plan drawings must be sufficient to describe the proposed changes.
- (4) An estimate of the effects the VECP would have on collateral costs to the County.
- (5) Engineering or other analysis in sufficient detail to identify and describe specific features of the contract which must be changed if the VECP is accepted, with a proposal as to how these changes can be accomplished and an assessment of their effect on other project elements. The County may require that engineering analyses be performed by a prequalified consultant in the applicable class of work. Any design changes which result from the VECP must be supported by computations sealed by a Professional Engineer registered in the State of South Carolina.
- (6) A statement of the time by which approval of the VECP must be issued by the County to obtain the total estimated cost reduction during the remainder of this Contract, noting any effect on the contract completion time or delivery schedule.

PROCESSING PROCEDURES

- (1) Two copies of each VECP shall be submitted, one to the Engineer, or his duly authorized representative, and one to the County's Value Engineering Office. VECPs will be processed expeditiously; however, the County will not be liable for any delay in acting upon a VECP submitted pursuant to this Subarticle. The Contractor may withdraw, in whole or in part, a VECP not accepted by the County within the period specified in the VECP. The County shall not be liable for any VECP development cost in the case where a VECP is rejected or withdrawn.

The Engineer shall be the sole judge of the acceptability of a VECP and of the estimated net savings in construction and/or collateral costs from the adoption of all or any part of such proposal. In determining the estimated net savings, the right is reserved to disregard the contract bid prices if, in the judgment of the Engineer, such prices do not represent a fair measure of the value of work to be performed or to be deleted.

Prior to approval, the Engineer may modify a VECP, with the concurrence of the Contractor, to make it acceptable. If any modification increases or decreases the net savings resulting from the VECP as modified and upon determination of final quantities, the new savings shall be computed by subtracting the revised total cost of all bid items affected by the VECP design from the total cost of the same bid items as represented in the original contract.

Prior to approval of the VECP, which initiates the supplemental agreement, the Contractor shall provide acceptable contract quality plan sheets revised to show all details consistent with the VECP design.

COMPUTATIONS FOR CHANGE IN CONTRACT COST OF PERFORMANCE

Contractor development and implementation costs for the VECP will not be recoverable. If the VECP is adopted, the Contractor's share of the net savings as defined hereinafter shall be considered full compensation to the Contractor for the VECP.

County costs of processing or implementation of a VECP will not normally be considered in the estimate. However, the County reserves the right, where it deems such action appropriate, to require the Contractor to pay the County's cost of investigating and implementing a VECP submitted by the Contractor as a condition of considering such proposal. Where such a condition is imposed, the Contractor shall indicate his acceptance thereof in writing, and such acceptance shall constitute full authority for the County to deduct amounts payable to the County from any monies due or that may become due to the Contractor under the contract.

COMPUTATIONS FOR COLLATERAL COSTS

When collateral cost savings are sought by the Contractor, separate estimates must be prepared for collateral costs of both the existing contract requirement and the proposed change. Each estimate shall consist of an itemized breakdown of all costs and the basis for the data used in the estimate. Cost benefits to the County include, but are not limited to: reduced costs of operation, maintenance or repair, and extended useful service life. Increased collateral costs include the converse of such factors.

Computations shall be as follows:

- (1) Costs shall be calculated over a 20-year period on a uniform basis for each estimate.
- (2) If the difference in the estimates as approved by the County indicates a savings, the Contractor shall divide the resultant amount by 20 to arrive at the average annual net collateral savings. The resultant savings shall be shared as stipulated in Sharing Arrangements.

SHARING ARRANGEMENTS

If a VECP is approved by the County, the Contractor may be entitled to share in both construction savings and collateral savings to the full extent provided for in this Subarticle.

Except for innovative ideas, the Contractor and County shall each receive 50 percent of net reduction in the cost of performance of this Contract. For innovative ideas, the reduction in the cost of performance shall be shared as follows:

Accrued Net Savings	Contractor's Share %	County's Share %
Less than \$25,000	100	0
\$25,000 to \$50,000	75	25
Over \$50,000	50	50

If an approved change is identical or similar to a previously submitted VECP or an idea previously utilized by the County it will not be considered an innovative idea, thus will only qualify for a 50 percent sharing of savings.

When collateral savings occur, the Contractor shall receive 20 percent of the average one year's net collateral savings.

The Contractor shall not receive construction savings or collateral savings on optional work listed in this Contract, until the County exercises its option to obtain that work.

TRAFFIC CONTROL:

The Contractor shall execute the item of Traffic Control as required by the Standard Specifications, the plans, the Standard Drawings For Road Construction, these special provisions, all supplemental specifications, the MUTCD, and the Engineer. This is an amendment to the Standard Specifications to require the following:

GENERAL REGULATIONS -

These special provisions shall have priority to the plans and comply with the requirements of the MUTCD and the standard specifications. Revisions to the traffic control plan through modifications of the special provisions and the plans shall require approval by the department. **Final approval of any revisions to the traffic control plan shall be pending upon review by the Director of Traffic Engineering.**

Install and utilize changeable message signs in all lane closures installed on high volume high-speed multilane roadways. Use of changeable message signs in lane closures installed on low volume low speed multilane roadways is optional unless otherwise directed by the plans and the Engineer. Install and use a changeable message sign within a lane closure set-up as directed by the *Standard Drawings For Road Construction*. When a lane closure is not present for any time to exceed 24 hours, remove the changeable message sign from the roadway. Place the sign in a predetermined area on the project site, as approved by the Engineer, where the sign is not visible to passing motorists. The preprogrammed messages utilized shall be in accordance with the *Standard Drawings For Road Construction* when used as part of the traffic control set-up for lane closures. Only those messages pertinent to the requirements of the traffic control situation and the traffic conditions are permitted for display on a changeable message sign at all times. At no time will the messages displayed on a changeable message sign duplicate the legends on the permanent construction signs.

During operation of changeable message signs, place the changeable message sign on the shoulder of the roadway no closer than 6 feet between the sign and the near edge of the adjacent travel lane. When the sign location is within 30' of the near edge of a travel lane open to traffic, supplement the sign location with no less than 5 portable plastic drums placed between the sign and the adjacent travel lane for delineation of the sign location. Install and maintain the drums no closer than 3 feet from the near edge of the adjacent travel lane. This requirement for delineation of the sign location shall apply during all times the sign location is within 30' of the near edge of a travel lane open to traffic, including times of operation and non-operation. Oversized cones are prohibited as a substitute for the portable plastic drums during this application.

On multilane primary routes, avoid placement of signs mounted on portable sign supports within paved median areas utilized for two-way left turns unless otherwise directed by the RCE.

When mounting signs on multiple ground mounted sign supports, ensure that each post is of the same type. Combining and installing both ground mounted u-section and square steel tube posts within the same sign assembly is prohibited.

When mounting signs on ground mounted u-section or square steel tube posts, utilize either a sign support / ground support post combination with an approved breakaway assembly or a single direct driven post for each individual sign support of a sign assembly installation. Do not combine a sign support / ground support post combination and a direct driven post on the same sign assembly installation that contains two or more sign supports. Regarding sign support / ground support post combination installations, ensure that post lengths, stub heights and breakaway assemblies comply with the manufacturer's requirements and specifications. Use approved breakaway assemblies found on the *Approved Products List For Traffic Control Devices in Work Zones*.

When covering signs with opaque materials, the Department prohibits attaching a covering material to the face of the sign with tape or a similar product or any method that will leave a residue on the retroreflective sheeting. Residue from tape or similar products, as well as many methods utilized to remove such residue, damages the effective reflectivity of the sign. Therefore, contact of tape or a similar product with the retroreflective sheeting will require replacement of the sign. Cost for replacement of a sign damaged by improper covering methods will be considered incidental to providing and maintaining the sign; no additional payment will be made.

Overlays are prohibited on all rigid construction signs. The legends and borders on all rigid construction signs shall be either reversed screened or direct applied.

Signs not illustrated on the typical traffic control standard drawings designated for permanent construction signs shall be considered temporary and shall be included in the lump sum price bid item for "Traffic Control" unless otherwise specified.

Install "Grooved Pavement" signs (W8-15-48) supplemented with the "Motorcycle" plaque (W8-15P-30) in advance of milled or surface planed pavement surfaces. On primary routes, install these signs no further than 500 feet in advance of the beginning of the pavement condition. On interstate routes, install these signs no less than 500 feet in advance of the beginning of the pavement condition. Install two sign assemblies at each sign location, one on each side of the roadway, on multilane roadways when the pavement condition is present. Install these signs immediately upon creation of this pavement condition and maintain these signs until this pavement condition is eliminated.

Install "Steel Plate Ahead" signs (W8-24-48) in advance of an area of roadway where temporary steel plates are present. Install these signs no further than 300 feet in advance of locations where steel plates are present. On multilane roadways, comply with the same guidelines as applied to all other advance warning signs and install two sign assemblies at each sign location, one on each side of the roadway, when roadway conditions warrant. Install these signs immediately upon installation of a temporary steel plate and maintain the signs until the temporary steel plates are removed.

Install and maintain any necessary detour signing as specified by the typical traffic control standard drawings designated for detour signing, Part VI of the MUTCD, these Special Provisions, and the Engineer. The lump sum price bid item for "Traffic Control" includes payment for installation and maintenance of the detour signing.

The Contractor shall maintain the travel patterns as directed by the traffic control plans and shall execute construction schedules expeditiously. The Contractor shall provide the Resident Engineer with no less than a two-week prior notification of changes in traffic patterns.

During nighttime flagging operations, flaggers shall wear a safety vest and safety pants that comply with the requirements of ANSI / ISEA 107 standard performance for Class 3 risk exposure, latest revision, and a fluorescent hard hat. The safety vest and the safety pants shall be retroreflectorized and the color of the background material of the safety vest and safety pants shall be fluorescent orange-red or fluorescent yellow-green.

During nighttime flagging operations, the contractor shall illuminate each flagger station with any combination of portable lights, standard electric lights, existing street lights, etc., that will provide a minimum illumination level of 108 Lx or 10 fc.

During nighttime flagging operations, supplement the array of advance warning signs with a changeable message sign for each approach. These changeable message signs are not required during daytime flagging operations. Install the changeable message signs 500' in advance of the advance warning sign arrays. Messages should be "Flagger Ahead" and "Prepare To Stop".

During surface planing and milling operations, grade elevation differences greater than 1 inch in areas with pavements composed of hot mixed asphalt (HMA) base courses, intermediate courses or surface courses and Portland cement concrete are PROHIBITED unless otherwise directed by the Department. However, during surface planing and milling operations for removal of Open-Graded Friction courses ONLY, a grade elevation difference of 1½ inches between adjacent travel lanes opened to traffic may exist unless otherwise directed by the Department.

During surface planing and milling operations, lane closures are required at all times where grade elevation differences and drop-offs greater than the acceptable measurements specified heretofore exist adjacent to or between travel lanes open to traffic unless otherwise specified by the department. If a grade elevation difference in excess of the specified acceptable ranges exist, either mill the adjacent travel lane or pave the milled travel lane as necessary to eliminate the grade

elevation difference prior to opening the travel lane to traffic at these locations. Maintain the lane closure restrictions at all times unless otherwise directed by these special provisions.

During surface planing and milling operations, the length of roadway with an acceptable grade elevation difference less than or equal to 1" shall not exceed 2 miles.

During paving operations, the Department requires lane closures at all times where grade elevation differences and drop-offs greater than 2" exist adjacent to or between the travel lanes of a roadway opened to traffic, unless otherwise specified by these special provisions. Maintain lane closure restrictions at all times unless otherwise directed by these special provisions.

During paving operations, the length of roadway with an acceptable grade elevation difference less than or equal to 2" shall not exceed 2 miles.

Upon completion of the final riding surface on each road, the Contractor will be allowed up to 3 working days to begin eliminating shoulder drop-offs greater than 2" and work continuously until these drop-offs are eliminated.

Supplement and delineate the shoulder edges of travel lanes through work zones with traffic control devices to provide motorists with a clear and positive travel path. Utilize portable plastic drums unless otherwise directed by the Department. Vertical panels may be used where specified by the plans and directed by the RCE. The installation of traffic control devices are required in all areas where those areas immediately adjacent to a travel lane open to traffic have been altered in any manner by work activities, including but not limited to activities such as grading, milling, etc. Install the traffic control devices immediately upon initiating any alterations to the areas immediately adjacent to or within 15 feet of the near edge line of the adjacent travel lane. When sufficient space is available, place the traffic control devices no closer than 3 feet from the near edge of the traffic control device to the near edge line on the adjacent travel lane. When sufficient space is unavailable, place the traffic control device at the maximum distance from the near edge of the adjacent travel lane available.

LANE CLOSURE RESTRICTIONS -

The lane closure restrictions stated below are project specific. For all other restrictions see supplemental specification "Closure Restrictions" dated July 1, 2019.

The Contractor shall install all lane closures as directed by the Standard Specifications For Highway Construction (latest edition), the Standard Drawings For Road Construction, these special provisions, the MUTCD, and the Engineer. The Contractor shall close the travel lanes of two-lane two-way roadways by installing flagging operations. The Contractor shall close the travel lanes of multilane roadways as directed by the typical traffic control standard drawings designated for lane closures on primary routes.

The Department prohibits lane closures on project routes on weekdays from 7:00am to 9:00am and from 4:00pm to 6:00pm and on all days during any time of the day that traffic volumes in the travel lanes remaining open to traffic exceed 800 vehicles per hour per lane. The Department reserves the right to suspend a lane closure if any resulting traffic backups are deemed excessive by the Engineer. Maintain all lane closure restrictions as directed by the plans, these special provisions, and the Engineer.

Flagging operations are considered to be lane closures for two-lane two-way operations and shall be subject to all restrictions for lane closures as specified by this contract.

Lane closures, including flagging operations, are restricted to maximum distances of 2 miles. Install all lane closures according to the typical traffic control standard drawings. On occasions when daytime lane closures must be extended into the nighttime hours, substitute the nighttime lane closure standards for the daytime lane closure standards.

The Department reserves the right to suspend a lane closure if any resulting traffic backups are deemed excessive by the Engineer. Maintain all lane closure restrictions as directed by the Standard Specifications, these special provisions, and the Engineer.

Installation and maintenance of a lane closure is PROHIBITED when the Contractor is not actively engaged in work activities specific to the location of the lane closure unless otherwise specified and approved by the Engineer. The length of the lane closure shall not exceed the length of roadway anticipated to be subjected to the proposed work activities within the work shift time frame or the maximum lane closure length specified unless otherwise approved by the Engineer. Also, the maximum lane closure length specified does not warrant installation of the specified lane closure length when the length of the lane closure necessary for conducting the work activity is less. The length and duration of each lane closure, within the specified parameters, shall require approval by the Engineer prior to installation. The length and duration of each lane closure may be reduced by the Engineer if the work zone impacts generated by a lane closure are deemed excessive or unnecessary.

The presence of temporary signs, portable sign supports, traffic control devices, trailer mounted equipment, truck mounted equipment, vehicles and vehicles with trailers relative to the installation or removal of a closure and personnel are prohibited within the 15 to 30 foot clear zone based upon the roadway speed limit during the prohibitive hours for lane closures specified by these special provisions.

The truck mounted changeable message signs are in addition to the requirements for trailer mounted changeable message signs. Truck mounted changeable message signs and trailer mounted changeable message signs are not interchangeable.

SHOULDER CLOSURE RESTRICTIONS -

The Department prohibits the Contractor from conducting work within 15' of the near edge of the adjacent travel lane on the outside shoulders or the median areas under a shoulder closure. The hourly restrictions for lane closures shall also apply to work activities conducted under a shoulder closure within 15' of the near edge of an adjacent travel lane or a median area. The Department reserves the right to suspend work conducted under a shoulder closure if any traffic backups develop and are deemed excessive by the Engineer. Maintain all shoulder closure restrictions as directed by the plans, these special provisions, and the Engineer.

On primary and secondary roadways, the Department prohibits the Contractor from conducting work within 1' or less of the near edge of an adjacent travel lane under a shoulder closure. All work that may require the presence of personnel, tools, equipment, materials, vehicles, etc., within 1' of the near edge of an adjacent travel lane shall be conducted under a lane closure.

The Contractor shall install all shoulder closures as directed by the typical traffic control standard drawings designated for shoulder closures, and the Engineer. Substitution of the portable plastic drums with oversized cones during nighttime shoulder closures is PROHIBITED.

MOBILE OPERATIONS -

A mobile operation moves continuously at all times at speeds 3 mph or greater without any stops. The minimal traffic flow impacts generated by these operations involve brief traffic flow speed reductions and travel path diversions. Conduct work operations that cannot be performed at speeds of 3 mph or greater under standard stationary lane closures.

The Department prohibits the Contractor from conducting mobile operations during the hours when lane closures are prohibited. The hourly restrictions for lane closures shall also apply to work activities conducted under mobile operations. The Department reserves the right to suspend work conducted under mobile operations if any traffic backups develop and are deemed excessive by the Engineer. Maintain all mobile operation restrictions as directed by the plans, these special provisions, and the Engineer.

The distance intervals between the vehicles, as indicated in the *Standard Drawings For Road Construction*, may require adjustments to compensate for sight distance obstructions created by hills and

curves and any other conditions that may obstruct the sight distance between the vehicles. However, adjustments to the distance intervals between the vehicles should be maintained within the range of variable distance intervals indicated in the standard drawings unless otherwise directed by the Engineer.

Maintain two-way radio communication between all vehicles in the vehicle train operating in a mobile operation.

Supplement the work vehicles and the shadow vehicles with amber colored flashing dome lights. The vehicles may also be supplemented with advance warning arrow panels and truck mounted attenuators as directed in the *Standard Drawings For Road Construction* and the Standard Specifications.

The Contractor shall install, operate and maintain all advance warning arrow panels, truck mounted attenuators and truck mounted changeable message signs as required by these special provisions, the manufacturer's specifications, the *Standard Drawings For Road Construction*, the Standard Specifications, the plans and the Engineer.

TYPICAL TRAFFIC CONTROL STANDARD DRAWINGS -

The typical traffic control standard drawings of the “Standard Drawings For Road Construction”, although compliant with the MUTCD, shall take precedence over the MUTCD. The typical traffic control standard drawings of the “Standard Drawings For Road Construction” shall apply to all projects let to contract.

Install the permanent construction signs as shown on the typical traffic control standard drawings designated for permanent construction signing.

605-010-01 Scheme C	SC 160 Eastbound	92 Square Feet
	SC 160 Westbound	92 Square Feet
605-010-01 Scheme E	Unnamed Rd	24 Square Feet
	S-1404	24 Square Feet
	S-1915	24 Square Feet
	Sleepy Hollow Road	24 Square Feet
	S-242 Northbound	24 Square Feet
TOTAL		304 Square Feet

TRAFFIC CONTROL PROCEDURES SPECIFIC TO TRAFFIC SIGNAL WORK OPERATIONS –

Utilize a vehicle train consisting of a primary work vehicle and no less than 1 shadow vehicle. The shadow vehicle is required for all Traffic Signal Work Operations except on a two-lane roadway for a time duration of 15 minutes or less when no pedestrian workers are present, excluding the flagger. A second shadow vehicle is necessary in some applications on multilane roadways as depicted on the Standard Drawings. Install and maintain the vehicle train as directed by these special provisions, the Standard Drawings For Road Construction, and the Engineer.

Two-Lane Two-Way Roadways

- A. Utilize flagging operations to control the traffic flow around the work site where the vehicle train is operating.
- B. Utilize flaggers to control the traffic flow on an intersecting two-lane two-way roadway. The advance warning signs for the flagging operations shall include the following:
 - W20-7a-48 Flagger symbol
 - W20-4-48-A One Lane Road Ahead
 - W20-1-48-A Road Work Ahead
- C. Maintain two-way radio communications between all flaggers.

Multilane Roadways

- A. During work operations that require the vehicle train to encroach upon or operate within the limits of a travel lane for a time duration of 15 minutes or less, advance warning signs may be omitted.
- B. During work operations that require the vehicle train to encroach upon or operate within the limits of a travel lane for a time duration in excess of 15 minutes but less than 60 minutes, advance warning signs are required. Typical advance warning signs required for a temporary closure of a travel lane shall include the following:

W4-2R(L)-48	Lane Ends symbol
W20-5R(L)-48-A	Right (Left) Lane Closed Ahead
W20-1-48-A	Road Work Ahead

- C. Utilization of flaggers to control the traffic flow in the travel lanes adjacent to the travel lane the vehicle train is operating in is PROHIBITED except as allowed in the Standard Drawings Requirements for a Temporary Cessation of Traffic Flow for a time duration of 3 minutes or less.
- D. Utilize flaggers to control the traffic flow on an intersecting two-lane two-way roadway. Only flaggers and advance warning signs are required on the approaches intersecting the travel lane the vehicle train is operating in. The advance warning signs for the flagging operations shall include the following:

W20-7a-48	Flagger symbol
W3-4-48	Be Prepared to Stop
W20-1-48-A	Road Work Ahead

- E. **During work operations that require the vehicle train to encroach upon or operate within the limits of a travel lane for a time duration in excess of 60 minutes, install a standard lane closure as directed by these special provisions, the Standard Drawings For Road Construction, and the Engineer.**

Conduct all equipment and material preparations prior to entering the roadway.

Conducting traffic signal work or conducting any activities that interfere with or create disruptions to normal traffic operations during morning, mid-day, and afternoon-evening high traffic volume peak periods is PROHIBITED. The contractor shall observe all lane closure restrictions.

Conduct all work activities within the boundaries of a travel lane closed to vehicular traffic or a pedestrian thoroughfare closed to pedestrian traffic. Conducting work activities over a travel lane open to traffic is PROHIBITED. Conducting work activities over a pedestrian thoroughfare open to pedestrian traffic is PROHIBITED. Do not conduct any work activities in any manner over a thoroughfare open to vehicular or pedestrian traffic.

When advance warning signs are required to supplement the vehicle train, install the advance warning signs at spacing intervals based on the regulatory speed limit of the roadway prior to beginning any work. When a work zone traffic control plan or a work zone traffic control standard drawing is not provided to indicate the spacing intervals for a typical 3 advance warning sign array installation, utilize the sign placement intervals below. **These sign intervals do not apply to the sign intervals of the advance sign intervals for standard lane closures.**

ADVANCE WARNING SIGN PLACEMENT INTERVALS	
URBAN / RURAL (LOW SPEED) ≤ 35 MPH	200 / 200 / 200 Feet

URBAN / RURAL (INTERMEDIATE SPEED) 40 - 50 MPH	350 / 350 / 350 Feet
RURAL (HIGH SPEED) ≥ 55 MPH	500 / 500 / 500 Feet
INTERSTATE	1000 / 1500 / 2600 Feet

ADDENDUMS

(Addendums to the “2007 Standard Specifications for Highway Construction”)

(A) Construction (Sub-section 601.4) –

Sub-section 601.4.2 Construction Vehicles (paragraph 2) -

When working within the rights-of-way of access-controlled roadways such as Interstate highways, the Contractor’s vehicles may only change direction of travel at interchanges. These vehicles are prohibited from crossing the roadway from right side to the median or vice versa. Use a flagger to control the Contractor’s vehicles when these vehicles attempt to enter the roadway from a closed lane or the median area. Ensure the flagger does not stop roadway traffic, cause roadway traffic to change lanes, or affect roadway traffic in any manner. The Contractor’s vehicles may not disrupt the normal flow of roadway traffic or enter the travel lane of the roadway until a sufficient gap is present.

The Contractor shall have flaggers available to control all construction vehicles entering or crossing the travel lanes of secondary and primary routes. The RCE shall determine the necessity of these flaggers for control of these construction vehicles. The RCE shall consider sight distance, vertical and horizontal curves of the roadway, prevailing speeds of roadway traffic, frequency of construction vehicles entering or crossing the roadway and other site conditions that may impact the safety of the workers and motorists when determining the necessity of these flaggers. Ensure these flaggers do not stop roadway traffic, cause roadway traffic to change lanes or affect roadway traffic in any manner. The Contractor’s vehicles may not disrupt the normal flow of roadway traffic or enter the travel lane of the roadway until a sufficient gap is present.

When working within the rights-of-way of access-controlled roadways with posted regulatory speed limits of 55 MPH or greater and average daily traffic volumes {ADT} of 10,000 vehicles per day or greater, i.e. Interstate highways, all construction and work vehicles possessing any one or more of the vehicular characteristics listed below are only permitted to enter and exit a right or left shoulder work area during the presence of active lane closures unless otherwise directed by the RCE. These vehicles are not permitted to enter or exit these work areas without the presence of active lane closures unless otherwise directed by the RCE. Shoulder closures are unacceptable and insufficient methods for control of traffic at ingress / egress areas for these vehicles. The restrictive vehicular characteristics include the following:

- Over six (6) tires
- Tandem rear axles
- A base curb weight greater than 8000 lbs.
- A gross vehicular weight greater than 12000 lbs. unless performing duties as a shadow vehicle while supporting a truck mounted attenuator
- A trailer in tow except under the following conditions:
 - Trailers transporting traffic control devices (including but not limited to standard and 42” oversized traffic cones, portable plastic drums, signs, portable sign supports, u-channel and square steel tube sign posts) relative to the installation

of lane closures, shoulder closures or other traffic control operations approved by the RCE

- o Trailer mounted traffic control devices (including but not limited to advance warning arrow panels, changeable message signs, temporary traffic signals, highway advisory radios, work zone intelligent transportation systems and trailer towed truck mounted attenuators)

(B) Construction (Sub-section 601.4) –

Sub-section 601.4.2 Construction Vehicles -

Auxiliary Warning Lights for Vehicles and Equipment -

Supplement all construction and/or construction-related vehicles and equipment that operate in a stationary or mobile work zone within or adjacent to a roadway within the highway rights-of-way with AMBER or YELLOW colored high intensity rotating or strobe type flashing auxiliary warning light devices. Utilize, install, operate and maintain a single or multiple lighting devices as necessary to provide visibility to approaching motorists.

All auxiliary warning light models shall meet *Society of Automotive Engineers* (SAE) Class I standards and SAE Standard J575 relative to *Tests for Motor Vehicle Lighting Devices and Components* and these specifications.

The amber/yellow color of the dome/lens of an auxiliary warning light device shall meet SAE Standard J578 for amber/yellow color specifications.

Auxiliary warning lights with parabolic reflectors that rotate shall rotate around a halogen lamp at a rate to produce approximately 175 flashes per minute. The parabolic reflector shall produce a minimum 80,000 candle power and a minimum 54,000 candela through an SAE Standard J846 approved amber dome.

Equip strobe type flashing auxiliary warning light devices with photosensitive circuit controls to adjust the lighting intensity in response to changes in ambient light conditions such as from day to night. These lights shall have a double-flash capability rated at approximately 80 double flashes per minute and produce a minimum 24 joules of flash energy at the highest power level setting.

Acceptable auxiliary warning light models shall provide sufficient light output to be clearly recognizable at a minimum distance of 1750 feet.

Mount all auxiliary warning light devices intended to function as the auxiliary warning light system or as an element thereof on vehicles and equipment at locations no less than 3 feet above the ground and in conspicuous locations to provide visibility to approaching motorists.

Auxiliary warning light devices and/or models that mount in the locations of the standard vehicle lighting system are unacceptable as the specified auxiliary warning light system due to restrictive simultaneous visibility capabilities from multiple sight angles. However, auxiliary warning light devices that mount in the standard vehicle lighting system locations are acceptable as supplements to the specified lighting devices mounted in locations that do meet the minimum height requirements and provide simultaneous visibility capabilities from multiple sight angles.

Standard vehicle hazard warning lights are only permitted as supplements to the specified auxiliary warning light devices.

(C) General Requirements for Providing and Maintaining Traffic Control Devices in the Work Zone (Section 602) –

Sub-section 602.4 Construction (paragraph 8) -

Mount flat sheet signs straight and level and with the face of the signs perpendicular to the surface of the roadway. This requirement applies to flat sheet signs whether they are portable or have the embedded supports. Mount advance construction signs 2 feet from the edge of a paved shoulder or the face of a curb,

or if no paved shoulder exists, 6 feet to 12 feet from the edge of an adjacent travel lane to the nearest edge of the signs. The mounting height of single signs mounted on ground embedded sign supports is no less than 7 feet or no greater than 8 feet from the bottom edge of the sign to the grade elevation of the near edge of the adjacent travel lane or sidewalk when a sidewalk is present. Any secondary sign on the same assembly has a minimum mounting height of 6 feet from the ground to the bottom edge of the secondary sign. Ensure that signs mounted on portable sign supports, including advance construction signs, regulatory signs, warning signs, etc., have a minimum mounting height of 5 feet from the ground to the bottom edge of the sign. Provide special sign mounting assemblies, when necessary, in areas of double-layered guardrail, concrete median barrier, or bridge parapet walls.

(D) Category I Traffic Control Devices (Section 603) –

Sub-section 603.2.2 Oversized Traffic Cones (paragraph 6) -

Reflectorize each oversized traffic cone with 4 retroreflective bands: 2 orange and 2 white retroreflective bands. Alternate the orange and white retroreflective bands, with the top band always being orange. Make each retroreflective band not less than 6 inches wide. Utilize Type III – Microprismatic retroreflective sheeting for retroreflectorization on all projects let to contract after May 1, 2010 unless otherwise specified. Separate each retroreflective band with not more than a 2-inch non-reflectorized area. Do not splice the retroreflective sheeting to create the 6-inch retroreflective bands. Apply the retroreflective sheeting directly to the cone surface. Do not apply the retroreflective sheeting over a pre-existing layer of retroreflective sheeting.

Sub-section 603.2.3 Portable Plastic Drums (paragraph 3) -

Reflectorize each drum with Type III – Microprismatic retroreflective sheeting: 2 orange and 2 white retroreflective bands, 6 inches wide on all projects let to contract after May 1, 2010 unless otherwise specified. Alternate the orange and white retroreflective bands with the top band always being orange. Ensure that any non-reflectorized area between the orange and white retroreflective bands does not exceed 2 inches. Do not splice the retroreflective sheeting to create the 6-inch retroreflective bands. Apply the retroreflective sheeting directly to the drum surface. Do not apply the retroreflective sheeting over a pre-existing layer of retroreflective sheeting.

(E) Category II Traffic Control Devices (Section 604) –

Sub-section 604.2.1 Type I and Type II Barricades (paragraph 3) -

Reflectorize these barricades with Type VIII or IX Prismatic retroreflective sheeting on all projects let to contract after May 1, 2012 unless otherwise specified. Ensure that the retroreflective sheeting has alternate orange and white stripes sloping downward at a 45-degree angle in the direction of passing traffic. The stripes shall be 6 inches wide.

Sub-section 604.2.2 Type III Barricades (paragraph 3) -

Reflectorize these barricades with Type VIII or IX Prismatic retroreflective sheeting on all projects let to contract after May 1, 2012 unless otherwise specified. Ensure that the retroreflective sheeting has alternate orange and white stripes sloping downward at a 45-degree angle. Apply the sloping orange and white stripes in accordance with the requirements of the Plans, SCDOT Standard Drawings and the MUTCD. The stripes shall be 6 inches wide.

(F) Temporary Concrete Barrier (Sub-section 605.2.3.2) –

Sub-section 605.2.3.2 Temporary Concrete Barrier (paragraph 6) -

Previously used temporary concrete barrier walls are subject to inspection and approval by the RCE before use. Ensure that previously used temporary concrete barrier walls are in good condition. Defects to a temporary concrete barrier wall that may disqualify a section of wall for use include gouges, cracks, chipped, or spalled areas. A defect that exposes reinforcing steel warrants immediate disqualification. A disqualification grade type defect shall consist of measurements in excess of 1 inch, entirely or partially within the boundaries of the end connection areas and the drainage slot areas as illustrated in the “Standard

Drawings for Road Construction”, and/or in excess of 4 inches for all areas beyond the end connection areas. To warrant disqualification, these measurements shall exceed the specified dimensions in all three directions, width, height, and depth. A defect that exceeds the specified dimensions in only one or two of the three directions does not warrant disqualification.

Temporary concrete barrier walls with defects less than 6 inches in all three directions, width, height, and depth that do not expose reinforcing steel may be repaired in accordance with the following requirements. Repair is prohibited on temporary concrete barrier walls with defects 6 inches or greater in all three directions, width, height and depth.

For repair of temporary concrete barrier walls with defects less than 6 inches in all three directions, width, height, and depth that do not expose reinforcing steel, repair the defect with a premanufactured patching material specifically fabricated for patching structural concrete. The strength of the patch must meet or exceed the design strength of the class 3000 concrete of the temporary concrete barrier wall. Perform the repair procedures in accordance with all requirements and instructions from the manufacturer of the patch material. Use a bonding compound between the patch material and the concrete unless specifically stated by the manufacturer that a bonding compound is not required. If the manufacturer states that application of a bonding compound is optional, SCDOT requires application of a bonding compound compatible with the patch material. If cracking occurs within the patched area, remove the patch material completely and repeat the repair process. The contractor shall submit documentation stating all repairs have been conducted in accordance with these requirements prior to installing any temporary concrete barrier walls with repairs. Utilization of temporary concrete barrier walls with repairs shall require approval by the RCE prior to installation.

The Contractor shall submit certification documents for the patch material utilized for repairs to the Engineer prior to placing temporary concrete barrier walls that have been repaired on the project site.

Sub-section 605.2.3.2 Temporary Concrete Barrier (paragraph 5) -

In regard to projects let to contract after January 1, 2017, ALL *NCHRP Report 350* compliant temporary concrete barrier walls placed on a project site SHALL comply with the requirements for the recessed approval stamp as directed by the *SCDOT Standard Drawings*. Those *NCHRP Report 350* compliant temporary concrete barrier walls with the original recessed approval stamp that reads "SCDOT 350" will continue to be acceptable on projects let to contract after January 1, 2017. However, those temporary concrete barriers with the "SCDOT 350" identification plate attached to the side of the barrier walls with mechanical anchors previously grandfathered will no longer be acceptable on projects let to contract after January 1, 2017.

(G) Construction Signs (Sub-section 605.4.1.1) –

On all projects relative to **interstate highways** let to contract after January 1, 2016, all signs attached to portable sign supports on and/or adjacent to **interstate highways** shall be rigid. Fabricate each of these rigid signs from an approved aluminum laminate composite rigid sign substrate approved by the Department. Utilization of signs fabricated from roll-up fabric substrates attached to portable sign supports installed on and/or adjacent to **interstate highways** will no longer be acceptable on projects let to contract after January 1, 2016.

ONLY those portable sign supports specified and approved for support of rigid signs fabricated from approved aluminum laminated composite rigid sign substrates and included on the *Approved Products List for Traffic Control Devices in Work Zones*, latest edition, are acceptable. To facilitate location of acceptable portable sign supports, the listing of portable sign supports is now separated into two (2) sections; "Portable Sign Supports for Use with Roll-Up Signs ONLY" and "Portable Sign Supports for Use with Roll-Up Sign Substrates and Rigid Sign Substrates".

The trade names of the approved aluminum laminate composite rigid sign substrates are "Acopan", "Alpolic", "Dibond" and "Reynolite". These rigid sign substrates are restricted to thicknesses no greater than 2 millimeters.

Rigid signs fabricated from standard aluminum sign blanks or any other rigid material other than Acopan, Alpolic, Dibond or Reynolite are PROHIBITED for attachment to portable sign supports. However,

rigid signs fabricated from standard 0.080 and 0.100 inches thick aluminum sign blanks will continue to be acceptable for mounting on ground mounted sign supports.

Signs fabricated from roll-up fabric substrates approved by the Department will continue to be acceptable for use on and/or adjacent to secondary and primary roadways unless otherwise directed by the Department.

The minimum mounting height of signs mounted on these portable sign supports shall continue to be 5 feet from the ground to the bottom edge of the sign except where a minimum 7 foot mounting height is required in accordance with the standard specifications, the standard drawings, these special provisions and the MUTCD, latest edition.

(H) Truck-Mounted Attenuator (Sub-section 605.4.2.2) –

Sub-section 605.2.2.2.3.3 Color (paragraph 1) -

Use industrial grade enamel paint for cover of the metal aspects of the unit. Provide and attach supplemental striping to the rear face of the unit with a minimum Type III high intensity retroreflective sheeting unless otherwise directed by the Department. Utilize an alternating 4 to 8 inch black and 4 to 8 inch yellow 45-degree striping pattern that forms an inverted “V” at the center of the unit that slopes down and to the sides of the unit in both directions from the center.

(I) Truck-Mounted Attenuator (Sub-section 605.4.2.2)–

Sub-section 605.4.2.2 Truck-Mounted Attenuators (paragraph 6) -

A direct truck mounted truck mounted attenuator is mounted and attached to brackets or similar devices connected to the frame of a truck with a minimum gross vehicular weight (GVW) of 15,000 pounds (actual weight) unless otherwise directed. A trailer towed truck mounted attenuator is towed from behind and attached via a standard pintle hook / hitch to the frame of a truck with a minimum gross vehicular weight (GVW) of 10,000 pounds (actual weight) unless otherwise directed.

Each truck utilized with a truck mounted attenuator shall comply with the manufacturer’s requirements to ensure proper operation of the attenuator. The minimum gross vehicular weight (GVW) (actual weight) for each truck shall comply with these specifications unless otherwise directed within the “Remarks” column of the *Approved Products List For Traffic Control Devices in Work Zones* in regard to specific requirements for the device in question.

If the addition of supplemental weight to the vehicle as ballast is necessary, contain the material within a structure constructed of steel. Construct this steel structure to have a minimum of four sides and a bottom to contain the ballast material in its entirety. A top is optional. Bolt this structure to the frame of the truck. Utilize a sufficient number of fasteners for attachment of the steel structure to the frame of the truck to ensure the structure will not part from the frame of the truck during an impact upon the attached truck mounted attenuator. Utilize either dry loose sand or steel reinforced concrete for ballast material within the steel structure to achieve the necessary weight. The ballast material shall remain contained within the confines of the steel structure in its entirety and shall not protrude from the steel structure in any manner.

(J) Trailer-Mounted Changeable Message Signs (Sub-section 606.3.2) -

Sub-section 606.3.2.7 Controller (paragraphs 1-4) -

The controller shall be an electronic unit housed in a weatherproof, rust resistant box with a keyed lock and a light for night operation. Provide the unit with a jack that allows direct communications between the on-board controller and a compatible personal computer. The unit shall have a LCD display screen that allows the operator to review messages prior to displaying the message on the sign.

The controller shall have the capability to store 199 factory preprogrammed messages and up to 199 additional messages created by the user in a manner that does not require a battery to recall the messages. Also, the controller shall allow the operator the capability to program the system to display multiple messages in sequence.

Provide the controller with a selector switch to allow the operator to control the brightness or intensity level of the light source of the sign panel. The selector switch shall include "bright," "dim" and "automatic" modes; inclusion of additional modes is permissible. When the selector switch is in the "automatic" mode, a photosensitive circuit shall control the brightness or intensity level of the light source in response to changes in ambient light such as from day to night and other various sources of ambient light.

Equip each sign with remote communications capabilities, such as utilization of cellular telephone or internet browser technology, to allow the operator to revise or modify the message selection from the office or other remote location. Also, provide protection to prohibit unauthorized access to the controller, (i.e. password protection).

Sub-section 606.5 Measurement (paragraph 2) -

Trailer-mounted changeable message signs are included in the lump sum item for Traffic Control in accordance with **Subsections 107.12** and **601.5** of the "2007 Standard Specifications for Highway Construction". No separate measurement will be made for trailer-mounted changeable message signs unless the contract includes a specific pay item for trailer-mounted changeable message signs.

The Contractor shall provide, install, operate, and maintain the trailer-mounted changeable message sign per traffic control set-up as directed by the Plans, the "Standard Drawings for Road Construction", these Special Provisions, the Specifications, and the Engineer.

Sub-section 606.6 Payment (paragraph 2) -

In addition to **Subsections 107.12** and **601.6**, the payment for Traffic Control is full compensation for providing, installing, removing, relocating, operating, and maintaining trailer-mounted advance warning arrow panels and trailer-mounted changeable message signs as specified or directed and includes providing the units' primary power source; repairing or replacing damaged or malfunctioning units within the specified time; providing traffic control necessary for installing, operating, and maintaining the units; and all other materials, labor, hardware, equipment, tools, supplies, transportation, incidentals, and any miscellaneous items necessary to fulfill the requirements of the pay item in accordance with the Plans, the Specifications, and other items of the Contract.

Sub-section 606.6 Payment (paragraph 3) -

Disregard this paragraph unless the Contract includes a specific pay item for trailer-mounted changeable message signs.

(K) Temporary Pavement Markings (Sub-section 609.4.1) –

Sub-section 609.4.1.1.1 Application Requirements General (in addition to paragraph 3) -

On two-lane two-way roadways, apply and place temporary or permanent pavement markings, as specified hereupon, prior to the end of each day's work or shift or reopening a closed travel lane to traffic. These pavement markings shall include 4-inch wide solid lines on edge lines and solid center lines and 4-inch wide by 10 feet long broken lines with a 30-foot gap for broken center lines and lane lines unless otherwise specified. The center line pavement markings shall be either double yellow solid lines, yellow broken lines or an appropriate combination of a yellow solid line and yellow broken lines for passing / no passing zones. Placement of a singular yellow solid line for a center line pavement marking is unacceptable. The edge line pavement markings shall be a white solid line.

On multilane primary and secondary roadways, apply and place temporary or permanent pavement markings, as specified hereupon, to the travel lanes prior to reopening a closed travel lane to traffic. These pavement markings shall include 4-inch wide solid lines, utilized for edge lines and solid center lines, and 4-inch wide by 10 feet long broken lines with a 30-foot gap, utilized for lane lines and turn lanes, unless otherwise specified. The center line pavement markings shall be either double yellow solid lines or an appropriate combination of a yellow solid line and 4-inch wide by 10 feet long yellow broken lines for two-way left turn median areas. The right edge line pavement markings shall be a white solid line and the left edge line shall be a yellow solid line except in areas where the travel lanes separate to create a gore type situation

and then the color schemes shall comply with SCDOT application practices for gore areas. The lane lines between travel lanes and turn lanes shall be 4-inch wide by 10 feet long white broken lines with a 30-foot gap.

However, on two-lane two-way and multilane primary and secondary roadways, application of a 4-inch wide solid line utilized for an edge line adjacent to an earth shoulder, white or yellow, may be delayed up to 72 hours after eradication of the original line when the length of eradicated line at a single location is no longer than 250 feet. In the event of multiple locations along the same line, each location must be separated from the adjacent location by no less than 250 feet with a cumulative total distance of eradicated line of no more than 1300 feet within any continuous 1 (one) mile length of roadway measured from a selected location. If the length of eradicated line exceeds 250 feet at any single location, the distance interval between multiple adjacent locations is less than 250 feet or a cumulative total distance of multiple locations of eradicated line exceeds 1300 feet within any continuous 1 (one) mile length of roadway measured from a selected location, replace the eradicated line(s) prior to reopening the adjacent travel lane to traffic.

On interstate roadways, apply and place temporary or permanent pavement markings, as specified hereupon, to the travel lanes prior to reopening a closed travel lane to traffic. These pavement markings shall include 6-inch wide solid lines, utilized for edge lines, and 6-inch wide by 10 feet long white broken lines with a 30-foot gap, utilized for lane lines between travel lanes and auxiliary lanes, unless otherwise specified. The right edge line pavement markings shall be a white solid line and the left edge line shall be a yellow solid line except in areas where the travel lanes separate to create a gore type situation and then the color schemes shall comply with SCDOT application practices for gore areas.

On all roadways, apply and place white stop bars and white triangle yield bars in all locations where previous stop bars and triangle yield bars have been eradicated by the work. Apply and place white stop bars and white triangle yield bars at intersections controlled by stop and yield signs within 72 hours of the eradication of the original pavement marking. Apply and place white stop bars at signalized intersections controlled by traffic control signals and at railroad crossings prior to reopening a closed travel lane to traffic.

Within the limits of existing turn lanes on all roadways, apply and place white arrows in all locations where previous arrows have been eradicated by the work unless otherwise directed by the RCE. Apply and place white arrows within 72 hours of the eradication of the original pavement markings. However, in regard to newly constructed turn lanes, apply and place white arrows the within turn lanes as directed by the RCE.

Within the limits of existing lane-drop sites on all roadways, apply and place white arrows in all locations where previous arrows have been eradicated by the work prior to the end of each day's work or shift or reopening the closed travel lane to traffic. In regard to newly constructed lane-drop sites, apply and place white arrows within the travel lane to be terminated prior to opening the travel lane to traffic and as directed by the RCE.

(L) Temporary Pavement Markings (Sub-section 609.4.1) –

Sub-section 609.4.1.1.1 Application Requirements General (Revision to paragraph 8) -

On two-lane, two-way roadways, passing zones may be eliminated within the work zone through application of 4-inch double yellow centerline pavement markings if determined feasible and directed to do so by the Plans and/or the RCE. Apply no passing zone markings as specified by the Plans, the Specifications, the *MUTCD* and the RCE.

(M) Flagging Operations (Sub-section 610.4.1) –

Sub-section 610.4.1.1 Flagging Operations (paragraph 1) -

Use a flagging operation to control the flow of traffic when two opposing directions of traffic must share a common travel lane. A flagging operation may be necessary during a lane closure on a two-lane two-way roadway, an intermittent ramp closure or an intermittent encroachment of equipment onto a portion of the roadway. Utilize flagging operations to direct traffic around work activities and maintain continuous traffic flow at reduced speeds when determined to be appropriate by the RCE. As stated above, flagging operations shall direct traffic around the work activities and maintain continuous traffic flow, therefore, stopped traffic shall not be required to stop for time durations greater than those listed below unless otherwise directed by

the RCE. Begin measurement of the time interval immediately upon the moment the Flagger rotates the Stop/Slow paddle to display the "Stop" condition to the approaching motorists.

LENGTH OF CLOSURE	MAXIMUM TIME DURATION FOR STOPPED TRAFFIC
1 MILE or LESS	5 Minutes
1 to 2 MILES	7 ½ Minutes

If the work activities require traffic to be stopped for periods greater than 5 to 7 ½ minutes as stated above, consider alternate work methods, conducting work activities during times of lowest traffic volumes such as during the hours of darkness or complete road closure with detour installation.

(N) Paving and Resurfacing (Sub-section 611.4.1) –

Sub-section 611.4.1.2 Requirements (paragraph 8) -

Whenever travel lanes with acceptable grade elevation differences are open to traffic, provide "Uneven Lanes" signs (W8-11-48) or "Uneven Pavement" signs (W8-11A-48). Reflectorize these signs with a fluorescent orange colored prismatic retroreflective sheeting unless otherwise specified. Install these signs adjacent to roadways with uneven pavement surfaces between travel lanes or between travel lanes and the adjacent paved shoulders. Install these signs at intervals no greater than 2600 feet.

STAGING

TRAFFIC CONTROL RESTRICTIONS (Project Specific) –

GENERAL NOTES (APPLIES TO ALL STAGES):

1. APPROPRIATE CHANNELIZING DEVICES SHALL BE MAINTAINED DURING CONSTRUCTION TO SEPARATE WORK FROM TRAFFIC.
2. ALL WORK AND MATERIALS SHALL CONFORM WITH THE SCDOT STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION 2007 EDITION, SCDOT STANDARD DRAWINGS LATEST EDITION, "SOUTH CAROLINA WORK ZONE SAFETY GUIDELINES", AND THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS" LATEST EDITION.
3. ALL EXISTING SIGNS IN CONFLICT WITH CONSTRUCTION SIGNING SHALL BE REMOVED, COVERED, OR RELOCATED. TEMPORARY PAVEMENT MARKINGS SHALL TIE TO EXISTING MARKINGS WHERE APPLICABLE.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ERADICATING ALL CONFLICTING PAVEMENT MARKINGS.
5. THE COST OF OBLITERATION OF EXISTING STRIPING AND MAINTAINING TRAFFIC STRIPING SHALL BE INCLUDED IN THE COST OF TRAFFIC CONTROL.
6. CONTRACTOR TO NOTIFY IN WRITING ALL BUSINESSES AND PROPERTY OWNERS OF CONSTRUCTION ACTIVITIES, DRIVEWAY MODIFICATIONS, AND OTHER ACCESS RESTRICTICONS 7 DAYS IN ADVANCE OF ANY CONSTRUCTION ACTIVITIES ADJACENT TO THEIR PROPERTY.
7. CONTRACTOR SHALL MAINTAIN ACCESS TO ALL COMMERCIAL AND PRIVATE DRIVEWAYS IN ACCORDANCE WITH THE FOLLOWING:
 - A. SITES WITH TWO OR MORE DRIVEWAYS - ONE DRIVEWAY TO BE MAINTAINED CONTINUOUSLY OPENED. NO DRIVEWAY TO BE CLOSED LONGER THAN 1 DAY.
 - B. SITE WITH ONE DRIVEWAY - DRIVEWAY NOT TO BE CLOSED FOR A PERIOD LONGER THAN 1 HOUR.

8. PLACE CONSTRUCTION ZONE ELECTRIC CHANGEABLE MESSAGE SIGNS AS OUTLINED IN THE TRAFFIC CONTROL SPECIAL PROVISIONS AND WHERE DIRECTED BY THE ENGINEER
9. CONTRACTOR SHALL MAINTAIN POSITIVE SURFACE DRAINAGE DURING ALL CONSTRUCTION PHASES.
10. CONTRACTOR SHALL INSTALL ADVANCED LANE CLOSURE SIGNING PER SCDOT STANDARD DRAWINGS 610-010 TO 610-040 AS DIRECTED IN THE TRAFFIC CONTROL SPECIAL PROVISION.
11. CONTRACTOR SHALL APPLY TEMPORARY LANE ARROW MARKINGS PER SCDOT STANDARD DRAWINGS 625-410-00.
12. CONTRACTOR SHALL INSTALL TEMPORARY CONCRETE BARRIERS PER SCDOT STANDARD DRAWINGS SECTION 605-100 THRU 605-400.
13. CONTRACTOR SHALL MAINTAIN SHIELDING OF EXISTING AND PROPOSED HAZARDOUS SLOPES IN THE AREAS DEPICTED WITH TEMPORARY CONCRETE BARRIER AS DIRECTED BY THE R.C.E. CONTRACTOR IS REQUIRED TO RESET THE BARRIER AS CONSTRUCTION OPERATIONS INCREASE THE GRADE IN THIS AREA.
14. CONTRACTOR SHALL BE ON SITE AT ALL TIMES TO MAINTAIN TRAFFIC CONTROL ONCE PAVEMENT OPERATIONS BEGIN, UNTIL COMPLETE AND APPROVED BY THE RCE.
15. CONTRACTOR SHALL ENSURE PAVEMENT DROP-OFFS ADJACENT TO ACTIVE TRAVEL LANES DO NOT EXCEED 2".
16. CONTRACTOR SHALL CONSTRUCT CEMENT MODIFIED RECYCLED BASE PER SCDOT SUPPLEMENTAL TECHNICAL SPECIFICATION SC-M-306, LATEST EDITION AND/OR AS DIRECTED BY THE R.C.E. FOR CMRB-METHOD B THE CONTRACTOR WILL BE REQUIRED TO WAIT 2 TO 5 DAYS AFTER SECOND APPLICATION OF ASPHALT SURFACE TREATMENT (SINGLE) BEFORE THE HMA COURSE CAN BE PLACED.
17. CONTRACTOR SHALL ENSURE TEMPORARY CONSTRUCTION SLOPES ADJACENT TO ACTIVE TRAVEL LANES ARE 6:1 OR SHALLOWER AT ALL TIMES.
18. HOURLY LANE CLOSURE RESTRICTIONS ARE AS FOLLOWS: MON-FRI FROM 7:00AM TO 9:00AM AND FROM 4:00PM TO 6:00PM.

STAGE 1:

1. INSTALL PERMANENT CONSTRUCTION SIGNING AS DIRECTED IN THE TRAFFIC CONTROL SPECIAL PROVISIONS.
2. PLACE PORTABLE PLASTIC DRUMS IN ACCORDANCE WITH SCDOT STANDARD DRAWINGS AND AS DIRECTED BY THE R.C.E.
3. INSTALL EROSION CONTROL DEVICES AS SHOWN ON THE EROSION CONTROL PLAN AND AS DIRECTED BY THE R.C.E.
4. APPLY TEMPORARY STRIPING AS INDICATED IN THE PLANS AND AS DIRECTED BY THE R.C.E.
5. CONSTRUCT CULVERT EXTENSION AS SHOWN ON THE CULVERT EXTENSION PLANS.
6. BEGIN CONSTRUCTION OF OUTSIDE WIDENING AREAS INCLUDING CUT/FILL, DRAINAGE, AND PREPARATION OF WIDENING SOIL SUBGRADE AS INDICATED IN THE PLANS. APPLY WEDGING TO SC 160 EXISTING PAVEMENT BETWEEN APPROX. STA 92+00 TO STA 95+00 TO MAINTAIN UNIFORM CROSS SLOPE AND POSITIVE DRAINAGE. APPLY WEDGING TO SIDEROAD AS NEED TO MAINTAIN TRAFFIC.
7. CONSTRUCT CEMENT MODIFIED RECYCLED BASE UTILIZE LANE CLOSURES/FLAGGER CONTROL AT NIGHT AS NEED TO MAINTAIN TRAFFIC INCLUDING REQUIRED MILLING AND SECOND APPLICATION OF CHIP SEAL AS DIRECTED BY THE R.C.E. FULL WIDTH RECLAMATION TO BE PERFORMED ONE TRAVEL LANE AT A TIME, ON

SUCCESSIVE DAYS. (I.E. ONE DIRECTION AT ONE NIGHT AND THE OTHER DIRECTION AT THE SAME LOCATION NEXT NIGHT.) NOT SHOWN IN PLAN VIEW.

STAGE 2

1. MAINTAIN/INSTALL PERMANENT CONSTRUCTION SIGNING AS DIRECTED IN THE TRAFFIC CONTROL SPECIAL PROVISIONS.
2. PLACE PORTABLE PLASTIC DRUMS IN ACCORDANCE WITH SCDOT STANDARD DRAWINGS AND AS DIRECTED BY THE R.C.E.
3. INSTALL AND MAINTAIN EROSION CONTROL DEVICES AS SHOWN ON THE EROSION CONTROL PLANS AND AS DIRECTED BY THE R.C.E.
4. MAINTAIN/APPLY TEMPORARY STRIPING AS INDICATED IN THE PLANS AND AS DIRECTED BY THE R.C.E.
5. CONSTRUCT WEDGING AS NEEDED AND FIRST LIFT OF SURFACE/INTERMEDIATE COURSE. UTILIZE LANE CLOSURE/FLAGGER CONTROL AS NEED TO MAINTAIN TRAFFIC. CONTINUE CONSTRUCTION OF SHOULDERS & CUT/FILL AS NEEDED.

STAGE 3

1. MAINTAIN/INSTALL PERMANENT CONSTRUCTION SIGNING AS DIRECTED IN THE TRAFFIC CONTROL SPECIAL PROVISIONS.
2. PLACE PORTABLE PLASTIC DRUMS IN ACCORDANCE WITH SCDOT STANDARD DRAWINGS AS NEEDED AND AS DIRECTED BY THE R.C.E.
3. INSTALL AND MAINTAIN EROSION CONTROL DEVICES AS SHOWN ON THE EROSION CONTROL PLANS AND AS DIRECTED BY THE R.C.E.
4. APPLY TEMPORARY STRIPING AS INDICATED IN THE PLANS AND AS DIRECTED BY THE R.C.E.
5. MILL EXISTING PAVEMENT AS SHOWN AND NOTED IN THE PLANS AND AS DIRECTED BY THE R.C.E.
6. CONSTRUCT FINAL SURFACE PAVEMENT THROUGHOUT THE PROJECT. UTILIZE LANE CLOSURE/FLAGGER CONTROL AS NEED TO MAINTAIN TRAFFIC.
7. APPLY FINAL PAVEMENT MARKING AS SHOWN IN THE PAVEMENT MARKING PLANS AND AS DIRECTED BY THE R.C.E. INSTALL SIGNING AS SHOWN IN THE SIGNING PLANS AND AS DIRECTED BY THE R.C.E.

SCDOT SUPPLEMENTAL SPECIFICATIONS REFERENCE

The following are SCDOT Supplemental Specifications and SCDOT Supplemental Technical Specifications that pertain specifically to the SC 160 East (Tom Hall Rd) Widening. Additional Supplemental Specifications and SCDOT Supplemental Technical Specifications, not included, but which may be required for the project, are on file with the SCDOT and are available on the SCDOT website <https://www.scdot.org/business/road-supplemental-specs.aspx> & <https://www.scdot.org/business/road-technical-specs.aspx>

The list of the Supplemental Specifications provided is as follows:

Section

Critical Path Construction Schedules (March 1, 2007)
High Performance Chip Seal (March 21, 2008)
Asphalt Binder Adjustment Index (March 3, 2009)
Errata to 2007 Standard Specifications for Highway Construction (January 1, 2018)
As-Built Construction Plans (November 4, 2009)
Concrete Batching and Mixing (April 5, 2010)
Subsection 401.4.17, Transportation and Delivery of Mixes (July 1, 2010)
Cement Modified Recycled Base (December 1, 2010)
Fine Grading (January 4, 2012)
Prompt Payment Clause (July 1, 2017)
Construction Schedules (November 4, 2013)
Muck Excavation (July 1, 2017) – {Shall be paid as Unclassified Excavation}
627 Thermoplastic Pavement Markings (July 1, 2020)
204 Structure Excavation (January 1, 2021)
Erosion Control Measures (January 1, 2021)
Temporary Barrier Fence (July 1, 2021)
Portland Cement & Portland Cement Concrete (May 5, 2014)
Asphalt Surface Treatment – Single Treatment (July 2, 2010)
Materials for Full Depth Patching (January 1, 2018)
Removal of Existing Asphalt Pavement before Patching (January 1, 2018)
Work Zone Traffic Control Local Law Enforcement (July 1, 2018)
Section 605 Temporary Concrete Barrier (July 1, 2020)
Work Zone Traffic Control Training Requirements for Contractors/Subcontractors
(July 1, 2020)

SC-M-204-2 Temporary Shoring (January 2023)
SC-M-210 Flowable Fill (June 2011)
SC-M-306 Cement Modified Recycled Base (July 2021)
SC-M-400 Asphalt Mixture Quality Acceptance (February 2020)
SC-M-675 Traffic Signals (January 2023)
SC-M-805-1 Guardrail (January 2023)
SC-M-810-4 Seeding (January 2021)
SC-M-815-2 Silt Fence Systems (July 2018)
SC-M-815-8 Inlet Structure Filters (July 2017)
SC-M-815-9 Rolled Erosion Control Product {RECP} (July 2017)
SC-M-815-10 Stabilized Construction Entrance (July 2018)
SC-M-815-11 Hydraulic Erosion Control Products (April 2011)

SECTION 809: RIGHT OF WAY PLAT:

Description:

The contractor by the “Substantial Work Complete” date shall prepare a right of way plat signed and sealed by a Professional Land Surveyor (PLS) licensed to practice in the state of South Carolina. The right of way plat shall be in accordance with the requirements of Section 49-460-A “General Property Survey” as outlined in the South Carolina “Standards of Practice Manual” for land surveyors. A copy of the plat will be recorded, by the contractor, in the Register Mesne Conveyance (RMC) office of the county or counties in which the project resides. The contractor will provide one copy of the plat on a full sized plan sheet(s) (22” X 36”) and submit to the resident construction engineer to be included in the as-built plans. In addition, the contractor shall furnish one PDF copy of the plat sheet(s) and one copy of the cad file(s) of the plat to York County.

Materials: Rebar Cap R/W Marker

Materials used shall comply with those listed on SCDOT Standard Drawing Nos. 809-105-00 or 809-110-00.

Construction Requirements:

The PLS shall set right of way markers along all new right of way lines as well as along any present right of way being retained by the Department at intervals listed on the SCDOT Standard Drawings. Right of way markers shall not be placed at points common to side property lines and/or corners. In the event that the plan reflects a break in the right of way along a side property line the right of way marker will not be set without the side property line being retraced and established by way of survey. The PLS shall prepare a plat documenting the location of all Right of Way Markers set and reflecting the as-built station and offset from the plan alignment. The plat shall show the entire project corridor as an enclosed strip or parcel of land to include the mainline and all side roads as defined on the project plan.

Measurement and Basis of Payment:

The item Right of Way Plat is paid on a lump sum (LS) basis; and therefore, there is no specific measurement for this item. The unit price bid for Property Right of Way Plat shall include all costs for labor, materials, equipment, services of a PLS and any related fees or costs associated with producing a plat, recording the plat at the RMC office, and all required copies. Each marker placed in accordance with the Standard Drawings complete and accepted will be measured and paid at the unit price bid.

Item No.	Description	Unit
8091010	RIGHT OF WAY MARKER (REBAR AND CAP)	EA
8091000	RIGHT OF WAY MARKER (REINFORCED CONCRETE)	EA
8091050	RIGHT OF WAY PLAT	LS

SCDOT TRAFFIC SIGNAL SPECIAL PROVISIONS – TRAFFIC CONTROL
FOR TRAFFIC SIGNAL PROJECTS

MAINTENANCE OF TRAFFIC

TRAFFIC CONTROL:

The Contractor shall execute the item of Traffic Control as required by the Standard Specifications, the plans, the Standard Drawings For Road Construction, these special provisions, all supplemental specifications, the MUTCD, and the Engineer. This is an amendment to the Standard Specifications to require the following:

GENERAL REGULATIONS -

These special provisions shall have priority to the plans and comply with the requirements of the MUTCD and the standard specifications. Revisions to the traffic control plan through modifications of the special provisions and the plans shall require approval by the department. **Final approval of any revisions to the traffic control plan shall be pending upon review by the Director of Traffic Engineering.**

Install and utilize changeable message signs in all lane closures installed on high volume high-speed multilane roadways. Use of changeable message signs in lane closures installed on low volume low speed multilane roadways is optional unless otherwise directed by the plans and the Engineer. Install and use a changeable message sign within a lane closure set-up as directed by the *Standard Drawings For Road Construction*. When a lane closure is not present for any time to exceed 24 hours, remove the changeable message sign from the roadway. Place the sign in a predetermined area on the project site, as approved by the Engineer, where the sign is not visible to passing motorists. The preprogrammed messages utilized shall be in accordance with the *Standard Drawings For Road Construction* when used as part of the traffic control set-up for lane closures. Only those messages pertinent to the requirements of the traffic control situation and the traffic conditions are permitted for display on a changeable message sign at all times. At no time will the messages displayed on a changeable message sign duplicate the legends on the permanent construction signs.

During operation of changeable message signs, place the changeable message sign on the shoulder of the roadway no closer than 6 feet between the sign and the near edge of the adjacent travel lane. When the sign location is within 30' of the near edge of a travel lane open to traffic, supplement the sign location with no less than 5 portable plastic drums placed between the sign and the adjacent travel lane for delineation of the sign location. Install and maintain the drums no closer than 3 feet from the near edge of the adjacent travel lane. This requirement for delineation of the sign location shall apply during all times the sign location is within 30' of the near edge of a travel lane open to traffic, including times of operation and non-operation. Oversized cones are prohibited as a substitute for the portable plastic drums during this application.

All signs mounted on portable sign supports shall have a minimum mounting height of 5' from the bottom of the sign to the ground. All signs mounted on ground mounted u-channel posts or square steel tube posts shall have a minimum mounting height of 7' from the bottom of the sign to the grade elevation of the near edge of the adjacent travel lane or sidewalk when a sidewalk is present.

On multilane primary routes, avoid placement of signs mounted on portable sign supports within paved median areas utilized for two-way left turns unless otherwise directed by the RCE.

When mounting signs on multiple ground mounted sign supports, ensure that each post is of the same type. Combining and installing both ground mounted u-section and square steel tube posts within the same sign assembly is prohibited.

When mounting signs on ground mounted u-section or square steel tube posts, utilize either a sign support / ground support post combination with an approved breakaway assembly or a single direct driven post for each individual sign support of a sign assembly installation. Do not combine a sign support / ground support post combination and a direct driven post on the same sign assembly installation that contains two or more sign supports. Regarding sign support / ground support post combination installations, ensure that post lengths, stub heights and breakaway assemblies comply

with the manufacturer's requirements and specifications. Use approved breakaway assemblies found on the *Approved Products List For Traffic Control Devices in Work Zones*.

Temporary "Exit" signs (M1025-00) shall be located within each temporary gore during lane closures on multilane roadways. Mount these signs a minimum of 7' from the pavement surface to the bottom of the sign in accordance with the requirements of the MUTCD.

When covering signs with opaque materials, the Department prohibits attaching a covering material to the face of the sign with tape or a similar product or any method that will leave a residue on the retroreflective sheeting. Residue from tape or similar products, as well as many methods utilized to remove such residue, damages the effective reflectivity of the sign. Therefore, contact of tape or a similar product with the retroreflective sheeting will require replacement of the sign. Cost for replacement of a sign damaged by improper covering methods will be considered incidental to providing and maintaining the sign; no additional payment will be made.

Overlays are prohibited on all rigid construction signs. The legends and borders on all rigid construction signs shall be either reversed screened or direct applied.

Signs not illustrated on the typical traffic control standard drawings designated for permanent construction signs shall be considered temporary and shall be included in the lump sum price bid item for "Traffic Control" unless otherwise specified.

Install "Grooved Pavement" signs (W8-15-48) supplemented with the "Motorcycle" plaque (W8-15P-30) in advance of milled or surface planed pavement surfaces. Install these signs no further than 500 feet in advance of the beginning of this pavement condition on primary routes with speed limits of 60 MPH or less and no less than 500 feet in advance of the beginning of this pavement condition on interstate routes. On multilane roadways, comply with the same guidelines as applied to all other advance warning signs and install two sign assemblies at each sign location, one on each side of the roadway, when roadway conditions warrant. Install these signs immediately upon creation of this pavement condition and maintain these signs until this pavement condition is eliminated.

Install "Steel Plate Ahead" signs (W8-24-48) in advance of an area of roadway where temporary steel plates are present. Install these signs no further than 300 feet in advance of locations where steel plates are present. On multilane roadways, comply with the same guidelines as applied to all other advance warning signs and install two sign assemblies at each sign location, one on each side of the roadway, when roadway conditions warrant. Install these signs immediately upon installation of a temporary steel plate and maintain the signs until the temporary steel plates are removed.

The Contractor shall maintain the travel patterns as directed by the traffic control plans and shall execute construction schedules expeditiously. The Contractor shall provide the Resident Engineer with no less than a two-week prior notification of changes in traffic patterns.

During nighttime flagging operations, flaggers shall wear a safety vest and safety pants that comply with the requirements of ANSI / ISEA 107 standard performance for Class 3 risk exposure, latest revision, and a fluorescent hard hat. The safety vest and the safety pants shall be retroreflectorized and the color of the background material of the safety vest and safety pants shall be fluorescent orange-red or fluorescent yellow-green.

During nighttime flagging operations, the contractor shall illuminate each flagger station with any combination of portable lights, standard electric lights, existing street lights, etc., that will provide a minimum illumination level of 108 Lx or 10 fc.

During nighttime flagging operations, supplement the array of advance warning signs with a changeable message sign for each approach. These changeable message signs are not required during daytime flagging operations. Install the changeable message signs 500' in advance of the advance warning sign arrays. Messages should be "Flagger Ahead" and "Prepare To Stop".

TRAFFIC CONTROL PROCEDURES SPECIFIC TO TRAFFIC SIGNAL WORK OPERATIONS –

Utilize a vehicle train consisting of a primary work vehicle and no less than 1 shadow vehicle. The shadow vehicle is required for all Traffic Signal Work Operations except on a two-lane roadway for a time duration of 15 minutes or less when no pedestrian workers are present, excluding the flagger. A second

shadow vehicle is necessary in some applications on multilane roadways as depicted on the Standard Drawings. Install and maintain the vehicle train as directed by these special provisions, , the Standard Drawings For Road Construction, and the Engineer.

Two-Lane Two-Way Roadways

- A. Utilize flagging operations to control the traffic flow around the work site where the vehicle train is operating.
- B. Utilize flaggers to control the traffic flow on an intersecting two-lane two-way roadway. The advance warning signs for the flagging operations shall include the following:
 - W20-7a-48 Flagger symbol
 - W20-4-48-A One Lane Road Ahead
 - W20-1-48-A Road Work Ahead
- C. Maintain two-way radio communications between all flaggers.

Multilane Roadways

- A. During work operations that require the vehicle train to encroach upon or operate within the limits of a travel lane for a time duration of 15 minutes or less, advance warning signs may be omitted.
- B. During work operations that require the vehicle train to encroach upon or operate within the limits of a travel lane for a time duration in excess of 15 minutes but less than 60 minutes, advance warning signs are required. Typical advance warning signs required for a temporary closure of a travel lane shall include the following:
 - W4-2R(L)-48 Lane Ends symbol
 - W20-5R(L)-48-A Right (Left) Lane Closed Ahead
 - W20-1-48-A Road Work Ahead
- C. Utilization of flaggers to control the traffic flow in the travel lanes adjacent to the travel lane the vehicle train is operating in is PROHIBITED except as allowed in the Standard Drawings Requirements for a Temporary Cessation of Traffic Flow for a time duration of 3 minutes or less.
- D. Utilize flaggers to control the traffic flow on an intersecting two-lane two-way roadway. Only flaggers and advance warning signs are required on the approaches intersecting the travel lane the vehicle train is operating in. Traffic control devices are not required on the intersecting approaches. The advance warning signs for the flagging operations shall include the following:
 - W20-7a-48 Flagger symbol
 - W20-4-48-A One Lane Road Ahead
 - W20-1-48-A Road Work Ahead
- E. **During work operations that require the vehicle train to encroach upon or operate within the limits of a travel lane for a time duration in excess of 60 minutes, install a standard lane closure as directed by these special provisions, the Standard Drawings For Road Construction, and the Engineer.**

Conduct all equipment and material preparations prior to entering the roadway.

Conducting traffic signal work or conducting any activities that interfere with or create disruptions to normal traffic operations during morning, mid-day, and afternoon-evening high traffic volume peak periods is PROHIBITED. The contractor shall observe all lane closure restrictions.

Conduct all work activities within the boundaries of a travel lane closed to vehicular traffic or a pedestrian thoroughfare closed to pedestrian traffic. Conducting work activities over a travel lane open to traffic is PROHIBITED. Conducting work activities over a pedestrian thoroughfare open to pedestrian traffic is PROHIBITED. Do not conduct any work activities in any manner over a thoroughfare open to vehicular or pedestrian traffic.

When advance warning signs are required to supplement the vehicle train, install the advance warning signs at spacing intervals based on the regulatory speed limit of the roadway prior to beginning any work. When a work zone traffic control plan or a work zone traffic control standard drawing is not provided to indicate the spacing intervals for a typical 3 advance warning sign array installation, utilize the sign placement intervals below. **These sign intervals do not apply to the sign intervals of the advance sign intervals for standard lane closures.**

ADVANCE WARNING SIGN PLACEMENT INTERVALS	
URBAN / RURAL (LOW SPEED) ≤ 35 MPH	200 / 200 / 200 Feet
URBAN / RURAL (INTERMEDIATE SPEED) 40 - 50 MPH	350 / 350 / 350 Feet
RURAL (HIGH SPEED) ≥ 55 MPH	500 / 500 / 500 Feet
INTERSTATE	1000 / 1500 / 2600 Feet

LANE CLOSURE RESTRICTIONS –

The lane closure restrictions stated below are project specific, for all other restrictions, see supplemental specification, “Restrictions”, dated September 1, 2015.

The Contractor shall install all lane closures as directed by the Standard Specifications For Highway Construction (latest edition), the Standard Drawings For Road Construction, these special provisions, the MUTCD, and the Engineer. The Contractor shall close the travel lanes of two-lane two-way roadways by installing flagging operations. The Contractor shall close the travel lanes of multilane roadways as directed by the typical traffic control standard drawings designated for lane closures on primary routes.

The Department prohibits lane closures on primary and secondary routes during any time of the day that traffic volumes in the travel lanes remaining open to traffic exceed 800 vehicles per hour per lane per direction. The Department reserves the right to suspend a lane closure if any resulting traffic backups are deemed excessive by the Engineer. Maintain all lane closure restrictions as directed by the plans, these special provisions, and the Engineer.

Flagging operations are considered to be lane closures for two-lane two-way operations and shall be subject to all restrictions for lane closures as specified by this contract.

Lane closures, including flagging operations, are restricted to maximum distances of 2 miles. Install all lane closures according to the typical traffic control standard drawings. On occasions when daytime lane closures must be extended into the nighttime hours, substitute the nighttime lane closure standards for the daytime lane closure standards.

The Department reserves the right to suspend a lane closure if any resulting traffic backups are deemed excessive by the Engineer. Maintain all lane closure restrictions as directed by the Standard Specifications, these special provisions, and the Engineer.

Installation and maintenance of a lane closure is PROHIBITED when the Contractor is not actively engaged in work activities specific to the location of the lane closure unless otherwise specified and approved by the Engineer. The length of the lane closure shall not exceed the length of roadway anticipated to be subjected to the proposed work activities within the work shift time frame or the maximum lane closure length specified unless otherwise approved by the Engineer. Also, the maximum lane closure length specified does not warrant installation of the specified lane closure length when the length of the lane closure necessary for conducting the work activity is less. The length and duration of each lane closure, within the specified parameters, shall require approval by the Engineer prior to installation. The length and duration of each lane closure may be reduced by the Engineer if the work zone impacts generated by a lane closure are deemed excessive or unnecessary.

The presence of temporary signs, portable sign supports, traffic control devices, trailer mounted equipment, truck mounted equipment, vehicles and vehicles with trailers relative to the installation or removal of a closure and personnel are prohibited within the 15 to 30 foot clear zone based upon the roadway speed limit during the prohibitive hours for lane closures specified by these special provisions.

The truck mounted changeable message signs are in addition to the requirements for trailer mounted changeable message signs. Truck mounted changeable message signs and trailer mounted changeable message signs are not interchangeable.

SHOULDER CLOSURE RESTRICTIONS -

The Department prohibits the Contractor from conducting work within 15' of the near edge of the adjacent travel lane on the outside shoulders or the median areas under a shoulder closure during any time that traffic volumes exceed 800 vehicles per hour per direction. The hourly restrictions for lane closures shall also apply to work activities conducted under a shoulder closure within 15' of the near edge of an adjacent travel lane or a median area. The Department reserves the right to suspend work conducted under a shoulder closure if any traffic backups develop and are deemed excessive by the Engineer. Maintain all shoulder closure restrictions as directed by the plans, these special provisions, and the Engineer.

On primary and secondary roadways, the Department prohibits the Contractor from conducting work within 1' or less of the near edge of an adjacent travel lane under a shoulder closure. All work that may require the presence of personnel, tools, equipment, materials, vehicles, etc., within 1' of the near edge of an adjacent travel lane shall be conducted under a lane closure.

The Contractor shall install all shoulder closures as directed by the typical traffic control standard drawings designated for shoulder closures, and the Engineer. Substitution of the portable plastic drums with oversized cones during nighttime shoulder closures is PROHIBITED.

TYPICAL TRAFFIC CONTROL STANDARD DRAWINGS -

The typical traffic control standard drawings of the “Standard Drawings For Road Construction”, although compliant with the MUTCD, shall take precedence over the MUTCD. The typical traffic control standard drawings of the “Standard Drawings For Road Construction” shall apply to all projects let to contract.

ADDENDUMS**(Addendums to the “2007 Standard Specifications for Highway Construction”)****(A) Construction (Sub-section 601.4) –****Sub-section 601.4.2 Construction Vehicles (paragraph 2) -**

When working within the rights-of-way of access-controlled roadways such as Interstate highways, the Contractor’s vehicles may only change direction of travel at interchanges. These vehicles are prohibited from crossing the roadway from right side to the median or vice versa. Use a flagger to control the Contractor’s vehicles when these vehicles attempt to enter the roadway from a closed lane or the median area. Ensure the flagger does not stop roadway traffic, cause roadway traffic to change lanes, or affect roadway traffic in any manner. The Contractor’s vehicles may not disrupt the normal flow of roadway traffic or enter the travel lane of the roadway until a sufficient gap is present.

The Contractor shall have flaggers available to control all construction vehicles entering or crossing the travel lanes of secondary and primary routes. The RCE shall determine the necessity of these flaggers for control of these construction vehicles. The RCE shall consider sight distance, vertical and horizontal curves of the roadway, prevailing speeds of roadway traffic, frequency of construction vehicles entering or crossing the roadway and other site conditions that may impact the safety of the workers and motorists when determining the necessity of these flaggers. Ensure these flaggers do not stop roadway traffic, cause roadway traffic to change lanes or affect roadway traffic in any manner. The Contractor’s vehicles may not disrupt the normal flow of roadway traffic or enter the travel lane of the roadway until a sufficient gap is present.

When working within the rights-of-way of access-controlled roadways with posted regulatory speed limits of 55 MPH or greater and average daily traffic volumes {ADT} of 10,000 vehicles per day or greater, all construction and work vehicles possessing any one or more of the vehicular characteristics listed below are only permitted to enter and exit a right or left shoulder work area during the presence of active lane closures unless otherwise directed by the RCE. These vehicles are not permitted to enter or exit these work areas without the presence of active lane closures unless otherwise directed by the RCE. Shoulder closures are unacceptable and insufficient methods for control of traffic at ingress / egress areas for these vehicles. The restrictive vehicular characteristics include the following:

- Over six (6) tires
- Tandem rear axles
- A base curb weight greater than 8000 lbs.
- A gross vehicular weight greater than 12000 lbs. unless performing duties as a shadow vehicle while supporting a truck mounted attenuator
- A trailer in tow except under the following conditions:
 - Trailers transporting traffic control devices (including but not limited to standard and 42” oversized traffic cones, portable plastic drums, signs, portable sign supports, u-channel and square steel tube sign posts) relative to the installation of lane closures, shoulder closures or other traffic control operations approved by the RCE
 - Trailer mounted traffic control devices (including but not limited to advance warning arrow panels, changeable message signs, temporary traffic signals, highway advisory radios, work zone intelligent transportation systems and trailer towed truck mounted attenuators)

(B) Construction (Sub-section 601.4) –

Sub-section 601.4.2 Construction Vehicles -

Auxiliary Warning Lights for Vehicles and Equipment -

Supplement all construction and/or construction-related vehicles and equipment that operate in a stationary or mobile work zone within or adjacent to a roadway within the highway rights-of-way with AMBER or YELLOW colored high intensity rotating or strobe type flashing auxiliary warning light devices. Utilize, install, operate and maintain a single or multiple lighting devices as necessary to provide visibility to approaching motorists.

All auxiliary warning light models shall meet *Society of Automotive Engineers (SAE) Class I* standards and SAE Standard J575 relative to *Tests for Motor Vehicle Lighting Devices and Components* and these specifications.

The amber/yellow color of the dome/lens of an auxiliary warning light device shall meet SAE Standard J578 for amber/yellow color specifications.

Auxiliary warning lights with parabolic reflectors that rotate shall rotate around a halogen lamp at a rate to produce approximately 175 flashes per minute. The parabolic reflector shall produce a minimum 80,000 candle power and a minimum 54,000 candela through an SAE Standard J846 approved amber dome.

Equip strobe type flashing auxiliary warning light devices with photosensitive circuit controls to adjust the lighting intensity in response to changes in ambient light conditions such as from day to night. These lights shall have a double-flash capability rated at approximately 80 double flashes per minute and produce a minimum 24 joules of flash energy at the highest power level setting.

Acceptable auxiliary warning light models shall provide sufficient light output to be clearly recognizable at a minimum distance of 1750 feet.

Mount all auxiliary warning light devices intended to function as the auxiliary warning light system or as an element thereof on vehicles and equipment at locations no less than 3 feet above the ground and in conspicuous locations to provide visibility to approaching motorists.

Auxiliary warning light devices and/or models that mount in the locations of the standard vehicle lighting system are unacceptable as the specified auxiliary warning light system due to restrictive simultaneous visibility capabilities from multiple sight angles. However, auxiliary warning light devices that mount in the standard vehicle lighting system locations are acceptable as supplements to the specified lighting devices mounted in locations that do meet the minimum height requirements and provide simultaneous visibility capabilities from multiple sight angles.

Standard vehicle hazard warning lights are only permitted as supplements to the specified auxiliary warning light devices.

(C) General Requirements for Providing and Maintaining Traffic Control Devices in the Work Zone (Section 602) –

Sub-section 602.4 Construction (paragraph 8) -

Mount flat sheet signs straight and level and with the face of the signs perpendicular to the surface of the roadway. This requirement applies to flat sheet signs whether they are portable or have the embedded supports. Mount advance construction signs 2 feet from the edge of a paved shoulder or the

face of a curb, or if no paved shoulder exists, 6 feet to 12 feet from the edge of an adjacent travel lane to the nearest edge of the signs. The mounting height of single signs mounted on ground embedded sign supports is no less than 7 feet or no greater than 8 feet from the bottom edge of the sign to the grade elevation of the near edge of the adjacent travel lane or sidewalk when a sidewalk is present. Any secondary sign on the same assembly has a minimum mounting height of 6 feet from the ground to the bottom edge of the secondary sign. Ensure that signs mounted on portable sign supports, including advance construction signs, regulatory signs, warning signs, etc., have a minimum mounting height of 5 feet from the ground to the bottom edge of the sign. Provide special sign mounting assemblies, when necessary, in areas of double-layered guardrail, concrete median barrier, or bridge parapet walls.

(D) Category I Traffic Control Devices (Section 603) –

Sub-section 603.2.2 Oversized Traffic Cones (paragraph 6) -

Reflectorize each oversized traffic cone with 4 retroreflective bands: 2 orange and 2 white retroreflective bands. Alternate the orange and white retroreflective bands, with the top band always being orange. Make each retroreflective band not less than 6 inches wide. Utilize Type III – Microprismatic retroreflective sheeting for retroreflectorization on all projects let to contract after May 1, 2010 unless otherwise specified. Separate each retroreflective band with not more than a 2-inch non-reflectorized area. Do not splice the retroreflective sheeting to create the 6-inch retroreflective bands. Apply the retroreflective sheeting directly to the cone surface. Do not apply the retroreflective sheeting over a pre-existing layer of retroreflective sheeting.

Sub-section 603.2.3 Portable Plastic Drums (paragraph 3) -

Reflectorize each drum with Type III – Microprismatic retroreflective sheeting: 2 orange and 2 white retroreflective bands, 6 inches wide on all projects let to contract after May 1, 2010 unless otherwise specified. Alternate the orange and white retroreflective bands with the top band always being orange. Ensure that any non-reflectorized area between the orange and white retroreflective bands does not exceed 2 inches. Do not splice the retroreflective sheeting to create the 6-inch retroreflective bands. Apply the retroreflective sheeting directly to the drum surface. Do not apply the retroreflective sheeting over a pre-existing layer of retroreflective sheeting.

(E) Category II Traffic Control Devices (Section 604) –

Sub-section 604.2.1 Type I and Type II Barricades (paragraph 3) -

Reflectorize these barricades with Type VIII or IX Prismatic retroreflective sheeting on all projects let to contract after May 1, 2012 unless otherwise specified. Ensure that the retroreflective sheeting has alternate orange and white stripes sloping downward at a 45-degree angle in the direction of passing traffic. The stripes shall be 6 inches wide.

Sub-section 604.2.2 Type III Barricades (paragraph 3) -

Reflectorize these barricades with Type VIII or IX Prismatic retroreflective sheeting on all projects let to contract after May 1, 2012 unless otherwise specified. Ensure that the retroreflective sheeting has alternate orange and white stripes sloping downward at a 45-degree angle. Apply the sloping orange and white stripes in accordance with the requirements of the Plans, SCDOT Standard Drawings and the MUTCD. The stripes shall be 6 inches wide.

(F) Temporary Concrete Barrier (Sub-section 605.2.3.2) –

Sub-section 605.2.3.2 Temporary Concrete Barrier (paragraph 6) -

Previously used temporary concrete barrier walls are subject to inspection and approval by the RCE before use. Ensure that previously used temporary concrete barrier walls are in good condition. Defects to a temporary concrete barrier wall that may disqualify a section of wall for use include gouges, cracks, chipped, or spalled areas. A defect that exposes reinforcing steel warrants immediate disqualification. A disqualification grade type defect shall consist of measurements in excess of 1 inch, entirely or partially within the boundaries of the end connection areas and the drainage slot areas as illustrated in the “Standard Drawings for Road Construction”, and/or in excess of 4 inches for all areas beyond the end connection areas. To warrant disqualification, these measurements shall exceed the specified dimensions in all three directions, width, height, and depth. A defect that exceeds the specified dimensions in only one or two of the three directions does not warrant disqualification.

Temporary concrete barrier walls with defects less than 6 inches in all three directions, width, height, and depth that do not expose reinforcing steel may be repaired in accordance with the following requirements. Repair is prohibited on temporary concrete barrier walls with defects 6 inches or greater in all three directions, width, height, and depth.

For repair of temporary concrete barrier walls with defects less than 6 inches in all three directions, width, height, and depth that do not expose reinforcing steel, repair the defect with a premanufactured patching material specifically fabricated for patching structural concrete. The strength of the patch must meet or exceed the design strength of the class 3000 concrete of the temporary concrete barrier wall. Perform the repair procedures in accordance with all requirements and instructions from the manufacturer of the patch material. Use a bonding compound between the patch material and the concrete unless specifically stated by the manufacturer that a bonding compound is not required. If the manufacturer states that application of a bonding compound is optional, SCDOT requires application of a bonding compound compatible with the patch material. If cracking occurs within the patched area, remove the patch material completely and repeat the repair process. The contractor shall submit documentation stating all repairs have been conducted in accordance with these requirements prior to installing any temporary concrete barrier walls with repairs. Utilization of temporary concrete barrier walls with repairs shall require approval by the RCE prior to installation.

The Contractor shall submit certification documents for the patch material utilized for repairs to the Engineer prior to placing temporary concrete barrier walls that have been repaired on the project site.

Sub-section 605.2.3.2 Temporary Concrete Barrier (paragraph 5) -

In regard to projects let to contract after January 1, 2017, ALL NCHRP Report 350 compliant temporary concrete barrier walls placed on a project site SHALL comply with the requirements for the recessed approval stamp as directed by the SCDOT Standard Drawings. Those NCHRP Report 350 compliant temporary concrete barrier walls with the original recessed approval stamp that reads “SCDOT 350” will continue to be acceptable on projects let to contract after January 1, 2017. However, those temporary concrete barriers with the “SCDOT 350” identification plate attached to the side of the barrier walls with mechanical anchors previously grandfathered will no longer be acceptable on projects let to contract after January 1, 2017.

(G) Construction Signs (Sub-section 605.4.1.1) –

On all projects relative to **interstate highways** let to contract after January 1, 2016, all signs attached to portable sign supports on and/or adjacent to **interstate highways** shall be rigid. Fabricate each of these rigid signs from an approved aluminum laminate composite rigid sign substrate approved by the Department. Utilization of signs fabricated from roll-up fabric substrates attached to portable sign supports installed on and/or adjacent to **interstate highways** will no longer be acceptable on projects let to contract after January 1, 2016.

ONLY those portable sign supports specified and approved for support of rigid signs fabricated from approved aluminum laminated composite rigid sign substrates and included on the Approved Products List for Traffic Control Devices in Work Zones, latest edition, are acceptable. To facilitate location of acceptable portable sign supports, the listing of portable sign supports is now separated into two (2) sections; “Portable

Sign Supports for Use with Roll-Up Signs ONLY” and “Portable Sign Supports for Use with Roll-Up Sign Substrates and Rigid Sign Substrates”.

The trade names of the approved aluminum laminate composite rigid sign substrates are “Acopan”, “Alpolic”, “Dibond” and “Reynolite”. These rigid sign substrates are restricted to thicknesses no greater than 2 millimeters.

Rigid signs fabricated from standard aluminum sign blanks or any other rigid material other than Acopan, Alpolic, Dibond or Reynolite are PROHIBITED for attachment to portable sign supports. However, rigid signs fabricated from standard 0.080 and 0.100 inches thick aluminum sign blanks will continue to be acceptable for mounting on ground mounted sign supports.

Signs fabricated from roll-up fabric substrates approved by the Department will continue to be acceptable for use on and/or adjacent to secondary and primary roadways unless otherwise directed by the Department.

The minimum mounting height of signs mounted on these portable sign supports shall continue to be 5 feet from the ground to the bottom edge of the sign except where a minimum 7 foot mounting height is required in accordance with the standard specifications, the standard drawings, these special provisions and the MUTCD, latest edition.

(H) Truck-Mounted Attenuator (Sub-section 605.4.2.2) –

Sub-section 605.2.2.2.3.3 Color (paragraph 1) -

Use industrial grade enamel paint for cover of the metal aspects of the unit. Provide and attach supplemental striping to the rear face of the unit with a minimum Type III high intensity retroreflective sheeting unless otherwise directed by the Department. Utilize an alternating 4 to 8 inch black and 4 to 8 inch yellow 45-degree striping pattern that forms an inverted “V” at the center of the unit that slopes down and to the sides of the unit in both directions from the center.

(I) Truck-Mounted Attenuator (Sub-section 605.4.2.2) –

Sub-section 605.4.2.2 Truck-Mounted Attenuators (paragraph 6) -

A direct truck mounted truck mounted attenuator is mounted and attached to brackets or similar devices connected to the frame of a truck with a minimum gross vehicular weight (GVW) of 15,000 pounds (actual weight) unless otherwise directed. A trailer towed truck mounted attenuator is towed from behind and attached via a standard pintle hook / hitch to the frame of a truck with a minimum gross vehicular weight (GVW) of 10,000 pounds (actual weight) unless otherwise directed.

Each truck utilized with a truck mounted attenuator shall comply with the manufacturer’s requirements to ensure proper operation of the attenuator. The minimum gross vehicular weight (GVW) (actual weight) for each truck shall comply with these specifications unless otherwise directed within the “Remarks” column of the *Approved Products List For Traffic Control Devices in Work Zones* in regard to specific requirements for the device in question.

If the addition of supplemental weight to the vehicle as ballast is necessary, contain the material within a structure constructed of steel. Construct this steel structure to have a minimum of four sides and a bottom to contain the ballast material in its entirety. A top is optional. Bolt this structure to the frame of the truck. Utilize a sufficient number of fasteners for attachment of the steel structure to the frame of the truck to ensure the structure will not part from the frame of the truck during an impact upon the attached truck mounted attenuator. Utilize either dry loose sand or steel reinforced concrete for ballast material within the

steel structure to achieve the necessary weight. The ballast material shall remain contained within the confines of the steel structure in its entirety and shall not protrude from the steel structure in any manner.

(J) Trailer-Mounted Changeable Message Signs (Sub-section 606.3.2) -

Sub-section 606.3.2.7 Controller (paragraphs 1-4) -

The controller shall be an electronic unit housed in a weatherproof, rust resistant box with a keyed lock and a light for night operation. Provide the unit with a jack that allows direct communications between the on-board controller and a compatible personal computer. The unit shall have a LCD display screen that allows the operator to review messages prior to displaying the message on the sign.

The controller shall have the capability to store 199 factory preprogrammed messages and up to 199 additional messages created by the user in a manner that does not require a battery to recall the messages. Also, the controller shall allow the operator the capability to program the system to display multiple messages in sequence.

Provide the controller with a selector switch to allow the operator to control the brightness or intensity level of the light source of the sign panel. The selector switch shall include "bright," "dim" and "automatic" modes; inclusion of additional modes is permissible. When the selector switch is in the "automatic" mode, a photosensitive circuit shall control the brightness or intensity level of the light source in response to changes in ambient light such as from day to night and other various sources of ambient light.

Equip each sign with remote communications capabilities, such as utilization of cellular telephone or internet browser technology, to allow the operator to revise or modify the message selection from the office or other remote location. Also, provide protection to prohibit unauthorized access to the controller, (i.e. password protection).

Sub-section 606.5 Measurement (paragraph 2) -

- Trailer-mounted changeable message signs are included in the lump sum item for Traffic Control in accordance with **Subsections 107.12** and **601.5** of the "2007 Standard Specifications for Highway Construction". No separate measurement will be made for trailer-mounted changeable message signs unless the contract includes a specific pay item for trailer-mounted changeable message signs.
- The Contractor shall provide, install, operate, and maintain the trailer-mounted changeable message sign per traffic control set-up as directed by the Plans, the "Standard Drawings for Road Construction", these Special Provisions, the Specifications, and the Engineer.

Sub-section 606.6 Payment (paragraph 2) -

In addition to **Subsections 107.12** and **601.6**, the payment for Traffic Control is full compensation for providing, installing, removing, relocating, operating, and maintaining trailer-mounted advance warning arrow panels and trailer-mounted changeable message signs as specified or directed and includes providing the units' primary power source; repairing or replacing damaged or malfunctioning units within the specified time; providing traffic control necessary for installing, operating, and maintaining the units; and all other materials, labor, hardware, equipment, tools, supplies, transportation, incidentals, and any miscellaneous items necessary to fulfill the requirements of the pay item in accordance with the Plans, the Specifications, and other items of the Contract.

Sub-section 606.6 Payment (paragraph 3) -

Disregard this paragraph unless the Contract includes a specific pay item for trailer-mounted changeable message signs.

(K) Temporary Pavement Markings (Sub-section 609.4.1) -

Sub-section 609.4.1.1.1 Application Requirements General (in addition to paragraph 3) -

On two-lane two-way roadways, apply and place temporary or permanent pavement markings, as specified hereupon, prior to the end of each day's work or shift or reopening a closed travel lane to traffic. These pavement markings shall include 4-inch wide solid lines on edge lines and solid center lines and 4-inch wide by 10 feet long broken lines with a 30-foot gap for broken center lines and lane lines unless otherwise specified. The center line pavement markings shall be either double yellow solid lines, yellow broken lines or an appropriate combination of a yellow solid line and yellow broken lines for passing / no passing zones. Placement of a singular yellow solid line for a center line pavement marking is unacceptable. The edge line pavement markings shall be a white solid line.

On multilane primary and secondary roadways, apply and place temporary or permanent pavement markings, as specified hereupon, to the travel lanes prior to reopening a closed travel lane to traffic. These pavement markings shall include 4-inch wide solid lines, utilized for edge lines and solid center lines, and 4-inch wide by 10 feet long broken lines with a 30-foot gap, utilized for lane lines and turn lanes, unless otherwise specified. The center line pavement markings shall be either double yellow solid lines or an appropriate combination of a yellow solid line and 4-inch wide by 10 feet long yellow broken lines for two-way left turn median areas. The right edge line pavement markings shall be a white solid line and the left edge line shall be a yellow solid line except in areas where the travel lanes separate to create a gore type situation and then the color schemes shall comply with SCDOT application practices for gore areas. The lane lines between travel lanes and turn lanes shall be 4-inch wide by 10 feet long white broken lines with a 30-foot gap.

However, on two-lane two-way and multilane primary and secondary roadways, application of a 4-inch wide solid line utilized for an edge line adjacent to an earth shoulder, white or yellow, may be delayed up to 72 hours after eradication of the original line when the length of eradicated line at a single location is no longer than 250 feet. In the event of multiple locations along the same line, each location must be separated from the adjacent location by no less than 250 feet with a cumulative total distance of eradicated line of no more than 1300 feet within any continuous 1 (one) mile length of roadway measured from a selected location. If the length of eradicated line exceeds 250 feet at any single location, the distance interval between multiple adjacent locations is less than 250 feet or a cumulative total distance of multiple locations of eradicated line exceeds 1300 feet within any continuous 1 (one) mile length of roadway measured from a selected location, replace the eradicated line(s) prior to reopening the adjacent travel lane to traffic.

On interstate roadways, apply and place temporary or permanent pavement markings, as specified hereupon, to the travel lanes prior to reopening a closed travel lane to traffic. These pavement markings shall include 6-inch wide solid lines, utilized for edge lines, and 6-inch wide by 10 feet long white broken lines with a 30-foot gap, utilized for lane lines between travel lanes and auxiliary lanes, unless otherwise specified. The right edge line pavement markings shall be a white solid line and the left edge line shall be a yellow solid line except in areas where the travel lanes separate to create a gore type situation and then the color schemes shall comply with SCDOT application practices for gore areas.

On all roadways, apply and place white stop bars and white triangle yield bars in all locations where previous stop bars and triangle yield bars have been eradicated by the work. Apply and place white stop bars and white triangle yield bars at intersections controlled by stop and yield signs within 72 hours of the eradication of the original pavement marking. Apply and place white stop bars at signalized intersections controlled by traffic control signals and at railroad crossings prior to reopening a closed travel lane to traffic.

Within the limits of existing turn lanes on all roadways, apply and place white arrows in all locations where previous arrows have been eradicated by the work unless otherwise directed by the RCE. Apply and place white arrows within 72 hours of the eradication of the original pavement markings. However, in regard to newly constructed turn lanes, apply and place white arrows the within turn lanes as directed by the RCE.

Within the limits of existing lane-drop sites on all roadways, apply and place white arrows in all locations where previous arrows have been eradicated by the work prior to the end of each day's work or shift or reopening the closed travel lane to traffic. In regard to newly constructed lane-drop sites, apply and

place white arrows within the travel lane to be terminated prior to opening the travel lane to traffic and as directed by the RCE.

(L) Temporary Pavement Markings (Sub-section 609.4.1) –

Sub-section 609.4.1.1 Application Requirements General (Revision to paragraph 8) -

On two-lane, two-way roadways, passing zones may be eliminated within the work zone through application of 4-inch double yellow centerline pavement markings if determined feasible and directed to do so by the Plans and/or the RCE. Apply no passing zone markings as specified by the Plans, the Specifications, the MUTCD and the RCE.

(M) Flagging Operations (Sub-section 610.4.1) –

Sub-section 610.4.1.1 Flagging Operations (paragraph 1) -

Use a flagging operation to control the flow of traffic when two opposing directions of traffic must share a common travel lane. A flagging operation may be necessary during a lane closure on a two-lane two-way roadway, an intermittent ramp closure or an intermittent encroachment of equipment onto a portion of the roadway. Utilize flagging operations to direct traffic around work activities and maintain continuous traffic flow at reduced speeds when determined to be appropriate by the RCE. As stated above, flagging operations shall direct traffic around the work activities and maintain continuous traffic flow, therefore, stopped traffic shall not be required to stop for time durations greater than those listed below unless otherwise directed by the RCE. Begin measurement of the time interval immediately upon the moment the Flagger rotates the Stop/Slow paddle to display the “Stop” condition to the approaching motorists.

LENGTH OF CLOSURE	MAXIMUM TIME DURATION FOR STOPPED TRAFFIC
1 MILE or LESS	5 Minutes
1 to 2 MILES	7 ½ Minutes

If the work activities require traffic to be stopped for periods greater than 5 to 7 ½ minutes as stated above, consider alternate work methods, conducting work activities during times of lowest traffic volumes such as during the hours of darkness or complete road closure with detour installation.

(N) Paving and Resurfacing (Sub-section 611.4.1) –

Sub-section 611.4.1.2 Requirements (paragraph 8) -

Whenever travel lanes with acceptable grade elevation differences are open to traffic, provide “Uneven Lanes” signs (W8-11-48) or “Uneven Pavement” signs (W8-11A-48). Reflectorize these signs with a fluorescent orange colored prismatic retroreflective sheeting unless otherwise specified. Install these signs adjacent to roadways with uneven pavement surfaces between travel lanes or between travel lanes and the adjacent paved shoulders. Install these signs at intervals no greater than 2600 feet.



Final Roadway Geotechnical Engineering Report (RGER) -
Revision 2
SC 160 East from Mimosa Lane to Hensley Road
York County, South Carolina
S&ME Project No. 6235-16-017

PREPARED FOR:

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September 24, 2021



September 24, 2021

STV Incorporated
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Attention: Mr. Thomas Mastillone, P.E.

Reference: **Final Roadway Geotechnical Engineering Report (RGER) – Revision 2**
SC 160 East from Mimosa Lane to Hensley Road
York County, South Carolina
S&ME Project No. 6235-16-017
SCDOT Project ID P029536

Dear Mr. Mastillone:

The purpose of this final roadway geotechnical engineering report (RGER) is to provide information that may be used in design of the roadway embankments and culvert extension along SC Route 160 (Highway 160 East) from 762 feet east of SC 460 (just west of Mimosa Lane) to S-242 (Hensley Road) in York County, South Carolina. Our services were performed in general accordance with the Subcontract for Professional Services between S&ME, Inc. (S&ME) and STV Incorporated (STV) dated December 16, 2016. The attached report presents our understanding of the project requirements and provides our recommendations in general accordance with Chapter 21.4.2 the SCDOT Geotechnical Design Manual (GDM), Version 2.0, January 2019.

Sincerely,

S&ME, Inc.

Nate R. Bradley, P.E.
Project Engineer



Stacie E. Mitchell, P.E.
Project Engineer

Senior Review by: Kristen H. Hill, P.E.





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1.0 Introduction

This report summarizes the results of the geotechnical investigation conducted to date for SC Route 160 (Highway 160 East) from 762 feet east of SC 460 (just west of Mimosa Lane) to S-242 (Hensley Road). The project is located in York County, South Carolina, as shown on the Site Vicinity Plan (Figure 1 in the Appendix). Our scope of work was conducted in two phases, as follows:

- Preliminary Investigation – March 2017
- Final Investigation – December 2020

S&ME's scope of work for the project included:

- Visits to the site by geotechnical personnel,
- Coordinating field exploration activities,
- Performing geotechnical subsurface investigations,
- Conducting laboratory testing,
- Reviewing available geologic and geotechnical-related data,
- Conducting geotechnical analyses,
- Preparing this report (RGER) which presents the results of our analyses and our geotechnical recommendations for the planned roadway embankments and non-bridge structure foundations.

2.0 Project Description

The proposed construction for this project includes widening of the existing SC 160 (Highway 160 East) roadway from 762 feet east of SC 460 (just west of Mimosa Lane) to S-242 (Hensley Road) in York County, South Carolina. Proposed improvements to this alignment include widening the existing roadway from SC 160 Station 70+50 to Station 97+10. The road will remain one travel lane in each direction but will be widened to accommodate a new median/or center turn lane. The project will also include a culvert extension at approximately Sta. 96+00. Improvements will be made to Mimosa Lane from Station 47+00 to 49+78, Kings Court from Station 47+00 to 49+76, and Sleepy Hollow Road from Station 47+50 to 49+71, including widening and/or minor realignment of these three roadways near their intersections with SC 160.

2.1 Existing Conditions

The existing SC 160 roadway in the project area consists of one, roughly eleven-foot wide travel lane in each direction.

From the beginning of the project near Mimosa Lane to Sleepy Hollow Road, the existing roadway embankments are generally grass-covered, and generally appear to consist of slopes ranging from roughly 2H:1V or flatter, sloping up and down to the edge of the new right-of-way. Existing residential and commercial properties are located along both sides of the road. Surface conditions along this portion of the project consist of a mix of

Final Roadway Geotechnical Engineering Report (RGER) – Revision 2

SC 160 East from Mimosa Lane to Hensley Road

York County, South Carolina

S&ME Project No. 6235-16-017

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grass-covered areas and wooded areas. Various underground and overhead utilities are present along the roadway.

From Sleepy Hollow Road to the end of the project at Hensley Road, the existing roadway embankments are generally wooded or grass-covered, and generally appear to consist of slopes ranging from roughly 1.7H:1V or flatter, sloping up and down to the edge of the new right-of-way. An existing slope on the order of 30 feet tall is present along a portion of the northern side of the road. The area beyond the toe of this slope is relatively low-lying and flat and appears to be the edge of the floodplain of Sugar Creek, which flows generally from north to south just east of the project area. Standing water was observed at the existing ground surface in this area at the time of our preliminary exploration. An existing culvert conveys a drainage feature under the road near Station 96+00, and the existing slopes of the roadway embankment over the culvert area are on the order of 20 feet tall. Property on both sides of the road is generally undeveloped, except for one residential property on the southern side of the road near Sleepy Hollow Road. Surface conditions along this portion of the project generally consist of wooded and brush-covered areas. Various underground and overhead utilities are present along the roadway.

2.2 Planned Development

From our review of the plan, profile and cross section sheets contained in the Proposed Plans for York County, South Carolina S.C. Route 160 (Highway 160 E) From 762 feet East of SC 460 to S-242, prepared by STV Incorporated, dated November 10, 2020, the proposed widened roadway will generally consist of one fourteen-foot wide travel lane in each direction as well as a fifteen-foot wide median/or center turn lane. The proposed centerline will follow the centerline of the existing road, and the existing road will be widened on both sides. Grades will generally be raised along Mimosa Lane, Kings Court, and Sleepy Hollow Road close to where they intersect with SC 160 to match proposed grades along SC 160. Proposed slopes along the project will be 2H:1V or flatter.

Based on our review of the provided plans, proposed profile grades for SC 160 will generally closely follow the existing profile grades, and proposed grades will be within approximately 1 to 2 feet of the existing grades along the centerline. Grading is planned at various locations along the SC 160 alignment for shoulders and drainage ditches, with cuts and fills generally on the order of 7 feet or less along most of the alignment. From approximately SC 160 Station 92+00 to 93+50, a sliver fill is proposed to raise grades up to approximately 10 feet along the existing slope (on the order of 30 feet tall) left of centerline. The proposed slope will have an inclination of 2H:1V. From approximately SC 160 Station 94+50 to 96+00, a sliver fill is proposed to raise grades up to approximately 7 feet along the existing slope (on the order of 20 feet tall) right of centerline. The proposed slope will have an inclination ranging from 4H:1V to 2H:1V.

Proposed profile grades for Mimosa Lane, Kings Court, and Sleepy Hollow Road will be raised generally 1 to 5 feet along their centerlines. Grading is planned along these alignments for shoulders and drainage ditches, with cuts and fills generally on the order of 5 feet or less.



3.0 Subsurface Exploration and Laboratory Testing

Representatives of S&ME were present for on-site field activities in March 2017 during the preliminary investigation, and again in December 2020 during the final investigation, to conduct the following testing:

- Eight (8) Standard Penetration Test (SPT) borings (B-1 through B-8)
- Five (5) hand auger borings (HA-1, HA-2, HA-3, HA-101, and HA-102)
- Two (2) bulk samples at selected boring locations (B-4 and HA-101)

The approximate test locations are shown on the Boring Location Plans (Figures 2 through 4) in the Appendix. Boring numbers, station, offset, elevation, and depth are shown in Table 3-1. Termination depths for the SPT borings ranged from 9.2 feet to 89.4 feet below the existing ground surface. Termination depths for the hand auger borings ranged from 4.5 to 10 feet below the existing ground surface. Borings were advanced by a truck mounted CME 550X-drill rig using hollow-stem auger techniques. The borings were backfilled with auger cuttings at completion of drilling activities. Asphalt cold patch was placed in the upper portion of the SPT borings performed in the existing roadway to match existing roadway grades. Detailed graphical logs which describe the conditions and results at each test location are presented in the Appendix.

The elevation, station and offset, northing, and easting shown in Table 3-1 and/or on the logs should be considered approximate. This information was obtained from Microstation files provided by STV. SPT hammer energy measurements were previously performed with a Pile Driving Analyzer (PDA) on the drill rig used to perform the borings. The N-values indicated on the logs are field values and were not corrected for overburden stress, rod length, borehole diameter, or hammer efficiency. Hammer energy ratios are provided on the individual soil test boring records.



Table 3-1 - Summary of Test Locations

Test ID	Station	Offset (ft)	Surface Elevation (ft)	Depth (ft)
B-1	67+09	CL	624.4	20
B-2	72+18	8 RT	617.1	20
B-3	77+10	23 LT	594.7	20
B-4	82+10	7 RT	577.2	20
B-5	87+10	6 LT	562.4	20
B-6	92+10	9 RT	536.8	89.4
B-7	96+28	15 LT	521.8	18.7
B-8	96+46	50 RT	521.5	9.2
HA-1	92+25	88 LT	508.2	10
HA-2	93+25	86 LT	500.7	4.5
HA-3	95+66	68 RT	502.2	6.5
HA-101	91+48	46 RT	546.6	10
HA-102	95+65	60 RT	502.4	6

S&ME performed the following laboratory tests on recovered split-spoon, bag, and bulk samples to help classify the soils and formulate our conclusions and recommendations.

Table 3-2 – Summary of Laboratory Testing

Test Type	Quantity
Atterberg Limits	8
Grain Size Analysis	8
Natural Moisture Content	15
Standard Proctor	2
California Bearing Ratio	1
Consolidated-Undrained Triaxial Shear Test	1

A summary table of the laboratory test results as well as the individual laboratory test data sheets are included in the Appendix. The laboratory test methods used are indicated on the individual data sheets.



4.0 Subsurface Conditions

4.1 Area Geology

The site is located within the Charlotte Belt of the Piedmont Physiographic Province of South Carolina. The Piedmont Province generally consists of well-rounded hills and ridges, which are dissected by a well-developed system of draws and streams. The Piedmont Province is predominantly underlain by metamorphic rock (formed by heat, pressure and/or chemical action) and igneous rock (formed directly from molten material), which were initially formed during the Precambrian and Paleozoic eras. The volcanic and sedimentary rocks deposited in the Piedmont Province during the Precambrian eras were the host for the metamorphism and were changed to gneiss and schist. The more recent Paleozoic era had periods of igneous emplacement, with at least several episodes of regional metamorphism resulting in the majority of the rock types seen today.

The topography and relief of the Piedmont Province have developed from differential weathering of the igneous and metamorphic bedrock. Because of the continued chemical and physical weathering, the rocks in the Piedmont Province are now generally covered with a mantle of soil that has weathered in place from the parent bedrock. These soils have variable thicknesses and are referred to as residuum or residual soils, which are typically finer grained and have a higher clay content near the surface because of the advanced weathering. Similarly, the soils typically become coarse grained with increasing depth because of decreased weathering. As the degree of weathering decreases, the residual soils generally retain the overall appearance, texture, gradation and foliations of the parent rock.

The boundary between soil and rock in the Piedmont is not sharply defined. A transitional zone termed "Partially Weathered Rock" (PWR) is defined for engineering purposes as residual material with Standard Penetration Resistances (N-values) exceeding 100 blows per foot. The transition between hard/dense residual soils and PWR occurs at irregular depths due to variations in degree of weathering.

Water is typically present in the residual soils and within fractures in the PWR or underlying bedrock in the Piedmont. On upland ridges in the Piedmont, water may or may not be present in the residual soils above the PWR and bedrock. Alluvial soils, which have been transported and deposited by water, are typically found in floodplains and are generally saturated to within a few feet of the ground surface. Fluctuations in water levels are typical in residual soils and PWR in the Piedmont, depending on variations in precipitation, evaporation and surface water runoff. Seasonal high water levels are expected to occur during or just after the typically wetter months of the year (November through April).

4.2 Soil and Rock Stratification

The soils encountered by the borings generally consisted of surficial pavement or topsoil, alluvial soils, fill soils, residual soils, Partially Weathered Rock (PWR), and auger refusal material. The thickness of and depth to the subsurface layers varied in the borings along the alignment. The boring logs should be referenced for details of subsurface conditions at specific locations.



4.2.1 *Surface Materials*

Surface materials penetrated by the borings performed within the existing roadway (B-1, B-2, B-4, B-5, B-6, B-7) consisted of asphalt pavement. Asphalt pavement thickness was on the order of 6.5 to 15 inches, and sand base course or sand clay base course materials encountered underlying the existing pavement were on the order of 6 to 11 inches thick. Surface materials penetrated by the borings performed outside the existing roadway (B-3, B-8, HA-1, HA-2, HA-3, HA-101, HA-102) consisted of topsoil. Topsoil thicknesses encountered by the borings were on the order of 2 to 7 inches.

4.2.2 *Alluvium*

Alluvial soils were encountered in borings HA-1, HA-2, HA-3, and HA-102 to their termination depths of 4.5 to 10 feet (approximate elevations ranging from 508.2 feet to 495.7 feet). HA-1 and HA-2 were performed in the relatively low-lying and flat area that appears to be the edge of the floodplain of Sugar Creek. HA-3 and HA-102 were performed in the footprint of the proposed culvert extension. The alluvial soils encountered consisted of silty sand (USCS Classification SM / AASHTO Classification A-2-4 and A-2-5), clayey sand (SC / A-6 and A-2-6), and silty clay (CH / A-7-6). DCP values ranged from 2 to 25 blows per 1 ¾ inches. Hand auger refusal was encountered at a depth of 6 feet in boring HA-102 (approximate elevation of 496.4 feet). Hand auger refusal is a designation applied to material having a resistance greater than the penetrating capacity of the drilling equipment. Hand auger refusal can result from PWR, boulders, rock seams, the upper surface of sound continuous rock, or moderate to high consistency / relative density soils.

4.2.3 *Fill Soils*

Fill soils were encountered in borings B-1 through B-8 to depths of 2 to 12 feet (approximate elevations ranging from 622.6 feet to 509.8 feet). The fill soils encountered consisted of sandy clay (CL / A-6 and A-7-6), silty clay (CH / A-7-6), clayey silt (MH / A-7-5) and clayey sand (SC / A-2-6 and A-6). SPT N-values in the fill soils primarily ranged from 2 to 21 blows per foot, but N-values of 50 blows in 0.1 feet were recorded in some of the fill soils in boring B-8.

4.2.4 *Residual Soils*

Residual soils were encountered in borings B-1 through B-8 to depths of 10 to 42 feet (approximate elevations ranging from 621.4 feet to 494.8 feet). The residual soils encountered consisted of silty clay (CH), sandy clay (CL / A-6 and A-4), clayey silt and elastic silt (MH / A-7-5), sandy silt (ML / A-4 and A-7-5), clayey sand (SC / A-7-6), and silty sand (SM / A-4 and A-2-4). SPT N-values in the residual soils ranged from 6 to 28 blows per foot. DCP values ranged from 7 to 25 blows per 1 ¾ inches. Borings B-1 through B-5 and HA-101 were terminated in residual soils.

4.2.5 *Partially Weathered Rock (PWR)*

PWR was first encountered at 42 feet in boring B-6 (approximate elevation 494.8 feet), and at 12 feet in boring B-7 (approximate elevation of 509.8 feet). The PWR, when sampled, consisted of silty sand (SM / A-2-4). Boring B-6 was terminated in PWR at a depth of 89.4 feet, and boring B-7 was terminated in PWR at a depth of 18.7 feet.



4.2.6 *Auger Refusal Material*

Auger refusal was encountered at a depth of 9.2 feet in boring B-8 (approximate elevation of 512.3 feet). In addition, boulders were observed near the ground surface in the vicinity of boring B-8. Refusal is a designation applied to material having a resistance greater than the penetrating capacity of the drilling equipment. Refusal can result from PWR, boulders, rock seams, or the upper surface of sound continuous rock. Core drilling procedures are required to determine the characteristics and continuity of the materials below the level of auger refusal.

4.2.7 *Ground Water*

Ground water was encountered at 37 feet below the existing ground surface (approximate elevation of 499.8 feet) in boring B-6, and at depths ranging from 3.7 to 9 feet below the existing ground surface (approximate elevations ranging from 499.2 feet to 496.7 feet) in borings HA-1, HA-2, HA-3, and HA-102. Ground water was not encountered in the remaining borings at completion of drilling activities.

5.0 Seismic Considerations

As described in the GDM, evaluation of performance under the EEI or EEII limit states is not required for roadway embankments. In addition, there are no proposed bridges or earth retaining structures (ERS) within the project limits. Therefore, evaluation of performance under the EEI or EEII limit states is not required for this project.

6.0 Roadway Embankments

The following paragraphs include recommendations for site preparation, fill placement and compaction, and design and construction of embankments. If the construction scope is altered, the proposed embankment locations are changed, or if conditions are encountered during construction that differ from those encountered by the soil test borings, S&ME, Inc. should be retained to review these recommendations based upon the new information and make any necessary changes.

6.1 Slope Stability Analyses

Based on Section 17.1 of the GDM, embankments with heights of 10 feet or less and slopes 2H:1V or flatter do not require analysis. Most of the proposed embankment heights for this project are 10 feet or less. As previously mentioned, from approximately SC 160 Station 92+00 to 93+50, a sliver fill is proposed to raise grades up to approximately 10 feet along the existing slope (on the order of 30 feet tall) left of centerline. The proposed slope will have an inclination of 2H:1V. From approximately SC 160 Station 94+50 to 96+00, a sliver fill is proposed to raise grades up to approximately 7 feet along the existing slope (on the order of 20 feet tall) right of centerline. The proposed slope will have an inclination ranging from 4H:1V to 2H:1V. Slope stability analyses were conducted on representative cross sections for these two areas. Analyses were performed in general accordance with Chapter 17 of the GDM.



Slope stability analyses were performed using the computer program SLIDE Version 9 and Spencer circular and non-circular shear surfaces to find the critical shear surface. Slope stability analysis outputs for the roadway embankments are attached in the Appendix.

6.1.1 Service Limit State

Soil test boring and laboratory testing results were incorporated into the soil parameters assumed for our service limit state analyses. Soil parameters assumed in global stability computations are included on the analysis outputs in the Appendix. Our service limit state analyses considered the short-term (end-of-construction) condition as well as the long-term condition as defined in the GDM.

Soil parameters for the proposed embankment fill were conservatively estimated using the SCDOT *Borrow Materials Database Spreadsheet*, Version 2.0, dated December 6, 2018 for York County, assuming typical Upstate residual type soils and peak effective shear strengths. It was assumed that pore pressures induced by fill placement would have time to dissipate in the new fill soils. From our analyses, we provide the following results:

Table 6-1 – Stability Analysis

Alignment	Approximate Station	Slope (H:V)	Type	Approximate Height (feet)	Loading Condition	Resistance Factor (computed)	Resistance Factor (required)
SC 160	93+00 LT	2:1	Fill Slope	29	Short-term	0.90	≤ 0.90
					Long-term	0.75	≤ 0.75
SC 160	95+50 RT	2:1	Fill Slope	17	Short-term	0.75	≤ 0.90
					Long-term	0.75	≤ 0.75

From the above-summarized results, the computed resistance factors do not exceed the maximum resistance factor for roadway embankment in Table 9-5 of the GDM.

6.2 Settlement Analysis

Relatively little fill placement (10± feet or less) is expected over a majority of the SC 160, Mimosa Lane, Kings Court, and Sleepy Hollow Road alignments. In these areas, elastic compression and most consolidation settlements are expected to occur during embankment construction. As a result, post-construction settlement of the embankments is anticipated to be minor and within GDM performance limits. The exception is the sliver fill proposed from approximately SC 160 Station 92+00 to 93+50.

6.2.1 SC 160 Station 92+00 to 93+50

Settlement analysis of the sliver fill proposed from approximately SC 160 Station 92+00 to 93+50 was performed using the computer program Settle3 version 5. Plans are to raise grades up to approximately 10 feet along the existing slope in this area. Soil test boring and laboratory testing results were incorporated into the soil



parameters for our analysis. The settlement model was developed assuming that the undercut detailed in the Recommended Plan Notes section of this report is backfilled with 57 Stone.

Results of the analysis indicate maximum total settlement is computed to be on the order of 1 inch or less in the foundation soils due to placement of the new fill. Settlement within the new fill under its own weight is estimated to be approximately 1 inch. Therefore, maximum total settlement of the sliver fill is anticipated to be 2 inches or less. Most of the settlement is anticipated to occur progressively as the sliver fill is being constructed. Based on the results of the analysis, post-construction settlements are anticipated to be on the order of ¼ inch and are anticipated to occur within approximately 1 month after the end of fill placement. Results of the settlement analyses are presented on the Settle3 output figures provided in the Appendix.

Settlement resulting from placement of the sliver fill was compared to performance limits provided in Tables 10-12 and 10-13 of the GDM. From our analyses, we provide the following results:

Table 6-2 – Settlement versus Performance Limits

Location	EV-01A Settlement During Construction (inches)	EV-01B Total Post- Construction Settlement (inches)	EV-03 Longitudinal Differential Settlement (inches/50-ft)	EV-04 Transverse Differential Settlement (inches/5-ft)
Criteria	No Limit	3	1	0.2
Embankment Widening SC 160 Sta. 93+00 LT Slope	1.6	< 1	< 1	< 0.2

From the above-summarized results, the computed vertical settlements will be less than performance limits of Tables 10-12 and 10-13 of the GDM.

Computations show that there need be no requirement for surcharging or wait periods following fill placement to meet the objectives of the GDM. This assumes construction of the fill in accordance with SCDOT standard specifications for earthwork. Geotechnical instrumentation such as settlement plates will not be required.

7.0 Non-Bridge Structure Foundations

As previously mentioned, the project will include a culvert extension at approximately Sta. 96+00. The existing 5-foot by 5-foot reinforced concrete box culvert located along SC 160 at approximate Station 96+00 will be extended in one direction, to the right of the SC 160 centerline. The culvert extension will have an upstream invert elevation of 502.39 feet and will have a downstream invert elevation of approximately 502.3 feet (where it connects to the existing culvert) based on the proposed invert slope of 0.77% and the proposed culvert extension



length of 14.5 feet. We have assumed that a minimum of 18 inches of #57 Stone will be placed under the culvert extension.

7.1 Culvert Extension Recommendations

As previously mentioned, hand auger borings HA-3 and HA-102 were performed in the footprint of the proposed culvert extension. Culvert extension bearing soils encountered in our hand auger borings consisted of very loose to loose alluvial soils. Groundwater was encountered at depths of 5.5 and 3.7 feet below the existing ground surface (approximate elevations of 496.7 feet and 498.7 feet, respectively) in borings HA-3 and HA-102. Hand auger refusal was encountered at a depth of 6 feet in boring HA-102 (approximate elevation of 496.4 feet). Hand auger refusal is a designation applied to material having a resistance greater than the penetrating capacity of the drilling equipment. Hand auger refusal can result from PWR, boulders, rock seams, the upper surface of sound continuous rock, or moderate to high consistency / relative density soils. For purposes of our analysis, we have assumed that the hand auger refusal material is medium dense/very stiff residual soils. Very loose to loose alluvial soils should be mucked out where they occur below the culvert extension and associated embankment widening. The undercut excavations should be backfilled with 57 Stone. Based on this undercutting and backfill material, design recommendations for the culvert extension have been developed and are included in the following sections.

7.1.1 Bearing Resistance

Based on the stratigraphy encountered in the borings performed at the culvert extension and the assumed undercutting and backfill material, recommended maximum values of nominal (q_n) and factored (q_R) bearing resistance at the strength and extreme limit states for the culvert are presented in the table below. The culvert extension located at Station 96+00 RT will bear at least 7 feet below proposed grades.



Table 7-1 – Bearing Resistance for Culvert

Structure	Offset (ft)	Approximate Bearing Elevation (ft)	Bearing Material	Limit State	Nominal Bearing Resistance, q_n (ksf)	Factored Bearing Resistance, q_R (ksf)
96+00 5'x5' Box Culvert Extension	RT	501.3 to 501.4	57 Stone backfill overlying medium dense alluvial soils and/or assumed medium dense/very stiff residual soils	Strength	13.4	6.0
				Extreme	8.0	8.0

Note: Resistance Factor (ϕ) used for Strength and Extreme Limit States are 0.45 and 1.00, respectively. (Table 9-1, Chapter 9 of the SCDOT GDM)

7.1.2 Settlement Potential

As previously mentioned, from approximately SC 160 Station 94+50 to 96+00, a sliver fill is proposed to raise grades up to approximately 7 feet along the existing slope (on the order of 20 feet tall) right of centerline. This sliver fill will be constructed over the top of the proposed culvert extension. Total settlements anticipated for the culvert extension range from about 0.35 inches near the upstream invert of the extension (near the proposed embankment toe), up to about 0.5 inches along the length of the culvert extension, and about 0.4 inches at the point where the extension connects to the existing culvert. Differential settlement inferred from these values are approximately 1/10 of an inch over a distance of approximately 6 feet and approximately 0.15 inches over a distance of approximately 8 feet, resulting in angular distortions of the culvert extensions of approximately 1/700 and 1/600, respectively. Settlements are anticipated to occur during construction of the extensions and embankment widening.

Very loose to loose and very soft to soft soils should be mucked out where they are encountered below the culvert extension.

Based on Section 10.1 of the GDM, “no performance objectives or limits have been established for hydraulic structures (i.e., culverts and pipes). The acceptable performance of a hydraulic structure is based on the integrity of the structure and the ability of the structure to continue to function as designed (i.e., convey water from one side of the embankment to the other). Therefore, the GEOR shall report anticipated deformations (i.e., total and differential settlement, etc.) to both the SEOR as well as the HEOR. It is the responsibility of these designers (i.e., SEOR and HEOR) to determine if the hydraulic structure will perform as designed given the anticipated deformations.”

7.1.3 Sliding Resistance

The factored resistance against failure by sliding (R_R) should be determined using Eq. 10.6.3.4-1 of the current AASHTO LRFD Bridge Design Specifications.



For headwall foundations bearing 2 feet or more below final grades on 57 Stone backfill, the nominal sliding resistance (R_t) between the 57 Stone and the shallow spread culvert headwall foundation should be taken as the total vertical force (V) acting on the foundation multiplied by the recommended coefficient of friction ($\tan \delta$). For the Station 96+00 culvert inlet headwall, $\tan \delta$ is recommended to be 0.78. If the headwalls are precast concrete units, the factored sliding resistance may then be determined by applying a resistance factor of 0.8 to the nominal value for shearing between the footing and 57 Stone.

8.0 Earthwork Considerations

We assume the roadway embankments and cut slopes will be constructed in general conformance with the SCDOT Standard Specifications for Highway Construction, 2007 edition, Division 200. Soils excavated during planned grading activities are Unclassified Excavation unless considered muck or rock excavation as described in Section 203.

8.1 Excavations

As previously mentioned, hand auger refusal was encountered at a depth of 6 feet in boring HA-102 (approximate elevation of 496.4 feet). Hand auger refusal is a designation applied to material having a resistance greater than the penetrating capacity of the drilling equipment. Hand auger refusal can result from PWR, boulders, rock seams, the upper surface of sound continuous rock, or moderate to high consistency / relative density soils. PWR was first encountered at 42 feet depth in boring B-6 (approximate elevation 494.8 feet), and at 12 feet depth in boring B-7 (approximate elevation of 509.8 feet). Auger refusal was encountered at a depth of 9.2 feet in boring B-8 (approximate elevation of 512.3 feet). In addition, boulders were observed near the ground surface in the vicinity of boring B-8. Refusal is a designation applied to material having a resistance greater than the penetrating capacity of the drilling equipment. Refusal can result from PWR, boulders, rock seams, or the upper surface of sound continuous rock. Based on the borings and the culvert extension invert elevations, excavation into PWR and/or rock could be required during construction of the culvert extension.

Excavatable PWR is defined as material that can be excavated using traditional equipment by first loosening with a single tooth ripper attached to a suitable sized dozer, such as a Caterpillar D-8 or D-9, or suitable sized trackhoe such as a Caterpillar C320 equipped with a rock bucket with a curling force of 18,300 pounds or greater.

Jack hammering or blasting may be required for PWR in trench excavations, below the upper 2-4 feet of PWR in open excavations, and for rock in both open site (greater than 10 feet wide and 30 feet long) and trench excavations. We anticipate blasting will not be allowed due to the close proximity of the existing roadway.

Jack hammering or blasting of rock may result in an uneven rock surface in the bottom of trench excavations and a subsequent point load condition on the culvert. If dissimilar bearing conditions exist in excavations, we recommend that those conditions be evaluated on a case-by-case basis. To provide a uniform bearing surface and reduce the potential for point loading, over-excavation below the bearing elevation and replacement with properly compacted low-plasticity granular soil, crushed stone, or lean concrete may be required.



The depth to, and thickness of, PWR, rock lenses or seams and bedrock, can vary dramatically in short distances and between boring locations; therefore, PWR, boulders or bedrock may be encountered during any excavation on this project.

8.2 Fill Soil Considerations

Borrow materials shall meet the requirements of subsection 203.2.1.8 of the Standard Specifications for York County.

The fill soil material properties used in slope stability analyses are provided in the table below:

Table 8-1 – Fill Material Properties Table

Soil Property	Value Used in Analysis
Effective Friction Angle, ϕ'	30°
Effective Cohesion, c'	0
Total Unit Weight, γ	120 pcf

8.3 Surface Preparation of Embankments

Embankments planned along existing embankment fills widened to accommodate the planned roadway alignment sections will require preparation as described by the SCDOT standard specifications:

1. Clearing and Grubbing - Before starting embankment construction, clear and grub the embankment area according to Section 201 and install Drainage Structures according to the standard specifications.
2. Depressions and Undercut Areas - Fill depressions below the ground surface and undercut areas with suitable material. Remove unsuitable or unstable material and compact new fill according to Subsection 205.4.6 before beginning embankment construction.
3. Scarification and Other Preparation - Plow and scarify the entire area upon which the embankment is to be placed (except inundated areas) at least 6 in deep.
4. Benching and Compaction of the Subgrade - Before placing the embankment, re-compact loosened soil to the approximate density of the underlying soil. Cut benches as specified in Subsection 205.4.4.
5. Compaction Under Shallow Fills - When the depth of fill and surfacing is 3 feet (1 m) or less, compact the original subgrade at least 1 foot deep to at least 95 percent of the maximum laboratory dry density as determined from representative samples of the compacted material. The in-place density of the compacted fill will be determined according to nuclear gage at random intervals.
6. Embankment Construction - Construct embankments in general accordance with specifications for materials, equipment, measurement, and payment provided in Section 205.



8.4 Shoulders and Slopes

Materials placed at the surface of shoulders and slopes may consist of materials removed from stockpiled soils stripped from within the right-of-way or from areas of roadway and drainage excavation. This may include friable materials capable of growing grass that resist erosion when compacted.

Due to the planned benching of the existing embankment slopes, existing subsurface utilities present along the existing alignment may be encountered. Existing utility lines located within right-of way and proposed excavation depths should be removed or plugged and relocated.

8.5 Muck Excavation

For the two slope areas for which slope stability analyses were performed, the area lying between the existing slope toe and the proposed slope toe should be undercut to firm materials to provide a shear key at the base of the slope. Based on our exploration, existing soils beyond the toe of the existing slopes will be near the encountered groundwater table and will likely consist of very loose to loose, wet alluvial soils, and standing water may be present at the existing ground surface. The proposed culvert extension is in the area of one of these slopes, and similar conditions are anticipated in the culvert extension area. Very loose to loose alluvial soils should be mucked out where they occur below the culvert extension and associated embankment widening. These soils are unstable and may be difficult for conventional grading equipment to traverse without improvement. The contractor shall be prepared to provide equipment and perform temporary dewatering during construction.

Mucking and stabilization of these soils is required prior to placement of new embankment fill for the widened sections. Areas that are anticipated to require mucking and stabilization are outlined in the Recommended Plan Notes section below. The extent of undercutting or mucking will be dependent upon the prevailing weather conditions and the condition of the subgrade at the time of construction. Actual areas along the planned alignments requiring undercut or mucking are best determined in the field at the time of construction with joint consultation between the RCE and the Contractor.

8.6 Erosion

The slopes of the new embankments and cut locations will be susceptible to erosion during rainfall events. Construction operations should be performed in a manner consistent with good erosion control practices that minimize soil erosion as described in Subsections 205.4.1, 205.4.1.2, and 205.4.7 of SCDOT Standard Specifications for Highway Construction, 2007 edition. We recommend diverting surface water runoff of slopes by use of berms along the crest and temporary drainage piping. We recommend the slopes be seeded and grassed as soon as practical to minimize the effects of erosion.

8.7 Crossline Reinforced Concrete Pipes

One new crossline stormwater pipe is indicated on the plans. Installation of permanent pipe culverts is typically carried out in accordance with the plans and SCDOT supplemental technical specification SC-M-714 (01/21). Table 8-2 below provides a summary of planned crossline pipes and provides details of pipe location, size, and



length as indicated by the cross sections. Table 8-2 also highlights pipe locations that either could require undercut and replacement of bearing soils, or where subsurface water or very dense soils were found near the pipe invert and may require ground water control or special excavation to install.

Table 8-2 – Summary of Crossline Pipes

Pipe Details	Station	Approx. Length	Comments
24" SWP (NP050)	83+80	84 feet	Boring B-4 suggests stiff to very stiff clayey residual soils near pipe invert elevations

The planned crossline pipes will be installed in areas of the roadway embankment that require little to no fill to reach planned grade. Therefore, settlement is not considered an issue at these locations.

8.8 Vibration Monitoring Assessment

An earth-borne vibration monitoring evaluation was conducted following the guidelines in Section 24.5.8 of the GDM version 2.0. It is anticipated that earth-borne vibrations during construction of the roadway widening will be generated from vibratory compaction of earth fill. The locations of potential receptors in the vicinity of the project were initially screened based on the distances in Table 24-6 of the GDM.

Initial screening based on review of available on-line aerial imagery did not indicate the presence of sensitive structures, hospitals, extremely fragile historic buildings, ancient monuments, ruins, or other historic or old buildings within the specified distances of the project limits as noted in Table 24-6 of the GDM.

However, initial screening did indicate the presence of multiple older residential structures, newer residential structures, and engineered structures (modern industrial/commercial buildings) within the specified distances (250 feet and 150 feet, respectively) of the project limits noted in Table 24-6 of the GDM. These structures are located within the specified distances of the roadway construction limits. The nearest residential and commercial structures of concern include the following:

- Residential Structure: the 2-car garage associated with the residence located on Tract 13 at 1424 Highway 160 E. This structure is located approximately 3 feet from potential vibratory compaction activities that may occur during construction along Mimosa Lane. The estimated peak particle velocity (PPV) is 3.31 inches per second (ips). The Maximum Allowable PPV value presented in GDM Table 24-4 for a newer residential structure is 0.50 ips.
- Commercial Structure: the auto repair shop at the gas station on Tract 14 at 1429 Highway 160 E. This structure is located approximately 11 feet from potential vibratory compaction activities that may occur during construction along Highway 160 E. The estimated PPV is 0.61 ips. The Maximum Allowable PPV value presented in GDM Table 24-4 for a commercial structure is 0.50 ips.
- Residential Structure: the garage associated with the residence located on Tract 31 at 1548 Highway 160 E. This structure is located approximately 21 feet from potential vibratory compaction activities that may occur during construction along Highway 160 E. The estimated PPV is 0.26 ips. The Maximum Allowable PPV value presented in GDM Table 24-4 for an older residential structure is 0.30 ips.



- Residential Structure: the residence on Tract 38 at 1581 Highway 160 E. This structure is located approximately 33 feet from potential vibratory compaction activities that may occur during construction along Highway 160 E. The estimated PPV is 0.15 ips. The Maximum Allowable PPV value presented in GDM Table 24-4 for an older residential structure is 0.30 ips.

The peak particle velocity (PPV) for a vibratory roller was estimated for the distances noted above for the residential and commercial structures using Equation 24-4 of the GDM. For the purposes of this estimate, the value of “n” in Equation 24-4 was selected from Table 24-2 assuming “Soil Class II Competent Soils” resulting in a value of 1.3. The reference PPV (PPV_{REF}) in Equation 24-4, was selected from Table 24-3 as 0.21 inches per second for a vibratory roller. PPV calculations are included in the Appendix. As indicated above, the estimated PPV values are above the Maximum Allowable PPV values presented in GDM Table 24-4 for the 2-car garage on Tract 13 and the auto repair shop on Tract 14.

In addition, multiple other nearby residential and commercial structures (including but not limited to the garage on Tract 31 and the residence on Tract 38 mentioned above) are generally within approximately 20 to 50 feet of potential vibratory compaction activities, and using the same assumptions discussed above, estimated PPV values ranging from 0.28 to 0.09 inches per second are obtained. Although these values are below the Maximum Allowable PPV values presented in GDM Table 24-4 (0.30 inches per second for older residential structures, 0.50 inches per second for newer residential structures, and 0.50 inches per second for commercial structures), these values are in the range of what is considered “strongly perceptible” to “severe” human response based on GDM Table 24-5.

York County has elected to not monitor the site; therefore, no Earth-borne vibration monitoring is required. A plan note is included in the following section.

9.0 Recommended Plan Notes

Place the following notes on the Roadway Plans.

Embankments

Cut benches as specified in Subsection 205.4.4.

Based on the borings and the culvert extension invert elevations, excavation into PWR and/or rock could be required during construction of the culvert extension.

Borrow Materials

Borrow materials shall meet the requirements of subsection 203.2.1.8 of the Standard Specifications for York County.

If conditions are encountered that require muck excavation, use No. 57 stone as borrow material. When using No. 57 Stone to backfill undercut areas, use a non-woven geotextile to separate the No. 57 Stone from the



surrounding soils. The depth to which mucking is required is dependent upon encountering a suitable bearing material within the excavation as determined by the Geotechnical Engineer of Record.

Muck Excavation

The following approximate areas have been identified as requiring muck excavation in accordance with Pay Item 2034000. Areas along the planned alignments requiring undercut or mucking are to be determined in the field at the time of construction with joint consultation between the RCE, GEOR, and the Contractor:

Table 9-1 – SC 160 Toes of Slope Muck Excavation

Begin Station	End Station	Direction	Begin Distance from Proposed Centerline, ft.	End Distance from Proposed Centerline, ft.	Estimated Depth Below Existing Ground Surface, ft.
92+25	92+75	Left	70	91	4 to 5
92+75	93+25	Left	65	94	4 to 5
94+75	95+25	Right	54	68	3.5 to 5.5
95+25	95+50	Right	61	69	3.5 to 5.5

Table 9-2 – SC 160 Culvert Extension Area Muck Excavation

Begin Station	End Station	Direction	Begin Distance from Proposed Centerline, ft.	End Distance from Proposed Centerline, ft.	Estimated Depth Below Existing Ground Surface, ft.
95+55	95+75	Right	57	79	3.5 to 5.5

Note: the above station and offset ranges indicate the approximate culvert extension location. Muck excavation should be performed in the culvert extension footprint, as well as to a distance equal to the depth of the muck excavation from the edges and end of the culvert extension.

Additional areas discovered to deflect or settle may require muck excavation or undercutting as directed by the RCE. The depth of undercutting or muck excavation to be determined by the RCE with consultation with the GEOR.

Contractor shall use 57 Stone to backfill the muck excavations. It is anticipated that a geogrid for stabilization meeting the requirements of SC-M-203-1 (07/17), Geosynthetic Materials for Separation and Stabilization will need to be placed along the bottom of the muck excavations. Place a geotextile for separation meeting the requirements of SC-M-203-1 (07/17), Geosynthetic Materials for Separation and Stabilization in the muck excavations so that the 57 Stone is separated on all sides from the surrounding and underlying soils. After



completion of backfilling the muck excavations with 57 Stone, place a geotextile for separation meeting the requirements of SC-M-203-1 (07/17), Geosynthetic Materials for Separation and Stabilization between the 57 Stone and the first lift of embankment fill. After the placement of an initial lift of material over the geosynthetics (geogrid and geotextile), expose approximately 1 square foot of the geosynthetics for visual observation to identify any damage caused by the placement of the material. After ascertaining that the geosynthetic has not been damaged, replace and compact the material excavated to allow observation of the geosynthetics. If the geosynthetic appears to be damaged, expose a larger area and contact the GEOR for instructions. Damaged areas shall be repaired by the Contractor at no expense to the Department.

The following quantities associated with muck excavation are for bid estimation purposes only. The Estimated Quantity is the total quantity estimated for a specific item to be used on the project, while the Inclusion Quantity is the additional quantity that may be required in areas not previously identified on the plans as needing the item. Do not purchase or stockpile these bid items on site without prior written approval from the RCE unless specific areas and details are defined in the plans.

Table 9-3 – Geotechnical Bid Items and Quantities

Item No.	Pay Item	Estimated Quantity	Inclusion Quantity
2034000	Muck Excavation	450 cubic yards	225 cubic yards
2052000	No. 57 Stone for Backfill	700 tons	350 tons
2036020	Geotextile for Separation	900 square yards	450 square yards
2037030	Geogrid for Stabilization	460 square yards	230 square yards

Earthborne Vibration Monitoring

Level 1 – York County has elected to not monitor the site; therefore, no Earth-borne Vibration Monitoring is required.

10.0 Closing

This report has been prepared in accordance with generally accepted geotechnical engineering practice for specific application to this project. The conclusions and recommendations contained in this report are based upon applicable standards of our practice in this geographic area at the time this report was prepared. No other warranty, express or implied, is made.

We relied on project information given to us to develop our conclusions and recommendations. If project information described in this report is not accurate, or if it changes during project development, we should be notified of the changes so that we can modify our recommendations based on this additional information if necessary.

Final Roadway Geotechnical Engineering Report (RGER) – Revision 2

SC 160 East from Mimosa Lane to Hensley Road

York County, South Carolina

S&ME Project No. 6235-16-017

SCDOT Project ID P029536



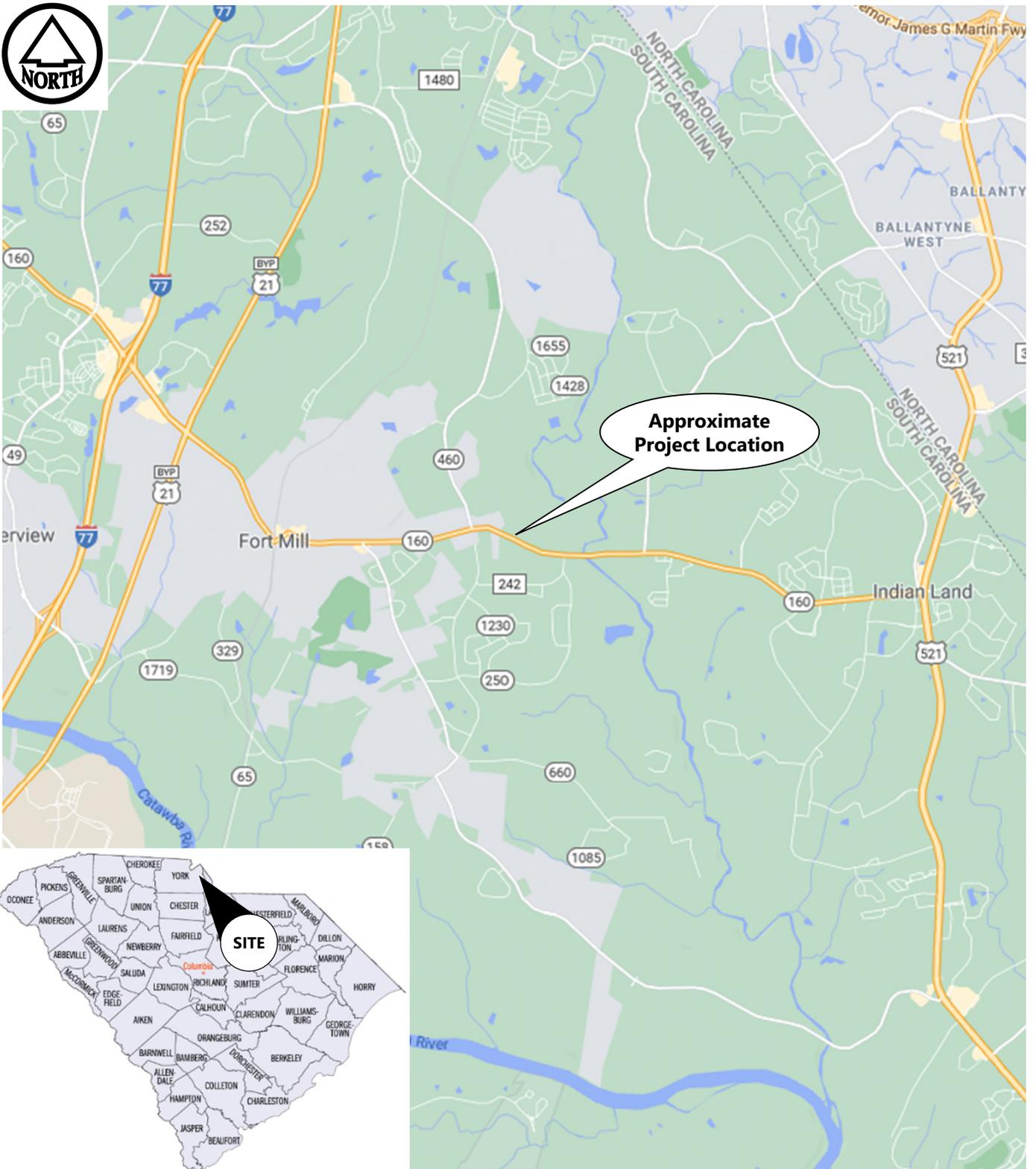
Our conclusions and recommendations are based on limited data from a field exploration program. Subsurface conditions can vary widely between explored areas. Some variations may not become evident until construction. If conditions are encountered which appear different than those described in our report, we should be notified. This report should not be construed to represent subsurface conditions for the entire site.

Unless specifically noted otherwise, our field exploration program did not include an assessment of regulatory compliance, environmental conditions or pollutants or presence of any biological materials (mold, fungi, bacteria). If there is a concern about these items, other studies should be performed. S&ME can provide a proposal and perform these services if requested.

S&ME should be retained to review the final plans and specifications to confirm that earthwork, foundation, and other recommendations are properly interpreted and implemented. The recommendations in this report are contingent on S&ME's review of final plans and specifications followed by our observation and monitoring of earthwork and foundation construction activities.

Appendices

Appendix I – Figures



Approximate Project Location

SITE



SITE VICINITY PLAN
SC 160 EAST FROM MIMOSA LANE TO HENSLEY ROAD
 YORK COUNTY, SOUTH CAROLINA

PROJECT NO.: 6235-16-017

SCALE: Not to Scale
 DRAWN BY: NRB
 CHECKED BY: SEM

DATE: February 2021

FIGURE NO.
1



BORING LOCATION PLAN

SC 160 EAST
FROM MIMOSA LANE TO HENSLEY ROAD
YORK COUNTY, SOUTH CAROLINA

SCALE:

1" = 100'

DATE:

FEBRUARY 2021

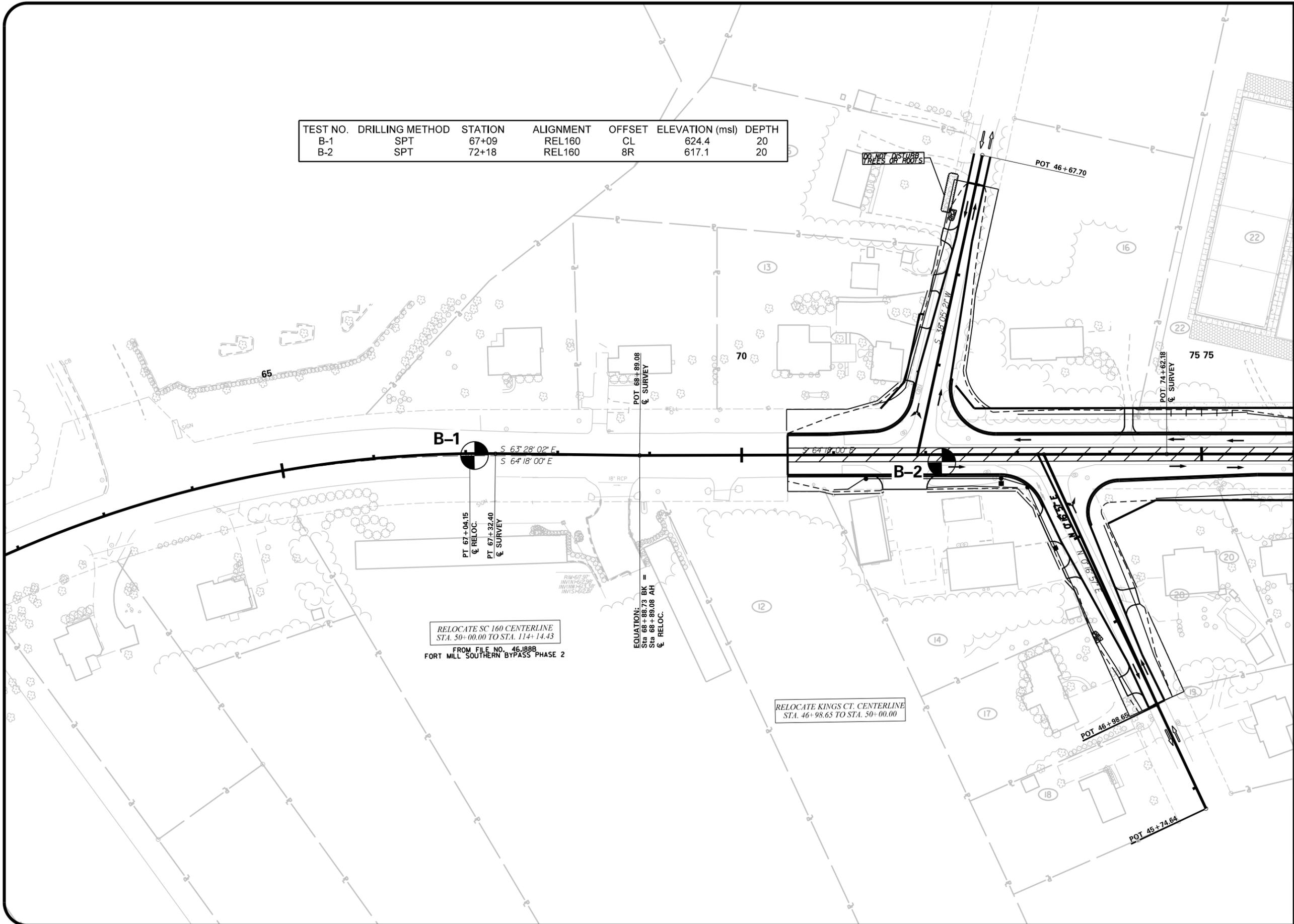
PROJECT NUMBER

6235-16-017

SHEET NO.

2

TEST NO.	DRILLING METHOD	STATION	ALIGNMENT	OFFSET	ELEVATION (msl)	DEPTH
B-1	SPT	67+09	REL160	CL	624.4	20
B-2	SPT	72+18	REL160	8R	617.1	20

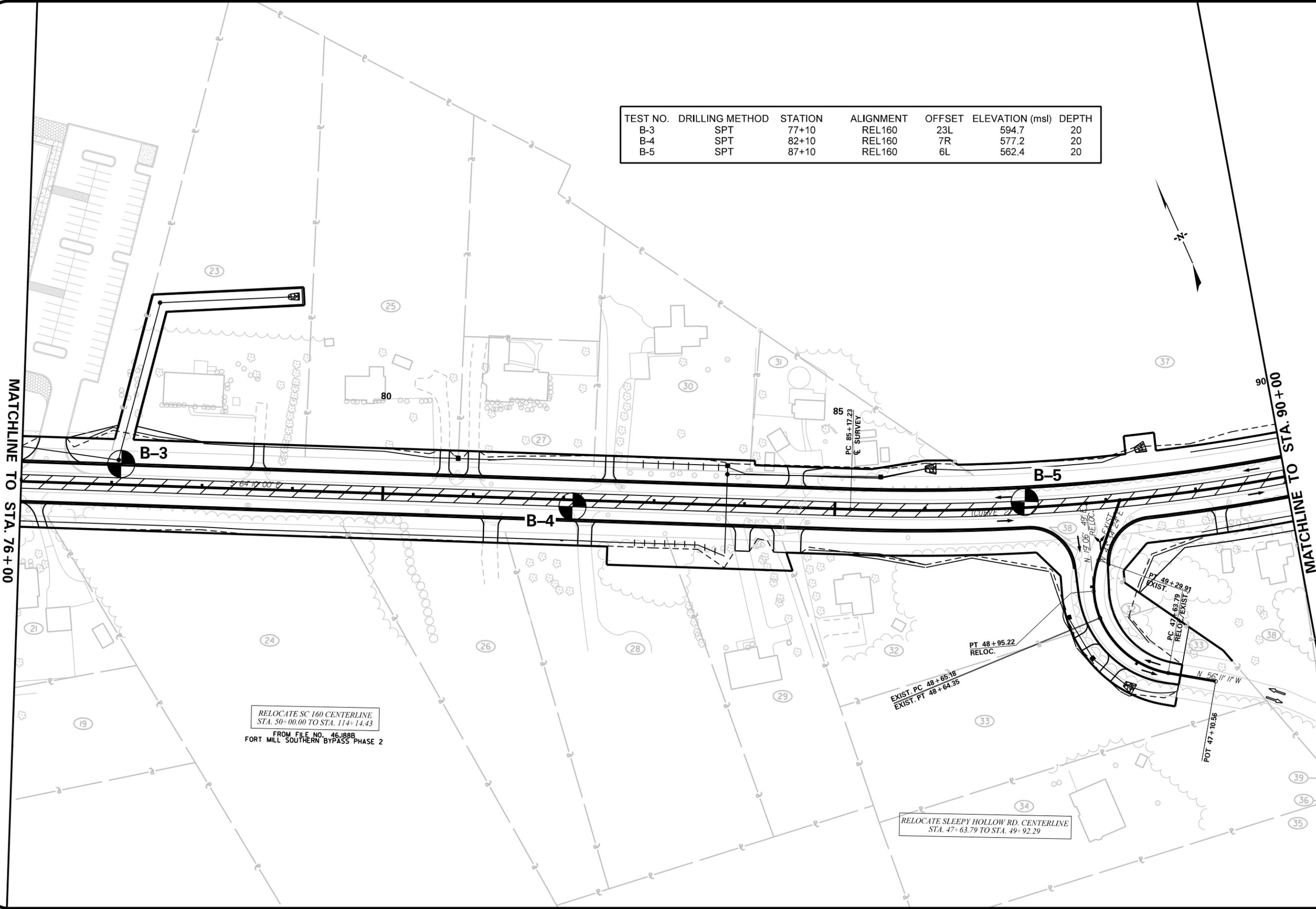




TEST NO.	DRILLING METHOD	STATION	ALIGNMENT	OFFSET	ELEVATION (msl)	DEPTH
B-3	SPT	77+10	REL160	23L	594.7	20
B-4	SPT	82+10	REL160	7R	577.2	20
B-5	SPT	87+10	REL160	6L	562.4	20

MATCHLINE TO STA. 76+00

MATCHLINE TO STA. 90+00



RELOCATE SC 160 CENTERLINE
STA. 50+00.00 TO STA. 114+14.43
FROM FILE NO. 46.188B
FORT MILL SOUTHERN BYPASS PHASE 2

RELOCATE SLEEPY HOLLOW RD. CENTERLINE
STA. 47+63.79 TO STA. 49+92.29

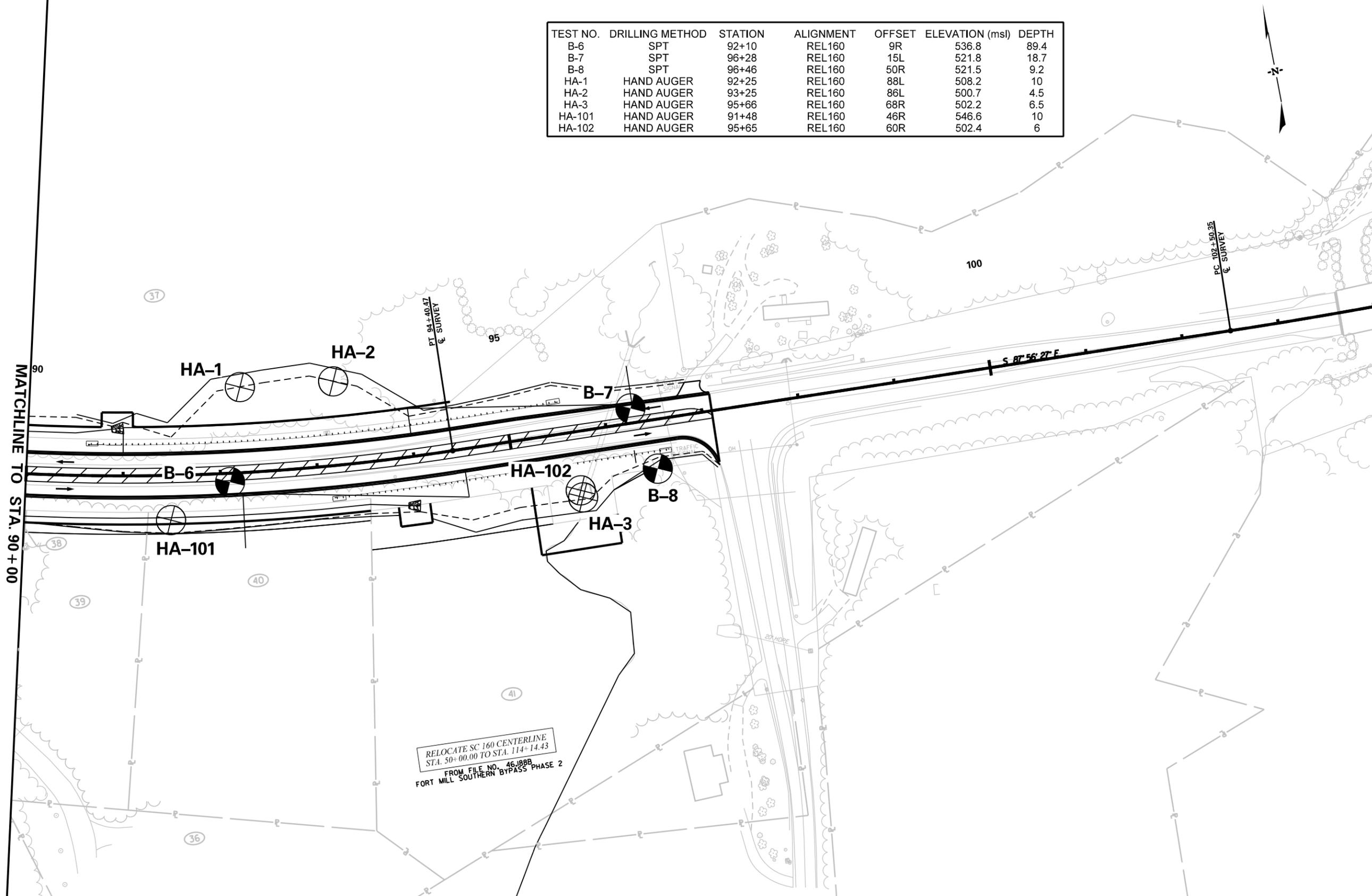
BORING LOCATION PLAN

SC 160 EAST
FROM MIMOSA LANE TO HENSLEY ROAD
YORK COUNTY, SOUTH CAROLINA

SCALE:
1" = 100'
DATE:
FEBRUARY 2021
PROJECT NUMBER
6235-16-017
SHEET NO.



TEST NO.	DRILLING METHOD	STATION	ALIGNMENT	OFFSET	ELEVATION (msl)	DEPTH
B-6	SPT	92+10	REL160	9R	536.8	89.4
B-7	SPT	96+28	REL160	15L	521.8	18.7
B-8	SPT	96+46	REL160	50R	521.5	9.2
HA-1	HAND AUGER	92+25	REL160	88L	508.2	10
HA-2	HAND AUGER	93+25	REL160	86L	500.7	4.5
HA-3	HAND AUGER	95+66	REL160	68R	502.2	6.5
HA-101	HAND AUGER	91+48	REL160	46R	546.6	10
HA-102	HAND AUGER	95+65	REL160	60R	502.4	6



BORING LOCATION PLAN

SC 160 EAST
FROM MIMOSA LANE TO HENSLEY ROAD
YORK COUNTY, SOUTH CAROLINA

SCALE:

1" = 100'

DATE:

FEBRUARY 2021

PROJECT NUMBER

6235-16-017

SHEET NO.

4

Appendix II – Boring Logs

SOIL CLASSIFICATION CHART

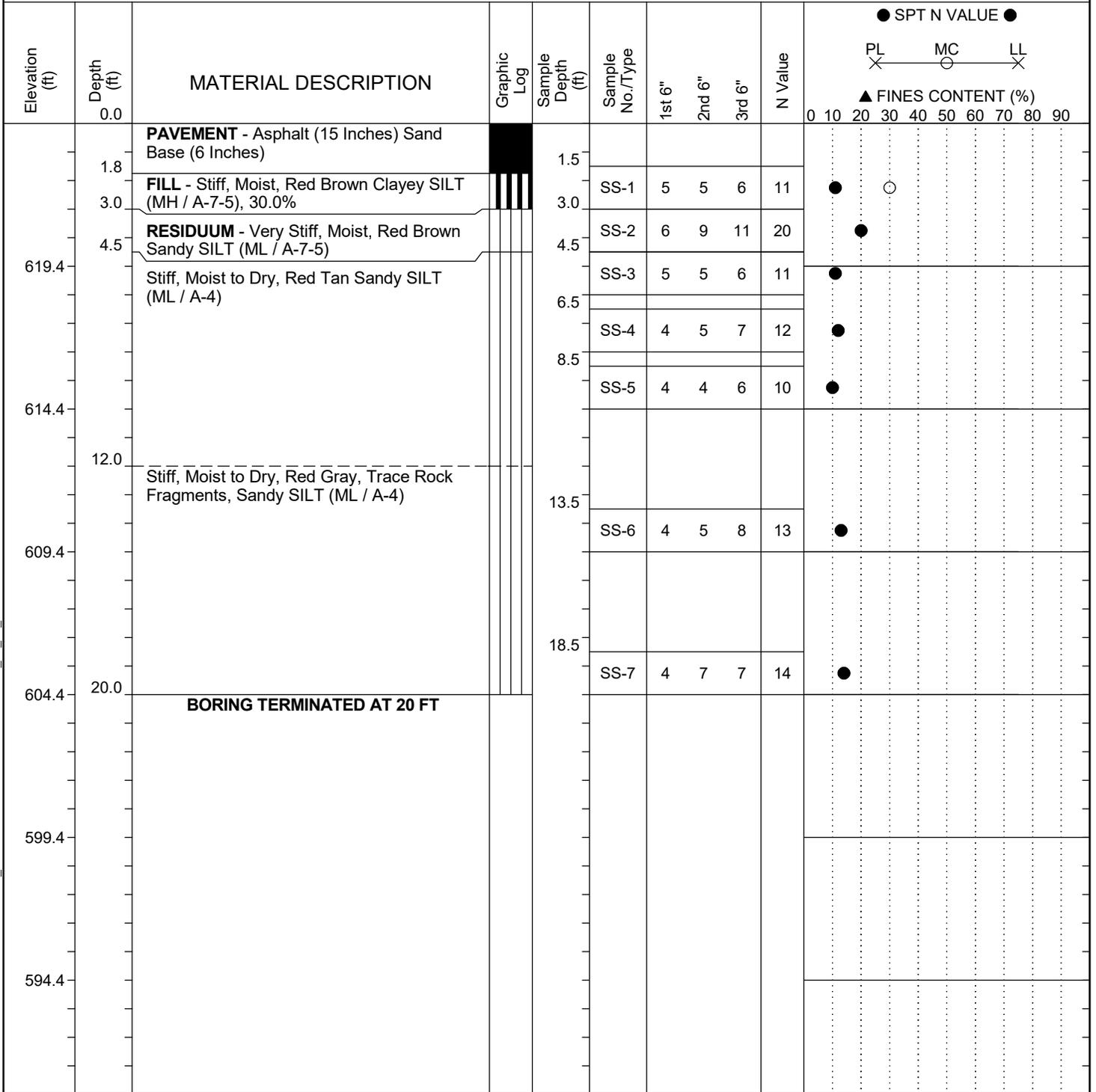
MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS	
			GRAPH	LETTER		
<p>COARSE GRAINED SOILS</p> <p>MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE</p>	<p>GRAVEL AND GRAVELLY SOILS</p>	<p>CLEAN GRAVELS</p> <p>(LITTLE OR NO FINES)</p>		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES	
		<p>MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE</p>	<p>GRAVELS WITH FINES</p> <p>(APPRECIABLE AMOUNT OF FINES)</p>		GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
			<p>GRAVELS WITH FINES</p> <p>(APPRECIABLE AMOUNT OF FINES)</p>		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
	<p>SAND AND SANDY SOILS</p>	<p>MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE</p>	<p>CLEAN SANDS</p> <p>(LITTLE OR NO FINES)</p>		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			<p>SANDS WITH FINES</p> <p>(APPRECIABLE AMOUNT OF FINES)</p>		SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		<p>SANDS WITH FINES</p> <p>(APPRECIABLE AMOUNT OF FINES)</p>		SM	SILTY SANDS, SAND - SILT MIXTURES	
	<p>FINE GRAINED SOILS</p> <p>MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE</p>	<p>SILTS AND CLAYS</p> <p>LIQUID LIMIT LESS THAN 50</p>		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY	
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	
		<p>SILTS AND CLAYS</p> <p>LIQUID LIMIT GREATER THAN 50</p>		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS	
			CH	INORGANIC CLAYS OF HIGH PLASTICITY		
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS		
<p>HIGHLY ORGANIC SOILS</p>				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS	

USCS LEGEND 1/30/21

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

SCDOT Soil Test Log

Project ID: P029536	County: York	Boring No.: B-1
Site Description: SC 160 (S&ME Project 6235-16-017)		Route: Hwy 160 East
Eng./Geo.: N. Bradley	Boring Location: 67+09	Offset: CL Alignment: REL160
Elev.: 624.4 ft	Latitude: 35.0085927	Longitude: -80.914528 Date Started: 3/7/2017
Total Depth: 20 ft	Soil Depth: 20 ft	Core Depth: 0 ft Date Completed: 3/7/2017
Bore Hole Diameter (in): 8	Sampler Configuration	Liner Required: Y (N) Liner Used: Y (N)
Drill Machine: CME 550X	Drill Method: 3-1/4" HSA	Hammer Type: Automatic Energy Ratio: 93%
Core Size: N/A	Driller: J. Little	Groundwater: TOB Dry 24HR: N/A



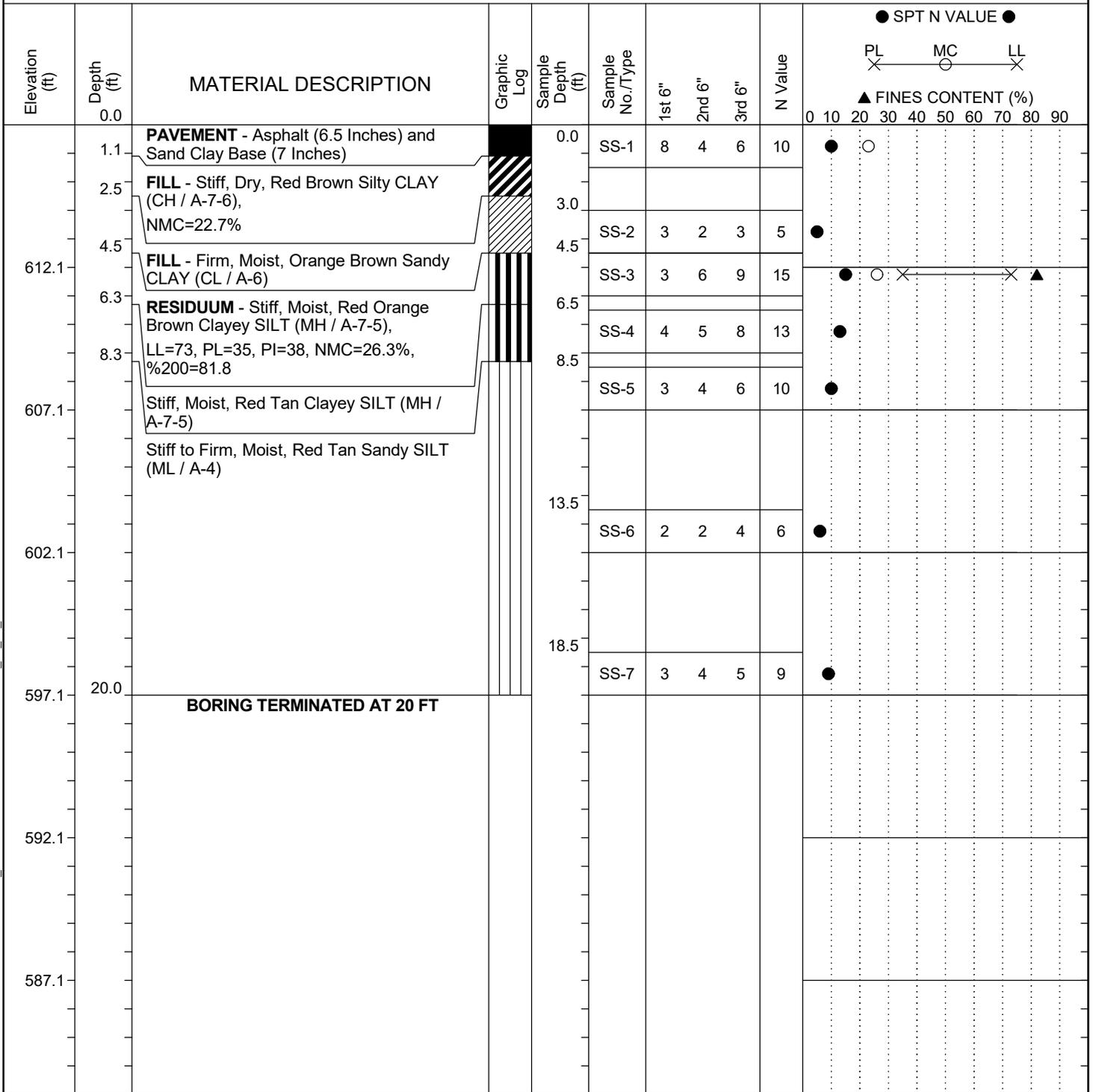
LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT_YORK_COUNTY_SC-160_PRGER_BORING_LOGS_AMR.GPJ_SCDOT_DATA_TEMPLATE_12_30_2014.GDT 9/24/21

SCDOT Soil Test Log

Project ID: P029536	County: York		Boring No.: B-2	
Site Description: SC 160 (S&ME Project 6235-16-017)			Route: Hwy 160 East	
Eng./Geo.: N. Bradley	Boring Location: 72+18		Offset: 8 RT	Alignment: REL160
Elev.: 617.1 ft	Latitude: 35.0079653	Longitude: -80.9130128	Date Started: 3/7/2017	
Total Depth: 20 ft	Soil Depth: 20 ft	Core Depth: 0 ft	Date Completed: 3/7/2017	
Bore Hole Diameter (in): 8		Sampler Configuration	Liner Required: Y (N)	Liner Used: Y (N)
Drill Machine: CME 550X	Drill Method: 3-1/4" HSA	Hammer Type: Automatic	Energy Ratio: 93%	
Core Size: N/A	Driller: J. Little	Groundwater: TOB Dry	24HR	N/A



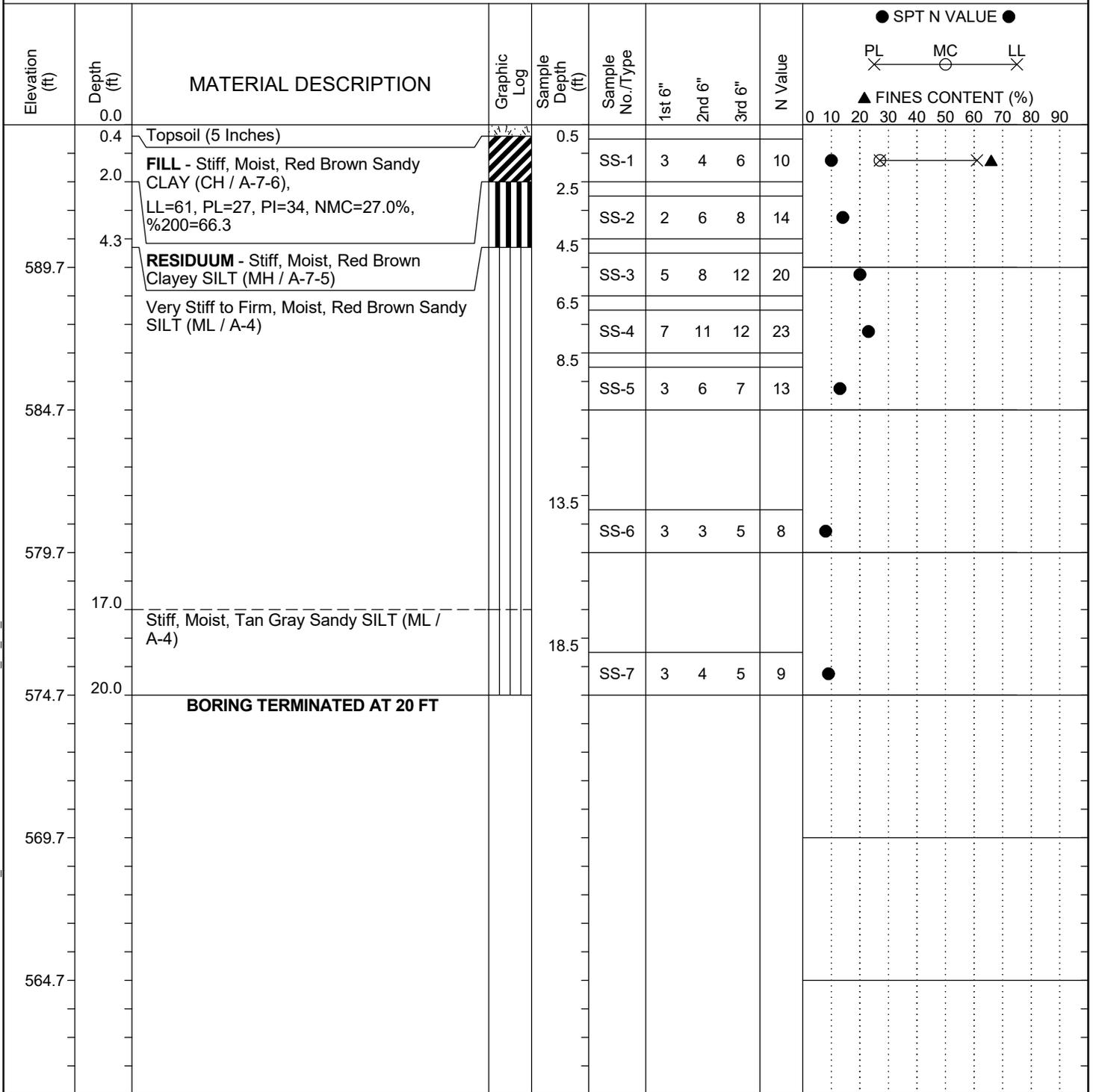
LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT YORK COUNTY SC-160 PRGER BORING LOGS_AMR.GPJ_SCDOT DATA TEMPLATE_12_30_2014.GDT 9/24/21

SCDOT Soil Test Log

Project ID: P029536	County: York			Boring No.: B-3	
Site Description: SC 160 (S&ME Project 6235-16-017)				Route: Hwy 160 East	
Eng./Geo.: T. Hill		Boring Location: 77+10		Offset: 23 LT	Alignment: REL160
Elev.: 594.7 ft	Latitude: 35.0074532	Longitude: -80.9114874	Date Started: 3/9/2017		
Total Depth: 20 ft	Soil Depth: 20 ft	Core Depth: 0 ft	Date Completed: 3/9/2017		
Bore Hole Diameter (in): 8		Sampler Configuration		Liner Required: Y (N)	Liner Used: Y (N)
Drill Machine: CME 550X	Drill Method: 3-1/4" HSA	Hammer Type: Automatic		Energy Ratio: 93%	
Core Size: N/A	Driller: J. Little	Groundwater: TOB Dry		24HR	N/A



LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT_YORK_COUNTY_SC-160_PRGER_BORING_LOGS_AMR.GPJ_SCDOT_DATA_TEMPLATE_12_30_2014.GDT 9/24/21

SCDOT Soil Test Log

Project ID: P029536	County: York			Boring No.: B-4	
Site Description: SC 160 (S&ME Project 6235-16-017)				Route: Hwy 160 East	
Eng./Geo.: N. Bradley	Boring Location: 82+10		Offset: 7 RT	Alignment: REL160	
Elev.: 577.2 ft	Latitude: 35.0067791	Longitude: -80.910029	Date Started: 3/7/2017		
Total Depth: 20 ft	Soil Depth: 20 ft	Core Depth: 0 ft	Date Completed: 3/7/2017		
Bore Hole Diameter (in): 8		Sampler Configuration		Liner Required: Y (N)	Liner Used: Y (N)
Drill Machine: CME 550X	Drill Method: 3-1/4" HSA	Hammer Type: Automatic		Energy Ratio: 93%	
Core Size: N/A	Driller: J. Little	Groundwater: TOB Dry		24HR	N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	SPT N VALUE											
										0	10	20	30	40	50	60	70	80	90		
	0.0									● SPT N VALUE ● PL — MC — LL ▲ FINES CONTENT (%)											
	1.3	PAVEMENT - Asphalt (7 Inches) and Sand Clay Base (9 Inches)		0.6	SS-1	4	3	4	7	●											
	4.5	FILL - Loose, Wet, Gray Red Brown, Fine to Coarse, Clayey SAND (SC / A-6)		3.0	SS-2	2	3	5	8	●											
572.2	4.5	RESIDUUM - Stiff to Very Stiff, Moist, Red Tan Sandy CLAY (CL / A-6)		4.5	SS-3	4	5	6	11	●											
	6.5			6.5	SS-4	4	6	8	14	●											
	8.5			8.5	SS-5	3	6	9	15	●											
567.2																					
	13.5			13.5	SS-6	4	7	9	16	●											
562.2																					
	17.0	Firm, Moist, Tan Gray, Trace Mica, Sandy SILT (ML / A-4)		17.0																	
	18.5			18.5	SS-7	3	3	4	7	●											
557.2	20.0	BORING TERMINATED AT 20 FT																			
552.2																					
547.2																					

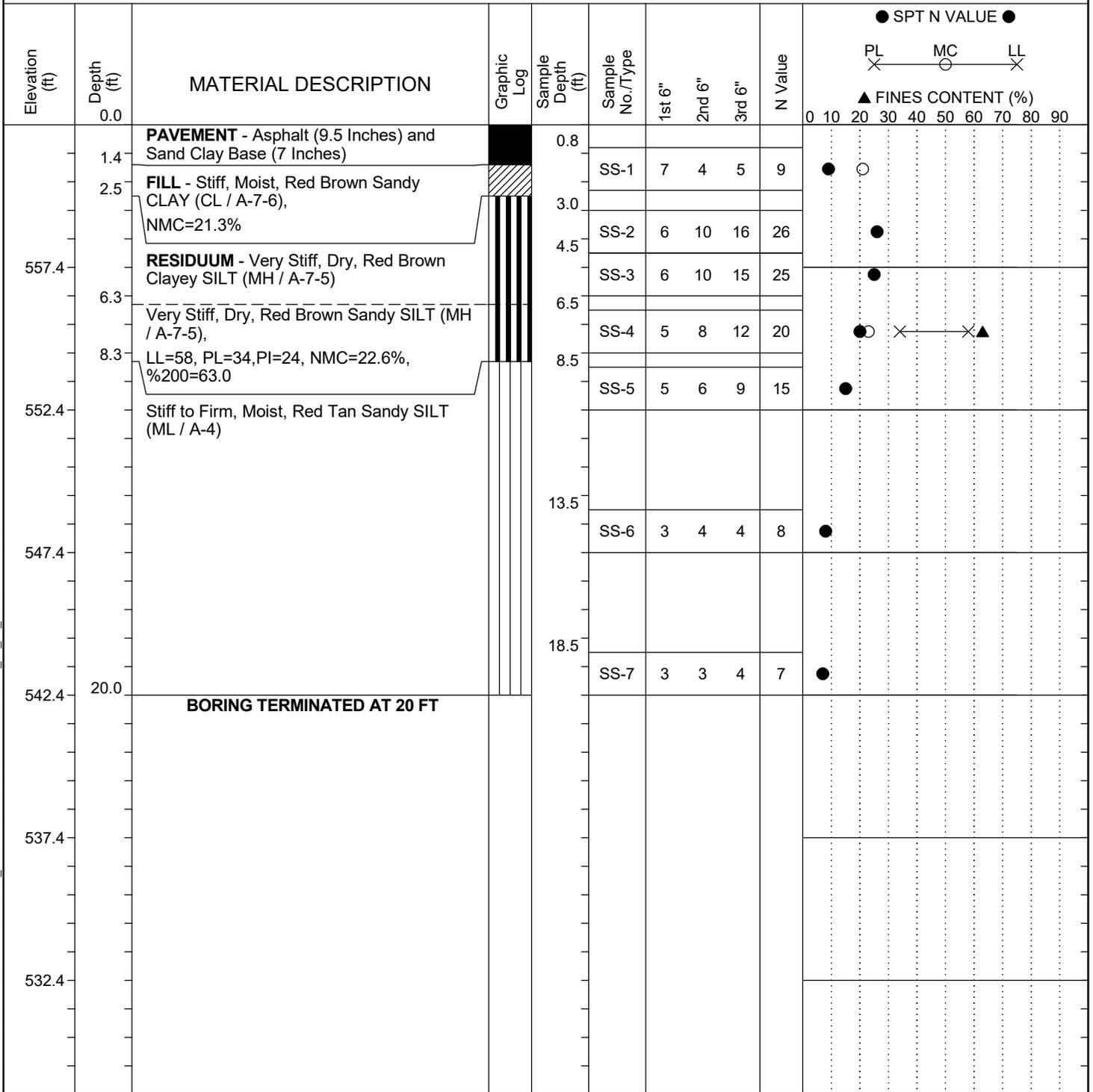
LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT_YORK_COUNTY_SC-160_PRGER_BORING_LOGS_AMR.GPJ_SCDOT_DATA_TEMPLATE_12_30_2014.GDT 9/24/21

SCDOT Soil Test Log

Project ID: P029536	County: York			Boring No.: B-5	
Site Description: SC 160 (S&ME Project 6235-16-017)			Route: Hwy 160 East		
Eng./Geo.: N. Bradley	Boring Location: 87+10		Offset: 6 LT	Alignment: REL160	
Elev.: 562.4 ft	Latitude: 35.0062341	Longitude: -80.908497	Date Started: 3/8/2017		
Total Depth: 20 ft	Soil Depth: 20 ft	Core Depth: 0 ft	Date Completed: 3/8/2017		
Bore Hole Diameter (in): 8		Sampler Configuration	Liner Required: Y (N)	Liner Used: Y (N)	
Drill Machine: CME 550X	Drill Method: 3-1/4" HSA	Hammer Type: Automatic	Energy Ratio: 93%		
Core Size: N/A	Driller: J. Little	Groundwater: TOB	Dry	24HR	N/A



LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT_YORK_COUNTY_SC-160_PRGER_BORING_LOGS_AMR.GPJ_SCDOT_DATA_TEMPLATE_12_30_2014.GDT 9/24/21

SCDOT Soil Test Log

Project ID: P029536	County: York	Boring No.: B-6
Site Description: SC 160 (S&ME Project 6235-16-017)		Route: Hwy 160 East
Eng./Geo.: T. Hill	Boring Location: 92+10	Offset: 9 RT
Elev.: 536.8 ft	Latitude: 35.005851	Longitude: -80.9068981
Total Depth: 89.4 ft	Soil Depth: 89.4 ft	Core Depth: 0 ft
Bore Hole Diameter (in): 8	Sampler Configuration	Liner Required: Y (N)
Drill Machine: CME 550X	Drill Method: 3-1/4" HSA	Hammer Type: Automatic
Core Size: N/A	Driller: J. Little	Groundwater: TOB 37 ft
		Energy Ratio: 93%
		24HR: N/A

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	N Value	SPT N VALUE												
										0	10	20	30	40	50	60	70	80	90			
	0.0	PAVEMENT - Asphalt (9.5 Inches) and Sand Clay Base (10.5 Inches)		0.8																		
	1.7	FILL - Stiff, Moist, Red Brown Sandy CLAY (CL / A-7-6), NMC=19.3%		3.0	SS-1	10	5	4	9		●	○										
	2.5		4.5	SS-2	4	8	10	18			●											
531.8	4.5	RESIDUUM - Very Stiff, Moist, Red Brown, Trace Mica, Sandy CLAY (CL / A-4) Loose to Medium Dense, Moist, Tan Gray, Fine to Medium, Trace Mica, Silty SAND, (SM / A-4), LL=35, PL=35, PI=0, NMC=20.9%, %200=42.9		6.5	SS-3	4	5	6	11		●											
			8.5	SS-4	3	4	6	10			●											
			13.5	SS-5	2	3	4	7			●	○	×	▲								
526.8					18.5	SS-6	3	4	4	8		●										
521.8				23.5	SS-7	4	4	6	10		●											
516.8				28.5	SS-8	5	7	7	14		●											
22.0		Medium Dense, Moist, Tan Gray, Fine to Coarse, with Rock Pieces, Silty SAND (SM / A-2-4)		33.5	SS-9	6	10	10	20		●	×	×	▲								
511.8																						
27.0		Medium Dense, Moist to Wet, Gray Tan, Fine to Medium, Silty SAND (SM / A-4), LL=34, PL=28, PI=6, NMC=22.3%, %200=43.7																				
506.8																						

LEGEND

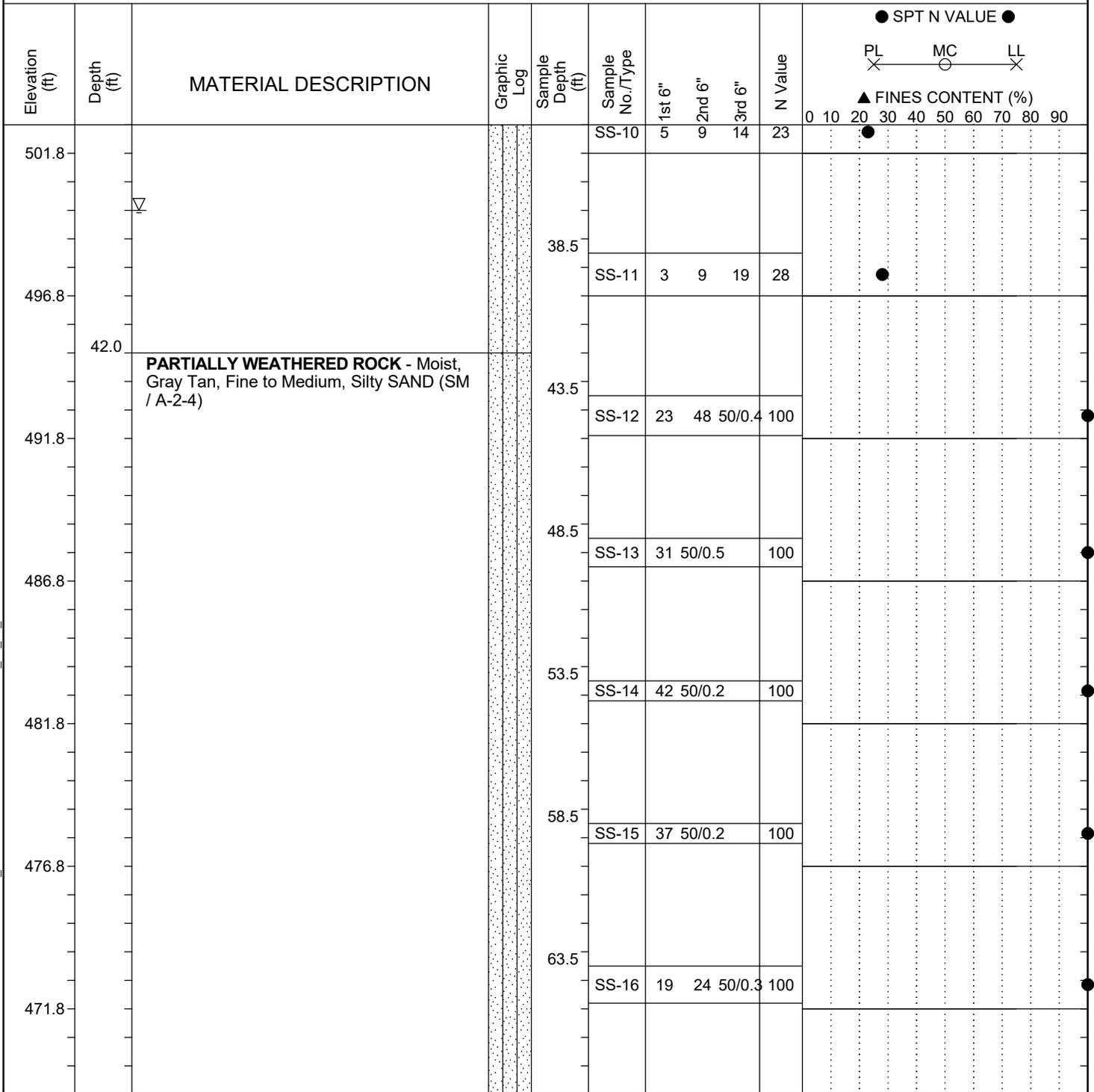
Continued Next Page

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC.DOT YORK COUNTY SC-160 PRGER BORING LOGS_AMR.GPJ_SCDOT DATA TEMPLATE_12_30_2014.GDT 9/24/21

SCDOT Soil Test Log

Project ID: P029536	County: York			Boring No.: B-6	
Site Description: SC 160 (S&ME Project 6235-16-017)				Route: Hwy 160 East	
Eng./Geo.: T. Hill		Boring Location: 92+10		Offset: 9 RT	Alignment: REL160
Elev.: 536.8 ft	Latitude: 35.005851	Longitude: -80.9068981		Date Started: 3/8/2017	
Total Depth: 89.4 ft	Soil Depth: 89.4 ft	Core Depth: 0 ft		Date Completed: 3/8/2017	
Bore Hole Diameter (in): 8		Sampler Configuration		Liner Required: Y (N)	Liner Used: Y (N)
Drill Machine: CME 550X	Drill Method: 3-1/4" HSA	Hammer Type: Automatic		Energy Ratio: 93%	
Core Size: N/A	Driller: J. Little	Groundwater: TOB 37 ft		24HR	N/A



LEGEND

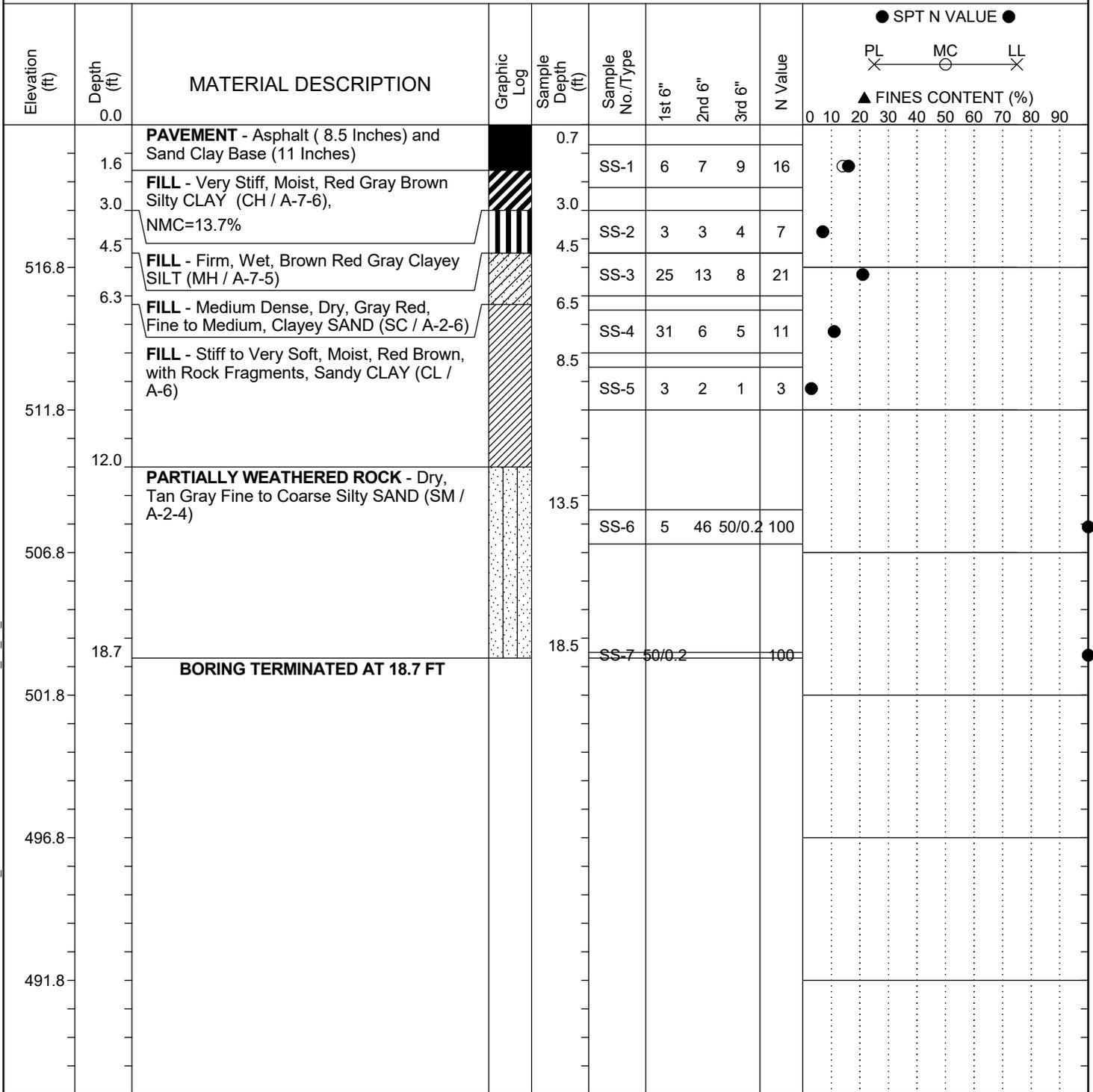
Continued Next Page

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT_YORK_COUNTY_SC-160_PRGER_BORING_LOGS_AMR.GPJ_SCDOT_DATA_TEMPLATE_12_30_2014.GDT 9/24/21

SCDOT Soil Test Log

Project ID: P029536	County: York			Boring No.: B-7	
Site Description: SC 160 (S&ME Project 6235-16-017)			Route: Hwy 160 East		
Eng./Geo.: N. Bradley	Boring Location: 96+28		Offset: 15 LT	Alignment: REL160	
Elev.: 521.8 ft	Latitude: 35.0058417	Longitude: -80.9054991	Date Started: 3/7/2017		
Total Depth: 18.7 ft	Soil Depth: 18.7 ft	Core Depth: 0 ft	Date Completed: 3/7/2017		
Bore Hole Diameter (in): 8		Sampler Configuration		Liner Required: Y (N)	Liner Used: Y (N)
Drill Machine: CME 550X	Drill Method: 3-1/4" HSA	Hammer Type: Automatic		Energy Ratio: 93%	
Core Size: N/A	Driller: J. Little	Groundwater: TOB Dry		24HR	N/A



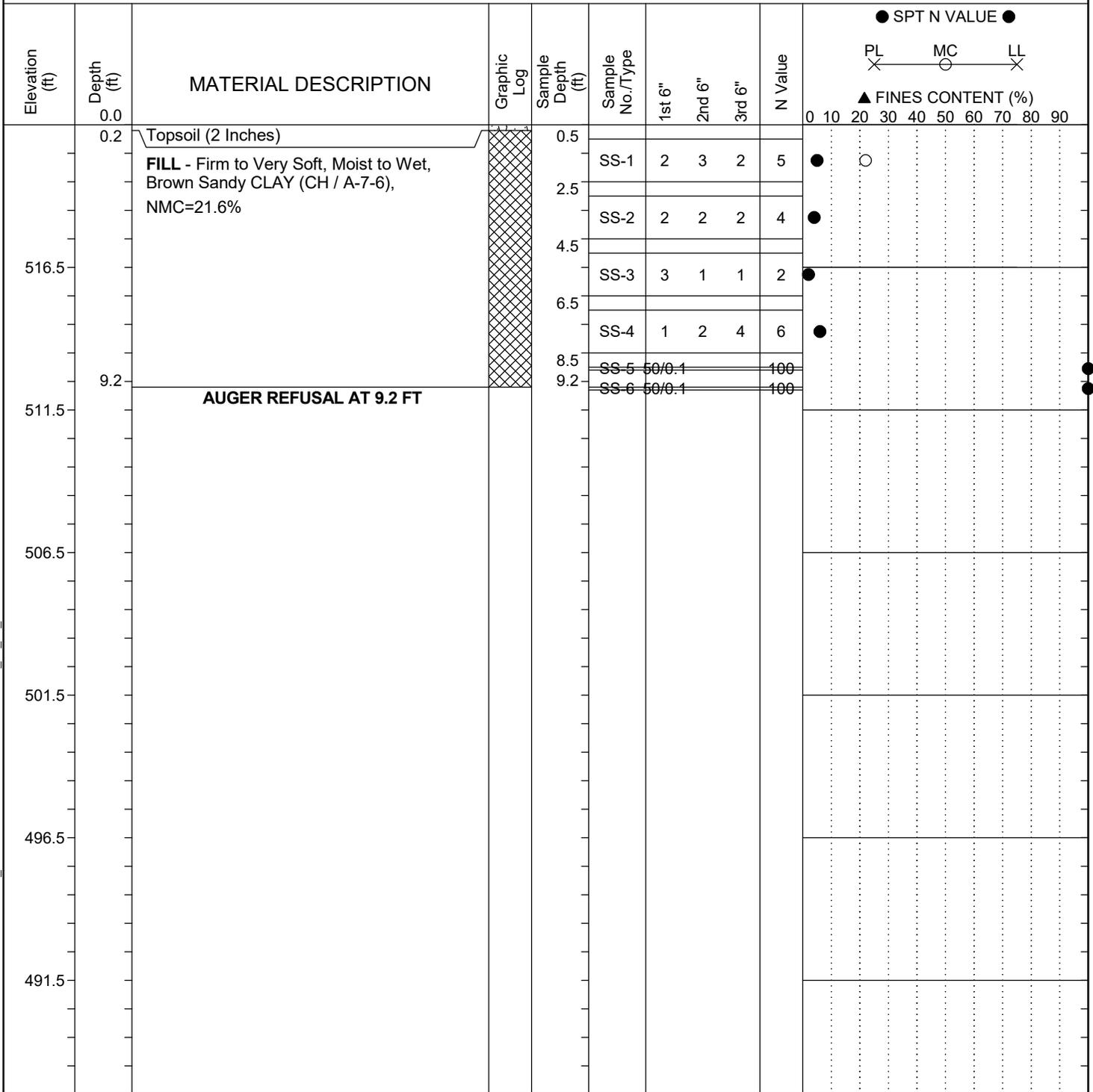
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SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT YORK COUNTY SC-160 PRGER BORING LOGS_AMR.GPJ_SCDOT DATA TEMPLATE_12_30_2014.GDT 9/24/21

SCDOT Soil Test Log

Project ID: P029536	County: York			Boring No.: B-8	
Site Description: SC 160 (S&ME Project 6235-16-017)			Route: Hwy 160 East		
Eng./Geo.: T. Hill		Boring Location: 96+46		Offset: 50 RT	Alignment: REL160
Elev.: 521.5 ft	Latitude: 35.0056604	Longitude: -80.9054458	Date Started: 3/9/2017		
Total Depth: 9.2 ft	Soil Depth: 9.2 ft	Core Depth: 0 ft	Date Completed: 3/9/2017		
Bore Hole Diameter (in): 8		Sampler Configuration		Liner Required: Y (N)	Liner Used: Y (N)
Drill Machine: CME 550X	Drill Method: 3-1/4" HSA	Hammer Type: Automatic		Energy Ratio: 93%	
Core Size: N/A	Driller: J. Little	Groundwater: TOB	Dry	24HR	N/A



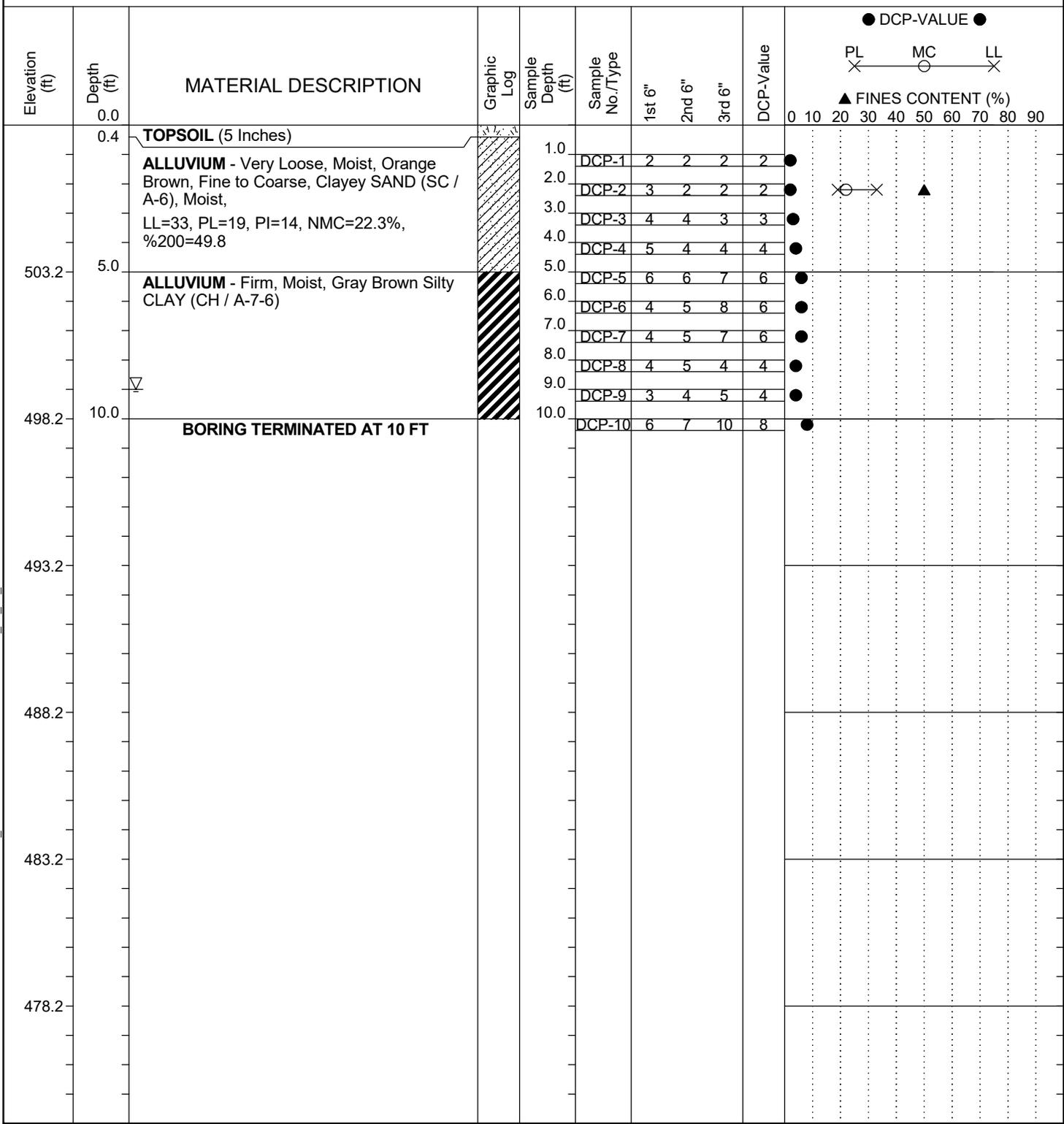
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SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC_DOT YORK COUNTY SC-160 PRGER BORING LOGS_AMR.GPJ SCDOT DATA TEMPLATE_12_30_2014.GDT 9/24/21

SCDOT Manual Auger Log

Project ID: P029536	County: York	Boring No.: HA-1
Site Description: SC 160 (S&ME Project 6235-16-017)		Route: Hwy 160 East
Driller: T. Hill/ C. Kahil	Boring Location: 92+25	Offset: 88 LT Alignment: REL160
Elev.: 508.2 ft	Latitude: 35.0061092	Longitude: -80.9068043 Date Started: 3/15/2017
Total Depth: 10 ft	Groundwater: TOB	Date Completed: 3/15/2017
Dynamic Cone Penetrometer Test Procedure: Sowers and Hedges (1966)		



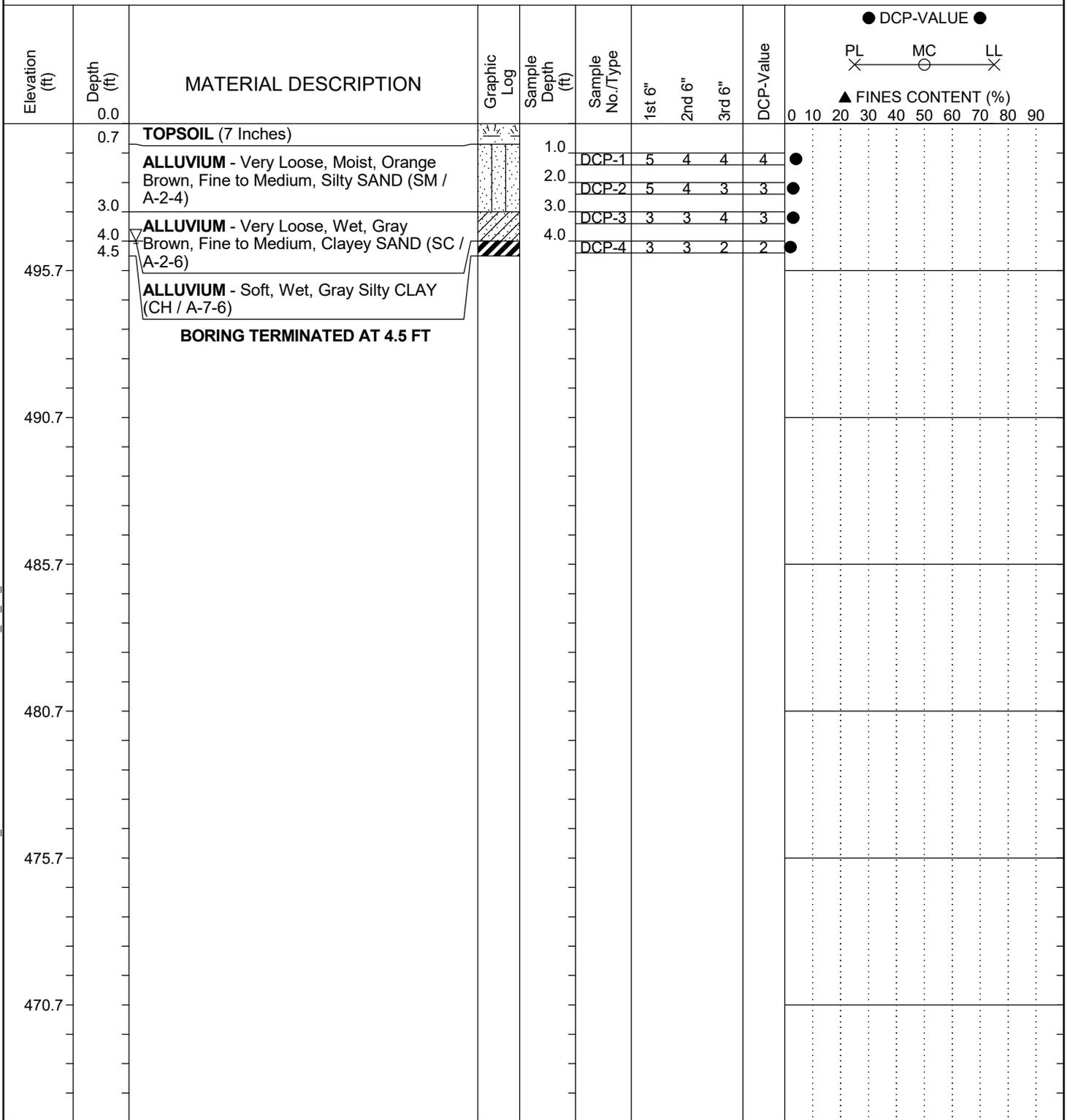
MANUAL AUGER LOG YORK COUNTY SC-160 PRGER BORING LOGS_AMR.GPJ_SCDOT DATA TEMPLATE_12_30_2014.GDT 9/24/21

LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	DCP Dynamic Cone Penetrometer	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SCDOT Manual Auger Log

Project ID: P029536	County: York	Boring No.: HA-2
Site Description: SC 160 (S&ME Project 6235-16-017)		Route: Hwy 160 East
Driller: T. Hill/ C. Kahil	Boring Location: 93+25	Offset: 86 LT
Elev.: 500.7 ft	Latitude: 35.006076	Longitude: -80.9064838
Total Depth: 4.5 ft	Groundwater: TOB	Date Started: 3/15/2017
Dynamic Cone Penetrometer Test Procedure:		Date Completed: 3/15/2017
Sowers and Hedges (1966)		



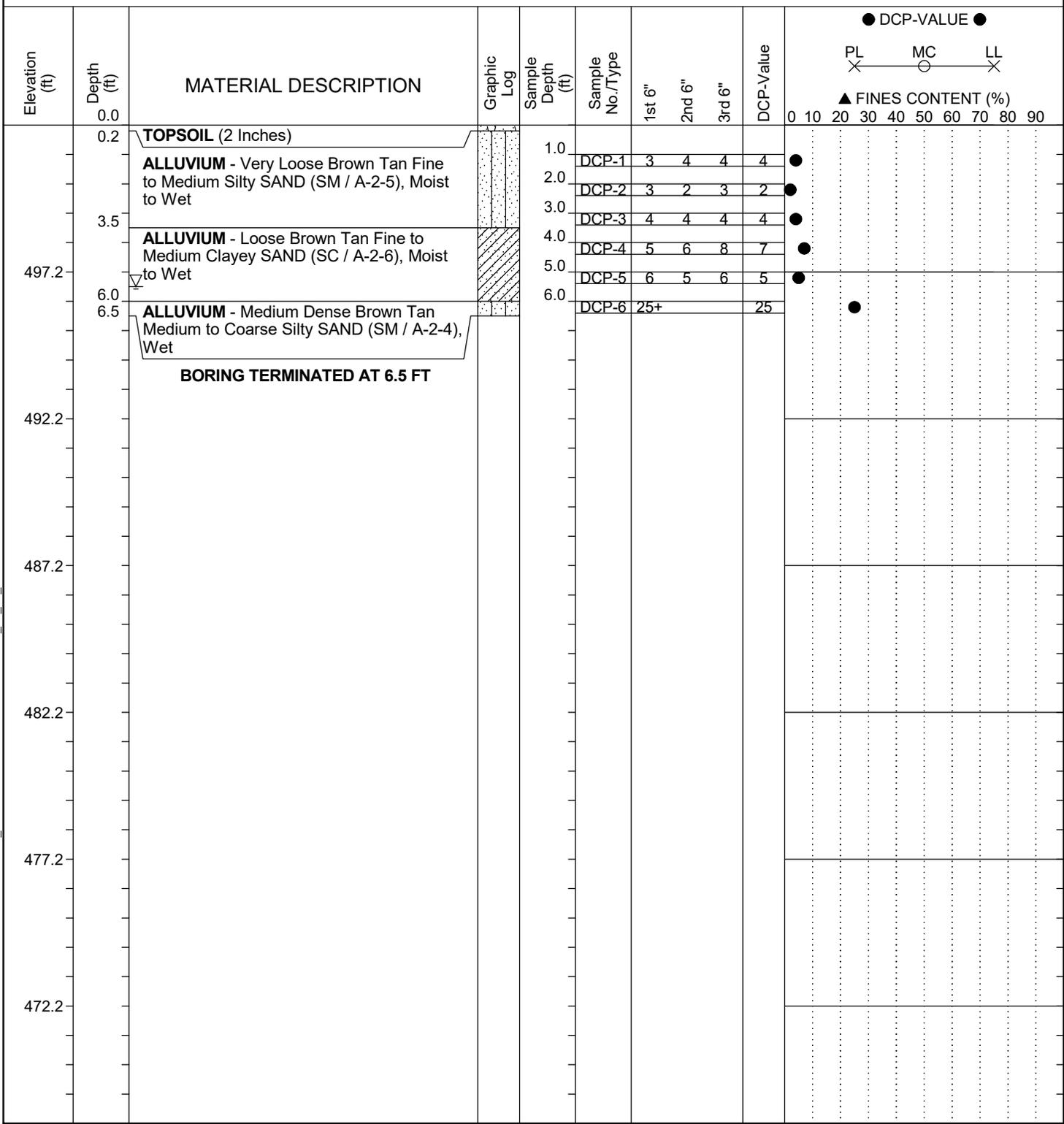
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SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	DCP Dynamic Cone Penetrometer	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

MANUAL AUGER LOG YORK COUNTY SC-160 PRGER BORING LOGS_AMR.GPJ_SCDOT DATA TEMPLATE_12_30_2014.GDT 9/24/21

SCDOT Manual Auger Log

Project ID: P029536	County: York	Boring No.: HA-3
Site Description: SC 160 (S&ME Project 6235-16-017)		Route: Hwy 160 East
Driller: T. Hill/ C. Kahil	Boring Location: 95+66	Offset: 68 RT
Elev.: 502.2 ft	Latitude: 35.0056221	Longitude: -80.9057163
Total Depth: 6.5 ft	Groundwater: TOB	Date Started: 3/15/2017
Dynamic Cone Penetrometer Test Procedure:		Date Completed: 3/15/2017
Sowers and Hedges (1966)		



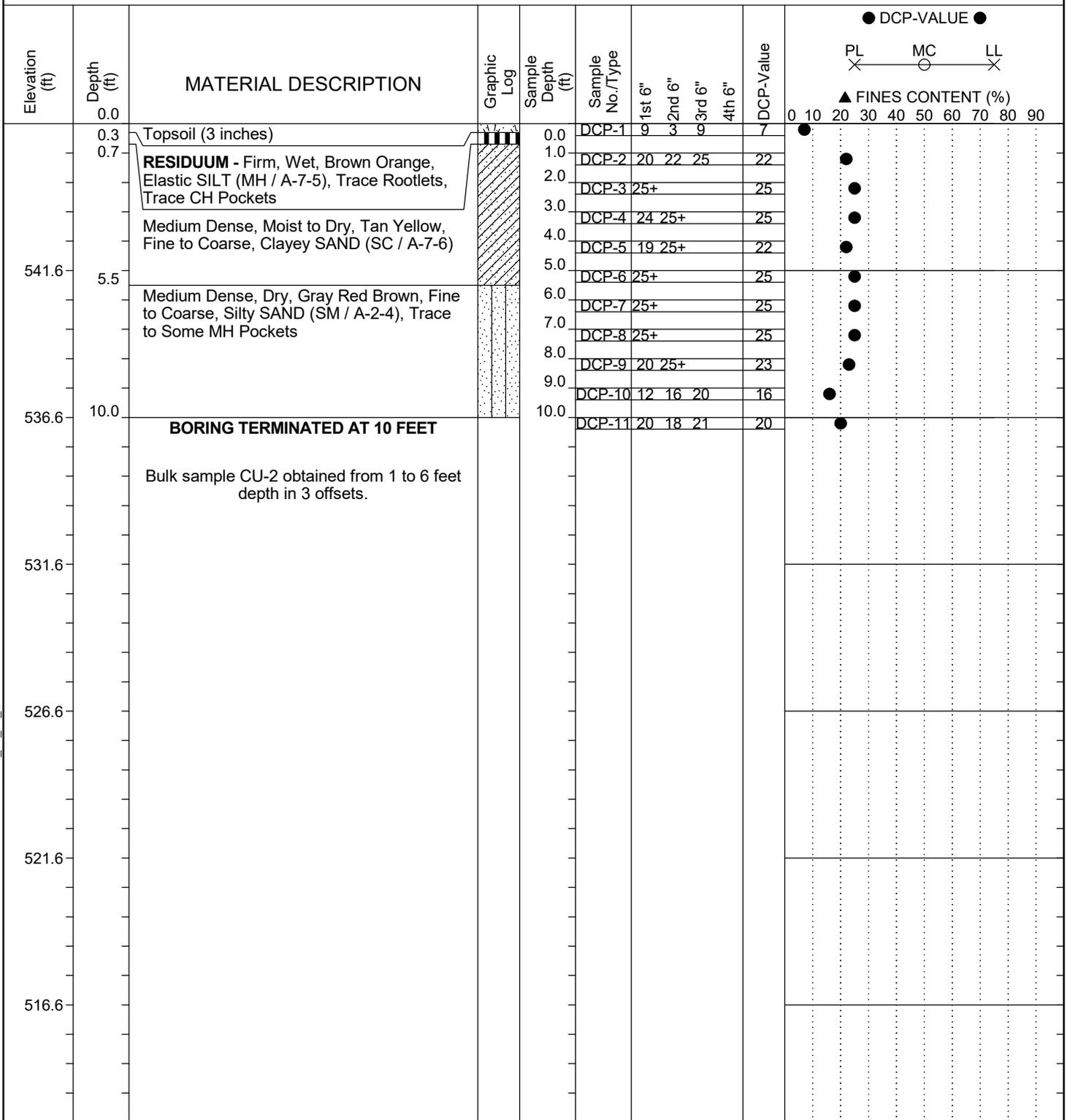
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SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	DCP Dynamic Cone Penetrometer	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

MANUAL AUGER LOG YORK COUNTY SC-160 PRGR BORING LOGS_AMR.GPJ_SCDOT DATA TEMPLATE_12_30_2014.GDT 9/24/21

SCDOT Manual Auger Log

Project ID: P029536	County: York	Boring No.: HA-101
Site Description: SC 160 (S&ME Project 6235-16-017)		Route: Hwy 160 East
Driller: B. Kebea	Boring Location: 91+48	Offset: 46 RT
Alignment: REL160	Elev.: 546.6 ft	Latitude: 35.005778
Longitude: -80.907123	Date Started: 12/9/2020	
Total Depth: 10 ft	Groundwater: TOB	Date Completed: 12/9/2020
Dynamic Cone Penetrometer Test Procedure:		Sowers and Hedges (1966)



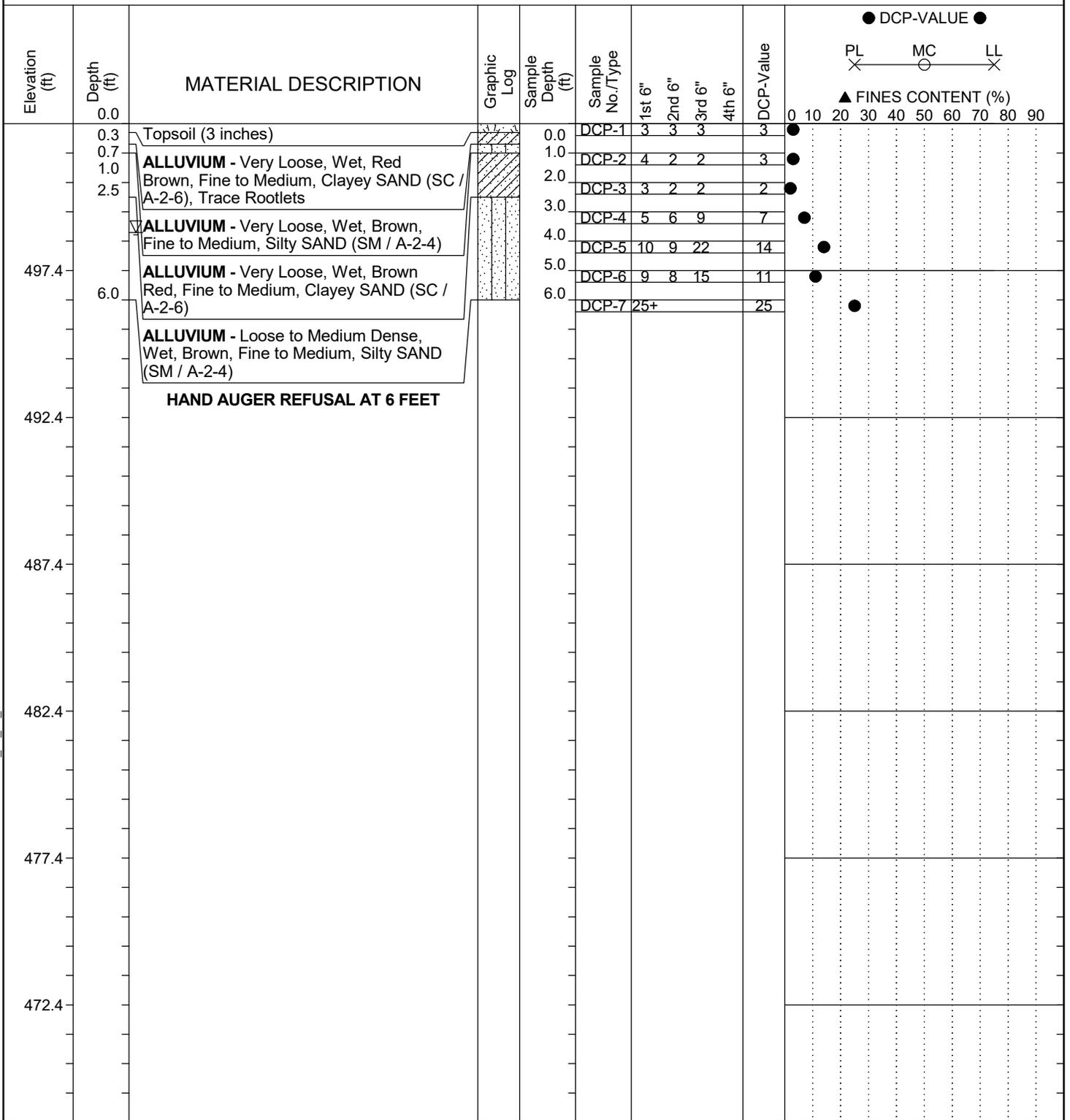
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SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	DCP Dynamic Cone Penetrometer	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

MANUAL AUGER LOG YORK COUNTY SC 160 RGER.GPJ SCDOT DATA TEMPLATE_01_30_2015.GDT 9/24/21

SCDOT Manual Auger Log

Project ID: P029536	County: York	Boring No.: HA-102
Site Description: SC 160 (S&ME Project 6235-16-017)		Route: Hwy 160 East
Driller: B. Kebea	Boring Location: 95+65	Offset: 60 RT
Elev.: 502.4 ft	Latitude: 35.005641	Longitude: -80.905719
Total Depth: 6 ft	Groundwater: TOB	Date Started: 12/9/2020
Dynamic Cone Penetrometer Test Procedure:		Date Completed: 12/9/2020
Sowers and Hedges (1966)		



LEGEND

SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	DCP Dynamic Cone Penetrometer	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

MANUAL AUGER LOG YORK COUNTY SC 160 RGER.GPJ SCDOT DATA TEMPLATE_01_30_2015.GDT 9/24/21

Appendix III – Lab Summary and Lab Results

SUMMARY OF LABORATORY TEST RESULTS

Boring No.	Sample Depth (ft)	Sample Number *	USCS Class.	AASHTO Class.	Natural Moisture Content (%)	% Finer No. 200	Atterberg Limits			Triaxial Shear Strength				Consolidation		California Bearing Ratio		Organic Content (%)	Standard Proctor	
							LL	PL	PI	Total		Effective		P _c (tsf)	C _c	CBR at 0.1 in.	CBR at 0.2 in.		Maximum Dry Density (pcf)	Optimum Moisture Content (%)
										c (psf)	φ (deg)	c' (psf)	φ' (deg)							
B-1	1.5 - 3.0	SS-1			30.0															
B-2	0.5 - 2.0	SS-1			22.7															
B-2	4.5 - 6.0	SS-3	MH	A-7-5	26.3	81.8	73	35	38											
B-3	0.5 - 2.0	SS-1	CH	A-7-6	27.0	66.3	61	27	34											
B-4	0.6 - 2.1	SS-1			20.8															
B-4	1.0 - 10.0	Bulk	SC	A-6	20.4	49.8	40	20	20						5.6	5.2		108.8	16.5	
B-5	0.8 - 2.3	SS-1			21.3															
B-5	6.5 - 8.0	SS-4	MH	A-7-5	22.6	63.0	58	34	24											
B-6	0.8 - 2.3	SS-1			19.3															
B-6	8.5 - 10.0	SS-5	SM	A-4	20.9	42.9	35	35	0											
B-6	28.5 - 30.0	SS-9	SM	A-4	15.9	43.7	34	28	6											
B-7	0.7 - 2.2	SS-1			13.7															
B-8	0.5 - 2.0	SS-1			21.6															
HA-1	0.5 - 2.0	S-2	SC	A-6	22.3	49.8	33	19	14											
HA-101	1.0 - 6.0	CU-2	SC	A-7-6	16.8	40.6	44	24	20	291	13.3	0	31.4					109.2	16.4	

* SS = Split Spoon Sample (ASTM D-1586)
 CU/Bulk= Bulk Sample
 S= Bag Sample

Graphic Presentations of Results of Grain Size Distribution, Triaxial Shear, and other tests follow this summary

Job Name: SC-160 East
 Job Location: York County, South Carolina
 Job Number: 6235-16-017

Sieve Analysis of Soils



ASTM D 422

Quality Assurance

S&ME, Inc. ~ 9751 Southern Pine Boulevard~Charlotte, NC 28273

Project #:	6235-16-017	Report Date:	4/26/17
Project Name:	York County SC 160	Test Date(s):	4/7-17/17
Client Name:	NA		
Client Address:	NA		
Sample ID:	B-2	Type:	Split Spoon
		Sample Date:	NA
Location:	Boreholes	Sample:	SS-3
		Elevation:	4.5-6'
Sample Description:	Reddish Orange Clayey Silt w/Medium to Fine Sand (MH)		A-7-5



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm (#200)
Gravel	< 75 mm and > 4.75 mm (#4)	Silt	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and > 2.00 mm (#10)	Clay	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Maximum Particle Size	#10	Coarse Sand	0.9%	Fine Sand	13.2%
Gravel	0.0%	Medium Sand	4.1%	Silt & Clay	81.8%
Liquid Limit	73	Plastic Limit	35	Plastic Index	38
Specific Gravity	ND			Moisture Content	26.3%
Coarse Sand	0.9%	Medium Sand	4.1%	Fine Sand	13.2%
Description of Sand & Gravel Particles:		Rounded	<input type="checkbox"/>	Angular	<input checked="" type="checkbox"/>
Hard & Durable	<input checked="" type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable	<input type="checkbox"/>

Notes / Deviations / References: ND: Not Determined

Technician Name: _____ Date: _____

Rob Kral _____
 Technical Responsibility Signature Position Date

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Sieve Analysis of Soils



ASTM D 422

Quality Assurance

S&ME, Inc. ~ 9751 Southern Pine Boulevard~Charlotte, NC 28273

Project #:	6235-16-017	Report Date:	4/26/17
Project Name:	York County SC 160	Test Date(s):	4/7-17/17
Client Name:	NA		
Client Address:	NA		
Sample ID:	B-3	Type:	Split Spoon
		Sample Date:	NA
Location:	Boreholes	Sample:	SS-1
		Elevation:	0.5-2'
Sample Description:	Brown Red Coarse to Fine Sandy Clay (CH)		A-7-6



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm (#200)
Gravel	< 75 mm and > 4.75 mm (#4)	Silt	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and > 2.00 mm (#10)	Clay	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Maximum Particle Size	#10	Coarse Sand	3.4%	Fine Sand	15.8%
Gravel	0.0%	Medium Sand	14.4%	Silt & Clay	66.3%
Liquid Limit	61	Plastic Limit	27	Plastic Index	34
Specific Gravity	ND			Moisture Content	27.0%
Coarse Sand	3.4%	Medium Sand	14.4%	Fine Sand	15.8%
Description of Sand & Gravel Particles:		Rounded	<input type="checkbox"/>	Angular	<input checked="" type="checkbox"/>
Hard & Durable	<input checked="" type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable	<input type="checkbox"/>

Notes / Deviations / References: ND: Not Determined

Technician Name: _____ Date: _____

Rob Kral _____
 Technical Responsibility Signature Position Date

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**CBR (California Bearing Ratio) of Laboratory
Compacted Soil**

AASHTO T 193

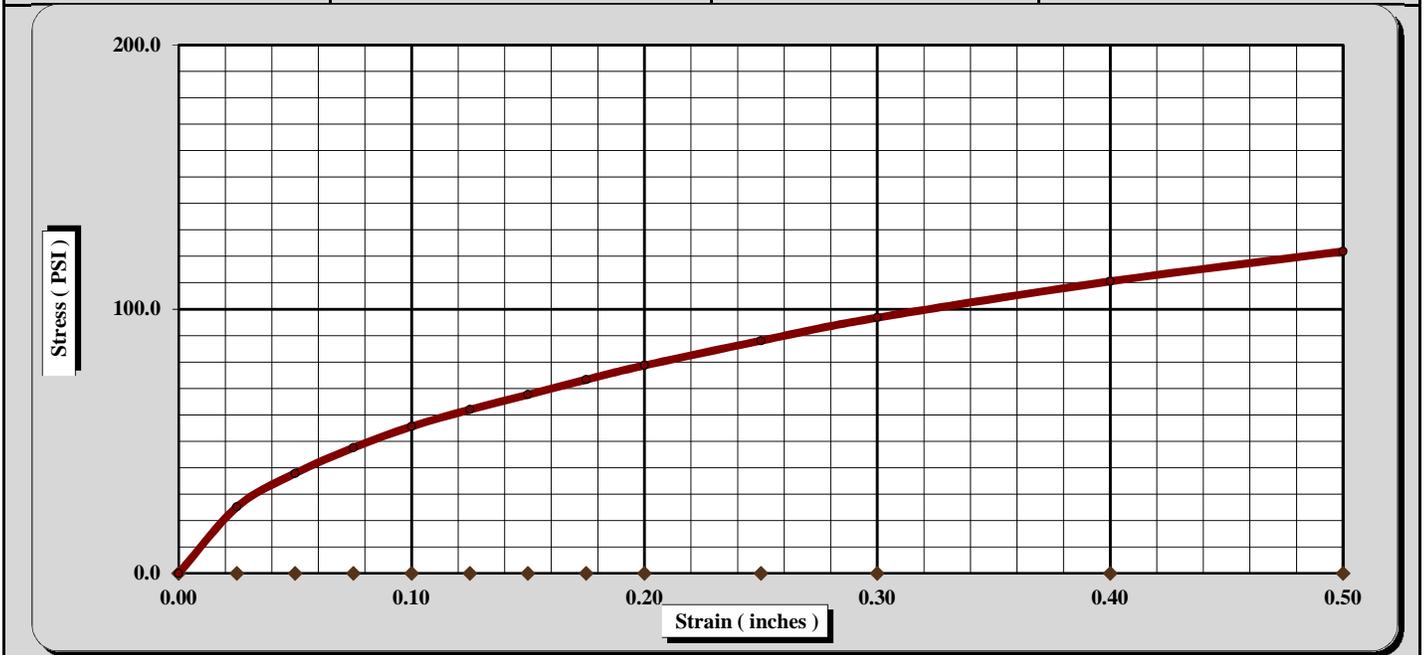


Quality Assurance

S&ME, Inc. Branch, Branch Address

Project #:	6235-16-017	Report Date:	4/26/17
Project Name:	York County SC 160	Test Date(s)	4/6-18/7
Client Name:	NA		
Client Address:	NA		
Boring #:	B-4	Sample #:	Bulk
		Sample Date:	NA
Location:	Borehole	Offset:	NA
		Elevation:	1-10'
Sample Description:	Red Orange Brown Clayey Coarse to Fine Sand (SC)		A-6
AASHTO T99 Method A	Maximum Dry Density:	108.8 PCF	Optimum Moisture Content:
			16.5%
	Compaction Test performed on the Fine Fraction only		% Retained on the 3/4" sieve:
			0.0%

Uncorrected CBR Values		Corrected CBR Values	
CBR at 0.1 in.	5.6	CBR at 0.2 in.	5.2
		CBR at 0.1 in.	5.6
		CBR at 0.2 in.	5.2



CBR Sample Preparation:

The entire gradation was used and compacted in a 6" CBR mold in accordance with AASHTO T 193, Section 5.1.1

Before Soaking		After Soaking	
Compactive Effort (Blows per Layer)	22	Final Dry Density (PCF)	100.9
Initial Dry Density (PCF)	103.7	Average Final Moisture Content	18.9%
Moisture Content of the Compacted Specimen	15.8%	Moisture Content (top 1" after soaking)	21.1%
Percent Compaction	95.3%	Percent Swell	0.1%
Soak Time:	96 hrs.	Surcharge Weight	30.0
		Surcharge Wt. per sq. Ft.	152.9
Liquid Limit	40	Plastic Index	20
		Assumed Apparent Relative Density	2.650

Notes/Deviations/References:

Rob Kral

Technical Responsibility

Signature

Position

Date

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Moisture - Density Report



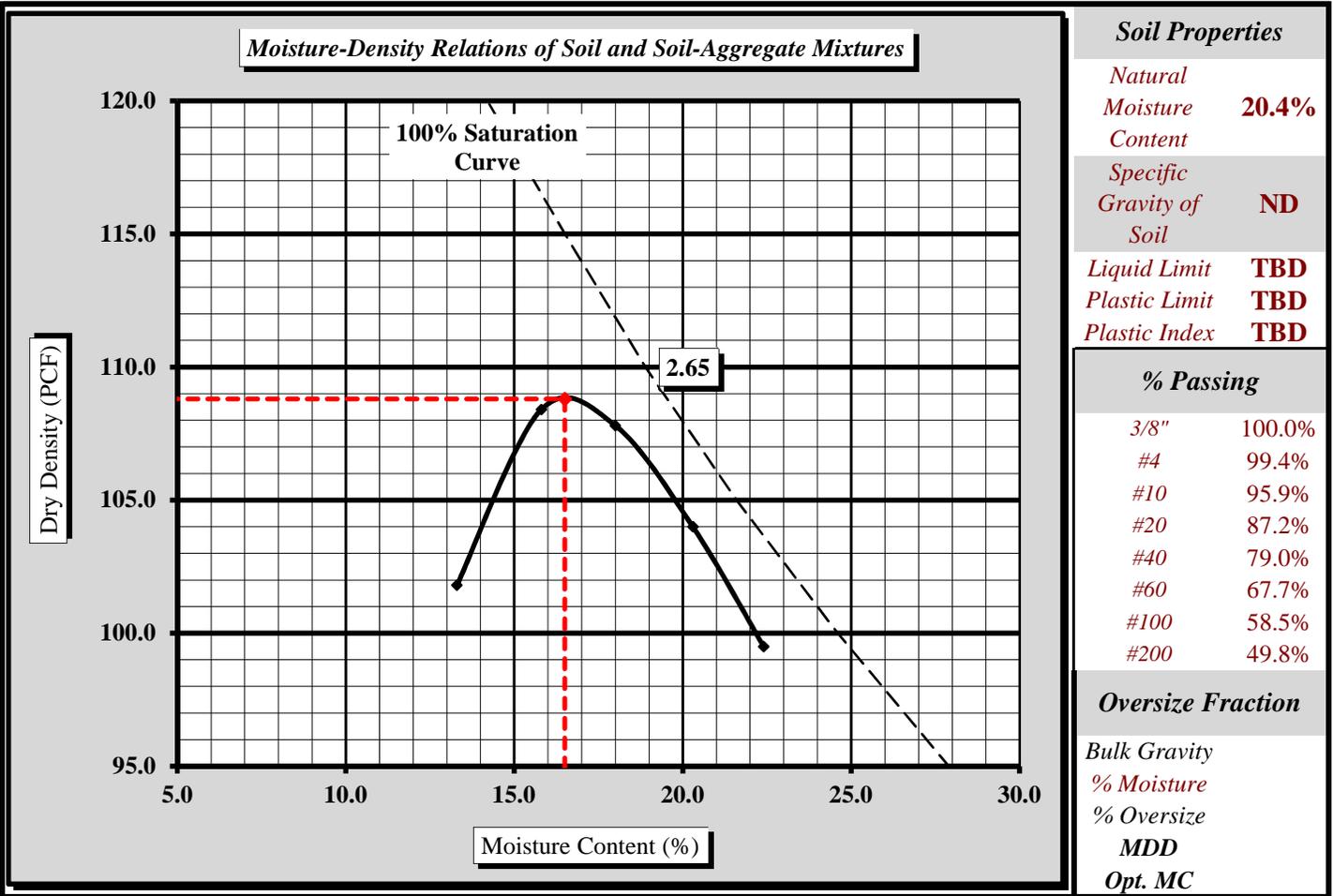
Quality Assurance

9751 Southern Pine Blvd., Charlotte, NC 28273

S&ME Project #:	6235-16-017	Report Date:	4/26/17
Project Name:	York County SC 160	Test Date(s):	4/6-11/17
Client Name:	NA		
Client Address:	NA		
Boring #:	B-4	Sample #:	Bulk
		Sample Date:	NA
Location:	Borehole	Offset:	NA
		Depth:	42745
Sample Description:	Red Orange Brown Clayey Coarse to Fine Sand (SC)		A-6

Maximum Dry Density 108.8 PCF. Optimum Moisture Content 16.5%

AASHTO T99 -- Method A



Moisture-Density Curve Displayed: Fine Fraction Corrected for Oversize Fraction (ASTM D 4718)
 Sieve Size used to separate the Oversize Fraction: #4 Sieve 3/8 inch Sieve 3/4 inch Sieve
 Mechanical Rammer Manual Rammer Moist Preparation Dry Preparation

References / Comments / Deviations:

Not Determined:

AASHTO T265: Laboratory Determination of Moisture Content of Soils

AASHTO T 99: Moisture-Density Relations of Soil Using a 5.5 Lb. Rammer and a 12" Drop

Rob Kral

Technical Responsibility

Signature

Staff Professional

Position

Date

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Sieve Analysis of Soils



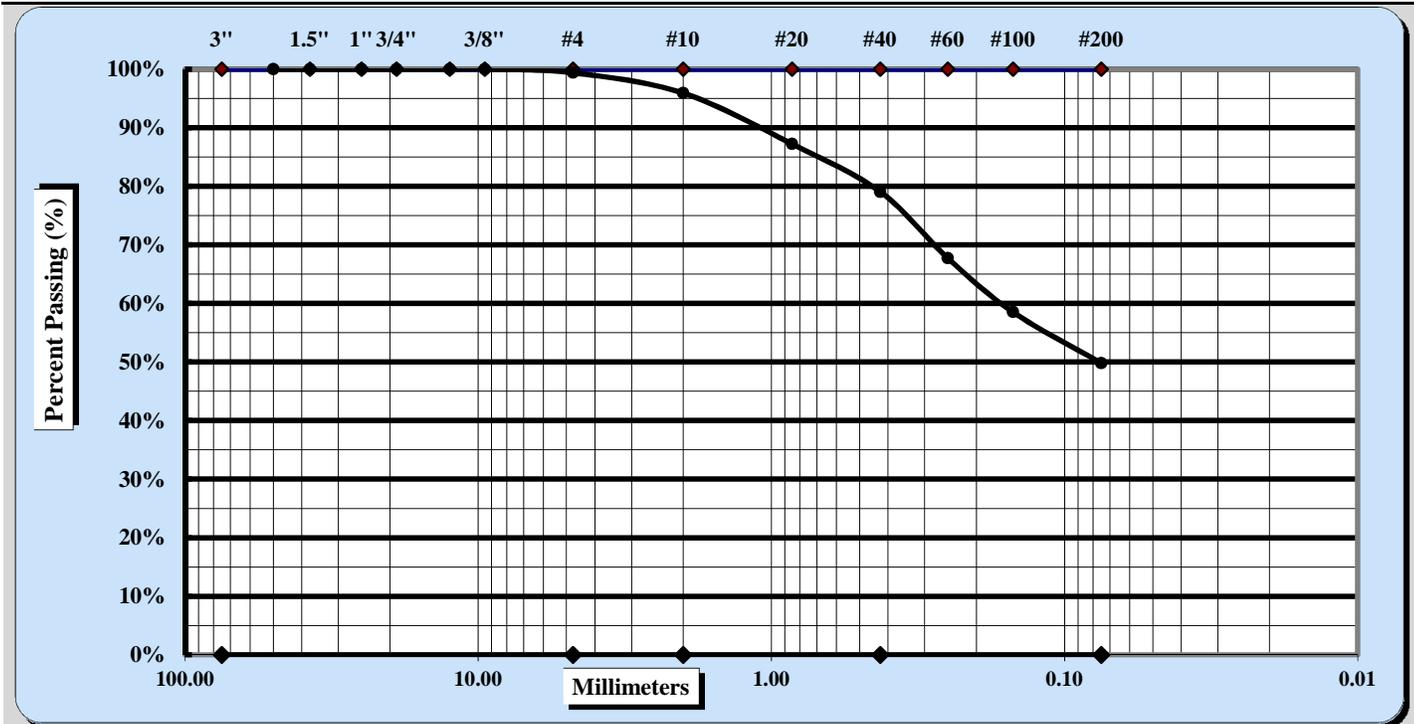
ASTM D 422

Quality Assurance

S&ME, Inc. ~ 9751 Southern Pine Boulevard~Charlotte, NC 28273

Project #:	6235-16-017	Report Date:	4/26/17
Project Name:	York County SC 160	Test Date(s):	4/7-17/17
Client Name:	NA		
Client Address:	NA		
Sample ID:	B-4	Type:	Bulk
		Sample Date:	NA
Location:	Boreholes	Sample:	Bulk
		Elevation:	1-10'

Sample Description: Red Orange Brown Clayey Coarse to Fine Sand (SC) **A-6**



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm (#200)
Gravel	< 75 mm and > 4.75 mm (#4)	Silt	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and > 2.00 mm (#10)	Clay	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Maximum Particle Size	#4	Coarse Sand	3.5%	Fine Sand	29.2%
Gravel	0.6%	Medium Sand	16.9%	Silt & Clay	49.8%
Liquid Limit	40	Plastic Limit	20	Plastic Index	20
Specific Gravity	ND			Moisture Content	20.4%
Coarse Sand	3.5%	Medium Sand	16.9%	Fine Sand	29.2%
Description of Sand & Gravel Particles:		Rounded	<input type="checkbox"/>	Angular	<input checked="" type="checkbox"/>
Hard & Durable	<input checked="" type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable	<input type="checkbox"/>

Notes / Deviations / References: ND: Not Determined

Technician Name: _____ **Date:** _____

Rob Kral

Technical Responsibility

Signature

Position

Date

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Sieve Analysis of Soils

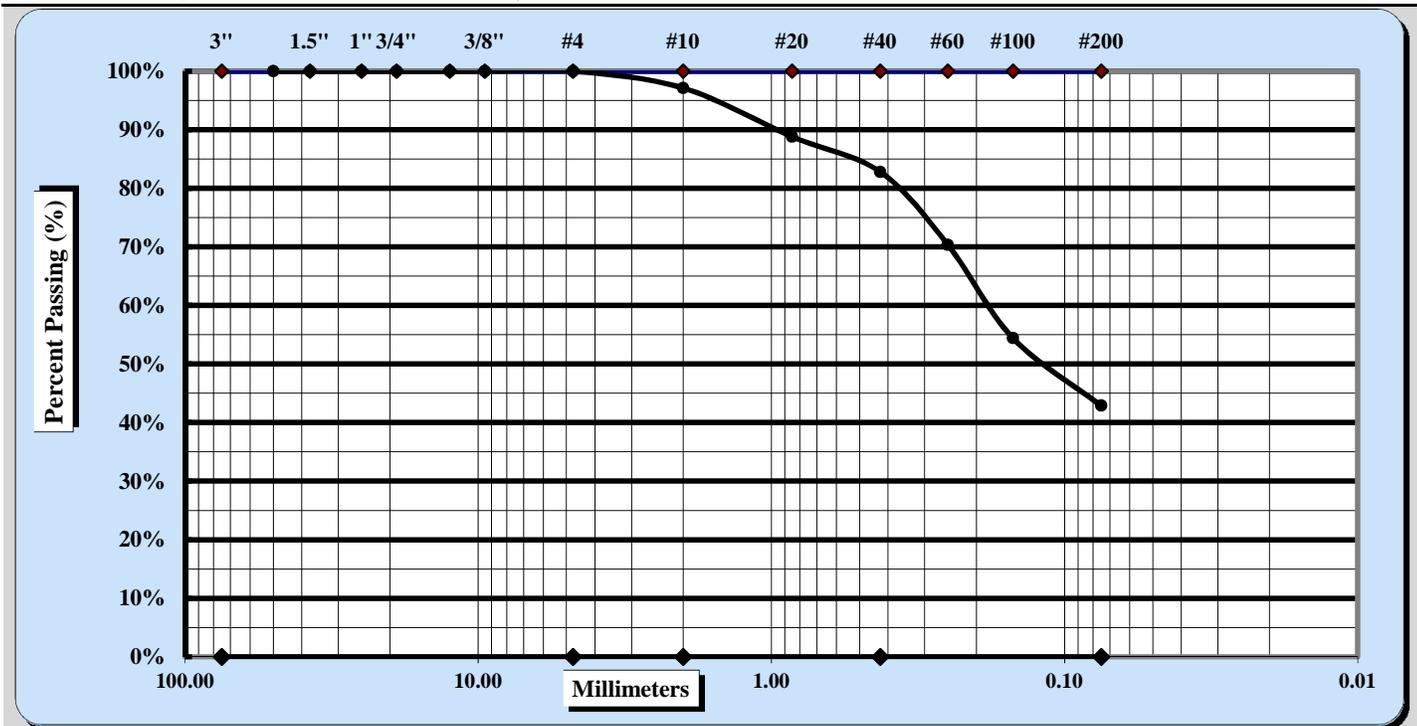


ASTM D 422

Quality Assurance

S&ME, Inc. ~ 9751 Southern Pine Boulevard~Charlotte, NC 28273

Project #:	6235-16-017	Report Date:	4/26/17
Project Name:	York County SC 160	Test Date(s):	4/7-17/17
Client Name:	NA		
Client Address:	NA		
Sample ID:	B-6	Type:	Split Spoon
		Sample Date:	NA
Location:	Boreholes	Sample:	SS-5
		Elevation:	8.5-10'
Sample Description:	Tan Brown Silty Coarse to Fine Sand (SM)		A-4



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm (#200)
Gravel	< 75 mm and > 4.75 mm (#4)	Silt	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and > 2.00 mm (#10)	Clay	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Maximum Particle Size	#10	Coarse Sand	2.9%	Fine Sand	39.9%
Gravel	0.0%	Medium Sand	14.3%	Silt & Clay	42.9%
Liquid Limit	35	Plastic Limit	35	Plastic Index	0
Specific Gravity	ND			Moisture Content	20.9%
Coarse Sand	2.9%	Medium Sand	14.3%	Fine Sand	39.9%
Description of Sand & Gravel Particles:		Rounded	<input type="checkbox"/>	Angular	<input checked="" type="checkbox"/>
Hard & Durable	<input checked="" type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable	<input type="checkbox"/>

Notes / Deviations / References: ND: Not Determined

Technician Name: _____ Date: _____

Rob Kral

Technical Responsibility

Signature

Position

Date

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Sieve Analysis of Soils



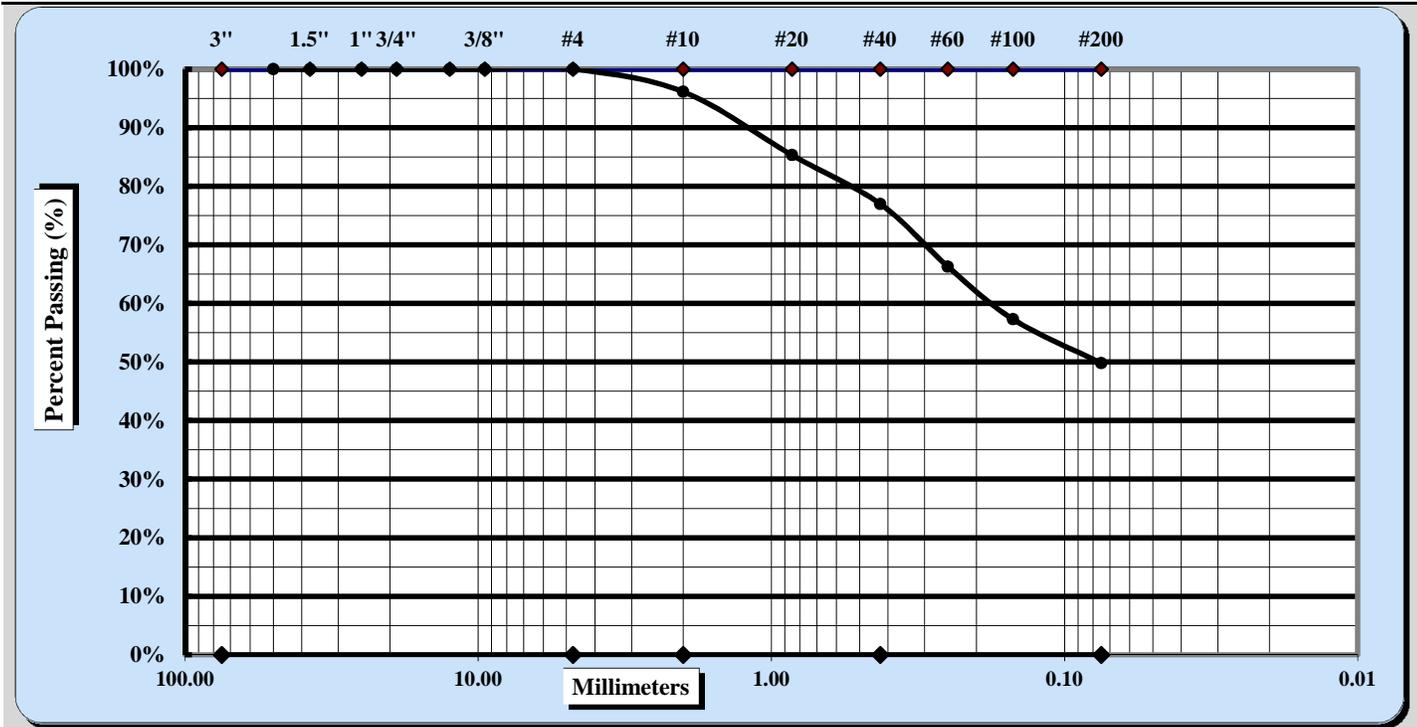
ASTM D 422

Quality Assurance

S&ME, Inc. ~ 9751 Southern Pine Boulevard~Charlotte, NC 28273

Project #:	6235-16-017	Report Date:	4/26/17
Project Name:	York County SC 160	Test Date(s):	4/7-17/17
Client Name:	NA		
Client Address:	NA		
Sample ID:	HA-1	Type:	Split Spoon
		Sample Date:	NA
Location:	Boreholes	Sample:	SS-2
		Elevation:	0.5-2'

Sample Description: Brown Gray Clayey Coarse to Fine Sand (SC) **A-6**



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm (#200)
Gravel	< 75 mm and > 4.75 mm (#4)	Silt	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and > 2.00 mm (#10)	Clay	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Maximum Particle Size	#10	Coarse Sand	3.8%	Fine Sand	27.2%
Gravel	0.0%	Medium Sand	19.2%	Silt & Clay	49.8%
Liquid Limit	33	Plastic Limit	19	Plastic Index	14
Specific Gravity	ND			Moisture Content	22.3%
Coarse Sand	3.8%	Medium Sand	19.2%	Fine Sand	27.2%
Description of Sand & Gravel Particles:		Rounded	<input type="checkbox"/>	Angular	<input type="checkbox"/>
Hard & Durable	<input type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable	<input type="checkbox"/>

Notes / Deviations / References: ND: Not Determined

Technician Name: _____ **Date:** _____

Rob Kral
Technical Responsibility

Signature

Position

Date

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LIQUID LIMIT, PLASTIC LIMIT, & PLASTIC INDEX



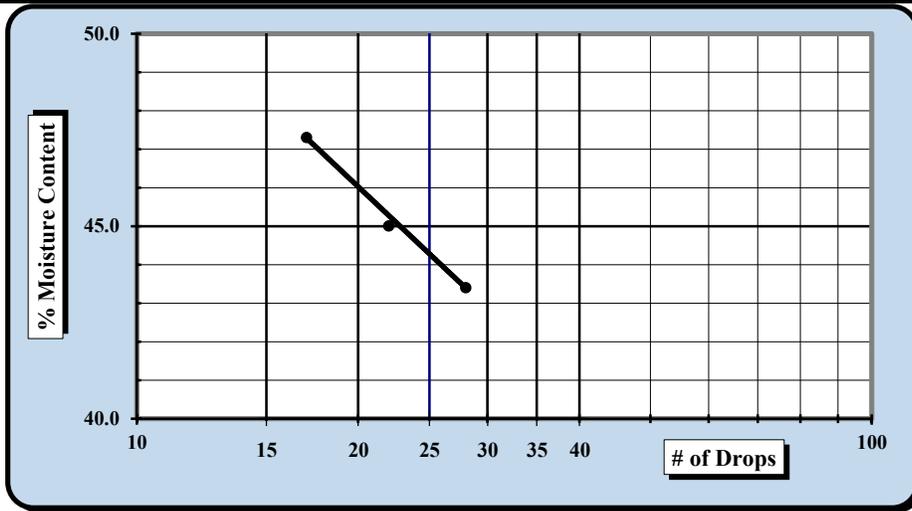
ASTM D 4318 AASHTO T 89 AASHTO T 90

S&ME, Inc. Charlotte: 9751 Southern Pine Boulevard, Charlotte, NC 28273

Project #:	6235-16-017	Report Date:	1/19/21
Project Name:	SC-160 East from Mimosa Lane to Hensley Road	Test Date(s)	12/15/20-1/9/21
Client Name:	STV		
Client Address:	North Charleston, South Carolina		
Boring:	HA-101	Sample #:	CU-2
		Sample Date:	12/9/20
Location:	Borehole	Offset:	NI
		Depth:	1-6'

Sample Description: Tan Yellow Clayey Coarse to Fine Sand (SC) [A-7-6]					
Type and Specification	S&ME ID #	Cal Date:	Type and Specification	S&ME ID #	Cal Date:
Balance (0.01 g)	3222	7/30/2020	Grooving tool	30427	2/14/2020
LL Apparatus	33575	10/4/2020	Grooving tool		
Oven	10844	2/11/2020	Grooving tool		

Pan #	Tare #:	Liquid Limit					Plastic Limit		
		J12	J37	J22			J19		
A	Tare Weight	14.05	14.00	14.14			14.13		
B	Wet Soil Weight + A	28.13	29.02	28.56			23.94		
C	Dry Soil Weight + A	23.87	24.36	23.93			22.02		
D	Water Weight (B-C)	4.26	4.66	4.63			1.92		
E	Dry Soil Weight (C-A)	9.82	10.36	9.79			7.89		
F	% Moisture (D/E)*100	43.4%	45.0%	47.3%			24.3%		
N	# OF DROPS	28	22	17			Moisture Contents determined by ASTM D 2216		
LL	LL = F * FACTOR								
Ave.	Average						24.3%		



One Point Liquid Limit			
N	Factor	N	Factor
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic

Liquid Limit **44**

Plastic Limit **24**

Plastic Index **20**

Group Symbol **CL /A-7-6**

Multipoint Method

One-point Method

Wet Preparation Dry Preparation Air Dried Estimate the % Retained on the #40 Sieve:

Notes / Deviations / References: ND: Not Determined NI: No Information Provided

ASTM D 4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils AASHTO T89: Determining the Liquid Limit of Soils

Juan Cruz
Technician Name

1/19/2021
Date

Nate Bradley, P.E.
Technical Responsibility

2/1/2021
Date

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ASTM D 422

S&ME, Inc. Charlotte: 9751 Southern Pine Boulevard, Charlotte, NC 28273

Project #:	6235-16-017	Report Date:	1/19/21
Project Name:	SC-160 East from Mimosa Lane to Hensley Road	Test Date(s):	12/15-1/19/21
Client Name:	STV Incorporated		
Client Address:	North Charleston, South Carolina		
Sample Id.	HA-101	Type:	Bulk
		Sample Date:	12/9/20
Location:	Borehole	Sample:	CU-2
		Depth:	1-6'

Sample Description: Tan Yellow Clayey Coarse to Fine Sand (SC) [A-7-6]



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm
Gravel	< 75 mm and > 4.75 mm (#4)	Silt	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and > 2.00 mm (#10)	Clay	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Maximum Particle Size	3/8"	Coarse Sand	4.2%	Fine Sand	28.5%
Gravel	0.0%	Medium Sand	26.3%	Silt & Clay	40.6%
Liquid Limit	44	Plastic Limit	24	Plastic Index	20
Specific Gravity	ND			Moisture Content	16.8%
Coarse Sand	4.2%	Medium Sand	26.3%	Fine Sand	28.5%
Description of Sand & Gravel Particles:		Rounded	<input type="checkbox"/>	Angular	<input checked="" type="checkbox"/>
Hard & Durable	<input checked="" type="checkbox"/>	Soft	<input type="checkbox"/>	Weathered & Friable	<input type="checkbox"/>

Notes / Deviations / References:

Nate Bradley, P.E.
Technical Responsibility

Project Engineer
Position

2/1/2021
Date

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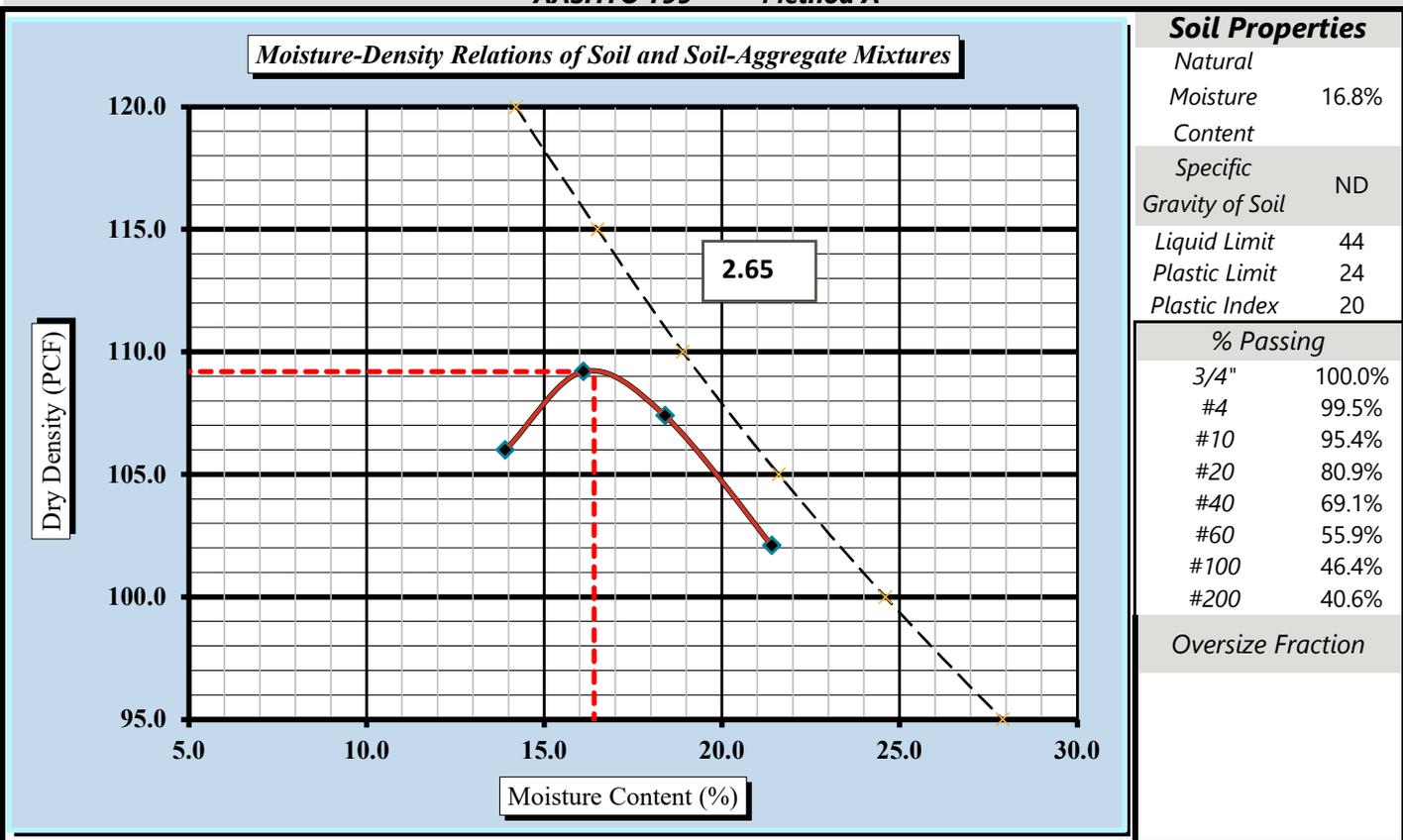
MOISTURE - DENSITY REPORT



Quality Assurance

S&ME, Inc. Charlotte: 9751 Southern Pine Boulevard, Charlotte, NC 28273			
S&ME Project #:	6235-16-017	Report Date:	1/19/21
Project Name:	SC-160 East From Minosa Lane to Hensley Road	Test Date(s):	12/15-2/19/21
Client Name:	STV Incorporated		
Client Address:	North Charleston, South Carolina		
Boring #:	HA-101	Sample #:	CU-2
Location:	Borehole	Offset:	NI
		Sample Date:	12/9/2020
		Depth:	1-6'
Sample Description:	Tan Yellow Clayey Coarse to Fine Sand (SC) [A-7-6]		

Maximum Dry Density 109.2 PCF. Optimum Moisture Content 16.4%
AASHTO T99 - - Method A



Moisture-Density Curve Displayed: Fine Fraction Corrected for Oversize Fraction (ASTM D 4718)
 Sieve Size used to separate the Oversize Fraction: #4 Sieve 3/8 inch Sieve 3/4 inch Sieve
 Mechanical Rammer Manual Rammer Moist Preparation Dry Preparation

References / Comments / Deviations: ND: Not Determined NI: No Information Provided

AASHTO T 99: Moisture-Density Relations of Soil Using a 5.5 Lb. Rammer and a 12" Drop

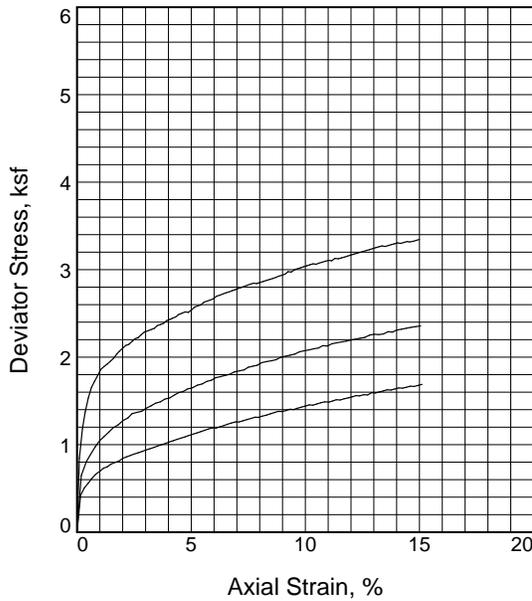
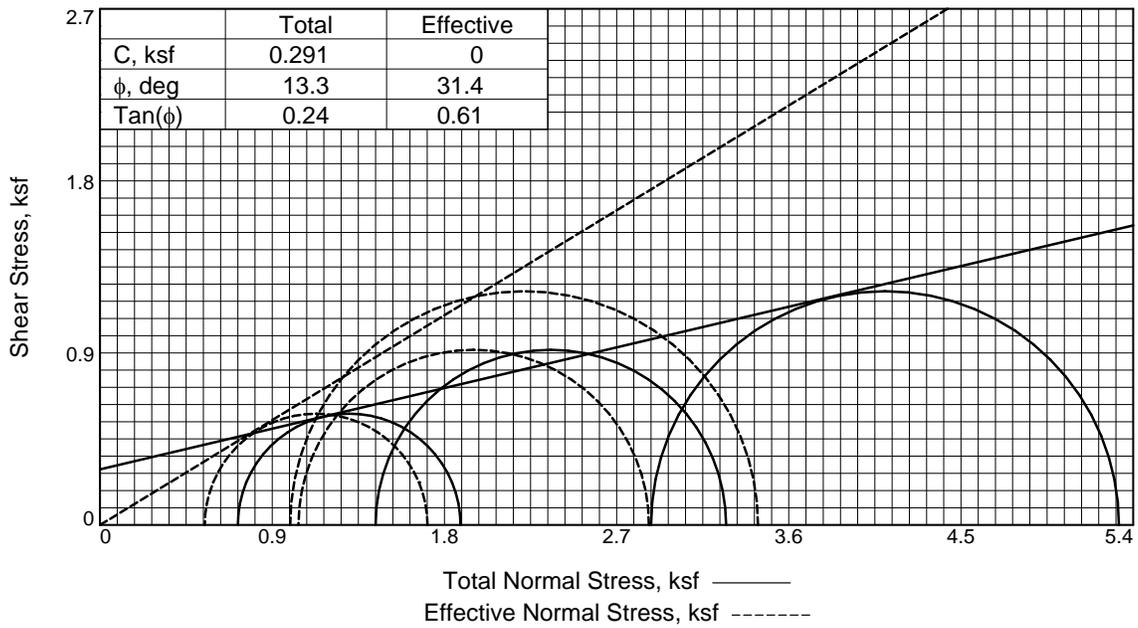
Nate Bradley, P.E.
 Technical Responsibility

Project Engineer
 Position

2/1/2021
 Date

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C & phi are not test results but an interpretation of the test results. The designer is responsible for interpreting test data as provided by S&ME.

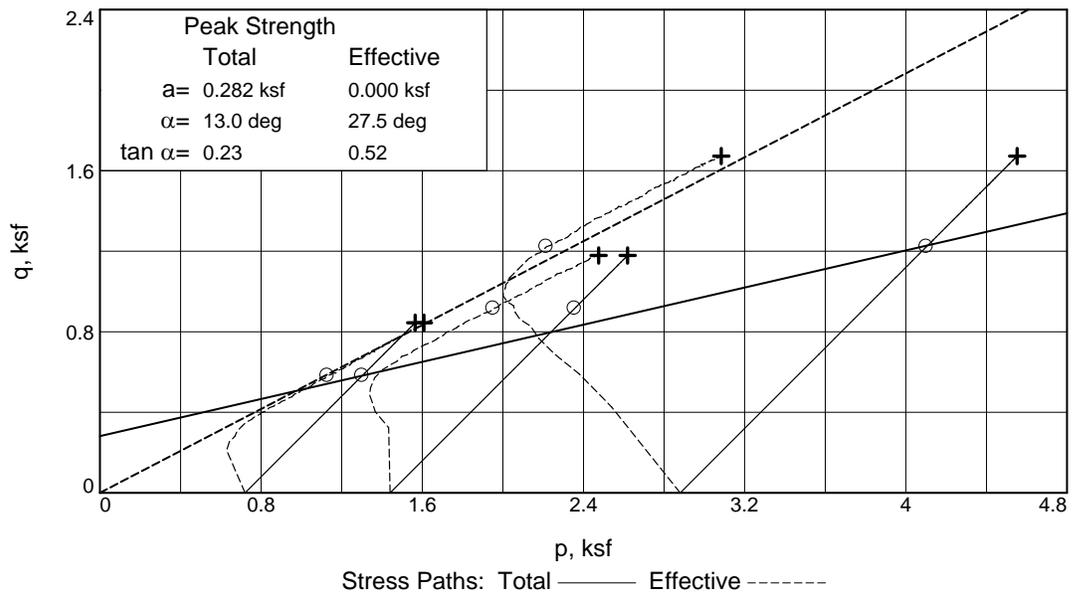
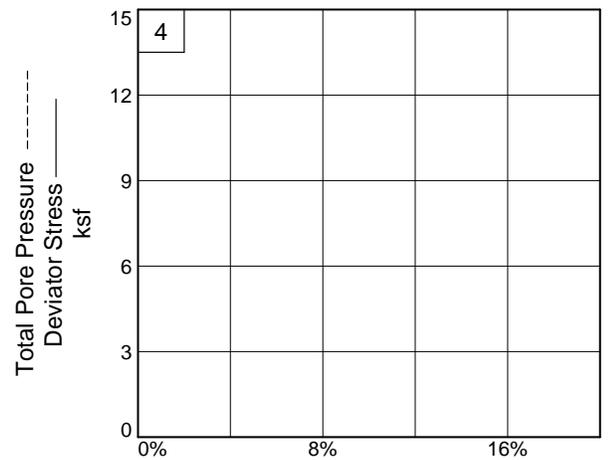
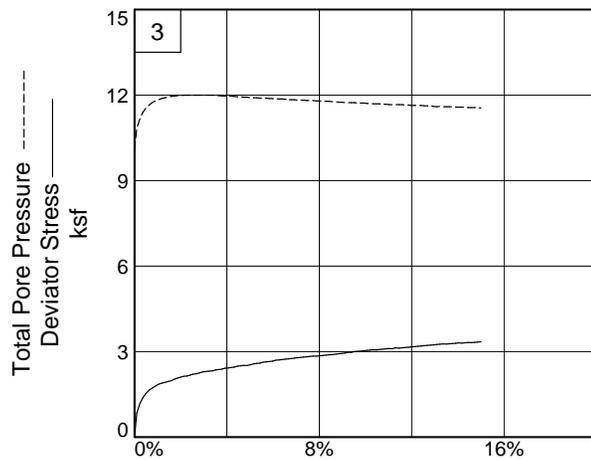
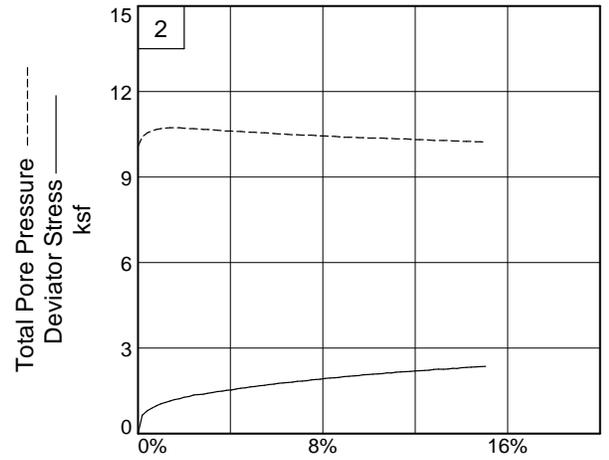
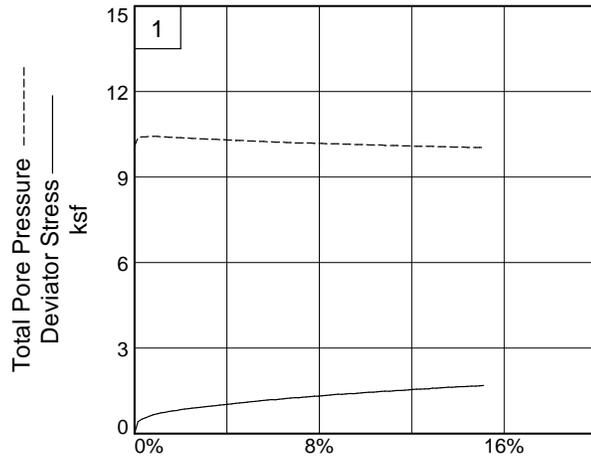


Sample No.	1	2	3	
Initial	Water Content, %	16.2	16.4	16.3
	Dry Density, pcf	104.4	104.2	104.3
	Saturation, %	75.7	76.7	76.1
	Void Ratio	0.5552	0.5571	0.5555
	Diameter, in.	2.865	2.864	2.865
	Height, in.	5.944	5.939	5.935
At Test	Water Content, %	19.8	20.1	19.1
	Dry Density, pcf	107.2	106.7	108.4
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.5138	0.5219	0.4978
	Diameter, in.	2.839	2.842	2.829
	Height, in.	5.891	5.894	5.861
Strain rate, in./min.	0.005	0.006	0.004	
Eff. Cell Pressure, ksf	0.720	1.440	2.880	
Fail. Stress, ksf	1.164	1.832	2.445	
Total Pore Pr., ksf	10.253	10.483	11.966	
Strain, %	5.6	6.9	4.2	
Ult. Stress, ksf	1.689	2.358	3.345	
Total Pore Pr., ksf	10.037	10.224	11.549	
Strain, %	15.1	15.0	15.0	
$\bar{\sigma}_1$ Failure, ksf	1.711	2.869	3.439	
$\bar{\sigma}_3$ Failure, ksf	0.547	1.037	0.994	

Type of Test: CU with Pore Pressures
Sample Type: Remolded
Description: Tan Yellow Clayey Coarse to Fine Sand (SC) [A-7-6]
LL= 44 PL= 24 PI= 20
Assumed Specific Gravity= 2.60
Remarks: Remolded to approximately 95% MDD (AASHTO T-99) at -1 to +2% Optimum Moisture Content. All specimens failed in shear (ASTM D4767).
 HA-101

Client: STV Incorporated
Project: SC-160 East from Mimosa Lane to Hensley Road
Location: Borehole
Sample Number: HA-101 CU-2 **Depth:** 1-6'
Proj. No.: 6235-16-017 **Date Sampled:** 12/9/20
 TRIAXIAL SHEAR TEST REPORT
 S & ME, INC.
 Charlotte, North Carolina

C & phi are not test results but an interpretation of the test results. The designer is responsible for interpreting test data as provided by S&ME.



Client: STV Incorporated

Project: SC-160 East from Mimosa Lane to Hensley Road

Location: Borehole

Depth: 1-6'

Sample Number: HA-101 CU-2

Project No.: 6235-16-017

HA-101

S & ME, INC.

Tested By: Gustavo Salazar

Checked By: Jason Reeves, P.E. 1/25/21

TRIAxIAL COMPRESSION TEST
CU with Pore Pressures

1/25/2021
1:09 PM

Date: 12/9/20
Client: STV Incorporated
Project: SC-160 East from Mimosa Lane to Hensley Road
Project No.: 6235-16-017
Location: Borehole
Depth: 1-6' **Sample Number:** HA-101 CU-2
Description: Tan Yellow Clayey Coarse to Fine Sand (SC) [A-7-6]
Remarks: Remolded to approximately 95% MDD (AASHTO T-99) at -1 to +2% Optimum Moisture Content. All specimens failed in shear (ASTM D4767).
Type of Sample: Remolded
Assumed Specific Gravity=2.60 **LL**=44 **PL**=24 **PI**=20
Test Method: COE uniform strain

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	203.350			1394.560
Moisture content: Dry soil+tare, gms.	176.280			1161.220
Moisture content: Tare, gms.	8.700			111.620
Moisture, %	16.2	20.6	19.8	22.2
Moist specimen weight, gms.	1219.40			
Diameter, in.	2.865	2.853	2.839	
Area, in. ²	6.447	6.392	6.332	
Height, in.	5.944	5.919	5.891	
Net decrease in height, in.		0.025	0.028	
Wet density, pcf	121.2	127.5	128.4	
Dry density, pcf	104.4	105.7	107.2	
Void ratio	0.5552	0.5356	0.5138	
Saturation, %	75.7	100.0	100.0	

Test Readings for Specimen No. 1

Consolidation cell pressure = 75.000 psi (10.800 ksf)
Consolidation back pressure = 70.000 psi (10.080 ksf)
Consolidation effective confining stress = 0.720 ksf
Strain rate, in./min. = 0.005
Fail. Stress = 1.164 ksf at reading no. 33
Ult. Stress = 1.689 ksf at reading no. 89

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	35.600	0.0	0.0	0.000	0.720	0.720	1.00	70.000	0.720	0.000
1	0.0090	54.200	18.6	0.2	0.422	0.418	0.840	2.01	72.100	0.629	0.211
2	0.0190	58.000	22.4	0.3	0.508	0.389	0.897	2.31	72.300	0.643	0.254
3	0.0290	60.400	24.8	0.5	0.561	0.389	0.950	2.44	72.300	0.669	0.281
4	0.0380	62.700	27.1	0.6	0.612	0.374	0.987	2.64	72.400	0.681	0.306
5	0.0480	65.000	29.4	0.8	0.663	0.374	1.038	2.77	72.400	0.706	0.332
6	0.0590	66.600	31.0	1.0	0.698	0.374	1.072	2.86	72.400	0.723	0.349
7	0.0680	68.100	32.5	1.2	0.731	0.389	1.119	2.88	72.300	0.754	0.365
8	0.0780	68.900	33.3	1.3	0.747	0.389	1.136	2.92	72.300	0.762	0.374
9	0.0880	70.400	34.8	1.5	0.780	0.403	1.183	2.93	72.200	0.793	0.390
10	0.0970	71.200	35.6	1.6	0.796	0.403	1.200	2.97	72.200	0.801	0.398
11	0.1080	72.000	36.4	1.8	0.813	0.418	1.230	2.95	72.100	0.824	0.406
12	0.1180	73.500	37.9	2.0	0.845	0.418	1.262	3.02	72.100	0.840	0.422
13	0.1280	74.300	38.7	2.2	0.861	0.432	1.293	2.99	72.000	0.863	0.431
14	0.1380	75.100	39.5	2.3	0.877	0.432	1.309	3.03	72.000	0.871	0.439
15	0.1470	75.900	40.3	2.5	0.894	0.446	1.340	3.00	71.900	0.893	0.447
16	0.1580	76.600	41.0	2.7	0.907	0.446	1.354	3.03	71.900	0.900	0.454
17	0.1680	77.400	41.8	2.9	0.924	0.461	1.384	3.00	71.800	0.923	0.462
18	0.1780	78.200	42.6	3.0	0.940	0.461	1.400	3.04	71.800	0.931	0.470
19	0.1880	78.900	43.3	3.2	0.953	0.475	1.429	3.01	71.700	0.952	0.477
20	0.1980	79.700	44.1	3.4	0.969	0.475	1.444	3.04	71.700	0.960	0.485
21	0.2080	80.500	44.9	3.5	0.985	0.475	1.460	3.07	71.700	0.968	0.493
22	0.2180	81.300	45.7	3.7	1.001	0.490	1.490	3.04	71.600	0.990	0.500
23	0.2280	82.000	46.4	3.9	1.014	0.490	1.504	3.07	71.600	0.997	0.507
24	0.2380	82.800	47.2	4.0	1.030	0.504	1.534	3.04	71.500	1.019	0.515
25	0.2480	83.600	48.0	4.2	1.046	0.504	1.550	3.07	71.500	1.027	0.523
26	0.2580	84.400	48.8	4.4	1.061	0.518	1.580	3.05	71.400	1.049	0.531
27	0.2680	85.100	49.5	4.5	1.075	0.518	1.593	3.07	71.400	1.056	0.537
28	0.2790	85.900	50.3	4.7	1.090	0.518	1.608	3.10	71.400	1.063	0.545
29	0.2880	86.700	51.1	4.9	1.105	0.533	1.638	3.07	71.300	1.085	0.553
30	0.2990	87.500	51.9	5.1	1.120	0.533	1.653	3.10	71.300	1.093	0.560
31	0.3090	88.200	52.6	5.2	1.134	0.547	1.681	3.07	71.200	1.114	0.567
32	0.3190	89.000	53.4	5.4	1.149	0.547	1.696	3.10	71.200	1.122	0.574
33	0.3290	89.800	54.2	5.6	1.164	0.547	1.711	3.13	71.200	1.129	0.582
34	0.3390	90.600	55.0	5.8	1.179	0.562	1.740	3.10	71.100	1.151	0.589
35	0.3480	91.300	55.7	5.9	1.192	0.562	1.754	3.12	71.100	1.158	0.596
36	0.3590	91.300	55.7	6.1	1.190	0.576	1.766	3.07	71.000	1.171	0.595
37	0.3690	92.100	56.5	6.3	1.204	0.576	1.780	3.09	71.000	1.178	0.602
38	0.3790	92.900	57.3	6.4	1.219	0.576	1.795	3.12	71.000	1.186	0.610
39	0.3880	93.700	58.1	6.6	1.234	0.590	1.825	3.09	70.900	1.208	0.617
40	0.3980	94.400	58.8	6.8	1.247	0.590	1.837	3.11	70.900	1.214	0.623
41	0.4090	95.200	59.6	6.9	1.261	0.605	1.866	3.09	70.800	1.235	0.631
42	0.4180	95.200	59.6	7.1	1.259	0.605	1.864	3.08	70.800	1.234	0.630
43	0.4280	96.000	60.4	7.3	1.274	0.605	1.879	3.11	70.800	1.242	0.637
44	0.4380	96.700	61.1	7.4	1.286	0.605	1.891	3.13	70.800	1.248	0.643
45	0.4490	97.500	61.9	7.6	1.300	0.605	1.905	3.15	70.800	1.255	0.650
46	0.4590	98.300	62.7	7.8	1.315	0.619	1.934	3.12	70.700	1.277	0.657

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
47	0.4690	98.300	62.7	8.0	1.312	0.619	1.932	3.12	70.700	1.275	0.656
48	0.4780	99.100	63.5	8.1	1.327	0.619	1.946	3.14	70.700	1.283	0.663
49	0.4890	99.800	64.2	8.3	1.339	0.634	1.972	3.11	70.600	1.303	0.669
50	0.4990	100.600	65.0	8.5	1.353	0.634	1.987	3.14	70.600	1.310	0.677
51	0.5090	101.400	65.8	8.6	1.367	0.634	2.001	3.16	70.600	1.317	0.684
52	0.5190	102.200	66.6	8.8	1.381	0.634	2.015	3.18	70.600	1.324	0.691
53	0.5290	102.200	66.6	9.0	1.379	0.648	2.027	3.13	70.500	1.337	0.689
54	0.5390	102.900	67.3	9.1	1.391	0.648	2.039	3.15	70.500	1.343	0.695
55	0.5490	103.700	68.1	9.3	1.404	0.648	2.052	3.17	70.500	1.350	0.702
56	0.5590	103.700	68.1	9.5	1.402	0.662	2.064	3.12	70.400	1.363	0.701
57	0.5680	104.500	68.9	9.6	1.416	0.662	2.078	3.14	70.400	1.370	0.708
58	0.5790	105.300	69.7	9.8	1.429	0.662	2.092	3.16	70.400	1.377	0.715
59	0.5890	106.000	70.4	10.0	1.441	0.662	2.103	3.18	70.400	1.383	0.720
60	0.5990	106.800	71.2	10.2	1.455	0.677	2.131	3.15	70.300	1.404	0.727
61	0.6090	106.800	71.2	10.3	1.452	0.677	2.129	3.15	70.300	1.403	0.726
62	0.6190	107.600	72.0	10.5	1.465	0.677	2.142	3.17	70.300	1.410	0.733
63	0.6290	108.400	72.8	10.7	1.479	0.677	2.156	3.19	70.300	1.416	0.739
64	0.6390	109.100	73.5	10.8	1.490	0.691	2.181	3.16	70.200	1.436	0.745
65	0.6500	109.100	73.5	11.0	1.487	0.691	2.178	3.15	70.200	1.435	0.744
66	0.6600	109.900	74.3	11.2	1.500	0.691	2.192	3.17	70.200	1.441	0.750
67	0.6690	110.700	75.1	11.4	1.514	0.691	2.205	3.19	70.200	1.448	0.757
68	0.6790	110.700	75.1	11.5	1.511	0.706	2.217	3.14	70.100	1.461	0.756
69	0.6890	111.500	75.9	11.7	1.524	0.706	2.230	3.16	70.100	1.468	0.762
70	0.7000	112.200	76.6	11.9	1.535	0.706	2.241	3.18	70.100	1.473	0.768
71	0.7100	113.000	77.4	12.1	1.548	0.720	2.268	3.15	70.000	1.494	0.774
72	0.7200	113.800	78.2	12.2	1.561	0.720	2.281	3.17	70.000	1.501	0.781
73	0.7290	113.800	78.2	12.4	1.558	0.720	2.278	3.16	70.000	1.499	0.779
74	0.7400	114.600	79.0	12.6	1.571	0.720	2.291	3.18	70.000	1.505	0.785
75	0.7500	114.600	79.0	12.7	1.568	0.720	2.288	3.18	70.000	1.504	0.784
76	0.7600	116.100	80.5	12.9	1.595	0.720	2.315	3.21	70.000	1.517	0.797
77	0.7700	116.100	80.5	13.1	1.591	0.734	2.326	3.17	69.900	1.530	0.796
78	0.7800	116.900	81.3	13.2	1.604	0.734	2.339	3.18	69.900	1.536	0.802
79	0.7900	117.600	82.0	13.4	1.615	0.734	2.349	3.20	69.900	1.542	0.807
80	0.8000	118.400	82.8	13.6	1.627	0.734	2.362	3.22	69.900	1.548	0.814
81	0.8100	118.400	82.8	13.7	1.624	0.749	2.373	3.17	69.800	1.561	0.812
82	0.8200	119.200	83.6	13.9	1.637	0.749	2.385	3.19	69.800	1.567	0.818
83	0.8300	120.000	84.4	14.1	1.649	0.749	2.398	3.20	69.800	1.573	0.825
84	0.8400	120.000	84.4	14.3	1.646	0.749	2.395	3.20	69.800	1.572	0.823
85	0.8500	120.700	85.1	14.4	1.656	0.763	2.419	3.17	69.700	1.591	0.828
86	0.8600	121.500	85.9	14.6	1.668	0.763	2.432	3.19	69.700	1.597	0.834
87	0.8700	121.500	85.9	14.8	1.665	0.763	2.428	3.18	69.700	1.596	0.833
88	0.8800	122.300	86.7	14.9	1.677	0.763	2.440	3.20	69.700	1.602	0.839
89	0.8900	123.100	87.5	15.1	1.689	0.763	2.453	3.21	69.700	1.608	0.845

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	202.160			1349.490
Moisture content: Dry soil+tare, gms.	174.800			1123.610
Moisture content: Tare, gms.	8.260			76.380
Moisture, %	16.4	21.0	20.1	21.6
Moist specimen weight, gms.	1218.88			
Diameter, in.	2.864	2.857	2.842	
Area, in. ²	6.442	6.410	6.345	
Height, in.	5.939	5.924	5.894	
Net decrease in height, in.		0.015	0.030	
Wet density, pcf	121.4	127.1	128.1	
Dry density, pcf	104.2	105.0	106.7	
Void ratio	0.5571	0.5453	0.5219	
Saturation, %	76.7	100.0	100.0	

Test Readings for Specimen No. 2

Consolidation cell pressure = 80.000 psi (11.520 ksf)

Consolidation back pressure = 70.000 psi (10.080 ksf)

Consolidation effective confining stress = 1.440 ksf

Strain rate, in./min. = 0.006

Fail. Stress = 1.832 ksf at reading no. 34

Ult. Stress = 2.358 ksf at reading no. 74

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	29.400	0.0	0.0	0.000	1.440	1.440	1.00	70.000	1.440	0.000
1	0.0110	58.000	28.6	0.2	0.648	1.109	1.757	1.58	72.300	1.433	0.324
2	0.0240	65.000	35.6	0.4	0.805	0.965	1.770	1.83	73.300	1.367	0.402
3	0.0350	68.900	39.5	0.6	0.891	0.907	1.798	1.98	73.700	1.353	0.446
4	0.0470	72.800	43.4	0.8	0.977	0.850	1.827	2.15	74.100	1.338	0.489
5	0.0580	75.900	46.5	1.0	1.045	0.821	1.866	2.27	74.300	1.343	0.523
6	0.0700	78.200	48.8	1.2	1.094	0.806	1.901	2.36	74.400	1.354	0.547
7	0.0820	80.500	51.1	1.4	1.144	0.792	1.936	2.44	74.500	1.364	0.572
8	0.0930	82.800	53.4	1.6	1.193	0.792	1.985	2.51	74.500	1.388	0.596
9	0.1060	84.400	55.0	1.8	1.226	0.792	2.018	2.55	74.500	1.405	0.613
10	0.1180	86.700	57.3	2.0	1.274	0.806	2.081	2.58	74.400	1.444	0.637
11	0.1310	88.200	58.8	2.2	1.305	0.821	2.126	2.59	74.300	1.473	0.652
12	0.1420	90.600	61.2	2.4	1.356	0.821	2.176	2.65	74.300	1.499	0.678
13	0.1540	91.300	61.9	2.6	1.368	0.835	2.203	2.64	74.200	1.519	0.684
14	0.1670	92.100	62.7	2.8	1.383	0.850	2.232	2.63	74.100	1.541	0.691
15	0.1780	93.700	64.3	3.0	1.415	0.850	2.265	2.67	74.100	1.557	0.708
16	0.1910	95.200	65.8	3.2	1.445	0.864	2.309	2.67	74.000	1.587	0.723
17	0.2030	96.700	67.3	3.4	1.475	0.878	2.353	2.68	73.900	1.616	0.737
18	0.2150	97.500	68.1	3.6	1.489	0.893	2.382	2.67	73.800	1.637	0.745
19	0.2270	99.100	69.7	3.9	1.521	0.907	2.428	2.68	73.700	1.668	0.761
20	0.2390	99.800	70.4	4.1	1.533	0.907	2.440	2.69	73.700	1.674	0.767
21	0.2500	101.400	72.0	4.2	1.565	0.922	2.486	2.70	73.600	1.704	0.782
22	0.2620	102.900	73.5	4.4	1.594	0.922	2.516	2.73	73.600	1.719	0.797
23	0.2740	103.700	74.3	4.6	1.608	0.936	2.544	2.72	73.500	1.740	0.804
24	0.2860	105.300	75.9	4.9	1.639	0.950	2.589	2.72	73.400	1.770	0.820
25	0.2980	106.000	76.6	5.1	1.651	0.950	2.601	2.74	73.400	1.776	0.825

Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
26	0.3110	107.600	78.2	5.3	1.681	0.965	2.646	2.74	73.300	1.805	0.841
27	0.3230	108.400	79.0	5.5	1.695	0.965	2.660	2.76	73.300	1.812	0.847
28	0.3350	109.900	80.5	5.7	1.723	0.979	2.702	2.76	73.200	1.841	0.862
29	0.3470	110.700	81.3	5.9	1.737	0.994	2.730	2.75	73.100	1.862	0.868
30	0.3580	112.200	82.8	6.1	1.765	1.008	2.773	2.75	73.000	1.891	0.883
31	0.3700	113.000	83.6	6.3	1.778	1.008	2.786	2.76	73.000	1.897	0.889
32	0.3820	113.800	84.4	6.5	1.791	1.022	2.814	2.75	72.900	1.918	0.896
33	0.3940	114.600	85.2	6.7	1.804	1.037	2.841	2.74	72.800	1.939	0.902
34	0.4060	116.100	86.7	6.9	1.832	1.037	2.869	2.77	72.800	1.953	0.916
35	0.4190	116.900	87.5	7.1	1.845	1.051	2.896	2.75	72.700	1.974	0.922
36	0.4310	117.600	88.2	7.3	1.855	1.051	2.907	2.77	72.700	1.979	0.928
37	0.4420	119.200	89.8	7.5	1.885	1.051	2.936	2.79	72.700	1.994	0.943
38	0.4540	120.000	90.6	7.7	1.898	1.066	2.964	2.78	72.600	2.015	0.949
39	0.4650	120.700	91.3	7.9	1.909	1.080	2.989	2.77	72.500	2.034	0.954
40	0.4770	122.300	92.9	8.1	1.938	1.080	3.018	2.79	72.500	2.049	0.969
41	0.4900	123.100	93.7	8.3	1.950	1.094	3.044	2.78	72.400	2.069	0.975
42	0.5020	123.800	94.4	8.5	1.960	1.094	3.054	2.79	72.400	2.074	0.980
43	0.5140	124.600	95.2	8.7	1.972	1.109	3.081	2.78	72.300	2.095	0.986
44	0.5260	126.200	96.8	8.9	2.001	1.123	3.124	2.78	72.200	2.124	1.000
45	0.5380	126.900	97.5	9.1	2.011	1.123	3.134	2.79	72.200	2.129	1.005
46	0.5500	127.700	98.3	9.3	2.023	1.123	3.146	2.80	72.200	2.135	1.011
47	0.5620	128.500	99.1	9.5	2.035	1.138	3.172	2.79	72.100	2.155	1.017
48	0.5740	130.000	100.6	9.7	2.061	1.138	3.199	2.81	72.100	2.168	1.030
49	0.5860	130.800	101.4	9.9	2.073	1.152	3.225	2.80	72.000	2.188	1.036
50	0.5990	131.600	102.2	10.2	2.084	1.152	3.236	2.81	72.000	2.194	1.042
51	0.6110	132.400	103.0	10.4	2.095	1.152	3.247	2.82	72.000	2.200	1.048
52	0.6230	133.100	103.7	10.6	2.105	1.152	3.257	2.83	72.000	2.204	1.052
53	0.6350	134.700	105.3	10.8	2.132	1.166	3.299	2.83	71.900	2.233	1.066
54	0.6460	134.700	105.3	11.0	2.128	1.166	3.294	2.82	71.900	2.230	1.064
55	0.6580	136.200	106.8	11.2	2.153	1.181	3.334	2.82	71.800	2.257	1.077
56	0.6700	137.000	107.6	11.4	2.165	1.181	3.345	2.83	71.800	2.263	1.082
57	0.6830	137.800	108.4	11.6	2.175	1.181	3.356	2.84	71.800	2.268	1.088
58	0.6950	138.500	109.1	11.8	2.184	1.195	3.379	2.83	71.700	2.287	1.092
59	0.7070	139.300	109.9	12.0	2.195	1.210	3.405	2.81	71.600	2.307	1.098
60	0.7190	140.100	110.7	12.2	2.206	1.210	3.416	2.82	71.600	2.313	1.103
61	0.7310	140.900	111.5	12.4	2.217	1.210	3.426	2.83	71.600	2.318	1.108
62	0.7430	141.600	112.2	12.6	2.226	1.224	3.450	2.82	71.500	2.337	1.113
63	0.7550	143.200	113.8	12.8	2.252	1.238	3.490	2.82	71.400	2.364	1.126
64	0.7670	144.000	114.6	13.0	2.263	1.238	3.501	2.83	71.400	2.370	1.131
65	0.7790	144.000	114.6	13.2	2.257	1.238	3.496	2.82	71.400	2.367	1.129
66	0.7910	144.700	115.3	13.4	2.266	1.238	3.504	2.83	71.400	2.371	1.133
67	0.8030	146.300	116.9	13.6	2.292	1.253	3.545	2.83	71.300	2.399	1.146
68	0.8140	146.300	116.9	13.8	2.287	1.253	3.540	2.83	71.300	2.396	1.143
69	0.8260	147.800	118.4	14.0	2.311	1.267	3.578	2.82	71.200	2.423	1.155
70	0.8380	148.600	119.2	14.2	2.321	1.267	3.588	2.83	71.200	2.428	1.160
71	0.8500	149.400	120.0	14.4	2.331	1.267	3.598	2.84	71.200	2.433	1.165
72	0.8620	150.200	120.8	14.6	2.341	1.282	3.622	2.83	71.100	2.452	1.170

Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
73	0.8740	150.900	121.5	14.8	2.349	1.282	3.630	2.83	71.100	2.456	1.174
74	0.8870	151.700	122.3	15.0	2.358	1.296	3.654	2.82	71.000	2.475	1.179

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	227.910			1369.440
Moisture content: Dry soil+tare, gms.	197.150			1151.540
Moisture content: Tare, gms.	8.070			105.970
Moisture, %	16.3	20.9	19.1	20.8
Moist specimen weight, gms.	1218.49			
Diameter, in.	2.865	2.857	2.829	
Area, in. ²	6.447	6.412	6.286	
Height, in.	5.935	5.919	5.861	
Net decrease in height, in.		0.016	0.058	
Wet density, pcf	121.3	127.2	129.1	
Dry density, pcf	104.3	105.2	108.4	
Void ratio	0.5555	0.5430	0.4978	
Saturation, %	76.1	100.0	100.0	

Test Readings for Specimen No. 3

Consolidation cell pressure = 90.000 psi (12.960 ksf)
Consolidation back pressure = 70.000 psi (10.080 ksf)
Consolidation effective confining stress = 2.880 ksf
Strain rate, in./min. = 0.004
Fail. Stress = 2.445 ksf at reading no. 31
Ult. Stress = 3.345 ksf at reading no. 110

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	27.900	0.0	0.0	0.000	2.880	2.880	1.00	70.000	2.880	0.000
1	0.0060	65.000	37.1	0.1	0.849	2.117	2.966	1.40	75.300	2.541	0.425
2	0.0140	79.700	51.8	0.2	1.184	1.786	2.969	1.66	77.600	2.378	0.592
3	0.0210	88.200	60.3	0.4	1.376	1.570	2.946	1.88	79.100	2.258	0.688
4	0.0290	95.200	67.3	0.5	1.534	1.411	2.945	2.09	80.200	2.178	0.767
5	0.0370	100.600	72.7	0.6	1.655	1.310	2.965	2.26	80.900	2.138	0.827
6	0.0450	103.700	75.8	0.8	1.723	1.224	2.947	2.41	81.500	2.086	0.862
7	0.0530	106.800	78.9	0.9	1.791	1.166	2.958	2.54	81.900	2.062	0.896
8	0.0610	109.900	82.0	1.0	1.859	1.123	2.982	2.66	82.200	2.053	0.929
9	0.0690	111.500	83.6	1.2	1.893	1.080	2.973	2.75	82.500	2.026	0.946
10	0.0780	113.000	85.1	1.3	1.924	1.051	2.975	2.83	82.700	2.013	0.962
11	0.0860	114.600	86.7	1.5	1.957	1.022	2.979	2.91	82.900	2.001	0.978
12	0.0940	116.100	88.2	1.6	1.988	1.008	2.996	2.97	83.000	2.002	0.994
13	0.1020	118.400	90.5	1.7	2.037	0.994	3.031	3.05	83.100	2.012	1.019
14	0.1090	120.000	92.1	1.9	2.071	0.979	3.050	3.11	83.200	2.015	1.035
15	0.1170	121.500	93.6	2.0	2.101	0.979	3.081	3.15	83.200	2.030	1.051
16	0.1250	123.100	95.2	2.1	2.134	0.965	3.099	3.21	83.300	2.032	1.067
17	0.1330	123.800	95.9	2.3	2.147	0.965	3.112	3.23	83.300	2.038	1.074
18	0.1410	125.400	97.5	2.4	2.180	0.965	3.145	3.26	83.300	2.055	1.090
19	0.1490	126.900	99.0	2.5	2.210	0.965	3.175	3.29	83.300	2.070	1.105

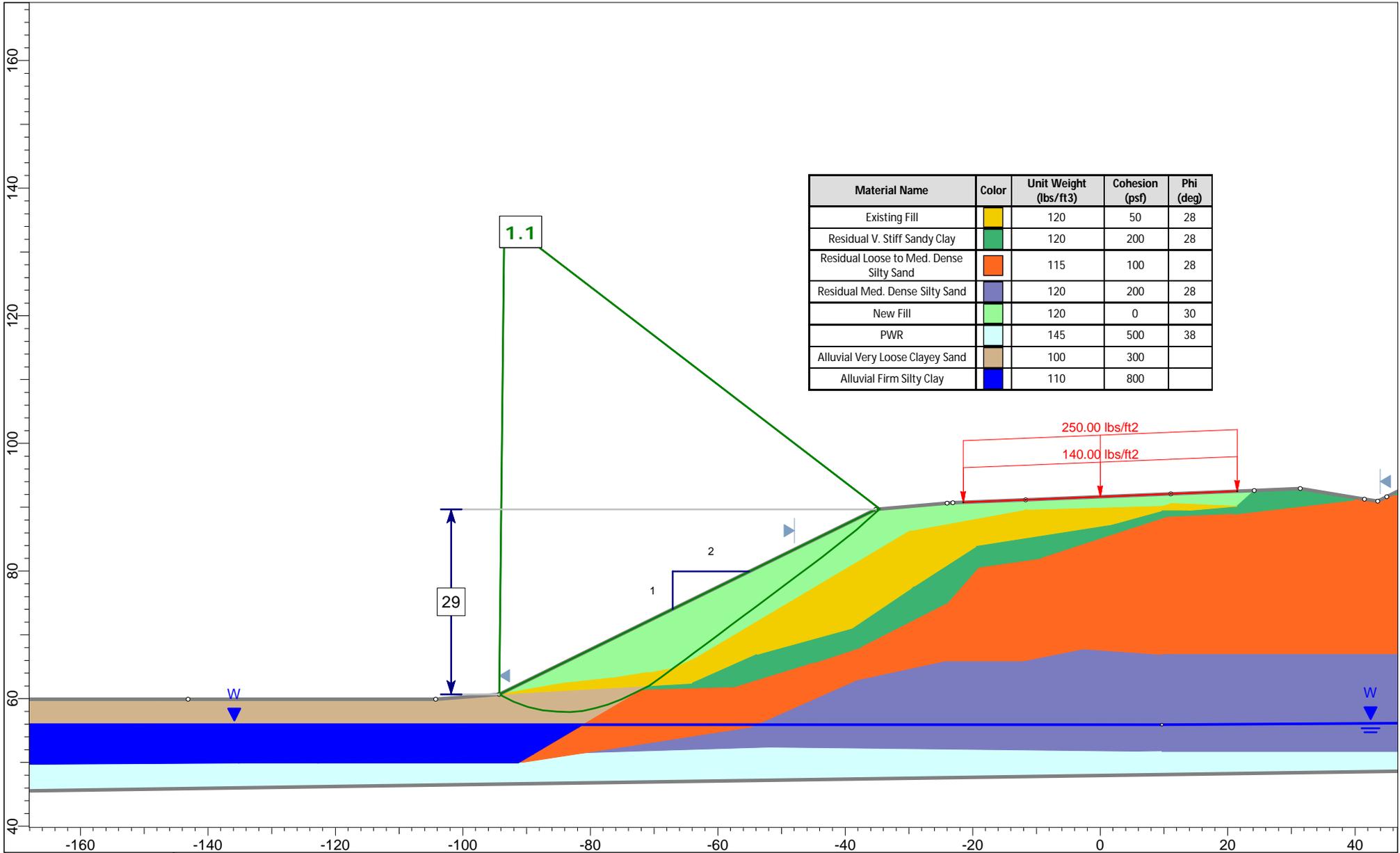
Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
20	0.1570	127.700	99.8	2.7	2.225	0.965	3.190	3.31	83.300	2.077	1.112
21	0.1650	129.300	101.4	2.8	2.257	0.965	3.222	3.34	83.300	2.094	1.129
22	0.1730	130.800	102.9	3.0	2.288	0.965	3.252	3.37	83.300	2.109	1.144
23	0.1820	131.600	103.7	3.1	2.302	0.965	3.267	3.39	83.300	2.116	1.151
24	0.1900	132.400	104.5	3.2	2.316	0.965	3.281	3.40	83.300	2.123	1.158
25	0.1980	133.100	105.2	3.4	2.329	0.965	3.293	3.41	83.300	2.129	1.164
26	0.2060	134.700	106.8	3.5	2.361	0.979	3.340	3.41	83.200	2.160	1.180
27	0.2140	135.400	107.5	3.7	2.373	0.979	3.352	3.42	83.200	2.166	1.186
28	0.2220	136.200	108.3	3.8	2.387	0.994	3.381	3.40	83.100	2.187	1.193
29	0.2300	137.800	109.9	3.9	2.419	0.994	3.412	3.43	83.100	2.203	1.209
30	0.2380	138.500	110.6	4.1	2.431	0.994	3.424	3.45	83.100	2.209	1.215
31	0.2450	139.300	111.4	4.2	2.445	0.994	3.439	3.46	83.100	2.216	1.223
32	0.2530	140.100	112.2	4.3	2.459	1.008	3.467	3.44	83.000	2.238	1.230
33	0.2610	141.600	113.7	4.5	2.489	1.022	3.511	3.43	82.900	2.267	1.244
34	0.2690	142.400	114.5	4.6	2.503	1.022	3.525	3.45	82.900	2.274	1.251
35	0.2770	143.200	115.3	4.7	2.516	1.037	3.553	3.43	82.800	2.295	1.258
36	0.2860	143.200	115.3	4.9	2.512	1.037	3.549	3.42	82.800	2.293	1.256
37	0.2940	144.700	116.8	5.0	2.541	1.051	3.593	3.42	82.700	2.322	1.271
38	0.3020	146.300	118.4	5.2	2.573	1.051	3.624	3.45	82.700	2.337	1.286
39	0.3100	147.100	119.2	5.3	2.586	1.051	3.637	3.46	82.700	2.344	1.293
40	0.3180	147.800	119.9	5.4	2.598	1.066	3.663	3.44	82.600	2.364	1.299
41	0.3260	149.400	121.5	5.6	2.629	1.066	3.694	3.47	82.600	2.380	1.314
42	0.3340	150.200	122.3	5.7	2.642	1.066	3.708	3.48	82.600	2.387	1.321
43	0.3420	150.900	123.0	5.8	2.653	1.080	3.733	3.46	82.500	2.407	1.327
44	0.3500	151.700	123.8	6.0	2.667	1.080	3.747	3.47	82.500	2.413	1.333
45	0.3580	153.300	125.4	6.1	2.697	1.094	3.792	3.46	82.400	2.443	1.349
46	0.3660	154.000	126.1	6.2	2.708	1.094	3.803	3.47	82.400	2.449	1.354
47	0.3740	154.800	126.9	6.4	2.722	1.094	3.816	3.49	82.400	2.455	1.361
48	0.3820	155.600	127.7	6.5	2.735	1.109	3.844	3.47	82.300	2.476	1.367
49	0.3900	156.300	128.4	6.7	2.746	1.123	3.869	3.44	82.200	2.496	1.373
50	0.3980	157.100	129.2	6.8	2.759	1.123	3.882	3.46	82.200	2.503	1.379
51	0.4060	157.900	130.0	6.9	2.772	1.123	3.895	3.47	82.200	2.509	1.386
52	0.4130	158.700	130.8	7.0	2.785	1.138	3.923	3.45	82.100	2.530	1.393
53	0.4210	159.400	131.5	7.2	2.796	1.138	3.934	3.46	82.100	2.536	1.398
54	0.4290	160.200	132.3	7.3	2.809	1.138	3.947	3.47	82.100	2.542	1.404
55	0.4370	161.000	133.1	7.5	2.822	1.152	3.974	3.45	82.000	2.563	1.411
56	0.4450	161.800	133.9	7.6	2.835	1.152	3.987	3.46	82.000	2.569	1.417
57	0.4530	162.500	134.6	7.7	2.845	1.152	3.997	3.47	82.000	2.575	1.423
58	0.4610	162.500	134.6	7.9	2.841	1.166	4.007	3.44	81.900	2.587	1.420
59	0.4690	163.300	135.4	8.0	2.854	1.166	4.020	3.45	81.900	2.593	1.427
60	0.4780	164.100	136.2	8.2	2.866	1.181	4.046	3.43	81.800	2.614	1.433
61	0.4860	164.900	137.0	8.3	2.878	1.181	4.059	3.44	81.800	2.620	1.439
62	0.4940	165.600	137.7	8.4	2.889	1.181	4.069	3.45	81.800	2.625	1.444
63	0.5030	166.400	138.5	8.6	2.900	1.195	4.096	3.43	81.700	2.645	1.450
64	0.5110	167.200	139.3	8.7	2.913	1.195	4.108	3.44	81.700	2.652	1.456
65	0.5180	168.000	140.1	8.8	2.926	1.210	4.135	3.42	81.600	2.672	1.463
66	0.5260	168.700	140.8	9.0	2.936	1.210	4.146	3.43	81.600	2.678	1.468

Test Readings for Specimen No. 3

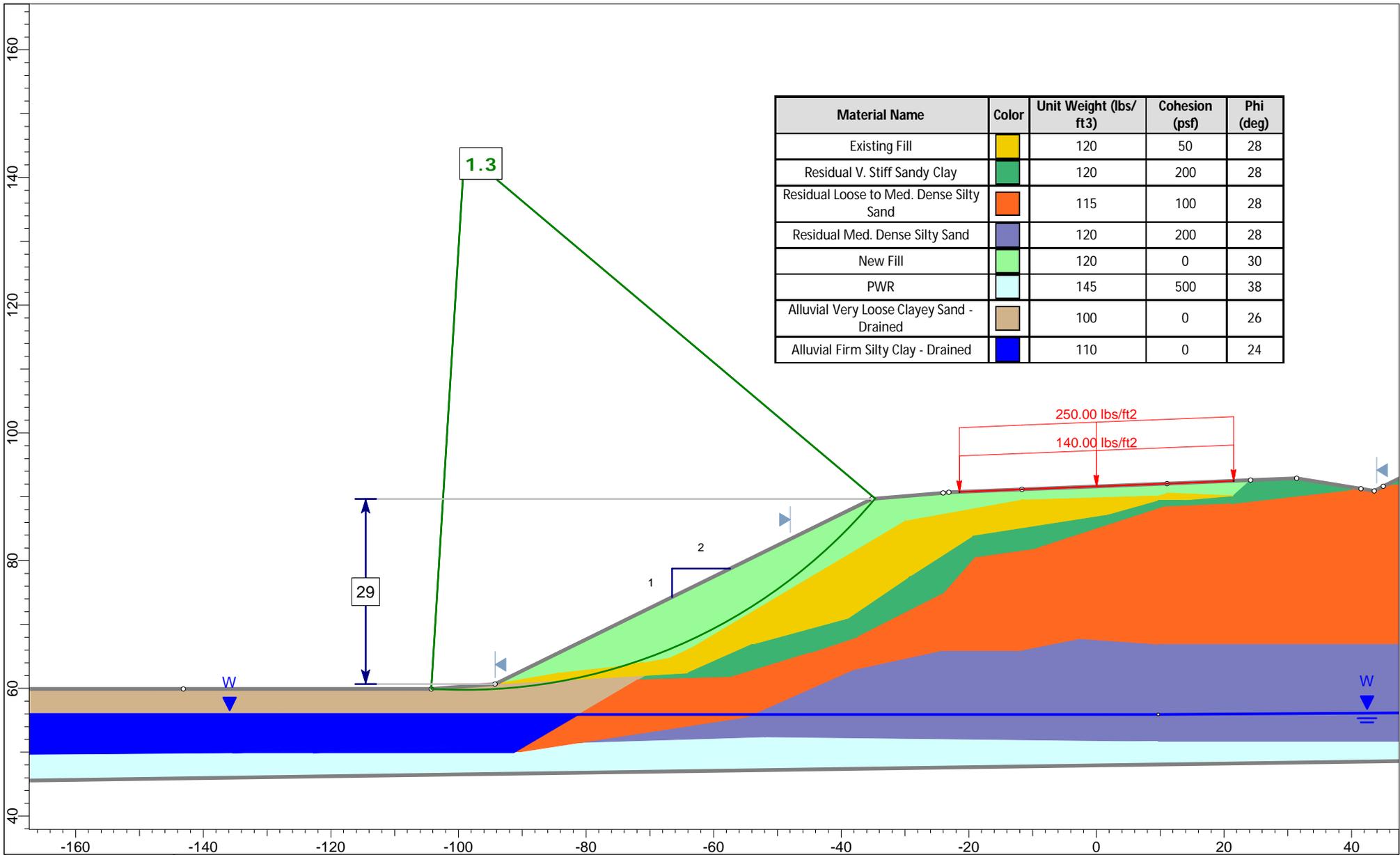
No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
67	0.5340	169.500	141.6	9.1	2.948	1.224	4.172	3.41	81.500	2.698	1.474
68	0.5420	171.100	143.2	9.2	2.977	1.224	4.201	3.43	81.500	2.713	1.489
69	0.5500	171.100	143.2	9.4	2.973	1.224	4.197	3.43	81.500	2.710	1.486
70	0.5580	172.600	144.7	9.5	2.999	1.224	4.223	3.45	81.500	2.724	1.500
71	0.5660	173.400	145.5	9.7	3.011	1.238	4.250	3.43	81.400	2.744	1.506
72	0.5740	174.100	146.2	9.8	3.021	1.238	4.260	3.44	81.400	2.749	1.511
73	0.5820	174.900	147.0	9.9	3.033	1.238	4.272	3.45	81.400	2.755	1.517
74	0.5900	175.700	147.8	10.1	3.045	1.253	4.298	3.43	81.300	2.775	1.522
75	0.5980	176.500	148.6	10.2	3.057	1.253	4.310	3.44	81.300	2.781	1.528
76	0.6060	177.200	149.3	10.3	3.067	1.267	4.334	3.42	81.200	2.800	1.533
77	0.6140	177.200	149.3	10.5	3.062	1.267	4.329	3.42	81.200	2.798	1.531
78	0.6210	178.000	150.1	10.6	3.074	1.267	4.341	3.43	81.200	2.804	1.537
79	0.6290	178.800	150.9	10.7	3.086	1.282	4.367	3.41	81.100	2.825	1.543
80	0.6380	179.600	151.7	10.9	3.097	1.282	4.378	3.42	81.100	2.830	1.548
81	0.6460	180.300	152.4	11.0	3.106	1.296	4.402	3.40	81.000	2.849	1.553
82	0.6540	180.300	152.4	11.2	3.102	1.296	4.398	3.39	81.000	2.847	1.551
83	0.6620	181.900	154.0	11.3	3.129	1.296	4.425	3.41	81.000	2.861	1.565
84	0.6710	181.900	154.0	11.4	3.124	1.296	4.420	3.41	81.000	2.858	1.562
85	0.6790	182.700	154.8	11.6	3.135	1.296	4.431	3.42	81.000	2.864	1.568
86	0.6870	183.400	155.5	11.7	3.145	1.310	4.455	3.40	80.900	2.883	1.572
87	0.6950	184.200	156.3	11.9	3.156	1.310	4.466	3.41	80.900	2.888	1.578
88	0.7030	185.000	157.1	12.0	3.167	1.325	4.492	3.39	80.800	2.908	1.584
89	0.7110	185.800	157.9	12.1	3.178	1.325	4.503	3.40	80.800	2.914	1.589
90	0.7190	186.500	158.6	12.3	3.188	1.325	4.512	3.41	80.800	2.919	1.594
91	0.7270	187.300	159.4	12.4	3.199	1.325	4.523	3.41	80.800	2.924	1.599
92	0.7350	188.100	160.2	12.5	3.210	1.339	4.549	3.40	80.700	2.944	1.605
93	0.7430	188.900	161.0	12.7	3.221	1.339	4.560	3.40	80.700	2.950	1.610
94	0.7510	189.600	161.7	12.8	3.230	1.339	4.569	3.41	80.700	2.954	1.615
95	0.7590	190.400	162.5	13.0	3.241	1.354	4.594	3.39	80.600	2.974	1.620
96	0.7670	191.200	163.3	13.1	3.251	1.368	4.619	3.38	80.500	2.994	1.626
97	0.7750	192.000	164.1	13.2	3.262	1.354	4.616	3.41	80.600	2.985	1.631
98	0.7830	192.700	164.8	13.4	3.271	1.368	4.639	3.39	80.500	3.003	1.635
99	0.7910	192.700	164.8	13.5	3.266	1.368	4.634	3.39	80.500	3.001	1.633
100	0.7990	193.500	165.6	13.6	3.276	1.368	4.644	3.40	80.500	3.006	1.638
101	0.8070	194.300	166.4	13.8	3.287	1.368	4.655	3.40	80.500	3.012	1.644
102	0.8150	195.000	167.1	13.9	3.296	1.382	4.678	3.38	80.400	3.030	1.648
103	0.8230	195.800	167.9	14.0	3.306	1.382	4.689	3.39	80.400	3.035	1.653
104	0.8310	195.800	167.9	14.2	3.301	1.382	4.683	3.39	80.400	3.033	1.650
105	0.8390	196.600	168.7	14.3	3.311	1.397	4.708	3.37	80.300	3.052	1.656
106	0.8470	197.400	169.5	14.5	3.322	1.397	4.719	3.38	80.300	3.058	1.661
107	0.8540	197.400	169.5	14.6	3.317	1.397	4.714	3.37	80.300	3.055	1.659
108	0.8630	198.100	170.2	14.7	3.325	1.397	4.722	3.38	80.300	3.059	1.662
109	0.8710	198.900	171.0	14.9	3.335	1.411	4.746	3.36	80.200	3.079	1.668
110	0.8790	199.700	171.8	15.0	3.345	1.411	4.757	3.37	80.200	3.084	1.673

Appendix IV – Slope Stability Analyses



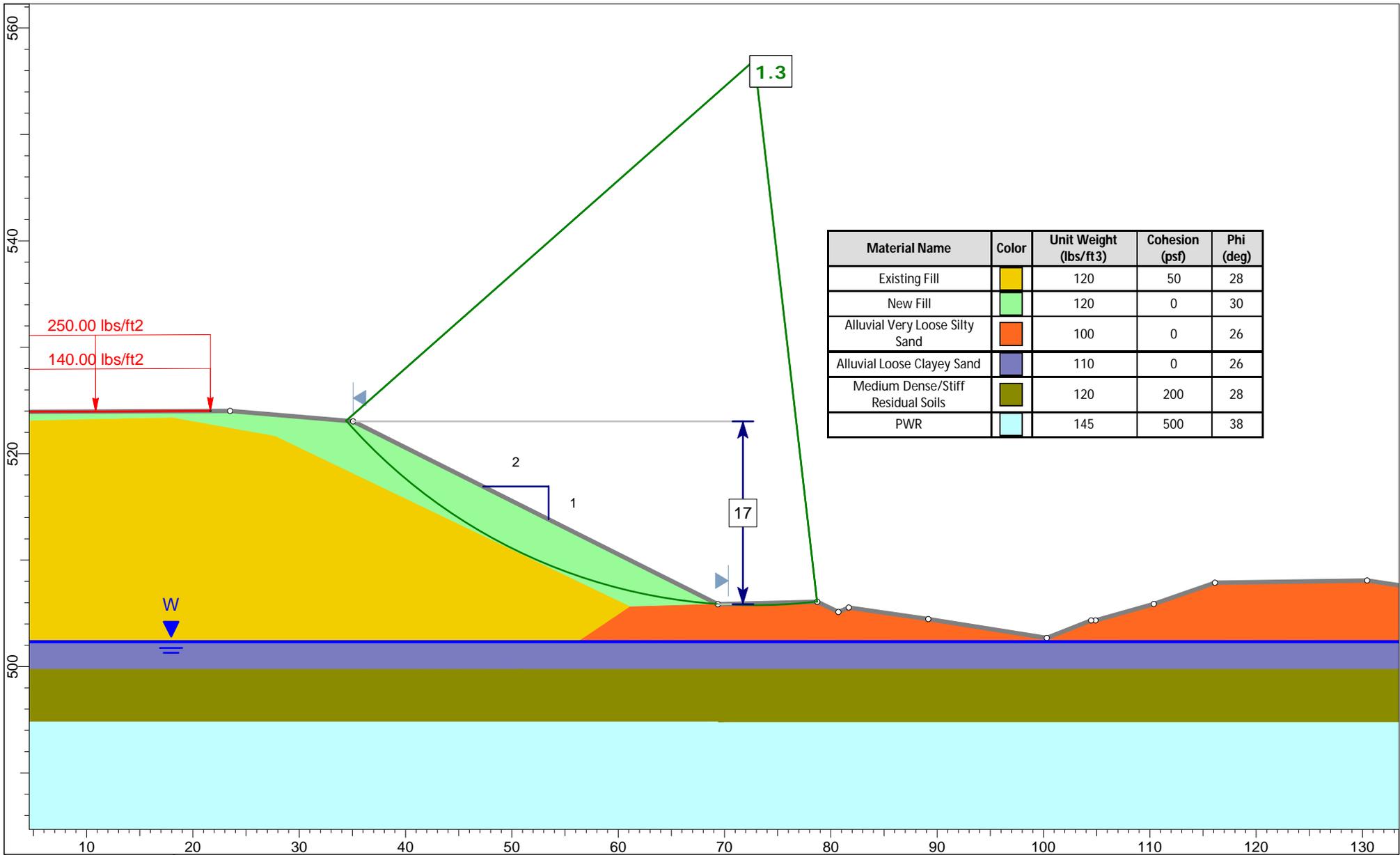
Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (deg)
Existing Fill	Yellow	120	50	28
Residual V. Stiff Sandy Clay	Green	120	200	28
Residual Loose to Med. Dense Silty Sand	Orange	115	100	28
Residual Med. Dense Silty Sand	Purple	120	200	28
New Fill	Light Green	120	0	30
PWR	Light Blue	145	500	38
Alluvial Very Loose Clayey Sand	Brown	100	300	
Alluvial Firm Silty Clay	Blue	110	800	

		Project SC 160	
Analysis Global Stability		Description Service - End-of-Construction	
Drawn By NRB	Project Number 6235-16-017	Company S&ME	Figure X
Location SC 160 Station 93+00	File Name SC 160 STA 9300.slmd	Date 1/27/2021	



Material Name	Color	Unit Weight (lbs/ft ³)	Cohesion (psf)	Phi (deg)
Existing Fill	Yellow	120	50	28
Residual V. Stiff Sandy Clay	Green	120	200	28
Residual Loose to Med. Dense Silty Sand	Orange	115	100	28
Residual Med. Dense Silty Sand	Purple	120	200	28
New Fill	Light Green	120	0	30
PWR	Cyan	145	500	38
Alluvial Very Loose Clayey Sand - Drained	Brown	100	0	26
Alluvial Firm Silty Clay - Drained	Blue	110	0	24

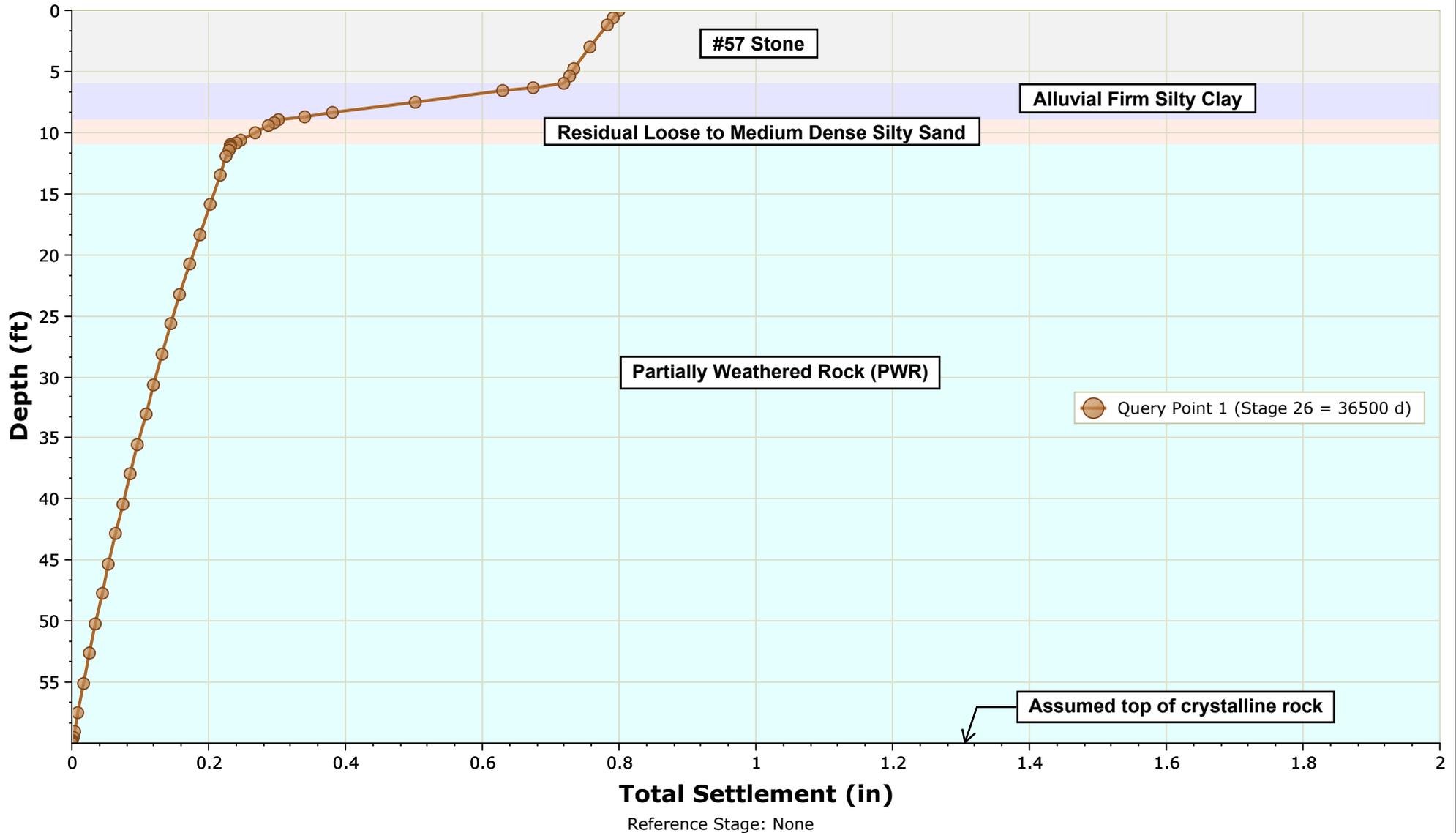
		Project SC 160	
Analysis Global Stability		Description Service - Long-Term	
Drawn By NRB	Project Number 6235-16-017	Company S&ME	Figure X
Location SC 160 Station 93+00	File Name SC 160 STA 9300.slmd	Date 1/27/2021	



	Project		SC 160	
	Analysis		Global Stability	Description: Service: End-of-Construction & Long-Term
	Drawn By	NRB	Project Number	6235-16-017
	Location	SC 160 Station 95+50	File Name	SC 160 STA 9550.slm
			Company	S&ME
			Date	1/27/2021
			Figure	X

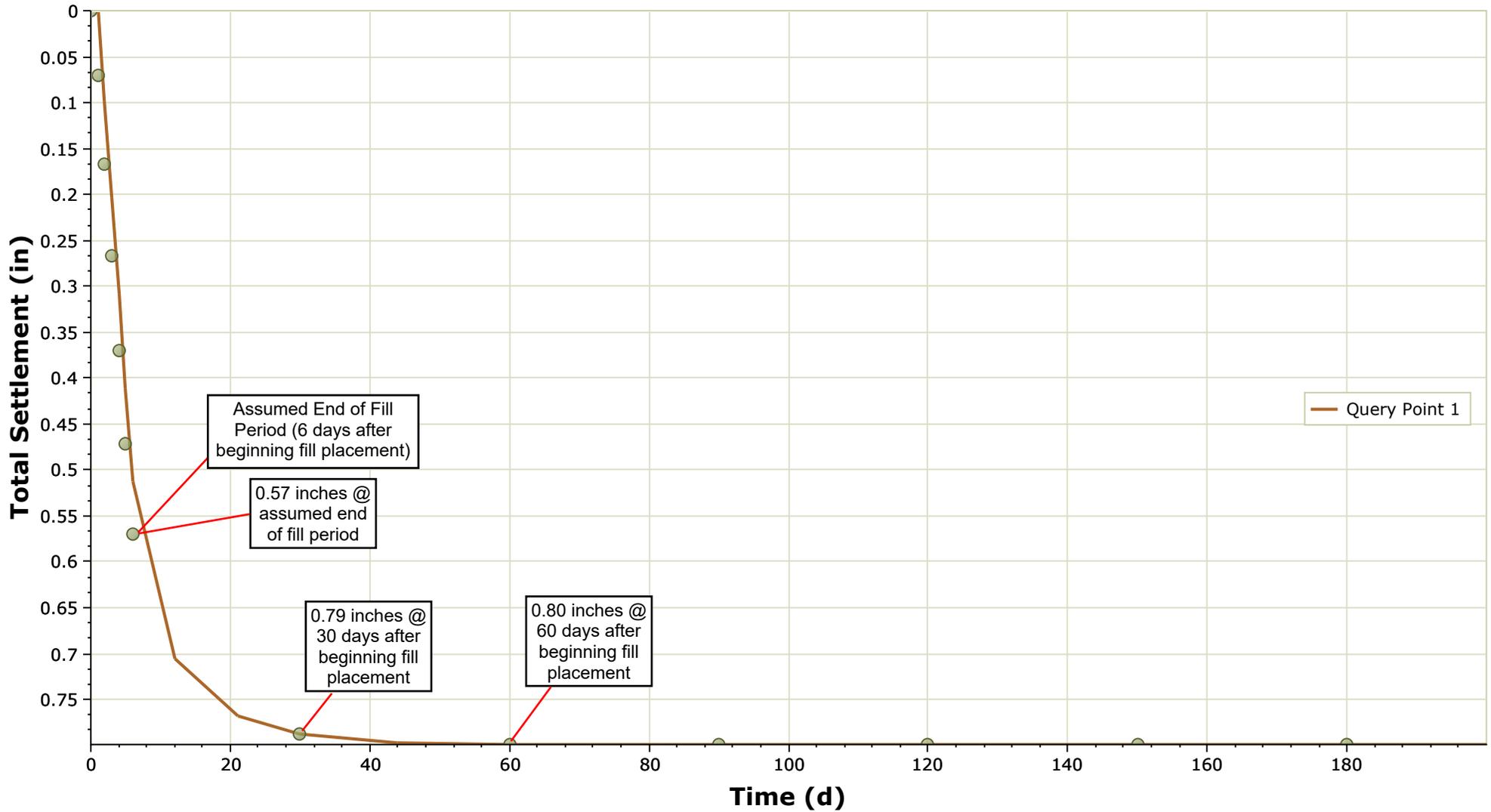
Appendix V – Settlement Analysis

SC 160 Sta. 93+00 LT Slope: Total Settlement vs. Depth



	Project		SC 160	
	Analysis		Settlement	
	Drawn By	NRB	Project Number	6235-16-017
	Location	SC 160 Sta. 93+00 LT Slope	File Name	SC 160 STA 9300 LT Slope.s3z
		Description	-	
		Company	S&ME	Figure X
		Date	1/30/2021	

SC 160 Sta. 93+00 LT Slope: Time vs. Total Settlement



Reference Stage: None
Total Settlement at Depth = 0 ft

	Project				SC 160			
	Analysis				Settlement		Description	
	Drawn By		Project Number		Company		Figure	
	NRB		6235-16-017		S&ME			
Location		File Name		Date		X		
SC 160 Sta. 93+00 LT Slope		SC 160 STA 9300 LT Slope.s3z		1/30/2021				



Project Name SC 160 Calculated By NRB Date 1/30/2021
Project Number 6235-16-017 Checked By _____ Date _____
Subject SC 160 Sta. 93+00 LT Slope - Settlement Sheet 1 of _____

Settlement model layers and thicknesses developed based on
"SC 160 Sta. 93+00 - Existing - with Undercut Excavation" Slide model

Assume 10 feet of new fill based on cross sections Depth (ft)

0

#57 Stone (based on assumed undercut and replacement of loose alluvial soils)

$$\gamma = 110 \text{ pcf}, E_s = 1000 \text{ ksf}$$

G.W.T. @ 6'

6

Alluvial Firm Silty Clay

$$\gamma = 110 \text{ pcf}$$

$$\text{Assume } LL = 70, e_0 = 1$$

From Holtz, Kovacs, and Sheahan 2nd Ed. p. 394, assume $C_c = 0.009(LL - 10)$

$$C_c = 0.54 \quad \text{Assume } C_r = 0.1 C_c \rightarrow C_r = 0.054$$

$$C_{sc} = \frac{C_c}{1 + e_0} = 0.27, \quad C_{sr} = \frac{C_r}{1 + e_0} = 0.03$$

From FHWA NHI-06-088 Figure 5-10, assume:

$$c_v \approx 0.05 \text{ ft}^2/\text{day}, \quad c_{vr} \approx 0.1 \text{ ft}^2/\text{day}$$

$$\text{Assume } \sigma'_p = \frac{S_u}{0.22} = \frac{800 \text{ psf}}{0.22} = 3600 \text{ psf}$$

9

Residual Loose to Medium Dense Silty Sand

$$\text{Assume } N = 8 \quad \gamma = 115 \text{ pcf}, E_s = 350 \text{ ksf}$$

11

PWR

$$\gamma = 145 \text{ pcf}, E_s = 1800 \text{ ksf}$$

60

Assumed top of crystalline rock

Appendix VI – Culvert Extension Analyses



Ultimate Bearing Capacity Determination

AASHTO LRFD Method

NOTES:

- nominal bearing resistance (capacity) of spread footings on cohesionless soils shall be evaluated using **effective stress** analyses and **drained** soil strength parameters.
- nominal bearing resistance (capacity) of spread footings on cohesive soils shall be evaluated for **total stress** analyses and **undrained** soil strength parameters.
- in cases where the cohesive soils may soften and lose strength with time, then these soils should be evaluated using **effective stress** analyses and **drained** soil strength parameters.
- for footings bearing on fill, the nominal bearing resistance (capacity) shall be evaluated using the **more critical of either total or effective strength** analyses.

GENERAL EQUATION: $q_n = cN_{cm} + \gamma D_f N_{qm} C_{wq} + 0.5\gamma B N_{ym} C_{wy}$

IN WHICH: $N_{cm} = N_c s_c i_c$
 $N_{qm} = N_q s_q d_q i_q$
 $N_{ym} = N_y s_y i_y$

WHERE: c = cohesion, taken as undrained shear strength (ksf)
 N_c = cohesion term (undrained loading) bearing capacity factor as specified in Table 1 (dim.)
 N_q = surcharge (embedment) term (drained loading) bearing capacity factor as specified in Table 1 (dim.)
 N_y = unit weight (footing width) term (drained loading) bearing capacity factor as specified in Table 1 (dim.)
 γ = total (moist) unit weight of soil above or below the bearing depth of the footing (kcf)
 D_f = footing embedment depth (ft.)
 B = footing width (ft.)
 C_{wq}, C_{wy} = correction factors to account for the location of the ground water table as specified in Table 2 (dim.)
 s_c, s_y, s_q = footing shape correction factors as specified in Table 3 (dim.)
 d_q = correction factor to account for the shearing resistance along the failure surface passing through cohesionless material above the bearing elevation as specified in Table 4 (dim.)
 i_c, i_y, i_q = load inclination factors - for footings with modest embedment, consideration may be given to omission of the load inclination factors
i.e. S&ME will assume all inclination factors = 1

TABLE 1 Bearing Capacity Factors			
ϕ	N_c	N_q	N_y
0.0	5.1	1.0	0.0
1.0	5.4	1.1	0.1
2.0	5.6	1.2	0.2
3.0	5.9	1.3	0.2
4.0	6.2	1.4	0.3
5.0	6.5	1.6	0.5
6.0	6.8	1.7	0.6
7.0	7.2	1.9	0.7
8.0	7.5	2.1	0.9
9.0	7.9	2.3	1.0
10.0	8.4	2.5	1.2
11.0	8.8	2.7	1.4
12.0	9.3	3.0	1.7
13.0	9.8	3.3	2.0
14.0	10.4	3.6	2.3
15.0	11.0	3.9	2.7
16.0	11.6	4.3	3.1
17.0	12.3	4.8	3.5
18.0	13.1	5.3	4.1
19.0	13.9	5.8	4.7
20.0	14.8	6.4	5.4
21.0	15.8	7.1	6.2
22.0	16.9	7.8	7.1
23.0	18.1	8.7	8.2
24.0	19.3	9.6	9.4
25.0	20.7	10.7	10.9
26.0	22.3	11.9	12.5
27.0	23.9	13.2	14.5
28.0	25.8	14.7	16.7
29.0	27.9	16.4	19.3
30.0	30.1	18.4	22.4
31.0	32.7	20.6	26.0
32.0	35.5	23.2	30.2
33.0	38.6	26.1	35.2
34.0	42.2	29.4	41.1
35.0	46.1	33.3	48.0
36.0	50.6	37.8	56.3
37.0	55.6	42.9	66.2
38.0	61.4	48.9	78.0
39.0	67.9	56.0	92.3
40.0	75.3	64.2	109.4
41.0	83.9	73.9	130.2
42.0	93.7	85.4	155.6
43.0	105.1	99.0	186.5
44.0	118.4	115.3	224.6
45.0	133.9	134.9	271.8

Table 10.6.3.1.2a-1 from AASHTO LRFD Bridge Design Specifications

TABLE 2 Ground Water Correction Factors		
D_w	C_{wq}	C_{wy}
0.0	0.5	0.5
D_f	1.0	0.5
$>1.5B+D_f$	1.0	1.0

Table 10.6.3.1.2a-2 from AASHTO LRFD Bridge Design Specifications

TABLE 3 Shape Correction Factors			
	s_c	s_y	s_q
$\phi = 0$	$1 + (B/5L)$	1	1
$\phi > 0$	$\frac{1 + (B/5L)(N_y/i)}{1 - 0.4(B/L)}$	$1 - 0.4(B/L)$	$1 + [(B/L)\tan\phi]$

Table 10.6.3.1.2a-3 from AASHTO LRFD Bridge Design Specifications

TABLE 4 Depth Correction Factor		
ϕ	D_f/B	d_q
32.0	1	1.20
	2	1.30
	4	1.35
37.0	1	1.20
	2	1.25
	4	1.30
42.0	1	1.15
	2	1.20
	4	1.25
	8	1.30

Table 10.6.3.1.2a-4 from AASHTO LRFD Bridge Design Specifications

Linear Interpolation for friction angles in between those provided

$$\frac{\phi - 32}{37 - 32} \frac{d_q - 1.35}{1.30 - 1.35} = 0.0000$$

$$\frac{\phi - 37}{42 - 37} \frac{d_q - 1.25}{1.20 - 1.25} = 0.0000$$

VALUES:

$N_{cm} = 32.625$	$N_{qm} = 12.77924$	$N_{ym} = 13.59857143$
$N_c = 25.80$ Table 1	$N_q = 14.70$ Table 1	$N_y = 16.70$ Table 1
$s_c = 1.26$	$s_y = 0.87$	$s_q = 0.81$
$i_c = 1.00$	$d_q = 1.00$ Table 4	$i_y = 1.00$
$i_q = 1.00$		
$c = 0.00$	$N_{cm} = 32.63$	$i_c = 1$
$\phi = 28$	$N_{qm} = 12.78$	$i_y = 1$
$\gamma = 0.12$ data	$N_{ym} = 13.60$	$i_q = 1$
$D_f = 7.00$ plans	$C_{wq} = 1.00$ Table 2	$s_c = 1.26$
$B = 6.50$ plans	$C_{wy} = 0.50$ Table 2	$s_y = 0.81$
$L = 14$ plans		$s_q = 0.87$
		$d_q = 1.00$

NOMINAL RESISTANCE: $q_n = 13.39$

RESISTANCE FACTOR: 0.45 from Ch 9 of SCDOT GDM - Strength

FACTORED RESISTANCE: $q_r = 6.02$

Station 96+00 Culvert Extension RT
Strength Limit State



Ultimate Bearing Capacity Determination

AASHTO LRFD Method

NOTES:

- nominal bearing resistance (capacity) of spread footings on cohesionless soils shall be evaluated using **effective stress** analyses and **drained** soil strength parameters.
- nominal bearing resistance (capacity) of spread footings on cohesive soils shall be evaluated for **total stress** analyses and **undrained** soil strength parameters.
- in cases where the cohesive soils may soften and lose strength with time, then these soils should be evaluated using **effective stress** analyses and **drained** soil strength parameters.
- for footings bearing on fill, the nominal bearing resistance (capacity) shall be evaluated using the **more critical of either total or effective strength** analyses.

GENERAL EQUATION: $q_n = cN_{cm} + \gamma D_f N_{qm} C_{wq} + 0.5\gamma B N_{ym} C_{wy}$

IN WHICH: $N_{cm} = N_c s_c i_c$
 $N_{qm} = N_q s_q d_q i_q$
 $N_{ym} = N_y s_y i_y$

WHERE: c = cohesion, taken as undrained shear strength (ksf)

N_c = cohesion term (undrained loading) bearing capacity factor as specified in Table 1 (dim.)

N_q = surcharge (embedment) term (drained loading) bearing capacity factor as specified in Table 1 (dim.)

N_y = unit weight (footing width) term (drained loading) bearing capacity factor as specified in Table 1 (dim.)

γ = total (moist) unit weight of soil above or below the bearing depth of the footing (kcf)

D_f = footing embedment depth (ft.)

B = footing width (ft.)

C_{wq}, C_{wy} = correction factors to account for the location of the ground water table as specified in Table 2 (dim.)

s_c, s_y, s_q = footing shape correction factors as specified in Table 3 (dim.)

d_q = correction factor to account for the shearing resistance along the failure surface passing through cohesionless material above the bearing elevation as specified in Table 4 (dim.)

i_c, i_y, i_q = load inclination factors - for footings with modest embedment, consideration may be given to omission of the load inclination factors
i.e. S&ME will assume all inclination factors = 1

TABLE 1 Bearing Capacity Factors			
ϕ	N_c	N_q	N_y
0.0	5.1	1.0	0.0
1.0	5.4	1.1	0.1
2.0	5.6	1.2	0.2
3.0	5.9	1.3	0.2
4.0	6.2	1.4	0.3
5.0	6.5	1.6	0.5
6.0	6.8	1.7	0.6
7.0	7.2	1.9	0.7
8.0	7.5	2.1	0.9
9.0	7.9	2.3	1.0
10.0	8.4	2.5	1.2
11.0	8.8	2.7	1.4
12.0	9.3	3.0	1.7
13.0	9.8	3.3	2.0
14.0	10.4	3.6	2.3
15.0	11.0	3.9	2.7
16.0	11.6	4.3	3.1
17.0	12.3	4.8	3.5
18.0	13.1	5.3	4.1
19.0	13.9	5.8	4.7
20.0	14.8	6.4	5.4
21.0	15.8	7.1	6.2
22.0	16.9	7.8	7.1
23.0	18.1	8.7	8.2
24.0	19.3	9.6	9.4
25.0	20.7	10.7	10.9
26.0	22.3	11.9	12.5
27.0	23.9	13.2	14.5
28.0	25.8	14.7	16.7
29.0	27.9	16.4	19.3
30.0	30.1	18.4	22.4
31.0	32.7	20.6	26.0
32.0	35.5	23.2	30.2
33.0	38.6	26.1	35.2
34.0	42.2	29.4	41.1
35.0	46.1	33.3	48.0
36.0	50.6	37.8	56.3
37.0	55.6	42.9	66.2
38.0	61.4	48.9	78.0
39.0	67.9	56.0	92.3
40.0	75.3	64.2	109.4
41.0	83.9	73.9	130.2
42.0	93.7	85.4	155.6
43.0	105.1	99.0	186.5
44.0	118.4	115.3	224.6
45.0	133.9	134.9	271.8

Table 10.6.3.1.2a-1 from AASHTO LRFD Bridge Design Specifications

TABLE 2 Ground Water Correction Factors		
D_w	C_{wq}	C_{wy}
0.0	0.5	0.5
D_f	1.0	0.5
$>1.5B+D_f$	1.0	1.0

Table 10.6.3.1.2a-2 from AASHTO LRFD Bridge Design Specifications

TABLE 3 Shape Correction Factors			
	s_c	s_y	s_q
$\phi = 0$	$1 + (B/5L)$	1	1
$\phi > 0$	$1 + (B/L)(N_y/i)$	$1 - 0.4(B/L)$	$1 + [(B/L)\tan\phi]$

Table 10.6.3.1.2a-3 from AASHTO LRFD Bridge Design Specifications

TABLE 4 Depth Correction Factor		
ϕ	D_f/B	d_q
32.0	1	1.20
	2	1.30
	4	1.35
37.0	1	1.20
	2	1.25
	4	1.30
42.0	1	1.15
	2	1.20
	4	1.25
	8	1.30

Table 10.6.3.1.2a-4 from AASHTO LRFD Bridge Design Specifications

Linear Interpolation for friction angles in between those provided

$$\frac{\phi - 32}{37 - 32} \frac{d_q - 1.35}{1.30 - 1.35} = 0.0000$$

$$\frac{\phi - 37}{42 - 37} \frac{d_q - 1.20}{1.15 - 1.20} = 0.0000$$

VALUES:

$N_{cm} = 32.625$	$N_{qm} = 12.77924$	$N_{ym} = 13.59857143$
$N_c = 25.80$ Table 1	$N_q = 14.70$ Table 1	$N_y = 16.70$ Table 1
$s_c = 1.26$	$s_y = 0.87$	$s_q = 0.81$
$i_c = 1.00$	$d_q = 1.00$ Table 4	$i_y = 1.00$
$i_q = 1.00$		
$c = 0.00$	$N_{cm} = 32.63$	$i_c = 1$
$\phi = 28$	$N_{qm} = 12.78$	$i_y = 1$
$\gamma = 0.12$ data	$N_{ym} = 13.60$	$i_q = 1$
$D_f = 7.00$ plans	$C_{wq} = 0.50$ Table 2	$s_c = 1.26$
$B = 6.50$ plans	$C_{wy} = 0.50$ Table 2	$s_y = 0.81$
$L = 14$ plans		$s_q = 0.87$
		$d_q = 1.00$

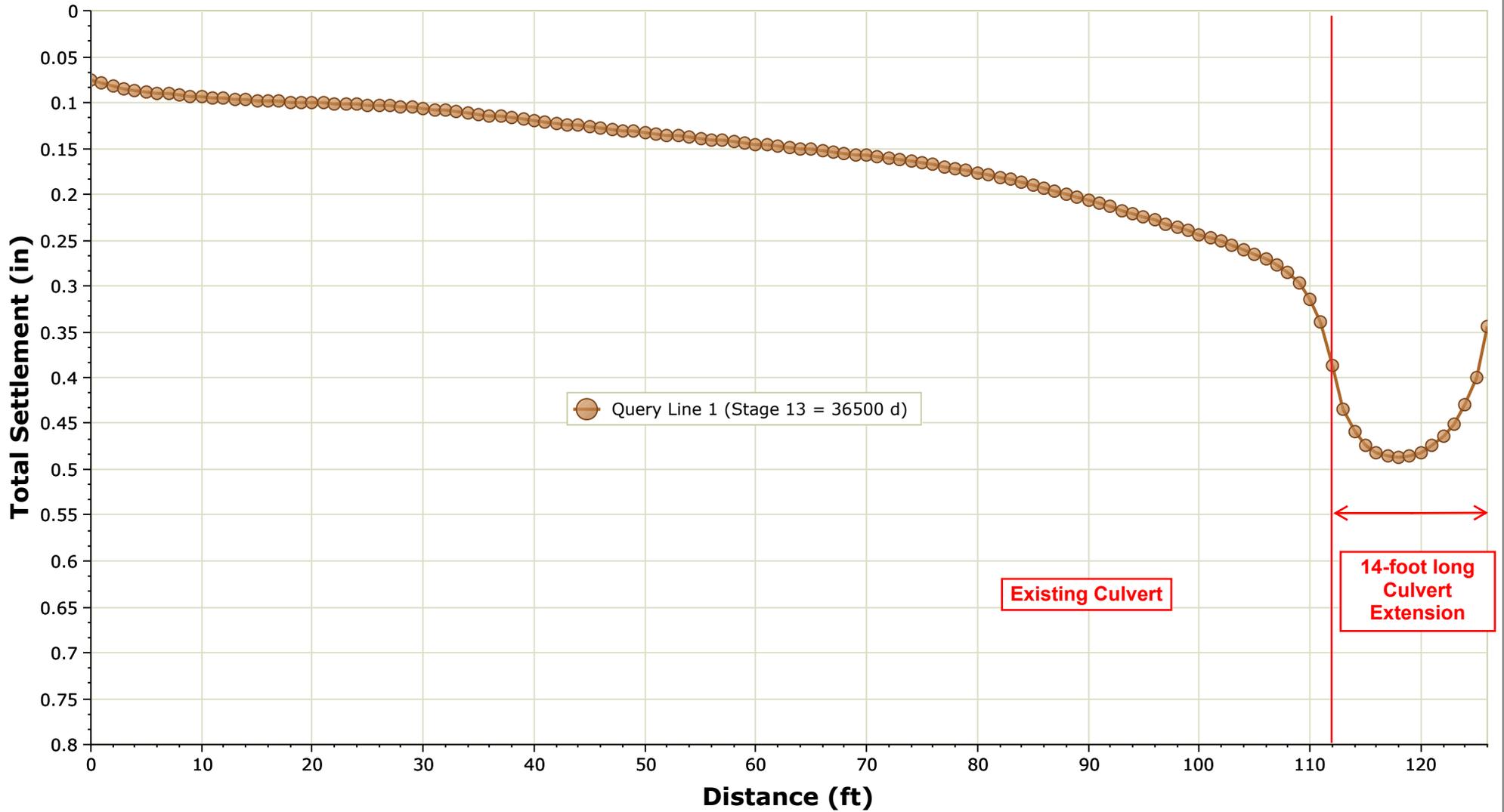
NOMINAL RESISTANCE: $q_n = 8.02$

RESISTANCE FACTOR: 1 from Ch 9 of SCDOT GDM - Strength

FACTORED RESISTANCE: $q_r = 8.02$

Station 96+00 Culvert Extension RT
Extreme Event Limit State

96+00 Culvert: Distance vs. Total Settlement



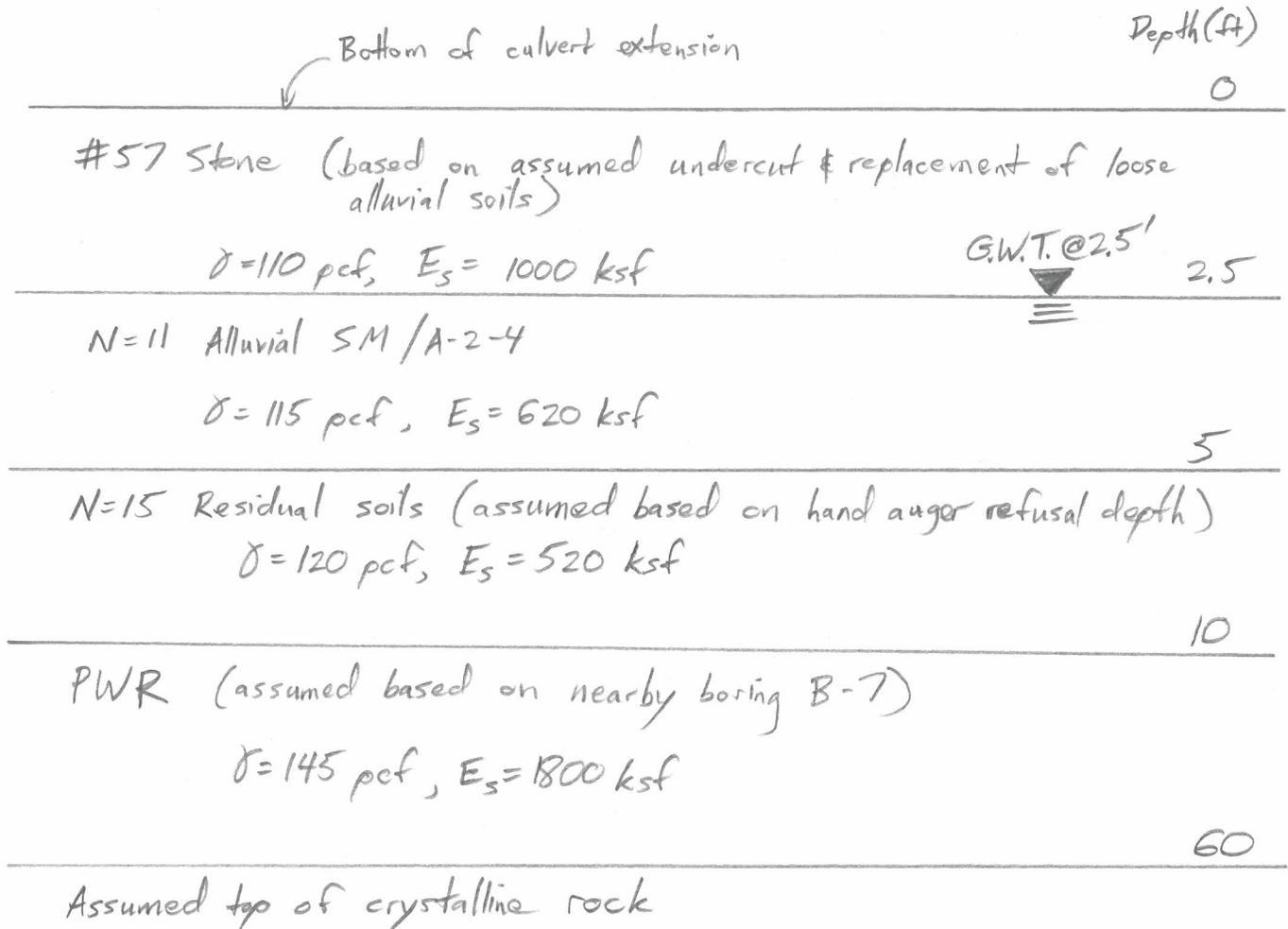
Reference Stage: Stage 1 = 0 d
 Total Settlement at Depth = 0 ft

	Project		SC 160	
	Analysis		96+00 Culvert	Description
	Drawn By	NRB	Project Number	6235-16-017
	Location	--	File Name	9600 Culvert.s3z
		Company	S&ME	Figure
		Date	1/28/2021	X



Project Name SC 160 Calculated By NRB Date 1/28/2021
Project Number 6235-16-017 Checked By _____ Date _____
Subject SC 160 Sta. 96+00 Culvert Extension RT Sheet 1 of _____

Settlement Model Below Culvert Extension RT (based on HA-102)





Project No 6235-16-017
Client STV
Project SC 160
Desc. Culvert Headwall
96+00 Culvert

Sheet 1 of 1
Calc. By NRB Date 1/28/21
Check By _____ Date _____

LRFD SLIDING PARAMETERS

Inlet Headwall:

Reference Boring: N/A

$D_f = 2$ ft below final grade, bearing in:

#57 Stone

For Cohesionless Soils (i.e. $\phi_f > 0$):

For Cohesive Soils (i.e. $\phi_f = 0$):

$\phi_f = 38$ degrees

$q_u =$ N/A tsf

$S_u =$ N/A ksf

Coefficient of Friction = $\tan \delta$
= $\tan(\phi_f)$ for concrete cast against soil
= $0.8 \tan(\phi_f)$ for precast concrete footing

For #57 Stone

soil, the unit sliding resistance equals

FootingType: Cast-in-Place

the undrained shear strength (S_u)

$\tan \delta = \tan (38)$

Therefore, sliding resistance = N/A ksf

$\tan \delta =$ 0.78

REFERENCES

AASHTO LRFD Bridge Design Specifications, 6th Edition, Section 10: Foundations.

10.6.3.4 Failure by Sliding

SCDOT GDM

Appendix VII – Vibration Monitoring Assessment Calculations



Project Name SC 160 Calculated By NRB Date 6/4/2021
Project Number 6235-16-017 Checked By _____ Date _____
Subject Estimated Peak Particle Velocities Sheet 1 of 1

Estimated Peak Particle Velocities for a Vibratory Roller:

Equation 24-4 from GDM version 2.0:

$$PPV_{\text{Const Equip}} = PPV_{\text{Ref}} \left(\frac{25}{D} \right)^n$$

Assume $n=1.3$ (Soil Class II Competent Soils, Table 24-2)

Assume $PPV_{\text{Ref}} = 0.21$ ips (Vibratory roller, Table 24-3)

Example calculation for $D=3$ feet:

$$PPV_{\text{Const Equip}} = (0.21 \text{ ips}) \left(\frac{25}{3} \right)^{1.3} = 3.31 \text{ inches per second}$$

Calculation results for various distances:

D (feet)	n	PPV_{Ref} (ips)	$PPV_{\text{Const Equip}}$ (ips)
3	1.3	0.21	3.31
11	1.3	0.21	0.61
21	1.3	0.21	0.26
33	1.3	0.21	0.15
20	1.3	0.21	0.28
50	1.3	0.21	0.09



April 22, 2021

York County Engineering
6 S. Congress Street
York, South Carolina 29745

Attention: Mr. Ron Smith, PE

Reference: **Report of Pavement Section Recommendations - Revised**
SC Highway 160 East
Fort Mill, South Carolina
S&ME Project No. 1535-20-079

Dear Mr. Smith:

S&ME, Inc. (S&ME) is pleased to submit this report for the above-referenced project. These services have been performed in accordance with S&ME Proposal No. 15-2000404 dated December 3, 2020 and our On-Call Contract for Professional Engineering Services with York County.

The project information is based on telephone and email conversations between yourself and our Ms. Kristen Hill on November 17, 2020 and December 7, 2020. Included in the email correspondence was the *SC Hwy 160 Final Plans for Review* prepared by STV, Inc. and video of the alignment. We understand York County is preparing to rehabilitate and widen an approximately 3,200-foot section of Highway 160 from 762 west of SC 460 to S-242. The plans include traffic information. York County has asked S&ME to provide pavement thickness sections for full depth reclamation and widening based on the information provided. Revisions to this report are based on review comments from SCDOT in April 2021.

Pavement analyses are based on the traffic conditions provided by York County and STV. The Soil Support Value of 2.0 was assumed based on our experience in Fort Mill. The Road Group classification was provided by SCDOT for this section of Highway 160 East. The asphalt design procedures are based on the SCDOT Pavement Design Guidelines (2008). The following traffic conditions were provided to us and are incorporated into our analyses:

2021 ADT	2041 ADT	Road Group	% Trucks	Design Life (years)	Directional Split
22,700	30,000	J	4.0	20	50

Using the SCDOT Pavement Design Procedures, a required total number of 18-kip single axle load applications (ESALs) of **2,267,750** has been determined. The following tables present the recommended pavement sections for rehabilitation with full depth reclamation and full depth asphalt widening.

Full Depth Asphalt Widening			Asphalt with FDR Base		
Thickness (in)	Rate (psy)	Material	Thickness (in)	Rate (psy)	Material
1.9	200	Surface Type B	1.9	200	Surface Type B
1.9	200	Intermediate Type B	1.9	200	Surface Type B
11	1150	HMA Base Type A	12	--	Cement Mod. Rec. Base

When widening pavements, a reflective crack will eventually form at the joint between the new and old pavements. If full depth reclamation is performed, this joint and subsequent crack could be prevented by building out the widened section prior to reclamation. The build out could consist of graded aggregate base course which would then be reclaimed at the same time as the existing pavements.

We understand that SCDOT prefers not to allow high levels of traffic (like those measured here) on unpaved reclaimed surfaces for an extended period of time. Depending on the timing and sequence of construction, consideration should be given to placing a chip seal over the newly reclaimed base until paving can be performed.

The information provided in this letter is based on our understanding of the project information given in this report and on our interpretation of the information provided. We have made our recommendations based on our experience with similar subsurface conditions and similar projects. These analyses apply to the specific project discussed in this report; therefore, any changes in the project information should be provided to us so we may review our conclusions and make any appropriate modifications.

This report has been prepared for the exclusive use of the client for specific application to the subject project and project site. It has been prepared in accordance with generally accepted geotechnical engineering practice for specific application to this project. The conclusions and recommendations contained in this report are based upon applicable standards of our practice in this geographic area at the time this report was prepared. No other warranty, expressed or implied, is made.

S&ME, Inc. appreciates the opportunity to assist you during this phase of the project. If you should have questions concerning this report, or if we may be of further assistance, please contact us.

Sincerely,

Sincerely,

S&ME, Inc.


Kristen H. Hill, PE
Principal Geotechnical Engineer
SC Registration No. 22379





David A. Bixler II, PE
Senior Engineer





South Opening (Invert-in)



No visible cracking in headwall and wingwall



Wingwall and headwall connection



No visible cracking or water seepage on inside of culvert.



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

May 16, 2023

Regulatory Division

Mr. Sean Connolly
South Carolina Department of Transportation
955 Park Street, Room 506
Columbia, South Carolina 29202
ConollyMS@scdot.org

Dear Mr. Connolly:

This is in response to your Pre-Construction Notification (PCN) (SAC-2011-00476) to widen an existing roadway, which we received and considered complete on May 5, 2023. In submitting the PCN, you requested verification the proposed project is authorized by Department of the Army (DA) General Permit (GP) # SAC-RGP-02 SCDOT Road Widening.

The work affecting waters of the United States is part of an overall project known as SC-160 Widening. The activities in waters of the United States include discharging fill material into 25 linear feet (0.004 acre) of a tributary associated with a culvert extension. The project is located on and along approximately 1.0 mile segment of SC-160 from just east of Springfield Parkway to the York County line in Fort Mill, York County, South Carolina (Latitude: 35.0064 °, Longitude: -80.9089 °).

The application also includes the following supplemental information:

- a. Drawing sheets 1-4 of 4 titled "SC 160 Widening" and dated April 20, 2023;
- b. A delineation of wetlands, other special aquatic sites, and other waters via a Preliminary Jurisdictional Determination dated September 24, 2014.

Based on a review of the information provided, the Corps concludes the proposed activity will not result in more than minimal individual or cumulative adverse environmental effects, and is not contrary to the public interest. Furthermore, the activity described above meets the terms and conditions of DA GP # SAC-RGP-02 SCDOT Road Widening.

For this authorization to remain valid, the project must comply with: (1) the terms and conditions listed in the attached copy of the DA GP # SAC-RGP-02 SCDOT Road Widening; and (2) 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.
- d. 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: <https://www.dnr.sc.gov/water/flood/index.html>.

This verification is valid until DA GP SAC-RGP-02 SCDOT Road Widening expires on September 3, 2026, unless prior to this date the subject GP is suspended, revoked, or is modified such that the activity no longer complies with the terms and conditions of the GP.

This authorization is verified under DA GP # SAC-RGP-02 SCDOT Road Widening based on information you provided. It is your responsibility to read the attached GP before you begin work. If your project fails to meet all of the terms and conditions of the subject GP, at any time (i.e., prior to commencement of the authorized work, during construction, or after project completion), the activity is unauthorized, and you should contact the Corps immediately.

In all future correspondence, please refer to file number SAC-2011-00476. A copy of this letter is forwarded to State and/or Federal agencies for their information. If you have any questions, please contact Jeremy M. Kinney, Project Manager, at (843) 714-4649, or by email at Jeremy.M.Kinney@usace.army.mil.

Sincerely,

Ronnie Smith

Ronnie D. Smith
Chief, Northeast Branch

Attachments:

Permit Drawings
General Permit # SAC-RGP-02 SCDOT Road Widening
Certification of Compliance

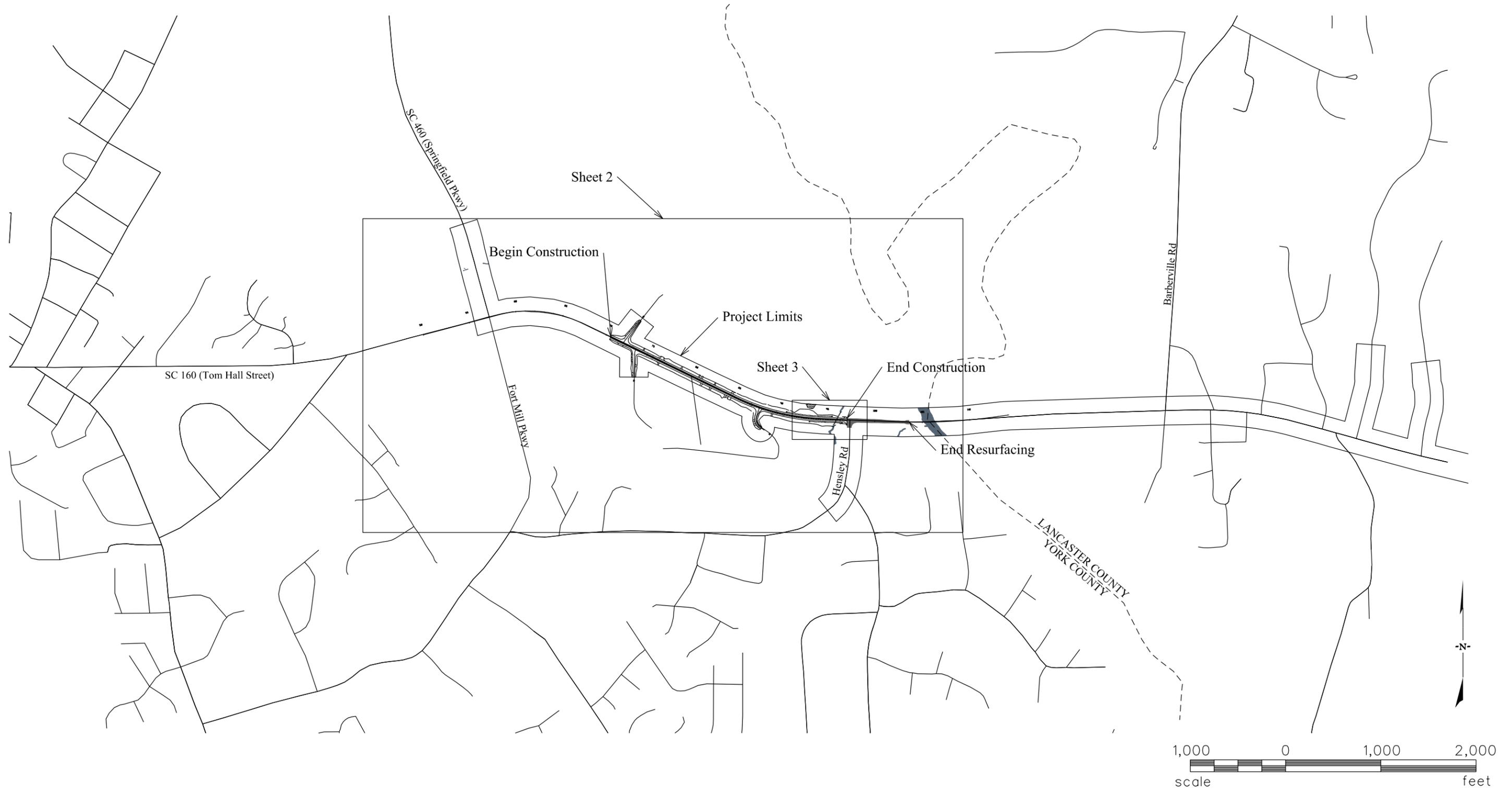
Copy Furnished:

Ms. Jackie Galloway
SCDOT
P.O. Box 191
Columbia, South Carolina 29202
GallowayJA@scdot.org

Mr. Joshua Kotheimer
STV Incorporated
900 West Trade Street, Suite 715
Charlotte, North Carolina 28202
Joshua.kotheimer@stvinc.com

SCDHEC – Bureau of Water
2600 Bull Street
Columbia, SC 29201
WQCWetlands@dhec.sc.gov

SC 160 WIDENING



WETLAND
 JURISDICTIONAL STREAM
 PERMANENT STREAM PIPE IMPACT



PROJECT IMPACTS

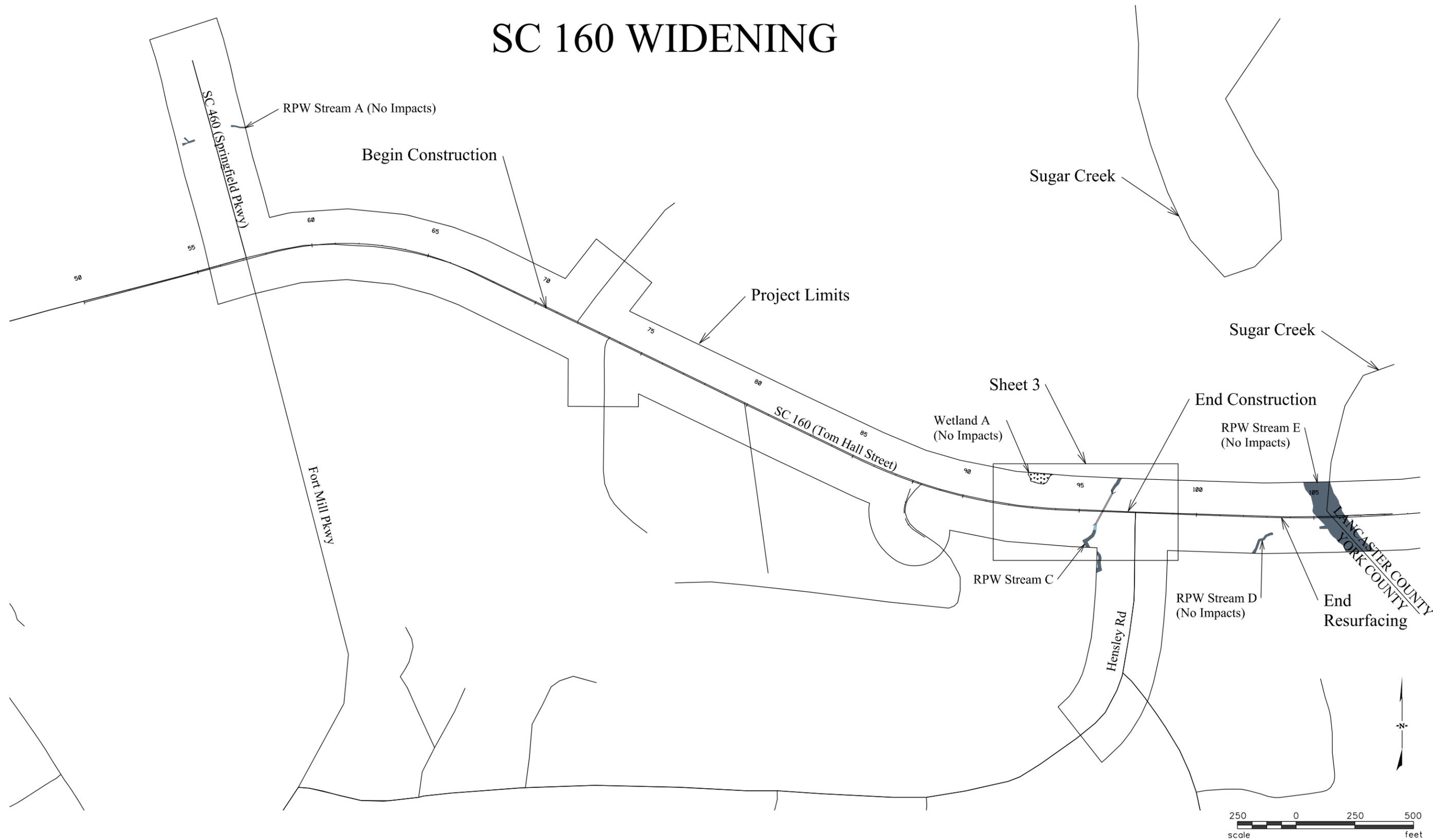
PERMANENT STREAM PIPE IMPACT 25-lf (0.004 acre)

Permitted Plans

STV Incorporated
 454 South Anderson Road, Suite 3, BTC 517
 Rock Hill, South Carolina 29730
 (803) 980-4970

APPLICANT:	SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION	
PROJECT:	SC 160 WIDENING	
SCDOT PROJECT ID:	P029536	
YORK COUNTY PROJECT #	11149-010	
LOCATION:	YORK COUNTY, SOUTH CAROLINA	
USACE FILE #	SAC-2011-00476	
SHEET:	1 OF 4	DATE: 4-20-2023

SC 160 WIDENING



WETLAND
 JURISDICTIONAL STREAM
 PERMANENT STREAM PIPE IMPACT



PROJECT IMPACTS

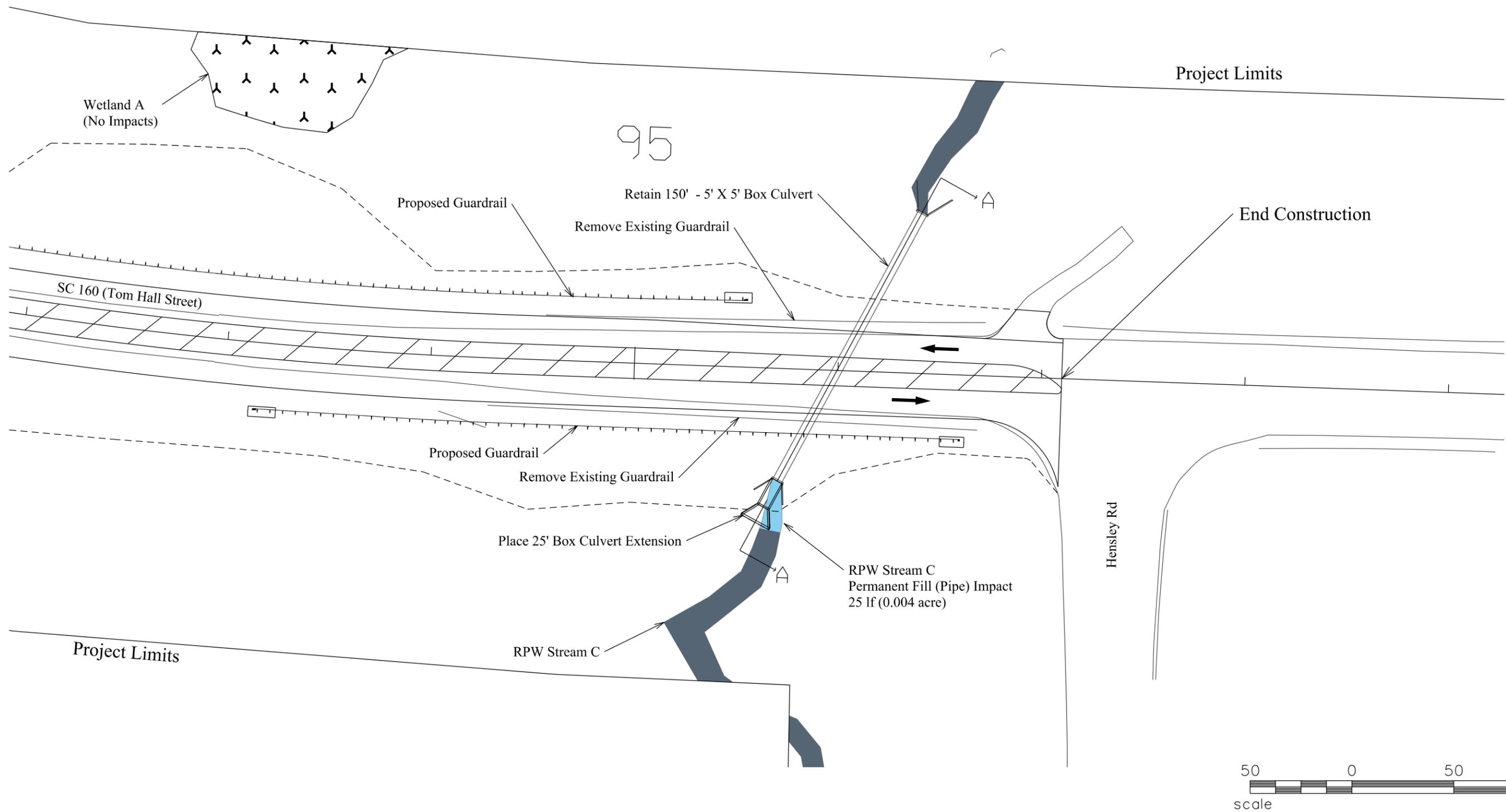
PERMANENT STREAM PIPE IMPACT 25 lf (0.004 acre)

Permitted Plans

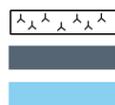
STV Incorporated
 454 South Anderson Road, Suite 3, BTC 517
 Rock Hill, South Carolina 29730
 (803) 980-4970

APPLICANT:	SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION	
PROJECT:	SC 160 WIDENING	
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YORK COUNTY PROJECT #	11149-010	
LOCATION:	YORK COUNTY, SOUTH CAROLINA	
USACE FILE #	SAC-2011-00476	
SHEET:	2 OF 4	DATE: 4-20-2023

SC 160 WIDENING



WETLAND
 JURISDICTIONAL STREAM
 PERMANENT STREAM PIPE IMPACT



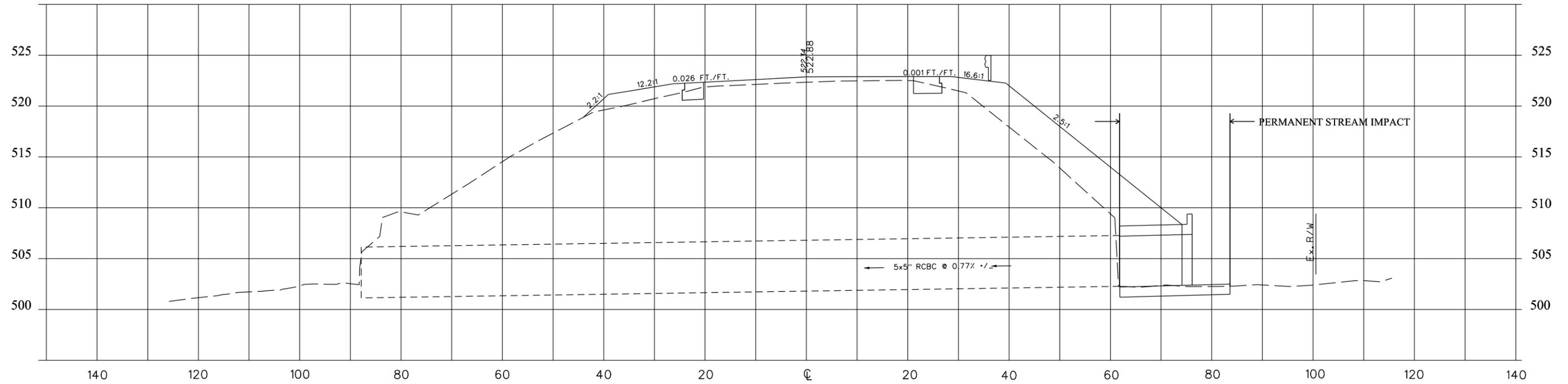
SHEET IMPACTS
 PERMANENT STREAM PIPE IMPACT 25 lf (0.004 acre)

Permitted Plans

STV Incorporated
 454 South Anderson Road, Suite 3, BTC 517
 Rock Hill, South Carolina 29730
 (803) 980-4970

APPLICANT:	SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION	
PROJECT:	SC 160 WIDENING	
SCDOT PROJECT ID:	P029536	
YORK COUNTY PROJECT #	11149-010	
LOCATION:	YORK COUNTY, SOUTH CAROLINA	
USACE FILE #	SAC-2011-00476	
SHEET:	3 OF 4	DATE: 4-20-2023

SC 160 WIDENING

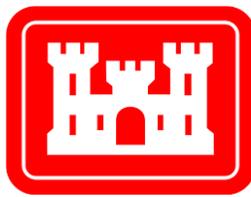


SC 160
CROSSLINE SECTION A
STATION 95+99.56

Permitted Plans

STV Incorporated
454 South Anderson Road, Suite 3, BTC 517
Rock Hill, South Carolina 29730
(803) 980-4970

APPLICANT:	SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION	
PROJECT:	SC 160 WIDENING	
SCDOT PROJECT ID:	P029536	
YORK COUNTY PROJECT #	11149-010	
LOCATION:	YORK COUNTY, SOUTH CAROLINA	
USACE FILE #	SAC-2011-00476	
SHEET:	4 OF 4	DATE: 4-20-2023



REGIONAL GENERAL PERMITS FOR ACTIVITIES ASSOCIATED WITH LINEAR TRANSPORTATION PROJECTS WITHIN WATERS OF THE U.S., LOCATED WITHIN THE STATE OF SOUTH CAROLINA

Authority: The Charleston District, U.S. Army Corps of Engineers (Corps) is authorizing the discharge of dredged and/or fill material in waters of the United States (U.S.), including navigable waters of the U.S. pursuant to Section 404 of the Clean Water Act (33 U.S.C. 1344) and/or to place structures or perform work in or affecting navigable waters of the U.S. pursuant to Section 10 of the Rivers and Harbors Act (33 U.S.C. 403), within the boundaries of the Charleston District in the State of South Carolina.

Purpose: The purpose of these Regional General Permits (RGPs) is to provide a simplified and expeditious means to authorize activities in waters of the U.S., including wetlands, that are similar in nature and cause only minimal individual and cumulative impacts, for specific transportation projects undertaken by the South Carolina Department of Transportation (SCDOT), within the State of South Carolina.

Description: These RGPs authorize the SCDOT to conduct activities required for the improvement, expansion, or maintenance of existing linear transportation projects in waters of the U.S., including navigable waters of the U.S., provided they meet the terms and conditions described herein. Only **one** RGP can be utilized for each single and complete project, defined by the stated purpose of the proposed project.

Charleston District Regional General Permits for Linear Transportation Projects		
RGP #	Project Purpose	Type of Project
RGP 2	Road Widening	Improvement
RGP 3	Intersection Improvements	Improvement
RGP 4	Bridge Replacements	Improvement
RGP 5	Roadway Improvements (to include shoulder improvements, addition of bike lanes, sidewalks or multi-use pathways, etc.)	Improvement
RGP 6	Roadway Maintenance Activities and Rip-Rap/ Scour Protection (roadway, causeway, bridge approaches, etc.)	Maintenance
RGP 7	Pipes and Culverts (replacements, extensions, etc.)	Maintenance
RGP 8	Cleaning and Repairing Existing Outfalls and Roadway Ditches	Maintenance

RGP 2 Road Widening

Activities required for the expansion of existing linear transportation projects for the purposes of widening an existing roadway for additional vehicular capacity (additional travel lanes) in waters of the U.S., including “navigable waters of the U.S.”, as well as the addition of bike lanes and pedestrian/multi-use pathways associated with road widening projects. Permanent and/or temporary impacts to waters of the U.S., including wetlands, for a single and complete project are not to exceed 3.0 acres of total impacts which can include up to 3.0 acres of non-tidal impacts, 0.5 acre of tidal water impacts, and 300 linear feet of non-tidal, waters of the US.

Authorized activities include the placement of fill in waters of the U.S. for suitable road base, pipe and culvert extensions, stabilization measures (i.e. rip-rap), etc. This RGP authorizes temporary structures, fills, and work necessary to expand the existing linear transportation project, in accordance with all terms and conditions listed herein to ensure the project results in only minimal impacts within the project area, as well as to adjacent properties. This RGP also authorizes the installation of utility lines (when those utility lines are being installed due to the improvement, expansion, or maintenance of existing linear transportation projects) and the associated excavation, backfill, or bedding for the utility lines, in all waters of the U.S., provided there is no change in pre-construction contours. 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 radio and television communication. The term "utility line" does not include activities that drain a water of the US, such as drainage tile or french drains.

Notification: SCDOT must submit a pre-construction notification to the Charleston District Engineer and may only commence work upon written verification from the Corps of Engineers that the project is consistent with the terms and conditions of the RGP. (See Section III. Pre-Construction Notification Requirements) (Sections 10 and 404)

RGP 3 Intersection Improvements

Activities required for the modification of existing transportation intersections for the purposes of improving the safety and/or traffic flow of vehicles at intersections to include the addition of turn lanes, slight shifts in alignment or alterations in the configuration of roadways or lanes, etc. in waters of the U.S., including “navigable waters of the U.S.” Permanent and/or temporary impacts to waters of the U.S., including wetlands, for a single and complete project are not to exceed 3.0 acres of total impacts, which can include up to 3.0 acres of non-tidal wetland/water impacts, 0.5 acre of tidal water impacts, and 300 linear feet of non-tidal, waters of the U.S.

Authorized activities include the placement of fill in waters of the U.S. for suitable road base, pipe and culvert extensions, stabilization measures (i.e. rip-rap), etc. This RGP authorizes temporary structures, fills, and work necessary to conduct construction activities, in accordance with all terms and conditions listed herein to ensure the project results in only minimal impacts within the project area, as well as to adjacent properties. This RGP also authorizes the installation of utility lines (when those utility lines are being installed due to the improvement, expansion, or maintenance of existing linear transportation projects) and the associated excavation, backfill, or bedding for the utility lines, in all waters of the U.S., provided there is no change in pre-construction contours. 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 radio and television communication. The term "utility line" does not include activities that drain a water of the U.S., such as drainage tile or french drains.

Notification: SCDOT must submit a pre-construction notification to the Charleston District Engineer and may only commence work upon written verification from the Corps of Engineers that the project is consistent with the terms and conditions of the RGP. (See Section III. Pre-Construction Notification Requirements) (Sections 10 and 404)

RGP 4 Bridge Replacements

Activities required for the replacement of existing bridges in waters of the U.S., including “navigable waters of the U.S.” and includes widening causeways and/or bridge abutments to allow for additional capacity (vehicular travel lanes and/or pedestrian access). This RGP includes bridge replacements on existing alignment, shifts in alignment, and includes improving existing bridges to allow for additional vehicular capacity (additional travel lanes). Permanent and/or temporary impacts to waters of the U.S., including wetlands, for a single and complete project are not to exceed 3.0 acres of total impacts which can include up to 3.0 acres of non-tidal wetland/water impacts, 0.5 acre of tidal water impacts, and 300 linear feet of non-tidal, waters of the US.

Authorized activities include the placement of fill in waters of the U.S. for suitable causeway, bridge approaches and/or bridge abutments, stabilization measures, (i.e. rip-rap), sheet pile walls, bulkheads, or other retaining walls, etc. This RGP authorizes temporary structures, fills, and work necessary to replace existing bridges in accordance with all terms and conditions listed herein to ensure the project results in only minimal impacts within the project area, as well as to adjacent properties. This RGP also authorizes the installation of utility lines (when those utility lines are being installed due to the improvement, expansion, or maintenance of existing linear transportation projects) and the associated excavation, backfill, or bedding for the utility lines, in all waters of the U.S., provided there is no change in pre-construction contours. 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 radio and television communication. The term "utility line" does not include activities that drain a water of the US, such as drainage tile or french drains.

For proposed bridge replacements that include shifts in alignment, it will be solely the Corps' discretion when a shift in alignment becomes such that an alternatives analysis is required (for example, a proposed alignment will adversely impact a tidal creek not currently impacted by the existing structure) and/or the proposed alignment is not considered an improvement or expansion of an existing linear transportation project, but a new alignment and as such will be evaluated for authorization via a Nationwide Permit or a Standard, Individual Permit.

Notification: SCDOT must submit a pre-construction notification to the Charleston District Engineer and may only commence work upon written verification from the Corps of Engineers that the project is consistent with the terms and conditions of the RGP. (See Section III. Pre-Construction Notification Requirements) (Sections 10 and 404)

RGP 5 Roadway Improvements (to include shoulder improvements, addition of bike lanes, sidewalks or multi-use pathways, etc.)

Activities required for the improvements of existing roadways, for purposes other than increasing vehicular capacity (additional travel lanes), which require fill in waters of the U.S., including “navigable waters of the U.S.” or where the project purpose is to improve an existing linear transportation project by the addition of bike lanes, sidewalks or multiuse pathways, shoulder improvement activities, etc. Permanent and/or temporary impacts to waters of the US, including wetlands, for a single and complete project are not to exceed 2.0 acres of total impacts, which can include up to 2.0 acres of non-tidal wetland/water impacts, 0.5 acre of tidal water impacts, and up to 300 linear feet of waters of the U.S.

This RGP can be used for the installation of bike lanes, sidewalks and/or multi-use pathways not associated with increasing vehicular capacity as well as shoulder improvement activities needed for safety purposes, the addition of turn lanes, the addition of guardrails, or other improvements to existing roadway shoulders.

This RGP also authorizes fill for the purposes of protecting side slopes from erosion/scour, etc., replacing or extending culverts and/or pipes, etc. This RGP also authorizes temporary structures, fills, and work necessary to conduct construction activities, in accordance with all terms and conditions listed herein to ensure the project results in only minimal impacts within the project area, as well as to adjacent properties.

Notification: SCDOT must submit a pre-construction notification to the Charleston District Engineer and may only commence work upon written verification from the Corps of Engineers that the project is consistent with the terms and conditions of the RGP. (See Section III. Pre-Construction Notification Requirements) (Sections 10 and 404)

RGP 6 Roadway Maintenance Activities and Rip-Rap/ Scour Protection (roadway, causeway, bridge approaches, etc.)

Activities required for the protection and maintenance of existing roadway surfaces, to include existing causeways, bridge approaches, etc. which require fill in waters of the US, including “navigable waters of the U.S.” to include the installation of rip-rap (or other stabilization materials), sheet pile walls, bulkheads, or other retaining walls, as well as fill for road shoulder rehabilitation activities. Permanent and/or temporary impacts to waters of the U.S., including wetlands, for a single and complete project are not to exceed 2.0 acres of total impacts, which can include up to 2.0 acres of non-tidal wetland/water impacts, 0.5 acre of tidal water impacts, and up to 200 linear feet of waters of the U.S.

This RGP also authorizes temporary structures, fills, and work necessary to conduct construction activities, in accordance with all terms and conditions listed herein to ensure the project results in only minimal impacts within the project area, as well as to adjacent properties.

Notification: SCDOT must submit a pre-construction notification to the Charleston District Engineer prior to commencing the activity. (See Section III. Pre-Construction Notification Requirements) (Sections 10 and 404)

RGP 7 Pipes and Culverts (replacements, extensions, etc.)

Activities required for the improvements or replacements of existing pipes and culverts associated with existing roadway shoulders which require fill in waters of the U.S., including “navigable waters of the U.S.” Permanent and/or temporary impacts to waters of the U.S., including wetlands, for a single and complete project are not to exceed 1.0 acre of total impacts which can include up to 1.0 acre of non-tidal wetland/water impacts, 0.5 acre of tidal water impacts, and up to 100 linear feet of waters of the U.S.

This RGP also authorizes the installation of rip-rap (or other erosion protection), wing walls, head walls, outfall aprons, etc. for the purposes of protecting areas around culverts and/or pipes and temporary fills associated with replacement or improvements of pipes and culverts during construction. This RGP authorizes temporary structures, fills, and work necessary to conduct construction activities, in accordance with all terms and conditions listed herein to ensure the project results in only minimal impacts within the project area, as well as to adjacent properties.

Notification: SCDOT must submit a pre-construction notification to the Charleston District Engineer prior to commencing the activity. (See Section III. Pre-Construction Notification Requirements) (Sections 10 and 404)

RGP 8 Cleaning and Repairing Existing Structures and Roadway Ditches

Activities required for the cleaning and repairing existing structures in waters of the U.S. and roadway ditches (determined to be waters of the U.S.) associated with existing roadways, which require fill in waters of the U.S., including “navigable waters of the U.S.” Permanent and/or temporary impacts to waters of the U.S., including wetlands, for a single and complete project are not to exceed 1.5 acres of total impacts, which can include up to 1.5 acres of non-tidal wetland/water impacts, 0.5 acre tidal water impacts, and up to 300 linear feet of waters of the US.

Authorized activities include modifying the existing cross-sectional configuration of currently serviceable drainage ditches constructed in waters, the installation of rip-rap (or other erosion protection) for the purposes of protecting road base and areas around culverts and/or pipes and temporary fills associated with replacement or improvements of pipes and culverts during construction. This RGP authorizes temporary structures, fills, and work necessary to conduct construction activities, in accordance with all terms and conditions listed herein to ensure the project results in only minimal impacts within the project area, as well as to adjacent properties.

Note: Maintenance of existing ditches (to include excavations of accumulated sediments back to original contours, re-shaping of side slopes, armoring or piping previously armored or piped sections within the same footprint of previously authorized work, and/or the replacement of existing control structures, where the original function is not changed and the capacity is not increased) is considered an exempt activity under Section 404(f)(1)(C) of the Clean Water Act so long as the activity is consistent with Section 404(f)(2) and 33 CFR.323.4 and 40 CFR 232.3. These do not allow any discharges into a water of the U.S. that is:

- part of an activity whose purpose is to convert an area of the waters of the U.S. into a use to which it was not previously subject;
- where the flow or circulation of waters of the U.S. may be impaired;
- the reach of such waters reduced;
- where the proposed discharge will result in significant discernible alterations to flow or circulation (the presumption is that flow or circulation may be impaired by such alteration).

Notification: SCDOT must submit a pre-construction notification to the Charleston District Engineer prior to commencing the activity. (See Section III. Pre-Construction Notification Requirements) (Sections 10 and 404)

I. General Conditions

1. Activities which are not specified in these Regional General Permits or which exceed their limitations will require authorization under a Department of the Army Standard, Individual Permit or Nationwide Permit authorization from the Charleston District, US Army Corps of Engineers. The District Engineer may also require authorization under a Department of the Army Standard, Individual Permit on a case-by-case basis if it is determined that authorization under a Regional General Permit might be contrary to the public interest.
2. This General Permit does not authorize the interference with any existing or proposed Federal project and SCDOT will not be entitled to compensation for damages or injury to the structures or work authorized herein which may be caused by or result from existing or future operations undertaken by the U.S. in the public interest.
3. These Regional General Permits do not convey any property rights, either in real estate or material, or any exclusive privileges; and do not authorize any injury to property or invasion of rights or any infringement of Federal, State, or local laws or regulations, nor does it obviate the requirement to obtain other Federal, State, local assent or to comply with any applicable standards required by ordinance for the activities authorized herein. Other Federal, State, or local agencies are not limited by this document and may impose more stringent requirements than those stated herein as they see fit.
4. SCDOT shall allow the District Engineer or his authorized representative(s) to make periodic inspections at any time deemed necessary in order to assure that the activity being performed under authority of these permits are in accordance with the terms and conditions prescribed herein. The Charleston District reserves the right to require post-construction engineering drawings and/or surveys of any work authorized by these Regional General Permits, as deemed necessary.
5. Upon receipt of a notice from the District Engineer for failure to comply with the terms, conditions, or standards of any given Regional General Permit, SCDOT must, within 60 days, without expense to the US, and in such manner as directed by the District Engineer or his authorized representative(s), effect compliance with the terms, conditions, and standards or remove the previously authorized structure/fill.
6. All activities identified and authorized herein shall be consistent with the terms and conditions of these Regional General Permits; any variance not specifically identified and authorized herein shall constitute a violation of the terms and conditions of these permits which may result in the modification, suspension, or revocation of the authorization, as set forth below and in the institution of such legal proceedings as the US Government may consider appropriate.

Authorization of a specific work or structure authorized herein may be summarily suspended in whole or in part upon a finding by the District Engineer that immediate suspension would be in the general public interest or there has been a violation of any terms and conditions of this permit. Such suspension shall be effective upon receipt by SCDOT of a written notice thereof, which shall indicate:

- (i) The extent of the suspension;
- (ii) The reasons for this action;
- (iii) Any corrective or preventative measures to be taken by SCDOT which are deemed necessary by the District Engineer to abate imminent hazards to the general public interest.

SCDOT shall take immediate action to comply with the provisions of this notice. Within ten (10) days following the receipt of this notice of suspension, SCDOT may request a meeting with the District Engineer or a public hearing to present information relevant to a decision whether their permit should be reinstated, modified, or revoked. If a public hearing is requested it shall be conducted pursuant to procedures prescribed by the Chief of Engineers. After completion of the public hearing or within a reasonable time after issuance of the suspension notice to SCDOT if no hearing is requested, the authorization of the specific work or structure will be reinstated, modified, or revoked. Any modification, suspension, or revocation of authorization under these Regional General Permits shall not be the basis for any claim for damages against the U.S.

7. As determined by the District Engineer, or his designee, there will be no unreasonable interference with navigation or the right of the public to riparian access by the existence or use of activities authorized by these Regional General Permits.
 - a. No authorized activity may cause more than a minimal adverse effect on navigation.
 - b. SCDOT understands and agrees that if future operations by the U.S. 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/her authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, SCDOT will be required, upon due notice from the Charleston District, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the U.S. No claim shall be made against the U.S. on account of any such removal or alteration.
8. The Charleston District may impose other special conditions on a project authorized pursuant to these Regional General Permits that are determined necessary to minimize adverse navigational and/or environmental effects or based on any other factor of the public interest. Failure to comply with all conditions of the authorization, including additional special conditions, constitutes a permit violation and may subject SCDOT, or his/her contractor, to criminal, civil, or administrative penalties and/or restoration.
9. Authorization under any of the Regional General Permits does not obviate the need to obtain other Federal, state or local authorizations required by law or to comply with all Federal, state, or local laws.
10. SCDOT will ensure that a copy of this Regional General Permit document, the accompanying authorization letter and all approved permit drawings are at the work site at all times. These copies must be made available to any regulatory representative upon request. Although SCDOT may assign various aspects of the work to different contractors or sub-contractors, all contractors and sub-contractors shall be expected to comply with all conditions of the Regional General Permits.

II. Special Conditions

The following Special Conditions are applicable to **ALL** the Regional General Permits (RGP) issued to SC Department of Transportation described in this document. This RGP contains certain limitations intended to protect the environment including natural and cultural resources. However, conformance with the conditions contained in the permit does not necessarily guarantee authorization. In cases where the District Engineer, or his designee, considers it necessary, a Standard, Individual Department of the Army permit will be required.

1. Water quality.
 - a. All activities authorized by these Regional General Permits that involve the discharge of dredged or fill material in waters of the US will be consistent with applicable water quality standards, effluent limitations, and standards of performance, prohibitions, pre-treatment standards and management practices established pursuant to the Clean Water Act (33 U.S.C. 1344) and applicable State and local law.
 - b. SCDOT must make every reasonable effort to conduct the work authorized herein in a manner to ensure that there is no more than a minimal adverse effect on water quality.
 - c. For projects potentially impacting impaired waters, Outstanding Resource Water (ORW), shellfish harvesting waters and other sensitive waters, the SCDOT must implement best management practices and post construction stormwater treatment to provide a reasonable assurance that the proposed project will not contribute to impairments or degrade water quality. A stormwater management plan must be submitted to SCDHEC in accordance with requirements of the SCDOT MS4 NPDES Stormwater Permit.
 - d. 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).
2. Historic properties.
 - a. SCDOT must submit a statement to the Corps regarding the authorized activity's potential to cause effects to any historic properties (i.e. any prehistoric or historic district, site, building, structure, or object) listed in, or determined to be eligible for listing on, the National Register of Historic Places, including previously unidentified properties. The statement must say which historic properties may be affected by the proposed work 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 or potential for the presence of historic resources can be sought from the South Carolina State Historic Preservation Office (SHPO) and the National Register of Historic Places. Where SCDOT has identified historic properties which the proposed activity may have the potential to cause effects and so notified the Charleston District, SCDOT shall not begin the activity until notified by the Charleston District that the activity has no potential to cause effects or that consultation under Section 106 of the NHPA has been completed.
 - b. SCDOT should be aware that Section 110(k) of the NHPA (16 U.S.C. § 470(h)-2(k)) prevents the Corps from granting a permit or other assistance to SCDOT 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 effects created or permitted by the SCDOT. If circumstances justify granting the assistance, the Charleston District is required to notify the ACHP and provide documentation specifying the circumstances, explaining the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from SCDOT, SHPO, Tribal Historic Preservation Officer, 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 legitimate interest in the impacts to the permitted activity on historic properties. If SCDOT, during construction or work authorized herein, encounters a previously unidentified

archaeological or other cultural resource, he/she must immediately stop work and notify the Charleston District of what has been found. Coordination with the SHPO and all appropriate consulting parties will commence and SCDOT will subsequently be advised when he/she may recommence work.

3. Endangered species.

a. No activity is authorized which:

- (i) Is likely to jeopardize the continued existence of any threatened or endangered species or threatened species, or species proposed for such designation, as identified under the Endangered Species Act of 1973, or which will result in the destruction or adverse modification of designated critical habitat of such species;
- (ii) "May affect" a listed species or critical habitat, unless Section 7 (Federal Endangered Species Act) consultation addressing the effects of the proposed activity has been completed.
- (iii) Involves the "take" of a threatened or endangered species as defined under the ESA without separate authorization (e.g., a Biological Opinion with "incidental take" provisions) from the U.S. Fish and Wildlife Service or the National Marine Fisheries Service.

- b. SCDOT shall include, in their permit applications, information regarding the presence of any federally listed threatened or endangered species or designated critical habitat in the vicinity of the project site that might be affected by the proposed work.

4. Essential Fish Habitat.

- a. The Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-297; 11 October 1996), requires all Federal agencies to consult with the National Marine Fisheries Services (NMFS) regarding any of their actions authorized, funded, or undertaken or proposed to be authorized, funded, or undertaken that may adversely affect Essential Fish Habitat (EFH). SCDOT must notify the District Engineer if the activity authorized by this General Permit may adversely affect EFH including indirect affects to EFH from actions outside the EFH. The activity is not authorized until the District Engineer determines that the requirements of the Magnuson-Stevens Fisheries Conservation and Management Act have been satisfied.

- b. Any projects that involve activities, including structures, excavation, discharges of dredged or fill material, etc. that are proposed in tidal waters require early coordination with the Charleston Office of the NMFS Habitat Conservation Division located at 219 Fort Johnson Road, Charleston SC 29412. An EFH assessment and copies of all coordination must be provided as described in Section III. (3) SCDOT cannot begin work until written approval is received from the Corps.

5. Anadromous Fish. Activities authorized under these RGPs must be avoided to the maximum extent practicable during the months of February, March, April, May and June in waters where anadromous fish spawn or migrate. Activities that result in the physical destruction (e.g., excavate, fill, or smother downstream by substantial turbidity) of a spawning area are not authorized under these RGPs.

6. Migratory Bird Breeding Areas. Activities in waters of the US that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.
7. Floodplains. SCDOT is advised that development activities in a 100-year floodplain, as designated in the Federal Emergency Management Agency's (FEMA) Flood Insurance Study Data, are subject to the floodplain management regulations of the National Flood Insurance Program [(NFIP) (44 CFR)]. The NFIP further prohibits any development within a designated floodway, including placement of fill that results in any increase in base flood elevations. SCDOT must also comply with the FEMA-U.S. Federal Highway Agreement on Floodplain Management. A statement ensuring compliance with applicable regulations must be included in the Pre-Construction Notification. See Section III (3).
8. SCDOT must coordinate with the appropriate state and/or federal agency when a project represents an intrusion into Outstanding Resource Waters, Wild and Scenic Rivers, Trout Streams (as defined by State Regulations 61-68 and 61-69), Wildlife Management Areas and National Estuarine Sanctuaries, Designated Shellfish Grounds, State Heritage Trust Preserves, State Parks, National Wildlife Refuge, or protected lands (previous mitigation/ restoration area). Detailed project information impacting these sensitive areas shall be presented at an interagency coordination meeting (or provided directly to appropriate agencies) during the early phases of development. The notification/application, as described in Section III.(3)(k) shall contain a summary and/or copy of the coordination that occurred.
9. Minimal impacts. SCDOT must make every reasonable effort to conduct the work authorized herein in a manner so as to avoid and minimize any adverse impact to fish, wildlife, and other environmental resources.
 - a. No activity may substantially disrupt the necessary life-cycle movements of those species of aquatic life indigenous to the water body, including those species that normally migrate through the area. Pipes or culverts placed in streams and wetlands must be appropriately sized and installed in a manner that prevents erosion and allows adequate passage of the aquatic community and provide unimpeded flow of flood waters. Culverts and pipes placed in tidal waters must be sized and positioned to maintain fish passage and allow for unimpeded tidal flow.
 - b. Activities, including structures and work in navigable waters of the US or discharges of dredged or fill material, must avoid and minimize potential impacts to shellfish resources to the greatest extent possible. Activities should occur in areas with the least amount of shellfish or in areas void of shellfish resources, if possible. Direct encroachment on any natural shellfish beds should be avoided.
 - c. All activities or structures proposed in waters of the US must be designed to maintain preconstruction downstream flow conditions (e.g., location, capacity, and flow rates) in freshwaters. For activities in tidal waters, preconstruction bi-directional flow conditions must be maintained or improved. Furthermore, the activity must not permanently restrict or impede the passage of normal or expected high flows and the structure or discharge of dredged or fill material must withstand expected high flows. The activity must, to the maximum extent practicable, provide for retaining excess flows from the site, provide for maintaining surface flow rates from the site similar to pre-construction conditions, and provide for not increasing water flows from the project site, relocating water, or redirecting water flow beyond preconstruction conditions. Stream channelizing will be reduced to the minimal amount necessary, and the activity must, to the maximum extent practicable, reduce adverse effects such as flooding or erosion downstream and upstream of the project site, unless the activity is

part of a larger system designed to manage water flows. Tidal waters should not be channelized. In most cases, it will not be a requirement to conduct detailed studies and monitoring of water flow.

- d. 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, 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 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. 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 mates, metal, synthetic and/or artificial mats, or other materials that may serve the purpose of mats.
- e. All road crossings that utilize culverts must be appropriately sized and positioned to maintain flow. All permanent and temporary culverted road crossings shall be constructed to maintain low flow to sustain the movement of aquatic species and should be designed and constructed to minimize the adverse effects to aquatic life movements. This is a minimum requirement that does not replace local and State requirements for roadway design.
- f. 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. SCDOT is encouraged to perform work within waters of the U.S. during periods of low-flow or no-flow conditions.
- g. Prior to the beginning of any construction activities, appropriate erosion control measures, such as silt fences, silt barriers or other suitable devices, must be placed between the construction area and affected waterways (including wetlands); and maintained in a functioning capacity until the area is permanently stabilized.
- h. All steps necessary must be taken to prevent oil, tar, trash, debris and other pollutants from entering adjacent wetlands and/or waterways. A spill response plan and all related spill materials should be on-site during all phases of construction.
- i. Construction access areas must be clearly identified in the permit application or, construction access must consist of minimal clearing for installation of elevated working platform(s), timber mat(s) or barge(s). Impacts will be temporary and minor in nature. All impacts for construction access count towards the thresholds allowed under these Regional General Permits.
- j. Construction activities must avoid encroachment into any waters of the US not designated as impact areas.
- k. Side slopes must be designed and constructed to minimize impacts to aquatic resources to the maximum extent practicable.
- l. SCDOT must ensure that the wetland boundaries are clearly identified (by flagging, fencing, or other means of identification) for the construction contractor.

- m. Once initiated, projects must be carried to completion in an expeditious manner in order to minimize the period of disturbance and upon completion, all disturbed areas must be permanently stabilized with vegetative cover and/or rip-rap, as appropriate.
10. Mitigation. SCDOT will submit a mitigation plan in accordance with the 2008 Mitigation Rule and the *2010 SAC Guidelines for Preparing a Mitigation Plan* (or the current documents superseding either of these two documents).
- a. The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the US to the maximum extent practicable at the project site.
 - b. Mitigation in all forms (avoiding, minimizing, rectifying, reducing, or compensating for resources losses) will be required to the extent necessary to ensure that the adverse effects to the aquatic environment are minimal.
 - c. Compensatory mitigation will be required in accordance with the *2010 SAC Guidelines for Preparing a Mitigation Plan* (or the current SAC Guidance/Proceedures superseding this document), for all wetland losses that exceed 1/10-acre unless the District Engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse effects of the proposed activity are minimal, and provides a project-specific waiver of this requirement. For wetland losses of 1/10-acre or less, the District Engineer may determine on a case by case basis that compensatory mitigation is required to ensure that the activity results in minimal adverse effects on the aquatic environment.
 - d. These Regional General Permits allow for SCDOT to perform stream and/or wetland restoration activities associated with a project-specific mitigation plan approved and authorized by the Corps, provided all work in waters of the U.S. is included in the pre-construction notification. SCDOT will not have to submit for a separate permit for activities in waters of the U.S. associated with the restoration of former waters, the enhancement of degraded tidal and non-tidal wetlands and riparian areas, and the restoration and enhancement of tidal/ non-tidal streams and tidal/ non-tidal open waters if the work is part of an approved mitigation plan. These activities may include installation of ditch plugs, the placement of in-stream habitat structures, modifications of stream bed and/or banks to restore or create meanders, or the creation of riffle and pool stream structures.
11. Single and complete project. All projects authorized under a Regional General Permit must be a single and complete project and meet the requirements for independent utility. A project that is determined to be single and complete will not be segmented or “piece mealed” in order to qualify for multiple Regional General Permits.
12. Wild and Scenic Rivers (Chattooga River)
- a. No activity is authorized that impacts the Chattooga River.

III. Pre-Construction Notification Requirements

- 1. The SCDOT shall submit a complete Pre-Construction Notification (PCN) package to the Corps, requesting verification that a proposed project is authorized under the terms and conditions of one of the Regional General Permits described herein. The PCN shall not be deemed complete until the Corps has verified that the delineation of waters of the U.S. is accurate.

2. SCDOT shall submit a PCN Form (Enclosure 1). This form is to assist the applicant in submitting complete and proper information. Please note that this is not an exhaustive list of information that may be required as each project has unique components; more information may be required to complete a PCN Form for any given project. All information provided in the form shall be succinct, accurate, and project specific.
3. Contents of a Complete PCN:
 - a. A complete Joint Federal and State Application Form;
 - b. Completed PCN Form;
 - c. 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. (see PCN Form for additional details);
 - d. A statement as to whether the Federal Highway Administration has completed a NEPA document for the proposed project. If so, a copy should be provided;
 - e. Proposed Project Plans to include a location map, plan view and cross sectional diagrams depicting the existing transportation facility and the proposed activities. The proposed plans should depict the entire project with specific detail provided for impacts to waters of the U.S. Cross sectional diagrams should be provided for every typical wetland fill and all open water crossings. All proposed bridge replacement projects should also include bridge profile drawings. Appropriate dimensions of the project as well as acreages or linear feet of impacts should be depicted clearly on the plans, as well as a project specific title block.
 - f. A detailed discussion of how impacts were avoided and minimized from the initial phase of the project plans to the project plan that is currently being proposed.
 - g. Information pertaining to the presence and/or the projects potential affects to historic properties (to assist in complying with Section 106 of the National Historic Preservation Act of 1966). Copies of any coordination with SHPO should be provided, to include material submitted to SHPO for review, as well as response(s) received. Copies of screening forms and supplemental materials should also be provided if the project was reviewed under an existing Section 106 Programmatic Agreement with SHPO;
 - h. Biological Assessment Report to include an assessment of potential impacts to Federally Threatened and Endangered Species and copies of habitat surveys. Copies of any coordination with USFWS and/or NMFS should be provided, to include material submitted to USFWS and/or NMFS for review, as well as the response(s) received;
 - i. Essential Fish Habitat (EFH) Assessment or statement stating why no EFH Assessment was conducted. Copies of any coordination with NMFS should be provided, to include material submitted to NMFS for review, as well as the response(s) received;
 - j. Mitigation Plan (to comply with the 2008 Mitigation Rule and the 2010 SAC Guidelines for Preparing a Mitigation Plan or the current documents superseding either of these two documents);

- k. Documentation of coordination that occurred with resource agencies, as required by II. Special Condition 6.

4. Pre-Construction Notification Timing.

- a. For projects considered Improvement Projects (see table above): SCDOT shall not begin work on a proposed project until receipt of written verification from the Corps that the activity may proceed under one of the Regional General Permits described herein.
- b. For projects considered Maintenance Projects (see table above): If the Corps has not requested additional information, nor approved a request for authorization for one of the RGPs, the applicant may commence work 45 calendar days past the date from the District Engineer's receipt of the complete PCN.

Note: It is SCDOT's responsibility (through FHWA, as appropriate) to determine and document that the project will have "no effect" on listed species or that consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) is complete; **and** that the project has "no potential to cause effects" on historic properties or that consultation required under Section 106 of the National Historic Preservation Act (see 33 CFR 330.4(g)) is complete **and** that the project will cause "no adverse effects" to EFH, or that consultation under the Magnuson-Stevens Act is complete. If the PCN is considered incomplete due to potential impacts to federally threatened or endangered species and/or critical habitat (Federal Endangered Species Act), historic properties (Section 106 of the National Historic Preservation Act of 1966, or essential fish habitat (EFH), SCDOT cannot begin the activity until receiving written notification from the Corps that consultation requirements have been met.

In addition, if the District Engineer notifies SCDOT in writing (within 45 calendar days of receipt of a PCN) that an individual permit is required, SCDOT cannot begin the activity in waters of the US until an individual permit has been obtained.

IV. PROHIBITED ACTIVITIES:

All work that exceeds the terms and conditions specified herein is prohibited unless an Individual or Nationwide Department of the Army Permit has been obtained from the Corps of Engineers. All work for purposes other than those specified herein is expressly not authorized by this document.

V. REQUIRED AUTHORIZATIONS:

Prior to performing any of the work authorized herein, the permittee shall obtain all necessary state permits from the South Carolina Department of Health and Environmental Control, Office of Ocean and Coastal Resource Management and any other required Federal, State, or local authorizations.

VI. PENALTIES FOR VIOLATIONS:

Authorization obtained under these Regional General Permits limits the size, length and use of structures. Any deviation from the specifications, or other terms or conditions of the General Permit shall constitute a violation of Section 10 of the Rivers and Harbors Act of 1899 and/or Section 404 of the Clean Water Act, and may result in the District Engineer seeking judicial relief to have SCDOT remove the structure or work and/or restore the project area to its former condition, as well as the imposition of penalties as provided by law.

VII. LIMITS OF FEDERAL LIABILITY:

In issuing these permits, the Federal Government does not assume any liability for the following:

- a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.
- b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the US in the public interest.
- c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.
- d. Design or construction deficiencies associated with the permitted work.
- e. Damage claims associated with any future modification, suspension, or revocation of this permit.

VIII. REVOCAION OF THE GENERAL PERMIT:

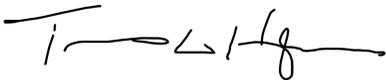
These permits may be revoked by issuance of a public notice at any time the District Engineer determines that the cumulative effects of the activities authorized herein have an adverse effect on the public interest. Following such revocation, any future activities in areas covered by these General Permits will be processed as Individual or Nationwide Permits.

IX. DURATION OF THE GENERAL PERMIT.

These Regional General Permits will cover activities started within five (5) years and completed within six (6) years after the initial date of issuance, unless these RGPs are revoked in the interim. At the end of the first year and every succeeding year, the Corps of Engineers will review activities authorized by these Regional General Permits to determine if significant cumulative impacts have resulted. If the District Engineer determines revocation of this permit, in whole or in part, may be in order due to cumulative impacts, a public notice of the intention will be issued and after a review of all additional data submitted, action will be taken to amend, modify or revoke this permit as appropriate. Revocation of the General Permit will not affect the work that had been authorized when the General Permit was in effect if such work is in accordance with the provisions contained herein.

These Regional General Permits shall become effective on the date of the District Engineer’s signature.

BY AUTHORITY OF THE SECRETARY OF THE ARMY:



Andrew C. Johannes, PhD PE PMP
Lieutenant Colonel, U.S. Army
Commander and District Engineer
or their Designee
Travis G. Hughes
Chief, Regulatory Division

3 September 2021

Date

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 2, 2023

Ms. Amanda Heath
U.S. Army - Corps of Engineers
Charleston District - Regulatory Division
69-A Hagood Avenue
Charleston, SC 29403-5107

Re: Application for Section 404/401 General Permit RGP 2
SC 160 Widening and Improvements, York County
SCDOT Project ID P029536, USACE SAC 2011-00476-DS
Total Impacts: 0 acres of wetland and 25 LF of stream impacts

Dear Ms. Heath:

The South Carolina Department of Transportation (SCDOT) is requesting authorization under Regional General Permit, RGP 2, for unavoidable impacts to jurisdictional waters of the United States associated with the above referenced project.

If necessary, SCDOT will obtain and provide to USACE a copy of all appropriate State certifications and/or authorizations (i.e., 401 Water Quality Certification, State Navigable Waters Permit) prior to commencement of work. In addition, SCDOT agrees to submit a signed compliance certification to USACE within 30 days following completion of the authorized work to include evidence that any required mitigation has been executed.

SCDOT hereby requests that this project be authorized under RGP 2. As SCDOT agrees to meet all terms and conditions of the GP, we respectfully request your concurrence that the proposed work qualifies for authorization under this GP. Please contact me at 737-1078 or GallowayJA@scdot.org with any questions concerning this GP submittal. Thank you in advance for your assistance with this project.

Sincerely,

A handwritten signature in black ink that reads "Jackie Galloway". The signature is written in a cursive, flowing style.

Jackie Galloway
Environmental Permits Manager

Enclosures

ec: M. Sean Connolly, SCDOT
Joshua Kotheimer, STV Engineers

April 20, 2023

Ms. Amanda Heath
U.S. Army Corps of Engineers
Regulatory Division
69-A Hagood Avenue
Charleston, SC 29403

**RE: Section 404 General Permit Submittal for
SC 160 Widening and Improvements (York County PFP 3 Project 11149-010)
SCDOT Project ID P029536
York County, South Carolina
Total Impacts: 25 linear feet permanent stream impacts**

Ms. Heath:

The South Carolina Department of Transportation (SCDOT), in coordination with York County, is requesting authorization under a General Permit for unavoidable impacts to jurisdictional waters of the United States associated with the above referenced project. The project involves widening and intersection improvements to a section of SC 160 from just east of Springfield Parkway to the York County Line. The project was previously permitted under a Nationwide 14 (NW14) permit dated May 4, 2017 (SAC-2011-00476) which has since expired. The previously authorized nationwide permit covered work in York County and Lancaster County. The section located in York County was not constructed before the previously authorized permit expired and we are now requesting that the York County segment be re-authorized under a General Permit.

Construction activities associated with the road widening and intersection improvements will result in permanent impacts to 25 linear feet of perennial stream. SCDOT proposes to mitigate for permanent impacts to jurisdictional waters of the U.S. through the use of previously purchased stream mitigation credits. Proposed stream impacts require 101.5 stream mitigation credits. There were 236.15 stream restoration credits purchased as mitigation for impacts within the York County section of the previously permitted project which did not occur. We are requesting to use the previously purchased credits for the current impacts. The impacts are in the same location as previously permitted but were reduced by 34 linear feet in the currently proposed design.

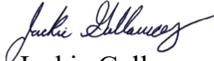
Included in this submittal are the following:

- Joint Federal and State Application Form
- Permit Drawing Sheets
- Preliminary Jurisdictional Determination (SAC 2011-00476 dated Sept 24, 2014)
- Environmental Assessment and Re-evaluation
- Biological Assessment
- Required Stream and Wetland Mitigation Calculations

If necessary, SCDOT will obtain and provide the Corps with a copy of all appropriate state certifications and/or authorizations (i.e., 401 Water Quality Certification, State Navigable Waters Permit) prior to commencement of work.

SCDOT hereby requests that this project be authorized under a Section 404 General Permit. Should you have any questions or require additional information, please do not hesitate to contact me at GallowayJA@scdot.org or (803) 737-1078.

Sincerely,



Jackie Galloway
Permits Coordinator RPG-3/NEPA

cc: Sean Connolly, Permitting Division Manager, SCDOT
Patrick Hamilton, Assistant County Engineer, York County

Enclosures

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: Galloway		11. Agent Last Name (agent is not required): Kotheimer	
2. Applicant First Name: Jackie		12. Agent First Name: Joshua	
3. Applicant Company Name: SCDOT		13. Agent Company Name: STV Incorporated	
4. Applicant Mailing Address: P.O. Box 191		14. Agent Mailing Address: 900 West Trade Street, Suite 715	
5. Applicant City: Columbia		15. Agent City: Charlotte	
6. Applicant State: South Carolina	7. Applicant Zip: 29202-0191	16. Agent State: North Carolina	17. Agent Zip: 28202-1444
8. Applicant Area Code and Phone No.: (803) 737-1337		18. Agent Area Code and Phone No.: (704) 816-2519	
9. Applicant Fax No.: (803) 737-1078		19. Agent Fax No.: (704) 372-3393	
10. Applicant E-mail: GallowayJA@scdot.org		20. Agent E-mail: joshua.kotheimer@stvinc.com	
21. Project Name: SC 160 Widening		22. Project Street Address: N/A	
23. Project City: Fort Mill (nearest town)	24. Project County: York	25. Project Zip Code: 29715	26. Nearest Waterbody: Sugar Creek
27. Tax Parcel ID: Various		28. Property Size (acres): ~50.4 acres	
29. Latitude: 35.007064° N		30. Longitude: -80.910698° W	

31. Directions to Project Site (Include Street Numbers, Street Names, and Landmarks and attach additional sheet if necessary):
From Charleston, take I-26 West to I-77 North. Take I-77 North to SC 160 (Exit 85). Take Exit 85 and proceed on SC 160 East to its intersection with SC 460 (Springfield Parkway) which is the western end of the project limits.

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)

The project involves widening and intersection improvements to a section of SC 160 from the York/Lancaster County line to Springfield Parkway.

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

The purpose of the project is to provide additional roadway capacity and intersection improvements to reduce congestion and improve safety. There will be one culvert extension affecting Waters of the U.S.

34. Type and quantity of Materials to Be Discharged Dirt or Topsoil: _____ <input type="checkbox"/> cubic yards Clean Sand: _____ <input type="checkbox"/> cubic yards Mud: _____ <input type="checkbox"/> cubic yards Clay: _____ <input type="checkbox"/> cubic yards Gravel, Rock, or Stone: _____ <input type="checkbox"/> cubic yards Concrete: _____ <input type="checkbox"/> cubic yards Other (describe): _____ <input type="checkbox"/> cubic yards TOTAL: _____ cubic yards	35. Type and Quantity of Impacts to U.S. Waters (including wetlands). Filling: ^{0.004} _____ <input checked="" type="checkbox"/> acres <input type="checkbox"/> sq.ft. _____ <input type="checkbox"/> cubic yards Backfill & Bedding: _____ <input type="checkbox"/> acres <input type="checkbox"/> sq.ft. _____ <input type="checkbox"/> cubic yards Landclearing: _____ <input type="checkbox"/> acres <input type="checkbox"/> sq.ft. _____ <input type="checkbox"/> cubic yards Dredging: _____ <input type="checkbox"/> acres <input type="checkbox"/> sq.ft. _____ <input type="checkbox"/> cubic yards Flooding: _____ <input type="checkbox"/> acres <input type="checkbox"/> sq.ft. _____ <input type="checkbox"/> cubic yards Draining/Excavation: _____ <input type="checkbox"/> acres <input type="checkbox"/> sq.ft. _____ <input type="checkbox"/> cubic yards Shading: _____ <input type="checkbox"/> acres <input type="checkbox"/> sq.ft. _____ <input type="checkbox"/> cubic yards TOTALS: ^{0.004} _____ acres _____ sq.ft. _____ 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)
RPW Stream C	Perennial	8	Pipe	25
Total Stream Impacts (Linear Feet)				25

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

The project was previously permitted under a Nationwide 14 (NW14) permit dated May 4, 2017 (SAC-2011-00476) which has since expired. The previously authorized nationwide permit covered work in York County and Lancaster County. The section located in York County was not constructed before the previously authorized permit expired and we are now requesting that the York County segment be re-authorized under a General Permit.

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

Avoidance and minimization measures include the use of sediment and erosion control BMPs. Reduction in culvert length through design modifications. Removal of excessive riprap in the design. Utilization of 2.5:1 slopes. Staging outside of jurisdictional areas. Culverts appropriately sized. Use of clean fill material.

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).

Proposed stream impacts require 101.5 stream mitigation credits. There were 236.15 stream restoration credits purchased as mitigation for impacts within the York County section of the previously permitted project which did not occur. We are requesting to use the previously purchased credits for the current impacts; See attached SC 160 Mitigation Certificate from Taylors Creek Mitigation Bank.

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

N/A

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

A Jurisdictional Determination (SAC 2011-00476-DS) was issued on Sept. 24, 2014. A Nationwide 14 permit was issued on May 4, 2017.

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


Applicant's Signature

5/4/2023
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


Applicant's Signature

5/4/2023
Date


Agent's Signature

5/4/2023
Date

¹The 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.

TAYLORS CREEK ASSOCIATES, LLC

a South Carolina Limited Liability Company
1812 Lincoln Street, Suite 200
Columbia, South Carolina 29201

Manager
Michael W. Tighe

Telephone
(803) 256-2371
Facsimile
(803) 256-6431

June 9, 2016

RECEIVED

JUN 13 2016

Environmental Management
SCDOT

SCDOT
c/o Ms. Siobhan O. Gordon
Environmental Permits Coordinator
Midlands Region, SCDOT
P.O. Box 191
Columbia, SC 29202

Re: 545.15 Restoration Stream Credits for Project known as SC 160 Widening, Lancaster and York Counties; USACE#-2011-00476-DS

Dear Ms Gordon:

Enclosed please find the original Certificate of Credit Purchase to SCDOT for the project known as SC 160 Widening, Lancaster and York Counties, SC, bearing USACE#-2011-00476-DS in connection with the above-referenced matter.

If you have any questions or concerns, please do not hesitate contact me.

With kind regards, I am

Yours very truly,

TAYLORS CREEK ASSOCIATES, LLC

Michael W. Tighe

MWT/stb
Encl.
4475.001\SCDOT.ltr

TAYLORS CREEK ASSOCIATES, LLC

a South Carolina Limited Liability Company
1812 Lincoln Street, Suite 200
Columbia, South Carolina 29201

Manager
Michael W. Tighe

Telephone
(803) 256-2371
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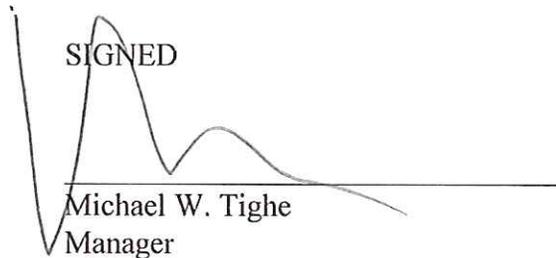
CERTIFICATE OF CREDIT PURCHASE

TAYLOR CREEK STREAM MITIGATION BANK FAIRFIELD COUNTY, SOUTH CAROLINA SAC 2007-1696-5MC

Date: June 1, 2016

This certificate transfers 545.15 restoration credits from Taylor Creek Stream Mitigation Bank inventory to SCDOT to mitigate impact on first order streams in client project known as SC 160 Widening, Lancaster and York Counties, South Carolina, bearing USACE #2011-00476-DS.

Taylors Creek Associates makes this transfer assuming that limitations and provisions for use of these credits have been agreed upon by the above client and proper agencies. In absence of such agreements no guarantee is made or implied.

SIGNED

Michael W. Tighe
Manager

TAYLORS CREEK ASSOCIATES, LLC

a South Carolina Limited Liability Company
1812 Lincoln Street, Suite 200
Columbia, South Carolina 29201

Manager
Michael W. Tighe

Telephone
(803) 256-2371
Facsimile
(803) 256-6431

April 21, 2016

York County
c/o Ms. Siobhan O. Gordon
Environmental Permits Coordinator
Midlands Region, SCDOT
P.O. Box 191
Columbia, SC 29202

Re: 236.15 Restoration Stream Credits for Project known as SC 160 Widening, Lancaster
and York Counties, 31125 and P029516

236.15	Restoration Credits @ \$150.00 each	\$35,422.50
--------	-------------------------------------	-------------

TOTAL PURCHASE PRICE:		\$35,422.50
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Gordon, Siobhan

From: Brumagin, Stephen A (Steve) CIV USARMY CESAC (US)
<Stephen.A.Brumagin@usace.army.mil>
Sent: Friday, December 16, 2016 1:42 PM
To: Gordon, Siobhan
Subject: RE: Mitigation - SC 160 Widening, Lancaster and York Cos.

*** This is an EXTERNAL email. Please do not click on a link or open any attachments unless you are confident it is from a trusted source. ***

Siobhan,

The Corps received your proof of purchase of 524 mitigation credits from Taylors Creek M B for the SC-160 widening project in York County (2011-00476) on June 17, 2016.

Steve

-----Original Message-----

From: Gordon, Siobhan [<mailto:GordonSO@scdot.org>]
Sent: Friday, December 16, 2016 11:57 AM
To: Brumagin, Stephen A (Steve) CIV USARMY CESAC (US) <Stephen.A.Brumagin@usace.army.mil>
Subject: [EXTERNAL] Mitigation - SC 160 Widening, Lancaster and York Cos.

Steve,

SCDOT submitted proof of mitigation along with a request to remove NLEB restrictions (condition 9) on June 15, 2016 (attached). On July 22, 2016, USACE issued a permit modification removing condition 9 (also attached), but did not provide written verification of receipt of the proof of mitigation. Per condition 8, SCDOT is requesting a written response through email that USACE has received proof of all required mitigation. Thank you!

Siobhan O. Gordon

Permits Manager, Midlands | Biologist

SCDOT Environmental Services Office

Phone W 803 737 1337 | M 803 509 2229



Photography by Tracy Martin and Jay Hawkins

Pre-Construction Notification Form for SCDOT GP RGP#2-8

» **Project Name:** SC 160 Widening and Improvements

Project City: Fort Mill	Project County: York
Latitude of Center Point: 35.006402	Longitude of Center Point: -80.90893
Project ID: P029536	SAC Number: SAC 2011-00476-DS
Project Type: Road Widening	RGP #: RGP 2
Construction Obligation Date: 06/15/2023	SCDOT Engineering District: 4

» Project Description:

The project involves widening and intersection improvements to a section of SC 160 from just east of Springfield Parkway to the York County line. The project was previously permitted under a Nationwide 14 (NW14) permit dated May 4, 2017 (SAC-2011-00476) which has since expired. The previously authorized permit covered work in York County and Lancaster County. The current roadway consists of a single eleven-foot travel lane in each direction. The proposed widening project would expand the roadway to include a single fourteen-foot travel lane in each direction with an additional fifteen-foot center median/or center turn lane. The project will also include a culvert extension at approximately Sta. 96+00. Construction will consist of typical roadway construction techniques utilizing machinery such as bulldozers, excavators, and other common equipment.

» **General Comments:**

The project was previously permitted along with a connecting segment in Lancaster County. The Lancaster County segment has been completed.

RGP REQUEST

The following must be completed with each RGP Request. There should be a box checked for each numbered item with all blanks filled in with appropriate information. If a blank is not applicable, state NA. The PCN will not be considered complete unless an answer is provided for every numbered item and the appropriate information listed for each item is enclosed.

» 1. Project Purpose

- What is the purpose of the project?

The purpose of the project is to widen the roadway and improve traffic efficiency and safety in the area. Local growth has driven the need to improve roadway capacity and efficiency in the area.

» 2. Joint Federal and State Application

- Completed Joint Federal and State Application Form (enclosed). If additional space is needed, additional sheets may be attached, referencing specific sections of the Joint Application as appropriate. #41 is not required for RGP Applications.

» 3. Waters of the U.S.

Wetland Determination. (SAC Number: SAC 2011-00476-DS)

- For Improvement Projects, the PCN packet must contain a copy of the Wetland Determination Letter and copy of the referenced JD map, drawing, or plat. SAC dated is enclosed.
- For Maintenance Projects, the PCN packet must contain a (1) Signed Jurisdictional Determination Request form (Approximate-Preliminary), to include information consistent with Charleston District's requirements for delineations and jurisdictional determination submittals (see <http://www.sac.usace.army.mil/missions/regulatory.aspx>).

» 4. NEPA Document

- The Federal Highway Administration has completed the NEPA study. A copy of the NEPA document is provided in Appendix A.
- Federal Highway Administration has not completed a NEPA document because there is no federal funding associated with this project.
- Federal Highway Administration has not completed a NEPA document because it is incomplete at the time of DA submittal.

» 5. Permit Drawings

- Proposed Plans (enclosed). A location map, plan view, and cross-sectional diagram should be provided. For bridge replacement projects, a bridge profile is needed.

>> **6.1 Stream Impacts**

Impact No.	Seasonal or Perennial Flow	Average Stream Width (lf)	Impact Type (road crossing, impoundment, flooding, etc.)	Impact Length (lf)
1	Perennial	8	Pipe	25
Total Stream Impacts (lf)				25

>> **6.2 Summary of Wetland and Stream Impacts**

	Freshwater (ac)	Tidal (ac)	Stream (lf)	Stream Area (ac)
Permanent Impact	N/A	N/A	25	N/A
Temporary Impact	N/A	N/A	N/A	N/A
Total Impact	N/A	N/A	25	N/A

7.1 Avoidance and Minimization

DESIGN		<input checked="" type="checkbox"/> 2-to-1 Slopes <input checked="" type="checkbox"/> 3-to-1 Slopes <input type="checkbox"/> 4-to-1 Slopes <input type="checkbox"/> Clearing limits reduced <input type="checkbox"/> Median widths reduced
HYDROLOGY & HYDRAULICS		<input checked="" type="checkbox"/> Rip rap reduced <input checked="" type="checkbox"/> Culverts and pipes appropriately sized <input type="checkbox"/> Closed drainage system installed <input type="checkbox"/> Stormwater diverted <input type="checkbox"/> Bridge vertical clearance increased <input type="checkbox"/> Scupper minimized
<i>Rip rap pads at the culvert inlet were removed from the design.</i>		
STRUCTURES		<input type="checkbox"/> Close and detour proposed <input type="checkbox"/> Bridge span increased <input type="checkbox"/> Bridge spans waterbody <input type="checkbox"/> Bridge crosses perpendicular to the water body <input type="checkbox"/> Narrowest point of waterbody crossed <input type="checkbox"/> Culvert bottoms buried <input type="checkbox"/> Existing piles removed <input type="checkbox"/> In water bridge bents reduced
CONSTRUCTION		<input checked="" type="checkbox"/> BMPs used <input checked="" type="checkbox"/> Clean fill materials used <input checked="" type="checkbox"/> Staging outside of the jurisdictional areas <input type="checkbox"/> Existing fill removed <input type="checkbox"/> Remediation proposed onsite <input type="checkbox"/> Innovative construction techniques included <input type="checkbox"/> Clearing, no grubbing <input type="checkbox"/> Stage construction of bridge
NATURAL ENVIRONMENT		<input type="checkbox"/> Higher quality wetlands avoided <input type="checkbox"/> Essential fish impacts minimized <input type="checkbox"/> In water work avoided for spawning <input type="checkbox"/> BMPs increased for aquatic species

7.2 Narrative on Avoidance and Minimization

Roadway design removed a previously designed turn lane which reduced total stream impacts from those previously permitted. During construction of the culvert extension within the impacted channel will be dewatered to avoid working in flowing water.

» 8. Historic Properties. See Section II (2) of SCDOT RGP and Appendix E in PCN Package.

- No Historic Properties Affected.
- No Adverse Effects to Historic Properties.
- Adverse Effects to Historic Properties.

Explanation: Appropriate documentation is located in the EA in Attachment J and in the EA Re-evaluation.

» 9. Threatened and Endangered Species. See Section II (3) of SCDOT RGP and Appendix C in PCN Package

- There will be no effect on any federally threatened or endangered species or critical habitat. A Biological Assessment is included.
- The proposed project is not likely to adversely affect (list appropriate federally threatened or endangered species): The Biological Assessment and copies of all correspondence with USFWS and/or NMFS is included.

Explanation: Appropriate documentation is attached in the EA , EA Re-evaluation, and BA.

» 10. Essential Fish Habitat. See Section II (4) of SCDOT RGP and Appendix D in PCN Package

- There will be no impacts to EFH.
- The project will impact acres of EFH. The EFH Assessment and copies of all correspondence with NMFS is enclosed. Any NMFS Conservation Recommendations must be clearly addressed and incorporated into the project in order for the PCN to be considered complete.

Explanation: N/A. No Essential Fish Habitat is located in York County.

» 11. Floodplain. See Section II (7) of SCDOT RGP and Appendix F in PCN Package

- Floodplain Management Statement: Provide a statement that the proposed project complies with any applicable Federal Emergency Management Agency (FEMA) Flood Insurance Program regulations, and/or any State, County, or local regulations and whether the proposed project may cause increases in the base flood elevations to adjacent properties.

Explanation: N/A. Land disturbing activities for the project are not located within a floodplain.

» 12.1 Stream Mitigation

- Mitigation was previously purchased for impacts.

Impact No.	Stream Type	Priority Category	Existing Condition	Duration	Dominant Impact	Cumulative Impact	Sum of Factors (R)	Impacted Area (LL)	R x LL
1	Type All Other Streams	Secondary	Partially Impaired	Permanent	Pipe	< 50 ft	4.06	25	101.5
Required Stream Mitigation Credits = $\sum(R \times LL) = 101.5$									

*Calculations generated from USACE Charleston Required Mitigation Worksheet.

Appendix A – NEPA document

Widening of S.C. Route 160 from Road S-157 (Possum Hollow Rd.) to
Springfield Parkway just east of the City of Fort Mill in
Lancaster and York Counties, South Carolina

ENVIRONMENTAL ASSESSMENT



Submitted by the
U.S. Department of Transportation
Federal Highway Administration
and
S.C. Department of Transportation

August 24, 2012
Date of Approval

Edward W. Iverson
S.C. Department of Transportation

SEPTEMBER 13, 2012
Date of Approval

J. Shane Belcher
Federal Highway Administration

The following individuals may be contacted for additional information concerning the project:

Mr. J. Shane Belcher
Environmental Coordinator
Federal Highway Administration
1835 Assembly Street
Suite 1270
Columbia, SC 29201
(803) 253-3187

Mr. Brian D. Klauk, P.E.
Program Manager
S.C. Department of Transportation
P. O. Box 191
Columbia, SC 29202
(803) 737-5051

Constr. PIN: 31125 RD01
File No. 29.031125A

Environmental Commitments

1. Standard sediment control measures would be implemented by the contractor in accordance to the Department's Standard Specifications, Supplemental Technical Specifications, and Special Provisions (November 11, 2008). (Page 8)
2. Local officials will be notified of future noise levels by the Department in compliance with 23 CFR 772.15 after a final decision by the FHWA is made on the Environmental Assessment. (page 17)
3. The Department will comply with the general conditions and specifications for a General Permit from the Corps of Engineers for stream encroachment. The permit will be obtained by the Department. (Page 9)
4. Wetland mitigation will involve replacement stream from an SCDOT and Corps of Engineers approved stream mitigation bank at the prescribed ratio by the Department. (Page 9)

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Lancaster Co. Land Use Map	Appendix A
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Natural Resources Technical Memorandum	Appendix C
Study Area Map	Appendix D
Farmlands Conversion Form	Appendix E
Hazardous Waste Study	Appendix F
Relocation Report	Appendix G
Noise Analysis	Appendix H
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I. INTRODUCTION

This document constitutes an Environmental Assessment and was prepared pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended; the Council on Environmental Quality regulations implementing NEPA (40 CFR Parts 1500-1508); and the Federal Highway Administration environmental impact and related procedures (23 CFR 771). This environmental document presents an assessment of the environmental consequences of a proposed action by the U.S. Department of Transportation, Federal Highway Administration (FHWA), in cooperation with the South Carolina Department of Transportation (SCDOT), to provide widening and side road intersection improvements to a section of S.C. Route 160 just east of the City of Fort Mill in Lancaster and York Counties (see Location Map on page 2). S.C. Route 160 is a major route that carries significant traffic to and from Interstate 77, Fort Mill, and the surrounding environs of greater Charlotte, N.C.

II. PURPOSE OF AND NEED FOR PROJECT

The section of S.C. Route 160 proposed for improvements extends from just east of the City of Fort Mill in Lancaster and York Counties, a distance of approximately 3.5 miles. Existing development to either side of this section of roadway is scattered residential and commercial development.

A. Project Purpose

The primary purpose and goal of the project is to improve traffic operational efficiency. Secondly safety would be improved, thereby assisting the movement of workers, shoppers, tourists, and goods in a safer and more efficient manner both locally and regionally.

B. Project Need

The transportation planning process for the Catawba COG (Council of Governments) and the York County Capital Sales and Use Tax Program identified a need for congestion mitigation for this section of S.C. Route 160 in the year 2008. The Transportation Improvement Program lists the priorities for the short term (five years) and shows the Right of Way funds programmed for 2012 and construction funds in 2013. Improving this section of S.C. Route 160 is needed to provide a safe and efficient transportation facility for autos, and pedestrians. This project is being advanced because the roadway will not be able to operationally accommodate traffic volumes expected by the year 2030 thus improving the operational efficiency and safety. Traffic studies indicate that the present average daily traffic for this section of S.C. Route 160 is approximately 15,100 vehicles per day (VPD). The termini of the project are logical, as the project widening section begins at a section of S.C. Route 160 that is an existing five-lane section and ends at an existing three lane section entering the City of Fort Mill from the east.

Operational Efficiency

The primary need for this project is to improve the traffic operational efficiency of this section of S.C. Route 160. Traffic studies indicate that the present average daily traffic (ADT) for this section of S.C. Route 160 is approximately 15,100 ADT with approximately 5% trucks. Traffic forecasts predict an approximate 58% growth in traffic over the next 20 years with 25,800 ADT expected by the year 2030.

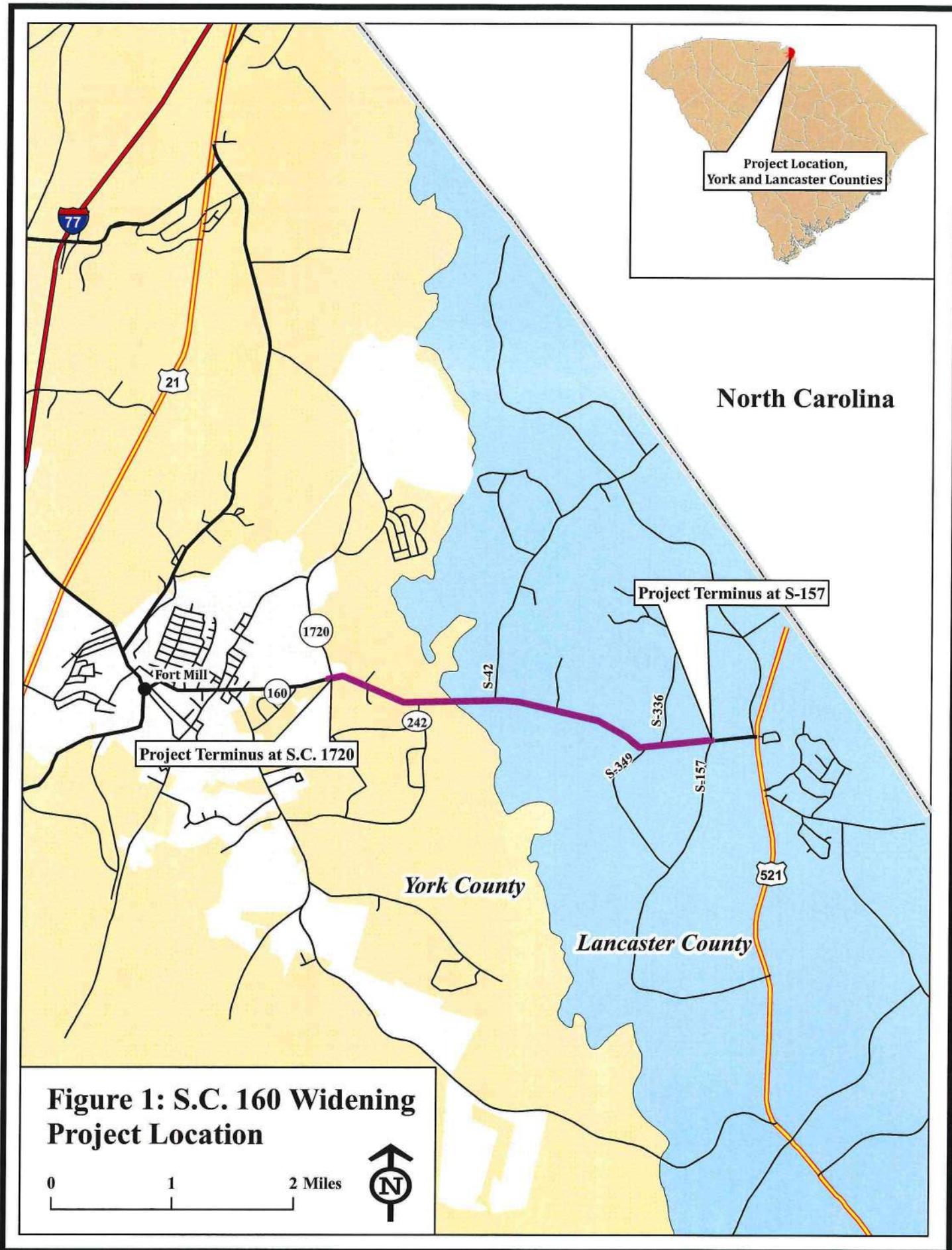


Figure 1: S.C. 160 Widening Project Location

0 1 2 Miles



The existing Level of Service rating (which is a qualitative measure of the roadway's operational conditions and how motorists perceive those conditions) for the majority of the main intersections during the PM peak are either "E" or "F" based on current data (see Table 1 in traffic analysis in Appendix N). The table below lists all the LOS values and their respective conditions.

Table 1 - Levels of Service

LOS A:	This level of service describes completely free-flow conditions. Desired speed and movements are virtually unaffected by the presence of other vehicles and constrained only by the geometric features of the roadway and driver preferences.
LOS B:	Traffic flow is stable, the presence of other vehicles only slightly restricts freedom to maneuver.
LOS C:	Traffic flow is stable, but the number of bumper-to-bumper groups of vehicles increases due to slow moving vehicles and turning maneuvers.
LOS D:	Unstable traffic flow conditions are approached under LOS D. The desire to pass becomes very high but safe passing opportunities decrease significantly.
LOS E:	Passing is virtually impossible. The slowest moving vehicle controls the travel speed.
LOS F:	Passing is impossible. The slowest moving vehicle controls the travel speed. Very unstable traffic flow conditions exist.

Future "Build" LOS values are discussed in Table 4 in the Traffic Analysis in Appendix N. LOS values and all traffic data were calculated and provided by the SCDOT's Traffic Engineering Office and SCDOT's Planning Office. Even though these are poor values, the paved median throughout the project, also called a Two-Way Left Turn Lane (TWLTL), will minimize and in most cases prevent queues along SC 160 due to left turning traffic. It will also aid the side street left turns by allowing them to stage their turns as opportunities to cross over/into each direction do not depend on concurrent gaps. Adding a TWLTL and creating a three lane section improves operations and increases lane efficiency. It does not increase calculated lane capacity but will allow a roadway with considerable access and side street traffic to function better under given volumes (see Table 4 in Traffic Analysis in Appendix N). As shown in the study in Appendix N, the LOS values mentioned above are primarily based on intersection delay rather than density or capacity of traffic.

C. Existing Facility

Existing S.C. Route 160 is a two-lane ditch section with one 12-foot travel lane in each direction. The proposed work would extend for a distance of approximately 3.5 miles.

Existing right of way is 66 feet, providing 33 feet to each side of the roadway centerline, along the roadway. The existing right of way expands to 75 feet to each side at the bridge over Sugar Creek. Posted traffic speed is 45 mph.

D. Proposed Facility

The Department proposes to widen the existing two-lane ditch section of S.C. Route 160 to a five lane curb and gutter section with a 15-foot paved median/turn lane and five-foot sidewalks from west of Road S-157 (Possum Hollow Road) to the intersection with Rosemont Dr. and MacMillan Park [See Appendix N for traffic analysis justifying the ending of the five lane section]. At this point the road will taper down to a three lane ditch section just west of the Rosemont/MacMillan Park intersection. This three lane ditch section will continue across Sugar Creek on the existing two lane bridge to Springfield Parkway. Most of the widening would occur symmetrically about the existing centerline. The three-lane section would include one 12-foot travel lane in each direction with a 15-foot paved median/turn lane (see page 5 for typical sections). The existing bridge over Sugar Creek would not be replaced. All side streets (except Road S-242 which is a separate project that will be completed prior to construction of this project) would have their turning radii and sight triangles improved to accommodate safer left and right turns. Sidewalks would only be provided along the five lane section due to greater pedestrian traffic associated with the large subdivisions and businesses in that area.

New right of way would vary from a maximum of 12.5 additional feet on each side of the roadway. This would provide a maximum of 100 feet around the existing centerline.

Traffic forecasts reflect an approximate 58% growth in traffic over the next 20 years with 25,800 vehicles per day (VPD) expected by the year 2030. The termini of the project are logical, as the project widening section begins at an existing five-lane section of S.C. 160 and ends at an existing three lane section just west of Springfield Parkway.

The cost of the project has been estimated at approximately \$20 million to include \$10 million for roadway construction, approximately \$9 million for right of way, and approximately \$1 million for preliminary engineering. As proposed, the Department expects to advertise for a public hearing immediately following approval of the environmental document.

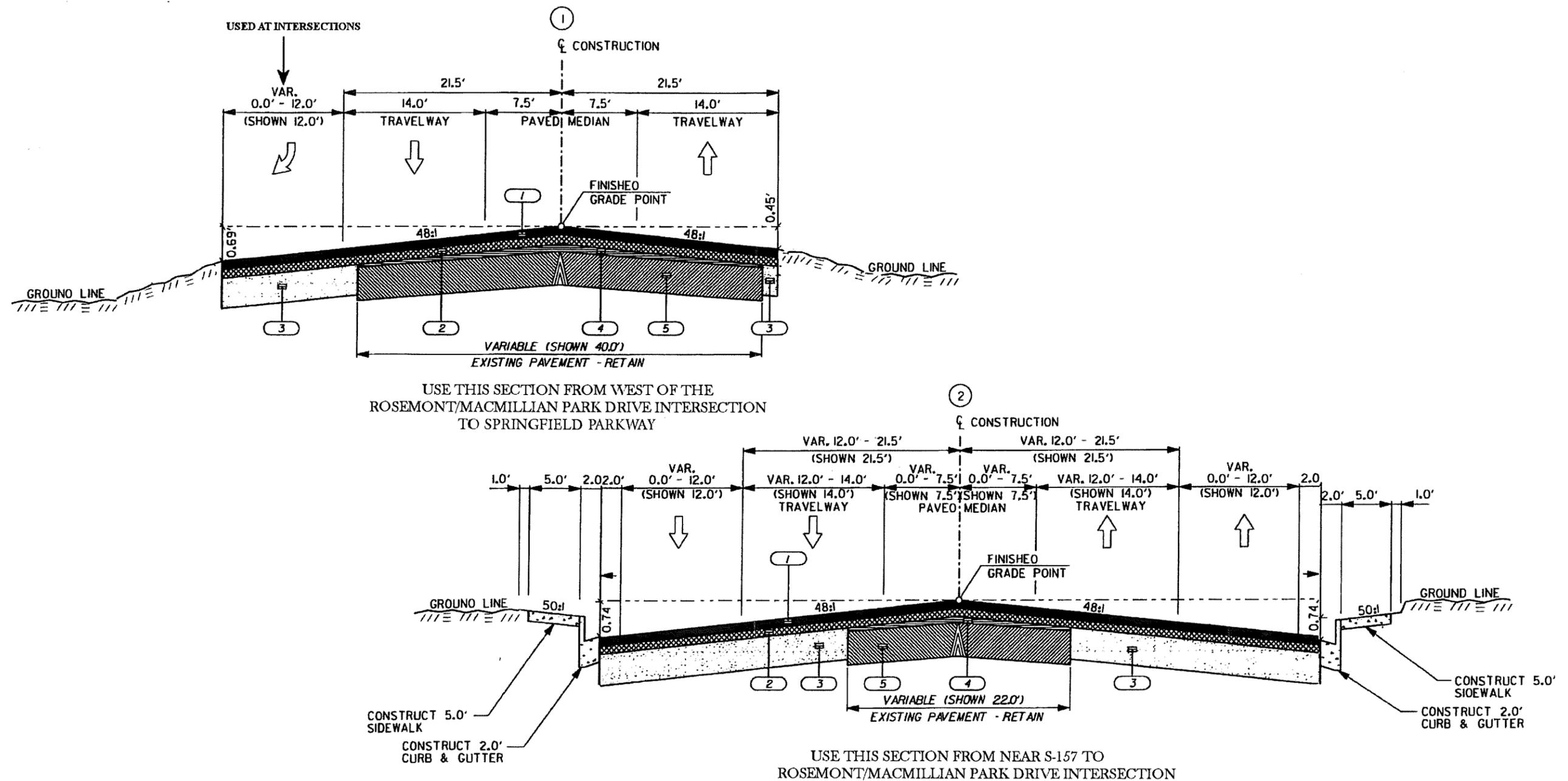
As stated above, the total project cost for the improvements to S.C. 160 has been estimated at approximately \$20 million. The project is consistent with the transportation plans developed by the Catawba Council of Governments (Catawba COG) and the Rock Hill/Fort Mill Transportation Study (RFATS). The funding for this project is being provided through a federal and state 80/20 match and through the York County Pennies for Progress Sales Tax Initiative. \$14.1 million in federal Surface Transportation Program (STP) funds has been identified in the Statewide Transportation Improvement Program (STIP) by the Catawba COG) for the portion of the project located in Lancaster County (www.scdot.org/inside/pdfs/STIP/District4/stip_district4_Lancaster.pdf). The RFATS Metropolitan Planning Organization (MPO) has identified \$4.8 million from the local Pennies for Progress Program to fund the remainder of the S.C. 160 improvements within York County (http://www.scdot.org/inside/pdfs/STIP/District4/stip_district4_York.pdf).

III. ALTERNATIVES

The Department has considered three alternatives in the process of developing the currently preferred “build” alternative. All three would taper from five lanes to three lanes at the Rosemont/MacMillan intersection.

TOTAL SHEET NO.	STATE	COUNTY	FILE NO.	DRAWING NO.	SHEET NO.
3	S.C.	YORK	46.208	S.C. 160	3

TYPICAL SECTIONS OF SC 160 IMPROVEMENTS YORK COUNTY



- 1 HOT MIX ASPHALT CONCRETE SURFACE COURSE (TYPE L)
- 2 HOT MIX ASPHALT CONCRETE INTERMEDIATE COURSE (T)
- 3 HOT MIX ASPHALT AGGREGATE BASE COURSE (TYPE A)
- 4 HOT MIX ASPHALT CONCRETE INTERMEDIATE COURSE FOR BUILD-UP (TYPE B)
- 5 EXISTING PAVEMENT (RETAIN)

SCALE: P = 5' HORIZ.
SCALE: P = 1' VERT.



FIGURE 2

S.C. ROUTE 160 (TOM HALL RD.)
TYPICAL SECTION SHEET

1. “Northern” Alternative

This alternative would be a widening of the entire length of the project to the north of the existing alignment utilizing the two existing lanes for two of the three and two of the five. There would be approximately 4 residential relocations, floodplain impacts, and approximately 110 impacted noise receptors. Cost of this alternative would be approximately \$24 million. This alternative was eliminated due to the large number of noise impacts and higher cost.

2. “Southern” Alternative

This alternative would involve widening the entire of length of the corridor to the south of the existing alignment utilizing the two existing lanes for the new widening. There would be approximately 5 residential displacements and 6 business displacements for this alternative. In addition, it would have approximately half an acre of wetland impacts and would cost approximately \$27 million. This alternative was eliminated due to the large number of displacements and high cost.

3. Preferred Alternative

The preferred alternative, widening about the centerline for five lanes from Road S-157 to Rosemont/MacMillan Dr. and three lanes from that point to Springfield Parkway, represents the design alternative that will meet the project’s purpose and need with the least cost. In addition, it would have the least number of displacements and least overall natural resource impacts among the “build” alternatives.

4. “No Build” Alternative

The “no build” alternative, which consists of the Department making no improvements was considered as a baseline for comparison, but because of the stated purpose and need, is not considered acceptable.

IV. PROBABLE IMPACTS OF THE PROJECT ON THE ENVIRONMENT

This section includes a discussion of the probable adverse and beneficial social, economic, and environmental effects of the preferred alignment and describes the measures proposed to mitigate any adverse impacts. This information has sufficient scientific and analytical substance to provide a basis for evaluating the merits of the project. This section has been organized by impacts of the preferred, rather than by alternatives.

Most of the work is to be carried out around or relatively near the centerline of the existing roadway; therefore the project’s impacts are expected to be relatively minor. In addition, utilizing a curb and gutter section through more developed sections of the project would reduce right of way and relocation impacts. Improved access afforded the traveling motorist as well as upgraded safety and design features represent the principal benefits to the public.

Environmental studies conducted by Department personnel are appended or incorporated by reference to this document:

Natural Resources Technical Memo is appended

Noise Analysis is appended
Cultural Resources study is incorporated by reference
Relocation study is appended
ISA (Initial Site Assessment) is appended.

These studies indicate the absence of any adverse impact on the human and natural environment. Based on these studies it has been determined that there is no need to prepare an EIS (Environmental Impact Statement). The following paragraphs provide an overview of the Department's environmental findings:

LAND USE

The alternatives considered for this project are consistent with the development plan for the area. There are County Land Use Plans for the areas in both counties. As shown in Appendix A, the project corridor is zoned for commercial and residential development by the Lancaster County Planning Office and nine different categories of development by the York County Planning and Development Office (see map in Appendix B). Present development trends are expected to continue after construction of the project. There are several known developments that are planned in proximity to the corridor at present:

1. Bailes Ridge: 475 acres; Located on SC Route 160 and Calvin Hall Rd./Old Bailes Road. Residential units will total 1264 dwellings on 200 acres. The remainder of the development will be a business park, a town center and 20% of the total acreage will be open space.
2. Hanover Crossing Planned Development District located just south of Possum Hollow Road. The site contains 42 acres. Townhouses will be developed on 37 acres and 5 acres will be developed with commercial uses. 296 townhouses will be developed on the site.
3. Two used car dealers have opened businesses on sites located on SC Route 160 Harrisburg Road.
4. Reid Pointe Planned Development District located on S.C. Route 160 to the east of Barberville Road. The site contains 86 acres. 192 Single-family homes will be developed on 46.4 acres, 6.6 acres will be developed with 70 townhouses and 9 acres will be developed with commercial uses. Twenty-four acres will be open space/recreational space.
5. Audubon Lake (*Bay Creek, Valley Rock*) Subdivision is located on Barberville Road. The site contains a total of 191 acres. On 124 acres will be placed 219 single-family homes. The remaining 67 acres will be open space. The open space equals 35% of the total site.
6. Foxridge Subdivision is located on Possum Hollow Road. The site contains 76 acres and 186 single-family homes will be constructed on the site. Eight acres will be provided as common open space (information provided by email communication with planning offices of both counties).

The project will provide safer and less congested access to these developments.

FISH AND WILDLIFE

A natural resources survey was conducted by the Department's biologists in November, and December, 2010, and April, 2011. Most of the project area consists of commercial and residential development with scattered areas of forest both upland and bottomland. The project

traverses two streams. These areas provide habitat for various plant and animal species. As a result of construction of the project, there will be a reduction of habitat in these areas, however the reduction would not be significant since most of the widening is around the existing roadway.

Temporary siltation of the two streams may increase the size of the impacted area of aquatic habitats. However, any siltation would be controlled using Best Management Practices. These procedures reflect policies contained in 23 CFR 650B and the Department's Supplemental Specifications on Seeding and Erosion Control Measures. BMP's are methods which prevent or reduce environmental impacts during construction projects that may otherwise potentially have adverse effects on the soil, water quality, air quality, and etc. Such methods include silt fences, temporary ponds, and temporary landscaping. Although some impacts would result from the proposed roadway improvements, permanent adverse impacts to fish and wildlife in the project area are not expected to occur (see Natural Resources Technical Memorandum in Appendix C).

Endangered and Threatened Species

The following list of threatened (T) and endangered (E) species in Lancaster and York Counties was obtained from the U. S. Fish and Wildlife Service (USFWS):

Animals

Bald eagle – *Haliaeetus leucocephalus* – (BGEPA)
Carolina heelsplitter – *Lasmigona decorata* – (E)

Plants

Schweinitz's sunflower – *Helianthus schweinitzii* – (E)
Little amphianthus – *Amphianthus pusillus* – (T)
Smooth coneflower – *Echinacea laevigata* – (E)
Black-spored quillwort – *Isoetes melanospora* – (E)
Dwarf-flowered heartleaf – *Hexastylis naniflora* – (T)

An office and field review of the proposed new right of way and surrounding area and the Heritage Trust List (provided by the S.C. Department of Natural Resources) by the Department's biologist did not reveal the presence of any species or habitat from the Endangered Species List for this area. The proposed project will have no effect on listed endangered or threatened species for Lancaster and York Counties (see attached Natural Resources Technical Memo in Appendix C).

WETLANDS AND STREAMS

Wetland habitats are defined as those areas that are inundated by water with sufficient frequency and duration to support vegetation that is tolerant of saturated soil conditions. Specific hydrologic, soil, and vegetation criteria are utilized by the U.S. Army Corps of Engineers in establishing the boundary of wetlands within their jurisdiction.

A combination of vegetation analysis, hydrological observations, and soil sampling were utilized to determine the locations of wetlands within the preferred alternative of S.C. Route 160 project area (see Study Area Map in Appendix D). No wetland sites were located within the project corridor, however, two streams will be traversed by the project.

One method of assessing the value and function of wetlands is in terms of wildlife habitat. The U.S. Fish and Wildlife Service (USFWS) Resource Category criteria are outlined in the USFWS Mitigation Policy, 46 CFR 7644-7663. Resource categories and mitigation planning techniques are assigned based on the following criteria:

- Category 1 - Communities of one-of-a-kind high value to wildlife, unique and irreplaceable on a national or eco-regional basis, habitat is not replaceable in kind based on present-day scientific and engineering skills within a reasonable time frame.
- Category 2 - Communities of high value to wildlife, which are relatively scarce or are becoming scarce on a national or eco-regional basis, habitat can be replaced in kind within a reasonable time frame based on present-day scientific and engineering skills.
- Category 3 - Community types of high to medium wildlife value which are relatively abundant on a national basis, out-of-kind replacement is allowable if a tradeoff analysis demonstrates equivalency of substituted habitat type and/or habitat values. These sites are often in conjunction with a replenishing source.
- Category 4 - Community types of low to medium wildlife value, generally losses will not have a substantial adverse effect on important fish and wildlife resources. These sites have often been affected by the present roadway or human disturbances and are usually isolated.

Below is the location and description of each wetland site. More detailed descriptions of the sites are located in the Natural Resources Tech Memo in Appendix C.

Wetland Site A is located on both sides of S.C. Route 160 and is Sugar Creek. It is a Category 3 wetland and classified as a riverine unconsolidated bottom wetland. No impacts are expected at this site. This site primarily functions as flood control and wildlife habitat and is expected to continue that function after construction of the project.

Wetland Site B is located on both sides of S.C. Route 160 approximately 850 feet west of Sugar Creek and is an unnamed tributary of Sugar Creek. It is a Category 3 wetland and classified as a riverine unconsolidated bottom wetland. Approximately 35 feet of stream would be impacted by extending the length of the existing culvert. This site functions as flood control and wildlife habitat. These functions are expected to continue after construction.

As a result of the approximately 35 feet of stream that would be impacted a Corps of Engineers General Permit will be required.

Wetlands were given special consideration during development and evaluation of the project with a subsequent determination that the present design would pose the least disruption to wetlands other than the "no build" alternative. In addition, 2:1 fill slopes would be utilized where appropriate to minimize wetland impacts. Based on these considerations, it has been determined that there is no practicable alternative to the proposed construction in wetlands and that the proposed action includes all practicable measures to minimize harm to the wetlands which may result from such use. In addition, the Department will comply with Executive Order 11990 regarding protection of wetlands by continuing to minimize impacts as the design becomes more complete. No floodplain impacts are expected.

Where impacts are determined to be unavoidable, mitigation will be carried out according to US Army Corps of Engineers' policy. This policy specifies that consideration should be given to mitigation within right of way limits or a Corps recognized mitigation bank. This may include enhancement of existing wetlands or creation of new wetlands where possible. Mitigation for this project will be the responsibility of permittee at the prescribed ratio. The Corps has not yet approved a Jurisdictional Determination for the project or the mitigation plan, however, similar plans for similar projects have been readily approved by the agency.

Reclamation of wetland areas temporarily lost through construction activities will involve returning disturbed areas to their original elevations to the extent practicable, allowing for adjacent vegetation to naturally reclaim the wetland areas.

FLOODPLAINS

The project will traverse Sugar Creek however, no work is proposed on the bridge, therefore, the project is not expected to impact any FEMA designated floodways or floodplains.

WATER QUALITY

The proposed project will traverse Sugar Creek and an unnamed tributary of Sugar Creek. These streams are classified by the South Carolina Department of Health and Environmental Control (DHEC) as Freshwater streams. As such, the waters of these creeks are suitable for primary and secondary contact recreation and as a source for a drinking water supply after conventional treatment in accordance with DHEC requirements. The waters are also suitable for fishing, the survival and propagation of a balanced indigenous aquatic community of fauna and flora, and for industrial and agricultural uses. This section of Sugar Creek is not on DHEC's 303(d) list.

During construction activities, temporary siltation may occur in the streambed and erosion will be of a greater degree than presently occurring on existing terrain. The contractor would be required to minimize this impact by employing erosion control measures reflecting policies contained in 23 CFR 650B and S.C. Code of Regulations 72-400.

The project will increase the area of impervious surfaces by widening from two to five lanes or from two to three lanes. But after reviewing the preliminary engineering plans, and knowing that erosion control methods necessary to curtail runoff will be employed during construction and after construction grassy swales and ditches will allow some pollutants to precipitate out of the runoff before it reaches most major water bodies, it has been determined that while there will be an impact on water quality in the area as a result of this project, it will not be substantial.

FARMLANDS

This project has been assessed under the provisions of the Farmland Protection Policy Act of 1981. As a result of this analysis, the Department has determined that the proposal would require the taking of lands protected under the Act. However, based on the Farmland Conversion Impact Rating Form SCS-CPA-106, the total point value on the proposed project is 125. According to an agreement with NRCS, SCDOT, and FHWA, policy states that if a site's Total Corridor Assessment score (NRCS-CPA-106 Form Section VI) is less than 60 points (in this case it is 25), Sections III, IV, and V do not need to be completed and no additional assessment by the NRCS district office would be necessary. As the total points are less than the maximum allowable score of 160, neither consideration of alternative sites nor additional studies are required under the Act. A copy of the form is attached in Appendix E.

HAZARDOUS WASTE/UNDERGROUND STORAGE TANKS

An Initial Site Assessment (ISA) was conducted, including a field survey and archival research at the South Carolina Department of Health and Environmental Control (SCDHEC) to locate any potential hazardous waste sites within the construction limits of the project. The regulatory databases reviewed during this evaluation are listed below.

Federal Databases

RCRIS	EPA Resource Conservation and Recovery Information System
CERCLIS	EPA Comprehensive Environmental Response, Cleanup and Liability Information System
NPL	National Priorities List
ERNS	EPA Emergency Response Notification System

State Databases

SHWS	State Hazardous Waste Sites
SWF/LS	Solid Waste Facilities/Landfill Sites
LUST	Leaking Underground Storage Tank Incidence Reports
RUST	Registered Underground Storage Tanks

The Department has determined that there are three locations where underground storage tanks and/or hazardous material are present adjacent or within the proposed right of way. None of these sites warrant additional investigation to determine their status (see UST Report in Appendix F). A review of the project corridor by Department personnel on April 29, 2011 confirmed that the 2007 report is still valid.

RELOCATION IMPACTS

The relocation study was conducted throughout the project corridor by the Right of Way section of the Department. A review of the project corridor on April 29, 2011 was conducted to determine whether the 2008 study was still valid. There have been no changes in the corridor except that the Fire Station has been converted into a private car garage, primarily used for parking. The study indicated that the preferred alternative would potentially cause the displacement of three single-family residences and three businesses, including the former fire station.

Relocation of displaced persons will be offered in areas at least as desirable in regard to public utilities and commercial facilities as their original residences. Rent and sale prices of replacement housing offered will be within the financial means of the families and individuals displaced. In addition, the locations of the new residences will be reasonably accessible to their places of employment. The study has noted comparable replacement housing available for the residences in the area that is safe, decent, and sanitary.

The three businesses are a former fire station that has now been converted to a private garage, a landscaping business, and an auto repair shop. Combined, these businesses employ a minimum of 13 workers (see attached relocation studies in Appendix G for more details). Travel patterns of employees will be affected by the relocation of these businesses. Many employees may be required to travel longer distances to work thereby incurring greater travel expenses and greater time away from family. These longer distances and times may affect the ability of the business to retain some employees. In addition, during the relocation process the businesses may shut down temporarily. These temporary shutdowns may affect owner's earnings and hiring abilities.

Relocation resources are available to all residential and business relocatees without discrimination in response to the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970. In addition, the proposed project is not anticipated to specifically benefit, harm, or disproportionately impact any social group, including elderly, handicapped, minority, or ethnic groups in accordance with Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations).

AIR QUALITY

NAAQS (National Ambient Air Quality Standards)

The Lancaster County section of the project would be consistent with the South Carolina State Air Quality Implementation Plan (SIP) regarding the attainment of the National Ambient Air Quality Standards. Presently, Lancaster County meets all air quality standards for automobile related pollutants. SCDHEC has determined that transportation control measures (TCMs) are not required to maintain the area's air quality status.

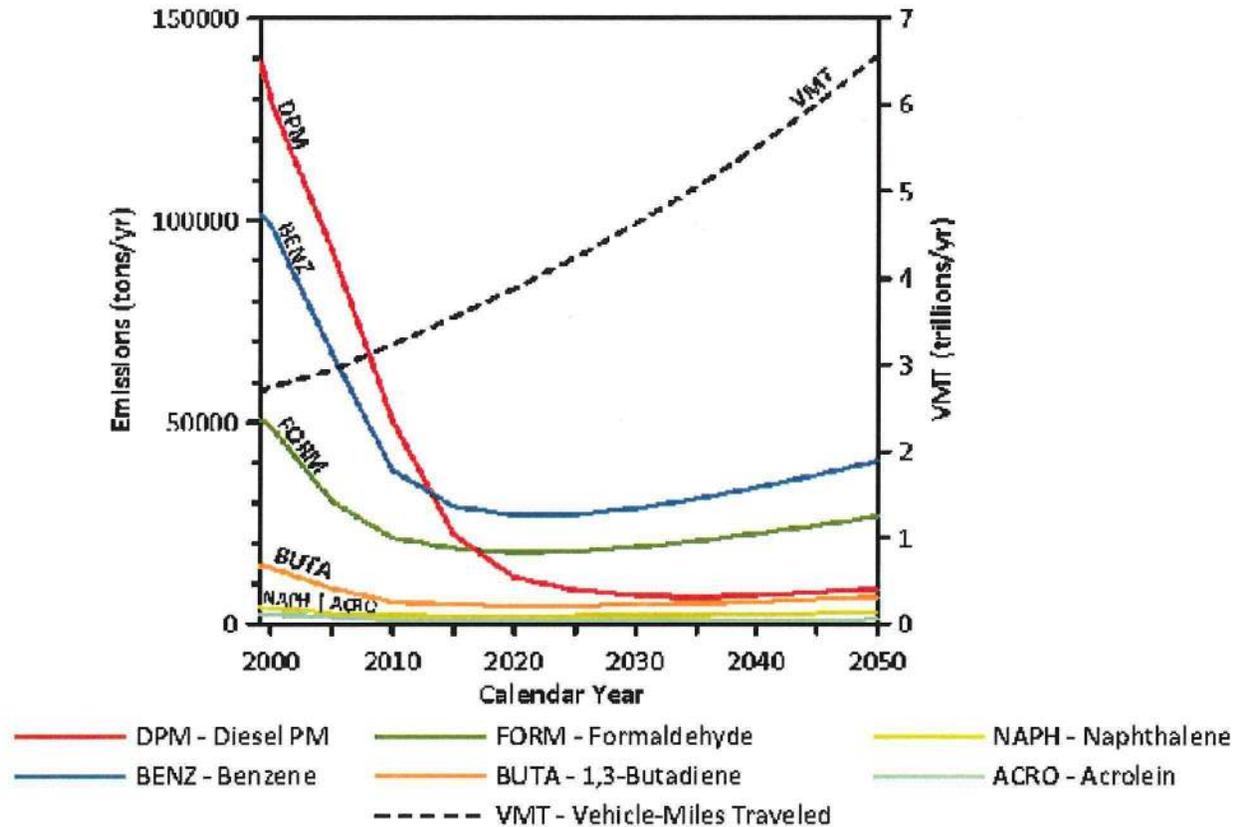
The York County section of the project is located within the ozone non-attainment boundary. The project is listed as "exempt" in the most recent Transportation Conformity Analysis Report and Conformity Determination for the 2035 Long Range Transportation Plan and Metropolitan Transportation Improvement Program. The York County section of the project is exempt as it is not adding capacity.

MSATS (Mobile Source Air Toxics)

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that the U.S. Environmental Protection Agency (EPA) regulate 188 air toxics, also known as hazardous air pollutants. The EPA has assessed this expansive list in their latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007) and identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated Risk Information System (IRIS) (<http://www.epa.gov/ncea/iris/index.html>). In addition, EPA identified seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment (NATA) (<http://www.epa.gov/ttn/atw/nata1999/>). These are acrolein, benzene, 1,3-butadiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future EPA rules.

The 2007 EPA rule mentioned above requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. According to an FHWA analysis using EPA's MOBILE6.2 model, even if vehicle activity (vehicle-miles travelled, VMT) increases by 145 percent as assumed, a combined reduction of 72 percent in the total annual emission rate for the priority MSAT is projected from 1999 to 2050, as shown in Figure 1.

Figure 1: NATIONAL MSAT EMISSION TRENDS 1999 - 2050 FOR VEHICLES OPERATING ON ROADWAYS USING EPA's MOBILE6.2 MODEL



Note:(1) Annual emissions of polycyclic organic matter are projected to be 561 tons/yr for 1999, decreasing to 373 tons/yr for 2050. (2) Trends for specific locations may be different, depending on locally derived information representing vehicle-miles travelled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors

Source: U.S. Environmental Protection Agency. MOBILE6.2 Model run 20 August 2009.

Air toxics analysis is a continuing area of research. While much work has been done to assess the overall health risk of air toxics, many questions remain unanswered. In particular, the tools and techniques for assessing project-specific health outcomes as a result of lifetime MSAT exposure remain limited. These limitations impede the ability to evaluate how the potential health risks posed by MSAT exposure should be factored into project-level decision-making within the context of the National Environmental Policy Act (NEPA).

Nonetheless, air toxics concerns continue to be raised on highway projects during the NEPA process. Even as the science emerges, we are duly expected by the public and other agencies to address MSAT impacts in our environmental documents. The FHWA, EPA, the Health Effects Institute, and others have funded and conducted research studies to try to more clearly define potential risks from MSAT emissions associated with highway projects. The FHWA will continue to monitor the developing research in this emerging field.

For each alternative in this EA, the amount of MSAT emitted would be proportional to the vehicle miles traveled, or VMT, assuming that other variables such as fleet mix are the same for each alternative. The VMT estimated for the Build Alternative is slightly higher than that for the No Build Alternative, because the additional capacity increases the efficiency of the roadway and attracts rerouted trips from elsewhere in the transportation network. This increase in VMT would lead to higher MSAT emissions for the preferred action alternative along the highway corridor, along with a corresponding decrease in MSAT emissions along the parallel routes. The emissions increase is offset somewhat by lower MSAT emission rates due to increased speeds; according to EPA's MOBILE6.2 model, emissions of all of the priority MSAT except for diesel particulate matter decrease as speed increases. The extent to which these speed-related emissions decreases will offset VMT-related emissions increases cannot be reliably projected due to the inherent deficiencies of technical models. Because the estimated VMT under each of the Alternatives are nearly the same, varying by less than three percent, it is expected there would be no appreciable difference in overall MSAT emissions among the various alternatives. Also, regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce annual MSAT emissions by 72 percent between 1999 and 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

The additional travel lanes contemplated as part of the project alternatives will have the effect of moving some traffic closer to nearby homes, schools, and businesses; therefore, under each alternative there may be localized areas where ambient concentrations of MSAT could be higher under certain Build Alternatives than the No Build Alternative. The localized increases in MSAT concentrations would likely be most pronounced along the expanded roadway sections that would be built east of Rosemont/MacMillan intersection, under all "Build" alternatives considered. However, the magnitude and the duration of these potential increases compared to the No-Build alternative cannot be reliably quantified due to incomplete or unavailable information in forecasting project-specific MSAT health impacts. In sum, when a highway is widened, the localized level of MSAT emissions for the Build Alternative could be higher relative to the No Build Alternative, but this could be offset due to increases in speeds and reductions in congestion (which are associated with lower MSAT emissions). Also, MSAT will be lower in other locations when traffic shifts away from them. However, on a regional basis, EPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be significantly lower than today.

INCOMPLETE OR UNAVAILABLE INFORMATION FOR PROJECT-SPECIFIC MSAT HEALTH IMPACTS ANALYSIS

In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

The U.S. Environmental Protection Agency (EPA) is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the Clean Air Act and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. The EPA is in the continual

process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the Integrated Risk Information System (IRIS), which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects" (EPA, <http://www.epa.gov/ncea/iris/index.html>). Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). Two HEI studies are summarized in Appendix D of FHWA's Interim Guidance Update on Mobile source Air Toxic Analysis in NEPA Documents. Among the adverse health effects linked to MSAT compounds at high exposures are cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations (HEI, <http://pubs.healtheffects.org/view.php?id=282>) or in the future as vehicle emissions substantially decrease (HEI, <http://pubs.healtheffects.org/view.php?id=306>).

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts - each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable. The results produced by the EPA's MOBILE6.2 model, the California EPA's Emfac2007 model, and the EPA's DraftMOVES2009 model in forecasting MSAT emissions are highly inconsistent. Indications from the development of the MOVES model are that MOBILE6.2 significantly underestimates diesel particulate matter (PM) emissions and significantly overestimates benzene emissions.

Regarding air dispersion modeling, an extensive evaluation of EPA's guideline CAL3QHC model was conducted in an NCHRP study (http://www.epa.gov/scram001/dispersion_alt.htm#hyroad), which documents poor model performance at ten sites across the country - three where intensive monitoring was conducted plus an additional seven with less intensive monitoring. The study indicates a bias of the CAL3QHC model to overestimate concentrations near highly congested intersections and underestimate concentrations near uncongested intersections. The consequence of this is a tendency to overstate the air quality benefits of mitigating congestion at intersections. Such poor model performance is less difficult to manage for demonstrating compliance with National Ambient Air Quality Standards for relatively short time frames than it is for forecasting individual exposure over an entire lifetime, especially given that some information needed for estimating 70-year lifetime exposure is unavailable. It is particularly difficult to reliably forecast MSAT exposure near roadways, and to determine the portion of time that people are actually exposed at a specific location.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (<http://pubs.healtheffects.org/view.php?id=282>). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The EPA (<http://www.epa.gov/risk/basicinformation.htm#g>) and the HEI

(<http://pubs.healtheffects.org/getfile.php?u=395>) have not established a basis for quantitative risk assessment of diesel PM in ambient settings.

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the EPA as provided by the Clean Air Act to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires EPA to determine a "safe" or "acceptable" level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 1 in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than 1 in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld EPA's approach to addressing risk in its two step decision framework. Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than safe or acceptable.

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and fatalities plus improved access for emergency response, that are better suited for quantitative analysis

NOISE ANALYSIS

How Was Noise Analyzed on this Project?

In accordance with SCDOT's Noise Policy (see Appendix I) and 23 CFR 772, a noise impact analysis has been completed for the preferred alternative and is located in Appendix H. TNM 2.5, a Federal Highway Administration (FHWA) traffic noise prediction model, was used in the analysis to compare existing and future Leq(h) noise levels. Leq(h) is the average sound level over a one-hour period. Two field readings were taken to confirm the accuracy of the model (see attached Noise Analysis in Appendix H).

Traffic parameters (Table 2 below), roadway characteristics, terrain, and receiver locations were used to estimate Leq(h) noise levels expected to occur in the project area by the year 2030. A thorough explanation of the methodology and assumptions used in this noise analysis can be found in Appendix I.

Table 2
Design Hourly Volume

Autos	2456
Medium Trucks	80
Heavy Trucks	104
Speed (Approx.)	45 mph

What are the different types of Noise receptors in the Project Corridor?

Land use Categories are defined by specifications in 23 CFR 772. The SC 160 project corridor contains a mixture of land use Categories B, C, D, and F. Land use Category B consists of residences. Land use Category C includes parks and recreation areas that are not considered Category A. Land use Category F includes retail and industrial.

What is an Impacted Receptor?

A business, church, or residence is considered an “impacted receptor” when existing or future noise levels approach (within 1 decibel) or exceed the Noise Abatement Criteria (NAC) for the appropriate land use category. Additionally, a receptor is considered impacted when the future noise levels indicate a substantial increase over existing levels. The Department has defined a substantial increase to occur when ambient levels are exceeded by 15 dBA or more. No receivers were identified as having a substantial increase under future 2030 “build” conditions.

How many impacted receptors are located in the Project Corridor?

Results of the noise analysis indicate that 38 receptors would receive future noise levels that approach or exceed their respective NAC listed in 23 CFR 772. 37 are residences and one is a children’s daycare. See Appendix H for maps showing the locations of all impacted receptors.

When does the Department Consider Abatement?

For impacted receptors, the Department’s Noise Policy and 23 CFR 772 require that abatement measures be considered according to the criteria listed in SCDOT’s Noise Policy (Appendix I). Because 38 receptors would receive noise levels that approach or exceed the NAC at locations along SC 160, the Department has considered various abatement measures. These measures included noise barrier construction, truck lane designation, lowering or raising of grade, alignment shifts, and not building the project. Truck lane designation is not a viable alternative of noise abatement on this project. The relatively small buffer gained by moving truck traffic to the inside travel lane would not produce a significant reduction in noise levels. Raising or lowering of the roadway grade is not feasible or practical as a change in grade would require additional new right-of-way and constitute a large cost versus small benefit in reduced noise levels. Alignment shifts are not practical due to the short distances involved and the potential for large numbers of residential and commercial displacements.

Implementation of the “no build” alternative as a form of abatement is not viable, as it would not provide for the level of roadway service needed to accommodate present and future traffic demands.

Are Noise Walls being proposed for the Project?

According to SCDOT’s Noise Policy there are important considerations for the construction of noise walls. From an engineering standpoint, walls must be determined “feasible” meaning that construction could be accomplished given the physical constraints of the area. The feasibility of a wall is determined by constructability of the wall given the topography, presence of

other dominant noise sources, and achieving at least a 5-dBA noise reduction for the impacted receivers.

Because transportation dollars are limited, noise walls must also be determined “reasonable.” Reasonableness is determined by whether the wall is cost effective. If the cost of the wall is \$30,000 or less per benefitted receiver, it is considered cost effective. A benefitted receptor is one who receives at least a 5 decibel reduction from the newly constructed noise wall.

Finally, SCDOT’s Noise Policy also requires that the exposed height of the wall is not to exceed 25 feet. Given these considerations, SCDOT analyzed the noise receptors within the Project Corridor by the above criteria.

Noise Barrier Evaluation

As shown in Figure 2 of the noise study, the impacted receptors all have direct access to SC 160 or are located near to SC 160 and an intersecting side street. In order to receive the minimum noise reduction goal of 8 dBA (decibels), noise barriers would have to be placed across driveways or intersecting side streets. These placements would restrict access to these residences. Gaps in the noise barriers would satisfy the access requirements, but the resulting non-continuous barrier segments would not be sufficient to achieve a noise reduction design goal of 8 dBA.

The feasibility criteria would not be met because the addition of noise barriers would not provide 5 dBA reduction for at least 75% of the receptors. Feasibility would also not be met because the placement of noise barriers across driveways and intersecting cross-streets would restrict access to residences. In addition, safety issues and line of sight hazards would occur if barriers were constructed.

The reasonableness criteria would not be met because the noise reduction design goal of 8 dBA would not be achieved for at least 80% of the receptors. Therefore, the cost effectiveness and property owners and residents viewpoints factors were not evaluated for the proposed project.

Based on the above variables, further abatement consideration is not warranted.

Construction noise should not hinder or annoy normal community functions as construction usually occurs during weekday, daylight hours. However, some work may also occur at night and on the weekends. The contractor would be required to comply with OSHA regulations concerning noise attenuation devices on construction equipment.

The Department will inform local planning officials of future, generalized noise levels expected to occur in the project vicinity by the year 2030.

CULTURAL RESOURCES

In accordance with 36 CFR 800.4, archival research and coordination with the State Historic Preservation Officer (SHPO) was performed to identify and help predict the locations of significant cultural resources in the vicinity of the proposed action. A field survey was then conducted within the project corridor. Although the survey was conducted five years ago, the departmental archaeologist, Mr. Chad Long, confirmed its present accuracy on August 22, 2012 (see attached email). The archaeological and architectural survey was designed to provide the

necessary management data to allow for sites and properties to be evaluated for recommendations of eligibility to the National Register of Historic Places (NRHP). This survey identified one architectural site and one archaeological site neither of which is eligible for the NRHP. In conclusion, no historic sites would be impacted by construction of the project. A copy of the cultural resources concurrence from SHPO is attached in Appendix J. In addition, coordination with the Catawba Indian Nation and the Eastern Band of Cherokees is documented in Appendices J and M.

SECTION 4(F)/6(f) PROPERTIES

No Section 4(f)/6(f) properties are located within the project corridor.

SOCIAL IMPACTS

The proposed project was evaluated in accordance with Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations). The proposed study area in Lancaster County is encompassed by one Census Tract, CT 112, as defined by the U.S. Census Bureau (http://www.sccommunityprofiles.org/census_demographics.php accessed 3-15-11). As illustrated in Table 3, the population of the study area is 11 percent minority with approximately 8.6 percent of the population living below the poverty level. Approximately 26 percent of the population over the age of 25 did not receive a high school diploma, while another 36 percent did graduate from high school, but did not continue to higher educational institutions. An estimated 17 percent of the population of the study area received college or graduate degrees.

The average median income for Census Tract 112 is 3 percent lower than for Lancaster County as a whole, while the per capita income is 2 percent lower than for Lancaster County. Based on the information summarized in the Table 3, the study area is comprised of a smaller minority population, but with less individuals living below the poverty level, a slightly higher number of individuals receiving a high school diploma, and higher median household and per capita income levels than compared with Lancaster County as a whole.

The proposed study area in York County is encompassed by two Census Tracts 610.01 and 610.02, as defined by the U.S. Census Bureau. As illustrated in Table 4, the population of the study area is 8.5 percent minority with approximately 4.5 percent of the population living below the poverty level. Approximately 10.7 percent of the population over the age of 25 did not receive a high school diploma, while another 22 percent did graduate from high school but did not continue to higher educational institutions. An estimated 44 percent of the population study area received college or graduate degrees.

The average median income for Census Tracts 610.01 and 610.02 is 24 percent higher than York County as a whole, while the per capita income is 29 percent higher than York County. Based on the information summarized in the Table 4, the study area is comprised of a smaller minority population, but with less individuals living below the poverty level, a slightly lower number of individuals receiving a high school diploma, and higher median household and slightly lower per capita income levels than compared with York County as a whole.

Recent aerial photography and a field survey of the project corridor was utilized to determine if there would be any cohesive communities impacted (www.Bing.com/maps accessed 3-1-11). None were located along the roadway corridor.

Although the proposed project would potentially displace or relocate approximately 3 residences and 3 businesses, it should not produce any significant adverse economic or social impacts on the surrounding communities or businesses due to the use of just compensation to the landowner and/or relocation on the same site.

ECONOMIC IMPACTS

The project will provide improved access to heavy truck traffic utilizing the current two-lane roadway. Local residential traffic will benefit by easing traffic flow and facilitating safer turning movements. It is not anticipated the right of way acquisition from any residential or commercial properties will cause a change in land use. This section is already developed with residential and commercial properties and these uses are expected to continue in the future.

Traffic services will be maintained throughout project construction to avoid impacts to motorists and adjacent businesses. In addition, no adverse effects on emergency services are anticipated.

**TABLE 3
EXISTING DEMOGRAPHIC CHARACTERISTICS*
S.C. ROUTE 160 WIDENING**

Category	Lancaster County	Study Area CT 112
Population (2000)	61,351	7,059
White	43,577	6,275
Black	16,479	636
Hispanic*	978	108
AIAN**	133	31
Asian	164	12
NHOPI***	12	3
Other	548	41
2+ Races	438	61
Income (1999)		
Median Household (\$)	34,688	43,133
Per Capita (\$)	16,276	19,077
Poverty (Persons)	7,599	604
Housing Units (2000)	24,962	2,785
Educational Attainment (Population 25 Years and Older)		
Less Than 9 th Grade	4,232	281
Some High School	7,997	890
High School Graduate	14,447	1,729
Some College	7,058	1,050
Associate Degree	2,657	253
Bachelor's Degree	2,742	451
Graduate Degree	1,387	124

*Hispanic numbers were not included in total population statistics by the Census Bureau
 ** AIAN - American Indian & Alaska Native
 *** NHOPI - Native Hawaiian & Other Pacific Islander
 SOURCE: United States Census Bureau Website (2011)

*These numbers may have substantially changed due to high growth in these parts of Lancaster/York County since the 2000 census, however, a 2010 breakdown of this data is not available at this time.

**TABLE 4
EXISTING DEMOGRAPHIC CHARACTERISTICS*
S.C. ROUTE 160 WIDENING**

Category	York County	Study Area (CTs Combined)		
		CT 610.01	Geographic Areas CT 610.02	
Population (2000)	164,614	15,915	5,367	10,548
White	127,162	14,539	4,938	9,601
Black	31,532	820	191	629
Hispanic*	3,220	276	131	145
AIAN**	1,403	39	15	24
Asian	1,459	236	111	125
NHOPI***	39	16	12	4
Other	1,527	139	66	73
2+ Races	1,492	126	34	92
Income (1999)				
Median Household (\$)	44,539	48,083	55,344	40,822
Per Capita (\$)	21,587	21,109	24,199	18,020
Poverty (Persons)	16,082	1023	306	717
Housing Units (2000)	66,061	5756	2,476	3,280
Educational Attainment (Population 25 Years and Older)				
Less Than 9th Grade	8,117	325	163	162
Some High School	15,888	782	331	451
High School Graduate	30,127	2,315	872	1,443
Some College	21,842	2,486	820	1,666
Associate Degree	7,610	926	381	545
Bachelor's Degree	14,945	2,579	804	1,775
Graduate Degree	7,168	1068	280	788

*Hispanic numbers were not included in total population statistics by the Census Bureau

** AIAN - American Indian & Alaska Native

*** NHOPI - Native Hawaiian & Other Pacific Islander

SOURCE: United States Census Bureau Website (2011)

INDIRECT IMPACTS

Indirect impacts are impacts caused by the action but are removed in time and distance from the project. Three resources were identified for study as part of the Indirect and Cumulative Impact Analysis. These three resources are water quality, and habitat fragmentation. Analysis of these impacts will follow the eight steps outlined in the National Cooperative Highway Research Program Report (NCHRP) 466: *Estimating the Indirect Effects of Proposed Transportation Projects*.

Step 1 – Study Area Boundaries

Indirect impacts are analyzed for resources of concern within particular geographic and temporal boundaries. This allows for the appropriate context to be developed for each resource. Study area boundaries are developed through consideration of input received during the agency coordination and public involvement process.

The study area (see Study Area map in Appendix D) boundaries for this project include a 300-foot area around the existing centerline from just west of S-157 to Springfield Parkway (S-1720).

Step 2 – Study Area Communities Trends and Goals

There is a high potential for future development along the corridor due to the close proximity to Ft. Mill, SC, and Charlotte, NC irrespective of whether the project is constructed. Consultation with local planners has revealed six known proposed developments planned along the study corridor (see Land Use Section on pages 7 and 8). Due to this high potential for future development, water quality, and habitat fragmentation are likely to be greater than the direct impacts discussed earlier in this document.

Step 3 – Inventory Notable Features

The indirect impact analysis focuses on ecological resources, including water quality, and habitat fragmentation.

Step 4 – Identify Impact Causing Activities of the Proposed Action

Indirect impacts to water quality would be related to the addition of impervious surface to the existing conditions. Widening the roadway would increase the surface area for the accumulation of particulate matter and increase the volume of runoff. Motor vehicles are a major source for roadway pollutants, and research demonstrates that pollutant concentrations are expected to increase with increased traffic volumes. Roadways have the potential to impact water quality through stormwater runoff, which may contain elevated levels of pollutants. Highway runoff is dependent upon numerous variables, and therefore the specific impacts are both site- and event-specific.

The potential indirect impact to habitat fragmentation would include induced development, change in land use, and/or increased access to the area that result in the loss of wildlife habitat. There would be direct alteration of natural habitat with the right of way through earthen fills, cuts, and clearing.

Steps 5-6 – Identify and Analyze Potential Impacts

The project would require the impacting of approximately 35 linear feet of stream.

The project will increase the impervious surface area along the corridor by widening to five lanes, thereby increasing runoff.

Habitat fragmentation may increase slightly because of the widening. Due to the larger expanse of roadway wildlife will have to cross, wildlife mortality would increase slightly.

Step 7 – Evaluate Analysis Results

Both qualitative and quantitative methods were used to identify and analyze the potential indirect impacts to the various resources of concern resulting from this proposed project. These methods and/or resources included:

- GIS overlays of resource information obtained from public agencies
- County planning documents
- Internet research

- Public involvement information

Current land uses and proposed land use designations will provide some restrictions to help control future land uses that would potentially affect the character and integrity of the area. However, unforeseen changes in the public and/or private land use patterns could affect the characteristics of the area in the future.

Environmental impacts from the build proposal, when added to past, present, and reasonably foreseeable future projects, would result in indirect impacts to environmental resources of concern. However, given the above considerations, they are not likely to be major. Some habitat types would be converted as a result of the proposed project and subsequent ongoing maintenance but the habitat would still provide for wetland and wildlife functions. Roadway runoff would be remediated through overland sheet flow, grassed side slopes, natural wetland filtration, and appropriate best management practices during construction.

Step 8 – Assess Consequences and Develop Mitigation

Based on the existing land use in the area and the documented potential of future planned development, the likelihood of this project leading to induced growth is relatively high. Though given the amount of development presently occurring, most of the developments would have occurred even without construction of the project.

CUMULATIVE IMPACTS

Cumulative impacts are impacts on the environment that result from the incremental impact of the action to resources resulting from past, present, and reasonably foreseeable future actions regardless of who sponsors the action. The Council on Environmental Quality (CEQ) developed Guidance for *Preparers of Cumulative Impact Analysis: Approach and Guidance* (2005), that includes an eight step process for preparing cumulative impact assessments. This cumulative impact analysis followed this eight step process.

Three resources were identified for study as part of the Indirect and Cumulative Impact Analysis. The identification of these resources took into consideration input received during the agency coordination and public involvement process.

Step 1 – Identification of Resources

The cumulative impact analysis focuses on two ecological resources, including water quality and habitat fragmentation.

Step 2 – Study Area

Cumulative impacts are analyzed for resources of concern within particular geographic and temporal boundaries. This allows for the appropriate context to be developed for each resource. Study area boundaries are developed through consideration of input received during the agency coordination and public involvement process. The primary study area is the same area mentioned in Step 2 of Indirect Impacts. The aquatic resource area encompasses middle reaches of the Catawba River Basin Watershed.

- Public involvement information

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Step 3 – Current Health and Context of the Affected Resources

Water Quality

Another resource of importance that will be impacted by this project is water quality due to the project creating a greater hard surface area for runoff to accumulate. There have been additions over the years of impervious surfaces in the project area and these are expected to continue whether or not there is construction of the project.

Habitat Fragmentation

Some habitat fragmentation is expected to occur due to the widening acting as a more significant barrier to wildlife mobility. In addition, slightly greater animal mortality is expected to occur as a result of adding two additional travel lanes that animals will be required to cross to move through various habitats. Also, approximately 35 feet of stream habitat would be impacted by the culverting of a stream.

Step 4 – Identify Direct and Indirect Impacts of the Proposed Project that Might Contribute to a Cumulative Impact

Water Quality

Roadways have the potential to impact water quality through stormwater runoff, which may contain elevated levels of suspended solids, heavy metals, aromatic hydrocarbons, oil and grease, nutrients, and other pollutants. Many of these pollutants are generated from motor vehicles through the emission and deposition of exhaust and discharge of fluids and solids during normal automobile operation. Indirect impacts would be related to the addition of impervious surface to the existing conditions. The proposed project would improve the roadway from approximately 24 feet of pavement to approximately a maximum of 66 feet of pavement. Therefore, this design would increase the surface area for the accumulation of particulate matter and increase the volume of runoff.

Habitat Fragmentation

The proposed project would directly impact approximately 11 acres. This disturbance will result in the direct alteration and loss of habitat in the area immediately adjacent to the existing roadway. The potential indirect impact to habitat fragmentation would include induced development, changes in land use, and/or increased access to the area that results in the loss of wildlife habitat.

Step 5 – Other Reasonably Foreseeable Actions

As stated earlier, there are known plans for six significant developments in the project area (see page 7). Therefore, given the greater access provided by the widening, some induced development is likely to occur and has the potential to be major.

Steps 6-7 – Assess Potential Cumulative Impacts and Report Results

Water Quality

The proposed project will traverse Sugar Creek and a tributary to Sugar Creek. These streams are classified by the South Carolina Department of Health and Environmental Control (DHEC) as Freshwater streams. As such, the waters of these creeks are suitable for primary and secondary contact recreation and as a source for a drinking water supply after conventional treatment in accordance with DHEC requirements. The waters are also suitable for fishing, the survival and propagation of a balanced indigenous aquatic community of fauna and flora, and for industrial and agricultural uses.

During construction activities, temporary siltation may occur in the streambed and erosion will be of a greater degree than presently occurring on existing terrain. The contractor would be required to minimize this impact by employing erosion control measures reflecting policies contained in 23 CFR 650B and S.C. Code of Regulations 72-400.

The proposed project requires a Section 401 Water Quality Certification from DHEC to ensure that no water quality standards are violated as a result of the project.

Habitat Fragmentation

Habitats that would be potentially impacted by the project are a stream, mixed hardwood-pine uplands, upland pine forests, and mowed grassy fields and yards.

Habitat fragmentation occurs when wildlife habitats change in an area, configuration or spatial relationships through natural and/or manmade mechanisms. Fragmentation generally reduces the size of large habitats into smaller parcels. Although larger habitats are being fragmented, these smaller habitats would be suitable for wildlife before and after fragmentation. Impacts to the Catawba River Basin Watershed include some construction of developments both upstream and downstream of the stream crossings on SC 160. The potential indirect impact to wildlife habitat would include induced development, change in land use, and/or increased access to areas that result in the loss of wildlife habitat.

Step 8 – Assess the Need for Mitigation

Various alternatives were developed and evaluated during the development of the project and measures were incorporated to avoid and/or minimize impacts to area resources. Impacts to the stream will be permitted and compensatory mitigation will be provided to ensure “no net loss” of stream habitat. Best Management Practices will be utilized during construction to minimize temporary construction impacts.

V. PUBLIC/RESOURCE AGENCY COORDINATION

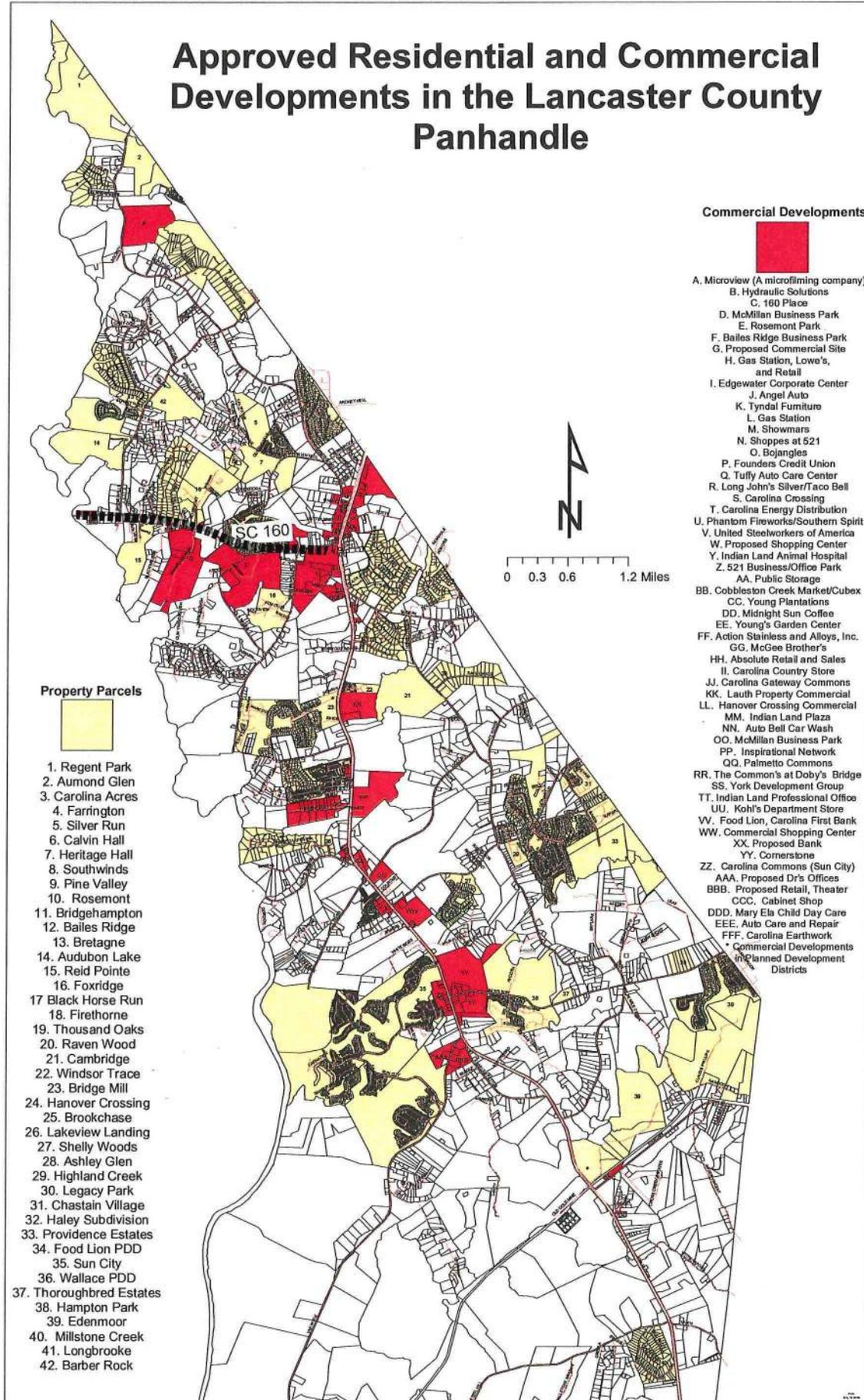
The first in-house scoping meeting regarding the project was held on March 7, 2003. Attendees included all relevant DOT personnel and a representative from the SC Department of Natural Resources [SCDNR] (see attached notes in Appendix K). At this meeting the project characteristics, termini, and length were discussed. The original scope at this meeting was to be three lanes throughout the corridor. Another scoping meeting was conducted on-site on March 24, 2003 where potential environmental impacts were discussed with representatives from the

Federal Highway Administration, SCDNR, and the SC Department of Archives and History (see Appendix L for notes from that meeting and validating memo). A letter of intent was sent to government agencies and interested parties on April 25, 2011 for input regarding the project. Responses are attached in Appendix M. No major objections were raised to the project.

APPENDICES

APPENDIX A

Approved Residential and Commercial Developments in the Lancaster County Panhandle



Property Parcels

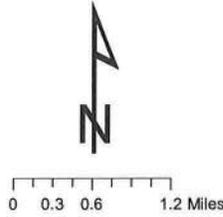


1. Regent Park
2. Aumond Glen
3. Carolina Acres
4. Farrington
5. Silver Run
6. Calvin Hall
7. Heritage Hall
8. Southwinds
9. Pine Valley
10. Rosemont
11. Bridgehampton
12. Bailes Ridge
13. Bretagne
14. Audubon Lake
15. Reid Pointe
16. Foxridge
17. Black Horse Run
18. Firethorne
19. Thousand Oaks
20. Raven Wood
21. Cambridge
22. Windsor Trace
23. Bridge Mill
24. Hanover Crossing
25. Brookchase
26. Lakeview Landing
27. Shelly Woods
28. Ashley Glen
29. Highland Creek
30. Legacy Park
31. Chastain Village
32. Haley Subdivision
33. Providence Estates
34. Food Lion PDD
35. Sun City
36. Wallace PDD
37. Thoroughbred Estates
38. Hampton Park
39. Edenmoor
40. Millstone Creek
41. Longbrooke
42. Barber Rock

Commercial Developments

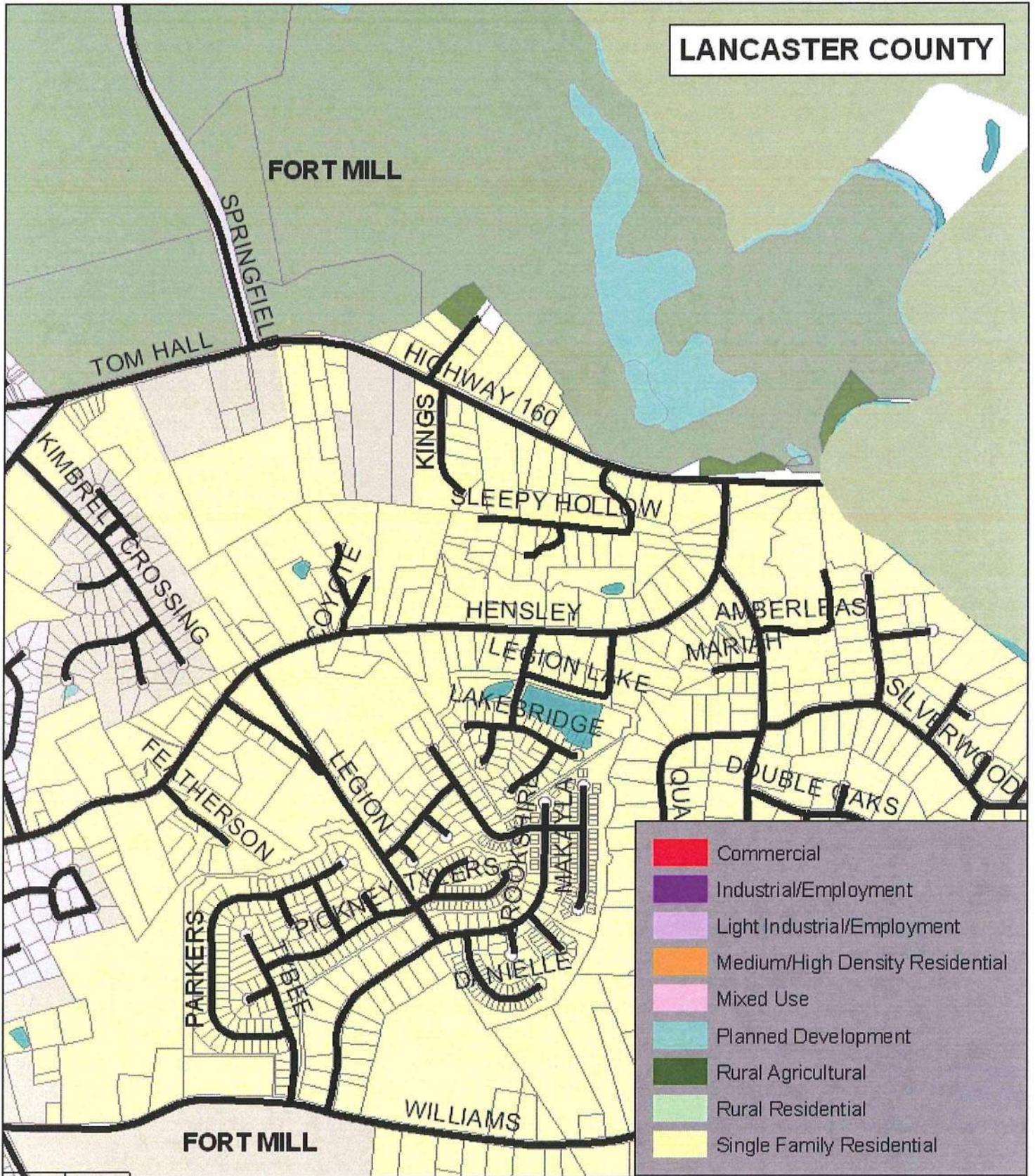


- A. Microview (A microfilming company)
- B. Hydraulic Solutions
- C. 160 Place
- D. McMillan Business Park
- E. Rosemont Park
- F. Bailes Ridge Business Park
- G. Proposed Commercial Site
- H. Gas Station, Lowe's, and Retail
- I. Edgewater Corporate Center
- J. Angel Auto
- K. Tyndal Furniture
- L. Gas Station
- M. Showmars
- N. Shoppes at 521
- O. Bojangles
- P. Founders Credit Union
- Q. Tully Auto Care Center
- R. Long John's Silver/Taco Bell
- S. Carolina Crossing
- T. Carolina Energy Distribution
- U. Phantom Fireworks/Southern Spirit
- V. United Steelworkers of America
- W. Proposed Shopping Center
- Y. Indian Land Animal Hospital
- Z. 521 Business/Office Park
- AA. Public Storage
- BB. Cobbleston Creek Market/Cubex
- CC. Young Plantations
- DD. Midnight Sun Coffee
- EE. Young's Garden Center
- FF. Action Stainless and Alloys, Inc.
- GG. McGee Brother's
- HH. Absolute Retail and Sales
- II. Carolina Country Store
- JJ. Carolina Gateway Commons
- KK. Lauth Property Commercial
- LL. Hanover Crossing Commercial
- MM. Indian Land Plaza
- NN. Auto Bell Car Wash
- OO. McMillan Business Park
- PP. Inspirational Network
- QQ. Palmetto Commons
- RR. The Common's at Doby's Bridge
- SS. York Development Group
- TT. Indian Land Professional Office
- UU. Kohl's Department Store
- VV. Food Lion, Carolina First Bank
- WW. Commercial Shopping Center
- XX. Proposed Bank
- YY. Cornerstone
- ZZ. Carolina Commons (Sun City)
- AAA. Proposed Dr's Offices
- BBB. Proposed Retail, Theater
- CCC. Cabinet Shop
- DDD. Mary Ela Child Day Care
- EEE. Auto Care and Repair
- FFF. Carolina Earthwork
- Commercial Developments in Planned Development Districts



APPENDIX B

2025 LAND USE MAP



- Commercial
- Industrial/Employment
- Light Industrial/Employment
- Medium/High Density Residential
- Mixed Use
- Planned Development
- Rural Agricultural
- Rural Residential
- Single Family Residential

0 500 1,000 Feet

APPENDIX C

Natural Resources Technical Memorandum
Proposed Widening of S.C. Route 160
from Road S-157 (Possum Hollow Road) to Springfield Parkway
York and Lancaster Counties, SC
SCDOT PIN 31125 RD01; File No. 29.031125A
April 29, 2011

Proposed Project Description

The Department proposes to widen the existing two-lane ditch section of S.C. Route 160 to a five lane curb and gutter section with a 15-foot paved median/turn lane from Road S-157 (Possum Hollow Road) to Sugar Creek. From just east of Sugar Creek to Springfield Parkway the roadway would be widened to a three-lane curb and gutter section. Most of the widening would occur symmetrically about the existing centerline. The five lane roadway would include two 12-foot travel lanes in each direction with a 15-foot paved median and a four-foot paved bike lane. The three-lane section would include one 12-foot travel lane in each direction with a 15-foot paved median/turn lane and four-foot paved bike lane. The existing bridge over Sugar Creek would remain in place. All side streets would have their intersections improved to accommodate left and right turns, to improve turning radii, and sight distances.

Wetlands Impacts

The proposed project will impact one stream. A total of < 100 feet of stream impacts. Below is a detailed description of each area. All soils were classified according to information from the U.S. Department of Agriculture.

Wetland Site A is located on both sides of S.C. Route 160 and is Sugar Creek. It is a Category 3 wetland and classified as a riverine unconsolidated bottom wetland. No impacts are expected at this site. This site primarily functions as flood control and wildlife habitat and is expected to continue that function after construction of the project.

Wetland Site B is located on both sides of S.C. Route 160 approximately 850 feet west of Sugar Creek and is an unnamed tributary of Sugar Creek. It is a Category 3 wetland and classified as a riverine unconsolidated bottom wetland. Approximately 35 feet of stream would be impacted. This site functions as flood control and wildlife habitat. These functions are expected to continue after construction.

Threatened and Endangered Species

Surveyed and Prepared by Staff Biologist: Edward W. Frierson

Pursuant to Section 7 of the Endangered Species Act a field survey was conducted on the proposed new right of way. The following list of species that are endangered (E), threatened (T) and Bald and Golden Eagle Protection Act (BGEPA) was obtained from the U.S. Fish and Wildlife Service for York and Lancaster Counties:

Animals

Bald eagle – *Haliaeetus leucocephalus* – (BGEPA)
Carolina heelsplitter – *Lasmigona decorata* – (E)

Plants

Schweinitz's sunflower – *Helianthus schweinitzii* – (E)
Little amphianthus – *Amphianthus pusillus* – (T)
Smooth coneflower – *Echinacea laevigata* – (E)
Black-spored quillwort – *Isoetes melanospora* – (E)
Dwarf-flowered heartleaf – *Hexastylis naniflora* – (T)

Methods

The project area was examined by reconnaissance methods on November 9, 2010 and April 29, 2011. Habitats surveyed were determined by each species' ecological requirements.

Results

The entire project area was surveyed on the visit above. The project corridor consists of stream habitats, mixed pine forests, hardwood forests, and landscaped commercial and residential areas. The upland forested areas are characterized by American holly (*Ilex opaca*), white oak (*Quercus alba*), short-leaf pine (*Pinus echinata*), and Flowering dogwood (*Cornus florida*). The water bodies are Sugar Creek and its unnamed tributary. These two streams are not large enough to support the Bald Eagle. The streams also do not provide habitat for the Carolina heelsplitter (see attachment).

Potential habitat for Schweinitz's sunflower is present in the project corridor. These plants are found in meadows and open woodland and are commonly found on the shoulder of roadways. The flowering period is from September to early November. No

good habitat was located and no specimens were located during this survey. Potential habitat for Dwarf-flowered heartleaf was located in the project corridor. These plants are found in upper Piedmont hardwood forests on deep, well-drained soils. It is often associated with mountain laurel on northerly slopes of moist rich soils. During the survey a species of heartleaf was located near the unnamed tributary of Sugar Creek. The plant is primarily identified by the shape of its flowers. Therefore, the site was revisited during the flowering season on April 29, 2011, and pictures of the flowers were sent to Dr. Doug Rayner of Wofford University in Spartanburg SC, a local expert on *Hexastylis* species. Dr. Rayner determined that the species within the project corridor was *Hexastylis ariflora* rather than *Hexastylis naniflora*, and therefore the project may proceed as *H. ariflora* is a very common heartleaf species and not listed as endangered or threatened.

Based on a lack of suitable habitat and/or no observations of the listed species during field surveys, results of the threatened and endangered species study indicate that the proposed action will not affect any threatened or endangered species or critical habitats currently listed by the USFWS for York and Lancaster Counties.

**Biological Survey for Carolina Heelsplitter (*Lasmigona decorata*) for
SC 160 Bridge Replacement over Tributary to Sugar Creek
in York County**

December 14, 2010

BIOLOGISTS: Jeffrey West, Siobhan O'Connor

U.S. FISH AND WILDLIFE SERVICE ES PERMIT: TE178643-1

STATION 20101202.1jcw

LOCATION: Tributary to Sugar Creek, Santee-Cooper River Basin, York County,
South Carolina; Location: 35° 0' 21" N, 80° 54' 19" W

SURVEY DATE: December 2, 2010

SITE COMMENTS: Stream is full of trash in an urban setting. Habitat otherwise is
decent. Surveyed 100 m upstream and 400 m downstream.

HABITAT DESCRIPTION (dominant types in bold):

Waterbody Type:	Stream
Flow:	Run, riffle, slack, pool
Relative Depth:	Very shallow
Depth (%<2 ft.):	99%
Substrate:	Sand, cobble, gravel
Compactness:	Normal
Sand/Gravel bars:	Present
Woody Debris:	Low
Beaver Activity:	None
Windthrow:	Low
Temporary Pools:	None
Channel Width:	7 meters
Bank Height:	2.0 meters
Bank Stability:	Some erosion/undercutting
Buffer Width:	Moderate
Riparian Vegetation:	Wooded
Land Use:	Natural, urban
Percent Cover:	50%
Woodland Extent:	Not extensive
Natural Levees:	None

Visibility: Clear
Water Level: Normal
Weather: Sunny, cool

TECHNIQUES AND SURVEY TIME:

Techniques: Visual; tactile
Survey time: 1.0 person-hours

FRESHWATER MUSSELS:

None

OTHER TAXA:

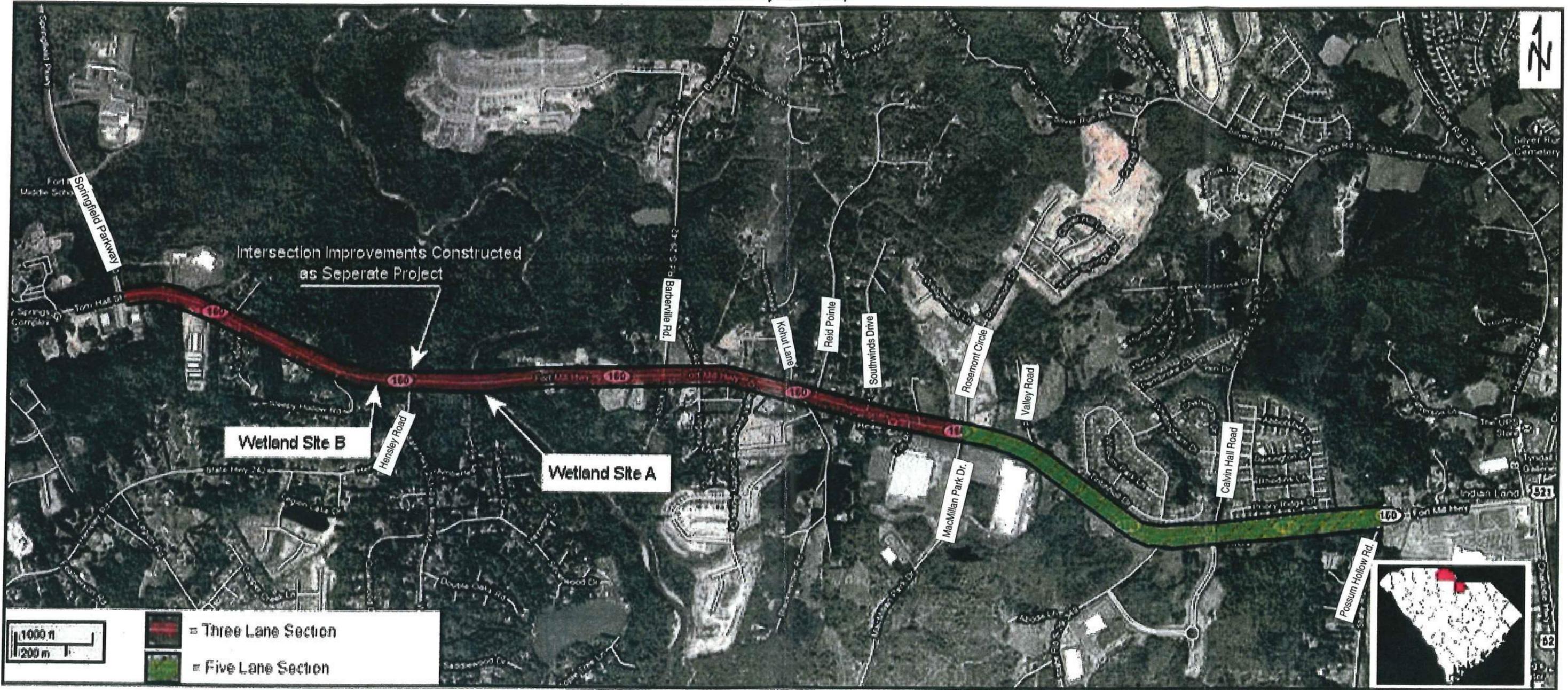
One juvenile shell of *Corbicula fluminea* found.

BIOLOGICAL DETERMINATION:

No effect for the federally listed endangered Carolina heelsplitter (*Lasmigona decorata*).

APPENDIX D

Wetland/Study Area Map



APPENDIX E

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I (To be completed by Federal Agency)	Date Of Land Evaluation Request 10/11/10
Name Of Project SC Route 160	Federal Agency Involved FHWA - USDOT
Proposed Land Use Highway	County And State Lancaster/York, South Carolina

PART II (To be completed by NRCS)		Date Request Received By NRCS	
Does the site contain prime, unique, statewide or local important farmland? <i>(If no, the FPPA does not apply -- do not complete additional parts of this form).</i>		Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Major Crop(s)		Acres Irrigated	Average Farm Size
Name Of Land Evaluation System Used		Date Land Evaluation Returned By NRCS	

PART III (To be completed by Federal Agency)	Alternative Site Rating			
	Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly	20.0			
B. Total Acres To Be Converted Indirectly	0.0			
C. Total Acres In Site	20.0	0.0	0.0	0.0

PART IV (To be completed by NRCS) Land Evaluation Information				
A. Total Acres Prime And Unique Farmland				
B. Total Acres Statewide And Local Important Farmland				
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted				
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value				

PART V (To be completed by NRCS) Land Evaluation Criterion Relative Value Of Farmland To Be Converted (Scale of 0 to 100 Points)	100	0	0	0
--	-----	---	---	---

PART VI (To be completed by Federal Agency) Site Assessment Criteria (These criteria are explained in 7 CFR 658.5(b))	Maximum Points				
1. Area In Nonurban Use	5				
2. Perimeter In Nonurban Use	5				
3. Percent Of Site Being Farmed	0				
4. Protection Provided By State And Local Government	0				
5. Distance From Urban Builtup Area	0				
6. Distance To Urban Support Services	0				
7. Size Of Present Farm Unit Compared To Average	10				
8. Creation Of Nonfarmable Farmland	0				
9. Availability Of Farm Support Services	5				
10. On-Farm Investments	0				
11. Effects Of Conversion On Farm Support Services	0				
12. Compatibility With Existing Agricultural Use	0				
TOTAL SITE ASSESSMENT POINTS	160	25	0	0	0

PART VII (To be completed by Federal Agency)					
Relative Value Of Farmland (From Part V)	100	100	0	0	0
Total Site Assessment (From Part VI above or a local site assessment)	160	25	0	0	0
TOTAL POINTS (Total of above 2 lines)	260	125	0	0	0

Site Selected:	Date Of Selection	Was A Local Site Assessment Used? Yes <input type="checkbox"/> No <input type="checkbox"/>
----------------	-------------------	---

Reason For Selection: Assessment completed by Ed Frierson.

APPENDIX F



South Carolina
Department of Transportation

MEMORANDUM

TO: Chris Lacy
Program Manager

FROM: Buford H. Wilburn *BHW*
Rights-of-Way Agent/UST Investigator

DATE: July 24, 2007

SUBJECT: File 29.031125A; PINs 31125 & 31127; Proposed widening of S.C. 160 in Lancaster and York Counties

An Initial Site Assessment (ISA) was conducted for the above described project. The ISA determined that 3 sites are/were involved in the use of USTs and/or other hazardous materials adjacent to the proposed right-of-way. (See attached list)

It would appear that none of these sites would warrant investigation at this time, as the probability for contamination is minimal based on the information furnished to me by DHEC. Please advise as to how you wish me to proceed.

Enclosure

Cc: Environmental Management
Cc: Mark A. Walker, Team Leader Central District



INITIAL SITE ASSESSMENT

File No. 29.03125A Project No. _____ PIN 31125 & 31127
 County Lancaster/York Date 7-24-07 Page 1 of 1

Site No: 1 Plan Sheet No. preliminary roll sheet Person Contacted _____

Site Name: Val Mart 2 Site Phone No. _____
 Site Address 1431 E. Tom Hall, Street, Fort Mill, SC 29715 Site Location 35+00 right

Owner Name: Bill Cater Owner Phone No. 803-547-5090
 Owner Address: 1866 Pleasant Hill Road, Fort Mill, SC 29715

Environmental Concern(s): 2-12,000 gallon GN
1-4,000 gallon DL

Current Land Use(s): Active gas station Previous Land Use(s): n/a

If Petroleum UST's or AST's are/were present, are tanks registered? UST Yes No AST Yes No
 Other (Explanation) _____

GWPD (UST) Site ID No.(s): 09352 AST Registration No.(s) n/a

Are UST's or AST's still present? UST Yes No AST Yes No
 Is a UST or AST closure assessment report available? UST Yes No AST Yes No
 Other (Explanation) _____

Can existing UST basin(s) be located? Yes No
 Distance from Centerline to Existing: UST's AST's approx. 100 l.f., mixture of concrete and asphalt cover over tank farm.
 Distance from Centerline to Existing Dispensers: approx. 60 l.f., concrete dispenser island and pads

Can former UST basin(s) or former AST location(s) be identified? UST Yes No AST Yes No
 Distance from Centerline to former: UST AST n/a
 Distance from Centerline to former dispensers: UST AST n/a

Do you recommend that tanks be located? Yes No
 Do you recommend additional site assessment? Yes No

Additional Comments Regarding Site Specifics, Site History or Environmental Concerns: There have been no releases at this site per DHEC (7-23-07)

Recommendation from Project Manager: _____

Do you want site(s) tested? Yes No
 Date Site Assessment Requested by Project Manager: _____
 Date forwarded to Laboratory: _____

INITIAL SITE ASSESSMENT

File No. 29.03125A Project No. _____ PIN 31125 & 31127
 County Lancaster/York Date 7-24-07 Page 1 of 1

Site No: 3 Plan Sheet No. 7 (preliminary plans) Person Contacted Danny Kiser
 Site Name: Names-in a-Hurry Signs Site Phone No. 803-548-3366
 Site Address 1138 Fort Mill Highway, Fort Mill, SC 29715 Site Location 121+00 left

Owner Name: Danny Kiser Owner Phone No. same
 Owner Address: same

Environmental Concern(s): current business occupies site of former gas station

Current Land Use(s): commercial Previous Land Use(s): gas station/grocery store

If Petroleum UST's or AST's are/were present, are tanks registered? UST Yes No AST Yes No
 Other (Explanation _____)

GWPD (UST) Site ID No.(s): 09410 and 09362 AST Registration No.(s) n/a

Are UST's or AST's still present? UST Yes No AST Yes No
 Is a UST or AST closure assessment report available? UST Yes No AST Yes No
 Other (Explanation 2- 1,000 gallon tanks and 1- 2,000 gallon tank were removed 6-1-89 per DHEC)

Can existing UST basin(s) be located? Yes No
 Distance from Centerline to Existing: UST's AST's
 Distance from Centerline to Existing Dispensers: _____

Can former UST basin(s) or former AST location(s) be identified? UST Yes No AST Yes No
 Distance from Centerline to former: UST AST n/a
 Distance from Centerline to former dispensers: UST AST n/a

Do you recommend that tanks be located? Yes No
 Do you recommend additional site assessment? Yes No

Additional Comments Regarding Site Specifics, Site History or Environmental Concerns: There have been no releases at this location per DHEC (7-23-07)

Recommendation from Project Manager: _____

Do you want site(s) tested? Yes No
 Date Site Assessment Requested by Project Manager: _____
 Date forwarded to Laboratory: _____

INITIAL SITE ASSESSMENT

File No. 29.03125A Project No. _____ PIN 31125 & 31127
 County Lancaster/York Date 7-24-07 Page 1 of 1

Site No: 4 Plan Sheet No. 8 (preliminary plans) Person Contacted To Nguyen
 Site Name: C & T Mart Site Phone No. 803-548-6749
 Site Address 304 S.E. Tom Hall Road, Fort Mill, SC 29715 Site Location 145+00 left

Owner Name: Petroleum World, Inc. Owner Phone No. _____
 Owner Address: 681 N.C. Highway 120, Mooresboro, NC 28114

Environmental Concern(s): 3- 8,000 gallon GN
1- 10,000 gallon DL

Current Land Use(s): Active gas station Previous Land Use(s): n/a

If Petroleum UST's or AST's are/were present, are tanks registered? UST Yes No AST Yes No
 Other (Explanation) _____

GWPD (UST) Site ID No.(s): 10925 AST Registration No.(s) n/a

Are UST's or AST's still present? UST Yes No AST Yes No
 Is a UST or AST closure assessment report available? UST Yes No AST Yes No
 Other (Explanation) _____

Can existing UST basin(s) be located? Yes No
 Distance from Centerline to Existing: UST's AST's approx. 80 l.f., mixture of concrete, asphalt and earth cover over tank farm.
 Distance from Centerline to Existing Dispensers: approx. 85 l.f., concrete dispenser island and pads

Can former UST basin(s) or former AST location(s) be identified? UST Yes No AST Yes No
 Distance from Centerline to former: UST AST n/a
 Distance from Centerline to former dispensers: UST AST n/a

Do you recommend that tanks be located? Yes No
 Do you recommend additional site assessment? Yes No

Additional Comments Regarding Site Specifics, Site History or Environmental Concerns: Per DHEC (7-23-07) there was a release in December 1991. In 1995 a "No Further Action" was issued. Assessment is archived with DHEC and is available through FOI Act.

Recommendation from Project Manager: _____

Do you want site(s) tested? Yes No
 Date Site Assessment Requested by Project Manager: _____
 Date forwarded to Laboratory: _____

APPENDIX G

COPY

MEMORANDUM

TO: Randy Williamson, Environment Engineer
FROM: Donald M. Liester, Relocation Manager *DM*
DATE: August 6, 2008
RE: Relocation Impact Study
File: 29.031125A – **County:**Lancaster - **Road/Route:** SC 160 Phase II
PIN: 31125 & 31128

Attached is the Relocation Impact Study completed for the referenced project.

If any further information is needed, please contact Donald Liester, extension #7-1062 or Annette McCrorey, extension #7-2371

DML:kc
Attachment
File: DL/KC

cc: Robert I. Pratt
Oscar K. Rucker
Ken Feaster
Chris Johnston



South Carolina
Department of Transportation

Date: July 7, 2008

To: Don Leister, Relocation Manager

From: Mary McQueen *MM*
Doris Foster *DF*

Subject: File 29.031125A – Road SC 160 Phase II – Lancaster County

Please be advised that this is a revised impact study is for Road SC 160 Phase II in Lancaster County. The project consists of Widening SC 160 from S-150 (Possum Hollow Rd.) to the bridge over Sugar Creek (York County Line).

REVISED RELOCATION IMPACT STUDY

File 29.031125A - Road SC 160 Phase II - Lancaster County
Pin 31125 and 31128

In accordance with FHWA Technical Advisory T664.8A, the South Carolina Department of Transportation has investigated the potential relocation impacts associated with this project. The purpose of this report is to explain the relocation impact, including anticipated problems and suggested solutions.

A. Description of Project

The project consists of widening SC 160 from S-157 (Possum Hollow Rd.) to the bridge over Sugar Creek (York County line). The length of the project is approximately 2.3 miles. The project consists of road widening with the realigned S-157 to tie into SC 160. This project would also adjust other side streets to accommodate left and right turns, including a left turn on Barberville road. The project area is located in Lancaster County.

B. Road Impact

The new right of way will impact several businesses and two residential displacees.

C. Estimated Number of Displaced Residential Households.

Improvement 10 – Is a doublewide mobile home at approximate survey station 229+00, which is in the center of the proposed Possum Hollow Road Construction. The property is listed at 0.271 acre with the tax assessed value of \$57,000.00. **(Tenant)**.

After speaking with a representative at Lancaster County, it was determined that because of the age of the mobile home, (1974), it cannot be relocated to another lot. This is a tenant occupied mobile home.

Improvement 11 - Is a single family residence with a detached garage at approximate survey station 11+00.50, which is in the center of the relocated Harrisburg Road Construction. The property is listed at 2.9 Acres with the tax assessed value of \$284,400.00.

Improvement 12 – Is a vacant single family dwelling on 5 acres of land. The dwelling, located in the new right of way is on the same property as Tyndall's Furniture store. The business is in operation and is outside of the new right of way. The owner of the business has indicated that the house will more than likely remain vacant for some time.

D. DSS Housing Needs of Displaced Persons and Current Available Resources

Few available rental mobile homes exist in the project area; however, available apartments and houses are located nearby in the Fort Mill vicinity. Last resort housing will probably be utilized due to increased housing cost on the market.

E. Non-Availability of DSS Housing

After consulting with a realtor it was determined that there are very little, if any rental lots for mobile homes currently on the market in the immediate area. County codes prohibit moving this mobile home (due to its age), therefore it will be necessary to negotiate to purchase.

F. Displacement of Businesses, Non –Profit and Farm

One Non-profit (Fire Department) and one business will be displaced.

Improvements 1 & 2 - Possible miscellaneous items, 3 truck trailers in the new right of way. This business has approximately three to five employees.

Improvement 3 – Loss of Parking Cost to cure for additional parking may mitigate potential displacement. This business has approximately three to five employees.

Improvement 4 – Landscaping business with miscellaneous landscaping items, various trees and rocks, located in new right of way.

Improvement 5 - Potential parking spaces, 6 to 8 feet of parking affected, but doesn't seem to affect the building itself, possible cost to cure for additional parking may mitigate the loss of parking spaces.

Improvement 6 – (2) dog kennels and (1) storage building, both can be moved back on the same lot.

Improvement 7 – Displaced Fire Department – Early coordination with the Fire Department will help with continuity of fire service. This is a volunteer fire station with approximately seven to ten volunteers.

Improvement 8 – Regen Auto LLC building is in the right of way – Tenant The business has approximately three employees.

Improvement 9 – Daycare facility is located on this tract, which will have 7 parking spaces adversely impacted. Until further information is developed the extent of the impact is unknown. This tract requires early coordination with the business owner to determine alternative parking solutions. The business has approximately five to ten employees.

G. Concurrent Displacement / Estimated Relocation Completion Schedule.

No other relocation is being conducted in the vicinity by other entities. Due to new construction probably required for the fire department, the estimated relocation schedule is 12-18 months.

H. Based on the visual inspection and research, this project will not divide or disrupt an established community. According to the provided road plans, only one mobile home is in the new right of way.

- I. The acquisition and relocation program will be conducted in compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended and all relocation resources are available to displacees without discrimination.

According, 49CFR 24.205 (A)-(F), relocation planning and services will be provided to businesses. The relocation services included the following:

- Site requirements, current lease terms, and other contractual obligations,
- Providing outside specialists to assist in planning and move, assistance for the actual move, and the reinstallation of machinery and other personal property,
- Identification and resolution of personality/realty issues,
- An estimate of time required for the business to vacate the site,
- An estimate of the anticipated difficulty in locating a replacement property, and
- An identification of any advanced relocation payments required for the move.

Mary McQueen 7/3/08 John J. Prater 7/3/08
Agent/Date District Agent/Date

Dain Foster 6-25-08
Agent/Date

Displaced Occupant Summary

Type of Displacee	Owners	Tenants	Total	Minorities
Residential	1	1	2	
Businesses		1	1	
Farms				
Non-Profit		1	1	
Other				

Residential Displacement

Type Housing	Owner	Rental
Single Family	1	
Duplex, Triplex		
Multi-Family (4+)		
Sleeping Rooms/Shared Quarters		
Mobile Homes		1
Other		
Total	1	1

Business Displacement

Type of Business	Owner	Tenant	Minority	# Employees
Construction				
Manufacturing				
Retail				
Government				
Service	2			
Non-Profit		1		
Other				

Housing Values And Availability

Owners	Subject	Available DSS Sales	Tenants	On-Site Rentals	Available DSS Rentals
0-25 M			0-150		
25 - 50 M			150 - 250		
50 - 75 M			250 - 400		
75 - 100 M			400 - 600		
100 - 125 M			600 - 800		1
125 UP		2	800 UP		1
Total					

MEMORANDUM

TO: Randy Williamson, Environment Engineer
FROM: Donald M. Liester, Relocation Manager *DML*
DATE: October 21, 2008
RE: Relocation Impact Study
File: 29.031125A– **County:** York - **Road/Route:** SC 160 Phase II
PIN: 31125 & 31128

Attached is the Relocation Impact Study completed for the referenced project.

If any further information is needed, please contact Donald Liester, extension #7-1062 or Annette McCrorey, extension #7-2371.

DML:kc
Attachment
File: DL/KC

cc: Robert I. Pratt
Oscar K. Rucker
Ken Feaster
Chris Johnston ✓

RELOCATION IMPACT STUDY

File 29.031125A - Road SC 160 Phase II - York County
Pin 31125 and 31128

In accordance with FHWA Technical Advisory T664.8A, the South Carolina Department of Transportation has investigated the potential relocation impacts associated with this project. The purpose of this report is to explain the relocation impact, including anticipated problems and suggested solutions.

A. Description of Project

The project consists of widening SC 160 from Springfield Parkway to Sugar Creek. The length of the project is approximately 1.118 miles. The project consists of road widening; and adjustments to other side streets to accommodate left and right turn. The project area is located in York County.

B. Road Impact

The new right of way will impact one (1) business, Starkey Automotive, and the gas and oil equipment for Valero Gas Station located on the same tract (a canopy, a well and possibly one (1) gas dispenser and an underground storage tank, depending on the location). One (1) wooden storage shed, one (1) wooden garage and one (1) single wide mobile home.

C. Estimated Number of Displaced Residential Households.

Tract 13 - Is a double garage at approximate survey station 49+50, which is located in the new right of way on Mimosa Lane. The residence is not affected by the new right of way. The property is listed at 1.014 acre with the tax assessed value of \$141,000.00.

(Owner)

Tract 31 - Is an 8x10 wooden storage shed and 25x25 wooden garage with attached porch. The residence is not affected by the new right of way. This property is listed at 1 acre with the tax assessed value of \$107,500.00. It is possible that they can rebuild the structure on the remaining property closest to the single family residence. **(Owner)**

Tract 43 - Is a singlewide Mobile home at approximate survey station 88+00, which is located in the new right of way of Road S-160 (Tom Hall Street). The property is listed at 1.59 Acre with the tax assessed value of \$43,000.00. Portion of this property is located in Lancaster County. **(Owner)**

After speaking with a representative at York County, it was determined that the 1989 singlewide mobile home can be moved. They have also requested that they be notified before the move is to take place.

The mobile home is owner occupied and contains 2.19 acres, is situated two counties. York County contains 1.59 acre, Lancaster County contains 0.60 of an acre. Because of the terrain, it may be impossible to relocate the mobile home on the remaining property.

D. DSS Housing Needs of Displaced Persons and Current Available Resources

Based on our research for replacement housing there are very few lots would accommodate the single wide mobile home. It is very likely that housing of last resort will be utilized.

E. Non-Availability of DSS Housing

Housing of last resort will be a factor in finding available property for the mobile home. There is a current real estate listing for 0.46 Acres of land which is zoned residential, and is cleared lot, with public water and septic. It is listed for \$125,000.00. It may be more cost effective to purchase an existing dwelling.

F. Displacement of Businesses, Non -Profit and Farm

One business will be displaced.

Tract 14 – One story block business (Starkey Automotive) is in the new right of way. This business has approximately four to five employees. Also the canopy and possibly 1 gas pump (Valero Gas Store) will be affected by the new right of way. There is also a well also in the new right of way (Kings Court.) at approximate survey station 45+75. It is also a possibility that the UST's will also be affected depending on their location.

G. Concurrent Displacement / Estimated Relocation Completion Schedule.

Unknown at this time.

H. Based on the visual inspection and research, this project will not divide or disrupt an established community. According to the provided road plans, only one mobile home is in the new right of way.

I. The acquisition and relocation program will be conducted in compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended and all relocation resources are available to displacees without discrimination.

In accordance with, 49CFR 24.205 (A)-(F), relocation planning and services will be provided to displaced businesses. The relocation services included the following:

- Site requirements, current lease terms, and other contractual obligations,

Displaced Occupant Summary

Type of Displacee	Owners	Tenants	Total	Minorities
Residential	1		1	
Businesses	2		2	
Farms				
Non-Profit				
Other				

Residential Displacement

Type Housing	Owner	Rental
Single Family		
Duplex, Triplex		
Multi-Family (4+)		
Sleeping Rooms/Shared Quarters		
Mobile Homes	1	
Other		
Total	1	

Business Displacement

Type of Business	Owner	Tenant	Minority	# Employees
Construction				
Manufacturing				
Retail				
Government				
Service	2			
Non-Profit				
Other				

Housing Values And Availability

Owners	Subject	Available DSS Sales	Tenants	On-Site Rentals	Available DSS Rentals
0-25 M			0-150		
25 - 50 M			150 - 250		
50 - 75 M		X	250 - 400		
75 - 100 M		X	400 - 600		
100 - 125 M			600 - 800		
125 UP		X	800 UP		
Total					

APPENDIX H

APPENDIX I

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
TRAFFIC NOISE ABATEMENT POLICY

Date of Issuance: March 2011

Effective Date: July 1, 2011



To replace previous policy entitled *South Carolina Department of Transportation Noise Abatement Policy*.

Responsible Official: SCDOT Environmental Engineer

APPENDIX J

Phase I Cultural Resources Survey of the SC 160 Widening East Project, York County, South Carolina.

SCDOT Project # 29536

Archaeologist: Rebecca Shepherd, Tracy Martin

Architectural Historian: Tracy Martin

This project involves widening and intersection improvements to a section of SC 160 (Tom Hall Street) from the intersection of SC 460 (Springfield Parkway) to the Lancaster County line (**Figure 1**). The area of direct effect (ADE) consists of the areas of proposed new right-of-way (ROW), construction limits, erosion control and ditches, and a proposed easement. The area of potential effect (APE) for architectural resources extends 300 feet beyond the ADE. The archaeological survey examined the ADE. The historic architecture survey examined the entire APE.

The project corridor is located within the Piedmont physiographic province of South Carolina. The closest named water source is Sugar Creek, which is located approximately 240 meters east of the eastern terminus of the ADE. Soils within the ADE are predominately well-drained (72.5%), but classified as moderately or severely eroded. Small amounts of moderately well drained (21.9%) and somewhat poorly drained and frequently flooded (5.6%) soils are also present. The western half of the APE is predominately characterized by recent and ongoing commercial and residential development such as strip malls, grocery stores, gas stations, commercial retail buildings, and single-family and multi-family residential development. The eastern half of the APE is less developed and characterized by single-family residential development interspersed with densely wooded areas.

A cultural resources background review of the APE was conducted using ArchSite and Google Earth. Historical imagery including topographic maps and aerial photographs showing the location were also examined. SCDOT originally conducted a cultural resources survey of the APE in 2007 entitled *Cultural Resources Reconnaissance Survey of the SC Route 160 Phase II Widening Project, Lancaster and York Counties*. This project examined a larger APE that extended into Lancaster County. During this survey no archaeological resources were identified within the York County section and one architectural resource was identified. Portions of two other cultural resources surveys overlap on the eastern and western ends of the APE (see **Figure 2**). One previously recorded resource was present within the APE (SHPO Site No. 3026). This resource is a residence built c. 1940 and recommended not eligible for the National Register of Historic Places (NRHP).

A cultural resources revisit survey was conducted August 25, 2022. The survey consisted of a reconnaissance of the APE to record historic resources that were not recorded during the initial cultural resource survey in 2007 as they were not yet 50 years of age. An archaeological survey was deemed unnecessary at this time as the survey from 2007 still provided adequate coverage of the ADE.

Eight architectural resources (SHPO Site Nos. 4030 to 4037) were recorded during this investigation (**Figure 2, Table 1**). A revisit was made to SHPO Site No. 3026 and an updated site



card for the site was submitted to the State Historic Preservation Office along with site cards for the newly recorded resources.

Table 1. Newly Recorded Resources

SHPO Site Number	Name/Address	Year Built	Parcel ID	Function	Eligibility
4030	1406 Highway 160 East	c. 1970	7370000063	Domestic	Not Eligible
4031	1416 Highway 160 East	1969	7370000064	Domestic	Not Eligible
4032	1424 Highway 160 East	1970	7370000065	Domestic	Not Eligible
4033	105 A and B Mimosa Lane	c. 1970	7370000066	Domestic	Not Eligible
4034	107 Mimosa Lane	1971	7370000067	Domestic	Not Eligible
4035	109, 111, 113, 115 Mimosa Lane	c. 1971	7370000068	Domestic	Not Eligible
4036	106 Mimosa Lane	1970	7370000071	Domestic	Not Eligible
4037	1458 Highway 160 East	1971	7370000072	Domestic	Not Eligible

SHPO Site Number 4030, 1406 Highway 160 East

This resource is located on the north side of SC 160 at the far western end of the APE. The resource is a single story, brick ranch house built circa 1970 with a gross gable design clad in composition shingles. There is an engaged front porch that covers only the entrance bay. **Figure 3** shows the resource as it looked at the time of survey. This resource does not embody any distinctive characteristics of a period or method of construction. It is not known to be associated with persons or events significant to the history of the area. Furthermore, it is unlikely to yield new information or answer important research questions about local, state, or national history. Therefore, this resource is recommended as not eligible for the NRHP under Criterion A, B, C, or D.

SHPO Site Number 4031, 1416 Highway 160 East

This resource is located on the north side of SC 160 at the western end of the APE. The resource is a single story, brick ranch house built in 1969 and has a lateral gable design. The roof is clad in composition shingles. The resource does not have a front porch but instead has steps leading to a front door. The house features a tripartite window to the left of the front door. The only alteration noted was the filled in garage bay. **Figure 4** shows the resource as it looked at the time of survey. This resource does not embody any distinctive characteristics of a period or method of construction. It is not known to be associated with persons or events significant to the history of the area. Furthermore, it is unlikely to yield new information or answer important research questions about local, state, or national history. Therefore, this resource is recommended as not eligible for the NRHP under Criterion A, B, C, or D.

SHPO Site Number 4032, 1424 Highway 160 East

This resource is located on the north side of SC 160 at the western end of the APE. The resource is a single story, brick ranch house built in 1970 and has a lateral gable design. The roof is clad in composition shingles. There is an engaged front porch with a balustrade. The porch covers one bay but less than the full facade. The house features a tripartite window to the right of the front

door as well as paired windows along the front facade. **Figure 5** shows the resource as it looked at the time of survey. This resource does not embody any distinctive characteristics of a period or method of construction. It is not known to be associated with persons or events significant to the history of the area. Furthermore, it is unlikely to yield new information or answer important research questions about local, state, or national history. Therefore, this resource is recommended as not eligible for the NRHP under Criterion A, B, C, or D.

SHPO Site Number 4033, 105 A and B Mimosa Lane

This resource is located on the west side of Mimosa Lane. The resource is a 1.5 story, brick ranch style duplex built circa 1970. The building has a lateral gable roof clad in composition shingles. The structure lacks a front porch but features a balanced front façade with a pair of entryways and matching paired windows on either side. **Figure 6** shows the resource as it looked at the time of survey. This resource does not embody any distinctive characteristics of a period or method of construction. It is not known to be associated with persons or events significant to the history of the area. Furthermore, it is unlikely to yield new information or answer important research questions about local, state, or national history. Therefore, this resource is recommended as not eligible for the NRHP under Criterion A, B, C, or D.

SHPO Site Number 4034, 107 Mimosa Lane

This resource is located on the west side of Mimosa Lane. The resource is a 1.5 story, brick ranch style duplex built in 1971. The building has a lateral gable roof clad in composition shingles. There is a gable front porch supported by two round posts that covers the entryway and the bay to left. **Figure 7** shows the resource as it looked at the time of survey. This resource does not embody any distinctive characteristics of a period or method of construction. It is not known to be associated with persons or events significant to the history of the area. Furthermore, it is unlikely to yield new information or answer important research questions about local, state, or national history. Therefore, this resource is recommended as not eligible for the NRHP under Criterion A, B, C, or D.

SHPO Site Number 4035, 109, 111, 113, and 115 Mimosa Lane

This resource is located on the northwest side of Mimosa Lane. The resource is a two story, brick, ranch style, quad apartment building constructed circa 1971. The building has a lateral gable roof clad in composition shingles. Each apartment has paired windows and an entryway along the front facade. **Figure 8** shows the resource as it looked at the time of survey. This resource does not embody any distinctive characteristics of a period or method of construction. It is not known to be associated with persons or events significant to the history of the area. Furthermore, it is unlikely to yield new information or answer important research questions about local, state, or national history. Therefore, this resource is recommended as not eligible for the NRHP under Criterion A, B, C, or D.

SHPO Site Number 4036, 106 Mimosa Lane

This resource is located on the northeast end of Mimosa Lane. The resource is a single story, brick ranch style duplex built in 1970. The building has a lateral gable roof clad in composition shingles. The house features a pediment entryway with steps leading to the front door. **Figure 9** shows the resource as it looked at the time of survey. This resource does not embody any distinctive characteristics of a period or method of construction. It is not known to be associated

with persons or events significant to the history of the area. Furthermore, it is unlikely to yield new information or answer important research questions about local, state, or national history. Therefore, this resource is recommended as not eligible for the NRHP under Criterion A, B, C, or D.

SHPO Site Number 4037, 1458 Highway 160 East

This resource is located at the corner of SC 160 and Mimosa Lane. The resource is a single story, brick ranch style duplex built in 1971. The building has a lateral gable roof clad in composition shingles. There is a gabled front porch with paired round posts on either side that covers the entryway and a set of paired windows to the right. The eastern elevation features a garage bay. **Figures 10 and 11** show the resource as it looked at the time of survey. This resource does not embody any distinctive characteristics of a period or method of construction. It is not known to be associated with persons or events significant to the history of the area. Furthermore, it is unlikely to yield new information or answer important research questions about local, state, or national history. Therefore, this resource is recommended as not eligible for the NRHP under Criterion A, B, C, or D.

No archaeological resources were identified within the York County portion of the original 2007 survey and no additional archaeological investigations were conducted during this revisit. Eight architectural resources were identified during this revisit survey and one previously recorded architectural resource was revisited. All of the resources identified with the project APE are recommended not eligible for the NRHP. No additional cultural resources investigations are recommended.

Sincerely,

Rebecca Shepherd

A handwritten signature in black ink, appearing to read 'Rebecca Shepherd', written in a cursive style.

Chief Archaeologist

Figure 1. Project Plans Map

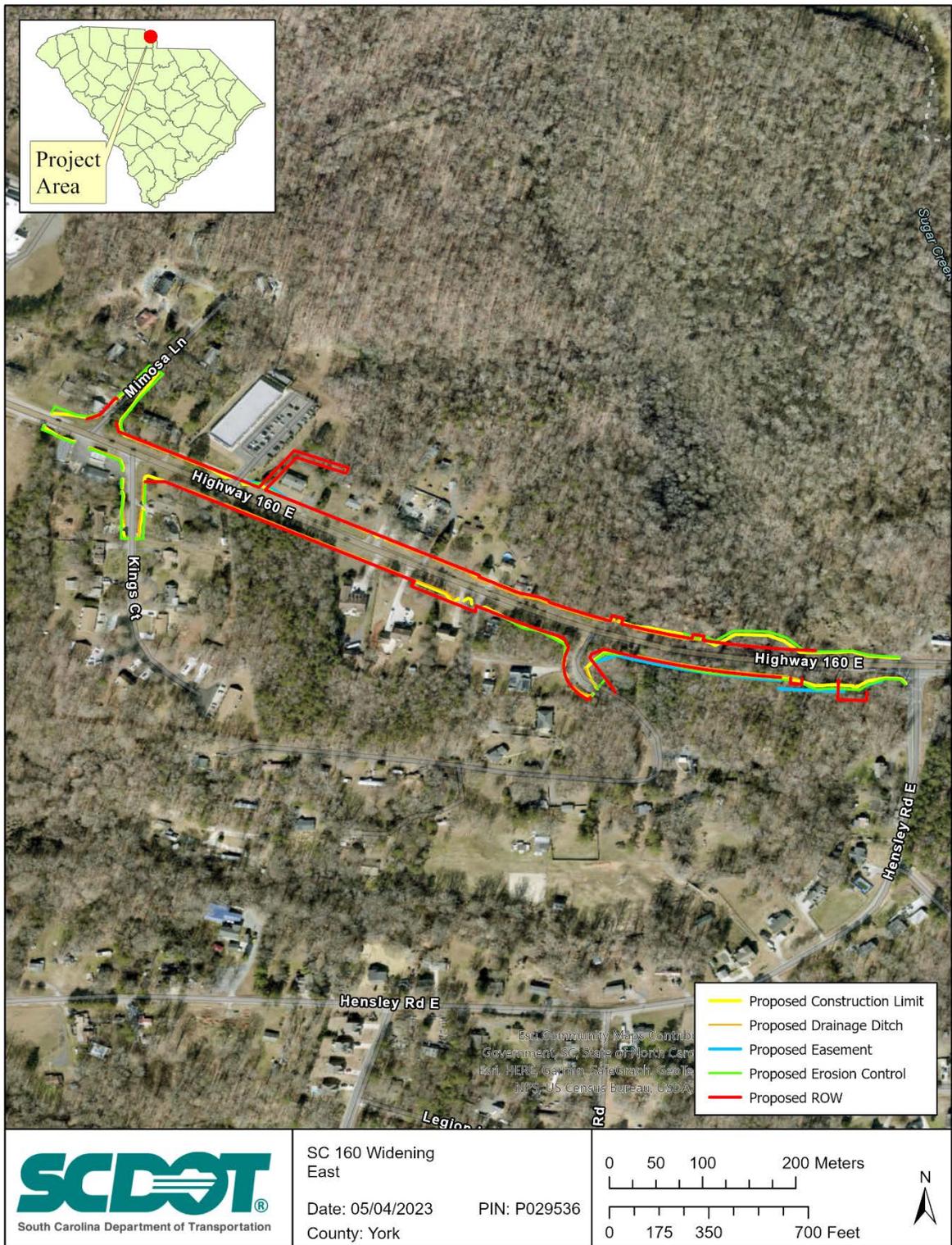


Figure 2. Newly and Previously Recorded Resources within the APE

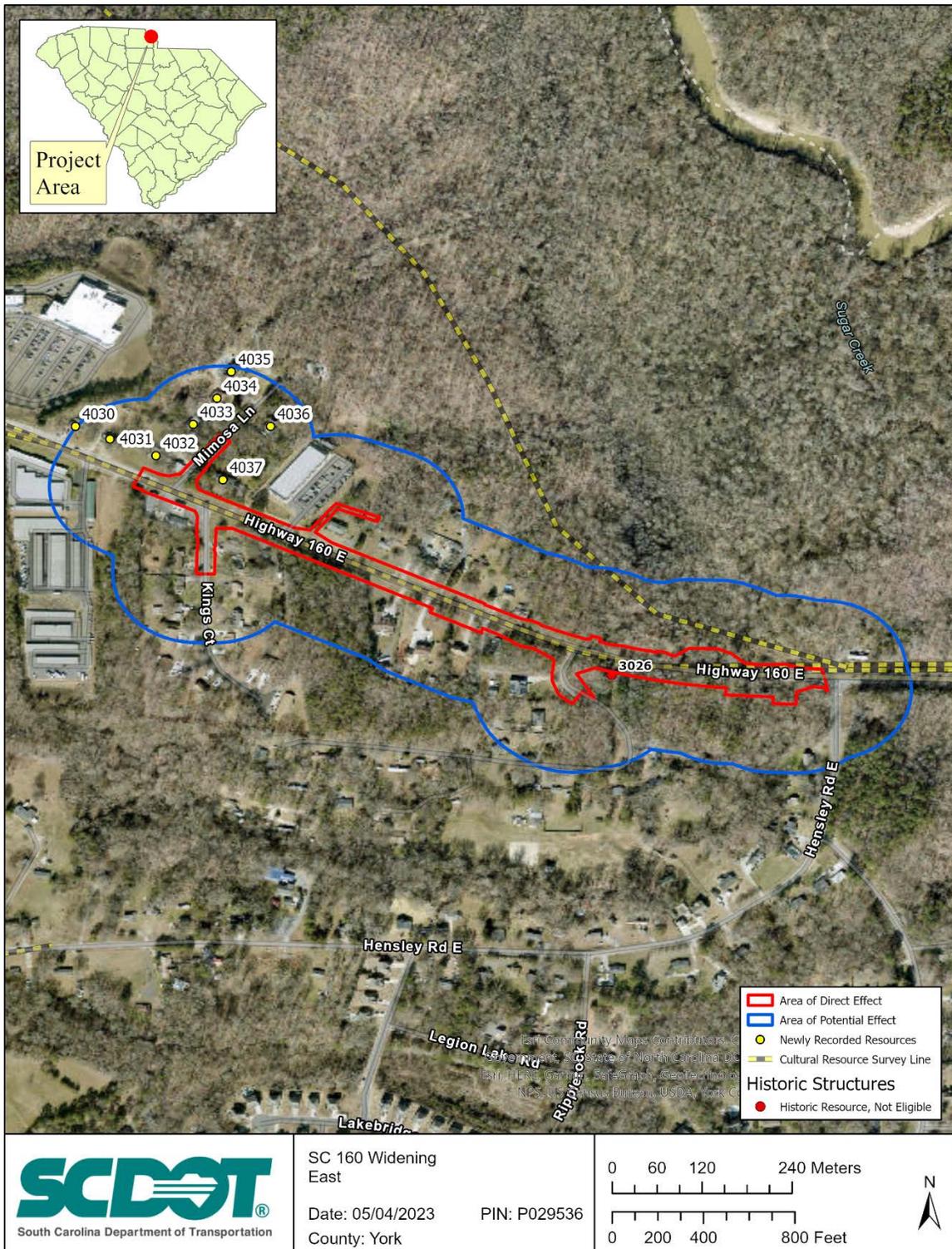


Figure 3. SHPO Site Number 4030



Figure 4. SHPO Site Number 4031



Figure 5. SHPO Site Number 4032



Figure 6. SHPO Site Number 4033



Figure 7. SHPO Site Number 4034



Figure 8. SHPO Site Number 4035



Figure 9. SHPO Site Number 4036



Figure 10. SHPO Site Number 4037



Figure 11. SHPO Site Number 4037, Eastern Elevation





South Carolina
Department of Transportation

June 26, 2007

MULT
#9063
NHPA

RECEIVED

JUN 28 2007

SC Department of
Archives & History

Ms. Mary W. Edmonds
Deputy State Historic Preservation Officer
South Carolina Department of Archives and History
8301 Parklane Road
Columbia, South Carolina 29223-4905

RE: Cultural Resource Reconnaissance Survey of the SC Route 160 Phase II Widening Project,
Lancaster and York Counties. File No.: 29.031125A PIN: 31125

Dear Ms. Edmonds:

The Department has completed a cultural resources survey of the above referenced project. Three copies of the report are enclosed for your review and comment.

The cultural resources survey resulted in the identification of one archaeological site (38LA568) and one historic architectural resource (Resource # 91-3026). Archaeological site 38LA568 represents a low-density lithic scatter that is recommended not eligible for listing in the National Register of Historic Places. Architectural Resource #91-3026 is a 1940s era house recorded in York County. The building contains no significant architectural features and is recommended not eligible for listing in the National Register of Historic Places. In summary, no historic properties will be affected by the proposed project. No additional investigations are recommended.

In accordance with the memorandum of agreement approved by the Federal Highway Administration, March 16, 1993, the Department is providing this information as agency official designee, as defined under 36 CFR 800.2, to ensure compliance with Section 106 of the National Historic Preservation Act.

It is requested that you review the enclosed material and, if appropriate, indicate your concurrence in the Department's findings, thus completing the Section 106 consultation process. Please respond within 30 days if you have any objections or if you have need of additional information.

Sincerely,

Chad C. Long
Archaeologist

CCL:ccl

Enclosures: 3 reports and 1 Survey Card

I (~~do not~~) concur in the above determination.

Signed: SCDAH Date: 6/28/07
DOT Project Coordinator

cc: Wenonah Haire, Catawba Indian Nation
Shane Belcher, FHWA
Keith Derting, SCIAA
Ed Frierson, Environmental Management

Post Office Box 191

Phone: (803) 737-2314

Columbia, South Carolina 29202-0191

TTY: (803) 737-3870

AN EQUAL OPPORTUNITY/
AFFIRMATIVE ACTION EMPLOYER

APPENDIX K

Lancaster SC Route 160 Initial Scoping Review Minutes

Date: March 7, 2003 at 10:00 a.m.

Place: SCDOT Headquarter, 5th Floor Auditorium

Attendees:

Wilson Elgin, SCDOT Program Dev.

Kenneth Wilson, SCDOT Lancaster RCE

Wayne Corley, SCDOT Hydrology

Sammy Jackson, SCDOT Surveys

Greg Shaw, SCDOT Dist. 4 Traffic Engr.

Patrick Tyndall, FHWA

Peter Yeh, SCDOT Road Design

Nick Rad, SCDOT Traffic Engr.

Ed Eargle SCDOT Road Design

Macie Gresham, SCDOT Right-of-way

John Gardner, SCDOT Planning

Greg Rickard, SCDOT Utilities

Maria Votava, SCDNR

Charlie Smoak, SCDOT Hydrology

Scott Davenport, SCDOT Cost Est.

Ed Frierson, SCDOT Environmental

Catherine Blackwell, FHWA

Dipak Patel, SCDOT Traffic Engr.

Phillip Bowers, SCDOT Rd. Design

Warren Davis, SCDOT Prel. Design

Blanche Sproul, SCDOT Environ.

Sid Bacchus, SCDOT Program Dev.

PM Elgin explained that the project was introduced by the Catawba COG as a project that would be a partial replacement of the Clover Bypass (a project that was eliminated from their program). It was noted that the Catawba COG asked for cost estimates for both a three-lane section and a five-lane section, but preliminary indications were that a three-lane section is desired. It was noted that plans would be developed in-house, rather than through the use of CRM or consultants.

Issues were discussed as prescribed by Engineering Directive Memorandum PC-33 and were as follows:

1. **Project Need** was discussed in detail. Traffic projections were noted on the agenda (2025 ADT – 15,000 or 11,360 depending on the model used) and discussed. The team recommended that a five-lane section be favored over a three-lane section to meet future traffic needs. It was also noted that should a three-lane section be built, that right of way be preserved for a full five-lane curb and gutter section. PM Elgin noted that costs could be prohibitive based on the potential funds that might be available. It was recommended that a five-lane section be built from US 521 easterly as far as financially feasible, with the remainder being constructed as a three-lane ditch section, graded for a future five-lane curb and gutter section.
2. **Termini** - The proposed limits of the project are from Sugar Creek to US521. Patrick Tyndall noted that for environmental purposes, the document should cover from the creek back into York County up to where the proposed Fort Mill Bypass would intersect. The creek is not a logical terminus per the regulations.

3. **Mapping/Surveying** – Sammy Jackson noted that it would be 3-4 months before a survey could begin, and that approximately three months would be required to complete it.
4. **Typical Section** – Team recommended the following:
 - Three-lane ditch section (graded for future five lanes) from Sugar Creek to near Wire plant
 - Five-lane curb and gutter section from near the Wire plant to US 521
 - Four foot bike lanes for the entire length of project
 - Sidewalks for the entire curb and gutter section, both sides
5. **Horizontal/Vertical Issues** – PM Elgin noted that no major grade changes would be required due to design issues. Team noted that significant cut and fills (substantial earthwork) would be required to construct the project.
6. **Environmental** – It was noted that potential wetlands and archeological sites would be encountered. Blanche Sproul noted that an Environmental Assessment would be required for this project. She recommended early public involvement on this project would be of benefit. Also, she noted that several large Oaks and Pines along the project may be impacted and could be cause for public concern. Finally, it was noted that at least one church and a fire station could be impacted by the project.
7. **Drainage** – It was noted that no major drainage crossings occurred on this project, except for Sugar Creek.
8. **Utilities/SUE** - Greg Rickard noted that utility relocations could impact the project costs. He would review the project to determine if SUE would be recommended.
9. **Bridge** – PM Elgin noted that the bridge over Sugar Creek was replaced in 1998 and that he would not want to impact this bridge with this project.
10. **Right-of-way** – Team recommended buying right-of-way for a five-lane section due to escalating property costs in the area.
11. **Other discussion** included whether or not breakdowns of traffic projections were needed (no, per Greg Shaw), effects of the Dave Lyle Boulevard and Fort Mill Bypass to this project, and truck traffic. Traffic Engineering provided a written copy of their recommendations after the meeting. (These have been scanned in and included for information.)

APPENDIX L



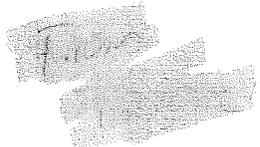
South Carolina
Department of Transportation

MEMORANDUM

TO: Shane Belcher, FHWA Environmental Coordinator
FROM: Edward W. Frierson, NEPA Coordinator Midlands Region
DATE: August 23, 2012
RE: SC-160 (Fort Mill Highway) Validation of Scoping Meetings Data
Lancaster and York Counties
File: 29.031125A Pin: 31125 RD01

As an attendee of the meetings in 2003 and after reviewing the summaries in this appendix, I can confirm that the information contained therein is still valid.

①



SC 160 from US 521 to York County line, Lancaster County
Initial Project Review
2/28/03

In addition to existing commercial and residential developments, additional developments are currently underway along SC 160. The developments consist of various numbers of subdivisions, a planned mixed-use development and a future business park. Based on the current traffic volume, we recommend providing a three-lane section for this segment of SC 160. The proposed three-lane section can then be tied into the existing three-lane section in York county side of the SC 160. This will add approximately an additional 1000ft. to the project.

The current lane arrangements for the approach of SC 160 to US 521 are a shared through and left turn lane, and double right turn lanes. As was observed during the field review, currently, the inside right turn lane is not being utilized as intended. A traffic count needs to be done at this intersection in order to analyze this intersection to obtain an optimum design.

Provide offset left turn lanes for vehicles making left turn onto SC 160 from US 521.

Due to heavy truck movements at the intersection of SC 160 and US 521 recommend designing the intersection for WB-62 trucks.

The free flow right turn lane's (from SC 160 to US 521) acceleration lane is dropped as the driveway for Texaco Gas Station about 100ft. from the intersection. The acceleration lane should be extended as required by Design Manual.

S-64 is too close to the intersection of SC 160 and US 521. We recommend realigning this road. S-64 can be tied into US 521 behind the Citgo Gas Station.

Due number of churches and subdivisions along this project we recommend providing sidewalks.

NVR

2/3/05
Mr W/ROB B, LOOKED AT ALTS TO
TIE S-64 ON SC 160 FURTHER DOWN,
700' MIN AND ALIGN W/ DEVELOPMENT
IF POSSIBLE.

2

29

Lancaster SC Route 160 Initial Scoping Review Minutes

Date: March 7, 2003 at 10:00 a.m.

Place: SCDOT Headquarter, 5th Floor Auditorium

Attendees:

Wilson Elgin, SCDOT Program Dev.
Kenneth Wilson, SCDOT Lancaster RCE
Wayne Corley, SCDOT Hydrology
Sammy Jackson, SCDOT Surveys
Greg Shaw, SCDOT Dist. 4 Traffic Engr.
Patrick Tyndall, FHWA
Peter Yeh, SCDOT Road Design
Nick Rad, SCDOT Traffic Engr.
Ed Eargle SCDOT Road Design
Macie Gresham, SCDOT Right-of-way
John Gardner, SCDOT Planning

Greg Rickard, SCDOT Utilities
Maria Votava, SCDNR
Charlie Smoak, SCDOT Hydrology
Scott Davenport, SCDOT Cost Est.
Ed Frierson, SCDOT Environmental
Catherine Blackwell, FHWA
Dipak Patel, SCDOT Traffic Engr.
Phillip Bowers, SCDOT Rd. Design
Warren Davis, SCDOT Prel. Design
Blanche Sproul, SCDOT Environ.
Sid Bacchus, SCDOT Program Dev.

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6. **Environmental** – It was noted that potential wetlands and archeological sites would be encountered. Blanche Sproul noted that an Environmental Assessment would be required for this project. She recommended early public involvement on this project would be of benefit. Also, she noted that several large Oaks and Pines along the project may be impacted and could be cause for public concern. Finally, it was noted that at least one church and a fire station could be impacted by the project.
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3

3

Dillon, Brent S

From: Dillon, Brent S
Sent: Thursday, June 16, 2005 10:56 AM
To: Lacy, Christopher R.
Cc: Patel, Dipak
Subject: RE: SC 160 Lancaster County

The location of LPA's transition is fine with Dipak and I. It extends the 5 lane to include more of the existing development.

Brent

-----Original Message-----

From: Lacy, Christopher R.
Sent: Thursday, June 16, 2005 10:11 AM
To: Dillon, Brent S
Cc: Patel, Dipak
Subject: FW: SC 160 Lancaster County

Brent,

Please find attached a DGN file that LPA designed for SC 160 in Lancaster County. LPA proposed to transition from 5 to 3 lanes west of Old Bayles Road (S-349), an area different from what we discussed. What is your opinion on their proposal?

Thanks for your input.

Chris

<< File: LPA_040805.dgn >>

-----Original Message-----

From: Spencer, Karen S.
Sent: Wednesday, June 15, 2005 10:52 AM
To: Lacy, Christopher R.
Subject: RE: SC 160 Lancaster County

Please have them review the design from Lancaster County (LPA) and see if that point is feasible for the transition.

-----Original Message-----

From: Lacy, Christopher R.
Sent: Wednesday, June 15, 2005 9:22 AM
To: Spencer, Karen S.
Subject: FW: SC 160 Lancaster County

Karen,

I requested traffic give me input on where to drop the 5 lane section and they provided the information below. As we discussed earlier, this is different from all designs to date.

Chris

-----Original Message-----

From: Dillon, Brent S
Sent: Tuesday, June 14, 2005 8:21 AM
To: Patel, Dipak; Lacy, Christopher R.
Subject: RE: SC 160 Lancaster County

Chris,

We recommend dropping from 5 to 3 lanes between S-157 and S-336. However, the transition should not occur until after the fire station on SC-160. The best section is shown in the attached photo graph with the lane drop occurring between the subdivision drive (beside the car) toward the camera. My back was to the S-336 intersection.

Let me know if this is confusing and I'd be happy to come down and show you.

Brent

<< File: RIMG1612.JPG >>

-----Original Message-----

From: Lacy, Christopher R.
Sent: Monday, June 13, 2005 4:12 PM
To: Patel, Dipak
Subject: SC 160 Lancaster County

Dipak,

Sorry for the loaded question, but based on traffic, where do you recommend we drop from 5 lanes to a 3 lane section on SC 160 between US 521 and Sugar Creek. We proposed a pretty long 5 lane section but the County is recommending dropping 2 lanes soon after Possum Hollow Road (S-29-157).

Let me know if you want to meet and discuss.

Chris
7-1419

Tracking:

Recipient

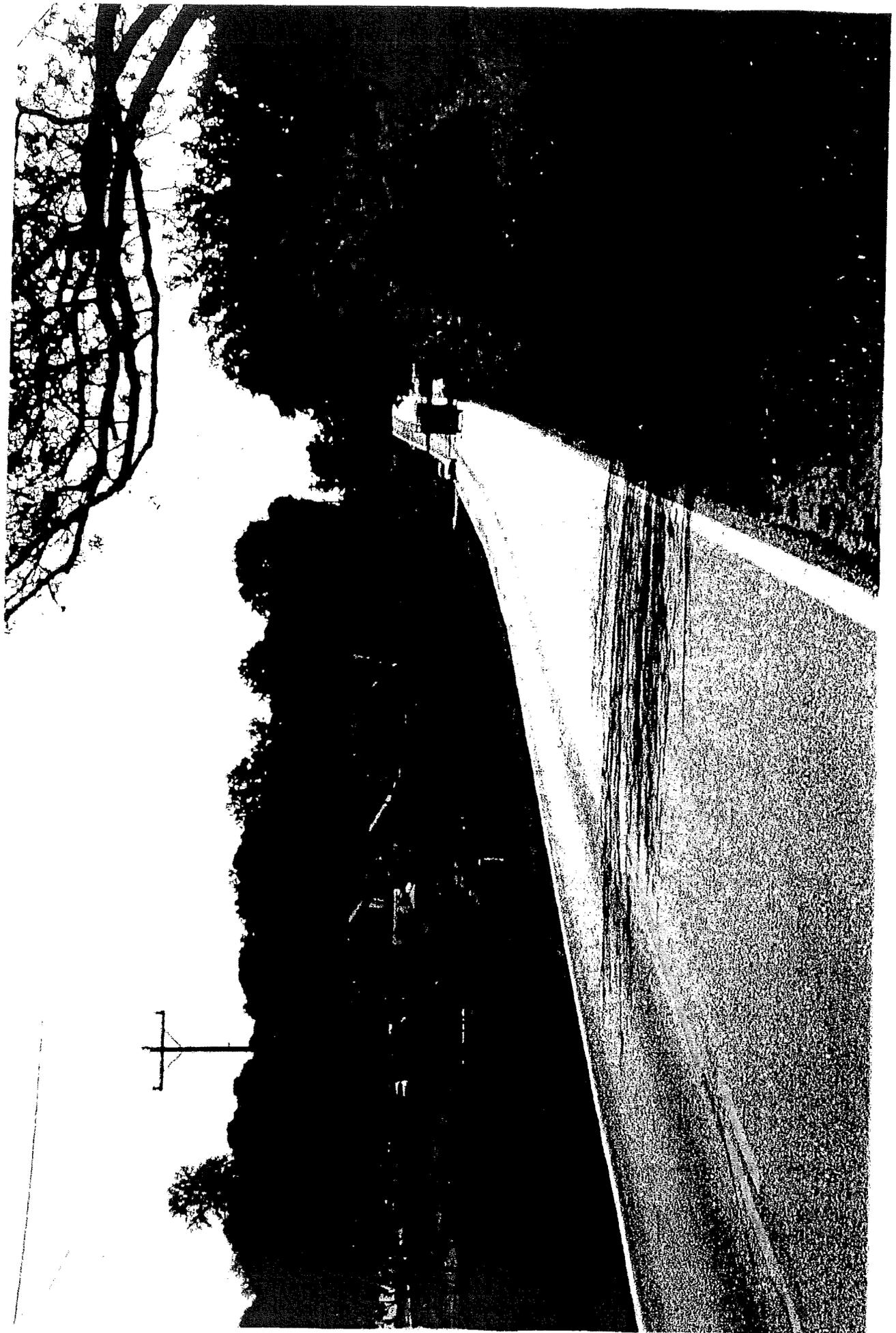
Lacy, Christopher R.

Patel, Dipak

Read

Read: 6/16/2005 11:00 AM

Read: 6/16/2005 11:36 AM





County/MPO: Lancaster	Project No.:	File No.:	Federal-Aid No.:
Project Description: SC 160 Widening outside of Fort Mill to the U.S. 521 intersection			
Subject: Initial scoping field review			
Review Made By: Patrick Tyndall & Shane Belcher			Date: March 24, 2003

In attendance:

Shane Belcher	FHWA
Patrick Tyndall	FHWA
David Kelly	SCDAH
Maria Votava	SCDNR
Ed Frierson	SCDOT

A field review was made to determine any major environmental obstacles that may be potentially impacted by this project. A decision has not been made whether to widen SC 160 to 3 lanes or 5. It was noted by FHWA that a more logical termini for the project would be at the signalized intersection in front of the Food Lion. This intersection was thought to be where the future Fort Mill Bypass will connect. By extending the termini, (from Sugar Cr. To the Food Lion) 0.8 mi would be added to the project. This would also place the project in Lancaster & York Counties.

DNR suggested that if SC 160 needed to be widened in the vicinity of Sugar Cr., the widening should occur to the North. A survey should also be conducted to identify any occurrences or habitat for the GA Aster & Schweinitz's sunflower. An un-named tributary to Sugar Cr. was also identified during the review and a culvert currently carries the small stream under SC 160. DNR suggested that if SC 160 was widened in this area, stream channel changes should be avoided and that they preferred the culvert to be extended rather than replacing the existing culvert with pipe. An abandoned railroad bed was also noted at this location.

No historical structures appeared to be present during the review. The only site that was noted that could possible be of importance was a collapsed home site, located in a grove of pecan trees, that may have the potential for cultural artifacts.

Several businesses such as old garages were noted along the project that may have the potential for hazardous materials.

A very large residential development was being constructed along the project and a proposed industrial/commercial park appeared to be planned for that area also. Several large oak and pecan trees were noted in that area and it would be desirable to preserve those trees.

Bicyclists were observed on SC 160 during the review.

Wilson Elgin is the SCDOT Program Manager for this project.

APPENDIX M

Frierson, Ed W

From: Long, Chad C.
Sent: Wednesday, August 22, 2012 4:39 PM
To: Frierson, Ed W
Subject: SC 160 Widening Lancaster/York County

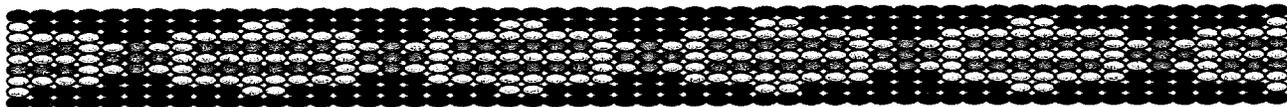
Ed,

As long as the APE has not expanded since the time that the initial survey took place, the SHPO and THPO concurrence letters are still valid for the SC 160 widening project in Lancaster/York Counties.

Chad C. Long
NEPA Coordinator/Archaeologist
South Carolina Department of Transportation

955 Park Street, Room 519
Columbia, South Carolina 29202
(803) 737-1396
Longcc@scdot.org

Catawba Indian Nation
Tribal Historic Preservation Office
P. O. Box 750
Rock Hill, South Carolina 29731
803-328-2427 Fax 803-328-5791



29 June 2007

Attention: Mr. Chad Long
SCDOT
PO Box 191
Columbia, South Carolina 29202-0191

Re. THPO #	Project / Site #	Project Description and location
2007-66-25	File 29.031125A PIN 31125	Cultural Resource Reconnaissance Survey of SC Rt. 160 Phase II Widening Project, Lancaster / York Co, SC

Dear Mr. Long,

The Catawba have no immediate concerns with regard to traditional cultural properties, sacred sites or Native American archaeological sites within the boundaries of the proposed project areas. The Catawba are to be notified if Native American artifacts and / or human remains are located during the construction phase of this project.

If you have questions, please contact Sandra Reinhardt at 803-328-2427 ext. 233, or e-mail (sandrar@ccppcrafts.com).

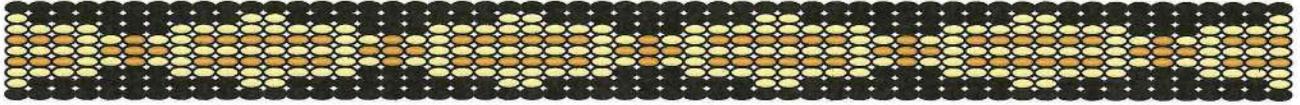
Sincerely,

Sandra Reinhardt for

Wenonah G. Haire
Tribal Historic Preservation Officer

Catawba Indian Nation
Tribal Historic Preservation Office
1536 Tom Steven Road
Rock Hill, South Carolina 29730

Office 803-328-2427
Fax 803-328-5791



May 20, 2011

Attention: Edward W. Frierson
SCDOT
Po. Box 191
Columbia, SC 29202-0191

Re. THPO #	TCNS#	Project Description
2011-66-32		Proposed Widening of SC Route 160 from Road S-157 to Springfield Parkway just east of the City of Fort Mill in Lancaster and York Counties, SC

Dear Mr. Frierson,

The Catawba will need to see the Cultural Resources Survey before we can comment due to the sensitive nature of this area. Thanks.

If you have questions please contact Caitlin Totherow at 803-328-2427 ext. 226, or e-mail caitlinh@ccppcrafts.com.

Sincerely,

Wenonah G. Haire
Tribal Historic Preservation Officer





South Carolina
Department of Transportation

The United Keetoowah Band of Cherokee Indians in Oklahoma has no objection to the referenced project. However, if any remains, artifacts or other items are inadvertently discovered, please cease construction immediately and contact us at 918-456-6533 or by letter.

April 25, 2011

RECEIVED MAY 3 2011

Lisa LaRue 5-12-11
Lisa C. Stopp, Tribal NAGPRA POC Date

George Wickliffe
Tribal Historic Preservation Office
United Keetoowah Band of Cherokee
18623 West Keetoowah Circle
Tahlequa, OK 74464

The United Keetoowah Band of Cherokee Indians in Oklahoma has no objection to the referenced project. However, if any remains, artifacts or other items are inadvertently discovered, please cease construction immediately and contact us at 918-456-6533 or by letter.

Lisa LaRue 5-12-11
Lisa C. Stopp, Tribal NAGPRA POC Date

RE: Proposed Widening of S.C. Route 160 from Road S-157 (Possum Hollow Rd.) to Springfield Parkway just east of the City of Fort Mill in Lancaster and York Counties, South Carolina, PIN 31125RD01, File No. 29.031125A

Dear Mr. Wickliffe:

The South Carolina Department of Transportation (SCDOT) proposes to widen the existing two-lane ditch section of S.C. Route 160 to a five lane curb and gutter section with a 15-foot paved median/turn lane and five-foot sidewalks from west of Road S-157 (Possum Hollow Road) to the bridge over Sugar Creek where the road will taper to two lanes. From just west of the bridge to Springfield Parkway the roadway would be widened to a three-lane curb and gutter section. Most of the widening would occur symmetrically about the existing centerline. The three-lane section would include one 12-foot travel lane in each direction with a 15-foot paved median/turn lane and five-foot sidewalk. The existing bridge over Sugar Creek would not be replaced. All side streets would have their turning radii and sight triangles improved to accommodate safer left and right turns.

New right of way would vary from a maximum of 12.5 additional feet on each side of the roadway. This would provide a maximum of 100 feet around the existing centerline. The project area for the widening extends approximately 3.5 miles in length. Land use throughout this segment is predominantly residential with some scattered commercial uses. The project location is depicted on the enclosed figure.

A review of the National Wetland Inventory Mapping (NWI) indicated no wetlands would be impacted, though some minor stream impacts are expected. Although the exact location and extent is not known at this time, U.S. Army Corps of Engineers approved wetland delineation will be obtained. Wetlands will be avoided and impacts minimized as much as practicable during the design of the facility. A cultural resources survey will be performed and submitted to the State Historic Preservation Office for approval. Additionally, in accordance with Section 7 of the Endangered Species Act, a field reconnaissance for federally protected species will be performed and a biological assessment will be prepared for the project. A noise analysis will also be conducted to assess potential noise impacts. Through conformance with



analysis will also be conducted to assess potential noise impacts. Through conformance with Best Management Practices and standard SCDOT procedures during construction, no adverse impacts to the area's air quality or water quality are anticipated.

As an integral part of the environmental process, the SCDOT is soliciting input from agencies and individuals concerning the potential social, economic, and environmental benefits and impacts of the proposed project on the surrounding area. An environmental assessment is being prepared for the proposed project pursuant to the National Environmental Policy Act of 1969, as amended (42 USC4321 et seq.).

The SCDOT looks forward to receiving your comments on the proposed project within 30 days of the receipt of this letter. Comments should be addressed to the following:

Mr. Edward W. Frierson
NEPA Coordinator
South Carolina Department of Transportation
P.O. Box 191
Columbia, S.C. 29202-0191

Should you have any immediate questions, please contact me at (803) 737-1861.

Sincerely,



Edward W. Frierson
NEPA Coordinator – RPG 3

EWf/ewf

cc: Brian Klauk, RPG-3 Program Manager

Attachment



United States Department of the Interior

FISH AND WILDLIFE SERVICE

176 Croghan Spur Road, Suite 200
Charleston, South Carolina 29407



May 10, 2011

Mr. Edward W. Frierson
NEPA Coordinator
S.C. Department of Transportation
P.O. Box 191
Columbia, SC 29202-0191

Re: SC Route 160 Widening, Ft. Mill, York and Lancaster Counties, SC
FWS Log No. 42410-2010-CPA-0248

Dear Mr. Frierson:

The South Carolina Ecological Services Field Office for the U.S. Fish and Wildlife Service (Service) received your request for comments on the proposed improvements to SC Route 160 in Lancaster and York Counties, SC. The South Carolina Department of Transportation (SCDOT) proposes to widen SC 160 from Springfield Parkway in York County to S-157 (Possum Hollow Road in Lancaster County). The improved roadway will vary in width from three to five lanes. SCDOT is seeking preliminary comments in preparation of an environmental assessment pursuant to the National Environmental Policy Act of 1969.

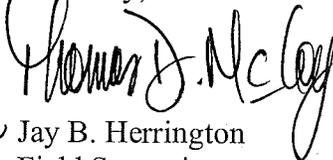
Without specific information regarding proposed alignments, bridge construction methods or culvert replacement plans, the Service cannot readily address specific project impacts. However, while these projects are in the planning stages, the Service recommends SCDOT seek the least damaging alignments through avoidance of wetlands where possible and increasing replacement bridge lengths to the maximum extent possible.

The Service recommends SCDOT survey along the entire project corridor for the presence of the Schweinitz's sunflower, *Helianthus schweinitzii*. The sunflower is found in Lancaster and York Counties and is commonly associated with mechanically maintained road shoulders. Habitat characteristics along the corridor of this roadway indicate potentially suitable habitat and may harbor sunflower populations.

Further, the project corridor is located within the slate belt region of South Carolina characterized by rocky outcrops which are particularly noticeable along stream banks. Rocky outcrops, and other features, serve as indicators for potential habitat for the endangered Carolina heelsplitter, *Lasmigona decorata*. Therefore, the Service recommends SCDOT perform an assessment for each of the stream crossings along the SC Route 160 to determine if they may be considered suitable habitat for the heelsplitter. If suitable habitat does exist, we recommend SCDOT perform an in-water survey to determine the presence of this critically endangered mussel.

The Service appreciates the opportunity to provide input at this early stage of the project's development. If you have any questions regarding our comments, please do not hesitate to contact Mark Caldwell of the S.C. Ecological Services Field Office at (843) 727-4707 ext. 215.

Sincerely,


for Jay B. Herrington
Field Supervisor

JBH/MAC

South Carolina

Department of Parks, Recreation & Tourism

May 13, 2011

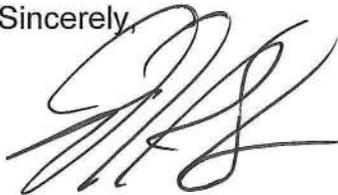
Mr. Edward W. Frierson
NEPA Coordinator, SCDOT
SC Department of Transportation
PO Box 191
Columbia, SC 29202-0191

Re: SC-160 Widening Project
PIN: 31125RD01
File No. 29.031125A

Dear Mr. Frierson:

The South Carolina Department of Parks, Recreation and Tourism has no comments or concerns pertinent to your project at this time. Thank you for the opportunity to review and comment on this and other projects that could possibly affect existing and/or planned recreational facilities.

Sincerely,



David R. Simms, P.E.
Chief of Engineering and Construction

cc: Phil Gaines





REPLY TO
ATTENTION OF

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

May 4, 2011

Regulatory Division

Mr. Edward Frierson
NEPA Coordinator-RPG3
South Carolina Department of Transportation
955 Park Street, P.O. Box 191
Columbia, South Carolina 29202

Dear Mr. Frierson:

This is in response to your request for agency comments to assist your preparation of the Environmental Assessment for the proposed widening of an approximately 3.3 mile portion of SC-160 from S-157 (Possum Hollow Road) west across Sugar Creek to the intersection of SC-160 and Springfield Parkway (SCDOT PIN 31125 RD01) in York and Lancaster Counties, South Carolina. It is the Corps understanding that a portion of this project (from Possum Hollow Road to just west of the existing bridge across Sugar Creek, the roadway will be widened to a five lane section. Then from the area west of the existing SC-160 Bridge across Sugar Creek to the Springfield Parkway, the roadway will be widened to a three lane section. The project location is depicted on a map prepared by the Corps based upon your project description.

Based upon a review of submitted information, along with soils maps, NWI maps, aerial photographs, it appears that the project may impact waters of the U.S., including wetlands, associated with Sugar Creek and tributaries to Sugar Creek. For this reason, it is strongly suggested that you conduct the wetland delineation in the areas where the proposed project may occur. Once the delineation is complete, a jurisdictional determination request should be submitted to our office with appropriate supporting information. Please be aware that a Department of the Army permit will be required pursuant to Section 404 of the Clean Water Act if the project involves discharges of dredged or fill material into waters of the U.S, including wetlands.

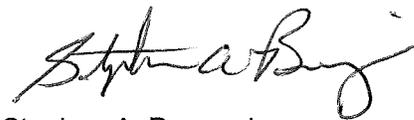
Furthermore, please note that a decision whether to issue a permit will be based on an evaluation of the probable impacts of your project, including cumulative impacts of the proposed activity, and will include the application of guidelines promulgated by the Administrator of the Environmental Protection Agency in conjunction with the Secretary of the Army under authority of Section 404(b) of the Clean Water Act. "Subpart B - Compliance with the Guidelines" [40 CFR 230.10.(a), (a)(1), (a)(2), and (a)(3)] states that:

"(a) Except as provided under Section 404(b)(2), no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences."

For this reason, the Corps encourages your office to closely evaluate alternatives with regard to impacts to the aquatic ecosystem. If the proposed project will be entirely constructed in uplands and will not involve work in a Navigable Water of the United States, nor will it entail the placement of fill material in wetlands/waters of the United States, a Department of the Army permit would not be required. Otherwise, a Department of the Army permit will be required pursuant to Section 404 of the Clean Water Act if the project involves discharges of dredged or fill material into waters of the U.S, including wetlands.

If you have further questions concerning this matter, please feel free to contact me at 803-253-3445. I would be happy to coordinate and provide additional comments as the project develops further. In future correspondence concerning this matter, please refer to SAC 2011-00476-DJS.

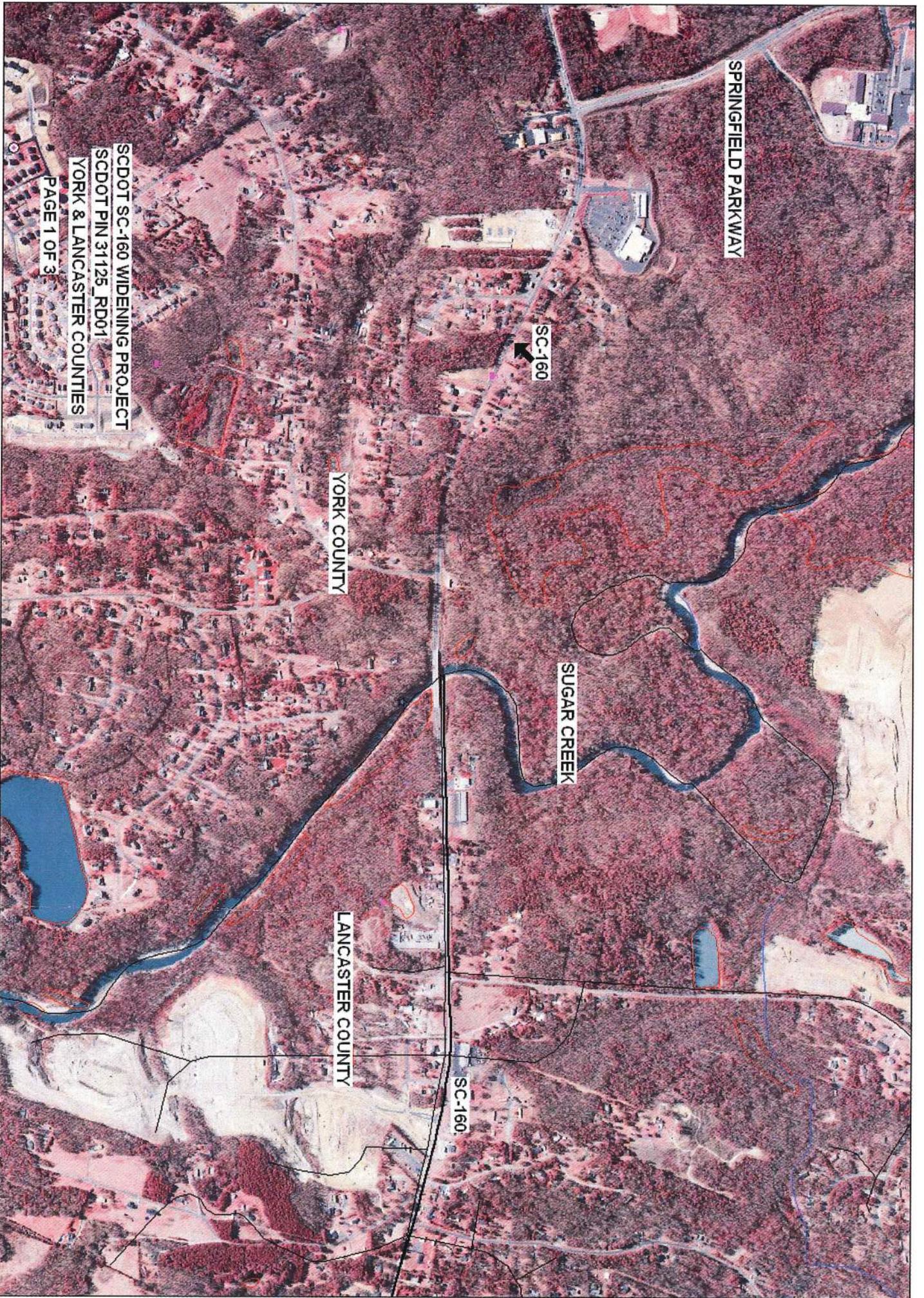
Sincerely,

A handwritten signature in black ink, appearing to read "Stephen A. Brumagin". The signature is fluid and cursive, with a large initial "S" and "B".

Stephen A. Brumagin
Project Manager, Special Projects Branch

Copy Furnished:

Ms. Heather Robbins, AICP
NEPA Manger
S.C. Department of Transportation
955 Park Street, P.O. Box 191
Columbia, South Carolina 29202-0191



SPRINGFIELD PARKWAY

SC-160

YORK COUNTY

SUGAR CREEK

LANCASTER COUNTY

SC-160

SCDOT SC-160 WIDENING PROJECT
SCDOT PIN 31125_RD01
YORK & LANCASTER COUNTIES

PAGE 1 OF 3



YORK
COUNTY

SUGAR CREEK

LANCASTER COUNTY

BARBERVILLE ROAD

SC-160

SCDOT SC-160 WIDENING PROJECT
SCDOT PIN 31125_RD01
YORK & LANCASTER COUNTIES
PAGE 2 OF 3

OLD BAILLES ROAD

SC-160



BOARD:
Paul C. Aughtry, III
Chairman
Edwin H. Cooper, III
Vice Chairman
Steven G. Kisner
Secretary



C. Earl Hunter, Commissioner

Promoting and protecting the health of the public and the environment

BOARD:
Henry C. Scott
M. David Mitchell, MD
Glenn A. McCall
Coleman F. Buckhouse, MD

May 3, 2011

S. C. Department of Transportation
Attn: Mr. Edward Frierson
C/O Randall Williamson
Environmental Management Office, Room 509
955 Park Street
P. O. Box 191
Columbia, SC 29202-0191

Re: Proposed Widening of S.C. Route 160 in Lancaster and York Counties, South Carolina.
PIN: 31125RD01, File No. 29.031125A

Dear Mr. Frierson:

The South Carolina Department of Health and Environmental Control (SCDHEC) is providing comments regarding potential environmental impacts of the above project, as requested in your letter dated April 25, 2011. As you are aware, SCDHEC's Bureau of Water administers applicable regulations pertaining to water quality standards and classifications, including wetland protection, in accordance with the South Carolina Pollution Control Act, the Federal Clean Water Act, the State Stormwater Management and Sediment Reduction Act, Construction in Navigable Waters Permitting, and associated regulations for all of these statutes.

The proposed project would consist of widening SC-160 from Road S-157 (Possum Hollow Rd) to Springfield Parkway just east of the City of Fort Mill in Lancaster and York Counties. The existing 2-lane road would be widened to 5-lanes with curb and gutter as well as a 15-foot paved median/turn lane and 5-foot sidewalk from west of Road S-157 (Possum Hollow Rd.) to the bridge over Sugar Creek, where the road will taper to 2 lanes. From just west of the bridge to Springfield Parkway the roadway would be widened to 3-lanes with curb and gutter. Most of the widening would occur symmetrically about the existing centerline. The 3-lane section would include a 12-foot travel lane in each direction with a 15-foot paved median/turn lane and a 5-foot sidewalk. The existing bridge over Sugar Creek would not be replaced. All side streets would have their turning radii and sight triangles improved to accommodate safer left and right turns. Presumably the project is needed to reduced traffic congestion and improve safety along the roadway.

The following comments are provided as input concerning environmental impacts of the proposed project to aid in the preparation of an Environmental Assessment (EA) in accordance with regulations of the Federal Highway Administration and National Environmental Policy Act.

Based on National Wetland Inventory Mapping (NWI) it does not appear that the project would impact wetlands, although some minor stream impacts are expected. A wetland delineation will be needed to identify any jurisdictional impacts. SCDHEC recommends efforts be made to minimize impacts to streams, wetlands and water quality when planning and constructing this project. Such efforts could include enlarging or adding to existing culverts to accommodate bank-full rain events, improve hydrologic flows and aquatic life passage. In addition, reducing road widths by utilizing 2:1 slopes and/or reducing median widths or shifting alignments in sensitive areas may minimize aquatic impacts. Finally, the use of best management practices to minimize sediment migration during construction, as well as other post construction stormwater management practices will minimize water quality impacts.

SCDHEC will review any additional information provided in the EA, including a thorough description (and quantification) of the stream and wetland resources that will potentially be impacted by the

Page 2
May 3, 2011
Edward Frierson

proposed project, if applicable. The EA will also include an alternatives analysis, which addresses stream and wetland impact avoidance and minimization, in addition to other factors. The above information will be useful in making a decision regarding 401 Water Quality Certification (Certification) administered by SCDHEC's Division of Water Quality. If required, the Certification may be conditioned to address specific modifications and measures that would be required to further reduce wetland and water quality impacts after a review of detailed project drawings. Also, a final mitigation plan addressing unavoidable wetland/stream impacts must be reviewed and approved by SCDHEC during the certification process.

In addition to the aforementioned Certification, the proposed work must be in compliance with State Sediment and Erosion Control and NPDES MS4 stormwater permitting requirements administered by the Bureau of Water.

Finally, please ensure that all other necessary environmental permits for this project are obtained in accordance with applicable State and Federal regulations. If you have not done so already, please contact the Bureau of Air Quality and the Bureau of Land and Waste Management for input regarding those program areas' assessments of this proposed project.

Please call me at 898-4179 if you have any questions.

Sincerely yours,



Mark Giffin, Project Manager
Water Quality Certification and Wetlands Section

cc: Heather Preston
Chuck Hightower
Jill Stewart
Myra Reece (BAQ)
Daphne Neel (BLWM)
EQC Region 4



Nikki R. Haley
Governor

SOUTH CAROLINA
DEPARTMENT OF COMMERCE

Robert M. Hitt, III
Secretary

April 29, 2011

Mr. Edward W. Frierson
NEPA Coordinator, SCDOT
Post Office Box 191
Columbia, SC 29201

Dear Mr. Frierson:

Thank you for the opportunity to participate in the environmental review process for the proposed widening of S.C. Route 160 from Road S-157 (Possum Hollow Rd.) to Springfield Parkway just east of the City of Fort Mill in Lancaster and York Counties. You may be aware that our agency has previously worked with Mark Pleasant, Chief of Statewide Planning with SCDOT, to evaluate and score road projects such as these as a part of the initial SCDOT process. Our review is based solely on the projects potential economic development impact. This partnership was established in 2007 and appears to be working very well for both SCDOT as well as the Department of Commerce.

Please feel free to let us know if you require any additional discussion regarding the proposed project. We will be happy to assist.

Sincerely,

A handwritten signature in black ink, appearing to read "Maceo Nance", written over a horizontal line.

Maceo Nance, Director
Community & Rural Planning and Development

APPENDIX N

MEMORANDUM

TO: Brian Klauk, Program Manager, RPG 3
FROM: Brent Dillon, State Traffic Design Engineer
DATE: April 18, 2012
RE: SC-160 (Fort Mill Highway) Traffic Analysis
 Environmental Supplement Analysis
 York and Lancaster Counties
 File: 29.031125A Pin: 31125 RD01

Traffic Engineering Design Review performed a traffic analysis for the Fort Mill Highway widening project in Lancaster and York Counties. The data presented herein serves as a supplement to facilitate completion of the Environmental Documentation process. The results of the analysis are summarized below.

Existing Conditions

SC-160 is a two lane Rural Minor Arterial that carries approximately 15,100 vehicles per day. There are currently two signals in operation; one at the Hensley Road intersection and the other at the MacMillan Park Drive intersection. Two safety projects are in progress which will add turn lanes at both Hensley Road and Barberville Road.

Construction completion was assumed to occur in 2014, making 2034 the design year. New turning movement counts were conducted at all major intersections. Synchro and SimTraffic were used to model the intersections along the corridor and also estimate travel times and delays for the roadway under simulated conditions.

Table 1 below shows the LOS of the main intersections at the time of the count in December of 2011. The safety projects were not completed when the count was performed.

Table 1: Intersection LOS, 2011 Existing Conditions

Intersection	2011 AM Peak		2011 PM Peak	
	LOS	Delay (s)	LOS	Delay (s)
Hensley Rd	C	24	F	232
Barberville Rd*	D	35	F	97
Reid Pointe*	C	25	E	39
Rosemont/MacMillan	B	11	B	11
Calvin Hall Rd*	D	28	E	38

* Unsignalized. Delay is on side street.

For the purposes of this report, the No Build scenarios will consider the two safety projects completed and in operation. **Table 2** shows the existing conditions scenario with the two safety projects completed.

Table 2: Intersection LOS, Safety Projects Completed

Intersection	2011 AM		2011 PM	
	LOS	Delay (s)	LOS	Delay (s)
Hensley Rd	B	18	B	20
Barberville Rd	A	9	B	10
Reid Pointe*	C	25	E	39
Rosemont/MacMillan	B	11	B	11
Calvin Hall Rd*	D	28	E	38

* Unsignalized. Delay is on side street.

The analysis shows that driveways and unsignalized side streets experience a poor LOS. Most of these side streets are not expected to meet warrants for signalization during the analysis period nor would it be desirable for more signals to be installed along SC-160. Due to the high level of access, a separate section is provided below to discuss access and additional delays.

No Build Analysis

SCDOT's Planning Division provided future AADTs on specified roads which were used to calculate annual growth rates. Annual growth rates on SC-160 vary from 1.2% to 2.8% per year. Hensley and Barberville are projected to grow at 3.6% and 3.4%, respectively.

Kohut Lane, Southwinds Drive, and Valley Lane are residential side streets and are being included in the analysis to demonstrate the delays that occur at driveways and otherwise unsignalized intersections along the analysis corridor. The results of the analysis are summarized in **Table 3** below.

Table 3: Intersection LOS, No Build Analysis (AM/PM)

Intersection	2014		2024		2034	
	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)
Hensley Road	B/C	20/23	C/C	24/29	D/E	53/62
Barberville Road	B/B	15/16	B/C	18/26	C/F	31/105
Reid Pointe*	E/D	38/33	F/F	59/200+	F/F	200+/200+
Kohut Lane*	C/D	19/32	C/F	21/130	F/F	65/200+
Southwinds Drive*	B/D	15/32	C/F	21/83	D/F	27/200+
Valley Road*	C/B	21/15	D/F	29/200+	E/F	40/200+
Rosemont/MacMillan	B/B	11/13	B/C	18/34	D/F	38/129
Calvin Hall Rd*	C/E	25/41	D/F	26/200+	F/F	200+/200+

* Unsignalized. Delay is on side street.

As shown in the Existing Conditions section, HCM calculations for on the unsignalized intersections indicate unacceptable LOS. Supporting these calculations, simulations also show that volumes along SC-160 have already, as of 2011, reached a point where gap times are becoming too short for side street traffic to access SC-160 without excessive delays during the peak hours. Compounding the delays seen on the side streets is that traffic turning left from SC-160 onto the side streets averages approximately 15 seconds of delay during the 2014 PM peak hour which blocks the through movement and causes the queues described earlier. By 2034 left turning traffic becomes large enough to cause a systemic failure along the corridor.

Build Analysis

The current construction plans extend the five lane section from Possum Hollow Road to mid-way between Calvin Hall Road and MacMillan Park Drive, transitioning to a three lane section out to the bridge at the county line.

To improve traffic operations along the corridor and at intersections, a Two-Way Left Turn Lane (TWLTL) is included in the Build design along the entire analysis corridor. An appropriate 15 foot TWLTL will minimize and in most cases prevent queues along SC-160 due to left turning traffic. It will also aid the side street left turns by allowing them to stage their turns as opportunities to cross over/into each direction do not depend on concurrent gaps.

During the course of evaluation, it was determined that the five lane section should be extended to the Rosemont/MacMillan Park intersection. The three lane section would proceed from this intersection to the bridge. **Table 4** below summarizes the results of the analysis.

Table 4: Intersection LOS, Build Analysis (AM/PM)

Intersection	2014		2024		2034	
	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)
Hensley Road	B/C	20/23	C/C	24/29	D/E	53/62
Barberville Road	B/B	17/17	A/C	9/20	C/F	33/105
Reid Pointe*	B/C	14/18	C/F	16/74	C/F	25/78
Kohut Lane*	A/A	8/6	B/C	14/16	C/F	17/200+
Southwinds Drive*	A/A	7/8	B/C	11/19	B/F	12/200+
Valley Road*	C/B	16/14	B/F	12/200+	C/F	17/200+
Rosemont/MacMillan	B/B	11/13	B/C	17/34	C/F	28/80
Calvin Hall Rd*	C/C	21/25	C/E	17/39	E/F	46/200+

* Unsignalized. Delay is on side street.

Adding a TWLTL and creating a three lane section improves operations and increases lane efficiency. It does not increase calculated lane capacity but will allow a roadway with considerable access and side street traffic to function better under given volumes.

Results

Simtraffic includes factors such as traffic volumes, roadway geometry, different driver types, and signal timing and phasing to accurately simulate typical trips through a complex roadway section. This is used to evaluate overall performance and calculate a roadway LOS based on the HCM criteria of average travel speeds. Also shown is the total travel time (T_{avg} , in seconds) for each scenario. **Table 5** summarizes these results for Fort Mill Highway.

Table 5: Roadway LOS (AM/PM)

Scenario	2014		2024		2034	
	LOS	T_{avg}	LOS	T_{avg}	LOS	T_{avg}
Eastbound No Build	A/B	229/303	B/C	239/311	C/D	357/1195
Eastbound Build	A/B	236/230	B/B	241/321	B/C	273/751
Westbound No Build	A/A	226/238	A/B	234/277	C/E	363/906
Westbound Build	A/A	224/220	A/A	226/227	C/C	296/324

The analysis indicates that the Build design greatly improves travel times through the corridor and reduces delays on the side streets. Removing the left turning vehicles from the through movement increases both safety and operations. The project will provide a significant benefit to operations on SC-160.

If you have any questions, please feel free to contact Ron Hinson or me.

Ec: Greg Shaw, District Traffic Engineer – District Four
Traffic Design File (Yellow Copy)

Appendix B – Jurisdictional Determination



REPLY TO
ATTENTION OF

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

SG /
RECEIVED

SEP 29 2014

September 24, 2014

Regulatory Division

Environmental Management
SCDOT

Mr. Sean Connolly, Environmental Permitting Manager
South Carolina Department of Transportation
P.O. Box 191, 955 Park Street
Columbia, South Carolina 29202-0191

Dear Mr. Connolly:

This is in response to your letter of August 1, 2014, requesting a Preliminary Jurisdictional Determination (Preliminary) for a 180 acre project area, located on and along approximately 3.4 mile segment of SC-160 from SC-460 (Springfield Parkway) to S-157 (Possum Hollow Road) in York and Lancaster Counties, South Carolina (SCDOT PIN 31125_RD01). The project area is depicted on the enclosed Figures 6-15 entitled "SC 160 Widening from SC 460 (Springfield Parkway) to S-157 (Possum Hollow Road), York and Lancaster Counties, South Carolina, Jurisdictional Waters of the U.S. Map" and dated June 30, 2014. A preliminary jurisdictional determination is used to indicate that this office has identified wetlands or other waters on the property and believes these waters may be jurisdictional waters of the United States. Since the Preliminary does not verify the actual jurisdictional status of wetlands and/or waters of the United States on the property, it relies on the presumption of jurisdiction for the purpose of expediting the request for a Preliminary.

Based on an on an on-site inspection, a review of aerial photography, topographic maps, National Wetland Inventory maps and soil survey information, it has been concluded that the boundaries shown on the referenced Figure 6-15 are a reasonable approximation of the location and boundaries of the waters found on this site. The area in question contains approximately 1,221 linear feet and 0.077 acres of federally defined freshwater wetlands or other waters. This office should be contacted prior to performing any work in or around these wetlands or other waters. In order for a definitive determination to be provided, these areas should be located and marked on-site, sketched or surveyed, platted on a map, and should be accompanied by a request for an Approved Jurisdictional Determination. Upon receipt of such a request, this office can then issue an approved determination as to jurisdiction (rather than the presumption of jurisdiction). You should also be aware that the areas identified as wetlands or other waters may be subject to restrictions or requirements of other state or local government entities.

Please note that since this jurisdictional determination is a Preliminary, it is subject to change and therefore is not an appealable action under the Corps of Engineers administrative appeal procedures defined at 33 CFR 331. If a permit application is forthcoming as a result of this Preliminary, a copy of this letter, as well as the attached sketch or plat should be submitted as part of the application. Otherwise, a delay could occur in confirming that a preliminary jurisdictional determination was performed for the permit project area.

This preliminary jurisdictional determination is a non-binding action and as such has no expiration until it is superseded by an Approved Jurisdictional Determination. If you intend to request an Approved Jurisdictional Determination in the future, you are advised not to commence work in these wetlands and/or waters prior to receiving the Approved Jurisdictional Determination.

In future correspondence concerning this matter, please refer to SAC 2011-00476-DS. You may still need state or local assent. Prior to performing any work, you should contact the South Carolina Department of Health and Environmental Control.

Enclosed are two copies of the Preliminary Jurisdictional Determination Form signed by our office. Please sign both copies, retain one copy for your records and return one signed copy to this office in the enclosed self-addressed envelope.

If you have any questions concerning this matter, please contact Stephen Brumagin at 803-253-3445.

Sincerely,

A handwritten signature in black ink, appearing to read "Travis G. Hughes", written over a horizontal line.

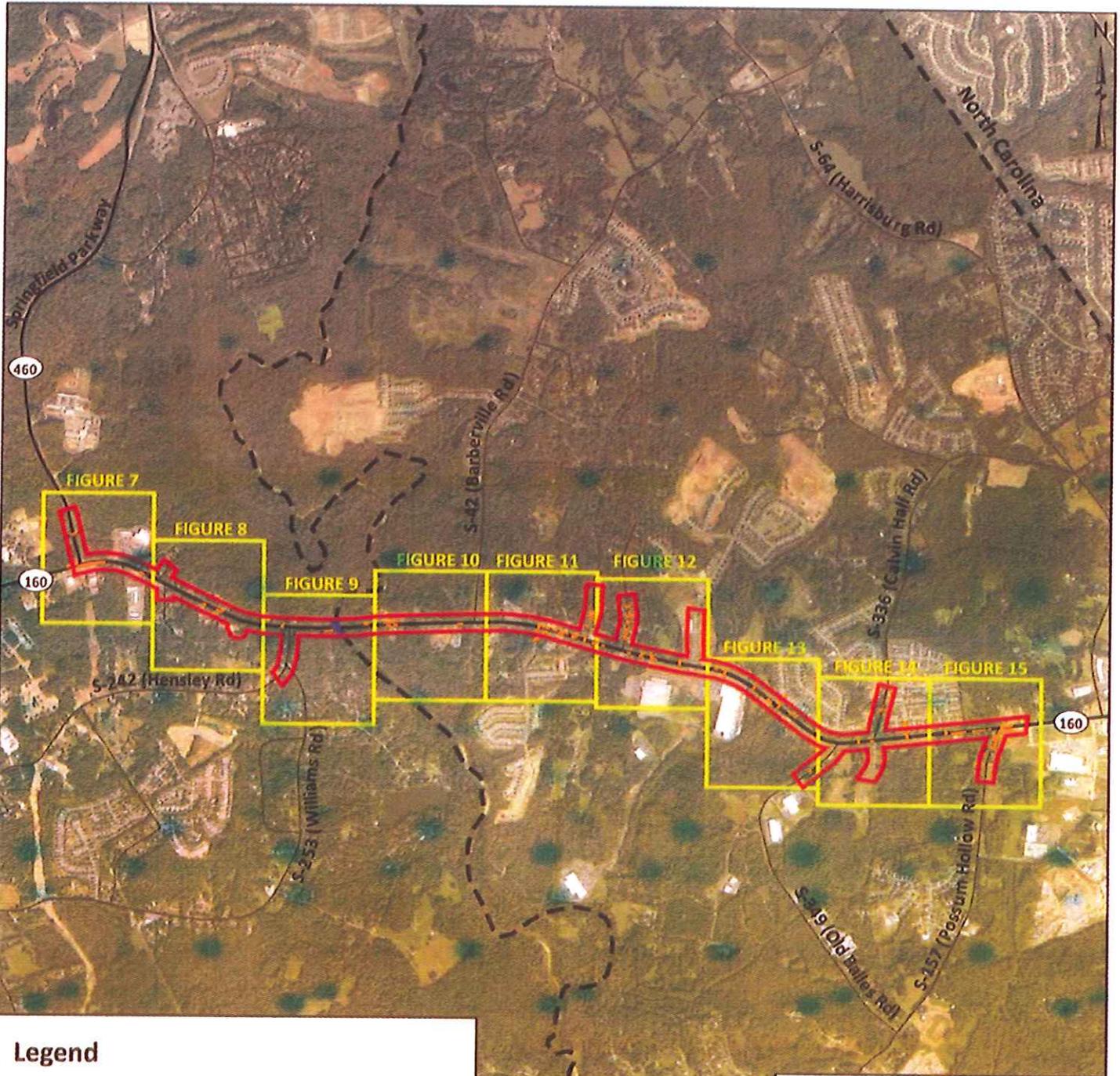
Travis G. Hughes
Chief, Special Projects Branch

Enclosures:

Copy of Figures 6-15 (Jurisdictional Waters)
Preliminary Jurisdictional Determination Form

Copy Furnished:

Mead & Hunt
Mr. Matt DeWitt, P.W.S.
307 West Main Street
Lexington, South Carolina 29072



Legend

-  Project Study Area (180 acres)
-  Jurisdictional Stream/RPW (1,221 lf; 0.947 acre)
-  Jurisdictional Wetland (0.077 acre)
-  Pipe/Culvert
-  County Boundary

Jurisdictional waters of the U.S. within the Project Study Area were delineated by Mead & Hunt during the field review conducted on June 25 and 26, 2014.

Jurisdictional boundaries of the waters of the U.S. have not been verified by the U.S. Army Corps of Engineers and are subject to change following verification.



Mead & Hunt
307 W. Main Street
Lexington, SC 29072
Tel. 803.936.2900
www.meadhunt.com

SC 160 WIDENING FROM SC 460 (SPRINGFIELD PARKWAY)
TO S-157 (POSSUM HOLLOW ROAD)
YORK AND LANCASTER COUNTIES, SOUTH CAROLINA

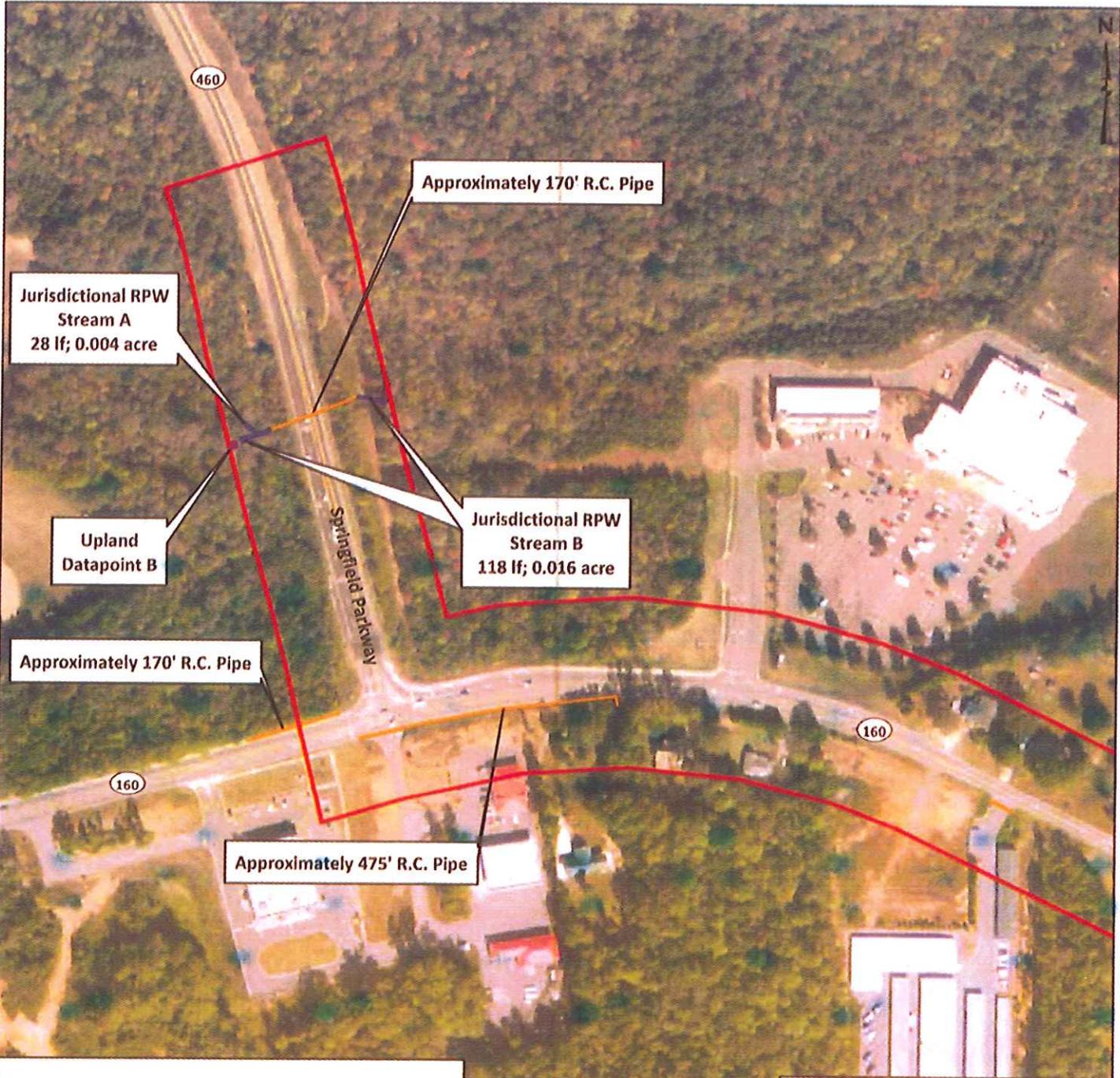
M&H PROJ: R3286900-140623-01
SCDOT PIN: 31125_R001
USACE SAC: 2011-00476-DJS

SOURCE: NATIONAL AGRICULTURE
IMAGERY PROGRAM (NAIP) AERIAL
PHOTOGRAPHY
[LANCASTER COUNTY (2013)]

APPLICATION BY **SCDOT**
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION

JURISDICTIONAL WATERS OF THE U.S. INDEX

DRAWN BY MID	QA/QC BY JBS
DATE: 05/30/2014	FIGURE 6



Legend

-  Project Study Area (180 acres)
-  Jurisdictional Stream/RPW (146 lf; 0.020 acre)
-  Jurisdictional Wetland (0.000 acre)
-  Pipe/Culvert

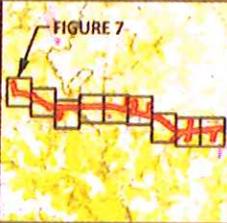
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SC 160 WIDENING FROM SC 460 (SPRINGFIELD PARKWAY)
TO S-157 (POSSUM HOLLOW ROAD)

YORK AND LANCASTER COUNTIES, SOUTH CAROLINA

M&H PROJ: R3286900 140623.01
SCDOT PIN: 31125_RD01
USACE SAC: 2011 00476_DJS

SOURCE: NATIONAL AGRICULTURE
IMAGERY PROGRAM (NAIP) AERIAL
PHOTOGRAPHY
[LANCASTER COUNTY (2013)]

APPLICATION BY
SCDOT
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION

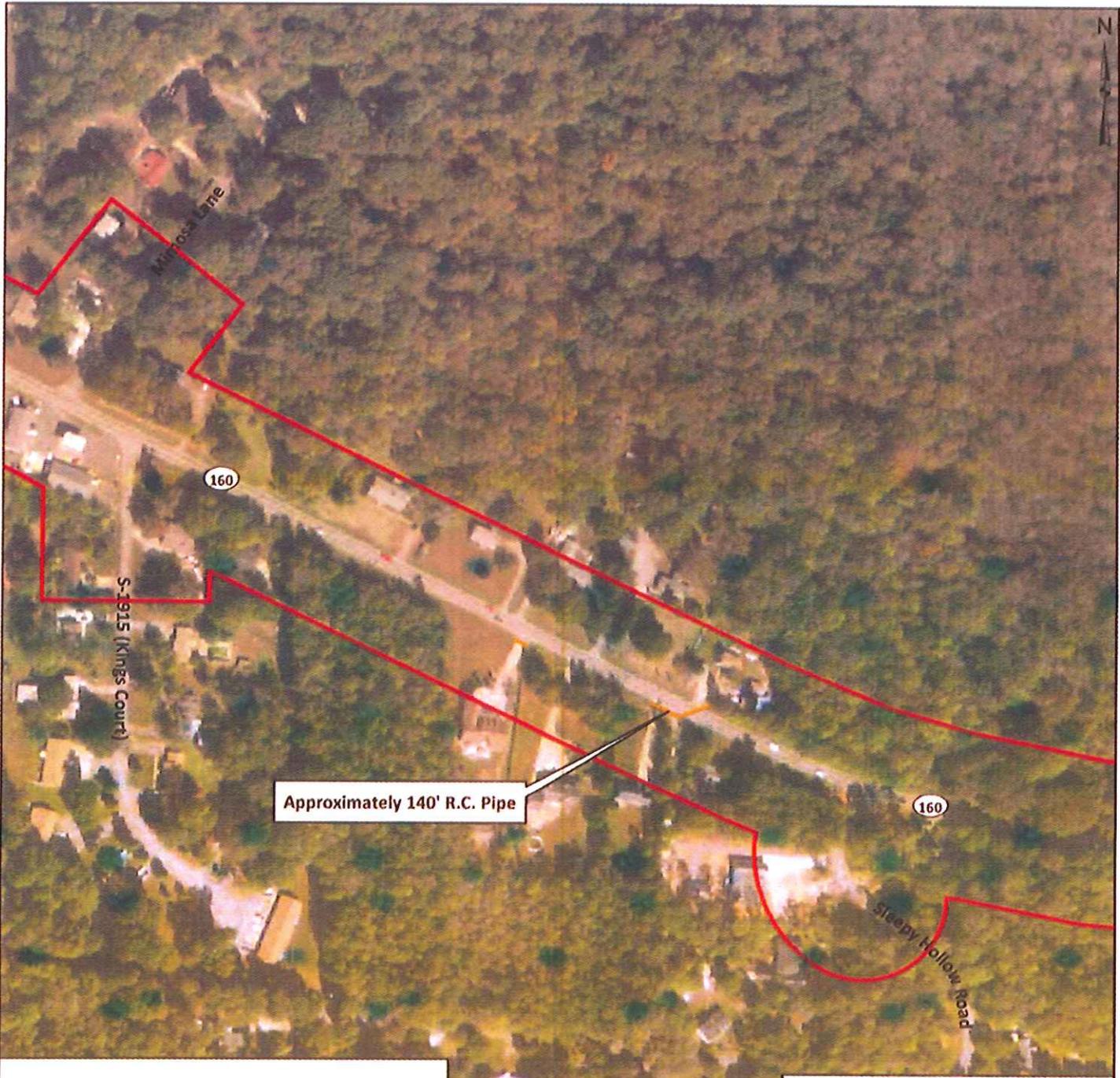
JURISDICTIONAL WATERS OF THE U.S. MAP

DRAWN BY: MTD

QA/QC BY: JBS

DATE: 06/30/2014

FIGURE 7



Legend

-  Project Study Area (180 acres)
-  Jurisdictional Stream/RPW (0 lf; 0.000 acre)
-  Jurisdictional Wetland (0.000 acre)
-  Pipe/Culvert

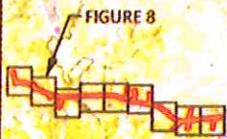
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SC 160 WIDENING FROM SC 460 (SPRINGFIELD PARKWAY)
TO S-157 (POSSUM HOLLOW ROAD)

YORK AND LANCASTER COUNTIES, SOUTH CAROLINA

M&H PROJ: R3286900 140623 01
SCDOT PIN: 31125_RD01
USACE SAC: 2011.00476_DJS

SOURCE: NATIONAL AGRICULTURE
IMAGERY PROGRAM (NAIP) AERIAL
PHOTOGRAPHY
[LANCASTER COUNTY (2013)]

APPLICATION BY **SCDOT**
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION

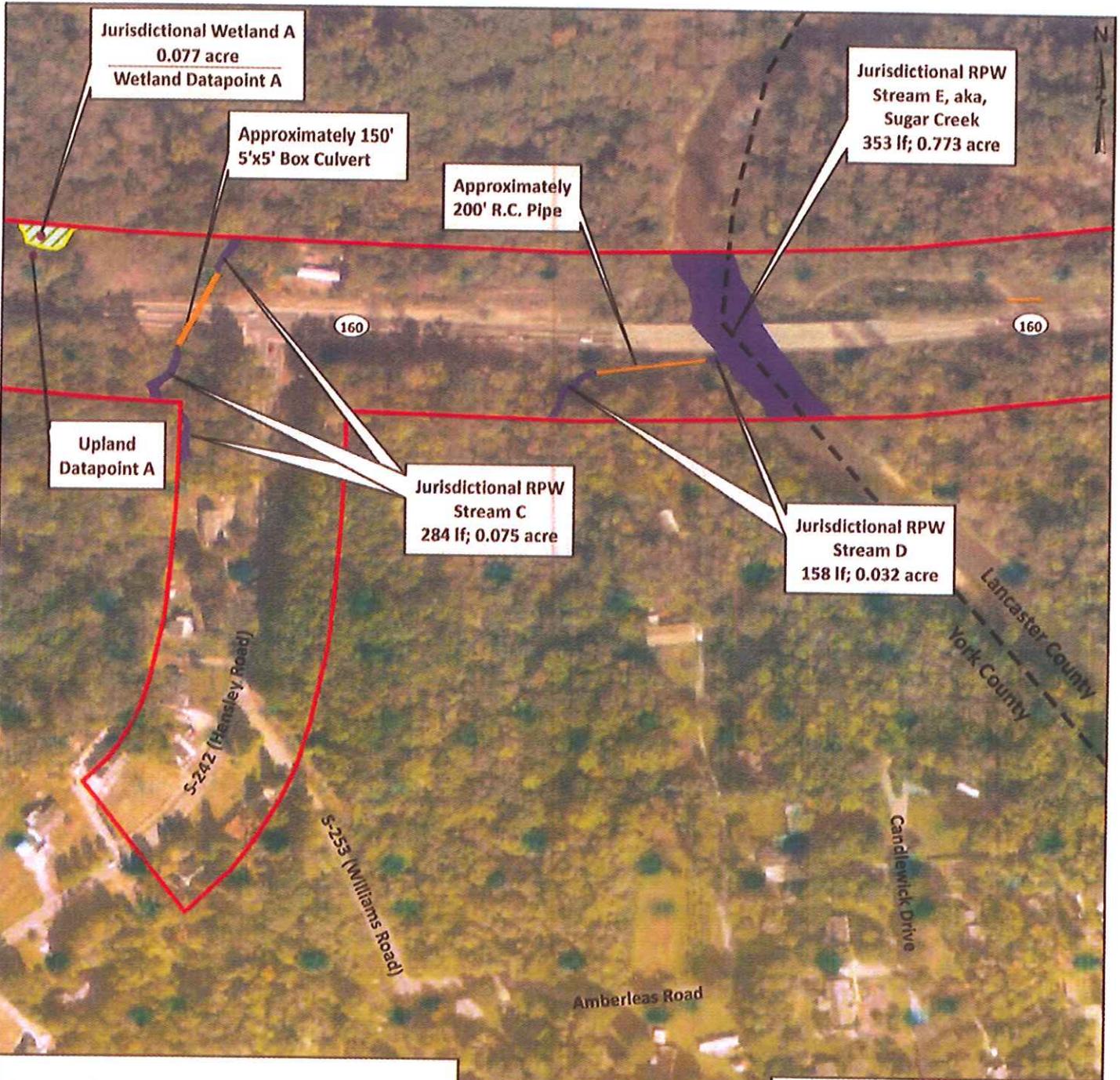
JURISDICTIONAL WATERS OF THE U.S. MAP

DRAWN BY: M1D

QA/QC BY: JBS

DATE: 06/30/2014

FIGURE 8



Legend

-  Project Study Area (180 acres)
-  Jurisdictional Stream/RPW (795 lf; 0.880 acre)
-  Jurisdictional Wetland (0.077 acre)
-  Pipe/Culvert

Jurisdictional waters of the U.S. within the Project Study Area were delineated by Mead & Hunt during the field review conducted on June 25 and 26, 2014.

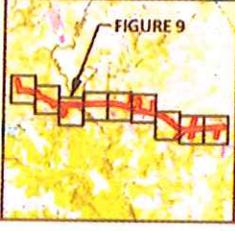
Jurisdictional boundaries of the waters of the U.S. have not been verified by the U.S. Army Corps of Engineers and are subject to change following verification.

Feet



Mead & Hunt

Mead & Hunt
307 W. Main Street
Levinston, SC 29072
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SC 160 WIDENING FROM SC 460 (SPRINGFIELD PARKWAY)
TO S-157 (POSSUM HOLLOW ROAD)

YORK AND LANCASTER COUNTIES, SOUTH CAROLINA

M&H PROJ: R3286900 140623 01
SCDOT PIN: 31125 RD01
USACE SAC: 2011 00476 DJS

SOURCE: NATIONAL AGRICULTURE
IMAGERY PROGRAM (NAIP) AERIAL
PHOTOGRAPHY
[LANCASTER COUNTY (2013)]

APPLICATION BY:	
SCDOT SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION	
JURISDICTIONAL WATERS OF THE U.S. MAP	
DRAWN BY: MID	QA/QC BY: JBS
DATE: 06/30/2014	FIGURE 9



Legend

-  Project Study Area (180 acres)
-  Jurisdictional Stream/RPW (0 lf; 0.000 acre)
-  Jurisdictional Wetland (0.000 acre)
-  Pipe/Culvert

Jurisdictional waters of the U.S. within the Project Study Area were delineated by Mead & Hunt during the field review conducted on June 25 and 26, 2014.

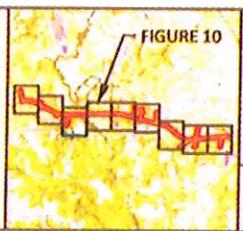
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Feet



Mead & Hunt

Mead & Hunt
307 W. Main Street
Lexington, SC 29072
Tel. 803.996.2900
www.meadhunt.com



**SC 160 WIDENING FROM SC 460 (SPRINGFIELD PARKWAY)
TO S-157 (POSSUM HOLLOW ROAD)**

YORK AND LANCASTER COUNTIES, SOUTH CAROLINA

M&H PROJ: R37R6900 140523.01
SCDOT PIN: 31125_RD01
USACE SAC: 2011.00476-DJS

SOURCE: NATIONAL AGRICULTURE
IMAGERY PROGRAM (NAIP) AERIAL
PHOTOGRAPHY
[LANCASTER COUNTY (2013)]

APPLICATION BY	
SCDOT	
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION	
JURISDICTIONAL WATERS OF THE U.S. MAP	
DRAWN BY: MTD	QA/QC BY: JBS
DATE: 05/30/2014	FIGURE 10



Legend

-  Project Study Area (180 acres)
-  Jurisdictional Stream/RPW (0 lf; 0.000 acre)
-  Jurisdictional Wetland (0.000 acre)
-  Pipe/Culvert

Jurisdictional waters of the U.S. within the Project Study Area were delineated by Mead & Hunt during the field review conducted on June 25 and 26, 2014.

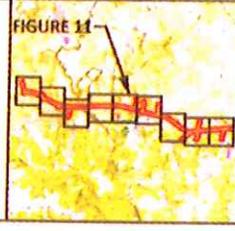
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Feet



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SC 160 WIDENING FROM SC 460 (SPRINGFIELD PARKWAY)
TO S-157 (POSSUM HOLLOW ROAD)

YORK AND LANCASTER COUNTIES, SOUTH CAROLINA

MRH PROJ: R3286500-140623 01
SCDOT PIN: 31125 RD01
USACE SAC: 2011 00476 DJS

SOURCE: NATIONAL AGRICULTURE
IMAGERY PROGRAM (NAIP) AERIAL
PHOTOGRAPHY
[LANCASTER COUNTY (2013)]

APPLICATION BY	
SCDOT	
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION	
JURISDICTIONAL WATERS OF THE U.S. MAP	
DRAWN BY: MID	QA/QC BY: JBS
DATE: 06/30/2014	FIGURE 11



Legend

-  Project Study Area (180 acres)
-  Jurisdictional Stream/RPW (0 lf; 0.000 acre)
-  Jurisdictional Wetland (0.000 acre)
-  Pipe/Culvert

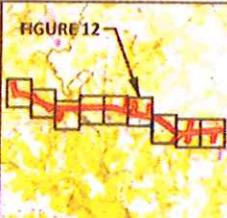
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Mead & Hunt

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SC 160 WIDENING FROM SC 460 (SPRINGFIELD PARKWAY)
TO S-157 (POSSUM HOLLOW ROAD)

YORK AND LANCASTER COUNTIES, SOUTH CAROLINA

M&H PROJ: R3286900-140623.01
SCDOT PIN: 31125_RD01
USACE SAC: 2011 00476_DJS

SOURCE: NATIONAL AGRICULTURE
IMAGERY PROGRAM (NAIP) AERIAL
PHOTOGRAPHY
[LANCASTER COUNTY (2013)]

APPLICATION BY:
SCDOT
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION

JURISDICTIONAL WATERS OF THE U.S. MAP

DRAWN BY: MTD

QA/QC BY: JBS

DATE: 05/30/2014

FIGURE 12



Legend

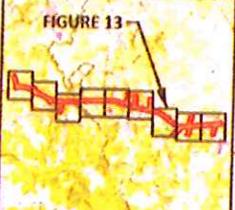
-  Project Study Area (180 acres)
-  Jurisdictional Stream/RPW (0 lf; 0.000 acre)
-  Jurisdictional Wetland (0.000 acre)
-  Pipe/Culvert

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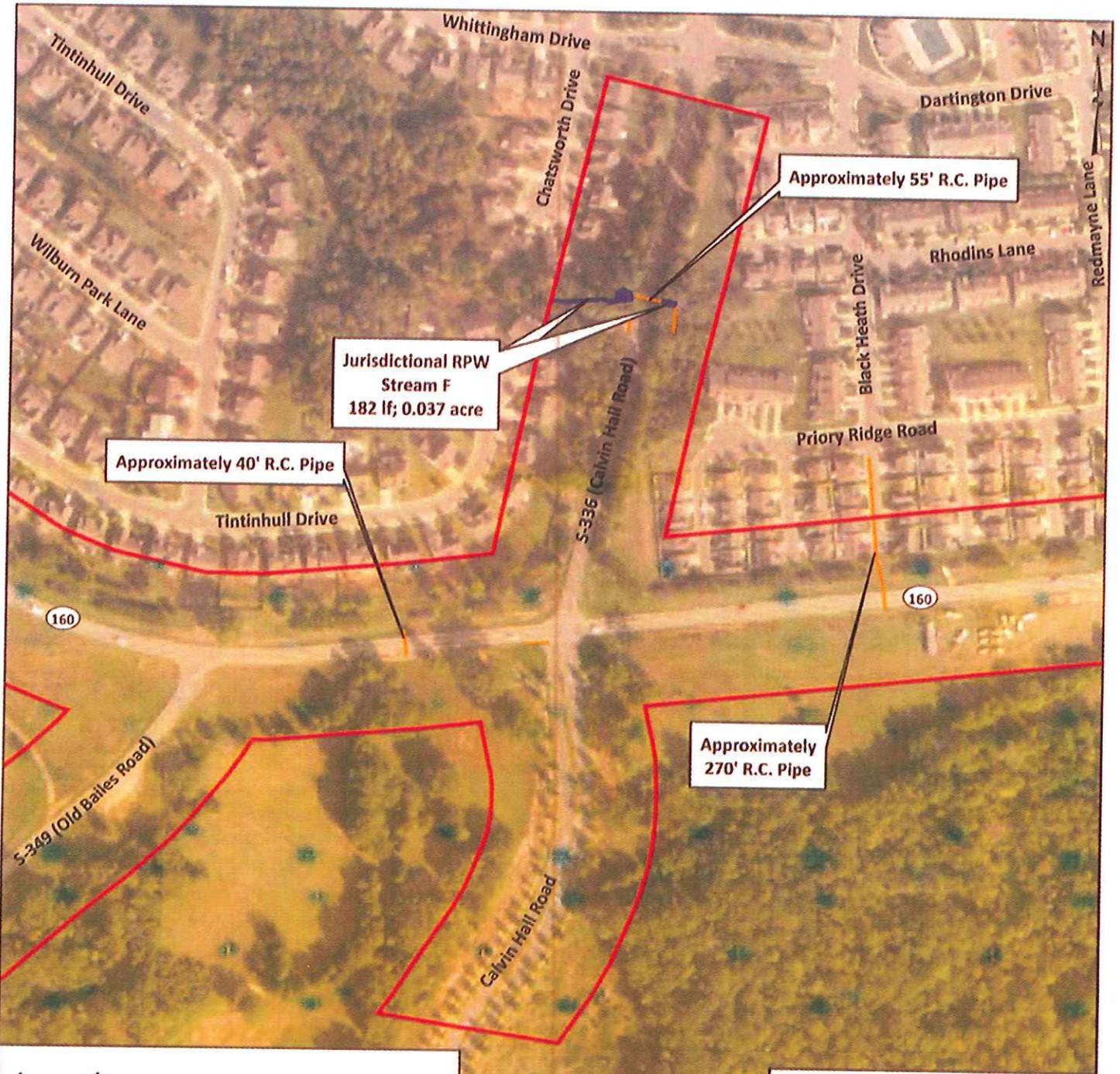


SC 160 WIDENING FROM SC 460 (SPRINGFIELD PARKWAY)
 TO S-157 (POSSUM HOLLOW ROAD)
 YORK AND LANCASTER COUNTIES, SOUTH CAROLINA

M&H PROJ: P3286900-140623-01
 SCDOT PIN: 31125_RD03
 USACE SAC: 2011-00476-DJS

SOURCE: NATIONAL AGRICULTURE
 IMAGERY PROGRAM (NAIP) AERIAL
 PHOTOGRAPHY
 [LANCASTER COUNTY (2013)]

APPLICATION BY: SCDOT SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION	
JURISDICTIONAL WATERS OF THE U.S. MAP	
DRAWN BY: MTD	QA/QC BY: JBS
DATE: 05/30/2014	FIGURE 13



Legend

-  Project Study Area (180 acres)
-  Jurisdictional Stream/RPW (182 lf; 0.037 acre)
-  Jurisdictional Wetland (0.000 acre)
-  Pipe/Culvert

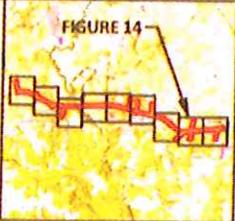
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SC 160 WIDENING FROM SC 460 (SPRINGFIELD PARKWAY)
TO S-157 (POSSUM HOLLOW ROAD)
YORK AND LANCASTER COUNTIES, SOUTH CAROLINA

M&H PROJ: R3286900-140623 01
SCDOT PIN: 31125_PD01
USACE SAC: 2011 00476 DJS

SOURCE: NATIONAL AGRICULTURE
IMAGERY PROGRAM (NAIP) AERIAL
PHOTOGRAPHY
[LANCASTER COUNTY (2013)]

APPLICATION BY:
SCDOT
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
JURISDICTIONAL WATERS OF THE U.S. MAP

DRAWN BY: MFD
DATE: 06/30/2014

QA/QC BY: JBS
FIGURE 14



Legend

-  Project Study Area (180 acres)
-  Jurisdictional Stream/RPW (98 lf; 0.010 acre)
-  Jurisdictional Wetland (0.000 acre)
-  Pipe/Culvert

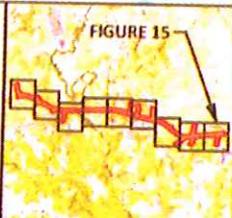
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Mead & Hunt

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www.meadhunt.com



SC 160 WIDENING FROM SC 460 (SPRINGFIELD PARKWAY)
TO S-157 (POSSUM HOLLOW ROAD)

YORK AND LANCASTER COUNTIES, SOUTH CAROLINA

MBH PROJ: R3285900-140623-01
SCDOT PIN: 31125_RD01
USACE SAC: 2011-00476-DJS

SOURCE: NATIONAL AGRICULTURE
IMAGERY PROGRAM (NAIP) AERIAL
PHOTOGRAPHY
[LANCASTER COUNTY (2013)]

APPLICATION BY:
SCDOT
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION

JURISDICTIONAL WATERS OF THE U.S. MAP

DRAWN BY: MTD

QA/QC BY: JBS

DATE: 06/30/2014

FIGURE 15

ATTACHMENT

PRELIMINARY JURISDICTIONAL DETERMINATION FORM

BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR PRELIMINARY JURISDICTIONAL DETERMINATION (JD):

September 12, 2014

B. NAME AND ADDRESS OF PERSON REQUESTING PRELIMINARY JD:

Mr. Sean Connolly, Environmental Permitting Manager
South Carolina Department of Transportation
P.O. Box 191, 955 Park Street
Columbia, South Carolina 29202-0191

C. DISTRICT OFFICE, FILE NAME, AND NUMBER: Charleston District, SCDOT SC-160 Widening Project, (SCDOT PIN 31125_RD01), SAC# 2011-00476-DS

D. PROJECT LOCATION(S) AND BACKGROUND INFORMATION: Project is located on and along an approximately 3.4 mile segment of SC-160 in Lancaster and York Counties, South Carolina. This segment is located on SC-160 from the intersection of SC-160 and SC-460 (Springfield Parkway) to the intersection of SC-160 and S-157 (Possum Hollow Road).

(USE THE ATTACHED TABLE TO DOCUMENT MULTIPLE WATERBODIES AT DIFFERENT SITES)

State: South Carolina County/parish/borough: Lancaster & York City:

Center coordinates of site (lat/long in degree decimal format):

Lat. 35.005715°N, Long. 80.893243°W. Universal Transverse Mercator:

Name of nearest waterbody: Sugar Creek

Identify (estimate) amount of waters in the review area:

Non-wetland waters: 1,221.0 linear feet: Varies width (ft) and/or acres.

Cowardin Class: Riverine Stream Flow: Perennial

Wetlands: 0.077 acres. Cowardin Class: Forested

Name of any water bodies on the site that have been identified as Section 10 waters:

Tidal: N/A

Non-Tidal: N/A

E. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

Office (Desk) Determination. Date: Sept. 12, 2014 Field Determination. Date(s): Sept. 11, 2014

1. The Corps of Engineers believes that there may be jurisdictional waters of the United States on the subject site, and the permit applicant or other affected party who requested this preliminary JD is hereby advised of his or her option to request and obtain an approved jurisdictional determination (JD) for that site. Nevertheless, the permit applicant or other person who requested this preliminary JD has declined to exercise the option to obtain an approved JD in this instance and at this time.

2. In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "pre-construction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an approved JD for the activity, the permit applicant is hereby made aware of the following: (1) the permit applicant has elected to seek a permit authorization based on a preliminary JD, which does not make an official determination of jurisdictional waters; (2) that the applicant has the option to request an approved JD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an approved JD could possibly result in less compensatory mitigation being required or different special conditions; (3) that the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) that the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) that undertaking any activity in reliance upon the subject permit authorization

without requesting an approved JD constitutes the applicant's acceptance of the use of the preliminary JD, but that either form of JD will be processed as soon as is practicable; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a preliminary JD constitutes agreement that all wetlands and other water bodies on the site affected in any way by that activity are jurisdictional waters of the United States, and precludes any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an approved JD or a preliminary JD, that JD will be processed as soon as is practicable. Further, an approved JD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331, and that in any administrative appeal, jurisdictional issues can be raised (see 33 C.F.R. 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable.

This preliminary JD finds that there "may be" waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:

SUPPORTING DATA. Data reviewed for preliminary JD (check all that apply - checked items should be included in case file and, where checked and requested, appropriately reference sources below):

- Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: Mead & Hunt-Matt DeWitt.
- Data sheets prepared/submitted by or on behalf of the applicant/consultant.
 - Office concurs with data sheets/delineation report. **Although the Corps may not agree with all the information provided be the agent in the data forms describing delineate wetlands, the Corps agrees with the conclusion and boundary established from site information documented.**
 - Office does not concur with data sheets/delineation report.
- Data sheets prepared by the Corps:
- Corps navigable waters' study:
- U.S. Geological Survey Hydrologic Atlas:
 - USGS NHD data.
 - USGS 8 and 12 digit HUC maps.
- U.S. Geological Survey map(s). Cite scale & quad name: Fort Mill, SC & Weddington, SC.
- USDA Natural Resources Conservation Service Soil Survey. Citation: York Co, page 35 and Lancaster Co, page 2: Cecil, Pacolet, Hard Labor, & Appling series.
- National wetlands inventory map(s). Cite name: PUBHh, Water, & PF01A.
- State/Local wetland inventory map(s):
- FEMA/FIRM maps:
- 100-year Floodplain Elevation is: (National Geodetic Vertical Datum of 1929)
- Photographs: Aerial (Name & Date): (1999) 11209:13 & 11209:22.
or Other (Name & Date):
- Previous determination(s). File no. and date of response letter:
- Other information (please specify): Photos with delineation request.

IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.

Signature and date of
Regulatory Project Manager
(REQUIRED)

Signature and date of
person requesting preliminary JD
(REQUIRED, unless obtaining the signature is
impracticable)

SC-160 Road Widening Project in York and Lancaster Counties (SCDOT PIN 31125)

Site number	Latitude	Longitude	Cowardin Class	Estimated amount of aquatic resource in review area	Class of aquatic resource
Wetland A	35.006185	- 80.906481	PFO	0.077acre	non-section 10 – wetland
Stream A	35.010159	- 80.918619	Riverine	28 linear feet	non-section 10 – non-wetland
Stream B	35.010307	- 80.917910	Riverine	118 linear feet	non-section 10 – non-wetland
Stream C	35.005528	- 80.905731	Riverine	284 linear feet	non-section 10 – non-wetland
Stream D	35.005479	- 80.903311	Riverine	158 linear feet	non-section 10 – non-wetland
Stream E	35.005723	- 80.902296	Riverine	353 linear feet	non-section 10 – non-wetland
Stream F	35..002064	- 80.869637	Riverine	182 linear feet	non-section 10 – non-wetland
Stream G	34.999971	- 80.863392	Riverine	98 linear feet	non-section 10 – non-wetland

Appendix C – Endangered Species Act

Threatened and Endangered Species

Surveyed and Prepared by Staff Biologist: Edward W. Frierson

Pursuant to Section 7 of the Endangered Species Act a field survey was conducted on the proposed new right of way. The following list of species that are endangered (E), threatened (T) and Bald and Golden Eagle Protection Act (BGEPA) was obtained from the U.S. Fish and Wildlife Service for York and Lancaster Counties:

Animals

Bald eagle – *Haliaeetus leucocephalus* – (BGEPA)
Carolina heelsplitter – *Lasmigona decorata* – (E)

Plants

Schweinitz's sunflower – *Helianthus schweinitzii* – (E)
Little amphianthus – *Amphianthus pusillus* – (T)
Smooth coneflower – *Echinacea laevigata* – (E)
Black-spored quillwort – *Isoetes melanospora* – (E)
Dwarf-flowered heartleaf – *Hexastylis naniflora* – (T)

Methods

The project area was examined by reconnaissance methods on November 9, 2010 and April 29, 2011. Habitats surveyed were determined by each species' ecological requirements.

Results

The entire project area was surveyed on the visit above. The project corridor consists of stream habitats, mixed pine forests, hardwood forests, and landscaped commercial and residential areas. The upland forested areas are characterized by American holly (*Ilex opaca*), white oak (*Quercus alba*), short-leaf pine (*Pinus echinata*), and Flowering dogwood (*Cornus florida*). The water bodies are Sugar Creek and its unnamed tributary. These two streams are not large enough to support the Bald Eagle. The streams also do not provide habitat for the Carolina heelsplitter (see attachment).

Potential habitat for Schweinitz's sunflower is present in the project corridor. These plants are found in meadows and open woodland and are commonly found on the shoulder of roadways. The flowering period is from September to early November. No

good habitat was located and no specimens were located during this survey. Potential habitat for Dwarf-flowered heartleaf was located in the project corridor. These plants are found in upper Piedmont hardwood forests on deep, well-drained soils. It is often associated with mountain laurel on northerly slopes of moist rich soils. During the survey a species of heartleaf was located near the unnamed tributary of Sugar Creek. The plant is primarily identified by the shape of its flowers. Therefore, the site was revisited during the flowering season on April 29, 2011, and pictures of the flowers were sent to Dr. Doug Rayner of Wofford University in Spartanburg SC, a local expert on *Hexastylis* species. Dr. Rayner determined that the species within the project corridor was *Hexastylis ariflora* rather than *Hexastylis naniflora*, and therefore the project may proceed as *H. ariflora* is a very common heartleaf species and not listed as endangered or threatened.

Based on a lack of suitable habitat and/or no observations of the listed species during field surveys, results of the threatened and endangered species study indicate that the proposed action will not affect any threatened or endangered species or critical habitats currently listed by the USFWS for York and Lancaster Counties.

Appendix D – Essential Fish Habitat
Not applicable

Appendix E – Section 106 Properties

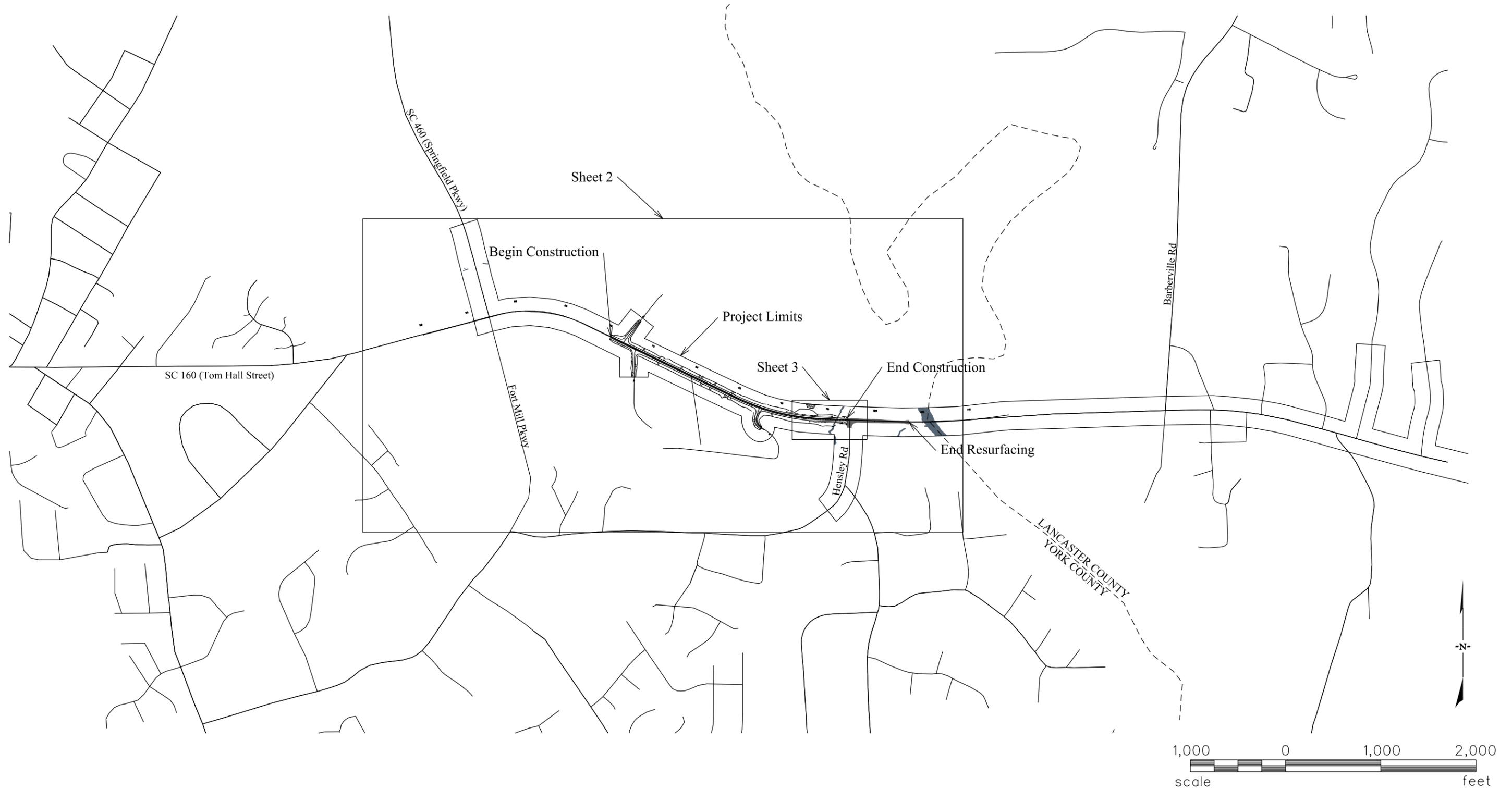
Appendix F – Floodplains
Not applicable

Appendix G – Critical Area
Not applicable

Appendix H – PRM plan(s)
Not applicable

Appendix I – Permit Drawings

SC 160 WIDENING



WETLAND
 JURISDICTIONAL STREAM
 PERMANENT STREAM PIPE IMPACT



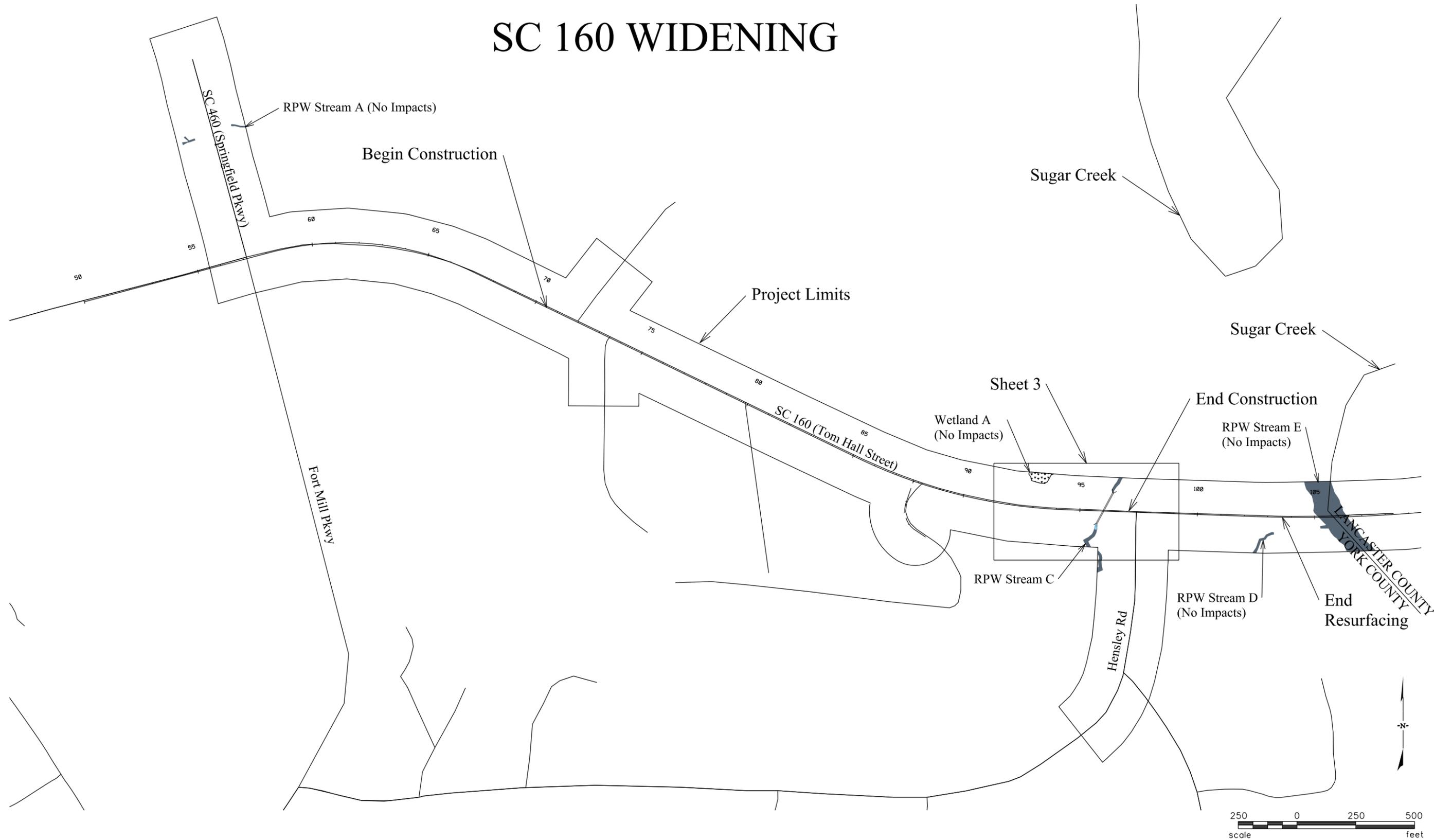
PROJECT IMPACTS

PERMANENT STREAM PIPE IMPACT 25-lf (0.004 acre)

STV Incorporated
 454 South Anderson Road, Suite 3, BTC 517
 Rock Hill, South Carolina 29730
 (803) 980-4970

APPLICANT:	SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION	
PROJECT:	SC 160 WIDENING	
SCDOT PROJECT ID:	P029536	
YORK COUNTY PROJECT #	11149-010	
LOCATION:	YORK COUNTY, SOUTH CAROLINA	
USACE FILE #	SAC-2011-00476	
SHEET:	1 OF 4	DATE: 4-20-2023

SC 160 WIDENING



WETLAND
 JURISDICTIONAL STREAM
 PERMANENT STREAM PIPE IMPACT



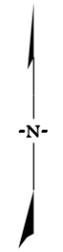
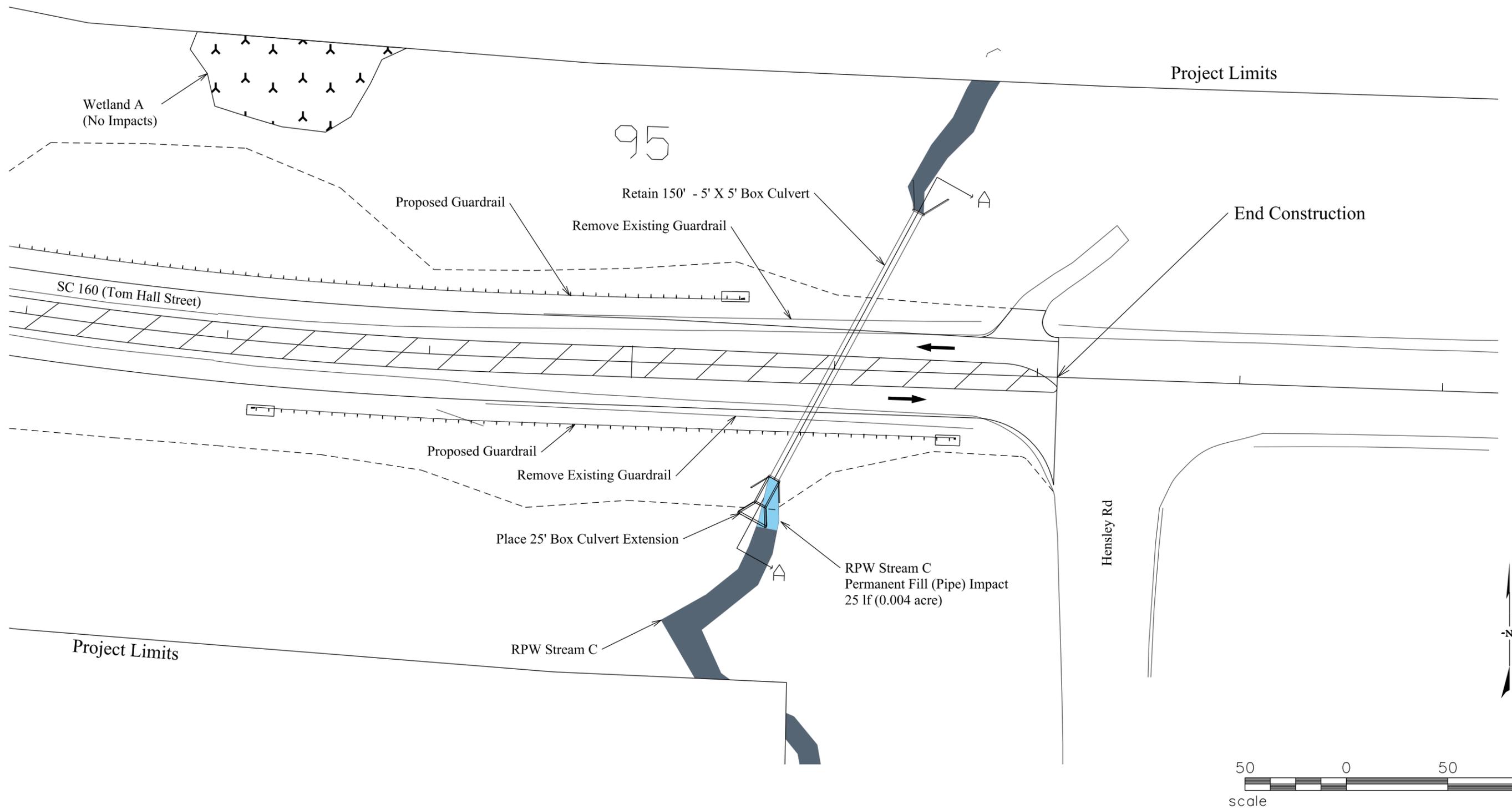
PROJECT IMPACTS

PERMANENT STREAM PIPE IMPACT 25 lf (0.004 acre)

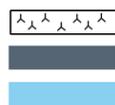
STV Incorporated
 454 South Anderson Road, Suite 3, BTC 517
 Rock Hill, South Carolina 29730
 (803) 980-4970

APPLICANT:	SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION	
PROJECT:	SC 160 WIDENING	
SCDOT PROJECT ID:	P029536	
YORK COUNTY PROJECT #	11149-010	
LOCATION:	YORK COUNTY, SOUTH CAROLINA	
USACE FILE #	SAC-2011-00476	
SHEET:	2 OF 4	DATE: 4-20-2023

SC 160 WIDENING



WETLAND
 JURISDICTIONAL STREAM
 PERMANENT STREAM PIPE IMPACT

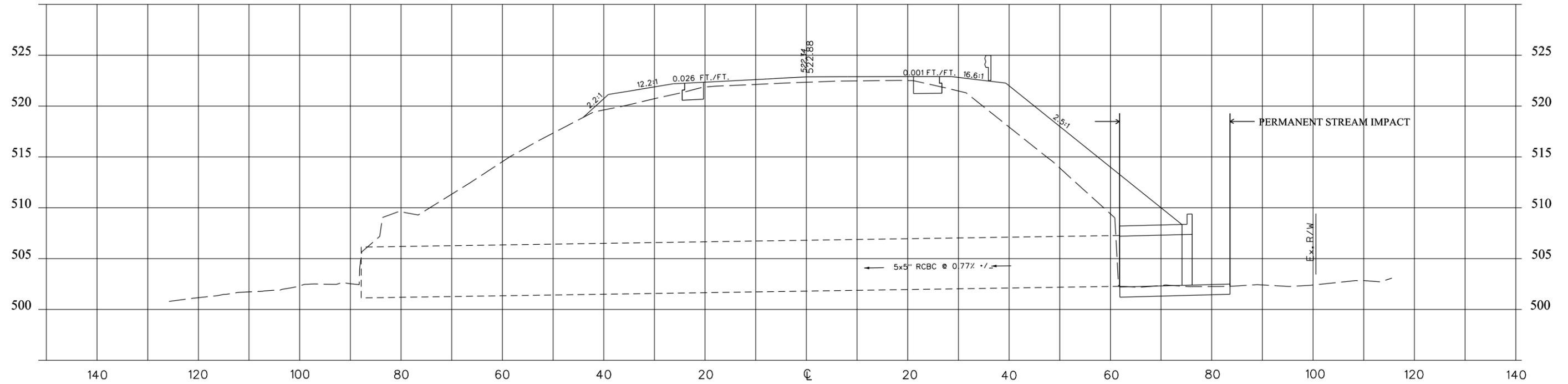


SHEET IMPACTS
 PERMANENT STREAM PIPE IMPACT 25 lf (0.004 acre)

STV Incorporated
 454 South Anderson Road, Suite 3, BTC 517
 Rock Hill, South Carolina 29730
 (803) 980-4970

APPLICANT:	SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION	
PROJECT:	SC 160 WIDENING	
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USACE FILE #	SAC-2011-00476	
SHEET:	3 OF 4	DATE: 4-20-2023

SC 160 WIDENING



SC 160
CROSSLINE SECTION A
STATION 95+99.56

STV Incorporated
454 South Anderson Road, Suite 3, BTC 517
Rock Hill, South Carolina 29730
(803) 980-4970

APPLICANT:	SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION	
PROJECT:	SC 160 WIDENING	
SCDOT PROJECT ID:	P029536	
YORK COUNTY PROJECT #	11149-010	
LOCATION:	YORK COUNTY, SOUTH CAROLINA	
USACE FILE #	SAC-2011-00476	
SHEET:	4 OF 4	DATE: 4-20-2023

**SC 160 (Tom Hall Road) Widening
PID P029536
YORK COUNTY
UTILITY COORDINATION FINAL REPORT**



P029536

FINAL UTILITY COORDINATION

SC 160 (Tom Hall Road)

Road Widening



York County
south carolina

June 28, 2023



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Town of Fort Mill (Water & Sewer)	E
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Charter (CATV)	H



1. General Notes

We have reviewed the proposed utility relocation plans submitted by all affected utilities and have determined that they comply with SCDOT directives in, "A Policy for Accommodating Utilities on Highway Rights-Of-Way." In our opinion, the adjustments of utility facilities will not conflict with the proposed highway improvements. Further, we have determined there are no conflicts between each of the company's relocation plans submitted by the affected companies.

Confirm with all utilities the status of their relocations. For the adjustment of minor utility appurtenances (i.e. valves, meters, services, fire hydrants, etc.) please notify the utility 5 days prior to the need for adjustment and allow for 3 days to complete the work. The existing utility information shown on the plans are depicted as Level D quality and were sketched in based off a combination of GIS information, PUPS field locates, utility as-builts, and/or existing survey information. STV is not responsible for the accuracy of this information. The contractor will be required to confirm locations via SC811/PUPS. Included in this report along with the individual utility submittals are the U-sheets and a utility conflict matrix.

1-1. RECOMMENDATION

We recommend that the relocation plans be approved. We further recommend that, from a utilities point of view, this project be let for contract.

1-2. UTILITY RELOCATION SEQUENCE

STV used the information provided by the utility owners to devise a plan for relocation staging that is consistent with the proposed traffic control sequence, overall project schedule, and utility work order sections. See *bar graph next page*.

STV assumed the following items in the schedule development to determine if utilities will impact overall project completion:

- York County will provide adequate notification time, so that each individual utility can perform work as soon as work area is available. (See notification times on chart and individual sections).
- Utilities will start prior to contractor being on-site or project award if ROW is available and areas do not need items like clearing and grubbing, removal items, etc.
- Project Duration: 18 months
- Project Let: April 2021
- Project NTP: May 2021
- Contractor On-Site: October 2021
- Utility Window: 90 days



STV's U-Sheet "U5 – General Notes" states that the contractor is responsible in confirming the status of all relocations. This page also shows a similar bar chart found in this report for demonstration purposes only as to how utility relocations could work with their project construction schedule and to show the order of relocations as requested by utilities.

Should any of these assumptions change based on the contractor's approach to project construction, then they need to account for the potential delays. The contractor should notify the utilities and SCDOT as soon as possible since the relocation staging allow the project to be built in the allotted time of 18 months.

Key		utility package approval	NOTEABLE DATES		Project Let		Utility Window	
		notifications (permitting, procurement, scheduling)			Project NTP			
		active relocation/ construction			Contractor on-site for C&G operations			
		no activity						

Project - SC 160 Widening																																			
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SC 160	Contractor Work			UTILITY WINDOW	Contractor could begin paving and complete most of the grading operations while utilities are still relocating since ex. Utilities are under new pavement.												ALL WORK COMPLETED											
	Duke Energy (Dist)***			ROW req'd***																								
	YCNGA																											
	Charter																											
	Comporium																											

***C&G: Clearing and grubbing both sides of SC 160. This also includes rough grading the larger cut areas from Station 90+00 to end of project.**

****NOTE: THIS CHART IS FOR VISUAL PURPOSES ONLY TO DEMONSTRATE THE ORDER OF UTILITY RELOCATION STAGING. ALL TIME LINES AND ORDER OF OPERATIONS WILL NEED TO BE VERIFIED BY CONTRACTOR.****

WORK AREAS, CONTRACTOR ACTIVITY, AND PRECEDING RELOCATION REQUIRED FOR UTILITY RELOCATION

<p>DUKE: Set new pole line on the north side of SC 160.***</p> <p>CONTRACTOR ACTIVITY C&G to ROW for Duke and YCNGA. 5 weeks for Duke to complete relocations.</p> <p>York County <i>Notify Duke 2 months prior to contractor clearing, so they are on site ready to complete their clearing needs for power installation. Duke will need 2-3 weeks for clearing and 5 weeks to complete relocation.</i></p>	<p>YCNGA: SC 160 relocation on the south side from outside the project limits to Hensley Road.</p> <p>CONTRACTOR ACTIVITY C&G to ROW on right side throughout project limits.</p> <p>OTHER UTILITY ACTIVITY Comporium to install new cables. Once new cables are in, YCNGA can begin. Comporium does NOT need to be active for new gas installtion.</p> <p>York County <i>Notify YCNGA once C&G operations begin. YCNGA will need 2 months notificaiton and 3 months to complete relocation.</i></p>	<p>COMPORIUM: SC 160 relocation from outside the project limits to Sta. 83+70 LT before it crosses to the south side.</p> <p>CONTRACTOR ACTIVITY C&G to ROW on right side throughout project limits.</p> <p>York County/SCDOT <i>Notify Comporium soon after Let. They will need 2 months notification and 4 months to complete relocation. YCNGA could install gas once Comporium has installed cables. Ask that Comporium flag their new cables so YCNGA knows where these are located while the cutovers are still on-going.</i></p>
		<p>CHARTER: SC 160 relocation from the project beginning to end.</p> <p>Other Utility Duke will need to relocate prior to Comporium performing aerial relocations.</p> <p>York County/SCDOT <i>Notify Comporium sooner after Let. They will need 3 months notification and 1 month to complete relocation. Charter will need to begin work after Duke completes their pole relocations for the aerial portion of their relocations.</i></p>



2. Duke Energy (Power Distribution) (DE-D) (OH1)

Duke Energy (DE-D) has an existing overhead power distribution line primarily on the south side of Tom Hall Road (SC 160) with multiple crossings to the north side throughout the project limits.

Duke Energy will remove the pole line from Sta. 70+93 RT to Sta. 89+42 RT on the south side of Tom Hall Road. Duke Energy will relocate this segment of the pole line outside of the new right-of-way. The new line will originate from an existing pole at Sta. 70+93 RT, cross Tom Hall Road, follow Tom Hall Road parallel to Sta. 77+00 and cross back to the south side of Tom Hall Road. The new pole line will continue on the south side of Tom Hall to Sta. 89+50. Additionally, existing transverse aerial lines spanning over SC160 tie back into the new aerial line. All poles being replaced with new poles will be removed once all joint-use utilities are removed from existing poles. All other poles within the project limits, not mentioned, will remain in place.

Duke Energy intends to relocate their overhead facilities once they have an approved utility agreement and their easements are secured. They will have their own crew to stake and clear right-of-way. Duke will need **4-6 weeks notification** to schedule work and order materials and **5 weeks to complete the relocations**. Duke has a blanket encroachment permit with the state. Contractor to confirm time frames and relocation status.

Accompanying this report are Duke's individual relocation plans, utility agreement, cost estimate, and encroachment permit.



3. Town of Fort Mill (Water & Sewer) (W1)

Town of Fort Mill has an existing water main on the south side of Tom Hall Road (SC 160) from the beginning of the project limits at Sta 67+32 RT to Sta. 74+62 RT which does not appear to conflict with the proposed widening.

Town of Fort Mill also has an existing sanitary sewer running along the south side of Tom Hall Road (SC 160); however, it terminates prior to beginning of construction at Sta. 70+34 RT and will not conflict with the proposed widening.

Town of Fort Mill's facilities will remain in place. They will adjust valves and manholes to new grade and relocate one fire hydrant. The Town will need to be notified two weeks prior to performing work.

Accompanying this report is the Town of Fort Mill's no-conflict letter.



4. York County Natural Gas Authority (G1) (YCNGA)

YCNGA has an existing 4-inch gas main on the south side of Tom Hall Road (SC 160) which will conflict with the proposed widening from beginning of project to Sta 97+26 RT.

YCNGA will install new 4-inch plastic gas line along the south side of Tom Hall Road. The new line will originate from the existing 4-inch gas main at Sta 63+94 RT and tie back into the existing 4-inch gas main along Hensley Road. The new gas line will be 7 feet off the proposed edge of pavement from Sta 63+94 RT to Sta 74+68 RT and 10 feet off the edge of pavement until Hensley Road. Additionally, existing service lines crossing Tom Hall Road will be extended and tied back in to the new 4-inch plastic gas main running along the south side of Tom Hall Road.

YCNGA will perform this relocation work for the 4-inch gas water main once encroachment permit authorization is received with a relocation timeline dependent upon clearing and grubbing activities. YCNGA will start work once the site's clearing and grubbing operations are performed and adequate embankment construction has been completed. YCNGA will need **2-month notification** to schedule work and will take approximately **3 months to complete relocations**. Contractor to confirm time frames and relocation status.

Accompanying this report are YCNGA's individual relocation plans, utility agreement, cost estimate, and encroachment permit.



3. Comporium Communications (T1/OH2) (Communications)

Comporium has buried copper, coax, and/or fiber lines on both sides of Tom Hall Road (SC 160) throughout the project limits. Additionally, they have an aerial fiber line along the south side of Tom Hall Road (SC160). Comporium has buried telecom lines on the east side of Mimosa Lane and west side of Hensley Road.

Comporium will abandon their buried lines from Sta. 65+80 LT to Sta. 100+82 LT on both sides of SC 160 to avoid conflicts with the proposed road alignment and grading of the typical section. They will start their relocations at a pedestal approximately 470' prior to the beginning of the project and bore their new buried lines 30-33 feet from the proposed road centerline on the north side of SC 160 from Sta. 65+80 LT to 83+69 LT with multiple crossings throughout the project limits. Comporium will cross SC 160 at 83+69 and bore their new telecom lines 28-30 feet from the proposed road centerline for the remainder of the project limits. They will cross SC 160 at Sta. 96+85 and tie back into an existing pedestal outside of the project limits. There will be locations where excavation and/or embankment construction is necessary prior to burial of proposed lines.

Comporium intends to relocate their underground facilities once right-of-way is staked and plans are approved. They will need Duke to complete their relocation efforts prior to starting work on their aerial facilities. They will need **2 months notification** to order materials and bid out job for construction and **3-4 months to complete relocations**. Contractor to confirm time frames and relocation status.

Accompanying this report are Comporium's individual relocation plans, utility agreement, and cost estimate.

NOTE: Comporium intends to submit an encroachment permit for the proposed work prior to the start of construction. STV recommends that Comporium stake their new telecom lines in order to assist gas as they install their new line that parallels them.



4. Charter (CATV)

Charter has an aerial CATV line on the north side of SC 160 from outside of the project limits to Sta. 62+85 LT where it transitions to buried for the remainder of the project limits.

Charter will abandon their buried lines from Sta. 62+85 LT to Sta. 98+85 LT to avoid conflicts with the proposed road alignment and grading of the typical section. Unless specified, they will bore their new buried lines 1-2 feet inside the SCDOT right-of-way at a minimum depth of 4 feet on the north side of SC 160 within the project limits. Charter will set a new pedestal at Sta. 87+82 LT, buried line will be 5 feet deep perpendicular to road, and bore following the existing right-of-way at a minimum depth of 4 feet. At Sta. 89+00, they will bore 6-8 feet closer to the existing road at a minimum depth of 8-9 feet until Sta. 91+00. From this point, they will move 2-3 feet closer to the existing road but will bore line at a depth of 4-5 feet until a new pedestal at Sta. 96+00 LT. Charter will tie back to their existing line at Sta. 98+85 LT. There will be locations where excavation and/or embankment construction is necessary prior to burial of proposed lines. Charter plans to overlash their existing aerial facilities on Duke's poles to remain in place from Fort Mill Parkway to Sta. 62+85 LT.

Charter intends to relocate their underground facilities once Duke completes all overhead relocations, right-of-way is cleared and staked, and plans are approved. They will need **2-3 months notification** to order materials and bid out job for construction and **one month to complete relocations**. Contractor to confirm time frames and relocation status.

Accompanying this report are Charter's individual relocation plans, utility agreement, and encroachment permit.

SC 160 (TOM HALL ROAD) ROAD WIDENING



APPENDIX A:



UTILITY CONTACT INFORMATION

**P029536 - SC 160 (TOM HALL RD) ROAD WIDENING
UTILITY CONTACT INFORMATION**

COMPANY	CONTACT	PHONE NO.
Duke Energy Power Distribution	Christopher Gionakis (Pike) 123 N. White Street Fort Mill, SC 29715 CGionakis@pike.com	803-396-3726
	William Boyd (Pike) 123 N. White Street Fort Mill, SC 29715 WRBoyd@pike.com	803-835-7900
Town of Fort Mill Water & Sewer NO CONFLICT	Greg Rushing 131 E. Elliott Street Fort Mill, SC 29715 grushing@fortmillsc.gov	803-396-9729
YCNGA Gas	Eric Cellucci 965 West Main Street Rock Hill, SC 29730 eric.cellucci@ycnga.com	803-323-5392
COMPANY	CONTACT	PHONE NO.
Comporium Telephone	Eric Kirkland 471 Lakeshore Parkway Rock Hill, SC 29730 eric.kirkland@comporium.com	803-326-6109
Charter/Spectrum CATV	Neal Barker 3140 West Arrowood Road Charlotte, NC 28273 neal.barker@charter.com	704-671-6103

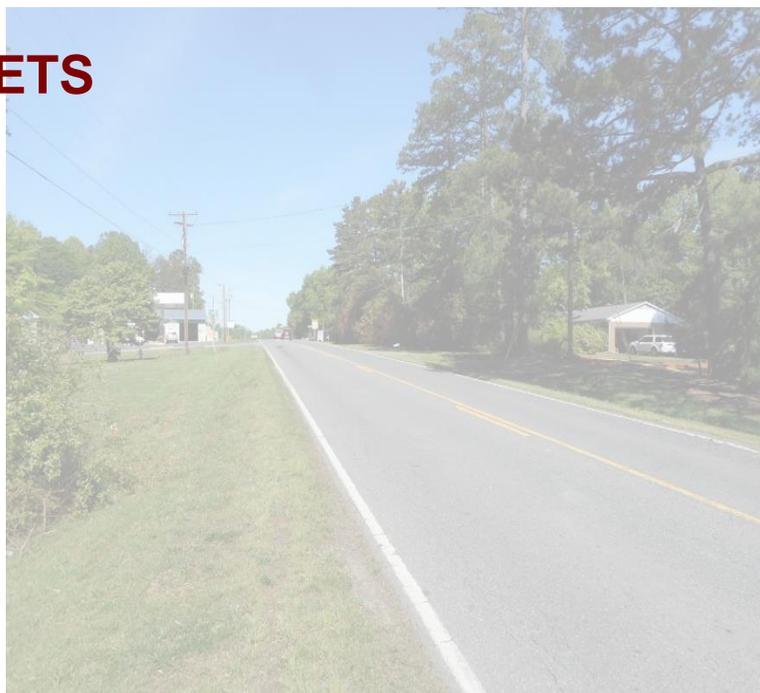
SC 160 (TOM HALL ROAD) ROAD WIDENING



APPENDIX B:



U-SHEETS



SC 160 (TOM HALL RD) ROAD WIDENING PID 029536 YORK COUNTY, SC

UTILITY RELOCATION PLANS

COMPANY	CONTACT	PHONE NO.
Duke Energy Power Distribution	Julie Monroy (Pike) 123 N. White Street Fort Mill, SC 29715 JMonroy@pike.com	803-659-5843
	Larry Robinson (Pike) 123 N. White Street Fort Mill, SC 29715 LNRobinson@pike.com	803-835-7880
Town of Fort Mill Water & Sewer NO CONFLICT	Greg Rushing 131 E. Elliott Street Fort Mill, SC 29715 grushing@fortmillsc.gov	803-396-9729
YCNGA Gas	Eric Cellucci 965 West Main Street Rock Hill, SC 29730 eric.cellucci@ycnga.com	803-323-5392
COMPANY	CONTACT	PHONE NO.
Comporium Telephone	Eric Kirkland 471 Lakeshore Parkway Rock Hill, SC 29730 eric.kirkland@comporium.com	803-326-6109
Charter/Spectrum CATV	Neal Barker 3140 West Arrowood Road Charlotte, NC 28273 neal.barker@charter.com	704-671-6103

INDEX OF SHEETS

DESCRIPTION	SUBTOTAL OF SHEETS
UTILITY REFERENCE SHEET	U1
UTILITY LEGEND SHEET	U2
UTILITY DATA SHEET	U3
UTILITY POLE DATA SHEET	U4
UTILITY GENERAL NOTES	U5
UTILITY PLAN SHEETS	U6-U8
TOTAL	8



6			
5			
4			
3			
2			
1			
REV. NO.	BY	DATE	DESCRIPTION OF REVISION

SUE LEGEND AND NOTES

FOR INFORMATION ONLY	FINAL PLANS	FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD / ROUTE NO.	SHEET NO.
		3	S.C.	YORK	P029536	SC 160	U2

ELECTRIC SYMBOLS		TELECOMMUNICATION SYMBOLS			
SYM	ABV	DESCRIPTION	SYM	ABV	DESCRIPTION
	ETM	ELECTRICAL TRANSFORMER		TB	TELEPHONE BOOTH
	EMH	ELECTRICAL MAN HOLE		TVP	CABLE TV PEDESTAL
	EHH	ELECTRICAL HAND HOLE		TLC	SUBSCRIBER LOOP CARRIER (aka SLICK)
	EPP	ELECTRIC PEDESTAL		TPP	TELEPHONE PEDESTAL
	EBX	ELECTRIC BOX		TMH	TELEPHONE MAN HOLE
	ESG	ELECTRIC SWITCH GEAR BOX		TFOH	FIBER OPTIC HAND HOLE
	EVT	ELECTRIC VAULT		THH	TELEPHONE HAND HOLE
	EGL	GROUND / LANDSCAPE LIGHT		TVHH	CABLE TV HAND HOLE
	EAB	ELECTRIC AIR BRAKE		TBX	TELEPHONE BOX
	ERO	ELECTRIC RESIDENTIAL OUTLET		TXB	UG / SPLICE - AG SPLICE BOX

POLE SYMBOLS		WATER SYMBOLS			
SYM	ABV	DESCRIPTION	SYM	ABV	DESCRIPTION
	PSP	SIGNIFICANT POLE (STEEL, CONCRETE, ETC)		TVB	CABLE TV BOX
	PP	ELECTRIC, COMBINATION POLE		TUV	UNDERGROUND TELEPHONE VAULT
	PMP	METER POLE		UTP	UNDERGROUND TELEPHONE PEDESTAL
	PLT	TRANSMISSION LINE POLE		UTV	UNDERGROUND CABLE TV PEDESTAL
	PLP	AREA LIGHT POLE	WATER SYMBOLS		
	PTF	TRAFFIC SIGNAL POLE		WM	WATER METER
	POP	OTHER USE POLE		WV	WATER VALVE
	PCT	CELL PHONE TOWER		WMW	WATER MONITORING WELL
	PTP	TELEPHONE POLE		WFH	FIRE HYDRANT
	PGP	GUY POLE		WMH	WATER MAN HOLE
				WAR	WATER AIR RELEASE VALVE

TRAFFIC CONTROL SYMBOLS		
SYM	ABV	DESCRIPTION
	TFV	TRAFFIC SIGNAL CONTROL VAULT
	TFHH	TRAFFIC CONTROL HAND HOLE
	TFJ	TRAFFIC SIGNAL JUNCTION BOX

GAS SYMBOLS		SEWER SYMBOLS			
SYM	ABV	DESCRIPTION	SYM	ABV	DESCRIPTION
	GM	GAS METER		SCO	SEWER CLEAN OUT
	GVC	GAS VALVE CAP		SMH	SEWER MAN HOLE
	GMH	GAS MAN HOLE		SAR	SEWER AIR RELEASE VALVE
	GVT	GAS VENT		SST	SEWER STEP TANK
	GR	GAS PRESSURE REGULATOR		SCV	SEWER CHECK VALVE BOX
	GTP	GAS LINE TEST POINT		SGP	SEWER GRINDER / PUMP STATION
	GTF	GAS LINE TAP FARM		SSV	SEWER VALVE
				SLS	SEWER LIFT STATION

MISC SYMBOLS		NONPOTABLE WATER SYMBOLS			
SYM	ABV	DESCRIPTION	SYM	ABV	DESCRIPTION
	MWP	UTILITY WITNESS POST		ICV	IRRIGATION CONTROL VALVE
	EOI	END OF INFORMATION		ICB	IRRIGATION CONTROL BOX
	MUC	MISC / UNKNOWN VALVE CAP OR COVER		IRH	IRRIGATION / SPRINKLER HEAD
	MPB	PAVED OR BURIED MANHOLE / CAP			
	MUE	UTILITY TERMINI / ENDS			
	MTH	TEST HOLE			

COMBINATION LINE DEPICTION CODES

SHOW COMBINED LEVEL C & D SUE WILL INCLUDE THE FOLLOWING LEVEL QUALITY CODES:
LINE SHOWN DEPICTS QUALITY LEVEL C <C>
LINE SHOWN DEPICTS QUALITY LEVEL D <D>

MULTIPLE SUE OWNERS CAN BE DEPICTED OWNERSHIP WITH THE FOLLOWING CODES:
(A) UTILITY OWNER "X"
(B) UTILITY OWNER "Y"

UTILITY LINES THAT REQUIRE MORE DETAILED INFORMATION ON THE PLAN SHEET CAN BE LABELED WITH THE SUPPLEMENTAL UTILITY LINE LABEL (SUL):

OWNERSHIP CODES WILL BE REFERENCED ON THE TITLE/OWNER SHEET AND THE UTILITY & POLE DATA SHEET.

SEWER MANHOLE NUMBERS (SMN)

S001 SANITARY SEWER MANHOLE
DESIGNATE EACH SANITARY SEWER MANHOLE WITH A SEWER MANHOLE NUMBER (SMN). REFERENCE THIS SMN ON THE UTILITY DATA SHEET AND LIST ELEVATIONS.

UTILITY INFORMATION ABBREVIATIONS	
SYM	DESCRIPTION
EOI	END OF INFORMATION
EORI	END OF RECORDED INFORMATION
AATUR	UTILITY ABANDONED ACCORDING TO UTILITY RECORDS
AATFI	UTILITY ABANDONED ACCORDING TO FIELD INSPECTION
EATUR	EMPTY ACCORDING TO UTILITY RECORDS
NAP	NO ASSOCIATED PIPING FOUND FROM STRUCTURE
NAC	NO ASSOCIATED CABLES FOUND FROM STRUCTURE
DBR	DIRECT BURIED
DATFI	DEPICTED ACCORDING TO FIELD INSPECTION
EATFI	EMPTY ACCORDING TO FIELD INSPECTION
PR	PAIR
MT	EMPTY
CAP	CAPACITY
GR	GROUND

MATERIAL ABBREVIATIONS	
SYM	DESCRIPTION
C	COPPER
DI	DUCTILE IRON
S	STEEL
P	PLASTIC
FO	FIBER OPTIC
CI	CAST IRON
S	STEEL
CO	CONCRETE
PV	PVC
VY	VYLLON
TC	TERRA COTTA
SWC	STEEL WRAPPED COATED
AC	ASBESTOS CEMENT
TF	TRAFFIC SIGNAL CABLE
GW	GUY WIRE
CNT	CONDUIT

GENERAL ABBREVIATIONS	
SYM	DESCRIPTION
E	ELECTRIC (POWER)
W	UNDERGROUND WATER
G	UNDERGROUND GAS
PUPS	PALMETTO UTILITY PROTECTION SERVICES
T	TELEPHONE, TELECOMMUNICATION
TV, C	CABLE TELEVISION
S	FIBER OPTIC
FS	FORCED SANITARY SEWER, FORCE MAIN
DB	DUCT BANK
TF	TRAFFIC CONTROL UTILITY
UNK	UNKNOWN UTILITY
HP	HYDROGEN PEROXIDE
ST	STEAM LINE
F	FUEL / PETROLEUM LINE
R	RECLAIMED WATER / SLURRY LINE
I	IRRIGATION LINE
DB	DUCT BANK
TNL	TUNNEL
CA	GASES MATERIAL
OSL	OUTSIDE LIMITS
N/A	NOT AVAILABLE
N/S	NOT SURVEYED (REFERENCE)
PH	PHASE (POWER)
CIR	CIRCUIT (TRANSMISSION)
SVC	SERVICE
LPR	LOW PRESSURE
HPR	HIGH PRESSURE
UG	UNDERGROUND
AG	ABOVE GROUND

SOIL COMBINATION CHART					
SANDY LOAM	SL	SILTY LOAM	ZL	SILT	Z
CLAY LOAM	CL	SILT CLAY LOAM	ZCL	SAND CLAY LOAM	SCL
SANDY CLAY	SC	SILTY CLAY	ZC	CLAY	C

SURFACE DESCRIPTION LEGEND KEY					
ASPHALT	A	INTER-LOCKING BRICK	I	CONCRETE	C
NATURAL GROUND	N				

SOIL DESCRIPTION LEGEND KEY				
COMPACTION	WATER LEVEL	SOIL TYPE		
LOOSE	DRY	D	CLAY	C
SOFT	MOIST	M	LOAM	L
HARD	WET	E	SAND	S
SOLID	STANDING WATER	WW	SILT	Z

UTILITY INFORMATION TAGS (UIT)	
SYM	DESCRIPTION
T001	UTILITY INFORMATION TAG

UTILITY POLE ID NUMBER (UPIN)	
SYM	DESCRIPTION
P001	UTILITY POLE ID NUMBER

UTILITY UNIQUE IDENTIFIER LINE-STYLES	
SYM	DESCRIPTION
	ELECTRIC RECORDED E1 THRU E10
	ELECTRIC DESIGNATED E1 THRU E10
	TRAFFIC CONTROL RECORDED TF1 THRU TF5
	TRAFFIC CONTROL DESIGNATED TF1 THRU TF5
	TELEPHONE RECORDED T1 THRU T10
	TELEPHONE DESIGNATED T1 THRU T10
	CABLE TV RECORDED TV1 THRU TV10
	CABLE TV DESIGNATED TV1 THRU TV10
	IRRIGATION RECORDED I1 THRU I5
	IRRIGATION DESIGNATED I1 THRU I5
	SLURRY RECORDED R1 THRU R5
	SLURRY DESIGNATED R1 THRU R5
	GAS RECORDED G1 THRU G10
	GAS DESIGNATED G1 THRU G10
	FUEL/PETROL RECORDED F1 THRU F5
	FUEL/PETROL DESIGNATED F1 THRU F5
	STEAM RECORDED ST1 THRU ST5
	STEAM DESIGNATED ST1 THRU ST5
	COMPRESSED GASES RECORDED CA1 THRU CA5
	COMPRESSED GASES DESIGNATED CA1 THRU CA5
	WATER RECORDED W1 THRU W10
	WATER DESIGNATED W1 THRU W10
	GRAVITY SEWER RECORDED S1 THRU S10
	FORCED SEWER RECORDED FS1 THRU FS10
	FORCED SEWER DESIGNATED FS1 THRU FS10
	AERIAL SIGNAL LINE SIG
	AERIAL UTILITY LINE OH1 THRU OH20
	AERIAL GUY WIRE GW
	MISCELLANEOUS RECORDED M1 THRU M5
	MISCELLANEOUS DESIGNATED M1 THRU M5
	DUCT BANK RECORDED DB1 THRU DB5
	DUCT BANK DESIGNATED DB1 THRU DB5
	UTILITY TUNNEL TNL
	UNKNOWN DESIGNATED UNK
	SWEEP LIMIT SUE
	AERIAL COMMUNICATIONS T1

QUALITY LEVEL DEFINITIONS	
LEVEL	DEFINITION
Level D	This level information comes solely from existing utility records. It may provide an overall "feel" for the congestion of utilities, but it is often highly limited in terms of comprehensiveness and accuracy. Its usefulness should be confined to project planning and route selection activities.
Level C	This level involves surveying visible aboveground utility facilities (e.g., manholes, valve boxes, posts) and correlating this information with existing utility records. When using this information, it is not unusual to find that many underground utilities have been either omitted or erroneously plotted. Its usefulness, therefore, should be confined to rural projects where utilities are not prevalent, or are not too expensive to repair or relocate.
Level B	This level involves the use of surface geophysical techniques to determine the existence and horizontal position of underground utilities. This activity is called "designating." Two-dimensional mapping information is obtained. This information is usually sufficient to accomplish preliminary engineering goals. Decisions can be made on where to place storm drainage systems, footers, foundations and other design features in order to avoid conflicts with existing utilities. Slight adjustments in the design can produce substantial cost savings by eliminating utility relocations.
Level A	This level involves the use of nondestructive digging equipment at critical points to determine the precise horizontal and vertical position of underground utilities, as well as the type, size, condition, material and other characteristics. This activity is called "locating." It is the highest level presently available. When surveyed and mapped, precise plan and profile information are available for use in making final design decisions. By knowing exactly where a utility is positioned in three dimensions, the designer can often make small adjustments in elevations or horizontal locations and avoid the need to relocate utilities. Additional information (e.g., utility materials, condition, size, soil contamination, paving thickness) also assists the designer and Utility Company in their decisions.

U SHEET - UTILITY COORDINATION LEGEND		
SYM	ABV	DESCRIPTION
	UCP	NEW / RELOCATED UTILITY POLE
	URP	REMOVE UTILITY POLE
	UCW	NEW / RELOCATE WATER STRUCTURE
	UCT	NEW / RELOCATE TELECOMMUNICATION PEDESTAL
	UCG	NEW / RELOCATE GAS STRUCTURE
	UCE	NEW / RELOCATE ELECTRIC STRUCTURE
	UCS	NEW / RELOCATE SEWER STRUCTURE
	UCF	NEW / RELOCATE TRAFFIC STRUCTURE
	UCU	NEW / RELOCATE MISC STRUCTURE

U SHEET PLAN NOTES		REMOVED UTILITIES	
U-SHEET LINEWORK WILL BE USED WHEN UTILITY RELOCATION PLANS ARE INCLUDED IN THE PLAN SET.			
ALL U-SHEET UII LINES WILL BE DETAILED ON THE U-SHEET DATA SHEET.			
"MISCELLANEOUS" UII U-SHEET LINEWORK CAN BE USED FOR ANY UTILITY NOT REPRESENTED WITH A RELOCATION UII.			
ON U-SHEETS, EXISTING UTILITIES ARE DEPICTED ON A GREYSCALE.			

PROJECT SPECIFIC NOTES

1. SUE WAS PERFORMED BY ESP ASSOCIATES, PA IN 2007 FOR YORK COUNTY.



REV. NO.	BY	DATE	DESCRIPTION OF REVISION
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POLE DATA

FED. ROAD DIV. NO.	STATE	COUNTY	PROJECT ID	ROUTE NO.	SHEET NO.
3	S.C.	YORK	P029536	SC 160	U4

FOR INFORMATION ONLY FINAL PLANS

POLE	ALIGNMENT / ROUTE / RD	STATION	OFFSET	OWNER	POLE DATA			RIDING UTILITIES
					OWNER No	HEIGHT	DIAMETER	
P1				DUKE		8	WOOD	1 PHASE POWER
P2				DUKE		9	WOOD	3 PHASE POWER, TRANSFORMER, METER, TV BOOSTER
P3				DUKE		9	WOOD	1 PHASE POWER, TRANSFORMER
P4				DUKE	142749 046321	9	WOOD	3 PHASE POWER, TRANSFORMER, TELEPHONE FO
P5				DUKE		9	WOOD	3 PHASE POWER
P6				DUKE		10	WOOD	3 PHASE POWER
P7				DUKE	142664 046357	9	WOOD	3 PHASE POWER
P8				DUKE		10	WOOD	3 PHASE & 1 PHASE POWER, TRANSFORMER
P9				DUKE		12	WOOD	3 PHASE & 1 PHASE POWER, TV
P10				DUKE		8	WOOD	1 PHASE POWER, TV
P11				DUKE		10	WOOD	3 PHASE & 1 PHASE POWER
P12				DUKE		8	WOOD	1 PHASE POWER, LIGHT
P13				DUKE		8	WOOD	1 PHASE POWER
P14				DUKE		12	WOOD	3 PHASE & 1 PHASE POWER
P15				DUKE		10	WOOD	1 PHASE POWER
P16				SC DOT		12	STEEL	1 PHASE POWER, METER, TRAFFIC SIGNAL
P17				SC DOT		12	STEEL	TRAFFIC SIGNAL
P18				SC DOT		12	STEEL	TRAFFIC SIGNAL
P19				SC DOT		12	STEEL	TRAFFIC SIGNAL
P20				DUKE		8	WOOD	1 PHASE POWER, LIGHT, TV, TELEPHONE
P21				DUKE		10	WOOD	3 PHASE & 1 PHASE POWER, TRANSFORMER, TV, TELEPHONE
P22				DUKE		12	WOOD	3 PHASE POWER, TV, TELE
P23				DUKE		10	WOOD	3 PHASE POWER, TV, TELE


STV Incorporated
 4969 CENTRE POINT DRIVE
 SUITE 102
 NORTH CHARLESTON, SOUTH CAROLINA 29418

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REV. NO.	BY	DATE	DESCRIPTION OF REVISION

SOUTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
**SC 160 (TOM HALL RD)
 ROAD WIDENING
 POLE DATA SHEET**
 SCALE: N/A RTE. SC 160 DWG. NO. U4

GENERAL NOTES

THESE PLANS ARE TO BE USED ONLY AS REFERENCE FOR UTILITY RELOCATIONS.

ALL RELOCATIONS ARE APPROXIMATE BASED ON INFORMATION PROVIDED BY THE INDIVIDUAL UTILITY OWNERS.

ALL PROPOSED RELOCATIONS ARE CONSIDERED INCOMPLETE AND THE INDIVIDUAL UTILITY OWNERS MAY REQUIRE ADDITIONAL RELOCATIONS.

ACTUAL FIELD CONDITIONS WILL DICTATE THE PRECISE LOCATION OF THE RELOCATED UTILITY THROUGH COORDINATION BETWEEN THE CONTRACTOR AND THE UTILITY OWNER.

THE CONTRACTOR SHALL REFER TO EACH UTILITY OWNER'S RELOCATION PLANS INDIVIDUALLY FOR DETAILED AND ACCURATE INFORMATION REGARDING RELOCATIONS. THESE PLANS ARE AVAILABLE FOR REVIEW AT THE SCDOT DISTRICT OFFICE.

THE CONTRACTOR IS REQUIRED TO CONTACT PALMETTO UTILITY PROTECTION SERVICE (PUPS) AS WELL AS THE NON-PUPS MEMBER UTILITIES THREE DAYS PRIOR TO EXCAVATING ACTIVITIES. 1-888-721-7877

THE CONTRACTOR IS REQUIRED TO COORDINATE THE ROADWAY CONSTRUCTION SCHEDULE WITH THE UTILITY RELOCATION SCHEDULES.

SPECIAL PROVISIONS

CONFIRM WITH ALL UTILITIES THE STATUS OF THEIR RELOCATIONS. INCLUDED IN THIS REPORT ALONG WITH THE INDIVIDUAL UTILITY SUBMITTALS ARE THE U-SHEETS.

UTILITY AS-BUILTS:

THE ROADWAY CONTRACTOR SHALL BE RESPONSIBLE FOR THE COLLECTION AND INCORPORATION OF THE UTILITY AS-BUILTS IN THEIR FINAL SUBMITTAL. ALL EXISTING, PROPOSED, AND ABANDON LINES MUST BE SHOWN.

UTILITY STAKING:

CONTRACTOR SHALL BE AWARE ON AS NEEDED BASIS, UTILITIES MAY REQUEST STAKING OF CONSTRUCTION ITEMS AND RIGHT-OF-WAY TO HELP FACILITATE RELOCATIONS AND TO AVOID POTENTIAL CONFLICT WITH ROADWAY CONSTRUCTION AND OTHER UTILITIES.

UTILITY RELOCATION INCIDENTALS:

FOR THE RELOCATION OF SERVICES, ADJUSTMENTS OF VALVE COVERS AND/OR MANHOLE LIDS, ADJUSTMENTS FOR POINT CONFLICTS, AND ANY OTHER UTILITY APPURTENANCES ADJUSTMENTS, THE CONTRACTOR SHALL NOTIFY THE UTILITY OWNER 14 DAYS PRIOR TO NEEDING ADJUST AND ALLOW ONE WEEK TO COMPLETE.

UTILITY RELOCATION WINDOW & SEQUENCE:

TEMPORARY SUSPENSION FOR UTILITY WORK AND UTILITY WINDOW:

THE DEPARTMENT HAS DETERMINED THAT IN THE BEST INTEREST OF THE TRAVELING PUBLIC, THE CONTRACTOR SHALL PERFORM THE CLEARING AND GRUBBING OPERATIONS AS SOON AS POSSIBLE AFTER THE AWARD OF THE CONTRACT TO ALLOW FOR UTILITIES TO RELOCATE WITHIN A SPECIFIED 90 DAY UTILITY WINDOW. ONCE THE NOTICE TO PROCEED HAS BEEN ESTABLISHED, THE CONTRACTOR SHALL BEGIN ASSOCIATED CLEARING AND STAKING OPERATIONS ON SC 160 (TOM HALL RD). UPON COMPLETION OF THE CLEARING AND GRUBBING AND CONSTRUCTION STAKING, THE CONTRACTOR SHALL NOTIFY THE RCE BY LETTER. ONCE THE RCE HAS BEEN NOTIFIED THAT CLEARING AND GRUBBING, EROSION CONTROL, AND STAKING OPERATIONS ON THE ARE ROAD ARE COMPLETE, THE UTILITY WINDOW SHALL BEGIN. THE RCE SHALL ESTABLISH THE BEGINNING AND END DATE OF THE UTILITY WINDOWS.

DURING THE UTILITY WINDOW, THE CONTRACTOR WILL NOT BE ALLOWED TO PERFORM ANY WORK ACTIVITIES UNLESS APPROVED BY THE RCE. IF WORK ACTIVITIES ARE APPROVED, THEY SHOULD IN NO WAY HINDER OR INTERFERE WITH THE UTILITY RELOCATIONS DURING THE UTILITY WINDOW PROVIDED. IF WORK ACTIVITIES INTERFERE WITH UTILITY RELOCATIONS, ALL WORK BY THE PRIME CONTRACTOR AND SUBCONTRACTORS WILL BE SUSPENDED UNTIL THE END OF THE UTILITY WINDOW.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL EROSION CONTROL MEASURES ON THE PROJECT. THE DEPARTMENT WILL NOT COMPENSATE THE CONTRACTOR FOR ANY ADDITIONAL MOBILIZATION OTHER THAN THE BID AMOUNT FOR MOBILIZATION.

THIS PROVISION IN NO WAY PROVIDES A GUARANTEE THAT ALL UTILITY RELOCATIONS WILL BE COMPLETED DURING THE UTILITY WINDOW.

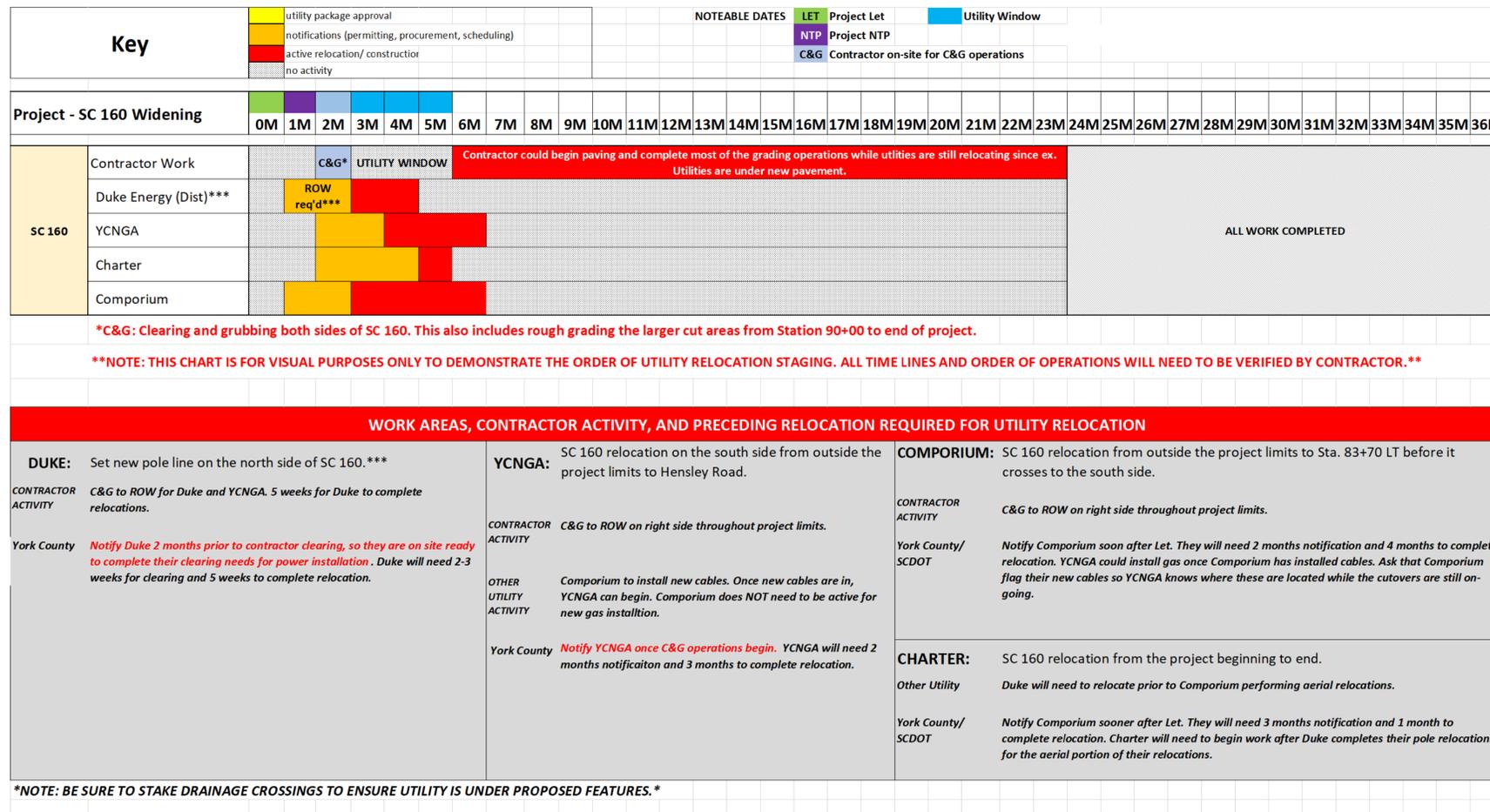
UTILITY WINDOW & RELOCATION SEQUENCE:

IT IS THE INTENTION OF THE UTILITIES TO RELOCATE ACCORDING TO THE FOLLOWING CONSTRUCTION SEQUENCE. IF THE CONTRACTOR PLANS TO DEVIATE FROM THE PROPOSED PHASING, THEN IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE ANY CHANGES AND ACCOUNT FOR ANY POTENTIAL DELAYS.

UTILITY WINDOW & RELOCATION SEQUENCE:

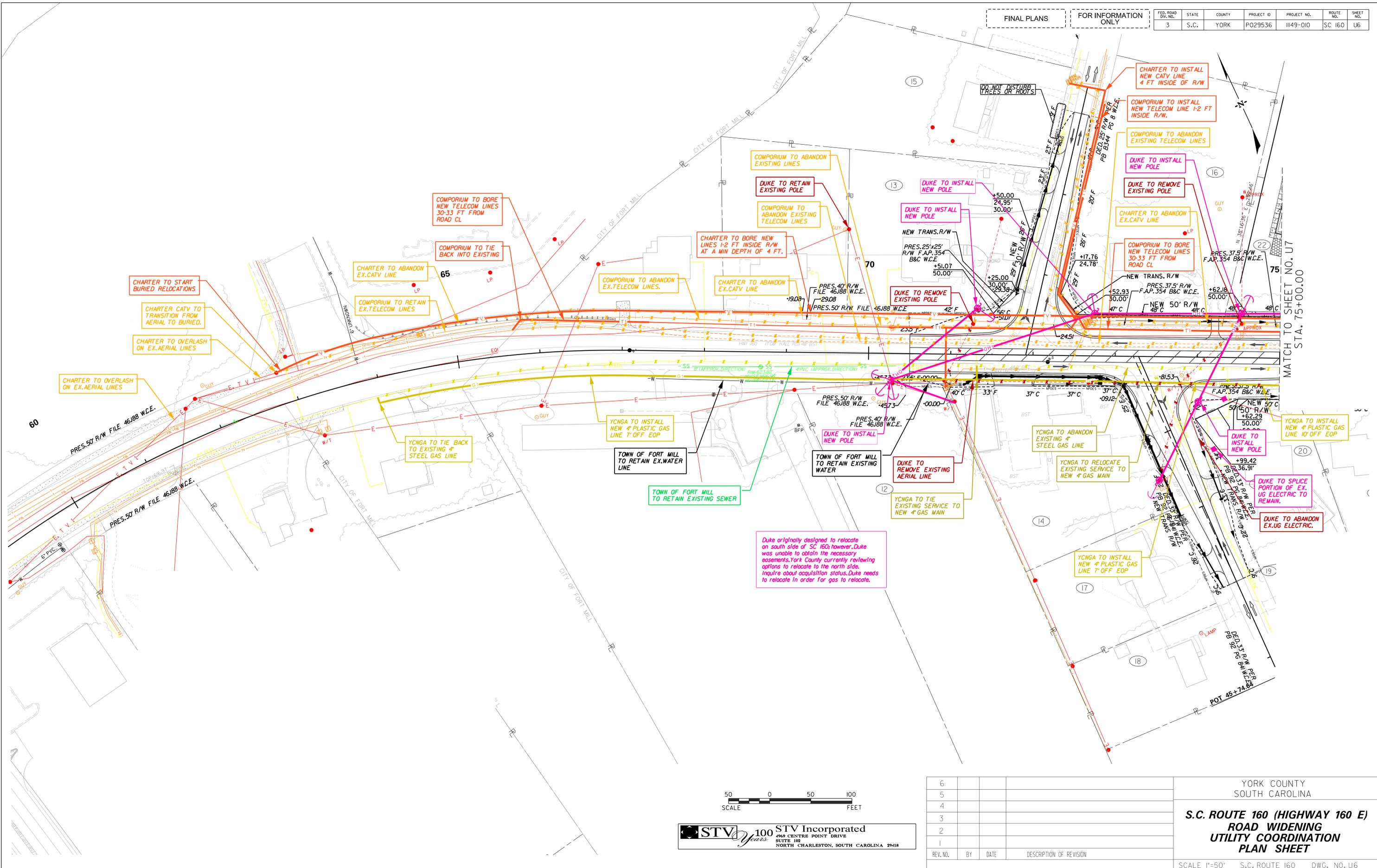
IT IS THE INTENTION OF THE UTILITIES TO RELOCATE ACCORDING TO THE FOLLOWING CONSTRUCTION SEQUENCE. IF THE CONTRACTOR PLANS TO DEVIATE FROM THE PROPOSED PHASING, THEN IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE ANY CHANGES AND ACCOUNT FOR ANY POTENTIAL DELAYS.

THIS PROVISION IN NO WAY PROVIDES A GUARANTEE THAT ALL UTILITY RELOCATIONS WILL BE COMPLETED DURING THE UTILITY WINDOW.



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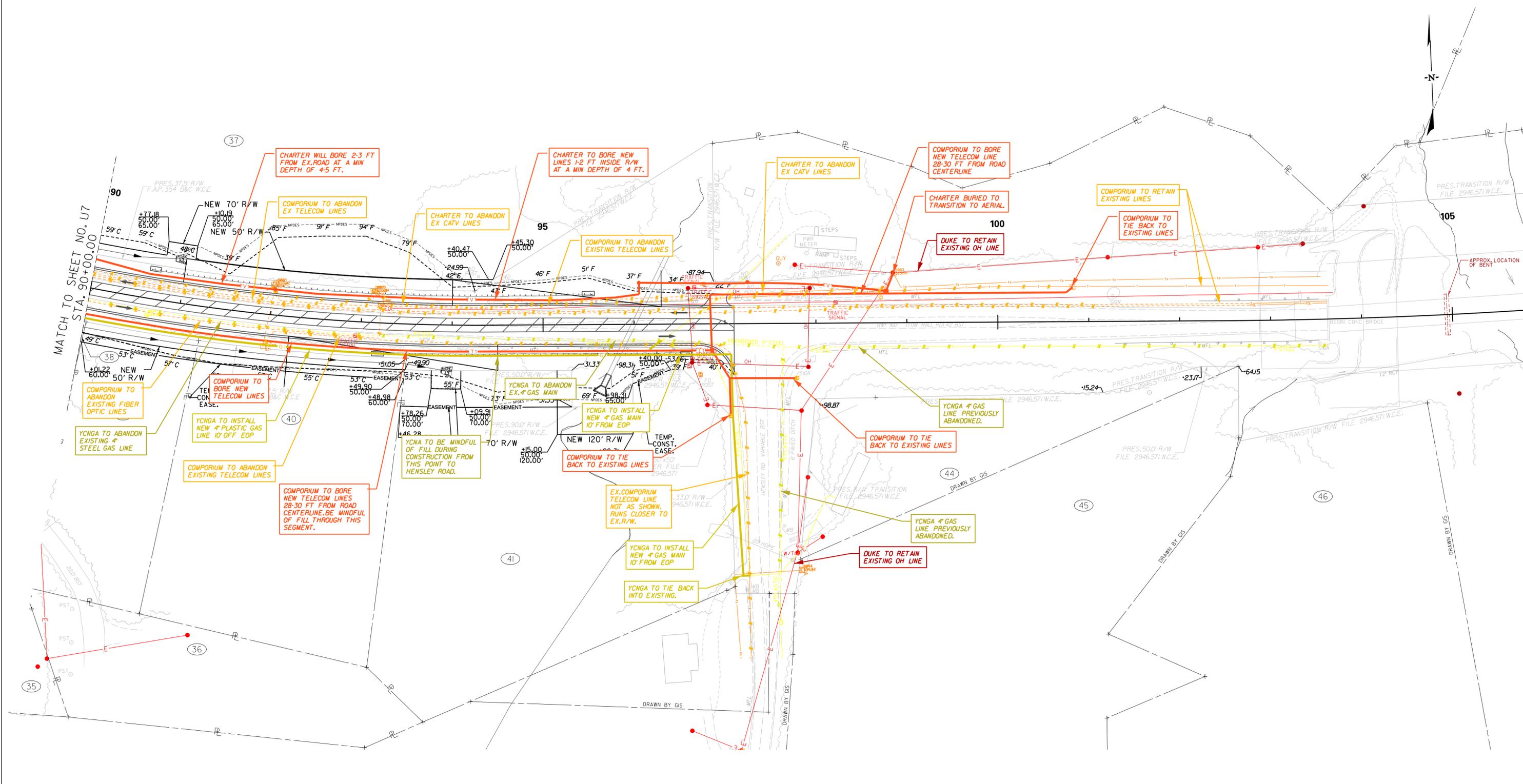


Duke originally designed to relocate on south side of SC 160; however, Duke was unable to obtain the necessary easements. York County currently reviewing options to relocate to the north side. Inquire about acquisition status. Duke needs to relocate in order for gas to relocate.

STV 100 Years STV Incorporated
 2969 CENTRE POINT DRIVE
 SUITE 102
 NORTH CHARLESTON, SOUTH CAROLINA 29418

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REV. NO.	BY	DATE	DESCRIPTION OF REVISION	

YORK COUNTY
 SOUTH CAROLINA
**S.C. ROUTE 160 (HIGHWAY 160 E)
 ROAD WIDENING
 UTILITY COORDINATION
 PLAN SHEET**
 SCALE 1"=50' S.C. ROUTE 160 DWG. NO. U6



STV 100 Years STV Incorporated
 2969 CENTRE POINT DRIVE
 SUITE 102
 NORTH CHARLESTON, SOUTH CAROLINA 29418

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REV. NO.	BY	DATE	DESCRIPTION OF REVISION

YORK COUNTY
 SOUTH CAROLINA
**S.C. ROUTE 160 (HIGHWAY 160 E)
 ROAD WIDENING
 UTILITY COORDINATION
 PLAN SHEET**
 SCALE 1"=50' S.C. ROUTE 160 DWG. NO. UB

SC 160 (TOM HALL ROAD) ROAD WIDENING



APPENDIX C:



**UTILITY CONFLICT &
RESOLUTION MATRIX**



**P029536 SC 160 ROAD WIDENING
CONFLICT MATRIX**

Item Number	Reloc. No.	Public or Private	Existing Utility Type	Utility Owner	Existing Utility		Overhead or Underground (OH/UG)	Sheet Number		Reference Baseline	Station		Offset (ft)	Parallel or Crossing	Proposed Conflict Feature	Relocate or Remain
					Size	Material		Start	End		Begin	End				
1001	1	Private	Gas	YCNGA	4"	STL	UG	STV_UO_6	STV_UO_6	REL160	50+00	70+46	Varies RT	Parallel	Road	Remain
1002	2	Private	Gas	YCNGA	4"	STL	UG	STV_UO_6	STV_UO_8	REL160	70+46	98+39	Varies RT	Parallel	Road, Drainage	Relocate
1003	3	Public	Water	Town of Fort Mill	UKN	UKN	UG	STV_UC_6	STV_UC_6	REL160	67+31	74+62	Varies RT	Parallel	Road	Remain
1004	4	Public	Gravity Sewer	Town of Fort Mill	8"	UKN	UG	STV_UC_6	STV_UC_6	REL160	67+68	70+34	Varies RT	Parallel	Road	Remain
1005	5	Private	CATV	Comporum	UKN	UKN	UG	STV_UO_6	STV_UO_7	REL160	50+00	82+32	Varies LT	Parallel	Road	Remain
1006	6	Private	CATV	Comporum	UKN	UKN	UG	STV_UO_7	STV_UO_8	REL160	82+32	96+91	Varies LT	Parallel	Road	Relocate
1007	7	Private	CATV	Comporum	UKN	UKN	UG	STV_UO_8	STV_UO_8	REL160	96+91	103+57	Varies LT	Parallel	Road	Remain
1008	8	Private	Telecom	Comporium	UKN	UKN	UG	STV_UO_6	STV_UO_6	REL160	50+00	66+96	Varies LT	Parallel	Road	Remain
1009	9	Private	Telecom	Comporium	UKN	UKN	UG	STV_UO_6	STV_UO_8	REL160	66+96	102+79	Varies LT	Parallel	Road, Drainage	Relocate
1010	10	Private	Telecom	Comporium	UKN	UKN	UG	STV_UO_8	STV_UO_8	REL160	102+79	103+62	Varies LT	Parallel	Road	Remain
1011	11	Private	Power	Duke Energy	UKN	Pole	OH	STV_UO_6	STV_UO_6	REL160	50+00	70+92	Varies RT	Parallel	Road	Remain
1012	12	Private	Power	Duke Energy	UKN	Pole	OH	STV_UO_6	STV_UO_8	REL160	70+92	89+42	Varies RT	Parallel	Road, Drainage	Relocate
1013	13	Private	Power	Duke Energy	UKN	Pole	OH	STV_UO_8	STV_UO_8	REL160	96+64	103+37	Varies	Parallel/ Crossing	Road	Remain
1014	14	Private	Telecom	Charter	UKN	Fiber	OH	STV_UO_6	STV_UO_8	REL160	50+00	89+42	Varies RT	Parallel	Road	Relocate
1015	15	Private	Telecom	Charter	UKN	Fiber	UG	STV_UO_8	STV_UO_8	REL160	89+42	98+85	Varies LT	Parallel/ Crossing	Road, Drainage	Relocate
1016	16	Private	Telecom	Charter	UKN	Fiber	OH	STV_UO_8	STV_UO_8	REL160	98+85	103+38	Varies LT	Parallel	Road	Remain
1017	17	Private	Gas	YCNGA	2"	Plastic	UG	STV_UO_6	STV_UO_6	Mimosa	46+67	50+00	21' RT	Parallel/ Crossing	Road	Remain
1018	18	Private	CATV	Comporium	UKN	UKN	UG	STV_UO_6	STV_UO_6	Mimosa	46+67	50+00	12 LT	Parallel	Road	Relocate
1019	19	Private	Telecom	Comporium	UKN	UKN	UG	STV_UO_6	STV_UO_6	Mimosa	46+67	50+00	15 LT	Parallel	Road	Relocate
1020	20	Private	Telecom	Comporium	UKN	UKN	UG	STV_UO_6	STV_UO_6	REL160	70+93	72+66	Varies	Parallel/ Crossing	Road	Remain
1021	21	Private	Power	Duke Energy	UKN	Pole	OH	STV_UO_6	STV_UO_6	REL160	71+08	71+08	LT/RT	Crossing	Road	Relocate
1022	22	Private	Gas	YCNGA	1"	Plastic	UG	STV_UO_6	STV_UO_6	King	48+07	48+07	LT/RT	Crossing	Road, Drainage	Remain

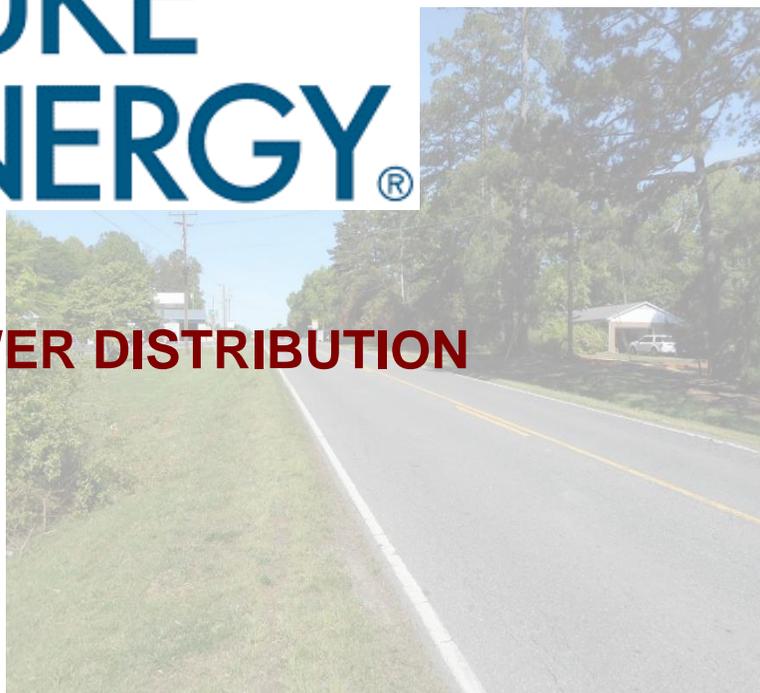
**P029536 SC 160 ROAD WIDENING
CONFLICT MATRIX**

Item Number	Reloc. No.	Public or Private	Existing Utility Type	Utility Owner	Existing Utility		Overhead or Underground (OH/UG)	Sheet Number		Reference Baseline	Station		Offset (ft)	Parallel or Crossing	Proposed Conflict Feature	Relocate or Remain
					Size	Material		Start	End		Begin	End				
1023	23	Private	Gas	YCNGA	1"	Plastic	UG	STV_UO_6	STV_UO_6	King	46+98	50+00	14" RT	Parallel	Road	Remain
1024	24	Private	Power	Duke Energy	UKN	Pole	OH	STV_UO_6	STV_UO_7	REL160	74+12	74+12	LT/RT	Crossing	Road, Drainage	Relocate
1025	25	Private	Power	Duke Energy	UKN	Pole	OH	STV_UO_6	STV_UO_7	REL160	76+69	76+69	LT/RT	Crossing	Road, Drainage	Relocate
1026	26	Private	Gas	YCNGA	UKN	UKN	UG	STV_UO_7	STV_UO_7	REL160	77+44	77+44	LT/RT	Crossing	Road	Remain
1027	27	Private	Gas	YCNGA	UKN	UKN	UG	STV_UO_7	STV_UO_7	REL160	79+50	79+50	LT/RT	Crossing	Road	Remain
1028	28	Private	Gas	YCNGA	UKN	UKN	UG	STV_UO_7	STV_UO_7	REL160	81+10	81+10	LT/RT	Crossing	Road	Remain
1029	29	Private	Gas	YCNGA	UKN	UKN	UG	STV_UO_7	STV_UO_7	REL160	82+37	82+37	LT/RT	Crossing	Road	Remain
1030	30	Private	Gas	YCNGA	UKN	UKN	UG	STV_UO_7	STV_UO_7	REL160	83+60	83+60	LT/RT	Crossing	Road	Remain
1031	31	Private	Gas	YCNGA	UKN	UKN	UG	STV_UO_8	STV_UO_8	REL160	96+55	96+55	LT/RT	Crossing	Road	Remain
1032	32	Private	Telecom	Comporium	UKN	UKN	UG	STV_UO_7	STV_UO_7	REL160	82+03	82+03	LT/RT	Crossing	Road	Relocate
1033	33	Private	Telecom	Comporium	UKN	UKN	UG	STV_UO_7	STV_UO_7	REL160	87+85	87+85	LT/RT	Crossing	Road	Remain
1034	34	Private	Telecom	Charter	UKN	Fiber	UG	STV_UO_7	STV_UO_7	REL160	91+99	91+99	LT/RT	Crossing	Road	Relocate
1035	35	Private	Telecom	Charter	UKN	Fiber	UG	STV_UO_8	STV_UO_8	REL160	93+20	93+20	LT/RT	Crossing	Road	Relocate
1036	36	Private	Power/Traffic	Duke/SCDOT	UKN	Pole	OH	STV_UO_8	STV_UO_8	REL160	96+62	96+62	LT/RT	Crossing	Road	Remain
1037	37	Private	Power/Traffic	Duke/SCDOT	UKN	Pole	OH	STV_UO_8	STV_UO_8	REL160	97+92	97+92	LT/RT	Crossing	Road	Remain
1038	38	Private	Power/Traffic	Duke/SCDOT	UKN	Pole	OH	STV_UO_8	STV_UO_8	REL160	96+60	97+93	38 LT/45 RT	Parallel	Road	Remain
1039	39	Private	Power	Duke	UKN	Pole	OH	STV_UO_8	STV_UO_8	REL160	98+48	98+48	LT/RT	Crossing	Road	Remain
1040	40	Private	Power	Duke	UKN	Pole	OH	STV_UO_8	STV_UO_8	Hensley	49+07	49+07	LT/RT	Crossing	Road	Remain
1041	41	Private	Gas	YCNGA	4"	Plastic	UG	STV_UO_8	STV_UO_8	Hensley	47+00	50+00	Varies LT	Parallel	Road	Remain
1042	42	Private	Telecom	Comporium	UKN	UKN	UG	STV_UO_8	STV_UO_8	Hensley	47+00	50+00	Varies LT/RT	Parallel	Road	Remain
1043	43	Private	Power	Duke Energy	UKN	Pole	OH	STV_UO_8	STV_UO_8	Hensley	47+00	49+04	45 RT	Parallel	Road	Remain
1044	44	Private	Power	Duke Energy	UKN	Pole	OH	STV_UO_8	STV_UO_8	REL160	97+77	104+06	Varies LT	Parallel	Road	Remain

SC 160 (TOM HALL ROAD) ROAD WIDENING



APPENDIX D:



POWER DISTRIBUTION



Agreement # _____

UTILITY AGREEMENT

York County Project No. _____ Route (or Road No.) _____

This Agreement made this _____ day of _____, 20 _____ by and between

York County, hereinafter called "County" and the utility company _

_____ hereinafter called "Company."

DEFINITIONS

Plans – detailed drawings or diagrams showing the stages for the relocation project

Schedule – the estimated number of days to complete each stage of the relocation project

Cost Estimate – the approximate cost of the relocation project

Actual Cost – the amount the Company pays to complete the relocation project

W I T N E S S E T H:

1. It is mutually agreed by and between the parties hereto that the Company shall perform or cause to be performed, the following work to its utility property facilities as shown on the Plans and Cost Estimate attached and incorporated into this agreement.

General description:

2. The Company hereby agrees to relocate its utility facilities in conflict with highway construction in accordance with the provisions set forth in the Federal Highway Administration's FAPG 23 C.F.R. § 645A and the SCDOT's "A Policy for Accommodating Utilities on Highway Rights-of-Way." The Cost Estimate is:

TOTAL \$ _____

County Share \$ _____

Company Share \$ _____

(a) The Company does have the right of occupancy in its existing location by reason of holding the fee, an easement, or other real property interest or does not and is in the existing right of way by encroachment.

(b) This section of line has been in service for approximately _____ years.

(c) Such work as is necessary to relocate, alter, or maintain the facility will be done in such a manner to minimize interference with or endangering the safety of the general public in their use of the roads as a highway. Traffic control and signing will be in accordance with "The Federal Highway Administration's Manual on Uniform Traffic Control Devices for Streets and Highways".

3. The Company shall designate an employee or agent who possesses knowledge of the relocation project and authority to make decisions on behalf of the Company to serve as the Designated Contact Person. The Designated Contact Person shall attend all bi-weekly construction meetings or ensure that any temporary designee attending a bi-weekly meeting possesses knowledge of the relocation project and authority to make decisions on behalf of the Company. The County shall communicate with the Company about the relocation project through the Designated Contact Person. The Company shall notify the County in writing of any changes to the Designated Contact Person within seven calendar days of the change. The Company designates the following person as the Designated Contact Person for this project:

Name: _____

Phone Number: _____

Email: _____

4. The County shall provide the Company written notice, by email, of the date the County intends to begin advertising the bid. The Company shall update its Schedule within sixty days after receiving written notice of the bid advertisement. The County shall provide the Company notice of the preconstruction meeting, which the Company's Designated Contact Person shall attend.

5. The Company shall begin relocation project work promptly upon receiving authorization in writing, by email, from the County and complete the work in accordance with the schedule and as promptly as is practicable. Within ten calendar days of receiving written authorization, the Company shall provide notice to the County of the date on which work is expected to begin.

6. The Company will perform the work provided for in this agreement by the method checked below, in accordance with the provisions FAPG 23 CFR § 645.115:

(X) BY COMPANY'S REGULAR FORCES

() BY CONTRACT: (State one of recognized reasons for necessity of performing work in this manner)

If the Company, subject to prior approval, proposes to contract a portion of or all of the work covered by this agreement, then the Company must submit a list of items in the Cost Estimate that will be accomplished by contract. Where the Company elects to solicit competitive bids from a list of qualified contractors rather than through advertising in a publication, the names and addresses of those contractors must be written on the Cost Estimate or furnished to the County in advance of the Company's solicitation of bids.

7. The County will reimburse the utility company for costs incurred for work performed in accordance with the Plans and Cost Estimate. The Company must provide accurate records supporting all costs incurred and submitted for reimbursement. The method of developing the relocation costs shall be one of the following alternatives.

- Actual and related direct costs accumulated in accordance with a work order accounting procedure prescribed by the applicable Federal or State regulatory body.
- Unit costs, such as broad gauge units of property, as used in own operations. (This method must have prior approval.)

The County will not pay for any components or items considered to be an upgrade unless such upgrades are required by applicable law, necessitated by the relocation, or proven to be more cost efficient.

8. All work performed by the Company shall be performed according to the plans and estimates approved by the County. The County is not obligated to reimburse the Company for any work not included in the Plans or Cost Estimate. The County Engineer may approve reimbursement for Actual Costs or additional work not included in the Plans or Cost Estimate if (1) the Actual Costs or additional work is necessary for the relocation project and (2) the Actual Costs or additional work do not exceed the Cost Estimate by more than 50%. The Company must seek and receive prior written approval before incurring costs for additional work.

9. The Plans must show the existing facilities, permanent changes to be made, and the stages by which these changes are to be accomplished. The Schedule must estimate the time required for each stage.

10. Periodic progress billings of incurred costs may be made by the Company to the County not to exceed monthly intervals and amounting to at least \$2500.00; however, total progress billing payments shall not exceed the Cost Estimate or approved Actual Cost.

Upon completion of the work and no later than three months thereafter, the Company shall, at the earliest date practicable, furnish the County with five (5) copies of its final and complete billing of all costs incurred in connection with the work performed hereunder, such statement to follow as closely as possible the order of the items contained in the Cost Estimate. The totals for labor, overhead construction cost, travel expense, transportation, equipment, material and supplies, handling cost, and other services shall be shown in such a manner as will permit ready comparison with the Plans and Cost Estimates. Items of materials shall be itemized where they represent major components.

Credit shall be given for usable materials recovered from permanent or temporary installations. The final billing shall show the description and site of the project, the date on which the first work was performed; or, if preliminary engineering or right-of-way items are involved, the date on which the earliest item of billed expense was incurred, the completion date and the location where the records and accounts billed can be audited. The Company shall make adequate reference in the billing to its records, accounts, and other documents. Contractors and any subcontractors are to maintain all books, documents, papers, accounting records, and other evidence pertaining to costs incurred and to make such materials available at their respective offices at all reasonable times during the contract for inspection by the County or any authorized representatives of the County. Copies shall be furnished if requested.

Final billings submitted by the Company shall carry a statement certifying that all items claimed have been reviewed and are in conformity with the provisions of the agreement, that credits have been given for all salvaged materials as required, and that all contractor's bills have been paid in full. This statement shall be signed by an authorized representative of the Company.

In the event a final and complete billing has not been received by the County three months following the completion of work and the Company has not during that period demonstrated to the County's satisfaction a hardship in completing that billing, the County may, in its sole discretion, consider the last payment made to be the final payment due under this agreement.

11. An extreme delay means the Company failed to begin relocation project work after receiving notice from the County to begin work and caused a thirty-day delay to the entire road construction project. The County shall notify the Company in writing if the Company causes an extreme delay. The Company shall have thirty calendar days from the date of the notice to stop the delay and expeditiously work to complete the relocation project. If the Company fails to stop the delay within thirty days after receiving notice of the delay, the County may require the Company to pay the costs associated with the delay of the project. The costs may include contractor remobilization costs, traffic control costs for the time of the delay, and any other costs attributable to the Company's delay. The County may deduct these costs from the retainage or any reimbursement owed to the Company. Should the costs of the delay exceed the amount of retainage or reimbursement owed to the Company, the County may invoice the Company for the costs of the delay, and the Company shall pay any invoices for the costs associated with extreme delays by the Company. The County may pursue any remedy available in law or equity to recover the costs of the delay.

Should a substantial hardship prevent the Company from performing the relocation project work and cause an extreme delay, the Company may apply in writing for a waiver excusing all or a portion of the delay and waiving all or a portion of the costs associated with the extreme delay. In its application, the Company shall state the cause of the delay and the time in which the Company shall resolve the hardship and continue with the relocation project work. The County Engineer shall determine whether to grant the waiver and what portion of the costs to waive.

Should a dispute arise about the cost levied upon the Company for an extreme delay, the County and the

Company agree participate in pre-litigation mediation and agree to diligently work in good faith to resolve any disputes associated with the costs charged to the Company for extreme delays. The parties shall select a mediator approved by both parties and set forth any resolutions in writing signed by both parties.

Should the parties fail to reach an agreement through pre-litigation mediation, the parties may seek a resolution for the dispute through the Court of Common Pleas located in York County, South Carolina, or the United States District Court for the State of South Carolina. This agreement shall be governed exclusively by the laws of the State of South Carolina without giving effect to its conflicts of law provisions.

12. The County shall have the right to inspect all recovered materials from the permanent facility prior to disposal by sale or scrap. This requirement will be satisfied by the Company giving notice to the County of the time and place the materials will be available for inspection. This notice is the responsibility of the Company and it may be held accountable for full value of materials disposed of without notice. The Company shall furnish a listing on final billings of major items not eligible for salvage credit and reasons therefore.

13. The Company will abide by the contract cost principles as set forth in FAPG 23 CFR 645A.

14. The Company will not participate directly or indirectly in any practice that subjects persons to discrimination because of their race, color, religion, sex, or national origin.

COMPANY: _____

YORK COUNTY

ADDRESS: _____

BY: _____

David E. Hudspeth
County Manager

BY:  _____

NAME: _____

TITLE: _____

INSTRUCTIONS: Submit three original copies of this agreement form and three prints of drawings showing present location and proposed location of poles or lines with reference to highway survey stations and centerline.

WO No. 4158000 Resp. 5416 Project CRDISC
Drawn By: Ryan Davis
Project Description: install ing overhead and underground
facilities to serve customer.

Return
Attn: Duke Energy Corporation
250 9th St. Ln SE
Hickory NC 28602
Attn: Kathie Adkins

STATE OF SOUTH CAROLINA
COUNTY OF YORK

RIGHT OF WAY AGREEMENT

KNOW ALL MEN BY THESE PRESENTS, That Paul A Blackann
hereinafter called "Grantor" (whether one or more), in consideration of the sum of One Dollar (\$1.00), does hereby grant unto DUKE
ENERGY CAROLINAS, LLC, and its successors and assigns, subsidiaries and divisions, hereinafter called "Grantee," the perpetual
right, privilege and easement to go in and upon that certain land of Grantor (hereinafter "premises") situated in said County and State,
property described as:

Known on tax map as parcel#: 7370000078
Deed Book: 3270
Deed Page: 18

and over and across said premises within a right-of-way strip (check applicable):

having a width of 15 feet on each side of a centerline determined by the centerline of the electrical facilities and/or the
lighting facilities, as installed, to construct, maintain and operate with poles, lighting fixtures, crossarms, wires, guys, anchors, cables,
transformers and other apparatus and appliances, overhead lines for the purpose of transporting electricity and/or providing lighting
services and for the communications purposes of the Grantee and regulated telephone utilities. The following rights are also granted to
Grantee: to enter said premises to inspect said lines, equipment and facilities, to perform maintenance and repairs, and to make
alterations and additions thereto; and relocate its facilities and right-of-way strip over the premises to conform to any future highway
or street relocation, widening or improvement; and to remove from the right-of-way strip, now or at any time in the future, trees,
structures or other obstructions that may endanger the proper maintenance and operation of said lines or other facilities or equipment
and trees of any species that Grantee determines will grow at maturity to a height that will endanger the proper maintenance and
operation of said lines or other facilities or equipment; to trim or remove and to keep trimmed or remove dead, diseased, weak or
leaning trees or limbs outside of the right-of-way strip which, in the opinion of the Grantee, might interfere with or fall upon the
electric, lighting, or regulated telephone facilities within the right-of-way strip; and to install guy wires and anchors extending beyond
the limits of the right-of-way strip.

having a width of 10 feet on each side of a centerline determined by the centerline of the electrical facilities and/or the
lighting facilities, as installed, to construct, maintain and operate underground lines and conduits with other apparatus and appliances,
either above ground or below ground, to include transformers and service connections, for the purpose of transporting electricity,
providing lighting services and for the communications purposes of Grantee. The following rights are also granted to Grantee: to
enter said premises to inspect said lines, equipment and facilities, to perform maintenance and repairs, and to make alterations and
additions thereto; and relocate its facilities and right-of-way strip over the premises to conform to any future highway or street
relocation, widening or improvement; and to clear the land within the right-of-way strip and to keep it clear of trees, structures or other
obstructions; and to clear that land outside the right-of-way strip within ten feet of the service door of any transformer or cabinet
located within the right-of-way strip and to keep the area within ten feet of said door clear of trees, structures or other
obstructions. Grantor, for itself and its successors and assigns, agrees to hold Grantee, its successors and assigns, harmless for
replacement and/or repair of paving, landscaping and fences as a result of future system maintenance and repair. All underground
facilities are to be installed in accordance with the provisions of Grantee's Underground Distribution Installment Plan, SCPSC Docket
No.2009-226-E, Order No. 2010-79, receipt of a copy of which is acknowledged by Grantor.

IN WITNESS WHEREOF, the said Grantor has caused this instrument to be executed by its duly authorized officials on this

8 day of August, 2013.

GRANTOR

Paul A Blackann
(Name of Grantor(s))

(Name of Grantor(s))

By: Paul A. Blackann
(Signature of Grantor(s))

By: _____
(Signature of Grantor(s))

Ryan Davis
Witness
Carl Sanburg
Witness

STATE OF ~~SOUTH~~ NORTH CAROLINA, Catawba COUNTY

Personally appeared before me Ryan Davis and made oath that he saw the within
(Subscribing Witness)

named Paul A Blackann sign, seal
(Name of Grantor(s))

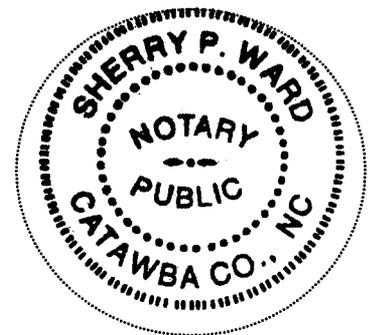
and as his/her act and deed deliver the within written instrument, and that he with Carl Sanburg
(Witness)
witnessed the execution thereof.

Ryan Davis
(Signature of Subscribing Witness)

Sworn to me this 8th day of August A.D., 2013

Sherry P. Ward
Notary Public

My Commission Expires 5-5-14



Affix Notary Seal



2019017877

EASEMENT
RECORDING FEES \$10.00
STATE TAX \$0.00
COUNTY TAX \$0.00

PRESENTED & RECORDED:
05-09-2019 11:09:07 AM

BK: RB 17534
PG: 304 - 307
DAVID HAMILTON
CLERK OF COURT
YORK COUNTY, SC
BY: REGINA PRUITT CLERK

EASEMENT

SOUTH CAROLINA
YORK COUNTY

Return To: Duke Energy
c/o Southeastern Land Co.
PO Box 1241
Conway, SC 29528

THIS EASEMENT ("Easement") is made this 30TH day of APRIL, 2019 ("Effective Date"), from THE ESTATE OF ALICE MARIE KIRKPATRICK by ROBERT L. KIRKPATRICK, HEIR and ROBBIE K. NICHOLS, HEIR, ("GRANTOR," whether one or more), to Duke Energy Carolinas, LLC, a North Carolina limited liability company ("DEC"); its successors, licensees, and assigns.

WITNESSETH:

THAT GRANTOR, for and in consideration of the sum of ONE DOLLAR (\$1.00), the receipt and sufficiency of which are hereby acknowledged, does hereby grant unto DEC, its successors, licensees, and assigns, the perpetual right, privilege, and easement to go in and upon the land of GRANTOR situated in Fort Mill Township, described as follows: Parcel Number 7370000062 containing 1.00 acres, more or less, and being the land described in a deed from Pearlie B. Kirk to Alice Marie Kirkpatrick, dated January 13, 1981, and recorded in Deed Book 625, Page 531, and being shown on a plat prepared by W. C. White, R.L.S., dated October 12, 1963 in Plat Book 25 at Page 143 in the Office of the Clerk of Court for York County, South Carolina, (the "Property"), LESS AND EXCEPT any prior out-conveyances, and to construct, reconstruct, operate, patrol, maintain, inspect, repair, replace, relocate, add to, modify and remove electric and/or communication facilities thereon including but not limited to, supporting structures such as poles, cables, wires, guy wires, anchors, and other appurtenant apparatus and equipment (the "Facilities") within an easement area being thirty (30) feet wide (the "Easement Area"), for the purpose of transmitting and distributing electrical energy and for communication purposes of DEC and Incumbent Local Exchange Carriers. The centerline of the Facilities shall be the center line of the Easement Area.

The right, privilege and easement shall include the following rights granted to DEC: (a) ingress and egress over the Easement Area and over adjoining portions of the Property (using lanes, driveways and paved areas where practical as determined by DEC); (b) to relocate the Facilities and Easement Area on the Property to conform to any future highway or street relocation, widening or improvement; (c) to trim and keep clear from the Easement Area, now or at any time in the future, trees, limbs, undergrowth, structures or other obstructions, and to trim or clear dead, diseased, weak or leaning trees or limbs outside of the Easement Area which, in the opinion of DEC, might interfere with or fall upon the Facilities; (d) to install guy wires and anchors extending beyond the limits of the Easement Area; and (e) all other rights and privileges reasonably necessary or convenient for DEC's safe, reliable and efficient installation, operation, and maintenance of the Facilities and for the enjoyment and use of the Easement Area for the purposes described herein.

Notwithstanding anything to the contrary above, it is understood and agreed that: (1) the EASEMENT herein granted is for Facilities to be installed at any point where needed on the above-referenced land of GRANTOR and/or where needed to serve adjoining lands, portions of which facilities may be installed immediately, and other portions installed in the future as the need develops; and (2) said facilities shall be installed at locations mutually agreeable to the

parties hereto.

TO HAVE AND TO HOLD said rights, privilege, and easement unto DEC, its successors, licensees, and assigns, forever, and GRANTOR, for itself, its heirs, executors, administrators, successors, and assigns, covenants to and with DEC that GRANTOR is the lawful owner of the Property and the Easement Area in fee and has the right to convey said rights and Easement.

IN WITNESS WHEREOF, this EASEMENT has been executed by GRANTOR and is effective as of the Effective Date herein.

Witnesses:

[Signature]
(Witness #1 Signature)

[Signature] (SEAL)
ROBERT L. KIRKPATRICK, HEIR to THE ESTATE
OF ALICE MARIE KIRKPATRICK

[Signature]
(Witness #2 Signature)

[Signature] (SEAL)
ROBBIE K. NICHOLS, HEIR to THE ESTATE
OF ALICE MARIE KIRKPATRICK

SOUTH CAROLINA, YORK COUNTY
I, WILLIAM R. CORACY a Notary Public of RICHLAND County, South
Carolina, certify that ROBERT L. KIRKPATRICK and ROBBIE K. NICHOLS HEIRS to the ESTATE OF ALICE MARIE

KIRKPATRICK personally appeared before me this day and acknowledged the due execution of the foregoing
EASEMENT.

Witness my hand and notarial seal, this 30TH day of APRIL, 2019

[Signature]
Notary Public

My Commission Expires: 3/8/2029



AFFIDAVIT FOR TAXABLE OR EXEMPT TRANSFERS

PERSONALLY appeared before me the undersigned, who being duly sworn, deposes and says:

- 1. I have read the information on this affidavit and I understand such information.
- 2. The property being transferred bears County Tax Map Number 7370000062 as transferred by THE ESTATE OF ALICE MARIE KIKPATRICK by ROBERT L. KIRKPATRICK, HEIR and ROBBIE K. NICHOLS, HEIR on _____.
- 3. Check one of the following: The deed is
 - (a) _____ subject to the deed recording fee as a transfer for consideration paid or to be paid in money or money's worth.
 - (b) _____ subject to the deed recording fee as a transfer between a corporation, a partnership, or other entity and a stockholder, partner, or owner of the entity, or is a transfer to a trust or as a distribution to a trust beneficiary.
 - (c) exempt from the deed recording fee because (See Information section of affidavit):
1

(If exempt, please skip items 4 - 7, and go to item 8 of this affidavit.)

If exempt under exemption #14 as described in the Information section of this affidavit, did the agent and principal relationship exist at the time of the original sale and was the purpose of this relationship to purchase the realty? Check Yes _____ or No

4. Check one of the following if either item 3(a) or item 3(b) above has been checked (See Information section of this affidavit.):

- (a) _____ The fee is computed on the consideration paid or to be paid in money or money's worth in the amount of _____.
- (b) _____ The fee is computed on the fair market value of the realty which is _____.
- (c) _____ The fee is computed on the fair market value of the realty as established for property tax purposes which is _____.

5. Check Yes _____ or No to the following: A lien or encumbrance existed on the land, tenement, or realty before the transfer and remained on the land, tenement, or realty after the transfer. (This includes, pursuant to Code Section 12-59-140(E)(6), any lien or encumbrance on realty in possession of a forfeited land commission which may subsequently be waived or reduced after the transfer under a signed contract or agreement between the lien holder and the buyer existing before the transfer.) If "Yes," the amount of the outstanding balance of this lien or encumbrance is:
_____.

6. The deed recording fee is computed as follows:

- (a) Place the amount listed in item 4 above here: _____
- (b) Place the amount listed in item 5 above here: _____
(If no amount is listed, place zero here.)
- (c) Subtract Line 6(b) from Line 6(a) and place result here: _____

7. The deed recording fee due is based on the amount listed on Line 6(c) above and the deed recording fee due is:
_____.

8. As required by Code Section 12-24-70, I state that I am a responsible person who was connected with the transaction as: Grantee

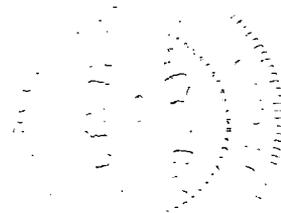
9. I understand that a person required to furnish this affidavit who willfully furnishes a false or fraudulent affidavit is guilty of a misdemeanor and, upon conviction, must be fined not more than one thousand dollars or imprisoned not more than one year, or both.

[Signature]
Responsible Person Connected with the Transaction
WILLIAM R. CORREY

SWORN to and subscribed before me this
30th day of March 20 19

Notary Public for South Carolina
My Commission Expires: 9/27/2021
Notary (L.S.): [Signature]
Notary (printed name): William J. Rogers, Jr.

 **William J. Rogers, Jr.**
Notary Public of South Carolina
Commission Expires: 09/27/2021



INFORMATION

Except as provided in this paragraph, the term "value" means "the consideration paid or to be paid in money or money's worth for the realty." Consideration paid or to be paid in money's worth includes, but is not limited to, other realty, personal property, stocks, bonds, partnership interest and other intangible property, the forgiveness or cancellation of a debt, the assumption of a debt, and the surrendering of any right. The fair market value of the consideration must be used in calculating the consideration paid in money's worth. Taxpayers may elect to use the fair market value of the realty being transferred in determining fair market value of the consideration. In the case of realty transferred between a corporation, a partnership, or other entity and a stockholder, partner, or owner of the entity, and in the case of realty transferred to a trust or as a distribution to a trust beneficiary, "value" means the realty's fair market value. A deduction from value is allowed for the amount of any lien or encumbrance existing on the land, tenement, or realty before the transfer and remaining on the land, tenement, or realty after the transfer. (This includes, pursuant to Code Section 12-59-140(E)(6), any lien or encumbrance on realty in possession of a forfeited land commission which may subsequently be waived or reduced after the transfer under a signed contract or agreement between the lien holder and the buyer existing before the transfer.) Taxpayers may elect to use the fair market value for property tax purposes in determining fair market value under the provisions of the law.

Exempted from the fee are deeds:

- (1) transferring realty in which the value of the realty, as defined in Code Section 12-24-30, is equal to or less than one hundred dollars;
- (2) transferring realty to the federal government or to a state, its agencies and departments, and its political subdivisions, including school districts;
- (3) that are otherwise exempted under the laws and Constitution of this State or of the United States;
- (4) transferring realty in which no gain or loss is recognized by reason of Section 1041 of the Internal Revenue Code as defined in Section 12-6-40(A);
- (5) transferring realty in order to partition realty as long as no consideration is paid for the transfer other than the interests in the realty that are being exchanged in order to partition the realty;
- (6) transferring an individual grave space at a cemetery owned by a cemetery company licensed under Chapter 55 of Title 39;
- (7) that constitute a contract for the sale of timber to be cut;
- (8) transferring realty to a corporation, a partnership, or a trust as a stockholder, partner, or trust beneficiary of the entity or so as to become a stockholder, partner, or trust beneficiary of the entity as long as no consideration is paid for the transfer other than stock in the corporation, interest in the partnership, beneficiary interest in the trust, or the increase in value in the stock or interest held by the grantor. However, except for transfers from one family trust to another family trust without consideration or transfers from a trust established for the benefit of a religious organization to the religious organization, the transfer of realty from a corporation, a partnership, or a trust to a stockholder, partner, or trust beneficiary of the entity is subject to the fee, even if the realty is transferred to another corporation, a partnership, or trust;
- (9) transferring realty from a family partnership to a partner or from a family trust to a beneficiary, provided no consideration is paid for the transfer other than a reduction in the grantee's interest in the partnership or trust. A "family partnership" is a partnership whose partners are all members of the same family. A "family trust" is a trust, in which the beneficiaries are all members of the same family. The beneficiaries of a family trust may also include charitable entities. "Family" means the grantor and the grantor's spouse, parents, grandparents, sisters, brothers, children, stepchildren, grandchildren, and the spouses and lineal descendants of any the above. A "charitable entity" means an entity which may receive deductible contributions under Section 170 of the Internal Revenue Code as defined in Section 12-6-40(A);
- (10) transferring realty in a statutory merger or consolidation from a constituent corporation to the continuing or new corporation;
- (11) transferring realty in a merger or consolidation from a constituent partnership to the continuing or new partnership;
- (12) that constitute a corrective deed or a quitclaim deed used to confirm title already vested in the grantee, provided that no consideration of any kind is paid or is to be paid under the corrective or quitclaim deed;
- (13) transferring realty subject to a mortgage to the mortgagee whether by a deed in lieu of foreclosure executed by the mortgagor or deed pursuant to foreclosure proceeding;
- (14) transferring realty from an agent to the agent's principal in which the realty was purchased with funds of the principal, provided that a notarized document is also filed with the deed that establishes the fact that the agent and principal relationship existed at the time of the original purchase as well as for the purpose of purchasing the realty;
- (15) transferring title to facilities for transmitting electricity that is transferred, sold, or exchanged by electrical utilities, municipalities, electric cooperatives, or political subdivisions to a limited liability company which is subject to regulation under the Federal Power Act (16 U.S.C. Section 791(a)) and which is formed to operate or to take functional control of electric transmission assets as defined in the Federal Power Act.

YORK COUNTY, SC	
2017011004	EASEMENT
RECORDING FEES	\$10.00
STATE TAX	\$0.00
COUNTY TAX	\$0.00
03-30-2017	01:34:04 PM
EK:RB 16303	PG:496-497

Site - 107823
Ln. 1694065

EASEMENT

SOUTH CAROLINA
YORK COUNTY

Prepared By: Susan Cannella
Return To: Duke Energy Carolinas
Attn: Susan Cannella
6325 Wilkinson Blvd.
Charlotte, NC 28214

THIS EASEMENT ("Easement") is made this 15th day of March, 2017 ("Effective Date"), from 160 EAST PHASE II, LLC, a North Carolina limited liability company ("GRANTOR", whether one or more), to DUKE ENERGY CAROLINAS, LLC, a North Carolina limited liability company ("DEC"); its successors, licensees, and assigns.

WITNESSETH:

THAT GRANTOR, for and in consideration of the sum of ONE DOLLAR (\$1.00), the receipt and sufficiency of which are hereby acknowledged, does hereby grant unto DEC, its successors, lessees, licensees, transferees, permittees, apportionees, and assigns, the perpetual right, privilege, and easement to go in and upon the land of GRANTOR situated in FORT MILL TOWNSHIP, described as follows: PIN #7370000074 containing 1.54 acres, more or less, 1 lot and being the land described in a deed from Janie Lowery Mixon a/k/a Janice Lowery Mixon to 160 East Phase II, LLC, dated December 29, 2016, and recorded in Deed Book 16174, Page 362, Union County Registry (the "Property"), LESS AND EXCEPT any prior out-conveyances, and to construct, reconstruct, operate, patrol, maintain, inspect, repair, replace, relocate, add to, modify and remove electric and/or communication facilities thereon including but not limited to, supporting structures such as poles, cables, wires, guy wires, anchors, underground conduits, enclosures/transformers, vaults and manholes, and other appurtenant apparatus and equipment (the "Facilities") within an easement area being thirty (30) feet wide for the overhead portion of said facilities and twenty (20) feet wide for the underground portion of said facilities together with an area ten (10) feet wide on all sides of the foundation of any DEC enclosure/transformer, vault or manhole (the "Easement Area"), for the purpose of transmitting and distributing electrical energy and for communication purposes of DEC and Incumbent Local Exchange Carriers. The center line of the Facilities shall be the center line of the Easement Area.

The right, privilege and easement shall include the following rights granted to DEC: (a) ingress and egress over the Easement Area and over adjoining portions of the Property (using lanes, driveways and paved areas where practical as determined by DEC); (b) to relocate the Facilities and Easement Area on the Property to conform to any future highway or street relocation, widening or improvement; (c) to trim and keep clear from the Easement Area, now or at any time in the future, trees, limbs, undergrowth, structures or other obstructions, and to trim or clear dead, diseased, weak or leaning trees or limbs outside of the Easement Area which, in the opinion of DEC, might interfere with or fall upon the Facilities; (d) to install guy wires and anchors extending beyond the limits of the Easement Area; and (e) all other rights and privileges reasonably necessary or convenient for DEC's safe, reliable and efficient installation, operation, and maintenance of the Facilities and for the enjoyment and use of the Easement Area for the purposes described herein.

Notwithstanding anything to the contrary above, it is understood and agreed that: (1) the EASEMENT herein granted is for facilities to be installed at any point where needed on the above-referenced land of GRANTOR and/or where needed to serve adjoining lands, portions of which facilities may be installed immediately, and other portions installed in the future as the need develops; and (2) said facilities shall be installed at locations mutually agreeable to the parties hereto.

TO HAVE AND TO HOLD said rights, privilege, and easement unto DEC, its successors, licensees, and assigns, forever, and GRANTOR, for itself, its heirs, executors, administrators, successors, and assigns, covenants to and with DEC that GRANTOR is the lawful owner of the Property and the Easement Area in fee and has the right to convey said rights and Easement.

IN WITNESS WHEREOF, this EASEMENT has been executed under seal by GRANTOR and is effective as of the Effective Date herein.

Witnesses:

[Signature]
(Witness #1)

[Signature]
(Witness #2)

160 EAST PHASE II, LLC
a North Carolina limited liability company

By: Queen City Enterprises, LLC
a North Carolina limited liability company
Its Member

By: [Signature]
F Andrew Welcher, Member

By: Kuester – 160 East Phase II, LLC
a North Carolina limited liability company
Its Member

By: [Signature]
Faison S. Kuester, Jr, Member

By: [Signature]
Faison S. Kuester, III, Member

SOUTH CAROLINA, York COUNTY
I, Allison S. Abshire a Notary Public of York County, South Carolina, certify that F. Andrew Welcher, Member of Queen City Enterprises, LLC, a North Carolina limited liability company, which is its Member of 160 EAST PHASE II, LLC, a North Carolina limited liability company, and Bryan Kuester, Faison Sharr Kuester, Faison S. Kuester Members of Kuester – 160 East Phase II, LLC, a North Carolina limited liability company, which is its Member of 160 EAST PHASE II, LLC, personally appeared before me this day and acknowledged the due execution of the foregoing EASEMENT on behalf of the limited liability company.

Witness my hand and notarial seal, this 23rd day of March, 2017.



[Signature]
Notary Public

My commission expires: 10/21/2016

SAFETYFIRST!
 PERSONAL ACCOUNTABILITY
 ACTIVE CAREER
 EXCELLENCE IN CUSTOMER SERVICE

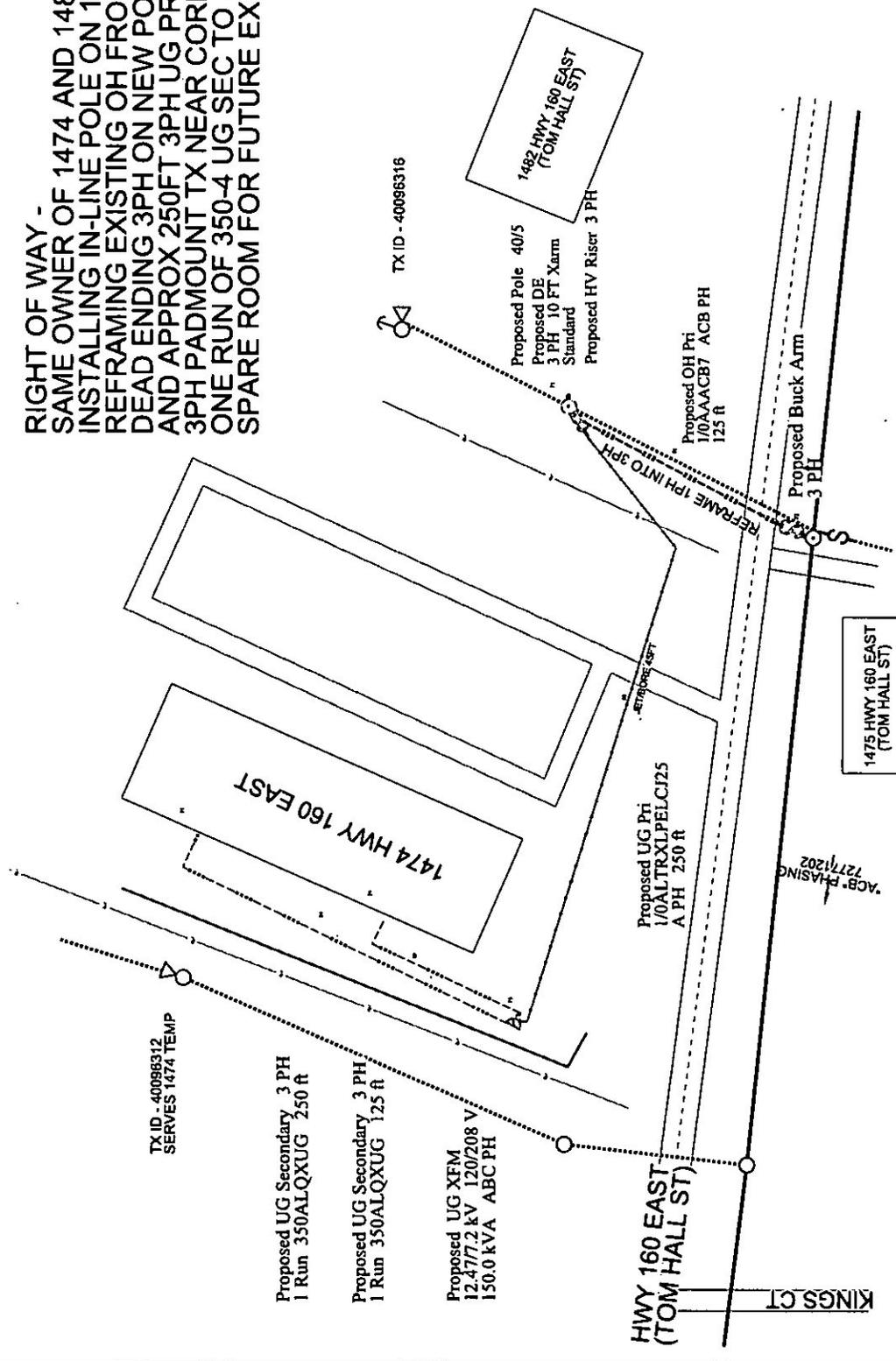
USP: Add Up Stream Protection, Facility ID, and Blocking Device Type
 USP: ?
 USP: ?
 USP: ?
 USP: ?

Safety Reminders / Adverse Conditions

Work Zone General Comments: Double click to edit

REMEMBER: Work zone area conditions may have changed for this job! Everyone is responsible for verifying the above safety information is correct prior to any work being performed each day.

RIGHT OF WAY -
 SAME OWNER OF 1474 AND 1482 HWY 160 EAST.
 INSTALLING IN-LINE POLE ON 1482 PROPERTY.
 REFRAMING EXISTING OH FROM 1PH TO 3PH AND
 DEAD ENDING 3PH ON NEW POLE. FUSING, HV DIP
 AND APPROX 250FT 3PH UG PRIM TO NEW 150KVA
 3PH PADMOUNT TX NEAR CORNER OF 1474.
 ONE RUN OF 350-4 UG SEC TO EACH TROUGH WITH
 SPARE ROOM FOR FUTURE EXPANSION NEEDS



Substation Name(s)
 Circuit ID(s)
 Facility ID(s)
 Work Order Number
 Customer/Contact
 Contact Phone
 Job Site Address
 City
 County
 State, Zip
 Designer
 Designer Phone
 Double click to add additional notes and details to drawing.

DUKE ENERGY
 Sheet 1 of 1
 Scale = N/A

YORK COUNTY, SC	
2019049257	EASEMENT
RECORDING FEES	\$25.00
STATE TAX	\$0.00
COUNTY TAX	\$0.00
11-11-2019	09:28:49 AM
BK:RB 17897	PG:202-203

EASEMENT

SOUTH CAROLINA
 YORK COUNTY

Prepared By: Duke Energy
 Return to: Duke Energy Carolinas
 Attn: Elliott Wallace
 6325 Wilkinson Blvd
 Charlotte, NC 28214

THIS EASEMENT ("Easement") is made this 10th day of November, 2019 ("Effective Date"), from ONE SIXTY EAST, LLC, a North Carolina limited liability company ("GRANTOR", whether one or more), to Duke Energy Carolinas, LLC, a North Carolina limited liability company ("DEC"); its successors, licensees, and assigns.

WITNESSETH:

THAT GRANTOR, for and in consideration of the sum of ONE DOLLAR (\$1.00), the receipt and sufficiency of which are hereby acknowledged, does hereby grant unto DEC, its successors, licensees, and assigns, the perpetual right, privilege, and easement to go in and upon the land of GRANTOR situated in the City of Fort Mill, described as follows: containing 3.62 acres, more or less and being the land described in a deed from Janie Lowery Mixon a/k/a Janice Lowery Mixon to One Sixty East, LLC, a North Carolina limited liability company, dated May 13, 2016, and recorded May 27, 2016 in Deed Book 15687 Page 76, in the Office of the Register of Deeds, York County, South Carolina. (the "Property"), LESS AND EXCEPT any prior out-conveyances, and to construct, reconstruct, operate, patrol, maintain, inspect, repair, replace, relocate, add to, modify and remove electric and/or communication facilities thereon including but not limited to, supporting structures such as poles, cables, wires, underground conduits, enclosures/transformers, vaults and manholes and other appurtenant apparatus and equipment (the "Facilities") within an easement area being twenty (20) feet wide, together with an area ten (10) feet wide on all sides of the foundation of any DEC enclosure/transformer, vault or manhole (the "Easement Area"), for the purpose of transmitting and distributing electrical energy and for communication purposes of DEC and Incumbent Local Exchange Carriers. The centerline of the Facilities shall be the center line of the Easement Area.

The right, privilege and easement shall include the following rights granted to DEC: (a) ingress and egress over the Easement Area and over adjoining portions of the Property (using lanes, driveways and paved areas where practical as determined by DEC); (b) to relocate the Facilities and Easement Area on the Property to conform to any future highway or street relocation, widening or improvement; (c) to trim and keep clear from the Easement Area, now or at any time in the future, trees, limbs, undergrowth, structures or other obstructions, and to trim or clear dead, diseased, weak or leaning trees or limbs outside of the Easement Area which, in the opinion of DEC, might interfere with or fall upon the Facilities; and (d) all other rights and privileges reasonably necessary or convenient for DEC's safe, reliable and efficient installation, operation, and maintenance of the Facilities and for the enjoyment and use of the Easement Area for the purposes described herein.

Notwithstanding anything to the contrary above, it is understood and agreed that: (1) the EASEMENT herein granted is for facilities to be installed at any point where needed on the above-referenced land of GRANTOR and/or where needed to serve adjoining lands, portions of which facilities may be installed immediately, and other portions installed in the future as the need develops; and (2) said facilities shall be installed at locations mutually agreeable to the parties hereto.

TO HAVE AND TO HOLD said rights, privilege, and easement unto DEC, its successors, licensees, and assigns, forever, and GRANTOR, for itself, its heirs, executors, administrators, successors, and assigns, covenants to and with DEC that GRANTOR is the lawful owner of the Property and the Easement Area in fee and has the right to convey said rights and Easement.

IN WITNESS WHEREOF, this EASEMENT has been executed under seal by GRANTOR and is effective as of the Effective Date herein

Witnesses:

Jennifer Hoover
(Witness #1)

One Sixty East, LLC
a North Carolina limited liability company

Faison S. Kuester, Jr.
Faison S. Kuester, Jr., Manager

Bittay Williams
(Witness #2)

SOUTH CAROLINA, YORK COUNTY

I, Kelly M. Clark, a Notary Public of York County, South Carolina, certify that Faison S. Kuester, Jr., Manager of One Sixty East, LLC a North Carolina limited liability company, personally appeared before me this day and acknowledged the due execution of the foregoing EASEMENT on behalf of the limited liability company.

Witness my hand and notarial seal, this 6th day of November, 2019.



Kelly M. Clark
Notary Public

My commission expires: 4/28/2027

CU Estimate Project Estimation By Compatible Unit

Workorder: 36104978
Work Order Desc: York County-Tom Hall Road Widening
Estimate: 5934373
Designer: Douglass, Thomas

I/R/T	QTY	CU	CU DESCRIPTION	MATERIAL COST	LABOR INSTALL	LABOR REMOVE	LABOR TRANSFER	SERVICE COST	SALVAGE VALUE
I	28	ANCH-PISA-SM-C	Anchor Power Installed Screw Anchor 8in 6000LB with 3/4in diameter x 7ft long rod	\$1,603.84	\$2,603.16	\$0.00	\$0.00	\$0.00	\$0.00
I	2	ARM-SDE-8-FBG-NB-C	(UOP) 8ft Fiberglass Deadend Crossarm	\$535.19	\$164.27	\$0.00	\$0.00	\$0.00	\$0.00
I	1	ARM-SGL-8-WD-WB-C	(UOP) 8ft Single Wood Crossarm	\$144.66	\$81.23	\$0.00	\$0.00	\$0.00	\$0.00
I	3	ARR-LINE-18KV-C	(UOP) Line Protection Arrester for use on 24kV Circuits	\$180.66	\$249.12	\$0.00	\$0.00	\$0.00	\$0.00
I	4	ARR-RISER-10KV-C	(UOP) Primary Riser Arrester for use on 4kV and 12kV Circuits	\$235.89	\$332.16	\$0.00	\$0.00	\$0.00	\$0.00
I	3	BKT-EM-ARM-1P-STL-MD-C	Bracket Equipment Mount Arm Single Phase Steel for use with 8ft or 10ft fiberglass DE crossarms	\$38.07	\$140.82	\$0.00	\$0.00	\$0.00	\$0.00
I	7	BKT-EM-ARM-1P-STL-SM-C	Bracket Equipment Mount Arm Single Phase Steel for use with all wood and tangent fiberglass crossarms	\$74.35	\$328.57	\$0.00	\$0.00	\$0.00	\$0.00
I	3	BKT-EM-ARM-B2B-STL-SM-C	Bracket Equipment Mount Arm Steel Back to Back Mounting on wood or tangent fiberglass crossarms	\$105.92	\$140.81	\$0.00	\$0.00	\$0.00	\$0.00
I	12	BKT-EM-POLE-1P-FG-C	Bracket Equipment Mount Pole Single Phase Fiberglass	\$666.24	\$563.28	\$0.00	\$0.00	\$0.00	\$0.00
I	1	BKT-EM-POLE-3P-FG-LG-C	Bracket equipment mount pole three position fiberglass 24in x 48 in	\$107.10	\$99.29	\$0.00	\$0.00	\$0.00	\$0.00
I	1	BKT-EM-POLE-3P-FG-XL-C	Bracket equipment mount pole three phase fiberglass 72in long	\$189.62	\$99.29	\$0.00	\$0.00	\$0.00	\$0.00
I	9	BKT-INSL-POST-POLE-MD-FG-C	Bracket insulator post on pole 20in fiberglass	\$817.20	\$430.53	\$0.00	\$0.00	\$0.00	\$0.00
I	1	BKT-INSL-POST-PTOP-STL-C	Bracket insulator pole top Steel	\$28.55	\$47.84	\$0.00	\$0.00	\$0.00	\$0.00
I	1	BKT-TERM-POLE-1P-FG-C	Bracket Termination Pole Single Phase Fiberglass	\$51.32	\$46.94	\$0.00	\$0.00	\$0.00	\$0.00
I	2	BKT-TF-CLUST-3POS-WING-AL-C	Bracket Transformer Cluster Three Position Aluminum for 3-167 KVA transformers	\$765.40	\$198.58	\$0.00	\$0.00	\$0.00	\$0.00
I	30	CABLE-PRI-1/0-AL-TRXLPE-LC-25KV-C	(UOP) 25kV 1P 1/0 Aluminum Primary Cable with LC Shield and TRXLPE Insulation	\$114.78	\$2.44	\$0.00	\$0.00	\$0.00	\$0.00
I	331	CABLE-SEC-2/0-AL-TX-C	(UOP) 600V Secondary Cable: 2/0 Aluminum Triplex with XLPE Insulation. (2) 2/0 cables and (1)#2 cable	\$459.60	\$9.76	\$0.00	\$0.00	\$0.00	\$0.00
I	20	CABLE-TAIL-EQ-1/0-AL-25KV-C	(UOP) UG Equipment Tail 25kV 1P 1/0 Aluminum Primary Cable with LC Shield and TRXLPE Insulation	\$76.52	\$2.44	\$0.00	\$0.00	\$0.00	\$0.00
I	90	CABLE-TAIL-EQ-2/0-TX-600V-C	(UOP) UG Equipment Tail 600V 2/0 Aluminum Triplex with XLPE Insulation. (2) 2/0 Cables and (1) #2 Cable	\$125.01	\$103.41	\$0.00	\$0.00	\$0.00	\$0.00
I	180	CABLE-TAIL-RISER-1/0-AL-25KV-C	(UOP) Primary Riser Tail 25kV 1P 1/0 Aluminum Primary Cable with LC Shield and TRXLPE Insulation	\$688.73	\$2.44	\$0.00	\$0.00	\$0.00	\$0.00
I	211	CABLE-TAIL-RISER-2/0-TX-600V-C	(UOP) Secondary Riser Tail 600V 2/0 Aluminum Triplex with XLPE Insulation. (2) 2/0 Cables and (1) #2 Cable	\$293.01	\$9.76	\$0.00	\$0.00	\$0.00	\$0.00
I	31727.02	CADD-CONTINGENCY-C	DEC Adder Cost Adder 10% contingency (per dollar)	\$0.00	\$0.00	\$0.00	\$0.00	\$31,727.02	\$0.00
I	11437.60	CADD-FLAGGING-C	DEC Adder Cost Adder flagging (per dollar)	\$0.00	\$0.00	\$0.00	\$0.00	\$11,437.60	\$0.00
I	64903.06	CADD-TREE-TRIM-C	DEC Adder Cost Adder tree trimming (per dollar)	\$0.00	\$0.00	\$0.00	\$0.00	\$64,903.06	\$0.00
I	34	CLAMP-DE-LG-C	Clamp dead end 556-795	\$955.24	\$9.18	\$0.00	\$0.00	\$0.00	\$0.00
I	10	CLAMP-DE-MD-C	Clamp dead end 336-477	\$184.40	\$9.18	\$0.00	\$0.00	\$0.00	\$0.00
I	47	CLAMP-DE-SM-C	Clamp dead end 6-4/0	\$837.85	\$41.31	\$0.00	\$0.00	\$0.00	\$0.00
I	6	CLAMP-TR-CUSHGRP-LG-C	Clamp trunnion cushion grip 556-954	\$239.66	\$3.06	\$0.00	\$0.00	\$0.00	\$0.00
I	6	COND-END-2IN-PVC-C	Conduit End 2in PVC	\$13.65	\$8.61	\$0.00	\$0.00	\$0.00	\$0.00
I	16	COND-END-4IN-PVC-C	Conduit End 4in PVC	\$60.48	\$22.96	\$0.00	\$0.00	\$0.00	\$0.00
I	25	CONN-OH-HLC-2/0CU-8CUSOL-C	Connector OH Hot Line Clamp 2/0CU-8CUSOL Line to 2/0CU-8CUSOL Tap	\$303.25	\$38.25	\$0.00	\$0.00	\$0.00	\$0.00
I	6	CONN-OH-STRP-BLT-2/0CU-C	Connector OH Stirrup Bolted 2/0CU-6CU Line	\$132.84	\$9.18	\$0.00	\$0.00	\$0.00	\$0.00
I	5	CONN-OH-STRP-BLTWDG-556AL-C	Connector OH Stirrup Bolted Wedge 556AL Line	\$242.25	\$7.65	\$0.00	\$0.00	\$0.00	\$0.00
I	14	CONN-OH-STRP-COMP-1/0AL-C	Connector OH Stirrup Compression 1/0AL Line	\$125.86	\$21.42	\$0.00	\$0.00	\$0.00	\$0.00
I	15	CONN-OH-TF-STEM-2POS-500AL-C	Connector OH Transformer Stem 1/2In stud to 2 position single set screw 500 AL	\$303.60	\$7.65	\$0.00	\$0.00	\$0.00	\$0.00
I	9	CONN-UG-SPL-600V-2/0AL-TX-C	Connector UG splice 600V 2/0AL triplex	\$56.16	\$374.94	\$0.00	\$0.00	\$0.00	\$0.00
I	4	CONN-UG-SPL-PRI-1/0-2-25KV-C	Connector UG splice primary 1/0 to #2 25kV	\$360.04	\$379.20	\$0.00	\$0.00	\$0.00	\$0.00

CU Estimate Project Estimation By Compatible Unit

I	11	FUSE-CUTOOUT-100-15KV-POLY-EQUIP-C	(UOP) EQUIPMENT PROTECTION ONLY: 15kV 100A Non-Loadbreak Fuse Cutout with Polymer Insulator (Non-Mapable)	\$1,078.44	\$1,231.12	\$0.00	\$0.00	\$0.00	\$0.00
I	11	FUSE-CUTOOUT-100-15KV-POLY-LINE-C	(UOP) LINE PROTECTION ONLY: 15kV 100A Non-Loadbreak Fuse Cutout with Polymer Insulator (Mapable)	\$1,078.44	\$1,231.12	\$0.00	\$0.00	\$0.00	\$0.00
I	3	FUSE-CUTOOUT-25/FLIMITER-27KV-POLY-FLIMITER	(UOP) EQUIPMENT PROTECTION ONLY: 25kV Fault Tamer Assembly with Polymer Insulator	\$1,296.60	\$335.76	\$0.00	\$0.00	\$0.00	\$0.00
I	2	FUSE-LINK-10-D-C	Fuse Link 10 D	\$5.76	\$3.62	\$0.00	\$0.00	\$0.00	\$0.00
I	3	FUSE-LINK-20-T-FLIMITER-C	Fuse Link 20A Current Limiting for Fault Limiting	\$60.12	\$124.56	\$0.00	\$0.00	\$0.00	\$0.00
I	6	FUSE-LINK-25-K-C	Fuse Link 25 K	\$11.40	\$10.86	\$0.00	\$0.00	\$0.00	\$0.00
I	5	FUSE-LINK-40-T-C	Fuse Link 40 T	\$11.20	\$9.05	\$0.00	\$0.00	\$0.00	\$0.00
I	9	FUSE-LINK-5-D-C	Fuse Link 5 D	\$25.29	\$16.29	\$0.00	\$0.00	\$0.00	\$0.00
I	2	GND-EQUIP-2-BOND-C	Ground Equipment #2 soft drawn copper bonding	\$18.28	\$3.06	\$0.00	\$0.00	\$0.00	\$0.00
I	9	GND-POLE-6-C	Ground Pole #6 soft drawn copper	\$133.38	\$438.66	\$0.00	\$0.00	\$0.00	\$0.00
I	9	GND-ROD-OH-C	Ground Rod Overhead	\$192.15	\$389.88	\$0.00	\$0.00	\$0.00	\$0.00
I	53	GUY-DOWN-3/8IN-GALV-SGL-C	Guy Down Guy 3/8 in diameter Galvanized Single	\$2,633.82	\$5,332.57	\$0.00	\$0.00	\$0.00	\$0.00
I	53	GUY-HOOK-C	Guy Hook for use on Wood Poles	\$1,012.58	\$42.84	\$0.00	\$0.00	\$0.00	\$0.00
I	34	GUY-INSL-7FT-FG-C	Guy Insulator 7ft Fiberglass	\$867.59	\$1,565.11	\$0.00	\$0.00	\$0.00	\$0.00
I	6	HDWR-DA-LG-14IN-GALV-C	Hardware Double Arming 3/4in diameter 14in long Galvanized Steel	\$51.08	\$10.84	\$0.00	\$0.00	\$0.00	\$0.00
I	32	HDWR-EYEBOLT-SM-10IN-GALV-C	Hardware Eye Bolt 5/8in diameter 10in long Galvanized Steel	\$143.52	\$57.84	\$0.00	\$0.00	\$0.00	\$0.00
I	10	HDWR-EYEBOLT-SM-12IN-GALV-C	Hardware Eye Bolt 5/8in diameter 12in long Galvanized Steel	\$63.69	\$18.09	\$0.00	\$0.00	\$0.00	\$0.00
I	45	HDWR-EYENUT-SM-GALV-C	Hardware Eye Nut 5/8in diameter Galvanized Steel	\$113.85	\$81.34	\$0.00	\$0.00	\$0.00	\$0.00
I	1	HDWR-MACH-LG-16IN-GALV-C	Hardware Machine Bolt 3/4in diameter 16in long Galvanized Steel	\$5.95	\$1.81	\$0.00	\$0.00	\$0.00	\$0.00
I	14	HDWR-MACH-SM-10IN-GALV-C	Hardware Machine Bolt 5/8in diameter 10in long Galvanized Steel	\$20.93	\$25.27	\$0.00	\$0.00	\$0.00	\$0.00
I	18	HDWR-MACH-SM-12IN-GALV-C	Hardware Machine Bolt 5/8in diameter 12in long Galvanized Steel	\$40.31	\$32.57	\$0.00	\$0.00	\$0.00	\$0.00
I	2	HDWR-MACH-SM-14IN-GALV-C	Hardware Machine Bolt 5/8in diameter 14in long Galvanized Steel	\$4.96	\$3.62	\$0.00	\$0.00	\$0.00	\$0.00
I	3	HDWR-SP-SM-10IN-GALV-C	Hardware Spool Bolt 5/8in diameter 10in long Galvanized Steel	\$25.38	\$5.43	\$0.00	\$0.00	\$0.00	\$0.00
I	3	INSL-1RACK-SEC-PORC-C	Insulator One Wire Rack Secondary/Neutral Porcelain	\$21.54	\$83.94	\$0.00	\$0.00	\$0.00	\$0.00
I	52	INSL-DE/S-35KV-POLY-C	Insulator Dead End/Suspension 35kV Polymer	\$1,254.97	\$4,552.68	\$0.00	\$0.00	\$0.00	\$0.00
I	6	INSL-GAIN-LG-C	Insulator gain grid 5 1/2in diameter	\$136.40	\$3.06	\$0.00	\$0.00	\$0.00	\$0.00
I	4	INSL-POST-25KV-PORC-TT-C	Insulator Post 25kV Porcelain Tie Top	\$111.63	\$133.59	\$0.00	\$0.00	\$0.00	\$0.00
I	6	INSL-POST-35KV-PORC-HC-C	Insulator Post 35kV Porcelain Horizontal Clamp Top	\$353.34	\$198.58	\$0.00	\$0.00	\$0.00	\$0.00
I	18	INSL-POST-35KV-PORC-TT-C	Insulator Post 35kV Porcelain Tie Top	\$674.51	\$596.65	\$0.00	\$0.00	\$0.00	\$0.00
I	6	INSL-SP-SEC-PORC-C	Insulator Spool Secondary/Neutral Porcelain	\$13.62	\$167.88	\$0.00	\$0.00	\$0.00	\$0.00
I	8	INSL-STUD-STL-10IN-THD-C	Insulator Stud Steel 5/8in by 10in Long Threaded	\$73.95	\$7.65	\$0.00	\$0.00	\$0.00	\$0.00
I	4	INSL-STUD-STL-7IN-THD-C	Insulator Stud Steel 5/8in by 7in Long Threaded	\$24.74	\$3.06	\$0.00	\$0.00	\$0.00	\$0.00
I	1	JUMP-1/0-AL-C	Jumper 1/0 AL	\$1.61	\$48.74	\$0.00	\$0.00	\$0.00	\$0.00
I	15	JUMP-556-AL-C	Jumper 556 AL	\$139.70	\$898.10	\$0.00	\$0.00	\$0.00	\$0.00
I	3	LBKT-MAST-AL-6FT-PUB-C	Light Bracket Mast Arm Aluminum 6 foot long Public	\$101.85	\$351.39	\$0.00	\$0.00	\$0.00	\$0.00
I	15	LEAD-EQ-2-CU-COVER-C	Lead Equipment 2 Copper Covered	\$228.91	\$19.89	\$0.00	\$0.00	\$0.00	\$0.00
I	3	LEAD-EQ-6-CU-COVER-C	Lead Trans/Reg/Cap 6 Copper Covered	\$16.20	\$4.59	\$0.00	\$0.00	\$0.00	\$0.00
I	15	LEAD-TF-6-CU-COVER-C	Lead Trans/Reg/Cap 6 Copper Covered	\$81.00	\$19.89	\$0.00	\$0.00	\$0.00	\$0.00
I	1	LFIX-FL-LED-130-BLK-3000K-PUB-C	Light Fixture Flood LED 130W Black Trunion Mount 3000K Public	\$385.98	\$87.24	\$0.00	\$0.00	\$0.00	\$0.00
I	1	LFIX-FL-LED-260-BLK-3000K-PUB-C	Light Fixture Flood LED 260W Black Trunion Mount 3000K Public	\$714.27	\$87.24	\$0.00	\$0.00	\$0.00	\$0.00
I	38515.80	OADD-1DOLLAR-C	DEC Adder Misc - Adder \$1 dollar of cost	\$0.00	\$0.00	\$0.00	\$0.00	\$38,515.80	\$0.00
I	31	POLE-EXISTING-C	DEC GIS Correction or Update Pole existing or foreign owned for GIS Updates	\$0.00	\$56.11	\$0.00	\$0.00	\$0.00	\$0.00
I	1	POLE-WD-35-C5-C	(UOP) 35ft long Class 5 Wood Pole with CCA Finish	\$163.94	\$457.62	\$0.00	\$0.00	\$0.00	\$0.00
I	3	POLE-WD-40-C5-C	(UOP) 40ft long Class 5 Wood Pole with CCA Finish	\$623.64	\$1,670.70	\$0.00	\$0.00	\$0.00	\$0.00
I	1	POLE-WD-45-C4-C	(UOP) 45ft long Class 4 Wood Pole with CCA Finish	\$306.22	\$556.90	\$0.00	\$0.00	\$0.00	\$0.00

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I	7	POLE-WD-50-C3-C	(UOP) 50ft long Class 3 Wood Pole with CCA Finish	\$1,926.75	\$3,898.30	\$0.00	\$0.00	\$0.00	\$0.00
I	3	POLE-WD-55-C3-C	(UOP) 55ft long Class 3 Wood Pole with CCA Finish	\$1,343.94	\$2,144.58	\$0.00	\$0.00	\$0.00	\$0.00
I	2	POLE-WD-60-H1-C	(UOP) 60ft long Class H1 Wood Pole with CCA Finish	\$1,888.84	\$1,366.54	\$0.00	\$0.00	\$0.00	\$0.00
I	2	RISER-2IN-COND-3PC-C	Riser 2in Conduit 3-10ft sections	\$26.10	\$155.14	\$0.00	\$0.00	\$0.00	\$0.00
I	1	RISER-2IN-COND-4PC-C	Riser 2in Conduit 4-10ft sections for poles taller than 50ft	\$68.99	\$77.57	\$0.00	\$0.00	\$0.00	\$0.00
I	7	RISER-4IN-COND-3PC-C	Riser 4in Conduit 3-10ft sections	\$1,270.22	\$703.85	\$0.00	\$0.00	\$0.00	\$0.00
I	1	RISER-4IN-COND-4PC-C	Riser 4in Conduit 4-10ft sections for poles taller than 50ft	\$248.02	\$100.55	\$0.00	\$0.00	\$0.00	\$0.00
I	4	TERM-1/0-AL-25KV-C	Termination Kit 1/0 AL 25kV	\$434.44	\$421.59	\$0.00	\$0.00	\$0.00	\$0.00
I	2	TF-OH-25-12KV-120/240V-1P-C	(UOP) Pole Mount 25kVA Single Bushing Transformer for 12.47/7.2kV Primary and 120/240V Secondary	\$2,166.94	\$1,122.84	\$0.00	\$0.00	\$0.00	\$0.00
I	2	TF-OH-50-12KV-120/240V-1P-C	(UOP) Pole Mount 50kVA Single Bushing Transformer for 12.47/7.2kV Primary and 120/240V Secondary	\$3,084.02	\$1,122.84	\$0.00	\$0.00	\$0.00	\$0.00
I	11	TIE-COMP-SM-COV-FNECK-C	Tie Composite 6-2	\$171.93	\$9.18	\$0.00	\$0.00	\$0.00	\$0.00
I	2	TIE-HAND-4-AL-C	Tie Hand 4 AL	\$1.14	\$1.53	\$0.00	\$0.00	\$0.00	\$0.00
I	3	TIE-SIDE-1/0-AL-FNECK-C	Tie Side 1/0 AL F Neck	\$10.88	\$1.53	\$0.00	\$0.00	\$0.00	\$0.00
I	6	TIE-SIDE-556-AL-FNECK-C	Tie Side 556 AL F Neck	\$32.44	\$3.06	\$0.00	\$0.00	\$0.00	\$0.00
I	1	TIE-SPOOL-1/0-AL-C	Tie Spool 1/0 AL	\$2.84	\$1.53	\$0.00	\$0.00	\$0.00	\$0.00
I	4	TIE-SPOOL-336-AL-C	Tie Spool 336 AL	\$17.00	\$6.12	\$0.00	\$0.00	\$0.00	\$0.00
I	361	ULAB-CABLE-TRN-MD-C	UG Labor Cable in trench > 1in - 2in diameter cable (per linear ft)	\$0.00	\$224.82	\$0.00	\$0.00	\$0.00	\$0.00
I	8	ULAB-CONN-SEC-RISER-C	UG Labor Connections for secondary at pole riser (per multiplex)	\$0.00	\$298.80	\$0.00	\$0.00	\$0.00	\$0.00
I	2	ULAB-SPL-PIT-PRI-C	UG Labor Splice pit primary (per pit)	\$0.00	\$360.54	\$0.00	\$0.00	\$0.00	\$0.00
I	3	ULAB-SPL-PIT-SEC-C	UG Labor Splice pit secondary (per pit)	\$0.00	\$293.04	\$0.00	\$0.00	\$0.00	\$0.00
I	331	ULAB-TRN-18W-30D-C	UG Labor Trenching up to 18in wide by 30in deep (per linear ft)	\$0.00	\$836.68	\$0.00	\$0.00	\$0.00	\$0.00
I	30	ULAB-TRN-18W-36D-C	UG Labor Trenching up to 18in wide by 36in deep (per linear ft)	\$0.00	\$89.06	\$0.00	\$0.00	\$0.00	\$0.00
I	1156	WIRE-PRI-1/0-AAAC-C	(UOP) 1/0 AAAC Bare Overhead Wire with 7 Strands	\$332.34	\$1,646.36	\$0.00	\$0.00	\$0.00	\$0.00
I	126	WIRE-PRI-336-AAC-C	(UOP) 336.4 AAC Bare Overhead Wire with 19 Strands	\$95.69	\$232.01	\$0.00	\$0.00	\$0.00	\$0.00
I	382	WIRE-PRI-556-AAC-C	(UOP) 556.5 AAC Bare Overhead Wire with 19 Strands	\$635.17	\$703.27	\$0.00	\$0.00	\$0.00	\$0.00
I	178	WIRE-SEC-1/0-AL-QX-C	(UOP) 600V Secondary Quadruplex Wire: (3) 1/0 Aluminum XLPE Insulated Wires and (1) #2 Bare Aluminum Wire	\$267.70	\$205.80	\$0.00	\$0.00	\$0.00	\$0.00
I	409	WIRE-SEC-1/0-AL-TX-C	(UOP) 600V Secondary Triplex Wire: (2) 1/0 Aluminum with XLPE Insulation and (1) 1/0 Bare Aluminum Wire	\$482.91	\$472.07	\$0.00	\$0.00	\$0.00	\$0.00
R	8 [0]	ANCH-PISA-SM-C	Anchor Power Installed Screw Anchor 8in 6000LB with 3/4in diameter x 7ft long rod [\$57.28]	\$0.00	\$0.00	\$462.16	\$0.00	\$0.00	\$0.00
R	1 [0]	ARM-DBL-10-FBG-NB-C	(UOP) 10ft Double Fiberglass Tangent Crossarm [\$57.28]	\$0.00	\$0.00	\$93.60	\$0.00	\$0.00	\$0.00
R	1 [0]	ARM-DBL-10-WD-WB-C	(UOP) 10ft Double Wood Crossarm [\$57.28]	\$0.00	\$0.00	\$71.03	\$0.00	\$0.00	\$0.00
R	5 [0]	ARM-DBL-8-WD-WB-C	(UOP) 8ft Double Wood Crossarm [\$57.28]	\$0.00	\$0.00	\$354.52	\$0.00	\$0.00	\$0.00
R	2 [0]	ARM-SDE-10-FBG-NB-C	(UOP) 10ft Fiberglass Deadend Crossarm [\$57.28]	\$0.00	\$0.00	\$92.06	\$0.00	\$0.00	\$0.00
R	7 [0]	ARM-SGL-8-WD-WB-C	(UOP) 8ft Single Wood Crossarm [\$57.28]	\$0.00	\$0.00	\$334.88	\$0.00	\$0.00	\$0.00
R	4 [0]	ARR-RISER-10KV-C	(UOP) Primary Riser Arrester for use on 4kV and 12kV Circuits [\$57.28]	\$0.00	\$0.00	\$162.47	\$0.00	\$0.00	\$0.00
R	18 [0]	BKT-EM-ARM-1P-STL-SM-C	Bracket Equipment Mount Arm Single Phase Steel for use with all wood and tangent fiberglass crossarms [\$57.28]	\$0.00	\$0.00	\$554.22	\$0.00	\$0.00	\$0.00
R	3 [0]	BKT-EM-ARM-B2B-STL-SM-C	Bracket Equipment Mount Arm Steel Back to Back Mounting on wood or tangent fiberglass crossarms [\$57.28]	\$0.00	\$0.00	\$92.97	\$0.00	\$0.00	\$0.00
R	4 [0]	BKT-EM-POLE-1P-FG-C	Bracket Equipment Mount Pole Single Phase Fiberglass [\$57.28]	\$0.00	\$0.00	\$122.76	\$0.00	\$0.00	\$0.00
R	9 [0]	BKT-INSL-POST-PTOP-STL-C	Bracket insulator pole top Steel [\$57.28]	\$0.00	\$0.00	\$227.43	\$0.00	\$0.00	\$0.00
R	1 [0]	BKT-TERM-POLE-1P-FG-C	Bracket Termination Pole Single Phase Fiberglass [\$57.28]	\$0.00	\$0.00	\$30.69	\$0.00	\$0.00	\$0.00
R	2 [0]	BKT-TF-CLUST-3POS-WING-AL-C	Bracket Transformer Cluster Three Position Aluminum for 3-167 kVA transformers [\$57.28]	\$0.00	\$0.00	\$110.12	\$0.00	\$0.00	\$0.00
R	170 [0]	CABLE-TAIL-RISER-1/0-AL-25KV-C	(UOP) Primary Riser Tail 25kV 1P 1/0 Aluminum Primary Cable with LC Shield and TRXLPE Insulation [\$57.28]	\$0.00	\$0.00	\$2.44	\$0.00	\$0.00	\$0.00
R	58 [0]	CLAMP-DE-SM-C	Clamp dead end 6-4/0 [\$57.28]	\$0.00	\$0.00	\$42.84	\$0.00	\$0.00	\$0.00
R	12 [0]	COND-END-2IN-PVC-C	Conduit End 2in PVC [\$57.28]	\$0.00	\$0.00	\$17.22	\$0.00	\$0.00	\$0.00
R	8 [0]	COND-END-4IN-PVC-C	Conduit End 4in PVC [\$57.28]	\$0.00	\$0.00	\$11.48	\$0.00	\$0.00	\$0.00
R	22 [0]	CONN-OH-HLC-2/0CU-8CUSOL-C	Connector OH Hot Line Clamp 2/0CU-8CUSOL Line to 2/0CU-8CUSOL Tap [\$57.28]	\$0.00	\$0.00	\$33.66	\$0.00	\$0.00	\$0.00

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R	6 [0]	CONN-OH-STRP-BLT-2/0CU-C	Connector OH Stirrup Bolted 2/0CU-6CU Line [\$57.28]	\$0.00	\$0.00	\$9.18	\$0.00	\$0.00	\$0.00
R	4 [0]	CONN-OH-STRP-BLTWDG-556AL-C	Connector OH Stirrup Bolted Wedge 556AL Line [\$57.28]	\$0.00	\$0.00	\$6.12	\$0.00	\$0.00	\$0.00
R	12 [0]	CONN-OH-STRP-COMP-1/0AL-C	Connector OH Stirrup Compression 1/0AL Line [\$57.28]	\$0.00	\$0.00	\$18.36	\$0.00	\$0.00	\$0.00
R	15 [0]	CONN-OH-TF-STEM-2POS-500AL-C	Connector OH Transformer Stem 1/2in stud to 2 position single set screw 500 AL [\$57.28]	\$0.00	\$0.00	\$7.65	\$0.00	\$0.00	\$0.00
R	12 [0]	FUSE-CUTOOUT-100-15KV-POLY-EQUIP-C	(UOP) EQUIPMENT PROTECTION ONLY: 15kV 100A Non-Loadbreak Fuse Cutout with Polymer Insulator (Non-Mapable) [\$57.28]	\$0.00	\$0.00	\$963.96	\$0.00	\$0.00	\$0.00
R	10 [0]	FUSE-CUTOOUT-100-15KV-POLY-LINE-C	(UOP) LINE PROTECTION ONLY: 15kV 100A Non-Loadbreak Fuse Cutout with Polymer Insulator (Mapable) [\$57.28]	\$0.00	\$0.00	\$803.30	\$0.00	\$0.00	\$0.00
R	1 [0]	FUSE-LINK-15-D-C	Fuse Link 15 D [\$57.28]	\$0.00	\$0.00	\$1.81	\$0.00	\$0.00	\$0.00
R	2 [0]	FUSE-LINK-25-K-C	Fuse Link 25 K [\$57.28]	\$0.00	\$0.00	\$3.62	\$0.00	\$0.00	\$0.00
R	1 [0]	FUSE-LINK-3-D-C	Fuse Link 3 D [\$57.28]	\$0.00	\$0.00	\$1.81	\$0.00	\$0.00	\$0.00
R	2 [0]	FUSE-LINK-30-K-C	Fuse Link 30 K [\$57.28]	\$0.00	\$0.00	\$3.62	\$0.00	\$0.00	\$0.00
R	8 [0]	FUSE-LINK-40-T-C	Fuse Link 40 T [\$57.28]	\$0.00	\$0.00	\$14.48	\$0.00	\$0.00	\$0.00
R	8 [0]	FUSE-LINK-5-D-C	Fuse Link 5 D [\$57.28]	\$0.00	\$0.00	\$14.48	\$0.00	\$0.00	\$0.00
R	16 [0]	GUY-DOWN-3/8IN-GALV-SGL-C	Guy Down Guy 3/8 in diameter Galvanized Single [\$57.28]	\$0.00	\$0.00	\$844.80	\$0.00	\$0.00	\$0.00
R	16 [0]	GUY-HOOK-C	Guy Hook for use on Wood Poles [\$57.28]	\$0.00	\$0.00	\$12.24	\$0.00	\$0.00	\$0.00
R	8 [0]	GUY-INSL-7FT-FG-C	Guy Insulator 7ft Fiberglass [\$57.28]	\$0.00	\$0.00	\$202.16	\$0.00	\$0.00	\$0.00
R	5 [0]	HDWR-DA-LG-14IN-GALV-C	Hardware Double Arming 3/4in diameter 14in long Galvanized Steel [\$57.28]	\$0.00	\$0.00	\$9.05	\$0.00	\$0.00	\$0.00
R	14 [0]	HDWR-EYEBOLT-SM-10IN-GALV-C	Hardware Eye Bolt 5/8in diameter 10in long Galvanized Steel [\$57.28]	\$0.00	\$0.00	\$25.33	\$0.00	\$0.00	\$0.00
R	7 [0]	HDWR-EYEBOLT-SM-12IN-GALV-C	Hardware Eye Bolt 5/8in diameter 12in long Galvanized Steel [\$57.28]	\$0.00	\$0.00	\$12.66	\$0.00	\$0.00	\$0.00
R	28 [0]	HDWR-EYENUT-SM-GALV-C	Hardware Eye Nut 5/8in diameter Galvanized Steel [\$57.28]	\$0.00	\$0.00	\$50.66	\$0.00	\$0.00	\$0.00
R	1 [0]	HDWR-MACH-LG-16IN-GALV-C	Hardware Machine Bolt 3/4in diameter 16in long Galvanized Steel [\$57.28]	\$0.00	\$0.00	\$1.81	\$0.00	\$0.00	\$0.00
R	2 [0]	HDWR-MACH-SM-10IN-GALV-C	Hardware Machine Bolt 5/8in diameter 10in long Galvanized Steel [\$57.28]	\$0.00	\$0.00	\$3.61	\$0.00	\$0.00	\$0.00
R	18 [0]	HDWR-MACH-SM-12IN-GALV-C	Hardware Machine Bolt 5/8in diameter 12in long Galvanized Steel [\$57.28]	\$0.00	\$0.00	\$32.57	\$0.00	\$0.00	\$0.00
R	2 [0]	HDWR-MACH-SM-14IN-GALV-C	Hardware Machine Bolt 5/8in diameter 14in long Galvanized Steel [\$57.28]	\$0.00	\$0.00	\$3.62	\$0.00	\$0.00	\$0.00
R	7 [0]	HDWR-SP-SM-10IN-GALV-C	Hardware Spool Bolt 5/8in diameter 10in long Galvanized Steel [\$57.28]	\$0.00	\$0.00	\$12.67	\$0.00	\$0.00	\$0.00
R	32 [0]	INSL-DE/S-35KV-POLY-C	Insulator Dead End/Suspension 35kV Polymer [\$57.28]	\$0.00	\$0.00	\$1,723.11	\$0.00	\$0.00	\$0.00
R	35 [0]	INSL-POST-25KV-PORC-TT-C	Insulator Post 25kV Porcelain Tie Top [\$57.28]	\$0.00	\$0.00	\$1,074.15	\$0.00	\$0.00	\$0.00
R	4 [0]	INSL-POST-35KV-PORC-TT-C	Insulator Post 35kV Porcelain Tie Top [\$57.28]	\$0.00	\$0.00	\$122.76	\$0.00	\$0.00	\$0.00
R	7 [0]	INSL-SP-SEC-PORC-C	Insulator Spool Secondary/Neutral Porcelain [\$57.28]	\$0.00	\$0.00	\$113.75	\$0.00	\$0.00	\$0.00
R	3 [0]	INSL-STUD-STL-10IN-THD-C	Insulator Stud Steel 5/8in by 10in Long Threaded [\$57.28]	\$0.00	\$0.00	\$4.59	\$0.00	\$0.00	\$0.00
R	22 [0]	INSL-STUD-STL-7IN-THD-C	Insulator Stud Steel 5/8in by 7in Long Threaded [\$57.28]	\$0.00	\$0.00	\$18.36	\$0.00	\$0.00	\$0.00
R	1 [0]	JUMP-1/0-AL-C	Jumper 1/0 AL [\$57.28]	\$0.00	\$0.00	\$35.20	\$0.00	\$0.00	\$0.00
R	4 [0]	JUMP-2-AL-C	Jumper 2 AL [\$57.28]	\$0.00	\$0.00	\$139.90	\$0.00	\$0.00	\$0.00
R	3 [0]	JUMP-4-CU-C	Jumper 4 CU [\$57.28]	\$0.00	\$0.00	\$104.70	\$0.00	\$0.00	\$0.00
R	2 [0]	LBKT-MAST-AL-6FT-PUB-C	Light Bracket Mast Arm Aluminum 6 foot long Public [\$57.28]	\$0.00	\$0.00	\$101.78	\$0.00	\$0.00	\$0.00
R	14 [0]	LEAD-EQ-2-CU-COVER-C	Lead Equipment 2 Copper Covered [\$57.28]	\$0.00	\$0.00	\$18.36	\$0.00	\$0.00	\$0.00
R	16 [0]	LEAD-TF-6-CU-COVER-C	Lead Trans/Reg/Cap 6 Copper Covered [\$57.28]	\$0.00	\$0.00	\$21.42	\$0.00	\$0.00	\$0.00
R	1 [0]	LFIX-FL-HPS-250-GRAY-MULTIV-WD-PVT-C	REM ONLY---Light Fixture Flood High Pressure Sodium 250W Gray (RAL7038) Multivoltage up to 277V for wood pole mount [REMOVED]	\$0.00	\$0.00	\$33.93	\$0.00	\$0.00	\$0.00
R	1 [0]	LFIX-FL-HPS-400-GRAY-MULTIV-WD-PVT-C	REM ONLY---Light Fixture Flood High Pressure Sodium 400W Gray (RAL7038) Multivoltage up to 277V for wood pole mount [REMOVED]	\$0.00	\$0.00	\$33.93	\$0.00	\$0.00	\$0.00
R	7 [0]	OLAB-POLE-PULL-STUB-C	OH Labor Pole pull stub (per pole) [\$0.00]	\$0.00	\$0.00	\$422.31	\$0.00	\$0.00	\$0.00
R	2 [0]	POLE-WD-30-C6-C	(UOP) 30ft long Class 6 Wood Pole with CCA Finish [\$57.28]	\$0.00	\$0.00	\$371.88	\$0.00	\$0.00	\$0.00
R	6 [0]	POLE-WD-40-AC-JU-REM-C	(UOP) REM ONLY: FOR NEW INSTALLS USE CU: POLE-WD-40-C5-C. 40ft Wood Pole Having Power Space Cutoff. Pole to remain in field for other utilities to transfer [REMOVED]	\$0.00	\$0.00	\$2,263.74	\$0.00	\$0.00	\$0.00
R	4 [0]	POLE-WD-40-C5-C	(UOP) 40ft long Class 5 Wood Pole with CCA Finish [\$57.28]	\$0.00	\$0.00	\$1,234.76	\$0.00	\$0.00	\$0.00
R	2 [0]	POLE-WD-45-C4-C	(UOP) 45ft long Class 4 Wood Pole with CCA Finish [\$57.28]	\$0.00	\$0.00	\$617.38	\$0.00	\$0.00	\$0.00
R	1 [0]	POLE-WD-50-AC-JU-REM-C	(UOP) REM ONLY: FOR NEW INSTALLS USE CU: POLE-WD-50-C3-C. 50ft Wood Pole Having Power Space Cutoff. Pole to remain in field for other utilities to transfer [REMOVED]	\$0.00	\$0.00	\$377.29	\$0.00	\$0.00	\$0.00
R	6 [0]	RISER-2IN-COND-3PC-C	Riser 2in Conduit 3-10ft sections [\$57.28]	\$0.00	\$0.00	\$245.64	\$0.00	\$0.00	\$0.00

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R	3 [0]	RISER-4IN-COND-3PC-C	Riser 4in Conduit 3-10ft sections [\$57.28]	\$0.00	\$0.00	\$152.97	\$0.00	\$0.00	\$0.00
R	1 [0]	RISER-4IN-COND-4PC-C	Riser 4in Conduit 4-10ft sections for poles taller than 50ft [\$57.28]	\$0.00	\$0.00	\$50.99	\$0.00	\$0.00	\$0.00
R	4 [0]	TERM-1/0-AL-25KV-C	Termination Kit 1/0 AL 25kV [\$57.28]	\$0.00	\$0.00	\$170.21	\$0.00	\$0.00	\$0.00
R	1 [0]	TF-OH-15-12KV-120/240V-1P-C	(UOP) Pole Mount 15kVA Single Bushing Transformer for 12.47/7.2kV Primary and 120/240V Secondary [\$57.28]	\$0.00	\$0.00	\$277.10	\$0.00	\$0.00	\$0.00
R	1 [0]	TF-OH-25-12KV-120/240V-1P-C	(UOP) Pole Mount 25kVA Single Bushing Transformer for 12.47/7.2kV Primary and 120/240V Secondary [\$57.28]	\$0.00	\$0.00	\$277.10	\$0.00	\$0.00	\$0.00
R	1 [0]	TF-OH-25-4KV-120/240V-1P-C	(UOP) Pole Mount 25kVA Single Bushing Transformer for 4.16/2.4kV Primary and 120/240V Secondary [\$57.28]	\$0.00	\$0.00	\$277.10	\$0.00	\$0.00	\$0.00
R	2 [0]	TF-OH-50-4KV-120/240V-1P-C	(UOP) Pole Mount 50kVA Single Bushing Transformer for 4.16/2.4kV Primary and 120/240V Secondary [\$57.28]	\$0.00	\$0.00	\$554.20	\$0.00	\$0.00	\$0.00
R	13 [0]	TIE-COMP-SM-COV-FNECK-C	Tie Composite 6-2 [\$57.28]	\$0.00	\$0.00	\$16.83	\$0.00	\$0.00	\$0.00
R	5 [0]	TIE-HAND-4-AL-C	Tie Hand 4 AL [\$57.28]	\$0.00	\$0.00	\$3.06	\$0.00	\$0.00	\$0.00
R	18 [0]	TIE-HAND-6-CU-C	Tie Hand 6 CU [\$57.28]	\$0.00	\$0.00	\$9.18	\$0.00	\$0.00	\$0.00
R	7 [0]	TIE-SPOOL-2-AL-C	Tie Spool 2 AL [\$57.28]	\$0.00	\$0.00	\$10.71	\$0.00	\$0.00	\$0.00
R	3 [0]	TIE-TOP-2-AL-FNECK-C	Tie Top 2 AL F Neck [\$57.28]	\$0.00	\$0.00	\$1.53	\$0.00	\$0.00	\$0.00
R	395 [0]	WIRE-PRI-1/0-AAAC-C	(UOP) 1/0 AAAC Bare Overhead Wire with 7 Strands [\$57.28]	\$0.00	\$0.00	\$327.64	\$0.00	\$0.00	\$0.00
R	2621 [0]	WIRE-PRI-2-AAAC-C	(UOP) #2 AAAC Bare Overhead Wire with 7 Strands [\$57.28]	\$0.00	\$0.00	\$2,176.18	\$0.00	\$0.00	\$0.00
R	6830 [0]	WIRE-PRI-4-CUHD-C	(UOP) REM ONLY---USE CU: WIRE-PRI-2-AAAC-C FOR INSTALLS. Wire Primary/Neutral #4 Hard Drawn CU [\$57.28]	\$0.00	\$0.00	\$5,673.74	\$0.00	\$0.00	\$0.00
R	144 [0]	WIRE-SEC-1/0-AL-QX-C	(UOP) 600V Secondary Quadruplex Wire: (3) 1/0 Aluminum XLPE Insulated Wires and (1) #2 Bare Aluminum Wire [\$57.28]	\$0.00	\$0.00	\$102.90	\$0.00	\$0.00	\$0.00
R	429 [0]	WIRE-SEC-1/0-AL-TX-C	(UOP) 600V Secondary Triplex Wire: (2) 1/0 Aluminum with XLPE Insulation and (1) 1/0 Bare Aluminum Wire [\$57.28]	\$0.00	\$0.00	\$306.89	\$0.00	\$0.00	\$0.00
T	2	CABLE-LGT-12-CU-WOOD-C	CABLE LIGHTING 12 CU from fixture to source through wood pole bracket when fixture does not have sufficient wire attached	\$0.00	\$0.00	\$0.00	\$2.74	\$0.00	\$0.00
T	2	LBKT-MAST-AL-6FT-PUB-C	Light Bracket Mast Arm Aluminum 6 foot long Public	\$0.00	\$0.00	\$0.00	\$221.34	\$0.00	\$0.00
T	2	LFIX-RW-LED-50-GRAY-III-3000K-PUB-C	Light Fixture Roadway LED 50W Gray Type III 3000K Public	\$0.00	\$0.00	\$0.00	\$287.58	\$0.00	\$0.00
T	7	TF-OH-25-12KV-120/240V-1P-C	(UOP) Pole Mount 25kVA Single Bushing Transformer for 12.47/7.2kV Primary and 120/240V Secondary	\$0.00	\$0.00	\$0.00	\$4,915.54	\$0.00	\$0.00
Totals:				\$39,947.98	\$44,064.74	\$25,343.39	\$5,427.20	\$146,583.48	\$0.00
Overhead Costs:				\$7,390.38	\$18,639.39	\$10,720.25	\$2,295.71	\$62,004.81	
Total Materials:				\$47,338.36					
Total Labor:					\$62,704.13	\$36,063.64	\$7,722.91		
Total Install Cost:				\$110,042.48					
Total Removal Cost:				\$36,063.64					
Total Transfer Cost:				\$7,722.91					
Total Salvage Value:									\$0.00
Gross Up Value:				\$49,651.17					
							Total Install Man Hours:	501.62	
							Total Remove Man Hours:	284.06	
							Total Transfer Man Hours:	60.79	

Total Project Cost: \$412,068.49

Show Report Criteria

Filename & URL: GPDx090 Project Estimation By CU, http://entdukerpt.duke-energy.com/ReportServer

Current Date: 6/5/2023 7:52:19 AM

User ID: TCDOUGL

Parameters: Request Number : 5934373

Estimated Version : 15

SELECT COUNT(*) AS SELECTID FROM PLUSDESTCONTROL WHERE ((plusdestcontrol.plusdestcontrolid = 18915410))

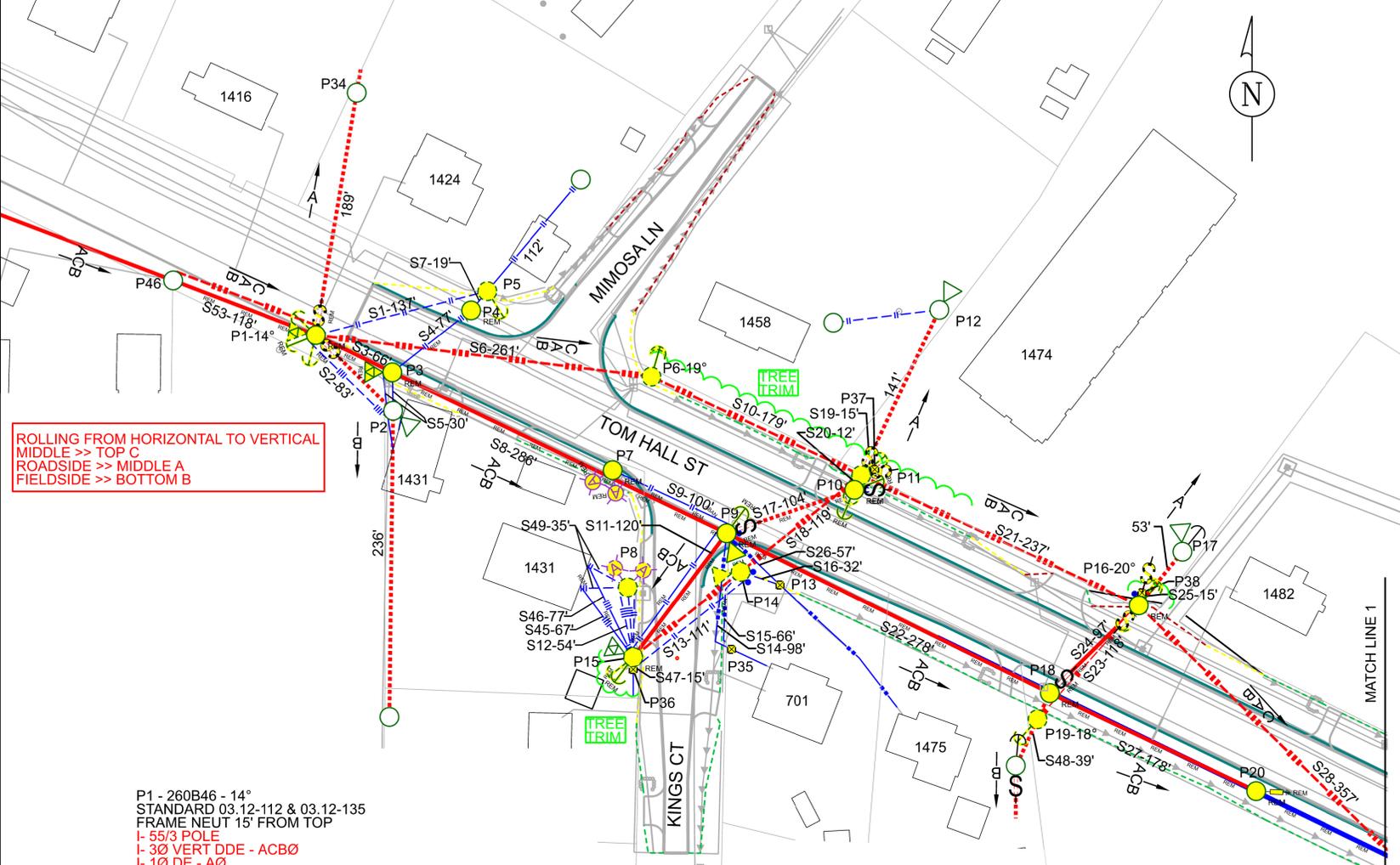
SELECT 0 AS ID FROM PLUSDESTCONTROL WHERE ((plusdestcontrol.plusdestcontrolid = 18915410))

CU Estimate Project Estimation By Compatible Unit

```
SELECT MAX(PLUSDESTVERSION.ESTVERSION) as ESTVERSION FROM PLUSDESTCONTROL INNER JOIN PLUSDESTVERSION ON PLUSDESTCONTROL.REQUESTNUM = PLUSDESTVERSION.REQUESTNUM WHERE  
PLUSDESTCONTROL.REQUESTNUM = '5934373' ORDER BY ESTVERSION ASC
```



REMEMBER: Work zone area conditions may have changed for this job! Everyone is responsible for verifying the above safety information is correct prior to any work being performed each day.



- S1 - 137'
I- OH 1/0 TRIPLEX
- S2 - 83'
E- OH 1/0 PRI & NEUT SLACK SPAN - BØ
E- OH 1/0 QUADRUPLIX
- S3 - 66'
R- OH #4 CU PRI & #2 ACSR NEUT - ACBØ
- S4 - 77'
R- OH 1/0 TRIPLEX
- S5 - 30'
R- OH 1/0 TRIPLEX
- S6 - 261'
I- OH 556 PRI & 336 NEUT - ACBØ
- S7 - 19'
R- OH 1/0 TRIPLEX
- S8 - 286'
R- OH #4 CU PRI & #2 ACSR NEUT - ACBØ
- S9 - 100'
R- OH 1/0 TRIPLEX
- S10 - 179'
I- OH 556 PRI & 336 NEUT - ACBØ
- S11 - 120'
R- OH #2 ACSR PRI & NEUT - BCAØ
R- OH 1/0 TRIPLEX
- S12 - 54'
I- OH 1/0 TRIPLEX
I- (2) OH 1/0 QUADRUPLIX
- S13 - 111'
I- OH 1/0 PRI & NEUT - BCAØ
I- OH 1/0 TRIPLEX
- S14 - 98'
A- UG 2/0 TRIPLEX
- S15 - 66'
I- UG 2/0 TRIPLEX
- S16 - 32'
I- UG 2/0 TRIPLEX
- S17 - 104'
R- OH 1/0 PRI & #2 ACSR NEUT - AØ
- S18 - 119'
I- OH 1/0 PRI & NEUT - BCAØ
- S19 - 15'
I- UG 1/0 PRI - AØ
- S20 - 12'
A- UG 1/0 PRI - AØ
- S21 - 237'
I- OH 556 PRI & 336 NEUT - ACBØ
- S22 - 278'
R- OH #4 CU PRI & #2 ACSR NEUT - ACBØ
- S23 - 118'
I- OH 1/0 PRI & NEUT - BØ
- S24 - 97'
R- OH 1/0 PRI & #2 CU NEUT - ACBØ
- S25 - 15'
I- UG 1/0 PRI - AØ
- S26 - 57'
A- UG 2/0 TRIPLEX
- S27 - 178'
R- OH #4 CU PRI & #2 ACSR NEUT - ACBØ
- S28 - 357'
I- OH 556 PRI & NEUT - ACBØ
- S45 - 67'
R- OH 1/0 QUADRUPLIX
- S46 - 77'
R- OH 1/0 QUADRUPLIX
- S47 - 15'
I- UG 2/0 TRIPLEX
- S48 - 38'
E- OH 1/0 PRI & #2 CU NEUT - BØ
SLACKSPAN
- S49 - 35'
I- (2) OH 1/0 QUADRUPLIX
- S53 - 118'
I- OH 556 PRI & 336 NEUT - ACBØ
R- OH #4 CU PRI & #2 ACSR NEUT - ACBØ

ROLLING FROM HORIZONTAL TO VERTICAL
 MIDDLE >> TOP C
 ROADSIDE >> MIDDLE A
 FIELDSIDE >> BOTTOM B

****NOTE****
 FOR SPAN S28 - INCREASE PRIMARY SPACING FOR 48" TO 60"
 INSTALL 556 NEUTRAL
 LOWER NEUTRAL FRAMING FROM 96" TO 108"

****NOTE****
 EXTEND CKT 72771202 (12.47KV) TO P32
 P32 TO BE NEW TIE IN POINT BETWEEN CKT 72771202 AND CKT 72770401

****NOTE****
 OH WIRE TO ROLL FROM HORIZONTAL TO VERTICAL AT S53.
 DEAD END TO THE CROSS ARM ON P46 AND DEAD END VERTICAL TO THE POLE AT P1

P1 - 260B46 - 14°
 STANDARD 03.12-112 & 03.12-135
 FRAME NEUT 15' FROM TOP
 I- 55/3 POLE
 I- 3Ø VERT DDE - ACBØ
 I- 1Ø DE - AØ
 I- 1Ø DE - BØ
 I- 1Ø 40T FUSE - AØ
 I- 1Ø 40T FUSE - BØ
 I- PRI & NEUT DGUY
 I- SEC DE
 I- SEC DGUY
 T- (FROM P3) 75KVA BANKED TX - ABCØ (FID:40096308)
 R- 40/5 POLE
 R- 8' SGL WD ARM - 3Ø T/L
 R- 1Ø 40T FUSE - AØ (FID: 38745092)
 R- 1Ø 40T FUSE - BØ (FID: 38745098)

P8 - 2060B49
 STANDARD 02.04-104
 I- 35/5 POLE
 I- SEC DE
 T- (FROM P7) 250W HPS AREA LIGHT
 T- (FROM P7) 400W HPS AREA LIGHT

P9
 T- (TO P14) 25KVA TX - AØ (FID:40096310)
 R- 40/5 POLE (J.U.)
 R- 8' SGL WD ARM - 3Ø T/L
 R- 1Ø DBL WD ARM - 3Ø DE
 R- 1Ø DE
 R- 1Ø 40T FUSE - AØ (FID: 38745093)
 R- (2) SEC DE
 R- (2) LV RISER
 R- PRI & NEUT DGUY

P14 - 260B51
 STANDARD 03.12-103 & 06.08-132
 FRAME NEUT 15' FROM TOP
 I- 50/3 POLE
 I- 3Ø VERT T/L - BCAØ
 I- SEC DE
 I- (2) LV RISERS
 T- (FROM P9) 25KVA TX - AØ (FID:40096310)

P15 - 265N74
 STANDARD 03.12-127
 FRAME NEUT 15' FROM TOP
 I- 50/3 POLE
 I- 3Ø VERT DE - BCAØ
 I- (4) SEC DE
 I- LV RISER
 I- DBL PRI DGUY
 I- PRI & NEUT DGUY
 T- 75KVA TX - ABCØ (FID: 40096326)
 R- 45/4 POLE
 R- 10' FG ARM - 3Ø DE
 R- (3) SEC DE
 R- LV RISER
 R- PRI & NEUT DGUY

P18
 R- 40/5 POLE (J.U.)
 R- 8' SGL WD ARM - 3Ø T/L
 R- 10' FG ARM - 3Ø DE
 R- 1Ø DE - BØ
 R- 3Ø 40T FUSE - ABCØ

P19 - 260B53 - 18°
 STANDARD 03.08-114
 FRAME NEUT 8' FROM TOP
 I- 40/5 POLE
 I- 1Ø DDE - BØ
 I- PRI & NEUT DGUY

P20
 R- 40/5 POLE
 R- 8' DBL WD ARM - 3Ø DDE
 R- 3Ø ARRESTOR STATION
****CKT MEET POINT****

P35
 I- UG SEC SPLICE

P36
 I- UG SEC SPLICE

P38
 I- UG PRI SPLICE

P46
 E- 50/3 POLE

P2
 E- 30/6 POLE

P3
 T- (TO P1) 75KVA BANKED TX - ABCØ (FID:40096308)
 R- 40/5 POLE (J.U.)
 R- 8' SGL WD ARM - 3Ø T/L
 R- (3) SEC DE

P4
 R- 30/6 POLE
 R- (2) SEC DE

P5 - 260B47
 STANDARD 02.04-140
 I- 40/5 POLE
 I- (2) SEC DE
 I- SEC DGUY

P6 - 260B48 - 19°
 STANDARD 03.12-107
 FRAME NEUT 15' FROM TOP
 I- 55/3 POLE (J.U.)
 I- 3Ø VERT T/L - ACBØ
 I- DBL PRI DGUY
 I- PRI & NEUT DGUY

P7
 T- (TO P8) 250W HPS AREA LIGHT
 T- (TO P8) 400W HPS AREA LIGHT
 R- 30/6 POLE
 R- SEC DE

P10
 R- 40/5 POLE
 R- 1Ø DDE - AØ
 R- 1Ø HV RISER - AØ
 R- 1Ø 20K FUSE - AØ (FID: 651434918)
 R- (2) PRI & NEUT DGUY

P11 - 260B50
 STANDARD 03.12.103 & 03.12-133
 & 03.12-130
 FRAME NEUT 15' FROM TOP
 I- 55/3 POLE (J.U.)
 I- 3Ø VERT T/L - ACBØ
 I- 3Ø VERT DE - BCAØ
 I- 1Ø DE - AØ
 I- 1Ø 40T FUSE - AØ
 I- 1Ø 20K FUSE - AØ
 I- 1Ø HV RISER - AØ
 I- DBL PRI DGUY
 I- PRI & NEUT DGUY

P12
 E- 40/5 POLE

P13
 I- UG SEC SPLICE

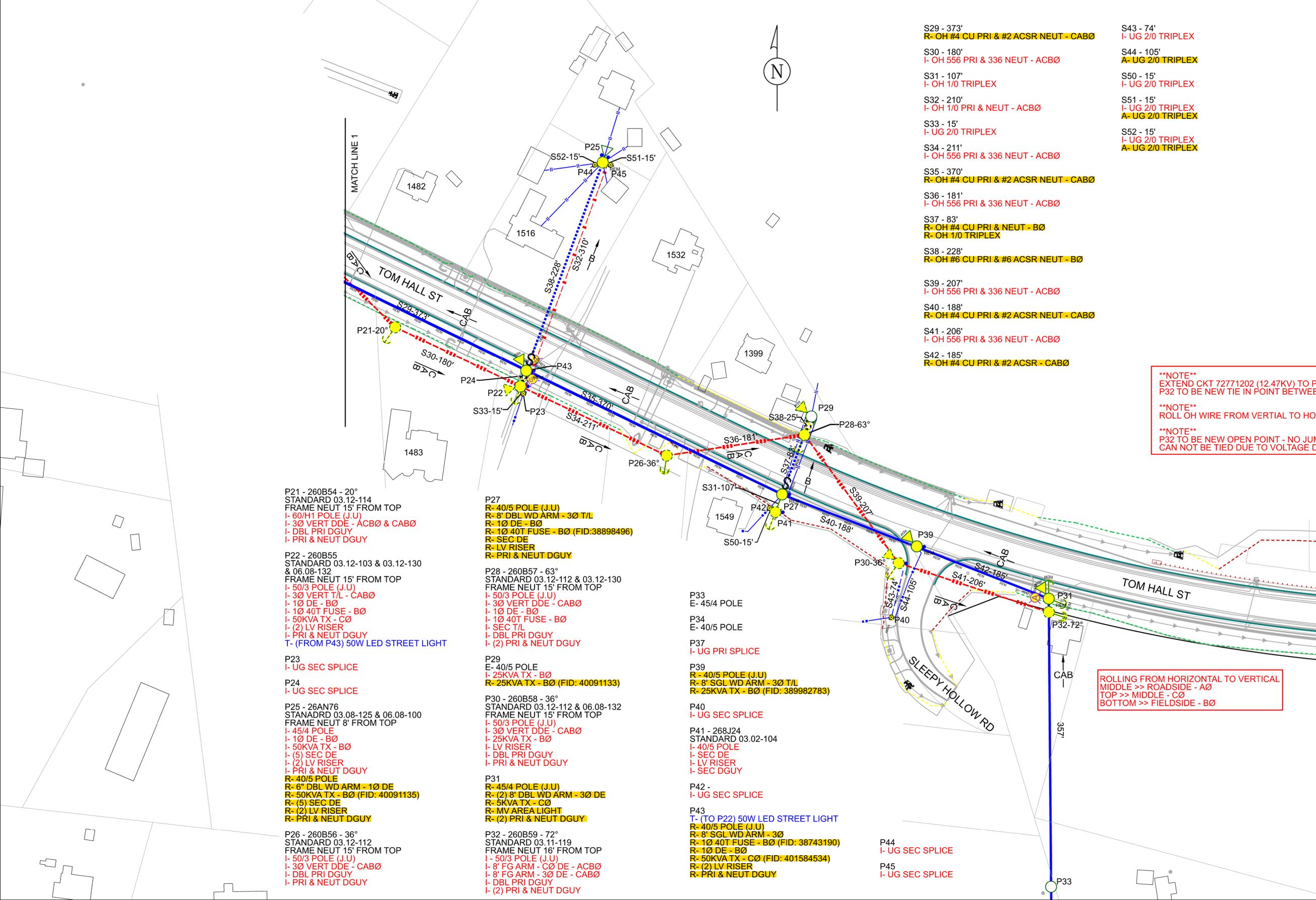
P16 - 260B52 - 20°
 STANDARD 03.12-112 & 03.12-130
 FRAME NEUT 16.5' FROM TOP
 I- 60/H1 POLE (J.U.)
 I- 3Ø VERT DDE
 I- 1Ø DE - AØ
 I- 1Ø DE - BØ
 I- 3Ø HV RISER - ACBØ
 I- 3Ø 25K FUSE - ABCØ
 I- DBL PRI DGUY
 I- (3) PRI & NEUT DGUY
 R- 50/3 POLE
 R- 10' DBL WD ARM - 3Ø DE
 R- 1Ø DE - AØ
 R- 3Ø HV RISER - ABCØ
 R- 3Ø 25K FUSE - ABCØ (FID: 411807516)

P17
 E- 40/5 POLE

Work Order Number	36104978
Customer/Contact	
Contact Phone	
Job Site Address	1399 TOM HALL
City	FORT MILL
County	YORK
State, Zip	SC 29715
Designer	THOMAS DOUGLAS
Designer Phone	919-606-4659
Circuit ID	72771202 72770401
Primary Voltage	12.47/7.2 KV & 4.16/2.4 KV
Permit Required	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Permit Type/No.	SC DOT ENCROACHMENT
Permit Type/No. 2	PERMIT #200120228
Permit Type/No. 3	
Permit Type/No. 4	



REMEMBER: Work zone area conditions may have changed for this job! Everyone is responsible for verifying the above safety information is correct prior to any work being performed each day.



****NOTE****
 EXTEND CKT 72771202 (12.47KV) TO P32
 P32 TO BE NEW TIE IN POINT BETWEEN CKT 72771202 AND CKT 72770401
****NOTE****
 ROLL OH WIRE FROM VERTICAL TO HORIZONTAL AT S41 TO DEADEND ON P32
****NOTE****
 P32 TO BE NEW OPEN POINT - NO JUMPERS OR SWITCH AS CIRCUITS
 CAN NOT BE TIED DUE TO VOLTAGE DIFFERENCE

ROLLING FROM HORIZONTAL TO VERTICAL
 MIDDLE >> ROADSIDE - AØ
 TOP >> MIDDLE - CØ
 BOTTOM >> FIELD SIDE - BØ

P21 - 260B54 - 20°
 STANDARD 03.12-114
 FRAME NEUT 15' FROM TOP
 I- 60/H1 POLE (J.U)
 I- 3Ø VERT DDE - ACBØ & CABØ
 I- DBL PRI DGUY
 I- PRI & NEUT DGUY

P22 - 260B55
 STANDARD 03.12-103 & 03.12-130
 & 06.08-132
 FRAME NEUT 15' FROM TOP
 I- 50/3 POLE (J.U)
 I- 3Ø VERT T/L - CABØ
 I- 1Ø DE - BØ
 I- 1Ø 40T FUSE - BØ
 I- 50KVA TX - CØ
 I- (2) LV RISER
 I- PRI & NEUT DGUY
 T- (FROM P43) 50W LED STREET LIGHT

P23
 I-UG SEC SPLICE

P24
 I-UG SEC SPLICE

P25 - 26AN76
 STANDARD 03.08-125 & 06.08-100
 FRAME NEUT 8' FROM TOP
 I- 45/4 POLE
 I- 1Ø DE - BØ
 I- 50KVA TX - BØ
 I- (5) SEC DE
 I- (2) LV RISER
 I- PRI & NEUT DGUY
 R- 40/5 POLE
 R- 6" DBL WD ARM - 1Ø DE
 R- 50KVA TX - BØ (FID: 40091135)
 R- (5) SEC DE
 R- (2) LV RISER
 R- PRI & NEUT DGUY

P26 - 260B56 - 36°
 STANDARD 03.12-112
 FRAME NEUT 15' FROM TOP
 I- 50/3 POLE (J.U)
 I- 3Ø VERT DDE - CABØ
 I- DBL PRI DGUY
 I- PRI & NEUT DGUY

P27
 R- 40/5 POLE (J.U)
 R- 8" DBL WD ARM - 3Ø T/L
 R- 1Ø DE - BØ
 R- 1Ø 40T FUSE - BØ (FID:38898496)
 R- SEC DE
 R- LV RISER
 R- PRI & NEUT DGUY

P28 - 260B57 - 63°
 STANDARD 03.12-112 & 03.12-130
 FRAME NEUT 15' FROM TOP
 I- 50/3 POLE (J.U)
 I- 3Ø VERT DDE - CABØ
 I- 1Ø DE - BØ
 I- 1Ø 40T FUSE - BØ
 I- SEC T/L
 I- DBL PRI DGUY
 I- (2) PRI & NEUT DGUY

P29
 E- 40/5 POLE
 I- 25KVA TX - BØ
 R- 25KVA TX - BØ (FID: 40091133)

P30 - 260B58 - 36°
 STANDARD 03.12-112 & 06.08-132
 FRAME NEUT 15' FROM TOP
 I- 50/3 POLE (J.U)
 I- 3Ø VERT DDE - CABØ
 I- 25KVA TX - BØ
 I- LV RISER
 I- DBL PRI DGUY
 I- PRI & NEUT DGUY

P31
 R- 45/4 POLE (J.U)
 R- (2) 8" DBL WD ARM - 3Ø DE
 R- 5KVA TX - CØ
 R- MV AREA LIGHT
 R- (2) PRI & NEUT DGUY

P32 - 260B59 - 72°
 STANDARD 03.11-119
 FRAME NEUT 16' FROM TOP
 I- 50/3 POLE (J.U)
 I- 8" FG ARM - CØ DE - ACBØ
 I- 8" FG ARM - 3Ø DE - CABØ
 I- DBL PRI DGUY
 I- (2) PRI & NEUT DGUY

P33
 E- 45/4 POLE

P34
 E- 40/5 POLE

P37
 I-UG PRI SPLICE

P39
 R- 40/5 POLE (J.U)
 R- 8" SGL WD ARM - 3Ø T/L
 R- 25KVA TX - BØ (FID: 389982783)

P40
 I-UG SEC SPLICE

P41 - 268J24
 STANDARD 03.02-104
 I- 40/5 POLE
 I- SEC DE
 I- LV RISER
 I- SEC DGUY

P42 -
 I-UG SEC SPLICE

P43
 T- (TO P22) 50W LED STREET LIGHT
 R- 40/5 POLE (J.U)
 R- 8" SGL WD ARM - 3Ø
 R- 1Ø 40T FUSE - BØ (FID: 38743190)
 R- 1Ø DE - BØ
 R- 50KVA TX - CØ (FID: 401584534)
 R- (2) LV RISER
 R- PRI & NEUT DGUY

P44
 I-UG SEC SPLICE

P45
 I-UG SEC SPLICE

Work Order Number	36104978
Customer/Contact	
Contact Phone	
Job Site Address	1399 TOM HALL
City	FORT MILL
County	YORK
State, Zip	SC 29715
Designer	THOMAS DOUGLASS
Designer Phone	919-606-4659
Circuit ID	72771202 72770401
Primary Voltage	12.47/7.2 KV & 4.16/2.4 KV
Permit Required	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Permit Type/No.	SC DOT ENCROACHMENT
Permit Type/No. 2	PERMIT #200120228
Permit Type/No. 3	
Permit Type/No. 4	

**SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
Encroachment Permit**

Permit No : 229820

Permit Decision Date :
12/5/2019

Expiration Date : 12/5/2020

Type Permit : Blanket
Service Connections
(Gov)

Location:

<u>District</u>	<u>Work County</u>	<u>Type</u>	<u>Route</u>	<u>Aux</u>	<u>Begin MP</u>	<u>End MP</u>
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Contact
Information

Applicant: DukeEnergyCarolinasLLC

Phone:

Contact: Lashaunda Jackson

Address: 4690 Simms Creek Road,

City: Raleigh

State: NC

Zip: 27616

Comments

BLANKET PERMIT FOR UTILITY SERVICE CONNECTIONS in the
York County

Special
Provisions:

0004 - SCDOT SHALL BE NOTIFIED WHEN WORK DEFINED IN THE PERMIT STARTS AS WELL AS WHEN THE WORK IS COMPLETED. REFERENCE SHALL BE MADE BY PERMIT NUMBER.

0101 - SHOULDER SOD DESTROYED BY THIS INSTALLATION TO BE REPLACED FOR THE ENTIRE AREA. THE AREA SHALL BE RE-SHAPED AND ROLLED TO THE CROSS SECTION EXISTING PRIOR TO THIS WORK.

0102 - BORE PITS SHALL BE CLOSED IMMEDIATELY AFTER INSTALLATION.

0103 - THE PROPOSED ENCROACHMENT SHALL BE TRENCHED TO A MINIMUM DEPTH OF 42" BELOW THE CROSS SECTION AS ORIGINALLY CONSTRUCTED.

0104 - ALL VALVES AND MANHOLES SHALL CONFORM TO THE EXISTING ELEVATION OF THE ROADWAY OR SHOULDER AND CONFORM TO THE ACCEPTED STANDARD. THE VALVES WILL BE LOCATED OUT OF THE PAVEMENT. THEY SHALL NOT BE PLACED IN A DITCH FLOW LINE.

0107 - TRENCH TO BE PROPERLY BACK-FILLED AND THOROUGHLY TAMPED. THE ENTIRE DISTURBED AREA SHALL BE RE-SHAPED AND DRESSED OUT IN A WORKMANSHIP LIKE MANNER.

0108 - FLOWABLE FILL SHALL BE USED AS BACK-FILL MATERIAL.

0109 - THE BORE SHALL BE MADE BY THE DRY BORE METHOD IN SUCH A MANNER AS NOT TO DISTURB THE PAVEMENT. THE BORE PIT MUST NOT BE

CLOSER THAN FIVE (5) FEET FROM THE EDGE OF PAVEMENT. THE BORE DEPTH SHALL BE NOT LESS THAN 48" DEEP AT ANY POINT IN THE BORE. NOTICE SHALL BE GIVEN TO THE DEPARTMENT IMMEDIATELY IF THE BORE TURNS AND DAMANGES THE ROAD.

0111 - OPEN CUTS AND/OR BELL HOLES WITHIN THE ROAD PAVEMENT SHALL BE CUT IN NEAT LINES AND REPAIRED.

0115 - WHERE PAVEMENT IS CUT THE WORK SHALL BE DONE IN CLEAR WEATHER WHEN TRAFFIC IS LIGHTEST. THERE SHALL BE NO TRENCH LEFT OPEN IN THE TRAVELED WAY WHEN WORK IS NOT IN PROGRESS.

0116 - PAVEMENT SHALL BE CUT TO NEAT LIES AND THE TRENCH BACK-FILLED USING FLOWABLE MATERIAL AND TAMPED IN 6" LAYERS TO 95% DENSITY.

0117 - OPEN TRENCHES SHALL BE COVERED WITH METAL PLATES WHEN THE PAVEMENT CANNOT BE RESTORED THE SAME DAY. PLATES SHALL BE MONITORED PERIODICALLY TO ENSURE THAT THE TRENCH IS PROPERLY COVERED.

0118 - AN OPEN CUT IS AUTHORIZED ONLY TO THE EXTENT NECESSARY TO MAKE A CONNECTION TO THE EXISTING LINE. DRY BORE UNDER REMAINING ROAD TO THE EXISTING LINE.

0121 - BELL HOLE CUT MUST BE COVERED WITH A STEEL PLATE UNTIL A PERMANENT PATCH HAS BEEN MADE. PLATE SHALL BE MONITORED PERIODICALLY TO ENSURE THAT BELL HOLE IS PROPERLY COVERED.

0123 - ALL WORK PERFORMED IN CONNECTION WITH THIS PERMIT SHALL CONFORM TO THE SCDOT "A POLICY FOR ACCOMODATING UTILITIES ON HIGHWAY RIGHT-OF-WAY" MOST CURRENT EDITION.

0209 - DISTURBED VEGETATION SHALL BE RESEDED 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.

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.

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.

SC 160 (TOM HALL ROAD) ROAD WIDENING



APPENDIX E:





TOWN OF FORT MILL

Fort Mill
SOUTH CAROLINA

October 19, 2020

STV Engineers, Inc.
2430 Mall Drive
Suite 315, Building B
North Charleston, SC 29406

Attn: Riska Dees
Engineering Specialist

Re: Project ID P029536
SC Route 160 Widening

Dear Sirs:

The Town of Fort Mill has received and reviewed the above-referenced plans.

The TOFM does have water and sewer pipelines in the construction area. We have determined that these lines have **no conflict** with proposed improvements. These lines consist of a 16-inch water line and a gravity sewer line.

Note that any valves and/or manholes shall be adjusted to the new road surface elevation. Also, one fire hydrant shall be relocated with a two-week notice. Any work shall comply with Town of Fort Mill Specifications as approved by the South Carolina Department of Health and Environmental Control.

We look forward to coordinating with you on this project. If you have any questions please call or email at grushing@fortmillsc.gov.

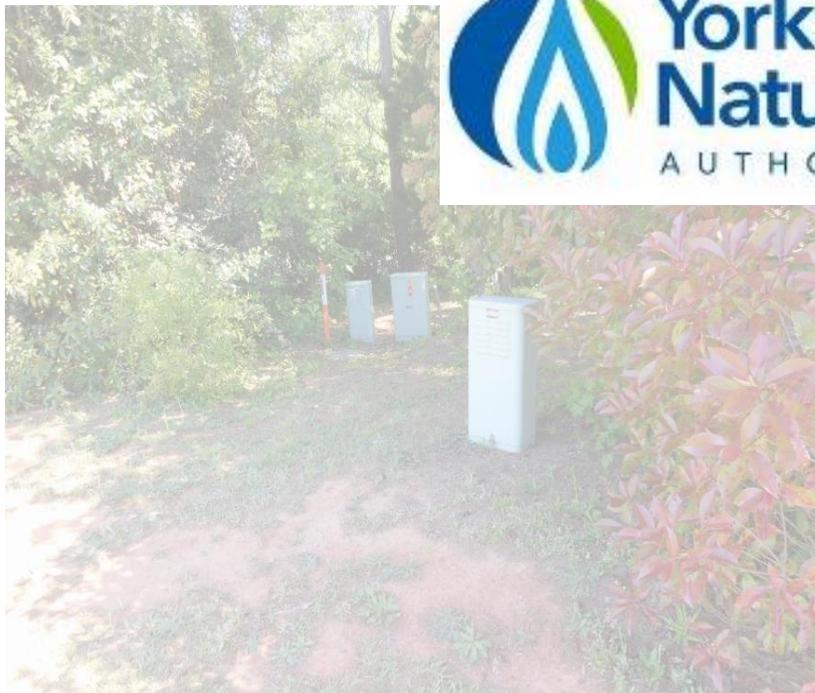
Respectfully yours,

R. Gregory Rushing, PE
Utilities Director
Town of Fort Mill

SC 160 (TOM HALL ROAD) ROAD WIDENING



APPENDIX F:





Agreement # _____

UTILITY AGREEMENT

York County Project No. 11149-010 Route (or Road No.) S.C 160

This Agreement made this 19th day of January, 2020 by and between 21 PMA

York County, hereinafter called "County" and the utility company _

York County Natural Gas Authority (YCNGA)

hereinafter called "Company."

DEFINITIONS

Plans – detailed drawings or diagrams showing the stages for the relocation project

Schedule – the estimated number of days to complete each stage of the relocation project

Cost Estimate – the approximate cost of the relocation project

Actual Cost – the amount the Company pays to complete the relocation project

W I T N E S S E T H:

1. It is mutually agreed by and between the parties hereto that the Company shall perform or cause to be performed, the following work to its utility property facilities as shown on the Plans and Cost Estimate attached and incorporated into this agreement.

General description:

YCNGA will relocate 4" plastic pipe (~3,600'), and 2" plastic pipe (~100') to follow proposed right of way. 2 main tie-ins and 14 service relocations also expected in this project.

At the request of the engineering company, the gas main will be relocated 4' off the edge of the asphalt.

2. The Company hereby agrees to relocate its utility facilities in conflict with highway construction in accordance with the provisions set forth in the Federal Highway Administration's FAPG 23 C.F.R. § 645A and the SCDOT's "A Policy for Accommodating Utilities on Highway Rights-of-Way." The Cost Estimate is:

TOTAL \$143,070.93

County Share \$143,070.93

Company Share \$ 0

(a) The Company does have the right of occupancy in its existing location by reason of holding the fee, an easement, or other real property interest or does not and is in the existing right of way by encroachment.

(b) This section of line has been in service for approximately 25+ years.

(c) Such work as is necessary to relocate, alter, or maintain the facility will be done in such a manner to minimize interference with or endangering the safety of the general public in their use of the roads as a highway. Traffic control and signing will be in accordance with "The Federal Highway Administration's Manual on Uniform Traffic Control Devices for Streets and Highways".

3. The Company shall designate an employee or agent who possesses knowledge of the relocation project and authority to make decisions on behalf of the Company to serve as the Designated Contact Person. The Designated Contact Person shall attend all bi-weekly construction meetings or ensure that any temporary designee attending a bi-weekly meeting possesses knowledge of the relocation project and authority to make decisions on behalf of the Company. The County shall communicate with the Company about the relocation project through the Designated Contact Person. The Company shall notify the County in writing of any changes to the Designated Contact Person within seven calendar days of the change. The Company designates the following person as the Designated Contact Person for this project:

Name: Eric Cellucci
Phone Number: (803) 627-4410
Email: Eric.Cellucci@ycnga.com

4. The County shall provide the Company written notice, by email, of the date the County intends to begin advertising the bid. The Company shall update its Schedule within sixty days after receiving written notice of the bid advertisement. The County shall provide the Company notice of the preconstruction meeting, which the Company's Designated Contact Person shall attend.

5. The Company shall begin relocation project work promptly upon receiving authorization in writing, by email, from the County and complete the work in accordance with the schedule and as promptly as is practicable. Within ten calendar days of receiving written authorization, the Company shall provide notice to the County of the date on which work is expected to begin.

6. The Company will perform the work provided for in this agreement by the method checked below, in accordance with the provisions FAPG 23 CFR § 645.115:

BY COMPANY'S REGULAR FORCES

BY CONTRACT: (State one of recognized reasons for necessity of performing work in this manner)

YCNGA does not own the equipment nor have the personnel to relocate and/or install this quality of gas main;

Therefore, for approved projects, we will contact construction forces who we have an established relationship.

If the Company, subject to prior approval, proposes to contract a portion of or all of the work covered by this agreement, then the Company must submit a list of items in the Cost Estimate that will be accomplished by contract. Where the Company elects to solicit competitive bids from a list of qualified contractors rather than through advertising in a publication, the names and addresses of those contractors must be written on the Cost Estimate or furnished to the County in advance of the Company's solicitation of bids.

7. The County will reimburse the utility company for costs incurred for work performed in accordance with the Plans and Cost Estimate. The Company must provide accurate records supporting all costs incurred and submitted for reimbursement. The method of developing the relocation costs shall be one of the following alternatives.

- Actual and related direct costs accumulated in accordance with a work order accounting procedure prescribed by the applicable Federal or State regulatory body.
- Unit costs, such as broad gauge units of property, as used in own operations. (This method must have prior approval.)

The County will not pay for any components or items considered to be an upgrade unless such upgrades are required by applicable law, necessitated by the relocation, or proven to be more cost efficient.

8. All work performed by the Company shall be performed according to the plans and estimates approved by the County. The County is not obligated to reimburse the Company for any work not included in the Plans or Cost Estimate. The County Engineer may approve reimbursement for Actual Costs or additional work not included in the Plans or Cost Estimate if (1) the Actual Costs or additional work is necessary for the relocation project and (2) the Actual Costs or additional work do not exceed the Cost Estimate by more than 50%. The Company must seek and receive prior written approval before incurring costs for additional work.

9. The Plans must show the existing facilities, permanent changes to be made, and the stages by which these changes are to be accomplished. The Schedule must estimate the time required for each stage.

10. Periodic progress billings of incurred costs may be made by the Company to the County not to exceed monthly intervals and amounting to at least \$2500.00; however, total progress billing payments shall not exceed the Cost Estimate or approved Actual Cost. The County shall retain 10% of each periodic progress billing until the Company completes the relocation project and either submits its final bill or three months lapse after completion of the relocation project.

Upon completion of the work and no later than three months thereafter, the Company shall, at the earliest date practicable, furnish the County with five (5) copies of its final and complete billing of all costs incurred in connection with the work performed hereunder, such statement to follow as closely as possible the order of the items contained in the Cost Estimate. The totals for labor, overhead construction cost, travel expense, transportation, equipment, material and supplies, handling cost, and other services shall be shown in such a manner as will permit ready comparison with the Plans and Cost Estimates. Items of materials shall be itemized where they represent major components.

Credit shall be given for usable materials recovered from permanent or temporary installations. The final billing shall show the description and site of the project, the date on which the first work was performed; or, if preliminary engineering or right-of-way items are involved, the date on which the earliest item of billed expense was incurred, the completion date and the location where the records and accounts billed can be audited. The Company shall make adequate reference in the billing to its records, accounts, and other documents. Contractors and any subcontractors are to maintain all books, documents, papers, accounting records, and other evidence pertaining to costs incurred and to make such materials available at their respective offices at all reasonable times during the contract for inspection by the County or any authorized representatives of the County. Copies shall be furnished if requested.

Final billings submitted by the Company shall carry a statement certifying that all items claimed have been reviewed and are in conformity with the provisions of the agreement, that credits have been given for all salvaged materials as required, and that all contractor's bills have been paid in full. This statement shall be signed by an authorized representative of the Company.

In the event a final and complete billing has not been received by the County three months following the completion of work and the Company has not during that period demonstrated to the County's satisfaction a hardship in completing that billing, the County may, in its sole discretion, consider the last payment made to be the final payment due under this agreement.

11. An extreme delay means the Company failed to begin relocation project work after receiving notice from the County to begin work and caused a thirty-day delay to the entire road construction project. The County shall notify the Company in writing if the Company causes an extreme delay. The Company shall have thirty calendar days from the date of the notice to stop the delay and expeditiously work to complete the relocation project. If the Company fails to stop the delay within thirty days after receiving notice of the delay, the County may require the Company to pay the costs associated with the delay of the project. The costs may include contractor remobilization costs, traffic control costs for the time of the delay, and any other costs attributable to the Company's delay. The County may deduct these costs from the retainage or any reimbursement owed to the Company. Should the costs of the delay exceed the amount of retainage or reimbursement owed to the Company, the County may invoice the Company for the costs of the delay, and the Company shall pay any invoices for the costs associated with extreme delays by the Company. The County may pursue any remedy available in law or equity to recover the costs of the delay.

Should a substantial hardship prevent the Company from performing the relocation project work and cause an extreme delay, the Company may apply in writing for a waiver excusing all or a portion of the delay and waiving all or a portion of the costs associated with the extreme delay. In its application, the Company shall state the cause of the delay and the time in which the Company shall resolve the hardship and continue with the relocation project work. The County Engineer shall determine whether to grant the waiver and what portion of the costs to waive.

Should a dispute arise about the cost levied upon the Company for an extreme delay, the County and the

Company agree participate in pre-litigation mediation and agree to diligently work in good faith to resolve any disputes associated with the costs charged to the Company for extreme delays. The parties shall select a mediator approved by both parties and set forth any resolutions in writing signed by both parties.

Should the parties fail to reach an agreement through pre-litigation mediation, the parties may seek a resolution for the dispute through the Court of Common Pleas located in York County, South Carolina, or the United States District Court for the State of South Carolina. This agreement shall be governed exclusively by the laws of the State of South Carolina without giving effect to its conflicts of law provisions.

12. The County shall have the right to inspect all recovered materials from the permanent facility prior to disposal by sale or scrap. This requirement will be satisfied by the Company giving notice to the County of the time and place the materials will be available for inspection. This notice is the responsibility of the Company and it may be held accountable for full value of materials disposed of without notice. The Company shall furnish a listing on final billings of major items not eligible for salvage credit and reasons therefore.

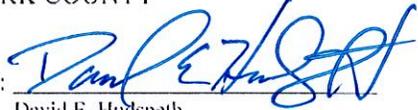
13. The Company will abide by the contract cost principles as set forth in FAPG 23 CFR 645A.

14. The Company will not participate directly or indirectly in any practice that subjects persons to discrimination because of their race, color, religion, sex, or national origin.

COMPANY: York County Natural Gas Authority

YORK COUNTY

ADDRESS: PO Box 11907 Rock Hill, SC 29731

BY: 

BY: Amanda Gallagher

David E. Hudspeth
County Manager

NAME: Amanda Gallagher

TITLE: Engineering Manager

INSTRUCTIONS: Submit three original copies of this agreement form and three prints of drawings showing present location and proposed location of poles or lines with reference to highway survey stations and centerline.

Pennies S.C 160 Road Improvements
 Project ID : P029536
 YCNGA Construction Cost Estimates
 Eric Cellucci 10/15/2020

	<u>Costs</u> per foot	<u>Quantity</u>	<u>Totals</u>
<u>2" Plastic Pipe</u>			
material	\$0.79	100	\$79.00
trench - dirt	\$8.00	24	\$192.00
trench - rock	\$28.49	1.25	\$35.61
bore - dirt	\$19.00	71	\$1,349.00
bore - rock	\$77.50	4	\$310.00
			<u>\$1,965.61</u>
<u>4" Plastic Pipe</u>			
material	\$2.84	3600	\$10,224.00
trench - dirt	\$10.00	713	\$7,130.00
trench - rock	\$30.49	38	\$1,158.62
bore - dirt	\$25.50	2708	\$69,054.00
bore - rock	\$149.50	143	\$21,378.50
			<u>\$108,945.12</u>
<u>Tie Ins</u>			
4"	\$500.00	2	\$1,000.00
			\$1,000.00
<u>Other</u>			
	<u>Cost</u>	<u>Quantity</u>	<u>Total</u>
Material - Valves & Cathodic Protection		4	\$44.00
Service Line Tie -Overs		14	\$7,000.00
10% Material Contingency			\$1,030.30
15% Labor Contingency			\$16,273.00
			<u>\$24,347.30</u>

ACTUAL
TOTAL: \$136,258.03
 5% Cont. \$143,070.93

PENNIES
TOTAL: \$136,258.03
 5% Cont. **\$143,070.93**

UTILITY OWNERS NOTES:

- | | |
|--|--|
| 1. COMPORIUM COMMUNICATIONS
GEORGE STEWART
P.O. BOX 470
471 LAKESHORE PARKWAY
ROCK HILL, SC 29731-6470
(803) 326-6019 | 3. DUKE ENERGY
LASHAUNDA JACKSON
HIGHWAY RELOCATIONS PROGRAM TEAM
4690 SIMMS CREEK ROAD
RALEIGH, NC 27616
(919) 431-4792 |
| 2. YORK COUNTY NATURAL GAS
STEPHEN COMER
979 WEST MAIN ST.
P.O. BOX 11907
ROCK HILL, SC 29731-1907
(803) 323-5388 | 4. TOWN OF FORT MILL WATER & SEWER
UTILITIES DIRECTOR
R. GREGORY RUSHING, PE
112 CONFEDERATE ST.
P.O. BOX 159
FORT MILL, SC 29716
(803) 547-5158 |

ALIGNMENT CONTROL CAN BE FOUND ON REFERENCE DATA SHEET 5A

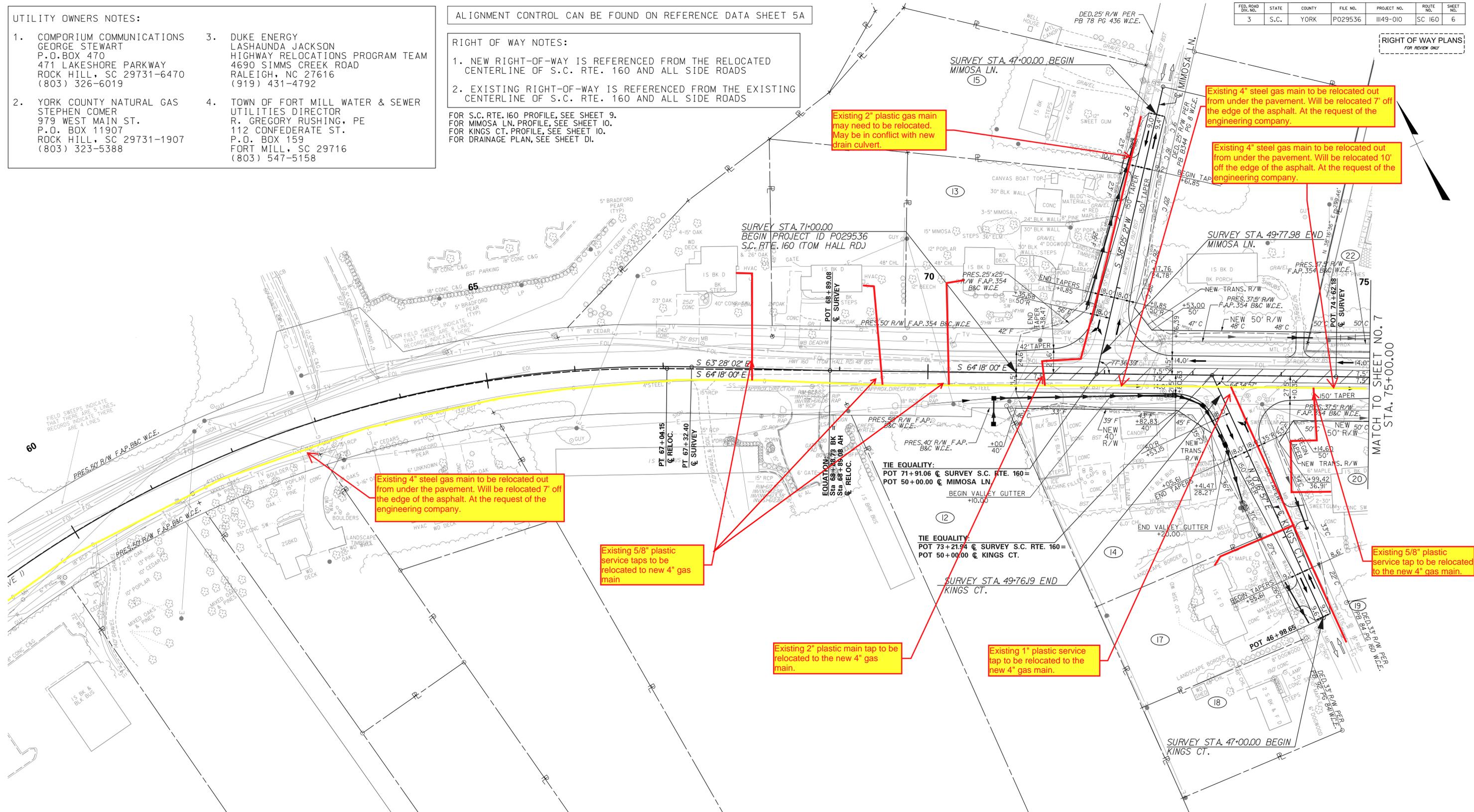
RIGHT OF WAY NOTES:

1. NEW RIGHT-OF-WAY IS REFERENCED FROM THE RELOCATED CENTERLINE OF S.C. RTE. 160 AND ALL SIDE ROADS
2. EXISTING RIGHT-OF-WAY IS REFERENCED FROM THE EXISTING CENTERLINE OF S.C. RTE. 160 AND ALL SIDE ROADS

FOR S.C. RTE. 160 PROFILE, SEE SHEET 9.
FOR MIMOSA LN. PROFILE, SEE SHEET 10.
FOR KINGS CT. PROFILE, SEE SHEET 10.
FOR DRAINAGE PLAN, SEE SHEET DL.

FED. ROAD DIST. NO.	STATE	COUNTY	FILE NO.	PROJECT NO.	ROUTE NO.	SHEET NO.
3	S.C.	YORK	P029536	III49-010	SC 160	6

RIGHT OF WAY PLANS FOR REVIEW ONLY



Existing 4" steel gas main to be relocated out from under the pavement. Will be relocated 7' off the edge of the asphalt. At the request of the engineering company.

Existing 2" plastic gas main may need to be relocated. May be in conflict with new drain culvert.

Existing 4" steel gas main to be relocated out from under the pavement. Will be relocated 7' off the edge of the asphalt. At the request of the engineering company.

Existing 4" steel gas main to be relocated out from under the pavement. Will be relocated 10' off the edge of the asphalt. At the request of the engineering company.

Existing 5/8" plastic service taps to be relocated to new 4" gas main

Existing 2" plastic main tap to be relocated to the new 4" gas main.

Existing 1" plastic service tap to be relocated to the new 4" gas main.

Existing 5/8" plastic service tap to be relocated to the new 4" gas main.

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 9/2/2017



STV 100 Years
 STV Incorporated
 ROCK HILL BUSINESS TECHNOLOGY CENTER, BTC 517
 454 S. ANDERSON ROAD, SUITE 3
 ROCK HILL, SOUTH CAROLINA 29730



6				
5				
4				
3				
2				
1				
REV. NO.	BY	DATE	DESCRIPTION OF REVISION	

YORK COUNTY
 SOUTH CAROLINA
S.C. ROUTE 160 (TOM HALL RD.)
PLAN SHEET
S.C. ROUTE 160
STA. 71+00.00 TO STA. 75+00.00
 SCALE 1"=50' S.C. ROUTE 160 DWG. NO. 6

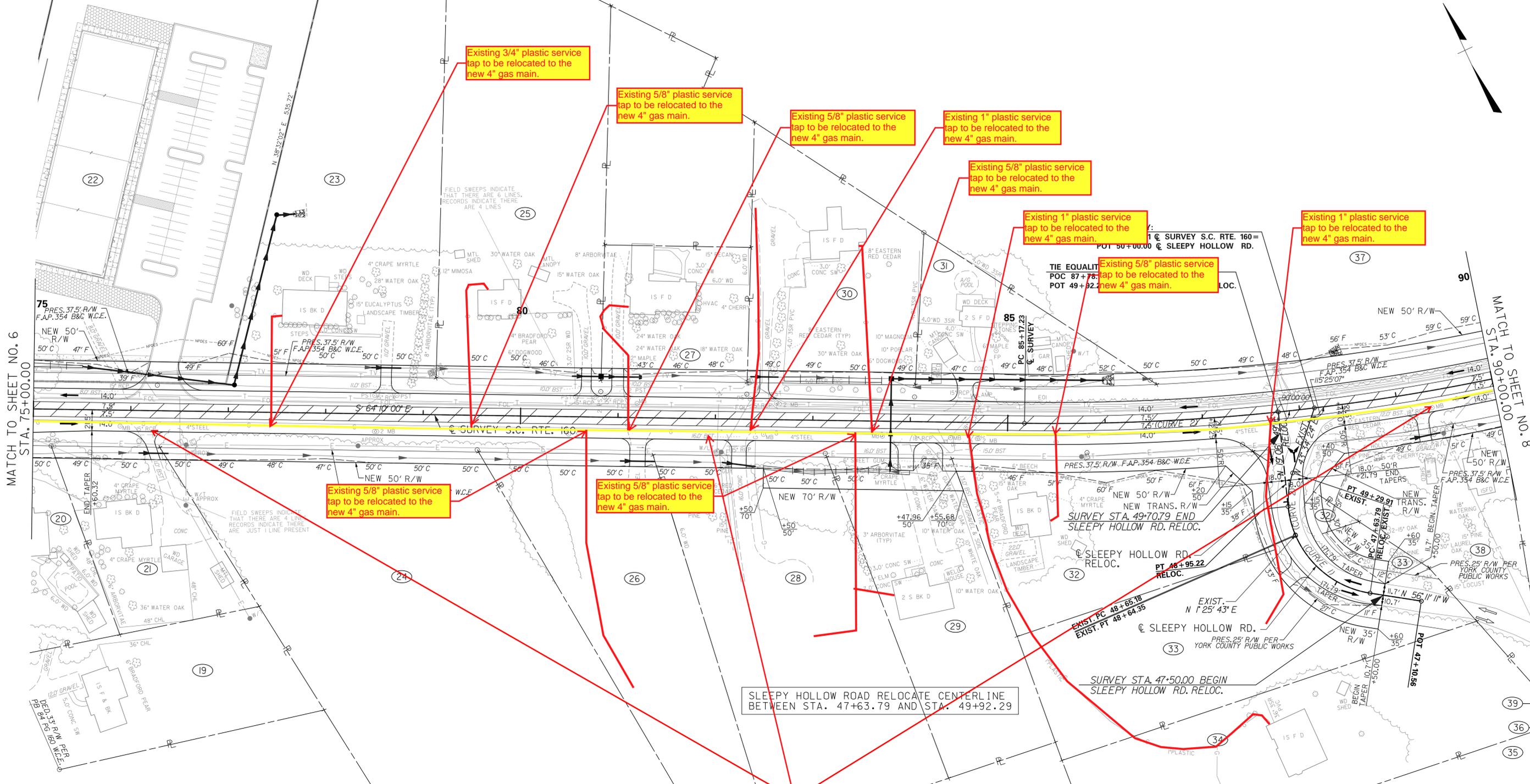
MATCH TO SHEET NO. 7
STA. 75+00.00

ALIGNMENT CONTROL CAN BE FOUND ON REFERENCE DATA SHEET 5A

FOR S.C. RTE. 160 PROFILE, SEE SHEET 9.
FOR SLEEPY HOLLOW RD. PROFILE, SEE SHEET 10.
FOR DRAINAGE PLAN, SEE SHEET D2.

FED. ROAD DIST. NO.	STATE	COUNTY	FILE NO.	PROJECT NO.	ROUTE NO.	SHEET NO.
3	S.C.	YORK	P029536	III49-010	SC 160	7

RIGHT OF WAY PLANS
FOR REVIEW ONLY



MATCH TO SHEET NO. 6
STA. 75+00.00

MATCH TO SHEET NO. 8
STA. 90+00.00

SLEEPY HOLLOW ROAD RELOCATE CENTERLINE BETWEEN STA. 47+63.79 AND STA. 49+92.29

6				
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4				
3				
2				
1				
REV. NO.	BY	DATE	DESCRIPTION OF REVISION	

YORK COUNTY
SOUTH CAROLINA

**S.C. ROUTE 160 (TOM HALL RD.)
PLAN SHEET
S.C. ROUTE 160
STA. 75+00.00 TO STA. 90+00.00**

SCALE 1"=50' S.C. ROUTE 160 DWG. NO. 7

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STV 100 Years STV Incorporated
ROCK HILL BUSINESS TECHNOLOGY CENTER, BTC 517
454 S. ANDERSON ROAD, SUITE 3
ROCK HILL, SOUTH CAROLINA 29730

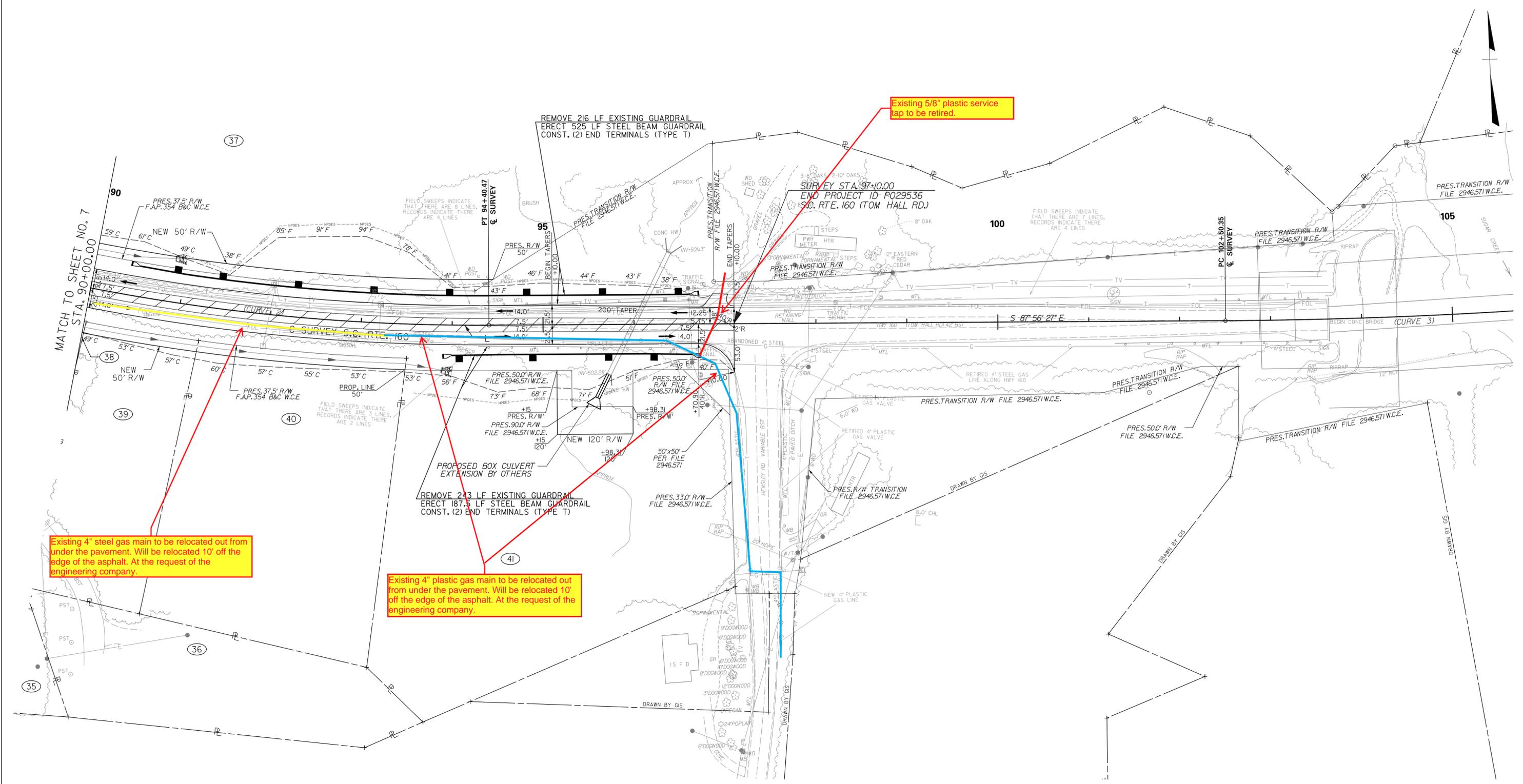


ALIGNMENT CONTROL CAN BE FOUND ON REFERENCE DATA SHEET 5A

FOR S.C. RTE. 160 PROFILE, SEE SHEET 9.
 FOR HENSLEY RD. PROFILE, SEE SHEET 10.
 FOR DRAINAGE SHEET, SEE SHEET D3.

FED. ROAD DIST. NO.	STATE	COUNTY	FILE NO.	PROJECT NO.	ROUTE NO.	SHEET NO.
3	S.C.	YORK	P029536	III49-010	SC 160	8

RIGHT OF WAY PLANS
 FOR REVIEW ONLY



Existing 4" steel gas main to be relocated out from under the pavement. Will be relocated 10' off the edge of the asphalt. At the request of the engineering company.

Existing 4" plastic gas main to be relocated out from under the pavement. Will be relocated 10' off the edge of the asphalt. At the request of the engineering company.

Existing 5/8" plastic service tap to be retired.



STV 100 Years
 STV Incorporated
 ROCK HILL BUSINESS TECHNOLOGY CENTER, BTC 517
 454 S. ANDERSON ROAD, SUITE 3
 ROCK HILL, SOUTH CAROLINA 29730

6			
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REV. NO.	BY	DATE	DESCRIPTION OF REVISION
PREPARED BY	CHK'D BY	REVIEWED BY	

YORK COUNTY
 SOUTH CAROLINA
S.C. ROUTE 160 (TOM HALL RD.)
PLAN SHEET
S.C. ROUTE 160
STA. 90+00.00 TO STA. 97+10.00
 SCALE 1"=50' S.C. ROUTE 160 DWG. NO. 8

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 9/2/2017



This is an automated alert from the SCDOT Encroachment Permit Processing System (EPPS). Please do not reply directly to this email. SC Department of Transportation has received your encroachment permit application and has assigned Application # 200089098 to this request. This application will be processed and you will be contacted if additional information is needed or once the review is complete.

Applicant: YorkCountyNaturalGasAuthority

County: York

Encroachment Type: GAS

Short Description: Relocation of 3700' of 4" plastic and 100' of 2" plastic natural gas main along the south side of Highway 160 E and Hensley Rd E in Fort Mill, SC. Gas main will be buried inside right-of-way per notes on drawings. All Construction will be done according to SCDOT specifications.

Road Name(s):

Highway 160 E (SC 160);Hensley Rd (S-242);

If you have any questions regarding this application, you may contact the County Permit Manager by e-mail at: BeaverCJ@scdot.org; DiamondSH@scdot.org; CaseAM@scdot.org; WrightRH@scdot.org or by phone at: (803) 327-6186. Please reference your Application # in any correspondence. Thank you!



SC 160 (TOM HALL ROAD) ROAD WIDENING



APPENDIX G:





Agreement # _____

UTILITY AGREEMENT

York County Project No. 11149-010 Route (or Road No.) Route 160 (Tom Hall Road)

This Agreement made this 18th 19th day of January, 2020 21 PWA by and between

York County, hereinafter called "County" and the utility company

Comporium Communications

hereinafter called "Company."

DEFINITIONS

Plans – detailed drawings or diagrams showing the stages for the relocation project

Schedule – the estimated number of days to complete each stage of the relocation project

Cost Estimate – the approximate cost of the relocation project

Actual Cost – the amount the Company pays to complete the relocation project

WITNESSETH:

1. It is mutually agreed by and between the parties hereto that the Company shall perform or cause to be performed, the following work to its utility property facilities as shown on the Plans and Cost Estimate attached and incorporated into this agreement.

General description:

Relocate communication facilities along Tom Hall Road in conjunction with Tom Hall

Road widening Project 11149-010.

2. The Company hereby agrees to relocate its utility facilities in conflict with highway construction in accordance with the provisions set forth in the Federal Highway Administration's FAPG 23 C.F.R. § 645A and the SCDOT's "A Policy for Accommodating Utilities on Highway Rights-of-Way." The Cost Estimate is:

TOTAL \$ 257,000

County Share \$ 257,000

Company Share \$ _____

(a) The Company does have the right of occupancy in its existing location by reason of holding the fee, an easement, or other real property interest or does not and is in the existing right of way by encroachment.

(b) This section of line has been in service for approximately 40 years.

(c) Such work as is necessary to relocate, alter, or maintain the facility will be done in such a manner to minimize interference with or endangering the safety of the general public in their use of the roads as a highway. Traffic control and signing will be in accordance with "The Federal Highway Administration's Manual on Uniform Traffic Control Devices for Streets and Highways".

3. The Company shall designate an employee or agent who possesses knowledge of the relocation project and authority to make decisions on behalf of the Company to serve as the Designated Contact Person. The Designated Contact Person shall attend all bi-weekly construction meetings or ensure that any temporary designee attending a bi-weekly meeting possesses knowledge of the relocation project and authority to make decisions on behalf of the Company. The County shall communicate with the Company about the relocation project through the Designated Contact Person. The Company shall notify the County in writing of any changes to the Designated Contact Person within seven calendar days of the change. The Company designates the following person as the Designated Contact Person for this project:

Name: Eric Kirkland

Phone Number: 803-326-6109

Email: eric.kirkland@comporium.com

4. The County shall provide the Company written notice, by email, of the date the County intends to begin advertising the bid. The Company shall update its Schedule within sixty days after receiving written notice of the bid advertisement. The County shall provide the Company notice of the preconstruction meeting, which the Company's Designated Contact Person shall attend.

5. The Company shall begin relocation project work promptly upon receiving authorization in writing, by email, from the County and complete the work in accordance with the schedule and as promptly as is practicable. Within ten calendar days of receiving written authorization, the Company shall provide notice to the County of the date on which work is expected to begin.

6. The Company will perform the work provided for in this agreement by the method checked below, in accordance with the provisions FAPG 23 CFR § 645.115:

BY COMPANY'S REGULAR FORCES

BY CONTRACT: (State one of recognized reasons for necessity of performing work in this manner)

If the Company, subject to prior approval, proposes to contract a portion of or all of the work covered by this agreement, then the Company must submit a list of items in the Cost Estimate that will be accomplished by contract. Where the Company elects to solicit competitive bids from a list of qualified contractors rather than through advertising in a publication, the names and addresses of those contractors must be written on the Cost Estimate or furnished to the County in advance of the Company's solicitation of bids.

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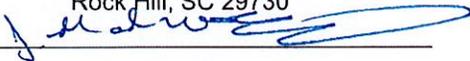
13. The Company will abide by the contract cost principles as set forth in FAPG 23 CFR 645A.

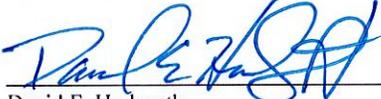
14. The Company will not participate directly or indirectly in any practice that subjects persons to discrimination because of their race, color, religion, sex, or national origin.

COMPANY: Comporium Communications

YORK COUNTY

ADDRESS: 471 Lakeshore Pkwy,
Rock Hill, SC 29730

BY: 

BY: 
David E. Hudspeth
County Manager

NAME: J Mark Whitfield

TITLE: Director - Plant Facilities Eng.

INSTRUCTIONS: Submit three original copies of this agreement form and three prints of drawings showing present location and proposed location of poles or lines with reference to highway survey stations and centerline.

Pennies for Progress
S.C. Route 160 (Tom Hall Road)
Project ID P029536

Comporium Communications Cost Breakdown

Material: \$140,416

Labor: \$116,584

Total: \$257,000

SUBMITTED
MARCH 20TH, 2019

FINAL R/W PLANS
FOR RIGHT OF WAY ACQUISITION ONLY



INDEX OF SHEETS

SHEET #	TITLE	NO. SHEETS
U1	COVER	1
U2	LEGENDS AND ABBREVIATIONS	1
U3	UTILITY DATA SHEET	1
U4	UTILITY POLE DATA SHEET	OMITTED
U5	TEST HOLE DATA SHEET	OMITTED
U6-U8	U-SHEETS	3

TOTAL SHEETS: 6

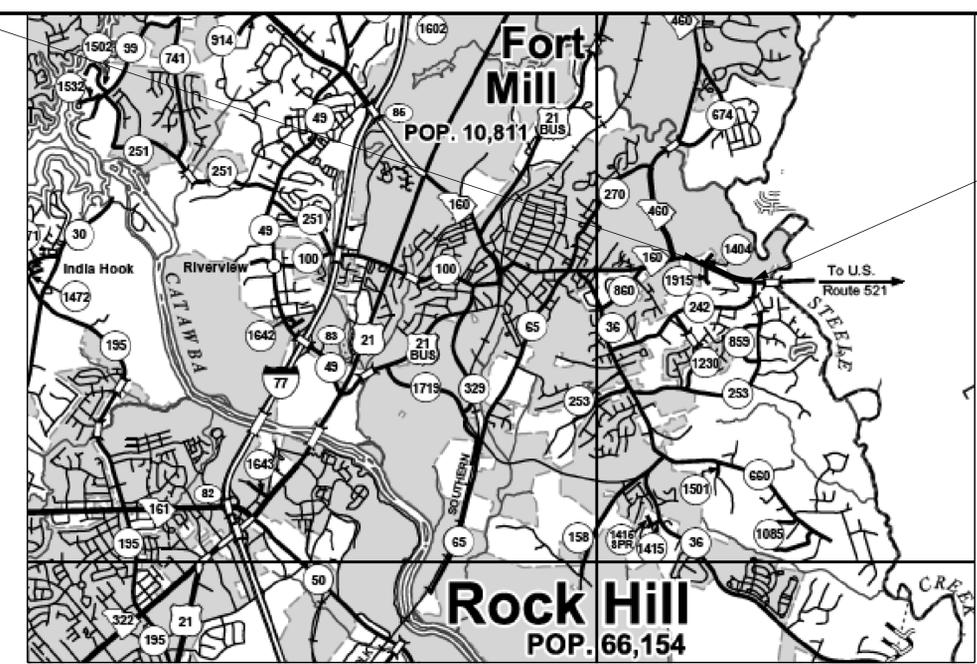
UTILITY COORDINATION PLANS

YORK COUNTY, SOUTH CAROLINA
S.C. ROUTE 160 (TOM HALL ROAD)
PROJECT ID P029536
YORK COUNTY PROJECT NO. 11149-010
S.C. ROUTE 160 (TOM HALL ROAD) FROM
MIMOSA LANE TO HENSLEY ROAD

NEW PROPOSED COMPORIUM DITCH

SURVEY STA. 71+00.00 BEGIN
PROJECT ID P029536
S.C. ROUTE 160 (TOM HALL RD.)

SURVEY STA. 97+10.00 END
PROJECT ID P029536
S.C. ROUTE 160 (TOM HALL RD.)



ENVIRONMENTAL PERMIT INFORMATION

USACE PERMIT	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
NEPA DOCUMENT	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
401 CERTIFICATION	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
OCRM CAP	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
NAVIGABLE WATERS	<input type="checkbox"/> SC	<input type="checkbox"/> USCG
	<input type="checkbox"/> USACE	<input checked="" type="checkbox"/> N/A

3 DAYS BEFORE DIGGING IN
SOUTH CAROLINA
CALL 811
 SOUTH CAROLINA 811 (SC811)
 WWW.SC811.COM
 ALL UTILITIES MAY NOT BE A MEMBER OF SC811

RAILROAD INVOLVEMENT?
 YES / (NO)

TRAFFIC DATA

2017	ADT	15,000
2027	ADT	20,400
	TRUCKS	4 %

AT THE DIRECTION OF YORK COUNTY DESIGN OF THE EXTENSION, RETROFIT IMPROVEMENT, AND/OR REPLACEMENT OF AN EXISTING 5'X5' BOX CULVERT(RCBC) AT STATION 96+00 IS NOT INCLUDED IN THESE ROADWAY IMPROVEMENT PLANS. THE PROJECT HYDRAULIC DESIGN REPORT INCLUDES SPECIFIC HYDRAULIC DESIGNER'S RECOMMENDATIONS CONCERNING THE CULVERT.

NOTE: EXCEPT AS MAY OTHERWISE BE SPECIFIED ON THE PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIALS AND WORKMANSHIP ON THIS PROJECT SHALL CONFORM TO THE SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION (2007 EDITION) AND THE STANDARD DRAWINGS FOR ROAD CONSTRUCTION IN EFFECT AT THE TIME OF LETTING.

	S.C. RTE. 160	SIDE ROADS	TOTAL
NET LENGTH OF ROADWAY	0.494 MILES	0.147 MILES	0.641 MILES
NET LENGTH OF BRIDGES	0.000 MILES	0.000 MILES	0.000 MILES
NET LENGTH OF PROJECT	0.494 MILES	0.147 MILES	0.641 MILES
LENGTH OF EXCEPTIONS	0.000 MILES	0.000 MILES	0.000 MILES
GROSS LENGTH OF PROJECT	0.494 MILES	0.147 MILES	0.641 MILES

EQUALITIES IN STATIONING
 STA. 68+88.73 S.C. RTE. 160 RELOC. (BK) = STA. 68+89.08 S.C. RTE. 160 SURVEY (AH) (-0.35)

CONSULTING ENGINEERING FIRM

STV 100 Years **STV Incorporated**
 ROCK HILL BUSINESS TECHNOLOGY CENTER, BTC 417
 44 S. ANDERSON ROAD, SUITE 3
 ROCK HILL, SOUTH CAROLINA 29726

SCDOT REVIEW	RIGHT-OF-WAY		CONSTRUCTION	
	INITIAL	DATE	INITIAL	DATE
PRECONSTRUCTION SUPPORT - ROAD				
PRECONSTRUCTION SUPPORT - STRUCTURES				
RPG - DESIGN MANAGER				
RPG - PROGRAM MANAGER				

THE INITIALS ABOVE DO NOT RELIEVE THE ENGINEER OF RECORD OF THE RESPONSIBILITY TO DESIGN THIS PROJECT IN ACCORDANCE WITH ALL APPLICABLE CRITERIA.

For Right Of Way Acquisition:

STV Incorporated
 Consultant Engineer of Record Date

SCDOT Engineer
 Regional Production Engineer Date

ENGINEER OF RECORD

FOR CONSTRUCTION: STV Incorporated DATE

HedricLA
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 4/8/2020

UTILITY OWNERS NOTES:

- | | |
|--|--|
| 1. COMPORIUM COMMUNICATIONS
GEORGE STEWART
P.O. BOX 470
471 LAKESHORE PARKWAY
ROCK HILL, SC 29731-6470
(803) 326-6019 | 3. DUKE ENERGY
LASHAUNDA JACKSON
HIGHWAY RELOCATIONS PROGRAM TEAM
4690 SIMMS CREEK ROAD
RALEIGH, NC 27616
(919) 431-4792 |
| 2. YORK COUNTY NATURAL GAS
AMANDA GALLAGHER
979 WEST MAIN ST.
P.O. BOX 11907
ROCK HILL, SC 29731-1907
(803) 323-5363 | 4. TOWN OF FORT MILL WATER & SEWER
UTILITIES DIRECTOR
R. GREGORY RUSHING, PE
112 CONFEDERATE ST.
P.O. BOX 159
FORT MILL, SC 29716
(803) 547-5158 |

ALIGNMENT CONTROL CAN BE FOUND ON REFERENCE DATA SHEET 5A

RIGHT OF WAY NOTES:

1. NEW RIGHT-OF-WAY IS REFERENCED FROM THE RELOCATED CENTERLINE OF S.C. RTE. 160 AND ALL SIDE ROADS
2. EXISTING RIGHT-OF-WAY IS REFERENCED FROM THE EXISTING CENTERLINE OF S.C. RTE. 160 AND ALL SIDE ROADS

FOR S.C. RTE. 160 PROFILE, SEE SHEET 9.
 FOR MIMOSA LN. PROFILE, SEE SHEET 10.
 FOR KINGS CT. PROFILE, SEE SHEET 10.
 FOR DRAINAGE PLAN, SEE SHEET DI.

FED. ROAD DIST. NO.	STATE	COUNTY	FILE NO.	PROJECT NO.	ROUTE NO.	SHEET NO.
3	S.C.	YORK	PO29536	III49-010	SC 160	U6

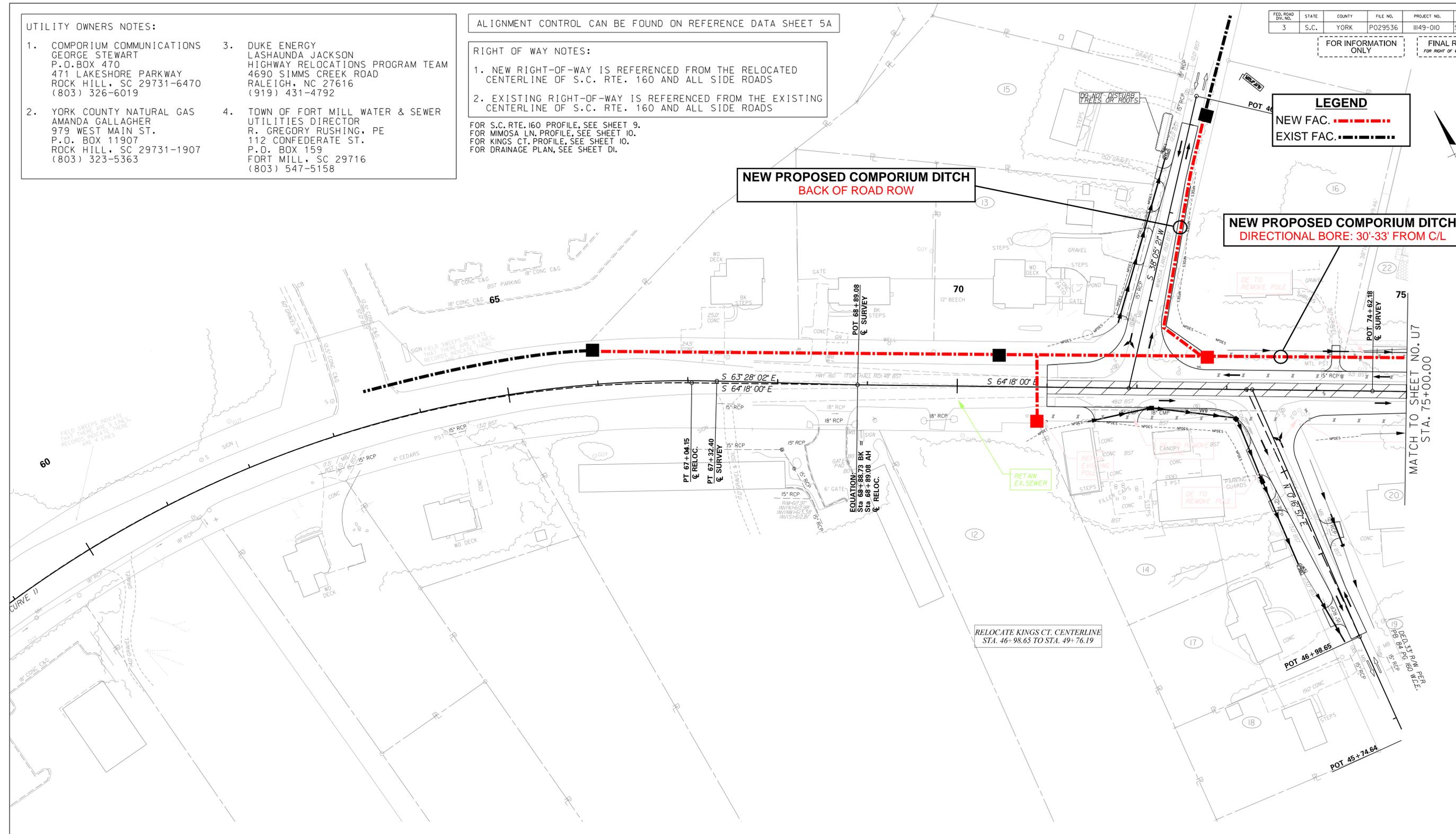
FOR INFORMATION ONLY

FINAL R/W PLANS
FOR RIGHT OF WAY ACQUISITION ONLY

LEGEND
 NEW FAC. - - - - -
 EXIST FAC. - - - - -

**NEW PROPOSED COMPORIUM DITCH
 BACK OF ROAD ROW**

**NEW PROPOSED COMPORIUM DITCH
 DIRECTIONAL BORE: 30'-33' FROM C/L**



MATCH TO SHEET NO. U7
STA. 75+00.00

RELOCATE KINGS CT. CENTERLINE
STA. 46+98.65 TO STA. 49+76.19



STV 100 Years STV Incorporated
 ROCK HILL BUSINESS TECHNOLOGY CENTER, BTC 517
 454 S. ANDERSON ROAD, SUITE 3
 ROCK HILL, SOUTH CAROLINA 29730



6			
5			
4			
3	MHC	07/09/19	REMOVED TCE FROM TRACT 15
2	MHC	06/24/19	ADDED TCE TO TRACT 15
1	MHC	05/22/19	REVISED OBTAIN AND REMOVED PREMISSIONS ON TRACT 20
REV. NO.	BY	DATE	DESCRIPTION OF REVISION
PREPARED BY	CHK'D BY	REVIEWED BY	

YORK COUNTY
 SOUTH CAROLINA
S.C. ROUTE 160 (TOM HALL RD.)
 SCALE 1"=50' S.C. ROUTE 160 DWG. NO. U

ALIGNMENT CONTROL CAN BE FOUND ON REFERENCE DATA SHEET 5A

FOR S.C. RTE. 160 PROFILE, SEE SHEET 9.
FOR SLEEPY HOLLOW RD. PROFILE, SEE SHEET 10.
FOR DRAINAGE PLAN, SEE SHEET D2.

FED. ROAD DIST. NO.	STATE	COUNTY	FILE NO.	PROJECT NO.	ROUTE NO.	SHEET NO.
3	S.C.	YORK	PO29536	III49-010	SC 160	U7

FOR INFORMATION ONLY
FINAL R/W PLANS
FOR RIGHT OF WAY ACQUISITION ONLY

LEGEND
NEW FAC. - - - - -
EXIST FAC. - - - - -

NEW PROPOSED COMPORIUM DITCH
DIRECTIONAL BORE: 30'-33' FROM C/L

AREA OF CONCERN
VERIFY DEPTH

NEW PROPOSED COMPORIUM DITCH
DIRECTIONAL BORE: 28'-30' FROM C/L

SLEEPY HOLLOW ROAD RELOCATE CENTERLINE
BETWEEN STA. 47+63.79 AND STA. 49+92.29

MATCH TO SHEET NO. U6
STA. 75+00.00

MATCH TO SHEET NO. U8
STA. 90+00.00

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4/8/2020



STV 100 Years STV Incorporated
ROCK HILL BUSINESS TECHNOLOGY CENTER, BTC 517
454 S. ANDERSON ROAD, SUITE 3
ROCK HILL, SOUTH CAROLINA 29730

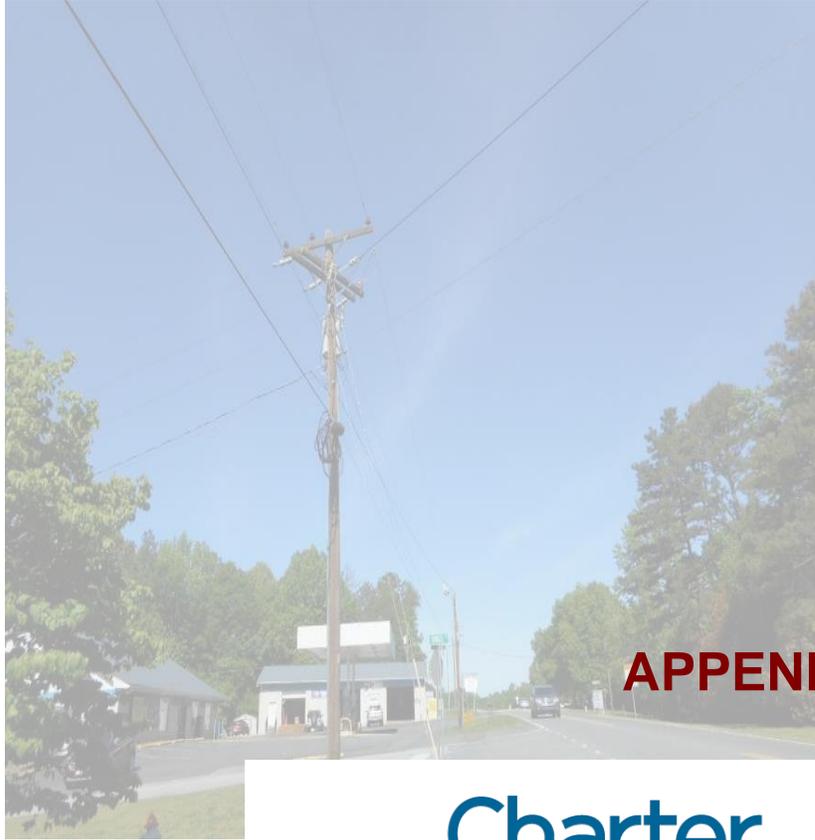


6	TGM	03/11/2020	REVISED NEW R/W - TRACT 23
5	MHC	05/22/19	ADDECD TCE TO TRS 22 & 23 TO COVER SLOPE & EC PERMISSIONS
4	MHC	05/22/19	REVISED OBTAIN AND REMOVE PERMISSION ON TR 20
3	MHC	05/17/19	ADDED TCE TO TRACT 38
2	MHC	05/14/19	REVISED RW LIMITS AND OBTAIN ON TRACT 31
1	MHC	04/22/19	REVISED SLOPE LIMITS AND RW OBTAIN ON TRACT 31
REV. NO.	BY	DATE	DESCRIPTION OF REVISION
PREPARED BY	CHK'D BY	REVIEWED BY	

YORK COUNTY
SOUTH CAROLINA
S.C. ROUTE 160 (TOM HALL RD.)
PLAN SHEET
S.C. ROUTE 160
STA. 75+00.00 TO STA. 90+00.00

SCALE 1"=50' S.C. ROUTE 160 DWG. NO. U7

SC 160 (TOM HALL ROAD) ROAD WIDENING



APPENDIX H:

Charter
Spectrum ▶





Agreement # _____

UTILITY AGREEMENT

York County Project No. 11149-010 Route (or Road No.) SC 160

This Agreement made this 19th day of January, 2020 by and between 14TH December 21 PWA

York County, hereinafter called "County" and the utility company _

SPECTRUM

hereinafter called "Company."

DEFINITIONS

Plans – detailed drawings or diagrams showing the stages for the relocation project

Schedule – the estimated number of days to complete each stage of the relocation project

Cost Estimate – the approximate cost of the relocation project

Actual Cost – the amount the Company pays to complete the relocation project

W I T N E S S E T H:

1. It is mutually agreed by and between the parties hereto that the Company shall perform or cause to be performed, the following work to its utility property facilities as shown on the Plans and Cost Estimate attached and incorporated into this agreement.

General description:

Relocate 3852ft of underground fiber and underground vaults out of the way of the road widening project. Also having to

replace 430ft of aerial fiber in order to keep it a continuous run to minimize splice points.

2. The Company hereby agrees to relocate its utility facilities in conflict with highway construction in accordance with the provisions set forth in the Federal Highway Administration's FAPG 23 C.F.R. § 645A and the SCDOT's "A Policy for Accommodating Utilities on Highway Rights-of-Way." The Cost Estimate is:

TOTAL \$ 66,209.58

County Share \$ 66,209.58

Company Share \$ 0

(a) The Company does have the right of occupancy in its existing location by reason of holding the fee, an easement, or other real property interest or does not and is in the existing right of way by encroachment.

(b) This section of line has been in service for approximately 5 years.

(c) Such work as is necessary to relocate, alter, or maintain the facility will be done in such a manner to minimize interference with or endangering the safety of the general public in their use of the roads as a highway. Traffic control and signing will be in accordance with "The Federal Highway Administration's Manual on Uniform Traffic Control Devices for Streets and Highways".

3. The Company shall designate an employee or agent who possesses knowledge of the relocation project and authority to make decisions on behalf of the Company to serve as the Designated Contact Person. The Designated Contact Person shall attend all bi-weekly construction meetings or ensure that any temporary designee attending a bi-weekly meeting possesses knowledge of the relocation project and authority to make decisions on behalf of the Company. The County shall communicate with the Company about the relocation project through the Designated Contact Person. The Company shall notify the County in writing of any changes to the Designated Contact Person within seven calendar days of the change. The Company designates the following person as the Designated Contact Person for this project:

Name: Neal Barker

Phone Number: 704-671-6103

Email: neal.barker@charter.com

4. The County shall provide the Company written notice, by email, of the date the County intends to begin advertising the bid. The Company shall update its Schedule within sixty days after receiving written notice of the bid advertisement. The County shall provide the Company notice of the preconstruction meeting, which the Company's Designated Contact Person shall attend.

5. The Company shall begin relocation project work promptly upon receiving authorization in writing, by email, from the County and complete the work in accordance with the schedule and as promptly as is practicable. Within ten calendar days of receiving written authorization, the Company shall provide notice to the County of the date on which work is expected to begin.

6. The Company will perform the work provided for in this agreement by the method checked below, in accordance with the provisions FAPG 23 CFR § 645.115:

BY COMPANY'S REGULAR FORCES

BY CONTRACT; (State one of recognized reasons for necessity of performing work in this manner)

If the Company, subject to prior approval, proposes to contract a portion of or all of the work covered by this agreement, then the Company must submit a list of items in the Cost Estimate that will be accomplished by contract. Where the Company elects to solicit competitive bids from a list of qualified contractors rather than through advertising in a publication, the names and addresses of those contractors must be written on the Cost Estimate or furnished to the County in advance of the Company's solicitation of bids.

7. The County will reimburse the utility company for costs incurred for work performed in accordance with the Plans and Cost Estimate. The Company must provide accurate records supporting all costs incurred and submitted for reimbursement. The method of developing the relocation costs shall be one of the following alternatives.

- Actual and related direct costs accumulated in accordance with a work order accounting procedure prescribed by the applicable Federal or State regulatory body.
- Unit costs, such as broad gauge units of property, as used in own operations. (This method must have prior approval.)

The County will not pay for any components or items considered to be an upgrade unless such upgrades are required by applicable law, necessitated by the relocation, or proven to be more cost efficient.

8. All work performed by the Company shall be performed according to the plans and estimates approved by the County. The County is not obligated to reimburse the Company for any work not included in the Plans or Cost Estimate. The County Engineer may approve reimbursement for Actual Costs or additional work not included in the Plans or Cost Estimate if (1) the Actual Costs or additional work is necessary for the relocation project and (2) the Actual Costs or additional work do not exceed the Cost Estimate by more than 50%. The Company must seek and receive prior written approval before incurring costs for additional work.

9. The Plans must show the existing facilities, permanent changes to be made, and the stages by which these changes are to be accomplished. The Schedule must estimate the time required for each stage.

10. Periodic progress billings of incurred costs may be made by the Company to the County not to exceed monthly intervals and amounting to at least \$2500.00; however, total progress billing payments shall not exceed the Cost Estimate or approved Actual Cost. The County shall retain 10% of each periodic progress billing until the Company completes the relocation project and either submits its final bill or three months lapse after completion of the relocation project.

Upon completion of the work and no later than three months thereafter, the Company shall, at the earliest date practicable, furnish the County with five (5) copies of its final and complete billing of all costs incurred in connection with the work performed hereunder, such statement to follow as closely as possible the order of the items contained in the Cost Estimate. The totals for labor, overhead construction cost, travel expense, transportation, equipment, material and supplies, handling cost, and other services shall be shown in such a manner as will permit ready comparison with the Plans and Cost Estimates. Items of materials shall be itemized where they represent major components.

Credit shall be given for usable materials recovered from permanent or temporary installations. The final billing shall show the description and site of the project, the date on which the first work was performed; or, if preliminary engineering or right-of-way items are involved, the date on which the earliest item of billed expense was incurred, the completion date and the location where the records and accounts billed can be audited. The Company shall make adequate reference in the billing to its records, accounts, and other documents. Contractors and any subcontractors are to maintain all books, documents, papers, accounting records, and other evidence pertaining to costs incurred and to make such materials available at their respective offices at all reasonable times during the contract for inspection by the County or any authorized representatives of the County. Copies shall be furnished if requested.

Final billings submitted by the Company shall carry a statement certifying that all items claimed have been reviewed and are in conformity with the provisions of the agreement, that credits have been given for all salvaged materials as required, and that all contractor's bills have been paid in full. This statement shall be signed by an authorized representative of the Company.

In the event a final and complete billing has not been received by the County three months following the completion of work and the Company has not during that period demonstrated to the County's satisfaction a hardship in completing that billing, the County may, in its sole discretion, consider the last payment made to be the final payment due under this agreement.

11. An extreme delay means the Company failed to begin relocation project work after receiving notice from the County to begin work and caused a thirty-day delay to the entire road construction project. The County shall notify the Company in writing if the Company causes an extreme delay. The Company shall have thirty calendar days from the date of the notice to stop the delay and expeditiously work to complete the relocation project. If the Company fails to stop the delay within thirty days after receiving notice of the delay, the County may require the Company to pay the costs associated with the delay of the project. The costs may include contractor remobilization costs, traffic control costs for the time of the delay, and any other costs attributable to the Company's delay. The County may deduct these costs from the retainage or any reimbursement owed to the Company. Should the costs of the delay exceed the amount of retainage or reimbursement owed to the Company, the County may invoice the Company for the costs of the delay, and the Company shall pay any invoices for the costs associated with extreme delays by the Company. The County may pursue any remedy available in law or equity to recover the costs of the delay.

Should a substantial hardship prevent the Company from performing the relocation project work and cause an extreme delay, the Company may apply in writing for a waiver excusing all or a portion of the delay and waiving all or a portion of the costs associated with the extreme delay. In its application, the Company shall state the cause of the delay and the time in which the Company shall resolve the hardship and continue with the relocation project work. The County Engineer shall determine whether to grant the waiver and what portion of the costs to waive.

Should a dispute arise about the cost levied upon the Company for an extreme delay, the County and the

Company agree participate in pre-litigation mediation and agree to diligently work in good faith to resolve any disputes associated with the costs charged to the Company for extreme delays. The parties shall select a mediator approved by both parties and set forth any resolutions in writing signed by both parties.

Should the parties fail to reach an agreement through pre-litigation mediation, the parties may seek a resolution for the dispute through the Court of Common Pleas located in York County, South Carolina, or the United States District Court for the State of South Carolina. This agreement shall be governed exclusively by the laws of the State of South Carolina without giving effect to its conflicts of law provisions.

12. The County shall have the right to inspect all recovered materials from the permanent facility prior to disposal by sale or scrap. This requirement will be satisfied by the Company giving notice to the County of the time and place the materials will be available for inspection. This notice is the responsibility of the Company and it may be held accountable for full value of materials disposed of without notice. The Company shall furnish a listing on final billings of major items not eligible for salvage credit and reasons therefore.

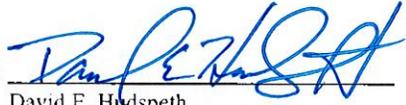
13. The Company will abide by the contract cost principles as set forth in FAPG 23 CFR 645A.

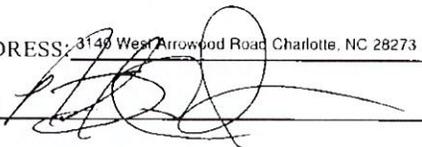
14. The Company will not participate directly or indirectly in any practice that subjects persons to discrimination because of their race, color, religion, sex, or national origin.

COMPANY: Spectrum Southeast LLC

YORK COUNTY

ADDRESS: 3140 West Arrowood Road Charlotte, NC 28273

BY: 

BY: 

David E. Hudspeth
County Manager

NAME: Neal Barker

TITLE: Construction Coordinator

INSTRUCTIONS: Submit three original copies of this agreement form and three prints of drawings showing present location and proposed location of poles or lines with reference to highway survey stations and centerline.



CONTRACT LABOR BOM/SOW



SOW ISSUE DATE:
ESTIMATED COMPLETION DATE

COORDINATOR	0
ACTIVITY NAME:	0
PROJECT ADDRESS	HWY 160 (TOM HALL RD0
PROJECT NUMBER	PENDING APPROVAL
DOCK# / CJ#	
PO#	
FRANCHISE	YORK
POINT OF CONTACT	NEAL BARKER
HUB/NODE ID	

SCOPE OF WORK	HWY 160 ROAD WIDENING PROJECT :TO RELCOATE 3852FT OF UNDERGROUND FIBER AND RELOCATE
	VAULTS TO NEW ROW.THERE WILL BE 430FT OF AERIAL FIBER THAT WILL NEED TO BE REPLACED DUE TO IT BEING THE SAME RUN AND NO HAVE TO ADD
	MULTIPLE SPLICE POINTS

TOTAL CONTRACT LABOR \$ **57,712.30**

National ID	Category	Task Name	Units of Measure	New Price	Quantity	Total	Sub Cat
AC02	Aerial	Composite New Aerial Construction - Fiber	Per Ft.	\$1.00	430.00	\$ 430.00	
AS14	Aerial	Install A New Riser	Per each Riser	\$29.80	2.00	\$ 59.60	
AS22	Aerial	Lash Aerial Duct	Per Cable Bearing Strand foot	\$0.58	430.00	\$ 249.40	
AS27	Aerial	Delash Cable	Per Ft.	\$0.15	430.00	\$ 64.50	
MC05	Permit	Perform Aerial/UG Engineering Survey For Row Or Utility Easement Permit And Or For Design Of Coax Or Fiber	Per Engineered Strand Or Trench Foot	\$0.08	17,500.00	\$ 1,400.00	
FS02	Splicing	Splice Fiber Optic Cable, 13-48 Fibers	Per Splice	\$30.00	96.00	\$ 2,880.00	
FS08	Splicing	Re Enter Existing Splice Case (Splicing and new cable entry)	Per reentry	\$125.00	2.00	\$ 250.00	
US09B	Ug	Direction Drill Or Bore And Place New Underground Conduit(s), Greater Than Four (4) inch Capacity To thirty-six (36) inch Minimum Cover	Per Bore Foot (Measured Pit to Pit)	\$13.40	3,852.00	\$ 51,616.80	
US14	Ug	Place or Replace A Concrete Utility Vault Or Other Heavy Vault Up To 48" x 24" x 24"	Per Each Vault	\$190.50	4.00	\$ 762.00	



MATERIAL BOM

COORDINATOR NAME NEAL BARKER
 CONTRACTOR NAME 0
 MATERIAL DUE DATE _____

PROJECT NAME: 0
 PROJECT #: PENDING APPROVAL
 DOCK #: _____
 NODE #: 0
 FRANCHISE: YORK

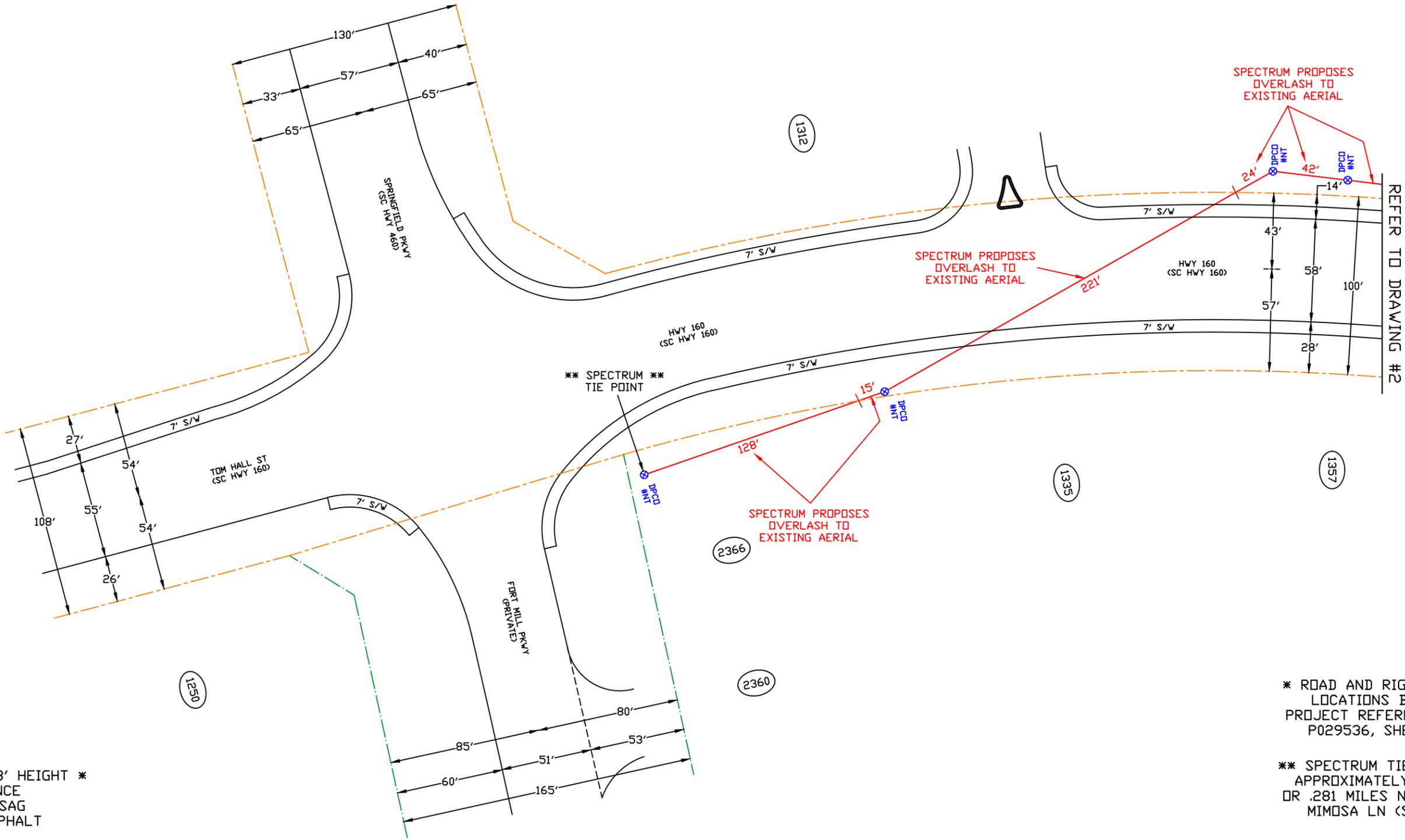
MATERIAL TOTAL \$ **8,497.29**

TAX / FREIGHT FEE \$ **594.81**

Area	Wshe ID	Vendor	Vendor #	Item	JDE PART #	Item Description	UOM	Price	Qty Req.	Total	Sub Cat
CHA/MAT	CH01R			Splicing - Fiber	1019761	BRACKET TAP ALUM. 2-1/2" STD	EA	\$0.79	2	\$ 1.58	
CHA/MAT	CH01R			Splicing - Fiber	1015101	Enclosure Fbr FOSC 400 D5 Encl 72-1-Bgv	EA	\$365.66	2	\$ 731.32	
CHA/MAT	CH01R			Splicing - Fiber	1030273	FOSC ACC-D Tray 36-2 (2 Per Pack)	EA	\$21.90	2	\$ 43.80	
CHA/MAT	CH01R			Splicing - Fiber	1033248	SNOWSHOE 24IN W/STRAND MOUNTING KIT	EA	\$84.42	2	\$ 168.84	
CHA/MAT	CH01R			Splicing - Fiber	1030258	SLEEVE SPLICE PROTECTION-60MM 100/Pk (Loose Tube)	EA	\$0.41	100	\$ 40.81	
CHA/MAT	CH01R			Splicing - Fiber	1015129	SLEEVE FBR SPLICE MASS RBBN	EA	\$0.88	100	\$ 88.00	
CHA/MAT	CH01R			Splicing - Fiber	1010730	TAPE ELECTRICAL 3/4" X 60' BK ECONOMY	EA	\$0.90	10	\$ 8.98	
CHA/MAT	CH04C			Hardware - Lockboxes, Peds, Vaults	1000625	VAULT 24X36X24 HDPE BODY AND SHIELD-X	EA	\$438.35	3	\$ 1,315.05	
CHA/MAT	CH04C			Hardware - Lockboxes, Peds, Vaults	1020048	(FTTH AND NODE) VAULT 30X48X36 HDPE BODY & SHIELD	EA	\$793.74	1	\$ 793.74	
CHA/MAT	CH04C			Hardware	1019782	GUARD CABLE 1-1/8" X 8' GALV STL	EA	\$10.67	2	\$ 21.34	
CHA/MAT	CH01R			Hardware	1021342	SCREW HEX LAG 1/4" x 2 1/2" DRIVE POINT	EA	\$0.16	8	\$ 1.24	
CHA/MAT	CH01R			Hardware	1020088	STRAP U GUARD 2 HOLE 1-1/8IN	EA	\$0.51	4	\$ 2.02	
CHA/MAT	CH01R			Hardware	1019853	WIRE LASHING 045/302 X 1200'	RL	\$19.59	2	\$ 39.18	
CHA/MAT	CH04C			FIBER	1028589	FBR 48 CT ARMORED LT SM DRY	FT	\$0.37	4600	\$ 1,694.18	
CHA/MAT	CH04C			FIBER	1009942	CONDUIT 2" SDR 13.5 TONEABLE RIB 1100#R (2500FV/R1)	FT	\$0.89	4000	\$ 3,547.20	

DRAWING #1

TOTAL PROPOSED CABLE FOOTAGE: 236 FEET OR 0.045 MILES
 TOTAL CABLE FOOTAGE TO BE REMOVED: 0 FEET OR 0.0 MILES
 TOTAL CABLE FOOTAGE TO REMAIN: 0 FEET OR 0.0 MILES



REFER TO DRAWING #2

* SPECTRUM PROPOSES 18' HEIGHT *
 MINIMUM CLEARANCE
 INCLUDING SPAN SAG
 TO THE TOP OF ASPHALT

* ROAD AND RIGHT OF WAY *
 LOCATIONS BASED OFF
 PROJECT REFERENCE NUMBER:
 P029536, SHEETS #6-8

** SPECTRUM TIE POINT IS **
 APPROXIMATELY 1486 FEET
 OR .281 MILES NORTHWEST OF
 MIMOSA LN (S-46-1404)

LEGEND

SPECTRUM AERIAL TO BE REMOVED (GREEN)	PROPOSED EDGE OF PAVEMENT
SPECTRUM AERIAL TO REMAIN (BLUE)	EXISTING EDGE OF PAVEMENT
PROPOSED SPECTRUM AERIAL (RED)	EXISTING SPECTRUM UG TO BE REMOVED (GREEN)
EXISTING UTILITY POLES TO BE REMOVED (GREEN)	EXISTING SPECTRUM UG TO REMAIN (BLUE)
EXISTING UTILITY POLES TO REMAIN (BLUE)	PROPOSED SPECTRUM UG ROUTE (RED)
PROPOSED UTILITY POLES (RED)	EXISTING CITY R.O.W. (FOREST)
EXISTING SCDOT STATE R.O.W. (ORANGE)	PROPOSED CITY R.O.W. (TEAL)
PROPOSED SCDOT STATE R.O.W. (CYAN)	PROPOSED PUBLIC UTILITY EASEMENT (YELLOW)

SCALE
 0 60
 1" = 60'

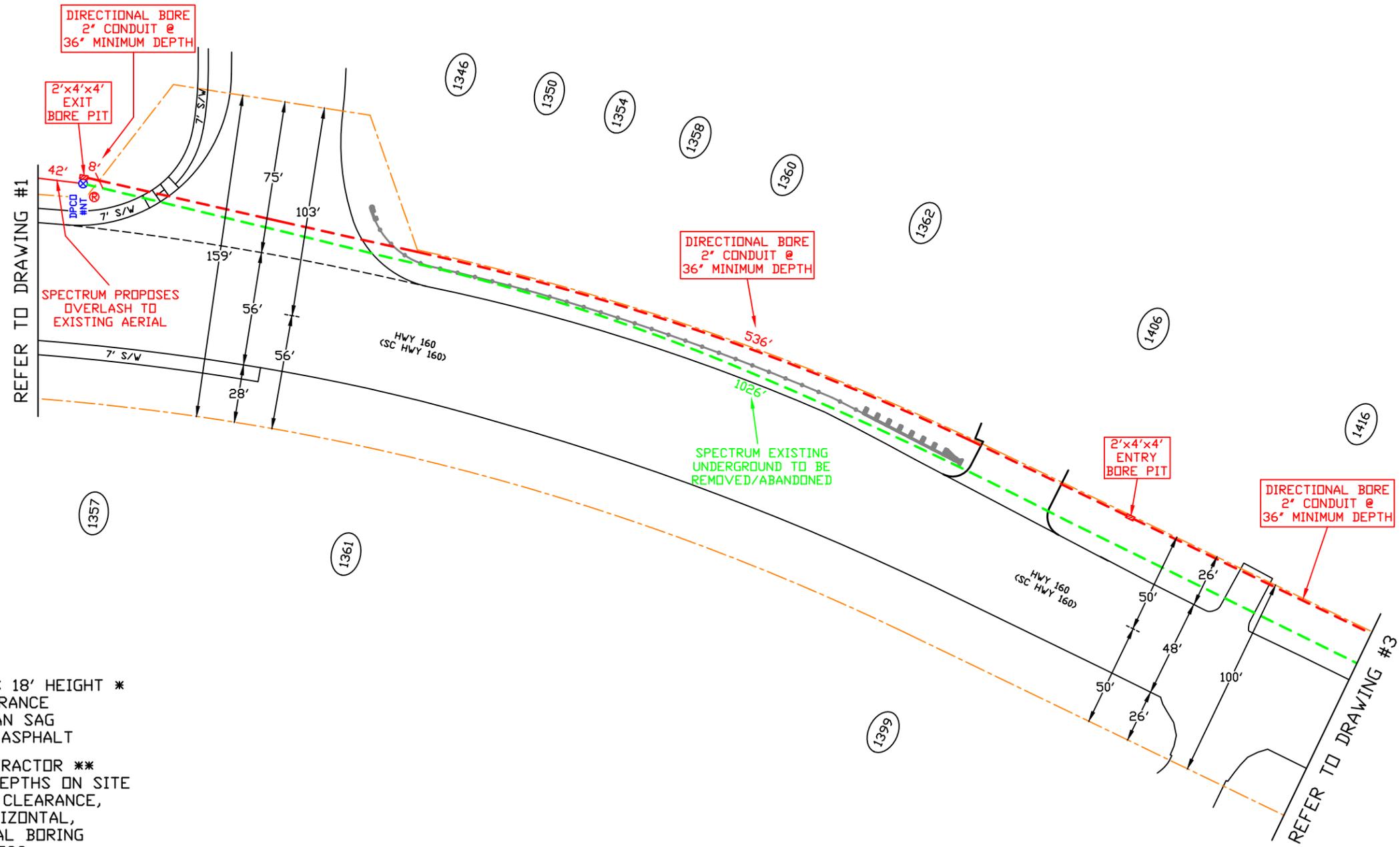
YORK
 COUNTY, SC

CONTACT: ANGELA JEVETT
 287 SPRINGHILL FARM RD.
 FORT MILL, SC 29715
 PHONE NUMBER: (803)-802-7578

SC 160
 FRELO

DRAWING #2

TOTAL PROPOSED CABLE FOOTAGE: 536 FEET OR 0.101 MILES
 TOTAL CABLE FOOTAGE TO BE REMOVED: 1026 FEET OR 0.194 MILES
 TOTAL CABLE FOOTAGE TO REMAIN: 0 FEET OR 0.0 MILES



* SPECTRUM PROPOSES 18' HEIGHT *
 MINIMUM CLEARANCE
 INCLUDING SPAN SAG
 TO THE TOP OF ASPHALT

** SPECTRUM CONTRACTOR **
 TO VERIFY CULVERT DEPTHS ON SITE
 AND MAINTAIN A 4' CLEARANCE,
 VERTICAL & HORIZONTAL,
 WHILE DIRECTIONAL BORING
 IS IN PROCESS.



SCALE
 0 60
 1" = 60'

YORK
 COUNTY, SC

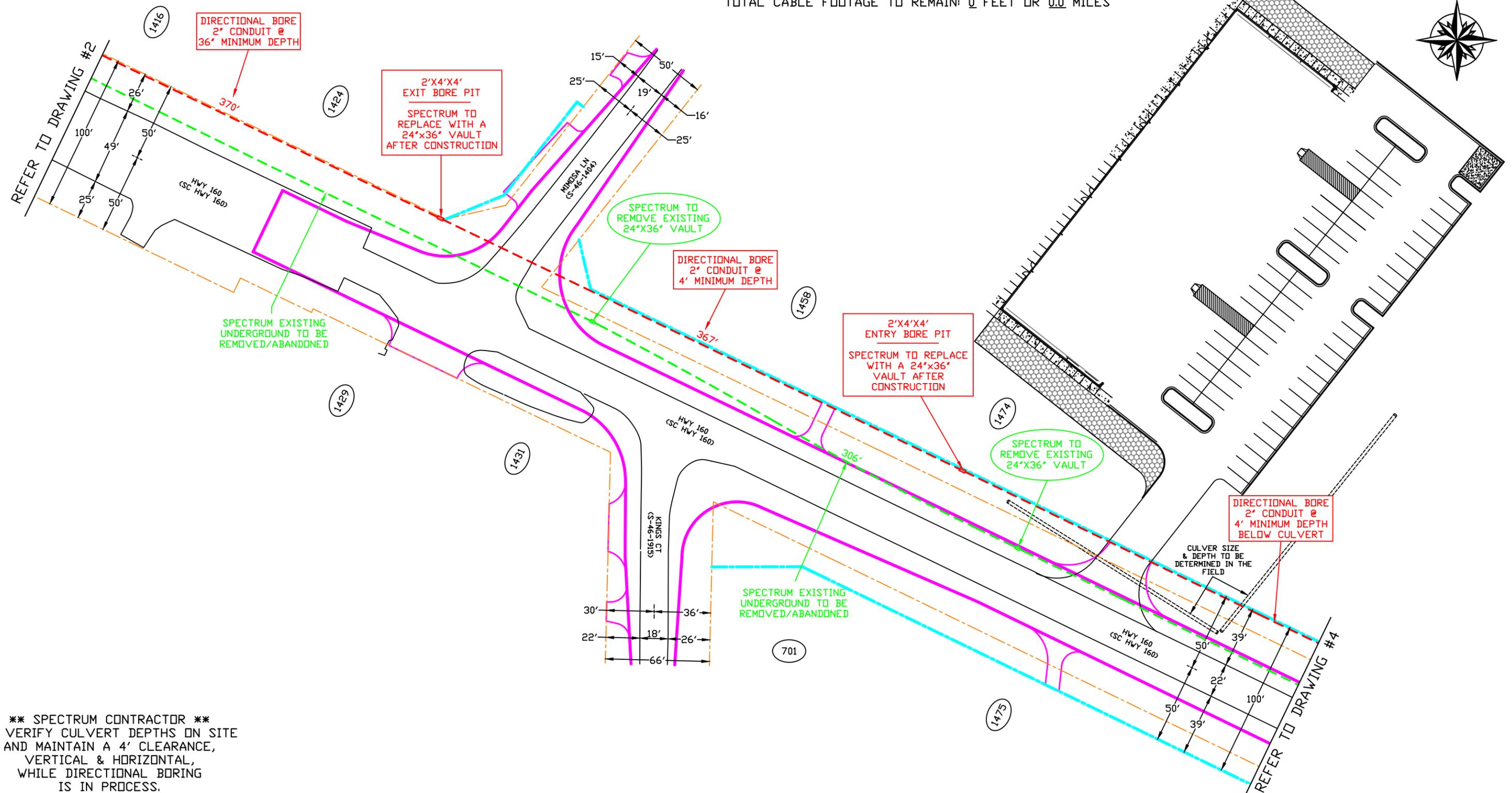
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	SPECTRUM AERIAL TO REMAIN (BLUE)
	PROPOSED SPECTRUM AERIAL (RED)
	EXISTING UTILITY POLES TO BE REMOVED (GREEN)
	EXISTING UTILITY POLES TO REMAIN (BLUE)
	PROPOSED UTILITY POLES (RED)
	EXISTING SCDOT STATE R.O.W. (ORANGE)
	PROPOSED SCDOT STATE R.O.W. (CYAN)
	PROPOSED EDGE OF PAVEMENT
	EXISTING EDGE OF PAVEMENT
	EXISTING SPECTRUM UG TO BE REMOVED (GREEN)
	EXISTING SPECTRUM UG TO REMAIN (BLUE)
	PROPOSED SPECTRUM UG ROUTE (RED)
	EXISTING CITY R.O.W. (FOREST)
	PROPOSED CITY R.O.W. (TEAL)
	PROPOSED PUBLIC UTILITY EASEMENT (YELLOW)

TELICS
 CONTACT: ANGELA JEVETT
 287 SPRINGHILL FARM RD.
 FORT MILL, SC 29715
 PHONE NUMBER: (803)-802-7578

SC 160
 FRELO

DRAWING #3

TOTAL PROPOSED CABLE FOOTAGE: 737 FEET OR 0.140 MILES
 TOTAL CABLE FOOTAGE TO BE REMOVED: 306 FEET OR 0.058 MILES
 TOTAL CABLE FOOTAGE TO REMAIN: 0 FEET OR 0.0 MILES



** SPECTRUM CONTRACTOR **
 TO VERIFY CULVERT DEPTHS ON SITE
 AND MAINTAIN A 4' CLEARANCE,
 VERTICAL & HORIZONTAL,
 WHILE DIRECTIONAL BORING
 IS IN PROCESS.



SCALE
 0 60
 1" = 60'

YORK
 COUNTY, SC

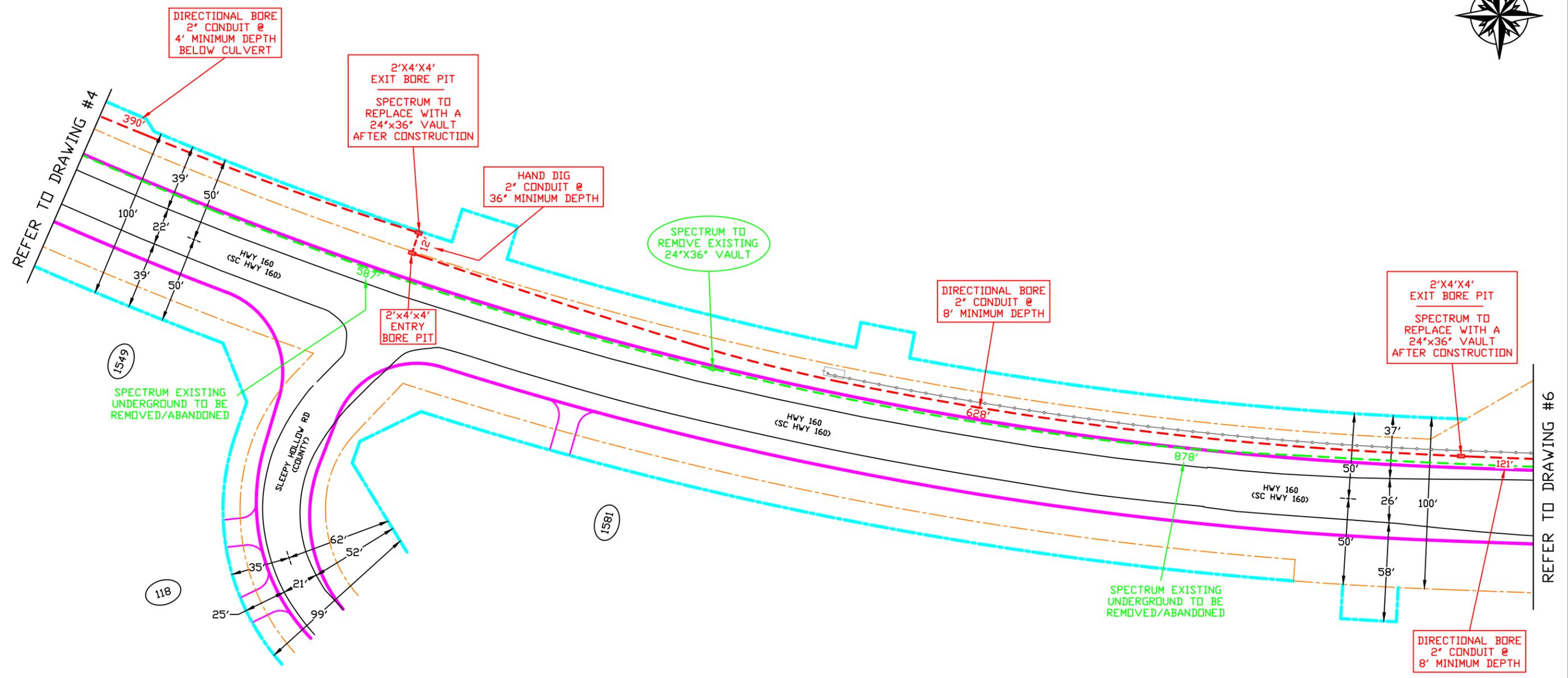
LEGEND	
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	SPECTRUM AERIAL TO REMAIN (BLUE)
	PROPOSED SPECTRUM AERIAL (RED)
	EXISTING UTILITY POLES TO BE REMOVED (GREEN)
	EXISTING UTILITY POLES TO REMAIN (BLUE)
	PROPOSED UTILITY POLES (RED)
	EXISTING SCDOT STATE R.O.W. (ORANGE)
	PROPOSED SCDOT STATE R.O.W. (CYAN)
	PROPOSED EDGE OF PAVEMENT
	EXISTING EDGE OF PAVEMENT
	EXISTING SPECTRUM UG TO BE REMOVED (GREEN)
	EXISTING SPECTRUM UG TO REMAIN (BLUE)
	PROPOSED SPECTRUM UG ROUTE (RED)
	EXISTING CITY R.O.W. (FOREST)
	PROPOSED CITY R.O.W. (TEAL)
	PROPOSED PUBLIC UTILITY EASEMENT (YELLOW)

TELICS
 CONTACT: ANGELA JEVETT
 287 SPRINGHILL FARM RD.
 FORT MILL, SC 29715
 PHONE NUMBER: (803)-802-7578

SC 160
 FRELO

DRAWING #5

TOTAL PROPOSED CABLE FOOTAGE: 1151 FEET OR 0.218 MILES
 TOTAL CABLE FOOTAGE TO BE REMOVED: 1465 FEET OR 0.277 MILES
 TOTAL CABLE FOOTAGE TO REMAIN: 0 FEET OR 0.0 MILES



** SPECTRUM CONTRACTOR **
 TO VERIFY CULVERT DEPTHS ON SITE
 AND MAINTAIN A 4' CLEARANCE,
 VERTICAL & HORIZONTAL,
 WHILE DIRECTIONAL BORING
 IS IN PROCESS.

SCALE
 0 60
 1" = 60'

YORK
 COUNTY, SC

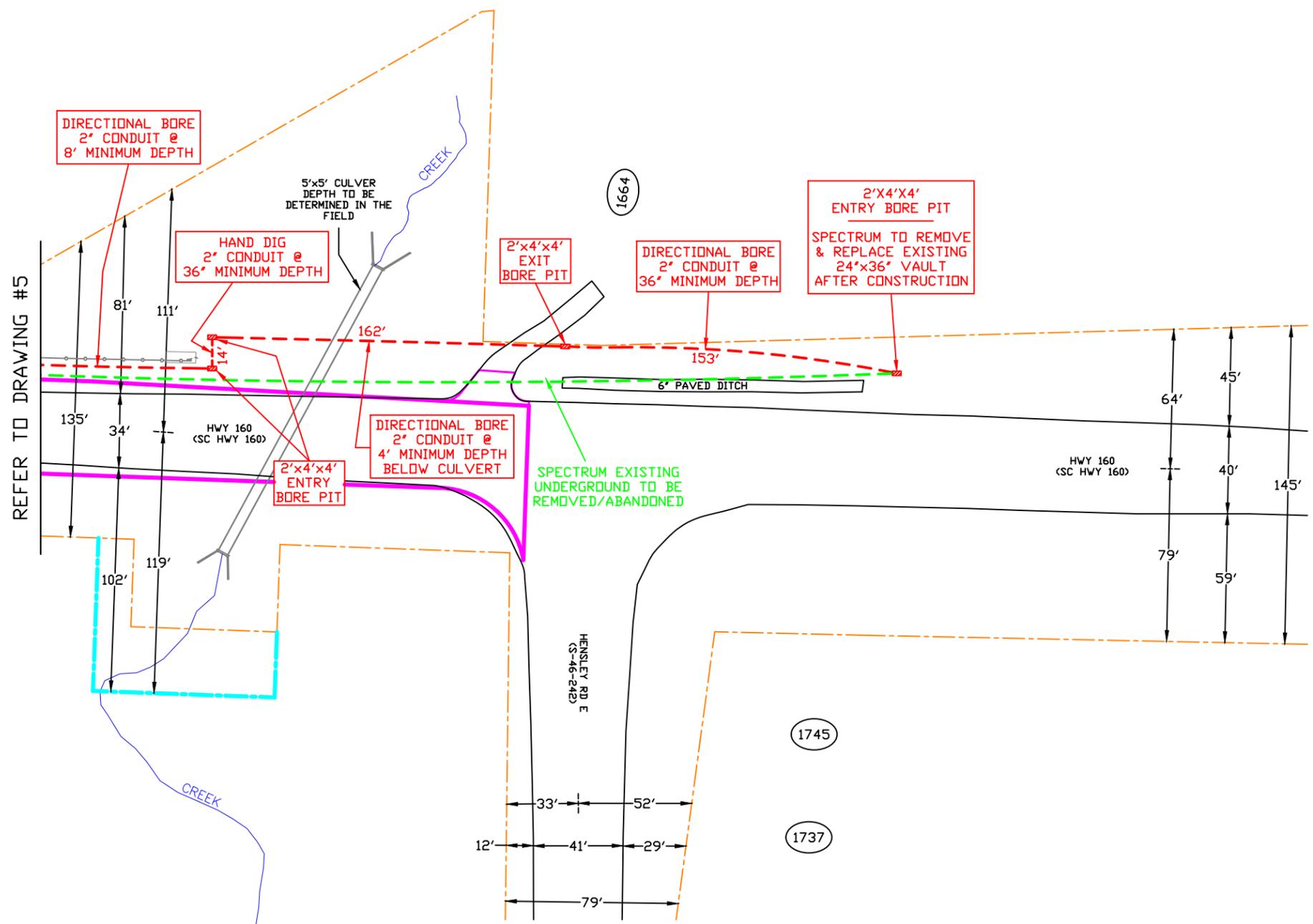
LEGEND	
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	SPECTRUM AERIAL TO REMAIN (BLUE)
	PROPOSED SPECTRUM AERIAL (RED)
	EXISTING UTILITY POLES TO BE REMOVED (GREEN)
	EXISTING UTILITY POLES TO REMAIN (BLUE)
	PROPOSED UTILITY POLES (RED)
	EXISTING SCDOT STATE R.O.W. (ORANGE)
	PROPOSED SCDOT STATE R.O.W. (CYAN)
	PROPOSED EDGE OF PAVEMENT
	EXISTING EDGE OF PAVEMENT
	EXISTING SPECTRUM UG TO BE REMOVED (GREEN)
	EXISTING SPECTRUM UG TO REMAIN (BLUE)
	PROPOSED SPECTRUM UG ROUTE (RED)
	EXISTING CITY R.O.W. (FOREST)
	PROPOSED CITY R.O.W. (TEAL)
	PROPOSED PUBLIC UTILITY EASEMENT (YELLOW)

TELICS
 CONTACT: ANGELA JEVETT
 287 SPRINGHILL FARM RD.
 FORT MILL, SC 29715
 PHONE NUMBER: (803)-802-7578

SC 160
 FRELO

DRAWING #6

TOTAL PROPOSED CABLE FOOTAGE: 329 FEET OR 0.062 MILES
 TOTAL CABLE FOOTAGE TO BE REMOVED: 0 FEET OR 0.0 MILES
 TOTAL CABLE FOOTAGE TO REMAIN: 0 FEET OR 0.0 MILES



** SPECTRUM CONTRACTOR **
 TO VERIFY CULVERT DEPTHS ON SITE
 AND MAINTAIN A 4' CLEARANCE,
 VERTICAL & HORIZONTAL,
 WHILE DIRECTIONAL BORING
 IS IN PROCESS.



SCALE
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 1" = 60'

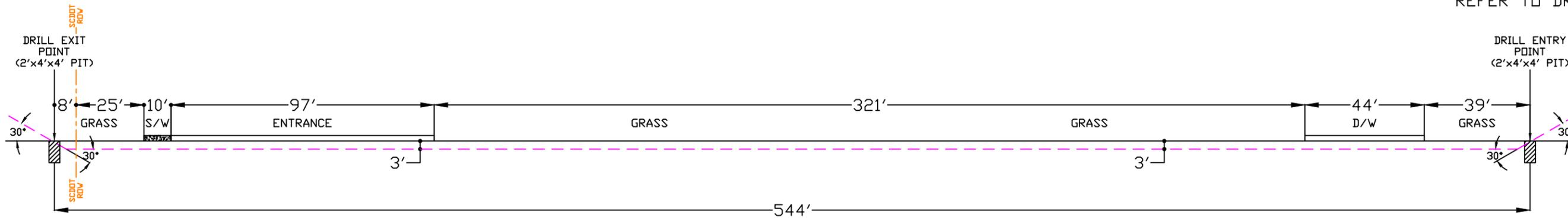
YORK
 COUNTY, SC

LEGEND	
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	SPECTRUM AERIAL TO REMAIN (BLUE)
	PROPOSED SPECTRUM AERIAL (RED)
	EXISTING SPECTRUM UG TO BE REMOVED (GREEN)
	EXISTING SPECTRUM UG TO REMAIN (BLUE)
	PROPOSED SPECTRUM UG ROUTE (RED)
	EXISTING UTILITY POLES TO BE REMOVED (GREEN)
	EXISTING UTILITY POLES TO REMAIN (BLUE)
	PROPOSED UTILITY POLES (RED)
	EXISTING SCDOT STATE R.O.W. (ORANGE)
	PROPOSED SCDOT STATE R.O.W. (CYAN)
	PROPOSED EDGE OF PAVEMENT
	EXISTING EDGE OF PAVEMENT
	EXISTING SPECTRUM UG TO BE REMOVED (GREEN)
	EXISTING SPECTRUM UG TO REMAIN (BLUE)
	PROPOSED SPECTRUM UG ROUTE (RED)
	EXISTING CITY R.O.W. (FOREST)
	PROPOSED CITY R.O.W. (TEAL)
	PROPOSED PUBLIC UTILITY EASEMENT (YELLOW)

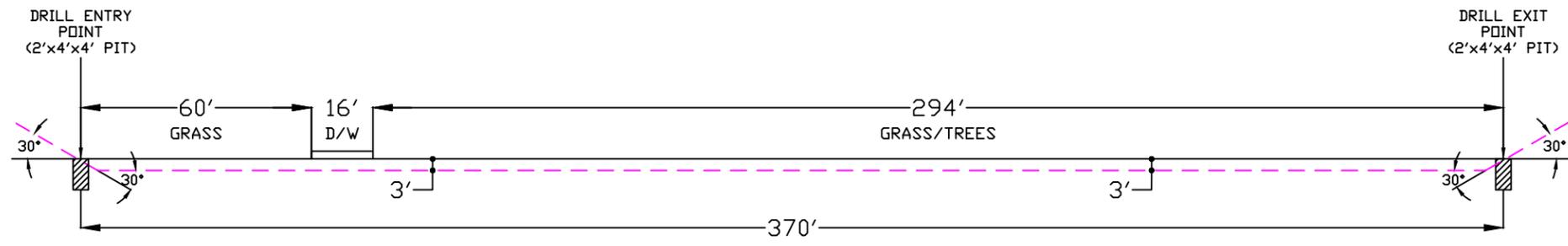
TELICS
 CONTACT: ANGELA JEVETT
 287 SPRINGHILL FARM RD.
 FORT MILL, SC 29715
 PHONE NUMBER: (803)-802-7578

SC 160
 FRELO

544' DIRECTIONAL
SCALE 1:40
REFER TO DRAWING #2



370' DIRECTIONAL
SCALE 1:40
REFER TO DRAWING #2 & 3



367' DIRECTIONAL
SCALE 1:40
REFER TO DRAWING #3



3347 Platt Springs Road
West Columbia, SC 29170
PHONE (803) 744-5595

SCALE:
N/A

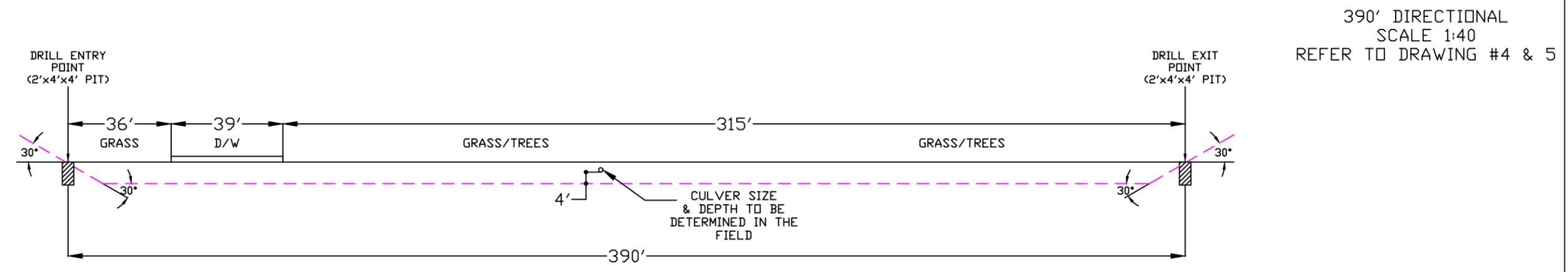
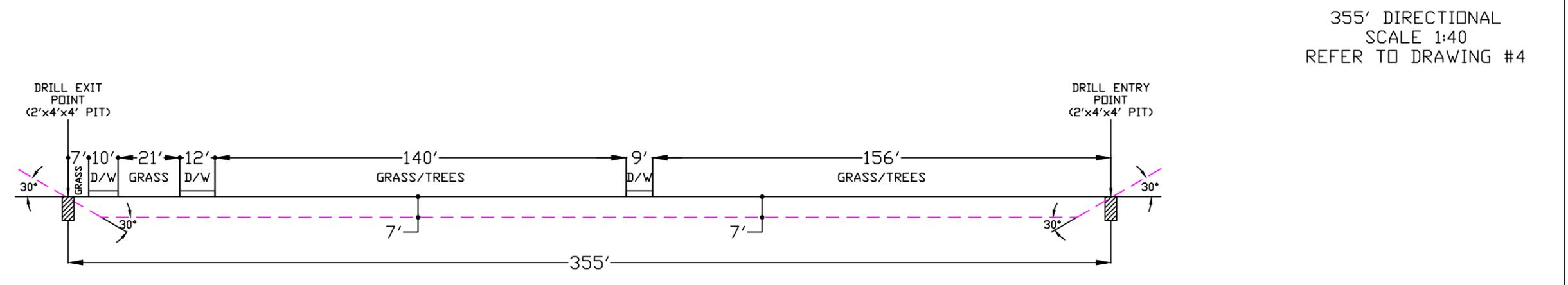
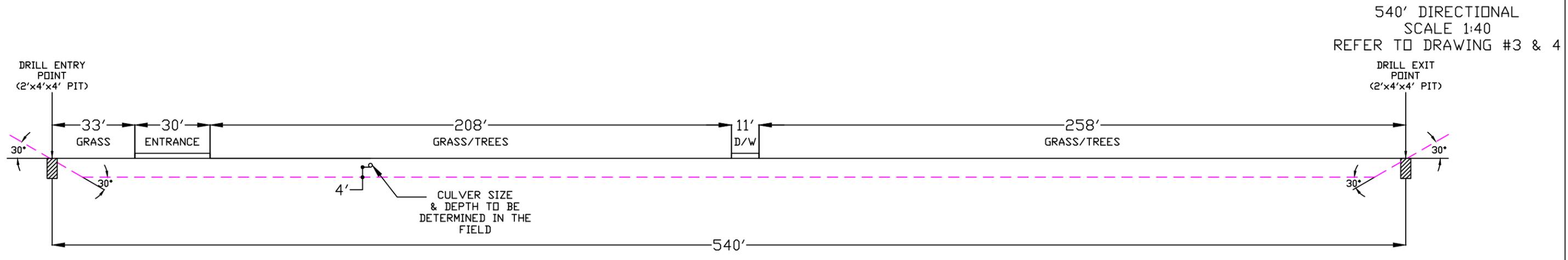
APPROVED BY:

DRAFTED BY:
TELICS

SC 160 FRELD

YORK SCDOT STATE ROADS

NO.	DATE	DRAFTER	COMMENT
3			REVISION #2
2	12/14/20	BMP	REVISION #1
1	12/08/20	BMP	ORIGINAL



Spectrum 3347 Platt Springs Road
West Columbia, SC 29170
PHONE (803) 744-5595

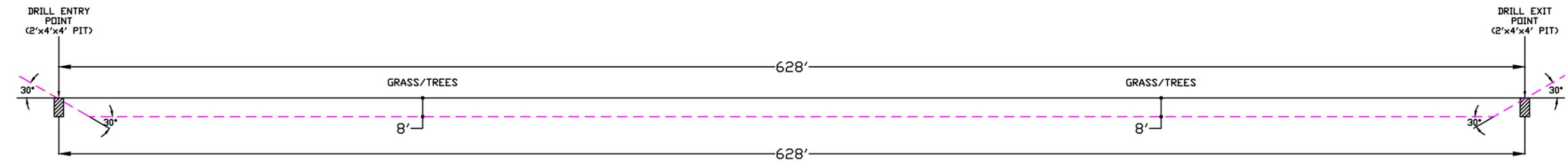
SCALE: N/A	APPROVED BY:	DRAFTED BY: TELICS
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SC 160 FRELD

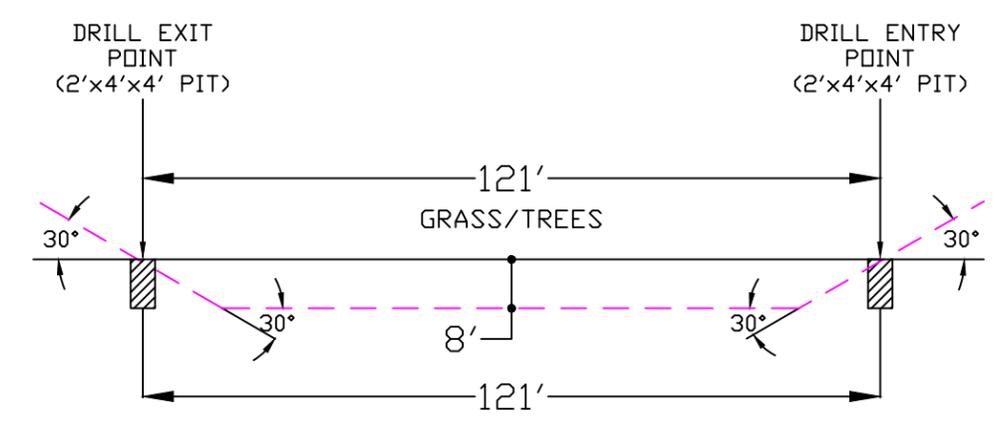
YORK SCDOT STATE ROADS

NO.	DATE	DRAFTER	COMMENT
3			REVISION #2
2	12/14/20	BMP	REVISION #1
1	12/08/20	BMP	ORIGINAL

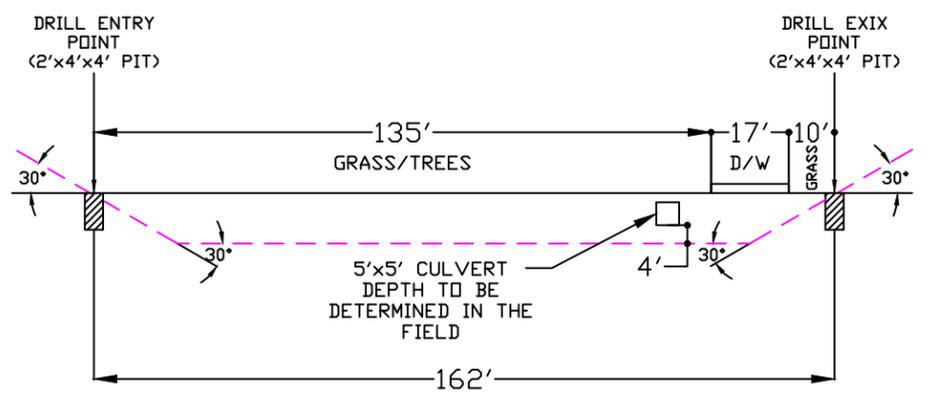
540' DIRECTIONAL
SCALE 1:50
REFER TO DRAWING #5



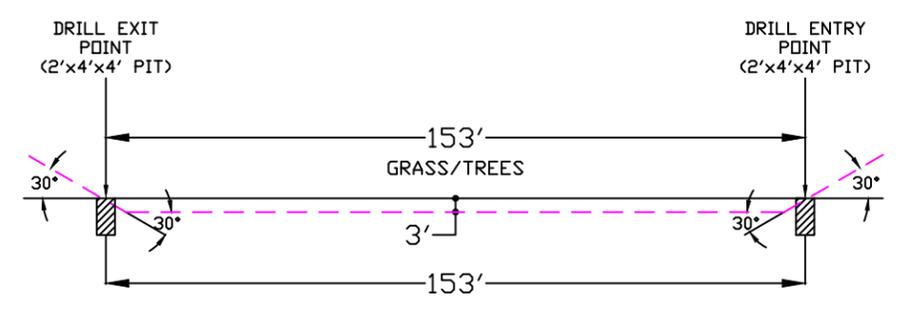
121' DIRECTIONAL
SCALE 1:30
REFER TO DRAWING #5 & 6



162' DIRECTIONAL
SCALE 1:40
REFER TO DRAWING #6



153' DIRECTIONAL
SCALE 1:40
REFER TO DRAWING #6



3347 Platt Springs Road
West Columbia, SC 29170
PHONE (803) 744-5595

SCALE:
N/A

APPROVED BY:

DRAFTED BY:
TELICS

SC 160 FRELO

YORK SCDOT STATE ROADS

NO.	DATE	DRAFTER	COMMENT
3			REVISION #2
2	12/14/20	BMP	REVISION #1
1	12/08/20	BMP	ORIGINAL

**SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
Encroachment Permit**

Permit No : 240409

Permit Decision Date :
12/21/2020

Expiration Date : 12/21/2021

Type

Permit : COMMUNICATIONS
(Cable TV, Telephone &
Other)

Location:

<u>District</u>	<u>Work County</u>	<u>Type</u>	<u>Route</u>	<u>Aux</u>	<u>Begin MP</u>	<u>End MP</u>
4	York, SC	SC	160	None	7.334	8.227

Contact Information

Applicant: SpectrumSoutheastLLC

Phone:

Contact: Tim Burris

Address: 3140 W. Arrowood Rd.,

City: Charlotte

State: NC

Zip: 28273

Comments

Location is approximately 1486 feet or .281 miles NW of Mimosa Ln (S-46-1404) starting at the corner of Fort Mill Pkwy & Hwy 160 working along & across to end at 1664 Hwy 160.

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.

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 RESEDED 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.

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

Project/Site Name:

SC 160 Widening

Primary Permittee:

York County
6 South Congress Street
Box 148
York, South Carolina 29745

Project Address/Location:

SC 160, East of Fort Mill
Fort Mill, South Carolina 29715

Permittee/Owner Contact:

Lisa W. Hagood, PE
County Engineer
P.O. Box 148
York, South Carolina 29745

SWPPP Preparer:

STV Incorporated
Guy P. Peters, PE, CFM
454 South Anderson Road Ste. 3, BTC 517
Rock Hill, South Carolina 29730-3392
803 656 2014
guy.peters@stvinc.com

Day-to-Day Operator:

Steven Moss
Construction Inspector
6 South Congress Street
P.O. Box 148
York, South Carolina 29745

C-SWPPP Preparation Date:

12 July 2022

Modification Dates:

Modification I: ___/___/____

Modification II: ___/___/____

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Appendices

REFERENCE MATERIAL

Appendix A -	Completed NOI Form & Checklist
Appendix B -	Additional Permits, Approvals, & Certification
Appendix C -	Receiving Waterbodies Map & Information
Appendix D -	Erosion Control Standard Drawings
Appendix E -	Stormwater Management Design Study (includes site maps and drainage maps)
Appendix F -	Inspection Log and Reports (OS-SWPPP** Only)
Appendix G -	Rainfall Records (OS-SWPPP** Only)
Appendix H -	Additional Site Logs and Records (OS-SWPPP** Only)
Appendix I -	Construction General Permit (CGP) - SCR100000
Appendix J -	Construction plan set

**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

York County has contracted STV Incorporated to provide professional engineering services for the proposed SC 160 improvement project from 1400 feet east of the Fort Mill Parkway to the intersection with Hensley Road in the City of Fort Mill (see Appendix J). The project area is circled in **Figure 1.1**, shown below.

The sediment and erosion control structures for this project consist of silt fence, check dams, sediment basins, inlet filters, and outlet protection. Proposed stormwater conveyances, consisting of grass lined channels and ditch berms will address permanent water quality.

The project will widen SC 160 for approximately 3000 feet, disturbing existing pavement and grading shoulders within the proposed construction limits. The approximate total disturbed area is 6 acres. Proposed construction near Hensley Road affects wetlands in the area.

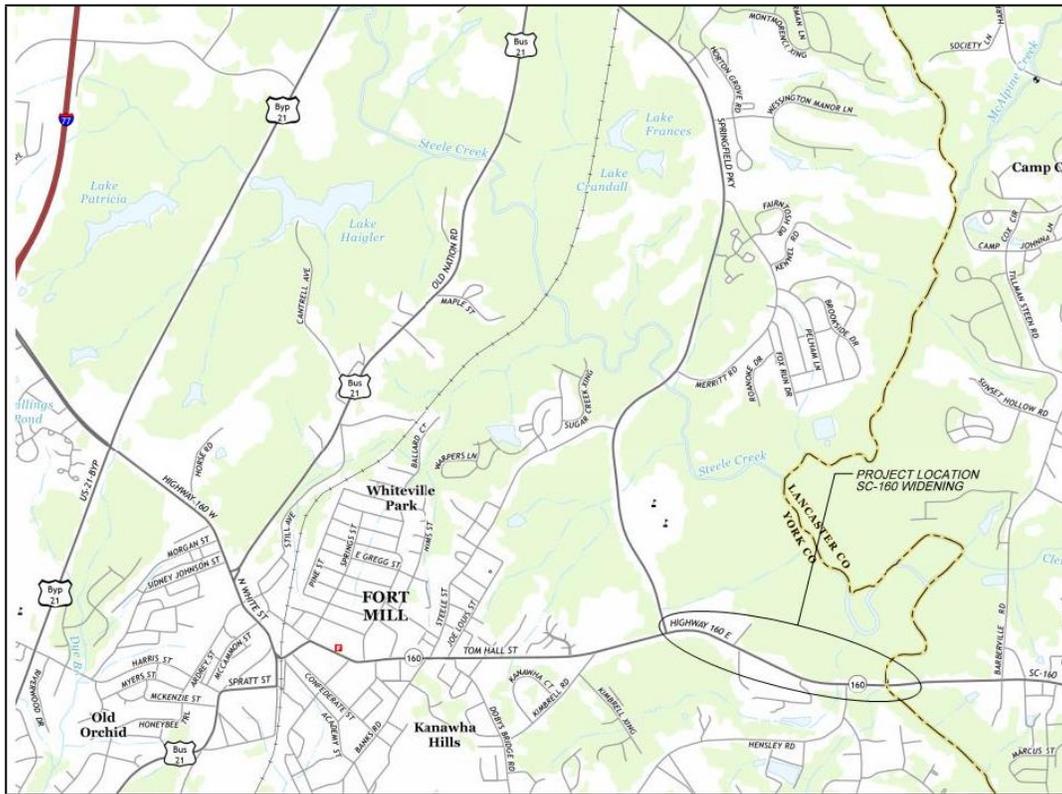


Figure 1.1: Project Location

Pre-Development Conditions

The project is located east of the city of Fort Mill in York County, South Carolina. The project area is rolling terrain with elevations ranging from 515 to 624 feet above sea level. The existing ground gradients typically range from 0.1 to 14 percent. The existing site soil features, as identified by The United States Department of Agriculture NRCS Web Soil Survey of York County, South Carolina, consist predominantly of sandy clay loam and sandy loam. Additional soils information and a soils map are in Appendix A, Stormwater Management Design Study.

The existing on-site drainage is predominantly collected in roadside ditches that drain toward Sugar Creek. Sugar Creek is the project's ultimate outfall and is located near the project end. In general, runoff flows west to east along this state road.

Post-Development Conditions

Post-development conditions will closely mirror existing conditions. Minor widening of existing roadway will technically increase peak runoff, but the amount is negligible when compared to runoff from the existing pavement. The existing outfalls will be maintained and will accept the proposed project's drainage. Existing grass lined channels will be utilized, and permanent vegetation will be established on disturbed soil areas after the construction has been completed. Peak discharge increases will not impose any adverse impacts to Sugar Creek or adjoining properties. Please also refer to Section 1.6 – Certification Statement and Detention Waiver.

Flooding Issues

The existing overall topography will not be modified and there is no anecdotal evidence of flooding issues on – or adjoining – the project. The drainage paths through the watershed are well-established. The project is located outside the FEMA mapped floodplain as shown on Federal Government Emergency Management Agency Flood Insurance Rate Maps (FEMA FIRM). See Appendix E, Stormwater Management Design Study for further information. There are no foreseeable flooding issues that would arise due to the proposed road widening.

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 elevations shown on the construction 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 (i.e., 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 plans (see Appendix J). 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](#), and Standard Drawings. The primary erosion control devices employed for Stage 1 of the project are rolled erosion control blankets, sediment basins, rock check dams (ditch checks), silt fence and inlet protection.

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 SWPPP Preparer as listed at the front of this SWPPP 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: **permanent vegetated swales and storm sewer systems**. 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 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.

No Structural Control BMPs are proposed within any 100-yr floodplains for the project.

Construction Entrances and Dust Control

Each access area into and out of the limits of disturbance, will incorporate a construction entrance. Access locations will be determined in the field by the contractor. 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 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.

Roads where vehicles are utilizing construction accesses will be monitored for sediment tracking and accumulated sediments will be removed from the road surface. Maintenance of roads shall be conducted as needed throughout shiftwork and at the end of each shift.

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 plans. A water tanker used to spray the soil down may be an effective way to prevent excessive dust at a construction site.

Water Quality BMPs During Construction

Site-specific water quality BMPs (e.g., sediment basins, sediment traps, rock check dams, and rock sediment dikes) must be installed prior to the mass clearing, grubbing and grading of the site, and must be kept in functioning order throughout the lifespan of all construction activities. Each of these BMPs must be maintained and inspected until all areas draining to these BMPs have reached final stabilization, approved by the construction site inspector or the SWPPP Preparer and recorded within the stabilization log located as an appendix of the On-site SWPPP.

The location, installation procedures, and maintenance procedures for each water quality BMP can be found within the approved construction site plans.

Post-Construction Water Quality

All construction sites disturbing 5 acres or more, including construction activities associated with Larger Common Plans disturbing 5 acres or more (for sites located within an MS4 this may be 1 acre or more), must be designed to treat water quality post-construction. These water quality controls must be installed and stabilized prior to terminating coverage under the CGP. These controls will require routine maintenance to remain functional. This is to be conducted by the Primary Permittee or the entity that accepts responsibility for these structures once construction has been completed.

Additional information, including permanent maintenance and inspection procedures, can be found in Appendix E of the OS-SWPPP or within the construction site plans.

Upon final stabilization, each construction site will have to make the transition from temporary BMPs to permanent BMPs. This transition may include the conversion of a sediment basin to a detention basin, a sediment trap to a bioretention area, or diversion swales to permanently vegetated swales. All post-construction (permanent) water quality and water quantity BMPs are identified in the final phase of the Erosion and Sediment Control or drainage sheets located within the construction plans.

Other Stormwater Management Procedures

Based on the nature, conditions, and/or procedures associated with this construction site, the following items must be followed and adopted by all those conducting land disturbing activities at this site:

- All construction debris must be stockpiled in designated areas, which have been provided with the proper BMPs to prevent the discharge of pollutants through stormwater runoff from building or other similar materials off-site or into surface waters.
- Any additional waste material or stockpile material (i.e., soil and mulch) must also be stored in the designated areas as shown on the Construction Site Plans or as the contractor, responsible for day-day activities at this site, deems appropriate. Silt fence or an approved equal shall surround all stockpiled materials.
- All parties conducting work at this construction site must be informed of and make note of pollutant sources, both industrial and construction, at this site, and be informed of all controls and measures that will be implemented to prevent the discharge of these pollutants in stormwater runoff.
- Any additional non-stormwater discharges, as referenced in the CGP, should be eliminated or reduced to the maximum extent feasible. All unpreventable non-stormwater discharges shall be treated through the approved stormwater management system before release off-site. Following is a list of allowable non-stormwater discharges:
 - Fire hydrant flushing
 - Wash water without detergents
 - Water used for dust control
 - Potable water
 - Building wash down water without detergents
 - Uncontaminated pavement wash water
 - Uncontaminated condensation from mechanical equipment
 - Uncontaminated ground or spring water
 - Water from foundation of footing drains
 - Uncontaminated excavation dewatering
 - Landscape irrigation.

1.3 Sequence of Construction

The construction sequence for this project has been provided on the construction site plans, provided in Appendix J. Each item/step of that construction sequence has been listed in 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.

Step 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

There are no buffer zones to be located or maintained associated with this project.

1.6 Certification Statement & Detention Waiver

"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."

"The 2-year and 10-year storm event pre- and post-development peak flows were compared at the proposed outfalls for this project. Because post-development flows exceeded pre-development flows in both the 2- and 10-year storms, a downstream inspection was performed to assess potential downstream impacts by the increased peak project will not pose any significant adverse impacts to the downstream receiving waterbody and/or downstream properties"



Name: Guy P. Peters, PE, CFM

Title: Senior Engineer

Date: 12 July 2020

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**, 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** and consult with the SWPPP Preparer to properly address this source and to prevent the discharge of its pollutant through stormwater runoff.

Table 2.1: 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	Selected locations as needed	Concrete Washout Basin.
Water encountered during trenching	Nutrients & Sediment	In and around any trenching activities.	Direct water into filter bags and/or impoundments such as basins or traps to allow for the sedimentation of the listed pollutants.
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, solvents, talc, calcium-carbonate, arsenic	Throughout site, primarily in areas of building construction	Wash-water 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 site will discharge into existing drainage systems as identified in Section 1. These outfalls discharge to Sugar Creek, which in turn discharges to the Catawba River. The route to the Catawba River, which is approximately 30,750 LF, is shown in **Figure 2.1**, below in dark blue.

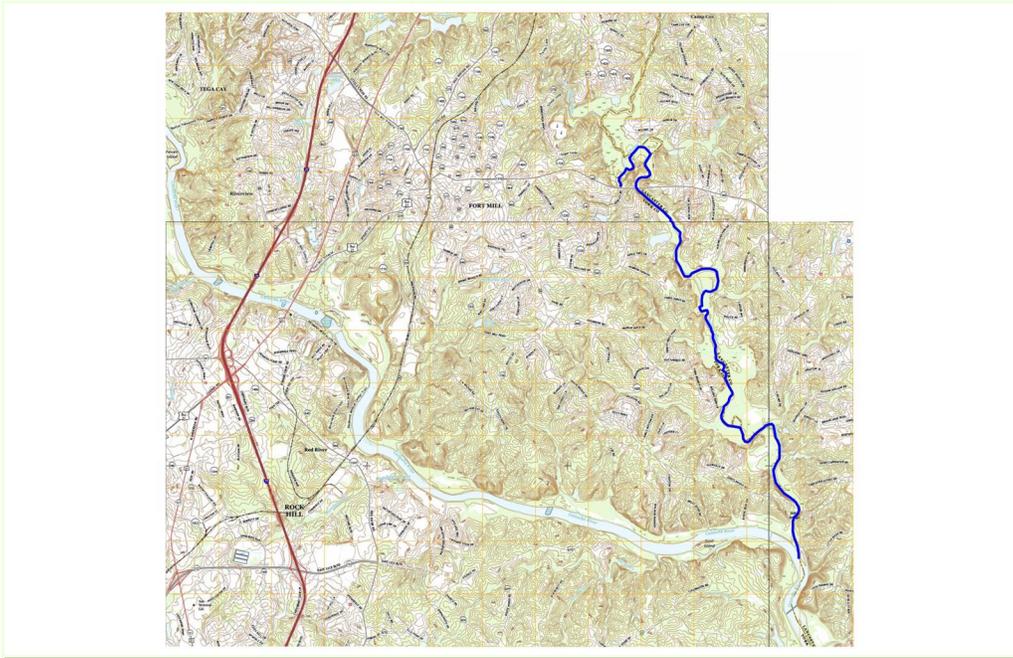


Figure 2.1: Stormwater Runoff Route

2.3 Impairments and TMDLs

Some Waters of the State (WoS) have been identified as not meeting the State's water quality standards for recreational swimming, fish consumption aquatic life use, and/or shellfish harvesting for one or more pollutants even after controls for point and nonpoint source pollution have been put in place. These waterbodies have been classified as "impaired." Once these waterbodies have been identified they are listed on the State's 303(d) List of Impaired Waterbodies. South Carolina lists impairments as "stations" where samples were taken along a waterbody.

The most recently-approved 303(d) list can be found at the following webpage:

<https://scdhec.gov/bow/south-carolina-303d-list-impaired-waters-tmdl>

After a pre-determined period of time, SCDHEC 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, or metals) that can enter a waterbody on a 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 in 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 caused the following impairments to receiving water bodies: BIO (Macroinvertebrate Community), Turbidity, TP (Total Phosphorus), TN (Total Nitrogen), CHLA (Chlorophyll-a), and Fecal Coliform in waters classified for Shellfish Harvesting in the coastal zone. The presence of any of these impairments in receiving waters will require approval control of the site's construction stormwater discharges. Information on each of these impairments and how to treat stormwater runoff for these impairments has been provided below.

Impairments Effected by Construction Site Discharges and Methods to Control Potential Pollutants Causing or Contributing to the Impairments

- 1. BIO (Macroinvertebrate Community):** A balanced and varied group of Macroinvertebrate organisms is an indicator of a healthy stream that supports aquatic life. A balanced community can be defined as a natural, diverse group of organisms (including Macroinvertebrate) characterized by the ability to sustain itself through season changes, presence of food chain species and a lack of domination by pollutant tolerant or invasive species. If these conditions do not exist, then the site may be considered impaired due to the presence of an undesirable or non-existent Macroinvertebrate community. Sediment from construction sites may further threaten the propagation of these organisms.

Address by: Examples include limiting the amount of disturbed area, designing sediment control BMPs to remove the maximum amount of sediment possible, immediate stabilization of disturbed areas, and other practices may be utilized to control the discharge of sediment from construction sites.

- 2. Turbidity:** Turbidity can be generally defined as the "cloudiness" of a waterbody and may be caused by the growth of aquatic phytoplankton and the presence of suspended solids in the water column. In SC, a water quality standard for turbidity is applicable to all waters of the State (see R. 61-68 D. 11. for numeric targets by waterbody classification). Turbidity levels that exceed the water quality standard may reduce light penetration, thereby inhibiting aquatic flora growth, **and may reduce the ability of fauna, such as fish, to absorb oxygen across their gills.**

Address by: Examples include limiting the amount of disturbed area, designing sediment control BMPs to remove the maximum amount of sediment possible, immediate stabilization of disturbed areas, and other practices may be utilized to control the discharge of sediment from construction sites.

3. **TP (Total Phosphorus):** Similar to total nitrogen, TP is an essential nutrient for the propagation of aquatic life. In SC, a water quality standard for TP is applicable to lakes greater than 40 acres (see R. 61-68 D. 11. for numeric and narrative targets). At acceptable levels, TP is assimilated by aquatic flora ensures the propagation of an overall balanced, indigenous aquatic community. TP levels that exceed the water quality standard are considered impaired and may cause negative impacts to the overall health of the aquatic community by promoting excessive algal growth in lakes. Phosphorous may enter a site's stormwater when excess amounts of the nutrient are applied to the site during temporary or final stabilization.

Address by: To prevent this soil should be tested to determine the quantity of the nutrient present in the soil and the correct amount that needs to be added so that it is absorbed by the vegetation.

TN (Total Nitrogen): Similar to total phosphorus, TN is an essential nutrient for the propagation of aquatic life. In SC, a water quality standard for TN is applicable to lakes greater than 40 acres (see R. 61-68 D. 11. for numeric and narrative targets). At acceptable levels, TN is assimilated by aquatic flora and ensures the propagation of an overall balanced, indigenous aquatic community. TN levels that exceed the water quality standard are considered impaired and may cause negative impacts to the overall health of the aquatic community by promoting excessive algal growth in lakes. Nitrogen may enter a site's stormwater when excess amounts of the nutrient are applied to the site during temporary or final stabilization

Address by: Examples include that the soil should be tested to determine the quantity of the nutrient present in the soil and the correct amount that needs to be added so that it is absorbed by the vegetation.

4. **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.

5. Fecal Coliform (FC) in Shellfish Harvesting waters: Fecal Coliform is an indicator bacteria for other pathogens which may be present in a waterbody. Shellfish Harvesting Waters are tidal salt-waters protected for shellfish harvesting and must be protected to a higher standard than other waters because of the risk to human health posed by ingesting shellfish from areas with high levels of bacteria. Bacteria levels increase following rain events. Potential sources of bacteria on construction sites include improperly located porta-johns and litter that may attract rodents and other animals.

Address by: Porta-johns should be placed away from WoS and not placed on catch basins and **other** drainage structures. Litter and construction debris should be placed in identified areas and emptied on a routine basis.

Impairment Sources and Prevention

Construction sites can contribute to these impairments directly through the release of excess soil and/or nutrients within stormwater runoff. For this reason, proper sediment and erosion control BMPs should be implemented and the design of the stormwater management systems, during both construction and post-construction, should address the control of stormwater runoff. A reduction in the volume released or the rate at which this volume is released can significantly improve the quality of stormwater runoff and limit the amount of the pollutants that contribute to the above listed impairments.

As an example, sediment basins and/or traps should be used during construction to allow for sedimentation of soils/nutrients, and to control the release of stormwater into the impaired water body. Vegetated Detention and Infiltration structures should be implemented as post-construction BMPs to control stormwater volumes. Caution is advised when using fertilizers to reach Final Stabilization; excess fertilizer can contribute to each of the above listed impairments.

Site-Specific Requirements

This construction site's discharges drain into Sugar Creek, which currently has only a BIO impairment designation. Due to the possibility of pollutants in construction stormwater discharges from this site creating an impairment, the following must be conducted throughout the lifespan of all land-disturbing activities at this site:

- Bi-weekly inspections of all the primary sediment control BMPs;
- 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 to meet or exceed an 80% trapping efficiency.

2.4 Critical Areas

There are no Critical Areas located within or directly adjacent to the disturbed areas.

Section 3

Compliance Requirements

3.1 SWPPP Availability

Section 3.1.6 of the CGP requires that a copy of the On-Site SWPPP (OS-SWPPP), as defined by Section 3.1.1.H of the CGP, must be retained at the locations where the OS-SWPPP can be easily accessed during normal business hours from the date of commencement to the date that final stabilization is reached. Due to the nature of this project, the OS-SWPPP will be retained at the construction site. The OS-SWPPP must be made available upon request and at the time of a construction site inspection by the EPA, SCDHEC, local government officials, and the Operator of the Municipal Separate Storm Sewer System (MS4).

3.2 Pre-Construction Conferences

A pre-construction conference must be held for this construction project and its approved On-Site Stormwater Pollution Prevention Plan (OS-SWPPP). Each contractor, subcontractor, utility provider, etc., who will work at a site must attend this conference in person. The primary purpose of this conference is for:

- The **preparer of the SWPPP** or someone with a registration equivalent to that of the preparer of the SWPPP; and/or
- The **person with operational control** of the plans and specifications (the Primary or Secondary Permittee) or their duly authorized representative (as defined in Section 122.22(b) of SC Regulation 61-9) to review and explain the On-Site SWPPP (OS-SWPPP) so that all are aware of the requirements before they start performing construction-related (land disturbing) activities that may affect the implementation of the approved OS-SWPPP. This conference may be held simultaneously with all contractors and builders present or may be conducted separately with one or more contractors, subcontractors, etc. present.

The conference must be held on-site and must specifically address Section 3.1.7 of the CGP detailing how each type of modification, Major and Minor, will be addressed and processed at the construction site to maintain compliance. The persons conducting the conference must document each contractor, subcontractor, utility provider, etc. attending the conference, and include the date, time, location, and identification of the attendees. These records must be maintained with the OS-SWPPP.

3.3 Inspection Requirements

Section 4.2 of the CGP requires that inspections be conducted on a routine basis of all areas disturbed by construction activity. These areas include perimeter BMPs and material storage areas exposed to precipitation. The purpose of the inspections is to look for evidence of, or potential for, inefficiencies within the On-Site SWPPP (OS-SWPPP), whether they are a direct result of improper design, installation, or maintenance. At a minimum, the inspections shall include the following:

- All areas of the site disturbed by construction activity and areas used for storage of materials that are exposed to precipitation.
- All stormwater conveyance systems for any evidence of, or the potential for, pollutants entering these systems.
- All BMPs identified in the OS-SWPPP.
- All discharge locations to ascertain whether the implemented BMPs are effective in preventing the discharge of sediment from the site. Where discharge locations are inaccessible, nearby downstream locations must be inspected to the extent that such inspections are practicable.
- Locations where vehicles enter or exit the site must be inspected for evidence of the off-site sediment tracking.

The Permittee shall provide qualified personnel and be responsible for inspections of the construction activity and performance of BMPs.

Frequency

The frequency of the inspections shall be at least bi-weekly after the date of commencement until the date that final stabilization is reached. The frequency may be increased based on the frequency of storm events of 0.5 inches or greater and under the direction of SCDHEC. The frequency of inspections may be reduced to at least once every month for areas that have reached and maintain temporary or final stabilization with no additional disturbance. If a definable area reaches final stabilization, this may be marked on the inspection reports of the OS-SWPPP, and no further inspections of the area will be required.

Rainfall Data

Rainfall data for the days of inspection and rainfall events of 0.5 inches or greater must be maintained in the OS-SWPPP. The Permittee may maintain an on-site rain gauge or use data from a certified weather record within a reasonable proximity of the construction site to record the rainfall amounts.

Inspector Qualifications

“Qualified personnel” means a person knowledgeable in the principles and practice of erosion and sediment control who possesses the skills to assess conditions at the construction site that could impact Stormwater quality and to assess the effectiveness of any BMPs selected to control the quality of stormwater discharges from the construction site, This person must be either the preparer of the approved C-SWPPP or an individual who is under the direct supervision of the preparer or the approved C-SWPPP and who meets the requirements of qualified personnel as described below or an individual who has been certified through a Construction Site Inspector Certification Course that has been approved by SCDHEC. Inspections may also be conducted by a person with a registration equivalent to the registration of the preparer of the C-SWPPP and who meets the qualifications listed below or an individual who is under the direct supervision of the person with an equivalent registration and who meets the requirements listed below.

Inspection Reports

For each inspection required above, the Permittee, or designated personnel, must complete an inspection report. At a minimum, the inspection report must include:

- The inspection data.
- Names, titles, and if not previously given in an inspection report, the qualifications of personnel making the inspection, unless those qualifications change.
- Weather information for the period since the last inspection (or since commencement of construction activity if the first inspection) including a best estimate of the beginning of each storm event, duration of each storm event, approximate amount of rainfall for each storm event (in inches), and whether any additional discharges have occurred. At the very least, the total rainfall (in inches) since the time of the last inspection must be recorded.
- Weather information and a description of any discharges occurring at the time of the inspection.
- Location(s) of discharges of sediment or other pollutants from the site.
- Location(s) of BMPs that need maintenance.
- Location(s) of BMPs that failed to operate as designed or proved inadequate for a particular location.
- Location(s) where additional BMPs are needed that did not exist at the time of inspection.
- Corrective action required including any changes to the OS-SWPPP necessary and implementation dates.
- Site Name, Operator Name and permit number.
- Verification that all BMPs and stormwater controls identified in the OS-SWPPP have been installed and are operating as designed.

A record of each inspection and of any actions taken in accordance with the Permit must be retained as part of the OS-SWPPP for at least three years from the date that permit coverage expires or is terminated and must be signed by the qualified inspector(s).

3.4 Maintenance Requirements

Construction Maintenance

While conducting construction activities, the BMPs and other protective measures identified on the plans and in the OS-SWPPP must remain in effective operating condition. If inspections find BMP's that are not operating effectively, maintenance must be performed before the next scheduled inspection or as soon as reasonably possible before the next storm event, whenever practicable.

If inspections reveal that a BMP has been used inappropriately or incorrectly, the Permittee must address the necessary replacement or modification required to correct the issue within 48 hours of identification of the issue. If existing BMPs need to be modified or additional BMPs are necessary to comply with the requirements of the General Construction Permit, the implementation must be before the next storm event whenever

practicable. If implementation before the next storm event is impracticable, the situation must be documented in the inspection report in the OS-SWPPP, and alternatives implemented as soon as reasonable possible.

Sediment collected by Silt Fence and other sediment control measures must be removed once the deposited sediment reaches 1/3 the height of the above ground portion of the BMP or lower height as specified by the manufacturer.

Permanent Maintenance

After construction activities have been terminated, the Permittee shall be responsible for maintaining the stormwater management items located within the site. The maintenance of these items shall include the following:

- Moving grass
- Removal of trash and sediment within the ditches
- Cleaning and unclogging pipes
- Inspecting for and addressing erosion of side slopes, if present

The frequency of completing the maintenance activities will be based on an as-needed basis.

3.5 Record Keeping

In addition to and in accordance with Section 3.1.1.H.V. of the CGP, the OS-SWPPP must contain appendices with the following documents:

- SCDHEC Construction General Permit. Provisions may be made for the copy of general permit to be accessed electronically as long as a hard copy can be made available by the end of the working day when required.
- Stamped and Approved Notice of Intent
- NPDES Coverage Approval
- CZC Certification
- North Charleston Municipal Separate Storm Sewer System (MS4) Approval
- Any and all logs as deemed necessary to comply with the Permit which includes, but is not limited to, preconstruction attendance, inspections reports, and rainfall data.

3.6 Final Stabilization

As the final grades for the site are established, the site will be transitioned to final stabilization. The Project Area will be stabilized by permanent seeding. Once temporary BMPs have been removed or converted to post construction BMP's and final stabilization has been reached on all disturbed areas, the Notice of Termination shall be submitted.

Appendix A

Completed NOI Form and Checklist



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

For Official Use Only

File Number: _____
Permit Number: **SCR10** _____
Submittal Package Complete: _____

Submission of this Notice of Intent constitutes notice that the Applicant identified in Section II intends to be authorized as a Primary Permittee in the state of South Carolina under NPDES General Permit SCR1000000. Fees required for review and NPDES coverage of each application type are as listed on page 2 of the Instructions.

Date: _____
Project/Site Name: _____ County: _____
(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** _____ **MS4 Operator** _____

II. Primary Permittee Information

Change of Information

<input type="checkbox"/> Person or <input type="checkbox"/> Company	If a Company, are you a <input type="checkbox"/> Lending Institution or <input type="checkbox"/> Government Entity? Company EIN (if applicable): EIN: _____
---	--

- A. **Primary Permittee Name:** _____
Mailing Address: _____ City: _____ State: _____ Zip: _____
Phone: _____ Fax: _____ Email Address: _____
- B. **Contact /ODSA Name** (If different from above OR if owner is a company): _____
Mailing Address: _____ City: _____ State: _____ Zip: _____
Phone: _____ Fax: _____ Email Address: _____
- 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:** _____
B. **Registered Professional** Engineer Landscape Architect Tier B Land Surveyor **S. C. Registration #:** _____
C. **Company/Firm Name:** _____ **S. C. COA # :** _____
Mailing Address: _____ City: _____ State: _____ Zip: _____
Phone: _____ Fax: _____ Email Address: _____

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.) _____
City/Town (If in limits): _____ Zip Code: _____
Latitude: ____° ____' ____" N Longitude: - ____° ____' ____" W (Source): GPS Web Site: _____
Tax Map Number (s) (List all): _____

- C. Is this site located on **Indian Land**? Yes No
- D. **Proposed Start Date:** _____ **Proposed Completion Date:** _____
- E. **Disturbed Area** (nearest tenth of an acre): _____ **Total Area** (acres): _____
- F. **Modification Only:**(nearest tenth of an acre): **Disturbed Area: Current (Approved) Area:** _____
Disturbed Area Change (Increase Only): _____ **Total Disturbed Area (After Change):** _____
- G. Is this project part of a **Larger Common Plan for Development or Sale (LCP)**? Yes No
LCP/ Overall Development Name: _____ Check here if this is the **First Phase.**
Previous State Permit/File Number: _____ **Previous NPDES Coverage Number:** SCR10 _____
- H. Any **Flooding Problems** exist downstream of or adjacent to this site? Yes No (If yes, provide detailed description of flooding problems and applicable floodway/flood zone information in the C-SWPPP).
- I. Active **S.C. DHEC Warning Notice, Notice to Comply or Notice of Violation** for this site or LCP? Yes No
- J. List Relevant **State and Federal Environmental Permits or Approvals** applied for or obtained for this site (e.g., **RCRA, USACOE, Nationwide**, etc.). If None, list None.

K. **Any Waiver(s)/Variances/Exceptions Requested for this Project?** (If yes, identify below and include **Waiver Request and Justifications** in the C-SWPPP for each proposed request).

1. Small Construction Activity Waiver(s) From NPDES permitting (Section 1.4 & Appendix B)? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, Identify requested waiver: <input type="checkbox"/> Rainfall Erosivity Waiver <input type="checkbox"/> TMDL Waiver <input type="checkbox"/> Equivalent Analysis Waiver	
2. Detention Waiver (72-302(B))? <input type="checkbox"/> Yes <input type="checkbox"/> 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: _____		
b. Next Nearest: _____		
c. Coastal Zone ONLY: Coastal Receiving Water (CRW): _____		Not Applicable
d. Other Waterbodies: _____		

B. **Waters of the U.S. / State Information** (Attach additional sheet(s) as needed)

Waters of the U.S./ State	1. On the site?	2. Delineated/ Identified?	3. Impacts?	4. Amount of impacts
a. Jurisdictional wetlands	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	___ Ac
b. Non-jurisdictional wetlands	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	___ Ac
c. Other Water(s): _____	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	___ Ac ___ Feet
d. Coastal Zone ONLY: Direct Critical Area	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	___ Ac ___ Feet

5. If yes for impacts in B.3, describe each impact and activity, and list all permits (e.g., USACOE Nationwide Permit, DHEC General Permit) and certifications that have been applied for or obtained for each impact:

C. **S.C. Navigable Waters (SCNW) Information (Section 2.6.5)** The Department will address any issues related to State Navigable Waters' Program under SC Regulation 19-450 during the review of the C-SWPPP for activities that will **NOT** require a 404 permit or a 401 certification. (Attach additional sheet(s) as needed).

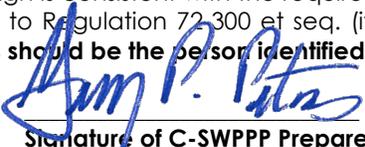
1. Are S. C. Navigable Waters (SCNW) on the site: <input type="checkbox"/> Yes <input type="checkbox"/> No a. If no, do not complete this question. Proceed to Section D (Impaired Waterbodies). b. If yes, provide the name of S.C. Navigable Waters (SCNW) on the site: _____		
2. If yes for C.1, will construction activities cross over or occur in, under, or thru the SCNW? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, describe SCNW activities (e.g., road crossing, sub-aqueous utility line, temporary or permanent structures, etc.) and proceed to Section C.3: _____		
3. Identify permits providing coverage of SCNW activities proposed for your site. If NONE, list none.		
Permits/Certifications	Permit or Certification No.	Corresponding Covered SCNW Activity(ies)
a. DHEC General/ Other DHEC Permit		
b. USACOE 404 Permit or 401 Certification		
c. SCNW Permit If applied for or issued, identify Date applied for or issued: _____		<input type="checkbox"/> All Activities or <input type="checkbox"/> 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				
		<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No	
		<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No	
		<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> 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? <input type="checkbox"/> Yes <input type="checkbox"/> 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?
		<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
		<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
		<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
f. If yes for e above, are your discharges consistent with the assumptions and requirements of the TMDL(s)? <input type="checkbox"/> Yes <input type="checkbox"/> 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).**



Printed Name of C-SWPPP Preparer

Signature of C-SWPPP Preparer

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."

Printed Name of Primary Permittee

Title/Position

Signature of Primary Permittee

Date Signed

NPDES CGP FEE SCHEDULE A

(All Counties **EXCEPT** Beaufort, Berkeley, Charleston, Colleton, Dorchester, Georgetown, Horry, and Jasper)

The schedule should be attached to DHEC Form 2617. Do not send payment in window envelope. **DO NOT MAIL CASH.** DHEC will notify the Project Owner/ Operator if the submitted check or credit card payment cannot be processed. **The review clock will start when acceptable payment is received.**

1. Identify (✓) the Project Review Type(s) Enter NPDES Coverage Fee of \$125 in the right-hand column if <u>any</u> of the following project/review types apply to this application. Proceed to Item 2.	(✓)	NPDES Coverage Fee
a. Project or LCP (Item IV.G) that will ultimately disturb one (1) acre or more Note: If your project will ultimately disturb less than one (1) acre AND is NOT a part of a Larger Common Plan, coverage under SCR100000 is <u>not</u> required; see http://www.scdhec.gov/administration/library/d-2628.pdf (Notification Form for Sites Disturbing Less Than 1-Acre Not Part of a Larger Common Plan, Non-Coastal County"	<input type="checkbox"/>	\$ _____ .00
b. New Owner/Operator (Transfer of Ownership)/Company Name Change (\$125 NPDES Coverage fee is required by the Department for Transfers of Ownership and Company Name Changes)	<input type="checkbox"/>	
c. Unpermitted Ongoing Project or Late Notification	<input type="checkbox"/>	
d. MS4 Project Review (Item I.A and I.B) (\$125 payable to Department thru MS4 Reviewer)	<input type="checkbox"/>	
e. Other (Specify): _____	<input type="checkbox"/>	

2. Determine the Project Review Fees (Review fees cannot exceed \$2000 for a project)		
PROJECT OR LCP THAT WILL ULTIMATELY DISTURB ONE (1) ACRE OR MORE	(✓)	Review Fees
a. Enter the disturbed area (Item IV.E) for this project. Proceed to Items 2.b and 2.c.	_____ (Nearest tenth of an acre)	
b. Will this project or LCP (Item IV.G) ultimately disturb more than 1.0 acres	<input type="checkbox"/> Yes <input type="checkbox"/> No	
c. Is this project exempt from S. C. Reg. 72-300 et seq.?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
1. If this project will not ultimately disturb more than 1.0 acre, and is not part of an LCP, your project is automatically covered under this permit and the NPDES coverage fee and review fee are not required. See the BOW-SPWS for "Less Than 1-Acre of Land Disturbance – Non-Coastal Counties". 2. If this project will ultimately disturb more than 1.0 acre, proceed to Item 2.d.		
d. Enter the project review fees (based on \$100/disturbed area) in the right-hand column. (Multiply the disturbed area (Item 2.a) by \$100/disturbed area). If the disturbed area for this project (Item 2.a.) totals 20.0 acres or more, enter \$2000 in the right-hand column. Review fees cannot exceed \$2000 for a project.		\$ _____ .00

3. Total Required Fees Add the values in the right-hand columns of Items 1 and 2.d. Proceed to Item 4. (The Department will not review this project until all required fees are received).	\$ _____ .000
---	---------------

4. Identify the Method of Payment:

Payment by Check:

Attach a **signed and dated check payable to S.C. DHEC** to the **front** of this Fee Schedule.
Please note that all checks must be **less than 30 days old** and must be for the **entire required fees.**

Payment by Credit Card: (Check here if you wish to pay via credit card using the on-line payment system).

The Department will contact you to provide instructions and the invoice number necessary for online payment.
Please provide an e-mail address where the invoice number may be sent: _____

For official use only: Invoice Number _____



Stormwater Management and Sediment and Erosion Control Plan Review Checklist For Design Professionals

This Plan Review Checklist for Design Professionals has been developed to aid those who prepare Stormwater Pollution Prevention Plans (SWPPPs). Adjacent to the heading for most sections are references from the corresponding portion of the NPDES General Permit for Stormwater Discharges from Construction Activities (SCR100000), which was issued on October 15, 2012. SWPPP Preparers should not utilize this checklist as a substitute for the language in the permit and should review the permit itself for more information on each specific requirement. The permit may be found at:

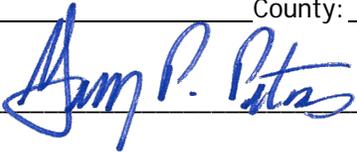
<http://www.scdhec.gov/Environment/docs/CGP-permit.pdf>

In the space provided please indicate the location and page number(s) where each item below can be found in your SWPPP or supporting calculations. If an item is not applicable, put N/A. The Department reserves the right to modify this checklist at any time. The Coastal Zone consists of the following counties: Beaufort, Berkeley, Charleston, Colleton, Dorchester, Georgetown, Horry, and Jasper.

Project Information:

Project Name: SC 160 Widening County: York

Checklist Completed by:

Printed name: Guy P. Peters, PE, CFM Signature:  Date: 12 July 2022

PLANS AND MAPS

1. CURRENT COMPLETED APPLICATION FORM/NOTICE OF INTENT
 - Original Signature of individual with signatory authority for the applicant according to requirements set forth in R.61-9.122.22 (see Appendix C)
 - All items completed and answered
 - Fee Schedule

2. COPIES OF PLANS AND CALCULATIONS
 - Plans stapled together!
 - ONE set of plans and supporting documentation (report, calculations, maps, etc.)
 - Supporting documentation tabbed (e.g., Maps, Pre-Development calculations) and pages numbered [no loose pages]

3. LOCATION MAP (3.2.7.A.IV) Location in C-SWPPP: Narrative
 - North arrow and scale
 - Outlined project location
 - Labeled road names

4. PROJECT NARRATIVE (3.2.1) Location in C-SWPPP: Section 1
 - Scope of project outlined, including a brief description of pre- and post-development conditions

4. PROJECT NARRATIVE (cont'd)
- Summary table of pre- and post-development flows (at least 2- and 10-year, 24-hour storm events)
 - Existing flooding problems in the surrounding area described
 - Disturbed area calculations included for subdivision projects or LCP disturbing 1 or more acres
 - For subdivisions if the site is not to be mass-graded, the following formula should be used to determine the amount of disturbance:

Amount of Disturbance = 2[Max Restricted Building Size][Number of Lots] + Right of Way (ROW) areas {ROW areas include clearing for roads, utilities, easements etc.}
 - If this equation is used, include a note on the plans stating: "The site is not to be mass-graded. Only 2 times the footprint is to be cleared as the lots are developed. The assumed disturbance on each lot is _____ sq. ft."
5. TOPOGRAPHIC MAP (3.2.7.A.I) Location in C-SWPPP: Appendix E
- Project boundary outlined
 - Route of runoff from site to nearest waterbody shown
 - Road names adjacent to site labeled
6. SOILS INFORMATION (3.2.7.A.II) Location in C-SWPPP: Appendix E
- Project boundary outlined
 - Predominate soil types found at the site identified on the plans or on a separate map
 - *Note: Soils information is available from the Natural Resource Conservation Service through their website: <http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>*
7. FLOODWAY/ FLOODPLAINS(3.2.7.A.III) Location in C-SWPPP: Appendix E
- Project boundary outlined, if in close proximity to floodplain/ floodway
 - *Note: The Department does not regulate the placement of fill in floodplains. Please see your local city or county official.*
8. SITE PLANS CHECKLIST:
- Location map with site outlined on first plan sheet (map should have enough detail to identify Surface Waters of the State within 1 mile of the site)
 - North arrow and scale
 - Property lines and adjacent landowners' names
 - Legend
 - Registered engineer's signed and dated seal
 - Engineering Firm's Certificate of Authorization seal
 - If the SWPPP has been developed by a Registered Professional Engineer, Registered Landscape Architect or Tier B Land Surveyor, the following statement must be included on the site plans:

"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."
 - Existing and proposed contours for entire disturbed area
 - Limits of disturbed area
 - Locations of off-site material, waste, borrow, or construction equipment storage areas, excluding roll-off containers (Note: Some off-site disturbed areas may require a separate application for NPDES coverage)
 - Location and identification of any stormwater discharges associated with industrial activity (not construction)
 - Location of Concrete Washout and other Pollution Prevention Measures
 - Easements
 - Road profiles with existing and proposed ground elevations (if no contours are shown on the plans)
 - Grassing and stabilization specifications (temporary and permanent)

8. SITE PLANS CHECKLIST: (cont'd)

- Standard notes
- Temporary and permanent control measures (provide details of all sediment and erosion control measures used; make sure the label or legend on the plans matches the name on the detail)
Note: Maintenance requirements for each BMP should be listed on the detail.
Note: If details from the [BMP Handbook](#) are used, then the inspection frequency must be changed to be in accordance with the new CGP (see Standard note 3).

9. WATERS OF THE STATE, INCLUDING WETLANDS (3.2.4.C) Location in C-SWPPP: Appendix B

- Delineation of all waters of the State (WoS), including wetlands, shown and labeled on plans (delineation not required if a 100-ft undisturbed buffer can be maintained between the WoS and all land-disturbing activities)
- Additional, separate plan sheet that shows all WoS on the site and the impacted areas with a description of the activity(s), whether it is permanent or temporary, and any other relevant information.
- If impacts to WoS, outlined areas of impacts and labeled that no work can begin in this area until all necessary USACOE permits, SCDHEC 401 Certifications, and Critical Area Permits (Coastal Zone only) have been obtained and are effective.
- *Note: If there are proposed impacts to WoS, then it is advised that you contact USACOE (866-329-8187) and/ or S.C. DHEC Water Quality Certification, Standards & Wetlands Programs Section (803-898-4300) to determine additional requirements before submitting the Notice of Intent (NOI).*
- *Note: If WoS are to be impacted, work cannot be performed in these designated areas until all necessary permits have been acquired*
- *Note: If a USACOE permit is required for construction of or access to a temporary or permanent stormwater management structure, NPDES permit coverage cannot be granted until the USACOE permits and S.C. DHEC 401 Section certifications are obtained.*
- *Note: Coastal Counties Only - If there are proposed wetland impacts and your project is located within one of the eight coastal counties, then it is advised you contact S.C. DHEC Office of Ocean and Coastal Resource Management (843-953-0200) to determine additional requirements before submitting the Notice of Intent (NOI).*

10. NAVIGABLE WATERS (3.2.4) Location in C-SWPPP: N/A

- Extra plan sheet showing impacts to navigable water and description of activity included if S.C. Navigable Waters (SCNW) crossing and separate SCNW permit has not been obtained for all activities
- *Note: For NOIs initially submitted to MS4s /delegated entities, if project has SCNW crossing and if separate SCNW permit has not been obtained for this crossing, then this item will be reviewed by S.C. DHEC before NPDES coverage will be granted.*

11. TMDL/ 303d IMPAIRED WATERBODIES (3.2.12) Location in C-SWPPP: Appendix A

- List the nearest S.C.DHEC Water Quality Monitoring Station (WQMS) that the site's stormwater discharges drain to and the waterbody on which it is located: _____

~~Coastal Zone Only: List the nearest upstream and downstream WQMS(s) and corresponding waterbody(ies) above. This requirement only applies when the receiving water body for your site is tidally influenced. Note, shellfish stations only monitor for Fecal coliform bacteria. Include both the nearest shellfish monitoring station(s) and full WQMS(s) for both upstream and downstream locations when shellfish monitoring stations are present. If a shellfish monitoring station is not present, then only list the full WQMS(s). When a shellfish monitoring station is present, everything but Fecal coliform bacteria needs to be assessed at the full WQMS(s). Shellfish monitoring stations begin with numbers and full WQMS(s) begin with letters~~

- Link to Water Quality Information Tool and Instructions:
<http://gisweb01.dhec.sc.gov/water/Stormwater.html?mode=1/>
- Qualitative and quantitative assessment (described in Section 3.4C of SCR100000), if nearest WQMS listed on the current [303\(d\) List of Impaired Waters](#) and if site's stormwater construction discharges contain the pollutant of impairment and if site disturbs 25 or more acres
- Evaluation of selected BMPs if nearest WQMS listed on the current [303\(d\) List of Impaired Waters](#) and if site's stormwater construction discharges contain the pollutant of impairment and if site disturbs less than 25 acres

11. TMDL/ 303d IMPAIRED WATERBODIES (con't)

- Pollutants of concern include TURBIDITY, BIO(Macroinvertebrate), TP(Total Phosphorus), TN(Total Nitrogen), and Chlorophyll-A. Coastal Counties Only: Fecal Coliform (FC) in shellfish harvesting waters
- If [Approved TMDL](#) developed for nearest WQMS and if site's stormwater construction discharges contain the pollutant of impairment, show that measures and controls on SWPPP meet assumptions and requirements of TMDL (may need to contact [303\(d\)/TMDL Program](#) for assistance)
- For TURBIDITY, BIO(Macroinvertebrate) consider inclusion of BMPs to reduce sediment load such as: sediment traps and basin designed to meet 80% sediment removal efficiency (regardless of size), additional measures to stabilize site, limited clearing and grading
- For TP(Total Phosphorus), TN(Total Nitrogen), and Chlorophyll-A consider inclusion of BMPs to reduce nutrient load. This could include limited clearing and grading, soil samples for to determine nutrient requirements during grassing
- For Fecal Coliform (FC) in shellfish harvesting waters, this may include location of porta-johns and waste receptacles
- *Note: To ensure sufficient Water Quality Monitoring Stations are selected to assess all of the identified parameters for construction stormwater, include monitoring stations that contain assessments for the first twelve parameters. Some stations only assess one parameter and should not be relied upon for the entire 303(d)/TMDL assessment for construction stormwater discharges. In addition, fecal coliform (for Shellfish Harvesting waters) must be assessed within the coastal critical area and nutrients and/or chlorophyll must be assessed in lakes/reservoirs*

Construction

12. CONSTRUCTION SEQUENCE (3.2.3)

Location in C-SWPPP: [Appendix J](#)

- Construction Sequence should accurately reflect the nature and timing of construction activities for the site
- Sequence should begin with the installation of perimeter controls and end with the removal of sediment and erosion control measures once the site has been finally stabilized
- Address conversion of any temporary sediment control structures to permanent measures (i.e., conversion of a sediment basin to a permanent detention basin)
- Sequence should reflect implementation and transition between each phased plan (see Item 13 below)

13. PHASED SEDIMENT & EROSION CONTROL PLANS (3.2.9)

Location in C-SWPPP: N/A

- Phased Sediment and Erosion Control Plans are not required when land-disturbance is 5 acres or less
- For land-disturbance between 5 and 10 acres, a two-phased stormwater management and sediment and erosion control plan is required for all non-linear projects. Each phase must be shown on a separate plan sheet. Plans should address the transition between phases.
 - Phase 1 - Initial Land Disturbance - Must include perimeter sediment and erosion control BMPs required prior to initial/ mass clearing and other appropriate BMPs needed to maintain compliance with the permit. On some sites, this may include appropriate BMPs for demolition of existing structures
 - Phase 2 - Stabilization - Sediment and erosion control BMPs required during the remainder of grading and construction. Must also include appropriate BMPs for stabilization - grassing, inlet protection, etc.
- For land-disturbance greater than 10 acres, a three-phased stormwater management and sediment and erosion control plan is required for all non-linear projects. Each phase must be shown on a separate plan sheet. Plans should address the transition between phases.
 - Phase 1 - Initial Land Disturbance - Must include perimeter sediment and erosion control BMPs required prior to initial/ mass clearing and other appropriate BMPs needed to maintain compliance with the permit. On some sites, this may include appropriate BMPs for demolition of existing structures
 - Phase 2 - Construction - Sediment and erosion control BMPs required during the majority of grading and construction activities.
 - Phase 3 - Stabilization - Sediment and erosion control BMPs required near the completion of the construction project. Must also include appropriate BMPs for stabilization - grassing, inlet protection, etc

14. UTILITY LINES Location in C-SWPPP: Appendix J
- Limits of disturbance include areas necessary for installation of all utilities (cable, electrical, natural gas, water and sewer), as appropriate
 - For instances where the location of cable, electric, and natural gas has not been determined at the time the SWPPP is developed, SWPPP preparer may include a note that the installation of these is to be within the permitted limits of disturbance and that installation outside of these areas will require a modification to the permit
 - Inlet protection provided at all existing inlets that receive flows from the disturbed areas; also add this as a note on the plans
 - For all utility lines crossing WoS, narrative and detail showing sediment and erosion control measures provided on plans
 - Note for construction entrances to be provided at all locations where construction traffic accesses a paved roadway
15. BUFFERS - SEE GUIDANCE DOCUMENT (3.2.4.C) Location in C-SWPPP: Appendix J
- Select Compliance Option A, B, or C and provide appropriate documentation
 - Double row of silt fence provided in all areas where a 50' undisturbed buffer cannot be maintained between the disturbed area and the WoS
 - Minimum 10' maintenance buffer provided between last row of silt fence and WoS; or, if buffer not provided, then statement from P.E. on plans indicating how silt fence will be installed and maintained without impacts to WoS
 - Ensure discharges into a buffer zone are non-channelized and non-concentrated to prevent erosion, and first treated by the construction site's sediment and erosion controls
 - Ensure any velocity dissipation measures implemented within a buffer zone comply with 3.2.4.C.III. (d)
 - Additional Local Requirements may apply
16. FLOW CONTROL (3.2.10) Location in C-SWPPP: N/A
- Control stormwater volume and velocity within the site during construction to minimize erosion within the site
 - Control stormwater rates and volume at outlets during construction to minimize erosion to downstream channels and streambanks
17. CONSTRUCTION SITE HYDROLOGY (3.2.8.V AND 3.2.6.A.II) Location in C-SWPPP: Appendix J
- *Note: MS4s may have additional requirements for the management of stormwater, sediment, and/or erosion.*
 - Pre-development drainage area map and during construction drainage area map outlining the area contributing to sediment basins, traps, and rock sediment dikes. Include all site drainage outlet points on each drainage area map.
 - During construction hydrologic analysis calculations for the 10-year, 24-hour storm event at each outfall point for sediment trapping efficiency calculations and/or skimmer sizing
 - Analysis performed using SCS 24-hour storm for routed structures (Rational method is not acceptable)
 - Rainfall data from South Carolina DHEC Storm Water Management BMP Handbook (BMP Handbook) or other appropriate source used in all calculations
 - Additional construction site hydrology information and hydrologic analysis calculations may be provided as a means of addressing non-numeric effluent limits during construction
 - Curve Number for construction hydrologic analysis needs to reflect construction/ disturbed conditions. Curve Numbers for newly-graded areas are:
 - Hydrologic Soil Group "A": 77
 - Hydrologic Soil Group "B": 86
 - Hydrologic Soil Group "C": 91
 - Hydrologic Soil Group "D": 94

18. SEDIMENTOLOGY & SEDIMENT BASIN/TRAP DESIGN (3.2.8.V AND 3.2.6.A.II)

Location in C-SWPPP: N/A

- Trapping efficiency calculations showing that all sediment basins/ traps are capable of achieving a sediment trapping efficiency of at least 80% for the 10-year, 24-hour storm event, if 10 or more disturbed acres drain to a common point (stream, lake, etc.)
- Additional trapping efficiency calculations may be necessary to satisfy construction buffer requirements or may be provided as a means of addressing non-numeric effluent limits
- Sediment basins provide storage for the 10-year, 24-hour storm event for disturbed conditions or 3600 ft³/acre draining to the basin, if 10 or more disturbed acres drain to a common point (stream, lake, property line, etc.)
- Sediment basins and traps designed for total area draining to them. Sediment traps only used for drainage areas of less than 5 acres
- Sediment trap storage calculations, showing that 1800 ft³/ total acre draining to each trap is provided below the spillway
- If trapping efficiency calculations are required for sediment traps, then provide peak outflow, q_{po} , calculations; the 10-year, 24-hour storm event for construction conditions cannot overtop the trap's spillway
- Drainage area map outlining the area draining to each basin/trap. Copies of figures used to determine V_{15} (SV-1) and trapping efficiency (ST-1, SB-1, SB-2), if Design Aids from BMP manual are used to determine trapping efficiencies. When the soil type is A/D, B/D or C/D, the chart for high water tables must be used to calculate sediment trapping efficiency for sediment ponds in the Coastal Zone.
- When multiple soil types exist within a drainage area, use the soil type with the smallest D15 or particle size for the appropriate depth to determine the settling velocity, V_{15} . Do not use an average D15.
- Sediment basins must dewater via an outlet structure that pulls water from the surface, unless infeasible. Options for this include skimmers and flashboard risers. Surface dewatering is not required for traps.
- Porous baffles must be provided in sediment basins, unless infeasible
- Forebays must be installed, unless infeasible
- Public Safety should be taken into consideration as a factor in design of sediment basins. Alternative BMPs must be utilized where a construction site limitations would preclude a safe design
- Silt fence only used in areas with drainage areas of less than ¼ acre per 100 LF of fence and not used in areas with concentrated flows
- Clean-out stake, marked at ½ the designed sediment storage depth, provided in all sediment basins/ sediment traps
- *Note: Consult the [BMP Handbook](#) for information on the design of these and other devices.*
- *Note: The Design Aids in the [BMP Handbook](#) cannot be used to determine trapping efficiencies for structures in series. Modeling is required in those instances. If the flow for the 10-year, 24-hour storm for construction conditions overtops the structure or the structure's spillway, then the Design Aids cannot be used.*

19. CONVEYANCE MEASURES AND STABLE CHANNELS (3.2.6.A.III)

Location in C-SWPPP: Appendix J

- All channels and diversion ditches able to handle the 10-year storm event with non-erosive velocities of less than 5 feet per second during construction (use appropriate CN for disturbed areas) and post-construction (if velocity exceeds 5 ft/s, then permanent measures to reduce the velocity to a non-erosive rate must be provided)
- Stabilization of conveyance channels is to be completed within 7 days of channel construction
- Rock check dams provided in temporary diversions
- Installation detail for erosion control blanket (ECB) or turf reinforcement matting (TRM) if ECBs or TRMs to be used
- Stabilized temporary conveyance channels should be utilized to divert concentrated stormwater flows from running onto and within the disturbed area

20. INLET PROTECTION (3.2.6.A.II(a) and (b))

Location in C-SWPPP: Appendix J

- Provided at all inlets (existing and proposed)
- Inlet protection details provided for pre-paving and after roadways have been paved
- Hay bales are not acceptable
- Steel posts and buried fabric shown for filter fabric inlet protection

20. INLET PROTECTION (cont'd)
- Filter fabric under the grate is not acceptable unless it is part of a manufactured best management practice made for inlet protection that is specifically designed to hang underneath the grate
 - *Note: The Department recommends that an inlet not have more than one (1) acre draining to it.*
21. ENERGY DISSIPATORS/ OUTLET PROTECTION (3.2.10)
- All outlets stabilized with appropriately sized riprap apron or other structure
 - Riprap detail shows apron dimensions and stone sizes for each pad or each pipe diameter
 - Filter fabric installed beneath all riprap
 - Note that appropriate outlet protection and energy dissipation is also required for post-construction
22. SLOPES AND/ OR EMBANKMENTS (3.2.6.A.III(e) and 3.2.10) Location in C-SWPPP: Appendix J
- All slopes stabilized
 - Minimize Disturbance to Steep Slopes (3H:1V) or greater
 - Divert concentrated flows around steep slopes using slope drains or temporary diversions
 - Utilize appropriate measures to prevent erosion (erosion control blankets, surface roughening, terracing, etc.)
 - Slope drains designed in accordance with the [BMP Handbook](#)
 - Slope drains provided where concentrated flows discharge onto a fill slope
 - *Note: Measures, in addition to grassing or hydroseeding, include synthetic or vegetative matting, diversion berms, temporary slope drains, etc.*
 - *Note: If retaining walls or fill slopes are to be constructed at the downstream property line, the Department recommends a 10' buffer to allow for construction and maintenance. If a 10' buffer is not provided, then provide permission from the adjacent property owner for possible land-disturbing activities on his property.*

Post-Construction

23. POST CONSTRUCTION HYDROLOGIC ANALYSIS (3.2.8.A.II) Location in C-SWPPP: Appendix J
- *Note: MS4s may have additional requirements for post construction hydrologic analysis.*
 - Pre- and post-developed hydrologic analysis calculations for the 2- and 10-year, 24-hour storm events at each outfall point
 - Drainage area maps that clearly correspond to the calculations (pre- and post-development)
 - Analysis points for comparing runoff rates and the total drainage area analyzed do not change from pre- to post-development, although the immediate drainage areas contributing to each analysis point might shift.
 - Post-development discharges less than or equal to pre-development discharges for each outfall point (if not, then see "Detention Waiver" section below)
 - Analysis performed using SCS 24-hour storm (Rational method is not acceptable)
 - Rainfall data from [South Carolina DHEC Storm Water Management BMP Handbook](#) (BMP Handbook) or other appropriate source used in all calculations
 - *Note: The curve number for open water, marshes, etc. should be 98.*
24. DISCHARGE POINTS (3.2.6.A.III) Location in C-SWPPP: Appendix J
- Storm drainage or pond outfalls carried to an existing drainage outfall such as a pipe, ditch, etc.
 - No new point discharges onto adjacent property where there was not a point discharge previously, unless written permission from the adjacent property owner is provided
 - Level spreaders, plunge pools, etc. provided when the proposed outlet is near the property line and not directed to an existing outfall, such as a creek or ditch
 - Twenty (20)-foot minimum buffer is provided between the property line and the discharge point
 - Outlets shall not discharge on fill slopes
 - *Note: This requirement also applies during construction.*

25. DETENTION ANALYSIS AND BASIN DESIGN (3.2.8.A.III)

Location in C-SWPPP: N/A

• Analysis

- *Note: MS4s may have additional requirements for detention analysis and basin design.*
- Pond routing using a volume-based hydrograph for the 2- and 10-year, SCS 24-hour storm event (Drain:Edge, ICPR, HEC-1, SedCAD, HYDRAFLOW, etc. perform full pond routings; TR55 does not perform a full pond routing; rational method cannot be used)
- Hydrologic and hydraulic calculations necessary to determine the impact of hydrograph timing modifications of the proposed land-disturbing activity, with and without the detention structure (results of analysis will determine the need to modify the detention design or eliminate the detention requirement—see note 2 below)
- Inputs and outputs from analysis program
- Summary table of the peak inflows, peak outflows, discharge velocities, and maximum water surface elevations (WSE) for the 2- and 10-year, 24-hour storm events for each detention structure
- Stage-storage-discharge relationship for the outlet structure of each detention structure
- If a rating curve for the outlet structure must be generated externally from the analysis program (Drain:Edge, HEC-1, etc.), data and equations used to rate the outlet structure
- As-built of existing detention pond if the site drains to an existing detention pond (see below)
- *Note: The Department recommends using the 10% rule in performing analysis. The hydrologic analysis should be conducted for the larger drainage area, where the site in question encompasses 10% of the total drainage area. For example, if your site is 10 acres, then the hydrologic analysis should be performed at the point downstream where the contributing drainage area, including your 10-acre site, is approximately 100 acres.*

• Design

- Detail of outlet structure and cross-section of the dam/ berm or pond bank, including elevations and dimensions that correspond to the calculations
- Orifice constructability should be considered (do not specify orifice diameters with increments of less than ¼")
- Small orifices (those less than 3") are prone to clogging
- Maximum WSE for the 10-year storm event below the emergency spillway with 0.5-ft of freeboard between maximum WSE for the 10-year storm and the emergency spillway
- Maximum WSE for the 100-year storm event below the embankment with 0.5-ft of freeboard between maximum WSE for the 100-year storm and the embankment
- Dewatering time calculations for the 10-year storm event (dry ponds must drain completely within 72 hours)
- Bottom of all detention and retention ponds graded to have a slope of not less than 0.5%
- If the pond is to be used for sediment control during construction, temporary horseshoe-shaped riprap berm in front of any low level outlets provided during construction and shown on the pond detail for dry ponds
- Permanent maintenance access to all permanent detention structures (easements may be needed for structures surrounded by lots)
- Infiltration systems designed in accordance with S.C. Reg. 72-307.C(11) [specify how items a-j have been addressed]
- Low Impact Development measure, bioretention cells, infiltration, and other post-construction practices should be installed only after the drainage area to these practices has been stabilized
- *Note: Emergency spillways should not be built on fill slopes.*
- *Note: The Department recommends installation of a trash rack or other debris-screening device on all pond risers.*
- *Note: The Department recommends a maximum slope of 3:1 on pond embankments to allow for ease of maintenance.*
- *Note: The Department recommends installation of sediment forebay at each outfall into the detention/ sediment basin. This is a requirement during construction.*

26. DETENTION WAIVER Location in C-SWPPP: Section 1.6

- *Note: If the 2- and 10-year, 24-hour post-developed flow rates exceed the pre-developed rates, waivers from detention may be granted in accordance with regulation 72-302(B) on a case-by-case basis*
- Justification and a written request, including the following statement: *"the increased flows will not have a significant adverse impact on the downstream/adjacent properties"*

26. DETENTION WAIVER (cont'd)

- A project may be eligible for a waiver or variance of stormwater management for water quantity control if the applicant can demonstrate that:
 - The proposed project will have no significant adverse impact on the receiving natural waterway or downstream properties; or
 - The imposition of peak control requirements for rates of stormwater runoff would aggravate downstream flooding
- Waiver signed by the project's Professional Engineer
- *Note: See note in checklist item 25 regarding the 10% rule.*

27. USE OF EXISTING STORMWATER MANAGEMENT STRUCTURES (3.2.8.A.VI) Location in C-SWPPP: N/A

- An as-built survey must be provided for all previously approved detention ponds that will receive flows from new construction
- Prepared by a South Carolina Licensed Land Surveyor
- Grades/ contours/ depths for pond
- Elevations and dimensions of all outlet structures, including:
 - Pipe and orifice inverts and diameters
 - Weir elevations and dimensions
 - Riser dimensions and elevations
 - Emergency spillway dimensions and elevations
 - Locations and inverts for all pipes discharging into the pond

28. PERMANENT WATER QUALITY REQUIREMENTS (3.2.8.A.IV) Location in C-SWPPP: N/A

- Permanent water quality addressed (all projects or LCP that disturb 5 or more acres)
 - Wet ponds designed to catch the first ½" of runoff from the entire area draining to the pond and release it over at least a 24-hour period
 - Dry ponds designed to catch the first 1" of runoff from the entire area draining to the pond and release it over at least a 24-hour period
 - Infiltration Practices designed to accept, at a minimum, the first 1" of runoff from all impervious areas and designed in accordance with S.C. Reg. 72-307.C(11) [specify how items a-j have been addressed]
 - For areas not draining to a pond or infiltration practice, show how permanent water quality requirements were addressed
- Water quality orifices should be a size that is conducive to proper operation and maintenance. Orifices less than 3" in diameter are prone to clogging
- Projects located within one-half (1/2) mile of a receiving water body in the Coastal Zone must meet Section III.C.3.XIII.A of the Coastal Zone Management Program Refinements (CZMP). Designs must show that the first ½ inch of runoff from the entire site or the first one (1) inch of runoff from the built upon area, whichever is greater, can be stored onsite when permanent water quality ponds having a permanent pool are proposed for the project. Projects with stormwater outlets draining within 1000 feet of shellfish beds need to retain the first 1.5 inches of runoff on site.
 - *"Receiving Water Body" as it relates to additional Coastal Zone stormwater management requirements is also known as a "Coastal Receiving Water" and means all regularly tidally influenced salt and fresh water marsh areas, all lakes or ponds which are used primarily for public recreation or a public drinking water supply, and other water bodies within the coastal zone, excluding wetlands, swamps, ditches and stormwater management ponds which are not contiguous via an outfall or similar structure with a tidal water body.*
- Bridges and golf courses proposed in the Coastal Zone are subject to the additional water quality requirements contained in section III.C.3.XIII.C and D of the CZMP.
- Waters of the U.S./State are not used for permanent water quality control (alternative means of treatment must be used if an existing pond is to be used for water quantity control).
- *Note: Other non-traditional stormwater controls such as Bioretention areas, constructed wetlands, etc. may be used. Consult the [BMP Handbook](#) for information on the design of these devices.*
- *Note: Pre-fabricated or proprietary treatment devices are approved on a case-by-case basis if adequate removal efficiency can be demonstrated. Provide pollutant removal efficiency data, preferably from a third-party testing company. Type of system selected should be based on the ability to remove the pollutants of concern in that area/situation (bacteria, hydrocarbons, etc.).*

29. PERMANENT STORMWATER MANAGEMENT STRUCTURE MAINTENANCE (4.3.B)

Location in C-SWPPP: N/A

- Signed agreement from the responsible party accepting ownership and maintenance of the structure
- If maintenance responsibility is transferred after NPDES coverage is granted, an updated agreement should be submitted with the Notice of Termination
- Description of maintenance plan to be used
- Schedule of maintenance procedures (e.g., every 6 months)
- Detailed or manufacturer-specific maintenance items for proprietary control devices (oil-water separators, etc.), underground detention structures, exfiltration systems and non-traditional stormwater controls (constructed wetlands, bioretention, etc.)
- Typical maintenance items to be addressed
 - Grass to be mowed
 - Trees to be removed from within the pond and on the embankment
 - Trash and sediment to be removed from inside of and around the pond outlet structure
 - Orifices to be cleaned and unclogged
 - Outlet pipe to be cleaned, inspected, and repaired
 - Sediment accumulation to be removed from pond
 - Pond bottom to be regraded to provide proper drainage towards the outlet discharge point
 - Energy dissipator to be cleaned and repaired
 - Emergency spillway, if applicable, to be inspected and repaired
 - Erosion on side slopes, if present, to be addressed
 - The Department must be notified in writing of any changes in maintenance responsibility for the stormwater devices at the site (include this statement in agreement).
- *Note: The Department recommends that the county, city, or other governing utility, which has the authority to accept the ownership and maintenance of a storm drainage system also accept the permanent stormwater management structure.*
- *Note: If the entity or person with maintenance responsibility changes, then a new maintenance agreement, signed by the new person responsible for maintenance, must be provided to the Department. If a new, signed maintenance agreement is not provided to the Department, then the entity/ person who signed the most recent maintenance agreement on file with the Department will be considered the responsible entity.*

Standard Notes

1. If necessary, slopes, which exceed eight (8) vertical feet should be stabilized with synthetic or vegetative mats, in addition to hydroseeding. It may be necessary to install temporary slope drains during construction. Temporary berms may be needed until the slope is brought to grade.
2. Stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than fourteen (14) days after work has ceased, except as stated below.
 - Where stabilization by the 14th day is precluded by snow cover or frozen ground conditions stabilization measures must be initiated as soon as practicable.
 - Where construction activity on a portion of the Site is temporarily ceased, and earth-disturbing activities will be resumed within 14 days, temporary stabilization measures do not have to be initiated on that portion of the Site.
3. All sediment and erosion control devices shall be inspected once every calendar week. If periodic inspection or other information indicates that a BMP has been inappropriately, or incorrectly, the Permittee must address the necessary replacement or modification required to correct the BMP within 48 hours of identification.
4. Provide silt fence and/or other control devices, as may be required, to control soil erosion during utility construction. All disturbed areas shall be cleaned, graded, and stabilized with grassing immediately after the utility installation. Fill, cover, and temporary seeding at the end of each day are recommended. If water is encountered while trenching, the water should be filtered to remove sediment before being pumped back into any waters of the State.
5. All erosion control devices shall be properly maintained during all phases of construction until the completion of all construction activities and all disturbed areas have been stabilized. Additional control devices may be required during construction in order to control erosion and/or offsite sedimentation. All temporary control devices shall be removed once construction is complete and the site is stabilized.
6. The contractor must take necessary action to minimize the tracking of mud onto paved roadway(s) from construction areas and the generation of dust. The contractor shall daily remove mud/soil from pavement, as may be required.
7. Residential subdivisions require erosion control features for infrastructure as well as for individual lot construction. Individual property owners shall follow these plans during construction or obtain approval of an individual plan in accordance with S.C Reg. 72-300 et seq. and SCR100000.
8. Temporary diversion berms and/or ditches will be provided as needed during construction to protect work areas from upslope runoff and/or to divert sediment-laden water to appropriate traps or stable outlets.
9. All waters of the State (WoS), including wetlands, are to be flagged or otherwise clearly marked in the field. A double row of silt fence is to be installed in all areas where a 50-foot buffer can't be maintained between the disturbed area and all WoS. A 10-foot buffer should be maintained between the last row of silt fence and all WoS.
10. Litter, construction debris, oils, fuels, and building products with significant potential for impact (such as stockpiles of freshly treated lumber) and construction chemicals that could be exposed to storm water must be prevented from becoming a pollutant source in storm water discharges.
11. A copy of the SWPPP, inspections records, and rainfall data must be retained at the construction site or a nearby location easily accessible during normal business hours, from the date of commencement of construction activities to the date that final stabilization is reached.
12. Initiate stabilization measures on any exposed steep slope (3H:1V or greater) where land-disturbing activities have permanently or temporarily ceased, and will not resume for a period of 7 calendar days.

13. Minimize soil compaction and, unless infeasible, preserve topsoil.
14. 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;
15. Minimize the discharge of pollutants from dewatering of trenches and excavated areas. These discharges are to be routed through appropriate BMPs (sediment basin, filter bag, etc.).
16. The following discharges from sites are prohibited:
 - 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.
17. After construction activities begin, inspections must be conducted at a minimum of at least once every calendar week and must be conducted until final stabilization is reached on all areas of the construction site.
18. If existing BMPs need to be modified or if additional BMPs are necessary to comply with the requirements of this permit and/or SC's Water Quality Standards, implementation must be completed before the next storm event whenever practicable. If implementation before the next storm event is impracticable, the situation must be documented in the SWPPP and alternative BMPs must be implemented as soon as reasonably possible.
19. A Pre-Construction Conference must be held for each construction site with an approved On-Site SWPPP prior to the implementation of construction activities. For non-linear projects that disturb 10 acres or more this conference must be held on-site unless the Department has approved otherwise.

Appendix B

Additional Permits, Approvals, & Certifications



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

MAY - 4 2017

Regulatory Division

Mrs. Siobhan O. Gordon
South Carolina Department of Transportation
P.O. Box 191
Columbia, South Carolina 29202-0191

RECEIVED
MAY 8 2017
Environmental Management
SCDOT

Dear Mrs. Gordon:

This letter is in response to a Pre-Construction Notification (PCN) (SAC-2011-00476) (SCDOT PIN 31125 and P029536) which we received on March 27, 2017, and supersedes all previously issued DA permits or verifications for this project. By submittal of the PCN, you requested verification that the proposed project is authorized by a Department of the Army (DA) Nationwide Permit (NWP).

The PCN contains the following identifying information for this project. The work affecting waters of the United States is part of an overall project known as the SC-160 roadway widening project from SC 460 (Springfield Parkway) to S-157 (Possum Hollow Road) in York and Lancaster Counties (SCDOT PIN 31125_RD01), and includes construction of additional travel and turn lanes for SC-160. The project involves impacts to not more than 136 linear feet of intermittent/perennial streams, including wetlands. The project is located across tributaries to Sugar Creek and Clems Branch at two separate locations along a 3.5 mile-long segment of SC-160, east of Fort Mill, in York and Lancaster Counties, South Carolina. The PCN also includes the following supplemental information:

- a. Drawing sheets 1-8 of 8 titled "SC 160 WIDENING FROM SC 460 (SPRINGFIELD PARKWAY) TO S-157 (POSSUM HOLLOW ROAD) YORK AND LANCASTER COUNTY SOUTH CAROLINA" and dated January 4, 2016;
- b. Proof of mitigation dated June 9, 2016, which includes the purchase of 524 stream mitigation credits from Taylor's Creek Mitigation Bank;
- c. A delineation of wetlands, other special aquatic sites, and other waters (SAC 2011-00476-DS, dated September 24, 2014).
- d. SCDOT Impact Assessment which included a Biological Survey for Threatened and Endangered Species, concurrence from USFWS on March 25, 2016, of the Corps' determination that this project may affect, but not likely to adversely affect Threatened or Endangered Species, and an Archeological/ Historical review with SHPO Concurrence.

Based on a review of the PCN, including the supplemental information indicated above, it has been determined that 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 Nationwide Permit #14.

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:

1. 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.
2. 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;
3. 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;
4. That the permittee shall submit the attached signed compliance certification to the Corps within 30 days following completion of the authorized work.
5. That appropriate soil and erosion control methods will be used at all times during construction activities. Prior to the initiation of the project, sediment barriers such as silt fencing, hay bales or other suitable devices will be placed between the adjacent wetlands or waterways and the project construction and staging areas. All erosion control methods will be regularly inspected and maintained in functional order during the course of the project. All exposed soils, in the project area and staging area will be contained during construction activities and permanently stabilized upon the completion of the project. Once initiated, construction will be carried to completion in an expeditious manner in order to minimize the period of disturbance;
6. That the permittee complies with all FEMA regulations. SCDOT is advised that development activities in a 100-year floodplain, as designated in the Federal Emergency Management Agency's (FEMA) Flood Insurance Study Data, are subject to the floodplain management regulations of the National Flood Insurance Program [(NFIP)(44CFR)]. The NFIP prohibits any development with a designated floodway, including placement of fill that results in any increase in base flood elevations.

This verification is valid until March 18, 2022, and supersedes all previously issued DA permits or verifications for this project, 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, so 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 being verified based on the information you have 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 that 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 concerning this matter, please refer to our file number SAC 2011-00476. A copy of this letter is being forwarded to certain State and/or Federal agencies for their information. If you have any questions concerning this matter, please contact Christopher Mims at 843-329-8044.

Sincerely,

A handwritten signature in black ink, appearing to read 'Travis G. Hughes', with a horizontal line extending to the right.

Travis G. Hughes
Chief, Regulatory Division

Enclosures

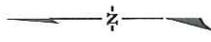
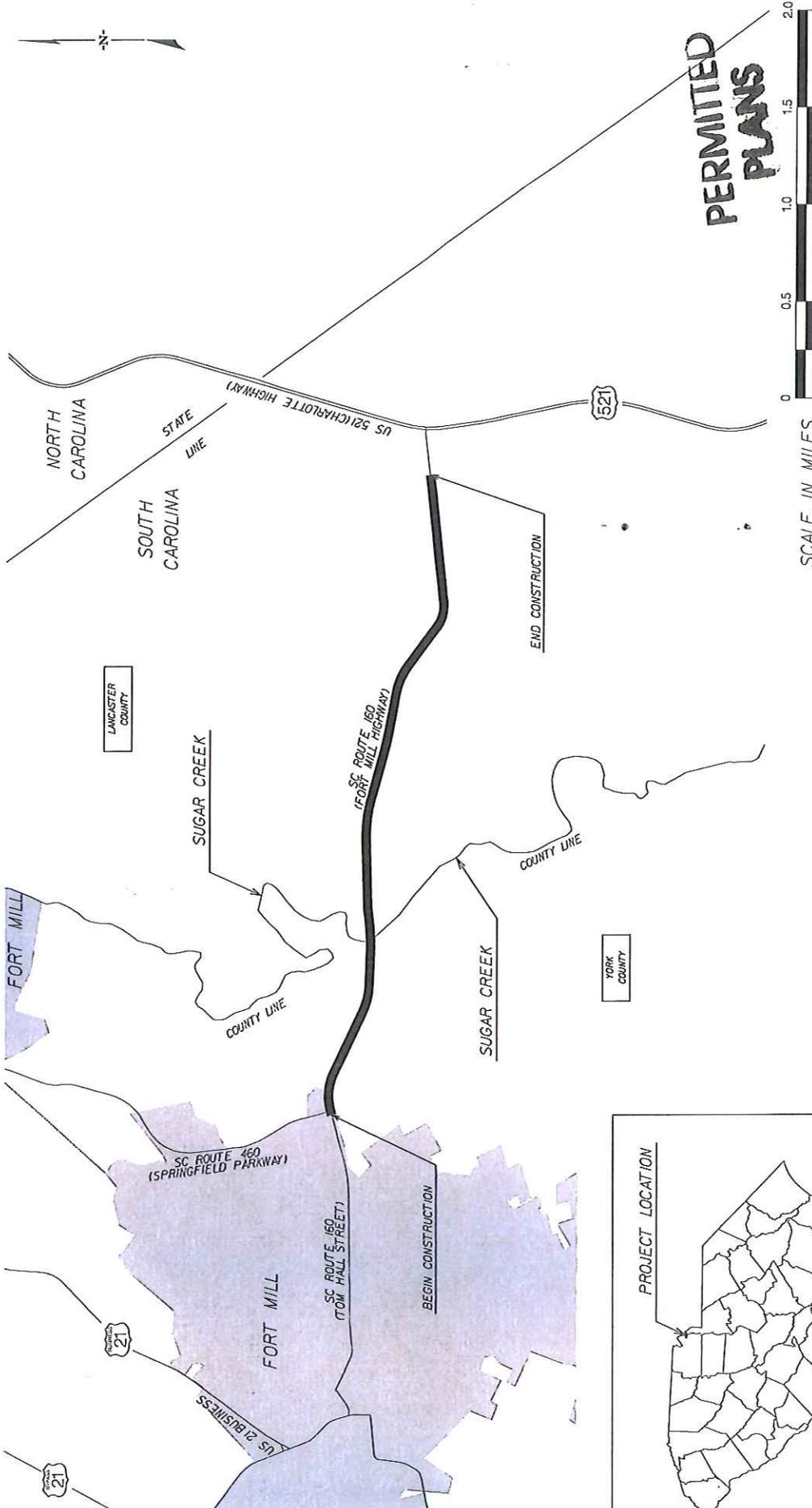
Referenced Permit Drawings
Nationwide Permit #14
Nationwide Permit General Conditions
Nationwide Permit Regional Conditions
Compliance Certification Form

Copies Furnished:

Mead & Hunt
Mr. Matt DeWitt, PWS
878 South Lake Drive
Lexington, South Carolina 29072

South Carolina Department of
Health and Environmental Control
Bureau of Water
2600 Bull Street
Columbia, South Carolina 29201

SC 160 WIDENING FROM SC 460 (SPRINGFIELD PARKWAY) TO S-157 (POSSUM HOLLOW ROAD)



PERMITTED PLANS



SCDOT
 SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION

APPLICATION BY:
 SC 160 WIDENING
 FROM SC 460 (SPRINGFIELD PARKWAY)
 TO S-157 (POSSUM HOLLOW ROAD)
 YORK AND LANCASTER COUNTY
 SOUTH CAROLINA

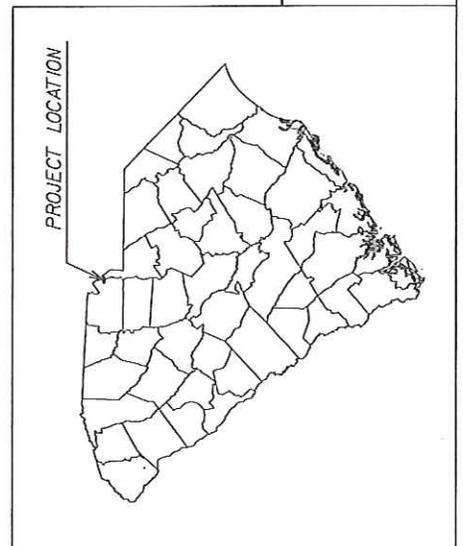
Rev. No.	Date	By	Description of Revision
1	January 4, 2016	MTD	
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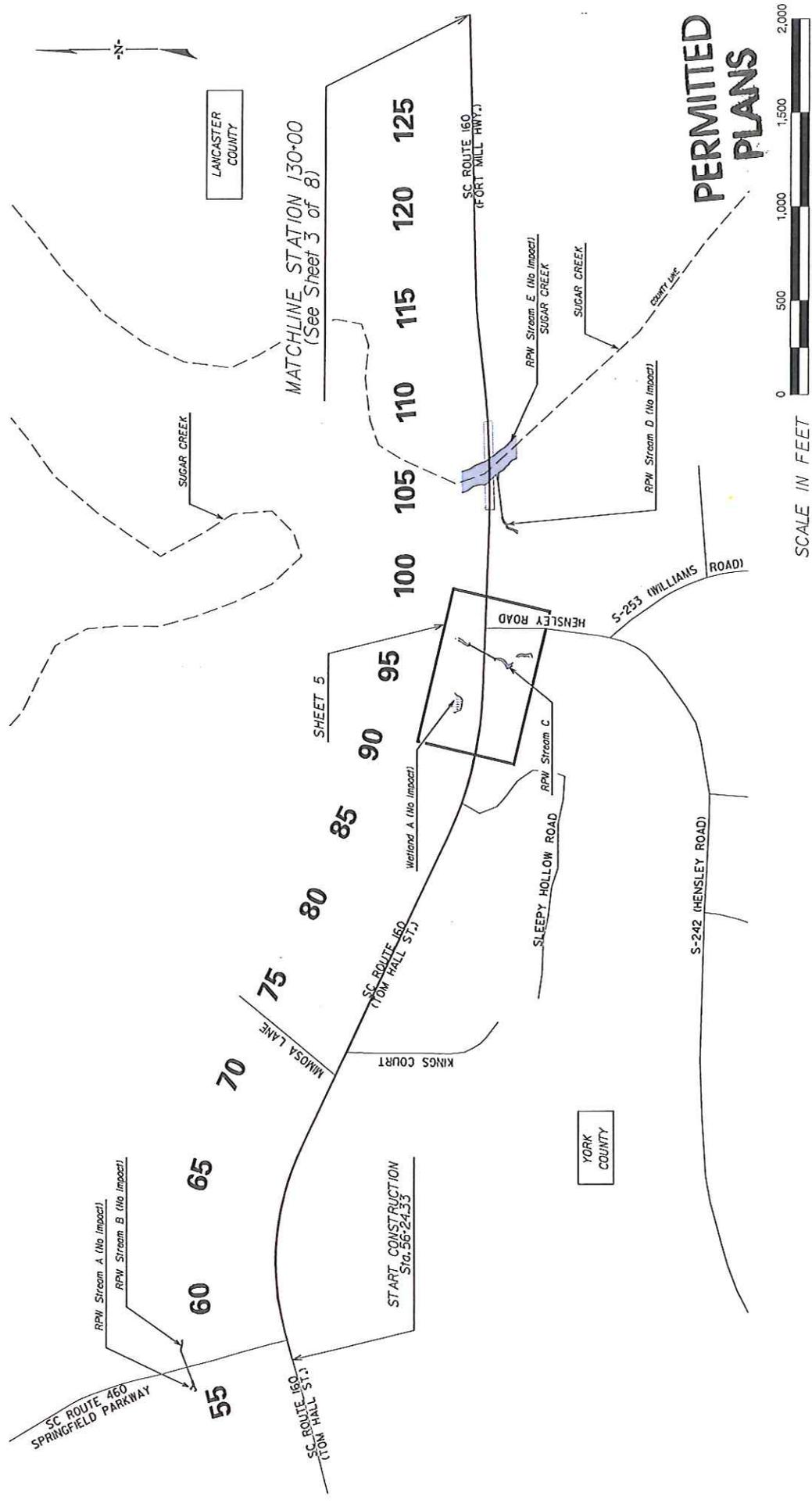
Mead&Hunt Project Number: R28286900-140623.01
 SCDOT PIN: 31125_RD01
 USACE SAC: 2011-00476-DJS

PREPARED BY:
Mead & Hunt
 MEAD & HUNT, INC.
 878 SOUTH LAKE DRIVE
 LEXINGTON, SC 29072
 TEL: 803.799.3000
 FAX: 803.799.3004
 WWW.MEADANDHUNT.COM

LEGEND

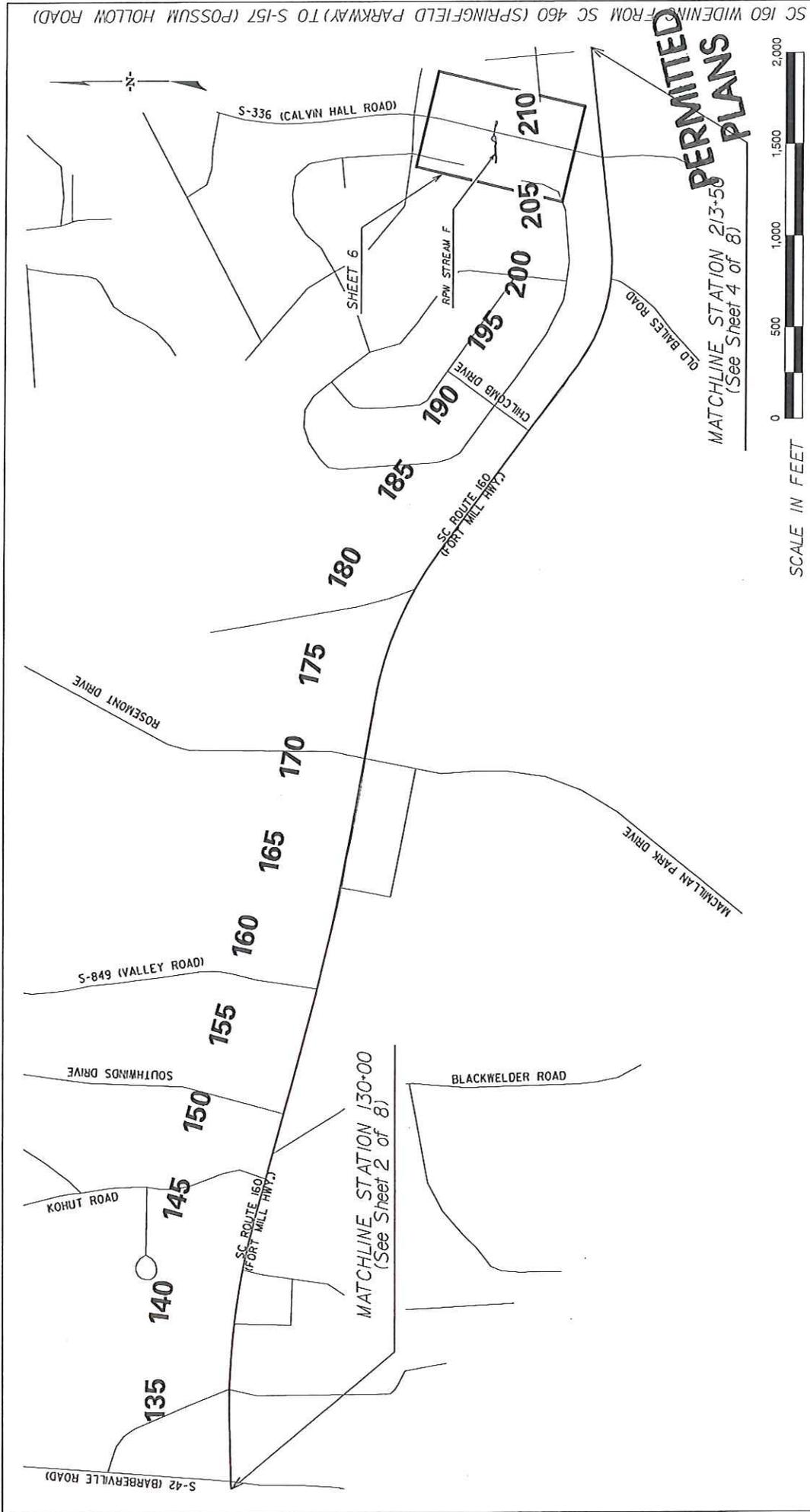
- Municipality
- Proposed Improvement Area





PERMITTED PLANS

LEGEND Jurisdictional Stream Jurisdictional Wetland		PREPARED BY: Mead & Hunt MEAD & HUNT, INC. 979 SOUTH LAKE DRIVE LEXINGTON, SC 29072 Tel. 803.790.3900 Fax 803.790.3901 www.meadandhunt.com		APPLICATION BY: SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION FROM SC 460 (SPRINGFIELD PARKWAY) TO S-157 (POSSUM HOLLOW ROAD) YORK AND LANCASTER COUNTY SOUTH CAROLINA	
Project Impacts Permanent Stream (RPW) Fill Permanent Stream (RPW) Armoring Total Stream (RPW) Impacts Jurisdictional Barrier Fences		104'-1" (0.028 acre) 32'-1" (0.007 acre) 136'-1" (0.035 acre) 250-LF		PROJECT PLAN VIEW SHEET 2 OF 8	
SHEET 5 55 60 65 70 75 80 85 90 95 100 105 110 115 120 125		PREPARED BY: MEAD & HUNT, INC. 979 SOUTH LAKE DRIVE LEXINGTON, SC 29072 Tel. 803.790.3900 Fax 803.790.3901 www.meadandhunt.com		APPLICATION BY: SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION FROM SC 460 (SPRINGFIELD PARKWAY) TO S-157 (POSSUM HOLLOW ROAD) YORK AND LANCASTER COUNTY SOUTH CAROLINA	
SC ROUTE 460 (SPRINGFIELD PARKWAY) SC ROUTE 160 (FORT MILL HWY.) SLEEPY HOLLOW ROAD HENSLEY ROAD S-253 WILLIAMS ROAD S-242 (HENSLEY ROAD)		PROJECT NO. / DATE / BY / DESCRIPTION OF REVISION 1 / January 4, 2016 / MTD / Mead&Hunt Project Number: R02826900-140623.01 SCDOT PIN: 31125_RD01 USACE SAC: 2011-00476-DJS		SCALE IN FEET 0 500 1,000 1,500 2,000	

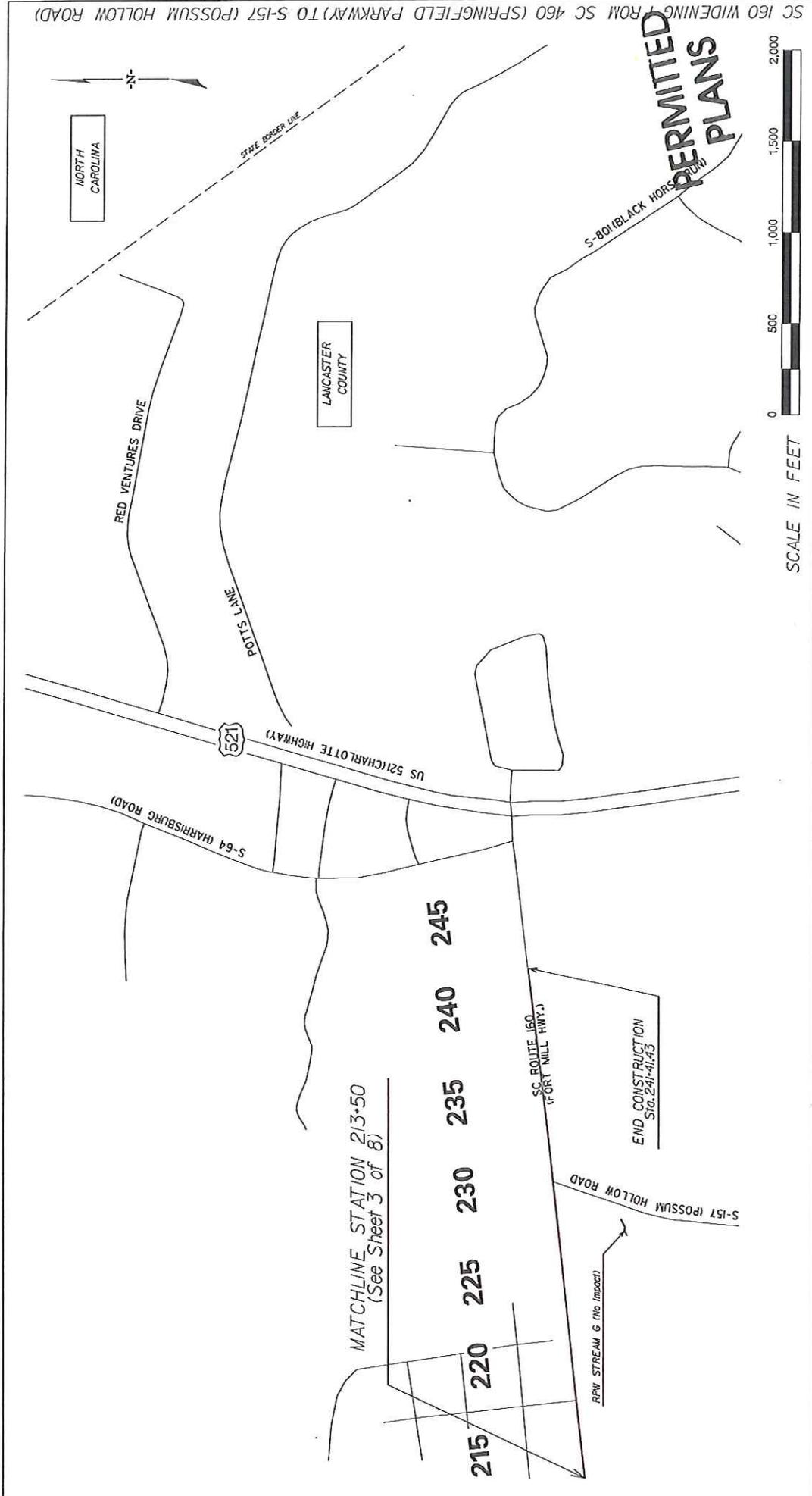


PERMITTED PLANS
 MATCHLINE STATION 213+50
 (See Sheet 4 of 8)

SCALE IN FEET

SC 160 WIDENING FROM SC 460 (SPRINGFIELD PARKWAY) TO S-157 (POSSUM HOLLOW ROAD)

<p>LEGEND</p> <p>Jurisdictional Stream</p> <p>Jurisdictional Wetland</p>	<p>PREPARED BY:</p> <p>Mead & Hunt</p> <p>Mead & Hunt, Inc. 871 South Lake Drive Lexington, SC 29022 Tel: 803.960.2000 Fax: 803.960.2001 www.meadandhunt.com</p>	<p>PROJECT IMPACTS</p> <p>Permanent Stream (RPW) Fill: 104-H (0.028 acre) Permanent Stream (RPW) Armoring: 32-H (0.007 acre) Total Stream (RPW) Impacts: 136-H (0.035 acre)</p> <p>Jurisdictional Barrier Fence: 250-LF</p>	<p>APPLICATION BY:</p> <p>SCDOT SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION</p> <p>SC 160 WIDENING FROM SC 460 (SPRINGFIELD PARKWAY) TO S-157 (POSSUM HOLLOW ROAD) YORK AND LANCASTER COUNTY SOUTH CAROLINA</p>
<p>4</p> <p>3</p> <p>2</p> <p>1</p>	<p>Date</p> <p>By</p> <p>MTD</p>	<p>Revised</p> <p>Project Number: R328690-14023.01</p> <p>SCDOT PIN: 3125, RD01</p> <p>USACE SAC: 2011-00476-DIS</p>	<p>PROJECT PLAN VIEW</p> <p style="text-align: right;">SHEET 3 OF 8</p>



**PERMITTED
PLANS**

SC 160 WIDENING FROM SC 460 (SPRINGFIELD PARKWAY) TO S-157 (POSSUM HOLLOW ROAD)

APPLICATION BY: **SCDOT**
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
FROM: SC 160 WIDENING
TO: S-157 (POSSUM HOLLOW ROAD)
YORK AND LANCASTER COUNTY
SOUTH CAROLINA

Rev. No.	Date	By	Description of Revision
1	January 4, 2016	MTD	
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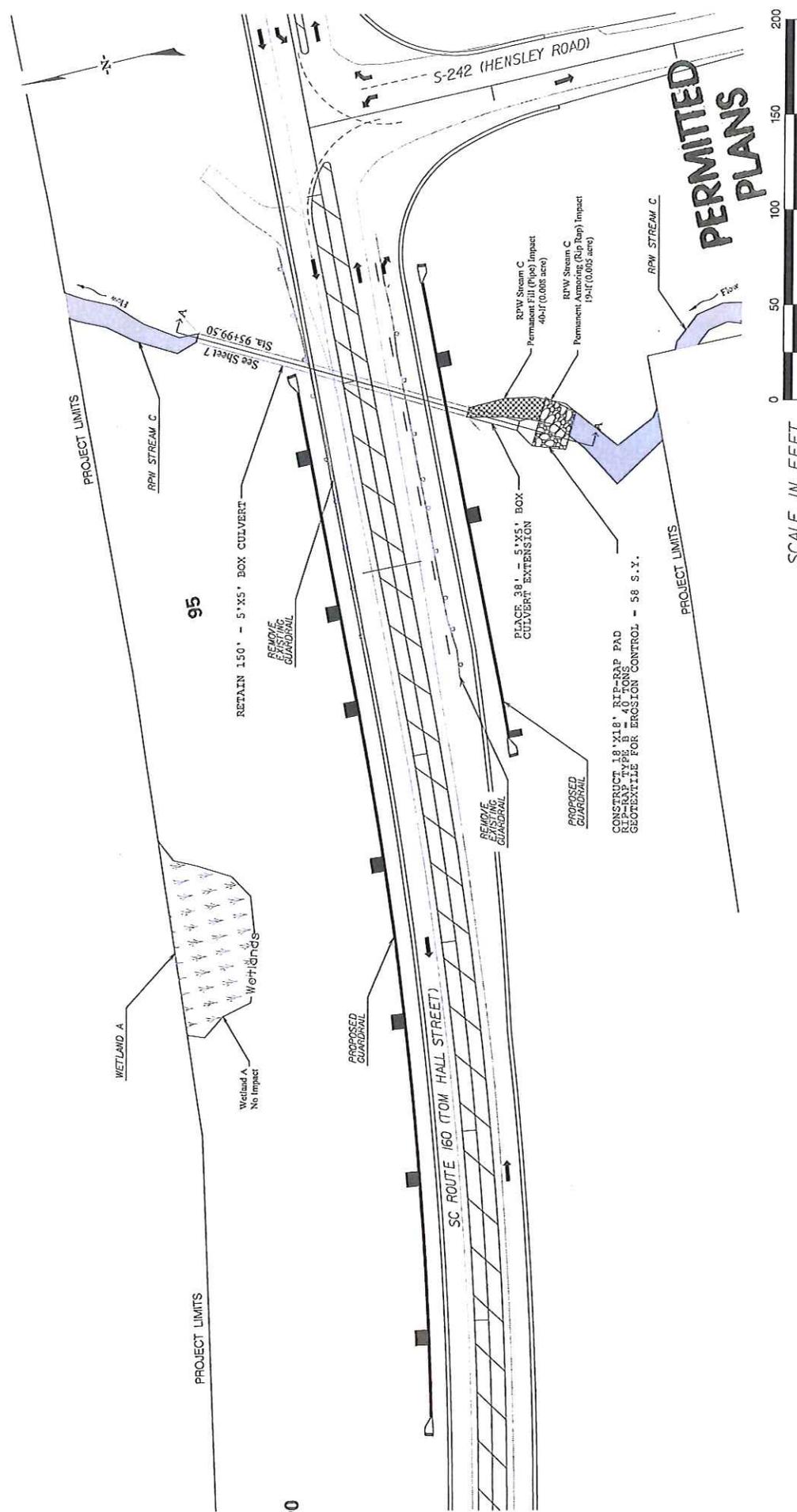
Mead & Hunt Project Number: R0226900-140623.01
SCDOT PIN: 31125-RD01
USACE SAC: 2011-00476-DJS

PREPARED BY: **Mead & Hunt**
MEAD & HUNT, INC.
1000 W. GREENWAY
LITTLE ROCK, AR 72202
Tel: 501.975.2300
Fax: 501.975.2344
www.meadandhunt.com

Project Impacts	250-LF
Permanent Stream (RPW) Fill	104-ft (0.028 acre)
Permanent Stream (RPW) Armoring	32-ft (0.007 acre)
Total Stream (RPW) Impacts	136-ft (0.035 acre)
Jurisdictional Barrier Fence	

LEGEND

Jurisdictional Stream	
Jurisdictional Wetland	



SCDOT
 SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
 APPLICATION BY:
 FROM SC 160 WIDENING (SPRINGFIELD PARKWAY)
 TO S-157 (POSSUM HOLLOW ROAD)
 YORK AND LANCASTER COUNTY
 SOUTH CAROLINA

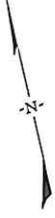
Rev. No.	Date	By	Description of Revision
1	January 4, 2008	MTD	

Mead&Hunt Project Number: R2286900-140623.01
 SCDOT PIN: 31125_R001
 USACE SAC: 2011-00476-DJS

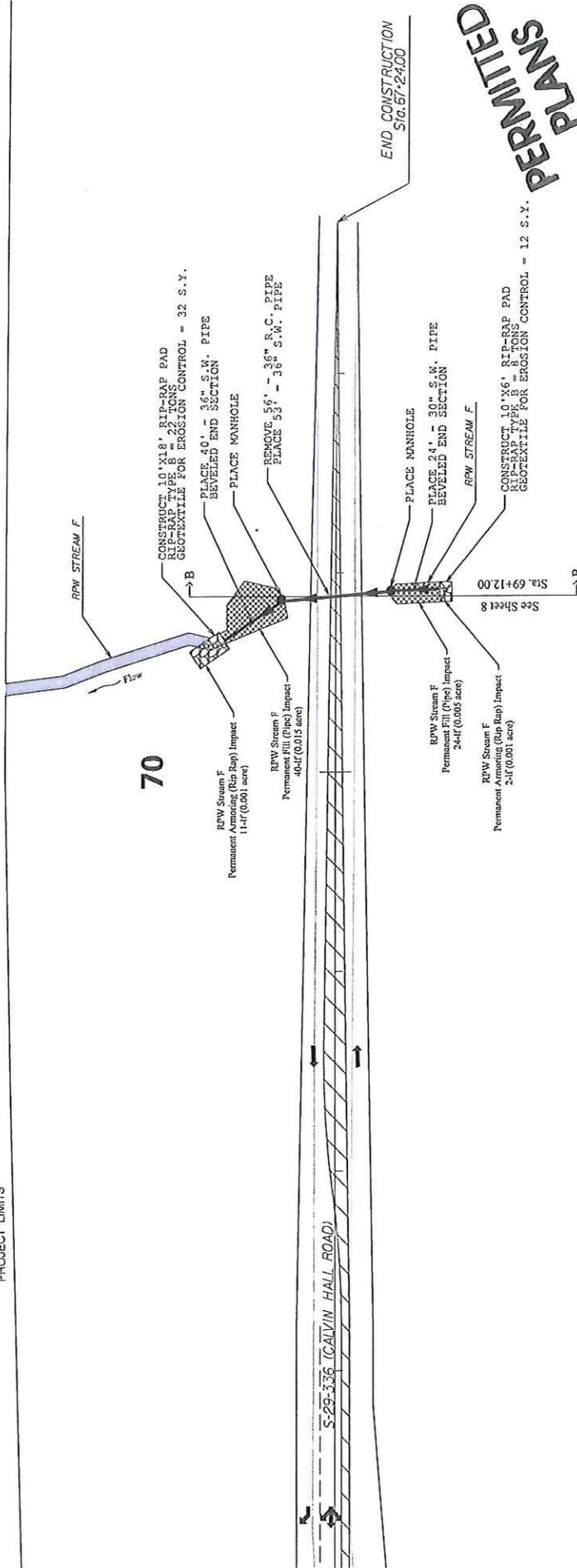
PREPARED BY:
Mead & Hunt Inc.
 670 SOUTH LAKE DRIVE
 LINDSEY, SC 29672
 Tel: 803.696.2000
 www.meadandhunt.com

Sheet 5 Impacts	Sheet 5 Impacts	Sheet 5 Impacts	Sheet 5 Impacts
Permanent Stream (RPW) Fill	40-ft (0.008 acre)	Permanent Stream (RPW) Armoring	19-ft (0.005 acre)
Permanent Stream (RPW) Impacts	59-ft (0.013 acre)	Jurisdictional Barrier Fence	140-LF

LEGEND	
Jurisdictional Stream	
Jurisdictional Wetland	
Permanent Stream (RPW) Fill	
Permanent Stream (RPW) Armoring	



PROJECT LIMITS



PROJECT LIMITS

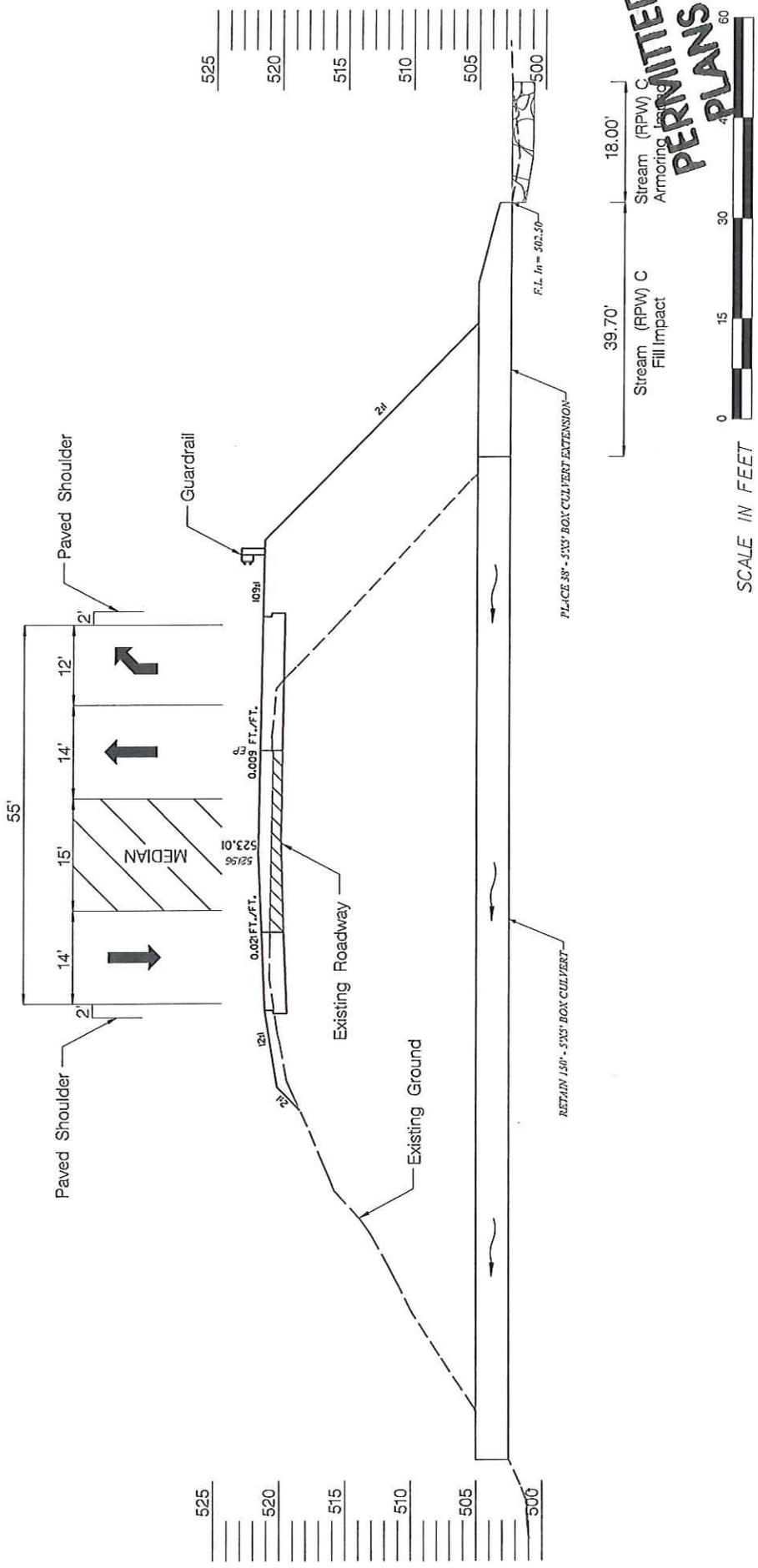


SCALE IN FEET

PLANS
 PERMITTED

LEGEND Jurisdictional Stream Jurisdictional Wetland Permanent Stream (RPW) Fill Permanent Stream (RPW) Armoring		Jurisdictional Stream Permanent Stream (RPW) Armoring Jurisdictional Barrier Fence		Sheet 6 Impacts Permanent Stream (RPW) Fill Permanent Stream (RPW) Armoring Total Stream (RPW) Impacts Jurisdictional Barrier Fence		PREPARED BY: Mead & Hunt MEAD & HUNT, INC. 470 SOUTH LAKE DRIVE LEXINGTON, SC 29024 Tel: 803.780.2000 Fax: 803.780.2044 www.mhinc.com		APPLICATION BY: SCDOT SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION FROM SC 460 (SPRINGFIELD PARKWAY) TO S-157 (POSSUM HOLLOW ROAD) YORK AND LANCASTER COUNTY SOUTH CAROLINA	
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Rev. No.	Date	By	Description of Revision						
	January 4, 2016	MTD							
Mead&Hunt Project Number: R3286900-140223.01 SCDOT PIN: 3125_R001 USACE SAC: 2011-00476-DJ5									

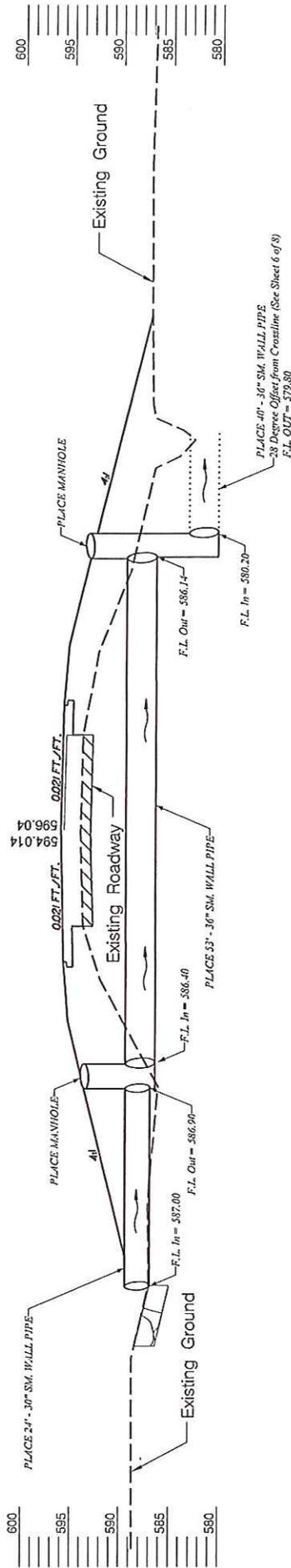
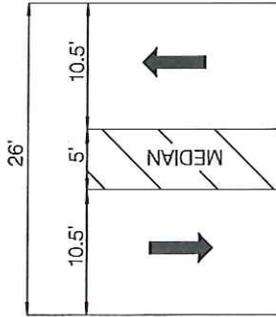
SC 160 WIDENING FROM SC 460 (SPRINGFIELD PARKWAY) TO S-157 (POSSUM HOLLOW ROAD)



PERMITTED PLANS

SC 160 (TOM HALL STREET)
SECTION A
STATION 95+99.50

PREPARED BY:	Mead & Hunt, Inc. 1000 W. LANTANA BLVD. LAWRENCEVILLE, GA 30046 Tel: 770.962.2000 Fax: 770.962.2044 www.mehunt.com	APPLICATION BY:	SCDOT SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION SC 160 WIDENING FROM SC 460 (SPRINGFIELD PARKWAY) TO S-157 (POSSUM HOLLOW ROAD) YORK AND LANCASTER COUNTY SOUTH CAROLINA
REVISIONS:			
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1	January 4, 2010	MTD	Description of Revision
		By	
Mead & Hunt Project Number: R0286900-140623.01			
SCDOT PIN: 91125_RD01			
USAGE SAC: 2011-00476-DUS			
CROSS SECTION SHT. 7 OF 8			



2.25' Stream (RPW) F
Armoring Impact

24.35' Stream (RPW) F
Fill Impact

51.12' Stream (RPW) F
Fill Impact

**PERMITTED
PLANS**



PREPARED BY:
Mead & Hunt
MEAD & HUNT, INC.
8711 SOUTH LAKE DRIVE
LORNINGTON, SC 29072
Tel: 803.900.2000
www.meadhunt.com

Rev. No.	Date	By	Description of Revision
1	January 4, 2016	MTD	
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Mead&Hunt Project Number: R3236900-440623.01
SCDOT PIN: 31125 RD01
USACE SAC: 2011-00476-DJS

APPLICATION BY:
SCDOT
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
SC 160 WIDENING
FROM SC 460 (SPRINGFIELD PARKWAY)
TO S-157 (POSSUM HOLLOW ROAD)
YORK AND LANCASTER COUNTY
SOUTH CAROLINA

S-29-336 (CALVIN HALL ROAD)
SECTION B
STATION 69+12.00

14. *Linear Transportation Projects.* Activities required for crossings of waters of the United States associated with the construction, expansion, modification, or improvement of linear transportation projects (e.g., roads, highways, railways, trails, airport runways, and taxiways) in waters of the United States. For linear transportation projects in non-tidal waters, the discharge cannot cause the loss of greater than 1/2-acre of waters of the United States. For linear transportation projects in tidal waters, the discharge cannot cause the loss of greater than 1/3-acre of waters of the United States. Any stream channel modification, including bank stabilization, is limited to the minimum necessary to construct or protect the linear transportation project; such modifications must be in the immediate vicinity of the project.

This NWP also authorizes temporary structures, fills, and work, including the use of temporary mats, necessary to construct the linear transportation project. 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.

This NWP cannot be used to authorize non-linear features commonly associated with transportation projects, such as vehicle maintenance or storage buildings, parking lots, train stations, or aircraft hangars.

Notification: The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity if: (1) The loss of waters of the United States exceeds 1/10-acre; or (2) there is a discharge in a special aquatic site, including wetlands. (See general condition 32.)

(Authorities: Sections 10 and 404)

Note 1: For linear transportation projects 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. Linear transportation projects must comply with 33 CFR 330.6(d).

Note 2: Some discharges for the construction of farm roads or forest roads, or temporary roads for moving mining equipment, may qualify for an exemption under section 404(f) of the Clean Water Act (see 33 CFR 323.4).

Note 3: For NWP 14 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 7 consultation 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 NWP. (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 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.* 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 NWP 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 proposed activity;
- (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

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*,

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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, *structures*, 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 *Structures* 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/

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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. For all proposed activities that would be located within a FEMA designated floodway, the *PCN* should include a “No Rise” letter from the National Flood Insurance Program (NFIP) coordinator. If a “No Rise” letter is not obtainable, additional information will be required in order to determine if the *PCN* may be processed as a Nationwide Permit.
15. For all proposed activities that require a *PCN* and are located within a FEMA designated Special Flood Hazard Area (SFHA), the *PCN* must include documentation from the NFIP coordinator that the proposed activity meets all Federal, state and local requirements.

For Specific Nationwide Permits:

16. For NWP 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 *structures*, 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

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FOR SOUTH CAROLINA

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 *structures*, 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 *structures*, 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 *PCNs* and that involve temporary *structures*, 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 *PCNs* 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.

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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 complexes*, 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 *structures* (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 *structures* 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 *structures*, 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.

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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 *structures*, 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.
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 *structures* 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;

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- 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 *discharges* 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.

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FOR SOUTH CAROLINA

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 *structures*, such as docks and boat ramps (if applicable); distance of the project footprint from the MHW line; distance of the project footprint from adjacent *structures*; 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.

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c. For projects that are 18 inches or less in height above substrate AND consist of hard *structures* 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 18 inches or more in height above substrate AND consist of hard *structures* 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.

Note: 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.

** For the purpose of these regional conditions, the term "stream bed" also includes features determined to be a "tributary" and a "relatively permanent water."

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.

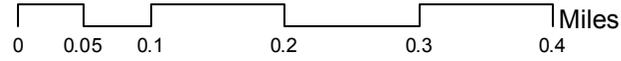
Signature of Permittee

Appendix C

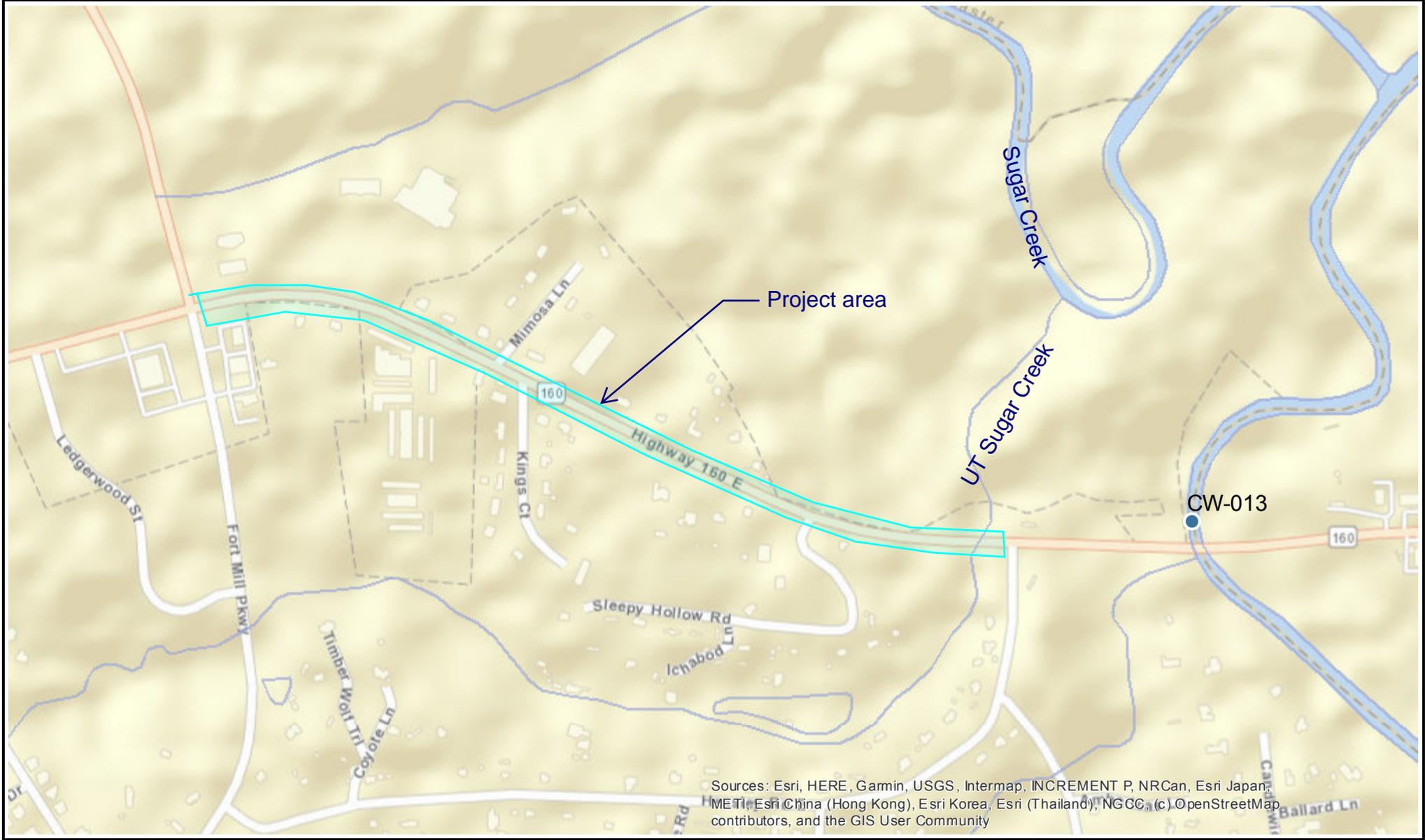
Receiving Waterbodies Map and Information



Watershed and Water Quality Information



Print Date: 7/13/2022



Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



Watershed and Water Quality Information

Applicant Name: York County Pennies For Progress

Permit Type: MS4

Address: 1516 HIGHWAY 160 E, FORT MILL, SC, 29715

Latitude/Longitude: 35.006957 / -80.910355

MS4 Designation: Small MS4

Monitoring Station: CW-013

Within Coastal Critical Area: No

Water Classification (Provisional): FW

Waterbody Name: Unnamed Trib

Entered Waterbody Name:

NH3N	Ammonia	CD	Cadmium	CR	Chromium
CU	Copper	HG	Mercury	NI	Nickel
PB	Lead	ZN	Zinc	DO	Dissolved Oxygen
PH	pH	TURBIDITY	Turbidity	ECOLI	Escherichia coli (Freshwaters)
FC	Fecal Coliform (Shellfish)	BIO	Macroinvertebrates (Bio)	TP	(Lakes) Phosphorus
TN	(Lakes) Nitrogen	CHLA	(Lakes) Chlorophyll a	ENTERO	Enterococcus (Coastal Waters)
HGF	Mercury (Fish Tissue)	PCB	PCB (Fish)		

Station	NH3N	CD	CR	CU	HG	NI	PB	ZN	DO	PH	TURBIDITY	ECOLI	FC	BIO	TP	TN	CHLA	ENTERO	HGF	PCB	
CW-013	X	X	X	X	X	X	X	X	X	X	X	X	X	N	X	X	X	X	X	X	X
CW-036	F	F	F	F	F	F	F	F	F	F	F	N	X	A	X	X	X	X	X	X	X

F = Standards full supported
N = Standards not supported

A = Assessed at upstream station
X = Parameter not assessed at station

WnTN = Within TMDL, parameter not supported
InTN = In TMDL, parameter not supported

WnTF = Within TMDL, parameter full supported
InTF = In TMDL, parameter full supported

BIO - Macroinvertebrates (Bio)

ECOLI - Escherichia coli (Freshwaters)

In TMDL Watershed: No
TMDL Report No:
TMDL Document Link:

TMDL Site:
TMDL Parameter:

Appendix D

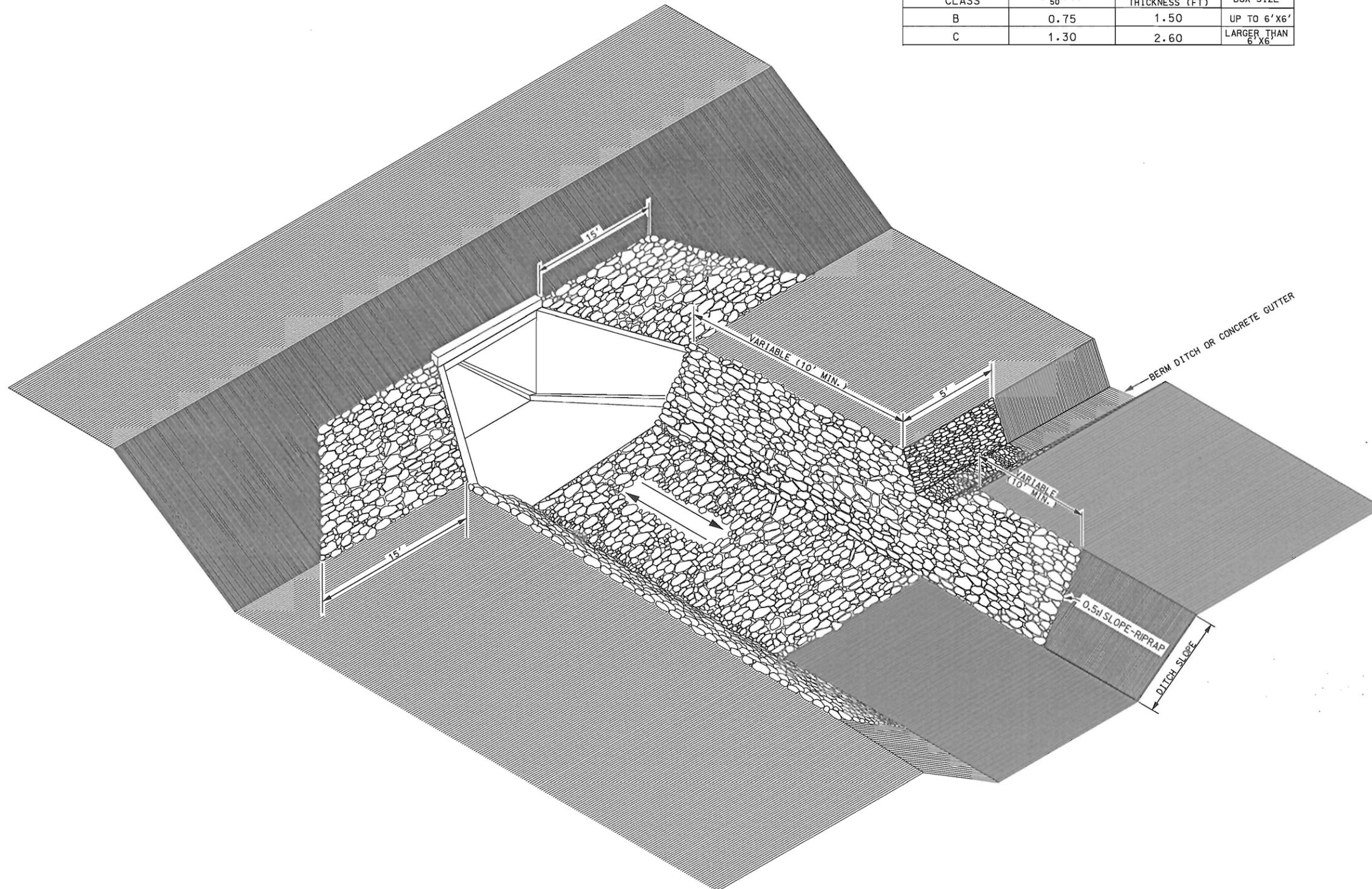
Erosion Control Standard Drawings

NOTES:

1. GEOTEXTILE FABRIC TO BE USED UNDER RIPRAP WHEN INCLUDED IN THE PLANS.
2. THE PAY ITEMS SHALL BE:
 RIPRAP - CLASS _____
 GEOTEXTILE FOR EROSION CONTROL UNDER RIPRAP (CLASS I) TYPE _____ TON S.Y.

CHART 804-205A
RIPRAP PLACEMENT

MINIMUM CLASS	D ₅₀ (FT)	MINIMUM THICKNESS (FT)	BOX SIZE
B	0.75	1.50	UP TO 6'X6'
C	1.30	2.60	LARGER THAN 6'X6'



REFERENCES

NATIONAL DOCUMENTS

SCDOT DOCUMENTS

RELATED DRAWINGS & KEYWORDS

PRECONSTRUCTION
SUPPORT ENGINEER



Sylvester Eargle, II
SIGNATURE

MARCH 3, 2009
DATE

6			
5			
4			
3			
2			
1	3/2009	DSO	CHANGED CHART 804-205A
0	3/2008	DSO	GENERAL REVISIONS
#	DATE	CHK	DESCRIPTION



SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DESIGN STANDARDS OFFICE
955 PARK STREET
ROOM 405
COLUMBIA, SC 29201

STANDARD DRAWING

RIPRAP
(BOX CULVERT)

804-205-00

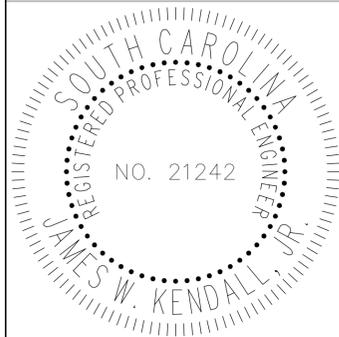
EFFECTIVE LETTING DATE | MAY 2009

REFERENCES

NATIONAL DOCUMENTS
USDA NRCS ENGINEERING
FIELD MANUAL

SCDOT DOCUMENTS
WQM

RELATED DRAWINGS & KEYWORDS



SIGNATURE

11/18/2016
DATE

6			
5			
4			
3			
2			
1			
0			
#	DATE	CHK	DESCRIPTION

SCDOT
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DESIGN STANDARDS OFFICE
955 PARK STREET
ROOM 405
COLUMBIA, SC 29201

STANDARD DRAWING
OUTLET PROTECTION
WITH NO DEFINED
CHANNEL

804-305-01

EFFECTIVE LETTING DATE | JULY 2017

THIS DRAWING IS NOT TO SCALE

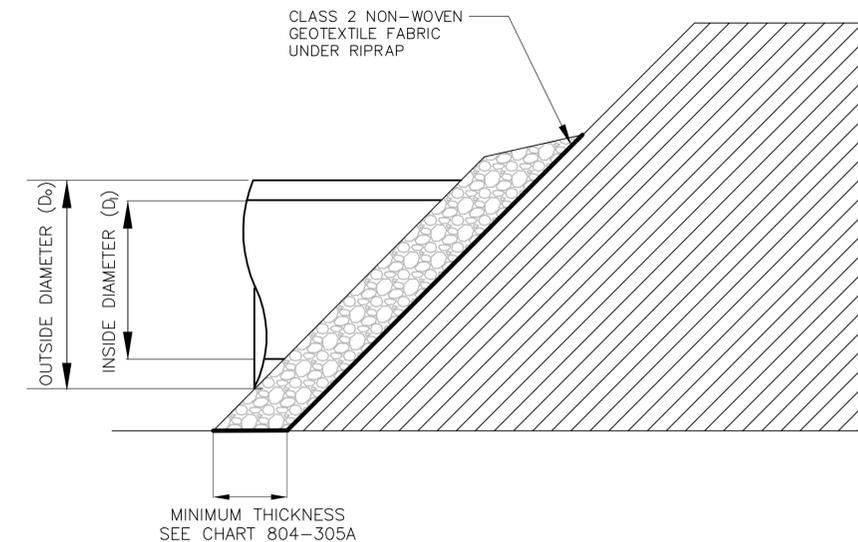
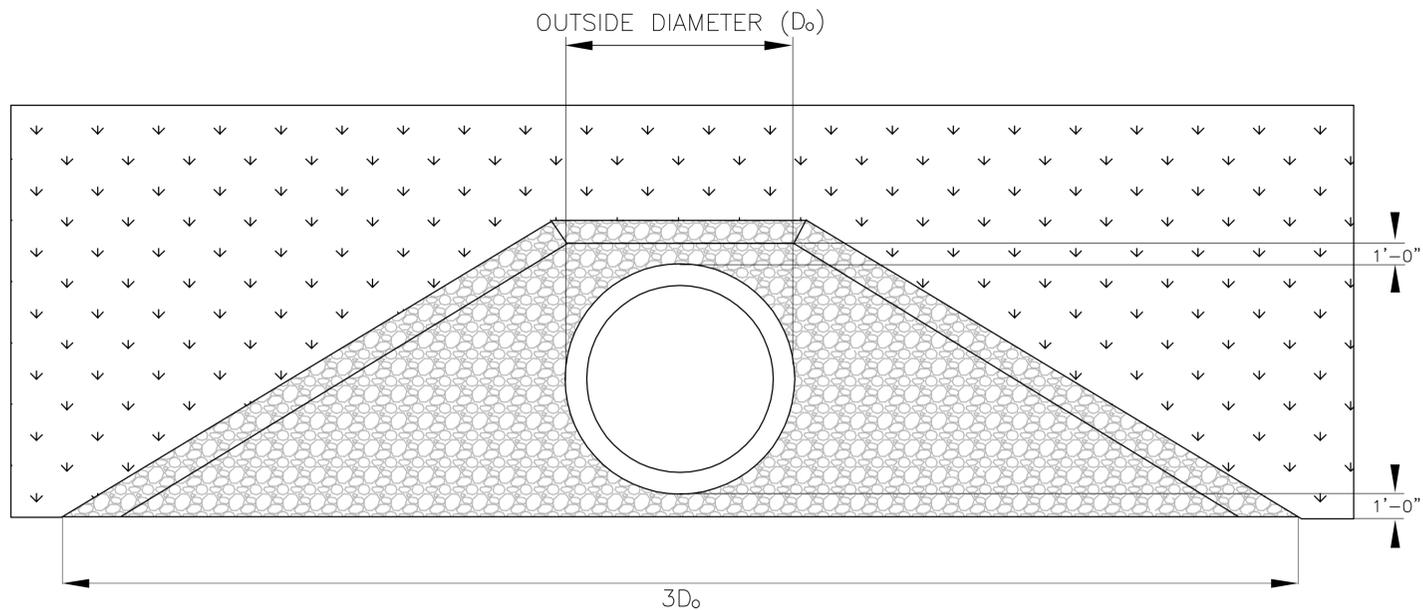
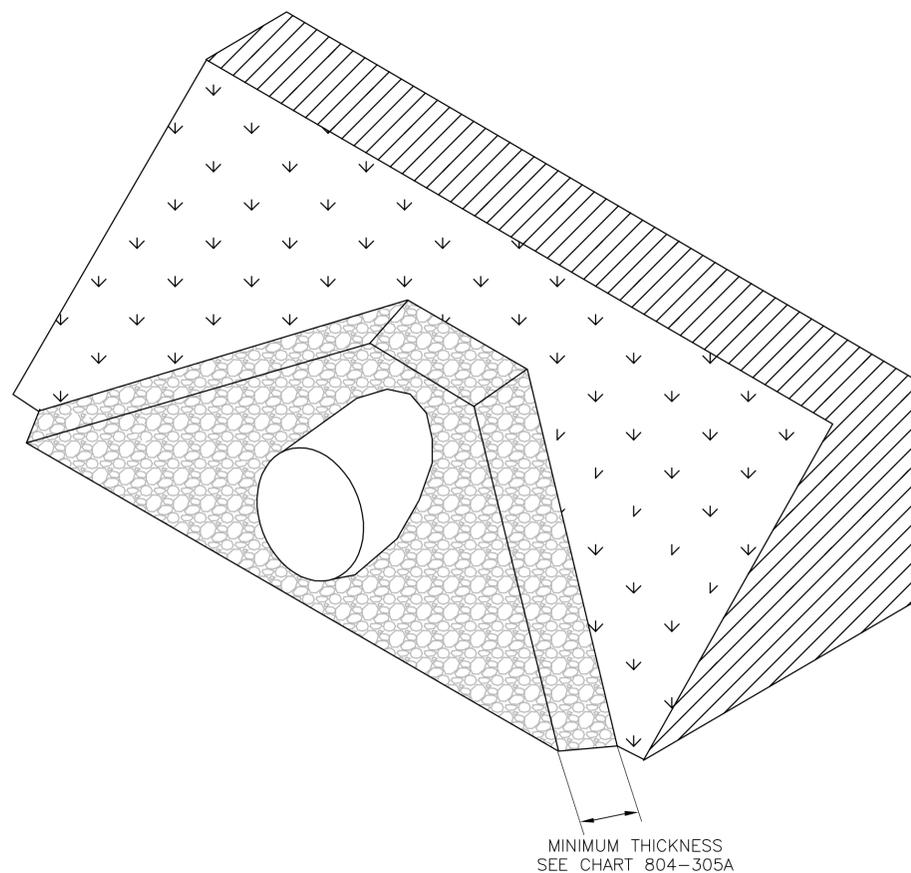


CHART 804-305A
SLOPE STABILIZATION RIPRAP PLACEMENT WITH
MINIMUM TAILWATER

MINIMUM CLASS*	D ₅₀ (FT)	MINIMUM THICKNESS (FT)	OUTSIDE PIPE DIAMETER
A	0.50	1.00	UP TO 24"
B	0.75	1.50	UP TO 84"
C	1.30	2.60	LARGER THAN 84"

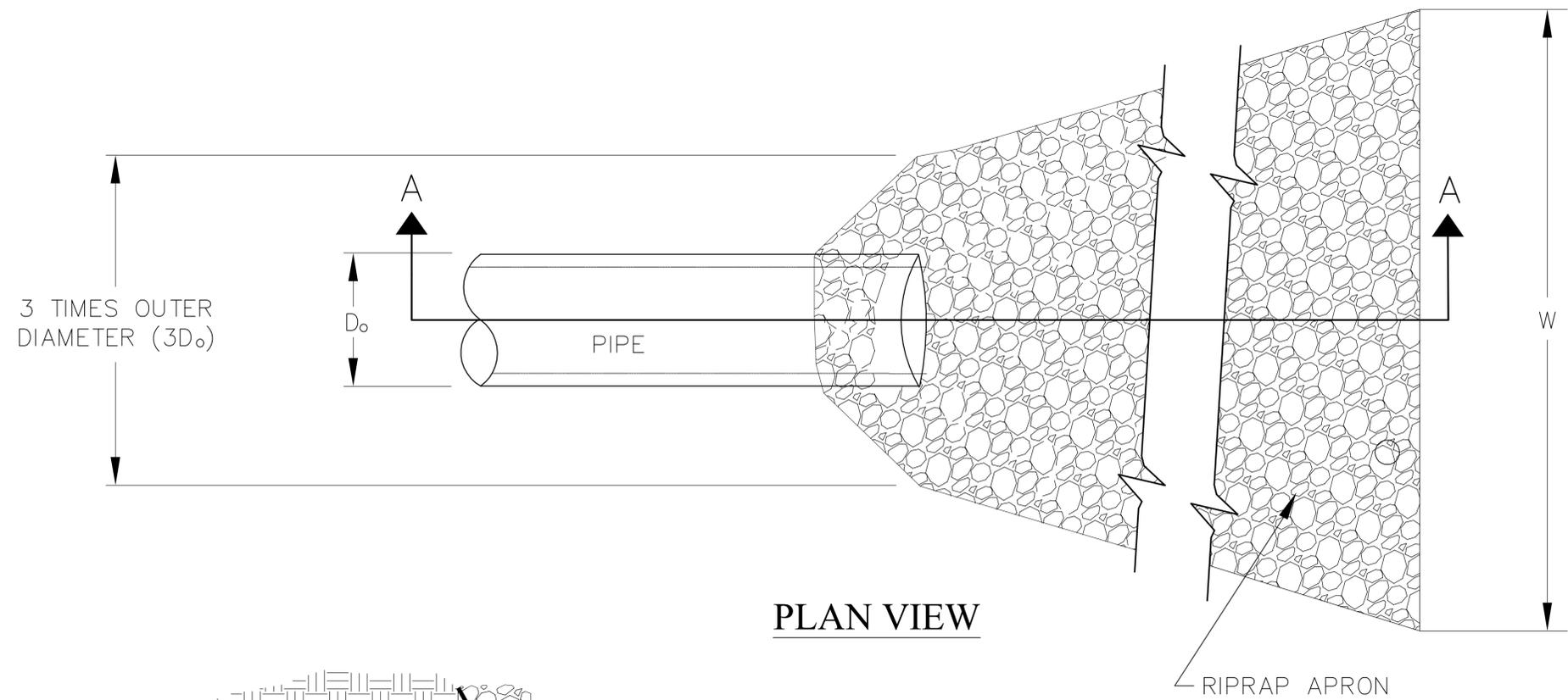
*WHEN RIPRAP APRON IS PRESENT, USE SAME CLASS OF RIPRAP ON SLOPE AS SPECIFIED FOR APRON. SEE DRAWING # 804-305-03 OR PLANS FOR APRON RIPRAP SPECIFICATIONS.



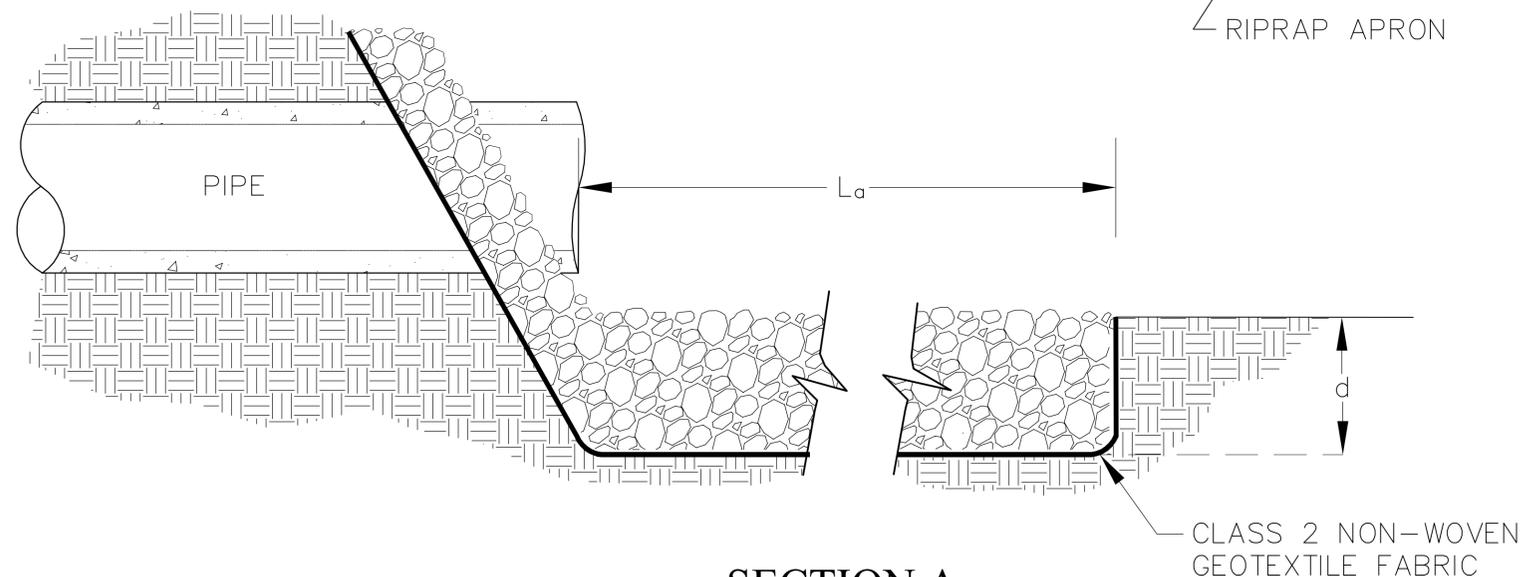
NOTES:

- 1) DESIGN OUTLET PROTECTION IN ACCORDANCE WITH THE SCDOT WATER QUALITY MANUAL.
- 2) OUTLET PROTECTION WILL HAVE A WIDTH THREE TIMES THE OUTSIDE DIAMETER OF THE OUTLET PIPE AT TOE OF SLOPE.
- 3) ADVANCE OUTLET PROTECTION UP THE SLOPE A MINIMUM OF 1 FOOT ABOVE TOP OF PIPE.
- 4) SEE DRAWINGS # 804-305-02 AND 804-305-03 FOR RIPRAP APRON DIMENSIONS.
- 4) THE PAY ITEMS MAY INCLUDE:

2031000	UNCLASSIFIED EXCAVATION	_____	CY
8041010	RIPRAP (CLASS A)	_____	TON
8041020	RIPRAP (CLASS B)	_____	TON
8041030	RIPRAP (CLASS C)	_____	TON
8042800	GEOTEXTILE FABRIC FOR EROSION CONTROL UNDER RIPRAP (CLASS 2)	_____	SY
8151151	TURF REINFORCEMENT MATTING (TRM) TYPE 1	_____	SY
8151152	TURF REINFORCEMENT MATTING (TRM) TYPE 2	_____	SY
8151153	TURF REINFORCEMENT MATTING (TRM) TYPE 3	_____	SY



PLAN VIEW



SECTION A

NOTES:

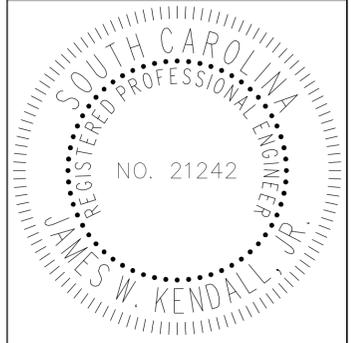
- 1) L_a = THE LENGTH OF THE RIPRAP APRON.
- 2) W = WIDTH OF OUTLET PROTECTION AT END OF RIPRAP APRON.
- 3) D_o = OUTER DIAMETER OF OUTLET PIPE.
- 4) $3D_o$ = WIDTH OF OUTLET PROTECTION AT TOE OF SLOPE AT PIPE OUTLET.
- 5) SEE DRAWING # 804-305-03 OR PLANS FOR DIMENSIONS L_a , W , AND $3D_o$.
- 6) d = DEPTH OF RIPRAP = 2.0 TIMES THE MAXIMUM RIPRAP DIAMETER.
- 7) SEE DRAWING # 804-305-01 FOR RIPRAP SLOPE STABILIZATION AROUND PIPE.

REFERENCES

NATIONAL DOCUMENTS
USDA NRCS ENGINEERING
FIELD MANUAL

SCDOT DOCUMENTS
WQM

RELATED DRAWINGS & KEYWORDS



SIGNATURE
11/18/2016
DATE

6			
5			
4			
3			
2			
1			
0			
#	DATE	CHK	DESCRIPTION

SCDOT
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DESIGN STANDARDS OFFICE
955 PARK STREET
ROOM 405
COLUMBIA, SC 29201

STANDARD DRAWING
OUTLET PROTECTION
WITH NO DEFINED
CHANNEL

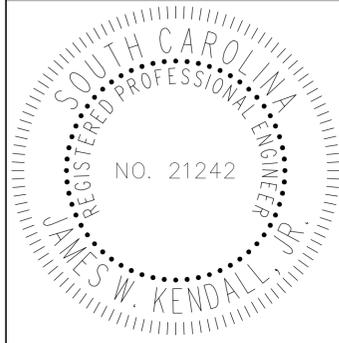
804-305-02
EFFECTIVE LETTING DATE | JULY 2017

REFERENCES

NATIONAL DOCUMENTS
USDA NRCS ENGINEERING FIELD MANUAL

SCDOT DOCUMENTS
WQM

RELATED DRAWINGS & KEYWORDS



SIGNATURE
11/18/2016
DATE

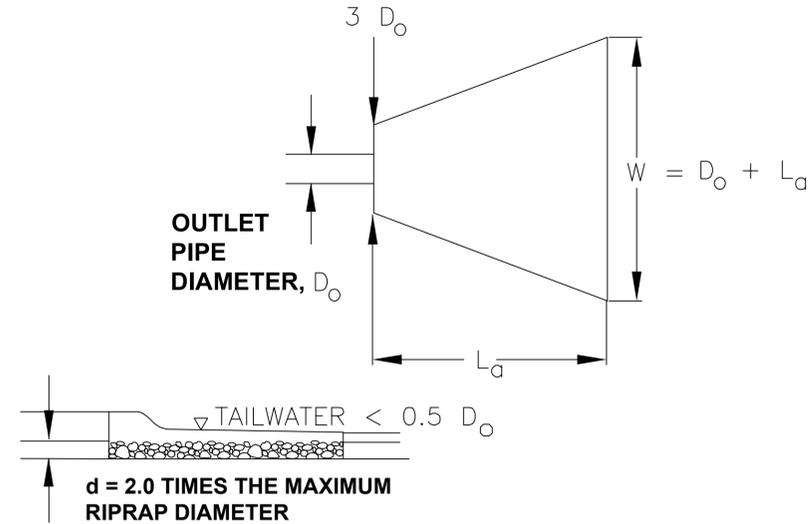
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SCDOT
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DESIGN STANDARDS OFFICE
955 PARK STREET
ROOM 405
COLUMBIA, SC 29201

STANDARD DRAWING
OUTLET PROTECTION WITH NO DEFINED CHANNEL

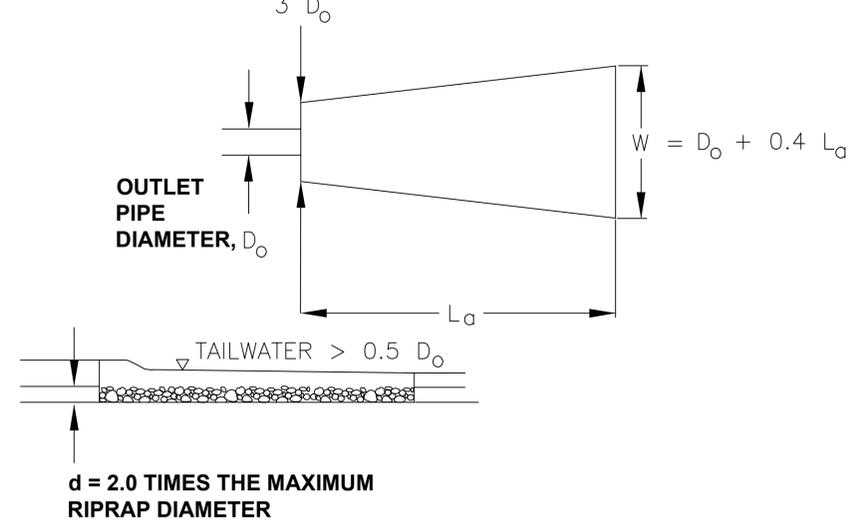
804-305-03
EFFECTIVE LETTING DATE | JULY 2017

PIPE OUTLET TO FLAT AREA WITH NO DEFINED CHANNEL
MINIMUM TAILWATER CONDITION:



PIPE INSIDE DIAMETER (D _i) (FT)	MAX PIPE SLOPE	OUTLET PROTECTION DIMENSIONS			MIN RIPRAP CLASS	RIPRAP DEPTH (d) (FT)
		3D _o (FT)	L _a (FT)	W (FT)		
1.5	≤ 1%	6	10	12	A	1.5
1.5	2%	6	14	16	A	1.5
1.5	5%	6	19	21	B	2.7
2.0	≤ 1%	8	14	17	A	1.5
2.0	2%	8	19	22	B	2.7
2.0	5%	8	26	29	B	2.7
2.5	≤ 1%	10	18	21	A	1.5
2.5	2%	10	25	28	B	2.7
2.5	5%	10	34	37	C	3.6
3.0	≤ 1%	12	24	28	B	2.7
3.0	2%	12	32	36	B	2.7
3.0	5%	12	42	46	C	3.6
3.5	≤ 1%	14	28	33	B	2.7
3.5	2%	14	37	42	C	3.6
3.5	5%	14	48	53	C	3.6
4.0	≤ 1%	16	33	38	B	2.7
4.0	2%	16	43	48	C	3.6

PIPE OUTLET TO FLAT AREA WITH NO DEFINED CHANNEL
MAXIMUM TAILWATER CONDITION:



PIPE INSIDE DIAMETER (D _i) (FT)	MAX PIPE SLOPE	OUTLET PROTECTION DIMENSIONS			MIN RIPRAP CLASS	RIPRAP DEPTH (d) (FT)
		3D _o (FT)	L _a (FT)	W (FT)		
1.5	≤ 1%	6	8	6	A	1.5
1.5	2%	6	23	11	A	1.5
1.5	5%	6	40	18	A	1.5
2.0	≤ 1%	8	14	8	A	1.5
2.0	2%	8	30	15	A	1.5
2.0	5%	8	55	25	B	2.7
2.5	≤ 1%	10	20	11	A	1.5
2.5	2%	10	39	19	A	1.5
2.5	5%	10	66	30	B	2.7
3.0	≤ 1%	12	27	15	A	1.5
3.0	2%	12	55	26	A	1.5
3.0	5%	12	91	40	C	3.6
3.5	≤ 1%	14	33	18	A	1.5
3.5	2%	14	66	31	B	2.7
3.5	5%	14	106	47	C	3.6
4.0	≤ 1%	16	42	22	A	1.5
4.0	2%	16	78	37	B	2.7

NOTES:

- 1) THESE TABLES ARE ONLY APPLICABLE FOR THE PIPE SIZES AND MAXIMUM PIPE SLOPES LISTED.
- 2) LARGER PIPES OR GREATER SLOPES REQUIRE ALTERNATIVE OUTLET PROTECTION DESIGN.
- 3) WHEN PLANS SPECIFY LARGER OR DIFFERENT OUTLET PROTECTION THAN SHOWN IN TABLES, INSTALL OUTLET PROTECTION PER THE PLANS.
- 4) SEE DRAWING # 804-305-02 FOR MORE INFORMATION ON OUTLET PROTECTION DIMENSIONS.

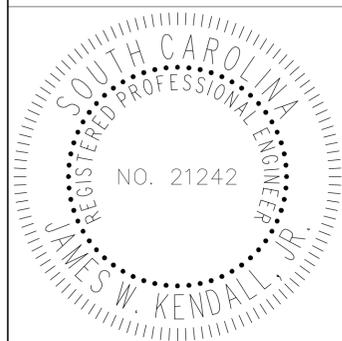
REFERENCES

NATIONAL DOCUMENTS

SCDOT DOCUMENTS

WQM

RELATED DRAWINGS & KEYWORDS



SIGNATURE

11/18/2016
DATE

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#	DATE	CHK	DESCRIPTION

SCDOT
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DESIGN STANDARDS OFFICE
955 PARK STREET
ROOM 405
COLUMBIA, SC 29201

STANDARD DRAWING
OUTLET PROTECTION
WITH DEFINED
CHANNEL

804-310-00

EFFECTIVE LETTING DATE | JULY 2017

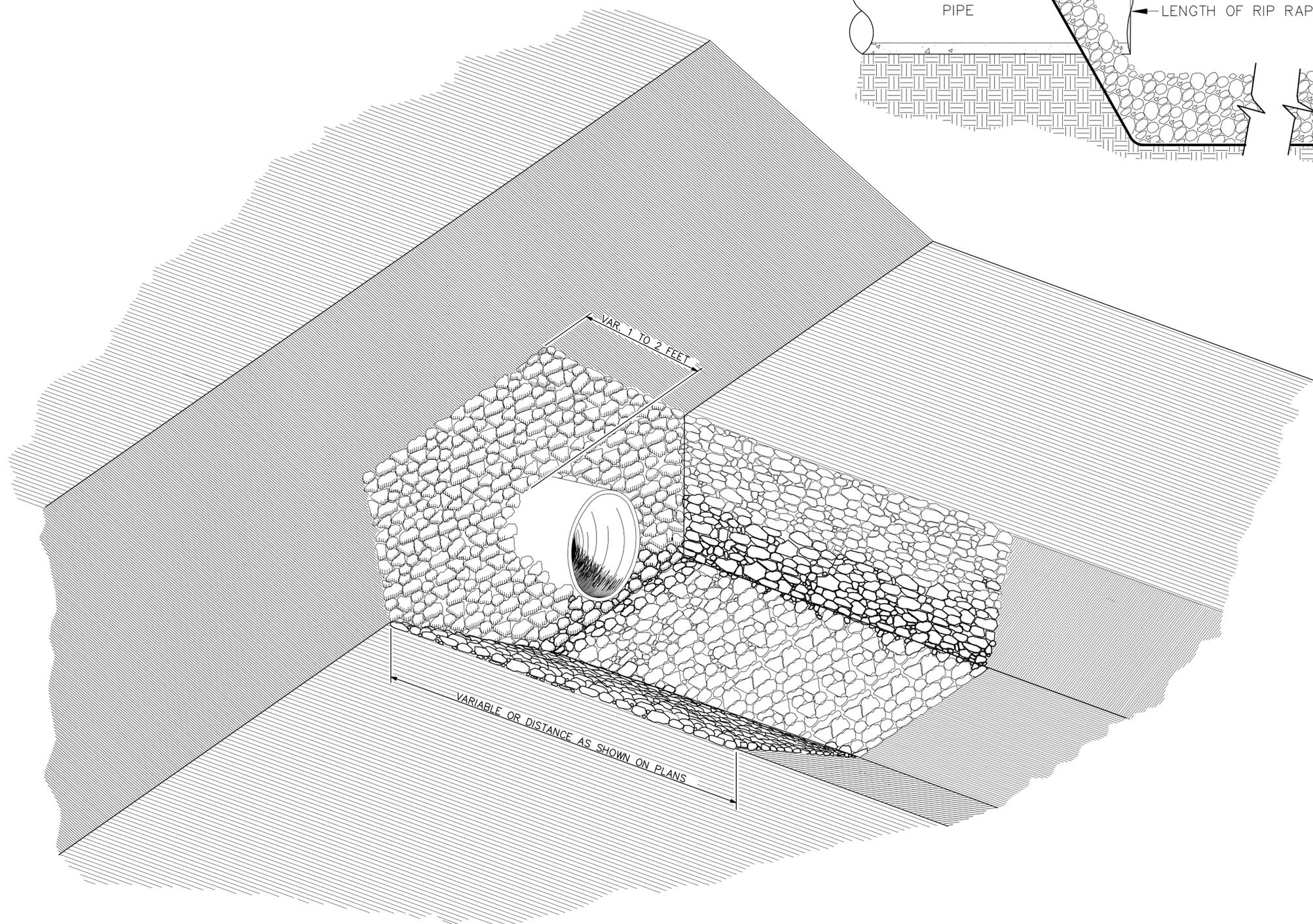
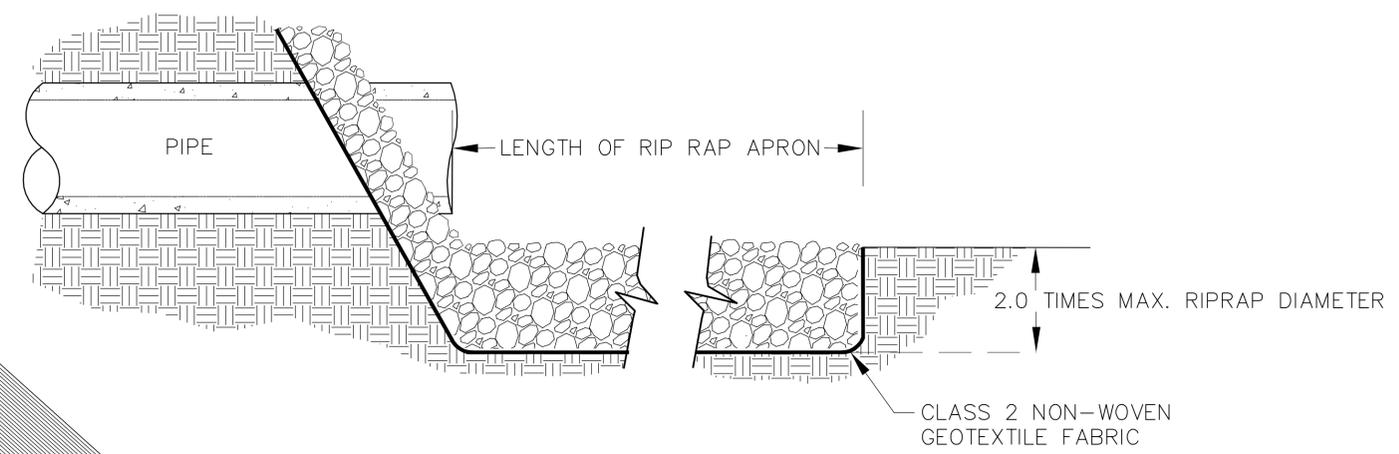
CHART 804-310A
SLOPE STABILIZATION RIPRAP PLACEMENT WITH
MINIMUM TAILWATER

MINIMUM CLASS*	D ₅₀ (FT)	MINIMUM THICKNESS (FT)	OUTSIDE PIPE DIAMETER
A	0.50	1.00	UP TO 24"
B	0.75	1.50	UP TO 84"
C	1.30	2.60	LARGER THAN 84"

*WHEN RIPRAP CHANNEL IS PRESENT, USE SAME CLASS OF RIPRAP ON SLOPE AS SPECIFIED FOR CHANNEL ON THE PLANS.

NOTES:

1. CLASS 2 NON-WOVEN GEOTEXTILE FABRIC TO BE USED UNDER RIPRAP.
2. SEE STANDARD DRAWINGS SECTION 719-600-00 FOR ADDITIONAL PIPE END TREATMENT OPTIONS.
3. THE PAY ITEMS SHALL BE:
2031000 UNCLASSIFIED EXCAVATION _____ CY
8041010 RIPRAP (CLASS A) _____ TON
8041020 RIPRAP (CLASS B) _____ TON
8041030 RIPRAP (CLASS C) _____ TON
8042800 GEOTEXTILE FABRIC FOR EROSION CONTROL UNDER RIPRAP (CLASS 2) _____ SY



THIS DRAWING IS NOT TO SCALE

REFERENCES

NATIONAL DOCUMENTS	

SCDOT DOCUMENTS	
SC-N-815-8	QPL 57
RELATED DRAWINGS & KEYWORDS	

INSTALLATION:

1. FILTER FABRIC IS USED FOR INLET PROTECTION WHEN STORMWATER FLOWS ARE RELATIVELY SMALL (1.0 CFS OR LESS) WITH LOW VELOCITIES, WHERE THE INLET DRAINS AREA HAS GRADES NO GREATER THAN 5% AND THE IMMEDIATE DRAINAGE AREA AROUND THE INLET (5 FOOT RADIUS) HAS GRADES LESS THAN 1%. DO NOT USE IN AREAS RECEIVING CONCENTRATED FLOW OR WHERE DITCHES ARE PAVED. A TRENCH SHALL BE EXCAVATED 6 INCHES WIDE AND 6 INCHES DEEP AROUND THE OUTER PERIMETER OF THE STAKES UNLESS FABRIC IS PNEUMATICALLY INSTALLED.
2. FILTER FABRIC SHALL CONFORM TO SCDOT STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION (LATEST EDITION). FILTER FABRIC SHALL EXTEND A MINIMUM OF 12 INCHES INTO THE TRENCH. THE TRENCH SHALL BE BACKFILLED WITH SOIL OR CRUSHED STONE AND COMPACTED OVER THE FILTER FABRIC UNLESS FABRIC IS PNEUMATICALLY INSTALLED.
3. USE STEEL POSTS WITH A MINIMUM POST LENGTH OF 5 FEET CONSISTING OF STANDARD "T" SECTIONS WITH A WEIGHT OF 1.25 POUNDS PER FOOT (±8%). THE HEIGHT OF THE FILTER BARRIER ABOVE GROUND SHALL BE A MINIMUM OF 24 INCHES. POSTS SHALL BE SPACED AROUND THE PERIMETER OF THE INLET A MAXIMUM OF 2 FEET APART AND DRIVEN INTO THE GROUND A MINIMUM OF 24 INCHES. ATTACH FABRIC TO POSTS USING ONLY HEAVY DUTY PLASTIC TIES. ATTACH AT LEAST 4 EVENLY SPACED TIES IN A MANNER TO PREVENT SAGGING OR TEARING OF THE FABRIC.
4. FILTER FABRIC SHOULD BE IN A CONTINUOUS ROLL AND CUT TO THE LENGTH OF THE PROTECTED AREA TO AVOID THE USE OF JOINTS. WHEN JOINTS ARE NECESSARY, FILTER FABRIC SHOULD BE WRAPPED TOGETHER ONLY AT A SUPPORT POST WITH BOTH ENDS SECURELY FASTENED TO THE POST WITH A MINIMUM 6" INCH OVERLAP.
5. PROVIDE A FILTER FABRIC CAPABLE OF REDUCING EFFLUENT SEDIMENT CONCENTRATIONS BY NOT LESS THAN 80% UNDER TYPICAL SEDIMENT MIGRATION CONDITIONS.

INSPECTION AND MAINTENANCE:

1. INSPECTIONS SHOULD BE MADE EVERY SEVEN (7) CALENDAR DAYS. ANY NEEDED REPAIRS SHOULD BE HANDLED IMMEDIATELY.
2. IF THE FABRIC BECOMES CLOGGED, IT SHOULD BE REPLACED.
3. SEDIMENT SHOULD BE REMOVED WHEN IT REACHES APPROXIMATELY 1/3 THE HEIGHT OF THE FILTER FABRIC. IF A SUMP IS USED, SEDIMENT SHOULD BE REMOVED WHEN IT FILLS APPROXIMATELY 1/3 THE DEPTH OF THE HOLE. MAINTAIN THE POOL AREA. ALWAYS PROVIDING ADEQUATE SEDIMENT STORAGE VOLUME FOR THE NEXT STORM. TAKE CARE NOT TO DAMAGE OR UNDERCUT FABRIC WHEN REMOVING SEDIMENT. CLEANING INLET STRUCTURE FILTERS IS PAID FOR EACH (EA) FILTER CLEANED OF DEPOSITED SEDIMENT FROM THE AREA ADJACENT TO EACH INLET STRUCTURE FILTER.
4. STORM DRAIN INLET PROTECTION STRUCTURES SHOULD BE REMOVED ONLY AFTER THE DISTURBED AREAS ARE PERMANENTLY STABILIZED. REMOVE ALL CONSTRUCTION MATERIAL AND SEDIMENT, AND DISPOSE OF THEM PROPERLY. GRADE THE DISTURBED AREA TO DRAIN. USE APPROPRIATE PERMANENT STABILIZATION METHODS TO STABILIZE BARE AREAS AROUND THE INLET.
5. THE PAY ITEMS SHALL BE:
8156219 INLET STRUCTURE FILTER TYPE A_____LF
8154155 CLEANING INLET STRUCTURE FILTERS_____EA

PRECONSTRUCTION SUPPORT ENGINEER



SIGNATURE

DATE

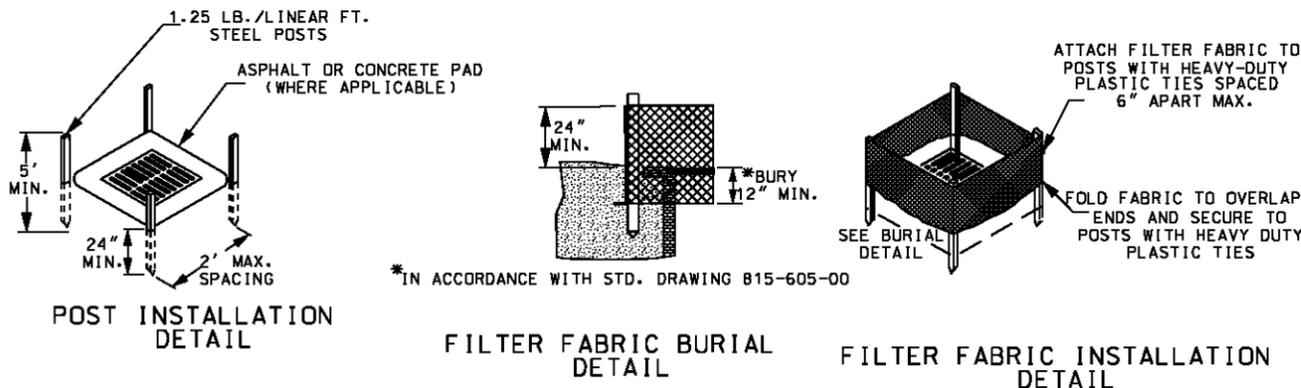
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2	8/2016	DSO	GENERAL REVISIONS
1	8/2012	DSO	UPDATED DIMENSIONS AND NOTES
0	3/2008	DSO	GENERAL REVISIONS
#	DATE	CHK	DESCRIPTION

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DESIGN STANDARDS OFFICE
 955 PARK STREET
 ROOM 405
 COLUMBIA, SC 29201

STANDARD DRAWING
 TYPE A
 INLET STRUCTURE
 FILTERS

815-001-01

EFFECTIVE LETTING DATE | JUL 2017 THIS DRAWING IS NOT TO SCALE



POST INSTALLATION DETAIL

FILTER FABRIC BURIAL DETAIL

FILTER FABRIC INSTALLATION DETAIL

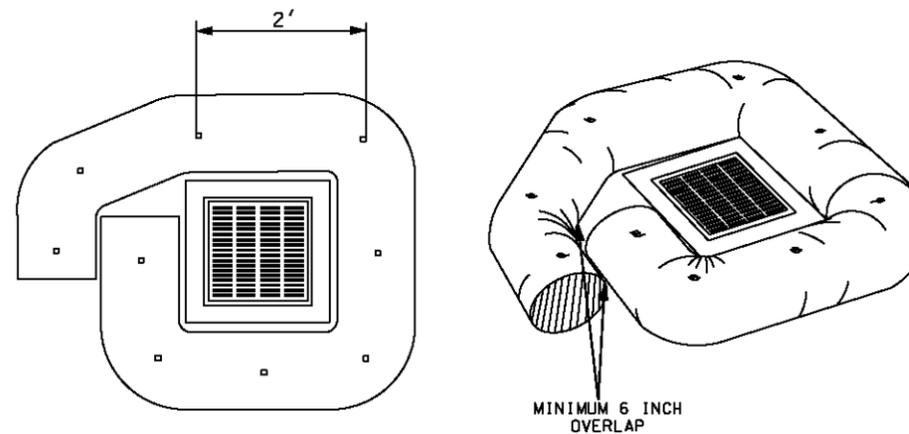
TYPE A
 LOW FLOW INLET FILTERS
 (FILTER FABRIC INLET PROTECTION)

INSTALLATION:

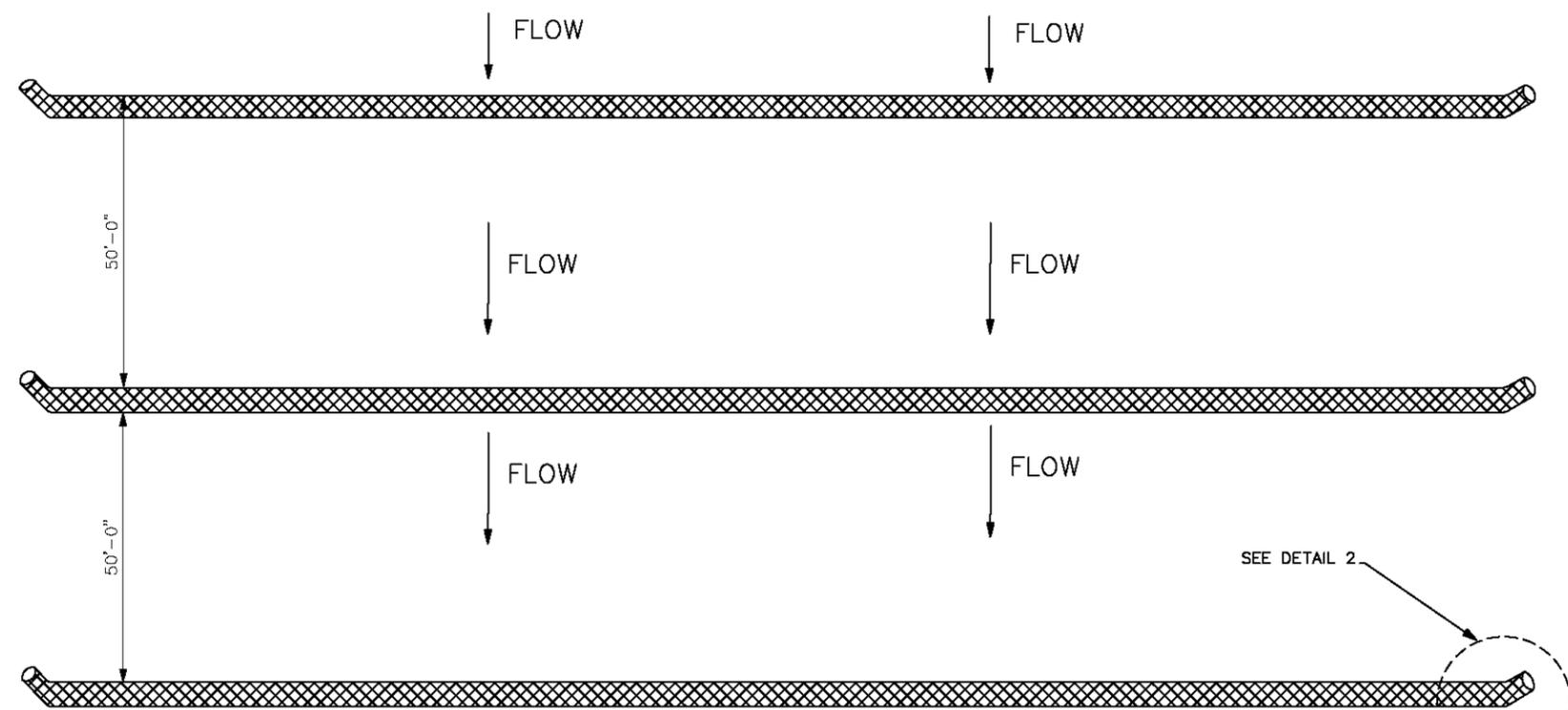
1. INSTALL SEDIMENT TUBES BY LAYING THEM FLAT ON THE GROUND. CONSTRUCT A SMALL TRENCH TO A DEPTH THAT IS 20% OF THE SEDIMENT TUBE DIAMETER. LAY THE SEDIMENT TUBE IN THE TRENCH AND COMPACT THE UPSTREAM SEDIMENT TUBE/SOIL INTERFACE. INSTALL ALL SEDIMENT TUBES SO NO GAPS EXIST BETWEEN THE SOIL AND THE BOTTOM OF THE SEDIMENT TUBE. LAP THE ENDS OF ADJACENT SEDIMENT TUBES A MINIMUM OF 6 INCHES TO PREVENT FLOW AND SEDIMENT FROM PASSING THROUGH THE FIELD JOINT. NEVER STACK SEDIMENT TUBES ON TOP OF ONE ANOTHER.
2. SHOULD SEDIMENT TUBE BECOME DAMAGED DURING INSTALLATION, PLACE A STAKE ON BOTH SIDES OF THE DAMAGED AREA TERMINATING THE TUBE SEGMENT AND INSTALL A NEW TUBE SEGMENT.
3. INSTALL SEDIMENT TUBES USING WOODEN STAKES WITH A MINIMUM POST LENGTH OF 4 FEET AND A MINIMUM MEASURED DIMENSION OF 3/4" X 3/4" AND A MAXIMUM MEASURED DIMENSION OF 2" X 2", OR USING STEEL POSTS (1.25lbs./linear foot). USE STEEL POSTS WITHOUT A SOIL PLATE AND PAINTING IS NOT REQUIRED. SPACE POSTS OR STAKES ON 2-FOOT CENTERS AND DRIVE THEM INTO THE GROUND TO A MINIMUM DEPTH OF 2 FEET. INSTALL THE STAKES ON THE DOWNSTREAM (1/3) OF THE SEDIMENT TUBE. ENSURE THE AREAS FOR STAKE INSTALLATION ARE COMPACTED SO THE POSTS ARE PROPERLY INSTALLED.

INSPECTION AND MAINTENANCE:

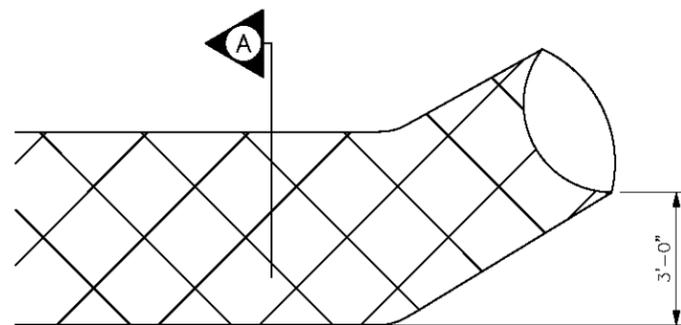
1. INSPECT SEDIMENT TUBES AFTER INSTALLATION FOR GAPS UNDER THE SEDIMENT TUBES AND FOR GAPS BETWEEN THE JOINTS OF ADJACENT ENDS OF SEDIMENT TUBES. REPAIR RILLS, GULLIES, AND ALL UNDERCUTTING NEAR SEDIMENT TUBES. INSPECT SEDIMENT TUBES EVERY 7 DAYS.
2. REMOVE SEDIMENT WHEN IT REACHES APPROXIMATELY 1/3 HEIGHT OF THE INLET STRUCTURE FILTER. IF A SUMP IS USED, REMOVE SEDIMENT WHEN IT FILLS APPROXIMATELY 1/3 THE DEPTH OF THE HOLE. MAINTAIN THE POOL AREA. ALWAYS PROVIDING ADEQUATE SEDIMENT STORAGE VOLUME FOR THE NEXT STORM EVENT. CLEANING INLET STRUCTURE FILTER IS PAID FOR EACH (EA) FILER CLEANED OF DEPOSITED SEDIMENT FROM THE AREA ADJACENT TO EACH INLET STRUCTURE FILTER.
3. REMOVE AND/OR REPLACE INSTALLED SEDIMENT TUBES AS REQUIRED TO ADAPT TO CHANGING CONSTRUCTION SITE CONDITIONS.
4. REMOVE ALL SEDIMENT TUBES FROM THE SITE WHEN THE FUNCTIONAL LONGEVITY IS EXCEEDED AS DETERMINED BY THE ENGINEER, INSPECTOR, OR MANUFACTURER'S REPRESENTATIVE.
5. DISPOSE OF SEDIMENT TUBES BY REGULAR MEANS AS NON-HAZARDOUS, INERT MATERIAL.
6. THE PAY ITEMS SHALL BE:
8156219 INLET STRUCTURE FILTER TYPE A_____LF
8154155 CLEANING INLET STRUCTURE FILTERS_____EA



TYPE A
 LOW FLOW INLET FILTERS
 (SEDIMENT TUBE INLET PROTECTION)



DETAIL 1
SCALE: 1" = 30'-0"
PLAN VIEW

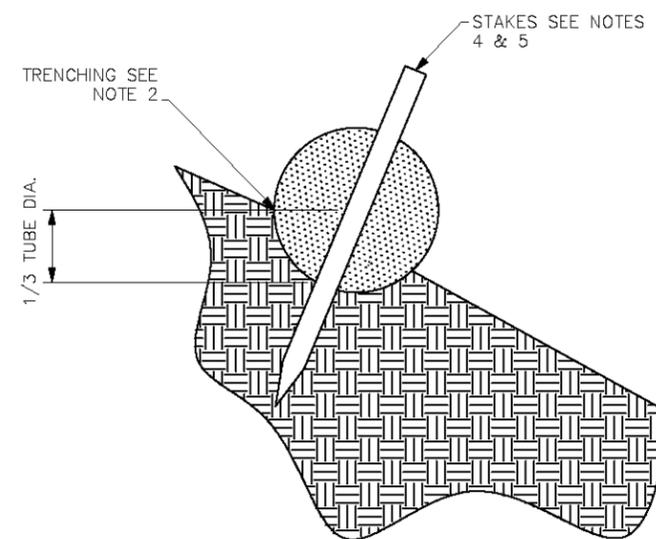


DETAIL 2

END VIEW OF TYPE F SLOPE INTERRUPTION DEVICE

NOTES:

1. INSTALL ALL NON-WEIGHTED INLET TUBES FOR SLOPE INTERRUPTION DEVICES FOR HECP APPLICATION PRIOR TO THE HECP INSTALLATION.
2. EXCAVATE A TRENCH ALONG (PARALLEL) THE CONTOUR OF THE SLOPE TO A DEPTH THAT IS $\frac{1}{2}$ THE TUBE DIAMETER. PLACE THE EXCAVATED SOIL ON THE UP-SLOPE SIDE OF THE TRENCH. PLACE THE SLOPE INTERRUPTION DEVICE INTO THE TRENCH SO IT CONTOURS TO THE SOIL SURFACE, ENSURING NO GAPS EXISTS UNDERNEATH THE TUBE. COMPACT THE EXCAVATED SOIL AGAINST THE TUBE ON THE UP-SLOPE SIDE. ENSURE THE INSTALLATION OF THE SLOPE INTERRUPTION DEVICE DOES NOT DAMAGE THE PREPARED SEEDBED.
3. INSTALL NON-WEIGHTED INLET TUBES SLOPE INTERRUPTION DEVICES FOR ECB APPLICATION AFTER THE ECB INSTALLATION ON TOP OF THE ECB. TUBE TRENCHING IS NOT REQUIRED FOR ECB APPLICATIONS. ENSURE THE INSTALLATION OF THE SLOPE INTERRUPTION DEVICE DOES NOT DAMAGE THE INSTALLED ECB.
4. INSTALL NON-WEIGHTED INLET TUBE FOR SLOPE INTERRUPTION DEVICES USING WOODEN STAKES WITH A MINIMUM LENGTH OF 3' WITH A MINIMUM MEASURED DIMENSION OF $\frac{3}{4}$ " X $\frac{3}{4}$ " AND A MAXIMUM MEASURED DIMENSION OF 1" X 1". DO NOT USE STEEL POSTS FOR THIS APPLICATION. INSTALL A STAKE AT EACH END OF EACH TUBE AND SPACE STAKES ON MAXIMUM 4' CENTERS. DRIVE STAKES INTO THE GROUND PERPENDICULAR TO THE SLOPE TO A DEPTH OF 2' OR TO THE MAXIMUM EXTENT PRACTICABLE.
5. INSTALL THE STAKES THROUGH THE CENTER OF THE NON-WEIGHTED TUBE.
6. ABUT ADJACENT TUBES TIGHTLY, END TO END, WITHOUT OVERLAPPING THE ENDS. TIE THE TUBE ENDS TOGETHER USING HEAVY TWINE OR PLASTIC LOCKING TIES. TURN ENDS UP OF INTERRUPTION DEVICES UP SLOPE TO ENSURE CONTAINMENT AND THE PREVENTION OF CHANNELING OF RUNOFF.
7. ENSURE THE AREAS FOR POST INSTALLATION ARE COMPACTED SO THE POSTS ARE PROPERLY INSTALLED.
8. PAY SHALL BE:
8152006 INLET STRUCTURE FILTER TYPE F (nonweighted) _____ LF



SECTION A
TYPE F SLOPE INTERRUPTION DEVICE CROSS SECTION

REFERENCES

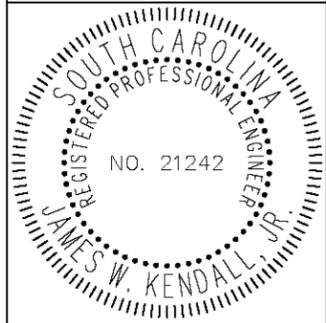
NATIONAL DOCUMENTS

SCDOT DOCUMENTS

SC-M-815-8
QPL 58

RELATED DRAWINGS & KEYWORDS

THIS DRAWING IS ONLY VALID FOR CONSTRUCTION WHEN SEALED AND SIGNED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF SOUTH CAROLINA. CHECK WWW.SCDOT.ORG FOR LATEST UPDATE.



SIGNATURE _____
DATE _____

#	DATE	CHK	DESCRIPTION
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1	8/2016	DSO	3 TYPOS; 1 PAY #
0	8/2012	DSO	NEW DRAWING



STANDARD DRAWING
TYPE F SLOPE INTERRUPTION DEVICE

815-001-02
EFFECTIVE LETTING DATE JUL 2017

GENERAL NOTES:

1. THESE ARE APPLICABLE FOR INLETS WITH PEAK FLOW RATES LESS THAN 3 CFS WHERE THE INLET DRAIN AREA HAS GRADES LESS THAN 5%. FLOW VELOCITIES TO THE INLET MAY NOT EXCEED 3 FEET PER SECOND. USE THESE WHERE OVERFLOW CAPACITY IS NOT REQUIRED TO PREVENT EXCESSIVE PONDING AROUND THE STRUCTURE.

INSTALLATION:

- HARDWARE FABRIC, OR COMPARABLE WIRE MESH, WITH A MAXIMUM OF 0.5 INCH X 0.5 INCH OPENINGS SHALL BE USED AS THE SUPPORTING MATERIAL AND SHALL BE EXTENDED A MINIMUM 6 INCHES INTO THE GROUND.
- POSTS SHALL BE 1.25 LB./LINEAR FOOT STEEL POSTS WITH A MINIMUM POST LENGTH OF 48 INCHES. THE HEIGHT OF THE HARDWARE FABRIC ABOVE GRADE SHALL BE A MINIMUM OF 18 INCHES.
- THE STEEL POSTS SHALL BE SPACED A MAXIMUM OF 2 FEET APART AROUND THE PERIMETER OF THE INLET AND DRIVEN INTO THE GROUND A MINIMUM OF 18 INCHES.
- HEAVY DUTY WIRE TIES SPACED A MAXIMUM OF 6 INCHES APART SHALL BE USED TO ATTACH THE HARDWARE FABRIC MATERIAL TO THE STEEL POSTS.
- THE STONE SHALL CONSIST OF AGGREGATE NO. 5 OR NO. 57 WASHED STONE AND SHALL EXTEND TO A MINIMUM HEIGHT OF 12 INCHES AND SHALL NOT EXCEED 24 INCHES AGAINST ALL 4 SIDES OF THE HARDWARE FABRIC.

INSPECTION AND MAINTENANCE:

- INSPECTIONS SHOULD BE MADE EVERY SEVEN (7) CALENDAR DAYS. ANY NEEDED REPAIRS SHOULD BE HANDLED IMMEDIATELY.
- SEDIMENT SHOULD BE REMOVED WHEN IT REACHES APPROXIMATELY 1/3 THE HEIGHT OF THE STRUCTURE. IF A SUMP IS USED, SEDIMENT SHOULD BE REMOVED WHEN IT FILLS APPROXIMATELY 1/3 THE DEPTH OF THE HOLE. MAINTAIN THE POOL AREA, ALWAYS PROVIDING ADEQUATE SEDIMENT STORAGE VOLUME FOR THE NEXT STORM. CLEANING INLET STRUCTURE FILTERS IS PAID FOR EACH (EA) FILTER CLEANED OF DEPOSITED SEDIMENT FROM THE AREA ADJACENT TO EACH INLET STRUCTURE FILTER.
- IF THE STONE BECOMES CLOGGED WITH SEDIMENT, THE STONES MUST BE PULLED AWAY FROM THE INLET AND CLEANED OR REPLACED. SINCE CLEANING OF GRAVEL AT A CONSTRUCTION SITE MAY BE DIFFICULT, AN ALTERNATIVE APPROACH WOULD BE TO REMOVE THE CLOGGED STONE AS FILL AND PUT FRESH STONE AROUND THE INLET. NO SEPARATE MEASUREMENT OR PAYMENT WILL BE MADE FOR THIS WORK.
- STORM DRAIN INLET PROTECTION STRUCTURES SHOULD BE REMOVED ONLY AFTER THE DISTURBED AREAS ARE PERMANENTLY STABILIZED. REMOVE ALL CONSTRUCTION MATERIAL AND SEDIMENT, AND DISPOSE OF THEM PROPERLY. GRADE THE DISTURBED AREA TO DRAIN. STABILIZE ALL BARE AREAS IMMEDIATELY.
- THE PAY ITEMS SHALL BE:
 8156210 INLET STRUCTURE FILTER TYPE B _____EA
 8154155 CLEANING INLET STRUCTURE FILTERS _____EA

GENERAL NOTES:

TYPE D INLET FILTERS ARE APPLICABLE FOR DRAINAGE AREAS UP TO 2 ACRES WITH PEAK FLOW RATES GREATER THAN 3 CFS AND DRAINAGE AREAS WITH GRADES GREATER THAN 5%. FLOW VELOCITIES MAY EXCEED 3 FEET PER SECOND. HIGH FLOW, HIGH VELOCITY INLET FILTERS ARE PREFABRICATED AND WILL DIFFER ACCORDING TO THE TYPE OF DRAIN BEING PROTECTED.

THEY EXHIBIT THE FOLLOWING PROPERTIES:

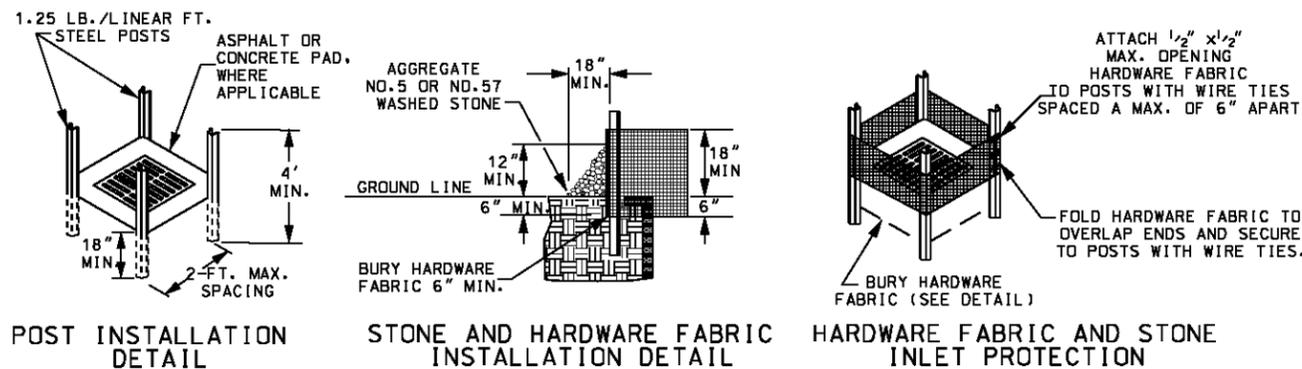
- COMPOSED OF A GEOTEXTILE FABRIC CONNECTED TO A RIGID STRUCTURE. THE GEOTEXTILE FABRIC IS NON-BIODEGRADABLE, RESISTANT TO DEGRADATION BY ULTRAVIOLET EXPOSURE, AND RESISTANT TO CONTAMINANTS COMMONLY ENCOUNTERED IN STORMWATER.
- PROVIDE A RIGID STRUCTURE RESISTANT TO DEGRADATION BY ULTRAVIOLET EXPOSURE AND RESISTANT TO CONTAMINANTS COMMONLY ENCOUNTERED IN STORMWATER. PROVIDE A RIGID STRUCTURE THAT IS REUSABLE. DO NOT USE RIGID STRUCTURES COMPOSED OF STEEL, REBAR, CONCRETE OR WOOD.
- PROVIDE A FILTER FABRIC CONSTRUCTED TO PROVIDE A DIRECT FIT ADJACENT TO THE ASSOCIATED RIGID STRUCTURE AND IS CAPABLE OF REDUCING EFFLUENT SEDIMENT CONCENTRATIONS BY NOT LESS THAN 80% UNDER TYPICAL SEDIMENT MIGRATION CONDITIONS.
- HIGH FLOW, HIGH VELOCITY INLET FILTERS HAVE A TWO STAGE DESIGN. THE FIRST STAGE CONVEYS NORMAL FLOWS AT A MINIMUM CLEAN WATER FLOW RATE OF 100 GALLONS PER MINUTE PER SQUARE FOOT. THE SECOND STAGE CONVEYS HIGH FLOW RATES, WITH A MINIMUM APPARENT OPENING OF 0.5 INCH PER SQUARE INCH (NUMBER 12 STANDARD SIEVE OPENING).
- TYPE D1 INLET FILTERS HAVE A FIRST STAGE MINIMUM HEIGHT OF 9 INCHES AND A MAXIMUM HEIGHT OF 12 INCHES IN ORDER TO ALLOW GREATER OVERFLOW CAPACITY AND PREVENT PONDING IN THE MEDIAN.
- TYPE D2 INLET STRUCTURE FILTERS USED FOR SUMP APPLICATIONS HAVE A FIRST STAGE MINIMUM HEIGHT OF 12" AND A FIRST STAGE MAXIMUM HEIGHT OF 30" IN ORDER TO ALLOW GREATER PONDING IN THE SUMP.
- HIGH FLOW, HIGH VELOCITY INLET FILTERS COMPLETELY SURROUND THE INLET.
- HIGH FLOW, HIGH VELOCITY INLET FILTERS HAVE LIFTING DEVICES OR STRUCTURES TO ASSIST IN THE INSTALLATION AND TO ALLOW INSPECTION OF THE STORMWATER SYSTEM.
- INLET STRUCTURE FILTER TYPE D1 IS TO BE USED IN MEDIAN APPLICATIONS, WHILE TYPE D2 IS TO BE USED IN SUMP APPLICATIONS. TYPE D1 INLET STRUCTURE FILTERS WILL HAVE GREATER OVERFLOW CAPACITY AND LESS FILTRATION AREA THAN TYPE D2 IN ORDER TO PREVENT PONDING IN THE MEDIANS. BOTH TYPES OF THESE INLET FILTERS ARE CAPABLE OF PROTECTING INLET STRUCTURES NOT ASSOCIATED WITH CURB INLETS AND MAY INCLUDE BUT ARE NOT LIMITED TO CATCH BASIN TYPE 9, YARD INLETS, DI 24 INCHES BY 24 INCHES, DI 24 INCHES BY 36 INCHES, AND MANHOLES.

INSTALLATION:

1. INSTALL TYPE D INLET FILTERS IN ACCORDANCE WITH THE MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS. SECURE TYPE D INLET FILTERS WITH #5 OR #57 STONE AS BALLAST IN LIEU OF SOIL WHEN SOIL IS RECOMMENDED BY THE MANUFACTURER. PROPERLY INSTALL TYPE D INLET FILTERS SO THE INLET IS COMPLETELY ENCLOSED.

INSPECTION AND MAINTENANCE:

- INSPECT AFTER INSTALLATION TO INSURE THAT NO GAPS EXIST THAT MAY PERMIT SEDIMENT TO ENTER THE STORM DRAIN SYSTEM.
- INSPECTIONS SHOULD BE MADE EVERY SEVEN (7) CALENDAR DAYS. ANY NEEDED REPAIRS SHOULD BE HANDLED IMMEDIATELY.
- SEDIMENT SHOULD BE REMOVED WHEN IT REACHES APPROXIMATELY 1/3 THE HEIGHT OF THE FILTERS. CLEANING INLET STRUCTURE FILTERS IS PAID FOR EACH (EA) FILTER CLEANED OF DEPOSITED SEDIMENT FROM THE AREA ADJACENT TO EACH INLET STRUCTURE FILTER.
- CLEAN THE RIGID INLET PROTECTION FILTER MATERIAL WHEN IT BECOMES COVERED OR CLOGGED WITH DEPOSITED SEDIMENT.
- REPLACE THE RIGID INLET PROTECTION FILTER MATERIAL AS DIRECTED BY THE ENGINEER.
- THE PAY ITEMS SHALL BE:
 8156205 INLET STRUCTURE FILTER TYPE D1 _____EA
 8156207 FILTER MATERIAL FOR INLET STRUCTURE FILTER TYPE D1 _____EA
 8156215 INLET STRUCTURE FILTER TYPE D2 _____EA
 8156217 FILTER MATERIAL FOR INLET STRUCTURE FILTER TYPE D2 _____EA
 8154155 CLEANING INLET STRUCTURE FILTERS _____EA



**TYPE B
MEDIUM FLOW, LOW VELOCITY INLET FILTERS**

THIS DRAWING IS NOT TO SCALE

REFERENCES

NATIONAL DOCUMENTS
ASTM D1117-99

SCDOT DOCUMENTS

SC-M-815-B
QPL 58

RELATED DRAWINGS & KEYWORDS

**PRECONSTRUCTION
SUPPORT ENGINEER**



SIGNATURE

DATE

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2	8/2016	DSO	GENERAL REVISIONS
1	8/2012	DSO	UPDATED NOTES AND DETAIL
0	3/2008	DSO	GENERAL REVISIONS
#	DATE	CHK	DESCRIPTION



SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DESIGN STANDARDS OFFICE
955 PARK STREET
ROOM 405
COLUMBIA, SC 29201

STANDARD DRAWING

**TYPE B, D1, & D2
INLET STRUCTURE
FILTERS**

815-002-00

EFFECTIVE LETTING DATE | JUL 2017

REFERENCES

NATIONAL DOCUMENTS

SCDOT DOCUMENTS

SC-M-815-8
QPL 58

RELATED DRAWINGS & KEYWORDS

PRECONSTRUCTION
SUPPORT ENGINEER



SIGNATURE

DATE

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3	11/2016	DSO	GENERAL REVISIONS
2	8/2016	DSO	GENERAL REVISIONS
1	8/2012	DSO	ADDED AND UPDATED NOTES
0	3/2008	DSO	GENERAL REVISIONS
#	DATE	CHK	DESCRIPTION



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COLUMBIA, SC 29201

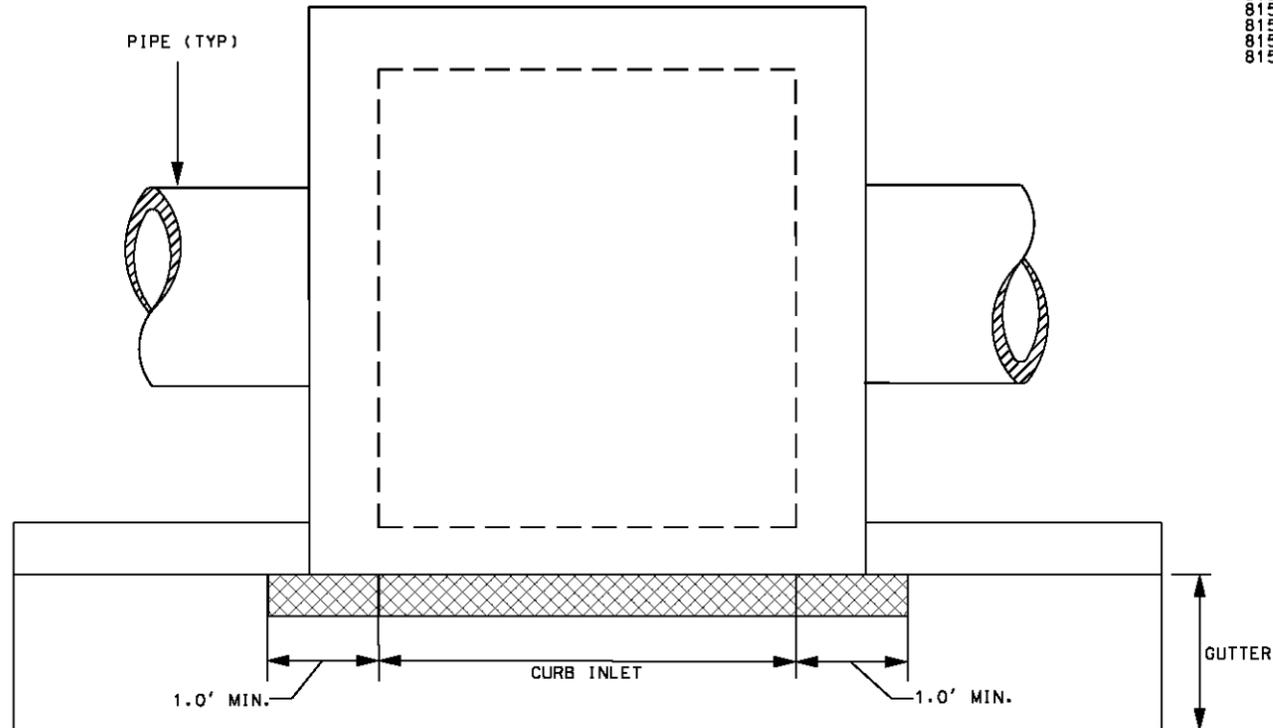
STANDARD DRAWING
TYPE E
INLET STRUCTURE
FILTERS

815-005-00

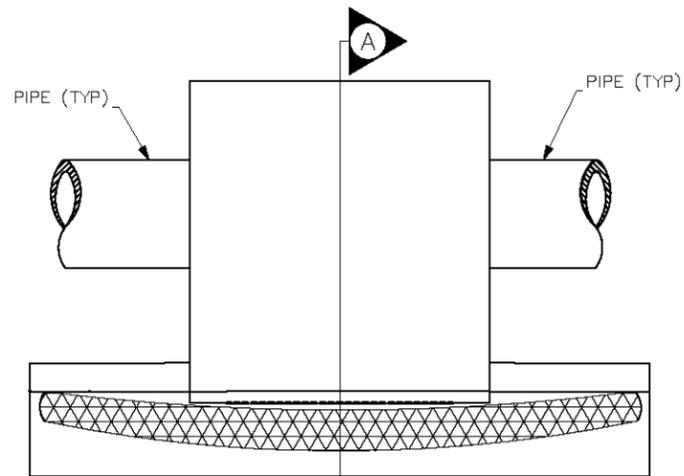
EFFECTIVE LETTING DATE | JUL 2017 THIS DRAWING IS NOT TO SCALE

NOTES:

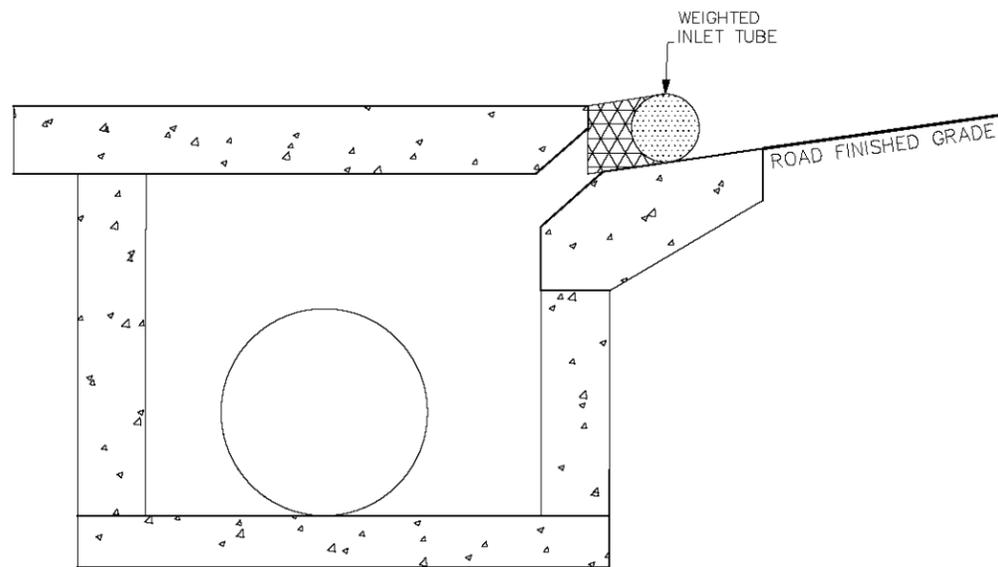
- DRAWING SHOWS TYPE 16 CATCH BASIN. TYPE E INLET STRUCTURE FILTERS ARE APPLICABLE FOR CATCH BASIN TYPE 1, 16, 17, AND 18 AFTER THE ROAD SURFACE COURSE IS PLACED.
- PLACE CURB INLET FILTER AS SHOWN IN AREA WHERE SEDIMENT MAY SPILL OVER SIDEWALK AND CURB AFTER BASE IS PLACED.
- PROVIDE A TYPE E SURFACE COURSE INLET FILTER COMPOSED OF A UNIFORM FILTER FABRIC COVERING AN INTERNAL FILTER MATERIAL WHICH HAS AGGREGATE COMPARTMENTS FOR STONE, SAND OR OTHER WEIGHTED MATERIALS, OR PHYSICAL MECHANISMS TO HOLD THE UNIT IN PLACE. FURNISH A TYPE E SURFACE COURSE INLET FILTER THAT HAS A MAXIMUM HEIGHT THAT DOES NOT COMPLETELY BLOCK THE INLET OPENING AND A MINIMUM LENGTH THAT IS 2' LONGER THAN THE LENGTH OF THE CURB OPENING FOR FILTERS THAT DO NOT USE A PHYSICAL MECHANISM TO HOLD THE UNIT IN PLACE. DO NOT COMPLETELY BLOCK THE INLET OPENING WITH TYPE E SURFACE COURSE FILTERS TO ENSURE OVERFLOW CAN ENTER THE INLET OPENING.
- PROVIDE A TYPE E SURFACE COURSE INLET FILTER COMPOSED OF A UNIFORM FILTER FABRIC THAT IS NON-BIODEGRADABLE AND RESISTANT TO DEGRADATION BY ULTRAVIOLET EXPOSURE AND RESISTANT TO CONTAMINANTS COMMONLY ENCOUNTERED IN STORMWATER. PROVIDE A TYPE E SURFACE COURSE INLET FILTER WITH FILTER MATERIAL THAT ALLOW STORMWATER TO FREELY FLOW WHILE TRAPPING SEDIMENT AND DEBRIS. ENSURE THAT THE FILTER MATERIAL IS RESISTANT TO CONTAMINANTS COMMONLY ENCOUNTERED IN STORMWATER. DO NOT USE STRAW BALES, PINE BALES, LEAF MULCH, OR GRASS CLIPPINGS AS FILTER MATERIALS.
- WHEN A TYPE E SURFACE COURSE INLET FILTER UTILIZES A RIGID STRUCTURE, PROVIDE A REUSABLE RIGID STRUCTURE RESISTANT TO DEGRADATION BY ULTRAVIOLET EXPOSURE AND RESISTANT TO CONTAMINANTS COMMONLY ENCOUNTERED IN STORMWATER. DO NOT USE RIGID STRUCTURES COMPOSED OF STEEL, RE-BAR, CONCRETE OR WOOD.
- PONDING IS LIKELY IF SEDIMENT IS NOT REMOVED REGULARLY. INSPECTION OF CURB INLET FILTER SHOULD BE MADE EVERY SEVEN (7) CALENDAR DAYS. ANY NEEDED REPAIRS SHOULD BE HANDLED IMMEDIATELY. THE CURB INLET FILTER SHOULD BE CLEANED IF A VISUAL INSPECTION SHOWS SILT AND DEBRIS BUILT UP AROUND THE FILTER. CLEANING INLET STRUCTURE FILTERS IS PAID FOR EACH (EA) FILTER CLEANED OF DEPOSITED SEDIMENT FROM THE AREA ADJACENT TO EACH INLET STRUCTURE FILTER.
- THE PAY ITEMS SHALL BE:
 8156211 INLET STRUCTURE FILTER - TYPE E (CATCH BASIN TYPE 1)-----EA
 8156212 INLET STRUCTURE FILTER - TYPE E (CATCH BASIN TYPE 16)-----EA
 8156213 INLET STRUCTURE FILTER - TYPE E (CATCH BASIN TYPE 17)-----EA
 8156214 INLET STRUCTURE FILTER - TYPE E (CATCH BASIN TYPE 18)-----EA
 8154155 CLEANING INLET STRUCTURE FILTERS-----EA



TOP VIEW



TOP VIEW
DETAIL 1

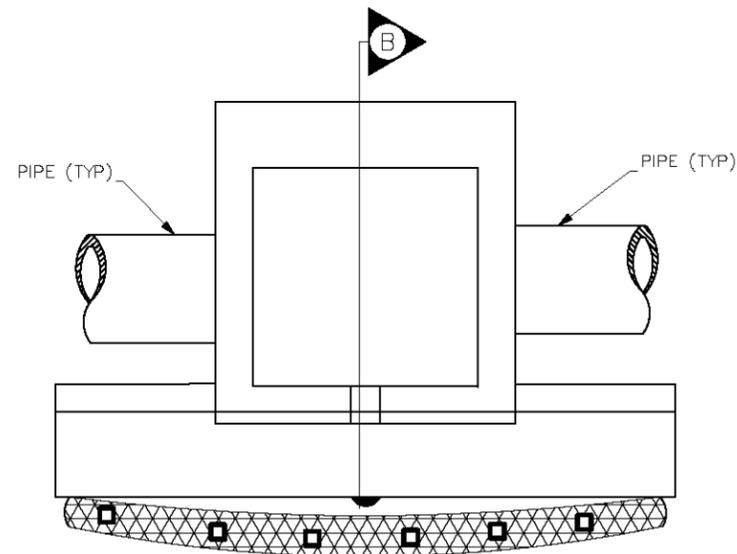


SECTION A
SIDE VIEW OF
CATCH BASIN &
TYPE F INLET STRUCTURE
FILTER

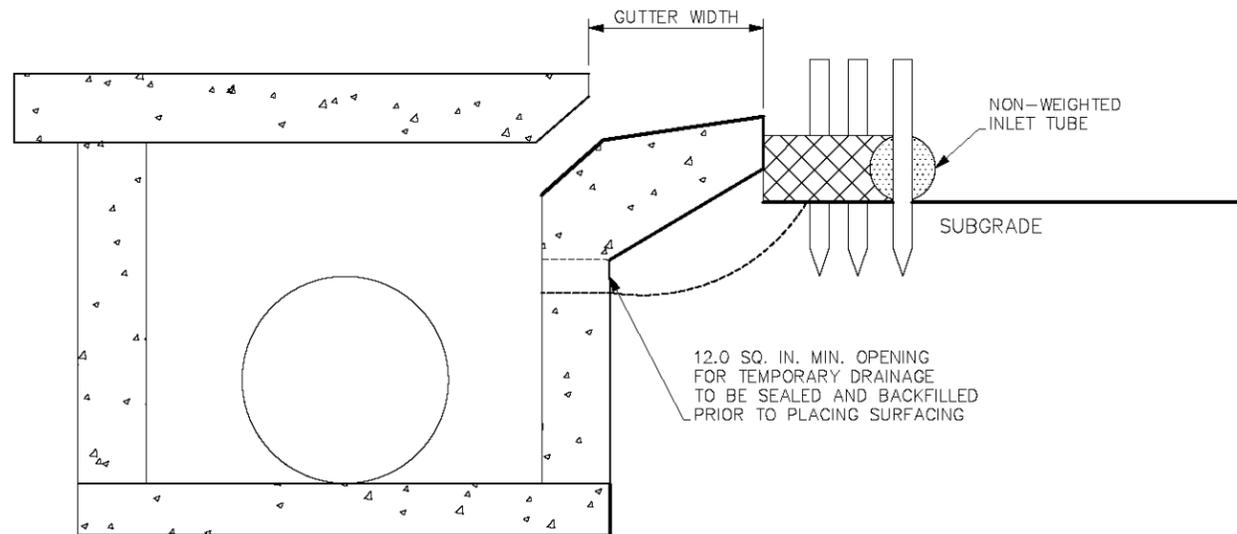
WEIGHTED INLET TUBE

NOTES:

- DRAWING SHOWS TYPE 16 CATCH BASIN.
- NON-WEIGHTED TUBES SHALL BE INSTALLED IMMEDIATELY AFTER GRADING AND CONSTRUCTION OF CATCH BASIN BOX. NON-WEIGHTED TUBES SHALL BE MAINTAINED DURING SUBGRADE AND BASE PREPARATION UNTIL BASE COURSE IS PLACED. THEY ARE APPLICABLE FOR CATCH BASIN TYPES 1, 16, 17, AND 18 WITH DRAINAGE AREAS LESS THAN 1 ACRE.
- INLET TUBES MAY BE TEMPORARILY MOVED DURING CONSTRUCTION AS NEEDED.
- CONSTRUCT A SMALL U-SHAPED TRENCH TO A DEPTH THAT IS 20% OF THE NON-WEIGHTED INLET TUBE DIAMETER. LAY THE INLET TUBE FLAT IN THE U-SHAPED TRENCH AND COMPACT THE UPSTREAM INLET TUBE SOIL INTERFACE.
- INSTALL NON-WEIGHTED INLET TUBES USING WOODEN STAKES WITH A MINIMUM LENGTH OF 3 FEET AND A MINIMUM MEASURED DIMENSION OF 3/4" X 3/4" AND A MAXIMUM MEASURED DIMENSION 2" X 2" OR 1.25 POUNDS PER FOOT STEEL POSTS WITH A MINIMUM LENGTH OF 3 FEET. USE STEEL POSTS WITHOUT A SOIL PLATE AND PAINTING IS NOT REQUIRED. SPACE POSTS OR STAKES ON 2 FOOT CENTERS AND DRIVE THEM INTO THE GROUND TO A MINIMUM DEPTH OF 2 FEET. INSTALL NON-WEIGHTED INLET TUBES SO THAT THE TOP IS BELOW THE TOP OF THE INSTALLED CURB LINE TO ENSURE THAT ALL OVERFLOW OR OVERTOPPING WATER HAS THE ABILITY TO ENTER THE INLET UNOBSTRUCTED.
- PLACE STAKES ON THE DOWNSTREAM SIDE OF THE NON-WEIGHTED INLET TUBE. REFER TO MANUFACTURER'S RECOMMENDATION FOR OTHER STAKING DETAILS.
- AFTER ROAD BASE COURSE IS PLACED, WEIGHTED INLET TUBES SHALL BE PLACED FOR CATCH BASIN TYPES 1, 9, 12, 14, 15, 16, 17, & 18. DI 24 INCHES X 24 INCHES, DI 24 INCHES X 36 INCHES, MANHOLES, AND TRENCH DRAINS. WEIGHTED INLET TUBES ARE APPLICABLE WHERE CONSTRUCTION TRAFFIC MAY OCCUR AROUND THE INLET.
- INSTALL WEIGHTED INLET TUBES LYING FLAT ON THE GROUND WITH NO GAPS BETWEEN THE UNDERLYING SURFACE AND THE TUBE.
- DO NOT COMPLETELY BLOCK INLETS WITH INLET TUBES. INSTALL WEIGHTED INLET TUBES IN SUCH A MANNER THAT ALL OVERFLOW CAN ENTER THE INLET UNOBSTRUCTED. TO AVOID POSSIBLE FLOODING, 2 OR 3 CONCRETE CINDER BLOCKS MAY BE PLACED BETWEEN THE WEIGHTED INLET TUBE AND THE INLET.
- FOR WEEP HOLE APPLICATIONS, BOTH WEIGHTED AND NON-WEIGHTED INLET TUBES ARE APPLICABLE.
- ALL WEIGHTED TYPE F INLET STRUCTURE FILTERS ARE APPLICABLE AS TYPE E INLET STRUCTURE FILTERS.
- REPLACE INLET TUBES DURING INSTALLATION AS DIRECTED BY THE ENGINEER, INSPECTOR, OR MANUFACTURER'S REPRESENTATIVE AT THE CONTRACTOR'S EXPENSE.
- ALL TYPE F INLET FILTERS SHALL BE INSPECTED EVERY 7 CALENDAR DAYS.
- THE PAY ITEMS SHALL BE:
8152004 INLET STRUCTURE FILTER TYPE F (WEIGHTED) LF
8152006 INLET STRUCTURE FILTER TYPE F (NON-WEIGHTED) LF
8154155 CLEANING INLET STRUCTURE FILTERS EA



TOP VIEW
DETAIL 2



SECTION B
SIDE VIEW OF
CATCH BASIN &
TYPE F INLET STRUCTURE
FILTER

NON-WEIGHTED INLET TUBE

REFERENCES

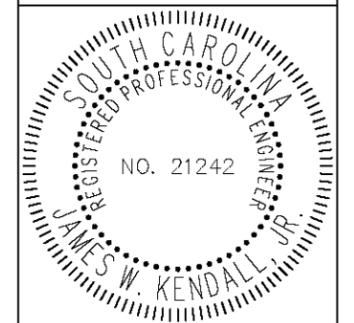
NATIONAL DOCUMENTS

SCDOT DOCUMENTS

SC-M-815-8
QPL 58

RELATED DRAWINGS & KEYWORDS

THIS DRAWING IS ONLY VALID FOR CONSTRUCTION WHEN SEALED AND SIGNED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF SOUTH CAROLINA. CHECK WWW.SCDOT.ORG FOR LATEST UPDATE.



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1	8/2016	DSO	TYPOS; PAY #
0	8/2013	DSO	UPDATED DRAWING



STANDARD DRAWING

TYPE F
INLET STRUCTURE
FILTERS

815-006-00

EFFECTIVE LETTING DATE JUL 2017

REFERENCES

NATIONAL DOCUMENTS

SCDOT DOCUMENTS

RELATED DRAWINGS & KEYWORDS

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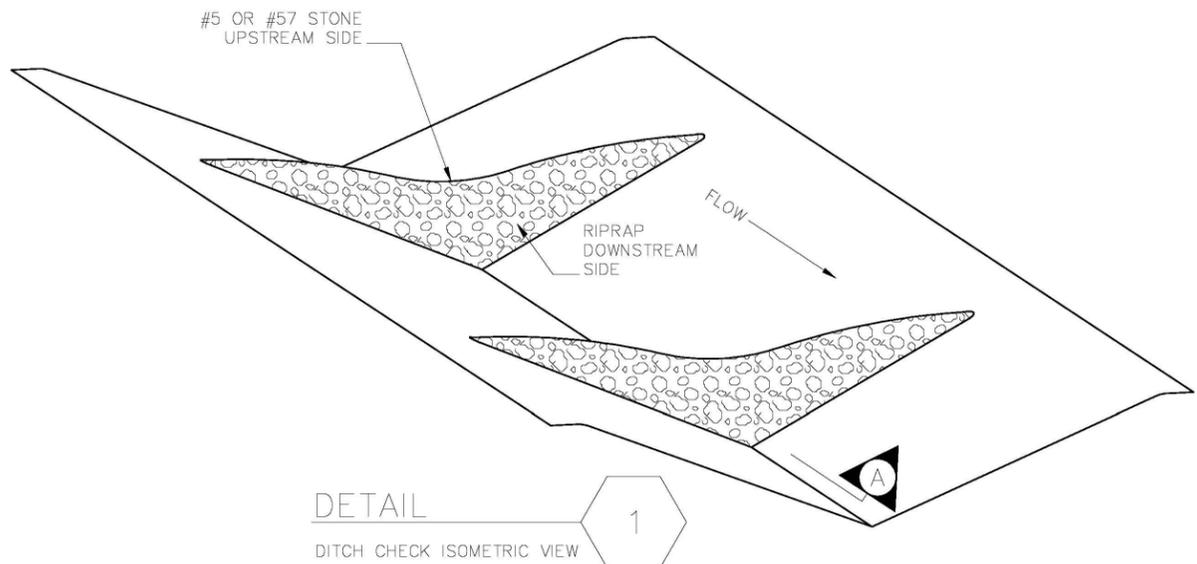
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SCDOT
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DESIGN STANDARDS OFFICE
955 PARK STREET
ROOM 405
COLUMBIA, SC 29201

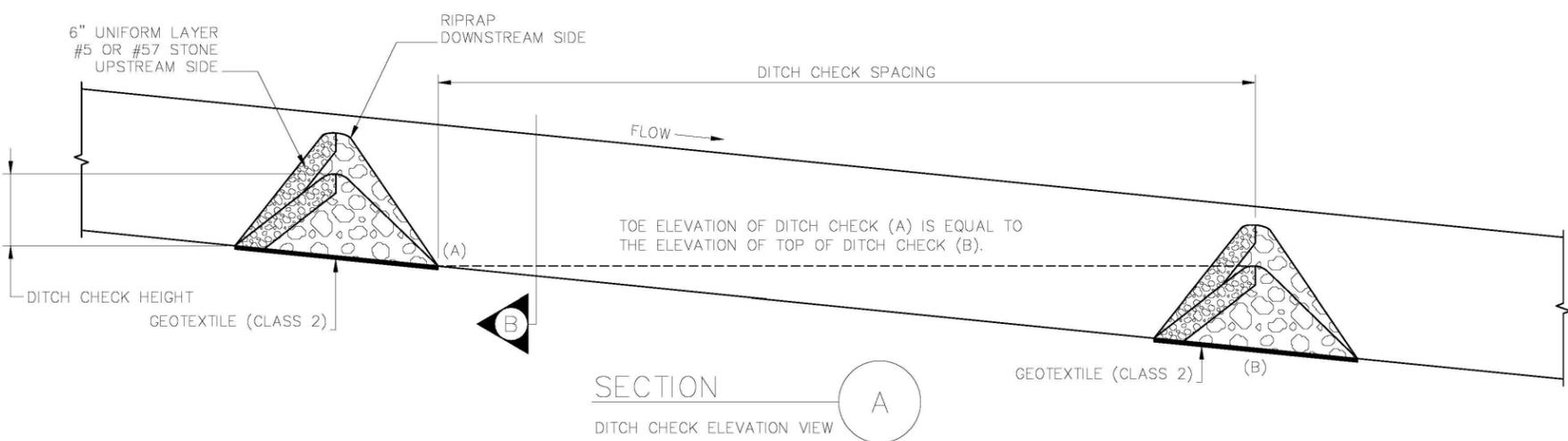
STANDARD DRAWING
DITCH CHECK

815-105-00
EFFECTIVE LETTING DATE JULY, 2017

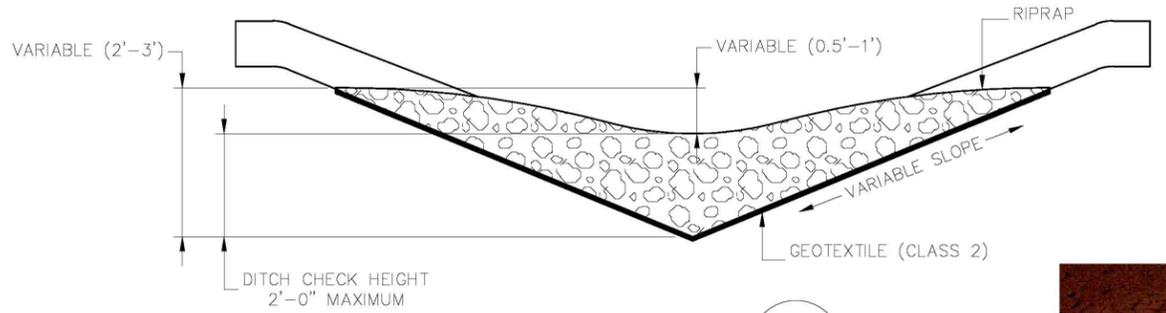


DETAIL
DITCH CHECK ISOMETRIC VIEW 1

- NOTES:**
- DITCH CHECK SHOULD NEVER BE USED IN LIVE STREAM.
 - DITCH CHECK IS NOT ADEQUATE FOR MORE THAN 2 ACRES OF DRAINAGE.
 - PLACE A CLASS 2 NON-WOVEN GEOTEXTILE FABRIC THAT MEETS THE REQUIREMENTS OF SECTION 804 BENEATH THE ROCK PRIOR TO INSTALLATION OF THE ROCK.
 - RIPRAP SHALL BE CLASS A.
 - RIPRAP MAY BE HAND PLACED OR MECHANICALLY PLACED AND SHAPED.
 - PLACE 6" UNIFORM LAYER OF AGGREGATE NO. 5 OR NO. 57 STONE ON THE UPSTREAM FACE OF ROCK DITCH CHECK.
 - SLOPES OF DITCH CHECK SHALL BE NO STEEPER THAN 2:1, BUT MAY BE FLATTENED DUE TO TRAFFIC SAFETY, AS DIRECTED BY THE ENGINEER.
 - HEIGHT OF DITCH CHECK SHALL BE NO MORE THAN 2.0 FEET.
 - DITCH CHECKS SHALL BE INSPECTED EVERY 7 DAYS.
 - REMOVE COLLECTED SEDIMENT IN FRONT OF DITCH CHECK AS DETERMINED BY THE ENGINEER. PAYMENT FOR REMOVAL AND DISPOSAL OF SEDIMENT WILL BE CLEANING SILT BASIN.
 - PAY ITEM SHALL BE:
 8041010 RIPRAP (CLASS A) _____ TON
 8042800 GEOTEXTILE FOR EROSION CONTROL UNDER RIPRAP (CLASS 2) _____ SY
 8154010 CLEANING SILT BASINS _____ CY
 8156410 AGGREGATE NO.5 OR NO.57 FOR EROSION CONTROL _____ TON

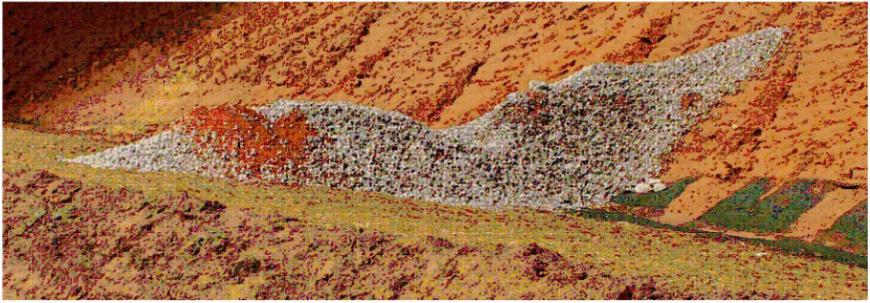
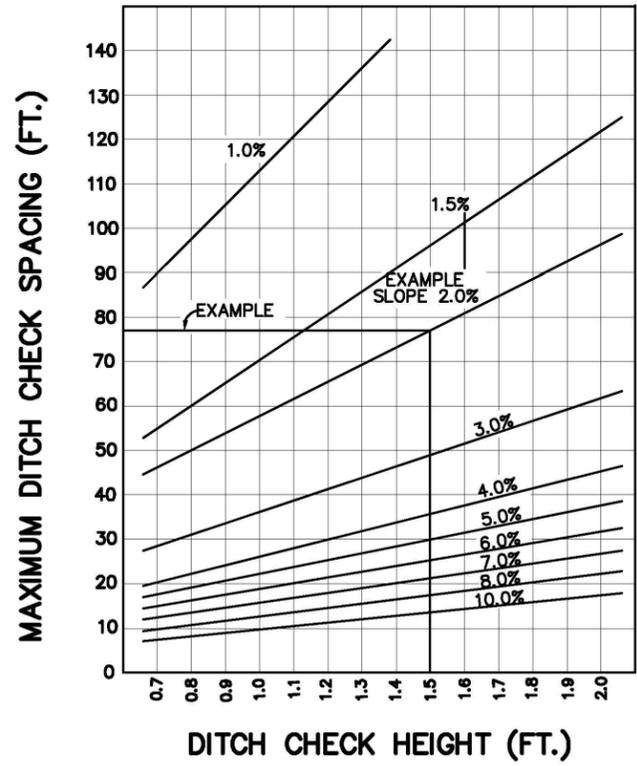


SECTION
DITCH CHECK ELEVATION VIEW A



SECTION
DITCH CHECK END VIEW B

DITCH CHECK SPACING



REFERENCES

NATIONAL DOCUMENTS	
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SCDOT DOCUMENTS	
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RELATED DRAWINGS & KEYWORDS	
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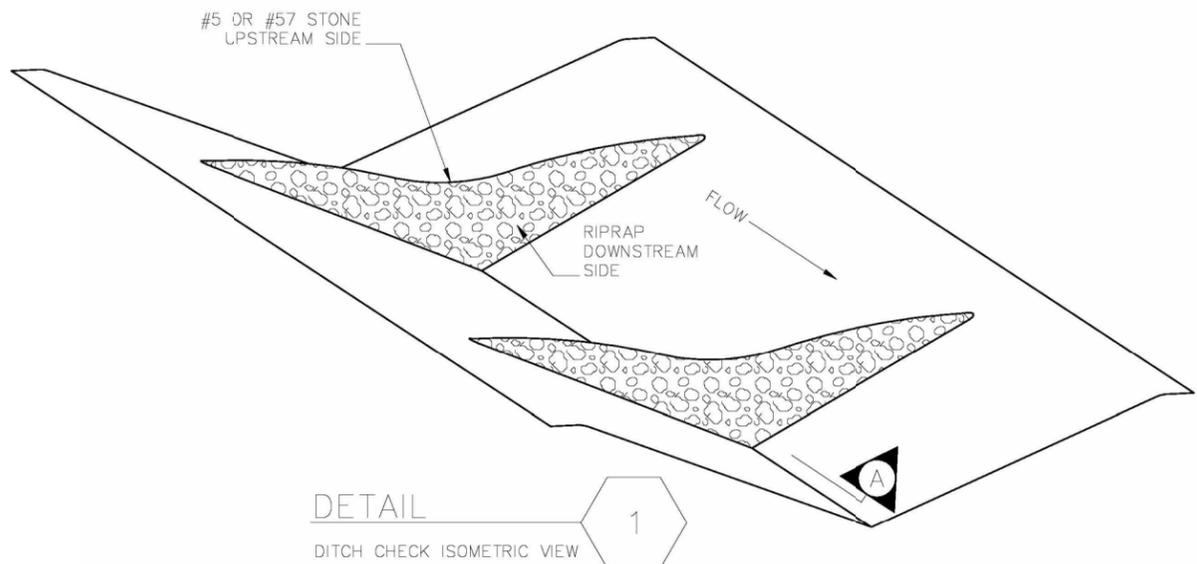
SIGNATURE
James W. Kendall, Jr.
DATE
09/30/2016

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0	8/2016	DSO	UPDATE
#	DATE	CHK	DESCRIPTION

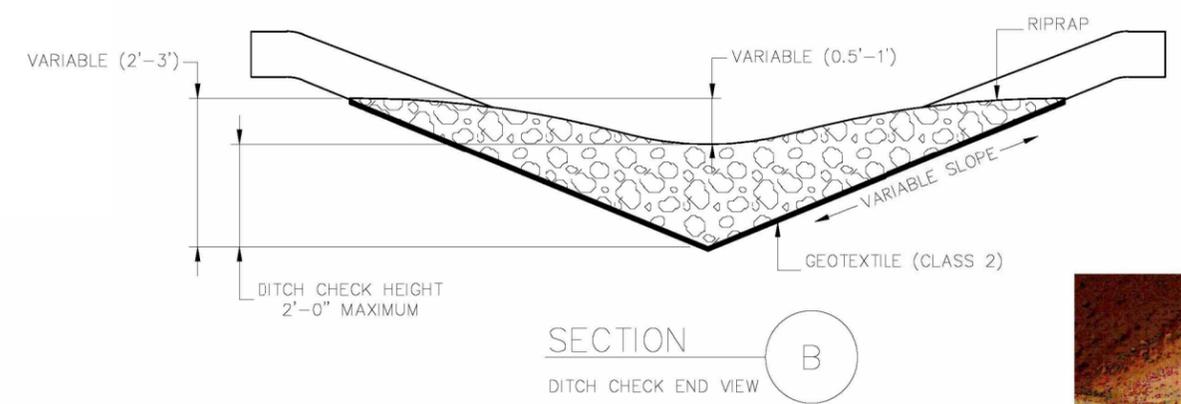
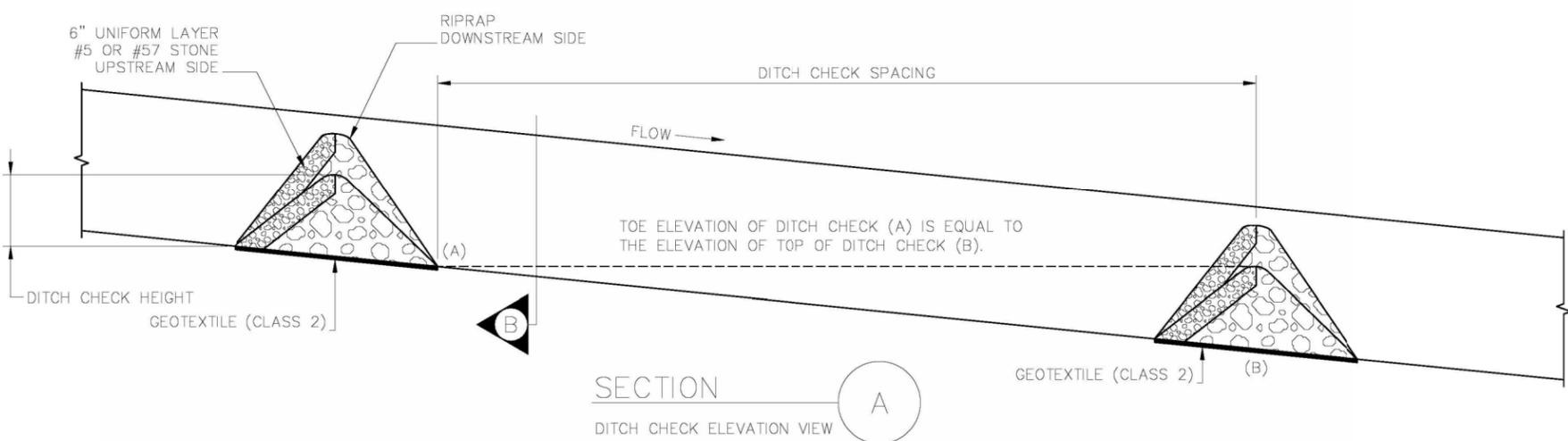
SCDOT
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DESIGN STANDARDS OFFICE
955 PARK STREET
ROOM 405
COLUMBIA, SC 29201

STANDARD DRAWING
DITCH CHECK

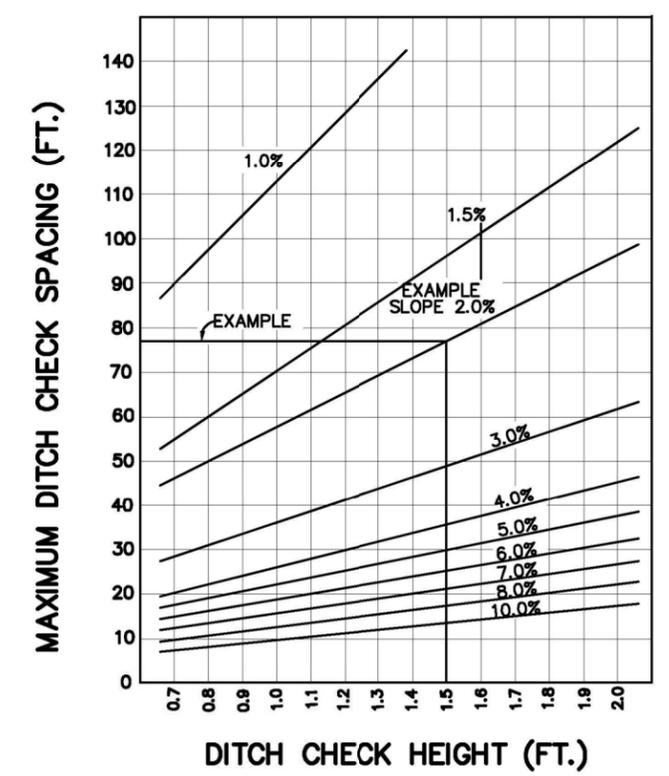
815-105-00
EFFECTIVE LETTING DATE JULY, 2017

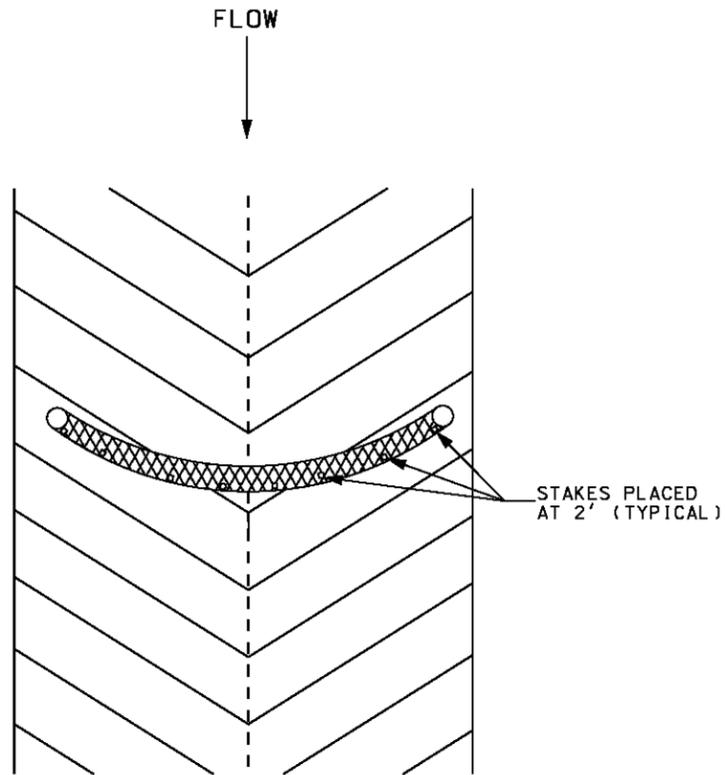


- NOTES:**
- DITCH CHECK SHOULD NEVER BE USED IN LIVE STREAM.
 - DITCH CHECK IS NOT ADEQUATE FOR MORE THAN 2 ACRES OF DRAINAGE.
 - PLACE A CLASS 2 NON-WOVEN GEOTEXTILE FABRIC THAT MEETS THE REQUIREMENTS OF SECTION 804 BENEATH THE ROCK PRIOR TO INSTALLATION OF THE ROCK.
 - RIPRAP SHALL BE CLASS A.
 - RIPRAP MAY BE HAND PLACED OR MECHANICALLY PLACED AND SHAPED.
 - PLACE 6" UNIFORM LAYER OF AGGREGATE NO. 5 OR NO. 57 STONE ON THE UPSTREAM FACE OF ROCK DITCH CHECK.
 - SLOPES OF DITCH CHECK SHALL BE NO STEEPER THAN 2:1, BUT MAY BE FLATTENED DUE TO TRAFFIC SAFETY, AS DIRECTED BY THE ENGINEER.
 - HEIGHT OF DITCH CHECK SHALL BE NO MORE THAN 2.0 FEET.
 - DITCH CHECKS SHALL BE INSPECTED EVERY 7 DAYS.
 - REMOVE COLLECTED SEDIMENT IN FRONT OF DITCH CHECK AS DETERMINED BY THE ENGINEER. PAYMENT FOR REMOVAL AND DISPOSAL OF SEDIMENT WILL BE CLEANING SILT BASIN.
 - PAY ITEM SHALL BE:
 8041010 RIPRAP (CLASS A) _____ TON
 8042800 GEOTEXTILE FOR EROSION CONTROL UNDER RIPRAP (CLASS 2) _____ SY
 8154010 CLEANING SILT BASINS _____ CY
 8156410 AGGREGATE NO.5 OR NO.57 FOR EROSION CONTROL _____ TON

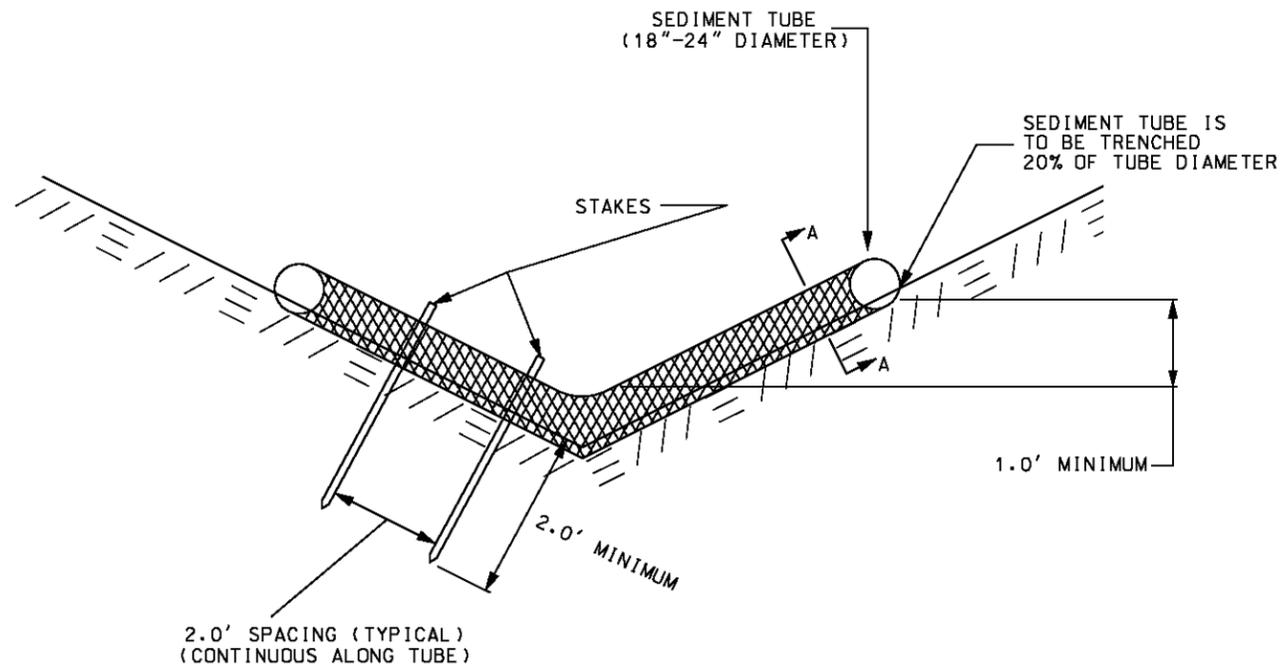


DITCH CHECK SPACING

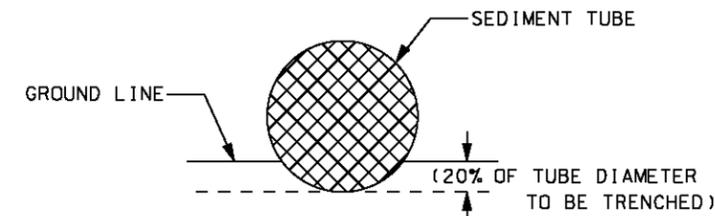




TOP VIEW OF DITCH



END VIEW OF DITCH



SECTION A-A

NOTES:

1. SEDIMENT TUBE SHALL COMPLY WITH THE REQUIREMENTS OF SECTION 815 OF THE SCDOT STANDARD SPECIFICATION FOR HIGHWAY CONSTRUCTION (LATEST EDITION), AND MUST BE LISTED ON SCDOT QUALIFIED PRODUCT LIST NUMBER 57. SEDIMENT TUBES MUST MEET THE CRITERIA OUTLINED IN THE SUPPLEMENTAL SPECIFICATIONS BEFORE BEING LISTED ON QPL, AND BE FREE FROM DEFECTS OR TRANSPORTATION DAMAGE.
2. PROPER SITE PREPARATION IS ESSENTIAL TO ENSURE SEDIMENT TUBES ARE IN COMPLETE CONTACT WITH UNDERLYING SOIL. SEDIMENT TUBES ARE TO BE 18-24 INCHES IN DIAMETER AND ARE TO BE TRENCHED TO A DEPTH OF 20% OF TUBE DIAMETER. LAY THE SEDIMENT TUBE FLAT IN THE U-SHAPED TRENCH AND COMPACT THE UPSTREAM SEDIMENT TUBER SOIL INTERFACE. PLACE AND ANCHOR THE SEDIMENT TUBE ENDS SO THEY ARE POSITIONED UPSTREAM OF THE SEDIMENT TUBE CENTER POINT. SEDIMENT TUBES FOR DITCH CHECKS WEIGHING MORE THAN 18 POUNDS PER FOOT DO NOT REQUIRE TRENCHING.
3. SEDIMENT TUBE SHALL BE INSTALLED IMMEDIATELY AFTER GRADING AND CONSTRUCTION. SEDIMENT TUBE SHALL BE MAINTAINED DURING SUBGRADE AND BASE PREPARATION UNTIL BASE COURSE IS COMPLETE. SEDIMENT TUBES MAY BE TEMPORARILY MOVED DURING CONSTRUCTION.
4. SEDIMENT TUBES ARE TO BE INSTALLED PERPENDICULAR TO WATER FLOW AND EXTEND UP SIDE SLOPES A MINIMUM OF 1 FOOT ABOVE DESIGN FLOW DEPTH. SPACE TUBES ACCORDING TO THE FOLLOWING TABLE:

SLOPE	MAXIMUM SEDIMENT TUBE SPACING
LESS THAN 2%	150 FEET
2%	100 FEET
3%	75 FEET
4%	50 FEET
5%	40 FEET
6%	30 FEET
GREATER THAN 6%	25 FEET

5. STAKE SEDIMENT TUBES FOR DITCH CHECKS USING STAKES WITH A MINIMUM MEASURED DIMENSION OF 3/4" x 3/4" AND A MAXIMUM MEASURED DIMENSION OF 2" x 2", OR USING STEEL POSTS (1.25 lbs/linear foot) A MINIMUM OF 4" IN LENGTH. USE STEEL POSTS WITHOUT A SOIL PLATE AND PAINTING IS NOT REQUIRED. SPACE POSTS OR STAKES ON 2' CENTERS AND DRIVE THEM INTO THE GROUND TO A MINIMUM DEPTH OF 2'. INSTALL THE STAKES ON THE DOWNSTREAM THIRD OF THE SEDIMENT TUBE. SEDIMENT TUBES FOR DITCH CHECKS WEIGHING MORE THAN 18 POUNDS PER FOOT DO NOT REQUIRE STAKING.
6. SELECT PROPER LENGTH OF TUBE TO MINIMIZE THE NUMBER NEEDED TO SPAN THE WIDTH OF DRAINAGE AREA. ONE CONTINUOUS LENGTH IS PREFERRED COMPARED TO TWO OVERLAPPING TUBES. IF NECESSARY, SEDIMENT TUBES CAN BE LAPPED A MINIMUM OF 6 INCHES TO PREVENT PASSAGE OF FLOW AND SEDIMENT THROUGH FIELD JOINT.
7. INSTALL SEDIMENT TUBES FOR DITCH CHECKS OVER BARE SOIL, MULCHED AREAS, OR EROSION CONTROL BLANKETS. KEEP SEDIMENT TUBES FOR DITCH CHECKS IN PLACE UNTIL FULLY ESTABLISHED VEGETATION AND ROOT SYSTEMS HAVE COMPLETELY DEVELOPED AND CAN SURVIVE ON THEIR OWN.
8. INSPECT SEDIMENT TUBES AFTER INSTALLATION FOR GAPS UNDER THE SEDIMENT TUBES AND FOR GAPS BETWEEN THE JOINTS OF ADJACENT ENDS OF SEDIMENT TUBES. INSPECT SEDIMENT TUBES EVERY 7 DAYS. REPAIR ALL RILLS, GULLIES, AND UNDERCUTTING NEAR SEDIMENT TUBES. REMOVE ALL SEDIMENT DEPOSITS THAT IMPAIR THE FILTRATION CAPABILITY OF SEDIMENT TUBES WHEN THE SEDIMENT REACHES 1/3 THE HEIGHT OF THE EXPOSED SEDIMENT TUBE.
9. REMOVE AND/OR REPLACE INSTALLED SEDIMENT TUBES AS REQUIRED TO ADAPT TO CHANGING CONSTRUCTION SITE CONDITIONS. REMOVE SEDIMENT TUBES WHEN THE FUNCTIONAL LONGEVITY IS EXCEEDED AS DETERMINED BY THE ENGINEER, INSPECTOR, OR MANUFACTURER'S REPRESENTATIVE. GATHER SEDIMENT TUBES AND DISPOSE OF THEM IN REGULAR MEANS AS NON-HAZARDOUS, INERT MATERIAL.
10. PRIOR TO FINAL STABILIZATION, BACKFILL ALL TRENCHES, DEPRESSIONS, AND OTHER GROUND DISTURBANCES CAUSED BY THE REMOVAL OF SEDIMENT TUBES.
11. CLEAN OUT OF TUBES WILL BE PAID FOR AS CLEANING SILT BASINS.
12. PAYMENT SHALL INCLUDE ALL MATERIALS, LABOR, TDLS, EQUIPMENT, MAINTENANCE, AND INCIDENTALS NECESSARY TO COMPLETE WORK.
13. THE PAY ITEMS SHALL BE:
 8152007 SEDIMENT TUBE LF
 8154010 CLEANING SILT BASINS CY

REFERENCES

- NATIONAL DOCUMENTS
-
- SCDOT DOCUMENTS
- SC-N-815-12
QPL 57

RELATED DRAWINGS & KEYWORDS

PRECONSTRUCTION SUPPORT ENGINEER



SIGNATURE

DATE

5			
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2	8/2016	DSO	GENERAL REVISIONS
1	8/2012	DSO	UPDATED NOTES, WOOD TEXT REMOVED
0	3/2008	DSO	GENERAL REVISIONS
#	DATE	CHK	DESCRIPTION



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 955 PARK STREET
 ROOM 405
 COLUMBIA, SC 29201

STANDARD DRAWING

SEDIMENT TUBE DITCH APPLICATION

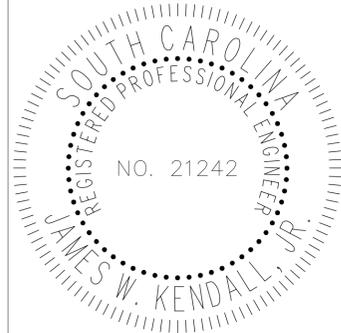
815-205-00

EFFECTIVE LETTING DATE | JUL 2017

REFERENCES

NATIONAL DOCUMENTS

SCDOT DOCUMENTS
WQM, SC-M-810
RELATED DRAWINGS & KEYWORDS



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STANDARD DRAWING
SEDIMENT DAM

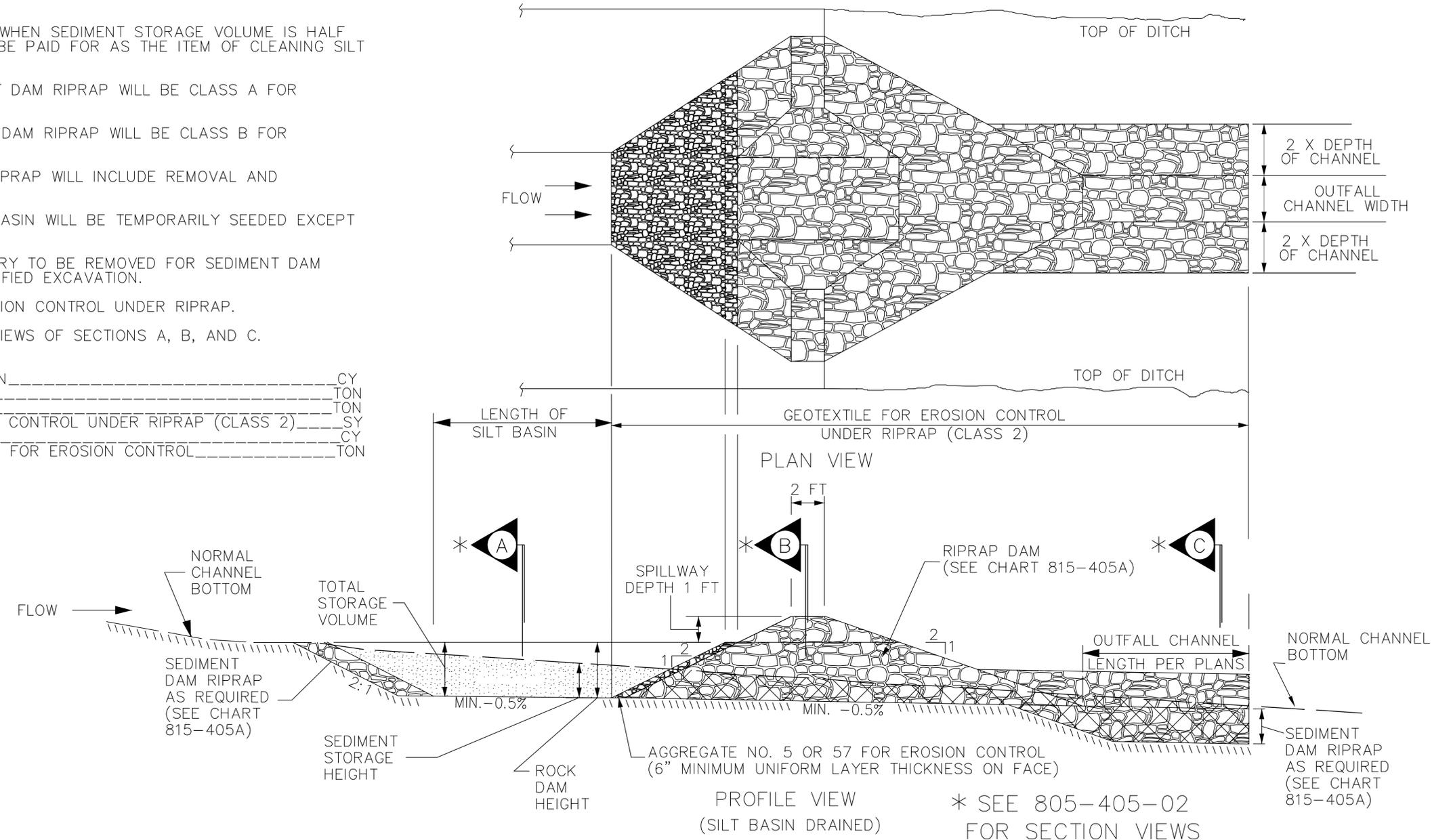
815-405-01
EFFECTIVE LETTING DATE JULY 2017

NOTES:

- SEDIMENT DAMS WILL BE DESIGNED IN ACCORDANCE WITH THE SCDOT WATER QUALITY MANUAL.
- SILT BASIN MUST BE CLEANED OUT WHEN SEDIMENT STORAGE VOLUME IS HALF FULL. CLEAN OUT OF SILT BASIN WILL BE PAID FOR AS THE ITEM OF CLEANING SILT BASINS.
- THE GRADATION CLASS OF SEDIMENT DAM RIPRAP WILL BE CLASS A FOR WATERSHEDS LESS THAN 3 ACRES.
- THE GRADATION CLASS OF SEDIMENT DAM RIPRAP WILL BE CLASS B FOR WATERSHEDS 3 ACRES OR GREATER.
- CONSTRUCTION OF SEDIMENT DAM RIPRAP WILL INCLUDE REMOVAL AND DISPOSAL OF RIPRAP.
- ALL EARTHEN AREAS OF THE SILT BASIN WILL BE TEMPORARILY SEEDED EXCEPT FOR THE BOTTOM OF THE BASIN.
- CROSS-HATCHED AREA, IF NECESSARY TO BE REMOVED FOR SEDIMENT DAM RIPRAP, WILL BE PAID FOR AS UNCLASSIFIED EXCAVATION.
- USE CLASS 2 GEOTEXTILE FOR EROSION CONTROL UNDER RIPRAP.
- SEE DRAWING # 815-405-02 FOR VIEWS OF SECTIONS A, B, AND C.
- THE PAY ITEMS SHALL BE:
 2031000 UNCLASSIFIED EXCAVATION _____ CY
 8041010 RIPRAP (CLASS A) _____ TON
 8041020 RIPRAP (CLASS B) _____ TON
 8042800 GEOTEXTILE FOR EROSION CONTROL UNDER RIPRAP (CLASS 2) _____ SY
 8154010 CLEANING SILT BASINS _____ CY
 8156410 AGGREGATE NO. 5 OR 57 FOR EROSION CONTROL _____ TON

**CHART 815-405A
RIPRAP PLACEMENT**

CLASS	D ₅₀ (FT)	MINIMUM THICKNESS (FT)
A	0.50	1.00
B	0.75	1.50



**South Carolina Department of Transportation
Regional Sediment Basin Specification**



MAX AREA DRAINING TO DAM (ACRES)	LOWER STATE: TOTAL STORAGE VOLUME (FT ³)	UPPER STATE: TOTAL STORAGE VOLUME (FT ³)			ROCK DAM HEIGHT (TO BOTTOM OF SPILLWAY) (FT)	ROCK DAM BOTTOM WIDTH (FT)	SEDIMENT STORAGE HEIGHT (FT)	SPILLWAY BOTTOM WIDTH (FT)
		PERCENTAGE OF TOTAL DRAINAGE AREAS DISTURBED						
		75-100%	25-75%	0-25%				
1	1,450	2,815	2,115	1,505	3	3	0.50	9
2	2,900	5,630	4,225	3,010	3	3	0.50	9
3	4,350	8,445	6,335	4,510	4	3	0.75	11
4	5,800	11,260	8,445	6,015	4	4	0.75	12
5	7,250	14,075	10,560	7,520	4	4	0.75	12
6	8,700	16,890	12,670	9,025	4	4	0.75	12
7	10,150	19,705	14,780	10,530	4	6	0.75	14
8	11,600	22,520	16,890	12,030	4	6	0.75	14
9	13,050	25,335	19,000	13,535	4	6	0.75	14
10	14,500	28,150	21,115	15,040	4	6	0.75	14

THIS DRAWING IS NOT TO SCALE

AGGREGATE NO. 5 OR 57
FOR EROSION CONTROL
(6" MINIMUM UNIFORM LAYER
THICKNESS ON FACE)

SEDIMENT DAM CLASS A OR B RIPRAP
(SEE CHART 815-405A)

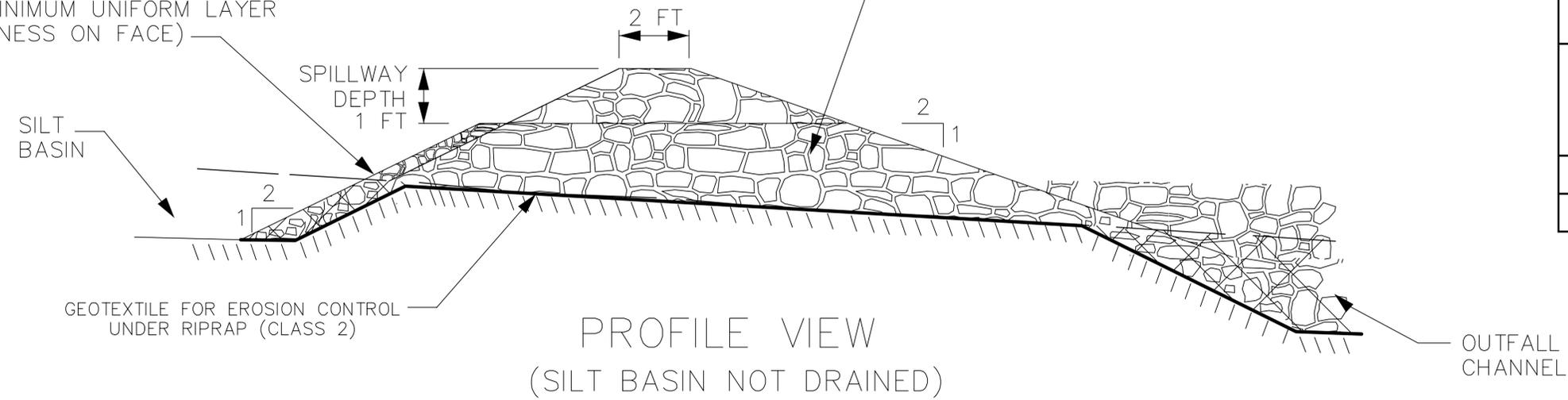
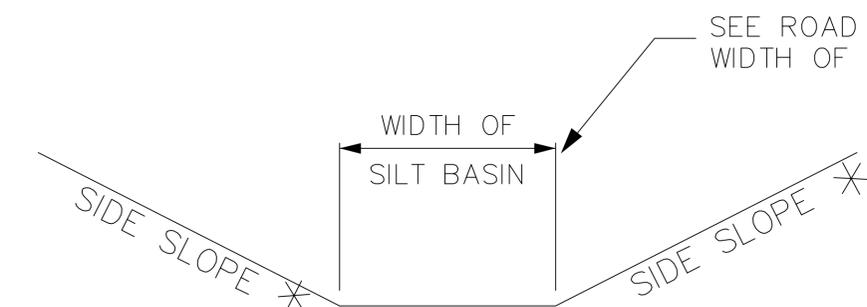
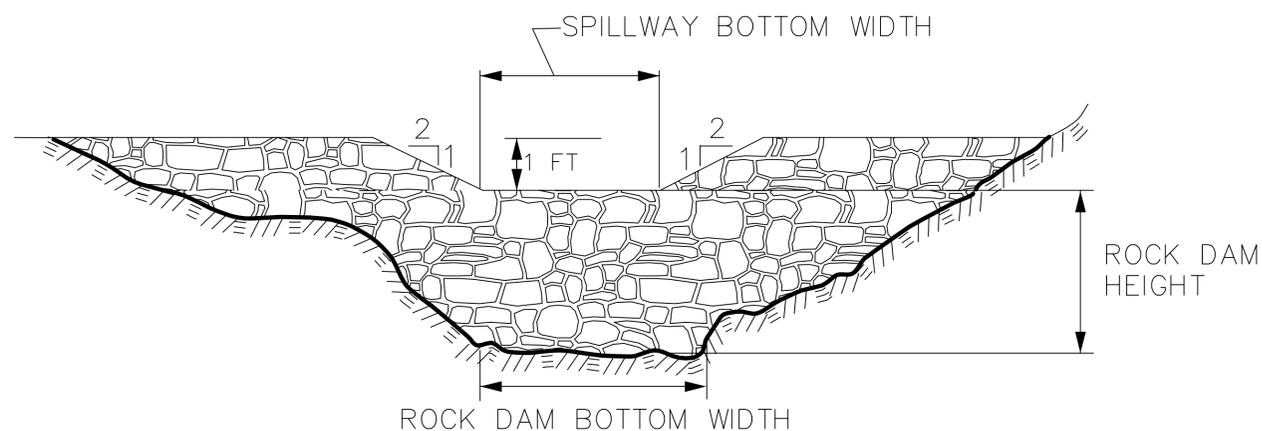


CHART 815-405A RIPRAP PLACEMENT		
CLASS	D ₅₀ (FT)	MINIMUM THICKNESS (FT)
A	0.50	1.00
B	0.75	1.50

PROFILE VIEW
(SILT BASIN NOT DRAINED)

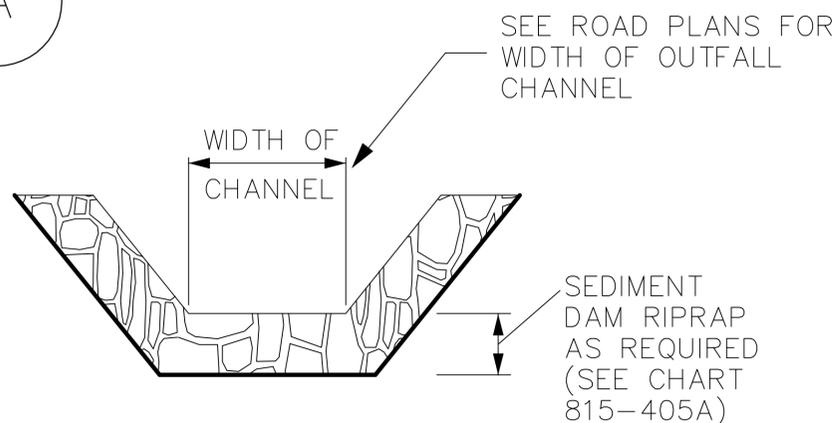


* SEE EROSION CONTROL DATA SHEET



SECTION
SEDIMENT DAM
CROSS SECTION

SECTION
SILT BASIN
CROSS SECTION



SECTION
OUTFALL CHANNEL
CROSS SECTION

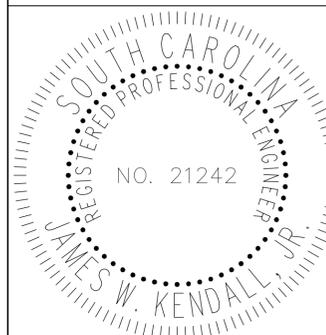
REFERENCES

NATIONAL DOCUMENTS

SCDOT DOCUMENTS

WQM

RELATED DRAWINGS & KEYWORDS



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ROOM 405
COLUMBIA, SC 29201

STANDARD DRAWING
SEDIMENT
DAM

815-405-02

EFFECTIVE LETTING DATE | JULY 2017

REFERENCES

NATIONAL DOCUMENTS

SCDOT DOCUMENTS
WQM, SC-M-810

RELATED DRAWINGS & KEYWORDS

NO. 21242
REGISTERED PROFESSIONAL ENGINEER
JAMES W. KENDALL, JR.

SIGNATURE

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STANDARD DRAWING
SEDIMENT DAM FOR PIPE INLET

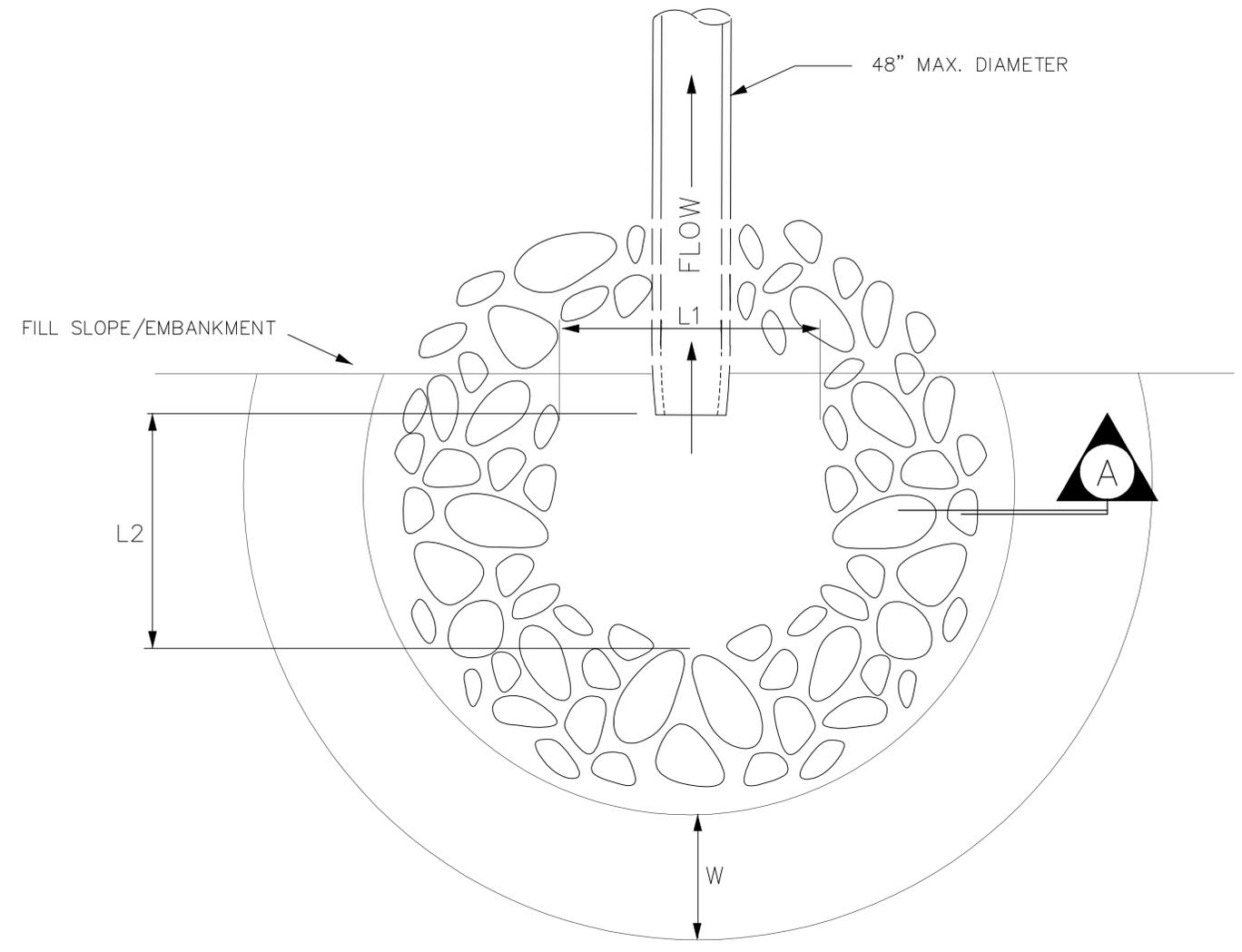
815-406-00
EFFECTIVE LETTING DATE | JULY 2017

THIS DRAWING IS NOT TO SCALE

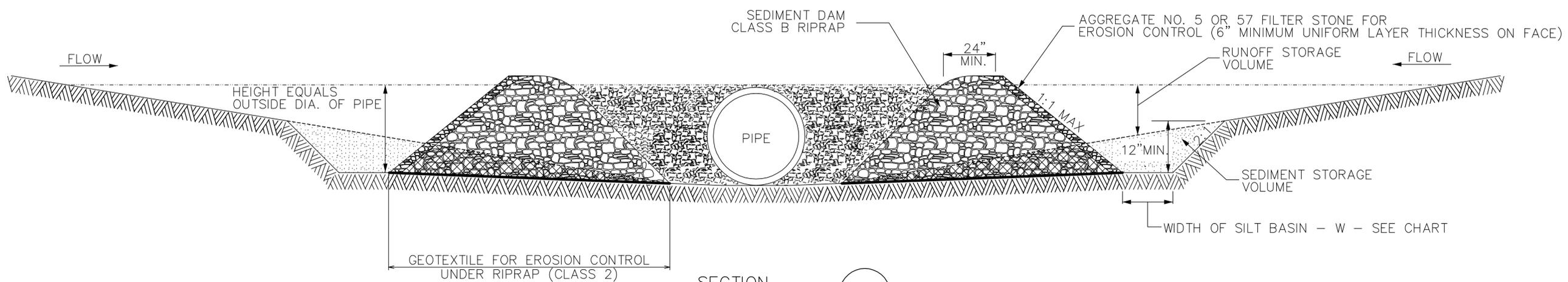
NOTES:

1. SEDIMENT DAM FOR PIPE INLET WILL BE DESIGNED IN ACCORDANCE WITH THE SCDOT WATER QUALITY MANUAL.
2. SILT BASIN MUST BE CLEANED OUT WHEN SEDIMENT STORAGE VOLUME IS HALF FULL. CLEAN OUT OF SILT BASIN WILL BE PAID FOR AS THE ITEM OF CLEANING SILT BASINS.
3. CONSTRUCTION OF SEDIMENT DAM RIPRAP WILL INCLUDE REMOVAL AND DISPOSAL OF RIPRAP.
4. ALL EARTHEN AREAS OF THE SILT BASIN WILL BE TEMPORARILY SEEDED EXCEPT FOR THE BOTTOM OF THE BASIN.
5. CROSS-HATCHED AREA, IF NECESSARY TO BE REMOVED FOR SEDIMENT DAM RIPRAP, WILL BE PAID FOR AS UNCLASSIFIED EXCAVATION.
6. USE CLASS 2 GEOTEXTILE FOR EROSION CONTROL UNDER RIPRAP.
7. THE PAY ITEMS SHALL BE:
 2031000 UNCLASSIFIED EXCAVATION _____ CY
 8041020 RIPRAP (CLASS B) _____ TON
 8042800 GEOTEXTILE FOR EROSION CONTROL UNDER RIPRAP (CLASS 2) _____ SY
 8154010 CLEANING SILT BASINS _____ CY
 8156410 AGGREGATE NO. 5 OR 57 FOR EROSION CONTROL _____ TON

PIPE SIZE (IN)	ROCK DAM HEIGHT (FT)	WIDTH OF SILT BASIN - W - (FT)				SEDIMENT DAM INSIDE L ₁ (FT)	SEDIMENT DAM INSIDE L ₂ (FT)
		MAX AREA DRAINING TO PIPE					
		0.5 AC	1.0 AC	1.5 AC	2.0 AC		
18	1.5	4.0	7.0	11.0	14.0	3.5	1.75
24	2.0	3.0	6.0	9.0	12.0	4.0	2.00
30	2.5	2.5	5.5	8.0	10.5	4.5	2.25
36	3.0	2.5	4.5	7.0	9.5	5.0	2.50
42	3.5	2.0	4.0	6.0	7.5	7.5	3.75
48	4.0	2.0	3.5	5.5	7.0	8.0	4.00



PLAN VIEW
SEDIMENT DAM
FOR PIPE INLET



SECTION
ELEVATION
SEDIMENT DAM
FOR PIPE INLETS

REFERENCES

NATIONAL DOCUMENTS

SCDOT DOCUMENTS

SC-M-815-10

RELATED DRAWINGS & KEYWORDS

PRECONSTRUCTION
SUPPORT ENGINEER



SIGNATURE

11/09/2016

DATE

6			
5			
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3	11/2016	DSO	GENERAL REVISIONS
2	8/2016	DSO	GENERAL REVISIONS
1	8/2012	DSO	ADDED CHART 815-505
0	3/2008	DSO	GENERAL REVISIONS
#	DATE	CHK	DESCRIPTION



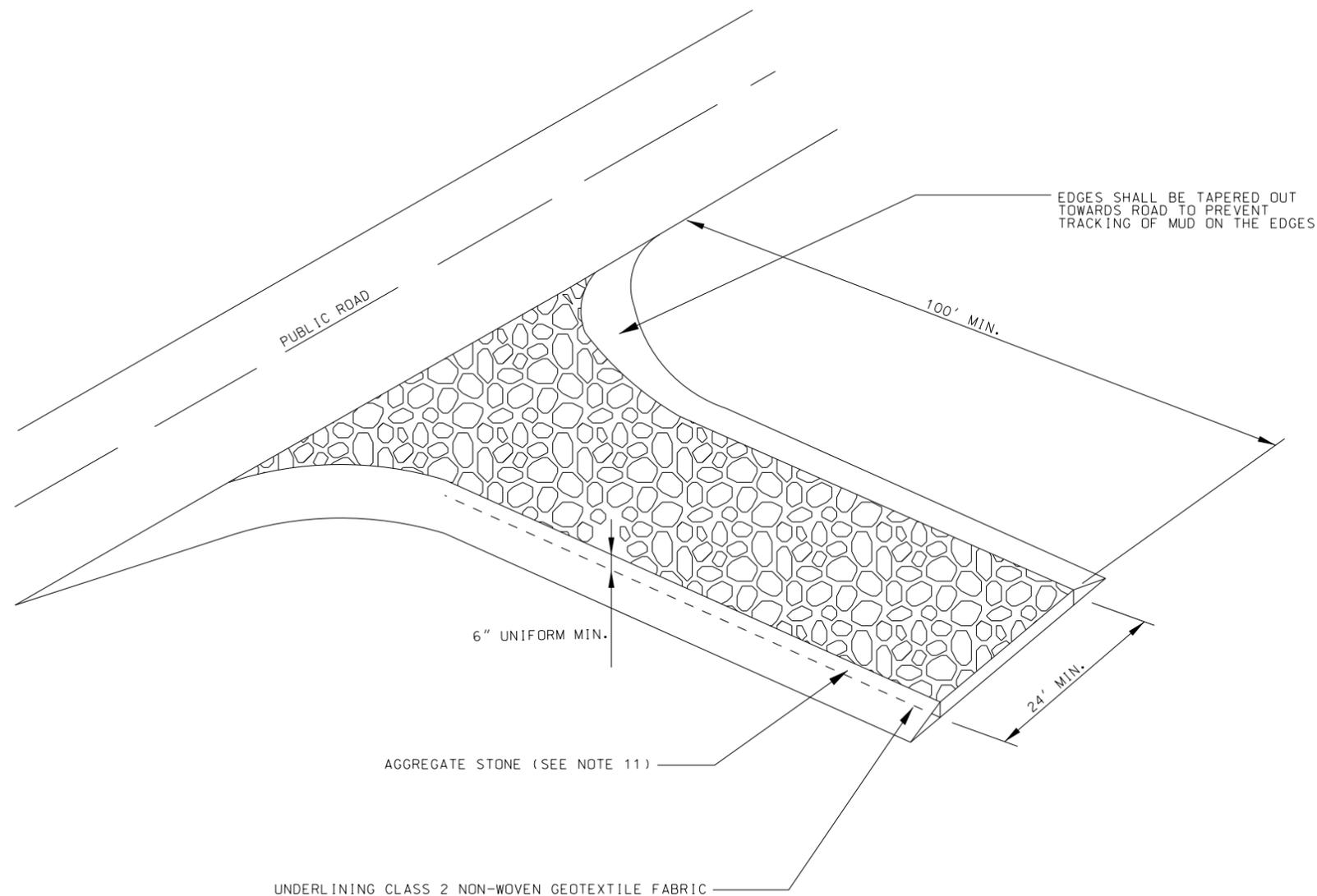
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DESIGN STANDARDS OFFICE
955 PARK STREET
ROOM 405
COLUMBIA, SC 29201

STANDARD DRAWING

STABILIZED
CONSTRUCTION
ENTRANCE

815-505-00

EFFECTIVE LETTING DATE | JUL 2017 THIS DRAWING IS NOT TO SCALE



NOTES:

1. STABILIZED CONSTRUCTION ENTRANCES SHOULD BE USED AT ALL POINTS WHERE TRAFFIC WILL BE LEAVING A CONSTRUCTION SITE AND MOVING DIRECTLY ONTO A PUBLIC ROAD.
2. IF WASHING IS USED, PROVISIONS MUST BE MADE TO INTERCEPT THE WASH WATER AND TRAP THE SEDIMENT BEFORE IT IS CARRIED OFF SITE. WASHDOWN FACILITIES SHALL BE REQUIRED AS DIRECTED BY SCDOT AS NEEDED. WASHDOWN AREAS IN GENERAL MUST BE ESTABLISHED WITH CRUSHED GRAVEL AND DRAIN INTO A SEDIMENT TRAP OR SEDIMENT BASIN. CONSTRUCTION ENTRANCES SHOULD BE USED IN CONJUNCTION WITH THE STABILIZATION OF CONSTRUCTION ROADS TO REDUCE THE AMOUNT OF MUD PICKED UP BY VEHICLES.
3. REMOVE ALL VEGETATION AND ANY OBJECTIONABLE MATERIAL FROM THE FOUNDATION AREA.
4. DIVERT ALL SURFACE RUNOFF AND DRAINAGE FROM STONES TO A SEDIMENT TRAP OR BASIN.
5. INSTALL A CLASS 2 NON-WOVEN GEOTEXTILE FABRIC THAT MEETS THE REQUIREMENTS OF SECTION 804 OF THE STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION, LATEST EDITION, PRIOR TO PLACING ANY STONE.
6. MINIMUM DIMENSIONS OF THE ENTRANCE SHALL BE 24-FT WIDE x 100-FT LONG, AND MAY BE MODIFIED AS NECESSARY TO ACCOMMODATE SITE CONSTRAINTS.
7. INSPECT CONSTRUCTION ENTRANCES EVERY SEVEN (7) CALENDAR DAYS. CHECK FOR MUD AND SEDIMENT BUILDUP, AS WELL AS PAD INTEGRITY. MAINTENANCE IS REQUIRED MORE FREQUENTLY IN WET WEATHER CONDITIONS. RESHAPE THE STONE PAD AS NEEDED FOR DRAINAGE AND RUNOFF CONTROL.
8. WASH OR REPLACE STONES AS NEEDED AND AS DIRECTED BY THE ENGINEER. THE STONE IN THE ENTRANCE SHOULD BE WASHED OR REPLACED WHENEVER THE ENTRANCE FAILS TO REDUCE MUD BEING CARRIED OFF SITE BY VEHICLES. FREQUENT WASHING WILL EXTEND THE USEFUL LIFE OF STONE.
9. IMMEDIATELY REMOVE MUD AND SEDIMENT TRACKED OR WASHED ONTO PUBLIC ROADS BY BRUSHING OR SWEEPING. FLUSHING SHOULD ONLY BE USED WHEN THE WATER CAN BE DISCHARGED TO A SEDIMENT TRAP OR BASIN.
10. REPAIR ANY BROKEN PAVEMENT IMMEDIATELY.
11. USE AGGREGATE No. 1, 2, 24, OR 3 AS CONSTRUCTION ENTRANCE MATERIAL.
12. PAY ITEM:
8156490 STABILIZED CONSTRUCTION ENTRANCE_____SY

HEIGHT OF FILL (y) IN FEET	FILL SLOPE	MINIMUM SILT FENCE OFFSET FROM TOE OF SLOPE (x) IN FEET	MINIMUM RIGHT OF WAY OFFSET FROM TOE OF SLOPE (NPDES LINE) (z) IN FEET	CHECK LENGTH IN FEET**
<6	2:1	2	3	2
	4:1 6:1			
6-10	2:1	12*	13*	5
	4:1 6:1	3	4	3
>10	2:1	12*	13*	5
	4:1 6:1	4	5	4

*THESE MINIMUM OFFSETS MAY BE REDUCED WHEN CURB AND GUTTER OR SOME OTHER FEATURE REDUCES THE FLOW OF WATER DOWN THE SLOPE. THE SMALL OFFSETS OF EACH GROUP OF HEIGHT OF FILL CANNOT BE REDUCED.

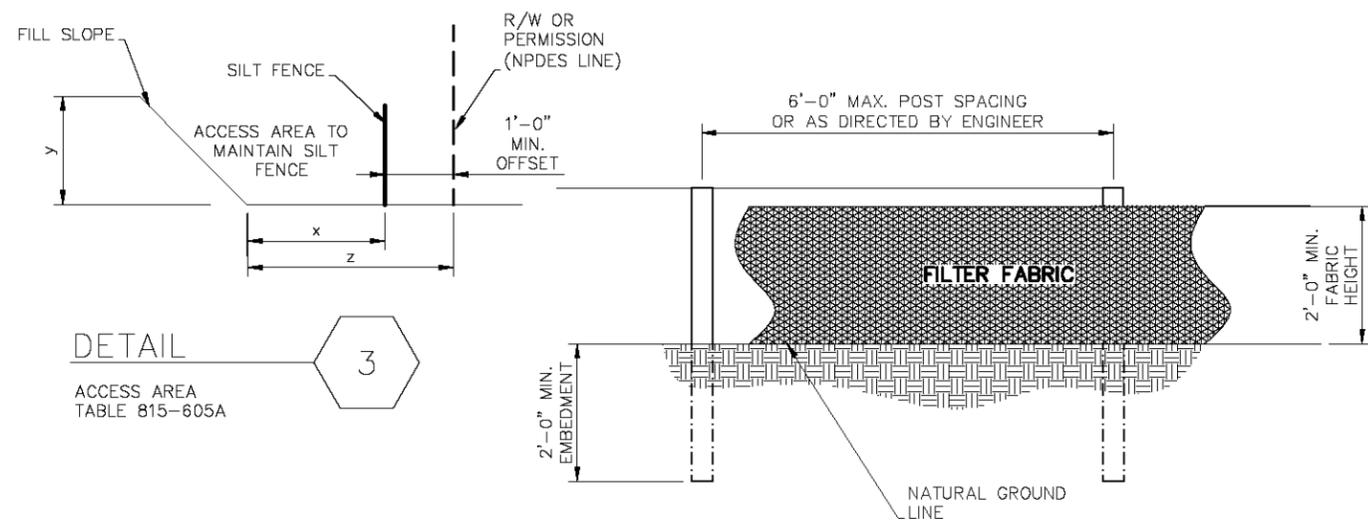
**SILT FENCE CHECKS WILL HAVE A MAXIMUM LENGTH OF FIVE (5) FEET OR UNTIL THEY TIE BACK INTO THE SLOPE.

**SEE 815-605-10 FOR
TEMPORARY DIVERSION DIKE**

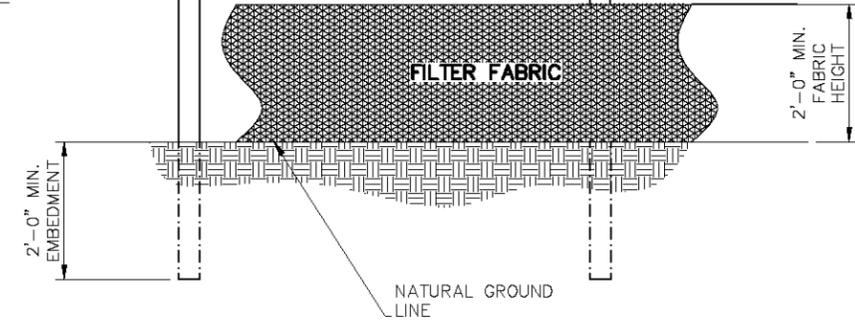
**SEE 815-605-20 FOR
TEMPORARY SILT DITCH**

**SEE 815-605-30 FOR ROLLED
EROSION CONTROL PRODUCT**

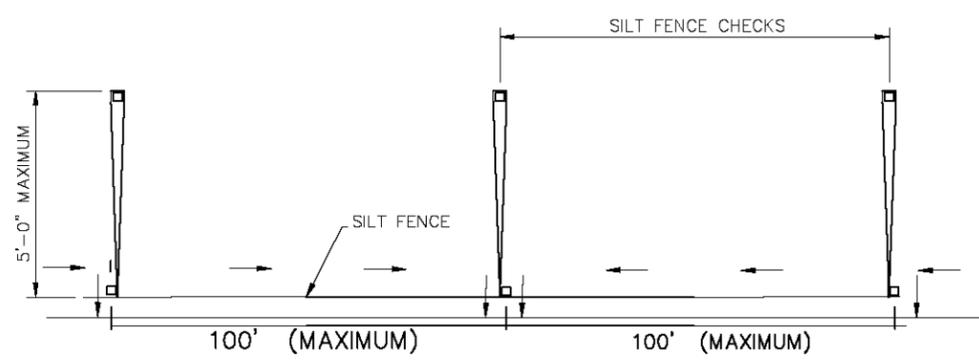
- NOTES:
- SILT FENCE CHECKS MUST BE LOCATED EVERY 100 FEET MAXIMUM AND AT LOW POINTS. FILTER FABRICS SHALL CONFORM TO SCDOT STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION (LATEST EDITION).
 - USE POSTS CONFORMING TO SCDOT STANDARD SPECIFICATIONS AND SPECIAL PROVISIONS. POSTS SHALL BE A MINIMUM OF 5 FEET LONG AND INSTALLED TO A MINIMUM DEPTH OF 24 INCHES WITH NO MORE THAN 3 FEET OF THE POST ABOVE GROUND. AT LEAST 1 TO 2 INCHES OF THE POSTS SHALL EXTEND ABOVE THE TOP OF THE FABRIC. POST SPACING WILL BE A MAXIMUM OF 6 FEET ON CENTER.
 - POSTS SHALL HAVE PROJECTIONS FOR FASTENING THE FABRIC TO THE POST. POSTS SHALL ALSO HAVE A SOIL PLATE NEAR THE BOTTOM OF THE POST, EXCEPT WHEN HEAVY CLAY SOILS ARE PRESENT ON-SITE.
 - ATTACH FABRIC TO POSTS USING HEAVY-DUTY PLASTIC TIES THAT ARE EVENLY SPACED AND PLACED IN A MANNER TO PREVENT SAGGING OR TEARING OF THE FABRIC. IN ALL CASES TIES SHOULD BE AFFIXED IN NO LESS THAN 4 PLACES.
 - SILT SHALL BE REMOVED AND DISPOSED OF WHEN SILT ACCUMULATES TO 1/3 THE HEIGHT OF THE FENCE. TRAPPED SEDIMENT SHALL BE REMOVED OR STABILIZED ON-SITE. MAINTENANCE OF SILT FENCE WILL BE MEASURED AND PAID FOR BY THE ITEM OF REMOVAL OF SILT RETAINED BY SILT FENCE.
 - TYPICAL SILT FENCE APPLICATIONS REQUIRE 24 INCHES OF THE FABRIC TO BE ABOVE GROUND. WHEN NEEDED, THE HEIGHT OF SILT FENCE FABRIC ABOVE THE GROUND MAY BE GREATER THAN 24". SEE PLANS FOR APPLICATION OF HIGHER SILT FENCE, PAY ITEMS, AND INSTALLATION METHODS.
 - IN TIDAL AREAS, EXTRA SILT FENCE MAY BE REQUIRED. THE LENGTH OF POST WILL BE TWICE THE EXPOSED POST HEIGHT. POST SPACING WILL REMAIN AS SHOWN HEREON. EXTRA HEIGHT FABRIC WILL BE 4, 5, OR 6 FEET TOTAL WIDTH.
 - PAY ITEMS:
 8153000 SILT FENCE _____ LF
 8153005 SILT FENCE EXTRA HEIGHT _____ LF
 8153090 REPLACE/REPAIR SILT FENCE _____ LF
 8154050 REMOVAL OF SILT RETAINED BY SILT FENCE _____ LF



DETAIL 3
ACCESS AREA
TABLE 815-605A

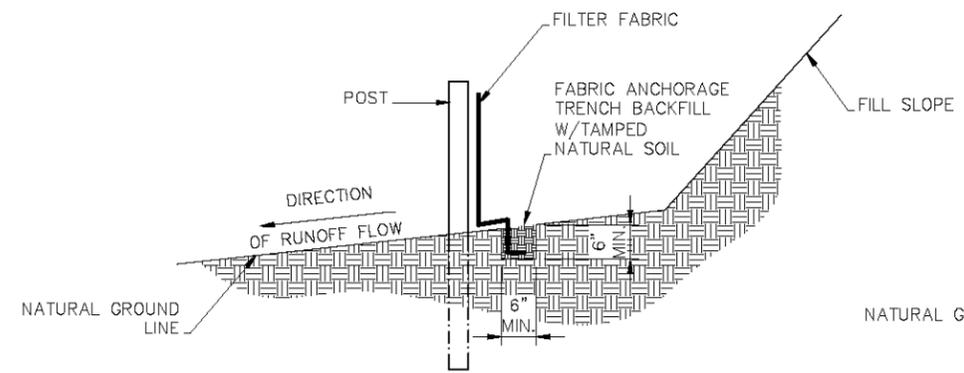


DETAIL 1
TYPICAL POST SPACING

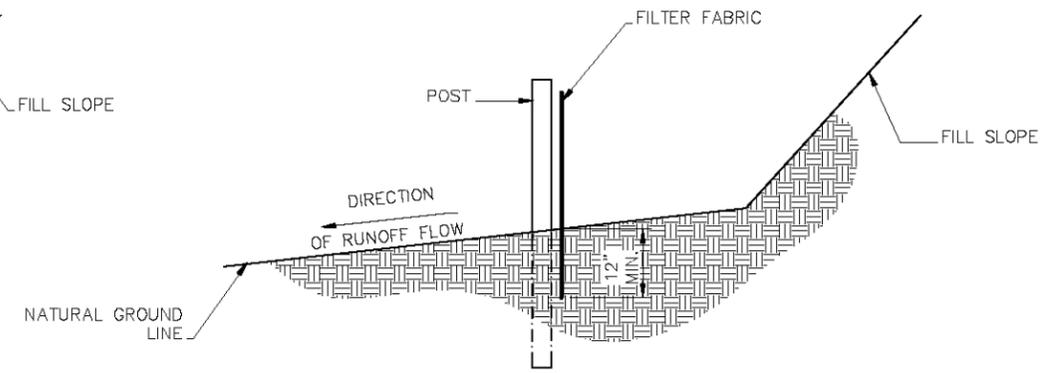


DETAIL 2
SILT FENCE CHECKS

12 INCHES OF THE FABRIC SHALL BE BURIED REGARDLESS, IF PLACED PNEUMATICALLY OR WITH A TRENCHER. BOTH METHODS SHOWN BELOW.



DETAIL 4
TRENCH METHOD

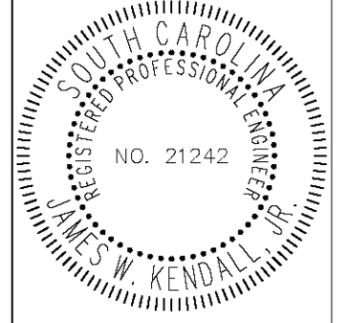


DETAIL 5
PNEUMATIC METHOD

REFERENCES

- NATIONAL DOCUMENTS
-
- SCDOT DOCUMENTS
- SC-M-815-2, QPL 34
- RELATED DRAWINGS & KEYWORDS
-

THIS DRAWING IS ONLY VALID FOR CONSTRUCTION WHEN SEALED AND SIGNED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF SOUTH CAROLINA. CHECK WWW.SCDOT.ORG FOR LATEST UPDATE.



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DATE _____

#	DATE	CHK	DESCRIPTION
5			
4			
3	11/2016	DSO	GENERAL REVISIONS
2	8/2016	DSO	GENERAL REVISIONS
1	8/2012	KNB	ADDED SCDOT DOCUMENTS, REMOVED STEEL, CHANGED NOTES
0	3/2008	DSO	GENERAL REVISIONS



STANDARD DRAWING

TEMPORARY SILT FENCE

815-605-00
EFFECTIVE LETTING DATE | JULY, 2017

REFERENCES

NATIONAL DOCUMENTS

SCDOT DOCUMENTS

SC-M-810
SC-M-815-9
QPL 55

RELATED DRAWINGS & KEYWORDS

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0	8/2016	DSO	NEW DRAWING
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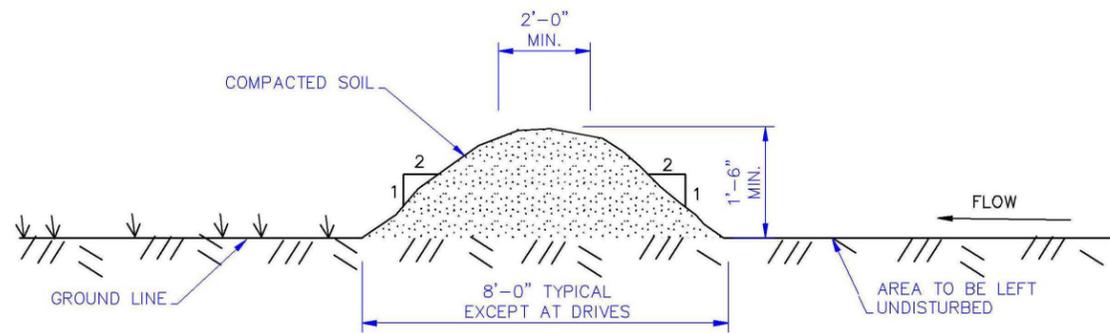
STANDARD DRAWING

TEMPORARY DIVERSION DIKE

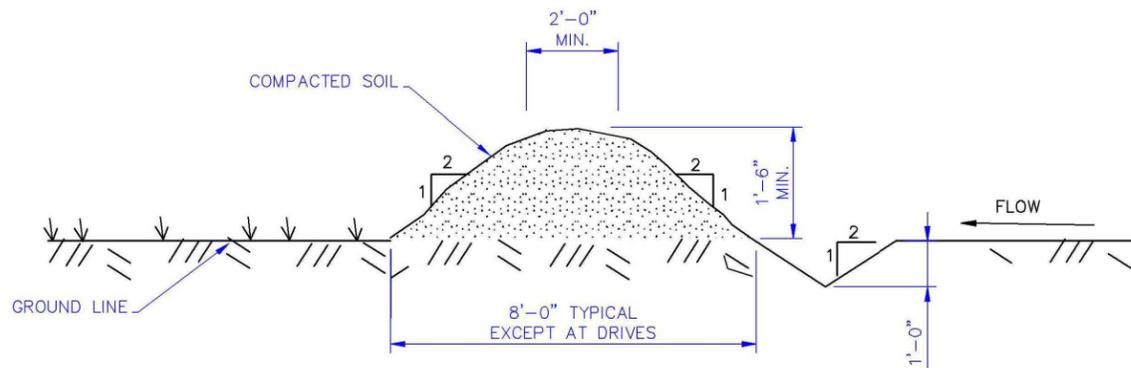
815-605-10

EFFECTIVE LETTING DATE JULY, 2017

NOT TO SCALE



DETAIL 6
TEMPORARY DIVERSION DIKE



DETAIL 7
TEMPORARY DIVERSION DIKE WITH DITCH

NOTES:

1. THIS ITEM IS FOR DIVERTING CLEAN WATER AROUND A CONSTRUCTION AREA.
2. CLEAR AND GRUB ALL TREES, BRUSH, STUMPS AND OTHER OBJECTIONABLE MATERIAL.
3. ENSURE THAT THE MINIMUM CONSTRUCTED CROSS SECTION MEETS ALL DIMENSIONS.
4. IMMEDIATELY AFTER CONSTRUCTION ESTABLISH VEGETATION BY SEEDING. PLACING TEMPORARY EROSION CONTROL BLANKET ON THE DIKE (AS APPLICABLE).
5. PAYMENT FOR TEMPORARY DIVERSION DIKE INCLUDES ALL MATERIALS IN PLACE, REMOVAL AND DISPOSAL OF MATERIALS, AND RESHAPING DIKE TO DRAIN. SEEDING TO BE PAID FOR SEPARATELY.

6. PAY ITEMS:

8155100 TEMPORARY DIVERSION DIKE	_____	LF
8155110 TEMP DIVERSION DIKE W DITCH	_____	LF
8100100 PERMANENT COVER	_____	ACRE
8100200 TEMP. COVER	_____	ACRE

REFERENCES

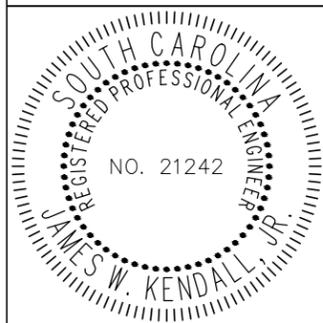
NATIONAL DOCUMENTS

SCDOT DOCUMENTS

SC-M-815-9
QPL 55, 56
SC-M-810

RELATED DRAWINGS & KEYWORDS

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2	---	---	---
1	11/2016	DSO	GENERAL REVISION
0	8/2016	DSO	NEW DRAWING
#	DATE	CHK	DESCRIPTION



STANDARD DRAWING

ROLLED EROSION CONTROL PRODUCT

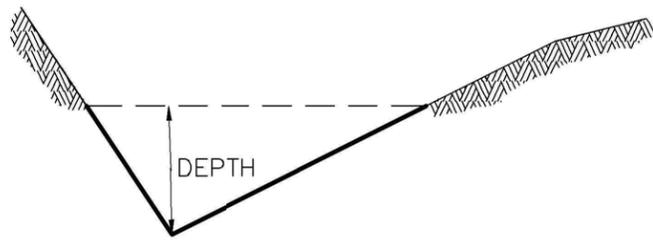
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EFFECTIVE LETTING DATE JULY, 2017

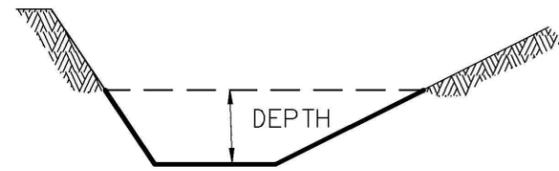
NOT TO SCALE

NOTES:

1. THE DEPTH OF THE EROSION CONTROL PRODUCTS ARE TO BE DETERMINED BY DESIGN AND PLACED ON PLAN SHEETS.
2. INSTALL IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.
3. COST OF INSTALLATION AND MATERIALS SHALL BE INCLUDED IN THE PAY ITEM FOR ROLLED EROSION CONTROL PRODUCT.
4. PAY ITEMS:
8151150 TEMPORARY EROSION CONTROL BLANKET (ECB) _____ SY
8151151 TURF REINFORCEMENT MATTING (TRM) TYPE 1 _____ SY
8151152 TURF REINFORCEMENT MATTING (TRM) TYPE 2 _____ SY
8151153 TURF REINFORCEMENT MATTING (TRM) TYPE 3 _____ SY



DETAIL 9
ROLLED EROSION CONTROL V DITCH



DETAIL 10
ROLLED EROSION CONTROL FLAT BOTTOM DITCH

Appendix E

Stormwater Management Design Study

**STORMWATER MANAGEMENT DESIGN STUDY
FOR THE PROPOSED CONSTRUCTION OF
SC 160 WIDENING
YORK COUNTY, SOUTH CAROLINA**

ROUTE/ROAD NUMBER: SC 160

SCDOT PROJECT NO.: P029536

YORK COUNTY PROJECT NO.: 11149-010

DATE: 14 February 2018

REVISED: 24 June 2022

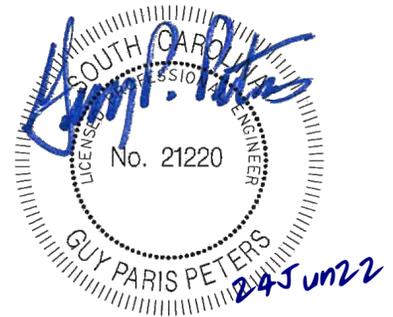
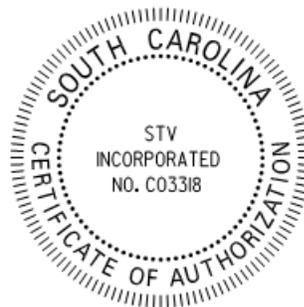
PREPARED BY: Steven C. Noriega, PE

CHECKED BY: Guy P. Peters, PE, CFM

Hydraulic Design Reference
for this study is the:

2009

Edition of SCDOT's
Requirements for Hydraulic
Design Studies.



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Rock Hill South Carolina 29730-3392
www.stvinc.com

**STORMWATER MANAGEMENT DESIGN STUDY
FOR THE PROPOSED CONSTRUCTION OF
SC 160 WIDENING
DRAINAGE REPORT
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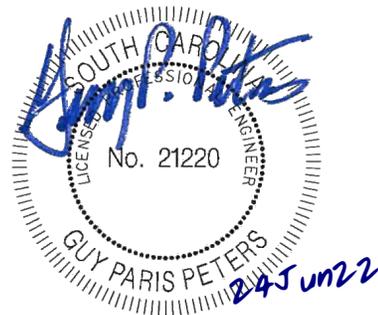
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Introduction

STV Incorporated entered into an agreement with York County, South Carolina to provide professional engineering services for the proposed South Carolina Highway 160 East (SC 160) road improvement project in York County, South Carolina (See Figure 1, Project location map). The project proposes to widen SC 160 between SC 460 and Hensley Road. The roadway areas studied include approximately 0.65 miles of SC 160 and all applicable watershed areas that drain to the roadway and adjacent drainage. This project adjoins FEMA flood Zone AE according to FIRM community panel numbers FM45091C0218E (effective date September 26, 2008), FM45091C0219E (effective date September 26, 2008), and FM45057C0020D (effective date June 16, 2011). See Figure B.1: FEMA Map. The work is expected to result in no adverse impact to the Sugar Creek floodplain. The project's total disturbed area is 5.75 acres. Disturbed area is computed in accordance with SCDOT WQDM-02.

The purpose of this report is to document the design procedures that were used to analyze the hydrology and hydraulics for the proposed roadway improvements. This report contains drainage calculations and summary tables for hydrology, closed systems, open channels, pre versus post analyses and sediment/erosion control.

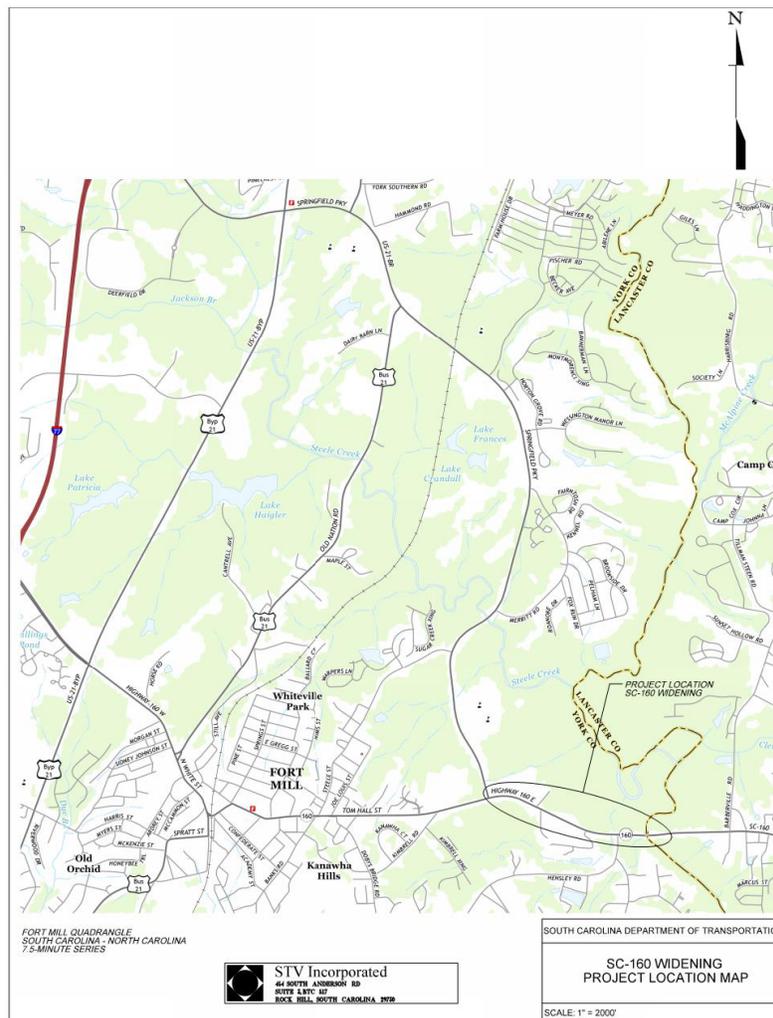


Figure 1: Project location map

Site Description and Soils

The project is located approximately 1.72 miles east of the Town of Fort Mill, South Carolina. The project area is rolling terrain with elevations ranging from about 520 feet to 625 feet above sea level. Existing road, pipe, and ditch gradients range from typically 0.1% to a maximum of 14%. The soils consist of predominantly sandy clay loam and sandy loam and are well drained to somewhat poorly drained (see Figure 2 and Table 1 for soils descriptions and soils map respectively). Land uses in the study corridor consist of mostly residential, small commercial sites, wooded areas, asphalt roadway pavement and grass.



Figure 2: Soils Map

Map Symbol	Soil Name	Description	Drainage	Hydrologic Soil Group
Ch	Chewacla soils, silty clay loam, 0 to 2 percent slope	<i>Depth to restrictive feature: More than 80 inches</i> <i>Depth to water table: ~ 6 inches</i> <i>Frequency of ponding: None</i> <i>Available water capacity: High (about 11.7 inches)</i>	Somewhat poorly drained	B/D
CeB2	Cecil sandy clay loam, 2 to 6 percent slopes	<i>Depth to restrictive feature: More than 80 inches</i> <i>Depth to water table: More than 80 inches</i> <i>Frequency of ponding: None</i> <i>Available water capacity: High (about 9.3 inches)</i>	Well drained	B
CeC2	Cecil sandy clay loam, 6 to 10 percent slopes	<i>Depth to restrictive feature: More than 80 inches</i> <i>Depth to water table: More than 80 inches</i> <i>Frequency of ponding: None</i> <i>Available water capacity: Moderate (about 8.4 inches)</i>	Well drained	B
CfB3	Cecil clay loam, 2 to 6 percent slopes	<i>Depth to restrictive feature: More than 80 inches</i> <i>Depth to water table: More than 80 inches</i> <i>Frequency of ponding: None</i> <i>Available water capacity: Moderate (about 8.8 inches)</i>	Well drained	B
ChA	Chewacla loam, 0 to 2 percent slopes	<i>Depth to restrictive feature: More than 80 inches</i> <i>Depth to water table: About 6 to 24 inches</i> <i>Frequency of ponding: None</i> <i>Available water capacity: High (about 10.8 inches)</i>	Somewhat poorly drained	B/D
HaB	Hard Labor sandy loam, 2 to 6 percent slopes	<i>Depth to restrictive feature: More than 80 inches</i> <i>Depth to water table: About 30 to 80 inches</i> <i>Frequency of ponding: None</i> <i>Available water capacity: Moderate (about 7.3 inches)</i>	Moderately Well drained	C
PaD2	Pacolet sandy clay loam, 10 to 15 percent slopes	<i>Depth to restrictive feature: More than 80 inches</i> <i>Depth to water table: More than 80 inches</i> <i>Frequency of ponding: None</i> <i>Available water capacity: Moderate (about 8.2 inches)</i>	Well drained	B
PaE2	Pacolet sandy clay loam, 15 to 25 percent slopes	<i>Depth to restrictive feature: More than 80 inches</i> <i>Depth to water table: More than 80 inches</i> <i>Frequency of ponding: None</i> <i>Available water capacity: Moderate (about 6.9 inches)</i>	Well drained	C
PcE3	Pacolet clay loam, 15 to 25 percent slopes	<i>Depth to restrictive feature: More than 80 inches</i> <i>Depth to water table: More than 80 inches</i> <i>Frequency of ponding: None</i> <i>Available water capacity: Moderate (about 7.1 inches)</i>	Well drained	B
UcC2	Urban Land-Cecil complex, 2 to 10 percent slopes	<i>Depth to restrictive feature: More than 80 inches</i> <i>Depth to water table: More than 80 inches</i> <i>Frequency of ponding: None</i> <i>Available water capacity: Moderate (about 6.8 inches)</i>	Well drained	B
W	Water			

Table 1: Soils Descriptions for SC 160 road widening in York County, South Carolina

Calculations Methodology

Hydrology

Design Criteria

In accordance with the SCDOT's Requirements for Hydraulic Design Studies, May 2009 Edition, the following design criteria were used. See Appendices C, D and F for calculations.

- 1) Roadside Ditches and Outfalls
 - a) 10% annual chance (10-year) peak discharge for drainage areas from 0 to 40 acres.
 - b) 4% annual chance (25-year) peak discharge for drainage areas from 40 to 500 acres.
 - c) 2% annual chance (50-year) peak discharge for drainage areas greater than 500 acres.
- 2) Culverts
 - a) 2% annual chance (50-year) peak discharge for primary road and interstate routes.
 - b) 4% annual chance (25-year) peak discharge for secondary roads.
 - c) 10% annual chance (10-year) peak discharge for driveway pipes.

Methodology

The rational method is used to calculate peak discharges for all drainage areas up to 100 acres. The formula for calculating peak flow by the Rational Method is

$$Q = C \cdot i \cdot DA \cdot C_f$$

Where: Q = discharge in cubic feet per second (cfs)
C = the runoff coefficient (dimensionless)
i = the rainfall intensity in inches per hour (in/hr)
DA = Drainage Area (ac)
C_f (dimensionless) is defined by:

<u>Recurrence Interval - % annual chance</u>	<u>C_f</u>
50 – 10 (2-yr – 10-yr)	1.0
4 (25-yr)	1.1
2 (50-yr)	1.2
1 (100-yr)	1.25

Runoff Coefficient (C)

Runoff coefficients were determined from a visual inspection of the project area and the following table from SCDOT's Requirements for Hydraulic Design Studies, May 2009 Edition.

RUNOFF FACTORS FOR RATIONAL METHOD				
Ground coverage type ↓	Terrain type →	Flat	Rolling	Hilly
	Slope range →	0% - 2%	2% - 10%	Over 10%
Pavements & Roofs		0.90	0.90	0.90
Earth shoulders		0.50	0.50	0.50
Drives & Walks		0.75	0.80	0.85
Gravel Pavements		0.50	0.55	0.60
City Business Areas		0.80	0.85	0.85
Unpaved Road, Sandy Soils		0.34	0.45	0.59
Unpaved Road, Silty Soils		0.35	0.47	0.61
Unpaved Road, Clay Soils		0.40	0.53	0.69
Apartment Dwelling Areas		0.50	0.60	0.70
Suburban, Normal Residential		0.45	0.50	0.55
Dense Residential Sections		0.60	0.65	0.70
Lawns, Sandy Soils		0.10	0.15	0.20
Lawns, Heavy Soils		0.17	0.22	0.35
Grass Shoulders		0.25	0.25	0.25
Side Slopes, Earth		0.60	0.60	0.60
Side Slopes, Turf		0.30	0.30	0.30
Median Areas, Turf		0.25	0.30	0.30
Cultivated Land, Clay & Loam		0.50	0.55	0.60
Cultivated Land, Sand & Gravel		0.25	0.30	0.35
Industrial Areas, Light		0.50	0.70	0.80
Industrial Areas, Heavy		0.60	0.80	0.90
Parks & Cemeteries		0.10	0.15	0.25
Playgrounds		0.20	0.25	0.30
Woodland & Forest		0.10	0.15	0.20
Meadows & Pasture Land		0.25	0.30	0.35
Unimproved Areas		0.10	0.20	0.30
Rail Yards		0.25	0.30	NA
Expressways & Freeways *		0.60	0.70*	0.75*

* The designer can also calculate weighted 'C' values for expressways and freeways using the values in the table for pavement, side slopes and planted medians.

Revised 3/16/09

Table 2: Runoff Coefficients for Rational Formula

Time of Concentration (t_c)

Time of Concentration is calculated using a spreadsheet based on the TR-55 method. All t_c values were derived from digital mapping, field survey, field observations and USGS topographic maps (see Appendices C and D for calculations).

Rainfall intensity (i)

Rainfall intensities were determined using the following equation and the values indicated in the Rainfall Intensity Values charts provided by SCDOT.

$$i = \frac{a}{(b + t_c)^c}$$

The coefficients for Rock Hill, South Carolina for the 50%, 20%, 10%, 4%, 2%, and 1% annual chance (2-, 5-, 10-, 25-, 50-, and 100-year) rainfalls are given in the table below as well as the intensity values for the 5-, 10-, and 15-minute times of concentration.

Rock Hill, South Carolina							
Frequency		a	b	c	i (t _c = 5)	i (t _c = 10)	i (t _c = 15)
% annual chance	x -year						
50	2	240.26568	35.61513	1.03559	5.19	4.60	4.13
20	5	254.71848	33.33552	1.02140	6.15	5.42	4.85
10	10	264.71357	31.82192	1.01175	6.89	6.06	5.40
4	25	276.98802	30.00177	1.00001	7.91	6.92	6.15
2	50	286.34575	28.61559	0.99107	8.80	7.66	6.79
1	100	294.57238	27.37215	0.98314	9.65	8.38	7.41

Table 3: Rainfall Intensities for Rock Hill, SC

Drainage Area (DA)

Drainage areas for ditches, and culverts were delineated with Microstation V8i utilizing field survey, USGS topographic maps, digital mapping and field observation (see Appendices C and D for Drainage Area Maps).

Open Channel Hydraulics

Design Criteria

- 1) Minimum Ditch Grade should be 0.30%.
- 2) Maximum Shear Stress allowable will be 1.00 lbs/ft² for Class ‘C’ vegetation.
- 3) Minimum ditch depth should be 1.0’ below the sub-grade of the roadway.
- 4) No modifications will be made to natural channels unless to prevent scour and erosion.

Methodology

An in-house spreadsheet using the formulas and procedure from HEC-15 (FHWA-IP-87-7, April 1988 Edition), Design of Roadside Channels with Flexible Linings was used to analyze proposed ditch sections. The ditches were analyzed for shear stress and adequate ditch depth. Where ditch section analysis indicated instability due to shear stress, temporary erosion control blanket or a permanent erosion control mat was proposed to stabilize the ditch (see Appendix C for calculations).

Shear stress is analyzed using the following formula:

$$\tau = \gamma d S$$

Where: τ = shear stress (lb/ft²)
 γ = unit weight of water (62.4 lb/ft³)
 d = flow depth (ft)
 S = Channel gradient (ft/ft)

Culvert Hydraulics

Design Criteria

- 1) Prevent potential damage to upstream property.
- 2) Headwater should be 1.0' below the subgrade of roadway.
- 3) Meet FEMA floodway or flood hazard requirements where applicable.
- 4) Design headwater should be limited to 1.2 times the height of the culvert.

Methodology

The FHWA computer program HY-8 is used to perform the hydraulic analysis for any project culvert crossings not designed as part of closed systems. The culvert located near Station 96+00 has been evaluated based on hydrologic analysis recommendations from SCDOT. SCDOT recommended the StreamStats regression equation tool in consideration of the general characteristics of the drainage area and local observations of the culvert's performance over many years. The completed analysis is included in Appendix G. In summary, the culvert does not overtop in the design rainfall event or the 1% AEP (100-year) event.

Driveway pipes were sized using the following table as a guideline for locations where HY-8 analysis was not performed:

Pipe Size (inches)	Maximum Capacity (cfs)
12	3
15	6
18	9
24	18
30	30
36	48
42	70
48	100
Maximum capacity is based on inlet control.	

Table 4: Driveway pipe capacity chart

Pre vs. Post Analysis

Design Criteria

Pre and post development peak discharge rates were analyzed at each outfall for the 50% and 10% annual chance (2- and 10- year) storm events. If post development discharges increased and/or if significant downstream impacts were anticipated, then the appropriate storm water management measure has been designed.

Methodology

The rational method was used to generate pre and post development peak discharges for all drainage areas less than 100 acres. The project outfalls were hydraulically analyzed to determine downstream impacts. See Appendix D for Pre versus Post discharge calculations. Based on these calculations, the proposed project improvements will not cause adverse impacts to the downstream receiving water body(s) and/or properties and will not require detention practices.

Sediment and Erosion Control

Design Criteria

The sediment and erosion control structures for this project consist of sediment dams, sediment dams for pipe inlets, silt fence, ditch checks/sediment tubes, erosion control blankets, permanent turf reinforcement matting and outlet protection. All projects that have one or more acres of disturbed area will be designed for sediment and erosion control in accordance with DHEC's General Permit and State Erosion Control regulations. All stormwater from the construction site should be treated before it is released.

Methodology

- 1) Sediment Dams (SCDOT Standard Drawing No. 815-405-01 and 815-405-02.) will be placed at the outfall locations as shown on the plans and are used to remove sediment from construction runoff where the total drainage area is less than 10 acres. Sediment dams will be designed in accordance with the SCDOT's Stormwater Quality Design Manual (June 2014 Edition).
- 2) Sediment Dams for Pipe Inlets (SCDOT Stand Drawing No. 815-406-00) will be placed at pipe inlets as shown on the plans and are used to remove sediment from construction runoff where the total disturbed area in less than 2 acres. Sediment Dams for Pipe Inlets will be designed in accordance with the SCDOT's Stormwater Quality Design Manual (June 2014 Edition).
- 3) Silt Fence (SCDOT Standard Drawing No. 815-605-00) will be placed along the perimeter of the disturbed area where runoff is in sheet flow or concentrated flow less than 0.5 cfs. Silt fence will act as a sediment filter by retarding flow and promoting deposition.
- 4) Ditch Checks (SCDOT Standard Drawing No. 815-105-00) or 20" Sediment Tubes (SCDOT Standard Drawing No. 815-205-00) will be placed in the roadside ditches and are intended to reduce erosion in the channel by reducing velocity and promoting deposition. The check dams will be placed so that the downstream toe of one check dam is level with the top of the next one downstream.
- 5) Erosion Control Blankets and/or Turf Reinforced Mats (SCDOT Standard Drawing No. 815-6 05-00) will be placed in ditches as shown on the Erosion Control Data Sheet and on some 2:1 slopes. These rolled erosion control products will protect the exposed soil from the forces

of raindrop impact and overland flow and will promote growth of vegetation.

- 6) Outlet protection riprap will be placed at the outlet end of culverts and ditches where needed to protect the receiving channel from scour by reducing discharge velocity and dissipating energy.

Sediment and erosion control devices should be inspected weekly and after each storm event. Any damage to devices should be repaired immediately, and any silt accumulated should be removed. All disturbed areas should be covered with temporary or permanent vegetation as soon as practical. All devices should be properly maintained during all phases of construction and be removed once the area has been stabilized.

Appendix A
Soils Report

Map Unit Description

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this report, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. Soils of a given series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Additional information about the map units described in this report is available in other soil reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the soil reports define some of the properties included in the map unit descriptions.

Report—Map Unit Description

York County, South Carolina

CeC2—Cecil sandy clay loam, 6 to 10 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: 2tqlf

Elevation: 220 to 1,160 feet
Mean annual precipitation: 40 to 69 inches
Mean annual air temperature: 50 to 66 degrees F
Frost-free period: 180 to 280 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Cecil, moderately eroded, and similar soils: 91 percent
Minor components: 9 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cecil, Moderately Eroded

Setting

Landform: Interfluves
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from gneiss and/or residuum weathered from granite

Typical profile

A - 0 to 3 inches: sandy clay loam
Bt - 3 to 48 inches: clay
BCt - 48 to 80 inches: sandy clay loam

Properties and qualities

Slope: 6 to 10 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat):
 Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Bethlehem, moderately eroded

Percent of map unit: 3 percent
Landform: Interfluves
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex

Across-slope shape: Linear
Hydric soil rating: No

Cataula, moderately eroded

Percent of map unit: 3 percent
Landform: Interfluves
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Mecklenburg, moderately eroded

Percent of map unit: 3 percent
Landform: Ridges, hills
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Hydric soil rating: No

CfB3—Cecil clay loam, 2 to 6 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: 2th0d
Elevation: 370 to 1,180 feet
Mean annual precipitation: 40 to 69 inches
Mean annual air temperature: 50 to 66 degrees F
Frost-free period: 180 to 280 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Cecil, severely eroded, and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cecil, Severely Eroded

Setting

Landform: Interfluves
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from granite and/or residuum weathered from gneiss

Typical profile

A - 0 to 5 inches: clay loam
Bt - 5 to 54 inches: clay
C - 54 to 80 inches: sandy clay loam

Properties and qualities

Slope: 2 to 6 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat):

Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Moderate (about 8.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: B

Hydric soil rating: No

Minor Components**Cataula, moderately eroded**

Percent of map unit: 5 percent

Landform: Interfluves

Landform position (two-dimensional): Backslope, shoulder

Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

ChA—Chewacla loam, 0 to 2 percent slopes, frequently flooded**Map Unit Setting**

National map unit symbol: 2sclw

Elevation: 90 to 1,930 feet

Mean annual precipitation: 40 to 69 inches

Mean annual air temperature: 50 to 66 degrees F

Frost-free period: 180 to 280 days

Farmland classification: Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Chewacla, frequently flooded, and similar soils: 80 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chewacla, Frequently Flooded**Setting**

Landform: Flood plains

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

A - 0 to 10 inches: loam
Bw - 10 to 80 inches: sandy clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat):
 Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 6 to 24 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Available water storage in profile: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: B/D
Hydric soil rating: No

Minor Components

Toccoa, frequently flooded

Percent of map unit: 15 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Wehadkee, ponded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

HaB—Hard Labor sandy loam, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2lq1v
Elevation: 250 to 600 feet
Mean annual precipitation: 42 to 55 inches
Mean annual air temperature: 51 to 72 degrees F
Frost-free period: 202 to 249 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Hard labor and similar soils: 90 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hard Labor

Setting

Landform: Interfluves

Landform position (two-dimensional): Backslope, shoulder, summit

Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Residuum weathered from gneiss and/or
residuum weathered from granite

Typical profile

A - 0 to 10 inches: sandy loam

BE - 10 to 15 inches: sandy clay loam

B - 15 to 45 inches: clay

BC - 45 to 80 inches: clay loam

Properties and qualities

Slope: 2 to 6 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Moderately well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat):

Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 30 to 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: C

Hydric soil rating: No

Minor Components

Helena

Percent of map unit: 10 percent

Landform: Interfluves

Landform position (two-dimensional): Backslope, shoulder, summit

Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

PaE2—Pacolet sandy clay loam, 15 to 25 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: 2vy5z
Elevation: 200 to 1,630 feet
Mean annual precipitation: 40 to 69 inches
Mean annual air temperature: 50 to 66 degrees F
Frost-free period: 180 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

Pacolet, moderately eroded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pacolet, Moderately Eroded

Setting

Landform: Interfluves
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from granite and/or residuum weathered from gneiss

Typical profile

Ap - 0 to 7 inches: sandy clay loam
Bt - 7 to 28 inches: clay
BC - 28 to 44 inches: sandy clay loam
C - 44 to 80 inches: loam

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat):
 Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Bethlehem

Percent of map unit: 5 percent

Landform: Interfluves

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Convex

Hydric soil rating: No

Saw, very rocky

Percent of map unit: 3 percent

Landform: Interfluves

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Convex

Hydric soil rating: No

Poindexter

Percent of map unit: 2 percent

Landform: Interfluves

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Convex

Hydric soil rating: No

Data Source Information

Soil Survey Area: York County, South Carolina

Survey Area Data: Version 13, Sep 27, 2016

Hydrologic Soil Group and Surface Runoff

This table gives estimates of various soil water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas.

Surface runoff refers to the loss of water from an area by flow over the land surface. Surface runoff classes are based on slope, climate, and vegetative cover. The concept indicates relative runoff for very specific conditions. It is assumed that the surface of the soil is bare and that the retention of surface water resulting from irregularities in the ground surface is minimal. The classes are negligible, very low, low, medium, high, and very high.

Report—Hydrologic Soil Group and Surface Runoff

Absence of an entry indicates that the data were not estimated. The dash indicates no documented presence.

Hydrologic Soil Group and Surface Runoff—York County, South Carolina			
Map symbol and soil name	Pct. of map unit	Surface Runoff	Hydrologic Soil Group
CeC2—Cecil sandy clay loam, 6 to 10 percent slopes, moderately eroded			
Cecil, moderately eroded	91	Medium	B

Hydrologic Soil Group and Surface Runoff--York County, South Carolina			
Map symbol and soil name	Pct. of map unit	Surface Runoff	Hydrologic Soil Group
CfB3—Cecil clay loam, 2 to 6 percent slopes, severely eroded			
Cecil, severely eroded	95	—	B
ChA—Chewacla loam, 0 to 2 percent slopes, frequently flooded			
Chewacla, frequently flooded	80	Low	B/D
HaB—Hard Labor sandy loam, 2 to 6 percent slopes			
Hard labor	90	Low	C
PaE2—Pacolet sandy clay loam, 15 to 25 percent slopes, moderately eroded			
Pacolet, moderately eroded	90	—	C

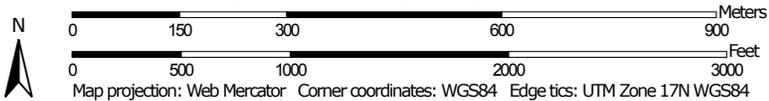
Data Source Information

Soil Survey Area: York County, South Carolina
 Survey Area Data: Version 13, Sep 27, 2016

Ponding Frequency Class—Lancaster County, South Carolina, and York County, South Carolina
(I-160)



Map Scale: 1:10,500 if printed on A landscape (11" x 8.5") sheet.



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

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

-  None
-  Rare
-  Occasional
-  Frequent
-  Not rated or not available

Soil Rating Lines

-  None
-  Rare
-  Occasional
-  Frequent
-  Not rated or not available

Soil Rating Points

-  None
-  Rare
-  Occasional
-  Frequent
-  Not rated or not available

Water Features

 Streams and Canals

Transportation

-  Rails
-  Interstate Highways

 US Routes

 Major Roads

 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:15,800 to 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Lancaster County, South Carolina

Survey Area Data: Version 17, Sep 28, 2016

Soil Survey Area: York County, South Carolina

Survey Area Data: Version 13, Sep 27, 2016

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 11, 2011—Feb 13, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Ponding Frequency Class

Ponding Frequency Class— Summary by Map Unit — Lancaster County, South Carolina (SC057)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Ch	Chewacla soils	None	0.6	2.3%
W	Water	None	0.1	0.5%
Subtotals for Soil Survey Area			0.7	2.8%
Totals for Area of Interest			26.3	100.0%

Ponding Frequency Class— Summary by Map Unit — York County, South Carolina (SC091)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
CeB2	Cecil sandy clay loam, 2 to 6 percent slopes, moderately eroded	None	3.5	13.3%
CeC2	Cecil sandy clay loam, 6 to 10 percent slopes, moderately eroded	None	3.2	12.1%
CfB3	Cecil clay loam, 2 to 6 percent slopes, severely eroded	None	2.7	10.4%
ChA	Chewacla loam, 0 to 2 percent slopes, frequently flooded	None	0.7	2.8%
HaB	Hard Labor sandy loam, 2 to 6 percent slopes	None	2.8	10.6%
PaD2	Pacolet sandy clay loam, 10 to 15 percent slopes, moderately eroded	None	4.7	17.7%
PaE2	Pacolet sandy clay loam, 15 to 25 percent slopes, moderately eroded	None	6.0	22.7%
PcE3	Pacolet clay loam, 15 to 25 percent slopes, severely eroded	None	0.7	2.6%
UcC2	Urban Land-Cecil complex, 2 to 10 percent slopes, moderately eroded	None	1.2	4.4%
W	Water	None	0.1	0.6%
Subtotals for Soil Survey Area			25.5	97.2%
Totals for Area of Interest			26.3	100.0%

Description

Ponding is standing water in a closed depression. The water is removed only by deep percolation, transpiration, or evaporation or by a combination of these processes. Ponding frequency classes are based on the number of times that ponding occurs over a given period. Frequency is expressed as none, rare, occasional, and frequent.

"None" means that ponding is not probable. The chance of ponding is nearly 0 percent in any year.

"Rare" means that ponding is unlikely but possible under unusual weather conditions. The chance of ponding is nearly 0 percent to 5 percent in any year.

"Occasional" means that ponding occurs, on the average, once or less in 2 years. The chance of ponding is 5 to 50 percent in any year.

"Frequent" means that ponding occurs, on the average, more than once in 2 years. The chance of ponding is more than 50 percent in any year.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: More Frequent

Beginning Month: January

Ending Month: December

Drainage Class—Lancaster County, South Carolina, and York County, South Carolina
(I-160)



Map Scale: 1:10,500 if printed on A landscape (11" x 8.5") sheet.



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

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

-  Excessively drained
-  Somewhat excessively drained
-  Well drained
-  Moderately well drained
-  Somewhat poorly drained
-  Poorly drained
-  Very poorly drained
-  Subaqueous
-  Not rated or not available

Soil Rating Lines

-  Excessively drained
-  Somewhat excessively drained
-  Well drained
-  Moderately well drained
-  Somewhat poorly drained
-  Poorly drained
-  Very poorly drained
-  Subaqueous
-  Not rated or not available

Soil Rating Points

-  Excessively drained
-  Somewhat excessively drained
-  Well drained
-  Moderately well drained
-  Somewhat poorly drained
-  Poorly drained
-  Very poorly drained
-  Subaqueous
-  Not rated or not available

Water Features

 Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:15,800 to 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Lancaster County, South Carolina
Survey Area Data: Version 17, Sep 28, 2016

Soil Survey Area: York County, South Carolina
Survey Area Data: Version 13, Sep 27, 2016

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 11, 2011—Feb 13, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Drainage Class

Drainage Class— Summary by Map Unit — Lancaster County, South Carolina (SC057)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Ch	Chewacla soils	Somewhat poorly drained	0.6	2.3%
W	Water		0.1	0.5%
Subtotals for Soil Survey Area			0.7	2.8%
Totals for Area of Interest			26.3	100.0%

Drainage Class— Summary by Map Unit — York County, South Carolina (SC091)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
CeB2	Cecil sandy clay loam, 2 to 6 percent slopes, moderately eroded	Well drained	3.5	13.3%
CeC2	Cecil sandy clay loam, 6 to 10 percent slopes, moderately eroded	Well drained	3.2	12.1%
CfB3	Cecil clay loam, 2 to 6 percent slopes, severely eroded	Well drained	2.7	10.4%
ChA	Chewacla loam, 0 to 2 percent slopes, frequently flooded	Somewhat poorly drained	0.7	2.8%
HaB	Hard Labor sandy loam, 2 to 6 percent slopes	Moderately well drained	2.8	10.6%
PaD2	Pacolet sandy clay loam, 10 to 15 percent slopes, moderately eroded	Well drained	4.7	17.7%
PaE2	Pacolet sandy clay loam, 15 to 25 percent slopes, moderately eroded	Well drained	6.0	22.7%
PcE3	Pacolet clay loam, 15 to 25 percent slopes, severely eroded	Well drained	0.7	2.6%
UcC2	Urban Land-Cecil complex, 2 to 10 percent slopes, moderately eroded		1.2	4.4%
W	Water		0.1	0.6%
Subtotals for Soil Survey Area			25.5	97.2%
Totals for Area of Interest			26.3	100.0%

Description

"Drainage class (natural)" refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained. These classes are defined in the "Soil Survey Manual."

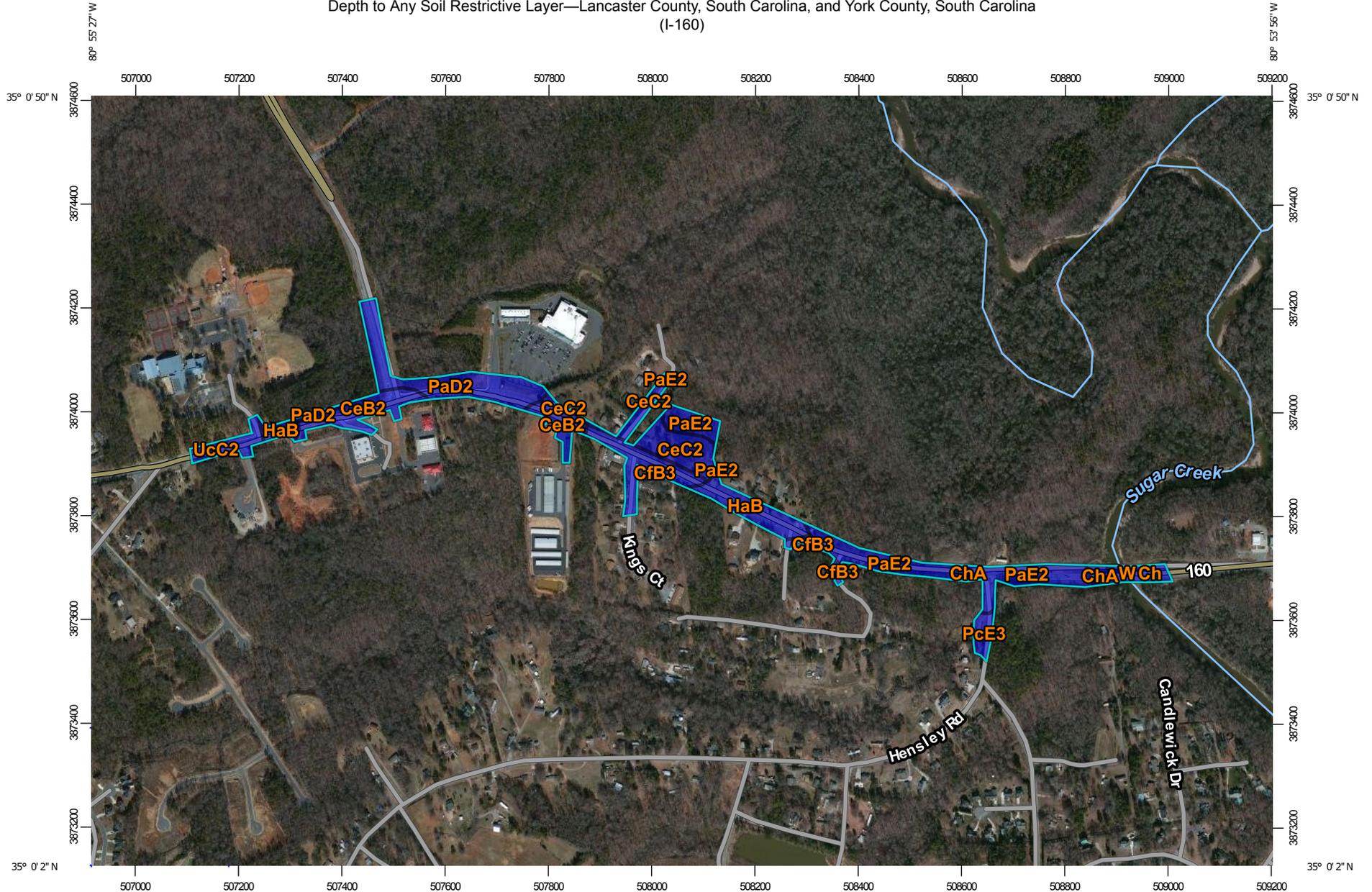
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Depth to Any Soil Restrictive Layer—Lancaster County, South Carolina, and York County, South Carolina
(I-160)



Map Scale: 1:10,500 if printed on A landscape (11" x 8.5") sheet.



MAP LEGEND

Area of Interest (AOI)	 Not rated or not available
 Area of Interest (AOI)	
Soils	Water Features
Soil Rating Polygons	 Streams and Canals
 0 - 25	Transportation
 25 - 50	 Rails
 50 - 100	 Interstate Highways
 100 - 150	 US Routes
 150 - 200	 Major Roads
 > 200	 Local Roads
 Not rated or not available	Background
	 Aerial Photography
Soil Rating Lines	
 0 - 25	
 25 - 50	
 50 - 100	
 100 - 150	
 150 - 200	
 > 200	
 Not rated or not available	
Soil Rating Points	
 0 - 25	
 25 - 50	
 50 - 100	
 100 - 150	
 150 - 200	
 > 200	

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:15,800 to 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

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Soil Survey Area: Lancaster County, South Carolina
Survey Area Data: Version 17, Sep 28, 2016

Soil Survey Area: York County, South Carolina
Survey Area Data: Version 13, Sep 27, 2016

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 11, 2011—Feb 13, 2011

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Depth to Any Soil Restrictive Layer

Depth to Any Soil Restrictive Layer— Summary by Map Unit — Lancaster County, South Carolina (SC057)				
Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
Ch	Chewacla soils	>200	0.6	2.3%
W	Water	>200	0.1	0.5%
Subtotals for Soil Survey Area			0.7	2.8%
Totals for Area of Interest			26.3	100.0%

Depth to Any Soil Restrictive Layer— Summary by Map Unit — York County, South Carolina (SC091)				
Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
CeB2	Cecil sandy clay loam, 2 to 6 percent slopes, moderately eroded	>200	3.5	13.3%
CeC2	Cecil sandy clay loam, 6 to 10 percent slopes, moderately eroded	>200	3.2	12.1%
CfB3	Cecil clay loam, 2 to 6 percent slopes, severely eroded	>200	2.7	10.4%
ChA	Chewacla loam, 0 to 2 percent slopes, frequently flooded	>200	0.7	2.8%
HaB	Hard Labor sandy loam, 2 to 6 percent slopes	>200	2.8	10.6%
PaD2	Pacolet sandy clay loam, 10 to 15 percent slopes, moderately eroded	>200	4.7	17.7%
PaE2	Pacolet sandy clay loam, 15 to 25 percent slopes, moderately eroded	>200	6.0	22.7%
PcE3	Pacolet clay loam, 15 to 25 percent slopes, severely eroded	>200	0.7	2.6%
UcC2	Urban Land-Cecil complex, 2 to 10 percent slopes, moderately eroded	>200	1.2	4.4%
W	Water	>200	0.1	0.6%
Subtotals for Soil Survey Area			25.5	97.2%
Totals for Area of Interest			26.3	100.0%

Description

A "restrictive layer" is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers.

This theme presents the depth to any type of restrictive layer that is described for each map unit. If more than one type of restrictive layer is described for an individual soil type, the depth to the shallowest one is presented. If no restrictive layer is described in a map unit, it is represented by the "> 200" depth class.

This attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Rating Options

Units of Measure: centimeters

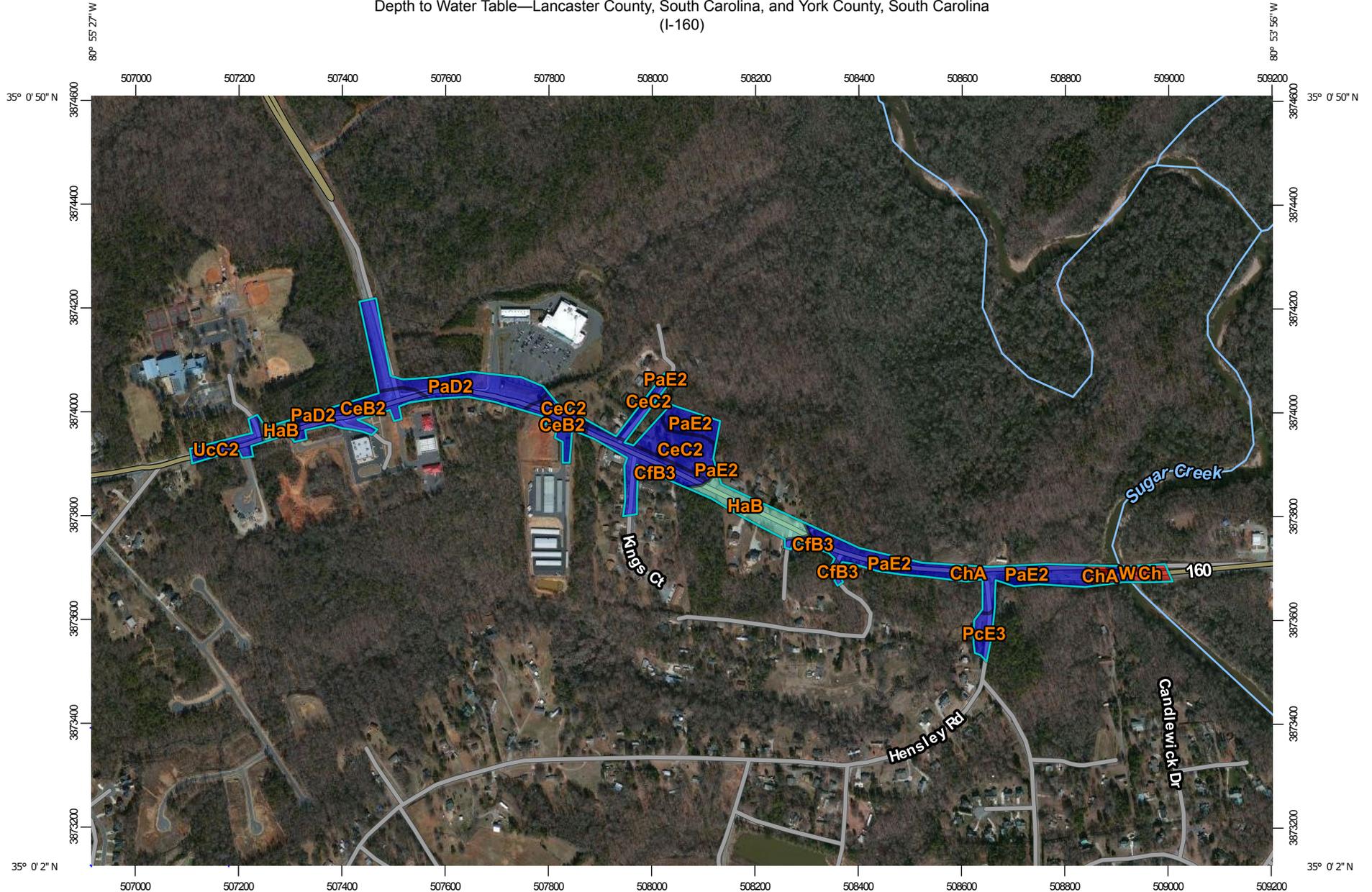
Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

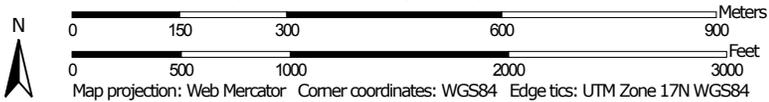
Tie-break Rule: Lower

Interpret Nulls as Zero: No

Depth to Water Table—Lancaster County, South Carolina, and York County, South Carolina
(I-160)



Map Scale: 1:10,500 if printed on A landscape (11" x 8.5") sheet.



MAP LEGEND

Area of Interest (AOI)	 Not rated or not available
 Area of Interest (AOI)	
Soils	Water Features
Soil Rating Polygons	 Streams and Canals
 0 - 25	Transportation
 25 - 50	 Rails
 50 - 100	 Interstate Highways
 100 - 150	 US Routes
 150 - 200	 Major Roads
 > 200	 Local Roads
 Not rated or not available	Background
	 Aerial Photography
Soil Rating Lines	
 0 - 25	
 25 - 50	
 50 - 100	
 100 - 150	
 150 - 200	
 > 200	
 Not rated or not available	
Soil Rating Points	
 0 - 25	
 25 - 50	
 50 - 100	
 100 - 150	
 150 - 200	
 > 200	

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:15,800 to 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Lancaster County, South Carolina
Survey Area Data: Version 17, Sep 28, 2016

Soil Survey Area: York County, South Carolina
Survey Area Data: Version 13, Sep 27, 2016

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 11, 2011—Feb 13, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Depth to Water Table

Depth to Water Table— Summary by Map Unit — Lancaster County, South Carolina (SC057)				
Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
Ch	Chewacla soils	15	0.6	2.3%
W	Water	>200	0.1	0.5%
Subtotals for Soil Survey Area			0.7	2.8%
Totals for Area of Interest			26.3	100.0%

Depth to Water Table— Summary by Map Unit — York County, South Carolina (SC091)				
Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
CeB2	Cecil sandy clay loam, 2 to 6 percent slopes, moderately eroded	>200	3.5	13.3%
CeC2	Cecil sandy clay loam, 6 to 10 percent slopes, moderately eroded	>200	3.2	12.1%
CfB3	Cecil clay loam, 2 to 6 percent slopes, severely eroded	>200	2.7	10.4%
ChA	Chewacla loam, 0 to 2 percent slopes, frequently flooded	25	0.7	2.8%
HaB	Hard Labor sandy loam, 2 to 6 percent slopes	114	2.8	10.6%
PaD2	Pacolet sandy clay loam, 10 to 15 percent slopes, moderately eroded	>200	4.7	17.7%
PaE2	Pacolet sandy clay loam, 15 to 25 percent slopes, moderately eroded	>200	6.0	22.7%
PcE3	Pacolet clay loam, 15 to 25 percent slopes, severely eroded	>200	0.7	2.6%
UcC2	Urban Land-Cecil complex, 2 to 10 percent slopes, moderately eroded	>200	1.2	4.4%
W	Water	>200	0.1	0.6%
Subtotals for Soil Survey Area			25.5	97.2%
Totals for Area of Interest			26.3	100.0%

Description

"Water table" refers to a saturated zone in the soil. It occurs during specified months. Estimates of the upper limit are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

This attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Rating Options

Units of Measure: centimeters

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Interpret Nulls as Zero: No

Beginning Month: January

Ending Month: December

Appendix B
FEMA FIRMs

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where Base Flood Elevations (BFEs) and/or floodways have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations (BFEs) shown on this map apply only to landward of 0.0 North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The projection used in the preparation of this map was State Plane South Carolina FIPS 3900. The horizontal datum was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at <http://www.ngs.noaa.gov> or contact the National Geodetic Survey at the following address:

Spatial Reference System Division
National Geodetic Survey, NOAA
Silver Spring Metro Center 1315
East-West Highway
Silver Spring, Maryland 20910
(301) 713-3191

To obtain current elevation, description, and/or location information for bench marks shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242 or visit its website at <http://www.ngs.noaa.gov>.

Base map information shown on this FIRM was provided in digital format by York County, South Carolina.

This map reflects more detailed and up-to-date stream channel configurations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

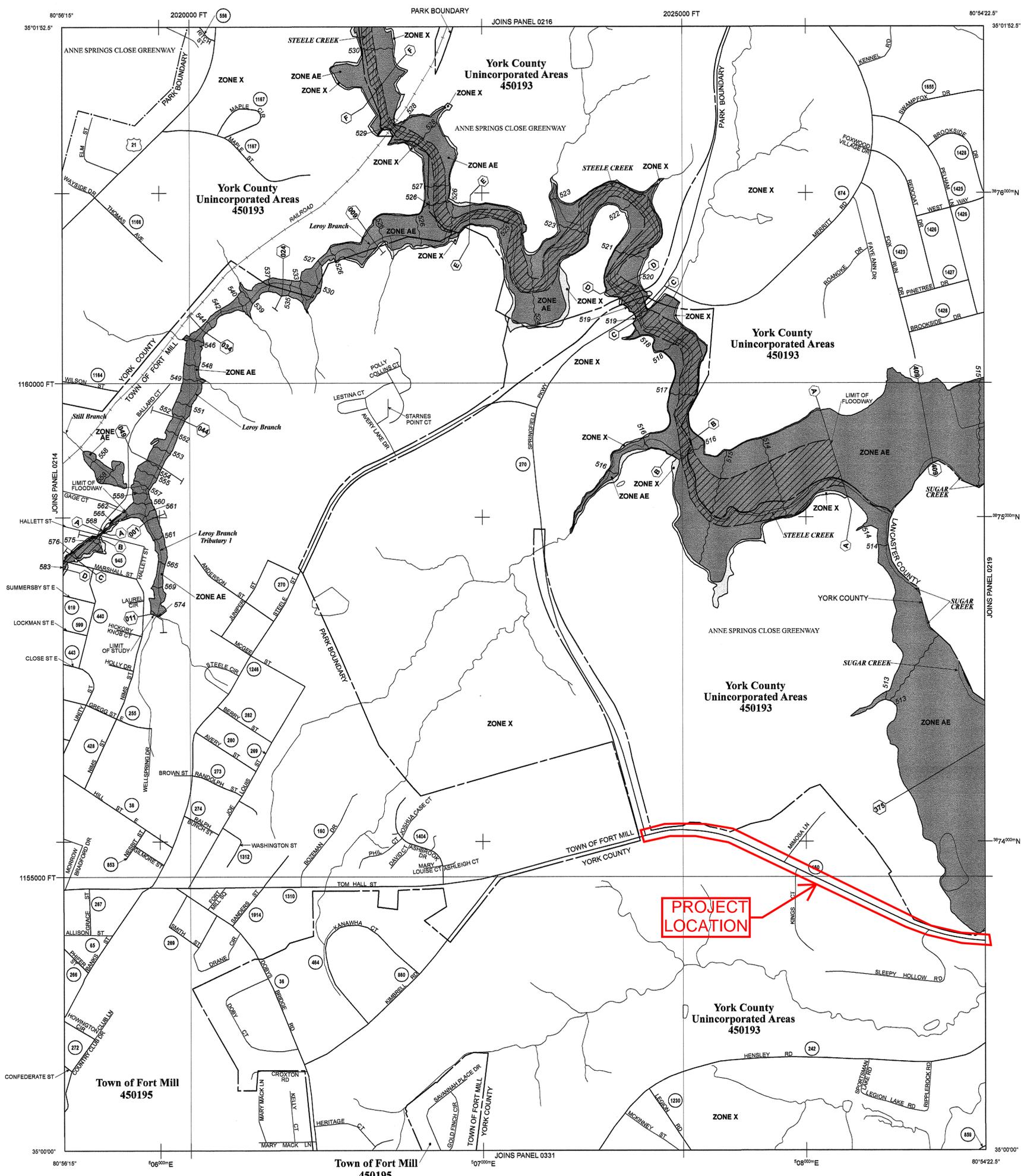
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Contact the FEMA Map Service Center at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at <http://www.msc.fema.gov>.

If you have questions about this map or questions concerning the National Flood Insurance Program in general, please call 1-877-FEMA MAP (1-877-336-2627) or visit the FEMA website at <http://www.fema.gov>.

DNR
This digital Flood Insurance Rate Map (FIRM) was produced through a unique cooperative partnership between the State of South Carolina and the Federal Emergency Management Agency (FEMA). The State of South Carolina has implemented a long term approach of floodplain management to decrease the costs associated with flooding. This is demonstrated by the State's commitment to map floodplain areas at the local level. As a part of this effort, the state of South Carolina has joined in a Cooperating Technical State agreement with FEMA to produce and maintain this digital FIRM.

<http://www.dnr.state.sc.us/>



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- ZONE A** No Base Flood Elevations determined.
- ZONE AE** Base Flood Elevations determined.
- ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR** Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently identified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE A99** Areas to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

- ZONE X** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

- ZONE X** Areas determined to be outside the 0.2% annual chance floodplain.
- ZONE D** Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- Floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities
- Base Flood Elevation line and value; elevation in feet*
- Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

- (EL 987)
- Reference to the North American Vertical Datum of 1988
- Transverse line
- Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 1000-meter Universal Transverse Mercator grid ticks, zone 17
- 5000-foot grid values: South Carolina State Plane coordinate system (FIPSZONE = 3900), Lambert projection
- Bench mark (see explanation in Notes to Users section of this FIRM panel)
- MAP REPOSITORIES
- Refer to Map Repositories list on Map Index
- EFFECTIVE DATE OF COUNTY-WIDE FLOOD INSURANCE RATE MAP
- SEPTEMBER 26, 2008
- EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-5623.

MAP SCALE 1" = 500'

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0218E

FIRM
FLOOD INSURANCE RATE MAP
YORK COUNTY,
SOUTH CAROLINA
AND INCORPORATED AREAS

PANEL 218 OF 505
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
FORT MILL, TOWN OF	450195	0218	E
YORK COUNTY	450193	0218	E

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
45091C0218E

EFFECTIVE DATE
SEPTEMBER 26, 2008
Federal Emergency Management Agency

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where Base Flood Elevations (BFEs) and/or floodways have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations (BFEs) shown on this map apply only landward of 0.1 North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The projection used in the preparation of this map was State Plane South Carolina FIPS 3900. The horizontal datum was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at <http://www.ngs.noaa.gov> or contact the National Geodetic Survey at the following address:

Spatial Reference System Division
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Silver Spring Metro Center
1315 East-West Highway
Silver Spring, Maryland 20910
(301) 713-3191

To obtain current elevation, description, and/or location information for bench marks shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242 or visit its website at <http://www.ngs.noaa.gov>.

Base map information shown on this FIRM was provided in digital format by York County, South Carolina.

This map reflects more detailed and up-to-date stream channel configurations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

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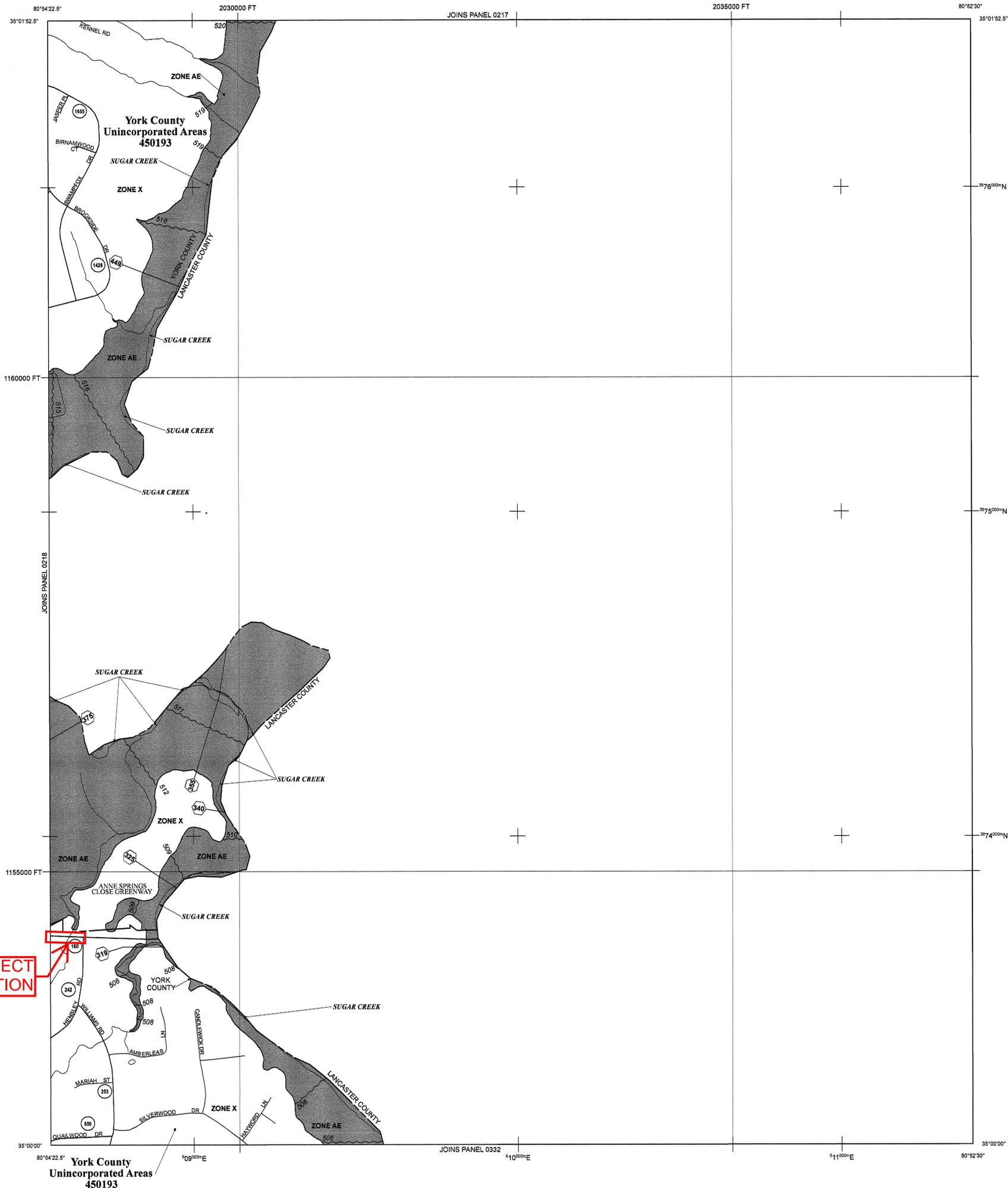
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If you have questions about this map or questions concerning the National Flood Insurance Program in general, please call 1-877-FEMA MAP (1-877-336-2627) or visit the FEMA website at <http://www.fema.gov>.



This digital Flood Insurance Rate Map (FIRM) was produced through a unique cooperative partnership between the State of South Carolina and the Federal Emergency Management Agency (FEMA). The State of South Carolina has implemented a long term approach of floodplain management to decrease the costs associated with flooding. This is demonstrated by the State's commitment to map floodplain areas at the local level. As a part of this effort, the state of South Carolina has joined in a Cooperating Technical State agreement with FEMA to produce and maintain this digital FIRM.

<http://www.dnr.state.sc.us/>



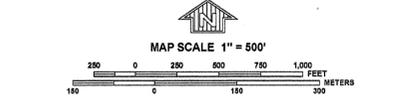
LEGEND

- SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD
- The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.
- ZONE A** No Base Flood Elevations determined.
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- The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.
- OTHER FLOOD AREAS**
- ZONE X** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
- OTHER AREAS**
- ZONE X** Areas determined to be outside the 0.2% annual chance floodplain.
- ZONE D** Areas in which flood hazards are undetermined, but possible.
- COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS
- OTHERWISE PROTECTED AREAS (OPAs)

- CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.
- Floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities
- Base Flood Elevation line and value; elevation in feet*
Base Flood Elevation value where uniform within zone; elevation in feet
- Bench mark (see explanation in Notes to Users section of this FIRM panel)
- River Mile
- MAP REPOSITORIES
Refer to Map Repositories list on Map Index
- EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
SEPTEMBER 26, 2008
- EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

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NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0219E

FIRM
FLOOD INSURANCE RATE MAP
YORK COUNTY,
SOUTH CAROLINA
AND INCORPORATED AREAS

PANEL 219 OF 505
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:
COMMUNITY NUMBER PANEL SUFFIX
YORK COUNTY 450193 0219 E

Notice to User: The Map Number shown below should be used when placing map orders, the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
4501C0219E

EFFECTIVE DATE
SEPTEMBER 26, 2008
Federal Emergency Management Agency

NOTES TO USERS

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NGS Information Services
NOAA, NNGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for bench marks shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242 or visit its website at <http://www.ngs.noaa.gov/>.

Base map information shown on this FIRM was provided in digital format by Lancaster County, South Carolina, and Catawba Regional Council of Governments.

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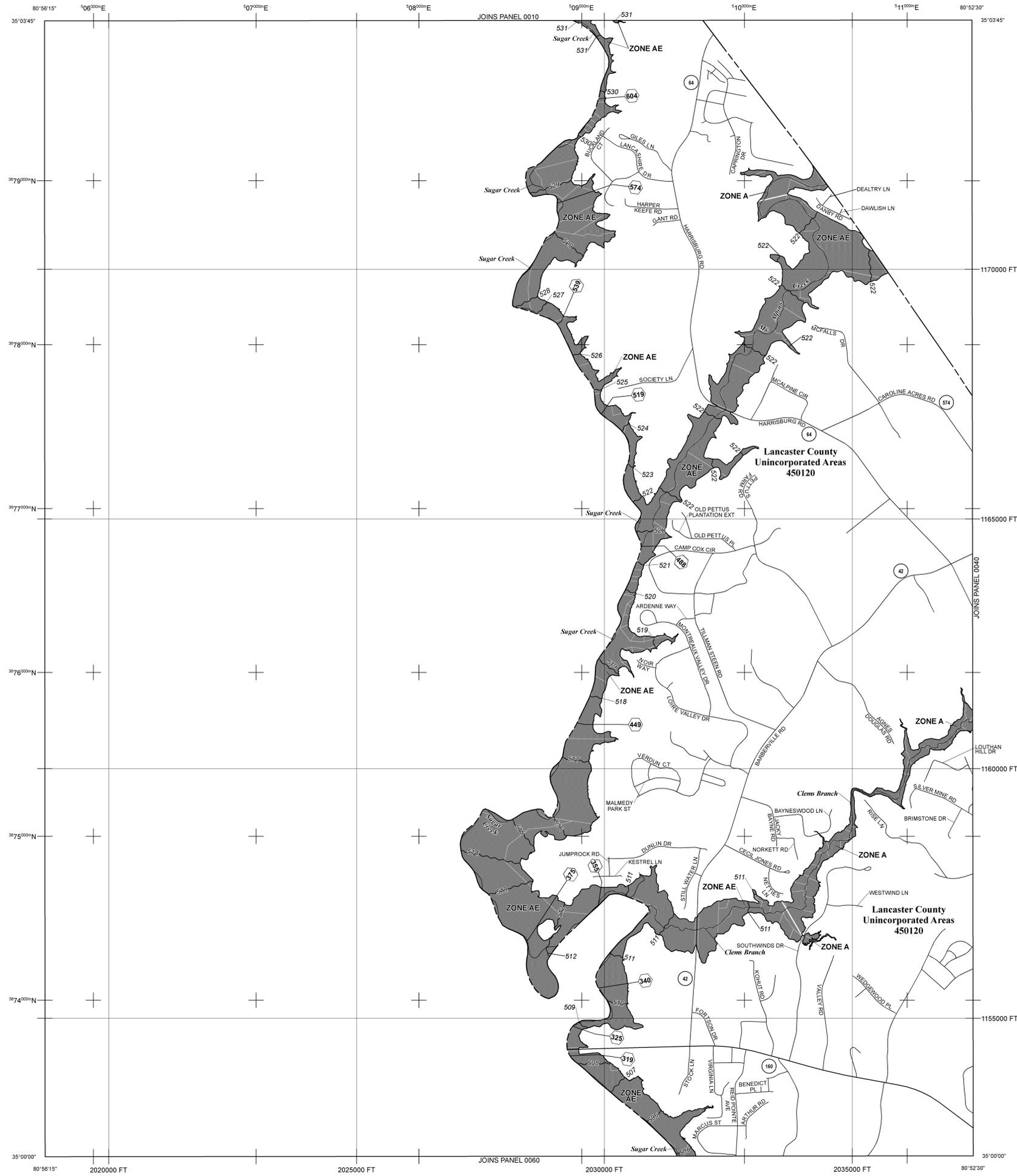
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The "profile base lines" depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the "profile base line", in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.

DNR
This digital Flood Insurance Rate Map (FIRM) was produced through a unique cooperative partnership between the State of South Carolina and the Federal Emergency Management Agency (FEMA). The State of South Carolina has implemented a long term approach of floodplain management to decrease the costs associated with flooding. This is demonstrated by the State's commitment to map floodplain areas at the local level. As a part of this effort, the state of South Carolina has joined in a Cooperating Technical State agreement with FEMA to produce and maintain this digital FIRM.

<http://www.dnr.state.sc.us/>



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

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ZONE A No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

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ZONE A99 Areas to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

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COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

Floodplain boundary
Floodway boundary
Zone D boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities
Base Flood Elevation line and value; elevation in feet*
Base Flood Elevation value where uniform within zone; elevation in feet*
* Referenced to the North American Vertical Datum of 1988

MAP SCALE 1" = 1000'

0 500 1,000 1,500 2,000 FEET
0 300 600 METERS

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0020D

FIRM
FLOOD INSURANCE RATE MAP
LANCASTER COUNTY,
SOUTH CAROLINA
AND INCORPORATED AREAS

PANEL 20 OF 550
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:
COMMUNITY NUMBER PANEL SUFFIX
LANCASTER COUNTY 450120 0020 D

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
45057C0020D

EFFECTIVE DATE
JUNE 16, 2011

Federal Emergency Management Agency

Appendix C
Ditch Calculations



STV Incorporated
 454 South Anderson Road, Suite 3, BTC 517
 Rock Hill, South Carolina 29730-3392
 803 980 4970 www.stvinc.com

JOB: **SC 160 Widening**
 SUBJECT: **Time of Concentration Calculations**
 CALC'D BY: **SCN** DATE: **17-Jul-20**
 CHEK'D BY: **GPP** DATE: **17-Jul-20**

TIME OF CONCENTRATION

WS	Sheet flow					Shallow Concentrated flow					Open Channel flow										Time Of Conc.	Time Of Conc.	
	Ditch ID	Slope ft/ft	Length ft	n	P2	Time hr	Slope ft/ft	Length ft	(P)aved p/u	V ft/s	Time hr	Elevation From	To	Length ft	Slope ft/ft	n	SS Lt z:1	SS Rt z:1	BW ft.	Depth ft.			V ft/s
002	0.025	100	0.240	3.6	0.21	0.039	64	u	3.19	0.006	609.5	602.7	97	0.070	0.030	2.0	4.0	2.0	0.5	6.38	0.00	12.9	13
004	0.040	100	0.240	3.6	0.17	0.037	188	u	3.11	0.017	581.0	569.0	318	0.038	0.030	2.0	4.0	2.0	0.5	4.68	0.02	12.4	12
006	0.020	100	0.240	3.6	0.23	0.046	218	u	3.46	0.017	597.0	550.0	1184	0.040	0.030	2.0	6.0	0.0	0.5	3.83	0.09	19.7	20
008	0.040	100	0.240	3.6	0.17	0.012	147	u	1.77	0.023	620.2	618.9	108	0.013	0.030	2.0	2.0	0.0	0.5	2.07	0.01	12.5	12
010	0.020	100	0.240	3.6	0.23	0.046	218	u	3.46	0.018	597.0	569.6	628	0.044	0.030	4.0	2.0	2.0	0.5	5.03	0.03	16.6	17
012	0.025	100	0.240	3.6	0.21	0.031	163	u	2.83	0.016	546.5	526.0	256	0.080	0.030	6.0	2.0	0.0	0.5	5.43	0.01	14.1	14
014																						5.0	5
016	0.040	100	0.240	3.6	0.17	0.031	161	u	2.83	0.016	567.0	555.0	318	0.038	0.030	4.0	4.0	0.0	0.5	3.75	0.02	12.6	13
018																						5.0	5

Slope in ft/ft.
 Length in feet.
 n is TR55 method for Sheet and Shallow concentrated flow, Mannings method for open channel flow.
 (P)aved refers to paved or unpaved velocity.
 V is velocity in ft/s.
 Tt is TR55 travel time in hours.
 Tc is TR55 time of concentration in minutes.



JOB: SC 160 Widening
 SUBJECT: Runoff Discharge Calculations
 CALC'D BY: SCN DATE: 17-Jul-20
 CHEK'D BY: GPP DATE: 17-Jul-20

Rational Method

Ditch/Area ID	Area Post	Tc (min)	C _{value}	Q2 (cfs)	Q5 (cfs)	Q10 (cfs)	Q25 (cfs)	Q50 (cfs)	Q100 (cfs)
002	0.33	13	0.58	0.8	1.0	1.1	1.4	1.6	1.9
004	0.69	12	0.56	1.7	2.0	2.2	2.8	3.3	3.8
006	0.73	20	0.64	10.8	12.7	14.1	17.7	21.2	24.1
008	0.62	12	0.51	1.4	1.6	1.8	2.3	2.7	3.1
010	3.36	17	0.55	7.3	8.6	9.6	12.0	14.4	16.4
012	0.40	14	0.25	0.4	0.5	0.5	0.7	0.8	0.9
014	0.39	5	0.75	2.9	3.4	3.8	4.8	5.8	6.6
016	1.99	13	0.27	9.7	11.4	12.6	15.8	19.1	21.6
018	0.10	5	0.67	0.8	0.9	1.0	1.3	1.5	1.8

Rock Hill, SC $i = a / (b + tc)^c$
 Rainfall Intensity

$Q = C * I * A * Cf$

freq	a	b	c	i(tc=5)	i(tc=10)	i(tc=15)	factor Cf
2	240.26568	35.61513	1.03559	5.19	4.60	4.13	1
5	254.71848	33.33552	1.0214	6.15	5.42	4.85	1
10	264.71357	31.82192	1.01175	6.89	6.06	5.40	1
25	276.98802	30.00177	1.00001	7.91	6.92	6.15	1.1
50	286.34575	28.61559	0.99107	8.80	7.66	6.79	1.2
100	294.57238	27.37215	0.98314	9.65	8.38	7.41	1.25



STV Incorporated
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JOB: SC 160 Widening
 LOCATION: York County, SC
 CALC'D BY: SCN DATE: 06-Aug-20
 CHEK'D BY: GPP DATE:

1 SHEET
 OF 10

DITCH ANALYSIS USING MANNINGS OPEN CHANNEL FOR VEGETATIVE LININGS

For Type **C** Vegetation (Enter A, B, C, D, or E)

From Station: **73+00** To Station: **74+50** Road Name: **S-160 (LT)**
 SL= **2.00** SR= **6.00** B= **0.00**

From Sta.	Ditch Elev.	Ditch Depth	To Sta.	Ditch Elev.	Ditch Depth	Q(Actual) c.f.s.	Depth ft.	Manning's n	Slope ft./ft.	Area sq. ft.	Wetted Perim.	Hyd. Rad. ft.	Velocity f.p.s.	Q(Cal.) c.f.s.	Depth ft.	Shear p.s.f.	Depth Comment	Shear Comment
73+00	612.54	1.5	73+50	610.86	1.5	1.1	0.38	0.045	0.0336	0.57	3.13	0.18	1.94	1.1	0.38	0.79	GOOD	GOOD
73+50	610.86	1.5	74+00	609.24	1.5	1.1	0.38	0.045	0.0324	0.57	3.15	0.18	1.92	1.1	0.38	0.77	GOOD	GOOD
REMARK: LINED WITH TEMPORARY EROSION CONTROL BLANKET																		



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JOB: SC 160 Widening
 LOCATION: York County, SC
 CALC'D BY: SCN DATE: 06-Aug-20
 CHEK'D BY: GPP DATE:

2
SHEET
OF
10

DITCH ANALYSIS USING MANNINGS OPEN CHANNEL FOR VEGETATIVE LININGS

For Type **C** Vegetation (Enter A, B, C, D, or E)

From Station: **74+50** To Station: **75+50** Road Name: **S-160 (LT)**
 SL= **2.00** SR= **4.00** B= **2.00**

From Sta.	Ditch Elev.	Ditch Depth	To Sta.	Ditch Elev.	Ditch Depth	Q(Actual) c.f.s.	Depth ft.	Manning's n	Slope ft./ft.	Area sq. ft.	Wetted Perim.	Hyd. Rad. ft.	Velocity f.p.s.	Q(Cal.) c.f.s.	Depth ft.	Shear p.s.f.	Depth Comment	Shear Comment
74+50	606.68	0.5	75+00	604.68	0.5	1.1	0.21	0.045	0.0400	0.55	3.33	0.17	2.00	1.1	0.21	0.52	GOOD	GOOD
75+00	604.68	0.5	75+50	602.68	0.5	1.1	0.21	0.045	0.0400	0.55	3.33	0.17	2.00	1.1	0.21	0.52	GOOD	GOOD
REMARK: LINED WITH TEMPORARY EROSION CONTROL BLANKET																		



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JOB: SC 160 Widening
 LOCATION: York County, SC
 CALC'D BY: SCN DATE: 06-Aug-20
 CHEK'D BY: GPP DATE:

3
 SHEET
 OF
 10

DITCH ANALYSIS USING MANNINGS OPEN CHANNEL FOR VEGETATIVE LININGS

For Type **C** Vegetation (Enter A, B, C, D, or E)

From Station: **78+00** To Station: **82+00** Road Name: **S-160 (LT)**
 SL= **2.00** SR= **4.00** B= **0.00**

From Sta.	Ditch Elev.	Ditch Depth	To Sta.	Ditch Elev.	Ditch Depth	Q(Actual) c.f.s.	Depth ft.	Manning's n	Slope ft./ft.	Area sq. ft.	Wetted Perim.	Hyd. Rad. ft.	Velocity f.p.s.	Q(Cal.) c.f.s.	Depth ft.	Shear p.s.f.	Depth Comment	Shear Comment
78+00	589.39	0.85	78+50	587.19	1.4	2.2	0.52	0.045	0.0440	0.81	3.30	0.25	2.72	2.2	0.52	1.43	GOOD	FIX
78+50	587.19	1.43	79+00	584.77	1.4	2.2	0.51	0.045	0.0484	0.78	3.24	0.24	2.82	2.2	0.51	1.54	GOOD	FIX
79+00	584.77	1.44	79+50	582.45	1.4	2.2	0.51	0.045	0.0464	0.79	3.27	0.24	2.77	2.2	0.51	1.49	GOOD	FIX
79+50	582.45	1.43	80+00	580.40	1.7	2.2	0.53	0.045	0.0410	0.83	3.35	0.25	2.65	2.2	0.53	1.35	GOOD	FIX
80+00	580.40	1.69	80+50	579.62	1.0	2.2	0.63	0.045	0.0156	1.19	4.01	0.30	1.84	2.2	0.63	0.61	GOOD	GOOD
80+50	579.62	1.02	81+00	578.19	1.0	2.2	0.56	0.045	0.0286	0.95	3.58	0.27	2.31	2.2	0.56	1.00	GOOD	GOOD
81+00	578.19	0.95	81+50	576.37	1.4	2.2	0.54	0.045	0.0364	0.87	3.42	0.25	2.53	2.2	0.54	1.22	GOOD	FIX
81+50	576.37	1.40	82+00	574.68	2.0	2.2	0.55	0.045	0.0338	0.89	3.47	0.26	2.46	2.2	0.55	1.15	GOOD	FIX
REMARK: LINED WITH TEMPORARY EROSION CONTROL BLANKET																		



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JOB: SC 160 Widening
 LOCATION: York County, SC
 CALCD BY: SCN
 CHEK'D BY: GPP
 DATE: 06-Aug-20

4 SHEET
 OF 10

DITCH ANALYSIS USING MANNINGS OPEN CHANNEL FOR VEGETATIVE LININGS

For Type **C** Vegetation (Enter A, B, C, D, or E)

From Station: **82+00** To Station: **83+50** Road Name: **S-160 (LT)**
 SL= **2.00** SR= **4.00** B= **2.00**

From Sta.	Ditch Elev.	Ditch Depth	To Sta.	Ditch Elev.	Ditch Depth	Q(Actual) c.f.s.	Depth ft.	Manning's n	Slope ft./ft.	Area sq. ft.	Wetted Perim.	Hyd. Rad. ft.	Velocity f.p.s.	Q(Cal.) c.f.s.	Depth ft.	Shear p.s.f.	Depth Comment	Shear Comment
82+00	574.68	2.00	82+50	573.12	1.5	2.2	0.33	0.045	0.0312	0.98	4.08	0.24	2.25	2.2	0.33	0.64	GOOD	GOOD
82+50	573.12	1.50	83+00	571.68	1.5	2.2	0.33	0.045	0.0288	1.00	4.13	0.24	2.19	2.2	0.33	0.60	GOOD	GOOD
83+00	571.68	1.50	83+50	570.36	1.5	2.2	0.34	0.045	0.0264	1.04	4.18	0.25	2.12	2.2	0.34	0.56	GOOD	GOOD
83+50	570.36	1.50	83+80	570.27	1.5	2.5	0.64	0.045	0.0030	2.49	6.05	0.41	1.00	2.5	0.64	0.12	GOOD	GOOD
REMARK: LINED WITH TEMPORARY EROSION CONTROL BLANKET																		



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JOB: SC 160 Widening
 LOCATION: York County, SC
 CALC'D BY: SCN DATE: 06-Aug-20
 CHEK'D BY: GPP DATE:

5 SHEET
 OF 10

DITCH ANALYSIS USING MANNINGS OPEN CHANNEL FOR VEGETATIVE LININGS

For Type **C** Vegetation (Enter A, B, C, D, or E)

From Station: **86+00** To Station: **88+50** Road Name: **S-160 (LT)**
 SL= **2.00** SR= **6.00** B= **0.00**

From Sta.	Ditch Elev.	Ditch Depth	To Sta.	Ditch Elev.	Ditch Depth	Q(Actual) c.f.s.	Depth ft.	Manning's n	Slope ft./ft.	Area sq. ft.	Wetted Perim.	Hyd. Rad. ft.	Velocity f.p.s.	Q(Cal.) c.f.s.	Depth ft.	Shear p.s.f.	Depth Comment	Shear Comment
86+00	563.39	2.0	86+50	561.77	2.0	14.1	0.99	0.045	0.0324	3.89	8.20	0.47	3.62	14.1	0.99	1.99	GOOD	FIX
86+50	561.77	2.0	87+00	559.96	2.0	14.1	0.97	0.045	0.0362	3.73	8.04	0.46	3.78	14.1	0.97	2.18	GOOD	FIX
87+00	559.96	2.0	87+50	557.98	2.0	14.1	0.95	0.045	0.0396	3.59	7.88	0.46	3.93	14.1	0.95	2.34	GOOD	FIX
87+50	557.98	2.0	88+00	555.81	2.0	14.1	0.92	0.044	0.0434	3.40	7.67	0.44	4.15	14.1	0.92	2.50	GOOD	FIX
88+00	555.81	2.0	88+50	549.30	2.0	14.1	0.67	0.032	0.1302	1.79	5.56	0.32	7.90	14.1	0.67	5.43	GOOD	FIX
REMARK: LINED WITH TEMPORARY EROSION CONTROL BLANKET																		



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JOB: SC 160 Widening
 LOCATION: York County, SC
 CALC'D BY: SCN DATE: 06-Aug-20
 CHEK'D BY: GPP DATE:

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 SHEET
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 10

DITCH ANALYSIS USING MANNINGS OPEN CHANNEL FOR VEGETATIVE LININGS

For Type **C** Vegetation (Enter A, B, C, D, or E)

From Station: **70+00** To Station: **71+00** Road Name: **S-160 (RT)**
 SL= **2.00** SR= **2.00** B= **0.00**

From Sta.	Ditch Elev.	Ditch Depth	To Sta.	Ditch Elev.	Ditch Depth	Q(Actual) c.f.s.	Depth ft.	Manning's n	Slope ft./ft.	Area sq. ft.	Wetted Perim.	Hyd. Rad. ft.	Velocity f.p.s.	Q(Cal.) c.f.s.	Depth ft.	Shear p.s.f.	Depth Comment	Shear Comment
70+00	619.54	1.3	70+50	619.38	1.0	1.8	0.93	0.045	0.0032	1.73	4.15	0.42	1.04	1.8	0.93	0.19	GOOD	GOOD
70+50	619.38	1.0	71+00	617.27	1.5	1.8	0.57	0.045	0.0422	0.66	2.56	0.26	2.74	1.8	0.57	1.51	GOOD	FIX



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JOB: SC 160 Widening
 LOCATION: York County, SC
 CALC'D BY: SCN
 CHEK'D BY: GPP
 DATE: 06-Aug-20

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 SHEET
 OF
 10

DITCH ANALYSIS USING MANNINGS OPEN CHANNEL FOR VEGETATIVE LININGS

For Type **C** Vegetation (Enter A, B, C, D, or E)

From Station: **74+50** To Station: **78+00** Road Name: **S-160 (RT)**
 SL= **6.00** SR= **2.00** B= **0.00**

From Sta.	Ditch Elev.	Ditch Depth	To Sta.	Ditch Elev.	Ditch Depth	Q(Actual) c.f.s.	Depth ft.	Manning's n	Slope ft./ft.	Area sq. ft.	Wetted Perim.	Hyd. Rad. ft.	Velocity f.p.s.	Q(Cal.) c.f.s.	Depth ft.	Shear p.s.f.	Depth Comment	Shear Comment
74+50	607.38	1.0	75+00	605.54	1.8	9.6	0.83	0.045	0.0368	2.78	6.94	0.40	3.45	9.6	0.83	1.91	GOOD	FIX
75+00	605.54	1.8	75+50	603.53	2.0	9.6	0.82	0.045	0.0402	2.69	6.82	0.39	3.57	9.6	0.82	2.06	GOOD	FIX
75+50	603.53	2.0	76+00	601.35	2.0	9.6	0.81	0.045	0.0436	2.61	6.72	0.39	3.68	9.6	0.81	2.20	GOOD	FIX
76+00	601.35	2.0	76+50	599.03	2.0	9.6	0.80	0.045	0.0464	2.55	6.64	0.38	3.77	9.6	0.80	2.31	GOOD	FIX
76+50	599.03	2.0	77+00	596.54	2.0	9.6	0.78	0.044	0.0498	2.44	6.50	0.38	3.93	9.6	0.78	2.43	GOOD	FIX
77+00	596.54	2.0	77+50	594.08	2.0	9.6	0.78	0.044	0.0492	2.46	6.52	0.38	3.90	9.6	0.78	2.41	GOOD	FIX
77+50	594.08	2.0	78+00	591.59	2.0	9.6	0.78	0.044	0.0498	2.44	6.50	0.38	3.93	9.6	0.78	2.43	GOOD	FIX
REMARK: LINED WITH TEMPORARY EROSION CONTROL BLANKET																		



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JOB: SC 160 Widening
 LOCATION: York County, SC
 CALC'D BY: SCN
 CHEK'D BY: GPP
 DATE: 06-Aug-20

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 SHEET
 OF
 10

DITCH ANALYSIS USING MANNINGS OPEN CHANNEL FOR VEGETATIVE LININGS

For Type **C** Vegetation (Enter A, B, C, D, or E)

From Station: **78+00** To Station: **83+50** Road Name: **S-160 (RT)**
 SL= **4.00** SR= **2.00** B= **2.00**

From Sta.	Ditch Elev.	Ditch Depth	To Sta.	Ditch Elev.	Ditch Depth	Q(Actual) c.f.s.	Depth ft.	Manning's n	Slope ft./ft.	Area sq. ft.	Wetted Perim.	Hyd. Rad. ft.	Velocity f.p.s.	Q(Cal.) c.f.s.	Depth ft.	Shear p.s.f.	Depth Comment	Shear Comment	
78+00	591.59	1.50	78+50	588.74	1.00	9.6	0.58	0.042	0.0570	2.14	5.66	0.38	4.48	9.6	0.58	2.05	GOOD	FIX	
78+50	588.74	1.00	79+00	584.80	1.00	9.6	0.51	0.038	0.0788	1.79	5.23	0.34	5.37	9.6	0.51	2.49	GOOD	FIX	
79+00	584.80	1.00	79+50	583.07	1.00	9.6	0.68	0.045	0.0346	2.73	6.30	0.43	3.52	9.6	0.68	1.46	GOOD	FIX	
79+50	583.07	1.00	80+00	580.59	1.00	9.6	0.61	0.043	0.0496	2.32	5.86	0.40	4.14	9.6	0.61	1.88	GOOD	FIX	
80+00	580.59	1.00	80+50	578.79	1.00	9.6	0.67	0.045	0.0360	2.69	6.26	0.43	3.57	9.6	0.67	1.50	GOOD	FIX	
80+50	578.79	1.00	81+00	577.19	1.38	9.6	0.69	0.045	0.0320	2.80	6.38	0.44	3.42	9.6	0.69	1.38	GOOD	FIX	
81+00	577.19	1.38	81+50	576.26	1.00	9.6	0.79	0.045	0.0186	3.42	7.00	0.49	2.80	9.6	0.79	0.91	GOOD	GOOD	
81+50	576.26	1.00	82+00	574.68	1.67	9.6	0.69	0.045	0.0316	2.82	6.40	0.44	3.41	9.6	0.69	1.36	GOOD	FIX	
82+00	574.68	1.67	82+50	573.18	1.44	9.6	0.70	0.045	0.0300	2.87	6.45	0.45	3.34	9.6	0.70	1.31	GOOD	FIX	
82+50	573.18	1.44	83+00	571.68	1.66	9.6	0.70	0.045	0.0300	2.87	6.45	0.45	3.34	9.6	0.70	1.31	GOOD	FIX	
83+00	571.68	1.66	83+50	570.36	1.63	9.6	0.72	0.045	0.0264	3.01	6.59	0.46	3.19	9.6	0.72	1.19	GOOD	FIX	
REMARK: LINED WITH TEMPORARY EROSION CONTROL BLANKET																			



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JOB: SC 160 Widening
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 CALC'D BY: SCN
 CHEK'D BY: GPP
 DATE: 06-Aug-20

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 OF 10

DITCH ANALYSIS USING MANNINGS OPEN CHANNEL FOR VEGETATIVE LININGS

For Type **C** Vegetation (Enter A, B, C, D, or E)

From Station: **89+00** To Station: **90+00** Road Name: **S-160 (RT)**
 SL= **4.00** SR= **4.00** B= **0.00**

From Sta.	Ditch Elev.	Ditch Depth	To Sta.	Ditch Elev.	Ditch Depth	Q(Actual) c.f.s.	Depth ft.	Manning's n	Slope ft./ft.	Area sq. ft.	Wetted Perim.	Hyd. Rad. ft.	Velocity f.p.s.	Q(Cal.) c.f.s.	Depth ft.	Shear p.s.f.	Depth Comment	Shear Comment
89+00	553.53	0.84	89+50	550.73	1.84	0.5	0.25	0.045	0.0560	0.26	2.09	0.12	1.94	0.5	0.25	0.89	GOOD	GOOD
89+50	550.73	1.84	90+00	548.28	2.00	0.5	0.26	0.045	0.0490	0.27	2.15	0.13	1.85	0.5	0.26	0.80	GOOD	GOOD
REMARK: LINED WITH TEMPORARY EROSION CONTROL BLANKET																		



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JOB: SC 160 Widening
 LOCATION: York County, SC
 CALC'D BY: SCN
 CHEK'D BY: GPP
 DATE: 06-Aug-20

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 SHEET
 OF
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DITCH ANALYSIS USING MANNINGS OPEN CHANNEL FOR VEGETATIVE LININGS

For Type **C** Vegetation (Enter A, B, C, D, or E)

From Station: **90+00** To Station: **94+00** Road Name: **S-160 (RT)**
 SL= **6.00** SR= **2.00** B= **0.00**

From Sta.	Ditch Elev.	Ditch Depth	To Sta.	Ditch Elev.	Ditch Depth	Q(Actual) c.f.s.	Depth ft.	Manning's n	Slope ft./ft.	Area sq. ft.	Wetted Perim.	Hyd. Rad. ft.	Velocity f.p.s.	Q(Cal.) c.f.s.	Depth ft.	Shear p.s.f.	Depth Comment	Shear Comment
90+00	548.28	2.00	90+50	545.38	2.00	0.5	0.25	0.045	0.0580	0.26	2.10	0.12	1.96	0.5	0.25	0.91	GOOD	GOOD
90+50	545.38	2.00	91+00	542.49	2.00	0.5	0.25	0.045	0.0578	0.26	2.10	0.12	1.95	0.5	0.25	0.91	GOOD	GOOD
91+00	542.49	2.00	91+50	539.60	2.00	0.5	0.25	0.045	0.0578	0.26	2.10	0.12	1.95	0.5	0.25	0.91	GOOD	GOOD
91+50	539.60	2.00	92+00	536.78	2.00	0.5	0.25	0.045	0.0564	0.26	2.11	0.12	1.94	0.5	0.25	0.89	GOOD	GOOD
92+00	536.78	2.00	92+50	534.14	2.00	0.5	0.26	0.045	0.0528	0.26	2.14	0.12	1.89	0.5	0.26	0.85	GOOD	GOOD
92+50	534.14	2.00	93+00	531.79	2.00	0.5	0.26	0.045	0.0470	0.28	2.19	0.13	1.81	0.5	0.26	0.77	GOOD	GOOD
93+00	531.79	2.00	93+50	529.60	2.00	0.5	0.27	0.045	0.0438	0.28	2.22	0.13	1.76	0.5	0.27	0.73	GOOD	GOOD
93+50	529.60	2.00	94+00	526.43	2.00	0.5	0.25	0.045	0.0634	0.25	2.07	0.12	2.02	0.5	0.25	0.98	GOOD	GOOD
REMARK: LINED WITH TEMPORARY EROSION CONTROL BLANKET																		

FED. ROAD DIST. NO.	STATE	COUNTY	FILE NO.	PROJECT NO.	ROUTE NO.	SHEET NO.
3	S.C.	YORK	P029536	III49-010	SC 160	6

FINAL PLANS
FOR REVIEW ONLY



norlegsc
 I:\Projects\4018372\4018372_000\90-CAD Models and Sheets\04_CIT_Transportation\Drainage\Dgn\JUV\shet_06.dgn
 8/6/2020



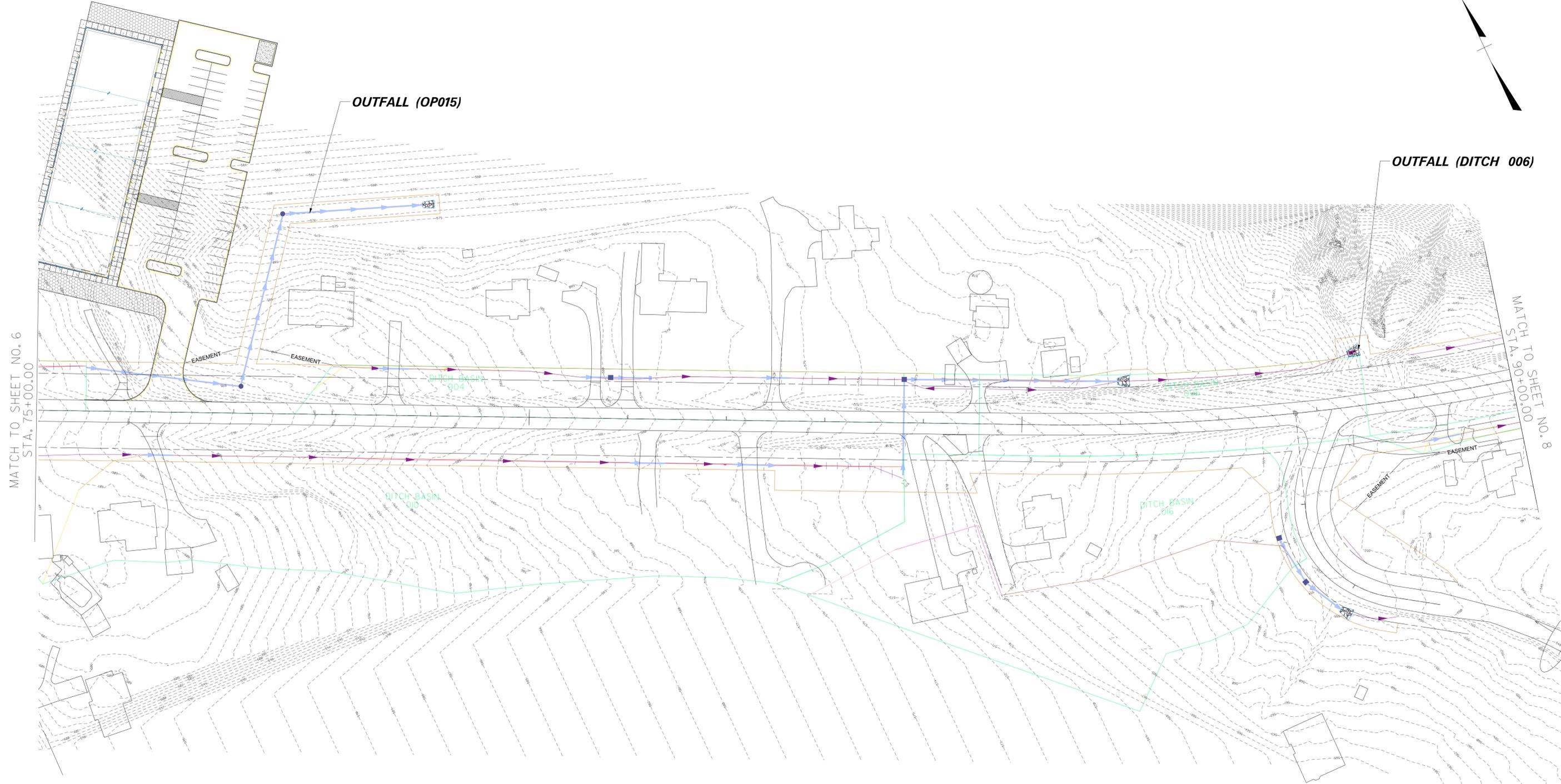
STV 100 Years
 STV Incorporated
 ROCK HILL BUSINESS TECHNOLOGY CENTER, BTC 517
 454 S. ANDERSON ROAD, SUITE 3
 ROCK HILL, SOUTH CAROLINA 29730

6			
5			
4			
3			
2			
1			
REV. NO.	BY	DATE	DESCRIPTION OF REVISION
PREPARED BY	CHK'D BY	REVIEWED BY	

YORK COUNTY
 SOUTH CAROLINA
S.C. ROUTE 160 (HIGHWAY 160 E)
Ditch ANALYSIS
STA. 71+00.00 TO STA. 75+00.00
 SCALE 1"=50' S.C. ROUTE 160 DWG. NO. 6

FED. ROAD DIST. NO.	STATE	COUNTY	FILE NO.	PROJECT NO.	ROUTE NO.	SHEET NO.
3	S.C.	YORK	P029536	1049-010	SC 160	7

FINAL PLANS
FOR REVIEW ONLY



MATCH TO SHEET NO. 6
STA. 75+00.00

MATCH TO SHEET NO. 8
STA. 90+00.00

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 8/6/2020



STV 100 Years
 STV Incorporated
 ROCK HILL BUSINESS TECHNOLOGY CENTER, BTC 517
 454 S. ANDERSON ROAD, SUITE 3
 ROCK HILL, SOUTH CAROLINA 29730

6			
5			
4			
3			
2			
1			
REV. NO.	BY	DATE	DESCRIPTION OF REVISION
PREPARED BY	CHK'D BY	REVIEWED BY	

YORK COUNTY
 SOUTH CAROLINA
S.C. ROUTE 160 (HIGHWAY 160 E)
DITCH ANALYSIS
STA. 75+00.00 TO STA. 90+00.00
 SCALE 1"=50' S.C. ROUTE 160 DWG. NO. 7

Appendix D
Pre vs. Post Calculations



STV
 Consulting Engineers
 454 South Anderson Road, Suite 3, BTC 517
 Rock Hill, SC 29730 (803) 980-4970

JOB: SC-160 Widening
 SUBJECT: Mimosa Lane Outfall
 CALC'D BY: SCN DATE: 22-Mar-17
 CHECK'D BY: GPP DATE: 23-Mar-17

1
 SHEET
 OF
 4

TIME OF CONCENTRATION (T_c) - PRE DEVELOPMENT

Check One: Present Developed

Note: Space for as many as three segments per flow type can be used for each worksheet.
 Include a map, schematic, or description of flow segments.

Sheet flow

	Path #1	Path #2	Path #3
Segment ID	AB		
1. Surface Description (table 3-1)	Grass		
2. Manning's roughness coefficient, n (table 3-1)	0.240		
3. Flow length, L (total L ≤ 300 ft) ft.	100		
4. Two-year 24-hour rainfall, P ₂ in.	3.57		
5. Land slope, s ft./ft.	0.0800		
6. $T_t = \frac{.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T _t hr.	0.1293	0.0000	0.0000

Shallow concentrated flow

	Path #1	Path #2	Path #3
Segment ID	BC		
7. Surface description (Paved or Unpaved)	Unpaved		
8. Flow length, L ft.	206		
9. Watercourse slope, s ft./ft.	0.0728		
10. Average velocity, V (figure 3-1) ft./sec.	4.35		
11. $T_t = \frac{L}{3600 V}$ Compute T _t hr.	0.0131	0.0000	0.0000

Channel flow

	Path #1	Path #2	Path #3
Segment ID			
12. Cross sectional flow area, a ft. ²			
13. Wetted perimeter, p _w ft.			
14. Hydraulic Radius, r = a / p _w Compute r ft.			
15. Channel slope, s ft./ft.			
16. Manning's roughness coefficient, n			
17a. $V = \frac{1.49r^{2/3}s^{1/2}}{n}$ Compute V ft./sec.			
17b. Input Velocity, FPS ft./sec.			
18. Flow length, L ft.			
19. $T_t = \frac{L}{3600 V}$ Compute T _t hr.	0.0000	0.0000	0.0000
20. Total, T _c (add T _t in steps 6, 11, and 19) hr.	0.1425	0.0000	0.0000

21. Watershed Total, T_c (maximum, Path #1, #2, or #3) **0.14** Hour
 8.5 min



STV Consulting Engineers 454 South Anderson Road, Suite 3, BTC 517 Rock Hill, SC 29730 (803) 980-4970	JOB: SC-160 Widening	2
	SUBJECT: Kings Court Outfall	SHEET
	CALC'D BY: SCN DATE: 15-Jan-18	OF
	CHECK'D BY: GPP DATE: 15-Jan-18	4

TIME OF CONCENTRATION (T_c) - PRE DEVELOPMENT

Check One: Present Developed

Note: Space for as many as three segments per flow type can be used for each worksheet.
 Include a map, schematic, or description of flow segments.

Sheet flow

	Path #1	Path #2	Path #3
Segment ID	AB		
1. Surface Description (table 3-1)	Grass		
2. Manning's roughness coefficient, n (table 3-1)	0.240		
3. Flow length, L (total L ≤ 300 ft) ft.	100		
4. Two-year 24-hour rainfall, P ₂ in.	3.57		
5. Land slope, s ft./ft.	0.0400		
6. $T_t = \frac{.007 (nL)^{0.8}}{P_2^{0.5} S^{0.4}}$ Compute T _t hr.	0.1707	0.0000	0.0000

Shallow concentrated flow

	Path #1	Path #2	Path #3
Segment ID	BC		
7. Surface description (Paved or Unpaved)	Unpaved		
8. Flow length, L ft.	174		
9. Watercourse slope, s ft./ft.	0.0115		
10. Average velocity, V (figure 3-1) ft./sec.	1.73		
11. $T_t = \frac{L}{3600 V}$ Compute T _t hr.	0.0279	0.0000	0.0000

Channel flow

	Path #1	Path #2	Path #3
Segment ID	CD		
12. Cross sectional flow area, a ft. ²	4.00		
13. Wetted perimeter, p _w ft.	8.25		
14. Hydraulic Radius, r = a / p _w Compute r ft.	0.4848		
15. Channel slope, s ft./ft.	0.0383		
16. Manning's roughness coefficient, n	0.0350		
17a. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V ft./sec.	5.14		
17b. Input Velocity, FPS ft./sec.	5.14		
18. Flow length, L ft.	495		
19. $T_t = \frac{L}{3600 V}$ Compute T _t hr.	0.0267	0.0000	0.0000
20. Total, T _c (add T _t in steps 6, 11, and 19) hr.	0.2253	0.0000	0.0000

21. Watershed Total, T_c (maximum, Path #1, #2, or #3) **0.23** Hour
 14 min



STV
 Consulting Engineers
 454 South Anderson Road, Suite 3, BTC 517
 Rock Hill, SC 29730 (803) 980-4970

JOB: SC-160 Widening
 SUBJECT: Outfall 77+65 Lt.
 CALC'D BY: SCN DATE: 22-Mar-17
 CHECK'D BY: GPP DATE: 23-Mar-17

3
 SHEET
 OF
 4

TIME OF CONCENTRATION (T_c) - PRE DEVELOPMENT

Check One: Present Developed

Note: Space for as many as three segments per flow type can be used for each worksheet.
 Include a map, schematic, or description of flow segments.

Sheet flow

	Path #1	Path #2	Path #3
Segment ID	AB		
1. Surface Description (table 3-1)	Grass		
2. Manning's roughness coefficient, n (table 3-1)	0.240		
3. Flow length, L (total L ≤ 300 ft) ft.	100		
4. Two-year 24-hour rainfall, P ₂ in.	3.57		
5. Land slope, s ft./ft.	0.0350		
6. $T_t = \frac{.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T _t hr.	0.1800	0.0000	0.0000

Shallow concentrated flow

	Path #1	Path #2	Path #3
Segment ID	BC		
7. Surface description (Paved or Unpaved)	Unpaved		
8. Flow length, L ft.	179		
9. Watercourse slope, s ft./ft.	0.0726		
10. Average velocity, V (figure 3-1) ft./sec.	4.35		
11. $T_t = \frac{L}{3600 V}$ Compute T _t hr.	0.0114	0.0000	0.0000

Channel flow

	Path #1	Path #2	Path #3
Segment ID	CD		
12. Cross sectional flow area, a ft. ²	2.67		
13. Wetted perimeter, p _w ft.	4.67		
14. Hydraulic Radius, r = a / p _w Compute r ft.	0.5717		
15. Channel slope, s ft./ft.	0.0861		
16. Manning's roughness coefficient, n	0.0350		
17a. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V ft./sec.	8.60		
17b. Input Velocity, FPS ft./sec.	8.60		
18. Flow length, L ft.	209		
19. $T_t = \frac{L}{3600 V}$ Compute T _t hr.	0.0067	0.0000	0.0000
20. Total, T _c (add T _t in steps 6, 11, and 19) hr.	0.1982	0.0000	0.0000

21. Watershed Total, T_c (maximum, Path #1, #2, or #3) **0.20** Hour
 12 min



STV
 Consulting Engineers
 454 South Anderson Road, Suite 3, BTC 517
 Rock Hill, SC 29730 (803) 980-4970

JOB: SC-160 Widening
 SUBJECT: Outfall 88+50 Lt.
 CALC'D BY: SCN DATE: 22-Mar-17
 CHECK'D BY: GPP DATE: 23-Mar-17

4
 SHEET
 OF
 4

TIME OF CONCENTRATION (T_c) - PRE DEVELOPMENT

Check One: Present Developed

Note: Space for as many as three segments per flow type can be used for each worksheet.
 Include a map, schematic, or description of flow segments.

Sheet flow

	Path #1	Path #2	Path #3
Segment ID	AB		
1. Surface Description (table 3-1)	Grass		
2. Manning's roughness coefficient, n (table 3-1)	0.240		
3. Flow length, L (total L ≤ 300 ft) ft.	100		
4. Two-year 24-hour rainfall, P ₂ in.	3.57		
5. Land slope, s ft./ft.	0.0500		
6. $T_t = \frac{.007 (nL)^{0.8}}{P_2^{0.5} S^{0.4}}$ Compute T _t hr.	0.1561	0.0000	0.0000

Shallow concentrated flow

	Path #1	Path #2	Path #3
Segment ID	BC		
7. Surface description (Paved or Unpaved)	Unpaved		
8. Flow length, L ft.	213		
9. Watercourse slope, s ft./ft.	0.0516		
10. Average velocity, V (figure 3-1) ft./sec.	3.67		
11. $T_t = \frac{L}{3600 V}$ Compute T _t hr.	0.0161	0.0000	0.0000

Channel flow

	Path #1	Path #2	Path #3
Segment ID	BC		
12. Cross sectional flow area, a ft. ²	4.00		
13. Wetted perimeter, p _w ft.	5.50		
14. Hydraulic Radius, r = a / p _w Compute r ft.	0.7273		
15. Channel slope, s ft./ft.	0.0394		
16. Manning's roughness coefficient, n	0.0350		
17a. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V ft./sec.	6.83		
17b. Input Velocity, FPS ft./sec.	6.83		
18. Flow length, L ft.	1092		
19. $T_t = \frac{L}{3600 V}$ Compute T _t hr.	0.0444	0.0000	0.0000
20. Total, T _c (add T _t in steps 6, 11, and 19) hr.	0.2166	0.0000	0.0000

21. Watershed Total, T_c (maximum, Path #1, #2, or #3) **0.22** Hour
 13 min

STV
 Consulting Engineers
 454 South Anderson Road, Suite 3, BTC 517
 Rock Hill, SC 29730 (803) 980-4970

JOB: SC-160 Widening
 SUBJECT: Mimosa Lane Outfall
 CALC'D BY: SCN DATE: 22-Mar-17
 CHECK'D BY: GPP DATE: 23-Mar-17

1
 SHEET
 OF
 4

TIME OF CONCENTRATION (T_c) - POST DEVELOPMENT

Check One: Present Developed

Note: Space for as many as three segments per flow type can be used for each worksheet.
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Sheet flow

	Path #1	Path #2	Path #3
Segment ID	AB		
1. Surface Description (table 3-1)	Grass		
2. Manning's roughness coefficient, n (table 3-1)	0.240		
3. Flow length, L (total L ≤ 300 ft) ft.	100		
4. Two-year 24-hour rainfall, P ₂ in.	3.57		
5. Land slope, s ft./ft.	0.0800		
6. $T_t = \frac{.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T _t hr.	0.1293	0.0000	0.0000

Shallow concentrated flow

	Path #1	Path #2	Path #3
Segment ID	BC		
7. Surface description (Paved or Unpaved)	Unpaved		
8. Flow length, L ft.	206		
9. Watercourse slope, s ft./ft.	0.0728		
10. Average velocity, V (figure 3-1) ft./sec.	4.35		
11. $T_t = \frac{L}{3600 V}$ Compute T _t hr.	0.0131	0.0000	0.0000

Channel flow

	Path #1	Path #2	Path #3
Segment ID			
12. Cross sectional flow area, a ft. ²			
13. Wetted perimeter, p _w ft.			
14. Hydraulic Radius, r = a / p _w Compute r ft.			
15. Channel slope, s ft./ft.			
16. Manning's roughness coefficient, n			
17a. $V = \frac{1.49r^{2/3}s^{1/2}}{n}$ Compute V ft./sec.			
17b. Input Velocity, FPS ft./sec.			
18. Flow length, L ft.			
19. $T_t = \frac{L}{3600 V}$ Compute T _t hr.	0.0000	0.0000	0.0000
20. Total, T _c (add T _t in steps 6, 11, and 19) hr.	0.1425	0.0000	0.0000

21. Watershed Total, T_c (maximum, Path #1, #2, or #3) 0.14 Hour
 8.5 min

STV Consulting Engineers 454 South Anderson Road, Suite 3, BTC 517 Rock Hill, SC 29730 (803) 980-4970	JOB: SC-160 Widening	2
	SUBJECT: Kings Court Outfall	SHEET
	CALC'D BY: SCN DATE: 15-Jan-18	OF
	CHECK'D BY: GPP DATE: 15-Jan-18	4

TIME OF CONCENTRATION (T_c) - POST DEVELOPMENT

Check One: Present Developed

Note: Space for as many as three segments per flow type can be used for each worksheet.
 Include a map, schematic, or description of flow segments.

Sheet flow

	Path #1	Path #2	Path #3
Segment ID	AB		
1. Surface Description (table 3-1)	Grass		
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3. Flow length, L (total L ≤ 300 ft) ft.	100		
4. Two-year 24-hour rainfall, P ₂ in.	3.57		
5. Land slope, s ft./ft.	0.0400		
6. $T_t = \frac{.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T _t hr.	0.1707	0.0000	0.0000

Shallow concentrated flow

	Path #1	Path #2	Path #3
Segment ID	BC		
7. Surface description (Paved or Unpaved)	Unpaved		
8. Flow length, L ft.	174		
9. Watercourse slope, s ft./ft.	0.0115		
10. Average velocity, V (figure 3-1) ft./sec.	1.73		
11. $T_t = \frac{L}{3600 V}$ Compute T _t hr.	0.0279	0.0000	0.0000

Channel flow

	Path #1	Path #2	Path #3
Segment ID	CD		
12. Cross sectional flow area, a ft. ²	4.00		
13. Wetted perimeter, p _w ft.	8.25		
14. Hydraulic Radius, r = a / p _w Compute r ft.	0.4848		
15. Channel slope, s ft./ft.	0.0383		
16. Manning's roughness coefficient, n	0.0350		
17a. $V = \frac{1.49r^{2/3}s^{1/2}}{n}$ Compute V ft./sec.	5.14		
17b. Input Velocity, FPS ft./sec.	5.14		
18. Flow length, L ft.	495		
19. $T_t = \frac{L}{3600 V}$ Compute T _t hr.	0.0267	0.0000	0.0000
20. Total, T _c (add T _t in steps 6, 11, and 19) hr.	0.2253	0.0000	0.0000

21. Watershed Total, T_c (maximum, Path #1, #2, or #3) **0.23** Hour
 14 min

STV
 Consulting Engineers
 454 South Anderson Road, Suite 3, BTC 517
 Rock Hill, SC 29730 (803) 980-4970

JOB: SC-160 Widening
 SUBJECT: Outfall 77+65 Lt.
 CALC'D BY: SCN DATE: 22-Mar-17
 CHECK'D BY: GPP DATE: 23-Mar-17

3
 SHEET
 OF
 4

TIME OF CONCENTRATION (T_c) - POST DEVELOPMENT

Check One: Present Developed

Note: Space for as many as three segments per flow type can be used for each worksheet.
 Include a map, schematic, or description of flow segments.

Sheet flow

	Path #1	Path #2	Path #3
Segment ID	AB		
1. Surface Description (table 3-1)	Grass		
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3. Flow length, L (total L ≤ 300 ft) ft.	100		
4. Two-year 24-hour rainfall, P ₂ in.	3.57		
5. Land slope, s ft./ft.	0.0350		
6. $T_t = \frac{.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T _t hr.	0.1800	0.0000	0.0000

Shallow concentrated flow

	Path #1	Path #2	Path #3
Segment ID	BC		
7. Surface description (Paved or Unpaved)	Unpaved		
8. Flow length, L ft.	179		
9. Watercourse slope, s ft./ft.	0.0726		
10. Average velocity, V (figure 3-1) ft./sec.	4.35		
11. $T_t = \frac{L}{3600 V}$ Compute T _t hr.	0.0114	0.0000	0.0000

Channel flow

	Path #1	Path #2	Path #3
Segment ID	CD		
12. Cross sectional flow area, a ft. ²	2.67		
13. Wetted perimeter, p _w ft.	4.67		
14. Hydraulic Radius, r = a / p _w Compute r ft.	0.5717		
15. Channel slope, s ft./ft.	0.0861		
16. Manning's roughness coefficient, n	0.0350		
17a. $V = \frac{1.49r^{2/3}s^{1/2}}{n}$ Compute V ft./sec.	8.60		
17b. Input Velocity, FPS ft./sec.	8.60		
18. Flow length, L ft.	209		
19. $T_t = \frac{L}{3600 V}$ Compute T _t hr.	0.0067	0.0000	0.0000
20. Total, T _c (add T _t in steps 6, 11, and 19) hr.	0.1982	0.0000	0.0000

21. Watershed Total, T_c (maximum, Path #1, #2, or #3) 0.20 Hour
 12 min

STV
 Consulting Engineers
 454 South Anderson Road, Suite 3, BTC 517
 Rock Hill, SC 29730 (803) 980-4970

JOB: SC-160 Widening
 SUBJECT: Outfall 88+50 Lt.
 CALC'D BY: SCN DATE: 22-Mar-17
 CHECK'D BY: GPP DATE: 23-Mar-17

4
 SHEET
 OF
 4

TIME OF CONCENTRATION (T_c) - POST DEVELOPMENT

Check One: Present Developed

Note: Space for as many as three segments per flow type can be used for each worksheet.
 Include a map, schematic, or description of flow segments.

Sheet flow

	Path #1	Path #2	Path #3
Segment ID	AB		
1. Surface Description (table 3-1)	Grass		
2. Manning's roughness coefficient, n (table 3-1)	0.240		
3. Flow length, L (total L ≤ 300 ft) ft.	100		
4. Two-year 24-hour rainfall, P ₂ in.	3.57		
5. Land slope, s ft./ft.	0.0500		
6. $T_t = \frac{.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T _t hr.	0.1561	0.0000	0.0000

Shallow concentrated flow

	Path #1	Path #2	Path #3
Segment ID	BC		
7. Surface description (Paved or Unpaved)	Unpaved		
8. Flow length, L ft.	213		
9. Watercourse slope, s ft./ft.	0.0516		
10. Average velocity, V (figure 3-1) ft./sec.	3.67		
11. $T_t = \frac{L}{3600 V}$ Compute T _t hr.	0.0161	0.0000	0.0000

Channel flow

	Path #1	Path #2	Path #3
Segment ID	BC		
12. Cross sectional flow area, a ft. ²	4.00		
13. Wetted perimeter, p _w ft.	5.50		
14. Hydraulic Radius, r = a / p _w Compute r ft.	0.7273		
15. Channel slope, s ft./ft.	0.0394		
16. Manning's roughness coefficient, n	0.0350		
17a. $V = \frac{1.49r^{2/3}s^{1/2}}{n}$ Compute V ft./sec.	6.83		
17b. Input Velocity, FPS ft./sec.	6.83		
18. Flow length, L ft.	1092		
19. $T_t = \frac{L}{3600 V}$ Compute T _t hr.	0.0444	0.0000	0.0000
20. Total, T _c (add T _t in steps 6, 11, and 19) hr.	0.2166	0.0000	0.0000

21. Watershed Total, T_c (maximum, Path #1, #2, or #3) 0.22 Hour
 13 min



STV Incorporated 454 South Anderson Road, Suite 3 Rock Hill, South Carolina 29730-3392 803 980 4970 o 803 980 4099 f	JOB:	SC-160 Widening	1	
	SUBJECT:	Mimosa Lane Outfall	SHEET	
	CALC'D BY:	SCN	DATE: 22-Mar-2017	OF
	CHECK'D BY:	GPP	DATE: 23-Mar-2017	4

PRE VS. POST OUTFALL EVALUATION

GIVEN:

Outfall Location: Road Name **Mimosa Lane** Sta. **47+25 (RT)**
 Analysis Point **Outfall (OP010)**

Weighted C-value (PRE)

Landuse	Sub-area	C
Pvmt & roofs	0.24	0.90
Grass	0.21	0.25
City Business		0.85
Wood		0.15
Lawns		0.22

Weighted C-value (PRE) = **0.60**
 Time of Concentration = **9** min.
 Rainfall Intensity (2 yr.) = **4.70** in./hr.
 Rainfall Intensity (10 yr.) = **6.27** in./hr.
 Drainage Area = **0.44** ac.

Weighted C-value (POST)

Landuse	Sub-area	C
Pvmt & roofs	0.30	0.90
Grass	0.14	0.25
City Business		0.85
Wood		0.15
Lawns		0.22

Weighted C-value (POST) = **0.70**
 Time of Concentration = **9** min.
 Rainfall Intensity (2 yr.) = **4.70** in./hr.
 Rainfall Intensity (10 yr.) = **6.27** in./hr.
 Drainage Area = **0.44** ac.

SOLUTION:

Peak Runoff (Q_y) = $C * I * A$ Where: Q = Peak Discharge (cfs) Y = Storm Event (Year)
 C = Runoff Coefficient
 I = Rainfall Intensity (in/hr) - Based on time of concentration
 A = Drainage Area (Acre)

Percent Change (Δ) = $100 * [Q_{POST} - Q_{PRE}] / Q_{PRE}$ Where: Δ = Change (%) - (10 Year Storm)
 Q_{POST} = Post-construction Discharge (cfs)
 Q_{PRE} = Pre-construction Discharge (cfs)

$Q_{2(PRE)} = \frac{1.3}{1.7}$ c.f.s.
 $Q_{10(PRE)} = \frac{1.7}{1.7}$ c.f.s.

$Q_{2(POST)} = \frac{1.4}{1.9}$ c.f.s.
 $Q_{10(POST)} = \frac{1.9}{1.9}$ c.f.s.

$\Delta_{10} = \boxed{15}$ %

CONCLUSION:

- 1 There is some change in Pre-construction versus Post-construction peak discharge.
- 2 The increase in peak runoff is caused by additional pavement area.
- 3 No adverse impact is anticipated for the downstream property.



STV Incorporated 454 South Anderson Road, Suite 3 Rock Hill, South Carolina 29730-3392 803 980 4970 o 803 980 4099 f	JOB:	SC-160 Widening	2
	SUBJECT:	Kings Court Outfall	SHEET
	CALC'D BY: SCN	DATE: 15-Jan-2018	OF
	CHECK'D BY: GPP	DATE: 15-Jan-2018	4

PRE VS. POST OUTFALL EVALUATION

GIVEN:

Outfall Location: Road Name **Kings Court** Sta. **48+00 (LT)**
 Analysis Point **Outfall (OP025)**

Weighted C-value (PRE)

Landuse	Sub-area	C
Pvmt & roofs	1.00	0.90
Grass	0.92	0.25
City Business		0.85
Residential		0.50
Wood		0.15
Lawns		0.22

Weighted C-value (PRE) = **0.59**
 Time of Concentration = **14** min.
 Rainfall Intensity (2 yr.) = **4.21** in./hr.
 Rainfall Intensity (10 yr.) = **5.51** in./hr.
 Drainage Area = **1.91** ac.

Weighted C-value (POST)

Landuse	Sub-area	C
Pvmt & roofs	1.05	0.90
Grass	0.86	0.25
City Business		0.85
Residential		0.50
Wood		0.15
Lawns		0.22

Weighted C-value (POST) = **0.61**
 Time of Concentration = **14** min.
 Rainfall Intensity (2 yr.) = **4.21** in./hr.
 Rainfall Intensity (10 yr.) = **5.51** in./hr.
 Drainage Area = **1.91** ac.

SOLUTION:

Peak Runoff (Q_y) = $C * I * A$ Where: Q = Peak Discharge (cfs) Y = Storm Event (Year)
 C = Runoff Coefficient
 I = Rainfall Intensity (in/hr) - Based on time of concentration
 A = Drainage Area (Acre)

Percent Change (Δ) = $100 * [Q_{POST} - Q_{PRE}] / Q_{PRE}$ Where: Δ = Change (%) - (10 Year Storm)
 Q_{POST} = Post-construction Discharge (cfs)
 Q_{PRE} = Pre-construction Discharge (cfs)

$Q_{2(PRE)} = \frac{4.7}{6.2} \text{ c.f.s.}$ $Q_{2(POST)} = \frac{4.9}{6.4} \text{ c.f.s.}$
 $Q_{10(PRE)} = \frac{5.51}{6.2} \text{ c.f.s.}$ $Q_{10(POST)} = \frac{5.51}{6.4} \text{ c.f.s.}$

$\Delta_{10} = \frac{3}{100} \%$

CONCLUSION:

- 1 There is some change in Pre-construction versus Post-construction peak discharge.
- 2 The increase in peak runoff is caused by additional pavement area.
- 3 No adverse impact is anticipated for the downstream property.



STV Incorporated 454 South Anderson Road, Suite 3 Rock Hill, South Carolina 29730-3392 803 980 4970 o 803 980 4099 f	JOB:	SC-160 Widening	3
	SUBJECT:	77+65 Lt. Outfall	SHEET
	CALC'D BY: SCN	DATE: 22-Mar-2017	OF
	CHECK'D BY: GPP	DATE: 23-Mar-2017	4

PRE VS. POST OUTFALL EVALUATION

GIVEN:

Outfall Location: Road Name **SC-160** Sta. **77+65 (LT)**
 Analysis Point **Outfall (OP015)**

Weighted C-value (PRE)

Landuse	Sub-area	C
Pvmt & roofs	0.22	0.90
Cultivated Land		0.55
City Business		0.85
Residential		0.50
Wood		0.15
Grass	2.38	0.25
Apartment		0.60

Weighted C-value (PRE) = **0.31**
 Time of Concentration = **12** min.
 Rainfall Intensity (2 yr.) = **4.18** in./hr.
 Rainfall Intensity (10 yr.) = **5.75** in./hr.
 Drainage Area = **2.61** ac.

Weighted C-value (POST)

Landuse	Sub-area	C
Pvmt & roofs	1.61	0.90
Cultivated Land		0.55
City Business		0.85
Residential		0.50
Wood		0.15
Grass	1.05	0.25
Apartment		0.60

Weighted C-value (POST) = **0.64**
 Time of Concentration = **12** min.
 Rainfall Intensity (2 yr.) = **4.18** in./hr.
 Rainfall Intensity (10 yr.) = **5.75** in./hr.
 Drainage Area = **2.66** ac.

SOLUTION:

Peak Runoff (Q_p) = $C * I * A$ Where: Q = Peak Discharge (cfs) Y = Storm Event (Year)
 C = Runoff Coefficient
 I = Rainfall Intensity (in/hr) - Based on time of concentration
 A = Drainage Area (Acre)

Percent Change (Δ) = $100 * [Q_{POST} - Q_{PRE}] / Q_{PRE}$ Where: Δ = Change (%) - (10 Year Storm)
 Q_{POST} = Post-construction Discharge (cfs)
 Q_{PRE} = Pre-construction Discharge (cfs)

$$Q_{2(PRE)} = \frac{3.4}{4.6} \text{ c.f.s.} \qquad Q_{2(POST)} = \frac{7.1}{9.8} \text{ c.f.s.}$$

$$Q_{10(PRE)} = \frac{4.6}{9.8} \text{ c.f.s.} \qquad Q_{10(POST)} = \frac{9.8}{9.8} \text{ c.f.s.}$$

$$\Delta_{10} = \boxed{111} \%$$

CONCLUSION:

- 1 There is a large change in Pre-construction versus Post-construction peak discharge.
- 2 The increase in peak runoff is primarily caused by the new commercial building area.



STV Incorporated 454 South Anderson Road, Suite 3 Rock Hill, South Carolina 29730-3392 803 980 4970 o 803 980 4099 f	JOB:	SC-160 Widening	4
	SUBJECT:	88+50 Lt. Outfall	SHEET
	CALC'D BY: SCN	DATE: 22-Mar-2017	OF
	CHECK'D BY: GPP	DATE: 23-Mar-2017	4

PRE VS. POST OUTFALL EVALUATION

GIVEN:

Outfall Location: Road Name **SC-160** Sta. **88+50 (LT)**
 Analysis Point **Outfall (Ditch 006)**

Weighted C-value (PRE)

Landuse	Sub-area	C
Pvmt & roofs	0.98	0.90
Grass	3.46	0.25
Gravel Pavement		0.55
Wood		0.15
Lawns		0.22
Meadows		0.30

Weighted C-value (PRE) = **0.39**
 Time of Concentration = **13** min.
 Rainfall Intensity (2 yr.) = **4.18** in./hr.
 Rainfall Intensity (10 yr.) = **5.75** in./hr.
 Drainage Area = **4.44** ac.

Weighted C-value (POST)

Landuse	Sub-area	C
Pvmt & roofs	1.65	0.90
Grass	2.79	0.25
Gravel Pavement		0.55
Wood		0.15
Lawns		0.22
Meadows		0.30

Weighted C-value (POST) = **0.49**
 Time of Concentration = **13** min.
 Rainfall Intensity (2 yr.) = **4.18** in./hr.
 Rainfall Intensity (10 yr.) = **5.75** in./hr.
 Drainage Area = **4.44** ac.

SOLUTION:

Peak Runoff (Q_y) = $C * I * A$ Where: Q = Peak Discharge (cfs) Y = Storm Event (Year)
 C = Runoff Coefficient
 I = Rainfall Intensity (in/hr) - Based on time of concentration
 A = Drainage Area (Acre)

Percent Change (Δ) = $100 * [Q_{POST} - Q_{PRE}] / Q_{PRE}$ Where: Δ = Change (%) - (10 Year Storm)
 Q_{POST} = Post-construction Discharge (cfs)
 Q_{PRE} = Pre-construction Discharge (cfs)

$Q_{2(PRE)} = \frac{7.2}{10.0} \text{ c.f.s.}$ $Q_{2(POST)} = \frac{9.1}{12.5} \text{ c.f.s.}$
 $Q_{10(PRE)} = \frac{10.0}{12.5} \text{ c.f.s.}$ $Q_{10(POST)} = \frac{12.5}{12.5} \text{ c.f.s.}$

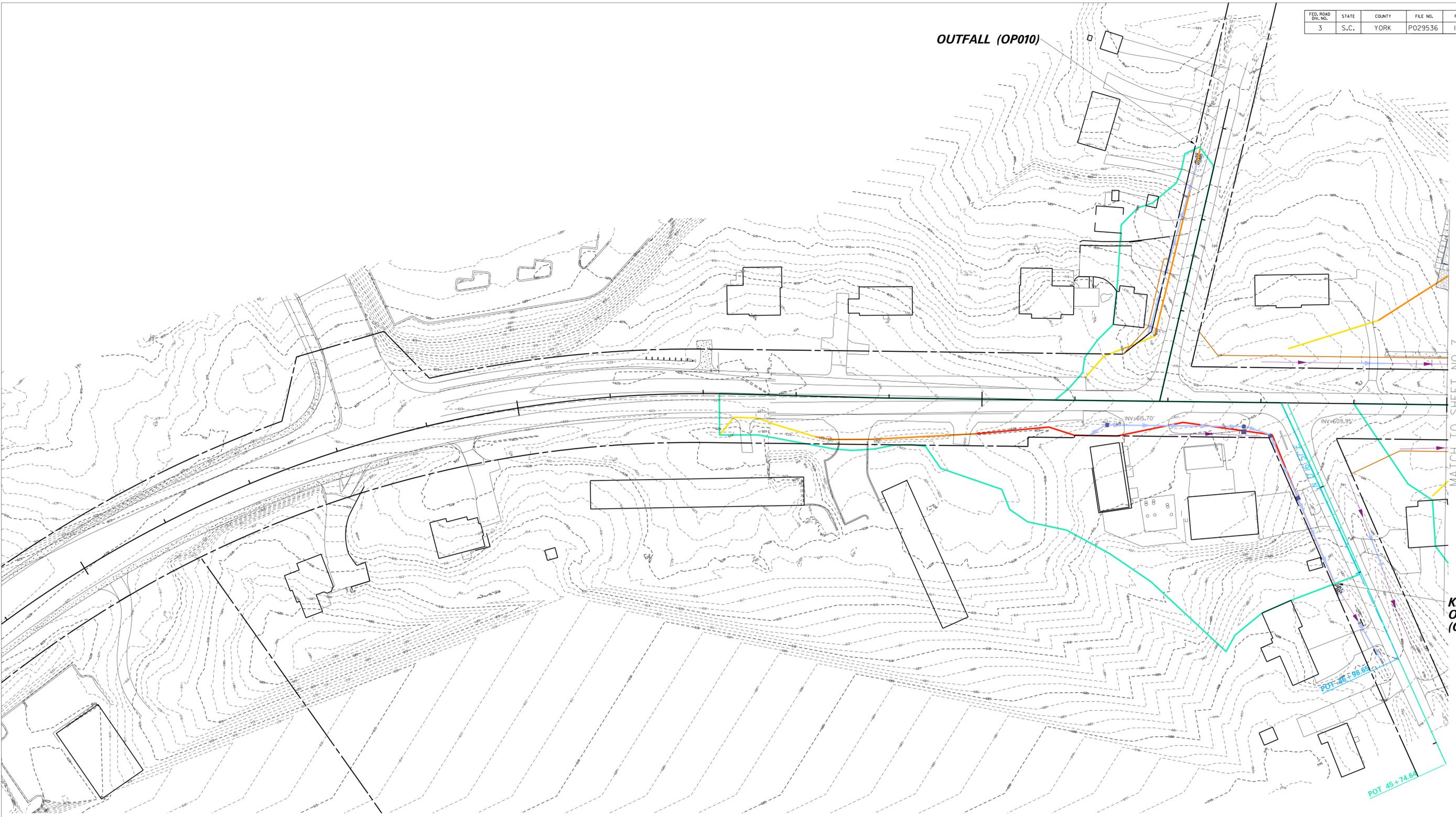
$\Delta_{10} = \frac{26}{100} \%$

CONCLUSION:

- 1 There is some change in Pre-construction versus Post-construction peak discharge.
- 2 The increase in peak runoff is caused by additional pavement area.
- 3 No adverse impact is anticipated for the downstream property.

FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	PROJECT NO.	ROUTE NO.	SHEET NO.
3	S.C.	YORK	P029536	III49-010	SC 160	6

FINAL PLANS
FOR REVIEW ONLY



MATCH TO SHEET NO. 7
STA. 75+00.00

**KINGS COURT
OUTFALL
(OP025)**



STV 100 Years
STV Incorporated
ROCK HILL BUSINESS TECHNOLOGY CENTER, BTC 517
454 S. ANDERSON ROAD, SUITE 3
ROCK HILL, SOUTH CAROLINA 29730

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REV. NO.	BY	DATE	DESCRIPTION OF REVISION	
	PREPARED BY		CHK'D BY	REVIEWED BY

YORK COUNTY
SOUTH CAROLINA
**S.C. ROUTE 160 (HIGHWAY 160 E)
OUTFALL ANALYSIS
PRE CONDITION
STA. 71+00.00 TO STA. 75+00.00**
SCALE 1"=50' S.C. ROUTE 160 DWG. NO. 6

FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	PROJECT NO.	ROUTE NO.	SHEET NO.
3	S.C.	YORK	P029536	III49-010	SC 160	6

FINAL PLANS
FOR REVIEW ONLY



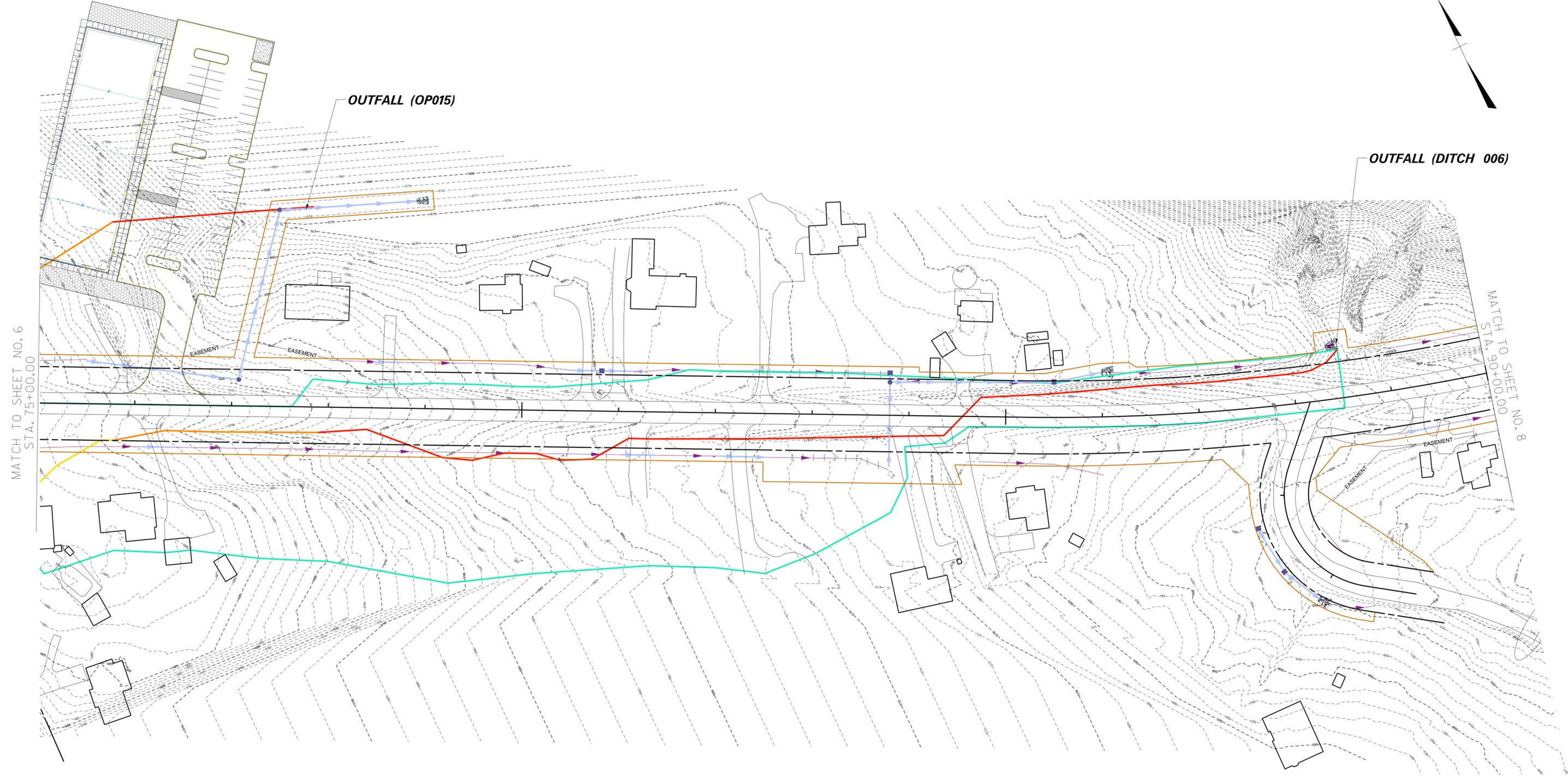
STV 100 Years
STV Incorporated
 ROCK HILL BUSINESS TECHNOLOGY CENTER, BTC 517
 454 S. ANDERSON ROAD, SUITE 3
 ROCK HILL, SOUTH CAROLINA 29730

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REV. NO.	BY	DATE	DESCRIPTION OF REVISION
PREPARED BY	CHK'D BY	REVIEWED BY	

YORK COUNTY
 SOUTH CAROLINA
S.C. ROUTE 160 (HIGHWAY 160 E)
OUTFALL ANALYSIS
POST CONDITION
STA. 71+00.00 TO STA. 75+00.00
 SCALE 1"=50' S.C. ROUTE 160 DWG. NO. 6

FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	PROJECT NO.	ROUTE NO.	SHEET NO.
3	S.C.	YORK	P029536	III49-010	SC 160	7

FINAL PLANS
FOR REVIEW ONLY



MATCH TO SHEET NO. 6
STA. 75+00.00

MATCH TO SHEET NO. 8
STA. 90+00.00



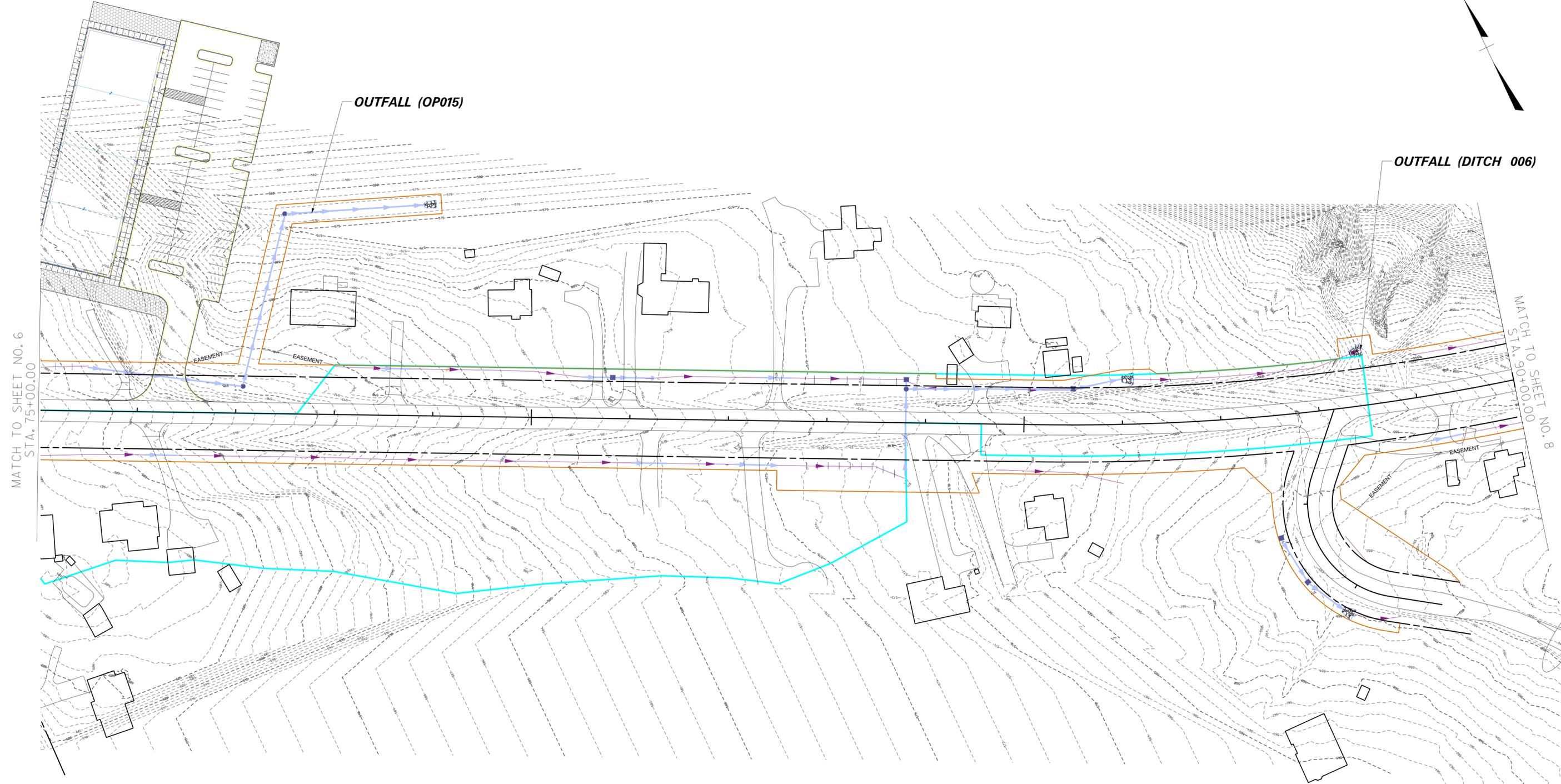
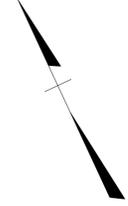
STV 100 Years
STV Incorporated
ROCK HILL BUSINESS TECHNOLOGY CENTER, BTC 517
454 S. ANDERSON ROAD, SUITE 3
ROCK HILL, SOUTH CAROLINA 29730

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REV. NO.	BY	DATE	DESCRIPTION OF REVISION
	PREPARED BY		CHK'D BY
			REVIEWED BY

YORK COUNTY
SOUTH CAROLINA
**S.C. ROUTE 160 (HIGHWAY 160 E)
OUTFALL ANALYSIS
PRECONDITION
STA. 75+00.00 TO STA. 90+00.00**
SCALE 1"=50' S.C. ROUTE 160 DWG. NO. 7

FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	PROJECT NO.	ROUTE NO.	SHEET NO.
3	S.C.	YORK	P029536	III49-010	SC 160	7

FINAL PLANS
FOR REVIEW ONLY



MATCH TO SHEET NO. 6
STA. 75+00.00

MATCH TO SHEET NO. 8
STA. 90+00.00



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 454 S. ANDERSON ROAD, SUITE 3
 ROCK HILL, SOUTH CAROLINA 29730

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PREPARED BY _____ CHK'D BY _____ REVIEWED BY _____			

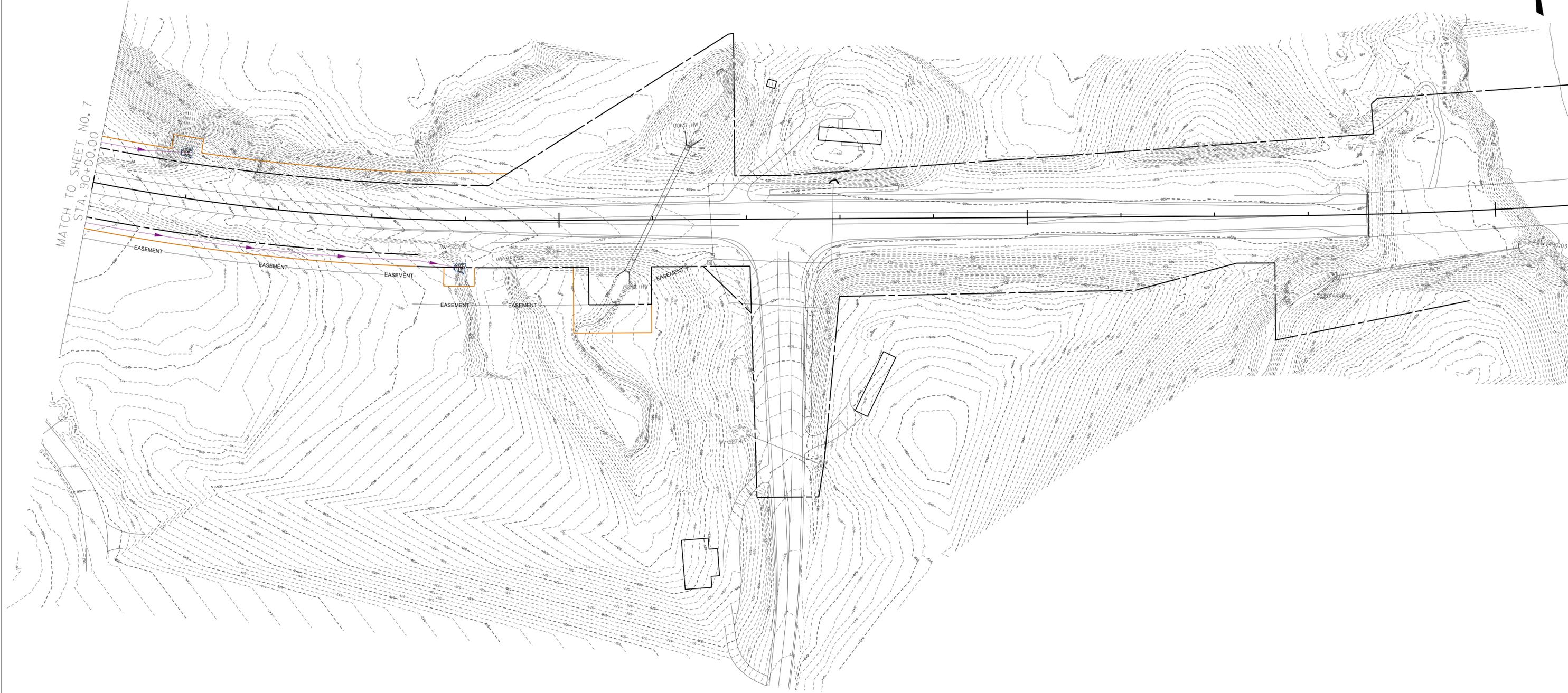
YORK COUNTY
 SOUTH CAROLINA
S.C. ROUTE 160 (HIGHWAY 160 E)
OUTFALL ANALYSIS
POST CONDITION
STA. 75+00.00 TO STA. 90+00.00
 SCALE 1"=50' S.C. ROUTE 160 DWG. NO. 7

FED. ROAD DWG. NO.	STATE	COUNTY	FILE NO.	PROJECT NO.	ROUTE NO.	SHEET NO.
3	S.C.	YORK	P029536	III49-010	SC 160	8

FINAL PLANS
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MATCH TO SHEET NO. 7
STA. 90+00.00



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ROCK HILL, SOUTH CAROLINA 29730

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			PREPARED BY _____ CHK'D BY _____ REVIEWED BY _____

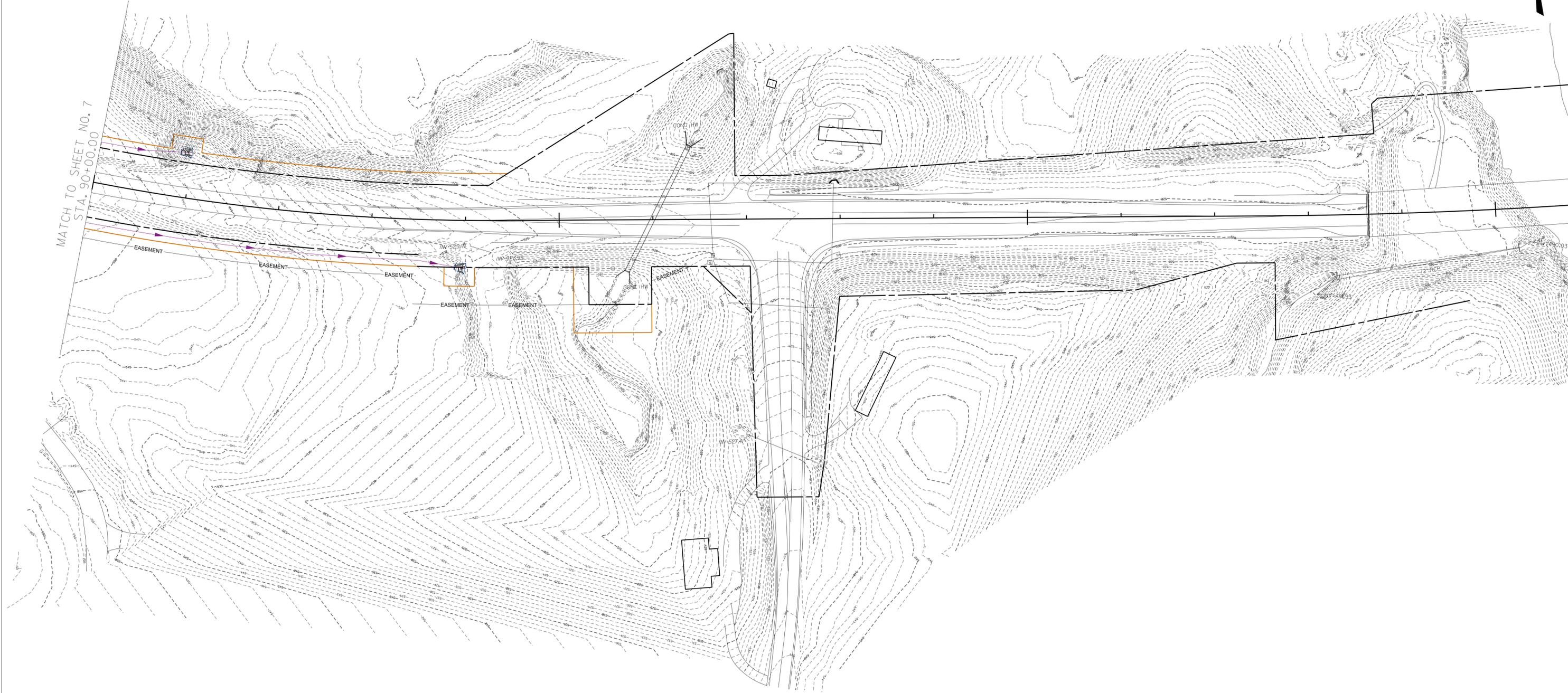
YORK COUNTY
SOUTH CAROLINA
**S.C. ROUTE 160 (HIGHWAY 160 E)
OUTFALL ANALYSIS
PRECONDITION
STA. 90+00.00 TO STA. 97+10.00**
SCALE 1"=50' S.C. ROUTE 160 DWG. NO. 8

FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	PROJECT NO.	ROUTE NO.	SHEET NO.
3	S.C.	YORK	P029536	III49-010	SC 160	8

FINAL PLANS
FOR REVIEW ONLY



MATCH TO SHEET NO. 7
STA. 90+00.00



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 ROCK HILL BUSINESS TECHNOLOGY CENTER, BTC 517
 454 S. ANDERSON ROAD, SUITE 3
 ROCK HILL, SOUTH CAROLINA 29730

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REV. NO.	BY	DATE	DESCRIPTION OF REVISION
PREPARED BY _____ CHK'D BY _____ REVIEWED BY _____			

YORK COUNTY
 SOUTH CAROLINA
**S.C. ROUTE 160 (HIGHWAY 160 E)
 OUTFALL ANALYSIS
 POSTCONDITION
 STA. 90+00.00 TO STA. 97+10.00**
 SCALE 1"=50' S.C. ROUTE 160 DWG. NO. 8

Appendix E
Erosion Control Calculations

Hydraulic Analysis Report

Project Data

Project Title: Project - SR-160
Designer:
Project Date: Tuesday, March 21, 2017
Project Units: U.S. Customary Units
Notes:

Riprap Analysis: Riprap Analysis_Outfall 78+88 Lt Pipe

Notes:

Input Parameters

Riprap Type: Culvert Outlet Protection
Flow: 3.3 cfs
Culvert Diameter: 1.5 ft
Normal Depth in Culvert: 0.354 ft
Tailwater Depth: 0.6 ft
If tailwater is unknown, use 0.4D
flow is supercritical

Result Parameters

Tailwater Depth Used in Computations: 0.6 ft
Culvert Diameter Used in Computations: 0.927 ft
Computed D50: 2.14933 in

Riprap Class

Riprap Name: CLASS I

Riprap Class: I

The following values are an 'average' of the size fraction range for the selected riprap class.

d100: 12 in

d85: 9 in

d50: 6.5 in

d15: 4.5 in

Layout Recommendations

Apron Length: 6 ft

Apron Depth: 1.89583 ft

Apron Width (at end): 6.781 ft

No channel used in calculations

Hydraulic Analysis Report

Project Data

Project Title: Project - SR-160
Designer:
Project Date: Tuesday, March 21, 2017
Project Units: U.S. Customary Units
Notes:

Riprap Analysis: Riprap Analysis_Outfall 86+00 Lt Pipe

Notes:

Input Parameters

Riprap Type: Culvert Outlet Protection
Flow: 11.8 cfs
Culvert Diameter: 2 ft
Normal Depth in Culvert: 1.097 ft
Tailwater Depth: 1 ft
If tailwater is unknown, use 0.4D
flow is sbcritical

Result Parameters

Tailwater Depth Used in Computations: 1 ft
Culvert Diameter Used in Computations: 2 ft
Computed D50: 2.52936 in

Riprap Class

Riprap Name: CLASS I

Riprap Class: I

The following values are an 'average' of the size fraction range for the selected riprap class.

d100: 12 in

d85: 9 in

d50: 6.5 in

d15: 4.5 in

Layout Recommendations

Apron Length: 8 ft

Apron Depth: 1.89583 ft

Apron Width (at end): 11.3333 ft

No channel used in calculations

Hydraulic Analysis Report

Project Data

Project Title: Project - SR-160
Designer:
Project Date: Tuesday, March 21, 2017
Project Units: U.S. Customary Units
Notes:

Riprap Analysis: Riprap Analysis_Mimosa Outfall Pipe

Notes:

Input Parameters

Riprap Type: Culvert Outlet Protection
Flow: 0.74 cfs
Culvert Diameter: 1.5 ft
Normal Depth in Culvert: 0.165 ft
Tailwater Depth: 0.6 ft
If tailwater is unknown, use 0.4D
flow is supercritical

Result Parameters

Tailwater Depth Used in Computations: 0.6 ft
Culvert Diameter Used in Computations: 0.8325 ft
Computed D50: 0.337951 in

Riprap Class

Riprap Name: CLASS I

Riprap Class: I

The following values are an 'average' of the size fraction range for the selected riprap class.

d100: 12 in

d85: 9 in

d50: 6.5 in

d15: 4.5 in

Layout Recommendations

Apron Length: 6 ft

Apron Depth: 1.89583 ft

Apron Width (at end): 6.4975 ft

No channel used in calculations

Hydraulic Analysis Report

Project Data

Project Title: Project - SR-160
Designer:
Project Date: Tuesday, March 21, 2017
Project Units: U.S. Customary Units
Notes:

Riprap Analysis: Riprap Analysis_Kings Court Outfall Pipe

Notes:

Input Parameters

Riprap Type: Culvert Outlet Protection
Flow: 7.6 cfs
Culvert Diameter: 1.5 ft
Normal Depth in Culvert: 0.75 ft
Tailwater Depth: 0.6 ft
If tailwater is unknown, use 0.4D
flow is sbcritical

Result Parameters

Tailwater Depth Used in Computations: 0.6 ft
Culvert Diameter Used in Computations: 1.5 ft
Computed D50: 3.44101 in

Riprap Class

Riprap Name: CLASS I

Riprap Class: I

The following values are an 'average' of the size fraction range for the selected riprap class.

d100: 12 in

d85: 9 in

d50: 6.5 in

d15: 4.5 in

Layout Recommendations

Apron Length: 6 ft

Apron Depth: 1.89583 ft

Apron Width (at end): 8.5 ft

No channel used in calculations

Hydraulic Analysis Report

Project Data

Project Title: Project - SR-160
Designer:
Project Date: Tuesday, March 21, 2017
Project Units: U.S. Customary Units
Notes:

Riprap Analysis: Riprap Analysis_Sleepy Hollow Outfall Pipe

Notes:

Input Parameters

Riprap Type: Culvert Outlet Protection
Flow: 0.74 cfs
Culvert Diameter: 1.5 ft
Normal Depth in Culvert: 0.165 ft
Tailwater Depth: 0.6 ft
If tailwater is unknown, use 0.4D
flow is supercritical

Result Parameters

Tailwater Depth Used in Computations: 0.6 ft
Culvert Diameter Used in Computations: 0.8325 ft
Computed D50: 0.337951 in

Riprap Class

Riprap shape should be angular

Riprap Class Name: CLASS I

Riprap Class Order: 1

The following values are an 'average' of the size fraction range for the selected riprap class.

d100: 12 in

d85: 9 in

d50: 6.5 in

d15: 4.5 in

Layout Recommendations

Apron Length: 6 ft

Apron Depth: 1.89583 ft

Apron Width (at end): 6.4975 ft

No channel used in calculations



STV Incorporated Consulting Engineers 454 S Anderson Rd, Suite 3, BTC 517 Rock Hill, SC, 29730	JOB: SC 160 Widening	1
	SUBJECT: Outlet Protection	SHEET
	CALCD BY: SCN DATE: 21-Mar-17	OF
	CHECK'D BY: GPP DATE: 22-Mar-17	8

DETERMINE RIP RAP APRON QUANTITY

GIVEN:

Outlet Protection for Pipe @ Sta. **47+25 Rt.** Road Name **Mimosa**

From Charts - Length (L_a) = **12** ft.

Width 1 (W₁) = 3 * D_o = **4.5** ft. Pipe Size (D_o) = **18** "

Width 2 (W₂) = **8** ft.

SOLUTION:

From Riprap Apron Design Charts Determine d₅₀ Riprap Size

SCDOT Riprap Class **B** (Round up to match SCDOT riprap class - see Table #1 below)

d₅₀ = **0.75** ft. d_{max} = **1.33** ft.

Thickness (T) = 1.5 * d_{max} = **2.00** ft.

Volume of Riprap = L_a * 0.5(W₁ + W₂) * T = **149.6** c.f.

Weight of Riprap = Vol. * (125 lbs./c.f.) / (2000 lbs./ton) = **9.35** Tons, use ==> **10 TONS**

DETERMINE GEOTEXTILE QUANTITY, TYPE, AND CLASS

SOLUTION:

Quantity of Geotextile

$[L_a * 0.5(W_1 + W_2) + T(2L_a + W_1 + W_2)] / (9 \text{ s.f./s.y.}) =$ **16.42** s.y., use ==> **17 SY**

SCDOT Geotextile Type **C** (see "Map of Recommended Geotextiles for Erosion Control")

SCDOT Geotextile Class **2** (In most cases will be Class 2; see SCDOT 2007 Specs., p.829)

Riprap Class	d ₅₀ Rock Size (ft.)	d _{max} (ft.)
A	0.50	0.75
B	0.75	1.33
C	1.30	1.80
D	1.80	2.25
E	2.25	2.85
F	2.85	3.60

TABLE #1: Riprap Class (From SCDOT 2007 Specs., P.825-826)



STV Incorporated Consulting Engineers 454 S Anderson Rd, Suite 3, BTC 517 Rock Hill, SC, 29730	JOB: SC 160 Widening	2
	SUBJECT: Outlet Protection	SHEET
	CALCD BY: SCN DATE: 21-Mar-17	OF
	CHECK'D BY: GPP DATE: 22-Mar-17	8

DETERMINE RIP RAP APRON QUANTITY

GIVEN:

Outlet Protection for Pipe @ Sta. **48+00 Lt.** Road Name **Kings Court**

From Charts - Length (L_a) = **12** ft. Pipe Size (D_o) = **18** "

Width 1 (W₁) = 3 * D_o = 4.5 ft.

Width 2 (W₂) = **9** ft.

SOLUTION:

From Riprap Apron Design Charts Determine d₅₀ Riprap Size

SCDOT Riprap Class **B** (Round up to match SCDOT riprap class - see Table #1 below)

d₅₀ = 0.75 ft. d_{max} = 1.33 ft.

Thickness (T) = 1.5 * d_{max} = 2.00 ft.

Volume of Riprap = L_a * 0.5(W₁ + W₂) * T = 161.6 c.f.

Weight of Riprap = Vol. * (125 lbs./c.f.) / (2000 lbs./ton) = 10.10 Tons, use ==> **11 TONS**

DETERMINE GEOTEXTILE QUANTITY, TYPE, AND CLASS

SOLUTION:

Quantity of Geotextile

$[L_a * 0.5(W_1 + W_2) + T(2L_a + W_1 + W_2)] / (9 \text{ s.f./s.y.}) =$ 17.31 s.y., use ==> **18 SY**

SCDOT Geotextile Type **C** (see "Map of Recommended Geotextiles for Erosion Control")

SCDOT Geotextile Class **2** (In most cases will be Class 2; see SCDOT 2007 Specs., p.829)

Riprap Class	d ₅₀ Rock Size (ft.)	d _{max} (ft.)
A	0.50	0.75
B	0.75	1.33
C	1.30	1.80
D	1.80	2.25
E	2.25	2.85
F	2.85	3.60

TABLE #1: Riprap Class (From SCDOT 2007 Specs., P.825-826)



STV Incorporated Consulting Engineers 454 S Anderson Rd, Suite 3, BTC 517 Rock Hill, SC, 29730	JOB: SC 160 Widening	3
	SUBJECT: Outlet Protection	SHEET
	CALCD BY: SCN DATE: 21-Mar-17	OF
	CHECK'D BY: GPP DATE: 22-Mar-17	8

DETERMINE RIP RAP APRON QUANTITY

GIVEN:

Outlet Protection for Pipe @ Sta. **48+00 Lt.** Road Name **Sleepy Hollow**

From Charts - Length (L_a) = **10** ft.

Width 1 (W₁) = 3 * D_o = **4.5** ft. Pipe Size (D_o) = **18** "

Width 2 (W₂) = **8** ft.

SOLUTION:

From Riprap Apron Design Charts Determine d₅₀ Riprap Size

SCDOT Riprap Class **B** (Round up to match SCDOT riprap class - see Table #1 below)

d₅₀ = **0.75** ft. d_{max} = **1.33** ft.

Thickness (T) = 1.5 * d_{max} = **2.00** ft.

Volume of Riprap = L_a * 0.5(W₁ + W₂) * T = 124.7 c.f.

Weight of Riprap = Vol. * (125 lbs./c.f.) / (2000 lbs./ton) = 7.79 Tons, use ==> **8 TONS**

DETERMINE GEOTEXTILE QUANTITY, TYPE, AND CLASS

SOLUTION:

Quantity of Geotextile

$[L_a * 0.5(W_1 + W_2) + T(2L_a + W_1 + W_2)] / (9 \text{ s.f./s.y.}) =$ 14.15 s.y., use ==> **15 SY**

SCDOT Geotextile Type **C** (see "Map of Recommended Geotextiles for Erosion Control")

SCDOT Geotextile Class **2** (In most cases will be Class 2; see SCDOT 2007 Specs., p.829)

Riprap Class	d ₅₀ Rock Size (ft.)	d _{max} (ft.)
A	0.50	0.75
B	0.75	1.33
C	1.30	1.80
D	1.80	2.25
E	2.25	2.85
F	2.85	3.60

TABLE #1: Riprap Class (From SCDOT 2007 Specs., P.825-826)



STV Incorporated Consulting Engineers 454 S Anderson Rd, Suite 3, BTC 517 Rock Hill, SC, 29730	JOB: SC 160 Widening	4
	SUBJECT: Outlet Protection	SHEET
	CALCD BY: SCN DATE: 21-Mar-17	OF
	CHECK'D BY: GPP DATE: 22-Mar-17	8

DETERMINE RIP RAP APRON QUANTITY

GIVEN:

Outlet Protection for Pipe @ Sta. **78+88 Lt.** Road Name **SC 160**

From Charts - Length (L_a) = **12** ft. Pipe Size (D_o) = **18** "

Width 1 (W₁) = 3 * D_o = 4.5 ft.

Width 2 (W₂) = **8** ft.

SOLUTION:

From Riprap Apron Design Charts Determine d₅₀ Riprap Size

SCDOT Riprap Class **B** (Round up to match SCDOT riprap class - see Table #1 below)

d₅₀ = 0.75 ft. d_{max} = 1.33 ft.

Thickness (T) = 1.5 * d_{max} = 2.00 ft.

Volume of Riprap = L_a * 0.5(W₁ + W₂) * T = 149.6 c.f.

Weight of Riprap = Vol. * (125 lbs./c.f.) / (2000 lbs./ton) = 9.35 Tons, use ==> **10 TONS**

DETERMINE GEOTEXTILE QUANTITY, TYPE, AND CLASS

SOLUTION:

Quantity of Geotextile

$[L_a * 0.5(W_1 + W_2) + T(2L_a + W_1 + W_2)] / (9 \text{ s.f./s.y.}) =$ 16.42 s.y., use ==> **17 SY**

SCDOT Geotextile Type **C** (see "Map of Recommended Geotextiles for Erosion Control")

SCDOT Geotextile Class **2** (In most cases will be Class 2; see SCDOT 2007 Specs., p.829)

Riprap Class	d ₅₀ Rock Size (ft.)	d _{max} (ft.)
A	0.50	0.75
B	0.75	1.33
C	1.30	1.80
D	1.80	2.25
E	2.25	2.85
F	2.85	3.60

TABLE #1: Riprap Class (From SCDOT 2007 Specs., P.825-826)



STV Incorporated Consulting Engineers 454 S Anderson Rd, Suite 3, BTC 517 Rock Hill, SC, 29730	JOB: SC 160 Widening	5
	SUBJECT: Outlet Protection	SHEET
	CALCD BY: SCN DATE: 21-Mar-17	OF
	CHECK'D BY: GPP DATE: 22-Mar-17	8

DETERMINE RIP RAP APRON QUANTITY

GIVEN:

Outlet Protection for Pipe @ Sta. **86+00 Lt.** Road Name **SC 160**

From Charts - Length (L_a) = **12** ft. Pipe Size (D_o) = **24** "

Width 1 (W₁) = 3 * D_o = **6.0** ft.

Width 2 (W₂) = **12** ft.

SOLUTION:

From Riprap Apron Design Charts Determine d₅₀ Riprap Size

SCDOT Riprap Class **B** (Round up to match SCDOT riprap class - see Table #1 below)

d₅₀ = **0.75** ft. d_{max} = **1.33** ft.

Thickness (T) = 1.5 * d_{max} = **2.00** ft.

Volume of Riprap = L_a * 0.5(W₁ + W₂) * T = 215.5 c.f.

Weight of Riprap = Vol. * (125 lbs./c.f.) / (2000 lbs./ton) = 13.47 Tons, use ==> **14 TONS**

DETERMINE GEOTEXTILE QUANTITY, TYPE, AND CLASS

SOLUTION:

Quantity of Geotextile

$[L_a * 0.5(W_1 + W_2) + T(2L_a + W_1 + W_2)] / (9 \text{ s.f./s.y.}) =$ 21.31 s.y., use ==> **22 SY**

SCDOT Geotextile Type **C** (see "Map of Recommended Geotextiles for Erosion Control")

SCDOT Geotextile Class **2** (In most cases will be Class 2; see SCDOT 2007 Specs., p.829)

Since we are combining the rip rap for use Type C riprap

Riprap Class	d ₅₀ Rock Size (ft.)	d _{max} (ft.)
A	0.50	0.75
B	0.75	1.33
C	1.30	1.80
D	1.80	2.25
E	2.25	2.85
F	2.85	3.60

TABLE #1: Riprap Class (From SCDOT 2007 Specs., P.825-826)



STV Incorporated Consulting Engineers 454 S Anderson Rd, Suite 3, BTC 517 Rock Hill, SC, 29730	JOB: SC 160 Widening	6
	SUBJECT: Outlet Protection	SHEET
	CALCD BY: SCN DATE: 21-Mar-17	OF
	CHECK'D BY: GPP DATE: 22-Mar-17	8
DETERMINE RIP RAP APRON QUANTITY		

GIVEN:

Outlet Protection for Pipe @ Sta. **88+50 Lt.** Road Name **SC 160**

From Charts - Length (L_a) = **12** ft. Pipe Size (D_o) = **18** "

Width 1 (W₁) = 3 * D_o = **4.5** ft.

Width 2 (W₂) = **8** ft.

SOLUTION:

From Riprap Apron Design Charts Determine d₅₀ Riprap Size

SCDOT Riprap Class **B** (Round up to match SCDOT riprap class - see Table #1 below)

d₅₀ = **0.75** ft. d_{max} = **1.33** ft.

Thickness (T) = 1.5 * d_{max} = **2.00** ft.

Volume of Riprap = L_a * 0.5(W₁ + W₂) * T = **149.6** c.f.

Weight of Riprap = Vol. * (125 lbs./c.f.) / (2000 lbs./ton) = **9.35** Tons, use ==> **10 TONS**

DETERMINE GEOTEXTILE QUANTITY, TYPE, AND CLASS

SOLUTION:

Quantity of Geotextile

$[L_a * 0.5(W_1 + W_2) + T(2L_a + W_1 + W_2)] / (9 \text{ s.f./s.y.}) =$ **16.42** s.y., use ==> **17 SY**

SCDOT Geotextile Type **C** (see "Map of Recommended Geotextiles for Erosion Control")

SCDOT Geotextile Class **2** (In most cases will be Class 2; see SCDOT 2007 Specs., p.829)

Riprap Class	d ₅₀ Rock Size (ft.)	d _{max} (ft.)
A	0.50	0.75
B	0.75	1.33
C	1.30	1.80
D	1.80	2.25
E	2.25	2.85
F	2.85	3.60

TABLE #1: Riprap Class (From SCDOT 2007 Specs., P.825-826)



STV Incorporated Consulting Engineers 454 S Anderson Rd, Suite 3, BTC 517 Rock Hill, SC, 29730	JOB: SC 160 Widening	7
	SUBJECT: Outlet Protection	SHEET
	CALC'D BY: SCN DATE: 21-Mar-17	OF
	CHECK'D BY: GPP DATE: 22-Mar-17	8

DETERMINE RIP RAP APRON QUANTITY

GIVEN:

Outlet Protection for Pipe @ Sta. **91+00 Lt.** Road Name **SC 160**

From Charts - Length (L_a) = **12** ft. Pipe Size (D_o) = **18** "

Width 1 (W₁) = 3 * D_o = 4.5 ft.

Width 2 (W₂) = **8** ft.

SOLUTION:

From Riprap Apron Design Charts Determine d₅₀ Riprap Size

SCDOT Riprap Class **B** (Round up to match SCDOT riprap class - see Table #1 below)

d₅₀ = 0.75 ft. d_{max} = 1.33 ft.

Thickness (T) = 1.5 * d_{max} = 2.00 ft.

Volume of Riprap = L_a * 0.5(W₁ + W₂) * T = 149.6 c.f.

Weight of Riprap = Vol. * (125 lbs./c.f.) / (2000 lbs./ton) = 9.35 Tons, use ==> **10 TONS**

DETERMINE GEOTEXTILE QUANTITY, TYPE, AND CLASS

SOLUTION:

Quantity of Geotextile

$[L_a * 0.5(W_1 + W_2) + T(2L_a + W_1 + W_2)] / (9 \text{ s.f./s.y.}) =$ 16.42 s.y., use ==> **17 SY**

SCDOT Geotextile Type **C** (see "Map of Recommended Geotextiles for Erosion Control")

SCDOT Geotextile Class **2** (In most cases will be Class 2; see SCDOT 2007 Specs., p.829)

Riprap Class	d ₅₀ Rock Size (ft.)	d _{max} (ft.)
A	0.50	0.75
B	0.75	1.33
C	1.30	1.80
D	1.80	2.25
E	2.25	2.85
F	2.85	3.60

TABLE #1: Riprap Class (From SCDOT 2007 Specs., P.825-826)



STV Incorporated Consulting Engineers 454 S Anderson Rd, Suite 3, BTC 517 Rock Hill, SC, 29730	JOB: SC 160 Widening	8
	SUBJECT: Outlet Protection	SHEET
	CALC'D BY: SCN DATE: 21-Mar-17	OF
	CHECK'D BY: GPP DATE: 22-Mar-17	8

DETERMINE RIP RAP APRON QUANTITY

GIVEN:

Outlet Protection for Pipe @ Sta. **94+00 Rt.** Road Name **SC 160**

From Charts - Length (L_a) = **12** ft. Pipe Size (D_o) = **18** "

Width 1 (W₁) = 3 * D_o = 4.5 ft.

Width 2 (W₂) = **8** ft.

SOLUTION:

From Riprap Apron Design Charts Determine d₅₀ Riprap Size

SCDOT Riprap Class **B** (Round up to match SCDOT riprap class - see Table #1 below)

d₅₀ = 0.75 ft. d_{max} = 1.33 ft.

Thickness (T) = 1.5 * d_{max} = 2.00 ft.

Volume of Riprap = L_a * 0.5(W₁ + W₂) * T = 149.6 c.f.

Weight of Riprap = Vol. * (125 lbs./c.f.) / (2000 lbs./ton) = 9.35 Tons, use ==> **10 TONS**

DETERMINE GEOTEXTILE QUANTITY, TYPE, AND CLASS

SOLUTION:

Quantity of Geotextile

$[L_a * 0.5(W_1 + W_2) + T(2L_a + W_1 + W_2)] / (9 \text{ s.f./s.y.}) =$ 16.42 s.y., use ==> **17 SY**

SCDOT Geotextile Type **C** (see "Map of Recommended Geotextiles for Erosion Control")

SCDOT Geotextile Class **2** (In most cases will be Class 2; see SCDOT 2007 Specs., p.829)

Riprap Class	d ₅₀ Rock Size (ft.)	d _{max} (ft.)
A	0.50	0.75
B	0.75	1.33
C	1.30	1.80
D	1.80	2.25
E	2.25	2.85
F	2.85	3.60

TABLE #1: Riprap Class (From SCDOT 2007 Specs., P.825-826)

SHEET NO.	TOTAL SHEETS
1	7



South Carolina Department of Transportation

PRELIMINARY PLANS FOR

YORK COUNTY PROJECT ID P029536 SC 160 IMPROVEMENT FROM : MIMOSA LANE TO HENSLEY ROAD

Construction Sequence – Phase I

Items must occur in the order listed; items cannot occur concurrently unless specifically noted.

1. Receive NPDES coverage from DHEC
2. Conduct pre-construction meeting (on-site if more than 10 acres disturbed and non-linear)
3. Notify DHEC EQC Regional office or OCRM office 48 hours prior to beginning land-disturbing activities
4. Install construction entrance(s)
5. Clear & grub only as necessary for installation of perimeter controls
6. Install perimeter controls (e.g., silt fence)

Construction Sequence – Phase II

1. Clear & grub site or demolition (sediment & erosion control measures for these areas must already be installed)
2. Complete rough grading
3. Complete fine grading, paving, etc.
4. Install permanent/ final stabilization including erosion control blanket on all cut/fill slopes.
5. Remove temporary sediment & erosion control measures after entire area draining to the structure is finally stabilized (The Department recommends that the Project Owner/ Operator have the SWPPP Preparer or registration equivalent approve the removal of temporary structures.)
6. Perform as-built surveys of all detention structures and submit to DHEC or MS4 for acceptance.
7. Submit Notice of Termination (NOT) to DHEC as appropriate.

Note: If flows from offsite areas will be diverted around the site and the on-site structures are not designed to handle flows from the offsite areas, then the diversions/ piping for the offsite flows must be designed and installed before land-disturbing activities begin on the site. Sediment and erosion control measures for the disturbed areas for the diversion/ piping must be installed before those areas are disturbed and should be shown on the plans.

Note: Maintenance of sediment and erosion control measures must continue until the site is permanently stabilized and the controls are removed.

Hydraulic Design Reference for these plans is the:

2009

Edition of SCDOT's "Requirements for Hydraulic Design Studies"

Design Reference for these plans is the:

2001

AASHTO "A Policy on Geometric Design of Highways and Streets"

NPDES PERMIT INFORMATION

Disturbed Area = 5.75 Acre(s)

Permitted Area = 8.10 Acre(s)

Approximate Location of Roadway is

Begin
Latitude 35°00'30" N
Longitude 80°54'51" N

End
Latitude 35°00'21" N
Longitude 80°54'19" N

Hydraulic and NPDES Design provided by:

STV Incorporated

Designs may be obtained from the SCDOT Regional Production Group

Control measures as noted in this plan set include by reference items from the following:
Sediment & Erosion Control Details as per the current edition of the SCDOT Standard Drawings

BEGIN PROJECT
STATION 67+72



END PROJECT
STATION 97+50

ENVIRONMENTAL PERMIT INFORMATION

USACE PERMIT	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO		
NEPA DOCUMENT	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO		
401 CERTIFICATION	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO		
OCRM CAP	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO		
NAVIGABLE WATERS	<input type="checkbox"/> SC	<input type="checkbox"/> USCG	<input type="checkbox"/> USACE	<input checked="" type="checkbox"/> N/A

3 DAYS BEFORE DIGGING IN
SOUTH CAROLINA

CALL 811

SOUTH CAROLINA 811 (SC811)
WWW.SC811.COM

ALL UTILITIES MAY NOT BE A MEMBER OF SC811

LAYOUT

SCALE 1 INCH = N/A FEET

SEDIMENT AND EROSION CONTROL PLANS

CONSULTING ENGINEERING FIRM



ENGINEER OF RECORD



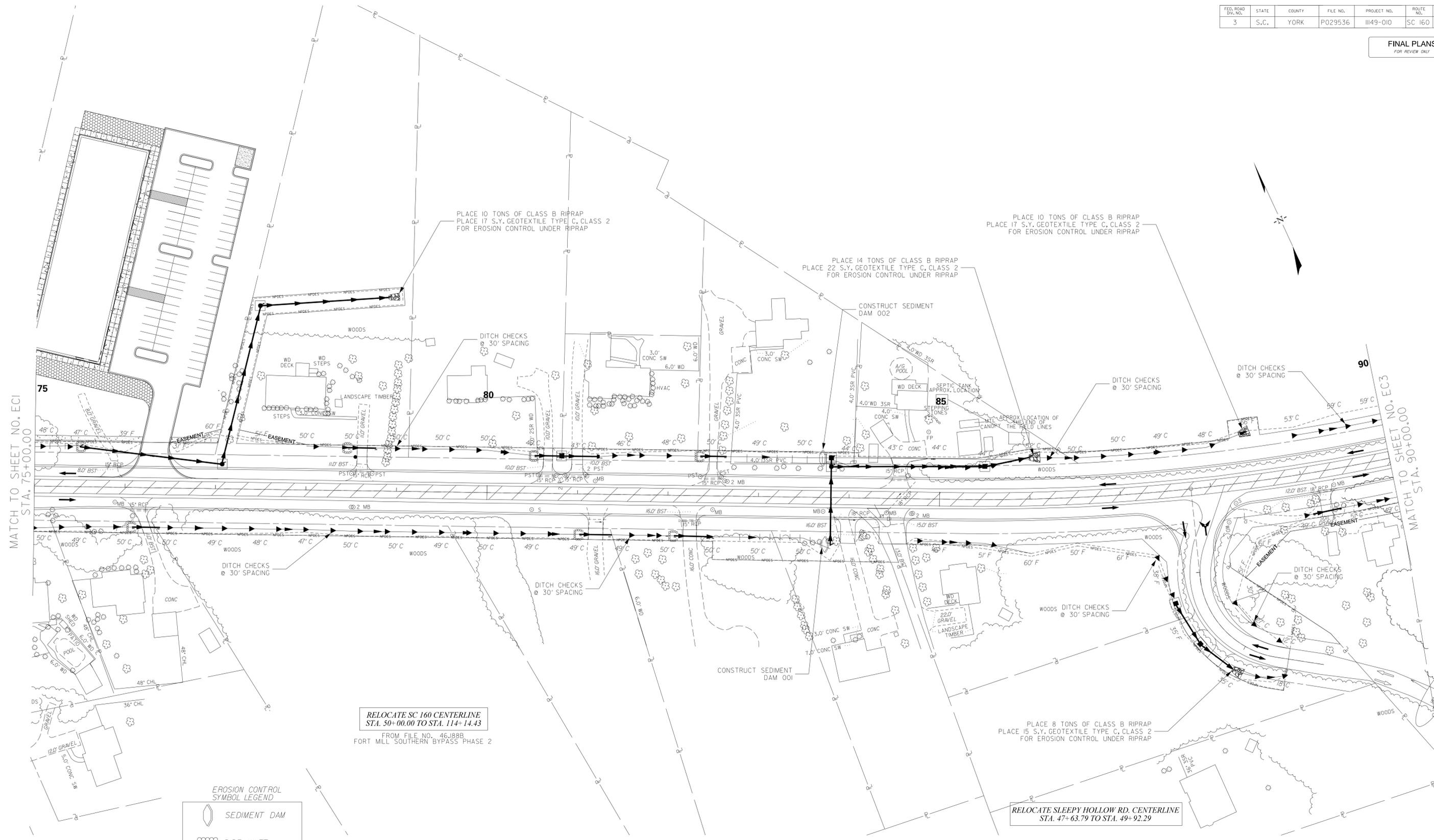
FOR CONSTRUCTION :

DATE



FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	PROJECT NO.	ROUTE NO.	SHEET NO.
3	S.C.	YORK	PO29536	III49-010	SC 160	EC2

FINAL PLANS
FOR REVIEW ONLY

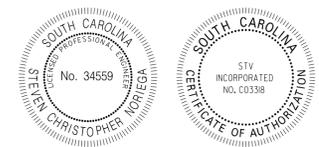


EROSION CONTROL SYMBOL LEGEND

	SEDIMENT DAM
	PIPE INLET SEDIMENT DAM
	DITCH CHECK
	INLET PROTECTION
	ROLLED EROSION CONTROL PRODUCT

RELOCATE SC 160 CENTERLINE
STA. 30+00.00 TO STA. 114+14.43
FROM FILE NO. 46J88B
FORT MILL SOUTHERN BYPASS PHASE 2

RELOCATE SLEEPY HOLLOW RD. CENTERLINE
STA. 47+63.79 TO STA. 49+92.29



STV 100 Years Incorporated
 ROCK HILL BUSINESS TECHNOLOGY CENTER, BTC 517
 454 S. ANDERSON ROAD, SUITE 3
 ROCK HILL, SOUTH CAROLINA 29730



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1			
REV. NO.	BY	DATE	DESCRIPTION OF REVISION

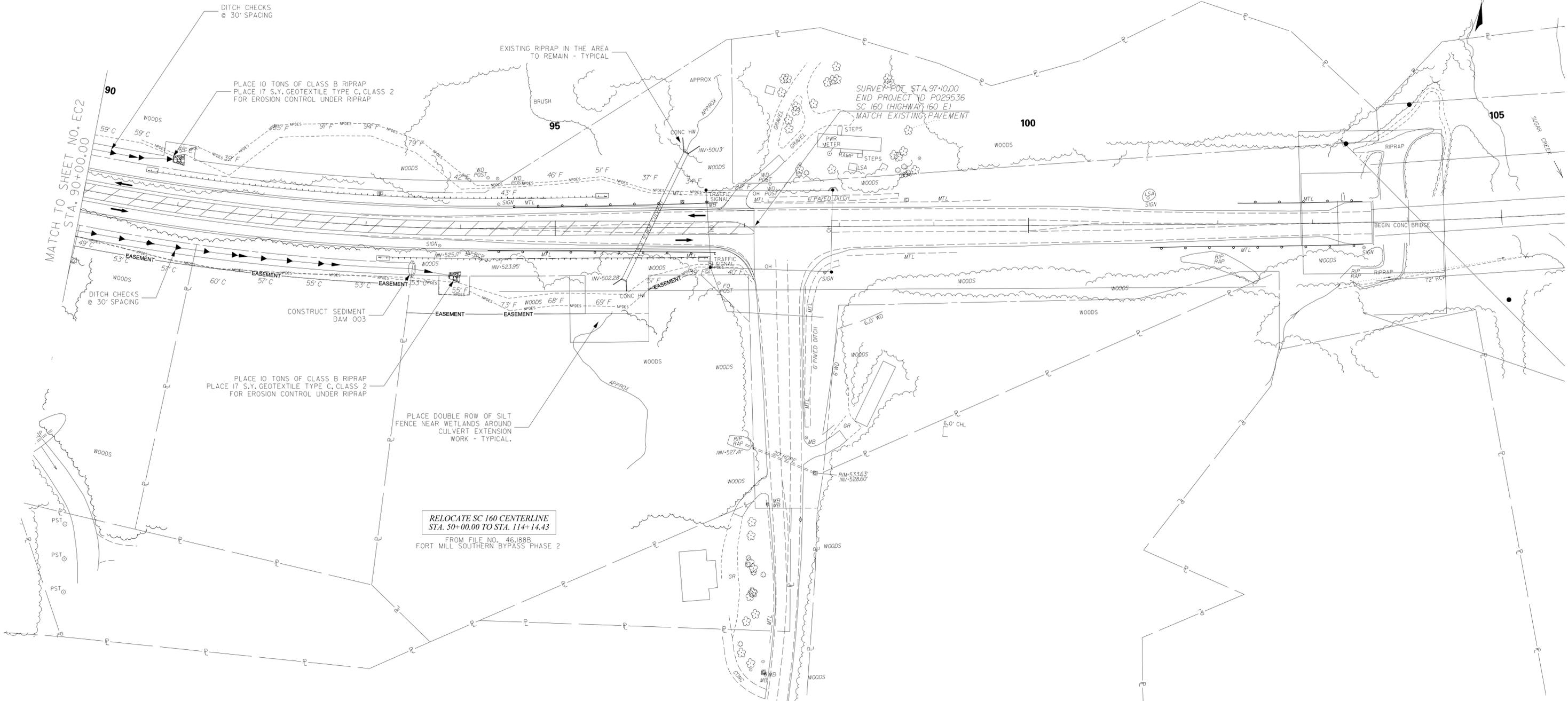
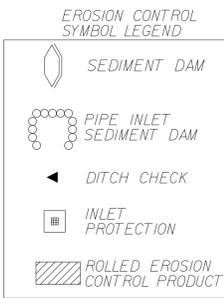
YORK COUNTY
SOUTH CAROLINA

**S.C. ROUTE 160 (TOM HALL RD.)
EROSION CONTROL PLAN SHEET
S.C. ROUTE 160
STA. 75+00.00 TO STA. 90+00.00**

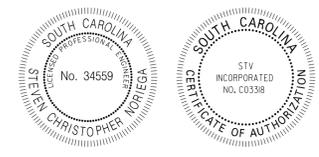
SCALE 1"=50' S.C. ROUTE 160 DWG. NO. EC2

FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	PROJECT NO.	ROUTE NO.	SHEET NO.
3	S.C.	YORK	P029536	III49-010	SC 160	EC 3

FINAL PLANS
FOR REVIEW ONLY



**RELOCATE SC 160 CENTERLINE
STA. 50+00.00 TO STA. 114+14.43**
FROM FILE NO. 46-188B
FORT MILL SOUTHERN BYPASS PHASE 2



STV 100 Years
STV Incorporated
ROCK HILL BUSINESS TECHNOLOGY CENTER, BTC 517
454 S. ANDERSON ROAD, SUITE 3
ROCK HILL, SOUTH CAROLINA 29730

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REV. NO.	BY	DATE	DESCRIPTION OF REVISION

YORK COUNTY
SOUTH CAROLINA
**S.C. ROUTE 160 (TOM HALL RD.)
EROSION CONTROL PLAN SHEET
S.C. ROUTE 160
STA. 90+00.00 TO STA. 97+10.00**
SCALE 1"=50' S.C. ROUTE 160 DWG. NO. EC3

Appendix F
Closed System Calculations



STV Inc.
Consulting Engineers
454 South Anderson Road, Suite 3, BTC 517
Rock Hill, South Carolina 29730-3392

JOB: S-160 Widening
SUBJECT: GEOPAK Output Tables
CALC'D BY: SCN
CHEK'D BY: GPP
DATE: 16-Mar-21

1
SHEET
OF
3

GEOPAK Output Tables

GEOPAK Output Type: Area

Area ID	Area Tc Used	Area Discharge	Area Intensity	Composite c value	Composite Area	Notes
HW005	5	0.74	6.89	0.63	0.17	



STV Inc.
 Consulting Engineers
 454 South Anderson Road, Suite 3, BTC 517
 Rock Hill, South Carolina 29730-3392

JOB: S-160 Widening
 SUBJECT: GEOPAK Output Tables
 CALC'D BY: SCN
 CHEK'D BY: GPP
 DATE: 16-Mar-21

2
 SHEET
 OF
 3

GEOPAK Output Tables

GEOPAK Output Type: Node

Node ID	Node Library Item	Node Ref. PGL	Node Station	Node Elevation	Node Depth	Node Tc Used	Node Supp. Dis.	Node Cuml. Dis.	Notes
CB005	C.B. TYPE 9	PR_REL160	72+82.00	613.50	4.25	0.00	1.00	1.00	
DI015	D.I. 24"X36"	PR_KING	49+00.00	609.32	4.58	0.00	3.80	9.60	
DI030	D.I. 24"X36"	PR_REL160	83+80.00	570.27	13.18	0.00	2.20	2.20	
DI035	D.I. 24"X36"	PR_REL160	85+50.00	566.30	2.92	0.00	2.20	14.00	
HW005	BEVELED END	PR_MIMOSA	49+32.00	610.00	0.00	5.00	0.00	0.74	
HW010	BEVELED END	PR_REL160	75+49.71	602.68	0.00	0.00	1.10	1.10	
HW015	BEVELED END	PR_REL160	83+80.00	566.77	0.00	0.00	9.60	9.60	
HW030	BEVELED END	PR_REL160	71+15.62	616.52	0.00	0.00	1.80	1.80	
MH030	M.H.	PR_REL160	83+80.00	570.88	14.36	0.00	2.20	11.80	
MH005	M.H.	PR_REL160	71+35.00	618.50	3.02	0.00	1.00	2.80	
MH007	M.H.	PR_REL160	72+82.00	615.25	6.11	0.00	1.00	4.80	
MH010	M.H.	PR_REL160	73+10.73	614.00	6.14	0.00	1.00	5.80	
MH015	M.H.	PR_REL160	77+07.07	598.91	15.16	0.00	1.10	2.20	
MH020	M.H.	PR_MIMOSA	77+46.85	579.00	4.25	0.00	1.10	3.30	
OP010	OP	PR_MIMOSA	47+42.00	595.50	0.00	0.00	0.00	0.00	
OP015	OP	EX_REL160	78+88.47	565.50	0.00	0.00	1.10	0.00	



STV Inc.
 Consulting Engineers
 454 South Anderson Road, Suite 3, BTC 517
 Rock Hill, South Carolina 29730-3392

JOB: S-160 Widening
 SUBJECT: GEOPAK Output Tables
 CALC'D BY: SCN DATE: 16-Mar-21
 CHEK'D BY: GPP DATE:

3
 SHEET
 OF
 3

GEOPAK Output Tables

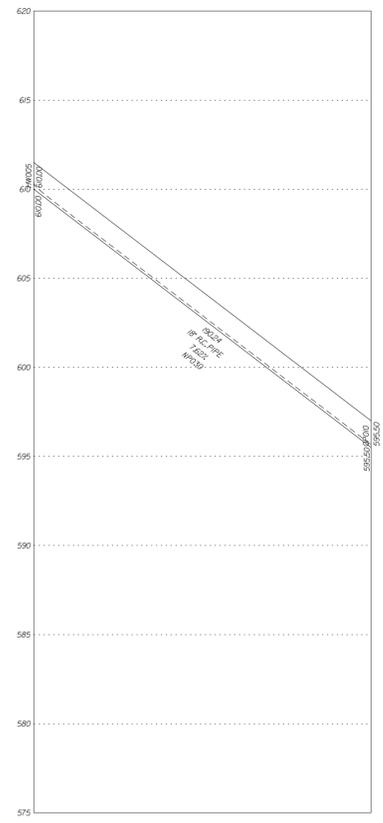
GEOPAK Output Type: [Link](#)

Link ID	Upstream Node	Downstream Node	Shape	Material	Number of Barrels	Rise (in)	Actual Length	Slope	Discharge	Upstream				Downstream			
										Invert	Soffit	HGL	Velocity	Invert	Soffit	HGL	Velocity
NP005	HW030	MH005	Circular	Concrete	1	18	20.8	4.28	1.80	616.52	618.02	617.21	2.28	615.63	617.13	615.93	7.26
NP007	MH005	MH007	Circular	Concrete	1	18	143.3	4.28	2.80	615.48	616.98	616.33	2.71	609.34	610.84	609.69	8.94
NP009	CB005	MH007	Circular	Concrete	1	18	1.8	6.23	1.00	609.25	610.75	610.32	0.74	609.14	610.64	610.33	0.67
NP010	MH007	MH010	Circular	Concrete	1	18	27.3	4.14	4.80	609.14	610.64	610.33	3.20	608.01	609.51	608.51	9.22
NP015	MH010	DI015	Circular	Concrete	1	18	68.9	4.34	5.80	607.86	609.36	609.10	3.71	604.87	606.37	605.39	10.78
NP025	DI015	OP025	Circular	Concrete	1	18	98.0	4.32	9.60	604.74	606.24	606.06	5.83	600.51	602.01	601.19	12.36
NP030	HW005	OP010	Circular	Concrete	1	18	190.2	7.62	0.74	610.00	611.50	610.39	2.02	595.50	597.00	595.66	7.40
NP035	HW010	MH015	Circular	Concrete	1	18	156.4	5.95	1.10	602.68	604.18	603.18	2.13	593.38	594.88	593.58	7.64
NP040	MH015	MH020	Circular	Concrete	1	18	175.7	5.12	2.20	583.75	585.25	584.57	2.22	574.75	576.25	575.05	8.90
NP045	MH020	OP015	Circular	Concrete	1	18	140.2	6.60	3.30	574.75	576.25	575.68	2.85	565.50	567.00	565.84	10.94
NP050	HW015	MH030	Circular	Concrete	1	24	84.9	0.78	9.60	566.77	568.77	568.43	3.44	566.11	568.11	567.05	6.63
NP051	DI030	MH030	Circular	Concrete	1	18	5.7	10.00	2.20	557.09	558.59	567.70	1.24	556.52	558.02	567.69	1.24
NP055	MH030	DI035	Circular	Concrete	1	24	165.7	1.59	11.80	566.01	568.01	567.69	4.18	563.38	565.38	564.24	9.12
NP060	DI035	OP020	Circular	Concrete	1	24	48.0	0.77	14.00	563.38	565.38	564.85	5.67	563.01	565.01	564.20	7.17

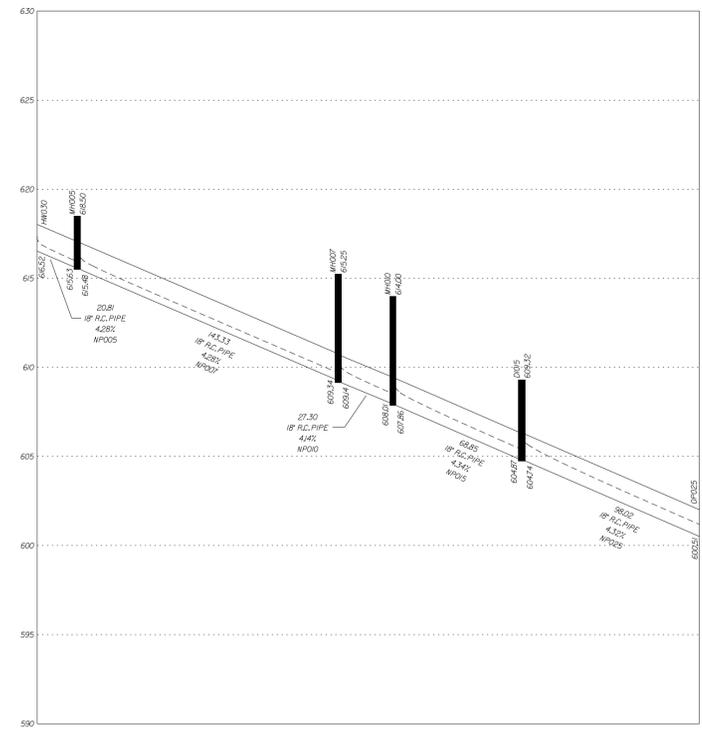
FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	PROJECT NO.	ROUTE NO.	SHEET NO.
3	S.C.	YORK	P029536	III49-010	SC 160	

RIGHT OF WAY PLANS
FOR REVIEW ONLY

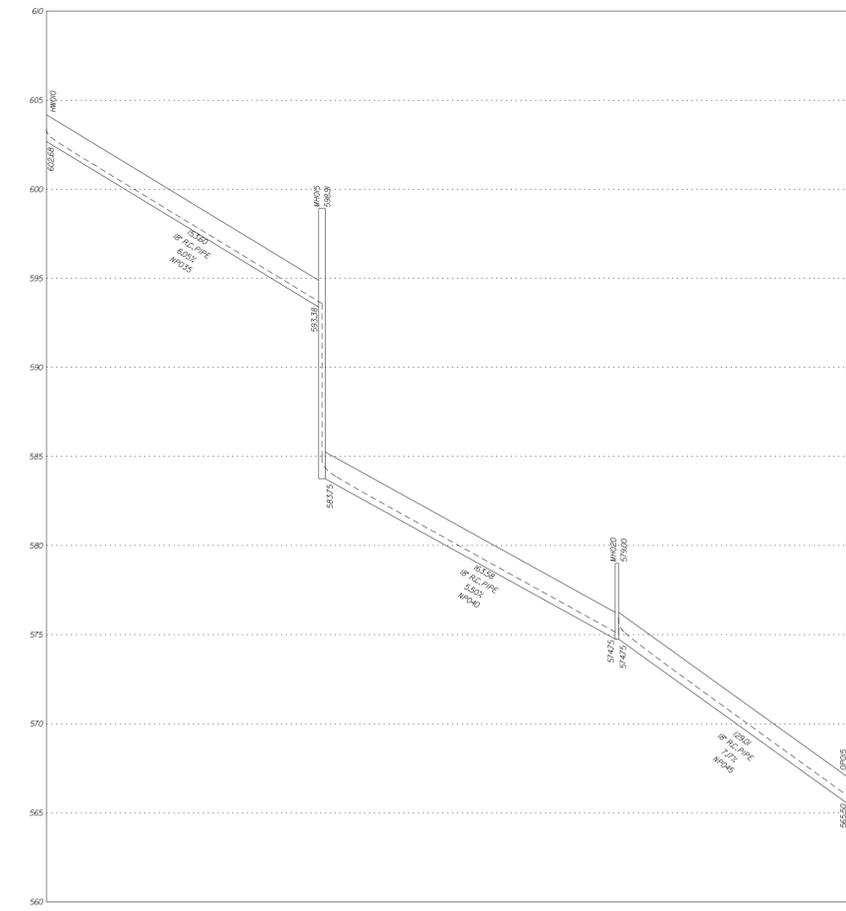
**HW005 TO OP010
(MIMOSA LANE)**



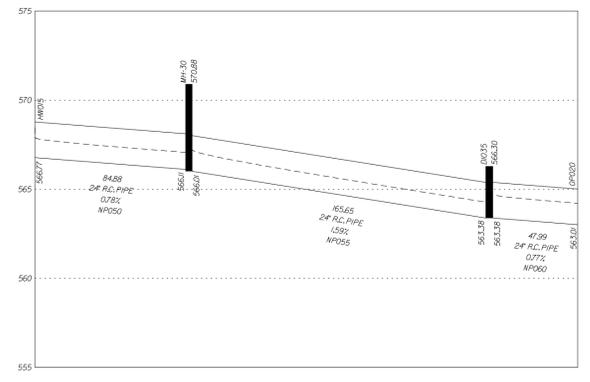
**HW030 TO OP025
(KINGS COURT)**



**HW010 TO OP015
(OUTFALL STA 77+65 LT)**



**HW015 TO OP020
(OUTFALL STA 86+00 LT)**



STV 100 Years
STV Incorporated
ROCK HILL BUSINESS TECHNOLOGY CENTER, BTC 517
454 S. ANDERSON ROAD, SUITE 3
ROCK HILL, SOUTH CAROLINA 29730



6			
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3			
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REV. NO.	BY	DATE	DESCRIPTION OF REVISION
			PREPARED BY _____ CHK'D BY _____ REVIEWED BY _____

YORK COUNTY
SOUTH CAROLINA
S.C. ROUTE 160 (TOM HALL RD.)
GEOPAK PIPE PROFILES
S.C. ROUTE 160
SCALE 1"=50' S.C. ROUTE 160 DWG. NO.

Appendix G
Culvert Crossing Discussion

Technical MEMORANDUM

DATE: 26 May 2022 (r2)

TO: Roberto Ruiz, PE - SCDOT HQ hydraulics

FROM: Guy P. Peters, PE, CFM 

SUBJECT: P029536 SC160 5x5 RCBC at STA 96+00

Continuing discussions between SCDOT staff and York County Pennies for Progress Program staff concerning the subject RCBC have resulted in a request that STV, as design engineer of record, re-evaluate peak flows and headwater analysis in accordance with recommendations in an email to Tameika Bostic dated 16 March 2022. The email is attached for reference.

Specifically, you recommended that peak flows used in headwater analysis be estimated using USGS Regression Equations via the USGS StreamStats online peak flow estimation tool. STV has completed the recommended peak flow analysis and applied those flows to HY-8 headwater computations. Results are summarized below. Reports generated from StreamStats and HY-8, along with a culvert summary spreadsheet are attached for your information.

PEAK FLOW ESTIMATES - SC 160 AT PROPOSED EXENDED 5X5 RCBC STA 96+00		
Annual Exceedance Probability, % (x-year)	Peak flows (cfs)	
	StreamStats	SCS TR-55
50 (2)	148	238
20 (10)	238	Not calculated
10 (10)	306	514
4 (25)	394	702
2* (50)	464	865
1 (100)	536	1040
0.5 (200)	610	Not calculated
0.2 (500)	707	Not calculated

* design flow

HEADWATER ESTIMATES SC 160 AT PROPOSED EXTENDED 5x5 RCBC STA 96+00				
Annual Exceedance Probability, % (x-year)	Headwater elevation (ft) and HW/D			
	SC 160 OVERTOPPING ELEVATION at Hensley Rd 520.50			
	Using StreamStats flows		Using SCS TR-55 flows	
	Elevation	HW/D	Elevation	HW/D
50 (2)	507.06	0.93	508.92	1.33
20 (5)	508.92	1.30	Not calculated	
10 (10)	510.48	1.62	517.52	3.02
4 (25)	512.97	2.11	523.30	4.18
2* (50)	515.38	2.60	523.72	4.26
1 (100)	518.44	3.21	524.10	4.34
0.5 (200)	521.63	3.85	Not calculated	
0.2 (500)	521.99	3.92	Not calculated	

Conclusion: headwater analysis of the 5x5' RCBC under SC 160 with StreamStats-generated peak flows indicates no overtopping of SC 160 or Hensley Road. This result affirms local anecdotal accounts that no roadway overtopping has been observed.

Attachments:

StreamStats peak flow estimates report

HY-8 analysis reports – SCS and StreamStats flows

Culvert Summary Report

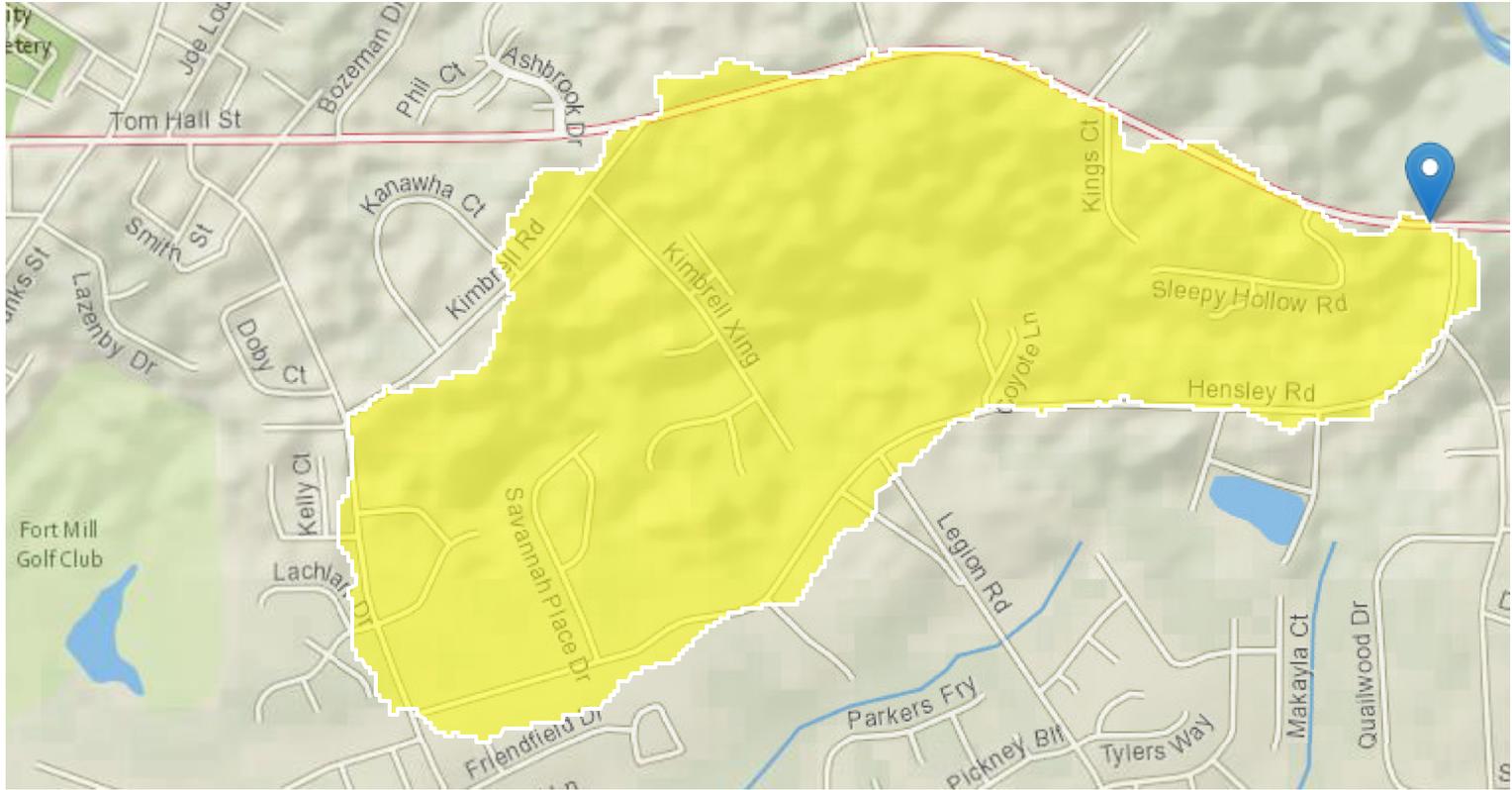
StreamStats Report

Region ID: SC

Workspace ID: SC20220322123359549000

Clicked Point (Latitude, Longitude): 35.00580, -80.90562

Time: 2022-03-22 08:34:18 -0400



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.62	square miles
PCTREG1	Percentage of drainage area located in Region 1 - Piedmont / Ridge and Valley	100	percent
PCTREG2	Percentage of drainage area located in Region 2 - Blue Ridge	0	percent
PCTREG3	Percentage of drainage area located in Region 3 - Sandhills	0	percent
PCTREG4	Percentage of drainage area located in Region 4 - Coastal Plains	0	percent
PCTREG5	Percentage of drainage area located in Region 5 - Lower Tifton Uplands	0	percent
LC06IMP	Percentage of impervious area determined from NLCD 2006 impervious dataset	7.98	percent

Peak-Flow Statistics Parameters [Region 1 rural under 1 sqmi 2014 5030]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.62	square miles	0.1	1
LC06IMP	Percent Impervious NLCD2006	7.98	percent	0	47.9

Peak-Flow Statistics Flow Report [Region 1 rural under 1 sqmi 2014 5030]

PII: Prediction Interval-Lower, Plu: Prediction Interval-Upper, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	PII	Plu	ASEp
50-percent AEP flood	148	ft ³ /s	80.3	273	31.9
20-percent AEP flood	238	ft ³ /s	145	390	25.4
10-percent AEP flood	306	ft ³ /s	191	491	25
4-percent AEP flood	394	ft ³ /s	235	661	27
2-percent AEP flood	464	ft ³ /s	265	812	29.3
1-percent AEP flood	536	ft ³ /s	290	992	32.1
0.5-percent AEP flood	610	ft ³ /s	313	1190	35.1
0.2-percent AEP flood	707	ft ³ /s	346	1440	37.5

Peak-Flow Statistics Citations

Feaster, T.D., Gotvald, A.J., and Weaver, J.C., 2014, Methods for estimating the magnitude and frequency of floods for urban and small, rural streams in Georgia, South Carolina, and North Carolina, 2011 (ver. 1.1, March 2014): U.S. Geological Survey Scientific Investigations Report 2014-5030, 104 p. (<http://pubs.usgs.gov/sir/2014/5030/>)

Urban Peak-Flow Statistics Parameters [Region 1 Urban under 3 sqmi 2014 5030]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.62	square miles	0.1	3
LC06IMP	Percent Impervious NLCD2006	7.98	percent	0	47.9

Urban Peak-Flow Statistics Flow Report [Region 1 Urban under 3 sqmi 2014 5030]

PII: Prediction Interval-Lower, Plu: Prediction Interval-Upper, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	PII	Plu	ASEp
Urban 50-percent AEP flood	148	ft ³ /s	80.3	273	31.9

Statistic	Value	Unit	PII	Plu	ASEp
Urban 20-Percent AEP flood	238	ft ³ /s	145	390	25.4
Urban 10-percent AEP flood	306	ft ³ /s	191	491	25
Urban 4-percent AEP flood	394	ft ³ /s	235	661	27
Urban 2-percent AEP flood	464	ft ³ /s	265	812	29.3
Urban 1-percent AEP flood	536	ft ³ /s	290	992	32.1
Urban 0.5-percent AEP flood	610	ft ³ /s	313	1190	35.1
Urban 0.2-percent AEP flood	707	ft ³ /s	346	1440	37.5

Urban Peak-Flow Statistics Citations

Feaster, T.D., Gotvald, A.J., and Weaver, J.C., 2014, Methods for estimating the magnitude and frequency of floods for urban and small, rural streams in Georgia, South Carolina, and North Carolina, 2011 (ver. 1.1, March 2014): U.S. Geological Survey Scientific Investigations Report 2014-5030, 104 p. (<http://pubs.usgs.gov/sir/2014/5030/>)

USGS Data Disclaimer: Unless otherwise stated, all data, metadata and related materials are considered to satisfy the quality standards relative to the purpose for which the data were collected. Although these data and associated metadata have been reviewed for accuracy and completeness and approved for release by the U.S. Geological Survey (USGS), no warranty expressed or implied is made regarding the display or utility of the data for other purposes, nor on all computer systems, nor shall the act of distribution constitute any such warranty.

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USGS Product Names Disclaimer: Any use of trade, firm, or product names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

Application Version: 4.7.0

StreamStats Services Version: 1.2.22

NSS Services Version: 2.1.2

HY-8 Culvert Analysis Report

Proposed Extended Culvert + SCS Flows

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 238 cfs

Design Flow: 865 cfs

Maximum Flow: 1040 cfs

Table 1 - Summary of Culvert Flows: Proposed Extended Culvert (MinDsnMax)

Headwater Elevation (ft)	Total Discharge (cfs)	Proposed Extension Discharge (cfs)	Roadway Discharge (cfs)	Iterations
508.92	238.00	238.00	0.00	1
510.79	318.20	318.20	0.00	1
513.11	398.40	398.40	0.00	1
515.94	478.60	478.60	0.00	1
519.62	558.80	558.80	0.00	1
523.03	639.00	620.17	18.59	12
523.33	719.20	625.28	93.57	5
523.55	799.40	629.05	170.21	5
523.72	865.00	628.92	235.60	4
523.93	959.80	627.98	331.44	4
524.10	1040.00	627.13	412.61	4
522.87	617.47	617.47	0.00	Overtopping

Rating Curve Plot for Crossing: Proposed Extended Culvert (MinDsnMax)

Total Rating Curve
Crossing: Proposed (MinDsnMax)

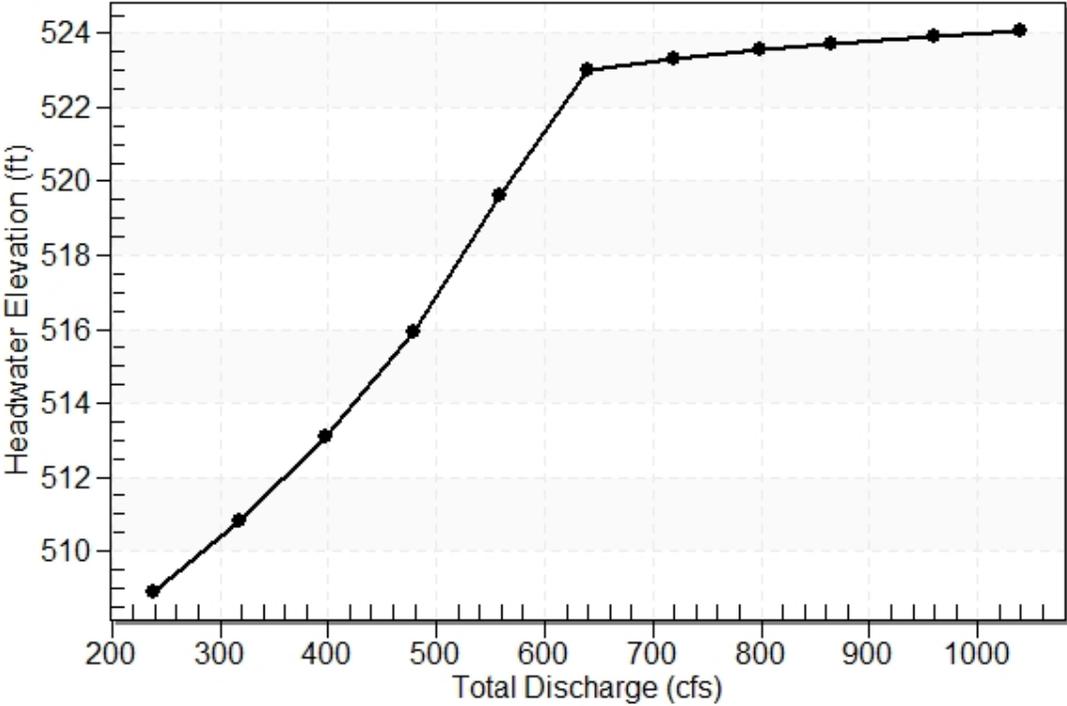


Table 2 - Culvert Summary Table: Proposed Extended Culvert

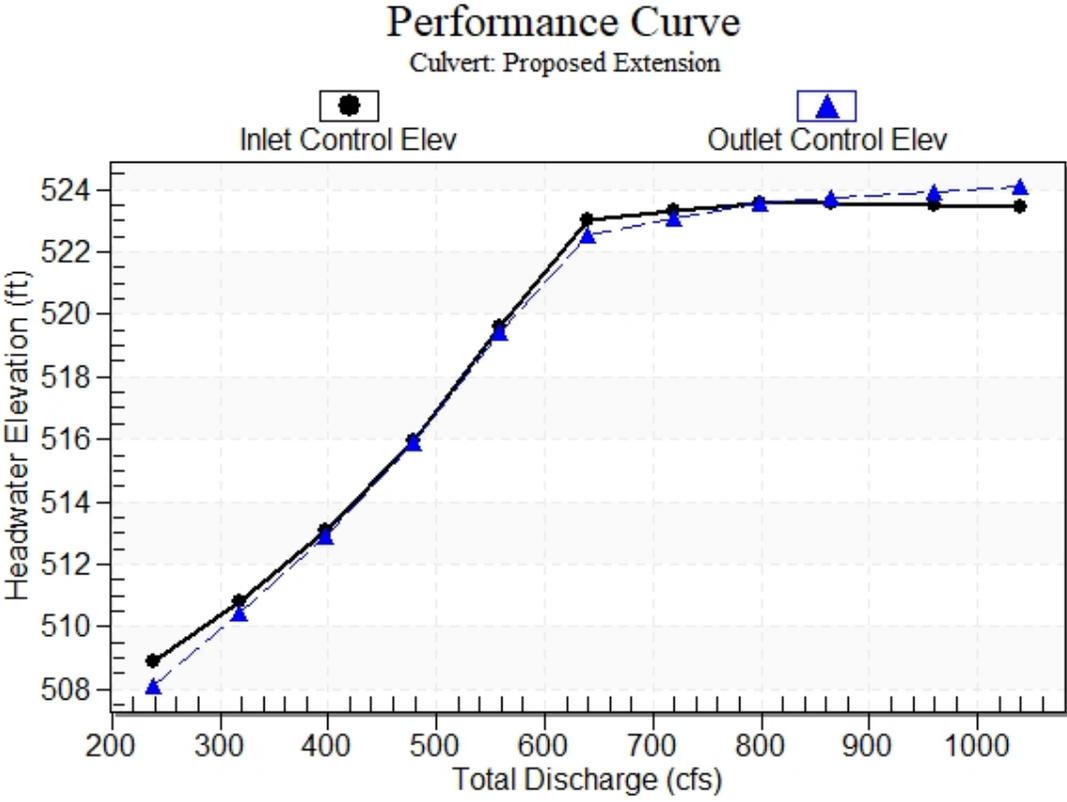
Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
238.00	238.00	508.92	6.516	5.701	5-S2n	3.417	4.128	3.507	3.292	13.574	6.829
318.20	318.20	510.79	8.393	8.031	5-S2n	4.300	5.000	4.389	3.758	14.499	7.354
398.40	398.40	513.11	10.706	10.473	6-FFc	5.000	5.000	5.000	4.156	15.936	7.785
478.60	478.60	515.94	13.540	13.461	6-FFc	5.000	5.000	5.000	4.509	19.144	8.155
558.80	558.80	519.62	17.217	16.995	6-FFc	5.000	5.000	5.000	4.826	22.352	8.480
639.00	620.17	523.03	20.627	20.136	4-FFf	5.000	5.000	5.000	5.118	24.807	8.771
719.20	625.28	523.33	20.927	20.676	4-FFf	5.000	5.000	5.000	5.387	25.011	9.037
799.40	629.05	523.55	21.151	21.129	4-FFf	5.000	5.000	5.000	5.639	25.162	9.280
865.00	628.92	523.72	21.143	21.316	4-FFf	5.000	5.000	5.000	5.833	25.157	9.466
959.80	627.98	523.93	21.087	21.532	4-FFf	5.000	5.000	5.000	6.099	25.119	9.716
1040.00	627.13	524.10	21.037	21.699	4-FFf	5.000	5.000	5.000	6.311	25.085	9.914

Straight Culvert

Inlet Elevation (invert): 502.40 ft, Outlet Elevation (invert): 501.13 ft

Culvert Length: 164.40 ft, Culvert Slope: 0.0077

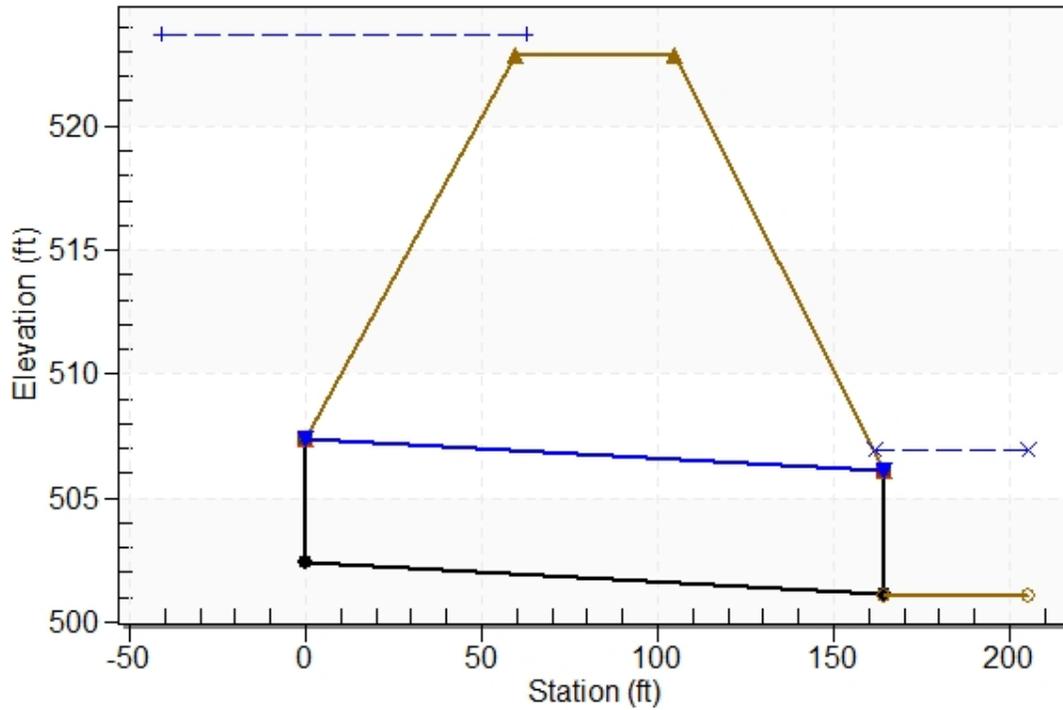
Culvert Performance Curve Plot: Proposed Extended Culvert



Water Surface Profile Plot for Culvert: Proposed Extended Culvert

Crossing - Proposed (MinDsnMax), Design Discharge - 865.0 cfs

Culvert - Proposed Extension, Culvert Discharge - 628.9 cfs



Site Data - Proposed Extended Culvert

Site Data Option: Culvert Invert Data
Inlet Station: 0.00 ft
Inlet Elevation: 502.40 ft
Outlet Station: 164.40 ft
Outlet Elevation: 501.13 ft
Number of Barrels: 1

Culvert Data Summary - Proposed Extended Culvert

Barrel Shape: Concrete Box
Barrel Span: 5.00 ft
Barrel Rise: 5.00 ft
Barrel Material: Concrete
Embedment: 0.00 in
Barrel Manning's n: 0.0120
Culvert Type: Straight
Inlet Configuration: 1.5:1 Bevel (18-34° flare) Wingwall
Inlet Depression: None

Table 3 - Downstream Channel Rating Curve (Crossing: Proposed (MinDsnMax))

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
238.00	504.37	3.29	6.83	2.32	0.84
318.20	504.84	3.76	7.35	2.65	0.86
398.40	505.24	4.16	7.79	2.93	0.87
478.60	505.59	4.51	8.15	3.18	0.88
558.80	505.91	4.83	8.48	3.40	0.89
639.00	506.20	5.12	8.77	3.61	0.90
719.20	506.47	5.39	9.04	3.80	0.90
799.40	506.72	5.64	9.28	3.98	0.91
865.00	506.91	5.83	9.47	4.11	0.91
959.80	507.18	6.10	9.72	4.30	0.92
1040.00	507.39	6.31	9.91	4.45	0.92

Tailwater Channel Data - Proposed Extended Culvert

Tailwater Channel Option: Trapezoidal Channel
Bottom Width: 4.00 ft
Side Slope (H:V): 2.00 (_:1)
Channel Slope: 0.0113
Channel Manning's n: 0.0350
Channel Invert Elevation: 501.08 ft

Roadway Data for Crossing: Proposed Extended Culvert

Roadway Profile Shape: Constant Roadway Elevation
Crest Length: 100.00 ft
Crest Elevation: 522.87 ft
Roadway Surface: Paved
Roadway Top Width: 45.00 ft

HY-8 Culvert Analysis Report

Proposed Extended Culvert + StreamStats Flows

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 148 cfs

Design Flow: 464 cfs

Maximum Flow: 707 cfs

Table 1 - Summary of Culvert Flows at Crossing: Proposed Extended Culvert

Headwater Elevation (ft)	Total Discharge (cfs)	Proposed Extended 5x5 RCBC (MinDsnMax) Discharge (cfs)	Roadway Discharge (cfs)	Iterations
507.06	148.00	148.00	0.00	1
508.21	203.90	203.90	0.00	1
509.39	259.80	259.80	0.00	1
510.73	315.70	315.70	0.00	1
512.28	371.60	371.60	0.00	1
514.07	427.50	427.50	0.00	1
515.38	464.00	464.00	0.00	1
518.61	539.30	539.30	0.00	1
521.53	595.20	593.93	1.22	12
521.81	651.10	598.99	51.83	6
521.99	707.00	602.20	104.55	5
521.50	593.47	593.47	0.00	Overtopping

Rating Curve Plot for Crossing: Proposed Extended Culvert

Total Rating Curve

Crossing: Proposed Extended 5x5 RCBC

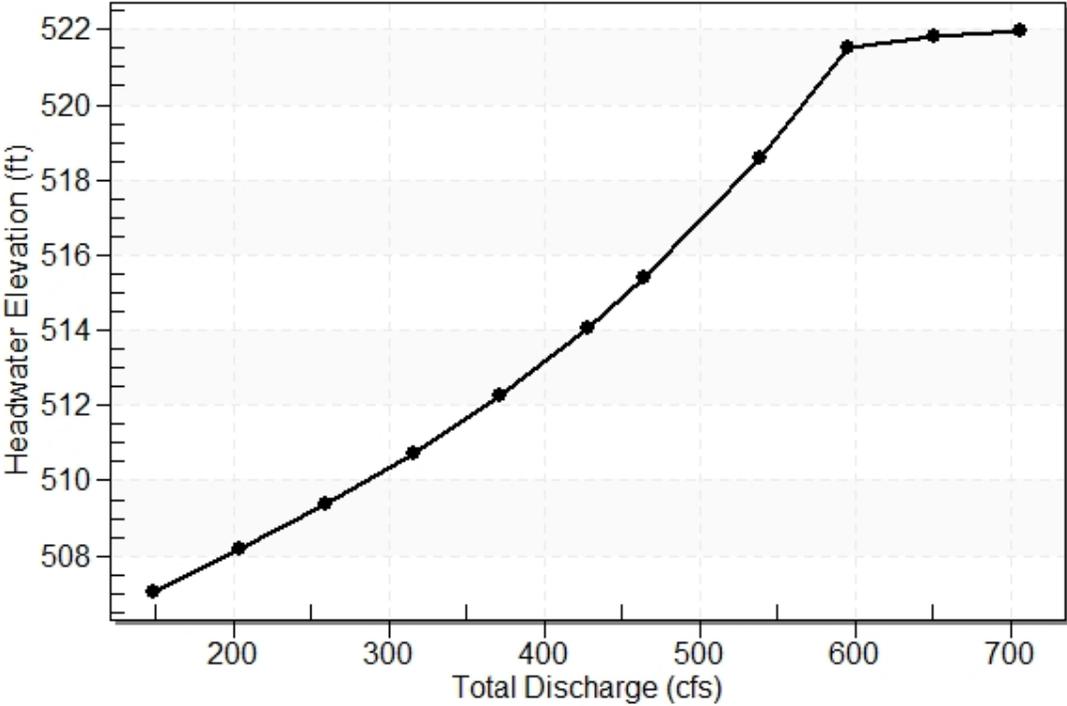


Table 2 - Culvert Summary Table: Proposed Extended Culvert

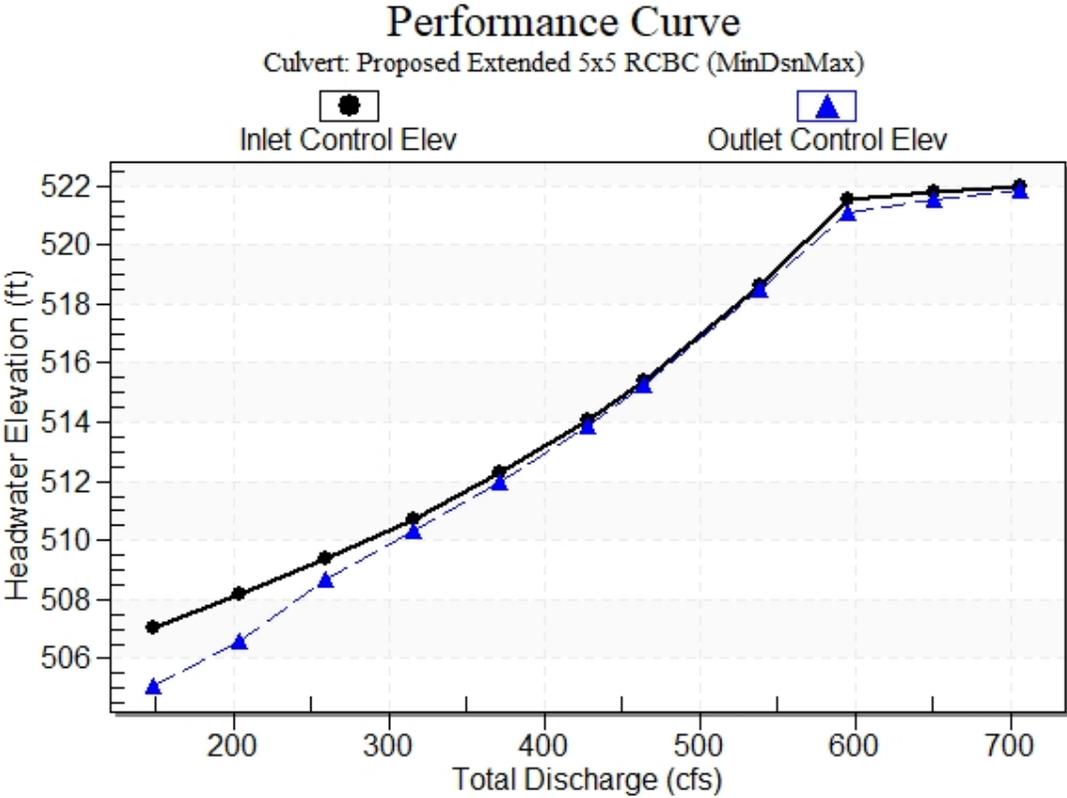
Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
148.00	148.00	507.06	4.662	2.668	1-S2n	2.378	3.008	2.446	2.700	12.101	6.064
203.90	203.90	508.21	5.805	4.220	5-S2n	3.031	3.724	3.115	3.092	13.092	6.530
259.80	259.80	509.39	6.992	6.286	5-S2n	3.660	4.377	3.751	3.471	13.852	6.975
315.70	315.70	510.73	8.328	7.956	5-S2n	4.273	4.984	4.363	3.791	14.472	7.335
371.60	371.60	512.28	9.877	9.596	6-FFc	5.000	5.000	5.000	4.070	14.864	7.640
427.50	427.50	514.07	11.673	11.494	6-FFc	5.000	5.000	5.000	4.333	17.100	7.921
464.00	464.00	515.38	12.984	12.876	6-FFc	5.000	5.000	5.000	4.496	18.560	8.090
539.30	539.30	518.61	16.208	16.085	6-FFc	5.000	5.000	5.000	4.801	21.572	8.405
595.20	593.93	521.53	19.126	18.716	6-FFc	5.000	5.000	5.000	5.009	23.757	8.613
651.10	598.99	521.81	19.410	19.128	4-FFf	5.000	5.000	5.000	5.206	23.960	8.809
707.00	602.20	521.99	19.592	19.482	4-FFf	5.000	5.000	5.000	5.396	24.088	8.996

Straight Culvert

Inlet Elevation (invert): 502.40 ft, Outlet Elevation (invert): 501.13 ft

Culvert Length: 164.40 ft, Culvert Slope: 0.0077

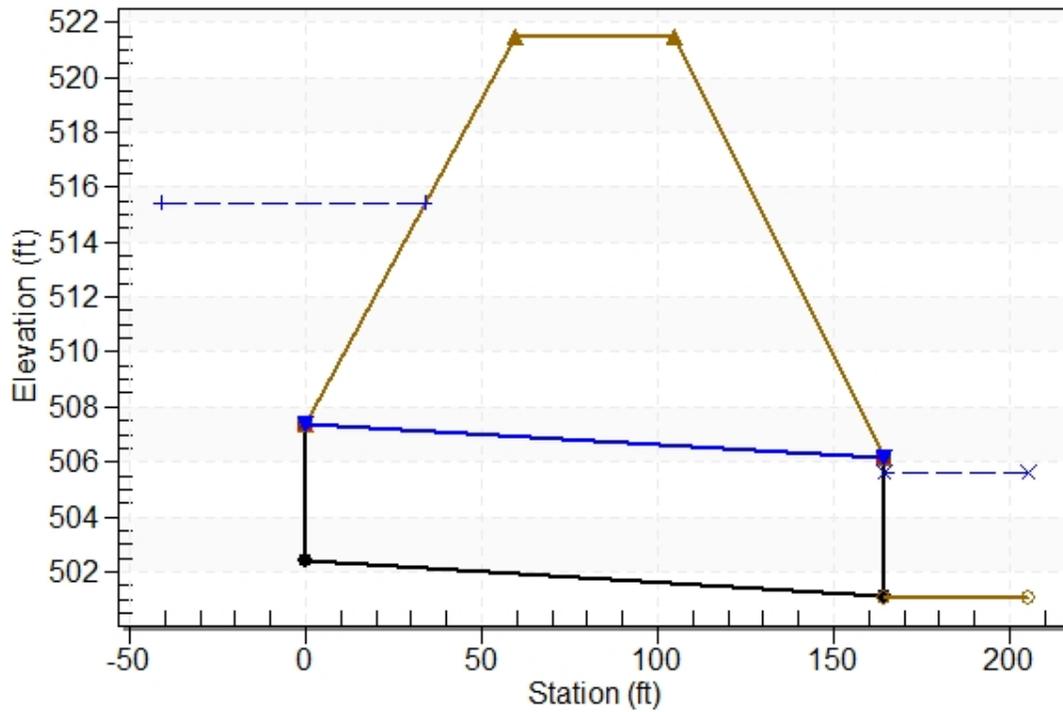
Culvert Performance Curve Plot: Proposed Extended Culvert



Water Surface Profile Plot for Culvert: Proposed Extended Culvert

Crossing - Proposed Extended 5x5 RCBC, Design Discharge - 464.0 cfs

Culvert - Proposed Extended 5x5 RCBC (MinDsnMax), Culvert Discharge - 464.0 cfs



Site Data - Proposed Extended Culvert

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 502.40 ft

Outlet Station: 164.40 ft

Outlet Elevation: 501.13 ft

Number of Barrels: 1

Culvert Data Summary - Proposed Extended Culvert

Barrel Shape: Concrete Box

Barrel Span: 5.00 ft

Barrel Rise: 5.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: 1.5:1 Bevel (18-34° flare) Wingwall

Inlet Depression: None

Table 3 - Downstream Channel Rating Curve (Crossing: Proposed Extended Culvert)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)
150.00	503.78	503.78	6.06
241.00	504.44	504.44	6.85
309.00	504.84	504.84	7.30
399.00	505.29	505.29	7.79
470.00	505.60	505.60	8.12
543.00	505.90	505.90	8.42
618.00	506.17	506.17	8.70
717.00	506.51	506.51	9.03

Tailwater Channel Data - Proposed Extended Culvert

Tailwater Channel Option: Enter Rating Curve

Channel Invert Elevation: 501.08 ft

Roadway Data for Crossing: Proposed Extended Culvert

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 521.50 ft

Roadway Surface: Paved

Roadway Top Width: 45.00 ft



STV Incorporated
 Consulting Engineers
 454 South Anderson Road, Suite 3, BTC 517
 Rock Hill, SC 29730 (803) 980-4970

JOB: SC160
 SUBJECT: Culvert Summary
 CALC'D BY: SCN, GPP DATE: 1-Apr-22
 CHECK'D BY: GPP DATE: 1-Apr-22

1
 SHEET
 OF
 1

CULVERT SUMMARY SHEET

SITE DATA					RUNOFF (Rational Method) $Q = C * I * A * C_f - (C_{f25} = 1.1, C_{f50} = 1.2, C_{f100} = 1.25)$ $Q_{500} = Q_{100} * 1.7$										PIPE DATA						RESULTS						
I.D.	Location	Upstream Building Elevation (ft.)	Roadway Elevation (ft.)	Elevation Below Roadway Subgrade Elevation (ft.)	Runoff Coefficient 'C'	Drainage Area 'A' (ac.)	Time of Conc. T _c (min.)	Rainfall Intensity 25 Year (in./hr.)	Rainfall Intensity 50 Year (in./hr.)	Rainfall Intensity 100 Year (in./hr.)	Total Runoff 10 Year (c.f.s.)	Total Runoff 25 Year (c.f.s.)	Total Runoff 50 Year (c.f.s.)	Total Runoff 100 Year (c.f.s.)	Material	Number of Barrel	Pipe Diameter/Height (ft.)	Pipe Length (ft.)	Invert Up	Invert Down	Pipe Slope (ft./ft.)	50 Yr. H.W. Elev. (ft.)	50 Yr. HW / D	50 Yr. Outlet Vel. (f.p.s.)	100 Yr. H.W. Elev. (ft.)	Flood / Overtop Frequency (Yr.)	
EXISTING 5'X5' BOX CULVERT																											
CL-1	SC160 - STA 96+00	A	521.5	519.5			NRCS				514	702	865	1040	Conc.	1	5	150	502.28	501.13	0.008	522.39	4.02	24.45	522.75	<25	
EXISTING 5'X5' BOX CULVERT WITH EXTENSION																											
CL-1	SC160 - STA 96+00	A	521.5	519.5			NRCS				514	702	865	1040	Conc.	1	5	165	502.40	501.13	0.008	523.72	4.26	23.54	524.10	<25	
EXISTING 5'X5' BOX CULVERT																											
CL-1	SC160 - STA 96+00	A	521.5	519.5			StreamStats				306	394	464	536	Conc.	1	5	150	502.28	501.13	0.008	515.26	2.60	18.56	518.32	<200	
EXISTING 5'X5' BOX CULVERT WITH EXTENSION																											
CL-1	SC160 - STA 96+00	A	521.5	519.5			StreamStats				306	394	464	536	Conc.	1	5	165	502.40	501.13	0.008	515.38	2.60	18.56	518.44	<200	
	100' Dnstrm SC160 - STA 96+00	N/A	522.0	520.0			StreamStats				309	399	470	543	Conc.	1	6	85	500.00	499.07	0.011	509.45	1.58	16.50	510.90	>100	

Peters, Guy P.

From: Ruiz, Roberto G. <RuizRG@scdot.org>
Sent: Wednesday, March 16, 2022 3:14 PM
To: Bostic, Tameika L.; Garrett, Jon M.; Paradise, John
Cc: Peters, Guy P.; Bykalo, David C.; Knight, Thomas P.
Subject: RE: P029536 - SC-160 Widening

****This e-mail is from outside STV****

Tameika:

The Hydro Support Office recommends the use of the USGS Regression Equations (StreamStats) for the analysis of the culvert presented in the above referenced project. The resulting flows from this method should be smaller and help this project. I've already discussed this issue with Guy Peters with STV, Inc. earlier today.

This decision is based on the improved accuracy of regression equations (particularly in Region 1 – Piedmont) and the numerous gages used to develop these equations in the area.

Please let me know if you have any questions.

Roberto Ruiz, PE
SCDOT Hydro Support Engineer
955 Park Street - Room 505
Columbia, SC 29201
Phone: (803) 737-0550



Safety 1st – Live By It!
Let 'em Work, Let 'em Live!

From: Bostic, Tameika L. <BosticTL@scdot.org>
Sent: Friday, March 11, 2022 1:57 PM
To: Garrett, Jon M. <GarrettJM@scdot.org>; Paradise, John <ParadiceJ@scdot.org>; Ruiz, Roberto G. <RuizRG@scdot.org>
Subject: RE: P029536 - SC-160 Widening

Gentlemen:

Happy Friday and hope you have had a wonderful week! For the project in the subject line, the consultant and York County have submitted responses to the questions below and exhibits.

1. *STV went back and reviewed their HY-8 calculations and their Microstation files. Roadway plans do indeed show the roadway elevation directly over the culvert location at 522.87' (proposed) and 522.34' (existing). That location however, is not a sag. Rising headwater first touches the pavement east of the culvert at the Hensley/160 intersection where the roadway elevation is 521.5'. That's why their HY-8 analysis uses that value instead of the roadway elevation directly above the culvert.*

2. *Attached are photos upstream of culvert on March 9, 2022, and a photo of the culvert from the upstream end. As you can see from the photos, there are no signs that the water overtops the creek bank or the culvert. In discussions with the SCDOT District 4 office, no one is aware of this culvert ever overtopping the roadway at this culvert. The floodplain does not extend to the upstream side of the culvert.*
3. *The 100 year FEMA map elevation just downstream is between 512 and 512.4. (maps attached)*

I would also like to add that the capacity of a 13' x 12' box culvert is exponentially larger than that of a 5' x 5'. If it truly needed to be a 13' x 12' box then there would be severe flooding happening.

Please review and let me know your thoughts concerning anything submitted.

Thank you ☺

"Roses are red. Violets are blue. You got Spring Flu. Keep antihistamine with you."

Tameika L. Bostic, EIT
(o) 803-737-0457

From: Garrett, Jon M. <GarrettJM@scdot.org>
Sent: Wednesday, March 2, 2022 10:39 AM
To: Bostic, Tameika L. <BosticTL@scdot.org>
Cc: Ruiz, Roberto G. <RuizRG@scdot.org>; Paradise, John <ParadiceJ@scdot.org>
Subject: RE: P029536 - SC-160 Widening

Tameika,

We have reviewed the above mentioned project and report and have several comments that we would like for the consultant to verify. Please let us know if you have any questions about what is being submitted.

1. Please verify from the HY-8 Model that the 50 year design storm event does not overtop the roadway. The roadway plans show the finished grade elevation to be 522.87' while the HY-8 model shows an elevation of 522'. Please verify these conditions.
2. It should be further verified that there are no adverse impacts to the upstream residence from the extension of the existing culvert to prevent potential damage to upstream property.
3. Please verify that the headwater will be at least 1.0 foot below the subgrade of the roadway.

Thanks,

J. Marc Garrett
Hydraulic Design
SCDOT
Room 505
803-737-1318

From: Ruiz, Roberto G. <RuizRG@scdot.org>
Sent: Tuesday, March 1, 2022 4:54 PM
To: Paradise, John <ParadiceJ@scdot.org>
Cc: Garrett, Jon M. <GarrettJM@scdot.org>
Subject: FW: P029536 - SC-160 Widening

John, Marc:

Can you QA this culvert? It looks like the consultant heard us and decided to follow our recommendations.
Thanks,

Roberto Ruiz, PE
SCDOT Hydro Support Engineer
955 Park Street - Room 505
Columbia, SC 29201
Phone: (803) 737-0550



*Safety 1st – Live By It!
Let 'em Work, Let 'em Live!*

From: Bostic, Tameika L. <BosticTL@scdot.org>
Sent: Monday, February 28, 2022 8:58 AM
To: Ruiz, Roberto G. <RuizRG@scdot.org>; Koon, Terry B <KoonTB@scdot.org>
Subject: RE: P029536 - SC-160 Widening

Gentlemen:

Happy Monday and hope you had a wonderful weekend! For the project in the subject line, I have attached a few items for review. Please see previous email for further details concerning this project.

Thank you ☺

"Find the good. It's all around you. Find it. Showcase it and you will start believing in it" Jesse Owens

Tameika L. Bostic, EIT
(o) 803-737-0457

From: Bostic, Tameika L.
Sent: Tuesday, January 11, 2022 10:22 AM
To: Ruiz, Roberto G. <RuizRG@scdot.org>; Koon, Terry B <KoonTB@scdot.org>
Subject: P029536 - SC-160 Widening

Gentlemen:

Happy Tuesday and hope you are having a wonderful week! For the project in the subject line, there is an issue concerning the extension / replacement of a culvert on the project. Please see below for some background information.

- Initial project started in 2016 with Brian Klauk
- Hydro Support approved extension of the 5' x 5' box culvert in July 2018
- ROW Authorization granted to York County in February 2019
- In 2020/2021, District 4 had comments concerning the culvert and wanting it replaced
- Meeting in August 2021 (with consultant/District 4/York County) concerning culvert, along with other comments from District 4
- Meeting in November 2021 (with consultant/District 4/York County/HQ Staff) concerning culvert

I have attached the Final ROW Plans to this email. But here is the part I truly need your expertise on – is what is originally in this set of plans good enough to go back to the original plan of only doing the culvert extension?

Please let me know of anything you need me to get from the consultant and York County to help you verify and come to a decision. After you have both had a chance to review, I would like to set up a meeting to discuss your findings and decision so that I may pass it along to the consultant and York County.

I thank you in advance for your help with this project and for helping to continue to move this forward. Again, if you need any other item to start this review, please let me know and I will get it for you.

Thank you ☺

"You need music to dance, not a partner."

*Tameika L. Bostic, EIT
Assistant Program Manager - Midlands
SCDOT
955 Park St. - Room 418
Columbia, SC 29201
(o) 803-737-0457*

Appendix F

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?	
		<input type="checkbox"/> Yes	<input type="checkbox"/> No
		<input type="checkbox"/> Yes	<input type="checkbox"/> No
		<input type="checkbox"/> Yes	<input type="checkbox"/> No
		<input type="checkbox"/> Yes	<input type="checkbox"/> No
		<input type="checkbox"/> Yes	<input type="checkbox"/> No
		<input type="checkbox"/> Yes	<input type="checkbox"/> No
		<input type="checkbox"/> Yes	<input type="checkbox"/> No
		<input type="checkbox"/> Yes	<input type="checkbox"/> No
		<input type="checkbox"/> Yes	<input type="checkbox"/> No
		<input type="checkbox"/> Yes	<input type="checkbox"/> No
		<input type="checkbox"/> Yes	<input type="checkbox"/> No
		<input type="checkbox"/> Yes	<input type="checkbox"/> No
		<input type="checkbox"/> Yes	<input type="checkbox"/> No

SWPPP Inspection Log (Continued)			
Date of Inspection	Inspector Name	Does Inspection Report require maintenance of installed BMPs?	
		<input type="checkbox"/> Yes	<input type="checkbox"/> No
		<input type="checkbox"/> Yes	<input type="checkbox"/> No
		<input type="checkbox"/> Yes	<input type="checkbox"/> No
		<input type="checkbox"/> Yes	<input type="checkbox"/> No
		<input type="checkbox"/> Yes	<input type="checkbox"/> No
		<input type="checkbox"/> Yes	<input type="checkbox"/> No
		<input type="checkbox"/> Yes	<input type="checkbox"/> No
		<input type="checkbox"/> Yes	<input type="checkbox"/> No
		<input type="checkbox"/> Yes	<input type="checkbox"/> No
		<input type="checkbox"/> Yes	<input type="checkbox"/> No
		<input type="checkbox"/> Yes	<input type="checkbox"/> No
		<input type="checkbox"/> Yes	<input type="checkbox"/> No
		<input type="checkbox"/> Yes	<input type="checkbox"/> No
		<input type="checkbox"/> Yes	<input type="checkbox"/> No
		<input type="checkbox"/> Yes	<input type="checkbox"/> No

Appendix G

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 H

Additional Site Logs and Records

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	
<input type="checkbox"/> Major <input type="checkbox"/> Minor		
Start Date:		
Completion Date:		
Reason for Modifications:		Approved/Implemented By:
Type of Modification	Description of Modification	
<input type="checkbox"/> Major <input type="checkbox"/> Minor		
Start Date:		
Completion Date:		
Reason for Modifications:		Approved/Implemented By:
Type of Modification	Description of Modification	
<input type="checkbox"/> Major <input type="checkbox"/> Minor		
Start Date:		
Completion Date:		
Reason for Modifications:		Approved/Implemented By:
Type of Modification	Description of Modification	
<input type="checkbox"/> Major <input type="checkbox"/> Minor		
Start Date:		
Completion Date:		
Reason for Modifications:		Approved/Implemented By:
Type of Modification	Description of Modification	
<input type="checkbox"/> Major <input type="checkbox"/> 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 <input type="checkbox"/> Major <input type="checkbox"/> Minor		Description of Modification
Start Date:		
Completion Date:		
Reason for Modifications:		Approved/Implemented By:
Type of Modification <input type="checkbox"/> Major <input type="checkbox"/> Minor		Description of Modification
Start Date:		
Completion Date:		
Reason for Modifications:		Approved/Implemented By:
Type of Modification <input type="checkbox"/> Major <input type="checkbox"/> Minor		Description of Modification
Start Date:		
Completion Date:		
Reason for Modifications:		Approved/Implemented By:
Type of Modification <input type="checkbox"/> Major <input type="checkbox"/> Minor		Description of Modification
Start Date:		
Completion Date:		
Reason for Modifications:		Approved/Implemented By:
Type of Modification <input type="checkbox"/> Major <input type="checkbox"/> Minor		Description of Modification
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	
<input type="checkbox"/> Final <input type="checkbox"/> Temporary		
Initiate Date:		
Completion Date:		
Additional work proposed for this area:		Inspection Frequency for Stabilized Area:
Type of Stabilization		Description of Stabilization
<input type="checkbox"/> Final <input type="checkbox"/> Temporary		
Initiate Date:		
Completion Date:		
Additional work proposed for this area:		Inspection Frequency for Stabilized Area:
Type of Stabilization		Description of Stabilization
<input type="checkbox"/> Final <input type="checkbox"/> Temporary		
Initiate Date:		
Completion Date:		
Additional work proposed for this area:		Inspection Frequency for Stabilized Area:
Type of Stabilization		Description of Stabilization
<input type="checkbox"/> Final <input type="checkbox"/> Temporary		
Initiate Date:		
Completion Date:		
Additional work proposed for this area:		Inspection Frequency for Stabilized Area:
Type of Stabilization		Description of Stabilization
<input type="checkbox"/> Final <input type="checkbox"/> Temporary		
Initiate Date:		
Completion Date:		
Additional work proposed for this area:		Inspection Frequency for Stabilized Area:
Type of Stabilization		Description of Stabilization
<input type="checkbox"/> Final <input type="checkbox"/> 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	
<input type="checkbox"/> Final <input type="checkbox"/> Temporary		
Initiate Date:		
Completion Date:		
Additional work proposed for this area:		Inspection Frequency for Stabilized Area:
Type of Stabilization		Description of Stabilization
<input type="checkbox"/> Final <input type="checkbox"/> Temporary		
Initiate Date:		
Completion Date:		
Additional work proposed for this area:		Inspection Frequency for Stabilized Area:
Type of Stabilization		Description of Stabilization
<input type="checkbox"/> Final <input type="checkbox"/> Temporary		
Initiate Date:		
Completion Date:		
Additional work proposed for this area:		Inspection Frequency for Stabilized Area:
Type of Stabilization		Description of Stabilization
<input type="checkbox"/> Final <input type="checkbox"/> Temporary		
Initiate Date:		
Completion Date:		
Additional work proposed for this area:		Inspection Frequency for Stabilized Area:
Type of Stabilization		Description of Stabilization
<input type="checkbox"/> Final <input type="checkbox"/> Temporary		
Initiate Date:		
Completion Date:		
Additional work proposed for this area:		Inspection Frequency for Stabilized Area:
Type of Stabilization		Description of Stabilization
<input type="checkbox"/> Final <input type="checkbox"/> Temporary		
Initiate Date:		
Completion Date:		
Additional work proposed for this area:		Inspection Frequency for Stabilized Area:

Appendix I

Construction General Permit SCR100000

***A copy of the NPDES General Permit for Stormwater Discharges from Construction Activities (SCR100000)
can be found at the following address:***

<http://www.scdhec.gov/environment/water/swater/docs/CGP-permit.pdf>

Appendix J

Sediment and Erosion Control Plan Set

Plans are provided as a separate volume and are not bound with the remainder of the SWPPP.

INDEX OF SHEETS
SEE SHEET ILI



PROPOSED PLANS FOR

YORK COUNTY, SOUTH CAROLINA S.C. ROUTE 160 (HIGHWAY 160 E) PROJECT ID P029536 YORK COUNTY PROJECT NO. 11149-010 FROM 762 FT EAST OF SC 460 TO 652 FT EAST OF S-242

This set of plans is provided as Appendix J to the project SWPPP.

This set contains:
Roadway plans
Roadway profiles
Drainage plans
Erosion and Sediment Control plans

A full set of plans that includes property data and roadway cross sections is available upon request to:
STV Incorporated
Guy P. Peters, PE, CFM
454 S. Anderson Road, Suite 3, BTC 517
Rock Hill, South Carolina 29730
803 656 2014 o | 704 314 5374 m
guy.peters@stvinc.com

FINAL PLANS	
SHEET NO.	TOTAL SHEETS
I	II6

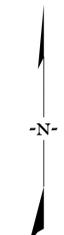
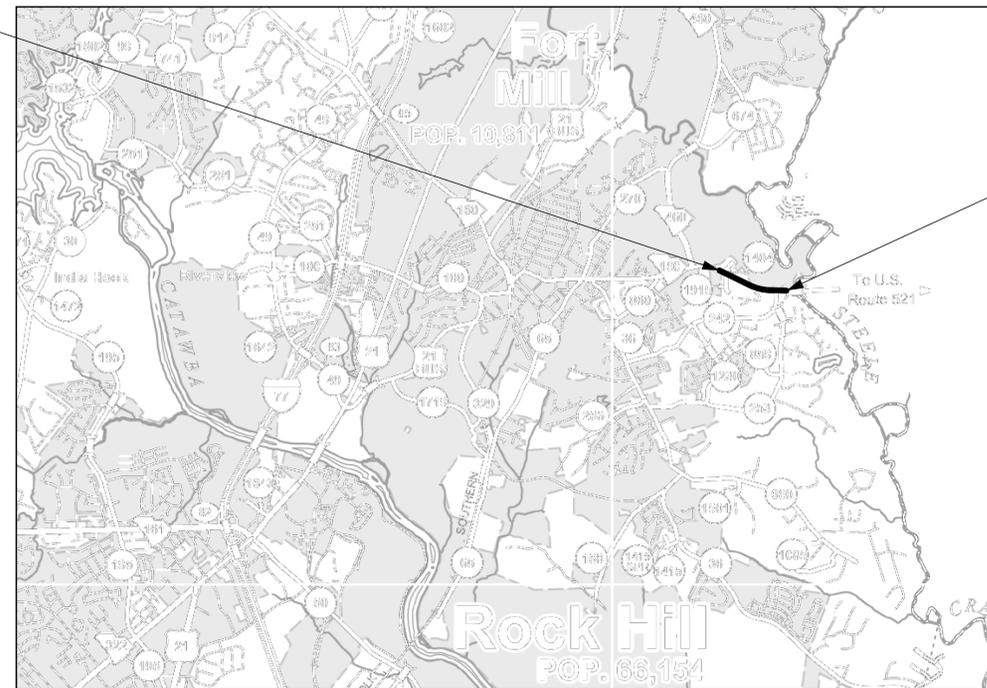
Hydraulic Design Reference for these plans is the:
2009
Edition of SCDOT's "Requirements for Hydraulic Design Studies"

Design Reference for these plans is the:
2001
AASHTO "A Policy on Geometric Design of Highways and Streets"

NPDES PERMIT INFORMATION	
Disturbed Area =	6.3 Acre(s)
Project Area =	8.3 Acre(s)
Approximate Location of Roadway is	
Begin	
Latitude	35° 00' 31.7" N
Longitude	80° 54' 55.0" W
End	
Latitude	35° 00' 20.6" N
Longitude	80° 54' 11.0" W
Hydraulic and NPDES Design provided by: STV INCORPORATED	
Designs may be obtained from the SCDOT Regional Production Group	

*SURVEY STA. 64+ 70.00 BEGIN
PROJECT ID P029536
S.C. ROUTE 160 (HIGHWAY 160 E)*

*SURVEY STA. 103+ 62.56 END
PROJECT ID P029536
S.C. ROUTE 160 (HIGHWAY 160 E)*



ENVIRONMENTAL PERMIT INFORMATION			
USACE PERMIT	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO	
NEPA DOCUMENT	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO	
401 CERTIFICATION	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO	
OCRM CAP	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO	
NAVIGABLE WATERS	<input type="checkbox"/> SC	<input type="checkbox"/> USCG	<input checked="" type="checkbox"/> USACE <input checked="" type="checkbox"/> N/A

SCDOT REVIEW	RIGHT-OF-WAY		CONSTRUCTION	
	INITIAL	DATE	INITIAL	DATE
PRECONSTRUCTION SUPPORT - ROAD				
PRECONSTRUCTION SUPPORT - STRUCTURES				
RPG - DESIGN MANAGER				
RPG - PROGRAM MANAGER				

3 DAYS BEFORE DIGGING IN
SOUTH CAROLINA
CALL 811
SOUTH CAROLINA 811 (SC811)
WWW.SC811.COM
ALL UTILITIES MAY NOT BE A MEMBER OF SC811

RAILROAD INVOLVEMENT?
YES / (NO)

TRAFFIC DATA	
2022	ADT 23,100
2042	ADT 30,400
	TRUCKS 4 %

NOTE: EXCEPT AS MAY OTHERWISE BE SPECIFIED ON THE PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIALS AND WORKMANSHIP ON THIS PROJECT SHALL CONFORM TO THE SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION (2007 EDITION) AND THE STANDARD DRAWINGS FOR ROAD CONSTRUCTION IN EFFECT AT THE TIME OF LETTING.

LAYOUT
SCALE 1 INCH = 4,000 FEET

	S.C. RTE. 160	SIDE ROADS	TOTAL
NET LENGTH OF ROADWAY	0.737 MILES	0.147 MILES	0.884 MILES
NET LENGTH OF BRIDGES	0.000 MILES	0.000 MILES	0.000 MILES
NET LENGTH OF PROJECT	0.737 MILES	0.147 MILES	0.884 MILES
LENGTH OF EXCEPTIONS	0.000 MILES	0.000 MILES	0.000 MILES
GROSS LENGTH OF PROJECT	0.737 MILES	0.147 MILES	0.884 MILES

EQUALITIES IN STATIONING
STA. 68+88.73 S.C. RTE. 160 (BK) = STA. 68+89.08 S.C. RTE. 160 (AH) (-0.35)

CONSULTING ENGINEERING FIRM

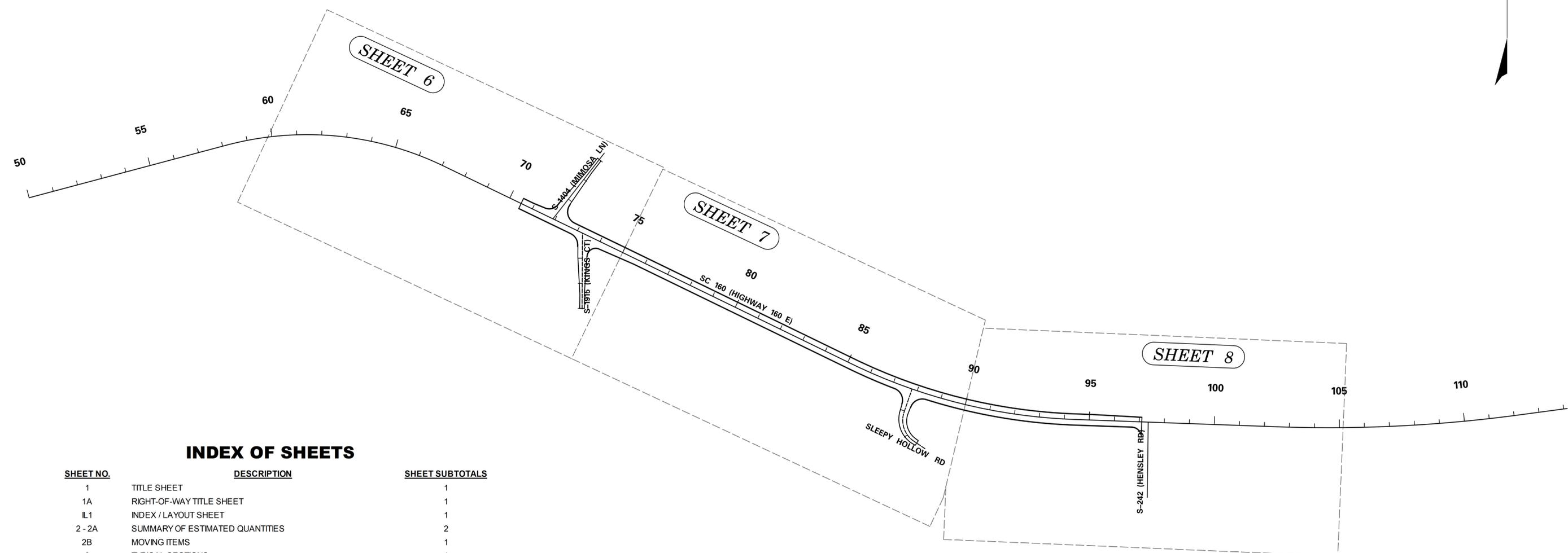
STV 100 Years **STV Incorporated**
100 MALL DRIVE
SUITE 303 BUILDING B
NORTH CHARLESTON, SOUTH CAROLINA 29406

ENGINEER OF RECORD

FOR CONSTRUCTION: STV Incorporated DATE

FINAL PLANS

FED. ROAD DIST. NO.	STATE	COUNTY	PROJECT ID	PROJECT NO.	ROUTE NO.	SHEET NO.
3	S.C.	YORK	P029536	III49-010	SC 160	ILI



INDEX OF SHEETS

SHEET NO.	DESCRIPTION	SHEET SUBTOTALS
1	TITLE SHEET	1
1A	RIGHT-OF-WAY TITLE SHEET	1
IL1	INDEX / LAYOUT SHEET	1
2 - 2A	SUMMARY OF ESTIMATED QUANTITIES	2
2B	MOVING ITEMS	1
3	TYPICAL SECTIONS	1
4	RIGHT-OF-WAY DATA SHEETS	1
4A - 4C	PROPERTY STRIP MAP	3
5	GENERAL CONSTRUCTION NOTES	1
5A	REFERENCE DATA SHEETS	1
5B	STAKE OUT PLAN SHEET	1
6 - 8	ROADWAY PLAN SHEETS	3
9 - 10	PROFILE SHEETS	2
D1-D3T	DRAINAGE PLAN SHEETS	6
TC1 - TC9	TRAFFIC CONTROL PLANS	9
PM1 - PM3	PAVEMENT MARKING PLANS	3
SN1 - SN5	SIGNING PLANS	5
G1	GEOTECHNICAL NOTES SHEET	1
EC1 - EC3	EROSION CONTROL SHEETS	3
EC4 - EC5	EROSION CONTROL DATA SHEET	2
S1 - S5	CULVERT DETAIL SHEETS	5
U1 - U8	UTILITY RELOCATION SHEETS	8
X1 - X55	CROSS SECTIONS	55
TOTAL		116



STV 100 Years **STV Incorporated**
 2430 MALL DRIVE
 SUITE 315 BUILDING B
 NORTH CHARLESTON, SOUTH CAROLINA 29406

6			
5			
4			
3			
2			
1			
REV. NO.	BY	DATE	DESCRIPTION OF REVISION

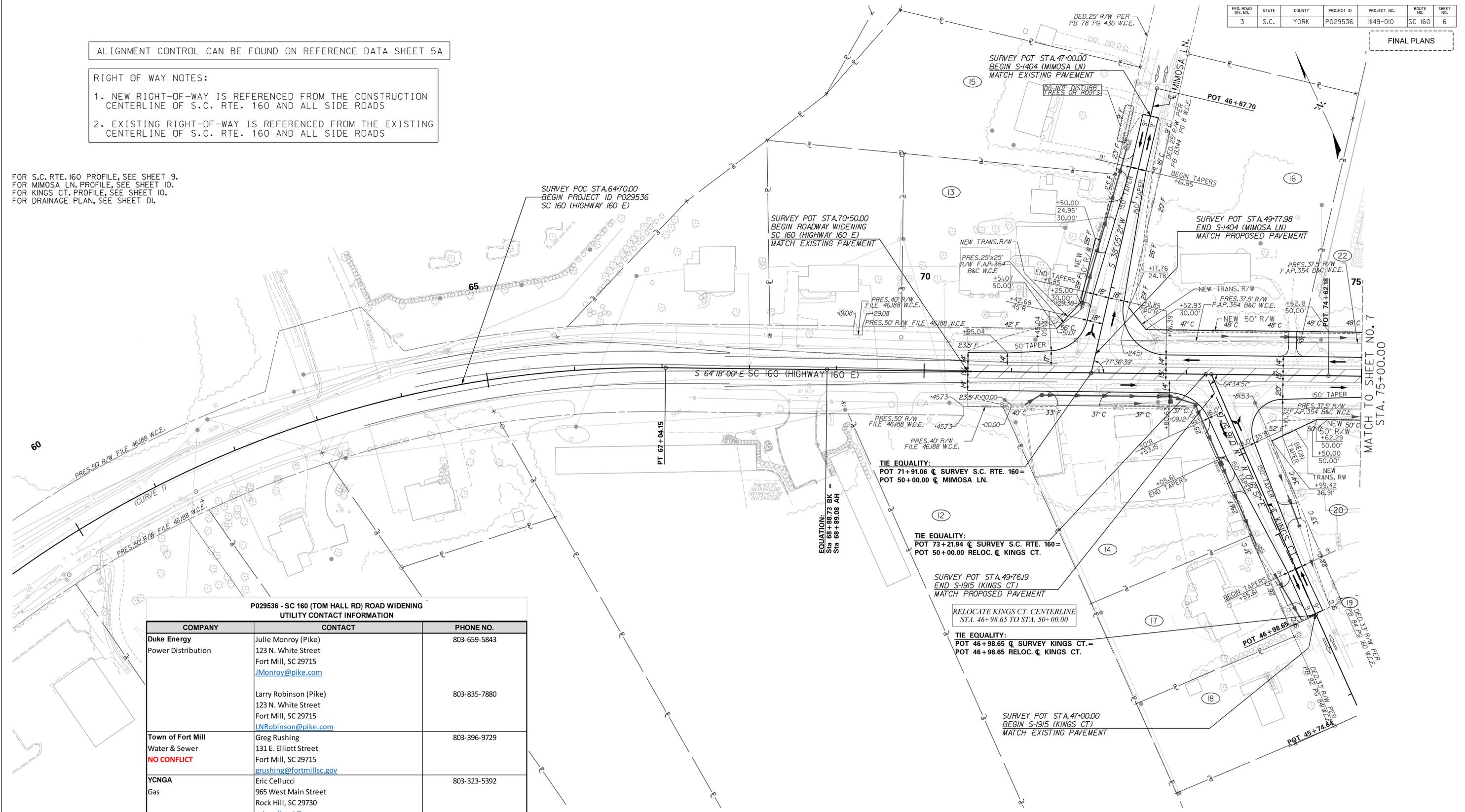
YORK COUNTY
 SOUTH CAROLINA
S.C. ROUTE 160 (HIGHWAY 160 E)
INDEX / LAYOUT SHEET
 SCALE 1"=200' S.C. ROUTE 160 DWG. NO. ILI

i:\Projects\4018372\4018372-000\30_CAD Models and Sheets\04_CIT_Transportation\Roadway\Dgn\Plan Sheets\sh1_01_index.dgn
 masti\g
 7/14/2022

ALIGNMENT CONTROL CAN BE FOUND ON REFERENCE DATA SHEET 5A

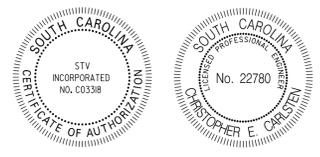
- RIGHT OF WAY NOTES:
1. NEW RIGHT-OF-WAY IS REFERENCED FROM THE CONSTRUCTION CENTERLINE OF S.C. RTE. 160 AND ALL SIDE ROADS
 2. EXISTING RIGHT-OF-WAY IS REFERENCED FROM THE EXISTING CENTERLINE OF S.C. RTE. 160 AND ALL SIDE ROADS

FOR S.C. RTE. 160 PROFILE, SEE SHEET 9.
 FOR MIMOSA LN. PROFILE, SEE SHEET 10.
 FOR KINGS CT. PROFILE, SEE SHEET 10.
 FOR DRAINAGE PLAN, SEE SHEET D1.



**P029536 - SC 160 (TOM HALL RD) ROAD WIDENING
 UTILITY CONTACT INFORMATION**

COMPANY	CONTACT	PHONE NO.
Duke Energy Power Distribution	Julie Monroy (Pike) 123 N. White Street Fort Mill, SC 29715 JMonroy@pike.com	803-659-5843
	Larry Robinson (Pike) 123 N. White Street Fort Mill, SC 29715 LNRobinson@pike.com	803-835-7880
Town of Fort Mill Water & Sewer NO CONFLICT	Greg Rushing 131 E. Elliott Street Fort Mill, SC 29715 grushing@fortmillsc.gov	803-396-9729
YCNGA Gas	Eric Cellucci 965 West Main Street Rock Hill, SC 29730 eric.cellucci@ycnga.com	803-323-5392
Comporium Telephone	Eric Kirkland 471 Lakeshore Parkway Rock Hill, SC 29730 eric_kirkland@comporium.com	803-326-6109
Charter/Spectrum CATV	Neal Barker 3140 West Arrowood Road Charlotte, NC 28273 neal.barker@charter.com	704-671-6103



STV 100 Years
 STV Incorporated
 3430 MALL DRIVE
 SUITE 315 BUILDING B
 NORTH CHARLESTON, SOUTH CAROLINA 29406

6			
5			
4			
3	MHC	07/09/19	REMOVED TCE FROM TRACT 15
2	MHC	06/24/19	ADDED TCE TO TRACT 15
1	MHC	05/22/19	REVISED OBTAIN AND REMOVED PREMISSIONS ON TRACT 20
REV. NO.	BY	DATE	DESCRIPTION OF REVISION
PREPARED BY _____ CHK'D BY _____ REVIEWED BY _____			

YORK COUNTY
 SOUTH CAROLINA
S.C. ROUTE 160 (HIGHWAY 160 E)
ROADWAY PLAN SHEET
 SCALE 1"=50' S.C. ROUTE 160 DWG. NO. 6

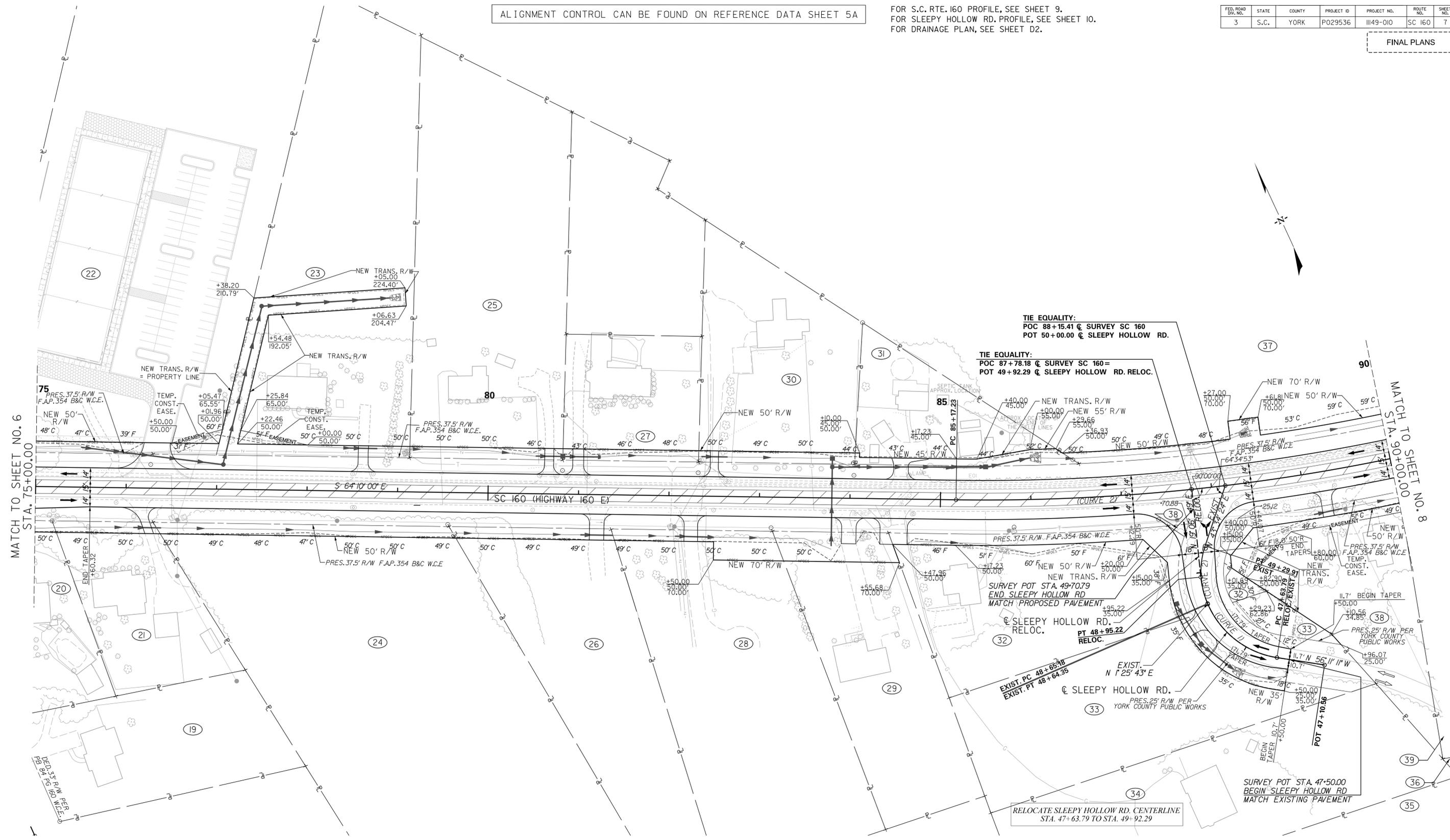
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 masthrg
 7/14/2022

ALIGNMENT CONTROL CAN BE FOUND ON REFERENCE DATA SHEET 5A

FOR S.C. RTE. 160 PROFILE, SEE SHEET 9.
FOR SLEEPY HOLLOW RD. PROFILE, SEE SHEET 10.
FOR DRAINAGE PLAN, SEE SHEET D2.

FED. ROAD DIST. NO.	STATE	COUNTY	PROJECT ID	PROJECT NO.	ROUTE NO.	SHEET NO.
3	S.C.	YORK	P029536	III49-010	SC 160	7

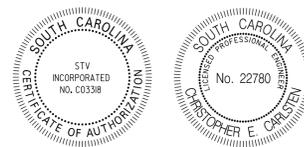
FINAL PLANS



MATCH TO SHEET NO. 6
STA. 75+00.00

MATCH TO SHEET NO. 8
STA. 90+00.00

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7/14/2022



STV 100 Years **STV Incorporated**
 2430 MALL DRIVE
 SUITE 315 BUILDING B
 NORTH CHARLESTON, SOUTH CAROLINA 29406

6	TGM	03/11/2020	REVISED NEW R/W - TRACT 23
5	MHC	05/22/19	ADDED TCE TO TRS 22 & 23 TO COVER SLOPE & EC PERMISSIONS
4	MHC	05/22/19	REVISED OBTAIN AND REMOVE PERMISSION ON TR 20
3	MHC	05/11/19	ADDED TCE TO TRACT 38
2	MHC	05/14/19	REVISED RW LIMITS AND OBTAIN ON TRACT 31
1	MHC	04/22/19	REVISED SLOPE LIMITS AND RW OBTAIN ON TRACT 31
REV. NO.	BY	DATE	DESCRIPTION OF REVISION
PREPARED BY _____ CHK'D BY _____ REVIEWED BY _____			

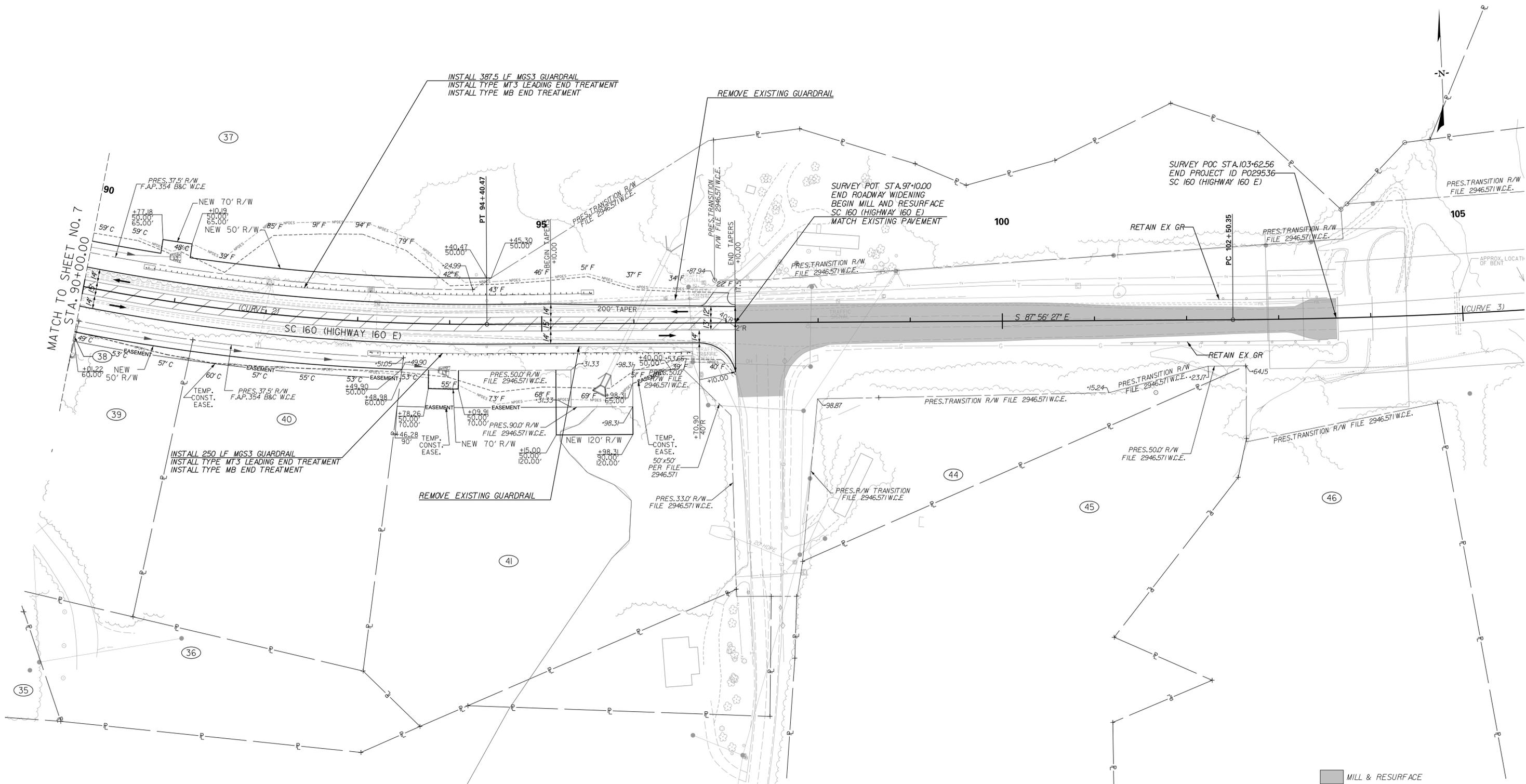
YORK COUNTY
 SOUTH CAROLINA
S.C. ROUTE 160 (HIGHWAY 160 E)
ROADWAY PLAN SHEET
 SCALE 1"=50' S.C. ROUTE 160 DWG. NO. 7

ALIGNMENT CONTROL CAN BE FOUND ON REFERENCE DATA SHEET 5A

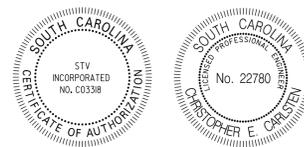
FOR S.C. RTE. 160 PROFILE, SEE SHEET 9.
FOR DRAINAGE SHEET, SEE SHEET D3.

FED. ROAD DIST. NO.	STATE	COUNTY	PROJECT ID	PROJECT NO.	ROUTE NO.	SHEET NO.
3	S.C.	YORK	P029536	III49-010	SC 160	8

FINAL PLANS



MILL & RESURFACE



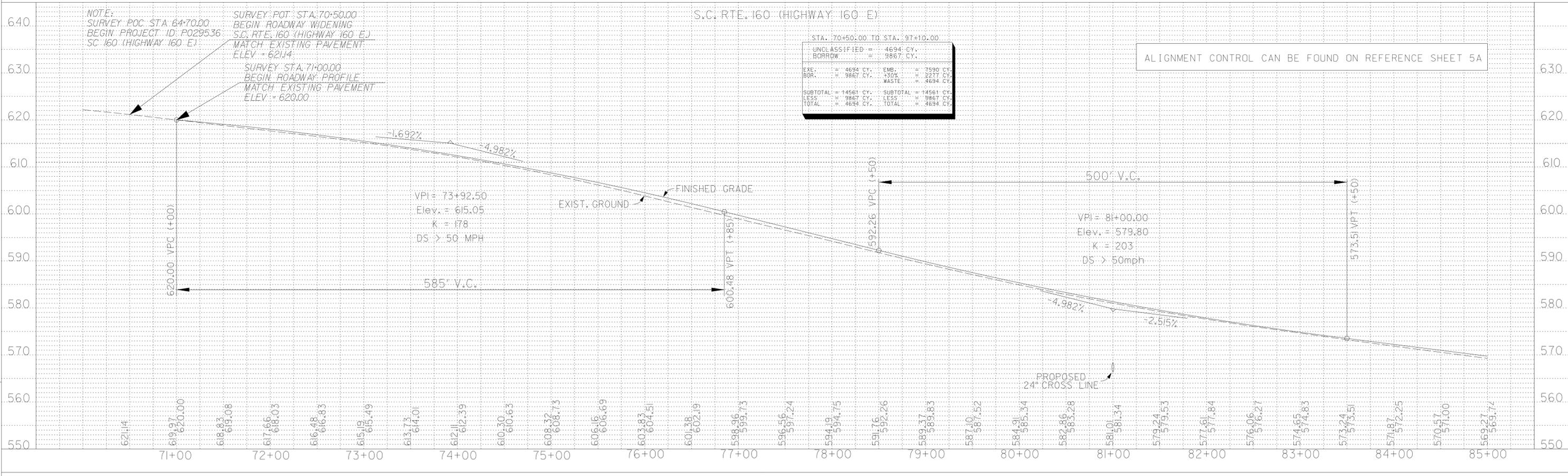
STV 100 Years **STV Incorporated**
2430 MALL DRIVE
SUITE 315 BUILDING B
NORTH CHARLESTON, SOUTH CAROLINA 29406

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3	MHC	06/24/19	ADDED TCE TO TRACT 41
2	MHC	05/17/19	ADDED TCE TO TRACT 38
1	MHC	04/25/19	ADDED TCE TO TRACTS 39 & 40
REV. NO.	BY	DATE	DESCRIPTION OF REVISION
PREPARED BY _____ CHK'D BY _____ REVIEWED BY _____			

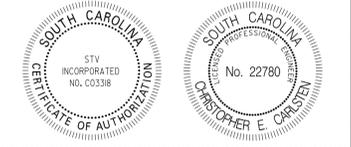
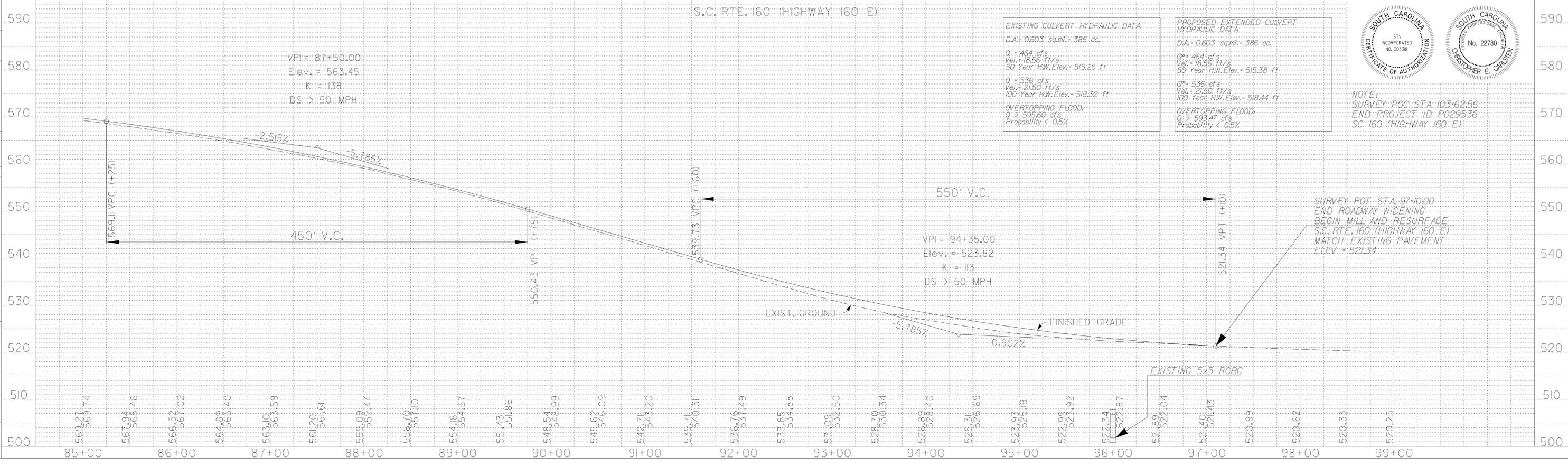
YORK COUNTY
SOUTH CAROLINA
S.C. ROUTE 160 (HIGHWAY 160 E)
ROADWAY PLAN SHEET
SCALE 1"=50' S.C. ROUTE 160 DWG. NO. 8

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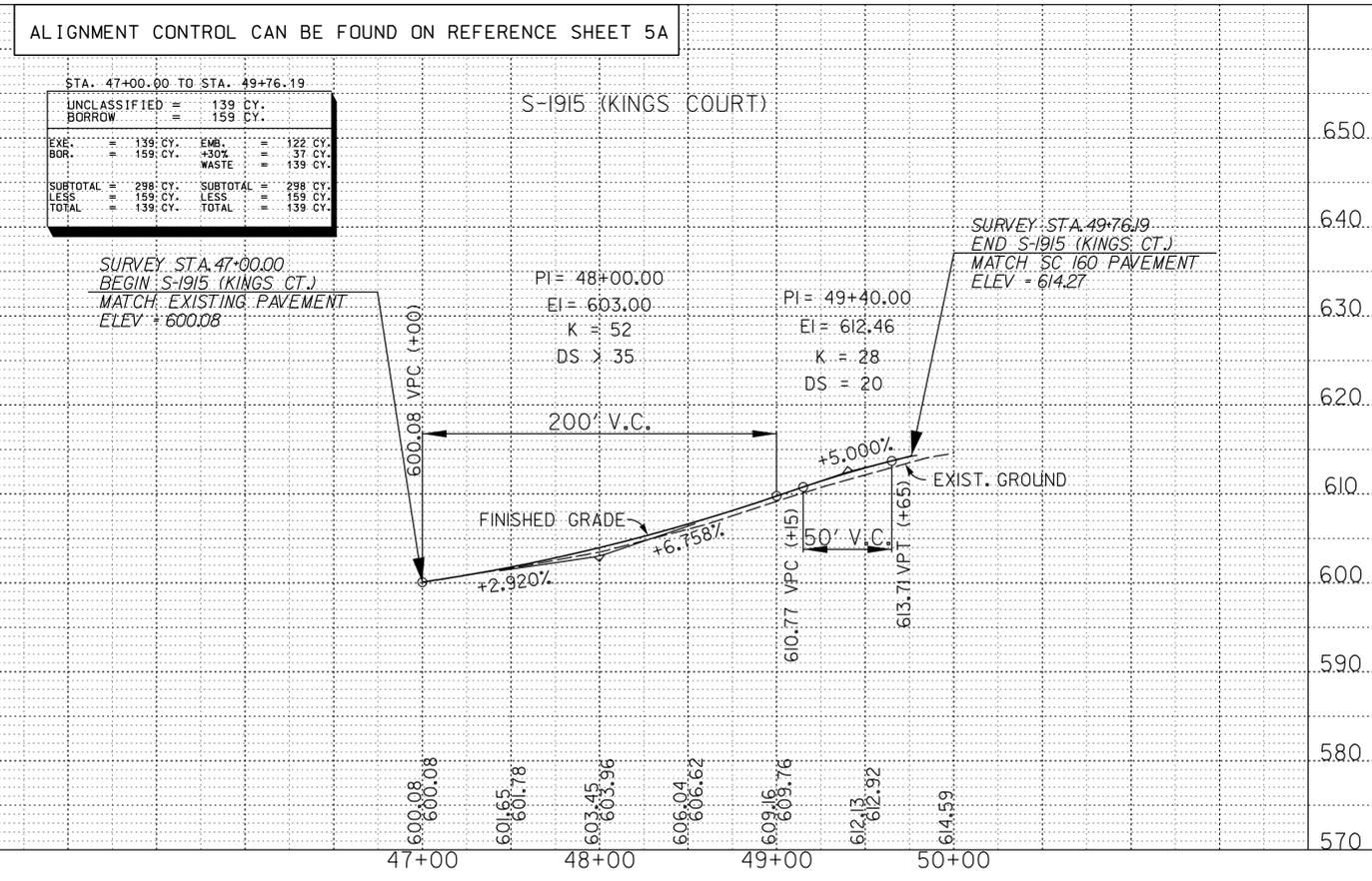
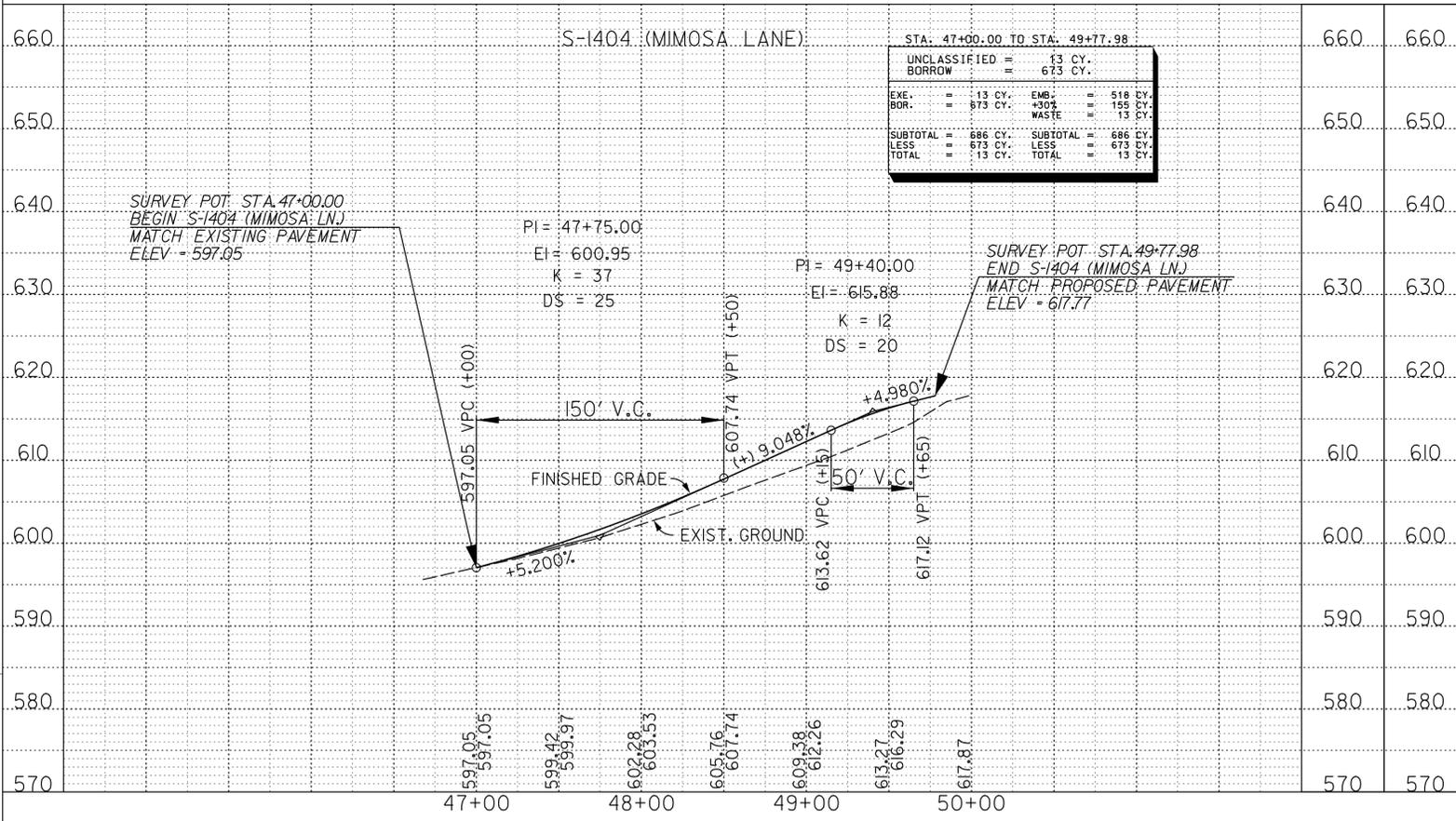
STV Incorporated
 100 *Myrtlewood*
 260 MALL DRIVE
 SUITE 316 BUILDING B
 NORTH CHARLESTON, SOUTH CAROLINA 29406



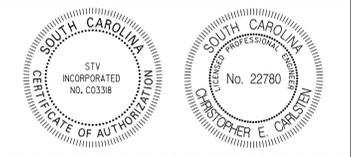
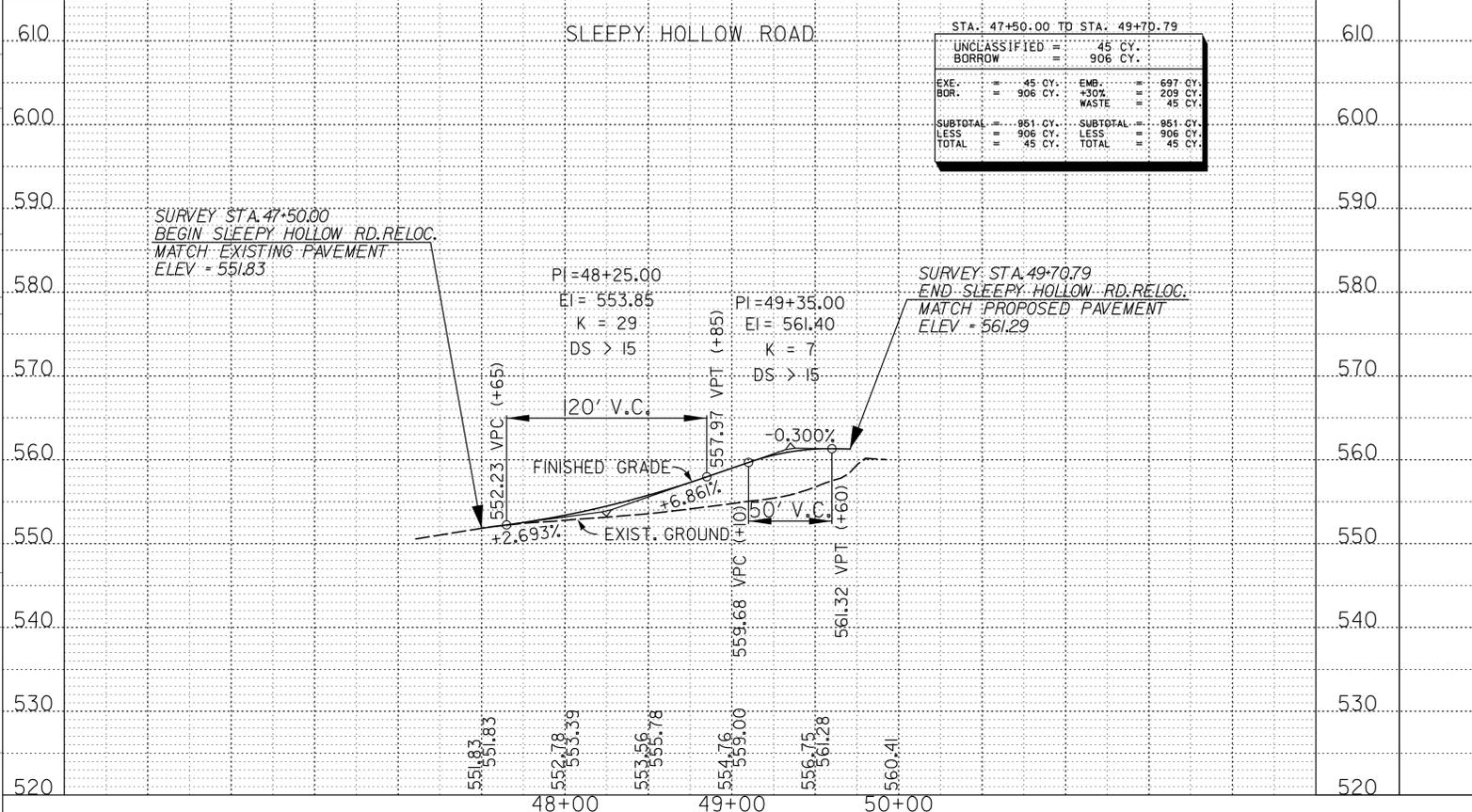
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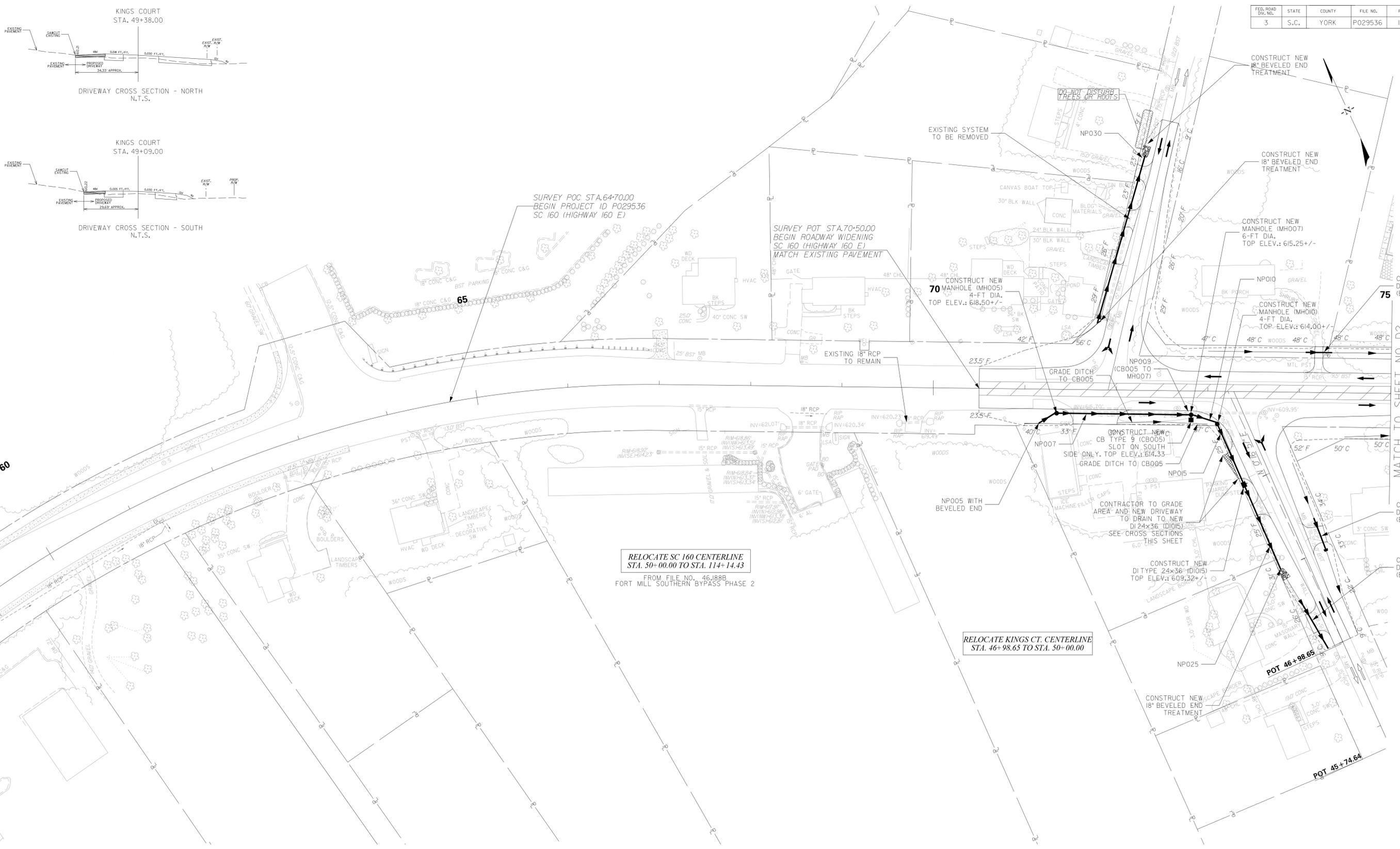


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FED. ROAD DIST. NO.	STATE	COUNTY	FILE NO.	PROJECT NO.	ROUTE NO.	SHEET NO.
3	S.C.	YORK	P029536	III49-010	SC 160	DI

FINAL PLANS



SURVEY POC STA. 64+70.00
BEGIN PROJECT ID P029536
SC 160 (HIGHWAY 160 E)
MATCH EXISTING PAVEMENT

SURVEY POT STA. 70+50.00
BEGIN ROADWAY WIDENING
SC 160 (HIGHWAY 160 E)
MATCH EXISTING PAVEMENT

RELOCATE SC 160 CENTERLINE
STA. 50+00.00 TO STA. 114+14.43
FROM FILE NO. 46,188B
FORT MILL SOUTHERN BYPASS PHASE 2

RELOCATE KINGS CT. CENTERLINE
STA. 46+98.65 TO STA. 50+00.00

MATCH TO SHEET NO. D2
STA. 75+00.00

- NOTES:**
- EXISTING DRIVEWAY PIPES SHALL BE REMOVED WHERE A NEW DRIVEWAY IS PROPOSED.
 - PLACE RIPRAP END TREATMENT FOR ALL DRIVEWAY AND OPEN END PIPES PER SCDOT STD 719-610-00



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STV Incorporated
ROCK HILL BUSINESS TECHNOLOGY CENTER, BTC 517
454 S. ANDERSON ROAD, SUITE 3
ROCK HILL, SOUTH CAROLINA 29730

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REV. NO.	BY	DATE	DESCRIPTION OF REVISION
			PREPARED BY _____ CHK'D BY _____ REVIEWED BY _____

YORK COUNTY
SOUTH CAROLINA
**S.C. ROUTE 160 (HIGHWAY 160 E)
DRAINAGE PLAN SHEET
S.C. ROUTE 160**
SCALE 1"=50' S.C. ROUTE 160 DWG. NO. DI

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FED. ROAD DIST. NO.	STATE	COUNTY	FILE NO.	PROJECT NO.	ROUTE NO.	SHEET NO.
3	S.C.	YORK	P029536	III49-010	SC 160	DIT

FINAL PLANS

Smooth																							
x	x	Geometry				Upstream				Downstream				Fill Height		Min Field	Joint	Smooth Wall Options					
System ID	Link ID	Diameter	No. of	Pipe Length	Slope	Node	Node	Node	Link Invert	Node	Node	Node	Link Invert	Min	Max	SPT "N"	Pressure	HDPE	Built	RCP	Built	SRAP	Built
x	x	(in)	Barrels	(ft)	(%)		Description	Station	(ft)	Description	Station	(ft)	(ft)	(ft)	below invert	(psi)	Type	✓	Highest Class	✓	Thickest Gage	✓	
Closed	NP005	18	1	20.81	4.28	HW030	BEVELED END	71+15.62	616.52	MH005	MANHOLE (4-FT)	71+35.00	615.63	0.00	1.37	-	10	S	-	III	-	16ga	
Closed	NP007	18	1	143.33	4.28	MH005	MANHOLE (4-FT)	71+35.00	615.48	MH007	MANHOLE (6-FT)	72+82.00	609.34	1.00	6.06	13	10	S	-	III	-	16ga	
Closed	NP009	18	1	2.25	6.23	CB005	C.B. TYPE 9	72+82.00	609.25	MH007	MANHOLE (6-FT)	72+82.00	609.14	2.00	6.06	-	10	S	-	III	-	16ga	
Closed	NP010	18	1	27.30	4.14	MH007	MANHOLE (6-FT)	72+82.00	609.14	MH010	MANHOLE (4-FT)	73+10.73	608.01	3.00	5.31	10	10	S	-	III	-	16ga	
Closed	NP015	18	1	68.85	4.34	MH010	MANHOLE (4-FT)	73+10.73	607.86	DI015	D.I. 24"X36"	49+00.00	604.87	4.00	5.00	-	10	S	-	III	-	16ga	
Closed	NP025	18	1	98.02	4.32	DI015	D.I. 24"X36"	49+00.00	604.74	OP025	BEVELED END	48+00.00	600.51	5.00		-	10	S	-	III	-	16ga	
Closed	NP030	18	1	190.24	7.62	HW005	BEVELED END	49+32.00	610.00	OP010	BEVELED END	47+42.00	595.50	6.00		-	10	S	-	III	-	16ga	

Driveway Pipe and Riprap for Pipe End Treatments																	
x	x	Geometry				Upstream				Downstream				Riprap Class		Fill Slopes	Pipe
System ID	Link ID	Diameter	No. of	Pipe Length	Slope	Riprap	Geotextile	Station	Link Invert	Riprap	Geotextile	Station	Link Invert	Upstream	Downstream	(Hor/Vert)	End
x	x	(in)	Barrels	(ft)	(%)	(tons)	(square yards)		(ft)	(tons)	(square yards)		(ft)				Type
Driveway	PIPE 1	18	1	29.0	4.1	12	15	74+06 (SR-160 Lt.)	608.98	12	15	74+35 (SR-160 Lt.)	607.78	B	B	4:1	Beveled
Driveway	PIPE 2	18	1	39.0	4.7	12	15	48+36 (Kings Ct. Rt.)	602.95	12	15	47+97 (Kings Ct. Rt.)	601.12	B	B	4:1	Beveled
Driveway	PIPE 3	18	1	54.0	2.5	12	15	47+54 (Kings Ct. Lt.)	599.25	12	15	47+00 (Kings Ct. Lt.)	597.90	B	B	4:1	Beveled

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STV 100 Years
 STV Incorporated
 ROCK HILL BUSINESS TECHNOLOGY CENTER, BTC 517
 454 S. ANDERSON ROAD, SUITE 3
 ROCK HILL, SOUTH CAROLINA 29730

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REV. NO.	BY	DATE	DESCRIPTION OF REVISION

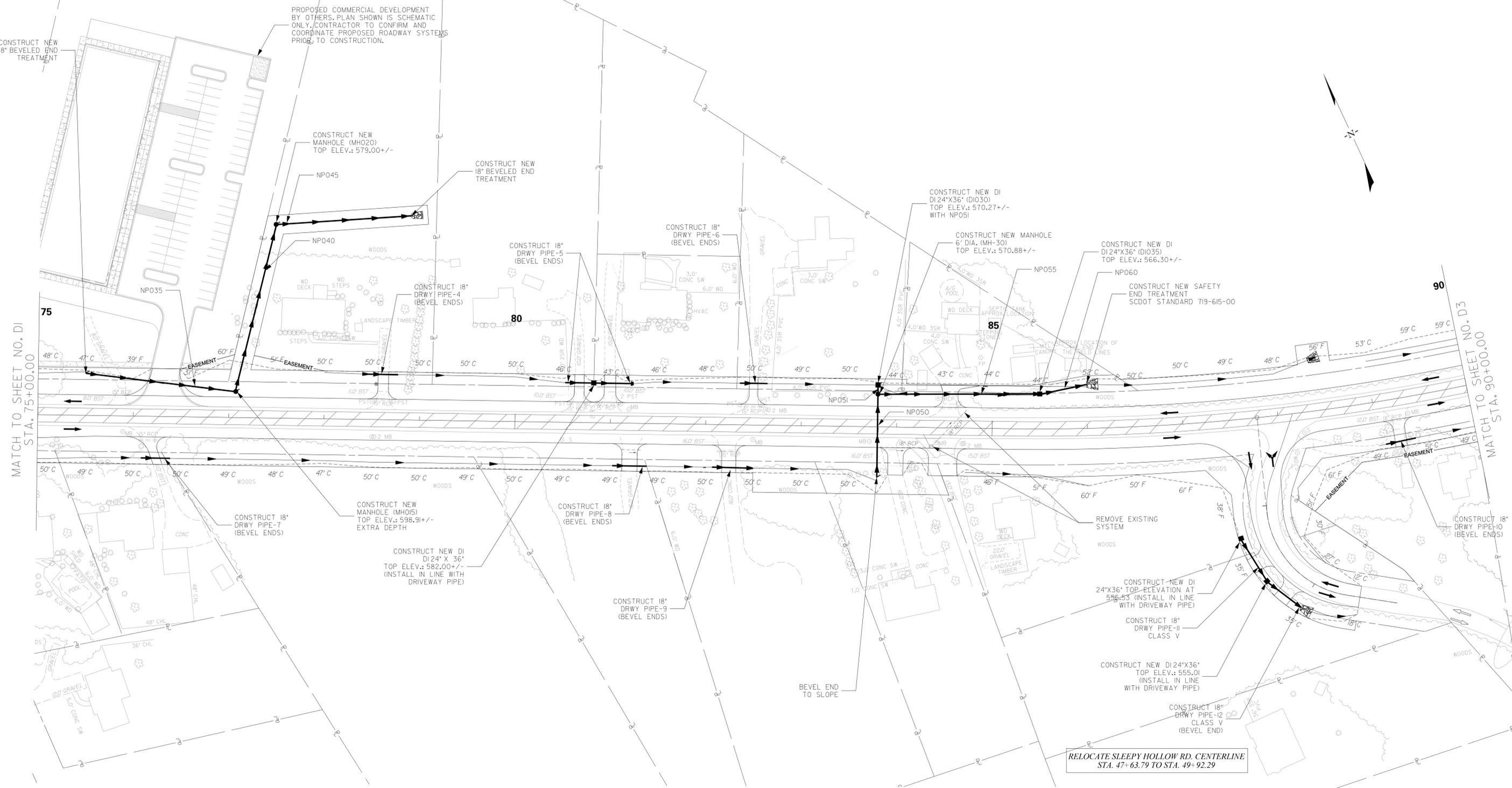
YORK COUNTY
 SOUTH CAROLINA
S.C. ROUTE 160 (HIGHWAY 160 E)
DRAINAGE PLAN TABLE
S.C. ROUTE 160
 SCALE 1"=50' S.C. ROUTE 160 DWG. NO. DIT

NOTES:

1. EXISTING DRIVEWAY PIPES SHALL BE REMOVED WHERE A NEW DRIVEWAY IS PROPOSED.
2. PLACE RIPRAP END TREATMENT FOR ALL DRIVEWAY AND OPEN END PIPES PER SCDOT STD 719-610-00

FED. ROAD DIST. NO.	STATE	COUNTY	FILE NO.	PROJECT NO.	ROUTE NO.	SHEET NO.
3	S.C.	YORK	P029536	III49-010	SC 160	D2

FINAL PLANS



STV 100 Years
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 ROCK HILL BUSINESS TECHNOLOGY CENTER, BTC 517
 454 S. ANDERSON ROAD, SUITE 3
 ROCK HILL, SOUTH CAROLINA 29730

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REV. NO.	BY	DATE	DESCRIPTION OF REVISION
			PREPARED BY _____ CHK'D BY _____ REVIEWED BY _____

YORK COUNTY
 SOUTH CAROLINA
**S.C. ROUTE 160 (HIGHWAY 160 E)
 DRAINAGE PLAN SHEET
 S.C. ROUTE 160**
 SCALE 1"=50' S.C. ROUTE 160 DWG. NO. D2

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 7/14/2022

FED. ROAD DIST. NO.	STATE	COUNTY	FILE NO.	PROJECT NO.	ROUTE NO.	SHEET NO.
3	S.C.	YORK	P029536	III49-010	SC 160	D2T

FINAL PLANS

Smooth

System ID	Link ID	Geometry				Upstream				Downstream				Fill Height		Min Field	Joint	Smooth Wall Options					
		Diameter	No. of Barrels	Pipe Length (ft)	Slope (%)	Node	Node Description	Node Station	Link Invert (ft)	Node	Node Description	Node Station	Link Invert (ft)	Min (ft)	Max (ft)	SPT "N" below invert	Pressure (psi)	HDPE Type	Built ✓	RCP Highest Class	Built ✓	SRAP Thickest Gage	Built ✓
Closed	NP035	18	1	156.43	6.00	HW010	BEVELED END	75+49.71	602.68	MH015	MANHOLE (4-FT)	77+07.07	593.38	0.00	4.03	-	10	S	-	III	-		
Closed	NP040	18	1	175.71	5.12	MH015	MANHOLE (4-FT)	77+07.07	583.75	MH020	MANHOLE (4-FT)	77+46.85	574.75	2.75	13.66	-	10	S	-	III	-		
Closed	NP045	18	1	140.22	6.60	MH020	MANHOLE (4-FT)	77+46.85	574.75	OP015	BEVELED END	78+88.47	565.50	0.00	2.75	-	10	S	-	III	-		
Closed	NP050	24	1	84.88	0.78	HW015	BEVELED END	83+80.00	566.77	MH030	MANHOLE (4-FT)	83+80.00	566.11	0.00	2.77	-	10	S	-	III	-		
Closed	NP051	18	1	5.67	10.00	DI030	D.I. 24"X36"	83+80.00	557.09	MH030	MANHOLE (4-FT)	83+80.00	556.52	11.68	12.86	-	10	S	-	III	-		
Closed	NP055	24	1	165.65	1.59	MH030	MANHOLE (4-FT)	83+80.00	566.01	DI035	D.I. 24"X36"	85+50.00	563.38	0.92	2.87	-	10	S	-	III	-		
Closed	NP060	24	1	47.99	0.77	DI035	D.I. 24"X36"	85+50.00	563.38	OP020	SAFETY END	86+00.00	563.01	0.00	0.92	-	13	S	-	III	-		

Driveway Pipe and Riprap for Pipe End Treatments

System ID	Link ID	Geometry				Upstream				Downstream				Riprap Class		Fill Slopes (Hor/Vert)	Pipe End Type
		Diameter	No. of Barrels	Pipe Length (ft)	Slope (%)	Riprap (tons)	Geotextile (square yards)	Station	Link Invert (ft)	Riprap (tons)	Geotextile (square yards)	Station	Link Invert (ft)	Upstream	Downstream		
Driveway	PIPE 4	18	1	31.0	4.8	12	15	78+46 (SR-160 Lt.)	587.37	12	15	78+77 (SR-160 Lt.)	585.89	B	B	4:1	Beveled
Driveway	PIPE 5	18	1	72.0	3.1	12	15	80+52 (SR-160 Lt.)	579.56	12	15	81+24 (SR-160 Lt.)	577.32	B	B	4:1	Beveled
Driveway	PIPE 6	18	1	29.0	2.5	12	15	82+35 (SR-160 Lt.)	573.93	12	15	82+64 (SR-160 Lt.)	573.21	B	B	4:1	Beveled
Driveway	PIPE 7	18	1	30.8	4.6	12	15	76+09 (SR-160 Rt.)	600.95	12	15	76+39 (SR-160 Rt.)	599.53	B	B	4:1	Beveled
Driveway	PIPE 8	18	1	36.0	1.6	12	15	81+03 (SR-160 Rt.)	577.15	12	15	81+39 (SR-160 Rt.)	576.56	B	B	4:1	Beveled
Driveway	PIPE 9	18	1	43.0	2.0	12	15	82+07 (SR-160 Rt.)	574.54	12	15	82+50 (SR-160 Rt.)	573.18	B	B	4:1	Beveled
Driveway	PIPE 10	18	1	32.0	5.5	12	15	89+07 (SR-160 Rt.)	553.13	12	15	89+39 (SR-160 Rt.)	551.37	B	B	4:1	Beveled
Driveway	PIPE 11	18	1	52.0	1.6			48+75 (Sleepy H. Rt)	553.02			48+35 (Sleepy H. Rt)	552.29				Square
Driveway	PIPE 12	18	1	45.0	1.6			48+35 (Sleepy H. Rt)	552.24	12	15	48+00 (Sleepy H. Rt)	551.50		B	4:1	Beveled

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STV Incorporated
 ROCK HILL BUSINESS TECHNOLOGY CENTER, BTC 517
 464 S. ANDERSON ROAD, SUITE 3
 ROCK HILL, SOUTH CAROLINA 29730

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REV. NO.	BY	DATE	DESCRIPTION OF REVISION
PREPARED BY _____ CHK'D BY _____ REVIEWED BY _____			

YORK COUNTY
 SOUTH CAROLINA
S.C. ROUTE 160 (HIGHWAY 160 E)
DRAINAGE PLAN TABLE
S.C. ROUTE 160

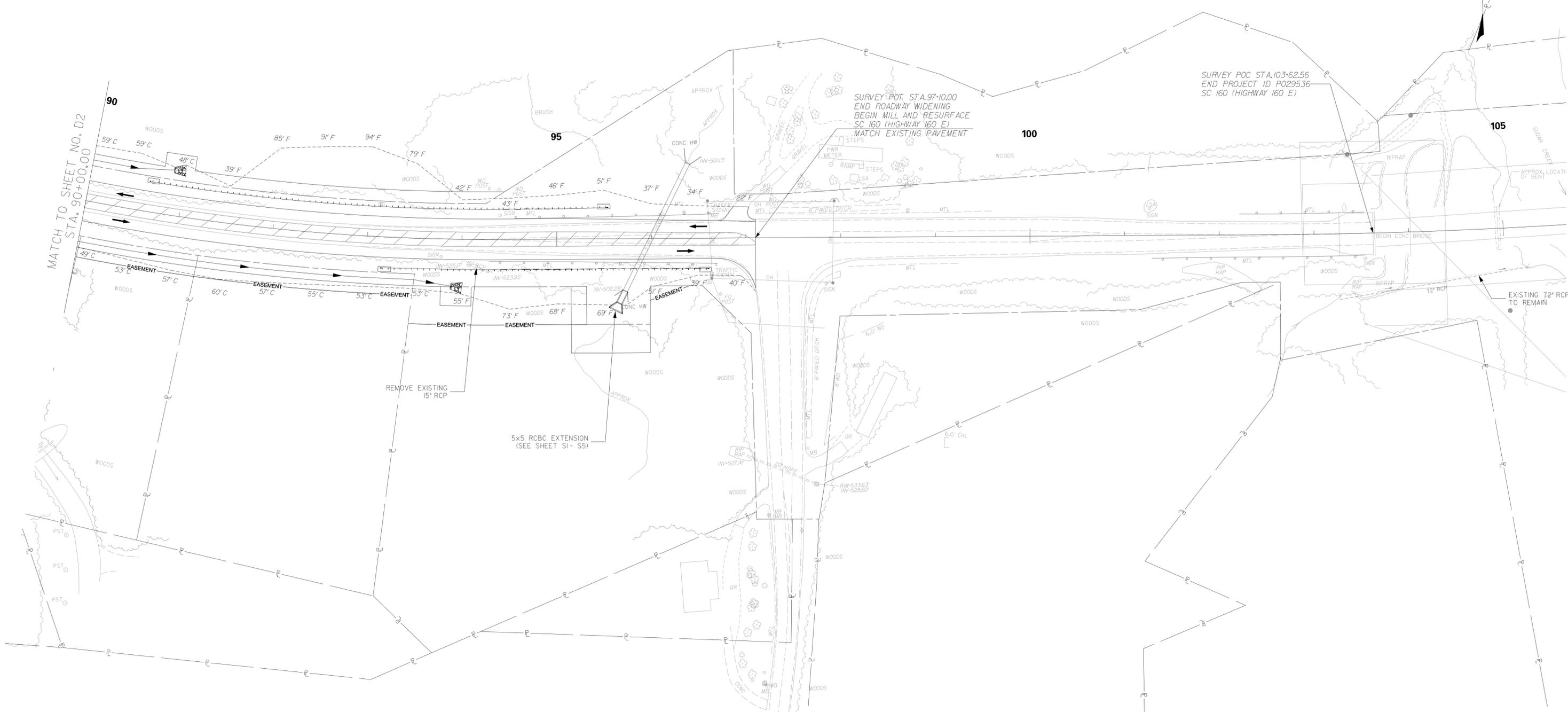
SCALE 1"=50' S.C. ROUTE 160 DWG. NO. D2T

FED. ROAD DIST. NO.	STATE	COUNTY	FILE NO.	PROJECT NO.	ROUTE NO.	SHEET NO.
3	S.C.	YORK	P029536	III49-010	SC 160	D3

FINAL PLANS

EXISTING CULVERT HYDRAULIC DATA
 D.A. = 0.603 sq.mil. = 386 ac.
 $Q_{50} = 464$ cfs
 Vel. = 18.56 ft/s
 50 Year H.W. Elev. = 515.26 ft
 $Q_{100} = 536$ cfs
 Vel. = 21.50 ft/s
 100 Year H.W. Elev. = 518.32 ft
OVERTOPPING FLOOD:
 $Q > 595.60$ cfs
 Probability > 0.5%

PROPOSED EXTENDED CULVERT HYDRAULIC DATA
 D.A. = 0.603 sq.mil. = 386 ac.
 $Q_{50} = 464$ cfs
 Vel. = 18.56 ft/s
 50 Year H.W. Elev. = 515.38 ft
 $Q_{100} = 536$ cfs
 Vel. = 21.50 ft/s
 100 Year H.W. Elev. = 518.44 ft
OVERTOPPING FLOOD:
 $Q > 593.47$ cfs
 Probability > 0.5%



MATCH TO SHEET NO. D2
 STA. 90+00.00

SURVEY POC STA. 97+10.00
 END ROADWAY WIDENING
 BEGIN MILL AND RESURFACE
 SC 160 (HIGHWAY 160 E)
 MATCH EXISTING PAVEMENT

SURVEY POC STA. 103+62.56
 END PROJECT ID P029536
 SC 160 (HIGHWAY 160 E)



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STV 100 Years
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 ROCK HILL BUSINESS TECHNOLOGY CENTER, BTC 517
 454 S. ANDERSON ROAD, SUITE 3
 ROCK HILL, SOUTH CAROLINA 29730

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REV. NO.	BY	DATE	DESCRIPTION OF REVISION
			PREPARED BY _____ CHK'D BY _____ REVIEWED BY _____

YORK COUNTY
 SOUTH CAROLINA
S.C. ROUTE 160 (HIGHWAY 160 E)
DRAINAGE PLAN SHEET
S.C. ROUTE 160
 SCALE 1"=50' S.C. ROUTE 160 DWG. NO. D3

FED. ROAD DIST. NO.	STATE	COUNTY	FILE NO.	PROJECT NO.	ROUTE NO.	SHEET NO.
3	S.C.	YORK	P029536	III49-010	SC 160	D3T

FINAL PLANS

Smooth

x		Geometry				Upstream				Downstream				Fill Height		Min Field	Joint	Smooth Wall Options						
System ID	Link ID	Diameter	No. of	Pipe Length	Slope	Node	Node	Node	Link Invert	Node	Node	Node	Link Invert	Min	Max	SPT "N"	Pressure	HDPE	Built	RCP	Built	SRAP	Built	
x	x	(in)	Barrels	(ft)	(%)		Description	Station	(ft)		Description	Station	(ft)	(ft)	(ft)	below invert	(psi)	Type	✓	Highest Class	✓	Thickest Gage	✓	

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STV Incorporated
 ROCK HILL BUSINESS TECHNOLOGY CENTER, BTC 517
 464 S. ANDERSON ROAD, SUITE 3
 ROCK HILL, SOUTH CAROLINA 29730

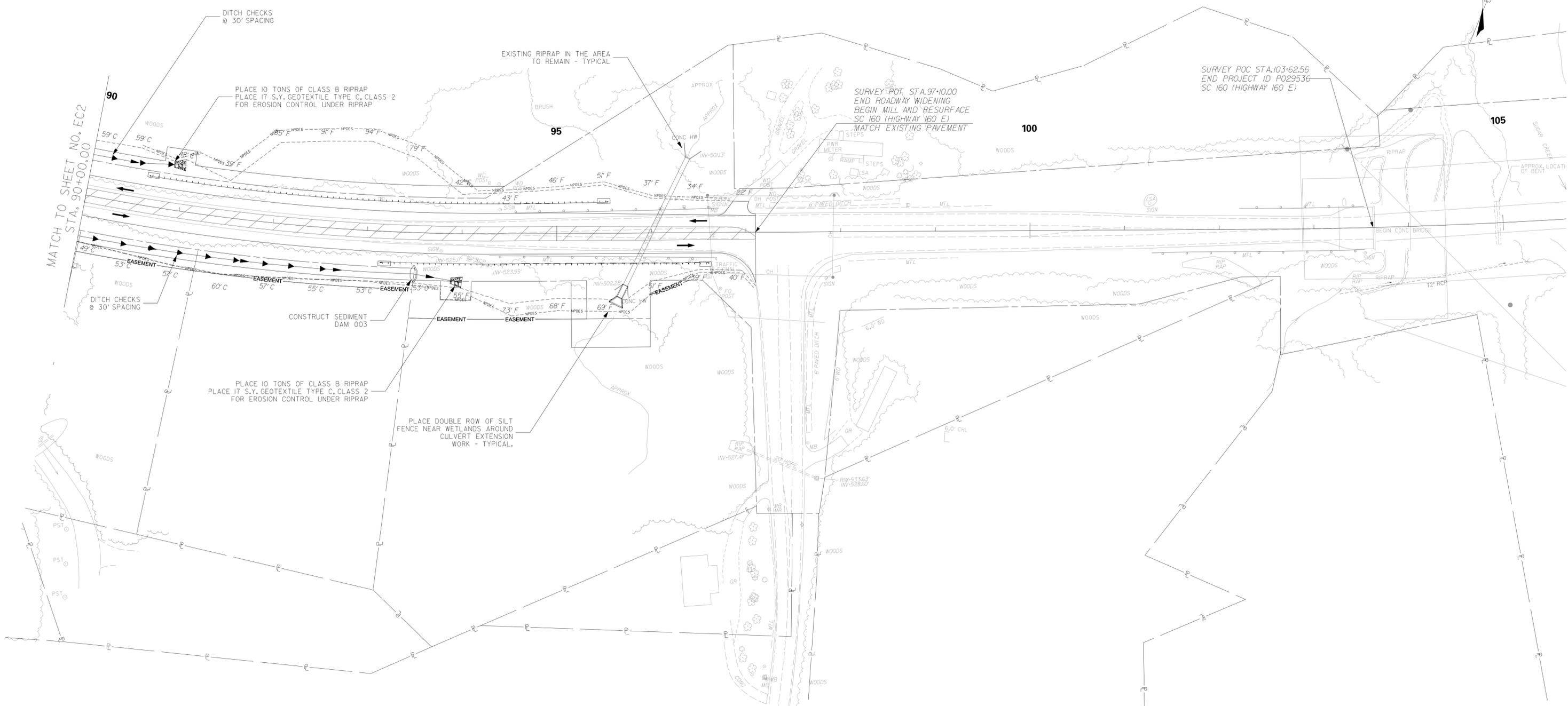
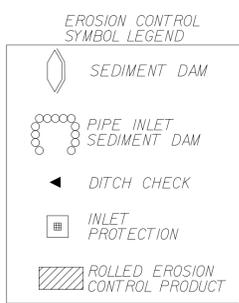
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REV. NO.	BY	DATE	DESCRIPTION OF REVISION

YORK COUNTY
 SOUTH CAROLINA
**S.C. ROUTE 160 (HIGHWAY 160 E)
 DRAINAGE PLAN TABLE
 S.C. ROUTE 160**

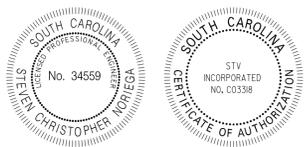
PREPARED BY _____ CHK'D BY _____ REVIEWED BY _____
 SCALE 1"=50' S.C. ROUTE 160 DWG. NO. D3T

FED. ROAD DIST. NO.	STATE	COUNTY	FILE NO.	PROJECT NO.	ROUTE NO.	SHEET NO.
3	S.C.	YORK	P029536	III49-010	SC 160	EC3

FINAL PLANS



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STV 100 Years
 STV Incorporated
 ROCK HILL BUSINESS TECHNOLOGY CENTER, BTC 517
 454 S. ANDERSON ROAD, SUITE 3
 ROCK HILL, SOUTH CAROLINA 29730

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REV. NO.	BY	DATE	DESCRIPTION OF REVISION
			PREPARED BY _____ CHK'D BY _____ REVIEWED BY _____

YORK COUNTY
 SOUTH CAROLINA
**S.C. ROUTE 160 (TOM HALL RD.)
 EROSION CONTROL PLAN SHEET
 S.C. ROUTE 160**
 SCALE 1"=50' S.C. ROUTE 160 DWG. NO. EC3

