



May 30, 2023

Lisa Hagood  
York County  
P.O Box 148  
York, SC 29745

RE: SC 557 Roadway Improvement Project, York County  
NPDES Coverage Number: SCR10ZD11

Dear Lisa Hagood:

The Department of Health and Environmental Control (Department or DHEC) has approved the Stormwater Pollution Prevention Plan (SWPPP) for the referenced project on **May 30, 2023**. Based on your submission of the Notice of Intent (NOI) and in accordance with the NPDES General Permit for Stormwater Discharges from Construction Activities (CGP), this project has been granted coverage under the CGP. This project's general permit coverage number is **SCR10ZD11**. The total disturbed area for this site is **44.9 acres**.

**Additional sets of final plans must be provided to the Department so that stamped, final plans are available for use on site, as required by the CGP.**

- "SC Navigable Waters Crossing"
- Because this project impacts waters of the U.S./State, make sure you obtain all necessary permits and certifications from USACOE and SCDHEC 401 Water Quality Certification, Standards Section before land-disturbing activities begin in those areas.

The CGP can be downloaded at the following website:

<http://www.scdhec.gov/Environment/docs/CGP-permit.pdf> or you may request a copy from us via email ([stormwatercgp@dhec.sc.gov](mailto:stormwatercgp@dhec.sc.gov)). You are responsible for ensuring your contractor(s) complies with the approved SWPPP and the minimum requirements of the CGP. Also, you are responsible for overall compliance with the Storm Water Management and Sediment Reduction Act of 1991 (1991 Act), SC Pollution Control Act, and the Federal Clean Water Act (CWA). Failure to comply with the approved SWPPP or applicable statutes and regulations may result in enforcement actions.

You must notify this DHEC EQC Regional Office prior to starting any land-disturbing activity. The address and telephone number of the EQC office are as follows:

Midlands EA Lancaster  
2475 DHEC Road  
Lancaster, SC 29720  
803-285-7461

Inspections of this site must be performed by qualified personnel as described in Section 4.2.E of the CGP.

You should be aware that this approval is only applicable for the SWPPP that was submitted for this project. Any additional construction or land disturbing activity beyond the scope of the approved plans is not authorized. Any future work for this project not shown on the stamped, approved plans will require that you submit another site plan for review and approval. All major modifications require review and approval by the Department. Minor modifications to the approved SWPPP may be made by the SWPPP preparer and do not require review and approval by the Department; these changes should be signed and dated by the SWPPP preparer. If you have a question about whether a modification is major or minor, contact the Stormwater Permitting Section at (803) 898-4300.

A copy of the stamped, approved SWPPP (including a copy of the CGP, contractor certifications, inspection records, rainfall data, etc.), NOI, and CGP coverage letter from DHEC must be retained and available at the construction site (or accessible within 30 minutes during normal business hours) from the date of commencement of construction activities to the date of final stabilization. If an on-site location is unavailable to store the SWPPP when no personnel are present, notice of the plan's location must be posted near the main entrance at the construction site.

All contractors who will conduct land-disturbing activities at the site must complete a Contractor Certification Form. You are also responsible for listing all contractors in the SWPPP and for holding a pre-construction conference with each contractor before they can conduct land-disturbing activity at the site.

The Department may conduct periodic inspections of your site. Any violations found during these inspections may result in enforcement action.

This NPDES coverage should be terminated by the permittee when one of the conditions listed in Section 5.1 of the CGP has been met. You must submit a Notice of Termination (NOT) to cancel your NPDES coverage under the CGP. Please see section 5.1 of the CGP for additional information required to be submitted with the NOT.

You are responsible for obtaining any other federal, state, or local permit that may be required for this project. In particular, any permits through the U.S. Army Corps of Engineers for the placement of fill material in Waters of the United States. Please note we have not sent a copy of this letter to

any county or city building official. You must send a copy of this letter to these agencies, if necessary.

***If material excavated during construction activities leaves the site, a mine operating permit may be needed. You are responsible for contacting the Mining and Reclamation Section to determine if a mining permit is required for the site. The Mining and Reclamation Section can be reached at (803)898-1362 or via e-mail at [AskMines@dhec.sc.gov](mailto:AskMines@dhec.sc.gov).***

Please see the enclosed "Guide to Board Review" document for information about the procedures for appealing this NPDES coverage.

If you have any questions or cannot access the referenced websites, please call me at 803-898-4198.

Sincerely,



Mohamad B Ismail, P.E.

Stormwater Permitting Section

CC: David Bocker, NV5 Engineers And Consultants  
Midlands EA Lancaster

**South Carolina Board of Health and Environmental Control**  
**Guide to Board Review**  
**Pursuant to S.C. Code Ann. § 44-1-60**

The decision of the South Carolina Department of Health and Environmental Control (Department) becomes the final agency decision fifteen (15) calendar days after notice of the decision has been mailed to the applicant, permittee, licensee and affected persons who have requested in writing to be notified, unless a written request for final review accompanied by a filing fee in the amount of \$100 is filed with Department by the applicant, permittee, licensee or affected person.

Applicants, permittees, licensees, and affected parties are encouraged to engage in mediation or settlement discussions during the final review process.

If the Board declines in writing to schedule a final review conference, the Department's decision becomes the final agency decision and an applicant, permittee, licensee, or affected person may request a contested case hearing before the Administrative Law Court within thirty (30) calendar days after notice is mailed that the Board declined to hold a final review conference. In matters pertaining to decisions under the South Carolina Mining Act, appeals should be made to the South Carolina Mining Council.

### **I. Filing of Request for Final Review**

1. A written Request for Final Review (RFR) and the required filing fee of one hundred dollars (\$100) must be received by Clerk of the Board within fifteen (15) calendar days after notice of the staff decision has been mailed to the applicant, permittee, licensee, or affected persons. If the 15th day occurs on a weekend or State holiday, the RFR must be received by the Clerk on the next working day. RFRs will not be accepted after 5:00 p.m.
2. RFRs shall be in writing and should include, at a minimum, the following information:
  - The grounds for amending, modifying, or rescinding the staff decision;
  - a statement of any significant issues or factors the Board should consider in deciding how to handle the matter;
  - the relief requested;
  - a copy of the decision for which review is requested; and
  - mailing address, email address, if applicable, and phone number(s) at which the requestor can be contacted.
3. RFRs should be filed in person or by mail at the following address:

South Carolina Board of Health and Environmental Control  
Attention: Clerk of the Board  
2600 Bull Street  
Columbia, South Carolina 29201

Alternatively, RFR's may be filed with the Clerk by facsimile (803-898-3393) or by electronic mail (boardclerk@dhec.sc.gov).
4. The filing fee may be paid by cash, check or credit card and must be received by the 15th day.
5. If there is any perceived discrepancy in compliance with this RFR filing procedure, the Clerk should consult with the Chairman or, if the Chairman is unavailable, the Vice-Chairman. The Chairman or the Vice-Chairman will determine whether the RFR is timely and properly filed and direct the Clerk to (1) process the RFR for consideration by the Board or (2) return the RFR and filing fee to the requestor with a cover letter explaining why the RFR was not timely or properly filed. Processing an RFR for consideration by the Board shall not be interpreted as a waiver of any claim or defense by the agency in subsequent proceedings concerning the RFR.
6. If the RFR will be processed for Board consideration, the Clerk will send an Acknowledgement of RFR to the Requestor and the applicant, permittee, or licensee, if other than the Requestor. All personal and financial

identifying information will be redacted from the RFR and accompanying documentation before the RFR is released to the Board, Department staff or the public.

7. If an RFR pertains to an emergency order, the Clerk will, upon receipt, immediately provide a copy of the RFR to all Board members. The Chairman, or in his or her absence, the Vice-Chairman shall based on the circumstances, decide whether to refer the RFR to the RFR Committee for expedited review or to decline in writing to schedule a Final Review Conference. If the Chairman or Vice-Chairman determines review by the RFR Committee is appropriate, the Clerk will forward a copy of the RFR to Department staff and Office of General Counsel. A Department response and RFR Committee review will be provided on an expedited schedule defined by the Chairman or Vice-Chairman.
8. The Clerk will email the RFR to staff and Office of General Counsel and request a Department Response within eight (8) working days. Upon receipt of the Department Response, the Clerk will forward the RFR and Department Response to all Board members for review, and all Board members will confirm receipt of the RFR to the Clerk by email. If a Board member does not confirm receipt of the RFR within a twenty-four (24) hour period, the Clerk will contact the Board member and confirm receipt. If a Board member believes the RFR should be considered by the RFR Committee, he or she will respond to the Clerk's email within forty-eight (48) hours and will request further review. If no Board member requests further review of the RFR within the forty-eight (48) hour period, the Clerk will send a letter by certified mail to the Requestor, with copy by regular mail to the applicant, permittee, or licensee, if not the Requestor, stating the Board will not hold a Final Review Conference. Contested case guidance will be included within the letter.  
*NOTE: If the time periods described above end on a weekend or State holiday, the time is automatically extended to 5:00 p.m. on the next business day.*
9. If the RFR is to be considered by the RFR Committee, the Clerk will notify the Presiding Member of the RFR Committee and the Chairman that further review is requested by the Board. RFR Committee meetings are open to the public and will be public noticed at least 24 hours in advance.
10. Following RFR Committee or Board consideration of the RFR, if it is determined no Conference will be held, the Clerk will send a letter by certified mail to the Requestor, with copy by regular mail to the applicant, permittee, or licensee, if not the Requestor, stating the Board will not hold a Conference. Contested case guidance will be included within the letter.

## **II. Final Review Conference Scheduling**

1. If a Conference will be held, the Clerk will send a letter by certified mail to the Requestor, with copy by regular mail to the applicant, permittee, or licensee, if not the Requestor, informing the Requestor of the determination.
2. The Clerk will request Department staff provide the Administrative Record.
3. The Clerk will send Notice of Final Review Conference to the parties at least ten (10) days before the Conference. The Conference will be publically noticed and should:
  - include the place, date and time of the Conference;
  - state the presentation times allowed in the Conference;
  - state evidence may be presented at the Conference;
  - if the conference will be held by committee, include a copy of the Chairman's order appointing the committee; and
  - inform the Requestor of his or her right to request a transcript of the proceedings of the Conference prepared at Requestor's expense.
4. If a party requests a transcript of the proceedings of the Conference and agrees to pay all related costs in writing, including costs for the transcript, the Clerk will schedule a court reporter for the Conference.

## **III. Final Review Conference and Decision**

1. The order of presentation in the Conference will, subject to the presiding officer's discretion, be as follows:

- Department staff will provide an overview of the staff decision and the applicable law to include [10 minutes]:
  - Type of decision (permit, enforcement, etc.) and description of the program.
  - Parties
  - Description of facility/site
  - Applicable statutes and regulations
  - Decision and materials relied upon in the administrative record to support the staff decision.
- Requestor(s) will state the reasons for protesting the staff decision and may provide evidence to support amending, modifying, or rescinding the staff decision. [15 minutes] *NOTE: The burden of proof is on the Requestor(s)*

- Rebuttal by Department staff [15 minutes]
- Rebuttal by Requestor(s) [10 minutes]

Note: Times noted in brackets are for information only and are superseded by times stated in the Notice of Final Review Conference or by the presiding officer.

2. Parties may present evidence during the conference; however, the rules of evidence do not apply.
3. At any time during the conference, the officers conducting the Conference may request additional information and may question the Requestor, the staff, and anyone else providing information at the Conference.
4. The presiding officer, in his or her sole discretion, may allow additional time for presentations and may impose time limits on the Conference.
5. All Conferences are open to the public.
6. The officers may deliberate in closed session.
7. The officers may announce the decision at the conclusion of the Conference or it may be reserved for consideration.
8. The Clerk will mail the written final agency decision (FAD) to parties within 30 days after the Conference. The written decision must explain the basis for the decision and inform the parties of their right to request a contested case hearing before the Administrative Law Court or in matters pertaining to decisions under the South Carolina Mining Act, to request a hearing before the South Carolina Mining Council. The FAD will be sent by certified mail, return receipt requested.
9. Communications may also be sent by electronic mail, in addition to the forms stated herein, when electronic mail addresses are provided to the Clerk.

**The above information is provided as a courtesy; parties are responsible for complying with all applicable legal requirements.**



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

**For Official Use Only**

File Number: \_\_\_\_\_  
 Permit Number: SCR10  
 Submittal Package Complete: \_\_\_\_\_

Submission of this Notice of Intent constitutes notice that the Applicant identified in Section II intends to be authorized as a Primary Permittee in the state of South Carolina under NPDES General Permit SCR1000000. Fees required for review and NPDES coverage of each application type are as listed on page 2 of the Instructions.

SOUTH CAROLINA  
 DEPT OF HEALTH AND ENVIRONMENTAL CONTROL  
 ENVIRONMENTAL QUALITY CONTROL  
 STORMWATER PERMITTING SECTION  
 APPROVED - FOR CONSTRUCTION ONLY  
 DHEC PERMIT #: SCR10ZD11  
 FILE #: N/A  
 DATE ISSUED: May 30, 2023  
 BY: [Signature]

Date: 03/31/2023  
 Project/Site Name: SC 557 Roadway Improvement Project County: York  
 (Modification or Change of Information Only) Prior Approved NPDES Permit or File Number: \_\_\_\_\_

Do you want this project to be considered for the Expedited Review Program (ERP)?  Yes or  No (See instructions)

**I. Notice of Intent (NOI) Application Type(s)**

- A. **Project (Application/Review) Type(s)** (Select **ALL** that apply):  
 New Project (Initial Notification) Ongoing Project:  Permitted or  Un-Permitted  
 Late Notification  Low Impact Development (LID) or Project Design Above Regulatory Requirements  
 New Owner/Operator or Company Name Change (see instructions, attach Form A (Transfer of Ownership))  
 Major Modification: (see instructions, attach Form B (Major Modifications))  
 MS4 Project Review  
 Ocean and Coastal Resource Management (OCRM) Review  
 Change of Information/Other (Specify): \_\_\_\_\_

B. If Applicable, identify the entity designated as **MS4 Reviewer** and **MS4 Operator** (i.e., Lexington County, City of Greer, etc.): MS4 Reviewer \_\_\_\_\_ MS4 Operator \_\_\_\_\_

**II. Primary Permittee Information**

Person or  Company If a Company, are you a  Lending Institution or  Government Entity?  
 Change of Information  
 Company EIN (if applicable): EIN: 57-6000418

- A. **Primary Permittee Name:** York County  
 Mailing Address: P.O. Box 148 City: York State: SC Zip: 29745  
 Phone: 803-818-5733 Fax: 803-684-8956 Email Address: lisa@hagood@yorkcountygov.com
- B. **Contact /ODSA Name** (If different from above OR if owner is a company): Lisa Hagood, PE  
 Mailing Address: P.O. Box 148 City: York State: SC Zip: 29745  
 Phone: 803-818-5733 Fax: 803-684-8596 Email Address: lisa.hagood@yorkcountygov.com
- C. **Property Owner Name** (If different from above): SCDOT  
 Mailing Address: P.O. Box 191 City: Chester State: SC Zip: 29706  
 Phone: 803-385-4280 Fax: \_\_\_\_\_ Email Address: \_\_\_\_\_

**III. Comprehensive Stormwater Pollution Prevention Plan (C-SWPPP) Preparer Information**  Change of Information

- A. **C-SWPPP Preparer Name:** David P. Bocker
- B. **Registered Professional**  Engineer  Landscape Architect  Tier B Land Surveyor **S. C. Registration #:** 23635
- C. **Company/Firm Name:** NV5 Engineers and Consultants **S. C. COA #:** C00957  
 Mailing Address: 7500 East Independence Blvd, Suite 100 City: Charlotte State: NC Zip: 28227  
 Phone: 704-566-4342 Fax: 704-537-2811 Email Address: david.bocker@nv5.com

**IV. Project/Site Information**

- A. **Type of Construction Activity(ies)** (Select **ALL** that apply):  Change of Information  
 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.) SC 557  
 City/Town (If in limits): \_\_\_\_\_ Zip Code: \_\_\_\_\_  
 Latitude: 35° 07' 13" N Longitude: - 81° 07' 57" W (Source):  GPS  Web Site: York County  
**Tax Map Number (s)** (List all): N/A (Road R/W)





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

**1. 303(d) Listed Impaired Waterbodies**

a. Name of Nearest DHEC Water Quality Monitoring Stations (WQMS)(s) that receives stormwater from your construction site and/or thru an MS4 and the Name of the Corresponding Waterbody?		b. Is this WQMS(s) listed on the <u>most current</u> 303(d) List? If <b>No</b> , proceed to Section 2 of this table. If <b>Yes</b> , 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 <b>yes</b> for d, list the "USE SUPPORT" impairment(s) affected by the pollutant(s) identified in c.
Nearest DHEC WQMS(s)	Corresponding Waterbody				
CW-230	Lake Wylie	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No	
CW-153	Beaverdam Creek	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No	
CW-201	Lake Wylie	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	PCB	<input type="checkbox"/> Yes <input checked="" 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?  Yes  No  
 (NOTE: If no for f, this site is **NOT** eligible for coverage under the CGP). See Instructions.

**2. TMDL Impaired Waterbodies**

a. Name of Nearest DHEC Water Quality Monitoring Stations (WQMS)(s) that receives stormwater from your construction site and/or thru an MS4?	b. Has a TMDL(s) been developed for this WQMS(s)? If <b>No</b> , identify as such below and proceed to Section VI. If <b>Yes</b> , complete items c thru f of this table.	c. If <b>yes</b> for b, what pollutants are listed as "CAUSES" or causing the impairment?	d. If <b>yes</b> for b, has the standard been "ATTAINED" or "Fully Supported" for the impairment(s)?	e. If <b>no</b> for d (Not Attained), will any pollutants causing the impairment be present in your site's construction stormwater discharges?
CW-230	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
CW-153	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	FECAL	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
CW-201	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	PCB	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

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

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

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

David Bocker, PE

*D. B. Bocker*

23635

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."

Lisa Hagood, PE

County Engineer

Printed Name of Primary Permittee

Title/Position

*Lisa Hagood*

3/9/2023

Signature of Primary Permittee

Date Signed

## Appendix C

### Additional Approvals/Certifications

#### USACE's Jurisdictional Determinations

A Jurisdictional Determination for this project was obtained from the USACE on July 31, 2013. See Letter below:



REPLY TO  
ATTENTION OF

DEPARTMENT OF THE ARMY  
CHARLESTON DISTRICT, CORPS OF ENGINEERS  
83A HAGOOD AVENUE  
CHARLESTON, SOUTH CAROLINA 29403-6107

July 31, 2013

Regulatory Division

RECEIVED

AUG 8 2013

Mr. Sean Connolly, Permitting Division Manager  
South Carolina Department of Transportation  
P.O. Box 191, 955 Park Street  
Columbia, South Carolina 29202-0191

Environmental Management  
SCDOT

Dear Mr. Connolly:

*PIN: 33312*

This is in response to Mulkey Engineers & Consultants letter dated June 19, 2012, and SCDOT's letter dated April 12, 2013, requesting a wetland determination, for South Carolina Department of Transportation, for a 112 acre area, located on SC-557 across Crowders Creek in York County, South Carolina. This request is a revision to the Corps Jurisdictional Determination dated July 15, 2010, due to a change in the project boundary area. The revised project area is depicted on the enclosed Figures 2, 4, 4a, & 4b labeled "Project Study Area/Jurisdictional Features, SC-557 Improvement Project, York County South Carolina" and were received by this office in the April 12, 2013 Jurisdictional Determination request from your office. Copies of these sketches are attached to this letter.

You have requested that this office delineate the wetlands or other waters of the United States within the regulatory authority of this office. Based on a review of aerial photography, topographic maps, National Wetland Inventory maps and soil survey, the information you supplied, and the Corps site view (October 23, 2012), it has been concluded that the boundaries shown on the referenced sketch are a reasonable approximation of the location and boundaries of the wetlands found on this site. The property in question contains a total of approximately 1.23 acres of federally defined freshwater wetlands (three separate wetland areas), 0.83 acres of a jurisdictional impoundment, and a total of approximately 2391.4 linear feet of waters of the United States (five separate tributaries) subject to the jurisdiction of this office. However, you are cautioned that this delineation is approximate, subject to change, and should be used for planning purposes only. This office should be contacted prior to performing any work in or around these approximated wetlands or other waters of the United States. In order for a more accurate delineation to be provided, these areas should be located and marked on-site, and surveyed and platted on a map (in order for the wetland line to be reproduced in the future based solely on the platted map). Upon receipt of such a plat, this office can then issue a letter verifying the accuracy of the actual jurisdictional boundaries. You should also be aware that the areas identified as wetlands or other waters of the United States may be subject to restrictions or requirements of other state or local government entities.

Please note that the actual boundary of wetlands is approximate and, therefore, is subject to change and not appealable; however, the determination of jurisdiction over these wetlands is final and this approved jurisdictional determination is an appealable action under the Corps of Engineers administrative appeal procedures defined at 33 CFR 331. The administrative appeal options, process and appeals request form is attached for your convenience and use. If a

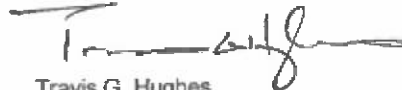
permit application is forthcoming as a result of this delineation, a copy of this letter, as well as the verified sketch should be submitted as part of the application. Otherwise, a delay could occur in confirming that a delineation was performed for the permit project area.

Please be advised that this determination is valid for five (5) years from the date of this letter unless new information warrants revision of the delineation before the expiration date. All actions concerning this determination must be complete within this time frame, or an additional determination and delineation must be conducted. **Due to this request for revision (project boundary area change), this Jurisdictional Determination will supersede the Jurisdictional Determinations that this office issued on March 5, 2008 and July 15, 2010 for this same project.**

In future correspondence concerning this matter, please refer to SAC 2007-02400-DJS. 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, Office of Ocean and Coastal Resource Management. A copy of this letter is being forwarded to them for their information.

If you have any questions concerning this matter, please contact Stephen Brumagin at 803-253-3445.

Respectfully,



Travis G. Hughes  
Chief, Special Projects Branch

Enclosures:  
Delineation sketches  
Approved Jurisdictional Determination Forms  
Notification of Appeal Options

Copy Furnished:

Mr. Mark Mickley  
Mulkey Engineers & Consultants  
6750 Tryon Road,  
Cary, North Carolina 27518

### USACE's Section 404 Permits

Section 404 of the Clean Water Act regulates the discharge of dredged, excavated, or fill material in wetlands, streams, rivers, and other U.S. waters. The U.S. Army Corps of Engineers is the federal agency authorized to issue Section 404 Permits for certain activities conducted in wetlands or other U.S. waters.

A Section 404 permit (SAC-2007-02400) was applied for and approved by the USACE. See letter below:



DEPARTMENT OF THE ARMY  
U.S. ARMY CORPS OF ENGINEERS, CHARLESTON DISTRICT  
69A HAGOOD AVENUE  
CHARLESTON, SC 29403-6107

October 21, 2022

Regulatory Division

Mr. Patrick Hamilton  
Pennies for Progress, York County  
6 South Congress Street  
York, South Carolina 29745  
Patrick.Hamilton@yorkcountygov.com

Dear Mr. Hamilton:

This is in response to a Pre-Construction Notification (PCN) (SAC-2007-02400) received on March 3, 2022, and considered complete on March 31, 2022. In submitting the PCN, you requested verification the proposed project is authorized by a Department of the Army (DA) Nationwide Permit (NWP).

The work affecting waters of the United States is part of an overall project known as SC 557 - Roadway Improvement Project, to discharge fill material in waters of the U.S. to create the proper grade and elevation to widen an existing two-lane roadway to a five-lane roadway. The activities in waters of the United States include placement of roadway fill, construction of 7' x 8' box culvert and bank stabilization. The project involves impacts to not more than 0.569 acre of waters of the United States. Specifically, this letter authorizes impacts to 0.302 acre of wetlands, 105 linear feet (0.011 acre) of tributaries, and 0.133 acre of other waters in the western permit area, and impacts to 0.079 acre of wetlands and 244 linear feet (0.044 acre) of tributaries in the eastern permit area. The project is located on Crowders Creek, its tributaries, an impoundment, and adjacent wetlands beginning on SC 557 approximately 1,600 feet west of Kingsbury Road (S-152) and continuing west approximately 2.4 miles to a point 2,000 feet west of SC 49, in York County, South Carolina (Latitude: 35.1211 °, Longitude: -81.1126 °). The PCN also includes the following supplemental information:

- a. Drawing sheets 1-19 of 19 titled "SC 557 – Roadway Improvement Project" and dated April 6, 2019.
- b. A mitigation plan/statement dated December 9, 2019 and last revised March 30, 2022.
- c. A delineation of wetlands, other special aquatic sites, and other waters (SAC-2007-02400, verified by letter dated July 31, 2013).

Based on a review of the PCN, including the supplemental information indicated above, the Corps has determined the proposed activity will result in minimal individual

and cumulative adverse environmental effects and is not contrary to the public interest. Furthermore, the activity meets the terms and conditions of NWP 14 Linear Transportation Projects.

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

- a. That impacts to aquatic areas do not exceed those specified in the above mentioned PCN, including any supplemental information or revised permit drawings that were submitted to the Corps by the permittee.
- b. That the construction, use, and maintenance of the authorized activity is in accordance with the information given in the PCN, including the supplemental information listed above, and is subject to any conditions or restrictions imposed by this letter.
- c. That the permittee shall submit the attached signed compliance certification to the Corps within 30 days following completion of the authorized work.
- d. The permittee recognizes that their commitment to perform and implement the following conditions was a deciding factor in the favorable and timely decision on this permit and recognizes that a failure on their part to both actively pursue and implement these conditions may be grounds for modification, suspension or revocation of this Department of the Army authorization:
  1. That as compensatory mitigation for impacts to aquatic resources, the permittee agrees to purchase or debit a total of 4.06 wetland credits from Congaree Creek Mitigation Bank and 1,215.7 stream credits from Sandy Fork Mitigation Bank. At least one half of the required credits 2.03 wetland credits and 607.85 stream credits must be restoration/non-buffer enhancement credits. In addition, no more than one half of the required mitigation credits 2.03 wetland credits and 607.85 stream credits may be preservation credits.
  2. That in order to fulfill your responsibility to complete the required compensatory mitigation as set forth in Special Condition d.1, the permittee must submit evidence of the purchase or debit of the required mitigation credits to both the Corps of Engineers and SCDHEC prior to commencement of the authorized work.

- e. That the permittee shall use only clean fill material obtained from an upland source.
- f. That the permittee shall incorporate Best Management Practices (BMPs) during construction to protect adjacent wetlands and Waters of the United States from sediment and erosion during construction. BMPs to be utilized, independently or in combination, may include but are not limited to; erosion control matting, mulch, silt fences, sediment tubes, and other devices. BMPs shall be maintained until the fill material is stabilized.
- g. In order to ensure there are no adverse impacts to aquatic resources, the permittee shall utilize the following during construction sequencing:
  - 1. Construct and stabilize the new channel in the upland area as designated on permitted plan sheets 8-11 of 19, prior to re-directing flow into the newly constructed channel. Once flow is established within the stabilized, reconstructed channel, the commencement of placement of fill in the abandoned segment of the unnamed tributary to Crowders Creek may occur.
  - 2. 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.
  - 3. The permittee must notify the Corps immediately if there are any additional adverse impacts to the waters of the U.S. resulting from the relocation of the unnamed tributary to Crowders Creek. Corrective measures may be required to stabilize and/or restore affected areas.
- h. Prior to beginning the authorized work, the permittee must coordinate with the local NFIP flood plain manager and comply with FEMA requirements. A list of NFIP floodplain managers may be found at:  
<https://www.dnr.sc.gov/water/flood/index.html>.

This verification is valid until March 14, 2026, unless the district engineer modifies, suspends, or revokes the NWP authorization in accordance with 33 CFR 330.5(d). If prior to this date, the NWP authorization is reissued without modification or the activity complies with any subsequent modification of the NWP authorization, the verification

continues to remain valid until March 14, 2026. If you commence, or are under contract to commence this activity before the NWP expires, or the NWP is modified, suspended, or revoked by the Chief of Engineers or division engineer in accordance with 33 CFR 330.5(b) or (c), respectively, in such a way that the activity would no longer comply with the terms and conditions of the NWP, you will have 12 months after the date the NWP expires or is modified, suspended, or revoked, to complete the activity under the present terms and conditions of this NWP.

This NWP is verified based on information you provided. It is your responsibility to read the attached NWP(s) along with the General, Regional, and Special Conditions before you begin work. If you determine your project will not be able to meet the NWP and the conditions, you must contact the Corps before you proceed. Enclosed you will also find a copy of the Section 401 Water Quality Certification special conditions, which are conditions of your authorization under Nationwide Permit NWP 14 Linear Transportation Projects. If you have questions concerning compliance with the conditions of the 401 certification, you should contact the South Carolina Department of Health and Environmental Control (SCDHEC).

In all future correspondence, please refer to file number SAC-2007-02400. A copy of this letter is forwarded to State and/or Federal agencies for their information. If you have any questions, please contact me at (803) 833-4459, or by email at [Amy.e.Cappellino@usace.army.mil](mailto:Amy.e.Cappellino@usace.army.mil).

Sincerely,



Amy Cappellino  
Project Manager

**Attachments**

Permit Drawings  
NWP 14 Linear Transportation Projects  
Nationwide Permit General Conditions  
Nationwide Permit Regional Conditions  
401 Water Quality Certification  
Compliance Certification Form

4

**Copies Furnished:**

Ms. Jennifer Harrod  
NV5 Engineers and Consultants, Inc.  
3300 Regency Parkway  
Cary, North Carolina 27518  
[Jennifer.Harrod@NV5.com](mailto:Jennifer.Harrod@NV5.com)

SC DHEC - Bureau of Water  
2600 Bull Street  
Columbia, South Carolina 29201  
[WQCWetlands@dhec.sc.gov](mailto:WQCWetlands@dhec.sc.gov)

### SC DHEC 401 Water Quality Certification

All activities requiring a Federal 404 permit (a U.S. Army Corps of Engineers permit for the discharge of dredged or fill material) result in a discharge to waters or wetlands, so SCDHEC must take certification action on all 404 permit applications. U.S. Coast Guard Permits and Federal Energy Regulatory Commission Permits also require states to take Water Quality Certification action.

A 401 Water Quality Certification (SAC-2007-02400) was applied for and approved by the USACE. See letter below: Finalization of the 401 Water Quality Certification was based on Wetland Mitigation Credits (2.03 Wetland Preservation Credits for \$81,238) purchased from Congaree Mitigation Bank on February 18, 2020.





September 19, 2022

Mr. Patrick Hamilton  
York County  
6 South Congress Street  
York, South Carolina 29745  
Patrick.Hamilton@yorkcountygov.com

Re: 401 Certification for Authorization Pursuant to Nationwide Permit 14 (Linear Transportation Projects)

Applicant Permit ID No.: SAC 2007-02400

Applicant: York

County: York

Project: SC 557 – Roadway Improvement

Dear Mr. Hamilton:

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

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

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

SC Department of Health and Environmental Control  
2600 Bull Street, Columbia, SC 29201 (803) 896-3432 www.scdhec.gov

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

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

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

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

Sincerely,

*Morgan Amedee*

Morgan D. Amedee  
Water Quality Certification and Wetlands Section

cc: USACE Greenville Field Office  
Ms. Jennifer Harrod

## SC Navigable Waters

Since the SC 557 Widening project includes replacement of the existing bridge over Crowders Creek with a new bridge on new alignment, a SC Navigable Water Permit was obtained (SC GP-2009-001 20-004) from SCDHEC, and reissued on 3/10/2022.

**From:** Wenerick, William "Rusty" <WENERIWR@dhec.sc.gov>  
**Sent:** Thursday, March 10, 2022 9:52 AM  
**To:** Jennifer Harrod; Amedee, Morgan D.; Cappellino, Amy E CIV USARMY CESAC (USA)  
**Cc:** SAC.RD.Columbia@usace.army.mil; Heather Wallace; Steve Drum  
**Subject:** Re: SAC-2007-02400 SC 557 - Roadway Improvement Project NWP - Reissuance under 2021 cycle NWP 14

Dear Ms. Harrod,

Thank you for providing the additional requested information. DHEC hereby grants your extension request for the Permit for Construction in Navigable Waters authorization. The extension will be for an additional three years. The new construct by date is now February 10, 2026. Please print this email and attach it to the original authorization and it will serve as an amendment. No hard copy will be mailed.

Please continue to coordinate with my colleague, Morgan Amedee, regarding the 401 WQC.

Respectfully,  
William R. "Rusty" Wenerick  
Project Manager  
S.C. Dept. of Health & Environmental Control  
Office: (803) 898-4266  
Fax: (803) 898-7344  
Connect: [www.scdhec.gov](http://www.scdhec.gov) [Facebook](#) [LinkedIn](#)



---

**From:** Jennifer Harrod <Jennifer.Harrod@nv5.com>  
**Sent:** Thursday, March 10, 2022 9:32 AM  
**To:** Wenerick, William "Rusty" <WENERIWR@dhec.sc.gov>; Amedee, Morgan D. <amedeesmd@dhec.sc.gov>; Cappellino, Amy E CIV USARMY CESAC (USA) <Amy.e.Cappellino@usace.army.mil>  
**Cc:** SAC.RD.Columbia@usace.army.mil <SAC.RD.Columbia@usace.army.mil>; Heather Wallace <Heather.Wallace@nv5.com>; Steve Drum <Steve.Drum@nv5.com>  
**Subject:** RE: SAC-2007-02400 SC 557 - Roadway Improvement Project NWP - Reissuance under 2021 cycle NWP 14

\*\*\* Caution. This is an EXTERNAL email. DO NOT open attachments or click links from unknown senders or unexpected email. \*\*\*

Good Morning Mr. Wenerick,  
Thank you for your timely response, please find the additional requested information below. Please let me know if additional information is needed.

Since the original permit was issued, the project has undergone roadway design and review which has resulted in the delay of moving to construction. Construction is not under way or is not yet under contract for this project. Therefore, an extension of the "construct by date" is requested. Slight changes in drainage design, such as slight shifts or orientation in the outfall, at some locations, has occurred during roadway design; drainage sheets have been submitted as part of this request. However, there are no changes to the construction limits or impacts to jurisdictional features since the original issuance of the NWP 14 on January 30, 2020, which utilized the April 6, 2019 permit drawings. No changes have occurred to the size or length of pipes/culverts for jurisdictional features nor were there changes to the stormwater management plan during the design revision, therefore a NWP 14 is still applicable. The revised joint application reports impact

calculations actually used in the processing of the current issued permits for the project, which are the same for the requested reissuance/extension. During the initial permit review, by Les Parker of USACE, it was determined that the original impact amount of impact number S-5 should be reduced from 241 linear feet to 226 linear feet. This change was not incorporated into a revised joint application until now. Therefore, the revised joint application submitted as part of this request has updated impact lengths for impact number S-5 to reflect 226 linear feet. Additionally, item 42 of the joint application, has now been updated to include the issued permits that were not applicable at the time of the initial permit request. Therefore, the following information was provided for item 42: SAC-2007-02400 issued January 20, 2020; 401 Certificate of Authorization issued February 5, 2020; Navigable Waters Permit issued February 10, 2020. All other project specific information remains the same.

Kind Regards,

Jennifer Harrod | Environmental Services Project Manager | NVS  
3300 Regency Parkway, Suite 100 | Cary, NC 27518  
C: 336.508.0050  
[Jennifer.Harrod@NVS.com](mailto:Jennifer.Harrod@NVS.com)

[Electronic Communications Disclaimer](#)

**From:** Wenerick, William "Rusty" <WENERIWR@dhec.sc.gov>  
**Sent:** Tuesday, March 08, 2022 12:38 PM  
**To:** Jennifer Harrod <Jennifer.Harrod@nv5.com>; Amedee, Morgan D. <amedeemd@dhec.sc.gov>; Cappellino, Amy E CIV USARMY CESAC (USA) <Amy.e.Cappellino@usace.army.mil>  
**Cc:** SAC.RD.Columbia@usace.army.mil; Heather Wallace <Heather.Wallace@nv5.com>; Steve Drum <Steve.Drum@nv5.com>  
**Subject:** Re: SAC-2007-02400 SC 557 - Roadway Improvement Project NWP - Reissuance under 2021 cycle NWP 14

Dear Ms. Harrod,

Thank you for providing a copy of the DHEC authorization letter for construction in navigable waters. Per R. 19-450.A.4, Extensions of time may be granted provided that the requests are submitted to the Department in writing prior to the expiration of the original time period (an email is satisfactory and it is well before the expiration date), and states whether there has been any change in the circumstances since the permit was approved (including relevant conditions at the construction site) and the reason for the extension of time.

Please provide more detail regarding the underlined information. Will you please briefly explain this in narrative form, including what information changed in the revised joint application and what changed in the current roadway plans compared to what was previously authorized?

Regarding the 401, I have included my colleague Morgan Amedee, who does the initial processing of 401 requests for NWPs for the DHEC WQC & Wetlands Program so she can respond regarding this portion of your request.

Respectfully,

William R. "Rusty" Wenerick  
Project Manager  
S.C. Dept. of Health & Environmental Control  
Office: (803) 898-4266  
Fax: (803) 898-7344  
Connect: [www.scdhec.gov](http://www.scdhec.gov) [Facebook](#) [LinkedIn](#)

## Jurisdictional Floodplain Management Certifications

A No-Rise Certification and associated Flood Study of the SC 557 bridge over Crowders Creek was obtained and approved by the York County Floodplain Administrator. See documentation and signed certification below:



Planning & Development Services  
18 W. Liberty Street  
York, SC 29745  
(803) 909-7200 Residential  
(803) 909-7238 Commercial  
(803) 909-7227 Fax  
[www.yorkcountygov.com](http://www.yorkcountygov.com)

### Letter of Notification for Plan Review

Review of: **SC 557 Widening & Bridge Replacement- Digital** Status: **Approved**  
**Floodplain Modifications**  
Digital

To: David Bocker  
NV5  
448 Lakeshore Parkway  
704-506-4342  
[david.bocker@nv5.com](mailto:david.bocker@nv5.com)

Project: 20200906  
SC 557 Widening & Bridge Replacem  
SC 557  
SC 557 Roadway Widening &  
Bridge Replacement over  
Crowders Creek

We have completed our review of the plan identified above. The plan was approved per attached comments, if any. This letter is not to be construed as a zoning compliance, grading, or building permit, certificate of occupancy, or a substitute for any permit or certificate required by any state or federal government entity.

For approved commercial site plans, once the owner/developer has received NPDES approval (if applicable) for the project (this is issued by SCDHEC and can take up to 14 days from the date the project is approved by York County), you may contact the Environmental Compliance Office (Stormwater) at (803) 809-7157 to schedule the pre-construction meeting. This meeting will occur on-site with county staff members, the financially responsible person, site engineer, and the contractor (who must be licensed in South Carolina through the SC Labor Licensing Board). Your preliminary grading permit and zoning compliance will be issued at the pre-construction meeting. Once this meeting has occurred, building permits can be applied for.

**\*Note for online users\***

Building plans submitted online do not require paper copies to be submitted upon approval of the plans. Approved plans can be viewed and/or printed at <https://enviropublic.yorkcountygov.com/> under applicant login.

All other online plan submittals will need to submit 7 complete sets of paper copies for stamping purposes.

Sincerely,

Bea McCarter  
Development Coordinator  
803-909-7238

4/14/2020

Page 1 of 2

### Review Comments

The following comments are grouped as "Review Comments" or "Advisory Comments". "Review Comments" are items related to your plan review that require action on your part. "Advisory Comments" are informational notes that may be important in the future and are for your information.

Floodplain - Tammy Marain - [tammy.marain@yorkcountygov.com](mailto:tammy.marain@yorkcountygov.com)

Approved

#### Review Comments:

If any changes are made to the current proposed plan that will directly or indirectly change regulatory floodplain boundaries/levels/velocities, you must resubmit for approval of the revisions before proceeding. A copy of the plan has been added to this submittal.

---

South Carolina Department of Transportation

**ENGINEERING "NO-RISE" CERTIFICATION**

This document is to certify that I am duly qualified engineer licensed to practice in the State of  
South Carolina . It is to further certify that the attached technical data supports  
*(State)*  
the fact that proposed SC 557 Bridge over Crowders Creek will not increase the 100-year  
*(Name of Development)*  
flood elevations on Crowders Creek at published  
*(Name of Stream)*  
cross sections in the Flood Insurance Study for, York County , dated September 26, 2008  
*(Name of community)* *(Date)*  
in the vicinity of the proposed development.



SEAL, SIGNATURE AND DATE

David P. Bocker, P.E.  
*Name*  
Water Resources Group Manager  
*Title*  
NVS Engineers & Consultants  
7500 E. Independence Blvd., Suite 100  
Charlotte, NC 27227  
*Address*

**FOR COMMUNITY USE ONLY:**

Community Approval

Approved       Disapproved

Tammy Marain, CFM      [Signature]      Environmental Compliance Manager  
Community Official's Name      Community Official's Signature      Title

FEMA, MT

## Appendix D

Engineering Reports

### Hydrologic Analysis

Each hydrologic analysis was performed in a manner consistent with SC Regulations 72-300 and the SC DHEC Stormwater Management BMP Handbook. Each analysis, at a minimum, meets the following requirements or guidelines:

- Analysis Points (Outfalls, where stormwater runoff drains from/off public R/W) for comparing runoff rates and the total drainage area were analyzed in the pre- to post-development conditions;
- Post-development runoff peak discharges for the 10-yr, 25-yr, and 100-yr storm events are less than Pre-Development peak discharges at critical outfalls (some outfalls directly drain to drainways and major creeks and thus increases are deemed negligible); and
- Each analysis was performed using a SCS 24-hour storm event.

Results show flow rate increases at Outfalls #1, #2, #3, #7, #8, #9, #11, #13, and #14. However, these increases will have no significant adverse impact on the receiving natural waterway or downstream properties. Outfalls #1, #2, and #11 have less than a 10% increase in flow rates; changes in velocities and flow depths were negligible and no significant adverse impacts are anticipated. Outfalls #3 and #13 drain to defined drainways/channels that flow through undeveloped areas to Crowders Creek and Mill Creek, respectively. Outfalls #7, #8, and #9 are proposed lateral ditches that drain directly to Crowders Creek at the proposed bridge location. Outfall #14 is an existing roadside grassed ditch that drains to Beaverdam Creek within SCDOT R/W. Detailed analysis showing pre-condition and post-condition outfall velocities and flow depths can be found in the detailed Outfall Analysis calculations within the "Outfall Analysis" section of the SC 557 Hydraulic and Erosion Control Calculations Package, pages 154 thru 188 of 389.

### Detention Analysis

Since this is a linear transportation project for York County and administered by SCDOT; no detention facilities have been proposed.

### Detention Waiver Request

Based on discussion above, field review, and calculations/analysis provided, the proposed SC 557 Widening project will have no significant adverse impact on the receiving natural waterway or downstream properties. Therefore, a detention waiver is requested for this project.



3/31/2023





September 19, 2022

Mr. Patrick Hamilton  
York County  
6 South Congress Street  
York, South Carolina 29745  
Patrick.Hamilton@yorkcountygov.com

Re: 401 Certification for Authorization Pursuant to Nationwide Permit 14 (Linear Transportation Projects)

Applicant Permit ID No.: SAC 2007-02400

Applicant: York

County: York

Project: SC 557 – Roadway Improvement

Dear Mr. Hamilton:

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

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

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

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

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

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

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

Sincerely,

*Morgan Amedee*

Morgan D. Amedee  
Water Quality Certification and Wetlands Section

cc: USACE Greenville Field Office  
Ms. Jennifer Harrod

**Nationwide Permit Number 14: Linear Transportation Projects**

**Proposed Conditions for the 401 Water Quality Certification:**

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

**From:** [Wenerick, William "Rusty"](#)  
**To:** [Jennifer Harrod](#); [Amedee, Morgan D.](#); [Cappellino, Amy E CIV USARMY CESAC \(USA\)](#)  
**Cc:** [SAC.RD.Columbia@usace.army.mil](#); [Heather Wallace](#); [Steve Drum](#)  
**Subject:** Re: SAC-2007-02400 SC 557 - Roadway Improvement Project NWP - Reissuance under 2021 cycle NWP 14  
**Date:** Thursday, March 10, 2022 9:52:38 AM  
**Attachments:** [image001.png](#)  
[Outlook-1469104240.png](#)

---

Dear Ms. Harrod,

Thank you for providing the additional requested information. DHEC hereby grants your extension request for the Permit for Construction in Navigable Waters authorization. The extension will be for an additional three years. The new construct by date is now February 10, 2026. Please print this email and attach it to the original authorization and it will serve as an amendment. No hard copy will be mailed.

Please continue to coordinate with my colleague, Morgan Amedee, regarding the 401 WQC.

Respectfully,

**William R. "Rusty" Wenerick**

Project Manager

**S.C. Dept. of Health & Environmental Control**

Office: (803) 898-4266

Fax: (803) 898-7344

Connect: [www.scdhec.gov](http://www.scdhec.gov) [Facebook](#) [LinkedIn](#)



---

**From:** Jennifer Harrod <Jennifer.Harrod@nv5.com>  
**Sent:** Thursday, March 10, 2022 9:32 AM  
**To:** Wenerick, William "Rusty" <WENERIWR@dhec.sc.gov>; Amedee, Morgan D. <amedeemd@dhec.sc.gov>; Cappellino, Amy E CIV USARMY CESAC (USA) <Amy.e.Cappellino@usace.army.mil>  
**Cc:** SAC.RD.Columbia@usace.army.mil <SAC.RD.Columbia@usace.army.mil>; Heather Wallace <Heather.Wallace@nv5.com>; Steve Drum <Steve.Drum@nv5.com>  
**Subject:** RE: SAC-2007-02400 SC 557 - Roadway Improvement Project NWP - Reissuance under 2021 cycle NWP 14

**\*\*\* Caution. This is an EXTERNAL email. DO NOT open attachments or click links from unknown senders or unexpected email. \*\*\***

Good Morning Mr. Wenerick,

Thank you for your timely response, please find the additional requested information below. Please let me know if additional information is needed.

Since the original permit was issued, the project has undergone roadway design and review which has resulted in the delay of moving to construction. Construction is not under way or is not yet under contract for this project. Therefore, an extension of the "construct by date" is requested. Slight changes in drainage design, such as slight shifts or orientation in the outfall, at some locations,

has occurred during roadway design; drainage sheets have been submitted as part of this request. However, there are no changes to the construction limits or impacts to jurisdictional features since the original issuance of the NWP 14 on January 30, 2020, which utilized the April 6, 2019 permit drawings. No changes have occurred to the size or length of pipes/culverts for jurisdictional features nor were there changes to the stormwater management plan during the design revision, therefore a NWP 14 is still applicable. The revised joint application reports impact calculations actually used in the processing of the current issued permits for the project, which are the same for the requested reissuance/extension. During the initial permit review, by Les Parker of USACE, it was determined that the original impact amount of impact number S-5 should be reduced from 241 linear feet to 226 linear feet. This change was not incorporated into a revised joint application until now. Therefore, the revised joint application submitted as part of this request has updated impact lengths for impact number S-5 to reflect 226 linear feet. Additionally, item 42 of the joint application, has now been updated to include the issued permits that were not applicable at the time of the initial permit request. Therefore, the following information was provided for item 42: SAC-2007-02400 issued January 20, 2020; 401 Certificate of Authorization issued February 5, 2020; Navigable Waters Permit issued February 10, 2020. All other project specific information remains the same.

Kind Regards,

**Jennifer Harrod** | Environmental Services Project Manager | [NV5](#)  
3300 Regency Parkway, Suite 100 | Cary, NC 27518  
C: 336.508.0050  
[Jennifer.Harrod@NV5.com](mailto:Jennifer.Harrod@NV5.com)

[Electronic Communications Disclaimer](#)

---

**From:** Wenerick, William "Rusty" <WENERIWR@dhec.sc.gov>  
**Sent:** Tuesday, March 08, 2022 12:38 PM  
**To:** Jennifer Harrod <Jennifer.Harrod@nv5.com>; Amedee, Morgan D. <amedeemd@dhec.sc.gov>; Cappellino, Amy E CIV USARMY CESAC (USA) <Amy.e.Cappellino@usace.army.mil>  
**Cc:** SAC.RD.Columbia@usace.army.mil; Heather Wallace <Heather.Wallace@nv5.com>; Steve Drum <Steve.Drum@nv5.com>  
**Subject:** Re: SAC-2007-02400 SC 557 - Roadway Improvement Project NWP - Reissuance under 2021 cycle NWP 14

Dear Ms. Harrod,

Thank you for providing a copy of the DHEC authorization letter for construction in navigable waters. Per R. 19-450.A.4, Extensions of time may be granted provided that the requests are submitted to the Department in writing prior to the expiration of the original time period (an email is satisfactory and it is well before the expiration date), and states whether there has been any change in the circumstances since the permit was approved (including relevant conditions at the construction site) and the reason for the extension of time.

Please provide more detail regarding the underlined information. Will you please briefly explain this in narrative form, including what information changed in the revised joint application and what changed in the current roadway plans compared to what was previously authorized?

Regarding the 401, I have included my colleague Morgan Amedee, who does the initial processing of 401 requests for NWP for the DHEC WQC & Wetlands Program so she can respond regarding this portion of your request.

Respectfully,

**William R. "Rusty" Wenerick**  
Project Manager  
**S.C. Dept. of Health & Environmental Control**  
Office: (803) 898-4266  
Fax: (803) 898-7344  
Connect: [www.scdhec.gov](http://www.scdhec.gov) [Facebook](#) [LinkedIn](#)



---

**From:** Jennifer Harrod <[Jennifer.Harrod@nv5.com](mailto:Jennifer.Harrod@nv5.com)>  
**Sent:** Tuesday, March 1, 2022 4:58 PM  
**To:** Cappellino, Amy E CIV USARMY CESAC (USA) <[Amy.e.Cappellino@usace.army.mil](mailto:Amy.e.Cappellino@usace.army.mil)>; Wenerick, William "Rusty" <[WENERIWR@dhec.sc.gov](mailto:WENERIWR@dhec.sc.gov)>; Amedee, Morgan D. <[amedeemd@dhec.sc.gov](mailto:amedeemd@dhec.sc.gov)>  
**Cc:** [SAC.RD.Columbia@usace.army.mil](mailto:SAC.RD.Columbia@usace.army.mil) <[SAC.RD.Columbia@usace.army.mil](mailto:SAC.RD.Columbia@usace.army.mil)>; Heather Wallace <[Heather.Wallace@nv5.com](mailto:Heather.Wallace@nv5.com)>; Steve Drum <[Steve.Drum@nv5.com](mailto:Steve.Drum@nv5.com)>  
**Subject:** SAC-2007-02400 SC 557 - Roadway Improvement Project NWP - Reissuance under 2021 cycle NWP 14

**\*\*\* Caution. This is an EXTERNAL email. DO NOT open attachments or click links from unknown senders or unexpected email. \*\*\***

Good afternoon Ms. Cappellino,

I would like to request that the project described above be reissued under the 2021 cycle NWP 14. Since the original permit was issued, the project has undergone roadway design and review. No changes to the construction limits or the jurisdictional features occurred during the design revision. Please find supporting documents along with a revised Joint Application at the ShareFile link: <https://calyx.sharefile.com/d-s9b5f0ef4cb4244a081fc945bbe06efee>

Additionally, this email submittal also serves as a request that the project's 401 Certificate of Authorization be reissued and an extension to the "construct by date" for the Navigable Waters Permit be granted. Please find the original Navigable Waters Permit here: <https://calyx.sharefile.com/d-sd3eb2dd01db64d66872a437cd50a4d11>

Please let me know if you have any questions or require any additional information.

Kind Regards,

**Jennifer Harrod** | Environmental Services Project Manager | [NV5](#)

3300 Regency Parkway, Suite 100 | Cary, NC 27518

C: 336.508.0050

[Jennifer.Harrod@NV5.com](mailto:Jennifer.Harrod@NV5.com)

[Electronic Communications Disclaimer](#)



February 10, 2020

Patrick Hamilton  
York County  
6 South Congress Street  
York, South Carolina 29745

Re: Authorization to Construct Under the General Permit, SC GP-2009-001 in accordance with Permits for Construction in Navigable Waters, R.19-450, *et. seq.*, 1976 Code of Laws and Coastal Zone Management Program (48-39-10 *et. seq.*, and 15 CFR 93)

Certificate Number: SC GP-2009-001 20-004

Construction Project: SC 557-Roadway Improvement

Construction must be completed by February 10, 2023

County: York

Dear Mr. Hamilton,

The Department of Health and Environmental Control (DHEC) is in receipt of your application for a permit to discharge fill material in water of the U.S to create the proper grade and elevation to widen an existing two-lane roadway to a five-lane roadway authorized under the US Army Corp of Engineers Nationwide Permit #14 located on Crowders Creek, its tributaries, an impoundment and adjacent wetlands, beginning on SC 557 approximately 1,600 feet west of Kingsburry Road (S-152) and continuing west approximately 2.4 miles to a point 2,000 feet west of SC 49 in, York County, South Carolina. The project involves impacts to not more than 0.569 acre of Waters of the US.

After reviewing the application, the Department finds that the construction project, as proposed, is consistent with the R. 19-450 and be advised that General Permit SC GP-2009-001 has been issued, copy enclosed, which conveys State authorization for the project as proposed. Construction must be completed by **February 10, 2023**.



Prior to beginning the authorized work all appropriate state, federal, or local permits and/or authorizations (i.e. U.S. Army Corps of Engineers) must be obtained. Please note that for this authorization to remain valid, the project must be constructed as proposed and comply with all terms and conditions listed in the enclosed permit. Also note that authorization to construct under this general permit shall not be deemed to be in derogation of any property rights or interests of persons or entities other than yours with respect to (a) property upon which the permitted activity is situated, or (b) property affected by the permitted activity.

Should you have questions, please contact Morgan Amedee, at (803) 898-4179 or by e-mail at [amedeemd@dhec.sc.gov](mailto:amedeemd@dhec.sc.gov). When corresponding about this authorization, please refer to the certificate number: SC GP-2009-001 20-004.

Sincerely,

A handwritten signature in black ink, appearing to read 'Chuck Hightower', written over a horizontal line.

Chuck Hightower, Manager  
Water Quality Certification and  
Wetlands Section

cc:

USACE- Columbia Regulatory Office  
SCDHEC  
Jennifer Harrod



South Carolina Department of Health and Environmental Control

# Permit for Construction in Navigable Waters

in Accordance with R. 19-450 et. seq., 1976 S.C. Code of Laws

PERMITTEE: **The General Public**

PERMIT NUMBER: **SC GP 2009-001 (Revised)**

DESCRIPTION OF WORK: The proposed activity is to authorize, subject to the general and special conditions contained herein, activities that are subject to permitting by the US Army Corps of Engineer (Corps) and qualify for nationwide permits (NWP) issued by the Corps where such activities have been certified by the Department in accordance with Section 401 of the Clean Water Act and are in accordance with all conditions pursuant to that certification. Some NWP contained herein are subject to Section 10 navigable waters only and the 401 Certification is not applicable.

DATE PERMIT ISSUED: April 13, 2016

CONSTRUCTION MUST BE COMPLETED BY: April 13, 2021

We have reviewed plans for this project and determined that there is a reasonable assurance that the proposed project will be conducted in a manner consistent with the permitting requirements of R. 19-450 et. seq., 1976 S.C. Code of Laws. The SC Department of Health and Environmental Control has also determined that this work is consistent with the Coastal Zone Management Program (48-39-10 et. seq.).

The permittee must adhere to all terms and conditions of the general permit.

The SC Department of Health and Environmental Control reserves the right to impose additional conditions on this Permit to respond to unforeseen, specific problems that might arise and to take any enforcement action necessary to ensure compliance with State standards.

All activities authorized by this permit remain subject to the requirements of all applicable laws, regulations and ordinances of federal, state, and local governments. The permittee may not conduct or maintain any activities authorized by this permit unless such activities also comply with all other applicable laws, regulations and ordinances of federal, state and local governments.

This permit shall not be deemed to be in derogation of any property rights or interests of persons or entities other than the permittee with respect to (a) property upon which the permitted activity is situated, or (b) property affected by the permitted activity. This permit confers upon the permittee no greater rights than the permittee possessed before issuance of the permit with respect to property rights or interests of third persons or entities.

*Heather Preston*  
Heather Preston, Director  
Division of Water Quality

4/13/16  
Date

General Permit No.: SC GP-2009-001 (Revised)  
Name of Applicant: The General Public  
Effective Date: April 13, 2016  
Expiration Date: April 13, 2021

**South Carolina Department of Health and Environmental Control  
General Permit**

A General Permit to perform work in or affecting the navigable waters of South Carolina, pursuant to regulations and procedures established under R.19-450, *Permits for Construction in Navigable Waters* (et seq., Code of Laws of South Carolina, 1976), as amended, is hereby issued by the South Carolina Department of Health and Environmental Control (the Department) to:

**The General Public**

To authorize, subject to the general and special conditions contained herein, activities that are subject to permitting by the US Army Corps of Engineers (Corps) and qualify for a nationwide permit (NWP) issued by the Corps where such activities have been certified by the Department in accordance with Section 401 of the Clean Water Act and the S. C. Coastal Zone Management Program in the Coastal Zone, excluding the Critical Area, and are in accordance with all conditions pursuant to those certifications. This general permit also authorizes activities that are subject to permitting by the Corps pursuant to a NWP issued in accordance with Section 10 of the Rivers and Harbors Act of 1899 for which a 401 Water Quality Certification is not required.

Special Note: The Corps issues NWPs for activities that have minimal individual and cumulative adverse effects on the aquatic environment. On February 21, 2012 (77 FR 10184), the Corps published a final notice to reissue 48 NWPs, issue two new NWPs and not reissue one NWP.

**NAVIGABLE WATERS IDENTIFIED HEREIN**

**I. Permit Area**

This permit authorizes construction in, on, over, or under all navigable waters of South Carolina, as defined at R.19-450.2.C. This excludes the Critical Area as defined in the S. C. Coastal Zone Management Program.

**II. Authorization to Construct**

**A. Duty to Apply.** In order to be authorized to construct under this permit, an applicant must apply as specified in Part II.A.1 or 2 below.

1. For construction projects in these waters, the applicant may submit to the Department a Permit Application for Construction in Navigable Waters and a copy of the provisional letter provided by the Corps certifying one of the NWP listed in this General Permit. The application form may be obtained by going to the Department's Internet page at: <http://www.scdhec.net/eqc/water/forms/navwtrs.pdf>, or a copy may be obtained by calling the Department at (803) 898-4300. Mail the application to:

Division of Water Quality  
Bureau of Water  
SC DHEC  
2600 Bull Street

2. **Complete Application.** The Department may request additional information to complete the application requirements of Part II.A.1 or 2 of this permit.

**B. Authorization.**

1. **Authorization.** An applicant is authorized to construct under this permit on the date of the Department's letter to the applicant, or the applicant's agent, giving notice of authorization.

2. **Period of Authorization.** An applicant is authorized to construct under this permit for three years after the date of the Department's letter giving notice that the applicant has been authorized to construct under the permit. Construction must be completed within three years of the date of the letter, unless the authorization time is extended as set forth in Part II.B.3 of this permit.

3. **Extension of Authorization Time.** A permittee may extend the authorization time to construct under this permit for up to three years, provided the request is submitted to the Department in writing prior to the expiration of the last authorization period, and prior to [three years from date of issuance], the date this general permit expires. The letter must state whether there has been any change in the circumstances since the last authorization was granted and the reason for the extension of time.

**III. General Conditions**

A. Activities authorized by this General Permit shall be structures or activities that have received provisional approval by the Corps for coverage under a Nationwide Permits and which conform to the general and special conditions pursuant to those permits including any 401 Water Quality Certification and Coastal Zone Consistency Conditions as applicable. Nationwide Permits eligible for authorization under this general permit shall be as follows:

Nationwide Permit Number 1: Aides to Navigation

Nationwide Permit Number 2: Structures in Artificial Canals

Nationwide Permit Number 3: Maintenance

Nationwide Permit Number 4: Fish and Wildlife Harvesting, Enhancement, and Attraction Devices and Activities

Nationwide Permit Number 5: Scientific Measurement devices

Nationwide Permit Number 6: Survey Activities

Nationwide Permit Number 7: Outfall Structures and Associated Intake Structures.

Nationwide Permit Number 9: Structures in Fleeting and Anchorage Areas

Nationwide Permit Number 10: Mooring Buoys

Nationwide Permit Number 11: Temporary Recreational Structures

Nationwide Permit Number 12: Utility Line Activities

Nationwide Permit Number 13: Bank Stabilization

Nationwide Permit Number 14: Linear Transportation Projects

Nationwide Permit Number 15: U.S. Coast Guard Approved Bridges

Nationwide Permit Number 18: Minor Discharges

Nationwide Permit Number 19: Minor Dredging

Nationwide Permit Number 20: Oil Spill Cleanup

Nationwide Permit Number 22: Removal of Vessels

Nationwide Permit Number 25: Structural Discharges

Nationwide Permit Number 27: Aquatic Habitat Restoration, Establishment, and Enhancement Activities

Nationwide Permit Number 28: Modifications of Existing Marinas

Nationwide Permit Number 31: Maintenance of Existing Flood Control Facilities  
Nationwide Permit Number 36: Boat Ramps  
Nationwide Permit Number 37: Emergency Watershed Protection and Rehabilitation  
Nationwide Permit Number 38: Cleanup of Hazardous and Toxic Waste  
Nationwide Permit Number 48: Commercial Shellfish Aquaculture Activities

B. All activities identified and authorized herein shall be consistent with the terms and conditions of this permit; and any variance or activity not specifically identified and authorized herein shall constitute a violation of the terms and conditions of this permit which may result in the modification, suspension, or revocation of this permit, and in the institution of such legal proceedings as the Department may consider appropriate.

C. The permittee must make every reasonable effort to execute the work authorized herein in a manner so as to minimize any adverse impact of the work on fish, wildlife, and natural environmental values or historic or prehistoric values.

D. The permittee must execute the work authorized herein in a manner so as to minimize any degradation of water quality.

E. The permittee shall permit State law enforcement personnel, representatives of the Department, or other authorized State permit inspectors to make periodic inspections at any time deemed necessary in order to assure that the activity being performed under authority of this permit is in accordance with the terms and conditions prescribed herein.

F. This General Permit does not convey any property rights, either in real estate or material, or any exclusive privileges; and it does 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 comply with any applicable standards required by ordinance for the construction of structures authorized herein.

G. This General Permit may be either modified, suspended, or revoked in whole or in part if the Department determines that such action would serve the public interest, and such modification, suspension or revocation shall not be an act entitling the permittee to compensation for any claimed loss as a consequence of such regulatory action, under any circumstances, this permit being issued solely as an accommodation to the permittee, and being revocable as conditions may warrant.

H. A permittee who desires to abandon an authorized structure, or who permits a structure to fall in to a state of disrepair such that it no longer conforms to the conditions of this permit, may be required to remove the structure.

I. There shall be no unreasonable interference with navigation by the existence or use of structures authorized herein.

J. Once the project is initiated, it must be carried to completion in an expeditious manner in order to minimize the period of disturbance to the environment.

K. A permittee, upon receipt of a notice from the Department of failure to comply with the terms, conditions, or standards of this General Permit, shall, within sixty (60) days (unless circumstances require more expeditious action to protect public health, safety, or environment), without expense to the State of South Carolina and in such manner as the agency may direct, effect compliance with terms, conditions, and standards.

L. The Permittee must notify the South Carolina Institute of Archaeology and Anthropology in accordance with South Carolina Underwater Antiquities Act of 1991 (Article 5, Chapter 7, Title 54 Code of Laws of South Carolina, 1976) in the event archaeological or paleontological remains are found during the course of work. Archaeological 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 nonrecent (i.e., older than 100 years) vessel ruins. Paleontological remains consist of old animal remains, original or fossilized, such as teeth, tusks, bone, or entire skeletons.

M. The permittee must notify the South Carolina Department of Archives and History, 8301 Parklane Road, Columbia, South Carolina 29223) if any archaeological materials are encountered during the course of the work. Archaeological materials consists of any items, fifty years or older, which were made or used by man. These items include, but are not limited to stone projectile points (arrowheads), ceramic shards, bricks, worked wood, bone and stone, metal and glass objects, and human skeleton remains. These materials may be present on the ground surface and/or under the surface of the ground.

N. Prior to beginning any land disturbing activity, appropriate erosion control measures, such as silt fences, silt barriers, or other devices must be placed around the construction area and maintained in a functioning capacity until the area is permanently stabilized.

O. Activities in the Critical Areas (as defined in 48-39-10, R 30.1(D) and R 30.10) are not eligible for coverage under this General Permit.

P. At the time the applicant submits its permit application to SCDHEC, SCDHEC shall also submit a copy of the application to S.C Department of Natural Resources (SCDNR). SCDNR shall have fifteen (15) days from the receipt of the application to notify SCDHEC of any relevant special or unique natural resource features or values (such as the presence of endangered species) and any measure needed to avoid impacts to such special features or values or to recommend that the project be elevated to individual permit status.

**IV. Special Conditions:** NWP may contain special conditions specific to the 401 Certification and/or Coastal Zone Consistency Certifications. Adherence to these specific conditions is required for coverage under this General Permit.

**V. Penalties for Violation.** Authorization obtained under this General Permit limits the size, length and use of structures. Any deviation from the specifications or other terms or conditions of the General Permit would constitute a violation of regulations and could result in removal of the structures or work and restoration of the waterway to its former condition and/or imposition of penalties as provided by law.

**VI. Revocation of General Permit.** This General Permit may be withdrawn by issuance of a public notice at any time the Department determines that the singular or 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 this General Permit will be processed as individual permits.

This General Permit shall become effective on the date signed by the Department.

By Authority of the South Carolina Department of Health and Environmental Control

*Shawn Press*  
Signature

4/13/16  
Date

Director, Water Quality Division  
Title



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

October 21, 2022

Regulatory Division

Mr. Patrick Hamilton  
Pennies for Progress, York County  
6 South Congress Street  
York, South Carolina 29745  
Patrick.Hamilton@yorkcountygov.com

Dear Mr. Hamilton:

This is in response to a Pre-Construction Notification (PCN) (SAC-2007-02400) received on March 3, 2022, and considered complete on March 31, 2022. In submitting the PCN, you requested verification the proposed project is authorized by a Department of the Army (DA) Nationwide Permit (NWP).

The work affecting waters of the United States is part of an overall project known as SC 557 - Roadway Improvement Project, to discharge fill material in waters of the U.S. to create the proper grade and elevation to widen an existing two-lane roadway to a five-lane roadway. The activities in waters of the United States include placement of roadway fill, construction of 7' x 8' box culvert and bank stabilization. The project involves impacts to not more than 0.569 acre of waters of the United States. Specifically, this letter authorizes impacts to 0.302 acre of wetlands, 105 linear feet (0.011 acre) of tributaries, and 0.133 acre of other waters in the western permit area, and impacts to 0.079 acre of wetlands and 244 linear feet (0.044 acre) of tributaries in the eastern permit area. The project is located on Crowders Creek, its tributaries, an impoundment, and adjacent wetlands beginning on SC 557 approximately 1,600 feet west of Kingsburry Road (S-152) and continuing west approximately 2.4 miles to a point 2,000 feet west of SC 49, in York County, South Carolina (Latitude: 35.1211 °, Longitude: -81.1126 °). The PCN also includes the following supplemental information:

- a. Drawing sheets 1-19 of 19 titled "SC 557 – Roadway Improvement Project" and dated April 6, 2019.
- b. A mitigation plan/statement dated December 9, 2019 and last revised March 30, 2022.
- c. A delineation of wetlands, other special aquatic sites, and other waters (SAC-2007-02400, verified by letter dated July 31, 2013).

Based on a review of the PCN, including the supplemental information indicated above, the Corps has determined the proposed activity will result in minimal individual



and cumulative adverse environmental effects and is not contrary to the public interest. Furthermore, the activity meets the terms and conditions of NWP 14 Linear Transportation Projects.

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

- a. That impacts to aquatic areas do not exceed those specified in the above mentioned PCN, including any supplemental information or revised permit drawings that were submitted to the Corps by the permittee.**
- b. That the construction, use, and maintenance of the authorized activity is in accordance with the information given in the PCN, including the supplemental information listed above, and is subject to any conditions or restrictions imposed by this letter.**
- c. That the permittee shall submit the attached signed compliance certification to the Corps within 30 days following completion of the authorized work.**
- d. The permittee recognizes that their commitment to perform and implement the following conditions was a deciding factor in the favorable and timely decision on this permit and recognizes that a failure on their part to both actively pursue and implement these conditions may be grounds for modification, suspension or revocation of this Department of the Army authorization:**
  - 1. That as compensatory mitigation for impacts to aquatic resources, the permittee agrees to purchase or debit a total of 4.06 wetland credits from Congaree Creek Mitigation Bank and 1,215.7 stream credits from Sandy Fork Mitigation Bank. At least one half of the required credits 2.03 wetland credits and 607.85 stream credits must be restoration/non-buffer enhancement credits. In addition, no more than one half of the required mitigation credits 2.03 wetland credits and 607.85 stream credits may be preservation credits.**
  - 2. That in order to fulfill your responsibility to complete the required compensatory mitigation as set forth in Special Condition d.1, the permittee must submit evidence of the purchase or debit of the required mitigation credits to both the Corps of Engineers and SCDHEC prior to commencement of the authorized work.**

- e. That the permittee shall use only clean fill material obtained from an upland source.
- f. That the permittee shall incorporate Best Management Practices (BMPs) during construction to protect adjacent wetlands and Waters of the United States from sediment and erosion during construction. BMPs to be utilized, independently or in combination, may include but are not limited to; erosion control matting, mulch, silt fences, sediment tubes, and other devices. BMPs shall be maintained until the fill material is stabilized.
- g. In order to ensure there are no adverse impacts to aquatic resources, the permittee shall utilize the following during construction sequencing:
  - 1. Construct and stabilize the new channel in the upland area as designated on permitted plan sheets 8-11 of 19, prior to re-directing flow into the newly constructed channel. Once flow is established within the stabilized, reconstructed channel, the commencement of placement of fill in the abandoned segment of the unnamed tributary to Crowders Creek may occur.
  - 2. 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.
  - 3. The permittee must notify the Corps immediately if there are any additional adverse impacts to the waters of the U.S. resulting from the relocation of the unnamed tributary to Crowders Creek. Corrective measures may be required to stabilize and/or restore affected areas.
- h. Prior to beginning the authorized work, the permittee must coordinate with the local NFIP flood plain manager and comply with FEMA requirements. A list of NFIP floodplain managers may be found at:  
<https://www.dnr.sc.gov/water/flood/index.html>.

This verification is valid until March 14, 2026, unless the district engineer modifies, suspends, or revokes the NWP authorization in accordance with 33 CFR 330.5(d). If prior to this date, the NWP authorization is reissued without modification or the activity complies with any subsequent modification of the NWP authorization, the verification

continues to remain valid until March 14, 2026. If you commence, or are under contract to commence this activity before the NWP expires, or the NWP is modified, suspended, or revoked by the Chief of Engineers or division engineer in accordance with 33 CFR 330.5(b) or (c), respectively, in such a way that the activity would no longer comply with the terms and conditions of the NWP, you will have 12 months after the date the NWP expires or is modified, suspended, or revoked, to complete the activity under the present terms and conditions of this NWP.

This NWP is verified based on information you provided. It is your responsibility to read the attached NWP(s) along with the General, Regional, and Special Conditions before you begin work. If you determine your project will not be able to meet the NWP and the conditions, you must contact the Corps before you proceed. Enclosed you will also find a copy of the Section 401 Water Quality Certification special conditions, which are conditions of your authorization under Nationwide Permit NWP 14 Linear Transportation Projects. If you have questions concerning compliance with the conditions of the 401 certification, you should contact the South Carolina Department of Health and Environmental Control (SCDHEC).

In all future correspondence, please refer to file number SAC-2007-02400. A copy of this letter is forwarded to State and/or Federal agencies for their information. If you have any questions, please contact me at (803) 833-4459, or by email at [Amy.e.Cappellino@usace.army.mil](mailto:Amy.e.Cappellino@usace.army.mil).

Sincerely,



Amy Cappellino  
Project Manager

#### Attachments

- Permit Drawings
- NWP 14 Linear Transportation Projects
- Nationwide Permit General Conditions
- Nationwide Permit Regional Conditions
- 401 Water Quality Certification
- Compliance Certification Form

Copies Furnished:

Ms. Jennifer Harrod  
NV5 Engineers and Consultants, Inc.  
3300 Regency Parkway  
Cary, North Carolina 27518  
Jennifer.Harrod@NV5.com

SC DHEC - Bureau of Water  
2600 Bull Street  
Columbia, South Carolina 29201  
[WQCWetlands@dhec.sc.gov](mailto:WQCWetlands@dhec.sc.gov)



BRIDGE PLANS BOUND  
UNDER SEPARATE COVER

PROJECT NO.	STATE	COUNTY	PROJECT ID	PROJECT NO.	SHEET NO.	TOTAL SHEETS
3	SC	YORK	0041800	03020-013-11149-009	567	1

SHEET NO.	INDEX OF SHEETS DESCRIPTION	SHEET SUBTOTALS
1	TITLE SHEET (RIGHT-OF-WAY)	1
	TITLE SHEET (CONSTRUCTION)	OMITTED
	SUMMARY OF ESTIMATED QUANTITIES	OMITTED
	MOVING ITEM SHEET	OMITTED
3-30	TYPICAL SECTIONS	5
4	R/W DATA SHEET	1
4A-4B	PROPERTY LAYOUT SHEETS	2
	GENERAL CONSTRUCTION NOTES	OMITTED
5A-5C	REFERENCE SHEETS	3
6-24	PLAN AND PROFILE	19
D1-D10	DRAINAGE PLAN SHEETS	10
	TRAFFIC CONTROL SHEETS	OMITTED
	PAVEMENT MARKING PLANS	OMITTED
	TRAFFIC SIGNAL PLANS	OMITTED
EC1-EC2	EROSION CONTROL SHEET	2
X1 - X24	CROSS SECTIONS MAIN	24
X25 - X111	CROSS SECTIONS SIDE ROAD	27
X112 - X118	DRIVEWAY PROFILES	7
X119 - X125	CROSS LINE PIPE PROFILES	7
	TOTAL	170

### STREAM AND WETLAND IMPACTS

- DENOTES JURISDICTIONAL STREAM
- DENOTES FILL IN WETLAND
- DENOTES MECHANIZED CLEARING
- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER

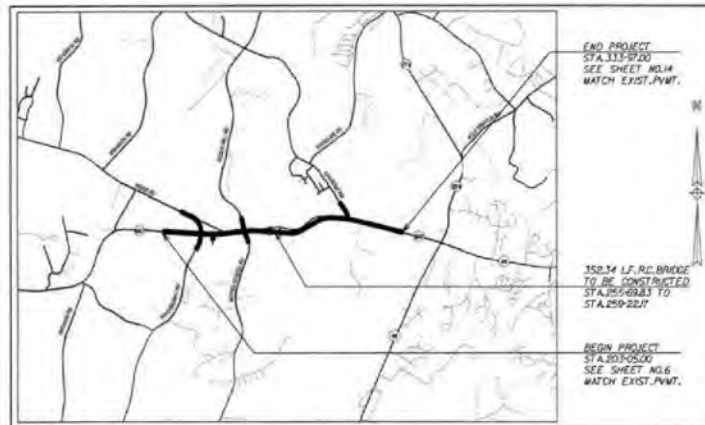
ENVIRONMENTAL PERMIT INFORMATION			
USACE PERMIT	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO	
NEPA DOCUMENT	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO	
401 CERTIFICATION	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO	
OCRM CAP	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO	
NAVIGABLE WATERS	<input checked="" type="checkbox"/> USC	<input type="checkbox"/> USCO	<input type="checkbox"/> USACE
			<input type="checkbox"/> NHA

3 DAYS BEFORE DIGGING IN  
SOUTH CAROLINA  
**CALL 811**  
SOUTH CAROLINA 811 (SCR11)  
WWW.SCR11.COM  
ALL UTILITIES MAY NOT BE A MEMBER OF SCR11

RAILROAD INVOLVEMENT?  
 NO

TRAFFIC DATA	
2017	ADT 16,100
2037	ADT 19,600
	TRUCKS 7.5 %

## PROPOSED PLANS FOR YORK COUNTY PROJECT ID 0041800 YORK CO. PROJECT NO. 03020-013-11149-009 SC 557 ROADWAY IMPROVEMENT PROJECT



LAYOUT  
SCALE 1 INCH = 300 FEET

	SC 807	RIEGE RD	KINGSBURY RD	PHARO YARRIS INC. DRIVEWAY	BETHEL SCHOOL RD	PIEDALE MILL RD	DAVIS MILL RD	OAKTRIDGE RD	GLENN WILKINSON RD	TOTAL	
NET LENGTH OF ROADWAY	2.415	0.228	0.148	0.045	0.112	0.136	0.253	0.029	0.034	3.143	MILES
NET LENGTH OF BRIDGES	0.087	—	—	—	—	—	—	—	—	0.087	MILES
NET LENGTH OF PROJECT	2.483	0.228	0.148	0.045	0.112	0.136	0.253	0.029	0.034	3.207	MILES
LENGTH OF EXCERPTIONS	—	—	—	—	—	—	—	—	—	—	MILES
GROSS LENGTH OF PROJECT	2.483	0.228	0.148	0.045	0.112	0.136	0.253	0.029	0.034	3.207	MILES

EQUALITIES IN STATIONING  
NONE

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.

CONSULTING ENGINEERING FIRM

**Calyx**  
ENGINEERS AND CONSULTANTS, INC.  
REGISTERED PROFESSIONAL ENGINEERS  
SOUTH CAROLINA  
MEMBERSHIP NO. 13719  
1000 W. 10TH STREET  
COLUMBIA, SC 29201  
PHONE: 803-733-7300  
CALYXENGINEERS.COM

REVIEW	RIGHT-OF-WAY		CONSTRUCTION	
	DESIGN	DATE	DESIGN	DATE
PRECONSTRUCTION SUPPORT - ROAD				
PRECONSTRUCTION SUPPORT - STRUCTURES				
RPO - DESIGN MANAGER				
RPO - 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:**

Stew Drum \_\_\_\_\_ Date \_\_\_\_\_  
Consultant Engineer of Record

Chris Lucy \_\_\_\_\_ Date \_\_\_\_\_  
Regional Production Engineer

**ENGINEER OF RECORD**

**NOT FOR CONSTRUCTION**

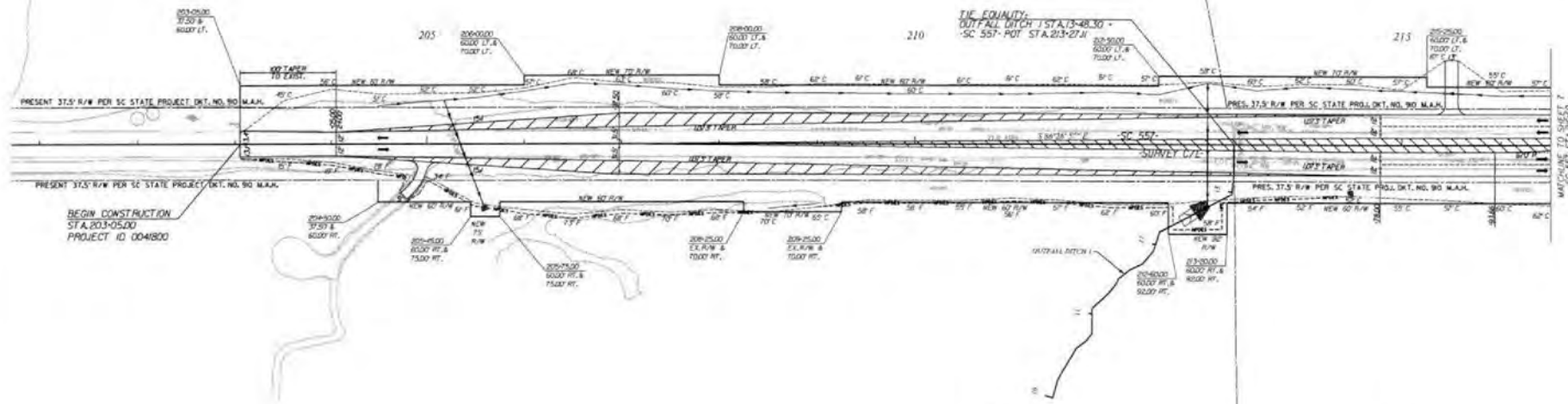
FOR CONSTRUCTION: \_\_\_\_\_ DATE \_\_\_\_\_  
STEW DRUM, P.E.  
PROGRAM MANAGER

Permitted Plans, SAC-2007-02400, SC 557 - Roadway Improvement Project, Sheet 2 of 19, April 6, 2019

STATE	COUNTY	PROJECT NO.	SHEET NO.	TOTAL SHEETS
3	SC	YORK 0041800 0341311-004 557	2	

UTILITY NOTES:  
 ELECTRIC: DUKE ENERGY  
 TELEPHONE: AT&T  
 GAS: YORK COUNTY NATURAL GAS AUTHORITY  
 CABLE TV: COMPTON  
 WATER AND SEWER: CAROLINA WATER SERVICE  
 WATER AND SEWER: TOWN OF CLOVER

**NO IMPACTS**



04/03/2018  
 04:46:46  
 C:\ProgramData\Bentley\MapGuide\Projects\Permitted\SC557\_02\pdp\perm\plan.dgn

ALIGNMENT CONTROL CAN BE FOUND ON REFERENCE SHEETS

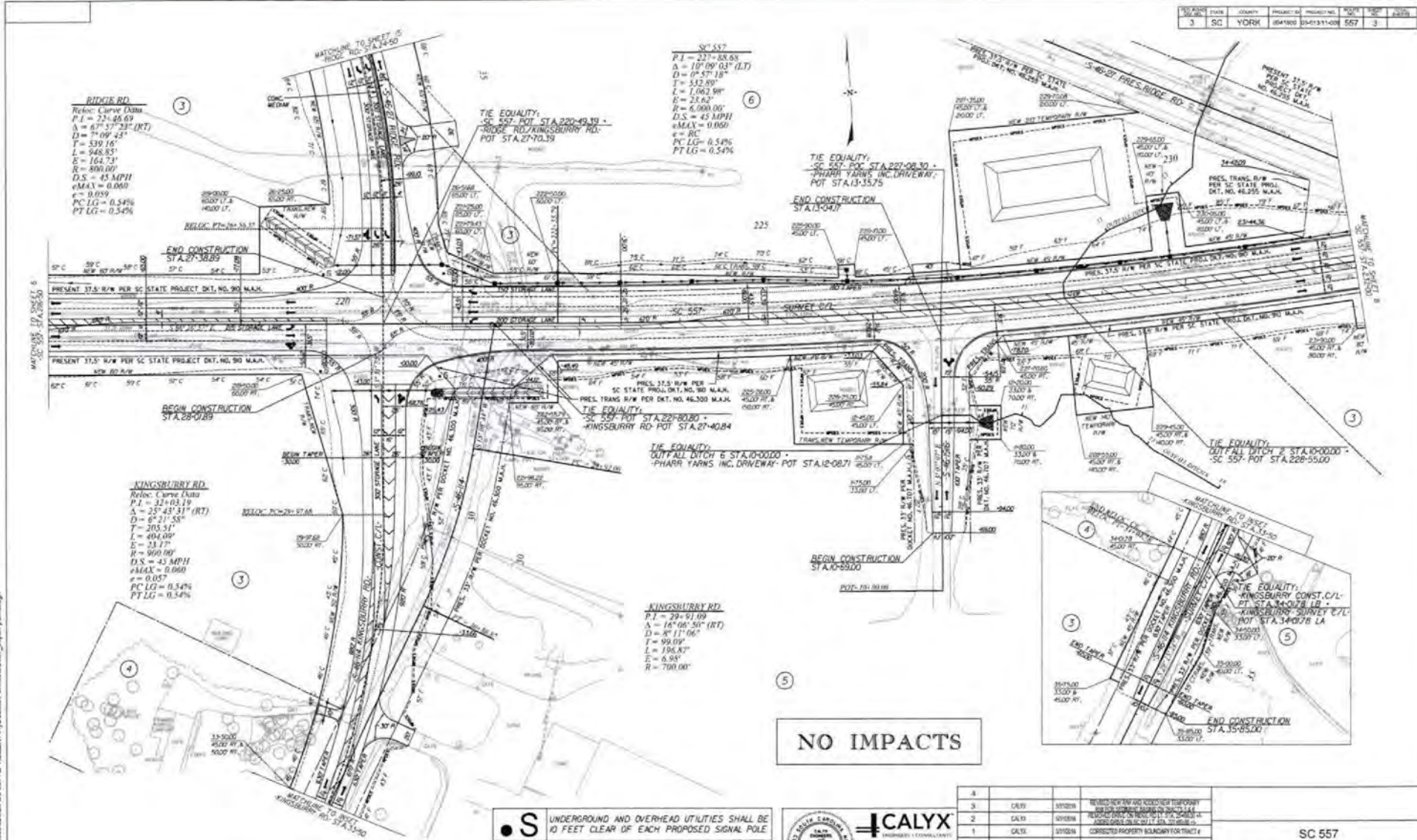


4				
3				
2				
1				
REV. NO.	DATE	BY	DESCRIPTION OF REVISION	

SC 557  
 PLAN  
 STA. 203+05 TO STA. 216+50  
 SCALE 1"=50' RTE. SC 557 DWS. NO.

Permitted Plans, SAC-2007-02400, SC 557 - Roadway Improvement Project, Sheet 3 of 19, April 6, 2019

NO.	DATE	BY	REVISION
3	SC	YORK	SC 557 STA 216+50 TO STA 232+00



**RIDGE RD**  
 Reloc. Curve Data  
 P.I. = 21+45.67  
 Δ = 67°37'29" (RT)  
 D = 7+09'43"  
 L = 539.16'  
 E = 948.85'  
 R = 164.73'  
 D.S. = 45 MPH  
 eMAX = 0.060  
 e = 0.059  
 PC LG = 0.54%  
 PT LG = 0.54%

SC 557  
 P.I. = 21+38.88  
 Δ = 10°09'03" (LT)  
 D = 0+57'18"  
 L = 512.89'  
 E = 1,062.98'  
 R = 23.82'  
 D.S. = 45 MPH  
 eMAX = 0.060  
 e = RC  
 PC LG = 0.54%  
 PT LG = 0.54%

**KINGSBURY RD**  
 Reloc. Curve Data  
 P.I. = 32+03.19  
 Δ = 25°43'11" (RT)  
 D = 6+21'55"  
 L = 203.31'  
 E = 404.09'  
 R = 23.17'  
 D.S. = 45 MPH  
 eMAX = 0.060  
 e = 0.057  
 PC LG = 0.34%  
 PT LG = 0.34%

**KINGSBURY RD**  
 P.I. = 29+91.09  
 Δ = 16°06'50" (RT)  
 D = 8+11'06"  
 L = 99.09'  
 E = 196.87'  
 R = 6.95'  
 R = 700.00'

**NO IMPACTS**

**S** UNDERGROUND AND OVERHEAD UTILITIES SHALL BE 10 FEET CLEAR OF EACH PROPOSED SIGNAL POLE

ALIGNMENT CONTROL CAN BE FOUND ON REFERENCE SHEETS



**CALYX**  
 ENGINEERS & CONSULTANTS  
 1550 EAST BIGHAMWOODS  
 BOULDER, CO 80502  
 PH: 303.440.1100  
 CALYX@calyx.com

NO.	DATE	DESCRIPTION
4		
3	CALY	ISSUED
2	CALY	ISSUED
1	CALY	ISSUED

SC 557  
 PLAN  
 STA. 216+50 TO STA. 232+00  
 SCALE 1"=40'  
 RTE. SC 657  
 DWG. NO.

3/20/2019  
 11:04 AM  
 I:\Projects\2006\2019\SC 557 44\GLENV\Hydral\Permits\SC557\_03\plan\perm.dwg



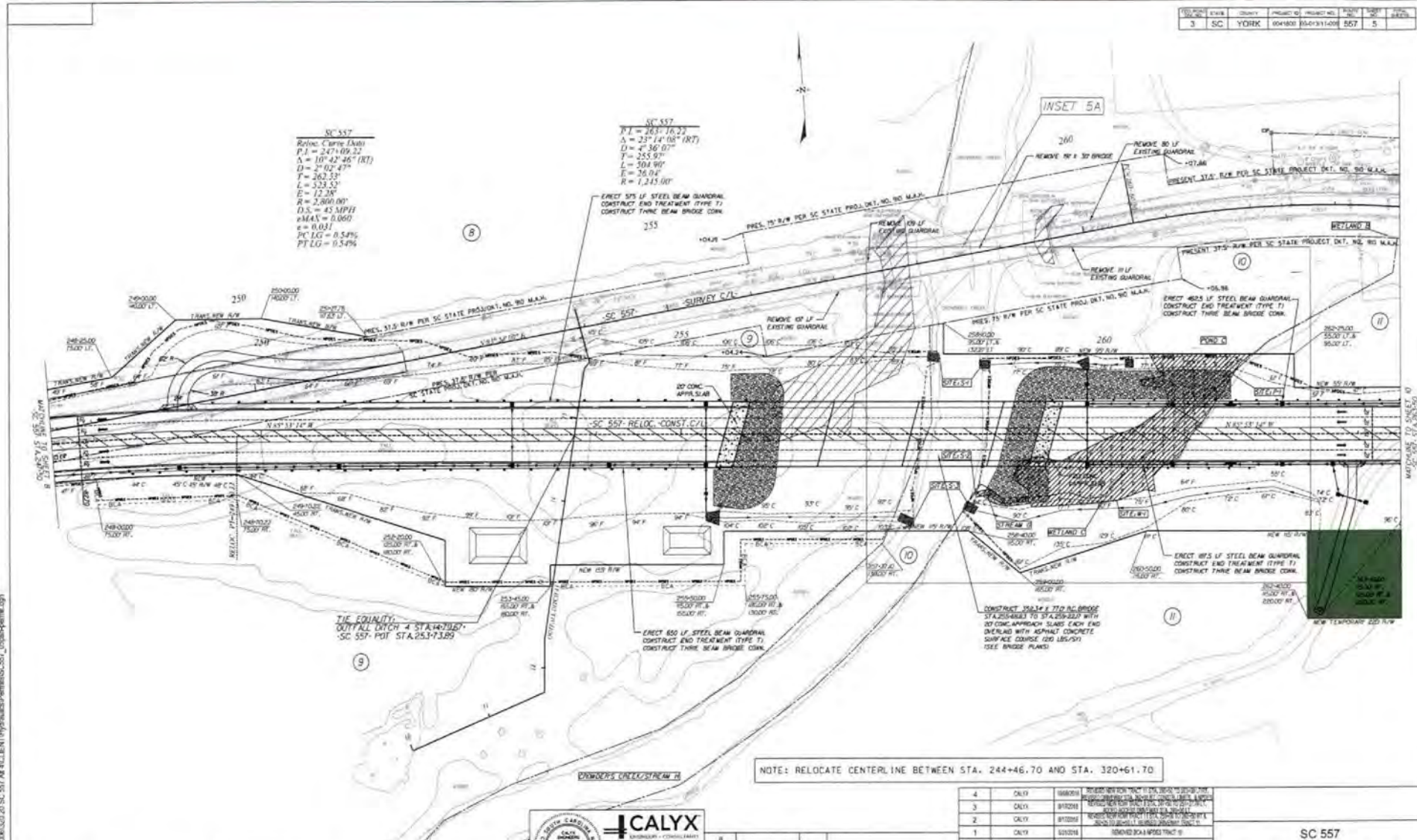


Permitted Plans, SAC-2007-02400, SC 557 - Roadway Improvement Project, Sheet 5 of 19, April 6, 2019

PROJECT NO.	COUNTY	PROJECT DIST.	SHEET NO.	TOTAL SHEETS
3	SC YORK	604800	5	5

SC 557  
 Reflec. Curve Data  
 P.I. = 247+09.27  
 $\Delta = 10^{\circ} 42' 46''$  (RT)  
 $D = 2^{\circ} 02' 47''$   
 $T = 262.53'$   
 $L = 523.52'$   
 $E = 12.28'$   
 $R = 2,800.00'$   
 $D.S. = 45$  MPH  
 $e_{MAX} = 0.060$   
 $e = 0.031$   
 $P.C. LG = 0.54\%$   
 $P.T. LG = 0.54\%$

SC 557  
 $P.I. = 263+16.23$   
 $\Delta = 23^{\circ} 14' 08''$  (RT)  
 $D = 4^{\circ} 36' 07''$   
 $T = 255.97'$   
 $L = 504.90'$   
 $E = 36.04'$   
 $R = 1,245.00'$



3/20/2019  
 H:\Project\2018\2018-20 SC 557 At Client\Hydro\Drawings\2018-20 SC 557 - Drawings\perm.dgn

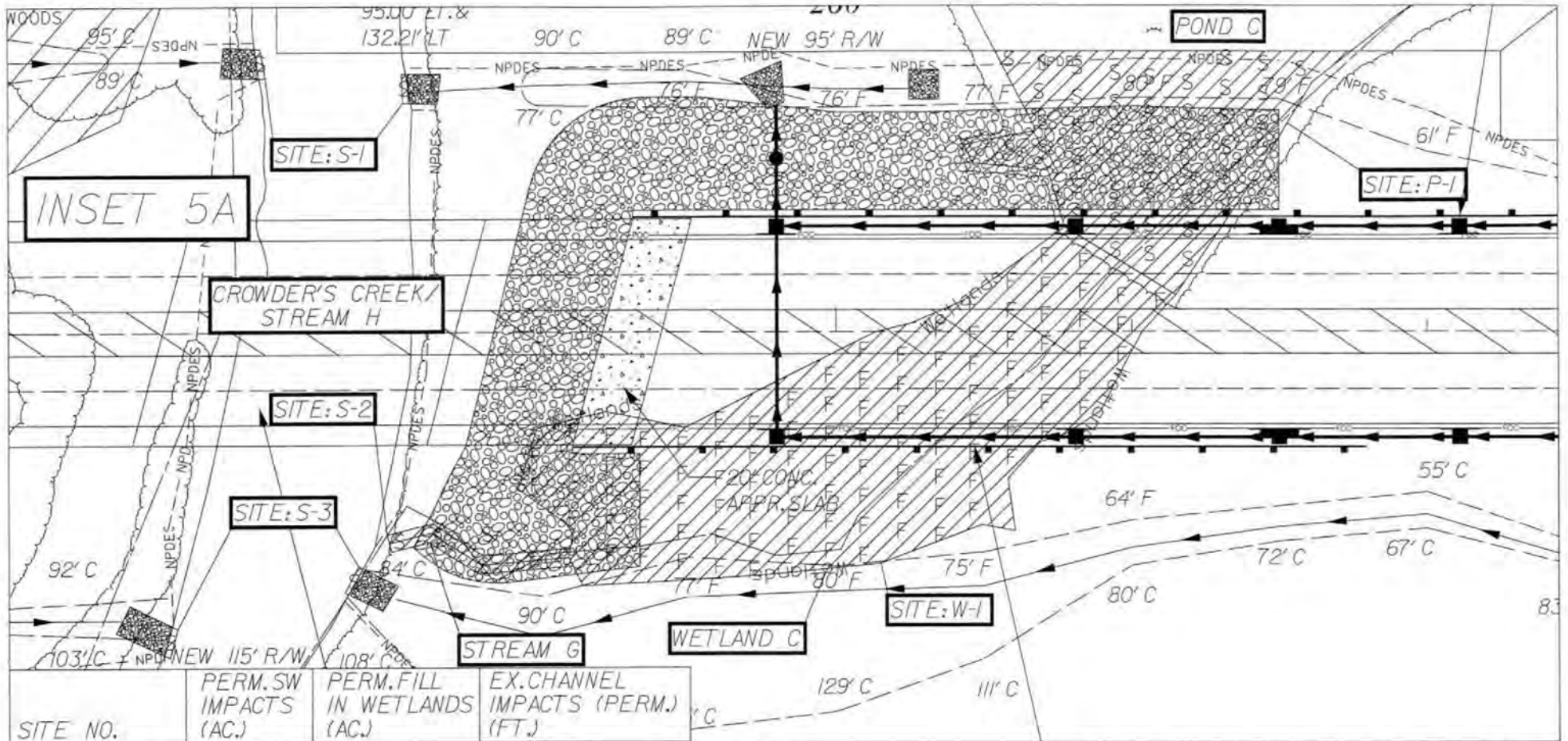
REMOVAL OF EXISTING PAVEMENT ALIGNMENT CONTROL CAN BE FOUND ON REFERENCE SHEETS

**CALYX**  
 ENGINEERS - CONSULTANTS  
 700 EAST KEMPERSHIP  
 CHARLOTTE, NC 28207  
 PHONE 704.447.7888  
 CALYX.com

NOTE: RELOCATE CENTERLINE BETWEEN STA. 244+6.70 AND STA. 320+61.70

NO.	BY	DATE	DESCRIPTION OF REVISION
4	CLY	08/05/18	REVISION TO PERM PLAN
3	CLY	07/20/18	REVISION TO PERM PLAN
2	CLY	07/20/18	REVISION TO PERM PLAN
1	CLY	03/22/18	REVISION TO PERM PLAN

SC 557  
 PLAN  
 STA. 247+50 TO STA. 263+50  
 SCALE 1"=50' RTE. SC 557 DWS. NO.





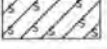
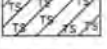
SITE NO.	PERM. SW IMPACTS (AC.)	PERM. FILL IN WETLANDS (AC.)	EX. CHANNEL IMPACTS (PERM.) (FT.)
P-1	0.133	0.000	0
S-1	<0.001	0.000	20
S-2	0.009	0.000	65
S-3	<0.001	0.000	20
W-1	0.000	0.302	0
<b>SHEET TOTAL</b>	<b>0.144</b>	<b>0.302</b>	<b>105</b>

R/W

259+75.00  
140.00' RT.


ERECT 187.5 LF STEEL BEAM GUARDRAIL N/A  
CONSTRUCT END TREATMENT (TYPE T)  
CONSTRUCT THRIE BEAM BRIDGE CONN.

**LEGEND**

-  DENOTES FILL IN WETLAND
-  DENOTES MECHANIZED CLEARING
-  DENOTES IMPACTS IN SURFACE WATER
-  DENOTES TEMPORARY IMPACTS IN SURFACE WATER

**SURFACE WATERS IMPACT MAP**

PROJECT TITLE: SC-557 ROADWAY IMPROVEMENT PROJECT  
 APPLICANT: YORK COUNTY, SC  
 PROJECT ID: 0041800  
 PROJ.: 03020-013/11149-009  
 DATE: SEPTEMBER 21, 2018  
 LOCATION: YORK COUNTY  
 PERMIT NUMBER:  
 SCALE: 1" = 50'  
 SHEET: 5A OF 14



**York County**  
south carolina

**Pennies for Progress**

**CALYX**  
ENGINEERS + CONSULTANTS

Permitted Plans, SAC-2007-02400, SC 557 - Roadway Improvement Project, Sheet 7 of 19, April 6, 2019

FILE NO.	STATE	COUNTY	PROJECT NO.	SHEET NO.	TOTAL SHEETS
3	SC	YORK	0041800	557	6

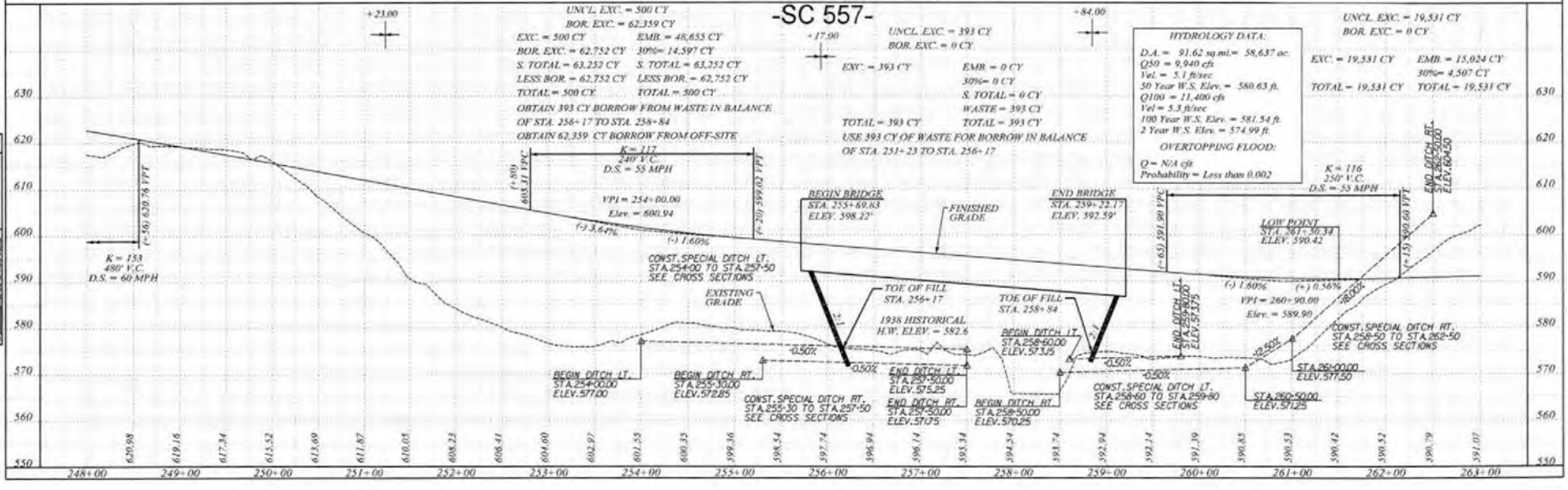
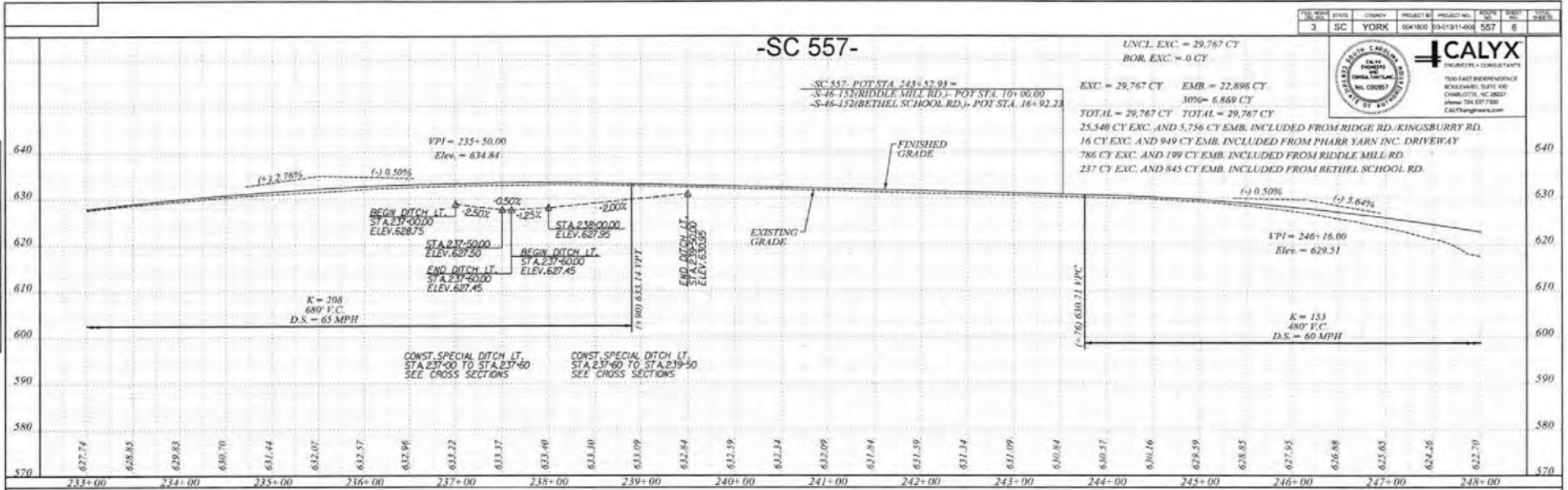


UNCL. EXC. = 29,767 CY  
BOR. EXC. = 0 CY

EXC = 29,767 CY    EMB = 22,898 CY  
30% = 8,869 CY

TOTAL = 29,767 CY    TOTAL = 29,767 CY

25,546 CY EXC. AND 5,756 CY EMB. INCLUDED FROM RIDGE RD. KINGSBURY RD.  
16 CY EXC. AND 949 CY EMB. INCLUDED FROM PHARR YARN INC. DRIVEWAY  
786 CY EXC. AND 199 CY EMB. INCLUDED FROM RIDDLE MILL RD.  
237 CY EXC. AND 845 CY EMB. INCLUDED FROM BETHEL SCHOOL RD.



UNCL. EXC. = 500 CY  
BOR. EXC. = 62,359 CY

EXC. = 500 CY    EMB. = 48,655 CY  
BOR. EXC. = 62,752 CY    30% = 14,597 CY  
S. TOTAL = 63,252 CY    S. TOTAL = 63,252 CY  
LESS BOR. = 62,752 CY    LESS BOR. = 62,752 CY  
TOTAL = 500 CY    TOTAL = 300 CY

OBTAIN 393 CY BORROW FROM WASTE IN BALANCE  
OF STA. 256+17 TO STA. 258+84  
OBTAIN 62,359 CY BORROW FROM OFF-SITE

UNCL. EXC. = 393 CY  
BOR. EXC. = 0 CY

EXC. = 393 CY    EMB. = 0 CY  
30% = 0 CY  
S. TOTAL = 0 CY  
WASTE = 393 CY  
TOTAL = 393 CY

USE 393 CY OF WASTE FOR BORROW IN BALANCE  
OF STA. 251+23 TO STA. 256+17

HYDROLOGY DATA:

D.A. = 91.62 sq.mil = 58,637 ac.  
Q50 = 0.940 cfs  
Vel. = 5.1 ft/sec  
50 Year W.S. Elev. = 580.63 ft.  
Q100 = 11,400 cfs  
Vel. = 5.3 ft/sec  
100 Year W.S. Elev. = 581.54 ft.  
2 Year W.S. Elev. = 574.99 ft.

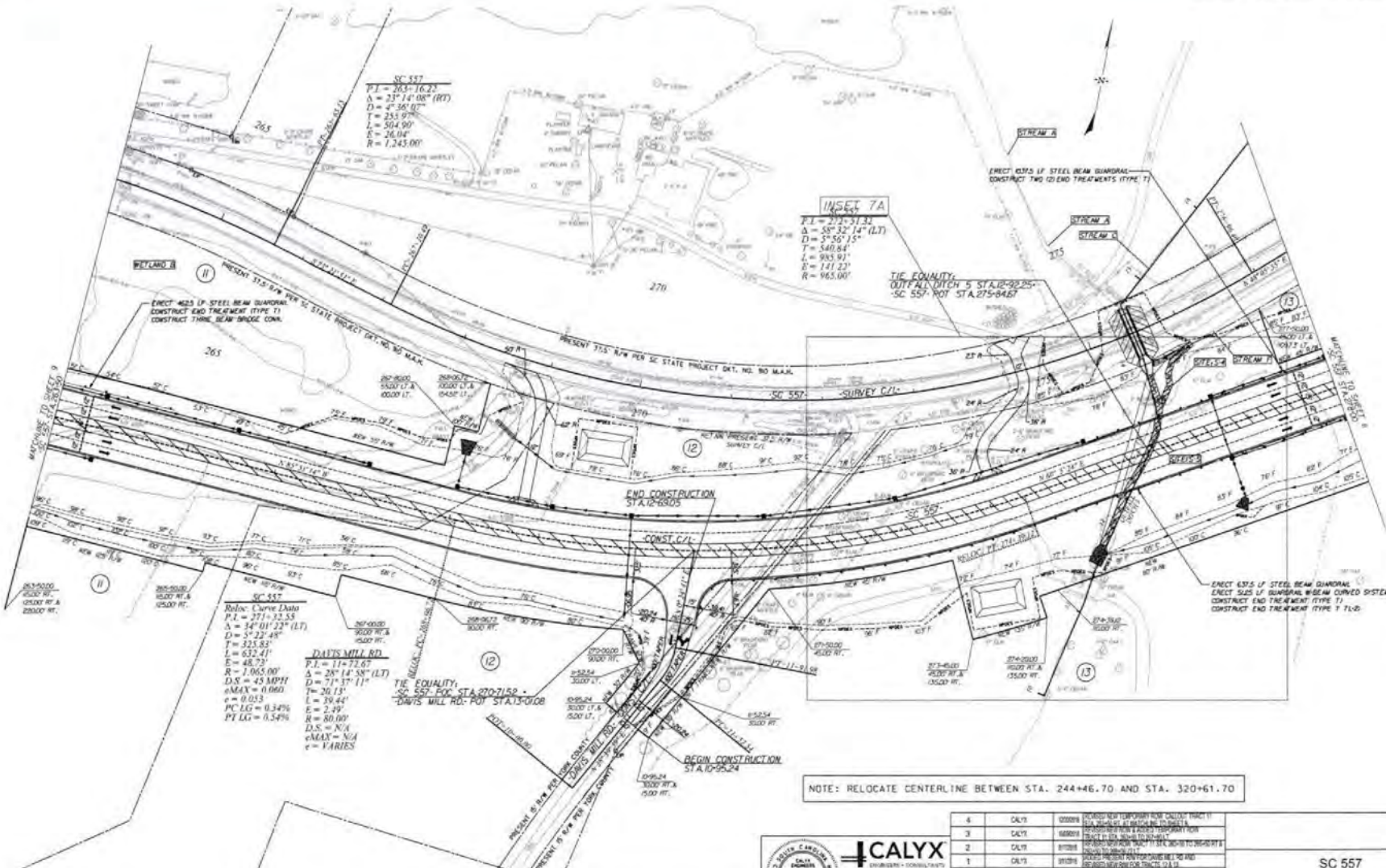
OVERTOPPING FLOOD:  
Q = N/A cfs  
Probability = Less than 0.002

PROFILE  
DATE: 04/06/19  
BY: [Name]

PROFILE  
DATE: 04/06/19  
BY: [Name]

Permitted Plans, SAC-2007-02400, SC 557 - Roadway Improvement Project, Sheet 8 of 19, April 6, 2019

TITLE	DATE	STATE	COUNTY	PROJECT NO.	PROJECT NAME	NO.	REV.	DATE
3		SC	YORK	004190	SC 557 - RD	557	7	



SC 557  
 P.I. = 263+16.23  
 Δ = 23° 14' 08" (RT)  
 D = 4° 36' 0"  
 T = 23.5 97'  
 L = 504.90'  
 E = 26.04'  
 R = 1,243.00'

INSET 7A  
 P.I. = 272+31.32  
 Δ = 58° 32' 14" (LT)  
 D = 3° 50' 15"  
 T = 540.84'  
 L = 983.97'  
 E = 141.22'  
 R = 965.00'

Reloc. Curve Data  
 P.I. = 271+22.53  
 Δ = 14° 01' 23" (LT)  
 D = 5° 22' 48"  
 T = 325.83'  
 L = 632.41'  
 E = 48.73'  
 R = 1,065.00'  
 D.S. = 45.80 FT  
 eMAX = 0.080  
 e = 0.033  
 PC LG = 0.349'  
 PT LG = 0.549'

DAVIS MILL RD.  
 P.I. = 11+72.67  
 Δ = 28° 14' 58" (LT)  
 D = 7° 13' 11"  
 T = 20.11'  
 L = 39.44'  
 E = 2.49'  
 R = 80.80'  
 D.S. = N/A  
 eMAX = N/A  
 e = VARIES

NOTE: RELOCATE CENTERLINE BETWEEN STA. 244+66.70 AND STA. 320+61.70

REMOVAL OF EXISTING PAVEMENT

ALIGNMENT CONTROL CAN BE FOUND ON REFERENCE SHEETS

**CALYX**  
 ENGINEERS • CONSULTANTS  
 1500 EAST INDEPENDENCE  
 SUITE 1000, SUITE 100  
 CHARLOTTE, NC 28202  
 PHONE: 704.533.7300  
 FAX: 704.533.7301  
 CALYX@calyx.com

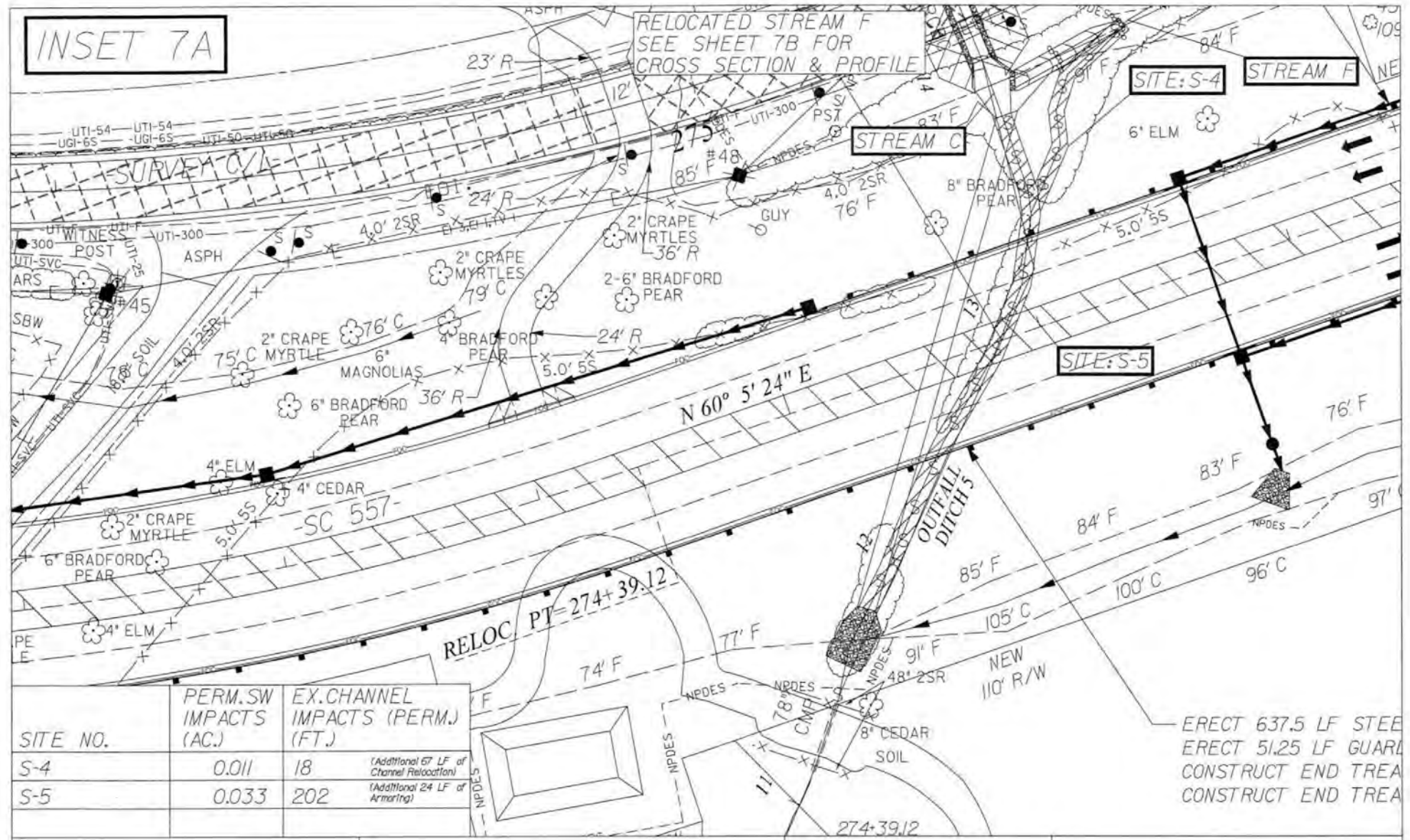
REV.	BY	DATE	DESCRIPTION OF REVISION
4	CA/T	02/02/19	ISSUED NEW TEMPORARY ROAD CLOSURE TRACT 11
3	CA/T	08/09/18	ISSUED TRACT 11 PERMITS FOR TRUCKS & TRAILERS
2	CA/T	07/09/18	ISSUED TRACT 11 PERMITS FOR TRUCKS & TRAILERS
1	CA/T	07/09/18	ISSUED TRACT 11 PERMITS FOR TRUCKS & TRAILERS

SC 557  
 PLAN  
 STA. 263+50 TO STA. 278+00  
 SCALE 1"=50' RTE. SC 557 DWG. NO.

3/29/2019  
 11:17 AM  
 H:\Projects\2019\02\20 SC 557 - Rd 4\CLIENT\Hydro\Drawings\Permits\SC557\_07\plan-permit.dgn

INSET 7A

RELOCATED STREAM F  
SEE SHEET 7B FOR  
CROSS SECTION & PROFILE



SITE NO.	PERM. SW IMPACTS (AC.)	EX. CHANNEL IMPACTS (PERM.) (FT.)	
S-4	0.011	18	(Additional 67 LF of Channel Relocation)
S-5	0.033	202	(Additional 24 LF of Armoring)

ERECT 637.5 LF STEE  
ERECT 51.25 LF GUARD  
CONSTRUCT END TREA  
CONSTRUCT END TREA

LEGEND

	DENOTES FILL IN WETLAND
	DENOTES MECHANIZED CLEARING
	DENOTES IMPACTS IN SURFACE WATER
	DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SURFACE WATERS IMPACT MAP

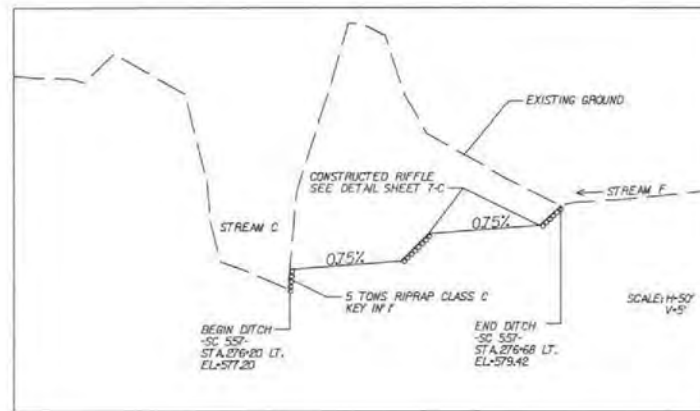
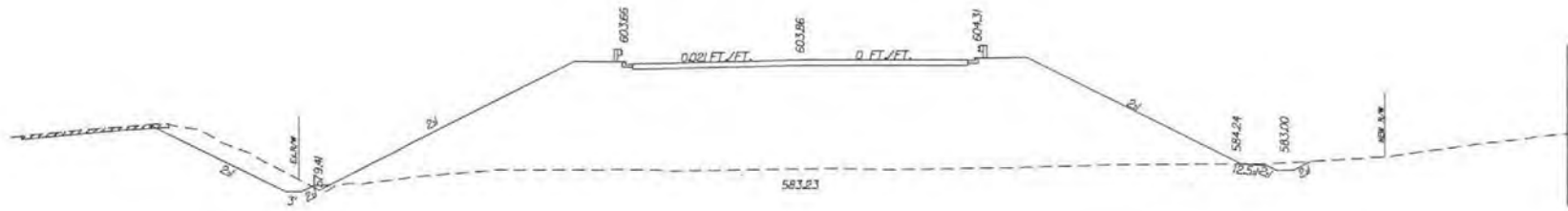
PROJECT TITLE: SC-557 ROADWAY IMPROVEMENT PROJECT  
 APPLICANT: YORK COUNTY, SC  
 PROJECT ID: 0041800  
 PROJ.: 03020-013/11149-009  
 DATE: SEPTEMBER 21, 2018  
 LOCATION: YORK COUNTY  
 PERMIT NUMBER:  
 SCALE: 1" = 50'  
 SHEET: 7A OF 14

York County south carolina

Pennies for Progress

**CALYX**

# STREAM F - RELOCATION CROSS SECTION & PROFILE



LEGEND



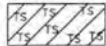
DENOTES FILL IN WETLAND



DENOTES MECHANIZED CLEARING



DENOTES IMPACTS IN SURFACE WATER



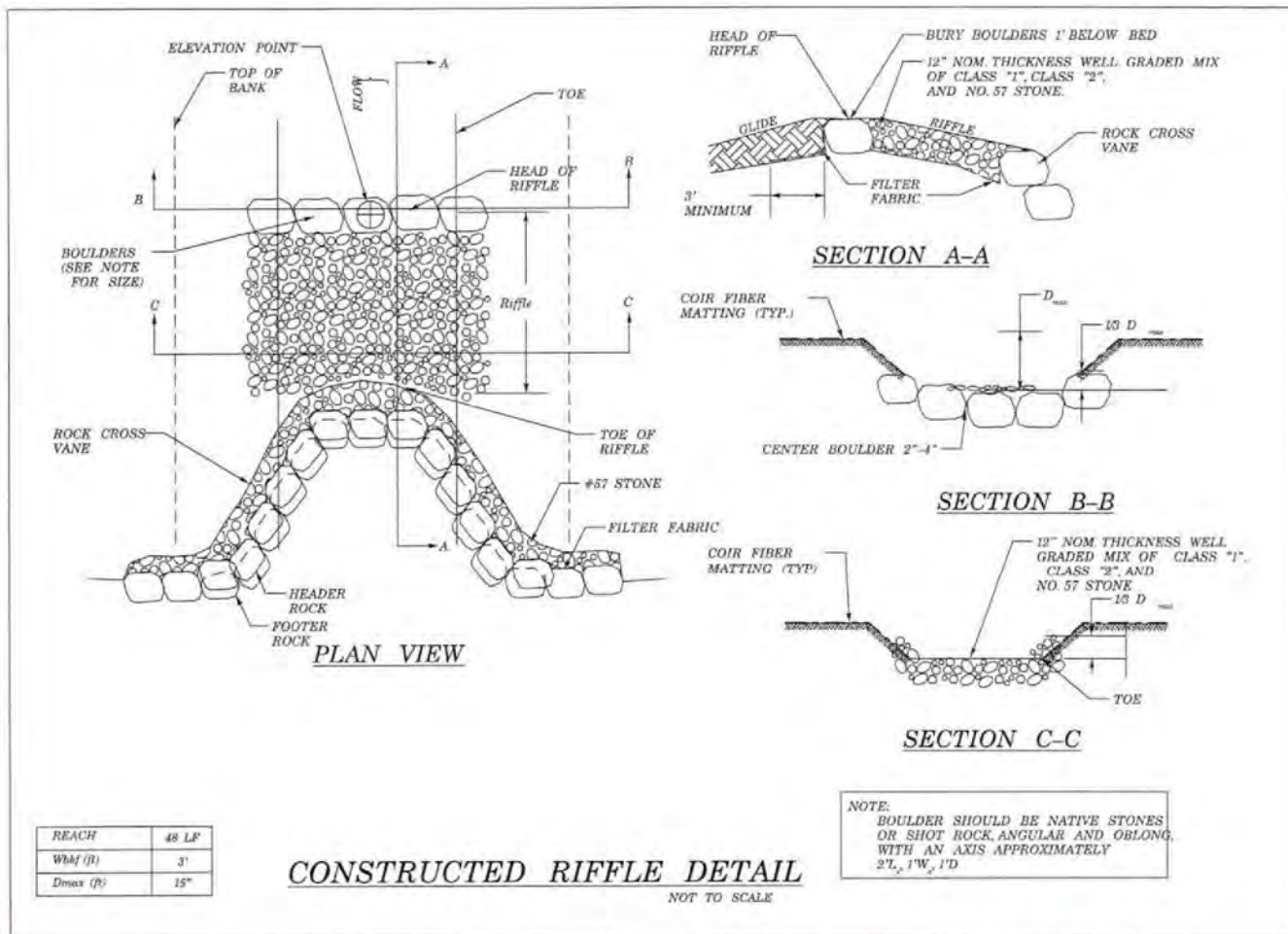
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SURFACE WATERS IMPACT MAP

PROJECT TITLE: SC-557 ROADWAY IMPROVEMENT PROJECT  
 APPLICANT: YORK COUNTY, SC  
 PROJECT ID: D041800  
 PROJ.: 03020-013/11149-009  
 DATE: SEPTEMBER 21, 2018  
 LOCATION: YORK COUNTY  
 PERMIT NUMBER:  
 SCALE: 1" = 50'  
 SHEET: 78 OF 14

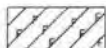


# CONSTRUCTED RIFFLE DETAIL



Permitted Plans, SAC-2007-02400, SC 557 - Roadway Improvement Project, Sheet 11 of 19, April 6, 2019

LEGEND



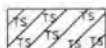
DENOTES FILL IN WETLAND



DENOTES MECHANIZED CLEARING



DENOTES IMPACTS IN SURFACE WATER



DENOTES TEMPORARY IMPACTS IN SURFACE WATER

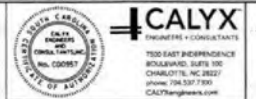
SURFACE WATERS IMPACT MAP

PROJECT TITLE: SC-557 ROADWAY IMPROVEMENT PROJECT  
 APPLICANT: YORK COUNTY, SC  
 PROJECT ID: 0041800  
 PROJ.: 03020-013/11149-009  
 DATE: SEPTEMBER 21, 2018  
 LOCATION: YORK COUNTY  
 PERMIT NUMBER:  
 SCALE: 1' = 50'  
 SHEET: 7C OF 14



Permitted Plans, SAC-2007-02400, SC 557 - Roadway Improvement Project, Sheet 12 of 19, April 6, 2019

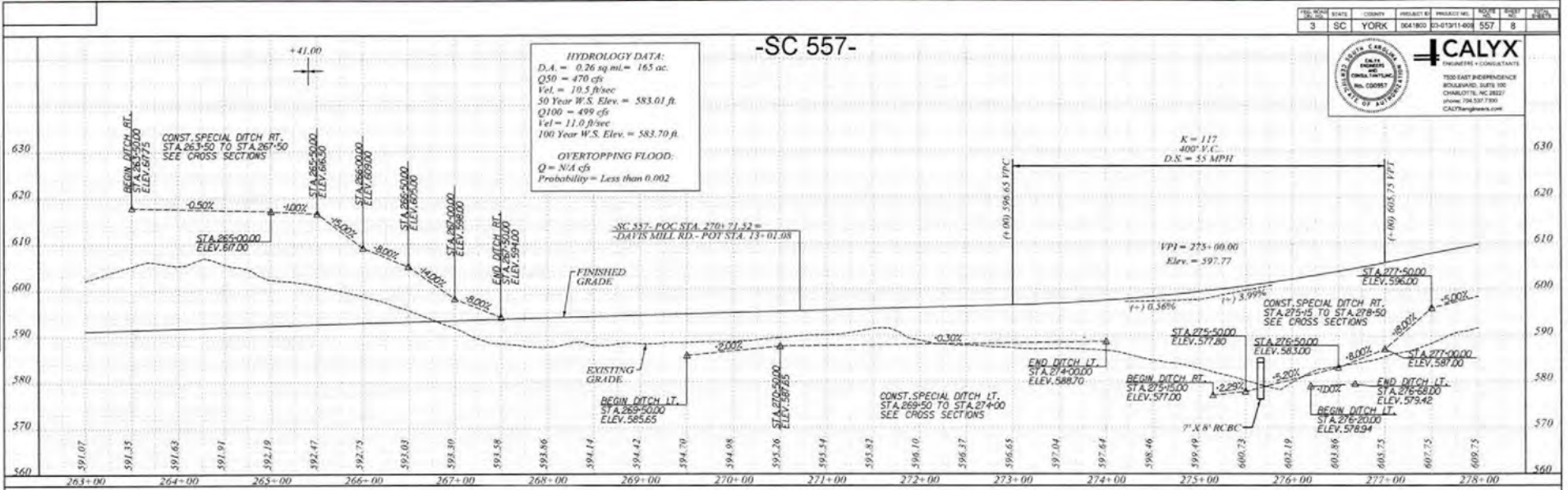
FED. ROAD DIST. NO.	STATE	COUNTY	PROJECT NO.	PROJECT NAME	SHEET NO.	TOTAL SHEETS
3	SC	YORK	1041800	SC 557 IMPROVEMENT	557	8



-SC 557-

**HYDROLOGY DATA:**  
 D.A. = 0.26 sq mi. = 165 ac.  
 Q50 = 470 cfs  
 Vel = 10.5 ft/sec  
 50 Year W.S. Elev. = 583.01 ft.  
 Q100 = 499 cfs  
 Vel = 11.0 ft/sec  
 100 Year W.S. Elev. = 583.70 ft.

**OVERTOPPING FLOOD:**  
 Q = N/A cfs  
 Probability = Less than 0.002



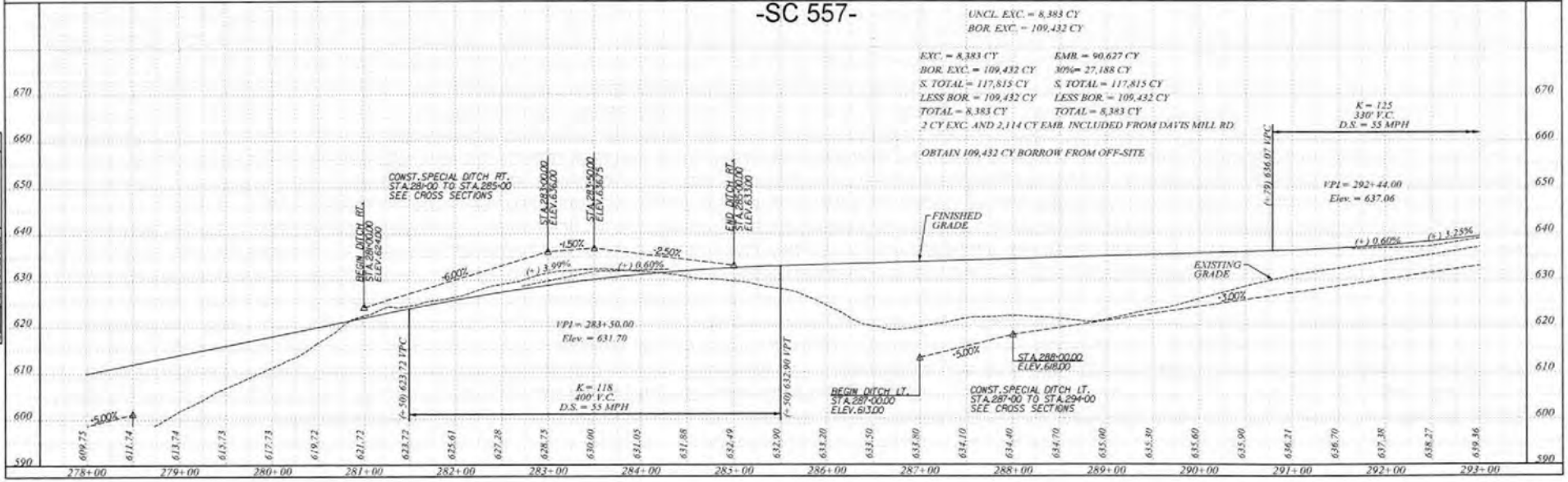
-SC 557-

UNCL. EXC. = 8,383 CY  
 BOR. EXC. = 109,432 CY

EXC. = 8,383 CY    EMB. = 90,627 CY  
 BOR. EXC. = 109,432 CY    30% = 27,188 CY  
 S. TOTAL = 117,815 CY    S. TOTAL = 117,815 CY  
 LESS BOR. = 109,432 CY    LESS BOR. = 109,432 CY  
 TOTAL = 8,383 CY    TOTAL = 8,383 CY

3 CY EXC. AND 2,114 CY EMB. INCLUDED FROM DAVIS MILL RD.

OBTAIN 109,432 CY BORROW FROM OFF-SITE



PROFILE

DATE	03/20/18
DRAWN	AMAL
CHECKED	AMAL
DATE	03/20/18
SCALE	AS SHOWN

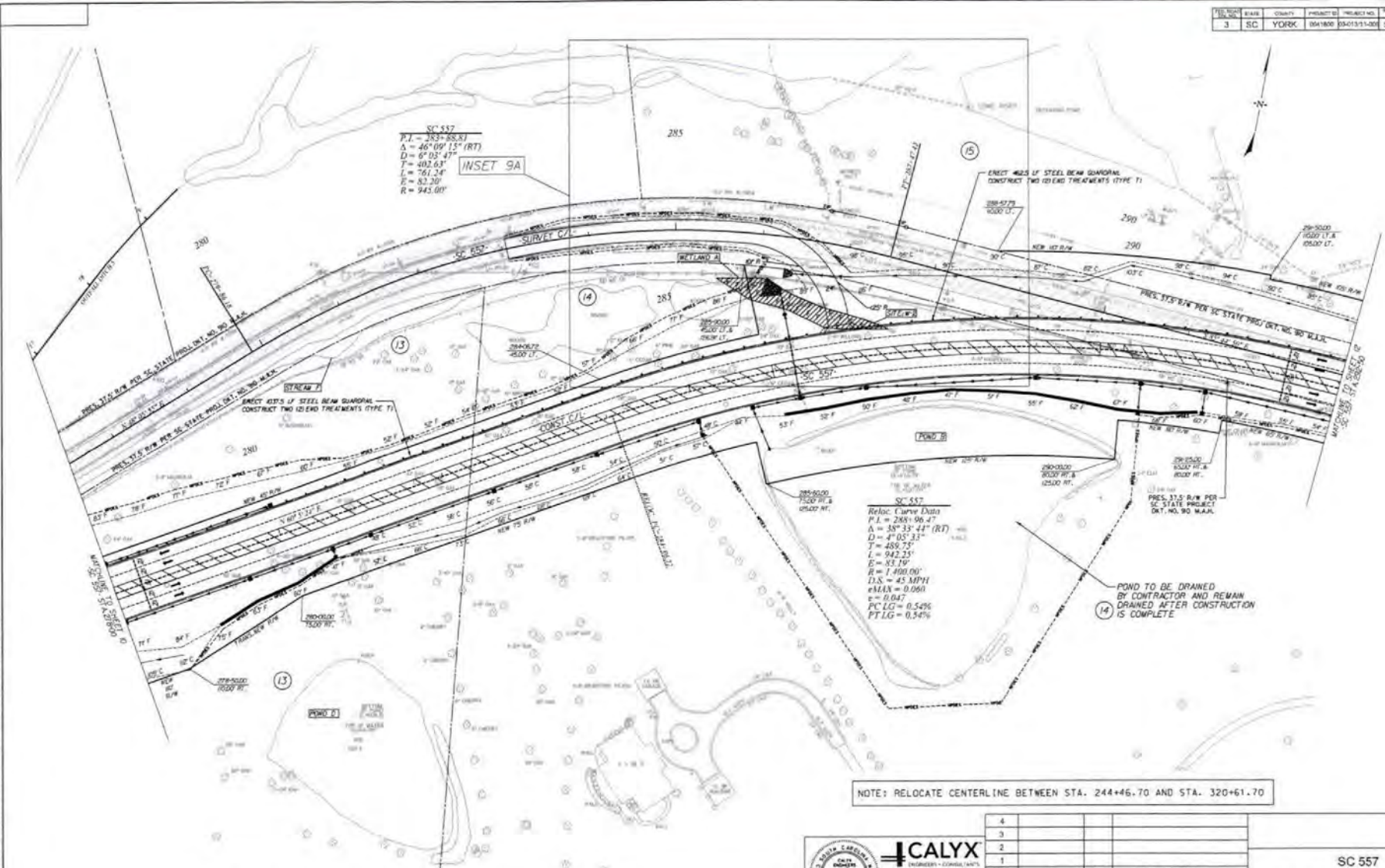
PROFILE

DATE	03/20/18
DRAWN	AMAL
CHECKED	AMAL
DATE	03/20/18
SCALE	AS SHOWN



Permitted Plans, SAC-2007-02400, SC 557 - Roadway Improvement Project, Sheet 13 of 19, April 6, 2019

PROJECT NO.	STATE	COUNTY	PROJECT	PROJECT NO.	SHEET	TOTAL SHEETS
3	SC	YORK	04/1800	04/1311-00	557	9



SC 557  
 P.I. = 283+88.87  
 Δ = 46°09'15" (RT)  
 D = 6'05.43'  
 T = 402.63'  
 L = 761.24'  
 E = 52.20'  
 R = 945.00'

INSET 9A

SC 557  
 Reloc. Curve Data  
 P.I. = 288+96.47  
 Δ = 38°33'41" (RT)  
 D = 4'05.31"  
 T = 489.75'  
 L = 942.25'  
 E = 85.19'  
 R = 1,400.00'  
 D.S. = 45 MPH  
 eMAX = 0.060  
 e = 0.047  
 PC LG = 0.549%  
 PT LG = 0.54%

POND TO BE DRAINED BY CONTRACTOR AND REMAIN DRAINED AFTER CONSTRUCTION IS COMPLETE

NOTE: RELOCATE CENTERLINE BETWEEN STA. 244+6.70 AND STA. 320+61.70

REMOVAL OF EXISTING PAVEMENT

ALIGNMENT CONTROL CAN BE FOUND ON REFERENCE SHEETS



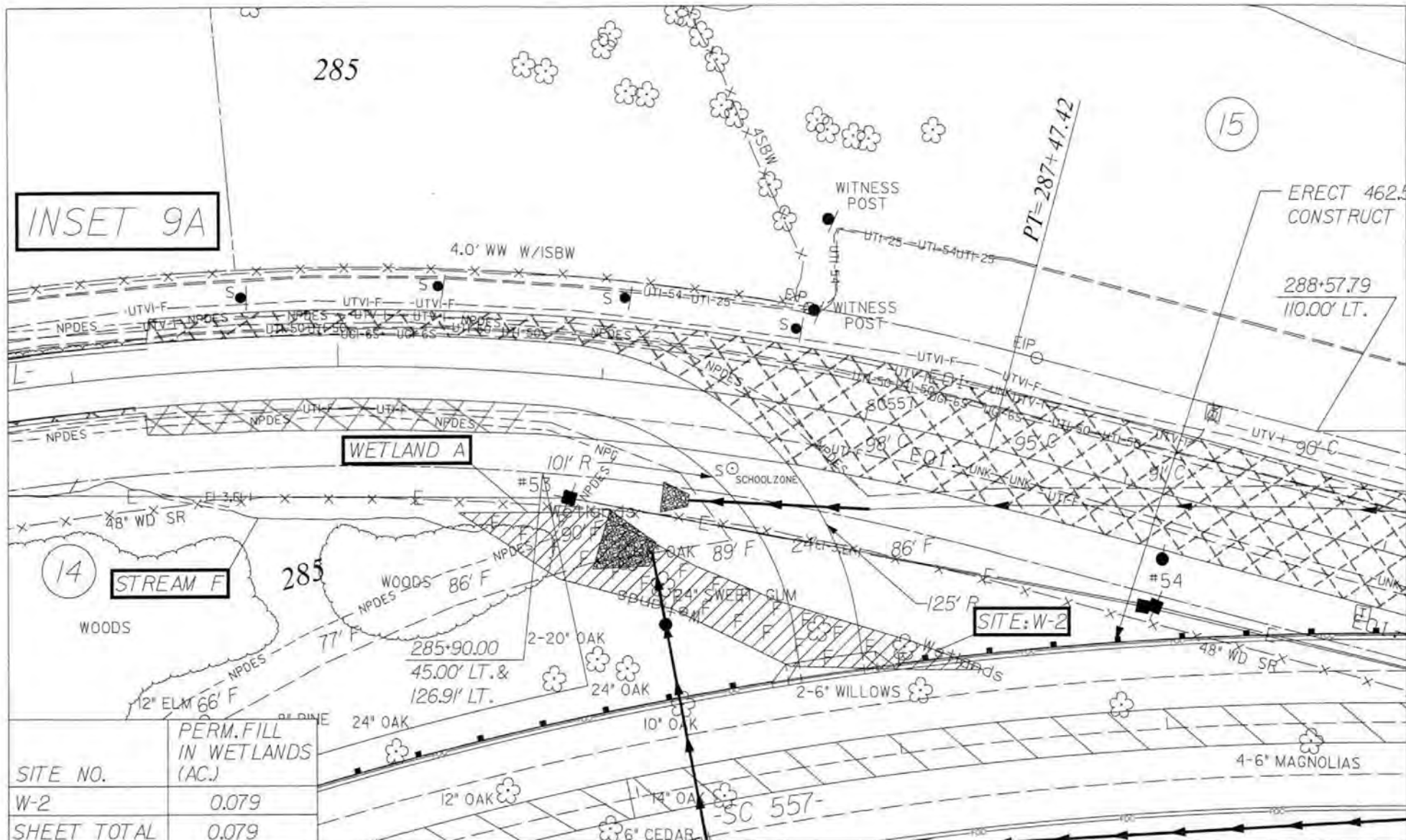
**CALYX**  
 ENGINEERS & CONSULTANTS, INC.  
 7300 EAST WINDSORFORD  
 RDU/FAIRFAX  
 CHARLOTTE, NC 28227  
 PHONE: 704.537.7300  
 CAY@calyxeng.com

4			
3			
2			
1			
REV. NO.	DATE	BY	DESCRIPTION OF REVISION


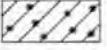
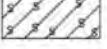
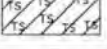
SC 557  
 PLAN  
 STA. 278+00 TO STA. 292+50  
 SCALE 1"=50' RTE. SC 507 DWG. NO.

8/3/2018 09:48:11 AM H:\PROJECTS\2008\02\20 SC 557 AM 410 CLIENT\Hydraulic\Permitted\05-557\_2\high\perm.plt.dwg

INSET 9A

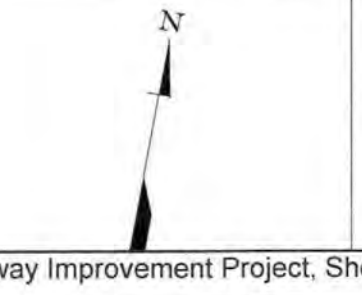


SITE NO.	PERM. FILL IN WETLANDS (AC.)
W-2	0.079
SHEET TOTAL	0.079

LEGEND	
	DENOTES FILL IN WETLAND
	DENOTES MECHANIZED CLEARING
	DENOTES IMPACTS IN SURFACE WATER
	DENOTES TEMPORARY IMPACTS IN SURFACE WATER

**SURFACE WATERS IMPACT MAP**

PROJECT TITLE: SC-557 ROADWAY IMPROVEMENT PROJECT  
 APPLICANT: YORK COUNTY, SC  
 PROJECT ID: 0041800  
 PROJ.: 03020-013/11149-009  
 DATE: SEPTEMBER 21, 2018  
 LOCATION: YORK COUNTY  
 PERMIT NUMBER:  
 SCALE: 1" = 50'  
 SHEET: 9A OF 14





YorkCounty  
south carolina



Pennies  
for  
Progress



**CALYX**  
ENGINEERS + CONSULTANTS

Permitted Plans, SAC-2007-02400, SC 557 - Roadway Improvement Project, Sheet 15 of 19, April 6, 2019

FILE NO.	STATUS	COUNTY	PROJECT ID	PROJECT NO.	DATE	SHEET	TOTAL SHEETS
3	SC	YORK	04-1802	03-0131-006	557	11	

**NO IMPACTS**

SC 557  
 P.I. = 300+88.00  
 Δ = 9° 59' 20" (RT)  
 D = 9° 54' 01"  
 T = 336.24'  
 L = 1,109.68'  
 E = 24.26'  
 R = 6,363.00'

OAKRIDGE RD  
 Reloc. Curve Data  
 P.I. = 13+99.83  
 Δ = 41° 45' 30" (LT)  
 D = 19° 05' 55"  
 T = 114.43'  
 L = 318.05'  
 E = 27.08'  
 R = 300.00'  
 D.S. = V.A.  
 eMAX = 3.14  
 e = 0.065

SC 557  
 Reloc. Curve Data  
 P.I. = 307+32.74  
 Δ = 5° 55' 22" (RT)  
 D = 0° 57' 18"  
 T = 292.89'  
 L = 583.32'  
 E = 7.14'  
 R = 6,000.00'  
 D.S. = 45 MPH  
 eMAX = 0.060  
 e = RC  
 P.C.L.G. = 0.54%  
 P.T.L.G. = 0.54%

SC 557  
 Reloc. Curve Data  
 P.I. = 289+94.47  
 Δ = 38° 33' 44" (RT)  
 D = 4° 05' 33"  
 T = 489.73'  
 L = 942.25'  
 E = 83.19'  
 R = 1,400.00'  
 D.S. = 45 MPH  
 eMAX = 0.060  
 e = 0.047  
 P.C.L.G. = 0.54%  
 P.T.L.G. = 0.54%

NOTE: RELOCATE CENTERLINE BETWEEN STA. 244+6.70 AND STA. 320+61.70

**S** UNDERGROUND AND OVERHEAD UTILITIES SHALL BE 10 FEET CLEAR OF EACH PROPOSED SIGNAL POLE.

ALIGNMENT CONTROL CAN BE FOUND ON REFERENCE SHEETS



**CALYX**  
 ENGINEERS + CONSULTANTS  
 1700 EAST WASHINGTON STREET  
 CHARLOTTE, NC 28203  
 704.333.7300  
 C.A.L.Y.X. @ g m a i l . c o m

4			
3			
2			
1	CALYX	03/2019	PREPARED FOR THE CLIENT BY THE ENGINEER
REV	BY	DATE	DESCRIPTION OF REVISION

SC 557  
 PLAN  
 STA. 292+50 TO STA. 308+00

SCALE 1"=60' RTE. SC 557 DWG. NO.

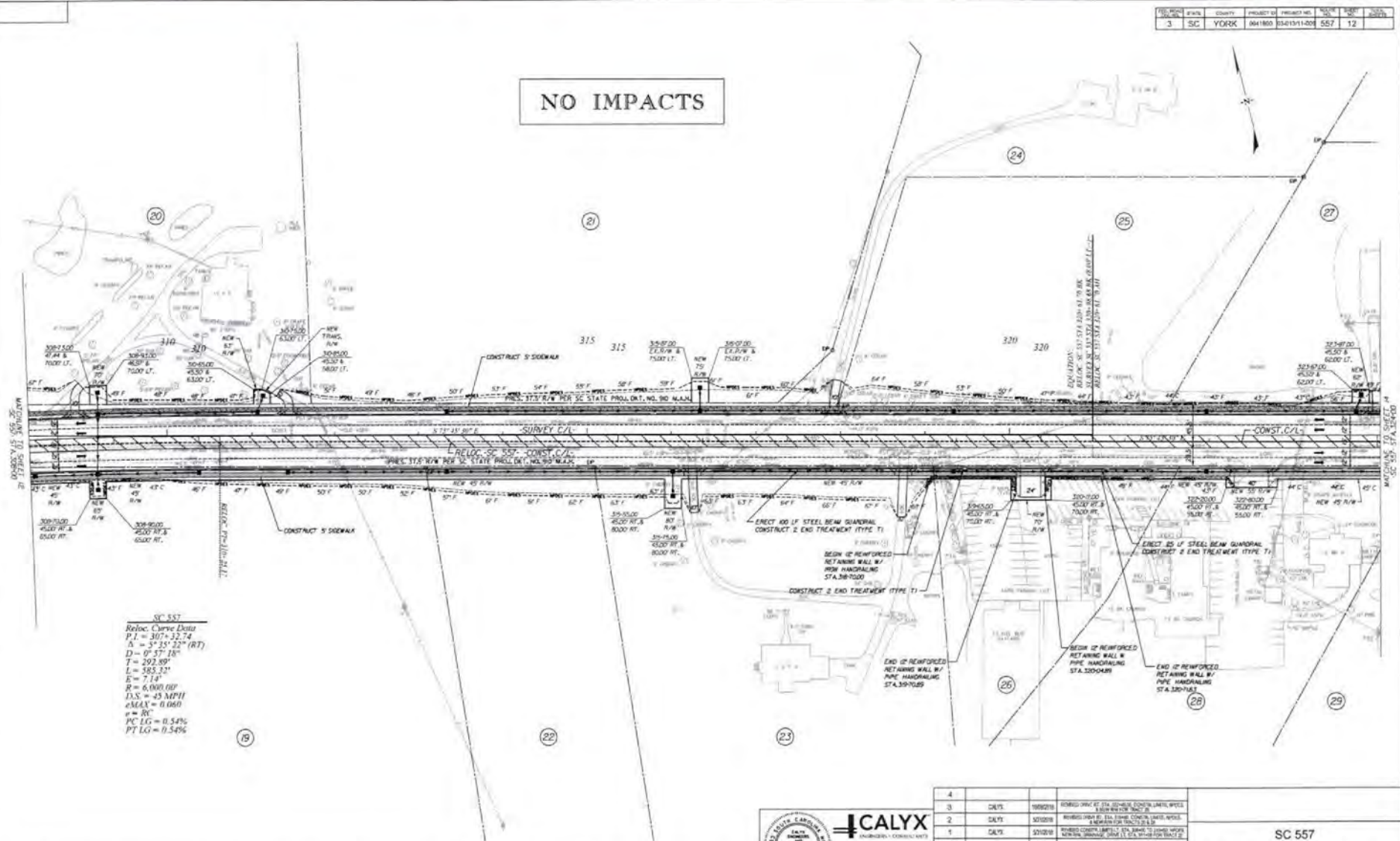
03/2019  
 cadw  
 H:\Projects\03062019\SC 557 - York\Drawings\Permitted\SC557\_11.dwg

REMOVAL OF EXISTING PAVEMENT

Permitted Plans, SAC-2007-02400, SC 557 - Roadway Improvement Project, Sheet 16 of 19, April 6, 2019

FILE NO.	STATE	COUNTY	PROJECT NO.	SHEET NO.	TOTAL SHEETS
3	SC	YORK	041800 557-1911-001	557 12	12

NO IMPACTS



SC 557  
 Reloc. Curve Data  
 P.I. = 307+32.74  
 Δ = 5° 35' 22" (RT)  
 D = 0' 57" 18"  
 T = 292.89'  
 L = 585.23'  
 E = 71.1'  
 R = 6,000.00'  
 D.S. = 45 MPH  
 eMAX = 0.060  
 f = SC  
 PC LG = 0.54%  
 PT LG = 0.54%

NOTE: RELOCATE CENTERLINE BETWEEN STA. 244+6.70 AND STA. 320+61.70

ALIGNMENT CONTROL CAN BE FOUND ON REFERENCE SHEETS

**CALYX**  
 ENGINEERS - CONSULTANTS  
 7100 EAST INDEPENDENCE  
 RICHMOND, VA 23221  
 PHONE: 761.331.2200  
 FAX: 761.331.2201  
 CALYX@calyx.com

NO.	DATE	BY	DESCRIPTION
4			
3	08/02/18		REVISED PER STA. 244+6.70 CENTERLINE MOVE
2	02/02/18		REVISED PER STA. 244+6.70 CENTERLINE MOVE
1	02/02/18		REVISED PER STA. 244+6.70 CENTERLINE MOVE
0			ISSUED FOR PERMIT

SC 557  
 PLAN  
 STA. 308+00 TO STA. 324+00  
 SCALE 1"=40' RTE. SC 557 DWG. NO.

5/25/2019  
 09:46 AM  
 H:\Projects\2008\2019\SC 557\A4\CLIENT\Hydras\Drawings\SC557\_12.dwg



Permitted Plans, SAC-2007-02400, SC 557 - Roadway Improvement Project, Sheet 18 of 19, April 6, 2019

DIST.	COUNTY	PROJECT NO.	SHEET NO.	TOTAL SHEETS
3	SC	YORK 0041803	18-21811-004 557	14

**NO IMPACTS**



**RIDGE RD.**  
 Reloc. Curve Data  
 P.I. = 22+46.69  
 A = 67° 37' 22" (RT)  
 D = 7° 09' 43"  
 T = 539.16'  
 L = 948.85'  
 E = 164.75'  
 R = 800.00'  
 DS = 45 MPH  
 eMAX = 0.060  
 e = 0.059  
 P.C.LG = 0.54%  
 P.T.LG = 0.54%

REMOVAL OF EXISTING PAVEMENT

ALIGNMENT CONTROL CAN BE FOUND ON REFERENCE SHEETS

**CALYX**  
 ENGINEERS + CONSULTANTS  
 700 EAST INDEPENDENCE  
 CHARLOTTE, NC 28202  
 phone: 704.527.7300  
 CALYXengineers.com

4				
3				
2				
1				
REV.	BY	DATE	DESCRIPTION/REVISION	

**RIDGE RD.**  
 PLAN  
 STA. 15+45 TO STA. 24+50  
 SCALE 1"=40'  
 RTE. SC 557 DWG. NO.

8/3/2018  
 cdm@e  
 I:\Project\2018\03\20 SC 557 A\CLIENT\Hydraulics\Permits\052557\_1\topo\perm.dwg

Permitted Plans, SAC-2007-02400, SC 557 - Roadway Improvement Project, Sheet 19 of 19, April 6, 2019

WETLAND PERMIT IMPACT SUMMARY												
Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS					SURFACE WATER IMPACTS				
			Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
P-1	-SC557- STA. 260+54 to 261+75 LT	Roadway Fill	0.000	0.000	0.000	0.000	0.000	0.133	0.000	0	0	0
S-1	-SC557- STA. 258+02 to STA. 258+55 LT	Bank Stabilization	0.000	0.000	0.000	0.000	0.000	< 0.001	0.000	20	0	0
S-2	-SC557- STA. 258+47 to STA. 259+11 RT	Roadway Fill	0.000	0.000	0.000	0.000	0.000	0.009	0.000	65	0	0
S-3	-SC557- STA. 257+71 to STA. 258+39 RT	Bank Stabilization	0.000	0.000	0.000	0.000	0.000	< 0.001	0.000	20	0	0
W-1	-SC557- STA. 258+92 to STA. 261+15 RT	Roadway Fill	0.302	0.000	0.000	0.000	0.000	0.000	0.000	0	0	0
S-4	-SC557- STA. 276+11 to STA. 276+45 LT	Roadway Fill	0.000	0.000	0.000	0.000	0.000	0.011	0.000	18 *	0	0
S-5	-SC557- STA. 274+82 RT to STA. 276+17 LT	7'x8' RCBC	0.000	0.000	0.000	0.000	0.000	0.033	0.000	202	0	0
S-5	-SC557- STA. 274+82 RT to STA. 276+17 LT	Roadway Fill	0.000	0.000	0.000	0.000	0.000	0.000	0.000	24	0	0
W-2	-SC557- STA. 285+58 to STA. 287+33 LT	Roadway Fill	0.079	0.000	0.000	0.000	0.000	0.000	0.000	0	0	0
*	Also 67 LF of Channel Relocation; therefore, not part of mitigation calculations											
TOTALS:			0.381	0.000	0.000	0.000	0.000	0.185	0.000	349	0	0

SC 557 ROADWAY IMPROVEMENT PROJECT  
 YORK COUNTY  
 PROJECT ID: 0041800  
 YORK CO. PROJ. 03020-013/11149-009  
 11/6/2018

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, driveways, airport runways, and taxiways) in waters of the United States. For linear transportation projects in non-tidal waters, the discharge of dredged or fill material 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 of dredged or fill material 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 of dredged or fill material, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The areas affected by temporary fills must be revegetated, as appropriate.

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 of dredged or fill material 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 of dredged or fill material 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 pre-construction notification (see paragraph (b)(4) of general condition 32). The district engineer will evaluate the PCN in accordance with Section D, "District Engineer's Decision." The district engineer may require mitigation to ensure that the authorized activity results in no more than minimal individual and cumulative adverse environmental effects (see general condition 23).

## Nationwide Permit General Conditions

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

(d) As a result of formal or informal consultation or conference with the FWS or NMFS the district engineer may add species-specific permit conditions to the 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 world wide web pages at <http://www.fws.gov/> or <http://www.fws.gov/ipac> and <http://www.nmfs.noaa.gov/pr/species/esa/> respectively.

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

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

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

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

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

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

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

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

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

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

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

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



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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

---

(Transferee)

---

(Date)

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

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

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

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

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

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

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

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

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

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

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

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

(2) Location of the proposed activity;

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

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

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

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

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

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

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

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

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



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

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

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

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

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

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

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

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

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

### **District Engineer's Decision**

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

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

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

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

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

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

### **Further Information**

1. District engineers have authority to determine if an activity complies with the terms and conditions of an NWP.
2. NWPs do not obviate the need to obtain other federal, state, or local permits, approvals, or authorizations required by law.
3. NWPs do not grant any property rights or exclusive privileges.
4. NWPs do not authorize any injury to the property or rights of others.
5. NWPs do not authorize interference with any existing or proposed Federal project (see general condition 31).

### **Nationwide Permit Definitions**

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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



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

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

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

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

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

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



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

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

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

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

### A. BACKGROUND/APPLICABILITY

1. The following regional conditions have been approved by the Division Engineer for the South Atlantic Division (SAD) for use in the Charleston District (SAC) for the following Nationwide Permits (NWP):
  - a. The NWP published in the January 13, 2021 Federal Register (86 FR 2744) announcing the reissuance of twelve (12) existing NWP (that is, NWP 12, 21, 29, 39, 40, 42, 43, 44, 48, 50, 51, and 52) and issuance of four (4) new NWP (that is, NWP 55, 56, 57, and 58), as well as the reissuance of NWP general conditions and definitions with some modifications. These 16 NWP were effective on March 15, 2021 and will expire on March 14, 2026; and
  - b. The NWP published in the December 27, 2021 Federal Register (86 FR 73522) announcing the reissuance of the remaining unmodified forty (40) existing NWP (that is, NWP 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18, 19, 20, 22, 23, 24, 25, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, 41, 45, 46, 49, 53, and 54) and issuance of one (1) new NWP (that is, NWP 59). At this time, NWP 26 and 47 are reserved. These 41 NWP will be effective as of February 25, 2022 and will expire on March 14, 2026.
2. Status of Activities Under Prior NWP and/or Regional Conditions.
  - i. 16 NWP: The modified regional conditions that were issued on January 19, 2022 and are incorporated in this document **supersede** the previous regional conditions that were approved for the 16 NWP that went into effect on March 15, 2021, **except** for the following scenarios:
    1. NWP verification letters for one or more of the 16 NWP that were issued **prior** to January 19, 2022; or

## 2021-2022 NWP REGIONAL CONDITIONS FOR CHARLESTON DISTRICT (SAC)

2. NWP activities that do not require a pre-construction notification (PCN)<sup>1</sup>, are covered by one or more of the 16 NWPs, and have either commenced, are under contract to commence, or have been completed **prior** to January 19, 2022.
  - ii. 40 NWPs: For information about whether an activity can continue under the 2017 versions of the 40 existing NWPs (for example, the status of prior permit verifications and pre-construction notifications) and, accordingly, the 2017 Regional Conditions, see the discussion in the Reissuance and Modification of Nationwide Permits at 86 FR 73522 in Section I.D. on page 73525 or contact the Charleston District Regulatory Office directly.
3. The following regional conditions will provide additional protection for the aquatic environment that is necessary to ensure that the NWPs authorize only those activities with no more than minimal adverse environmental effects.
4. As specified, under NWP General Condition 27, Regional and Case-By-Case Conditions: The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case-specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its Section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

### **B. EXCLUDED WATERS AND/OR AREAS**

Not applicable.

### **C. REGIONAL CONDITIONS APPLICABLE TO ALL NWPs**

1. Use of nationwide permits does not preclude requirements to obtain all other applicable Federal, State, county, and local government authorizations.
2. NWP activities are not authorized in areas known or suspected to have sediment contamination, with the exception of the following: (1) activities authorized by NWP 38; (2) activities authorized by NWP 53 when used in combination with NWP 38; (3) sediment sampling for dredging projects authorized by NWP 6; and (4) activities authorized by NWP 20.
3. For all proposed activities, both temporary and permanent, that would be located within a FEMA designated floodway, the prospective permittee must submit a PCN to the District Engineer in accordance with General Condition 32.

---

<sup>1</sup> The acronym "PCN" used throughout this document refers to *Pre-Construction Notification*, as defined in NWP General Condition 32.

## 2021-2022 NWP REGIONAL CONDITIONS FOR CHARLESTON DISTRICT (SAC)

4. For all NWPs, the prospective permittee must submit a PCN to the District Engineer in accordance with General Conditions 31 and 32, for any activity that would be located in or adjacent to an authorized USACE Civil Works project, including Federal Navigation projects:
  - a. **USACE Civil Works projects:** Buck Creek in Horry County, Eagle Creek in Dorchester County, Kingstree Branch in Williamsburg County, Sawmill Branch in Berkeley and Dorchester Counties, Scotts Creek in Newberry County, Socastee Creek in Horry County and Turkey Creek in Sumter County, Wilson Branch in Chesterfield County, Edisto River in Orangeburg and Dorchester Counties, North Edisto River in Aitken and Orangeburg Counties, Folly Beach in Charleston County, Hunting Island Beach, waste water treatment plant and water line in Beaufort County, Myrtle Beach in Georgetown and Horry County, Pawleys Island Beach in Georgetown County, Edisto Island Beach in Charleston County, Crab Bank in Charleston County, Morris Island Lighthouse in Charleston County, Miller Corner Disposal area Phragmites Control in Georgetown County, Cape Marsh Management area (Santee Coastal Reserve) in Charleston County, Murphy Island in Charleston County, Pocolaligo River and Swamp in Clarendon and Sumter Counties, Pinopolis Dam in Berkeley County, Battery Pringle in Charleston County, Castle Pinckney in Charleston County, Pompion Hill Chapel along the Cooper River in Berkeley County, Drayton Hall in Charleston County, Indian Bluff in Orangeburg County, Singleton Swash at Shore Drive in Horry County, Turkey Creek Bridge at Pineview Drive in Lancaster, Big Dutchman Creek Bridge at West Oak Drive in Rock Hill, SC, Calabash Branch Bridge at Tom Joye Road in Clover, Blue Branch Bridge at Fortanberry Road in Gaffney, Glenn Creek Bridge at Sulphur Springs Road in Spartanburg County, Cow Castle Creek (Bowman) in Orangeburg County, Cowpen Swamp at Simpson Creek in Horry County, Crabtree Swamp in Horry County, Saluda River (North, South, and Middle Fork) in Greenville County, Shot Pouch Creek in Sumter County, Simpson Creek in Horry County, and Todd Swamp in Horry County.
  - b. **Defined Federal Navigation projects:** Ashley River (0.5 miles east of Hwy 7 bridge downstream to the Atlantic Intracoastal Waterway (AIWW)), Atlantic Intracoastal Waterway ((AIWW) GA/SC line to SC/NC line), Brookgreen Garden Canal, Calabash Creek, Charleston Harbor (including the Cooper River, Town Creek, Shem Creek to Coleman Blvd and Mount Pleasant Channel), Folly River, Georgetown Harbor (Winyah Bay, Sampit River and Bypass Channel), Jeremy Creek, Little River Inlet, Murrells Inlet (Main Creek), Port Royal Harbor, Shipyard River, Savannah River (Below Augusta) and Town Creek McClellanville (i.e., Five Fathoms Creek, AIWW to Bulls Bay).
  - c. **Undefined Federal Navigation projects:** Adams Creek, Archers Creek (From intersection with Beaufort River for 2 miles), Edisto River (River mile 0.00 to 175.0), Great Pee Dee River (Waccamaw River via Bull Creek then to

## 2021-2022 NWP REGIONAL CONDITIONS FOR CHARLESTON DISTRICT (SAC)

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

5. For all proposed activities that would be located in or adjacent to an authorized Federal Navigation project, as referenced in Regional Condition C.4.b, the project drawings must include the following information: (1) State Plane Coordinates (NAD 1983) for a minimum of two corners of each structure or fill where it is closest to the Federal channel; (2) the distance from the watermost edge of the proposed structure or fill to the nearest edge of the Federal channel; and (3) Mean Low Water line and the Mean High Water line.
6. For all NWPs requiring a PCN and when the activity involves the discharge of dredged or fill material into waters of the U.S. associated with mechanized land clearing that results in the permanent conversion of forested or scrub-shrub wetlands to herbaceous wetlands, the PCN should include the following information: (1) a written description and/or drawings of the proposed conversion activity and (2) acreage of the permanent conversion.

### D. REGIONAL CONDITIONS APPLICABLE TO SPECIFIC NWPs

1. For NWP 3, paragraph (a) activities, the prospective permittee must submit a PCN to the District Engineer in accordance with General Condition #32 for the repair, rehabilitation or replacement of existing utility lines, which include electric lines and/or telecommunication lines, constructed over navigable waters of the United States (i.e., Section 10 waters), and existing utility lines, electric lines, telecommunication lines and/or pipelines routed in or under navigable waters of the United States (i.e., Section 10 waters), even if no discharge of dredged or fill material occurs.
2. For NWP 3, the prospective permittee must submit a PCN to the District Engineer in accordance with General Condition 32, for maintenance activities related to stormwater management that would occur in tidal waters, including tidal wetlands.
3. For NWPs 3, 11, 12, 13, 14, 15, 20, 22, 33, 57, 58, and 59, temporary structures, fills, and/or work, including the use of temporary mats, are authorized for the minimum amount of time necessary to accomplish the work, which shall not exceed a period of 180 days without additional Corps approval. **However, temporary sidecast material authorized by NWPs 12, 57, or 58 cannot ever exceed a period of 180 days.** The temporary structures, fills, and/or work, including the use of temporary mats, shall be removed as soon as the work is

## 2021-2022 NWP REGIONAL CONDITIONS FOR CHARLESTON DISTRICT (SAC)

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

4. For NWPs 3, 11, 12, 13, 14, 15, 20, 22, 33, 57, 58 and 59 that require PCNs and when the activity involves temporary structures, fills, and/or work, including the use of temporary mats, the PCN should include the following information: (1) a written description and/or drawings of the proposed temporary activities that will be used during project construction; (2) the timeframe that the proposed temporary activities will be in place; and (3) specifications of how pre-construction contours will be re-established and verified after construction. Temporary mats include timber mats, metal, synthetic and/or artificial mats, or other materials that may serve the purpose of mats.
5. For NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, 50, 51, 52, 57 and 58 in accordance with General Condition 22(a) and for NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, 38 and 54, in accordance with General Condition 22(b), the ACE Basin National Estuarine Research Reserve and the North Inlet Winyah Bay National Estuarine Research Reserve are Designated Critical Resource Waters. Activities described in the NWPs listed herein are subject to the limitations and/or PCN requirements listed in General Condition 22 (a) and (b).
6. For NWPs 7 and 58 activities that involve intake structures, the associated intake structure must be screened to prevent entrainment of juvenile and larval organisms, and the inflow velocity of the associated intake structures cannot exceed 0.5 feet/second.
7. For NWPs 12, 57 and 58 activities that involve horizontal directional drilling beneath navigable waters of the United States (i.e., Section 10 waters), the PCN should include a proposed remediation plan (i.e., frac-out plan).
8. For NWPs 12, 14, 29, 39, 46, 51, 52, 57 and 58 activities that involve crossings, all culverts must be adequately sized to maintain flow. For these activities that require submittal of a PCN, the PCN should include the minimum size of and number of culvert/pipes that are proposed.
9. For NWPs 12, 14, 18, 43, 51, 57 and 58, the prospective permittee must submit a PCN to the District Engineer in accordance with General Condition #32, for activities that involve the loss of greater than 0.005 acre of stream bed.
10. For NWPs 12, 14, 18, 21, 29, 39, 40, 42, 43, 44, 50, 51, 52, 57, 58 and 59, activities that involve the loss of greater than 0.005 acre of stream bed, compensatory mitigation will be required and the PCN should include a compensatory mitigation plan.

2021-2022 NWP REGIONAL CONDITIONS FOR CHARLESTON DISTRICT (SAC)

11. For NWPs 12, 14, 18, 21, 27, 29, 39, 40, 42, 43, 44, 50, 51, 52, 57, 58, and 59, the discharge cannot cause the loss of greater than 0.05 acre of stream bed.
12. For NWPs 29 and 39, the discharges of dredged or fill material for the construction of stormwater management facilities in perennial streams are not authorized.
13. For NWP 33, the prospective permittee must submit a PCN to the District Engineer, in accordance with General Condition #32, for temporary construction, access, and dewatering activities that impact greater than 0.1 acre of non-tidal waters of the United States, including wetlands. In addition, the PCN should include a restoration plan.
14. For existing NWP 48 activities that involve changing from bottom culture to floating or suspended culture OR proposed NWP 48 activities that involve floating or suspended culture, the prospective permittee must submit a PCN to the District Engineer in accordance with General Condition #32.
15. For proposed NWP 48 activities involving floating or suspended culture and/or proposed NWPs 55 and 56 activities that will occur adjacent to property that is not owned by the prospective permittee, the PCN should include the following information:
  - a. A map or depiction that shows the adjacent property(ies) and adjacent property owners' contact information. Note: This information may be obtained online from the applicable county's tax information pages.
  - b. A signed letter(s) of "no objection" to the proposed mariculture activity from each of the adjacent property owner(s). Each letter shall include the name, mailing address, property address, property Tax Map Parcel (TMS) number, and signature of the property owner. Or, if the prospective permittee is unable to obtain a letter(s) of "no objection", the Corps will notify the adjacent property owner(s) of the proposed project by letter wherein the adjacent property owner will be given 15 days to provide comments.
16. For NWP 53, the PCN should include a Tier I evaluation, in accordance with the Inland Testing Manual, for the project area immediately upstream of the low-head dam. If the Tier I evaluation indicates contaminated sediments are present, a Tier II evaluation may be required.
17. The prospective permittee is advised of the following for activities under any NWP for which (1) the 401 Water Quality Certifications (WQC) were denied (see F.1.a), and/or (2) activities under the NWP were found to be inconsistent with the S.C. Coastal Zone Management Program and, therefore, concurrence with the Coastal Zone Consistency determination was denied (see F.2.a), and/or (3) the

## 2021-2022 NWP REGIONAL CONDITIONS FOR CHARLESTON DISTRICT (SAC)

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

- a. For NWPs 12, 14, 16, 17, 21, 23, 29, 34, 39, 44, 46, 49, 50, 54, 57, 58 and 59 where WQC was denied, the prospective permittee should provide to the Corps a copy of the Individual WQC or evidence demonstrating a waiver was granted.
- b. For NWPs 12, 14, 16, 17, 21, 23, 24, 29, 34, 35, 39, 42, 44, 46, 49, 50, 51, 55, 56, 57, 58 and 59 where concurrence with the Coastal Zone Consistency was denied, the prospective permittee should provide to the Corps a copy of the Individual CZC Concurrence or presumed concurrence for the proposed activity.
- c. For all NWPs in any of the “Critical Areas” of the Coastal Zone, an Individual Critical Area permit is required (see F.3). Therefore, the prospective permittee should provide a copy of the Individual Critical Area permit to the Corps for the proposed activity.

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

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

### **E. ACTIVITY SPECIFIC REGIONAL CONDITIONS**

Not applicable.

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

#### **1. Water Quality Certification (WQC)**

##### **a. WQC Denied**

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



## 2021-2022 NWP REGIONAL CONDITIONS FOR CHARLESTON DISTRICT (SAC)

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

### b. **WQC Granted With Conditions**

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

- i. For NWP 43, "Activities authorized by this certification are limited to maintenance of existing facilities, such as stormwater ponds, detention and retention basins, water control structures, outfall structures, emergency spillways, and existing ponds, that are proposed for use as water quantity or volume control. This NWP cannot be used for existing ponds that are proposed to be converted into water quality treatment facilities, such as sediment basins, sediment traps, or other similar structures."
- ii. For NWP 51, "This NWP is not certified for activities that cause the loss of more than 300 linear feet of stream bed."
- iii. For NWP 52, "This NWP is not certified for activities that cause the loss of more than 300 linear feet of stream bed."

### c. **WQC Granted Without Conditions**

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

### d. **No WQC Required**

NWPs 1, 2, 8, 9, 10, 11, 24, 28, 35, 55 and 56 do not require WQCs.

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

### a. **CZC Concurrence Denied**

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

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

### b. **CZC Concurrence Granted With Conditions**

## 2021-2022 NWP REGIONAL CONDITIONS FOR CHARLESTON DISTRICT (SAC)

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

- i. For NWP 43, "Activities authorized by this certification are limited to maintenance of existing facilities, such as stormwater ponds, detention and retention basins, water control structures, outfall structures, emergency spillways, and existing ponds that are proposed for use as water quantity or volume control. This NWP cannot be used for existing ponds that are proposed to be converted into water quality treatment facilities such as sediment basins, sediment traps, or other similar structures."
- ii. For NWP 52, "This NWP is not certified for activities that cause the loss of more than 300 linear feet of stream bed."

### c. **CZC Concurrence Granted Without Conditions**

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

### d. **No CZC required**

Not applicable.

## 3. **Coastal Zone Consistency (CZC) General Condition**

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

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

## G. **DISTRICT POINT OF CONTACT**

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



September 19, 2022

Mr. Patrick Hamilton  
York County  
6 South Congress Street  
York, South Carolina 29745  
Patrick.Hamilton@yorkcountygov.com

Re: 401 Certification for Authorization Pursuant to Nationwide Permit 14 (Linear Transportation Projects)

Applicant Permit ID No.: SAC 2007-02400

Applicant: York

County: York

Project: SC 557 – Roadway Improvement

Dear Mr. Hamilton:

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

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

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

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

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

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

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

Sincerely,

*Morgan Amedee*

Morgan D. Amedee  
Water Quality Certification and Wetlands Section

cc: USACE Greenville Field Office  
Ms. Jennifer Harrod

**Nationwide Permit Number 14: Linear Transportation Projects**

**Proposed Conditions for the 401 Water Quality Certification:**

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

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  
[sac.rd.columbia@usace.army.mil](mailto:sac.rd.columbia@usace.army.mil)

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

=====

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

\_\_\_\_\_  
Signature of Permittee



REVISED

# FINAL BRIDGE GEOTECHNICAL ENGINEERING REPORT

SC 557 Bridge over Crowders Creek

York County, South Carolina



## PREPARED FOR

NV5

448 Lakeshore Parkway, Suite 215

Rock Hill, South Carolina 29730



## PREPARED BY

F&ME Consultants, Inc.

1825 Blanding Street

Columbia, South Carolina 29205

SCDOT Project ID: 0041800RD01

F&ME Project #: G4843.00

**MARCH 15, 2021**

March 15, 2021

Mr. Steve Drum, P.E.  
NV5  
448 Lakeshore Parkway, Suite 215  
Rock Hill, South Carolina 29730

Re: REVISED Final Bridge Geotechnical Engineering Report  
SC 557 Bridge over Crowders Creek  
York County, South Carolina  
Project ID 0041800RD01  
F&ME File No. G4843.00

Mr. Drum:

Submitted herein is the revised final geotechnical report for the above referenced project. Revisions to our previously submitted report, dated June 28, 2019, were generated from SCDOT review comments (comment matrix dated March 4, 2020). Included is a general project description, a summary of the performed field investigation(s), our analysis of the subsurface findings, and our conclusions and recommendations for the proposed bridge foundation system and the bridge embankments. For geotechnical information associated with the SC 557 roadway embankments and roadway structures, please refer to F&ME's Final Roadway Geotechnical Engineering Report.

Please notify us if there are any questions or if we may be of further assistance with the implementation of our recommendations.

Sincerely,

F&ME CONSULTANTS



John F. Hamilton, P.E.  
Geotechnical Design Manager

JFH:APR/jfh:apr



Alex P. Ross, E.I.T.  
Geotechnical Associate





# TABLE OF CONTENTS

<b>1. INTRODUCTION</b> .....	<b>1</b>
<b>2. SUBSURFACE INVESTIGATION</b> .....	<b>2</b>
2.1. Preliminary Subsurface Investigation .....	2
2.2. Final Subsurface Investigation .....	3
2.3. Field Investigation Summary .....	3
<b>3. LABORATORY TESTING PROGRAM</b> .....	<b>5</b>
<b>4. GENERAL SITE GEOLOGY</b> .....	<b>6</b>
<b>5. SUBSURFACE CONDITIONS</b> .....	<b>6</b>
5.1 Soil Stratigraphy .....	7
5.2 Rock Conditions .....	7
5.3 Groundwater Conditions .....	8
<b>6. BRIDGE FOUNDATION LOADINGS</b> .....	<b>8</b>
<b>7. CONCLUSIONS AND RECOMMENDATIONS</b> .....	<b>9</b>
7.1. Site Preparation .....	9
7.2. Bridge Embankment Static Settlements.....	10
7.3. Acceleration Design Response Spectrum.....	12
7.4. Geotechnical Seismic Hazard Potential.....	13
7.5. Seismic Induced Deformation.....	14
7.6. Bridge Embankment Slope Stability .....	15
7.7. Pile Corrosion and Deterioration Potential .....	17
7.8. End Bent Pile Foundation Axial Analyses.....	18
7.9. Interior Bent Drilled Shaft Foundation Axial Analyses .....	19
7.10. Bridge Foundation Lateral Design Analyses .....	19
<b>8. BRIDGE PLAN NOTES</b> .....	<b>21</b>
<b>9. TEMPORARY SHORING</b> .....	<b>24</b>
<b>10. VIBRATION MONITORING</b> .....	<b>25</b>
<b>11. LIMITATIONS OF REPORT</b> .....	<b>25</b>

## APPENDIX

Section 1	Site Location Plan
Section 2	Boring Location Plan
Section 3	Generalized Subsurface Profile
Section 4	Boring Logs
Section 5	Shelby Tube Preparation Logs
Section 6	Rock Core Photos
Section 7	Laboratory Test Results
Section 8	Seismic Design Data
Section 9	Bridge Foundation Loadings
Section 10	Embankment Static Settlement Analyses
Section 11	Seismic Soil Shear Strength Loss Calculations
Section 12	Embankment Slope Stability Analyses
Section 12a	SLIDE Results
Section 12b	Newmark Deformation Calculations
Section 13	End Bent 1 Driven Pile Analyses
Section 14	Interior Bent 2 Drilled Shaft Analyses
Section 15	Interior Bent 3 Drilled Shaft Analyses
Section 16	Interior Bent 4 Drilled Shaft Analyses
Section 17	End Bent 5 Driven Pile Analyses
Section 18	Geotechnical Drawings & Details

## 1. INTRODUCTION

The project is located on route SC 557 over Crowders Creek in York County, South Carolina. A site location plan is presented in Section 1 of the Appendix as Figure 1.

It is our understanding that the project will include the demolition/removal of the existing two-lane bridge and the replacement with a new, five-lane bridge on a new roadway alignment. The new roadway alignment is detailed at approximately 155 feet south of the existing alignment at the bridge location. We understand that the maximum increase in vertical grade of the bridge approach embankments and replacement bridge relative to the existing grade at the centerline of the new alignment is approximately twenty-three (23) feet.

The proposed replacement bridge consists of four (4) spans (100'-1 9/16", 100'-0", 100'-0" and 50'-1 9/16"). The planned foundation elements for the replacement bridge are HP14x89 steel piles at End Bents 1 and 5 (EB1 and EB5) and 42-inch columns founded on 48-inch diameter drilled shafts and 42-inch rock sockets at Interior Bents 2, 3 and 4 (IB2, IB3 and IB4).

As specified in the 2019 SCDOT Geotechnical Design Manual (GDM) v2.0 at the time the original report was generated, the bridge embankment is defined as:

*"The longitudinal length of embankment where mitigation is required to meet the Global Performance Objectives of the Bridge System as contained in the Seismic Specs or 3.25 times the height of the backwall, whichever is longer; in the event mitigation is not required, this embankment shall encompass the front slope and shall extend 3.25 times the height of the backwall"*

F&ME has utilized the above bridge embankment definition for use in the final bridge embankment analyses, provided herein. In accordance with the 2008 SCDOT Seismic Design Specifications v2.0, the bridge Operational Classification is II.

The preliminary and final subsurface investigations were performed by F&ME in general accordance with the 2010 GDM v1.2. The contract does not contemplate compliance with the GDM v2.0. F&ME has elected to use the analysis and design elements of the GDM v2.0 where it can be effectively implemented under the general conditions of our contract and where it will provide a benefit to the project. The final bridge foundation and bridge embankment analyses and the development of the final design recommendations were performed in general accordance with the GDM v2.0. The original final geotechnical report implemented analysis/design elements of the GDM v2.0 that were available at the time that report was issued. F&ME did not update that report or any subsequent revisions to geotechnical design bulletins that were issued following submittal of the original final geotechnical report. Where the GDM does not offer design guidance, the AASHTO LRFD Specifications for Highway Bridges, 6<sup>th</sup> Ed., 2012 with the 2013 interim revisions were utilized.

## 2. SUBSURFACE INVESTIGATION

### 2.1. Preliminary Subsurface Investigation

On September 21, 2012, two (2) standard penetration test (SPT) borings (designated as B-1 and B-2) were performed for preliminary bridge design purposes. Borings B-1 and B-2 were performed near the beginning and the end of the existing bridge end bents, respectively. The soil test borings were advanced utilizing a CME 550X drill rig. Hollow stem auger drilling techniques were used to maintain a stable borehole. Borings B-1 and B-2 were advanced to practical refusal which occurred at depths of 50.5 feet and 35.0 feet, respectively, below the present ground surface. Standard spilt-spoon samples (SPT tests) were obtained at regular intervals throughout the depths of the borings to determine the relative densities and consistencies of the subsurface soils and to collect subsurface soil samples. Sampling in the top ten (10) feet below the surface was continuous, as specified in the GDM. During SPT testing of the encountered soils, an automatic hammer system was used. The recorded energy ratio for the hammer is 83%.

On September 17, 2012, dynamic cone penetrometer (DCP) tests were performed through one (1) hand auger boring, designated as HA-1, within Crowders Creek. HA-1 was performed primarily to obtain soil samples for laboratory testing to evaluate scour potential. DCP testing was performed in accordance with Sowers and Hedges methodology for shallow in-situ soil testing at regular intervals throughout the soil test borings. Subsurface soil samples were obtained at visually discernable soil strata changes throughout the depths of the borings. HA-1 was terminated at an approximate depth of four (4) feet following collapse of the borehole.

In addition, F&ME performed a Multi-channel Analysis of Surface Waves (MASW) test from the existing ground surface at the western shoulder of the existing bridge approach embankment, left of existing roadway centerline. The MASW test is a geophysical technique that measures the velocity of energy waves as they travel through the earth's surface. This method is based on the physical characteristics of different materials refracting energy at different velocities. The shear waves can be active (purposely generated by applying energy at a known distance from a geophone) or passive (generated from ambient cultural noises such as vehicular traffic, heavy equipment operations, or industrial activities). The collected shear wave measurements allow the user to define site-specific conditions such as ground spectral earthquake response. Shear wave velocities are dependent on the shear strengths of the subsurface materials and allow one to calculate elastic properties, including Young's Modulus, Shear Modulus, Bulk Modulus, and Poisson's ratio. MASW surveys, when combined with other geotechnical methods, allow for a greater understanding of the subsurface matrix.

## 2.2. Final Subsurface Investigation

F&ME performed a final subsurface investigation to supplement the preliminary subsurface investigation. Between May 30 and June 8, 2018, ten (10) soil test borings (designated as B-3 through B-10, RW-18 and RW-19) and three (3) auger probe borings (designated as AP-1 through AP-3) were performed along the planned roadway alignment at the new proposed bridge location. Two (2) borings were performed at each interior bent and one (1) boring and one (1) auger probe boring were performed at each end bent. Boring RW-18 and RW-19 were performed approximately one-hundred fifty (150) feet from each end bent.

The soil test borings were advanced utilizing a CME 550X ATV-mounted drill rig. In most borings, hollow stem auger drilling techniques were used to maintain a stable borehole. Rotary wash drilling techniques were used to maintain a stable borehole in borings B-9, B-10 & RW-19. SPT tests were continuously obtained in the top ten (10) feet of each test boring. Following the continuous sampling, SPT samples were obtained at regular, five (5) foot intervals throughout the remaining depths of the borings. SPT samples were performed in general accordance with ASTM D-1586 to determine the relative densities and consistencies of the subsurface soils and to collect subsurface soil samples. During SPT testing of the encountered soils, an automatic hammer system was used. The energy ratio for the CME 550X hammer is 81%.

The auger probe borings were advanced with the CME 550X drill rig. The purpose of auger probe borings AP-1 and AP-2 was to obtain undisturbed Shelby tube samples and determine top of rock elevations at each proposed bridge end bent. Auger probe boring AP-3 was performed to collect undisturbed Shelby tube samples within the existing Crowders Creek channel. Hollow-stem auger drilling techniques were used to maintain a stable borehole. After undisturbed samples were collected in auger probe borings AP-1 and AP-2, augers were used to drill to top of rock, and SPT samples were performed to verify top of rock elevations.

## 2.3. Field Investigation Summary

The survey coordinates of the borings performed during the preliminary and final subsurface investigations were collected by F&ME personnel utilizing a Trimble R8 GPS rover on the SC VRS system. The survey coordinates of the boring locations were placed on the provided CAD drawing for the proposed roadway alignment. Subsequently, the station and offset of each boring location relative to the proposed roadway alignment was determined.

The locations of the borings performed during the preliminary and final subsurface investigations are provided in the following table.

Soil Testing Location Table					
Test Number	Test Hole Locale	Station	Offset from CL (ft)	Elevation (ft-MSL)	Depth (ft)
AP-1	Begin Bridge End Bent (EB1)	255+66	20 – RT	575.6	37.4
AP-2	End Bridge End Bent (EB5)	259+26	17 – LT	573.7	24.5
AP-3	Interior Bent (IB4)	258+76	19 – LT	574.4	8.0
B-1	Existing Begin Bridge End Bent	257+46	189 – LT	583.5	50.5
B-2	Existing End Bridge End Bent	259+41	226 – LT	583.8	35.0
B-3	Begin Bridge End Bent (EB1)	255+77	19 – LT	580.4	48.5
B-4	Interior Bent (IB2)	256+76	19 – LT	576.1	46.8
B-5	Interior Bent (IB2)	256+66	19 – RT	574.1	49.8
B-6	Interior Bent (IB3)	257+77	20 – LT	575.2	45.9
B-7	Interior Bent (IB3)	257+70	22 – RT	575.0	48.3
B-8	Interior Bent (IB4)	258+76	19 – LT	574.4	46.6
B-9	Interior Bent (IB4)	258+67	19 – RT	574.0	40.9
B-10	End Bridge End Bent (EB5)	259+16	19 – RT	573.2	26.1
HA-1	Existing Interior Bent	258+10	231 – LT	568.0	4.0
RW-18	Begin Bridge Approach Embankment	254+22	2 – RT	579.8	48.6
RW-19	End Bridge Approach Embankment	260+60	3 – LT	572.7	21.1

All of the collected soil samples performed for the preliminary and final subsurface investigations were examined and logged in the field by F&ME personnel, sealed in plastic bags, and transported to our laboratory for further examination and analyses. The soils were visually classified in the field based upon the Unified Soil Classification System.

We have provided a boring location plan in Section 2 of the Appendix displaying the locations of the borings performed during the preliminary and final subsurface investigations.

### 3. LABORATORY TESTING PROGRAM

F&ME performed laboratory testing on the material recovered from the preliminary and final geotechnical investigations. F&ME’s laboratory test program was performed to determine representative physical and engineering soil properties. The laboratory program included moisture content, Atterberg limits, grain size distribution, hydrometer analysis, consolidated-undrained triaxial shear, consolidation, and unconfined compressive strength of rock. These tests were used to determine the strength and behavioral characteristics of the soils and rock as well as to verify the field classifications by the AASHTO classification system and the Unified Soil Classification System (USCS).

The type and number of laboratory tests performed by F&ME are summarized in the following tables. These soil tests were conducted at F&ME’s AASHTO accredited laboratory in accordance with applicable ASTM/AASHTO standards.

Preliminary Laboratory Test Program Summary		
Type of Test	Testing Standard	Number of Tests
Moisture Content	AASHTO T265 (ASTM D2216)	4
Grain Size w/ Wash #200	ASTM D6913 & AASHTO T11 (ASTM D1140)	6
Atterberg Limits	AASHTO T89/90 (ASTM D4318)	4
Specific Gravity of Soils	AASHTO T100 (ASTM D854)	2

Final Laboratory Test Program Summary		
Type of Test	Testing Standard	Number of Tests
Moisture Content	AASHTO T265 (ASTM D2216)	61
Grain Size w/ Wash #200	ASTM D6913 & AASHTO T11 (ASTM D1140)	64
Hydrometer	AASHTO T88 (ASTM D422)	6
Atterberg Limits	AASHTO T89/90 (ASTM D4318)	64
Consolidation	AASHTO T216 (ASTM D2435)	1
CU Triaxial Shear	AASHTO T297 (ASTM D4767)	3
Unconfined Compressive Strength of Rock	ASTM D7012	14
Electro-Chemical Series	AASHTO T289 (ASTM G51) AASHTO T291 AASHTO T 290 (ASTM C1580) AASHTO T288	2

Data sheets presenting the results of the laboratory test program are provided in Section 7 of the Appendix.

## 4. GENERAL SITE GEOLOGY

In general, this site is in the Piedmont geologic area of South Carolina. The Piedmont Unit is bounded on the west by the Blue Ridge Unit and on the east by the Coastal Plain Unit. The boundary between the Blue Ridge Unit and the Piedmont Unit is typically assumed to be the Brevard Fault zone. The common boundary between the Piedmont Unit and the Coastal Plain Unit is the “Fall Line”. It is believed that the Piedmont is the remains of an ancient mountain chain that has been eroded with existing elevation ranging from 300 feet to 1,400 feet. The Piedmont is characterized by gently rolling topography, deeply weathered bedrock, and relatively few rock outcrops. It contains monadnocks that are isolated outcrops of bedrock (usually quartzite or granite) that are the result of the erosion of the mountains. The vertical stratigraphic sequence consists of 5 to 70 feet of weathered residual soils at the surface underlain by metamorphic and igneous basement rocks (granite, schist, and gneiss). The weathered soils (saprolites) are physically and chemically weathered rocks that can be soft/loose to very hard and dense, or friable and typically retain the structure of the parent rock. The geology of the Piedmont is complex with numerous rock types that were formed during the Paleozoic era (250 to 570 MYA).

The typical residual soil profile consists of clayey soils near the surface, where soil weathering is more advanced, underlain by sandy silts and silty sands. The boundary between soil and rock is not sharply defined. This transitional zone termed “partially weathered rock” (PWR) is normally found overlying the parent bedrock. PWR is defined, for normal engineering purposes, as residual material with standard penetration test resistances in excess of 100 blows per foot. The PWR is considered in geotechnical engineering as an Intermediate Geo-Material (IGM). Weathering is facilitated by fractures, joints and by the presence of less resistant rock types. Consequently, the profile of the partially weathered rock and hard rock is quite irregular and erratic, even over short horizontal distances. Also, it is not unusual to find lenses and boulders of hard rock and zones of partially weathered rock within the soil mantle, well above the general bedrock level.

## 5. SUBSURFACE CONDITIONS

The below soil descriptions, strata depths, and consistencies are generalized and were interpreted by F&ME based on the subsurface conditions as encountered in the test borings. We have included the soil test boring logs in Section 4 of the Appendix for detailed descriptions of the encountered soil conditions. As with any geologic formation, the depth and thickness of the soil strata will vary across the site. Although the test borings designate strata changes at specific depths in the description of the soil stratigraphy on the soil test boring logs, transitions between soil strata are generally gradual. Therefore, the outlined subsurface profile shown on the soil test boring logs should only be considered general on-site soil conditions and should not be utilized as an absolute indicator.



## 5.1 Soil Stratigraphy

The following table summarizes the soil stratification along the proposed new roadway alignment.

Soil Stratification Table					
Geologic Formation	Elevation of Top of Layer (ft-MSL)	Depth to Top of Layer (ft)	USCS Soil Type	SPT N-Values (bpf)	Comments
Holocene	+580	0	SC-SM/SM	WOH to 19	Colluvium/Alluvium
Piedmont Residuum	+576	4	ML	3 to 28	Residuum
Bedrock	+554	26	N/A	N/A	Bedrock (Metagabbro/ Metadiorite)

## 5.2 Rock Conditions

Following auger refusal conditions encountered in the bridge soil test borings, rock coring operations were conducted. Rock coring was performed to a minimum depth of twenty (20) feet at each interior bent boring location and ten (10) feet at End Bent 5. Diamond NQ rock coring techniques were utilized to recover the rock core samples in accordance with ASTM D-2113.

The encountered rock mass was classified as a combination of Metagabbro & Metadiorite. Based on the visual classification of the recovered core samples, the rocks are classified as strong to extremely strong and highly weathered to fresh. The in-situ rock has numerous, moderately narrow to tight joints. Joints are dipping at low to high angles (10 to 80 degrees). The core recovery (REC) ranged from 20 to 100 percent, and the rock quality designation (RQD) for the lengths recovered ranged from 0 to 100 percent. Unconfined compressive strengths of the intact rock samples ranged from 8,200 to 39,210 psi. The summary of the rock core compressive strength testing is provided in the following table.

Summary of Rock Core Compressive Strength Testing							
Boring No.	Core No.	Depth (ft)	Rock Type	Unit Weight (pcf)	REC (%)	RQD (%)	Compressive Strength (psi)
B-4	NQ-1	24.5 – 26.8	Metagabbro	178.04	86	75	10,510
	NQ-2	26.8 – 31.8	Metagabbro/Metadiorite	173.56	100	100	9,560
B-5	NQ-2	31.1 – 36.1	Metadiorite	186.98	99	98	26,420
	NQ-3	36.1 – 41.1	Metadiorite	178.32	97	87	20,110
B-6	NQ-1	26.4 – 30.9	Metagabbro/Metadiorite	175.18	32	29	29,140
	NQ-2	30.9 – 35.9	Metagabbro/Metadiorite	168.77	98	90	39,210

B-7	NQ-2	30.3 – 35.3	Metadiorite	182.10	100	100	8,200
	NQ-3	35.3 – 40.3	Metadiorite	182.10	95	80	17,190
B-8	NQ-1	26.6 – 31.6	Metadiorite	167.03	76	41	13,680
	NQ-2	31.6 – 36.6	Metadiorite	167.50	88	74	19,620
	NQ-4	41.6 – 46.6	Metagabbro/Metadiorite	180.23	90	53	16,810
B-9	NQ-1	20.9 – 25.9	Metadiorite	167.71	86	40	19,840
	NQ-2	25.9 – 30.9	Metadiorite	167.69	85	70	26,980
B-10	NQ-1	19.3 – 21.1	Metagabbro	183.45	98	98	26,670

### 5.3 Groundwater Conditions

Within the performed soil test borings, the depth to groundwater was measured immediately following completion of the borings, 24-hours following completion of the borings, or both.

The measured groundwater table elevation ranges from approximately 565 ft-MSL to 573 ft-MSL based on the water table measurements. The surficial soils within the extents of the bridge approach embankments are either clayey or clay-like and are expected to be moisture inhibitors. During and following periods of heavy rainfall, perched groundwater conditions may be observed on or in these clayey soils. Perched groundwater is a temporary condition and is not indicative of the normal, static groundwater table elevation. For the geotechnical bridge foundation and bridge embankment design, we have selected a design water table elevation of 567 ft-MSL.

## 6. BRIDGE FOUNDATION LOADINGS

The maximum factored loads per foundation element for the Service and Strength Limit States are summarized in the following table. The point of application for the loads is at the top of pile at the end bents or top of column at the interior bents.

Maximum Factored Loads							
	Analysis For:	Limit State	$F_y$ (kip)	$F_x^2$ (kip)	$F_z^1$ (kip)	$M_x$ (k-ft)	$M_z$ (k-ft)
EB1	Axial Resistance & Structural Capacity	Strength	200	--	--	--	--
	Lateral Stability	Strength	200	2	12	--	--
	Lateral Displacements	Service	150	1.6	8	--	--

IB2 & IB3	Axial Resistance & Structural Capacity	Strength	1155	--	--	--	--
	Lateral Stability	Strength	1155	15.6	-20.7	114	-384
	Lateral Displacements	Service	810	16.8	-10.7	117	-218
IB4	Axial Resistance & Structural Capacity	Strength	925	--	--	--	--
	Lateral Stability	Strength	925	16.1	-23.2	102	-180
	Lateral Displacements	Service	640	15.7	-12.5	96	-60
EB5	Axial Resistance & Structural Capacity	Strength	135.0	--	--	--	--
	Lateral Stability	Strength	135.0	1.3	-11.7	--	--
	Lateral Displacements	Service	95.0	0.7	-7.8	--	--

<sup>1</sup>*z-axis oriented in longitudinal direction (parallel to roadway centerline)*

<sup>2</sup>*x-axis oriented in transverse direction (perpendicular to roadway centerline)*

The bridge foundation loadings provided to F&ME by NV5 are provided in Section 9 of the Appendix.

## 7. CONCLUSIONS AND RECOMMENDATIONS

The conclusions and recommendations presented in this report are based upon the general soil conditions as encountered in the preliminary and final subsurface investigations, our analyses of the site and subsurface conditions, and our experience on similar projects. The recommendations do not reflect variations in subsurface conditions or the presence of undiscovered obstructions that could exist outside the soil testing locations or in unexplored areas of the site. If subsurface conditions are discovered during construction activities that deviate from the soils indicated on the soil test boring logs, F&ME should be contacted to evaluate the impact of the identified conditions on the proposed bridge foundation systems and the proposed bridge embankments.

### 7.1. Site Preparation

Based on the subsurface conditions as encountered in the field investigation, the soil subgrade below the planned bridge embankments will likely be unstable if wet. The SCDOT understands this risk and has elected to eliminate mucking and/or bridge lift quantities from the road plans. F&ME's geotechnical design does not require that mucking operations be performed. SCDOT's RCE is responsible for determining the need and quantifying any mucking and/or bridge lifts

during construction. If mucking and/or bridge lifts are needed, we have provided a Geotechnical General Notes sheet in Section 18 of the Appendix that provides additional information relative to these operations.

Temporary and permanent site drainage should be established as soon as possible to promote drainage away from the proposed embankment subgrade locations. Establishing good site drainage prior to construction and maintaining it thereafter can minimize the effects of surface run-off and shallow and/or fluctuating groundwater and can minimize the risk associated with mucking costs. Permanent site drainage should be established to prevent soils at and below the roadway subgrade and the foundation elements from becoming saturated and to minimize fluctuations in moisture contents. The shear strength of soils typically decreases with increasing moisture content and saturation. Therefore, site drainage is the single most critical factor impacting construction and the long-term performance of the roadway.

Site preparation should be performed in accordance with Section 201 of the 2007 SCDOT Standard Specifications for Highway Construction, supplemental specifications, and/or special provisions. Where existing ground surface approximates final grade or where final roadway embankment fill heights will not exceed five (5) feet above existing grade, the ground surface below the embankment footprint should be stripped of any organic materials and topsoil to depths as required, and grubbing of tree root systems will be required. Stump holes and other holes resulting from obstruction removal shall be backfilled with suitable material and properly compacted. In planned roadway embankment areas where fill heights will exceed five (5) feet, stumps may be left in place as long as stumps do not extend more than eight (8) inches above ground line.

## 7.2. Bridge Embankment Static Settlements

Bridge embankment construction at both bridge ends will require fill placement. The maximum new fill height is estimated to be approximately twenty-three (23) feet relative to the existing ground surface.

The majority of the settlement at the site will occur in the soft/loose alluvial soils. The alluvial soils are comprised of very soft to firm silts and clays and very loose to loose silty sands below the groundwater table. Deformations are predicted to occur in both coarse-grained and fine-grained soils. To analyze the magnitude and time rate of consolidation of the fine-grained soils, consolidation parameters from the performed laboratory consolidation testing from boring AP-3 were utilized. The Settle3D software, developed by Rocscience, was utilized to estimate the beginning of the bridge and end of the bridge embankment settlement. For each settlement analyses, both single drainage and double drainage conditions were modelled to investigate the rate of settlement sensitivity at the site.

Based on the results from the Settle3D analyses, some consolidation settlements are estimated to occur following final paving operations, but we anticipate that the remaining settlement will conform to the allowable settlement limits established in the GDM.

The following table summarizes the results of the settlement analyses performed for the beginning of the bridge and end of the bridge approach embankments.

Settlement Analyses Summary					
Location	Boring Used for Stratigraphy	Consolidation Parameters	Double Drained?	Total Settlement (in)	Time to Meet EV-01B (days)
Begin Bridge Embankment	RW-18	AP-3	Y	3.93	0
			N	3.93	0
Begin Bridge	B-3	AP-3	Y	5.45	0
			N	5.45	0
End Bridge	B-10	AP-3	Y	6.35	0
			N	6.35	0
End Bridge Embankment	RW-19	AP-3	Y	9.01	0
			N	9.01	0

The results from the settlement analyses compared to the GDM v2.0 performance limits are provided in the following tables.

Embankment (Pavement) Performance Limits			
Deformation ID No.	Service Limit State Performance Limit Description	Predicted Value	Performance Limit
EV-01A	Maximum Settlement from Elastic Compression + Primary Consolidation + Secondary Compression along the profile grade that occurs during the duration of the construction of the embankment commences at the start of construction and terminates just prior to paving operations. This deformation is used to adjust borrow requirements, if necessary	6.42"	No Limit

EV-01B	Maximum Settlement from Primary Consolidation + Secondary Compression along the profile grade over the design life of the embankment. The design life begins after the pavement has been placed (i.e., the settlement that occurs after EV-01A).	2.59"	3.00"
EV-03	Maximum Differential Settlement from Primary Consolidation + Secondary Compression occurring longitudinally along the profile grade after the roadway has been paved. Differential ratio is shown in parenthesis for informational purposes. (Inches per 50 Feet of Embankment Longitudinally)	0.44"	1.00" (1/600)

Bridge/Embankment Transition Settlement Performance Limits			
Deformation ID No.	Service Limit State Performance Limit Description	Predicted Value	Performance Limit
EV-05A	Maximum Differential Settlement ( $\delta_v$ ) between the bridge End Bent and the end of the Approach Slab after the roadway has been paved at the end of the pavement design life (20 yrs). The Approach Slab length ( $L_{slab}$ ) is measured in feet.	0.37" <sup>2</sup>	$0.05 \times L_{slab}^1 = 1.00"$
EV-05B	Maximum Differential Settlement ( $\delta_v$ ) between the bridge End Bent and a point 1 foot from either the "begin" or "end" of bridge after the roadway has been paved at the end of the pavement design life (20 yrs).	0.37" <sup>2</sup>	0.5"

<sup>1</sup>Performance Limit based on a twenty (20) foot approach slab length

The Settle3D input properties and analyses results are provided in Section 10 of the Appendix.

### 7.3. Acceleration Design Response Spectrum

F&ME performed a seismic evaluation for this bridge site. The seismic evaluation was based on a Multi-channel spectral Analysis of Surface Waves (MASW) test performed by F&ME during the preliminary investigation. The MASW test was performed from the existing ground surface at the western shoulder of the existing bridge approach embankment, left of the existing roadway centerline. The results from the MASW testing were utilized to generate the subsurface shear wave velocity profile.

Based on the MASW test results, the average shear wave velocity is greater than 1,350 ft/s. The SCDOT provided the project ADRS curves. The following table provides the applicable spectral accelerations from the developed ADRS curves.

Acceleration Design Response Spectra			
Design Event	PGA	$S_{DS}$	$S_{D1}$
FEE	0.04	0.08	0.04
SEE	0.11	0.17	0.10

The referenced ADRS curves are provided in Section 8 of the Appendix.

#### 7.4. Geotechnical Seismic Hazard Potential

Geotechnical seismic hazards consist of a loss in a soil’s shear strength through cyclic ground motions induced by earthquakes. In sand-like soils, this phenomenon is typically referred to as soil liquefaction. Cyclic-softening is the typical terminology for fine grained soils.

Liquefaction is the loss of a soil’s shear strength due to a rapid increase in pore water pressure resulting from soil particle contraction induced by seismic vibrations. Soils most susceptible to liquefaction generally consist of saturated, loose, “clean” (i.e. Plasticity Indexes less than 7), fine (10% particle size ranging from 0.07 to 0.25 mm) sands.

F&ME has performed soil shear loss (SSL) calculations in accordance with Chapter 13 of the GDM. Where the calculations indicate that SSL is triggered, the Idriss & Boulanger (2008) methodology for calculating the soil’s residual shear strength was utilized. Based on the calculations, SSL is triggered for the SEE seismic event within the low density, alluvial material in boring B-8 at IB-4 within the Crowders Creek channel. For the other loose/soft alluvial soils that were not considered liquefiable, the fines contents are approximately 50% or greater, and the  $N_{1,60,CS}$  values are increased such that the soils do not classify as “liquefiable” for the given seismic motion.

The residual soil strength parameters determined from the SSL calculations were utilized in the embankment global slope stability analyses for the SEE seismic event. The performed SSL calculations are provided in Section 11 of the Appendix.

## 7.5. Seismic Induced Deformation

Where the calculations indicate that SSL is triggered, a subsequent deformation analysis was performed to calculate the vertical settlement from the sand-like soil's redistribution effects. Re-distribution effects of the fine-grained soil particles that are predicted to undergo SSL are negligible. Lateral displacements were also calculated from lateral spreading due to the liquefied soils. The liquefaction induced settlement was calculated in accordance with the Idriss & Boulanger (2008) methodology.

The calculated liquefaction-induced vertical settlements are approximately two (2) inches for the SEE event. These liquefaction induced settlements are only expected to occur in the alluvial soils located in the creek channel. No liquefiable, sand-like soils were indicated at the end bent locations. The seismic settlement will induce downdrag loadings on the interior bent drilled shafts. Since the IB drilled shafts will be socketed in rock, the additional down drag loadings will not govern the foundation axial resistance.

Since the only area where liquefaction is expected is within the existing creek channel, no seismic induced embankment deformations are predicted at the bridge approach embankments. As such, ground improvements are not necessary to meet the seismic induced vertical settlement performance criteria. The results from the seismic vertical deformation analyses at the bridge approach embankments are summarized in the following tables.

Bridge/Embankment Transition Settlement Performance Limits at EE I Limit State				
Deformation ID No.	EE I Limit State Performance Limit Description	Design EQ	Predicted	Performance Limit
EV-05A	Maximum Vertical Differential Settlement Between End Bent and the End of Approach Slab (Inches). The Approach Slab Length ( $L_{slab}$ ) is measured in feet.	FEE	0"	$0.4 \times L_{slab}^1 = 8.0^1$
		SEE	0"	No Limit
EV-05B	Maximum Differential Settlement ( $\delta_v$ ) between the bridge End Bent and a point 1 foot from either the "begin" or "end" of bridge.	FEE	0"	8.0
		SEE	0"	No Limit

<sup>1</sup>Performance Limit based on a twenty (20) foot approach slab length

The detailed seismic settlement calculations are provided in Section 11 of the Appendix.



## 7.6. Bridge Embankment Slope Stability

F&ME has performed static and seismic global slope stability analyses for the bridge embankment side slopes and end slopes. F&ME utilized the computer software program *Slide* v. 7.009 developed by Rocscience for the global slope stability analyses. Three (3) slope stability methodologies were utilized: the Bishop Method, the Spencer Method, and the General Limit Equilibrium Method.

The subsurface soil stratigraphy, ground water conditions, and soil strength parameters utilized in these analyses were based on generalized conditions as indicated by the test borings performed at each respective bridge embankment location. Roadway cross-sections provided to F&ME indicate that 2H:1V side slopes are proposed for the left and right side slopes at the bridge embankments. The proposed bridge profile indicate 2H:1V end slopes armored with rip-rap are proposed at both bridge ends.

The seismic ground motion parameters were calculated based on the provided design response spectrums' peak ground acceleration (PGA). Specifically, the Response Spectrum lists a FEE PGA of 0.04g and a SEE PGA of 0.11g. The horizontal ground acceleration value ( $K_h$ ) used in our seismic slope stability analyses was taken as the full PGA value of the respective seismic design event. As previously mentioned, the calculated residual soil strength parameters from the SSL analyses were included with the seismic slope stability analyses, where applicable. A uniform distributed live loading of 250 pounds per square foot (psf) and 125 pounds per square foot (psf) were applied within planned approach slab/roadway pavement areas for the static design and seismic design, respectively.

Based on the static slope stability analyses at the beginning and end of bridge embankments, soil reinforcement is required to meet the GDM design criteria. The proposed soil reinforcement is uni-axial geo-grid.

Global Embankment Slope Stability Results Summary					
Location	Design Event	Resistance Factor, $\phi$			Design Criteria <sup>1</sup>
		Bishop Method	Spencer Method	GLE Method	
Begin Bridge Approach, Left Side Slope	Static	0.72	0.75	0.75	0.75
	FEE	0.79	0.82	0.83	1.0
	SEE	0.94	0.98	0.99	1.0
Begin Bridge Approach, Right Side Slope	Static	0.73 <sup>1</sup>	0.75 <sup>1</sup>	0.75 <sup>1</sup>	0.75
	FEE	0.80	0.83	0.83	1.0
	SEE	0.97 <sup>2</sup>	0.99 <sup>2</sup>	0.99 <sup>2</sup>	1.0
Begin Bridge, Left Side Slope	Static	0.64 <sup>1</sup>	0.64 <sup>1</sup>	0.64 <sup>1</sup>	0.75
	FEE	0.70	0.71	0.71	1.0
	SEE	0.83	0.83	0.83	1.0

Begin Bridge, Right Side Slope	Static	0.65 <sup>1</sup>	0.65 <sup>1</sup>	0.65 <sup>1</sup>	0.75
	FEE	0.72	0.72	0.72	1.0
	SEE	0.83	0.83	0.84	1.0
Begin Bridge End Slope	Static	0.67	0.67	0.67	0.75
	Scour	0.66	0.67	0.67	0.75
	FEE	0.70	0.71	0.71	1.0
	SEE	0.84	0.84	0.84	1.0
End Bridge End Slope	Static	0.60	0.59	0.59	0.75
	Scour	0.77	0.77	0.77	0.75
	FEE	0.66	0.65	0.65	1.0
	SEE	1.08 <sup>1,2</sup>	1.05 <sup>1,2</sup>	1.04 <sup>1,2</sup>	1.0
End Bridge, Left Side Slope	Static	0.72 <sup>1</sup>	0.72 <sup>1</sup>	0.72 <sup>1</sup>	0.75
	FEE	0.80	0.80	0.80	1.0
	SEE	0.96	0.95	0.95	1.0
End Bridge, Right Side Slope	Static	0.75 <sup>1</sup>	0.75 <sup>1</sup>	0.75 <sup>1</sup>	0.75
	FEE	0.69	0.70	0.70	1.0
	SEE	1.00	0.99	0.98	1.0
End Bridge Approach, Left Side Slope	Static	0.61 <sup>1</sup>	0.61 <sup>1</sup>	0.61 <sup>1</sup>	0.75
	FEE	0.74	0.74	0.74	1.0
	SEE	0.90	0.89	0.89	1.0
End Bridge Approach, Right Side Slope	Static	0.62 <sup>1</sup>	0.63 <sup>1</sup>	0.63 <sup>1</sup>	0.75
	FEE	0.77	0.77	0.77	1.0
	SEE	0.90	0.90	0.90	1.0

<sup>1</sup> Soil reinforcement is required

<sup>2</sup> Newmark Seismic Displacement Analysis performed in accordance with Chapter 13 of GDM

The *Slide* output graphs depicting the slope geometry, soil strength parameters, soil profiles and the computer generated critical failure circles of each of the above listed slope stability analyses are presented in Section 12a of the Appendix.

The soil reinforcement requirements details are provided in Section 18 of the Appendix. In general, soil reinforcement is planned at the beginning of bridge side slopes, the end of bridge front slope, and the end of bridge side slopes.

Where geotechnical resistance factors for seismic slope stability did not comply with the design criteria established in the GDM, a Newmark Seismic Displacement Analysis was performed in accordance with Chapter 13 of the GDM. The following table presents the worst-case results from the Newmark seismic displacement analysis.

Embankment Global Instability Performance at EEI Limit State		
Location	Design EQ	Predicted Deformation (in)
Station 148+00, LT Side Slope	SEE	0.05
Station 148+00, RT Side Slope	SEE	1.39
Station 148+50, LT Side Slope	SEE	0.04
Station 148+50, RT Side Slope	SEE	0.88
Begin Bridge, End Side Slope	SEE	0.88
End Bridge, End Side Slope	SEE	0.63
Station 156+00, LT Side Slope	SEE	0.01
Station 156+00, RT Side Slope	SEE	0.01

The above summarized Newmark seismic displacement calculations are presented in Section 12b of the Appendix.

### 7.7. Pile Corrosion and Deterioration Potential

Per AASHTO LRFD Bridge Design Specifications, 6<sup>th</sup> Ed., 2012, the following soil or site conditions are considered indicative of a potential for steel and/or concrete corrosion or deterioration.

1. Resistivity less than 2,000 ohm-cm;
2. pH less than 5.5;
3. pH between 5.5 and 8.5 in soils with high organic content;
4. Sulfate concentrations greater than 1,000 ppm;
5. Landfills and cinder fills;
6. Soils subject to mine or industrial discharge; and,
7. Areas with a mixture of high resistivity soils and low resistivity high alkaline soils.

Based on the results from the corrosion series testing, steel corrosion is anticipated. Test results indicate pH levels less than 5.5 in Borings B-3 and B-10 and resistivity less than 2,000 ohm-cm in Boring B-3. F&ME recommends mitigating corrosion potential by increasing the steel cross-section from HP 14x73 piles to HP 14x89 piles to allow for sacrificial steel. The laboratory electro-chemical test data sheets have been included in Section 7 of the Appendix.

## 7.8. End Bent Pile Foundation Axial Analyses

Driven pile foundations are planned at EB1 and EB5 using steel HP 14x89 piles with reinforced pile tips. The Strength Limit State axial loading condition will govern the geotechnical end bent pile design.

Resistance factors for driven end bent piles were determined in accordance with the GDM. The end bent piles will be driven to a practical refusal condition on PWR or hard rock. Pile driving practical refusal is considered as 20 blows per inch or equivalent fractions thereof. Each end bent line will be supported by two (2) rows of piles. In total, seventeen (17) piles are planned at each end bent, and the end bents are, therefore, classified as redundant foundation systems. As such, the geotechnical resistance factor for axial compressive resistance of driven end bent piles for a redundant foundation system driven to rock is 0.50.

The following table outlines the end bent axial pile bearing requirements for each applicable limit state. In the Bridge Plan Notes section we have only provided the required ultimate driving resistance for the Strength Limit State since it is controlling end bent pile design.

End Bent Pile Axial Loads			
		EB1	EB5
Service Limit State	Factored Design Load (Tons)	75.0	47.5
	Geotechnical Resistance Factor	0.50	0.50
	Nominal Resistance (Tons)	150.0	95.0
	Estimated Scour Loss (Tons)	N/A	N/A
	Downdrag Loss (Tons)	N/A	N/A
	Required Driving Resistance (Tons)	150.0	95.0
	Anticipated Pile Tip EL (ft-MSL)	550.0	552.0
Strength Limit State	Factored Design Load (Tons)	100	67.5
	Geotechnical Resistance Factor	0.50	0.50
	Nominal Resistance (Tons)	200.0	135.0
	Estimated Scour Loss (Tons)	N/A	N/A
	Unfactored Downdrag (Tons)	N/A	N/A
	Required Driving Resistance (Tons)	200.0	135.0
	Anticipated Pile Tip EL (ft-MSL)	550.0	552.0

## 7.9. Interior Bent Drilled Shaft Foundation Axial Analyses

Drilled shaft foundations are planned at IB2, IB3 & IB4. The drilled shaft section consists of a 42 inch diameter column supported by an 48 inch diameter drilled shaft and a 42 inch diameter rock socket. Due to the measured strength of the rock, the axial resistance of the rock mass is greater than the factored structural loadings at short embedments into the bedrock. As such, the Strength Limit State lateral loading condition will govern the drilled shaft geotechnical design.

Resistance factors for drilled shaft supported interior bents were determined in accordance with the GDM. We anticipate that the rock socketed shafts will obtain the geotechnical ultimate axial resistance based only on tip resistance in rock. Each interior bent will be supported by five (5) drilled shafts each supporting a single column and, as such, are considered a non-redundant foundation system. For drilled shaft design utilizing nominal tip resistance in rock and a non-redundant foundation system, the specified resistance factor is 0.50.

For calculation of the drilled shaft nominal axial resistance in rock, we have utilized the AASHTO LRFD Bridge Design Specifications, 8<sup>th</sup> Edition (Section 10.8 – Drilled Shafts). The Hoek-Brown strength parameters determined from the Geologic Strength Indices (GSI) were utilized. Permanent construction casing will be utilized. We assume the casing will be installed utilizing either vibratory or direct drilling methods.

Based on F&ME's laboratory derived unconfined compressive rock strengths, the UC rock strengths generally range from 8,000 psi to 39,000 psi. Based on the UC rock strength and the associated GSI's, the tip resistance in rock alone provides sufficient resistance to the factored structural design loadings. In order for the tip resistant only design approach to be successful, the Contractor is required to sufficiently clean the bottom of the drilled shaft borehole. If poor cleaning methods are implemented, then a reduction in tip resistance will be applied.

For IB2, IB3 & IB4, we have calculated the drilled shaft factored tip resistance and anticipated design drilled shaft tip elevations using the above referenced methodology. This information is presented in the *Bridge Plan Notes* section of this report. The calculation sheets from the rock socket axial resistance analyses are provided in Section 14, 15 & 16 of the Appendix.

## 7.10. Bridge Foundation Lateral Design Analyses

The Strength Limit State lateral loading conditions govern the geotechnical drilled shaft design. To determine the foundation response under static lateral loading conditions, F&ME has performed lateral analyses utilizing the computer software program LPile<sup>v.2013</sup>. The soil parameters and depths used as input into the LPile program were based on generalized conditions as shown on the test borings. The 100-yr scour profile was used to develop soil profile at the interior bent.

The following table lists the maximum top of pile/shaft deflections.

Lateral Response Summary			
Bent ID.	Design Event	Longitudinal Top of Pile Deflection (in)	Transverse Top of Pile Deflection (in)
EB1	Service	0.15	0.01
	Strength	0.28	0.01
IB2	Service	1.12	0.30
	Strength	2.19	0.28
IB3	Service	0.89	0.23
	Strength	1.72	0.22
IB4	Service	0.54	0.17
	Strength	1.13	0.17
EB5	Service	0.14	< 0.01
	Strength	0.27	0.01

The minimum pile/shaft tip elevations required to maintain lateral stability (critical depth) were performed by lateral soil-structure interaction analyses using the LPILE<sup>v.2013</sup> computer program. The critical depth may be considered as the point where the lateral deflection of the foundation becomes and practically remains zero. The critical depths at each bent location referenced from either the bottom of the proposed pile cap elevations or the top of column elevations are provided in the following table.

Critical Depth <sup>1</sup>			
Bent No.	Drilled Shaft ID	Depth <sup>1,2</sup> (ft)	Elevation (ft-MSL)
EB1	N/A	21	+567.0
IB2	DS1 & DS2	41	+545.5
	DS3	44	+542.5
	DS4 & DS5	48	+539.0
IB3	DS1 – DS5	42	+541.0
IB4	DS1 & DS2	45	+542.0
	DS3	42	+544.5
	DS4 & DS5	40	+547.5
EB5	N/A	19	+564.0

<sup>1</sup>Based on maximum Strength load case

<sup>2</sup>Referenced from bottom of cap/top of column

We have included the input/output summary sheets, critical depth, deflection and bending moment graphs from our LPILE generated lateral analyses in Sections 13 through 17 of the Appendix.

## 8. BRIDGE PLAN NOTES

Place the following notes on the bridge plans for EB1 and EB5.

<i>Pile Resistance</i>		
<i>Bent I.D.</i>	<i>EB1</i>	<i>EB5</i>
<i>Governing Limit State</i>	<i>Strength Axial</i>	<i>Strength Axial</i>
<i>Factored Design Load</i>	<i>100.0 Tons</i>	<i>67.5 Tons</i>
<i>Geotechnical Resistance Factor</i>	<i>0.50</i>	<i>0.50</i>
<i>Nominal Resistance</i>	<i>200.0 Tons</i>	<i>135.0 Tons</i>
<i>Estimated Scour</i>	<i>0 Tons</i>	<i>0 Tons</i>
<i>Unfactored Downdrag</i>	<i>0 Tons</i>	<i>0 Tons</i>
<i>Required Driving Resistance</i>	<i>200.0 Tons</i>	<i>135.0 Tons</i>

*Method of controlling installation of piles and verifying their capacity:*

*Pile Installation will be controlled through wave equation analysis without stress measurements during driving, and pile capacity will be verified by driving to a practical refusal condition.*

*Reinforced pile tips with teeth are required to mitigate hard driving conditions at EB1 and EB5. Install the reinforced pile tips in accordance with the manufacturer's installation recommendations.*

*For EB1 and EB5 steel piles, the required minimum pile tip elevation to achieve lateral stability and the estimated pile tip elevation to achieve the required axial capacity are provided in the following table:*

<i>Pile Tip Elevation Table</i>		
<i>Bent I.D.</i>	<i>Minimum Pile Tip Elevation (ft-NAVD88)</i>	<i>Estimated Pile Tip Elevation (ft-NAVD88)</i>
<i>EB1</i>	<i>+567</i>	<i>+550</i>
<i>EB5</i>	<i>+564</i>	<i>+552</i>

The following estimated parameters were used for performing a drivability analysis for EB1 and EB5 piles:

<i>Estimated Pile Drivability Analysis Parameters</i>	
<i>Skin Quake (QS)</i>	<i>0.10 in.</i>
<i>Toe Quake (QT)</i>	<i>0.04 in.</i>
<i>Skin Damping (SD)</i>	<i>0.20 sec/ft</i>
<i>Toe Damping (TD)</i>	<i>0.15 sec/ft</i>
<i>% Skin Friction</i>	<i>20%</i>
<i>Distribution Shape No.</i>	<i>1.0<sup>1</sup></i>
<i>Bearing Graph</i>	<i>Constant Skin Friction<sup>2</sup></i>
<i>Pile Penetration</i>	<i>90%</i>
<i>Hammer Energy Range</i>	<i>40 - 50 ft-kips</i>

<sup>1</sup>Distribution Shape No. varies with depth: 0 at the ground surface and 1.0 at the pile tip elevation

<sup>2</sup>Bearing Graph Options – proportional, constant skin friction, and constant end bearing. Note: GRLWEAP (2010) was used to perform the wave equation analysis.

A pile hammer having a rated energy as indicated above is considered suitable for driven pile installation. However, final hammer approval is based on a wave equation analysis that accurately reflects the Contractor’s proposed driving system.

End bent piles shall be driven to a practical refusal condition. Practical refusal is defined as 5 blows per quarter inch or equivalent multiples thereof.

Each pile is to be installed in one continuous operation. Include details of any anticipated temporary driving discontinuities including anticipated time intervals in the Pile Installation Plan.

Reference the 2007 Standard Specifications for Highway Construction for Driven Pile Foundations, Section 711. Notes included in these plans are in addition to the requirements of the Standard Specifications.



Place the following notes on the bridge plans for IB2, IB3 & IB4.

<i>Drilled Shaft Resistance</i>			
<i>Bent ID</i>	<i>IB2</i>	<i>IB3</i>	<i>IB4</i>
<i>Governing Limit State</i>	<i>Strength Lateral</i>	<i>Strength Lateral</i>	<i>Strength Lateral</i>
<i>Factored Design Load (tons)</i>	<i>577.5</i>	<i>577.5</i>	<i>462.5</i>
<i>Factored Resistance – Side (tons)</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>
<i>Factored Resistance – End (tons)</i>	<i>14,061</i>	<i>12,787</i>	<i>16,130</i>
<i>Geotechnical Resistance Factor – Side</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>
<i>Geotechnical Resistance Factor - End</i>	<i>0.50</i>	<i>0.50</i>	<i>0.50</i>
<i>Total Nominal Resistance (tons)</i>	<i>28,122</i>	<i>25,574</i>	<i>32,260</i>

The estimated bottom of casing elevation and the estimated rock socket tip elevations are indicated in the table below. The minimum diameter for the rock sockets is 42 inches, and the minimum diameter of the drilled shaft is 48 inches. Support the top of casing to maintain construction tolerances during construction.

<i>Drilled Shaft Elevations</i>				
<i>Bent ID</i>	<i>Shaft Number</i>	<i>Estimated Bottom of Casing Elevation (ft-NAVD 88)</i>	<i>Rock Excavation per Shaft (ft)</i>	<i>Estimated Tip Elevation (ft-NAVD 88)</i>
<i>IB2</i>	<i>DS1 &amp; DS2</i>	<i>551.0</i>	<i>5.5</i>	<i>545.5</i>
	<i>DS-3</i>	<i>548.0</i>	<i>5.5</i>	<i>542.5</i>
	<i>DS-4 &amp; DS-5</i>	<i>544.5</i>	<i>5.5</i>	<i>539.0</i>
<i>IB3</i>	<i>DS1 – DS5</i>	<i>546.5</i>	<i>5.5</i>	<i>541.0</i>
<i>IB4</i>	<i>DS1 &amp; DS2</i>	<i>547.5</i>	<i>5.5</i>	<i>542.0</i>
	<i>DS-3</i>	<i>550.0</i>	<i>5.5</i>	<i>544.5</i>
	<i>DS-4 &amp; DS-5</i>	<i>553.0</i>	<i>5.5</i>	<i>547.5</i>

The wet method of drilled shaft construction is required. Use potable water or mineral slurry throughout the excavation and construction of the shafts. Polymer slurry is not allowed. If mineral slurry is used, the tolerances for testing (including time intervals) and maintaining the mineral slurries are indicated in the Standard Specifications for Highway Construction, Section 712.

During drilled shaft construction, the bottom elevation of the shaft may vary, and rock may be encountered at a different elevation than shown on the plans. If rock is encountered at an elevation less than 2 feet higher than that shown, extend the socket to the tip elevation indicated on the plans. If rock is encountered at an elevation less than 2 feet lower than that shown, lower the tip elevation as needed to maintain the required minimum depth of rock penetration. If rock is

encountered at an elevation more than 2 feet higher or lower than that shown, immediately notify the Geotechnical Engineer of Record.

Provide equipment capable of drilling through rock at the site that may be twenty-five percent (25%) greater than the strength indicated in the table below.

<i>Rock Core Compressive Strength Testing Summary Table</i>					
<i>Boring No.</i>	<i>Recovery (%)</i>	<i>RQD (%)</i>	<i>Core Number</i>	<i>Depth<sup>1</sup> (ft)</i>	<i>Compressive Strength (psi)</i>
<i>B-4</i>	<i>86</i>	<i>75</i>	<i>NQ-1</i>	<i>24.5 – 26.8</i>	<i>10,510</i>
	<i>100</i>	<i>100</i>	<i>NQ-2</i>	<i>26.8 – 31.5</i>	<i>9,560</i>
<i>B-5</i>	<i>99</i>	<i>98</i>	<i>NQ-2</i>	<i>31.1 – 36.1</i>	<i>26,420</i>
	<i>97</i>	<i>87</i>	<i>NQ-3</i>	<i>36.1 – 41.1</i>	<i>20,110</i>
<i>B-6</i>	<i>32</i>	<i>29</i>	<i>NQ-1</i>	<i>26.4 – 30.9</i>	<i>29,140</i>
	<i>98</i>	<i>90</i>	<i>NQ-2</i>	<i>30.9 – 35.9</i>	<i>39,210</i>
<i>B-7</i>	<i>100</i>	<i>100</i>	<i>NQ-2</i>	<i>30.3 – 35.3</i>	<i>8,200</i>
	<i>95</i>	<i>80</i>	<i>NQ-3</i>	<i>35.3 – 40.3</i>	<i>17,190</i>
<i>B-8</i>	<i>76</i>	<i>41</i>	<i>NQ-1</i>	<i>26.6 – 31.6</i>	<i>13,680</i>
	<i>88</i>	<i>74</i>	<i>NQ-2</i>	<i>31.6 – 36.6</i>	<i>19,620</i>
	<i>90</i>	<i>53</i>	<i>NQ-4</i>	<i>41.6 – 46.6</i>	<i>16,810</i>
<i>B-9</i>	<i>86</i>	<i>40</i>	<i>NQ-1</i>	<i>20.9 – 25.9</i>	<i>19,840</i>
	<i>85</i>	<i>70</i>	<i>NQ-2</i>	<i>25.9 – 30.9</i>	<i>26,980</i>
<i>B-10</i>	<i>98</i>	<i>98</i>	<i>NQ-1</i>	<i>19.3 – 21.1</i>	<i>26,670</i>

<sup>1</sup>Depths are referenced from the top of the indicated test boring

Reference the Standard Specifications for Highway Construction for Drilled Shafts (Section 712) and for Crosshole Sonic Logging of Drilled Shafts (Section 727). Notes included in these plans are in addition to the requirements of the Standard Specifications.

### 9. TEMPORARY SHORING

Based on our understanding of the construction sequencing, we do not anticipate that temporary shoring walls will be required for construction of the bridge. If it is determined that temporary shoring walls are necessary to facilitate construction, F&ME will provide temporary shoring design parameters for use by the Contractor in their design.



## 10.VIBRATION MONITORING

Two (2) residential structures are located within the vicinity of the proposed bridge that may be affected by construction related earthborne vibrations. The closest structure to foundation installation and roadway compaction activities is approximately 390 feet. Based on Table 24-1 of the GDM v2.0, “cosmetic damage cannot typically be attributed to construction vibration levels” at a distance greater than 200 feet from impact pile driving activities. Since the nearest commercial and residential structure at the bridge site is more than 200 feet from the proposed bridge end bent, a vibration monitoring program is not required for commercial or residential structures during bridge construction for this project.

The following notes are provided on the Geotechnical General Notes sheet. The Geotechnical General Notes sheet shall be included with the roadway plans.

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

## 11.LIMITATIONS OF REPORT

This report has been prepared in accordance with generally accepted geotechnical engineering practice for specific application to the referenced project. The conclusions and recommendations contained in this report are based upon the provided CAD documents, provided structural design data, soil test borings, and testing result data, contained within, and applicable standards in this geographic area at the time this report was prepared. No other warranty, expressed or implied, is made.

In the event that any changes in nature, design, or location of the structure and/or foundation elements are planned, the recommendations contained in this report will not be considered valid unless the changes are reviewed and verified in writing.

**SC 557 Bridge over Crowders Creek**  
**Final Bridge Geotechnical Engineering Report**

---

# APPENDIX

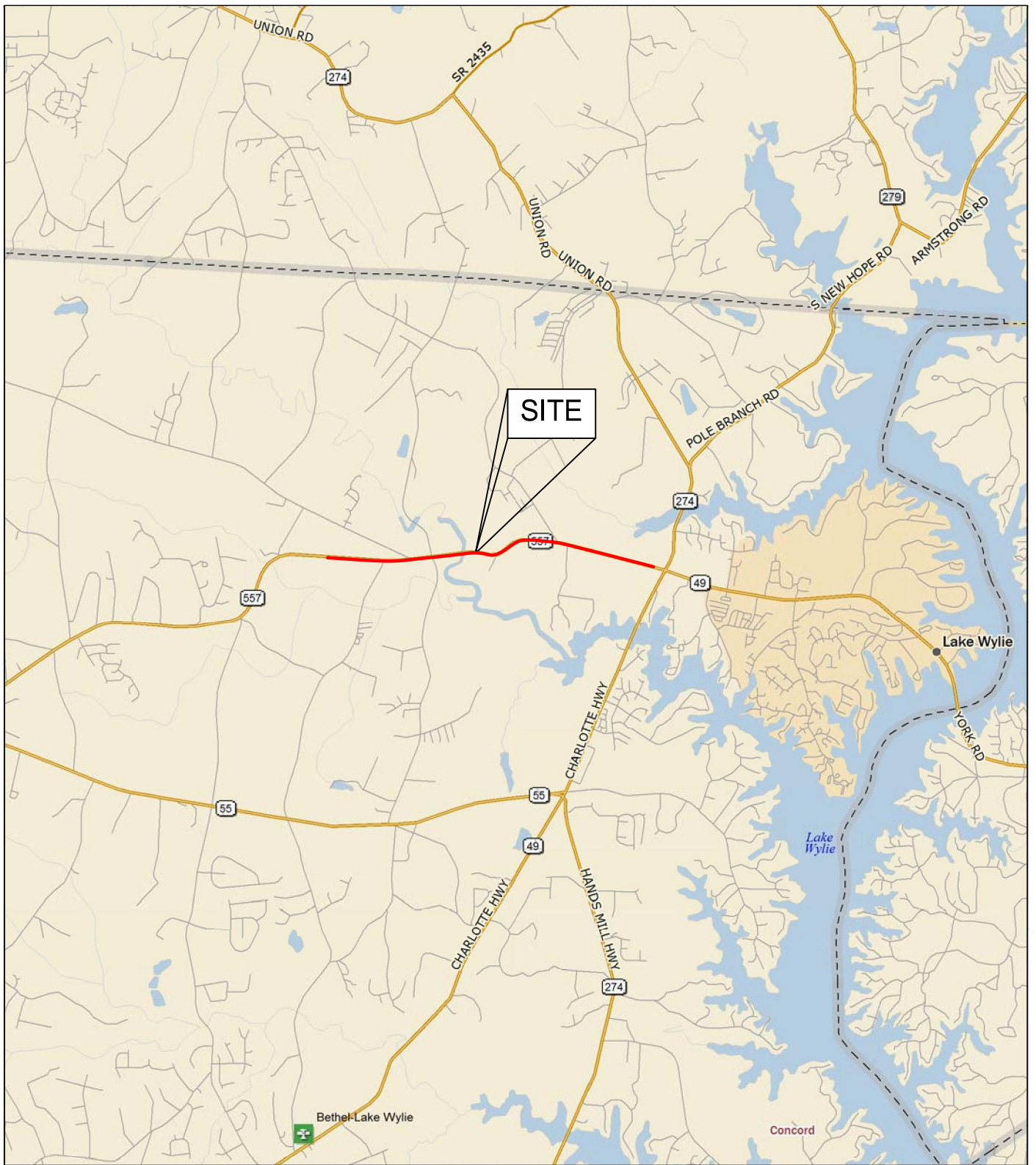
SECTION 1	SITE LOCATION PLAN
SECTION 2	BORING LOCATION PLAN
SECTION 3	GENERALIZED SUBSURFACE PROFILE
SECTION 4	BORING LOGS
SECTION 5	SHELBY TUBE PREPARATION LOGS
SECTION 6	ROCK CORE PHOTOS
SECTION 7	LABORATORY TEST RESULTS
SECTION 8	SEISMIC DESIGN DATA
SECTION 9	BRIDGE FOUNDATION LOADINGS
SECTION 10	EMBANKMENT STATIC SETTLEMENT ANALYSES
SECTION 11	SEISMIC SOIL SHEAR STRENGTH LOSS CALCS
SECTION 12	EMBANKMENT SLOPE STABILITY ANALYSES
SECTION 12A	SLIDE RESULTS
SECTION 12B	NEWMARK DEFORMATION CALCS
SECTION 13	END BENT 1 DRIVEN PILE ANALYSES
SECTION 14	INTERIOR BENT 2 DRILLED SHAFT ANALYSES
SECTION 15	INTERIOR BENT 3 DRILLED SHAFT ANALYSES
SECTION 16	INTERIOR BENT 3 DRILLED SHAFT ANALYSES
SECTION 17	END BENT 5 DRIVEN PILE ANALYSES
SECTION 18	GEOTECHNICAL DRAWINGS & DETAILS

SC 557 Bridge over Crowders Creek  
Final Bridge Geotechnical Engineering Report

---

# APPENDIX

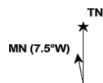
## SECTION 1 SITE LOCATION PLAN



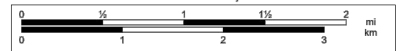
Data use subject to license.

© DeLorme, DeLorme Street Atlas USA® 2009.

www.delorme.com



Scale 1 : 75,000



1" = 1.18 mi

Data Zoom 11-4

**F&ME**  
CONSULTANTS

GEOTECHNICAL – ENVIRONMENTAL – MATERIALS  
COLUMBIA, SOUTH CAROLINA

SC 557 ROADWAY IMPROVEMENT PROJECT  
YORK COUNTY, SC

SITE LOCATION PLAN

F&ME JOB NO. 5503.020

SCALE = As Noted

FIGURE 1

4			
3			
2			
1			
REV.	BY	DATE	DESCRIPTION OF REVISION
TOPO.		DATE	
DWG. CTC		DATE 07.13.18	GROUP - -
R/W		DATE	

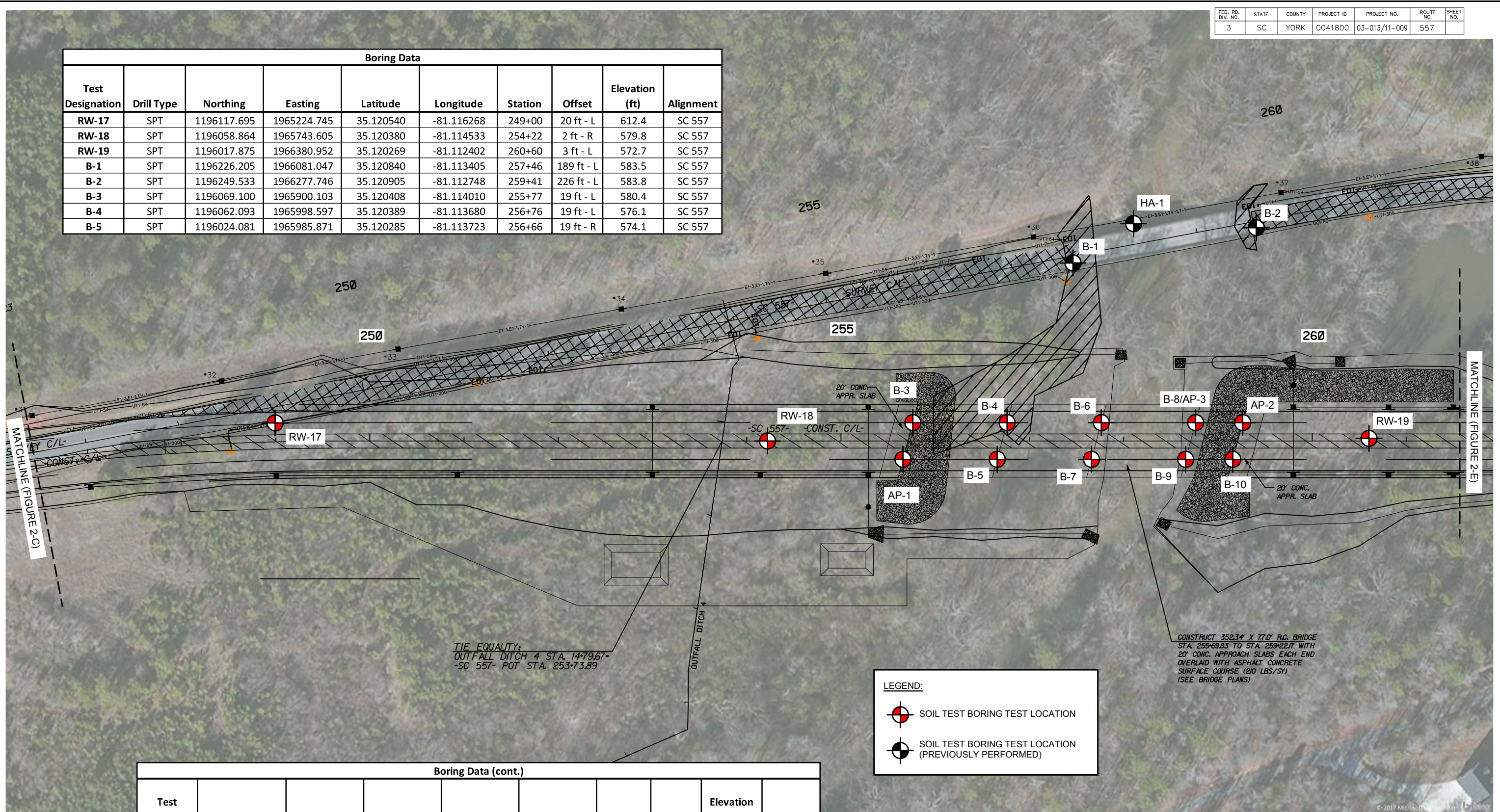
SC 557 Bridge over Crowders Creek  
Final Bridge Geotechnical Engineering Report

---

# APPENDIX

## SECTION 2 BORING LOCATION PLAN

Boring Data									
Test Designation	Drill Type	Northing	Easting	Latitude	Longitude	Station	Offset	Elevation (ft)	Alignment
RW-17	SPT	1196117.695	1965224.745	35.120540	-81.116268	249+00	20 ft - L	612.4	SC 557
RW-18	SPT	1196058.864	1965743.605	35.120380	-81.114533	254+22	2 ft - R	579.8	SC 557
RW-19	SPT	1196017.875	1966380.952	35.120269	-81.112402	260+60	3 ft - L	572.7	SC 557
B-1	SPT	1196226.205	1966081.047	35.120840	-81.113405	257+46	189 ft - L	583.5	SC 557
B-2	SPT	1196249.533	1966277.746	35.120905	-81.112748	259+41	226 ft - L	583.8	SC 557
B-3	SPT	1196069.100	1965900.103	35.120408	-81.114010	255+77	19 ft - L	580.4	SC 557
B-4	SPT	1196062.093	1965998.597	35.120389	-81.113680	256+76	19 ft - L	576.1	SC 557
B-5	SPT	1196024.081	1965985.871	35.120285	-81.113723	256+66	19 ft - R	574.1	SC 557



**LEGEND:**

- SOIL TEST BORING TEST LOCATION
- SOIL TEST BORING TEST LOCATION (PREVIOUSLY PERFORMED)

Boring Data (cont.)									
Test Designation	Drill Type	Northing	Easting	Latitude	Longitude	Station	Offset	Elevation (ft)	Alignment
B-6	SPT	1196055.728	1966099.245	35.120372	-81.113344	257+77	20 ft - L	575.2	SC 557
B-7	SPT	1196013.876	1966089.416	35.120257	-81.113376	257+70	22 ft - R	575.0	SC 557
B-8/AP-3	SPT/Auger Probe	1196047.754	1966198.735	35.120351	-81.113011	258+76	19 ft - L	574.4	SC 557
B-9	SPT	1196010.060	1966186.214	35.120247	-81.113053	258+67	19 ft - R	574.0	SC 557
B-10	SPT	1196006.220	1966235.425	35.120237	-81.112888	259+16	19 ft - R	573.2	SC 557
HA-1	Hand Auger	1196263.227	1966148.157	35.120942	-81.113181	258+10	231 ft - L	568.0	SC 557
AP-1	Auger Probe	1196030.747	1965885.897	35.120303	-81.114057	255+66	20 ft - R	575.6	SC 557
AP-2	Auger Probe	1196041.491	1966247.597	35.120333	-81.112848	259+26	17 ft - L	573.7	SC 557

4			
3			
2			
1			
REV.	BY	DATE	DESCRIPTION OF REVISION
TOPO.		DATE	GROUP
DWG. CTC		07.13.18	
R/W		DATE	

**F&ME CONSULTANTS**  
 GEOTECHNICAL – ENVIRONMENTAL – MATERIALS  
 COLUMBIA, SOUTH CAROLINA

SC 557 ROADWAY IMPROVEMENT PROJECT  
 YORK COUNTY, SC

BORING LOCATION PLAN

SCALE = 1"=100'

F&ME JOB NO. G4843.000  
 FIGURE 2-D

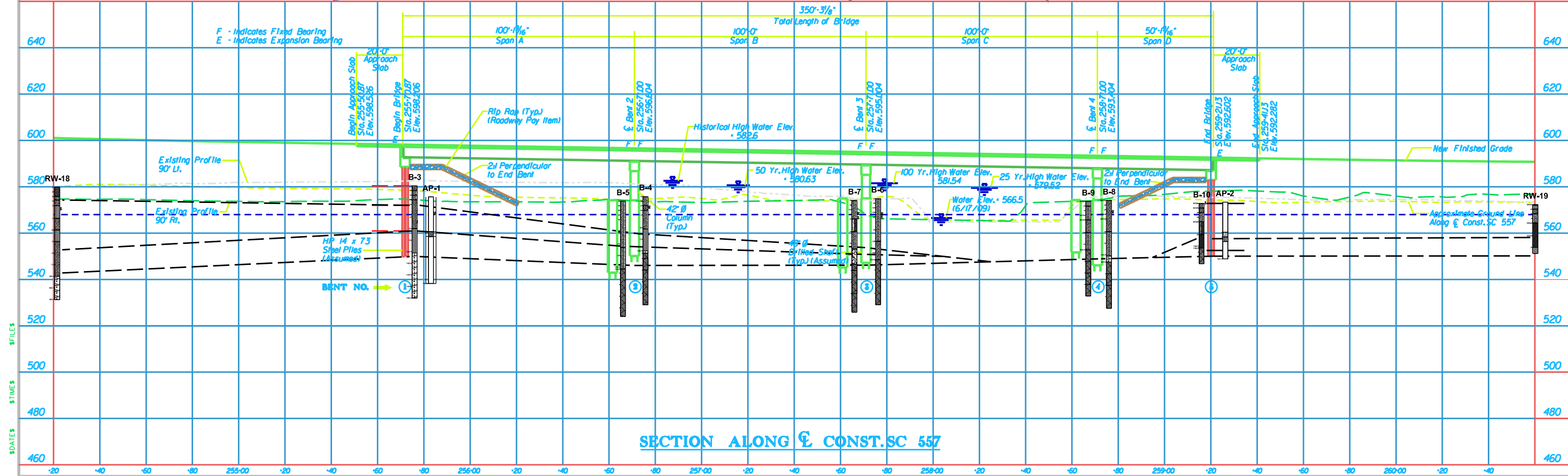
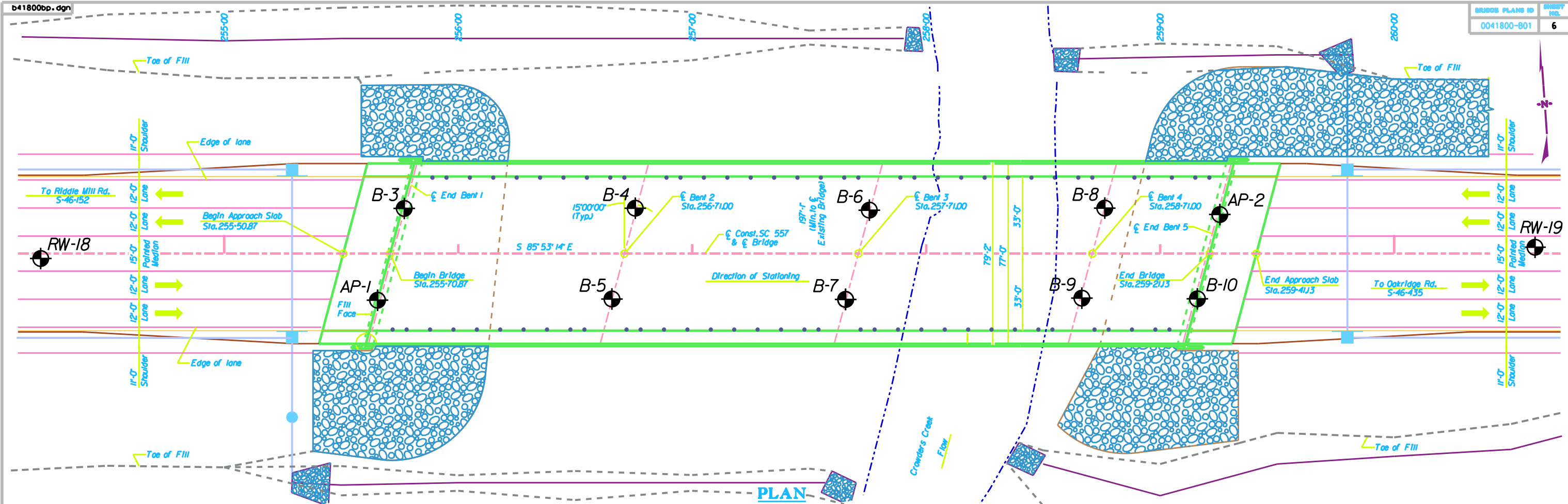


SC 557 Bridge over Crowders Creek  
Final Bridge Geotechnical Engineering Report

---

# APPENDIX

## SECTION 3 GENERALIZED SUBSURFACE PROFILE



SC 557 Bridge over Crowders Creek  
Final Bridge Geotechnical Engineering Report

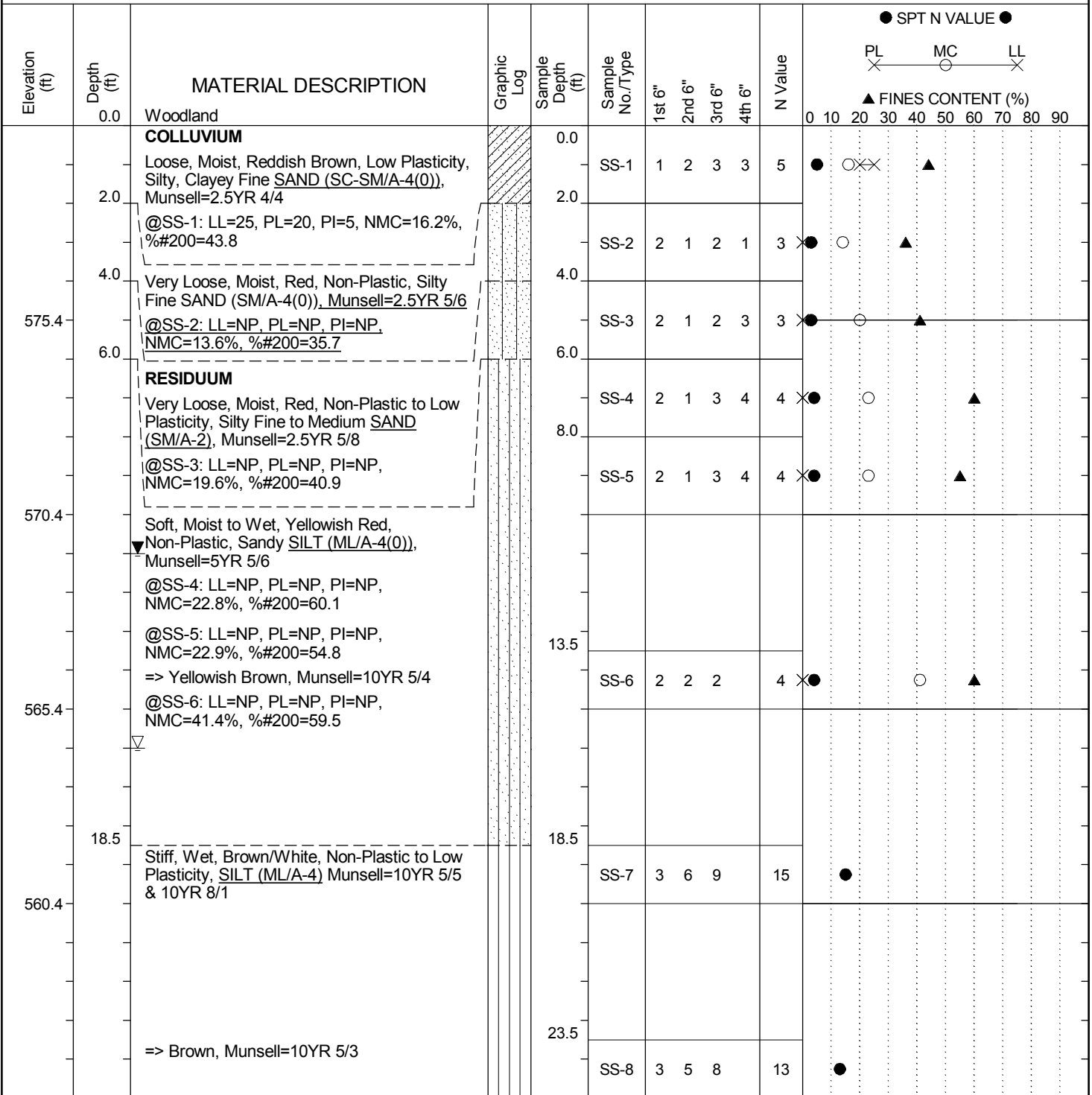
---

# APPENDIX

## SECTION 4 BORING LOGS

# SCDOT Soil Test Log

<b>Project ID:</b> G4843.000	<b>County:</b> York	<b>Boring No.:</b> B-3
<b>Site Description:</b> SC 557 Bridge over Crowders Creek		<b>Route:</b> SC 557
<b>Eng./Geo.:</b> R. Wessinger	<b>Boring Location:</b> 255+77	<b>Offset:</b> 19 ft - L
<b>Alignment:</b> Mainline	<b>Date Started:</b> 6/7/2018	<b>Date Completed:</b> 6/7/2018
<b>Elev.:</b> 580.4 ft	<b>Latitude:</b> 35.120408	<b>Longitude:</b> -81.11401
<b>Total Depth:</b> 48.5 ft	<b>Soil Depth:</b> 48.5 ft	<b>Core Depth:</b> 0 ft
<b>Bore Hole Diameter (in):</b> 6	<b>Sampler Configuration</b>	<b>Liner Required:</b> Y (N)
<b>Liner Used:</b> Y (N)	<b>Drill Machine:</b> CME 550X	<b>Drill Method:</b> HSA
<b>Hammer Type:</b> Automatic	<b>Energy Ratio:</b> 81%	<b>Groundwater:</b> TOB 16.0 ft
<b>Core Size:</b> N/A	<b>Driller:</b> D. Harris	<b>24HR:</b> 11.0 ft



## 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	





# SCDOT Soil Test Log

<b>Project ID:</b> G4843.000	<b>County:</b> York	<b>Boring No.:</b> B-4
<b>Site Description:</b> SC 557 Bridge over Crowders Creek		<b>Route:</b> SC 557
<b>Eng./Geo.:</b> R. Wessinger	<b>Boring Location:</b> 256+76	<b>Offset:</b> 19 ft - L
<b>Alignment:</b> Mainline	<b>Elev.:</b> 576.1 ft	<b>Latitude:</b> 35.120389
<b>Longitude:</b> -81.11368	<b>Date Started:</b> 6/6/2018	
<b>Total Depth:</b> 46.8 ft	<b>Soil Depth:</b> 24.5 ft	<b>Core Depth:</b> 22.3 ft
<b>Date Completed:</b> 6/7/2018	<b>Bore Hole Diameter (in):</b> 6	<b>Sampler Configuration:</b>
<b>Liner Required:</b> Y (N)	<b>Liner Used:</b> Y (N)	
<b>Drill Machine:</b> CME 550X	<b>Drill Method:</b> HSA/RC	<b>Hammer Type:</b> Automatic
<b>Energy Ratio:</b> 81%	<b>Core Size:</b> NQ	<b>Driller:</b> D. Harris
<b>Groundwater:</b> TOB 5.0 ft	<b>24HR:</b> Not Recorded	

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	SPT N VALUE				N Value	FINES CONTENT (%)									
						1st 6"	2nd 6"	3rd 6"	4th 6"		PL	MC	LL	0	10	20	30	40	50	60
556.1					SS-7	4	8	9		17										
	23.5	<b>PARTIALLY WEATHERED ROCK (PWR)</b>		23.5	SS-8	50/4"				100+										
	24.5	SAMPLED AS: Hard, Moist, Olive Gray, Non-Plastic to Low Plasticity, Sandy SILT (ML/A-4), Munsell=5Y 4/2		24.5																
551.1		<b>METAGABBRO</b> Grayish Green/White, Medium to Coarse Grained, Very Thickly Bedded, Plagioclase Feldspar/Clinopyroxene, Moderately to Slightly Weathered, Strong Rock, Joints Dip from 10° to 40°, Few Joints, Very Narrow to Tight, Filled (Healed), Irregular, Very Close, Rough to Very Rough			NQ-1						@25.1-ft: UC Strength=10,510 psi %REC=86, %RQD=75, RMR=65, GSI=60-70									
		NQ-2: Strong Rock, Joints Dip from 10° to 40°, Few Joints, Very Narrow to Tight, Filled (Healed), Irregular, Very Close, Rough to Very Rough		26.8	NQ-2						%REC=100, %RQD=100, RMR=67, GSI=60-70									
546.1											@31.4-ft: UC Strength=9,560 psi									
	31.8	<b>METAGABBRO/METADIORITE</b> Grayish Green/White/Gray, Fine to Coarse Grained, Thickly to Very Thickly Bedded, Plagioclase Feldspar/Clinopyroxene/Hornblende, Slightly Weathered to Fresh, Joints Dip from 20° to 45°, Occasional Joints, Very Narrow to Tight, Partially Filled/Filled (Quartz), Irregular, Very Close, Slightly Rough to Rough		31.8	NQ-3						%REC=99, %RQD=90, GSI=50-60									
541.1																				
	36.8			36.8																

## 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	

# SCDOT Soil Test Log

<b>Project ID:</b> G4843.000	<b>County:</b> York	<b>Boring No.:</b> B-4
<b>Site Description:</b> SC 557 Bridge over Crowders Creek	<b>Route:</b> SC 557	
<b>Eng./Geo.:</b> R. Wessinger	<b>Boring Location:</b> 256+76	<b>Offset:</b> 19 ft - L
<b>Alignment:</b> Mainline		
<b>Elev.:</b> 576.1 ft	<b>Latitude:</b> 35.120389	<b>Longitude:</b> -81.11368
<b>Date Started:</b> 6/6/2018		
<b>Total Depth:</b> 46.8 ft	<b>Soil Depth:</b> 24.5 ft	<b>Core Depth:</b> 22.3 ft
<b>Date Completed:</b> 6/7/2018		
<b>Bore Hole Diameter (in):</b> 6	<b>Sampler Configuration</b>	<b>Liner Required:</b> Y (N)
<b>Liner Used:</b> Y (N)		
<b>Drill Machine:</b> CME 550X	<b>Drill Method:</b> HSA/RC	<b>Hammer Type:</b> Automatic
<b>Energy Ratio:</b> 81%		
<b>Core Size:</b> NQ	<b>Driller:</b> D. Harris	<b>Groundwater:</b> TOB 5.0 ft
<b>24HR:</b> Not Recorded		

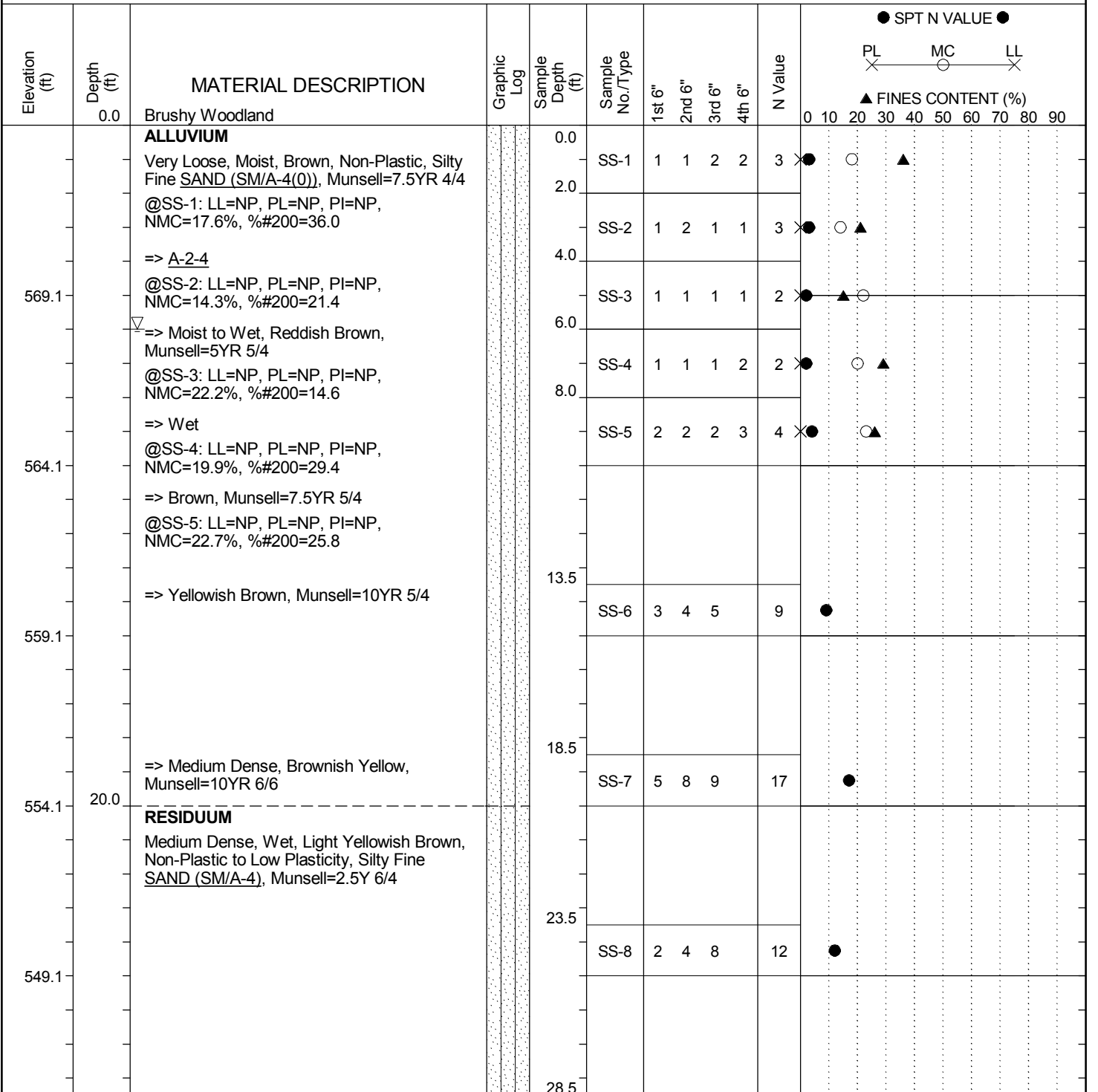
Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	SPT N VALUE				N Value	FINES CONTENT (%)									
						1st 6"	2nd 6"	3rd 6"	4th 6"		PL	MC	LL	0	10	20	30	40	50	60
536.1		@NQ-4: Moderately to Slightly Weathered, Joints Dip from 20° to 45°, Occasional Joints/Veins, Moderately Narrow to Narrow, Surface Stain/Partially Filled (Iron Oxide), Irregular, Very Close, Slightly Rough to Rough			NQ-4						%REC=93; %RQD=85; GSI=50-60									
531.1	41.8	@NQ-5: Medium to Coarse Grained, Highly Weathered to Fresh, Joints Dip from 20° to 45°, Few Joints, Moderately Narrow to Narrow, Partially Filled (Iron Oxide), Irregular, Very Close, Slightly Rough to Rough			NQ-5						%REC=99; %RQD=88; GSI=55-65									
526.1	46.8	Coring Terminated at 46.8 feet																		
521.1																				

### LEGEND

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



<b>Project ID:</b> G4843.000		<b>County:</b> York		<b>Boring No.:</b> B-5	
<b>Site Description:</b> SC 557 Bridge over Crowders Creek			<b>Route:</b> SC 557		
<b>Eng./Geo.:</b> R. Wessinger	<b>Boring Location:</b> 256+66		<b>Offset:</b> 19 ft - R	<b>Alignment:</b> Mainline	
<b>Elev.:</b> 574.1 ft	<b>Latitude:</b> 35.120285	<b>Longitude:</b> -81.113723		<b>Date Started:</b>	6/7/2018
<b>Total Depth:</b> 49.8 ft	<b>Soil Depth:</b> 29.3 ft	<b>Core Depth:</b> 20.5 ft	<b>Date Completed:</b>		6/7/2018
<b>Bore Hole Diameter (in):</b> 6		<b>Sampler Configuration</b>	<b>Liner Required:</b> Y (N)	<b>Liner Used:</b> Y (N)	
<b>Drill Machine:</b> CME 550X	<b>Drill Method:</b> HSA/RC	<b>Hammer Type:</b> Automatic		<b>Energy Ratio:</b> 81%	
<b>Core Size:</b> NQ	<b>Driller:</b> D. Harris	<b>Groundwater:</b> TOB 6.0 ft		<b>24HR</b> Cave 5.0-ft	



**LEGEND**

Continued Next Page

<b>SAMPLER TYPE</b>		<b>DRILLING METHOD</b>	
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	

# SCDOT Soil Test Log

Project ID: G4843.000			County: York		Boring No.: B-5	
Site Description: SC 557 Bridge over Crowders Creek				Route: SC 557		
Eng./Geo.: R. Wessinger		Boring Location: 256+66		Offset: 19 ft - R	Alignment: Mainline	
Elev.: 574.1 ft	Latitude: 35.120285	Longitude: -81.113723		Date Started: 6/7/2018		
Total Depth: 49.8 ft		Soil Depth: 29.3 ft	Core Depth: 20.5 ft		Date Completed: 6/7/2018	
Bore Hole Diameter (in): 6		Sampler Configuration		Liner Required: Y (N)	Liner Used: Y (N)	
Drill Machine: CME 550X		Drill Method: HSA/RC		Hammer Type: Automatic		Energy Ratio: 81%
Core Size: NQ		Driller: D. Harris	Groundwater: TOB 6.0 ft		24HR Cave 5.0-ft	

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	SPT N VALUE				FINES CONTENT (%)				
						1st 6"	2nd 6"	3rd 6"	4th 6"	PL	MC	LL		
	29.3	=> Very Dense, Dark Greenish Gray, Munsell=5GY 4/1		29.3	SS-9	28	50/3.5"							
544.1		<b>METADIORITE</b> Grayish Green/White/Gray, Medium Grained, Very Thickly Bedded, Plagioclase Feldspar/Hornblende, Moderately to Slightly Weathered, Joints Dip from 20° to 60°, Few Joints, Very Narrow to Tight, Filled (Calcite), Irregular, Very Close, Slightly Rough to Rough			SS-10	10/0"								
				31.1	NQ-1									
		@NQ-2: Very Strong Rock, Joints Dip from 20° to 45°, Few Joints, Very Narrow to Tight, Filled (Healed), Irregular, Very Close, Slightly Rough to Rough			NQ-2									
539.1		@NQ-3: Very Strong Rock, Joints Dip from 10° to 70°, Few Joints, Narrow to Tight, Surface Stain/Partially Filled (Calcite/Iron Oxide), Irregular, Very Close, Slightly Rough to Rough			36.1	NQ-3								
534.1		@NQ-4: Joints Dip from 20° to 70°, Occasional Joints, Narrow to Tight, Surface Stain/Partially Filled (Chlorite/Iron Oxide), Irregular, Very Close, Slightly Rough to Rough			41.1	NQ-4								
529.1		@NQ-5: Joints Dip from 30° to 80°, Few Joints, Narrow to Very Narrow, Surface Stain/Partially Filled (Calcite/Iron Oxide), Irregular, Very Close, Slightly Rough to Rough			46.1	NQ-5								
524.1	49.8	Coring Terminated at 49.8 feet												
519.1														

## 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	

# SCDOT Soil Test Log

<b>Project ID:</b> G4843.000	<b>County:</b> York	<b>Boring No.:</b> B-6
<b>Site Description:</b> SC 557 Bridge over Crowders Creek	<b>Route:</b> SC 557	
<b>Eng./Geo.:</b> R. Wessinger	<b>Boring Location:</b> 257+77	<b>Offset:</b> 20 ft - L
<b>Alignment:</b> Mainline	<b>Date Started:</b> 6/6/2018	<b>Date Completed:</b> 6/6/2018
<b>Elev.:</b> 575.2 ft	<b>Latitude:</b> 35.120372	<b>Longitude:</b> -81.113344
<b>Total Depth:</b> 45.9 ft	<b>Soil Depth:</b> 26.4 ft	<b>Core Depth:</b> 19.5 ft
<b>Bore Hole Diameter (in):</b> 6	<b>Sampler Configuration:</b>	<b>Liner Required:</b> Y (N)
<b>Liner Used:</b> Y (N)	<b>Drill Machine:</b> CME 550X	<b>Drill Method:</b> HSA/RC
<b>Hammer Type:</b> Automatic	<b>Energy Ratio:</b> 81%	<b>Groundwater:</b> TOB 7.0 ft
<b>Core Size:</b> NQ	<b>Driller:</b> D. Harris	<b>24HR:</b> 6.5 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	SPT N Value				PL		MC		LL		FINES CONTENT (%)		
						1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	0	10	20	30	40	50	60	70
570.2	0.0	Woodland <b>ALLUVIUM</b> Very Loose to Loose, Moist, Light Brown, Non-Plastic, Silty Fine SAND (SM/A-2-4), Munsell=7.5YR 6/4 @SS-1: LL=NP, PL=NP, PI=NP, NMC=17.6%, %200=21.8 => Strong Brown, Munsell=7.5YR 5/8 @SS-2: LL=NP, PL=NP, PI=NP, NMC=16.5%, %200=34.4 => Medium Dense to Loose, Brown, Munsell=7.5YR 5/4 @SS-3: LL=NP, PL=NP, PI=NP, NMC=21.0%, %200=33.8 => Wet, A-4(0) @SS-4: LL=NP, PL=NP, PI=NP, NMC=27.7%, %200=47.4 => Very Loose, Brown/Gray, A-2-4, Munsell=7.5YR 5/4 & 7.5YR 6/1 @SS-5: LL=NP, PL=NP, PI=NP, NMC=27.0%, %200=20.4		0.0	SS-1	WOH	1	1	2	2	●	○	○	○	○	○	○	○
	2.0			2.0	SS-12		4	4	5	6	9	×	●	○	○	○	○	○
	4.0			4.0	SS-3		8	8	8	7	16	×	●	○	○	○	○	○
	6.0			6.0	SS-4		4	6	4	4	10	×	●	○	○	○	○	○
	8.0			8.0	SS-5		1	1	1	2	2	×	●	○	○	○	○	○
565.2	13.5	Very Soft, Wet, Gray, Non-Plastic, Sandy SILT (ML/A-4(0)), Munsell=7.5YR 5/1 @SS-6: LL=NP, PL=NP, PI=NP, NMC=43.3%, %200=57.0		13.5	SS-6		1	1	1	2	2	×	●	○	○	○	○	○
560.2	18.5	Very Stiff, Wet to Moist, Dark Greenish Gray, Non-Plastic to Low Plasticity, Sandy SILT (ML/A-4), Munsell=5GY 4/1		18.5	SS-7		4	6	13	19			●					
555.2	23.5			23.5														

## LEGEND

Continued Next Page

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

# SCDOT Soil Test Log

Project ID: G4843.000			County: York		Boring No.: B-6	
Site Description: SC 557 Bridge over Crowders Creek				Route: SC 557		
Eng./Geo.: R. Wessinger		Boring Location: 257+77		Offset: 20 ft - L		Alignment: Mainline
Elev.: 575.2 ft	Latitude: 35.120372	Longitude: -81.113344		Date Started: 6/6/2018		
Total Depth: 45.9 ft	Soil Depth: 26.4 ft	Core Depth: 19.5 ft		Date Completed: 6/6/2018		
Bore Hole Diameter (in): 6		Sampler Configuration		Liner Required: Y (N)		Liner Used: Y (N)
Drill Machine: CME 550X		Drill Method: HSA/RC		Hammer Type: Automatic		Energy Ratio: 81%
Core Size: NQ		Driller: D. Harris		Groundwater: TOB 7.0 ft		24HR 6.5 ft

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	SPT N VALUE				N Value	PL X	MC O	LL X	FINES CONTENT (%) ▲
						1st 6"	2nd 6"	3rd 6"	4th 6"					
550.2	26.4	<p>@NQ-3: Grayish Green, Joints Dip from 20° to 70°, Occasional Joints/Bedding, Very Narrow to Tight, Surface Stain/Filled (Calcite/Quartz), Irregular, Very Close, Smooth to Slightly Rough</p> <p><b>METAGABBRO/METADIORITE</b> Grayish Green/White, Medium to Fine Grained, Very Thickly to Thickly Bedded, Plagioclase Feldspar/Clinopyroxene/Hornblende, Highly to Slightly Weathered, Very Strong Rock, Joints Dip from 20° to 70°, Few Joints, Narrow to Tight, Surface Stain/Filled (Iron Oxide/Quartz), Irregular, Very Close, Slightly Rough to Rough</p> <p>@NQ-2: Grayish Green/White/Gray, Extremely Strong Rock, Joints Dip from 20° to 70°, Occasional Joints/Bedding, Narrow to Very Narrow, Surface Stain/Filled (Iron Oxide/Quartz), Irregular, Very Close, Slightly Rough to Rough</p> <p>@NQ-3: Joints Dip from 20° to 70°, Occasional Joints/Bedding, Very Narrow to Tight, Surface Stain/Filled (Calcite/Quartz), Irregular, Very Close, Smooth to Slightly Rough</p> <p>@NQ-4: Grayish Green/White/Gray/Black, Joints Dip from 10° to 70°, Numerous Joints/Shears, Narrow to Very Narrow, Surface Stain/Filled (Healed/Chlorite), Irregular, Very Close, Slickensided to Slightly Rough</p>		26.4	SS-8	10	10	18		28				●
				26.4	SS-9	10/0"				100				>>●
545.2				30.9	NQ-1									@27.7-ft: UC Strength=29,140 psi %REC=32, %RQD=29, RMR=62, GSI=45-55
540.2				35.9	NQ-2									%REC=98, %RQD=90, RMR=68, GSI=50-60 @35.0-ft: UC Strength=39,210 psi
535.2				40.9	NQ-3									%REC=98, %RQD=83, GSI=35-45
530.2					NQ-4									%REC=98, %RQD=75, GSI=35-45
	45.9	Coring Terminated at 45.9 feet												

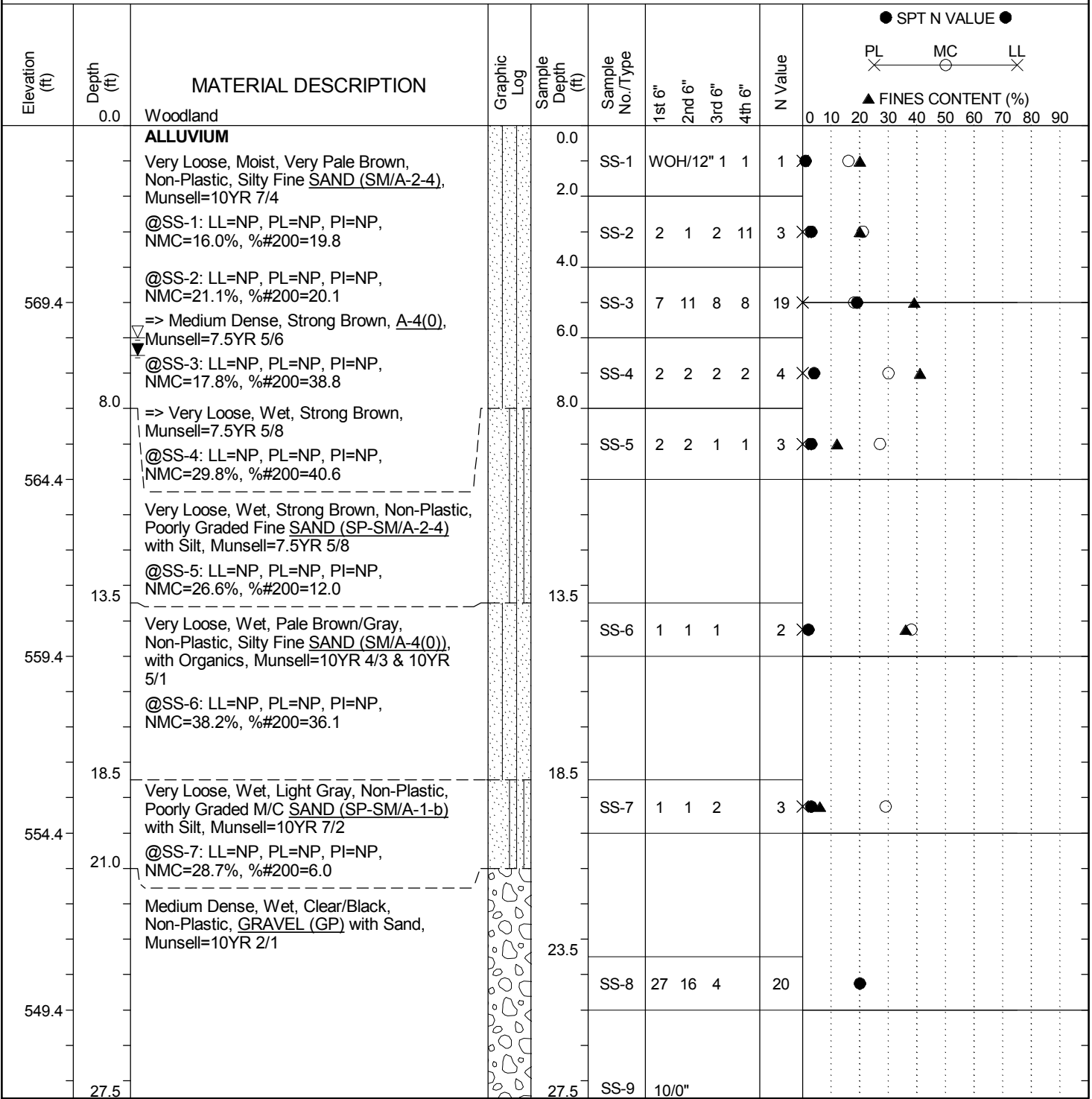
### LEGEND

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\_G4843 - CURRENT - SC-557.GPJ\_FME2017.GDT\_7/16/18

# SCDOT Soil Test Log

<b>Project ID:</b> G4843.000	<b>County:</b> York	<b>Boring No.:</b> B-7
<b>Site Description:</b> SC 557 Bridge over Crowders Creek	<b>Route:</b> SC 557	
<b>Eng./Geo.:</b> R. Wessinger	<b>Boring Location:</b> 257+70	<b>Offset:</b> 22 ft - R
<b>Alignment:</b> Mainline	<b>Date Started:</b> 6/5/2018	<b>Date Completed:</b> 6/5/2018
<b>Elev.:</b> 574.4 ft	<b>Latitude:</b> 35.120257	<b>Longitude:</b> -81.113376
<b>Total Depth:</b> 48.3 ft	<b>Soil Depth:</b> 27.5 ft	<b>Core Depth:</b> 20.8 ft
<b>Bore Hole Diameter (in):</b> 6	<b>Sampler Configuration:</b>	<b>Liner Required:</b> Y (N)
<b>Liner Used:</b> Y (N)	<b>Drill Machine:</b> CME 550X	<b>Drill Method:</b> HSA/RC
<b>Hammer Type:</b> Automatic	<b>Energy Ratio:</b> 81%	<b>Groundwater:</b> TOB 6.0 ft
<b>Core Size:</b> NQ	<b>Driller:</b> D. Harris	<b>24HR:</b> 6.5 ft



### 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	

# SCDOT Soil Test Log

<b>Project ID:</b> G4843.000	<b>County:</b> York	<b>Boring No.:</b> B-7
<b>Site Description:</b> SC 557 Bridge over Crowders Creek	<b>Route:</b> SC 557	
<b>Eng./Geo.:</b> R. Wessinger	<b>Boring Location:</b> 257+70	<b>Offset:</b> 22 ft - R
<b>Alignment:</b> Mainline		
<b>Elev.:</b> 574.4 ft	<b>Latitude:</b> 35.120257	<b>Longitude:</b> -81.113376
<b>Date Started:</b> 6/5/2018		
<b>Total Depth:</b> 48.3 ft	<b>Soil Depth:</b> 27.5 ft	<b>Core Depth:</b> 20.8 ft
<b>Date Completed:</b> 6/5/2018		
<b>Bore Hole Diameter (in):</b> 6	<b>Sampler Configuration</b>	<b>Liner Required:</b> Y (N)
<b>Liner Used:</b> Y (N)		
<b>Drill Machine:</b> CME 550X	<b>Drill Method:</b> HSA/RC	<b>Hammer Type:</b> Automatic
<b>Energy Ratio:</b> 81%		
<b>Core Size:</b> NQ	<b>Driller:</b> D. Harris	<b>Groundwater:</b> TOB 6.0 ft
<b>24HR:</b> 6.5 ft		

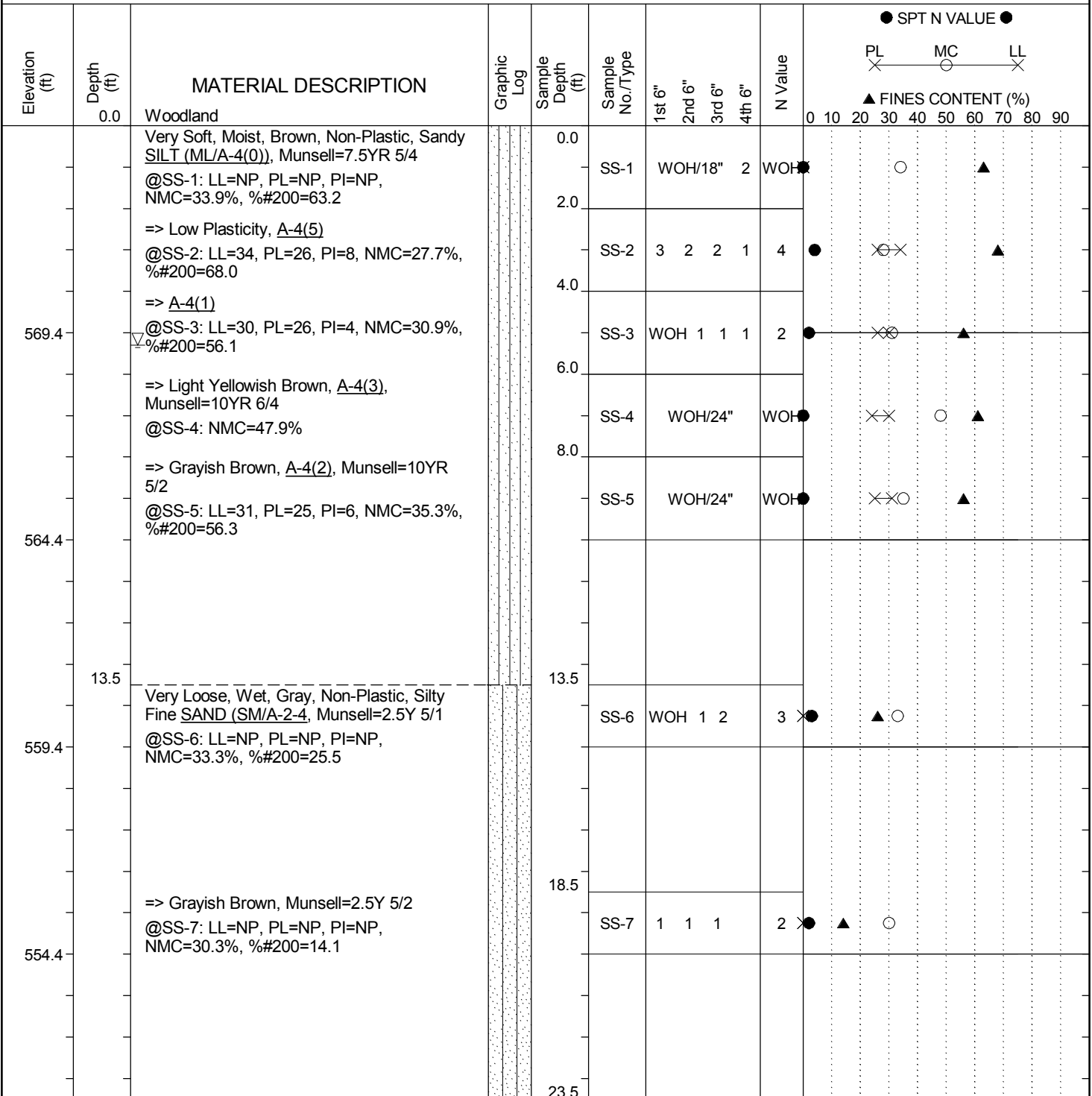
Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	SPT N VALUE				N Value	● SPT N VALUE ● PL — MC — LL ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
						1st 6"	2nd 6"	3rd 6"	4th 6"		
544.4	30.3	<b>METAGABBRO</b> Grayish Green/White, Fine to Medium Grained, Very Thickly Bedded, Plagioclase Feldspar/Clinopyroxene, Moderately to Slightly Weathered, Joints Dip from 45° to 70°, Few Joints, Very Narrow to Tight, Surface Stain/Filled (Calcite/Iron Oxide), Irregular, Very Close, Slightly Rough to Rough		27.5	NQ-1						%REC=85; %RQD=47; GSI=50-60
539.4	35.3	<b>METADIORITE</b> Grayish Green/White, Medium Grained, Thickly Bedded, Plagioclase Feldspar/Hornblende, Slightly Weathered to Fresh, Strong Rock, Joints Dip from 20° to 60°, Few Joints, Very Narrow to Tight, Surface Stain (Healed), Irregular, Very Close, Slightly Rough to Rough  @NQ-3: Very Strong Rock, Joints Dip from 20° to 80°, Few Joints, Very Narrow to Tight, Surface Stain (Iron Oxide), Irregular, Very Close, Slightly Rough to Rough		30.3	NQ-2						@30.9-ft: UC Strength=8,200 psi %REC=100, %RQD=100 RMR=70, GSI=65-75
534.4	40.3	<b>METAGABBRO/METADIORITE</b> Grayish Green/White, Fine to Medium Grained, Thickly to Very Thickly Bedded, Plagioclase Feldspar/Clinopyroxene/Hornblende, Slightly Weathered to Fresh, Joints Dip from 20° to 70°, Few Joints, Very Narrow, Surface Stain/Partially Filled (Chlorite), Irregular, Very Close, Slightly Rough to Rough  @NQ-5: Joints Dip from 20° to 60°, Few Joints, Tight, Filled (Calcite), Irregular, Very Close, Slightly Rough to Rough		40.3	NQ-3						@38.2-ft: UC Strength=17,190 psi %REC=95, %RQD=80; RMR=69, GSI=60-70
529.4	45.3	<b>METAGABBRO/METADIORITE</b> Grayish Green/White, Fine to Medium Grained, Thickly to Very Thickly Bedded, Plagioclase Feldspar/Clinopyroxene/Hornblende, Slightly Weathered to Fresh, Joints Dip from 20° to 70°, Few Joints, Very Narrow, Surface Stain/Partially Filled (Chlorite), Irregular, Very Close, Slightly Rough to Rough  @NQ-5: Joints Dip from 20° to 60°, Few Joints, Tight, Filled (Calcite), Irregular, Very Close, Slightly Rough to Rough		45.3	NQ-4						%REC=93; %RQD=85; GSI=60-70
524.4	48.3	Coring Terminated at 48.3 feet			NQ-5						%REC=99; %RQD=99; GSI=65-75

## 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	

# SCDOT Soil Test Log

<b>Project ID:</b> G4843.000	<b>County:</b> York	<b>Boring No.:</b> B-8
<b>Site Description:</b> SC 557 Bridge over Crowders Creek	<b>Route:</b> SC 557	
<b>Eng./Geo.:</b> C. Piercy	<b>Boring Location:</b> 258+76	<b>Offset:</b> 19 ft - L
<b>Alignment:</b> Mainline		
<b>Elev.:</b> 574.4 ft	<b>Latitude:</b> 35.120351	<b>Longitude:</b> -81.113011
<b>Date Started:</b> 5/30/2018		
<b>Total Depth:</b> 46.6 ft	<b>Soil Depth:</b> 26.6 ft	<b>Core Depth:</b> 20 ft
<b>Date Completed:</b> 5/30/2018		
<b>Bore Hole Diameter (in):</b> 6	<b>Sampler Configuration</b>	<b>Liner Required:</b> Y (N)
<b>Liner Used:</b> Y (N)		
<b>Drill Machine:</b> CME 550X	<b>Drill Method:</b> HSA/RC	<b>Hammer Type:</b> Automatic
<b>Energy Ratio:</b> 81%		
<b>Core Size:</b> NQ	<b>Driller:</b> D. Harris	<b>Groundwater:</b> TOB 5.3 ft
<b>24HR:</b> Not Recorded		



## 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	

# SCDOT Soil Test Log

<b>Project ID:</b> G4843.000	<b>County:</b> York	<b>Boring No.:</b> B-8
<b>Site Description:</b> SC 557 Bridge over Crowders Creek	<b>Route:</b> SC 557	
<b>Eng./Geo.:</b> C. Piercy	<b>Boring Location:</b> 258+76	<b>Offset:</b> 19 ft - L
<b>Alignment:</b> Mainline		
<b>Elev.:</b> 574.4 ft	<b>Latitude:</b> 35.120351	<b>Longitude:</b> -81.113011
<b>Date Started:</b> 5/30/2018		
<b>Total Depth:</b> 46.6 ft	<b>Soil Depth:</b> 26.6 ft	<b>Core Depth:</b> 20 ft
<b>Date Completed:</b> 5/30/2018		
<b>Bore Hole Diameter (in):</b> 6	<b>Sampler Configuration</b>	<b>Liner Required:</b> Y (N)
<b>Liner Used:</b> Y (N)		
<b>Drill Machine:</b> CME 550X	<b>Drill Method:</b> HSA/RC	<b>Hammer Type:</b> Automatic
<b>Energy Ratio:</b> 81%		
<b>Core Size:</b> NQ	<b>Driller:</b> D. Harris	<b>Groundwater:</b> TOB 5.3 ft
<b>24HR:</b> Not Recorded		

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	SPT N VALUE				N Value	PL	MC	LL	FINES CONTENT (%)
						1st 6"	2nd 6"	3rd 6"	4th 6"					
549.4	24.0	=> Light Yellowish Brown, Munsell=2.5Y 6/3 / <b>PARTIALLY WEATHERED ROCK (PWR)</b> SAMPLED AS: Very Dense, Wet to Moist, Very Dark Grayish Green, Non-Plastic to Low Plasticity, Silty Fine to Coarse SAND (SM), with Gravel, Munsell=5GY 3/2 => Light Olive Brown, Munsell=2.5Y 5/3		27	SS-8	27	50/3"			100+				>>
	26.6	<b>METADIORITE</b> White/Gray/Black, Medium Grained, Thickly Bedded, Plagioclase Feldspar/Hornblende, Moderately to Slightly Weathered, Strong Rock, Joints Dip from 20° to 60°, Occasional Joints, Very Narrow to Tight, Surface Stain (Iron Oxide), Irregular, Very Close, Slightly Rough to Rough @NQ-2: Very Strong Rock, Joints Dip from 20° to 70°, Few Joints, Very Narrow to Tight, Surface Stain, Irregular, Very Close, Slightly Rough to Rough		50/0.5"	SS-9	50/0.5"			100+				@27.2-ft: UC Strength=13,680 psi	>>
544.4				31.6	NQ-1								%REC=76, %RQD=41; RMR=37, GSI=30-40	
539.4					NQ-2								@35.4-ft: UC Strength=19,620 psi	
534.4	36.6	<b>METAGABBRO</b> Grayish Green, Fine Grained, Very Thickly Bedded, Plagioclase Feldspar/Clinopyroxene, Highly to Moderately Weathered, Joints Dip from 20° to 80°, Numerous Joints, Moderately Wide, Spotty (Healed), Irregular, Very Close, Slightly Rough to Rough		36.6	NQ-3								%REC=20, %RQD=0, GSI=25-35	
529.4		<b>METAGABBRO/METADIORITE</b> Grayish Green/White/Gray, Medium to Fine Grained, Thickly to Very Thickly Bedded, Plagioclase Feldspar/Clinopyroxene/bHornblende, Highly to Moderately Weathered, Very Strong Rock, Joints Dip from 10° to 70°, Numerous Joints, Very Narrow to Tight, Surface Stain (Clay/Iron Oxide), Irregular, Very Close, Slightly Rough to Rough		41.6	NQ-4								@42.4-ft: UC Strength=16,810 psi	
	46.6	Coring Terminated at 46.6 feet												

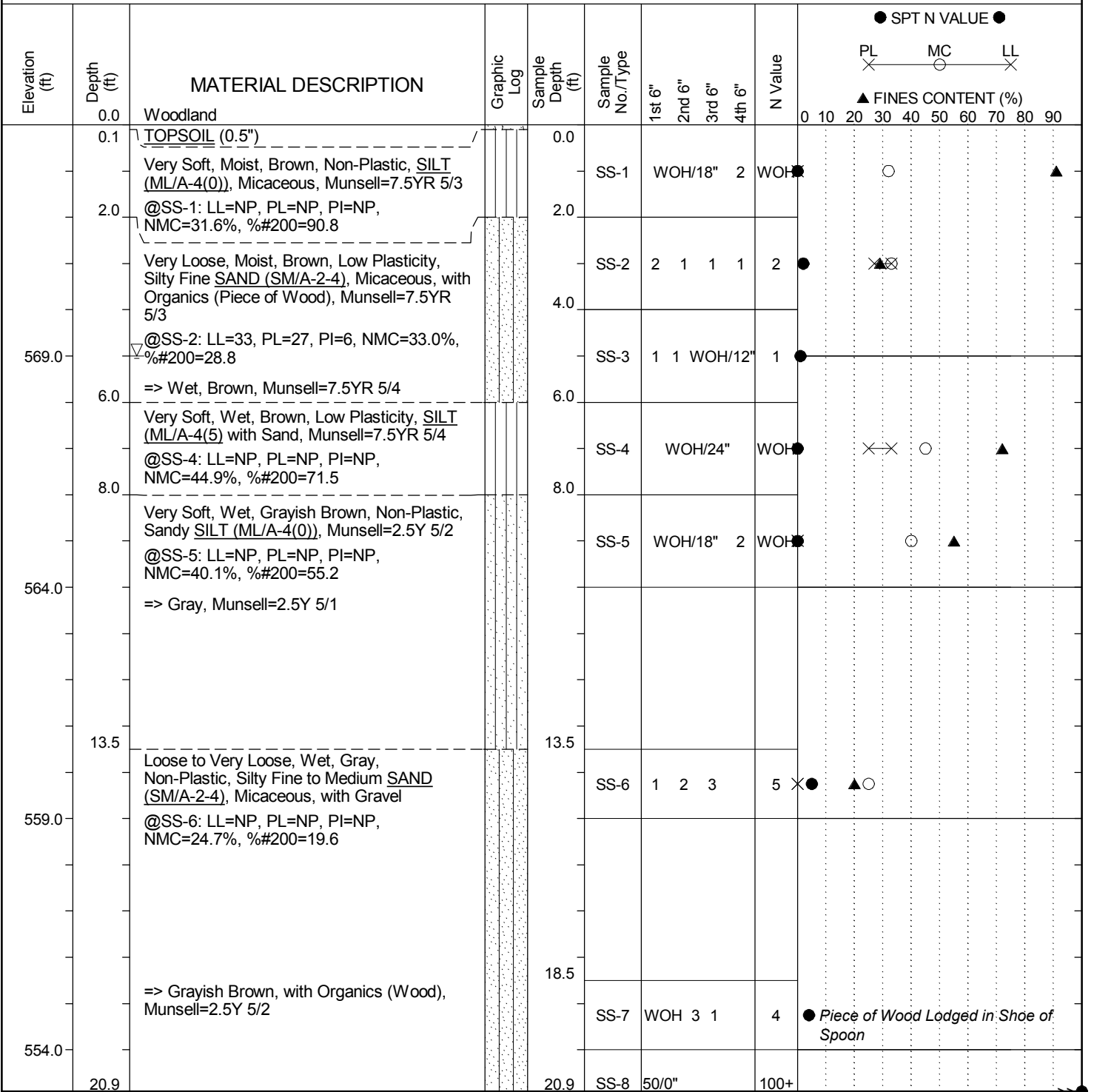
## LEGEND

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	



# SCDOT Soil Test Log

<b>Project ID:</b> G4843.000	<b>County:</b> York	<b>Boring No.:</b> B-9
<b>Site Description:</b> SC 557 Bridge over Crowders Creek	<b>Route:</b> SC 557	
<b>Eng./Geo.:</b> C. Piercy	<b>Boring Location:</b> 258+67	<b>Offset:</b> 19 ft - R
<b>Alignment:</b> Mainline	<b>Date Started:</b> 5/31/2018	<b>Date Completed:</b> 5/31/2018
<b>Elev.:</b> 574.0 ft	<b>Latitude:</b> 35.120247	<b>Longitude:</b> -81.113053
<b>Total Depth:</b> 40.9 ft	<b>Soil Depth:</b> 20.9 ft	<b>Core Depth:</b> 20 ft
<b>Bore Hole Diameter (in):</b> 4	<b>Sampler Configuration</b>	<b>Liner Required:</b> Y (N)
<b>Liner Used:</b> Y (N)	<b>Drill Machine:</b> CME 550X	<b>Drill Method:</b> RW/RC
<b>Hammer Type:</b> Automatic	<b>Energy Ratio:</b> 81%	<b>Groundwater:</b> TOB 5.0 ft
<b>Core Size:</b> NQ	<b>Driller:</b> D. Harris	<b>24HR:</b> Cave 6.2-ft



## 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	

# SCDOT Soil Test Log

<b>Project ID:</b> G4843.000	<b>County:</b> York	<b>Boring No.:</b> B-9
<b>Site Description:</b> SC 557 Bridge over Crowders Creek	<b>Route:</b> SC 557	
<b>Eng./Geo.:</b> C. Piercy	<b>Boring Location:</b> 258+67	<b>Offset:</b> 19 ft - R
<b>Alignment:</b> Mainline		
<b>Elev.:</b> 574.0 ft	<b>Latitude:</b> 35.120247	<b>Longitude:</b> -81.113053
<b>Date Started:</b> 5/31/2018		
<b>Total Depth:</b> 40.9 ft	<b>Soil Depth:</b> 20.9 ft	<b>Core Depth:</b> 20 ft
<b>Date Completed:</b> 5/31/2018		
<b>Bore Hole Diameter (in):</b> 4	<b>Sampler Configuration</b>	<b>Liner Required:</b> Y (N)
<b>Liner Used:</b> Y (N)		
<b>Drill Machine:</b> CME 550X	<b>Drill Method:</b> RW/RC	<b>Hammer Type:</b> Automatic
<b>Energy Ratio:</b> 81%		
<b>Core Size:</b> NQ	<b>Driller:</b> D. Harris	<b>Groundwater:</b> TOB 5.0 ft
<b>24HR:</b> Cave 6.2-ft		

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	SPT N VALUE				N Value	● SPT N VALUE ● PL — MC — LL ▲ FINES CONTENT (%) 0 10 20 30 40 50 60 70 80 90
						1st 6"	2nd 6"	3rd 6"	4th 6"		
549.0	20.9	<b>METADIORITE</b> White/Gray/Black, Medium Grained, Thickly Bedded, Plagioclase Feldspar/Hornblende, Moderately to Slightly Weathered, Very Strong Rock, Joints Dip from 20° to 80°, Numerous Joints, Very Narrow to Tight, Surface Stain (Iron Oxide), Irregular, Very Close, Slightly Rough to Rough		20.9	NQ-1					@21.7-ft: UC Strength=19,840 psi  %REC=86, %RQD=40; RMR=57, GSI=40-50	
544.0	25.9	@NQ-2: Very Strong Rock, Joints Dip from 30° to 60°, Occasional Joints, Very Narrow to Tight, Surface Stain (Iron Oxide), Irregular, Very Close, Slightly Rough to Rough		25.9	NQ-2					@28.1-ft: UC Strength=26,980 psi  %REC=85, %RQD=70; RMR=60, GSI=40-50	
539.0	30.9	<b>METAGABBRO/METADIORITE</b> Grayish Green/White/Gray, Medium Grained, Thickly to Very Thickly Bedded, Plagioclase Feldspar/Clinopyroxene/Hornblende, Slightly Weathered to Fresh, Joints Dip from 30° to 60°, Few Joints, Very Narrow to Tight, Filled (Calcite), Irregular, Very Close, Slightly Rough to Rough		30.9	NQ-3					%REC=100, %RQD=99, GSI=55-65	
534.0	35.9	<b>METADIORITE</b> White/Gray/Black, Medium Grained, Thickly Bedded, Plagioclase Feldspar/Hornblende, Fresh, Joints Dip from 20° to 80°, Few Joints, Very Narrow to Tight, Partially Filled/Filled (Calcite), Irregular, Very Close, Slightly Rough to Rough		35.9	NQ-4					%REC=94, %RQD=93, GSI=55-65	
	40.9	Coring Terminated at 40.9 feet									

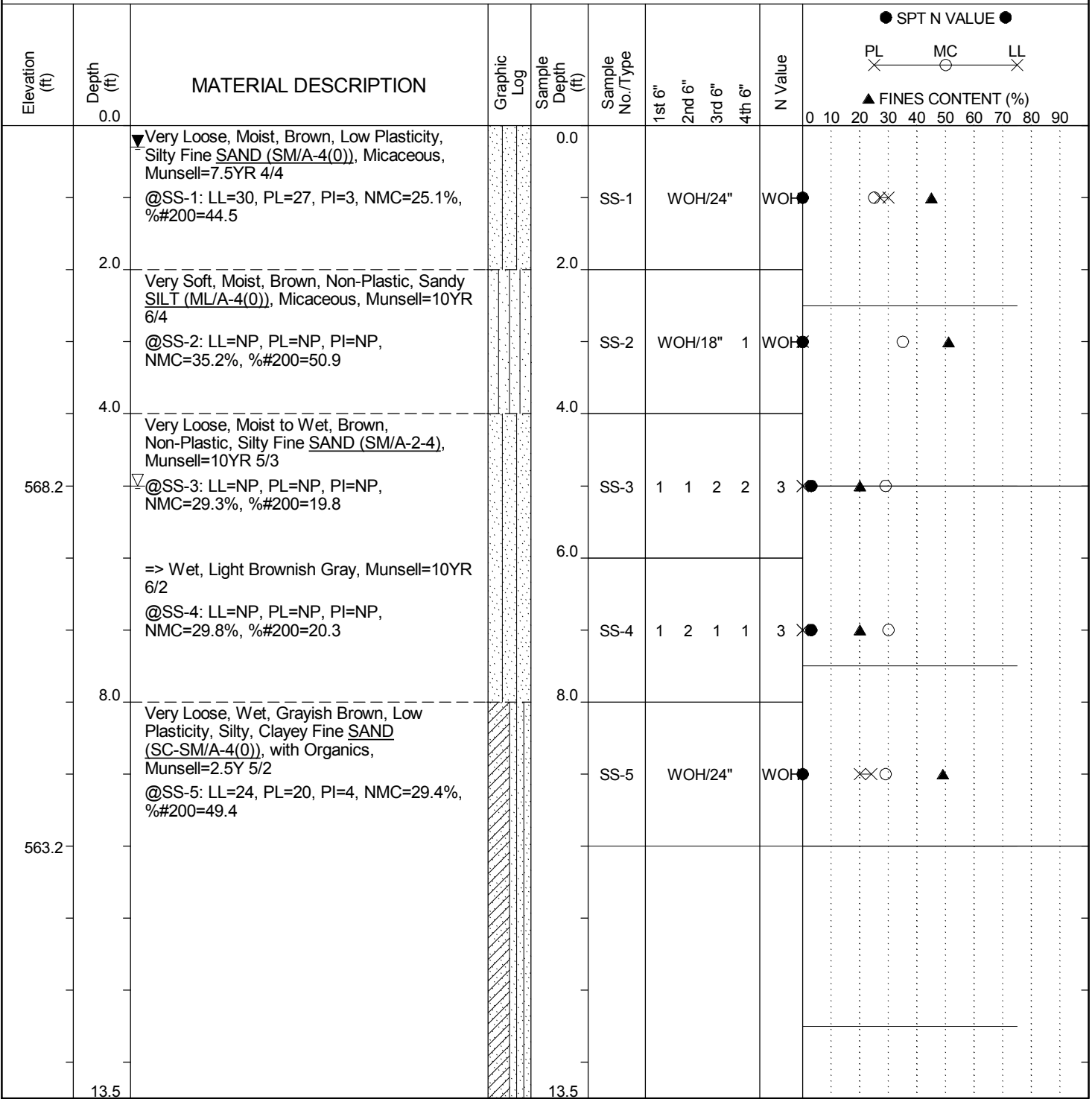
## LEGEND

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\_G4843 - CURRENT - SC-557.GPJ\_FME2017.GDT\_7/16/18

# SCDOT Soil Test Log

<b>Project ID:</b> G4843.000	<b>County:</b> York	<b>Boring No.:</b> B-10
<b>Site Description:</b> SC 557 Bridge over Crowders Creek	<b>Route:</b> SC 557	
<b>Eng./Geo.:</b> C. Piercy	<b>Boring Location:</b> 259+16	<b>Offset:</b> 19 ft - R
<b>Alignment:</b> Mainline		
<b>Elev.:</b> 573.2 ft	<b>Latitude:</b> 35.120237	<b>Longitude:</b> -81.112888
<b>Date Started:</b> 5/31/2018		
<b>Total Depth:</b> 26.1 ft	<b>Soil Depth:</b> 19.3 ft	<b>Core Depth:</b> 6.8 ft
<b>Date Completed:</b> 5/31/2018		
<b>Bore Hole Diameter (in):</b> 4	<b>Sampler Configuration</b>	<b>Liner Required:</b> Y (N)
<b>Liner Used:</b> Y (N)		
<b>Drill Machine:</b> CME 550X	<b>Drill Method:</b> RW/RC	<b>Hammer Type:</b> Automatic
<b>Energy Ratio:</b> 81%		
<b>Core Size:</b> NQ	<b>Driller:</b> D. Harris	<b>Groundwater:</b> TOB 5.0 ft
<b>24HR:</b> 0.3 ft		



### LEGEND

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	

Continued Next Page

SC\_DOT\_G4843 - CURRENT - SC-557.GPJ\_FME2017.GDT\_7/16/18

# SCDOT Soil Test Log

<b>Project ID:</b> G4843.000	<b>County:</b> York	<b>Boring No.:</b> B-10
<b>Site Description:</b> SC 557 Bridge over Crowders Creek	<b>Route:</b> SC 557	
<b>Eng./Geo.:</b> C. Piercy	<b>Boring Location:</b> 259+16	<b>Offset:</b> 19 ft - R
<b>Alignment:</b> Mainline		
<b>Elev.:</b> 573.2 ft	<b>Latitude:</b> 35.120237	<b>Longitude:</b> -81.112888
<b>Date Started:</b> 5/31/2018		
<b>Total Depth:</b> 26.1 ft	<b>Soil Depth:</b> 19.3 ft	<b>Core Depth:</b> 6.8 ft
<b>Date Completed:</b> 5/31/2018		
<b>Bore Hole Diameter (in):</b> 4	<b>Sampler Configuration</b>	<b>Liner Required:</b> Y (N)
<b>Liner Used:</b> Y (N)		
<b>Drill Machine:</b> CME 550X	<b>Drill Method:</b> RW/RC	<b>Hammer Type:</b> Automatic
<b>Energy Ratio:</b> 81%		
<b>Core Size:</b> NQ	<b>Driller:</b> D. Harris	<b>Groundwater:</b> TOB 5.0 ft
<b>24HR:</b> 0.3 ft		

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	SPT N VALUE				FINES CONTENT (%)		
						1st 6"	2nd 6"	3rd 6"	4th 6"	PL	MC	LL
558.2		Very Soft, Wet, Grayish Brown, Low Plasticity, Silty CLAY (CL-ML/A-4(1)), Micaceous, with Organics, Munsell=2.5Y 5/2 @SS-6: LL=25, PL=18, PI=7, NMC=39.9%, %200=56.5 => Gray, Munsell=2.5Y 5/1			SS-6	WOH	1	1	2	25	18	7
18.5		<b>PARTIALLY WEATHERED ROCK (PWR)</b>		18.5	SS-7	50/4"			100+			
19.3		SAMPLED AS: Hard, Wet, Gray, Non-Plastic, Silty Fine SAND (SM/A-4), with Organics (Wood), Munsell=2.5Y 5/1		19.3	SS-8	50/0"			100+			
553.2		<b>METAGABBRO</b> Grayish Green/White, Medium Grained, Very Thickly Bedded, Plagioclase Feldspar/Clinopyroxene, Slightly Weathered, Very Strong Rock, Joints Dip from 20° to 40°, Few Joints, Very Narrow to Tight, Surface Stain/Filled (Iron Oxide/Quartz), Irregular, Very Close, Slightly Rough to Rough @NQ-2: Joints Dip from 10° to 40°, Few Joints/Veins, Very Narrow to Tight, Surface Stain/Filled (Iron Oxide/Quartz), Irregular, Very Close, Slightly Rough to Rough		21.1	NQ-1							
548.2					NQ-2							
26.1		Coring Terminated at 26.1 feet										

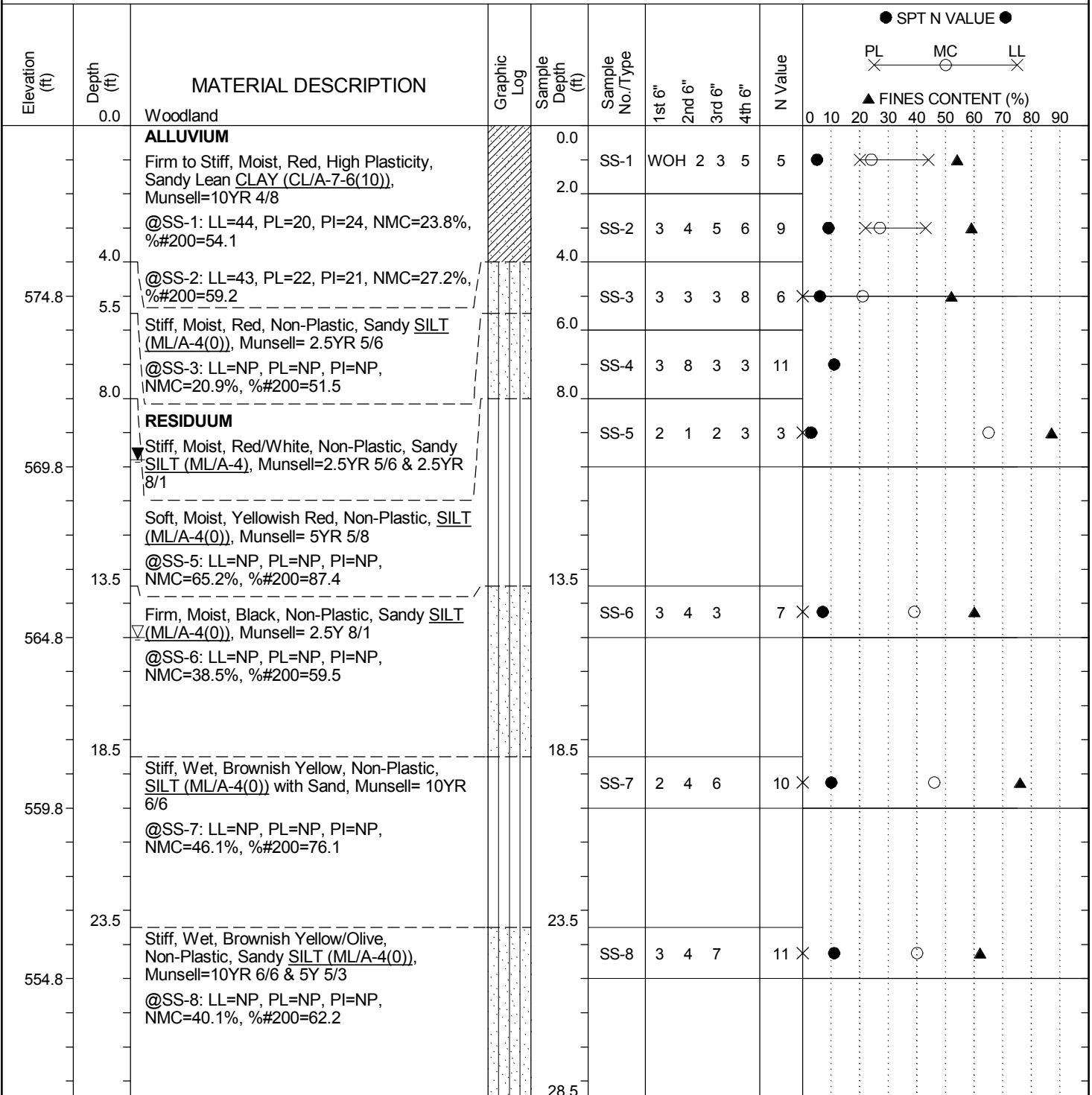
## LEGEND

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\_G4843 - CURRENT - SC-557.GPJ\_FME2017.GDT\_7/16/18

# SCDOT Soil Test Log

<b>Project ID:</b> G4843.000	<b>County:</b> York	<b>Boring No.:</b> RW-18
<b>Site Description:</b> SC 557 Bridge over Crowders Creek		<b>Route:</b> SC 557
<b>Eng./Geo.:</b> R. Wessinger	<b>Boring Location:</b> 254+22	<b>Offset:</b> 2 ft - R
<b>Alignment:</b> Mainline	<b>Elev.:</b> 579.8 ft	<b>Latitude:</b> 35.12038
<b>Longitude:</b> -81.114533	<b>Date Started:</b> 6/8/2018	
<b>Total Depth:</b> 48.6 ft	<b>Soil Depth:</b> 48.6 ft	<b>Core Depth:</b> 0 ft
<b>Date Completed:</b> 6/8/2018		
<b>Bore Hole Diameter (in):</b> 6	<b>Sampler Configuration</b>	<b>Liner Required:</b> Y (N)
<b>Liner Used:</b> Y (N)	<b>Drill Machine:</b> CME 550X	<b>Drill Method:</b> HSA
<b>Hammer Type:</b> Automatic	<b>Energy Ratio:</b> 81%	
<b>Core Size:</b> N/A	<b>Driller:</b> D. Harris	<b>Groundwater:</b> TOB 15 ft
<b>24HR:</b> 9.8 ft		



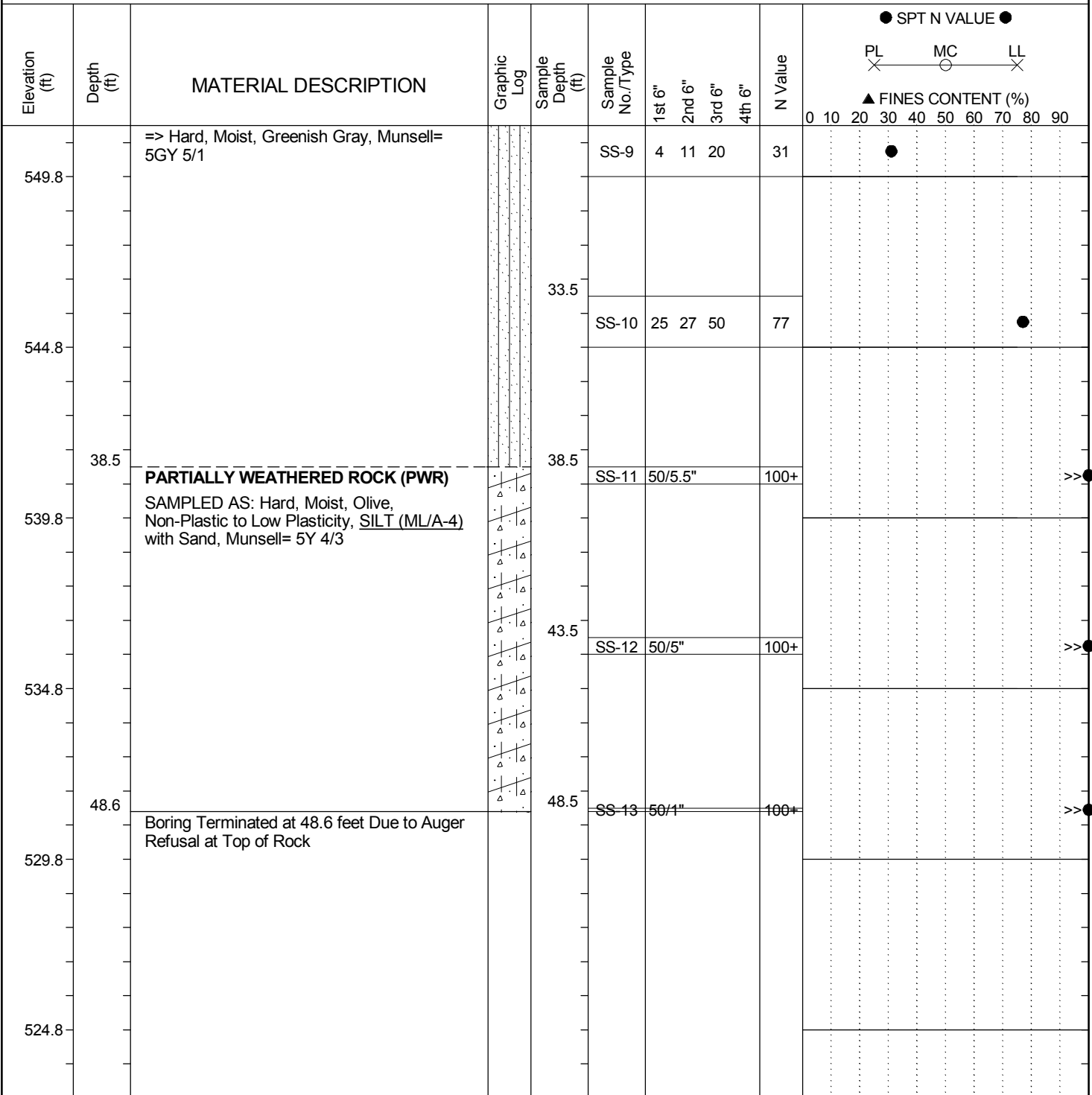
## LEGEND

Continued Next Page

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

# SCDOT Soil Test Log

<b>Project ID:</b> G4843.000	<b>County:</b> York	<b>Boring No.:</b> RW-18
<b>Site Description:</b> SC 557 Bridge over Crowders Creek		<b>Route:</b> SC 557
<b>Eng./Geo.:</b> R. Wessinger	<b>Boring Location:</b> 254+22	<b>Offset:</b> 2 ft - R
<b>Alignment:</b> Mainline	<b>Date Started:</b> 6/8/2018	<b>Date Completed:</b> 6/8/2018
<b>Elev.:</b> 579.8 ft	<b>Latitude:</b> 35.12038	<b>Longitude:</b> -81.114533
<b>Total Depth:</b> 48.6 ft	<b>Soil Depth:</b> 48.6 ft	<b>Core Depth:</b> 0 ft
<b>Bore Hole Diameter (in):</b> 6	<b>Sampler Configuration</b>	<b>Liner Required:</b> Y (N)
<b>Liner Used:</b> Y (N)	<b>Drill Machine:</b> CME 550X	<b>Drill Method:</b> HSA
<b>Hammer Type:</b> Automatic	<b>Energy Ratio:</b> 81%	<b>Groundwater:</b> TOB 15 ft
<b>Core Size:</b> N/A	<b>Driller:</b> D. Harris	<b>24HR:</b> 9.8 ft

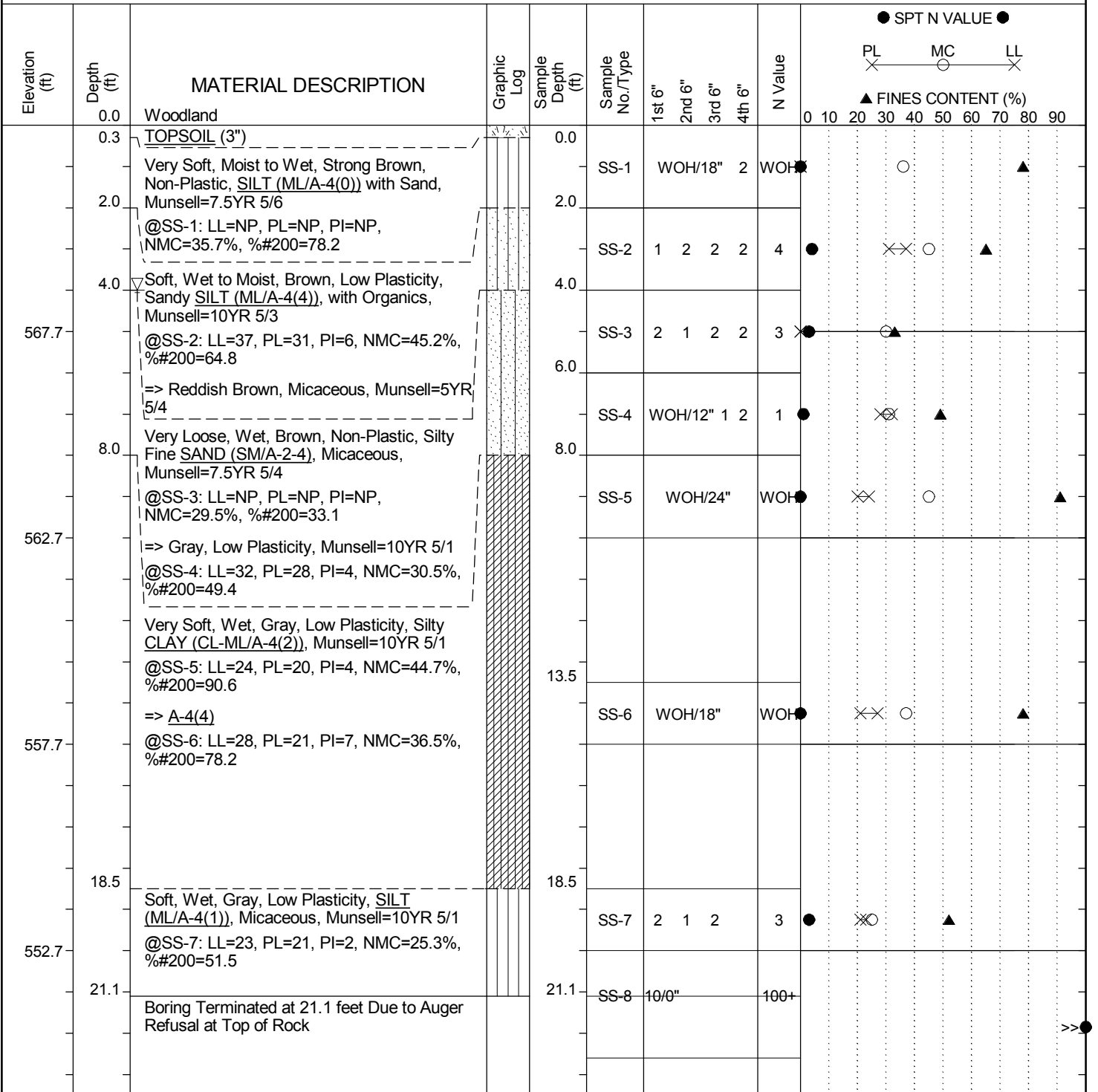


## LEGEND

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	

# SCDOT Soil Test Log

<b>Project ID:</b> G4843.000	<b>County:</b> York	<b>Boring No.:</b> RW-19
<b>Site Description:</b> SC 557 Bridge over Crowders Creek		<b>Route:</b> SC 557
<b>Eng./Geo.:</b> C. Piercy	<b>Boring Location:</b> 260+60	<b>Offset:</b> 3 ft - L
<b>Alignment:</b> Mainline	<b>Date Started:</b> 6/1/2018	<b>Date Completed:</b> 6/1/2018
<b>Elev.:</b> 572.7 ft	<b>Latitude:</b> 35.120269	<b>Longitude:</b> -81.112402
<b>Total Depth:</b> 21.1 ft	<b>Soil Depth:</b> 21.1 ft	<b>Core Depth:</b> 0 ft
<b>Bore Hole Diameter (in):</b> 4	<b>Sampler Configuration</b>	<b>Liner Required:</b> Y (N)
<b>Liner Used:</b> Y (N)	<b>Drill Machine:</b> CME 550X	<b>Drill Method:</b> RW
<b>Hammer Type:</b> Automatic	<b>Energy Ratio:</b> 81%	<b>Groundwater:</b> TOB 4.0 ft
<b>Core Size:</b> N/A	<b>Driller:</b> D. Harris	<b>24HR</b> Cave 2.0-ft

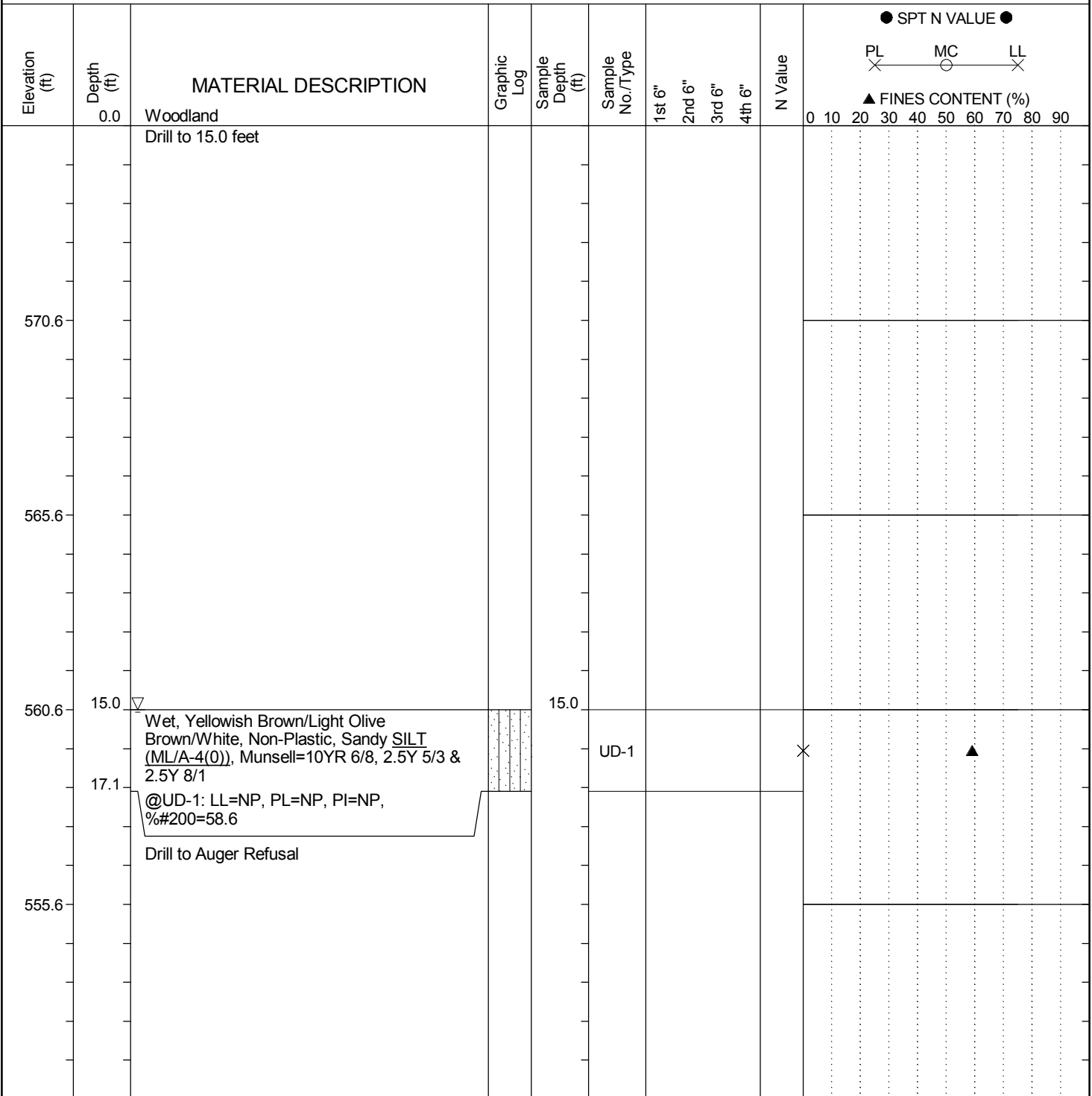


## LEGEND

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	

# SCDOT Soil Test Log

<b>Project ID:</b> G4843.000	<b>County:</b> York	<b>Boring No.:</b> AP-1
<b>Site Description:</b> SC 557 Bridge over Crowders Creek		<b>Route:</b> SC 557
<b>Eng./Geo.:</b> R. Wessinger	<b>Boring Location:</b> 255+66	<b>Offset:</b> 20 ft - R
<b>Alignment:</b> Mainline	<b>Date Started:</b> 6/8/2018	<b>Date Completed:</b> 6/8/2018
<b>Elev.:</b> 575.6 ft	<b>Latitude:</b> 35.120303	<b>Longitude:</b> -81.114057
<b>Total Depth:</b> 37.4 ft	<b>Soil Depth:</b> 37.4 ft	<b>Core Depth:</b> 0 ft
<b>Bore Hole Diameter (in):</b> 6	<b>Sampler Configuration</b>	<b>Liner Required:</b> Y (N)
<b>Liner Used:</b> Y (N)	<b>Drill Machine:</b> CME 550X	<b>Drill Method:</b> HSA
<b>Hammer Type:</b> Automatic	<b>Energy Ratio:</b> 81%	<b>24HR:</b> Not Recorded
<b>Core Size:</b> N/A	<b>Driller:</b> D. Harris	<b>Groundwater:</b> TOB 15 ft



### 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	



# SCDOT Soil Test Log

<b>Project ID:</b> G4843.000	<b>County:</b> York	<b>Boring No.:</b> AP-1
<b>Site Description:</b> SC 557 Bridge over Crowders Creek	<b>Route:</b> SC 557	
<b>Eng./Geo.:</b> R. Wessinger	<b>Boring Location:</b> 255+66	<b>Offset:</b> 20 ft - R
<b>Alignment:</b> Mainline		
<b>Elev.:</b> 575.6 ft	<b>Latitude:</b> 35.120303	<b>Longitude:</b> -81.114057
<b>Date Started:</b> 6/8/2018		
<b>Total Depth:</b> 37.4 ft	<b>Soil Depth:</b> 37.4 ft	<b>Core Depth:</b> 0 ft
<b>Date Completed:</b> 6/8/2018		
<b>Bore Hole Diameter (in):</b> 6	<b>Sampler Configuration</b>	<b>Liner Required:</b> Y (N)
<b>Liner Used:</b> Y (N)		
<b>Drill Machine:</b> CME 550X	<b>Drill Method:</b> HSA	<b>Hammer Type:</b> Automatic
<b>Energy Ratio:</b> 81%		
<b>Core Size:</b> N/A	<b>Driller:</b> D. Harris	<b>Groundwater:</b> TOB 15 ft
<b>24HR:</b> Not Recorded		

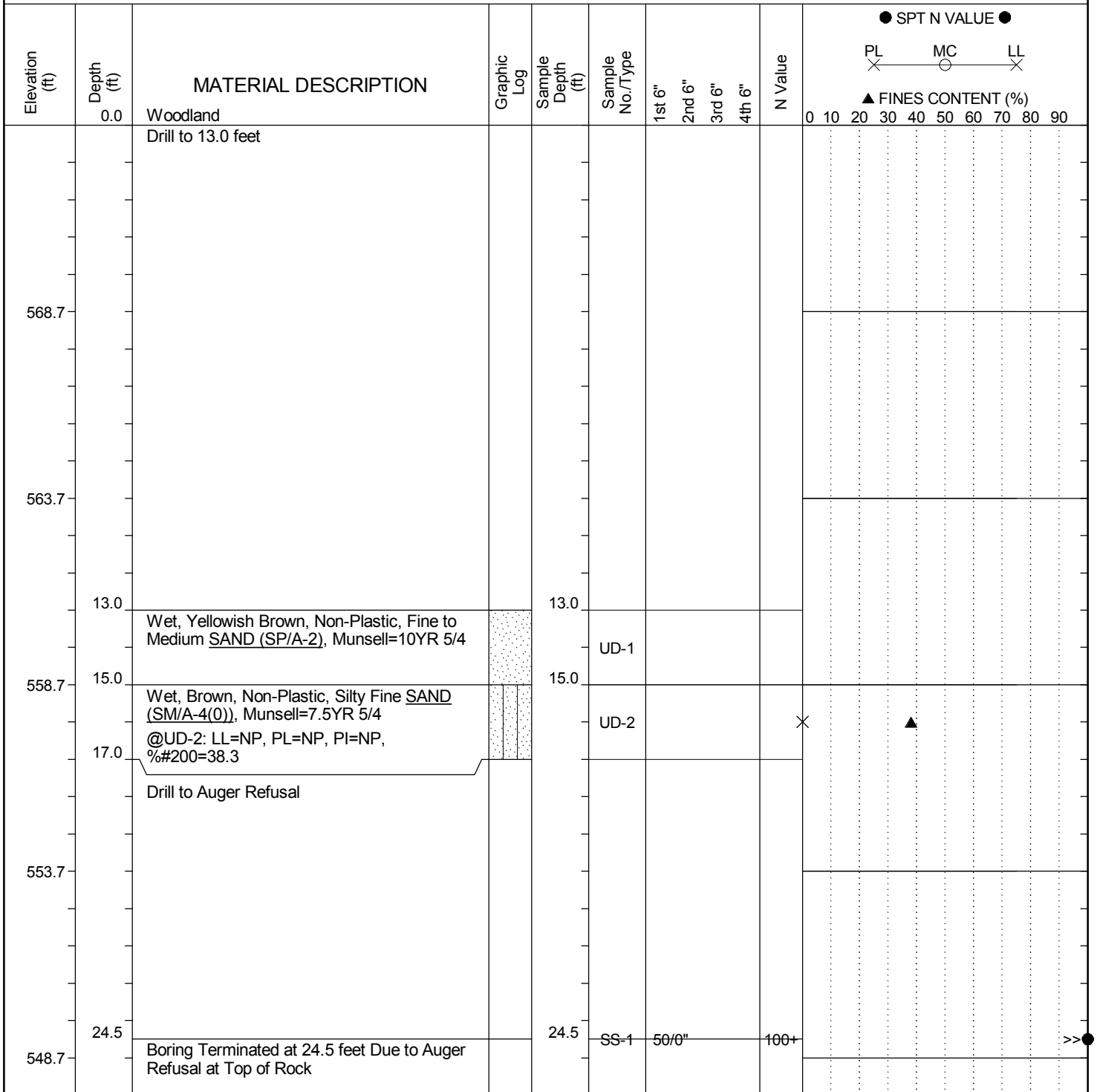
Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	SPT N VALUE									
											PL	MC	LL	FINES CONTENT (%)						
											0	10	20	30	40	50	60	70	80	90
545.6																				
540.6																				
	37.4	Boring Terminated at 37.4 feet Due to Auger Refusal at Top of Rock		37.4	SS-1	10/0"				100+										>>
535.6																				
530.6																				

### 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	

# SCDOT Soil Test Log

<b>Project ID:</b>	G4843.000	<b>County:</b>	York	<b>Boring No.:</b>	AP-2
<b>Site Description:</b>	SC 557 Bridge over Crowders Creek			<b>Route:</b>	SC 557
<b>Eng./Geo.:</b>	C. Piercy	<b>Boring Location:</b>	259+26	<b>Offset:</b>	17 ft - L
<b>Alignment:</b>	Mainline				
<b>Elev.:</b>	573.7 ft	<b>Latitude:</b>	35.120333	<b>Longitude:</b>	-81.112848
<b>Date Started:</b>	6/1/2018				
<b>Total Depth:</b>	24.5 ft	<b>Soil Depth:</b>	24.5 ft	<b>Core Depth:</b>	0 ft
<b>Date Completed:</b>	6/1/2018				
<b>Bore Hole Diameter (in):</b>	6	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)
<b>Liner Used:</b>	Y (N)				
<b>Drill Machine:</b>	CME 550X	<b>Drill Method:</b>	HSA	<b>Hammer Type:</b>	Automatic
<b>Energy Ratio:</b>	81%				
<b>Core Size:</b>	N/A	<b>Driller:</b>	D. Harris	<b>Groundwater:</b>	TOB Not Recorded
<b>24HR</b>	Cave 2.0-f				

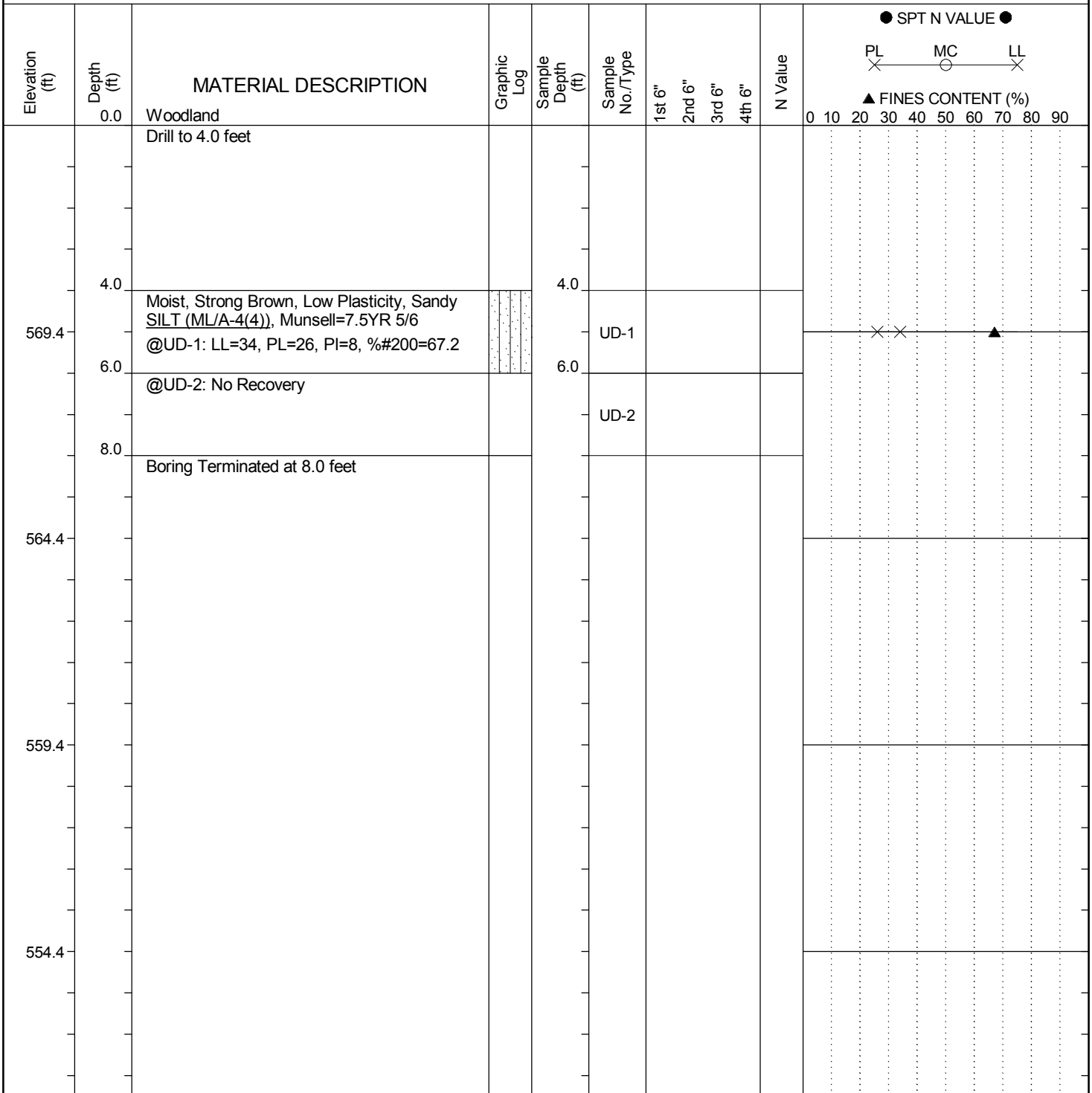


## LEGEND

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	

# SCDOT Soil Test Log

<b>Project ID:</b> G4843.000	<b>County:</b> York	<b>Boring No.:</b> AP-3
<b>Site Description:</b> SC 557 Bridge over Crowders Creek	<b>Route:</b> SC 557	
<b>Eng./Geo.:</b> C. Piercy	<b>Boring Location:</b> 258+76	<b>Offset:</b> 19 ft - L
<b>Alignment:</b> Mainline	<b>Date Started:</b> 6/4/2018	<b>Date Completed:</b> 6/4/2018
<b>Elev.:</b> 574.4 ft	<b>Latitude:</b> 35.120351	<b>Longitude:</b> -81.113011
<b>Total Depth:</b> 8 ft	<b>Soil Depth:</b> 8 ft	<b>Core Depth:</b> 0 ft
<b>Bore Hole Diameter (in):</b> 6	<b>Sampler Configuration:</b>	<b>Liner Required:</b> Y (N)
<b>Liner Used:</b> Y (N)	<b>Drill Machine:</b> CME 550X	<b>Drill Method:</b> HSA
<b>Hammer Type:</b> Automatic	<b>Energy Ratio:</b> 81%	<b>Groundwater:</b> TOB Not Recorded
<b>Core Size:</b> N/A	<b>Driller:</b> D. Harris	<b>24HR:</b> Not Recorded



### 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 557 Bridge over Crowders Creek  
Final Bridge Geotechnical Engineering Report

---

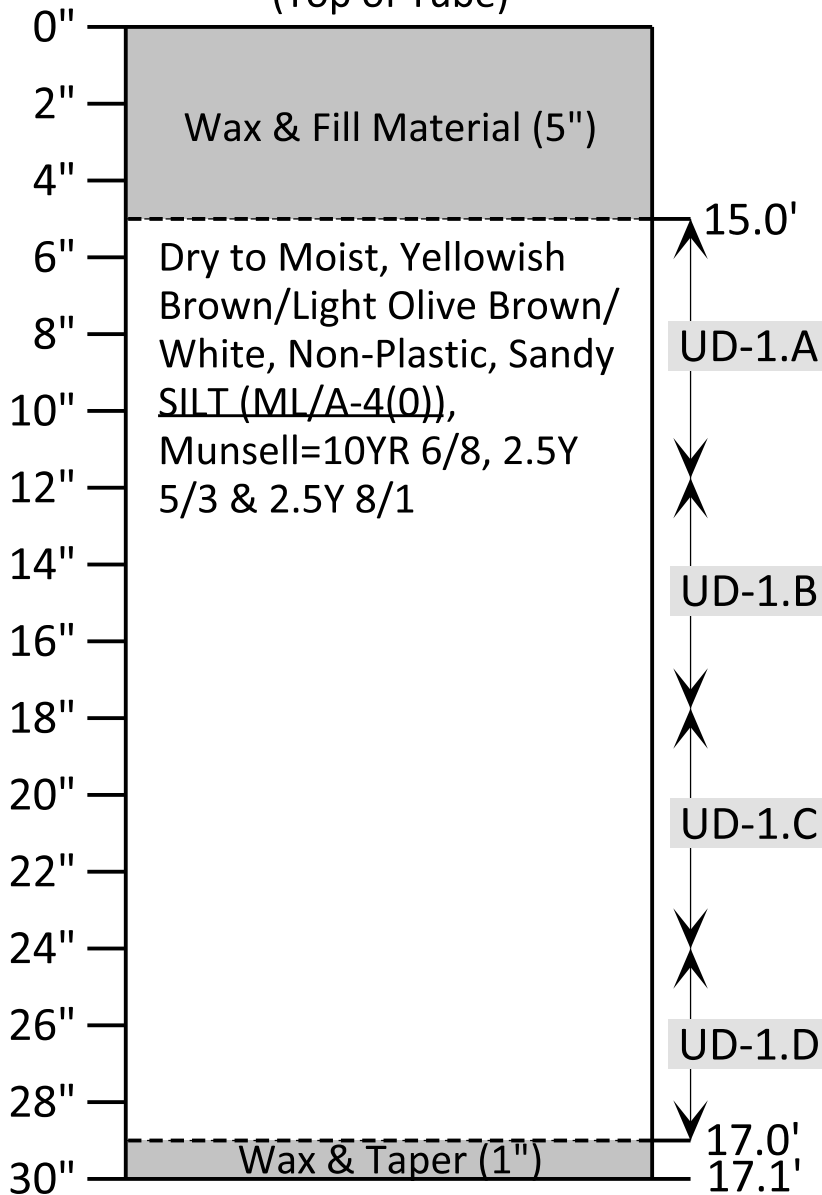
# APPENDIX

## SECTION 5 SHELBY TUBE PREPARATION LOGS

# UNDISTURBED SHELBY TUBE SAMPLE LOG

## Shelby Tube UD-1

(Top of Tube)



Prepared For: **SCDOT**

**Project:** SC 557 Bridge over Crowders Creek

**SCDOT Project ID:** 0041800RD01

**F&ME Project No.:** G4843

**Boring No.:** AP-1

**Sample Depth:** 15.0' - 17.1'

**Date Sampled:** 6/8/2018

**Date Pushed:** 6/11/2018

**Sample ID:** 18-1156

**Additional Comments:**

Shelby Tube was advanced 26", and 25" of material was recovered. Samples UD-1.A, UD-1.B and UD-1.C were used for triaxial shear. Sample UD-1.B was used for grain size analysis and Atterberg limits.

### LABORATORY TEST RESULTS

Liquid Limit	Plastic Limit	Plasticity Index	%#200 Sieve	Water Content (%)	c (psi)	$\Phi$	c' (psi)	$\Phi'$
NP	NP	NP	58.6	--	0.51	26.4	0.25	36.4

# SC 557 Bridge over Crowders Creek

Boring AP-1: Station 255+66, Offset 20 ft - R



UD-1.A



UD-1.B



UD-1.C

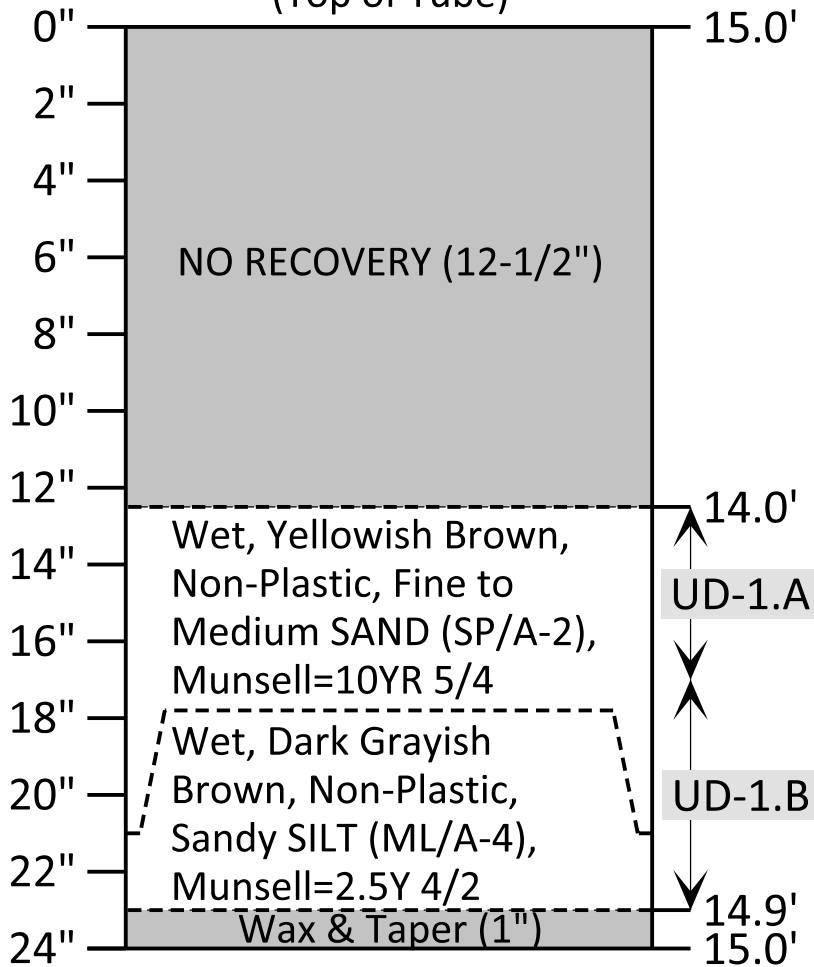


UD-1.D

# UNDISTURBED SHELBY TUBE SAMPLE LOG

## Shelby Tube UD-1

(Top of Tube)



Prepared For: **SCDOT**

**Project:** SC 557 Bridge over Crowders Creek

**SCDOT Project ID:** 0041800RD01

**F&ME Project No.:** G4843

**Boring No.:** AP-2

**Sample Depth:** 13.0' - 15.0'

**Date Sampled:** 6/1/2018

**Date Pushed:** 6/13/2018

**Sample ID:** 18-1096

**Additional Comments:**

Shelby Tube was advanced 24", and 11-1/2" of material was recovered. Neither classification testing nor triaxial testing was performed on the recovered material.

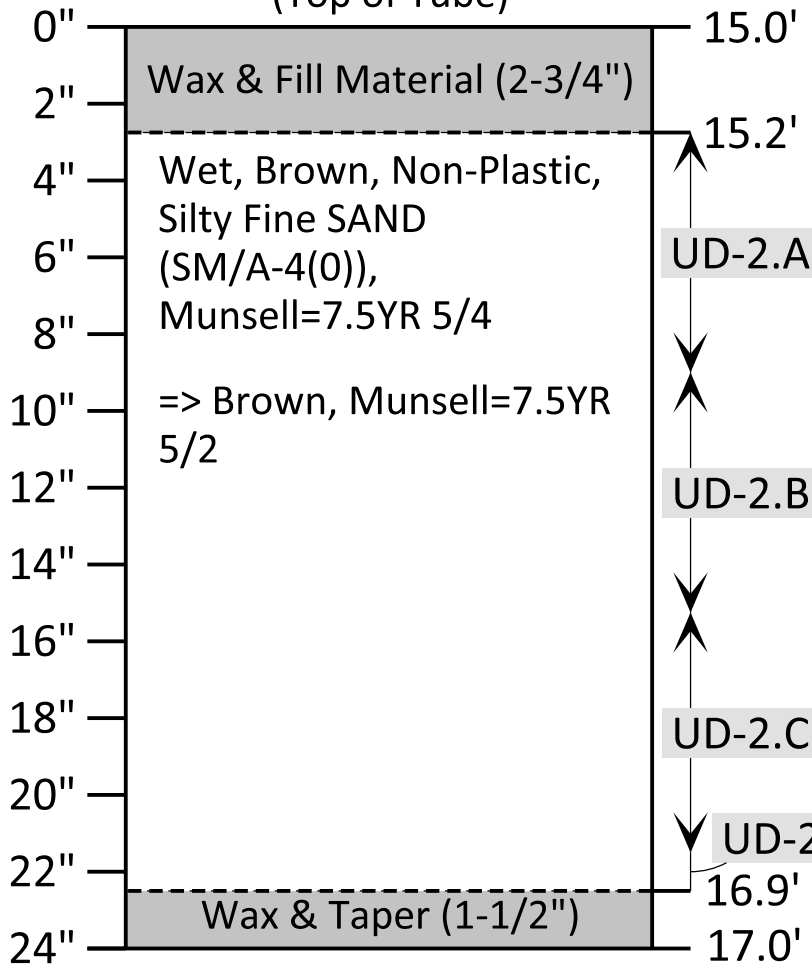
### LABORATORY TEST RESULTS

Liquid Limit	Plastic Limit	Plasticity Index	%#200 Sieve	Water Content (%)	c (psi)	Φ	c' (psi)	Φ'
--	--	--	--	--	--	--	--	--

# UNDISTURBED SHELBY TUBE SAMPLE LOG

## Shelby Tube UD-2

(Top of Tube)



Prepared For: **SCDOT**

**Project:** SC 557 Bridge over Crowders Creek

**SCDOT Project ID:** 0041800RD01

**F&ME Project No.:** G4843

**Boring No.:** AP-2

**Sample Depth:** 15.0' - 17.0'

**Date Sampled:** 6/1/2018

**Date Pushed:** 6/13/2018

**Sample ID:** 18-1096

**Additional Comments:**

Shelby Tube was advanced 24", and 21-1/4" of material was recovered. Sample UD-2.A was very wet and slumped when extracted and placed on the triaxial pedestal. Sample UD-2.B was extracted straight into membrane from the tube. Samples UD-2.B & UD-2.C were used for triaxial testing. Sample UD-2.B was used for grain size analysis and Atterberg limits.

### LABORATORY TEST RESULTS

Liquid Limit	Plastic Limit	Plasticity Index	%#200 Sieve	Water Content (%)	c (psi)	Φ	c' (psi)	Φ'
NP	NP	NP	38.3	--	--	--	0.00	41.0



# SC 557 Bridge over Crowders Creek

## Boring AP-2: Station 259+26, Offset 17 ft - L



UD-1.A



UD-1.B



UD-2.A (Sample Slumped on Pedestal)



UD-2.B (Extruded Directly to Membrane)



UD-2.C

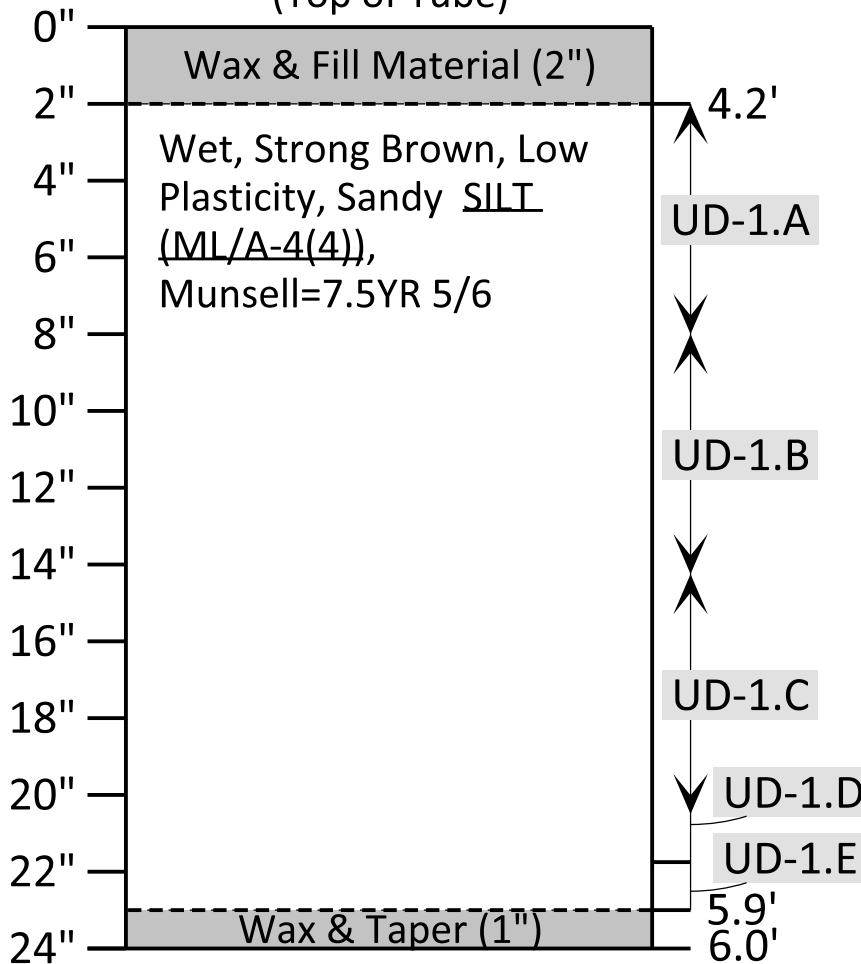


UD-2.D

# UNDISTURBED SHELBY TUBE SAMPLE LOG

## Shelby Tube UD-1

(Top of Tube)



Prepared For: **SCDOT**

**Project:** SC 557 Bridge over Crowders Creek

**SCDOT Project ID:** 0041800RD01

**F&ME Project No.:** G4843

**Boring No.:** AP-3

**Sample Depth:** 4.0' - 6.0'

**Date Sampled:** 6/15/2018

**Date Pushed:** 6/15/2018

**Sample ID:** 18-1112

**Additional Comments:**

Shelby Tube was advanced 24", and 22" of material was recovered. Sample UD-1.A contained several voids. Samples UD-1.B & UD-1.C were used for triaxial shear. Sample UD-1.B was used for grain size analysis and Atterberg limits. Sample UD-1.D contained organics (wood) in the bottom of the sample. Sample UD-1.E was used for consolidation testing.

### LABORATORY TEST RESULTS

Liquid Limit	Plastic Limit	Plasticity Index	%#200 Sieve	Water Content (%)	c (psi)	$\Phi$	c' (psi)	$\Phi'$
34	26	8	67.2	--	1.16	13.2	0.05	35.9

# SC 557 Bridge over Crowders Creek

## Boring AP-3: Station 258+76, Offset 19 ft - L



UD-1.A



UD-1.B



UD-1.C



UD-1.D



UD-1.D (Top)



UD-1.D (Bottom)

# SC 557 Bridge over Crowders Creek

Boring AP-3: Station 258+76, Offset 19 ft - L



UD-1.E

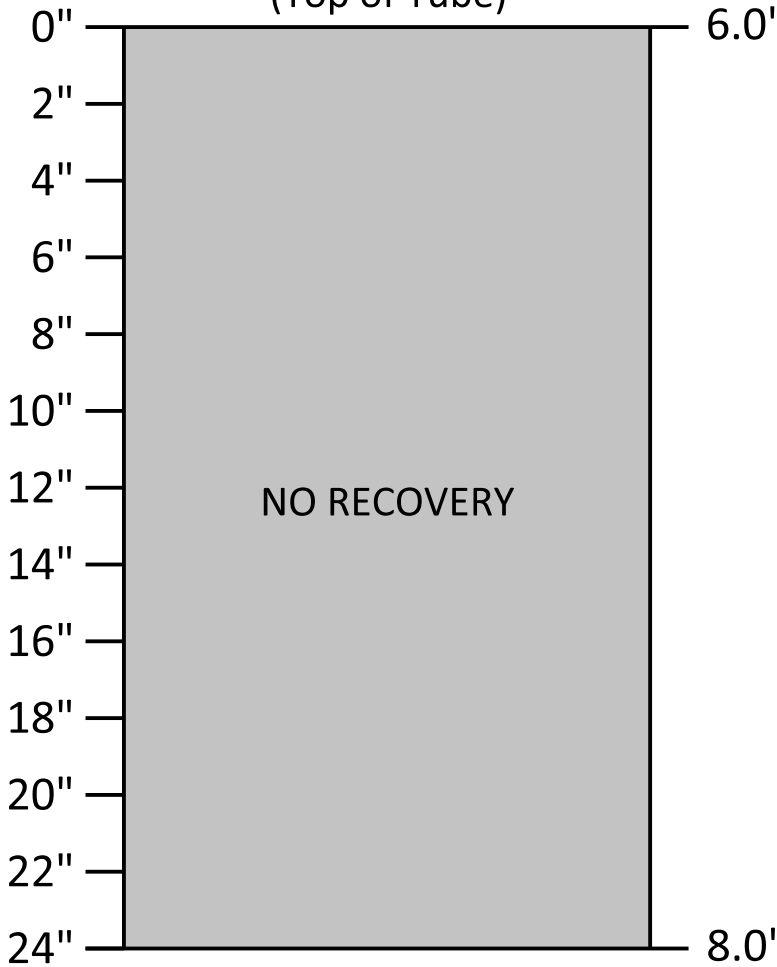


UD-1.E (Top)

# UNDISTURBED SHELBY TUBE SAMPLE LOG

## Shelby Tube UD-2

(Top of Tube)



Prepared For: **SCDOT**

**Project:** SC 557 Bridge over Crowders Creek

**SCDOT Project ID:** 0041800RD01

**F&ME Project No.:** G4843

**Boring No.:** AP-3

**Sample Depth:** 6.0' - 8.0'

**Date Sampled:** 6/15/2018

**Date Pushed:** N/A

**Sample ID:** 18-1112

**Additional Comments:**

Shelby Tube was advanced 24", but no sample was recovered.

### LABORATORY TEST RESULTS

Liquid Limit	Plastic Limit	Plasticity Index	%#200 Sieve	Water Content (%)	c (psi)	$\Phi$	c' (psi)	$\Phi'$
--	--	--	--	--	--	--	--	--

SC 557 Bridge over Crowders Creek  
Final Bridge Geotechnical Engineering Report

---

# APPENDIX

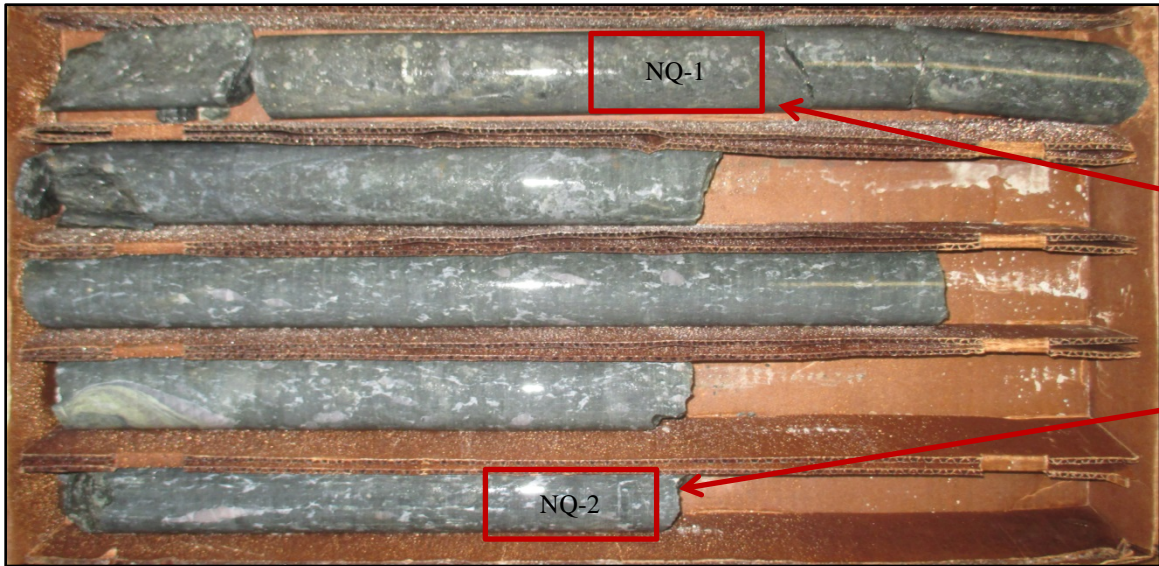
## SECTION 6 ROCK CORE PHOTOS

# SC 557 Bridge over Crowders Creek

Boring B-4 – Station 256+76, Offset 19 ft – L

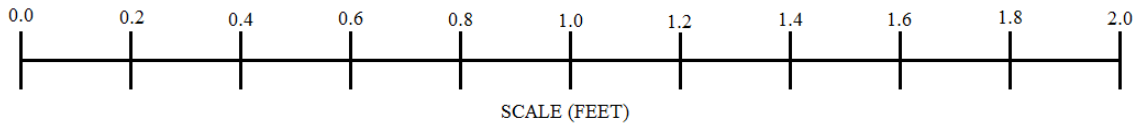
Begin Run 1  
(24.5-26.8-ft)

Begin Run 2  
(26.8-31.8-ft)



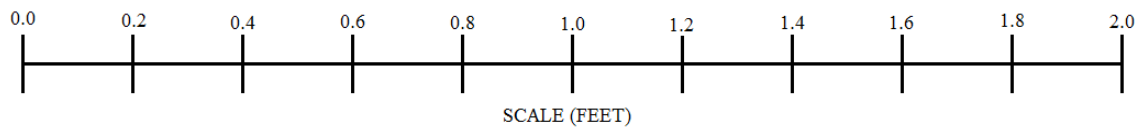
UC Strength  
10,510 psi

UC Strength  
9,560 psi



Begin Run 3  
(31.8-36.8-ft)

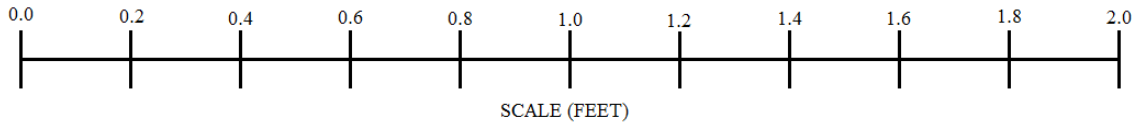
Begin Run 4  
(36.8-41.8-ft)



# SC 557 Bridge over Crowders Creek

Boring B-4 – Station 256+76, Offset 19 ft – L

Begin Run 5  
(41.8-46.8-ft)





# SC 557 Bridge over Crowders Creek

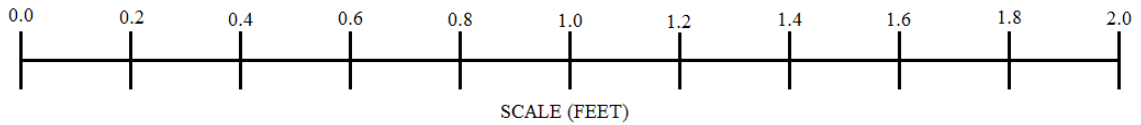
Boring B-5 – Station 256+66, Offset 19 ft – R

Begin Run 1  
(29.3-31.1-ft)

Begin Run 2  
(31.1-36.1-ft)

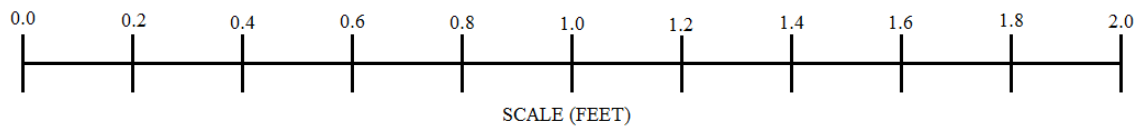
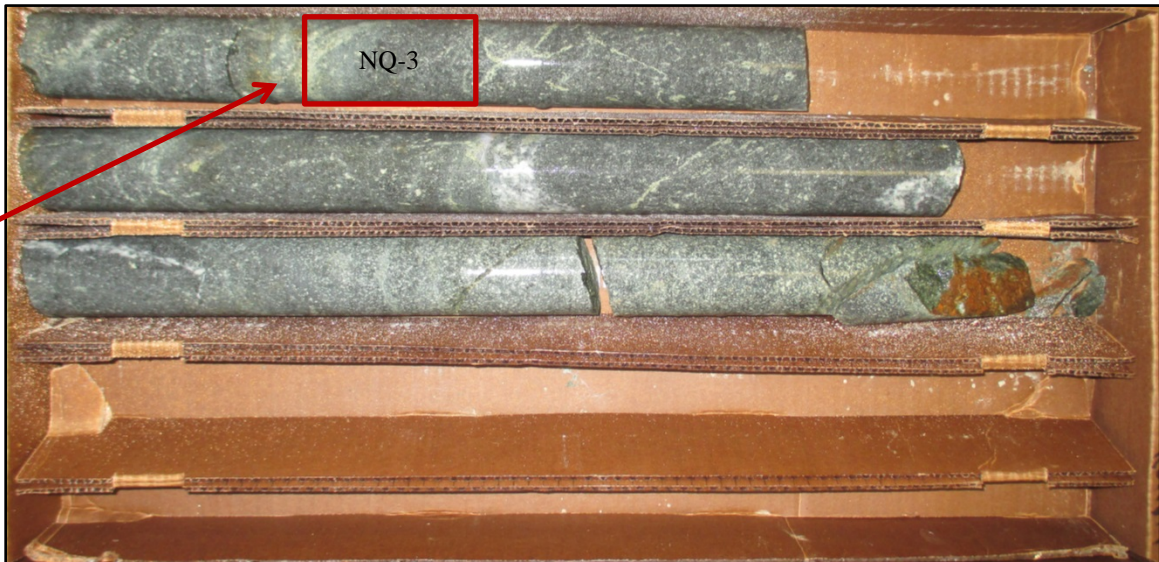


UC Strength  
26,420 psi



Begin Run 3  
(36.1-41.1-ft)

UC Strength  
20,110 psi



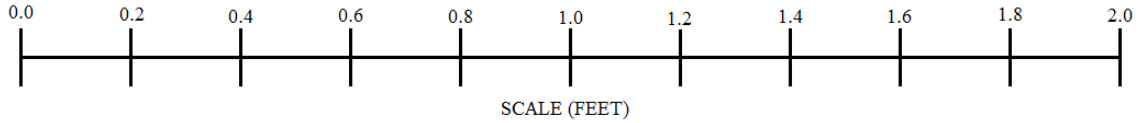
# SC 557 Bridge over Crowders Creek

## Boring B-5 – Station 256+66, Offset 19 ft – R

Begin Run 4  
(41.1-46.1-ft)



Begin Run 5  
(46.1-49.8-ft)

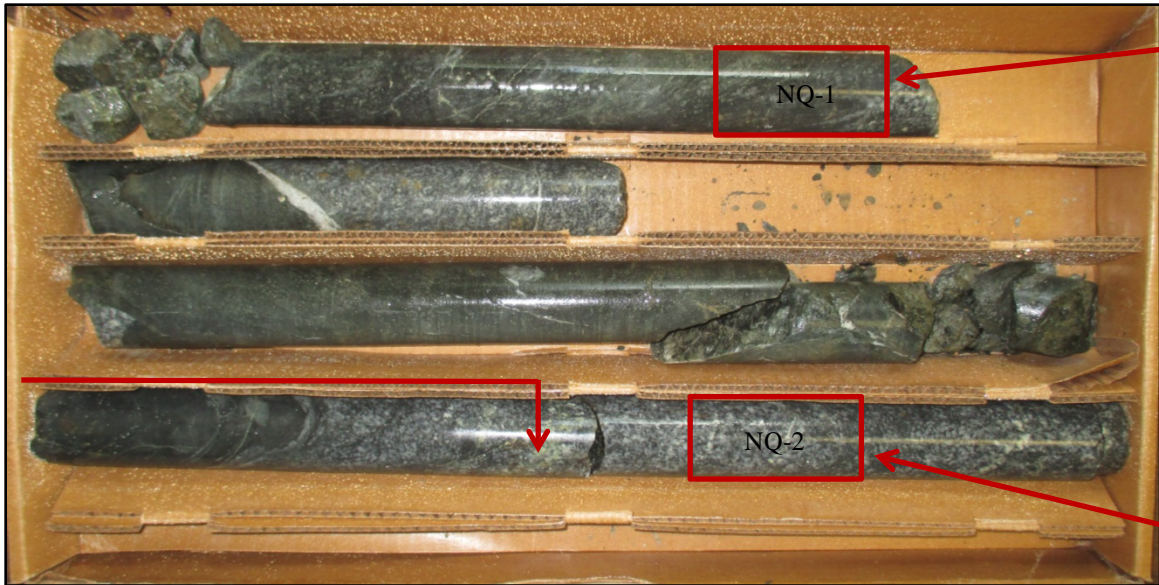


# SC 557 Bridge over Crowders Creek

Boring B-6 – Station 257+77, Offset 20 ft – L

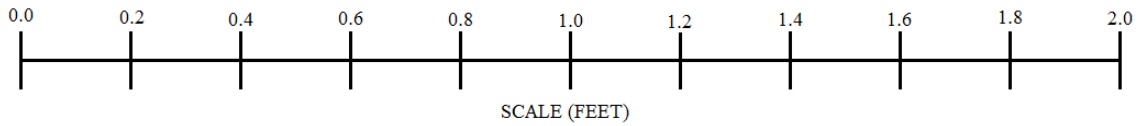
Begin Run 1  
(26.4-30.9-ft)

Begin Run 2  
(30.9-35.9-ft)

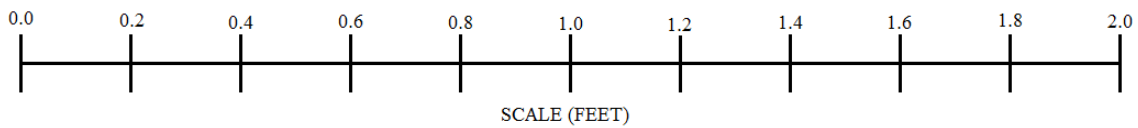


UC Strength  
29,140 psi

UC Strength  
39,210 psi



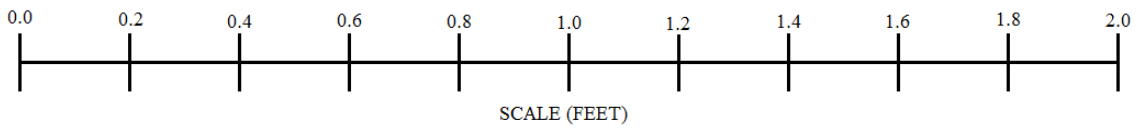
Begin Run 3  
(35.9-40.9-ft)



# SC 557 Bridge over Crowders Creek

## Boring B-6 – Station 257+77, Offset 20 ft – L

Begin Run 4  
(40.9-45.9-ft)



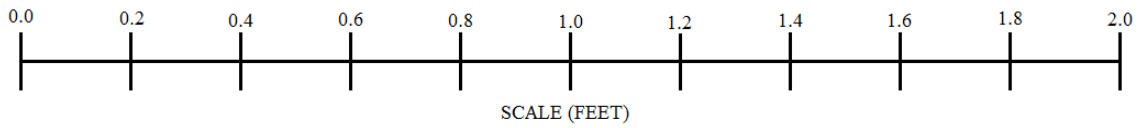
# SC 557 Bridge over Crowders Creek

Boring B-7 – Station 257+70, Offset 22 ft – R

Begin Run 1  
(27.5-30.3-ft)

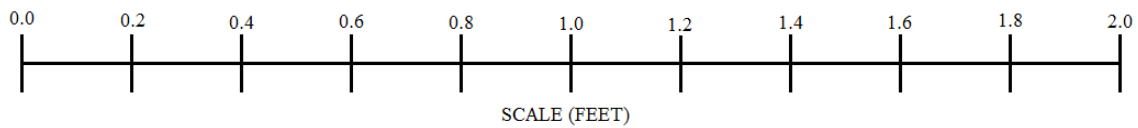
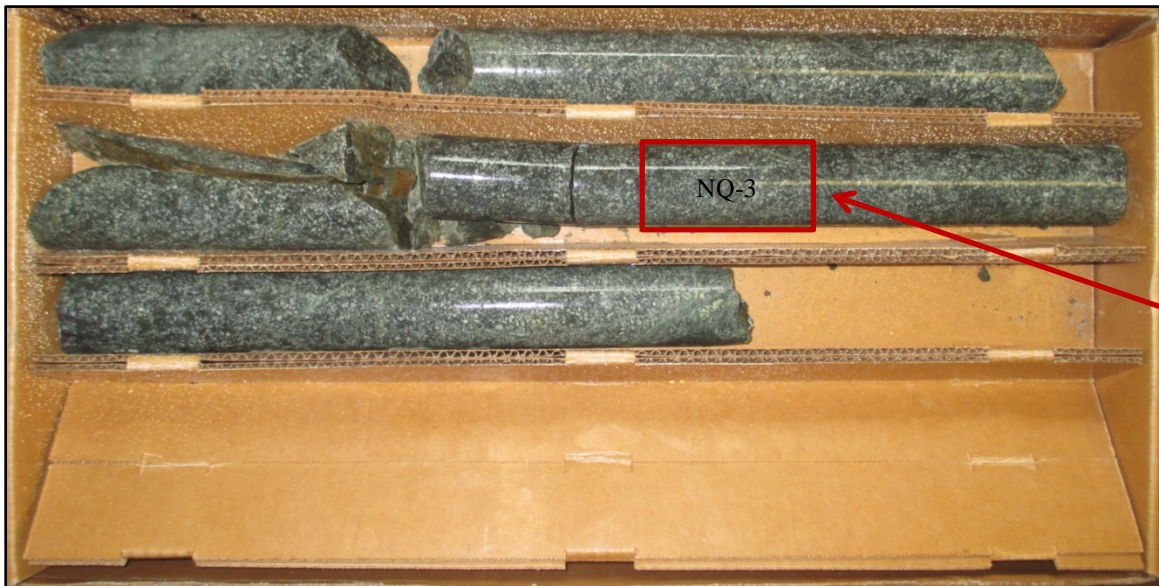
Begin Run 2  
(30.3-35.3-ft)

UC Strength  
8,200 psi



Begin Run 3  
(35.3-40.3-ft)

UC Strength  
17,190 psi

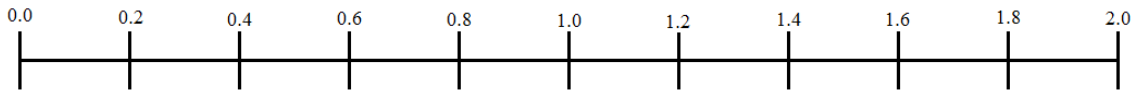


# SC 557 Bridge over Crowders Creek

Boring B-7 – Station 257+70, Offset 22 ft – R

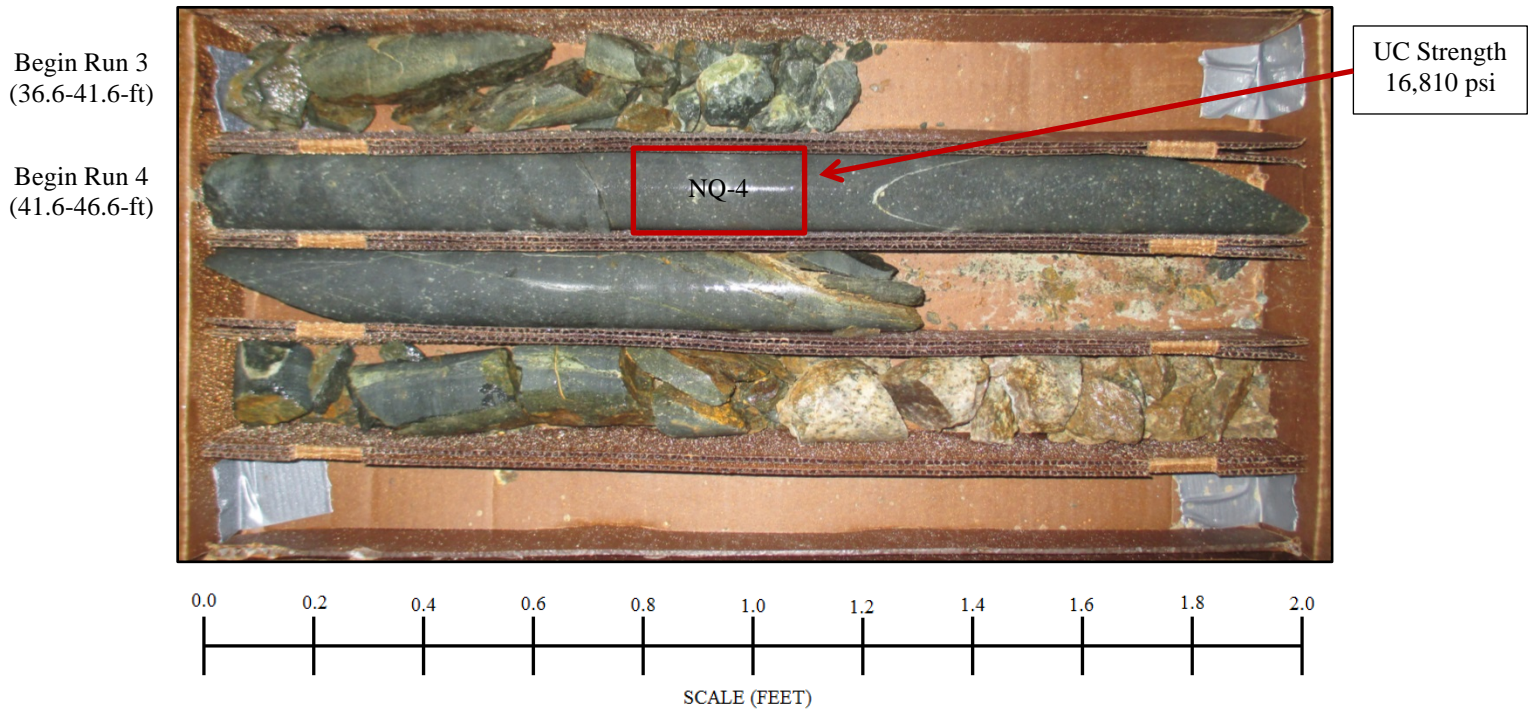
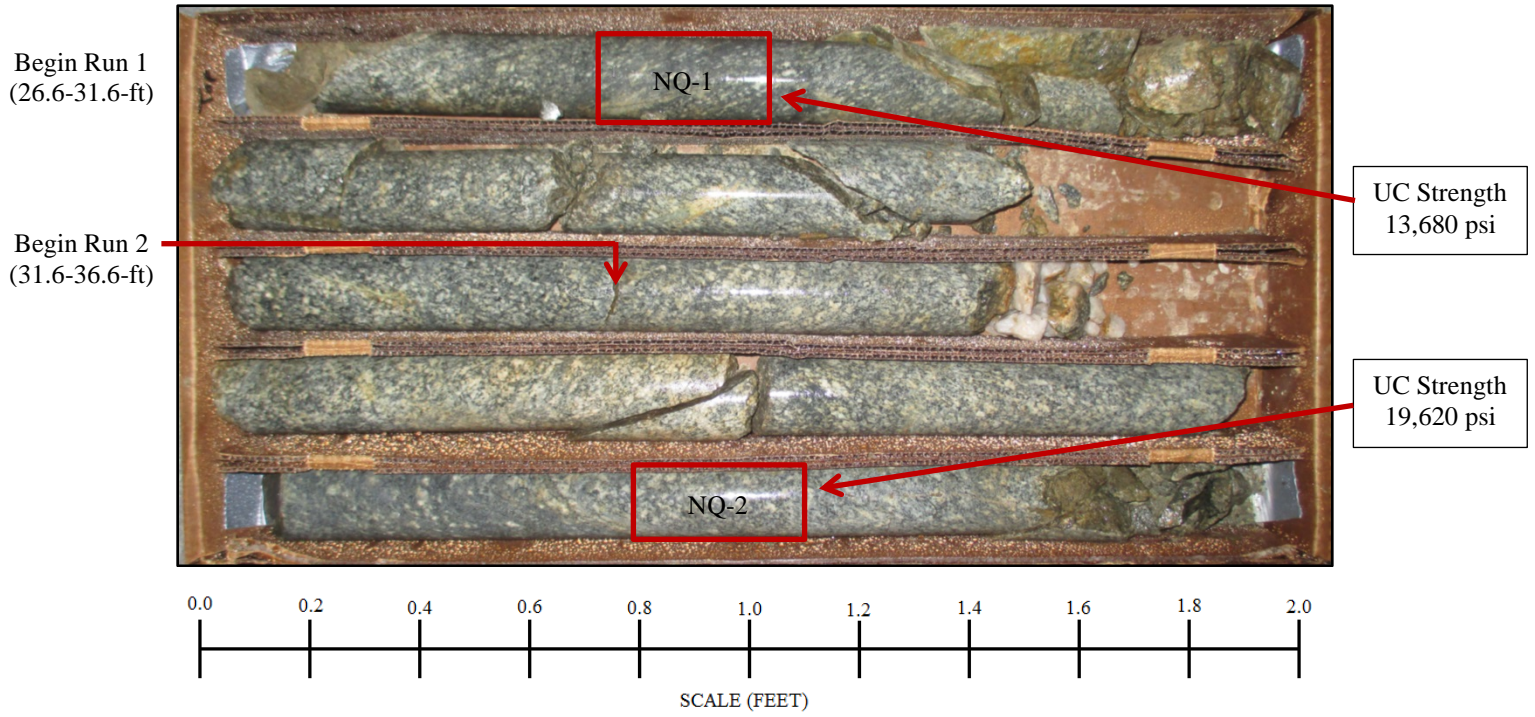
Begin Run 4  
(40.3-45.3-ft)

Begin Run 5  
(45.3-48.3-ft)



# SC 557 Bridge over Crowders Creek

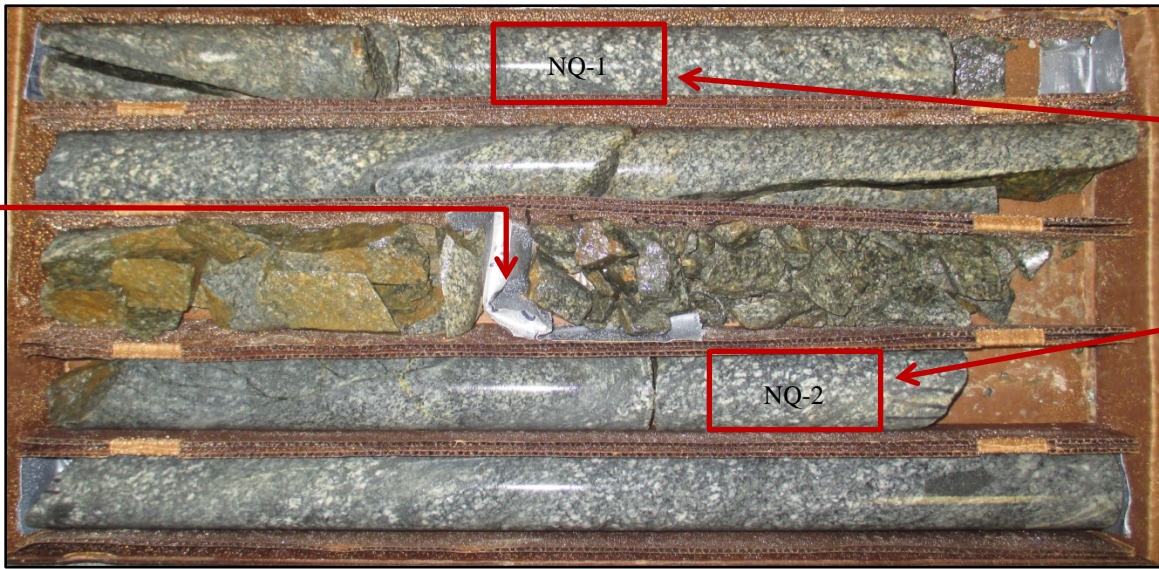
Boring B-8 – Station 258+76, Offset 19 ft – L



# SC 557 Bridge over Crowders Creek

## Boring B-9 – Station 258+67, Offset 19 ft – R

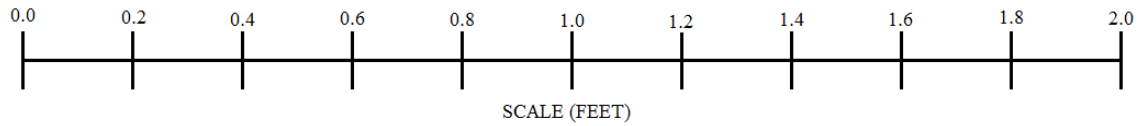
Begin Run 1  
(20.9-25.9-ft)



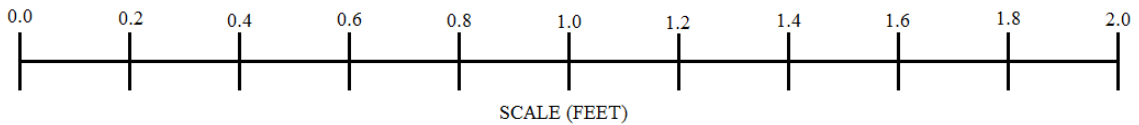
UC Strength  
19,840 psi

Begin Run 2  
(25.9-30.9-ft)

UC Strength  
26,980 psi



Begin Run 3  
(30.9-35.9-ft)

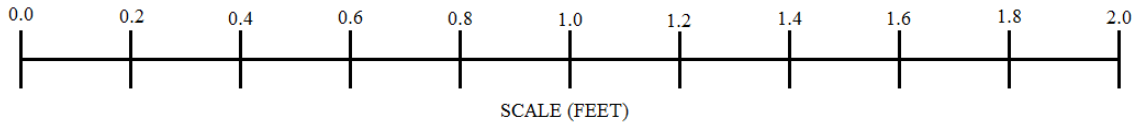




# SC 557 Bridge over Crowders Creek

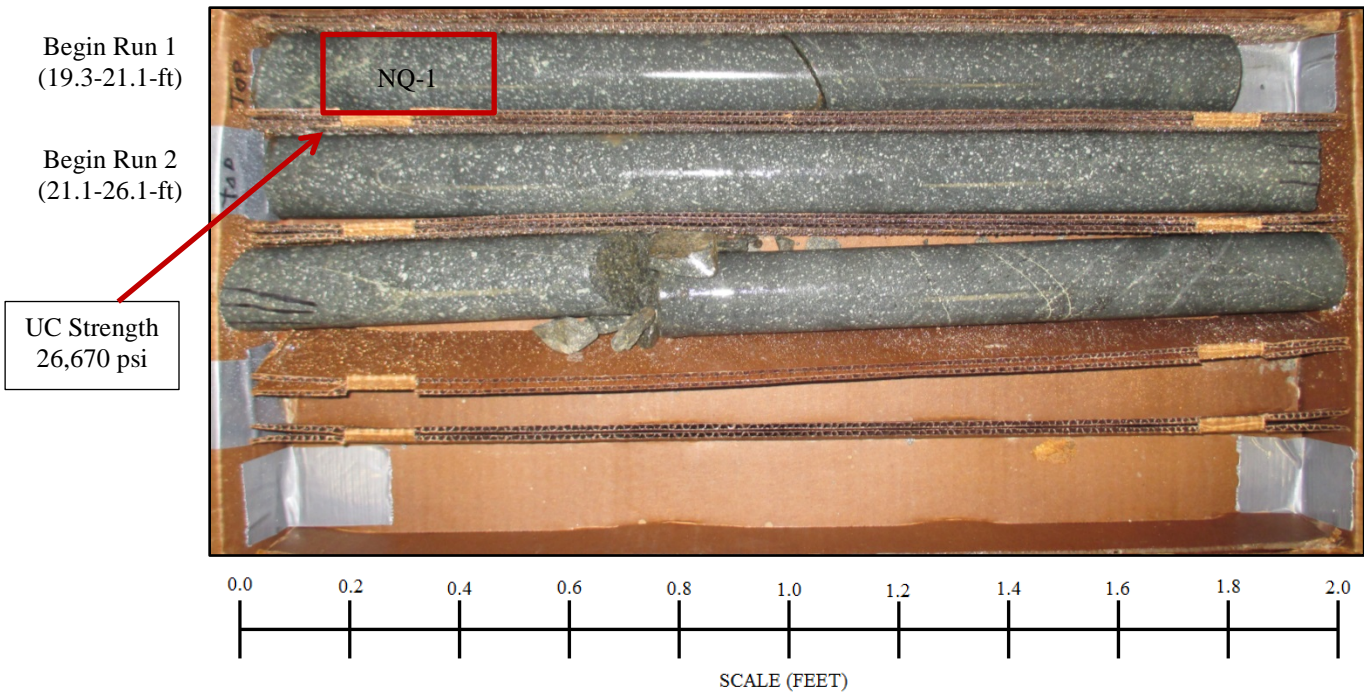
## Boring B-9 – Station 258+67, Offset 19 ft – R

Begin Run 4  
(35.9-40.9-ft)



# SC 557 Bridge over Crowders Creek

Boring B-10 – Station 259+16, 19 ft – R



SC 557 Bridge over Crowders Creek  
Final Bridge Geotechnical Engineering Report

---

# APPENDIX

## SECTION 7 LABORATORY TEST RESULTS

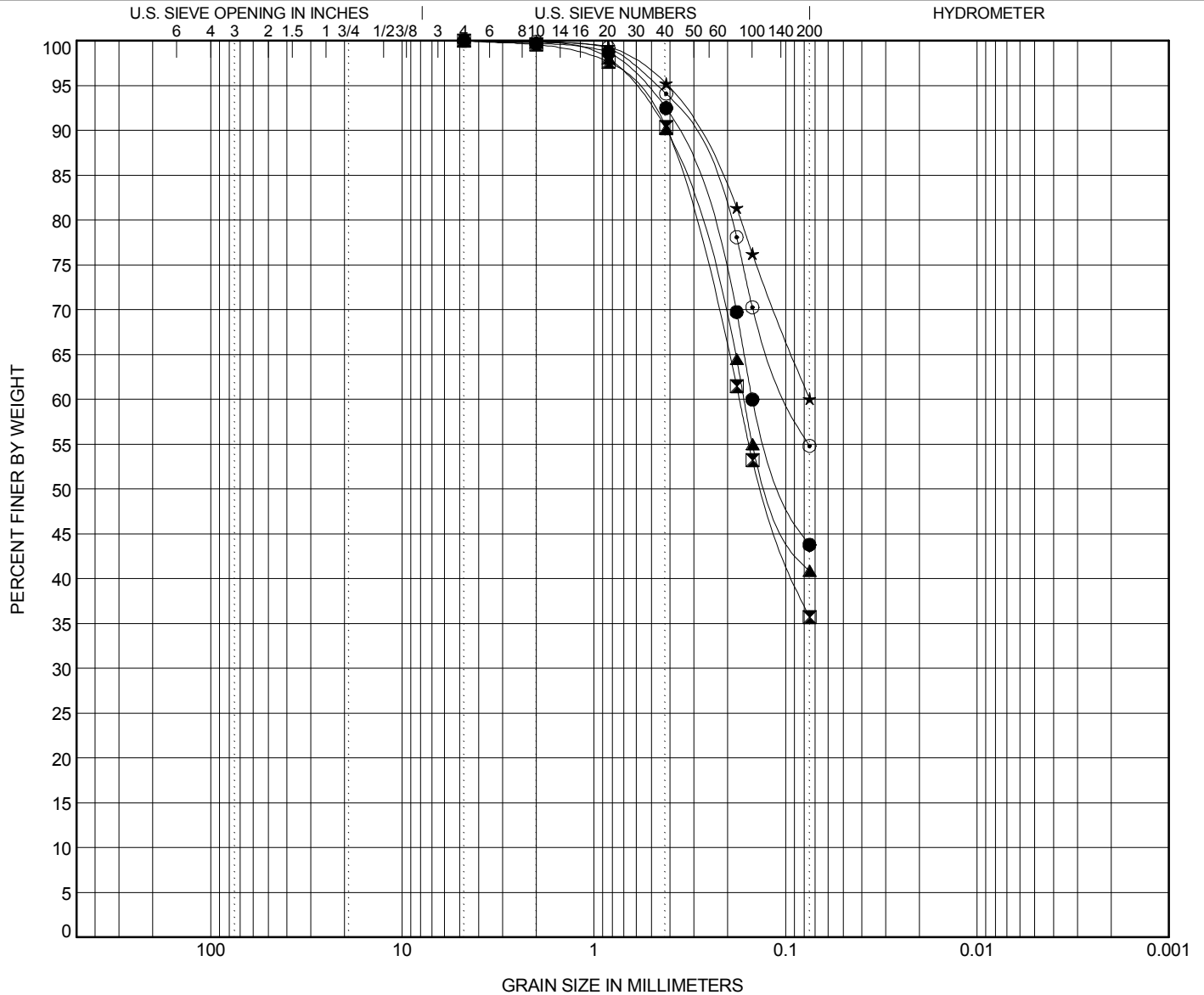


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● B-3	2.0	Silty, Clayey Fine SAND (SC-SM) A-4(0)	25	20	5		
⊠ B-3	4.0	Silty Fine SAND (SM) A-4(0)	NP	NP	NP		
▲ B-3	6.0	Silty Fine SAND (SM) A-4(0)	NP	NP	NP		
★ B-3	8.0	Sandy SILT (ML) A-4(0)	NP	NP	NP		
⊙ B-3	10.0	Sandy SILT (ML) A-4(0)	NP	NP	NP		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● B-3	2.0	4.76	0.554	0.098		0.0	56.2	43.8	
⊠ B-3	4.0	4.76	0.652	0.131		0.0	64.3	35.7	
▲ B-3	6.0	4.76	0.642	0.117		0.0	59.1	40.9	
★ B-3	8.0	4.76	0.413			0.0	39.9	60.1	
⊙ B-3	10.0	4.76	0.473			0.0	45.2	54.8	

GRAIN SIZE - SCDOT - G4843 - CURRENT - SC-557.GPJ FME2017.GDT 6/18/18

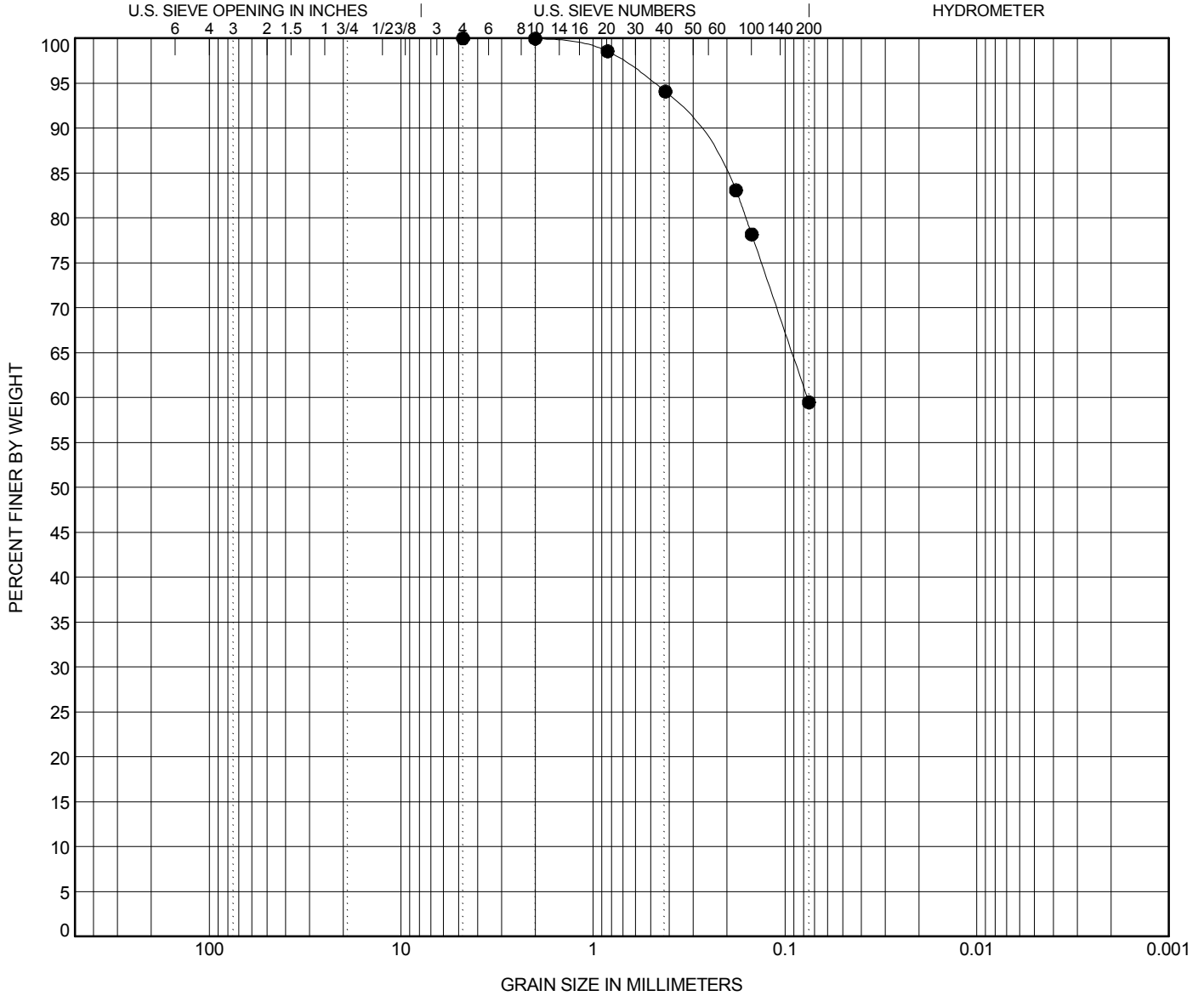


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● B-3	15.0	<b>Sandy SILT (ML) A-4(0)</b>					<b>NP</b>	<b>NP</b>	<b>NP</b>		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● B-3	15.0	<b>4.76</b>	<b>0.484</b>			<b>0.0</b>	<b>40.5</b>	<b>59.5</b>	

GRAIN SIZE - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 6/18/18

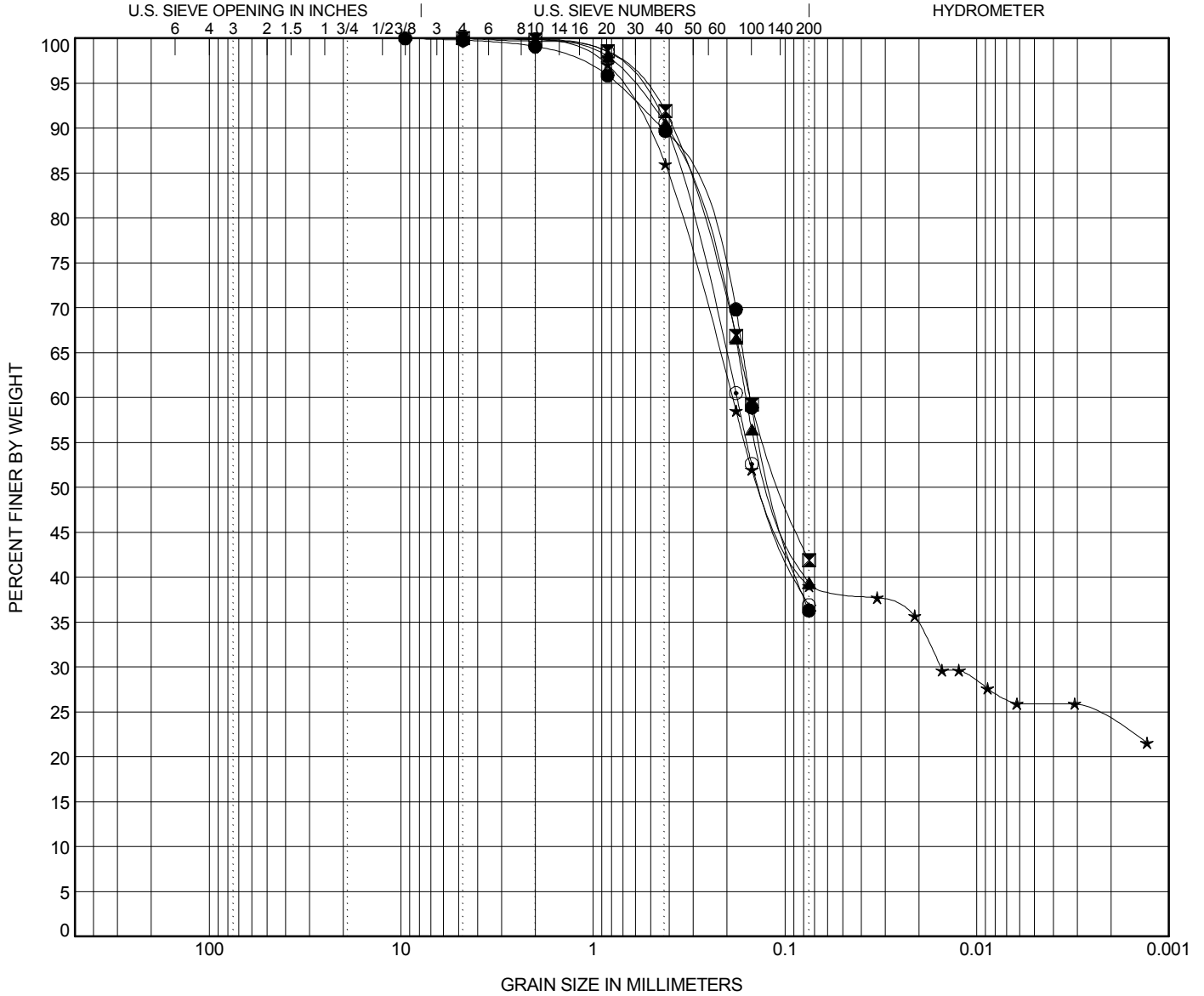


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● B-4	2.0	Silty Fine SAND (SM) A-4(0)					NP	NP	NP		
■ B-4	4.0	Silty Fine SAND (SM) A-4(0)					23	20	3		
▲ B-4	6.0	Silty, Clayey Fine SAND (SC-SM) A-4(0)					29	22	7		
★ B-4	8.0	Silty Fine SAND (SM) A-4(0)					28	23	5		
○ B-4	10.0	Silty Fine SAND (SM) A-4(0)					32	26	6		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● B-4	2.0	9.52	0.761	0.114	0.0	0.2	63.5	36.3	
■ B-4	4.0	4.76	0.578	0.103	0.0	0.0	58.1	41.9	
▲ B-4	6.0	4.76	0.636	0.115	0.0	0.0	60.6	39.4	
★ B-4	8.0	4.76	0.737	0.134	0.0	0.0	61.0	13.1	25.9
○ B-4	10.0	4.76	0.618	0.133	0.0	0.0	63.1	36.9	

GRAIN SIZE - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 6/25/18

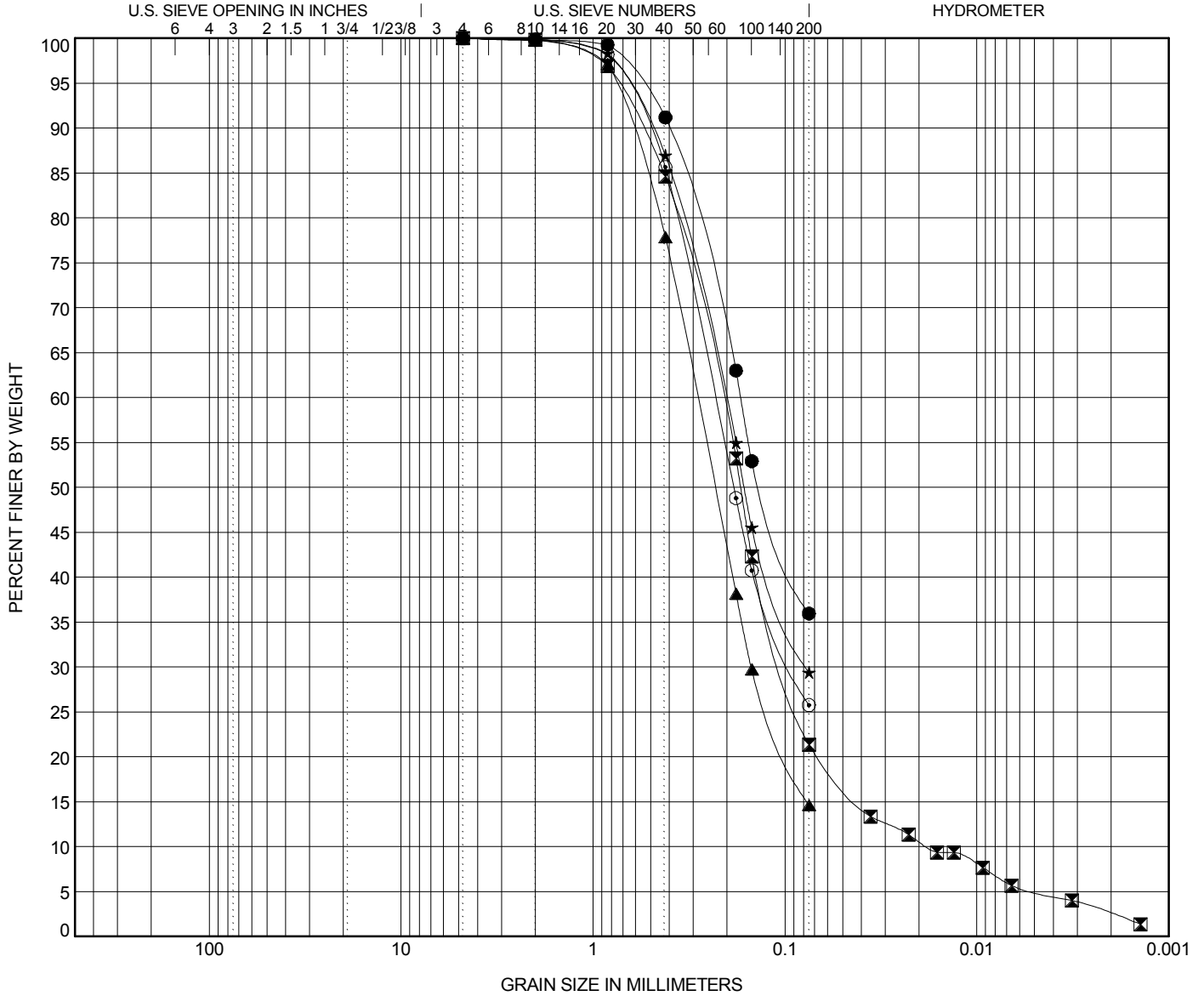


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu	
●	B-5	2.0	Silty Fine SAND (SM) A-4(0)					NP	NP	NP		
■	B-5	4.0	Silty Fine SAND (SM) A-2-4					NP	NP	NP	2.56	12.04
▲	B-5	6.0	Silty Fine SAND (SM) A-2-4					NP	NP	NP		
★	B-5	8.0	Silty Fine SAND (SM) A-2-4					NP	NP	NP		
○	B-5	10.0	Silty Fine SAND (SM) A-2-4					NP	NP	NP		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
●	B-5	2.0	4.76	0.581	0.132	0.0	64.0	36.0	
■	B-5	4.0	4.76	0.753	0.17	0.018	78.6	16.3	5.1
▲	B-5	6.0	4.76	0.778	0.232	0.0	85.4	14.6	
★	B-5	8.0	4.76	0.685	0.163	0.0	70.6	29.4	
○	B-5	10.0	4.76	0.703	0.185	0.0	74.2	25.8	

GRAIN SIZE - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 6/25/18

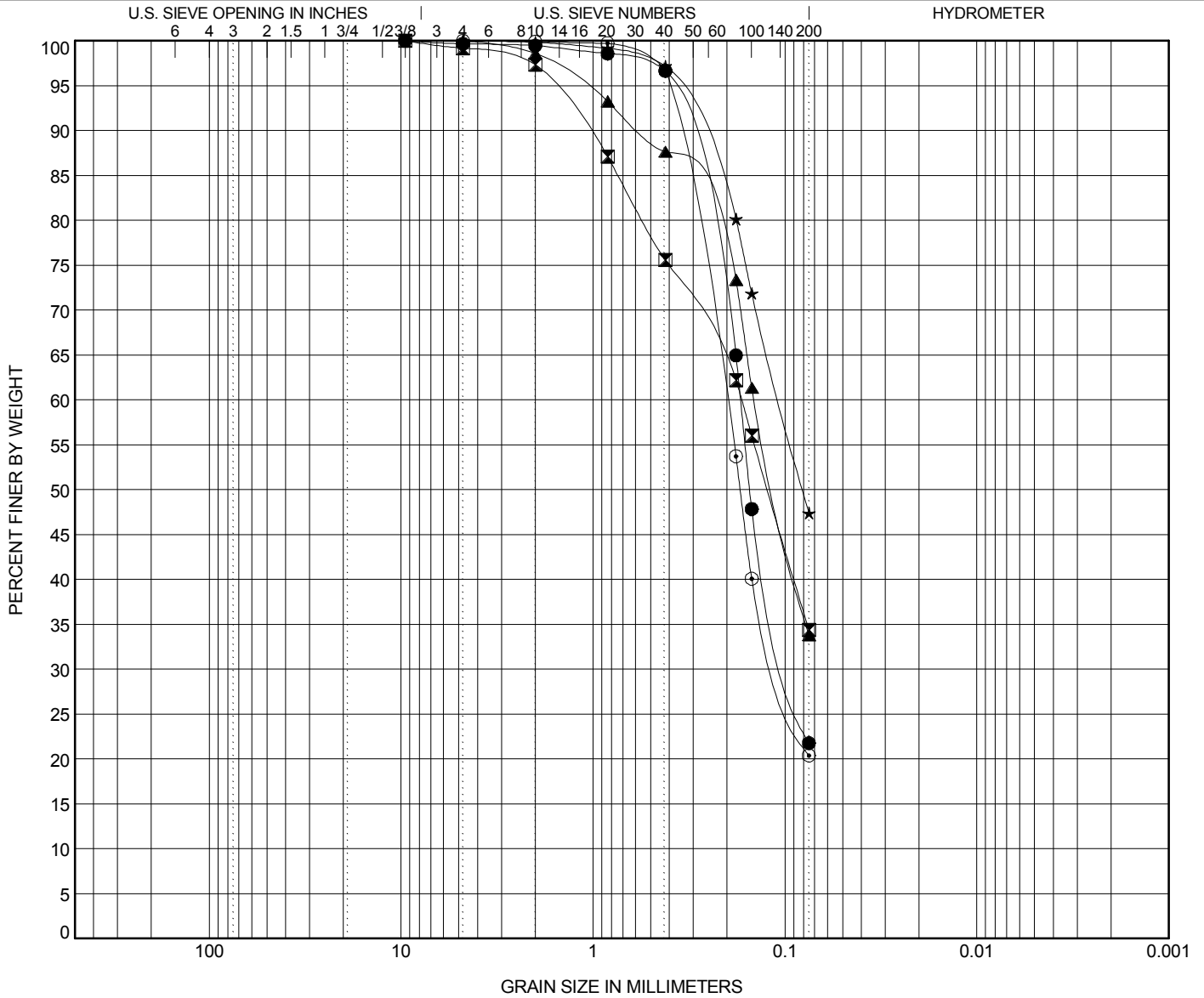


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● B-6	2.0	Silty Fine SAND (SM) A-2-4					NP	NP	NP		
☒ B-6	4.0	Silty Fine SAND (SM) A-2-4					NP	NP	NP		
▲ B-6	6.0	Silty Fine SAND (SM) A-2-4					NP	NP	NP		
★ B-6	8.0	Silty Fine SAND (SM) A-4(0)					NP	NP	NP		
⊙ B-6	10.0	Silty Fine SAND (SM) A-2-4					NP	NP	NP		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● B-6	2.0	9.52	0.402	0.153		0.3	77.9	21.8	
☒ B-6	4.0	9.52	1.64	0.123		0.8	64.8	34.4	
▲ B-6	6.0	4.76	1.114	0.112		0.0	66.2	33.8	
★ B-6	8.0	4.76	0.377	0.081		0.0	52.6	47.4	
⊙ B-6	10.0	4.76	0.406	0.171		0.0	79.6	20.4	

GRAIN SIZE - SCDOT - G4843 - CURRENT - SC-557.GPJ FMEI2017.GDT 6/25/18



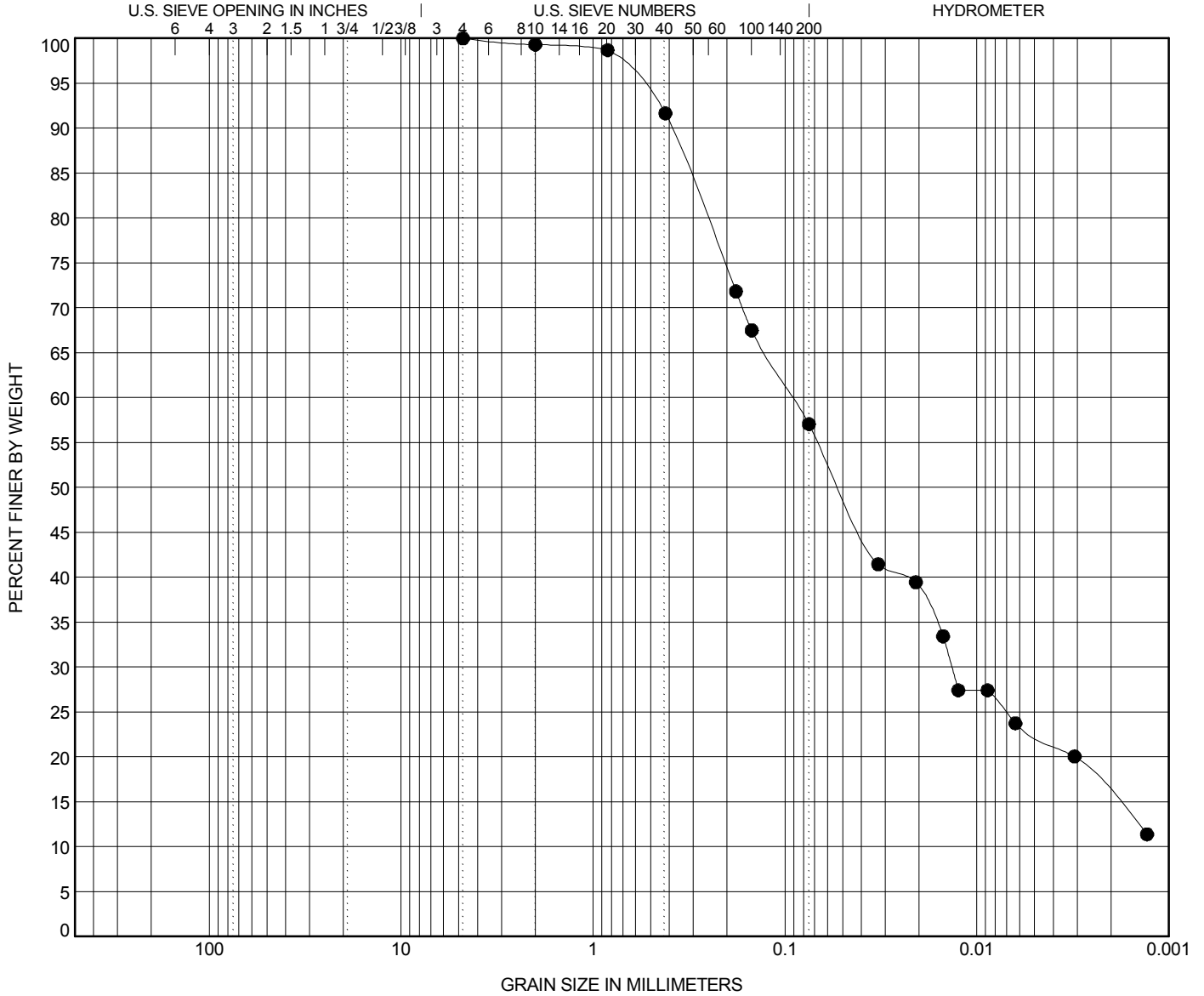


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● B-6	15.0	<b>Sandy SILT (ML) A-4(0)</b>					<b>NP</b>	<b>NP</b>	<b>NP</b>		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● B-6	15.0	4.76	0.584	0.052		0.0	42.9	34.5	22.5

GRAIN SIZE - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 6/25/18

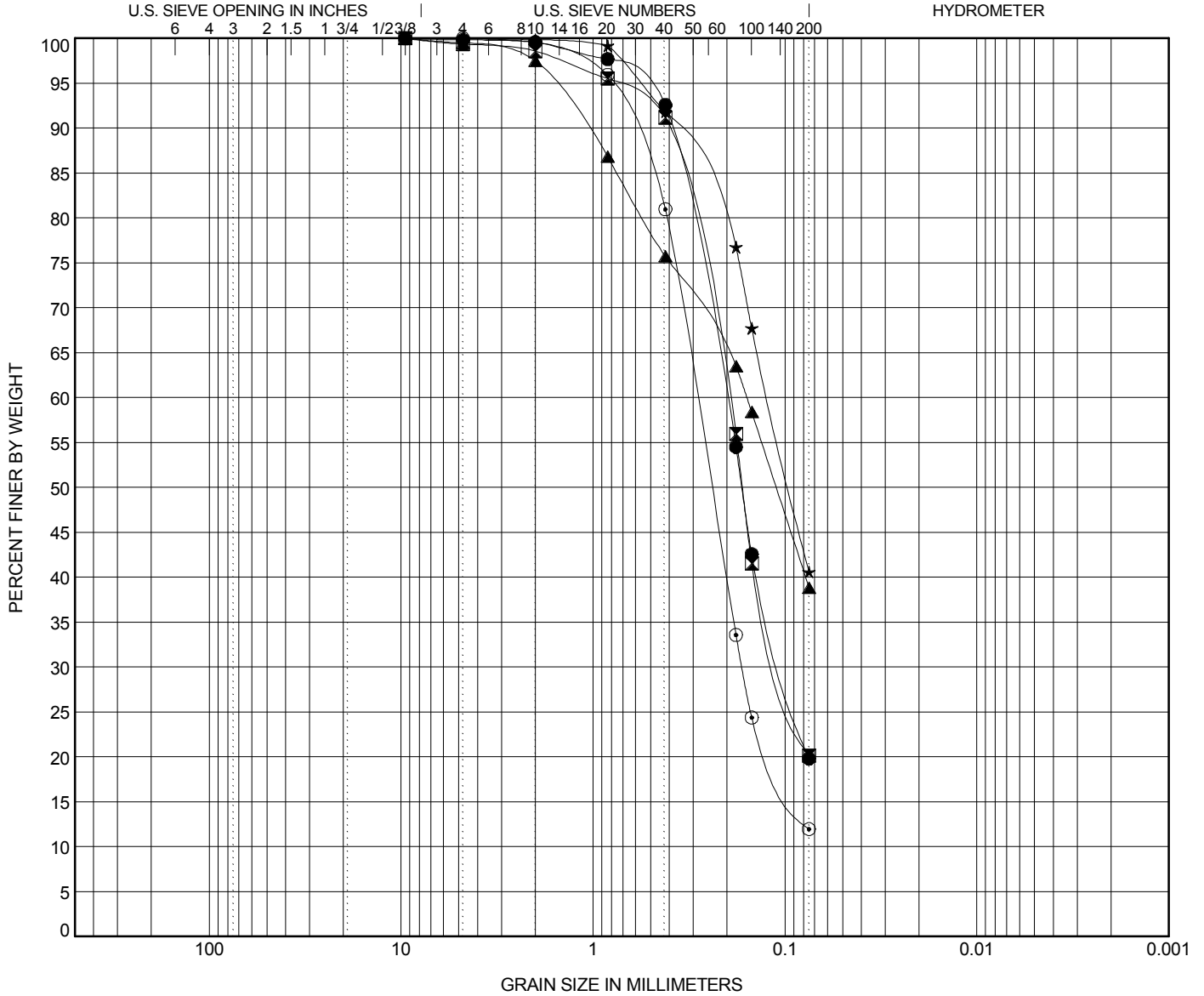


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu	
●	B-7	2.0	Silty Fine SAND (SM) A-2-4					NP	NP	NP		
☒	B-7	4.0	Silty Fine SAND (SM) A-2-4					NP	NP	NP		
▲	B-7	6.0	Silty Fine SAND (SM) A-4(0)					NP	NP	NP		
★	B-7	8.0	Silty Fine SAND (SM) A-4(0)					NP	NP	NP		
⊙	B-7	10.0	Poorly Graded Fine SAND (SP-SM) with Silt A-2-4					NP	NP	NP	1.44	4.29
BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay			
●	B-7	2.0	9.52	0.582	0.168	0.2	80.0	19.8				
☒	B-7	4.0	9.52	0.773	0.166	0.6	79.2	20.1				
▲	B-7	6.0	9.52	1.631	0.111	0.5	60.6	38.8				
★	B-7	8.0	4.76	0.565	0.095	0.0	59.4	40.6				
⊙	B-7	10.0	4.76	0.804	0.241	0.0	88.0	12.0				

GRAIN SIZE - SCDOT - G4843 - CURRENT - SC-557.GPJ FME2017.GDT 6/25/18

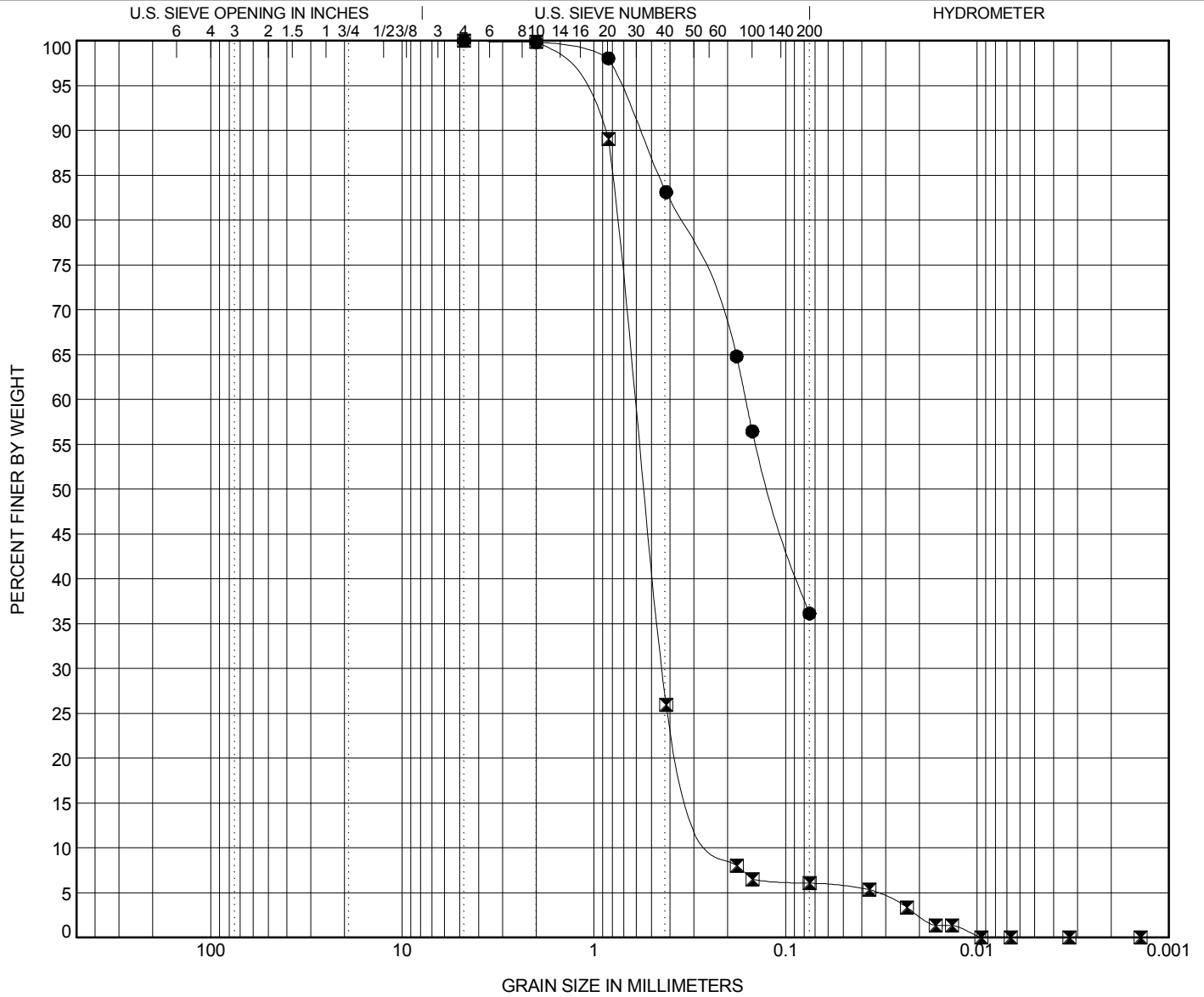


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● B-7	15.0	<b>Silty Fine SAND (SM) A-4(0)</b>					<b>NP</b>	<b>NP</b>	<b>NP</b>		
☒ B-7	20.0	<b>Poorly Graded M/C SAND (SP-SM) with Silt A-1-b</b>					<b>NP</b>	<b>NP</b>	<b>NP</b>	<b>1.60</b>	<b>3.09</b>
BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay		
● B-7	15.0	4.76	0.729	0.12		0.0	63.9	36.1			
☒ B-7	20.0	4.76	1.353	0.547	0.198	0.0	93.9	6.0	0.0		

GRAIN SIZE - SCDOT - G4843 - CURRENT - SC-557.GPJ FME2017.GDT 6/25/18

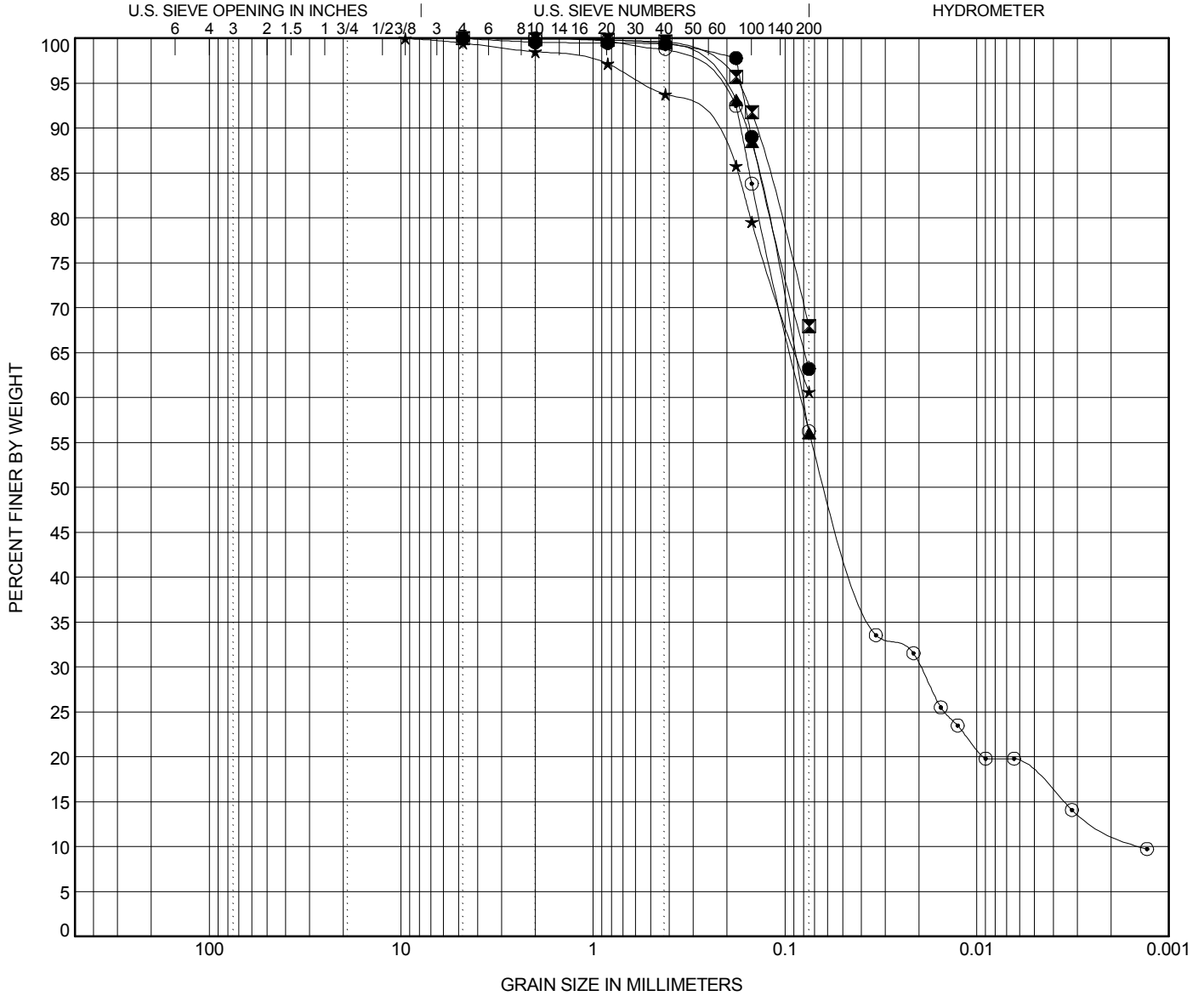


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● B-8	2.0	Sandy SILT (ML) A-4(0)					NP	NP	NP		
⊠ B-8	4.0	Sandy SILT (ML) A-4(5)					34	26	8		
▲ B-8	6.0	Sandy SILT (ML) A-4(1)					30	26	4		
★ B-8	8.0	Sandy SILT (ML) A-4(3)					30	24	6		
⊙ B-8	10.0	Sandy SILT (ML) A-4(2)					31	25	6	3.43	60.12

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● B-8	2.0	4.76	0.169			0.0	36.8	63.2	
⊠ B-8	4.0	4.76	0.174			0.0	32.0	68.0	
▲ B-8	6.0	2	0.231			0.0	43.9	56.1	
★ B-8	8.0	9.52	0.538			0.5	38.8	60.7	
⊙ B-8	10.0	2	0.252	0.06	0.001	0.0	43.7	38.5	17.8

GRAIN SIZE - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 6/25/18

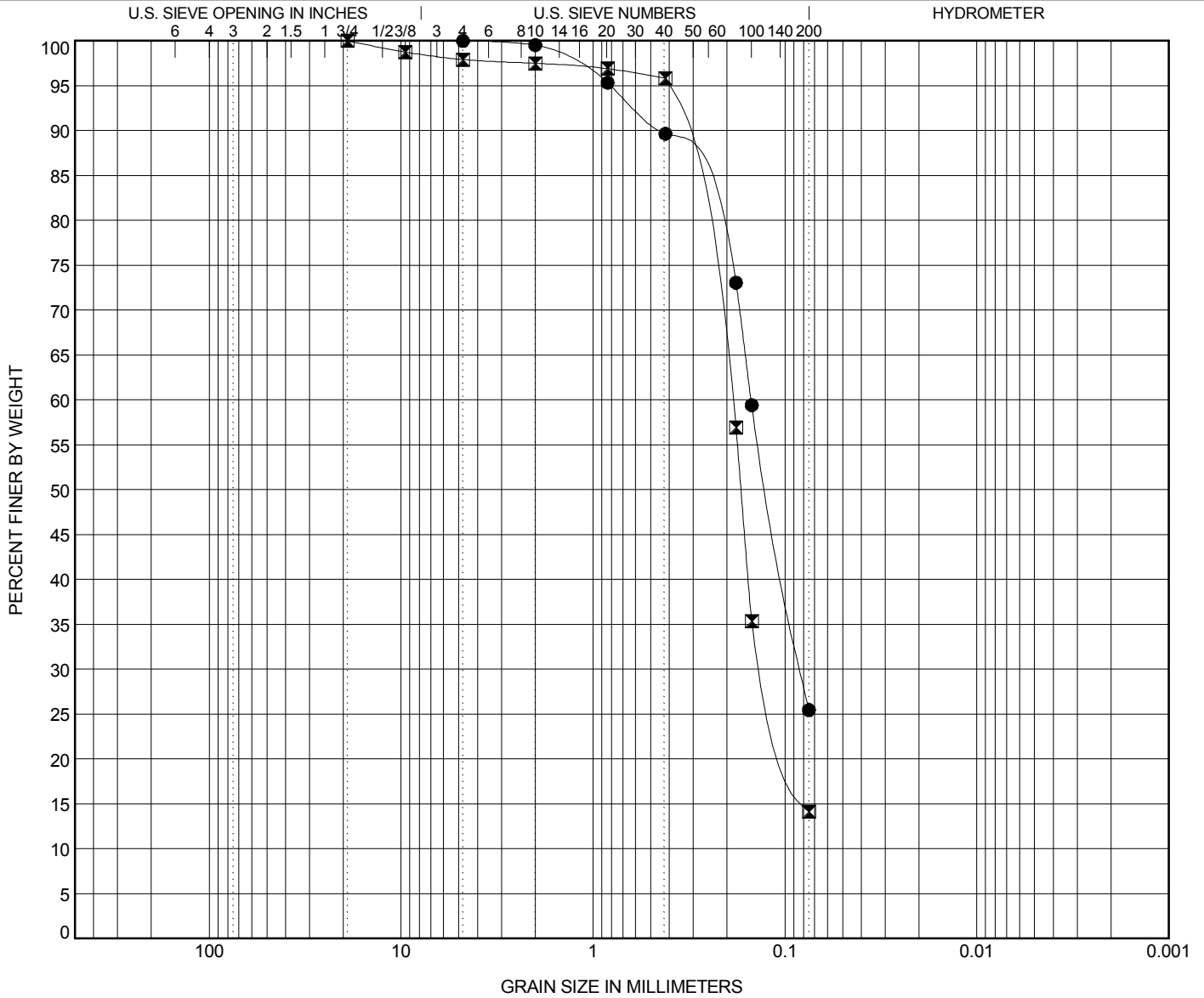


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● B-8	15.0	<b>Silty Fine SAND (SM) A-2-4</b>					<b>NP</b>	<b>NP</b>	<b>NP</b>		
☒ B-8	20.0	<b>Silty Fine SAND (SM) A-2-4</b>					<b>NP</b>	<b>NP</b>	<b>NP</b>		
BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay		
● B-8	15.0	4.76	0.805	0.123		0.0	74.5	25.5			
☒ B-8	20.0	19	0.412	0.169		2.1	83.8	14.1			

GRAIN SIZE - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 6/25/18

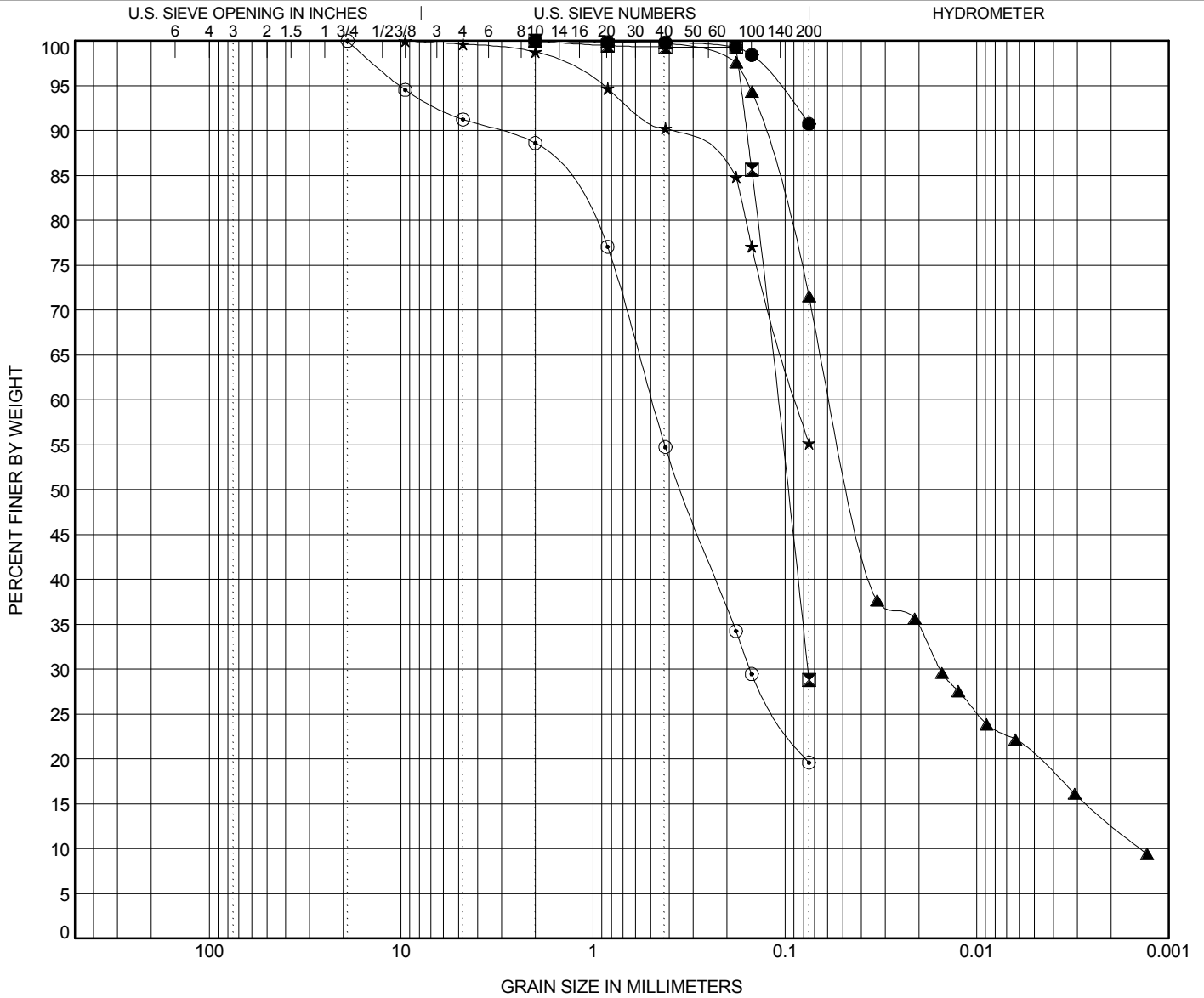


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● B-9	2.0	<b>SILT (ML) A-4(0)</b>	<b>NP</b>	<b>NP</b>	<b>NP</b>		
■ B-9	4.0	<b>Silty Fine SAND (SM) A-2-4</b>	<b>33</b>	<b>27</b>	<b>6</b>		
▲ B-9	8.0	<b>SILT (ML) with Sand A-4(5)</b>	<b>33</b>	<b>25</b>	<b>8</b>	<b>3.04</b>	<b>40.60</b>
★ B-9	10.0	<b>Sandy SILT (ML) A-4(0)</b>	<b>NP</b>	<b>NP</b>	<b>NP</b>		
◎ B-9	15.0	<b>Silty F/M SAND (SM) A-2-4</b>	<b>NP</b>	<b>NP</b>	<b>NP</b>		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● B-9	2.0	<b>2</b>	<b>0.11</b>			<b>0.0</b>	<b>9.2</b>	<b>90.8</b>	
■ B-9	4.0	<b>2</b>	<b>0.17</b>	<b>0.097</b>		<b>0.0</b>	<b>71.2</b>	<b>28.8</b>	
▲ B-9	8.0	<b>2</b>	<b>0.155</b>	<b>0.045</b>	<b>0.001</b>	<b>0.0</b>	<b>28.4</b>	<b>51.3</b>	<b>20.2</b>
★ B-9	10.0	<b>9.52</b>	<b>0.893</b>			<b>0.3</b>	<b>44.5</b>	<b>55.2</b>	
◎ B-9	15.0	<b>19</b>	<b>10.083</b>	<b>0.345</b>		<b>8.8</b>	<b>71.6</b>	<b>19.6</b>	

GRAIN SIZE - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 6/25/18

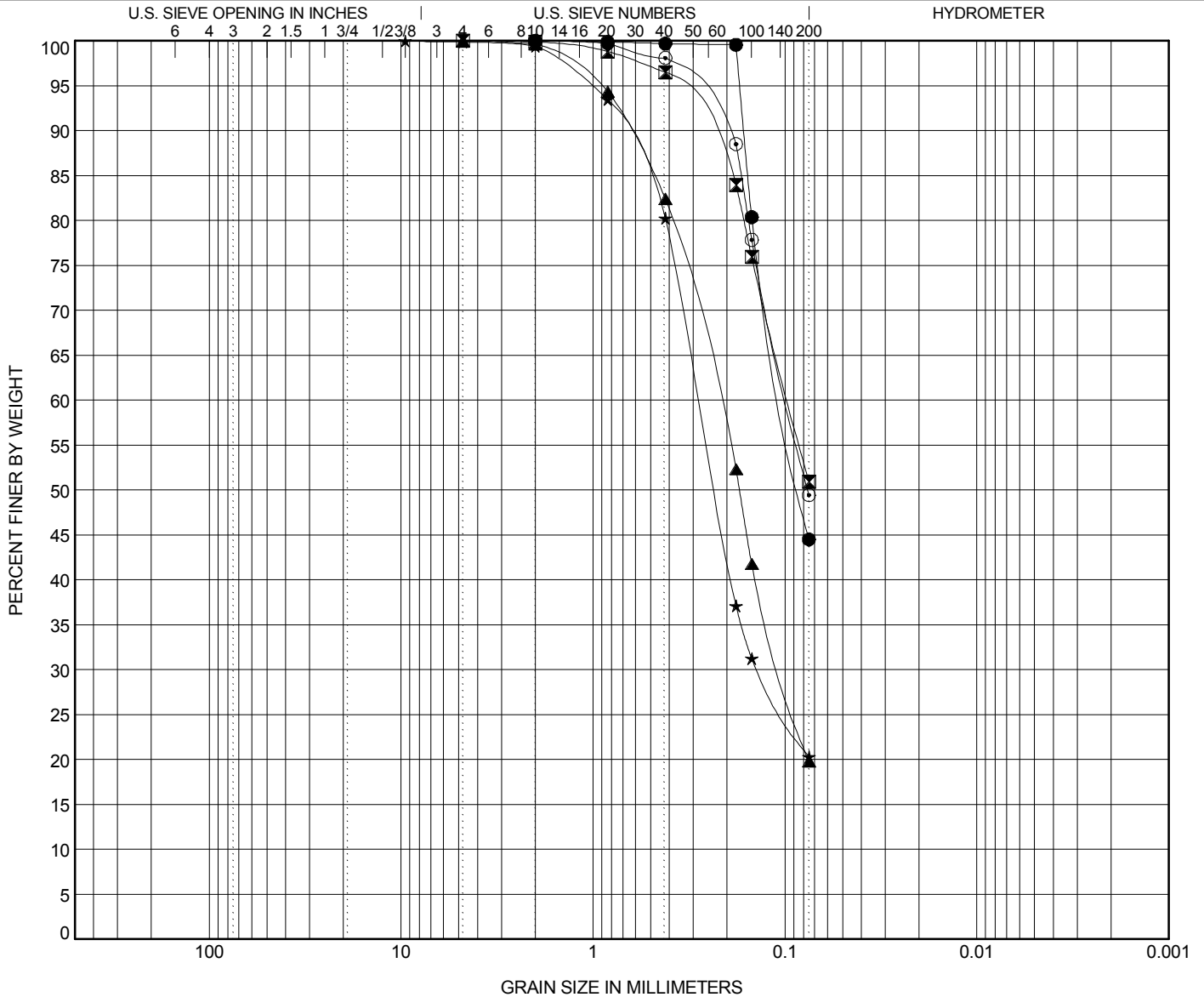


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● B-10	2.0	Silty Fine SAND (SM) A-4(0)	30	27	3		
■ B-10	4.0	Sandy SILT (ML) A-4(0)	NP	NP	NP		
▲ B-10	6.0	Silty Fine SAND (SM) A-2-4	NP	NP	NP		
★ B-10	8.0	Silty Fine SAND (SM) A-2-4	NP	NP	NP		
⊙ B-10	10.0	Silty, Clayey Fine SAND (SC-SM) A-4(0)	24	20	4		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● B-10	2.0	2	0.172	0.083		0.0	55.5	44.5	
■ B-10	4.0	4.76	0.379			0.0	49.1	50.9	
▲ B-10	6.0	4.76	0.933	0.173		0.0	80.2	19.8	
★ B-10	8.0	9.52	1.047	0.232		0.1	79.6	20.3	
⊙ B-10	10.0	2	0.319	0.076		0.0	50.6	49.4	

GRAIN SIZE - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 6/18/18

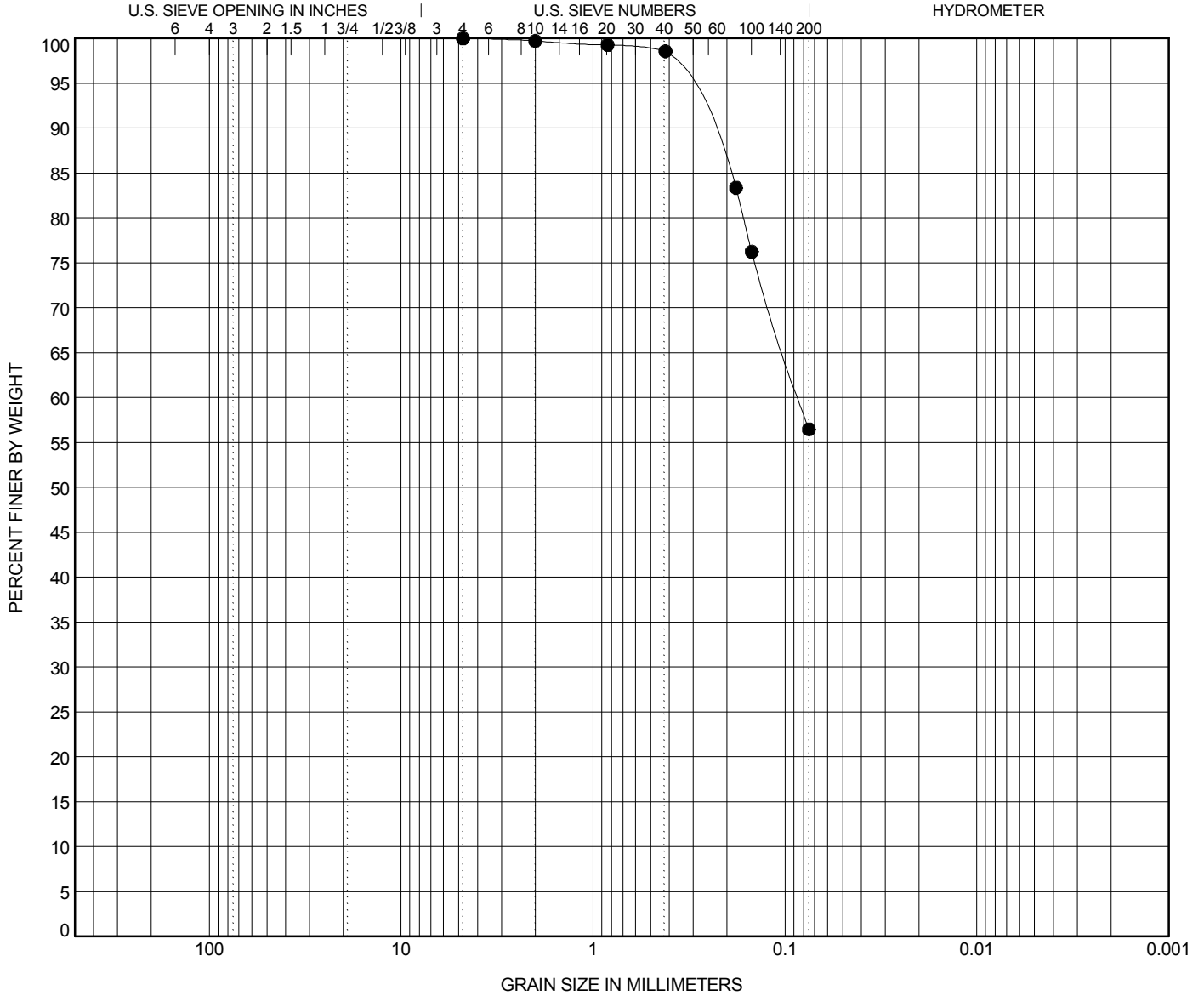


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● B-10	15.0	<b>Sandy, Silty CLAY (CL-ML) A-4(1)</b>					<b>25</b>	<b>18</b>	<b>7</b>		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● B-10	15.0	<b>4.76</b>	<b>0.344</b>			<b>0.0</b>	<b>43.5</b>	<b>56.5</b>	

GRAIN SIZE - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 6/18/18



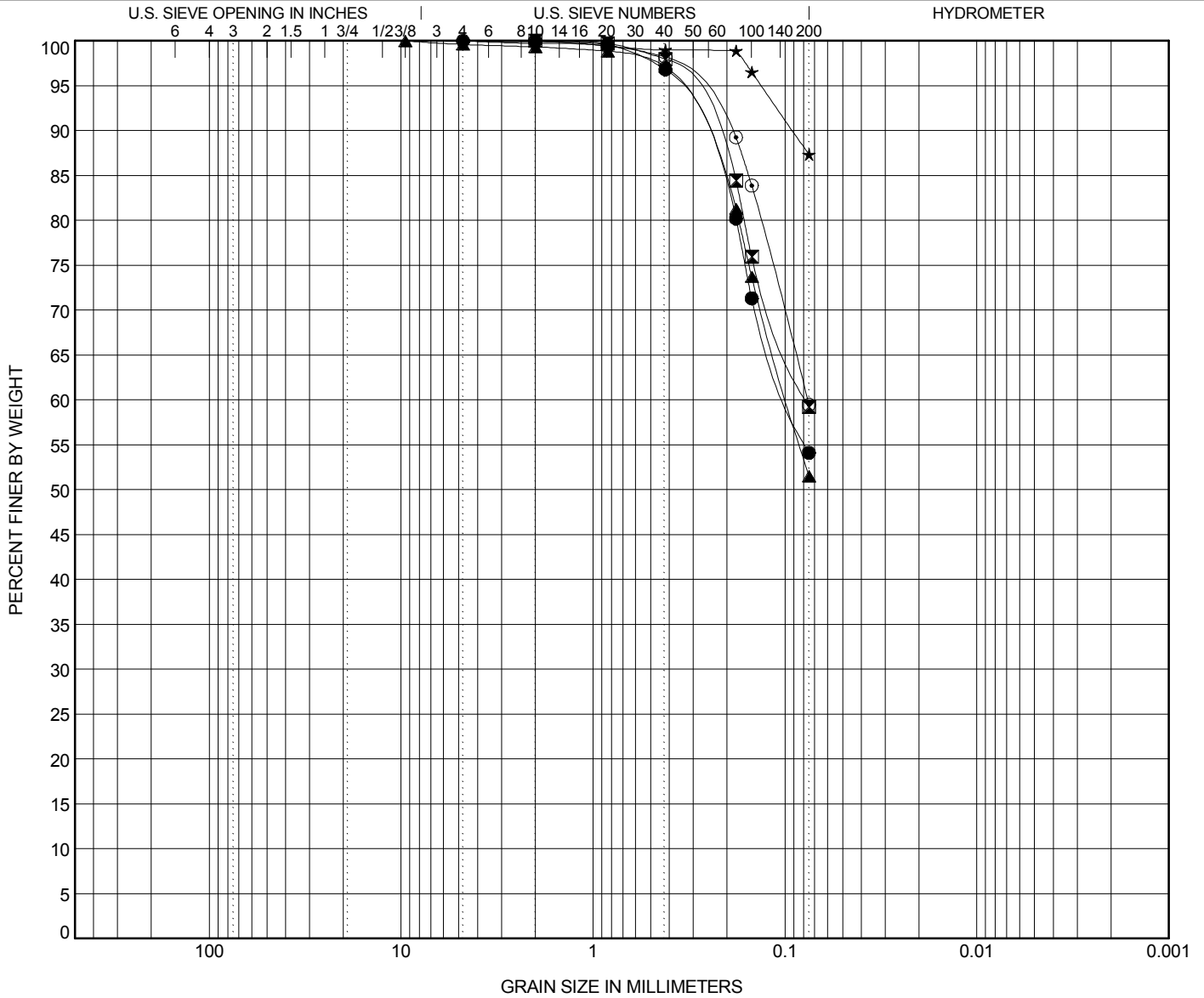


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Bridge over Crowders Creek

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● RW-18	2.0	Sandy Lean CLAY (CL) A-7-6(10)	44	20	24		
☒ RW-18	4.0	Sandy Lean CLAY (CL) A-7-6(10)	43	22	21		
▲ RW-18	6.0	Sandy SILT (ML) A-4(0)	NP	NP	NP		
★ RW-18	10.0	SILT (ML) A-4(0)	NP	NP	NP		
◎ RW-18	15.0	Sandy SILT (ML) A-4(0)	NP	NP	NP		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● RW-18	2.0	4.76	0.383			0.0	45.9	54.1	
☒ RW-18	4.0	2	0.348			0.0	40.8	59.2	
▲ RW-18	6.0	9.52	0.375			0.4	48.1	51.5	
★ RW-18	10.0	4.76	0.133			0.0	12.6	87.4	
◎ RW-18	15.0	2	0.31			0.0	40.5	59.5	

GRAIN SIZE - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 7/16/18

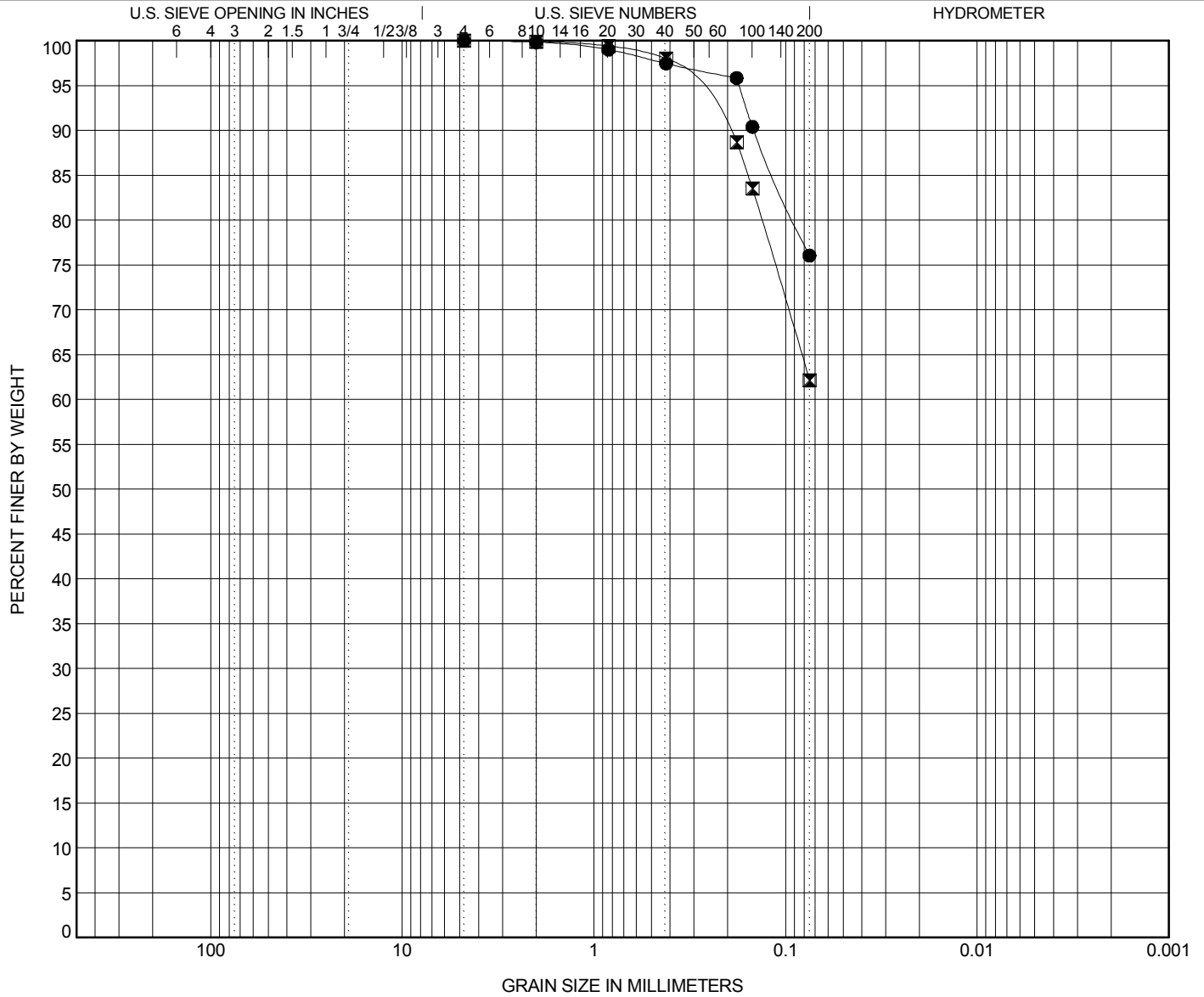


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Bridge over Crowders Creek

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● RW-18	20.0	<b>SILT (ML) with Sand A-4(0)</b>	<b>NP</b>	<b>NP</b>	<b>NP</b>		
☒ RW-18	25.0	<b>Sandy SILT (ML) A-4(0)</b>	<b>NP</b>	<b>NP</b>	<b>NP</b>		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● RW-18	20.0	<b>4.76</b>	<b>0.175</b>			<b>0.0</b>	<b>23.9</b>	<b>76.1</b>	
☒ RW-18	25.0	<b>4.76</b>	<b>0.318</b>			<b>0.0</b>	<b>37.8</b>	<b>62.2</b>	

GRAIN SIZE - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 7/16/18

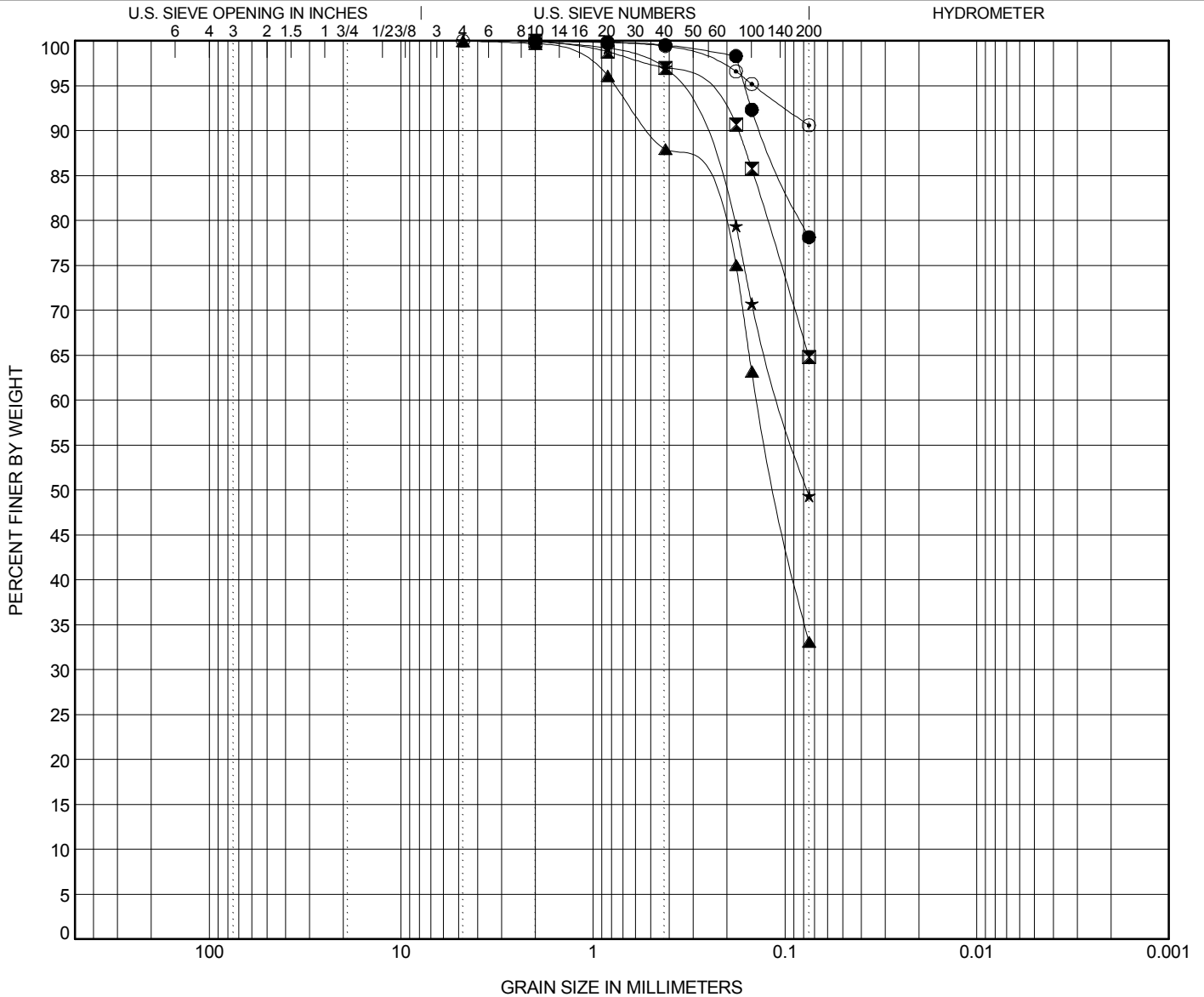


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● RW-19	2.0	SILT (ML) with Sand A-4(0)					NP	NP	NP		
☒ RW-19	4.0	Sandy SILT (ML) A-4(4)					37	31	6		
▲ RW-19	6.0	Silty Fine SAND (SM) A-2-4					NP	NP	NP		
★ RW-19	8.0	Silty Fine SAND (SM) A-2-4					32	28	4		
⊙ RW-19	10.0	Silty CLAY (CL-ML) A-4(2)					24	20	4		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● RW-19	2.0	2	0.162			0.0	21.8	78.2	
☒ RW-19	4.0	2	0.32			0.0	35.2	64.8	
▲ RW-19	6.0	4.76	0.762	0.11		0.0	66.9	33.1	
★ RW-19	8.0	4.76	0.381	0.077		0.0	50.6	49.4	
⊙ RW-19	10.0	4.76	0.144			0.0	9.4	90.6	

GRAIN SIZE - SCDOT - G4843 - CURRENT - SC-557.GPJ FME2017.GDT 6/18/18

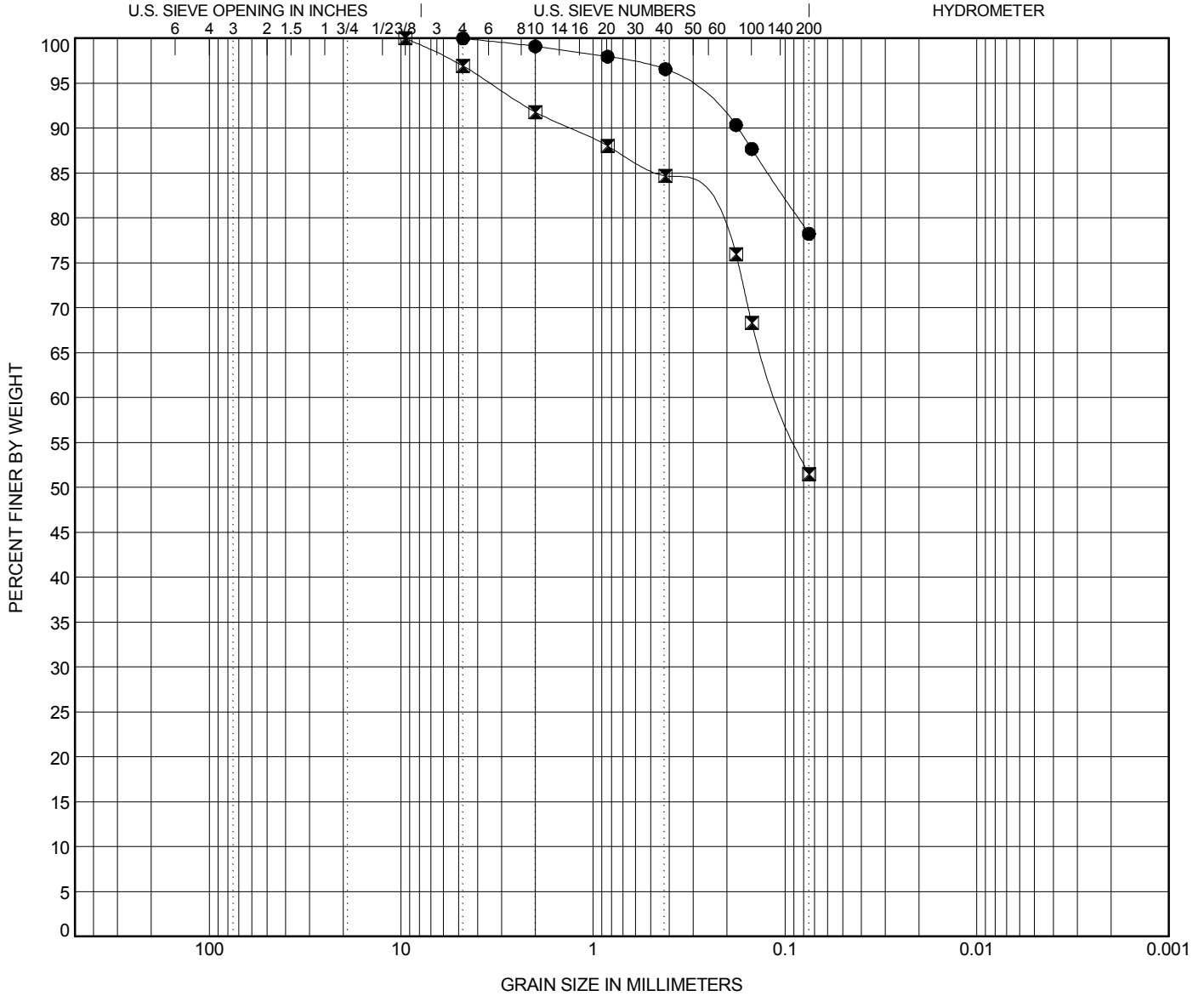


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● RW-19	15.0	<b>Silty CLAY (CL-ML) with Sand A-4(4)</b>					<b>28</b>	<b>21</b>	<b>7</b>		
◻ RW-19	20.0	<b>SILT (ML) A-4(1)</b>					<b>23</b>	<b>21</b>	<b>2</b>		
BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay		
● RW-19	15.0	<b>4.76</b>	<b>0.338</b>			<b>0.0</b>	<b>21.8</b>	<b>78.2</b>			
◻ RW-19	20.0	<b>9.52</b>	<b>3.431</b>			<b>3.1</b>	<b>45.5</b>	<b>51.5</b>			

GRAIN SIZE - SCDOT - G4843 - CURRENT - SC-557.GPJ FME2017.GDT 6/18/18

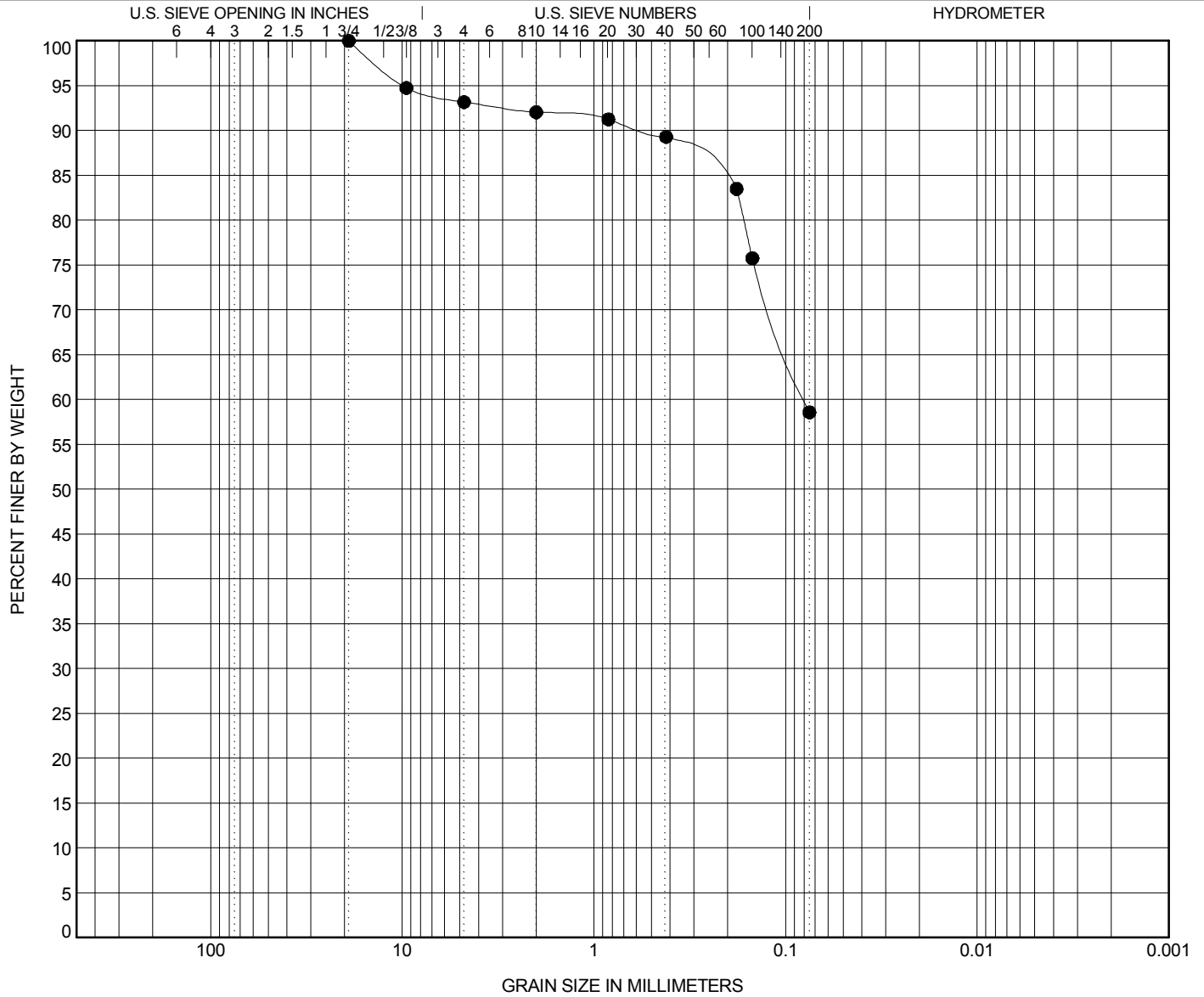


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● AP-1	17.0	<b>Sandy SILT (ML) A-4(0)</b>					<b>NP</b>	<b>NP</b>	<b>NP</b>		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● AP-1	17.0	19	9.831			6.8	34.6	58.6	

GRAIN SIZE - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 6/18/18

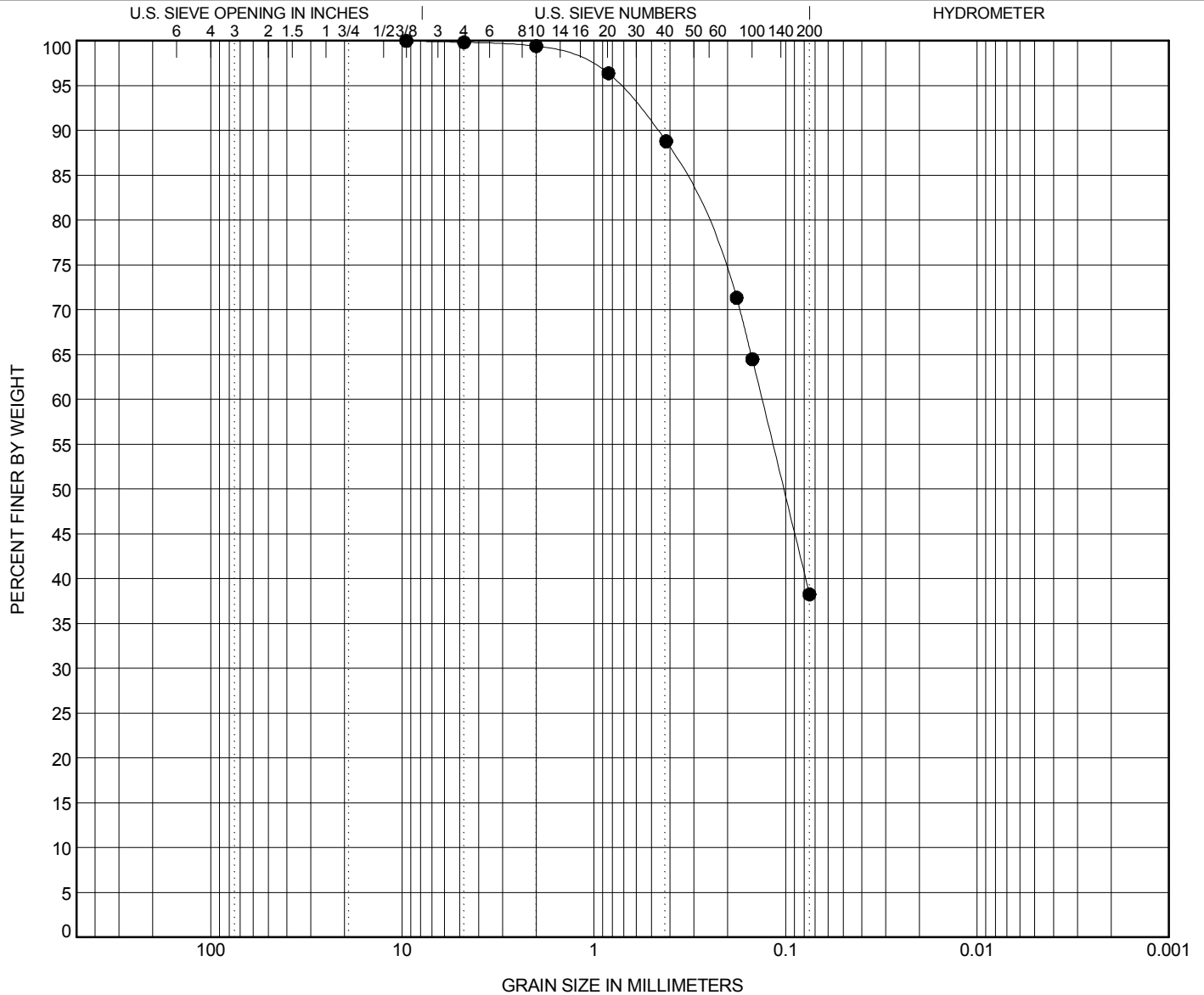


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● AP-2	17.0	<b>Silty Fine SAND (SM) A-4(0)</b>					<b>NP</b>	<b>NP</b>	<b>NP</b>		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● AP-2	17.0	<b>9.52</b>	<b>0.739</b>	<b>0.102</b>		<b>0.2</b>	<b>61.6</b>	<b>38.3</b>	

GRAIN SIZE - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 6/18/18

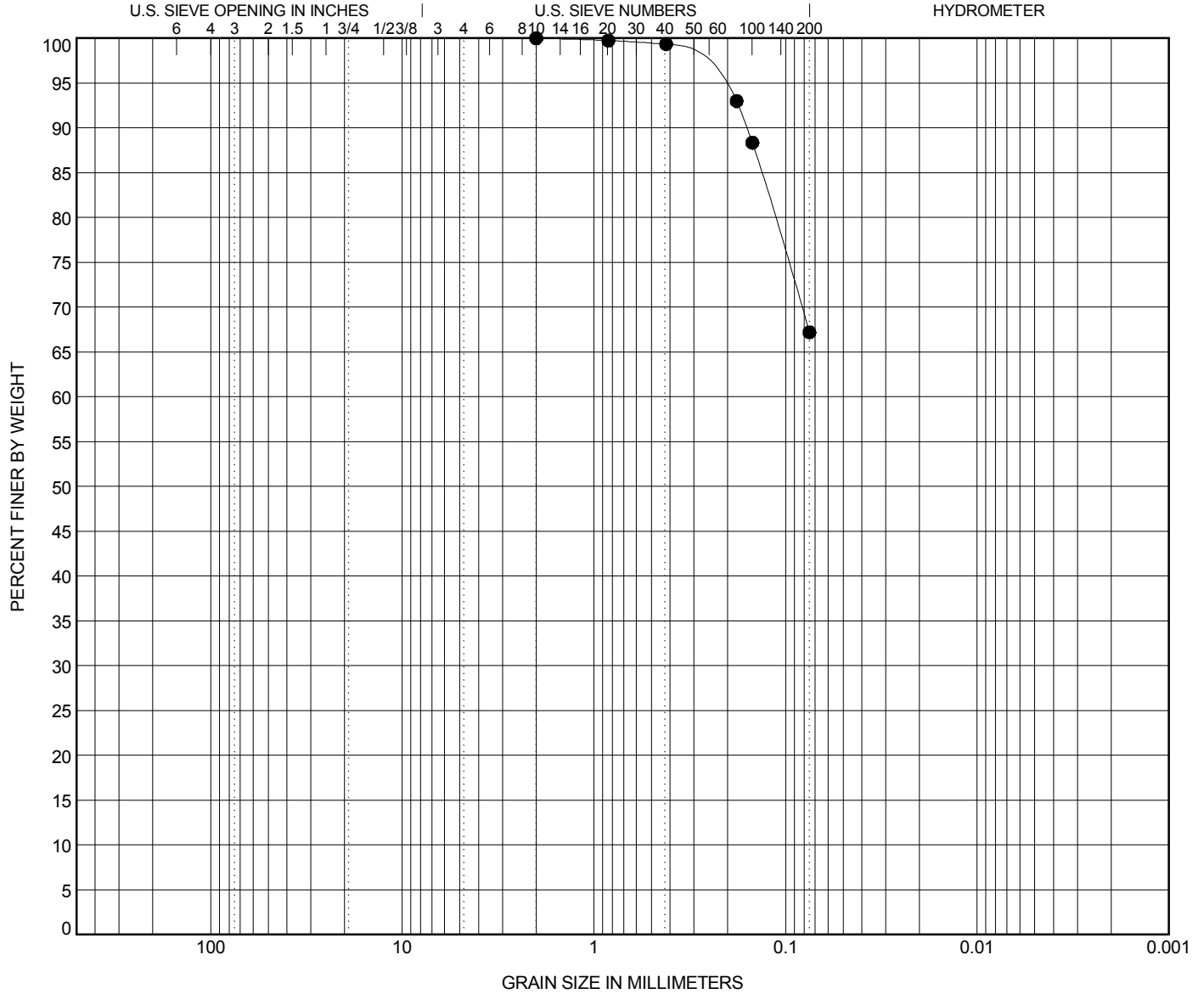


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● AP-3	6.0	Sandy SILT (ML) A-4(4)					34	26	8		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● AP-3	6.0	2	0.235			0.0	32.8	67.2	

GRAIN SIZE - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 6/22/18

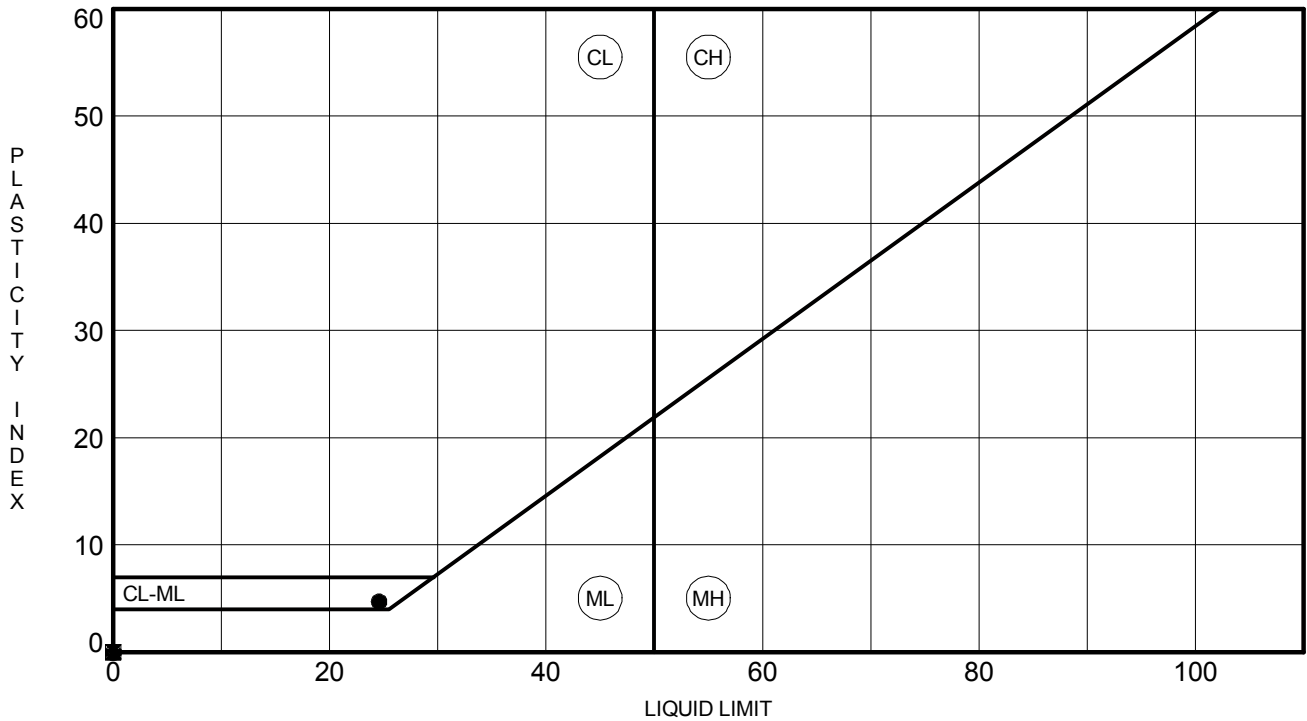


# ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	B-3	2.0	25	20	5	44	Silty, Clayey Fine SAND (SC-SM) A-4(0)
☒	B-3	4.0	NP	NP	NP	36	Silty Fine SAND (SM) A-4(0)
▲	B-3	6.0	NP	NP	NP	41	Silty Fine SAND (SM) A-4(0)
★	B-3	8.0	NP	NP	NP	60	Sandy SILT (ML) A-4(0)
⊙	B-3	10.0	NP	NP	NP	55	Sandy SILT (ML) A-4(0)
⊕	B-3	15.0	NP	NP	NP	59	Sandy SILT (ML) A-4(0)

ATTERBERG LIMITS - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 6/18/18



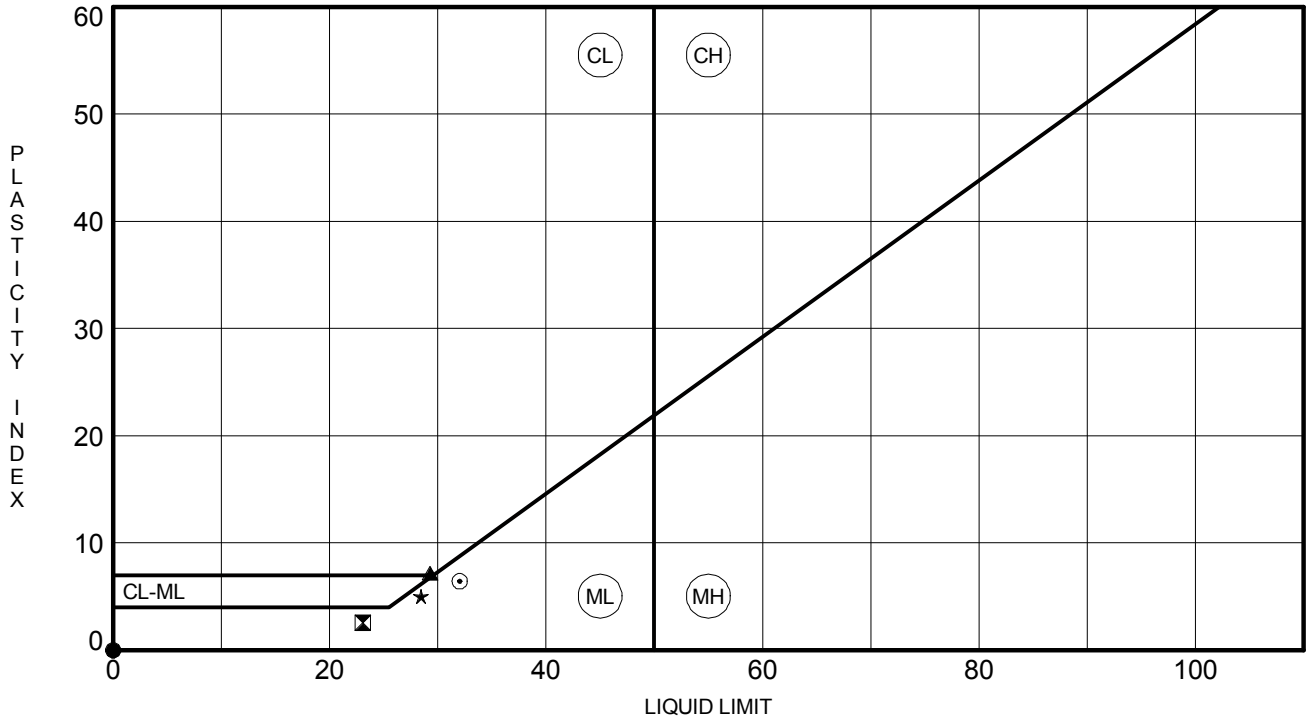


# ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● B-4	2.0	NP	NP	NP	36	Silty Fine SAND (SM) A-4(0)
⊠ B-4	4.0	23	20	3	42	Silty Fine SAND (SM) A-4(0)
▲ B-4	6.0	29	22	7	39	Silty, Clayey Fine SAND (SC-SM) A-4(0)
★ B-4	8.0	28	23	5	39	Silty Fine SAND (SM) A-4(0)
⊙ B-4	10.0	32	26	6	37	Silty Fine SAND (SM) A-4(0)

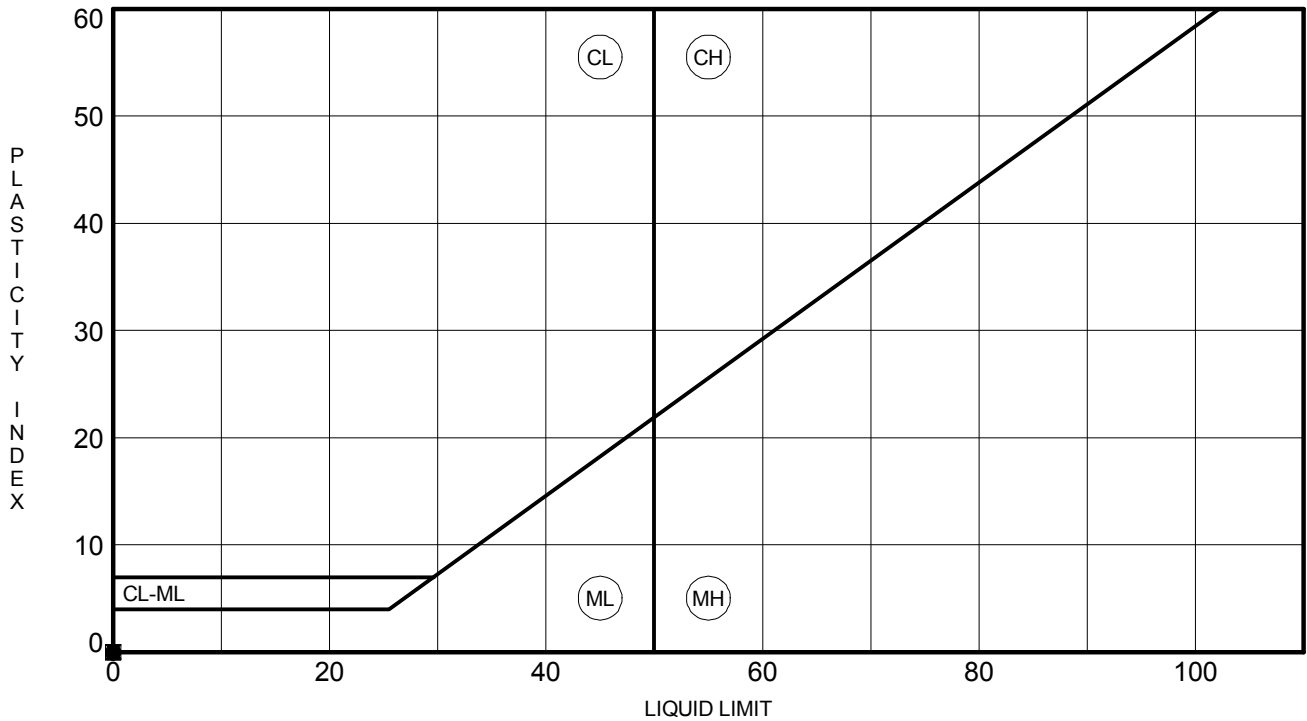


# ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



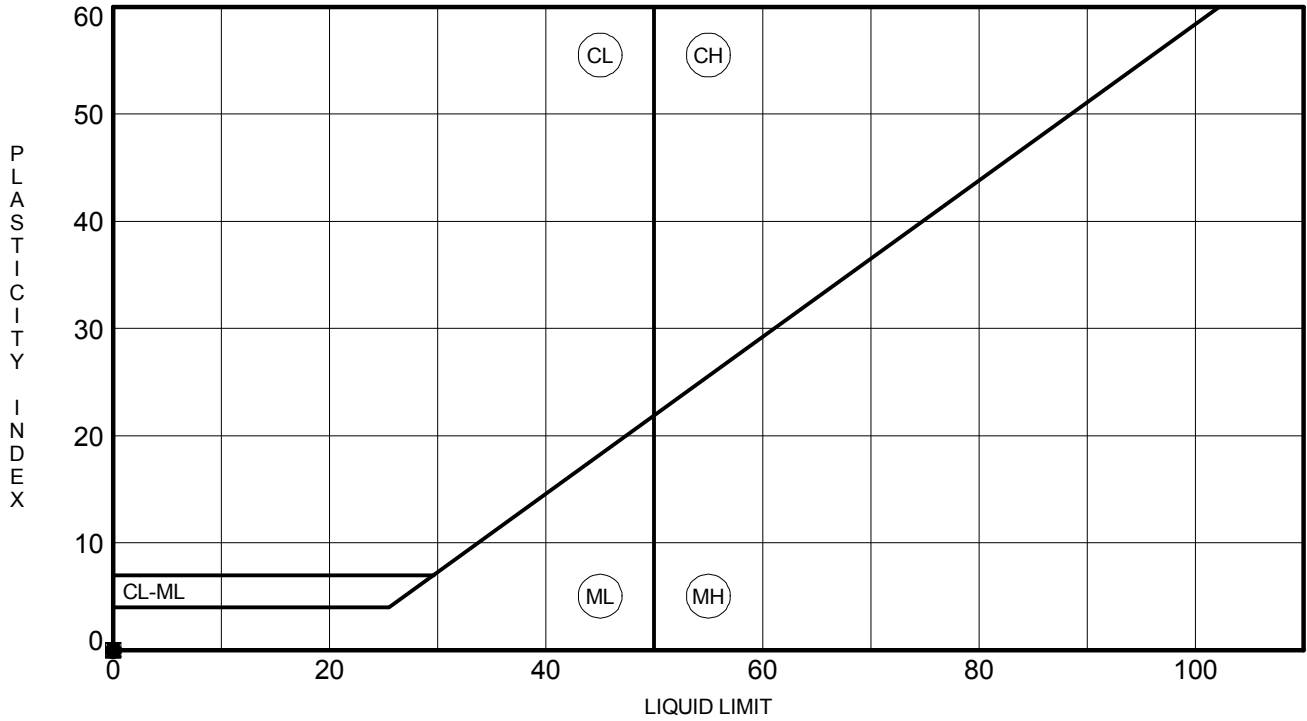
BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● B-5	2.0	NP	NP	NP	36	Silty Fine SAND (SM) A-4(0)
▣ B-5	4.0	NP	NP	NP	21	Silty Fine SAND (SM) A-2-4
▲ B-5	6.0	NP	NP	NP	15	Silty Fine SAND (SM) A-2-4
★ B-5	8.0	NP	NP	NP	29	Silty Fine SAND (SM) A-2-4
⊙ B-5	10.0	NP	NP	NP	26	Silty Fine SAND (SM) A-2-4

ATTERBERG LIMITS - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 6/25/18

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● B-6	2.0	NP	NP	NP	22	Silty Fine SAND (SM) A-2-4
☒ B-6	4.0	NP	NP	NP	34	Silty Fine SAND (SM) A-2-4
▲ B-6	6.0	NP	NP	NP	34	Silty Fine SAND (SM) A-2-4
★ B-6	8.0	NP	NP	NP	47	Silty Fine SAND (SM) A-4(0)
⊙ B-6	10.0	NP	NP	NP	20	Silty Fine SAND (SM) A-2-4
⊕ B-6	15.0	NP	NP	NP	57	Sandy SILT (ML) A-4(0)

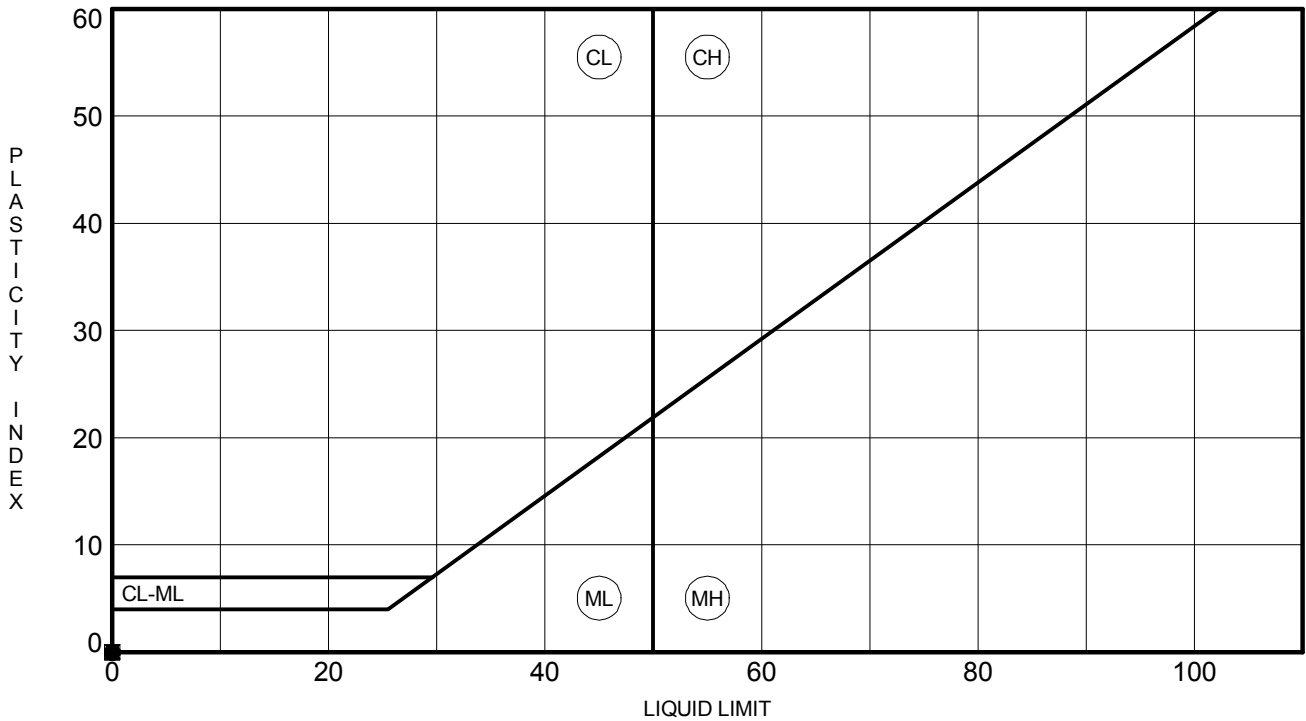


# ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● B-7	2.0	NP	NP	NP	20	Silty Fine SAND (SM) A-2-4
▣ B-7	4.0	NP	NP	NP	20	Silty Fine SAND (SM) A-2-4
▲ B-7	6.0	NP	NP	NP	39	Silty Fine SAND (SM) A-4(0)
★ B-7	8.0	NP	NP	NP	41	Silty Fine SAND (SM) A-4(0)
⊙ B-7	10.0	NP	NP	NP	12	Poorly Graded Fine SAND (SP-SM) with Silt A-2-4
⊕ B-7	15.0	NP	NP	NP	36	Silty Fine SAND (SM) A-4(0)
○ B-7	20.0	NP	NP	NP	6	Poorly Graded M/C SAND (SP-SM) with Silt A-1-b

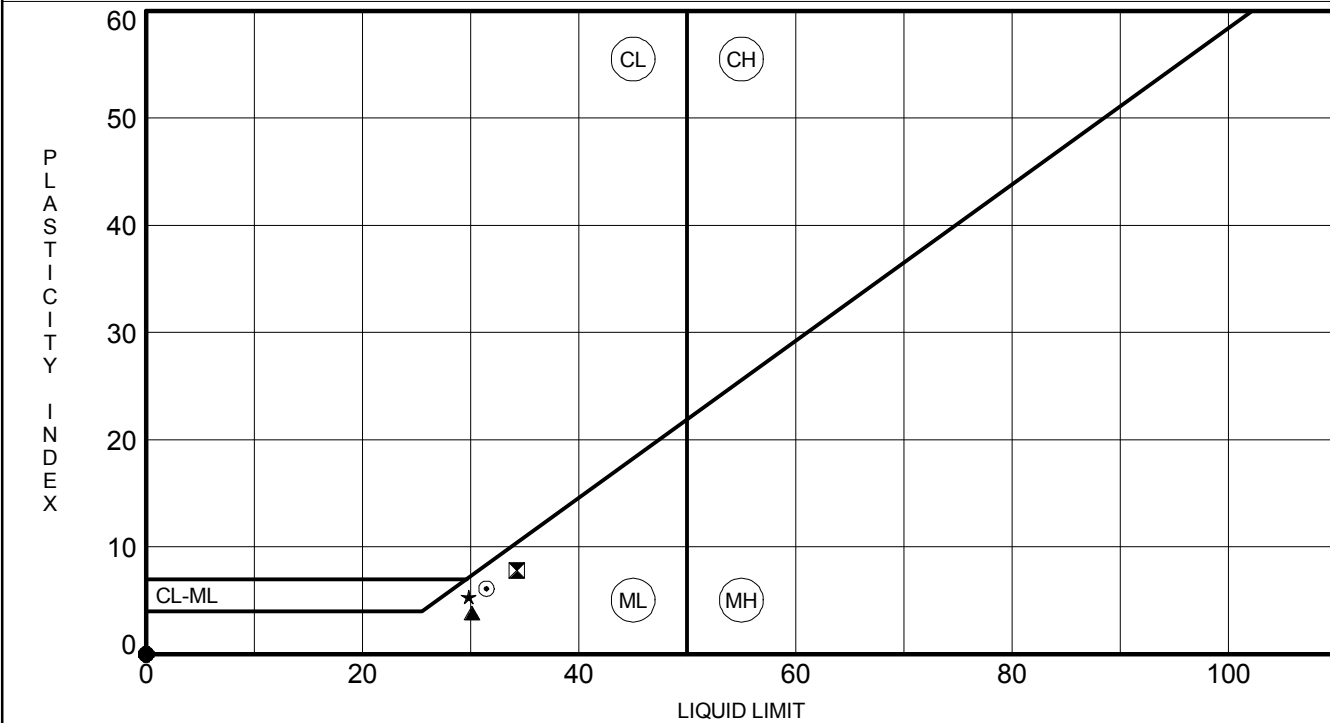


# ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● B-8	2.0	NP	NP	NP	63	Sandy SILT (ML) A-4(0)
☒ B-8	4.0	34	26	8	68	Sandy SILT (ML) A-4(5)
▲ B-8	6.0	30	26	4	56	Sandy SILT (ML) A-4(1)
★ B-8	8.0	30	24	6	61	Sandy SILT (ML) A-4(3)
⊙ B-8	10.0	31	25	6	56	Sandy SILT (ML) A-4(2)
⊕ B-8	15.0	NP	NP	NP	25	Silty Fine SAND (SM) A-2-4
○ B-8	20.0	NP	NP	NP	14	Silty Fine SAND (SM) A-2-4

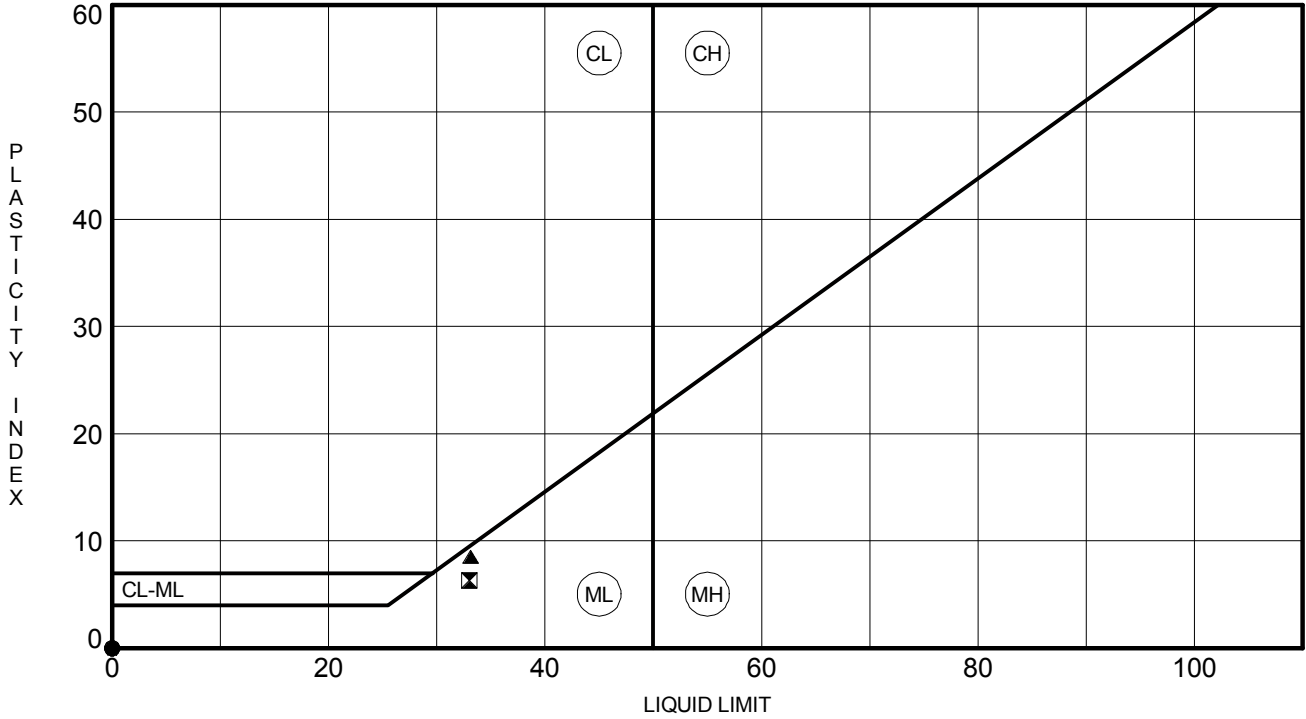


ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



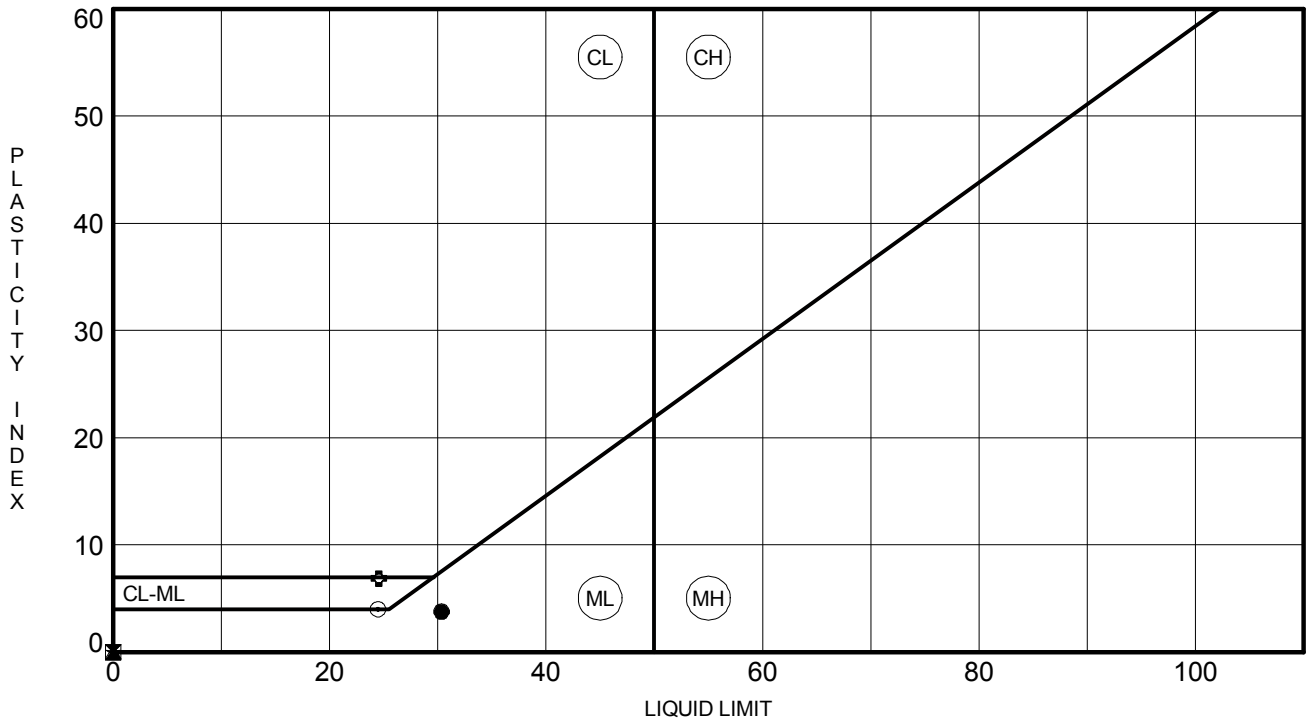
BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● B-9	2.0	NP	NP	NP	91	SILT (ML) A-4(0)
☒ B-9	4.0	33	27	6	29	Silty Fine SAND (SM) A-2-4
▲ B-9	8.0	33	25	8	72	SILT (ML) with Sand A-4(5)
★ B-9	10.0	NP	NP	NP	55	Sandy SILT (ML) A-4(0)
⊙ B-9	15.0	NP	NP	NP	20	Silty F/M SAND (SM) A-2-4

ATTERBERG LIMITS - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 6/25/18

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York

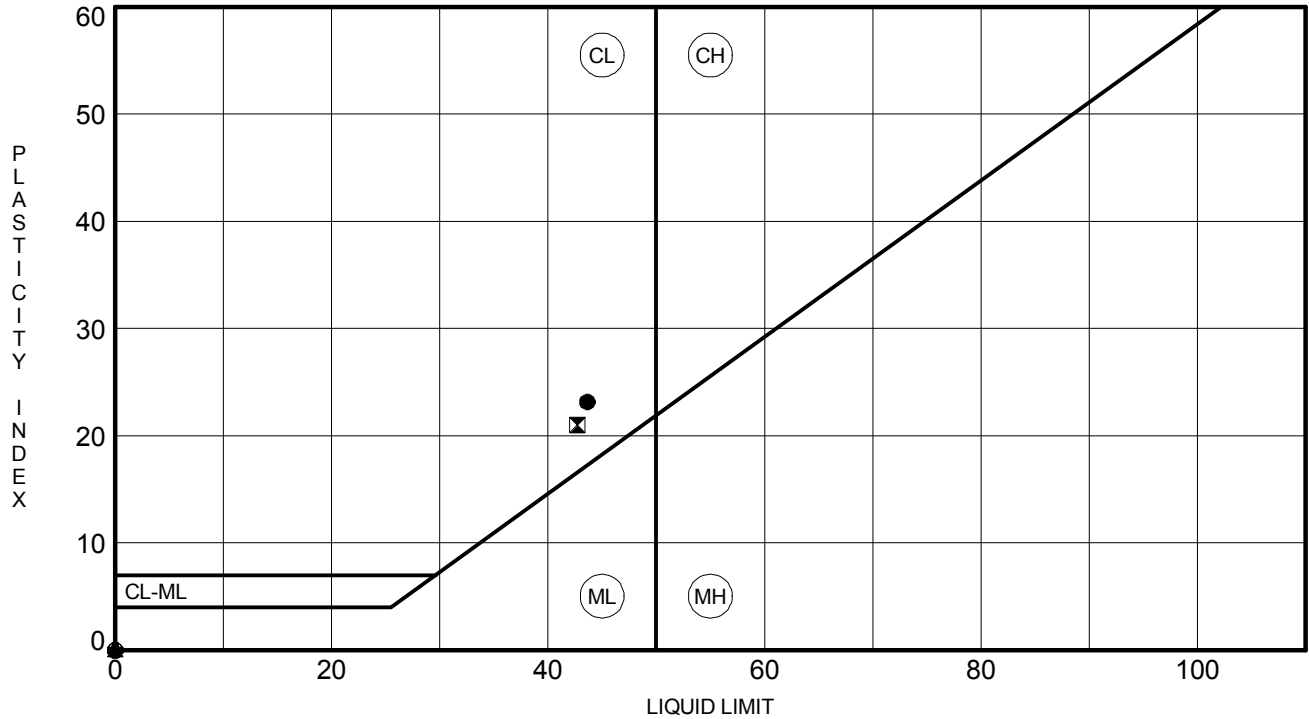


BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● B-10	2.0	30	27	3	45	Silty Fine SAND (SM) A-4(0)
⊠ B-10	4.0	NP	NP	NP	51	Sandy SILT (ML) A-4(0)
▲ B-10	6.0	NP	NP	NP	20	Silty Fine SAND (SM) A-2-4
★ B-10	8.0	NP	NP	NP	20	Silty Fine SAND (SM) A-2-4
⊙ B-10	10.0	24	20	4	49	Silty, Clayey Fine SAND (SC-SM) A-4(0)
⊕ B-10	15.0	25	18	7	56	Sandy, Silty CLAY (CL-ML) A-4(1)

PROJECT ID G4843.000

PROJECT NAME SC 557 Bridge over Crowders Creek

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● RW-18	2.0	44	20	24	54	Sandy Lean CLAY (CL) A-7-6(10)
⊠ RW-18	4.0	43	22	21	59	Sandy Lean CLAY (CL) A-7-6(10)
▲ RW-18	6.0	NP	NP	NP	52	Sandy SILT (ML) A-4(0)
★ RW-18	10.0	NP	NP	NP	87	SILT (ML) A-4(0)
⊙ RW-18	15.0	NP	NP	NP	59	Sandy SILT (ML) A-4(0)
⊕ RW-18	20.0	NP	NP	NP	76	SILT (ML) with Sand A-4(0)
○ RW-18	25.0	NP	NP	NP	62	Sandy SILT (ML) A-4(0)

ATTERBERG LIMITS - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 7/16/18



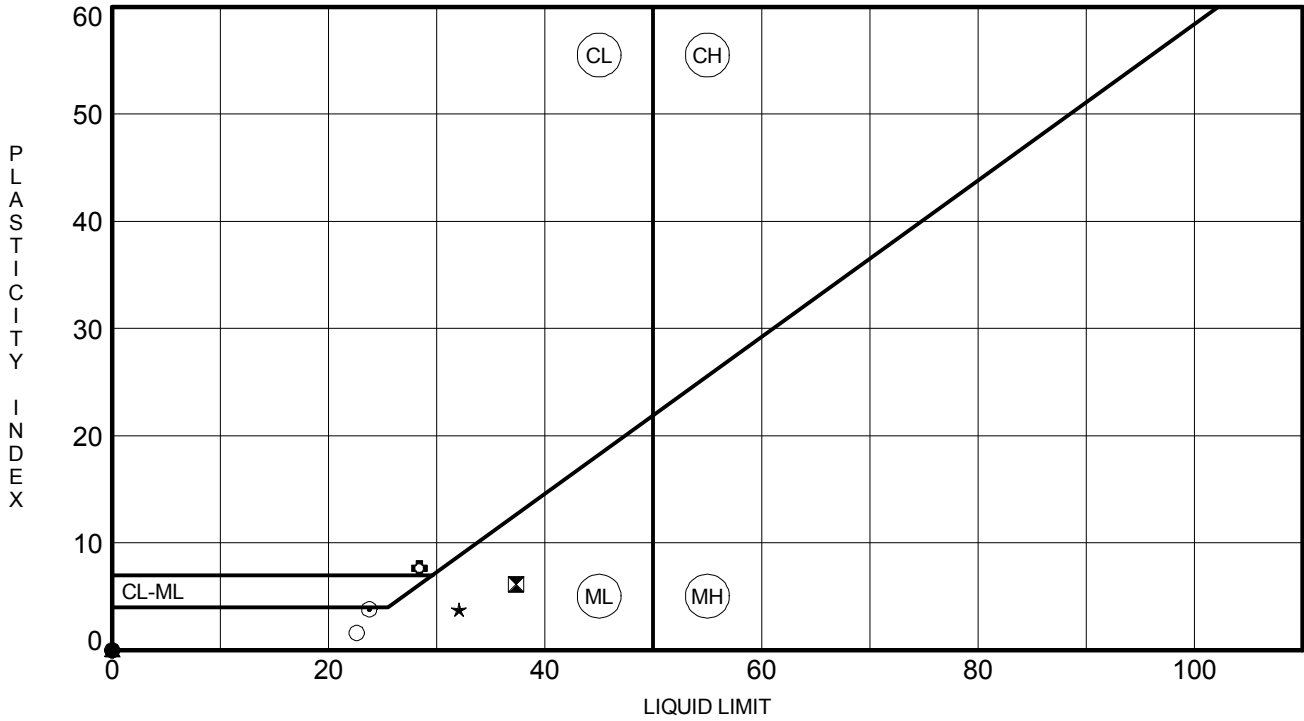


# ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● RW-19	2.0	NP	NP	NP	78	SILT (ML) with Sand A-4(0)
⊠ RW-19	4.0	37	31	6	65	Sandy SILT (ML) A-4(4)
▲ RW-19	6.0	NP	NP	NP	33	Silty Fine SAND (SM) A-2-4
★ RW-19	8.0	32	28	4	49	Silty Fine SAND (SM) A-2-4
⊙ RW-19	10.0	24	20	4	91	Silty CLAY (CL-ML) A-4(2)
⊕ RW-19	15.0	28	21	7	78	Silty CLAY (CL-ML) with Sand A-4(4)
○ RW-19	20.0	23	21	2	51	SILT (ML) A-4(1)

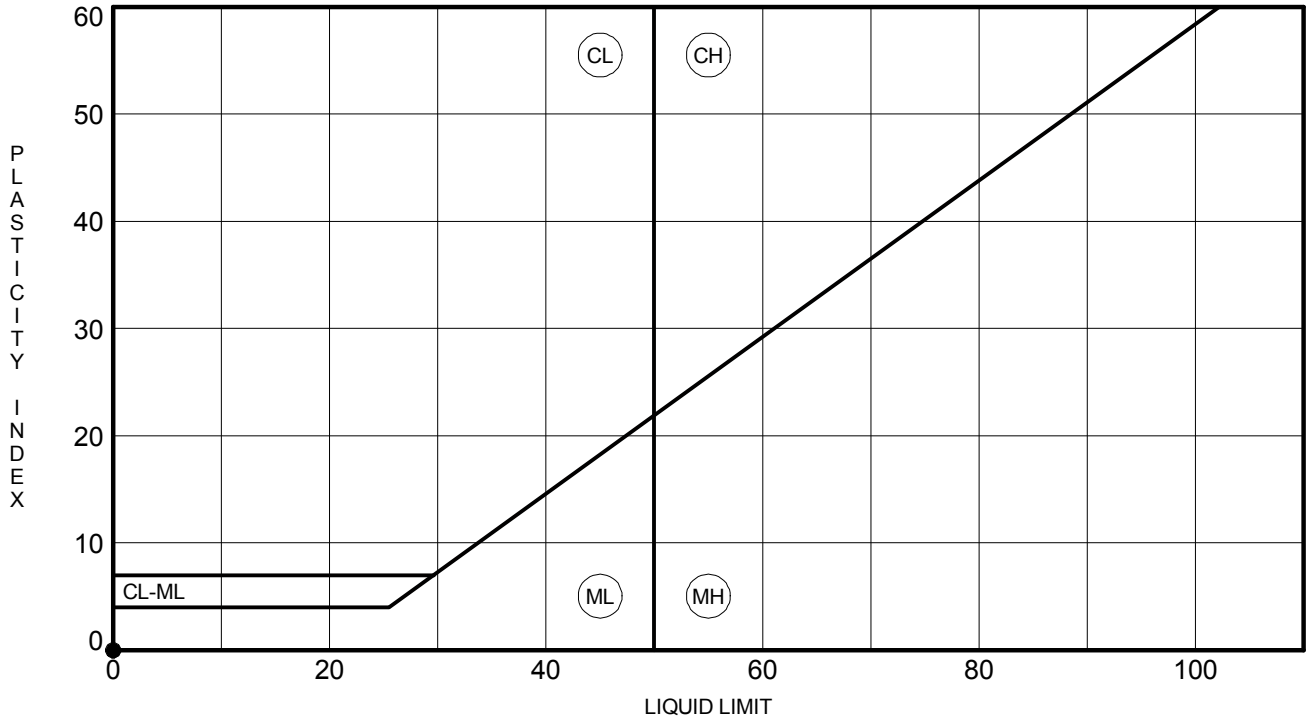


# ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● AP-1	17.0	NP	NP	NP	59	Sandy SILT (ML) A-4(0)

ATTERBERG LIMITS - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 6/18/18

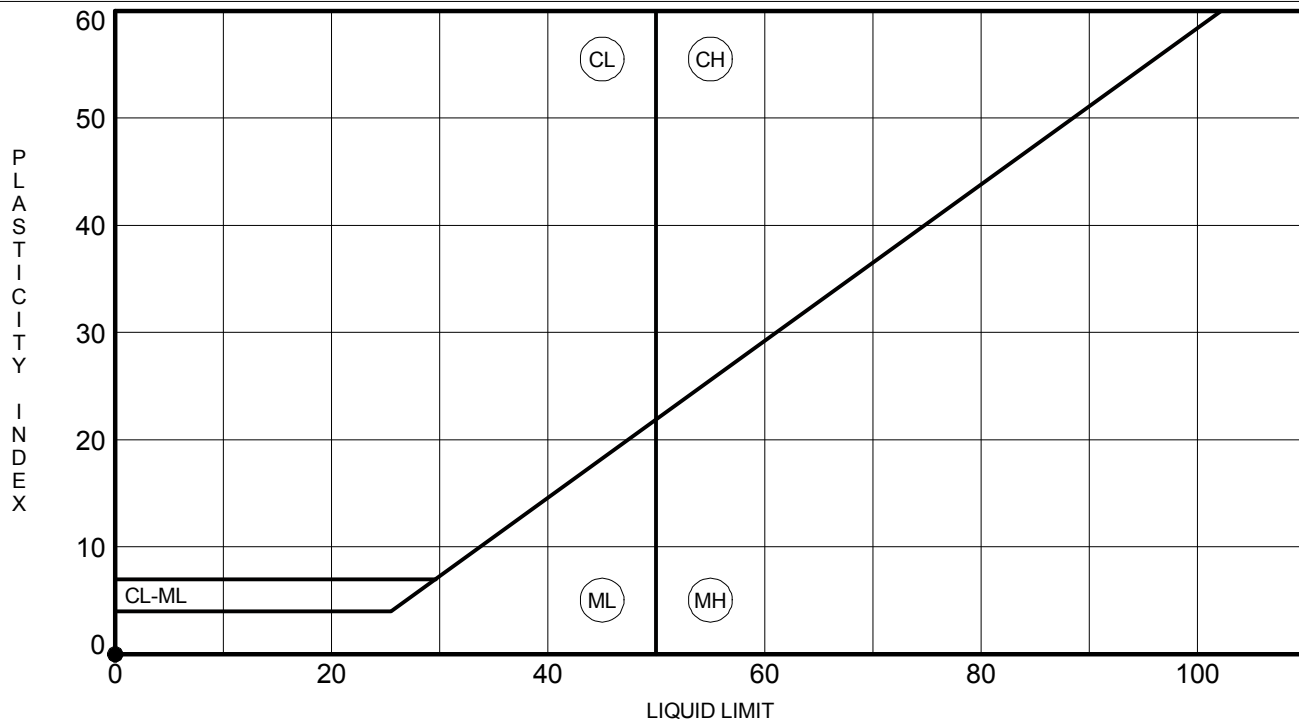


# ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● AP-2	17.0	NP	NP	NP	38	Silty Fine SAND (SM) A-4(0)

ATTERBERG LIMITS - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 6/18/18

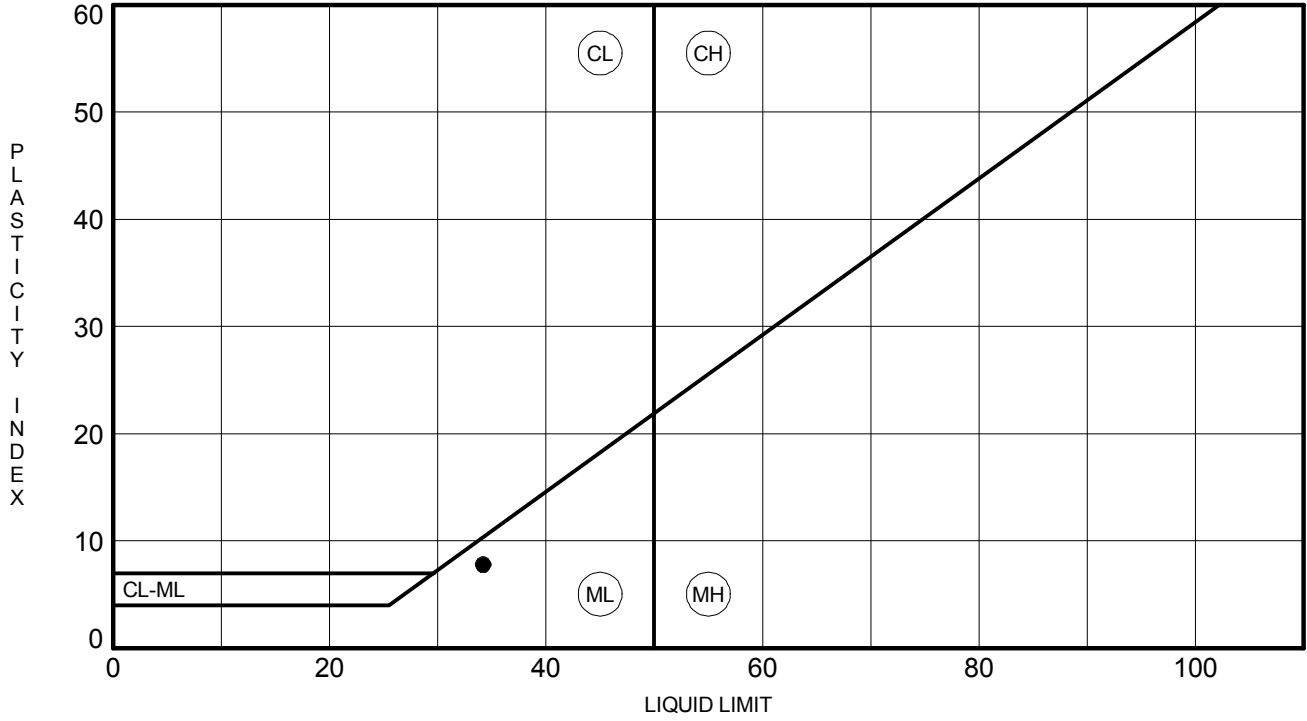


# ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● AP-3	6.0	34	26	8	67	Sandy SILT (ML) A-4(4)

ATTERBERG LIMITS - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 6/22/18

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

**PROJECT:** SC-557 Roadway Improvements/Bridge Replacement

**PROJECT NO.:** G4843

**SAMPLE NUMBER:** 18-1141

**DATE SAMPLE RECEIVED:** 6/12/2018

**DESCRIPTION OF SOIL:** Various

**TESTED BY:** MB

**DATE OF TESTING:** 6/12/2018

**DATE OF WEIGHING:** 6/13/2018

<b>BORING NO.</b>	B-3	B-3	B-3	B-3	B-3
<b>SAMPLE NO.</b>	18-1141C SS-1	18-1141F SS-2	18-1141I SS-3	18-1141L SS-4	18-1141O SS-5
<b>SAMPLE DEPTH</b>	0.0-2.0'	2.0-4.0'	4.0-6.0'	6.0-8.0'	8.0-10.0'
<b>WATER CONTENT, W%</b>	16.2	13.6	19.6	22.8	22.9

<b>BORING NO.</b>	B-3				
<b>SAMPLE NO.</b>	18-1141R SS-6				
<b>SAMPLE DEPTH</b>	13.5-15.0'				
<b>WATER CONTENT, W%</b>	41.4				

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

**PROJECT:** SC-557 Roadway Improvements/Bridge Replacement

**PROJECT NO.:** G4843

**SAMPLE NUMBER:** 18-1142

**DATE SAMPLE RECEIVED:** 6/12/2018

**DESCRIPTION OF SOIL:**

Various

**TESTED BY:** MB

**DATE OF TESTING:** 6/12/2018

**DATE OF WEIGHING:** 6/13/2018

<b>BORING NO.</b>	B-4	B-4	B-4	B-4	B-4
<b>SAMPLE NO.</b>	18-1142C SS-1	18-1142F SS-2	18-1142I SS-3	18-1142L SS-4	18-1142O SS-5
<b>SAMPLE DEPTH</b>	0.0-2.0'	2.0-4.0'	4.0-6.0'	6.0-8.0'	8.0-10.0'
<b>WATER CONTENT, W%</b>	15.9	16.1	18.1	22.6	23.7

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

**PROJECT:** SC-557 Roadway Improvements/Bridge Replacement

**PROJECT NO.:** G4843

**SAMPLE NUMBER:** 18-1143

**DATE SAMPLE RECEIVED:** 6/12/2018

**DESCRIPTION OF SOIL:**

Various

**TESTED BY:** MB

**DATE OF TESTING:** 6/12/2018

**DATE OF WEIGHING:** 6/13/2018

<b>BORING NO.</b>	B-5	B-5	B-5	B-5	B-5
<b>SAMPLE NO.</b>	18-1143C SS-1	18-1143F SS-2	18-1143I SS-3	18-1143L SS-4	18-1143O SS-5
<b>SAMPLE DEPTH</b>	0.0-2.0'	2.0-4.0'	4.0-6.0'	6.0-8.0'	8.0-10.0'
<b>WATER CONTENT, W%</b>	17.6	14.3	22.2	19.9	22.7

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

**PROJECT:** SC-557 Roadway Improvements/Bridge Replacement

**PROJECT NO.:** G4843

**SAMPLE NUMBER:** 18-1144

**DATE SAMPLE RECEIVED:** 6/12/2018

**DESCRIPTION OF SOIL:**

Various

**TESTED BY:** MB

**DATE OF TESTING:** 6/12/2018

**DATE OF WEIGHING:** 6/13/2018

<b>BORING NO.</b>	B-6	B-6	B-6	B-6	B-6
<b>SAMPLE NO.</b>	18-1144C SS-1	18-1144F SS-2	18-1144I SS-3	18-1144L SS-4	18-1144O SS-5
<b>SAMPLE DEPTH</b>	0.0-2.0'	2.0-4.0'	4.0-6.0'	6.0-8.0'	8.0-10.0'
<b>WATER CONTENT, W%</b>	17.6	16.5	21.0	27.7	27.0

<b>BORING NO.</b>	B-6				
<b>SAMPLE NO.</b>	18-1144R SS-6				
<b>SAMPLE DEPTH</b>	13.5-15.0'				
<b>WATER CONTENT, W%</b>	43.3				

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					



**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

**PROJECT:** SC-557 Roadway Improvements/Bridge Replacement

**PROJECT NO.:** G4843

**SAMPLE NUMBER:** 18-1145

**DATE SAMPLE RECEIVED:** 6/12/2018

**DESCRIPTION OF SOIL:**

Various

**TESTED BY:** MB

**DATE OF TESTING:** 6/12/2018

**DATE OF WEIGHING:** 6/13/2018

<b>BORING NO.</b>	B-7	B-7	B-7	B-7	B-7
<b>SAMPLE NO.</b>	18-1145C SS-1	18-1145F SS-2	18-1145I SS-3	18-1145L SS-4	18-1145O SS-5
<b>SAMPLE DEPTH</b>	0.0-2.0'	2.0-4.0'	4.0-6.0'	6.0-8.0'	8.0-10.0'
<b>WATER CONTENT, W%</b>	16.0	21.1	17.8	29.8	26.6

<b>BORING NO.</b>	B-7	B-7			
<b>SAMPLE NO.</b>	18-1145R SS-6	18-1145U SS-7			
<b>SAMPLE DEPTH</b>	13.5-15.0'	18.5-20.0'			
<b>WATER CONTENT, W%</b>	38.2	28.7			

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

**PROJECT:** SC-557 Roadway Improvements/Bridge Replacement

**PROJECT NO.:** G4843

**SAMPLE NUMBER:** 18-1090

**DATE SAMPLE RECEIVED:** 6/12/2018

**DESCRIPTION OF SOIL:**

Various

**TESTED BY:** MB

**DATE OF TESTING:** 6/12/2018

**DATE OF WEIGHING:** 6/13/2018

<b>BORING NO.</b>	B-8	B-8	B-8	B-8	B-8
<b>SAMPLE NO.</b>	18-1090C SS-1	18-1090F SS-2	18-1090I SS-3	18-1090L SS-4	18-1090O SS-5
<b>SAMPLE DEPTH</b>	0.0-2.0'	2.0-4.0'	4.0-6.0'	6.0-8.0'	8.0-10.0'
<b>WATER CONTENT, W%</b>	33.9	27.7	30.9	47.9	35.3

<b>BORING NO.</b>	B-8	B-8			
<b>SAMPLE NO.</b>	18-1090R SS-6	18-1090U SS-7			
<b>SAMPLE DEPTH</b>	13.5-15.0'	18.5-20.0'			
<b>WATER CONTENT, W%</b>	33.3	30.3			

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

<b>PROJECT:</b> <u>SC-557 Roadway Improvements/Bridge Replacement</u>	<b>PROJECT NO.:</b> <u>G4843</u>
<b>SAMPLE NUMBER:</b> <u>18-1091</u>	<b>DATE SAMPLE RECEIVED:</b> <u>6/12/2018</u>
<b>DESCRIPTION OF SOIL:</b> <u>Various</u>	
<b>TESTED BY:</b> <u>MB</u>	<b>DATE OF TESTING:</b> <u>6/12/2018</u>
	<b>DATE OF WEIGHING:</b> <u>6/13/2018</u>

<b>BORING NO.</b>	B-9	B-9	B-9	B-9	B-9
<b>SAMPLE NO.</b>	18-1091C SS-1	18-1091F SS-2	18-1091I SS-4	18-1091L SS-5	18-1091O SS-6
<b>SAMPLE DEPTH</b>	0.0-2.0'	2.0-4.0'	6.0-8.0'	8.0-10.0'	13.5-15.0'
<b>WATER CONTENT, W%</b>	31.6	33.0	44.9	40.1	24.7

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

**PROJECT:** SC-557 Roadway Improvements/Bridge Replacement

**PROJECT NO.:** G4843

**SAMPLE NUMBER:** 18-1092

**DATE SAMPLE RECEIVED:** 6/12/2018

**DESCRIPTION OF SOIL:**

Various

**TESTED BY:** MB

**DATE OF TESTING:** 6/12/2018

**DATE OF WEIGHING:** 6/13/2018

<b>BORING NO.</b>	B-10	B-10	B-10	B-10	B-10
<b>SAMPLE NO.</b>	18-1092C SS-1	18-1092F SS-2	18-1092I SS-3	18-1092L SS-4	18-1092O SS-5
<b>SAMPLE DEPTH</b>	0.0-2.0'	2.0-4.0'	4.0-6.0'	6.0-8.0'	8.0-10.0'
<b>WATER CONTENT, W%</b>	25.1	35.2	29.3	29.8	29.4

<b>BORING NO.</b>	B-10				
<b>SAMPLE NO.</b>	18-1092R SS-6				
<b>SAMPLE DEPTH</b>	13.5-15.0'				
<b>WATER CONTENT, W%</b>	39.9				

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

**PROJECT:** SC-557 Roadway Improvements/Bridge Replacement

**PROJECT NO.:** G4843

**SAMPLE NUMBER:** 18-1150

**DATE SAMPLE RECEIVED:** 6/12/2018

**DESCRIPTION OF SOIL:**

Various

**TESTED BY:** MB

**DATE OF TESTING:** 6/12/2018

**DATE OF WEIGHING:** 6/13/2018

<b>BORING NO.</b>	RW-18	RW-18	RW-18	RW-18	RW-18
<b>SAMPLE NO.</b>	18-1150C SS-1	18-1150F SS-2	18-1150I SS-3	18-1150L SS-5	18-1150O SS-6
<b>SAMPLE DEPTH</b>	0.0-2.0'	2.0-4.0'	4.0-6.0'	8.0-10.0'	13.5-15.0'
<b>WATER CONTENT, W%</b>	23.8	27.2	20.9	65.2	38.5

<b>BORING NO.</b>	RW-18	RW-18			
<b>SAMPLE NO.</b>	18-1150R SS-7	18-1150U SS-8			
<b>SAMPLE DEPTH</b>	18.5-20.0'	23.5-25.0'			
<b>WATER CONTENT, W%</b>	46.1	40.1			

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

**PROJECT:** SC-557 Roadway Improvements/Bridge Replacement

**PROJECT NO.:** G4843

**SAMPLE NUMBER:** 18-1111

**DATE SAMPLE RECEIVED:** 6/12/2018

**DESCRIPTION OF SOIL:**

Various

**TESTED BY:** MB

**DATE OF TESTING:** 6/12/2018

**DATE OF WEIGHING:** 6/13/2018

<b>BORING NO.</b>	RW-19	RW-19	RW-19	RW-19	RW-19
<b>SAMPLE NO.</b>	18-1111C SS-1	18-1111F SS-2	18-1111I SS-3	18-1111L SS-4	18-1111O SS-5
<b>SAMPLE DEPTH</b>	0.0-2.0'	2.0-4.0'	4.0-6.0'	6.0-8.0'	8.0-10.0'
<b>WATER CONTENT, W%</b>	35.7	45.2	29.5	30.5	44.7

<b>BORING NO.</b>	RW-19	RW-19			
<b>SAMPLE NO.</b>	18-1111R SS-6	18-1111U SS-7			
<b>SAMPLE DEPTH</b>	13.5-15.0'	18.5-20.0'			
<b>WATER CONTENT, W%</b>	36.5	25.3			

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**ROCK CORE COMPRESSION TEST**

**PROJECT:** SC 557 Roadway Improvements/Bridge Replacement

**PROJECT NO:** G4843

**SAMPLED BY:** RW

**DATE SAMPLED:** 6/8/2018

**TESTED BY:** BF

**DATE TESTED:** 6/21/2018

<b>Lab No.</b>	18-1146A	18-1146B			
<b>Boring No.</b>	B-4	B-4			
<b>Sample No.</b>	NQ-1	NQ-2			
<b>Depth</b>	25.1-25.4	31.4-31.7			
<b>Length (in)</b>	3.91	3.90			
<b>Diameter (in)</b>	1.86	1.86			
<b>Mass (g)</b>	495.97	482.02			
<b>Cross Sectional Area (in<sup>2</sup>)</b>	2.71	2.71			
<b>Load (lb)</b>	28490	25945			
<b>Compressive Strength (psi)</b>	10510	9560			
<b>Corrected Compressive Strength (psi)</b>					
<b>Unit Weight (lb/ft<sup>3</sup>)</b>	178.04	173.56			

Signature: \_\_\_\_\_

Remarks:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**ROCK CORE COMPRESSION TEST**

**PROJECT:** SC 557 Roadway Improvements/Bridge Replacement

**PROJECT NO:** G4843

**SAMPLED BY:** RW

**DATE SAMPLED:** 6/8/2018

**TESTED BY:** BF

**DATE TESTED:** 6/21/2018

<b>Lab No.</b>	18-1147A	18-1147B			
<b>Boring No.</b>	B-5	B-5			
<b>Sample No.</b>	NQ-2	NQ-3			
<b>Depth</b>	32.0-32.3	36.7-37.0			
<b>Length (in)</b>	3.95	4.01			
<b>Diameter (in)</b>	1.86	1.87			
<b>Mass (g)</b>	528.79	512.12			
<b>Cross Sectional Area (in<sup>2</sup>)</b>	2.73	2.73			
<b>Load (lb)</b>	72100	54930			
<b>Compressive Strength (psi)</b>	26420	20110			
<b>Corrected Compressive Strength (psi)</b>					
<b>Unit Weight (lb/ft<sup>3</sup>)</b>	186.98	178.32			

Signature: \_\_\_\_\_

Remarks:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**ROCK CORE COMPRESSION TEST**

**PROJECT:** SC 557 Roadway Improvements/Bridge Replacement

**PROJECT NO:** G4843

**SAMPLED BY:** RW

**DATE SAMPLED:** 6/8/2018

**TESTED BY:** BF

**DATE TESTED:** 6/21/2018

<b>Lab No.</b>	18-1148A	18-1148B			
<b>Boring No.</b>	B-6	B-6			
<b>Sample No.</b>	NQ-1	NQ-2			
<b>Depth</b>	27.7-28.0	35.0-35.3			
<b>Length (in)</b>	4.02	4.01			
<b>Diameter (in)</b>	1.86	1.86			
<b>Mass (g)</b>	503.24	483.79			
<b>Cross Sectional Area (in<sup>2</sup>)</b>	2.72	2.73			
<b>Load (lb)</b>	79345	106885			
<b>Compressive Strength (psi)</b>	29140	39210			
<b>Corrected Compressive Strength (psi)</b>					
<b>Unit Weight (lb/ft<sup>3</sup>)</b>	175.18	168.77			

Signature: \_\_\_\_\_

Remarks:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**ROCK CORE COMPRESSION TEST**

**PROJECT:** SC 557 Roadway Improvements/Bridge Replacement

**PROJECT NO:** G4843

**SAMPLED BY:** RW

**DATE SAMPLED:** 6/8/2018

**TESTED BY:** BF

**DATE TESTED:** 6/21/2018

<b>Lab No.</b>	18-1149A	18-1149B			
<b>Boring No.</b>	B-7	B-7			
<b>Sample No.</b>	NQ-2	NQ-3			
<b>Depth</b>	30.9-31.2	38.2-38.5			
<b>Length (in)</b>	4.06	3.86			
<b>Diameter (in)</b>	1.86	1.86			
<b>Mass (g)</b>	524.42	502.59			
<b>Cross Sectional Area (in<sup>2</sup>)</b>	2.71	2.73			
<b>Load (lb)</b>	22195	46870			
<b>Compressive Strength (psi)</b>	8200	17190			
<b>Corrected Compressive Strength (psi)</b>					
<b>Unit Weight (lb/ft<sup>3</sup>)</b>	182.10	182.10			

Signature: \_\_\_\_\_

Remarks:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**ROCK CORE COMPRESSION TEST**

**PROJECT:** SC 557 Roadway Improvements/Bridge Replacement

**PROJECT NO:** G4843

**SAMPLED BY:** CP

**DATE SAMPLED:** 6/1/2018

**TESTED BY:** BF

**DATE TESTED:** 6/6/2018

<b>Lab No.</b>	18-1093A				
<b>Boring No.</b>	B-8				
<b>Sample No.</b>	NQ-1				
<b>Depth</b>	27.2-27.5				
<b>Length (in)</b>	3.84				
<b>Diameter (in)</b>	1.87				
<b>Mass (g)</b>	464.52				
<b>Cross Sectional Area (in<sup>2</sup>)</b>	2.76				
<b>Load (lb)</b>	37745				
<b>Compressive Strength (psi)</b>	13680				
<b>Corrected Compressive Strength (psi)</b>					
<b>Unit Weight (lb/ft<sup>3</sup>)</b>	167.03				

Signature: \_\_\_\_\_

Remarks: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**ROCK CORE COMPRESSION TEST**

**PROJECT:** SC 557 Roadway Improvements/Bridge Replacement

**PROJECT NO:** G4843

**SAMPLED BY:** CP

**DATE SAMPLED:** 6/1/2018

**TESTED BY:** BF

**DATE TESTED:** 6/21/2018

<b>Lab No.</b>	18-1093B	18-1093C			
<b>Boring No.</b>	B-8	B-8			
<b>Sample No.</b>	NQ-2	NQ-4			
<b>Depth</b>	35.4-35.7	42.4-42.7			
<b>Length (in)</b>	4.09	3.82			
<b>Diameter (in)</b>	1.87	1.87			
<b>Mass (g)</b>	494.37	496.91			
<b>Cross Sectional Area (in<sup>2</sup>)</b>	2.75	2.75			
<b>Load (lb)</b>	53875	46260			
<b>Compressive Strength (psi)</b>	19620	16810			
<b>Corrected Compressive Strength (psi)</b>					
<b>Unit Weight (lb/ft<sup>3</sup>)</b>	167.50	180.23			

Signature: \_\_\_\_\_

Remarks: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**ROCK CORE COMPRESSION TEST**

**PROJECT:** SC 557 Roadway Improvements/Bridge Replacement

**PROJECT NO:** G4843

**SAMPLED BY:** CP

**DATE SAMPLED:** 6/1/2018

**TESTED BY:** BF

**DATE TESTED:** 6/6/2018

<b>Lab No.</b>	18-1094A	18-1094B			
<b>Boring No.</b>	B-9	B-9			
<b>Sample No.</b>	NQ-1	NQ-2			
<b>Depth</b>	21.7-22.0	28.1-28.4			
<b>Length (in)</b>	3.99	4.03			
<b>Diameter (in)</b>	1.87	1.87			
<b>Mass (g)</b>	483.36	487.13			
<b>Cross Sectional Area (in<sup>2</sup>)</b>	2.76	2.75			
<b>Load (lb)</b>	54660	74170			
<b>Compressive Strength (psi)</b>	19840	26980			
<b>Corrected Compressive Strength (psi)</b>					
<b>Unit Weight (lb/ft<sup>3</sup>)</b>	167.71	167.69			

Signature: \_\_\_\_\_

Remarks:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**ROCK CORE COMPRESSION TEST**

**PROJECT:** SC 557 Roadway Improvements/Bridge Replacement

**PROJECT NO:** G4843

**SAMPLED BY:** CP

**DATE SAMPLED:** 6/1/2018

**TESTED BY:** BF

**DATE TESTED:** 6/21/2018

<b>Lab No.</b>	18-1095A				
<b>Boring No.</b>	B-10				
<b>Sample No.</b>	NQ-1				
<b>Depth</b>	19.4-19.7				
<b>Length (in)</b>	4.03				
<b>Diameter (in)</b>	1.86				
<b>Mass (g)</b>	526.22				
<b>Cross Sectional Area (in<sup>2</sup>)</b>	2.71				
<b>Load (lb)</b>	72380				
<b>Compressive Strength (psi)</b>	26670				
<b>Corrected Compressive Strength (psi)</b>					
<b>Unit Weight (lb/ft<sup>3</sup>)</b>	183.45				

Signature: \_\_\_\_\_

Remarks:

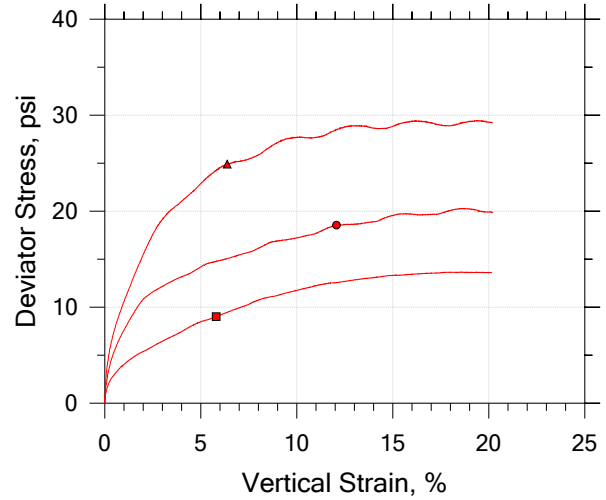
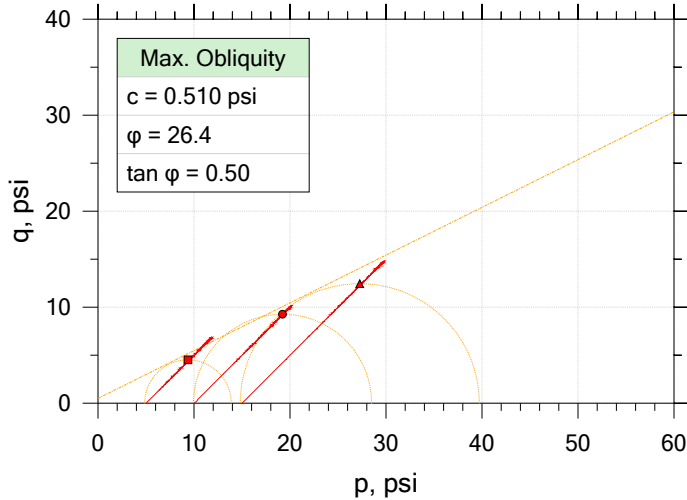
\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

# CONSOLIDATED UNDRAINED TRIAXIAL TEST by AASHTO T297

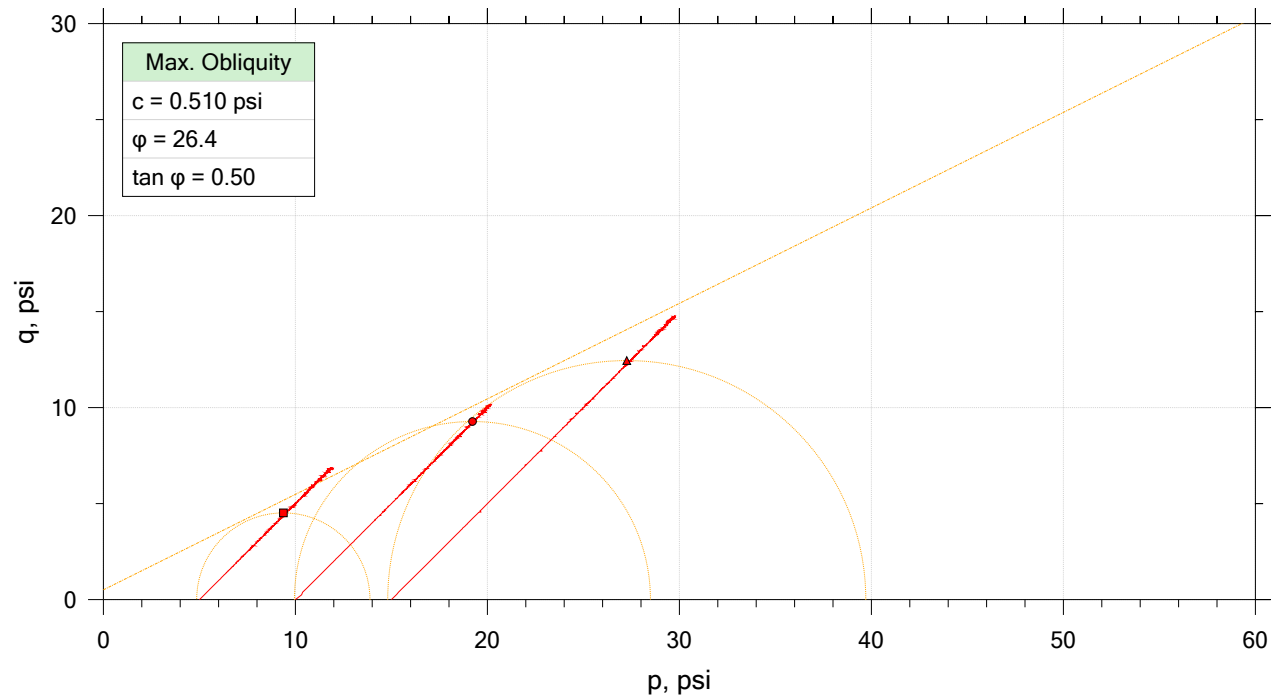
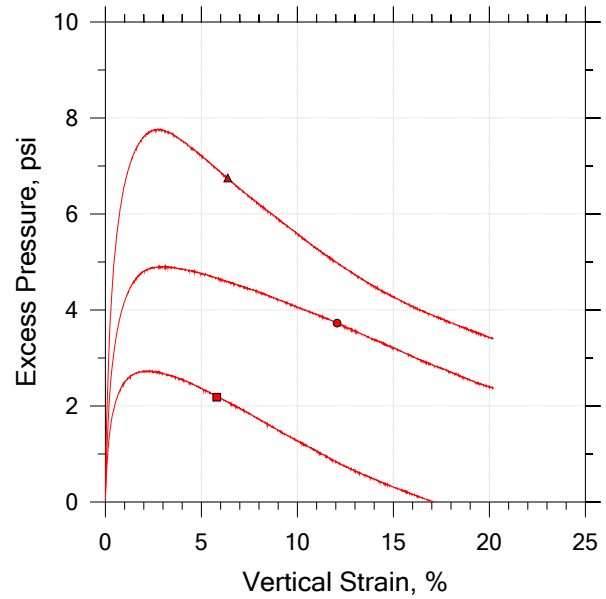
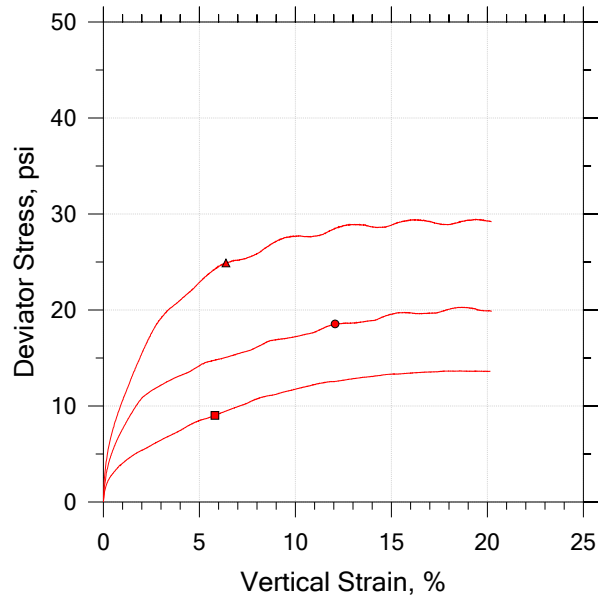


Symbol	■	●	▲
Sample ID	18-1156	18-1156	18-1156
Depth, ft	15' - 17'	15' - 17'	15' - 17'
Test Number	A	B	C
Initial			
Height, in	6.048	6.091	5.940
Diameter, in	2.862	2.862	2.874
Moisture Content (from Cuttings), %	31.7	37.6	34.1
Dry Density, pcf	88.1	83.1	84.6
Saturation (Wet Method), %	94.4	99.3	93.5
Void Ratio	0.898	1.01	0.978
Final			
Moisture Content, %	31.5	34.7	33.4
Dry Density, pcf	90.7	86.7	88.3
Cross-Sectional Area (Method A), in <sup>2</sup>	6.298	6.234	6.280
Saturation, %	100.0	100.0	100.0
Void Ratio	0.844	0.930	0.894
Back Pressure, %	43.99	49.99	58.99
Vertical Effective Consolidation Stress, psi	4.948	9.937	14.93
Horizontal Effective Consolidation Stress, psi	5.006	10.00	15.00
Vertical Strain after Consolidation, %	0.6291	0.9257	1.084
Volumetric Strain after Consolidation, %	2.452	3.597	4.317
Time to 50% Consolidation, min	0.0000	0.0000	0.0000
Shear Strength, psi	4.513	9.275	12.45
Strain at Failure, %	5.81	12.1	6.38
Strain Rate, %/min	0.07500	0.07500	0.07500
Deviator Stress at Failure, psi	9.025	18.55	24.90
Effective Minor Principal Stress at Failure, psi	2.673	6.220	8.056
Effective Major Principal Stress at Failure, psi	11.70	24.77	32.96
B-Value	0.95	0.95	0.95

Notes:  
 - Before Shear Saturation set to 100% for phase calculation.  
 - Moisture Content determined by ASTM D2216.  
 - Deviator Stress includes membrane correction.  
 - Values for c and φ determined from best-fit straight line for the specific test conditions.  
 Actual strength parameters may vary and should be determined by an engineer for site conditions.

	Project: SC-557	Location: Columbia, SC	Project No.: G4843
	Boring No.: AP-1	Tested By: WAP	Checked By: JFH/RS
	Sample No.: 18-1156	Test Date: 6/11/2018	Depth: 15' - 17'
	Test No.: ABC	Sample Type: Undisturbed	Elevation: --
	Description: Sandy SILT (ML/A-4(0)) LL: NP PL: NP PI: NP %#200 Finer: 58.6		
	Remarks:		

# CONSOLIDATED UNDRAINED TRIAXIAL TEST by AASHTO T297

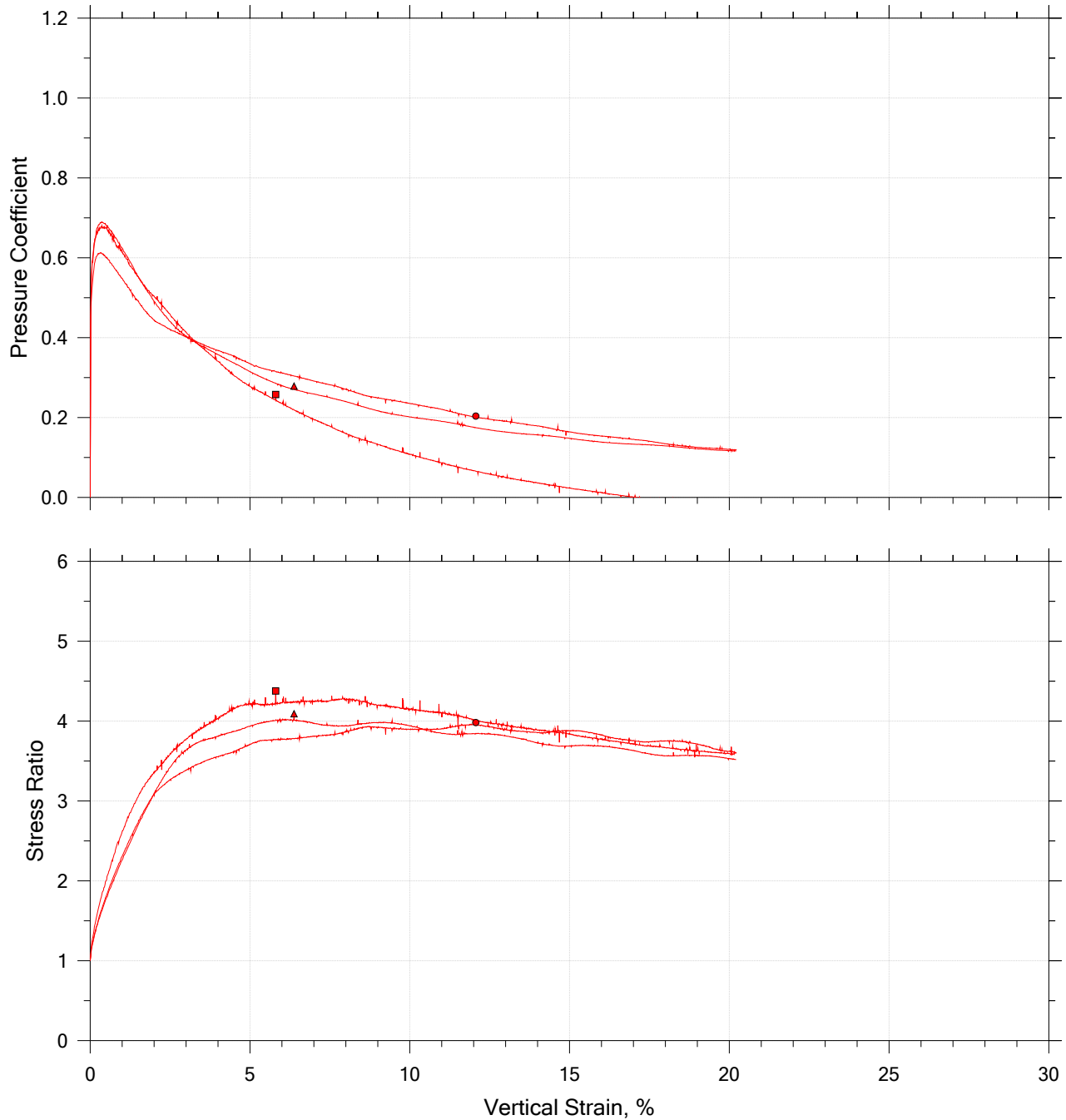


	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	18-1156	A	15' - 17'	WAP	6/11/2018	JFH/RS		AP-1_test A.dat
●	18-1156	B	15' - 17'	WAP	6/12/2018	JFH/RS		AP-1_test B.dat
▲	18-1156	C	15' - 17'	WAP	6/12/2018	JFH/RS		AP-1_test C.dat

	Project: SC-557	Location: Columbia, SC	Project No.: G4843
	Boring No.: AP-1	Tested By: WAP	Checked By: JFH/RS
	Sample No.: 18-1156	Test Date: 6/11/2018	Depth: 15' - 17'
	Test No.: ABC	Sample Type: Undisturbed	Elevation: --
	Description: Sandy SILT (ML/A-4(0)) LL: NP PL: NP PI: NP %#200 Finer: 58.6		
	Remarks:		



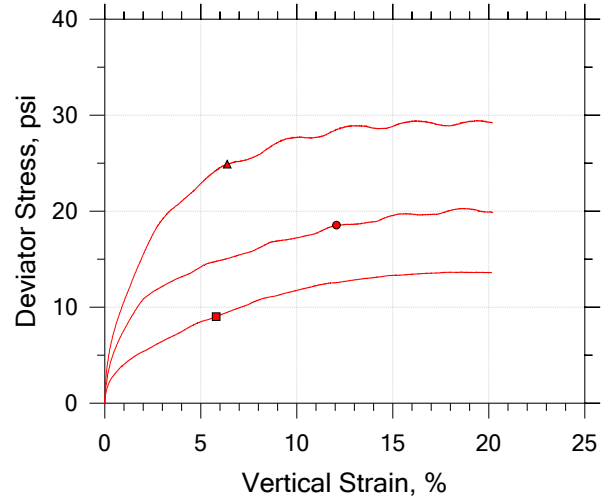
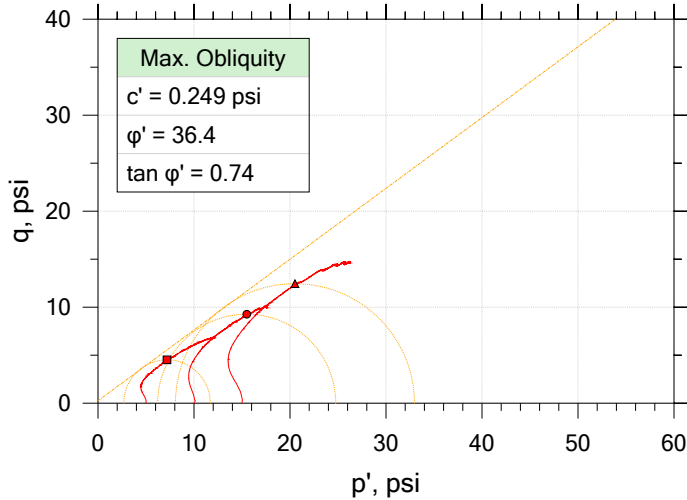
# CONSOLIDATED UNDRAINED TRIAXIAL TEST by AASHTO T297



	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	18-1156	A	15' - 17'	WAP	6/11/2018	JFH/RS		AP-1_test A.dat
●	18-1156	B	15' - 17'	WAP	6/12/2018	JFH/RS		AP-1_test B.dat
▲	18-1156	C	15' - 17'	WAP	6/12/2018	JFH/RS		AP-1_test C.dat

	Project: SC-557	Location: Columbia, SC	Project No.: G4843
	Boring No.: AP-1	Tested By: WAP	Checked By: JFH/RS
	Sample No.: 18-1156	Test Date: 6/11/2018	Depth: 15' - 17'
	Test No.: ABC	Sample Type: Undisturbed	Elevation: --
	Description: Sandy SILT (ML/A-4(0)) LL: NP PL: NP PI: NP %#200 Finer: 58.6		
	Remarks:		

# CONSOLIDATED UNDRAINED TRIAXIAL TEST by AASHTO T297

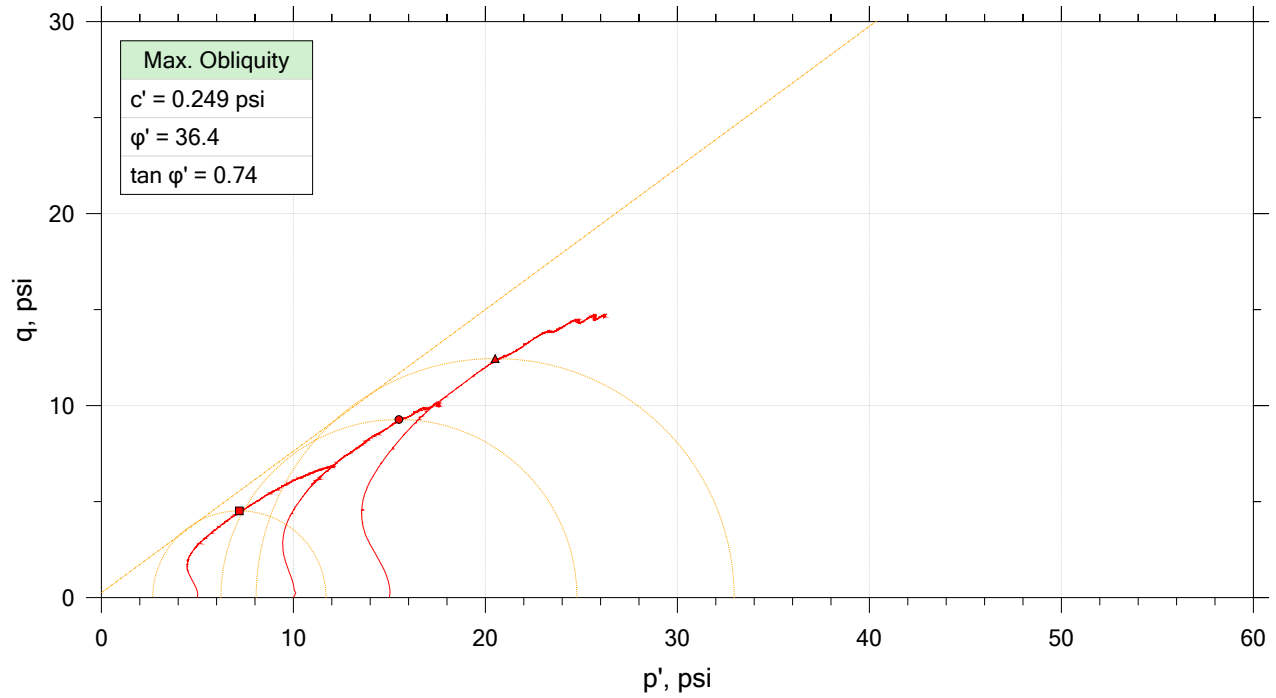
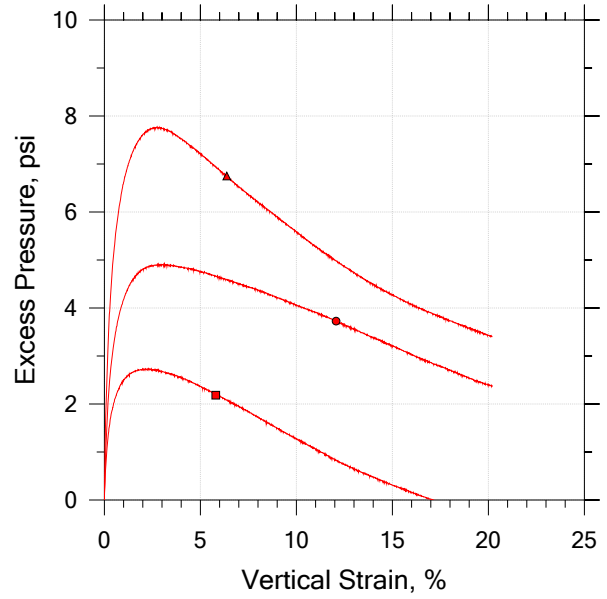
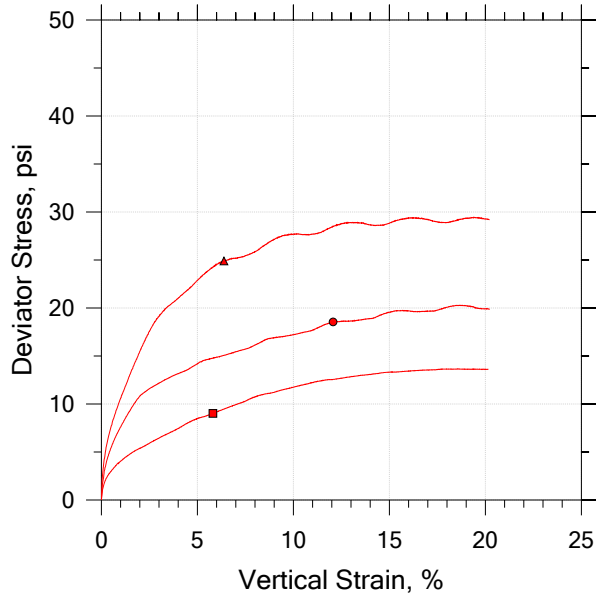


Symbol	■	●	▲
Sample ID	18-1156	18-1156	18-1156
Depth, ft	15' - 17'	15' - 17'	15' - 17'
Test Number	A	B	C
Initial			
Height, in	6.048	6.091	5.940
Diameter, in	2.862	2.862	2.874
Moisture Content (from Cuttings), %	31.7	37.6	34.1
Dry Density, pcf	88.1	83.1	84.6
Saturation (Wet Method), %	94.4	99.3	93.5
Void Ratio	0.898	1.01	0.978
Final			
Moisture Content, %	31.5	34.7	33.4
Dry Density, pcf	90.7	86.7	88.3
Cross-Sectional Area (Method A), in <sup>2</sup>	6.298	6.234	6.280
Saturation, %	100.0	100.0	100.0
Void Ratio	0.844	0.930	0.894
Back Pressure, %	43.99	49.99	58.99
Vertical Effective Consolidation Stress, psi	4.948	9.937	14.93
Horizontal Effective Consolidation Stress, psi	5.006	10.00	15.00
Vertical Strain after Consolidation, %	0.6291	0.9257	1.084
Volumetric Strain after Consolidation, %	2.452	3.597	4.317
Time to 50% Consolidation, min	0.0000	0.0000	0.0000
Shear Strength, psi	4.513	9.275	12.45
Strain at Failure, %	5.81	12.1	6.38
Strain Rate, %/min	0.07500	0.07500	0.07500
Deviator Stress at Failure, psi	9.025	18.55	24.90
Effective Minor Principal Stress at Failure, psi	2.673	6.220	8.056
Effective Major Principal Stress at Failure, psi	11.70	24.77	32.96
B-Value	0.95	0.95	0.95

Notes:  
 - Before Shear Saturation set to 100% for phase calculation.  
 - Moisture Content determined by ASTM D2216.  
 - Deviator Stress includes membrane correction.  
 - Values for c and  $\phi$  determined from best-fit straight line for the specific test conditions.  
 Actual strength parameters may vary and should be determined by an engineer for site conditions.

	Project: SC-557	Location: Columbia, SC	Project No.: G4843
	Boring No.: AP-1	Tested By: WAP	Checked By: JFH/RS
	Sample No.: 18-1156	Test Date: 6/11/2018	Depth: 15' - 17'
	Test No.: ABC	Sample Type: Undisturbed	Elevation: --
	Description: Sandy SILT (ML/A-4(0)) LL: NP PL: NP PI: NP %#200 Finer: 58.6		
	Remarks:		

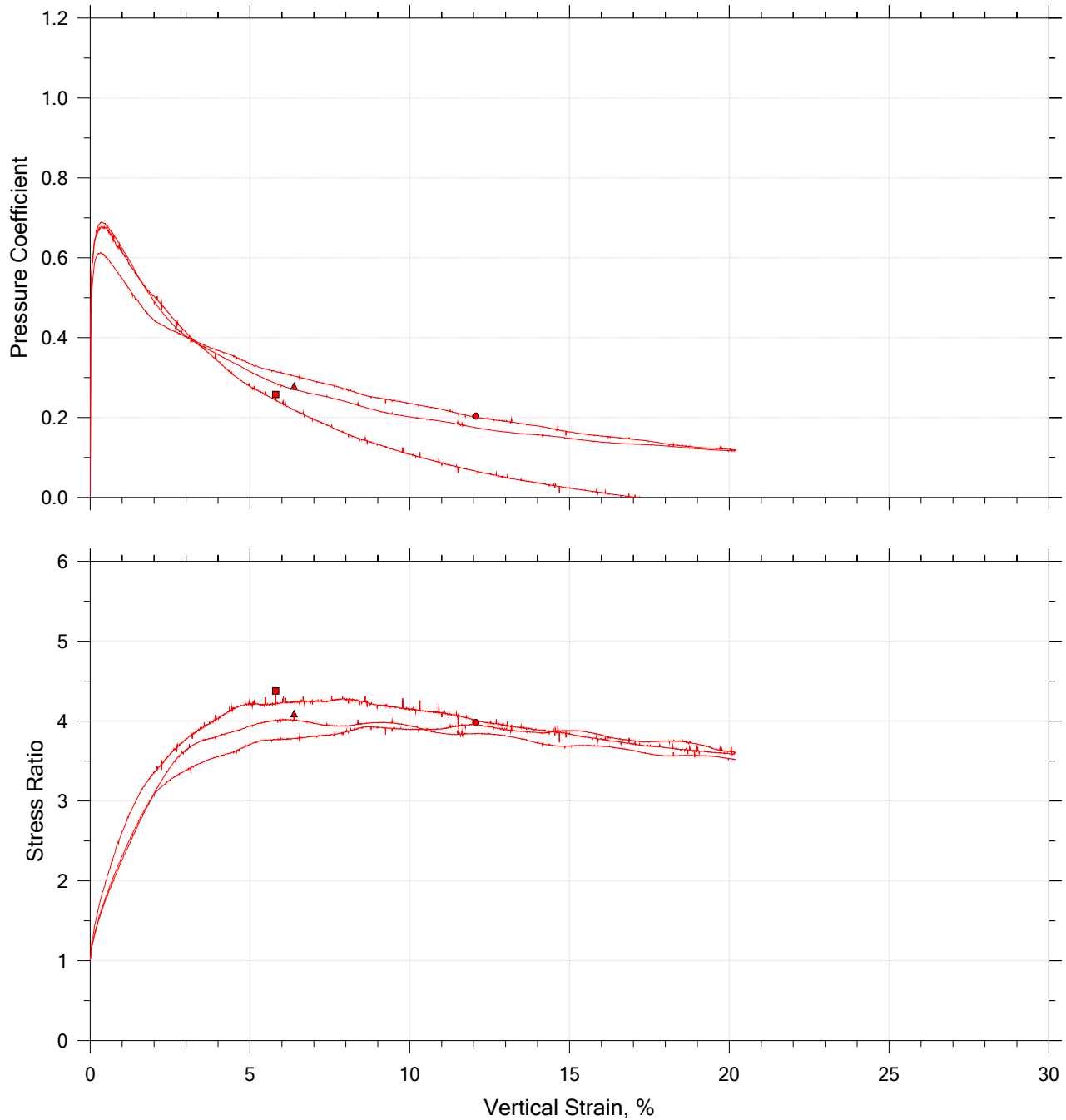
# CONSOLIDATED UNDRAINED TRIAXIAL TEST by AASHTO T297



	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	18-1156	A	15' - 17'	WAP	6/11/2018	JFH/RS		AP-1_test A.dat
●	18-1156	B	15' - 17'	WAP	6/12/2018	JFH/RS		AP-1_test B.dat
▲	18-1156	C	15' - 17'	WAP	6/12/2018	JFH/RS		AP-1_test C.dat

	Project: SC-557	Location: Columbia, SC	Project No.: G4843
	Boring No.: AP-1	Tested By: WAP	Checked By: JFH/RS
	Sample No.: 18-1156	Test Date: 6/11/2018	Depth: 15' - 17'
	Test No.: ABC	Sample Type: Undisturbed	Elevation: --
	Description: Sandy SILT (ML/A-4(0)) LL: NP PL: NP PI: NP %#200 Finer: 58.6		
	Remarks:		

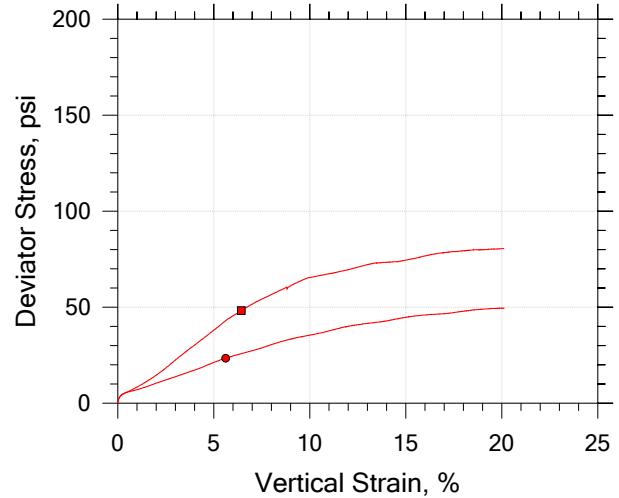
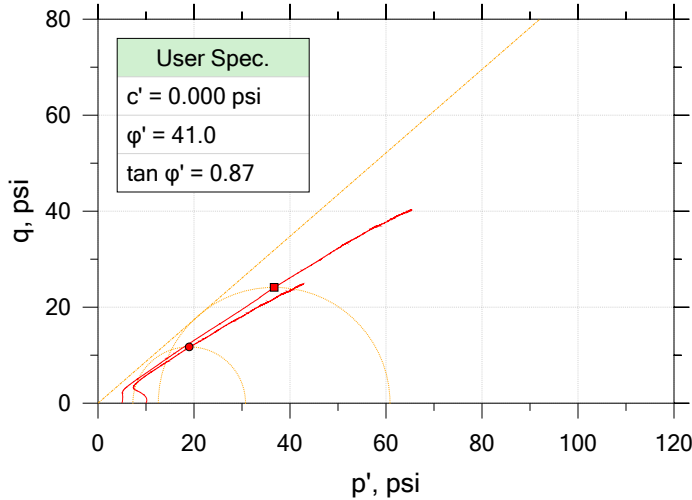
# CONSOLIDATED UNDRAINED TRIAXIAL TEST by AASHTO T297



	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	18-1156	A	15' - 17'	WAP	6/11/2018	JFH/RS		AP-1_test A.dat
●	18-1156	B	15' - 17'	WAP	6/12/2018	JFH/RS		AP-1_test B.dat
▲	18-1156	C	15' - 17'	WAP	6/12/2018	JFH/RS		AP-1_test C.dat

	Project: SC-557	Location: Columbia, SC	Project No.: G4843
	Boring No.: AP-1	Tested By: WAP	Checked By: JFH/RS
	Sample No.: 18-1156	Test Date: 6/11/2018	Depth: 15' - 17'
	Test No.: ABC	Sample Type: Undisturbed	Elevation: --
	Description: Sandy SILT (ML/A-4(0)) LL: NP PL: NP PI: NP %#200 Finer: 58.6		
	Remarks:		

# CONSOLIDATED UNDRAINED TRIAXIAL TEST by AASHTO T297

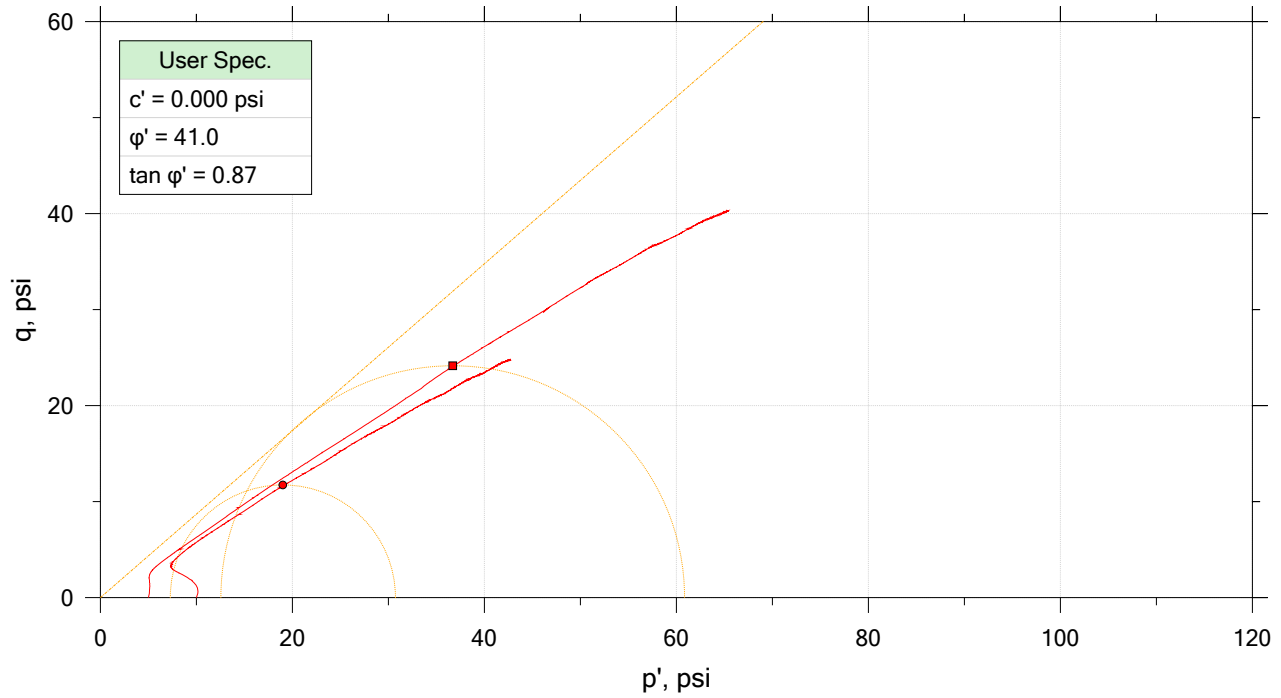
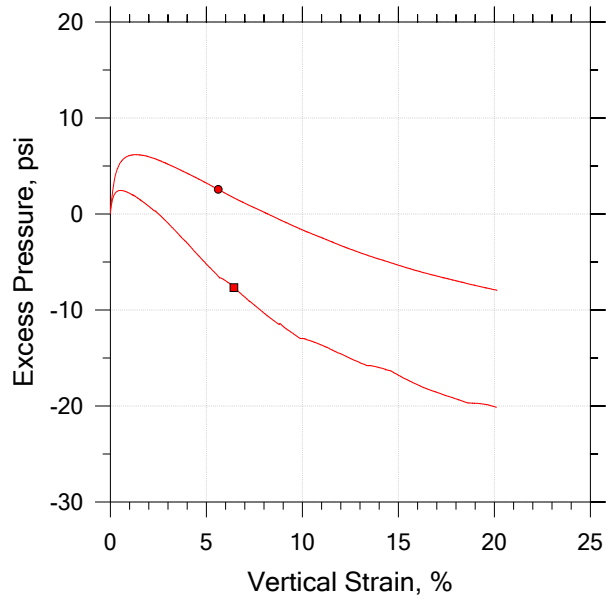
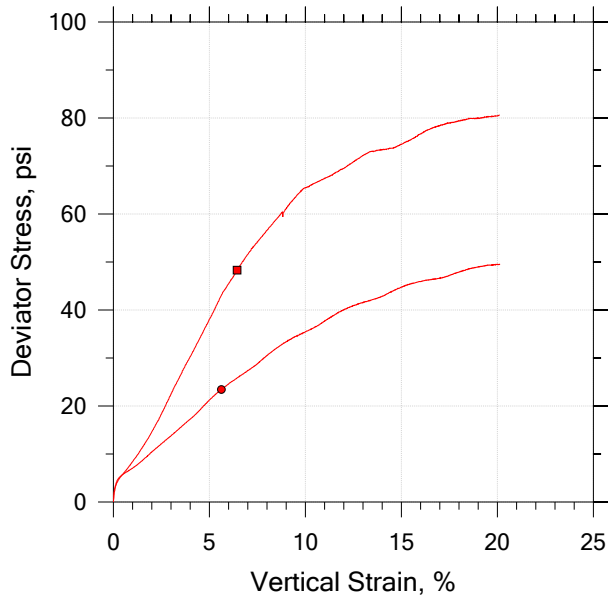


Symbol	■	●		
Sample ID	18-1096	18-1096		
Depth, ft	13' - 15'	13' - 15'		
Test Number	A	B		
Initial				
Height, in	6.000	6.000		
Diameter, in	2.800	2.800		
Moisture Content (from Cuttings), %	34.2	23.3		
Dry Density, pcf	100.	106.		
Saturation (Wet Method), %	137.8	107.9		
Void Ratio	0.666	0.578		
Final				
Moisture Content, %	23.6	20.0		
Dry Density, pcf	103.	109.		
Cross-Sectional Area (Method A), in <sup>2</sup>	6.067	6.038		
Saturation, %	100.0	100.0		
Void Ratio	0.632	0.537		
Back Pressure, %	31.99	83.00		
Vertical Effective Consolidation Stress, psi	4.977	9.960		
Horizontal Effective Consolidation Stress, psi	4.997	9.994		
Vertical Strain after Consolidation, %	0.1455	0.4473		
Volumetric Strain after Consolidation, %	0.7503	1.851		
Time to 50% Consolidation, min	0.0000	0.0000		
Shear Strength, psi	24.15	11.73		
Strain at Failure, %	6.44	5.62		
Strain Rate, %/min	0.07500	0.07500		
Deviator Stress at Failure, psi	48.29	23.45		
Effective Minor Principal Stress at Failure, psi	12.55	7.274		
Effective Major Principal Stress at Failure, psi	60.85	30.73		
B-Value	1.15	0.96		

Notes:  
 - Before Shear Saturation set to 100% for phase calculation.  
 - Moisture Content determined by ASTM D2216.  
 - Deviator Stress includes membrane correction.  
 - Values for  $c$  and  $\phi$  determined from best-fit straight line for the specific test conditions.  
 Actual strength parameters may vary and should be determined by an engineer for site conditions.

	Project: SC-557	Location: Columbia, SC	Project No.: G4843
	Boring No.: AP-2	Tested By: WAP	Checked By: JFH/RS
	Sample No.: 18-1096	Test Date: 6/13/2018	Depth: 13' - 15'
	Test No.: AB	Sample Type: Undisturbed	Elevation: --
	Description: Silty Fine SAND (SM/A-4(0)) LL: NP PL: NP PI: NP % #200 Finer: 38.3		
	Remarks:		

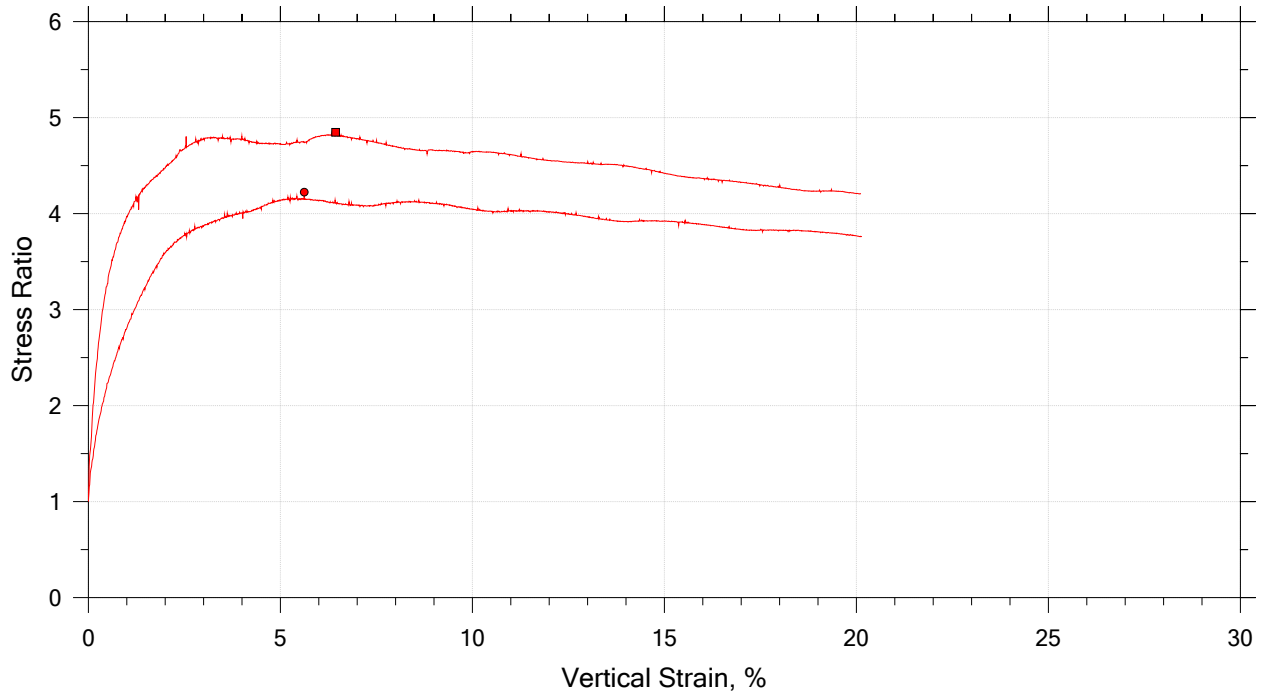
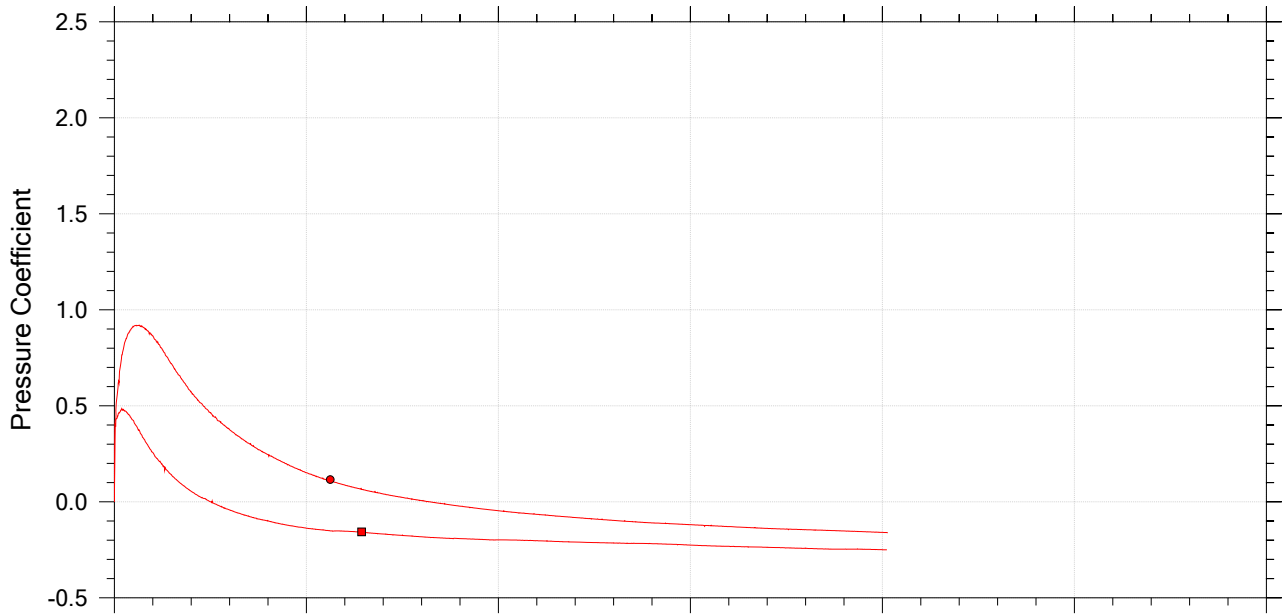
# CONSOLIDATED UNDRAINED TRIAXIAL TEST by AASHTO T297



	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	18-1096	A	13' - 15'	WAP	6/13/2018	JFH/RS		AP-2_test A.dat
●	18-1096	B	13' - 15'	WAP	6/14/2018	JFH/RS		AP-2_test B.dat

	Project: SC-557	Location: Columbia, SC	Project No.: G4843
	Boring No.: AP-2	Tested By: WAP	Checked By: JFH/RS
	Sample No.: 18-1096	Test Date: 6/13/2018	Depth: 13' - 15'
	Test No.: AB	Sample Type: Undisturbed	Elevation: --
	Description: Silty Fine SAND (SM/A-4(0)) LL: NP PL: NP PI: NP % #200 Finer: 38.3		
	Remarks:		

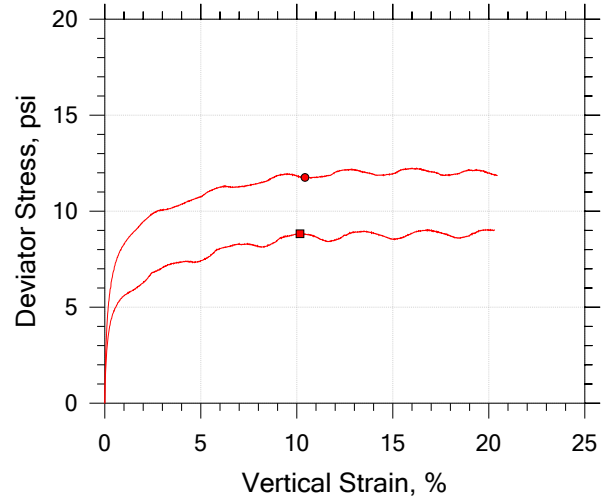
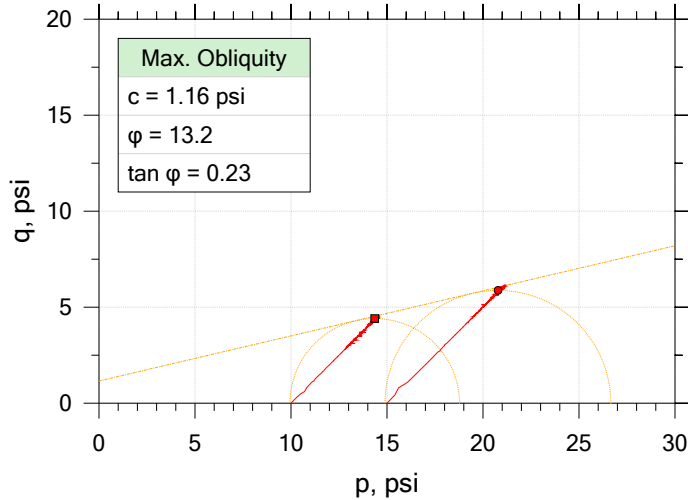
# CONSOLIDATED UNDRAINED TRIAXIAL TEST by AASHTO T297



	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	18-1096	A	13' - 15'	WAP	6/13/2018	JFH/RS		AP-2_test A.dat
●	18-1096	B	13' - 15'	WAP	6/14/2018	JFH/RS		AP-2_test B.dat

	Project: SC-557	Location: Columbia, SC	Project No.: G4843
	Boring No.: AP-2	Tested By: WAP	Checked By: JFH/RS
	Sample No.: 18-1096	Test Date: 6/13/2018	Depth: 13' - 15'
	Test No.: AB	Sample Type: Undisturbed	Elevation: --
	Description: Silty Fine SAND (SM/A-4(0)) LL: NP PL: NP PI: NP %#200 Finer: 38.3		
Remarks:			

# CONSOLIDATED UNDRAINED TRIAXIAL TEST by AASHTO T297



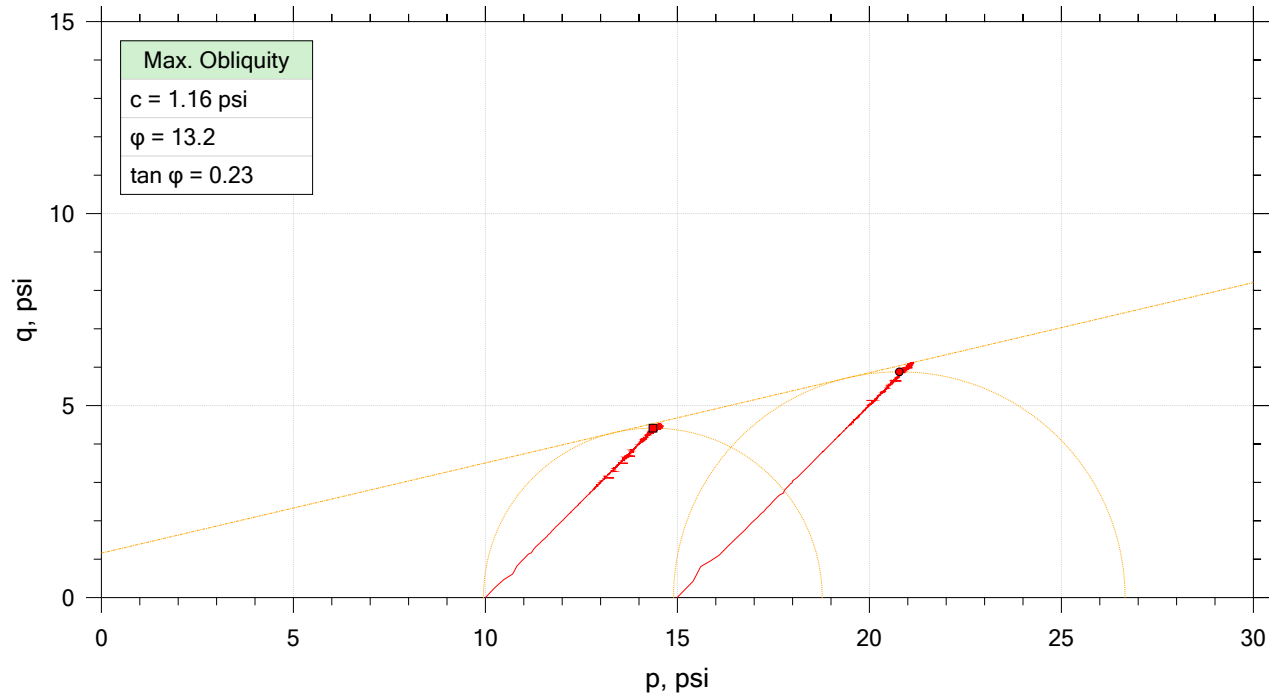
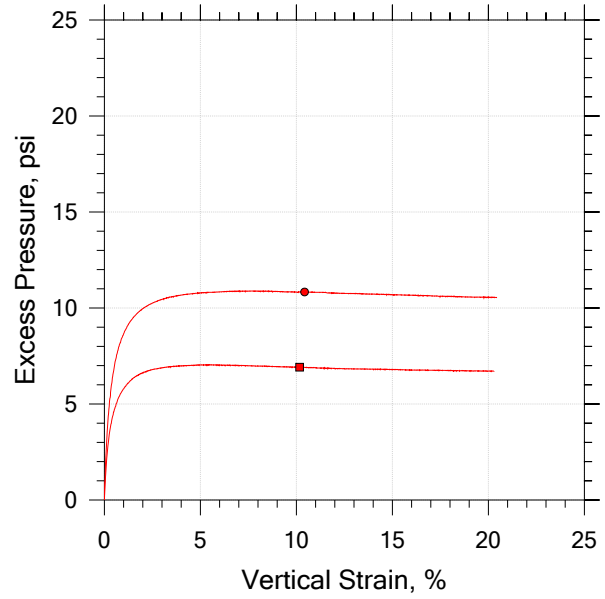
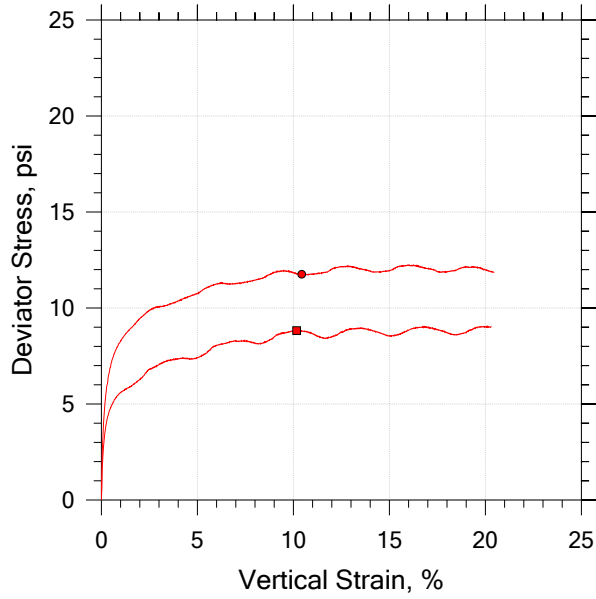
Symbol	■	●		
Sample ID	18-1112	18-1112		
Depth, ft	4' - 6'	4' - 6'		
Test Number	A	B		
Initial				
Height, in	6.000	6.000		
Diameter, in	2.800	2.800		
Moisture Content (from Cuttings), %	43.1	29.0		
Dry Density, pcf	74.3	83.5		
Saturation (Wet Method), %	92.2	77.5		
Void Ratio	1.25	1.00		
Final				
Moisture Content, %	42.4	32.0		
Dry Density, pcf	78.3	90.0		
Cross-Sectional Area (Method A), in <sup>2</sup>	5.931	5.842		
Saturation, %	100.0	100.0		
Void Ratio	1.14	0.858		
Back Pressure, %	101.0	101.0		
Vertical Effective Consolidation Stress, psi	9.921	14.88		
Horizontal Effective Consolidation Stress, psi	9.999	14.99		
Vertical Strain after Consolidation, %	1.149	1.813		
Volumetric Strain after Consolidation, %	4.202	6.083		
Time to 50% Consolidation, min	0.0000	0.0000		
Shear Strength, psi	4.412	5.879		
Strain at Failure, %	10.2	10.4		
Strain Rate, %/min	0.07500	0.07500		
Deviator Stress at Failure, psi	8.823	11.76		
Effective Minor Principal Stress at Failure, psi	3.030	4.063		
Effective Major Principal Stress at Failure, psi	11.85	15.82		
B-Value	0.95	0.96		

Notes:  
 - Before Shear Saturation set to 100% for phase calculation.  
 - Moisture Content determined by ASTM D2216.  
 - Deviator Stress includes membrane correction.  
 - Values for c and  $\phi$  determined from best-fit straight line for the specific test conditions.  
 Actual strength parameters may vary and should be determined by an engineer for site conditions.

	Project: SC-557	Location: Columbia, SC	Project No.: G4843
	Boring No.: AP-3	Tested By: WAP	Checked By: JFH/RS
	Sample No.: 18-1112	Test Date: 6/15/2018	Depth: 4' - 6'
	Test No.: AB	Sample Type: Undisturbed	Elevation: --
	Description: Sandy SILT (ML/A-4(4)) LL: NP PL: NP PI: NP %#200 Finer: 67.2		
	Remarks:		



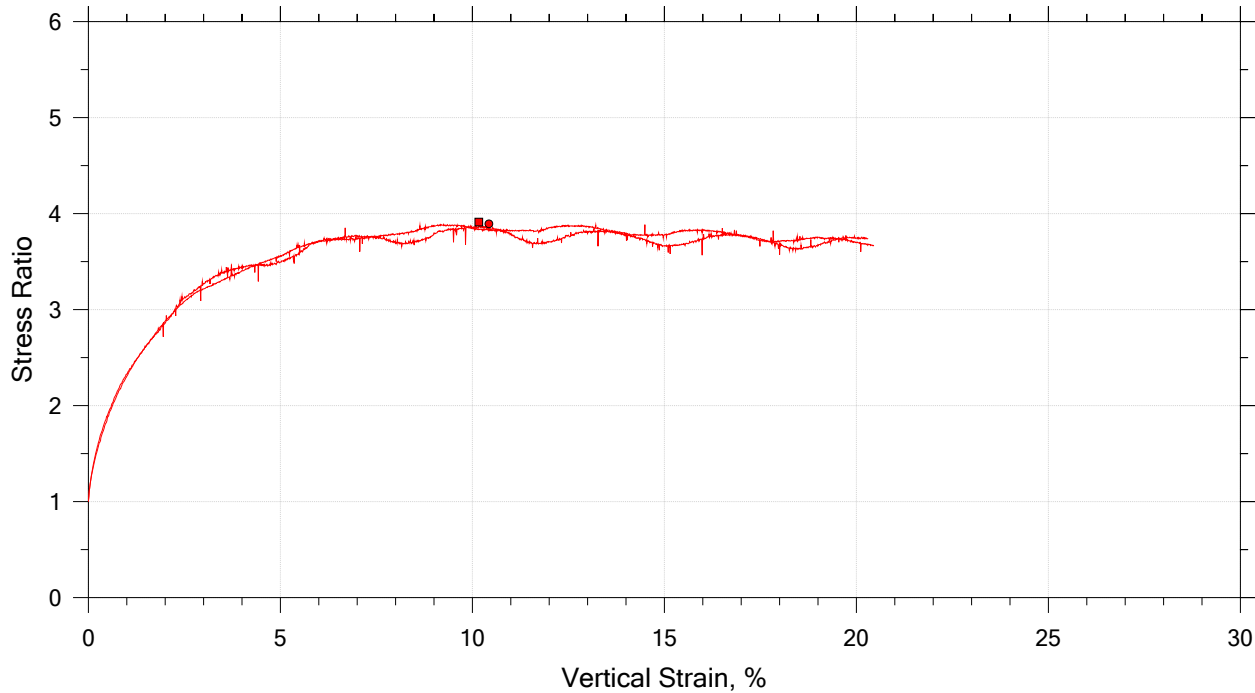
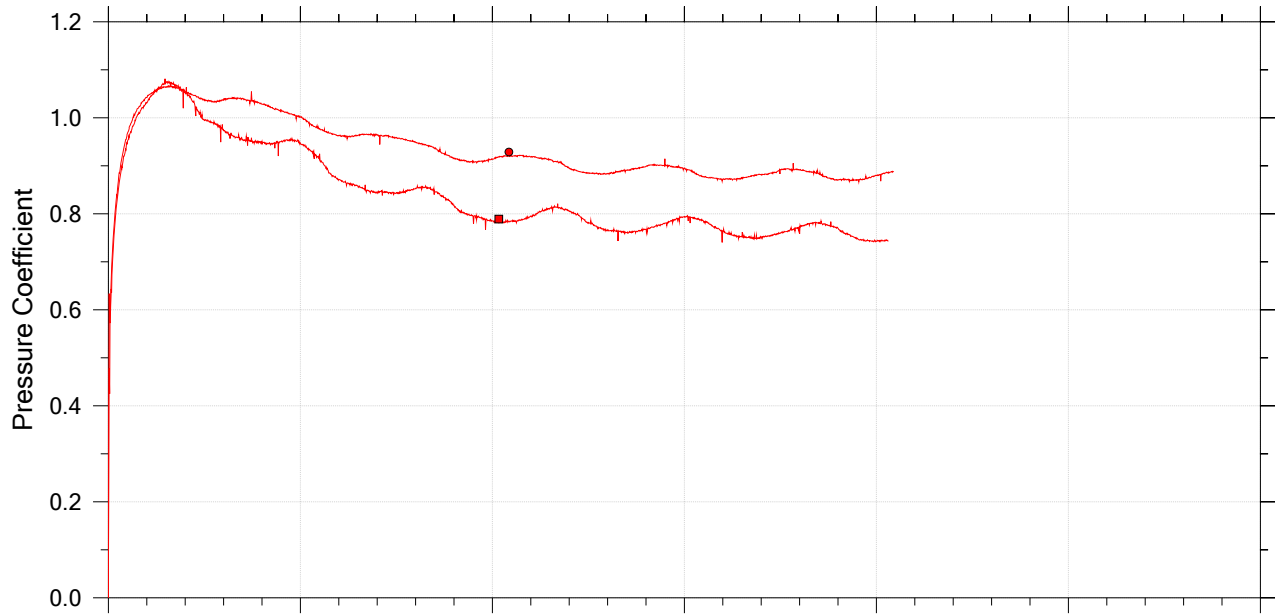
# CONSOLIDATED UNDRAINED TRIAXIAL TEST by AASHTO T297



Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■ 18-1112	A	4' - 6'	WAP	6/15/2018	JFH/RS		AP-3 at B-8_Test A.dat
● 18-1112	B	4' - 6'	WAP	6/16/2018	JFH/RS		AP-3 at B-8_Test B.dat

	Project: SC-557	Location: Columbia, SC	Project No.: G4843
	Boring No.: AP-3	Tested By: WAP	Checked By: JFH/RS
	Sample No.: 18-1112	Test Date: 6/15/2018	Depth: 4' - 6'
	Test No.: AB	Sample Type: Undisturbed	Elevation: --
	Description: Sandy SILT (ML/A-4(4)) LL: NP PL: NP PI: NP %\#200 Finer: 67.2		
	Remarks:		

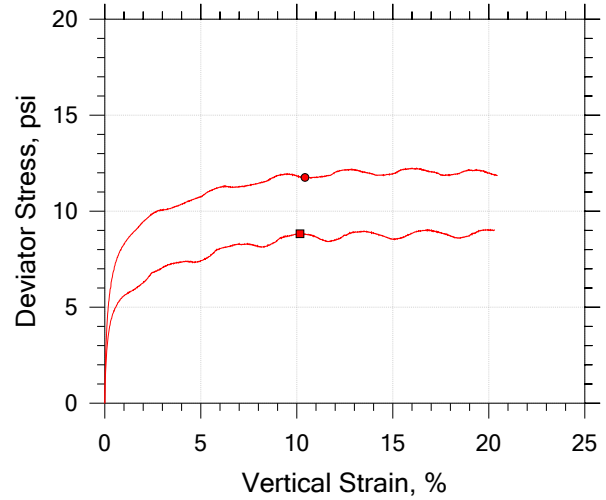
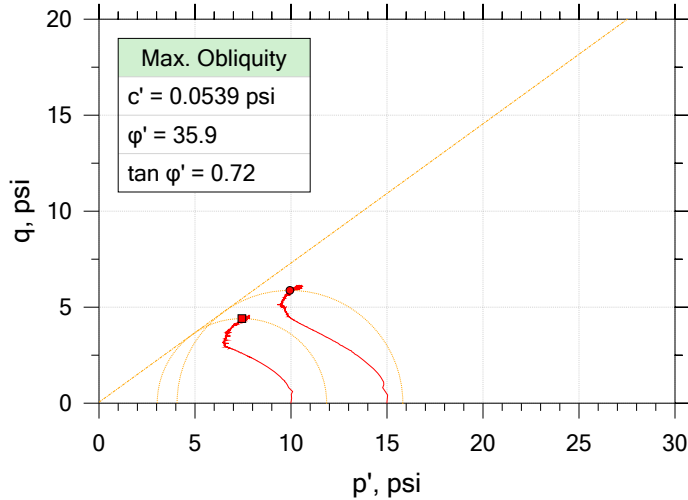
# CONSOLIDATED UNDRAINED TRIAXIAL TEST by AASHTO T297



	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	18-1112	A	4' - 6'	WAP	6/15/2018	JFH/RS		AP-3 at B-8_Test A.dat
●	18-1112	B	4' - 6'	WAP	6/16/2018	JFH/RS		AP-3 at B-8_Test B.dat

	Project: SC-557	Location: Columbia, SC	Project No.: G4843
	Boring No.: AP-3	Tested By: WAP	Checked By: JFH/RS
	Sample No.: 18-1112	Test Date: 6/15/2018	Depth: 4' - 6'
	Test No.: AB	Sample Type: Undisturbed	Elevation: --
	Description: Sandy SILT (ML/A-4(4)) LL: NP PL: NP PI: NP %#200 Finer: 67.2		
	Remarks:		

# CONSOLIDATED UNDRAINED TRIAXIAL TEST by AASHTO T297

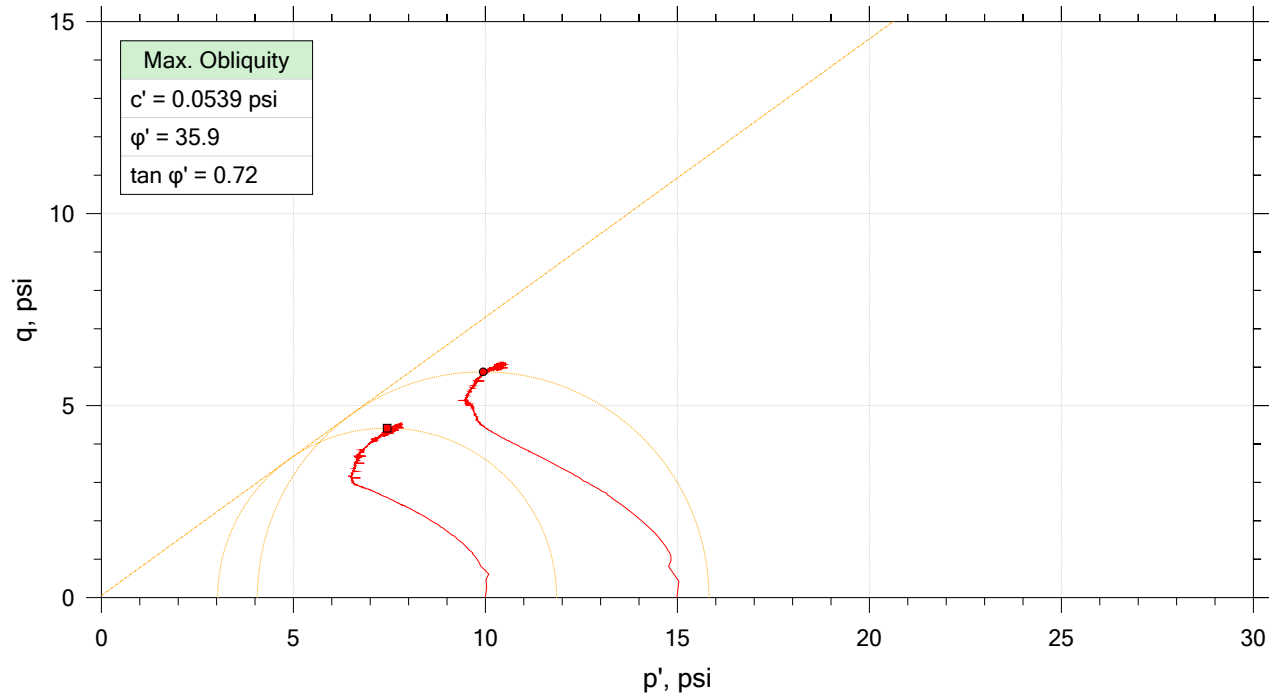
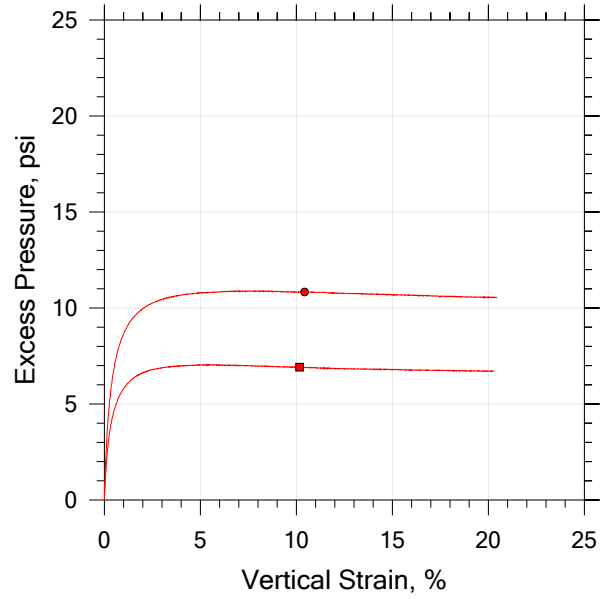
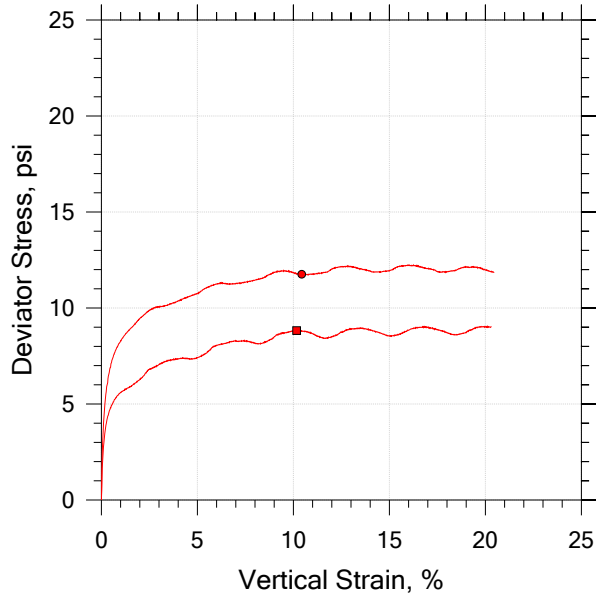


Symbol	■	●		
Sample ID	18-1112	18-1112		
Depth, ft	4' - 6'	4' - 6'		
Test Number	A	B		
Initial				
Height, in	6.000	6.000		
Diameter, in	2.800	2.800		
Moisture Content (from Cuttings), %	43.1	29.0		
Dry Density, pcf	74.3	83.5		
Saturation (Wet Method), %	92.2	77.5		
Void Ratio	1.25	1.00		
Final				
Moisture Content, %	42.4	32.0		
Dry Density, pcf	78.3	90.0		
Cross-Sectional Area (Method A), in <sup>2</sup>	5.931	5.842		
Saturation, %	100.0	100.0		
Void Ratio	1.14	0.858		
Back Pressure, %	101.0	101.0		
Vertical Effective Consolidation Stress, psi	9.921	14.88		
Horizontal Effective Consolidation Stress, psi	9.999	14.99		
Vertical Strain after Consolidation, %	1.149	1.813		
Volumetric Strain after Consolidation, %	4.202	6.083		
Time to 50% Consolidation, min	0.0000	0.0000		
Shear Strength, psi	4.412	5.879		
Strain at Failure, %	10.2	10.4		
Strain Rate, %/min	0.07500	0.07500		
Deviator Stress at Failure, psi	8.823	11.76		
Effective Minor Principal Stress at Failure, psi	3.030	4.063		
Effective Major Principal Stress at Failure, psi	11.85	15.82		
B-Value	0.95	0.96		

Notes:  
 - Before Shear Saturation set to 100% for phase calculation.  
 - Moisture Content determined by ASTM D2216.  
 - Deviator Stress includes membrane correction.  
 - Values for  $c$  and  $\phi$  determined from best-fit straight line for the specific test conditions.  
 Actual strength parameters may vary and should be determined by an engineer for site conditions.

	Project: SC-557	Location: Columbia, SC	Project No.: G4843
	Boring No.: AP-3	Tested By: WAP	Checked By: JFH/RS
	Sample No.: 18-1112	Test Date: 6/15/2018	Depth: 4' - 6'
	Test No.: AB	Sample Type: Undisturbed	Elevation: --
	Description: Sandy SILT (ML/A-4(4)) LL: NP PL: NP PI: NP %#200 Finer: 67.2		
	Remarks:		

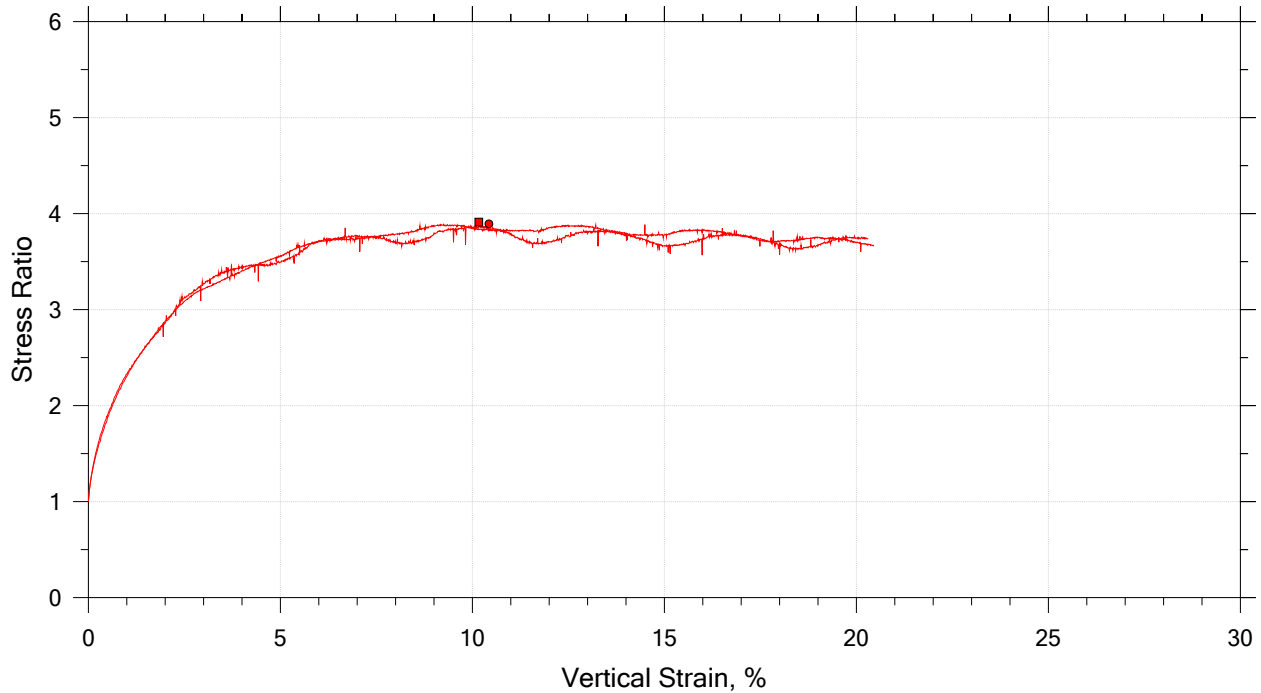
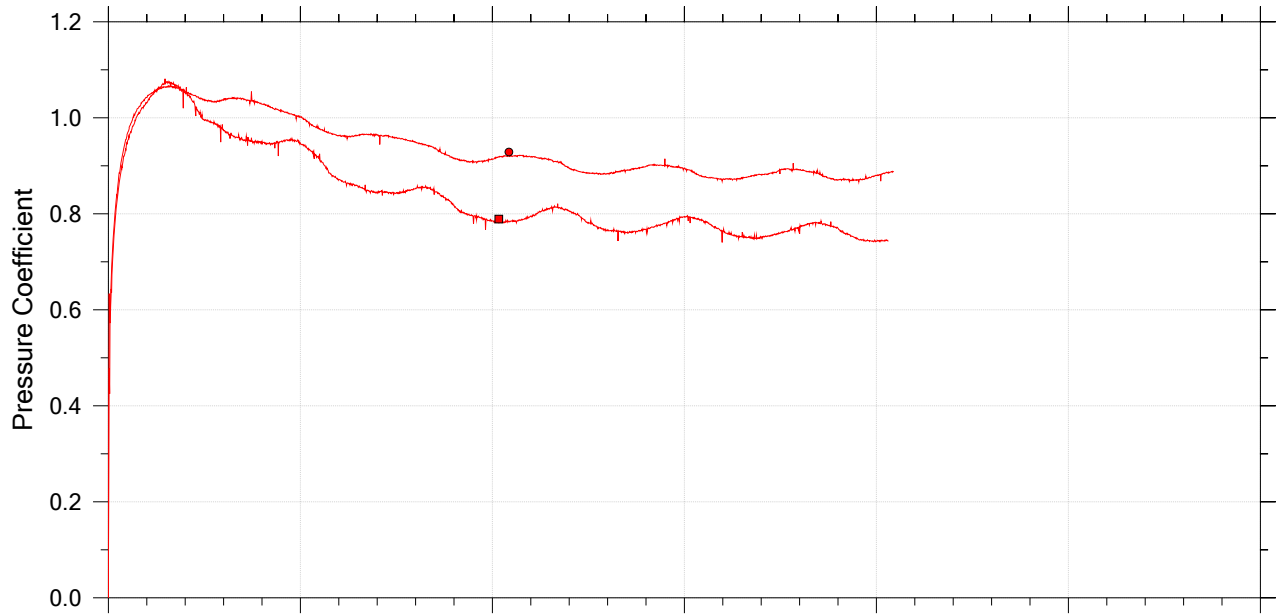
# CONSOLIDATED UNDRAINED TRIAXIAL TEST by AASHTO T297



Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■ 18-1112	A	4' - 6'	WAP	6/15/2018	JFH/RS		AP-3 at B-8_Test A.dat
● 18-1112	B	4' - 6'	WAP	6/16/2018	JFH/RS		AP-3 at B-8_Test B.dat

	Project: SC-557	Location: Columbia, SC	Project No.: G4843
	Boring No.: AP-3	Tested By: WAP	Checked By: JFH/RS
	Sample No.: 18-1112	Test Date: 6/15/2018	Depth: 4' - 6'
	Test No.: AB	Sample Type: Undisturbed	Elevation: --
	Description: Sandy SILT (ML/A-4(4)) LL: NP PL: NP PI: NP %\#200 Finer: 67.2		
	Remarks:		

# CONSOLIDATED UNDRAINED TRIAXIAL TEST by AASHTO T297

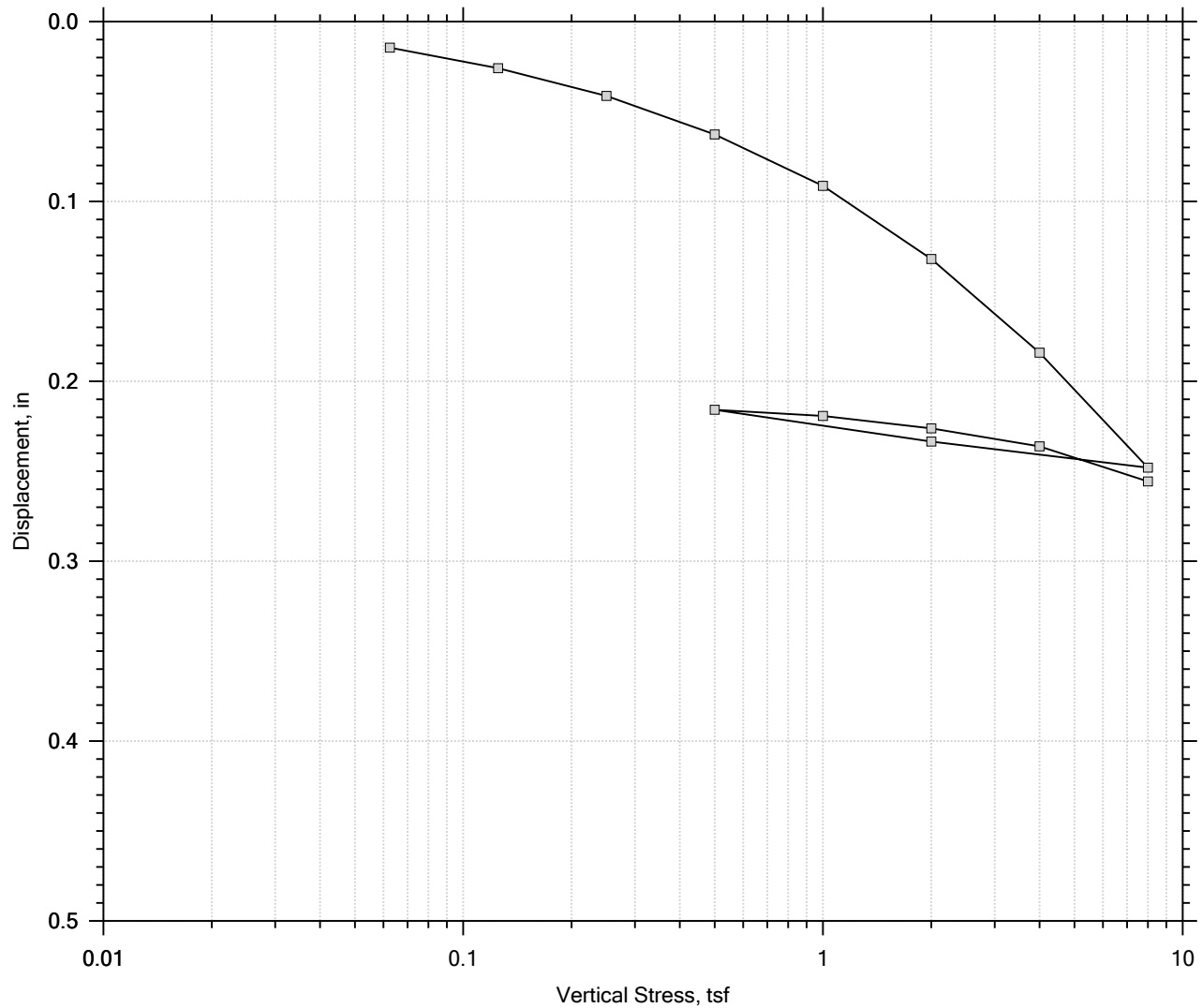


	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	18-1112	A	4' - 6'	WAP	6/15/2018	JFH/RS		AP-3 at B-8_Test A.dat
●	18-1112	B	4' - 6'	WAP	6/16/2018	JFH/RS		AP-3 at B-8_Test B.dat

	Project: SC-557	Location: Columbia, SC	Project No.: G4843
	Boring No.: AP-3	Tested By: WAP	Checked By: JFH/RS
	Sample No.: 18-1112	Test Date: 6/15/2018	Depth: 4' - 6'
	Test No.: AB	Sample Type: Undisturbed	Elevation: --
	Description: Sandy SILT (ML/A-4(4)) LL: NP PL: NP PI: NP %#200 Finer: 67.2		
	Remarks:		

# One-Dimensional Consolidation by ASTM D2435 - Method A

## Summary Report

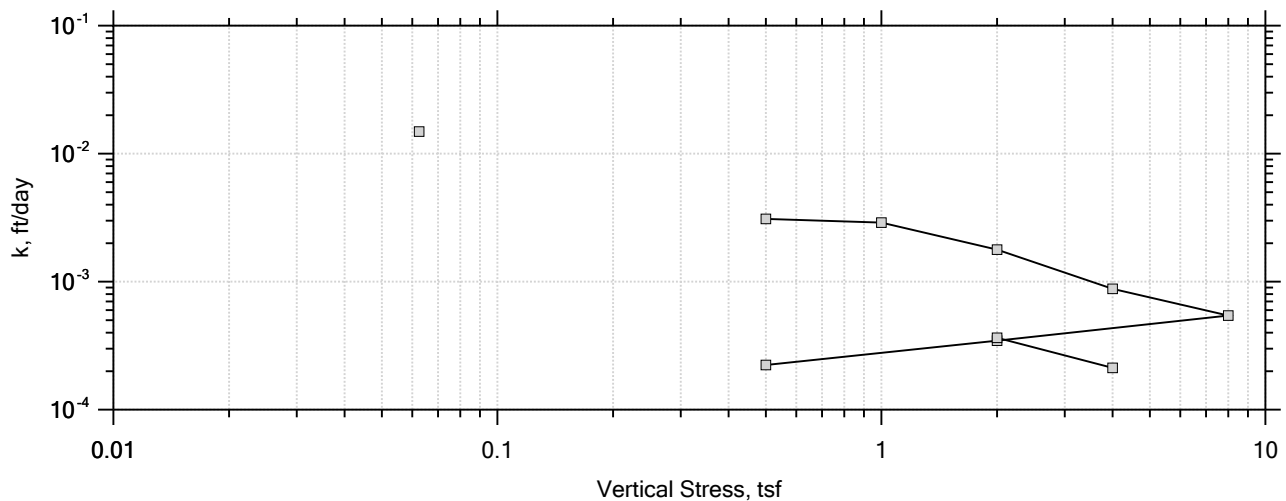
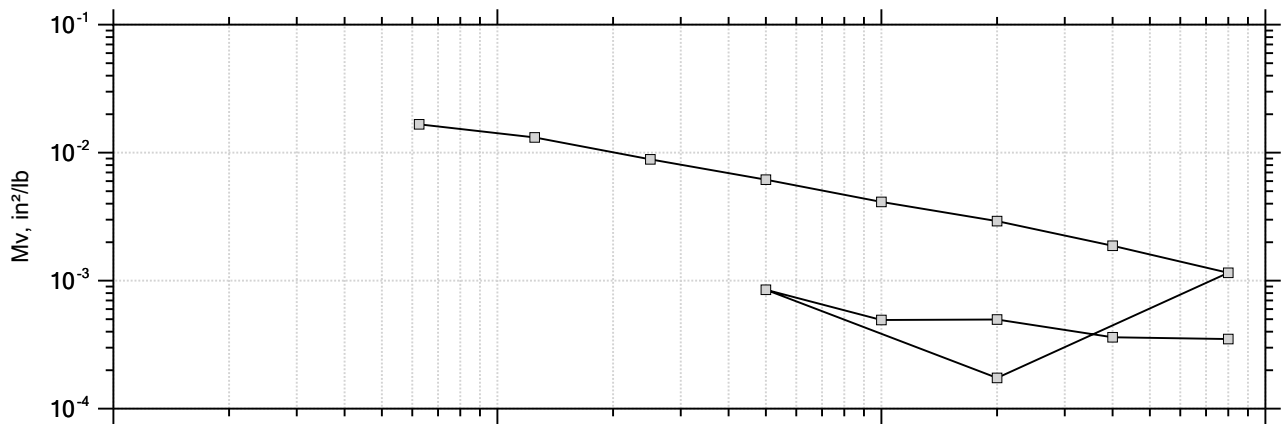
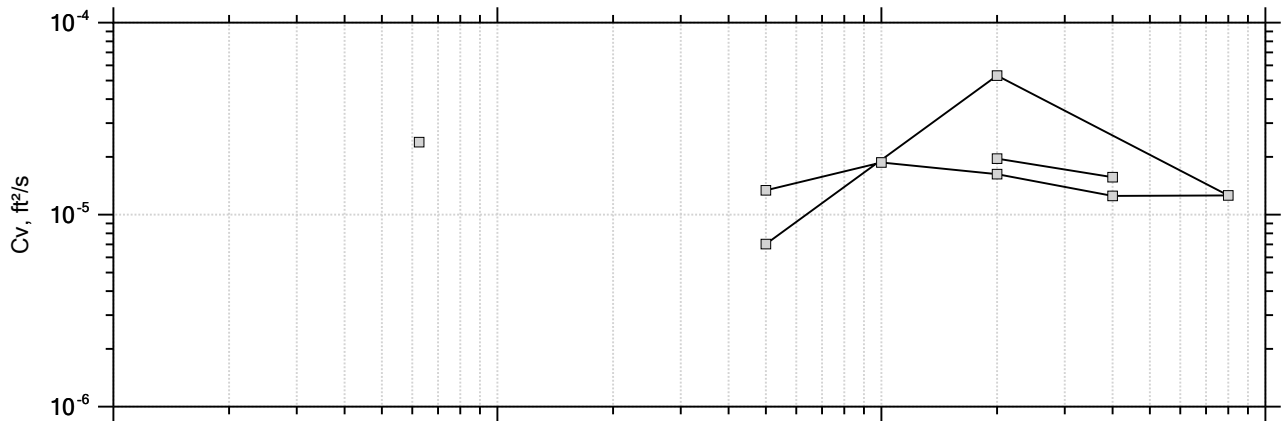



				Before Test	After Test	
Current Vertical Effective Stress: 0 tsf				Water Content, %	48.35	36.26
Preconsolidation Stress: 0 tsf				Dry Unit Weight, pcf	71.941	82.218
Compression Ratio: 0				Saturation, %	98.60	94.94
Diameter: 2.5 in		Height: 1 in		Void Ratio	1.30	1.01
LL: 34	PL: 26	PI: 8	GS: 2.65			

	Project: SC-557	Location: York County	Project No.: G4843
	Boring No.: AP-3	Tested By: WAP	Checked By: RS/JFH
	Sample No.: 1	Test Date: 06/22/2018	Depth: 4.0' - 6.0'
	Test No.: A	Sample Type: Undisturbed	Elevation: --
	Description: Sandy SILT (ML/A-4(4))		
	Remarks:		
Displacement at End of Increment			

# One-Dimensional Consolidation by ASTM D2435 - Method A

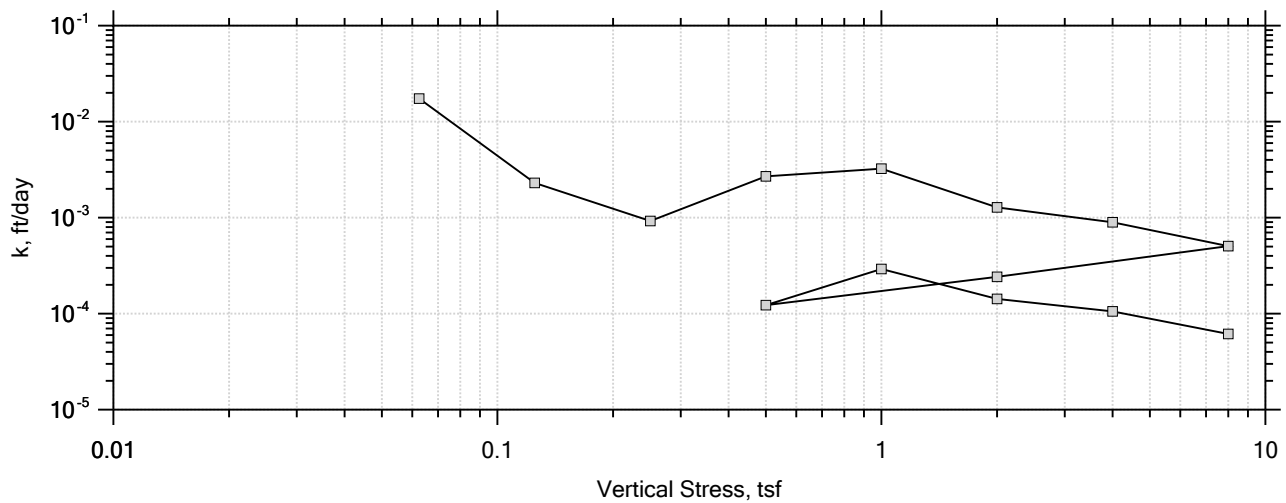
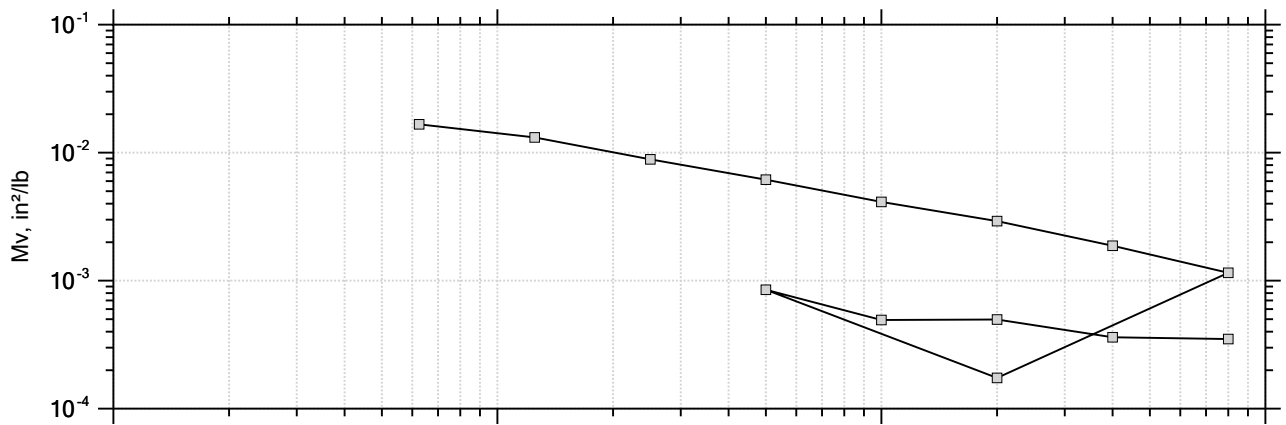
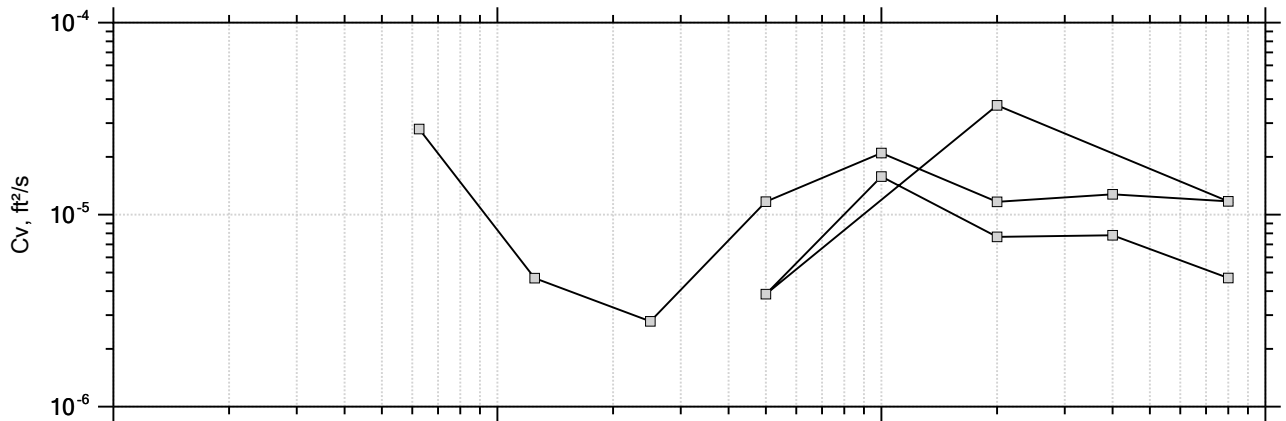
## Log of Time Coefficients




	Project: SC-557	Location: York County	Project No.: G4843
	Boring No.: AP-3	Tested By: WAP	Checked By: RS/JFH
	Sample No.: 1	Test Date: 06/22/2018	Depth: 4.0' - 6.0'
	Test No.: A	Sample Type: Undisturbed	Elevation: --
	Description: Sandy SILT (ML/A-4(4))		
	Remarks:		

# One-Dimensional Consolidation by ASTM D2435 - Method A

## Square Root of Time Coefficients

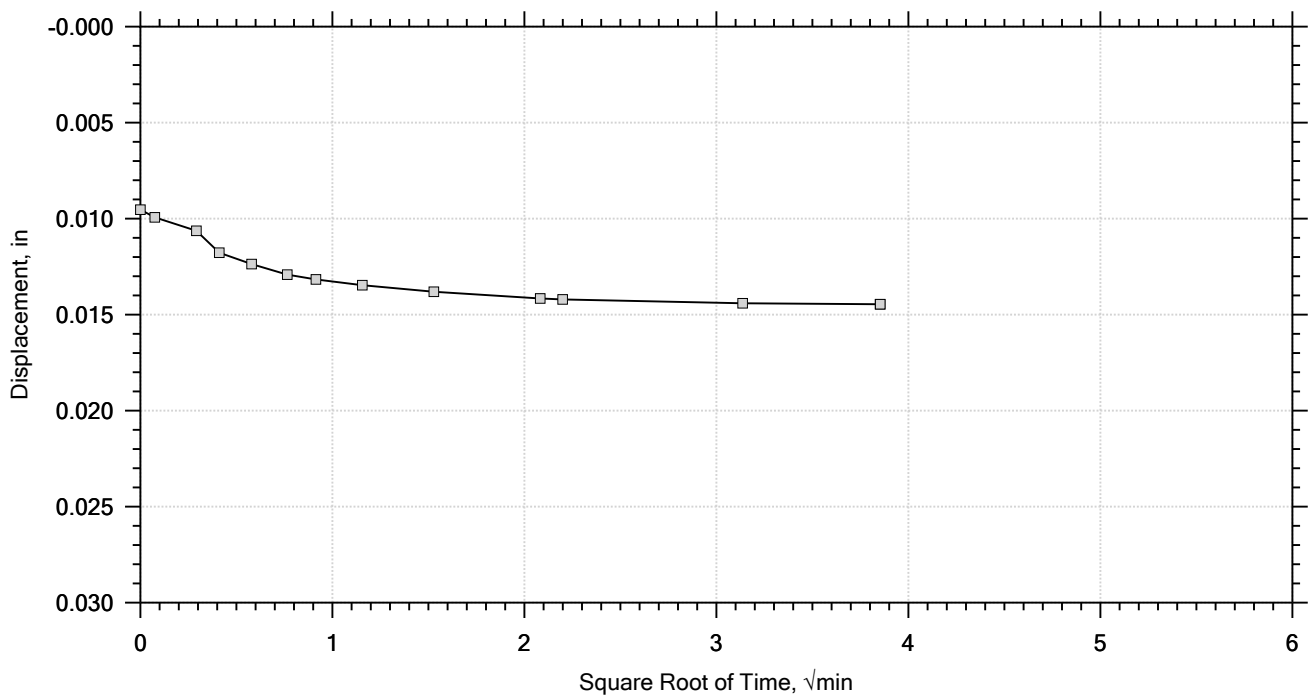
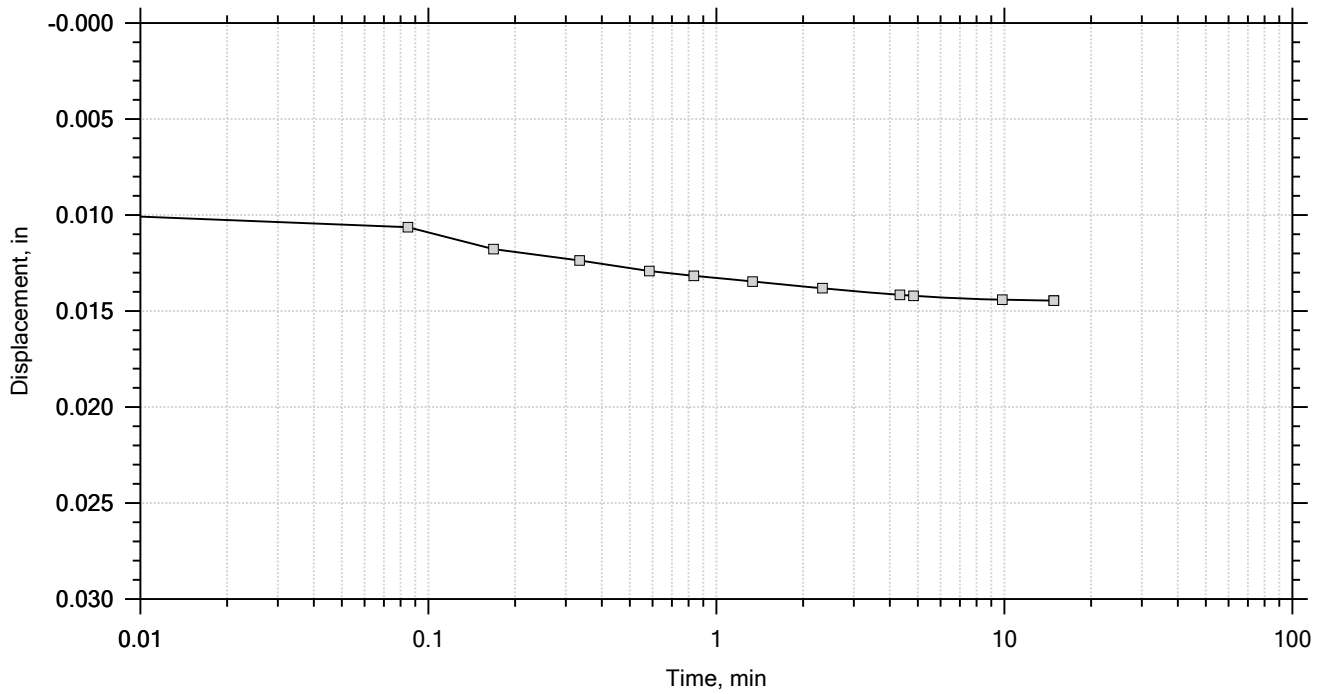


	Project: SC-557	Location: York County	Project No.: G4843
	Boring No.: AP-3	Tested By: WAP	Checked By: RS/JFH
	Sample No.: 1	Test Date: 06/22/2018	Depth: 4.0' - 6.0'
	Test No.: A	Sample Type: Undisturbed	Elevation: --
	Description: Sandy SILT (ML/A-4(4))		
	Remarks:		



# One-Dimensional Consolidation by ASTM D2435 - Method A

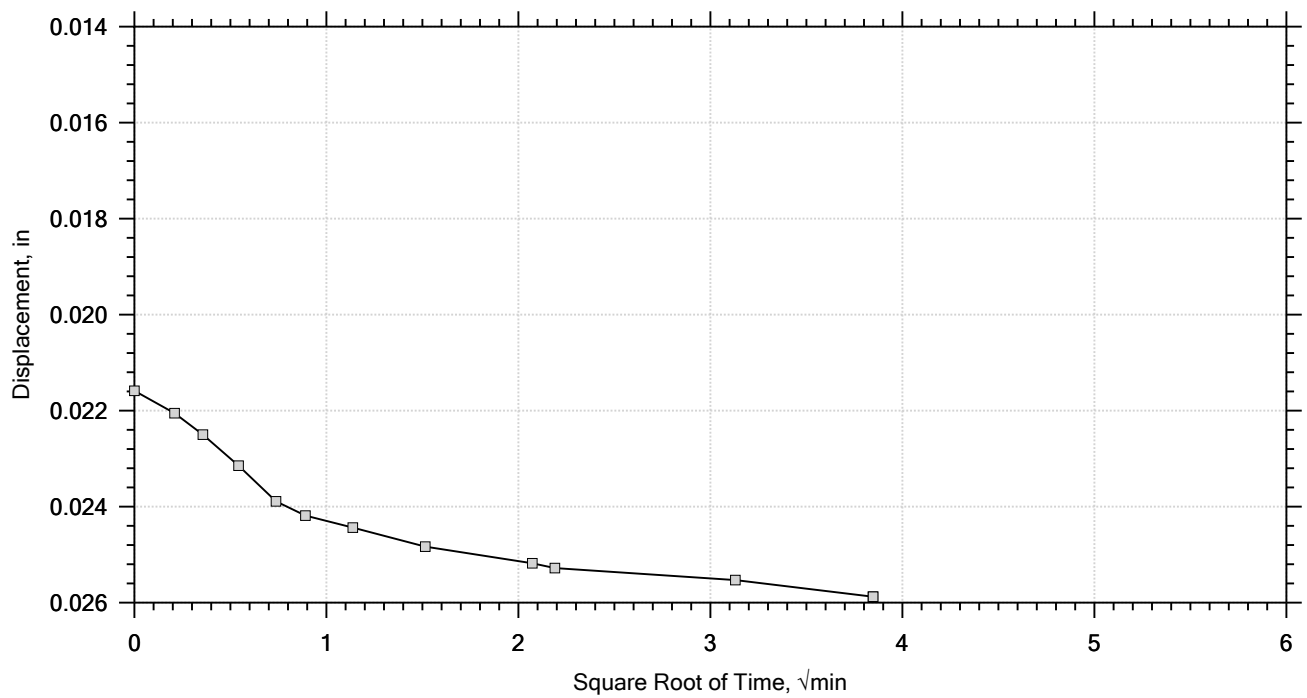
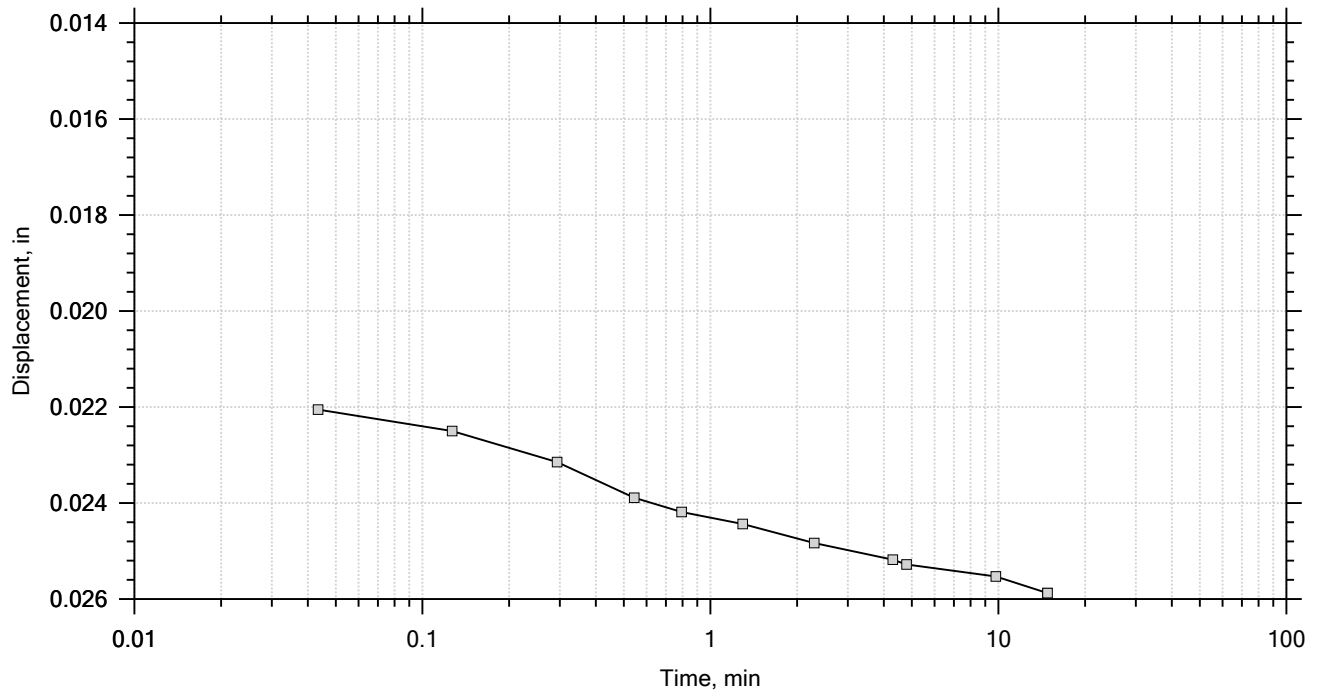
Time Curve 1 of 14  
 Constant Load Step  
 Stress: 0.0625 tsf



	Project: SC-557	Location: York County	Project No.: G4843
	Boring No.: AP-3	Tested By: WAP	Checked By: RS/JFH
	Sample No.: 1	Test Date: 06/22/2018	Depth: 4.0' - 6.0'
	Test No.: A	Sample Type: Undisturbed	Elevation: --
	Description: Sandy SILT (ML/A-4(4))		
	Remarks:		

# One-Dimensional Consolidation by ASTM D2435 - Method A

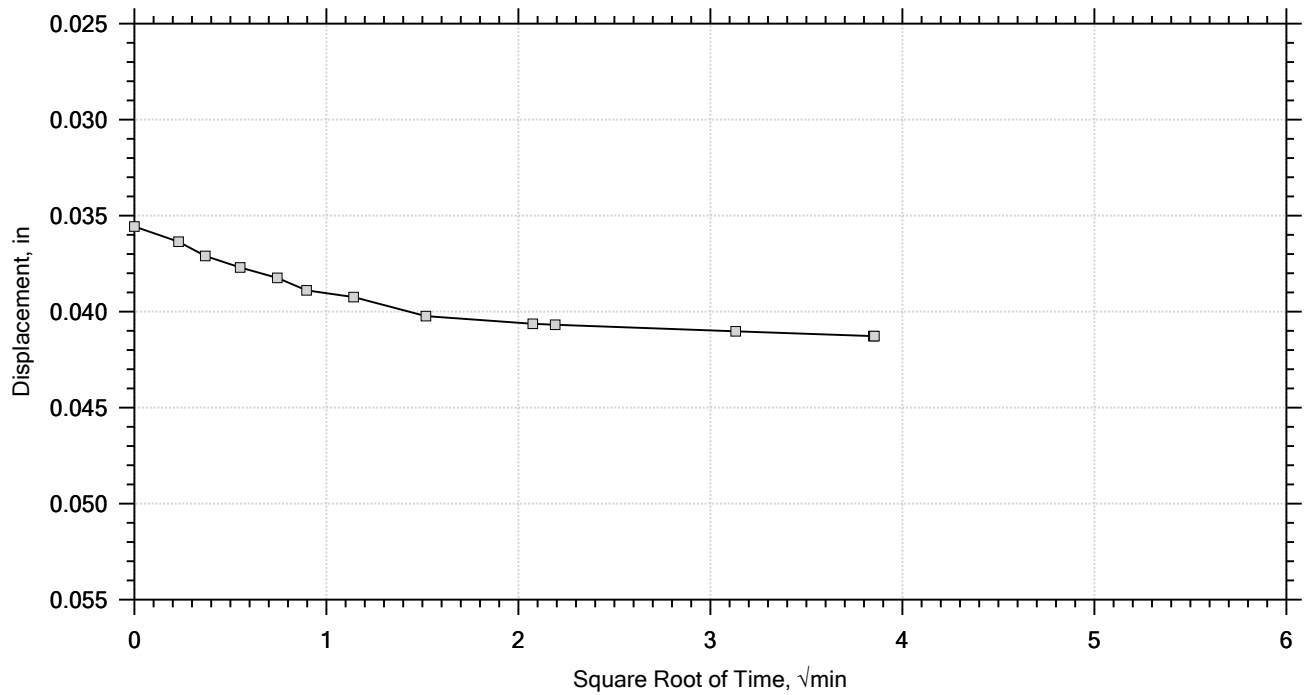
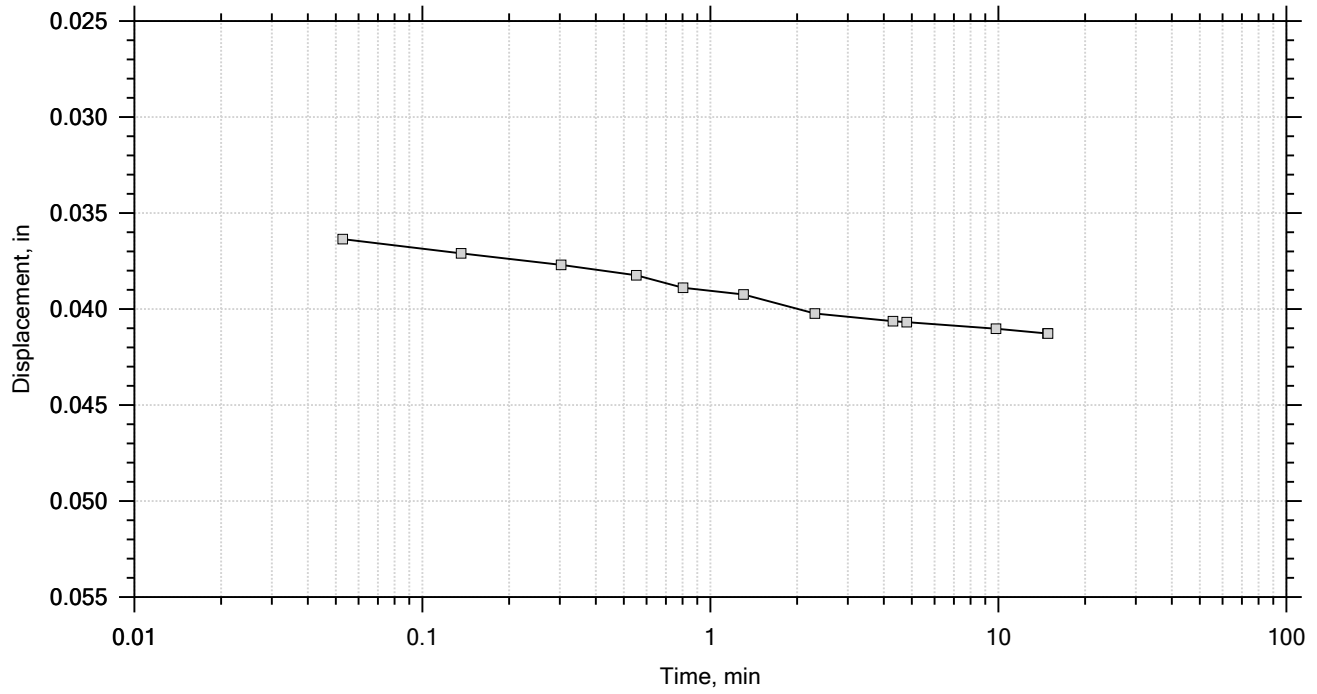
Time Curve 2 of 14  
 Constant Load Step  
 Stress: 0.125 tsf



	Project: SC-557	Location: York County	Project No.: G4843
	Boring No.: AP-3	Tested By: WAP	Checked By: RS/JFH
	Sample No.: 1	Test Date: 06/22/2018	Depth: 4.0' - 6.0'
	Test No.: A	Sample Type: Undisturbed	Elevation: --
	Description: Sandy SILT (ML/A-4(4))		
	Remarks:		

# One-Dimensional Consolidation by ASTM D2435 - Method A

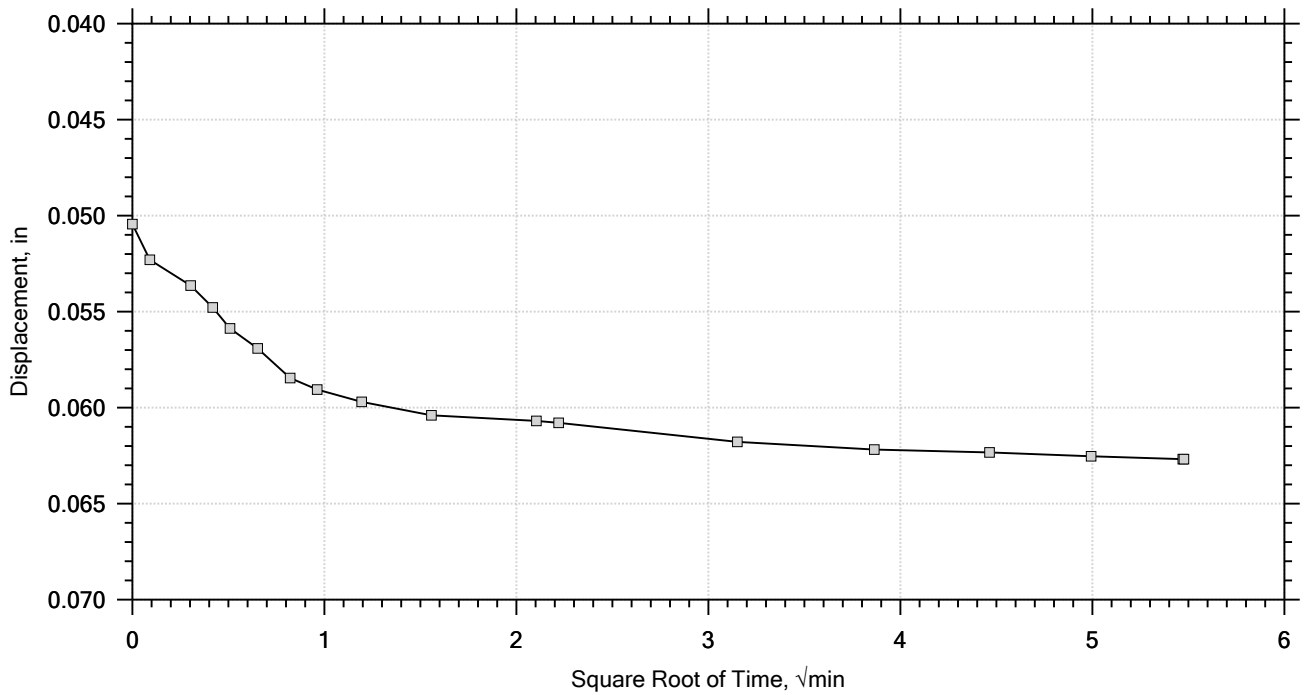
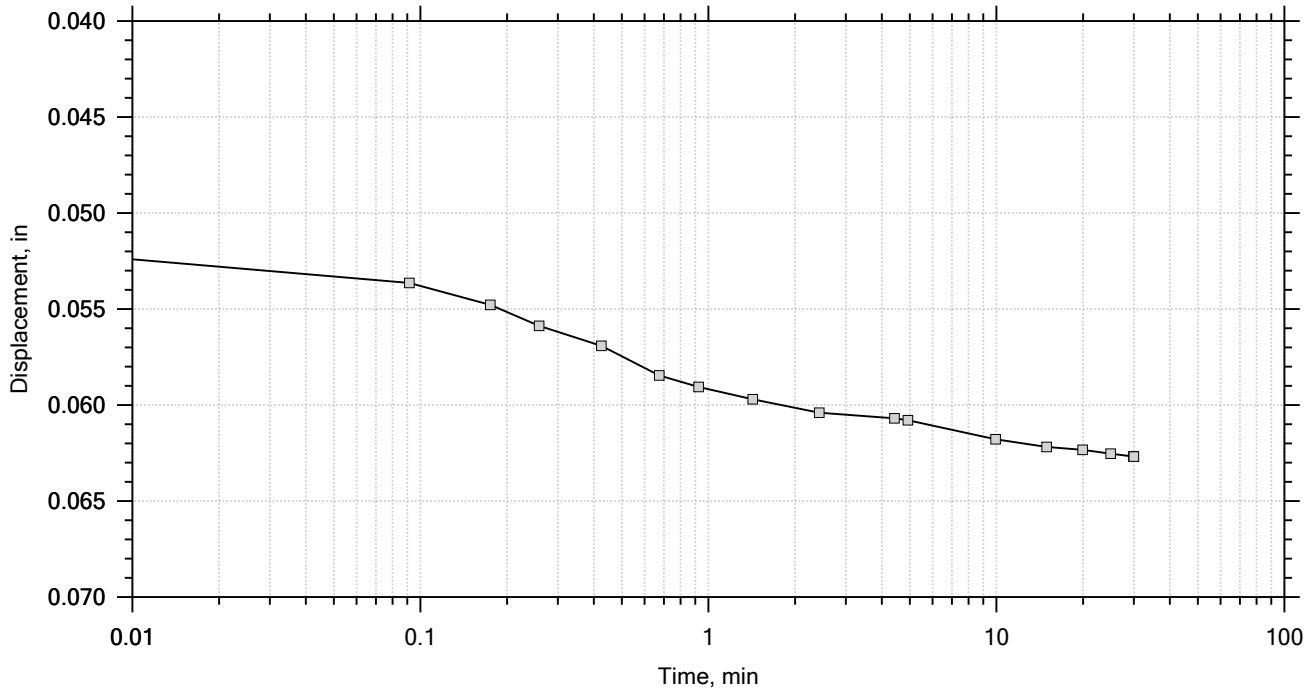
Time Curve 3 of 14  
Constant Load Step  
Stress: 0.25 tsf



	Project: SC-557	Location: York County	Project No.: G4843
	Boring No.: AP-3	Tested By: WAP	Checked By: RS/JFH
	Sample No.: 1	Test Date: 06/22/2018	Depth: 4.0' - 6.0'
	Test No.: A	Sample Type: Undisturbed	Elevation: --
	Description: Sandy SILT (ML/A-4(4))		
	Remarks:		

# One-Dimensional Consolidation by ASTM D2435 - Method A

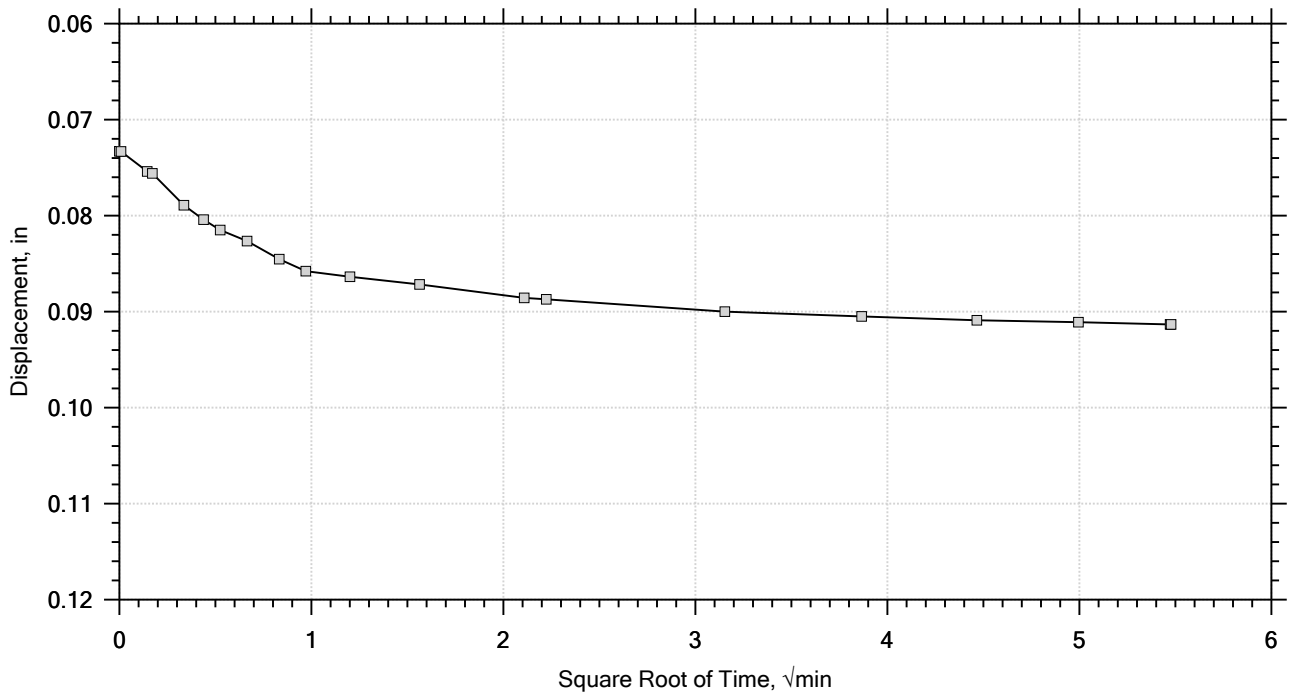
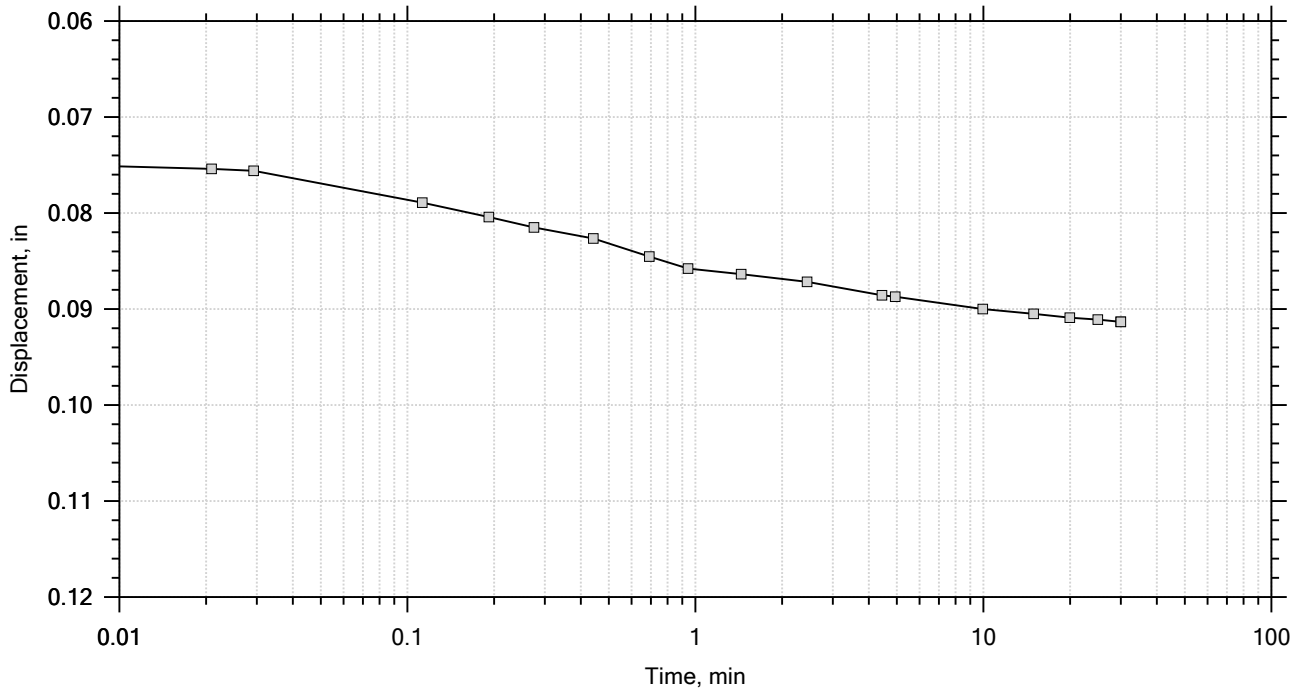
Time Curve 4 of 14  
Constant Load Step  
Stress: 0.5 tsf



	Project: SC-557	Location: York County	Project No.: G4843
	Boring No.: AP-3	Tested By: WAP	Checked By: RS/JFH
	Sample No.: 1	Test Date: 06/22/2018	Depth: 4.0' - 6.0'
	Test No.: A	Sample Type: Undisturbed	Elevation: --
	Description: Sandy SILT (ML/A-4(4))		
	Remarks:		

# One-Dimensional Consolidation by ASTM D2435 - Method A

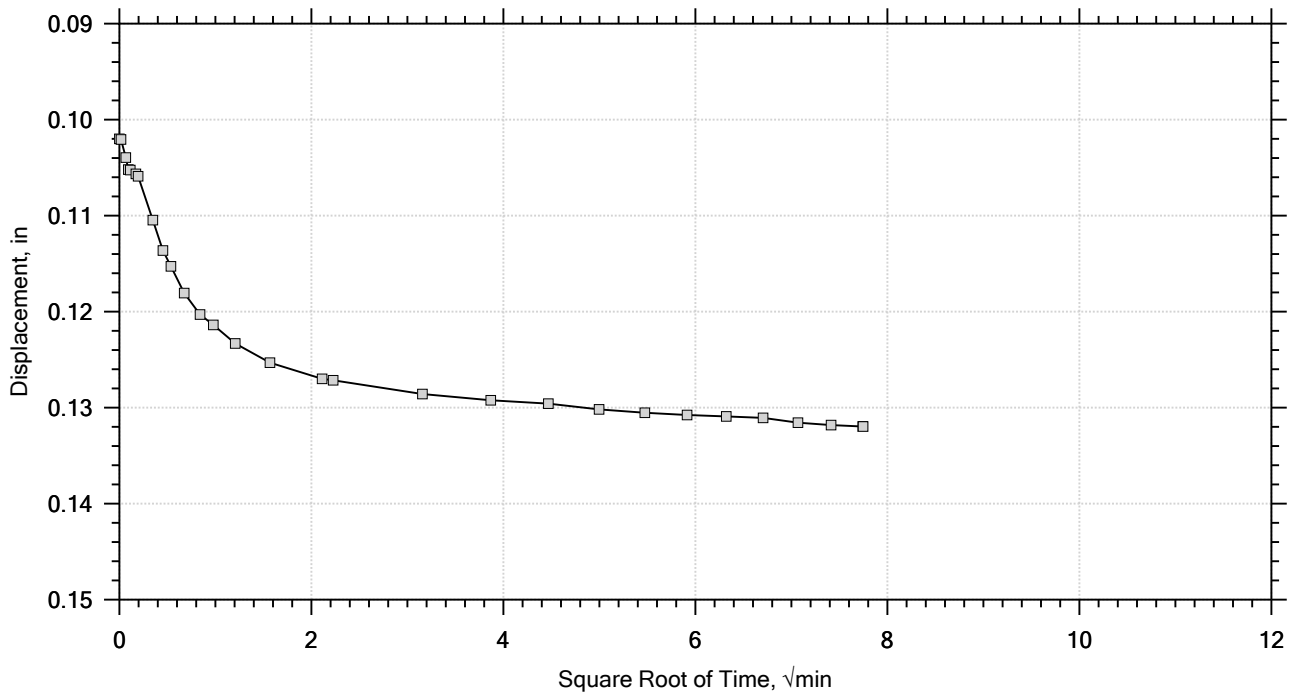
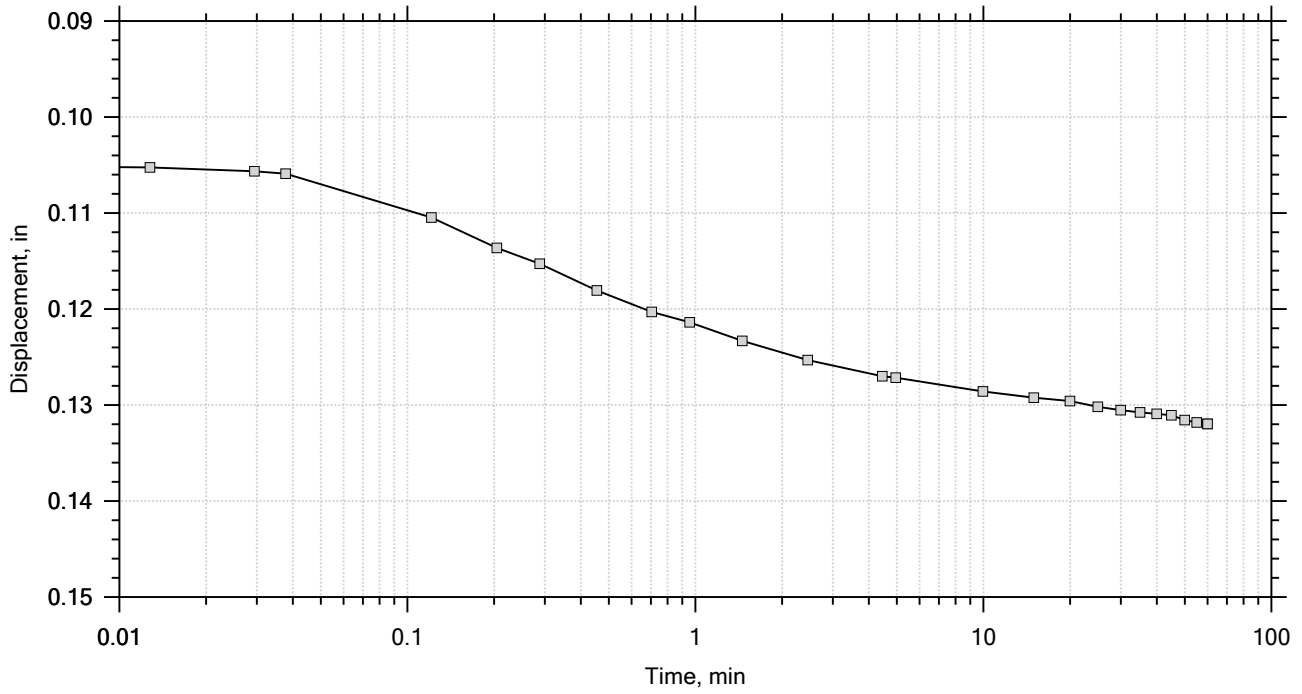
Time Curve 5 of 14  
 Constant Load Step  
 Stress: 1 tsf



	Project: SC-557	Location: York County	Project No.: G4843
	Boring No.: AP-3	Tested By: WAP	Checked By: RS/JFH
	Sample No.: 1	Test Date: 06/22/2018	Depth: 4.0' - 6.0'
	Test No.: A	Sample Type: Undisturbed	Elevation: --
	Description: Sandy SILT (ML/A-4(4))		
	Remarks:		

# One-Dimensional Consolidation by ASTM D2435 - Method A

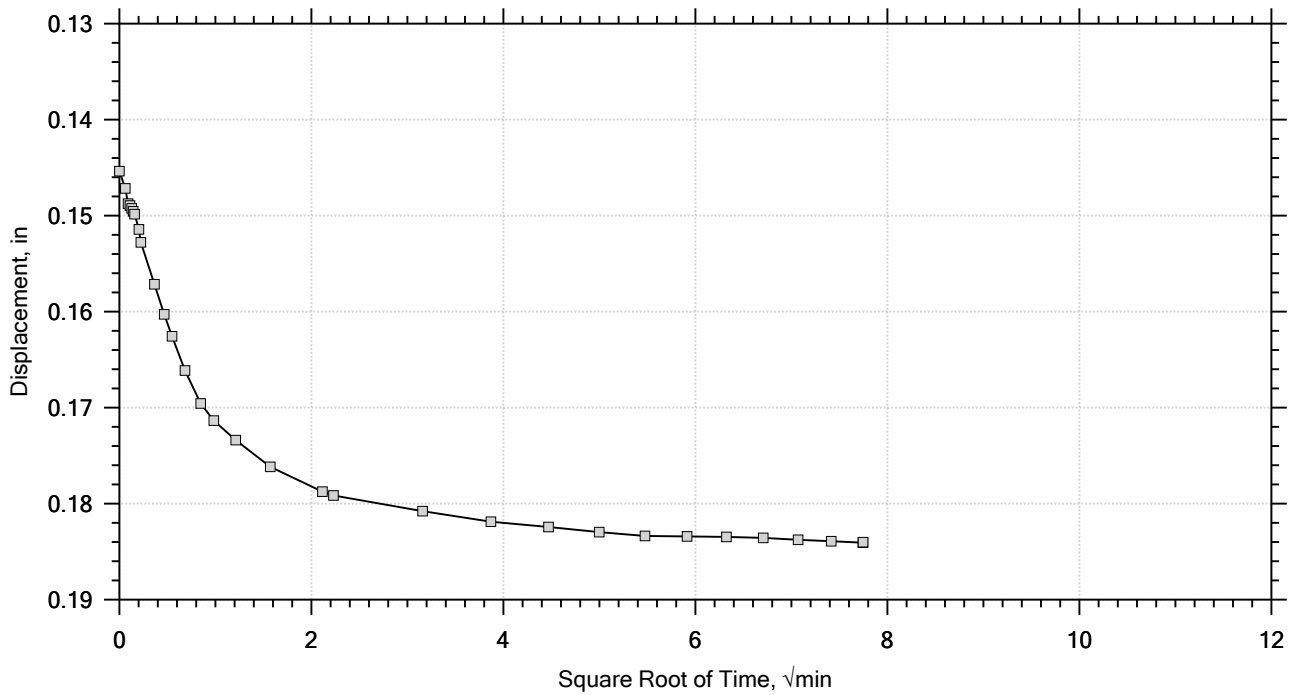
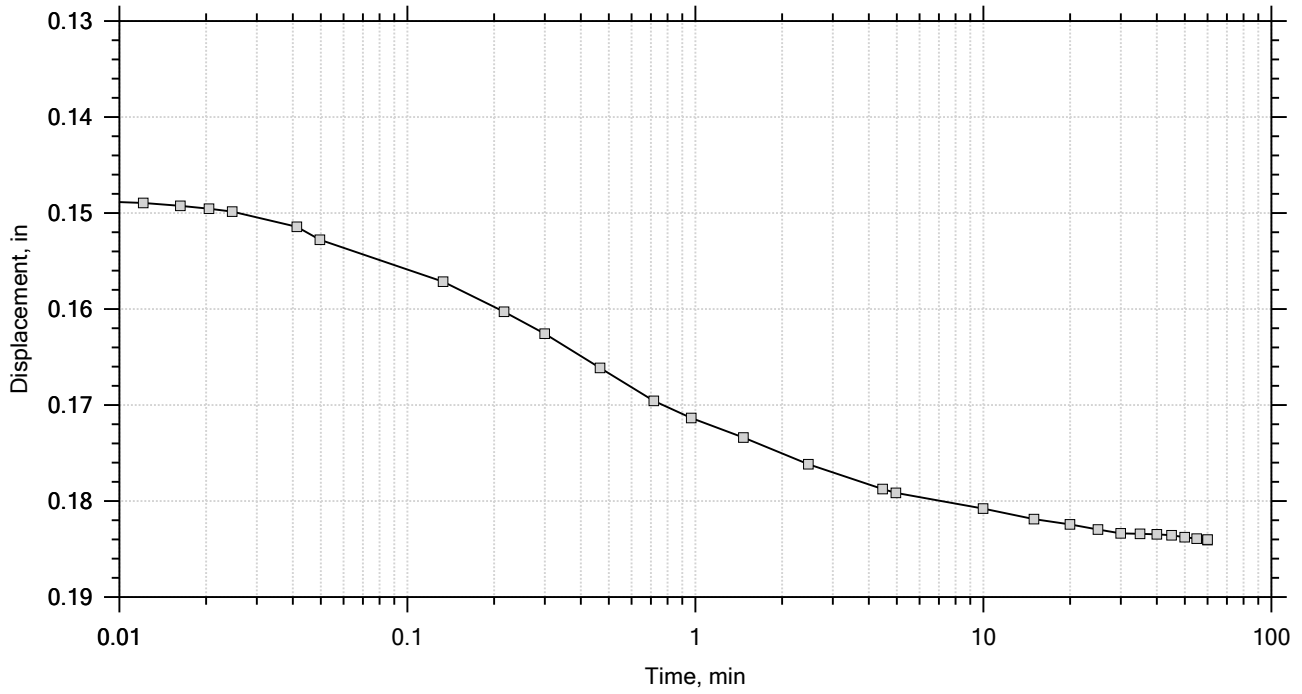
Time Curve 6 of 14  
Constant Load Step  
Stress: 2 tsf



	Project: SC-557	Location: York County	Project No.: G4843
	Boring No.: AP-3	Tested By: WAP	Checked By: RS/JFH
	Sample No.: 1	Test Date: 06/22/2018	Depth: 4.0' - 6.0'
	Test No.: A	Sample Type: Undisturbed	Elevation: --
	Description: Sandy SILT (ML/A-4(4))		
	Remarks:		

# One-Dimensional Consolidation by ASTM D2435 - Method A

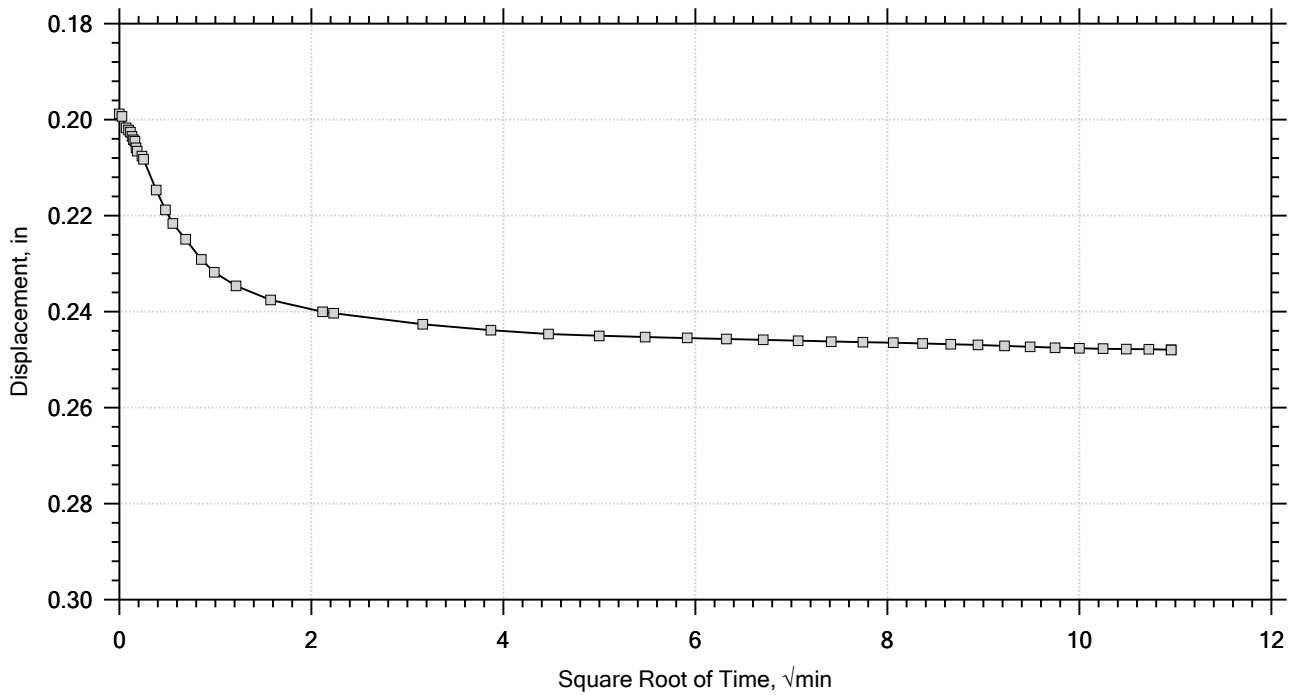
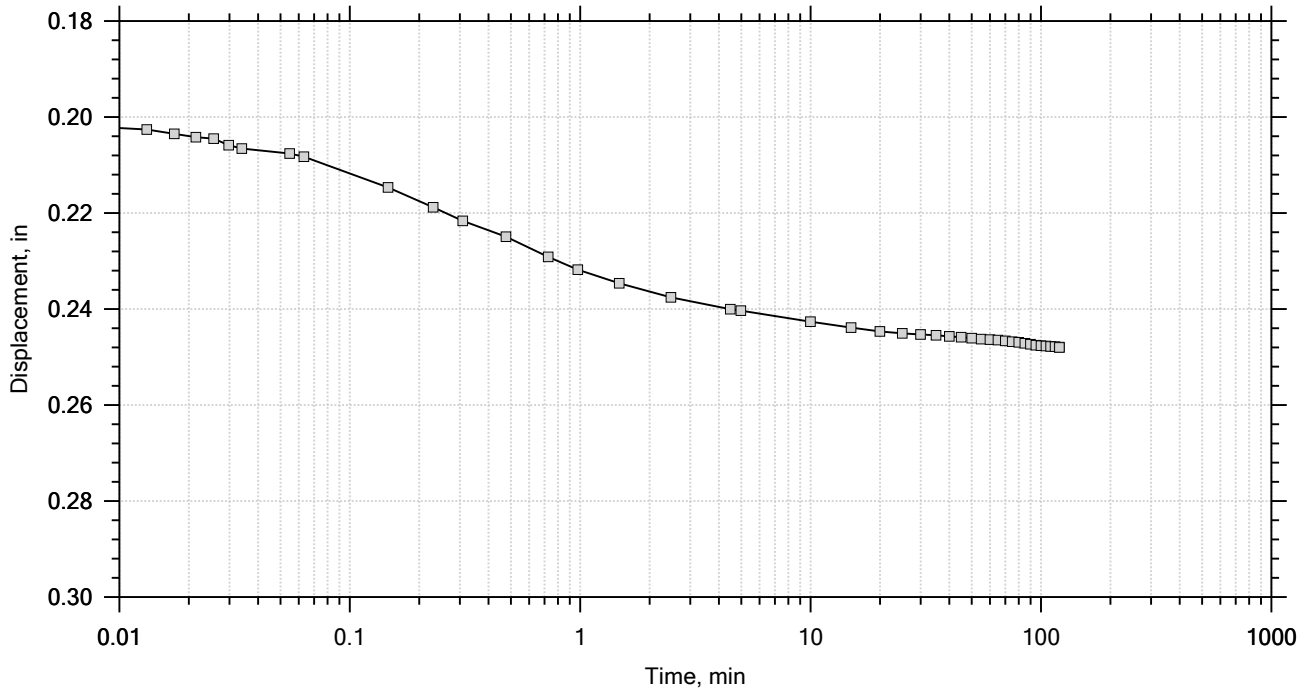
Time Curve 7 of 14  
Constant Load Step  
Stress: 4 tsf



	Project: SC-557	Location: York County	Project No.: G4843
	Boring No.: AP-3	Tested By: WAP	Checked By: RS/JFH
	Sample No.: 1	Test Date: 06/22/2018	Depth: 4.0' - 6.0'
	Test No.: A	Sample Type: Undisturbed	Elevation: --
	Description: Sandy SILT (ML/A-4(4))		
	Remarks:		

# One-Dimensional Consolidation by ASTM D2435 - Method A

Time Curve 8 of 14  
Constant Load Step  
Stress: 8 tsf

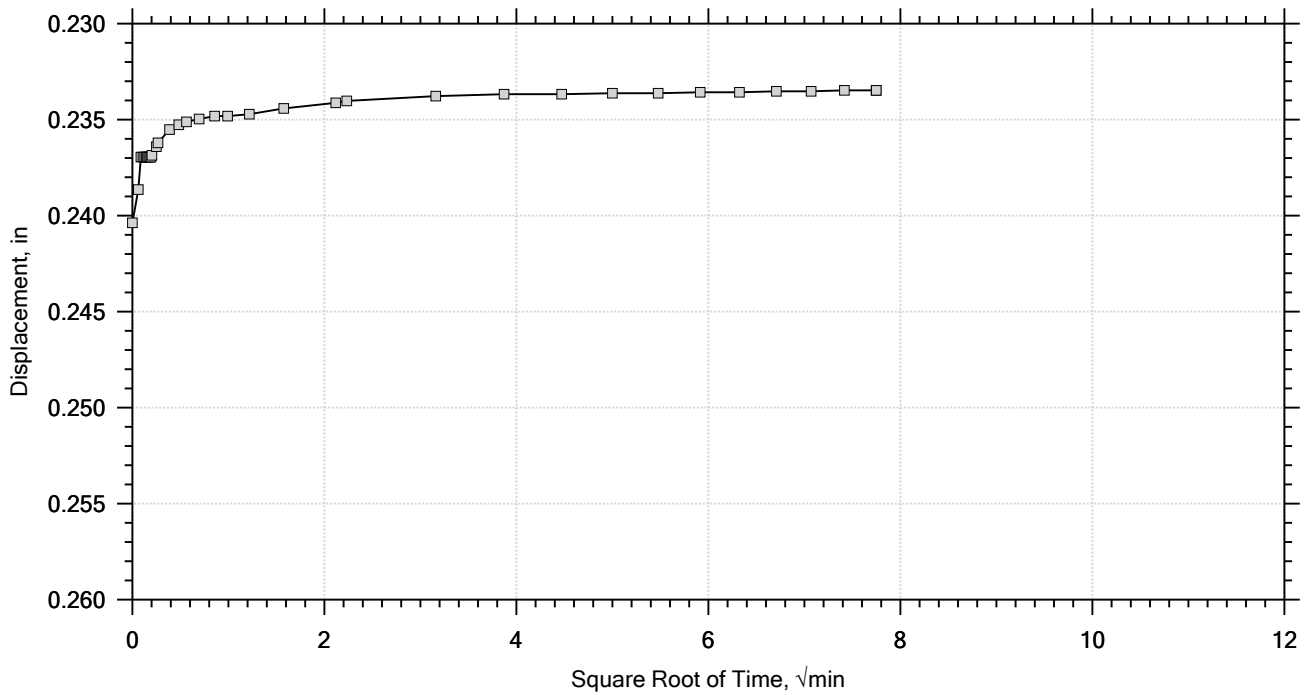
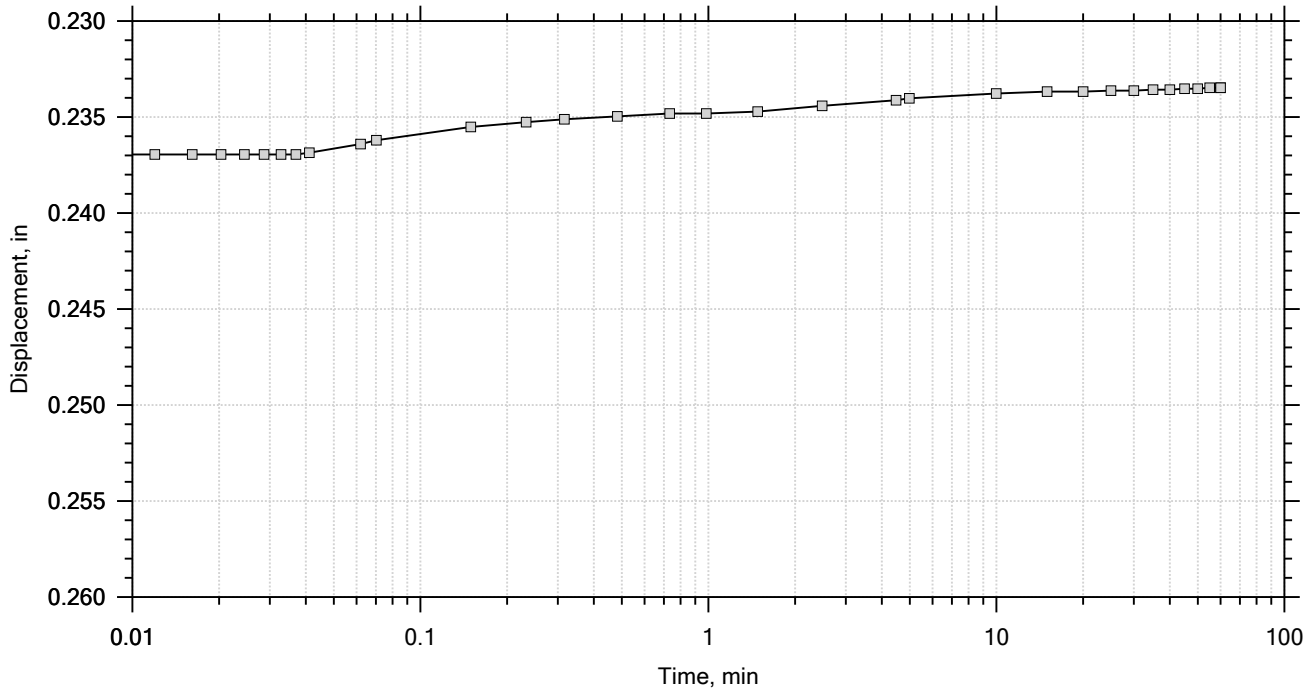


	Project: SC-557	Location: York County	Project No.: G4843
	Boring No.: AP-3	Tested By: WAP	Checked By: RS/JFH
	Sample No.: 1	Test Date: 06/22/2018	Depth: 4.0' - 6.0'
	Test No.: A	Sample Type: Undisturbed	Elevation: --
	Description: Sandy SILT (ML/A-4(4))		
	Remarks:		



# One-Dimensional Consolidation by ASTM D2435 - Method A

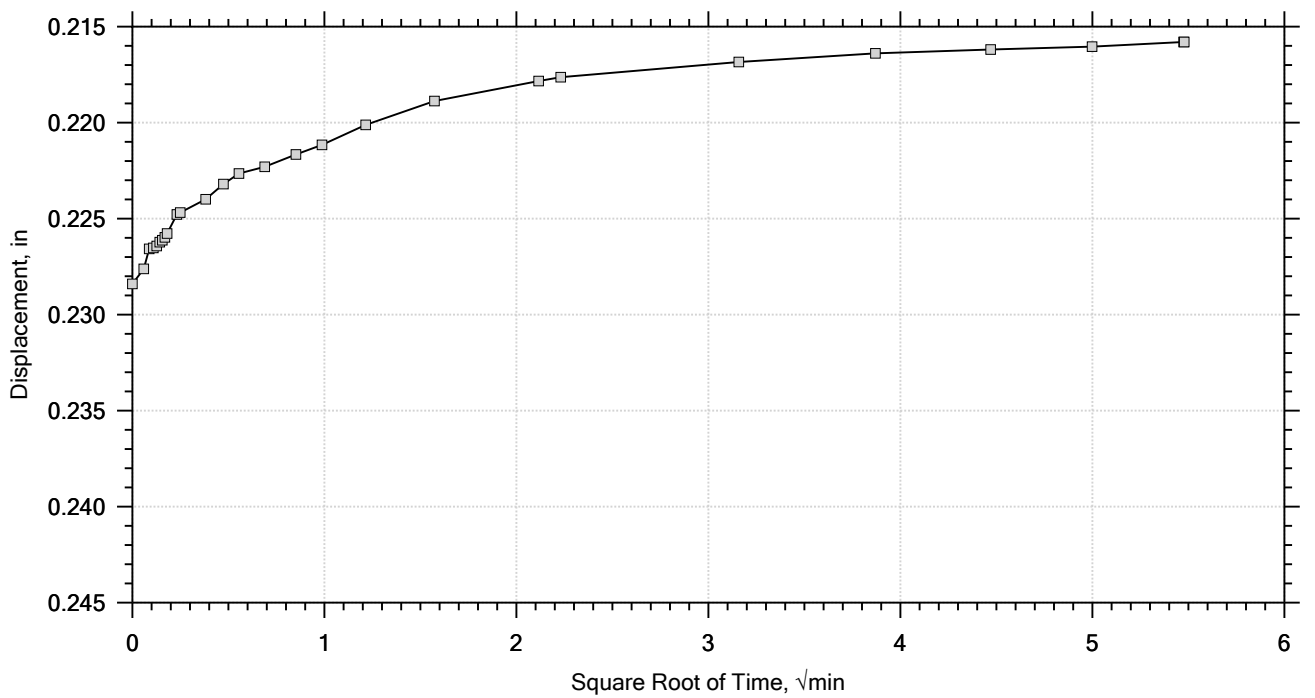
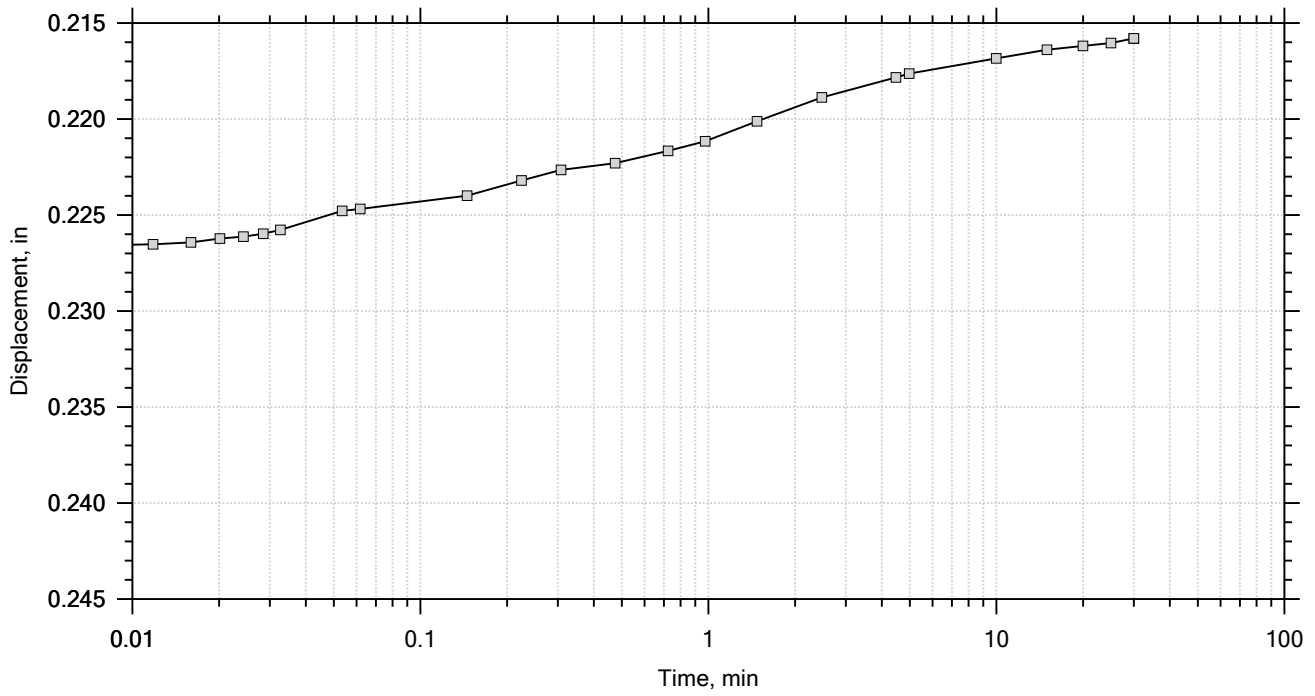
Time Curve 9 of 14  
Constant Load Step  
Stress: 2 tsf



	Project: SC-557	Location: York County	Project No.: G4843
	Boring No.: AP-3	Tested By: WAP	Checked By: RS/JFH
	Sample No.: 1	Test Date: 06/22/2018	Depth: 4.0' - 6.0'
	Test No.: A	Sample Type: Undisturbed	Elevation: --
	Description: Sandy SILT (ML/A-4(4))		
	Remarks:		

# One-Dimensional Consolidation by ASTM D2435 - Method A

Time Curve 10 of 14  
 Constant Load Step  
 Stress: 0.5 tsf



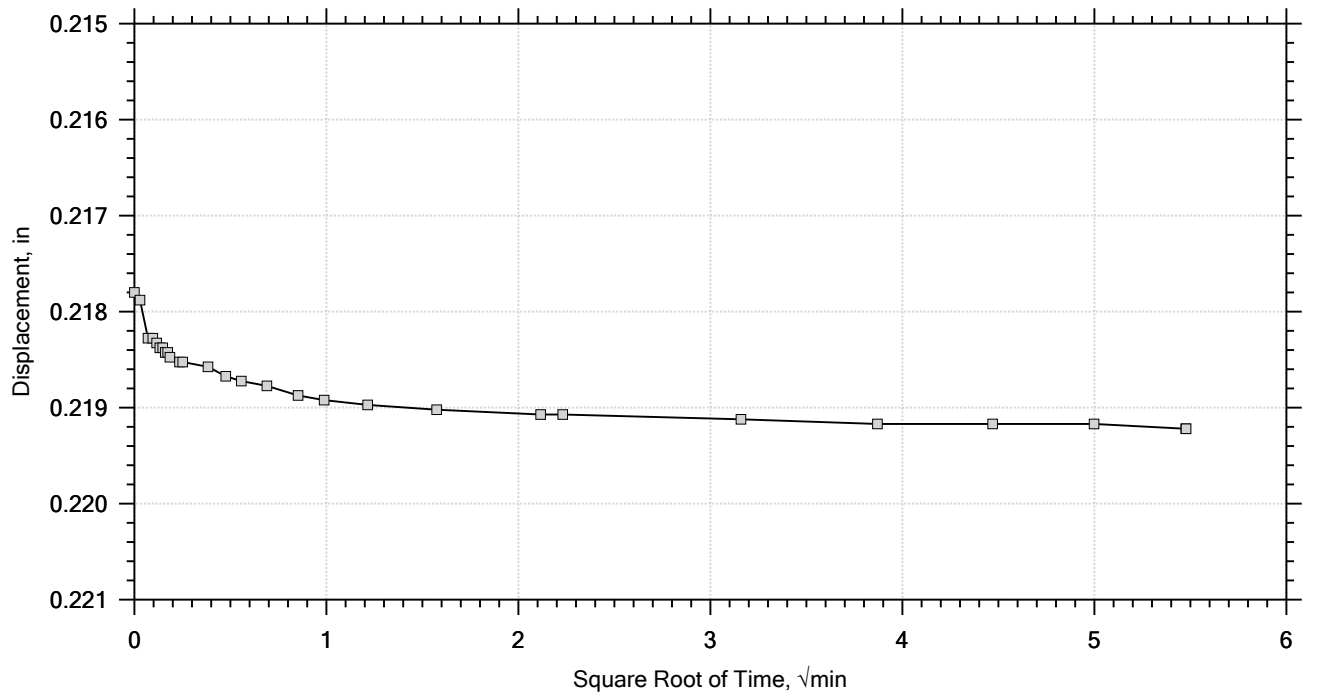
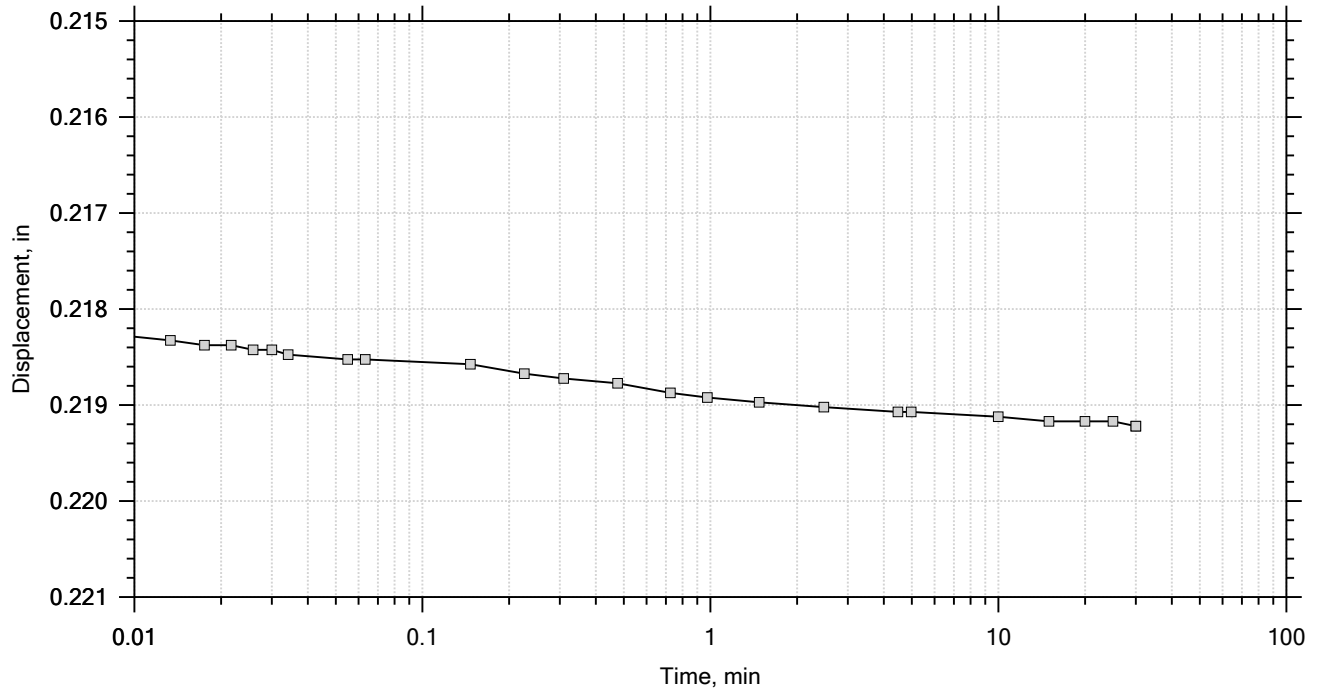
	Project: SC-557	Location: York County	Project No.: G4843
	Boring No.: AP-3	Tested By: WAP	Checked By: RS/JFH
	Sample No.: 1	Test Date: 06/22/2018	Depth: 4.0' - 6.0'
	Test No.: A	Sample Type: Undisturbed	Elevation: --
	Description: Sandy SILT (ML/A-4(4))		
	Remarks:		

# One-Dimensional Consolidation by ASTM D2435 - Method A

Time Curve 11 of 14

Constant Load Step

Stress: 1 tsf



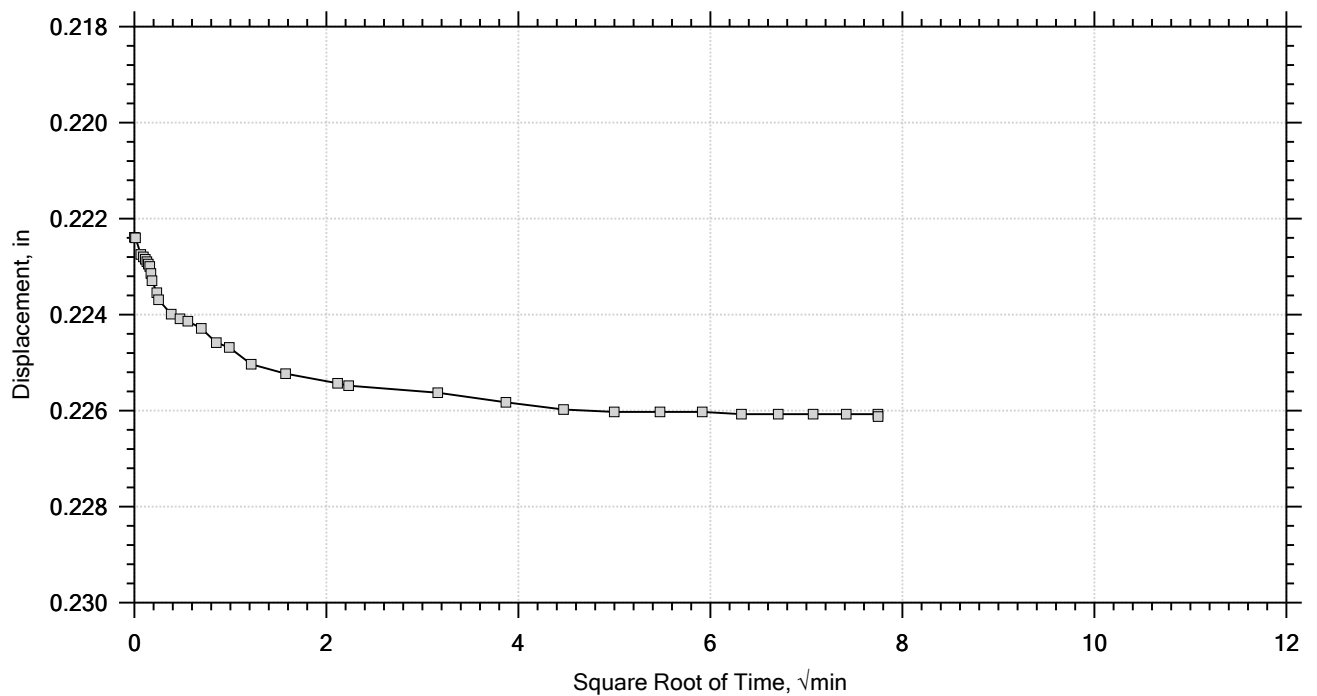
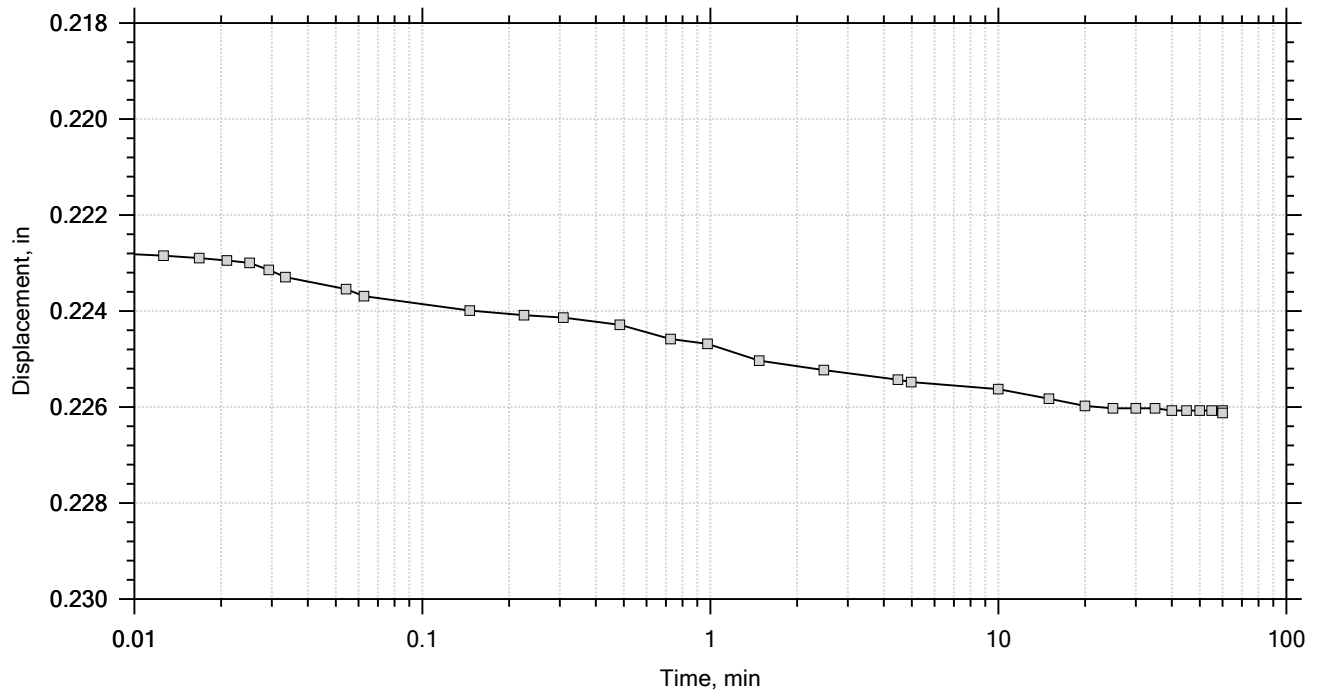
	Project: SC-557	Location: York County	Project No.: G4843
	Boring No.: AP-3	Tested By: WAP	Checked By: RS/JFH
	Sample No.: 1	Test Date: 06/22/2018	Depth: 4.0' - 6.0'
	Test No.: A	Sample Type: Undisturbed	Elevation: --
	Description: Sandy SILT (ML/A-4(4))		
	Remarks:		

# One-Dimensional Consolidation by ASTM D2435 - Method A

Time Curve 12 of 14

Constant Load Step

Stress: 2 tsf



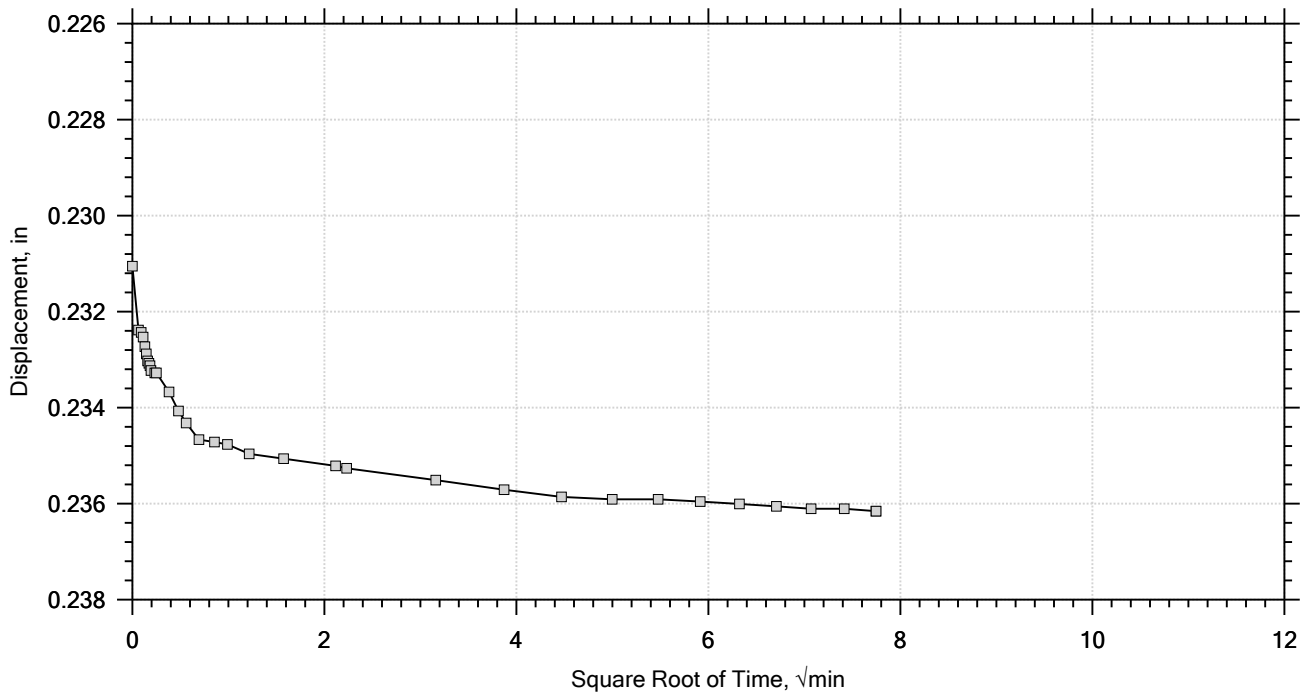
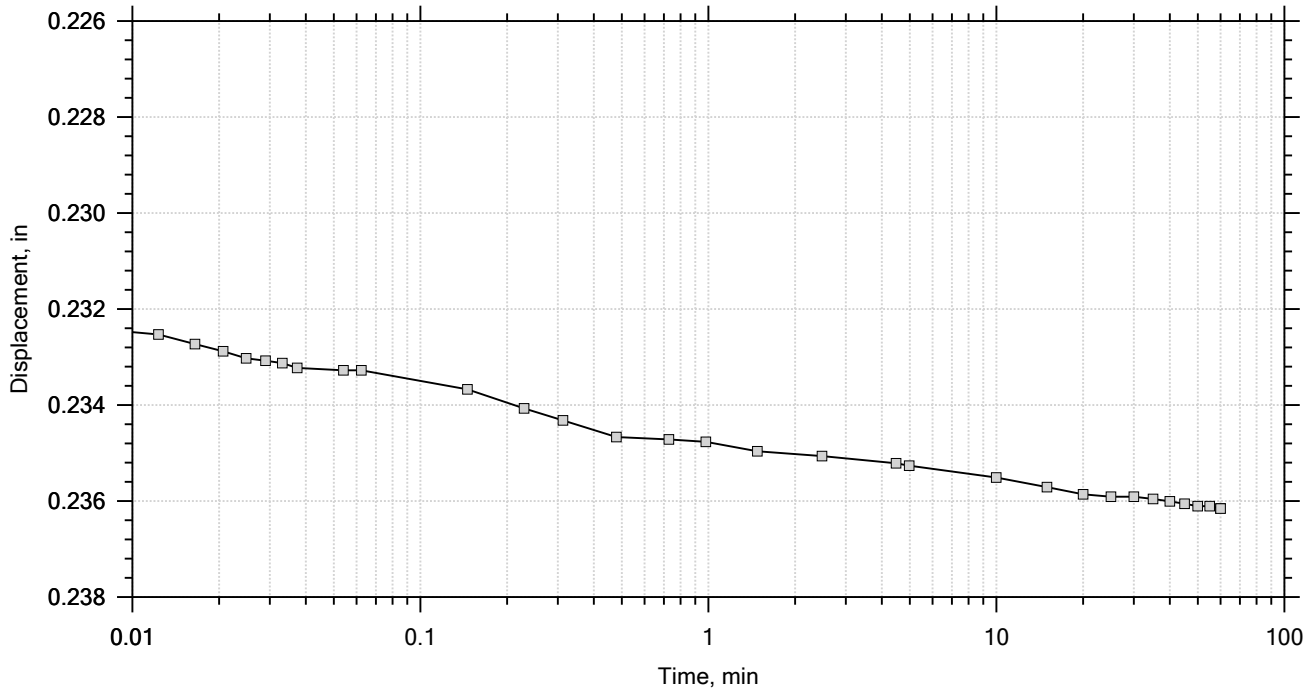
	Project: SC-557	Location: York County	Project No.: G4843
	Boring No.: AP-3	Tested By: WAP	Checked By: RS/JFH
	Sample No.: 1	Test Date: 06/22/2018	Depth: 4.0' - 6.0'
	Test No.: A	Sample Type: Undisturbed	Elevation: --
	Description: Sandy SILT (ML/A-4(4))		
	Remarks:		


# One-Dimensional Consolidation by ASTM D2435 - Method A

Time Curve 13 of 14

Constant Load Step

Stress: 4 tsf



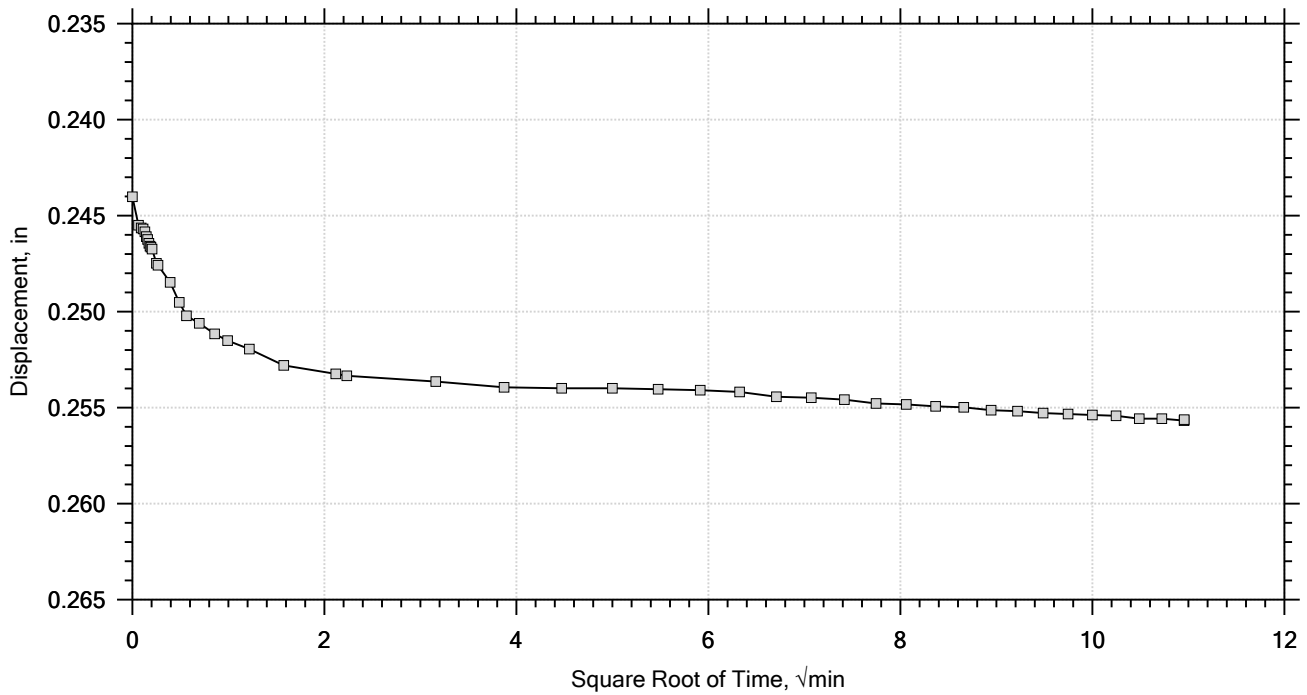
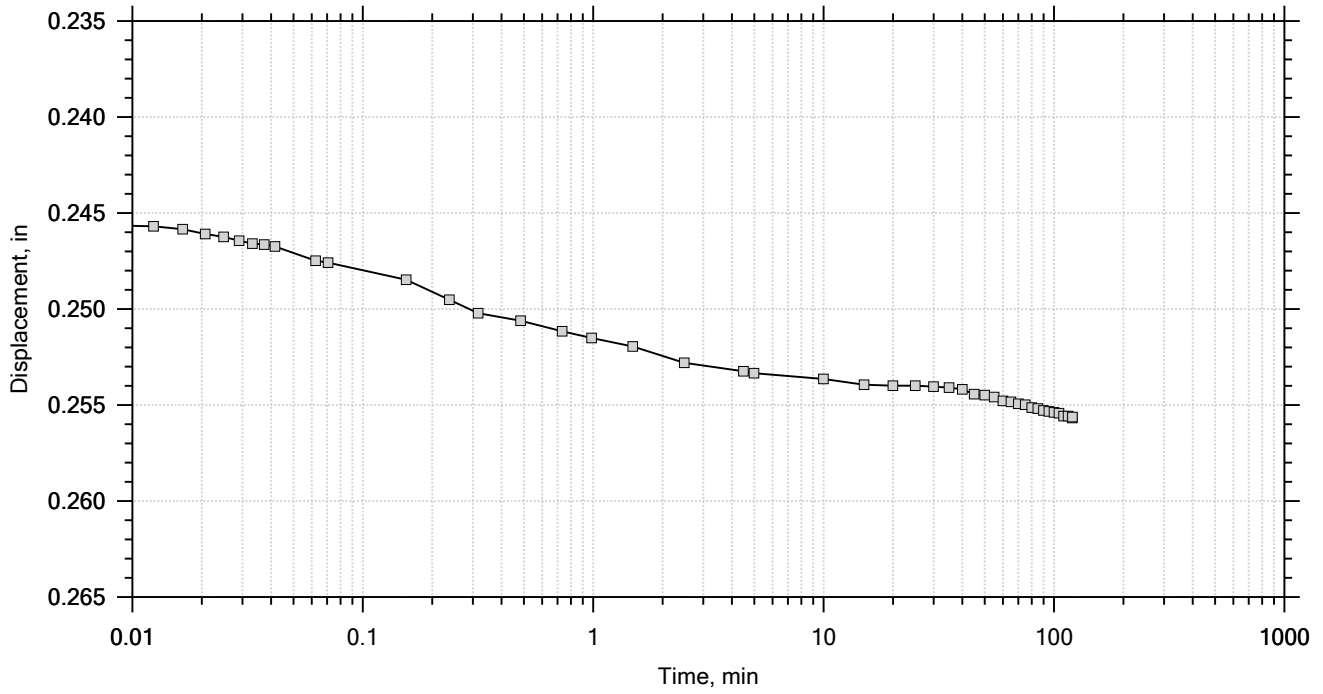
	Project: SC-557	Location: York County	Project No.: G4843
	Boring No.: AP-3	Tested By: WAP	Checked By: RS/JFH
	Sample No.: 1	Test Date: 06/22/2018	Depth: 4.0' - 6.0'
	Test No.: A	Sample Type: Undisturbed	Elevation: --
	Description: Sandy SILT (ML/A-4(4))		
	Remarks:		

# One-Dimensional Consolidation by ASTM D2435 - Method A

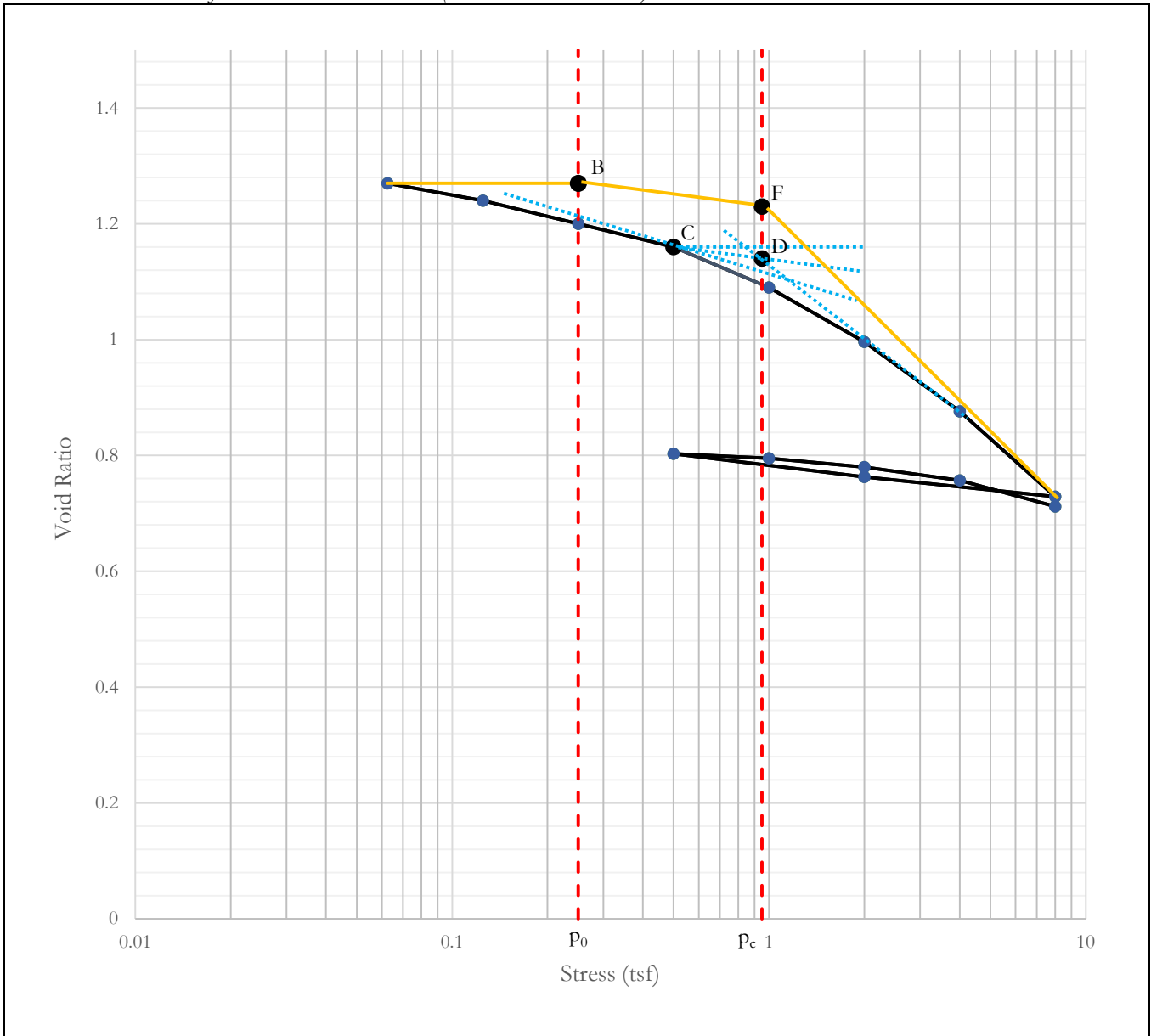
Time Curve 14 of 14

Constant Load Step

Stress: 8 tsf



	Project: SC-557	Location: York County	Project No.: G4843
	Boring No.: AP-3	Tested By: WAP	Checked By: RS/JFH
	Sample No.: 1	Test Date: 06/22/2018	Depth: 4.0' - 6.0'
	Test No.: A	Sample Type: Undisturbed	Elevation: --
	Description: Sandy SILT (ML/A-4(4))		
	Remarks:		



Initial Eff. Vertical Stress, $p_0$ =	0.25	tsf
Pre-consolidation Pressure, $p_c$ =	0.95	tsf
Over Consolidation Ratio, OCR =	3.8	dim
Compression Index, $C_c$ =	0.071	dim
Recompression Index, $C_r$ =	0.027	dim
Initial Void Ratio =	1.27	dim
Coefficient of Consolidation, $C_v$ =	1.51	ft <sup>2</sup> /day



Client:	F&ME Consultants
Project:	SC 557 Widening and Improvements
Location:	---
GTX#:	308716
Test Date:	09/04/18
Tested By:	twh
Checked By:	mcm

**Laboratory Measurement of Soil Resistivity Using  
the Wenner Four-Electrode Method by ASTM G57  
(Laboratory Measurement)**

Boring ID	Sample ID	Depth, ft.	Sample Description	Electrical Resistivity, ohm-cm	Electrical Conductivity, (ohm-cm) <sup>-1</sup>
B-3	---	0-20 ft	Moist, yellowish red silty sand	1,529	6.54E-04
B-10	---	0-18 ft	Moist, grayish brown sandy clay	10,194	9.81E-05

Notes: Test Equipment: Nilsson Model 400 Soil Resistance Meter, MC Miller Soil Box  
Water added to sample to create a thick slurry prior to testing (saturated condition).  
Electrical Conductivity is calculated as inverse of Electrical Resistivity (per ASTM G57)  
Test conducted in standard laboratory atmosphere: 68-73 F





Client:	F&ME Consultants		Project No:	GTX-308716	
Project:	SC 557 Widening and Improvements				
Location:	---		Tested By:	twh	
Boring ID:	---	Sample Type:	---	Checked By:	MCM
Sample ID:	---	Test Date:	09/04/18	Test Id:	299521
Depth :	---				

**pH of Soil by ASTM D4972**

Boring ID	Sample ID	Depth	Visual Description	pH of Soil in Distilled Water	pH of Soil in Calcium Chloride
B-10	---	0-18 ft	Moist, grayish brown sandy clay	4.9	4.0
B-3	---	0-20 ft	Moist, yellowish red silty sand	5.1	4.3

Notes: Sample Preparation: screened through #10 sieve  
Method A, pH meter used

**Project Name:** SC 557 WIDENING & IMPROVEMENTS  
**Project Number:** 308716

**Lab Number:** L1835228  
**Report Date:** 09/16/18

**SAMPLE RESULTS**

**Lab ID:** L1835228-01  
**Client ID:** B-3, 0-20 FT  
**Sample Location:** Not Specified

**Date Collected:** 08/31/18 15:11  
**Date Received:** 09/06/18  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
<b>General Chemistry - Westborough Lab</b>										
Solids, Total	83.5		%	0.100	NA	1	-	09/10/18 09:47	121,2540G	EO
Chloride	ND		mg/kg	12	--	1	-	09/11/18 21:01	1,9251	ML
Sulfate	ND		mg/kg	120	--	1	-	09/07/18 13:28	1,9038	BR



**Project Name:** SC 557 WIDENING & IMPROVEMENTS  
**Project Number:** 308716

**Lab Number:** L1835228  
**Report Date:** 09/16/18

**SAMPLE RESULTS**

**Lab ID:** L1835228-02  
**Client ID:** B-10, 0-18 FT  
**Sample Location:** Not Specified

**Date Collected:** 08/31/18 15:15  
**Date Received:** 09/06/18  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
<b>General Chemistry - Westborough Lab</b>										
Solids, Total	72.1		%	0.100	NA	1	-	09/10/18 09:47	121,2540G	EO
Chloride	ND		mg/kg	12	--	1	-	09/11/18 21:02	1,9251	ML
Sulfate	ND		mg/kg	140	--	1	-	09/07/18 13:28	1,9038	BR



SC 557 Bridge over Crowders Creek  
Final Bridge Geotechnical Engineering Report

---

# APPENDIX

## SECTION 8 SEISMIC DESIGN DATA

## Consultant Geotechnical Seismic Response

<b>To:</b>	William J. Gieser						
<b>Consultant:</b>	F&ME Consultants						
<b>Date Requested:</b>	5/14/13						
<b>PROJECT INFORMATION</b>							
<b>File No.</b>	46.199B			<b>Project No. (PIN):</b>	33312		
<b>County:</b>	York			<b>Route:</b>	SC 557		
<b>Description:</b> SC-557 Roadway Improvements and Bridge Replacement							
<b>Latitude (4 decimals):</b> 35.1208				<b>Longitude (4 decimals):</b> 81.1134			
<b>Bridge Category / Seismic OC:</b>				II			
<b>Type of Seismic Information Requested:</b>				Preliminary Seismic Design Information			
<b>Seismic Site Class:</b>				C			
<b>Pseudo-Spectral Acceleration (PSA)</b>							
The SCDOT Geotechnical Design Section has generated the required Design Earthquake the pseudo-spectral acceleration (PSA) oscillator response for frequencies 0.5, 1.0, 2.0, 3.3, 5.0, 6.7 and 13 Hz, for 5% critical damping and peak horizontal ground acceleration (PGA) at the <b>B-C Boundary</b> .							
<i>SEE – 3% Probability of Exceedance in 75 years</i>							
<b>PSA and PGA as Percentage of g</b>							
0.5Hz	1.0Hz	2.0Hz	3.3Hz	5.0Hz	6.7Hz	13.0Hz	PGA
2.82393	5.68241	8.79213	11.79677	14.12128	14.14489	15.97737	8.99715
<b>Thickness of sediments:</b>		0 meters					
<i>FEE – 15% Probability of Exceedance in 75 years</i>							
<b>PSA and PGA as Percentage of g</b>							
0.5Hz	1.0Hz	2.0Hz	3.3Hz	5.0Hz	6.7Hz	13.0Hz	PGA
1.03913	2.41266	3.10376	5.40319	6.37944	6.21450	6.59676	3.72599
<b>Thickness of sediments:</b>		0 meters					
<b>Time Series</b>							
Unscaled and Scaled time series were generated for the <b>B-C Boundary</b> in Shake91 data format. The Scaled time series are based on the earthquake magnitude ( <i>M<sub>w</sub></i> ) and Epicentral distance requested.							
<b>The Time Series Files are Attached:</b>				Yes <input type="checkbox"/>		No <input checked="" type="checkbox"/>	
<b>Design Response Spectrum</b>							
<b>Two-Point Method</b>				<input type="checkbox"/>			
<b>Three-Point Method</b>				<input checked="" type="checkbox"/>			
<b>The Design Response Spectrum is Attached:</b>				Yes <input checked="" type="checkbox"/>		No <input type="checkbox"/>	
<b>Geotechnical Designer:</b>		Melissa Jackson <i>mg</i>			<b>RPG<sup>1</sup>:</b>		Midlands
<b>Date:</b>		5/30/2013		<b>Phone Number:</b>		(803) 737-9929	
<b>Geotechnical Review:</b>		Sara Stone, PE <i>SS</i>			<b>RPG<sup>1,2</sup>:</b>		Midlands

<sup>1</sup>RPG – Region Production Group

**Lowcountry** – Beaufort, Berkeley, Charleston, Colleton, Dorchester, Hampton, Jasper

**Pee Dee** – Chesterfield, Clarendon, Darlington, Dillon, Florence, Georgetown, Horry, Kershaw, Lee, Marion, Marlboro, Sumter, Williamsburg

**Midlands** – Aiken, Allendale, Bamberg, Barnwell, Calhoun, Chester, Fairfield, Lancaster, Lexington, Newberry, Orangeburg, Richland, Union, York

**Upstate** – Abbeville, Anderson, Cherokee, Edgefield, Greenville, Greenwood, Laurens, McCormick, Oconee, Pickens, Saluda, Spartanburg

<sup>2</sup>RPG – PreConstruction Support – Geotechnical Design Section (PCS/GDS)

**SC Seismic Hazard Map  
Three-Point ADRS Curves**

PIN No:	33312	File No:	46.199B	Latitude:	35.1208
Route:	SC 557	County:	York	Longitude:	81.1134
Project:	SC-557 Roadway Improvements and Bridge Replacement				

Designer:	M. Jackson - Midlands RPG
Date:	5/30/2013

Design EQ	PGA	S <sub>DS</sub>	S <sub>D1</sub>	M <sub>w</sub>	R (km)	Geologic Condition	Site Class	Damping
FEE	0.04	0.08	0.04	7.365	218.4	Hard Rock Basement Outcrop	C	5%
SEE	0.11	0.17	0.10	7.36	218.45	Hard Rock Basement Outcrop	C	

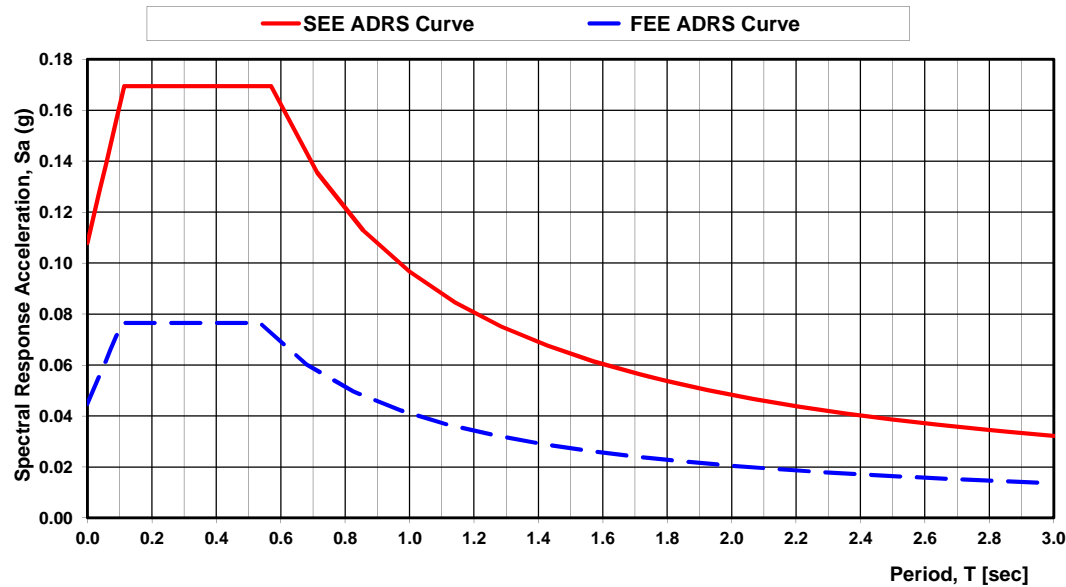
FEE ADRS Curve  
Three-Point Method

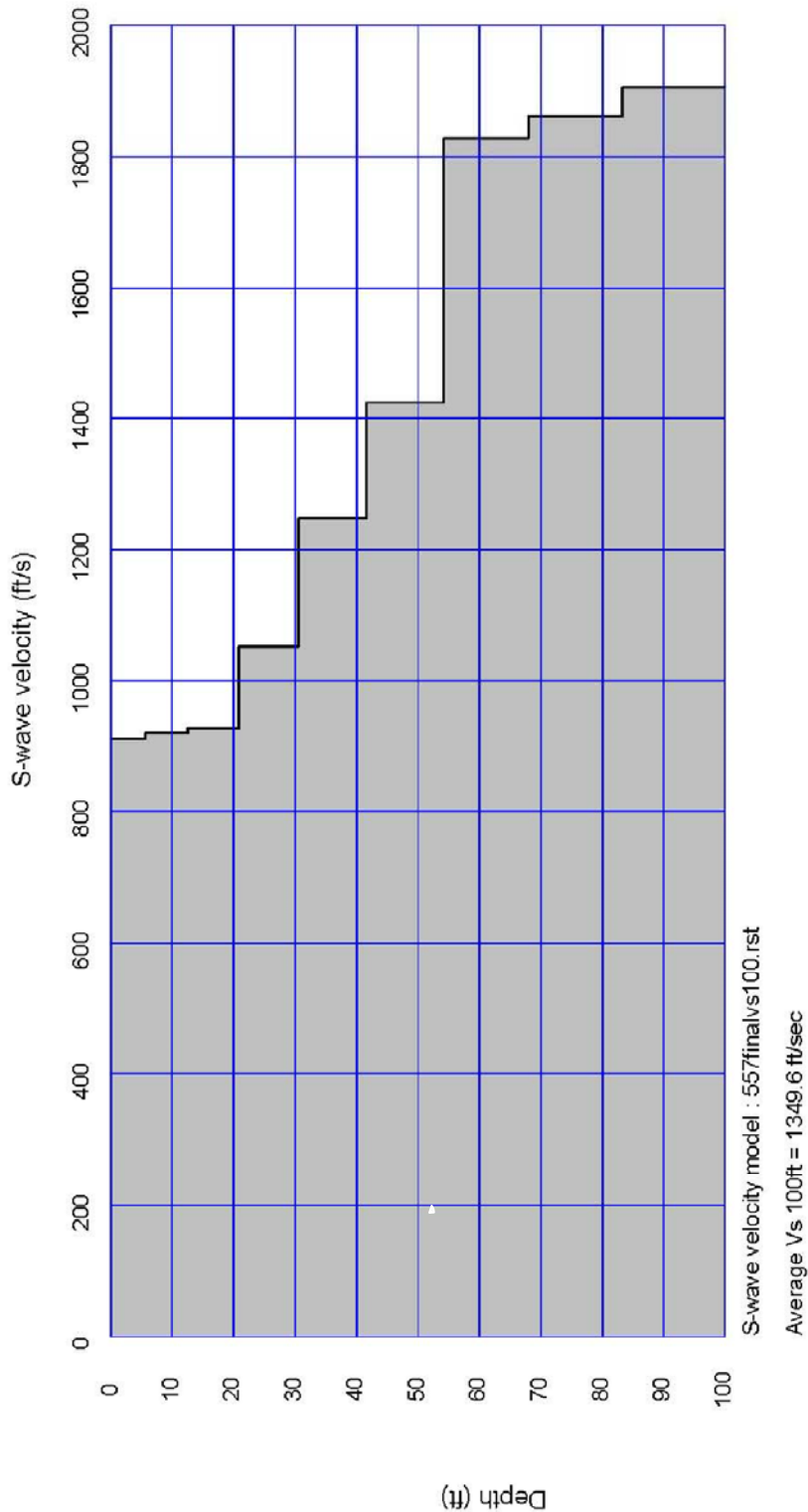
SEE ADRS Curve  
Three-Point Method

T	S <sub>a</sub>
0.00	0.04
0.02	0.05
0.04	0.06
0.05	0.06
0.07	0.07
0.09	0.07
0.11	0.08
0.14	0.08
0.18	0.08
0.21	0.08
0.25	0.08
0.29	0.08
0.32	0.08
0.36	0.08
0.39	0.08
0.43	0.08
0.46	0.08
0.50	0.08
0.54	0.08
0.68	0.06
0.83	0.05
0.97	0.04
1.12	0.04
1.26	0.03
1.41	0.03
1.55	0.03
1.70	0.02
1.84	0.02
1.99	0.02
2.13	0.02
2.28	0.02
2.42	0.02
2.57	0.02
2.71	0.02
2.86	0.01
3.00	0.01

T	S <sub>a</sub>
0.00	0.11
0.02	0.12
0.04	0.13
0.06	0.14
0.08	0.15
0.10	0.16
0.11	0.17
0.15	0.17
0.19	0.17
0.23	0.17
0.27	0.17
0.30	0.17
0.34	0.17
0.38	0.17
0.42	0.17
0.46	0.17
0.49	0.17
0.53	0.17
0.57	0.17
0.71	0.14
0.86	0.11
1.00	0.10
1.14	0.08
1.28	0.08
1.43	0.07
1.57	0.06
1.71	0.06
1.86	0.05
2.00	0.05
2.14	0.05
2.29	0.04
2.43	0.04
2.57	0.04
2.71	0.04
2.86	0.03
3.00	0.03

**SC Seismic Hazard Map Three-Point ADRS Curve From Ground Surface**





DRWN. BY: JFH  
 CHKD. BY: MSM  
 APPR. BY: MSM  
 \_\_\_\_\_  
 \_\_\_\_\_  
 NOTES:  
 \_\_\_\_\_  
 \_\_\_\_\_

ORIGINAL:  
 31 MAY 2013  
 REVISIONS:  
 1 \_\_\_\_\_  
 2 \_\_\_\_\_  
 3 \_\_\_\_\_  
 4 \_\_\_\_\_  
 SCALE:  
 NONE

**F&ME**  
**CONSULTANTS**  
 GEOTECHNICAL - ENVIRONMENTAL - MATERIALS  
 COLUMBIA, SOUTH CAROLINA

MULTI-CHANNEL ANALYSIS OF SURFACE  
 WAVES (MASW) TEST RESULTS  
 SC 557 ROADWAY IMPROVEMENT PROJECT  
 YORK COUNTY, SOUTH CAROLINA  
 SCDOT FILE NO.: 46.199B

F&ME CONSULTANTS  
 PROJECT NUMBER:  
**G4843.00**

DRAWING NUMBER:  
**FIGURE 3**

SC 557 Bridge over Crowders Creek  
Final Bridge Geotechnical Engineering Report

---

# APPENDIX

## SECTION 9 BRIDGE FOUNDATION LOADINGS

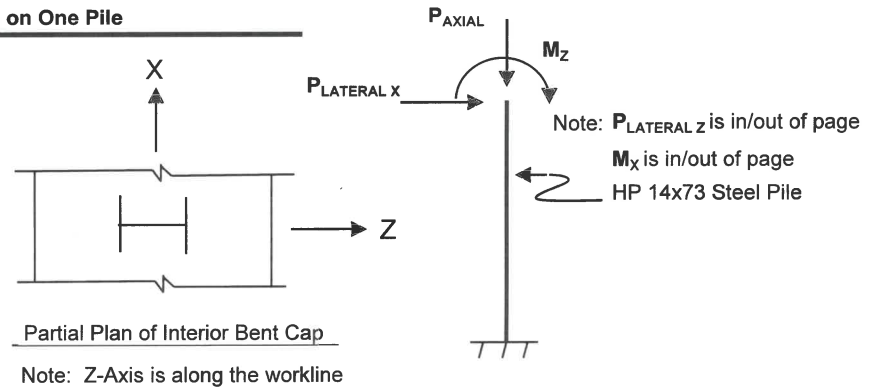


CLIENT SCDOT SUBJECT GEOTECH LOADS  
 PROJECT NO. 2006320.20 (SC-557)

Prepared By CDR DATE 7/6/18  
 Reviewed By GFW DATE 7-6-18

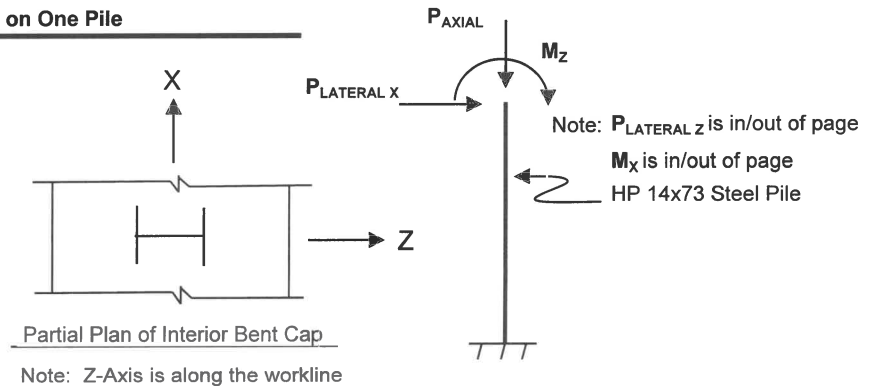
**End Bent #1: Loads Acting on One Pile**

Load Case	P <sub>AXIAL</sub> kip	P <sub>LATERAL X</sub> kip	P <sub>LATERAL Z</sub> kip	M <sub>Z</sub> kip-ft	M <sub>X</sub> kip-ft
Service I	✓	✓	✓	✓	✓
Service II	150.0	1.6	8.0	0.0	0.0
Service III					
Service IV					
Strength I		✓	✓	✓	✓
Strength II	200.0	2.0	12.0	0.0	0.0
Strength III					
Strength IV					
Strength V					



**End Bent #5: Loads Acting on One Pile**

Load Case	P <sub>AXIAL</sub> kip	P <sub>LATERAL X</sub> kip	P <sub>LATERAL Z</sub> kip	M <sub>Z</sub> kip-ft	M <sub>X</sub> kip-ft
Service I	✓	✓	✓	✓	✓
Service II	95.0	0.7	-7.8	0.0	0.0
Service III					
Service IV					
Strength I		✓	✓	✓	✓
Strength II	135.0	1.3	-11.7	0.0	0.0
Strength III					
Strength IV					
Strength V					

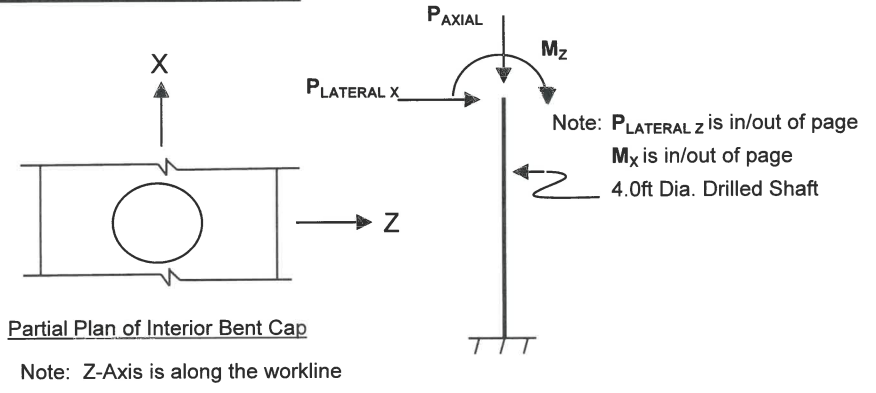


CLIENT SCDOT SUBJECT GEOTECH LOADS  
 PROJECT NO. 2006320.20 (SC-557)

Prepared By CDR DATE 7/6/18  
 Reviewed By \_\_\_\_\_ DATE \_\_\_\_\_

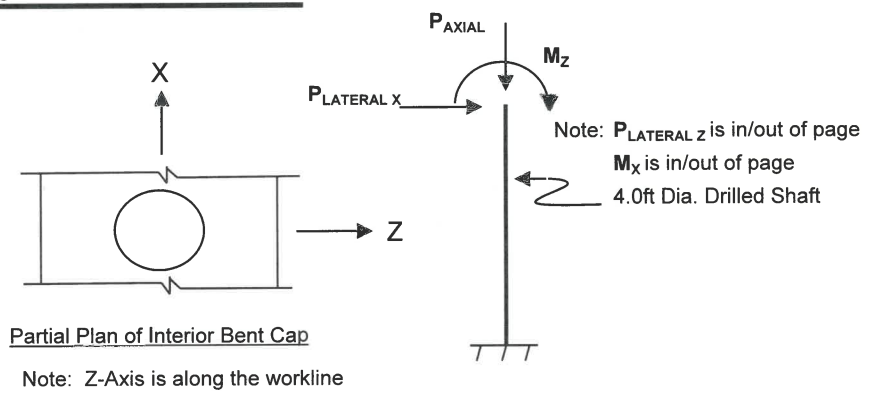
**Interior Bent #2 & #3: Loads Acting on One Shaft**

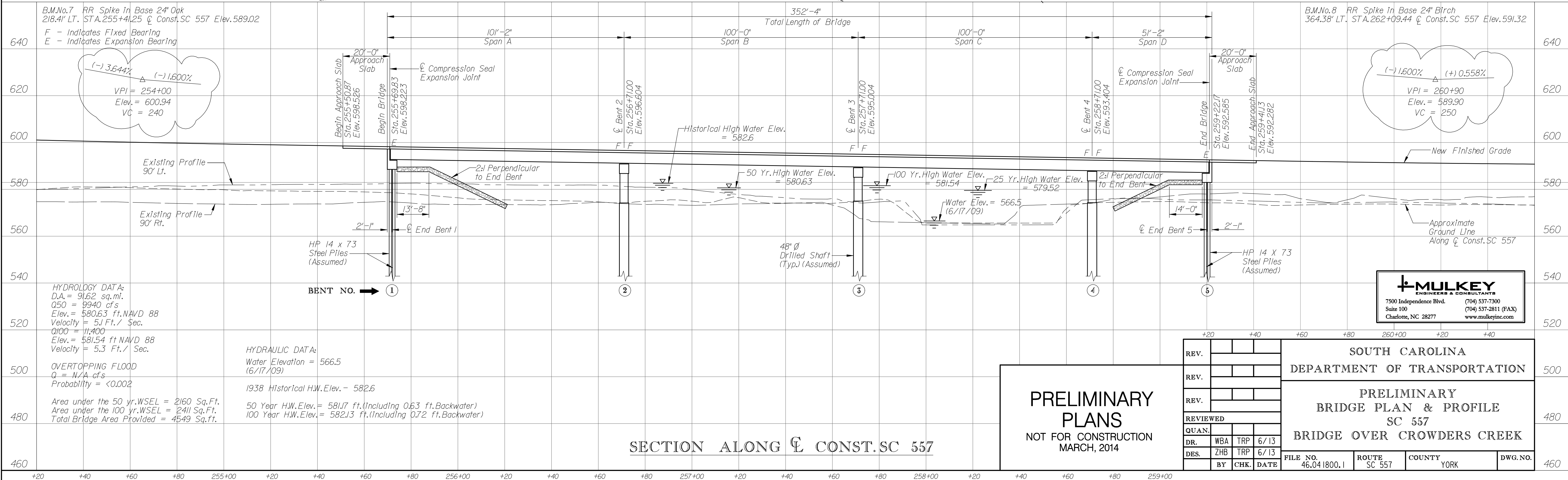
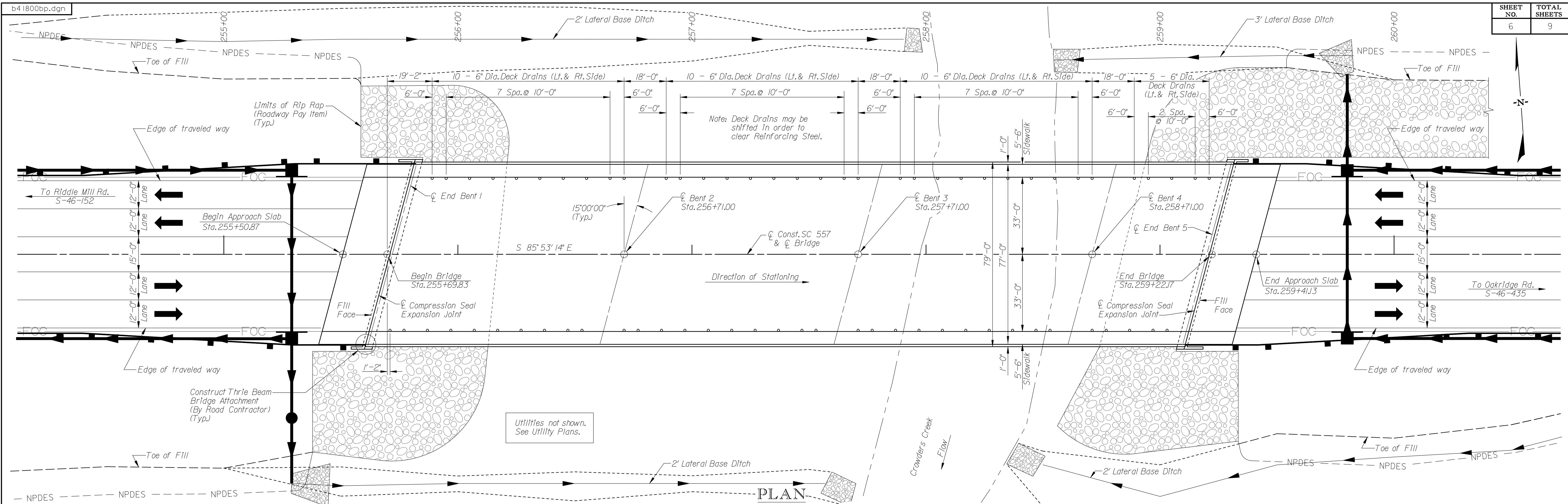
Load Case	P <sub>AXIAL</sub> kip	P <sub>LATERAL X</sub> kip	P <sub>LATERAL Z</sub> kip	M <sub>Z</sub> kip-ft	M <sub>X</sub> kip-ft
Service I	810.0	16.8	-10.7	117.0	-218.0
Service II					
Service III					
Service IV					
Strength I	1155.0	15.6	-20.7	114.0	-384.0
Strength II					
Strength III					
Strength IV					
Strength V					



**Interior Bent #4: Loads Acting on One Shaft**

Load Case	P <sub>AXIAL</sub> kip	P <sub>LATERAL X</sub> kip	P <sub>LATERAL Z</sub> kip	M <sub>Z</sub> kip-ft	M <sub>X</sub> kip-ft
Service I	640.0	15.7	-12.5	96.0	-60.0
Service II					
Service III					
Service IV					
Strength I	925.0	16.1	-23.2	102.0	-180.0
Strength II					
Strength III					
Strength IV					
Strength V					





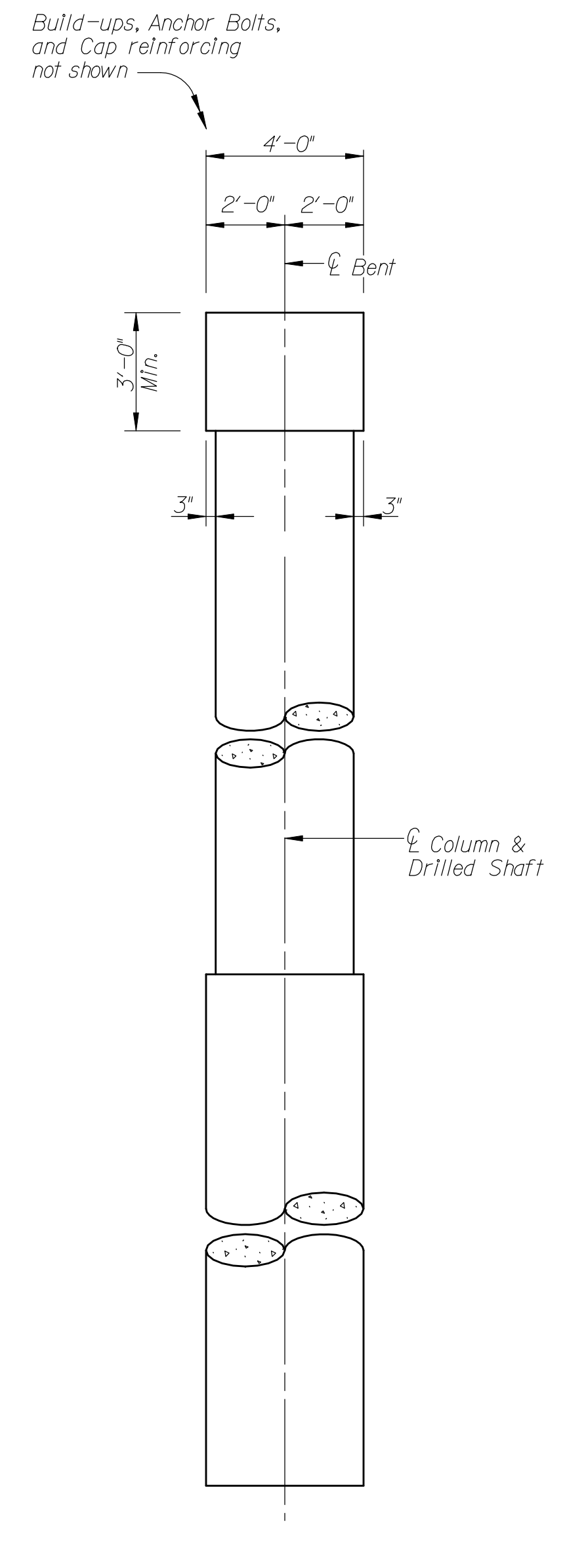
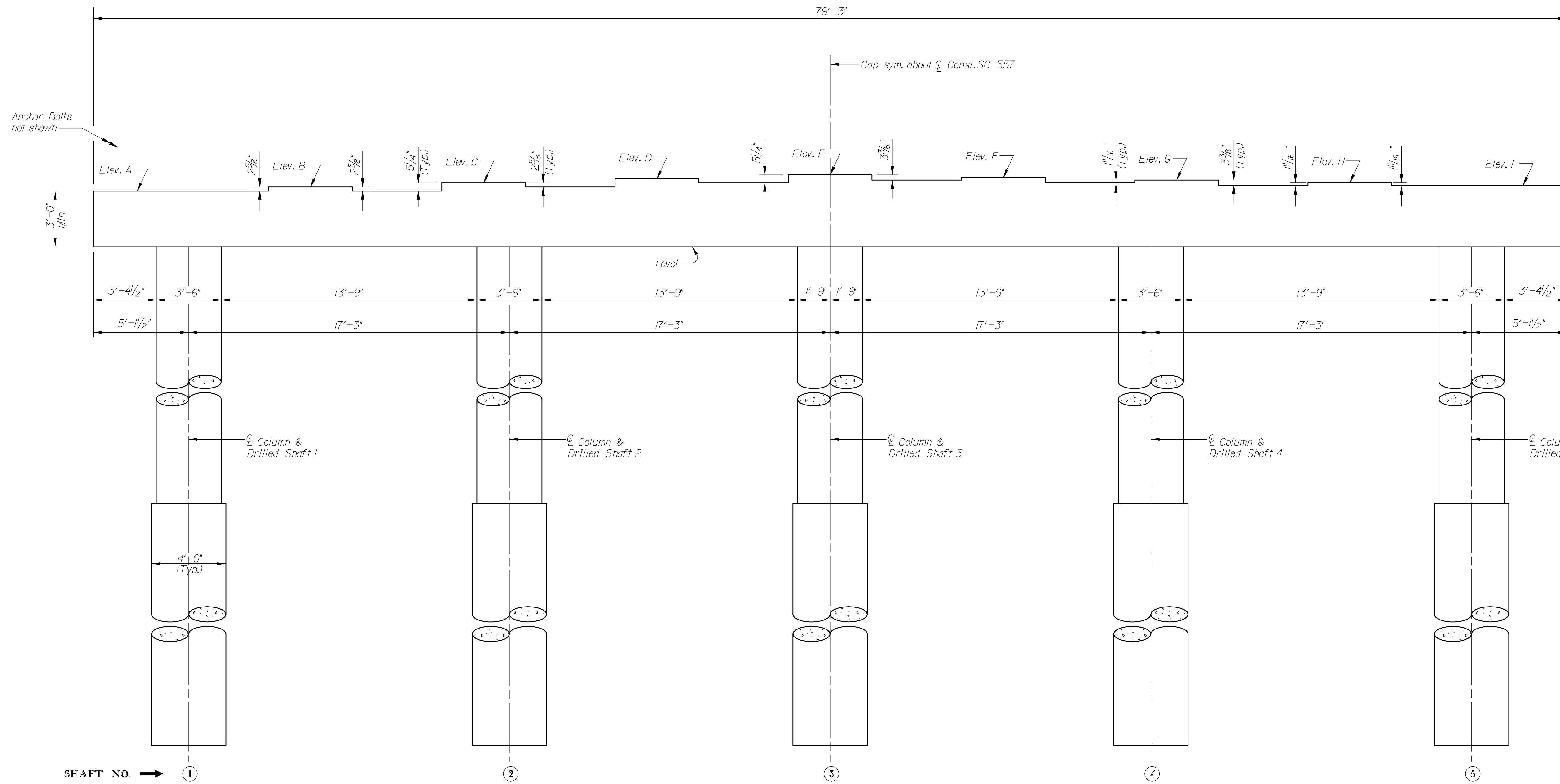
SHEET NO.	TOTAL SHEETS
6	9

**MULKEY ENGINEERS & CONSULTANTS**  
 7500 Independence Blvd. (704) 537-7300  
 Suite 100 (704) 537-2811 (FAX)  
 Charlotte, NC 28277 www.mulkeyinc.com

**PRELIMINARY PLANS**  
 NOT FOR CONSTRUCTION  
 MARCH, 2014

REV.					
REV.					
REV.					
REVIEWED					
QUAN.					
DR.	WBA	TRP	6/13		
DES.	ZHB	TRP	6/13		
BY	CHK.	DATE			
FILE NO.	46.041800.1	ROUTE	SC 557	COUNTY	YORK
DWG. NO.					460

3/7/2014 9:54:40 AM H:\Project\2006\320\20 SC 557 AIT 4\CLIENT\Structures\4600bp.dgn



**ELEVATION**  
Looking In direction of Stationing

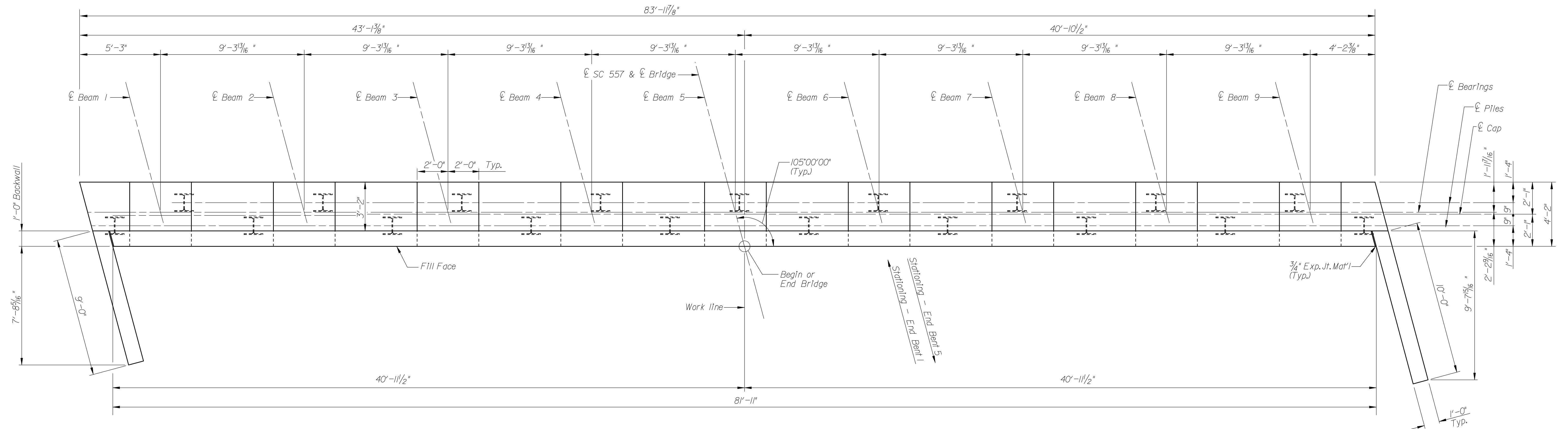
**END ELEVATION**

3/7/2014 8:03:12 AM H:\Project\2006\320.20 SC 557 Alt 4\CLIENT\Structures\b41800bt1.dgn

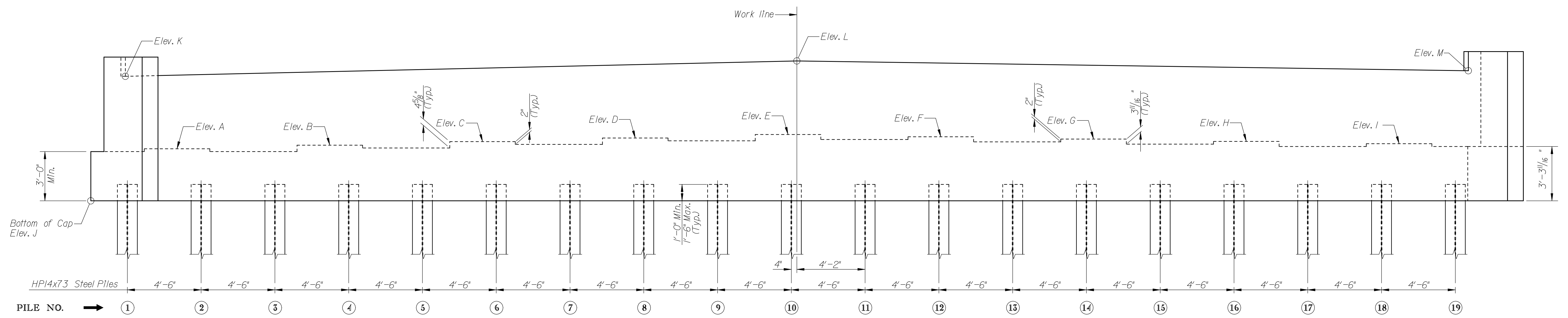


**PRELIMINARY PLANS**  
NOT FOR CONSTRUCTION  
MARCH, 2014

REV.				SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION			
REV.							
REV.							
REVIEWED				PRELIMINARY INTERIOR BENTS SC 557 BRIDGE OVER CROWDERS CREEK			
QUAN.							
DR.	WBA	TRP	6/13				
DES.	ZHB	TRP	6/13	FILE NO.	ROUTE	COUNTY	DWG. NO.
BY	CHK.	DATE		46.041800.1	SC 557	YORK	



PLAN



ELEVATION

3/7/2014 8:04:13 AM H:\Project\2006\320\20 SC 557 Alt 4\CLIENT\Structures\41800eb1.dgn

**PRELIMINARY PLANS**  
 NOT FOR CONSTRUCTION  
 MARCH, 2014

**MULKEY**  
 ENGINEERS & CONSULTANTS  
 7500 Independence Blvd. (704) 537-7300  
 Suite 100 (704) 537-2811 (FAX)  
 Charlotte, NC 28277 www.mulkeyinc.com

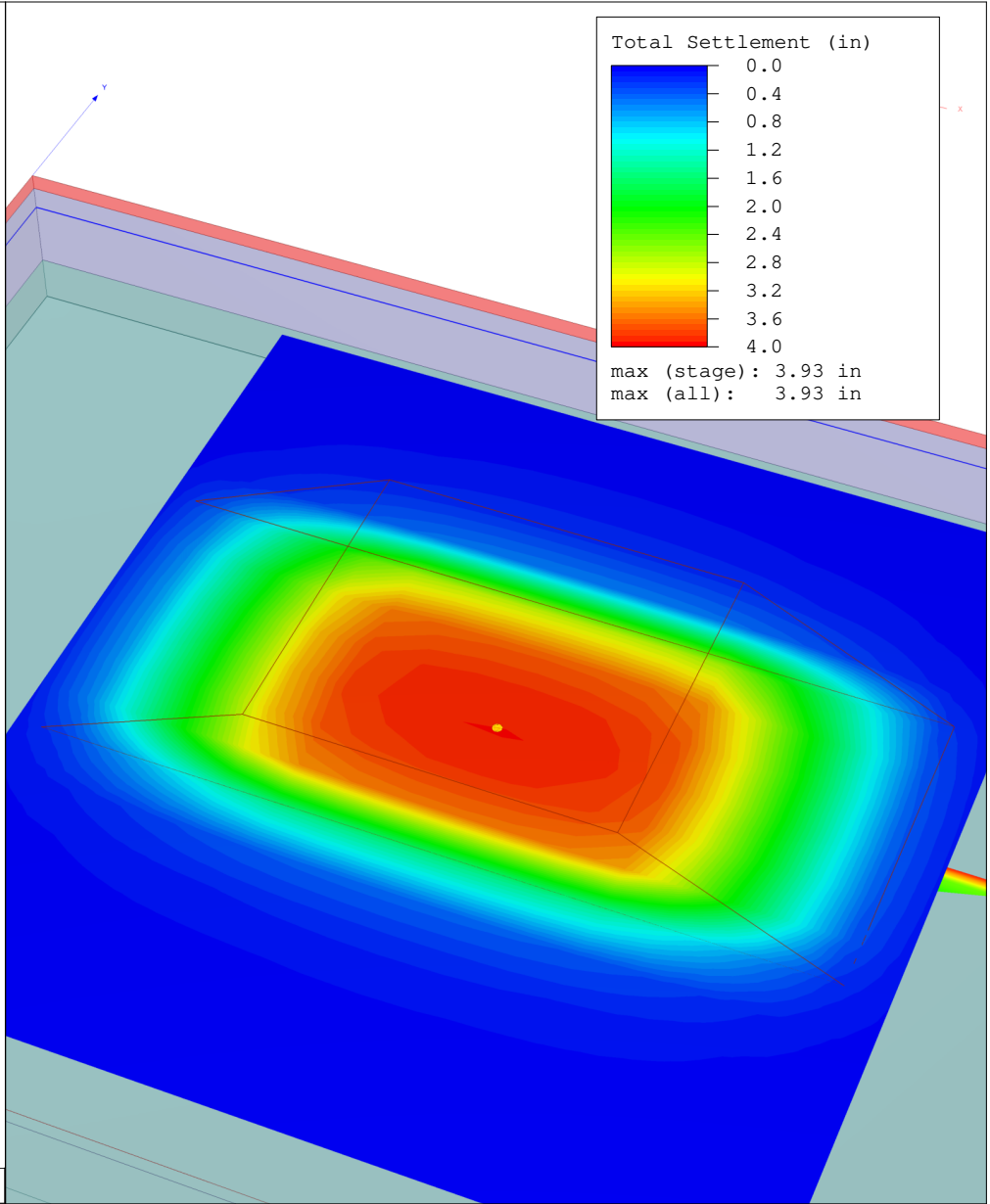
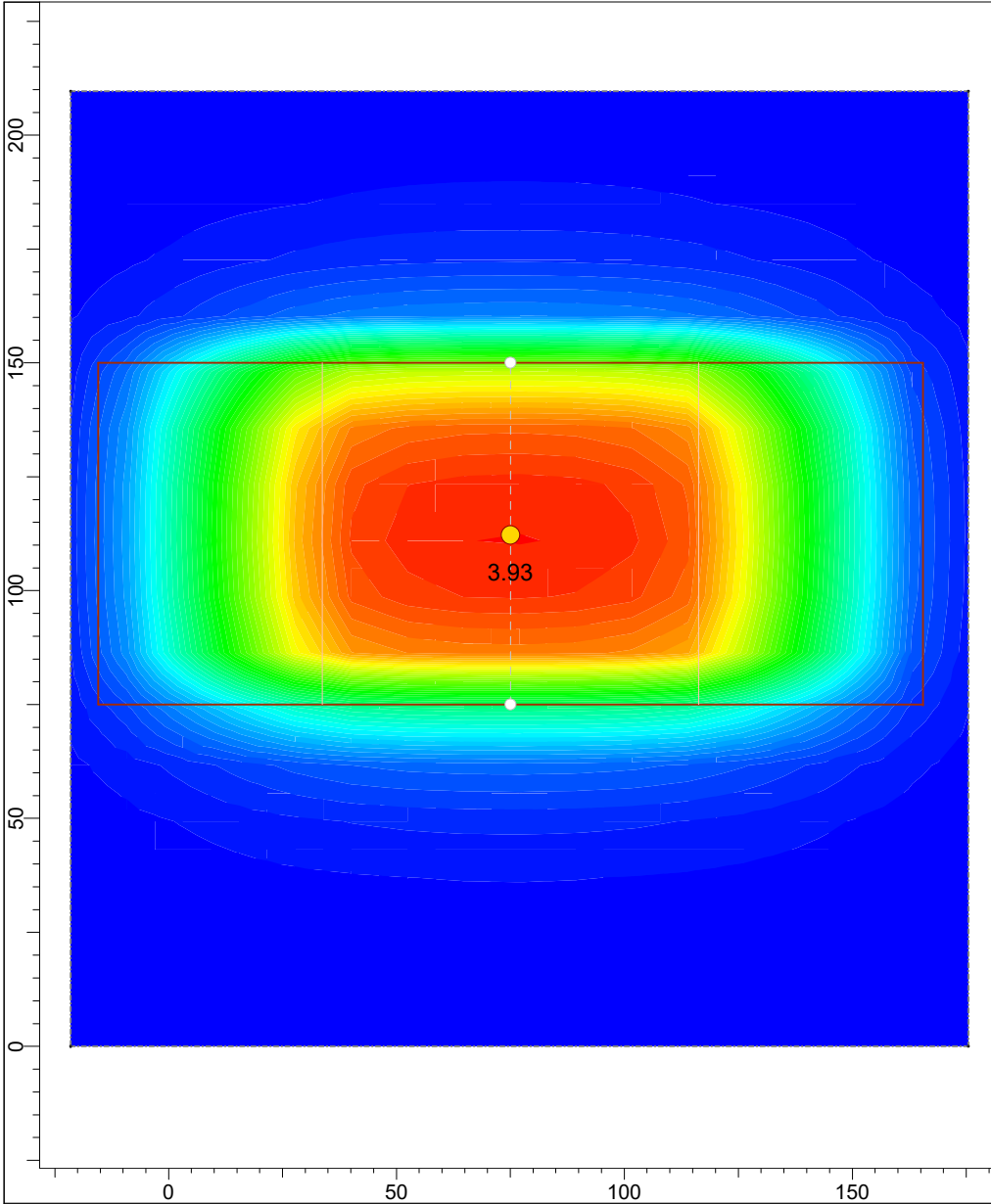
REV.				SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION			
REV.				PRELIMINARY END BENTS SC 557 BRIDGE OVER CROWDERS CREEK			
REV.				FILE NO. 46.041800.1 ROUTE SC 557 COUNTY YORK DWG. NO.			
REVIEWED							
QUAN.							
DR.	WBA	TRP	6-13				
DES.	ZHB	TRP	6-13				
BY	CHK.	DATE					

SC 557 Bridge over Crowders Creek  
Final Bridge Geotechnical Engineering Report

---

# APPENDIX

## SECTION 10 EMBANKMENT STATIC SETTLEMENT ANALYSES



Project	SC 557 Over Crowders Creek		
Analysis Description	Begin Bridge Embankment Single Drainage		
Drawn By	JFH	Company	F&ME
STAGE	Stage 2:150 Days (End Construction)	File Name	Begin Bridge Embankment.s3z

# Settle3D Analysis Information

## SC 557 Over Crowders Creek

### Project Settings

Document Name	Begin Bridge Embankment
Project Title	SC 557 Over Crowders Creek
Analysis	Begin Bridge Embankment Single Drainage
Author	JFH
Company	F&ME
Stress Computation Method	Boussinesq
Time-dependent Consolidation Analysis	
Time Units	days
Permeability Units	feet/day
Use average properties to calculate layered stresses	
Improve consolidation accuracy	
Ignore negative effective stresses in settlement calculations	


### Stage Settings

Stage #	Name	Time [days]
1	Stage 1	0
2	Stage 2	150
3	Stage 3	200
4	Stage 4	250
5	Stage 5	300
6	Stage 6	350
7	Stage 7	400
8	Stage 8	500
9	Stage 9	600
10	Stage 10	700
11	Stage 11	800
12	Stage 12	900
13	Stage 13	1000

### Results

Time taken to compute: 0.632021 seconds

**Stage: Stage 1 = 0 d**

	<i>Project</i>		SC 557 Over Crowders Creek	
	<i>Analysis Description</i>		Begin Bridge Embankment Single Drainage	
	<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
	<i>Date</i>		<i>File Name</i>	Begin Bridge Embankment.s3z




Data Type	Minimum	Maximum
Total Settlement [in]	0	0
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0
Effective Stress [ksf]	0	2.6454
Total Stress [ksf]	0	4.455
Total Strain	0	0
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	2.64471
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.52908

### Stage: Stage 2 = 150 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

### Stage: Stage 3 = 200 d


	<i>Project</i> SC 557 Over Crowders Creek	
	<i>Analysis Description</i> Begin Bridge Embankment Single Drainage	
	<i>Drawn By</i> JFH	<i>Company</i> F&ME
	<i>Date</i>	<i>File Name</i> Begin Bridge Embankment.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

#### Stage: Stage 4 = 250 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

#### Stage: Stage 5 = 300 d


	<i>Project</i> SC 557 Over Crowders Creek	
	<i>Analysis Description</i> Begin Bridge Embankment Single Drainage	
	<i>Drawn By</i> JFH	<i>Company</i> F&ME
	<i>Date</i>	<i>File Name</i> Begin Bridge Embankment.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

### Stage: Stage 6 = 350 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

### Stage: Stage 7 = 400 d


	<i>Project</i> SC 557 Over Crowders Creek	
	<i>Analysis Description</i> Begin Bridge Embankment Single Drainage	
	<i>Drawn By</i> JFH	<i>Company</i> F&ME
	<i>Date</i>	<i>File Name</i> Begin Bridge Embankment.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

### Stage: Stage 8 = 500 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

### Stage: Stage 9 = 600 d


	<i>Project</i> SC 557 Over Crowders Creek	
	<i>Analysis Description</i> Begin Bridge Embankment Single Drainage	
	<i>Drawn By</i> JFH	<i>Company</i> F&ME
	<i>Date</i>	<i>File Name</i> Begin Bridge Embankment.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

### Stage: Stage 10 = 700 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

### Stage: Stage 11 = 800 d


	<i>Project</i> SC 557 Over Crowders Creek	
	<i>Analysis Description</i> Begin Bridge Embankment Single Drainage	
	<i>Drawn By</i> JFH	<i>Company</i> F&ME
	<i>Date</i>	<i>File Name</i> Begin Bridge Embankment.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

### Stage: Stage 12 = 900 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

### Stage: Stage 13 = 1000 d

	<i>Project</i> SC 557 Over Crowders Creek	
	<i>Analysis Description</i> Begin Bridge Embankment Single Drainage	
	<i>Drawn By</i> JFH	<i>Company</i> F&ME
	<i>Date</i>	<i>File Name</i> Begin Bridge Embankment.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

## Embankments

### 1. Embankment


Center Line (75, 75) to (75, 150)  
 Number of Layers 1  
 Near End Angle 90 degrees  
 Far End Angle 90 degrees  
 Base Width 181

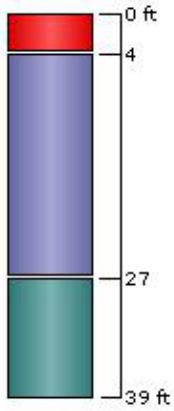
Layer	Stage	Left Bench Width (ft)	Left Angle (deg)	Height (ft)	Unit Weight (kips/ft <sup>3</sup> )	Right Angle (deg)	Right Bench Width (ft)
1	Stage 2 = 150 d	0	26	24	0.125	26	0

## Soil Layers




Ground Surface Drained: Yes

Layer #	Type	Thickness [ft]	Depth [ft]	Drained at Bottom
1	Soft Clay	4	0	No
2	Firm Silt	23	4	No
3	Hard Silt	12	27	No

	Project		SC 557 Over Crowders Creek	
	Analysis Description		Begin Bridge Embankment Single Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	Begin Bridge Embankment.s3z



### Soil Properties

Property	Firm Silt	Hard Silt	Soft Clay
Color			
Unit Weight [kips/ft <sup>3</sup> ]	0.11	0.115	0.1
Saturated Unit Weight [kips/ft <sup>3</sup> ]	0.115	0.12	0.105
Immediate Settlement	Enabled	Enabled	Enabled
Es [ksf]	500	400	100
E <sub>sur</sub> [ksf]	500	400	100
Undrained Su A [kips/ft <sup>2</sup> ]	0	0	0
Undrained Su S	0.2	0.2	0.2
Undrained Su m	0.8	0.8	0.8
Piezo Line ID	1	1	1

### Groundwater

Groundwater method Piezometric Lines  
 Water Unit Weight 0.0624 kips/ft<sup>3</sup>

### Piezometric Line Entities

ID	Depth (ft)
1	10 ft


### Query Points

Point #	(X,Y) Location	Number of Divisions
2	75, 112.162	Auto: 57

### Field Point Grid


Number of points 306  
 Expansion Factor 2

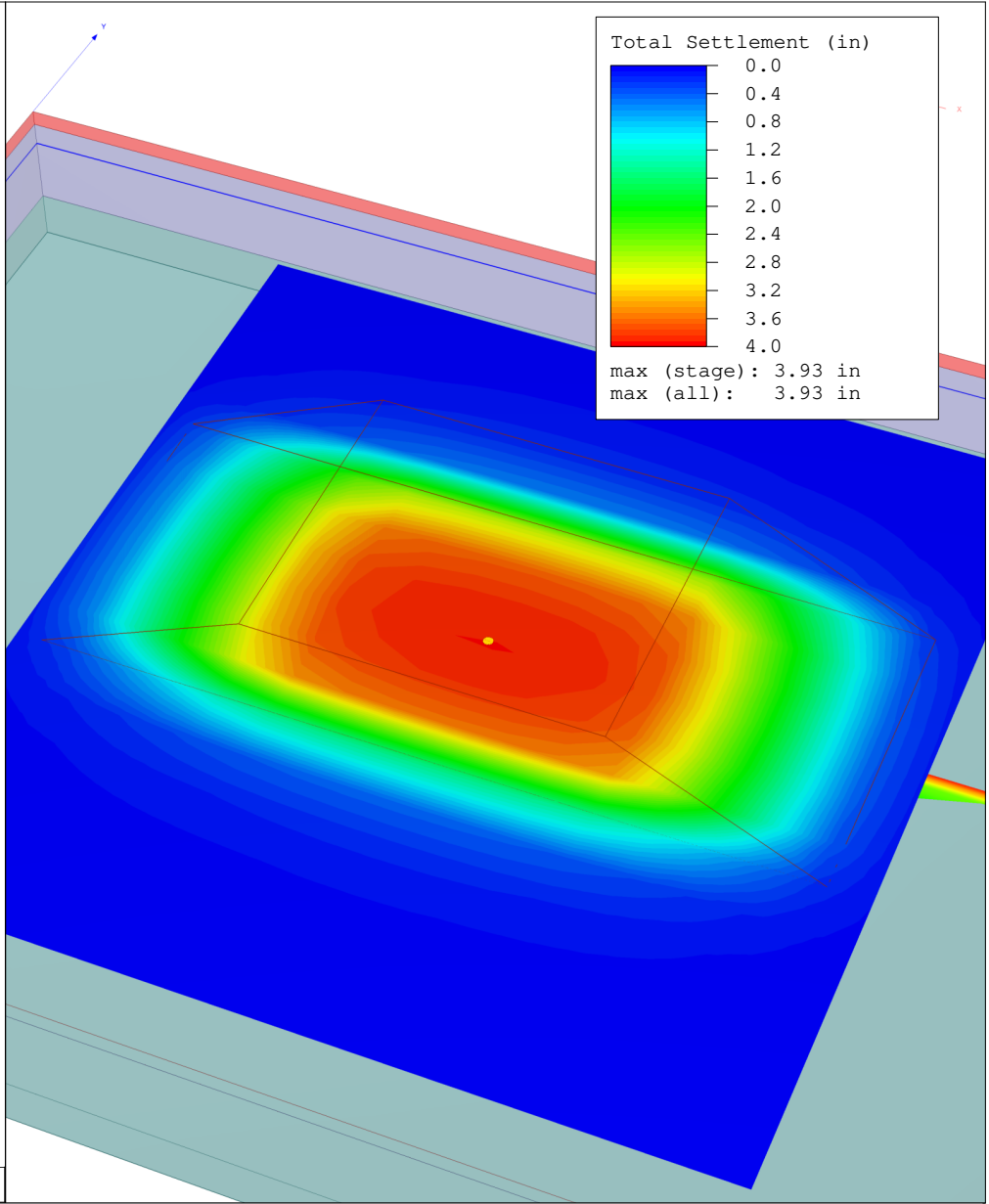
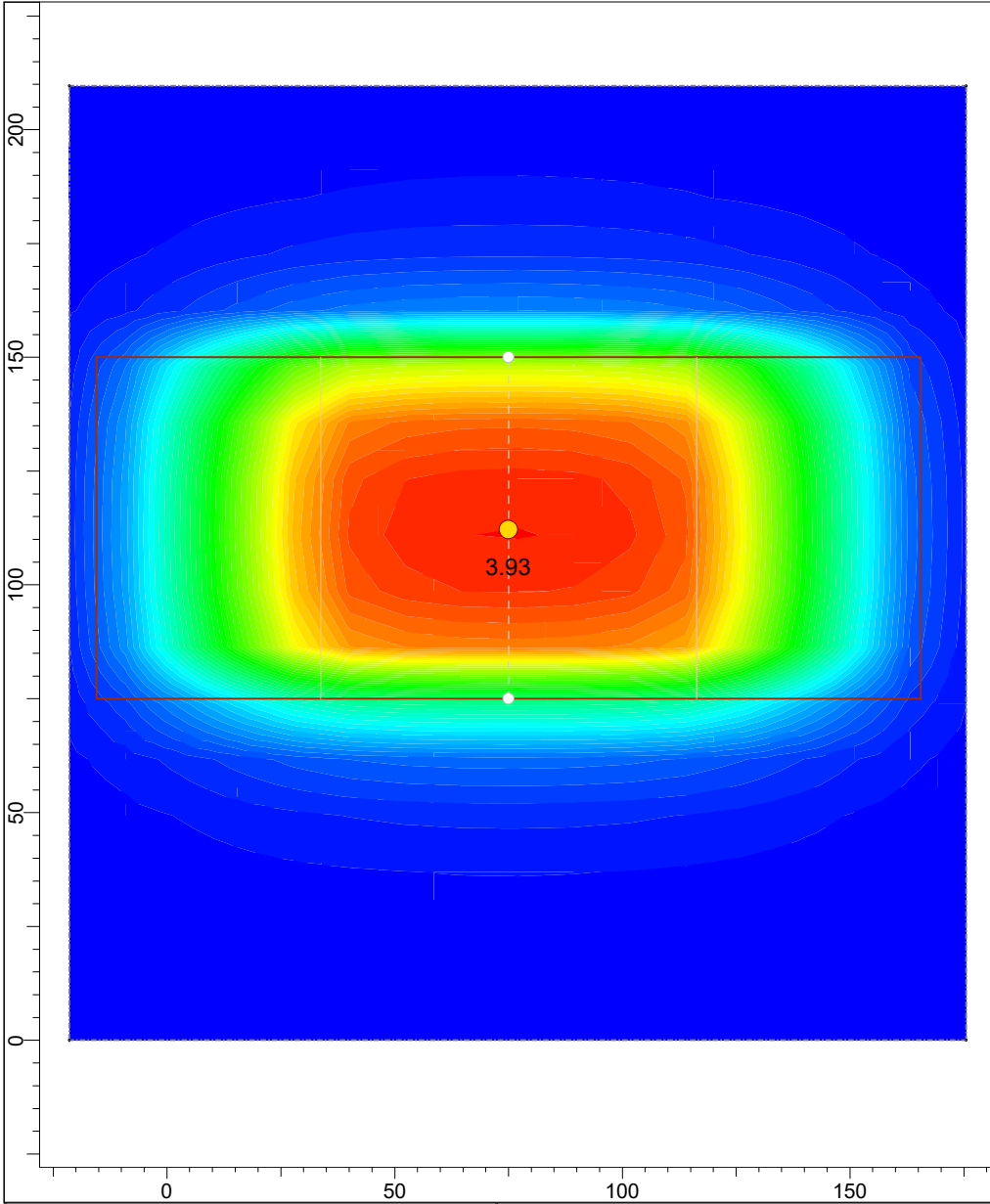
### Grid Coordinates

	Project		SC 557 Over Crowders Creek	
	Analysis Description		Begin Bridge Embankment Single Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	Begin Bridge Embankment.s3z



X [ft]	Y [ft]
256	240.5
256	-15.5
-106	-15.5
-106	240.5

	<i>Project</i>		SC 557 Over Crowders Creek	
	<i>Analysis Description</i>		Begin Bridge Embankment Single Drainage	
	<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
	<i>Date</i>		<i>File Name</i>	Begin Bridge Embankment.s3z



<i>Project</i>	SC 557 Over Crowders Creek		
<i>Analysis Description</i>	Begin Bridge Embankment Double Drainage		
<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
<i>STAGE</i>	Stage 2:150 Days (End Construction)	<i>File Name</i>	Begin Bridge Embankment_DD.s3z

# Settle3D Analysis Information

## SC 557 Over Crowders Creek

### Project Settings

Document Name	Begin Bridge Embankment_DD
Project Title	SC 557 Over Crowders Creek
Analysis	Begin Bridge Embankment Double Drainage
Author	JFH
Company	F&ME
Stress Computation Method	Boussinesq
Time-dependent Consolidation Analysis	
Time Units	days
Permeability Units	feet/day
Use average properties to calculate layered stresses	
Improve consolidation accuracy	
Ignore negative effective stresses in settlement calculations	


### Stage Settings

Stage #	Name	Time [days]
1	Stage 1	0
2	Stage 2	150
3	Stage 3	160
4	Stage 4	250
5	Stage 5	300
6	Stage 6	350
7	Stage 7	400
8	Stage 8	500
9	Stage 9	600
10	Stage 10	700
11	Stage 11	800
12	Stage 12	900
13	Stage 13	1000

### Results

Time taken to compute: 0.639458 seconds

**Stage: Stage 1 = 0 d**


	<i>Project</i>		SC 557 Over Crowders Creek	
	<i>Analysis Description</i>		Begin Bridge Embankment Double Drainage	
	<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
	<i>Date</i>		<i>File Name</i>	Begin Bridge Embankment_DD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	0
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0
Effective Stress [ksf]	0	2.6454
Total Stress [ksf]	0	4.455
Total Strain	0	0
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	2.64471
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.52908

### Stage: Stage 2 = 150 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

### Stage: Stage 3 = 160 d


	<i>Project</i> SC 557 Over Crowders Creek	
	<i>Analysis Description</i> Begin Bridge Embankment Double Drainage	
	<i>Drawn By</i> JFH	<i>Company</i> F&ME
	<i>Date</i>	<i>File Name</i> Begin Bridge Embankment_DD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

### Stage: Stage 4 = 250 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

### Stage: Stage 5 = 300 d


	<i>Project</i> SC 557 Over Crowders Creek	
	<i>Analysis Description</i> Begin Bridge Embankment Double Drainage	
	<i>Drawn By</i> JFH	<i>Company</i> F&ME
	<i>Date</i>	<i>File Name</i> Begin Bridge Embankment_DD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

### Stage: Stage 6 = 350 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

### Stage: Stage 7 = 400 d


	Project		SC 557 Over Crowders Creek	
	Analysis Description		Begin Bridge Embankment Double Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	Begin Bridge Embankment_DD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

### Stage: Stage 8 = 500 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

### Stage: Stage 9 = 600 d


	<i>Project</i> SC 557 Over Crowders Creek	
	<i>Analysis Description</i> Begin Bridge Embankment Double Drainage	
	<i>Drawn By</i> JFH	<i>Company</i> F&ME
	<i>Date</i>	<i>File Name</i> Begin Bridge Embankment_DD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

### Stage: Stage 10 = 700 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

### Stage: Stage 11 = 800 d

	<i>Project</i> SC 557 Over Crowders Creek	
	<i>Analysis Description</i> Begin Bridge Embankment Double Drainage	
	<i>Drawn By</i> JFH	<i>Company</i> F&ME
	<i>Date</i>	<i>File Name</i> Begin Bridge Embankment_DD.s3z




Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

### Stage: Stage 12 = 900 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

### Stage: Stage 13 = 1000 d

	Project SC 557 Over Crowders Creek	
	Analysis Description Begin Bridge Embankment Double Drainage	
	Drawn By JFH	Company F&ME
	Date	File Name Begin Bridge Embankment_DD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

## Embankments

### 1. Embankment


Center Line (75, 75) to (75, 150)  
 Number of Layers 1  
 Near End Angle 90 degrees  
 Far End Angle 90 degrees  
 Base Width 181

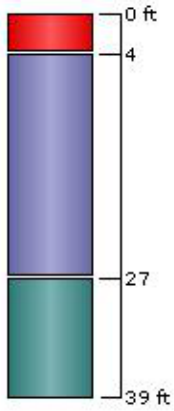
Layer	Stage	Left Bench Width (ft)	Left Angle (deg)	Height (ft)	Unit Weight (kips/ft <sup>3</sup> )	Right Angle (deg)	Right Bench Width (ft)
1	Stage 2 = 150 d	0	26	24	0.125	26	0

## Soil Layers




Ground Surface Drained: Yes

Layer #	Type	Thickness [ft]	Depth [ft]	Drained at Bottom
1	Soft Clay	4	0	Yes
2	Firm Silt	23	4	Yes
3	Hard Silt	12	27	Yes

	Project		SC 557 Over Crowders Creek	
	Analysis Description		Begin Bridge Embankment Double Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	Begin Bridge Embankment_DD.s3z



### Soil Properties

Property	Firm Silt	Hard Silt	Soft Clay
Color			
Unit Weight [kips/ft <sup>3</sup> ]	0.11	0.115	0.1
Saturated Unit Weight [kips/ft <sup>3</sup> ]	0.115	0.12	0.105
Immediate Settlement	Enabled	Enabled	Enabled
Es [ksf]	500	400	100
E <sub>sur</sub> [ksf]	500	400	100
Undrained Su A [kips/ft <sup>2</sup> ]	0	0	0
Undrained Su S	0.2	0.2	0.2
Undrained Su m	0.8	0.8	0.8
Piezo Line ID	1	1	1

### Groundwater

Groundwater method Piezometric Lines  
 Water Unit Weight 0.0624 kips/ft<sup>3</sup>

### Piezometric Line Entities

ID	Depth (ft)
1	10 ft


### Query Points

Point #	(X,Y) Location	Number of Divisions
2	75, 112.162	Auto: 57


### Field Point Grid

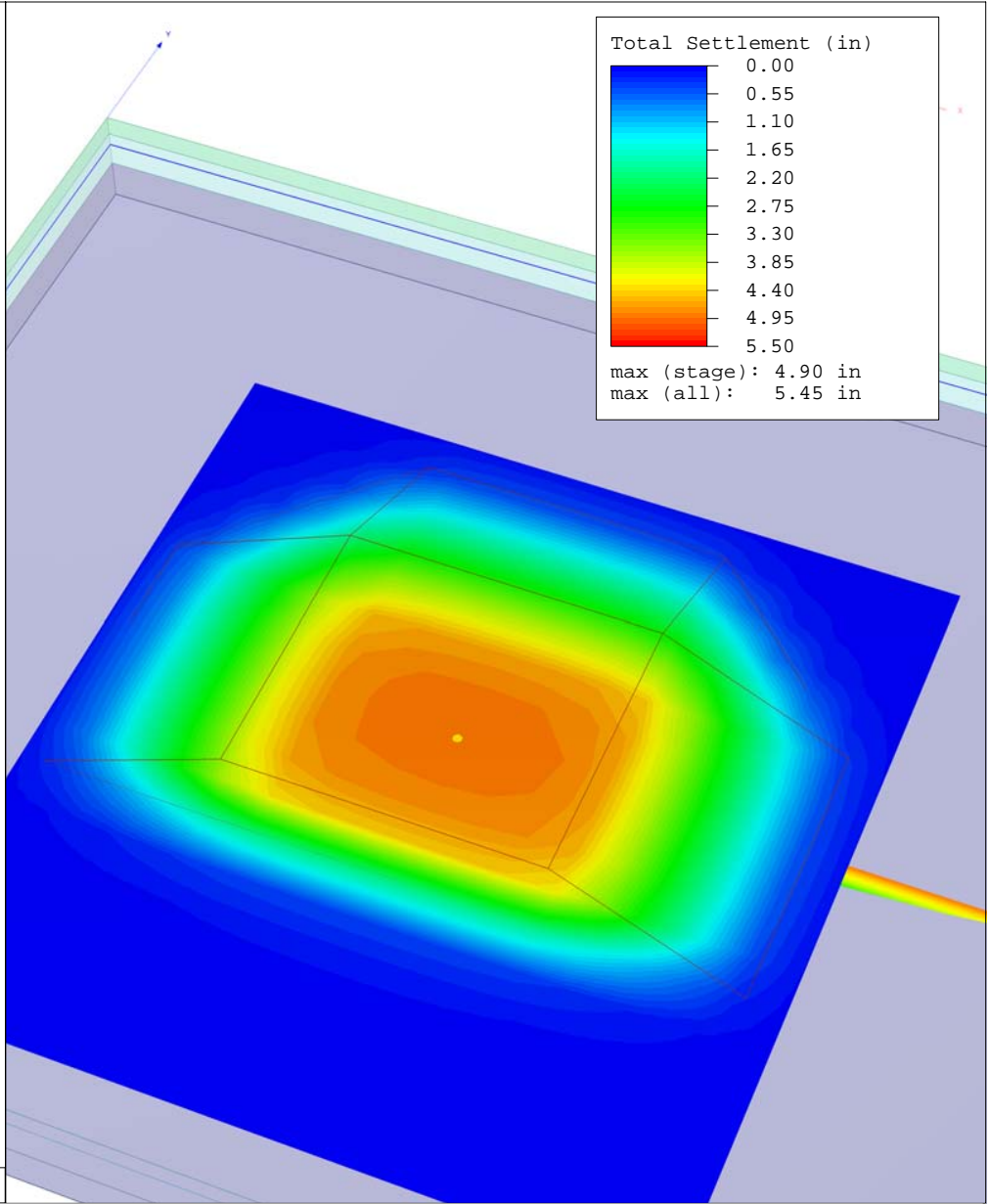
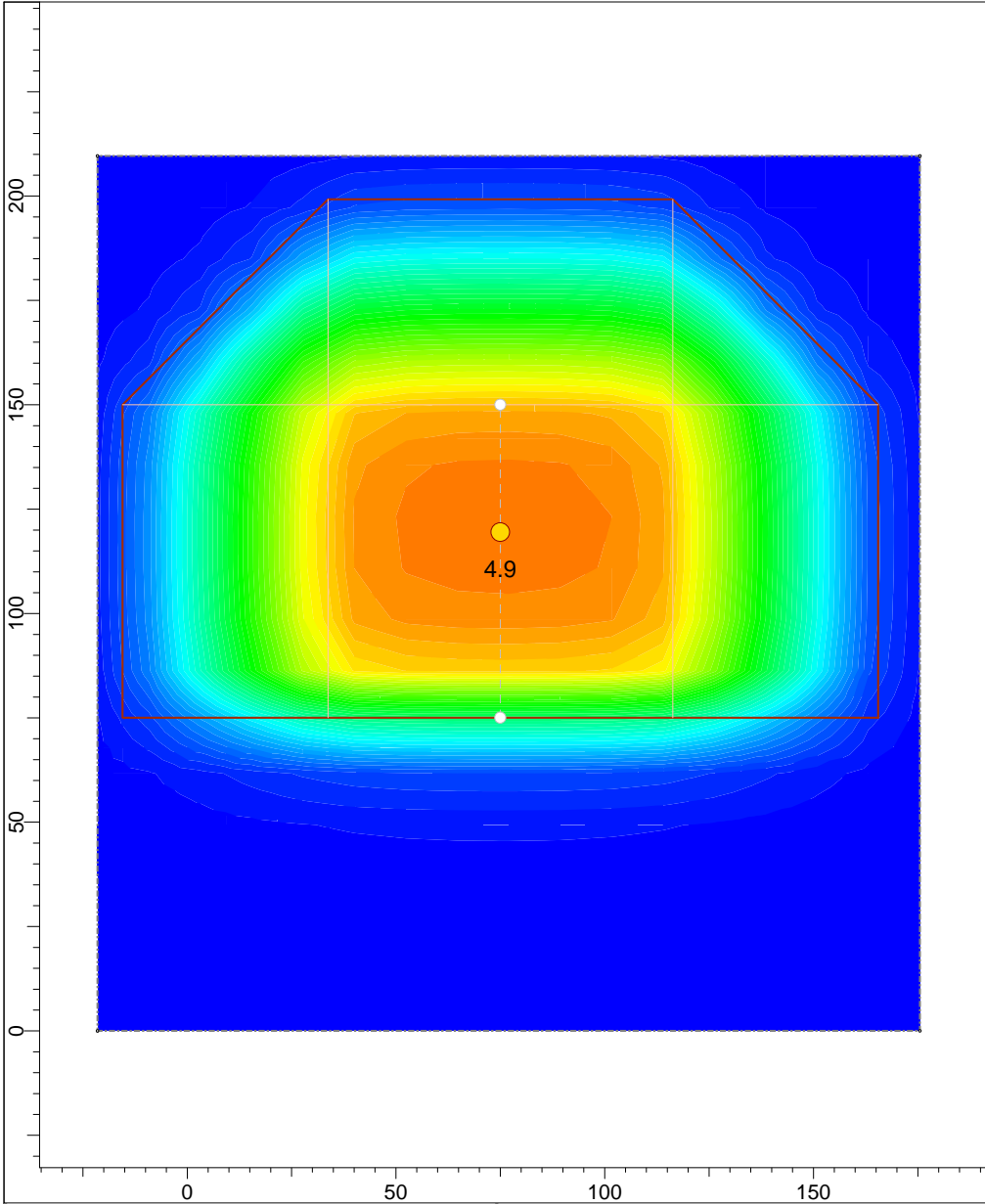
Number of points 306  
 Expansion Factor 2

### Grid Coordinates

	Project		SC 557 Over Crowders Creek	
	Analysis Description		Begin Bridge Embankment Double Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	Begin Bridge Embankment_DD.s3z

X [ft]	Y [ft]
256	240.5
256	-15.5
-106	-15.5
-106	240.5

	<i>Project</i>		SC 557 Over Crowders Creek	
	<i>Analysis Description</i>		Begin Bridge Embankment Double Drainage	
	<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
	<i>Date</i>		<i>File Name</i>	Begin Bridge Embankment_DD.s3z



<i>Project</i>	SC 557 Over Crowders Creek		
<i>Analysis Description</i>	Begin Bridge Single Drainage		
<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
<i>Date</i>		<i>File Name</i>	Begin Bridge.s3z

# Settle3D Analysis Information

## SC 557 Over Crowders Creek

### Project Settings

Document Name	Begin Bridge
Project Title	SC 557 Over Crowders Creek
Analysis	Begin Bridge Single Drainage
Author	JFH
Company	F&ME
Stress Computation Method	Boussinesq
Time-dependent Consolidation Analysis	
Time Units	days
Permeability Units	feet/day
Use average properties to calculate layered stresses	
Improve consolidation accuracy	
Ignore negative effective stresses in settlement calculations	


### Stage Settings

Stage #	Name	Time [days]
1	Stage 1	0
2	Stage 2	150
3	Stage 3	200
4	Stage 4	250
5	Stage 5	300
6	Stage 6	350
7	Stage 7	400
8	Stage 8	500
9	Stage 9	600
10	Stage 10	700
11	Stage 11	800
12	Stage 12	900
13	Stage 13	1000

### Results

Time taken to compute: 4.54433 seconds

**Stage: Stage 1 = 0 d**


	<i>Project</i>		SC 557 Over Crowders Creek	
	<i>Analysis Description</i>		Begin Bridge Single Drainage	
	<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
	<i>Date</i>		<i>File Name</i>	Begin Bridge.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	0
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0
Effective Stress [ksf]	0	1.9994
Total Stress [ksf]	0	3.185
Total Strain	0	0
Pore Water Pressure [ksf]	0	1.1856
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.00054	5.19601
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.000885483
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.795743

### Stage: Stage 2 = 150 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	4.90188
Consolidation Settlement [in]	0	0.501127
Immediate Settlement [in]	0	4.40075
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	3.97464
Total Stress [ksf]	0	5.90628
Total Strain	0	0.0290516
Pore Water Pressure [ksf]	0	3.90688
Excess Pore Water Pressure [ksf]	0	2.98346
Degree of Consolidation [%]	0	48.4917
Pre-consolidation Stress [ksf]	0.00054	5.19601
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.00232849
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.795743

### Stage: Stage 3 = 200 d


	<i>Project</i> SC 557 Over Crowders Creek	
	<i>Analysis Description</i> Begin Bridge Single Drainage	
	<i>Drawn By</i> JFH	<i>Company</i> F&ME
	<i>Date</i>	<i>File Name</i> Begin Bridge.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	5.44887
Consolidation Settlement [in]	0	1.04812
Immediate Settlement [in]	0	4.40075
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.66678
Total Stress [ksf]	0	5.90628
Total Strain	0	0.0290516
Pore Water Pressure [ksf]	0	1.2395
Excess Pore Water Pressure [ksf]	0	0.0538997
Degree of Consolidation [%]	0	99.6639
Pre-consolidation Stress [ksf]	0.00054	5.19601
Over-consolidation Ratio	1	3.79947
Void Ratio	0	1.27
Permeability [ft/d]	0	0.00232849
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	98.8276
Undrained Shear Strength	0	0.997875

#### Stage: Stage 4 = 250 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	5.45244
Consolidation Settlement [in]	0	1.05169
Immediate Settlement [in]	0	4.40075
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.71993
Total Stress [ksf]	0	5.90628
Total Strain	0	0.0290516
Pore Water Pressure [ksf]	0	1.18635
Excess Pore Water Pressure [ksf]	0	0.000750517
Degree of Consolidation [%]	0	99.9953
Pre-consolidation Stress [ksf]	0.00054	5.19601
Over-consolidation Ratio	1	3.79947
Void Ratio	0	1.27
Permeability [ft/d]	0	0.00232849
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	99.9837
Undrained Shear Strength	0	1.00036

#### Stage: Stage 5 = 300 d

	Project		SC 557 Over Crowders Creek	
	Analysis Description		Begin Bridge Single Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	Begin Bridge.s3z




Data Type	Minimum	Maximum
Total Settlement [in]	0	5.45249
Consolidation Settlement [in]	0	1.05174
Immediate Settlement [in]	0	4.40075
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.72067
Total Stress [ksf]	0	5.90628
Total Strain	0	0.0290516
Pore Water Pressure [ksf]	0	1.18561
Excess Pore Water Pressure [ksf]	0	1.03891e-005
Degree of Consolidation [%]	0	99.9999
Pre-consolidation Stress [ksf]	0.00054	5.19601
Over-consolidation Ratio	1	3.79947
Void Ratio	0	1.27
Permeability [ft/d]	0	0.00232849
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	99.9998
Undrained Shear Strength	0	1.0004

### Stage: Stage 6 = 350 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	5.45249
Consolidation Settlement [in]	0	1.05174
Immediate Settlement [in]	0	4.40075
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.72068
Total Stress [ksf]	0	5.90628
Total Strain	0	0.0290516
Pore Water Pressure [ksf]	0	1.1856
Excess Pore Water Pressure [ksf]	0	1.41968e-007
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.00054	5.19601
Over-consolidation Ratio	1	3.79947
Void Ratio	0	1.27
Permeability [ft/d]	0	0.00232849
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	1.0004

### Stage: Stage 7 = 400 d


	Project		SC 557 Over Crowders Creek	
	Analysis Description		Begin Bridge Single Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	Begin Bridge.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	5.45249
Consolidation Settlement [in]	0	1.05174
Immediate Settlement [in]	0	4.40075
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.72068
Total Stress [ksf]	0	5.90628
Total Strain	0	0.0290516
Pore Water Pressure [ksf]	0	1.1856
Excess Pore Water Pressure [ksf]	0	1.94e-009
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.00054	5.19601
Over-consolidation Ratio	1	3.79947
Void Ratio	0	1.27
Permeability [ft/d]	0	0.00232849
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	1.0004

### Stage: Stage 8 = 500 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	5.45249
Consolidation Settlement [in]	0	1.05174
Immediate Settlement [in]	0	4.40075
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.72068
Total Stress [ksf]	0	5.90628
Total Strain	0	0.0290516
Pore Water Pressure [ksf]	0	1.1856
Excess Pore Water Pressure [ksf]	0	3.52936e-013
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.00054	5.19601
Over-consolidation Ratio	1	3.79947
Void Ratio	0	1.27
Permeability [ft/d]	0	0.00232849
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	1.0004

### Stage: Stage 9 = 600 d


	<i>Project</i> SC 557 Over Crowders Creek	
	<i>Analysis Description</i> Begin Bridge Single Drainage	
	<i>Drawn By</i> JFH	<i>Company</i> F&ME
	<i>Date</i>	<i>File Name</i> Begin Bridge.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	5.45249
Consolidation Settlement [in]	0	1.05174
Immediate Settlement [in]	0	4.40075
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.72068
Total Stress [ksf]	0	5.90628
Total Strain	0	0.0290516
Pore Water Pressure [ksf]	0	1.1856
Excess Pore Water Pressure [ksf]	-5.46257e-015	6.84314e-015
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.00054	5.19601
Over-consolidation Ratio	1	3.79947
Void Ratio	0	1.27
Permeability [ft/d]	0	0.00232849
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	1.0004

### Stage: Stage 10 = 700 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	5.45249
Consolidation Settlement [in]	0	1.05174
Immediate Settlement [in]	0	4.40075
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.72068
Total Stress [ksf]	0	5.90628
Total Strain	0	0.0290516
Pore Water Pressure [ksf]	0	1.1856
Excess Pore Water Pressure [ksf]	-5.51168e-015	6.76449e-015
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.00054	5.19601
Over-consolidation Ratio	1	3.79947
Void Ratio	0	1.27
Permeability [ft/d]	0	0.00232849
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	1.0004

### Stage: Stage 11 = 800 d


	Project		SC 557 Over Crowders Creek	
	Analysis Description		Begin Bridge Single Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	Begin Bridge.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	5.45249
Consolidation Settlement [in]	0	1.05174
Immediate Settlement [in]	0	4.40075
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.72068
Total Stress [ksf]	0	5.90628
Total Strain	0	0.0290516
Pore Water Pressure [ksf]	0	1.1856
Excess Pore Water Pressure [ksf]	-5.50378e-015	6.73749e-015
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.00054	5.19601
Over-consolidation Ratio	1	3.79947
Void Ratio	0	1.27
Permeability [ft/d]	0	0.00232849
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	1.0004

### Stage: Stage 12 = 900 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	5.45249
Consolidation Settlement [in]	0	1.05174
Immediate Settlement [in]	0	4.40075
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.72068
Total Stress [ksf]	0	5.90628
Total Strain	0	0.0290516
Pore Water Pressure [ksf]	0	1.1856
Excess Pore Water Pressure [ksf]	-5.49613e-015	6.71133e-015
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.00054	5.19601
Over-consolidation Ratio	1	3.79947
Void Ratio	0	1.27
Permeability [ft/d]	0	0.00232849
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	1.0004

### Stage: Stage 13 = 1000 d

	Project		SC 557 Over Crowders Creek	
	Analysis Description		Begin Bridge Single Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	Begin Bridge.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	5.45249
Consolidation Settlement [in]	0	1.05174
Immediate Settlement [in]	0	4.40075
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.72068
Total Stress [ksf]	0	5.90628
Total Strain	0	0.0290516
Pore Water Pressure [ksf]	0	1.1856
Excess Pore Water Pressure [ksf]	-6.68864e-015	5.49069e-015
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.00054	5.19601
Over-consolidation Ratio	1	3.79947
Void Ratio	0	1.27
Permeability [ft/d]	0	0.00232849
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	1.0004

## Embankments

### 1. Embankment


Center Line (75, 75) to (75, 150)  
 Number of Layers 1  
 Near End Angle 90 degrees  
 Far End Angle 26 degrees  
 Base Width 181

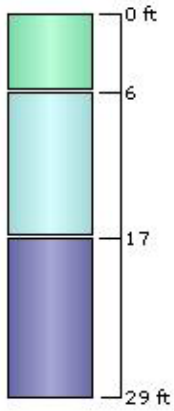
Layer	Stage	Left Bench Width (ft)	Left Angle (deg)	Height (ft)	Unit Weight (kips/ft <sup>3</sup> )	Right Angle (deg)	Right Bench Width (ft)
1	Stage 2 = 150 d	0	26	24	0.125	26	0

## Soil Layers




Ground Surface Drained: Yes

Layer #	Type	Thickness [ft]	Depth [ft]	Drained at Bottom
1	V. Loose Silty Sand	6	0	No
2	Soft Sandy Silt	11	6	No
3	Stiff Silt	12	17	No

	Project		SC 557 Over Crowders Creek	
	Analysis Description		Begin Bridge Single Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	Begin Bridge.s3z



## Soil Properties

Property	Stiff Silt	Soft Sandy Silt	V. Loose Silty Sand
Color			
Unit Weight [kips/ft <sup>3</sup> ]	0.11	0.115	0.09
Saturated Unit Weight [kips/ft <sup>3</sup> ]	0.115	0.115	0.095
Immediate Settlement	Enabled	Enabled	Enabled
Es [ksf]	300	200	200
Esur [ksf]	300	200	200
Primary Consolidation	Disabled	Enabled	Disabled
Material Type		Non-Linear	
Cc		0.071	
Cr		0.027	
e0		1.27	
OCR	1	3.8	1
Cv [ft <sup>2</sup> /d]		1.51	
B-bar		1	
Undrained Su A [kips/ft <sup>2</sup> ]	0	0	0
Undrained Su S	0.2	0.2	0.2
Undrained Su m	0.8	0.8	0.8
Piezo Line ID	1	1	1

## Groundwater


Groundwater method Piezometric Lines  
 Water Unit Weight 0.0624 kips/ft<sup>3</sup>

## Piezometric Line Entities

ID	Depth (ft)
1	10 ft

## Query Points

Point #	(X,Y) Location	Number of Divisions
2	75, 119.491	Auto: 65


	Project		SC 557 Over Crowders Creek	
	Analysis Description		Begin Bridge Single Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	Begin Bridge.s3z

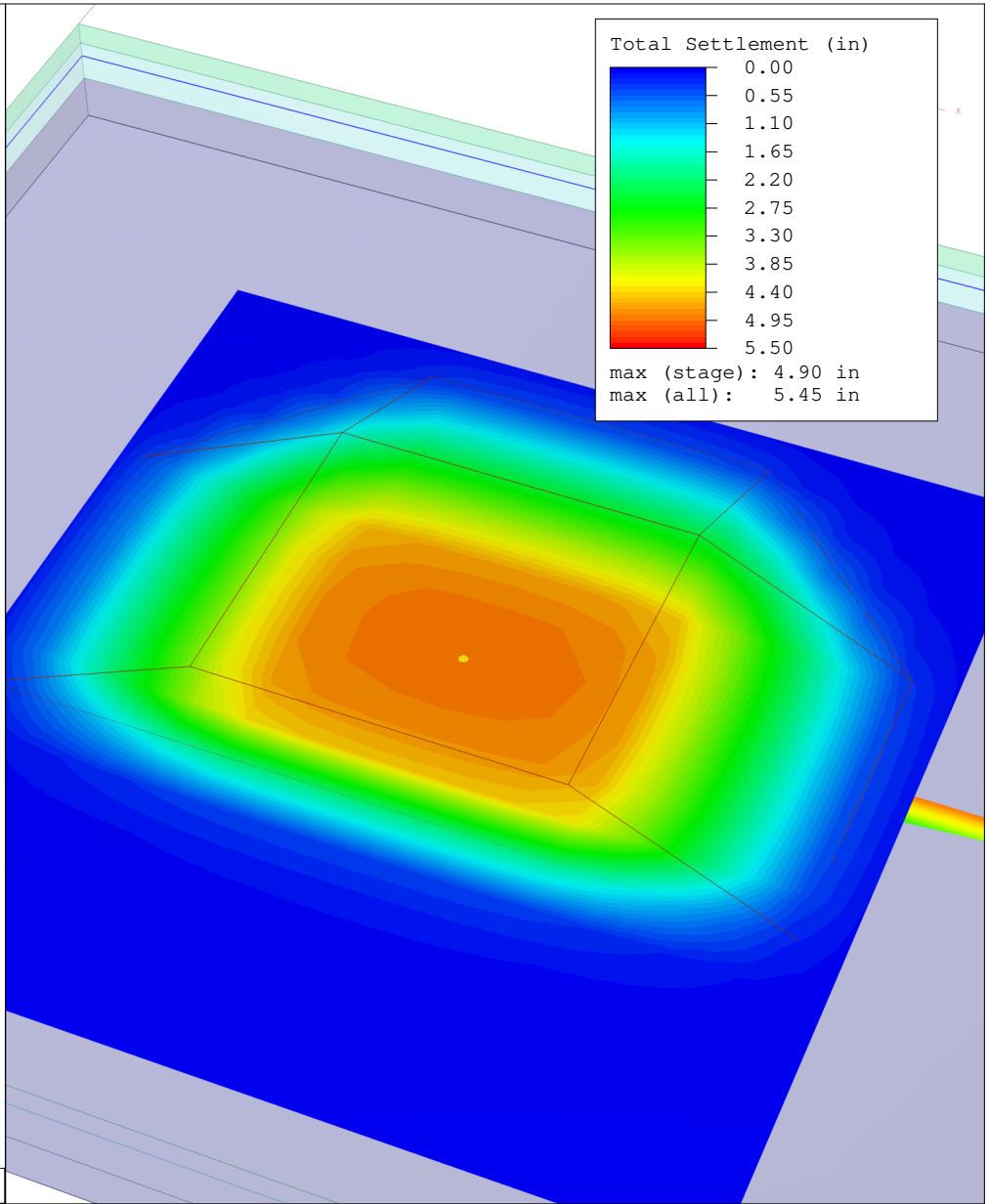
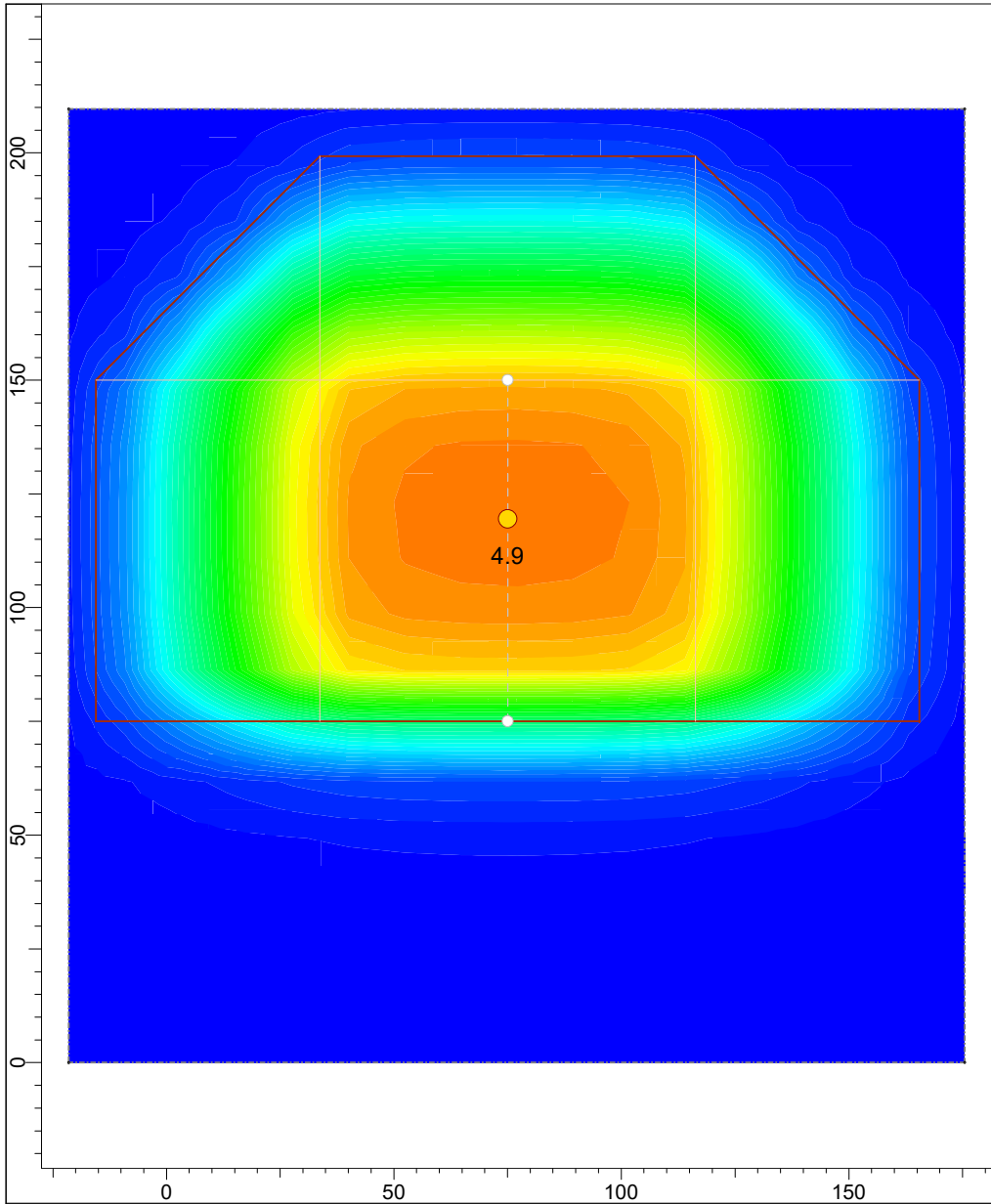
## Field Point Grid

Number of points 306  
 Expansion Factor 2

### Grid Coordinates

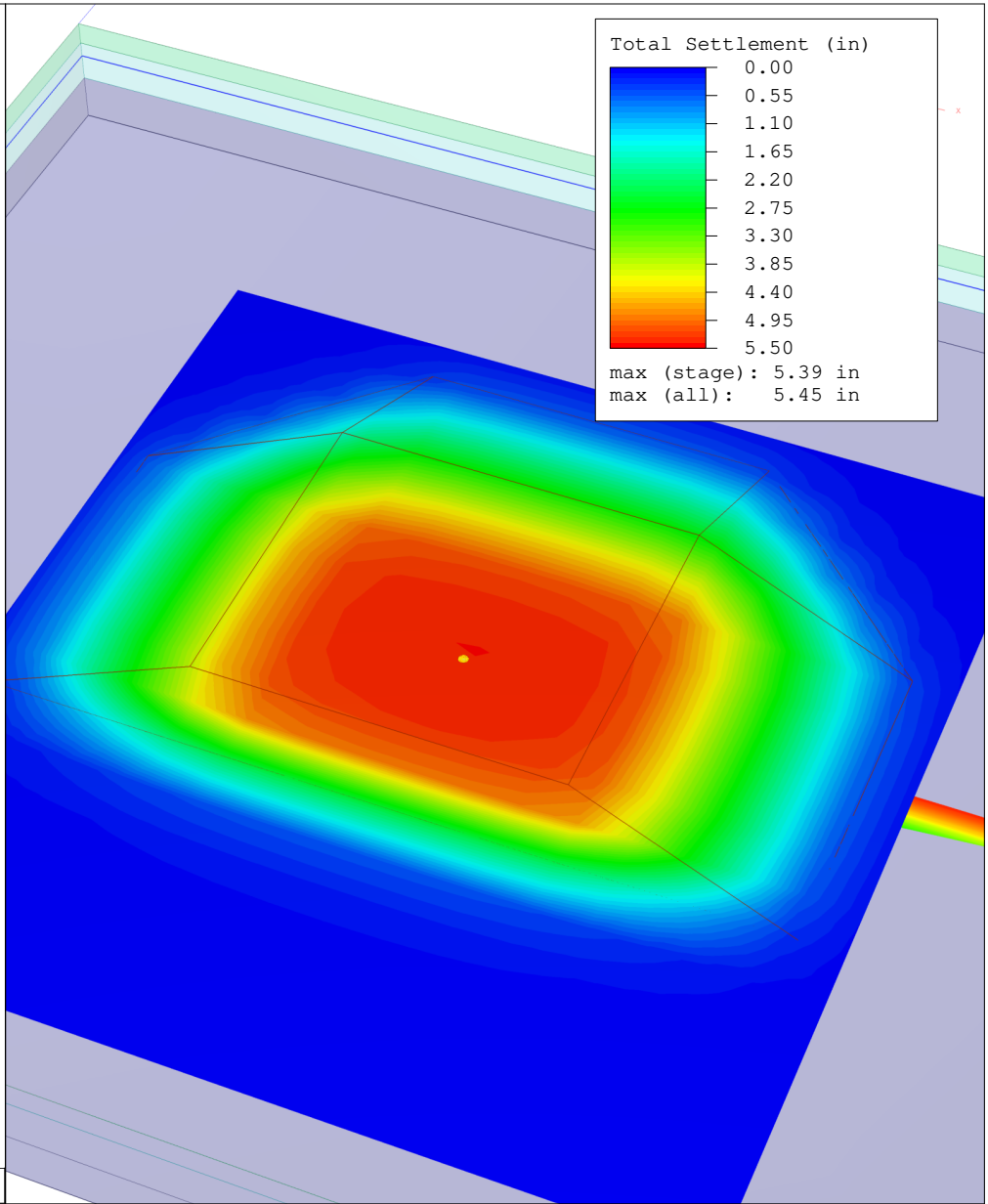
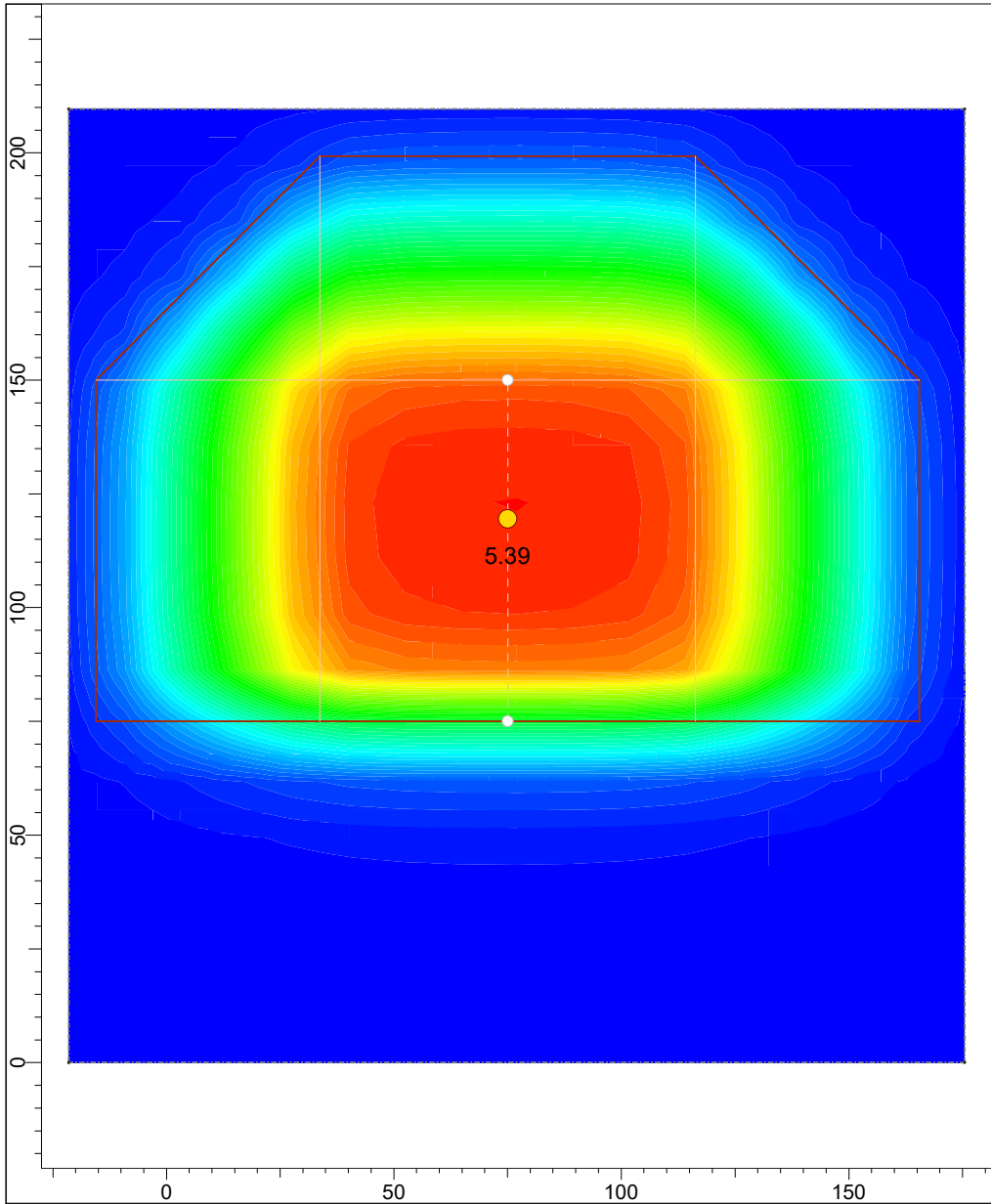
X [ft]	Y [ft]
256	289.707
256	-15.5
-106	-15.5
-106	289.707

	<i>Project</i>		SC 557 Over Crowders Creek	
	<i>Analysis Description</i>		Begin Bridge Single Drainage	
	<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
	<i>Date</i>		<i>File Name</i>	Begin Bridge.s3z

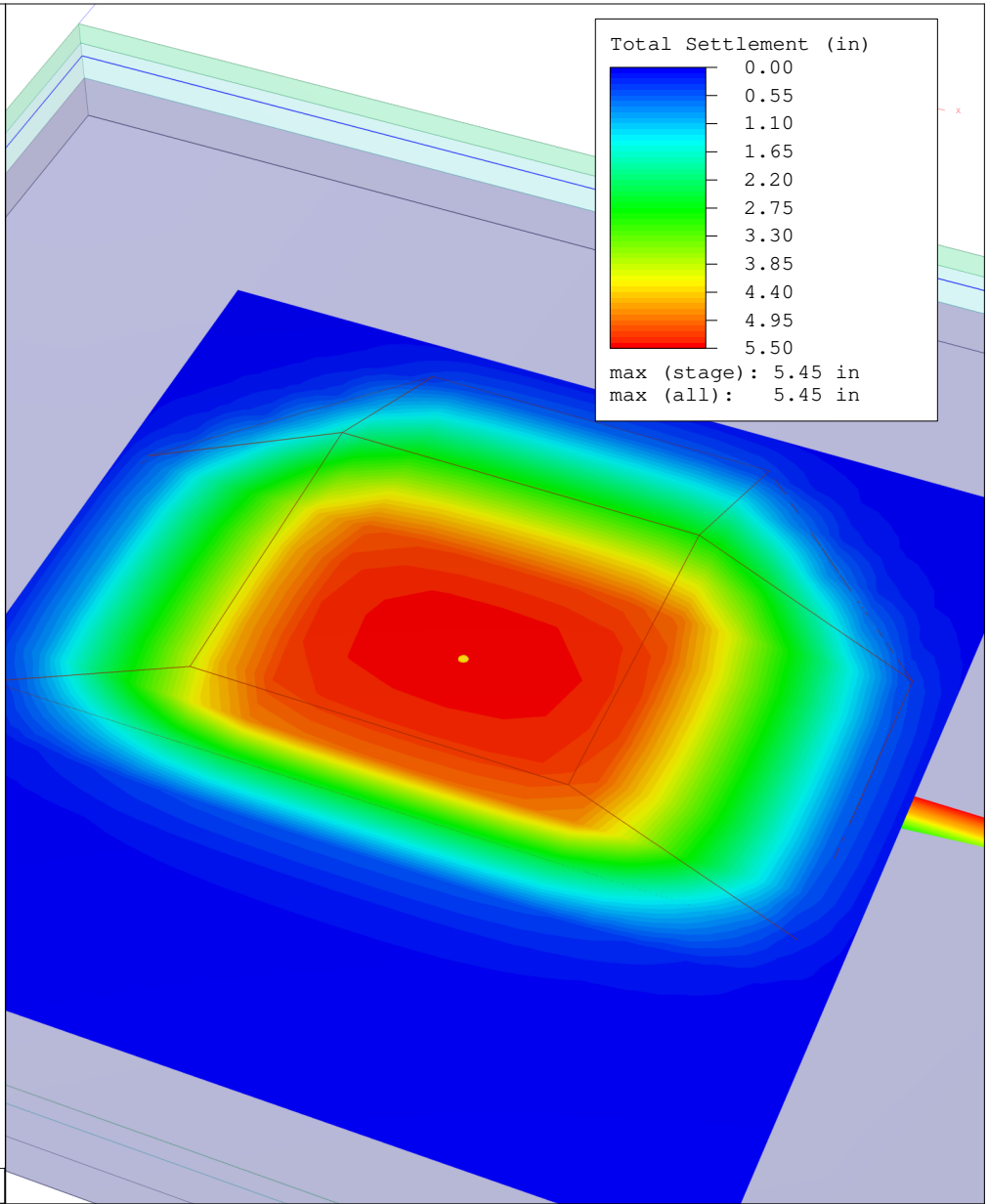
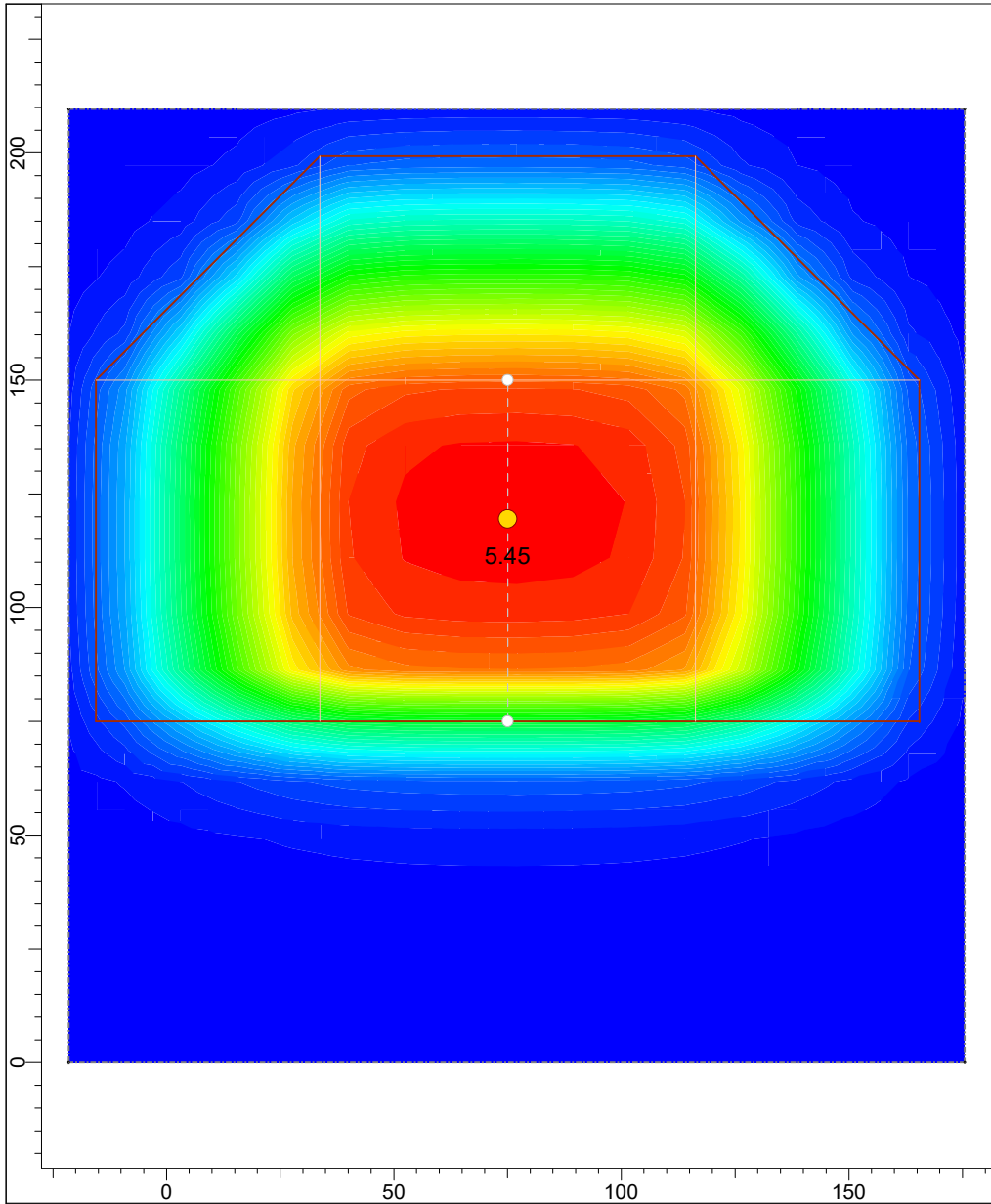


<i>Project</i>	SC 557 Over Crowders Creek		
<i>Analysis Description</i>	Begin Bridge Double Drainage		
<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
<i>STAGE</i>	Stage 2: 150 Days (End Construction)	<i>File Name</i>	Begin Bridge_DD.s3z





<i>Project</i>	SC 557 Over Crowders Creek		
<i>Analysis Description</i>	Begin Bridge Double Drainage		
<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
<i>STAGE</i>	Stage 3: 155 Days (Time to meet EV-05B)	<i>File Name</i>	Begin Bridge_DD.s3z



<i>Project</i>	SC 557 Over Crowders Creek		
<i>Analysis Description</i>	Begin Bridge Double Drainage		
<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
<i>STAGE</i>	Stage 5: 170 Days (End Consolidation)	<i>File Name</i>	Begin Bridge_DD.s3z

# Settle3D Analysis Information

## SC 557 Over Crowders Creek

### Project Settings

Document Name	Begin Bridge_DD
Project Title	SC 557 Over Crowders Creek
Analysis	Begin Bridge Double Drainage
Author	JFH
Company	F&ME
Stress Computation Method	Boussinesq
Time-dependent Consolidation Analysis	
Time Units	days
Permeability Units	feet/day
Use average properties to calculate layered stresses	
Improve consolidation accuracy	
Ignore negative effective stresses in settlement calculations	


### Stage Settings

Stage #	Name	Time [days]
1	Stage 1	0
2	Stage 2	150
3	Stage 3	155
4	Stage 4	160
5	Stage 5	170
6	Stage 6	200
7	Stage 7	300
8	Stage 8	350
9	Stage 9	400
10	Stage 10	500
11	Stage 11	600
12	Stage 12	700
13	Stage 13	800
14	Stage 14	900
15	Stage 15	1000

### Results

Time taken to compute: 4.44296 seconds

**Stage: Stage 1 = 0 d**


	<i>Project</i>		SC 557 Over Crowders Creek	
	<i>Analysis Description</i>		Begin Bridge Double Drainage	
	<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
	<i>Date</i>		<i>File Name</i>	Begin Bridge_DD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	0
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0
Effective Stress [ksf]	0	1.9994
Total Stress [ksf]	0	3.185
Total Strain	0	0
Pore Water Pressure [ksf]	0	1.1856
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.00054	5.19601
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.000885483
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.795743

### Stage: Stage 2 = 150 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	4.90188
Consolidation Settlement [in]	0	0.501127
Immediate Settlement [in]	0	4.40075
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	3.97464
Total Stress [ksf]	0	5.90628
Total Strain	0	0.0290516
Pore Water Pressure [ksf]	0	3.90688
Excess Pore Water Pressure [ksf]	0	2.98346
Degree of Consolidation [%]	0	48.4917
Pre-consolidation Stress [ksf]	0.00054	5.19601
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.00232849
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.795743

### Stage: Stage 3 = 155 d


	<i>Project</i> SC 557 Over Crowders Creek	
	<i>Analysis Description</i> Begin Bridge Double Drainage	
	<i>Drawn By</i> JFH	<i>Company</i> F&ME
	<i>Date</i>	<i>File Name</i> Begin Bridge_DD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	5.39357
Consolidation Settlement [in]	0	0.992825
Immediate Settlement [in]	0	4.40075
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.72068
Total Stress [ksf]	0	5.90628
Total Strain	0	0.0290516
Pore Water Pressure [ksf]	0	1.1856
Excess Pore Water Pressure [ksf]	0	0.819531
Degree of Consolidation [%]	0	99.9515
Pre-consolidation Stress [ksf]	0.00054	5.19601
Over-consolidation Ratio	1	3.79947
Void Ratio	0	1.27
Permeability [ft/d]	0	0.00232849
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	83.0322
Undrained Shear Strength	0	1.00015

#### Stage: Stage 4 = 160 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	5.44017
Consolidation Settlement [in]	0	1.03943
Immediate Settlement [in]	0	4.40075
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.72068
Total Stress [ksf]	0	5.90628
Total Strain	0	0.0290516
Pore Water Pressure [ksf]	0	1.1856
Excess Pore Water Pressure [ksf]	0	0.175138
Degree of Consolidation [%]	0	99.9897
Pre-consolidation Stress [ksf]	0.00054	5.19601
Over-consolidation Ratio	1	3.79947
Void Ratio	0	1.27
Permeability [ft/d]	0	0.00232849
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	96.374
Undrained Shear Strength	0	1.00035

#### Stage: Stage 5 = 170 d


	<i>Project</i> SC 557 Over Crowders Creek	
	<i>Analysis Description</i> Begin Bridge Double Drainage	
	<i>Drawn By</i> JFH	<i>Company</i> F&ME
	<i>Date</i>	<i>File Name</i> Begin Bridge_DD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	5.45193
Consolidation Settlement [in]	0	1.05118
Immediate Settlement [in]	0	4.40075
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.72068
Total Stress [ksf]	0	5.90628
Total Strain	0	0.0290516
Pore Water Pressure [ksf]	0	1.1856
Excess Pore Water Pressure [ksf]	0	0.00798849
Degree of Consolidation [%]	0	99.9995
Pre-consolidation Stress [ksf]	0.00054	5.19601
Over-consolidation Ratio	1	3.79947
Void Ratio	0	1.27
Permeability [ft/d]	0	0.00232849
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	99.8346
Undrained Shear Strength	0	1.0004

### Stage: Stage 6 = 200 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	5.45249
Consolidation Settlement [in]	0	1.05174
Immediate Settlement [in]	0	4.40075
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.72068
Total Stress [ksf]	0	5.90628
Total Strain	0	0.0290516
Pore Water Pressure [ksf]	0	1.1856
Excess Pore Water Pressure [ksf]	0	7.34981e-007
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.00054	5.19601
Over-consolidation Ratio	1	3.79947
Void Ratio	0	1.27
Permeability [ft/d]	0	0.00232849
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	1.0004

### Stage: Stage 7 = 300 d


	Project		SC 557 Over Crowders Creek
	Analysis Description		Begin Bridge Double Drainage
	Drawn By	JFH	Company F&ME
	Date		File Name Begin Bridge_DD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	5.45249
Consolidation Settlement [in]	0	1.05174
Immediate Settlement [in]	0	4.40075
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.72068
Total Stress [ksf]	0	5.90628
Total Strain	0	0.0290516
Pore Water Pressure [ksf]	0	1.1856
Excess Pore Water Pressure [ksf]	-1.39485e-017	1.24738e-017
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.00054	5.19601
Over-consolidation Ratio	1	3.79947
Void Ratio	0	1.27
Permeability [ft/d]	0	0.00232849
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	1.0004

### Stage: Stage 8 = 350 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	5.45249
Consolidation Settlement [in]	0	1.05174
Immediate Settlement [in]	0	4.40075
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.72068
Total Stress [ksf]	0	5.90628
Total Strain	0	0.0290516
Pore Water Pressure [ksf]	0	1.1856
Excess Pore Water Pressure [ksf]	-1.38728e-017	1.23921e-017
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.00054	5.19601
Over-consolidation Ratio	1	3.79947
Void Ratio	0	1.27
Permeability [ft/d]	0	0.00232849
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	1.0004

### Stage: Stage 9 = 400 d


	Project		SC 557 Over Crowders Creek	
	Analysis Description		Begin Bridge Double Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	Begin Bridge_DD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	5.45249
Consolidation Settlement [in]	0	1.05174
Immediate Settlement [in]	0	4.40075
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.72068
Total Stress [ksf]	0	5.90628
Total Strain	0	0.0290516
Pore Water Pressure [ksf]	0	1.1856
Excess Pore Water Pressure [ksf]	-1.23184e-017	1.3827e-017
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.00054	5.19601
Over-consolidation Ratio	1	3.79947
Void Ratio	0	1.27
Permeability [ft/d]	0	0.00232849
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	1.0004

### Stage: Stage 10 = 500 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	5.45249
Consolidation Settlement [in]	0	1.05174
Immediate Settlement [in]	0	4.40075
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.72068
Total Stress [ksf]	0	5.90628
Total Strain	0	0.0290516
Pore Water Pressure [ksf]	0	1.1856
Excess Pore Water Pressure [ksf]	-1.2218e-017	1.37771e-017
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.00054	5.19601
Over-consolidation Ratio	1	3.79947
Void Ratio	0	1.27
Permeability [ft/d]	0	0.00232849
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	1.0004

### Stage: Stage 11 = 600 d

	Project		SC 557 Over Crowders Creek	
	Analysis Description		Begin Bridge Double Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	Begin Bridge_DD.s3z




Data Type	Minimum	Maximum
Total Settlement [in]	0	5.45249
Consolidation Settlement [in]	0	1.05174
Immediate Settlement [in]	0	4.40075
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.72068
Total Stress [ksf]	0	5.90628
Total Strain	0	0.0290516
Pore Water Pressure [ksf]	0	1.1856
Excess Pore Water Pressure [ksf]	-1.21689e-017	1.37526e-017
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.00054	5.19601
Over-consolidation Ratio	1	3.79947
Void Ratio	0	1.27
Permeability [ft/d]	0	0.00232849
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	1.0004

### Stage: Stage 12 = 700 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	5.45249
Consolidation Settlement [in]	0	1.05174
Immediate Settlement [in]	0	4.40075
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.72068
Total Stress [ksf]	0	5.90628
Total Strain	0	0.0290516
Pore Water Pressure [ksf]	0	1.1856
Excess Pore Water Pressure [ksf]	-1.37433e-017	1.21505e-017
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.00054	5.19601
Over-consolidation Ratio	1	3.79947
Void Ratio	0	1.27
Permeability [ft/d]	0	0.00232849
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	1.0004

### Stage: Stage 13 = 800 d


	Project		SC 557 Over Crowders Creek	
	Analysis Description		Begin Bridge Double Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	Begin Bridge_DD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	5.45249
Consolidation Settlement [in]	0	1.05174
Immediate Settlement [in]	0	4.40075
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.72068
Total Stress [ksf]	0	5.90628
Total Strain	0	0.0290516
Pore Water Pressure [ksf]	0	1.1856
Excess Pore Water Pressure [ksf]	-1.21321e-017	1.37341e-017
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.00054	5.19601
Over-consolidation Ratio	1	3.79947
Void Ratio	0	1.27
Permeability [ft/d]	0	0.00232849
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	1.0004

### Stage: Stage 14 = 900 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	5.45249
Consolidation Settlement [in]	0	1.05174
Immediate Settlement [in]	0	4.40075
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.72068
Total Stress [ksf]	0	5.90628
Total Strain	0	0.0290516
Pore Water Pressure [ksf]	0	1.1856
Excess Pore Water Pressure [ksf]	-1.21162e-017	1.37261e-017
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.00054	5.19601
Over-consolidation Ratio	1	3.79947
Void Ratio	0	1.27
Permeability [ft/d]	0	0.00232849
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	1.0004

### Stage: Stage 15 = 1000 d

	Project		SC 557 Over Crowders Creek	
	Analysis Description		Begin Bridge Double Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	Begin Bridge_DD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	5.45249
Consolidation Settlement [in]	0	1.05174
Immediate Settlement [in]	0	4.40075
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.72068
Total Stress [ksf]	0	5.90628
Total Strain	0	0.0290516
Pore Water Pressure [ksf]	0	1.1856
Excess Pore Water Pressure [ksf]	-1.21002e-017	1.37181e-017
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.00054	5.19601
Over-consolidation Ratio	1	3.79947
Void Ratio	0	1.27
Permeability [ft/d]	0	0.00232849
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	1.0004

## Embankments

### 1. Embankment


Center Line (75, 75) to (75, 150)  
 Number of Layers 1  
 Near End Angle 90 degrees  
 Far End Angle 26 degrees  
 Base Width 181

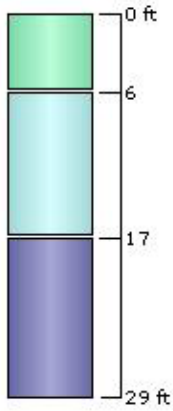
Layer	Stage	Left Bench Width (ft)	Left Angle (deg)	Height (ft)	Unit Weight (kips/ft <sup>3</sup> )	Right Angle (deg)	Right Bench Width (ft)
1	Stage 2 = 150 d	0	26	24	0.125	26	0

## Soil Layers




Ground Surface Drained: Yes

Layer #	Type	Thickness [ft]	Depth [ft]	Drained at Bottom
1	V. Loose Silty Sand	6	0	Yes
2	Soft Sandy Silt	11	6	Yes
3	Stiff Silt	12	17	Yes

	Project		SC 557 Over Crowders Creek	
	Analysis Description		Begin Bridge Double Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	Begin Bridge_DD.s3z



## Soil Properties

Property	Stiff Silt	Soft Sandy Silt	V. Loose Silty Sand
Color			
Unit Weight [kips/ft <sup>3</sup> ]	0.11	0.115	0.09
Saturated Unit Weight [kips/ft <sup>3</sup> ]	0.115	0.115	0.095
Immediate Settlement	Enabled	Enabled	Enabled
Es [ksf]	300	200	200
Esur [ksf]	300	200	200
Primary Consolidation	Disabled	Enabled	Disabled
Material Type		Non-Linear	
Cc		0.071	
Cr		0.027	
e0		1.27	
OCR	1	3.8	1
Cv [ft <sup>2</sup> /d]		1.51	
B-bar		1	
Undrained Su A [kips/ft <sup>2</sup> ]	0	0	0
Undrained Su S	0.2	0.2	0.2
Undrained Su m	0.8	0.8	0.8
Piezo Line ID	1	1	1

## Groundwater


Groundwater method Piezometric Lines  
 Water Unit Weight 0.0624 kips/ft<sup>3</sup>

## Piezometric Line Entities

ID	Depth (ft)
1	10 ft

## Query Points

Point #	(X,Y) Location	Number of Divisions
2	75, 119.491	Auto: 65


	Project		SC 557 Over Crowders Creek	
	Analysis Description		Begin Bridge Double Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	Begin Bridge_DD.s3z

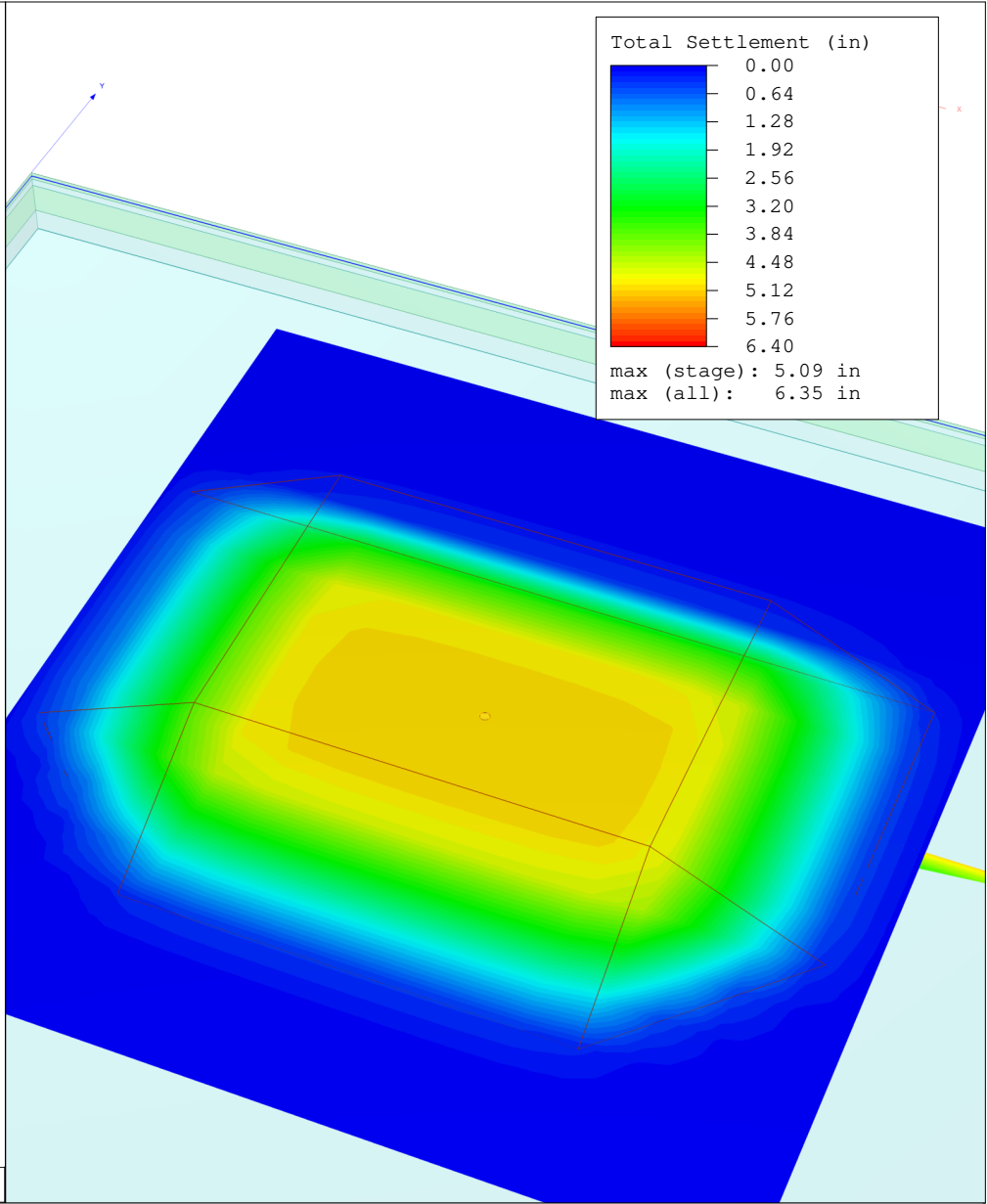
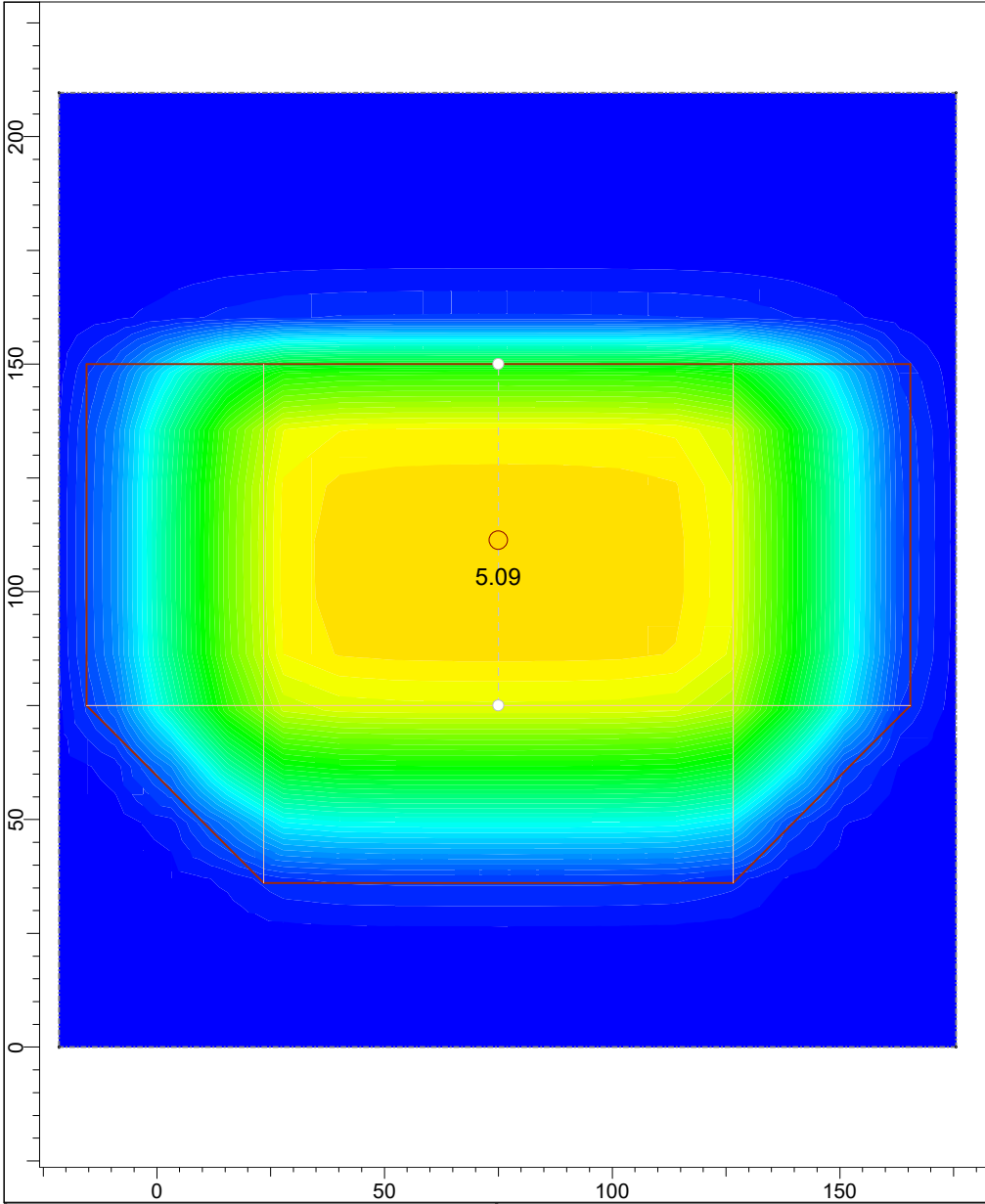
## Field Point Grid

Number of points 306  
 Expansion Factor 2

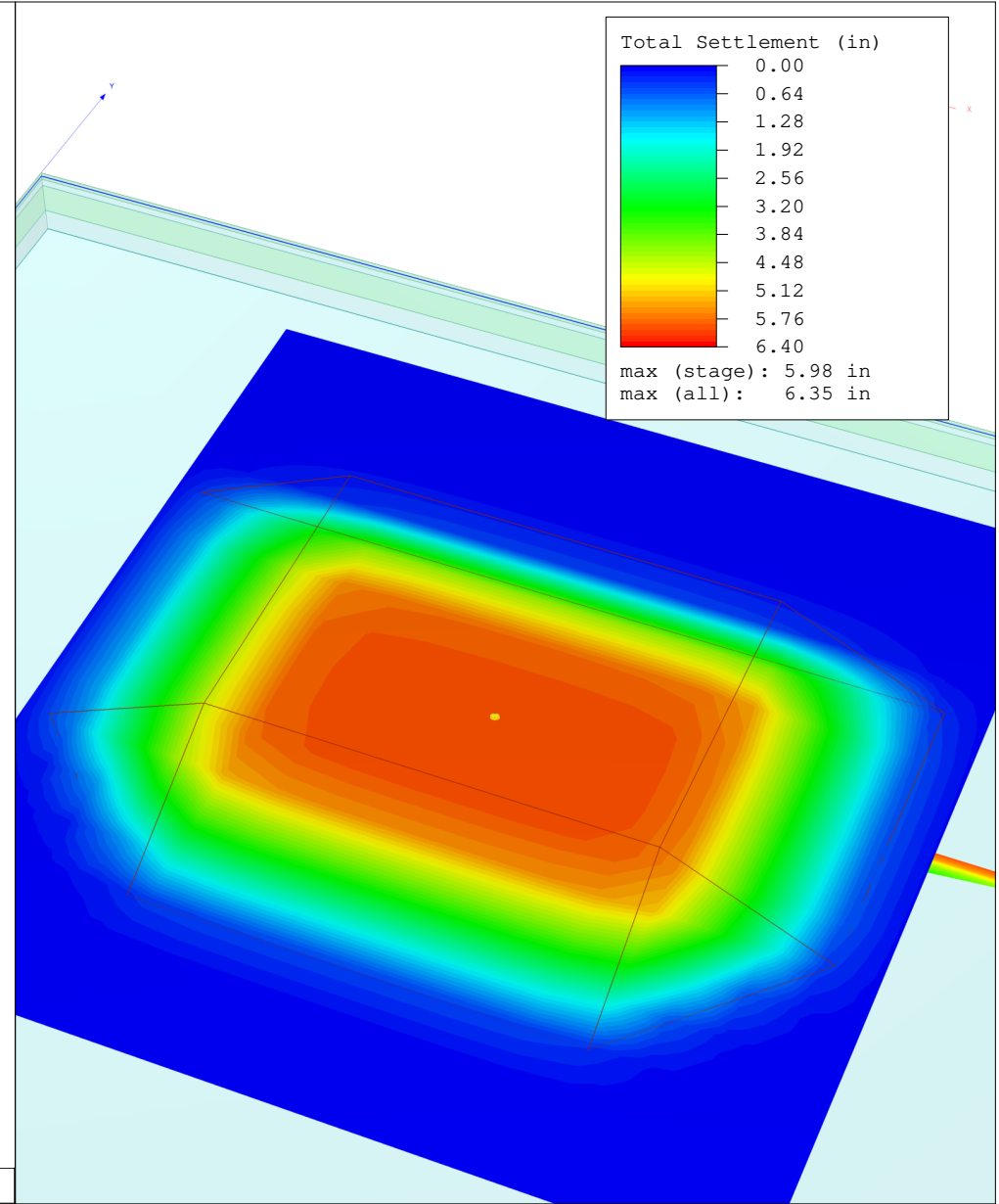
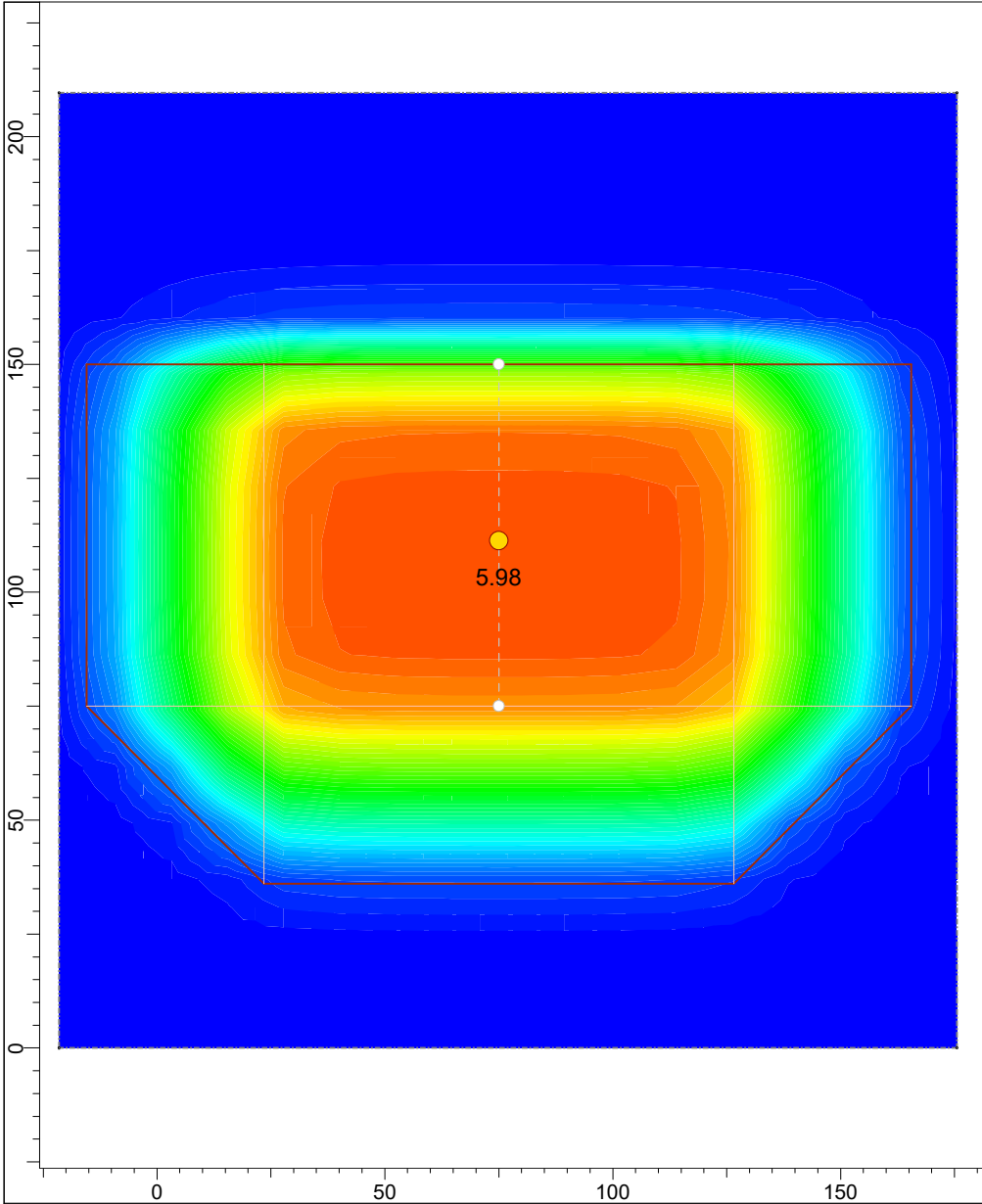
### Grid Coordinates

X [ft]	Y [ft]
256	289.707
256	-15.5
-106	-15.5
-106	289.707

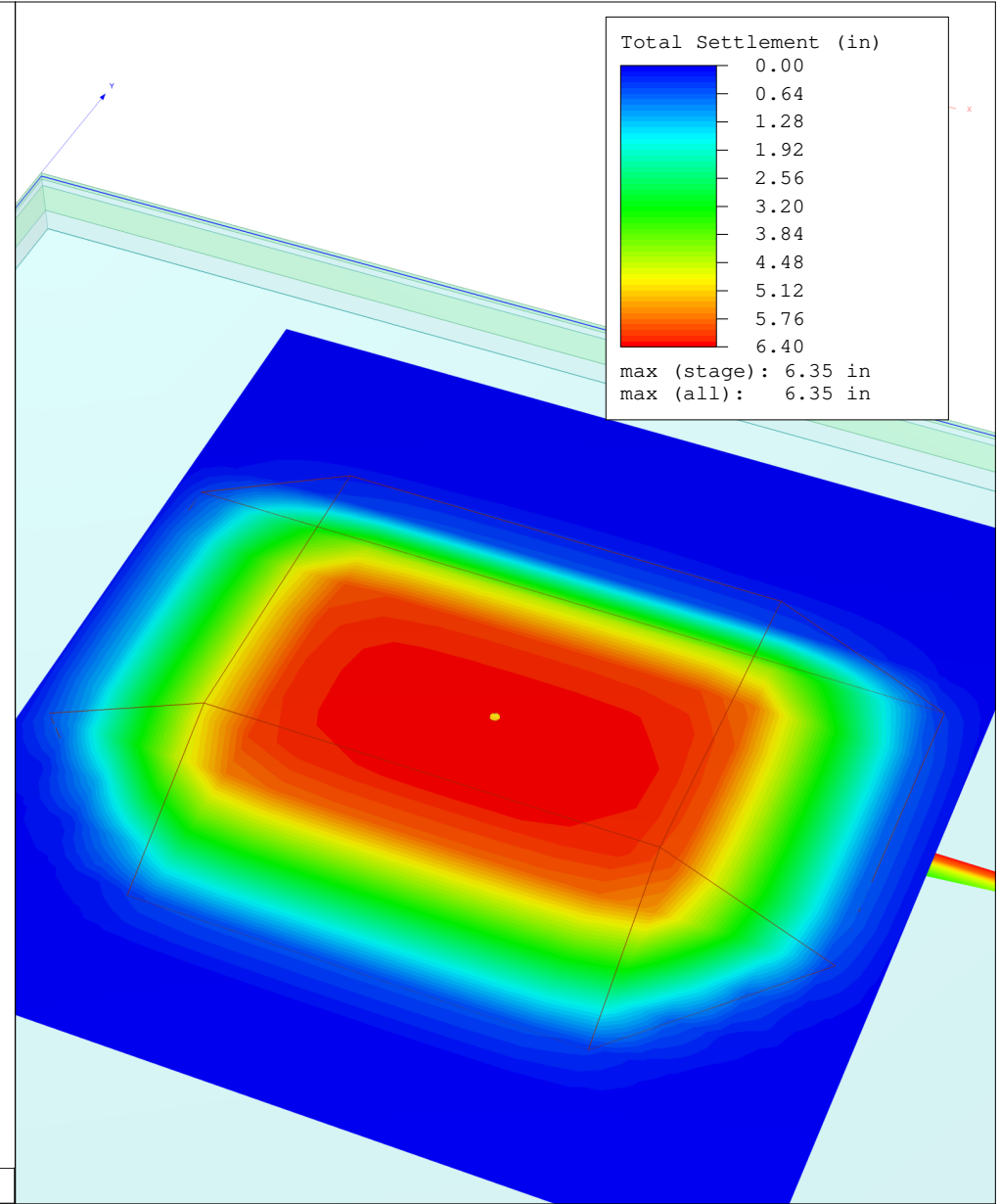
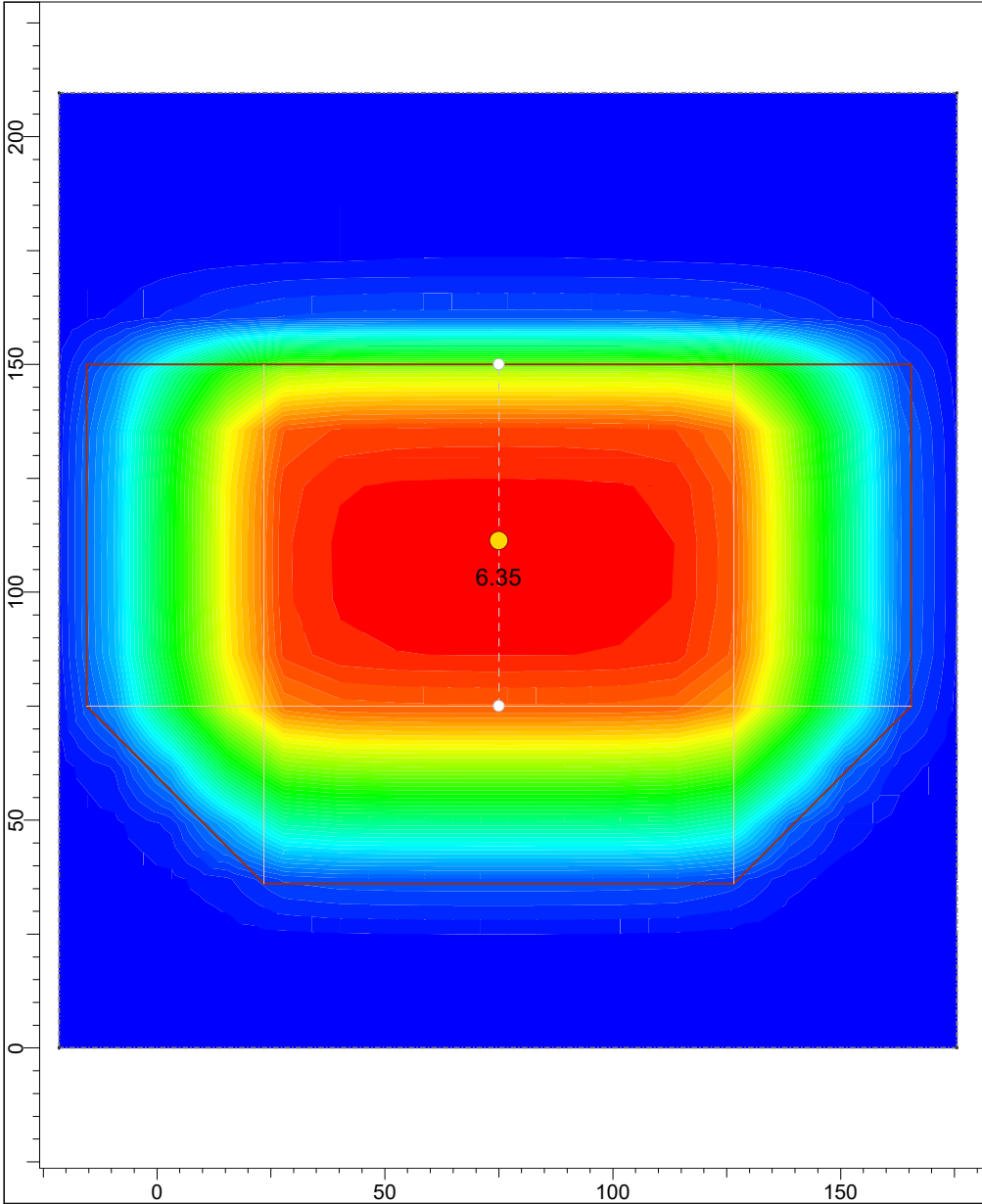
	<i>Project</i>		SC 557 Over Crowders Creek	
	<i>Analysis Description</i>		Begin Bridge Double Drainage	
	<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
	<i>Date</i>		<i>File Name</i>	Begin Bridge_DD.s3z



<i>Project</i>	SC 557 Over Crowders Creek		
<i>Analysis Description</i>	End Bridge Single Drainage		
<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
<i>STAGE</i>	Stage 2:150 Days (End Construction)	<i>File Name</i>	End Bridge.s3z



<i>Project</i>	SC 557 Over Crowders Creek		
<i>Analysis Description</i>	End Bridge Single Drainage		
<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
<i>STAGE</i>	Stage 3:155 Days (Time to meet EV-05B)	<i>File Name</i>	End Bridge.s3z



SETTLE3D 3.020

<i>Project</i>	SC 557 Over Crowders Creek		
<i>Analysis Description</i>	End Bridge Single Drainage		
<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
<i>STAGE</i>	Stage 5:215 Days (End Consolidation)	<i>File Name</i>	End Bridge.s3z



# Settle3D Analysis Information

## SC 557 Over Crowders Creek

### Project Settings

Document Name	End Bridge
Project Title	SC 557 Over Crowders Creek
Analysis	End Bridge Single Drainage
Author	JFH
Company	F&ME
Stress Computation Method	Boussinesq
Time-dependent Consolidation Analysis	
Time Units	days
Permeability Units	feet/day
Use average properties to calculate layered stresses	
Improve consolidation accuracy	
Ignore negative effective stresses in settlement calculations	


### Stage Settings

Stage #	Name	Time [days]
1	Stage 1	0
2	Stage 2	150
3	Stage 3	155
4	Stage 4	200
5	Stage 5	215
6	Stage 6	250
7	Stage 7	300
8	Stage 8	350
9	Stage 9	400
10	Stage 10	500
11	Stage 11	600
12	Stage 12	700
13	Stage 13	800
14	Stage 14	900
15	Stage 15	1000

### Results

Time taken to compute: 6.58896 seconds

**Stage: Stage 1 = 0 d**


	<i>Project</i>		SC 557 Over Crowders Creek	
	<i>Analysis Description</i>		End Bridge Single Drainage	
	<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
	<i>Date</i>		<i>File Name</i>	End Bridge.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	0
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0
Effective Stress [ksf]	0	0.7842
Total Stress [ksf]	0	1.845
Total Strain	0	0
Pore Water Pressure [ksf]	0	1.0608
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.005	2.9791
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.00337713
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.456335

### Stage: Stage 2 = 150 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	5.09
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	5.09
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	2.46499
Total Stress [ksf]	0	4.15072
Total Strain	0	0.0238758
Pore Water Pressure [ksf]	0	3.36652
Excess Pore Water Pressure [ksf]	0	2.37499
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.005	2.9791
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.0088806
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.456335

### Stage: Stage 3 = 155 d


	Project		SC 557 Over Crowders Creek	
	Analysis Description		End Bridge Single Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	End Bridge.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	5.97777
Consolidation Settlement [in]	0	0.887767
Immediate Settlement [in]	0	5.09
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	2.55759
Total Stress [ksf]	0	4.15072
Total Strain	-0.000304564	0.0513209
Pore Water Pressure [ksf]	0	3.05786
Excess Pore Water Pressure [ksf]	0	1.99706
Degree of Consolidation [%]	0	75.9155
Pre-consolidation Stress [ksf]	0.005	2.9791
Over-consolidation Ratio	1	4.22376
Void Ratio	0	1.27069
Permeability [ft/d]	0	0.00337713
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	93.7748
Undrained Shear Strength	0	0.487653

#### Stage: Stage 4 = 200 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	6.34096
Consolidation Settlement [in]	0	1.25096
Immediate Settlement [in]	0	5.09
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.0624
Total Stress [ksf]	0	4.15072
Total Strain	0	0.0513577
Pore Water Pressure [ksf]	0	1.08832
Excess Pore Water Pressure [ksf]	0	0.027522
Degree of Consolidation [%]	0	99.7658
Pre-consolidation Stress [ksf]	0.005	3.06223
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.00337713
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	99.9338
Undrained Shear Strength	0	0.599254

#### Stage: Stage 5 = 215 d


	Project		SC 557 Over Crowders Creek	
	Analysis Description		End Bridge Single Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	End Bridge.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	6.34578
Consolidation Settlement [in]	0	1.25578
Immediate Settlement [in]	0	5.09
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.08341
Total Stress [ksf]	0	4.15072
Total Strain	0	0.051358
Pore Water Pressure [ksf]	0	1.06731
Excess Pore Water Pressure [ksf]	0	0.00651036
Degree of Consolidation [%]	0	99.9447
Pre-consolidation Stress [ksf]	0.005	3.08324
Over-consolidation Ratio	1	3.79999
Void Ratio	0	1.27
Permeability [ft/d]	0	0.00337713
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	99.9843
Undrained Shear Strength	0	0.600074

### Stage: Stage 6 = 250 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	6.34721
Consolidation Settlement [in]	0	1.25722
Immediate Settlement [in]	0	5.09
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.08969
Total Stress [ksf]	0	4.15072
Total Strain	0	0.0513581
Pore Water Pressure [ksf]	0	1.06103
Excess Pore Water Pressure [ksf]	0	0.00022501
Degree of Consolidation [%]	0	99.9981
Pre-consolidation Stress [ksf]	0.005	3.08953
Over-consolidation Ratio	1	3.79999
Void Ratio	0	1.27
Permeability [ft/d]	0	0.00337713
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	99.9995
Undrained Shear Strength	0	0.600318

### Stage: Stage 7 = 300 d


	Project		SC 557 Over Crowders Creek	
	Analysis Description		End Bridge Single Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	End Bridge.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	6.34727
Consolidation Settlement [in]	0	1.25727
Immediate Settlement [in]	0	5.09
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.08992
Total Stress [ksf]	0	4.15072
Total Strain	0	0.0513581
Pore Water Pressure [ksf]	0	1.0608
Excess Pore Water Pressure [ksf]	0	1.82654e-006
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.005	3.08975
Over-consolidation Ratio	1	3.79999
Void Ratio	0	1.27
Permeability [ft/d]	0	0.00337713
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.600327

### Stage: Stage 8 = 350 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	6.34727
Consolidation Settlement [in]	0	1.25727
Immediate Settlement [in]	0	5.09
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.08992
Total Stress [ksf]	0	4.15072
Total Strain	0	0.0513581
Pore Water Pressure [ksf]	0	1.0608
Excess Pore Water Pressure [ksf]	0	1.47344e-008
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.005	3.08975
Over-consolidation Ratio	1	3.79999
Void Ratio	0	1.27
Permeability [ft/d]	0	0.00337713
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.600327

### Stage: Stage 9 = 400 d


	Project		SC 557 Over Crowders Creek	
	Analysis Description		End Bridge Single Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	End Bridge.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	6.34727
Consolidation Settlement [in]	0	1.25727
Immediate Settlement [in]	0	5.09
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.08992
Total Stress [ksf]	0	4.15072
Total Strain	0	0.0513581
Pore Water Pressure [ksf]	0	1.0608
Excess Pore Water Pressure [ksf]	0	1.18862e-010
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.005	3.08975
Over-consolidation Ratio	1	3.79999
Void Ratio	0	1.27
Permeability [ft/d]	0	0.00337713
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.600327

### Stage: Stage 10 = 500 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	6.34727
Consolidation Settlement [in]	0	1.25727
Immediate Settlement [in]	0	5.09
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.08992
Total Stress [ksf]	0	4.15072
Total Strain	0	0.0513581
Pore Water Pressure [ksf]	0	1.0608
Excess Pore Water Pressure [ksf]	0	1.39946e-014
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.005	3.08975
Over-consolidation Ratio	1	3.79999
Void Ratio	0	1.27
Permeability [ft/d]	0	0.00337713
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.600327

### Stage: Stage 11 = 600 d


	Project		SC 557 Over Crowders Creek	
	Analysis Description		End Bridge Single Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	End Bridge.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	6.34727
Consolidation Settlement [in]	0	1.25727
Immediate Settlement [in]	0	5.09
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.08992
Total Stress [ksf]	0	4.15072
Total Strain	0	0.0513581
Pore Water Pressure [ksf]	0	1.0608
Excess Pore Water Pressure [ksf]	-5.22487e-015	6.4671e-015
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.005	3.08975
Over-consolidation Ratio	1	3.79999
Void Ratio	0	1.27
Permeability [ft/d]	0	0.0088806
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.600327

### Stage: Stage 12 = 700 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	6.34727
Consolidation Settlement [in]	0	1.25727
Immediate Settlement [in]	0	5.09
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.08992
Total Stress [ksf]	0	4.15072
Total Strain	0	0.0513581
Pore Water Pressure [ksf]	0	1.0608
Excess Pore Water Pressure [ksf]	-6.29736e-015	5.25275e-015
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.005	3.08975
Over-consolidation Ratio	1	3.79999
Void Ratio	0	1.27
Permeability [ft/d]	0	0.0088806
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.600327

### Stage: Stage 13 = 800 d


	Project		SC 557 Over Crowders Creek	
	Analysis Description		End Bridge Single Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	End Bridge.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	6.34727
Consolidation Settlement [in]	0	1.25727
Immediate Settlement [in]	0	5.09
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.08992
Total Stress [ksf]	0	4.15072
Total Strain	0	0.0513581
Pore Water Pressure [ksf]	0	1.0608
Excess Pore Water Pressure [ksf]	-5.23743e-015	6.21411e-015
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.005	3.08975
Over-consolidation Ratio	1	3.79999
Void Ratio	0	1.27
Permeability [ft/d]	0	0.0088806
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.600327

### Stage: Stage 14 = 900 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	6.34727
Consolidation Settlement [in]	0	1.25727
Immediate Settlement [in]	0	5.09
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.08992
Total Stress [ksf]	0	4.15072
Total Strain	0	0.0513581
Pore Water Pressure [ksf]	0	1.0608
Excess Pore Water Pressure [ksf]	-6.29583e-015	5.11464e-015
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.005	3.08975
Over-consolidation Ratio	1	3.79999
Void Ratio	0	1.27
Permeability [ft/d]	0	0.0088806
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.600327

### Stage: Stage 15 = 1000 d

	Project		SC 557 Over Crowders Creek	
	Analysis Description		End Bridge Single Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	End Bridge.s3z



Data Type	Minimum	Maximum
Total Settlement [in]	0	6.34727
Consolidation Settlement [in]	0	1.25727
Immediate Settlement [in]	0	5.09
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.08992
Total Stress [ksf]	0	4.15072
Total Strain	0	0.0513581
Pore Water Pressure [ksf]	0	1.0608
Excess Pore Water Pressure [ksf]	-5.15462e-015	6.15468e-015
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.005	3.08975
Over-consolidation Ratio	1	3.79999
Void Ratio	0	1.27
Permeability [ft/d]	0	0.0088806
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.600327

## Embankments

### 1. Embankment


Center Line (75, 75) to (75, 150)  
 Number of Layers 1  
 Near End Angle 26 degrees  
 Far End Angle 90 degrees  
 Base Width 181

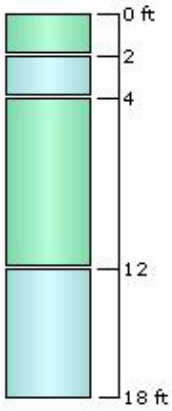
Layer	Stage	Left Bench Width (ft)	Left Angle (deg)	Height (ft)	Unit Weight (kips/ft <sup>3</sup> )	Right Angle (deg)	Right Bench Width (ft)
1	Stage 2 = 150 d	0	26	19	0.125	26	0

## Soil Layers



Ground Surface Drained: Yes

Layer #	Type	Thickness [ft]	Depth [ft]	Drained at Bottom
1	V. Loose Silty Sand	2	0	No
2	V. Soft Sandy Silt	2	2	No
3	V. Loose Silty Sand	8	4	No
4	V. Soft Sandy Silt	6	12	No

	Project		SC 557 Over Crowders Creek	
	Analysis Description		End Bridge Single Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	End Bridge.s3z



## Soil Properties

Property	V. Soft Sandy Silt	V. Loose Silty Sand
Color		
Unit Weight [kips/ft <sup>3</sup> ]	0.095	0.1
Saturated Unit Weight [kips/ft <sup>3</sup> ]	0.1	0.105
Immediate Settlement	Enabled	Enabled
Es [ksf]	100	100
Esur [ksf]	100	100
Primary Consolidation	Enabled	Disabled
Material Type	Non-Linear	
Cc	0.071	
Cr	0.027	
e0	1.27	
OCR	3.8	1
Cv [ft <sup>2</sup> /d]	1.51	
B-bar	1	
Undrained Su A [kips/ft <sup>2</sup> ]	0	0
Undrained Su S	0.2	0.2
Undrained Su m	0.8	0.8
Piezo Line ID	1	1

## Groundwater


Groundwater method Piezometric Lines  
 Water Unit Weight 0.0624 kips/ft<sup>3</sup>

## Piezometric Line Entities

ID	Depth (ft)
1	1 ft

## Query Points

Point #	(X,Y) Location	Number of Divisions
2	75, 111.325	Auto: 59


	Project		SC 557 Over Crowders Creek	
	Analysis Description		End Bridge Single Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	End Bridge.s3z

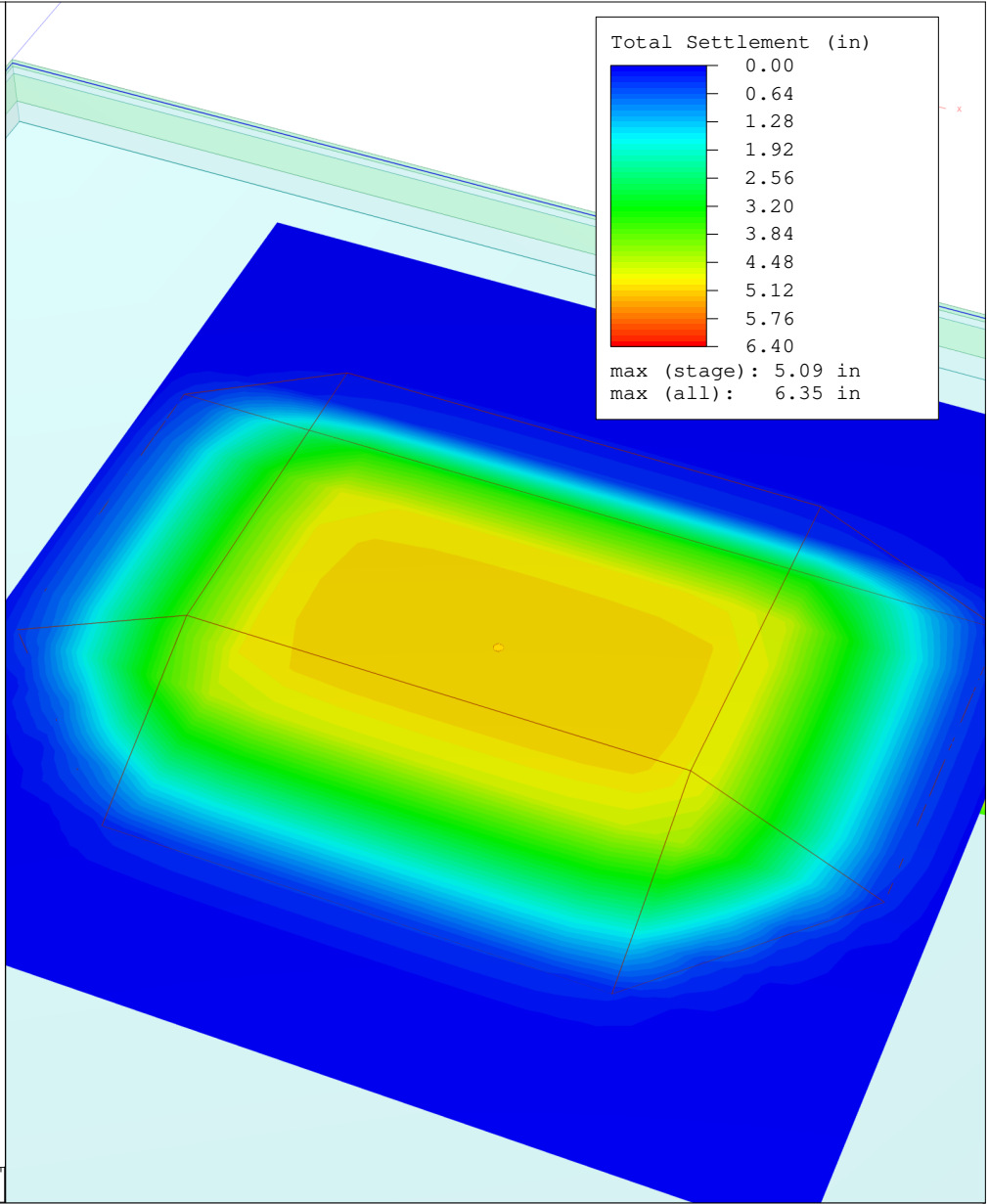
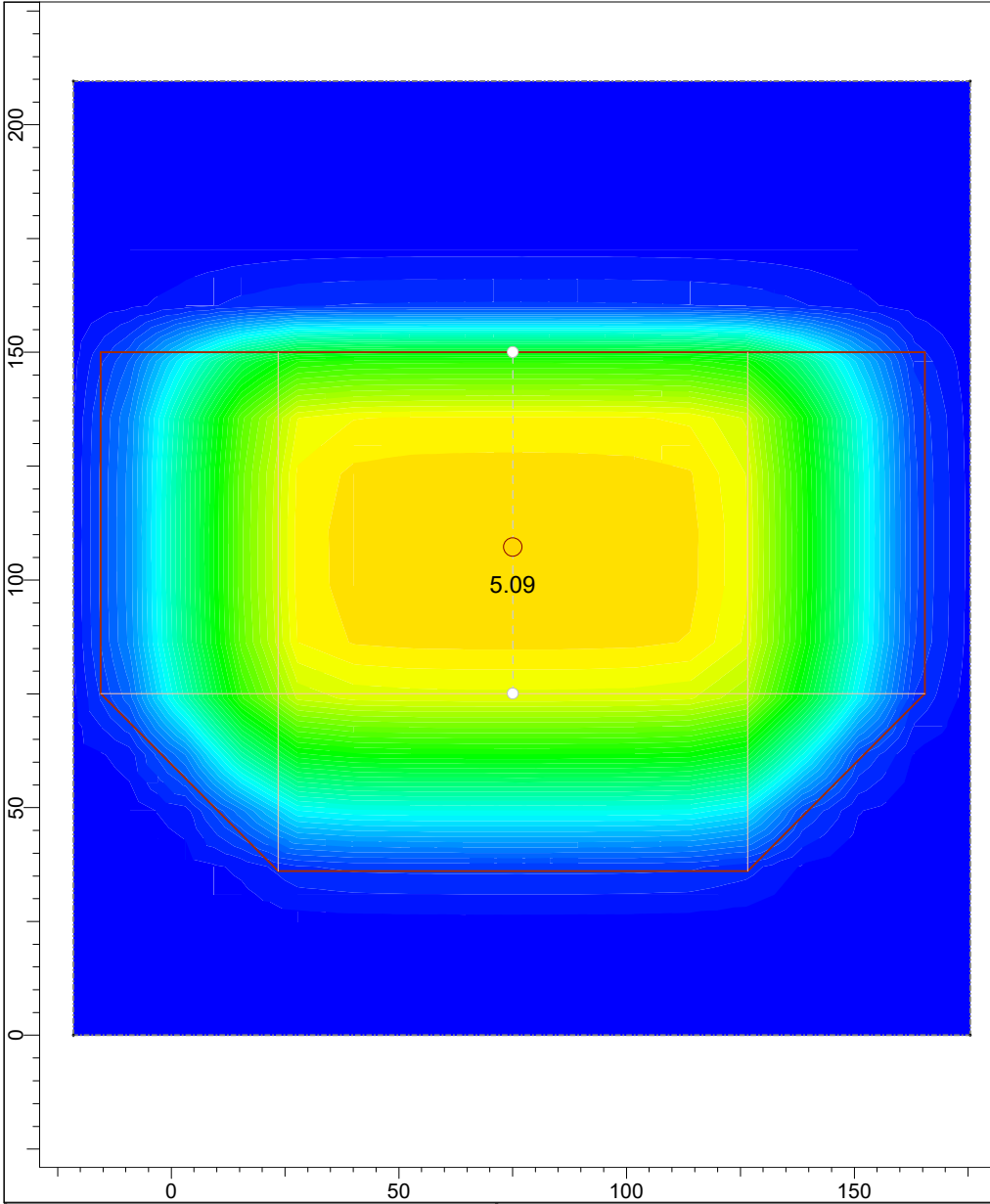
## Field Point Grid

Number of points 306  
 Expansion Factor 2

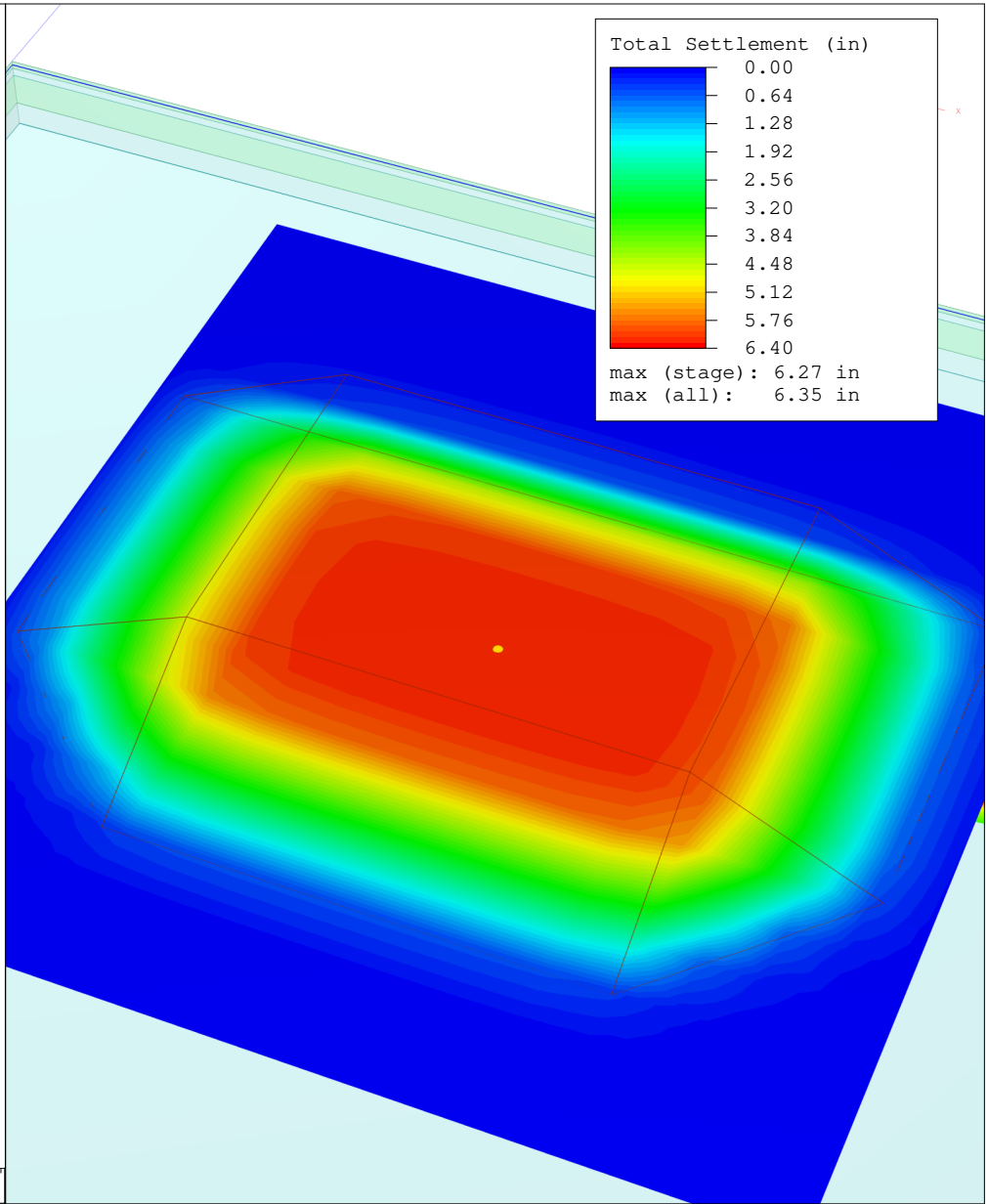
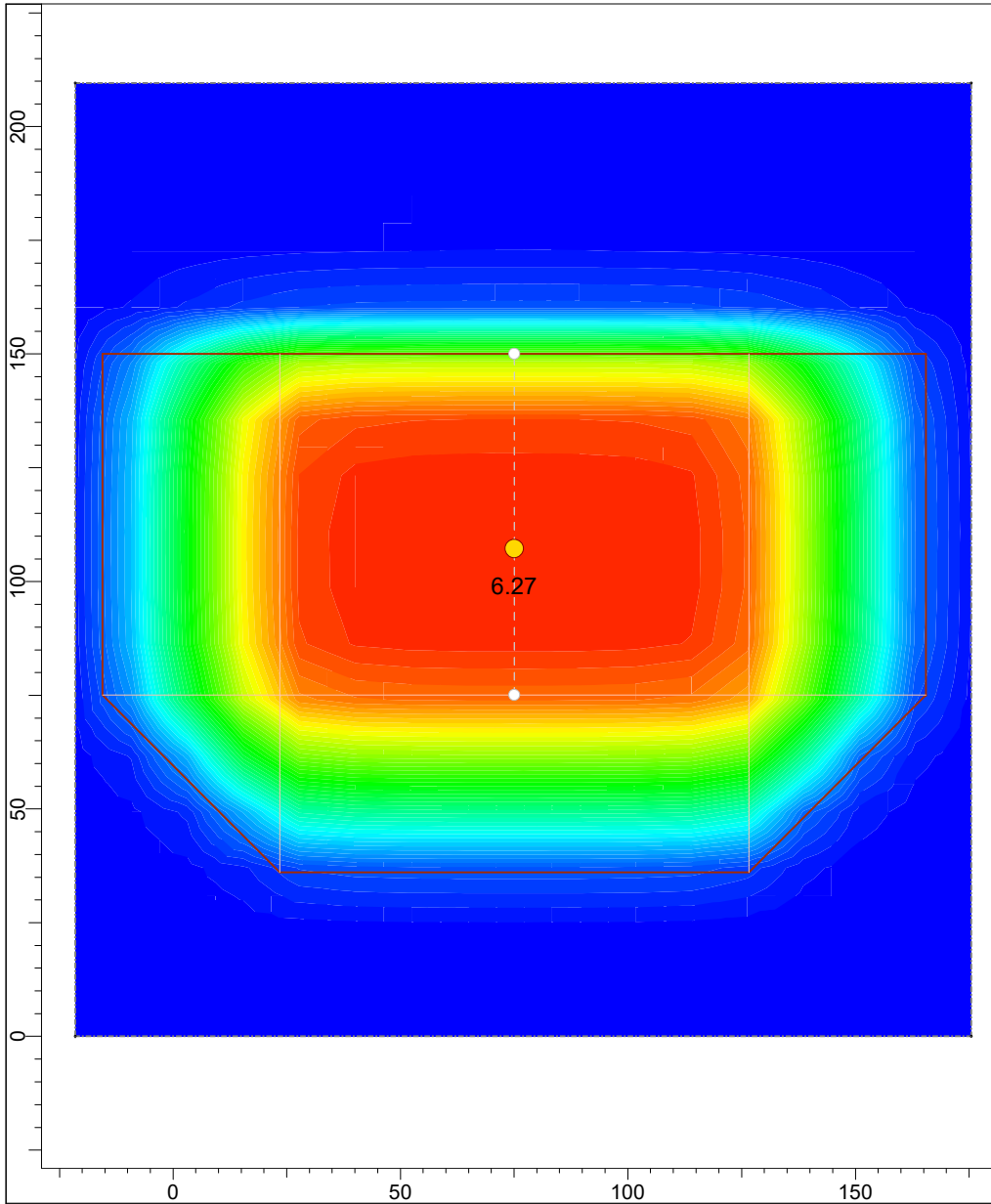
### Grid Coordinates

X [ft]	Y [ft]
256	240.5
256	-54.4558
-106	-54.4558
-106	240.5

	<i>Project</i>		SC 557 Over Crowders Creek	
	<i>Analysis Description</i>		End Bridge Single Drainage	
	<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
	<i>Date</i>		<i>File Name</i>	End Bridge.s3z



<i>Project</i>	SC 557 Over Crowders Creek		
<i>Analysis Description</i>	End Bridge Double Drainage		
<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
<i>STAGE</i>	Stage 2: 150 Days (End Construction)	<i>File Name</i>	End Bridge_DD.s3z



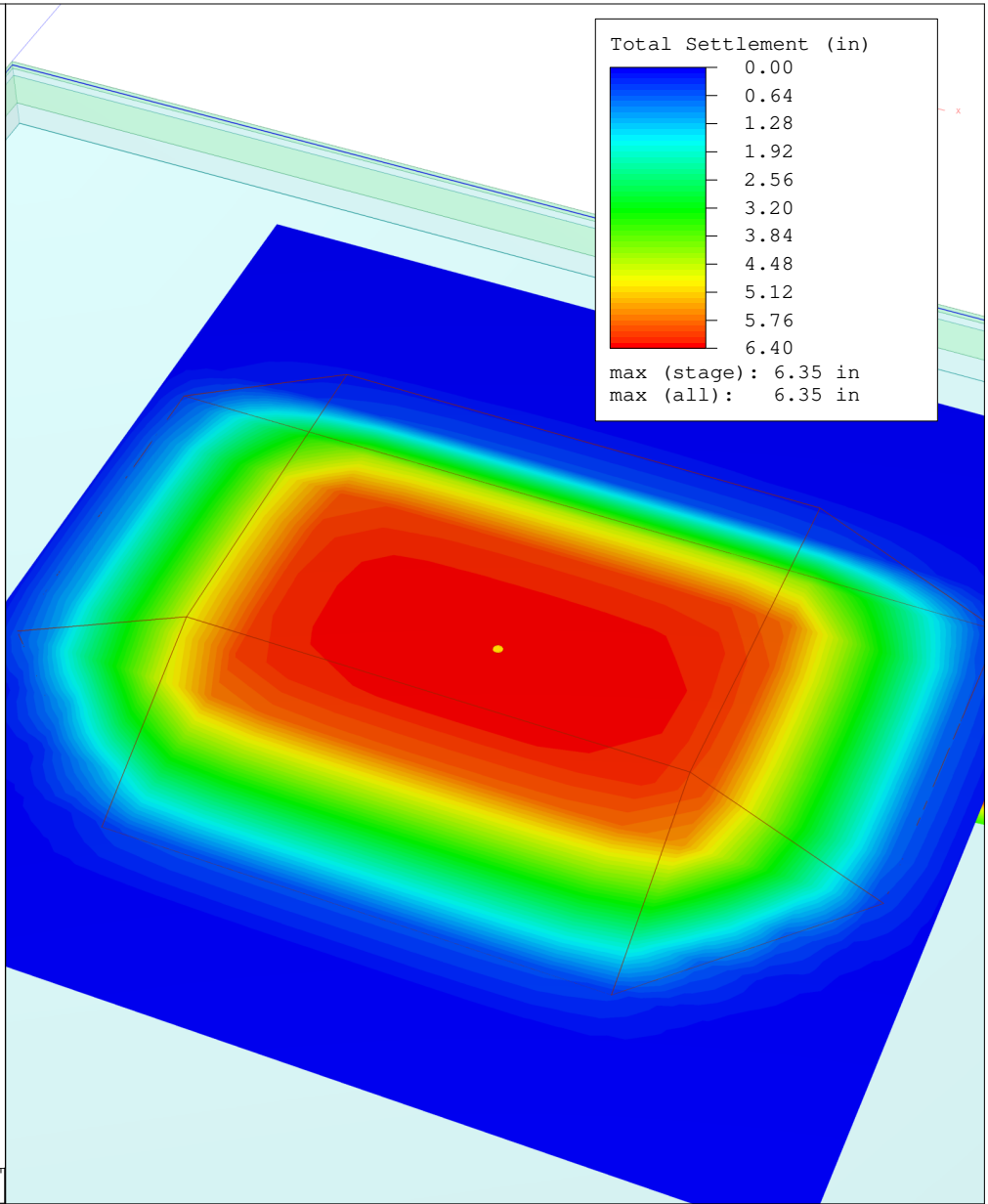
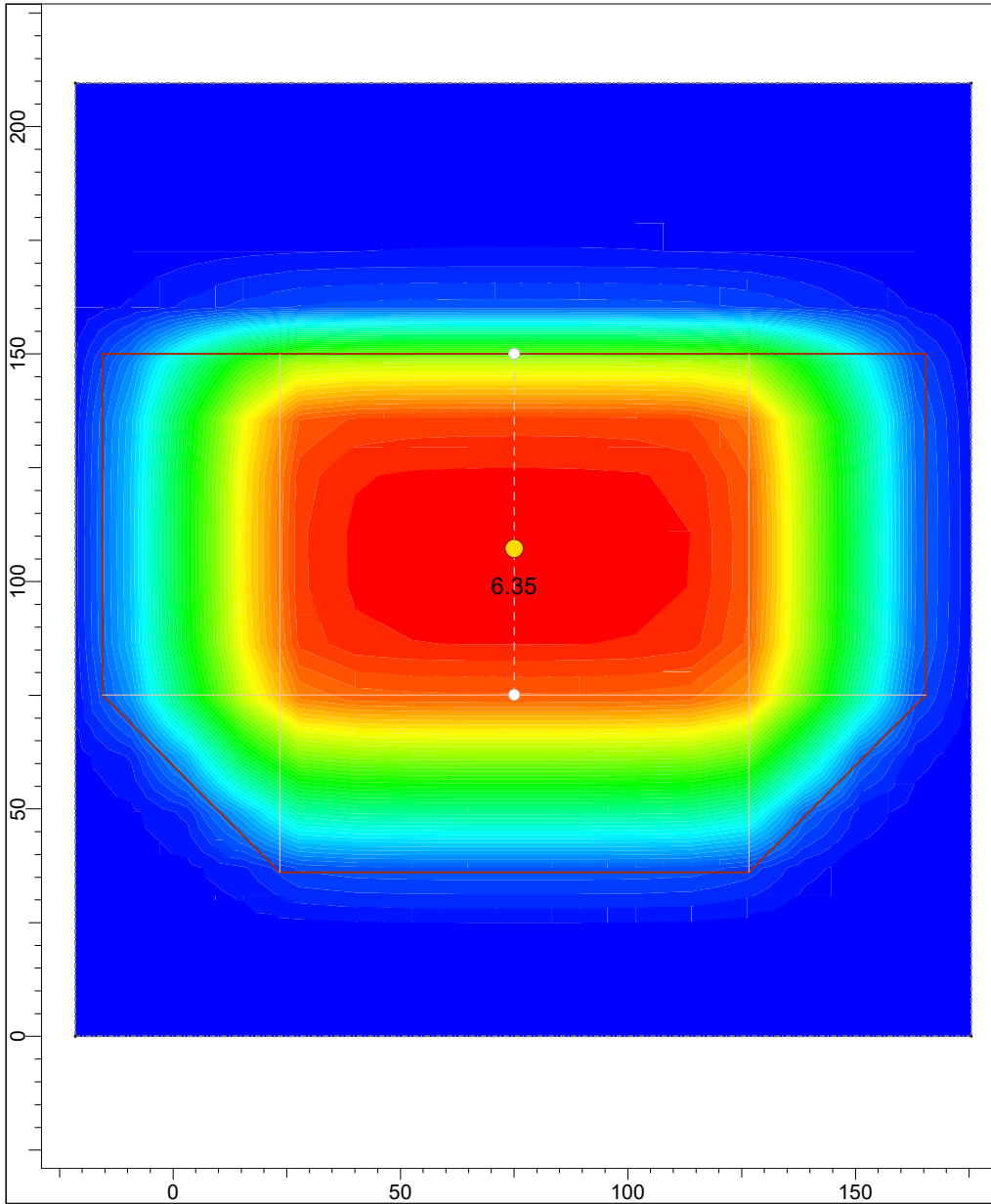
Total Settlement (in)

0.00
0.64
1.28
1.92
2.56
3.20
3.84
4.48
5.12
5.76
6.40

max (stage): 6.27 in  
max (all): 6.35 in



<i>Project</i>	SC 557 Over Crowders Creek		
<i>Analysis Description</i>	End Bridge Double Drainage		
<i>Drawn By</i>	JFH	<i>Company</i>	F&M
<i>STAGE</i>	Stage 3: 155 Days (Time to meet EV-05B)	<i>File Name</i>	End Bridge_DD.s3z



Project	SC 557 Over Crowders Creek		
Analysis Description	End Bridge Double Drainage		
Drawn By	JFH	Company	F&ME
STAGE	Stage 5: 165 Days (End Consolidation)	File Name	End Bridge_DD.s3z

# Settle3D Analysis Information

## SC 557 Over Crowders Creek

### Project Settings

Document Name	End Bridge_DD
Project Title	SC 557 Over Crowders Creek
Analysis	End Bridge Double Drainage
Author	JFH
Company	F&ME
Stress Computation Method	Boussinesq
Time-dependent Consolidation Analysis	
Time Units	days
Permeability Units	feet/day
Use average properties to calculate layered stresses	
Improve consolidation accuracy	
Ignore negative effective stresses in settlement calculations	


### Stage Settings

Stage #	Name	Time [days]
1	Stage 1	0
2	Stage 2	150
3	Stage 3	155
4	Stage 4	160
5	Stage 5	165
6	Stage 6	200
7	Stage 7	300
8	Stage 8	350
9	Stage 9	400
10	Stage 10	500
11	Stage 11	600
12	Stage 12	700
13	Stage 13	800
14	Stage 14	900
15	Stage 15	1000

### Results

Time taken to compute: 5.90115 seconds

**Stage: Stage 1 = 0 d**


	<i>Project</i>		SC 557 Over Crowders Creek	
	<i>Analysis Description</i>		End Bridge Double Drainage	
	<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
	<i>Date</i>		<i>File Name</i>	End Bridge_DD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	0
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0
Effective Stress [ksf]	0	0.7842
Total Stress [ksf]	0	1.845
Total Strain	0	0
Pore Water Pressure [ksf]	0	1.0608
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.005	2.9791
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.00337713
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.456335

### Stage: Stage 2 = 150 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	5.09226
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	5.09226
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	2.46499
Total Stress [ksf]	0	4.15438
Total Strain	0	0.0238758
Pore Water Pressure [ksf]	0	3.37018
Excess Pore Water Pressure [ksf]	0	2.37499
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.005	2.9791
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.0088806
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.456335

### Stage: Stage 3 = 155 d

	<i>Project</i> SC 557 Over Crowders Creek	
	<i>Analysis Description</i> End Bridge Double Drainage	
	<i>Drawn By</i> JFH	<i>Company</i> F&ME
	<i>Date</i>	<i>File Name</i> End Bridge_DD.s3z




Data Type	Minimum	Maximum
Total Settlement [in]	0	6.27293
Consolidation Settlement [in]	0	1.18067
Immediate Settlement [in]	0	5.09226
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09358
Total Stress [ksf]	0	4.15438
Total Strain	0	0.0513582
Pore Water Pressure [ksf]	0	1.25512
Excess Pore Water Pressure [ksf]	0	0.369388
Degree of Consolidation [%]	0	99.9702
Pre-consolidation Stress [ksf]	0.005	3.09219
Over-consolidation Ratio	1	3.79999
Void Ratio	0	1.27
Permeability [ft/d]	0	0.00337713
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.600469

#### Stage: Stage 4 = 160 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	6.34126
Consolidation Settlement [in]	0	1.249
Immediate Settlement [in]	0	5.09226
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09358
Total Stress [ksf]	0	4.15438
Total Strain	0	0.0513582
Pore Water Pressure [ksf]	0	1.0608
Excess Pore Water Pressure [ksf]	0	0.045089
Degree of Consolidation [%]	0	99.9964
Pre-consolidation Stress [ksf]	0.005	3.09326
Over-consolidation Ratio	1	3.79999
Void Ratio	0	1.27
Permeability [ft/d]	0	0.00337713
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.600469

#### Stage: Stage 5 = 165 d


	Project		SC 557 Over Crowders Creek	
	Analysis Description		End Bridge Double Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	End Bridge_DD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	6.34922
Consolidation Settlement [in]	0	1.25696
Immediate Settlement [in]	0	5.09226
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09358
Total Stress [ksf]	0	4.15438
Total Strain	0	0.0513582
Pore Water Pressure [ksf]	0	1.0608
Excess Pore Water Pressure [ksf]	-1.25862e-020	0.00549922
Degree of Consolidation [%]	0	99.9996
Pre-consolidation Stress [ksf]	0.005	3.09339
Over-consolidation Ratio	1	3.79999
Void Ratio	0	1.27
Permeability [ft/d]	0	0.0088806
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.600469

### Stage: Stage 6 = 200 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	6.35032
Consolidation Settlement [in]	0	1.25806
Immediate Settlement [in]	0	5.09226
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09358
Total Stress [ksf]	0	4.15438
Total Strain	0	0.0513582
Pore Water Pressure [ksf]	0	1.0608
Excess Pore Water Pressure [ksf]	-8.37412e-021	2.0217e-009
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.005	3.09341
Over-consolidation Ratio	1	3.79999
Void Ratio	0	1.27
Permeability [ft/d]	0	0.0088806
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.600469

### Stage: Stage 7 = 300 d


	<i>Project</i> SC 557 Over Crowders Creek	
	<i>Analysis Description</i> End Bridge Double Drainage	
	<i>Drawn By</i> JFH	<i>Company</i> F&ME
	<i>Date</i>	<i>File Name</i> End Bridge_DD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	6.35032
Consolidation Settlement [in]	0	1.25806
Immediate Settlement [in]	0	5.09226
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09358
Total Stress [ksf]	0	4.15438
Total Strain	0	0.0513582
Pore Water Pressure [ksf]	0	1.0608
Excess Pore Water Pressure [ksf]	-1.52807e-017	1.46708e-017
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.005	3.09341
Over-consolidation Ratio	1	3.79999
Void Ratio	0	1.27
Permeability [ft/d]	0	0.0088806
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.600469

### Stage: Stage 8 = 350 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	6.35032
Consolidation Settlement [in]	0	1.25806
Immediate Settlement [in]	0	5.09226
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09358
Total Stress [ksf]	0	4.15438
Total Strain	0	0.0513582
Pore Water Pressure [ksf]	0	1.0608
Excess Pore Water Pressure [ksf]	-1.46261e-017	1.51881e-017
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.005	3.09341
Over-consolidation Ratio	1	3.79999
Void Ratio	0	1.27
Permeability [ft/d]	0	0.0088806
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.600469

### Stage: Stage 9 = 400 d


	Project		SC 557 Over Crowders Creek	
	Analysis Description		End Bridge Double Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	End Bridge_DD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	6.35032
Consolidation Settlement [in]	0	1.25806
Immediate Settlement [in]	0	5.09226
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09358
Total Stress [ksf]	0	4.15438
Total Strain	0	0.0513582
Pore Water Pressure [ksf]	0	1.0608
Excess Pore Water Pressure [ksf]	-1.45855e-017	1.51047e-017
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.005	3.09341
Over-consolidation Ratio	1	3.79999
Void Ratio	0	1.27
Permeability [ft/d]	0	0.0088806
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.600469

### Stage: Stage 10 = 500 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	6.35032
Consolidation Settlement [in]	0	1.25806
Immediate Settlement [in]	0	5.09226
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09358
Total Stress [ksf]	0	4.15438
Total Strain	0	0.0513582
Pore Water Pressure [ksf]	0	1.0608
Excess Pore Water Pressure [ksf]	-1.50464e-017	1.45279e-017
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.005	3.09341
Over-consolidation Ratio	1	3.79999
Void Ratio	0	1.27
Permeability [ft/d]	0	0.0088806
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.600469

### Stage: Stage 11 = 600 d


	Project		SC 557 Over Crowders Creek	
	Analysis Description		End Bridge Double Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	End Bridge_DD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	6.35032
Consolidation Settlement [in]	0	1.25806
Immediate Settlement [in]	0	5.09226
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09358
Total Stress [ksf]	0	4.15438
Total Strain	0	0.0513582
Pore Water Pressure [ksf]	0	1.0608
Excess Pore Water Pressure [ksf]	-1.50454e-017	1.4498e-017
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.005	3.09341
Over-consolidation Ratio	1	3.79999
Void Ratio	0	1.27
Permeability [ft/d]	0	0.0088806
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.600469

### Stage: Stage 12 = 700 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	6.35032
Consolidation Settlement [in]	0	1.25806
Immediate Settlement [in]	0	5.09226
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09358
Total Stress [ksf]	0	4.15438
Total Strain	0	0.0513582
Pore Water Pressure [ksf]	0	1.0608
Excess Pore Water Pressure [ksf]	-1.44834e-017	1.50447e-017
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.005	3.09341
Over-consolidation Ratio	1	3.79999
Void Ratio	0	1.27
Permeability [ft/d]	0	0.0088806
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.600469

### Stage: Stage 13 = 800 d


	Project		SC 557 Over Crowders Creek	
	Analysis Description		End Bridge Double Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	End Bridge_DD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	6.35032
Consolidation Settlement [in]	0	1.25806
Immediate Settlement [in]	0	5.09226
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09358
Total Stress [ksf]	0	4.15438
Total Strain	0	0.0513582
Pore Water Pressure [ksf]	0	1.0608
Excess Pore Water Pressure [ksf]	-1.5044e-017	1.44688e-017
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.005	3.09341
Over-consolidation Ratio	1	3.79999
Void Ratio	0	1.27
Permeability [ft/d]	0	0.0088806
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.600469

### Stage: Stage 14 = 900 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	6.35032
Consolidation Settlement [in]	0	1.25806
Immediate Settlement [in]	0	5.09226
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09358
Total Stress [ksf]	0	4.15438
Total Strain	0	0.0513582
Pore Water Pressure [ksf]	0	1.0608
Excess Pore Water Pressure [ksf]	-1.44542e-017	1.50431e-017
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.005	3.09341
Over-consolidation Ratio	1	3.79999
Void Ratio	0	1.27
Permeability [ft/d]	0	0.0088806
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.600469

### Stage: Stage 15 = 1000 d

	Project		SC 557 Over Crowders Creek	
	Analysis Description		End Bridge Double Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	End Bridge_DD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	6.35032
Consolidation Settlement [in]	0	1.25806
Immediate Settlement [in]	0	5.09226
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09358
Total Stress [ksf]	0	4.15438
Total Strain	0	0.0513582
Pore Water Pressure [ksf]	0	1.0608
Excess Pore Water Pressure [ksf]	-1.50422e-017	1.44397e-017
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.005	3.09341
Over-consolidation Ratio	1	3.79999
Void Ratio	0	1.27
Permeability [ft/d]	0	0.0088806
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.600469

## Embankments

### 1. Embankment


Center Line (75, 75) to (75, 150)  
 Number of Layers 1  
 Near End Angle 26 degrees  
 Far End Angle 90 degrees  
 Base Width 181

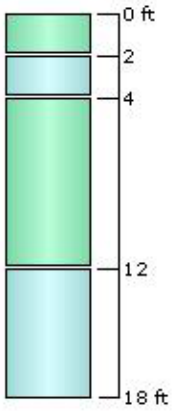
Layer	Stage	Left Bench Width (ft)	Left Angle (deg)	Height (ft)	Unit Weight (kips/ft <sup>3</sup> )	Right Angle (deg)	Right Bench Width (ft)
1	Stage 2 = 150 d	0	26	19	0.125	26	0

## Soil Layers



Ground Surface Drained: Yes

Layer #	Type	Thickness [ft]	Depth [ft]	Drained at Bottom
1	V. Loose Silty Sand	2	0	Yes
2	V. Soft Sandy Silt	2	2	Yes
3	V. Loose Silty Sand	8	4	Yes
4	V. Soft Sandy Silt	6	12	Yes

	Project		SC 557 Over Crowders Creek	
	Analysis Description		End Bridge Double Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	End Bridge_DD.s3z



## Soil Properties

Property	V. Soft Sandy Silt	V. Loose Silty Sand
Color		
Unit Weight [kips/ft <sup>3</sup> ]	0.095	0.1
Saturated Unit Weight [kips/ft <sup>3</sup> ]	0.1	0.105
Immediate Settlement	Enabled	Enabled
Es [ksf]	100	100
Esur [ksf]	100	100
Primary Consolidation	Enabled	Disabled
Material Type	Non-Linear	
Cc	0.071	
Cr	0.027	
e0	1.27	
OCR	3.8	1
Cv [ft <sup>2</sup> /d]	1.51	
B-bar	1	
Undrained Su A [kips/ft <sup>2</sup> ]	0	0
Undrained Su S	0.2	0.2
Undrained Su m	0.8	0.8
Piezo Line ID	1	1

## Groundwater


Groundwater method Piezometric Lines  
 Water Unit Weight 0.0624 kips/ft<sup>3</sup>

## Piezometric Line Entities

ID	Depth (ft)
1	1 ft

## Query Points

Point #	(X,Y) Location	Number of Divisions
2	75, 107.173	Auto: 59

	Project		SC 557 Over Crowders Creek	
	Analysis Description		End Bridge Double Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	End Bridge_DD.s3z




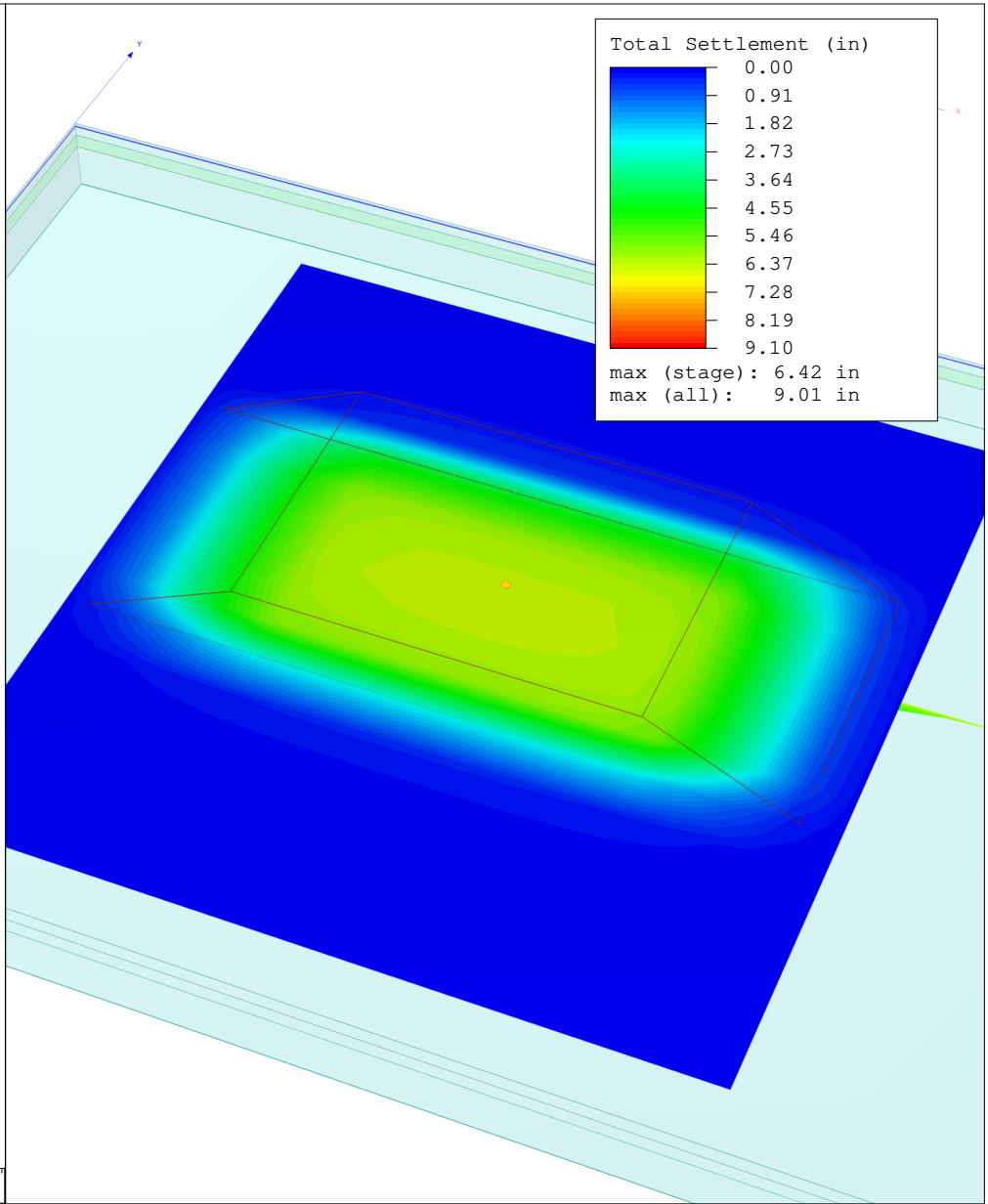
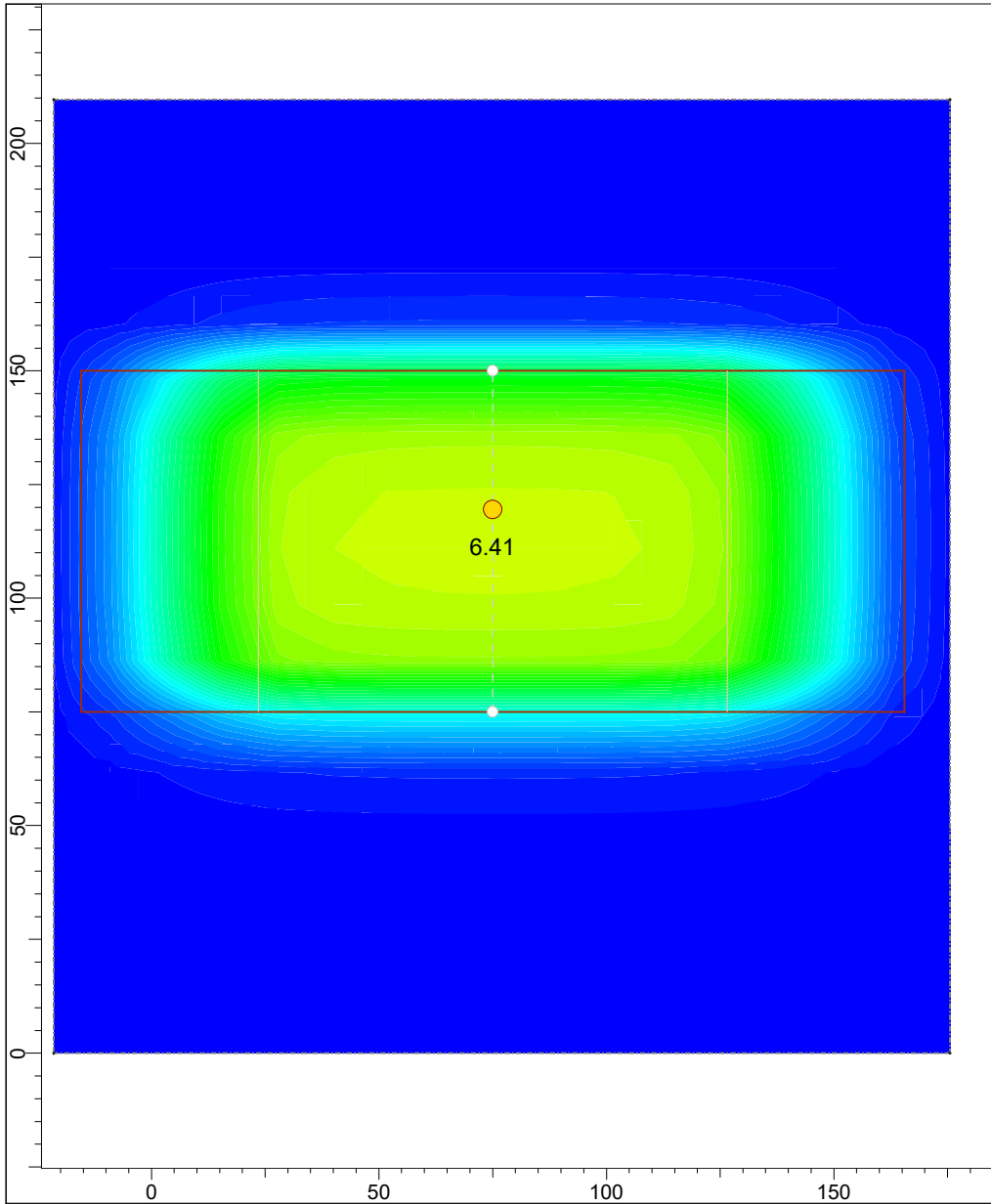
## Field Point Grid

Number of points 306  
 Expansion Factor 2

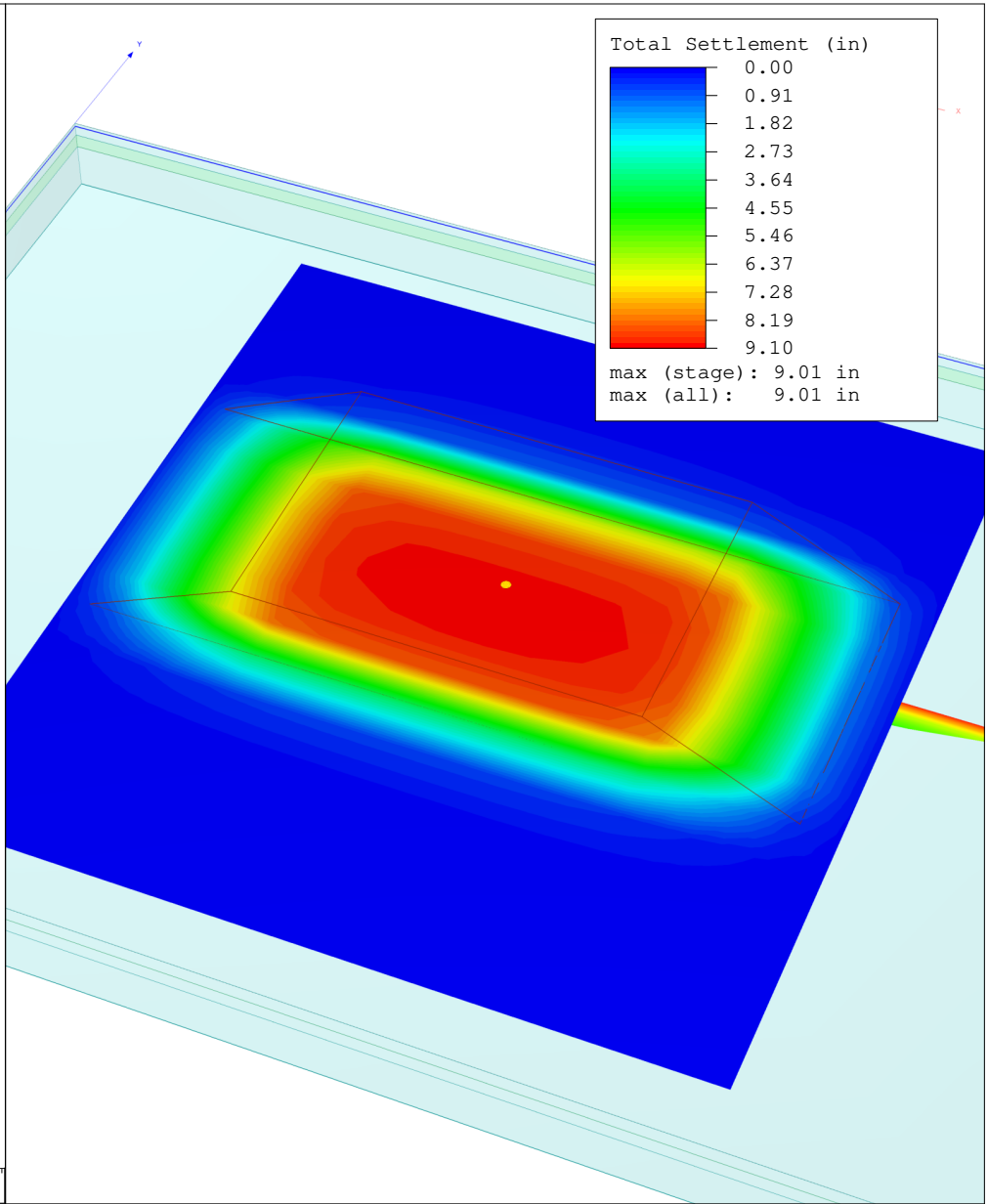
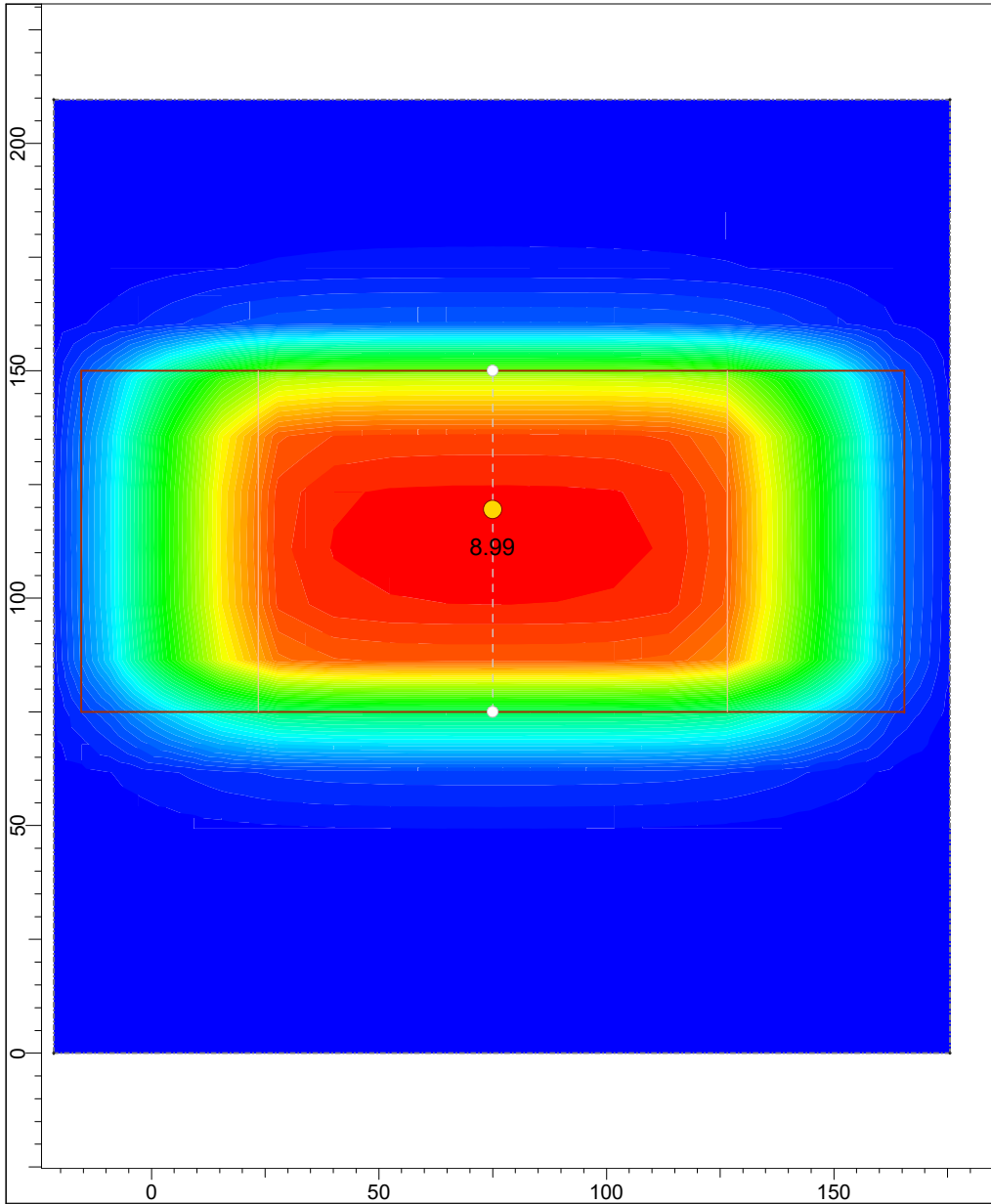
### Grid Coordinates

X [ft]	Y [ft]
256	240.5
256	-54.4558
-106	-54.4558
-106	240.5

	<i>Project</i>		SC 557 Over Crowders Creek	
	<i>Analysis Description</i>		End Bridge Double Drainage	
	<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
	<i>Date</i>		<i>File Name</i>	End Bridge_DD.s3z



<i>Project</i>	SC 557 Over Crowders Creek		
<i>Analysis Description</i>	End Bridge Embankment Single Drainage		
<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
<i>STAGE</i>	Stage 2:150 Days (End Construction)	<i>File Name</i>	End Bridge Embankment.s3z



<i>Project</i>	SC 557 Over Crowders Creek		
<i>Analysis Description</i>	End Bridge Embankment Single Drainage		
<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
<i>STAGE</i>	Stage 7:400 Days (End Consolidation)	<i>File Name</i>	End Bridge Embankment.s3z

# Settle3D Analysis Information

## SC 557 Over Crowders Creek

### Project Settings

Document Name	End Bridge Embankment
Project Title	SC 557 Over Crowders Creek
Analysis	End Bridge Embankment Single Drainage
Author	JFH
Company	F&ME
Stress Computation Method	Boussinesq
Time-dependent Consolidation Analysis	
Time Units	days
Permeability Units	feet/day
Use average properties to calculate layered stresses	
Improve consolidation accuracy	
Ignore negative effective stresses in settlement calculations	


### Stage Settings

Stage #	Name	Time [days]
1	Stage 1	0
2	Stage 2	150
3	Stage 3	200
4	Stage 4	250
5	Stage 5	300
6	Stage 6	350
7	Stage 7	400
8	Stage 8	500
9	Stage 9	600
10	Stage 10	700
11	Stage 11	800
12	Stage 12	900
13	Stage 13	1000

### Results

Time taken to compute: 10.2699 seconds

**Stage: Stage 1 = 0 d**


	<i>Project</i>		SC 557 Over Crowders Creek	
	<i>Analysis Description</i>		End Bridge Embankment Single Drainage	
	<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
	<i>Date</i>		<i>File Name</i>	End Bridge Embankment.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	0
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0
Effective Stress [ksf]	0	0.867
Total Stress [ksf]	0	2.115
Total Strain	0	0
Pore Water Pressure [ksf]	0	1.248
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.102584
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.504517

### Stage: Stage 2 = 150 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	6.4235
Consolidation Settlement [in]	0	0.537981
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	2.46048
Total Stress [ksf]	0	4.34747
Total Strain	0	0.0970962
Pore Water Pressure [ksf]	0	3.48047
Excess Pore Water Pressure [ksf]	0	2.37498
Degree of Consolidation [%]	0	31.6422
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	30
Undrained Shear Strength	0	0.504517

### Stage: Stage 3 = 200 d


	Project		SC 557 Over Crowders Creek	
	Analysis Description		End Bridge Embankment Single Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	End Bridge Embankment.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	8.67675
Consolidation Settlement [in]	0	2.79123
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	2.64752
Total Stress [ksf]	0	4.34747
Total Strain	-2.53611e-005	0.0970962
Pore Water Pressure [ksf]	0	2.16971
Excess Pore Water Pressure [ksf]	0	0.921707
Degree of Consolidation [%]	0	92.9197
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.82654
Void Ratio	0	1.27006
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	98.5476
Undrained Shear Strength	0	0.606561

#### Stage: Stage 4 = 250 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	8.9114
Consolidation Settlement [in]	0	3.02588
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	2.84823
Total Stress [ksf]	0	4.34747
Total Strain	-9.05615e-007	0.0970962
Pore Water Pressure [ksf]	0	1.49924
Excess Pore Water Pressure [ksf]	0	0.251243
Degree of Consolidation [%]	0	98.2013
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.80067
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	99.6052
Undrained Shear Strength	0	0.640011

#### Stage: Stage 5 = 300 d


	<i>Project</i> SC 557 Over Crowders Creek	
	<i>Analysis Description</i> End Bridge Embankment Single Drainage	
	<i>Drawn By</i> JFH	<i>Company</i> F&ME
	<i>Date</i>	<i>File Name</i> End Bridge Embankment.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	8.98275
Consolidation Settlement [in]	0	3.09723
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.03103
Total Stress [ksf]	0	4.34747
Total Strain	-2.46678e-007	0.0970962
Pore Water Pressure [ksf]	0	1.31644
Excess Pore Water Pressure [ksf]	0	0.0684405
Degree of Consolidation [%]	0	99.5182
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.80018
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	99.8924
Undrained Shear Strength	0	0.648023

### Stage: Stage 6 = 350 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	9.00307
Consolidation Settlement [in]	0	3.11755
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.08083
Total Stress [ksf]	0	4.34747
Total Strain	-6.71869e-008	0.0970962
Pore Water Pressure [ksf]	0	1.26664
Excess Pore Water Pressure [ksf]	0	0.0186413
Degree of Consolidation [%]	0	99.8694
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.80005
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	99.9707
Undrained Shear Strength	0	0.650138

### Stage: Stage 7 = 400 d


	<i>Project</i> SC 557 Over Crowders Creek	
	<i>Analysis Description</i> End Bridge Embankment Single Drainage	
	<i>Drawn By</i> JFH	<i>Company</i> F&ME
	<i>Date</i>	<i>File Name</i> End Bridge Embankment.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	9.00856
Consolidation Settlement [in]	0	3.12304
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09439
Total Stress [ksf]	0	4.34747
Total Strain	-1.82997e-008	0.0970962
Pore Water Pressure [ksf]	0	1.25308
Excess Pore Water Pressure [ksf]	0	0.00507736
Degree of Consolidation [%]	0	99.9645
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.80001
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	99.992
Undrained Shear Strength	0	0.65071

### Stage: Stage 8 = 500 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	9.01048
Consolidation Settlement [in]	0	3.12497
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.0991
Total Stress [ksf]	0	4.34747
Total Strain	-1.35672e-009	0.0970962
Pore Water Pressure [ksf]	0	1.24838
Excess Pore Water Pressure [ksf]	0	0.000376429
Degree of Consolidation [%]	0	99.9974
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	99.9994
Undrained Shear Strength	0	0.650907

### Stage: Stage 9 = 600 d

	Project		SC 557 Over Crowders Creek
	Analysis Description		End Bridge Embankment Single Drainage
	Drawn By	JFH	Company F&ME
	Date		File Name End Bridge Embankment.s3z




Data Type	Minimum	Maximum
Total Settlement [in]	0	9.01063
Consolidation Settlement [in]	0	3.12512
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09944
Total Stress [ksf]	0	4.34747
Total Strain	0	0.0970962
Pore Water Pressure [ksf]	0	1.24803
Excess Pore Water Pressure [ksf]	0	2.78744e-005
Degree of Consolidation [%]	0	99.9998
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.650922

### Stage: Stage 10 = 700 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	9.01064
Consolidation Settlement [in]	0	3.12513
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09947
Total Stress [ksf]	0	4.34747
Total Strain	0	0.0970962
Pore Water Pressure [ksf]	0	1.248
Excess Pore Water Pressure [ksf]	0	2.0601e-006
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.650923

### Stage: Stage 11 = 800 d


	<i>Project</i> SC 557 Over Crowders Creek	
	<i>Analysis Description</i> End Bridge Embankment Single Drainage	
	<i>Drawn By</i> JFH	<i>Company</i> F&ME
	<i>Date</i>	<i>File Name</i> End Bridge Embankment.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	9.01064
Consolidation Settlement [in]	0	3.12513
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09947
Total Stress [ksf]	0	4.34747
Total Strain	0	0.0970962
Pore Water Pressure [ksf]	0	1.248
Excess Pore Water Pressure [ksf]	0	1.52255e-007
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.650923

### Stage: Stage 12 = 900 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	9.01064
Consolidation Settlement [in]	0	3.12513
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09947
Total Stress [ksf]	0	4.34747
Total Strain	0	0.0970962
Pore Water Pressure [ksf]	0	1.248
Excess Pore Water Pressure [ksf]	0	1.12527e-008
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.650923

### Stage: Stage 13 = 1000 d

	<i>Project</i> SC 557 Over Crowders Creek	
	<i>Analysis Description</i> End Bridge Embankment Single Drainage	
	<i>Drawn By</i> JFH	<i>Company</i> F&ME
	<i>Date</i>	<i>File Name</i> End Bridge Embankment.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	9.01064
Consolidation Settlement [in]	0	3.12513
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09947
Total Stress [ksf]	0	4.34747
Total Strain	0	0.0970962
Pore Water Pressure [ksf]	0	1.248
Excess Pore Water Pressure [ksf]	0	8.3165e-010
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.650923

## Embankments

### 1. Embankment


Center Line (75, 75) to (75, 150)  
 Number of Layers 1  
 Near End Angle 90 degrees  
 Far End Angle 90 degrees  
 Base Width 181

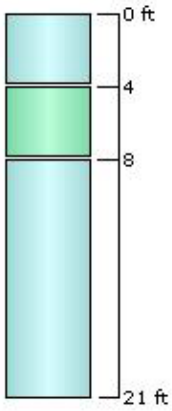
Layer	Stage	Left Bench Width (ft)	Left Angle (deg)	Height (ft)	Unit Weight (kips/ft <sup>3</sup> )	Right Angle (deg)	Right Bench Width (ft)
1	Stage 2 = 150 d	0	26	19	0.125	26	0

## Soil Layers



Ground Surface Drained: Yes

Layer #	Type	Thickness [ft]	Depth [ft]	Drained at Bottom
1	V. Soft Sandy Silt	4	0	No
2	V. Loose Silty Sand	4	4	No
3	V. Soft Sandy Silt	13	8	No

	Project		SC 557 Over Crowders Creek	
	Analysis Description		End Bridge Embankment Single Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	End Bridge Embankment.s3z



## Soil Properties

Property	V. Soft Sandy Silt	V. Loose Silty Sand
Color		
Unit Weight [kips/ft <sup>3</sup> ]	0.095	0.1
Saturated Unit Weight [kips/ft <sup>3</sup> ]	0.1	0.105
Immediate Settlement	Enabled	Enabled
Es [ksf]	100	100
E <sub>sur</sub> [ksf]	100	100
Primary Consolidation	Enabled	Disabled
Material Type	Non-Linear	
C <sub>c</sub>	0.071	
C <sub>r</sub>	0.027	
e <sub>0</sub>	1.27	
OCR	3.8	1
C <sub>v</sub> [ft <sup>2</sup> /d]	1.51	
B-bar	1	
Undrained Su A [kips/ft <sup>2</sup> ]	0	0
Undrained Su S	0.2	0.2
Undrained Su m	0.8	0.8
Piezo Line ID	1	1

## Groundwater


Groundwater method Piezometric Lines  
 Water Unit Weight 0.0624 kips/ft<sup>3</sup>

## Piezometric Line Entities

ID	Depth (ft)
1	1 ft

## Query Points

Point #	(X,Y) Location	Number of Divisions
2	75, 119.491	Auto: 57


	Project		SC 557 Over Crowders Creek	
	Analysis Description		End Bridge Embankment Single Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	End Bridge Embankment.s3z

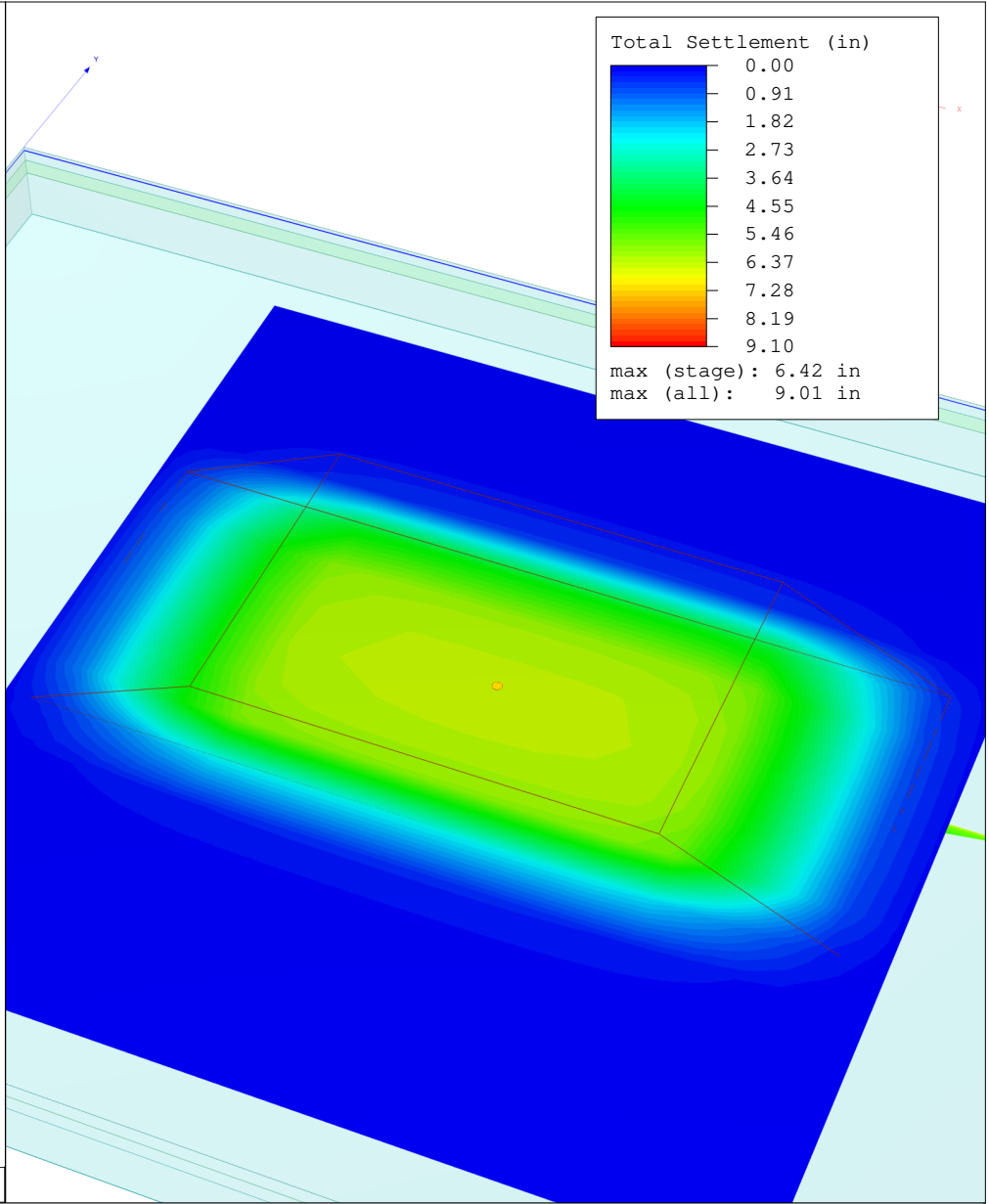
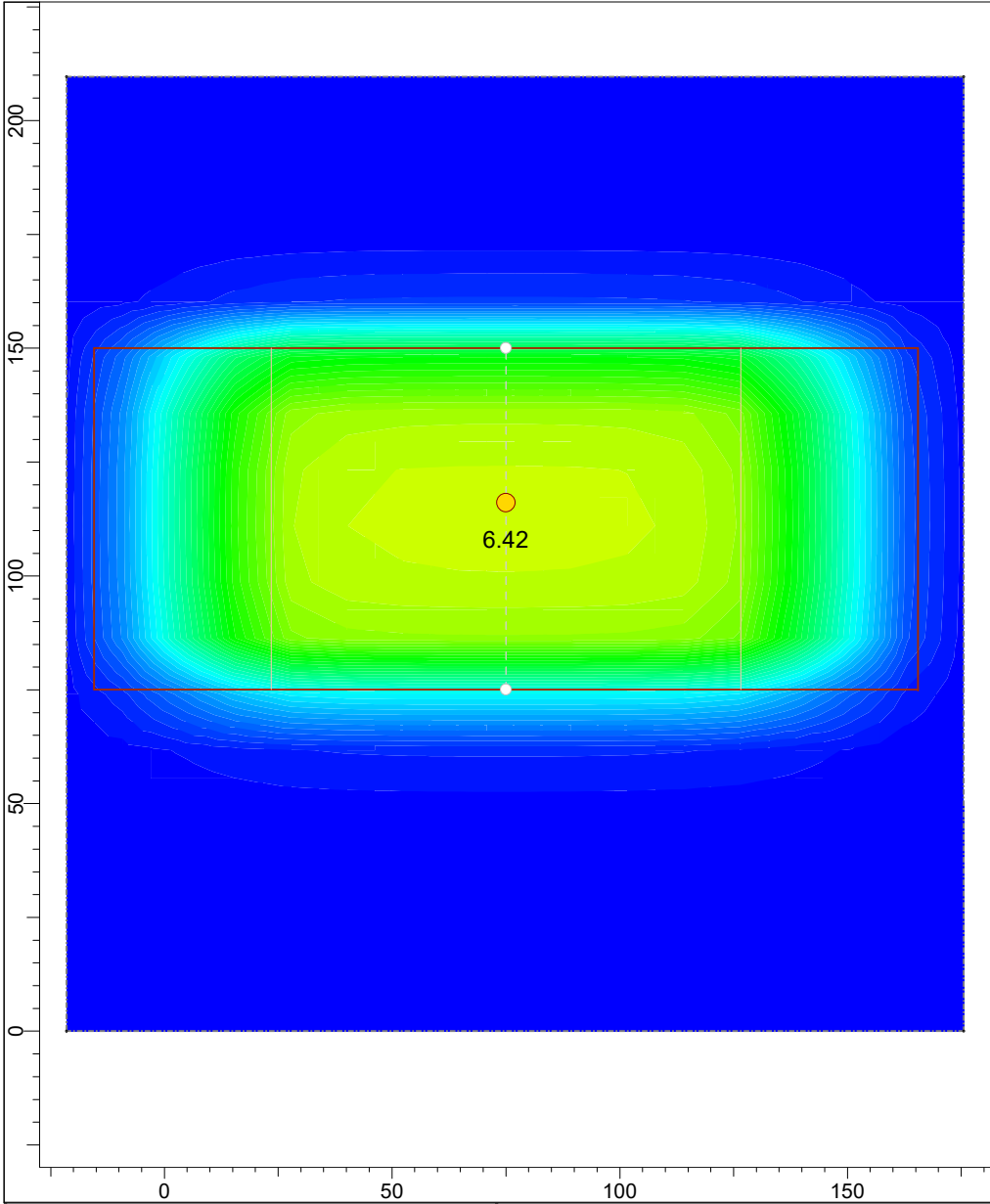
## Field Point Grid

Number of points 306  
 Expansion Factor 2

### Grid Coordinates

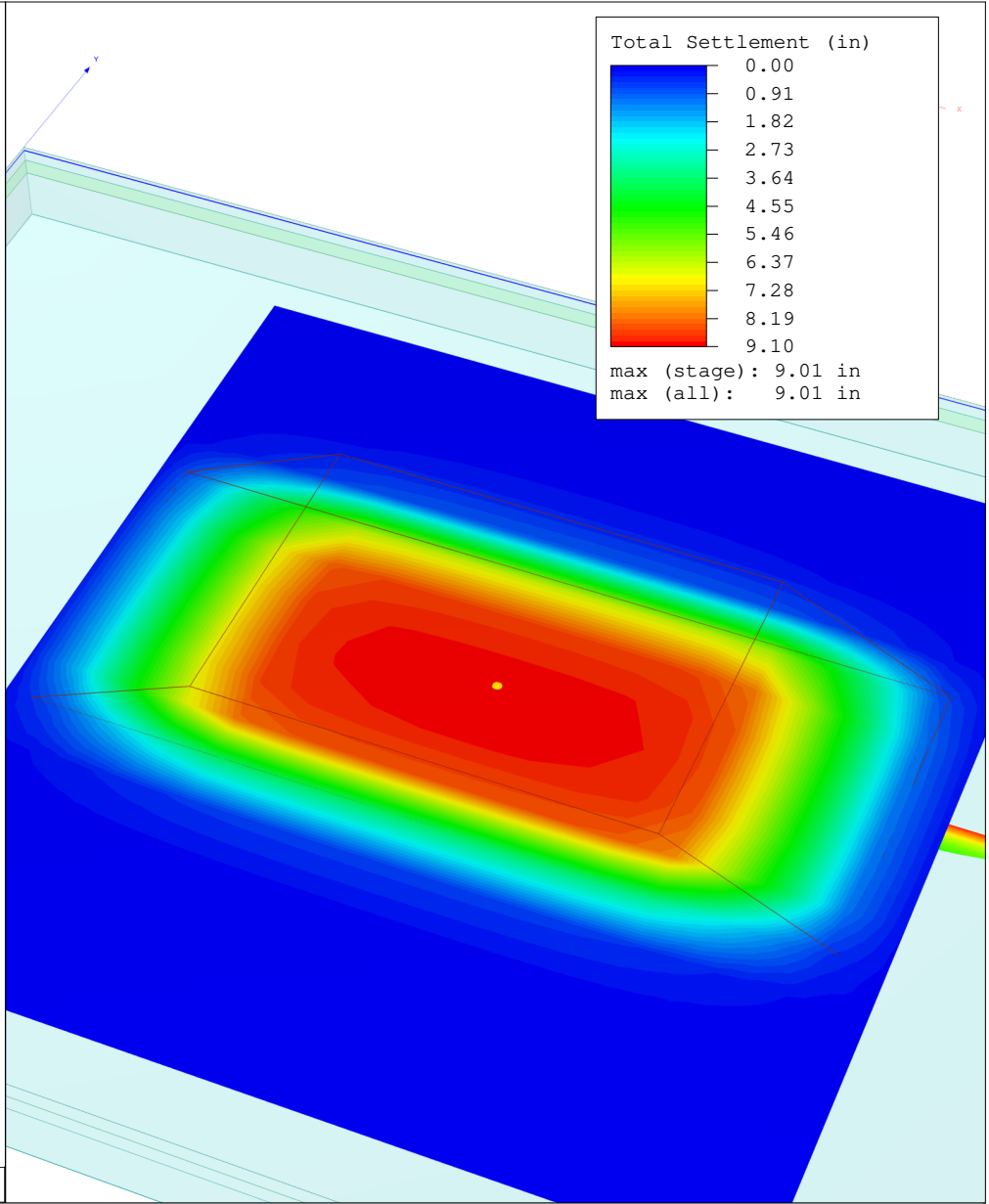
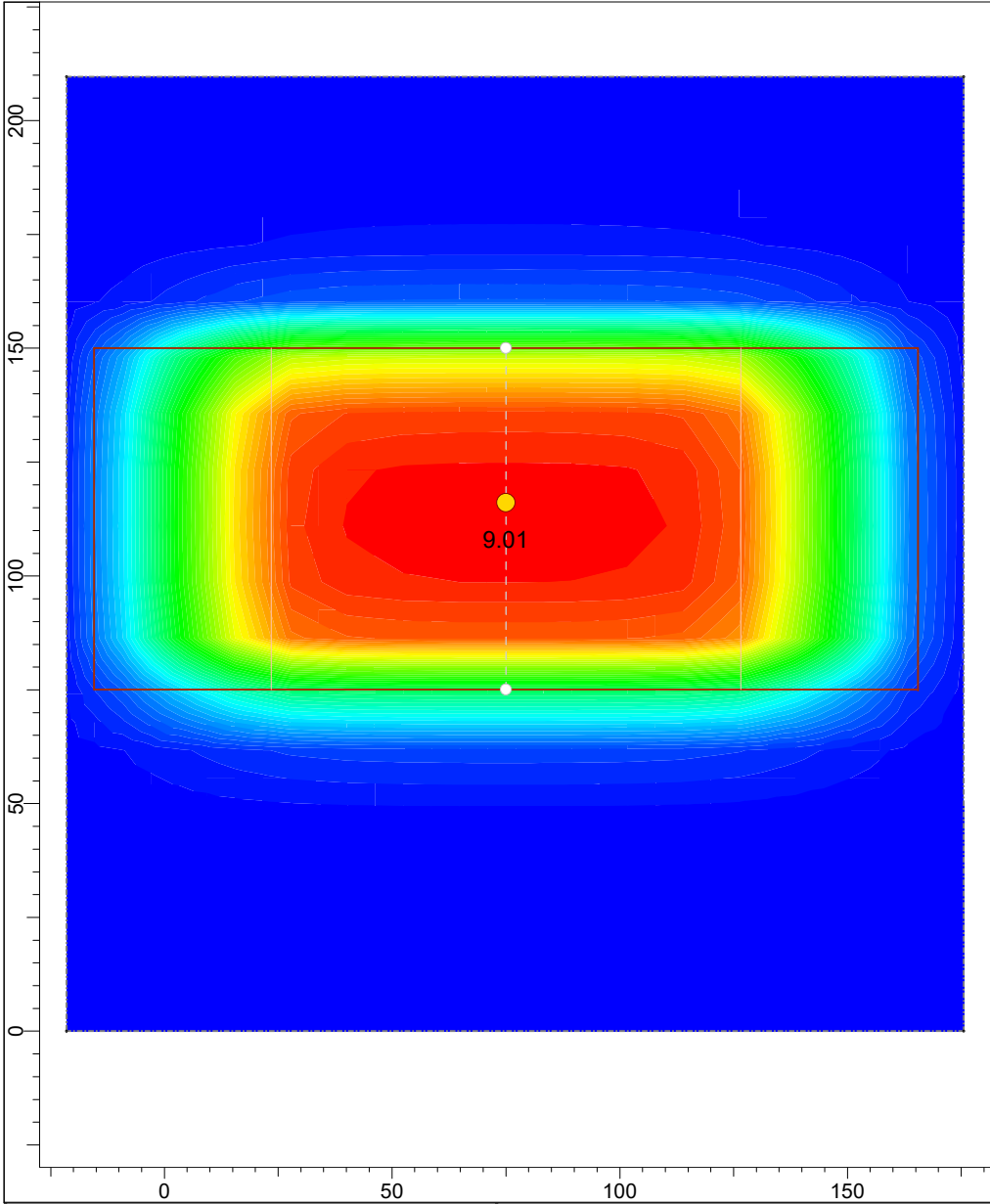
X [ft]	Y [ft]
256	240.5
256	-15.5
-106	-15.5
-106	240.5

	<i>Project</i>		SC 557 Over Crowders Creek	
	<i>Analysis Description</i>		End Bridge Embankment Single Drainage	
	<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
	<i>Date</i>		<i>File Name</i>	End Bridge Embankment.s3z



SETTLE3D 3.020

<i>Project</i>	SC 557 Over Crowders Creek		
<i>Analysis Description</i>	End Bridge Embankment Double Drainage		
<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
<i>STAGE</i>	Stage 2:150 Days (End Construction)	<i>File Name</i>	End Bridge Embankment_DD.s3z



<i>Project</i>	SC 557 Over Crowders Creek		
<i>Analysis Description</i>	End Bridge Embankment Double Drainage		
<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
<i>STAGE</i>	Stage 4:250 Days (End Consolidation)	<i>File Name</i>	End Bridge Embankment_DD.s3z

# Settle3D Analysis Information

## SC 557 Over Crowders Creek

### Project Settings

Document Name	End Bridge Embankment_DD
Project Title	SC 557 Over Crowders Creek
Analysis	End Bridge Embankment Double Drainage
Author	JFH
Company	F&ME
Stress Computation Method	Boussinesq
Time-dependent Consolidation Analysis	
Time Units	days
Permeability Units	feet/day
Use average properties to calculate layered stresses	
Improve consolidation accuracy	
Ignore negative effective stresses in settlement calculations	


### Stage Settings

Stage #	Name	Time [days]
1	Stage 1	0
2	Stage 2	150
3	Stage 3	200
4	Stage 4	250
5	Stage 5	300
6	Stage 6	350
7	Stage 7	400
8	Stage 8	500
9	Stage 9	600
10	Stage 10	700
11	Stage 11	800
12	Stage 12	900
13	Stage 13	1000

### Results

Time taken to compute: 9.61684 seconds

**Stage: Stage 1 = 0 d**

	<i>Project</i>		SC 557 Over Crowders Creek	
	<i>Analysis Description</i>		End Bridge Embankment Double Drainage	
	<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
	<i>Date</i>		<i>File Name</i>	End Bridge Embankment_DD.s3z




Data Type	Minimum	Maximum
Total Settlement [in]	0	0
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0
Effective Stress [ksf]	0	0.867
Total Stress [ksf]	0	2.115
Total Strain	0	0
Pore Water Pressure [ksf]	0	1.248
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.102584
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.504517

### Stage: Stage 2 = 150 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	6.4235
Consolidation Settlement [in]	0	0.537981
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	2.46048
Total Stress [ksf]	0	4.34747
Total Strain	0	0.0970962
Pore Water Pressure [ksf]	0	3.48047
Excess Pore Water Pressure [ksf]	0	2.37498
Degree of Consolidation [%]	0	31.6422
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	30
Undrained Shear Strength	0	0.504517

### Stage: Stage 3 = 200 d


	<i>Project</i> SC 557 Over Crowders Creek	
	<i>Analysis Description</i> End Bridge Embankment Double Drainage	
	<i>Drawn By</i> JFH	<i>Company</i> F&ME
	<i>Date</i>	<i>File Name</i> End Bridge Embankment_DD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	8.9977
Consolidation Settlement [in]	0	3.11219
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09947
Total Stress [ksf]	0	4.34747
Total Strain	0	0.0970962
Pore Water Pressure [ksf]	0	1.248
Excess Pore Water Pressure [ksf]	-9.81136e-021	0.0295706
Degree of Consolidation [%]	0	99.9991
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.650923

#### Stage: Stage 4 = 250 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	9.01052
Consolidation Settlement [in]	0	3.125
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09947
Total Stress [ksf]	0	4.34747
Total Strain	0	0.0970962
Pore Water Pressure [ksf]	0	1.248
Excess Pore Water Pressure [ksf]	-7.97292e-021	0.000289705
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.650923

#### Stage: Stage 5 = 300 d


	Project		SC 557 Over Crowders Creek	
	Analysis Description		End Bridge Embankment Double Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	End Bridge Embankment_DD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	9.01064
Consolidation Settlement [in]	0	3.12513
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09947
Total Stress [ksf]	0	4.34747
Total Strain	0	0.0970962
Pore Water Pressure [ksf]	0	1.248
Excess Pore Water Pressure [ksf]	-7.03023e-021	2.8223e-006
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.650923

### Stage: Stage 6 = 350 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	9.01064
Consolidation Settlement [in]	0	3.12513
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09947
Total Stress [ksf]	0	4.34747
Total Strain	0	0.0970962
Pore Water Pressure [ksf]	0	1.248
Excess Pore Water Pressure [ksf]	-6.61351e-021	2.73341e-008
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.650923

### Stage: Stage 7 = 400 d


	Project		SC 557 Over Crowders Creek
	Analysis Description		End Bridge Embankment Double Drainage
	Drawn By	JFH	Company F&ME
	Date		File Name End Bridge Embankment_DD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	9.01064
Consolidation Settlement [in]	0	3.12513
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09947
Total Stress [ksf]	0	4.34747
Total Strain	0	0.0970962
Pore Water Pressure [ksf]	0	1.248
Excess Pore Water Pressure [ksf]	-6.22148e-021	2.64732e-010
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.650923

### Stage: Stage 8 = 500 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	9.01064
Consolidation Settlement [in]	0	3.12513
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09947
Total Stress [ksf]	0	4.34747
Total Strain	0	0.0970962
Pore Water Pressure [ksf]	0	1.248
Excess Pore Water Pressure [ksf]	-5.82302e-021	2.41078e-014
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.650923

### Stage: Stage 9 = 600 d


	Project		SC 557 Over Crowders Creek	
	Analysis Description		End Bridge Embankment Double Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	End Bridge Embankment_DD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	9.01064
Consolidation Settlement [in]	0	3.12513
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09947
Total Stress [ksf]	0	4.34747
Total Strain	0	0.0970962
Pore Water Pressure [ksf]	0	1.248
Excess Pore Water Pressure [ksf]	-2.89312e-017	5.05221e-016
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.650923

### Stage: Stage 10 = 700 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	9.01064
Consolidation Settlement [in]	0	3.12513
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09947
Total Stress [ksf]	0	4.34747
Total Strain	0	0.0970962
Pore Water Pressure [ksf]	0	1.248
Excess Pore Water Pressure [ksf]	-4.06083e-017	4.46655e-016
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.650923

### Stage: Stage 11 = 800 d


	Project		SC 557 Over Crowders Creek	
	Analysis Description		End Bridge Embankment Double Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	End Bridge Embankment_DD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	9.01064
Consolidation Settlement [in]	0	3.12513
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09947
Total Stress [ksf]	0	4.34747
Total Strain	0	0.0970962
Pore Water Pressure [ksf]	0	1.248
Excess Pore Water Pressure [ksf]	-4.95223e-017	4.02555e-016
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.650923

### Stage: Stage 12 = 900 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	9.01064
Consolidation Settlement [in]	0	3.12513
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09947
Total Stress [ksf]	0	4.34747
Total Strain	0	0.0970962
Pore Water Pressure [ksf]	0	1.248
Excess Pore Water Pressure [ksf]	-6.00369e-017	3.67429e-016
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.650923

### Stage: Stage 13 = 1000 d

	<i>Project</i> SC 557 Over Crowders Creek	
	<i>Analysis Description</i> End Bridge Embankment Double Drainage	
	<i>Drawn By</i> JFH	<i>Company</i> F&ME
	<i>Date</i>	<i>File Name</i> End Bridge Embankment_DD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	9.01064
Consolidation Settlement [in]	0	3.12513
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09947
Total Stress [ksf]	0	4.34747
Total Strain	0	0.0970962
Pore Water Pressure [ksf]	0	1.248
Excess Pore Water Pressure [ksf]	-6.57947e-017	3.3875e-016
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.650923

## Embankments

### 1. Embankment


Center Line (75, 75) to (75, 150)  
 Number of Layers 1  
 Near End Angle 90 degrees  
 Far End Angle 90 degrees  
 Base Width 181

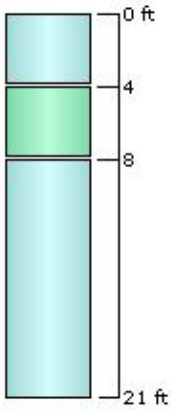
Layer	Stage	Left Bench Width (ft)	Left Angle (deg)	Height (ft)	Unit Weight (kips/ft <sup>3</sup> )	Right Angle (deg)	Right Bench Width (ft)
1	Stage 2 = 150 d	0	26	19	0.125	26	0

## Soil Layers



Ground Surface Drained: Yes

Layer #	Type	Thickness [ft]	Depth [ft]	Drained at Bottom
1	V. Soft Sandy Silt	4	0	Yes
2	V. Loose Silty Sand	4	4	Yes
3	V. Soft Sandy Silt	13	8	Yes

	Project		SC 557 Over Crowders Creek	
	Analysis Description		End Bridge Embankment Double Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	End Bridge Embankment_DD.s3z



## Soil Properties

Property	V. Soft Sandy Silt	V. Loose Silty Sand
Color		
Unit Weight [kips/ft <sup>3</sup> ]	0.095	0.1
Saturated Unit Weight [kips/ft <sup>3</sup> ]	0.1	0.105
Immediate Settlement	Enabled	Enabled
Es [ksf]	100	100
E <sub>sur</sub> [ksf]	100	100
Primary Consolidation	Enabled	Disabled
Material Type	Non-Linear	
C <sub>c</sub>	0.071	
C <sub>r</sub>	0.027	
e <sub>0</sub>	1.27	
OCR	3.8	1
C <sub>v</sub> [ft <sup>2</sup> /d]	1.51	
B-bar	1	
Undrained Su A [kips/ft <sup>2</sup> ]	0	0
Undrained Su S	0.2	0.2
Undrained Su m	0.8	0.8
Piezo Line ID	1	1

## Groundwater


Groundwater method Piezometric Lines  
 Water Unit Weight 0.0624 kips/ft<sup>3</sup>

## Piezometric Line Entities

ID	Depth (ft)
1	1 ft

## Query Points

Point #	(X,Y) Location	Number of Divisions
2	75, 116.031	Auto: 57

	Project		SC 557 Over Crowders Creek	
	Analysis Description		End Bridge Embankment Double Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	End Bridge Embankment_DD.s3z




## Field Point Grid

Number of points 306  
 Expansion Factor 2

### Grid Coordinates

X [ft]	Y [ft]
256	240.5
256	-15.5
-106	-15.5
-106	240.5

	<i>Project</i>		SC 557 Over Crowders Creek	
	<i>Analysis Description</i>		End Bridge Embankment Double Drainage	
	<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
	<i>Date</i>		<i>File Name</i>	End Bridge Embankment_DD.s3z

SC 557 Bridge over Crowders Creek  
Final Bridge Geotechnical Engineering Report

---

# APPENDIX

## SECTION 11 SEISMIC SOIL SHEAR STRENGTH LOSS CALCULATIONS

Project: SC 557 over Crowders Creek  
Location : Begin Bridge Embankment  
Calc. By: JFH

Date: 6/12/2018

Method: SCDOT Geotechnical Design Manual (2010), Chapter 13: Idriss & Boulanger (2008)

Depth to Groundwater = 15.0 ft

Soil Fill Unit Weight = 125 pcf  
Soil Fill Height = 21.0 ft

Design Event = FEE  
Peak Ground Acceleration, PGA (%g) = 0.04  
Earthquake Magnitude, M<sub>v</sub> = 7.3  
Max. RF defining on-set of Liquefaction = 0.85

Main soil parameter table with columns: SPT Test Interval, USCS Desig., gamma, gamma', sigma\_v, sigma'\_v, N\_meas, C\_R, C\_S, C\_B, C\_E, C\_N, N'\_{1,60}, FC, PI, and various correction factors for cyclic resistance ratio, static shear stress, age, and high overburden.

Liquefaction Induced Displacements table with columns: SPT Test Interval, Layer Thickness, N\_{1,60,CS}, Y\_{lim}, F\_{a,max}, Y\_{max}, Delta LDI, LD, E\_v, Delta S.

Residual Soil Strength Parameters table with columns: SPT Test Interval, N\_{1,60,CS}, tau\_r / sigma'\_v, R\_p, phi\_r, tau\_r.

Y\_{lim} = Limiting Shear Strain; Limiting shear strain is further limited to 50% of the computed value (Idriss & Boulanger, 2008)  
Y\_{max} = Maximum Shear Strain; Y\_{max} = Y\_{lim} if FS\_{eq} <= F\_a (Idriss & Boulanger, 2008)  
LDI = Lateral Displacement Index  
E\_v = Volumetric Strain  
Delta S = Liquefaction Induced Vertical Displacement

tau\_r / sigma'\_v = Liquefaction Residual Shear Strength Ratio  
R\_p = Excess Pore Pressure Ratio  
phi\_r = Internal Friction Angle for Cyclic Liquefaction  
tau\_r = Liquefaction Residual Shear Strength































Project: SC 557 over Crowders Creek  
 Location: IB4 - RT of CL  
 Calc. By: JFH  
 Date: 6/12/2018  
 Method: SCDOT Geotechnical Design Manual (2010); Chapter 13; Idriss & Boulanger (2008)

Depth to Groundwater = 6.0 ft	Soil Fill Unit Weight = 125 pcf	Design Event = FEE
	Soil Fill Height = 0.0 ft	Peak Ground Acceleration, PGA (%g) = 0.04
		Earthquake Magnitude, M <sub>w</sub> = 7.3
		Max. RF defining on-set of Liquefaction = 0.85

SPT Test Interval	USCS Desig.	γ	γ'	σ <sub>v</sub>	σ' <sub>v</sub>	N <sub>meas</sub>	C <sub>u</sub>	C <sub>s</sub>	C <sub>b</sub>	C <sub>e</sub>	C <sub>n</sub>	N <sub>1,60</sub>	FC	PI	ΔN <sub>1,60</sub>	N <sub>1,60,CS</sub>	α	β	r <sub>d</sub>	σ <sub>v,OB</sub>	σ' <sub>v,OB</sub>	CSR <sub>PEAK</sub>	CSR <sub>SL</sub>	MSF	CSR <sub>SL7.5</sub>	High Overburden Correction		Age Correction		Static Shear Stress Ratio Correction		CRR <sub>eq,7.5</sub>	(D/C) <sub>SL</sub>	EQ Hazard Desc.	SSL Potential		
																										C <sub>v</sub>	K <sub>σ</sub>	K <sub>OR</sub>	K <sub>α</sub>								
0.0 - 2.0	ML	105	105	0.210	0.210	0	0.75	1.00	1.00	1.35	1.70	0.0	91	NP	5.5	5.5																					
2.0 - 4.0	SM	90	90	0.390	0.390	2	0.75	1.00	1.00	1.35	1.70	3.4	29	6	5.3	8.8																					
4.0 - 6.0	SM	90	90	0.570	0.570	1	0.75	1.00	1.00	1.35	1.70	1.7	29	6	5.3	7.0																					
6.0 - 8.0	SM	90	27.6	0.750	0.625	0	0.85	1.00	1.00	1.35	1.70	0.0	29	6	5.3	5.3	-1.117	0.117	0.76907	0.75	0.63	0.037	0.024	1.054	0.023	0.053	1.06	1.00					0.094	0.24	Sand-Like	No SSL	
8.0 - 10.0	ML	90	27.6	0.930	0.680	0	0.85	1.00	1.00	1.35	1.70	0.0	55	NP	5.5	5.5	-1.118	0.117	0.76891	0.93	0.68	0.042	0.027	1.054	0.026	0.053	1.06	1.00					0.094	0.27	Sand-Like	No SSL	
13.5 - 15.0	SM	105	42.6	1.455	0.893	5	0.95	1.00	1.00	1.35	1.55	9.9	20	NP	4.5	14.4	-1.120	0.117	0.76851	1.46	0.89	0.050	0.033	1.054	0.031	0.092	1.08	1.00					0.163	0.19	Sand-Like	No SSL	
18.5 - 20.0	SM	105	42.6	1.980	1.106	4	0.95	1.00	1.00	1.35	1.41	7.2	20	NP	4.5	11.7	-1.123	0.118	0.76811	1.98	1.11	0.055	0.036	1.054	0.034	0.083	1.05	1.00					0.137	0.25	Sand-Like	No SSL	

Liquefaction Induced Displacements									
SPT Test Interval	Layer Thickness	N <sub>1,60,CS</sub>	γ <sub>lim</sub>	F <sub>α</sub>	γ <sub>max</sub>	ΔLDI	LD	ε <sub>v</sub>	ΔS
ft	ft	dim	dim	dim	dim	in	in	%	in
0.0 - 2.0									
2.0 - 4.0									
4.0 - 6.0									
6.0 - 8.0									
8.0 - 10.0									
13.5 - 15.0									
18.5 - 20.0									

S = 0.00

Residual Soil Strength Parameters					
SPT Test Interval	N <sub>1,60,CS</sub>	τ <sub>r</sub> / σ' <sub>vo</sub>	R <sub>e</sub>	φ <sub>rl</sub>	τ <sub>rl</sub>
ft	dim	dim	%	deg	psf
0.0 - 2.0					
2.0 - 4.0					
4.0 - 6.0					
6.0 - 8.0					
8.0 - 10.0					
13.5 - 15.0					
18.5 - 20.0					

γ<sub>lim</sub> = Limiting Shear Strain; Limiting shear strain is further limited to 50% of the computed value (Idriss & Boulanger, 2008)  
 γ<sub>max</sub> = Maximum Shear Strain; γ<sub>max</sub> = γ<sub>lim</sub> if F<sub>α</sub> ≤ F<sub>α</sub> (Idriss & Boulanger, 2008)  
 LDI = Lateral Displacement Index  
 ε<sub>v</sub> = Volumetric Strain  
 ΔS = Liquefaction Induced Vertical Displacement

τ<sub>r</sub> / σ'<sub>vo</sub> = Liquefaction Residual Shear Strength Ratio  
 R<sub>e</sub> = Excess Pore Pressure Ratio  
 φ<sub>rl</sub> = Internal Friction Angle for Cyclic Liquefaction  
 τ<sub>rl</sub> = Liquefaction Residual Shear Strength





Project: SC 557 over Crowders Creek  
 Location : EB5  
 Calc. By: JFH  
 Date: 6/12/2018  
 Method: SCDOT Geotechnical Design Manual (2010); Chapter 13; Idriss & Boulanger (2008)

Soil Fill Unit Weight = 125 pcf	Design Event = SEE
Soil Fill Height = 20.0 ft	Peak Ground Acceleration, PGA (%g) = 0.11
	Earthquake Magnitude, $M_w$ = 7.3
	Max. RF defining on-set of Liquefaction = 0.9

SPT Test Interval	USCS Desig.	$\gamma$	$\gamma'$	$\sigma_v$	$\sigma_v'$	$N_{max}$	$C_R$	$C_S$	$C_B$	$C_E$	$C_V$	$N'_{1,60}$	FC	PI	$\Delta N'_{1,60}$	$N'_{1,60,CS}$	$\alpha$	$\beta$	$r_d$	$\sigma_{v,OB}$	$\sigma'_{v,OB}$	CSR <sub>PEAK</sub>	CSR <sub>20</sub>	MSF	CSR <sub>20,7.5</sub>	High Overburden Correction		Age Correction		Static Shear Stress Ratio Correction		CRR'eq7.5	(D/C) <sup>st</sup>	EQ Hazard Desc.	SSL Potential							
																										$C_o$	$K_o$	$K_{DR}$	$K_\alpha$	$CRR'_{eq7.5}$	(D/C) <sup>st</sup>											
ft	dim	pcf	pcf	ksf	ksf	dim	dim	dim	dim	dim	dim	dim	%	dim	dim	dim	dim	dim	dim	ksf	ksf	dim	dim	dim	dim	dim	dim	dim	dim	dim	dim	dim	dim	dim	dim	dim	dim	dim	dim	dim	dim	dim
0.0 - 2.0	SM	90	27.6	0.180	0.055	0	0.75	1.00	1.00	1.35	1.70	0.0	45	3	5.5	5.5	-1.114	0.117	0.76955	2.68	2.56	0.089	0.058	1.054	0.055	0.053	0.99	1.00	1.00	1.00	0.088	0.62	Sand-Like	No SSL								
2.0 - 4.0	ML	90	27.6	0.360	0.110	0	0.75	1.00	1.00	1.35	1.70	0.0	51	NP	5.5	5.5	-1.115	0.117	0.76939	2.86	2.61	0.093	0.060	1.054	0.057	0.053	0.99	1.00	1.00	0.088	0.65	Sand-Like	No SSL									
4.0 - 6.0	SM	90	27.6	0.540	0.166	3	0.75	1.00	1.00	1.35	1.70	5.2	20	NP	4.5	9.6	-1.116	0.117	0.76923	3.04	2.67	0.097	0.063	1.054	0.059	0.076	0.98	1.00	1.00	0.114	0.52	Sand-Like	No SSL									
6.0 - 8.0	SM	90	27.6	0.720	0.221	3	0.85	1.00	1.00	1.35	1.70	5.9	20	NP	4.5	10.3	-1.117	0.117	0.76907	3.22	2.72	0.100	0.065	1.054	0.062	0.079	0.98	1.00	1.00	0.118	0.52	Sand-Like	No SSL									
8.0 - 10.0	SC-SM	90	27.6	0.900	0.276	0	0.85	1.00	1.00	1.35	1.70	0.0	49	4	5.5	5.5	-1.118	0.117	0.76891	3.40	2.78	0.104	0.067	1.054	0.064	0.053	0.99	1.00	1.00	0.088	0.73	Sand-Like	No SSL									
13.5 - 15.0	CL-ML	90	27.6	1.350	0.414	2	0.85	1.00	1.00	1.35	1.70	4.4	56	7	5.5	9.9	-1.120	0.117	0.76851	3.85	2.91	0.112	0.073	1.009	0.072	0.074	0.98	1.00	1.00	0.114	0.63	Clay-Like	No Strength Loss									

SPT Test Interval	Layer Thickness	$N'_{1,60,CS}$	$\gamma_{lim}$	$F_a$	$\gamma_{max}$	$\Delta LDI$	LD	$\epsilon_v$	$\Delta S$
ft	ft	dim	dim	dim	dim	in	in	%	in
0.0 - 2.0									
2.0 - 4.0									
4.0 - 6.0									
6.0 - 8.0									
8.0 - 10.0									
13.5 - 15.0									
								S= 0.00	

SPT Test Interval	$N'_{1,60,CS}$	$\tau_{r1} / \sigma'_{v,OB}$	$R_u$	$\phi_{r1}$	$\tau_{r1}$
ft	dim	dim	%	deg	psf
0.0 - 2.0					
2.0 - 4.0					
4.0 - 6.0					
6.0 - 8.0					
8.0 - 10.0					
13.5 - 15.0					

$\gamma_{lim}$  = Limiting Shear Strain; Limiting shear strain is further limited to 50% of the computed value (Idriss & Boulanger, 2008)  
 $\gamma_{max}$  = Maximum Shear Strain;  $\gamma_{max} = \gamma_{lim}$  if  $FS_{Li} \leq F_a$  (Idriss & Boulanger, 2008)  
 LDI = Lateral Displacement Index  
 $\epsilon_v$  = Volumetric Strain  
 S = Liquefaction Induced Vertical Displacement

$\tau_{r1} / \sigma'_{v,OB}$  = Liquefaction Residual Shear Strength Ratio  
 $R_u$  = Excess Pore Pressure Ratio  
 $\phi_{r1}$  = Internal Friction Angle for Cyclic Liquefaction  
 $\tau_{r1}$  = Liquefaction Residual Shear Strength



Project: SC 557 over Crowders Creek  
 Location : End of Bridge Embankment  
 Calc. By: JFH  
 Date: 6/12/2018  
 Method: SCDOT Geotechnical Design Manual (2010); Chapter 13; Idriss & Boulanger (2008)

Depth to Groundwater = 2.0 ft	Soil Fill Unit Weight = 125 pcf	Design Event = SEE
	Soil Fill Height = 18.0 ft	Peak Ground Acceleration, PGA (%g) = 0.11
		Earthquake Magnitude, $M_w$ = 7.3
		Max. RF defining on-set of Liquefaction = 0.9

SPT Test Interval ft	USCS Desig.	$\gamma$ pcf	$\gamma'$ pcf	$\sigma_v$ ksf	$\sigma'_v$ ksf	$N_{max}$ dim	$C_R$ dim	$C_S$ dim	$C_B$ dim	$C_E$ dim	$C_V$ dim	$N'_{1,60}$ dim	FC	PI	$\Delta N'_{1,60}$ dim	$N'_{1,60,CS}$ dim	$\alpha$ dim	$\beta$ dim	$r_d$ dim	$\sigma'_{v,OB}$ ksf	$\sigma'_{v,CS}$ ksf	$CSR_{PEAK}$ dim	$CSR_{EQ}$ dim	MSF	$CSR_{EQ,7.5}$ dim	High Overburden Correction			Age Correction		Static Shear Stress Ratio Correction		CRR <sub>eq,7.5</sub>	(D/C) <sup>sl</sup>	EQ Hazard Desc.	SSL Potential		
																										$C_o$ dim	$K_o$ dim	$K_{DR}$ dim	$K_a$ dim	$K_{DR}$ dim	$K_a$ dim							
0.0 - 2.0	ML	90	90	0.180	0.180	0	0.75	1.00	1.00	1.35	1.70	0.0	78	NP	5.5	5.5																						
2.0 - 4.0	ML	100	37.6	0.380	0.255	4	0.75	1.00	1.00	1.35	1.70	6.9	65	6	5.5	12.4	-1.115	0.117	0.76939	2.63	2.51	0.089	0.058	1.054	0.055	0.082	0.99	1.00			1.00	1.00	0.133	0.41	Sand-Like	No SSL		
4.0 - 6.0	SM	100	37.6	0.580	0.330	3	0.75	1.00	1.00	1.35	1.70	5.2	33	NP	5.5	10.6	-1.116	0.117	0.76923	2.83	2.58	0.093	0.060	1.054	0.057	0.076	0.99	1.00			1.00	1.00	0.121	0.47	Sand-Like	No SSL		
6.0 - 8.0	SM	90	27.6	0.760	0.386	1	0.85	1.00	1.00	1.35	1.70	2.0	49	4	5.5	7.5	-1.117	0.117	0.76907	3.01	2.64	0.097	0.063	1.054	0.060	0.065	0.99	1.00			1.00	1.00	0.100	0.60	Sand-Like	No SSL		
8.0 - 10.0	CL-ML	90	27.6	0.940	0.441	0	0.85	1.00	1.00	1.35	1.70	0.0	91	4	5.5	5.5	-1.118	0.117	0.76891	3.19	2.69	0.100	0.065	1.054	0.062	0.053	0.99	1.00			1.00	1.00	0.088	0.70	Sand-Like	No SSL		
13.5 - 15.0	CL-ML	90	27.6	1.390	0.579	0	0.85	1.00	1.00	1.35	1.70	0.0	78	7	5.5	5.5	-1.120	0.117	0.76851	3.64	2.83	0.109	0.071	1.009	0.070	0.053	0.88	1.00			1.00	1.00	0.088	0.80	Clay-Like	No Strength Loss		
18.5 - 20.0	CL-ML	100	37.6	1.890	0.767	3	0.95	1.00	1.00	1.35	1.70	6.5	52	2	5.5	12.0	-1.123	0.118	0.76811	4.14	3.02	0.116	0.075	1.054	0.071	0.081	0.97	1.00			1.00	1.00	0.129	0.55	Sand-Like	No SSL		

Liquefaction Induced Displacements										
SPT Test Interval ft	Layer Thickness ft	$N'_{1,60,CS}$ dim	$\gamma_{lim}$ dim	$F_a$ dim	$\gamma_{max}$ dim	$\Delta LDI$ in	LD in	$\epsilon_v$ %	$\Delta S$ in	S = 0.00
0.0 - 2.0										
2.0 - 4.0										
4.0 - 6.0										
6.0 - 8.0										
8.0 - 10.0										
13.5 - 15.0										
18.5 - 20.0										

Residual Soil Strength Parameters						
SPT Test Interval ft	$N'_{1,60,CS}$ dim	$\tau_{rl} / \sigma'_{v,cs}$ %	$R_u$ %	$\phi_{rl}$ deg	$\tau_{rl}$ psf	
0.0 - 2.0						
2.0 - 4.0						
4.0 - 6.0						
6.0 - 8.0						
8.0 - 10.0						
13.5 - 15.0						
18.5 - 20.0						

$\gamma_{lim}$  = Limiting Shear Strain; Limiting shear strain is further limited to 50% of the computed value (Idriss & Boulanger, 2008)  
 $\gamma_{max}$  = Maximum Shear Strain;  $\gamma_{max} = \gamma_{lim}$  if  $FS_{sl} \leq F_a$  (Idriss & Boulanger, 2008)  
 LDI = Lateral Displacement Index  
 $\epsilon_v$  = Volumetric Strain  
 S = Liquefaction Induced Vertical Displacement

$\tau_{rl} / \sigma'_{v,cs}$  = Liquefaction Residual Shear Strength Ratio  
 $R_u$  = Excess Pore Pressure Ratio  
 $\phi_{rl}$  = Internal Friction Angle for Cyclic Liquefaction  
 $\tau_{rl}$  = Liquefaction Residual Shear Strength

SC 557 Bridge over Crowders Creek  
Final Bridge Geotechnical Engineering Report

---

# APPENDIX

## SECTION 12 EMBANKMENT SLOPE STABILITY ANALYSES

SC 557 Bridge over Crowders Creek  
Final Bridge Geotechnical Engineering Report

---

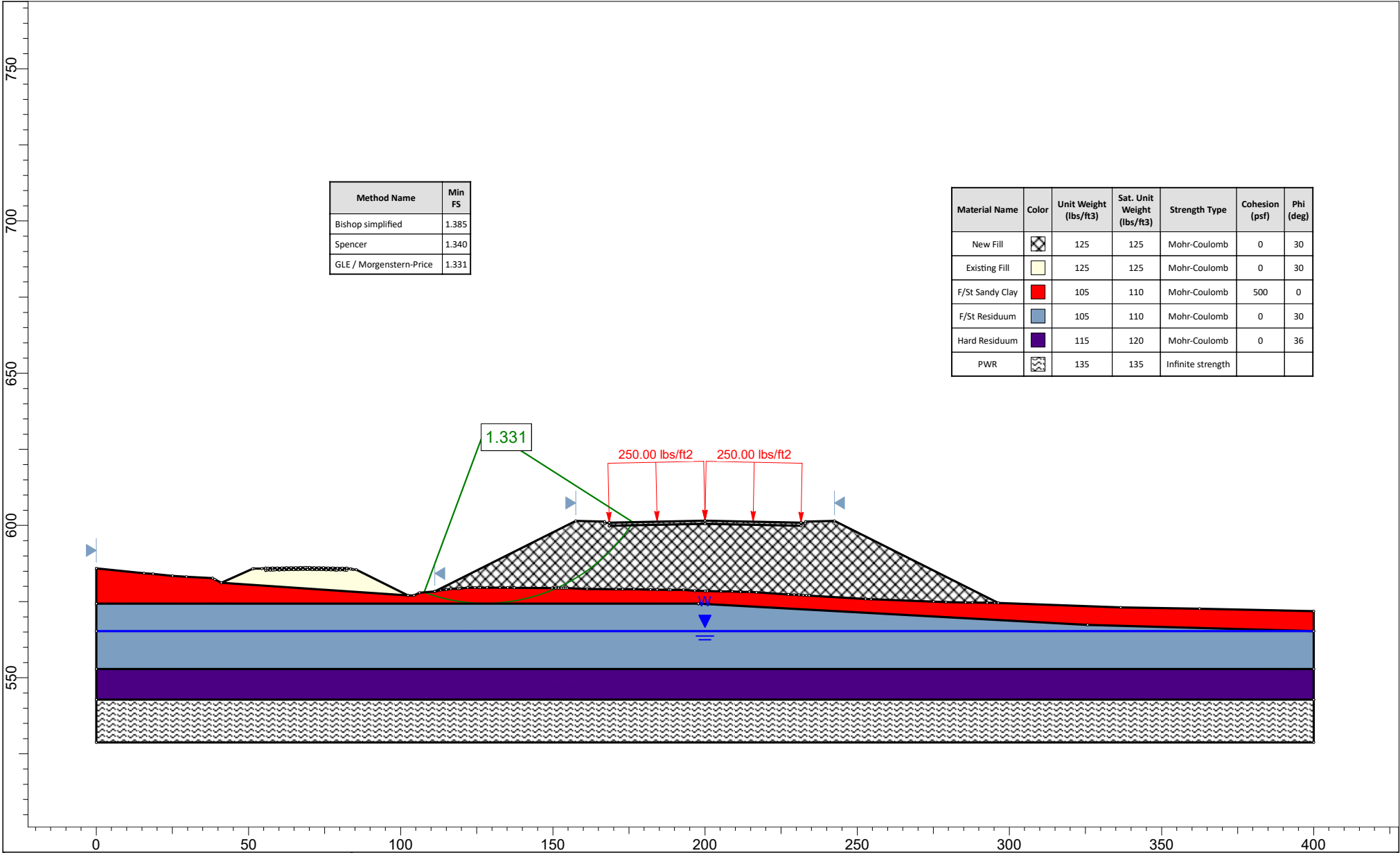
# APPENDIX

## SECTION 12A SLIDE RESULTS

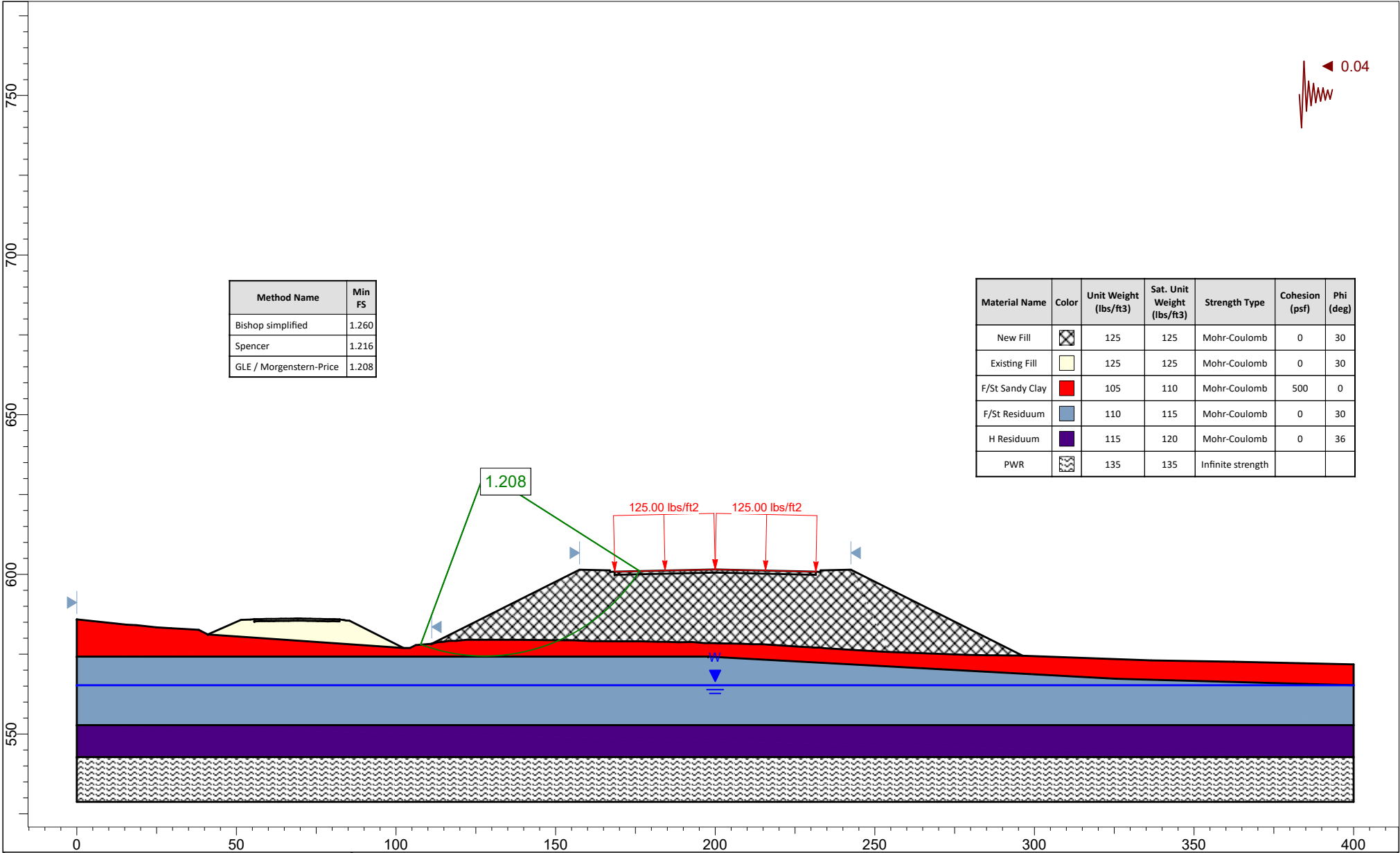


Method Name	Min FS
Bishop simplified	1.385
Spencer	1.340
GLE / Morgenstern-Price	1.331

Material Name	Color	Unit Weight (lbs/ft <sup>3</sup> )	Sat. Unit Weight (lbs/ft <sup>3</sup> )	Strength Type	Cohesion (psf)	Phi (deg)
New Fill		125	125	Mohr-Coulomb	0	30
Existing Fill		125	125	Mohr-Coulomb	0	30
F/St Sandy Clay		105	110	Mohr-Coulomb	500	0
F/St Residuum		105	110	Mohr-Coulomb	0	30
Hard Residuum		115	120	Mohr-Coulomb	0	36
PWR		135	135	Infinite strength		



	Project		SC 557 Over Crowders Creek	
	Analysis Description		Begin Bridge Embankment-LT Side Slope - Static	
	Drawn By	JFH	Scale	1:524
			File Name	Begin Bridge Emb_LT Side Slope_Static.slim

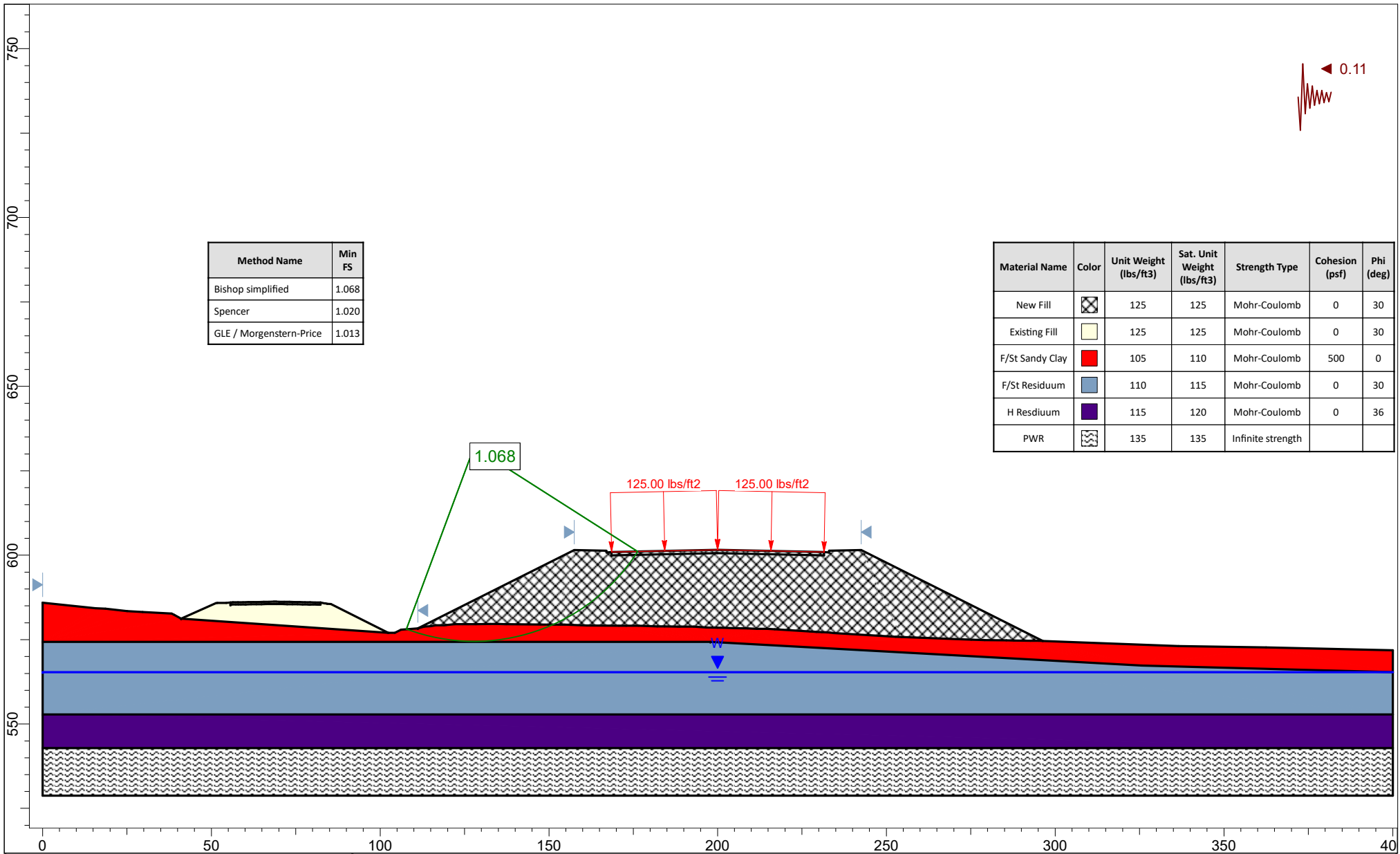


Method Name	Min FS
Bishop simplified	1.260
Spencer	1.216
GLE / Morgenstern-Price	1.208

Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
New Fill	☒	125	125	Mohr-Coulomb	0	30
Existing Fill	□	125	125	Mohr-Coulomb	0	30
F/St Sandy Clay	■	105	110	Mohr-Coulomb	500	0
F/St Residuuum	■	110	115	Mohr-Coulomb	0	30
H Residuuum	■	115	120	Mohr-Coulomb	0	36
PWR	☒	135	135	Infinite strength		



Project		SC 557 Over Crowders Creek	
Analysis Description		Begin Bridge Embankment - LT Side Slope - FEE	
Drawn By	JFH	Scale	1:500
		F&ME	
		File Name	Begin Bridge Emb_LT Side Slope_FEE.slim



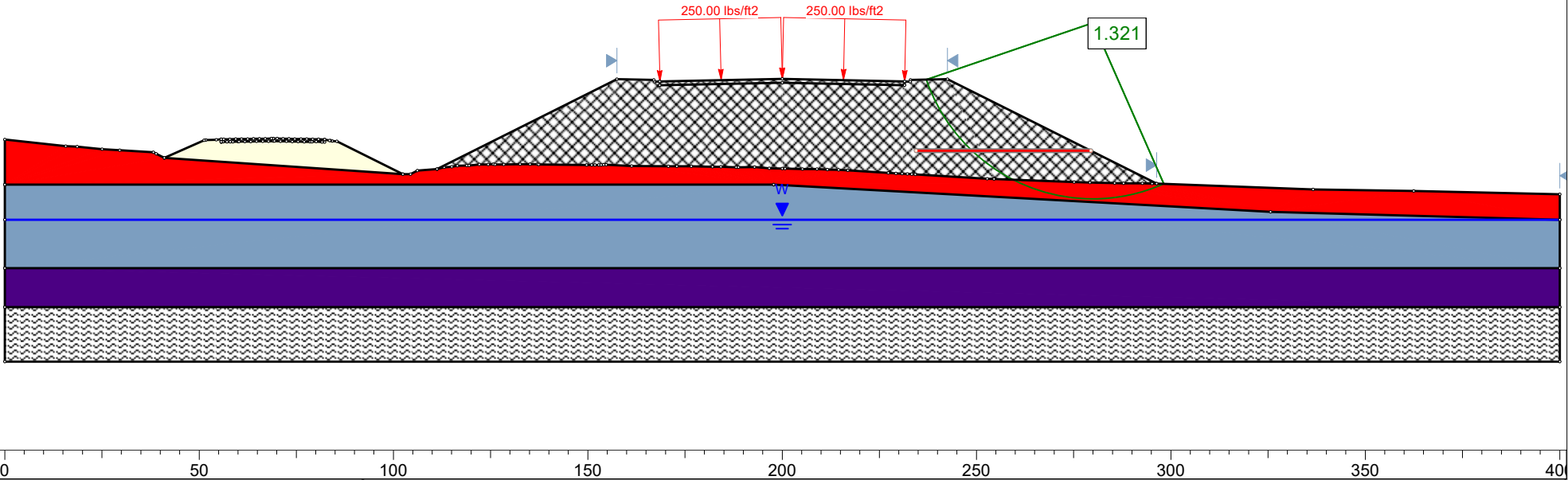
Project		SC 557 Over Crowders Creek	
Analysis Description		Begin Bridge Embankment - LT Side Slope - SEE	
Drawn By	JFH	Scale	1:472
		F&ME	
		File Name	Begin Bridge Emb_LT Side Slope_SEE.slim

74  
700  
650  
600  
550  
0 50 100 150 200 250 300 350 400

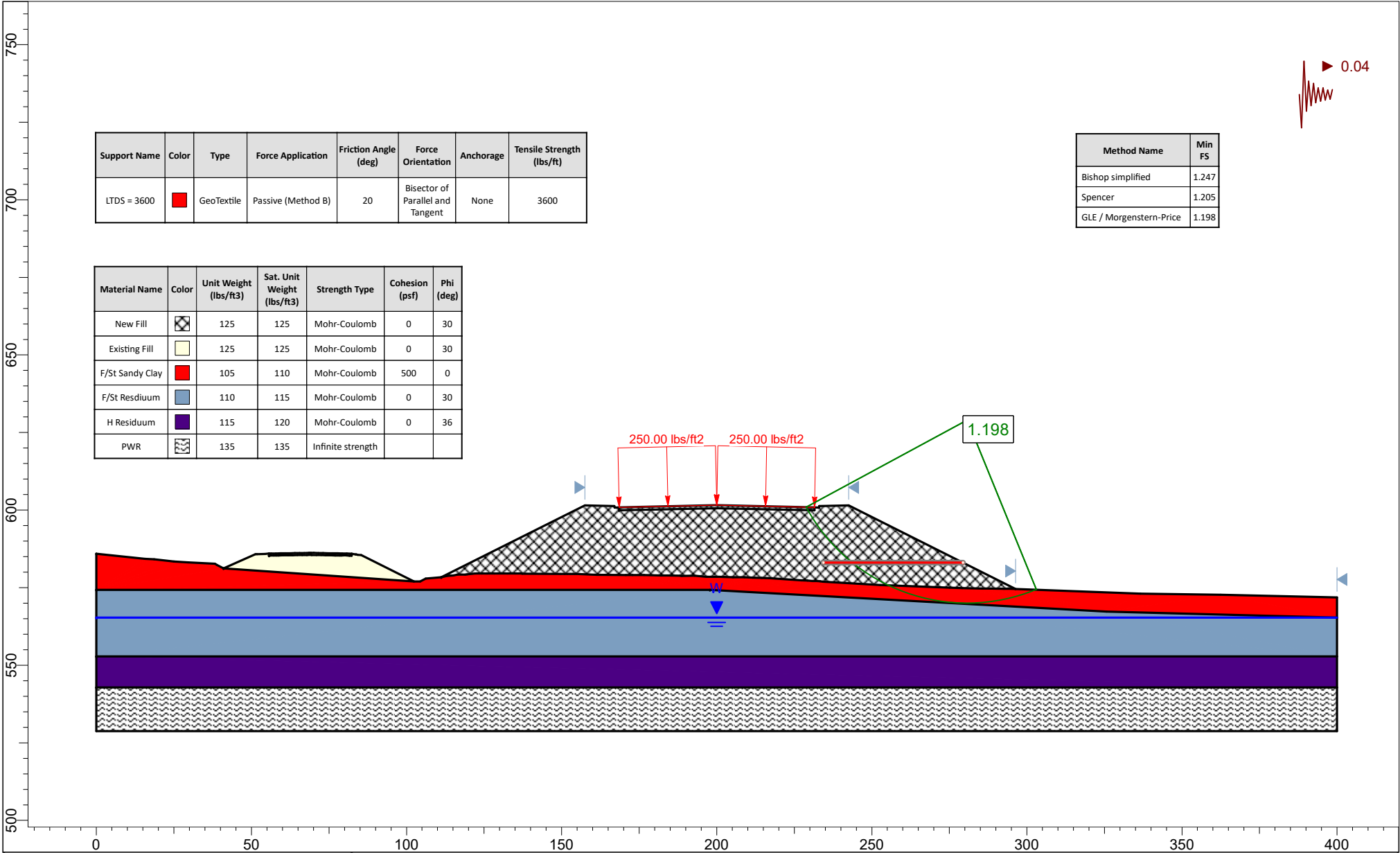
Support Name	Color	Type	Force Application	Friction Angle (deg)	Force Orientation	Anchorage	Tensile Strength (lbs/ft)
LTDS = 3600	<span style="color: red;">■</span>	GeoTextile	Passive (Method B)	20	Bisector of Parallel and Tangent	None	3600

Method Name	Min FS
Bishop simplified	1.374
Spencer	1.330
GLE / Morgenstern-Price	1.321

Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
New Fill	<span style="color: gray;">■</span>	125	125	Mohr-Coulomb	0	30
Existing Fill	<span style="color: yellow;">■</span>	125	125	Mohr-Coulomb	0	30
F/St Sandy Clay	<span style="color: red;">■</span>	105	110	Mohr-Coulomb	500	0
F/St Residium	<span style="color: blue;">■</span>	105	110	Mohr-Coulomb	0	30
Hard Residium	<span style="color: purple;">■</span>	115	120	Mohr-Coulomb	0	36
PWR	<span style="color: gray;">■</span>	135	135	Infinite strength		




Project		SC 557 Over Crowders Creek	
Analysis Description		Begin Bridge Embankment - RT Side Slope - Static	
Drawn By	JFH	Scale	1:472
		Company	F&ME
		File Name	Begin Bridge Emb_RT Side Slope_Static.slim

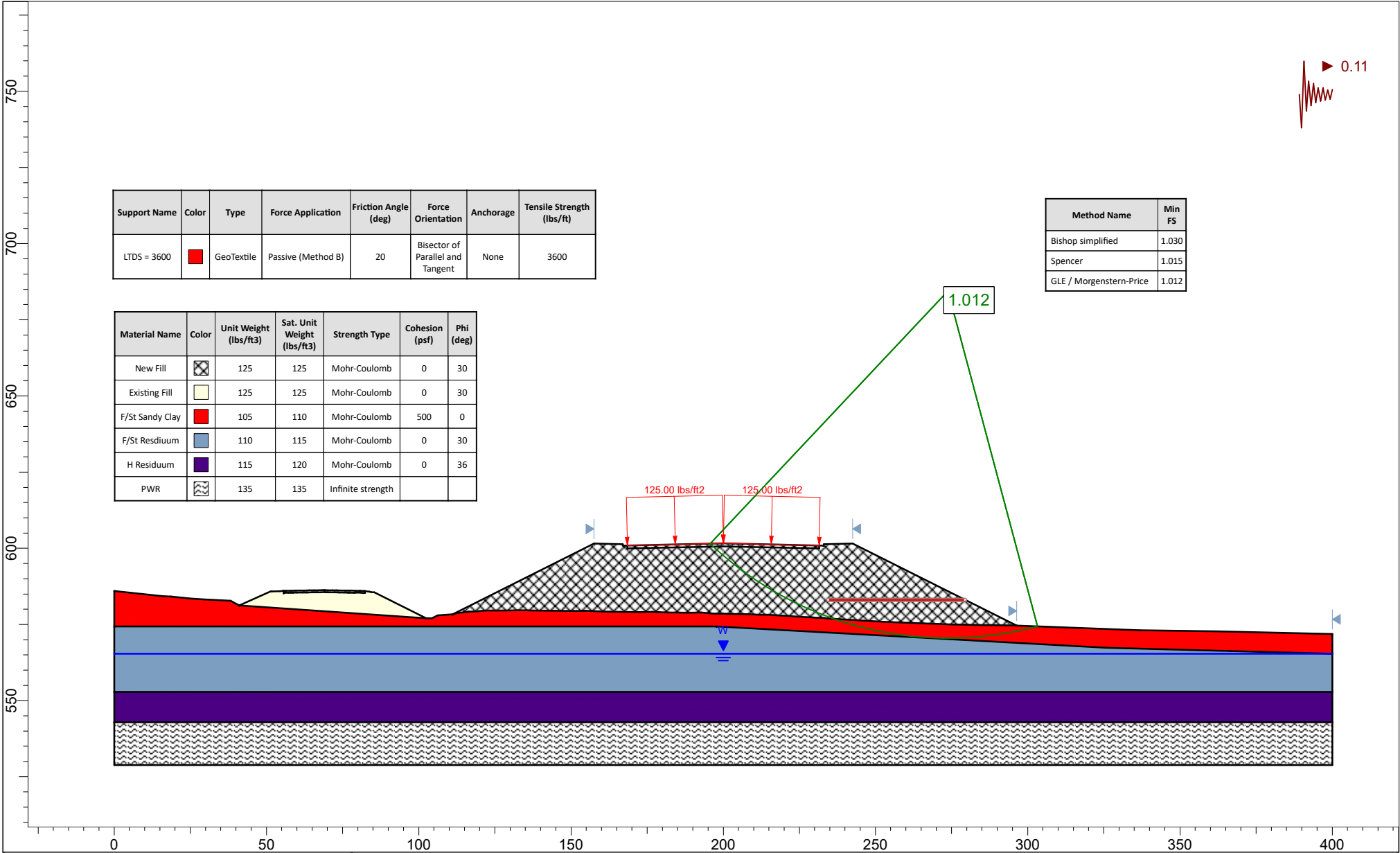


Support Name	Color	Type	Force Application	Friction Angle (deg)	Force Orientation	Anchorage	Tensile Strength (lbs/ft)
LTDS = 3600	Red	GeoTextile	Passive (Method B)	20	Bisector of Parallel and Tangent	None	3600

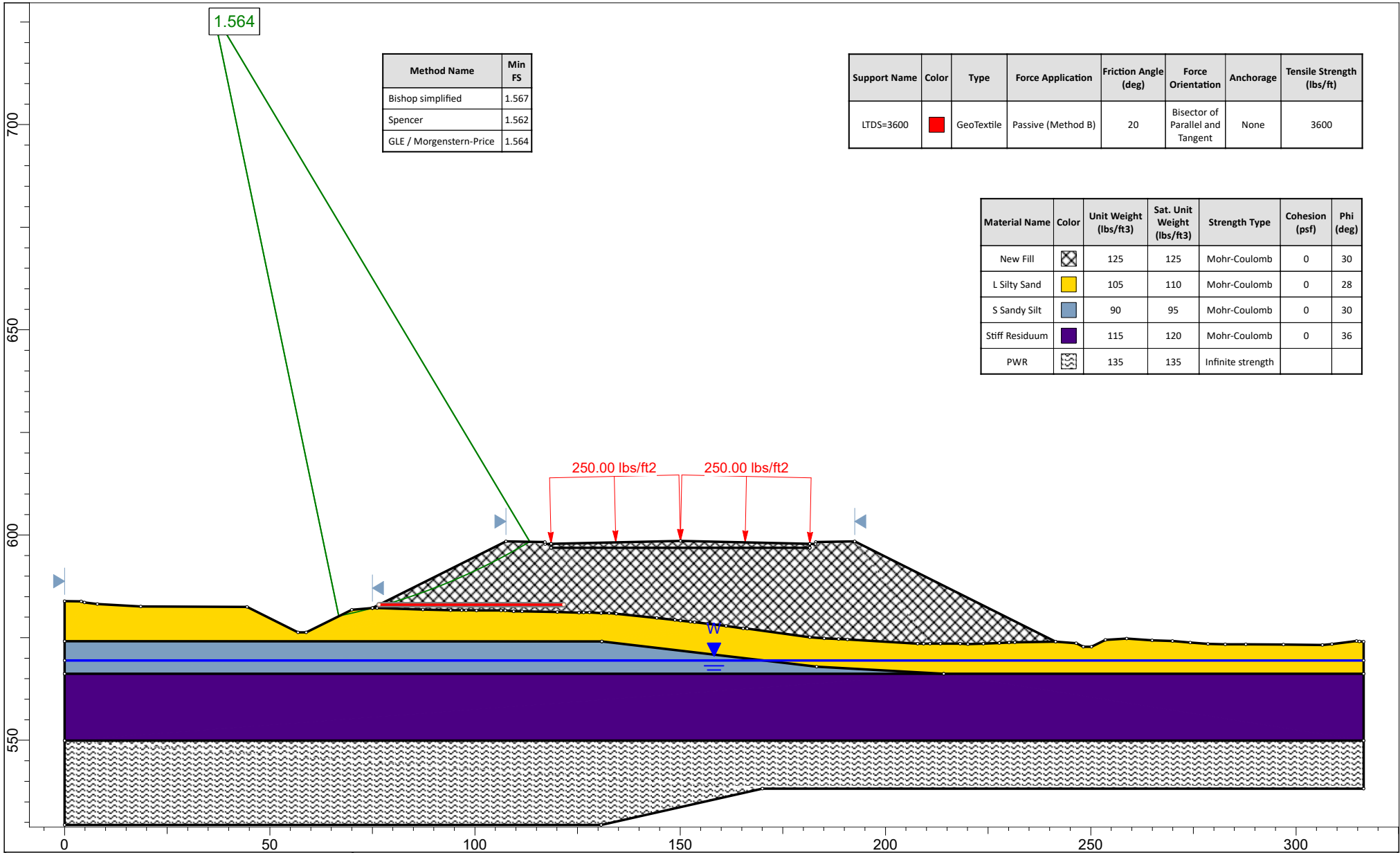
Method Name	Min FS
Bishop simplified	1.247
Spencer	1.205
GLE / Morgenstern-Price	1.198

Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
New Fill	White with cross-hatch	125	125	Mohr-Coulomb	0	30
Existing Fill	Yellow	125	125	Mohr-Coulomb	0	30
F/St Sandy Clay	Red	105	110	Mohr-Coulomb	500	0
F/St Residium	Blue	110	115	Mohr-Coulomb	0	30
H Residium	Purple	115	120	Mohr-Coulomb	0	36
PWR	White with wavy lines	135	135	Infinite strength		

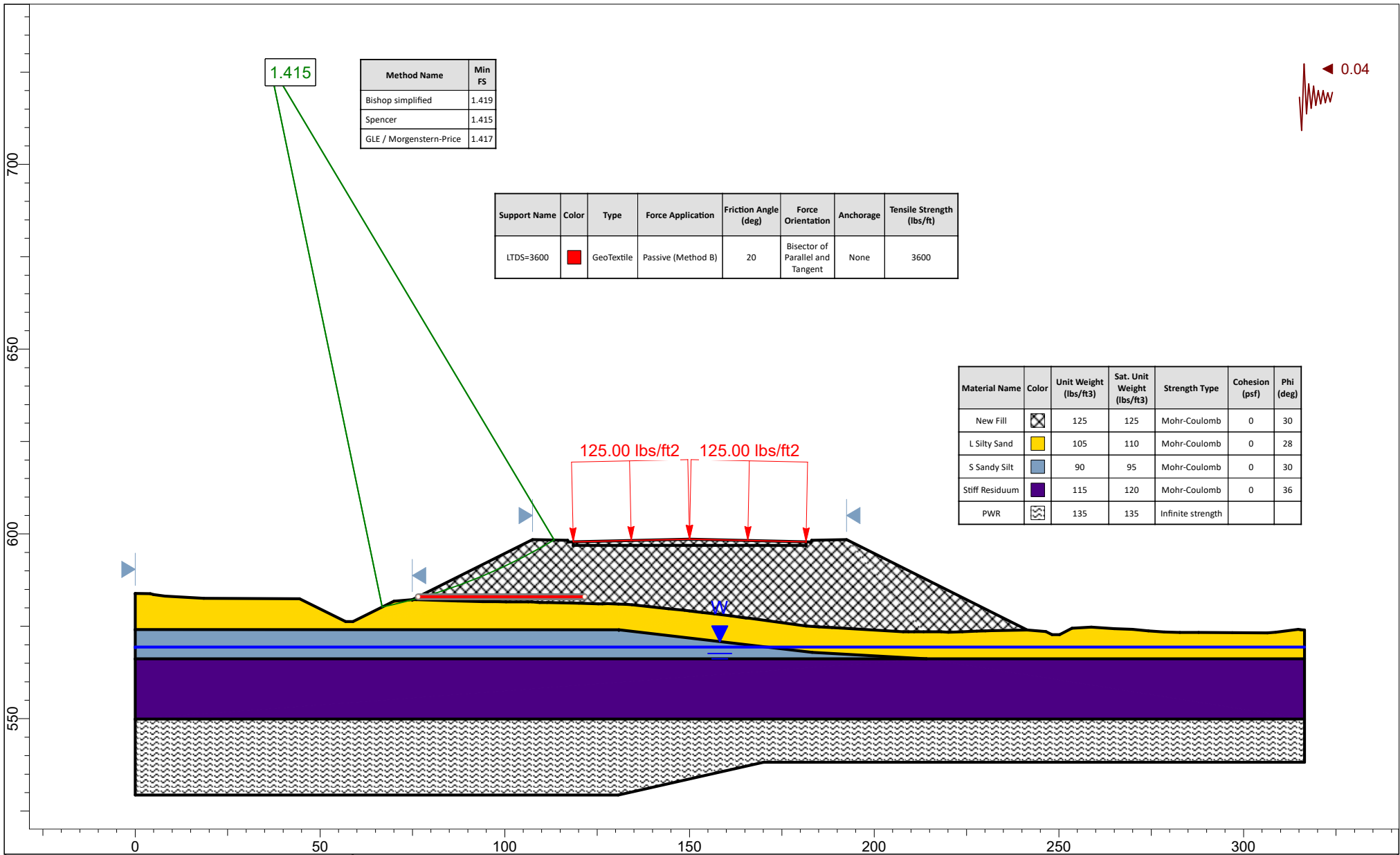
	Project		SC 557 Over Crowders Creek	
	Analysis Description		Begin Bridge Embankment - RT Side Slope - FEE	
	Drawn By	JFH	Scale	1:515
			File Name	Begin Bridge Emb_RT Side Slope_FEE.slim



Project		SC 557 Over Crowders Creek	
Analysis Description		Begin Bridge Embankment - RT Side Slope - SEE	
Drawn By	JFH	Scale	1:524
		Company	F&ME
		File Name	Begin Bridge Emb_RT Side Slope_SEE.slim



Project		SC 557 Over Crowders Creek	
Analysis Description		Begin Bridge - LT Side Slope - Static	
Drawn By	JFH	Scale	1:388
		F&ME	
		File Name	Begin Bridge_LT Side Slope_Static.slim



Method Name	Min FS
Bishop simplified	1.419
Spencer	1.415
GLE / Morgenstern-Price	1.417

Support Name	Color	Type	Force Application	Friction Angle (deg)	Force Orientation	Anchorage	Tensile Strength (lbs/ft)
LTDS=3600	Red	GeoTextile	Passive (Method B)	20	Bisector of Parallel and Tangent	None	3600

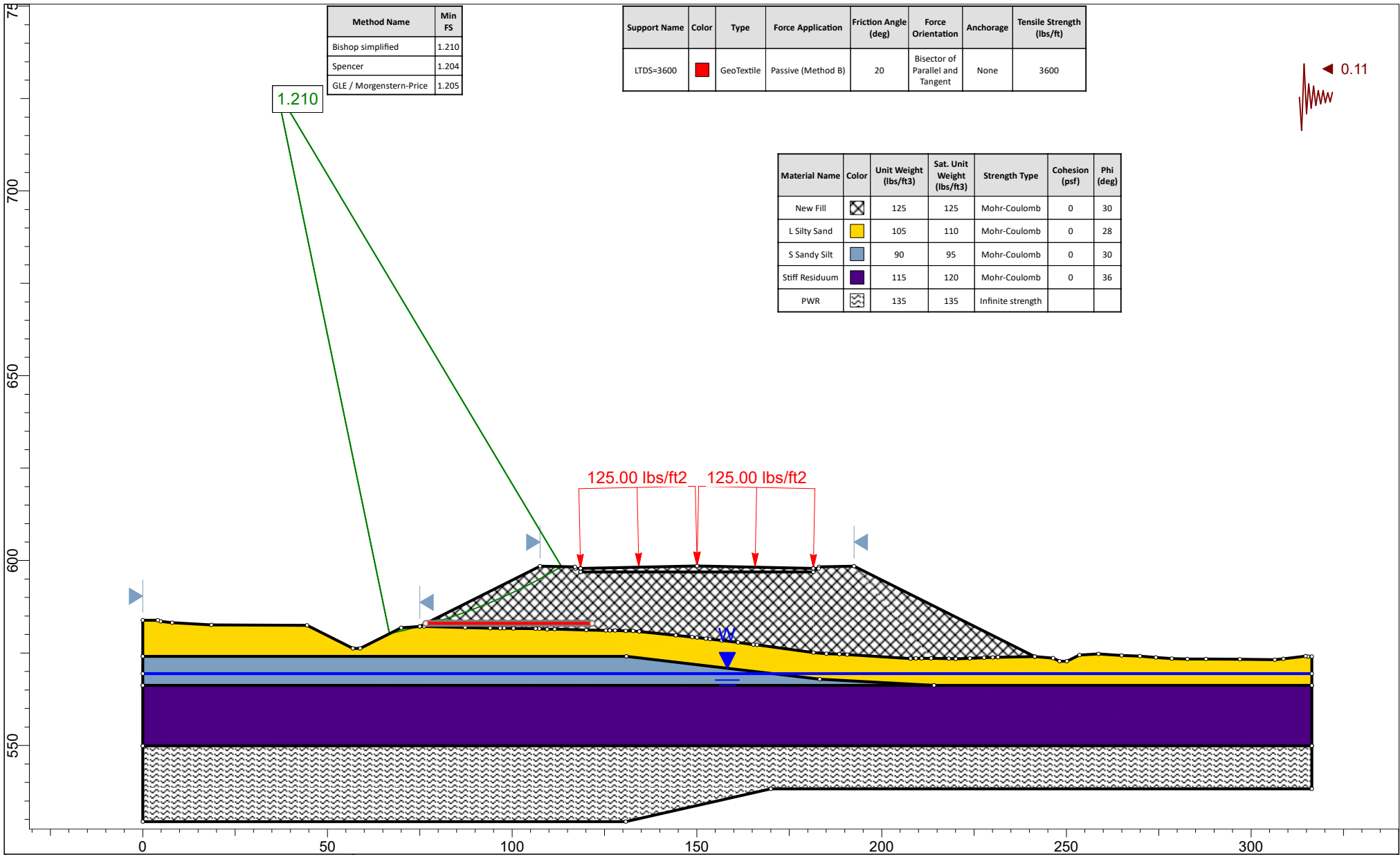
Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
New Fill	Cross-hatched	125	125	Mohr-Coulomb	0	30
L Silty Sand	Yellow	105	110	Mohr-Coulomb	0	28
S Silty Sand	Blue	90	95	Mohr-Coulomb	0	30
Stiff Residuum	Purple	115	120	Mohr-Coulomb	0	36
PWR	White wavy	135	135	Infinite strength		



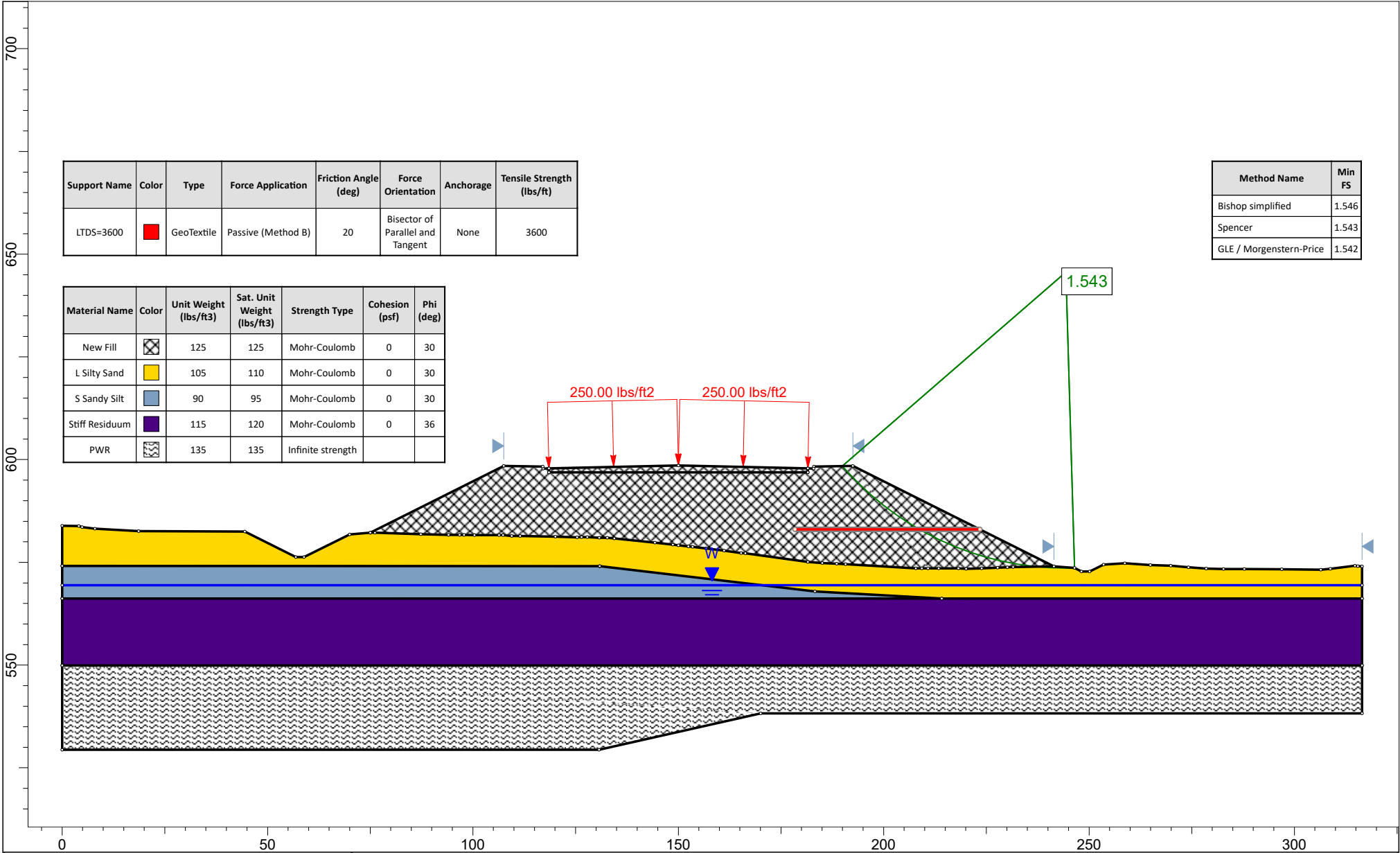
SLIDEINTERPRET 8.026

Project		SC 557 Over Crowders Creek	
Analysis Description		Begin Bridge - LT Side Slope - FEE	
Drawn By	JFH	Scale	1:432
		File Name	Begin Bridge_LT Side Slope_FEE.slim






Project		SC 557 Over Crowders Creek	
Analysis Description		Begin Bridge - LT Side Slope - SEE	
Drawn By	JFH	Scale	1:432
		File Name	Begin Bridge_LT Side Slope_SEE.slim

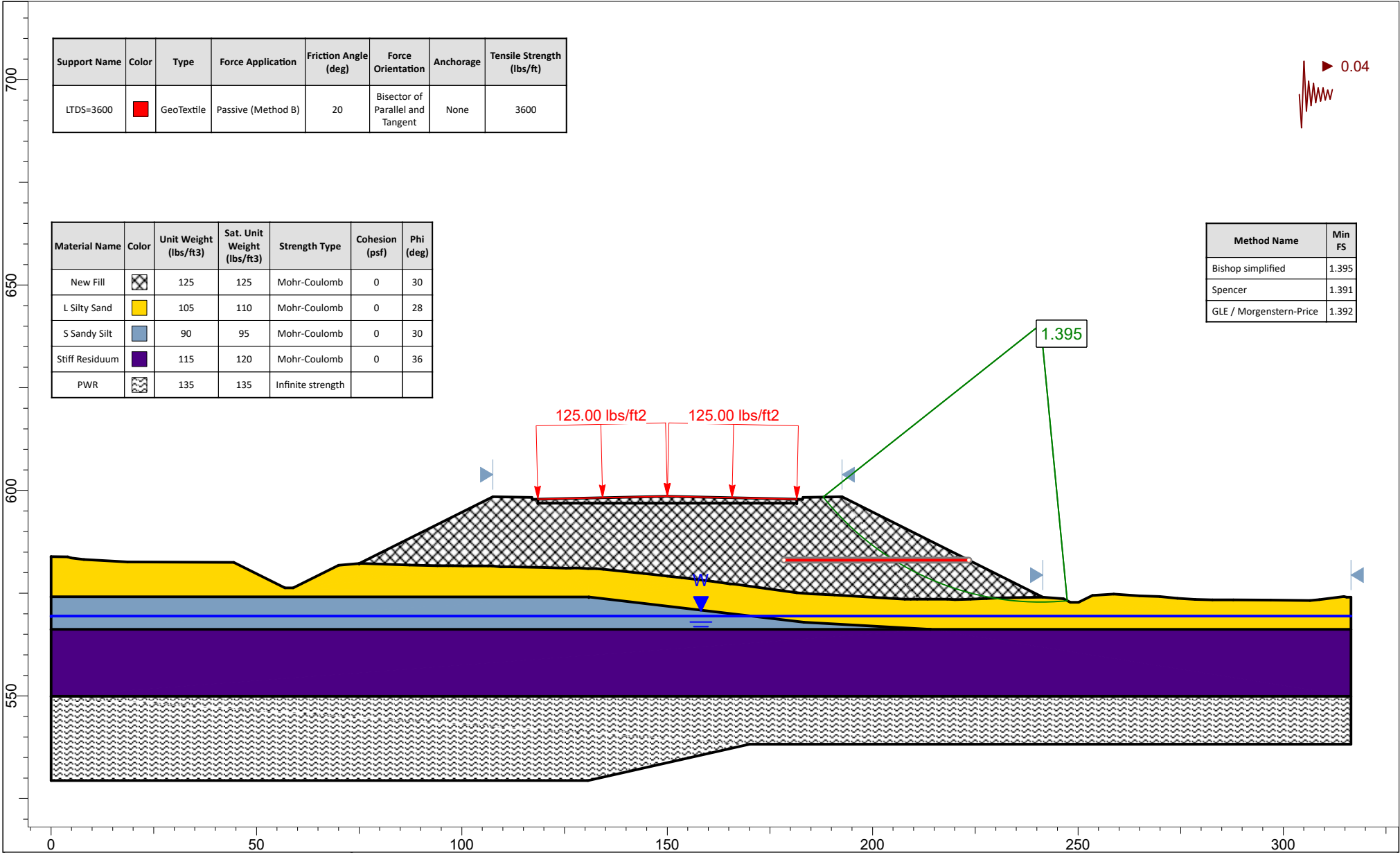


Support Name	Color	Type	Force Application	Friction Angle (deg)	Force Orientation	Anchorage	Tensile Strength (lbs/ft)
LTDS=3600	Red	GeoTextile	Passive (Method B)	20	Bisector of Parallel and Tangent	None	3600

Method Name	Min FS
Bishop simplified	1.546
Spencer	1.543
GLE / Morgenstern-Price	1.542

Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
New Fill	White with cross-hatch	125	125	Mohr-Coulomb	0	30
L Silty Sand	Yellow	105	110	Mohr-Coulomb	0	30
S Silty Sand	Blue	90	95	Mohr-Coulomb	0	30
Stiff Residuum	Purple	115	120	Mohr-Coulomb	0	36
PWR	White with wavy lines	135	135	Infinite strength		

	Project		SC 557 Over Crowders Creek	
	Analysis Description		Begin Bridge - RT Side Slope - Static	
	Drawn By	JFH	Scale	1:389
			File Name	Begin Bridge_RT Side Slope_Static.slim



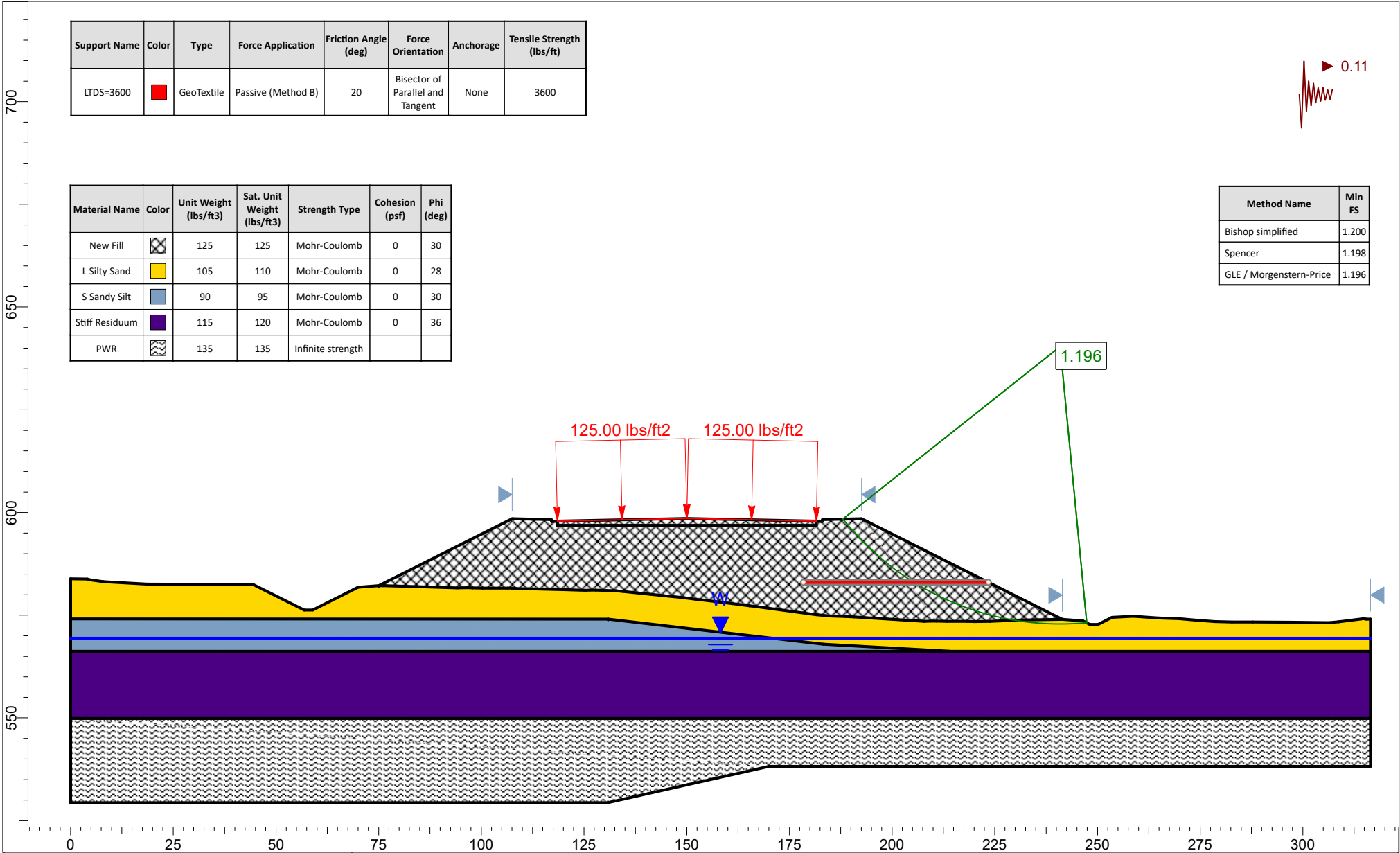
Support Name	Color	Type	Force Application	Friction Angle (deg)	Force Orientation	Anchorage	Tensile Strength (lbs/ft)
LTDS=3600	Red	GeoTextile	Passive (Method B)	20	Bisector of Parallel and Tangent	None	3600

Material Name	Color	Unit Weight (lbs/ft³)	Sat. Unit Weight (lbs/ft³)	Strength Type	Cohesion (psf)	Phi (deg)
New Fill	Grid	125	125	Mohr-Coulomb	0	30
L Silty Sand	Yellow	105	110	Mohr-Coulomb	0	28
S Sandy Silt	Blue	90	95	Mohr-Coulomb	0	30
Stiff Residuum	Purple	115	120	Mohr-Coulomb	0	36
PWR	Wavy	135	135	Infinite strength		

Method Name	Min FS
Bishop simplified	1.395
Spencer	1.391
GLE / Morgenstern-Price	1.392



Project		SC 557 Over Crowders Creek	
Analysis Description		Begin Bridge - RT Side Slope - FEE	
Drawn By	JFH	Scale	1:389
		F&ME	
		File Name	Begin Bridge_RT Side Slope_FEE.slim



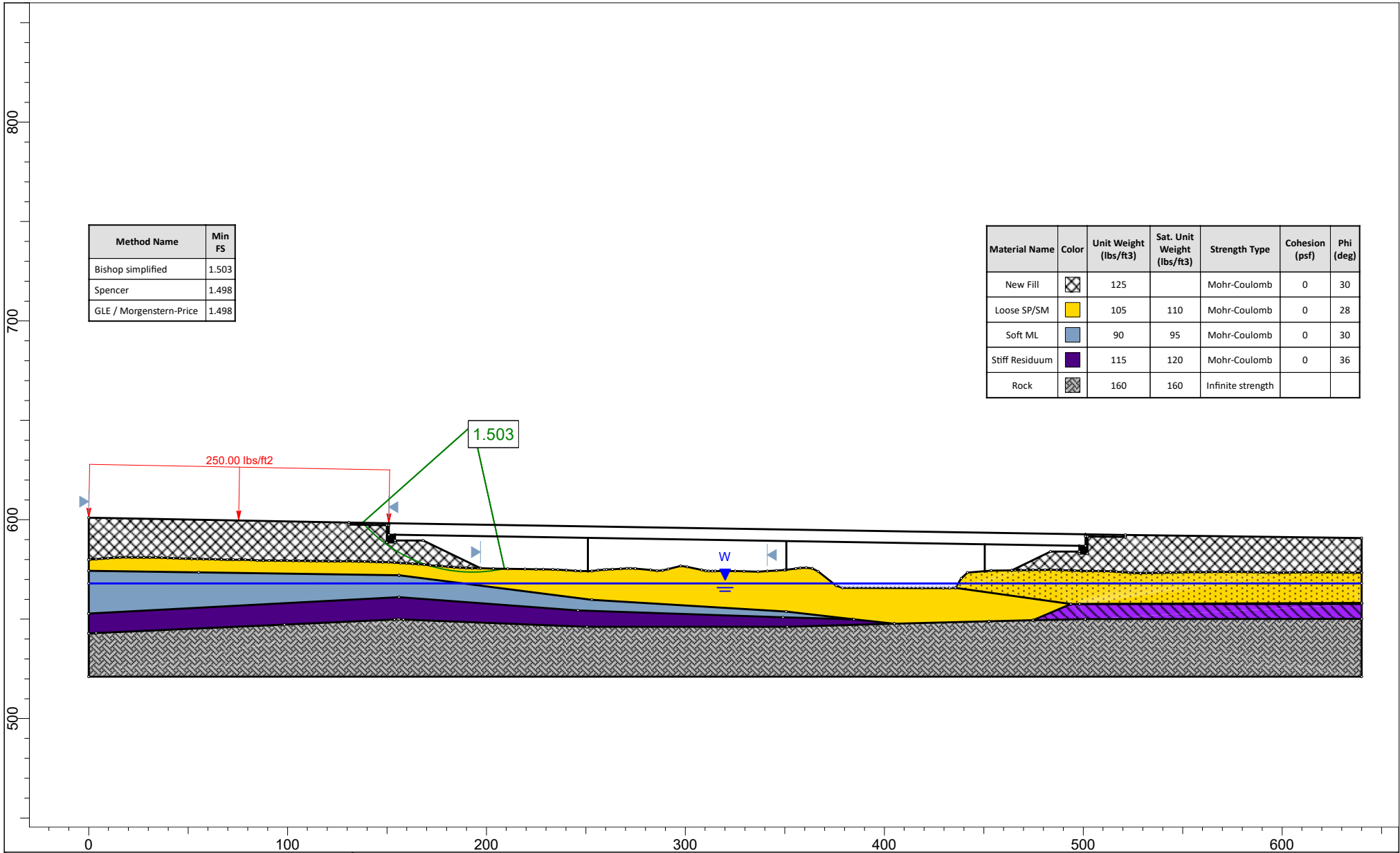
Support Name	Color	Type	Force Application	Friction Angle (deg)	Force Orientation	Anchorage	Tensile Strength (lbs/ft)
LTDS=3600	Red	GeoTextile	Passive (Method B)	20	Bisector of Parallel and Tangent	None	3600

Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
New Fill	Hatched	125	125	Mohr-Coulomb	0	30
L Silty Sand	Yellow	105	110	Mohr-Coulomb	0	28
S Silty Sand	Blue	90	95	Mohr-Coulomb	0	30
Stiff Residuum	Purple	115	120	Mohr-Coulomb	0	36
PWR	Wavy	135	135	Infinite strength		

Method Name	Min FS
Bishop simplified	1.200
Spencer	1.198
GLE / Morgenstern-Price	1.196



Project		SC 557 Over Crowders Creek	
Analysis Description		Begin Bridge - RT Side Slope - SEE	
Drawn By	JFH	Scale	1:389
		F&ME	
		File Name	Begin Bridge_RT Side Slope_SEE.slim

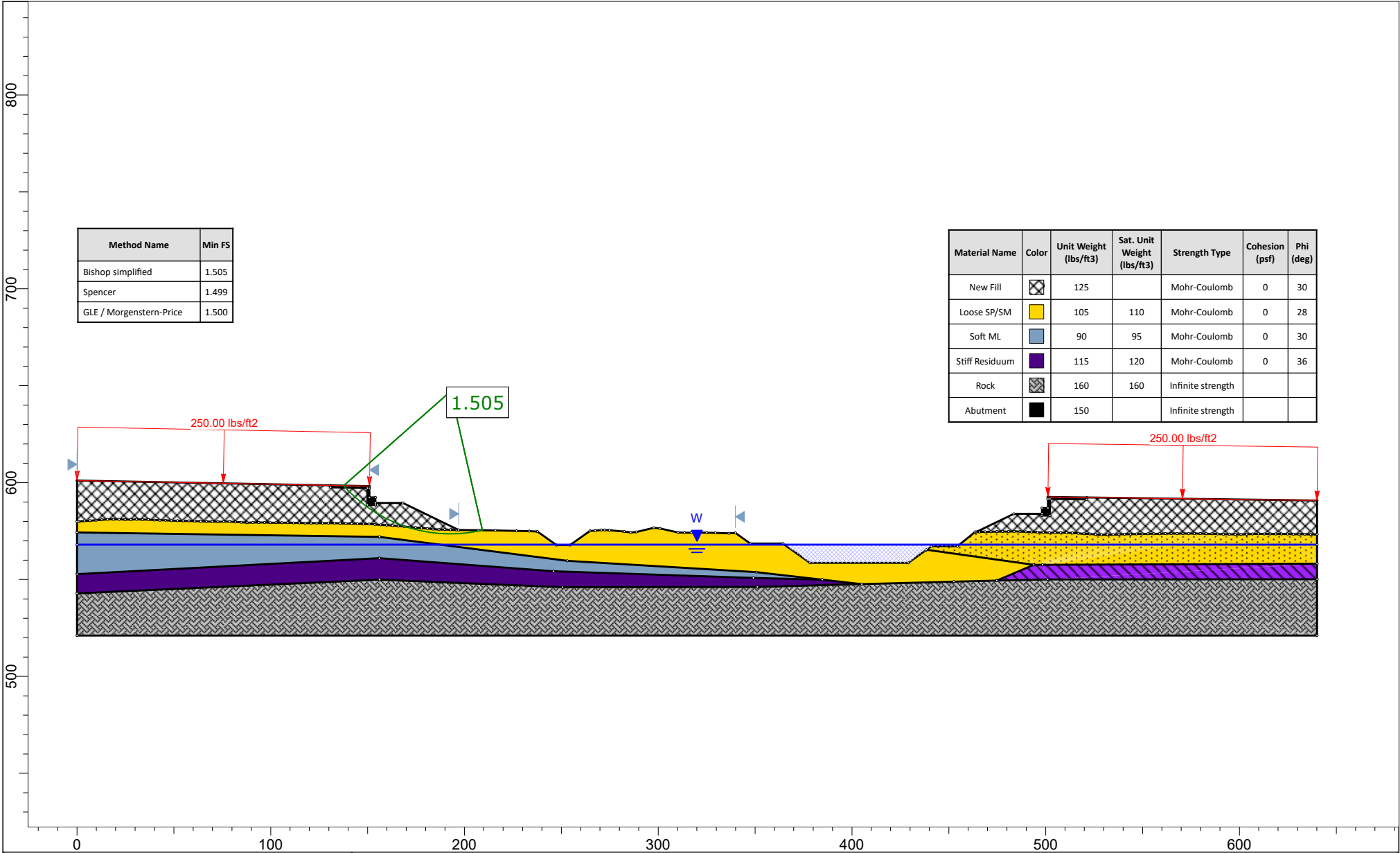


Method Name	Min FS
Bishop simplified	1.503
Spencer	1.498
GLE / Morgenstern-Price	1.498

Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
New Fill	Grid pattern	125		Mohr-Coulomb	0	30
Loose SP/SM	Yellow	105	110	Mohr-Coulomb	0	28
Soft ML	Blue	90	95	Mohr-Coulomb	0	30
Stiff Residuum	Purple	115	120	Mohr-Coulomb	0	36
Rock	Diagonal lines	160	160	Infinite strength		



Project		SC 557 Over Crowders Creek	
Analysis Description		Begin Bridge, End Slope - Static	
Drawn By	JFH	Scale	1:802
		File Name	Begin Bridge_End Slope_Static.slim

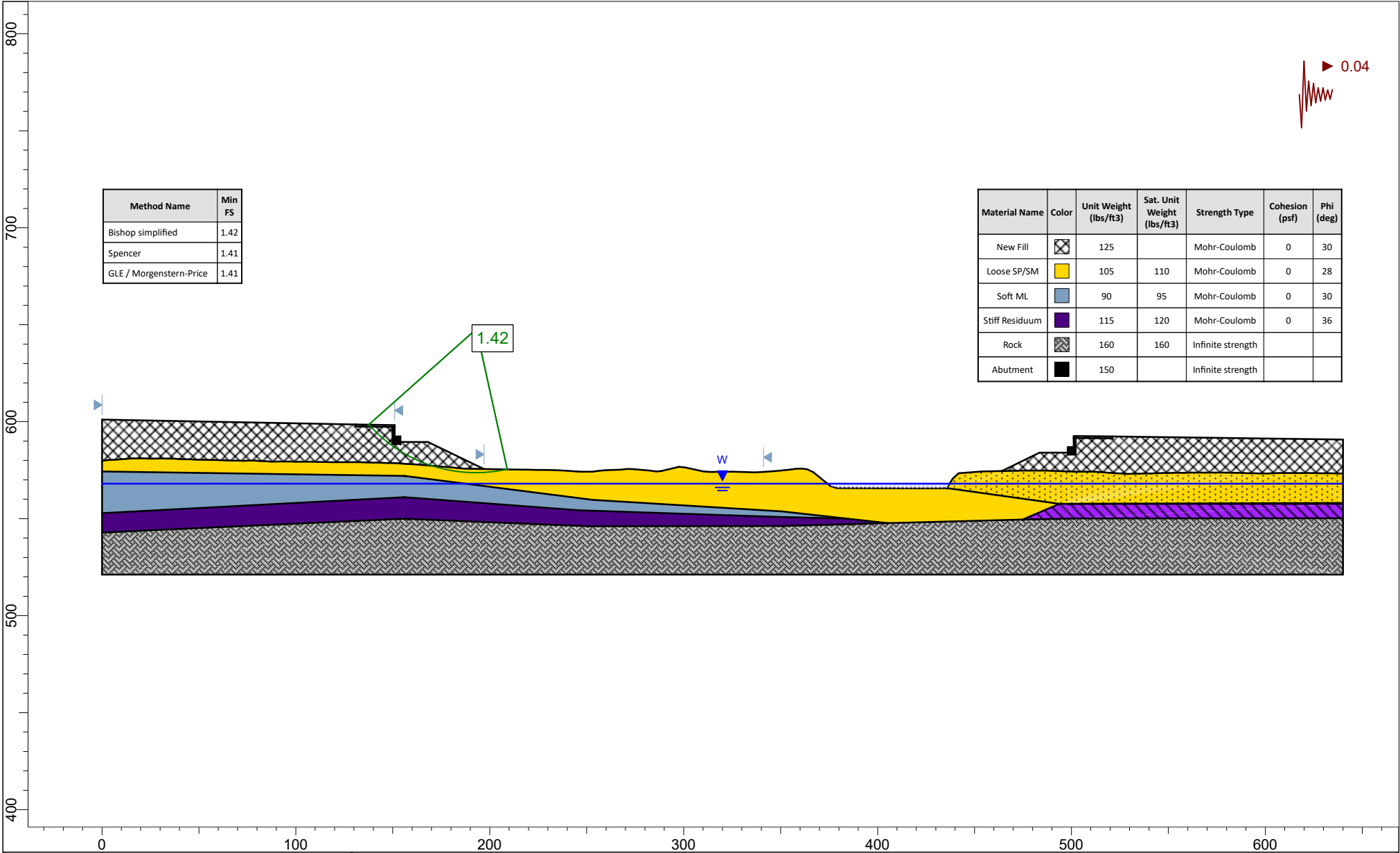


Method Name	Min FS
Bishop simplified	1.505
Spencer	1.499
GLE / Morgenstern-Price	1.500

Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
New Fill		125		Mohr-Coulomb	0	30
Loose SP/SM		105	110	Mohr-Coulomb	0	28
Soft ML		90	95	Mohr-Coulomb	0	30
Stiff Residuuum		115	120	Mohr-Coulomb	0	36
Rock		160	160	Infinite strength		
Abutment		150		Infinite strength		



Project		SC 557 Over Crowders Creek	
Analysis Description		Begin Bridge, End Slope - 100-yr Scour	
Drawn By	JFH	Scale	1:824
		F&ME	
		File Name	Begin Bridge_End Slope_Scour.slim

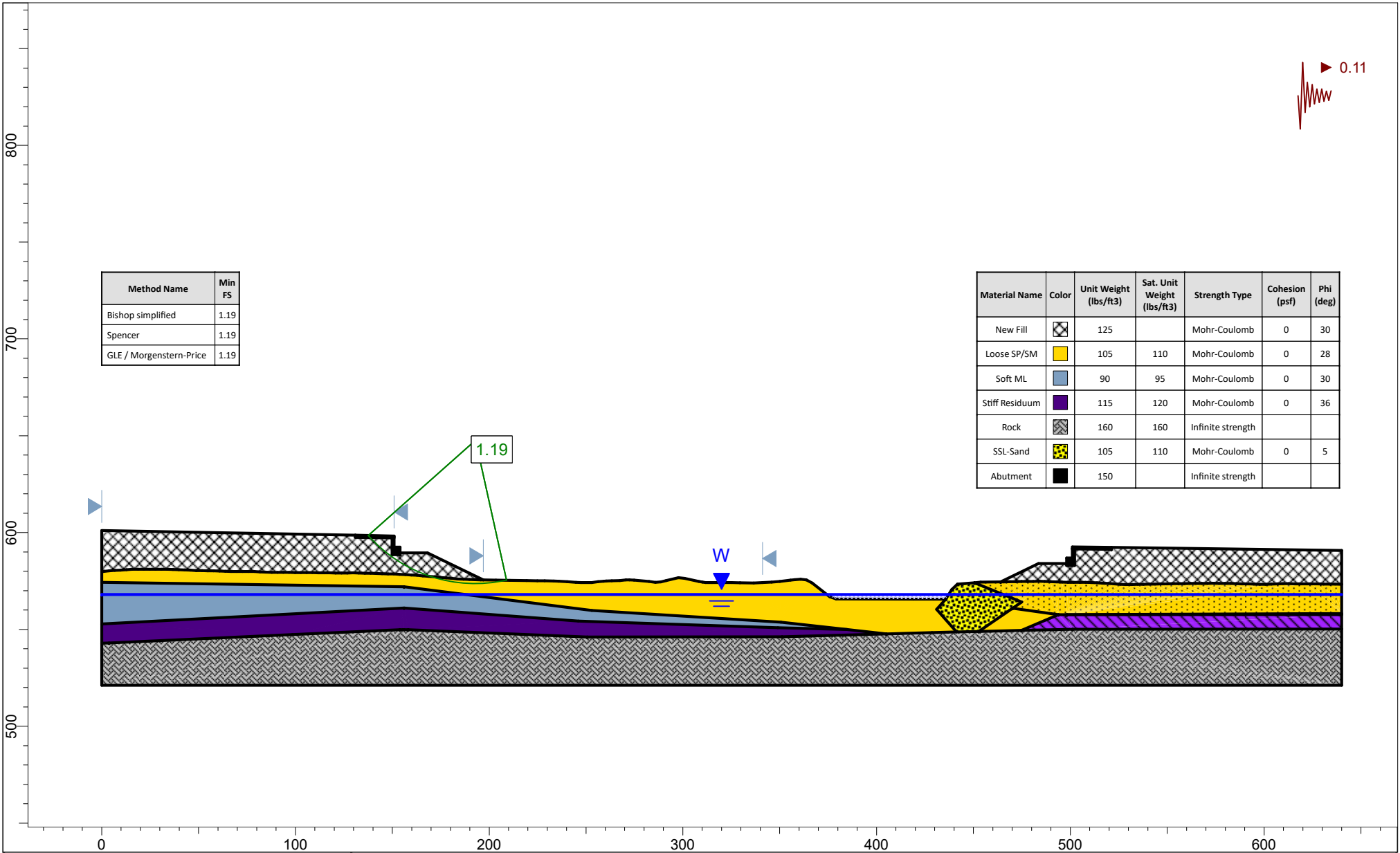


Method Name	Min FS
Bishop simplified	1.42
Spencer	1.41
GLE / Morgenstern-Price	1.41

Material Name	Color	Unit Weight (lbs/ft <sup>3</sup> )	Sat. Unit Weight (lbs/ft <sup>3</sup> )	Strength Type	Cohesion (psf)	Phi (deg)
New Fill	☒	125		Mohr-Coulomb	0	30
Loose SP/SM	■	105	110	Mohr-Coulomb	0	28
Soft ML	■	90	95	Mohr-Coulomb	0	30
Stiff Residuum	■	115	120	Mohr-Coulomb	0	36
Rock	☒	160	160	Infinite strength		
Abutment	■	150		Infinite strength		



<i>Project</i>		SC 557 Over Crowders Creek	
<i>Analysis Description</i>		Begin Bridge, End Slope - FEE	
<i>Drawn By</i>	JFH	<i>Scale</i>	1:823
		<i>File Name</i>	Begin Bridge_End Slope_FEE.slim



Method Name	Min FS
Bishop simplified	1.19
Spencer	1.19
GLE / Morgenstern-Price	1.19

Material Name	Color	Unit Weight (lbs/ft <sup>3</sup> )	Sat. Unit Weight (lbs/ft <sup>3</sup> )	Strength Type	Cohesion (psf)	Phi (deg)
New Fill	☒	125		Mohr-Coulomb	0	30
Loose SP/SM	■	105	110	Mohr-Coulomb	0	28
Soft ML	■	90	95	Mohr-Coulomb	0	30
Stiff Residuum	■	115	120	Mohr-Coulomb	0	36
Rock	■	160	160	Infinite strength		
SSL-Sand	■	105	110	Mohr-Coulomb	0	5
Abutment	■	150		Infinite strength		



Project		SC 557 Over Crowders Creek	
Analysis Description		Begin Bridge, End Slope - SEE	
Drawn By	JFH	Scale	1:823
		File Name	Begin Bridge_End Slope_SEE.slim

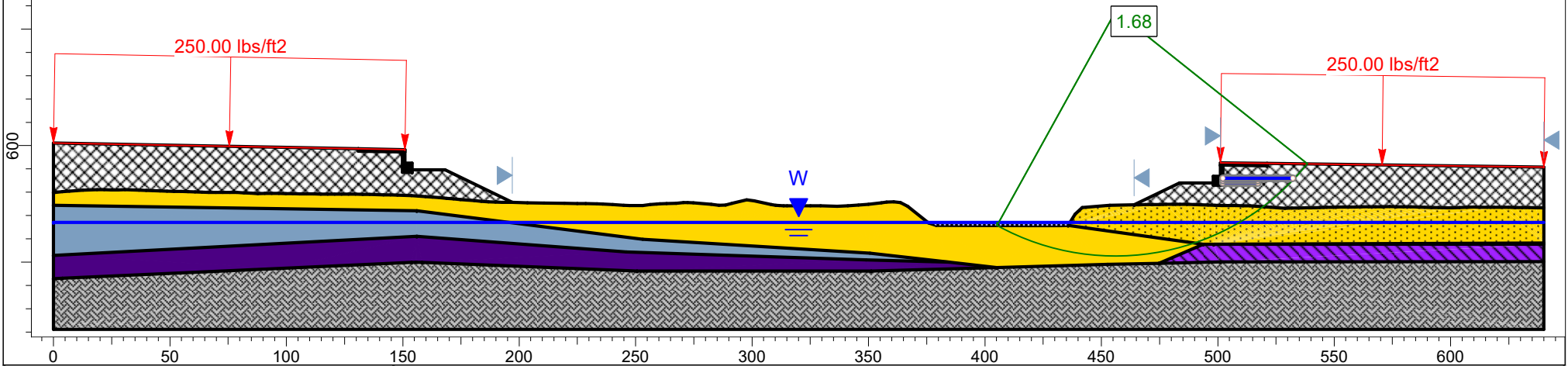


900  
800  
700  
600

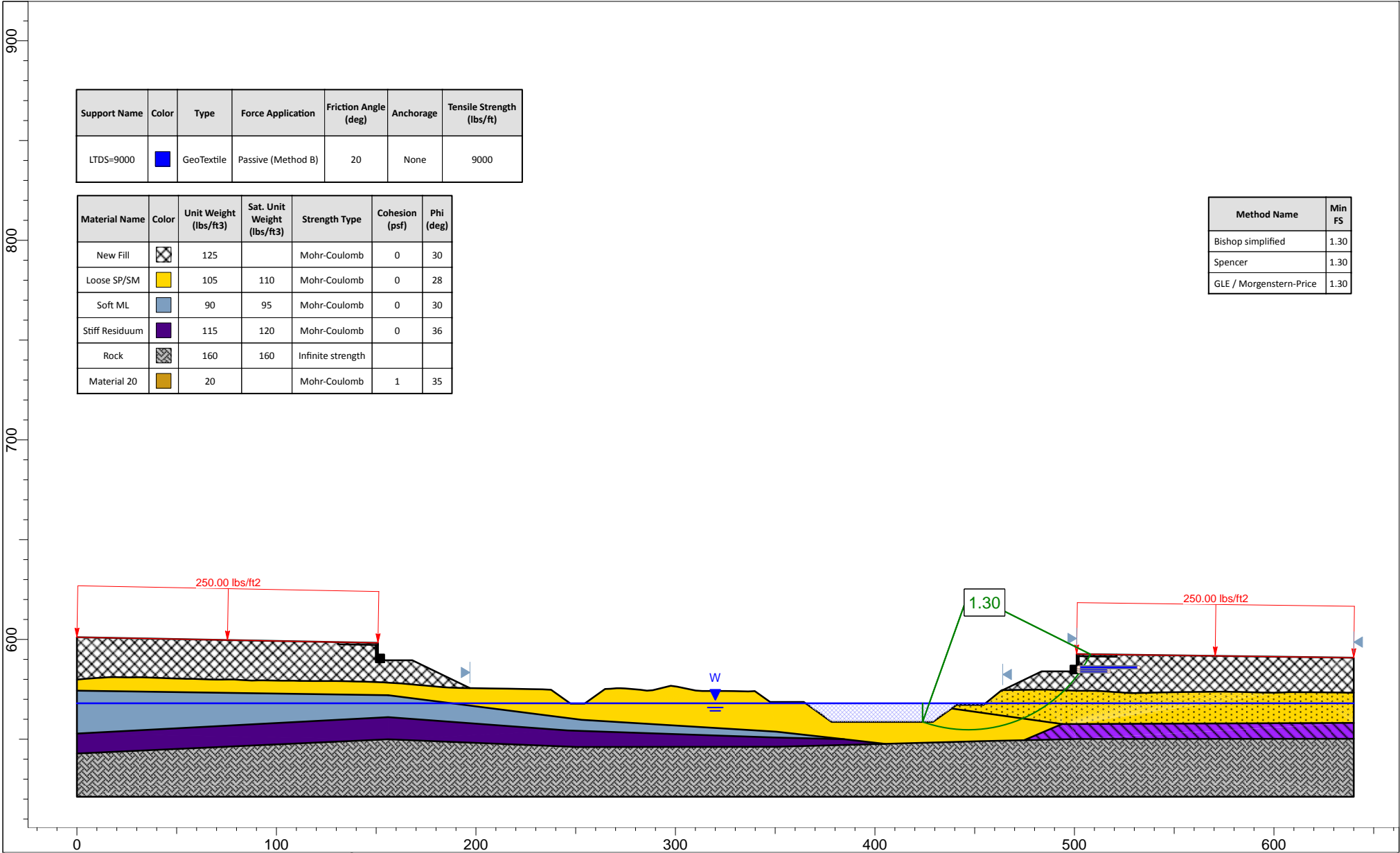
Support Name	Color	Type	Force Application	Friction Angle (deg)	Force Orientation	Anchorage	Tensile Strength (lbs/ft)
LTDS=9000	Blue	GeoTextile	Passive (Method B)	20	Bisector of Parallel and Tangent	None	9000

Method Name	Min FS
Bishop simplified	1.68
Spencer	1.69
GLE / Morgenstern-Price	1.69

Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
New Fill	Grey cross-hatch	125		Mohr-Coulomb	0	30
Loose SP/SM	Yellow	105	110	Mohr-Coulomb	0	28
Soft ML	Light Blue	90	95	Mohr-Coulomb	0	30
Stiff Residuum	Purple	115	120	Mohr-Coulomb	0	36
Rock	Grey diagonal hatch	160	160	Infinite strength		
V. Loose SP/SM	Yellow with dots	100	105	Mohr-Coulomb	0	24
V. Soft ML	Purple with dots	100	105	Mohr-Coulomb	0	28
Abutment	Black	150		Infinite strength		



Project		SC 557 Over Crowders Creek	
Analysis Description		End Bridge, End Slope - Static	
Drawn By	JFH	Scale	1:767
		File Name	End Bridge_End Slope_Static.slim
		<b>F&amp;ME</b>	



Support Name	Color	Type	Force Application	Friction Angle (deg)	Anchorage	Tensile Strength (lbs/ft)
LTDS=9000	Blue	GeoTextile	Passive (Method B)	20	None	9000

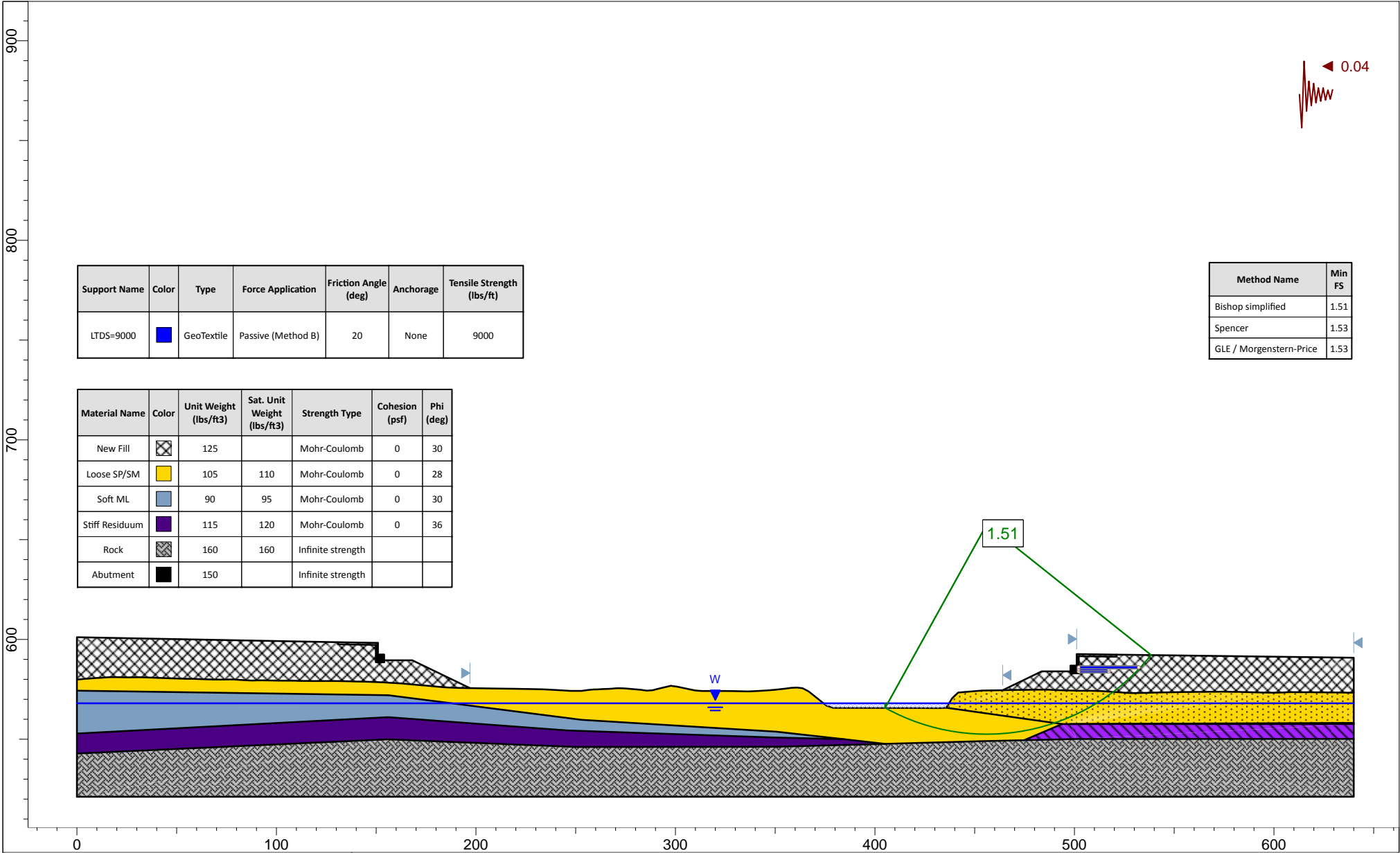
Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
New Fill	White with cross-hatch	125		Mohr-Coulomb	0	30
Loose SP/SM	Yellow	105	110	Mohr-Coulomb	0	28
Soft ML	Blue	90	95	Mohr-Coulomb	0	30
Stiff Residuum	Purple	115	120	Mohr-Coulomb	0	36
Rock	Grey with diagonal lines	160	160	Infinite strength		
Material 20	Brown	20		Mohr-Coulomb	1	35

Method Name	Min FS
Bishop simplified	1.30
Spencer	1.30
GLE / Morgenstern-Price	1.30



SLIDEINTERPRET 8.025

Project		SC 557 Over Crowders Creek	
Analysis Description		End Bridge, End Slope - 100-yr Scour	
Drawn By	JFH	Scale	1:800
Date		Company	F&ME
		File Name	End Bridge_End Slope_Scour.slim



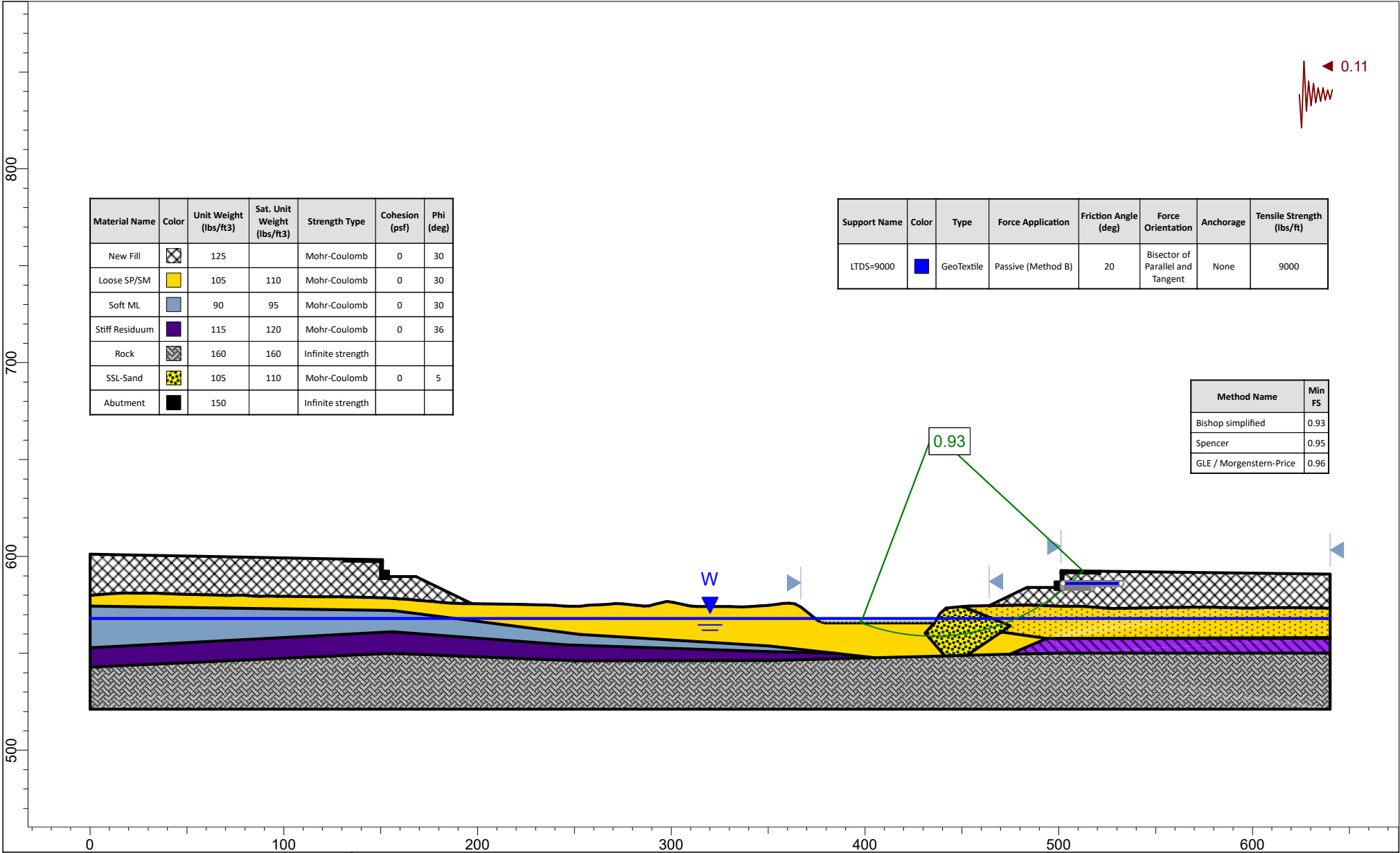
Support Name	Color	Type	Force Application	Friction Angle (deg)	Anchorage	Tensile Strength (lbs/ft)
LTDS=9000	Blue	GeoTextile	Passive (Method B)	20	None	9000

Method Name	Min FS
Bishop simplified	1.51
Spencer	1.53
GLE / Morgenstern-Price	1.53

Material Name	Color	Unit Weight (lbs/ft <sup>3</sup> )	Sat. Unit Weight (lbs/ft <sup>3</sup> )	Strength Type	Cohesion (psf)	Phi (deg)
New Fill	Cross-hatched	125		Mohr-Coulomb	0	30
Loose SP/SM	Yellow	105	110	Mohr-Coulomb	0	28
Soft ML	Light Blue	90	95	Mohr-Coulomb	0	30
Stiff Residuum	Purple	115	120	Mohr-Coulomb	0	36
Rock	Diagonal Hatching	160	160	Infinite strength		
Abutment	Black	150		Infinite strength		



Project		SC 557 Over Crowders Creek	
Analysis Description		End Bridge, End Slope - FEE	
Drawn By	JFH	Scale	1:800
Date		Company	F&ME
		File Name	End Bridge_End Slope_FEE.slim



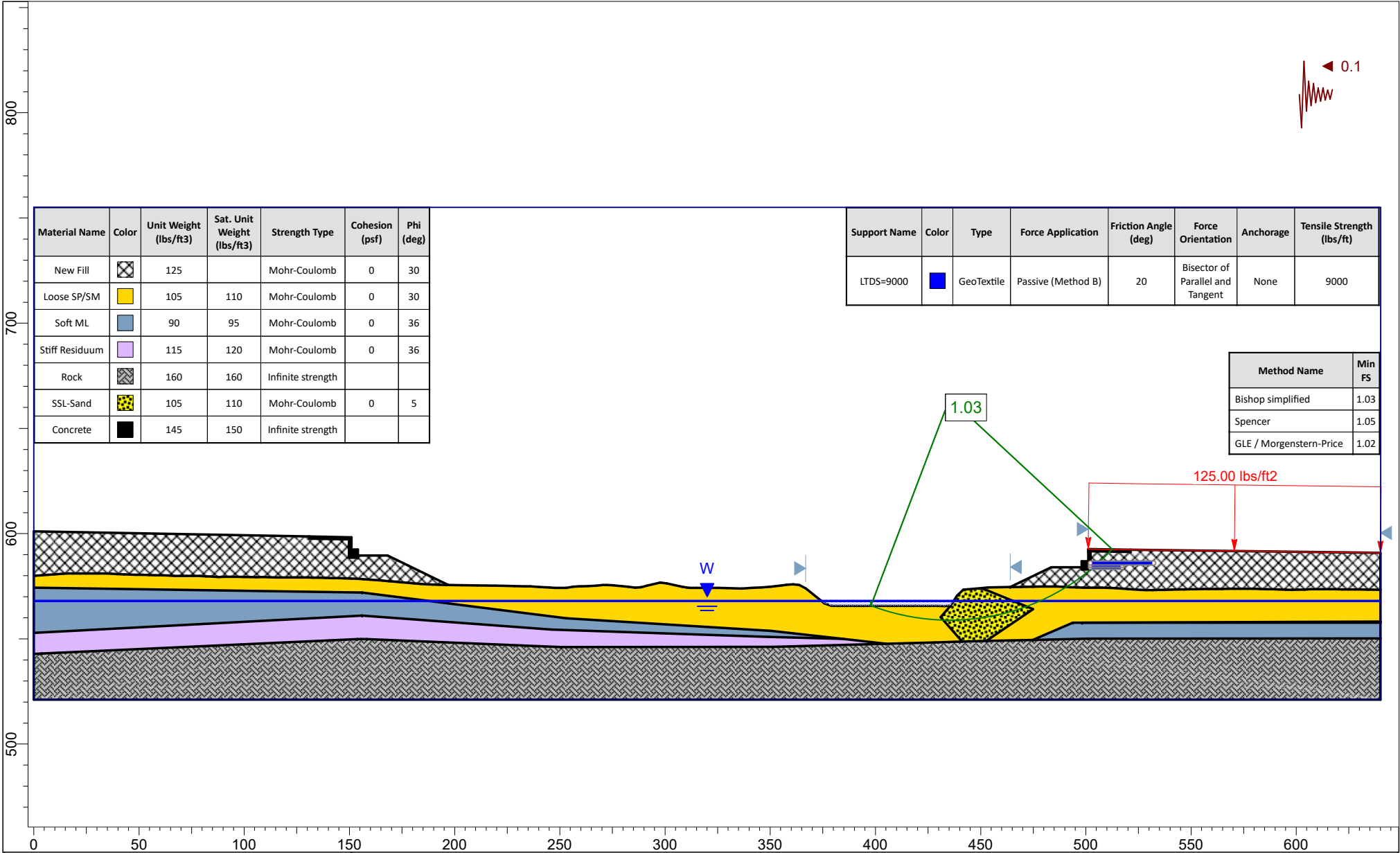
Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
New Fill	⊗	125		Mohr-Coulomb	0	30
Loose SP/SM	■	105	110	Mohr-Coulomb	0	30
Soft ML	■	90	95	Mohr-Coulomb	0	30
Stiff Residuum	■	115	120	Mohr-Coulomb	0	36
Rock	▨	160	160	Infinite strength		
SSL-Sand	■	105	110	Mohr-Coulomb	0	5
Abutment	■	150		Infinite strength		

Support Name	Color	Type	Force Application	Friction Angle (deg)	Force Orientation	Anchorage	Tensile Strength (lbs/ft)
LTDS=9000	■	GeoTextile	Passive (Method B)	20	Bisector of Parallel and Tangent	None	9000

Method Name	Min FS
Bishop simplified	0.93
Spencer	0.95
GLE / Morgenstern-Price	0.96



Project		SC 557 Over Crowders Creek	
Analysis Description		End Bridge, End Slope - SEE	
Drawn By	JFH	Scale	1:824
		File Name	End Bridge_End Slope_SEE.slim



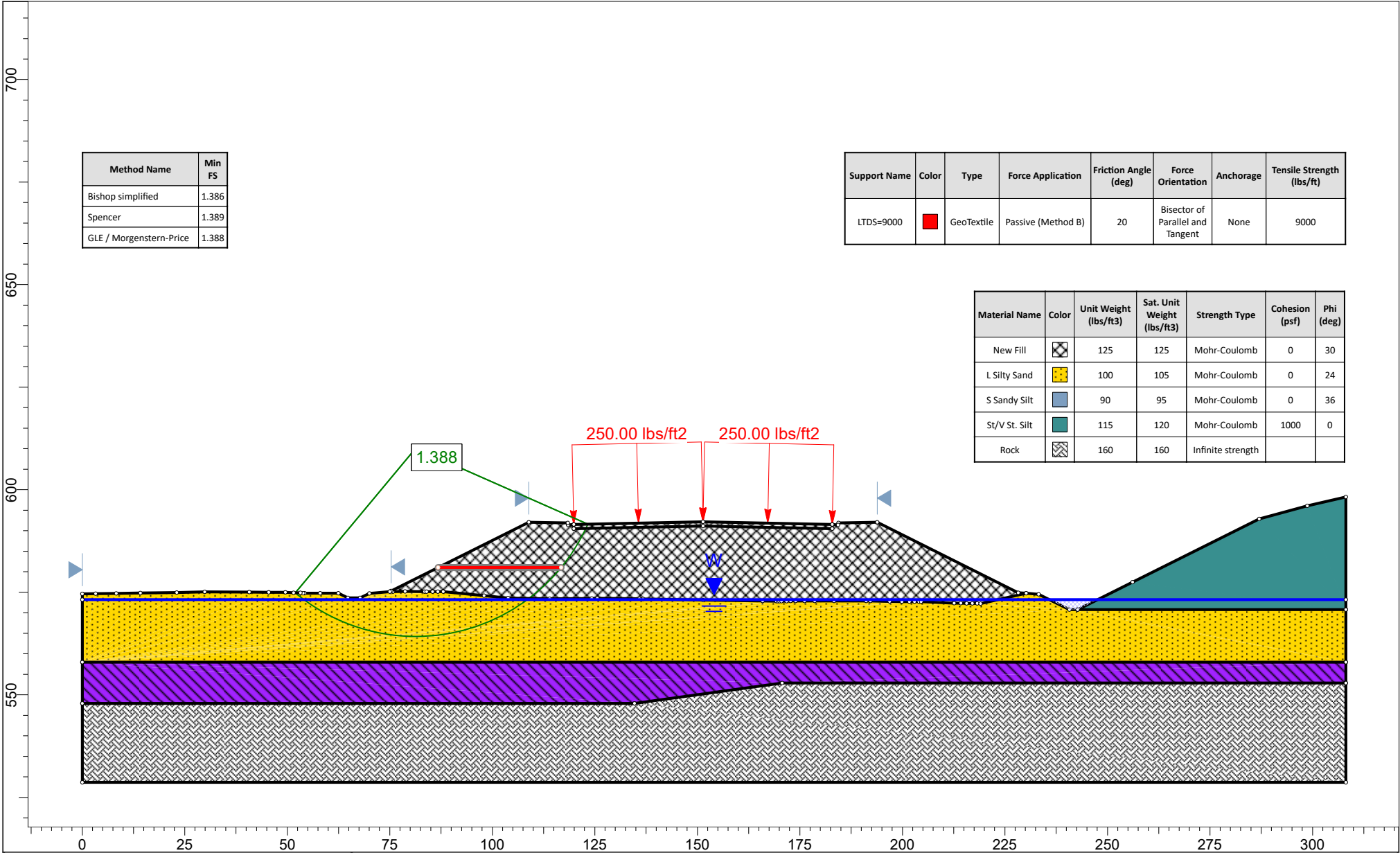
Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
New Fill	☒	125		Mohr-Coulomb	0	30
Loose SP/SM	■	105	110	Mohr-Coulomb	0	30
Soft ML	■	90	95	Mohr-Coulomb	0	36
Stiff Residuum	■	115	120	Mohr-Coulomb	0	36
Rock	■	160	160	Infinite strength		
SSL-Sand	■	105	110	Mohr-Coulomb	0	5
Concrete	■	145	150	Infinite strength		

Support Name	Color	Type	Force Application	Friction Angle (deg)	Force Orientation	Anchorage	Tensile Strength (lbs/ft)
LTDS=9000	■	GeoTextile	Passive (Method B)	20	Bisector of Parallel and Tangent	None	9000

Method Name	Min FS
Bishop simplified	1.03
Spencer	1.05
GLE / Morgenstern-Price	1.02




Project		SC 557 Over Crowders Creek	
Analysis Description		End Bridge, End Slope - SEE Newmark	
Drawn By	JFH	Scale	1:759
		F&ME	
		File Name	End Bridge_End Slope_SEE Newmark.slim

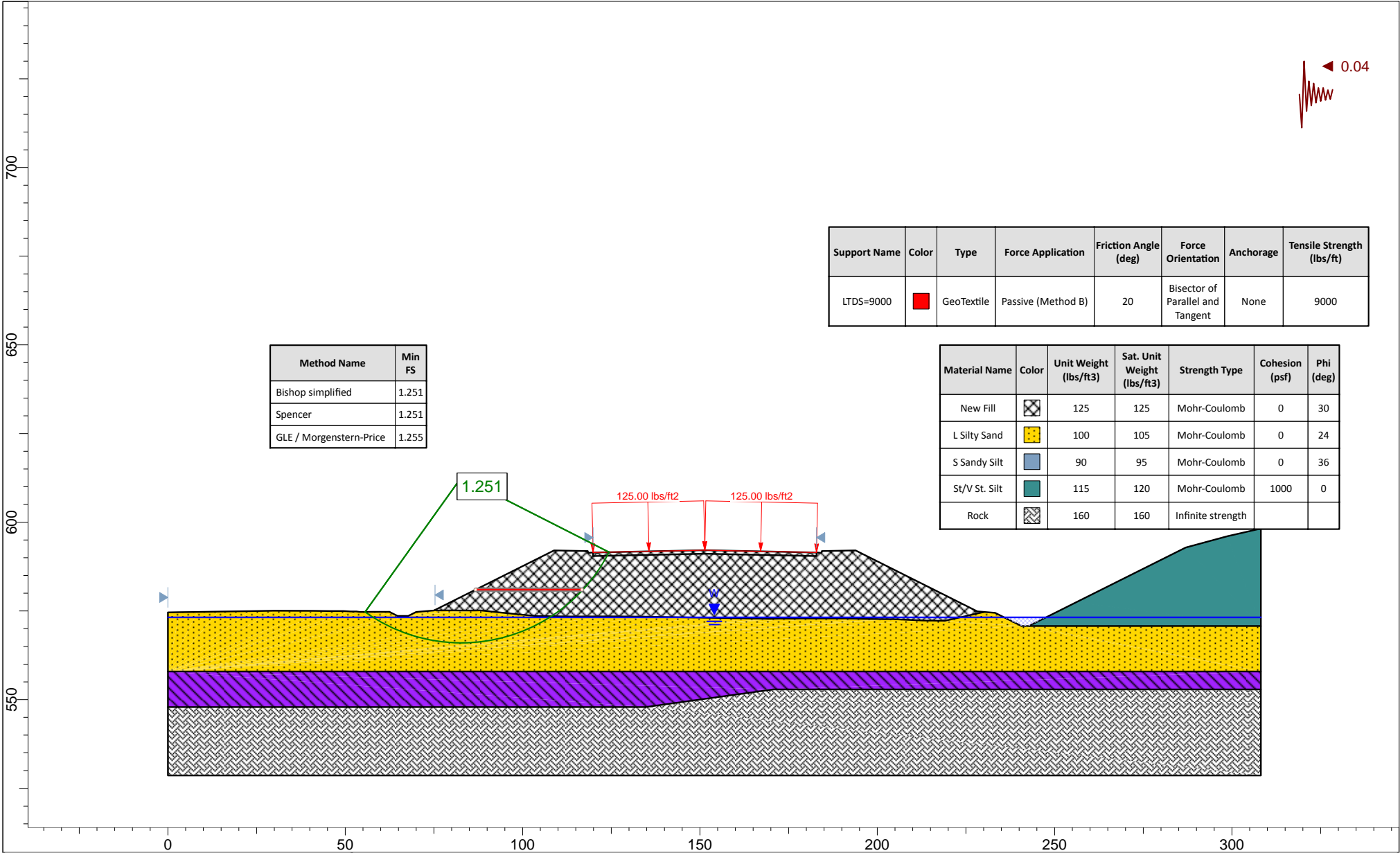


Method Name	Min FS
Bishop simplified	1.386
Spencer	1.389
GLE / Morgenstern-Price	1.388

Support Name	Color	Type	Force Application	Friction Angle (deg)	Force Orientation	Anchorage	Tensile Strength (lbs/ft)
LTDS=9000	Red	GeoTextile	Passive (Method B)	20	Bisector of Parallel and Tangent	None	9000

Material Name	Color	Unit Weight (lbs/ft <sup>3</sup> )	Sat. Unit Weight (lbs/ft <sup>3</sup> )	Strength Type	Cohesion (psf)	Phi (deg)
New Fill	White with cross-hatch	125	125	Mohr-Coulomb	0	30
L Silty Sand	Yellow with dots	100	105	Mohr-Coulomb	0	24
S Silty Silt	Blue with dots	90	95	Mohr-Coulomb	0	36
St/V St. Silt	Teal with dots	115	120	Mohr-Coulomb	1000	0
Rock	Grey with cross-hatch	160	160	Infinite strength		

	Project		SC 557 Over Crowders Creek	
	Analysis Description		End Bridge - LT Side Slope - Static	
	Drawn By	JFH	Scale	1:389
			File Name	End Bridge_LT Side Slope_Static.slim



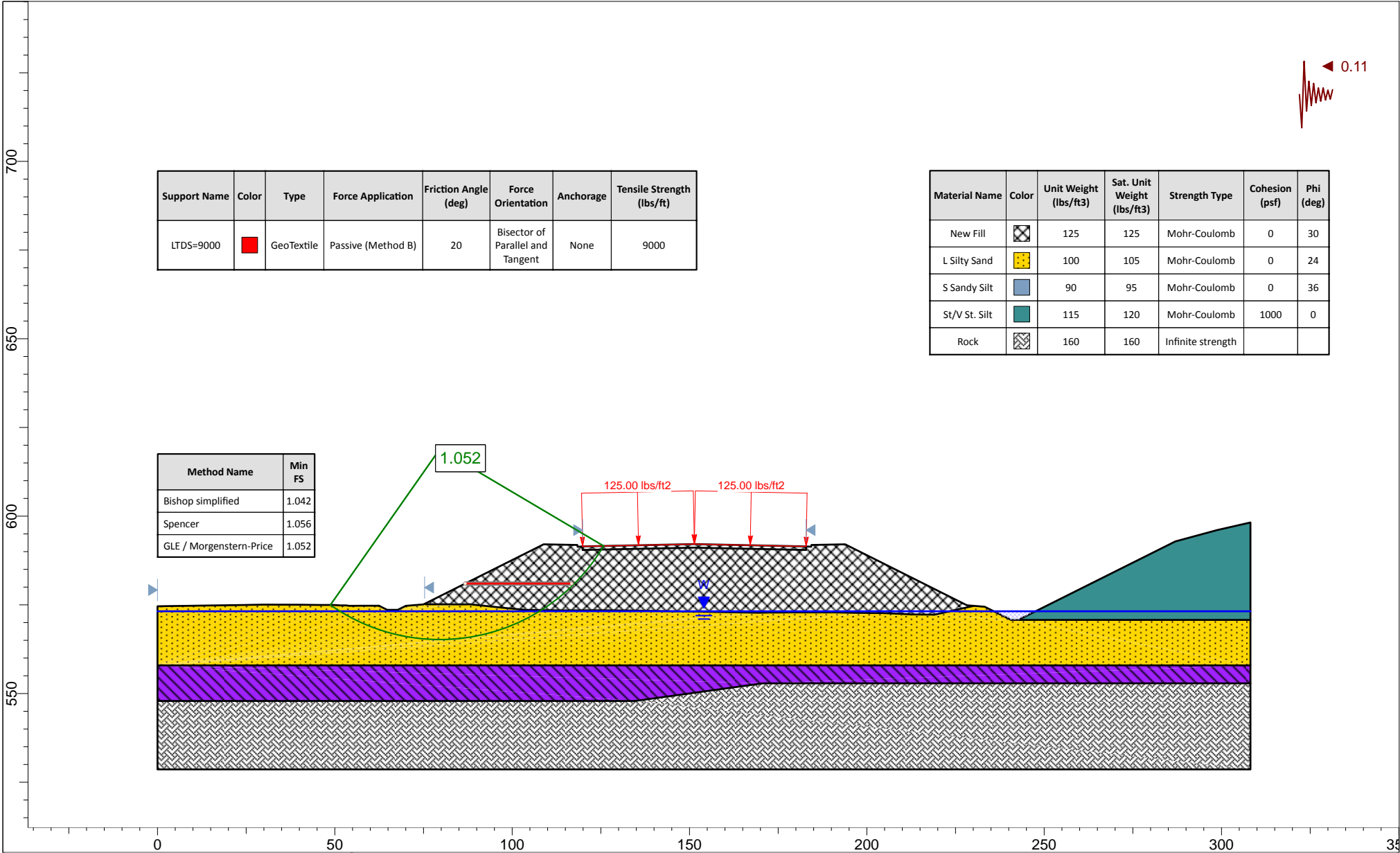
Method Name	Min FS
Bishop simplified	1.251
Spencer	1.251
GLE / Morgenstern-Price	1.255

Support Name	Color	Type	Force Application	Friction Angle (deg)	Force Orientation	Anchorage	Tensile Strength (lbs/ft)
LTDS=9000	Red	GeoTextile	Passive (Method B)	20	Bisector of Parallel and Tangent	None	9000

Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
New Fill	Diagonal Hatching	125	125	Mohr-Coulomb	0	30
L Silty Sand	Yellow Dotted	100	105	Mohr-Coulomb	0	24
S Sandy Silt	Blue Dotted	90	95	Mohr-Coulomb	0	36
St/V St. Silt	Teal Solid	115	120	Mohr-Coulomb	1000	0
Rock	Grey Hatching	160	160	Infinite strength		

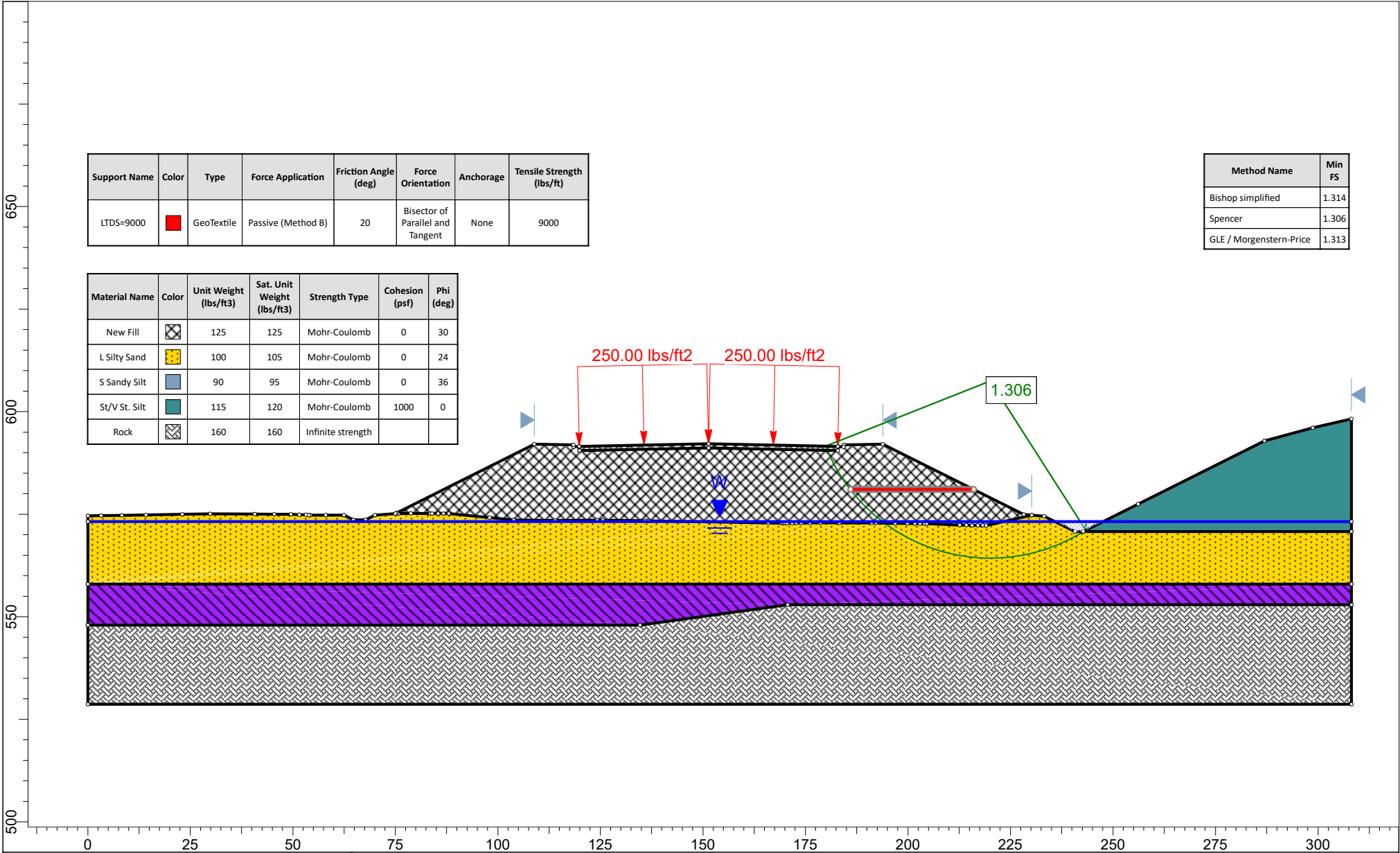


Project		SC 557 Over Crowders Creek	
Analysis Description		End Bridge - LT Side Slope - FEE	
Drawn By	JFH	Scale	1:450
Date		Company	F&ME
		File Name	End Bridge_LT Side Slope_FEE.slim



Project		SC 557 Over Crowders Creek	
Analysis Description		End Bridge - LT Side Slope - SEE	
Drawn By	JFH	Scale	1:450
Date		Company	F&ME
		File Name	End Bridge_LT Side Slope_SEE.slim





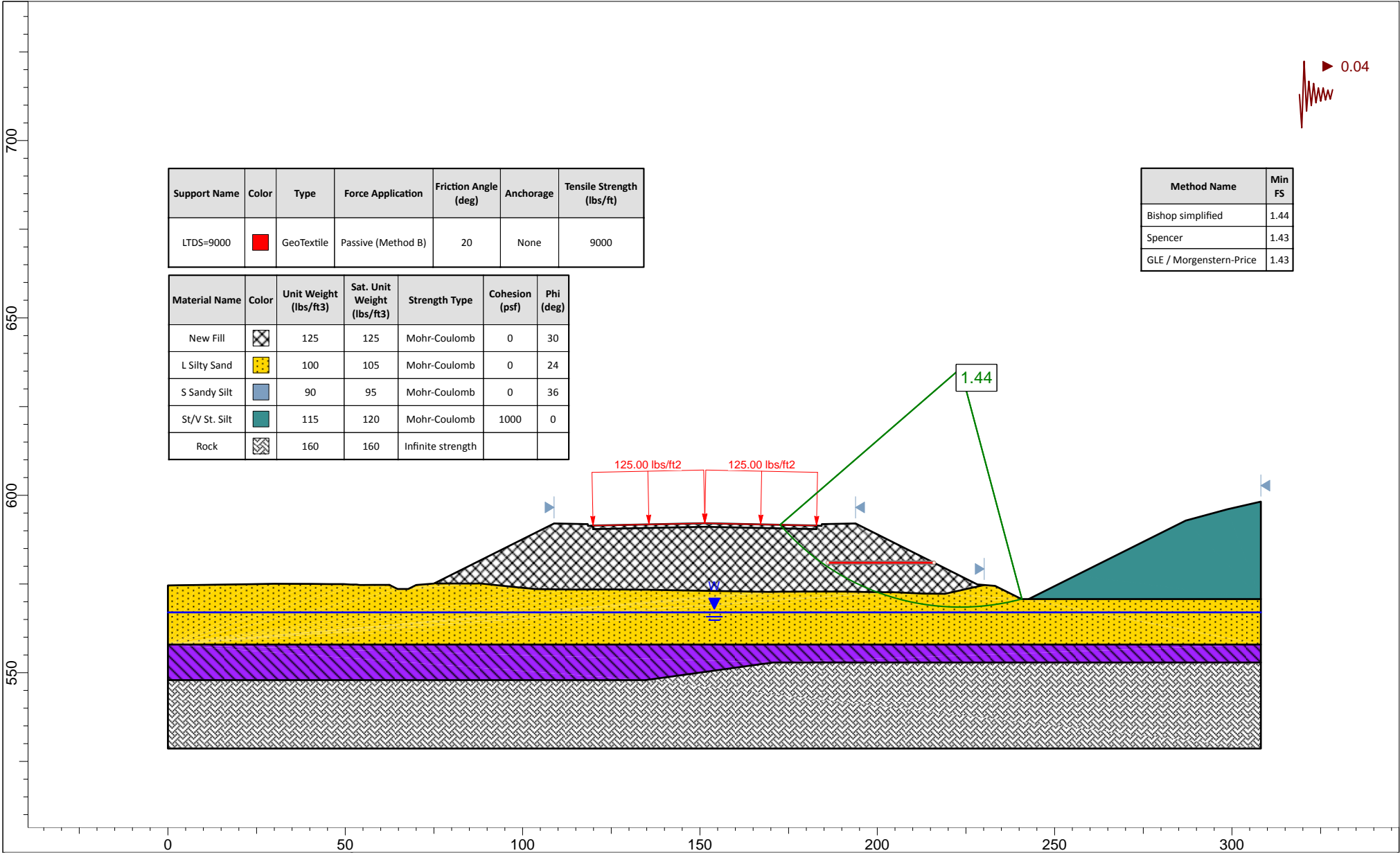
Support Name	Color	Type	Force Application	Friction Angle (deg)	Force Orientation	Anchorage	Tensile Strength (lbs/ft)
LTDS=9000	■	GeoTextile	Passive (Method B)	20	Bisector of Parallel and Tangent	None	9000

Method Name	Min FS
Bishop simplified	1.314
Spencer	1.306
GLE / Morgenstern-Price	1.313

Material Name	Color	Unit Weight (lbs/ft³)	Sat. Unit Weight (lbs/ft³)	Strength Type	Cohesion (psf)	Phi (deg)
New Fill	⊗	125	125	Mohr-Coulomb	0	30
L Silty Sand	■	100	105	Mohr-Coulomb	0	24
S Sandy Silt	■	90	95	Mohr-Coulomb	0	36
St/V St. Silt	■	115	120	Mohr-Coulomb	1000	0
Rock	⊗	160	160	Infinite strength		



Project		SC 557 Over Crowders Creek	
Analysis Description		End Bridge - RT Side Slope - Static	
Drawn By	JFH	Scale	1:389
		F&ME	
		File Name	End Bridge_RT Side Slope_Static.slim



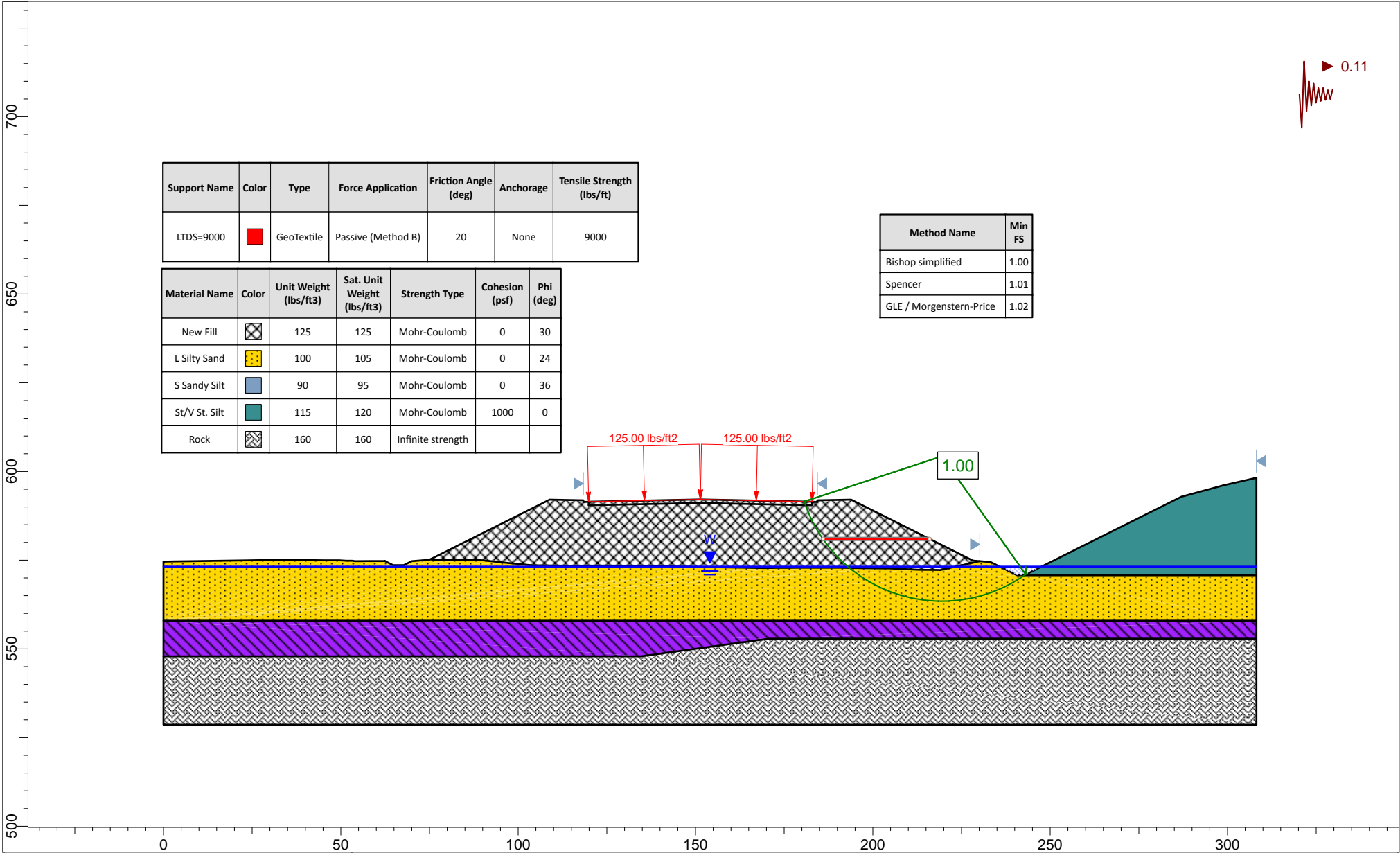
Support Name	Color	Type	Force Application	Friction Angle (deg)	Anchorage	Tensile Strength (lbs/ft)
LTDS=9000	Red	GeoTextile	Passive (Method B)	20	None	9000

Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
New Fill	Diagonal lines	125	125	Mohr-Coulomb	0	30
L Silty Sand	Yellow dots	100	105	Mohr-Coulomb	0	24
S Sandy Silt	Blue dots	90	95	Mohr-Coulomb	0	36
St/V St. Silt	Teal dots	115	120	Mohr-Coulomb	1000	0
Rock	Grey cross-hatch	160	160	Infinite strength		

Method Name	Min FS
Bishop simplified	1.44
Spencer	1.43
GLE / Morgenstern-Price	1.43



Project		SC 557 Over Crowders Creek	
Analysis Description		End Bridge - RT Side Slope - FEE	
Drawn By	JFH	Scale	1:450
Date		Company	F&ME
		File Name	End Bridge_RT Side Slope_FEE.slim



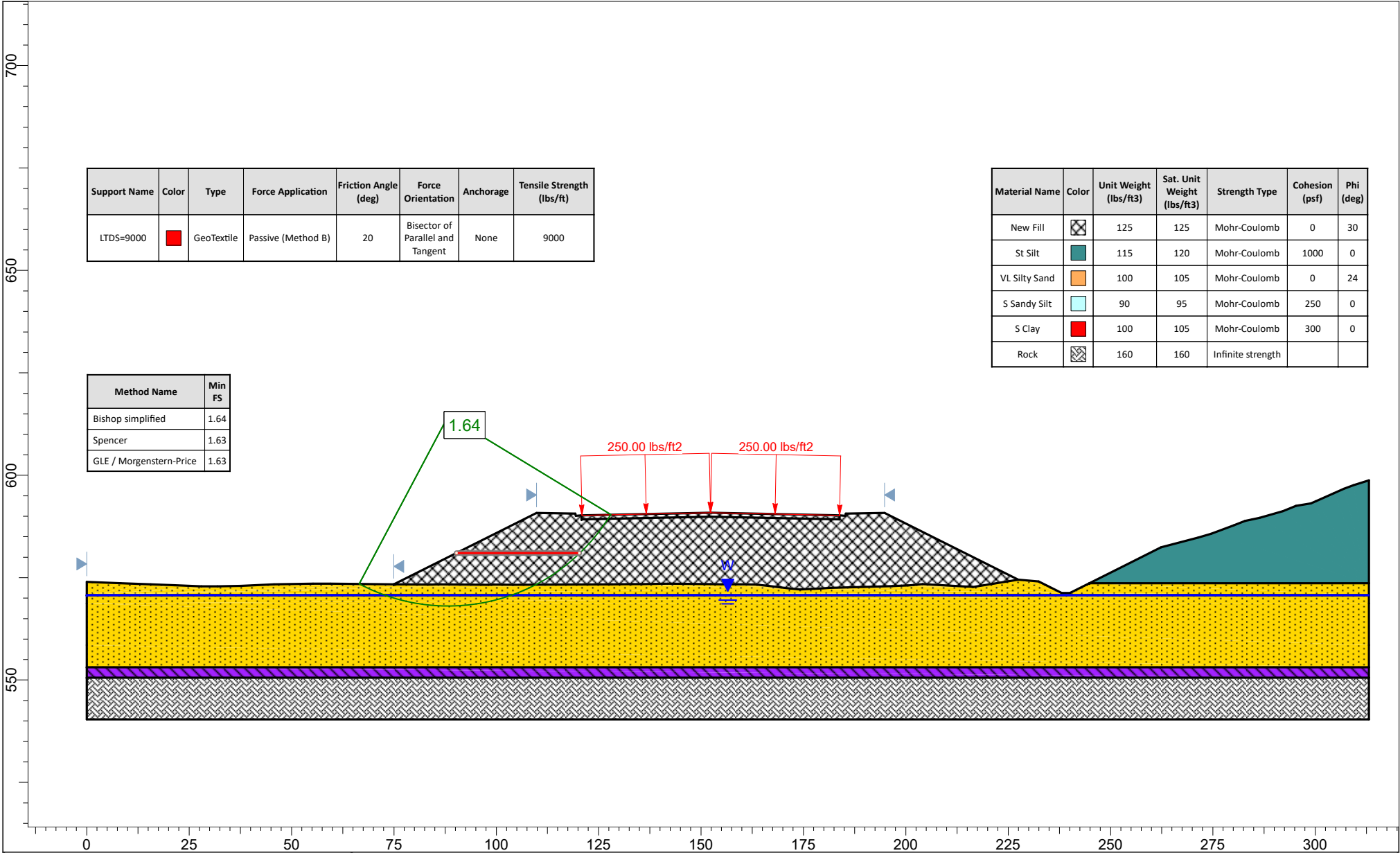
Support Name	Color	Type	Force Application	Friction Angle (deg)	Anchorage	Tensile Strength (lbs/ft)
LTDS=9000	Red	GeoTextile	Passive (Method B)	20	None	9000

Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
New Fill	Diagonal lines	125	125	Mohr-Coulomb	0	30
L Silty Sand	Yellow dots	100	105	Mohr-Coulomb	0	24
S Sandy Silt	Blue	90	95	Mohr-Coulomb	0	36
St/V St. Silt	Teal	115	120	Mohr-Coulomb	1000	0
Rock	Grey cross-hatch	160	160	Infinite strength		

Method Name	Min FS
Bishop simplified	1.00
Spencer	1.01
GLE / Morgenstern-Price	1.02




Project		SC 557 Over Crowders Creek	
Analysis Description		End Bridge - RT Side Slope - SEE	
Drawn By	JFH	Scale	1:450
Date		Company	F&ME
		File Name	End Bridge_RT Side Slope_SEE.slim

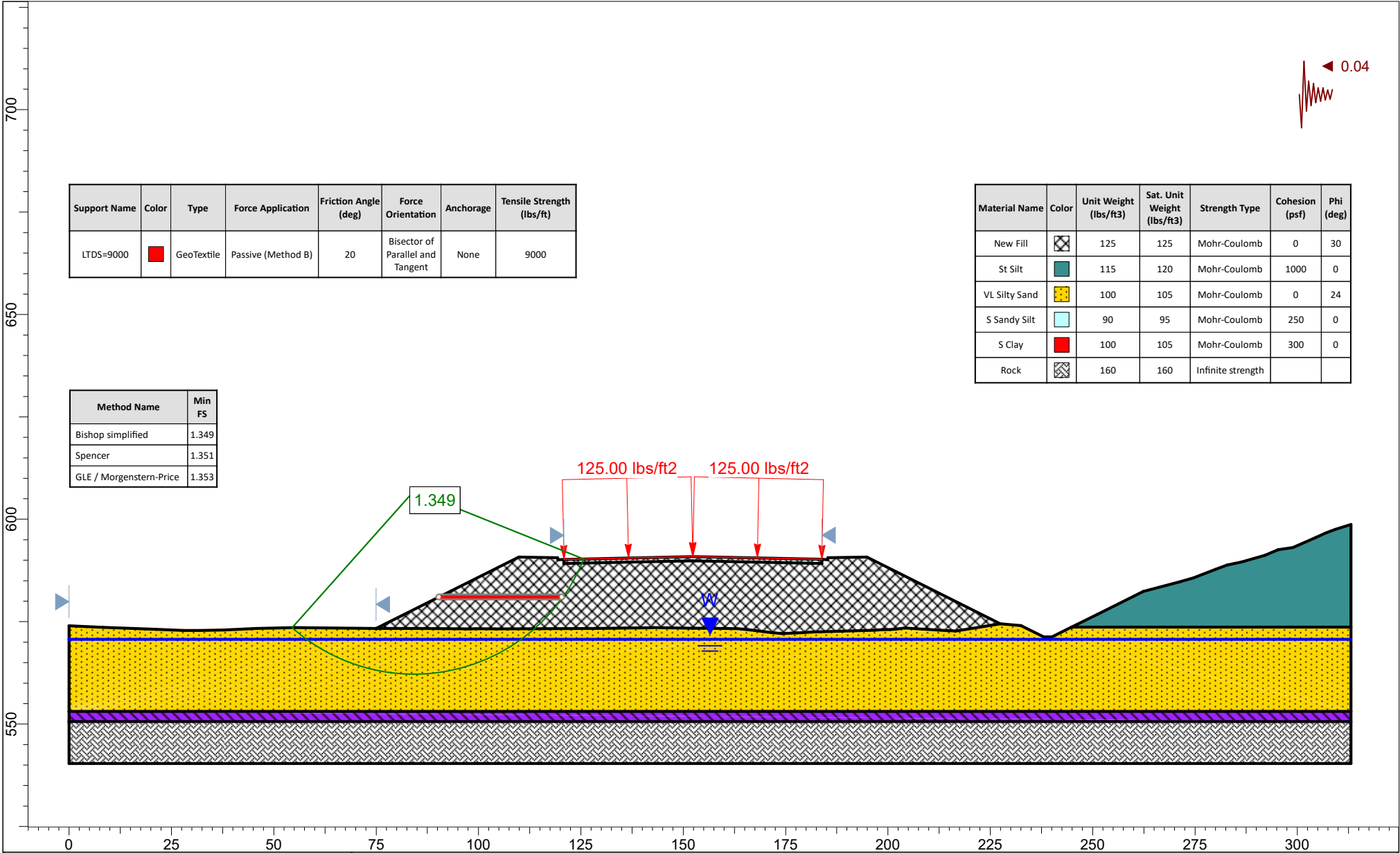


Support Name	Color	Type	Force Application	Friction Angle (deg)	Force Orientation	Anchorage	Tensile Strength (lbs/ft)
LTDS=9000	Red	GeoTextile	Passive (Method B)	20	Bisector of Parallel and Tangent	None	9000

Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
New Fill	Cross-hatched	125	125	Mohr-Coulomb	0	30
St Silt	Teal	115	120	Mohr-Coulomb	1000	0
VL Silty Sand	Orange	100	105	Mohr-Coulomb	0	24
S Sandy Silt	Light Blue	90	95	Mohr-Coulomb	250	0
S Clay	Red	100	105	Mohr-Coulomb	300	0
Rock	Diagonal hatching	160	160	Infinite strength		

Method Name	Min FS
Bishop simplified	1.64
Spencer	1.63
GLE / Morgenstern-Price	1.63

	Project		SC 557 Over Crowders Creek	
	Analysis Description		End Bridge Embankment - LT Side Slope - Static	
	Drawn By	JFH	Scale	1:390
			F&ME	
SLIDEINTERPRET 8.026		File Name		End Bridge Embankment_LT Side Slope_Static.slim



Support Name	Color	Type	Force Application	Friction Angle (deg)	Force Orientation	Anchorage	Tensile Strength (lbs/ft)
LTDS=9000	Red	GeoTextile	Passive (Method B)	20	Bisector of Parallel and Tangent	None	9000

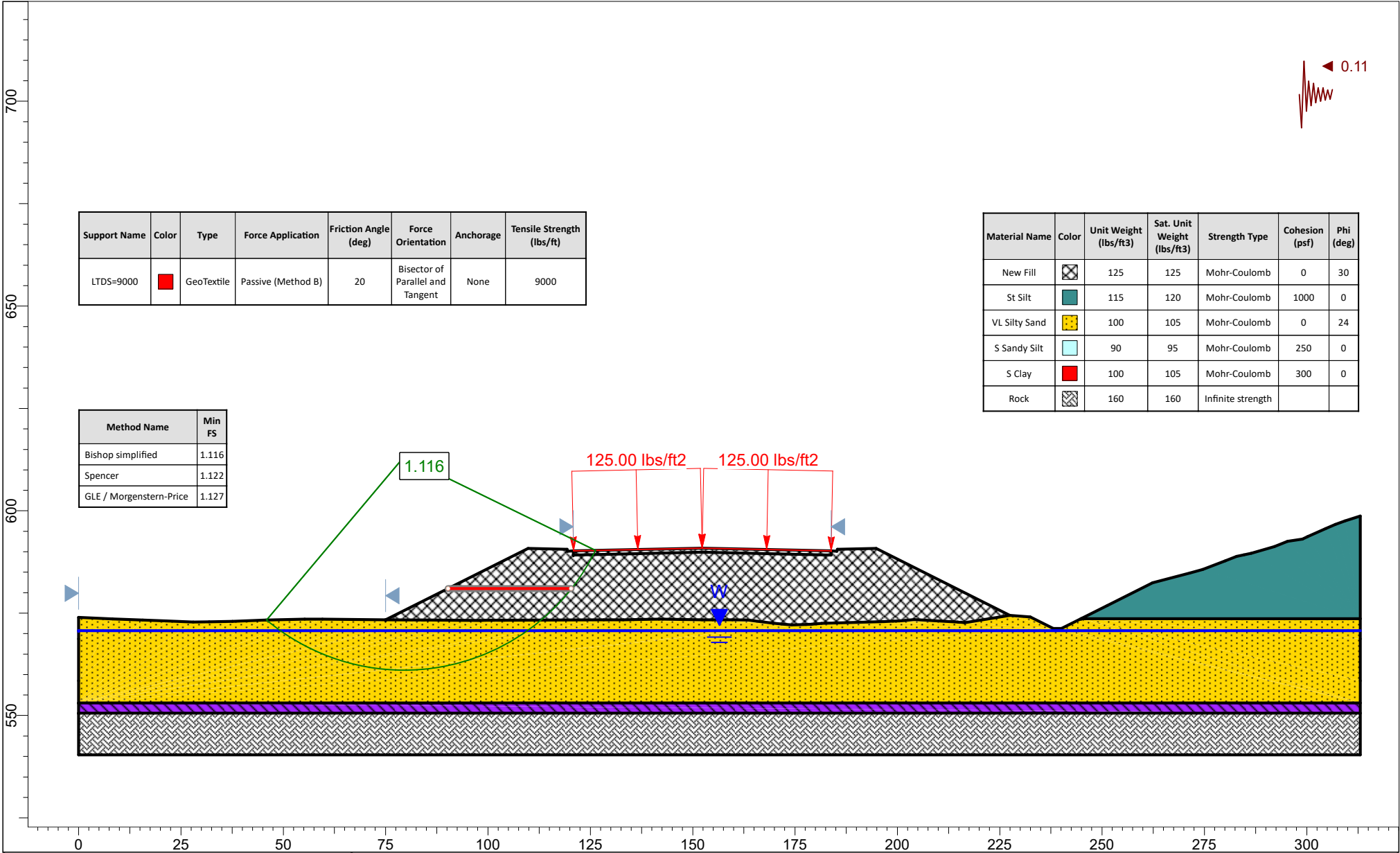
Material Name	Color	Unit Weight (lbs/ft³)	Sat. Unit Weight (lbs/ft³)	Strength Type	Cohesion (psf)	Phi (deg)
New Fill	Diagonal Hatching	125	125	Mohr-Coulomb	0	30
St Silt	Dark Teal	115	120	Mohr-Coulomb	1000	0
VL Silty Sand	Yellow Dotted	100	105	Mohr-Coulomb	0	24
S Sandy Silt	Light Teal	90	95	Mohr-Coulomb	250	0
S Clay	Red	100	105	Mohr-Coulomb	300	0
Rock	Diagonal Hatching	160	160	Infinite strength		

Method Name	Min FS
Bishop simplified	1.349
Spencer	1.351
GLE / Morgenstern-Price	1.353



SLIDEINTERPRET 8.026

Project		SC 557 Over Crowders Creek	
Analysis Description		End Bridge Embankment - LT Side Slope - FEE	
Drawn By	JFH	Scale	1:390
		F&ME	
		File Name	End Bridge Embankment_LT Side Slope_FEE.slim

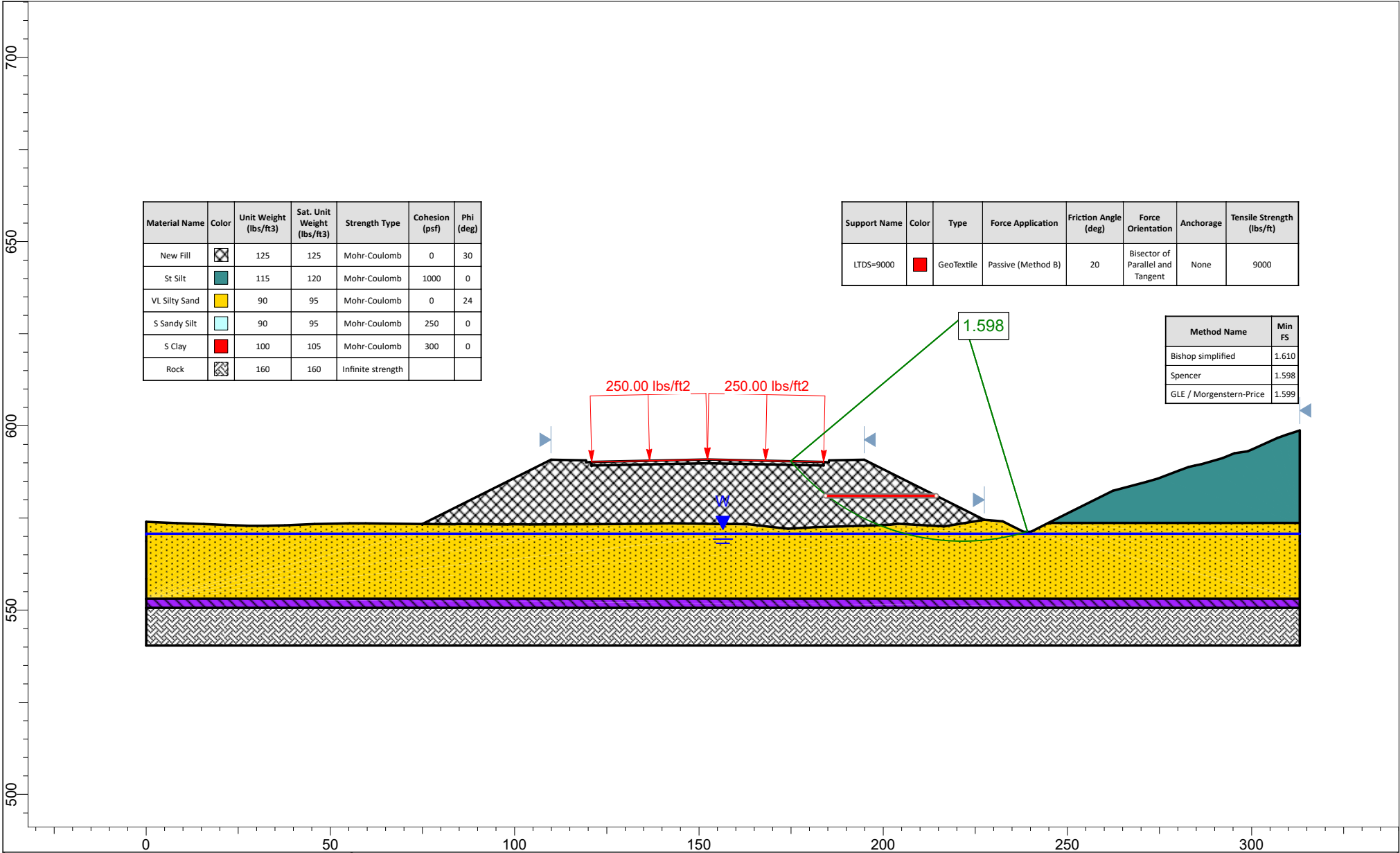


Support Name	Color	Type	Force Application	Friction Angle (deg)	Force Orientation	Anchorage	Tensile Strength (lbs/ft)
LTDS=9000	Red	GeoTextile	Passive (Method B)	20	Bisector of Parallel and Tangent	None	9000

Material Name	Color	Unit Weight (lbs/ft³)	Sat. Unit Weight (lbs/ft³)	Strength Type	Cohesion (psf)	Phi (deg)
New Fill	White with cross-hatch	125	125	Mohr-Coulomb	0	30
St Silt	Teal	115	120	Mohr-Coulomb	1000	0
VL Silty Sand	Yellow with dots	100	105	Mohr-Coulomb	0	24
S Sandy Silt	Light Blue	90	95	Mohr-Coulomb	250	0
S Clay	Red	100	105	Mohr-Coulomb	300	0
Rock	Grey with cross-hatch	160	160	Infinite strength		

Method Name	Min FS
Bishop simplified	1.116
Spencer	1.122
GLE / Morgenstern-Price	1.127

	Project		SC 557 Over Crowders Creek	
	Analysis Description		End Bridge Embankment - LT Side Slope - SEE	
	Drawn By	JFH	Scale	1:390
			F&ME	
SLIDEINTERPRET 8.026		File Name		End Bridge Embankment_LT Side Slope_SEE.slim



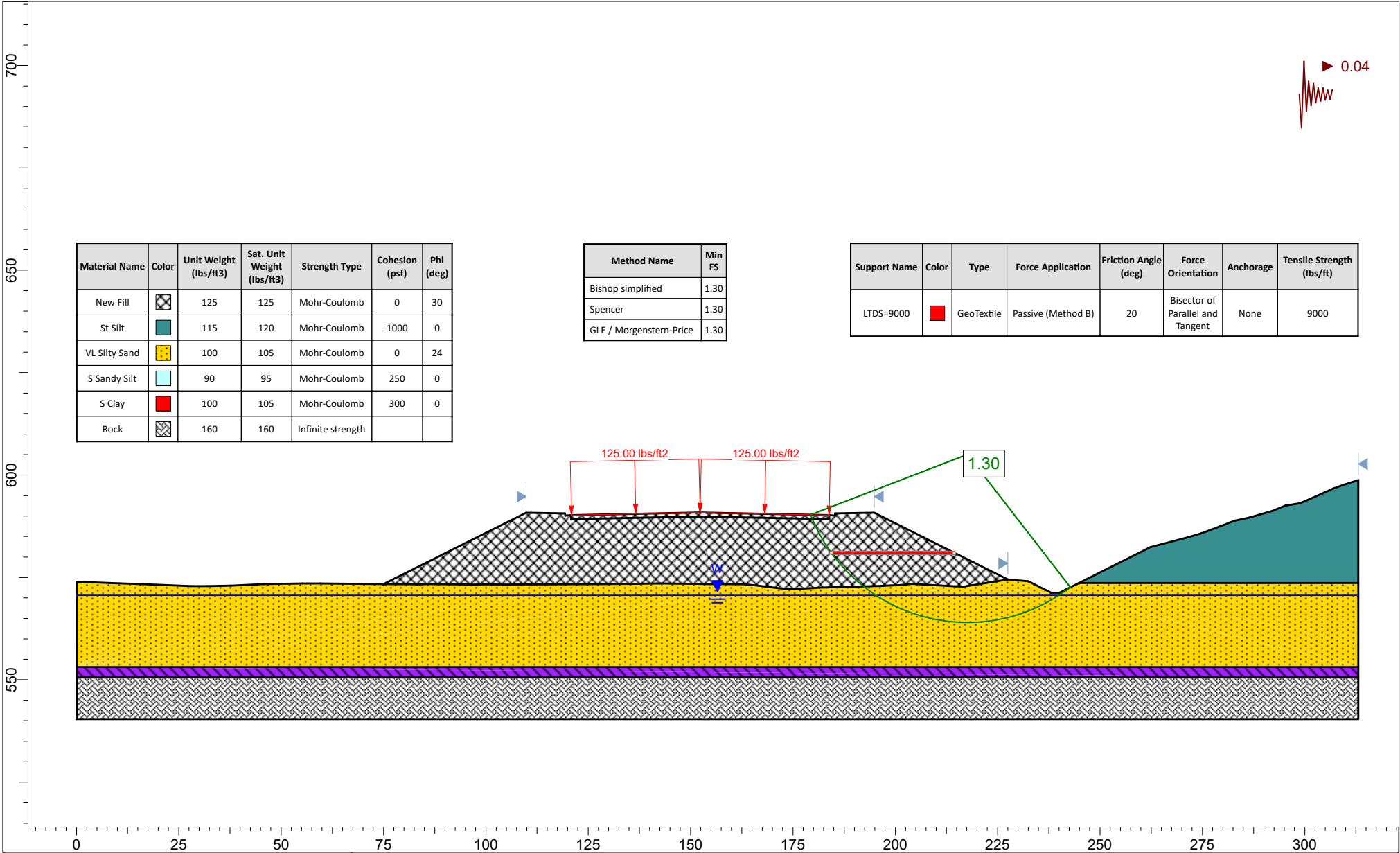
Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
New Fill	☒	125	125	Mohr-Coulomb	0	30
St Silt	■	115	120	Mohr-Coulomb	1000	0
VL Silty Sand	■	90	95	Mohr-Coulomb	0	24
S Silty Sand	■	90	95	Mohr-Coulomb	250	0
S Clay	■	100	105	Mohr-Coulomb	300	0
Rock	☒	160	160	Infinite strength		

Support Name	Color	Type	Force Application	Friction Angle (deg)	Force Orientation	Anchorage	Tensile Strength (lbs/ft)
LTDS=9000	■	GeoTextile	Passive (Method B)	20	Bisector of Parallel and Tangent	None	9000

Method Name	Min FS
Bishop simplified	1.610
Spencer	1.598
GLE / Morgenstern-Price	1.599



Project		SC 557 Over Crowders Creek	
Analysis Description		End Bridge Embankment - RT Side Slope - Static	
Drawn By	JFH	Scale	1:433
		F&ME	
		File Name	End Bridge Embankment_RT Side Slope_Static.slim



Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
New Fill	☒	125	125	Mohr-Coulomb	0	30
St Silt	■	115	120	Mohr-Coulomb	1000	0
VL Silty Sand	■	100	105	Mohr-Coulomb	0	24
S Silty Sand	■	90	95	Mohr-Coulomb	250	0
S Clay	■	100	105	Mohr-Coulomb	300	0
Rock	☒	160	160	Infinite strength		

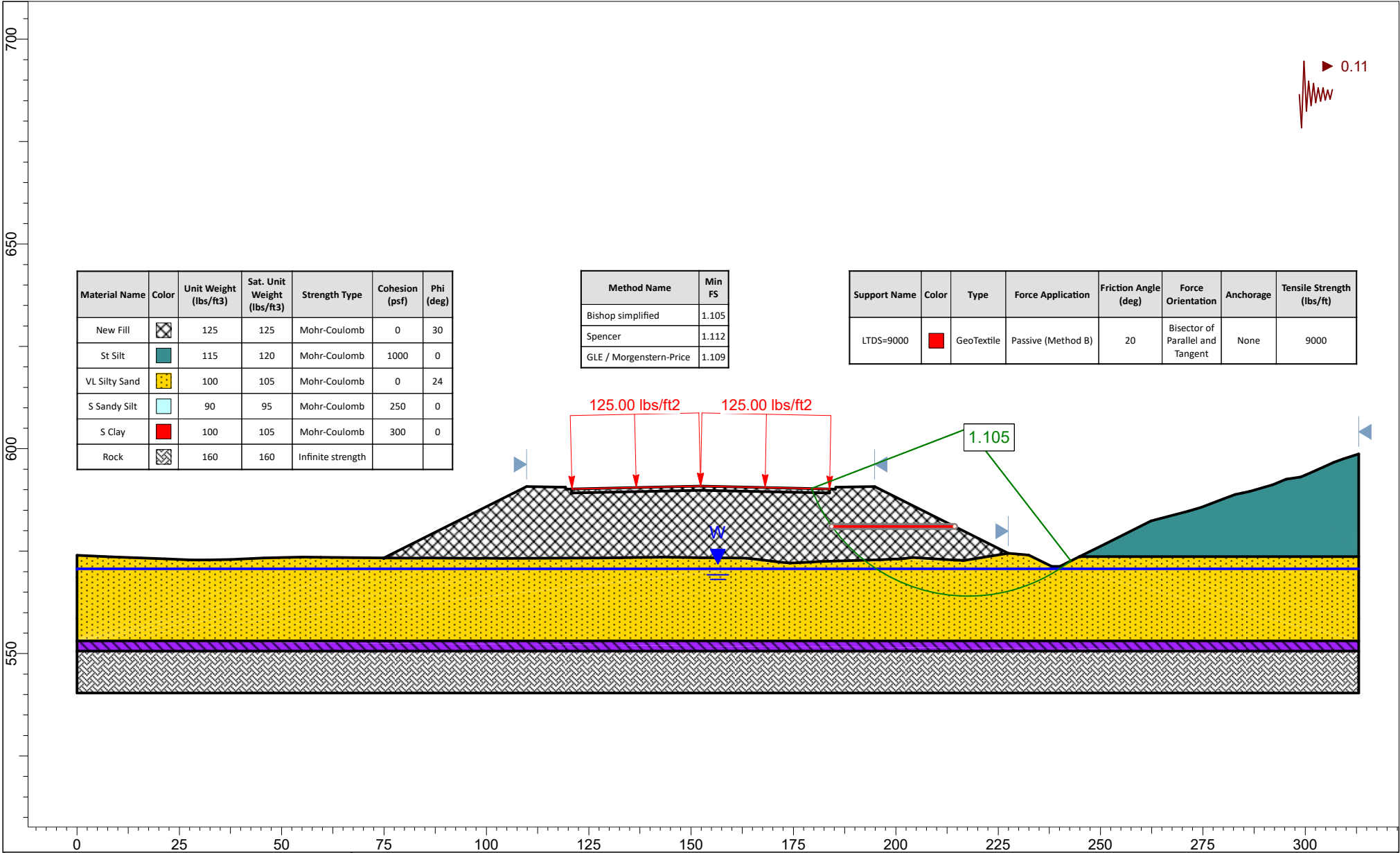
Method Name	Min FS
Bishop simplified	1.30
Spencer	1.30
GLE / Morgenstern-Price	1.30

Support Name	Color	Type	Force Application	Friction Angle (deg)	Force Orientation	Anchorage	Tensile Strength (lbs/ft)
LTDS=9000	■	GeoTextile	Passive (Method B)	20	Bisector of Parallel and Tangent	None	9000



Project		SC 557 Over Crowders Creek	
Analysis Description		End Bridge Embankment - RT Side Slope - FEE	
Drawn By	JFH	Scale	1:390
		F&ME	
		File Name	End Bridge Embankment_RT Side Slope_FEE.slim





Material Name	Color	Unit Weight (lbs/ft <sup>3</sup> )	Sat. Unit Weight (lbs/ft <sup>3</sup> )	Strength Type	Cohesion (psf)	Phi (deg)
New Fill	☒	125	125	Mohr-Coulomb	0	30
St Silt	■	115	120	Mohr-Coulomb	1000	0
VL Silty Sand	■	100	105	Mohr-Coulomb	0	24
S Sandy Silt	■	90	95	Mohr-Coulomb	250	0
S Clay	■	100	105	Mohr-Coulomb	300	0
Rock	☒	160	160	Infinite strength		

Method Name	Min FS
Bishop simplified	1.105
Spencer	1.112
GLE / Morgenstern-Price	1.109

Support Name	Color	Type	Force Application	Friction Angle (deg)	Force Orientation	Anchorage	Tensile Strength (lbs/ft)
LTDS=9000	■	GeoTextile	Passive (Method B)	20	Bisector of Parallel and Tangent	None	9000



Project		SC 557 Over Crowders Creek	
Analysis Description		End Bridge Embankment - RT Side Slope - SEE	
Drawn By	JFH	Scale	1:390
		F&ME	
		File Name	End Bridge Embankment_RT Side Slope_SEE.slim

**SC 557 Bridge over Crowders Creek  
Final Bridge Geotechnical Engineering Report**

---

# **APPENDIX**

**SECTION 12B      NEWMARK DEFORMATION  
CALCULATIONS**

Project: SC 557 Bridge over Crowders Creek - **SEE NEWMARK CALCULATIONS**

Calc. By: BMF

Date: 8/16/2018

Method: *SCDOT Geotechnical Design Manual (2010)* - Section 13.17.2

$$\log(d) = -1.49 - 0.75 \log\left(\frac{k_y}{k_{\max}}\right) + 3.62 \log\left[1 - \left(\frac{k_y}{k_{\max}}\right)\right] - 0.85 \log(k_{\max}) + 1.61 \log(V_{\text{peak}})$$

---

**End Bridge, LT Side Slope**

---

d = Displacement (in)

 $k_y = \text{Yield Acceleration (\%g)} = 0.095$  $k_{\max} = \text{Peak Ground Acceleration (\%g)} = 0.11$  $V_{\text{peak}} = \text{Peak Ground Velocity (in/sec)} = 55 S_{D1} = 5.50$ d = **0.003** inches

---

**End Bridge, RT Side Slope**

---

d = Displacement (in)

 $k_y = \text{Yield Acceleration (\%g)} = 0.09$  $k_{\max} = \text{Peak Ground Acceleration (\%g)} = 0.11$  $V_{\text{peak}} = \text{Peak Ground Velocity (in/sec)} = 55 S_{D1} = 5.50$ d = **0.008** inches

---

**End Bridge, End Slope**

---

d = Displacement (in)

 $k_y = \text{Yield Acceleration (\%g)} = 0.035$  $k_{\max} = \text{Peak Ground Acceleration (\%g)} = 0.11$  $V_{\text{peak}} = \text{Peak Ground Velocity (in/sec)} = 55 S_{D1} = 5.50$ d = **1.94** inches

**SC 557 Bridge over Crowders Creek**  
**Final Bridge Geotechnical Engineering Report**

---

# **APPENDIX**

## **SECTION 13 END BENT 1 DRIVEN PILE ANALYSES**

=====  
LPile Plus for Windows, Version 2013-07.007

Analysis of Individual Piles and Drilled Shafts  
Subjected to Lateral Loading Using the p-y Method

© 1985-2013 by Ensoft, Inc.  
All Rights Reserved

=====  
This copy of LPile is used by:

Bradley Fischer  
F&ME

Serial Number of Security Device: 291490957

This copy of LPile is licensed for exclusive use by: F&ME Consultants, Columbia, Sout

Use of this program by any entity other than F&ME Consultants, Columbia, Sout  
is forbidden by the software license agreement.

-----  
Files Used for Analysis  
-----

Path to file locations: P:\Geotechnical\G4800's\G4843 - SC557 - York County\Report\Final\Bridge\LPile\  
Name of input data file: EB1\_B-3\_Long.l p7d  
Name of output report file: EB1\_B-3\_Long.l p7o  
Name of plot output file: EB1\_B-3\_Long.l p7p  
Name of runtime message file: EB1\_B-3\_Long.l p7r

-----  
Date and Time of Analysis  
-----

Date: August 3, 2018 Time: 8:49:05

-----  
Problem Title  
-----

Project Name: SC 557 over Crowders Creek

Job Number: G4843

Client: CALYX

Engineer: JFH

Description: EB1 - HP14x73 Steel Pile - Longitudinal Analysis

-----  
 Program Options and Settings  
 -----

Engineering Units of Input Data and Computations:

- Engineering units are US Customary Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

Computational Options:

- Use unfactored loads in computations (conventional analysis)
- Compute pile response under loading and nonlinear bending properties of pile (only if nonlinear pile properties are input)
- Analysis uses p-y modification factors for p-y curves
- Analysis includes loading by lateral soil movements acting on pile
- Input of shear resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- No p-y curves to be computed and reported for user-specified depths
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1

-----  
 Pile Structural Properties and Geometry  
 -----

- Total number of pile sections = 1
- Total length of pile = 47.00 ft
- Depth of ground surface below top of pile = 0.00 ft

Pile diameter values used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile.

Point	Depth X ft	Pile Diameter in
1	0.00000	14.6000000
2	47.000000	14.6000000

## Input Structural Properties:

-----  
Pile Section No. 1:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Strong H-Pile
Section Length	=	47.00000 ft
Flange Width	=	14.60000 in
Section Depth	=	13.60000 in
Flange Thickness	=	0.50500 in
Web Thickness	=	0.50500 in
Section Area	=	21.10395 Sq. in
Moment of Inertia	=	716.45302 in <sup>4</sup>
Elastic Modulus	=	29000000. lbs/in <sup>2</sup>

-----  
Ground Slope and Pile Batter Angles  
-----

Ground Slope Angle	=	0.000 degrees
	=	0.000 radians
Pile Batter Angle	=	0.000 degrees
	=	0.000 radians

-----  
Soil and Rock Layering Information  
-----

The soil profile is modelled using 6 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer	=	0.0000 ft
Distance from top of pile to bottom of layer	=	10.00000 ft
Effective unit weight at top of layer	=	125.00000 pcf
Effective unit weight at bottom of layer	=	125.00000 pcf
Friction angle at top of layer	=	30.00000 deg.
Friction angle at bottom of layer	=	30.00000 deg.
Subgrade k at top of layer	=	90.00000 pci
Subgrade k at bottom of layer	=	90.00000 pci

Layer 2 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer	=	10.00000 ft
Distance from top of pile to bottom of layer	=	14.00000 ft
Effective unit weight at top of layer	=	105.00000 pcf
Effective unit weight at bottom of layer	=	105.00000 pcf
Friction angle at top of layer	=	28.00000 deg.
Friction angle at bottom of layer	=	28.00000 deg.
Subgrade k at top of layer	=	30.00000 pci
Subgrade k at bottom of layer	=	30.00000 pci

Layer 3 is soft clay, p-y criteria by Matlock, 1970

EB1\_B-3\_Long.l p7o

Distance from top of pile to top of layer = 14.00000 ft  
 Distance from top of pile to bottom of layer = 26.50000 ft  
 Effective unit weight at top of layer = 43.00000 pcf  
 Effective unit weight at bottom of layer = 43.00000 pcf  
 Undrained cohesion at top of layer = 400.00000 psf  
 Undrained cohesion at bottom of layer = 400.00000 psf  
 Epsilon-50 at top of layer = 0.01500  
 Epsilon-50 at bottom of layer = 0.01500

Layer 4 is Piedmont residual soil

Distance from top of pile to top of layer = 26.50000 ft  
 Distance from top of pile to bottom of layer = 37.00000 ft  
 Effective unit weight at top of layer = 53.00000 pcf  
 Effective unit weight at bottom of layer = 53.00000 pcf  
 The type of field test is the Standard Penetration Test (SPT)  
 SPT N60 at top of layer = 17.00000 blows/ft  
 SPT N60 at bottom of layer = 17.00000 blows/ft

Layer 5 is Piedmont residual soil

Distance from top of pile to top of layer = 37.00000 ft  
 Distance from top of pile to bottom of layer = 56.50000 ft  
 Effective unit weight at top of layer = 68.00000 pcf  
 Effective unit weight at bottom of layer = 68.00000 pcf  
 The type of field test is the Standard Penetration Test (SPT)  
 SPT N60 at top of layer = 100.00000 blows/ft  
 SPT N60 at bottom of layer = 100.00000 blows/ft

Layer 6 is strong rock (vuggy limestone)

Distance from top of pile to top of layer = 56.50000 ft  
 Distance from top of pile to bottom of layer = 80.00000 ft  
 Effective unit weight at top of layer = 103.00000 pcf  
 Effective unit weight at bottom of layer = 103.00000 pcf  
 Uniaxial compressive strength at top of layer = 5000.00000 psi  
 Uniaxial compressive strength at bottom of layer = 5000.00000 psi

(Depth of lowest soil layer extends 33.00 ft below pile tip)

-----  
 Summary of Soil Properties  
 -----

Layer	Layer In-situ Soil Type	Layer In-situ Test Property	Layer Depth ft	Effective Unit Wt. pcf	Undrained Cohesion psf	Angle of Friction deg.	Uni axial qu psi	Strain Factor Epsilon
50	(p-y Curve Criteria) Type	Test Property	ft	pcf	psf	deg.	psi	Epsilon
1	Sand (Reese, et al.)	--	0.00	125.000	--	30.000	--	--
	90.000	--						



				EB1_B-3_Long. l p7o					
	90.000	--	--	10.000	125.000	--	30.000	--	--
2	Sand (Reese, et al.)	--	--	10.000	105.000	--	28.000	--	--
	30.000	--	--	14.000	105.000	--	28.000	--	--
3	Soft Clay	--	--	14.000	43.000	400.000	--	--	--
0.01500	--	--	--	26.500	43.000	400.000	--	--	--
0.01500	--	--	--	26.500	53.000	--	--	--	--
4	Piedmont Residual SPT	--	17.000	37.000	53.000	--	--	--	--
	--	SPT	17.000	37.000	68.000	--	--	--	--
5	Piedmont Residual SPT	--	100.000	56.500	68.000	--	--	--	--
	--	SPT	100.000	56.500	103.000	--	--	5000.000	--
6	Vuggy Limestone	--	--	80.000	103.000	--	--	5000.000	--
	--	--	--						

-----  
p-y Modification Factors for Group Action  
-----

Distribution of p-y modifiers with depth defined using 2 points

Point No.	Depth X ft	p-mult	y-mult
1	0.000	0.8700	1.0000
2	100.000	0.8700	1.0000

-----  
Lateral Soil Movements  
-----

Profile of soil movement with depth defined using 2 points

Point No.	Depth X ft	Soil Movement in
1	0.00000	0.00000
2	0.00000	0.00000

-----  
Loading Type  
-----

Static loading criteria were used when computing p-y curves for all analyses.

-----  
Pile-head Loading and Pile-head Fixity Conditions  
-----

Number of Loads specified = 2

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length
1	1	V = 8000.0000 lbs	M = 0.0000 in-lbs	150000.	Yes
2	1	V = 12000. lbs	M = 0.0000 in-lbs	200000.	Yes

V = perpendicular shear force applied to pile head  
M = bending moment applied to pile head  
y = lateral deflection relative to pile axis  
S = pile slope relative to original pile batter angle  
R = rotational stiffness applied to pile head  
Axial thrust is assumed to be acting axially for all pile batter angles.

-----  
Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness  
-----

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Moment-curvature properties were derived from elastic section properties

-----  
Computed Values of Pile Loading and Deflection  
for Lateral Loading for Load Case Number 1  
-----

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 8000.0 lbs  
Applied moment at pile head = 0.0 in-lbs  
Axial thrust load on pile head = 150000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi *	Bending Stiffness lb-in <sup>2</sup>	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.1472	1.632E-07	8000.0000	-0.001878	7107.6742	2.078E+10	0.000	0.000	0.000
0.470	0.1366	46708.	7919.4211	-0.001871	7583.5904	2.078E+10	-28.5741	1179.7261	0.000
0.940	0.1261	92497.	7671.5196	-0.001852	8050.1361	2.078E+10	-59.3343	2654.0626	0.000
1.410	0.1157	136377.	7255.0704	-0.001821	8497.2346	2.078E+10	-88.3427	4305.9931	0.000
1.880	0.1055	177416.	6688.9288	-0.001779	8915.3811	2.078E+10	-112.4167	6007.2710	0.000
2.350	0.0956	214838.	6001.2263	-0.001725	9296.6771	2.078E+10	-131.4494	7751.0960	0.000
2.820	0.0861	248029.	5223.2348	-0.001663	9634.8661	2.078E+10	-144.4341	9463.3197	0.000
3.290	0.0769	276569.	4394.1472	-0.001591	9925.6622	2.078E+10	-149.5686	10971.	0.000
3.760	0.0681	300288.	3557.4358	-0.001513	10167.	2.078E+10	-147.1376	12181.	0.000

EB1\_B-3\_Long. l p7o

4. 230	0. 0598	319257.	2741. 9545	-0. 001429	10361.	2. 078E+10	-142. 0402	13391.	0. 000
4. 700	0. 0520	333635.	1981. 5950	-0. 001340	10507.	2. 078E+10	-127. 5908	13836.	0. 000
5. 170	0. 0447	343878.	1276. 9287	-0. 001248	10611.	2. 078E+10	-122. 2908	15428.	0. 000
5. 640	0. 0379	350151.	586. 6141	-0. 001154	10675.	2. 078E+10	-122. 5016	18217.	0. 000
6. 110	0. 0317	352448.	-96. 2323	-0. 001059	10699.	2. 078E+10	-119. 6425	21297.	0. 000
6. 580	0. 0260	350858.	-775. 0633	-0. 000963	10683.	2. 078E+10	-121. 0777	26283.	0. 000
7. 050	0. 0208	345335.	-1454. 3602	-0. 000869	10626.	2. 078E+10	-119. 8077	32461.	0. 000
7. 520	0. 0162	335923.	-2114. 6094	-0. 000777	10530.	2. 078E+10	-114. 3232	39851.	0. 000
7. 990	0. 0121	322796.	-2692. 2671	-0. 000687	10397.	2. 078E+10	-90. 5200	42342.	0. 000
8. 460	0. 008429	306717.	-3136. 4855	-0. 000602	10233.	2. 078E+10	-67. 0042	44832.	0. 000
8. 930	0. 005271	288435.	-3450. 1492	-0. 000521	10047.	2. 078E+10	-44. 2240	47323.	0. 000
9. 400	0. 002554	268680.	-3638. 4642	-0. 000445	9845. 2797	2. 078E+10	-22. 5543	49814.	0. 000
9. 870	0. 000248	248146.	-3708. 5525	-0. 000375	9636. 0590	2. 078E+10	-2. 2997	52305.	0. 000
10. 340	-0. 001678	227482.	-3698. 7557	-0. 000311	9425. 5123	2. 078E+10	5. 7737	19409.	0. 000
10. 810	-0. 003255	206950.	-3649. 5321	-0. 000252	9216. 3046	2. 078E+10	11. 6815	20239.	0. 000
11. 280	-0. 004516	186741.	-3569. 0169	-0. 000198	9010. 3988	2. 078E+10	16. 8700	21069.	0. 000
11. 750	-0. 005491	167027.	-3461. 3221	-0. 000150	8809. 5238	2. 078E+10	21. 3196	21900.	0. 000
12. 220	-0. 006210	147952.	-3330. 6286	-0. 000107	8615. 1678	2. 078E+10	25. 0256	22730.	0. 000
12. 690	-0. 006702	129639.	-3181. 1047	-6. 973E-05	8428. 5767	2. 078E+10	27. 9971	23560.	0. 000
13. 160	-0. 006996	112187.	-3016. 8332	-3. 691E-05	8250. 7565	2. 078E+10	30. 2552	24390.	0. 000
13. 630	-0. 007118	95672.	-2841. 7475	-8. 696E-06	8082. 4797	2. 078E+10	31. 8319	25220.	0. 000
14. 100	-0. 007094	80147.	-2646. 7889	1. 517E-05	7924. 2962	2. 078E+10	37. 3024	29656.	0. 000
14. 570	-0. 006947	65790.	-2437. 1325	3. 497E-05	7778. 0152	2. 078E+10	37. 0439	30073.	0. 000
15. 040	-0. 006700	52597.	-2229. 4589	5. 104E-05	7643. 5866	2. 078E+10	36. 5993	30810.	0. 000
15. 510	-0. 006372	40555.	-2024. 7495	6. 369E-05	7520. 8971	2. 078E+10	35. 9927	31860.	0. 000
15. 980	-0. 005981	29650.	-1823. 8636	7. 321E-05	7409. 7784	2. 078E+10	35. 2434	33232.	0. 000
16. 450	-0. 005546	19858.	-1627. 5613	7. 993E-05	7310. 0130	2. 078E+10	34. 3673	34951.	0. 000
16. 920	-0. 005080	11156.	-1436. 5204	8. 414E-05	7221. 3400	2. 078E+10	33. 3776	37059.	0. 000
17. 390	-0. 004597	3512. 0760	-1251. 3505	8. 613E-05	7143. 4590	2. 078E+10	32. 2855	39614.	0. 000
17. 860	-0. 004108	-3105. 3201	-1072. 6029	8. 619E-05	7139. 3145	2. 078E+10	31. 1002	42697.	0. 000
18. 330	-0. 003624	-8732. 7178	-900. 7801	8. 458E-05	7196. 6526	2. 078E+10	29. 8298	46419.	0. 000
18. 800	-0. 003154	-13409.	-736. 3436	8. 158E-05	7244. 3020	2. 078E+10	28. 4810	50929.	0. 000
19. 270	-0. 002704	-17177.	-579. 7211	7. 743E-05	7282. 6890	2. 078E+10	27. 0589	56435.	0. 000
19. 740	-0. 002281	-20079.	-431. 3150	7. 237E-05	7312. 2658	2. 078E+10	25. 5674	63227.	0. 000
20. 210	-0. 001888	-22164.	-291. 5111	6. 664E-05	7333. 5090	2. 078E+10	24. 0085	71725.	0. 000
20. 680	-0. 001529	-23480.	-160. 6908	6. 044E-05	7346. 9188	2. 078E+10	22. 3817	82558.	0. 000
21. 150	-0. 001206	-24079.	-39. 2489	5. 399E-05	7353. 0196	2. 078E+10	20. 6828	96718.	0. 000
21. 620	-0. 000920	-24015.	72. 3786	4. 746E-05	7352. 3605	2. 078E+10	18. 9014	115867.	0. 000
22. 090	-0. 000671	-23343.	173. 6643	4. 103E-05	7345. 5191	2. 078E+10	17. 0156	143072.	0. 000
22. 560	-0. 000457	-22125.	263. 8917	3. 486E-05	7333. 1082	2. 078E+10	14. 9800	184783.	0. 000
23. 030	-0. 000278	-20425.	341. 9247	2. 908E-05	7315. 7903	2. 078E+10	12. 6913	257895.	0. 000
23. 500	-0. 000129	-18317.	405. 4911	2. 383E-05	7294. 3112	2. 078E+10	9. 8500	430150.	0. 000
23. 970	-8. 793E-06	-15892.	445. 0597	1. 918E-05	7269. 5968	2. 078E+10	4. 1815	2682128.	0. 000
24. 440	8. 723E-05	-13330.	432. 6412	1. 522E-05	7243. 4899	2. 078E+10	-8. 5852	555064.	0. 000
24. 910	0. 000163	-11037.	378. 5622	1. 191E-05	7220. 1344	2. 078E+10	-10. 5917	366817.	0. 000
25. 380	0. 000222	-9079. 5051	315. 5750	9. 179E-06	7200. 1860	2. 078E+10	-11. 7441	298937.	0. 000
25. 850	0. 000266	-7493. 1734	247. 2289	6. 930E-06	7184. 0227	2. 078E+10	-12. 4921	264476.	0. 000
26. 320	0. 000300	-6302. 4886	175. 3534	5. 058E-06	7171. 8907	2. 078E+10	-12. 9957	244527.	0. 000
26. 790	0. 000323	-5523. 7438	134. 3726	3. 452E-06	7163. 9560	2. 078E+10	-1. 5365	26793.	0. 000
27. 260	0. 000339	-4792. 6072	125. 5023	2. 052E-06	7156. 5064	2. 078E+10	-1. 6090	26793.	0. 000
27. 730	0. 000347	-4111. 5501	116. 3219	8. 437E-07	7149. 5671	2. 078E+10	-1. 6465	26793.	0. 000
28. 200	0. 000348	-3481. 9236	107. 0140	-1. 870E-07	7143. 1518	2. 078E+10	-1. 6542	26793.	0. 000
28. 670	0. 000344	-2904. 1157	97. 7344	-1. 054E-06	7137. 2644	2. 078E+10	-1. 6365	26793.	0. 000
29. 140	0. 000336	-2377. 6969	88. 6140	-1. 771E-06	7131. 9007	2. 078E+10	-1. 5777	26793.	0. 000
29. 610	0. 000325	-1901. 5541	79. 7611	-2. 351E-06	7127. 0493	2. 078E+10	-1. 5416	26793.	0. 000
30. 080	0. 000310	-1474. 0126	71. 2636	-2. 810E-06	7122. 6930	2. 078E+10	-1. 4717	26793.	0. 000
30. 550	0. 000293	-1092. 9465	63. 1907	-3. 158E-06	7118. 8103	2. 078E+10	-1. 3911	26793.	0. 000
31. 020	0. 000274	-755. 8784	55. 5949	-3. 409E-06	7115. 3759	2. 078E+10	-1. 3025	26793.	0. 000
31. 490	0. 000254	-460. 0677	48. 5143	-3. 574E-06	7112. 3618	2. 078E+10	-1. 2084	26793.	0. 000
31. 960	0. 000234	-202. 5895	41. 9738	-3. 664E-06	7109. 7384	2. 078E+10	-1. 1110	26793.	0. 000

EB1\_B-3\_Long.l p7o

32.430	0.000213	19.5961	35.9869	-3.689E-06	7107.8738	2.078E+10	-1.0121	26793.	0.000
32.900	0.000192	209.5843	30.5575	-3.658E-06	7109.8096	2.078E+10	-0.9133	26793.	0.000
33.370	0.000172	370.4729	25.6807	-3.579E-06	7111.4489	2.078E+10	-0.8161	26793.	0.000
33.840	0.000152	505.3181	21.3448	-3.460E-06	7112.8229	2.078E+10	-0.7215	26793.	0.000
34.310	0.000133	617.0962	17.5317	-3.308E-06	7113.9618	2.078E+10	-0.6306	26793.	0.000
34.780	0.000115	708.6720	14.2184	-3.128E-06	7114.8949	2.078E+10	-0.5443	26793.	0.000
35.250	9.747E-05	782.7722	11.3778	-2.925E-06	7115.6499	2.078E+10	-0.4630	26793.	0.000
35.720	8.157E-05	841.9634	8.9793	-2.705E-06	7116.2530	2.078E+10	-0.3875	26793.	0.000
36.190	6.696E-05	888.6348	6.9894	-2.470E-06	7116.7285	2.078E+10	-0.3181	26793.	0.000
36.660	5.371E-05	924.9833	5.3728	-2.224E-06	7117.0989	2.078E+10	-0.2552	26793.	0.000
37.130	4.188E-05	953.0029	1.3532	-1.969E-06	7117.3844	2.078E+10	-1.1702	157606.	0.000
37.600	3.150E-05	943.5786	-4.4294	-1.711E-06	7117.2884	2.078E+10	-0.8803	157606.	0.000
38.070	2.257E-05	905.9349	-8.6907	-1.460E-06	7116.9048	2.078E+10	-0.6308	157606.	0.000
38.540	1.503E-05	848.0184	-11.6539	-1.222E-06	7116.3147	2.078E+10	-0.4200	157606.	0.000
39.010	8.784E-06	776.5475	-13.5305	-1.002E-06	7115.5865	2.078E+10	-0.2455	157606.	0.000
39.480	3.728E-06	697.0898	-14.5165	-8.018E-07	7114.7769	2.078E+10	-0.1042	157606.	0.000
39.950	-2.603E-07	614.1578	-14.7898	-6.239E-07	7113.9319	2.078E+10	0.007275	157606.	0.000
40.420	-3.309E-06	531.3161	-14.5086	-4.684E-07	7113.0878	2.078E+10	0.0925	157606.	0.000
40.890	-5.544E-06	451.2936	-13.8109	-3.350E-07	7112.2724	2.078E+10	0.1549	157606.	0.000
41.360	-7.088E-06	376.0955	-12.8155	-2.227E-07	7111.5062	2.078E+10	0.1981	157606.	0.000
41.830	-8.056E-06	307.1115	-11.6221	-1.300E-07	7110.8033	2.078E+10	0.2251	157606.	0.000
42.300	-8.555E-06	245.2183	-10.3131	-5.504E-08	7110.1727	2.078E+10	0.2391	157606.	0.000
42.770	-8.677E-06	190.8730	-8.9552	4.146E-09	7109.6190	2.078E+10	0.2425	157606.	0.000
43.240	-8.508E-06	144.1970	-7.6009	4.962E-08	7109.1434	2.078E+10	0.2377	157606.	0.000
43.710	-8.117E-06	105.0504	-6.2908	8.345E-08	7108.7445	2.078E+10	0.2268	157606.	0.000
44.180	-7.566E-06	73.0954	-5.0549	1.076E-07	7108.4189	2.078E+10	0.2114	157606.	0.000
44.650	-6.903E-06	47.8493	-3.9146	1.240E-07	7108.1617	2.078E+10	0.1929	157606.	0.000
45.120	-6.167E-06	28.7287	-2.8846	1.344E-07	7107.9669	2.078E+10	0.1723	157606.	0.000
45.590	-5.387E-06	15.0835	-1.9741	1.404E-07	7107.8278	2.078E+10	0.1505	157606.	0.000
46.060	-4.584E-06	6.2233	-1.1884	1.433E-07	7107.7376	2.078E+10	0.1281	157606.	0.000
46.530	-3.771E-06	1.4359	-0.5301	1.443E-07	7107.6888	2.078E+10	0.1054	157606.	0.000
47.000	-2.956E-06	0.000	0.000	1.445E-07	7107.6742	2.078E+10	0.0826	78803.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 1:

Pile-head deflection = 0.1471957 inches  
 Computed slope at pile head = -0.0018776 radians  
 Maximum bending moment = 352448. inch-lbs  
 Maximum shear force = 8000.000000 lbs  
 Depth of maximum bending moment = 6.1100000 feet below pile head  
 Depth of maximum shear force = 0.000000 feet below pile head  
 Number of iterations = 14  
 Number of zero deflection points = 3

-----  
 Pile-head Deflection vs. Pile Length for Load Case 1  
 -----

Boundary Condition Type 1, Shear and Moment

Shear = 8000. lb  
 Moment = 0. in-lb  
 Axial Load = 150000. lb

EB1\_B-3\_Long.l p70

Pile Length feet	Pile Head Deflection inches	Maximum Moment In-lbs	Maximum Shear lbs
47.0000	0.1471957	352448.	8000.0000000
44.6500	0.1472797	352350.	8000.0000000
42.3000	0.1471046	351879.	8000.0000000
39.9500	0.1471818	351994.	8000.0000000
37.6000	0.1471437	351987.	8000.0000000
35.2500	0.1470426	351815.	8000.0000000
32.9000	0.1470242	351884.	8000.0000000
30.5500	0.1471239	351978.	8000.0000000
28.2000	0.1470755	351749.	8000.0000000
25.8500	0.1472144	351635.	8000.0000000
23.5000	0.1474432	351457.	8000.0000000
21.1500	0.1474260	351522.	8000.0000000
18.8000	0.1503749	349306.	8000.0000000
16.4500	0.1644966	341065.	8000.0000000
14.1000	0.1841746	332597.	7999.9999999
11.7500	0.2744473	311820.	8000.0000002
9.4000	0.6087827	294613.	-9152.0612267

-----  
 Computed Values of Pile Loading and Deflection  
 for Lateral Loading for Load Case Number 2  
 -----

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 12000.0 lbs  
 Applied moment at pile head = 0.0 in-lbs  
 Axial thrust load on pile head = 200000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi *	Bending Stiffness lb-in <sup>2</sup>	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.2821	-1.450E-07	12000.	-0.003386	9476.8989	2.078E+10	0.000	0.000	0.000
0.470	0.2630	71499.	11903.	-0.003376	10205.	2.078E+10	-34.2899	735.3054	0.000
0.940	0.2440	141885.	11604.	-0.003347	10923.	2.078E+10	-71.8631	1660.9066	0.000
1.410	0.2253	209942.	11097.	-0.003299	11616.	2.078E+10	-107.8544	2700.4231	0.000
1.880	0.2068	274504.	10402.	-0.003233	12274.	2.078E+10	-138.4904	3776.7478	0.000
2.350	0.1888	334576.	9549.6956	-0.003151	12886.	2.078E+10	-163.9066	4896.6632	0.000
2.820	0.1713	389332.	8573.7753	-0.003052	13444.	2.078E+10	-182.1644	5998.5918	0.000
3.290	0.1544	438175.	7517.1247	-0.002940	13941.	2.078E+10	-192.5344	7034.9487	0.000
3.760	0.1381	480758.	6421.4978	-0.002815	14375.	2.078E+10	-195.9858	8003.4579	0.000
4.230	0.1226	516961.	5311.3207	-0.002680	14744.	2.078E+10	-197.6941	9094.6086	0.000
4.700	0.1079	546716.	4224.2730	-0.002536	15047.	2.078E+10	-187.7838	9817.3804	0.000
5.170	0.0940	570331.	3167.8429	-0.002384	15288.	2.078E+10	-186.8368	11210.	0.000
5.640	0.0810	587827.	2100.7751	-0.002227	15466.	2.078E+10	-191.5561	13340.	0.000
6.110	0.0689	599051.	1019.6143	-0.002066	15581.	2.078E+10	-191.8343	15708.	0.000
6.580	0.0577	603989.	-75.8913	-0.001902	15631.	2.078E+10	-196.6429	19225.	0.000
7.050	0.0474	602487.	-1187.7694	-0.001739	15616.	2.078E+10	-197.6401	23507.	0.000
7.520	0.0381	594513.	-2293.3011	-0.001576	15534.	2.078E+10	-194.3924	28795.	0.000
7.990	0.0296	580174.	-3367.1806	-0.001417	15388.	2.078E+10	-186.4160	35471.	0.000
8.460	0.0221	559728.	-4381.0131	-0.001262	15180.	2.078E+10	-173.0991	44187.	0.000
8.930	0.0154	533604.	-5233.6494	-0.001114	14914.	2.078E+10	-129.2542	47323.	0.000
9.400	0.009532	503205.	-5835.5587	-0.000973	14604.	2.078E+10	-84.1888	49814.	0.000
9.870	0.004430	469974.	-6188.8202	-0.000841	14265.	2.078E+10	-41.0812	52305.	0.000

EB1\_B-3\_Long. l p7o

10.340	4.711E-05	435292.	-6305.1264	-0.000718	13912.	2.078E+10	-0.1621	19409.	0.000
10.810	-0.003669	400472.	-6268.4535	-0.000605	13557.	2.078E+10	13.1667	20239.	0.000
11.280	-0.006772	365948.	-6159.9800	-0.000501	13206.	2.078E+10	25.2991	21069.	0.000
11.750	-0.009315	332116.	-5986.6378	-0.000406	12861.	2.078E+10	36.1697	21900.	0.000
12.220	-0.0113	299334.	-5755.6529	-0.000320	12527.	2.078E+10	45.7398	22730.	0.000
12.690	-0.0129	267915.	-5474.4022	-0.000243	12207.	2.078E+10	53.9945	23560.	0.000
13.160	-0.0141	238131.	-5150.2888	-0.000174	11903.	2.078E+10	60.9393	24390.	0.000
13.630	-0.0149	210213.	-4790.6358	-0.000114	11619.	2.078E+10	66.5972	25220.	0.000
14.100	-0.0154	184349.	-4466.7276	-6.000E-05	11355.	2.078E+10	48.2638	17707.	0.000
14.570	-0.0156	159963.	-4193.9387	-1.327E-05	11107.	2.078E+10	48.4698	17558.	0.000
15.040	-0.0155	137071.	-3920.7071	2.704E-05	10874.	2.078E+10	48.4208	17594.	0.000
15.510	-0.0153	115677.	-3648.3715	6.135E-05	10656.	2.078E+10	48.1521	17791.	0.000
15.980	-0.0148	95779.	-3378.0931	9.005E-05	10453.	2.078E+10	47.6913	18137.	0.000
16.450	-0.0142	77369.	-3110.8928	0.000114	10265.	2.078E+10	47.0606	18627.	0.000
16.920	-0.0135	60432.	-2847.6780	0.000132	10093.	2.078E+10	46.2780	19263.	0.000
17.390	-0.0128	44949.	-2589.2625	0.000147	9934.8840	2.078E+10	45.3587	20053.	0.000
17.860	-0.0119	30894.	-2336.3823	0.000157	9791.6844	2.078E+10	44.3152	21010.	0.000
18.330	-0.0110	18240.	-2089.7075	0.000164	9662.7515	2.078E+10	43.1582	22153.	0.000
18.800	-0.0101	6953.5975	-1849.8525	0.000167	9547.7497	2.078E+10	41.8968	23508.	0.000
19.270	-0.009105	-3002.5801	-1617.3847	0.000167	9507.4924	2.078E+10	40.5386	25111.	0.000
19.740	-0.008163	-11668.	-1392.8321	0.000165	9595.7884	2.078E+10	39.0900	27009.	0.000
20.210	-0.007238	-19087.	-1176.6902	0.000161	9671.3785	2.078E+10	37.5560	29263.	0.000
20.680	-0.006343	-25305.	-969.4302	0.000155	9734.7367	2.078E+10	35.9404	31956.	0.000
21.150	-0.005487	-30373.	-771.5060	0.000148	9786.3673	2.078E+10	34.2454	35202.	0.000
21.620	-0.004677	-34341.	-583.3646	0.000139	9826.8038	2.078E+10	32.4714	39159.	0.000
22.090	-0.003919	-37266.	-405.4583	0.000129	9856.6088	2.078E+10	30.6160	44056.	0.000
22.560	-0.003219	-39206.	-238.2618	0.000119	9876.3747	2.078E+10	28.6735	50236.	0.000
23.030	-0.002579	-40222.	-82.2990	0.000108	9886.7248	2.078E+10	26.6325	58245.	0.000
23.500	-0.002000	-40378.	61.8153	9.712E-05	9888.3175	2.078E+10	24.4719	69003.	0.000
23.970	-0.001483	-39744.	193.3000	8.625E-05	9881.8527	2.078E+10	22.1538	84234.	0.000
24.440	-0.001027	-38393.	311.0595	7.564E-05	9868.0836	2.078E+10	19.6048	107630.	0.000
24.910	-0.000630	-36406.	413.3363	6.549E-05	9847.8405	2.078E+10	16.6636	149159.	0.000
25.380	-0.000289	-33878.	496.5919	5.595E-05	9822.0831	2.078E+10	12.8597	251333.	0.000
25.850	1.062E-06	-30930.	532.1390	4.716E-05	9792.0519	2.078E+10	-0.2543	1350112.	0.000
26.320	0.000243	-27982.	497.3167	3.916E-05	9762.0068	2.078E+10	-12.0940	280301.	0.000
26.790	0.000443	-25409.	457.2798	3.191E-05	9735.7941	2.078E+10	-2.1035	26793.	0.000
27.260	0.000603	-22896.	443.2653	2.536E-05	9710.1839	2.078E+10	-2.8662	26793.	0.000
27.730	0.000729	-20466.	425.4189	1.947E-05	9685.4312	2.078E+10	-3.4623	26793.	0.000
28.200	0.000823	-18141.	404.6301	1.423E-05	9661.7369	2.078E+10	-3.9096	26793.	0.000
28.670	0.000889	-15934.	381.6905	9.607E-06	9639.2531	2.078E+10	-4.2250	26793.	0.000
29.140	0.000931	-13857.	357.2991	5.564E-06	9618.0889	2.078E+10	-4.4244	26793.	0.000
29.610	0.000952	-11916.	332.0670	2.066E-06	9598.3156	2.078E+10	-4.5231	26793.	0.000
30.080	0.000955	-10116.	306.5226	-9.244E-07	9579.9710	2.078E+10	-4.5352	26793.	0.000
30.550	0.000942	-8456.6885	281.1179	-3.445E-06	9563.0648	2.078E+10	-4.4736	26793.	0.000
31.020	0.000916	-6937.1541	256.2339	-5.535E-06	9547.5821	2.078E+10	-4.3505	26793.	0.000
31.490	0.000879	-5553.8843	232.1862	-7.230E-06	9533.4879	2.078E+10	-4.1770	26793.	0.000
31.960	0.000834	-4301.7832	209.2310	-8.568E-06	9520.7301	2.078E+10	-3.9631	26793.	0.000
32.430	0.000783	-3174.4298	187.5705	-9.582E-06	9509.2434	2.078E+10	-3.7179	26793.	0.000
32.900	0.000726	-2164.3699	167.3581	-1.031E-05	9498.9518	2.078E+10	-3.4496	26793.	0.000
33.370	0.000666	-1263.3785	148.7031	-1.077E-05	9489.7715	2.078E+10	-3.1656	26793.	0.000
33.840	0.000605	-462.6970	131.6759	-1.101E-05	9481.6133	2.078E+10	-2.8724	26793.	0.000
34.310	0.000542	246.7567	116.3120	-1.104E-05	9479.4131	2.078E+10	-2.5758	26793.	0.000
34.780	0.000480	874.1992	102.6157	-1.088E-05	9485.8062	2.078E+10	-2.2810	26793.	0.000
35.250	0.000419	1428.8154	90.5641	-1.057E-05	9491.4572	2.078E+10	-1.9926	26793.	0.000
35.720	0.000361	1919.6104	80.1099	-1.012E-05	9496.4579	2.078E+10	-1.7146	26793.	0.000
36.190	0.000305	2355.2778	71.1844	-9.536E-06	9500.8970	2.078E+10	-1.4505	26793.	0.000
36.660	0.000253	2744.0845	63.7000	-8.844E-06	9504.8586	2.078E+10	-1.2036	26793.	0.000
37.130	0.000206	3093.7665	44.1065	-8.052E-06	9508.4215	2.078E+10	-5.7445	157606.	0.000
37.600	0.000163	3259.7710	15.0996	-7.190E-06	9510.1130	2.078E+10	-4.5417	157606.	0.000
38.070	0.000124	3280.3092	-7.5166	-6.302E-06	9510.3222	2.078E+10	-3.4783	157606.	0.000

EB1\_B-3\_Long.l p7o

38.540	9.144E-05	3189.2008	-24.5310	-5.424E-06	9509.3939	2.078E+10	-2.5552	157606.	0.000
39.010	6.329E-05	3015.8354	-36.7242	-4.582E-06	9507.6275	2.078E+10	-1.7686	157606.	0.000
39.480	3.976E-05	2785.2877	-44.8448	-3.794E-06	9505.2784	2.078E+10	-1.1110	157606.	0.000
39.950	2.049E-05	2518.5455	-49.5927	-3.074E-06	9502.5605	2.078E+10	-0.5726	157606.	0.000
40.420	5.080E-06	2232.8174	-51.6078	-2.429E-06	9499.6492	2.078E+10	-0.1420	157606.	0.000
40.890	-6.913E-06	1941.8902	-51.4633	-1.863E-06	9496.6850	2.078E+10	0.1932	157606.	0.000
41.360	-1.593E-05	1656.5136	-49.6629	-1.374E-06	9493.7772	2.078E+10	0.4453	157606.	0.000
41.830	-2.242E-05	1384.7932	-46.6407	-9.617E-07	9491.0086	2.078E+10	0.6264	157606.	0.000
42.300	-2.678E-05	1132.5756	-42.7637	-6.200E-07	9488.4388	2.078E+10	0.7484	157606.	0.000
42.770	-2.941E-05	903.8173	-38.3355	-3.436E-07	9486.1079	2.078E+10	0.8219	157606.	0.000
43.240	-3.066E-05	700.9260	-33.6019	-1.258E-07	9484.0407	2.078E+10	0.8567	157606.	0.000
43.710	-3.083E-05	525.0716	-28.7564	4.057E-08	9482.2489	2.078E+10	0.8615	157606.	0.000
44.180	-3.020E-05	376.4619	-23.9470	1.629E-07	9480.7347	2.078E+10	0.8439	157606.	0.000
44.650	-2.899E-05	254.5816	-19.2824	2.486E-07	9479.4928	2.078E+10	0.8102	157606.	0.000
45.120	-2.740E-05	158.3951	-14.8388	3.046E-07	9478.5128	2.078E+10	0.7656	157606.	0.000
45.590	-2.556E-05	86.5123	-10.6660	3.379E-07	9477.7804	2.078E+10	0.7142	157606.	0.000
46.060	-2.358E-05	37.3202	-6.7935	3.547E-07	9477.2791	2.078E+10	0.6591	157606.	0.000
46.530	-2.156E-05	9.0810	-3.2363	3.610E-07	9476.9914	2.078E+10	0.6024	157606.	0.000
47.000	-1.951E-05	0.000	0.000	3.622E-07	9476.8989	2.078E+10	0.5453	78803.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 2:

Pile-head deflection = 0.2821074 inches  
 Computed slope at pile head = -0.0033855 radians  
 Maximum bending moment = 603989. inch-lbs  
 Maximum shear force = 12000. lbs  
 Depth of maximum bending moment = 6.5800000 feet below pile head  
 Depth of maximum shear force = 0.0000000 feet below pile head  
 Number of iterations = 16  
 Number of zero deflection points = 3

-----  
 Pile-head Deflection vs. Pile Length for Load Case 2  
 -----

Boundary Condition Type 1, Shear and Moment

Shear = 12000. lb  
 Moment = 0. in-lb  
 Axial Load = 200000. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
47.0000	0.2821074	603989.	12000.
44.6500	0.2820837	604268.	12000.
42.3000	0.2817662	603776.	12000.
39.9500	0.2818442	603855.	12000.
37.6000	0.2819543	603725.	12000.
35.2500	0.2818480	603603.	12000.
32.9000	0.2818699	603249.	12000.
30.5500	0.2823519	603382.	12000.
28.2000	0.2825338	602898.	12000.

25. 8500	0. 2828064	602791.	12000.
23. 5000	0. 2828032	602598.	12000.
21. 1500	0. 2852899	601082.	12000.
18. 8000	0. 3055508	590767.	12000.
16. 4500	0. 3426670	576317.	12000.
14. 1000	0. 3789552	565809.	12000.
11. 7500	0. 6265753	528420.	-12911.

-----  
 Summary of Pile Response(s)  
 -----

Defi ni ti ons of Pile-head Loading Condi ti ons:

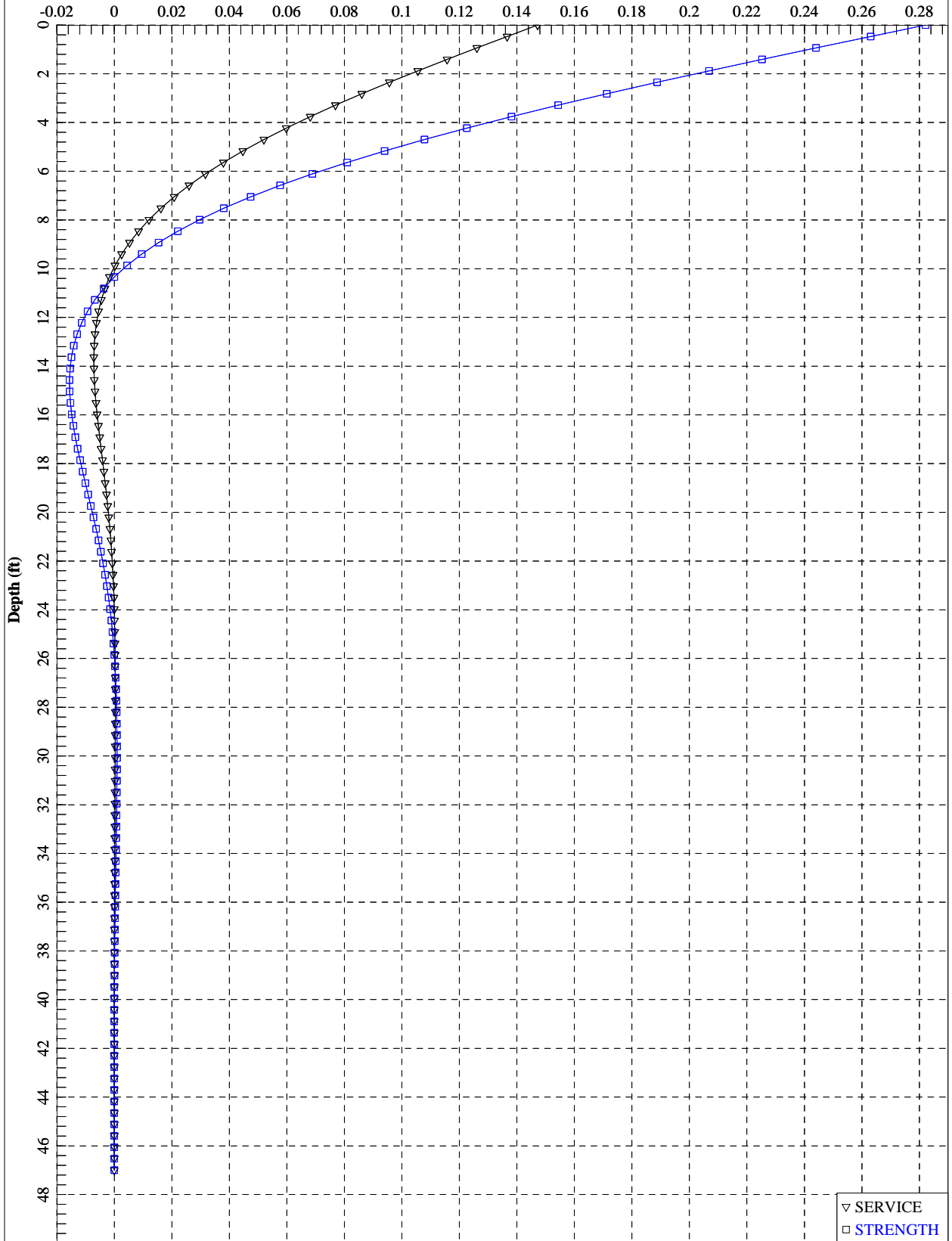
- Load Type 1: Load 1 = Shear, lbs, and Load 2 = Moment, in-lbs
- Load Type 2: Load 1 = Shear, lbs, and Load 2 = Slope, radians
- Load Type 3: Load 1 = Shear, lbs, and Load 2 = Rotational Stiffness, in-lbs/radian
- Load Type 4: Load 1 = Top Deflection, inches, and Load 2 = Moment, in-lbs
- Load Type 5: Load 1 = Top Deflection, inches, and Load 2 = Slope, radians

Load Case No.	Load Type No.	Pile-head Condition 1 V(lbs) or y(inches)	Pile-head Condition 2 in-lb, rad., or in-lb/rad.	Axi al Loading lbs	Pile-head Deflection inches	Maxi mum Moment in Pile in-lbs	Maxi mum Shear in Pile lbs	Pile-head Rotati on radi ans
1	1	V = 8000.0000	M = 0.000	150000.	0.14719568	352448.	8000.0000	-0.00187759
2	1	V = 12000.	M = 0.000	200000.	0.28210739	603989.	12000.	-0.00338552

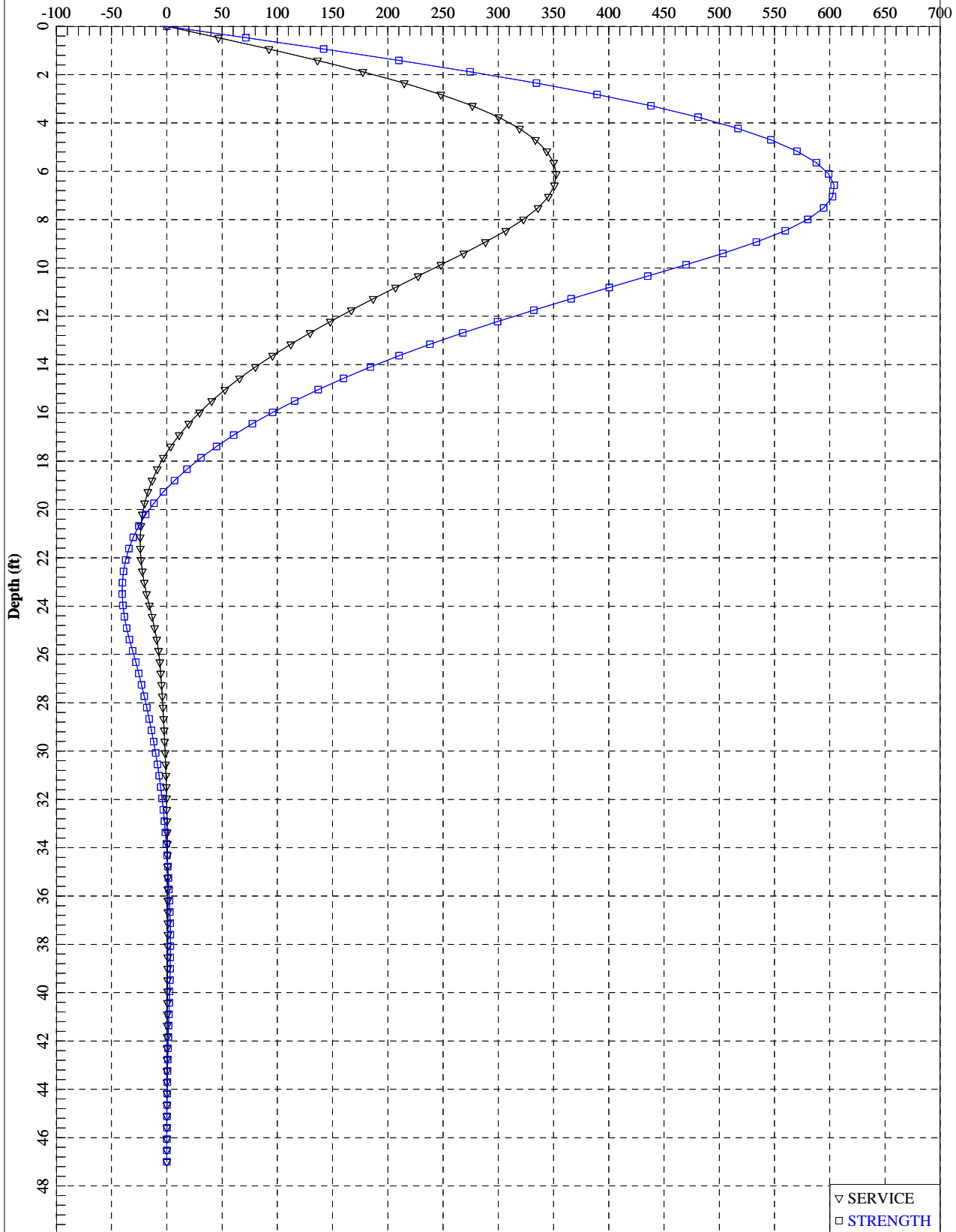
The analysis ended normally.



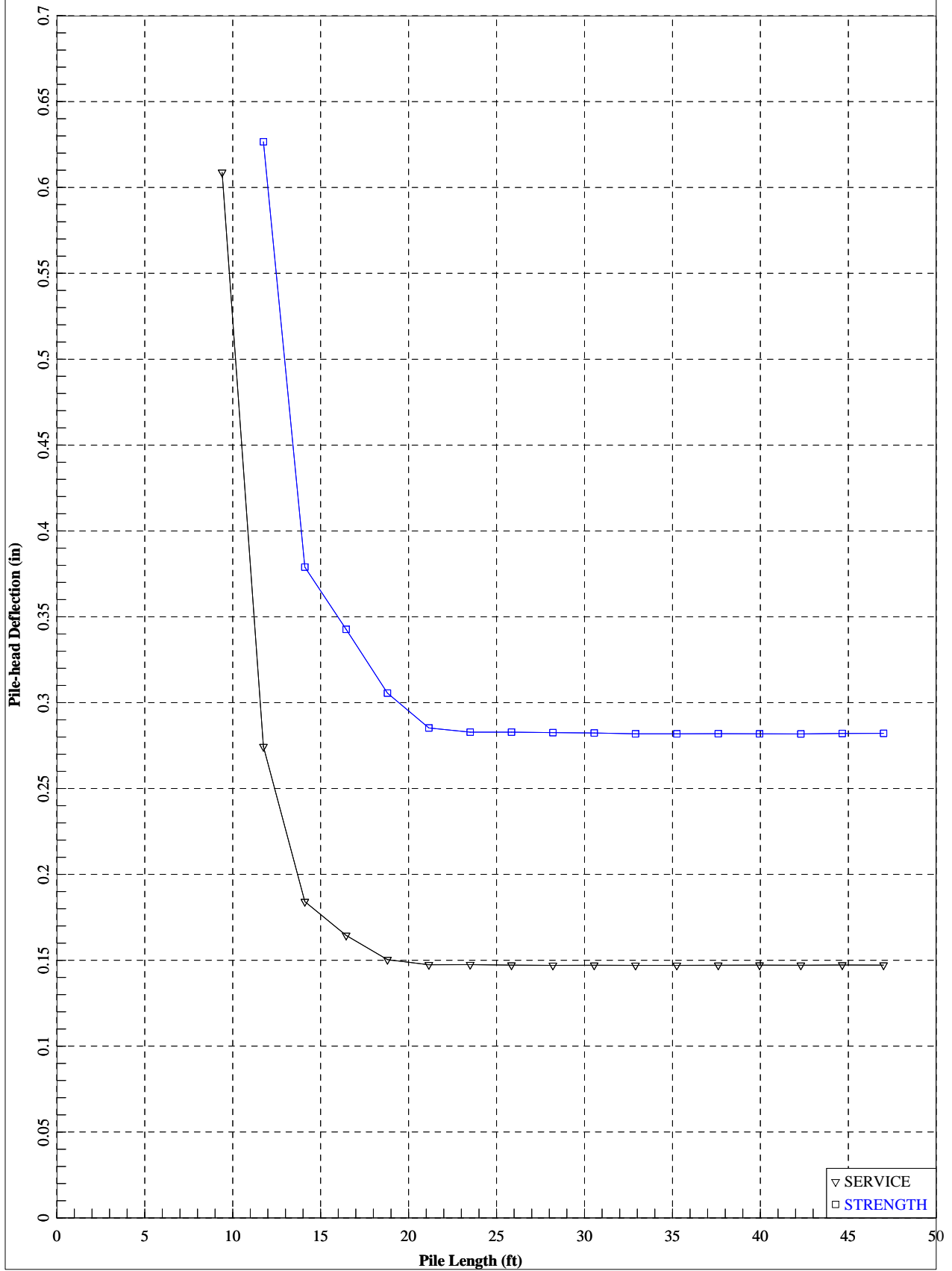
SC 557 Bridge over Crowders Creek - EB1 - HP 14x73 Steel Pile - Longitudinal Analysis  
Lateral Pile Deflection (inches)



SC 557 Bridge over Crowders Creek - EB1 - HP 14x73 Steel Pile - Longitudinal Analysis  
Bending Moment (in-kips)



SC 557 Bridge over Crowders Creek - EB1 - HP 14x73 Steel Pile - Longitudinal Analysis



=====  
LPile Plus for Windows, Version 2013-07.007

Analysis of Individual Piles and Drilled Shafts  
Subjected to Lateral Loading Using the p-y Method

© 1985-2013 by Ensoft, Inc.  
All Rights Reserved

=====  
This copy of LPile is used by:

Bradley Fischer  
F&ME

Serial Number of Security Device: 291490957

This copy of LPile is licensed for exclusive use by: F&ME Consultants, Columbia, Sout

Use of this program by any entity other than F&ME Consultants, Columbia, Sout  
is forbidden by the software license agreement.

-----  
Files Used for Analysis  
-----

Path to file locations: P:\Geotechnical\G4800's\G4843 - SC557 - York County\Report\Final\Bridge\LPile\  
Name of input data file: EB1\_B-3\_Trans.l p7d  
Name of output report file: EB1\_B-3\_Trans.l p7o  
Name of plot output file: EB1\_B-3\_Trans.l p7p  
Name of runtime message file: EB1\_B-3\_Trans.l p7r

-----  
Date and Time of Analysis  
-----

Date: August 3, 2018 Time: 8:50:16

-----  
Problem Title  
-----

Project Name: SC 557 over Crowders Creek

Job Number: G4843

Client: CALYX

Engineer: JFH

Description: EB1 - HP14x73 Steel Pile - Transverse Analysis

-----  
 Program Options and Settings  
 -----

Engineering Units of Input Data and Computations:

- Engineering units are US Customary Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

Computational Options:

- Use unfactored loads in computations (conventional analysis)
- Compute pile response under loading and nonlinear bending properties of pile (only if nonlinear pile properties are input)
- Analysis uses p-y modification factors for p-y curves
- Analysis includes loading by lateral soil movements acting on pile
- Input of shear resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- No p-y curves to be computed and reported for user-specified depths
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1

-----  
 Pile Structural Properties and Geometry  
 -----

- Total number of pile sections = 1
- Total length of pile = 47.00 ft
- Depth of ground surface below top of pile = 0.00 ft

Pile diameter values used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile.

Point	Depth X ft	Pile Diameter in
1	0.00000	13.6000000
2	47.000000	13.6000000

Input Structural Properties:

Pile Section No. 1:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Weak H-Pile
Section Length	=	47.00000 ft
Flange Width	=	14.60000 in
Section Depth	=	13.60000 in
Flange Thickness	=	0.50500 in
Web Thickness	=	0.50500 in
Section Area	=	21.10395 Sq. in
Moment of Inertia	=	261.00000 in^4
Elastic Modulus	=	29000000. lbs/in^2

-----  
 Ground Slope and Pile Batter Angles  
 -----

Ground Slope Angle	=	0.000 degrees
	=	0.000 radians
Pile Batter Angle	=	0.000 degrees
	=	0.000 radians

-----  
 Soil and Rock Layering Information  
 -----

The soil profile is modelled using 6 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer	=	0.0000 ft
Distance from top of pile to bottom of layer	=	10.00000 ft
Effective unit weight at top of layer	=	125.00000 pcf
Effective unit weight at bottom of layer	=	125.00000 pcf
Friction angle at top of layer	=	30.00000 deg.
Friction angle at bottom of layer	=	30.00000 deg.
Subgrade k at top of layer	=	90.00000 pci
Subgrade k at bottom of layer	=	90.00000 pci

Layer 2 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer	=	10.00000 ft
Distance from top of pile to bottom of layer	=	14.00000 ft
Effective unit weight at top of layer	=	105.00000 pcf
Effective unit weight at bottom of layer	=	105.00000 pcf
Friction angle at top of layer	=	28.00000 deg.
Friction angle at bottom of layer	=	28.00000 deg.
Subgrade k at top of layer	=	30.00000 pci
Subgrade k at bottom of layer	=	30.00000 pci

Layer 3 is soft clay, p-y criteria by Matlock, 1970

EB1\_B-3\_Trans.l p7o

Distance from top of pile to top of layer = 14.00000 ft  
 Distance from top of pile to bottom of layer = 26.50000 ft  
 Effective unit weight at top of layer = 43.00000 pcf  
 Effective unit weight at bottom of layer = 43.00000 pcf  
 Undrained cohesion at top of layer = 400.00000 psf  
 Undrained cohesion at bottom of layer = 400.00000 psf  
 Epsilon-50 at top of layer = 0.01500  
 Epsilon-50 at bottom of layer = 0.01500

Layer 4 is Piedmont residual soil

Distance from top of pile to top of layer = 26.50000 ft  
 Distance from top of pile to bottom of layer = 37.00000 ft  
 Effective unit weight at top of layer = 53.00000 pcf  
 Effective unit weight at bottom of layer = 53.00000 pcf  
 The type of field test is the Standard Penetration Test (SPT)  
 SPT N60 at top of layer = 17.00000 blows/ft  
 SPT N60 at bottom of layer = 17.00000 blows/ft

Layer 5 is Piedmont residual soil

Distance from top of pile to top of layer = 37.00000 ft  
 Distance from top of pile to bottom of layer = 56.50000 ft  
 Effective unit weight at top of layer = 68.00000 pcf  
 Effective unit weight at bottom of layer = 68.00000 pcf  
 The type of field test is the Standard Penetration Test (SPT)  
 SPT N60 at top of layer = 100.00000 blows/ft  
 SPT N60 at bottom of layer = 100.00000 blows/ft

Layer 6 is strong rock (vuggy limestone)

Distance from top of pile to top of layer = 56.50000 ft  
 Distance from top of pile to bottom of layer = 80.00000 ft  
 Effective unit weight at top of layer = 103.00000 pcf  
 Effective unit weight at bottom of layer = 103.00000 pcf  
 Uniaxial compressive strength at top of layer = 5000.00000 psi  
 Uniaxial compressive strength at bottom of layer = 5000.00000 psi

(Depth of lowest soil layer extends 33.00 ft below pile tip)

-----  
 Summary of Soil Properties  
 -----

Layer	Layer In-situ Soil Type	Layer In-situ Test Property	Layer Depth ft	Effective Unit Wt. pcf	Undrained Cohesion psf	Angle of Friction deg.	Uni axial qu psi	Strain Factor Epsilon
50	(p-y Curve Criteria) Type	Test Property	ft	pcf	psf	deg.	psi	Epsilon
1	Sand (Reese, et al.)	--	0.00	125.000	--	30.000	--	--
	90.000	--						

				EB1_B-3_Trans. I p7o					
	90.000	--	--	10.000	125.000	--	30.000	--	--
2	Sand (Reese, et al.)	--	--	10.000	105.000	--	28.000	--	--
	30.000	--	--	14.000	105.000	--	28.000	--	--
3	Soft Clay	--	--	14.000	43.000	400.000	--	--	--
0.01500	--	--	--	26.500	43.000	400.000	--	--	--
0.01500	--	--	--	26.500	53.000	--	--	--	--
4	Piedmont Residual SPT	--	17.000	37.000	53.000	--	--	--	--
	--	SPT	17.000	37.000	68.000	--	--	--	--
5	Piedmont Residual SPT	--	100.000	56.500	68.000	--	--	--	--
	--	SPT	100.000	56.500	103.000	--	--	5000.000	--
6	Vuggy Limestone	--	--	80.000	103.000	--	--	5000.000	--
	--	--	--						

-----  
p-y Modification Factors for Group Action  
-----

Distribution of p-y modifiers with depth defined using 2 points

Point No.	Depth X ft	p-mult	y-mult
1	0.000	0.9900	1.0000
2	100.000	0.9900	1.0000

-----  
Lateral Soil Movements  
-----

Profile of soil movement with depth defined using 2 points

Point No.	Depth X ft	Soil Movement in
1	0.00000	0.00000
2	0.00000	0.00000

-----  
Loading Type  
-----

Static loading criteria were used when computing p-y curves for all analyses.



-----  
Pile-head Loading and Pile-head Fixity Conditions  
-----

Number of Loads specified = 2

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length
1	2	V = 1600.00000 lbs	S = 0.0000 in/in	150000.	Yes
2	2	V = 2000.00000 lbs	S = 0.0000 in/in	200000.	Yes

V = perpendicular shear force applied to pile head  
M = bending moment applied to pile head  
y = lateral deflection relative to pile axis  
S = pile slope relative to original pile batter angle  
R = rotational stiffness applied to pile head  
Axial thrust is assumed to be acting axially for all pile batter angles.

-----  
Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness  
-----

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

-----  
Moment-curvature properties were derived from elastic section properties

-----  
Computed Values of Pile Loading and Deflection  
for Lateral Loading for Load Case Number 1  
-----

Pile-head conditions are Shear and Pile-head Rotation (Loading Type 2)

Shear force at pile head = 1600.0 lbs  
Rotation of pile head = 0.000E+00 radians  
Axial load at pile head = 150000.0 lbs

(Zero slope for this load indicates fixed-head conditions)

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi *	Bending Stiffness lb-in <sup>2</sup>	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.0114	-57850.	1600.0000	0.000	8614.8648	7.569E+09	0.000	0.000	0.000
0.470	0.0113	-48807.	1584.0286	-3.974E-05	8379.2817	7.569E+09	-5.6636	2834.2354	0.000
0.940	0.0109	-39914.	1537.0402	-7.279E-05	8147.5908	7.569E+09	-10.9989	5668.4707	0.000
1.410	0.0104	-31346.	1461.5998	-9.934E-05	7924.3597	7.569E+09	-15.7530	8502.7061	0.000
1.880	0.009823	-23260.	1361.4944	-0.000120	7713.6691	7.569E+09	-19.7454	11337.	0.000
2.350	0.009099	-15786.	1241.3394	-0.000134	7518.9607	7.569E+09	-22.8628	14171.	0.000
2.820	0.008309	-9030.0805	1106.2179	-0.000143	7342.9406	7.569E+09	-25.0526	17005.	0.000

EB1\_B-3\_Trans. I p7o

3.290	0.007481	-3065.2380	961.3620	-0.000148	7187.5348	7.569E+09	-26.3147	19840.	0.000
3.760	0.006640	2064.4762	811.8813	-0.000148	7161.4613	7.569E+09	-26.6926	22674.	0.000
4.230	0.005807	6343.8069	662.5422	-0.000145	7272.9534	7.569E+09	-26.2645	25508.	0.000
4.700	0.005001	9783.6763	517.5995	-0.000139	7362.5745	7.569E+09	-25.1337	28342.	0.000
5.170	0.004237	12418.	380.6773	-0.000131	7431.2053	7.569E+09	-23.4203	31177.	0.000
5.640	0.003524	14299.	254.6980	-0.000121	7480.2224	7.569E+09	-21.2532	34011.	0.000
6.110	0.002872	15496.	141.8533	-0.000110	7511.3909	7.569E+09	-18.7626	36845.	0.000
6.580	0.002285	16085.	43.6125	-9.813E-05	7526.7553	7.569E+09	-16.0746	39679.	0.000
7.050	0.001765	16154.	-39.2403	-8.611E-05	7528.5336	7.569E+09	-13.3059	42514.	0.000
7.520	0.001313	15788.	-106.5442	-7.421E-05	7519.0193	7.569E+09	-10.5608	45348.	0.000
7.990	0.000928	15077.	-158.6838	-6.271E-05	7500.4934	7.569E+09	-7.9285	48182.	0.000
8.460	0.000606	14105.	-196.5014	-5.184E-05	7475.1491	7.569E+09	-5.4820	51016.	0.000
8.930	0.000343	12949.	-221.2043	-4.176E-05	7445.0299	7.569E+09	-3.2779	53850.	0.000
9.400	0.000135	11680.	-234.2735	-3.259E-05	7411.9814	7.569E+09	-1.3566	56685.	0.000
9.870	-2.427E-05	10361.	-237.3770	-2.437E-05	7377.6169	7.569E+09	0.2561	59519.	0.000
10.340	-0.000140	9043.6588	-235.1099	-1.714E-05	7343.2944	7.569E+09	0.5479	22077.	0.000
10.810	-0.000218	7738.0069	-231.0595	-1.089E-05	7309.2774	7.569E+09	0.8884	23022.	0.000
11.280	-0.000263	6455.7378	-225.4045	-5.604E-06	7275.8696	7.569E+09	1.1169	23966.	0.000
11.750	-0.000281	5204.9258	-218.7566	-1.260E-06	7243.2814	7.569E+09	1.2406	24911.	0.000
12.220	-0.000277	3990.2945	-211.6767	2.166E-06	7211.6359	7.569E+09	1.2700	25856.	0.000
12.690	-0.000256	2813.5473	-204.6589	4.701E-06	7180.9773	7.569E+09	1.2185	26801.	0.000
13.160	-0.000224	1673.7880	-198.1150	6.373E-06	7151.2824	7.569E+09	1.1020	27745.	0.000
13.630	-0.000185	568.0273	-192.3600	7.208E-06	7122.4733	7.569E+09	0.9388	28690.	0.000
14.100	-0.000143	-508.2296	-158.4970	7.231E-06	7120.9154	7.569E+09	11.0694	437502.	0.000
14.570	-0.000103	-1232.0525	-99.1855	6.582E-06	7139.7736	7.569E+09	9.9630	545616.	0.000
15.040	-6.845E-05	-1638.1786	-46.4074	5.513E-06	7150.3547	7.569E+09	8.7526	721148.	0.000
15.510	-4.080E-05	-1764.8556	-0.6470	4.245E-06	7153.6551	7.569E+09	7.4745	1033166.	0.000
15.980	-2.057E-05	-1652.6587	37.8847	2.972E-06	7150.7319	7.569E+09	6.1892	1696978.	0.000
16.450	-7.283E-06	-1342.5444	60.2545	1.856E-06	7142.6523	7.569E+09	1.7434	1350112.	0.000
16.920	3.624E-07	-976.1283	64.9260	9.918E-07	7133.1059	7.569E+09	-0.0868	1350112.	0.000
17.390	3.905E-06	-611.8568	57.8085	4.002E-07	7123.6153	7.569E+09	-2.4372	3519758.	0.000
17.860	4.877E-06	-324.7257	43.0686	5.127E-08	7116.1344	7.569E+09	-2.7897	3226310.	0.000
18.330	4.484E-06	-126.1302	27.6355	-1.167E-07	7110.9603	7.569E+09	-2.6830	3374980.	0.000
18.800	3.560E-06	-12.7998	13.2631	-1.685E-07	7108.0076	7.569E+09	-2.4136	3823473.	0.000
19.270	2.583E-06	23.7630	4.7130	-1.644E-07	7108.2933	7.569E+09	-0.6184	1350112.	0.000
19.740	1.706E-06	40.6405	1.8175	-1.404E-07	7108.7330	7.569E+09	-0.4084	1350112.	0.000
20.210	9.996E-07	44.5018	-0.008931	-1.087E-07	7108.8336	7.569E+09	-0.2393	1350112.	0.000
20.680	4.802E-07	40.7236	-1.0079	-7.692E-08	7108.7352	7.569E+09	-0.1149	1350112.	0.000
21.150	1.319E-07	33.2633	-1.4211	-4.935E-08	7108.5408	7.569E+09	-0.0316	1350112.	0.000
21.620	-7.652E-08	24.7774	-1.4585	-2.773E-08	7108.3197	7.569E+09	0.0183	1350112.	0.000
22.090	-1.808E-07	16.8585	-1.2848	-1.222E-08	7108.1134	7.569E+09	0.0433	1350112.	0.000
22.560	-2.143E-07	10.3060	-1.0180	-2.096E-09	7107.9427	7.569E+09	0.0513	1350112.	0.000
23.030	-2.045E-07	5.3790	-0.7353	3.748E-09	7107.8143	7.569E+09	0.0490	1350112.	0.000
23.500	-1.720E-07	2.0057	-0.4811	6.499E-09	7107.7264	7.569E+09	0.0412	1350112.	0.000
23.970	-1.312E-07	-0.0588	-0.2764	7.225E-09	7107.6757	7.569E+09	0.0314	1350112.	0.000
24.440	-9.055E-08	-1.1244	-0.1267	6.784E-09	7107.7035	7.569E+09	0.0217	1350112.	0.000
24.910	-5.465E-08	-1.4998	-0.0287	5.806E-09	7107.7132	7.569E+09	0.0131	1350112.	0.000
25.380	-2.506E-08	-1.4581	0.0251	4.704E-09	7107.7121	7.569E+09	0.005999	1350112.	0.000
25.850	-1.595E-09	-1.2246	0.0431	3.704E-09	7107.7061	7.569E+09	0.000382	1350112.	0.000
26.320	1.672E-08	-0.9782	0.0329	2.884E-09	7107.6996	7.569E+09	-0.004004	1350112.	0.000
26.790	3.093E-08	-0.8586	0.0212	2.199E-09	7107.6965	7.569E+09	-0.000156	28400.	0.000
27.260	4.153E-08	-0.7433	0.0201	1.602E-09	7107.6935	7.569E+09	-0.000209	28400.	0.000
27.730	4.901E-08	-0.6343	0.0188	1.089E-09	7107.6907	7.569E+09	-0.000247	28400.	0.000
28.200	5.382E-08	-0.5327	0.0174	6.544E-10	7107.6880	7.569E+09	-0.000271	28400.	0.000
28.670	5.639E-08	-0.4394	0.0158	2.923E-10	7107.6856	7.569E+09	-0.000284	28400.	0.000
29.140	5.712E-08	-0.3548	0.0142	-3.601E-12	7107.6834	7.569E+09	-0.000288	28400.	0.000
29.610	5.635E-08	-0.2791	0.0126	-2.398E-10	7107.6814	7.569E+09	-0.000284	28400.	0.000
30.080	5.441E-08	-0.2124	0.0110	-4.229E-10	7107.6797	7.569E+09	-0.000274	28400.	0.000
30.550	5.158E-08	-0.1541	0.009513	-5.595E-10	7107.6782	7.569E+09	-0.000260	28400.	0.000
31.020	4.810E-08	-0.1041	0.008098	-6.557E-10	7107.6769	7.569E+09	-0.000242	28400.	0.000

EB1\_B-3\_Trans.l p7o

31.490	4.418E-08	-0.0617	0.006787	-7.174E-10	7107.6758	7.569E+09	-0.000222	28400.	0.000
31.960	4.001E-08	-0.0263	0.005592	-7.502E-10	7107.6748	7.569E+09	-0.000201	28400.	0.000
32.430	3.572E-08	0.002650	0.004516	-7.591E-10	7107.6742	7.569E+09	-0.000180	28400.	0.000
32.900	3.145E-08	0.0259	0.003563	-7.484E-10	7107.6748	7.569E+09	-0.000158	28400.	0.000
33.370	2.728E-08	0.0441	0.002729	-7.223E-10	7107.6753	7.569E+09	-0.000137	28400.	0.000
33.840	2.330E-08	0.0579	0.002010	-6.843E-10	7107.6757	7.569E+09	-0.000117	28400.	0.000
34.310	1.956E-08	0.0679	0.001402	-6.374E-10	7107.6759	7.569E+09	-9.849E-05	28400.	0.000
34.780	1.611E-08	0.0748	0.000895	-5.843E-10	7107.6761	7.569E+09	-8.111E-05	28400.	0.000
35.250	1.297E-08	0.0790	0.000482	-5.270E-10	7107.6762	7.569E+09	-6.531E-05	28400.	0.000
35.720	1.016E-08	0.0811	0.000154	-4.673E-10	7107.6763	7.569E+09	-5.118E-05	28400.	0.000
36.190	7.698E-09	0.0816	-9.962E-05	-4.067E-10	7107.6763	7.569E+09	-3.876E-05	28400.	0.000
36.660	5.576E-09	0.0807	-0.000288	-3.462E-10	7107.6763	7.569E+09	-2.808E-05	28400.	0.000
37.130	3.793E-09	0.0789	-0.000684	-2.868E-10	7107.6762	7.569E+09	-0.000112	167061.	0.000
37.600	2.341E-09	0.0735	-0.001196	-2.300E-10	7107.6761	7.569E+09	-6.934E-05	167061.	0.000
38.070	1.198E-09	0.0658	-0.001492	-1.781E-10	7107.6759	7.569E+09	-3.549E-05	167061.	0.000
38.540	3.317E-10	0.0569	-0.001620	-1.324E-10	7107.6756	7.569E+09	-9.825E-06	167061.	0.000
39.010	-2.955E-10	0.0477	-0.001623	-9.341E-11	7107.6754	7.569E+09	8.752E-06	167061.	0.000
39.480	-7.220E-10	0.0388	-0.001538	-6.118E-11	7107.6752	7.569E+09	2.139E-05	167061.	0.000
39.950	-9.856E-10	0.0305	-0.001395	-3.537E-11	7107.6750	7.569E+09	2.919E-05	167061.	0.000
40.420	-1.121E-09	0.0231	-0.001219	-1.540E-11	7107.6748	7.569E+09	3.320E-05	167061.	0.000
40.890	-1.159E-09	0.0168	-0.001029	0.000	7107.6746	7.569E+09	3.434E-05	167061.	0.000
41.360	-1.127E-09	0.0115	-0.000838	9.985E-12	7107.6745	7.569E+09	3.339E-05	167061.	0.000
41.830	-1.047E-09	0.007296	-0.000656	1.699E-11	7107.6743	7.569E+09	3.100E-05	167061.	0.000
42.300	-9.355E-10	0.004071	-0.000491	2.122E-11	7107.6743	7.569E+09	2.771E-05	167061.	0.000
42.770	-8.073E-10	0.001725	-0.000345	2.338E-11	7107.6742	7.569E+09	2.391E-05	167061.	0.000
43.240	-6.718E-10	0.000138	-0.000222	2.408E-11	7107.6742	7.569E+09	1.990E-05	167061.	0.000
43.710	-5.357E-10	-0.000815	-0.000121	2.382E-11	7107.6742	7.569E+09	1.587E-05	167061.	0.000
44.180	-4.030E-10	-0.001264	-4.230E-05	2.305E-11	7107.6742	7.569E+09	1.194E-05	167061.	0.000
44.650	-2.757E-10	-0.001332	1.439E-05	2.208E-11	7107.6742	7.569E+09	8.166E-06	167061.	0.000
45.120	-1.539E-10	-0.001139	5.028E-05	2.116E-11	7107.6742	7.569E+09	4.560E-06	167061.	0.000
45.590	-3.698E-11	-0.000800	6.622E-05	2.044E-11	7107.6742	7.569E+09	1.095E-06	167061.	0.000
46.060	7.662E-11	-0.000426	6.291E-05	1.998E-11	7107.6742	7.569E+09	-2.269E-06	167061.	0.000
46.530	1.884E-10	-0.000125	4.077E-05	1.978E-11	7107.6742	7.569E+09	-5.581E-06	167061.	0.000
47.000	2.997E-10	0.000	0.000	1.973E-11	7107.6742	7.569E+09	-8.877E-06	83531.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 1:

Pile-head deflection = 0.0113919 inches  
 Computed slope at pile head = 0.000000 radians  
 Maximum bending moment = -57850. inch-lbs  
 Maximum shear force = 1600.000000 lbs  
 Depth of maximum bending moment = 0.000000 feet below pile head  
 Depth of maximum shear force = 0.000000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 6

-----  
 Pile-head Deflection vs. Pile Length for Load Case 1  
 -----

Boundary Condition Type 2, Shear and Slope

Shear = 1600. lb  
 Slope = 0.00000  
 Axial Load = 150000. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment In-lbs	Maximum Shear lbs
47.0000	0.0113919	-57850.	1600.0000000
44.6500	0.0113898	-57857.	1600.0000000
42.3000	0.0113864	-57859.	1600.0000000
39.9500	0.0113813	-57848.	1600.0000000
37.6000	0.0113748	-57841.	1600.0000000
35.2500	0.0113669	-57821.	1600.0000000
32.9000	0.0113637	-57820.	1600.0000000
30.5500	0.0113581	-57811.	1600.0000000
28.2000	0.0113555	-57809.	1600.0000000
25.8500	0.0113546	-57814.	1600.0000000
23.5000	0.0113494	-57803.	1600.0000000
21.1500	0.0113481	-57804.	1600.0000000
18.8000	0.0113446	-57797.	1600.0000000
16.4500	0.0113561	-57856.	1600.0000000
14.1000	0.0115088	-57904.	1600.0000000
11.7500	0.0119841	-58503.	1600.0000000
9.4000	0.0127641	-60864.	1600.0000000
7.0500	0.0135656	-66931.	1600.0000000
4.7000	0.0150333	-57703.	1600.0000000
2.3500	0.0458951	-30134.	1599.9999991

-----  
 Computed Values of Pile Loading and Deflection  
 for Lateral Loading for Load Case Number 2  
 -----

Pile-head conditions are Shear and Pile-head Rotation (Loading Type 2)

Shear force at pile head = 2000.0 lbs  
 Rotation of pile head = 0.000E+00 radians  
 Axial load at pile head = 200000.0 lbs

(Zero slope for this load indicates fixed-head conditions)

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi *	Bending Stiffness lb-in^2	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.0143	-72572.	2000.0000	0.000	11368.	7.569E+09	0.000	0.000	0.000
0.470	0.0141	-61262.	1979.9574	-4.986E-05	11073.	7.569E+09	-7.1073	2834.2354	0.000
0.940	0.0137	-50126.	1920.9914	-9.136E-05	10783.	7.569E+09	-13.8026	5668.4707	0.000
1.410	0.0131	-39387.	1826.3214	-0.000125	10503.	7.569E+09	-19.7683	8502.7061	0.000
1.880	0.0123	-29243.	1700.7022	-0.000150	10239.	7.569E+09	-24.7775	11337.	0.000
2.350	0.0114	-19864.	1549.9300	-0.000169	9994.4192	7.569E+09	-28.6878	14171.	0.000
2.820	0.0104	-11380.	1380.3899	-0.000180	9773.3845	7.569E+09	-31.4328	17005.	0.000
3.290	0.009385	-3886.2799	1198.6555	-0.000186	9578.1506	7.569E+09	-33.0120	19840.	0.000
3.760	0.008328	2560.4225	1011.1480	-0.000186	9543.6072	7.569E+09	-33.4800	22674.	0.000
4.230	0.007282	7939.9879	823.8589	-0.000182	9683.7645	7.569E+09	-32.9346	25508.	0.000
4.700	0.006269	12265.	642.1372	-0.000175	9796.4531	7.569E+09	-31.5057	28342.	0.000
5.170	0.005308	15578.	470.5407	-0.000165	9882.7626	7.569E+09	-29.3441	31177.	0.000
5.640	0.004413	17944.	312.7460	-0.000152	9944.4118	7.569E+09	-26.6114	34011.	0.000
6.110	0.003593	19449.	171.5125	-0.000138	9983.6138	7.569E+09	-23.4714	36845.	0.000
6.580	0.002854	20191.	48.6917	-0.000123	10003.	7.569E+09	-20.0821	39679.	0.000

EB1\_B-3\_Trans. I p7o

7.050	0.002201	20277.	-54.7245	-0.000108	10005.	7.569E+09	-16.5903	42514.	0.000
7.520	0.001633	19818.	-138.5270	-9.338E-05	9993.2217	7.569E+09	-13.1269	45348.	0.000
7.990	0.001148	18925.	-203.1913	-7.895E-05	9969.9541	7.569E+09	-9.8037	48182.	0.000
8.460	0.000742	17704.	-249.7673	-6.530E-05	9938.1471	7.569E+09	-6.7126	51016.	0.000
8.930	0.000411	16255.	-279.7630	-5.265E-05	9900.3894	7.569E+09	-3.9242	53850.	0.000
9.400	0.000148	14667.	-295.0300	-4.113E-05	9859.0235	7.569E+09	-1.4897	56685.	0.000
9.870	-5.293E-05	13019.	-297.6559	-3.081E-05	9816.1018	7.569E+09	0.5585	59519.	0.000
10.340	-0.000199	11379.	-293.8803	-2.172E-05	9773.3579	7.569E+09	0.7803	22077.	0.000
10.810	-0.000298	9753.4441	-288.2500	-1.385E-05	9731.0116	7.569E+09	1.2162	23022.	0.000
11.280	-0.000356	8158.5809	-280.5594	-7.176E-06	9689.4596	7.569E+09	1.5110	23966.	0.000
11.750	-0.000379	6604.9234	-271.5790	-1.676E-06	9648.9812	7.569E+09	1.6736	24911.	0.000
12.220	-0.000374	5098.9497	-262.0184	2.685E-06	9609.7451	7.569E+09	1.7167	25856.	0.000
12.690	-0.000349	3643.2988	-252.5056	5.942E-06	9571.8201	7.569E+09	1.6566	26801.	0.000
13.160	-0.000307	2237.2809	-243.5689	8.133E-06	9535.1882	7.569E+09	1.5125	27745.	0.000
13.630	-0.000257	877.4931	-235.6189	9.294E-06	9499.7608	7.569E+09	1.3067	28690.	0.000
14.100	-0.000203	-441.4664	-196.8102	9.456E-06	9488.4007	7.569E+09	12.4553	346700.	0.000
14.570	-0.000150	-1363.8581	-129.8362	8.783E-06	9512.4323	7.569E+09	11.2944	424064.	0.000
15.040	-0.000104	-1925.8336	-69.7718	7.558E-06	9527.0738	7.569E+09	10.0050	544982.	0.000
15.510	-6.496E-05	-2167.9341	-17.2965	6.032E-06	9533.3814	7.569E+09	8.6032	746920.	0.000
15.980	-3.550E-05	-2134.5473	26.9599	4.429E-06	9532.5116	7.569E+09	7.0905	1126642.	0.000
16.450	-1.500E-05	-1873.8196	62.2721	2.936E-06	9525.7187	7.569E+09	5.4315	2042486.	0.000
16.920	-2.376E-06	-1438.7421	79.1931	1.702E-06	9514.3833	7.569E+09	0.5688	1350112.	0.000
17.390	4.199E-06	-984.3612	77.9624	7.991E-07	9502.5451	7.569E+09	-1.0053	1350112.	0.000
17.860	6.638E-06	-561.1296	64.5105	2.233E-07	9491.5183	7.569E+09	-3.7649	3198837.	0.000
18.330	6.719E-06	-257.1870	43.2997	-8.155E-08	9483.5995	7.569E+09	-3.7566	3153530.	0.000
18.800	5.718E-06	-72.5245	22.8817	-2.044E-07	9478.7884	7.569E+09	-3.4838	3436166.	0.000
19.270	4.413E-06	1.3799	10.0783	-2.309E-07	9476.9348	7.569E+09	-1.0564	1350112.	0.000
19.740	3.114E-06	41.6791	4.9972	-2.149E-07	9477.9848	7.569E+09	-0.7454	1350112.	0.000
20.210	1.990E-06	58.2335	1.5523	-1.776E-07	9478.4161	7.569E+09	-0.4763	1350112.	0.000
20.680	1.110E-06	59.5894	-0.5401	-1.337E-07	9478.4514	7.569E+09	-0.2657	1350112.	0.000
21.150	4.810E-07	52.4423	-1.6142	-9.199E-08	9478.2652	7.569E+09	-0.1152	1350112.	0.000
21.620	7.242E-08	41.5882	-1.9879	-5.696E-08	9477.9824	7.569E+09	-0.0173	1350112.	0.000
22.090	-1.614E-07	30.1477	-1.9278	-3.023E-08	9477.6843	7.569E+09	0.0386	1350112.	0.000
22.560	-2.686E-07	19.9112	-1.6375	-1.158E-08	9477.4176	7.569E+09	0.0643	1350112.	0.000
23.030	-2.921E-07	11.7032	-1.2590	1.982E-10	9477.2038	7.569E+09	0.0699	1350112.	0.000
23.500	-2.664E-07	5.7092	-0.8820	6.686E-09	9477.0476	7.569E+09	0.0638	1350112.	0.000
23.970	-2.167E-07	1.7387	-0.5560	9.460E-09	9476.9442	7.569E+09	0.0519	1350112.	0.000
24.440	-1.596E-07	-0.5835	-0.3020	9.891E-09	9476.9141	7.569E+09	0.0382	1350112.	0.000
24.910	-1.051E-07	-1.6897	-0.1233	9.044E-09	9476.9429	7.569E+09	0.0252	1350112.	0.000
25.380	-5.763E-08	-1.9943	-0.0134	7.671E-09	9476.9508	7.569E+09	0.0138	1350112.	0.000
25.850	-1.855E-08	-1.8583	0.0380	6.236E-09	9476.9473	7.569E+09	0.004440	1350112.	0.000
26.320	1.272E-08	-1.5796	0.0419	4.955E-09	9476.9400	7.569E+09	-0.003044	1350112.	0.000
26.790	3.734E-08	-1.3964	0.0328	3.846E-09	9476.9353	7.569E+09	-0.000188	28400.	0.000
27.260	5.610E-08	-1.2180	0.0315	2.872E-09	9476.9306	7.569E+09	-0.000283	28400.	0.000
27.730	6.974E-08	-1.0476	0.0297	2.028E-09	9476.9262	7.569E+09	-0.000351	28400.	0.000
28.200	7.898E-08	-0.8874	0.0276	1.307E-09	9476.9220	7.569E+09	-0.000398	28400.	0.000
28.670	8.449E-08	-0.7392	0.0253	7.012E-10	9476.9181	7.569E+09	-0.000425	28400.	0.000
29.140	8.689E-08	-0.6038	0.0228	2.009E-10	9476.9146	7.569E+09	-0.000438	28400.	0.000
29.610	8.675E-08	-0.4819	0.0204	-2.036E-10	9476.9114	7.569E+09	-0.000437	28400.	0.000
30.080	8.459E-08	-0.3735	0.0179	-5.223E-10	9476.9086	7.569E+09	-0.000426	28400.	0.000
30.550	8.086E-08	-0.2783	0.0156	-7.651E-10	9476.9061	7.569E+09	-0.000407	28400.	0.000
31.020	7.596E-08	-0.1958	0.0134	-9.418E-10	9476.9040	7.569E+09	-0.000383	28400.	0.000
31.490	7.024E-08	-0.1253	0.0113	-1.061E-09	9476.9021	7.569E+09	-0.000354	28400.	0.000
31.960	6.399E-08	-0.0660	0.009389	-1.133E-09	9476.9006	7.569E+09	-0.000322	28400.	0.000
32.430	5.746E-08	-0.0168	0.007665	-1.164E-09	9476.8993	7.569E+09	-0.000289	28400.	0.000
32.900	5.087E-08	0.0231	0.006126	-1.161E-09	9476.8995	7.569E+09	-0.000256	28400.	0.000
33.370	4.436E-08	0.0549	0.004774	-1.132E-09	9476.9003	7.569E+09	-0.000223	28400.	0.000
33.840	3.809E-08	0.0795	0.003603	-1.082E-09	9476.9009	7.569E+09	-0.000192	28400.	0.000
34.310	3.216E-08	0.0980	0.002606	-1.016E-09	9476.9014	7.569E+09	-0.000162	28400.	0.000
34.780	2.663E-08	0.1112	0.001771	-9.381E-10	9476.9018	7.569E+09	-0.000134	28400.	0.000

EB1\_B-3\_Trans.l p7o

35.250	2.158E-08	0.1200	0.001086	-8.519E-10	9476.9020	7.569E+09	-0.000109	28400.	0.000
35.720	1.702E-08	0.1254	0.000538	-7.605E-10	9476.9021	7.569E+09	-8.573E-05	28400.	0.000
36.190	1.300E-08	0.1278	0.000112	-6.661E-10	9476.9022	7.569E+09	-6.546E-05	28400.	0.000
36.660	9.511E-09	0.1281	-0.000208	-5.708E-10	9476.9022	7.569E+09	-4.789E-05	28400.	0.000
37.130	6.561E-09	0.1268	-0.000891	-4.758E-10	9476.9022	7.569E+09	-0.000194	167061.	0.000
37.600	4.143E-09	0.1191	-0.001785	-3.842E-10	9476.9020	7.569E+09	-0.000123	167061.	0.000
38.070	2.227E-09	0.1075	-0.002317	-2.998E-10	9476.9017	7.569E+09	-6.596E-05	167061.	0.000
38.540	7.620E-10	0.0937	-0.002567	-2.248E-10	9476.9013	7.569E+09	-2.257E-05	167061.	0.000
39.010	-3.091E-10	0.0791	-0.002605	-1.605E-10	9476.9009	7.569E+09	9.155E-06	167061.	0.000
39.480	-1.048E-09	0.0647	-0.002492	-1.069E-10	9476.9006	7.569E+09	3.104E-05	167061.	0.000
39.950	-1.515E-09	0.0512	-0.002277	-6.376E-11	9476.9002	7.569E+09	4.488E-05	167061.	0.000
40.420	-1.767E-09	0.0391	-0.002003	-3.011E-11	9476.8999	7.569E+09	5.234E-05	167061.	0.000
40.890	-1.855E-09	0.0287	-0.001701	-4.865E-12	9476.8996	7.569E+09	5.494E-05	167061.	0.000
41.360	-1.822E-09	0.0199	-0.001394	1.324E-11	9476.8994	7.569E+09	5.397E-05	167061.	0.000
41.830	-1.705E-09	0.0129	-0.001099	2.548E-11	9476.8992	7.569E+09	5.052E-05	167061.	0.000
42.300	-1.535E-09	0.007481	-0.000828	3.307E-11	9476.8991	7.569E+09	4.546E-05	167061.	0.000
42.770	-1.332E-09	0.003492	-0.000589	3.716E-11	9476.8990	7.569E+09	3.946E-05	167061.	0.000
43.240	-1.115E-09	0.000755	-0.000384	3.874E-11	9476.8989	7.569E+09	3.304E-05	167061.	0.000
43.710	-8.953E-10	-0.000932	-0.000216	3.868E-11	9476.8989	7.569E+09	2.652E-05	167061.	0.000
44.180	-6.791E-10	-0.001774	-8.495E-05	3.767E-11	9476.8989	7.569E+09	2.012E-05	167061.	0.000
44.650	-4.704E-10	-0.001975	1.106E-05	3.627E-11	9476.8989	7.569E+09	1.393E-05	167061.	0.000
45.120	-2.699E-10	-0.001731	7.290E-05	3.489E-11	9476.8989	7.569E+09	7.995E-06	167061.	0.000
45.590	-7.676E-11	-0.001232	0.000102	3.379E-11	9476.8989	7.569E+09	2.274E-06	167061.	0.000
46.060	1.112E-10	-0.000658	9.898E-05	3.308E-11	9476.8989	7.569E+09	-3.294E-06	167061.	0.000
46.530	2.964E-10	-0.000190	6.493E-05	3.277E-11	9476.8989	7.569E+09	-8.781E-06	167061.	0.000
47.000	4.809E-10	0.000	0.000	3.270E-11	9476.8989	7.569E+09	-1.424E-05	83531.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 2:

Pile-head deflection = 0.0142957 inches  
 Computed slope at pile head = 0.000000 radians  
 Maximum bending moment = -72572. inch-lbs  
 Maximum shear force = 2000.000000 lbs  
 Depth of maximum bending moment = 0.000000 feet below pile head  
 Depth of maximum shear force = 0.000000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 6

-----  
 Pile-head Deflection vs. Pile Length for Load Case 2  
 -----

Boundary Condition Type 2, Shear and Slope

Shear = 2000. lb  
 Slope = 0.00000  
 Axial Load = 200000. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment In-lbs	Maximum Shear lbs
47.0000	0.0142957	-72572.	2000.000000
44.6500	0.0142932	-72580.	2000.000000

42. 3000	0. 0142887	-72582.	2000. 0000000
39. 9500	0. 0142821	-72567.	2000. 0000000
37. 6000	0. 0142744	-72560.	2000. 0000000
35. 2500	0. 0142642	-72535.	2000. 0000000
32. 9000	0. 0142602	-72534.	2000. 0000000
30. 5500	0. 0142532	-72522.	2000. 0000000
28. 2000	0. 0142499	-72519.	2000. 0000000
25. 8500	0. 0142487	-72526.	2000. 0000000
23. 5000	0. 0142423	-72511.	2000. 0000000
21. 1500	0. 0142406	-72512.	2000. 0000000
18. 8000	0. 0142370	-72505.	2000. 0000000
16. 4500	0. 0142515	-72581.	2000. 0000000
14. 1000	0. 0144445	-72627.	2000. 0000000
11. 7500	0. 0150487	-73391.	2000. 0000000
9. 4000	0. 0160456	-76419.	2000. 0000000
7. 0500	0. 0170678	-84244.	2000. 0000000
4. 7000	0. 0188259	-72515.	1999. 9999999
2. 3500	0. 0872560	-37736.	2000. 0000033

-----  
 Summary of Pile Response(s)  
 -----

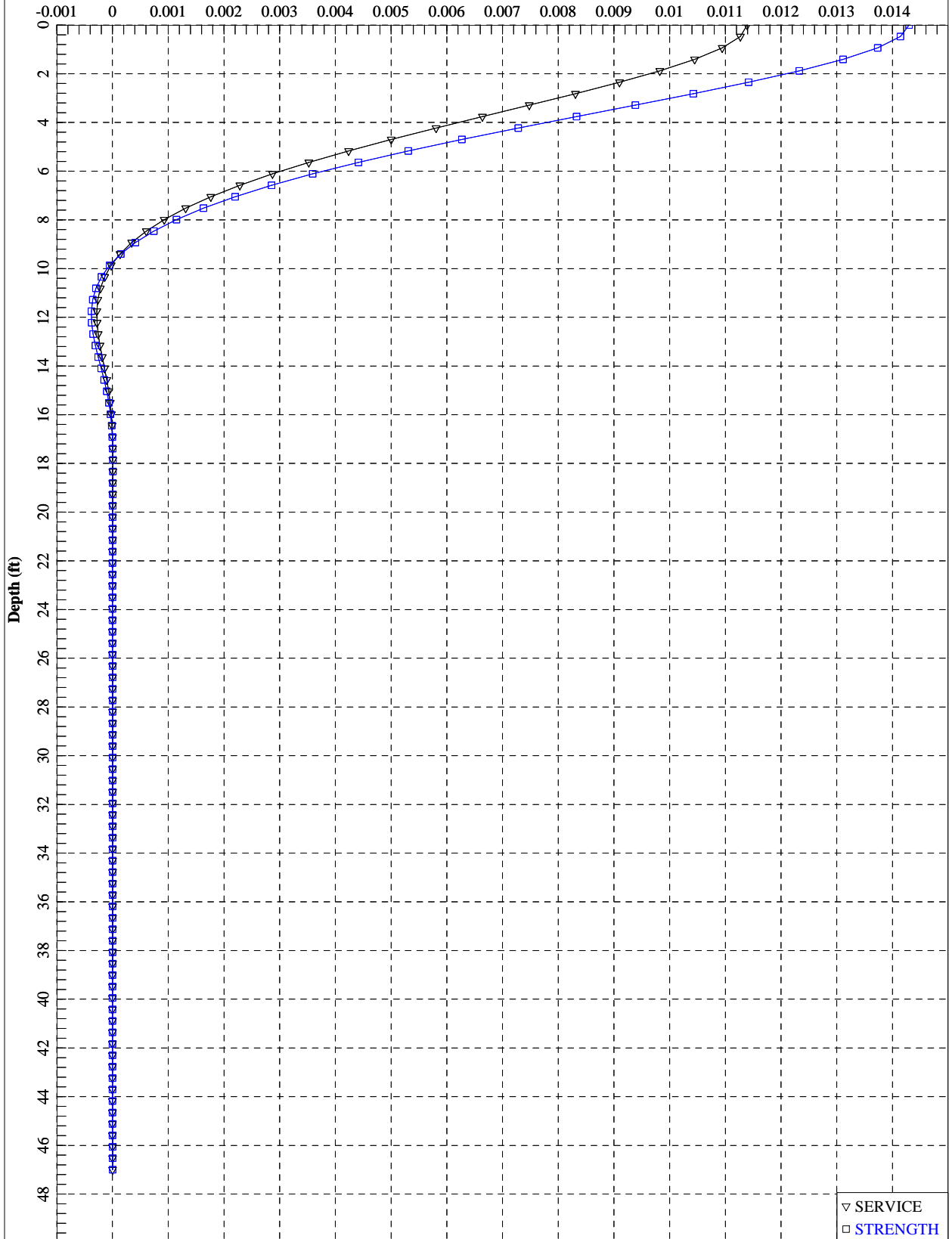
Defi ni ti ons of Pile-head Loadi ng Condi ti ons:

- Load Type 1: Load 1 = Shear, lbs, and Load 2 = Moment, in-lbs
- Load Type 2: Load 1 = Shear, lbs, and Load 2 = Slope, radians
- Load Type 3: Load 1 = Shear, lbs, and Load 2 = Rotational Stiffness, in-lbs/radian
- Load Type 4: Load 1 = Top Deflection, inches, and Load 2 = Moment, in-lbs
- Load Type 5: Load 1 = Top Deflection, inches, and Load 2 = Slope, radians

Load Case No.	Load Type No.	Pile-head Condition 1 V(lbs) or y(inches)	Pile-head Condition 2 in-lb, rad., or in-lb/rad.	Axial Loading lbs	Pile-head Deflection inches	Maximum Moment in Pile in-lbs	Maximum Shear in Pile lbs	Pile-head Rotation radians
1	2	V = 1600.0000	S = 0.000	150000.	0.01139192	-57850.	1600.0000	0.00000000
2	2	V = 2000.0000	S = 0.000	200000.	0.01429574	-72572.	2000.0000	0.00000000

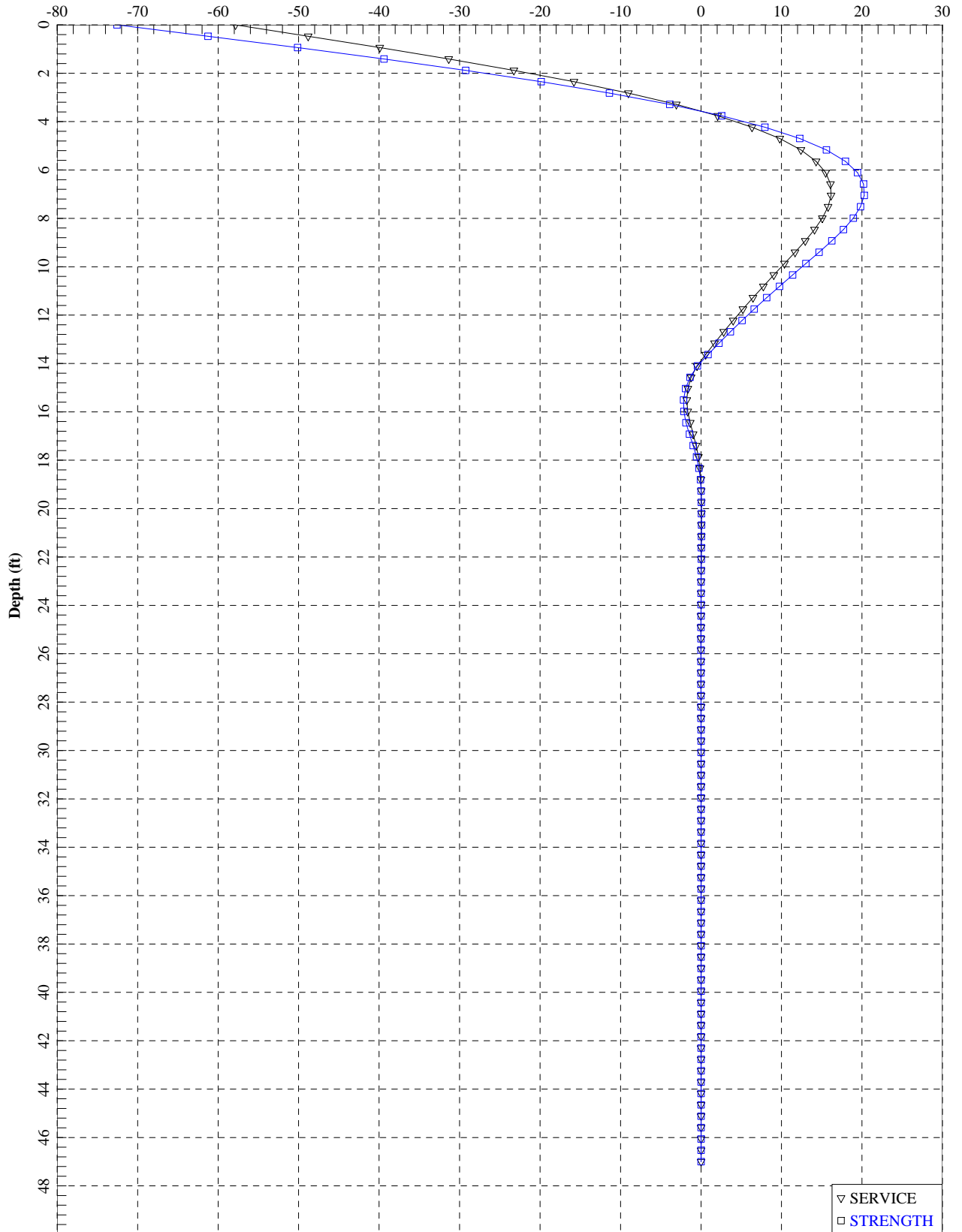
The analysis ended normally.

SC 557 Bridge over Crowders Creek - EB1 - HP 14x73 Steel Pile - Transverse Analysis  
Lateral Pile Deflection (inches)

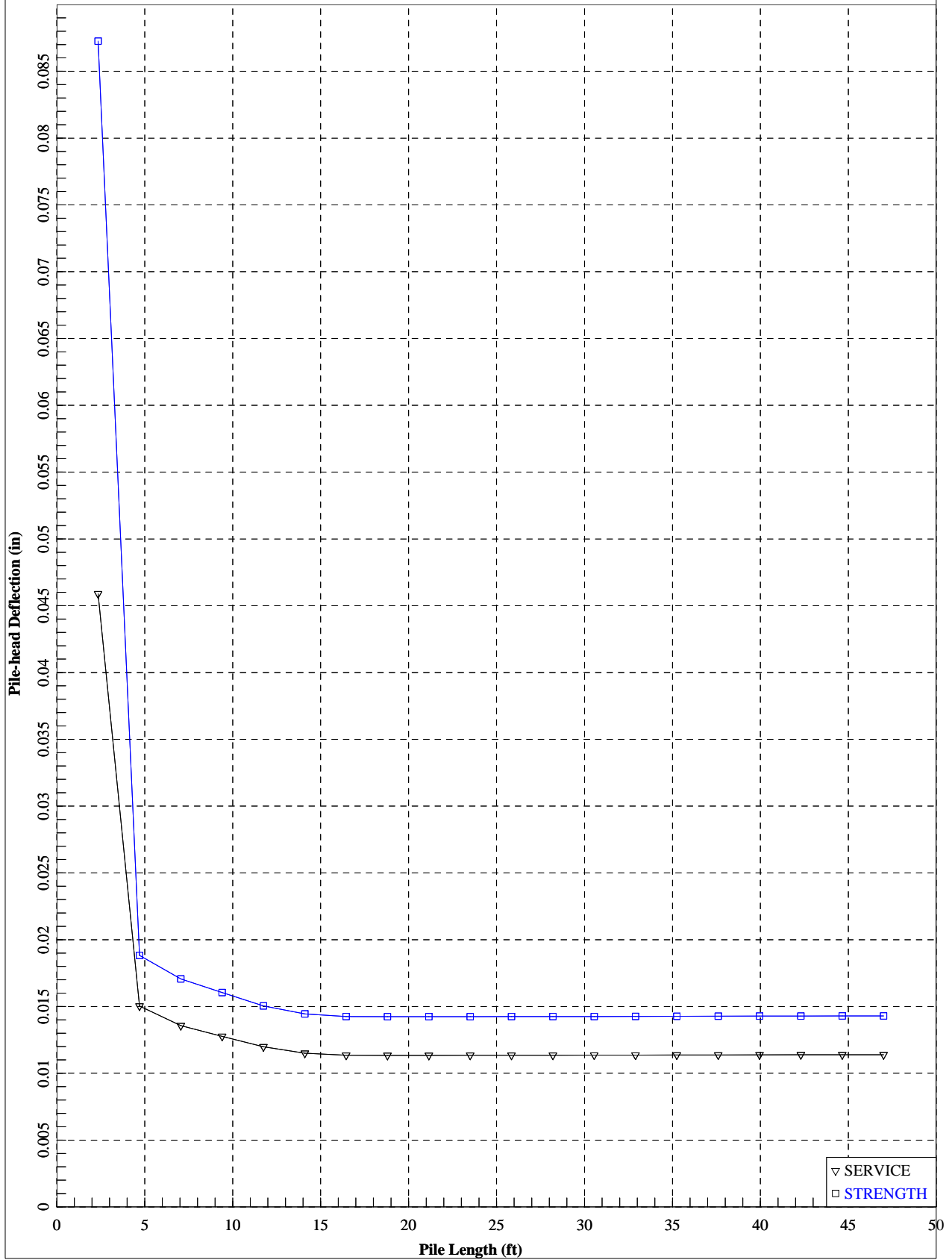




SC 557 Bridge over Crowders Creek - EB1 - HP 14x73 Steel Pile - Transverse Analysis  
Bending Moment (in-kips)



SC 557 Bridge over Crowders Creek - EB1 - HP 14x73 Steel Pile - Transverse Analysis



SC 557 Bridge over Crowders Creek  
Final Bridge Geotechnical Engineering Report

---

# APPENDIX

## SECTION 14 INTERIOR BENT 2 DRILLED SHAFT ANALYSES





=====  
LPile Plus for Windows, Version 2013-07.007

Analysis of Individual Piles and Drilled Shafts  
Subjected to Lateral Loading Using the p-y Method

© 1985-2013 by Ensoft, Inc.  
All Rights Reserved

=====  
This copy of LPile is used by:

Bradley Fischer  
F&ME

Serial Number of Security Device: 291490957

This copy of LPile is licensed for exclusive use by: F&ME Consultants, Columbia, Sout

Use of this program by any entity other than F&ME Consultants, Columbia, Sout  
is forbidden by the software license agreement.

-----  
Files Used for Analysis  
-----

Path to file locations: P:\Geotechnical\G4800's\G4843 - SC557 - York County\Report\Final\Bridge\LPile\  
Name of input data file: IB2\_B-4\_Long\_Scoured.l p7d  
Name of output report file: IB2\_B-4\_Long\_Scoured.l p7o  
Name of plot output file: IB2\_B-4\_Long\_Scoured.l p7p  
Name of runtime message file: IB2\_B-4\_Long\_Scoured.l p7r

-----  
Date and Time of Analysis  
-----

Date: July 31, 2018 Time: 8:37:06

-----  
Problem Title  
-----

Project Name: SC 557 over Crowders Creek

Job Number: G4843

Client: CALYX

Engineer: JFH

Description: IB2 - Boring B-4 - 48" Dia. Drilled Shaft - Scoured Long.

-----  
 Program Options and Settings  
 -----

Engineering Units of Input Data and Computations:

- Engineering units are US Customary Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

Computational Options:

- Use unfactored loads in computations (conventional analysis)
- Compute pile response under loading and nonlinear bending properties of pile (only if nonlinear pile properties are input)
- Analysis uses p-y modification factors for p-y curves
- Analysis includes loading by lateral soil movements acting on pile
- Input of shear resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- No p-y curves to be computed and reported for user-specified depths
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1

-----  
 Pile Structural Properties and Geometry  
 -----

- Total number of pile sections = 3
- Total length of pile = 46.00 ft
- Depth of ground surface below top of pile = 35.50 ft

Pile diameter values used for p-y curve computations are defined using 6 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile.

Point	Depth X ft	Pile Diameter in
1	0.00000	42.0000000
2	12.50000	42.0000000
3	12.50000	48.0000000
4	36.50000	48.0000000

5	36.50000	42.000000
6	46.00000	42.000000

-----  
 Input Structural Properties:  
 -----

Pile Section No. 1:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Circular
Section Length	=	12.50000 ft
Top Width	=	42.00000 in
Bottom Width	=	42.00000 in
Top Area	=	1385.44236 Sq. in
Bottom Area	=	1385.44236 Sq. in
Moment of Inertia at Top	=	152745. in^4
Moment of Inertia at Bottom	=	152745. in^4
Elastic Modulus	=	3605000. lbs/in^2

Pile Section No. 2:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Circular
Section Length	=	24.00000 ft
Top Width	=	48.00000 in
Bottom Width	=	48.00000 in
Top Area	=	1809.55737 Sq. in
Bottom Area	=	1809.55737 Sq. in
Moment of Inertia at Top	=	260576. in^4
Moment of Inertia at Bottom	=	260576. in^4
Elastic Modulus	=	3605000. lbs/in^2

Pile Section No. 3:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Circular
Section Length	=	9.50000 ft
Top Width	=	42.00000 in
Bottom Width	=	42.00000 in
Top Area	=	1385.44236 Sq. in
Bottom Area	=	1385.44236 Sq. in
Moment of Inertia at Top	=	152745. in^4
Moment of Inertia at Bottom	=	152745. in^4
Elastic Modulus	=	3605000. lbs/in^2

-----  
 Ground Slope and Pile Batter Angles  
 -----

Ground Slope Angle	=	0.000 degrees
	=	0.000 radians
Pile Batter Angle	=	0.000 degrees
	=	0.000 radians

-----  
 Soil and Rock Layering Information  
 -----



The soil profile is modelled using 1 layers

Layer 1 is strong rock (vuggy limestone)

Distance from top of pile to top of layer = 35.50000 ft  
 Distance from top of pile to bottom of layer = 60.00000 ft  
 Effective unit weight at top of layer = 98.00000 pcf  
 Effective unit weight at bottom of layer = 98.00000 pcf  
 Uniaxial compressive strength at top of layer = 10000.00000 psi  
 Uniaxial compressive strength at bottom of layer = 10000.00000 psi

(Depth of lowest soil layer extends 14.00 ft below pile tip)

Summary of Soil Properties

Layer Num.	Layer Soil Type (p-y Curve Criteria)	Layer Depth ft	Effective Unit Wt. pcf	Uniaxial qu psi
1	Vuggy Limestone	35.500 60.000	98.000 98.000	10000.000 10000.000

p-y Modification Factors for Group Action

Distribution of p-y modifiers with depth defined using 2 points

Point No.	Depth X ft	p-mult	y-mult
1	35.500	0.9300	1.0000
2	100.000	0.9300	1.0000

Lateral Soil Movements

Profile of soil movement with depth defined using 2 points

Point No.	Depth X ft	Soil Movement in
1	0.00000	0.00000
2	0.00000	0.00000

Loading Type

-----  
 Static loading criteria were used when computing p-y curves for all analyses.  
 -----

-----  
 Pile-head Loading and Pile-head Fixity Conditions  
 -----

Number of loads specified = 4

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length
1	1	V = 10700. lbs	M = 2616000. in-lbs	810000.	Yes
2	1	V = 20700. lbs	M = 4608000. in-lbs	1155000.	Yes
3	2	V = 10700. lbs	S = 0.0000 in/in	810000.	Yes
4	2	V = 20700. lbs	S = 0.0000 in/in	1155000.	Yes

V = perpendicular shear force applied to pile head  
 M = bending moment applied to pile head  
 y = lateral deflection relative to pile axis  
 S = pile slope relative to original pile batter angle  
 R = rotational stiffness applied to pile head  
 Axial thrust is assumed to be acting axially for all pile batter angles.

-----  
 Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness  
 -----

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 3

Pile Section No. 1:  
 -----

Moment-curvature properties were derived from elastic section properties

Pile Section No. 2:  
 -----

Moment-curvature properties were derived from elastic section properties

Pile Section No. 3:  
 -----

Moment-curvature properties were derived from elastic section properties

-----  
 Computed Values of Pile Loading and Deflection  
 for Lateral Loading for Load Case Number 1  
 -----

Pile-head conditions are Shear and Moment (Loading Type 1)

I B2\_B-4\_Long\_Scoured. I p7o

Shear force at pile head = 10700.0 lbs  
 Applied moment at pile head = 2616000.0 in-lbs  
 Axial thrust load on pile head = 810000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi *	Bending Stiffness lb-in <sup>2</sup>	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.7491	2616000.	10700.	-0.003081	944.3090	5.506E+11	0.000	0.000	0.000
0.460	0.7321	2688783.	10700.	-0.003055	954.3155	5.506E+11	0.000	0.000	0.000
0.920	0.7154	2761445.	10700.	-0.003027	964.3054	5.506E+11	0.000	0.000	0.000
1.380	0.6987	2833984.	10700.	-0.002999	974.2783	5.506E+11	0.000	0.000	0.000
1.840	0.6822	2906395.	10700.	-0.002971	984.2337	5.506E+11	0.000	0.000	0.000
2.300	0.6659	2978677.	10700.	-0.002941	994.1713	5.506E+11	0.000	0.000	0.000
2.760	0.6498	3050824.	10700.	-0.002911	1004.0904	5.506E+11	0.000	0.000	0.000
3.220	0.6338	3122835.	10700.	-0.002880	1013.9908	5.506E+11	0.000	0.000	0.000
3.680	0.6180	3194706.	10700.	-0.002848	1023.8719	5.506E+11	0.000	0.000	0.000
4.140	0.6023	3266434.	10700.	-0.002816	1033.7334	5.506E+11	0.000	0.000	0.000
4.600	0.5869	3338016.	10700.	-0.002783	1043.5747	5.506E+11	0.000	0.000	0.000
5.060	0.5716	3409448.	10700.	-0.002749	1053.3954	5.506E+11	0.000	0.000	0.000
5.520	0.5565	3480727.	10700.	-0.002714	1063.1951	5.506E+11	0.000	0.000	0.000
5.980	0.5416	3551850.	10700.	-0.002679	1072.9734	5.506E+11	0.000	0.000	0.000
6.440	0.5270	3622813.	10700.	-0.002643	1082.7298	5.506E+11	0.000	0.000	0.000
6.900	0.5125	3693615.	10700.	-0.002607	1092.4639	5.506E+11	0.000	0.000	0.000
7.360	0.4982	3764251.	10700.	-0.002569	1102.1752	5.506E+11	0.000	0.000	0.000
7.820	0.4841	3834718.	10700.	-0.002531	1111.8633	5.506E+11	0.000	0.000	0.000
8.280	0.4702	3905013.	10700.	-0.002492	1121.5277	5.506E+11	0.000	0.000	0.000
8.740	0.4566	3975133.	10700.	-0.002453	1131.1682	5.506E+11	0.000	0.000	0.000
9.200	0.4432	4045076.	10700.	-0.002413	1140.7841	5.506E+11	0.000	0.000	0.000
9.660	0.4300	4114836.	10700.	-0.002372	1150.3751	5.506E+11	0.000	0.000	0.000
10.120	0.4170	4184413.	10700.	-0.002330	1159.9407	5.506E+11	0.000	0.000	0.000
10.580	0.4042	4253801.	10700.	-0.002288	1169.4805	5.506E+11	0.000	0.000	0.000
11.040	0.3917	4322999.	10700.	-0.002245	1178.9942	5.506E+11	0.000	0.000	0.000
11.500	0.3794	4392004.	10700.	-0.002201	1188.4812	5.506E+11	0.000	0.000	0.000
11.960	0.3674	4460811.	10700.	-0.002157	1197.9411	5.506E+11	0.000	0.000	0.000
12.420	0.3556	4529419.	10700.	-0.002112	1207.3735	5.506E+11	0.000	0.000	0.000
12.880	0.3441	4597823.	10700.	-0.002076	871.0992	9.394E+11	0.000	0.000	0.000
13.340	0.3327	4666107.	10700.	-0.002048	877.3883	9.394E+11	0.000	0.000	0.000
13.800	0.3215	4734268.	10700.	-0.002021	883.6662	9.394E+11	0.000	0.000	0.000
14.260	0.3104	4802305.	10700.	-0.001993	889.9326	9.394E+11	0.000	0.000	0.000
14.720	0.2995	4870216.	10700.	-0.001964	896.1874	9.394E+11	0.000	0.000	0.000
15.180	0.2887	4937998.	10700.	-0.001935	902.4305	9.394E+11	0.000	0.000	0.000
15.640	0.2781	5005651.	10700.	-0.001906	908.6615	9.394E+11	0.000	0.000	0.000
16.100	0.2677	5073172.	10700.	-0.001877	914.8805	9.394E+11	0.000	0.000	0.000
16.560	0.2574	5140560.	10700.	-0.001847	921.0872	9.394E+11	0.000	0.000	0.000
17.020	0.2473	5207813.	10700.	-0.001816	927.2814	9.394E+11	0.000	0.000	0.000
17.480	0.2374	5274930.	10700.	-0.001785	933.4630	9.394E+11	0.000	0.000	0.000
17.940	0.2276	5341907.	10700.	-0.001754	939.6319	9.394E+11	0.000	0.000	0.000
18.400	0.2180	5408744.	10700.	-0.001723	945.7879	9.394E+11	0.000	0.000	0.000
18.860	0.2086	5475439.	10700.	-0.001691	951.9307	9.394E+11	0.000	0.000	0.000
19.320	0.1993	5541991.	10700.	-0.001658	958.0603	9.394E+11	0.000	0.000	0.000
19.780	0.1903	5608396.	10700.	-0.001626	964.1765	9.394E+11	0.000	0.000	0.000
20.240	0.1814	5674655.	10700.	-0.001592	970.2791	9.394E+11	0.000	0.000	0.000
20.700	0.1727	5740764.	10700.	-0.001559	976.3680	9.394E+11	0.000	0.000	0.000
21.160	0.1642	5806722.	10700.	-0.001525	982.4430	9.394E+11	0.000	0.000	0.000
21.620	0.1558	5872528.	10700.	-0.001491	988.5040	9.394E+11	0.000	0.000	0.000
22.080	0.1477	5938179.	10700.	-0.001456	994.5507	9.394E+11	0.000	0.000	0.000
22.540	0.1398	6003675.	10700.	-0.001421	1000.5831	9.394E+11	0.000	0.000	0.000
23.000	0.1320	6069013.	10700.	-0.001385	1006.6009	9.394E+11	0.000	0.000	0.000

IB2_B-4_Long_Scoured.l p7o									
23.460	0.1245	6134191.	10700.	-0.001349	1012.6041	9.394E+11	0.000	0.000	0.000
23.920	0.1171	6199208.	10700.	-0.001313	1018.5924	9.394E+11	0.000	0.000	0.000
24.380	0.1100	6264062.	10700.	-0.001277	1024.5657	9.394E+11	0.000	0.000	0.000
24.840	0.1030	6328752.	10700.	-0.001240	1030.5238	9.394E+11	0.000	0.000	0.000
25.300	0.0963	6393275.	10700.	-0.001202	1036.4667	9.394E+11	0.000	0.000	0.000
25.760	0.0898	6457631.	10700.	-0.001164	1042.3940	9.394E+11	0.000	0.000	0.000
26.220	0.0834	6521817.	10700.	-0.001126	1048.3058	9.394E+11	0.000	0.000	0.000
26.680	0.0773	6585831.	10700.	-0.001088	1054.2017	9.394E+11	0.000	0.000	0.000
27.140	0.0714	6649672.	10700.	-0.001049	1060.0817	9.394E+11	0.000	0.000	0.000
27.600	0.0657	6713339.	10700.	-0.001010	1065.9457	9.394E+11	0.000	0.000	0.000
28.060	0.0603	6776829.	10700.	-0.000970	1071.7933	9.394E+11	0.000	0.000	0.000
28.520	0.0550	6840141.	10700.	-0.000930	1077.6246	9.394E+11	0.000	0.000	0.000
28.980	0.0500	6903274.	10700.	-0.000890	1083.4393	9.394E+11	0.000	0.000	0.000
29.440	0.0452	6966225.	10700.	-0.000849	1089.2374	9.394E+11	0.000	0.000	0.000
29.900	0.0406	7028993.	10700.	-0.000808	1095.0185	9.394E+11	0.000	0.000	0.000
30.360	0.0363	7091576.	10700.	-0.000766	1100.7827	9.394E+11	0.000	0.000	0.000
30.820	0.0322	7153973.	10700.	-0.000724	1106.5297	9.394E+11	0.000	0.000	0.000
31.280	0.0283	7216183.	10700.	-0.000682	1112.2593	9.394E+11	0.000	0.000	0.000
31.740	0.0247	7278202.	10700.	-0.000640	1117.9716	9.394E+11	0.000	0.000	0.000
32.200	0.0212	7340030.	10700.	-0.000597	1123.6662	9.394E+11	0.000	0.000	0.000
32.660	0.0181	7401666.	10700.	-0.000553	1129.3430	9.394E+11	0.000	0.000	0.000
33.120	0.0151	7463107.	10700.	-0.000510	1135.0019	9.394E+11	0.000	0.000	0.000
33.580	0.0124	7524352.	10700.	-0.000466	1140.6428	9.394E+11	0.000	0.000	0.000
34.040	0.009988	7585399.	10700.	-0.000421	1146.2655	9.394E+11	0.000	0.000	0.000
34.500	0.007785	7646247.	10700.	-0.000377	1151.8698	9.394E+11	0.000	0.000	0.000
34.960	0.005831	7706894.	10700.	-0.000331	1157.4556	9.394E+11	0.000	0.000	0.000
35.420	0.004127	7767338.	10700.	-0.000286	1163.0227	9.394E+11	0.000	0.000	0.000
35.880	0.002674	7827579.	-57946.	-0.000240	1168.5711	9.394E+11	-24872.	51336000.	0.000
36.340	0.001476	7129757.	-164476.	-0.000196	1104.2993	9.394E+11	-13726.	51336000.	0.000
36.800	0.000509	6013513.	-215417.	-0.000145	1411.4128	5.506E+11	-4730.8171	51336000.	0.000
37.260	-0.000126	4752850.	-225246.	-9.112E-05	1238.0917	5.506E+11	1169.6362	51336000.	0.000
37.720	-0.000497	3527612.	-209255.	-4.961E-05	1069.6411	5.506E+11	4624.1661	51336000.	0.000
38.180	-0.000673	2443117.	-179206.	-1.968E-05	920.5404	5.506E+11	6263.3075	51336000.	0.000
38.640	-0.000715	1549358.	-143578.	3.274E-07	797.6627	5.506E+11	6645.1659	51336000.	0.000
39.100	-0.000670	858010.	-108044.	1.239E-05	702.6134	5.506E+11	6229.6900	51336000.	0.000
39.560	-0.000578	356444.	-76021.	1.848E-05	633.6562	5.506E+11	5372.6631	51336000.	0.000
40.020	-0.000466	18570.	-49236.	2.036E-05	587.2040	5.506E+11	4332.2018	51336000.	0.000
40.480	-0.000353	-187300.	-28220.	1.952E-05	610.4016	5.506E+11	3282.1837	51336000.	0.000
40.940	-0.000250	-293153.	-12734.	1.711E-05	624.9547	5.506E+11	2328.5547	51336000.	0.000
41.400	-0.000164	-328041.	-2096.4319	1.399E-05	629.7513	5.506E+11	1525.7890	51336000.	0.000
41.860	-9.590E-05	-316423.	4576.2262	1.076E-05	628.1539	5.506E+11	891.8408	51336000.	0.000
42.320	-4.524E-05	-277616.	8198.9245	7.785E-06	622.8186	5.506E+11	420.7311	51336000.	0.000
42.780	-9.945E-06	-225977.	9615.4116	5.261E-06	615.7190	5.506E+11	92.4889	51336000.	0.000
43.240	1.285E-05	-171509.	9540.9697	3.269E-06	608.2306	5.506E+11	-119.4606	51336000.	0.000
43.700	2.614E-05	-120674.	8540.1709	1.805E-06	601.2415	5.506E+11	-243.1477	51336000.	0.000
44.160	3.277E-05	-77242.	7028.0190	8.125E-07	595.2703	5.506E+11	-304.7334	51336000.	0.000
44.620	3.511E-05	-43092.	5285.6249	2.094E-07	590.5752	5.506E+11	-326.5688	51336000.	0.000
45.080	3.508E-05	-18890.	3483.9047	-1.013E-07	587.2479	5.506E+11	-326.2284	51336000.	0.000
45.540	3.400E-05	-4628.3624	1710.8947	-2.192E-07	585.2871	5.506E+11	-316.1665	51336000.	0.000
46.000	3.266E-05	0.000	0.000	-2.424E-07	584.6508	5.506E+11	-303.7229	25668000.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 1:

Pile-head deflection = 0.7490778 inches  
 Computed slope at pile head = -0.0030814 radians  
 Maximum bending moment = 7827579. inch-lbs  
 Maximum shear force = -225246. lbs



I B2\_B-4\_Long\_Scoured.l p7o

0.460	1.4089	4759476.	20700.	-0.005813	1488.0206	5.506E+11	0.000	0.000	0.000
0.920	1.3769	4910647.	20700.	-0.005764	1508.8042	5.506E+11	0.000	0.000	0.000
1.380	1.3452	5061504.	20700.	-0.005714	1529.5447	5.506E+11	0.000	0.000	0.000
1.840	1.3138	5212038.	20700.	-0.005663	1550.2407	5.506E+11	0.000	0.000	0.000
2.300	1.2827	5362239.	20700.	-0.005610	1570.8910	5.506E+11	0.000	0.000	0.000
2.760	1.2519	5512097.	20700.	-0.005555	1591.4941	5.506E+11	0.000	0.000	0.000
3.220	1.2214	5661603.	20700.	-0.005499	1612.0487	5.506E+11	0.000	0.000	0.000
3.680	1.1912	5810747.	20700.	-0.005442	1632.5536	5.506E+11	0.000	0.000	0.000
4.140	1.1613	5959520.	20700.	-0.005383	1653.0075	5.506E+11	0.000	0.000	0.000
4.600	1.1318	6107911.	20700.	-0.005322	1673.4090	5.506E+11	0.000	0.000	0.000
5.060	1.1026	6255913.	20700.	-0.005260	1693.7568	5.506E+11	0.000	0.000	0.000
5.520	1.0737	6403514.	20700.	-0.005197	1714.0497	5.506E+11	0.000	0.000	0.000
5.980	1.0452	6550706.	20700.	-0.005132	1734.2862	5.506E+11	0.000	0.000	0.000
6.440	1.0170	6697480.	20700.	-0.005065	1754.4653	5.506E+11	0.000	0.000	0.000
6.900	0.9893	6843826.	20700.	-0.004998	1774.5854	5.506E+11	0.000	0.000	0.000
7.360	0.9619	6989734.	20700.	-0.004928	1794.6455	5.506E+11	0.000	0.000	0.000
7.820	0.9349	7135195.	20700.	-0.004857	1814.6441	5.506E+11	0.000	0.000	0.000
8.280	0.9082	7280200.	20700.	-0.004785	1834.5800	5.506E+11	0.000	0.000	0.000
8.740	0.8820	7424740.	20700.	-0.004712	1854.4519	5.506E+11	0.000	0.000	0.000
9.200	0.8562	7568806.	20700.	-0.004636	1874.2587	5.506E+11	0.000	0.000	0.000
9.660	0.8308	7712388.	20700.	-0.004560	1893.9988	5.506E+11	0.000	0.000	0.000
10.120	0.8059	7855477.	20700.	-0.004482	1913.6713	5.506E+11	0.000	0.000	0.000
10.580	0.7814	7998063.	20700.	-0.004402	1933.2747	5.506E+11	0.000	0.000	0.000
11.040	0.7573	8140139.	20700.	-0.004321	1952.8078	5.506E+11	0.000	0.000	0.000
11.500	0.7337	8281694.	20700.	-0.004239	1972.2694	5.506E+11	0.000	0.000	0.000
11.960	0.7105	8422720.	20700.	-0.004155	1991.6582	5.506E+11	0.000	0.000	0.000
12.420	0.6878	8563208.	20700.	-0.004070	2010.9731	5.506E+11	0.000	0.000	0.000
12.880	0.6656	8703149.	20700.	-0.004002	1439.8686	9.394E+11	0.000	0.000	0.000
13.340	0.6436	8842763.	20700.	-0.003950	1452.7275	9.394E+11	0.000	0.000	0.000
13.800	0.6219	8982046.	20700.	-0.003898	1465.5560	9.394E+11	0.000	0.000	0.000
14.260	0.6006	9120993.	20700.	-0.003845	1478.3535	9.394E+11	0.000	0.000	0.000
14.720	0.5795	9259597.	20700.	-0.003791	1491.1195	9.394E+11	0.000	0.000	0.000
15.180	0.5587	9397855.	20700.	-0.003736	1503.8535	9.394E+11	0.000	0.000	0.000
15.640	0.5383	9535761.	20700.	-0.003680	1516.5551	9.394E+11	0.000	0.000	0.000
16.100	0.5181	9673310.	20700.	-0.003624	1529.2239	9.394E+11	0.000	0.000	0.000
16.560	0.4982	9810496.	20700.	-0.003566	1541.8592	9.394E+11	0.000	0.000	0.000
17.020	0.4787	9947315.	20700.	-0.003508	1554.4607	9.394E+11	0.000	0.000	0.000
17.480	0.4595	10083761.	20700.	-0.003450	1567.0278	9.394E+11	0.000	0.000	0.000
17.940	0.4406	10219829.	20700.	-0.003390	1579.5602	9.394E+11	0.000	0.000	0.000
18.400	0.4221	10355514.	20700.	-0.003329	1592.0573	9.394E+11	0.000	0.000	0.000
18.860	0.4039	10490811.	20700.	-0.003268	1604.5187	9.394E+11	0.000	0.000	0.000
19.320	0.3860	10625716.	20700.	-0.003206	1616.9438	9.394E+11	0.000	0.000	0.000
19.780	0.3685	10760222.	20700.	-0.003143	1629.3323	9.394E+11	0.000	0.000	0.000
20.240	0.3513	10894325.	20700.	-0.003080	1641.6837	9.394E+11	0.000	0.000	0.000
20.700	0.3345	11028020.	20700.	-0.003015	1653.9975	9.394E+11	0.000	0.000	0.000
21.160	0.3180	11161302.	20700.	-0.002950	1666.2732	9.394E+11	0.000	0.000	0.000
21.620	0.3019	11294166.	20700.	-0.002884	1678.5104	9.394E+11	0.000	0.000	0.000
22.080	0.2862	11426606.	20700.	-0.002817	1690.7087	9.394E+11	0.000	0.000	0.000
22.540	0.2708	11558618.	20700.	-0.002750	1702.8675	9.394E+11	0.000	0.000	0.000
23.000	0.2558	11690198.	20700.	-0.002682	1714.9864	9.394E+11	0.000	0.000	0.000
23.460	0.2412	11821339.	20700.	-0.002612	1727.0650	9.394E+11	0.000	0.000	0.000
23.920	0.2270	11952038.	20700.	-0.002543	1739.1028	9.394E+11	0.000	0.000	0.000
24.380	0.2131	12082289.	20700.	-0.002472	1751.0994	9.394E+11	0.000	0.000	0.000
24.840	0.1997	12212087.	20700.	-0.002401	1763.0542	9.394E+11	0.000	0.000	0.000
25.300	0.1866	12341427.	20700.	-0.002328	1774.9670	9.394E+11	0.000	0.000	0.000
25.760	0.1740	12470306.	20700.	-0.002256	1786.8371	9.394E+11	0.000	0.000	0.000
26.220	0.1617	12598717.	20700.	-0.002182	1798.6642	9.394E+11	0.000	0.000	0.000
26.680	0.1499	12726656.	20700.	-0.002108	1810.4479	9.394E+11	0.000	0.000	0.000
27.140	0.1385	12854118.	20700.	-0.002032	1822.1876	9.394E+11	0.000	0.000	0.000
27.600	0.1275	12981098.	20700.	-0.001956	1833.8829	9.394E+11	0.000	0.000	0.000

IB2_B-4_Long_Scoured.l p7o									
28.060	0.1169	13107593.	20700.	-0.001880	1845.5335	9.394E+11	0.000	0.000	0.000
28.520	0.1067	13233596.	20700.	-0.001802	1857.1389	9.394E+11	0.000	0.000	0.000
28.980	0.0970	13359103.	20700.	-0.001724	1868.6986	9.394E+11	0.000	0.000	0.000
29.440	0.0877	13484110.	20700.	-0.001645	1880.2121	9.394E+11	0.000	0.000	0.000
29.900	0.0788	13608612.	20700.	-0.001566	1891.6792	9.394E+11	0.000	0.000	0.000
30.360	0.0704	13732604.	20700.	-0.001485	1903.0993	9.394E+11	0.000	0.000	0.000
30.820	0.0624	13856082.	20700.	-0.001404	1914.4720	9.394E+11	0.000	0.000	0.000
31.280	0.0549	13979040.	20700.	-0.001323	1925.7969	9.394E+11	0.000	0.000	0.000
31.740	0.0478	14101475.	20700.	-0.001240	1937.0736	9.394E+11	0.000	0.000	0.000
32.200	0.0412	14223381.	20700.	-0.001157	1948.3016	9.394E+11	0.000	0.000	0.000
32.660	0.0350	14344754.	20700.	-0.001073	1959.4805	9.394E+11	0.000	0.000	0.000
33.120	0.0293	14465590.	20700.	-0.000988	1970.6099	9.394E+11	0.000	0.000	0.000
33.580	0.0241	14585885.	20700.	-0.000903	1981.6895	9.394E+11	0.000	0.000	0.000
34.040	0.0194	14705632.	20700.	-0.000817	1992.7186	9.394E+11	0.000	0.000	0.000
34.500	0.0151	14824829.	20700.	-0.000730	2003.6971	9.394E+11	0.000	0.000	0.000
34.960	0.0113	14943470.	20700.	-0.000643	2014.6244	9.394E+11	0.000	0.000	0.000
35.420	0.008003	15061552.	20700.	-0.000555	2025.5001	9.394E+11	0.000	0.000	0.000
35.880	0.005186	15179069.	-112425.	-0.000466	2036.3238	9.394E+11	-48234.	51336000.	0.000
36.340	0.002862	13826323.	-319015.	-0.000380	1911.7311	9.394E+11	-26618.	51336000.	0.000
36.800	0.000986	11661995.	-417800.	-0.000281	2437.0067	5.506E+11	-9173.5321	51336000.	0.000
37.260	-0.000244	9217400.	-436855.	-0.000177	2100.9140	5.506E+11	2269.4981	51336000.	0.000
37.720	-0.000964	6841369.	-405837.	-9.621E-05	1774.2477	5.506E+11	8969.0468	51336000.	0.000
38.180	-0.001306	4738191.	-347554.	-3.817E-05	1485.0943	5.506E+11	12148.	51336000.	0.000
38.640	-0.001386	3004861.	-278454.	6.377E-07	1246.7891	5.506E+11	12888.	51336000.	0.000
39.100	-0.001299	1664051.	-209535.	2.404E-05	1062.4492	5.506E+11	12082.	51336000.	0.000
39.560	-0.001120	691290.	-147428.	3.585E-05	928.7101	5.506E+11	10420.	51336000.	0.000
40.020	-0.000903	35990.	-95479.	3.949E-05	838.6168	5.506E+11	8402.0828	51336000.	0.000
40.480	-0.000684	-363297.	-54720.	3.785E-05	883.6163	5.506E+11	6365.5276	51336000.	0.000
40.940	-0.000486	-568601.	-24687.	3.318E-05	911.8424	5.506E+11	4515.9334	51336000.	0.000
41.400	-0.000318	-636267.	-4056.4775	2.714E-05	921.1453	5.506E+11	2958.9543	51336000.	0.000
41.860	-0.000186	-613731.	8883.4147	2.087E-05	918.0470	5.506E+11	1729.4124	51336000.	0.000
42.320	-8.771E-05	-538460.	15908.	1.510E-05	907.6984	5.506E+11	815.7103	51336000.	0.000
42.780	-1.926E-05	-438300.	18654.	1.020E-05	893.9280	5.506E+11	179.1118	51336000.	0.000
43.240	2.494E-05	-332654.	18508.	6.339E-06	879.4033	5.506E+11	-231.9277	51336000.	0.000
43.700	5.073E-05	-234053.	16566.	3.499E-06	865.8474	5.506E+11	-471.7762	51336000.	0.000
44.160	6.357E-05	-149813.	13632.	1.575E-06	854.2657	5.506E+11	-591.1755	51336000.	0.000
44.620	6.812E-05	-83577.	10252.	4.051E-07	845.1593	5.506E+11	-633.4775	51336000.	0.000
45.080	6.804E-05	-36638.	6757.0386	-1.974E-07	838.7059	5.506E+11	-632.7688	51336000.	0.000
45.540	6.594E-05	-8976.8790	3318.1493	-4.261E-07	834.9029	5.506E+11	-613.2055	51336000.	0.000
46.000	6.334E-05	0.000	0.000	-4.711E-07	833.6687	5.506E+11	-589.0225	25668000.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 2:

Pile-head deflection = 1.4410970 inches  
 Computed slope at pile head = -0.0058596 radians  
 Maximum bending moment = 15179069. inch-lbs  
 Maximum shear force = -436855. lbs  
 Depth of maximum bending moment = 35.8800000 feet below pile head  
 Depth of maximum shear force = 37.2600000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 2

-----  
 Pile-head Deflection vs. Pile Length for Load Case 2  
 -----





I B2\_B-4\_Long\_Scoured. I p7o

4. 140	0. 1153	-1650021.	10700.	-0. 000173	811. 5023	5. 506E+11	0. 000	0. 000	0. 000
4. 600	0. 1143	-1590146.	10700.	-0. 000189	803. 2705	5. 506E+11	0. 000	0. 000	0. 000
5. 060	0. 1132	-1530200.	10700.	-0. 000205	795. 0288	5. 506E+11	0. 000	0. 000	0. 000
5. 520	0. 1120	-1470185.	10700.	-0. 000220	786. 7778	5. 506E+11	0. 000	0. 000	0. 000
5. 980	0. 1107	-1410105.	10700.	-0. 000234	778. 5177	5. 506E+11	0. 000	0. 000	0. 000
6. 440	0. 1094	-1349961.	10700.	-0. 000248	770. 2489	5. 506E+11	0. 000	0. 000	0. 000
6. 900	0. 1080	-1289757.	10700.	-0. 000261	761. 9717	5. 506E+11	0. 000	0. 000	0. 000
7. 360	0. 1065	-1229495.	10700.	-0. 000274	753. 6867	5. 506E+11	0. 000	0. 000	0. 000
7. 820	0. 1050	-1169177.	10700.	-0. 000286	745. 3940	5. 506E+11	0. 000	0. 000	0. 000
8. 280	0. 1034	-1108808.	10700.	-0. 000298	737. 0942	5. 506E+11	0. 000	0. 000	0. 000
8. 740	0. 1017	-1048389.	10700.	-0. 000308	728. 7875	5. 506E+11	0. 000	0. 000	0. 000
9. 200	0. 1000	-987922.	10700.	-0. 000319	720. 4743	5. 506E+11	0. 000	0. 000	0. 000
9. 660	0. 0982	-927412.	10700.	-0. 000328	712. 1551	5. 506E+11	0. 000	0. 000	0. 000
10. 120	0. 0963	-866860.	10700.	-0. 000337	703. 8302	5. 506E+11	0. 000	0. 000	0. 000
10. 580	0. 0945	-806269.	10700.	-0. 000346	695. 4999	5. 506E+11	0. 000	0. 000	0. 000
11. 040	0. 0925	-745642.	10700.	-0. 000353	687. 1646	5. 506E+11	0. 000	0. 000	0. 000
11. 500	0. 0906	-684981.	10700.	-0. 000361	678. 8248	5. 506E+11	0. 000	0. 000	0. 000
11. 960	0. 0885	-624290.	10700.	-0. 000367	670. 4807	5. 506E+11	0. 000	0. 000	0. 000
12. 420	0. 0865	-563571.	10700.	-0. 000373	662. 1328	5. 506E+11	0. 000	0. 000	0. 000
12. 880	0. 0844	-502826.	10700.	-0. 000377	493. 9354	9. 394E+11	0. 000	0. 000	0. 000
13. 340	0. 0823	-442068.	10700.	-0. 000380	488. 3394	9. 394E+11	0. 000	0. 000	0. 000
13. 800	0. 0802	-381299.	10700.	-0. 000383	482. 7423	9. 394E+11	0. 000	0. 000	0. 000
14. 260	0. 0781	-320520.	10700.	-0. 000385	477. 1443	9. 394E+11	0. 000	0. 000	0. 000
14. 720	0. 0760	-259732.	10700.	-0. 000386	471. 5455	9. 394E+11	0. 000	0. 000	0. 000
15. 180	0. 0739	-198938.	10700.	-0. 000388	465. 9461	9. 394E+11	0. 000	0. 000	0. 000
15. 640	0. 0717	-138138.	10700.	-0. 000389	460. 3463	9. 394E+11	0. 000	0. 000	0. 000
16. 100	0. 0696	-77334.	10700.	-0. 000389	454. 7461	9. 394E+11	0. 000	0. 000	0. 000
16. 560	0. 0674	-16529.	10700.	-0. 000390	449. 1457	9. 394E+11	0. 000	0. 000	0. 000
17. 020	0. 0653	44277.	10700.	-0. 000389	451. 7013	9. 394E+11	0. 000	0. 000	0. 000
17. 480	0. 0631	105082.	10700.	-0. 000389	457. 3017	9. 394E+11	0. 000	0. 000	0. 000
17. 940	0. 0610	165884.	10700.	-0. 000388	462. 9017	9. 394E+11	0. 000	0. 000	0. 000
18. 400	0. 0588	226681.	10700.	-0. 000387	468. 5014	9. 394E+11	0. 000	0. 000	0. 000
18. 860	0. 0567	287473.	10700.	-0. 000386	474. 1005	9. 394E+11	0. 000	0. 000	0. 000
19. 320	0. 0546	348257.	10700.	-0. 000384	479. 6990	9. 394E+11	0. 000	0. 000	0. 000
19. 780	0. 0525	409032.	10700.	-0. 000381	485. 2966	9. 394E+11	0. 000	0. 000	0. 000
20. 240	0. 0504	469796.	10700.	-0. 000379	490. 8932	9. 394E+11	0. 000	0. 000	0. 000
20. 700	0. 0483	530548.	10700.	-0. 000376	496. 4886	9. 394E+11	0. 000	0. 000	0. 000
21. 160	0. 0462	591286.	10700.	-0. 000373	502. 0828	9. 394E+11	0. 000	0. 000	0. 000
21. 620	0. 0442	652008.	10700.	-0. 000369	507. 6755	9. 394E+11	0. 000	0. 000	0. 000
22. 080	0. 0421	712713.	10700.	-0. 000365	513. 2667	9. 394E+11	0. 000	0. 000	0. 000
22. 540	0. 0401	773400.	10700.	-0. 000361	518. 8562	9. 394E+11	0. 000	0. 000	0. 000
23. 000	0. 0382	834066.	10700.	-0. 000356	524. 4437	9. 394E+11	0. 000	0. 000	0. 000
23. 460	0. 0362	894710.	10700.	-0. 000351	530. 0293	9. 394E+11	0. 000	0. 000	0. 000
23. 920	0. 0343	955331.	10700.	-0. 000345	535. 6127	9. 394E+11	0. 000	0. 000	0. 000
24. 380	0. 0324	1015927.	10700.	-0. 000340	541. 1938	9. 394E+11	0. 000	0. 000	0. 000
24. 840	0. 0305	1076496.	10700.	-0. 000333	546. 7724	9. 394E+11	0. 000	0. 000	0. 000
25. 300	0. 0287	1137037.	10700.	-0. 000327	552. 3484	9. 394E+11	0. 000	0. 000	0. 000
25. 760	0. 0269	1197547.	10700.	-0. 000320	557. 9216	9. 394E+11	0. 000	0. 000	0. 000
26. 220	0. 0252	1258027.	10700.	-0. 000313	563. 4920	9. 394E+11	0. 000	0. 000	0. 000
26. 680	0. 0235	1318473.	10700.	-0. 000305	569. 0593	9. 394E+11	0. 000	0. 000	0. 000
27. 140	0. 0218	1378885.	10700.	-0. 000297	574. 6235	9. 394E+11	0. 000	0. 000	0. 000
27. 600	0. 0202	1439260.	10700.	-0. 000289	580. 1842	9. 394E+11	0. 000	0. 000	0. 000
28. 060	0. 0186	1499598.	10700.	-0. 000280	585. 7416	9. 394E+11	0. 000	0. 000	0. 000
28. 520	0. 0171	1559896.	10700.	-0. 000271	591. 2952	9. 394E+11	0. 000	0. 000	0. 000
28. 980	0. 0156	1620153.	10700.	-0. 000262	596. 8451	9. 394E+11	0. 000	0. 000	0. 000
29. 440	0. 0142	1680368.	10700.	-0. 000252	602. 3911	9. 394E+11	0. 000	0. 000	0. 000
29. 900	0. 0128	1740538.	10700.	-0. 000242	607. 9330	9. 394E+11	0. 000	0. 000	0. 000
30. 360	0. 0115	1800663.	10700.	-0. 000232	613. 4708	9. 394E+11	0. 000	0. 000	0. 000
30. 820	0. 0103	1860741.	10700.	-0. 000221	619. 0041	9. 394E+11	0. 000	0. 000	0. 000
31. 280	0. 009077	1920769.	10700.	-0. 000210	624. 5330	9. 394E+11	0. 000	0. 000	0. 000

IB2_B-4_Long_Scoured.l p7o									
31.740	0.007949	1980747.	10700.	-0.000199	630.0571	9.394E+11	0.000	0.000	0.000
32.200	0.006884	2040673.	10700.	-0.000187	635.5766	9.394E+11	0.000	0.000	0.000
32.660	0.005886	2100546.	10700.	-0.000175	641.0910	9.394E+11	0.000	0.000	0.000
33.120	0.004956	2160363.	10700.	-0.000162	646.6004	9.394E+11	0.000	0.000	0.000
33.580	0.004096	2220124.	10700.	-0.000149	652.1046	9.394E+11	0.000	0.000	0.000
34.040	0.003309	2279826.	10700.	-0.000136	657.6033	9.394E+11	0.000	0.000	0.000
34.500	0.002595	2339468.	10700.	-0.000122	663.0966	9.394E+11	0.000	0.000	0.000
34.960	0.001957	2399049.	10700.	-0.000109	668.5842	9.394E+11	0.000	0.000	0.000
35.420	0.001396	2458567.	10700.	-9.427E-05	674.0660	9.394E+11	0.000	0.000	0.000
35.880	0.000916	2518020.	-12809.	-7.965E-05	679.5419	9.394E+11	-8517.6988	51336000.	0.000
36.340	0.000517	2317869.	-49590.	-6.544E-05	661.1073	9.394E+11	-4808.8130	51336000.	0.000
36.800	0.000193	1971131.	-67828.	-4.875E-05	855.6499	5.506E+11	-1799.1409	51336000.	0.000
37.260	-2.109E-05	1569484.	-72252.	-3.100E-05	800.4298	5.506E+11	196.1427	51336000.	0.000
37.720	-0.000149	1173744.	-67892.	-1.725E-05	746.0218	5.506E+11	1383.7342	51336000.	0.000
38.180	-0.000212	820113.	-58643.	-7.257E-06	697.4033	5.506E+11	1967.2909	51336000.	0.000
38.640	-0.000229	526390.	-47338.	-5.077E-07	657.0211	5.506E+11	2128.7988	51336000.	0.000
39.100	-0.000217	297509.	-35889.	3.622E-06	625.5536	5.506E+11	2019.4144	51336000.	0.000
39.560	-0.000189	130147.	-25466.	5.765E-06	602.5439	5.506E+11	1756.9252	51336000.	0.000
40.020	-0.000153	16313.	-16677.	6.500E-06	586.8936	5.506E+11	1427.4595	51336000.	0.000
40.480	-0.000117	-54026.	-9730.0032	6.311E-06	592.0786	5.506E+11	1089.5987	51336000.	0.000
40.940	-8.382E-05	-91163.	-4571.1775	5.583E-06	597.1842	5.506E+11	779.5410	51336000.	0.000
41.400	-5.553E-05	-104542.	-994.3865	4.602E-06	599.0237	5.506E+11	516.3977	51336000.	0.000
41.860	-3.302E-05	-102182.	1278.3406	3.566E-06	598.6992	5.506E+11	307.0541	51336000.	0.000
42.320	-1.616E-05	-90461.	2540.6257	2.600E-06	597.0878	5.506E+11	150.2956	51336000.	0.000
42.780	-4.311E-06	-74157.	3066.0906	1.775E-06	594.8462	5.506E+11	40.0903	51336000.	0.000
43.240	3.436E-06	-56627.	3088.5511	1.120E-06	592.4362	5.506E+11	-31.9524	51336000.	0.000
43.700	8.049E-06	-40069.	2793.7671	6.349E-07	590.1597	5.506E+11	-74.8534	51336000.	0.000
44.160	1.044E-05	-25790.	2319.0818	3.047E-07	588.1965	5.506E+11	-97.1340	51336000.	0.000
44.620	1.141E-05	-14469.	1758.0383	1.030E-07	586.6401	5.506E+11	-106.1426	51336000.	0.000
45.080	1.158E-05	-6381.9068	1167.8183	-1.551E-09	585.5282	5.506E+11	-107.7052	51336000.	0.000
45.540	1.140E-05	-1576.3098	578.0377	-4.144E-08	584.8675	5.506E+11	-105.9834	51336000.	0.000
46.000	1.112E-05	0.000	0.000	-4.934E-08	584.6508	5.506E+11	-103.4505	25668000.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 3:

Pile-head deflection = 0.1197709 inches  
 Computed slope at pile head = 0.000000 radians  
 Maximum bending moment = 2518020. inch-lbs  
 Maximum shear force = -72252. lbs  
 Depth of maximum bending moment = 35.8800000 feet below pile head  
 Depth of maximum shear force = 37.2600000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 2

-----  
 Pile-head Deflection vs. Pile Length for Load Case 3  
 -----

Boundary Condition Type 2, Shear and Slope

Shear = 10700. lb  
 Slope = 0.00000  
 Axial Load = 810000. lb

I B2\_B-4\_Long\_Scoured. I p7o

Pile Length feet	Pile Head Deflection inches	Maximum Moment in-lbs	Maximum Shear lbs
46.0000	0.1197709	2518020.	-72252.
43.7000	0.1195738	2511176.	-72203.
41.4000	0.1162988	2503049.	-70747.
39.1000	0.1182961	2484580.	-84390.
39.1000	0.000000	2957785896.	315538009.
39.1000	0.000000	2957785896.	315538009.
39.1000	0.000000	2957785896.	315538009.
39.1000	0.000000	2957785896.	315538009.
39.1000	0.000000	2957785896.	315538009.
39.1000	0.000000	2957785896.	315538009.
39.1000	0.000000	2957785896.	315538009.
39.1000	0.000000	2957785896.	315538009.
39.1000	0.000000	2957785896.	315538009.
39.1000	0.000000	2957785896.	315538009.
39.1000	0.000000	2957785896.	315538009.
39.1000	0.000000	2957785896.	315538009.
39.1000	0.000000	2957785896.	315538009.
39.1000	0.000000	2957785896.	315538009.
39.1000	0.000000	2957785896.	315538009.
39.1000	0.000000	2957785896.	315538009.
39.1000	0.000000	2957785896.	315538009.

-----  
 Computed Values of Pile Loading and Deflection  
 for Lateral Loading for Load Case Number 4  
 -----

Pile-head conditions are Shear and Pile-head Rotation (Loading Type 2)

Shear force at pile head = 20700.0 lbs  
 Rotation of pile head = 0.000E+00 radians  
 Axial load at pile head = 1155000.0 lbs

(Zero slope for this load indicates fixed-head conditions)

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi *	Bending Stiffness lb-in^2	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.2341	-4263956.	20700.	0.000	1419.8946	5.506E+11	0.000	0.000	0.000
0.460	0.2340	-4149556.	20700.	-4.217E-05	1404.1664	5.506E+11	0.000	0.000	0.000
0.920	0.2336	-4034890.	20700.	-8.319E-05	1388.4017	5.506E+11	0.000	0.000	0.000
1.380	0.2330	-3919967.	20700.	-0.000123	1372.6016	5.506E+11	0.000	0.000	0.000
1.840	0.2323	-3804793.	20700.	-0.000162	1356.7670	5.506E+11	0.000	0.000	0.000
2.300	0.2313	-3689376.	20700.	-0.000199	1340.8990	5.506E+11	0.000	0.000	0.000
2.760	0.2301	-3573723.	20700.	-0.000236	1324.9986	5.506E+11	0.000	0.000	0.000
3.220	0.2287	-3457842.	20700.	-0.000271	1309.0668	5.506E+11	0.000	0.000	0.000
3.680	0.2271	-3341740.	20700.	-0.000305	1293.1045	5.506E+11	0.000	0.000	0.000
4.140	0.2253	-3225424.	20700.	-0.000338	1277.1130	5.506E+11	0.000	0.000	0.000
4.600	0.2233	-3108902.	20700.	-0.000370	1261.0931	5.506E+11	0.000	0.000	0.000
5.060	0.2212	-2992181.	20700.	-0.000400	1245.0458	5.506E+11	0.000	0.000	0.000
5.520	0.2189	-2875269.	20700.	-0.000430	1228.9723	5.506E+11	0.000	0.000	0.000
5.980	0.2165	-2758173.	20700.	-0.000458	1212.8735	5.506E+11	0.000	0.000	0.000
6.440	0.2139	-2640901.	20700.	-0.000485	1196.7505	5.506E+11	0.000	0.000	0.000
6.900	0.2111	-2523461.	20700.	-0.000511	1180.6043	5.506E+11	0.000	0.000	0.000
7.360	0.2082	-2405859.	20700.	-0.000536	1164.4359	5.506E+11	0.000	0.000	0.000

I B2\_B-4\_Long\_Scoured. I p7o

7. 820	0. 2052	-2288103.	20700.	-0. 000559	1148. 2463	5. 506E+11	0. 000	0. 000	0. 000
8. 280	0. 2020	-2170201.	20700.	-0. 000581	1132. 0367	5. 506E+11	0. 000	0. 000	0. 000
8. 740	0. 1988	-2052160.	20700.	-0. 000603	1115. 8080	5. 506E+11	0. 000	0. 000	0. 000
9. 200	0. 1954	-1933988.	20700.	-0. 000623	1099. 5612	5. 506E+11	0. 000	0. 000	0. 000
9. 660	0. 1919	-1815693.	20700.	-0. 000641	1083. 2975	5. 506E+11	0. 000	0. 000	0. 000
10. 120	0. 1883	-1697281.	20700.	-0. 000659	1067. 0178	5. 506E+11	0. 000	0. 000	0. 000
10. 580	0. 1846	-1578761.	20700.	-0. 000675	1050. 7232	5. 506E+11	0. 000	0. 000	0. 000
11. 040	0. 1808	-1460140.	20700.	-0. 000691	1034. 4147	5. 506E+11	0. 000	0. 000	0. 000
11. 500	0. 1770	-1341426.	20700.	-0. 000705	1018. 0934	5. 506E+11	0. 000	0. 000	0. 000
11. 960	0. 1731	-1222626.	20700.	-0. 000718	1001. 7602	5. 506E+11	0. 000	0. 000	0. 000
12. 420	0. 1691	-1103748.	20700.	-0. 000729	985. 4164	5. 506E+11	0. 000	0. 000	0. 000
12. 880	0. 1650	-984799.	20700.	-0. 000738	728. 9811	9. 394E+11	0. 000	0. 000	0. 000
13. 340	0. 1609	-865813.	20700.	-0. 000743	718. 0221	9. 394E+11	0. 000	0. 000	0. 000
13. 800	0. 1568	-746795.	20700.	-0. 000748	707. 0601	9. 394E+11	0. 000	0. 000	0. 000
14. 260	0. 1527	-627749.	20700.	-0. 000752	696. 0956	9. 394E+11	0. 000	0. 000	0. 000
14. 720	0. 1485	-508680.	20700.	-0. 000755	685. 1288	9. 394E+11	0. 000	0. 000	0. 000
15. 180	0. 1443	-389591.	20700.	-0. 000758	674. 1604	9. 394E+11	0. 000	0. 000	0. 000
15. 640	0. 1401	-270488.	20700.	-0. 000760	663. 1905	9. 394E+11	0. 000	0. 000	0. 000
16. 100	0. 1359	-151375.	20700.	-0. 000761	652. 2198	9. 394E+11	0. 000	0. 000	0. 000
16. 560	0. 1317	-32256.	20700.	-0. 000762	641. 2485	9. 394E+11	0. 000	0. 000	0. 000
17. 020	0. 1275	86865.	20700.	-0. 000761	646. 2782	9. 394E+11	0. 000	0. 000	0. 000
17. 480	0. 1233	205981.	20700.	-0. 000761	657. 2493	9. 394E+11	0. 000	0. 000	0. 000
17. 940	0. 1191	325091.	20700.	-0. 000759	668. 2196	9. 394E+11	0. 000	0. 000	0. 000
18. 400	0. 1150	444188.	20700.	-0. 000757	679. 1889	9. 394E+11	0. 000	0. 000	0. 000
18. 860	0. 1108	563268.	20700.	-0. 000754	690. 1566	9. 394E+11	0. 000	0. 000	0. 000
19. 320	0. 1066	682327.	20700.	-0. 000750	701. 1224	9. 394E+11	0. 000	0. 000	0. 000
19. 780	0. 1025	801361.	20700.	-0. 000746	712. 0858	9. 394E+11	0. 000	0. 000	0. 000
20. 240	0. 0984	920365.	20700.	-0. 000741	723. 0465	9. 394E+11	0. 000	0. 000	0. 000
20. 700	0. 0943	1039334.	20700.	-0. 000735	734. 0040	9. 394E+11	0. 000	0. 000	0. 000
21. 160	0. 0903	1158264.	20700.	-0. 000728	744. 9579	9. 394E+11	0. 000	0. 000	0. 000
21. 620	0. 0863	1277151.	20700.	-0. 000721	755. 9078	9. 394E+11	0. 000	0. 000	0. 000
22. 080	0. 0823	1395990.	20700.	-0. 000713	766. 8533	9. 394E+11	0. 000	0. 000	0. 000
22. 540	0. 0784	1514777.	20700.	-0. 000705	777. 7940	9. 394E+11	0. 000	0. 000	0. 000
23. 000	0. 0745	1633507.	20700.	-0. 000696	788. 7294	9. 394E+11	0. 000	0. 000	0. 000
23. 460	0. 0707	1752176.	20700.	-0. 000686	799. 6593	9. 394E+11	0. 000	0. 000	0. 000
23. 920	0. 0670	1870779.	20700.	-0. 000675	810. 5830	9. 394E+11	0. 000	0. 000	0. 000
24. 380	0. 0633	1989312.	20700.	-0. 000664	821. 5003	9. 394E+11	0. 000	0. 000	0. 000
24. 840	0. 0596	2107771.	20700.	-0. 000652	832. 4108	9. 394E+11	0. 000	0. 000	0. 000
25. 300	0. 0561	2226150.	20700.	-0. 000639	843. 3140	9. 394E+11	0. 000	0. 000	0. 000
25. 760	0. 0526	2344446.	20700.	-0. 000626	854. 2095	9. 394E+11	0. 000	0. 000	0. 000
26. 220	0. 0492	2462655.	20700.	-0. 000611	865. 0969	9. 394E+11	0. 000	0. 000	0. 000
26. 680	0. 0458	2580771.	20700.	-0. 000597	875. 9758	9. 394E+11	0. 000	0. 000	0. 000
27. 140	0. 0426	2698790.	20700.	-0. 000581	886. 8458	9. 394E+11	0. 000	0. 000	0. 000
27. 600	0. 0394	2816708.	20700.	-0. 000565	897. 7065	9. 394E+11	0. 000	0. 000	0. 000
28. 060	0. 0364	2934521.	20700.	-0. 000548	908. 5575	9. 394E+11	0. 000	0. 000	0. 000
28. 520	0. 0334	3052224.	20700.	-0. 000530	919. 3983	9. 394E+11	0. 000	0. 000	0. 000
28. 980	0. 0305	3169812.	20700.	-0. 000512	930. 2286	9. 394E+11	0. 000	0. 000	0. 000
29. 440	0. 0277	3287282.	20700.	-0. 000493	941. 0480	9. 394E+11	0. 000	0. 000	0. 000
29. 900	0. 0251	3404629.	20700.	-0. 000473	951. 8560	9. 394E+11	0. 000	0. 000	0. 000
30. 360	0. 0225	3521848.	20700.	-0. 000453	962. 6523	9. 394E+11	0. 000	0. 000	0. 000
30. 820	0. 0201	3638935.	20700.	-0. 000432	973. 4365	9. 394E+11	0. 000	0. 000	0. 000
31. 280	0. 0177	3755885.	20700.	-0. 000410	984. 2080	9. 394E+11	0. 000	0. 000	0. 000
31. 740	0. 0155	3872695.	20700.	-0. 000388	994. 9666	9. 394E+11	0. 000	0. 000	0. 000
32. 200	0. 0134	3989360.	20700.	-0. 000365	1005. 7119	9. 394E+11	0. 000	0. 000	0. 000
32. 660	0. 0115	4105876.	20700.	-0. 000341	1016. 4434	9. 394E+11	0. 000	0. 000	0. 000
33. 120	0. 009676	4222237.	20700.	-0. 000317	1027. 1607	9. 394E+11	0. 000	0. 000	0. 000
33. 580	0. 007997	4338441.	20700.	-0. 000291	1037. 8635	9. 394E+11	0. 000	0. 000	0. 000
34. 040	0. 006459	4454482.	20700.	-0. 000266	1048. 5512	9. 394E+11	0. 000	0. 000	0. 000
34. 500	0. 005065	4570356.	20700.	-0. 000239	1059. 2236	9. 394E+11	0. 000	0. 000	0. 000
34. 960	0. 003819	4686059.	20700.	-0. 000212	1069. 8803	9. 394E+11	0. 000	0. 000	0. 000

IB2_B-4_Long_Scoured.l p7o									
35.420	0.002725	4801586.	20700.	-0.000184	1080.5208	9.394E+11	0.000	0.000	0.000
35.880	0.001787	4916933.	-25173.	-0.000155	1091.1447	9.394E+11	-16621.	51336000.	0.000
36.340	0.001009	4525656.	-96938.	-0.000128	1055.1066	9.394E+11	-9380.9021	51336000.	0.000
36.800	0.000377	3848369.	-132506.	-9.515E-05	1362.7581	5.506E+11	-3506.2934	51336000.	0.000
37.260	-4.171E-05	3063999.	-141113.	-6.050E-05	1254.9196	5.506E+11	387.8578	51336000.	0.000
37.720	-0.000291	2291250.	-132576.	-3.366E-05	1148.6791	5.506E+11	2705.2063	51336000.	0.000
38.180	-0.000413	1600784.	-114502.	-1.415E-05	1053.7510	5.506E+11	3843.4257	51336000.	0.000
38.640	-0.000447	1027327.	-92419.	-9.755E-07	974.9098	5.506E+11	4157.8455	51336000.	0.000
39.100	-0.000424	580495.	-70059.	7.083E-06	913.4775	5.506E+11	3943.5798	51336000.	0.000
39.560	-0.000369	253788.	-49706.	1.127E-05	868.5605	5.506E+11	3430.5784	51336000.	0.000
40.020	-0.000300	31596.	-32546.	1.270E-05	838.0127	5.506E+11	2786.9721	51336000.	0.000
40.480	-0.000229	-105678.	-18983.	1.232E-05	848.1977	5.506E+11	2127.1057	51336000.	0.000
40.940	-0.000164	-178131.	-8912.2763	1.090E-05	858.1589	5.506E+11	1521.6234	51336000.	0.000
41.400	-0.000108	-204208.	-1931.0367	8.985E-06	861.7441	5.506E+11	1007.8112	51336000.	0.000
41.860	-6.442E-05	-199564.	2504.0083	6.961E-06	861.1056	5.506E+11	599.0892	51336000.	0.000
42.320	-3.151E-05	-176653.	4966.3600	5.076E-06	857.9557	5.506E+11	293.0672	51336000.	0.000
42.780	-8.382E-06	-144800.	5990.3807	3.465E-06	853.5765	5.506E+11	77.9548	51336000.	0.000
43.240	6.736E-06	-110563.	6032.6485	2.185E-06	848.8694	5.506E+11	-62.6403	51336000.	0.000
43.700	1.574E-05	-78228.	5455.8707	1.238E-06	844.4238	5.506E+11	-146.3372	51336000.	0.000
44.160	2.041E-05	-50346.	4528.1975	5.938E-07	840.5905	5.506E+11	-189.7763	51336000.	0.000
44.620	2.229E-05	-28244.	3432.2494	1.999E-07	837.5518	5.506E+11	-207.3063	51336000.	0.000
45.080	2.261E-05	-12457.	2279.6522	-4.093E-09	835.3813	5.506E+11	-210.3014	51336000.	0.000
45.540	2.225E-05	-3076.4172	1128.2149	-8.195E-08	834.0917	5.506E+11	-206.8860	51336000.	0.000
46.000	2.171E-05	0.000	0.000	-9.737E-08	833.6687	5.506E+11	-201.8875	25668000.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 4:

Pile-head deflection = 0.2340790 inches  
 Computed slope at pile head = 0.000000 radians  
 Maximum bending moment = 4916933. inch-lbs  
 Maximum shear force = -141113. lbs  
 Depth of maximum bending moment = 35.8800000 feet below pile head  
 Depth of maximum shear force = 37.2600000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 2

-----  
 Pile-head Deflection vs. Pile Length for Load Case 4  
 -----

Boundary Condition Type 2, Shear and Slope

Shear = 20700. lb  
 Slope = 0.00000  
 Axial Load = 1155000. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
46.0000	0.2340790	4916933.	-141113.
43.7000	0.2336910	4903552.	-141020.
41.4000	0.2272456	4886666.	-138152.
39.1000	0.2311771	4851485.	-164793.

I B2\_B-4\_Long\_Scoured. I p7o

39. 1000	0. 000000	5780181798.	616622865.
39. 1000	0. 000000	5780181798.	616622865.
39. 1000	0. 000000	5780181798.	616622865.
39. 1000	0. 000000	5780181798.	616622865.
39. 1000	0. 000000	5780181798.	616622865.
39. 1000	0. 000000	5780181798.	616622865.
39. 1000	0. 000000	5780181798.	616622865.
39. 1000	0. 000000	5780181798.	616622865.
39. 1000	0. 000000	5780181798.	616622865.
39. 1000	0. 000000	5780181798.	616622865.
39. 1000	0. 000000	5780181798.	616622865.
39. 1000	0. 000000	5780181798.	616622865.
39. 1000	0. 000000	5780181798.	616622865.
39. 1000	0. 000000	5780181798.	616622865.
39. 1000	0. 000000	5780181798.	616622865.
39. 1000	0. 000000	5780181798.	616622865.

-----  
 Summary of Pile Response(s)  
 -----

Defin itions of Pile-head Loading Condi tions:

- Load Type 1: Load 1 = Shear, lbs, and Load 2 = Moment, in-lbs
- Load Type 2: Load 1 = Shear, lbs, and Load 2 = Slope, radians
- Load Type 3: Load 1 = Shear, lbs, and Load 2 = Rotational Sti ffness, in-lbs/radian
- Load Type 4: Load 1 = Top Deflection, inches, and Load 2 = Moment, in-lbs
- Load Type 5: Load 1 = Top Deflection, inches, and Load 2 = Slope, radians

Load Case No.	Load Type No.	Pile-head Condition 1 V(lbs) or y(inches)	Pile-head Condition 2 in-lb, rad., or in-lb/rad.	Axial Loading lbs	Pile-head Deflection inches	Maximum Moment in Pile in-lbs	Maximum Shear in Pile lbs	Pile-head Rotation radians
1	1	V = 10700.	M = 2616000.	810000.	0. 74907778	7827579.	-225246.	-0. 00308139
2	1	V = 20700.	M = 4608000.	1155000.	1. 44109705	15179069.	-436855.	-0. 00585965
3	2	V = 10700.	S = 0. 000	810000.	0. 11977094	2518020.	-72252.	0. 00000000
4	2	V = 20700.	S = 0. 000	1155000.	0. 23407905	4916933.	-141113.	0. 00000000

-----  
 Summary of Warning Messages  
 -----

The following warning was reported 4000 times

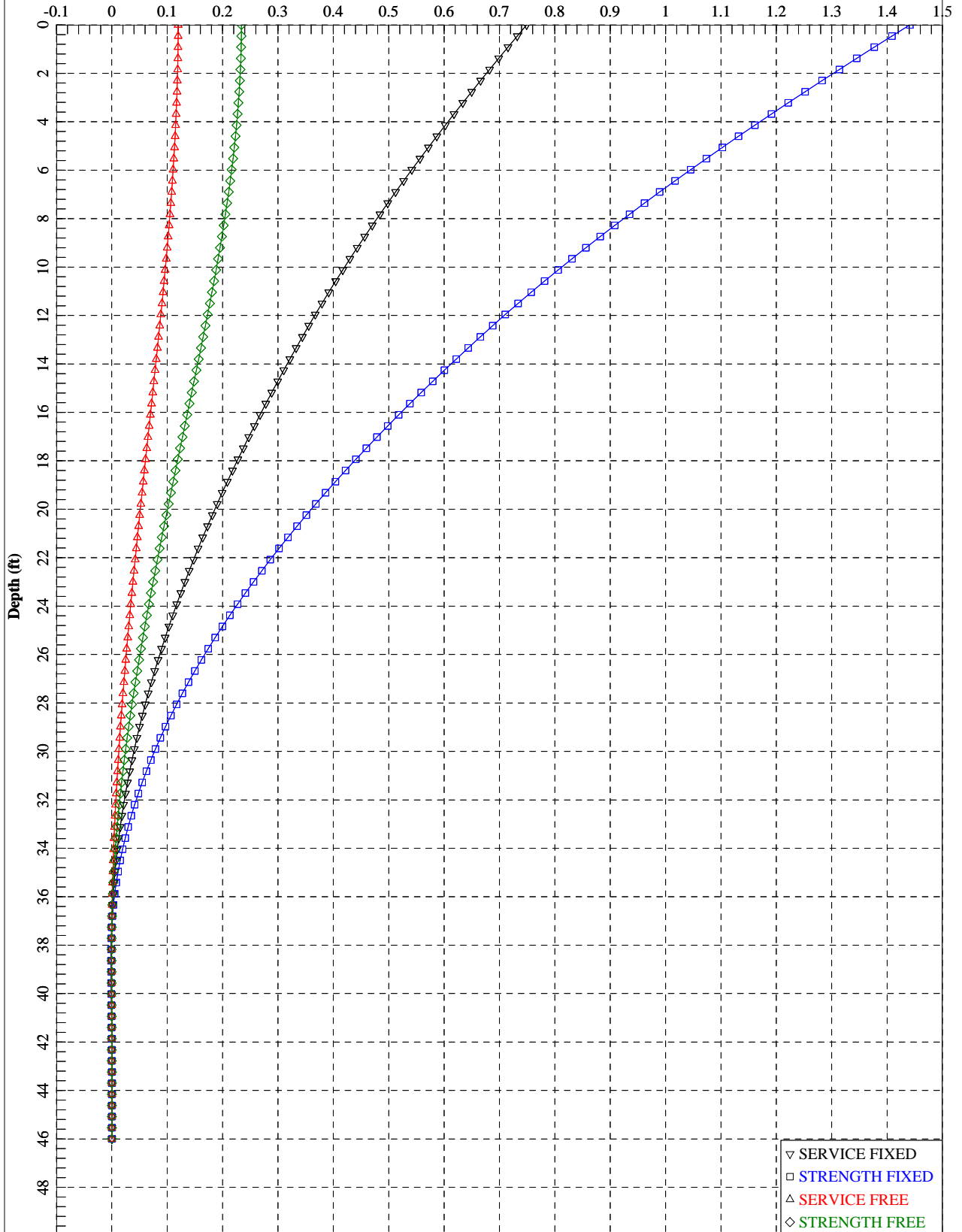
\*\*\*\* Warning \*\*\*\*

An unreasonable input value for uniaxial compressive strength has been specified for a soil defined using the vuggy limestone criteria. The input value is outside of the range of 1,000 to 2,500 psi (6,895 to 17,237 kPa). You should check your input data for correctness.

The analysis ended normally.

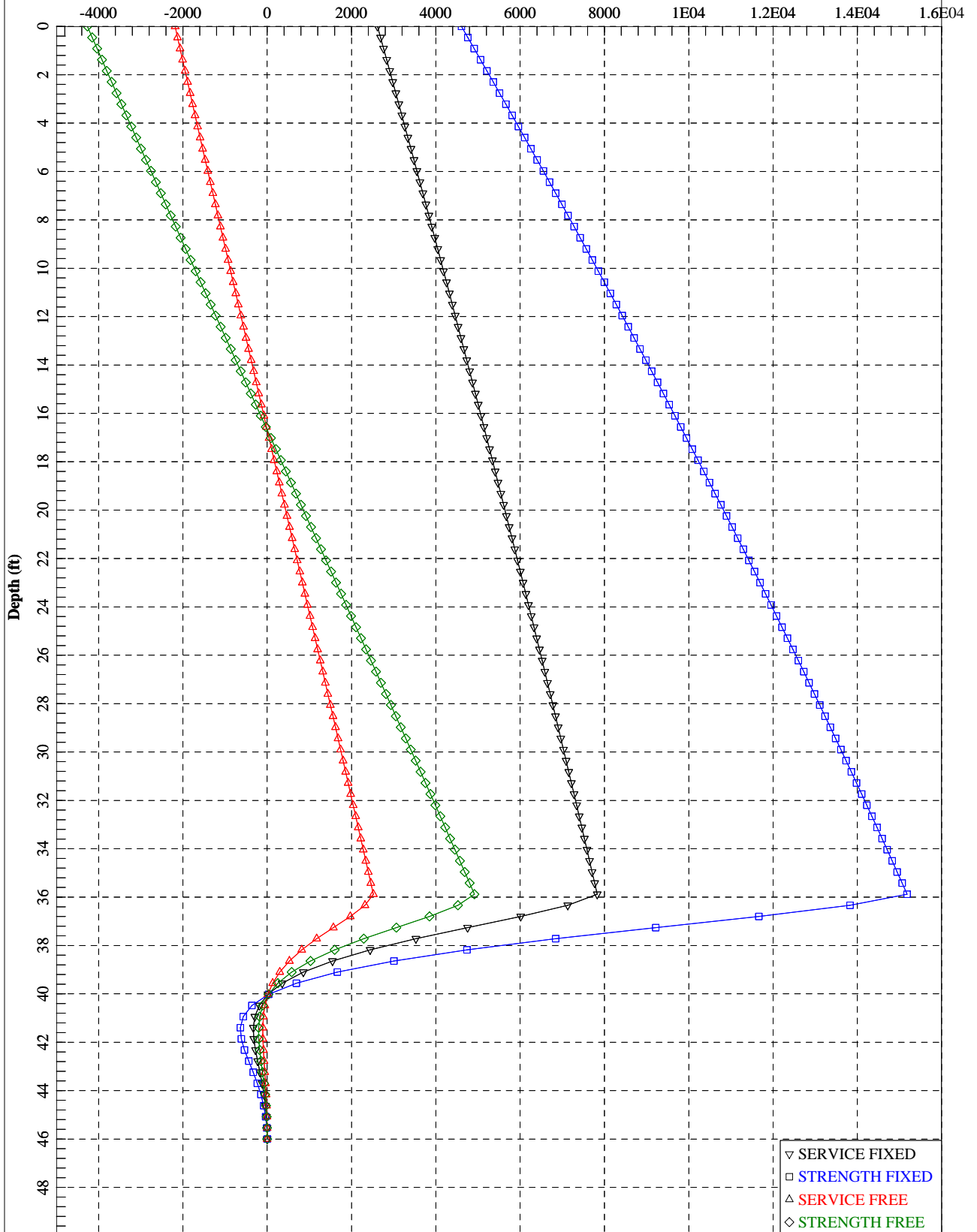
IB2\_B-4\_Long\_Scoured.1p7o

SC 557 Bridge over Crowders Creek - IB2 - Boring B-4 - 48" Dia. Drilled Shaft - Scoured Longitudinal Analysis  
Lateral Pile Deflection (inches)

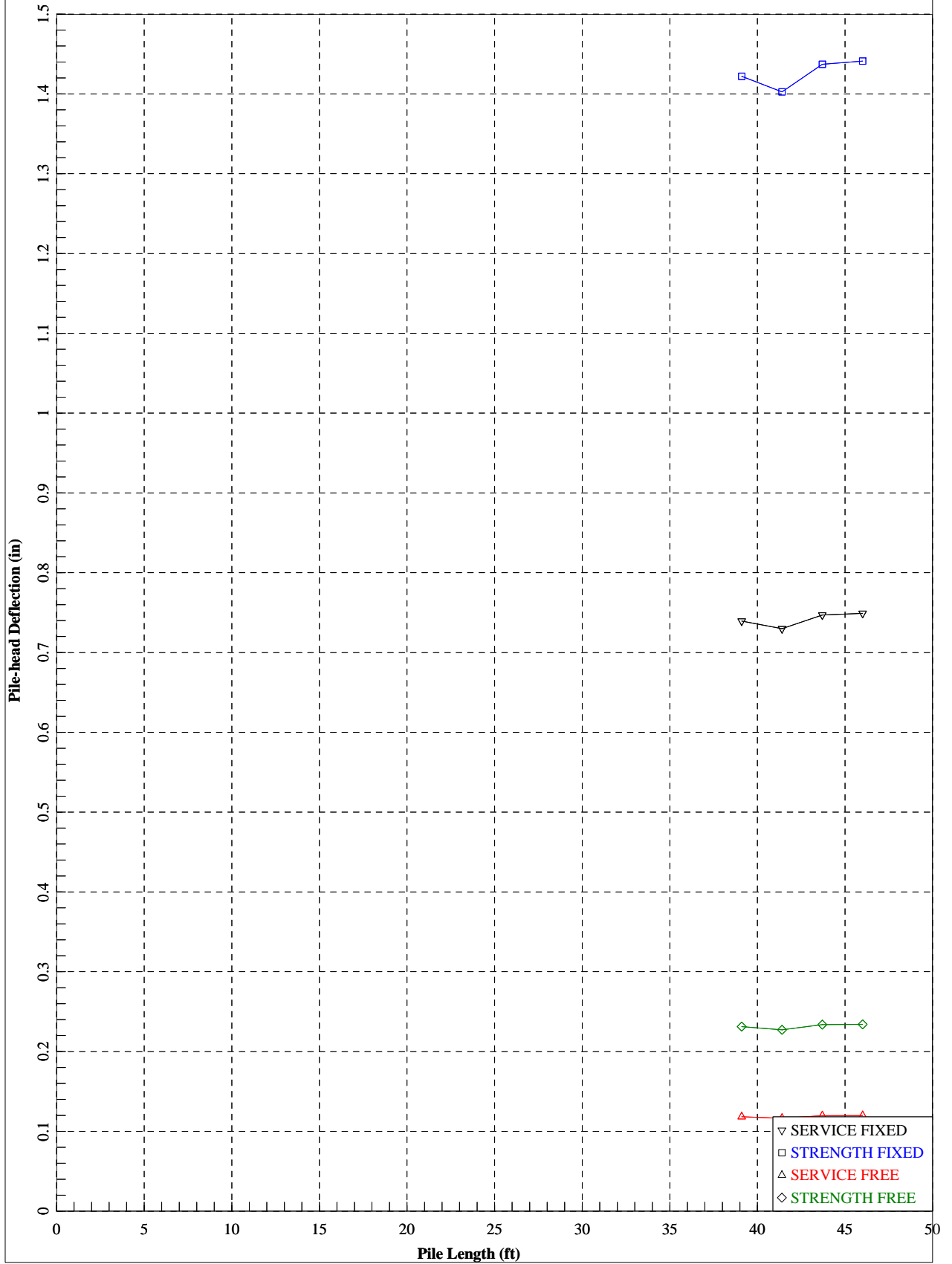




SC 557 Bridge over Crowders Creek - IB2 - Boring B-4 - 48" Dia. Drilled Shaft - Scoured Longitudinal Analysis  
Bending Moment (in-kips)



SC 557 Bridge over Crowders Creek - IB2 - Boring B-4 - 48" Dia. Drilled Shaft - Scoured Longitudinal Analysis



=====  
LPile Plus for Windows, Version 2013-07.007

Analysis of Individual Piles and Drilled Shafts  
Subjected to Lateral Loading Using the p-y Method

© 1985-2013 by Ensoft, Inc.  
All Rights Reserved

=====  
This copy of LPile is used by:

Bradley Fischer  
F&ME

Serial Number of Security Device: 291490957

This copy of LPile is licensed for exclusive use by: F&ME Consultants, Columbia, Sout

Use of this program by any entity other than F&ME Consultants, Columbia, Sout  
is forbidden by the software license agreement.

-----  
Files Used for Analysis  
-----

Path to file locations: P:\Geotechnical\G4800's\G4843 - SC557 - York County\Report\Final\Bridge\LPile\  
Name of input data file: IB2\_B-4\_Trans\_Scoured.l p7d  
Name of output report file: IB2\_B-4\_Trans\_Scoured.l p7o  
Name of plot output file: IB2\_B-4\_Trans\_Scoured.l p7p  
Name of runtime message file: IB2\_B-4\_Trans\_Scoured.l p7r

-----  
Date and Time of Analysis  
-----

Date: July 31, 2018 Time: 8:51:46

-----  
Problem Title  
-----

Project Name: SC 557 over Crowders Creek

Job Number: G4843

Client: CALYX

Engineer: JFH

Description: IB2 - Boring B-4 - 48" Dia. Drilled Shaft - Scoured Trans.

-----  
 Program Options and Settings  
 -----

Engineering Units of Input Data and Computations:

- Engineering units are US Customary Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

Computational Options:

- Use unfactored loads in computations (conventional analysis)
- Compute pile response under loading and nonlinear bending properties of pile (only if nonlinear pile properties are input)
- Analysis uses p-y modification factors for p-y curves
- Analysis includes loading by lateral soil movements acting on pile
- Input of shear resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- No p-y curves to be computed and reported for user-specified depths
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1

-----  
 Pile Structural Properties and Geometry  
 -----

- Total number of pile sections = 3
- Total length of pile = 46.00 ft
- Depth of ground surface below top of pile = 35.50 ft

Pile diameter values used for p-y curve computations are defined using 6 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile.

Point	Depth X ft	Pile Diameter in
1	0.00000	42.0000000
2	12.50000	42.0000000
3	12.50000	48.0000000
4	36.50000	48.0000000

5	36.500000	42.0000000
6	46.000000	42.0000000

-----  
Input Structural Properties:  
-----

Pile Section No. 1:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Circular
Section Length	=	12.50000 ft
Top Width	=	42.00000 in
Bottom Width	=	42.00000 in
Top Area	=	1385.44236 Sq. in
Bottom Area	=	1385.44236 Sq. in
Moment of Inertia at Top	=	152745. in^4
Moment of Inertia at Bottom	=	152745. in^4
Elastic Modulus	=	3605000. lbs/in^2

Pile Section No. 2:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Circular
Section Length	=	24.00000 ft
Top Width	=	48.00000 in
Bottom Width	=	48.00000 in
Top Area	=	1809.55737 Sq. in
Bottom Area	=	1809.55737 Sq. in
Moment of Inertia at Top	=	260576. in^4
Moment of Inertia at Bottom	=	260576. in^4
Elastic Modulus	=	3605000. lbs/in^2

Pile Section No. 3:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Circular
Section Length	=	9.50000 ft
Top Width	=	42.00000 in
Bottom Width	=	42.00000 in
Top Area	=	1385.44236 Sq. in
Bottom Area	=	1385.44236 Sq. in
Moment of Inertia at Top	=	152745. in^4
Moment of Inertia at Bottom	=	152745. in^4
Elastic Modulus	=	3605000. lbs/in^2

-----  
Ground Slope and Pile Batter Angles  
-----

Ground Slope Angle	=	0.000 degrees
	=	0.000 radians
Pile Batter Angle	=	0.000 degrees
	=	0.000 radians

-----  
Soil and Rock Layering Information  
-----

The soil profile is modelled using 1 layers

Layer 1 is strong rock (vuggy limestone)

Distance from top of pile to top of layer = 35.50000 ft  
 Distance from top of pile to bottom of layer = 60.00000 ft  
 Effective unit weight at top of layer = 98.00000 pcf  
 Effective unit weight at bottom of layer = 98.00000 pcf  
 Uniaxial compressive strength at top of layer = 10000.00000 psi  
 Uniaxial compressive strength at bottom of layer = 10000.00000 psi

(Depth of lowest soil layer extends 14.00 ft below pile tip)

Summary of Soil Properties

Layer Num.	Layer Soil Type (p-y Curve Criteria)	Layer Depth ft	Effective Unit Wt. pcf	Uniaxial qu psi
1	Vuggy Limestone	35.500 60.000	98.000 98.000	10000.000 10000.000

p-y Modification Factors for Group Action

Distribution of p-y modifiers with depth defined using 2 points

Point No.	Depth X ft	p-mult	y-mult
1	35.500	1.0000	1.0000
2	100.000	1.0000	1.0000

Lateral Soil Movements

Profile of soil movement with depth defined using 2 points

Point No.	Depth X ft	Soil Movement in
1	0.00000	0.00000
2	0.00000	0.00000

Loading Type

-----  
 Static loading criteria were used when computing p-y curves for all analyses.  
 -----

-----  
 Pile-head Loading and Pile-head Fixity Conditions  
 -----

Number of loads specified = 4

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length
1	1	V = 16800. lbs	M = 1404000. in-lbs	810000.	Yes
2	1	V = 15600. lbs	M = 1368000. in-lbs	1155000.	Yes
3	2	V = 16800. lbs	S = 0.0000 in/in	810000.	Yes
4	2	V = 15600. lbs	S = 0.0000 in/in	1155000.	Yes

V = perpendicular shear force applied to pile head  
 M = bending moment applied to pile head  
 y = lateral deflection relative to pile axis  
 S = pile slope relative to original pile batter angle  
 R = rotational stiffness applied to pile head  
 Axial thrust is assumed to be acting axially for all pile batter angles.

-----  
 Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness  
 -----

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 3

Pile Section No. 1:  
 -----

Moment-curvature properties were derived from elastic section properties

Pile Section No. 2:  
 -----

Moment-curvature properties were derived from elastic section properties

Pile Section No. 3:  
 -----

Moment-curvature properties were derived from elastic section properties

-----  
 Computed Values of Pile Loading and Deflection  
 for Lateral Loading for Load Case Number 1  
 -----

Pile-head conditions are Shear and Moment (Loading Type 1)

I B2\_B-4\_Trans\_Scoured. I p7o

Shear force at pile head = 16800.0 lbs  
 Applied moment at pile head = 1404000.0 in-lbs  
 Axial thrust load on pile head = 810000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi *	Bending Stiffness lb-in^2	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.8186	1404000.	16800.	-0.003096	777.6784	5.506E+11	0.000	0.000	0.000
0.460	0.8016	1510546.	16800.	-0.003081	792.3268	5.506E+11	0.000	0.000	0.000
0.920	0.7846	1617025.	16800.	-0.003065	806.9659	5.506E+11	0.000	0.000	0.000
1.380	0.7677	1723431.	16800.	-0.003049	821.5950	5.506E+11	0.000	0.000	0.000
1.840	0.7509	1829760.	16800.	-0.003031	836.2136	5.506E+11	0.000	0.000	0.000
2.300	0.7342	1936007.	16800.	-0.003012	850.8208	5.506E+11	0.000	0.000	0.000
2.760	0.7177	2042167.	16800.	-0.002992	865.4161	5.506E+11	0.000	0.000	0.000
3.220	0.7012	2148235.	16800.	-0.002971	879.9989	5.506E+11	0.000	0.000	0.000
3.680	0.6849	2254208.	16800.	-0.002949	894.5683	5.506E+11	0.000	0.000	0.000
4.140	0.6687	2360079.	16800.	-0.002926	909.1239	5.506E+11	0.000	0.000	0.000
4.600	0.6526	2465844.	16800.	-0.002902	923.6650	5.506E+11	0.000	0.000	0.000
5.060	0.6366	2571499.	16800.	-0.002876	938.1909	5.506E+11	0.000	0.000	0.000
5.520	0.6208	2677039.	16800.	-0.002850	952.7009	5.506E+11	0.000	0.000	0.000
5.980	0.6052	2782459.	16800.	-0.002823	967.1944	5.506E+11	0.000	0.000	0.000
6.440	0.5897	2887753.	16800.	-0.002794	981.6708	5.506E+11	0.000	0.000	0.000
6.900	0.5743	2992919.	16800.	-0.002765	996.1294	5.506E+11	0.000	0.000	0.000
7.360	0.5591	3097950.	16800.	-0.002734	1010.5695	5.506E+11	0.000	0.000	0.000
7.820	0.5441	3202843.	16800.	-0.002703	1024.9905	5.506E+11	0.000	0.000	0.000
8.280	0.5293	3307592.	16800.	-0.002670	1039.3918	5.506E+11	0.000	0.000	0.000
8.740	0.5146	3412193.	16800.	-0.002636	1053.7728	5.506E+11	0.000	0.000	0.000
9.200	0.5002	3516640.	16800.	-0.002602	1068.1327	5.506E+11	0.000	0.000	0.000
9.660	0.4859	3620930.	16800.	-0.002566	1082.4709	5.506E+11	0.000	0.000	0.000
10.120	0.4719	3725058.	16800.	-0.002529	1096.7868	5.506E+11	0.000	0.000	0.000
10.580	0.4580	3829019.	16800.	-0.002491	1111.0798	5.506E+11	0.000	0.000	0.000
11.040	0.4444	3932808.	16800.	-0.002452	1125.3491	5.506E+11	0.000	0.000	0.000
11.500	0.4309	4036421.	16800.	-0.002412	1139.5943	5.506E+11	0.000	0.000	0.000
11.960	0.4177	4139853.	16800.	-0.002371	1153.8145	5.506E+11	0.000	0.000	0.000
12.420	0.4047	4243100.	16800.	-0.002329	1168.0093	5.506E+11	0.000	0.000	0.000
12.880	0.3920	4346156.	16800.	-0.002295	847.9197	9.394E+11	0.000	0.000	0.000
13.340	0.3794	4449098.	16800.	-0.002270	857.4011	9.394E+11	0.000	0.000	0.000
13.800	0.3669	4551924.	16800.	-0.002243	866.8716	9.394E+11	0.000	0.000	0.000
14.260	0.3546	4654629.	16800.	-0.002216	876.3312	9.394E+11	0.000	0.000	0.000
14.720	0.3425	4757213.	16800.	-0.002188	885.7795	9.394E+11	0.000	0.000	0.000
15.180	0.3305	4859671.	16800.	-0.002160	895.2162	9.394E+11	0.000	0.000	0.000
15.640	0.3186	4962002.	16800.	-0.002131	904.6413	9.394E+11	0.000	0.000	0.000
16.100	0.3069	5064202.	16800.	-0.002102	914.0543	9.394E+11	0.000	0.000	0.000
16.560	0.2954	5166269.	16800.	-0.002072	923.4550	9.394E+11	0.000	0.000	0.000
17.020	0.2841	5268201.	16800.	-0.002041	932.8433	9.394E+11	0.000	0.000	0.000
17.480	0.2729	5369994.	16800.	-0.002010	942.2188	9.394E+11	0.000	0.000	0.000
17.940	0.2619	5471646.	16800.	-0.001978	951.5813	9.394E+11	0.000	0.000	0.000
18.400	0.2511	5573154.	16800.	-0.001946	960.9306	9.394E+11	0.000	0.000	0.000
18.860	0.2404	5674516.	16800.	-0.001913	970.2663	9.394E+11	0.000	0.000	0.000
19.320	0.2299	5775728.	16800.	-0.001879	979.5884	9.394E+11	0.000	0.000	0.000
19.780	0.2197	5876789.	16800.	-0.001845	988.8965	9.394E+11	0.000	0.000	0.000
20.240	0.2096	5977696.	16800.	-0.001810	998.1903	9.394E+11	0.000	0.000	0.000
20.700	0.1997	6078445.	16800.	-0.001774	1007.4697	9.394E+11	0.000	0.000	0.000
21.160	0.1900	6179035.	16800.	-0.001738	1016.7344	9.394E+11	0.000	0.000	0.000
21.620	0.1805	6279463.	16800.	-0.001702	1025.9841	9.394E+11	0.000	0.000	0.000
22.080	0.1712	6379725.	16800.	-0.001665	1035.2186	9.394E+11	0.000	0.000	0.000
22.540	0.1621	6479820.	16800.	-0.001627	1044.4377	9.394E+11	0.000	0.000	0.000
23.000	0.1532	6579745.	16800.	-0.001588	1053.6411	9.394E+11	0.000	0.000	0.000



IB2_B-4_Trans_Scored.l p7o									
23.460	0.1446	6679496.	16800.	-0.001549	1062.8286	9.394E+11	0.000	0.000	0.000
23.920	0.1361	6779073.	16800.	-0.001510	1072.0000	9.394E+11	0.000	0.000	0.000
24.380	0.1279	6878471.	16800.	-0.001470	1081.1549	9.394E+11	0.000	0.000	0.000
24.840	0.1199	6977688.	16800.	-0.001429	1090.2932	9.394E+11	0.000	0.000	0.000
25.300	0.1121	7076722.	16800.	-0.001388	1099.4145	9.394E+11	0.000	0.000	0.000
25.760	0.1046	7175570.	16800.	-0.001346	1108.5188	9.394E+11	0.000	0.000	0.000
26.220	0.0973	7274230.	16800.	-0.001303	1117.6057	9.394E+11	0.000	0.000	0.000
26.680	0.0902	7372698.	16800.	-0.001260	1126.6750	9.394E+11	0.000	0.000	0.000
27.140	0.0834	7470973.	16800.	-0.001217	1135.7265	9.394E+11	0.000	0.000	0.000
27.600	0.0768	7569052.	16800.	-0.001173	1144.7598	9.394E+11	0.000	0.000	0.000
28.060	0.0704	7666931.	16800.	-0.001128	1153.7749	9.394E+11	0.000	0.000	0.000
28.520	0.0643	7764609.	16800.	-0.001083	1162.7714	9.394E+11	0.000	0.000	0.000
28.980	0.0585	7862083.	16800.	-0.001037	1171.7491	9.394E+11	0.000	0.000	0.000
29.440	0.0529	7959351.	16800.	-0.000990	1180.7078	9.394E+11	0.000	0.000	0.000
29.900	0.0475	8056410.	16800.	-0.000943	1189.6472	9.394E+11	0.000	0.000	0.000
30.360	0.0425	8153256.	16800.	-0.000895	1198.5672	9.394E+11	0.000	0.000	0.000
30.820	0.0376	8249889.	16800.	-0.000847	1207.4674	9.394E+11	0.000	0.000	0.000
31.280	0.0331	8346305.	16800.	-0.000798	1216.3476	9.394E+11	0.000	0.000	0.000
31.740	0.0288	8442501.	16800.	-0.000749	1225.2077	9.394E+11	0.000	0.000	0.000
32.200	0.0248	8538476.	16800.	-0.000699	1234.0473	9.394E+11	0.000	0.000	0.000
32.660	0.0211	8634226.	16800.	-0.000649	1242.8662	9.394E+11	0.000	0.000	0.000
33.120	0.0177	8729750.	16800.	-0.000598	1251.6643	9.394E+11	0.000	0.000	0.000
33.580	0.0145	8825044.	16800.	-0.000546	1260.4412	9.394E+11	0.000	0.000	0.000
34.040	0.0116	8920106.	16800.	-0.000494	1269.1968	9.394E+11	0.000	0.000	0.000
34.500	0.009055	9014934.	16800.	-0.000441	1277.9308	9.394E+11	0.000	0.000	0.000
34.960	0.006765	9109525.	16800.	-0.000388	1286.6430	9.394E+11	0.000	0.000	0.000
35.420	0.004770	9203877.	16800.	-0.000334	1295.3331	9.394E+11	0.000	0.000	0.000
35.880	0.003074	9297987.	-68040.	-0.000280	1304.0009	9.394E+11	-30739.	55200000.	0.000
36.340	0.001679	8455219.	-199229.	-0.000228	1226.3790	9.394E+11	-16793.	55200000.	0.000
36.800	0.000559	7100534.	-261007.	-0.000167	1560.8608	5.506E+11	-5589.8826	55200000.	0.000
37.260	-0.000168	5575204.	-271786.	-0.000104	1351.1523	5.506E+11	1684.3023	55200000.	0.000
37.720	-0.000587	4100946.	-250927.	-5.533E-05	1148.4654	5.506E+11	5873.4060	55200000.	0.000
38.180	-0.000779	2805469.	-213207.	-2.072E-05	970.3580	5.506E+11	7793.2203	55200000.	0.000
38.640	-0.000816	1747329.	-169174.	-2.103E-06	824.8806	5.506E+11	8160.6073	55200000.	0.000
39.100	-0.000756	937767.	-125782.	1.556E-05	713.5788	5.506E+11	7561.0967	55200000.	0.000
39.560	-0.000644	358553.	-87132.	2.206E-05	633.9462	5.506E+11	6442.6656	55200000.	0.000
40.020	-0.000513	-24366.	-55203.	2.373E-05	588.0008	5.506E+11	5125.8264	55200000.	0.000
40.480	-0.000382	-251098.	-30506.	2.235E-05	619.1728	5.506E+11	3822.4703	55200000.	0.000
40.940	-0.000266	-361347.	-12619.	1.928E-05	634.3303	5.506E+11	2658.0615	55200000.	0.000
41.400	-0.000169	-390588.	-608.6833	1.551E-05	638.3504	5.506E+11	1693.6070	55200000.	0.000
41.860	-9.453E-05	-368206.	6674.6646	1.171E-05	635.2733	5.506E+11	945.2872	55200000.	0.000
42.320	-4.007E-05	-317004.	10390.	8.276E-06	628.2338	5.506E+11	400.7170	55200000.	0.000
42.780	-3.156E-06	-253578.	11583.	5.417E-06	619.5138	5.506E+11	31.5635	55200000.	0.000
43.240	1.973E-05	-189179.	11125.	3.197E-06	610.6600	5.506E+11	-197.2705	55200000.	0.000
43.700	3.214E-05	-130783.	9693.7916	1.594E-06	602.6314	5.506E+11	-321.4206	55200000.	0.000
44.160	3.732E-05	-82174.	7776.6356	5.262E-07	595.9484	5.506E+11	-373.2011	55200000.	0.000
44.620	3.795E-05	-44933.	5699.1533	-1.109E-07	590.8284	5.506E+11	-379.5099	55200000.	0.000
45.080	3.610E-05	-19255.	3655.4719	-4.327E-07	587.2980	5.506E+11	-360.9544	55200000.	0.000
45.540	3.317E-05	-4573.1842	1743.6237	-5.521E-07	585.2796	5.506E+11	-331.7442	55200000.	0.000
46.000	3.000E-05	0.000	0.000	-5.750E-07	584.6508	5.506E+11	-300.0035	27600000.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 1:

Pile-head deflection = 0.8186036 inches  
 Computed slope at pile head = -0.0030958 radians  
 Maximum bending moment = 9297987. inch-lbs  
 Maximum shear force = -271786. lbs



IB2\_B-4\_Trans\_Scoured.l p7o

0.460	0.7799	1473313.	15600.	-0.003004	1036.2257	5.506E+11	0.000	0.000	0.000
0.920	0.7634	1578532.	15600.	-0.002989	1050.6916	5.506E+11	0.000	0.000	0.000
1.380	0.7469	1683650.	15600.	-0.002973	1065.1437	5.506E+11	0.000	0.000	0.000
1.840	0.7305	1788660.	15600.	-0.002955	1079.5809	5.506E+11	0.000	0.000	0.000
2.300	0.7143	1893556.	15600.	-0.002937	1094.0024	5.506E+11	0.000	0.000	0.000
2.760	0.6981	1998331.	15600.	-0.002917	1108.4073	5.506E+11	0.000	0.000	0.000
3.220	0.6821	2102978.	15600.	-0.002897	1122.7946	5.506E+11	0.000	0.000	0.000
3.680	0.6661	2207491.	15600.	-0.002875	1137.1635	5.506E+11	0.000	0.000	0.000
4.140	0.6503	2311862.	15600.	-0.002852	1151.5129	5.506E+11	0.000	0.000	0.000
4.600	0.6347	2416086.	15600.	-0.002829	1165.8420	5.506E+11	0.000	0.000	0.000
5.060	0.6191	2520156.	15600.	-0.002804	1180.1499	5.506E+11	0.000	0.000	0.000
5.520	0.6037	2624064.	15600.	-0.002778	1194.4357	5.506E+11	0.000	0.000	0.000
5.980	0.5884	2727805.	15600.	-0.002751	1208.6984	5.506E+11	0.000	0.000	0.000
6.440	0.5733	2831372.	15600.	-0.002723	1222.9371	5.506E+11	0.000	0.000	0.000
6.900	0.5584	2934757.	15600.	-0.002695	1237.1509	5.506E+11	0.000	0.000	0.000
7.360	0.5436	3037955.	15600.	-0.002665	1251.3390	5.506E+11	0.000	0.000	0.000
7.820	0.5290	3140959.	15600.	-0.002634	1265.5004	5.506E+11	0.000	0.000	0.000
8.280	0.5145	3243762.	15600.	-0.002602	1279.6341	5.506E+11	0.000	0.000	0.000
8.740	0.5002	3346357.	15600.	-0.002569	1293.7394	5.506E+11	0.000	0.000	0.000
9.200	0.4861	3448739.	15600.	-0.002535	1307.8153	5.506E+11	0.000	0.000	0.000
9.660	0.4722	3550900.	15600.	-0.002500	1321.8608	5.506E+11	0.000	0.000	0.000
10.120	0.4585	3652835.	15600.	-0.002463	1335.8752	5.506E+11	0.000	0.000	0.000
10.580	0.4451	3754536.	15600.	-0.002426	1349.8574	5.506E+11	0.000	0.000	0.000
11.040	0.4318	3855997.	15600.	-0.002388	1363.8067	5.506E+11	0.000	0.000	0.000
11.500	0.4187	3957211.	15600.	-0.002349	1377.7221	5.506E+11	0.000	0.000	0.000
11.960	0.4058	4058173.	15600.	-0.002309	1391.6027	5.506E+11	0.000	0.000	0.000
12.420	0.3932	4158875.	15600.	-0.002268	1405.4476	5.506E+11	0.000	0.000	0.000
12.880	0.3808	4259312.	15600.	-0.002234	1030.5754	9.394E+11	0.000	0.000	0.000
13.340	0.3685	4359588.	15600.	-0.002209	1039.8112	9.394E+11	0.000	0.000	0.000
13.800	0.3564	4459702.	15600.	-0.002183	1049.0320	9.394E+11	0.000	0.000	0.000
14.260	0.3444	4559648.	15600.	-0.002157	1058.2375	9.394E+11	0.000	0.000	0.000
14.720	0.3326	4659424.	15600.	-0.002129	1067.4272	9.394E+11	0.000	0.000	0.000
15.180	0.3209	4759025.	15600.	-0.002102	1076.6008	9.394E+11	0.000	0.000	0.000
15.640	0.3094	4858448.	15600.	-0.002073	1085.7580	9.394E+11	0.000	0.000	0.000
16.100	0.2980	4957689.	15600.	-0.002045	1094.8984	9.394E+11	0.000	0.000	0.000
16.560	0.2868	5056744.	15600.	-0.002015	1104.0217	9.394E+11	0.000	0.000	0.000
17.020	0.2758	5155609.	15600.	-0.001985	1113.1276	9.394E+11	0.000	0.000	0.000
17.480	0.2649	5254282.	15600.	-0.001955	1122.2157	9.394E+11	0.000	0.000	0.000
17.940	0.2542	5352757.	15600.	-0.001923	1131.2856	9.394E+11	0.000	0.000	0.000
18.400	0.2437	5451032.	15600.	-0.001892	1140.3371	9.394E+11	0.000	0.000	0.000
18.860	0.2333	5549103.	15600.	-0.001859	1149.3698	9.394E+11	0.000	0.000	0.000
19.320	0.2231	5646966.	15600.	-0.001827	1158.3833	9.394E+11	0.000	0.000	0.000
19.780	0.2132	5744617.	15600.	-0.001793	1167.3773	9.394E+11	0.000	0.000	0.000
20.240	0.2033	5842054.	15600.	-0.001759	1176.3515	9.394E+11	0.000	0.000	0.000
20.700	0.1937	5939271.	15600.	-0.001724	1185.3056	9.394E+11	0.000	0.000	0.000
21.160	0.1843	6036266.	15600.	-0.001689	1194.2392	9.394E+11	0.000	0.000	0.000
21.620	0.1751	6133034.	15600.	-0.001653	1203.1519	9.394E+11	0.000	0.000	0.000
22.080	0.1661	6229573.	15600.	-0.001617	1212.0435	9.394E+11	0.000	0.000	0.000
22.540	0.1572	6325879.	15600.	-0.001580	1220.9135	9.394E+11	0.000	0.000	0.000
23.000	0.1486	6421947.	15600.	-0.001543	1229.7618	9.394E+11	0.000	0.000	0.000
23.460	0.1402	6517775.	15600.	-0.001505	1238.5879	9.394E+11	0.000	0.000	0.000
23.920	0.1320	6613359.	15600.	-0.001466	1247.3915	9.394E+11	0.000	0.000	0.000
24.380	0.1240	6708694.	15600.	-0.001427	1256.1722	9.394E+11	0.000	0.000	0.000
24.840	0.1162	6803779.	15600.	-0.001387	1264.9299	9.394E+11	0.000	0.000	0.000
25.300	0.1087	6898609.	15600.	-0.001347	1273.6640	9.394E+11	0.000	0.000	0.000
25.760	0.1014	6993180.	15600.	-0.001306	1282.3744	9.394E+11	0.000	0.000	0.000
26.220	0.0943	7087489.	15600.	-0.001265	1291.0606	9.394E+11	0.000	0.000	0.000
26.680	0.0874	7181533.	15600.	-0.001223	1299.7223	9.394E+11	0.000	0.000	0.000
27.140	0.0808	7275307.	15600.	-0.001180	1308.3593	9.394E+11	0.000	0.000	0.000
27.600	0.0744	7368810.	15600.	-0.001137	1316.9712	9.394E+11	0.000	0.000	0.000

IB2_B-4_Trans_Scored.l p7o									
28.060	0.0682	7462036.	15600.	-0.001094	1325.5576	9.394E+11	0.000	0.000	0.000
28.520	0.0623	7554982.	15600.	-0.001050	1334.1183	9.394E+11	0.000	0.000	0.000
28.980	0.0566	7647645.	15600.	-0.001005	1342.6530	9.394E+11	0.000	0.000	0.000
29.440	0.0512	7740022.	15600.	-0.000960	1351.1612	9.394E+11	0.000	0.000	0.000
29.900	0.0460	7832109.	15600.	-0.000914	1359.6427	9.394E+11	0.000	0.000	0.000
30.360	0.0411	7923903.	15600.	-0.000868	1368.0972	9.394E+11	0.000	0.000	0.000
30.820	0.0364	8015399.	15600.	-0.000821	1376.5244	9.394E+11	0.000	0.000	0.000
31.280	0.0320	8106596.	15600.	-0.000774	1384.9239	9.394E+11	0.000	0.000	0.000
31.740	0.0279	8197488.	15600.	-0.000726	1393.2954	9.394E+11	0.000	0.000	0.000
32.200	0.0240	8288074.	15600.	-0.000677	1401.6387	9.394E+11	0.000	0.000	0.000
32.660	0.0204	8378349.	15600.	-0.000628	1409.9533	9.394E+11	0.000	0.000	0.000
33.120	0.0171	8468310.	15600.	-0.000579	1418.2391	9.394E+11	0.000	0.000	0.000
33.580	0.0140	8557954.	15600.	-0.000529	1426.4956	9.394E+11	0.000	0.000	0.000
34.040	0.0113	8647277.	15600.	-0.000478	1434.7226	9.394E+11	0.000	0.000	0.000
34.500	0.008759	8736276.	15600.	-0.000427	1442.9197	9.394E+11	0.000	0.000	0.000
34.960	0.006543	8824948.	15600.	-0.000376	1451.0867	9.394E+11	0.000	0.000	0.000
35.420	0.004612	8913290.	15600.	-0.000323	1459.2233	9.394E+11	0.000	0.000	0.000
35.880	0.002971	9001297.	-66410.	-0.000271	1467.3291	9.394E+11	-29714.	55200000.	0.000
36.340	0.001622	8183573.	-193197.	-0.000220	1392.0138	9.394E+11	-16223.	55200000.	0.000
36.800	0.000539	6871215.	-252841.	-0.000162	1778.3510	5.506E+11	-5386.9984	55200000.	0.000
37.260	-0.000165	5394274.	-263163.	-0.000100	1575.2952	5.506E+11	1646.9655	55200000.	0.000
37.720	-0.000570	3967171.	-242897.	-5.347E-05	1379.0914	5.506E+11	5695.9675	55200000.	0.000
38.180	-0.000755	2713374.	-206339.	-1.998E-05	1206.7143	5.506E+11	7549.7053	55200000.	0.000
38.640	-0.000790	1689446.	-163692.	2.086E-06	1065.9406	5.506E+11	7901.9771	55200000.	0.000
39.100	-0.000732	906186.	-121681.	1.510E-05	958.2548	5.506E+11	7319.3813	55200000.	0.000
39.560	-0.000624	345893.	-84270.	2.137E-05	881.2235	5.506E+11	6235.3408	55200000.	0.000
40.020	-0.000496	-24429.	-53371.	2.298E-05	837.0274	5.506E+11	4959.8980	55200000.	0.000
40.480	-0.000370	-243620.	-29476.	2.164E-05	867.1626	5.506E+11	3697.9734	55200000.	0.000
40.940	-0.000257	-350116.	-12174.	1.866E-05	881.8041	5.506E+11	2570.8577	55200000.	0.000
41.400	-0.000164	-378255.	-558.6108	1.501E-05	885.6727	5.506E+11	1637.4814	55200000.	0.000
41.860	-9.134E-05	-356475.	6481.8634	1.133E-05	882.6783	5.506E+11	913.4151	55200000.	0.000
42.320	-3.866E-05	-306839.	10070.	8.006E-06	875.8543	5.506E+11	386.6067	55200000.	0.000
42.780	-2.959E-06	-245405.	11219.	5.238E-06	867.4080	5.506E+11	29.5902	55200000.	0.000
43.240	1.916E-05	-183053.	10771.	3.090E-06	858.8356	5.506E+11	-191.6298	55200000.	0.000
43.700	3.116E-05	-126528.	9382.6035	1.538E-06	851.0643	5.506E+11	-311.5563	55200000.	0.000
44.160	3.615E-05	-79488.	7525.0572	5.058E-07	844.5971	5.506E+11	-361.4677	55200000.	0.000
44.620	3.674E-05	-43458.	5513.4000	-1.105E-07	839.6435	5.506E+11	-367.3936	55200000.	0.000
45.080	3.493E-05	-18619.	3535.4029	-4.216E-07	836.2285	5.506E+11	-349.2720	55200000.	0.000
45.540	3.208E-05	-4421.4117	1685.8733	-5.371E-07	834.2766	5.506E+11	-320.8474	55200000.	0.000
46.000	2.900E-05	0.000	0.000	-5.593E-07	833.6687	5.506E+11	-289.9762	27600000.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 2:

Pile-head deflection = 0.7965306 inches  
 Computed slope at pile head = -0.0030185 radians  
 Maximum bending moment = 9001297. inch-lbs  
 Maximum shear force = -263163. lbs  
 Depth of maximum bending moment = 35.8800000 feet below pile head  
 Depth of maximum shear force = 37.2600000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 2

-----  
 Pile-head Deflection vs. Pile Length for Load Case 2  
 -----



I B2\_B-4\_Trans\_Scored.l p7o

4. 140	0. 1802	-2585618.	16800.	-0. 000271	940. 1320	5. 506E+11	0. 000	0. 000	0. 000
4. 600	0. 1787	-2491611.	16800.	-0. 000297	927. 2075	5. 506E+11	0. 000	0. 000	0. 000
5. 060	0. 1770	-2397493.	16800.	-0. 000321	914. 2677	5. 506E+11	0. 000	0. 000	0. 000
5. 520	0. 1751	-2303267.	16800.	-0. 000345	901. 3132	5. 506E+11	0. 000	0. 000	0. 000
5. 980	0. 1732	-2208937.	16800.	-0. 000367	888. 3444	5. 506E+11	0. 000	0. 000	0. 000
6. 440	0. 1711	-2114509.	16800.	-0. 000389	875. 3620	5. 506E+11	0. 000	0. 000	0. 000
6. 900	0. 1689	-2019986.	16800.	-0. 000410	862. 3666	5. 506E+11	0. 000	0. 000	0. 000
7. 360	0. 1665	-1925373.	16800.	-0. 000430	849. 3588	5. 506E+11	0. 000	0. 000	0. 000
7. 820	0. 1641	-1830673.	16800.	-0. 000448	836. 3391	5. 506E+11	0. 000	0. 000	0. 000
8. 280	0. 1616	-1735891.	16800.	-0. 000466	823. 3081	5. 506E+11	0. 000	0. 000	0. 000
8. 740	0. 1590	-1641031.	16800.	-0. 000483	810. 2664	5. 506E+11	0. 000	0. 000	0. 000
9. 200	0. 1563	-1546098.	16800.	-0. 000499	797. 2146	5. 506E+11	0. 000	0. 000	0. 000
9. 660	0. 1535	-1451095.	16800.	-0. 000514	784. 1532	5. 506E+11	0. 000	0. 000	0. 000
10. 120	0. 1506	-1356028.	16800.	-0. 000528	771. 0830	5. 506E+11	0. 000	0. 000	0. 000
10. 580	0. 1476	-1260899.	16800.	-0. 000541	758. 0043	5. 506E+11	0. 000	0. 000	0. 000
11. 040	0. 1446	-1165715.	16800.	-0. 000554	744. 9179	5. 506E+11	0. 000	0. 000	0. 000
11. 500	0. 1415	-1070477.	16800.	-0. 000565	731. 8244	5. 506E+11	0. 000	0. 000	0. 000
11. 960	0. 1384	-975192.	16800.	-0. 000575	718. 7242	5. 506E+11	0. 000	0. 000	0. 000
12. 420	0. 1352	-879863.	16800.	-0. 000584	705. 6180	5. 506E+11	0. 000	0. 000	0. 000
12. 880	0. 1319	-784495.	16800.	-0. 000591	519. 8781	9. 394E+11	0. 000	0. 000	0. 000
13. 340	0. 1286	-689106.	16800.	-0. 000595	511. 0924	9. 394E+11	0. 000	0. 000	0. 000
13. 800	0. 1253	-593699.	16800.	-0. 000599	502. 3051	9. 394E+11	0. 000	0. 000	0. 000
14. 260	0. 1220	-498277.	16800.	-0. 000602	493. 5163	9. 394E+11	0. 000	0. 000	0. 000
14. 720	0. 1187	-402841.	16800.	-0. 000605	484. 7264	9. 394E+11	0. 000	0. 000	0. 000
15. 180	0. 1153	-307395.	16800.	-0. 000607	475. 9354	9. 394E+11	0. 000	0. 000	0. 000
15. 640	0. 1120	-211940.	16800.	-0. 000609	467. 1437	9. 394E+11	0. 000	0. 000	0. 000
16. 100	0. 1086	-116481.	16800.	-0. 000610	458. 3516	9. 394E+11	0. 000	0. 000	0. 000
16. 560	0. 1053	-21018.	16800.	-0. 000610	449. 5591	9. 394E+11	0. 000	0. 000	0. 000
17. 020	0. 1019	74446.	16800.	-0. 000610	454. 4800	9. 394E+11	0. 000	0. 000	0. 000
17. 480	0. 0985	169907.	16800.	-0. 000609	463. 2724	9. 394E+11	0. 000	0. 000	0. 000
17. 940	0. 0952	265365.	16800.	-0. 000608	472. 0643	9. 394E+11	0. 000	0. 000	0. 000
18. 400	0. 0918	360815.	16800.	-0. 000606	480. 8556	9. 394E+11	0. 000	0. 000	0. 000
18. 860	0. 0885	456255.	16800.	-0. 000604	489. 6460	9. 394E+11	0. 000	0. 000	0. 000
19. 320	0. 0852	551684.	16800.	-0. 000601	498. 4353	9. 394E+11	0. 000	0. 000	0. 000
19. 780	0. 0819	647098.	16800.	-0. 000597	507. 2233	9. 394E+11	0. 000	0. 000	0. 000
20. 240	0. 0786	742495.	16800.	-0. 000593	516. 0097	9. 394E+11	0. 000	0. 000	0. 000
20. 700	0. 0753	837873.	16800.	-0. 000588	524. 7944	9. 394E+11	0. 000	0. 000	0. 000
21. 160	0. 0721	933229.	16800.	-0. 000583	533. 5769	9. 394E+11	0. 000	0. 000	0. 000
21. 620	0. 0689	1028560.	16800.	-0. 000577	542. 3573	9. 394E+11	0. 000	0. 000	0. 000
22. 080	0. 0657	1123864.	16800.	-0. 000571	551. 1351	9. 394E+11	0. 000	0. 000	0. 000
22. 540	0. 0626	1219138.	16800.	-0. 000564	559. 9103	9. 394E+11	0. 000	0. 000	0. 000
23. 000	0. 0595	1314381.	16800.	-0. 000557	568. 6824	9. 394E+11	0. 000	0. 000	0. 000
23. 460	0. 0564	1409589.	16800.	-0. 000549	577. 4514	9. 394E+11	0. 000	0. 000	0. 000
23. 920	0. 0534	1504760.	16800.	-0. 000540	586. 2170	9. 394E+11	0. 000	0. 000	0. 000
24. 380	0. 0505	1599891.	16800.	-0. 000531	594. 9790	9. 394E+11	0. 000	0. 000	0. 000
24. 840	0. 0475	1694981.	16800.	-0. 000521	603. 7370	9. 394E+11	0. 000	0. 000	0. 000
25. 300	0. 0447	1790026.	16800.	-0. 000511	612. 4910	9. 394E+11	0. 000	0. 000	0. 000
25. 760	0. 0419	1885023.	16800.	-0. 000500	621. 2406	9. 394E+11	0. 000	0. 000	0. 000
26. 220	0. 0392	1979972.	16800.	-0. 000489	629. 9857	9. 394E+11	0. 000	0. 000	0. 000
26. 680	0. 0365	2074868.	16800.	-0. 000477	638. 7260	9. 394E+11	0. 000	0. 000	0. 000
27. 140	0. 0339	2169710.	16800.	-0. 000465	647. 4613	9. 394E+11	0. 000	0. 000	0. 000
27. 600	0. 0314	2264494.	16800.	-0. 000452	656. 1913	9. 394E+11	0. 000	0. 000	0. 000
28. 060	0. 0289	2359220.	16800.	-0. 000438	664. 9158	9. 394E+11	0. 000	0. 000	0. 000
28. 520	0. 0265	2453883.	16800.	-0. 000424	673. 6346	9. 394E+11	0. 000	0. 000	0. 000
28. 980	0. 0242	2548482.	16800.	-0. 000409	682. 3475	9. 394E+11	0. 000	0. 000	0. 000
29. 440	0. 0220	2643014.	16800.	-0. 000394	691. 0542	9. 394E+11	0. 000	0. 000	0. 000
29. 900	0. 0199	2737476.	16800.	-0. 000378	699. 7546	9. 394E+11	0. 000	0. 000	0. 000
30. 360	0. 0179	2831867.	16800.	-0. 000362	708. 4483	9. 394E+11	0. 000	0. 000	0. 000
30. 820	0. 0159	2926183.	16800.	-0. 000345	717. 1351	9. 394E+11	0. 000	0. 000	0. 000
31. 280	0. 0140	3020422.	16800.	-0. 000327	725. 8149	9. 394E+11	0. 000	0. 000	0. 000

IB2_B-4_Trans_Scoured.l p7o									
31.740	0.0123	3114582.	16800.	-0.000309	734.4873	9.394E+11	0.000	0.000	0.000
32.200	0.0106	3208660.	16800.	-0.000291	743.1522	9.394E+11	0.000	0.000	0.000
32.660	0.009077	3302653.	16800.	-0.000272	751.8094	9.394E+11	0.000	0.000	0.000
33.120	0.007632	3396560.	16800.	-0.000252	760.4586	9.394E+11	0.000	0.000	0.000
33.580	0.006296	3490378.	16800.	-0.000232	769.0995	9.394E+11	0.000	0.000	0.000
34.040	0.005074	3584104.	16800.	-0.000211	777.7320	9.394E+11	0.000	0.000	0.000
34.500	0.003968	3677736.	16800.	-0.000190	786.3558	9.394E+11	0.000	0.000	0.000
34.960	0.002981	3771271.	16800.	-0.000168	794.9707	9.394E+11	0.000	0.000	0.000
35.420	0.002117	3864707.	16800.	-0.000145	803.5765	9.394E+11	0.000	0.000	0.000
35.880	0.001378	3958042.	-21238.	-0.000122	812.1730	9.394E+11	-13782.	55200000.	0.000
36.340	0.000768	3631335.	-80461.	-9.994E-05	782.0822	9.394E+11	-7676.0516	55200000.	0.000
36.800	0.000275	3070642.	-109232.	-7.388E-05	1006.8150	5.506E+11	-2748.2006	55200000.	0.000
37.260	-4.805E-05	2426071.	-115491.	-4.633E-05	918.1968	5.506E+11	480.4878	55200000.	0.000
37.720	-0.000237	1796033.	-107633.	-2.517E-05	831.5766	5.506E+11	2366.6914	55200000.	0.000
38.180	-0.000326	1238028.	-92106.	-9.960E-06	754.8599	5.506E+11	3259.0467	55200000.	0.000
38.640	-0.000347	779272.	-73544.	1.508E-07	691.7883	5.506E+11	3466.3299	55200000.	0.000
39.100	-0.000324	426102.	-55028.	6.193E-06	643.2330	5.506E+11	3242.3971	55200000.	0.000
39.560	-0.000278	171709.	-38399.	9.189E-06	608.2581	5.506E+11	2782.6777	55200000.	0.000
40.020	-0.000223	2098.6173	-24569.	1.006E-05	584.9393	5.506E+11	2227.9417	55200000.	0.000
40.480	-0.000167	-99626.	-13805.	9.571E-06	598.3478	5.506E+11	1672.0443	55200000.	0.000
40.940	-0.000117	-150398.	-5957.7966	8.318E-06	605.3282	5.506E+11	1171.2757	55200000.	0.000
41.400	-7.537E-05	-165474.	-644.7777	6.735E-06	607.4009	5.506E+11	753.7311	55200000.	0.000
41.860	-4.278E-05	-157577.	2616.1184	5.116E-06	606.3151	5.506E+11	427.7530	55200000.	0.000
42.320	-1.890E-05	-136638.	4318.2768	3.641E-06	603.4364	5.506E+11	188.9711	55200000.	0.000
42.780	-2.580E-06	-109936.	4911.0422	2.405E-06	599.7652	5.506E+11	25.7990	55200000.	0.000
43.240	7.654E-06	-82442.	4770.9984	1.441E-06	595.9852	5.506E+11	-76.5395	55200000.	0.000
43.700	1.333E-05	-57277.	4191.9569	7.404E-07	592.5254	5.506E+11	-133.2582	55200000.	0.000
44.160	1.583E-05	-36169.	3387.3048	2.720E-07	589.6235	5.506E+11	-158.2824	55200000.	0.000
44.620	1.633E-05	-19883.	2499.7588	-8.904E-09	587.3844	5.506E+11	-163.2922	55200000.	0.000
45.080	1.573E-05	-8571.7836	1614.9257	-1.515E-07	585.8293	5.506E+11	-157.2995	55200000.	0.000
45.540	1.466E-05	-2053.0133	776.2638	-2.048E-07	584.9331	5.506E+11	-146.5635	55200000.	0.000
46.000	1.347E-05	0.000	0.000	-2.151E-07	584.6508	5.506E+11	-134.6915	27600000.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 3:

Pile-head deflection = 0.1872967 inches  
 Computed slope at pile head = 0.000000 radians  
 Maximum bending moment = 3958042. inch-lbs  
 Maximum shear force = -115491. lbs  
 Depth of maximum bending moment = 35.8800000 feet below pile head  
 Depth of maximum shear force = 37.2600000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 2

-----  
 Pile-head Deflection vs. Pile Length for Load Case 3  
 -----

Boundary Condition Type 2, Shear and Slope

Shear = 16800. lb  
 Slope = 0.00000  
 Axial Load = 810000. lb





IB2\_B-4\_Trans\_Scoured.l p7o

7. 820	0. 1540	-1719577.	15600.	-0. 000421	1070. 0831	5. 506E+11	0. 000	0. 000	0. 000
8. 280	0. 1516	-1630729.	15600.	-0. 000437	1057. 8679	5. 506E+11	0. 000	0. 000	0. 000
8. 740	0. 1491	-1541776.	15600.	-0. 000453	1045. 6383	5. 506E+11	0. 000	0. 000	0. 000
9. 200	0. 1466	-1452725.	15600.	-0. 000468	1033. 3952	5. 506E+11	0. 000	0. 000	0. 000
9. 660	0. 1440	-1363581.	15600.	-0. 000482	1021. 1394	5. 506E+11	0. 000	0. 000	0. 000
10. 120	0. 1413	-1274350.	15600.	-0. 000496	1008. 8715	5. 506E+11	0. 000	0. 000	0. 000
10. 580	0. 1385	-1185037.	15600.	-0. 000508	996. 5925	5. 506E+11	0. 000	0. 000	0. 000
11. 040	0. 1357	-1095649.	15600.	-0. 000519	984. 3030	5. 506E+11	0. 000	0. 000	0. 000
11. 500	0. 1328	-1006191.	15600.	-0. 000530	972. 0039	5. 506E+11	0. 000	0. 000	0. 000
11. 960	0. 1298	-916668.	15600.	-0. 000540	959. 6960	5. 506E+11	0. 000	0. 000	0. 000
12. 420	0. 1268	-827087.	15600.	-0. 000548	947. 3800	5. 506E+11	0. 000	0. 000	0. 000
12. 880	0. 1238	-737453.	15600.	-0. 000555	706. 1997	9. 394E+11	0. 000	0. 000	0. 000
13. 340	0. 1207	-647791.	15600.	-0. 000559	697. 9415	9. 394E+11	0. 000	0. 000	0. 000
13. 800	0. 1176	-558105.	15600.	-0. 000562	689. 6811	9. 394E+11	0. 000	0. 000	0. 000
14. 260	0. 1145	-468399.	15600.	-0. 000565	681. 4188	9. 394E+11	0. 000	0. 000	0. 000
14. 720	0. 1113	-378674.	15600.	-0. 000568	673. 1549	9. 394E+11	0. 000	0. 000	0. 000
15. 180	0. 1082	-288935.	15600.	-0. 000570	664. 8896	9. 394E+11	0. 000	0. 000	0. 000
15. 640	0. 1051	-199186.	15600.	-0. 000571	656. 6234	9. 394E+11	0. 000	0. 000	0. 000
16. 100	0. 1019	-109429.	15600.	-0. 000572	648. 3565	9. 394E+11	0. 000	0. 000	0. 000
16. 560	0. 0987	-19668.	15600.	-0. 000572	640. 0891	9. 394E+11	0. 000	0. 000	0. 000
17. 020	0. 0956	70094.	15600.	-0. 000572	644. 7335	9. 394E+11	0. 000	0. 000	0. 000
17. 480	0. 0924	159853.	15600.	-0. 000572	653. 0006	9. 394E+11	0. 000	0. 000	0. 000
17. 940	0. 0893	249606.	15600.	-0. 000570	661. 2672	9. 394E+11	0. 000	0. 000	0. 000
18. 400	0. 0861	339350.	15600.	-0. 000569	669. 5329	9. 394E+11	0. 000	0. 000	0. 000
18. 860	0. 0830	429081.	15600.	-0. 000566	677. 7975	9. 394E+11	0. 000	0. 000	0. 000
19. 320	0. 0799	518796.	15600.	-0. 000564	686. 0606	9. 394E+11	0. 000	0. 000	0. 000
19. 780	0. 0768	608491.	15600.	-0. 000560	694. 3218	9. 394E+11	0. 000	0. 000	0. 000
20. 240	0. 0737	698164.	15600.	-0. 000556	702. 5810	9. 394E+11	0. 000	0. 000	0. 000
20. 700	0. 0706	787810.	15600.	-0. 000552	710. 8378	9. 394E+11	0. 000	0. 000	0. 000
21. 160	0. 0676	877427.	15600.	-0. 000547	719. 0918	9. 394E+11	0. 000	0. 000	0. 000
21. 620	0. 0646	967012.	15600.	-0. 000542	727. 3428	9. 394E+11	0. 000	0. 000	0. 000
22. 080	0. 0616	1056560.	15600.	-0. 000536	735. 5905	9. 394E+11	0. 000	0. 000	0. 000
22. 540	0. 0587	1146068.	15600.	-0. 000529	743. 8346	9. 394E+11	0. 000	0. 000	0. 000
23. 000	0. 0558	1235533.	15600.	-0. 000522	752. 0747	9. 394E+11	0. 000	0. 000	0. 000
23. 460	0. 0529	1324953.	15600.	-0. 000515	760. 3105	9. 394E+11	0. 000	0. 000	0. 000
23. 920	0. 0501	1414322.	15600.	-0. 000507	768. 5417	9. 394E+11	0. 000	0. 000	0. 000
24. 380	0. 0473	1503639.	15600.	-0. 000498	776. 7681	9. 394E+11	0. 000	0. 000	0. 000
24. 840	0. 0446	1592899.	15600.	-0. 000489	784. 9893	9. 394E+11	0. 000	0. 000	0. 000
25. 300	0. 0419	1682099.	15600.	-0. 000479	793. 2050	9. 394E+11	0. 000	0. 000	0. 000
25. 760	0. 0393	1771237.	15600.	-0. 000469	801. 4149	9. 394E+11	0. 000	0. 000	0. 000
26. 220	0. 0367	1860308.	15600.	-0. 000459	809. 6186	9. 394E+11	0. 000	0. 000	0. 000
26. 680	0. 0342	1949309.	15600.	-0. 000447	817. 8160	9. 394E+11	0. 000	0. 000	0. 000
27. 140	0. 0318	2038238.	15600.	-0. 000436	826. 0066	9. 394E+11	0. 000	0. 000	0. 000
27. 600	0. 0294	2127090.	15600.	-0. 000424	834. 1902	9. 394E+11	0. 000	0. 000	0. 000
28. 060	0. 0271	2215862.	15600.	-0. 000411	842. 3664	9. 394E+11	0. 000	0. 000	0. 000
28. 520	0. 0249	2304552.	15600.	-0. 000397	850. 5350	9. 394E+11	0. 000	0. 000	0. 000
28. 980	0. 0227	2393155.	15600.	-0. 000384	858. 6957	9. 394E+11	0. 000	0. 000	0. 000
29. 440	0. 0206	2481668.	15600.	-0. 000369	866. 8481	9. 394E+11	0. 000	0. 000	0. 000
29. 900	0. 0186	2570088.	15600.	-0. 000355	874. 9919	9. 394E+11	0. 000	0. 000	0. 000
30. 360	0. 0167	2658413.	15600.	-0. 000339	883. 1269	9. 394E+11	0. 000	0. 000	0. 000
30. 820	0. 0149	2746637.	15600.	-0. 000323	891. 2527	9. 394E+11	0. 000	0. 000	0. 000
31. 280	0. 0132	2834759.	15600.	-0. 000307	899. 3690	9. 394E+11	0. 000	0. 000	0. 000
31. 740	0. 0115	2922774.	15600.	-0. 000290	907. 4755	9. 394E+11	0. 000	0. 000	0. 000
32. 200	0. 009962	3010680.	15600.	-0. 000273	915. 5720	9. 394E+11	0. 000	0. 000	0. 000
32. 660	0. 008506	3098473.	15600.	-0. 000255	923. 6580	9. 394E+11	0. 000	0. 000	0. 000
33. 120	0. 007151	3186150.	15600.	-0. 000236	931. 7334	9. 394E+11	0. 000	0. 000	0. 000
33. 580	0. 005899	3273708.	15600.	-0. 000217	939. 7977	9. 394E+11	0. 000	0. 000	0. 000
34. 040	0. 004754	3361143.	15600.	-0. 000198	947. 8508	9. 394E+11	0. 000	0. 000	0. 000
34. 500	0. 003718	3448452.	15600.	-0. 000178	955. 8923	9. 394E+11	0. 000	0. 000	0. 000
34. 960	0. 002793	3535632.	15600.	-0. 000157	963. 9219	9. 394E+11	0. 000	0. 000	0. 000

IB2_B-4_Trans_Scoured.l p7o									
35.420	0.001983	3622679.	15600.	-0.000136	971.9393	9.394E+11	0.000	0.000	0.000
35.880	0.001291	3709591.	-20025.	-0.000115	979.9441	9.394E+11	-12908.	55200000.	0.000
36.340	0.000719	3403060.	-75487.	-9.363E-05	951.7116	9.394E+11	-7187.1880	55200000.	0.000
36.800	0.000257	2877406.	-102418.	-6.921E-05	1229.2661	5.506E+11	-2570.5053	55200000.	0.000
37.260	-4.539E-05	2273243.	-108260.	-4.340E-05	1146.2033	5.506E+11	453.9433	55200000.	0.000
37.720	-0.000222	1682767.	-100879.	-2.357E-05	1065.0223	5.506E+11	2220.4757	55200000.	0.000
38.180	-0.000306	1159842.	-86316.	-9.320E-06	993.1285	5.506E+11	3055.8365	55200000.	0.000
38.640	-0.000325	729955.	-68914.	1.523E-07	934.0259	5.506E+11	3249.3900	55200000.	0.000
39.100	-0.000304	399032.	-51558.	5.811E-06	888.5293	5.506E+11	3039.0173	55200000.	0.000
39.560	-0.000261	160684.	-35972.	8.617E-06	855.7602	5.506E+11	2607.8370	55200000.	0.000
40.020	-0.000209	1787.1766	-23013.	9.431E-06	833.9145	5.506E+11	2087.7409	55200000.	0.000
40.480	-0.000157	-93495.	-12926.	8.971E-06	846.5229	5.506E+11	1566.6559	55200000.	0.000
40.940	-0.000110	-141035.	-5573.9348	7.796E-06	853.0589	5.506E+11	1097.3074	55200000.	0.000
41.400	-7.060E-05	-155131.	-596.8013	6.311E-06	854.9968	5.506E+11	706.0019	55200000.	0.000
41.860	-4.005E-05	-147705.	2457.2524	4.793E-06	853.9758	5.506E+11	400.5393	55200000.	0.000
42.320	-1.768E-05	-128064.	4050.7372	3.411E-06	851.2755	5.506E+11	176.8103	55200000.	0.000
42.780	-2.395E-06	-103028.	4604.8258	2.253E-06	847.8335	5.506E+11	23.9465	55200000.	0.000
43.240	7.191E-06	-77256.	4472.4574	1.349E-06	844.2902	5.506E+11	-71.9060	55200000.	0.000
43.700	1.250E-05	-53669.	3928.9733	6.930E-07	841.0474	5.506E+11	-125.0085	55200000.	0.000
44.160	1.484E-05	-33889.	3174.3307	2.541E-07	838.3279	5.506E+11	-148.4127	55200000.	0.000
44.620	1.531E-05	-18628.	2342.2538	-9.099E-09	836.2298	5.506E+11	-153.0644	55200000.	0.000
45.080	1.474E-05	-8029.9833	1512.9494	-1.427E-07	834.7727	5.506E+11	-147.4082	55200000.	0.000
45.540	1.373E-05	-1923.1297	727.1311	-1.926E-07	833.9331	5.506E+11	-137.3086	55200000.	0.000
46.000	1.261E-05	0.000	0.000	-2.022E-07	833.6687	5.506E+11	-126.1447	27600000.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 4:

Pile-head deflection = 0.1756942 inches  
 Computed slope at pile head = 0.000000 radians  
 Maximum bending moment = 3709591. inch-lbs  
 Maximum shear force = -108260. lbs  
 Depth of maximum bending moment = 35.8800000 feet below pile head  
 Depth of maximum shear force = 37.2600000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 2

-----  
 Pile-head Deflection vs. Pile Length for Load Case 4  
 -----

Boundary Condition Type 2, Shear and Slope

Shear = 15600. lb  
 Slope = 0.00000  
 Axial Load = 1155000. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
46.0000	0.1756942	3709591.	-108260.
43.7000	0.1753948	3699575.	-108340.
41.4000	0.1705730	3686670.	-106281.
39.1000	0.1731111	3662711.	-124421.

39. 1000	0. 000000	4328334016.	461743564.
39. 1000	0. 000000	4328334016.	461743564.
39. 1000	0. 000000	4328334016.	461743564.
39. 1000	0. 000000	4328334016.	461743564.
39. 1000	0. 000000	4328334016.	461743564.
39. 1000	0. 000000	4328334016.	461743564.
39. 1000	0. 000000	4328334016.	461743564.
39. 1000	0. 000000	4328334016.	461743564.
39. 1000	0. 000000	4328334016.	461743564.
39. 1000	0. 000000	4328334016.	461743564.
39. 1000	0. 000000	4328334016.	461743564.
39. 1000	0. 000000	4328334016.	461743564.
39. 1000	0. 000000	4328334016.	461743564.
39. 1000	0. 000000	4328334016.	461743564.
39. 1000	0. 000000	4328334016.	461743564.
39. 1000	0. 000000	4328334016.	461743564.
39. 1000	0. 000000	4328334016.	461743564.
39. 1000	0. 000000	4328334016.	461743564.
39. 1000	0. 000000	4328334016.	461743564.
39. 1000	0. 000000	4328334016.	461743564.

-----  
 Summary of Pile Response(s)  
 -----

Defi ni ti ons of Pile-head Loading Condi ti ons:

- Load Type 1: Load 1 = Shear, lbs, and Load 2 = Moment, in-lbs
- Load Type 2: Load 1 = Shear, lbs, and Load 2 = Slope, radians
- Load Type 3: Load 1 = Shear, lbs, and Load 2 = Rotational Sti ffness, in-lbs/radian
- Load Type 4: Load 1 = Top Deflection, inches, and Load 2 = Moment, in-lbs
- Load Type 5: Load 1 = Top Deflection, inches, and Load 2 = Slope, radians

Load Case No.	Load Type No.	Pile-head Condition 1 V(lbs) or y(inches)	Pile-head Condition 2 in-lb, rad., or in-lb/rad.	Axial Loading lbs	Pile-head Deflection inches	Maximum Moment in Pile in-lbs	Maximum Shear in Pile lbs	Pile-head Rotation radians
1	1	V = 16800.	M = 1404000.	810000.	0. 81860360	9297987.	-271786.	-0. 00309576
2	1	V = 15600.	M = 1368000.	1155000.	0. 79653063	9001297.	-263163.	-0. 00301848
3	2	V = 16800.	S = 0. 000	810000.	0. 18729674	3958042.	-115491.	-0. 00000000
4	2	V = 15600.	S = 0. 000	1155000.	0. 17569421	3709591.	-108260.	0. 00000000

-----  
 Summary of Warni ng Messages  
 -----

The following warning was reported 4000 times

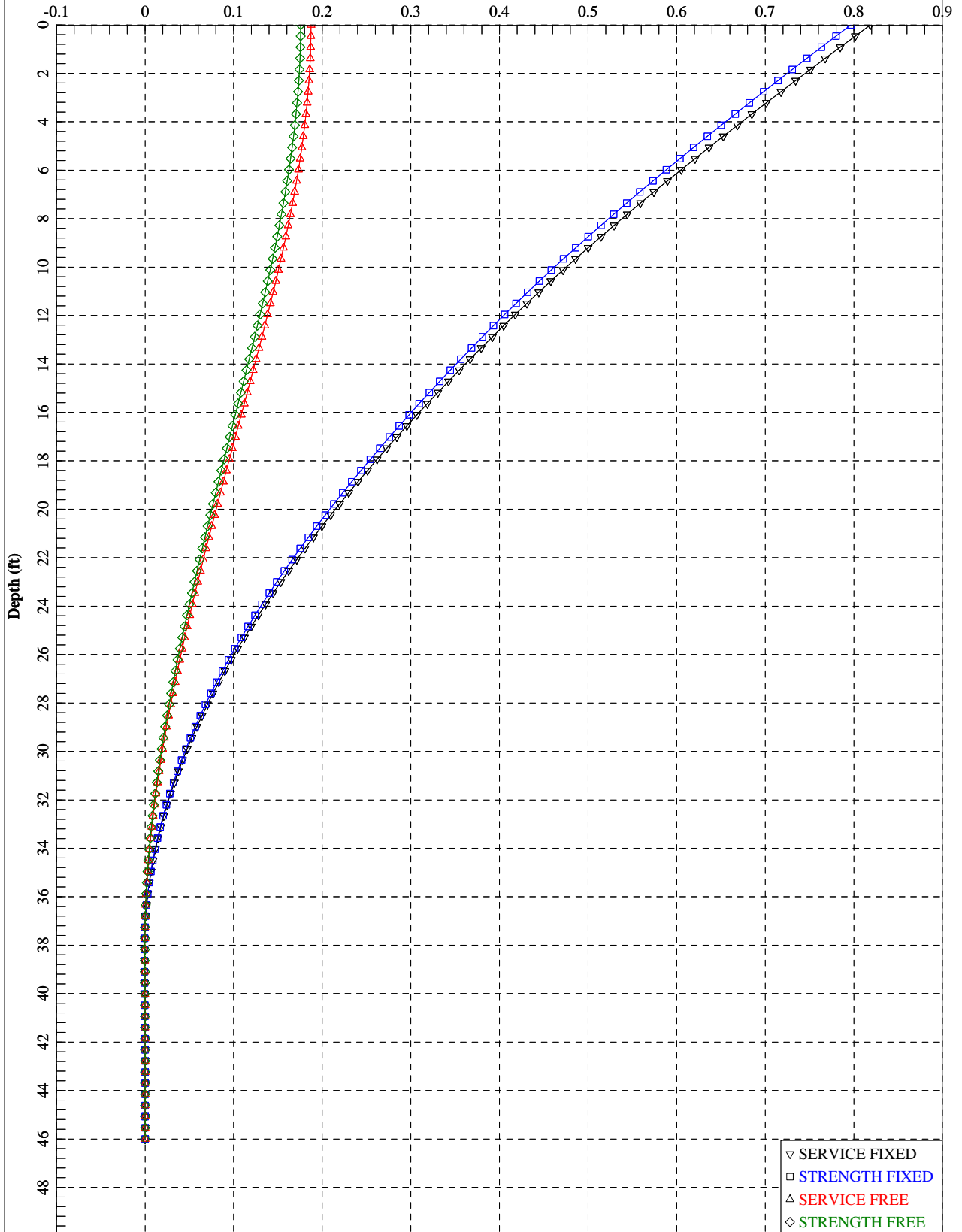
\*\*\*\* Warni ng \*\*\*\*

An unreasonable input value for uniaxial compressive strength has been specified for a soil defined using the vuggy limestone criteria. The input value is outside of the range of 1,000 to 2,500 psi (6,895 to 17,237 kPa). You should check your input data for correctness.

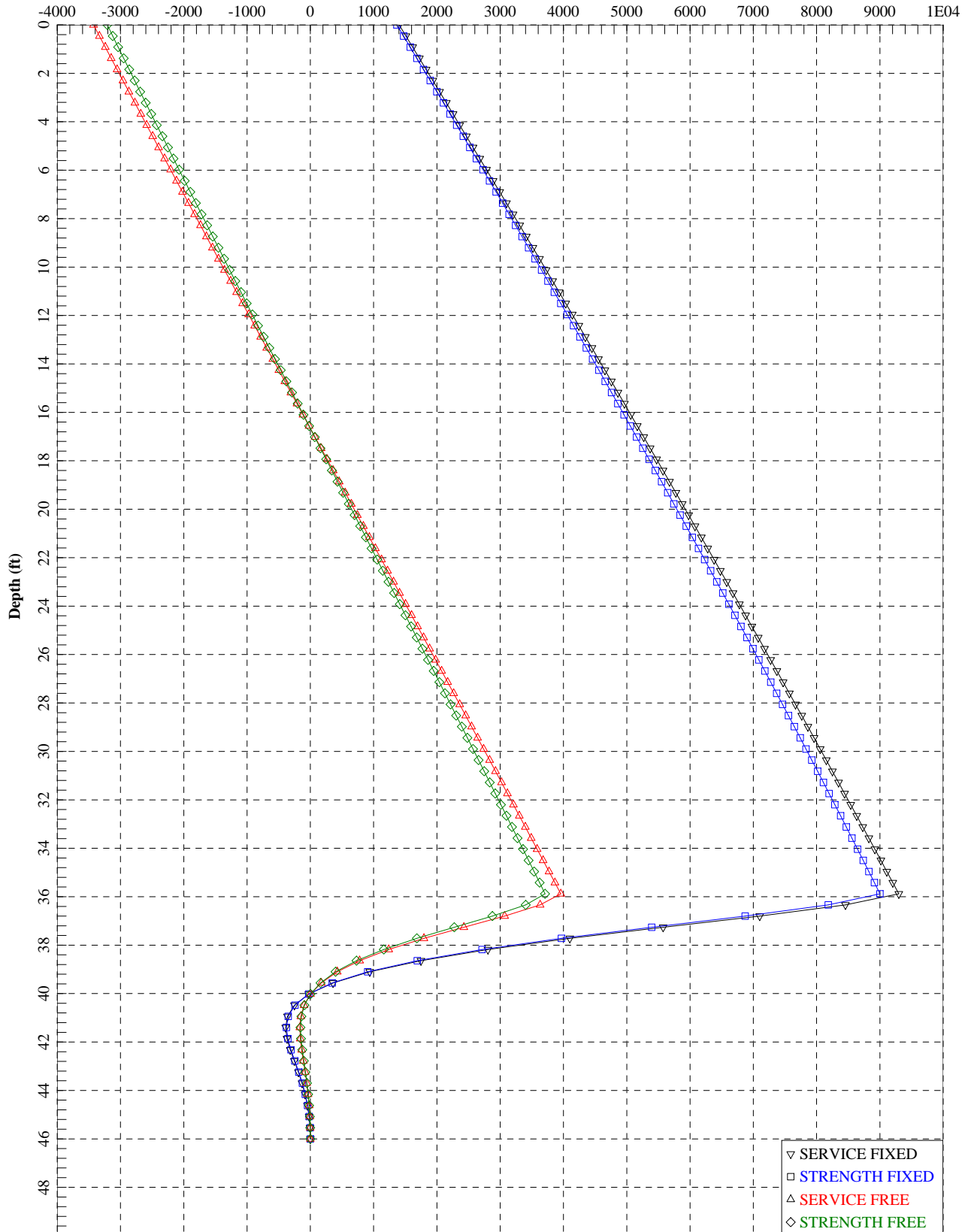
The analysis ended normally.

IB2\_B-4\_Trans\_Scoured.1p7o

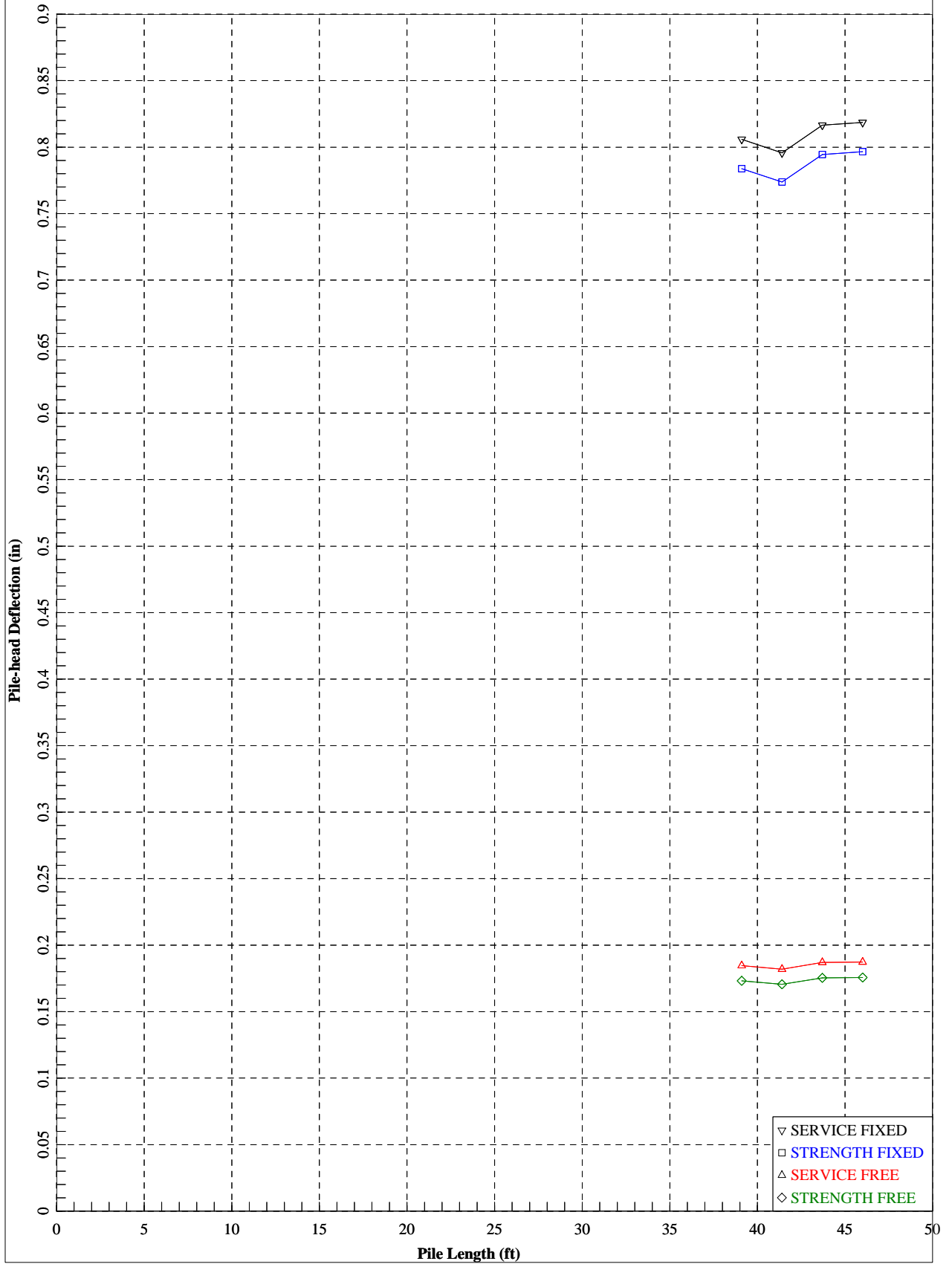
SC 557 Bridge over Crowders Creek - IB2 - Boring B-4 - 48" Dia. Drilled Shaft - Scoured Transverse Analysis  
Lateral Pile Deflection (inches)



SC 557 Bridge over Crowders Creek - IB2 - Boring B-4 - 48" Dia. Drilled Shaft - Scoured Transverse Analysis  
Bending Moment (in-kips)



SC 557 Bridge over Crowders Creek - IB2 - Boring B-4 - 48" Dia. Drilled Shaft - Scoured Transverse Analysis



=====  
LPile Plus for Windows, Version 2013-07.007

Analysis of Individual Piles and Drilled Shafts  
Subjected to Lateral Loading Using the p-y Method

© 1985-2013 by Ensoft, Inc.  
All Rights Reserved

=====  
This copy of LPile is used by:

Bradley Fischer  
F&ME

Serial Number of Security Device: 291490957

This copy of LPile is licensed for exclusive use by: F&ME Consultants, Columbia, Sout

Use of this program by any entity other than F&ME Consultants, Columbia, Sout  
is forbidden by the software license agreement.

-----  
Files Used for Analysis  
-----

Path to file locations: P:\Geotechnical\G4800's\G4843 - SC557 - York County\Report\Final\Bridge\LPile\  
Name of input data file: IB2\_B-5\_Long\_Scoured.l p7d  
Name of output report file: IB2\_B-5\_Long\_Scoured.l p7o  
Name of plot output file: IB2\_B-5\_Long\_Scoured.l p7p  
Name of runtime message file: IB2\_B-5\_Long\_Scoured.l p7r

-----  
Date and Time of Analysis  
-----

Date: July 31, 2018 Time: 8:55:33

-----  
Problem Title  
-----

Project Name: SC 557 over Crowders Creek

Job Number: G4843

Client: CALYX

Engineer: JFH

Description: IB2 - Boring B-5 - 48" Dia. Drilled Shaft - Scoured Long.



-----  
 Program Options and Settings  
 -----

Engineering Units of Input Data and Computations:

- Engineering units are US Customary Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

Computational Options:

- Use unfactored loads in computations (conventional analysis)
- Compute pile response under loading and nonlinear bending properties of pile (only if nonlinear pile properties are input)
- Analysis uses p-y modification factors for p-y curves
- Analysis includes loading by lateral soil movements acting on pile
- Input of shear resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- No p-y curves to be computed and reported for user-specified depths
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1

-----  
 Pile Structural Properties and Geometry  
 -----

- Total number of pile sections = 3
- Total length of pile = 53.00 ft
- Depth of ground surface below top of pile = 42.00 ft

Pile diameter values used for p-y curve computations are defined using 6 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile.

Point	Depth X ft	Pile Diameter in
1	0.00000	42.0000000
2	12.50000	42.0000000
3	12.50000	48.0000000
4	43.50000	48.0000000

5	43.500000	42.0000000
6	53.000000	42.0000000

-----  
 Input Structural Properties:  
 -----

Pile Section No. 1:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Circular
Section Length	=	12.50000 ft
Top Width	=	42.00000 in
Bottom Width	=	42.00000 in
Top Area	=	1385.44236 Sq. in
Bottom Area	=	1385.44236 Sq. in
Moment of Inertia at Top	=	152745. in^4
Moment of Inertia at Bottom	=	152745. in^4
Elastic Modulus	=	3605000. lbs/in^2

Pile Section No. 2:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Circular
Section Length	=	31.00000 ft
Top Width	=	48.00000 in
Bottom Width	=	48.00000 in
Top Area	=	1809.55737 Sq. in
Bottom Area	=	1809.55737 Sq. in
Moment of Inertia at Top	=	260576. in^4
Moment of Inertia at Bottom	=	260576. in^4
Elastic Modulus	=	3605000. lbs/in^2

Pile Section No. 3:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Circular
Section Length	=	9.50000 ft
Top Width	=	42.00000 in
Bottom Width	=	42.00000 in
Top Area	=	1385.44236 Sq. in
Bottom Area	=	1385.44236 Sq. in
Moment of Inertia at Top	=	152745. in^4
Moment of Inertia at Bottom	=	152745. in^4
Elastic Modulus	=	3605000. lbs/in^2

-----  
 Ground Slope and Pile Batter Angles  
 -----

Ground Slope Angle	=	0.000 degrees
	=	0.000 radians
Pile Batter Angle	=	0.000 degrees
	=	0.000 radians

-----  
 Soil and Rock Layering Information  
 -----

The soil profile is modelled using 1 layers

Layer 1 is strong rock (vuggy limestone)

Distance from top of pile to top of layer = 42.00000 ft  
 Distance from top of pile to bottom of layer = 60.00000 ft  
 Effective unit weight at top of layer = 98.00000 pcf  
 Effective unit weight at bottom of layer = 98.00000 pcf  
 Uniaxial compressive strength at top of layer = 10000.00000 psi  
 Uniaxial compressive strength at bottom of layer = 10000.00000 psi

(Depth of lowest soil layer extends 7.00 ft below pile tip)

Summary of Soil Properties

Layer Num.	Layer Soil Type (p-y Curve Criteria)	Layer Depth ft	Effective Unit Wt. pcf	Uniaxial qu psi
1	Vuggy Limestone	42.000 60.000	98.000 98.000	10000.000 10000.000

p-y Modification Factors for Group Action

Distribution of p-y modifiers with depth defined using 2 points

Point No.	Depth X ft	p-mult	y-mult
1	42.000	0.9300	1.0000
2	100.000	0.9300	1.0000

Lateral Soil Movements

Profile of soil movement with depth defined using 2 points

Point No.	Depth X ft	Soil Movement in
1	0.00000	0.00000
2	0.00000	0.00000

Loading Type

-----  
 Static loading criteria were used when computing p-y curves for all analyses.  
 -----

-----  
 Pile-head Loading and Pile-head Fixity Conditions  
 -----

Number of loads specified = 4

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length
1	1	V = 10700. lbs	M = 2616000. in-lbs	810000.	Yes
2	1	V = 20700. lbs	M = 4608000. in-lbs	1155000.	Yes
3	2	V = 10700. lbs	S = 0.0000 in/in	810000.	Yes
4	2	V = 20700. lbs	S = 0.0000 in/in	1155000.	Yes

V = perpendicular shear force applied to pile head  
 M = bending moment applied to pile head  
 y = lateral deflection relative to pile axis  
 S = pile slope relative to original pile batter angle  
 R = rotational stiffness applied to pile head  
 Axial thrust is assumed to be acting axially for all pile batter angles.

-----  
 Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness  
 -----

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 3

Pile Section No. 1:  
 -----

Moment-curvature properties were derived from elastic section properties

Pile Section No. 2:  
 -----

Moment-curvature properties were derived from elastic section properties

Pile Section No. 3:  
 -----

Moment-curvature properties were derived from elastic section properties

-----  
 Computed Values of Pile Loading and Deflection  
 for Lateral Loading for Load Case Number 1  
 -----

Pile-head conditions are Shear and Moment (Loading Type 1)

I B2\_B-5\_Long\_Scoured. I p7o

Shear force at pile head = 10700.0 lbs  
 Applied moment at pile head = 2616000.0 in-lbs  
 Axial thrust load on pile head = 810000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi *	Bending Stiffness lb-in^2	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	1.1198	2616000.	10700.	-0.003852	944.3090	5.506E+11	0.000	0.000	0.000
0.530	1.0954	2703817.	10700.	-0.003821	956.3824	5.506E+11	0.000	0.000	0.000
1.060	1.0712	2791473.	10700.	-0.003789	968.4337	5.506E+11	0.000	0.000	0.000
1.590	1.0472	2878962.	10700.	-0.003757	980.4621	5.506E+11	0.000	0.000	0.000
2.120	1.0234	2966281.	10700.	-0.003723	992.4670	5.506E+11	0.000	0.000	0.000
2.650	0.9998	3053423.	10700.	-0.003688	1004.4477	5.506E+11	0.000	0.000	0.000
3.180	0.9765	3140383.	10700.	-0.003652	1016.4033	5.506E+11	0.000	0.000	0.000
3.710	0.9534	3227157.	10700.	-0.003615	1028.3333	5.506E+11	0.000	0.000	0.000
4.240	0.9305	3313738.	10700.	-0.003578	1040.2368	5.506E+11	0.000	0.000	0.000
4.770	0.9079	3400122.	10700.	-0.003539	1052.1133	5.506E+11	0.000	0.000	0.000
5.300	0.8855	3486304.	10700.	-0.003499	1063.9619	5.506E+11	0.000	0.000	0.000
5.830	0.8634	3572279.	10700.	-0.003458	1075.7821	5.506E+11	0.000	0.000	0.000
6.360	0.8415	3658041.	10700.	-0.003417	1087.5730	5.506E+11	0.000	0.000	0.000
6.890	0.8199	3743585.	10700.	-0.003374	1099.3339	5.506E+11	0.000	0.000	0.000
7.420	0.7986	3828906.	10700.	-0.003330	1111.0643	5.506E+11	0.000	0.000	0.000
7.950	0.7776	3914000.	10700.	-0.003285	1122.7633	5.506E+11	0.000	0.000	0.000
8.480	0.7568	3998861.	10700.	-0.003240	1134.4303	5.506E+11	0.000	0.000	0.000
9.010	0.7363	4083484.	10700.	-0.003193	1146.0646	5.506E+11	0.000	0.000	0.000
9.540	0.7162	4167864.	10700.	-0.003145	1157.6655	5.506E+11	0.000	0.000	0.000
10.070	0.6963	4251996.	10700.	-0.003097	1169.2323	5.506E+11	0.000	0.000	0.000
10.600	0.6768	4335875.	10700.	-0.003047	1180.7643	5.506E+11	0.000	0.000	0.000
11.130	0.6576	4419495.	10700.	-0.002997	1192.2608	5.506E+11	0.000	0.000	0.000
11.660	0.6387	4502853.	10700.	-0.002945	1203.7212	5.506E+11	0.000	0.000	0.000
12.190	0.6201	4585943.	10700.	-0.002893	1215.1448	5.506E+11	0.000	0.000	0.000
12.720	0.6019	4668761.	10700.	-0.002850	877.6327	9.394E+11	0.000	0.000	0.000
13.250	0.5839	4751415.	10700.	-0.002818	885.2455	9.394E+11	0.000	0.000	0.000
13.780	0.5660	4833904.	10700.	-0.002786	892.8430	9.394E+11	0.000	0.000	0.000
14.310	0.5484	4916224.	10700.	-0.002753	900.4249	9.394E+11	0.000	0.000	0.000
14.840	0.5310	4998372.	10700.	-0.002719	907.9911	9.394E+11	0.000	0.000	0.000
15.370	0.5138	5080346.	10700.	-0.002685	915.5412	9.394E+11	0.000	0.000	0.000
15.900	0.4969	5162143.	10700.	-0.002651	923.0750	9.394E+11	0.000	0.000	0.000
16.430	0.4801	5243760.	10700.	-0.002615	930.5922	9.394E+11	0.000	0.000	0.000
16.960	0.4636	5325194.	10700.	-0.002580	938.0926	9.394E+11	0.000	0.000	0.000
17.490	0.4473	5406443.	10700.	-0.002543	945.5759	9.394E+11	0.000	0.000	0.000
18.020	0.4312	5487502.	10700.	-0.002506	953.0417	9.394E+11	0.000	0.000	0.000
18.550	0.4154	5568371.	10700.	-0.002469	960.4900	9.394E+11	0.000	0.000	0.000
19.080	0.3998	5649045.	10700.	-0.002431	967.9204	9.394E+11	0.000	0.000	0.000
19.610	0.3845	5729522.	10700.	-0.002392	975.3326	9.394E+11	0.000	0.000	0.000
20.140	0.3694	5809799.	10700.	-0.002353	982.7264	9.394E+11	0.000	0.000	0.000
20.670	0.3546	5889874.	10700.	-0.002314	990.1016	9.394E+11	0.000	0.000	0.000
21.200	0.3400	5969743.	10700.	-0.002274	997.4578	9.394E+11	0.000	0.000	0.000
21.730	0.3256	6049404.	10700.	-0.002233	1004.7949	9.394E+11	0.000	0.000	0.000
22.260	0.3116	6128854.	10700.	-0.002192	1012.1125	9.394E+11	0.000	0.000	0.000
22.790	0.2978	6208090.	10700.	-0.002150	1019.4105	9.394E+11	0.000	0.000	0.000
23.320	0.2842	6287110.	10700.	-0.002108	1026.6884	9.394E+11	0.000	0.000	0.000
23.850	0.2709	6365910.	10700.	-0.002065	1033.9462	9.394E+11	0.000	0.000	0.000
24.380	0.2580	6444489.	10700.	-0.002022	1041.1836	9.394E+11	0.000	0.000	0.000
24.910	0.2452	6522842.	10700.	-0.001978	1048.4002	9.394E+11	0.000	0.000	0.000
25.440	0.2328	6600968.	10700.	-0.001933	1055.5959	9.394E+11	0.000	0.000	0.000
25.970	0.2206	6678864.	10700.	-0.001888	1062.7704	9.394E+11	0.000	0.000	0.000
26.500	0.2088	6756527.	10700.	-0.001843	1069.9234	9.394E+11	0.000	0.000	0.000

IB2_B-5_Long_Scoured.l p7o									
27.030	0.1972	6833954.	10700.	-0.001797	1077.0548	9.394E+11	0.000	0.000	0.000
27.560	0.1859	6911143.	10700.	-0.001750	1084.1641	9.394E+11	0.000	0.000	0.000
28.090	0.1749	6988091.	10700.	-0.001703	1091.2513	9.394E+11	0.000	0.000	0.000
28.620	0.1643	7064795.	10700.	-0.001656	1098.3160	9.394E+11	0.000	0.000	0.000
29.150	0.1539	7141253.	10700.	-0.001607	1105.3581	9.394E+11	0.000	0.000	0.000
29.680	0.1438	7217461.	10700.	-0.001559	1112.3771	9.394E+11	0.000	0.000	0.000
30.210	0.1341	7293418.	10700.	-0.001510	1119.3730	9.394E+11	0.000	0.000	0.000
30.740	0.1246	7369121.	10700.	-0.001460	1126.3455	9.394E+11	0.000	0.000	0.000
31.270	0.1155	7444566.	10700.	-0.001410	1133.2943	9.394E+11	0.000	0.000	0.000
31.800	0.1067	7519752.	10700.	-0.001359	1140.2192	9.394E+11	0.000	0.000	0.000
32.330	0.0982	7594676.	10700.	-0.001308	1147.1199	9.394E+11	0.000	0.000	0.000
32.860	0.0900	7669334.	10700.	-0.001256	1153.9962	9.394E+11	0.000	0.000	0.000
33.390	0.0822	7743725.	10700.	-0.001204	1160.8479	9.394E+11	0.000	0.000	0.000
33.920	0.0747	7817847.	10700.	-0.001152	1167.6747	9.394E+11	0.000	0.000	0.000
34.450	0.0676	7891695.	10700.	-0.001098	1174.4764	9.394E+11	0.000	0.000	0.000
34.980	0.0607	7965268.	10700.	-0.001045	1181.2528	9.394E+11	0.000	0.000	0.000
35.510	0.0543	8038563.	10700.	-0.000991	1188.0035	9.394E+11	0.000	0.000	0.000
36.040	0.0481	8111578.	10700.	-0.000936	1194.7285	9.394E+11	0.000	0.000	0.000
36.570	0.0424	8184310.	10700.	-0.000881	1201.4274	9.394E+11	0.000	0.000	0.000
37.100	0.0369	8256757.	10700.	-0.000825	1208.0999	9.394E+11	0.000	0.000	0.000
37.630	0.0319	8328915.	10700.	-0.000769	1214.7460	9.394E+11	0.000	0.000	0.000
38.160	0.0272	8400784.	10700.	-0.000712	1221.3653	9.394E+11	0.000	0.000	0.000
38.690	0.0228	8472359.	10700.	-0.000655	1227.9576	9.394E+11	0.000	0.000	0.000
39.220	0.0188	8543638.	10700.	-0.000598	1234.5227	9.394E+11	0.000	0.000	0.000
39.750	0.0152	8614620.	10700.	-0.000540	1241.0604	9.394E+11	0.000	0.000	0.000
40.280	0.0120	8685301.	10700.	-0.000481	1247.5704	9.394E+11	0.000	0.000	0.000
40.810	0.009090	8755679.	10700.	-0.000422	1254.0524	9.394E+11	0.000	0.000	0.000
41.340	0.006596	8825752.	10700.	-0.000362	1260.5064	9.394E+11	0.000	0.000	0.000
41.870	0.004481	8895517.	10700.	-0.000302	1266.9320	9.394E+11	0.000	0.000	0.000
42.400	0.002749	8964972.	-70602.	-0.000242	1273.3290	9.394E+11	-25567.	59148000.	0.000
42.930	0.001403	7999952.	-193408.	-0.000185	1184.4473	9.394E+11	-13052.	59148000.	0.000
43.460	0.000402	6506717.	-246807.	-0.000135	1046.9150	9.394E+11	-3740.3527	59148000.	0.000
43.990	-0.000319	4861959.	-249272.	-8.529E-05	1253.0925	5.506E+11	2965.3207	59148000.	0.000
44.520	-0.000683	3336859.	-219651.	-3.794E-05	1043.4156	5.506E+11	6349.4794	59148000.	0.000
45.050	-0.000802	2068393.	-175756.	-6.729E-06	869.0218	5.506E+11	7454.0170	59148000.	0.000
45.580	-0.000768	1101317.	-129329.	1.158E-05	736.0643	5.506E+11	7145.5033	59148000.	0.000
46.110	-0.000654	423208.	-87257.	2.038E-05	642.8351	5.506E+11	6084.6098	59148000.	0.000
46.640	-0.000509	-8806.7546	-52852.	2.277E-05	585.8616	5.506E+11	4734.5961	59148000.	0.000
47.170	-0.000365	-249308.	-27014.	2.128E-05	618.9267	5.506E+11	3390.5989	59148000.	0.000
47.700	-0.000238	-352646.	-9182.2538	1.781E-05	633.1340	5.506E+11	2216.9199	59148000.	0.000
48.230	-0.000138	-366290.	1951.1680	1.365E-05	635.0098	5.506E+11	1284.1561	59148000.	0.000
48.760	-6.469E-05	-327968.	7947.9621	9.645E-06	629.7412	5.506E+11	601.6282	59148000.	0.000
49.290	-1.539E-05	-265291.	10316.	6.219E-06	621.1241	5.506E+11	143.1562	59148000.	0.000
49.820	1.442E-05	-196808.	10345.	3.551E-06	611.7087	5.506E+11	-134.0785	59148000.	0.000
50.350	2.977E-05	-133736.	9038.4551	1.642E-06	603.0374	5.506E+11	-276.8613	59148000.	0.000
50.880	3.530E-05	-81856.	7114.1049	3.966E-07	595.9046	5.506E+11	-328.2803	59148000.	0.000
51.410	3.481E-05	-43249.	5040.5576	-3.259E-07	590.5968	5.506E+11	-323.7786	59148000.	0.000
51.940	3.115E-05	-17736.	3089.5978	-6.781E-07	587.0893	5.506E+11	-289.7308	59148000.	0.000
52.470	2.619E-05	-3942.1947	1393.7134	-8.033E-07	585.1928	5.506E+11	-243.5662	59148000.	0.000
53.000	2.094E-05	0.000	0.000	-8.260E-07	584.6508	5.506E+11	-194.7084	29574000.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 1:

Pile-head deflection = 1.1198004 inches  
 Computed slope at pile head = -0.0038517 radians  
 Maximum bending moment = 8964972. inch-lbs  
 Maximum shear force = -249272. lbs

Depth of maximum bending moment = 42.400000 feet below pile head  
 Depth of maximum shear force = 43.990000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 2

-----  
 Pile-head Deflection vs. Pile Length for Load Case 1  
 -----

Boundary Condition Type 1, Shear and Moment

Shear = 10700. lb  
 Moment = 2616000. in-lb  
 Axial Load = 810000. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment in-lbs	Maximum Shear lbs
53.0000	1.1198004	8964972.	-249272.
50.3500	1.1140188	8946634.	-252068.
47.7000	1.1300198	8979953.	-254112.
45.0500	1.1945777	9017332.	-372011.
45.0500	0.000000	22916635426.	-2119555566.
45.0500	0.000000	22916635426.	-2119555566.
45.0500	0.000000	22916635426.	-2119555566.
45.0500	0.000000	22916635426.	-2119555566.
45.0500	0.000000	22916635426.	-2119555566.
45.0500	0.000000	22916635426.	-2119555566.
45.0500	0.000000	22916635426.	-2119555566.
45.0500	0.000000	22916635426.	-2119555566.
45.0500	0.000000	22916635426.	-2119555566.
45.0500	0.000000	22916635426.	-2119555566.
45.0500	0.000000	22916635426.	-2119555566.
45.0500	0.000000	22916635426.	-2119555566.
45.0500	0.000000	22916635426.	-2119555566.
45.0500	0.000000	22916635426.	-2119555566.

-----  
 Computed Values of Pile Loading and Deflection for Lateral Loading for Load Case Number 2  
 -----

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 20700.0 lbs  
 Applied moment at pile head = 4608000.0 in-lbs  
 Axial thrust load on pile head = 1155000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	2.1920	4608000.	20700.	-0.007449	1467.1951	5.506E+11	0.000	0.000	0.000

I B2\_B-5\_Long\_Scoured. I p7o

0. 530	2. 1448	4794172.	20700.	-0. 007394	1492. 7908	5. 506E+11	0. 000	0. 000	0. 000
1. 060	2. 0979	4979937.	20700.	-0. 007338	1518. 3305	5. 506E+11	0. 000	0. 000	0. 000
1. 590	2. 0515	5165279.	20700.	-0. 007279	1543. 8121	5. 506E+11	0. 000	0. 000	0. 000
2. 120	2. 0053	5350183.	20700.	-0. 007218	1569. 2335	5. 506E+11	0. 000	0. 000	0. 000
2. 650	1. 9596	5534634.	20700.	-0. 007156	1594. 5925	5. 506E+11	0. 000	0. 000	0. 000
3. 180	1. 9143	5718614.	20700.	-0. 007091	1619. 8869	5. 506E+11	0. 000	0. 000	0. 000
3. 710	1. 8694	5902110.	20700.	-0. 007023	1645. 1146	5. 506E+11	0. 000	0. 000	0. 000
4. 240	1. 8250	6085105.	20700.	-0. 006954	1670. 2734	5. 506E+11	0. 000	0. 000	0. 000
4. 770	1. 7810	6267583.	20700.	-0. 006883	1695. 3613	5. 506E+11	0. 000	0. 000	0. 000
5. 300	1. 7374	6449530.	20700.	-0. 006809	1720. 3761	5. 506E+11	0. 000	0. 000	0. 000
5. 830	1. 6944	6630929.	20700.	-0. 006734	1745. 3156	5. 506E+11	0. 000	0. 000	0. 000
6. 360	1. 6518	6811766.	20700.	-0. 006656	1770. 1778	5. 506E+11	0. 000	0. 000	0. 000
6. 890	1. 6097	6992025.	20700.	-0. 006577	1794. 9605	5. 506E+11	0. 000	0. 000	0. 000
7. 420	1. 5681	7171691.	20700.	-0. 006495	1819. 6617	5. 506E+11	0. 000	0. 000	0. 000
7. 950	1. 5271	7350748.	20700.	-0. 006411	1844. 2792	5. 506E+11	0. 000	0. 000	0. 000
8. 480	1. 4866	7529182.	20700.	-0. 006325	1868. 8110	5. 506E+11	0. 000	0. 000	0. 000
9. 010	1. 4466	7706977.	20700.	-0. 006237	1893. 2549	5. 506E+11	0. 000	0. 000	0. 000
9. 540	1. 4072	7884117.	20700.	-0. 006147	1917. 6089	5. 506E+11	0. 000	0. 000	0. 000
10. 070	1. 3684	8060589.	20700.	-0. 006055	1941. 8710	5. 506E+11	0. 000	0. 000	0. 000
10. 600	1. 3302	8236377.	20700.	-0. 005961	1966. 0391	5. 506E+11	0. 000	0. 000	0. 000
11. 130	1. 2926	8411467.	20700.	-0. 005865	1990. 1110	5. 506E+11	0. 000	0. 000	0. 000
11. 660	1. 2556	8585842.	20700.	-0. 005766	2014. 0849	5. 506E+11	0. 000	0. 000	0. 000
12. 190	1. 2193	8759489.	20700.	-0. 005666	2037. 9586	5. 506E+11	0. 000	0. 000	0. 000
12. 720	1. 1836	8932393.	20700.	-0. 005585	1460. 9828	9. 394E+11	0. 000	0. 000	0. 000
13. 250	1. 1482	9104853.	20700.	-0. 005524	1476. 8670	9. 394E+11	0. 000	0. 000	0. 000
13. 780	1. 1133	9276860.	20700.	-0. 005462	1492. 7094	9. 394E+11	0. 000	0. 000	0. 000
14. 310	1. 0787	9448405.	20700.	-0. 005399	1508. 5093	9. 394E+11	0. 000	0. 000	0. 000
14. 840	1. 0446	9619481.	20700.	-0. 005334	1524. 2660	9. 394E+11	0. 000	0. 000	0. 000
15. 370	1. 0109	9790078.	20700.	-0. 005269	1539. 9786	9. 394E+11	0. 000	0. 000	0. 000
15. 900	0. 9776	9960188.	20700.	-0. 005202	1555. 6464	9. 394E+11	0. 000	0. 000	0. 000
16. 430	0. 9447	10129803.	20700.	-0. 005134	1571. 2685	9. 394E+11	0. 000	0. 000	0. 000
16. 960	0. 9123	10298914.	20700.	-0. 005065	1586. 8442	9. 394E+11	0. 000	0. 000	0. 000
17. 490	0. 8803	10467513.	20700.	-0. 004994	1602. 3728	9. 394E+11	0. 000	0. 000	0. 000
18. 020	0. 8488	10635591.	20700.	-0. 004923	1617. 8534	9. 394E+11	0. 000	0. 000	0. 000
18. 550	0. 8177	10803140.	20700.	-0. 004850	1633. 2853	9. 394E+11	0. 000	0. 000	0. 000
19. 080	0. 7871	10970153.	20700.	-0. 004777	1648. 6677	9. 394E+11	0. 000	0. 000	0. 000
19. 610	0. 7569	11136619.	20700.	-0. 004702	1663. 9998	9. 394E+11	0. 000	0. 000	0. 000
20. 140	0. 7273	11302532.	20700.	-0. 004626	1679. 2810	9. 394E+11	0. 000	0. 000	0. 000
20. 670	0. 6981	11467882.	20700.	-0. 004549	1694. 5103	9. 394E+11	0. 000	0. 000	0. 000
21. 200	0. 6694	11632662.	20700.	-0. 004470	1709. 6872	9. 394E+11	0. 000	0. 000	0. 000
21. 730	0. 6412	11796864.	20700.	-0. 004391	1724. 8107	9. 394E+11	0. 000	0. 000	0. 000
22. 260	0. 6136	11960478.	20700.	-0. 004311	1739. 8802	9. 394E+11	0. 000	0. 000	0. 000
22. 790	0. 5864	12123498.	20700.	-0. 004229	1754. 8949	9. 394E+11	0. 000	0. 000	0. 000
23. 320	0. 5598	12285915.	20700.	-0. 004147	1769. 8541	9. 394E+11	0. 000	0. 000	0. 000
23. 850	0. 5337	12447721.	20700.	-0. 004063	1784. 7570	9. 394E+11	0. 000	0. 000	0. 000
24. 380	0. 5081	12608908.	20700.	-0. 003978	1799. 6029	9. 394E+11	0. 000	0. 000	0. 000
24. 910	0. 4831	12769468.	20700.	-0. 003892	1814. 3911	9. 394E+11	0. 000	0. 000	0. 000
25. 440	0. 4586	12929393.	20700.	-0. 003805	1829. 1207	9. 394E+11	0. 000	0. 000	0. 000
25. 970	0. 4347	13088675.	20700.	-0. 003717	1843. 7911	9. 394E+11	0. 000	0. 000	0. 000
26. 500	0. 4113	13247305.	20700.	-0. 003628	1858. 4016	9. 394E+11	0. 000	0. 000	0. 000
27. 030	0. 3885	13405277.	20700.	-0. 003538	1872. 9513	9. 394E+11	0. 000	0. 000	0. 000
27. 560	0. 3663	13562583.	20700.	-0. 003446	1887. 4397	9. 394E+11	0. 000	0. 000	0. 000
28. 090	0. 3447	13719213.	20700.	-0. 003354	1901. 8659	9. 394E+11	0. 000	0. 000	0. 000
28. 620	0. 3236	13875162.	20700.	-0. 003261	1916. 2293	9. 394E+11	0. 000	0. 000	0. 000
29. 150	0. 3032	14030420.	20700.	-0. 003166	1930. 5292	9. 394E+11	0. 000	0. 000	0. 000
29. 680	0. 2834	14184980.	20700.	-0. 003071	1944. 7648	9. 394E+11	0. 000	0. 000	0. 000
30. 210	0. 2641	14338835.	20700.	-0. 002974	1958. 9354	9. 394E+11	0. 000	0. 000	0. 000
30. 740	0. 2455	14491977.	20700.	-0. 002876	1973. 0403	9. 394E+11	0. 000	0. 000	0. 000
31. 270	0. 2276	14644398.	20700.	-0. 002778	1987. 0788	9. 394E+11	0. 000	0. 000	0. 000
31. 800	0. 2102	14796091.	20700.	-0. 002678	2001. 0502	9. 394E+11	0. 000	0. 000	0. 000



IB2_B-5_Long_Scoured.l p7o									
32.330	0.1935	14947048.	20700.	-0.002577	2014.9539	9.394E+11	0.000	0.000	0.000
32.860	0.1774	15097262.	20700.	-0.002476	2028.7891	9.394E+11	0.000	0.000	0.000
33.390	0.1620	15246725.	20700.	-0.002373	2042.5552	9.394E+11	0.000	0.000	0.000
33.920	0.1472	15395429.	20700.	-0.002269	2056.2514	9.394E+11	0.000	0.000	0.000
34.450	0.1331	15543368.	20700.	-0.002165	2069.8771	9.394E+11	0.000	0.000	0.000
34.980	0.1197	15690533.	20700.	-0.002059	2083.4315	9.394E+11	0.000	0.000	0.000
35.510	0.1069	15836919.	20700.	-0.001952	2096.9142	9.394E+11	0.000	0.000	0.000
36.040	0.0949	15982516.	20700.	-0.001844	2110.3242	9.394E+11	0.000	0.000	0.000
36.570	0.0835	16127319.	20700.	-0.001736	2123.6611	9.394E+11	0.000	0.000	0.000
37.100	0.0728	16271320.	20700.	-0.001626	2136.9241	9.394E+11	0.000	0.000	0.000
37.630	0.0628	16414512.	20700.	-0.001515	2150.1125	9.394E+11	0.000	0.000	0.000
38.160	0.0535	16556887.	20700.	-0.001404	2163.2258	9.394E+11	0.000	0.000	0.000
38.690	0.0449	16698438.	20700.	-0.001291	2176.2632	9.394E+11	0.000	0.000	0.000
39.220	0.0371	16839160.	20700.	-0.001178	2189.2241	9.394E+11	0.000	0.000	0.000
39.750	0.0300	16979043.	20700.	-0.001063	2202.1079	9.394E+11	0.000	0.000	0.000
40.280	0.0236	17118083.	20700.	-0.000948	2214.9139	9.394E+11	0.000	0.000	0.000
40.810	0.0179	17256271.	20700.	-0.000831	2227.6415	9.394E+11	0.000	0.000	0.000
41.340	0.0130	17393600.	20700.	-0.000714	2240.2901	9.394E+11	0.000	0.000	0.000
41.870	0.008827	17530065.	20700.	-0.000596	2252.8589	9.394E+11	0.000	0.000	0.000
42.400	0.005415	17665658.	-139443.	-0.000477	2265.3475	9.394E+11	-50360.	59148000.	0.000
42.930	0.002764	15763349.	-381321.	-0.000364	2090.1381	9.394E+11	-25703.	59148000.	0.000
43.460	0.000791	12820589.	-486457.	-0.000267	1819.0995	9.394E+11	-7358.6265	59148000.	0.000
43.990	-0.000629	9579538.	-491250.	-0.000168	2150.7022	5.506E+11	5851.4328	59148000.	0.000
44.520	-0.001346	6574362.	-432838.	-7.473E-05	1737.5385	5.506E+11	12517.	59148000.	0.000
45.050	-0.001580	4074940.	-346315.	-1.323E-05	1393.9079	5.506E+11	14691.	59148000.	0.000
45.580	-0.001514	2169434.	-254816.	2.283E-05	1131.9312	5.506E+11	14082.	59148000.	0.000
46.110	-0.001289	833348.	-171907.	4.018E-05	948.2408	5.506E+11	11990.	59148000.	0.000
46.640	-0.001003	-17809.	-104111.	4.489E-05	836.1172	5.506E+11	9329.2701	59148000.	0.000
47.170	-0.000718	-491599.	-53200.	4.194E-05	901.2558	5.506E+11	6680.4926	59148000.	0.000
47.700	-0.000470	-695125.	-18067.	3.509E-05	929.2373	5.506E+11	4367.5580	59148000.	0.000
48.230	-0.000272	-721925.	3865.8356	2.691E-05	932.9219	5.506E+11	2529.5074	59148000.	0.000
48.760	-0.000127	-646347.	15677.	1.900E-05	922.5311	5.506E+11	1184.6498	59148000.	0.000
49.290	-3.025E-05	-522795.	20339.	1.225E-05	905.5447	5.506E+11	281.3527	59148000.	0.000
49.820	2.847E-05	-387818.	20391.	6.994E-06	886.9875	5.506E+11	-264.7900	59148000.	0.000
50.350	5.871E-05	-263519.	17813.	3.232E-06	869.8983	5.506E+11	-545.9897	59148000.	0.000
50.880	6.959E-05	-161282.	14019.	7.791E-07	855.8425	5.506E+11	-647.1630	59148000.	0.000
51.410	6.862E-05	-85210.	9931.5995	-6.444E-07	845.3837	5.506E+11	-638.1542	59148000.	0.000
51.940	6.139E-05	-34943.	6086.7014	-1.338E-06	838.4728	5.506E+11	-570.9333	59148000.	0.000
52.470	5.160E-05	-7767.0134	2745.2399	-1.585E-06	834.7366	5.506E+11	-479.8408	59148000.	0.000
53.000	4.123E-05	0.000	0.000	-1.630E-06	833.6687	5.506E+11	-383.4422	29574000.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 2:

Pile-head deflection = 2.1919930 inches  
 Computed slope at pile head = -0.0074485 radians  
 Maximum bending moment = 17665658. inch-lbs  
 Maximum shear force = -491250. lbs  
 Depth of maximum bending moment = 42.4000000 feet below pile head  
 Depth of maximum shear force = 43.9900000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 2

-----  
 Pile-head Deflection vs. Pile Length for Load Case 2  
 -----

Boundary Condition Type 1, Shear and Moment

Shear = 20700. lb  
 Moment = 4608000. in-lb  
 Axial Load = 1155000. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment in-lbs	Maximum Shear lbs
53.0000	2.1919930	17665658.	-491250.
50.3500	2.1801531	17625528.	-496656.
47.7000	2.2129570	17702749.	-501013.
45.0500	2.3462278	17826656.	-735616.
45.0500	0.000000	44999746123.	-4162018578.
45.0500	0.000000	44999746123.	-4162018578.
45.0500	0.000000	44999746123.	-4162018578.
45.0500	0.000000	44999746123.	-4162018578.
45.0500	0.000000	44999746123.	-4162018578.
45.0500	0.000000	44999746123.	-4162018578.
45.0500	0.000000	44999746123.	-4162018578.
45.0500	0.000000	44999746123.	-4162018578.
45.0500	0.000000	44999746123.	-4162018578.
45.0500	0.000000	44999746123.	-4162018578.
45.0500	0.000000	44999746123.	-4162018578.
45.0500	0.000000	44999746123.	-4162018578.
45.0500	0.000000	44999746123.	-4162018578.
45.0500	0.000000	44999746123.	-4162018578.
45.0500	0.000000	44999746123.	-4162018578.
45.0500	0.000000	44999746123.	-4162018578.
45.0500	0.000000	44999746123.	-4162018578.
45.0500	0.000000	44999746123.	-4162018578.

-----  
 Computed Values of Pile Loading and Deflection  
 for Lateral Loading for Load Case Number 3  
 -----

Pile-head conditions are Shear and Pile-head Rotation (Loading Type 2)

Shear force at pile head = 10700.0 lbs  
 Rotation of pile head = 0.000E+00 radians  
 Axial load at pile head = 810000.0 lbs

(Zero slope for this load indicates fixed-head conditions)

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi *	Bending Stiffness lb-in^2	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.1895	-2584470.	10700.	0.000	939.9741	5.506E+11	0.000	0.000	0.000
0.530	0.1894	-2516341.	10700.	-2.946E-05	930.6075	5.506E+11	0.000	0.000	0.000
1.060	0.1891	-2448062.	10700.	-5.813E-05	921.2203	5.506E+11	0.000	0.000	0.000
1.590	0.1886	-2379638.	10700.	-8.601E-05	911.8130	5.506E+11	0.000	0.000	0.000
2.120	0.1880	-2311072.	10700.	-0.000113	902.3863	5.506E+11	0.000	0.000	0.000
2.650	0.1872	-2242369.	10700.	-0.000139	892.9407	5.506E+11	0.000	0.000	0.000
3.180	0.1862	-2173532.	10700.	-0.000165	883.4767	5.506E+11	0.000	0.000	0.000
3.710	0.1851	-2104566.	10700.	-0.000190	873.9950	5.506E+11	0.000	0.000	0.000
4.240	0.1838	-2035475.	10700.	-0.000214	864.4960	5.506E+11	0.000	0.000	0.000

I B2\_B-5\_Long\_Scoured. I p7o

4. 770	0. 1824	-1966262.	10700.	-0. 000237	854. 9804	5. 506E+11	0. 000	0. 000	0. 000
5. 300	0. 1808	-1896933.	10700.	-0. 000259	845. 4487	5. 506E+11	0. 000	0. 000	0. 000
5. 830	0. 1791	-1827490.	10700.	-0. 000280	835. 9015	5. 506E+11	0. 000	0. 000	0. 000
6. 360	0. 1772	-1757939.	10700.	-0. 000301	826. 3394	5. 506E+11	0. 000	0. 000	0. 000
6. 890	0. 1752	-1688284.	10700.	-0. 000321	816. 7628	5. 506E+11	0. 000	0. 000	0. 000
7. 420	0. 1731	-1618527.	10700.	-0. 000340	807. 1725	5. 506E+11	0. 000	0. 000	0. 000
7. 950	0. 1709	-1548675.	10700.	-0. 000358	797. 5689	5. 506E+11	0. 000	0. 000	0. 000
8. 480	0. 1686	-1478730.	10700.	-0. 000376	787. 9526	5. 506E+11	0. 000	0. 000	0. 000
9. 010	0. 1661	-1408698.	10700.	-0. 000393	778. 3243	5. 506E+11	0. 000	0. 000	0. 000
9. 540	0. 1636	-1338581.	10700.	-0. 000408	768. 6844	5. 506E+11	0. 000	0. 000	0. 000
10. 070	0. 1609	-1268385.	10700.	-0. 000424	759. 0335	5. 506E+11	0. 000	0. 000	0. 000
10. 600	0. 1582	-1198114.	10700.	-0. 000438	749. 3723	5. 506E+11	0. 000	0. 000	0. 000
11. 130	0. 1554	-1127771.	10700.	-0. 000451	739. 7013	5. 506E+11	0. 000	0. 000	0. 000
11. 660	0. 1525	-1057361.	10700.	-0. 000464	730. 0211	5. 506E+11	0. 000	0. 000	0. 000
12. 190	0. 1495	-986888.	10700.	-0. 000476	720. 3322	5. 506E+11	0. 000	0. 000	0. 000
12. 720	0. 1464	-916357.	10700.	-0. 000484	532. 0230	9. 394E+11	0. 000	0. 000	0. 000
13. 250	0. 1433	-845793.	10700.	-0. 000490	525. 5238	9. 394E+11	0. 000	0. 000	0. 000
13. 780	0. 1402	-775200.	10700.	-0. 000496	519. 0220	9. 394E+11	0. 000	0. 000	0. 000
14. 310	0. 1370	-704580.	10700.	-0. 000501	512. 5176	9. 394E+11	0. 000	0. 000	0. 000
14. 840	0. 1338	-633936.	10700.	-0. 000505	506. 0110	9. 394E+11	0. 000	0. 000	0. 000
15. 370	0. 1306	-563269.	10700.	-0. 000509	499. 5023	9. 394E+11	0. 000	0. 000	0. 000
15. 900	0. 1273	-492583.	10700.	-0. 000513	492. 9919	9. 394E+11	0. 000	0. 000	0. 000
16. 430	0. 1241	-421879.	10700.	-0. 000516	486. 4798	9. 394E+11	0. 000	0. 000	0. 000
16. 960	0. 1208	-351161.	10700.	-0. 000519	479. 9664	9. 394E+11	0. 000	0. 000	0. 000
17. 490	0. 1175	-280430.	10700.	-0. 000521	473. 4519	9. 394E+11	0. 000	0. 000	0. 000
18. 020	0. 1141	-209690.	10700.	-0. 000523	466. 9365	9. 394E+11	0. 000	0. 000	0. 000
18. 550	0. 1108	-138942.	10700.	-0. 000524	460. 4204	9. 394E+11	0. 000	0. 000	0. 000
19. 080	0. 1075	-68190.	10700.	-0. 000524	453. 9038	9. 394E+11	0. 000	0. 000	0. 000
19. 610	0. 1041	2564. 9273	10700.	-0. 000525	447. 8595	9. 394E+11	0. 000	0. 000	0. 000
20. 140	0. 1008	73320.	10700.	-0. 000524	454. 3763	9. 394E+11	0. 000	0. 000	0. 000
20. 670	0. 0975	144072.	10700.	-0. 000524	460. 8928	9. 394E+11	0. 000	0. 000	0. 000
21. 200	0. 0941	214819.	10700.	-0. 000522	467. 4089	9. 394E+11	0. 000	0. 000	0. 000
21. 730	0. 0908	285559.	10700.	-0. 000521	473. 9242	9. 394E+11	0. 000	0. 000	0. 000
22. 260	0. 0875	356288.	10700.	-0. 000519	480. 4387	9. 394E+11	0. 000	0. 000	0. 000
22. 790	0. 0842	427006.	10700.	-0. 000516	486. 9520	9. 394E+11	0. 000	0. 000	0. 000
23. 320	0. 0809	497708.	10700.	-0. 000513	493. 4640	9. 394E+11	0. 000	0. 000	0. 000
23. 850	0. 0777	568393.	10700.	-0. 000509	499. 9743	9. 394E+11	0. 000	0. 000	0. 000
24. 380	0. 0745	639058.	10700.	-0. 000505	506. 4828	9. 394E+11	0. 000	0. 000	0. 000
24. 910	0. 0713	709701.	10700.	-0. 000501	512. 9893	9. 394E+11	0. 000	0. 000	0. 000
25. 440	0. 0681	780319.	10700.	-0. 000495	519. 4935	9. 394E+11	0. 000	0. 000	0. 000
25. 970	0. 0650	850910.	10700.	-0. 000490	525. 9951	9. 394E+11	0. 000	0. 000	0. 000
26. 500	0. 0619	921472.	10700.	-0. 000484	532. 4941	9. 394E+11	0. 000	0. 000	0. 000
27. 030	0. 0588	992001.	10700.	-0. 000477	538. 9901	9. 394E+11	0. 000	0. 000	0. 000
27. 560	0. 0558	1062495.	10700.	-0. 000471	545. 4829	9. 394E+11	0. 000	0. 000	0. 000
28. 090	0. 0528	1132953.	10700.	-0. 000463	551. 9722	9. 394E+11	0. 000	0. 000	0. 000
28. 620	0. 0499	1203371.	10700.	-0. 000455	558. 4580	9. 394E+11	0. 000	0. 000	0. 000
29. 150	0. 0470	1273747.	10700.	-0. 000447	564. 9399	9. 394E+11	0. 000	0. 000	0. 000
29. 680	0. 0442	1344078.	10700.	-0. 000438	571. 4177	9. 394E+11	0. 000	0. 000	0. 000
30. 210	0. 0415	1414363.	10700.	-0. 000429	577. 8911	9. 394E+11	0. 000	0. 000	0. 000
30. 740	0. 0388	1484598.	10700.	-0. 000419	584. 3600	9. 394E+11	0. 000	0. 000	0. 000
31. 270	0. 0361	1554782.	10700.	-0. 000409	590. 8242	9. 394E+11	0. 000	0. 000	0. 000
31. 800	0. 0336	1624911.	10700.	-0. 000398	597. 2834	9. 394E+11	0. 000	0. 000	0. 000
32. 330	0. 0311	1694984.	10700.	-0. 000387	603. 7373	9. 394E+11	0. 000	0. 000	0. 000
32. 860	0. 0287	1764997.	10700.	-0. 000375	610. 1858	9. 394E+11	0. 000	0. 000	0. 000
33. 390	0. 0263	1834949.	10700.	-0. 000363	616. 6286	9. 394E+11	0. 000	0. 000	0. 000
33. 920	0. 0240	1904837.	10700.	-0. 000350	623. 0656	9. 394E+11	0. 000	0. 000	0. 000
34. 450	0. 0219	1974659.	10700.	-0. 000337	629. 4964	9. 394E+11	0. 000	0. 000	0. 000
34. 980	0. 0198	2044411.	10700.	-0. 000323	635. 9208	9. 394E+11	0. 000	0. 000	0. 000
35. 510	0. 0178	2114093.	10700.	-0. 000309	642. 3387	9. 394E+11	0. 000	0. 000	0. 000
36. 040	0. 0158	2183700.	10700.	-0. 000295	648. 7498	9. 394E+11	0. 000	0. 000	0. 000

IB2_B-5_Long_Scoured.l p7o									
36.570	0.0140	2253232.	10700.	-0.000280	655.1539	9.394E+11	0.000	0.000	0.000
37.100	0.0123	2322685.	10700.	-0.000264	661.5508	9.394E+11	0.000	0.000	0.000
37.630	0.0106	2392057.	10700.	-0.000248	667.9402	9.394E+11	0.000	0.000	0.000
38.160	0.009122	2461345.	10700.	-0.000232	674.3219	9.394E+11	0.000	0.000	0.000
38.690	0.007701	2530548.	10700.	-0.000215	680.6957	9.394E+11	0.000	0.000	0.000
39.220	0.006390	2599662.	10700.	-0.000197	687.0614	9.394E+11	0.000	0.000	0.000
39.750	0.005190	2668686.	10700.	-0.000180	693.4187	9.394E+11	0.000	0.000	0.000
40.280	0.004105	2737616.	10700.	-0.000161	699.7675	9.394E+11	0.000	0.000	0.000
40.810	0.003139	2806451.	10700.	-0.000143	706.1074	9.394E+11	0.000	0.000	0.000
41.340	0.002293	2875188.	10700.	-0.000123	712.4383	9.394E+11	0.000	0.000	0.000
41.870	0.001571	2943825.	10700.	-0.000104	718.7601	9.394E+11	0.000	0.000	0.000
42.400	0.000975	3012360.	-18144.	-8.341E-05	725.0723	9.394E+11	-9070.2952	59148000.	0.000
42.930	0.000510	2713899.	-62060.	-6.403E-05	697.5830	9.394E+11	-4739.8577	59148000.	0.000
43.460	0.000161	2223618.	-81891.	-4.731E-05	652.4264	9.394E+11	-1496.2230	59148000.	0.000
43.990	-9.214E-05	1672738.	-83923.	-3.012E-05	814.6256	5.506E+11	856.9459	59148000.	0.000
44.520	-0.000222	1156422.	-74624.	-1.379E-05	743.6404	5.506E+11	2067.3605	59148000.	0.000
45.050	-0.000267	723661.	-60139.	-2.928E-06	684.1426	5.506E+11	2487.7494	59148000.	0.000
45.580	-0.000260	391485.	-44552.	3.512E-06	638.4738	5.506E+11	2413.7592	59148000.	0.000
46.110	-0.000223	156922.	-30286.	6.679E-06	606.2251	5.506E+11	2072.3205	59148000.	0.000
46.640	-0.000175	6173.5810	-18533.	7.621E-06	585.4996	5.506E+11	1623.6785	59148000.	0.000
47.170	-0.000126	-78898.	-9646.6099	7.201E-06	595.4980	5.506E+11	1170.8189	59148000.	0.000
47.700	-8.300E-05	-116605.	-3468.8928	6.072E-06	600.6822	5.506E+11	771.8595	59148000.	0.000
48.230	-4.866E-05	-123085.	424.7634	4.687E-06	601.5730	5.506E+11	452.5607	59148000.	0.000
48.760	-2.337E-05	-111251.	2555.0763	3.334E-06	599.9460	5.506E+11	217.3490	59148000.	0.000
49.290	-6.252E-06	-90619.	3431.1306	2.168E-06	597.1094	5.506E+11	58.1398	59148000.	0.000
49.820	4.211E-06	-67629.	3491.4797	1.254E-06	593.9487	5.506E+11	-39.1621	59148000.	0.000
50.350	9.706E-06	-46220.	3079.9104	5.970E-07	591.0053	5.506E+11	-90.2622	59148000.	0.000
50.880	1.181E-05	-28459.	2443.7552	1.657E-07	588.5634	5.506E+11	-109.7866	59148000.	0.000
51.410	1.181E-05	-15137.	1745.2506	-8.602E-08	586.7319	5.506E+11	-109.8689	59148000.	0.000
51.940	1.071E-05	-6258.3709	1079.1069	-2.096E-07	585.5112	5.506E+11	-99.6102	59148000.	0.000
52.470	9.148E-06	-1408.5818	491.8047	-2.539E-07	584.8445	5.506E+11	-85.0760	59148000.	0.000
53.000	7.482E-06	0.000	0.000	-2.620E-07	584.6508	5.506E+11	-69.5795	29574000.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 3:

Pile-head deflection = 0.1894560 inches  
 Computed slope at pile head = 0.000000 radians  
 Maximum bending moment = 3012360. inch-lbs  
 Maximum shear force = -83923. lbs  
 Depth of maximum bending moment = 42.4000000 feet below pile head  
 Depth of maximum shear force = 43.9900000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 2

-----  
 Pile-head Deflection vs. Pile Length for Load Case 3  
 -----

Boundary Condition Type 2, Shear and Slope

Shear = 10700. lb  
 Slope = 0.00000  
 Axial Load = 810000. lb

I B2\_B-5\_Long\_Scoured. I p7o

Pile Length feet	Pile Head Deflection inches	Maximum Moment in-lbs	Maximum Shear lbs
53.0000	0.1894560	3012360.	-83923.
50.3500	0.1884203	3001068.	-84590.
47.7000	0.1912019	3014497.	-85283.
45.0500	0.2023895	2946024.	-122679.
45.0500	0.000000	3812037183.	352933039.
45.0500	0.000000	3812037183.	352933039.
45.0500	0.000000	3812037183.	352933039.
45.0500	0.000000	3812037183.	352933039.
45.0500	0.000000	3812037183.	352933039.
45.0500	0.000000	3812037183.	352933039.
45.0500	0.000000	3812037183.	352933039.
45.0500	0.000000	3812037183.	352933039.
45.0500	0.000000	3812037183.	352933039.
45.0500	0.000000	3812037183.	352933039.
45.0500	0.000000	3812037183.	352933039.
45.0500	0.000000	3812037183.	352933039.
45.0500	0.000000	3812037183.	352933039.
45.0500	0.000000	3812037183.	352933039.
45.0500	0.000000	3812037183.	352933039.
45.0500	0.000000	3812037183.	352933039.
45.0500	0.000000	3812037183.	352933039.
45.0500	0.000000	3812037183.	352933039.

-----  
 Computed Values of Pile Loading and Deflection  
 for Lateral Loading for Load Case Number 4  
 -----

Pile-head conditions are Shear and Pile-head Rotation (Loading Type 2)

Shear force at pile head = 20700.0 lbs  
 Rotation of pile head = 0.000E+00 radians  
 Axial load at pile head = 1155000.0 lbs

(Zero slope for this load indicates fixed-head conditions)

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi *	Bending Stiffness lb-in <sup>2</sup>	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.3716	-5058985.	20700.	0.000	1529.1984	5.506E+11	0.000	0.000	0.000
0.530	0.3714	-4927119.	20700.	-5.767E-05	1511.0688	5.506E+11	0.000	0.000	0.000
1.060	0.3709	-4794834.	20700.	-0.000114	1492.8818	5.506E+11	0.000	0.000	0.000
1.590	0.3700	-4662142.	20700.	-0.000168	1474.6389	5.506E+11	0.000	0.000	0.000
2.120	0.3687	-4529055.	20700.	-0.000222	1456.3415	5.506E+11	0.000	0.000	0.000
2.650	0.3672	-4395584.	20700.	-0.000273	1437.9913	5.506E+11	0.000	0.000	0.000
3.180	0.3653	-4261740.	20700.	-0.000323	1419.5899	5.506E+11	0.000	0.000	0.000
3.710	0.3631	-4127534.	20700.	-0.000371	1401.1387	5.506E+11	0.000	0.000	0.000
4.240	0.3605	-3992978.	20700.	-0.000418	1382.6394	5.506E+11	0.000	0.000	0.000
4.770	0.3577	-3858083.	20700.	-0.000464	1364.0936	5.506E+11	0.000	0.000	0.000
5.300	0.3546	-3722861.	20700.	-0.000508	1345.5027	5.506E+11	0.000	0.000	0.000
5.830	0.3513	-3587323.	20700.	-0.000550	1326.8684	5.506E+11	0.000	0.000	0.000
6.360	0.3476	-3451481.	20700.	-0.000590	1308.1922	5.506E+11	0.000	0.000	0.000
6.890	0.3438	-3315346.	20700.	-0.000629	1289.4758	5.506E+11	0.000	0.000	0.000
7.420	0.3396	-3178929.	20700.	-0.000667	1270.7207	5.506E+11	0.000	0.000	0.000
7.950	0.3353	-3042243.	20700.	-0.000703	1251.9285	5.506E+11	0.000	0.000	0.000
8.480	0.3307	-2905299.	20700.	-0.000737	1233.1009	5.506E+11	0.000	0.000	0.000

I B2\_B-5\_Long\_Scoured. I p7o

9. 010	0. 3259	-2768108.	20700.	-0. 000770	1214. 2393	5. 506E+11	0. 000	0. 000	0. 000
9. 540	0. 3209	-2630682.	20700.	-0. 000801	1195. 3455	5. 506E+11	0. 000	0. 000	0. 000
10. 070	0. 3157	-2493033.	20700.	-0. 000831	1176. 4210	5. 506E+11	0. 000	0. 000	0. 000
10. 600	0. 3103	-2355173.	20700.	-0. 000859	1157. 4674	5. 506E+11	0. 000	0. 000	0. 000
11. 130	0. 3048	-2217113.	20700.	-0. 000885	1138. 4863	5. 506E+11	0. 000	0. 000	0. 000
11. 660	0. 2991	-2078864.	20700.	-0. 000910	1119. 4794	5. 506E+11	0. 000	0. 000	0. 000
12. 190	0. 2932	-1940439.	20700.	-0. 000933	1100. 4482	5. 506E+11	0. 000	0. 000	0. 000
12. 720	0. 2872	-1801850.	20700.	-0. 000950	804. 2344	9. 394E+11	0. 000	0. 000	0. 000
13. 250	0. 2811	-1663171.	20700.	-0. 000962	791. 4616	9. 394E+11	0. 000	0. 000	0. 000
13. 780	0. 2750	-1524409.	20700.	-0. 000973	778. 6812	9. 394E+11	0. 000	0. 000	0. 000
14. 310	0. 2687	-1385572.	20700.	-0. 000983	765. 8937	9. 394E+11	0. 000	0. 000	0. 000
14. 840	0. 2625	-1246666.	20700.	-0. 000992	753. 1000	9. 394E+11	0. 000	0. 000	0. 000
15. 370	0. 2561	-1107697.	20700.	-0. 001000	740. 3005	9. 394E+11	0. 000	0. 000	0. 000
15. 900	0. 2497	-968674.	20700.	-0. 001007	727. 4959	9. 394E+11	0. 000	0. 000	0. 000
16. 430	0. 2433	-829602.	20700.	-0. 001013	714. 6869	9. 394E+11	0. 000	0. 000	0. 000
16. 960	0. 2369	-690489.	20700.	-0. 001018	701. 8741	9. 394E+11	0. 000	0. 000	0. 000
17. 490	0. 2304	-551342.	20700.	-0. 001022	689. 0582	9. 394E+11	0. 000	0. 000	0. 000
18. 020	0. 2239	-412167.	20700.	-0. 001025	676. 2397	9. 394E+11	0. 000	0. 000	0. 000
18. 550	0. 2173	-272972.	20700.	-0. 001028	663. 4193	9. 394E+11	0. 000	0. 000	0. 000
19. 080	0. 2108	-133763.	20700.	-0. 001029	650. 5977	9. 394E+11	0. 000	0. 000	0. 000
19. 610	0. 2042	5452. 3249	20700.	-0. 001030	638. 7798	9. 394E+11	0. 000	0. 000	0. 000
20. 140	0. 1977	144667.	20700.	-0. 001029	651. 6020	9. 394E+11	0. 000	0. 000	0. 000
20. 670	0. 1912	283875.	20700.	-0. 001028	664. 4236	9. 394E+11	0. 000	0. 000	0. 000
21. 200	0. 1846	423069.	20700.	-0. 001025	677. 2438	9. 394E+11	0. 000	0. 000	0. 000
21. 730	0. 1781	562242.	20700.	-0. 001022	690. 0621	9. 394E+11	0. 000	0. 000	0. 000
22. 260	0. 1716	701387.	20700.	-0. 001018	702. 8779	9. 394E+11	0. 000	0. 000	0. 000
22. 790	0. 1652	840497.	20700.	-0. 001012	715. 6904	9. 394E+11	0. 000	0. 000	0. 000
23. 320	0. 1587	979565.	20700.	-0. 001006	728. 4991	9. 394E+11	0. 000	0. 000	0. 000
23. 850	0. 1524	1118584.	20700.	-0. 000999	741. 3032	9. 394E+11	0. 000	0. 000	0. 000
24. 380	0. 1460	1257548.	20700.	-0. 000991	754. 1023	9. 394E+11	0. 000	0. 000	0. 000
24. 910	0. 1398	1396450.	20700.	-0. 000982	766. 8956	9. 394E+11	0. 000	0. 000	0. 000
25. 440	0. 1335	1535281.	20700.	-0. 000972	779. 6825	9. 394E+11	0. 000	0. 000	0. 000
25. 970	0. 1274	1674037.	20700.	-0. 000961	792. 4624	9. 394E+11	0. 000	0. 000	0. 000
26. 500	0. 1213	1812709.	20700.	-0. 000950	805. 2346	9. 394E+11	0. 000	0. 000	0. 000
27. 030	0. 1153	1951291.	20700.	-0. 000937	817. 9985	9. 394E+11	0. 000	0. 000	0. 000
27. 560	0. 1094	2089776.	20700.	-0. 000923	830. 7534	9. 394E+11	0. 000	0. 000	0. 000
28. 090	0. 1036	2228157.	20700.	-0. 000908	843. 4988	9. 394E+11	0. 000	0. 000	0. 000
28. 620	0. 0978	2366427.	20700.	-0. 000893	856. 2340	9. 394E+11	0. 000	0. 000	0. 000
29. 150	0. 0922	2504580.	20700.	-0. 000876	868. 9583	9. 394E+11	0. 000	0. 000	0. 000
29. 680	0. 0867	2642608.	20700.	-0. 000859	881. 6712	9. 394E+11	0. 000	0. 000	0. 000
30. 210	0. 0813	2780504.	20700.	-0. 000841	894. 3720	9. 394E+11	0. 000	0. 000	0. 000
30. 740	0. 0760	2918263.	20700.	-0. 000821	907. 0600	9. 394E+11	0. 000	0. 000	0. 000
31. 270	0. 0708	3055876.	20700.	-0. 000801	919. 7347	9. 394E+11	0. 000	0. 000	0. 000
31. 800	0. 0658	3193337.	20700.	-0. 000780	932. 3953	9. 394E+11	0. 000	0. 000	0. 000
32. 330	0. 0609	3330639.	20700.	-0. 000758	945. 0414	9. 394E+11	0. 000	0. 000	0. 000
32. 860	0. 0562	3467776.	20700.	-0. 000735	957. 6721	9. 394E+11	0. 000	0. 000	0. 000
33. 390	0. 0516	3604740.	20700.	-0. 000711	970. 2870	9. 394E+11	0. 000	0. 000	0. 000
33. 920	0. 0471	3741525.	20700.	-0. 000686	982. 8854	9. 394E+11	0. 000	0. 000	0. 000
34. 450	0. 0428	3878124.	20700.	-0. 000660	995. 4666	9. 394E+11	0. 000	0. 000	0. 000
34. 980	0. 0387	4014530.	20700.	-0. 000634	1008. 0301	9. 394E+11	0. 000	0. 000	0. 000
35. 510	0. 0348	4150736.	20700.	-0. 000606	1020. 5752	9. 394E+11	0. 000	0. 000	0. 000
36. 040	0. 0310	4286736.	20700.	-0. 000577	1033. 1013	9. 394E+11	0. 000	0. 000	0. 000
36. 570	0. 0274	4422523.	20700.	-0. 000548	1045. 6077	9. 394E+11	0. 000	0. 000	0. 000
37. 100	0. 0240	4558090.	20700.	-0. 000517	1058. 0939	9. 394E+11	0. 000	0. 000	0. 000
37. 630	0. 0209	4693430.	20700.	-0. 000486	1070. 5592	9. 394E+11	0. 000	0. 000	0. 000
38. 160	0. 0179	4828536.	20700.	-0. 000454	1083. 0030	9. 394E+11	0. 000	0. 000	0. 000
38. 690	0. 0151	4963403.	20700.	-0. 000421	1095. 4247	9. 394E+11	0. 000	0. 000	0. 000
39. 220	0. 0125	5098022.	20700.	-0. 000387	1107. 8236	9. 394E+11	0. 000	0. 000	0. 000
39. 750	0. 0102	5232389.	20700.	-0. 000352	1120. 1992	9. 394E+11	0. 000	0. 000	0. 000
40. 280	0. 008038	5366494.	20700.	-0. 000316	1132. 5509	9. 394E+11	0. 000	0. 000	0. 000

IB2_B-5_Long_Scoured.l p7o									
40.810	0.006145	5500333.	20700.	-0.000279	1144.8779	9.394E+11	0.000	0.000	0.000
41.340	0.004488	5633899.	20700.	-0.000241	1157.1797	9.394E+11	0.000	0.000	0.000
41.870	0.003074	5767184.	20700.	-0.000203	1169.4558	9.394E+11	0.000	0.000	0.000
42.400	0.001909	5900182.	-35746.	-0.000163	1181.7054	9.394E+11	-17750.	59148000.	0.000
42.930	0.000997	5314897.	-121677.	-0.000125	1127.7986	9.394E+11	-9272.0782	59148000.	0.000
43.460	0.000314	4354296.	-160455.	-9.261E-05	1039.3238	9.394E+11	-2922.3118	59148000.	0.000
43.990	-0.000181	3275272.	-164394.	-5.896E-05	1283.9663	5.506E+11	1683.7416	59148000.	0.000
44.520	-0.000436	2264076.	-146153.	-2.697E-05	1144.9431	5.506E+11	4052.2479	59148000.	0.000
45.050	-0.000524	1416601.	-117768.	-5.713E-06	1028.4287	5.506E+11	4874.0191	59148000.	0.000
45.580	-0.000508	766157.	-87233.	6.893E-06	939.0031	5.506E+11	4728.0200	59148000.	0.000
46.110	-0.000436	306895.	-59292.	1.309E-05	875.8619	5.506E+11	4058.6102	59148000.	0.000
46.640	-0.000342	11776.	-36274.	1.493E-05	835.2877	5.506E+11	3179.5411	59148000.	0.000
47.170	-0.000246	-154733.	-18873.	1.410E-05	854.9421	5.506E+11	2292.4273	59148000.	0.000
47.700	-0.000162	-228501.	-6778.4434	1.189E-05	865.0840	5.506E+11	1511.0218	59148000.	0.000
48.230	-9.524E-05	-241130.	843.1963	9.179E-06	866.8203	5.506E+11	885.7202	59148000.	0.000
48.760	-4.572E-05	-217911.	5011.7631	6.528E-06	863.6280	5.506E+11	425.1498	59148000.	0.000
49.290	-1.220E-05	-177476.	6724.5051	4.245E-06	858.0689	5.506E+11	113.4483	59148000.	0.000
49.820	8.280E-06	-132438.	6840.3853	2.455E-06	851.8768	5.506E+11	-77.0080	59148000.	0.000
50.350	1.903E-05	-90503.	6032.6789	1.168E-06	846.1114	5.506E+11	-176.9877	59148000.	0.000
50.880	2.313E-05	-55719.	4785.7147	3.232E-07	841.3292	5.506E+11	-215.1394	59148000.	0.000
51.410	2.314E-05	-29633.	3417.1531	-1.697E-07	837.7428	5.506E+11	-215.2259	59148000.	0.000
51.940	2.098E-05	-12250.	2112.4180	-4.115E-07	835.3530	5.506E+11	-195.0682	59148000.	0.000
52.470	1.791E-05	-2757.0050	962.4994	-4.982E-07	834.0478	5.506E+11	-166.5415	59148000.	0.000
53.000	1.464E-05	0.000	0.000	-5.141E-07	833.6687	5.506E+11	-136.1313	29574000.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 4:

Pile-head deflection = 0.3716121 inches  
 Computed slope at pile head = 0.000000 radians  
 Maximum bending moment = 5900182. inch-lbs  
 Maximum shear force = -164394. lbs  
 Depth of maximum bending moment = 42.4000000 feet below pile head  
 Depth of maximum shear force = 43.9900000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 2

-----  
 Pile-head Deflection vs. Pile Length for Load Case 4  
 -----

Boundary Condition Type 2, Shear and Slope

Shear = 20700. lb  
 Slope = 0.00000  
 Axial Load = 1155000. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
53.0000	0.3716121	5900182.	-164394.
50.3500	0.3695609	5877860.	-165699.
47.7000	0.3750729	5905042.	-167082.
45.0500	0.3972721	5776059.	-240566.

I B2\_B-5\_Long\_Scoured. I p7o

45.0500	0.000000	7482684964.	692761309.
45.0500	0.000000	7482684964.	692761309.
45.0500	0.000000	7482684964.	692761309.
45.0500	0.000000	7482684964.	692761309.
45.0500	0.000000	7482684964.	692761309.
45.0500	0.000000	7482684964.	692761309.
45.0500	0.000000	7482684964.	692761309.
45.0500	0.000000	7482684964.	692761309.
45.0500	0.000000	7482684964.	692761309.
45.0500	0.000000	7482684964.	692761309.
45.0500	0.000000	7482684964.	692761309.
45.0500	0.000000	7482684964.	692761309.
45.0500	0.000000	7482684964.	692761309.
45.0500	0.000000	7482684964.	692761309.
45.0500	0.000000	7482684964.	692761309.
45.0500	0.000000	7482684964.	692761309.
45.0500	0.000000	7482684964.	692761309.

-----  
Summary of Pile Response(s)  
-----

Defini ti ons of Pile-head Loading Condi ti ons:

Load Type 1: Load 1 = Shear, lbs, and Load 2 = Moment, in-lbs  
Load Type 2: Load 1 = Shear, lbs, and Load 2 = Slope, radians  
Load Type 3: Load 1 = Shear, lbs, and Load 2 = Rotational Sti ffness, in-lbs/radian  
Load Type 4: Load 1 = Top Deflection, inches, and Load 2 = Moment, in-lbs  
Load Type 5: Load 1 = Top Deflection, inches, and Load 2 = Slope, radians

Load Case No.	Load Type No.	Pile-head Condition 1 V(lbs) or y(inches)	Pile-head Condition 2 in-lb, rad., or in-lb/rad.	Axial Loading lbs	Pile-head Deflection inches	Maximum Moment in Pile in-lbs	Maximum Shear in Pile lbs	Pile-head Rotation radians
1	1	V = 10700.	M = 2616000.	810000.	1.11980036	8964972.	-249272.	-0.00385173
2	1	V = 20700.	M = 4608000.	1155000.	2.19199305	17665658.	-491250.	-0.00744851
3	2	V = 10700.	S = 0.000	810000.	0.18945601	3012360.	-83923.	0.00000000
4	2	V = 20700.	S = 0.000	1155000.	0.37161214	5900182.	-164394.	0.00000000

-----  
Summary of Warning Messages  
-----

The following warning was reported 4000 times

\*\*\*\* Warning \*\*\*\*

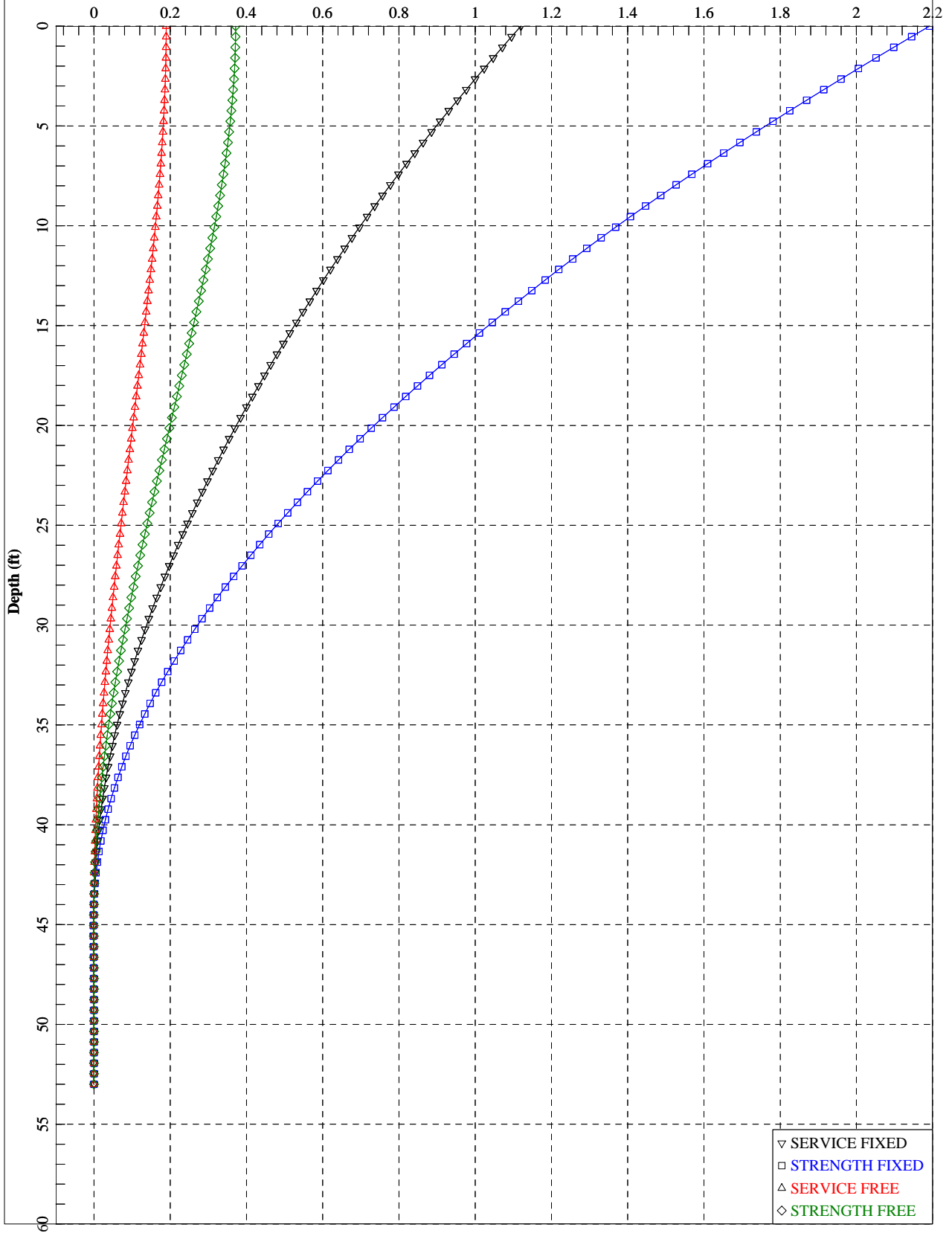
An unreasonable input value for uniaxial compressive strength has been specified for a soil defined using the vuggy limestone criteria. The input value is outside of the range of 1,000 to 2,500 psi (6,895 to 17,237 kPa). You should check your input data for correctness.



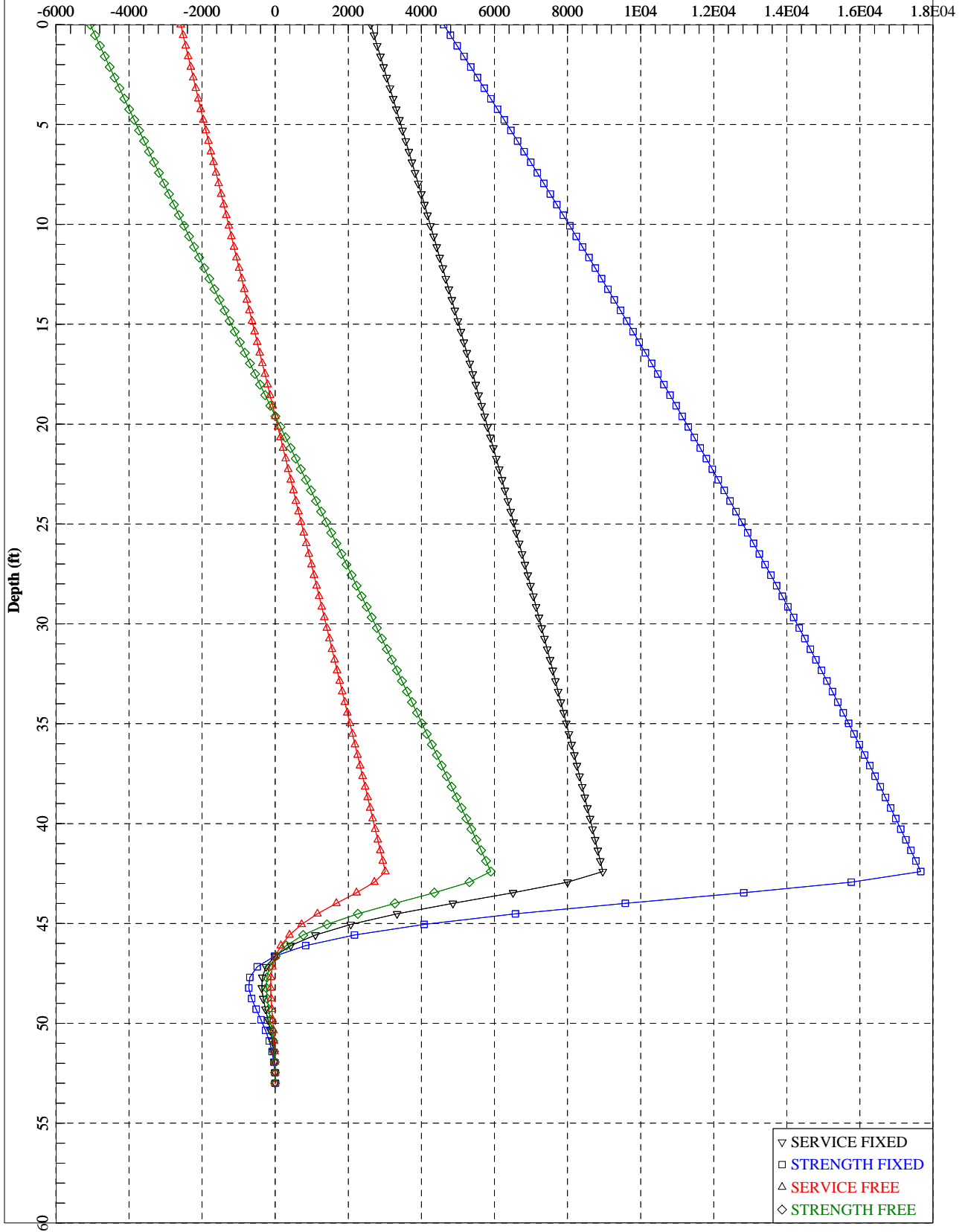
The analysis ended normally.

IB2\_B-5\_Long\_Scoured.1p7o

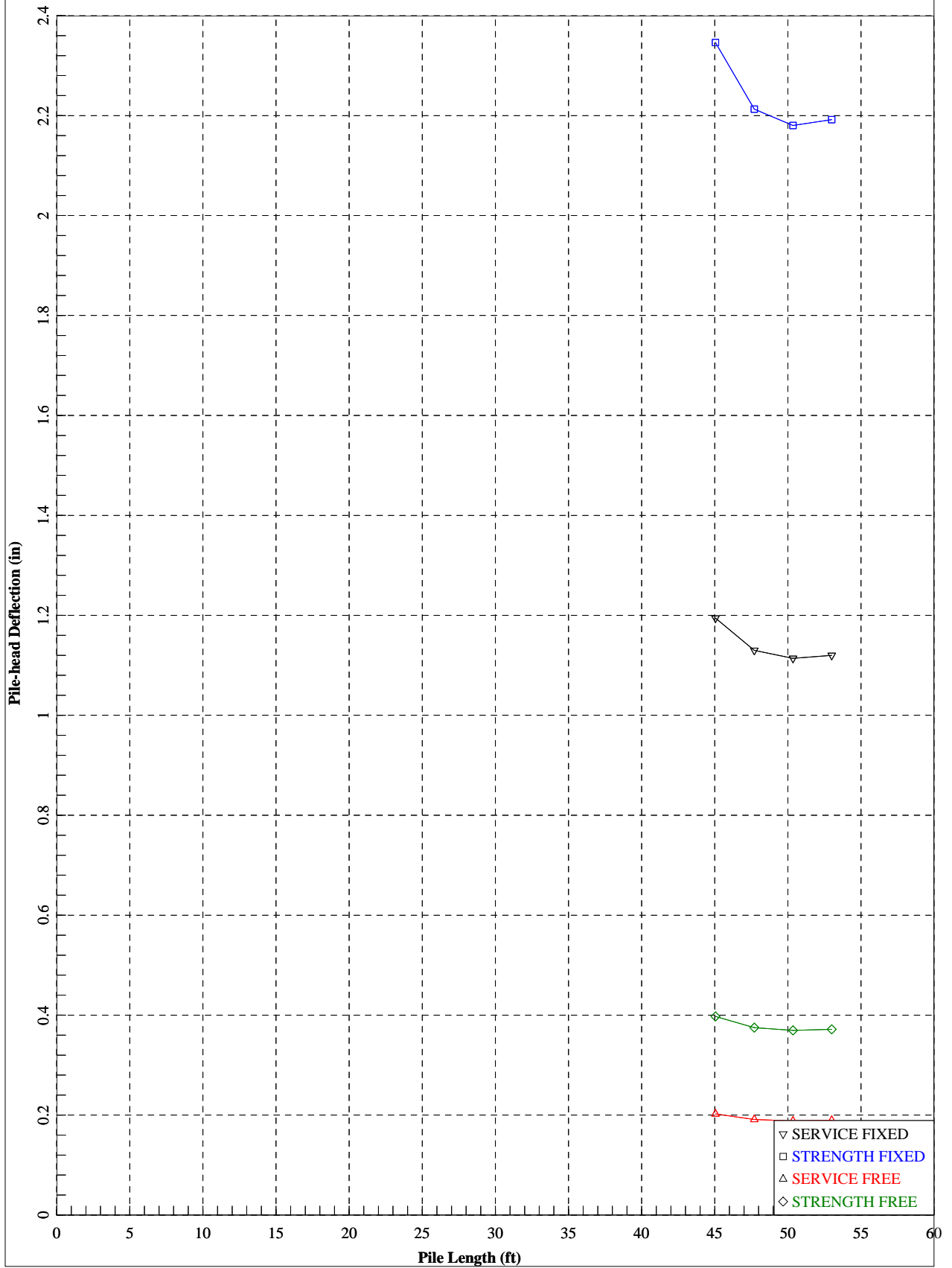
SC 557 Bridge over Crowders Creek - IB2 - Boring B-5 - 48" Dia. Drilled Shaft - Scoured Longitudinal Analysis  
Lateral Pile Deflection (inches)



SC 557 Bridge over Crowders Creek - IB2 - Boring B-5 - 48" Dia. Drilled Shaft - Scoured Longitudinal Analysis  
Bending Moment (in-kips)



SC 557 Bridge over Crowders Creek - IB2 - Boring B-5 - 48" Dia. Drilled Shaft - Scoured Longitudinal Analysis



=====  
LPile Plus for Windows, Version 2013-07.007

Analysis of Individual Piles and Drilled Shafts  
Subjected to Lateral Loading Using the p-y Method

© 1985-2013 by Ensoft, Inc.  
All Rights Reserved

=====  
This copy of LPile is used by:

Bradley Fischer  
F&ME

Serial Number of Security Device: 291490957

This copy of LPile is licensed for exclusive use by: F&ME Consultants, Columbia, Sout

Use of this program by any entity other than F&ME Consultants, Columbia, Sout  
is forbidden by the software license agreement.

-----  
Files Used for Analysis  
-----

Path to file locations: P:\Geotechnical\G4800's\G4843 - SC557 - York County\Report\Final\Bridge\LPile\  
Name of input data file: IB2\_B-5\_Trans\_Scoured.l p7d  
Name of output report file: IB2\_B-5\_Trans\_Scoured.l p7o  
Name of plot output file: IB2\_B-5\_Trans\_Scoured.l p7p  
Name of runtime message file: IB2\_B-5\_Trans\_Scoured.l p7r

-----  
Date and Time of Analysis  
-----

Date: July 31, 2018 Time: 9:04:13

-----  
Problem Title  
-----

Project Name: SC 557 over Crowders Creek

Job Number: G4843

Client: CALYX

Engineer: JFH

Description: IB2 - Boring B-5 - 48" Dia. Drilled Shaft - Scoured Trans.

-----  
 Program Options and Settings  
 -----

Engineering Units of Input Data and Computations:

- Engineering units are US Customary Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

Computational Options:

- Use unfactored loads in computations (conventional analysis)
- Compute pile response under loading and nonlinear bending properties of pile (only if nonlinear pile properties are input)
- Analysis uses p-y modification factors for p-y curves
- Analysis includes loading by lateral soil movements acting on pile
- Input of shear resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- No p-y curves to be computed and reported for user-specified depths
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1

-----  
 Pile Structural Properties and Geometry  
 -----

- Total number of pile sections = 3
- Total length of pile = 53.00 ft
- Depth of ground surface below top of pile = 42.00 ft

Pile diameter values used for p-y curve computations are defined using 6 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile.

Point	Depth X ft	Pile Diameter in
1	0.00000	42.0000000
2	12.50000	42.0000000
3	12.50000	48.0000000
4	43.50000	48.0000000

5	43.500000	42.0000000
6	53.000000	42.0000000

-----  
 Input Structural Properties:  
 -----

Pile Section No. 1:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Circular
Section Length	=	12.50000 ft
Top Width	=	42.00000 in
Bottom Width	=	42.00000 in
Top Area	=	1385.44236 Sq. in
Bottom Area	=	1385.44236 Sq. in
Moment of Inertia at Top	=	152745. in^4
Moment of Inertia at Bottom	=	152745. in^4
Elastic Modulus	=	3605000. lbs/in^2

Pile Section No. 2:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Circular
Section Length	=	31.00000 ft
Top Width	=	48.00000 in
Bottom Width	=	48.00000 in
Top Area	=	1809.55737 Sq. in
Bottom Area	=	1809.55737 Sq. in
Moment of Inertia at Top	=	260576. in^4
Moment of Inertia at Bottom	=	260576. in^4
Elastic Modulus	=	3605000. lbs/in^2

Pile Section No. 3:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Circular
Section Length	=	9.50000 ft
Top Width	=	42.00000 in
Bottom Width	=	42.00000 in
Top Area	=	1385.44236 Sq. in
Bottom Area	=	1385.44236 Sq. in
Moment of Inertia at Top	=	152745. in^4
Moment of Inertia at Bottom	=	152745. in^4
Elastic Modulus	=	3605000. lbs/in^2

-----  
 Ground Slope and Pile Batter Angles  
 -----

Ground Slope Angle	=	0.000 degrees
	=	0.000 radians
Pile Batter Angle	=	0.000 degrees
	=	0.000 radians

-----  
 Soil and Rock Layering Information  
 -----

The soil profile is modelled using 1 layers

Layer 1 is strong rock (vuggy limestone)

Distance from top of pile to top of layer = 42.00000 ft  
 Distance from top of pile to bottom of layer = 60.00000 ft  
 Effective unit weight at top of layer = 98.00000 pcf  
 Effective unit weight at bottom of layer = 98.00000 pcf  
 Uniaxial compressive strength at top of layer = 10000.00000 psi  
 Uniaxial compressive strength at bottom of layer = 10000.00000 psi

(Depth of lowest soil layer extends 7.00 ft below pile tip)

Summary of Soil Properties

Layer Num.	Layer Soil Type (p-y Curve Criteria)	Layer Depth ft	Effective Unit Wt. pcf	Uniaxial qu psi
1	Vuggy Limestone	42.000 60.000	98.000 98.000	10000.000 10000.000

p-y Modification Factors for Group Action

Distribution of p-y modifiers with depth defined using 2 points

Point No.	Depth X ft	p-mult	y-mult
1	42.000	1.0000	1.0000
2	100.000	1.0000	1.0000

Lateral Soil Movements

Profile of soil movement with depth defined using 2 points

Point No.	Depth X ft	Soil Movement in
1	0.00000	0.00000
2	0.00000	0.00000



Loading Type

-----  
 Static loading criteria were used when computing p-y curves for all analyses.

-----  
 Pile-head Loading and Pile-head Fixity Conditions  
 -----

Number of loads specified = 4

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length
1	1	V = 16800. lbs	M = 1404000. in-lbs	0.000000	Yes
2	1	V = 15600. lbs	M = 1368000. in-lbs	0.000000	Yes
3	2	V = 16800. lbs	S = 0.0000 in/in	810000.	Yes
4	2	V = 15600. lbs	S = 0.0000 in/in	1155000.	Yes

V = perpendicular shear force applied to pile head  
 M = bending moment applied to pile head  
 y = lateral deflection relative to pile axis  
 S = pile slope relative to original pile batter angle  
 R = rotational stiffness applied to pile head  
 Axial thrust is assumed to be acting axially for all pile batter angles.

-----  
 Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness  
 -----

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 3

Pile Section No. 1:  
 -----

Moment-curvature properties were derived from elastic section properties

Pile Section No. 2:  
 -----

Moment-curvature properties were derived from elastic section properties

Pile Section No. 3:  
 -----

Moment-curvature properties were derived from elastic section properties

-----  
 Computed Values of Pile Loading and Deflection  
 for Lateral Loading for Load Case Number 1  
 -----

Pile-head conditions are Shear and Moment (Loading Type 1)

I B2\_B-5\_Trans\_Scoured. I p7o

Shear force at pile head = 16800.0 lbs  
 Applied moment at pile head = 1404000.0 in-lbs  
 Axial thrust load on pile head = 0.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi *	Bending Stiffness lb-in <sup>2</sup>	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	1.1416	1404000.	16800.	-0.003638	193.0276	5.506E+11	0.000	0.000	0.000
0.530	1.1185	1510848.	16800.	-0.003621	207.7175	5.506E+11	0.000	0.000	0.000
1.060	1.0956	1617696.	16800.	-0.003603	222.4074	5.506E+11	0.000	0.000	0.000
1.590	1.0727	1724544.	16800.	-0.003583	237.0972	5.506E+11	0.000	0.000	0.000
2.120	1.0500	1831392.	16800.	-0.003563	251.7871	5.506E+11	0.000	0.000	0.000
2.650	1.0274	1938240.	16800.	-0.003541	266.4770	5.506E+11	0.000	0.000	0.000
3.180	1.0049	2045088.	16800.	-0.003518	281.1669	5.506E+11	0.000	0.000	0.000
3.710	0.9826	2151936.	16800.	-0.003494	295.8568	5.506E+11	0.000	0.000	0.000
4.240	0.9605	2258784.	16800.	-0.003468	310.5467	5.506E+11	0.000	0.000	0.000
4.770	0.9385	2365632.	16800.	-0.003442	325.2366	5.506E+11	0.000	0.000	0.000
5.300	0.9167	2472480.	16800.	-0.003414	339.9265	5.506E+11	0.000	0.000	0.000
5.830	0.8951	2579328.	16800.	-0.003385	354.6164	5.506E+11	0.000	0.000	0.000
6.360	0.8737	2686176.	16800.	-0.003354	369.3063	5.506E+11	0.000	0.000	0.000
6.890	0.8524	2793024.	16800.	-0.003322	383.9962	5.506E+11	0.000	0.000	0.000
7.420	0.8314	2899872.	16800.	-0.003290	398.6861	5.506E+11	0.000	0.000	0.000
7.950	0.8106	3006720.	16800.	-0.003256	413.3760	5.506E+11	0.000	0.000	0.000
8.480	0.7900	3113568.	16800.	-0.003220	428.0659	5.506E+11	0.000	0.000	0.000
9.010	0.7696	3220416.	16800.	-0.003184	442.7558	5.506E+11	0.000	0.000	0.000
9.540	0.7495	3327264.	16800.	-0.003146	457.4456	5.506E+11	0.000	0.000	0.000
10.070	0.7296	3434112.	16800.	-0.003107	472.1355	5.506E+11	0.000	0.000	0.000
10.600	0.7100	3540960.	16800.	-0.003066	486.8254	5.506E+11	0.000	0.000	0.000
11.130	0.6906	3647808.	16800.	-0.003025	501.5153	5.506E+11	0.000	0.000	0.000
11.660	0.6715	3754656.	16800.	-0.002982	516.2052	5.506E+11	0.000	0.000	0.000
12.190	0.6527	3861504.	16800.	-0.002938	530.8951	5.506E+11	0.000	0.000	0.000
12.720	0.6341	3968352.	16800.	-0.002902	365.4993	9.394E+11	0.000	0.000	0.000
13.250	0.6158	4075200.	16800.	-0.002875	375.3404	9.394E+11	0.000	0.000	0.000
13.780	0.5976	4182048.	16800.	-0.002847	385.1815	9.394E+11	0.000	0.000	0.000
14.310	0.5795	4288896.	16800.	-0.002819	395.0226	9.394E+11	0.000	0.000	0.000
14.840	0.5617	4395744.	16800.	-0.002789	404.8636	9.394E+11	0.000	0.000	0.000
15.370	0.5441	4502592.	16800.	-0.002759	414.7047	9.394E+11	0.000	0.000	0.000
15.900	0.5266	4609440.	16800.	-0.002728	424.5458	9.394E+11	0.000	0.000	0.000
16.430	0.5094	4716288.	16800.	-0.002697	434.3869	9.394E+11	0.000	0.000	0.000
16.960	0.4923	4823136.	16800.	-0.002664	444.2280	9.394E+11	0.000	0.000	0.000
17.490	0.4755	4929984.	16800.	-0.002631	454.0691	9.394E+11	0.000	0.000	0.000
18.020	0.4588	5036832.	16800.	-0.002598	463.9101	9.394E+11	0.000	0.000	0.000
18.550	0.4424	5143680.	16800.	-0.002563	473.7512	9.394E+11	0.000	0.000	0.000
19.080	0.4262	5250528.	16800.	-0.002528	483.5923	9.394E+11	0.000	0.000	0.000
19.610	0.4103	5357376.	16800.	-0.002492	493.4334	9.394E+11	0.000	0.000	0.000
20.140	0.3945	5464224.	16800.	-0.002455	503.2745	9.394E+11	0.000	0.000	0.000
20.670	0.3790	5571072.	16800.	-0.002418	513.1155	9.394E+11	0.000	0.000	0.000
21.200	0.3638	5677920.	16800.	-0.002380	522.9566	9.394E+11	0.000	0.000	0.000
21.730	0.3488	5784768.	16800.	-0.002341	532.7977	9.394E+11	0.000	0.000	0.000
22.260	0.3340	5891616.	16800.	-0.002302	542.6388	9.394E+11	0.000	0.000	0.000
22.790	0.3195	5998464.	16800.	-0.002261	552.4799	9.394E+11	0.000	0.000	0.000
23.320	0.3052	6105312.	16800.	-0.002220	562.3209	9.394E+11	0.000	0.000	0.000
23.850	0.2912	6212160.	16800.	-0.002179	572.1620	9.394E+11	0.000	0.000	0.000
24.380	0.2775	6319008.	16800.	-0.002136	582.0031	9.394E+11	0.000	0.000	0.000
24.910	0.2641	6425856.	16800.	-0.002093	591.8442	9.394E+11	0.000	0.000	0.000
25.440	0.2509	6532704.	16800.	-0.002049	601.6853	9.394E+11	0.000	0.000	0.000
25.970	0.2380	6639552.	16800.	-0.002005	611.5263	9.394E+11	0.000	0.000	0.000
26.500	0.2254	6746400.	16800.	-0.001959	621.3674	9.394E+11	0.000	0.000	0.000

IB2_B-5_Trans_Scoured.l p7o									
27.030	0.2131	6853248.	16800.	-0.001913	631.2085	9.394E+11	0.000	0.000	0.000
27.560	0.2011	6960096.	16800.	-0.001867	641.0496	9.394E+11	0.000	0.000	0.000
28.090	0.1893	7066944.	16800.	-0.001819	650.8907	9.394E+11	0.000	0.000	0.000
28.620	0.1779	7173792.	16800.	-0.001771	660.7317	9.394E+11	0.000	0.000	0.000
29.150	0.1668	7280640.	16800.	-0.001722	670.5728	9.394E+11	0.000	0.000	0.000
29.680	0.1560	7387488.	16800.	-0.001672	680.4139	9.394E+11	0.000	0.000	0.000
30.210	0.1455	7494336.	16800.	-0.001622	690.2550	9.394E+11	0.000	0.000	0.000
30.740	0.1354	7601184.	16800.	-0.001571	700.0961	9.394E+11	0.000	0.000	0.000
31.270	0.1256	7708032.	16800.	-0.001519	709.9371	9.394E+11	0.000	0.000	0.000
31.800	0.1161	7814880.	16800.	-0.001466	719.7782	9.394E+11	0.000	0.000	0.000
32.330	0.1069	7921728.	16800.	-0.001413	729.6193	9.394E+11	0.000	0.000	0.000
32.860	0.0981	8028576.	16800.	-0.001359	739.4604	9.394E+11	0.000	0.000	0.000
33.390	0.0896	8135424.	16800.	-0.001304	749.3015	9.394E+11	0.000	0.000	0.000
33.920	0.0815	8242272.	16800.	-0.001249	759.1426	9.394E+11	0.000	0.000	0.000
34.450	0.0737	8349120.	16800.	-0.001193	768.9836	9.394E+11	0.000	0.000	0.000
34.980	0.0663	8455968.	16800.	-0.001136	778.8247	9.394E+11	0.000	0.000	0.000
35.510	0.0593	8562816.	16800.	-0.001078	788.6658	9.394E+11	0.000	0.000	0.000
36.040	0.0526	8669664.	16800.	-0.001020	798.5069	9.394E+11	0.000	0.000	0.000
36.570	0.0463	8776512.	16800.	-0.000961	808.3480	9.394E+11	0.000	0.000	0.000
37.100	0.0404	8883360.	16800.	-0.000901	818.1890	9.394E+11	0.000	0.000	0.000
37.630	0.0348	8990208.	16800.	-0.000841	828.0301	9.394E+11	0.000	0.000	0.000
38.160	0.0297	9097056.	16800.	-0.000779	837.8712	9.394E+11	0.000	0.000	0.000
38.690	0.0249	9203904.	16800.	-0.000717	847.7123	9.394E+11	0.000	0.000	0.000
39.220	0.0206	9310752.	16800.	-0.000655	857.5534	9.394E+11	0.000	0.000	0.000
39.750	0.0166	9417600.	16800.	-0.000591	867.3944	9.394E+11	0.000	0.000	0.000
40.280	0.0130	9524448.	16800.	-0.000527	877.2355	9.394E+11	0.000	0.000	0.000
40.810	0.009891	9631296.	16800.	-0.000462	887.0766	9.394E+11	0.000	0.000	0.000
41.340	0.007157	9738144.	16800.	-0.000397	896.9177	9.394E+11	0.000	0.000	0.000
41.870	0.004843	9844992.	16800.	-0.000331	906.7588	9.394E+11	0.000	0.000	0.000
42.400	0.002952	9951840.	-77079.	-0.000264	916.5998	9.394E+11	-29522.	63600000.	0.000
42.930	0.001490	8864545.	-218345.	-0.000200	816.4561	9.394E+11	-14901.	63600000.	0.000
43.460	0.000410	7174494.	-278763.	-0.000146	660.7964	9.394E+11	-4098.0881	63600000.	0.000
43.990	-0.000362	5318678.	-280297.	-9.057E-05	731.2333	5.506E+11	3615.8713	63600000.	0.000
44.520	-0.000742	3609122.	-245194.	-3.901E-05	496.1967	5.506E+11	7422.8108	63600000.	0.000
45.050	-0.000858	2199816.	-194309.	-5.468E-06	302.4396	5.506E+11	8578.5441	63600000.	0.000
45.580	-0.000812	1137509.	-141213.	1.381E-05	156.3893	5.506E+11	8118.3260	63600000.	0.000
46.110	-0.000682	403585.	-93701.	2.271E-05	55.4864	5.506E+11	6822.5112	63600000.	0.000
46.640	-0.000523	-54372.	-55374.	2.472E-05	7.4753	5.506E+11	5230.2294	63600000.	0.000
47.170	-0.000368	-300768.	-27046.	2.267E-05	41.3508	5.506E+11	3677.8883	63600000.	0.000
47.700	-0.000235	-398394.	-7888.2811	1.863E-05	54.7729	5.506E+11	2346.4866	63600000.	0.000
48.230	-0.000131	-401107.	3732.1577	1.402E-05	55.1458	5.506E+11	1307.7394	63600000.	0.000
48.760	-5.636E-05	-350921.	9683.1413	9.673E-06	48.2461	5.506E+11	563.6390	63600000.	0.000
49.290	-7.732E-06	-277937.	11721.	6.041E-06	38.2119	5.506E+11	77.3202	63600000.	0.000
49.820	2.048E-05	-201825.	11316.	3.271E-06	27.7478	5.506E+11	-204.8304	63600000.	0.000
50.350	3.387E-05	-133999.	9587.4090	1.331E-06	18.4227	5.506E+11	-338.7231	63600000.	0.000
50.880	3.742E-05	-79873.	7320.3693	9.626E-08	10.9813	5.506E+11	-374.1824	63600000.	0.000
51.410	3.510E-05	-40884.	5014.3910	-6.011E-07	5.6208	5.506E+11	-350.9680	63600000.	0.000
51.940	2.977E-05	-16090.	2951.5602	-9.301E-07	2.2122	5.506E+11	-297.7210	63600000.	0.000
52.470	2.327E-05	-3339.8048	1264.9670	-1.042E-06	0.4592	5.506E+11	-232.6542	63600000.	0.000
53.000	1.651E-05	0.000	0.000	-1.062E-06	0.000	5.506E+11	-165.1341	31800000.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 1:

Pile-head deflection = 1.1416176 inches  
 Computed slope at pile head = -0.0036376 radians  
 Maximum bending moment = 9951840. inch-lbs  
 Maximum shear force = -280297. lbs



IB2\_B-5\_Trans\_Scoured.l p7o

0.530	1.0486	1467216.	15600.	-0.003405	201.7188	5.506E+11	0.000	0.000	0.000
1.060	1.0270	1566432.	15600.	-0.003388	215.3594	5.506E+11	0.000	0.000	0.000
1.590	1.0055	1665648.	15600.	-0.003369	229.0000	5.506E+11	0.000	0.000	0.000
2.120	0.9842	1764864.	15600.	-0.003349	242.6406	5.506E+11	0.000	0.000	0.000
2.650	0.9629	1864080.	15600.	-0.003328	256.2812	5.506E+11	0.000	0.000	0.000
3.180	0.9418	1963296.	15600.	-0.003306	269.9218	5.506E+11	0.000	0.000	0.000
3.710	0.9209	2062512.	15600.	-0.003283	283.5624	5.506E+11	0.000	0.000	0.000
4.240	0.9001	2161728.	15600.	-0.003258	297.2031	5.506E+11	0.000	0.000	0.000
4.770	0.8794	2260944.	15600.	-0.003233	310.8437	5.506E+11	0.000	0.000	0.000
5.300	0.8590	2360160.	15600.	-0.003206	324.4843	5.506E+11	0.000	0.000	0.000
5.830	0.8387	2459376.	15600.	-0.003178	338.1249	5.506E+11	0.000	0.000	0.000
6.360	0.8185	2558592.	15600.	-0.003149	351.7655	5.506E+11	0.000	0.000	0.000
6.890	0.7986	2657808.	15600.	-0.003119	365.4061	5.506E+11	0.000	0.000	0.000
7.420	0.7789	2757024.	15600.	-0.003088	379.0468	5.506E+11	0.000	0.000	0.000
7.950	0.7593	2856240.	15600.	-0.003056	392.6874	5.506E+11	0.000	0.000	0.000
8.480	0.7400	2955456.	15600.	-0.003022	406.3280	5.506E+11	0.000	0.000	0.000
9.010	0.7209	3054672.	15600.	-0.002987	419.9686	5.506E+11	0.000	0.000	0.000
9.540	0.7020	3153888.	15600.	-0.002951	433.6092	5.506E+11	0.000	0.000	0.000
10.070	0.6833	3253104.	15600.	-0.002914	447.2498	5.506E+11	0.000	0.000	0.000
10.600	0.6649	3352320.	15600.	-0.002876	460.8904	5.506E+11	0.000	0.000	0.000
11.130	0.6468	3451536.	15600.	-0.002837	474.5311	5.506E+11	0.000	0.000	0.000
11.660	0.6288	3550752.	15600.	-0.002797	488.1717	5.506E+11	0.000	0.000	0.000
12.190	0.6112	3649968.	15600.	-0.002755	501.8123	5.506E+11	0.000	0.000	0.000
12.720	0.5938	3749184.	15600.	-0.002721	345.3132	9.394E+11	0.000	0.000	0.000
13.250	0.5766	3848400.	15600.	-0.002695	354.4513	9.394E+11	0.000	0.000	0.000
13.780	0.5595	3947616.	15600.	-0.002669	363.5895	9.394E+11	0.000	0.000	0.000
14.310	0.5426	4046832.	15600.	-0.002642	372.7276	9.394E+11	0.000	0.000	0.000
14.840	0.5259	4146048.	15600.	-0.002614	381.8658	9.394E+11	0.000	0.000	0.000
15.370	0.5094	4245264.	15600.	-0.002586	391.0039	9.394E+11	0.000	0.000	0.000
15.900	0.4930	4344480.	15600.	-0.002557	400.1421	9.394E+11	0.000	0.000	0.000
16.430	0.4768	4443696.	15600.	-0.002527	409.2802	9.394E+11	0.000	0.000	0.000
16.960	0.4609	4542912.	15600.	-0.002497	418.4183	9.394E+11	0.000	0.000	0.000
17.490	0.4451	4642128.	15600.	-0.002466	427.5565	9.394E+11	0.000	0.000	0.000
18.020	0.4295	4741344.	15600.	-0.002434	436.6946	9.394E+11	0.000	0.000	0.000
18.550	0.4141	4840560.	15600.	-0.002401	445.8328	9.394E+11	0.000	0.000	0.000
19.080	0.3990	4939776.	15600.	-0.002368	454.9709	9.394E+11	0.000	0.000	0.000
19.610	0.3840	5038992.	15600.	-0.002334	464.1091	9.394E+11	0.000	0.000	0.000
20.140	0.3693	5138208.	15600.	-0.002300	473.2472	9.394E+11	0.000	0.000	0.000
20.670	0.3547	5237424.	15600.	-0.002265	482.3854	9.394E+11	0.000	0.000	0.000
21.200	0.3405	5336640.	15600.	-0.002229	491.5235	9.394E+11	0.000	0.000	0.000
21.730	0.3264	5435856.	15600.	-0.002193	500.6617	9.394E+11	0.000	0.000	0.000
22.260	0.3126	5535072.	15600.	-0.002155	509.7998	9.394E+11	0.000	0.000	0.000
22.790	0.2990	5634288.	15600.	-0.002118	518.9380	9.394E+11	0.000	0.000	0.000
23.320	0.2856	5733504.	15600.	-0.002079	528.0761	9.394E+11	0.000	0.000	0.000
23.850	0.2725	5832720.	15600.	-0.002040	537.2142	9.394E+11	0.000	0.000	0.000
24.380	0.2597	5931936.	15600.	-0.002000	546.3524	9.394E+11	0.000	0.000	0.000
24.910	0.2471	6031152.	15600.	-0.001960	555.4905	9.394E+11	0.000	0.000	0.000
25.440	0.2348	6130368.	15600.	-0.001919	564.6287	9.394E+11	0.000	0.000	0.000
25.970	0.2227	6229584.	15600.	-0.001877	573.7668	9.394E+11	0.000	0.000	0.000
26.500	0.2109	6328800.	15600.	-0.001834	582.9050	9.394E+11	0.000	0.000	0.000
27.030	0.1994	6428016.	15600.	-0.001791	592.0431	9.394E+11	0.000	0.000	0.000
27.560	0.1881	6527232.	15600.	-0.001747	601.1813	9.394E+11	0.000	0.000	0.000
28.090	0.1771	6626448.	15600.	-0.001703	610.3194	9.394E+11	0.000	0.000	0.000
28.620	0.1664	6725664.	15600.	-0.001657	619.4576	9.394E+11	0.000	0.000	0.000
29.150	0.1560	6824880.	15600.	-0.001612	628.5957	9.394E+11	0.000	0.000	0.000
29.680	0.1459	6924096.	15600.	-0.001565	637.7339	9.394E+11	0.000	0.000	0.000
30.210	0.1361	7023312.	15600.	-0.001518	646.8720	9.394E+11	0.000	0.000	0.000
30.740	0.1266	7122528.	15600.	-0.001470	656.0101	9.394E+11	0.000	0.000	0.000
31.270	0.1174	7221744.	15600.	-0.001421	665.1483	9.394E+11	0.000	0.000	0.000
31.800	0.1086	7320960.	15600.	-0.001372	674.2864	9.394E+11	0.000	0.000	0.000

IB2_B-5_Trans_Scoured.l p7o									
32.330	0.1000	7420176.	15600.	-0.001322	683.4246	9.394E+11	0.000	0.000	0.000
32.860	0.0917	7519392.	15600.	-0.001272	692.5627	9.394E+11	0.000	0.000	0.000
33.390	0.0838	7618608.	15600.	-0.001220	701.7009	9.394E+11	0.000	0.000	0.000
33.920	0.0762	7717824.	15600.	-0.001168	710.8390	9.394E+11	0.000	0.000	0.000
34.450	0.0690	7817040.	15600.	-0.001116	719.9772	9.394E+11	0.000	0.000	0.000
34.980	0.0620	7916256.	15600.	-0.001063	729.1153	9.394E+11	0.000	0.000	0.000
35.510	0.0554	8015472.	15600.	-0.001009	738.2535	9.394E+11	0.000	0.000	0.000
36.040	0.0492	8114688.	15600.	-0.000954	747.3916	9.394E+11	0.000	0.000	0.000
36.570	0.0433	8213904.	15600.	-0.000899	756.5298	9.394E+11	0.000	0.000	0.000
37.100	0.0378	8313120.	15600.	-0.000843	765.6679	9.394E+11	0.000	0.000	0.000
37.630	0.0326	8412336.	15600.	-0.000786	774.8061	9.394E+11	0.000	0.000	0.000
38.160	0.0278	8511552.	15600.	-0.000729	783.9442	9.394E+11	0.000	0.000	0.000
38.690	0.0233	8610768.	15600.	-0.000671	793.0823	9.394E+11	0.000	0.000	0.000
39.220	0.0192	8709984.	15600.	-0.000612	802.2205	9.394E+11	0.000	0.000	0.000
39.750	0.0155	8809200.	15600.	-0.000553	811.3586	9.394E+11	0.000	0.000	0.000
40.280	0.0122	8908416.	15600.	-0.000493	820.4968	9.394E+11	0.000	0.000	0.000
40.810	0.009247	9007632.	15600.	-0.000432	829.6349	9.394E+11	0.000	0.000	0.000
41.340	0.006691	9106848.	15600.	-0.000371	838.7731	9.394E+11	0.000	0.000	0.000
41.870	0.004527	9206064.	15600.	-0.000309	847.9112	9.394E+11	0.000	0.000	0.000
42.400	0.002760	9305280.	-72156.	-0.000246	857.0494	9.394E+11	-27596.	63600000.	0.000
42.930	0.001393	8288235.	-204203.	-0.000187	763.3759	9.394E+11	-13928.	63600000.	0.000
43.460	0.000383	6707816.	-260667.	-0.000136	617.8137	9.394E+11	-3828.1904	63600000.	0.000
43.990	-0.000338	4972547.	-262083.	-8.467E-05	683.6458	5.506E+11	3383.0428	63600000.	0.000
44.520	-0.000694	3374122.	-229251.	-3.647E-05	463.8879	5.506E+11	6941.5186	63600000.	0.000
45.050	-0.000802	2056478.	-181669.	-5.103E-06	282.7329	5.506E+11	8021.4159	63600000.	0.000
45.580	-0.000759	1063297.	-132022.	1.291E-05	146.1864	5.506E+11	7590.6557	63600000.	0.000
46.110	-0.000638	377156.	-87599.	2.123E-05	51.8529	5.506E+11	6378.8134	63600000.	0.000
46.640	-0.000489	-50966.	-51765.	2.312E-05	7.0069	5.506E+11	4889.9182	63600000.	0.000
47.170	-0.000344	-281292.	-25280.	2.120E-05	38.6731	5.506E+11	3438.4615	63600000.	0.000
47.700	-0.000219	-372533.	-7370.4030	1.742E-05	51.2174	5.506E+11	2193.6373	63600000.	0.000
48.230	-0.000122	-375043.	3492.8191	1.310E-05	51.5624	5.506E+11	1222.4703	63600000.	0.000
48.760	-5.268E-05	-328105.	9055.5117	9.043E-06	45.1091	5.506E+11	526.8041	63600000.	0.000
49.290	-7.216E-06	-259857.	10960.	5.648E-06	35.7262	5.506E+11	72.1586	63600000.	0.000
49.820	1.916E-05	-188691.	10580.	3.057E-06	25.9419	5.506E+11	-191.6000	63600000.	0.000
50.350	3.167E-05	-125274.	8963.8382	1.244E-06	17.2232	5.506E+11	-316.7494	63600000.	0.000
50.880	3.499E-05	-74671.	6843.9756	8.960E-08	10.2660	5.506E+11	-349.8741	63600000.	0.000
51.410	3.281E-05	-38219.	4687.8687	-5.623E-07	5.2545	5.506E+11	-328.1469	63600000.	0.000
51.940	2.783E-05	-15041.	2759.2256	-8.699E-07	2.0679	5.506E+11	-278.3446	63600000.	0.000
52.470	2.175E-05	-3121.6836	1182.4602	-9.748E-07	0.4292	5.506E+11	-217.4935	63600000.	0.000
53.000	1.543E-05	0.000	0.000	-9.928E-07	0.000	5.506E+11	-154.3493	31800000.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 2:

Pile-head deflection = 1.0703398 inches  
 Computed slope at pile head = -0.0034215 radians  
 Maximum bending moment = 9305280. inch-lbs  
 Maximum shear force = -262083. lbs  
 Depth of maximum bending moment = 42.4000000 feet below pile head  
 Depth of maximum shear force = 43.9900000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 2

-----  
 Pile-head Deflection vs. Pile Length for Load Case 2  
 -----



IB2\_B-5\_Trans\_Scored.l p7o

4. 770	0. 2854	-3082338.	16800.	-0. 000371	1008. 4230	5. 506E+11	0. 000	0. 000	0. 000
5. 300	0. 2829	-2973487.	16800.	-0. 000406	993. 4577	5. 506E+11	0. 000	0. 000	0. 000
5. 830	0. 2802	-2864459.	16800.	-0. 000440	978. 4681	5. 506E+11	0. 000	0. 000	0. 000
6. 360	0. 2773	-2755260.	16800.	-0. 000472	963. 4551	5. 506E+11	0. 000	0. 000	0. 000
6. 890	0. 2742	-2645898.	16800.	-0. 000503	948. 4195	5. 506E+11	0. 000	0. 000	0. 000
7. 420	0. 2709	-2536378.	16800.	-0. 000533	933. 3623	5. 506E+11	0. 000	0. 000	0. 000
7. 950	0. 2674	-2426708.	16800.	-0. 000562	918. 2843	5. 506E+11	0. 000	0. 000	0. 000
8. 480	0. 2638	-2316893.	16800.	-0. 000589	903. 1865	5. 506E+11	0. 000	0. 000	0. 000
9. 010	0. 2599	-2206940.	16800.	-0. 000615	888. 0698	5. 506E+11	0. 000	0. 000	0. 000
9. 540	0. 2559	-2096856.	16800.	-0. 000640	872. 9349	5. 506E+11	0. 000	0. 000	0. 000
10. 070	0. 2518	-1986647.	16800.	-0. 000664	857. 7830	5. 506E+11	0. 000	0. 000	0. 000
10. 600	0. 2475	-1876319.	16800.	-0. 000686	842. 6147	5. 506E+11	0. 000	0. 000	0. 000
11. 130	0. 2431	-1765881.	16800.	-0. 000707	827. 4312	5. 506E+11	0. 000	0. 000	0. 000
11. 660	0. 2385	-1655337.	16800.	-0. 000727	812. 2332	5. 506E+11	0. 000	0. 000	0. 000
12. 190	0. 2338	-1544694.	16800.	-0. 000745	797. 0216	5. 506E+11	0. 000	0. 000	0. 000
12. 720	0. 2290	-1433960.	16800.	-0. 000759	579. 6961	9. 394E+11	0. 000	0. 000	0. 000
13. 250	0. 2242	-1323176.	16800.	-0. 000769	569. 4925	9. 394E+11	0. 000	0. 000	0. 000
13. 780	0. 2193	-1212345.	16800.	-0. 000777	559. 2846	9. 394E+11	0. 000	0. 000	0. 000
14. 310	0. 2143	-1101472.	16800.	-0. 000785	549. 0728	9. 394E+11	0. 000	0. 000	0. 000
14. 840	0. 2093	-990561.	16800.	-0. 000792	538. 8575	9. 394E+11	0. 000	0. 000	0. 000
15. 370	0. 2042	-879616.	16800.	-0. 000798	528. 6390	9. 394E+11	0. 000	0. 000	0. 000
15. 900	0. 1991	-768639.	16800.	-0. 000804	518. 4177	9. 394E+11	0. 000	0. 000	0. 000
16. 430	0. 1940	-657636.	16800.	-0. 000809	508. 1939	9. 394E+11	0. 000	0. 000	0. 000
16. 960	0. 1888	-546610.	16800.	-0. 000813	497. 9680	9. 394E+11	0. 000	0. 000	0. 000
17. 490	0. 1836	-435565.	16800.	-0. 000816	487. 7403	9. 394E+11	0. 000	0. 000	0. 000
18. 020	0. 1784	-324504.	16800.	-0. 000819	477. 5113	9. 394E+11	0. 000	0. 000	0. 000
18. 550	0. 1732	-213432.	16800.	-0. 000821	467. 2812	9. 394E+11	0. 000	0. 000	0. 000
19. 080	0. 1680	-102353.	16800.	-0. 000822	457. 0504	9. 394E+11	0. 000	0. 000	0. 000
19. 610	0. 1628	8729. 4907	16800.	-0. 000822	448. 4273	9. 394E+11	0. 000	0. 000	0. 000
20. 140	0. 1575	119812.	16800.	-0. 000822	458. 6584	9. 394E+11	0. 000	0. 000	0. 000
20. 670	0. 1523	230890.	16800.	-0. 000820	468. 8891	9. 394E+11	0. 000	0. 000	0. 000
21. 200	0. 1471	341960.	16800.	-0. 000818	479. 1190	9. 394E+11	0. 000	0. 000	0. 000
21. 730	0. 1419	453019.	16800.	-0. 000816	489. 3479	9. 394E+11	0. 000	0. 000	0. 000
22. 260	0. 1367	564061.	16800.	-0. 000812	499. 5753	9. 394E+11	0. 000	0. 000	0. 000
22. 790	0. 1316	675084.	16800.	-0. 000808	509. 8009	9. 394E+11	0. 000	0. 000	0. 000
23. 320	0. 1265	786083.	16800.	-0. 000803	520. 0243	9. 394E+11	0. 000	0. 000	0. 000
23. 850	0. 1214	897055.	16800.	-0. 000797	530. 2452	9. 394E+11	0. 000	0. 000	0. 000
24. 380	0. 1163	1007996.	16800.	-0. 000791	540. 4633	9. 394E+11	0. 000	0. 000	0. 000
24. 910	0. 1113	1118901.	16800.	-0. 000784	550. 6780	9. 394E+11	0. 000	0. 000	0. 000
25. 440	0. 1063	1229767.	16800.	-0. 000776	560. 8892	9. 394E+11	0. 000	0. 000	0. 000
25. 970	0. 1014	1340591.	16800.	-0. 000767	571. 0965	9. 394E+11	0. 000	0. 000	0. 000
26. 500	0. 0966	1451368.	16800.	-0. 000758	581. 2994	9. 394E+11	0. 000	0. 000	0. 000
27. 030	0. 0918	1562094.	16800.	-0. 000748	591. 4977	9. 394E+11	0. 000	0. 000	0. 000
27. 560	0. 0871	1672765.	16800.	-0. 000737	601. 6909	9. 394E+11	0. 000	0. 000	0. 000
28. 090	0. 0824	1783378.	16800.	-0. 000725	611. 8788	9. 394E+11	0. 000	0. 000	0. 000
28. 620	0. 0779	1893930.	16800.	-0. 000712	622. 0609	9. 394E+11	0. 000	0. 000	0. 000
29. 150	0. 0734	2004415.	16800.	-0. 000699	632. 2370	9. 394E+11	0. 000	0. 000	0. 000
29. 680	0. 0690	2114830.	16800.	-0. 000685	642. 4066	9. 394E+11	0. 000	0. 000	0. 000
30. 210	0. 0646	2225171.	16800.	-0. 000671	652. 5694	9. 394E+11	0. 000	0. 000	0. 000
30. 740	0. 0604	2335435.	16800.	-0. 000655	662. 7251	9. 394E+11	0. 000	0. 000	0. 000
31. 270	0. 0563	2445617.	16800.	-0. 000639	672. 8733	9. 394E+11	0. 000	0. 000	0. 000
31. 800	0. 0523	2555714.	16800.	-0. 000622	683. 0136	9. 394E+11	0. 000	0. 000	0. 000
32. 330	0. 0484	2665722.	16800.	-0. 000604	693. 1457	9. 394E+11	0. 000	0. 000	0. 000
32. 860	0. 0446	2775637.	16800.	-0. 000586	703. 2693	9. 394E+11	0. 000	0. 000	0. 000
33. 390	0. 0409	2885455.	16800.	-0. 000567	713. 3839	9. 394E+11	0. 000	0. 000	0. 000
33. 920	0. 0374	2995172.	16800.	-0. 000547	723. 4893	9. 394E+11	0. 000	0. 000	0. 000
34. 450	0. 0340	3104785.	16800.	-0. 000526	733. 5850	9. 394E+11	0. 000	0. 000	0. 000
34. 980	0. 0307	3214290.	16800.	-0. 000505	743. 6708	9. 394E+11	0. 000	0. 000	0. 000
35. 510	0. 0276	3323682.	16800.	-0. 000483	753. 7462	9. 394E+11	0. 000	0. 000	0. 000
36. 040	0. 0246	3432959.	16800.	-0. 000460	763. 8110	9. 394E+11	0. 000	0. 000	0. 000



IB2_B-5_Trans_Scoured.l p7o									
36.570	0.0217	3542116.	16800.	-0.000436	773.8647	9.394E+11	0.000	0.000	0.000
37.100	0.0190	3651149.	16800.	-0.000412	783.9071	9.394E+11	0.000	0.000	0.000
37.630	0.0165	3760055.	16800.	-0.000387	793.9377	9.394E+11	0.000	0.000	0.000
38.160	0.0141	3868830.	16800.	-0.000361	803.9562	9.394E+11	0.000	0.000	0.000
38.690	0.0119	3977470.	16800.	-0.000334	813.9624	9.394E+11	0.000	0.000	0.000
39.220	0.009853	4085971.	16800.	-0.000307	823.9557	9.394E+11	0.000	0.000	0.000
39.750	0.007988	4194329.	16800.	-0.000279	833.9359	9.394E+11	0.000	0.000	0.000
40.280	0.006303	4302542.	16800.	-0.000250	843.9027	9.394E+11	0.000	0.000	0.000
40.810	0.004804	4410604.	16800.	-0.000221	853.8556	9.394E+11	0.000	0.000	0.000
41.340	0.003495	4518513.	16800.	-0.000191	863.7943	9.394E+11	0.000	0.000	0.000
41.870	0.002380	4626263.	16800.	-0.000160	873.7186	9.394E+11	0.000	0.000	0.000
42.400	0.001465	4733853.	-29782.	-0.000128	883.6280	9.394E+11	-14649.	63600000.	0.000
42.930	0.000753	4248748.	-100319.	-9.750E-05	838.9481	9.394E+11	-7532.6764	63600000.	0.000
43.460	0.000225	3458801.	-131416.	-7.141E-05	766.1912	9.394E+11	-2246.2844	63600000.	0.000
43.990	-0.000155	2577873.	-133628.	-4.481E-05	939.0671	5.506E+11	1550.7474	63600000.	0.000
44.520	-0.000345	1759518.	-117712.	-1.977E-05	826.5564	5.506E+11	3454.1133	63600000.	0.000
45.050	-0.000406	1080776.	-93802.	-3.363E-06	733.2402	5.506E+11	4064.9644	63600000.	0.000
45.580	-0.000388	566395.	-68531.	6.149E-06	662.5211	5.506E+11	3881.8943	63600000.	0.000
46.110	-0.000328	209002.	-45747.	1.063E-05	613.3853	5.506E+11	3282.7588	63600000.	0.000
46.640	-0.000253	-15617.	-27262.	1.174E-05	586.7979	5.506E+11	2530.0934	63600000.	0.000
47.170	-0.000179	-137894.	-13528.	1.086E-05	603.6090	5.506E+11	1788.8997	63600000.	0.000
47.700	-0.000115	-187802.	-4185.2587	8.977E-06	610.4706	5.506E+11	1149.0006	63600000.	0.000
48.230	-6.471E-05	-191223.	1526.2075	6.788E-06	610.9409	5.506E+11	647.0579	63600000.	0.000
48.760	-2.856E-05	-168459.	4492.0103	4.711E-06	607.8112	5.506E+11	285.5844	63600000.	0.000
49.290	-4.786E-06	-134133.	5552.3571	2.963E-06	603.0919	5.506E+11	47.8580	63600000.	0.000
49.820	9.134E-06	-97863.	5414.0951	1.623E-06	598.1054	5.506E+11	-91.3366	63600000.	0.000
50.350	1.586E-05	-65282.	4619.1615	6.813E-07	593.6261	5.506E+11	-158.6425	63600000.	0.000
50.880	1.780E-05	-39114.	3548.6602	7.837E-08	590.0284	5.506E+11	-177.9931	63600000.	0.000
51.410	1.686E-05	-20144.	2446.4594	-2.639E-07	587.4203	5.506E+11	-168.6109	63600000.	0.000
51.940	1.444E-05	-7992.6800	1450.9853	-4.263E-07	585.7497	5.506E+11	-144.4312	63600000.	0.000
52.470	1.144E-05	-1683.0721	627.9648	-4.822E-07	584.8822	5.506E+11	-114.3803	63600000.	0.000
53.000	8.309E-06	0.000	0.000	-4.919E-07	584.6508	5.506E+11	-83.0929	31800000.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 3:

Pile-head deflection = 0.2965053 inches  
 Computed slope at pile head = 0.000000 radians  
 Maximum bending moment = 4733853. inch-lbs  
 Maximum shear force = -133628. lbs  
 Depth of maximum bending moment = 42.4000000 feet below pile head  
 Depth of maximum shear force = 43.9900000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 2

-----  
 Pile-head Deflection vs. Pile Length for Load Case 3  
 -----

Boundary Condition Type 2, Shear and Slope

Shear = 16800. lb  
 Slope = 0.00000  
 Axial Load = 810000. lb



IB2\_B-5\_Trans\_Scoured.l p7o

9.010	0.2447	-2081472.	15600.	-0.000579	1119.8379	5.506E+11	0.000	0.000	0.000
9.540	0.2410	-1977912.	15600.	-0.000603	1105.6001	5.506E+11	0.000	0.000	0.000
10.070	0.2371	-1874184.	15600.	-0.000625	1091.3391	5.506E+11	0.000	0.000	0.000
10.600	0.2330	-1770297.	15600.	-0.000646	1077.0563	5.506E+11	0.000	0.000	0.000
11.130	0.2289	-1666260.	15600.	-0.000666	1062.7528	5.506E+11	0.000	0.000	0.000
11.660	0.2246	-1562081.	15600.	-0.000685	1048.4299	5.506E+11	0.000	0.000	0.000
12.190	0.2202	-1457770.	15600.	-0.000702	1034.0888	5.506E+11	0.000	0.000	0.000
12.720	0.2156	-1353335.	15600.	-0.000715	762.9246	9.394E+11	0.000	0.000	0.000
13.250	0.2111	-1248833.	15600.	-0.000724	753.2996	9.394E+11	0.000	0.000	0.000
13.780	0.2064	-1144269.	15600.	-0.000732	743.6688	9.394E+11	0.000	0.000	0.000
14.310	0.2017	-1039647.	15600.	-0.000739	734.0329	9.394E+11	0.000	0.000	0.000
14.840	0.1970	-934975.	15600.	-0.000746	724.3921	9.394E+11	0.000	0.000	0.000
15.370	0.1923	-830255.	15600.	-0.000752	714.7471	9.394E+11	0.000	0.000	0.000
15.900	0.1875	-725494.	15600.	-0.000757	705.0983	9.394E+11	0.000	0.000	0.000
16.430	0.1826	-620698.	15600.	-0.000762	695.4461	9.394E+11	0.000	0.000	0.000
16.960	0.1778	-515870.	15600.	-0.000766	685.7911	9.394E+11	0.000	0.000	0.000
17.490	0.1729	-411017.	15600.	-0.000769	676.1337	9.394E+11	0.000	0.000	0.000
18.020	0.1680	-306143.	15600.	-0.000771	666.4745	9.394E+11	0.000	0.000	0.000
18.550	0.1631	-201254.	15600.	-0.000773	656.8139	9.394E+11	0.000	0.000	0.000
19.080	0.1582	-96355.	15600.	-0.000774	647.1523	9.394E+11	0.000	0.000	0.000
19.610	0.1532	8548.6742	15600.	-0.000774	639.0650	9.394E+11	0.000	0.000	0.000
20.140	0.1483	113452.	15600.	-0.000774	648.7270	9.394E+11	0.000	0.000	0.000
20.670	0.1434	218350.	15600.	-0.000773	658.3884	9.394E+11	0.000	0.000	0.000
21.200	0.1385	323237.	15600.	-0.000771	668.0489	9.394E+11	0.000	0.000	0.000
21.730	0.1336	428107.	15600.	-0.000768	677.7078	9.394E+11	0.000	0.000	0.000
22.260	0.1287	532957.	15600.	-0.000765	687.3648	9.394E+11	0.000	0.000	0.000
22.790	0.1239	637780.	15600.	-0.000761	697.0194	9.394E+11	0.000	0.000	0.000
23.320	0.1190	742571.	15600.	-0.000756	706.6711	9.394E+11	0.000	0.000	0.000
23.850	0.1142	847325.	15600.	-0.000751	716.3193	9.394E+11	0.000	0.000	0.000
24.380	0.1095	952037.	15600.	-0.000745	725.9637	9.394E+11	0.000	0.000	0.000
24.910	0.1048	1056702.	15600.	-0.000738	735.6037	9.394E+11	0.000	0.000	0.000
25.440	0.1001	1161315.	15600.	-0.000731	745.2388	9.394E+11	0.000	0.000	0.000
25.970	0.0955	1265869.	15600.	-0.000722	754.8687	9.394E+11	0.000	0.000	0.000
26.500	0.0909	1370361.	15600.	-0.000714	764.4927	9.394E+11	0.000	0.000	0.000
27.030	0.0864	1474784.	15600.	-0.000704	774.1105	9.394E+11	0.000	0.000	0.000
27.560	0.0819	1579134.	15600.	-0.000694	783.7215	9.394E+11	0.000	0.000	0.000
28.090	0.0776	1683406.	15600.	-0.000683	793.3253	9.394E+11	0.000	0.000	0.000
28.620	0.0733	1787593.	15600.	-0.000671	802.9213	9.394E+11	0.000	0.000	0.000
29.150	0.0690	1891692.	15600.	-0.000658	812.5092	9.394E+11	0.000	0.000	0.000
29.680	0.0649	1995697.	15600.	-0.000645	822.0884	9.394E+11	0.000	0.000	0.000
30.210	0.0608	2099603.	15600.	-0.000631	831.6585	9.394E+11	0.000	0.000	0.000
30.740	0.0569	2203404.	15600.	-0.000617	841.2190	9.394E+11	0.000	0.000	0.000
31.270	0.0530	2307095.	15600.	-0.000601	850.7693	9.394E+11	0.000	0.000	0.000
31.800	0.0492	2410672.	15600.	-0.000585	860.3091	9.394E+11	0.000	0.000	0.000
32.330	0.0455	2514129.	15600.	-0.000569	869.8379	9.394E+11	0.000	0.000	0.000
32.860	0.0420	2617461.	15600.	-0.000551	879.3551	9.394E+11	0.000	0.000	0.000
33.390	0.0385	2720663.	15600.	-0.000533	888.8603	9.394E+11	0.000	0.000	0.000
33.920	0.0352	2823729.	15600.	-0.000515	898.3531	9.394E+11	0.000	0.000	0.000
34.450	0.0320	2926655.	15600.	-0.000495	907.8330	9.394E+11	0.000	0.000	0.000
34.980	0.0289	3029435.	15600.	-0.000475	917.2994	9.394E+11	0.000	0.000	0.000
35.510	0.0259	3132065.	15600.	-0.000454	926.7520	9.394E+11	0.000	0.000	0.000
36.040	0.0231	3234539.	15600.	-0.000433	936.1902	9.394E+11	0.000	0.000	0.000
36.570	0.0204	3336852.	15600.	-0.000410	945.6136	9.394E+11	0.000	0.000	0.000
37.100	0.0179	3438999.	15600.	-0.000387	955.0217	9.394E+11	0.000	0.000	0.000
37.630	0.0155	3540975.	15600.	-0.000364	964.4140	9.394E+11	0.000	0.000	0.000
38.160	0.0133	3642775.	15600.	-0.000339	973.7902	9.394E+11	0.000	0.000	0.000
38.690	0.0112	3744394.	15600.	-0.000314	983.1496	9.394E+11	0.000	0.000	0.000
39.220	0.009261	3845827.	15600.	-0.000289	992.4919	9.394E+11	0.000	0.000	0.000
39.750	0.007507	3947068.	15600.	-0.000262	1001.8166	9.394E+11	0.000	0.000	0.000
40.280	0.005924	4048113.	15600.	-0.000235	1011.1232	9.394E+11	0.000	0.000	0.000

IB2_B-5_Trans_Scoured.l p7o									
40.810	0.004514	4148957.	15600.	-0.000208	1020.4113	9.394E+11	0.000	0.000	0.000
41.340	0.003284	4249594.	15600.	-0.000179	1029.6804	9.394E+11	0.000	0.000	0.000
41.870	0.002236	4350020.	15600.	-0.000150	1038.9299	9.394E+11	0.000	0.000	0.000
42.400	0.001376	4450230.	-28154.	-0.000120	1048.1596	9.394E+11	-13759.	63600000.	0.000
42.930	0.000707	3993664.	-94399.	-9.162E-05	1006.1082	9.394E+11	-7072.5051	63600000.	0.000
43.460	0.000211	3250819.	-123585.	-6.709E-05	937.6896	9.394E+11	-2105.4768	63600000.	0.000
43.990	-0.000146	2422647.	-125632.	-4.210E-05	1166.7440	5.506E+11	1461.7486	63600000.	0.000
44.520	-0.000325	1653396.	-110651.	-1.856E-05	1060.9843	5.506E+11	3249.3346	63600000.	0.000
45.050	-0.000382	1015440.	-88163.	-3.146E-06	973.2755	5.506E+11	3822.3608	63600000.	0.000
45.580	-0.000365	532010.	-64403.	5.791E-06	906.8117	5.506E+11	3649.4602	63600000.	0.000
46.110	-0.000309	196155.	-42985.	9.996E-06	860.6369	5.506E+11	3085.7529	63600000.	0.000
46.640	-0.000238	-14900.	-25610.	1.104E-05	835.7172	5.506E+11	2377.9533	63600000.	0.000
47.170	-0.000168	-129766.	-12702.	1.021E-05	851.5095	5.506E+11	1681.0989	63600000.	0.000
47.700	-0.000108	-176621.	-3923.2512	8.438E-06	857.9514	5.506E+11	1079.5687	63600000.	0.000
48.230	-6.078E-05	-179794.	1442.5236	6.380E-06	858.3875	5.506E+11	607.7819	63600000.	0.000
48.760	-2.681E-05	-158366.	4227.7292	4.427E-06	855.4416	5.506E+11	268.0689	63600000.	0.000
49.290	-4.469E-06	-126082.	5222.3007	2.784E-06	851.0030	5.506E+11	44.6894	63600000.	0.000
49.820	8.607E-06	-91980.	5090.7039	1.525E-06	846.3145	5.506E+11	-86.0721	63600000.	0.000
50.350	1.493E-05	-61351.	4342.3265	6.393E-07	842.1035	5.506E+11	-149.2668	63600000.	0.000
50.880	1.674E-05	-36755.	3335.3449	7.276E-08	838.7219	5.506E+11	-167.3941	63600000.	0.000
51.410	1.585E-05	-18926.	2298.9313	-2.488E-07	836.2708	5.506E+11	-158.5221	63600000.	0.000
51.940	1.357E-05	-7508.5037	1363.1550	-4.015E-07	834.7010	5.506E+11	-135.7472	63600000.	0.000
52.470	1.075E-05	-1581.0303	589.7669	-4.540E-07	833.8861	5.506E+11	-107.4566	63600000.	0.000
53.000	7.800E-06	0.000	0.000	-4.631E-07	833.6687	5.506E+11	-78.0047	31800000.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 4:

Pile-head deflection = 0.2791447 inches  
 Computed slope at pile head = 0.000000 radians  
 Maximum bending moment = 4450230. inch-lbs  
 Maximum shear force = -125632. lbs  
 Depth of maximum bending moment = 42.4000000 feet below pile head  
 Depth of maximum shear force = 43.9900000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 2

-----  
 Pile-head Deflection vs. Pile Length for Load Case 4  
 -----

Boundary Condition Type 2, Shear and Slope

Shear = 15600. lb  
 Slope = 0.00000  
 Axial Load = 1155000. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
53.0000	0.2791447	4450230.	-125632.
50.3500	0.2775847	4433496.	-126817.
47.7000	0.2817149	4454020.	-127844.
45.0500	0.2965744	4364754.	-181619.

45.0500	0.000000	5586015543.	517167149.
45.0500	0.000000	5586015543.	517167149.
45.0500	0.000000	5586015543.	517167149.
45.0500	0.000000	5586015543.	517167149.
45.0500	0.000000	5586015543.	517167149.
45.0500	0.000000	5586015543.	517167149.
45.0500	0.000000	5586015543.	517167149.
45.0500	0.000000	5586015543.	517167149.
45.0500	0.000000	5586015543.	517167149.
45.0500	0.000000	5586015543.	517167149.
45.0500	0.000000	5586015543.	517167149.
45.0500	0.000000	5586015543.	517167149.
45.0500	0.000000	5586015543.	517167149.
45.0500	0.000000	5586015543.	517167149.
45.0500	0.000000	5586015543.	517167149.
45.0500	0.000000	5586015543.	517167149.

-----  
 Summary of Pile Response(s)  
 -----

Defi ni ti ons of Pile-head Loading Condi ti ons:

- Load Type 1: Load 1 = Shear, lbs, and Load 2 = Moment, in-lbs
- Load Type 2: Load 1 = Shear, lbs, and Load 2 = Slope, radians
- Load Type 3: Load 1 = Shear, lbs, and Load 2 = Rotational Sti ffness, in-lbs/radi an
- Load Type 4: Load 1 = Top Deflection, inches, and Load 2 = Moment, in-lbs
- Load Type 5: Load 1 = Top Deflection, inches, and Load 2 = Slope, radi ans

Load Case No.	Load Type No.	Pile-head Condition 1 V(lbs) or y(inches)	Pile-head Condition 2 in-lb, rad., or in-lb/rad.	Axial Loading lbs	Pile-head Deflection inches	Maximum Moment in Pile in-lbs	Maximum Shear in Pile lbs	Pile-head Rotation radi ans
1	1	V = 16800.	M = 1404000.	0.0000000	1.14161763	9951840.	-280297.	-0.00363758
2	1	V = 15600.	M = 1368000.	0.0000000	1.07033979	9305280.	-262083.	-0.00342147
3	2	V = 16800.	S = 0.000	810000.	0.29650526	4733853.	-133628.	-0.00000000
4	2	V = 15600.	S = 0.000	1155000.	0.27914470	4450230.	-125632.	-0.00000000

-----  
 Summary of Warni ng Messages  
 -----

The followi ng warni ng was reported 4000 times

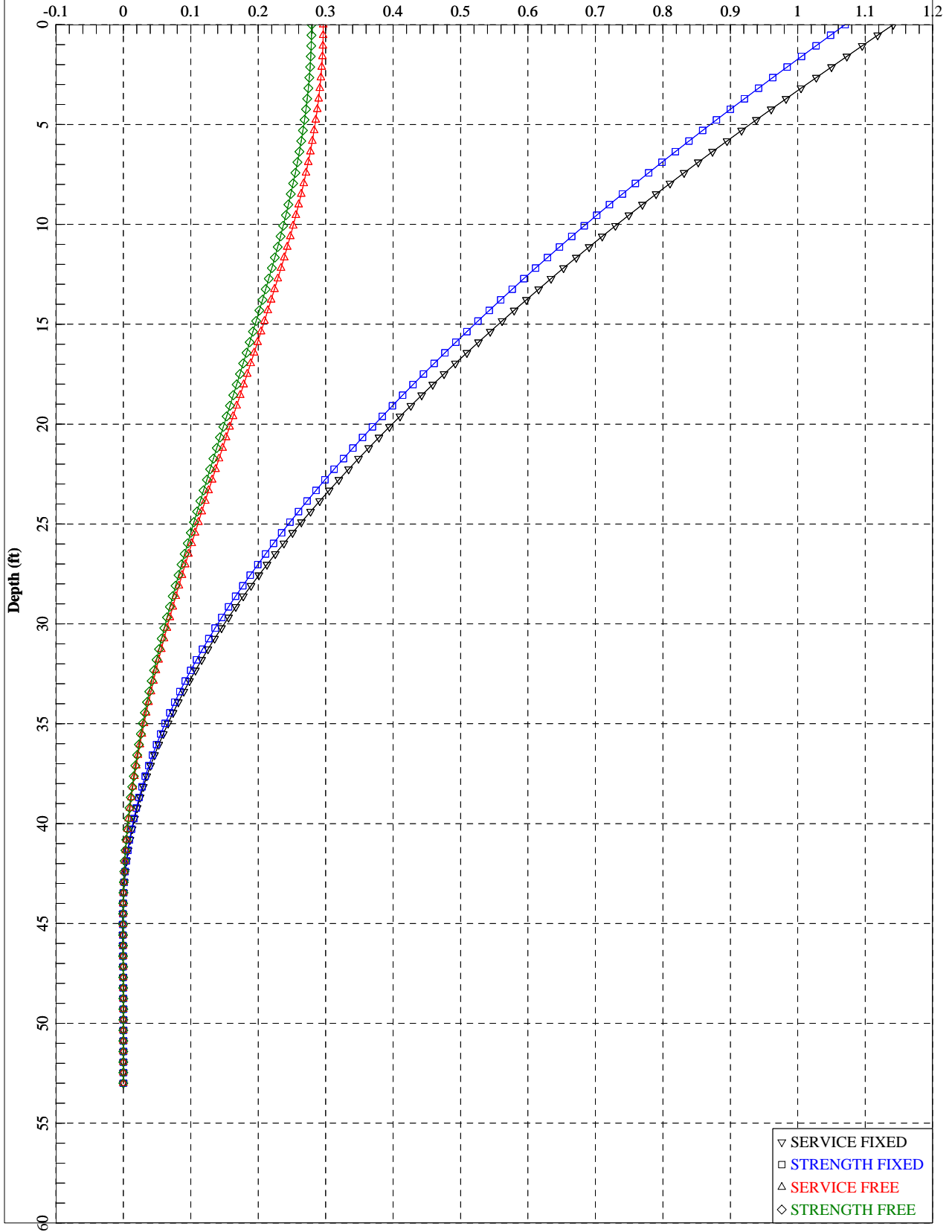
\*\*\*\* Warni ng \*\*\*\*

An unreasonable input value for uniaxial compressive strength has been specified for a soil defined using the vuggy limestone criteria. The input value is outside of the range of 1,000 to 2,500 psi (6,895 to 17,237 kPa). You should check your input data for correctness.

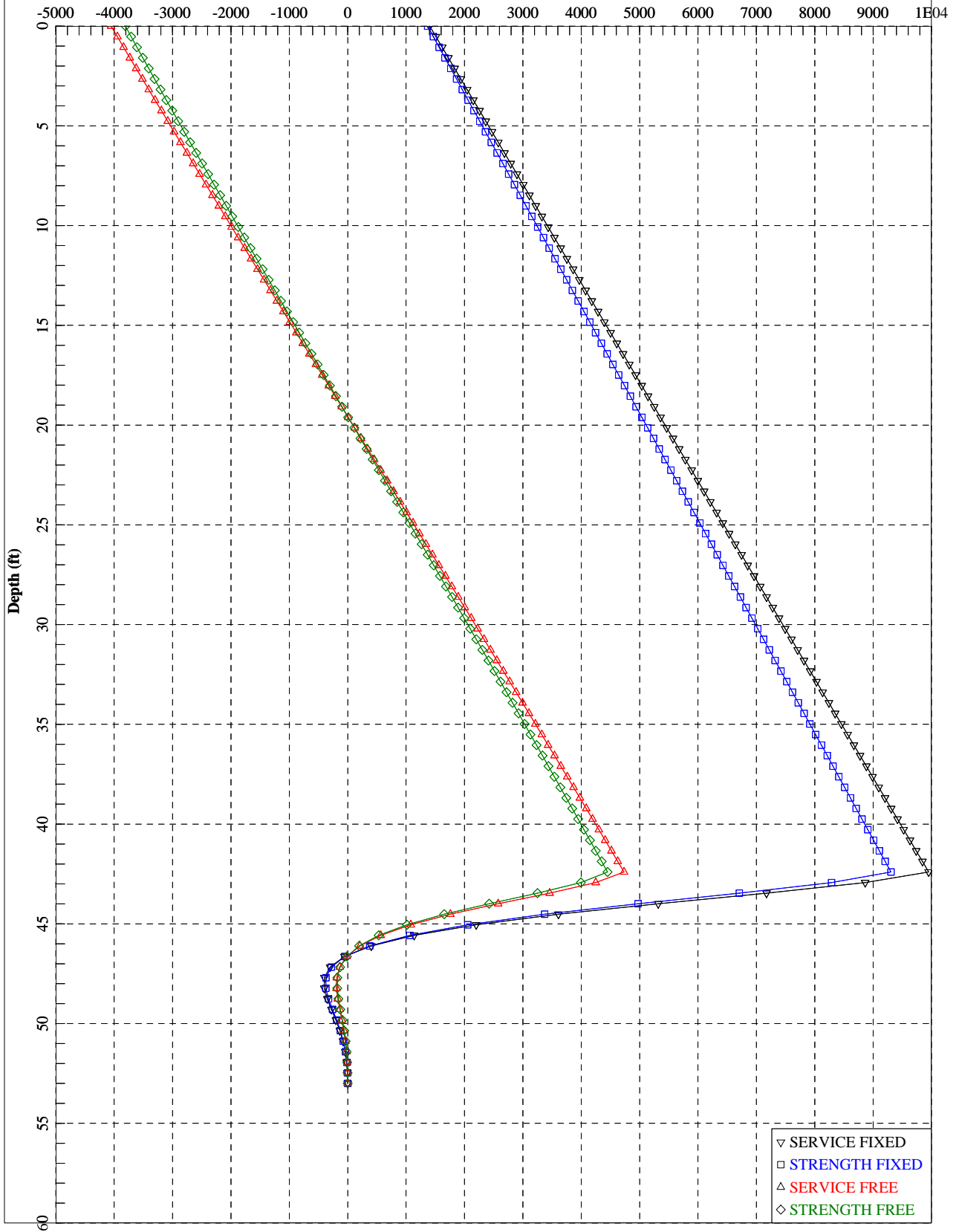
The analysis ended normally.

IB2\_B-5\_Trans\_Scoured.1p7o

SC 557 Bridge over Crowders Creek - IB2 - Boring B-5 - 48" Dia. Drilled Shaft - Scoured Transverse Analysis  
Lateral Pile Deflection (inches)

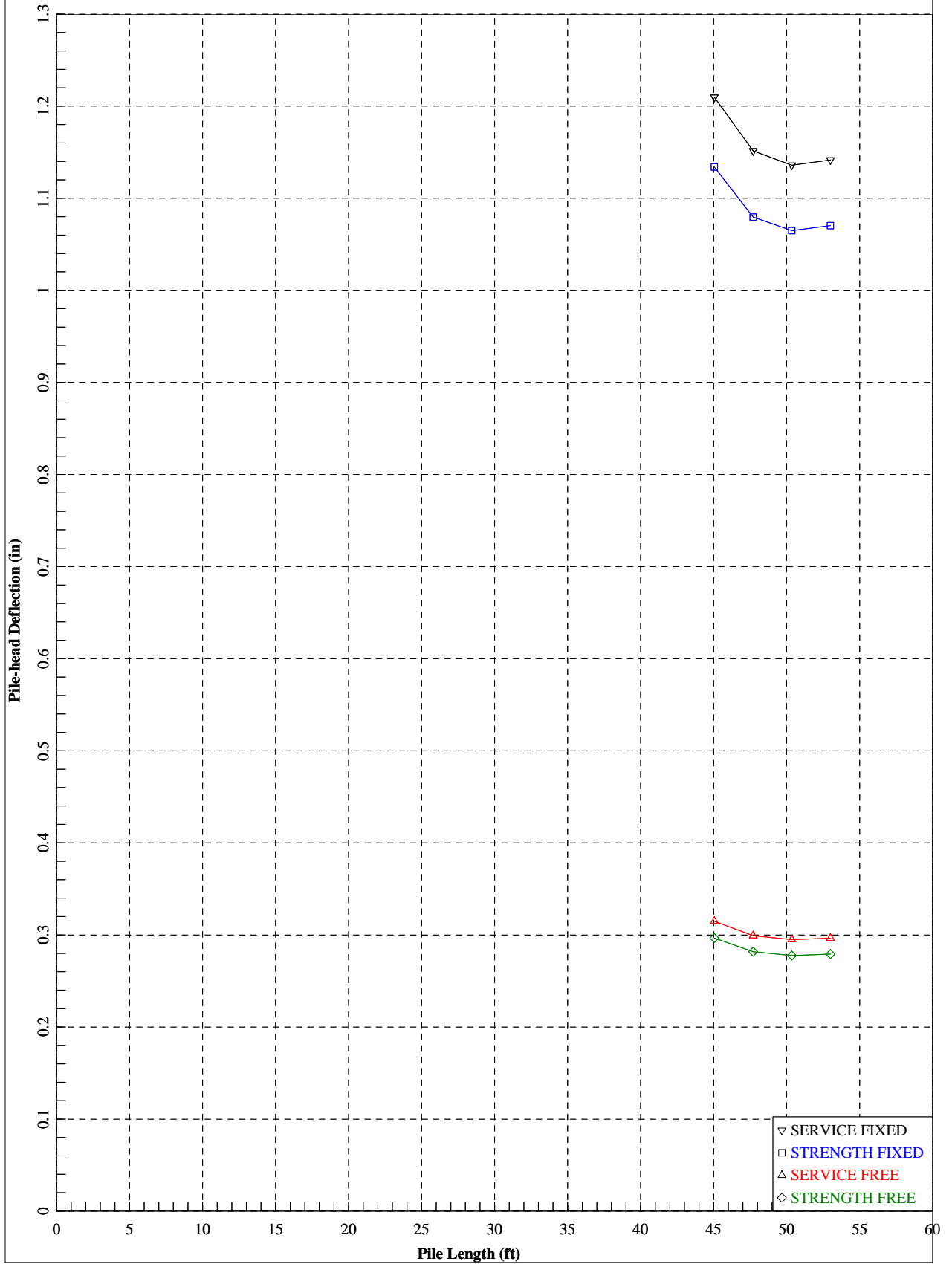


SC 557 Bridge over Crowders Creek - IB2 - Boring B-5 - 48" Dia. Drilled Shaft - Scoured Transverse Analysis  
Bending Moment (in-kips)





SC 557 Bridge over Crowders Creek - IB2 - Boring B-5 - 48" Dia. Drilled Shaft - Scoured Transverse Analysis



SC 557 Bridge over Crowders Creek  
Final Bridge Geotechnical Engineering Report

---

# APPENDIX

## SECTION 15 INTERIOR BENT 3 DRILLED SHAFT ANALYSES





=====  
LPile Plus for Windows, Version 2013-07.007

Analysis of Individual Piles and Drilled Shafts  
Subjected to Lateral Loading Using the p-y Method

© 1985-2013 by Ensoft, Inc.  
All Rights Reserved

=====  
This copy of LPile is used by:

Bradley Fischer  
F&ME

Serial Number of Security Device: 291490957

This copy of LPile is licensed for exclusive use by: F&ME Consultants, Columbia, Sout

Use of this program by any entity other than F&ME Consultants, Columbia, Sout  
is forbidden by the software license agreement.

-----  
Files Used for Analysis  
-----

Path to file locations: P:\Geotechnical\G4800's\G4843 - SC557 - York County\Report\Final\Bridge\LPile\  
Name of input data file: IB3\_B-6\_Long\_Scoured.l p7d  
Name of output report file: IB3\_B-6\_Long\_Scoured.l p7o  
Name of plot output file: IB3\_B-6\_Long\_Scoured.l p7p  
Name of runtime message file: IB3\_B-6\_Long\_Scoured.l p7r

-----  
Date and Time of Analysis  
-----

Date: July 31, 2018 Time: 9:12:06

-----  
Problem Title  
-----

Project Name: SC 557 over Crowders Creek

Job Number: G4843

Client: CALYX

Engineer: JFH

Description: IB3 - Boring B-6 - 48" Dia. Drilled Shaft - Scoured Long.

-----  
 Program Options and Settings  
 -----

Engineering Units of Input Data and Computations:

- Engineering units are US Customary Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

Computational Options:

- Use unfactored loads in computations (conventional analysis)
- Compute pile response under loading and nonlinear bending properties of pile (only if nonlinear pile properties are input)
- Analysis uses p-y modification factors for p-y curves
- Analysis includes loading by lateral soil movements acting on pile
- Input of shear resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- No p-y curves to be computed and reported for user-specified depths
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1

-----  
 Pile Structural Properties and Geometry  
 -----

- Total number of pile sections = 3
- Total length of pile = 47.50 ft
- Depth of ground surface below top of pile = 36.50 ft

Pile diameter values used for p-y curve computations are defined using 6 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile.

Point	Depth X ft	Pile Diameter in
1	0.00000	42.0000000
2	10.000000	42.0000000
3	10.000000	48.0000000
4	38.000000	48.0000000

5	38.000000	42.0000000
6	47.500000	42.0000000

-----  
Input Structural Properties:  
-----

Pile Section No. 1:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Circular
Section Length	=	10.00000 ft
Top Width	=	42.00000 in
Bottom Width	=	42.00000 in
Top Area	=	1385.44236 Sq. in
Bottom Area	=	1385.44236 Sq. in
Moment of Inertia at Top	=	152745. in^4
Moment of Inertia at Bottom	=	152745. in^4
Elastic Modulus	=	3605000. lbs/in^2

Pile Section No. 2:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Circular
Section Length	=	28.00000 ft
Top Width	=	48.00000 in
Bottom Width	=	48.00000 in
Top Area	=	1809.55737 Sq. in
Bottom Area	=	1809.55737 Sq. in
Moment of Inertia at Top	=	260576. in^4
Moment of Inertia at Bottom	=	260576. in^4
Elastic Modulus	=	3605000. lbs/in^2

Pile Section No. 3:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Circular
Section Length	=	9.50000 ft
Top Width	=	42.00000 in
Bottom Width	=	42.00000 in
Top Area	=	1385.44236 Sq. in
Bottom Area	=	1385.44236 Sq. in
Moment of Inertia at Top	=	152745. in^4
Moment of Inertia at Bottom	=	152745. in^4
Elastic Modulus	=	3605000. lbs/in^2

-----  
Ground Slope and Pile Batter Angles  
-----

Ground Slope Angle	=	0.000 degrees
	=	0.000 radians
Pile Batter Angle	=	0.000 degrees
	=	0.000 radians

-----  
Soil and Rock Layering Information  
-----

The soil profile is modelled using 1 layers

Layer 1 is strong rock (vuggy limestone)

Distance from top of pile to top of layer = 36.50000 ft  
 Distance from top of pile to bottom of layer = 60.00000 ft  
 Effective unit weight at top of layer = 98.00000 pcf  
 Effective unit weight at bottom of layer = 98.00000 pcf  
 Uniaxial compressive strength at top of layer = 30000. psi  
 Uniaxial compressive strength at bottom of layer = 30000. psi

(Depth of lowest soil layer extends 12.50 ft below pile tip)

Summary of Soil Properties

Layer Num.	Layer Soil Type (p-y Curve Criteria)	Layer Depth ft	Effective Unit Wt. pcf	Uniaxial qu psi
1	Vuggy Limestone	36.500 60.000	98.000 98.000	30000. 30000.

p-y Modification Factors for Group Action

Distribution of p-y modifiers with depth defined using 2 points

Point No.	Depth X ft	p-mult	y-mult
1	36.500	0.9300	1.0000
2	100.000	0.9300	1.0000

Lateral Soil Movements

Profile of soil movement with depth defined using 2 points

Point No.	Depth X ft	Soil Movement in
1	0.00000	0.00000
2	0.00000	0.00000



Loading Type

-----  
 Static loading criteria were used when computing p-y curves for all analyses.  
 -----

-----  
 Pile-head Loading and Pile-head Fixity Conditions  
 -----

Number of loads specified = 4

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length
1	1	V = 10700. lbs	M = 2616000. in-lbs	810000.	Yes
2	1	V = 20700. lbs	M = 4608000. in-lbs	1155000.	Yes
3	1	V = 10700. lbs	M = 0.0000 in-lbs	81000.	Yes
4	1	V = 20700. lbs	M = 0.0000 in-lbs	1155000.	Yes

V = perpendicular shear force applied to pile head  
 M = bending moment applied to pile head  
 y = lateral deflection relative to pile axis  
 S = pile slope relative to original pile batter angle  
 R = rotational stiffness applied to pile head  
 Axial thrust is assumed to be acting axially for all pile batter angles.

-----  
 Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness  
 -----

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 3

Pile Section No. 1:  
 -----

Moment-curvature properties were derived from elastic section properties

Pile Section No. 2:  
 -----

Moment-curvature properties were derived from elastic section properties

Pile Section No. 3:  
 -----

Moment-curvature properties were derived from elastic section properties

-----  
 Computed Values of Pile Loading and Deflection  
 for Lateral Loading for Load Case Number 1  
 -----

Pile-head conditions are Shear and Moment (Loading Type 1)

I B3\_B-6\_Long\_Scoured. I p7o

Shear force at pile head = 10700.0 lbs  
 Applied moment at pile head = 2616000.0 in-lbs  
 Axial thrust load on pile head = 810000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi *	Bending Stiffness lb-in^2	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.7240	2616000.	10700.	-0.002954	944.3090	5.506E+11	0.000	0.000	0.000
0.475	0.7072	2690568.	10700.	-0.002927	954.5609	5.506E+11	0.000	0.000	0.000
0.950	0.6906	2765007.	10700.	-0.002899	964.7951	5.506E+11	0.000	0.000	0.000
1.425	0.6742	2839314.	10700.	-0.002870	975.0112	5.506E+11	0.000	0.000	0.000
1.900	0.6579	2913486.	10700.	-0.002840	985.2086	5.506E+11	0.000	0.000	0.000
2.375	0.6418	2987518.	10700.	-0.002809	995.3868	5.506E+11	0.000	0.000	0.000
2.850	0.6259	3061407.	10700.	-0.002778	1005.5454	5.506E+11	0.000	0.000	0.000
3.325	0.6102	3135150.	10700.	-0.002746	1015.6839	5.506E+11	0.000	0.000	0.000
3.800	0.5946	3208744.	10700.	-0.002713	1025.8018	5.506E+11	0.000	0.000	0.000
4.275	0.5792	3282184.	10700.	-0.002680	1035.8986	5.506E+11	0.000	0.000	0.000
4.750	0.5640	3355467.	10700.	-0.002645	1045.9739	5.506E+11	0.000	0.000	0.000
5.225	0.5491	3428589.	10700.	-0.002610	1056.0271	5.506E+11	0.000	0.000	0.000
5.700	0.5343	3501548.	10700.	-0.002574	1066.0577	5.506E+11	0.000	0.000	0.000
6.175	0.5197	3574340.	10700.	-0.002538	1076.0654	5.506E+11	0.000	0.000	0.000
6.650	0.5054	3646960.	10700.	-0.002500	1086.0496	5.506E+11	0.000	0.000	0.000
7.125	0.4912	3719407.	10700.	-0.002462	1096.0098	5.506E+11	0.000	0.000	0.000
7.600	0.4773	3791675.	10700.	-0.002423	1105.9456	5.506E+11	0.000	0.000	0.000
8.075	0.4636	3863763.	10700.	-0.002384	1115.8564	5.506E+11	0.000	0.000	0.000
8.550	0.4501	3935665.	10700.	-0.002343	1125.7419	5.506E+11	0.000	0.000	0.000
9.025	0.4369	4007380.	10700.	-0.002302	1135.6015	5.506E+11	0.000	0.000	0.000
9.500	0.4239	4078903.	10700.	-0.002260	1145.4348	5.506E+11	0.000	0.000	0.000
9.975	0.4111	4150231.	10700.	-0.002218	1155.2413	5.506E+11	0.000	0.000	0.000
10.450	0.3986	4221361.	10700.	-0.002183	836.4256	9.394E+11	0.000	0.000	0.000
10.925	0.3862	4292373.	10700.	-0.002158	842.9660	9.394E+11	0.000	0.000	0.000
11.400	0.3740	4363264.	10700.	-0.002131	849.4954	9.394E+11	0.000	0.000	0.000
11.875	0.3619	4434033.	10700.	-0.002105	856.0135	9.394E+11	0.000	0.000	0.000
12.350	0.3500	4504678.	10700.	-0.002077	862.5201	9.394E+11	0.000	0.000	0.000
12.825	0.3382	4575196.	10700.	-0.002050	869.0151	9.394E+11	0.000	0.000	0.000
13.300	0.3266	4645587.	10700.	-0.002022	875.4983	9.394E+11	0.000	0.000	0.000
13.775	0.3152	4715847.	10700.	-0.001994	881.9696	9.394E+11	0.000	0.000	0.000
14.250	0.3039	4785975.	10700.	-0.001965	888.4286	9.394E+11	0.000	0.000	0.000
14.725	0.2928	4855969.	10700.	-0.001935	894.8753	9.394E+11	0.000	0.000	0.000
15.200	0.2818	4925827.	10700.	-0.001906	901.3095	9.394E+11	0.000	0.000	0.000
15.675	0.2711	4995547.	10700.	-0.001876	907.7310	9.394E+11	0.000	0.000	0.000
16.150	0.2605	5065128.	10700.	-0.001845	914.1395	9.394E+11	0.000	0.000	0.000
16.625	0.2500	5134566.	10700.	-0.001814	920.5350	9.394E+11	0.000	0.000	0.000
17.100	0.2398	5203860.	10700.	-0.001783	926.9173	9.394E+11	0.000	0.000	0.000
17.575	0.2297	5273009.	10700.	-0.001751	933.2861	9.394E+11	0.000	0.000	0.000
18.050	0.2198	5342010.	10700.	-0.001719	939.6413	9.394E+11	0.000	0.000	0.000
18.525	0.2101	5410861.	10700.	-0.001686	945.9828	9.394E+11	0.000	0.000	0.000
19.000	0.2006	5479560.	10700.	-0.001653	952.3103	9.394E+11	0.000	0.000	0.000
19.475	0.1913	5548106.	10700.	-0.001620	958.6236	9.394E+11	0.000	0.000	0.000
19.950	0.1821	5616497.	10700.	-0.001586	964.9226	9.394E+11	0.000	0.000	0.000
20.425	0.1732	5684730.	10700.	-0.001552	971.2072	9.394E+11	0.000	0.000	0.000
20.900	0.1644	5752805.	10700.	-0.001517	977.4770	9.394E+11	0.000	0.000	0.000
21.375	0.1559	5820717.	10700.	-0.001482	983.7320	9.394E+11	0.000	0.000	0.000
21.850	0.1476	5888467.	10700.	-0.001446	989.9720	9.394E+11	0.000	0.000	0.000
22.325	0.1394	5956052.	10700.	-0.001410	996.1968	9.394E+11	0.000	0.000	0.000
22.800	0.1315	6023470.	10700.	-0.001374	1002.4063	9.394E+11	0.000	0.000	0.000
23.275	0.1237	6090719.	10700.	-0.001337	1008.6002	9.394E+11	0.000	0.000	0.000
23.750	0.1162	6157798.	10700.	-0.001300	1014.7784	9.394E+11	0.000	0.000	0.000

IB3_B-6_Long_Scoured.l p7o									
24. 225	0. 1089	6224704.	10700.	-0. 001262	1020. 9406	9. 394E+11	0. 000	0. 000	0. 000
24. 700	0. 1018	6291436.	10700.	-0. 001225	1027. 0869	9. 394E+11	0. 000	0. 000	0. 000
25. 175	0. 0950	6357991.	10700.	-0. 001186	1033. 2169	9. 394E+11	0. 000	0. 000	0. 000
25. 650	0. 0883	6424369.	10700.	-0. 001147	1039. 3305	9. 394E+11	0. 000	0. 000	0. 000
26. 125	0. 0819	6490566.	10700.	-0. 001108	1045. 4275	9. 394E+11	0. 000	0. 000	0. 000
26. 600	0. 0757	6556581.	10700.	-0. 001069	1051. 5077	9. 394E+11	0. 000	0. 000	0. 000
27. 075	0. 0697	6622413.	10700.	-0. 001029	1057. 5711	9. 394E+11	0. 000	0. 000	0. 000
27. 550	0. 0640	6688060.	10700.	-0. 000988	1063. 6173	9. 394E+11	0. 000	0. 000	0. 000
28. 025	0. 0584	6753519.	10700.	-0. 000947	1069. 6463	9. 394E+11	0. 000	0. 000	0. 000
28. 500	0. 0532	6818788.	10700.	-0. 000906	1075. 6579	9. 394E+11	0. 000	0. 000	0. 000
28. 975	0. 0481	6883867.	10700.	-0. 000865	1081. 6519	9. 394E+11	0. 000	0. 000	0. 000
29. 450	0. 0433	6948753.	10700.	-0. 000823	1087. 6281	9. 394E+11	0. 000	0. 000	0. 000
29. 925	0. 0387	7013444.	10700.	-0. 000780	1093. 5864	9. 394E+11	0. 000	0. 000	0. 000
30. 400	0. 0344	7077939.	10700.	-0. 000738	1099. 5266	9. 394E+11	0. 000	0. 000	0. 000
30. 875	0. 0303	7142235.	10700.	-0. 000694	1105. 4485	9. 394E+11	0. 000	0. 000	0. 000
31. 350	0. 0265	7206331.	10700.	-0. 000651	1111. 3520	9. 394E+11	0. 000	0. 000	0. 000
31. 825	0. 0229	7270226.	10700.	-0. 000607	1117. 2369	9. 394E+11	0. 000	0. 000	0. 000
32. 300	0. 0196	7333917.	10700.	-0. 000563	1123. 1031	9. 394E+11	0. 000	0. 000	0. 000
32. 775	0. 0165	7397402.	10700.	-0. 000518	1128. 9503	9. 394E+11	0. 000	0. 000	0. 000
33. 250	0. 0137	7460680.	10700.	-0. 000473	1134. 7784	9. 394E+11	0. 000	0. 000	0. 000
33. 725	0. 0111	7523749.	10700.	-0. 000427	1140. 5873	9. 394E+11	0. 000	0. 000	0. 000
34. 200	0. 008786	7586607.	10700.	-0. 000382	1146. 3768	9. 394E+11	0. 000	0. 000	0. 000
34. 675	0. 006742	7649253.	10700.	-0. 000335	1152. 1467	9. 394E+11	0. 000	0. 000	0. 000
35. 150	0. 004963	7711684.	10700.	-0. 000289	1157. 8968	9. 394E+11	0. 000	0. 000	0. 000
35. 625	0. 003450	7773900.	10700.	-0. 000242	1163. 6271	9. 394E+11	0. 000	0. 000	0. 000
36. 100	0. 002206	7835897.	10700.	-0. 000194	1169. 3373	9. 394E+11	0. 000	0. 000	0. 000
36. 575	0. 001233	7897676.	-87355.	-0. 000147	1175. 0273	9. 394E+11	-34405.	1. 590E+08	0. 000
37. 050	0. 000533	6841401.	-227824.	-0. 000102	1077. 7406	9. 394E+11	-14882.	1. 590E+08	0. 000
37. 525	7. 025E-05	5301425.	-275823.	-6. 517E-05	935. 9033	9. 394E+11	-1959. 9618	1. 590E+08	0. 000
38. 000	-0. 000210	3697620.	-264747.	-3. 787E-05	788. 1873	9. 394E+11	5846. 1697	1. 590E+08	0. 000
38. 475	-0. 000361	2283655.	-219346.	-1. 483E-05	898. 6169	5. 506E+11	10084.	1. 590E+08	0. 000
38. 950	-0. 000379	1197216.	-160501.	3. 186E-06	749. 2489	5. 506E+11	10563.	1. 590E+08	0. 000
39. 425	-0. 000325	453909.	-104546.	1. 173E-05	647. 0560	5. 506E+11	9070. 7452	1. 590E+08	0. 000
39. 900	-0. 000245	5288. 5161	-59225.	1. 411E-05	585. 3779	5. 506E+11	6831. 3641	1. 590E+08	0. 000
40. 375	-0. 000164	-221381.	-26693.	1. 299E-05	615. 0872	5. 506E+11	4583. 2770	1. 590E+08	0. 000
40. 850	-9. 676E-05	-299130.	-5936. 5423	1. 030E-05	625. 7763	5. 506E+11	2699. 6267	1. 590E+08	0. 000
41. 325	-4. 690E-05	-289153.	5486. 3408	7. 252E-06	624. 4047	5. 506E+11	1308. 4024	1. 590E+08	0. 000
41. 800	-1. 409E-05	-236652.	10336.	4. 530E-06	617. 1867	5. 506E+11	393. 1803	1. 590E+08	0. 000
42. 275	4. 748E-06	-171366.	11079.	2. 418E-06	608. 2109	5. 506E+11	-132. 4658	1. 590E+08	0. 000
42. 750	1. 348E-05	-110375.	9629. 7323	9. 602E-07	599. 8256	5. 506E+11	-376. 0099	1. 590E+08	0. 000
43. 225	1. 569E-05	-61596.	7310. 2181	7. 008E-08	593. 1193	5. 506E+11	-437. 8547	1. 590E+08	0. 000
43. 700	1. 428E-05	-27039.	4927. 1750	-3. 887E-07	588. 3683	5. 506E+11	-398. 3007	1. 590E+08	0. 000
44. 175	1. 126E-05	-5422. 4650	2896. 4495	-5. 567E-07	585. 3963	5. 506E+11	-314. 2345	1. 590E+08	0. 000
44. 650	7. 930E-06	5985. 2569	1370. 3416	-5. 538E-07	585. 4737	5. 506E+11	-221. 2419	1. 590E+08	0. 000
45. 125	4. 950E-06	10205.	346. 2109	-4. 700E-07	586. 0538	5. 506E+11	-138. 1022	1. 590E+08	0. 000
45. 600	2. 572E-06	9936. 4010	-251. 8996	-3. 657E-07	586. 0169	5. 506E+11	-71. 7612	1. 590E+08	0. 000
46. 075	7. 806E-07	7336. 2643	-518. 4844	-2. 763E-07	585. 6594	5. 506E+11	-21. 7774	1. 590E+08	0. 000
46. 550	-5. 781E-07	4028. 2300	-534. 5810	-2. 175E-07	585. 2046	5. 506E+11	16. 1295	1. 590E+08	0. 000
47. 025	-1. 699E-06	1244. 0496	-353. 5076	-1. 902E-07	584. 8218	5. 506E+11	47. 4051	1. 590E+08	0. 000
47. 500	-2. 747E-06	0. 000	0. 000	-1. 838E-07	584. 6508	5. 506E+11	76. 6327	79515000.	0. 000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 1:

Pile-head deflection = 0. 7240054 inches  
 Computed slope at pile head = -0. 0029544 radians  
 Maximum bending moment = 7897676. inch-lbs  
 Maximum shear force = -275823. lbs

Depth of maximum bending moment = 36.5750000 feet below pile head  
 Depth of maximum shear force = 37.5250000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 3

-----  
 Pile-head Deflection vs. Pile Length for Load Case 1  
 -----

Boundary Condition Type 1, Shear and Moment

Shear = 10700. lb  
 Moment = 2616000. in-lb  
 Axial Load = 810000. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment in-lbs	Maximum Shear lbs
47.5000	0.7240054	7897676.	-275823.
45.1250	0.7234123	7894123.	-276207.
42.7500	0.7386610	7933835.	-289225.
40.3750	0.7345442	7927466.	-287931.
40.3750	0.000000	17569463231.	-1813154049.
40.3750	0.000000	17569463231.	-1813154049.
40.3750	0.000000	17569463231.	-1813154049.
40.3750	0.000000	17569463231.	-1813154049.
40.3750	0.000000	17569463231.	-1813154049.
40.3750	0.000000	17569463231.	-1813154049.
40.3750	0.000000	17569463231.	-1813154049.
40.3750	0.000000	17569463231.	-1813154049.
40.3750	0.000000	17569463231.	-1813154049.
40.3750	0.000000	17569463231.	-1813154049.
40.3750	0.000000	17569463231.	-1813154049.
40.3750	0.000000	17569463231.	-1813154049.
40.3750	0.000000	17569463231.	-1813154049.
40.3750	0.000000	17569463231.	-1813154049.
40.3750	0.000000	17569463231.	-1813154049.
40.3750	0.000000	17569463231.	-1813154049.
40.3750	0.000000	17569463231.	-1813154049.
40.3750	0.000000	17569463231.	-1813154049.
40.3750	0.000000	17569463231.	-1813154049.

-----  
 Computed Values of Pile Loading and Deflection  
 for Lateral Loading for Load Case Number 2  
 -----

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 20700.0 lbs  
 Applied moment at pile head = 4608000.0 in-lbs  
 Axial thrust load on pile head = 1155000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	1.3915	4608000.	20700.	-0.005612	1467.1951	5.506E+11	0.000	0.000	0.000

I B3\_B-6\_Long\_Scoured. I p7o

0. 475	1. 3596	4762780.	20700.	-0. 005564	1488. 4749	5. 506E+11	0. 000	0. 000	0. 000
0. 950	1. 3280	4917235.	20700.	-0. 005513	1509. 7100	5. 506E+11	0. 000	0. 000	0. 000
1. 425	1. 2968	5071355.	20700.	-0. 005462	1530. 8990	5. 506E+11	0. 000	0. 000	0. 000
1. 900	1. 2658	5225129.	20700.	-0. 005408	1552. 0405	5. 506E+11	0. 000	0. 000	0. 000
2. 375	1. 2351	5378547.	20700.	-0. 005354	1573. 1330	5. 506E+11	0. 000	0. 000	0. 000
2. 850	1. 2047	5531599.	20700.	-0. 005297	1594. 1752	5. 506E+11	0. 000	0. 000	0. 000
3. 325	1. 1747	5684274.	20700.	-0. 005239	1615. 1655	5. 506E+11	0. 000	0. 000	0. 000
3. 800	1. 1450	5836561.	20700.	-0. 005179	1636. 1026	5. 506E+11	0. 000	0. 000	0. 000
4. 275	1. 1157	5988450.	20700.	-0. 005118	1656. 9850	5. 506E+11	0. 000	0. 000	0. 000
4. 750	1. 0867	6139932.	20700.	-0. 005055	1677. 8113	5. 506E+11	0. 000	0. 000	0. 000
5. 225	1. 0580	6290995.	20700.	-0. 004991	1698. 5801	5. 506E+11	0. 000	0. 000	0. 000
5. 700	1. 0298	6441629.	20700.	-0. 004925	1719. 2899	5. 506E+11	0. 000	0. 000	0. 000
6. 175	1. 0019	6591825.	20700.	-0. 004858	1739. 9393	5. 506E+11	0. 000	0. 000	0. 000
6. 650	0. 9744	6741571.	20700.	-0. 004789	1760. 5270	5. 506E+11	0. 000	0. 000	0. 000
7. 125	0. 9473	6890857.	20700.	-0. 004718	1781. 0516	5. 506E+11	0. 000	0. 000	0. 000
7. 600	0. 9206	7039674.	20700.	-0. 004646	1801. 5115	5. 506E+11	0. 000	0. 000	0. 000
8. 075	0. 8943	7188012.	20700.	-0. 004572	1821. 9055	5. 506E+11	0. 000	0. 000	0. 000
8. 550	0. 8685	7335859.	20700.	-0. 004497	1842. 2322	5. 506E+11	0. 000	0. 000	0. 000
9. 025	0. 8431	7483207.	20700.	-0. 004421	1862. 4901	5. 506E+11	0. 000	0. 000	0. 000
9. 500	0. 8181	7630044.	20700.	-0. 004342	1882. 6780	5. 506E+11	0. 000	0. 000	0. 000
9. 975	0. 7936	7776362.	20700.	-0. 004263	1902. 7943	5. 506E+11	0. 000	0. 000	0. 000
10. 450	0. 7695	7922150.	20700.	-0. 004198	1367. 9358	9. 394E+11	0. 000	0. 000	0. 000
10. 925	0. 7457	8067621.	20700.	-0. 004150	1381. 3342	9. 394E+11	0. 000	0. 000	0. 000
11. 400	0. 7222	8212770.	20700.	-0. 004100	1394. 7029	9. 394E+11	0. 000	0. 000	0. 000
11. 875	0. 6990	8357590.	20700.	-0. 004050	1408. 0414	9. 394E+11	0. 000	0. 000	0. 000
12. 350	0. 6760	8502077.	20700.	-0. 003999	1421. 3492	9. 394E+11	0. 000	0. 000	0. 000
12. 825	0. 6534	8646225.	20700.	-0. 003947	1434. 6257	9. 394E+11	0. 000	0. 000	0. 000
13. 300	0. 6310	8790027.	20700.	-0. 003894	1447. 8703	9. 394E+11	0. 000	0. 000	0. 000
13. 775	0. 6090	8933477.	20700.	-0. 003840	1461. 0827	9. 394E+11	0. 000	0. 000	0. 000
14. 250	0. 5872	9076571.	20700.	-0. 003786	1474. 2621	9. 394E+11	0. 000	0. 000	0. 000
14. 725	0. 5658	9219302.	20700.	-0. 003730	1487. 4082	9. 394E+11	0. 000	0. 000	0. 000
15. 200	0. 5447	9361665.	20700.	-0. 003674	1500. 5203	9. 394E+11	0. 000	0. 000	0. 000
15. 675	0. 5239	9503654.	20700.	-0. 003616	1513. 5980	9. 394E+11	0. 000	0. 000	0. 000
16. 150	0. 5035	9645264.	20700.	-0. 003558	1526. 6407	9. 394E+11	0. 000	0. 000	0. 000
16. 625	0. 4834	9786488.	20700.	-0. 003499	1539. 6480	9. 394E+11	0. 000	0. 000	0. 000
17. 100	0. 4636	9927321.	20700.	-0. 003440	1552. 6192	9. 394E+11	0. 000	0. 000	0. 000
17. 575	0. 4442	10067758.	20700.	-0. 003379	1565. 5539	9. 394E+11	0. 000	0. 000	0. 000
18. 050	0. 4251	10207792.	20700.	-0. 003317	1578. 4516	9. 394E+11	0. 000	0. 000	0. 000
18. 525	0. 4063	10347419.	20700.	-0. 003255	1591. 3117	9. 394E+11	0. 000	0. 000	0. 000
19. 000	0. 3880	10486632.	20700.	-0. 003192	1604. 1337	9. 394E+11	0. 000	0. 000	0. 000
19. 475	0. 3700	10625426.	20700.	-0. 003128	1616. 9172	9. 394E+11	0. 000	0. 000	0. 000
19. 950	0. 3523	10763796.	20700.	-0. 003063	1629. 6615	9. 394E+11	0. 000	0. 000	0. 000
20. 425	0. 3350	10901736.	20700.	-0. 002997	1642. 3663	9. 394E+11	0. 000	0. 000	0. 000
20. 900	0. 3181	11039240.	20700.	-0. 002931	1655. 0309	9. 394E+11	0. 000	0. 000	0. 000
21. 375	0. 3016	11176304.	20700.	-0. 002863	1667. 6549	9. 394E+11	0. 000	0. 000	0. 000
21. 850	0. 2855	11312921.	20700.	-0. 002795	1680. 2378	9. 394E+11	0. 000	0. 000	0. 000
22. 325	0. 2698	11449085.	20700.	-0. 002726	1692. 7791	9. 394E+11	0. 000	0. 000	0. 000
22. 800	0. 2544	11584793.	20700.	-0. 002656	1705. 2783	9. 394E+11	0. 000	0. 000	0. 000
23. 275	0. 2395	11720038.	20700.	-0. 002585	1717. 7348	9. 394E+11	0. 000	0. 000	0. 000
23. 750	0. 2250	11854815.	20700.	-0. 002514	1730. 1482	9. 394E+11	0. 000	0. 000	0. 000
24. 225	0. 2108	11989118.	20700.	-0. 002441	1742. 5180	9. 394E+11	0. 000	0. 000	0. 000
24. 700	0. 1971	12122942.	20700.	-0. 002368	1754. 8437	9. 394E+11	0. 000	0. 000	0. 000
25. 175	0. 1838	12256282.	20700.	-0. 002294	1767. 1247	9. 394E+11	0. 000	0. 000	0. 000
25. 650	0. 1710	12389132.	20700.	-0. 002220	1779. 3607	9. 394E+11	0. 000	0. 000	0. 000
26. 125	0. 1585	12521487.	20700.	-0. 002144	1791. 5511	9. 394E+11	0. 000	0. 000	0. 000
26. 600	0. 1465	12653342.	20700.	-0. 002068	1803. 6955	9. 394E+11	0. 000	0. 000	0. 000
27. 075	0. 1350	12784692.	20700.	-0. 001990	1815. 7932	9. 394E+11	0. 000	0. 000	0. 000
27. 550	0. 1238	12915531.	20700.	-0. 001913	1827. 8440	9. 394E+11	0. 000	0. 000	0. 000
28. 025	0. 1132	13045854.	20700.	-0. 001834	1839. 8472	9. 394E+11	0. 000	0. 000	0. 000
28. 500	0. 1029	13175656.	20700.	-0. 001754	1851. 8024	9. 394E+11	0. 000	0. 000	0. 000

IB3_B-6_Long_Scoured.l p7o									
28.975	0.0932	13304931.	20700.	-0.001674	1863.7091	9.394E+11	0.000	0.000	0.000
29.450	0.0838	13433675.	20700.	-0.001593	1875.5669	9.394E+11	0.000	0.000	0.000
29.925	0.0750	13561883.	20700.	-0.001511	1887.3752	9.394E+11	0.000	0.000	0.000
30.400	0.0666	13689548.	20700.	-0.001428	1899.1337	9.394E+11	0.000	0.000	0.000
30.875	0.0587	13816667.	20700.	-0.001345	1910.8418	9.394E+11	0.000	0.000	0.000
31.350	0.0513	13943234.	20700.	-0.001260	1922.4990	9.394E+11	0.000	0.000	0.000
31.825	0.0444	14069243.	20700.	-0.001175	1934.1050	9.394E+11	0.000	0.000	0.000
32.300	0.0379	14194691.	20700.	-0.001090	1945.6592	9.394E+11	0.000	0.000	0.000
32.775	0.0319	14319572.	20700.	-0.001003	1957.1611	9.394E+11	0.000	0.000	0.000
33.250	0.0265	14443881.	20700.	-0.000916	1968.6104	9.394E+11	0.000	0.000	0.000
33.725	0.0215	14567612.	20700.	-0.000828	1980.0065	9.394E+11	0.000	0.000	0.000
34.200	0.0170	14690762.	20700.	-0.000739	1991.3490	9.394E+11	0.000	0.000	0.000
34.675	0.0131	14813325.	20700.	-0.000650	2002.6375	9.394E+11	0.000	0.000	0.000
35.150	0.009613	14935296.	20700.	-0.000559	2013.8715	9.394E+11	0.000	0.000	0.000
35.625	0.006683	15056670.	20700.	-0.000468	2025.0505	9.394E+11	0.000	0.000	0.000
36.100	0.004273	15177443.	20700.	-0.000377	2036.1741	9.394E+11	0.000	0.000	0.000
36.575	0.002389	15297610.	-169236.	-0.000284	2047.2419	9.394E+11	-66644.	1.590E+08	0.000
37.050	0.001033	13251893.	-441327.	-0.000198	1858.8241	9.394E+11	-28826.	1.590E+08	0.000
37.525	0.000136	10269081.	-534300.	-0.000126	1584.0965	9.394E+11	-3795.8770	1.590E+08	0.000
38.000	-0.000406	7162531.	-512842.	-7.335E-05	1297.9722	9.394E+11	11325.	1.590E+08	0.000
38.475	-0.000700	4423649.	-424892.	-2.873E-05	1441.8499	5.506E+11	19535.	1.590E+08	0.000
38.950	-0.000733	2319142.	-310903.	6.173E-06	1152.5137	5.506E+11	20462.	1.590E+08	0.000
39.425	-0.000630	879278.	-202509.	2.273E-05	954.5554	5.506E+11	17571.	1.590E+08	0.000
39.900	-0.000474	10240.	-114717.	2.733E-05	835.0766	5.506E+11	13233.	1.590E+08	0.000
40.375	-0.000318	-428855.	-51700.	2.516E-05	892.6295	5.506E+11	8878.2071	1.590E+08	0.000
40.850	-0.000187	-579468.	-11493.	1.995E-05	913.3363	5.506E+11	5229.2928	1.590E+08	0.000
41.325	-9.084E-05	-560142.	10633.	1.405E-05	910.6793	5.506E+11	2534.2966	1.590E+08	0.000
41.800	-2.729E-05	-458438.	20026.	8.775E-06	896.6966	5.506E+11	761.4035	1.590E+08	0.000
42.275	9.205E-06	-331965.	21464.	4.684E-06	879.3086	5.506E+11	-256.8107	1.590E+08	0.000
42.750	2.611E-05	-213813.	18655.	1.860E-06	863.0646	5.506E+11	-728.5454	1.590E+08	0.000
43.225	3.041E-05	-119317.	14161.	1.355E-07	850.0730	5.506E+11	-848.3016	1.590E+08	0.000
43.700	2.766E-05	-52374.	9544.6189	-7.531E-07	840.8694	5.506E+11	-771.6382	1.590E+08	0.000
44.175	2.182E-05	-10499.	5610.4949	-1.079E-06	835.1121	5.506E+11	-608.7562	1.590E+08	0.000
44.650	1.536E-05	11599.	2654.0548	-1.073E-06	835.2635	5.506E+11	-428.5912	1.590E+08	0.000
45.125	9.589E-06	19772.	670.1346	-9.105E-07	836.3870	5.506E+11	-267.5211	1.590E+08	0.000
45.600	4.982E-06	19251.	-488.4479	-7.085E-07	836.3154	5.506E+11	-138.9991	1.590E+08	0.000
46.075	1.511E-06	14213.	-1004.7733	-5.353E-07	835.6228	5.506E+11	-42.1678	1.590E+08	0.000
46.550	-1.121E-06	7803.5176	-1035.8414	-4.214E-07	834.7416	5.506E+11	31.2667	1.590E+08	0.000
47.025	-3.292E-06	2409.6569	-684.9447	-3.685E-07	834.0000	5.506E+11	91.8550	1.590E+08	0.000
47.500	-5.322E-06	0.000	0.000	-3.560E-07	833.6687	5.506E+11	148.4765	79515000.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 2:

Pile-head deflection = 1.3914624 inches  
 Computed slope at pile head = -0.0056120 radians  
 Maximum bending moment = 15297610. inch-lbs  
 Maximum shear force = -534300. lbs  
 Depth of maximum bending moment = 36.5750000 feet below pile head  
 Depth of maximum shear force = 37.5250000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 3

-----  
 Pile-head Deflection vs. Pile Length for Load Case 2  
 -----



I B3\_B-6\_Long\_Scoured. I p7o

5. 225	0. 2901	677199.	10700.	-0. 001216	151. 5691	5. 506E+11	0. 000	0. 000	0. 000
5. 700	0. 2832	738749.	10700.	-0. 001209	160. 0313	5. 506E+11	0. 000	0. 000	0. 000
6. 175	0. 2763	800296.	10700.	-0. 001201	168. 4929	5. 506E+11	0. 000	0. 000	0. 000
6. 650	0. 2695	861838.	10700.	-0. 001193	176. 9541	5. 506E+11	0. 000	0. 000	0. 000
7. 125	0. 2627	923377.	10700.	-0. 001183	185. 4146	5. 506E+11	0. 000	0. 000	0. 000
7. 600	0. 2560	984911.	10700.	-0. 001173	193. 8746	5. 506E+11	0. 000	0. 000	0. 000
8. 075	0. 2493	1046440.	10700.	-0. 001163	202. 3339	5. 506E+11	0. 000	0. 000	0. 000
8. 550	0. 2427	1107965.	10700.	-0. 001152	210. 7925	5. 506E+11	0. 000	0. 000	0. 000
9. 025	0. 2362	1169484.	10700.	-0. 001140	219. 2504	5. 506E+11	0. 000	0. 000	0. 000
9. 500	0. 2297	1230997.	10700.	-0. 001128	227. 7076	5. 506E+11	0. 000	0. 000	0. 000
9. 975	0. 2234	1292505.	10700.	-0. 001115	236. 1639	5. 506E+11	0. 000	0. 000	0. 000
10. 450	0. 2170	1354007.	10700.	-0. 001104	169. 4711	9. 394E+11	0. 000	0. 000	0. 000
10. 925	0. 2108	1415504.	10700.	-0. 001095	175. 1353	9. 394E+11	0. 000	0. 000	0. 000
11. 400	0. 2046	1476998.	10700.	-0. 001087	180. 7991	9. 394E+11	0. 000	0. 000	0. 000
11. 875	0. 1984	1538488.	10700.	-0. 001077	186. 4625	9. 394E+11	0. 000	0. 000	0. 000
12. 350	0. 1923	1599973.	10700.	-0. 001068	192. 1255	9. 394E+11	0. 000	0. 000	0. 000
12. 825	0. 1862	1661454.	10700.	-0. 001058	197. 7881	9. 394E+11	0. 000	0. 000	0. 000
13. 300	0. 1802	1722930.	10700.	-0. 001048	203. 4503	9. 394E+11	0. 000	0. 000	0. 000
13. 775	0. 1743	1784401.	10700.	-0. 001037	209. 1120	9. 394E+11	0. 000	0. 000	0. 000
14. 250	0. 1684	1845867.	10700.	-0. 001026	214. 7733	9. 394E+11	0. 000	0. 000	0. 000
14. 725	0. 1626	1907329.	10700.	-0. 001015	220. 4341	9. 394E+11	0. 000	0. 000	0. 000
15. 200	0. 1568	1968784.	10700.	-0. 001003	226. 0944	9. 394E+11	0. 000	0. 000	0. 000
15. 675	0. 1511	2030235.	10700.	-0. 000991	231. 7542	9. 394E+11	0. 000	0. 000	0. 000
16. 150	0. 1455	2091679.	10700.	-0. 000978	237. 4134	9. 394E+11	0. 000	0. 000	0. 000
16. 625	0. 1400	2153118.	10700.	-0. 000965	243. 0721	9. 394E+11	0. 000	0. 000	0. 000
17. 100	0. 1345	2214551.	10700.	-0. 000952	248. 7303	9. 394E+11	0. 000	0. 000	0. 000
17. 575	0. 1291	2275977.	10700.	-0. 000939	254. 3879	9. 394E+11	0. 000	0. 000	0. 000
18. 050	0. 1238	2337397.	10700.	-0. 000925	260. 0449	9. 394E+11	0. 000	0. 000	0. 000
18. 525	0. 1186	2398811.	10700.	-0. 000910	265. 7013	9. 394E+11	0. 000	0. 000	0. 000
19. 000	0. 1135	2460218.	10700.	-0. 000895	271. 3571	9. 394E+11	0. 000	0. 000	0. 000
19. 475	0. 1084	2521618.	10700.	-0. 000880	277. 0123	9. 394E+11	0. 000	0. 000	0. 000
19. 950	0. 1034	2583010.	10700.	-0. 000865	282. 6668	9. 394E+11	0. 000	0. 000	0. 000
20. 425	0. 0985	2644396.	10700.	-0. 000849	288. 3206	9. 394E+11	0. 000	0. 000	0. 000
20. 900	0. 0937	2705774.	10700.	-0. 000833	293. 9738	9. 394E+11	0. 000	0. 000	0. 000
21. 375	0. 0890	2767145.	10700.	-0. 000816	299. 6262	9. 394E+11	0. 000	0. 000	0. 000
21. 850	0. 0844	2828508.	10700.	-0. 000799	305. 2780	9. 394E+11	0. 000	0. 000	0. 000
22. 325	0. 0799	2889863.	10700.	-0. 000782	310. 9290	9. 394E+11	0. 000	0. 000	0. 000
22. 800	0. 0755	2951210.	10700.	-0. 000764	316. 5792	9. 394E+11	0. 000	0. 000	0. 000
23. 275	0. 0712	3012548.	10700.	-0. 000746	322. 2288	9. 394E+11	0. 000	0. 000	0. 000
23. 750	0. 0670	3073879.	10700.	-0. 000727	327. 8775	9. 394E+11	0. 000	0. 000	0. 000
24. 225	0. 0629	3135200.	10700.	-0. 000709	333. 5254	9. 394E+11	0. 000	0. 000	0. 000
24. 700	0. 0589	3196513.	10700.	-0. 000689	339. 1725	9. 394E+11	0. 000	0. 000	0. 000
25. 175	0. 0551	3257817.	10700.	-0. 000670	344. 8188	9. 394E+11	0. 000	0. 000	0. 000
25. 650	0. 0513	3319112.	10700.	-0. 000650	350. 4643	9. 394E+11	0. 000	0. 000	0. 000
26. 125	0. 0477	3380397.	10700.	-0. 000630	356. 1089	9. 394E+11	0. 000	0. 000	0. 000
26. 600	0. 0441	3441673.	10700.	-0. 000609	361. 7526	9. 394E+11	0. 000	0. 000	0. 000
27. 075	0. 0407	3502939.	10700.	-0. 000588	367. 3955	9. 394E+11	0. 000	0. 000	0. 000
27. 550	0. 0374	3564196.	10700.	-0. 000566	373. 0374	9. 394E+11	0. 000	0. 000	0. 000
28. 025	0. 0343	3625442.	10700.	-0. 000545	378. 6784	9. 394E+11	0. 000	0. 000	0. 000
28. 500	0. 0312	3686679.	10700.	-0. 000522	384. 3185	9. 394E+11	0. 000	0. 000	0. 000
28. 975	0. 0283	3747905.	10700.	-0. 000500	389. 9577	9. 394E+11	0. 000	0. 000	0. 000
29. 450	0. 0255	3809120.	10700.	-0. 000477	395. 5958	9. 394E+11	0. 000	0. 000	0. 000
29. 925	0. 0229	3870325.	10700.	-0. 000454	401. 2330	9. 394E+11	0. 000	0. 000	0. 000
30. 400	0. 0203	3931519.	10700.	-0. 000430	406. 8692	9. 394E+11	0. 000	0. 000	0. 000
30. 875	0. 0180	3992702.	10700.	-0. 000406	412. 5044	9. 394E+11	0. 000	0. 000	0. 000
31. 350	0. 0157	4053874.	10700.	-0. 000381	418. 1385	9. 394E+11	0. 000	0. 000	0. 000
31. 825	0. 0136	4115034.	10700.	-0. 000357	423. 7716	9. 394E+11	0. 000	0. 000	0. 000
32. 300	0. 0117	4176183.	10700.	-0. 000332	429. 4036	9. 394E+11	0. 000	0. 000	0. 000
32. 775	0. 009837	4237320.	10700.	-0. 000306	435. 0346	9. 394E+11	0. 000	0. 000	0. 000
33. 250	0. 008166	4298446.	10700.	-0. 000280	440. 6645	9. 394E+11	0. 000	0. 000	0. 000



IB3_B-6_Long_Scoured.l p7o									
33.725	0.006644	4359559.	10700.	-0.000254	446.2932	9.394E+11	0.000	0.000	0.000
34.200	0.005272	4420660.	10700.	-0.000227	451.9208	9.394E+11	0.000	0.000	0.000
34.675	0.004054	4481749.	10700.	-0.000200	457.5473	9.394E+11	0.000	0.000	0.000
35.150	0.002990	4542825.	10700.	-0.000173	463.1727	9.394E+11	0.000	0.000	0.000
35.625	0.002084	4603888.	10700.	-0.000145	468.7968	9.394E+11	0.000	0.000	0.000
36.100	0.001336	4664939.	10700.	-0.000117	474.4198	9.394E+11	0.000	0.000	0.000
36.575	0.000751	4725976.	-48978.	-8.845E-05	480.0415	9.394E+11	-20940.	1.590E+08	0.000
37.050	0.000328	4106672.	-134745.	-6.165E-05	423.0014	9.394E+11	-9153.9951	1.590E+08	0.000
37.525	4.771E-05	3189943.	-164628.	-3.951E-05	338.5674	9.394E+11	-1331.1769	1.590E+08	0.000
38.000	-0.000122	2229955.	-158693.	-2.307E-05	250.1491	9.394E+11	3413.4422	1.590E+08	0.000
38.475	-0.000215	1380863.	-131847.	-9.157E-06	248.3117	5.506E+11	6006.2217	1.590E+08	0.000
38.950	-0.000227	726907.	-96701.	1.753E-06	158.4032	5.506E+11	6325.8292	1.590E+08	0.000
39.425	-0.000195	278474.	-63143.	6.956E-06	96.7508	5.506E+11	5448.8045	1.590E+08	0.000
39.900	-0.000147	7071.2949	-35891.	8.434E-06	59.4373	5.506E+11	4113.3566	1.590E+08	0.000
40.375	-9.915E-05	-130689.	-16284.	7.794E-06	76.4327	5.506E+11	2766.2680	1.590E+08	0.000
40.850	-5.858E-05	-178572.	-3742.1974	6.194E-06	83.0159	5.506E+11	1634.3186	1.590E+08	0.000
41.325	-2.854E-05	-173355.	3185.1616	4.372E-06	82.2987	5.506E+11	796.3337	1.590E+08	0.000
41.800	-8.736E-06	-142265.	6149.3318	2.739E-06	78.0243	5.506E+11	243.7260	1.590E+08	0.000
42.275	2.677E-06	-103256.	6631.0977	1.468E-06	72.6611	5.506E+11	-74.6853	1.590E+08	0.000
42.750	7.997E-06	-66672.	5782.3592	5.883E-07	67.6314	5.506E+11	-223.1177	1.590E+08	0.000
43.225	9.383E-06	-37337.	4400.3589	4.996E-08	63.5984	5.506E+11	-261.7947	1.590E+08	0.000
43.700	8.567E-06	-16508.	2973.0731	-2.287E-07	60.7347	5.506E+11	-239.0073	1.590E+08	0.000
44.175	6.776E-06	-3444.0138	1753.1253	-3.320E-07	58.9386	5.506E+11	-189.0445	1.590E+08	0.000
44.650	4.782E-06	3477.9339	834.1237	-3.318E-07	58.9432	5.506E+11	-133.4122	1.590E+08	0.000
45.125	2.993E-06	6065.3028	215.9090	-2.824E-07	59.2990	5.506E+11	-83.5052	1.590E+08	0.000
45.600	1.562E-06	5939.5576	-146.2923	-2.203E-07	59.2817	5.506E+11	-43.5829	1.590E+08	0.000
46.075	4.817E-07	4397.7742	-308.8029	-1.668E-07	59.0697	5.506E+11	-13.4383	1.590E+08	0.000
46.550	-3.393E-07	2419.3581	-320.1222	-1.315E-07	58.7977	5.506E+11	9.4667	1.590E+08	0.000
47.025	-1.018E-06	748.5025	-212.2337	-1.151E-07	58.5680	5.506E+11	28.3889	1.590E+08	0.000
47.500	-1.652E-06	0.000	0.000	-1.112E-07	58.4651	5.506E+11	46.0790	79515000.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 3:

Pile-head deflection = 0.3679890 inches  
 Computed slope at pile head = -0.0012550 radians  
 Maximum bending moment = 4725976. inch-lbs  
 Maximum shear force = -164628. lbs  
 Depth of maximum bending moment = 36.5750000 feet below pile head  
 Depth of maximum shear force = 37.5250000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 3

-----  
 Pile-head Deflection vs. Pile Length for Load Case 3  
 -----

Boundary Condition Type 1, Shear and Moment

Shear = 10700. lb  
 Moment = 0. in-lb  
 Axial Load = 81000. lb

Pile Length	Pile Head Deflection	Maximum Moment	Maximum Shear
-------------	----------------------	----------------	---------------



I B3\_B-6\_Long\_Scoured. I p7o

9. 975	0. 4777	2837583.	20700.	-0. 002396	1223. 7910	5. 506E+11	0. 000	0. 000	0. 000
10. 450	0. 4641	2971251.	20700.	-0. 002372	911. 9404	9. 394E+11	0. 000	0. 000	0. 000
10. 925	0. 4507	3104801.	20700.	-0. 002354	924. 2408	9. 394E+11	0. 000	0. 000	0. 000
11. 400	0. 4373	3238227.	20700.	-0. 002335	936. 5298	9. 394E+11	0. 000	0. 000	0. 000
11. 875	0. 4241	3371523.	20700.	-0. 002315	948. 8069	9. 394E+11	0. 000	0. 000	0. 000
12. 350	0. 4109	3504684.	20700.	-0. 002294	961. 0715	9. 394E+11	0. 000	0. 000	0. 000
12. 825	0. 3979	3637706.	20700.	-0. 002272	973. 3233	9. 394E+11	0. 000	0. 000	0. 000
13. 300	0. 3850	3770582.	20700.	-0. 002250	985. 5617	9. 394E+11	0. 000	0. 000	0. 000
13. 775	0. 3723	3903308.	20700.	-0. 002226	997. 7862	9. 394E+11	0. 000	0. 000	0. 000
14. 250	0. 3596	4035878.	20700.	-0. 002202	1009. 9963	9. 394E+11	0. 000	0. 000	0. 000
14. 725	0. 3472	4168286.	20700.	-0. 002177	1022. 1916	9. 394E+11	0. 000	0. 000	0. 000
15. 200	0. 3348	4300528.	20700.	-0. 002152	1034. 3716	9. 394E+11	0. 000	0. 000	0. 000
15. 675	0. 3226	4432599.	20700.	-0. 002125	1046. 5357	9. 394E+11	0. 000	0. 000	0. 000
16. 150	0. 3106	4564492.	20700.	-0. 002098	1058. 6836	9. 394E+11	0. 000	0. 000	0. 000
16. 625	0. 2987	4696203.	20700.	-0. 002070	1070. 8146	9. 394E+11	0. 000	0. 000	0. 000
17. 100	0. 2870	4827726.	20700.	-0. 002041	1082. 9283	9. 394E+11	0. 000	0. 000	0. 000
17. 575	0. 2754	4959056.	20700.	-0. 002011	1095. 0243	9. 394E+11	0. 000	0. 000	0. 000
18. 050	0. 2641	5090188.	20700.	-0. 001981	1107. 1021	9. 394E+11	0. 000	0. 000	0. 000
18. 525	0. 2529	5221117.	20700.	-0. 001950	1119. 1611	9. 394E+11	0. 000	0. 000	0. 000
19. 000	0. 2418	5351838.	20700.	-0. 001917	1131. 2009	9. 394E+11	0. 000	0. 000	0. 000
19. 475	0. 2310	5482344.	20700.	-0. 001885	1143. 2210	9. 394E+11	0. 000	0. 000	0. 000
19. 950	0. 2204	5612632.	20700.	-0. 001851	1155. 2210	9. 394E+11	0. 000	0. 000	0. 000
20. 425	0. 2099	5742695.	20700.	-0. 001816	1167. 2003	9. 394E+11	0. 000	0. 000	0. 000
20. 900	0. 1996	5872529.	20700.	-0. 001781	1179. 1584	9. 394E+11	0. 000	0. 000	0. 000
21. 375	0. 1896	6002128.	20700.	-0. 001745	1191. 0950	9. 394E+11	0. 000	0. 000	0. 000
21. 850	0. 1797	6131488.	20700.	-0. 001708	1203. 0095	9. 394E+11	0. 000	0. 000	0. 000
22. 325	0. 1701	6260602.	20700.	-0. 001671	1214. 9014	9. 394E+11	0. 000	0. 000	0. 000
22. 800	0. 1607	6389467.	20700.	-0. 001632	1226. 7703	9. 394E+11	0. 000	0. 000	0. 000
23. 275	0. 1515	6518076.	20700.	-0. 001593	1238. 6156	9. 394E+11	0. 000	0. 000	0. 000
23. 750	0. 1425	6646425.	20700.	-0. 001553	1250. 4370	9. 394E+11	0. 000	0. 000	0. 000
24. 225	0. 1338	6774509.	20700.	-0. 001513	1262. 2340	9. 394E+11	0. 000	0. 000	0. 000
24. 700	0. 1253	6902321.	20700.	-0. 001471	1274. 0060	9. 394E+11	0. 000	0. 000	0. 000
25. 175	0. 1170	7029858.	20700.	-0. 001429	1285. 7526	9. 394E+11	0. 000	0. 000	0. 000
25. 650	0. 1090	7157115.	20700.	-0. 001386	1297. 4733	9. 394E+11	0. 000	0. 000	0. 000
26. 125	0. 1012	7284085.	20700.	-0. 001342	1309. 1677	9. 394E+11	0. 000	0. 000	0. 000
26. 600	0. 0937	7410764.	20700.	-0. 001297	1320. 8354	9. 394E+11	0. 000	0. 000	0. 000
27. 075	0. 0864	7537147.	20700.	-0. 001252	1332. 4757	9. 394E+11	0. 000	0. 000	0. 000
27. 550	0. 0794	7663230.	20700.	-0. 001206	1344. 0883	9. 394E+11	0. 000	0. 000	0. 000
28. 025	0. 0727	7789006.	20700.	-0. 001159	1355. 6727	9. 394E+11	0. 000	0. 000	0. 000
28. 500	0. 0662	7914470.	20700.	-0. 001111	1367. 2285	9. 394E+11	0. 000	0. 000	0. 000
28. 975	0. 0600	8039619.	20700.	-0. 001063	1378. 7551	9. 394E+11	0. 000	0. 000	0. 000
29. 450	0. 0541	8164447.	20700.	-0. 001014	1390. 2522	9. 394E+11	0. 000	0. 000	0. 000
29. 925	0. 0485	8288948.	20700.	-0. 000964	1401. 7192	9. 394E+11	0. 000	0. 000	0. 000
30. 400	0. 0431	8413118.	20700.	-0. 000913	1413. 1558	9. 394E+11	0. 000	0. 000	0. 000
30. 875	0. 0381	8536953.	20700.	-0. 000862	1424. 5613	9. 394E+11	0. 000	0. 000	0. 000
31. 350	0. 0333	8660446.	20700.	-0. 000810	1435. 9355	9. 394E+11	0. 000	0. 000	0. 000
31. 825	0. 0288	8783593.	20700.	-0. 000757	1447. 2778	9. 394E+11	0. 000	0. 000	0. 000
32. 300	0. 0247	8906389.	20700.	-0. 000703	1458. 5878	9. 394E+11	0. 000	0. 000	0. 000
32. 775	0. 0208	9028830.	20700.	-0. 000649	1469. 8650	9. 394E+11	0. 000	0. 000	0. 000
33. 250	0. 0173	9150910.	20700.	-0. 000593	1481. 1090	9. 394E+11	0. 000	0. 000	0. 000
33. 725	0. 0140	9272624.	20700.	-0. 000538	1492. 3193	9. 394E+11	0. 000	0. 000	0. 000
34. 200	0. 0111	9393968.	20700.	-0. 000481	1503. 4955	9. 394E+11	0. 000	0. 000	0. 000
34. 675	0. 008565	9514937.	20700.	-0. 000424	1514. 6371	9. 394E+11	0. 000	0. 000	0. 000
35. 150	0. 006315	9635525.	20700.	-0. 000365	1525. 7437	9. 394E+11	0. 000	0. 000	0. 000
35. 625	0. 004399	9755729.	20700.	-0. 000307	1536. 8149	9. 394E+11	0. 000	0. 000	0. 000
36. 100	0. 002819	9875543.	20700.	-0. 000247	1547. 8502	9. 394E+11	0. 000	0. 000	0. 000
36. 575	0. 001582	9994962.	-105083.	-0. 000187	1558. 8492	9. 394E+11	-44134.	1. 590E+08	0. 000
37. 050	0. 000690	8680056.	-285733.	-0. 000130	1437. 7417	9. 394E+11	-19252.	1. 590E+08	0. 000
37. 525	9. 839E-05	6739317.	-348424.	-8. 335E-05	1258. 9926	9. 394E+11	-2744. 9669	1. 590E+08	0. 000
38. 000	-0. 000260	4709124.	-335560.	-4. 862E-05	1072. 0047	9. 394E+11	7258. 5035	1. 590E+08	0. 000

IB3_B-6_Long_Scoured.l p7o										
38.475	-0.000456	2914572.	-278628.	-1.924E-05	1234.3758	5.506E+11	12718.	1.590E+08	0.000	
38.950	-0.000480	1533023.	-204251.	3.776E-06	1044.4349	5.506E+11	13379.	1.590E+08	0.000	
39.425	-0.000413	586058.	-133298.	1.474E-05	914.2424	5.506E+11	11517.	1.590E+08	0.000	
39.900	-0.000311	13236.	-75709.	1.785E-05	835.4886	5.506E+11	8689.7824	1.590E+08	0.000	
40.375	-0.000209	-277255.	-34296.	1.648E-05	871.7869	5.506E+11	5840.9198	1.590E+08	0.000	
40.850	-0.000124	-377957.	-7821.3727	1.309E-05	885.6317	5.506E+11	3448.4737	1.590E+08	0.000	
41.325	-6.015E-05	-366591.	6789.6991	9.234E-06	884.0692	5.506E+11	1678.2182	1.590E+08	0.000	
41.800	-1.833E-05	-300676.	13030.	5.781E-06	875.0068	5.506E+11	511.4437	1.590E+08	0.000	
42.275	5.748E-06	-218123.	14031.	3.095E-06	863.6571	5.506E+11	-160.3598	1.590E+08	0.000	
42.750	1.696E-05	-140765.	12225.	1.238E-06	853.0217	5.506E+11	-473.0906	1.590E+08	0.000	
43.225	1.986E-05	-78768.	9298.0131	1.017E-07	844.4981	5.506E+11	-554.0947	1.590E+08	0.000	
43.700	1.812E-05	-34769.	6278.3654	-4.860E-07	838.4489	5.506E+11	-505.4308	1.590E+08	0.000	
44.175	1.432E-05	-7188.5734	3699.2264	-7.031E-07	834.6571	5.506E+11	-399.5303	1.590E+08	0.000	
44.650	1.010E-05	7411.5210	1757.4462	-7.020E-07	834.6877	5.506E+11	-281.7961	1.590E+08	0.000	
45.125	6.318E-06	12856.	451.9790	-5.971E-07	835.4362	5.506E+11	-176.2626	1.590E+08	0.000	
45.600	3.294E-06	12572.	-312.2616	-4.655E-07	835.3972	5.506E+11	-91.8920	1.590E+08	0.000	
46.075	1.011E-06	9301.9027	-654.5727	-3.523E-07	834.9476	5.506E+11	-28.2172	1.590E+08	0.000	
46.550	-7.220E-07	5114.4523	-677.5789	-2.776E-07	834.3719	5.506E+11	20.1448	1.590E+08	0.000	
47.025	-2.154E-06	1581.1591	-448.9168	-2.430E-07	833.8861	5.506E+11	60.0875	1.590E+08	0.000	
47.500	-3.492E-06	0.000	0.000	-2.348E-07	833.6687	5.506E+11	97.4272	79515000.	0.000	

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 4:

Pile-head deflection = 0.7892285 inches  
 Computed slope at pile head = -0.0027053 radians  
 Maximum bending moment = 9994962. inch-lbs  
 Maximum shear force = -348424. lbs  
 Depth of maximum bending moment = 36.5750000 feet below pile head  
 Depth of maximum shear force = 37.5250000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 3

-----  
 Pile-head Deflection vs. Pile Length for Load Case 4  
 -----

Boundary Condition Type 1, Shear and Moment

Shear = 20700. lb  
 Moment = 0. in-lb  
 Axial Load = 1155000. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment in-lbs	Maximum Shear lbs
47.5000	0.7892285	9994962.	-348424.
45.1250	0.7886214	9988320.	-348697.
42.7500	0.8090448	10064846.	-366070.
40.3750	0.8040857	10053246.	-365506.
40.3750	0.000000	19172619644.	-1978598463.
40.3750	0.000000	19172619644.	-1978598463.
40.3750	0.000000	19172619644.	-1978598463.
40.3750	0.000000	19172619644.	-1978598463.

40.3750	0.000000	19172619644.	-1978598463.
40.3750	0.000000	19172619644.	-1978598463.
40.3750	0.000000	19172619644.	-1978598463.
40.3750	0.000000	19172619644.	-1978598463.
40.3750	0.000000	19172619644.	-1978598463.
40.3750	0.000000	19172619644.	-1978598463.
40.3750	0.000000	19172619644.	-1978598463.
40.3750	0.000000	19172619644.	-1978598463.
40.3750	0.000000	19172619644.	-1978598463.
40.3750	0.000000	19172619644.	-1978598463.
40.3750	0.000000	19172619644.	-1978598463.
40.3750	0.000000	19172619644.	-1978598463.
40.3750	0.000000	19172619644.	-1978598463.
40.3750	0.000000	19172619644.	-1978598463.
40.3750	0.000000	19172619644.	-1978598463.

-----  
 Summary of Pile Response(s)  
 -----

Defi ni ti ons of Pile-head Loading Condi ti ons:

- Load Type 1: Load 1 = Shear, lbs, and Load 2 = Moment, in-lbs
- Load Type 2: Load 1 = Shear, lbs, and Load 2 = Slope, radians
- Load Type 3: Load 1 = Shear, lbs, and Load 2 = Rotational Sti ffness, in-lbs/radian
- Load Type 4: Load 1 = Top Deflection, inches, and Load 2 = Moment, in-lbs
- Load Type 5: Load 1 = Top Deflection, inches, and Load 2 = Slope, radians

Load Case No.	Load Type No.	Pile-head Condition 1 V(lbs) or y(inches)	Pile-head Condition 2 in-lb, rad., or in-lb/rad.	Axial Loading lbs	Pile-head Deflection inches	Maximum Moment in Pile in-lbs	Maximum Shear in Pile lbs	Pile-head Rotation radians
1	1	V = 10700.	M = 2616000.	810000.	0.72400543	7897676.	-275823.	-0.00295438
2	1	V = 20700.	M = 4608000.	1155000.	1.39146235	15297610.	-534300.	-0.00561200
3	1	V = 10700.	M = 0.000	81000.	0.36798901	4725976.	-164628.	-0.00125501
4	1	V = 20700.	M = 0.000	1155000.	0.78922852	9994962.	-348424.	-0.00270535

-----  
 Summary of Warning Messages  
 -----

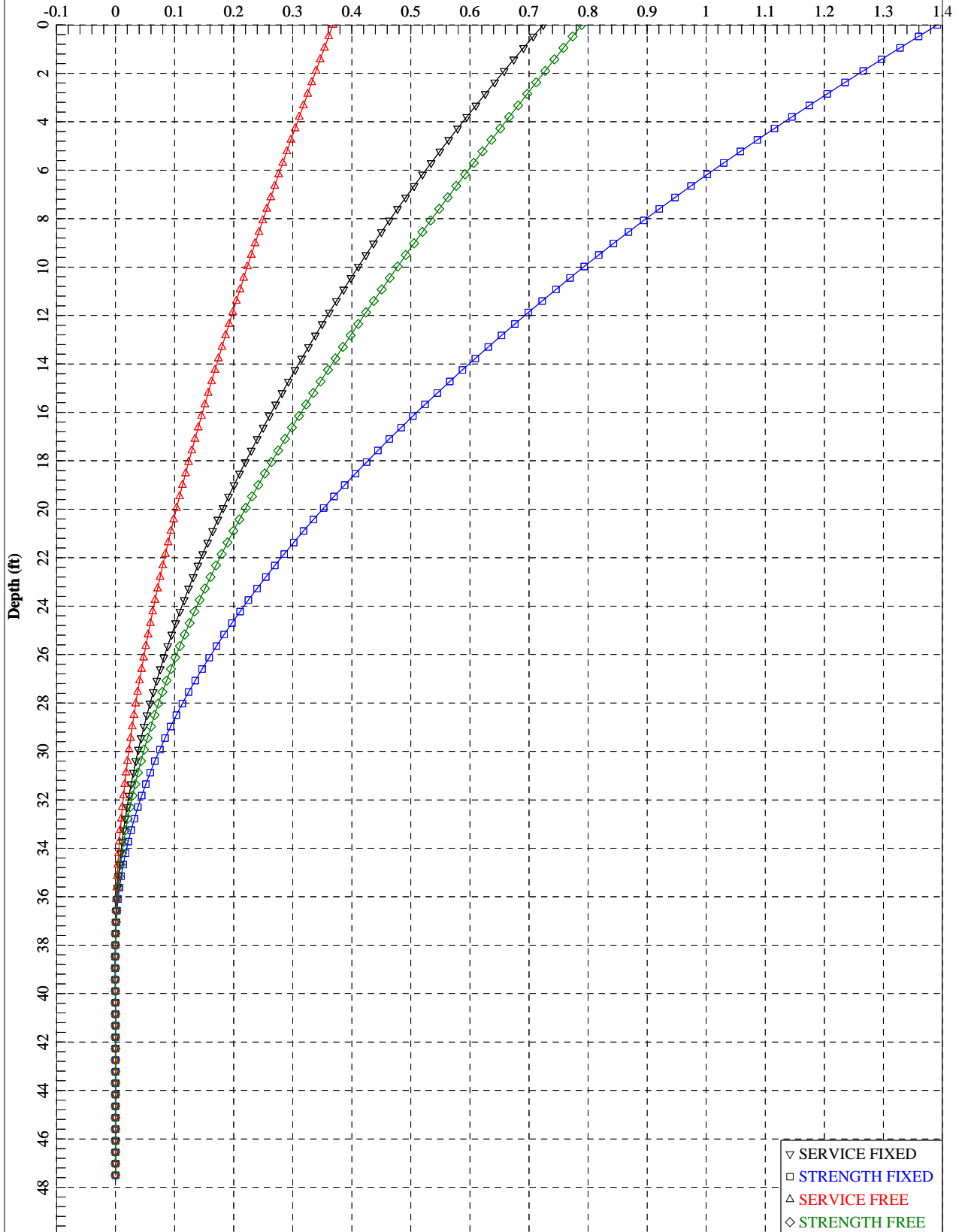
The following warning was reported 4000 times

\*\*\*\* Warning \*\*\*\*

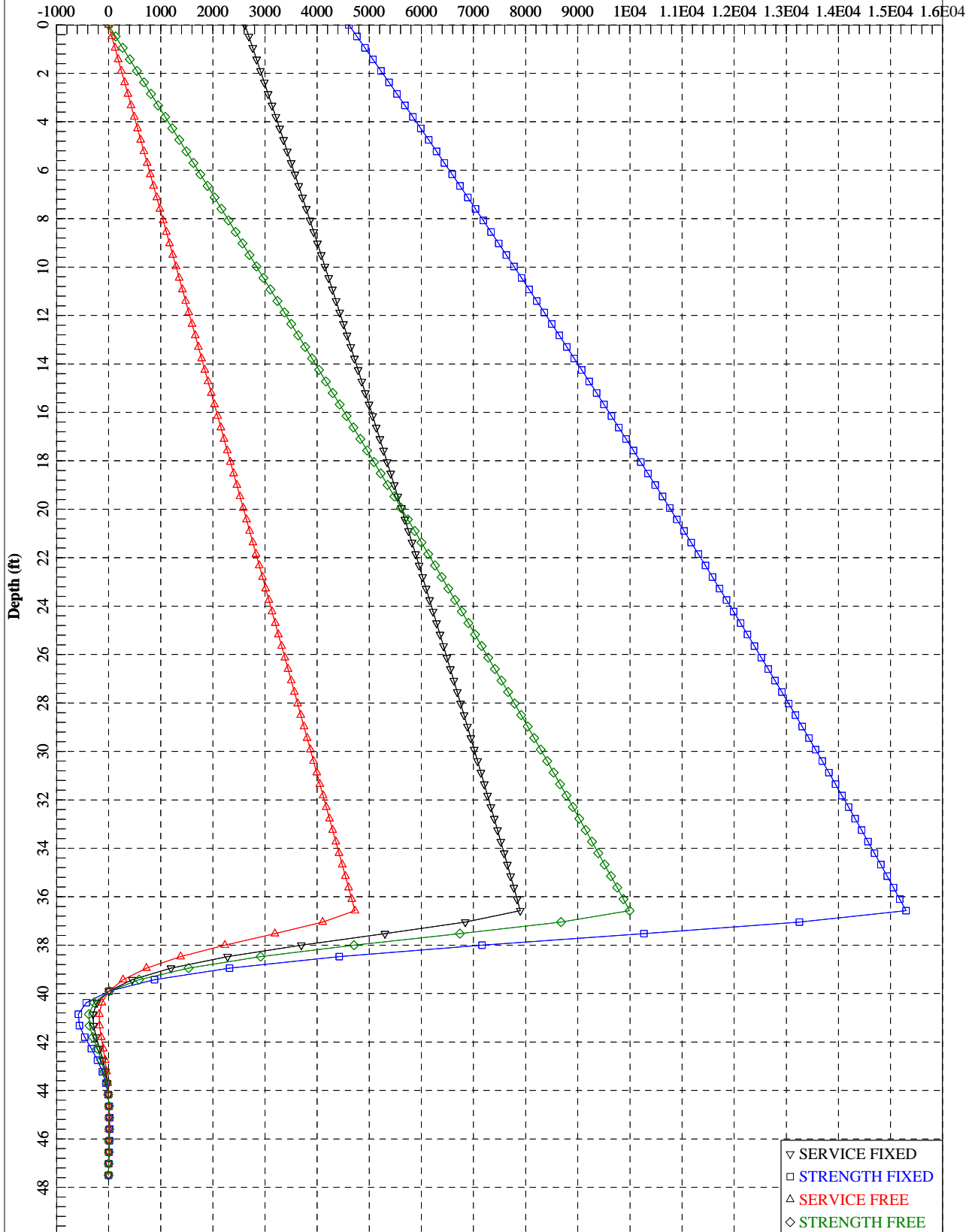
An unreasonable input value for uniaxial compressive strength has been specified for a soil defined using the vuggy limestone criteria. The input value is outside of the range of 1,000 to 2,500 psi (6,895 to 17,237 kPa). You should check your input data for correctness.

The analysis ended normally.

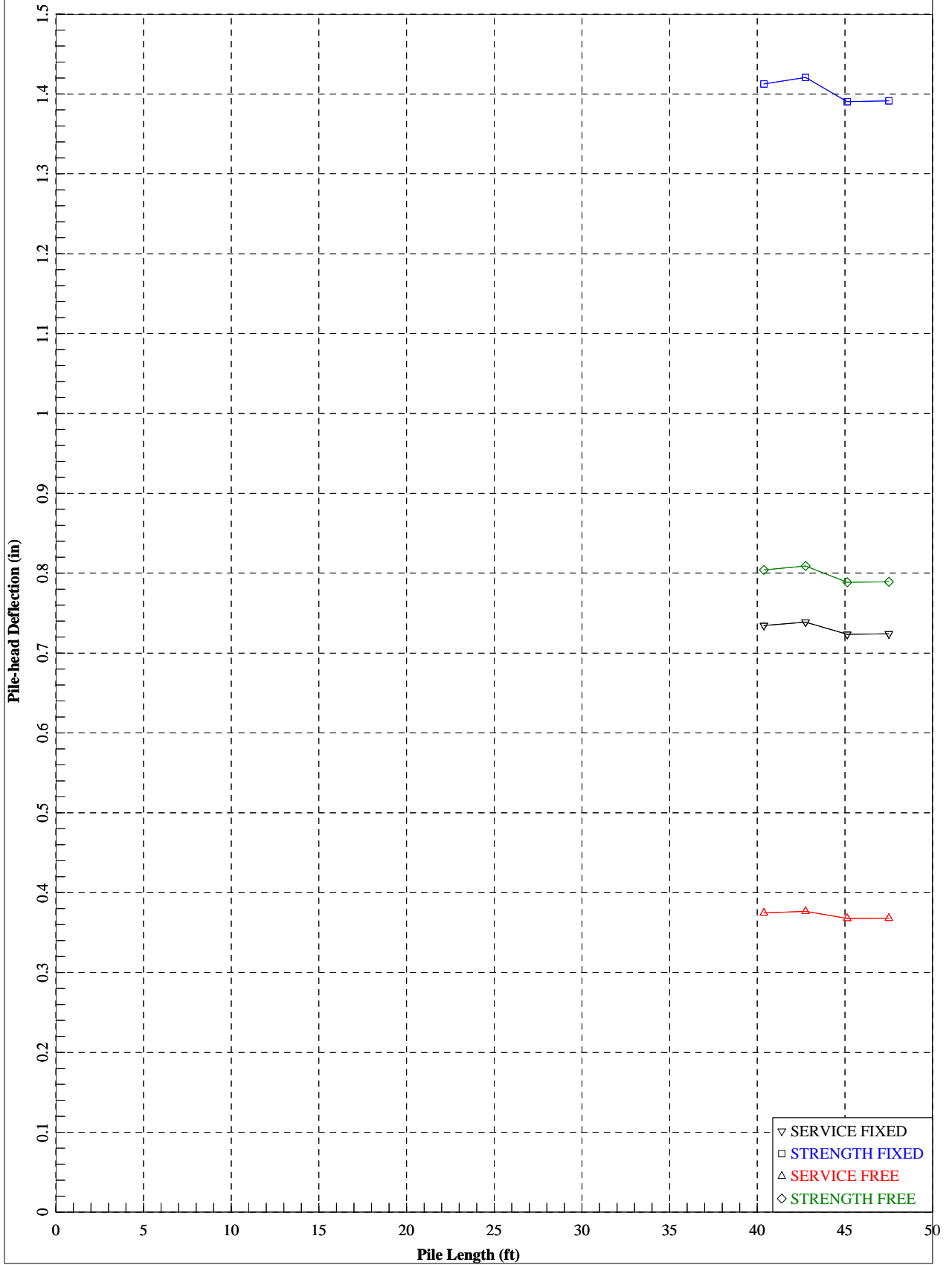
SC 557 Bridge over Crowders Creek - IB3 - Boring B-6 - 48" Dia. Drilled Shaft - Scoured Longitudinal Analysis  
Lateral Pile Deflection (inches)



SC 557 Bridge over Crowders Creek - IB3 - Boring B-6 - 48" Dia. Drilled Shaft - Scoured Longitudinal Analysis  
Bending Moment (in-kips)



SC 557 Bridge over Crowders Creek - IB3 - Boring B-6 - 48" Dia. Drilled Shaft - Scoured Longitudinal Analysis





=====  
LPile Plus for Windows, Version 2013-07.007

Analysis of Individual Piles and Drilled Shafts  
Subjected to Lateral Loading Using the p-y Method

© 1985-2013 by Ensoft, Inc.  
All Rights Reserved

=====  
This copy of LPile is used by:

Bradley Fischer  
F&ME

Serial Number of Security Device: 291490957

This copy of LPile is licensed for exclusive use by: F&ME Consultants, Columbia, Sout

Use of this program by any entity other than F&ME Consultants, Columbia, Sout  
is forbidden by the software license agreement.

-----  
Files Used for Analysis  
-----

Path to file locations: P:\Geotechnical\G4800's\G4843 - SC557 - York County\Report\Final\Bridge\LPile\  
Name of input data file: IB3\_B-6\_Trans\_Scoured.lp7d  
Name of output report file: IB3\_B-6\_Trans\_Scoured.lp7o  
Name of plot output file: IB3\_B-6\_Trans\_Scoured.lp7p  
Name of runtime message file: IB3\_B-6\_Trans\_Scoured.lp7r

-----  
Date and Time of Analysis  
-----

Date: July 31, 2018 Time: 9:18:01

-----  
Problem Title  
-----

Project Name: SC 557 over Crowders Creek

Job Number: G4843

Client: CALYX

Engineer: JFH

Description: IB3 - Boring B-6 - 48" Dia. Drilled Shaft - Scoured Trans.

-----  
 Program Options and Settings  
 -----

Engineering Units of Input Data and Computations:

- Engineering units are US Customary Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

Computational Options:

- Use unfactored loads in computations (conventional analysis)
- Compute pile response under loading and nonlinear bending properties of pile (only if nonlinear pile properties are input)
- Analysis uses p-y modification factors for p-y curves
- Analysis includes loading by lateral soil movements acting on pile
- Input of shear resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- No p-y curves to be computed and reported for user-specified depths
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1

-----  
 Pile Structural Properties and Geometry  
 -----

- Total number of pile sections = 3
- Total length of pile = 47.50 ft
- Depth of ground surface below top of pile = 36.50 ft

Pile diameter values used for p-y curve computations are defined using 6 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile.

Point	Depth X ft	Pile Diameter in
1	0.00000	42.0000000
2	10.000000	42.0000000
3	10.000000	48.0000000
4	38.000000	48.0000000

5	38.000000	42.0000000
6	47.500000	42.0000000

-----  
Input Structural Properties:  
-----

Pile Section No. 1:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Circular
Section Length	=	10.00000 ft
Top Width	=	42.00000 in
Bottom Width	=	42.00000 in
Top Area	=	1385.44236 Sq. in
Bottom Area	=	1385.44236 Sq. in
Moment of Inertia at Top	=	152745. in^4
Moment of Inertia at Bottom	=	152745. in^4
Elastic Modulus	=	3605000. lbs/in^2

Pile Section No. 2:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Circular
Section Length	=	28.00000 ft
Top Width	=	48.00000 in
Bottom Width	=	48.00000 in
Top Area	=	1809.55737 Sq. in
Bottom Area	=	1809.55737 Sq. in
Moment of Inertia at Top	=	260576. in^4
Moment of Inertia at Bottom	=	260576. in^4
Elastic Modulus	=	3605000. lbs/in^2

Pile Section No. 3:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Circular
Section Length	=	9.50000 ft
Top Width	=	42.00000 in
Bottom Width	=	42.00000 in
Top Area	=	1385.44236 Sq. in
Bottom Area	=	1385.44236 Sq. in
Moment of Inertia at Top	=	152745. in^4
Moment of Inertia at Bottom	=	152745. in^4
Elastic Modulus	=	3605000. lbs/in^2

-----  
Ground Slope and Pile Batter Angles  
-----

Ground Slope Angle	=	0.000 degrees
	=	0.000 radians
Pile Batter Angle	=	0.000 degrees
	=	0.000 radians

-----  
Soil and Rock Layering Information  
-----

The soil profile is modelled using 1 layers

Layer 1 is strong rock (vuggy limestone)

Distance from top of pile to top of layer = 36.50000 ft  
 Distance from top of pile to bottom of layer = 60.00000 ft  
 Effective unit weight at top of layer = 98.00000 pcf  
 Effective unit weight at bottom of layer = 98.00000 pcf  
 Uniaxial compressive strength at top of layer = 30000. psi  
 Uniaxial compressive strength at bottom of layer = 30000. psi

(Depth of lowest soil layer extends 12.50 ft below pile tip)

Summary of Soil Properties

Layer Num.	Layer Soil Type (p-y Curve Criteria)	Layer Depth ft	Effective Unit Wt. pcf	Uniaxial qu psi
1	Vuggy Limestone	36.500 60.000	98.000 98.000	30000. 30000.

p-y Modification Factors for Group Action

Distribution of p-y modifiers with depth defined using 2 points

Point No.	Depth X ft	p-mult	y-mult
1	36.500	1.0000	1.0000
2	100.000	1.0000	1.0000

Lateral Soil Movements

Profile of soil movement with depth defined using 2 points

Point No.	Depth X ft	Soil Movement in
1	0.00000	0.00000
2	0.00000	0.00000

Loading Type

-----  
 Static loading criteria were used when computing p-y curves for all analyses.

-----  
 Pile-head Loading and Pile-head Fixity Conditions  
 -----

Number of loads specified = 4

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length
1	1	V = 16800. lbs	M = 1404000. in-lbs	0.000000	Yes
2	1	V = 15600. lbs	M = 1368000. in-lbs	0.000000	Yes
3	2	V = 16800. lbs	S = 0.0000 in/in	810000.	Yes
4	2	V = 15600. lbs	S = 0.0000 in/in	1155000.	Yes

V = perpendicular shear force applied to pile head  
 M = bending moment applied to pile head  
 y = lateral deflection relative to pile axis  
 S = pile slope relative to original pile batter angle  
 R = rotational stiffness applied to pile head  
 Axial thrust is assumed to be acting axially for all pile batter angles.

-----  
 Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness  
 -----

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 3

Pile Section No. 1:  
 -----

Moment-curvature properties were derived from elastic section properties

Pile Section No. 2:  
 -----

Moment-curvature properties were derived from elastic section properties

Pile Section No. 3:  
 -----

Moment-curvature properties were derived from elastic section properties

-----  
 Computed Values of Pile Loading and Deflection  
 for Lateral Loading for Load Case Number 1  
 -----

Pile-head conditions are Shear and Moment (Loading Type 1)

I B3\_B-6\_Trans\_Scoured. I p7o

Shear force at pile head = 16800.0 lbs  
 Applied moment at pile head = 1404000.0 in-lbs  
 Axial thrust load on pile head = 0.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi *	Bending Stiffness lb-in^2	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.7353	1404000.	16800.	-0.002763	193.0276	5.506E+11	0.000	0.000	0.000
0.475	0.7196	1499760.	16800.	-0.002748	206.1930	5.506E+11	0.000	0.000	0.000
0.950	0.7039	1595520.	16800.	-0.002732	219.3585	5.506E+11	0.000	0.000	0.000
1.425	0.6884	1691280.	16800.	-0.002715	232.5240	5.506E+11	0.000	0.000	0.000
1.900	0.6730	1787040.	16800.	-0.002697	245.6894	5.506E+11	0.000	0.000	0.000
2.375	0.6577	1882800.	16800.	-0.002678	258.8549	5.506E+11	0.000	0.000	0.000
2.850	0.6425	1978560.	16800.	-0.002658	272.0204	5.506E+11	0.000	0.000	0.000
3.325	0.6274	2074320.	16800.	-0.002637	285.1859	5.506E+11	0.000	0.000	0.000
3.800	0.6124	2170080.	16800.	-0.002615	298.3513	5.506E+11	0.000	0.000	0.000
4.275	0.5976	2265840.	16800.	-0.002592	311.5168	5.506E+11	0.000	0.000	0.000
4.750	0.5829	2361600.	16800.	-0.002568	324.6823	5.506E+11	0.000	0.000	0.000
5.225	0.5683	2457360.	16800.	-0.002543	337.8477	5.506E+11	0.000	0.000	0.000
5.700	0.5539	2553120.	16800.	-0.002517	351.0132	5.506E+11	0.000	0.000	0.000
6.175	0.5396	2648880.	16800.	-0.002490	364.1787	5.506E+11	0.000	0.000	0.000
6.650	0.5255	2744640.	16800.	-0.002462	377.3442	5.506E+11	0.000	0.000	0.000
7.125	0.5115	2840400.	16800.	-0.002433	390.5096	5.506E+11	0.000	0.000	0.000
7.600	0.4978	2936160.	16800.	-0.002403	403.6751	5.506E+11	0.000	0.000	0.000
8.075	0.4841	3031920.	16800.	-0.002372	416.8406	5.506E+11	0.000	0.000	0.000
8.550	0.4707	3127680.	16800.	-0.002341	430.0060	5.506E+11	0.000	0.000	0.000
9.025	0.4575	3223440.	16800.	-0.002308	443.1715	5.506E+11	0.000	0.000	0.000
9.500	0.4444	3319200.	16800.	-0.002274	456.3370	5.506E+11	0.000	0.000	0.000
9.975	0.4315	3414960.	16800.	-0.002239	469.5024	5.506E+11	0.000	0.000	0.000
10.450	0.4189	3510720.	16800.	-0.002211	323.3498	9.394E+11	0.000	0.000	0.000
10.925	0.4063	3606480.	16800.	-0.002189	332.1696	9.394E+11	0.000	0.000	0.000
11.400	0.3939	3702240.	16800.	-0.002167	340.9895	9.394E+11	0.000	0.000	0.000
11.875	0.3816	3798000.	16800.	-0.002144	349.8093	9.394E+11	0.000	0.000	0.000
12.350	0.3695	3893760.	16800.	-0.002121	358.6291	9.394E+11	0.000	0.000	0.000
12.825	0.3575	3989520.	16800.	-0.002097	367.4490	9.394E+11	0.000	0.000	0.000
13.300	0.3456	4085280.	16800.	-0.002072	376.2688	9.394E+11	0.000	0.000	0.000
13.775	0.3338	4181040.	16800.	-0.002047	385.0886	9.394E+11	0.000	0.000	0.000
14.250	0.3222	4276800.	16800.	-0.002022	393.9085	9.394E+11	0.000	0.000	0.000
14.725	0.3108	4372560.	16800.	-0.001995	402.7283	9.394E+11	0.000	0.000	0.000
15.200	0.2995	4468320.	16800.	-0.001969	411.5482	9.394E+11	0.000	0.000	0.000
15.675	0.2884	4564080.	16800.	-0.001941	420.3680	9.394E+11	0.000	0.000	0.000
16.150	0.2774	4659840.	16800.	-0.001913	429.1878	9.394E+11	0.000	0.000	0.000
16.625	0.2665	4755600.	16800.	-0.001885	438.0077	9.394E+11	0.000	0.000	0.000
17.100	0.2559	4851360.	16800.	-0.001855	446.8275	9.394E+11	0.000	0.000	0.000
17.575	0.2454	4947120.	16800.	-0.001826	455.6473	9.394E+11	0.000	0.000	0.000
18.050	0.2351	5042880.	16800.	-0.001795	464.4672	9.394E+11	0.000	0.000	0.000
18.525	0.2249	5138640.	16800.	-0.001764	473.2870	9.394E+11	0.000	0.000	0.000
19.000	0.2150	5234400.	16800.	-0.001733	482.1068	9.394E+11	0.000	0.000	0.000
19.475	0.2052	5330160.	16800.	-0.001701	490.9267	9.394E+11	0.000	0.000	0.000
19.950	0.1956	5425920.	16800.	-0.001668	499.7465	9.394E+11	0.000	0.000	0.000
20.425	0.1861	5521680.	16800.	-0.001635	508.5664	9.394E+11	0.000	0.000	0.000
20.900	0.1769	5617440.	16800.	-0.001601	517.3862	9.394E+11	0.000	0.000	0.000
21.375	0.1679	5713200.	16800.	-0.001567	526.2060	9.394E+11	0.000	0.000	0.000
21.850	0.1591	5808960.	16800.	-0.001532	535.0259	9.394E+11	0.000	0.000	0.000
22.325	0.1504	5904720.	16800.	-0.001496	543.8457	9.394E+11	0.000	0.000	0.000
22.800	0.1420	6000480.	16800.	-0.001460	552.6655	9.394E+11	0.000	0.000	0.000
23.275	0.1338	6096240.	16800.	-0.001424	561.4854	9.394E+11	0.000	0.000	0.000
23.750	0.1258	6192000.	16800.	-0.001386	570.3052	9.394E+11	0.000	0.000	0.000

IB3\_B-6\_Trans\_Scored.l p7o

24. 225	0. 1180	6287760.	16800.	-0. 001348	579. 1250	9. 394E+11	0. 000	0. 000	0. 000
24. 700	0. 1104	6383520.	16800.	-0. 001310	587. 9449	9. 394E+11	0. 000	0. 000	0. 000
25. 175	0. 1030	6479280.	16800.	-0. 001271	596. 7647	9. 394E+11	0. 000	0. 000	0. 000
25. 650	0. 0959	6575040.	16800.	-0. 001231	605. 5846	9. 394E+11	0. 000	0. 000	0. 000
26. 125	0. 0890	6670800.	16800.	-0. 001191	614. 4044	9. 394E+11	0. 000	0. 000	0. 000
26. 600	0. 0823	6766560.	16800.	-0. 001150	623. 2242	9. 394E+11	0. 000	0. 000	0. 000
27. 075	0. 0759	6862320.	16800.	-0. 001109	632. 0441	9. 394E+11	0. 000	0. 000	0. 000
27. 550	0. 0697	6958080.	16800.	-0. 001067	640. 8639	9. 394E+11	0. 000	0. 000	0. 000
28. 025	0. 0637	7053840.	16800.	-0. 001025	649. 6837	9. 394E+11	0. 000	0. 000	0. 000
28. 500	0. 0580	7149600.	16800.	-0. 000982	658. 5036	9. 394E+11	0. 000	0. 000	0. 000
28. 975	0. 0525	7245360.	16800.	-0. 000938	667. 3234	9. 394E+11	0. 000	0. 000	0. 000
29. 450	0. 0473	7341120.	16800.	-0. 000894	676. 1432	9. 394E+11	0. 000	0. 000	0. 000
29. 925	0. 0423	7436880.	16800.	-0. 000849	684. 9631	9. 394E+11	0. 000	0. 000	0. 000
30. 400	0. 0376	7532640.	16800.	-0. 000803	693. 7829	9. 394E+11	0. 000	0. 000	0. 000
30. 875	0. 0332	7628400.	16800.	-0. 000757	702. 6028	9. 394E+11	0. 000	0. 000	0. 000
31. 350	0. 0290	7724160.	16800.	-0. 000711	711. 4226	9. 394E+11	0. 000	0. 000	0. 000
31. 825	0. 0251	7819920.	16800.	-0. 000664	720. 2424	9. 394E+11	0. 000	0. 000	0. 000
32. 300	0. 0214	7915680.	16800.	-0. 000616	729. 0623	9. 394E+11	0. 000	0. 000	0. 000
32. 775	0. 0181	8011440.	16800.	-0. 000568	737. 8821	9. 394E+11	0. 000	0. 000	0. 000
33. 250	0. 0150	8107200.	16800.	-0. 000519	746. 7019	9. 394E+11	0. 000	0. 000	0. 000
33. 725	0. 0121	8202960.	16800.	-0. 000469	755. 5218	9. 394E+11	0. 000	0. 000	0. 000
34. 200	0. 009616	8298720.	16800.	-0. 000419	764. 3416	9. 394E+11	0. 000	0. 000	0. 000
34. 675	0. 007370	8394480.	16800.	-0. 000369	773. 1615	9. 394E+11	0. 000	0. 000	0. 000
35. 150	0. 005415	8490240.	16800.	-0. 000317	781. 9813	9. 394E+11	0. 000	0. 000	0. 000
35. 625	0. 003753	8586000.	16800.	-0. 000265	790. 8011	9. 394E+11	0. 000	0. 000	0. 000
36. 100	0. 002388	8681760.	16800.	-0. 000213	799. 6210	9. 394E+11	0. 000	0. 000	0. 000
36. 575	0. 001324	8777520.	-96379.	-0. 000160	808. 4408	9. 394E+11	-39712.	1. 710E+08	0. 000
37. 050	0. 000563	7583038.	-257684.	-0. 000110	698. 4247	9. 394E+11	-16886.	1. 710E+08	0. 000
37. 525	6. 430E-05	5839918.	-311308.	-6. 975E-05	537. 8772	9. 394E+11	-1928. 8955	1. 710E+08	0. 000
38. 000	-0. 000232	4034128.	-296943.	-3. 980E-05	371. 5576	9. 394E+11	6969. 0475	1. 710E+08	0. 000
38. 475	-0. 000389	2454763.	-243790.	-1. 485E-05	337. 4907	5. 506E+11	11681.	1. 710E+08	0. 000
38. 950	-0. 000402	1254919.	-176162.	4. 349E-06	172. 5314	5. 506E+11	12048.	1. 710E+08	0. 000
39. 425	-0. 000340	446518.	-112773.	1. 316E-05	61. 3891	5. 506E+11	10194.	1. 710E+08	0. 000
39. 900	-0. 000252	-30689.	-62206.	1. 531E-05	4. 2192	5. 506E+11	7548. 9270	1. 710E+08	0. 000
40. 375	-0. 000165	-262632.	-26560.	1. 379E-05	36. 1077	5. 506E+11	4958. 4672	1. 710E+08	0. 000
40. 850	-9. 443E-05	-333474.	-4354. 6908	1. 070E-05	45. 8473	5. 506E+11	2832. 8925	1. 710E+08	0. 000
41. 325	-4. 325E-05	-312275.	7417. 2155	7. 362E-06	42. 9328	5. 506E+11	1297. 6009	1. 710E+08	0. 000
41. 800	-1. 050E-05	-248917.	12013.	4. 457E-06	34. 2222	5. 506E+11	315. 0685	1. 710E+08	0. 000
42. 275	7. 562E-06	-175323.	12265.	2. 262E-06	24. 1041	5. 506E+11	-226. 8543	1. 710E+08	0. 000
42. 750	1. 528E-05	-109100.	10312.	7. 896E-07	14. 9994	5. 506E+11	-458. 4368	1. 710E+08	0. 000
43. 225	1. 656E-05	-57770.	7588. 9386	-7. 406E-08	7. 9425	5. 506E+11	-496. 9019	1. 710E+08	0. 000
43. 700	1. 444E-05	-22586.	4938. 4123	-4. 900E-07	3. 1052	5. 506E+11	-433. 1074	1. 710E+08	0. 000
44. 175	1. 098E-05	-1472. 4895	2765. 4545	-6. 145E-07	0. 2024	5. 506E+11	-329. 3340	1. 710E+08	0. 000
44. 650	7. 432E-06	8940. 5701	1191. 4331	-5. 758E-07	1. 2292	5. 506E+11	-222. 9542	1. 710E+08	0. 000
45. 125	4. 413E-06	12110.	178. 6735	-4. 669E-07	1. 6649	5. 506E+11	-132. 4001	1. 710E+08	0. 000
45. 600	2. 109E-06	10977.	-379. 0196	-3. 474E-07	1. 5092	5. 506E+11	-63. 2817	1. 710E+08	0. 000
46. 075	4. 532E-07	7789. 0248	-598. 1168	-2. 503E-07	1. 0709	5. 506E+11	-13. 5945	1. 710E+08	0. 000
46. 550	-7. 435E-07	4158. 9164	-573. 2910	-1. 884E-07	0. 5718	5. 506E+11	22. 3053	1. 710E+08	0. 000
47. 025	-1. 695E-06	1253. 5073	-364. 8172	-1. 604E-07	0. 1723	5. 506E+11	50. 8434	1. 710E+08	0. 000
47. 500	-2. 572E-06	0. 000	0. 000	-1. 539E-07	0. 000	5. 506E+11	77. 1627	85500000.	0. 000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 1:

Pile-head deflection = 0. 7352724 inches  
 Computed slope at pile head = -0. 0027627 radians  
 Maximum bending moment = 8777520. inch-lbs  
 Maximum shear force = -311308. lbs





I B3\_B-6\_Trans\_Scoured.l p7o

0. 475	0. 6754	1456920.	15600.	-0. 002588	200. 3032	5. 506E+11	0. 000	0. 000	0. 000
0. 950	0. 6607	1545840.	15600.	-0. 002572	212. 5283	5. 506E+11	0. 000	0. 000	0. 000
1. 425	0. 6461	1634760.	15600.	-0. 002556	224. 7534	5. 506E+11	0. 000	0. 000	0. 000
1. 900	0. 6316	1723680.	15600.	-0. 002538	236. 9785	5. 506E+11	0. 000	0. 000	0. 000
2. 375	0. 6172	1812600.	15600.	-0. 002520	249. 2035	5. 506E+11	0. 000	0. 000	0. 000
2. 850	0. 6029	1901520.	15600.	-0. 002501	261. 4286	5. 506E+11	0. 000	0. 000	0. 000
3. 325	0. 5887	1990440.	15600.	-0. 002481	273. 6537	5. 506E+11	0. 000	0. 000	0. 000
3. 800	0. 5746	2079360.	15600.	-0. 002460	285. 8788	5. 506E+11	0. 000	0. 000	0. 000
4. 275	0. 5606	2168280.	15600.	-0. 002438	298. 1039	5. 506E+11	0. 000	0. 000	0. 000
4. 750	0. 5468	2257200.	15600.	-0. 002415	310. 3289	5. 506E+11	0. 000	0. 000	0. 000
5. 225	0. 5331	2346120.	15600.	-0. 002391	322. 5540	5. 506E+11	0. 000	0. 000	0. 000
5. 700	0. 5195	2435040.	15600.	-0. 002366	334. 7791	5. 506E+11	0. 000	0. 000	0. 000
6. 175	0. 5061	2523960.	15600.	-0. 002341	347. 0042	5. 506E+11	0. 000	0. 000	0. 000
6. 650	0. 4928	2612880.	15600.	-0. 002314	359. 2293	5. 506E+11	0. 000	0. 000	0. 000
7. 125	0. 4797	2701800.	15600.	-0. 002287	371. 4543	5. 506E+11	0. 000	0. 000	0. 000
7. 600	0. 4668	2790720.	15600.	-0. 002258	383. 6794	5. 506E+11	0. 000	0. 000	0. 000
8. 075	0. 4540	2879640.	15600.	-0. 002229	395. 9045	5. 506E+11	0. 000	0. 000	0. 000
8. 550	0. 4414	2968560.	15600.	-0. 002198	408. 1296	5. 506E+11	0. 000	0. 000	0. 000
9. 025	0. 4289	3057480.	15600.	-0. 002167	420. 3547	5. 506E+11	0. 000	0. 000	0. 000
9. 500	0. 4167	3146400.	15600.	-0. 002135	432. 5797	5. 506E+11	0. 000	0. 000	0. 000
9. 975	0. 4046	3235320.	15600.	-0. 002102	444. 8048	5. 506E+11	0. 000	0. 000	0. 000
10. 450	0. 3927	3324240.	15600.	-0. 002075	306. 1743	9. 394E+11	0. 000	0. 000	0. 000
10. 925	0. 3809	3413160.	15600.	-0. 002055	314. 3642	9. 394E+11	0. 000	0. 000	0. 000
11. 400	0. 3693	3502080.	15600.	-0. 002034	322. 5540	9. 394E+11	0. 000	0. 000	0. 000
11. 875	0. 3577	3591000.	15600.	-0. 002012	330. 7439	9. 394E+11	0. 000	0. 000	0. 000
12. 350	0. 3463	3679920.	15600.	-0. 001990	338. 9337	9. 394E+11	0. 000	0. 000	0. 000
12. 825	0. 3350	3768840.	15600.	-0. 001968	347. 1236	9. 394E+11	0. 000	0. 000	0. 000
13. 300	0. 3239	3857760.	15600.	-0. 001945	355. 3134	9. 394E+11	0. 000	0. 000	0. 000
13. 775	0. 3129	3946680.	15600.	-0. 001921	363. 5033	9. 394E+11	0. 000	0. 000	0. 000
14. 250	0. 3020	4035600.	15600.	-0. 001897	371. 6931	9. 394E+11	0. 000	0. 000	0. 000
14. 725	0. 2913	4124520.	15600.	-0. 001872	379. 8830	9. 394E+11	0. 000	0. 000	0. 000
15. 200	0. 2807	4213440.	15600.	-0. 001847	388. 0728	9. 394E+11	0. 000	0. 000	0. 000
15. 675	0. 2702	4302360.	15600.	-0. 001821	396. 2627	9. 394E+11	0. 000	0. 000	0. 000
16. 150	0. 2599	4391280.	15600.	-0. 001794	404. 4525	9. 394E+11	0. 000	0. 000	0. 000
16. 625	0. 2498	4480200.	15600.	-0. 001767	412. 6423	9. 394E+11	0. 000	0. 000	0. 000
17. 100	0. 2398	4569120.	15600.	-0. 001740	420. 8322	9. 394E+11	0. 000	0. 000	0. 000
17. 575	0. 2299	4658040.	15600.	-0. 001712	429. 0220	9. 394E+11	0. 000	0. 000	0. 000
18. 050	0. 2202	4746960.	15600.	-0. 001684	437. 2119	9. 394E+11	0. 000	0. 000	0. 000
18. 525	0. 2107	4835880.	15600.	-0. 001654	445. 4017	9. 394E+11	0. 000	0. 000	0. 000
19. 000	0. 2014	4924800.	15600.	-0. 001625	453. 5916	9. 394E+11	0. 000	0. 000	0. 000
19. 475	0. 1922	5013720.	15600.	-0. 001595	461. 7814	9. 394E+11	0. 000	0. 000	0. 000
19. 950	0. 1832	5102640.	15600.	-0. 001564	469. 9713	9. 394E+11	0. 000	0. 000	0. 000
20. 425	0. 1744	5191560.	15600.	-0. 001533	478. 1611	9. 394E+11	0. 000	0. 000	0. 000
20. 900	0. 1657	5280480.	15600.	-0. 001501	486. 3510	9. 394E+11	0. 000	0. 000	0. 000
21. 375	0. 1573	5369400.	15600.	-0. 001469	494. 5408	9. 394E+11	0. 000	0. 000	0. 000
21. 850	0. 1490	5458320.	15600.	-0. 001436	502. 7307	9. 394E+11	0. 000	0. 000	0. 000
22. 325	0. 1409	5547240.	15600.	-0. 001402	510. 9205	9. 394E+11	0. 000	0. 000	0. 000
22. 800	0. 1330	5636160.	15600.	-0. 001368	519. 1104	9. 394E+11	0. 000	0. 000	0. 000
23. 275	0. 1253	5725080.	15600.	-0. 001334	527. 3002	9. 394E+11	0. 000	0. 000	0. 000
23. 750	0. 1178	5814000.	15600.	-0. 001299	535. 4901	9. 394E+11	0. 000	0. 000	0. 000
24. 225	0. 1105	5902920.	15600.	-0. 001263	543. 6799	9. 394E+11	0. 000	0. 000	0. 000
24. 700	0. 1034	5991840.	15600.	-0. 001227	551. 8698	9. 394E+11	0. 000	0. 000	0. 000
25. 175	0. 0965	6080760.	15600.	-0. 001191	560. 0596	9. 394E+11	0. 000	0. 000	0. 000
25. 650	0. 0898	6169680.	15600.	-0. 001154	568. 2495	9. 394E+11	0. 000	0. 000	0. 000
26. 125	0. 0833	6258600.	15600.	-0. 001116	576. 4393	9. 394E+11	0. 000	0. 000	0. 000
26. 600	0. 0771	6347520.	15600.	-0. 001078	584. 6292	9. 394E+11	0. 000	0. 000	0. 000
27. 075	0. 0711	6436440.	15600.	-0. 001039	592. 8190	9. 394E+11	0. 000	0. 000	0. 000
27. 550	0. 0652	6525360.	15600.	-0. 001000	601. 0089	9. 394E+11	0. 000	0. 000	0. 000
28. 025	0. 0597	6614280.	15600.	-0. 000960	609. 1987	9. 394E+11	0. 000	0. 000	0. 000
28. 500	0. 0543	6703200.	15600.	-0. 000919	617. 3886	9. 394E+11	0. 000	0. 000	0. 000

IB3_B-6_Trans_Scoured.l p7o									
28.975	0.0492	6792120.	15600.	-0.000878	625.5784	9.394E+11	0.000	0.000	0.000
29.450	0.0443	6881040.	15600.	-0.000837	633.7682	9.394E+11	0.000	0.000	0.000
29.925	0.0396	6969960.	15600.	-0.000795	641.9581	9.394E+11	0.000	0.000	0.000
30.400	0.0352	7058880.	15600.	-0.000752	650.1479	9.394E+11	0.000	0.000	0.000
30.875	0.0311	7147800.	15600.	-0.000709	658.3378	9.394E+11	0.000	0.000	0.000
31.350	0.0271	7236720.	15600.	-0.000665	666.5276	9.394E+11	0.000	0.000	0.000
31.825	0.0235	7325640.	15600.	-0.000621	674.7175	9.394E+11	0.000	0.000	0.000
32.300	0.0201	7414560.	15600.	-0.000577	682.9073	9.394E+11	0.000	0.000	0.000
32.775	0.0169	7503480.	15600.	-0.000531	691.0972	9.394E+11	0.000	0.000	0.000
33.250	0.0140	7592400.	15600.	-0.000486	699.2870	9.394E+11	0.000	0.000	0.000
33.725	0.0114	7681320.	15600.	-0.000439	707.4769	9.394E+11	0.000	0.000	0.000
34.200	0.008999	7770240.	15600.	-0.000392	715.6667	9.394E+11	0.000	0.000	0.000
34.675	0.006897	7859160.	15600.	-0.000345	723.8566	9.394E+11	0.000	0.000	0.000
35.150	0.005067	7948080.	15600.	-0.000297	732.0464	9.394E+11	0.000	0.000	0.000
35.625	0.003512	8037000.	15600.	-0.000248	740.2363	9.394E+11	0.000	0.000	0.000
36.100	0.002235	8125920.	15600.	-0.000199	748.4261	9.394E+11	0.000	0.000	0.000
36.575	0.001239	8214840.	-90295.	-0.000150	756.6160	9.394E+11	-37156.	1.710E+08	0.000
37.050	0.000527	7096562.	-241210.	-0.000103	653.6185	9.394E+11	-15797.	1.710E+08	0.000
37.525	6.002E-05	5465050.	-291362.	-6.527E-05	503.3505	9.394E+11	-1800.7283	1.710E+08	0.000
38.000	-0.000217	3775032.	-277899.	-3.723E-05	347.6939	9.394E+11	6524.6572	1.710E+08	0.000
38.475	-0.000364	2297000.	-228145.	-1.389E-05	315.8009	5.506E+11	10933.	1.710E+08	0.000
38.950	-0.000376	1174184.	-164850.	4.074E-06	161.4316	5.506E+11	11276.	1.710E+08	0.000
39.425	-0.000318	417710.	-105527.	1.231E-05	57.4284	5.506E+11	9539.5866	1.710E+08	0.000
39.900	-0.000235	-28823.	-58206.	1.433E-05	3.9627	5.506E+11	7064.2457	1.710E+08	0.000
40.375	-0.000155	-245839.	-24849.	1.290E-05	33.7989	5.506E+11	4639.9245	1.710E+08	0.000
40.850	-8.836E-05	-312103.	-4070.6710	1.002E-05	42.9092	5.506E+11	2650.7632	1.710E+08	0.000
41.325	-4.047E-05	-292244.	6944.0657	6.889E-06	40.1789	5.506E+11	1214.0567	1.710E+08	0.000
41.800	-9.822E-06	-232941.	11244.	4.171E-06	32.0256	5.506E+11	294.6528	1.710E+08	0.000
42.275	7.081E-06	-164064.	11478.	2.116E-06	22.5562	5.506E+11	-212.4219	1.710E+08	0.000
42.750	1.430E-05	-102089.	9649.9473	7.387E-07	14.0356	5.506E+11	-429.0863	1.710E+08	0.000
43.225	1.550E-05	-54055.	7101.6783	-6.950E-08	7.4316	5.506E+11	-465.0431	1.710E+08	0.000
43.700	1.351E-05	-21130.	4621.1499	-4.586E-07	2.9050	5.506E+11	-405.3177	1.710E+08	0.000
44.175	1.027E-05	-1373.4686	2587.6510	-5.751E-07	0.1888	5.506E+11	-308.1907	1.710E+08	0.000
44.650	6.954E-06	8369.5846	1114.7051	-5.389E-07	1.1507	5.506E+11	-208.6324	1.710E+08	0.000
45.125	4.130E-06	11334.	167.0184	-4.369E-07	1.5583	5.506E+11	-123.8892	1.710E+08	0.000
45.600	1.974E-06	10274.	-354.8107	-3.251E-07	1.4125	5.506E+11	-59.2087	1.710E+08	0.000
46.075	4.238E-07	7289.3281	-559.7888	-2.342E-07	1.0022	5.506E+11	-12.7135	1.710E+08	0.000
46.550	-6.960E-07	3892.0018	-536.5173	-1.763E-07	0.5351	5.506E+11	20.8789	1.710E+08	0.000
47.025	-1.586E-06	1173.0311	-341.4037	-1.501E-07	0.1613	5.506E+11	47.5820	1.710E+08	0.000
47.500	-2.407E-06	0.000	0.000	-1.440E-07	0.000	5.506E+11	72.2087	85500000.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 2:

Pile-head deflection = 0.6902231 inches  
 Computed slope at pile head = -0.0026025 radians  
 Maximum bending moment = 8214840. inch-lbs  
 Maximum shear force = -291362. lbs  
 Depth of maximum bending moment = 36.5750000 feet below pile head  
 Depth of maximum shear force = 37.5250000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 3

-----  
 Pile-head Deflection vs. Pile Length for Load Case 2  
 -----



IB3\_B-6\_Trans\_Scoured.l p7o

4. 275	0. 1758	-2580285.	16800.	-0. 000281	939. 3988	5. 506E+11	0. 000	0. 000	0. 000
4. 750	0. 1741	-2483167.	16800.	-0. 000307	926. 0466	5. 506E+11	0. 000	0. 000	0. 000
5. 225	0. 1723	-2385929.	16800.	-0. 000332	912. 6780	5. 506E+11	0. 000	0. 000	0. 000
5. 700	0. 1703	-2288578.	16800.	-0. 000357	899. 2937	5. 506E+11	0. 000	0. 000	0. 000
6. 175	0. 1682	-2191117.	16800.	-0. 000380	885. 8944	5. 506E+11	0. 000	0. 000	0. 000
6. 650	0. 1660	-2093552.	16800.	-0. 000402	872. 4808	5. 506E+11	0. 000	0. 000	0. 000
7. 125	0. 1636	-1995886.	16800.	-0. 000423	859. 0533	5. 506E+11	0. 000	0. 000	0. 000
7. 600	0. 1611	-1898126.	16800.	-0. 000443	845. 6128	5. 506E+11	0. 000	0. 000	0. 000
8. 075	0. 1586	-1800274.	16800.	-0. 000462	832. 1597	5. 506E+11	0. 000	0. 000	0. 000
8. 550	0. 1559	-1702336.	16800.	-0. 000480	818. 6949	5. 506E+11	0. 000	0. 000	0. 000
9. 025	0. 1531	-1604317.	16800.	-0. 000498	805. 2188	5. 506E+11	0. 000	0. 000	0. 000
9. 500	0. 1502	-1506222.	16800.	-0. 000514	791. 7322	5. 506E+11	0. 000	0. 000	0. 000
9. 975	0. 1472	-1408054.	16800.	-0. 000529	778. 2358	5. 506E+11	0. 000	0. 000	0. 000
10. 450	0. 1442	-1309819.	16800.	-0. 000540	568. 2623	9. 394E+11	0. 000	0. 000	0. 000
10. 925	0. 1411	-1211548.	16800.	-0. 000548	559. 2111	9. 394E+11	0. 000	0. 000	0. 000
11. 400	0. 1379	-1113242.	16800.	-0. 000555	550. 1568	9. 394E+11	0. 000	0. 000	0. 000
11. 875	0. 1347	-1014905.	16800.	-0. 000561	541. 0997	9. 394E+11	0. 000	0. 000	0. 000
12. 350	0. 1315	-916540.	16800.	-0. 000567	532. 0399	9. 394E+11	0. 000	0. 000	0. 000
12. 825	0. 1283	-818149.	16800.	-0. 000572	522. 9777	9. 394E+11	0. 000	0. 000	0. 000
13. 300	0. 1250	-719735.	16800.	-0. 000577	513. 9135	9. 394E+11	0. 000	0. 000	0. 000
13. 775	0. 1217	-621301.	16800.	-0. 000581	504. 8473	9. 394E+11	0. 000	0. 000	0. 000
14. 250	0. 1184	-522850.	16800.	-0. 000585	495. 7796	9. 394E+11	0. 000	0. 000	0. 000
14. 725	0. 1150	-424384.	16800.	-0. 000587	486. 7106	9. 394E+11	0. 000	0. 000	0. 000
15. 200	0. 1117	-325906.	16800.	-0. 000590	477. 6404	9. 394E+11	0. 000	0. 000	0. 000
15. 675	0. 1083	-227419.	16800.	-0. 000591	468. 5694	9. 394E+11	0. 000	0. 000	0. 000
16. 150	0. 1049	-128926.	16800.	-0. 000592	459. 4978	9. 394E+11	0. 000	0. 000	0. 000
16. 625	0. 1016	-30429.	16800.	-0. 000593	450. 4259	9. 394E+11	0. 000	0. 000	0. 000
17. 100	0. 0982	68069.	16800.	-0. 000593	453. 8927	9. 394E+11	0. 000	0. 000	0. 000
17. 575	0. 0948	166565.	16800.	-0. 000592	462. 9645	9. 394E+11	0. 000	0. 000	0. 000
18. 050	0. 0914	265056.	16800.	-0. 000591	472. 0359	9. 394E+11	0. 000	0. 000	0. 000
18. 525	0. 0881	363540.	16800.	-0. 000589	481. 1066	9. 394E+11	0. 000	0. 000	0. 000
19. 000	0. 0847	462014.	16800.	-0. 000586	490. 1764	9. 394E+11	0. 000	0. 000	0. 000
19. 475	0. 0814	560475.	16800.	-0. 000583	499. 2450	9. 394E+11	0. 000	0. 000	0. 000
19. 950	0. 0781	658920.	16800.	-0. 000580	508. 3121	9. 394E+11	0. 000	0. 000	0. 000
20. 425	0. 0748	757346.	16800.	-0. 000575	517. 3776	9. 394E+11	0. 000	0. 000	0. 000
20. 900	0. 0715	855752.	16800.	-0. 000570	526. 4411	9. 394E+11	0. 000	0. 000	0. 000
21. 375	0. 0683	954133.	16800.	-0. 000565	535. 5023	9. 394E+11	0. 000	0. 000	0. 000
21. 850	0. 0651	1052488.	16800.	-0. 000559	544. 5611	9. 394E+11	0. 000	0. 000	0. 000
22. 325	0. 0619	1150813.	16800.	-0. 000552	553. 6172	9. 394E+11	0. 000	0. 000	0. 000
22. 800	0. 0588	1249106.	16800.	-0. 000545	562. 6704	9. 394E+11	0. 000	0. 000	0. 000
23. 275	0. 0557	1347364.	16800.	-0. 000537	571. 7203	9. 394E+11	0. 000	0. 000	0. 000
23. 750	0. 0527	1445584.	16800.	-0. 000528	580. 7667	9. 394E+11	0. 000	0. 000	0. 000
24. 225	0. 0497	1543764.	16800.	-0. 000519	589. 8094	9. 394E+11	0. 000	0. 000	0. 000
24. 700	0. 0467	1641900.	16800.	-0. 000510	598. 8481	9. 394E+11	0. 000	0. 000	0. 000
25. 175	0. 0439	1739991.	16800.	-0. 000499	607. 8826	9. 394E+11	0. 000	0. 000	0. 000
25. 650	0. 0410	1838032.	16800.	-0. 000489	616. 9126	9. 394E+11	0. 000	0. 000	0. 000
26. 125	0. 0383	1936022.	16800.	-0. 000477	625. 9378	9. 394E+11	0. 000	0. 000	0. 000
26. 600	0. 0356	2033958.	16800.	-0. 000465	634. 9581	9. 394E+11	0. 000	0. 000	0. 000
27. 075	0. 0330	2131837.	16800.	-0. 000452	643. 9731	9. 394E+11	0. 000	0. 000	0. 000
27. 550	0. 0304	2229657.	16800.	-0. 000439	652. 9826	9. 394E+11	0. 000	0. 000	0. 000
28. 025	0. 0280	2327413.	16800.	-0. 000425	661. 9863	9. 394E+11	0. 000	0. 000	0. 000
28. 500	0. 0256	2425105.	16800.	-0. 000411	670. 9841	9. 394E+11	0. 000	0. 000	0. 000
28. 975	0. 0233	2522729.	16800.	-0. 000396	679. 9756	9. 394E+11	0. 000	0. 000	0. 000
29. 450	0. 0211	2620282.	16800.	-0. 000380	688. 9605	9. 394E+11	0. 000	0. 000	0. 000
29. 925	0. 0190	2717761.	16800.	-0. 000364	697. 9388	9. 394E+11	0. 000	0. 000	0. 000
30. 400	0. 0169	2815165.	16800.	-0. 000347	706. 9100	9. 394E+11	0. 000	0. 000	0. 000
30. 875	0. 0150	2912489.	16800.	-0. 000330	715. 8739	9. 394E+11	0. 000	0. 000	0. 000
31. 350	0. 0132	3009732.	16800.	-0. 000312	724. 8303	9. 394E+11	0. 000	0. 000	0. 000
31. 825	0. 0114	3106891.	16800.	-0. 000294	733. 7790	9. 394E+11	0. 000	0. 000	0. 000
32. 300	0. 009824	3203962.	16800.	-0. 000274	742. 7196	9. 394E+11	0. 000	0. 000	0. 000

IB3_B-6_Trans_Scoured.l p7o									
32.775	0.008316	3300944.	16800.	-0.000255	751.6520	9.394E+11	0.000	0.000	0.000
33.250	0.006922	3397834.	16800.	-0.000234	760.5758	9.394E+11	0.000	0.000	0.000
33.725	0.005645	3494628.	16800.	-0.000213	769.4909	9.394E+11	0.000	0.000	0.000
34.200	0.004489	3591324.	16800.	-0.000192	778.3970	9.394E+11	0.000	0.000	0.000
34.675	0.003457	3687920.	16800.	-0.000170	787.2938	9.394E+11	0.000	0.000	0.000
35.150	0.002553	3784412.	16800.	-0.000147	796.1811	9.394E+11	0.000	0.000	0.000
35.625	0.001780	3880799.	16800.	-0.000124	805.0586	9.394E+11	0.000	0.000	0.000
36.100	0.001141	3977076.	16800.	-0.000100	813.9261	9.394E+11	0.000	0.000	0.000
36.575	0.000639	4073242.	-37867.	-7.562E-05	822.7834	9.394E+11	-19182.	1.710E+08	0.000
37.050	0.000279	3546086.	-116372.	-5.250E-05	774.2304	9.394E+11	-8363.9777	1.710E+08	0.000
37.525	4.086E-05	2747084.	-143703.	-3.341E-05	700.6395	9.394E+11	-1225.8254	1.710E+08	0.000
38.000	-0.000102	1908178.	-138470.	-1.929E-05	623.3733	9.394E+11	3061.9469	1.710E+08	0.000
38.475	-0.000179	1168702.	-114440.	-7.447E-06	745.3286	5.506E+11	5369.7894	1.710E+08	0.000
38.950	-0.000187	603634.	-83150.	1.726E-06	667.6408	5.506E+11	5608.9088	1.710E+08	0.000
39.425	-0.000159	220771.	-53543.	5.993E-06	615.0032	5.506E+11	4779.5339	1.710E+08	0.000
39.900	-0.000119	-6816.2026	-29778.	7.100E-06	585.5879	5.506E+11	3559.3723	1.710E+08	0.000
40.375	-7.838E-05	-118759.	-12932.	6.450E-06	600.9782	5.506E+11	2351.2760	1.710E+08	0.000
40.850	-4.511E-05	-154302.	-2373.8565	5.037E-06	605.8649	5.506E+11	1353.3948	1.710E+08	0.000
41.325	-2.095E-05	-145867.	3274.9569	3.483E-06	604.7052	5.506E+11	628.6450	1.710E+08	0.000
41.800	-5.403E-06	-117000.	5528.5660	2.123E-06	600.7365	5.506E+11	162.0951	1.710E+08	0.000
42.275	3.245E-06	-82861.	5713.0824	1.088E-06	596.0429	5.506E+11	-97.3525	1.710E+08	0.000
42.750	7.004E-06	-51881.	4836.7647	3.910E-07	591.7836	5.506E+11	-210.1274	1.710E+08	0.000
43.225	7.702E-06	-27726.	3579.3595	-2.104E-08	588.4626	5.506E+11	-231.0674	1.710E+08	0.000
43.700	6.764E-06	-11076.	2342.4657	-2.219E-07	586.1736	5.506E+11	-202.9304	1.710E+08	0.000
44.175	5.173E-06	-1019.4182	1321.8303	-2.845E-07	584.7910	5.506E+11	-155.1873	1.710E+08	0.000
44.650	3.521E-06	3995.3337	578.4728	-2.691E-07	585.2001	5.506E+11	-105.6398	1.710E+08	0.000
45.125	2.105E-06	5577.6561	97.3804	-2.195E-07	585.4176	5.506E+11	-63.1645	1.710E+08	0.000
45.600	1.019E-06	5107.4972	-169.7407	-1.642E-07	585.3530	5.506E+11	-30.5622	1.710E+08	0.000
46.075	2.334E-07	3644.1289	-276.7948	-1.189E-07	585.1518	5.506E+11	-7.0007	1.710E+08	0.000
46.550	-3.370E-07	1953.1347	-267.9322	-8.996E-08	584.9193	5.506E+11	10.1104	1.710E+08	0.000
47.025	-7.921E-07	590.5329	-171.3898	-7.679E-08	584.7320	5.506E+11	23.7641	1.710E+08	0.000
47.500	-1.212E-06	0.000	0.000	-7.373E-08	584.6508	5.506E+11	36.3726	85500000.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 3:

Pile-head deflection = 0.1833194 inches  
 Computed slope at pile head = 0.000000 radians  
 Maximum bending moment = 4073242. inch-lbs  
 Maximum shear force = -143703. lbs  
 Depth of maximum bending moment = 36.5750000 feet below pile head  
 Depth of maximum shear force = 37.5250000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 3

-----  
 Pile-head Deflection vs. Pile Length for Load Case 3  
 -----

Boundary Condition Type 2, Shear and Slope

Shear = 16800. lb  
 Slope = 0.00000  
 Axial Load = 810000. lb



IB3\_B-6\_Trans\_Scoured.l p7o

8. 075	0. 1487	-1690708.	15600.	-0. 000434	1066. 1141	5. 506E+11	0. 000	0. 000	0. 000
8. 550	0. 1462	-1598876.	15600.	-0. 000451	1053. 4887	5. 506E+11	0. 000	0. 000	0. 000
9. 025	0. 1436	-1506935.	15600.	-0. 000467	1040. 8482	5. 506E+11	0. 000	0. 000	0. 000
9. 500	0. 1409	-1414891.	15600.	-0. 000482	1028. 1937	5. 506E+11	0. 000	0. 000	0. 000
9. 975	0. 1381	-1322751.	15600.	-0. 000496	1015. 5259	5. 506E+11	0. 000	0. 000	0. 000
10. 450	0. 1352	-1230520.	15600.	-0. 000507	751. 6129	9. 394E+11	0. 000	0. 000	0. 000
10. 925	0. 1323	-1138241.	15600.	-0. 000514	743. 1137	9. 394E+11	0. 000	0. 000	0. 000
11. 400	0. 1294	-1045916.	15600.	-0. 000520	734. 6102	9. 394E+11	0. 000	0. 000	0. 000
11. 875	0. 1264	-953549.	15600.	-0. 000526	726. 1029	9. 394E+11	0. 000	0. 000	0. 000
12. 350	0. 1234	-861144.	15600.	-0. 000532	717. 5921	9. 394E+11	0. 000	0. 000	0. 000
12. 825	0. 1203	-768705.	15600.	-0. 000537	709. 0781	9. 394E+11	0. 000	0. 000	0. 000
13. 300	0. 1172	-676235.	15600.	-0. 000541	700. 5613	9. 394E+11	0. 000	0. 000	0. 000
13. 775	0. 1141	-583738.	15600.	-0. 000545	692. 0420	9. 394E+11	0. 000	0. 000	0. 000
14. 250	0. 1110	-491217.	15600.	-0. 000548	683. 5205	9. 394E+11	0. 000	0. 000	0. 000
14. 725	0. 1079	-398677.	15600.	-0. 000551	674. 9972	9. 394E+11	0. 000	0. 000	0. 000
15. 200	0. 1047	-306121.	15600.	-0. 000553	666. 4725	9. 394E+11	0. 000	0. 000	0. 000
15. 675	0. 1016	-213553.	15600.	-0. 000555	657. 9467	9. 394E+11	0. 000	0. 000	0. 000
16. 150	0. 0984	-120977.	15600.	-0. 000556	649. 4200	9. 394E+11	0. 000	0. 000	0. 000
16. 625	0. 0952	-28395.	15600.	-0. 000556	640. 8929	9. 394E+11	0. 000	0. 000	0. 000
17. 100	0. 0921	64187.	15600.	-0. 000556	644. 1895	9. 394E+11	0. 000	0. 000	0. 000
17. 575	0. 0889	156768.	15600.	-0. 000555	652. 7165	9. 394E+11	0. 000	0. 000	0. 000
18. 050	0. 0857	249341.	15600.	-0. 000554	661. 2429	9. 394E+11	0. 000	0. 000	0. 000
18. 525	0. 0826	341905.	15600.	-0. 000552	669. 7683	9. 394E+11	0. 000	0. 000	0. 000
19. 000	0. 0794	434455.	15600.	-0. 000550	678. 2925	9. 394E+11	0. 000	0. 000	0. 000
19. 475	0. 0763	526988.	15600.	-0. 000547	686. 8151	9. 394E+11	0. 000	0. 000	0. 000
19. 950	0. 0732	619500.	15600.	-0. 000544	695. 3358	9. 394E+11	0. 000	0. 000	0. 000
20. 425	0. 0701	711987.	15600.	-0. 000540	703. 8542	9. 394E+11	0. 000	0. 000	0. 000
20. 900	0. 0671	804446.	15600.	-0. 000535	712. 3699	9. 394E+11	0. 000	0. 000	0. 000
21. 375	0. 0640	896872.	15600.	-0. 000530	720. 8827	9. 394E+11	0. 000	0. 000	0. 000
21. 850	0. 0610	989263.	15600.	-0. 000524	729. 3922	9. 394E+11	0. 000	0. 000	0. 000
22. 325	0. 0580	1081614.	15600.	-0. 000518	737. 8981	9. 394E+11	0. 000	0. 000	0. 000
22. 800	0. 0551	1173922.	15600.	-0. 000511	746. 4000	9. 394E+11	0. 000	0. 000	0. 000
23. 275	0. 0522	1266183.	15600.	-0. 000504	754. 8976	9. 394E+11	0. 000	0. 000	0. 000
23. 750	0. 0494	1358393.	15600.	-0. 000496	763. 3905	9. 394E+11	0. 000	0. 000	0. 000
24. 225	0. 0466	1450549.	15600.	-0. 000487	771. 8784	9. 394E+11	0. 000	0. 000	0. 000
24. 700	0. 0438	1542648.	15600.	-0. 000478	780. 3610	9. 394E+11	0. 000	0. 000	0. 000
25. 175	0. 0411	1634684.	15600.	-0. 000468	788. 8379	9. 394E+11	0. 000	0. 000	0. 000
25. 650	0. 0385	1726655.	15600.	-0. 000458	797. 3087	9. 394E+11	0. 000	0. 000	0. 000
26. 125	0. 0359	1818558.	15600.	-0. 000447	805. 7733	9. 394E+11	0. 000	0. 000	0. 000
26. 600	0. 0334	1910387.	15600.	-0. 000436	814. 2311	9. 394E+11	0. 000	0. 000	0. 000
27. 075	0. 0309	2002141.	15600.	-0. 000424	822. 6819	9. 394E+11	0. 000	0. 000	0. 000
27. 550	0. 0285	2093814.	15600.	-0. 000412	831. 1254	9. 394E+11	0. 000	0. 000	0. 000
28. 025	0. 0262	2185404.	15600.	-0. 000399	839. 5611	9. 394E+11	0. 000	0. 000	0. 000
28. 500	0. 0240	2276906.	15600.	-0. 000385	847. 9888	9. 394E+11	0. 000	0. 000	0. 000
28. 975	0. 0218	2368318.	15600.	-0. 000371	856. 4081	9. 394E+11	0. 000	0. 000	0. 000
29. 450	0. 0198	2459635.	15600.	-0. 000357	864. 8187	9. 394E+11	0. 000	0. 000	0. 000
29. 925	0. 0178	2550853.	15600.	-0. 000341	873. 2203	9. 394E+11	0. 000	0. 000	0. 000
30. 400	0. 0159	2641970.	15600.	-0. 000326	881. 6125	9. 394E+11	0. 000	0. 000	0. 000
30. 875	0. 0141	2732981.	15600.	-0. 000309	889. 9949	9. 394E+11	0. 000	0. 000	0. 000
31. 350	0. 0123	2823883.	15600.	-0. 000292	898. 3673	9. 394E+11	0. 000	0. 000	0. 000
31. 825	0. 0107	2914672.	15600.	-0. 000275	906. 7293	9. 394E+11	0. 000	0. 000	0. 000
32. 300	0. 009204	3005345.	15600.	-0. 000257	915. 0806	9. 394E+11	0. 000	0. 000	0. 000
32. 775	0. 007790	3095898.	15600.	-0. 000239	923. 4208	9. 394E+11	0. 000	0. 000	0. 000
33. 250	0. 006484	3186327.	15600.	-0. 000220	931. 7496	9. 394E+11	0. 000	0. 000	0. 000
33. 725	0. 005288	3276628.	15600.	-0. 000200	940. 0668	9. 394E+11	0. 000	0. 000	0. 000
34. 200	0. 004205	3366799.	15600.	-0. 000180	948. 3718	9. 394E+11	0. 000	0. 000	0. 000
34. 675	0. 003238	3456836.	15600.	-0. 000159	956. 6645	9. 394E+11	0. 000	0. 000	0. 000
35. 150	0. 002391	3546734.	15600.	-0. 000138	964. 9444	9. 394E+11	0. 000	0. 000	0. 000
35. 625	0. 001667	3636490.	15600.	-0. 000116	973. 2113	9. 394E+11	0. 000	0. 000	0. 000
36. 100	0. 001068	3726102.	15600.	-9. 370E-05	981. 4648	9. 394E+11	0. 000	0. 000	0. 000

IB3\_B-6\_Trans\_Scoured.l p7o

36.575	0.000599	3815564.	-35579.	-7.082E-05	989.7047	9.394E+11	-17958.	1.710E+08	0.000
37.050	0.000261	3321429.	-109067.	-4.916E-05	944.1931	9.394E+11	-7827.3463	1.710E+08	0.000
37.525	3.811E-05	2572851.	-134633.	-3.128E-05	875.2464	9.394E+11	-1143.3395	1.710E+08	0.000
38.000	-9.570E-05	1787023.	-129709.	-1.805E-05	802.8688	9.394E+11	2871.0715	1.710E+08	0.000
38.475	-0.000168	1094405.	-107187.	-6.968E-06	984.1320	5.506E+11	5031.2633	1.710E+08	0.000
38.950	-0.000175	565178.	-77874.	1.621E-06	911.3717	5.506E+11	5254.2448	1.710E+08	0.000
39.425	-0.000149	206623.	-50140.	5.616E-06	862.0761	5.506E+11	4476.8025	1.710E+08	0.000
39.900	-0.000111	-6494.8343	-27881.	6.652E-06	834.5617	5.506E+11	3333.6162	1.710E+08	0.000
40.375	-7.340E-05	-111303.	-12104.	6.042E-06	848.9711	5.506E+11	2201.9263	1.710E+08	0.000
40.850	-4.224E-05	-144563.	-2217.1120	4.718E-06	853.5439	5.506E+11	1267.2544	1.710E+08	0.000
41.325	-1.962E-05	-136640.	3071.7145	3.262E-06	852.4546	5.506E+11	588.4742	1.710E+08	0.000
41.800	-5.052E-06	-109589.	5180.8161	1.988E-06	848.7354	5.506E+11	151.5614	1.710E+08	0.000
42.275	3.046E-06	-77605.	5352.3665	1.019E-06	844.3382	5.506E+11	-91.3683	1.710E+08	0.000
42.750	6.564E-06	-48585.	4530.7196	3.659E-07	840.3484	5.506E+11	-196.9289	1.710E+08	0.000
43.225	7.216E-06	-25960.	3352.4787	-1.997E-08	837.2378	5.506E+11	-216.4890	1.710E+08	0.000
43.700	6.337E-06	-10366.	2193.7068	-2.080E-07	835.0940	5.506E+11	-190.0977	1.710E+08	0.000
44.175	4.845E-06	-948.7589	1237.6621	-2.666E-07	833.7992	5.506E+11	-145.3566	1.710E+08	0.000
44.650	3.298E-06	3746.3842	541.4278	-2.521E-07	834.1838	5.506E+11	-98.9361	1.710E+08	0.000
45.125	1.972E-06	5226.8367	90.8903	-2.056E-07	834.3874	5.506E+11	-59.1472	1.710E+08	0.000
45.600	9.537E-07	4785.2412	-159.2183	-1.538E-07	834.3266	5.506E+11	-28.6102	1.710E+08	0.000
46.075	2.181E-07	3413.7729	-259.4070	-1.114E-07	834.1381	5.506E+11	-6.5437	1.710E+08	0.000
46.550	-3.160E-07	1829.4676	-251.0381	-8.424E-08	833.9203	5.506E+11	9.4801	1.710E+08	0.000
47.025	-7.422E-07	553.0476	-160.5627	-7.191E-08	833.7448	5.506E+11	22.2656	1.710E+08	0.000
47.500	-1.136E-06	0.000	0.000	-6.904E-08	833.6687	5.506E+11	34.0722	85500000.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 4:

Pile-head deflection = 0.1719230 inches  
 Computed slope at pile head = 0.000000 radians  
 Maximum bending moment = 3815564. inch-lbs  
 Maximum shear force = -134633. lbs  
 Depth of maximum bending moment = 36.5750000 feet below pile head  
 Depth of maximum shear force = 37.5250000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 3

-----  
 Pile-head Deflection vs. Pile Length for Load Case 4  
 -----

Boundary Condition Type 2, Shear and Slope

Shear = 15600. lb  
 Slope = 0.00000  
 Axial Load = 1155000. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
47.5000	0.1719230	3815564.	-134633.
45.1250	0.1717721	3810365.	-134626.
42.7500	0.1758423	3823514.	-140864.
40.3750	0.1748044	3820915.	-140462.



40.3750	0.000000	4098872444.	423491569.
40.3750	0.000000	4098872444.	423491569.
40.3750	0.000000	4098872444.	423491569.
40.3750	0.000000	4098872444.	423491569.
40.3750	0.000000	4098872444.	423491569.
40.3750	0.000000	4098872444.	423491569.
40.3750	0.000000	4098872444.	423491569.
40.3750	0.000000	4098872444.	423491569.
40.3750	0.000000	4098872444.	423491569.
40.3750	0.000000	4098872444.	423491569.
40.3750	0.000000	4098872444.	423491569.
40.3750	0.000000	4098872444.	423491569.
40.3750	0.000000	4098872444.	423491569.
40.3750	0.000000	4098872444.	423491569.
40.3750	0.000000	4098872444.	423491569.
40.3750	0.000000	4098872444.	423491569.
40.3750	0.000000	4098872444.	423491569.
40.3750	0.000000	4098872444.	423491569.
40.3750	0.000000	4098872444.	423491569.
40.3750	0.000000	4098872444.	423491569.

-----  
 Summary of Pile Response(s)  
 -----

Definitions of Pile-head Loading Conditions:

- Load Type 1: Load 1 = Shear, lbs, and Load 2 = Moment, in-lbs
- Load Type 2: Load 1 = Shear, lbs, and Load 2 = Slope, radians
- Load Type 3: Load 1 = Shear, lbs, and Load 2 = Rotational Stiffness, in-lbs/radian
- Load Type 4: Load 1 = Top Deflection, inches, and Load 2 = Moment, in-lbs
- Load Type 5: Load 1 = Top Deflection, inches, and Load 2 = Slope, radians

Load Case No.	Load Type No.	Pile-head Condition 1 V(lbs) or y(inches)	Pile-head Condition 2 in-lb, rad., or in-lb/rad.	Axial Loading lbs	Pile-head Deflection inches	Maximum Moment in Pile in-lbs	Maximum Shear in Pile lbs	Pile-head Rotation radians
1	1	V = 16800.	M = 1404000.	0.0000000	0.73527244	8777520.	-311308.	-0.00276270
2	1	V = 15600.	M = 1368000.	0.0000000	0.69022311	8214840.	-291362.	-0.00260248
3	2	V = 16800.	S = 0.000	810000.	0.18331938	4073242.	-143703.	0.00000000
4	2	V = 15600.	S = 0.000	1155000.	0.17192297	3815564.	-134633.	-0.00000000

-----  
 Summary of Warning Messages  
 -----

The following warning was reported 4000 times

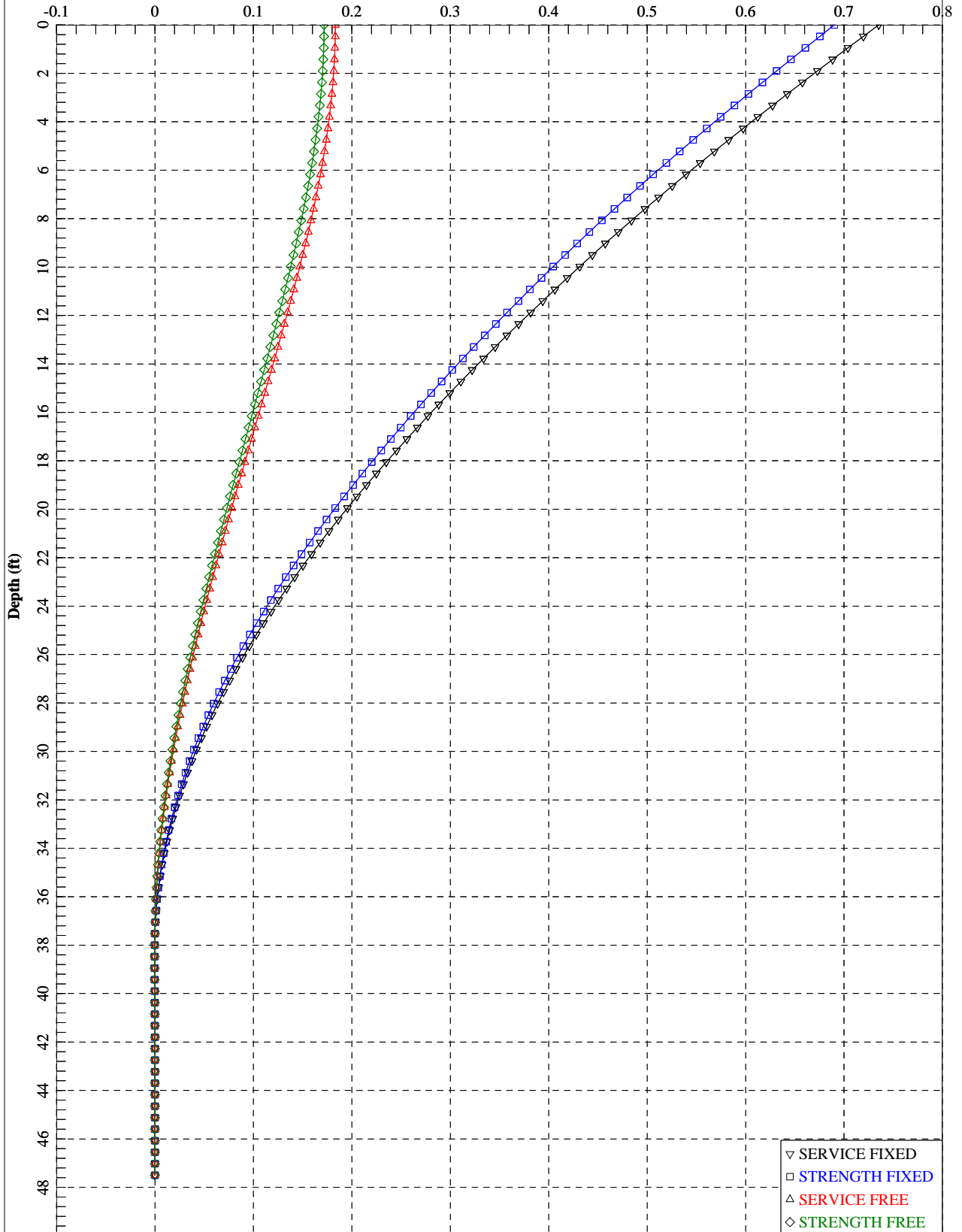
\*\*\*\* Warning \*\*\*\*

An unreasonable input value for uniaxial compressive strength has been specified for a soil defined using the vuggy limestone criteria. The input value is outside of the range of 1,000 to 2,500 psi (6,895 to 17,237 kPa). You should check your input data for correctness.

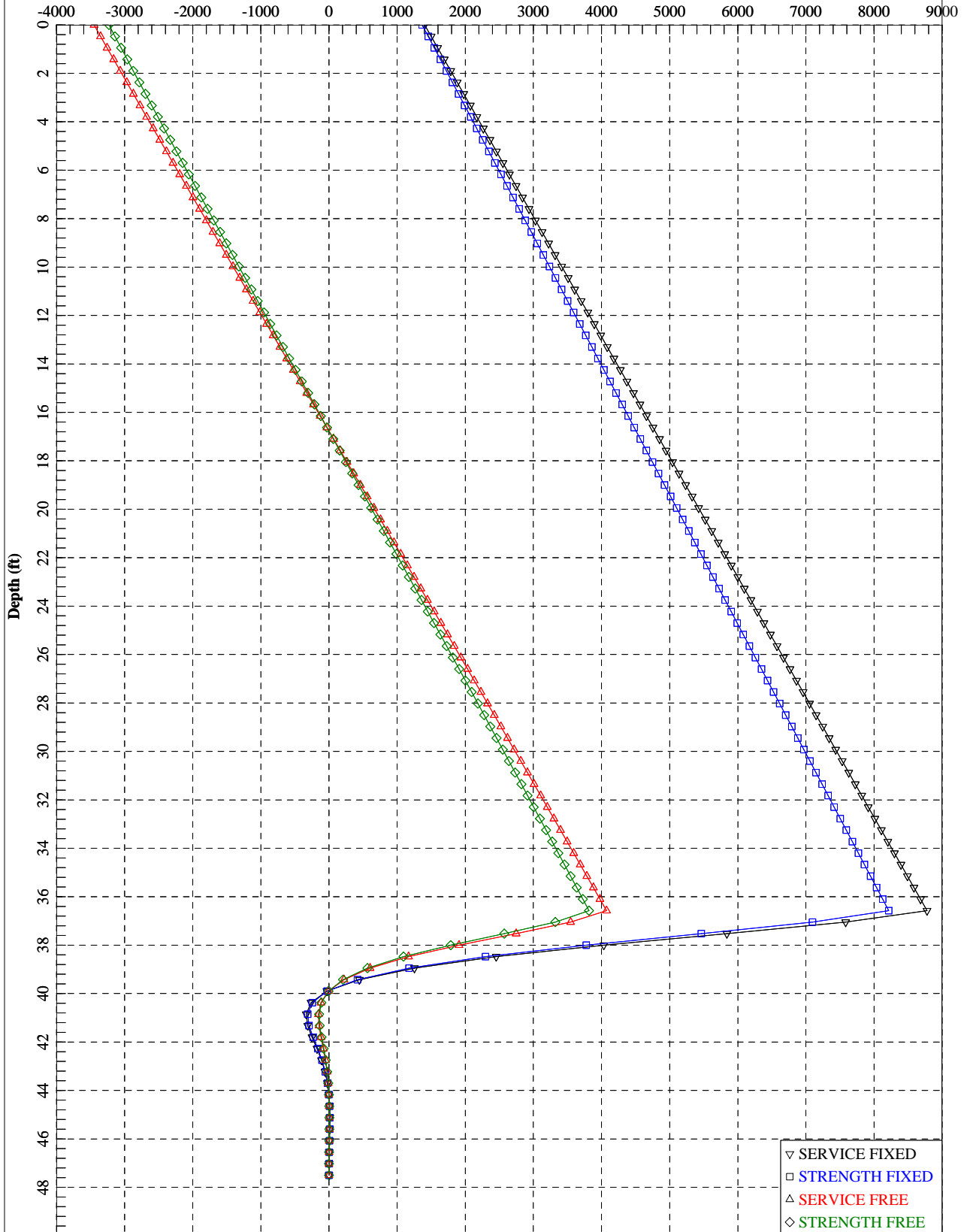
The analysis ended normally.

IB3\_B-6\_Trans\_Scoured.1p7o

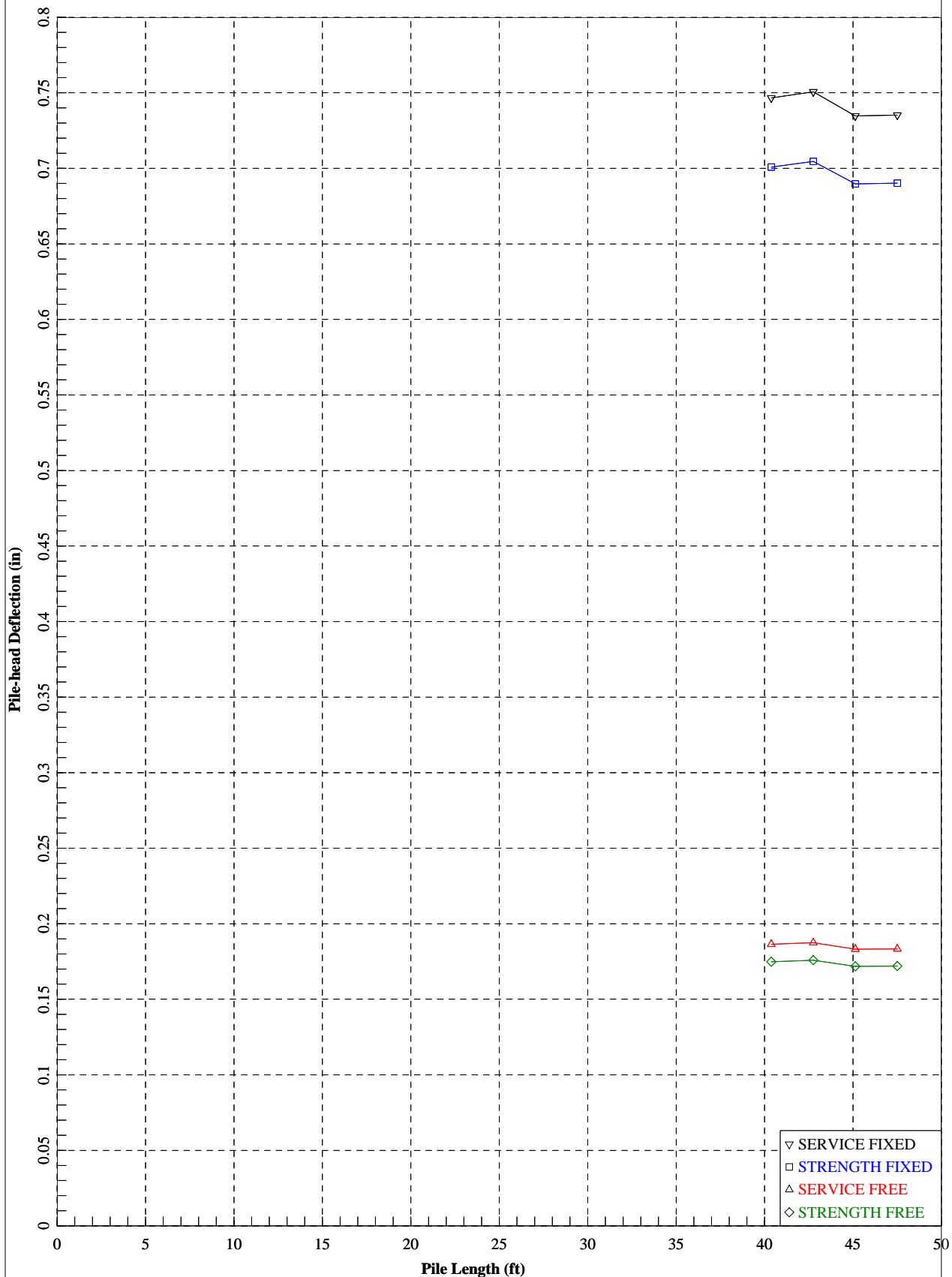
SC 557 Bridge over Crowders Creek - IB3 - Boring B-6 - 48" Dia. Drilled Shaft - Scoured Transverse Analysis  
Lateral Pile Deflection (inches)



SC 557 Bridge over Crowders Creek - IB3 - Boring B-6 - 48" Dia. Drilled Shaft - Scoured Transverse Analysis  
Bending Moment (in-kips)



SC 557 Bridge over Crowders Creek - IB3 - Boring B-6 - 48" Dia. Drilled Shaft - Scoured Transverse Analysis



=====  
LPile Plus for Windows, Version 2013-07.007

Analysis of Individual Piles and Drilled Shafts  
Subjected to Lateral Loading Using the p-y Method

© 1985-2013 by Ensoft, Inc.  
All Rights Reserved

=====  
This copy of LPile is used by:

Bradley Fischer  
F&ME

Serial Number of Security Device: 291490957

This copy of LPile is licensed for exclusive use by: F&ME Consultants, Columbia, Sout

Use of this program by any entity other than F&ME Consultants, Columbia, Sout  
is forbidden by the software license agreement.

-----  
Files Used for Analysis  
-----

Path to file locations: P:\Geotechnical\G4800's\G4843 - SC557 - York County\Report\Final\Bridge\LPile\  
Name of input data file: IB3\_B-7\_Long\_Scoured.l p7d  
Name of output report file: IB3\_B-7\_Long\_Scoured.l p7o  
Name of plot output file: IB3\_B-7\_Long\_Scoured.l p7p  
Name of runtime message file: IB3\_B-7\_Long\_Scoured.l p7r

-----  
Date and Time of Analysis  
-----

Date: July 31, 2018 Time: 9:24:49

-----  
Problem Title  
-----

Project Name: SC 557 over Crowders Creek

Job Number: G4843

Client: CALYX

Engineer: JFH

Description: IB3 - Boring B-7 - 48" Dia. Drilled Shaft - Scoured Long.

-----  
 Program Options and Settings  
 -----

Engineering Units of Input Data and Computations:

- Engineering units are US Customary Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

Computational Options:

- Use unfactored loads in computations (conventional analysis)
- Compute pile response under loading and nonlinear bending properties of pile (only if nonlinear pile properties are input)
- Analysis uses p-y modification factors for p-y curves
- Analysis includes loading by lateral soil movements acting on pile
- Input of shear resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- No p-y curves to be computed and reported for user-specified depths
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1

-----  
 Pile Structural Properties and Geometry  
 -----

- Total number of pile sections = 3
- Total length of pile = 49.50 ft
- Depth of ground surface below top of pile = 39.00 ft

Pile diameter values used for p-y curve computations are defined using 6 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile.

Point	Depth X ft	Pile Diameter in
1	0.00000	42.0000000
2	10.000000	42.0000000
3	10.000000	48.0000000
4	40.000000	48.0000000

5	40.000000	42.0000000
6	49.500000	42.0000000

-----  
 Input Structural Properties:  
 -----

Pile Section No. 1:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Circular
Section Length	=	10.00000 ft
Top Width	=	42.00000 in
Bottom Width	=	42.00000 in
Top Area	=	1385.44236 Sq. in
Bottom Area	=	1385.44236 Sq. in
Moment of Inertia at Top	=	152745. in^4
Moment of Inertia at Bottom	=	152745. in^4
Elastic Modulus	=	3605000. lbs/in^2

Pile Section No. 2:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Circular
Section Length	=	30.00000 ft
Top Width	=	48.00000 in
Bottom Width	=	48.00000 in
Top Area	=	1809.55737 Sq. in
Bottom Area	=	1809.55737 Sq. in
Moment of Inertia at Top	=	260576. in^4
Moment of Inertia at Bottom	=	260576. in^4
Elastic Modulus	=	3605000. lbs/in^2

Pile Section No. 3:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Circular
Section Length	=	9.50000 ft
Top Width	=	42.00000 in
Bottom Width	=	42.00000 in
Top Area	=	1385.44236 Sq. in
Bottom Area	=	1385.44236 Sq. in
Moment of Inertia at Top	=	152745. in^4
Moment of Inertia at Bottom	=	152745. in^4
Elastic Modulus	=	3605000. lbs/in^2

-----  
 Ground Slope and Pile Batter Angles  
 -----

Ground Slope Angle	=	0.000 degrees
	=	0.000 radians
Pile Batter Angle	=	0.000 degrees
	=	0.000 radians

-----  
 Soil and Rock Layering Information  
 -----



The soil profile is modelled using 1 layers

Layer 1 is strong rock (vuggy limestone)

Distance from top of pile to top of layer = 39.00000 ft  
 Distance from top of pile to bottom of layer = 70.00000 ft  
 Effective unit weight at top of layer = 98.00000 pcf  
 Effective unit weight at bottom of layer = 98.00000 pcf  
 Uniaxial compressive strength at top of layer = 17000. psi  
 Uniaxial compressive strength at bottom of layer = 17000. psi

(Depth of lowest soil layer extends 20.50 ft below pile tip)

Summary of Soil Properties

Layer Num.	Layer Soil Type (p-y Curve Criteria)	Layer Depth ft	Effective Unit Wt. pcf	Uniaxial qu psi
1	Vuggy Limestone	39.000 70.000	98.000 98.000	17000. 17000.

p-y Modification Factors for Group Action

Distribution of p-y modifiers with depth defined using 2 points

Point No.	Depth X ft	p-mult	y-mult
1	39.000	0.9300	1.0000
2	100.000	0.9300	1.0000

Lateral Soil Movements

Profile of soil movement with depth defined using 2 points

Point No.	Depth X ft	Soil Movement in
1	0.00000	0.00000
2	0.00000	0.00000

Loading Type

-----  
 Static loading criteria were used when computing p-y curves for all analyses.  
 -----

-----  
 Pile-head Loading and Pile-head Fixity Conditions  
 -----

Number of loads specified = 4

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length
1	1	V = 10700. lbs	M = 2616000. in-lbs	810000.	Yes
2	1	V = 20700. lbs	M = 4608000. in-lbs	1155000.	Yes
3	1	V = 10700. lbs	M = 0.0000 in-lbs	810000.	Yes
4	1	V = 20700. lbs	M = 0.0000 in-lbs	1155000.	Yes

V = perpendicular shear force applied to pile head  
 M = bending moment applied to pile head  
 y = lateral deflection relative to pile axis  
 S = pile slope relative to original pile batter angle  
 R = rotational stiffness applied to pile head  
 Axial thrust is assumed to be acting axially for all pile batter angles.

-----  
 Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness  
 -----

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 3

Pile Section No. 1:  
 -----

Moment-curvature properties were derived from elastic section properties

Pile Section No. 2:  
 -----

Moment-curvature properties were derived from elastic section properties

Pile Section No. 3:  
 -----

Moment-curvature properties were derived from elastic section properties

-----  
 Computed Values of Pile Loading and Deflection  
 for Lateral Loading for Load Case Number 1  
 -----

Pile-head conditions are Shear and Moment (Loading Type 1)

I B3\_B-7\_Long\_Scoured. I p7o

Shear force at pile head = 10700.0 lbs  
 Applied moment at pile head = 2616000.0 in-lbs  
 Axial thrust load on pile head = 810000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi *	Bending Stiffness lb-in^2	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.8880	2616000.	10700.	-0.003312	944.3090	5.506E+11	0.000	0.000	0.000
0.495	0.8685	2695425.	10700.	-0.003283	955.2287	5.506E+11	0.000	0.000	0.000
0.990	0.8490	2774710.	10700.	-0.003254	966.1291	5.506E+11	0.000	0.000	0.000
1.485	0.8298	2853851.	10700.	-0.003223	977.0097	5.506E+11	0.000	0.000	0.000
1.980	0.8107	2932843.	10700.	-0.003192	987.8699	5.506E+11	0.000	0.000	0.000
2.475	0.7919	3011684.	10700.	-0.003160	998.7092	5.506E+11	0.000	0.000	0.000
2.970	0.7732	3090368.	10700.	-0.003127	1009.5271	5.506E+11	0.000	0.000	0.000
3.465	0.7547	3168892.	10700.	-0.003093	1020.3228	5.506E+11	0.000	0.000	0.000
3.960	0.7365	3247251.	10700.	-0.003059	1031.0960	5.506E+11	0.000	0.000	0.000
4.455	0.7184	3325442.	10700.	-0.003023	1041.8460	5.506E+11	0.000	0.000	0.000
4.950	0.7005	3403460.	10700.	-0.002987	1052.5722	5.506E+11	0.000	0.000	0.000
5.445	0.6829	3481302.	10700.	-0.002950	1063.2742	5.506E+11	0.000	0.000	0.000
5.940	0.6655	3558963.	10700.	-0.002912	1073.9514	5.506E+11	0.000	0.000	0.000
6.435	0.6483	3636439.	10700.	-0.002873	1084.6031	5.506E+11	0.000	0.000	0.000
6.930	0.6314	3713727.	10700.	-0.002833	1095.2289	5.506E+11	0.000	0.000	0.000
7.425	0.6147	3790821.	10700.	-0.002793	1105.8282	5.506E+11	0.000	0.000	0.000
7.920	0.5982	3867719.	10700.	-0.002752	1116.4004	5.506E+11	0.000	0.000	0.000
8.415	0.5820	3944416.	10700.	-0.002710	1126.9450	5.506E+11	0.000	0.000	0.000
8.910	0.5660	4020909.	10700.	-0.002667	1137.4615	5.506E+11	0.000	0.000	0.000
9.405	0.5503	4097193.	10700.	-0.002623	1147.9493	5.506E+11	0.000	0.000	0.000
9.900	0.5348	4173264.	10700.	-0.002578	1158.4079	5.506E+11	0.000	0.000	0.000
10.395	0.5197	4249118.	10700.	-0.002542	838.9822	9.394E+11	0.000	0.000	0.000
10.890	0.5046	4324843.	10700.	-0.002515	845.9567	9.394E+11	0.000	0.000	0.000
11.385	0.4898	4400437.	10700.	-0.002488	852.9192	9.394E+11	0.000	0.000	0.000
11.880	0.4751	4475897.	10700.	-0.002460	859.8693	9.394E+11	0.000	0.000	0.000
12.375	0.4606	4551221.	10700.	-0.002431	866.8069	9.394E+11	0.000	0.000	0.000
12.870	0.4462	4626406.	10700.	-0.002402	873.7317	9.394E+11	0.000	0.000	0.000
13.365	0.4320	4701450.	10700.	-0.002372	880.6435	9.394E+11	0.000	0.000	0.000
13.860	0.4180	4776351.	10700.	-0.002342	887.5422	9.394E+11	0.000	0.000	0.000
14.355	0.4042	4851107.	10700.	-0.002312	894.4275	9.394E+11	0.000	0.000	0.000
14.850	0.3905	4925716.	10700.	-0.002281	901.2992	9.394E+11	0.000	0.000	0.000
15.345	0.3771	5000174.	10700.	-0.002250	908.1571	9.394E+11	0.000	0.000	0.000
15.840	0.3638	5074481.	10700.	-0.002218	915.0010	9.394E+11	0.000	0.000	0.000
16.335	0.3507	5148633.	10700.	-0.002186	921.8307	9.394E+11	0.000	0.000	0.000
16.830	0.3379	5222628.	10700.	-0.002153	928.6459	9.394E+11	0.000	0.000	0.000
17.325	0.3252	5296465.	10700.	-0.002120	935.4465	9.394E+11	0.000	0.000	0.000
17.820	0.3127	5370140.	10700.	-0.002086	942.2323	9.394E+11	0.000	0.000	0.000
18.315	0.3004	5443652.	10700.	-0.002052	949.0030	9.394E+11	0.000	0.000	0.000
18.810	0.2883	5516999.	10700.	-0.002017	955.7585	9.394E+11	0.000	0.000	0.000
19.305	0.2764	5590177.	10700.	-0.001982	962.4985	9.394E+11	0.000	0.000	0.000
19.800	0.2648	5663186.	10700.	-0.001946	969.2228	9.394E+11	0.000	0.000	0.000
20.295	0.2533	5736022.	10700.	-0.001910	975.9313	9.394E+11	0.000	0.000	0.000
20.790	0.2421	5808684.	10700.	-0.001874	982.6237	9.394E+11	0.000	0.000	0.000
21.285	0.2310	5881169.	10700.	-0.001837	989.2998	9.394E+11	0.000	0.000	0.000
21.780	0.2202	5953475.	10700.	-0.001799	995.9595	9.394E+11	0.000	0.000	0.000
22.275	0.2097	6025599.	10700.	-0.001761	1002.6024	9.394E+11	0.000	0.000	0.000
22.770	0.1993	6097541.	10700.	-0.001723	1009.2285	9.394E+11	0.000	0.000	0.000
23.265	0.1892	6169297.	10700.	-0.001684	1015.8375	9.394E+11	0.000	0.000	0.000
23.760	0.1793	6240865.	10700.	-0.001645	1022.4292	9.394E+11	0.000	0.000	0.000
24.255	0.1697	6312244.	10700.	-0.001605	1029.0034	9.394E+11	0.000	0.000	0.000
24.750	0.1602	6383430.	10700.	-0.001565	1035.5599	9.394E+11	0.000	0.000	0.000

IB3_B-7_Long_Scoured.l p7o									
25.245	0.1511	6454423.	10700.	-0.001525	1042.0985	9.394E+11	0.000	0.000	0.000
25.740	0.1421	6525218.	10700.	-0.001484	1048.6191	9.394E+11	0.000	0.000	0.000
26.235	0.1334	6595816.	10700.	-0.001442	1055.1214	9.394E+11	0.000	0.000	0.000
26.730	0.1250	6666212.	10700.	-0.001400	1061.6051	9.394E+11	0.000	0.000	0.000
27.225	0.1168	6736406.	10700.	-0.001358	1068.0702	9.394E+11	0.000	0.000	0.000
27.720	0.1089	6806395.	10700.	-0.001315	1074.5165	9.394E+11	0.000	0.000	0.000
28.215	0.1012	6876177.	10700.	-0.001272	1080.9436	9.394E+11	0.000	0.000	0.000
28.710	0.0937	6945749.	10700.	-0.001228	1087.3515	9.394E+11	0.000	0.000	0.000
29.205	0.0866	7015111.	10700.	-0.001184	1093.7399	9.394E+11	0.000	0.000	0.000
29.700	0.0797	7084259.	10700.	-0.001139	1100.1087	9.394E+11	0.000	0.000	0.000
30.195	0.0730	7153191.	10700.	-0.001094	1106.4576	9.394E+11	0.000	0.000	0.000
30.690	0.0667	7221906.	10700.	-0.001049	1112.7865	9.394E+11	0.000	0.000	0.000
31.185	0.0606	7290401.	10700.	-0.001003	1119.0951	9.394E+11	0.000	0.000	0.000
31.680	0.0548	7358674.	10700.	-0.000957	1125.3833	9.394E+11	0.000	0.000	0.000
32.175	0.0492	7426723.	10700.	-0.000910	1131.6509	9.394E+11	0.000	0.000	0.000
32.670	0.0440	7494546.	10700.	-0.000863	1137.8977	9.394E+11	0.000	0.000	0.000
33.165	0.0390	7562142.	10700.	-0.000815	1144.1234	9.394E+11	0.000	0.000	0.000
33.660	0.0343	7629507.	10700.	-0.000767	1150.3280	9.394E+11	0.000	0.000	0.000
34.155	0.0299	7696640.	10700.	-0.000719	1156.5112	9.394E+11	0.000	0.000	0.000
34.650	0.0257	7763539.	10700.	-0.000670	1162.6728	9.394E+11	0.000	0.000	0.000
35.145	0.0219	7830202.	10700.	-0.000621	1168.8127	9.394E+11	0.000	0.000	0.000
35.640	0.0184	7896627.	10700.	-0.000571	1174.9307	9.394E+11	0.000	0.000	0.000
36.135	0.0151	7962811.	10700.	-0.000521	1181.0265	9.394E+11	0.000	0.000	0.000
36.630	0.0122	8028753.	10700.	-0.000470	1187.1000	9.394E+11	0.000	0.000	0.000
37.125	0.009528	8094451.	10700.	-0.000419	1193.1510	9.394E+11	0.000	0.000	0.000
37.620	0.007191	8159902.	10700.	-0.000368	1199.1793	9.394E+11	0.000	0.000	0.000
38.115	0.005159	8225105.	10700.	-0.000316	1205.1847	9.394E+11	0.000	0.000	0.000
38.610	0.003437	8290058.	10700.	-0.000264	1211.1671	9.394E+11	0.000	0.000	0.000
39.105	0.002026	8354759.	-84444.	-0.000211	1217.1263	9.394E+11	-32035.	93911400.	0.000
39.600	0.000929	7288897.	-223219.	-0.000162	1118.9566	9.394E+11	-14691.	93911400.	0.000
40.095	0.000106	5704470.	-271825.	-0.000108	1368.9243	5.506E+11	-1674.8979	93911400.	0.000
40.590	-0.000352	4060651.	-260280.	-5.516E-05	1142.9254	5.506E+11	5562.0108	93911400.	0.000
41.085	-0.000549	2612869.	-217966.	-1.916E-05	943.8785	5.506E+11	8685.2624	93911400.	0.000
41.580	-0.000579	1471399.	-164961.	2.865E-06	786.9446	5.506E+11	9161.5377	93911400.	0.000
42.075	-0.000515	653104.	-113554.	1.432E-05	674.4422	5.506E+11	8147.2074	93911400.	0.000
42.570	-0.000409	122238.	-70137.	1.851E-05	601.4566	5.506E+11	6471.2479	93911400.	0.000
43.065	-0.000295	-180305.	-37043.	1.819E-05	609.4399	5.506E+11	4671.4547	93911400.	0.000
43.560	-0.000193	-318013.	-14098.	1.550E-05	628.3726	5.506E+11	3054.3203	93911400.	0.000
44.055	-0.000111	-347937.	198.6989	1.191E-05	632.4866	5.506E+11	1759.3504	93911400.	0.000
44.550	-5.167E-05	-315767.	7850.0427	8.333E-06	628.0638	5.506E+11	816.8597	93911400.	0.000
45.045	-1.229E-05	-254759.	10853.	5.256E-06	619.6761	5.506E+11	194.2582	93911400.	0.000
45.540	1.077E-05	-186884.	10924.	2.874E-06	610.3443	5.506E+11	-170.2586	93911400.	0.000
46.035	2.185E-05	-125006.	9392.6802	1.191E-06	601.8371	5.506E+11	-345.4524	93911400.	0.000
46.530	2.492E-05	-75310.	7196.4805	1.108E-07	595.0047	5.506E+11	-394.0088	93911400.	0.000
47.025	2.317E-05	-39512.	4938.4458	-5.085E-07	590.0831	5.506E+11	-366.2722	93911400.	0.000
47.520	1.888E-05	-16636.	2964.0503	-8.113E-07	586.9380	5.506E+11	-298.5074	93911400.	0.000
48.015	1.353E-05	-4291.7305	1442.2326	-9.242E-07	585.2409	5.506E+11	-213.8891	93911400.	0.000
48.510	7.902E-06	506.3000	435.9604	-9.446E-07	584.7204	5.506E+11	-124.9231	93911400.	0.000
49.005	2.307E-06	896.5685	-43.3769	-9.370E-07	584.7741	5.506E+11	-36.4699	93911400.	0.000
49.500	-3.231E-06	0.000	0.000	-9.322E-07	584.6508	5.506E+11	51.0749	46955700.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 1:

Pile-head deflection = 0.8880475 inches  
 Computed slope at pile head = -0.0033119 radians  
 Maximum bending moment = 8354759. inch-lbs  
 Maximum shear force = -271825. lbs

I B3\_B-7\_Long\_Scoured.l p7o

Depth of maximum bending moment = 39.1050000 feet below pile head  
 Depth of maximum shear force = 40.0950000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 3

-----  
 Pile-head Deflection vs. Pile Length for Load Case 1  
 -----

Boundary Condition Type 1, Shear and Moment

Shear = 10700. lb  
 Moment = 2616000. in-lb  
 Axial Load = 810000. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment in-lbs	Maximum Shear lbs
49.5000	0.8880475	8354759.	-271825.
47.0250	0.8761120	8335622.	-263676.
44.5500	0.8971549	8374779.	-268367.
42.0750	0.8999916	8367266.	-329926.
42.0750	0.000000	19804616462.	-1961241425.
42.0750	0.000000	19804616462.	-1961241425.
42.0750	0.000000	19804616462.	-1961241425.
42.0750	0.000000	19804616462.	-1961241425.
42.0750	0.000000	19804616462.	-1961241425.
42.0750	0.000000	19804616462.	-1961241425.
42.0750	0.000000	19804616462.	-1961241425.
42.0750	0.000000	19804616462.	-1961241425.
42.0750	0.000000	19804616462.	-1961241425.
42.0750	0.000000	19804616462.	-1961241425.
42.0750	0.000000	19804616462.	-1961241425.
42.0750	0.000000	19804616462.	-1961241425.
42.0750	0.000000	19804616462.	-1961241425.
42.0750	0.000000	19804616462.	-1961241425.
42.0750	0.000000	19804616462.	-1961241425.
42.0750	0.000000	19804616462.	-1961241425.
42.0750	0.000000	19804616462.	-1961241425.

-----  
 Computed Values of Pile Loading and Deflection  
 for Lateral Loading for Load Case Number 2  
 -----

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 20700.0 lbs  
 Applied moment at pile head = 4608000.0 in-lbs  
 Axial thrust load on pile head = 1155000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in <sup>2</sup>	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	1.7206	4608000.	20700.	-0.006341	1467.1951	5.506E+11	0.000	0.000	0.000

I B3\_B-7\_Long\_Scoured. I p7o

0.495	1.6831	4774290.	20700.	-0.006290	1490.0573	5.506E+11	0.000	0.000	0.000
0.990	1.6459	4940226.	20700.	-0.006238	1512.8710	5.506E+11	0.000	0.000	0.000
1.485	1.6090	5105797.	20700.	-0.006184	1535.6343	5.506E+11	0.000	0.000	0.000
1.980	1.5724	5270990.	20700.	-0.006128	1558.3457	5.506E+11	0.000	0.000	0.000
2.475	1.5362	5435793.	20700.	-0.006070	1581.0035	5.506E+11	0.000	0.000	0.000
2.970	1.5003	5600194.	20700.	-0.006010	1603.6059	5.506E+11	0.000	0.000	0.000
3.465	1.4648	5764180.	20700.	-0.005949	1626.1514	5.506E+11	0.000	0.000	0.000
3.960	1.4297	5927740.	20700.	-0.005886	1648.6383	5.506E+11	0.000	0.000	0.000
4.455	1.3949	6090861.	20700.	-0.005821	1671.0648	5.506E+11	0.000	0.000	0.000
4.950	1.3605	6253531.	20700.	-0.005755	1693.4293	5.506E+11	0.000	0.000	0.000
5.445	1.3265	6415738.	20700.	-0.005686	1715.7302	5.506E+11	0.000	0.000	0.000
5.940	1.2929	6577470.	20700.	-0.005616	1737.9659	5.506E+11	0.000	0.000	0.000
6.435	1.2598	6738716.	20700.	-0.005544	1760.1346	5.506E+11	0.000	0.000	0.000
6.930	1.2271	6899463.	20700.	-0.005471	1782.2347	5.506E+11	0.000	0.000	0.000
7.425	1.1948	7059699.	20700.	-0.005396	1804.2646	5.506E+11	0.000	0.000	0.000
7.920	1.1630	7219413.	20700.	-0.005319	1826.2227	5.506E+11	0.000	0.000	0.000
8.415	1.1316	7378593.	20700.	-0.005240	1848.1074	5.506E+11	0.000	0.000	0.000
8.910	1.1007	7537226.	20700.	-0.005159	1869.9169	5.506E+11	0.000	0.000	0.000
9.405	1.0703	7695302.	20700.	-0.005077	1891.6498	5.506E+11	0.000	0.000	0.000
9.900	1.0404	7852808.	20700.	-0.004993	1913.3044	5.506E+11	0.000	0.000	0.000
10.395	1.0110	8009733.	20700.	-0.004926	1376.0025	9.394E+11	0.000	0.000	0.000
10.890	0.9819	8166310.	20700.	-0.004874	1390.4239	9.394E+11	0.000	0.000	0.000
11.385	0.9531	8322534.	20700.	-0.004822	1404.8126	9.394E+11	0.000	0.000	0.000
11.880	0.9246	8478396.	20700.	-0.004769	1419.1680	9.394E+11	0.000	0.000	0.000
12.375	0.8964	8633890.	20700.	-0.004715	1433.4896	9.394E+11	0.000	0.000	0.000
12.870	0.8686	8789010.	20700.	-0.004660	1447.7767	9.394E+11	0.000	0.000	0.000
13.365	0.8411	8943748.	20700.	-0.004604	1462.0287	9.394E+11	0.000	0.000	0.000
13.860	0.8139	9098099.	20700.	-0.004547	1476.2449	9.394E+11	0.000	0.000	0.000
14.355	0.7871	9252055.	20700.	-0.004489	1490.4248	9.394E+11	0.000	0.000	0.000
14.850	0.7606	9405609.	20700.	-0.004430	1504.5677	9.394E+11	0.000	0.000	0.000
15.345	0.7344	9558755.	20700.	-0.004370	1518.6730	9.394E+11	0.000	0.000	0.000
15.840	0.7087	9711487.	20700.	-0.004309	1532.7401	9.394E+11	0.000	0.000	0.000
16.335	0.6832	9863798.	20700.	-0.004247	1546.7685	9.394E+11	0.000	0.000	0.000
16.830	0.6582	10015680.	20700.	-0.004184	1560.7574	9.394E+11	0.000	0.000	0.000
17.325	0.6335	10167128.	20700.	-0.004120	1574.7063	9.394E+11	0.000	0.000	0.000
17.820	0.6092	10318135.	20700.	-0.004056	1588.6145	9.394E+11	0.000	0.000	0.000
18.315	0.5854	10468694.	20700.	-0.003990	1602.4816	9.394E+11	0.000	0.000	0.000
18.810	0.5618	10618799.	20700.	-0.003923	1616.3068	9.394E+11	0.000	0.000	0.000
19.305	0.5387	10768444.	20700.	-0.003856	1630.0896	9.394E+11	0.000	0.000	0.000
19.800	0.5160	10917621.	20700.	-0.003787	1643.8293	9.394E+11	0.000	0.000	0.000
20.295	0.4938	11066325.	20700.	-0.003718	1657.5255	9.394E+11	0.000	0.000	0.000
20.790	0.4719	11214548.	20700.	-0.003647	1671.1774	9.394E+11	0.000	0.000	0.000
21.285	0.4504	11362285.	20700.	-0.003576	1684.7845	9.394E+11	0.000	0.000	0.000
21.780	0.4294	11509529.	20700.	-0.003503	1698.3462	9.394E+11	0.000	0.000	0.000
22.275	0.4088	11656274.	20700.	-0.003430	1711.8619	9.394E+11	0.000	0.000	0.000
22.770	0.3886	11802513.	20700.	-0.003356	1725.3311	9.394E+11	0.000	0.000	0.000
23.265	0.3689	11948240.	20700.	-0.003281	1738.7530	9.394E+11	0.000	0.000	0.000
23.760	0.3497	12093449.	20700.	-0.003205	1752.1273	9.394E+11	0.000	0.000	0.000
24.255	0.3309	12238133.	20700.	-0.003128	1765.4532	9.394E+11	0.000	0.000	0.000
24.750	0.3125	12382286.	20700.	-0.003050	1778.7302	9.394E+11	0.000	0.000	0.000
25.245	0.2946	12525902.	20700.	-0.002971	1791.9578	9.394E+11	0.000	0.000	0.000
25.740	0.2772	12668975.	20700.	-0.002892	1805.1353	9.394E+11	0.000	0.000	0.000
26.235	0.2603	12811498.	20700.	-0.002811	1818.2621	9.394E+11	0.000	0.000	0.000
26.730	0.2438	12953465.	20700.	-0.002730	1831.3378	9.394E+11	0.000	0.000	0.000
27.225	0.2278	13094870.	20700.	-0.002647	1844.3617	9.394E+11	0.000	0.000	0.000
27.720	0.2124	13235707.	20700.	-0.002564	1857.3333	9.394E+11	0.000	0.000	0.000
28.215	0.1974	13375970.	20700.	-0.002480	1870.2521	9.394E+11	0.000	0.000	0.000
28.710	0.1829	13515653.	20700.	-0.002395	1883.1173	9.394E+11	0.000	0.000	0.000
29.205	0.1689	13654749.	20700.	-0.002309	1895.9286	9.394E+11	0.000	0.000	0.000
29.700	0.1555	13793253.	20700.	-0.002222	1908.6853	9.394E+11	0.000	0.000	0.000

IB3_B-7_Long_Scoured.l p7o									
30.195	0.1425	13931159.	20700.	-0.002135	1921.3869	9.394E+11	0.000	0.000	0.000
30.690	0.1301	14068460.	20700.	-0.002046	1934.0328	9.394E+11	0.000	0.000	0.000
31.185	0.1182	14205151.	20700.	-0.001957	1946.6225	9.394E+11	0.000	0.000	0.000
31.680	0.1069	14341226.	20700.	-0.001867	1959.1555	9.394E+11	0.000	0.000	0.000
32.175	0.0960	14476678.	20700.	-0.001775	1971.6311	9.394E+11	0.000	0.000	0.000
32.670	0.0858	14611502.	20700.	-0.001683	1984.0490	9.394E+11	0.000	0.000	0.000
33.165	0.0760	14745693.	20700.	-0.001591	1996.4084	9.394E+11	0.000	0.000	0.000
33.660	0.0669	14879244.	20700.	-0.001497	2008.7089	9.394E+11	0.000	0.000	0.000
34.155	0.0583	15012149.	20700.	-0.001402	2020.9499	9.394E+11	0.000	0.000	0.000
34.650	0.0502	15144403.	20700.	-0.001307	2033.1310	9.394E+11	0.000	0.000	0.000
35.145	0.0427	15276000.	20700.	-0.001211	2045.2516	9.394E+11	0.000	0.000	0.000
35.640	0.0358	15406935.	20700.	-0.001114	2057.3111	9.394E+11	0.000	0.000	0.000
36.135	0.0295	15537201.	20700.	-0.001016	2069.3090	9.394E+11	0.000	0.000	0.000
36.630	0.0237	15666792.	20700.	-0.000917	2081.2449	9.394E+11	0.000	0.000	0.000
37.125	0.0186	15795705.	20700.	-0.000818	2093.1182	9.394E+11	0.000	0.000	0.000
37.620	0.0140	15923932.	20700.	-0.000718	2104.9284	9.394E+11	0.000	0.000	0.000
38.115	0.0101	16051468.	20700.	-0.000617	2116.6749	9.394E+11	0.000	0.000	0.000
38.610	0.006707	16178308.	20700.	-0.000515	2128.3573	9.394E+11	0.000	0.000	0.000
39.105	0.003954	16304446.	-164950.	-0.000412	2139.9750	9.394E+11	-62509.	93911400.	0.000
39.600	0.001813	14224351.	-435727.	-0.000315	1948.3909	9.394E+11	-28662.	93911400.	0.000
40.095	0.000206	11132332.	-530545.	-0.000210	2364.1865	5.506E+11	-3262.8849	93911400.	0.000
40.590	-0.000687	7924362.	-507985.	-0.000108	1923.1419	5.506E+11	10859.	93911400.	0.000
41.085	-0.001072	5098945.	-425385.	-3.739E-05	1534.6922	5.506E+11	16953.	93911400.	0.000
41.580	-0.001131	2871304.	-321928.	5.601E-06	1228.4272	5.506E+11	17881.	93911400.	0.000
42.075	-0.001006	1274363.	-221596.	2.796E-05	1008.8733	5.506E+11	15901.	93911400.	0.000
42.570	-0.000799	238364.	-136861.	3.612E-05	866.4400	5.506E+11	12629.	93911400.	0.000
43.065	-0.000577	-352041.	-72275.	3.551E-05	882.0688	5.506E+11	9116.5676	93911400.	0.000
43.560	-0.000377	-620755.	-27497.	3.026E-05	919.0126	5.506E+11	5960.3572	93911400.	0.000
44.055	-0.000217	-679120.	401.3536	2.325E-05	927.0369	5.506E+11	3433.0049	93911400.	0.000
44.550	-0.000101	-616306.	15330.	1.626E-05	918.4010	5.506E+11	1593.6376	93911400.	0.000
45.045	-2.395E-05	-497217.	21188.	1.026E-05	902.0281	5.506E+11	378.6213	93911400.	0.000
45.540	2.104E-05	-364732.	21325.	5.607E-06	883.8136	5.506E+11	-332.6876	93911400.	0.000
46.035	4.266E-05	-243959.	18333.	2.324E-06	867.2092	5.506E+11	-674.5032	93911400.	0.000
46.530	4.865E-05	-146966.	14045.	2.154E-07	853.8742	5.506E+11	-769.1755	93911400.	0.000
47.025	4.522E-05	-77102.	9637.5399	-9.931E-07	844.2690	5.506E+11	-714.9632	93911400.	0.000
47.520	3.685E-05	-32459.	5783.6508	-1.584E-06	838.1313	5.506E+11	-582.6425	93911400.	0.000
48.015	2.640E-05	-8370.4517	2813.4068	-1.804E-06	834.8196	5.506E+11	-417.4396	93911400.	0.000
48.510	1.542E-05	989.4873	849.6530	-1.844E-06	833.8048	5.506E+11	-243.7570	93911400.	0.000
49.005	4.496E-06	1748.7297	-85.4030	-1.829E-06	833.9092	5.506E+11	-71.0767	93911400.	0.000
49.500	-6.314E-06	0.000	0.000	-1.820E-06	833.6687	5.506E+11	99.8320	46955700.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 2:

Pile-head deflection = 1.7206322 inches  
 Computed slope at pile head = -0.0063408 radians  
 Maximum bending moment = 16304446. inch-lbs  
 Maximum shear force = -530545. lbs  
 Depth of maximum bending moment = 39.1050000 feet below pile head  
 Depth of maximum shear force = 40.0950000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 3

-----  
 Pile-head Deflection vs. Pile Length for Load Case 2  
 -----





I B3\_B-7\_Long\_Scoured. I p7o

5. 445	0. 3987	782084.	10700.	-0. 001536	692. 1749	5. 506E+11	0. 000	0. 000	0. 000
5. 940	0. 3896	853013.	10700.	-0. 001527	701. 9265	5. 506E+11	0. 000	0. 000	0. 000
6. 435	0. 3806	923897.	10700.	-0. 001518	711. 6719	5. 506E+11	0. 000	0. 000	0. 000
6. 930	0. 3716	994734.	10700.	-0. 001507	721. 4108	5. 506E+11	0. 000	0. 000	0. 000
7. 425	0. 3627	1065519.	10700.	-0. 001496	731. 1426	5. 506E+11	0. 000	0. 000	0. 000
7. 920	0. 3538	1136248.	10700.	-0. 001484	740. 8668	5. 506E+11	0. 000	0. 000	0. 000
8. 415	0. 3450	1206919.	10700.	-0. 001472	750. 5829	5. 506E+11	0. 000	0. 000	0. 000
8. 910	0. 3363	1277527.	10700.	-0. 001458	760. 2904	5. 506E+11	0. 000	0. 000	0. 000
9. 405	0. 3277	1348069.	10700.	-0. 001444	769. 9887	5. 506E+11	0. 000	0. 000	0. 000
9. 900	0. 3192	1418540.	10700.	-0. 001429	779. 6774	5. 506E+11	0. 000	0. 000	0. 000
10. 395	0. 3107	1488938.	10700.	-0. 001417	584. 7598	9. 394E+11	0. 000	0. 000	0. 000
10. 890	0. 3023	1559291.	10700.	-0. 001407	591. 2395	9. 394E+11	0. 000	0. 000	0. 000
11. 385	0. 2940	1629596.	10700.	-0. 001397	597. 7149	9. 394E+11	0. 000	0. 000	0. 000
11. 880	0. 2857	1699852.	10700.	-0. 001387	604. 1857	9. 394E+11	0. 000	0. 000	0. 000
12. 375	0. 2775	1770056.	10700.	-0. 001376	610. 6518	9. 394E+11	0. 000	0. 000	0. 000
12. 870	0. 2694	1840206.	10700.	-0. 001364	617. 1128	9. 394E+11	0. 000	0. 000	0. 000
13. 365	0. 2613	1910301.	10700.	-0. 001352	623. 5688	9. 394E+11	0. 000	0. 000	0. 000
13. 860	0. 2533	1980337.	10700.	-0. 001340	630. 0193	9. 394E+11	0. 000	0. 000	0. 000
14. 355	0. 2454	2050313.	10700.	-0. 001327	636. 4644	9. 394E+11	0. 000	0. 000	0. 000
14. 850	0. 2376	2120226.	10700.	-0. 001314	642. 9036	9. 394E+11	0. 000	0. 000	0. 000
15. 345	0. 2298	2190075.	10700.	-0. 001301	649. 3370	9. 394E+11	0. 000	0. 000	0. 000
15. 840	0. 2221	2259857.	10700.	-0. 001287	655. 7642	9. 394E+11	0. 000	0. 000	0. 000
16. 335	0. 2145	2329571.	10700.	-0. 001272	662. 1850	9. 394E+11	0. 000	0. 000	0. 000
16. 830	0. 2070	2399214.	10700.	-0. 001257	668. 5994	9. 394E+11	0. 000	0. 000	0. 000
17. 325	0. 1996	2468783.	10700.	-0. 001242	675. 0070	9. 394E+11	0. 000	0. 000	0. 000
17. 820	0. 1923	2538278.	10700.	-0. 001226	681. 4077	9. 394E+11	0. 000	0. 000	0. 000
18. 315	0. 1850	2607695.	10700.	-0. 001210	687. 8013	9. 394E+11	0. 000	0. 000	0. 000
18. 810	0. 1779	2677033.	10700.	-0. 001193	694. 1876	9. 394E+11	0. 000	0. 000	0. 000
19. 305	0. 1708	2746290.	10700.	-0. 001176	700. 5663	9. 394E+11	0. 000	0. 000	0. 000
19. 800	0. 1639	2815463.	10700.	-0. 001158	706. 9374	9. 394E+11	0. 000	0. 000	0. 000
20. 295	0. 1571	2884550.	10700.	-0. 001140	713. 3006	9. 394E+11	0. 000	0. 000	0. 000
20. 790	0. 1504	2953550.	10700.	-0. 001122	719. 6557	9. 394E+11	0. 000	0. 000	0. 000
21. 285	0. 1438	3022460.	10700.	-0. 001103	726. 0025	9. 394E+11	0. 000	0. 000	0. 000
21. 780	0. 1373	3091277.	10700.	-0. 001083	732. 3409	9. 394E+11	0. 000	0. 000	0. 000
22. 275	0. 1309	3160001.	10700.	-0. 001064	738. 6706	9. 394E+11	0. 000	0. 000	0. 000
22. 770	0. 1246	3228629.	10700.	-0. 001043	744. 9915	9. 394E+11	0. 000	0. 000	0. 000
23. 265	0. 1185	3297158.	10700.	-0. 001023	751. 3033	9. 394E+11	0. 000	0. 000	0. 000
23. 760	0. 1125	3365587.	10700.	-0. 001002	757. 6058	9. 394E+11	0. 000	0. 000	0. 000
24. 255	0. 1066	3433914.	10700.	-0. 000980	763. 8989	9. 394E+11	0. 000	0. 000	0. 000
24. 750	0. 1008	3502136.	10700.	-0. 000958	770. 1824	9. 394E+11	0. 000	0. 000	0. 000
25. 245	0. 0952	3570252.	10700.	-0. 000936	776. 4561	9. 394E+11	0. 000	0. 000	0. 000
25. 740	0. 0897	3638259.	10700.	-0. 000913	782. 7198	9. 394E+11	0. 000	0. 000	0. 000
26. 235	0. 0844	3706155.	10700.	-0. 000890	788. 9733	9. 394E+11	0. 000	0. 000	0. 000
26. 730	0. 0791	3773938.	10700.	-0. 000866	795. 2164	9. 394E+11	0. 000	0. 000	0. 000
27. 225	0. 0741	3841607.	10700.	-0. 000842	801. 4490	9. 394E+11	0. 000	0. 000	0. 000
27. 720	0. 0691	3909159.	10700.	-0. 000818	807. 6707	9. 394E+11	0. 000	0. 000	0. 000
28. 215	0. 0644	3976592.	10700.	-0. 000793	813. 8815	9. 394E+11	0. 000	0. 000	0. 000
28. 710	0. 0597	4043904.	10700.	-0. 000767	820. 0812	9. 394E+11	0. 000	0. 000	0. 000
29. 205	0. 0552	4111093.	10700.	-0. 000742	826. 2696	9. 394E+11	0. 000	0. 000	0. 000
29. 700	0. 0509	4178157.	10700.	-0. 000715	832. 4464	9. 394E+11	0. 000	0. 000	0. 000
30. 195	0. 0467	4245094.	10700.	-0. 000689	838. 6115	9. 394E+11	0. 000	0. 000	0. 000
30. 690	0. 0427	4311901.	10700.	-0. 000662	844. 7647	9. 394E+11	0. 000	0. 000	0. 000
31. 185	0. 0389	4378577.	10700.	-0. 000634	850. 9058	9. 394E+11	0. 000	0. 000	0. 000
31. 680	0. 0352	4445121.	10700.	-0. 000606	857. 0347	9. 394E+11	0. 000	0. 000	0. 000
32. 175	0. 0317	4511529.	10700.	-0. 000578	863. 1511	9. 394E+11	0. 000	0. 000	0. 000
32. 670	0. 0283	4577799.	10700.	-0. 000549	869. 2549	9. 394E+11	0. 000	0. 000	0. 000
33. 165	0. 0251	4643931.	10700.	-0. 000520	875. 3458	9. 394E+11	0. 000	0. 000	0. 000
33. 660	0. 0221	4709921.	10700.	-0. 000491	881. 4237	9. 394E+11	0. 000	0. 000	0. 000
34. 155	0. 0193	4775768.	10700.	-0. 000461	887. 4885	9. 394E+11	0. 000	0. 000	0. 000
34. 650	0. 0167	4841469.	10700.	-0. 000430	893. 5398	9. 394E+11	0. 000	0. 000	0. 000

IB3_B-7_Long_Scoured.l p7o									
35.145	0.0142	4907023.	10700.	-0.000399	899.5776	9.394E+11	0.000	0.000	0.000
35.640	0.0119	4972428.	10700.	-0.000368	905.6016	9.394E+11	0.000	0.000	0.000
36.135	0.009836	5037682.	10700.	-0.000336	911.6117	9.394E+11	0.000	0.000	0.000
36.630	0.007931	5102782.	10700.	-0.000304	917.6077	9.394E+11	0.000	0.000	0.000
37.125	0.006219	5167727.	10700.	-0.000272	923.5894	9.394E+11	0.000	0.000	0.000
37.620	0.004701	5232515.	10700.	-0.000239	929.5565	9.394E+11	0.000	0.000	0.000
38.115	0.003379	5297144.	10700.	-0.000206	935.5091	9.394E+11	0.000	0.000	0.000
38.610	0.002256	5361612.	10700.	-0.000172	941.4468	9.394E+11	0.000	0.000	0.000
39.105	0.001334	5425916.	-51949.	-0.000138	947.3694	9.394E+11	-21094.	93911400.	0.000
39.600	0.000616	4745791.	-143544.	-0.000106	884.7275	9.394E+11	-9746.5021	93911400.	0.000
40.095	7.700E-05	3721630.	-176107.	-7.075E-05	1096.3155	5.506E+11	-1217.4359	93911400.	0.000
40.590	-0.000224	2654320.	-169205.	-3.636E-05	949.5774	5.506E+11	3541.4196	93911400.	0.000
41.085	-0.000355	1711827.	-142021.	-1.281E-05	819.9996	5.506E+11	5611.3065	93911400.	0.000
41.580	-0.000376	967231.	-107693.	1.642E-06	717.6297	5.506E+11	5947.0213	93911400.	0.000
42.075	-0.000335	432418.	-74281.	9.191E-06	644.1014	5.506E+11	5302.8788	93911400.	0.000
42.570	-0.000267	84687.	-45996.	1.198E-05	596.2939	5.506E+11	4220.6736	93911400.	0.000
43.065	-0.000193	-114128.	-24394.	1.182E-05	600.3415	5.506E+11	3052.6757	93911400.	0.000
43.560	-0.000127	-205227.	-9386.6589	1.010E-05	612.8663	5.506E+11	2000.2952	93911400.	0.000
44.055	-7.311E-05	-225738.	-12.9944	7.775E-06	615.6862	5.506E+11	1155.8208	93911400.	0.000
44.550	-3.416E-05	-205456.	5023.6861	5.449E-06	612.8978	5.506E+11	540.0313	93911400.	0.000
45.045	-8.373E-06	-166109.	7020.7475	3.445E-06	607.4882	5.506E+11	132.3800	93911400.	0.000
45.540	6.767E-06	-122083.	7096.1449	1.890E-06	601.4353	5.506E+11	-106.9936	93911400.	0.000
46.035	1.409E-05	-81825.	6116.9823	7.906E-07	595.9005	5.506E+11	-222.6907	93911400.	0.000
46.530	1.616E-05	-49421.	4696.7726	8.274E-08	591.4454	5.506E+11	-255.4944	93911400.	0.000
47.025	1.507E-05	-26028.	3230.4051	-3.242E-07	588.2293	5.506E+11	-238.2321	93911400.	0.000
47.520	1.231E-05	-11040.	1944.8890	-5.241E-07	586.1687	5.506E+11	-194.6016	93911400.	0.000
48.015	8.842E-06	-2918.1301	951.7562	-5.994E-07	585.0520	5.506E+11	-139.7865	93911400.	0.000
48.510	5.188E-06	272.1757	293.0049	-6.137E-07	584.6882	5.506E+11	-82.0152	93911400.	0.000
49.005	1.551E-06	568.6741	-23.4038	-6.092E-07	584.7290	5.506E+11	-24.5197	93911400.	0.000
49.500	-2.049E-06	0.000	0.000	-6.061E-07	584.6508	5.506E+11	32.3998	46955700.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 3:

Pile-head deflection = 0.5011294 inches  
 Computed slope at pile head = -0.0015826 radians  
 Maximum bending moment = 5425916. inch-lbs  
 Maximum shear force = -176107. lbs  
 Depth of maximum bending moment = 39.1050000 feet below pile head  
 Depth of maximum shear force = 40.0950000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 3

-----  
 Pile-head Deflection vs. Pile Length for Load Case 3  
 -----

Boundary Condition Type 1, Shear and Moment

Shear = 10700. lb  
 Moment = 0. in-lb  
 Axial Load = 810000. lb

Pile Length	Pile Head Deflection	Maximum Moment	Maximum Shear
-------------	----------------------	----------------	---------------



I B3\_B-7\_Long\_Scoured. I p7o

10. 395	0. 6254	3025836.	20700.	-0. 002857	916. 9679	9. 394E+11	0. 000	0. 000	0. 000
10. 890	0. 6085	3168332.	20700.	-0. 002838	930. 0923	9. 394E+11	0. 000	0. 000	0. 000
11. 385	0. 5917	3310690.	20700.	-0. 002817	943. 2039	9. 394E+11	0. 000	0. 000	0. 000
11. 880	0. 5750	3452904.	20700.	-0. 002796	956. 3024	9. 394E+11	0. 000	0. 000	0. 000
12. 375	0. 5585	3594968.	20700.	-0. 002774	969. 3870	9. 394E+11	0. 000	0. 000	0. 000
12. 870	0. 5421	3736877.	20700.	-0. 002750	982. 4573	9. 394E+11	0. 000	0. 000	0. 000
13. 365	0. 5258	3878623.	20700.	-0. 002726	995. 5126	9. 394E+11	0. 000	0. 000	0. 000
13. 860	0. 5097	4020202.	20700.	-0. 002701	1008. 5525	9. 394E+11	0. 000	0. 000	0. 000
14. 355	0. 4937	4161605.	20700.	-0. 002675	1021. 5763	9. 394E+11	0. 000	0. 000	0. 000
14. 850	0. 4779	4302829.	20700.	-0. 002649	1034. 5835	9. 394E+11	0. 000	0. 000	0. 000
15. 345	0. 4622	4443865.	20700.	-0. 002621	1047. 5734	9. 394E+11	0. 000	0. 000	0. 000
15. 840	0. 4468	4584709.	20700.	-0. 002592	1060. 5456	9. 394E+11	0. 000	0. 000	0. 000
16. 335	0. 4314	4725354.	20700.	-0. 002563	1073. 4995	9. 394E+11	0. 000	0. 000	0. 000
16. 830	0. 4163	4865794.	20700.	-0. 002533	1086. 4345	9. 394E+11	0. 000	0. 000	0. 000
17. 325	0. 4014	5006023.	20700.	-0. 002502	1099. 3501	9. 394E+11	0. 000	0. 000	0. 000
17. 820	0. 3866	5146034.	20700.	-0. 002469	1112. 2457	9. 394E+11	0. 000	0. 000	0. 000
18. 315	0. 3720	5285823.	20700.	-0. 002436	1125. 1207	9. 394E+11	0. 000	0. 000	0. 000
18. 810	0. 3576	5425382.	20700.	-0. 002403	1137. 9746	9. 394E+11	0. 000	0. 000	0. 000
19. 305	0. 3435	5564705.	20700.	-0. 002368	1150. 8068	9. 394E+11	0. 000	0. 000	0. 000
19. 800	0. 3295	5703788.	20700.	-0. 002332	1163. 6168	9. 394E+11	0. 000	0. 000	0. 000
20. 295	0. 3158	5842622.	20700.	-0. 002296	1176. 4039	9. 394E+11	0. 000	0. 000	0. 000
20. 790	0. 3022	5981204.	20700.	-0. 002258	1189. 1678	9. 394E+11	0. 000	0. 000	0. 000
21. 285	0. 2889	6119526.	20700.	-0. 002220	1201. 9077	9. 394E+11	0. 000	0. 000	0. 000
21. 780	0. 2759	6257582.	20700.	-0. 002181	1214. 6232	9. 394E+11	0. 000	0. 000	0. 000
22. 275	0. 2630	6395367.	20700.	-0. 002141	1227. 3137	9. 394E+11	0. 000	0. 000	0. 000
22. 770	0. 2504	6532875.	20700.	-0. 002100	1239. 9786	9. 394E+11	0. 000	0. 000	0. 000
23. 265	0. 2381	6670099.	20700.	-0. 002058	1252. 6174	9. 394E+11	0. 000	0. 000	0. 000
23. 760	0. 2260	6807033.	20700.	-0. 002016	1265. 2296	9. 394E+11	0. 000	0. 000	0. 000
24. 255	0. 2141	6943673.	20700.	-0. 001972	1277. 8146	9. 394E+11	0. 000	0. 000	0. 000
24. 750	0. 2026	7080011.	20700.	-0. 001928	1290. 3718	9. 394E+11	0. 000	0. 000	0. 000
25. 245	0. 1912	7216042.	20700.	-0. 001883	1302. 9008	9. 394E+11	0. 000	0. 000	0. 000
25. 740	0. 1802	7351760.	20700.	-0. 001837	1315. 4009	9. 394E+11	0. 000	0. 000	0. 000
26. 235	0. 1694	7487159.	20700.	-0. 001790	1327. 8716	9. 394E+11	0. 000	0. 000	0. 000
26. 730	0. 1589	7622233.	20700.	-0. 001742	1340. 3124	9. 394E+11	0. 000	0. 000	0. 000
27. 225	0. 1487	7756977.	20700.	-0. 001693	1352. 7228	9. 394E+11	0. 000	0. 000	0. 000
27. 720	0. 1388	7891384.	20700.	-0. 001644	1365. 1021	9. 394E+11	0. 000	0. 000	0. 000
28. 215	0. 1292	8025448.	20700.	-0. 001594	1377. 4500	9. 394E+11	0. 000	0. 000	0. 000
28. 710	0. 1199	8159165.	20700.	-0. 001542	1389. 7657	9. 394E+11	0. 000	0. 000	0. 000
29. 205	0. 1109	8292528.	20700.	-0. 001490	1402. 0489	9. 394E+11	0. 000	0. 000	0. 000
29. 700	0. 1022	8425530.	20700.	-0. 001437	1414. 2989	9. 394E+11	0. 000	0. 000	0. 000
30. 195	0. 0938	8558168.	20700.	-0. 001384	1426. 5153	9. 394E+11	0. 000	0. 000	0. 000
30. 690	0. 0857	8690434.	20700.	-0. 001329	1438. 6975	9. 394E+11	0. 000	0. 000	0. 000
31. 185	0. 0780	8822323.	20700.	-0. 001274	1450. 8449	9. 394E+11	0. 000	0. 000	0. 000
31. 680	0. 0706	8953829.	20700.	-0. 001218	1462. 9571	9. 394E+11	0. 000	0. 000	0. 000
32. 175	0. 0635	9084947.	20700.	-0. 001161	1475. 0335	9. 394E+11	0. 000	0. 000	0. 000
32. 670	0. 0568	9215670.	20700.	-0. 001103	1487. 0736	9. 394E+11	0. 000	0. 000	0. 000
33. 165	0. 0504	9345994.	20700.	-0. 001044	1499. 0769	9. 394E+11	0. 000	0. 000	0. 000
33. 660	0. 0444	9475913.	20700.	-0. 000985	1511. 0429	9. 394E+11	0. 000	0. 000	0. 000
34. 155	0. 0387	9605420.	20700.	-0. 000924	1522. 9710	9. 394E+11	0. 000	0. 000	0. 000
34. 650	0. 0334	9734511.	20700.	-0. 000863	1534. 8607	9. 394E+11	0. 000	0. 000	0. 000
35. 145	0. 0285	9863179.	20700.	-0. 000801	1546. 7115	9. 394E+11	0. 000	0. 000	0. 000
35. 640	0. 0239	9991420.	20700.	-0. 000738	1558. 5229	9. 394E+11	0. 000	0. 000	0. 000
36. 135	0. 0197	10119227.	20700.	-0. 000675	1570. 2944	9. 394E+11	0. 000	0. 000	0. 000
36. 630	0. 0159	10246595.	20700.	-0. 000610	1582. 0254	9. 394E+11	0. 000	0. 000	0. 000
37. 125	0. 0125	10373518.	20700.	-0. 000545	1593. 7155	9. 394E+11	0. 000	0. 000	0. 000
37. 620	0. 009417	10499992.	20700.	-0. 000479	1605. 3642	9. 394E+11	0. 000	0. 000	0. 000
38. 115	0. 006768	10626009.	20700.	-0. 000412	1616. 9709	9. 394E+11	0. 000	0. 000	0. 000
38. 610	0. 004517	10751566.	20700.	-0. 000345	1628. 5351	9. 394E+11	0. 000	0. 000	0. 000
39. 105	0. 002671	10876657.	-104724.	-0. 000276	1640. 0564	9. 394E+11	-42230.	93911400.	0. 000
39. 600	0. 001233	9511242.	-288058.	-0. 000212	1514. 2968	9. 394E+11	-19499.	93911400.	0. 000

I B3\_B-7\_Long\_Scoured.l p7o

40.095	0.000153	7457436.	-353141.	-0.000142	1858.9470	5.506E+11	-2414.9279	93911400.	0.000
40.590	-0.000450	5317871.	-339185.	-7.278E-05	1564.7910	5.506E+11	7113.8840	93911400.	0.000
41.085	-0.000712	3428916.	-284628.	-2.561E-05	1305.0899	5.506E+11	11255.	93911400.	0.000
41.580	-0.000754	1936838.	-215788.	3.335E-06	1099.9530	5.506E+11	11923.	93911400.	0.000
42.075	-0.000672	865312.	-148808.	1.845E-05	952.6353	5.506E+11	10629.	93911400.	0.000
42.570	-0.000535	168751.	-92119.	2.403E-05	856.8694	5.506E+11	8458.1045	93911400.	0.000
43.065	-0.000387	-229390.	-48833.	2.370E-05	865.2062	5.506E+11	6116.2707	93911400.	0.000
43.560	-0.000253	-411710.	-18767.	2.024E-05	890.2722	5.506E+11	4006.8209	93911400.	0.000
44.055	-0.000146	-452624.	6.7973	1.558E-05	895.8973	5.506E+11	2314.4550	93911400.	0.000
44.550	-6.835E-05	-411843.	10090.	1.092E-05	890.2905	5.506E+11	1080.6216	93911400.	0.000
45.045	-1.670E-05	-332903.	14084.	6.900E-06	879.4375	5.506E+11	264.0068	93911400.	0.000
45.540	1.362E-05	-244623.	14228.	3.785E-06	867.3005	5.506E+11	-215.3599	93911400.	0.000
46.035	2.827E-05	-163923.	12261.	1.581E-06	856.2056	5.506E+11	-446.9106	93911400.	0.000
46.530	3.241E-05	-98981.	9412.1127	1.635E-07	847.2770	5.506E+11	-512.3981	93911400.	0.000
47.025	3.021E-05	-52110.	6471.7800	-6.515E-07	840.8330	5.506E+11	-477.6129	93911400.	0.000
47.520	2.467E-05	-22087.	3894.8577	-1.052E-06	836.7054	5.506E+11	-390.0377	93911400.	0.000
48.015	1.772E-05	-5824.4383	1904.5864	-1.202E-06	834.4695	5.506E+11	-280.0873	93911400.	0.000
48.510	1.039E-05	556.0250	584.9453	-1.231E-06	833.7452	5.506E+11	-164.2363	93911400.	0.000
49.005	3.096E-06	1141.5979	-48.2142	-1.221E-06	833.8257	5.506E+11	-48.9487	93911400.	0.000
49.500	-4.123E-06	0.000	0.000	-1.215E-06	833.6687	5.506E+11	65.1824	46955700.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 4:

Pile-head deflection = 1.0095758 inches  
 Computed slope at pile head = -0.0031942 radians  
 Maximum bending moment = 10876657. inch-lbs  
 Maximum shear force = -353141. lbs  
 Depth of maximum bending moment = 39.1050000 feet below pile head  
 Depth of maximum shear force = 40.0950000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 3

-----  
 Pile-head Deflection vs. Pile Length for Load Case 4  
 -----

Boundary Condition Type 1, Shear and Moment

Shear = 20700. lb  
 Moment = 0. in-lb  
 Axial Load = 1155000. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
49.5000	1.0095758	10876657.	-353141.
47.0250	0.9935005	10839768.	-343111.
44.5500	1.0223866	10915913.	-349812.
42.0750	1.0266993	10901930.	-430698.
42.0750	0.000000	22528926918.	-2231028549.
42.0750	0.000000	22528926918.	-2231028549.
42.0750	0.000000	22528926918.	-2231028549.
42.0750	0.000000	22528926918.	-2231028549.

I B3\_B-7\_Long\_Scoured. I p7o

42.0750	0.000000	22528926918.	-2231028549.
42.0750	0.000000	22528926918.	-2231028549.
42.0750	0.000000	22528926918.	-2231028549.
42.0750	0.000000	22528926918.	-2231028549.
42.0750	0.000000	22528926918.	-2231028549.
42.0750	0.000000	22528926918.	-2231028549.
42.0750	0.000000	22528926918.	-2231028549.
42.0750	0.000000	22528926918.	-2231028549.
42.0750	0.000000	22528926918.	-2231028549.
42.0750	0.000000	22528926918.	-2231028549.
42.0750	0.000000	22528926918.	-2231028549.
42.0750	0.000000	22528926918.	-2231028549.

-----  
 Summary of Pile Response(s)  
 -----

Defi ni ti ons of Pile-head Loading Condi ti ons:

Load Type 1: Load 1 = Shear, lbs, and Load 2 = Moment, in-lbs  
 Load Type 2: Load 1 = Shear, lbs, and Load 2 = Slope, radians  
 Load Type 3: Load 1 = Shear, lbs, and Load 2 = Rotational Sti ffness, in-lbs/radi an  
 Load Type 4: Load 1 = Top Deflection, inches, and Load 2 = Moment, in-lbs  
 Load Type 5: Load 1 = Top Deflection, inches, and Load 2 = Slope, radi ans

Load Case No.	Load Type No.	Pile-head Condition 1 V(lbs) or y(inches)	Pile-head Condition 2 in-lb, rad., or in-lb/rad.	Axial Loading lbs	Pile-head Deflection inches	Maximum Moment in Pile in-lbs	Maximum Shear in Pile lbs	Pile-head Rotation radi ans
1	1	V = 10700.	M = 2616000.	810000.	0.88804747	8354759.	-271825.	-0.00331186
2	1	V = 20700.	M = 4608000.	1155000.	1.72063224	16304446.	-530545.	-0.00634081
3	1	V = 10700.	M = 0.000	810000.	0.50112942	5425916.	-176107.	-0.00158258
4	1	V = 20700.	M = 0.000	1155000.	1.00957580	10876657.	-353141.	-0.00319420

-----  
 Summary of Warning Messages  
 -----

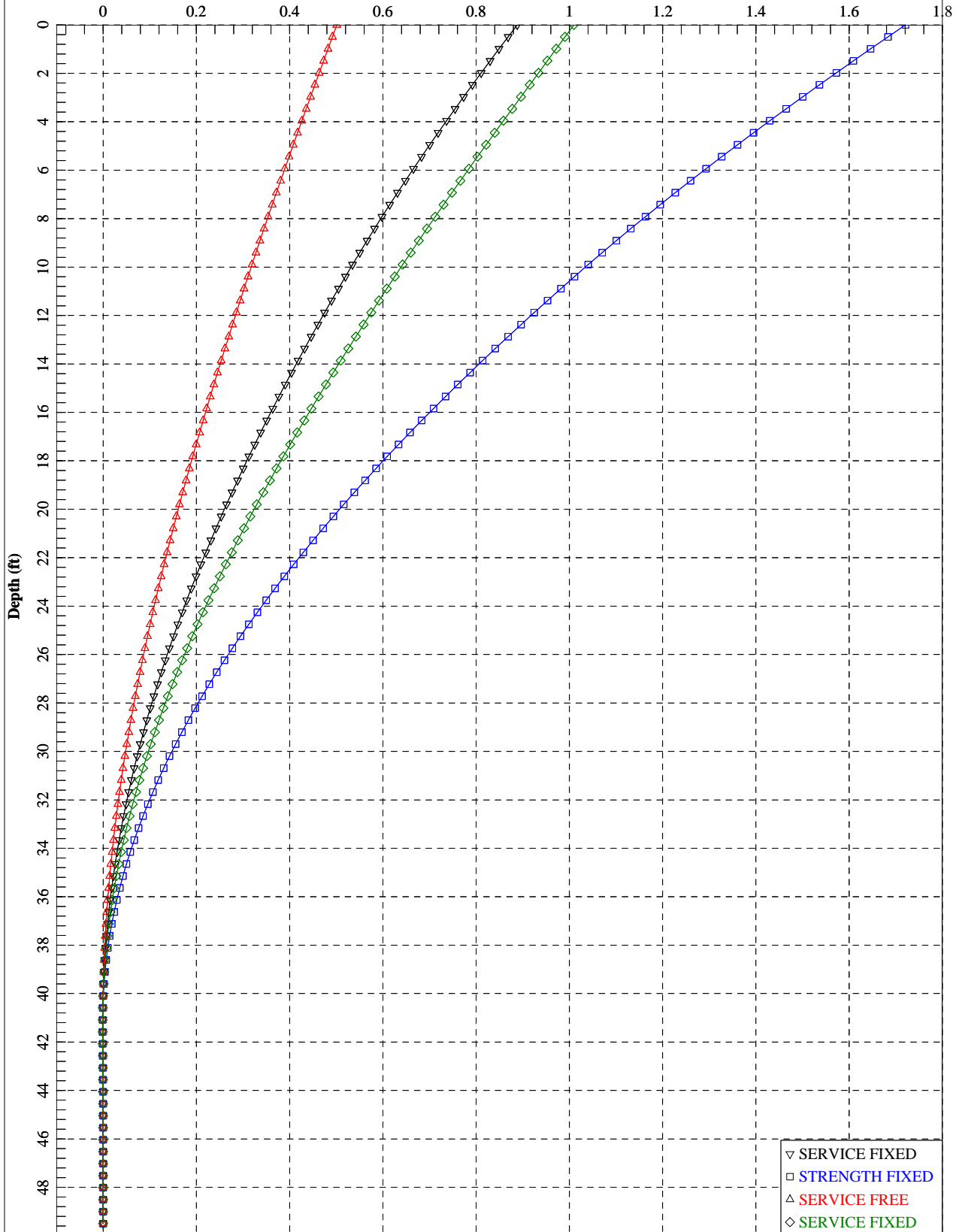
The following warning was reported 4000 times

\*\*\*\* Warning \*\*\*\*

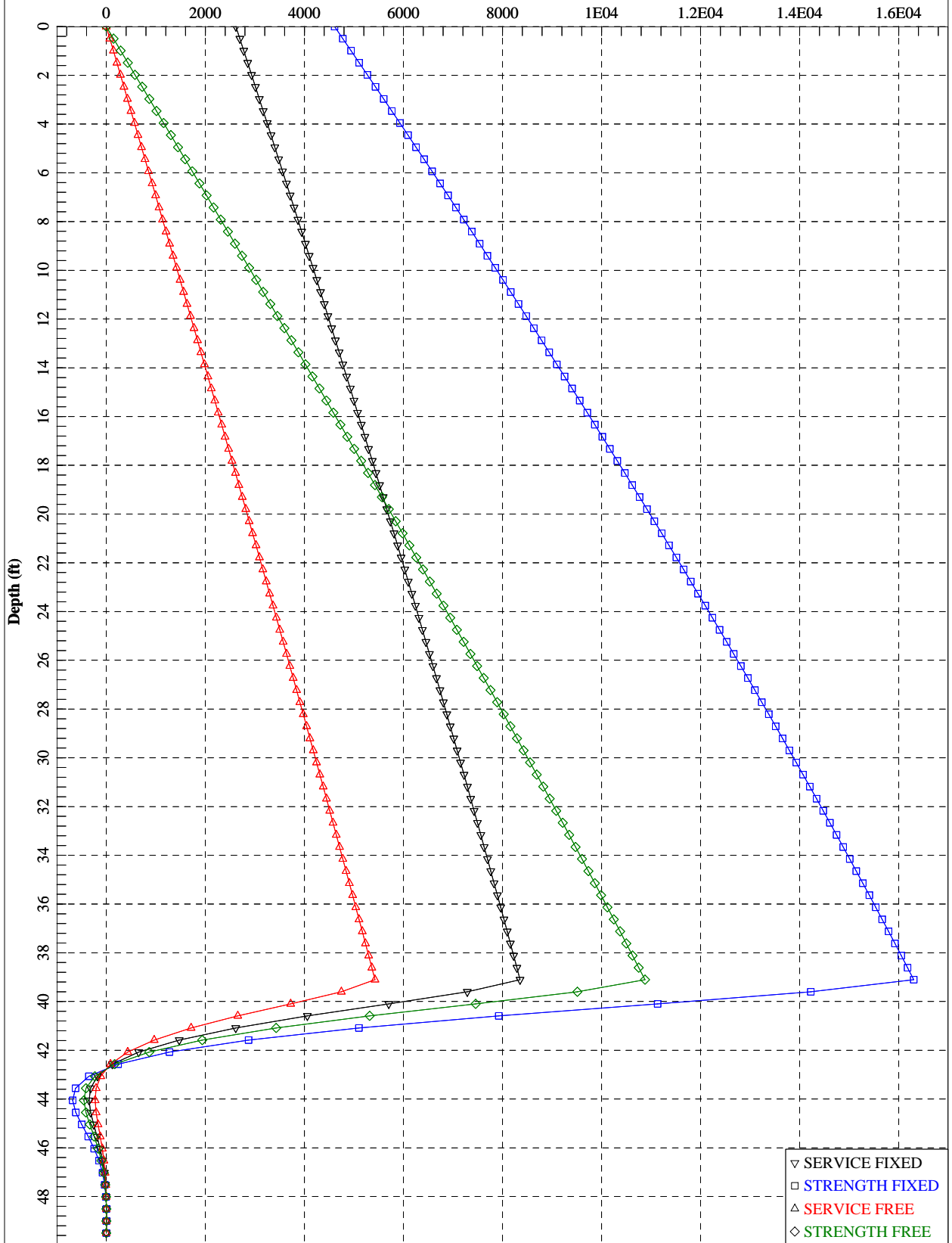
An unreasonable input value for uniaxial compressive strength has been specified for a soil defined using the vuggy limestone criteria. The input value is outside of the range of 1,000 to 2,500 psi (6,895 to 17,237 kPa). You should check your input data for correctness.

The analysis ended normally.

SC 557 Bridge over Crowders Creek - IB3 - Boring B-7 - 48" Dia. Drilled Shaft - Scoured Longitudinal Analysis  
Lateral Pile Deflection (inches)

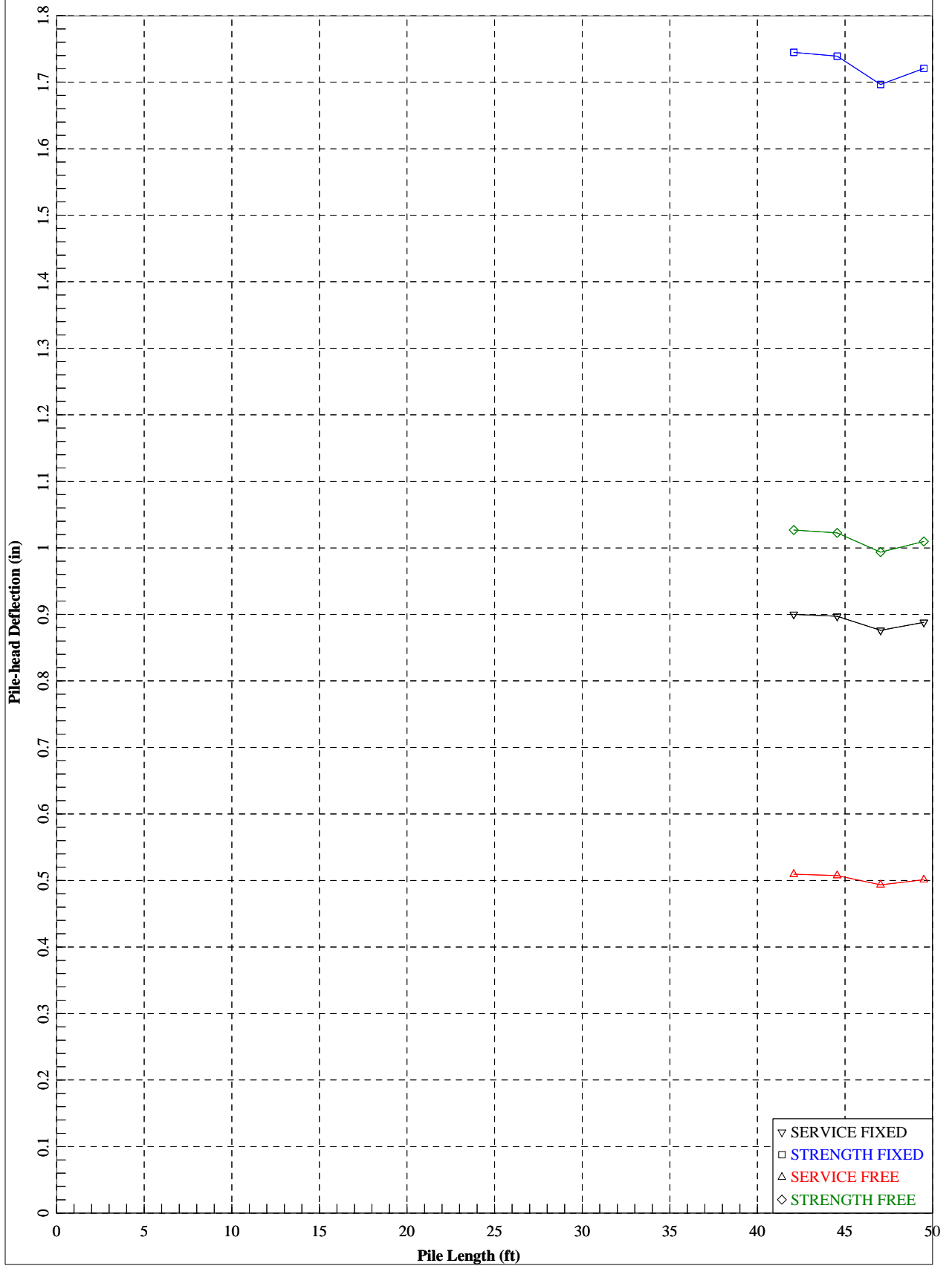


SC 557 Bridge over Crowders Creek - IB3 - Boring B-7 - 48" Dia. Drilled Shaft - Scoured Longitudinal Analysis  
Bending Moment (in-kips)





SC 557 Bridge over Crowders Creek - IB3 - Boring B-7 - 48" Dia. Drilled Shaft - Scoured Longitudinal Analysis



=====  
LPile Plus for Windows, Version 2013-07.007

Analysis of Individual Piles and Drilled Shafts  
Subjected to Lateral Loading Using the p-y Method

© 1985-2013 by Ensoft, Inc.  
All Rights Reserved

=====  
This copy of LPile is used by:

Bradley Fischer  
F&ME

Serial Number of Security Device: 291490957

This copy of LPile is licensed for exclusive use by: F&ME Consultants, Columbia, Sout

Use of this program by any entity other than F&ME Consultants, Columbia, Sout  
is forbidden by the software license agreement.

-----  
Files Used for Analysis  
-----

Path to file locations: P:\Geotechnical\G4800's\G4843 - SC557 - York County\Report\Final\Bridge\LPile\  
Name of input data file: IB3\_B-7\_Trans\_Scoured.lpd  
Name of output report file: IB3\_B-7\_Trans\_Scoured.lp7o  
Name of plot output file: IB3\_B-7\_Trans\_Scoured.lp7p  
Name of runtime message file: IB3\_B-7\_Trans\_Scoured.lp7r

-----  
Date and Time of Analysis  
-----

Date: July 31, 2018 Time: 9:30:16

-----  
Problem Title  
-----

Project Name: SC 557 over Crowders Creek

Job Number: G4843

Client: CALYX

Engineer: JFH

Description: IB3 - Boring B-7 - 48" Dia. Drilled Shaft - Scoured Trans.

-----  
 Program Options and Settings  
 -----

Engineering Units of Input Data and Computations:

- Engineering units are US Customary Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

Computational Options:

- Use unfactored loads in computations (conventional analysis)
- Compute pile response under loading and nonlinear bending properties of pile (only if nonlinear pile properties are input)
- Analysis uses p-y modification factors for p-y curves
- Analysis includes loading by lateral soil movements acting on pile
- Input of shear resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- No p-y curves to be computed and reported for user-specified depths
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1

-----  
 Pile Structural Properties and Geometry  
 -----

- Total number of pile sections = 3
- Total length of pile = 49.50 ft
- Depth of ground surface below top of pile = 39.00 ft

Pile diameter values used for p-y curve computations are defined using 6 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile.

Point	Depth X ft	Pile Diameter in
1	0.00000	42.0000000
2	10.000000	42.0000000
3	10.000000	48.0000000
4	40.000000	48.0000000

5	40.000000	42.0000000
6	49.500000	42.0000000

-----  
Input Structural Properties:  
-----

Pile Section No. 1:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Circular
Section Length	=	10.00000 ft
Top Width	=	42.00000 in
Bottom Width	=	42.00000 in
Top Area	=	1385.44236 Sq. in
Bottom Area	=	1385.44236 Sq. in
Moment of Inertia at Top	=	152745. in^4
Moment of Inertia at Bottom	=	152745. in^4
Elastic Modulus	=	3605000. lbs/in^2

Pile Section No. 2:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Circular
Section Length	=	30.00000 ft
Top Width	=	48.00000 in
Bottom Width	=	48.00000 in
Top Area	=	1809.55737 Sq. in
Bottom Area	=	1809.55737 Sq. in
Moment of Inertia at Top	=	260576. in^4
Moment of Inertia at Bottom	=	260576. in^4
Elastic Modulus	=	3605000. lbs/in^2

Pile Section No. 3:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Circular
Section Length	=	9.50000 ft
Top Width	=	42.00000 in
Bottom Width	=	42.00000 in
Top Area	=	1385.44236 Sq. in
Bottom Area	=	1385.44236 Sq. in
Moment of Inertia at Top	=	152745. in^4
Moment of Inertia at Bottom	=	152745. in^4
Elastic Modulus	=	3605000. lbs/in^2

-----  
Ground Slope and Pile Batter Angles  
-----

Ground Slope Angle	=	0.000 degrees
	=	0.000 radians
Pile Batter Angle	=	0.000 degrees
	=	0.000 radians

-----  
Soil and Rock Layering Information  
-----

The soil profile is modelled using 1 layers

Layer 1 is strong rock (vuggy limestone)

Distance from top of pile to top of layer = 39.00000 ft  
 Distance from top of pile to bottom of layer = 60.00000 ft  
 Effective unit weight at top of layer = 98.00000 pcf  
 Effective unit weight at bottom of layer = 98.00000 pcf  
 Uniaxial compressive strength at top of layer = 17000. psi  
 Uniaxial compressive strength at bottom of layer = 17000. psi

(Depth of lowest soil layer extends 10.50 ft below pile tip)

Summary of Soil Properties

Layer Num.	Layer Soil Type (p-y Curve Criteria)	Layer Depth ft	Effective Unit Wt. pcf	Uniaxial qu psi
1	Vuggy Limestone	39.000 60.000	98.000 98.000	17000. 17000.

p-y Modification Factors for Group Action

Distribution of p-y modifiers with depth defined using 2 points

Point No.	Depth X ft	p-mult	y-mult
1	39.000	1.0000	1.0000
2	100.000	1.0000	1.0000

Lateral Soil Movements

Profile of soil movement with depth defined using 2 points

Point No.	Depth X ft	Soil Movement in
1	0.00000	0.00000
2	0.00000	0.00000

Loading Type

-----  
 Static loading criteria were used when computing p-y curves for all analyses.  
 -----

-----  
 Pile-head Loading and Pile-head Fixity Conditions  
 -----

Number of loads specified = 4

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length
1	1	V = 16800. lbs	M = 1404000. in-lbs	0.000000	Yes
2	1	V = 15600. lbs	M = 1368000. in-lbs	0.000000	Yes
3	2	V = 16800. lbs	S = 0.0000 in/in	810000.	Yes
4	2	V = 15600. lbs	S = 0.0000 in/in	1155000.	Yes

V = perpendicular shear force applied to pile head  
 M = bending moment applied to pile head  
 y = lateral deflection relative to pile axis  
 S = pile slope relative to original pile batter angle  
 R = rotational stiffness applied to pile head  
 Axial thrust is assumed to be acting axially for all pile batter angles.

-----  
 Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness  
 -----

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 3

Pile Section No. 1:  
 -----

Moment-curvature properties were derived from elastic section properties

Pile Section No. 2:  
 -----

Moment-curvature properties were derived from elastic section properties

Pile Section No. 3:  
 -----

Moment-curvature properties were derived from elastic section properties

-----  
 Computed Values of Pile Loading and Deflection  
 for Lateral Loading for Load Case Number 1  
 -----

Pile-head conditions are Shear and Moment (Loading Type 1)

I B3\_B-7\_Trans\_Scoured. I p7o

Shear force at pile head = 16800.0 lbs  
 Applied moment at pile head = 1404000.0 in-lbs  
 Axial thrust load on pile head = 0.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi *	Bending Stiffness lb-in^2	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.9062	1404000.	16800.	-0.003123	193.0276	5.506E+11	0.000	0.000	0.000
0.495	0.8877	1503792.	16800.	-0.003107	206.7474	5.506E+11	0.000	0.000	0.000
0.990	0.8693	1603584.	16800.	-0.003090	220.4672	5.506E+11	0.000	0.000	0.000
1.485	0.8510	1703376.	16800.	-0.003072	234.1870	5.506E+11	0.000	0.000	0.000
1.980	0.8328	1803168.	16800.	-0.003053	247.9068	5.506E+11	0.000	0.000	0.000
2.475	0.8147	1902960.	16800.	-0.003034	261.6266	5.506E+11	0.000	0.000	0.000
2.970	0.7968	2002752.	16800.	-0.003012	275.3464	5.506E+11	0.000	0.000	0.000
3.465	0.7790	2102544.	16800.	-0.002990	289.0662	5.506E+11	0.000	0.000	0.000
3.960	0.7613	2202336.	16800.	-0.002967	302.7860	5.506E+11	0.000	0.000	0.000
4.455	0.7437	2302128.	16800.	-0.002943	316.5058	5.506E+11	0.000	0.000	0.000
4.950	0.7263	2401920.	16800.	-0.002917	330.2256	5.506E+11	0.000	0.000	0.000
5.445	0.7090	2501712.	16800.	-0.002891	343.9454	5.506E+11	0.000	0.000	0.000
5.940	0.6920	2601504.	16800.	-0.002863	357.6652	5.506E+11	0.000	0.000	0.000
6.435	0.6750	2701296.	16800.	-0.002835	371.3850	5.506E+11	0.000	0.000	0.000
6.930	0.6583	2801088.	16800.	-0.002805	385.1048	5.506E+11	0.000	0.000	0.000
7.425	0.6417	2900880.	16800.	-0.002774	398.8247	5.506E+11	0.000	0.000	0.000
7.920	0.6253	3000672.	16800.	-0.002743	412.5445	5.506E+11	0.000	0.000	0.000
8.415	0.6091	3100464.	16800.	-0.002710	426.2643	5.506E+11	0.000	0.000	0.000
8.910	0.5931	3200256.	16800.	-0.002676	439.9841	5.506E+11	0.000	0.000	0.000
9.405	0.5773	3300048.	16800.	-0.002641	453.7039	5.506E+11	0.000	0.000	0.000
9.900	0.5618	3399840.	16800.	-0.002604	467.4237	5.506E+11	0.000	0.000	0.000
10.395	0.5464	3499632.	16800.	-0.002575	322.3285	9.394E+11	0.000	0.000	0.000
10.890	0.5312	3599424.	16800.	-0.002553	331.5197	9.394E+11	0.000	0.000	0.000
11.385	0.5161	3699216.	16800.	-0.002530	340.7109	9.394E+11	0.000	0.000	0.000
11.880	0.5011	3799008.	16800.	-0.002506	349.9021	9.394E+11	0.000	0.000	0.000
12.375	0.4863	3898800.	16800.	-0.002482	359.0933	9.394E+11	0.000	0.000	0.000
12.870	0.4716	3998592.	16800.	-0.002457	368.2845	9.394E+11	0.000	0.000	0.000
13.365	0.4571	4098384.	16800.	-0.002431	377.4757	9.394E+11	0.000	0.000	0.000
13.860	0.4428	4198176.	16800.	-0.002405	386.6669	9.394E+11	0.000	0.000	0.000
14.355	0.4285	4297968.	16800.	-0.002378	395.8581	9.394E+11	0.000	0.000	0.000
14.850	0.4145	4397760.	16800.	-0.002350	405.0493	9.394E+11	0.000	0.000	0.000
15.345	0.4006	4497552.	16800.	-0.002322	414.2405	9.394E+11	0.000	0.000	0.000
15.840	0.3869	4597344.	16800.	-0.002293	423.4317	9.394E+11	0.000	0.000	0.000
16.335	0.3734	4697136.	16800.	-0.002264	432.6229	9.394E+11	0.000	0.000	0.000
16.830	0.3600	4796928.	16800.	-0.002234	441.8141	9.394E+11	0.000	0.000	0.000
17.325	0.3468	4896720.	16800.	-0.002203	451.0053	9.394E+11	0.000	0.000	0.000
17.820	0.3338	4996512.	16800.	-0.002172	460.1965	9.394E+11	0.000	0.000	0.000
18.315	0.3210	5096304.	16800.	-0.002140	469.3877	9.394E+11	0.000	0.000	0.000
18.810	0.3084	5196096.	16800.	-0.002108	478.5789	9.394E+11	0.000	0.000	0.000
19.305	0.2960	5295888.	16800.	-0.002075	487.7701	9.394E+11	0.000	0.000	0.000
19.800	0.2838	5395680.	16800.	-0.002041	496.9613	9.394E+11	0.000	0.000	0.000
20.295	0.2718	5495472.	16800.	-0.002006	506.1525	9.394E+11	0.000	0.000	0.000
20.790	0.2599	5595264.	16800.	-0.001971	515.3437	9.394E+11	0.000	0.000	0.000
21.285	0.2483	5695056.	16800.	-0.001936	524.5349	9.394E+11	0.000	0.000	0.000
21.780	0.2369	5794848.	16800.	-0.001899	533.7261	9.394E+11	0.000	0.000	0.000
22.275	0.2258	5894640.	16800.	-0.001862	542.9173	9.394E+11	0.000	0.000	0.000
22.770	0.2148	5994432.	16800.	-0.001825	552.1085	9.394E+11	0.000	0.000	0.000
23.265	0.2041	6094224.	16800.	-0.001786	561.2997	9.394E+11	0.000	0.000	0.000
23.760	0.1936	6194016.	16800.	-0.001748	570.4909	9.394E+11	0.000	0.000	0.000
24.255	0.1833	6293808.	16800.	-0.001708	579.6821	9.394E+11	0.000	0.000	0.000
24.750	0.1733	6393600.	16800.	-0.001668	588.8733	9.394E+11	0.000	0.000	0.000

IB3\_B-7\_Trans\_Scored.l p7o

25.245	0.1635	6493392.	16800.	-0.001627	598.0645	9.394E+11	0.000	0.000	0.000
25.740	0.1540	6593184.	16800.	-0.001586	607.2557	9.394E+11	0.000	0.000	0.000
26.235	0.1447	6692976.	16800.	-0.001544	616.4469	9.394E+11	0.000	0.000	0.000
26.730	0.1356	6792768.	16800.	-0.001501	625.6381	9.394E+11	0.000	0.000	0.000
27.225	0.1268	6892560.	16800.	-0.001458	634.8293	9.394E+11	0.000	0.000	0.000
27.720	0.1183	6992352.	16800.	-0.001414	644.0205	9.394E+11	0.000	0.000	0.000
28.215	0.1100	7092144.	16800.	-0.001370	653.2117	9.394E+11	0.000	0.000	0.000
28.710	0.1020	7191936.	16800.	-0.001324	662.4029	9.394E+11	0.000	0.000	0.000
29.205	0.0943	7291728.	16800.	-0.001279	671.5941	9.394E+11	0.000	0.000	0.000
29.700	0.0869	7391520.	16800.	-0.001232	680.7853	9.394E+11	0.000	0.000	0.000
30.195	0.0797	7491312.	16800.	-0.001185	689.9765	9.394E+11	0.000	0.000	0.000
30.690	0.0728	7591104.	16800.	-0.001137	699.1677	9.394E+11	0.000	0.000	0.000
31.185	0.0662	7690896.	16800.	-0.001089	708.3589	9.394E+11	0.000	0.000	0.000
31.680	0.0598	7790688.	16800.	-0.001040	717.5501	9.394E+11	0.000	0.000	0.000
32.175	0.0538	7890480.	16800.	-0.000991	726.7413	9.394E+11	0.000	0.000	0.000
32.670	0.0481	7990272.	16800.	-0.000940	735.9325	9.394E+11	0.000	0.000	0.000
33.165	0.0426	8090064.	16800.	-0.000890	745.1237	9.394E+11	0.000	0.000	0.000
33.660	0.0375	8189856.	16800.	-0.000838	754.3149	9.394E+11	0.000	0.000	0.000
34.155	0.0327	8289648.	16800.	-0.000786	763.5061	9.394E+11	0.000	0.000	0.000
34.650	0.0282	8389440.	16800.	-0.000733	772.6972	9.394E+11	0.000	0.000	0.000
35.145	0.0240	8489232.	16800.	-0.000680	781.8884	9.394E+11	0.000	0.000	0.000
35.640	0.0201	8589024.	16800.	-0.000626	791.0796	9.394E+11	0.000	0.000	0.000
36.135	0.0165	8688816.	16800.	-0.000571	800.2708	9.394E+11	0.000	0.000	0.000
36.630	0.0133	8788608.	16800.	-0.000516	809.4620	9.394E+11	0.000	0.000	0.000
37.125	0.0104	8888400.	16800.	-0.000460	818.6532	9.394E+11	0.000	0.000	0.000
37.620	0.007835	8988192.	16800.	-0.000404	827.8444	9.394E+11	0.000	0.000	0.000
38.115	0.005607	9087984.	16800.	-0.000346	837.0356	9.394E+11	0.000	0.000	0.000
38.610	0.003720	9187776.	16800.	-0.000289	846.2268	9.394E+11	0.000	0.000	0.000
39.105	0.002178	9287568.	-93163.	-0.000230	855.4180	9.394E+11	-37024.	1.010E+08	0.000
39.600	0.000985	8081003.	-252854.	-0.000175	744.2891	9.394E+11	-16744.	1.010E+08	0.000
40.095	9.547E-05	6283659.	-307404.	-0.000116	863.9027	5.506E+11	-1622.9971	1.010E+08	0.000
40.590	-0.000391	4429049.	-292465.	-5.807E-05	608.9235	5.506E+11	6652.9349	1.010E+08	0.000
41.085	-0.000594	2809179.	-242696.	-1.903E-05	386.2173	5.506E+11	10104.	1.010E+08	0.000
41.580	-0.000617	1545825.	-181514.	4.463E-06	212.5262	5.506E+11	10496.	1.010E+08	0.000
42.075	-0.000541	652792.	-123009.	1.632E-05	89.7484	5.506E+11	9202.9941	1.010E+08	0.000
42.570	-0.000423	84473.	-74294.	2.030E-05	11.6138	5.506E+11	7199.3240	1.010E+08	0.000
43.065	-0.000300	-229827.	-37755.	1.951E-05	31.5975	5.506E+11	5103.6364	1.010E+08	0.000
43.560	-0.000192	-364052.	-12920.	1.631E-05	50.0514	5.506E+11	3258.3002	1.010E+08	0.000
44.055	-0.000106	-383313.	2131.7183	1.228E-05	52.6994	5.506E+11	1809.5279	1.010E+08	0.000
44.550	-4.578E-05	-338727.	9817.5680	8.385E-06	46.5696	5.506E+11	778.3003	1.010E+08	0.000
45.045	-6.826E-06	-266680.	12474.	5.120E-06	36.6643	5.506E+11	116.0501	1.010E+08	0.000
45.540	1.504E-05	-190539.	12059.	2.654E-06	26.1960	5.506E+11	-255.7038	1.010E+08	0.000
46.035	2.470E-05	-123419.	10052.	9.604E-07	16.9682	5.506E+11	-419.9029	1.010E+08	0.000
46.530	2.645E-05	-71115.	7469.8614	-8.888E-08	9.7772	5.506E+11	-449.6608	1.010E+08	0.000
47.025	2.364E-05	-34677.	4940.5702	-6.595E-07	4.7676	5.506E+11	-401.9524	1.010E+08	0.000
47.520	1.862E-05	-12421.	2806.8565	-9.135E-07	1.7078	5.506E+11	-316.4698	1.010E+08	0.000
48.015	1.279E-05	-1331.8349	1221.0958	-9.877E-07	0.1831	5.506E+11	-217.4564	1.010E+08	0.000
48.510	6.882E-06	2085.1522	227.7834	-9.836E-07	0.2867	5.506E+11	-116.9922	1.010E+08	0.000
49.005	1.106E-06	1374.2323	-175.5179	-9.650E-07	0.1889	5.506E+11	-18.7995	1.010E+08	0.000
49.500	-4.582E-06	0.000	0.000	-9.576E-07	0.000	5.506E+11	77.8964	50490000.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 1:

Pile-head deflection = 0.9062357 inches  
 Computed slope at pile head = -0.0031227 radians  
 Maximum bending moment = 9287568. inch-lbs  
 Maximum shear force = -307404. lbs



Depth of maximum bending moment = 39.1050000 feet below pile head  
 Depth of maximum shear force = 40.0950000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 3

-----  
 Pile-head Deflection vs. Pile Length for Load Case 1  
 -----

Boundary Condition Type 1, Shear and Moment

Shear = 16800. lb  
 Moment = 1404000. in-lb  
 Axial Load = 0. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment in-lbs	Maximum Shear lbs
49.5000	0.9062357	9287568.	-307404.
47.0250	0.8940948	9272599.	-297172.
44.5500	0.9158202	9307526.	-303914.
42.0750	0.9170173	9292558.	-367114.
42.0750	0.000000	20150938805.	-1995537556.
42.0750	0.000000	20150938805.	-1995537556.
42.0750	0.000000	20150938805.	-1995537556.
42.0750	0.000000	20150938805.	-1995537556.
42.0750	0.000000	20150938805.	-1995537556.
42.0750	0.000000	20150938805.	-1995537556.
42.0750	0.000000	20150938805.	-1995537556.
42.0750	0.000000	20150938805.	-1995537556.
42.0750	0.000000	20150938805.	-1995537556.
42.0750	0.000000	20150938805.	-1995537556.
42.0750	0.000000	20150938805.	-1995537556.
42.0750	0.000000	20150938805.	-1995537556.
42.0750	0.000000	20150938805.	-1995537556.
42.0750	0.000000	20150938805.	-1995537556.
42.0750	0.000000	20150938805.	-1995537556.
42.0750	0.000000	20150938805.	-1995537556.
42.0750	0.000000	20150938805.	-1995537556.
42.0750	0.000000	20150938805.	-1995537556.
42.0750	0.000000	20150938805.	-1995537556.
42.0750	0.000000	20150938805.	-1995537556.

-----  
 Computed Values of Pile Loading and Deflection  
 for Lateral Loading for Load Case Number 2  
 -----

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 15600.0 lbs  
 Applied moment at pile head = 1368000.0 in-lbs  
 Axial thrust load on pile head = 0.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.8501	1368000.	15600.	-0.002939	188.0781	5.506E+11	0.000	0.000	0.000

IB3\_B-7\_Trans\_Scored.l p7o

0.495	0.8327	1460664.	15600.	-0.002924	200.8180	5.506E+11	0.000	0.000	0.000
0.990	0.8154	1553328.	15600.	-0.002908	213.5578	5.506E+11	0.000	0.000	0.000
1.485	0.7982	1645992.	15600.	-0.002890	226.2976	5.506E+11	0.000	0.000	0.000
1.980	0.7811	1738656.	15600.	-0.002872	239.0374	5.506E+11	0.000	0.000	0.000
2.475	0.7641	1831320.	15600.	-0.002853	251.7772	5.506E+11	0.000	0.000	0.000
2.970	0.7472	1923984.	15600.	-0.002833	264.5171	5.506E+11	0.000	0.000	0.000
3.465	0.7304	2016648.	15600.	-0.002811	277.2569	5.506E+11	0.000	0.000	0.000
3.960	0.7138	2109312.	15600.	-0.002789	289.9967	5.506E+11	0.000	0.000	0.000
4.455	0.6973	2201976.	15600.	-0.002766	302.7365	5.506E+11	0.000	0.000	0.000
4.950	0.6809	2294640.	15600.	-0.002742	315.4763	5.506E+11	0.000	0.000	0.000
5.445	0.6647	2387304.	15600.	-0.002716	328.2162	5.506E+11	0.000	0.000	0.000
5.940	0.6487	2479968.	15600.	-0.002690	340.9560	5.506E+11	0.000	0.000	0.000
6.435	0.6328	2572632.	15600.	-0.002663	353.6958	5.506E+11	0.000	0.000	0.000
6.930	0.6170	2665296.	15600.	-0.002635	366.4356	5.506E+11	0.000	0.000	0.000
7.425	0.6015	2757960.	15600.	-0.002605	379.1754	5.506E+11	0.000	0.000	0.000
7.920	0.5861	2850624.	15600.	-0.002575	391.9153	5.506E+11	0.000	0.000	0.000
8.415	0.5709	2943288.	15600.	-0.002544	404.6551	5.506E+11	0.000	0.000	0.000
8.910	0.5558	3035952.	15600.	-0.002512	417.3949	5.506E+11	0.000	0.000	0.000
9.405	0.5410	3128616.	15600.	-0.002478	430.1347	5.506E+11	0.000	0.000	0.000
9.900	0.5264	3221280.	15600.	-0.002444	442.8745	5.506E+11	0.000	0.000	0.000
10.395	0.5120	3313944.	15600.	-0.002416	455.6143	5.506E+11	0.000	0.000	0.000
10.890	0.4977	3406608.	15600.	-0.002395	468.3541	5.506E+11	0.000	0.000	0.000
11.385	0.4835	3499272.	15600.	-0.002373	481.0939	5.506E+11	0.000	0.000	0.000
11.880	0.4695	3591936.	15600.	-0.002351	493.8337	5.506E+11	0.000	0.000	0.000
12.375	0.4556	3684600.	15600.	-0.002328	506.5735	5.506E+11	0.000	0.000	0.000
12.870	0.4418	3777264.	15600.	-0.002304	519.3133	5.506E+11	0.000	0.000	0.000
13.365	0.4282	3869928.	15600.	-0.002280	532.0531	5.506E+11	0.000	0.000	0.000
13.860	0.4148	3962592.	15600.	-0.002255	544.7929	5.506E+11	0.000	0.000	0.000
14.355	0.4014	4055256.	15600.	-0.002230	557.5327	5.506E+11	0.000	0.000	0.000
14.850	0.3883	4147920.	15600.	-0.002204	570.2725	5.506E+11	0.000	0.000	0.000
15.345	0.3753	4240584.	15600.	-0.002177	583.0123	5.506E+11	0.000	0.000	0.000
15.840	0.3624	4333248.	15600.	-0.002150	595.7521	5.506E+11	0.000	0.000	0.000
16.335	0.3497	4425912.	15600.	-0.002123	608.4919	5.506E+11	0.000	0.000	0.000
16.830	0.3372	4518576.	15600.	-0.002094	621.2317	5.506E+11	0.000	0.000	0.000
17.325	0.3248	4611240.	15600.	-0.002065	633.9715	5.506E+11	0.000	0.000	0.000
17.820	0.3126	4703904.	15600.	-0.002036	646.7113	5.506E+11	0.000	0.000	0.000
18.315	0.3006	4796568.	15600.	-0.002006	659.4511	5.506E+11	0.000	0.000	0.000
18.810	0.2888	4889232.	15600.	-0.001975	672.1909	5.506E+11	0.000	0.000	0.000
19.305	0.2772	4981896.	15600.	-0.001944	684.9307	5.506E+11	0.000	0.000	0.000
19.800	0.2657	5074560.	15600.	-0.001912	697.6705	5.506E+11	0.000	0.000	0.000
20.295	0.2545	5167224.	15600.	-0.001880	710.4103	5.506E+11	0.000	0.000	0.000
20.790	0.2434	5259888.	15600.	-0.001847	723.1501	5.506E+11	0.000	0.000	0.000
21.285	0.2325	5352552.	15600.	-0.001813	735.8899	5.506E+11	0.000	0.000	0.000
21.780	0.2218	5445216.	15600.	-0.001779	748.6297	5.506E+11	0.000	0.000	0.000
22.275	0.2114	5537880.	15600.	-0.001745	761.3695	5.506E+11	0.000	0.000	0.000
22.770	0.2011	5630544.	15600.	-0.001709	774.1093	5.506E+11	0.000	0.000	0.000
23.265	0.1911	5723208.	15600.	-0.001673	786.8491	5.506E+11	0.000	0.000	0.000
23.760	0.1812	5815872.	15600.	-0.001637	799.5889	5.506E+11	0.000	0.000	0.000
24.255	0.1716	5908536.	15600.	-0.001600	812.3287	5.506E+11	0.000	0.000	0.000
24.750	0.1622	6001200.	15600.	-0.001562	825.0685	5.506E+11	0.000	0.000	0.000
25.245	0.1531	6093864.	15600.	-0.001524	837.8083	5.506E+11	0.000	0.000	0.000
25.740	0.1441	6186528.	15600.	-0.001485	850.5481	5.506E+11	0.000	0.000	0.000
26.235	0.1354	6279192.	15600.	-0.001446	863.2879	5.506E+11	0.000	0.000	0.000
26.730	0.1269	6371856.	15600.	-0.001406	876.0277	5.506E+11	0.000	0.000	0.000
27.225	0.1187	6464520.	15600.	-0.001365	888.7675	5.506E+11	0.000	0.000	0.000
27.720	0.1107	6557184.	15600.	-0.001324	901.5073	5.506E+11	0.000	0.000	0.000
28.215	0.1030	6649848.	15600.	-0.001282	914.2471	5.506E+11	0.000	0.000	0.000
28.710	0.0955	6742512.	15600.	-0.001240	926.9869	5.506E+11	0.000	0.000	0.000
29.205	0.0883	6835176.	15600.	-0.001197	939.7267	5.506E+11	0.000	0.000	0.000
29.700	0.0813	6927840.	15600.	-0.001153	952.4665	5.506E+11	0.000	0.000	0.000

IB3\_B-7\_Trans\_Scored.l p7o

30.195	0.0746	7020504.	15600.	-0.001109	646.6134	9.394E+11	0.000	0.000	0.000
30.690	0.0681	7113168.	15600.	-0.001065	655.1481	9.394E+11	0.000	0.000	0.000
31.185	0.0619	7205832.	15600.	-0.001019	663.6827	9.394E+11	0.000	0.000	0.000
31.680	0.0560	7298496.	15600.	-0.000974	672.2174	9.394E+11	0.000	0.000	0.000
32.175	0.0503	7391160.	15600.	-0.000927	680.7521	9.394E+11	0.000	0.000	0.000
32.670	0.0450	7483824.	15600.	-0.000880	689.2868	9.394E+11	0.000	0.000	0.000
33.165	0.0399	7576488.	15600.	-0.000832	697.8215	9.394E+11	0.000	0.000	0.000
33.660	0.0351	7669152.	15600.	-0.000784	706.3562	9.394E+11	0.000	0.000	0.000
34.155	0.0306	7761816.	15600.	-0.000735	714.8908	9.394E+11	0.000	0.000	0.000
34.650	0.0263	7854480.	15600.	-0.000686	723.4255	9.394E+11	0.000	0.000	0.000
35.145	0.0224	7947144.	15600.	-0.000636	731.9602	9.394E+11	0.000	0.000	0.000
35.640	0.0188	8039808.	15600.	-0.000586	740.4949	9.394E+11	0.000	0.000	0.000
36.135	0.0155	8132472.	15600.	-0.000534	749.0296	9.394E+11	0.000	0.000	0.000
36.630	0.0124	8225136.	15600.	-0.000483	757.5643	9.394E+11	0.000	0.000	0.000
37.125	0.009729	8317800.	15600.	-0.000430	766.0990	9.394E+11	0.000	0.000	0.000
37.620	0.007329	8410464.	15600.	-0.000378	774.6336	9.394E+11	0.000	0.000	0.000
38.115	0.005244	8503128.	15600.	-0.000324	783.1683	9.394E+11	0.000	0.000	0.000
38.610	0.003479	8595792.	15600.	-0.000270	791.7030	9.394E+11	0.000	0.000	0.000
39.105	0.002037	8688456.	-87242.	-0.000215	800.2377	9.394E+11	-34627.	1.010E+08	0.000
39.600	0.000921	7559353.	-236587.	-0.000164	696.2432	9.394E+11	-15657.	1.010E+08	0.000
40.095	8.908E-05	5877805.	-287586.	-0.000108	808.1043	5.506E+11	-1514.3045	1.010E+08	0.000
40.590	-0.000366	4142827.	-273593.	-5.431E-05	569.5726	5.506E+11	6225.9142	1.010E+08	0.000
41.085	-0.000556	2627523.	-227025.	-1.779E-05	361.2424	5.506E+11	9453.3305	1.010E+08	0.000
41.580	-0.000578	1445765.	-169788.	4.181E-06	198.7696	5.506E+11	9818.5734	1.010E+08	0.000
42.075	-0.000506	610442.	-115058.	1.527E-05	83.9261	5.506E+11	8608.9372	1.010E+08	0.000
42.570	-0.000396	78874.	-69489.	1.899E-05	10.8439	5.506E+11	6734.3430	1.010E+08	0.000
43.065	-0.000281	-215083.	-35309.	1.825E-05	29.5704	5.506E+11	4773.8311	1.010E+08	0.000
43.560	-0.000179	-340601.	-12080.	1.526E-05	46.8272	5.506E+11	3047.6098	1.010E+08	0.000
44.055	-9.955E-05	-358589.	1998.1640	1.149E-05	49.3003	5.506E+11	1692.4073	1.010E+08	0.000
44.550	-4.281E-05	-316863.	9186.2326	7.843E-06	43.5636	5.506E+11	727.8179	1.010E+08	0.000
45.045	-6.376E-06	-249457.	11670.	4.789E-06	34.2963	5.506E+11	108.3891	1.010E+08	0.000
45.540	1.408E-05	-178226.	11281.	2.482E-06	24.5033	5.506E+11	-239.3050	1.010E+08	0.000
46.035	2.311E-05	-115439.	9403.4285	8.980E-07	15.8711	5.506E+11	-392.8563	1.010E+08	0.000
46.530	2.474E-05	-66514.	6987.2882	-8.342E-08	9.1446	5.506E+11	-420.6590	1.010E+08	0.000
47.025	2.212E-05	-32430.	4621.1870	-6.171E-07	4.4586	5.506E+11	-376.0081	1.010E+08	0.000
47.520	1.741E-05	-11614.	2625.2316	-8.547E-07	1.5967	5.506E+11	-296.0308	1.010E+08	0.000
48.015	1.196E-05	-1242.5311	1141.9153	-9.240E-07	0.1708	5.506E+11	-203.4023	1.010E+08	0.000
48.510	6.436E-06	1952.0620	212.8316	-9.202E-07	0.2684	5.506E+11	-109.4204	1.010E+08	0.000
49.005	1.033E-06	1285.9080	-164.3150	-9.027E-07	0.1768	5.506E+11	-17.5649	1.010E+08	0.000
49.500	-4.288E-06	0.000	0.000	-8.958E-07	0.000	5.506E+11	72.8898	50490000.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 2:

Pile-head deflection	=	0.8501473	inches
Computed slope at pile head	=	-0.0029392	radians
Maximum bending moment	=	8688456.	inch-lbs
Maximum shear force	=	-287586.	lbs
Depth of maximum bending moment	=	39.1050000	feet below pile head
Depth of maximum shear force	=	40.0950000	feet below pile head
Number of iterations	=	6	
Number of zero deflection points	=	3	

-----  
Pile-head Deflection vs. Pile Length for Load Case 2  
-----

Boundary Condition Type 1, Shear and Moment

Shear = 15600. lb  
 Moment = 1368000. in-lb  
 Axial Load = 0. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment in-lbs	Maximum Shear lbs
49.5000	0.8501473	8688456.	-287586.
47.0250	0.8387895	8674556.	-278022.
44.5500	0.8591058	8706989.	-284322.
42.0750	0.8602192	8693089.	-343419.
42.0750	0.000000	18903924508.	-1872046344.
42.0750	0.000000	18903924508.	-1872046344.
42.0750	0.000000	18903924508.	-1872046344.
42.0750	0.000000	18903924508.	-1872046344.
42.0750	0.000000	18903924508.	-1872046344.
42.0750	0.000000	18903924508.	-1872046344.
42.0750	0.000000	18903924508.	-1872046344.
42.0750	0.000000	18903924508.	-1872046344.
42.0750	0.000000	18903924508.	-1872046344.
42.0750	0.000000	18903924508.	-1872046344.
42.0750	0.000000	18903924508.	-1872046344.
42.0750	0.000000	18903924508.	-1872046344.
42.0750	0.000000	18903924508.	-1872046344.
42.0750	0.000000	18903924508.	-1872046344.
42.0750	0.000000	18903924508.	-1872046344.
42.0750	0.000000	18903924508.	-1872046344.
42.0750	0.000000	18903924508.	-1872046344.
42.0750	0.000000	18903924508.	-1872046344.
42.0750	0.000000	18903924508.	-1872046344.
42.0750	0.000000	18903924508.	-1872046344.

-----  
 Computed Values of Pile Loading and Deflection  
 for Lateral Loading for Load Case Number 3  
 -----

Pile-head conditions are Shear and Pile-head Rotation (Loading Type 2)

Shear force at pile head = 16800.0 lbs  
 Rotation of pile head = 0.000E+00 radians  
 Axial load at pile head = 810000.0 lbs

(Zero slope for this load indicates fixed-head conditions)

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi *	Bending Stiffness lb-in^2	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.2301	-3754358.	16800.	0.000	1100.8151	5.506E+11	0.000	0.000	0.000
0.495	0.2300	-3654469.	16800.	-3.996E-05	1087.0819	5.506E+11	0.000	0.000	0.000
0.990	0.2296	-3554390.	16800.	-7.884E-05	1073.3226	5.506E+11	0.000	0.000	0.000
1.485	0.2291	-3454126.	16800.	-0.000117	1059.5380	5.506E+11	0.000	0.000	0.000
1.980	0.2283	-3353683.	16800.	-0.000153	1045.7287	5.506E+11	0.000	0.000	0.000
2.475	0.2272	-3253066.	16800.	-0.000189	1031.8955	5.506E+11	0.000	0.000	0.000
2.970	0.2260	-3152281.	16800.	-0.000224	1018.0390	5.506E+11	0.000	0.000	0.000
3.465	0.2246	-3051331.	16800.	-0.000257	1004.1601	5.506E+11	0.000	0.000	0.000
3.960	0.2230	-2950223.	16800.	-0.000289	990.2594	5.506E+11	0.000	0.000	0.000

I B3\_B-7\_Trans\_Scoured.l p7o

4. 455	0. 2212	-2848963.	16800.	-0. 000321	976. 3377	5. 506E+11	0. 000	0. 000	0. 000
4. 950	0. 2192	-2747554.	16800.	-0. 000351	962. 3956	5. 506E+11	0. 000	0. 000	0. 000
5. 445	0. 2170	-2646003.	16800.	-0. 000380	948. 4339	5. 506E+11	0. 000	0. 000	0. 000
5. 940	0. 2146	-2544314.	16800.	-0. 000408	934. 4533	5. 506E+11	0. 000	0. 000	0. 000
6. 435	0. 2121	-2442493.	16800.	-0. 000435	920. 4546	5. 506E+11	0. 000	0. 000	0. 000
6. 930	0. 2095	-2340546.	16800.	-0. 000461	906. 4384	5. 506E+11	0. 000	0. 000	0. 000
7. 425	0. 2067	-2238477.	16800.	-0. 000485	892. 4056	5. 506E+11	0. 000	0. 000	0. 000
7. 920	0. 2037	-2136291.	16800.	-0. 000509	878. 3568	5. 506E+11	0. 000	0. 000	0. 000
8. 415	0. 2006	-2033995.	16800.	-0. 000531	864. 2927	5. 506E+11	0. 000	0. 000	0. 000
8. 910	0. 1974	-1931594.	16800.	-0. 000553	850. 2141	5. 506E+11	0. 000	0. 000	0. 000
9. 405	0. 1941	-1829092.	16800.	-0. 000573	836. 1217	5. 506E+11	0. 000	0. 000	0. 000
9. 900	0. 1906	-1726495.	16800.	-0. 000592	822. 0163	5. 506E+11	0. 000	0. 000	0. 000
10. 395	0. 1870	-1623809.	16800.	-0. 000607	597. 1818	9. 394E+11	0. 000	0. 000	0. 000
10. 890	0. 1834	-1521073.	16800.	-0. 000617	587. 7195	9. 394E+11	0. 000	0. 000	0. 000
11. 385	0. 1797	-1418291.	16800.	-0. 000626	578. 2529	9. 394E+11	0. 000	0. 000	0. 000
11. 880	0. 1759	-1315466.	16800.	-0. 000635	568. 7823	9. 394E+11	0. 000	0. 000	0. 000
12. 375	0. 1721	-1212600.	16800.	-0. 000643	559. 3081	9. 394E+11	0. 000	0. 000	0. 000
12. 870	0. 1683	-1109698.	16800.	-0. 000650	549. 8304	9. 394E+11	0. 000	0. 000	0. 000
13. 365	0. 1644	-1006762.	16800.	-0. 000657	540. 3497	9. 394E+11	0. 000	0. 000	0. 000
13. 860	0. 1605	-903796.	16800.	-0. 000663	530. 8661	9. 394E+11	0. 000	0. 000	0. 000
14. 355	0. 1566	-800802.	16800.	-0. 000668	521. 3800	9. 394E+11	0. 000	0. 000	0. 000
14. 850	0. 1526	-697783.	16800.	-0. 000673	511. 8916	9. 394E+11	0. 000	0. 000	0. 000
15. 345	0. 1486	-594744.	16800.	-0. 000677	502. 4013	9. 394E+11	0. 000	0. 000	0. 000
15. 840	0. 1445	-491686.	16800.	-0. 000680	492. 9093	9. 394E+11	0. 000	0. 000	0. 000
16. 335	0. 1405	-388613.	16800.	-0. 000683	483. 4159	9. 394E+11	0. 000	0. 000	0. 000
16. 830	0. 1364	-285529.	16800.	-0. 000685	473. 9215	9. 394E+11	0. 000	0. 000	0. 000
17. 325	0. 1323	-182436.	16800.	-0. 000687	464. 4262	9. 394E+11	0. 000	0. 000	0. 000
17. 820	0. 1283	-79337.	16800.	-0. 000688	454. 9305	9. 394E+11	0. 000	0. 000	0. 000
18. 315	0. 1242	23764.	16800.	-0. 000688	449. 8121	9. 394E+11	0. 000	0. 000	0. 000
18. 810	0. 1201	126865.	16800.	-0. 000687	459. 3080	9. 394E+11	0. 000	0. 000	0. 000
19. 305	0. 1160	229961.	16800.	-0. 000686	468. 8035	9. 394E+11	0. 000	0. 000	0. 000
19. 800	0. 1119	333051.	16800.	-0. 000684	478. 2985	9. 394E+11	0. 000	0. 000	0. 000
20. 295	0. 1079	436130.	16800.	-0. 000682	487. 7924	9. 394E+11	0. 000	0. 000	0. 000
20. 790	0. 1038	539197.	16800.	-0. 000679	497. 2852	9. 394E+11	0. 000	0. 000	0. 000
21. 285	0. 0998	642246.	16800.	-0. 000675	506. 7764	9. 394E+11	0. 000	0. 000	0. 000
21. 780	0. 0958	745277.	16800.	-0. 000671	516. 2659	9. 394E+11	0. 000	0. 000	0. 000
22. 275	0. 0918	848284.	16800.	-0. 000666	525. 7533	9. 394E+11	0. 000	0. 000	0. 000
22. 770	0. 0879	951266.	16800.	-0. 000660	535. 2382	9. 394E+11	0. 000	0. 000	0. 000
23. 265	0. 0840	1054219.	16800.	-0. 000654	544. 7206	9. 394E+11	0. 000	0. 000	0. 000
23. 760	0. 0801	1157139.	16800.	-0. 000647	554. 1999	9. 394E+11	0. 000	0. 000	0. 000
24. 255	0. 0763	1260025.	16800.	-0. 000639	563. 6761	9. 394E+11	0. 000	0. 000	0. 000
24. 750	0. 0726	1362872.	16800.	-0. 000631	573. 1486	9. 394E+11	0. 000	0. 000	0. 000
25. 245	0. 0688	1465678.	16800.	-0. 000622	582. 6174	9. 394E+11	0. 000	0. 000	0. 000
25. 740	0. 0652	1568439.	16800.	-0. 000612	592. 0821	9. 394E+11	0. 000	0. 000	0. 000
26. 235	0. 0616	1671152.	16800.	-0. 000602	601. 5424	9. 394E+11	0. 000	0. 000	0. 000
26. 730	0. 0580	1773815.	16800.	-0. 000591	610. 9979	9. 394E+11	0. 000	0. 000	0. 000
27. 225	0. 0545	1876424.	16800.	-0. 000579	620. 4486	9. 394E+11	0. 000	0. 000	0. 000
27. 720	0. 0511	1978975.	16800.	-0. 000567	629. 8939	9. 394E+11	0. 000	0. 000	0. 000
28. 215	0. 0478	2081466.	16800.	-0. 000554	639. 3337	9. 394E+11	0. 000	0. 000	0. 000
28. 710	0. 0445	2183894.	16800.	-0. 000541	648. 7677	9. 394E+11	0. 000	0. 000	0. 000
29. 205	0. 0414	2286256.	16800.	-0. 000527	658. 1956	9. 394E+11	0. 000	0. 000	0. 000
29. 700	0. 0383	2388548.	16800.	-0. 000512	667. 6170	9. 394E+11	0. 000	0. 000	0. 000
30. 195	0. 0353	2490767.	16800.	-0. 000497	677. 0318	9. 394E+11	0. 000	0. 000	0. 000
30. 690	0. 0324	2592911.	16800.	-0. 000481	686. 4396	9. 394E+11	0. 000	0. 000	0. 000
31. 185	0. 0296	2694976.	16800.	-0. 000464	695. 8401	9. 394E+11	0. 000	0. 000	0. 000
31. 680	0. 0269	2796958.	16800.	-0. 000446	705. 2331	9. 394E+11	0. 000	0. 000	0. 000
32. 175	0. 0243	2898856.	16800.	-0. 000428	714. 6182	9. 394E+11	0. 000	0. 000	0. 000
32. 670	0. 0218	3000665.	16800.	-0. 000410	723. 9952	9. 394E+11	0. 000	0. 000	0. 000
33. 165	0. 0194	3102383.	16800.	-0. 000391	733. 3638	9. 394E+11	0. 000	0. 000	0. 000
33. 660	0. 0171	3204007.	16800.	-0. 000371	742. 7237	9. 394E+11	0. 000	0. 000	0. 000

IB3_B-7_Trans_Scored.l p7o									
34.155	0.0150	3305533.	16800.	-0.000350	752.0746	9.394E+11	0.000	0.000	0.000
34.650	0.0130	3406959.	16800.	-0.000329	761.4163	9.394E+11	0.000	0.000	0.000
35.145	0.0111	3508281.	16800.	-0.000307	770.7484	9.394E+11	0.000	0.000	0.000
35.640	0.009345	3609496.	16800.	-0.000284	780.0707	9.394E+11	0.000	0.000	0.000
36.135	0.007723	3710601.	16800.	-0.000261	789.3829	9.394E+11	0.000	0.000	0.000
36.630	0.006241	3811594.	16800.	-0.000237	798.6846	9.394E+11	0.000	0.000	0.000
37.125	0.004902	3912471.	16800.	-0.000213	807.9757	9.394E+11	0.000	0.000	0.000
37.620	0.003710	4013228.	16800.	-0.000188	817.2559	9.394E+11	0.000	0.000	0.000
38.115	0.002669	4113864.	16800.	-0.000162	826.5247	9.394E+11	0.000	0.000	0.000
38.610	0.001782	4214374.	16800.	-0.000136	835.7821	9.394E+11	0.000	0.000	0.000
39.105	0.001053	4314756.	-36381.	-0.000109	845.0276	9.394E+11	-17906.	1.010E+08	0.000
39.600	0.000487	3783215.	-114145.	-8.340E-05	796.0708	9.394E+11	-8276.9971	1.010E+08	0.000
40.095	6.256E-05	2959517.	-141886.	-5.547E-05	991.5371	5.506E+11	-1063.5912	1.010E+08	0.000
40.590	-0.000172	2098138.	-136355.	-2.819E-05	873.1112	5.506E+11	2925.9985	1.010E+08	0.000
41.085	-0.000272	1339889.	-113914.	-9.648E-06	768.8642	5.506E+11	4630.0765	1.010E+08	0.000
41.580	-0.000287	744937.	-85685.	1.596E-06	687.0678	5.506E+11	4874.6066	1.010E+08	0.000
42.075	-0.000253	321940.	-58413.	7.351E-06	628.9124	5.506E+11	4307.6730	1.010E+08	0.000
42.570	-0.000199	50916.	-35551.	9.362E-06	591.6510	5.506E+11	3390.0487	1.010E+08	0.000
43.065	-0.000142	-100497.	-18304.	9.094E-06	598.4675	5.506E+11	2416.9610	1.010E+08	0.000
43.560	-9.137E-05	-166626.	-6512.4379	7.654E-06	607.5592	5.506E+11	1553.3450	1.010E+08	0.000
44.055	-5.125E-05	-177938.	688.5647	5.795E-06	609.1145	5.506E+11	871.2351	1.010E+08	0.000
44.550	-2.253E-05	-158501.	4413.5066	3.981E-06	606.4422	5.506E+11	382.9541	1.010E+08	0.000
45.045	-3.961E-06	-125544.	5750.8487	2.448E-06	601.9111	5.506E+11	67.3294	1.010E+08	0.000
45.540	6.561E-06	-90205.	5619.5447	1.285E-06	597.0525	5.506E+11	-111.5395	1.010E+08	0.000
46.035	1.130E-05	-58796.	4717.5926	4.811E-07	592.7344	5.506E+11	-192.1480	1.010E+08	0.000
46.530	1.228E-05	-34164.	3527.0458	-2.026E-08	589.3479	5.506E+11	-208.7095	1.010E+08	0.000
47.025	1.106E-05	-16895.	2348.6538	-2.957E-07	586.9736	5.506E+11	-188.0555	1.010E+08	0.000
47.520	8.765E-06	-6259.5112	1347.6047	-4.205E-07	585.5114	5.506E+11	-148.9980	1.010E+08	0.000
48.015	6.066E-06	-881.1472	598.8080	-4.591E-07	584.7720	5.506E+11	-103.1220	1.010E+08	0.000
48.510	3.311E-06	858.7454	125.3655	-4.592E-07	584.7689	5.506E+11	-56.2862	1.010E+08	0.000
49.005	6.109E-07	612.6131	-72.6505	-4.512E-07	584.7350	5.506E+11	-10.3858	1.010E+08	0.000
49.500	-2.050E-06	0.000	0.000	-4.479E-07	584.6508	5.506E+11	34.8473	50490000.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 3:

Pile-head deflection = 0.2301227 inches  
 Computed slope at pile head = 0.000000 radians  
 Maximum bending moment = 4314756. inch-lbs  
 Maximum shear force = -141886. lbs  
 Depth of maximum bending moment = 39.1050000 feet below pile head  
 Depth of maximum shear force = 40.0950000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 3

-----  
 Pile-head Deflection vs. Pile Length for Load Case 3  
 -----

Boundary Condition Type 2, Shear and Slope

Shear = 16800. lb  
 Slope = 0.00000  
 Axial Load = 810000. lb

Pi le Length feet	Pi le Head Deflecti on inches	Maxi mum Moment In-l bs	Maxi mum Shear l bs
49. 5000	0. 2301227	4314756.	-141886.
47. 0250	0. 2268707	4316484.	-138603.
44. 5500	0. 2326448	4316885.	-140408.
42. 0750	0. 2328980	4295756.	-170785.
42. 0750	0. 000000	5028797375.	498550611.
42. 0750	0. 000000	5028797375.	498550611.
42. 0750	0. 000000	5028797375.	498550611.
42. 0750	0. 000000	5028797375.	498550611.
42. 0750	0. 000000	5028797375.	498550611.
42. 0750	0. 000000	5028797375.	498550611.
42. 0750	0. 000000	5028797375.	498550611.
42. 0750	0. 000000	5028797375.	498550611.
42. 0750	0. 000000	5028797375.	498550611.
42. 0750	0. 000000	5028797375.	498550611.
42. 0750	0. 000000	5028797375.	498550611.
42. 0750	0. 000000	5028797375.	498550611.
42. 0750	0. 000000	5028797375.	498550611.
42. 0750	0. 000000	5028797375.	498550611.
42. 0750	0. 000000	5028797375.	498550611.
42. 0750	0. 000000	5028797375.	498550611.
42. 0750	0. 000000	5028797375.	498550611.
42. 0750	0. 000000	5028797375.	498550611.

-----  
 Computed Values of Pile Loading and Deflection  
 for Lateral Loading for Load Case Number 4  
 -----

Pile-head conditions are Shear and Pile-head Rotation (Loading Type 2)

Shear force at pile head = 15600.0 l bs  
 Rotation of pile head = 0.000E+00 radi ans  
 Axial load at pile head = 1155000.0 l bs

(Zero slope for this load indicates fixed-head conditions)

Depth X feet	Deflect. y inches	Bendi ng Moment in-l bs	Shear Force l bs	Sl ope S radi ans	Total Stress psi *	Bendi ng Sti ffness l b-i n^2	Soi l Res. p l b/i n	Soi l Spr. Es*h l b/i nch	Di stri b. Lat. Load l b/i nch
0. 00	0. 2162	-3520869.	15600.	0. 000	1317. 7319	5. 506E+11	0. 000	0. 000	0. 000
0. 495	0. 2161	-3428074.	15600.	-3. 748E-05	1304. 9742	5. 506E+11	0. 000	0. 000	0. 000
0. 990	0. 2157	-3335026.	15600.	-7. 396E-05	1292. 1816	5. 506E+11	0. 000	0. 000	0. 000
1. 485	0. 2152	-3241732.	15600.	-0. 000109	1279. 3551	5. 506E+11	0. 000	0. 000	0. 000
1. 980	0. 2144	-3148197.	15600.	-0. 000144	1266. 4955	5. 506E+11	0. 000	0. 000	0. 000
2. 475	0. 2135	-3054429.	15600.	-0. 000177	1253. 6040	5. 506E+11	0. 000	0. 000	0. 000
2. 970	0. 2123	-2960435.	15600.	-0. 000210	1240. 6813	5. 506E+11	0. 000	0. 000	0. 000
3. 465	0. 2110	-2866222.	15600.	-0. 000241	1227. 7285	5. 506E+11	0. 000	0. 000	0. 000
3. 960	0. 2095	-2771797.	15600.	-0. 000272	1214. 7466	5. 506E+11	0. 000	0. 000	0. 000
4. 455	0. 2077	-2677167.	15600.	-0. 000301	1201. 7365	5. 506E+11	0. 000	0. 000	0. 000
4. 950	0. 2059	-2582339.	15600.	-0. 000329	1188. 6991	5. 506E+11	0. 000	0. 000	0. 000
5. 445	0. 2038	-2487320.	15600.	-0. 000357	1175. 6355	5. 506E+11	0. 000	0. 000	0. 000
5. 940	0. 2016	-2392116.	15600.	-0. 000383	1162. 5465	5. 506E+11	0. 000	0. 000	0. 000
6. 435	0. 1993	-2296736.	15600.	-0. 000408	1149. 4332	5. 506E+11	0. 000	0. 000	0. 000
6. 930	0. 1968	-2201185.	15600.	-0. 000433	1136. 2965	5. 506E+11	0. 000	0. 000	0. 000
7. 425	0. 1941	-2105472.	15600.	-0. 000456	1123. 1375	5. 506E+11	0. 000	0. 000	0. 000
7. 920	0. 1914	-2009603.	15600.	-0. 000478	1109. 9570	5. 506E+11	0. 000	0. 000	0. 000

IB3\_B-7\_Trans\_Scoured.l p7o

8. 415	0. 1885	-1913585.	15600.	-0. 000499	1096. 7561	5. 506E+11	0. 000	0. 000	0. 000
8. 910	0. 1854	-1817425.	15600.	-0. 000519	1083. 5357	5. 506E+11	0. 000	0. 000	0. 000
9. 405	0. 1823	-1721131.	15600.	-0. 000538	1070. 2968	5. 506E+11	0. 000	0. 000	0. 000
9. 900	0. 1790	-1624710.	15600.	-0. 000556	1057. 0404	5. 506E+11	0. 000	0. 000	0. 000
10. 395	0. 1757	-1528168.	15600.	-0. 000570	779. 0273	9. 394E+11	0. 000	0. 000	0. 000
10. 890	0. 1723	-1431560.	15600.	-0. 000579	770. 1294	9. 394E+11	0. 000	0. 000	0. 000
11. 385	0. 1688	-1334890.	15600.	-0. 000588	761. 2257	9. 394E+11	0. 000	0. 000	0. 000
11. 880	0. 1653	-1238162.	15600.	-0. 000596	752. 3167	9. 394E+11	0. 000	0. 000	0. 000
12. 375	0. 1617	-1141380.	15600.	-0. 000604	743. 4028	9. 394E+11	0. 000	0. 000	0. 000
12. 870	0. 1581	-1044549.	15600.	-0. 000611	734. 4843	9. 394E+11	0. 000	0. 000	0. 000
13. 365	0. 1545	-947672.	15600.	-0. 000617	725. 5616	9. 394E+11	0. 000	0. 000	0. 000
13. 860	0. 1508	-850755.	15600.	-0. 000623	716. 6352	9. 394E+11	0. 000	0. 000	0. 000
14. 355	0. 1471	-753800.	15600.	-0. 000628	707. 7053	9. 394E+11	0. 000	0. 000	0. 000
14. 850	0. 1433	-656813.	15600.	-0. 000632	698. 7724	9. 394E+11	0. 000	0. 000	0. 000
15. 345	0. 1396	-559797.	15600.	-0. 000636	689. 8369	9. 394E+11	0. 000	0. 000	0. 000
15. 840	0. 1358	-462757.	15600.	-0. 000639	680. 8992	9. 394E+11	0. 000	0. 000	0. 000
16. 335	0. 1320	-365697.	15600.	-0. 000642	671. 9596	9. 394E+11	0. 000	0. 000	0. 000
16. 830	0. 1281	-268621.	15600.	-0. 000644	663. 0186	9. 394E+11	0. 000	0. 000	0. 000
17. 325	0. 1243	-171533.	15600.	-0. 000645	654. 0764	9. 394E+11	0. 000	0. 000	0. 000
17. 820	0. 1205	-74438.	15600.	-0. 000646	645. 1336	9. 394E+11	0. 000	0. 000	0. 000
18. 315	0. 1166	22660.	15600.	-0. 000646	640. 3647	9. 394E+11	0. 000	0. 000	0. 000
18. 810	0. 1128	119758.	15600.	-0. 000646	649. 3077	9. 394E+11	0. 000	0. 000	0. 000
19. 305	0. 1090	216850.	15600.	-0. 000645	658. 2503	9. 394E+11	0. 000	0. 000	0. 000
19. 800	0. 1051	313932.	15600.	-0. 000643	667. 1919	9. 394E+11	0. 000	0. 000	0. 000
20. 295	0. 1013	411002.	15600.	-0. 000641	676. 1323	9. 394E+11	0. 000	0. 000	0. 000
20. 790	0. 0975	508053.	15600.	-0. 000638	685. 0711	9. 394E+11	0. 000	0. 000	0. 000
21. 285	0. 0937	605082.	15600.	-0. 000634	694. 0078	9. 394E+11	0. 000	0. 000	0. 000
21. 780	0. 0900	702085.	15600.	-0. 000630	702. 9422	9. 394E+11	0. 000	0. 000	0. 000
22. 275	0. 0863	799058.	15600.	-0. 000625	711. 8737	9. 394E+11	0. 000	0. 000	0. 000
22. 770	0. 0826	895995.	15600.	-0. 000620	720. 8020	9. 394E+11	0. 000	0. 000	0. 000
23. 265	0. 0789	992894.	15600.	-0. 000614	729. 7267	9. 394E+11	0. 000	0. 000	0. 000
23. 760	0. 0753	1089750.	15600.	-0. 000608	738. 6475	9. 394E+11	0. 000	0. 000	0. 000
24. 255	0. 0717	1186559.	15600.	-0. 000600	747. 5639	9. 394E+11	0. 000	0. 000	0. 000
24. 750	0. 0681	1283316.	15600.	-0. 000593	756. 4756	9. 394E+11	0. 000	0. 000	0. 000
25. 245	0. 0646	1380018.	15600.	-0. 000584	765. 3822	9. 394E+11	0. 000	0. 000	0. 000
25. 740	0. 0612	1476659.	15600.	-0. 000575	774. 2832	9. 394E+11	0. 000	0. 000	0. 000
26. 235	0. 0578	1573237.	15600.	-0. 000565	783. 1783	9. 394E+11	0. 000	0. 000	0. 000
26. 730	0. 0545	1669746.	15600.	-0. 000555	792. 0672	9. 394E+11	0. 000	0. 000	0. 000
27. 225	0. 0512	1766183.	15600.	-0. 000544	800. 9494	9. 394E+11	0. 000	0. 000	0. 000
27. 720	0. 0480	1862543.	15600.	-0. 000533	809. 8245	9. 394E+11	0. 000	0. 000	0. 000
28. 215	0. 0449	1958823.	15600.	-0. 000521	818. 6922	9. 394E+11	0. 000	0. 000	0. 000
28. 710	0. 0418	2055017.	15600.	-0. 000508	827. 5520	9. 394E+11	0. 000	0. 000	0. 000
29. 205	0. 0388	2151123.	15600.	-0. 000495	836. 4037	9. 394E+11	0. 000	0. 000	0. 000
29. 700	0. 0359	2247135.	15600.	-0. 000481	845. 2467	9. 394E+11	0. 000	0. 000	0. 000
30. 195	0. 0331	2343049.	15600.	-0. 000466	854. 0808	9. 394E+11	0. 000	0. 000	0. 000
30. 690	0. 0304	2438862.	15600.	-0. 000451	862. 9055	9. 394E+11	0. 000	0. 000	0. 000
31. 185	0. 0278	2534569.	15600.	-0. 000436	871. 7205	9. 394E+11	0. 000	0. 000	0. 000
31. 680	0. 0252	2630166.	15600.	-0. 000419	880. 5253	9. 394E+11	0. 000	0. 000	0. 000
32. 175	0. 0228	2725649.	15600.	-0. 000402	889. 3196	9. 394E+11	0. 000	0. 000	0. 000
32. 670	0. 0204	2821014.	15600.	-0. 000385	898. 1031	9. 394E+11	0. 000	0. 000	0. 000
33. 165	0. 0182	2916256.	15600.	-0. 000367	906. 8752	9. 394E+11	0. 000	0. 000	0. 000
33. 660	0. 0161	3011372.	15600.	-0. 000348	915. 6357	9. 394E+11	0. 000	0. 000	0. 000
34. 155	0. 0141	3106357.	15600.	-0. 000329	924. 3842	9. 394E+11	0. 000	0. 000	0. 000
34. 650	0. 0122	3201208.	15600.	-0. 000309	933. 1203	9. 394E+11	0. 000	0. 000	0. 000
35. 145	0. 0104	3295919.	15600.	-0. 000288	941. 8435	9. 394E+11	0. 000	0. 000	0. 000
35. 640	0. 008767	3390488.	15600.	-0. 000267	950. 5536	9. 394E+11	0. 000	0. 000	0. 000
36. 135	0. 007245	3484910.	15600.	-0. 000245	959. 2502	9. 394E+11	0. 000	0. 000	0. 000
36. 630	0. 005854	3579180.	15600.	-0. 000223	967. 9328	9. 394E+11	0. 000	0. 000	0. 000
37. 125	0. 004598	3673295.	15600.	-0. 000200	976. 6012	9. 394E+11	0. 000	0. 000	0. 000
37. 620	0. 003480	3767251.	15600.	-0. 000176	985. 2548	9. 394E+11	0. 000	0. 000	0. 000



IB3_B-7_Trans_Scoured.l p7o									
38.115	0.002503	3861043.	15600.	-0.000152	993.8934	9.394E+11	0.000	0.000	0.000
38.610	0.001671	3954668.	15600.	-0.000128	1002.5166	9.394E+11	0.000	0.000	0.000
39.105	0.000988	4048121.	-34262.	-0.000102	1011.1240	9.394E+11	-16788.	1.010E+08	0.000
39.600	0.000456	3549043.	-107162.	-7.821E-05	965.1571	9.394E+11	-7757.3264	1.010E+08	0.000
40.095	5.838E-05	2776105.	-133149.	-5.202E-05	1215.3389	5.506E+11	-992.4282	1.010E+08	0.000
40.590	-0.000162	1967946.	-127934.	-2.643E-05	1104.2298	5.506E+11	2748.4445	1.010E+08	0.000
41.085	-0.000256	1256615.	-106864.	-9.039E-06	1006.4333	5.506E+11	4345.6242	1.010E+08	0.000
41.580	-0.000269	698521.	-80373.	1.506E-06	929.7043	5.506E+11	4573.9665	1.010E+08	0.000
42.075	-0.000238	301761.	-54786.	6.902E-06	875.1561	5.506E+11	4041.4063	1.010E+08	0.000
42.570	-0.000187	47575.	-33338.	8.786E-06	840.2095	5.506E+11	3180.1360	1.010E+08	0.000
43.065	-0.000133	-94409.	-17159.	8.533E-06	846.6485	5.506E+11	2267.0425	1.010E+08	0.000
43.560	-8.569E-05	-156396.	-6099.6351	7.180E-06	855.1708	5.506E+11	1456.7894	1.010E+08	0.000
44.055	-4.805E-05	-166971.	653.2211	5.436E-06	856.6246	5.506E+11	816.8996	1.010E+08	0.000
44.550	-2.111E-05	-148711.	4145.3237	3.734E-06	854.1141	5.506E+11	358.8925	1.010E+08	0.000
45.045	-3.699E-06	-117776.	5397.9788	2.296E-06	849.8611	5.506E+11	62.8768	1.010E+08	0.000
45.540	6.167E-06	-84614.	5273.3340	1.205E-06	845.3019	5.506E+11	-104.8448	1.010E+08	0.000
46.035	1.061E-05	-55145.	4426.1700	4.507E-07	841.2504	5.506E+11	-180.3956	1.010E+08	0.000
46.530	1.152E-05	-32038.	3308.6423	-1.950E-08	838.0734	5.506E+11	-195.8763	1.010E+08	0.000
47.025	1.038E-05	-15838.	2202.8084	-2.777E-07	835.8463	5.506E+11	-176.4583	1.010E+08	0.000
47.520	8.223E-06	-5864.3688	1263.5586	-3.948E-07	834.4750	5.506E+11	-139.7874	1.010E+08	0.000
48.015	5.690E-06	-822.0063	561.1068	-4.308E-07	833.7818	5.506E+11	-96.7284	1.010E+08	0.000
48.510	3.104E-06	807.4921	117.0850	-4.309E-07	833.7798	5.506E+11	-52.7739	1.010E+08	0.000
49.005	5.705E-07	574.8767	-68.4598	-4.235E-07	833.7478	5.506E+11	-9.6991	1.010E+08	0.000
49.500	-1.926E-06	0.000	0.000	-4.204E-07	833.6687	5.506E+11	32.7495	50490000.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 4:

Pile-head deflection = 0.2161681 inches  
 Computed slope at pile head = 0.000000 radians  
 Maximum bending moment = 4048121. inch-lbs  
 Maximum shear force = -133149. lbs  
 Depth of maximum bending moment = 39.1050000 feet below pile head  
 Depth of maximum shear force = 40.0950000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 3

-----  
 Pile-head Deflection vs. Pile Length for Load Case 4  
 -----

Boundary Condition Type 2, Shear and Slope

Shear = 15600. lb  
 Slope = 0.00000  
 Axial Load = 1155000. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
49.5000	0.2161681	4048121.	-133149.
47.0250	0.2130878	4049158.	-130027.
44.5500	0.2185551	4050485.	-131754.
42.0750	0.2187935	4030809.	-160259.

42.0750	0.000000	4724252744.	468349883.
42.0750	0.000000	4724252744.	468349883.
42.0750	0.000000	4724252744.	468349883.
42.0750	0.000000	4724252744.	468349883.
42.0750	0.000000	4724252744.	468349883.
42.0750	0.000000	4724252744.	468349883.
42.0750	0.000000	4724252744.	468349883.
42.0750	0.000000	4724252744.	468349883.
42.0750	0.000000	4724252744.	468349883.
42.0750	0.000000	4724252744.	468349883.
42.0750	0.000000	4724252744.	468349883.
42.0750	0.000000	4724252744.	468349883.
42.0750	0.000000	4724252744.	468349883.
42.0750	0.000000	4724252744.	468349883.
42.0750	0.000000	4724252744.	468349883.
42.0750	0.000000	4724252744.	468349883.
42.0750	0.000000	4724252744.	468349883.
42.0750	0.000000	4724252744.	468349883.
42.0750	0.000000	4724252744.	468349883.
42.0750	0.000000	4724252744.	468349883.

-----  
 Summary of Pile Response(s)  
 -----

Defi ni ti ons of Pile-head Loading Condi ti ons:

- Load Type 1: Load 1 = Shear, lbs, and Load 2 = Moment, in-lbs
- Load Type 2: Load 1 = Shear, lbs, and Load 2 = Slope, radians
- Load Type 3: Load 1 = Shear, lbs, and Load 2 = Rotational Sti ffness, in-lbs/radi an
- Load Type 4: Load 1 = Top Deflection, inches, and Load 2 = Moment, in-lbs
- Load Type 5: Load 1 = Top Deflection, inches, and Load 2 = Slope, radi ans

Load Case No.	Load Type No.	Pile-head Condition 1 V(lbs) or y(inches)	Pile-head Condition 2 in-lb, rad., or in-lb/rad.	Axial Loading lbs	Pile-head Deflection inches	Maximum Moment in Pile in-lbs	Maximum Shear in Pile lbs	Pile-head Rotation radi ans
1	1	V = 16800.	M = 1404000.	0.0000000	0.90623573	9287568.	-307404.	-0.00312269
2	1	V = 15600.	M = 1368000.	0.0000000	0.85014728	8688456.	-287586.	-0.00293920
3	2	V = 16800.	S = 0.000	810000.	0.23012269	4314756.	-141886.	-0.00000000
4	2	V = 15600.	S = 0.000	1155000.	0.21616813	4048121.	-133149.	0.00000000

-----  
 Summary of Warni ng Messages  
 -----

The following warning was reported 4000 times

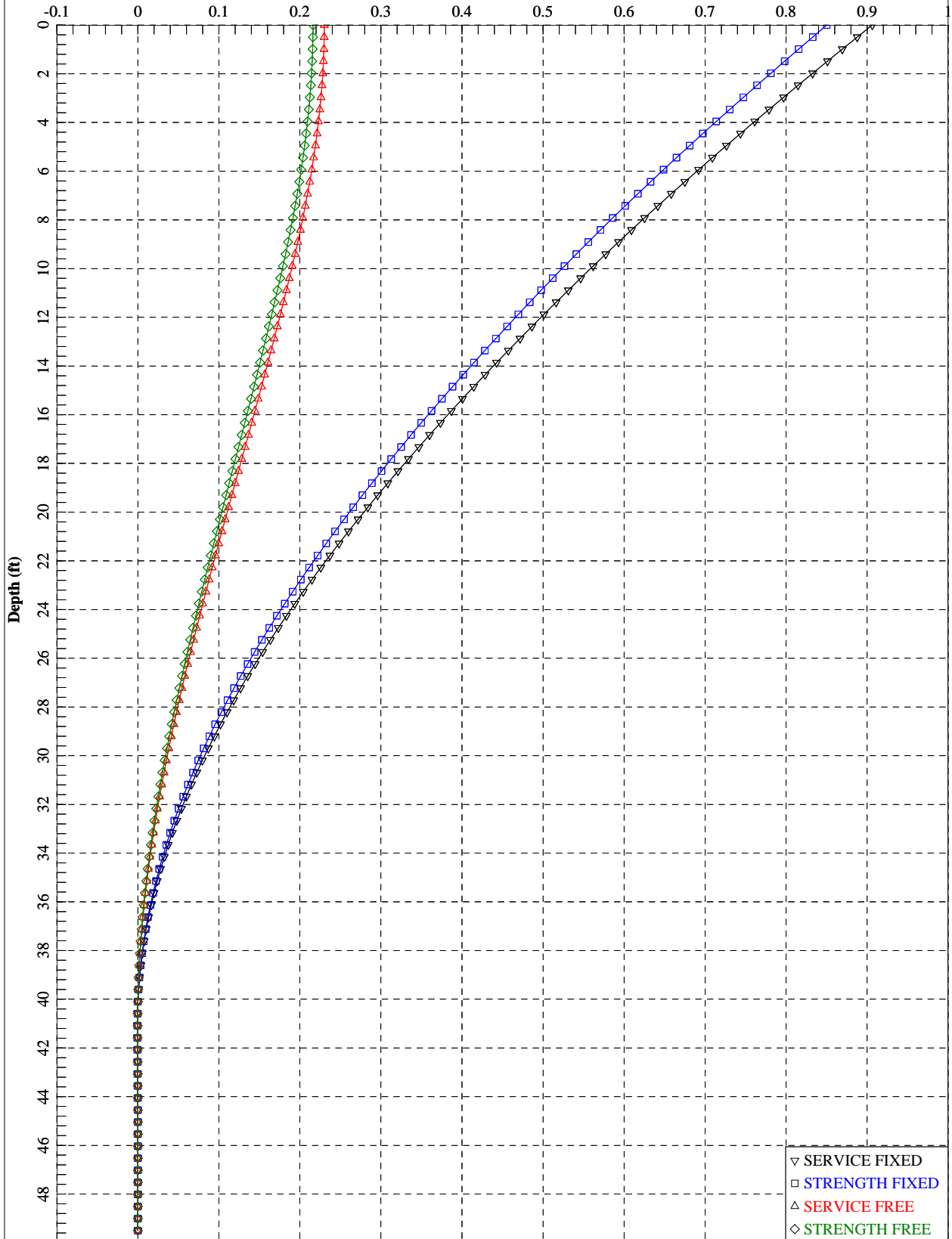
\*\*\*\* Warni ng \*\*\*\*

An unreasonable input value for uniaxial compressive strength has been specified for a soil defined using the vuggy limestone criteria. The input value is outside of the range of 1,000 to 2,500 psi (6,895 to 17,237 kPa). You should check your input data for correctness.

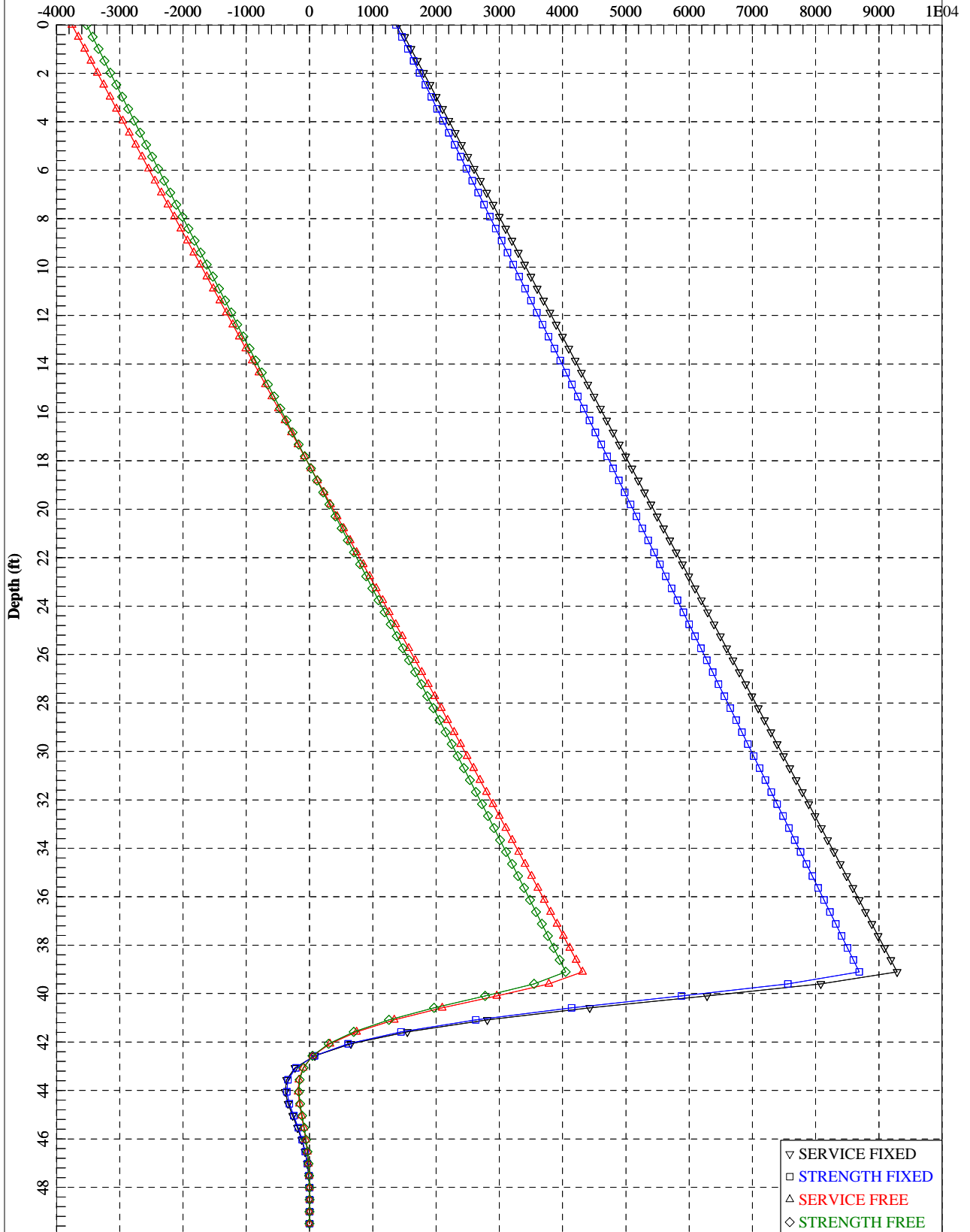
The analysis ended normally.

IB3\_B-7\_Trans\_Scoured.1p7o

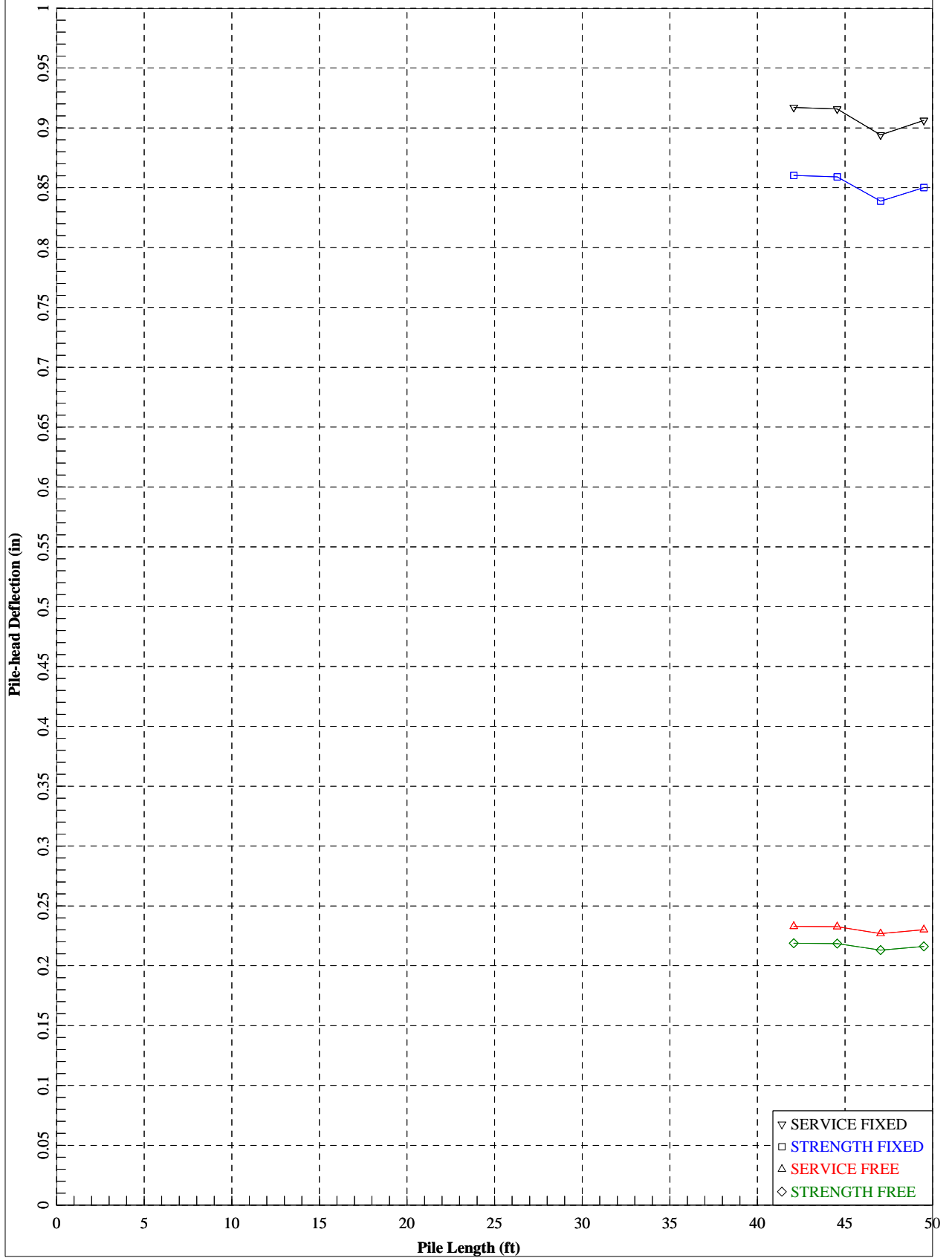
SC 557 Bridge over Crowders Creek - IB3 - Boring B-7 - 48" Dia. Drilled Shaft - Scoured Transverse Analysis  
Lateral Pile Deflection (inches)



SC 557 Bridge over Crowders Creek - IB3 - Boring B-7 - 48" Dia. Drilled Shaft - Scoured Transverse Analysis  
Bending Moment (in-kips)



SC 557 Bridge over Crowders Creek - IB3 - Boring B-7 - 48" Dia. Drilled Shaft - Scoured Transverse Analysis



SC 557 Bridge over Crowders Creek  
Final Bridge Geotechnical Engineering Report

---

# APPENDIX

## SECTION 16 INTERIOR BENT 4 DRILLED SHAFT ANALYSES







Project: SC 557 Bridge over Crowders Creek - Drilled Shaft Axial Resistance Calculations

Location : Interior Bent 4, Boring B-9

Calc. By: JFH

Date: 7/6/2020

Method: AASHTO LRFD Bridge Design Specifications, 8th ed (2017)

Factored Design Load =	925.0	kips
	462.5	tons
$\phi_{IGM}$ =	0.60	
$\phi_{ROCK}$ =	0.50	

Pa =	2.12	ksf
	1.06	tsf

RS Dia. =	3.5	ft
-----------	-----	----

RQD	$\alpha$
100	1.00
70	0.85
50	0.60
30	0.50
20	0.45

Depth		SIDE RESISTANCE																									
		IGM														ROCK								TOTAL			
		$\gamma$	$\gamma'$	$\sigma'_v$		$N_{meas}$	$N_{60}$	$\phi'$	$\sigma'_p$	OCR	$K_0$	$f_{max}$	$R_{s,IGM}$	$\phi R_s$	GSI	RQD	$\alpha$	$q_u$		$f'_c$	$f_{max,rock}$	$f_{max,concrete}$	RS Length	$R_{s,ROCK}$	$\phi R_s$	$\phi R_{s,TOTAL}$	
Top	Bottom	pcf	pcf	psf	tsf	bpf	bpf	deg	tsf	dim	dim	tsf	tons	tons	dim	dim	dim	psi	tsf	psi	tsf	tsf	ft	tons	tons	tons	
	0	2	100	37.6	37.6	0.019	0	0.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	2	4	105	42.6	122.8	0.061	2	2.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4	6	100	37.6	198	0.099	1	1.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	6	8	100	37.6	273.2	0.137	0	0.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	8	10	100	37.6	348.4	0.174	0	0.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10	15	105	42.6	561.4	0.281	5	6.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	15	20	105	42.6	774.4	0.387	4	5.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	20	20.9	140	77.6	844.24	0.422	100	100	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Casing to 20.9'	20.9	25.9	160	97.6	1332.24	0.666	--	--	--	--	--	--	--	--	45	40	0.55	13680	985	4000	32.31	17.47	5	960.59	480.29	480.3	
	25.9	30.9	160	97.6	1820.24	0.910	--	--	--	--	--	--	--	--	45	70	0.85	13680	985	4000	32.31	17.47	0.5	96.06	48.03	528.3	
	30.9	35.9	160	97.6	2308.24	1.154	--	--	--	--	--	--	--	--	60	99	1.00	19620	1413	4000	38.70	17.47					
	35.9	40.9	160	97.6	2796.24	1.398	--	--	--	--	--	--	--	--	60	93	0.97	15000	1080	4000	33.83	17.47					

TIP RESISTANCE										
ROCK										
D	s	a	$m_i$	$m_b$	A	$q_p$	RS Length	$R_p$	$\phi R_p$	
dim	dim	dim	dim	dim	tsf	tsf	ft	tons	tons	
--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--
1.0	0.1304	0.508	26	22.596	370.82	3316.5	5	31908.3	15954.2	
1.0	0.1304	0.508	26	22.596	378.22	3353.2	0.5	32261.3	16130.7	

=====  
LPile Plus for Windows, Version 2013-07.007

Analysis of Individual Piles and Drilled Shafts  
Subjected to Lateral Loading Using the p-y Method

© 1985-2013 by Ensoft, Inc.  
All Rights Reserved

=====  
This copy of LPile is used by:

Bradley Fischer  
F&ME

Serial Number of Security Device: 291490957

This copy of LPile is licensed for exclusive use by: F&ME Consultants, Columbia, Sout

Use of this program by any entity other than F&ME Consultants, Columbia, Sout  
is forbidden by the software license agreement.

-----  
Files Used for Analysis  
-----

Path to file locations: P:\Geotechnical\G4800's\G4843 - SC557 - York County\Report\Final\Bridge\LPile\  
Name of input data file: IB4\_\_B-8\_Long\_Scoured.l p7d  
Name of output report file: IB4\_\_B-8\_Long\_Scoured.l p7o  
Name of plot output file: IB4\_\_B-8\_Long\_Scoured.l p7p  
Name of runtime message file: IB4\_\_B-8\_Long\_Scoured.l p7r

-----  
Date and Time of Analysis  
-----

Date: July 31, 2018 Time: 9:35:01

-----  
Problem Title  
-----

Project Name: SC 557 over Crowders Creek

Job Number: G4843

Client: CALYX

Engineer: JFH

Description: IB4 - Boring B-8 - 48" Dia. Drilled Shaft - Scoured Long.

-----  
 Program Options and Settings  
 -----

Engineering Units of Input Data and Computations:

- Engineering units are US Customary Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

Computational Options:

- Use unfactored loads in computations (conventional analysis)
- Compute pile response under loading and nonlinear bending properties of pile (only if nonlinear pile properties are input)
- Analysis uses p-y modification factors for p-y curves
- Analysis includes loading by lateral soil movements acting on pile
- Input of shear resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- No p-y curves to be computed and reported for user-specified depths
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1

-----  
 Pile Structural Properties and Geometry  
 -----

- Total number of pile sections = 3
- Total length of pile = 47.50 ft
- Depth of ground surface below top of pile = 36.00 ft

Pile diameter values used for p-y curve computations are defined using 6 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile.

Point	Depth X ft	Pile Diameter in
1	0.00000	42.0000000
2	9.000000	42.0000000
3	9.000000	48.0000000
4	37.500000	48.0000000

5	37.50000	42.0000000
6	47.50000	42.0000000

-----  
 Input Structural Properties:  
 -----

Pile Section No. 1:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Circular
Section Length	=	9.00000 ft
Top Width	=	42.00000 in
Bottom Width	=	42.00000 in
Top Area	=	1385.44236 Sq. in
Bottom Area	=	1385.44236 Sq. in
Moment of Inertia at Top	=	152745. in^4
Moment of Inertia at Bottom	=	152745. in^4
Elastic Modulus	=	3605000. lbs/in^2

Pile Section No. 2:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Circular
Section Length	=	28.50000 ft
Top Width	=	48.00000 in
Bottom Width	=	48.00000 in
Top Area	=	1809.55737 Sq. in
Bottom Area	=	1809.55737 Sq. in
Moment of Inertia at Top	=	260576. in^4
Moment of Inertia at Bottom	=	260576. in^4
Elastic Modulus	=	3605000. lbs/in^2

Pile Section No. 3:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Circular
Section Length	=	10.00000 ft
Top Width	=	42.00000 in
Bottom Width	=	42.00000 in
Top Area	=	1385.44236 Sq. in
Bottom Area	=	1385.44236 Sq. in
Moment of Inertia at Top	=	152745. in^4
Moment of Inertia at Bottom	=	152745. in^4
Elastic Modulus	=	3605000. lbs/in^2

-----  
 Ground Slope and Pile Batter Angles  
 -----

Ground Slope Angle	=	0.000 degrees
	=	0.000 radians
Pile Batter Angle	=	0.000 degrees
	=	0.000 radians

-----  
 Soil and Rock Layering Information  
 -----

The soil profile is modelled using 1 layers

Layer 1 is strong rock (vuggy limestone)

Distance from top of pile to top of layer = 36.00000 ft  
 Distance from top of pile to bottom of layer = 60.00000 ft  
 Effective unit weight at top of layer = 98.00000 pcf  
 Effective unit weight at bottom of layer = 98.00000 pcf  
 Uniaxial compressive strength at top of layer = 15000. psi  
 Uniaxial compressive strength at bottom of layer = 15000. psi

(Depth of lowest soil layer extends 12.50 ft below pile tip)

Summary of Soil Properties

Layer Num.	Layer Soil Type (p-y Curve Criteria)	Layer Depth ft	Effective Unit Wt. pcf	Uniaxial qu psi
1	Vuggy Limestone	36.000 60.000	98.000 98.000	15000. 15000.

p-y Modification Factors for Group Action

Distribution of p-y modifiers with depth defined using 2 points

Point No.	Depth X ft	p-mult	y-mult
1	36.000	0.9300	1.0000
2	100.000	0.9300	1.0000

Lateral Soil Movements

Profile of soil movement with depth defined using 2 points

Point No.	Depth X ft	Soil Movement in
1	0.00000	0.00000
2	0.00000	0.00000

Loading Type

-----  
 Static loading criteria were used when computing p-y curves for all analyses.  
 -----

-----  
 Pile-head Loading and Pile-head Fixity Conditions  
 -----

Number of loads specified = 4

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length
1	1	V = 12500. lbs	M = 720000. in-lbs	640000.	Yes
2	1	V = 23200. lbs	M = 2160000. in-lbs	925000.	Yes
3	2	V = 12500. lbs	S = 0.0000 in/in	640000.	Yes
4	2	V = 23200. lbs	S = 0.0000 in/in	925000.	Yes

V = perpendicular shear force applied to pile head  
 M = bending moment applied to pile head  
 y = lateral deflection relative to pile axis  
 S = pile slope relative to original pile batter angle  
 R = rotational stiffness applied to pile head  
 Axial thrust is assumed to be acting axially for all pile batter angles.

-----  
 Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness  
 -----

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 3

Pile Section No. 1:  
 -----

Moment-curvature properties were derived from elastic section properties

Pile Section No. 2:  
 -----

Moment-curvature properties were derived from elastic section properties

Pile Section No. 3:  
 -----

Moment-curvature properties were derived from elastic section properties

-----  
 Computed Values of Pile Loading and Deflection  
 for Lateral Loading for Load Case Number 1  
 -----

Pile-head conditions are Shear and Moment (Loading Type 1)

I B4\_\_B-8\_Long\_Scoured. I p7o

Shear force at pile head = 12500.0 lbs  
 Applied moment at pile head = 720000.0 in-lbs  
 Axial thrust load on pile head = 640000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi *	Bending Stiffness lb-in^2	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.5373	720000.	12500.	-0.001952	560.9348	5.506E+11	0.000	0.000	0.000
0.475	0.5262	798357.	12500.	-0.001944	571.7077	5.506E+11	0.000	0.000	0.000
0.950	0.5151	876685.	12500.	-0.001935	582.4765	5.506E+11	0.000	0.000	0.000
1.425	0.5041	954979.	12500.	-0.001926	593.2406	5.506E+11	0.000	0.000	0.000
1.900	0.4932	1033237.	12500.	-0.001916	603.9999	5.506E+11	0.000	0.000	0.000
2.375	0.4823	1111456.	12500.	-0.001905	614.7537	5.506E+11	0.000	0.000	0.000
2.850	0.4715	1189633.	12500.	-0.001893	625.5018	5.506E+11	0.000	0.000	0.000
3.325	0.4607	1267765.	12500.	-0.001880	636.2438	5.506E+11	0.000	0.000	0.000
3.800	0.4500	1345849.	12500.	-0.001866	646.9791	5.506E+11	0.000	0.000	0.000
4.275	0.4394	1423883.	12500.	-0.001852	657.7075	5.506E+11	0.000	0.000	0.000
4.750	0.4289	1501863.	12500.	-0.001837	668.4284	5.506E+11	0.000	0.000	0.000
5.225	0.4185	1579786.	12500.	-0.001821	679.1416	5.506E+11	0.000	0.000	0.000
5.700	0.4081	1657649.	12500.	-0.001804	689.8466	5.506E+11	0.000	0.000	0.000
6.175	0.3979	1735450.	12500.	-0.001787	700.5429	5.506E+11	0.000	0.000	0.000
6.650	0.3878	1813185.	12500.	-0.001768	711.2303	5.506E+11	0.000	0.000	0.000
7.125	0.3778	1890852.	12500.	-0.001749	721.9082	5.506E+11	0.000	0.000	0.000
7.600	0.3678	1968447.	12500.	-0.001729	732.5763	5.506E+11	0.000	0.000	0.000
8.075	0.3580	2045968.	12500.	-0.001708	743.2342	5.506E+11	0.000	0.000	0.000
8.550	0.3484	2123412.	12500.	-0.001687	753.8815	5.506E+11	0.000	0.000	0.000
9.025	0.3388	2200775.	12500.	-0.001669	556.3769	9.394E+11	0.000	0.000	0.000
9.500	0.3293	2278090.	12500.	-0.001656	563.4978	9.394E+11	0.000	0.000	0.000
9.975	0.3199	2355354.	12500.	-0.001642	570.6142	9.394E+11	0.000	0.000	0.000
10.450	0.3106	2432567.	12500.	-0.001627	577.7257	9.394E+11	0.000	0.000	0.000
10.925	0.3014	2509725.	12500.	-0.001612	584.8323	9.394E+11	0.000	0.000	0.000
11.400	0.2922	2586828.	12500.	-0.001597	591.9337	9.394E+11	0.000	0.000	0.000
11.875	0.2832	2663874.	12500.	-0.001581	599.0299	9.394E+11	0.000	0.000	0.000
12.350	0.2742	2740860.	12500.	-0.001564	606.1206	9.394E+11	0.000	0.000	0.000
12.825	0.2654	2817786.	12500.	-0.001547	613.2058	9.394E+11	0.000	0.000	0.000
13.300	0.2566	2894650.	12500.	-0.001530	620.2852	9.394E+11	0.000	0.000	0.000
13.775	0.2479	2971449.	12500.	-0.001512	627.3587	9.394E+11	0.000	0.000	0.000
14.250	0.2393	3048183.	12500.	-0.001494	634.4261	9.394E+11	0.000	0.000	0.000
14.725	0.2309	3124849.	12500.	-0.001475	641.4874	9.394E+11	0.000	0.000	0.000
15.200	0.2225	3201446.	12500.	-0.001456	648.5422	9.394E+11	0.000	0.000	0.000
15.675	0.2143	3277973.	12500.	-0.001436	655.5906	9.394E+11	0.000	0.000	0.000
16.150	0.2062	3354426.	12500.	-0.001416	662.6322	9.394E+11	0.000	0.000	0.000
16.625	0.1981	3430806.	12500.	-0.001396	669.6671	9.394E+11	0.000	0.000	0.000
17.100	0.1902	3507109.	12500.	-0.001375	676.6949	9.394E+11	0.000	0.000	0.000
17.575	0.1825	3583335.	12500.	-0.001353	683.7156	9.394E+11	0.000	0.000	0.000
18.050	0.1748	3659482.	12500.	-0.001331	690.7289	9.394E+11	0.000	0.000	0.000
18.525	0.1673	3735547.	12500.	-0.001309	697.7348	9.394E+11	0.000	0.000	0.000
19.000	0.1599	3811530.	12500.	-0.001286	704.7331	9.394E+11	0.000	0.000	0.000
19.475	0.1526	3887428.	12500.	-0.001262	711.7236	9.394E+11	0.000	0.000	0.000
19.950	0.1455	3963241.	12500.	-0.001239	718.7062	9.394E+11	0.000	0.000	0.000
20.425	0.1385	4038966.	12500.	-0.001214	725.6807	9.394E+11	0.000	0.000	0.000
20.900	0.1317	4114601.	12500.	-0.001190	732.6470	9.394E+11	0.000	0.000	0.000
21.375	0.1250	4190145.	12500.	-0.001164	739.6049	9.394E+11	0.000	0.000	0.000
21.850	0.1184	4265597.	12500.	-0.001139	746.5543	9.394E+11	0.000	0.000	0.000
22.325	0.1120	4340954.	12500.	-0.001113	753.4949	9.394E+11	0.000	0.000	0.000
22.800	0.1057	4416215.	12500.	-0.001086	760.4267	9.394E+11	0.000	0.000	0.000
23.275	0.0996	4491378.	12500.	-0.001059	767.3495	9.394E+11	0.000	0.000	0.000
23.750	0.0936	4566441.	12500.	-0.001032	774.2631	9.394E+11	0.000	0.000	0.000

I B4\_B-8\_Long\_Scoured.l p7o

24. 225	0. 0878	4641404.	12500.	-0. 001004	781. 1675	9. 394E+11	0. 000	0. 000	0. 000
24. 700	0. 0822	4716264.	12500.	-0. 000975	788. 0623	9. 394E+11	0. 000	0. 000	0. 000
25. 175	0. 0767	4791020.	12500.	-0. 000946	794. 9476	9. 394E+11	0. 000	0. 000	0. 000
25. 650	0. 0714	4865669.	12500.	-0. 000917	801. 8231	9. 394E+11	0. 000	0. 000	0. 000
26. 125	0. 0663	4940211.	12500.	-0. 000887	808. 6886	9. 394E+11	0. 000	0. 000	0. 000
26. 600	0. 0613	5014643.	12500.	-0. 000857	815. 5441	9. 394E+11	0. 000	0. 000	0. 000
27. 075	0. 0565	5088965.	12500.	-0. 000827	822. 3894	9. 394E+11	0. 000	0. 000	0. 000
27. 550	0. 0519	5163174.	12500.	-0. 000795	829. 2243	9. 394E+11	0. 000	0. 000	0. 000
28. 025	0. 0474	5237268.	12500.	-0. 000764	836. 0487	9. 394E+11	0. 000	0. 000	0. 000
28. 500	0. 0432	5311247.	12500.	-0. 000732	842. 8624	9. 394E+11	0. 000	0. 000	0. 000
28. 975	0. 0391	5385108.	12500.	-0. 000699	849. 6652	9. 394E+11	0. 000	0. 000	0. 000
29. 450	0. 0352	5458850.	12500.	-0. 000667	856. 4571	9. 394E+11	0. 000	0. 000	0. 000
29. 925	0. 0315	5532471.	12500.	-0. 000633	863. 2379	9. 394E+11	0. 000	0. 000	0. 000
30. 400	0. 0280	5605969.	12500.	-0. 000599	870. 0073	9. 394E+11	0. 000	0. 000	0. 000
30. 875	0. 0246	5679344.	12500.	-0. 000565	876. 7654	9. 394E+11	0. 000	0. 000	0. 000
31. 350	0. 0215	5752592.	12500.	-0. 000530	883. 5118	9. 394E+11	0. 000	0. 000	0. 000
31. 825	0. 0186	5825714.	12500.	-0. 000495	890. 2466	9. 394E+11	0. 000	0. 000	0. 000
32. 300	0. 0159	5898706.	12500.	-0. 000460	896. 9694	9. 394E+11	0. 000	0. 000	0. 000
32. 775	0. 0134	5971568.	12500.	-0. 000424	903. 6803	9. 394E+11	0. 000	0. 000	0. 000
33. 250	0. 0110	6044297.	12500.	-0. 000387	910. 3789	9. 394E+11	0. 000	0. 000	0. 000
33. 725	0. 008939	6116893.	12500.	-0. 000350	917. 0653	9. 394E+11	0. 000	0. 000	0. 000
34. 200	0. 007048	6189354.	12500.	-0. 000313	923. 7391	9. 394E+11	0. 000	0. 000	0. 000
34. 675	0. 005371	6261677.	12500.	-0. 000275	930. 4004	9. 394E+11	0. 000	0. 000	0. 000
35. 150	0. 003910	6333862.	12500.	-0. 000237	937. 0489	9. 394E+11	0. 000	0. 000	0. 000
35. 625	0. 002668	6405907.	12500.	-0. 000198	943. 6844	9. 394E+11	0. 000	0. 000	0. 000
36. 100	0. 001648	6477810.	-53035.	-0. 000159	950. 3069	9. 394E+11	-22995.	79515000.	0. 000
36. 575	0. 000852	5802468.	-152457.	-0. 000122	888. 1056	9. 394E+11	-11890.	79515000.	0. 000
37. 050	0. 000257	4740690.	-196561.	-9. 006E-05	790. 3121	9. 394E+11	-3584. 9664	79515000.	0. 000
37. 525	-0. 000174	3562331.	-199844.	-5. 724E-05	951. 7100	5. 506E+11	2432. 8310	79515000.	0. 000
38. 000	-0. 000371	2462881.	-177183.	-2. 606E-05	800. 5531	5. 506E+11	5518. 4803	79515000.	0. 000
38. 475	-0. 000471	1542633.	-142711.	-5. 327E-06	674. 0337	5. 506E+11	6576. 9370	79515000.	0. 000
38. 950	-0. 000456	836011.	-105825.	6. 984E-06	576. 8845	5. 506E+11	6365. 6556	79515000.	0. 000
39. 425	-0. 000392	336178.	-72104.	1. 305E-05	508. 1654	5. 506E+11	5466. 2551	79515000.	0. 000
39. 900	-0. 000308	13931.	-44298.	1. 486E-05	463. 8616	5. 506E+11	4290. 1472	79515000.	0. 000
40. 375	-0. 000222	-168930.	-23229.	1. 406E-05	485. 1715	5. 506E+11	3102. 5729	79515000.	0. 000
40. 850	-0. 000147	-250982.	-8532. 5979	1. 189E-05	496. 4523	5. 506E+11	2054. 0448	79515000.	0. 000
41. 325	-8. 689E-05	-266288.	775. 9129	9. 210E-06	498. 5567	5. 506E+11	1212. 0994	79515000.	0. 000
41. 800	-4. 225E-05	-242204.	5910. 0023	6. 578E-06	495. 2455	5. 506E+11	589. 3355	79515000.	0. 000
42. 275	-1. 189E-05	-198962.	8062. 5064	4. 295E-06	489. 3005	5. 506E+11	165. 9291	79515000.	0. 000
42. 750	6. 718E-06	-150323.	8268. 3260	2. 487E-06	482. 6133	5. 506E+11	-93. 7117	79515000.	0. 000
43. 225	1. 646E-05	-104722.	7346. 8240	1. 167E-06	476. 3439	5. 506E+11	-229. 6223	79515000.	0. 000
43. 700	2. 002E-05	-66577.	5896. 2908	2. 806E-07	471. 0996	5. 506E+11	-279. 3367	79515000.	0. 000
44. 175	1. 966E-05	-37506.	4318. 5645	-2. 581E-07	467. 1028	5. 506E+11	-274. 2515	79515000.	0. 000
44. 650	1. 708E-05	-17344.	2857. 8066	-5. 420E-07	464. 3308	5. 506E+11	-238. 2951	79515000.	0. 000
45. 125	1. 348E-05	-4923. 0504	1642. 6853	-6. 572E-07	462. 6232	5. 506E+11	-188. 0632	79515000.	0. 000
45. 600	9. 590E-06	1387. 6595	725. 4347	-6. 755E-07	462. 1371	5. 506E+11	-133. 7791	79515000.	0. 000
46. 075	5. 780E-06	3351. 8337	114. 3482	-6. 510E-07	462. 4071	5. 506E+11	-80. 6372	79515000.	0. 000
46. 550	2. 169E-06	2695. 9789	-201. 6921	-6. 197E-07	462. 3170	5. 506E+11	-30. 2542	79515000.	0. 000
47. 025	-1. 284E-06	1057. 0646	-236. 8735	-6. 003E-07	462. 0916	5. 506E+11	17. 9098	79515000.	0. 000
47. 500	-4. 674E-06	0. 000	0. 000	-5. 948E-07	461. 9463	5. 506E+11	65. 2037	39757500.	0. 000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 1:

Pile-head deflection = 0. 5372884 inches  
 Computed slope at pile head = -0. 0019520 radians  
 Maximum bending moment = 6477810. inch-lbs  
 Maximum shear force = -199844. lbs



IB4\_B-8\_Long\_Scoured.l p7o

Depth of maximum bending moment = 36.100000 feet below pile head  
 Depth of maximum shear force = 37.5250000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 3

-----  
 Pile-head Deflection vs. Pile Length for Load Case 1  
 -----

Boundary Condition Type 1, Shear and Moment

Shear = 12500. lb  
 Moment = 720000. in-lb  
 Axial Load = 640000. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment in-lbs	Maximum Shear lbs
47.5000	0.5372884	6477810.	-199844.
45.1250	0.5343392	6475951.	-197911.
42.7500	0.5507860	6522020.	-205122.
40.3750	0.5527971	6523259.	-212487.
40.3750	0.000000	13194035564.	-1361613539.
40.3750	0.000000	13194035564.	-1361613539.
40.3750	0.000000	13194035564.	-1361613539.
40.3750	0.000000	13194035564.	-1361613539.
40.3750	0.000000	13194035564.	-1361613539.
40.3750	0.000000	13194035564.	-1361613539.
40.3750	0.000000	13194035564.	-1361613539.
40.3750	0.000000	13194035564.	-1361613539.
40.3750	0.000000	13194035564.	-1361613539.
40.3750	0.000000	13194035564.	-1361613539.
40.3750	0.000000	13194035564.	-1361613539.
40.3750	0.000000	13194035564.	-1361613539.
40.3750	0.000000	13194035564.	-1361613539.
40.3750	0.000000	13194035564.	-1361613539.
40.3750	0.000000	13194035564.	-1361613539.
40.3750	0.000000	13194035564.	-1361613539.
40.3750	0.000000	13194035564.	-1361613539.
40.3750	0.000000	13194035564.	-1361613539.
40.3750	0.000000	13194035564.	-1361613539.
40.3750	0.000000	13194035564.	-1361613539.
40.3750	0.000000	13194035564.	-1361613539.
40.3750	0.000000	13194035564.	-1361613539.

-----  
 Computed Values of Pile Loading and Deflection  
 for Lateral Loading for Load Case Number 2  
 -----

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 23200.0 lbs  
 Applied moment at pile head = 2160000.0 in-lbs  
 Axial thrust load on pile head = 925000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	1.1288	2160000.	23200.	-0.004221	964.6223	5.506E+11	0.000	0.000	0.000

IB4\_B-8\_Long\_Scored.l p7o

0.475	1.1048	2314438.	23200.	-0.004198	985.8550	5.506E+11	0.000	0.000	0.000
0.950	1.0809	2468749.	23200.	-0.004173	1007.0703	5.506E+11	0.000	0.000	0.000
1.425	1.0572	2622925.	23200.	-0.004147	1028.2671	5.506E+11	0.000	0.000	0.000
1.900	1.0336	2776959.	23200.	-0.004119	1049.4442	5.506E+11	0.000	0.000	0.000
2.375	1.0102	2930840.	23200.	-0.004089	1070.6005	5.506E+11	0.000	0.000	0.000
2.850	0.9870	3084562.	23200.	-0.004058	1091.7348	5.506E+11	0.000	0.000	0.000
3.325	0.9640	3238116.	23200.	-0.004026	1112.8460	5.506E+11	0.000	0.000	0.000
3.800	0.9411	3391493.	23200.	-0.003991	1133.9328	5.506E+11	0.000	0.000	0.000
4.275	0.9185	3544684.	23200.	-0.003955	1154.9942	5.506E+11	0.000	0.000	0.000
4.750	0.8960	3697682.	23200.	-0.003918	1176.0290	5.506E+11	0.000	0.000	0.000
5.225	0.8738	3850479.	23200.	-0.003879	1197.0361	5.506E+11	0.000	0.000	0.000
5.700	0.8518	4003065.	23200.	-0.003838	1218.0143	5.506E+11	0.000	0.000	0.000
6.175	0.8300	4155433.	23200.	-0.003796	1238.9624	5.506E+11	0.000	0.000	0.000
6.650	0.8085	4307574.	23200.	-0.003752	1259.8794	5.506E+11	0.000	0.000	0.000
7.125	0.7873	4459480.	23200.	-0.003707	1280.7640	5.506E+11	0.000	0.000	0.000
7.600	0.7663	4611142.	23200.	-0.003660	1301.6152	5.506E+11	0.000	0.000	0.000
8.075	0.7456	4762553.	23200.	-0.003611	1322.4317	5.506E+11	0.000	0.000	0.000
8.550	0.7251	4913704.	23200.	-0.003561	1343.2125	5.506E+11	0.000	0.000	0.000
9.025	0.7050	5064586.	23200.	-0.003520	977.6411	9.394E+11	0.000	0.000	0.000
9.500	0.6850	5215307.	23200.	-0.003489	991.5230	9.394E+11	0.000	0.000	0.000
9.975	0.6652	5365861.	23200.	-0.003457	1005.3896	9.394E+11	0.000	0.000	0.000
10.450	0.6456	5516243.	23200.	-0.003424	1019.2403	9.394E+11	0.000	0.000	0.000
10.925	0.6261	5666449.	23200.	-0.003390	1033.0748	9.394E+11	0.000	0.000	0.000
11.400	0.6069	5816473.	23200.	-0.003355	1046.8926	9.394E+11	0.000	0.000	0.000
11.875	0.5879	5966311.	23200.	-0.003320	1060.6932	9.394E+11	0.000	0.000	0.000
12.350	0.5691	6115959.	23200.	-0.003283	1074.4763	9.394E+11	0.000	0.000	0.000
12.825	0.5505	6265410.	23200.	-0.003245	1088.2413	9.394E+11	0.000	0.000	0.000
13.300	0.5321	6414662.	23200.	-0.003207	1101.9879	9.394E+11	0.000	0.000	0.000
13.775	0.5139	6563708.	23200.	-0.003168	1115.7155	9.394E+11	0.000	0.000	0.000
14.250	0.4960	6712544.	23200.	-0.003127	1129.4239	9.394E+11	0.000	0.000	0.000
14.725	0.4783	6861165.	23200.	-0.003086	1143.1124	9.394E+11	0.000	0.000	0.000
15.200	0.4608	7009567.	23200.	-0.003044	1156.7808	9.394E+11	0.000	0.000	0.000
15.675	0.4435	7157745.	23200.	-0.003001	1170.4284	9.394E+11	0.000	0.000	0.000
16.150	0.4266	7305693.	23200.	-0.002957	1184.0550	9.394E+11	0.000	0.000	0.000
16.625	0.4098	7453408.	23200.	-0.002912	1197.6601	9.394E+11	0.000	0.000	0.000
17.100	0.3934	7600884.	23200.	-0.002867	1211.2432	9.394E+11	0.000	0.000	0.000
17.575	0.3772	7748118.	23200.	-0.002820	1224.8039	9.394E+11	0.000	0.000	0.000
18.050	0.3612	7895103.	23200.	-0.002773	1238.3418	9.394E+11	0.000	0.000	0.000
18.525	0.3455	8041836.	23200.	-0.002724	1251.8564	9.394E+11	0.000	0.000	0.000
19.000	0.3302	8188311.	23200.	-0.002675	1265.3473	9.394E+11	0.000	0.000	0.000
19.475	0.3151	8334525.	23200.	-0.002625	1278.8141	9.394E+11	0.000	0.000	0.000
19.950	0.3002	8480471.	23200.	-0.002574	1292.2563	9.394E+11	0.000	0.000	0.000
20.425	0.2857	8626147.	23200.	-0.002522	1305.6735	9.394E+11	0.000	0.000	0.000
20.900	0.2715	8771546.	23200.	-0.002469	1319.0653	9.394E+11	0.000	0.000	0.000
21.375	0.2576	8916665.	23200.	-0.002416	1332.4313	9.394E+11	0.000	0.000	0.000
21.850	0.2439	9061499.	23200.	-0.002361	1345.7710	9.394E+11	0.000	0.000	0.000
22.325	0.2306	9206043.	23200.	-0.002306	1359.0840	9.394E+11	0.000	0.000	0.000
22.800	0.2177	9350292.	23200.	-0.002249	1372.3699	9.394E+11	0.000	0.000	0.000
23.275	0.2050	9494242.	23200.	-0.002192	1385.6282	9.394E+11	0.000	0.000	0.000
23.750	0.1927	9637889.	23200.	-0.002134	1398.8585	9.394E+11	0.000	0.000	0.000
24.225	0.1807	9781227.	23200.	-0.002075	1412.0605	9.394E+11	0.000	0.000	0.000
24.700	0.1690	9924252.	23200.	-0.002015	1425.2336	9.394E+11	0.000	0.000	0.000
25.175	0.1577	10066959.	23200.	-0.001955	1438.3775	9.394E+11	0.000	0.000	0.000
25.650	0.1467	10209345.	23200.	-0.001893	1451.4917	9.394E+11	0.000	0.000	0.000
26.125	0.1361	10351404.	23200.	-0.001831	1464.5758	9.394E+11	0.000	0.000	0.000
26.600	0.1259	10493131.	23200.	-0.001768	1477.6294	9.394E+11	0.000	0.000	0.000
27.075	0.1160	10634523.	23200.	-0.001704	1490.6521	9.394E+11	0.000	0.000	0.000
27.550	0.1064	10775575.	23200.	-0.001639	1503.6435	9.394E+11	0.000	0.000	0.000
28.025	0.0973	10916282.	23200.	-0.001573	1516.6031	9.394E+11	0.000	0.000	0.000
28.500	0.0885	11056640.	23200.	-0.001506	1529.5306	9.394E+11	0.000	0.000	0.000

IB4_B-8_Long_Scoured.l p7o									
28.975	0.0801	11196644.	23200.	-0.001439	1542.4254	9.394E+11	0.000	0.000	0.000
29.450	0.0721	11336290.	23200.	-0.001370	1555.2873	9.394E+11	0.000	0.000	0.000
29.925	0.0645	11475573.	23200.	-0.001301	1568.1158	9.394E+11	0.000	0.000	0.000
30.400	0.0573	11614489.	23200.	-0.001231	1580.9105	9.394E+11	0.000	0.000	0.000
30.875	0.0505	11753033.	23200.	-0.001160	1593.6709	9.394E+11	0.000	0.000	0.000
31.350	0.0440	11891202.	23200.	-0.001088	1606.3967	9.394E+11	0.000	0.000	0.000
31.825	0.0381	12028990.	23200.	-0.001016	1619.0875	9.394E+11	0.000	0.000	0.000
32.300	0.0325	12166393.	23200.	-0.000942	1631.7428	9.394E+11	0.000	0.000	0.000
32.775	0.0273	12303407.	23200.	-0.000868	1644.3623	9.394E+11	0.000	0.000	0.000
33.250	0.0226	12440027.	23200.	-0.000793	1656.9455	9.394E+11	0.000	0.000	0.000
33.725	0.0183	12576250.	23200.	-0.000717	1669.4920	9.394E+11	0.000	0.000	0.000
34.200	0.0144	12712070.	23200.	-0.000640	1682.0015	9.394E+11	0.000	0.000	0.000
34.675	0.0110	12847483.	23200.	-0.000563	1694.4736	9.394E+11	0.000	0.000	0.000
35.150	0.007980	12982485.	23200.	-0.000485	1706.9078	9.394E+11	0.000	0.000	0.000
35.625	0.005443	13117072.	23200.	-0.000405	1719.3037	9.394E+11	0.000	0.000	0.000
36.100	0.003360	13251239.	-110366.	-0.000325	1731.6610	9.394E+11	-46865.	79515000.	0.000
36.575	0.001734	11862334.	-312883.	-0.000249	1603.7379	9.394E+11	-24193.	79515000.	0.000
37.050	0.000519	9687005.	-402482.	-0.000184	1403.3823	9.394E+11	-7245.0916	79515000.	0.000
37.525	-0.000361	7275973.	-408797.	-0.000117	1667.9869	5.506E+11	5029.4024	79515000.	0.000
38.000	-0.000811	5027949.	-362215.	-5.303E-05	1358.9195	5.506E+11	11315.	79515000.	0.000
38.475	-0.000965	3147277.	-291600.	-1.071E-05	1100.3571	5.506E+11	13462.	79515000.	0.000
38.950	-0.000933	1703821.	-216129.	1.439E-05	901.9050	5.506E+11	13019.	79515000.	0.000
39.425	-0.000801	683254.	-147182.	2.675E-05	761.5933	5.506E+11	11173.	79515000.	0.000
39.900	-0.000628	25664.	-90359.	3.042E-05	671.1852	5.506E+11	8764.9300	79515000.	0.000
40.375	-0.000454	-347155.	-47322.	2.875E-05	715.3851	5.506E+11	6335.6502	79515000.	0.000
40.850	-0.000301	-514111.	-17318.	2.430E-05	738.3388	5.506E+11	4192.1134	79515000.	0.000
41.325	-0.000177	-544836.	1674.0810	1.882E-05	742.5630	5.506E+11	2471.7399	79515000.	0.000
41.800	-8.601E-05	-495224.	12138.	1.343E-05	735.7422	5.506E+11	1199.8198	79515000.	0.000
42.275	-2.405E-05	-406604.	16514.	8.765E-06	723.5583	5.506E+11	335.5179	79515000.	0.000
42.750	1.391E-05	-307060.	16917.	5.071E-06	709.8727	5.506E+11	-194.1091	79515000.	0.000
43.225	3.376E-05	-213806.	15021.	2.376E-06	697.0518	5.506E+11	-470.9954	79515000.	0.000
43.700	4.100E-05	-135844.	12049.	5.659E-07	686.3331	5.506E+11	-571.8980	79515000.	0.000
44.175	4.021E-05	-76454.	8820.2342	-5.329E-07	678.1680	5.506E+11	-560.9882	79515000.	0.000
44.650	3.492E-05	-35287.	5833.0435	-1.111E-06	672.5082	5.506E+11	-487.1489	79515000.	0.000
45.125	2.755E-05	-9945.8062	3349.5141	-1.345E-06	669.0242	5.506E+11	-384.2649	79515000.	0.000
45.600	1.958E-05	2911.4058	1475.7550	-1.382E-06	668.0571	5.506E+11	-273.1944	79515000.	0.000
46.075	1.179E-05	6892.3716	228.2678	-1.331E-06	668.6044	5.506E+11	-164.5204	79515000.	0.000
46.550	4.410E-06	5527.6943	-415.9456	-1.267E-06	668.4168	5.506E+11	-61.5194	79515000.	0.000
47.025	-2.647E-06	2163.9501	-486.0204	-1.227E-06	667.9543	5.506E+11	36.9317	79515000.	0.000
47.500	-9.577E-06	0.000	0.000	-1.216E-06	667.6568	5.506E+11	133.6017	39757500.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 2:

Pile-head deflection = 1.1287643 inches  
 Computed slope at pile head = -0.0042212 radians  
 Maximum bending moment = 13251239. inch-lbs  
 Maximum shear force = -408797. lbs  
 Depth of maximum bending moment = 36.1000000 feet below pile head  
 Depth of maximum shear force = 37.5250000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 3

-----  
 Pile-head Deflection vs. Pile Length for Load Case 2  
 -----



IB4\_B-8\_Long\_Scoured.l p7o

4. 275	0. 1287	-1935266.	12500.	-0. 000210	728. 0144	5. 506E+11	0. 000	0. 000	0. 000
4. 750	0. 1275	-1863212.	12500.	-0. 000230	718. 1082	5. 506E+11	0. 000	0. 000	0. 000
5. 225	0. 1261	-1791087.	12500.	-0. 000249	708. 1922	5. 506E+11	0. 000	0. 000	0. 000
5. 700	0. 1246	-1718895.	12500.	-0. 000267	698. 2670	5. 506E+11	0. 000	0. 000	0. 000
6. 175	0. 1230	-1646638.	12500.	-0. 000285	688. 3328	5. 506E+11	0. 000	0. 000	0. 000
6. 650	0. 1214	-1574319.	12500.	-0. 000301	678. 3901	5. 506E+11	0. 000	0. 000	0. 000
7. 125	0. 1196	-1501941.	12500.	-0. 000317	668. 4392	5. 506E+11	0. 000	0. 000	0. 000
7. 600	0. 1178	-1429505.	12500.	-0. 000332	658. 4805	5. 506E+11	0. 000	0. 000	0. 000
8. 075	0. 1158	-1357016.	12500.	-0. 000347	648. 5143	5. 506E+11	0. 000	0. 000	0. 000
8. 550	0. 1138	-1284476.	12500.	-0. 000360	638. 5412	5. 506E+11	0. 000	0. 000	0. 000
9. 025	0. 1117	-1211887.	12500.	-0. 000371	465. 2967	9. 394E+11	0. 000	0. 000	0. 000
9. 500	0. 1096	-1139271.	12500.	-0. 000378	458. 6085	9. 394E+11	0. 000	0. 000	0. 000
9. 975	0. 1074	-1066630.	12500.	-0. 000385	451. 9180	9. 394E+11	0. 000	0. 000	0. 000
10. 450	0. 1052	-993965.	12500.	-0. 000391	445. 2254	9. 394E+11	0. 000	0. 000	0. 000
10. 925	0. 1029	-921278.	12500.	-0. 000397	438. 5307	9. 394E+11	0. 000	0. 000	0. 000
11. 400	0. 1007	-848571.	12500.	-0. 000402	431. 8341	9. 394E+11	0. 000	0. 000	0. 000
11. 875	0. 0984	-775845.	12500.	-0. 000407	425. 1358	9. 394E+11	0. 000	0. 000	0. 000
12. 350	0. 0960	-703102.	12500.	-0. 000411	418. 4359	9. 394E+11	0. 000	0. 000	0. 000
12. 825	0. 0937	-630344.	12500.	-0. 000415	411. 7346	9. 394E+11	0. 000	0. 000	0. 000
13. 300	0. 0913	-557571.	12500.	-0. 000419	405. 0319	9. 394E+11	0. 000	0. 000	0. 000
13. 775	0. 0889	-484786.	12500.	-0. 000422	398. 3282	9. 394E+11	0. 000	0. 000	0. 000
14. 250	0. 0865	-411991.	12500.	-0. 000425	391. 6235	9. 394E+11	0. 000	0. 000	0. 000
14. 725	0. 0841	-339186.	12500.	-0. 000427	384. 9179	9. 394E+11	0. 000	0. 000	0. 000
15. 200	0. 0816	-266374.	12500.	-0. 000429	378. 2116	9. 394E+11	0. 000	0. 000	0. 000
15. 675	0. 0792	-193556.	12500.	-0. 000430	371. 5048	9. 394E+11	0. 000	0. 000	0. 000
16. 150	0. 0767	-120733.	12500.	-0. 000431	364. 7976	9. 394E+11	0. 000	0. 000	0. 000
16. 625	0. 0742	-47908.	12500.	-0. 000432	358. 0902	9. 394E+11	0. 000	0. 000	0. 000
17. 100	0. 0718	24918.	12500.	-0. 000432	355. 9727	9. 394E+11	0. 000	0. 000	0. 000
17. 575	0. 0693	97744.	12500.	-0. 000432	362. 6802	9. 394E+11	0. 000	0. 000	0. 000
18. 050	0. 0669	170567.	12500.	-0. 000431	369. 3875	9. 394E+11	0. 000	0. 000	0. 000
18. 525	0. 0644	243387.	12500.	-0. 000430	376. 0944	9. 394E+11	0. 000	0. 000	0. 000
19. 000	0. 0620	316201.	12500.	-0. 000428	382. 8009	9. 394E+11	0. 000	0. 000	0. 000
19. 475	0. 0595	389008.	12500.	-0. 000426	389. 5067	9. 394E+11	0. 000	0. 000	0. 000
19. 950	0. 0571	461807.	12500.	-0. 000423	396. 2117	9. 394E+11	0. 000	0. 000	0. 000
20. 425	0. 0547	534595.	12500.	-0. 000420	402. 9158	9. 394E+11	0. 000	0. 000	0. 000
20. 900	0. 0523	607372.	12500.	-0. 000417	409. 6188	9. 394E+11	0. 000	0. 000	0. 000
21. 375	0. 0500	680135.	12500.	-0. 000413	416. 3205	9. 394E+11	0. 000	0. 000	0. 000
21. 850	0. 0476	752883.	12500.	-0. 000408	423. 0209	9. 394E+11	0. 000	0. 000	0. 000
22. 325	0. 0453	825615.	12500.	-0. 000404	429. 7197	9. 394E+11	0. 000	0. 000	0. 000
22. 800	0. 0430	898328.	12500.	-0. 000398	436. 4168	9. 394E+11	0. 000	0. 000	0. 000
23. 275	0. 0408	971021.	12500.	-0. 000393	443. 1122	9. 394E+11	0. 000	0. 000	0. 000
23. 750	0. 0385	1043693.	12500.	-0. 000387	449. 8055	9. 394E+11	0. 000	0. 000	0. 000
24. 225	0. 0364	1116342.	12500.	-0. 000380	456. 4967	9. 394E+11	0. 000	0. 000	0. 000
24. 700	0. 0342	1188966.	12500.	-0. 000373	463. 1856	9. 394E+11	0. 000	0. 000	0. 000
25. 175	0. 0321	1261563.	12500.	-0. 000366	469. 8721	9. 394E+11	0. 000	0. 000	0. 000
25. 650	0. 0300	1334133.	12500.	-0. 000358	476. 5560	9. 394E+11	0. 000	0. 000	0. 000
26. 125	0. 0280	1406673.	12500.	-0. 000349	483. 2373	9. 394E+11	0. 000	0. 000	0. 000
26. 600	0. 0261	1479182.	12500.	-0. 000341	489. 9156	9. 394E+11	0. 000	0. 000	0. 000
27. 075	0. 0241	1551659.	12500.	-0. 000331	496. 5909	9. 394E+11	0. 000	0. 000	0. 000
27. 550	0. 0223	1624101.	12500.	-0. 000322	503. 2631	9. 394E+11	0. 000	0. 000	0. 000
28. 025	0. 0205	1696507.	12500.	-0. 000312	509. 9319	9. 394E+11	0. 000	0. 000	0. 000
28. 500	0. 0187	1768875.	12500.	-0. 000301	516. 5973	9. 394E+11	0. 000	0. 000	0. 000
28. 975	0. 0170	1841204.	12500.	-0. 000290	523. 2591	9. 394E+11	0. 000	0. 000	0. 000
29. 450	0. 0154	1913493.	12500.	-0. 000279	529. 9172	9. 394E+11	0. 000	0. 000	0. 000
29. 925	0. 0139	1985739.	12500.	-0. 000267	536. 5713	9. 394E+11	0. 000	0. 000	0. 000
30. 400	0. 0124	2057941.	12500.	-0. 000255	543. 2214	9. 394E+11	0. 000	0. 000	0. 000
30. 875	0. 0110	2130098.	12500.	-0. 000242	549. 8673	9. 394E+11	0. 000	0. 000	0. 000
31. 350	0. 009611	2202208.	12500.	-0. 000229	556. 5088	9. 394E+11	0. 000	0. 000	0. 000
31. 825	0. 008344	2274268.	12500.	-0. 000215	563. 1459	9. 394E+11	0. 000	0. 000	0. 000
32. 300	0. 007155	2346279.	12500.	-0. 000201	569. 7783	9. 394E+11	0. 000	0. 000	0. 000

IB4_B-8_Long_Scoured.l p7o									
32.775	0.006048	2418237.	12500.	-0.000187	576.4059	9.394E+11	0.000	0.000	0.000
33.250	0.005025	2490142.	12500.	-0.000172	583.0286	9.394E+11	0.000	0.000	0.000
33.725	0.004088	2561992.	12500.	-0.000157	589.6462	9.394E+11	0.000	0.000	0.000
34.200	0.003239	2633785.	12500.	-0.000141	596.2587	9.394E+11	0.000	0.000	0.000
34.675	0.002481	2705520.	12500.	-0.000125	602.8657	9.394E+11	0.000	0.000	0.000
35.150	0.001817	2777195.	12500.	-0.000108	609.4672	9.394E+11	0.000	0.000	0.000
35.625	0.001249	2848809.	12500.	-9.100E-05	616.0631	9.394E+11	0.000	0.000	0.000
36.100	0.000780	2920359.	-18510.	-7.350E-05	622.6531	9.394E+11	-10881.	79515000.	0.000
36.575	0.000412	2638335.	-65881.	-5.663E-05	596.6777	9.394E+11	-5741.0402	79515000.	0.000
37.050	0.000134	2169727.	-87585.	-4.204E-05	553.5172	9.394E+11	-1874.4686	79515000.	0.000
37.525	-6.776E-05	1640168.	-90234.	-2.697E-05	687.4433	5.506E+11	945.2426	79515000.	0.000
38.000	-0.000173	1141259.	-80657.	-1.258E-05	618.8512	5.506E+11	2414.9343	79515000.	0.000
38.475	-0.000211	720768.	-65381.	-2.939E-06	561.0404	5.506E+11	2945.2577	79515000.	0.000
38.950	-0.000207	395941.	-48772.	2.841E-06	516.3819	5.506E+11	2882.3183	79515000.	0.000
39.425	-0.000179	164746.	-33451.	5.743E-06	484.5962	5.506E+11	2493.4804	79515000.	0.000
39.900	-0.000141	14558.	-20733.	6.671E-06	463.9477	5.506E+11	1969.0405	79515000.	0.000
40.375	-0.000103	-71657.	-11038.	6.375E-06	471.7980	5.506E+11	1432.6183	79515000.	0.000
40.850	-6.847E-05	-111324.	-4232.9045	5.428E-06	477.2515	5.506E+11	955.1770	79515000.	0.000
41.325	-4.081E-05	-119952.	112.0431	4.231E-06	478.4378	5.506E+11	569.3660	79515000.	0.000
41.800	-2.024E-05	-110077.	2539.2545	3.041E-06	477.0802	5.506E+11	282.2871	79515000.	0.000
42.275	-6.151E-06	-91027.	3588.3387	2.000E-06	474.4610	5.506E+11	85.8126	79515000.	0.000
42.750	2.562E-06	-69185.	3731.0510	1.171E-06	471.4581	5.506E+11	-35.7381	79515000.	0.000
43.225	7.193E-06	-48501.	3343.2198	5.615E-07	468.6145	5.506E+11	-100.3430	79515000.	0.000
43.700	8.962E-06	-31076.	2700.9160	1.496E-07	466.2188	5.506E+11	-125.0267	79515000.	0.000
44.175	8.898E-06	-17712.	1990.8143	-1.029E-07	464.3814	5.506E+11	-124.1318	79515000.	0.000
44.650	7.789E-06	-8380.0198	1327.3628	-2.380E-07	463.0984	5.506E+11	-108.6582	79515000.	0.000
45.125	6.185E-06	-2578.1783	771.7686	-2.947E-07	462.3008	5.506E+11	-86.2871	79515000.	0.000
45.600	4.430E-06	420.2926	349.7378	-3.059E-07	462.0041	5.506E+11	-61.7939	79515000.	0.000
46.075	2.699E-06	1411.0643	66.3324	-2.964E-07	462.1403	5.506E+11	-37.6466	79515000.	0.000
46.550	1.051E-06	1178.6441	-82.7437	-2.830E-07	462.1084	5.506E+11	-14.6608	79515000.	0.000
47.025	-5.272E-07	469.8505	-103.5655	-2.744E-07	462.0109	5.506E+11	7.3549	79515000.	0.000
47.500	-2.078E-06	0.000	0.000	-2.720E-07	461.9463	5.506E+11	28.9839	39757500.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 3:

Pile-head deflection = 0.1343691 inches  
 Computed slope at pile head = 0.000000 radians  
 Maximum bending moment = 2920359. inch-lbs  
 Maximum shear force = -90234. lbs  
 Depth of maximum bending moment = 36.100000 feet below pile head  
 Depth of maximum shear force = 37.5250000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 3

-----  
 Pile-head Deflection vs. Pile Length for Load Case 3  
 -----

Boundary Condition Type 2, Shear and Slope

Shear = 12500. lb  
 Slope = 0.00000  
 Axial Load = 640000. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment In-lbs	Maximum Shear lbs
47.5000	0.1343691	2920359.	-90234.
45.1250	0.1336690	2925521.	-89380.
42.7500	0.1379638	2943527.	-92448.
40.3750	0.1384058	2937763.	-95678.
40.3750	0.000000	3245376616.	335319902.
40.3750	0.000000	3245376616.	335319902.
40.3750	0.000000	3245376616.	335319902.
40.3750	0.000000	3245376616.	335319902.
40.3750	0.000000	3245376616.	335319902.
40.3750	0.000000	3245376616.	335319902.
40.3750	0.000000	3245376616.	335319902.
40.3750	0.000000	3245376616.	335319902.
40.3750	0.000000	3245376616.	335319902.
40.3750	0.000000	3245376616.	335319902.
40.3750	0.000000	3245376616.	335319902.
40.3750	0.000000	3245376616.	335319902.
40.3750	0.000000	3245376616.	335319902.
40.3750	0.000000	3245376616.	335319902.
40.3750	0.000000	3245376616.	335319902.
40.3750	0.000000	3245376616.	335319902.
40.3750	0.000000	3245376616.	335319902.
40.3750	0.000000	3245376616.	335319902.

-----  
 Computed Values of Pile Loading and Deflection  
 for Lateral Loading for Load Case Number 4  
 -----

Pile-head conditions are Shear and Pile-head Rotation (Loading Type 2)

Shear force at pile head = 23200.0 lbs  
 Rotation of pile head = 0.000E+00 radians  
 Axial load at pile head = 925000.0 lbs

(Zero slope for this load indicates fixed-head conditions)

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi *	Bending Stiffness lb-in^2	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.2514	-4821975.	23200.	0.000	1330.6013	5.506E+11	0.000	0.000	0.000
0.475	0.2513	-4689603.	23200.	-4.923E-05	1312.4023	5.506E+11	0.000	0.000	0.000
0.950	0.2508	-4556976.	23200.	-9.709E-05	1294.1681	5.506E+11	0.000	0.000	0.000
1.425	0.2502	-4424099.	23200.	-0.000144	1275.8998	5.506E+11	0.000	0.000	0.000
1.900	0.2492	-4290982.	23200.	-0.000189	1257.5982	5.506E+11	0.000	0.000	0.000
2.375	0.2480	-4157630.	23200.	-0.000232	1239.2645	5.506E+11	0.000	0.000	0.000
2.850	0.2466	-4024051.	23200.	-0.000275	1220.8995	5.506E+11	0.000	0.000	0.000
3.325	0.2449	-3890252.	23200.	-0.000316	1202.5044	5.506E+11	0.000	0.000	0.000
3.800	0.2430	-3756242.	23200.	-0.000355	1184.0800	5.506E+11	0.000	0.000	0.000
4.275	0.2408	-3622026.	23200.	-0.000393	1165.6275	5.506E+11	0.000	0.000	0.000
4.750	0.2385	-3487612.	23200.	-0.000430	1147.1478	5.506E+11	0.000	0.000	0.000
5.225	0.2359	-3353009.	23200.	-0.000466	1128.6419	5.506E+11	0.000	0.000	0.000
5.700	0.2332	-3218222.	23200.	-0.000500	1110.1109	5.506E+11	0.000	0.000	0.000
6.175	0.2302	-3083259.	23200.	-0.000532	1091.5557	5.506E+11	0.000	0.000	0.000
6.650	0.2271	-2948129.	23200.	-0.000564	1072.9774	5.506E+11	0.000	0.000	0.000
7.125	0.2238	-2812837.	23200.	-0.000593	1054.3769	5.506E+11	0.000	0.000	0.000
7.600	0.2203	-2677392.	23200.	-0.000622	1035.7554	5.506E+11	0.000	0.000	0.000

IB4\_B-8\_Long\_Scoured.l p7o

8.075	0.2167	-2541801.	23200.	-0.000649	1017.1138	5.506E+11	0.000	0.000	0.000
8.550	0.2129	-2406071.	23200.	-0.000674	998.4531	5.506E+11	0.000	0.000	0.000
9.025	0.2090	-2270209.	23200.	-0.000694	720.2691	9.394E+11	0.000	0.000	0.000
9.500	0.2050	-2134275.	23200.	-0.000707	707.7491	9.394E+11	0.000	0.000	0.000
9.975	0.2010	-1998273.	23200.	-0.000720	695.2228	9.394E+11	0.000	0.000	0.000
10.450	0.1968	-1862207.	23200.	-0.000731	682.6906	9.394E+11	0.000	0.000	0.000
10.925	0.1926	-1726081.	23200.	-0.000742	670.1529	9.394E+11	0.000	0.000	0.000
11.400	0.1884	-1589900.	23200.	-0.000752	657.6102	9.394E+11	0.000	0.000	0.000
11.875	0.1840	-1453668.	23200.	-0.000762	645.0628	9.394E+11	0.000	0.000	0.000
12.350	0.1797	-1317390.	23200.	-0.000770	632.5110	9.394E+11	0.000	0.000	0.000
12.825	0.1753	-1181070.	23200.	-0.000778	619.9554	9.394E+11	0.000	0.000	0.000
13.300	0.1708	-1044711.	23200.	-0.000784	607.3964	9.394E+11	0.000	0.000	0.000
13.775	0.1663	-908320.	23200.	-0.000790	594.8342	9.394E+11	0.000	0.000	0.000
14.250	0.1618	-771899.	23200.	-0.000795	582.2694	9.394E+11	0.000	0.000	0.000
14.725	0.1573	-635453.	23200.	-0.000800	569.7022	9.394E+11	0.000	0.000	0.000
15.200	0.1527	-498988.	23200.	-0.000803	557.1333	9.394E+11	0.000	0.000	0.000
15.675	0.1481	-362506.	23200.	-0.000806	544.5628	9.394E+11	0.000	0.000	0.000
16.150	0.1435	-226013.	23200.	-0.000807	531.9913	9.394E+11	0.000	0.000	0.000
16.625	0.1389	-89512.	23200.	-0.000808	519.4191	9.394E+11	0.000	0.000	0.000
17.100	0.1343	46991.	23200.	-0.000808	515.5028	9.394E+11	0.000	0.000	0.000
17.575	0.1297	183493.	23200.	-0.000808	528.0751	9.394E+11	0.000	0.000	0.000
18.050	0.1251	319989.	23200.	-0.000806	540.6469	9.394E+11	0.000	0.000	0.000
18.525	0.1205	456475.	23200.	-0.000804	553.2177	9.394E+11	0.000	0.000	0.000
19.000	0.1159	592947.	23200.	-0.000801	565.7872	9.394E+11	0.000	0.000	0.000
19.475	0.1114	729399.	23200.	-0.000797	578.3550	9.394E+11	0.000	0.000	0.000
19.950	0.1068	865828.	23200.	-0.000792	590.9205	9.394E+11	0.000	0.000	0.000
20.425	0.1023	1002229.	23200.	-0.000786	603.4836	9.394E+11	0.000	0.000	0.000
20.900	0.0979	1138598.	23200.	-0.000780	616.0437	9.394E+11	0.000	0.000	0.000
21.375	0.0935	1274931.	23200.	-0.000772	628.6004	9.394E+11	0.000	0.000	0.000
21.850	0.0891	1411223.	23200.	-0.000764	641.1534	9.394E+11	0.000	0.000	0.000
22.325	0.0847	1547470.	23200.	-0.000755	653.7022	9.394E+11	0.000	0.000	0.000
22.800	0.0805	1683667.	23200.	-0.000745	666.2464	9.394E+11	0.000	0.000	0.000
23.275	0.0762	1819810.	23200.	-0.000735	678.7857	9.394E+11	0.000	0.000	0.000
23.750	0.0721	1955895.	23200.	-0.000723	691.3197	9.394E+11	0.000	0.000	0.000
24.225	0.0680	2091918.	23200.	-0.000711	703.8478	9.394E+11	0.000	0.000	0.000
24.700	0.0640	2227874.	23200.	-0.000698	716.3698	9.394E+11	0.000	0.000	0.000
25.175	0.0600	2363758.	23200.	-0.000684	728.8853	9.394E+11	0.000	0.000	0.000
25.650	0.0562	2499567.	23200.	-0.000669	741.3937	9.394E+11	0.000	0.000	0.000
26.125	0.0524	2635296.	23200.	-0.000654	753.8948	9.394E+11	0.000	0.000	0.000
26.600	0.0487	2770940.	23200.	-0.000637	766.3882	9.394E+11	0.000	0.000	0.000
27.075	0.0451	2906496.	23200.	-0.000620	778.8734	9.394E+11	0.000	0.000	0.000
27.550	0.0417	3041959.	23200.	-0.000602	791.3500	9.394E+11	0.000	0.000	0.000
28.025	0.0383	3177325.	23200.	-0.000583	803.8176	9.394E+11	0.000	0.000	0.000
28.500	0.0350	3312588.	23200.	-0.000563	816.2759	9.394E+11	0.000	0.000	0.000
28.975	0.0319	3447746.	23200.	-0.000543	828.7244	9.394E+11	0.000	0.000	0.000
29.450	0.0288	3582794.	23200.	-0.000522	841.1628	9.394E+11	0.000	0.000	0.000
29.925	0.0259	3717727.	23200.	-0.000499	853.5906	9.394E+11	0.000	0.000	0.000
30.400	0.0231	3852541.	23200.	-0.000477	866.0075	9.394E+11	0.000	0.000	0.000
30.875	0.0205	3987232.	23200.	-0.000453	878.4130	9.394E+11	0.000	0.000	0.000
31.350	0.0180	4121795.	23200.	-0.000428	890.8067	9.394E+11	0.000	0.000	0.000
31.825	0.0156	4256227.	23200.	-0.000403	903.1883	9.394E+11	0.000	0.000	0.000
32.300	0.0134	4390522.	23200.	-0.000376	915.5574	9.394E+11	0.000	0.000	0.000
32.775	0.0113	4524676.	23200.	-0.000349	927.9135	9.394E+11	0.000	0.000	0.000
33.250	0.009393	4658686.	23200.	-0.000322	940.2563	9.394E+11	0.000	0.000	0.000
33.725	0.007640	4792547.	23200.	-0.000293	952.5854	9.394E+11	0.000	0.000	0.000
34.200	0.006054	4926255.	23200.	-0.000263	964.9003	9.394E+11	0.000	0.000	0.000
34.675	0.004638	5059805.	23200.	-0.000233	977.2008	9.394E+11	0.000	0.000	0.000
35.150	0.003396	5193193.	23200.	-0.000202	989.4863	9.394E+11	0.000	0.000	0.000
35.625	0.002335	5326415.	23200.	-0.000170	1001.7565	9.394E+11	0.000	0.000	0.000
36.100	0.001457	5459467.	-34740.	-0.000137	1014.0110	9.394E+11	-20330.	79515000.	0.000



IB4_B-8_Long_Scoured.l p7o										
36.575	0.000769	4931833.	-123243.	-0.000106	965.4141	9.394E+11	-10724.	79515000.	0.000	
37.050	0.000251	4055613.	-163777.	-7.857E-05	884.7111	9.394E+11	-3498.2224	79515000.	0.000	
37.525	-0.000127	3065606.	-168699.	-5.040E-05	1089.1287	5.506E+11	1770.9554	79515000.	0.000	
38.000	-0.000324	2132971.	-150779.	-2.349E-05	960.9062	5.506E+11	4516.8384	79515000.	0.000	
38.475	-0.000395	1346970.	-122211.	-5.482E-06	852.8437	5.506E+11	5507.0774	79515000.	0.000	
38.950	-0.000386	739822.	-91158.	5.319E-06	769.3705	5.506E+11	5388.6276	79515000.	0.000	
39.425	-0.000334	307709.	-62516.	1.074E-05	709.9619	5.506E+11	4661.2319	79515000.	0.000	
39.900	-0.000264	27023.	-38742.	1.247E-05	671.3721	5.506E+11	3680.5614	79515000.	0.000	
40.375	-0.000192	-134083.	-20621.	1.192E-05	686.0910	5.506E+11	2677.6481	79515000.	0.000	
40.850	-0.000128	-208185.	-7902.4168	1.015E-05	696.2789	5.506E+11	1785.0981	79515000.	0.000	
41.325	-7.627E-05	-224277.	217.2406	7.909E-06	698.4913	5.506E+11	1063.9045	79515000.	0.000	
41.800	-3.780E-05	-205791.	4752.2105	5.683E-06	695.9498	5.506E+11	527.3130	79515000.	0.000	
42.275	-1.148E-05	-170162.	6711.3609	3.737E-06	691.0514	5.506E+11	160.1082	79515000.	0.000	
42.750	4.805E-06	-129321.	6976.6149	2.187E-06	685.4364	5.506E+11	-67.0366	79515000.	0.000	
43.225	1.346E-05	-90652.	6250.5094	1.049E-06	680.1200	5.506E+11	-187.7372	79515000.	0.000	
43.700	1.676E-05	-58077.	5049.0639	2.790E-07	675.6414	5.506E+11	-233.8226	79515000.	0.000	
44.175	1.664E-05	-33095.	3721.1695	-1.929E-07	672.2069	5.506E+11	-232.1052	79515000.	0.000	
44.650	1.456E-05	-15653.	2480.7002	-4.452E-07	669.8089	5.506E+11	-203.1472	79515000.	0.000	
45.125	1.156E-05	-4810.6309	1442.0119	-5.511E-07	668.3182	5.506E+11	-161.3049	79515000.	0.000	
45.600	8.280E-06	791.4756	653.1092	-5.719E-07	667.7656	5.506E+11	-115.5030	79515000.	0.000	
46.075	5.043E-06	2640.8452	123.4206	-5.542E-07	668.0199	5.506E+11	-70.3526	79515000.	0.000	
46.550	1.962E-06	2204.3139	-155.1057	-5.291E-07	667.9598	5.506E+11	-27.3759	79515000.	0.000	
47.025	-9.883E-07	878.2196	-193.8355	-5.131E-07	667.7775	5.506E+11	13.7865	79515000.	0.000	
47.500	-3.887E-06	0.000	0.000	-5.086E-07	667.6568	5.506E+11	54.2260	39757500.	0.000	

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 4:

Pile-head deflection = 0.2514049 inches  
 Computed slope at pile head = 0.000000 radians  
 Maximum bending moment = 5459467. inch-lbs  
 Maximum shear force = -168699. lbs  
 Depth of maximum bending moment = 36.1000000 feet below pile head  
 Depth of maximum shear force = 37.5250000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 3

-----  
 Pile-head Deflection vs. Pile Length for Load Case 4  
 -----

Boundary Condition Type 2, Shear and Slope

Shear = 23200. lb  
 Slope = 0.00000  
 Axial Load = 925000. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
47.5000	0.2514049	5459467.	-168699.
45.1250	0.2500872	5468873.	-167099.
42.7500	0.2581722	5503650.	-172874.
40.3750	0.2590030	5493015.	-178916.

40.3750	0.000000	6073173356.	627485881.
40.3750	0.000000	6073173356.	627485881.
40.3750	0.000000	6073173356.	627485881.
40.3750	0.000000	6073173356.	627485881.
40.3750	0.000000	6073173356.	627485881.
40.3750	0.000000	6073173356.	627485881.
40.3750	0.000000	6073173356.	627485881.
40.3750	0.000000	6073173356.	627485881.
40.3750	0.000000	6073173356.	627485881.
40.3750	0.000000	6073173356.	627485881.
40.3750	0.000000	6073173356.	627485881.
40.3750	0.000000	6073173356.	627485881.
40.3750	0.000000	6073173356.	627485881.
40.3750	0.000000	6073173356.	627485881.
40.3750	0.000000	6073173356.	627485881.
40.3750	0.000000	6073173356.	627485881.
40.3750	0.000000	6073173356.	627485881.
40.3750	0.000000	6073173356.	627485881.
40.3750	0.000000	6073173356.	627485881.
40.3750	0.000000	6073173356.	627485881.
40.3750	0.000000	6073173356.	627485881.

-----  
 Summary of Pile Response(s)  
 -----

Defi ni ti ons of Pile-head Loading Condi ti ons:

- Load Type 1: Load 1 = Shear, lbs, and Load 2 = Moment, in-lbs
- Load Type 2: Load 1 = Shear, lbs, and Load 2 = Slope, radians
- Load Type 3: Load 1 = Shear, lbs, and Load 2 = Rotational Stiffness, in-lbs/radian
- Load Type 4: Load 1 = Top Deflection, inches, and Load 2 = Moment, in-lbs
- Load Type 5: Load 1 = Top Deflection, inches, and Load 2 = Slope, radians

Load Case No.	Load Type No.	Pile-head Condition 1 V(lbs) or y(inches)	Pile-head Condition 2 in-lb, rad., or in-lb/rad.	Axial Loading lbs	Pile-head Deflection inches	Maximum Moment in Pile in-lbs	Maximum Shear in Pile lbs	Pile-head Rotation radians
1	1	V = 12500.	M = 720000.	640000.	0.53728843	6477810.	-199844.	-0.00195202
2	1	V = 23200.	M = 2160000.	925000.	1.12876428	13251239.	-408797.	-0.00422125
3	2	V = 12500.	S = 0.000	640000.	0.13436914	2920359.	-90234.	-0.00000000
4	2	V = 23200.	S = 0.000	925000.	0.25140492	5459467.	-168699.	-0.00000000

-----  
 Summary of Warning Messages  
 -----

The following warning was reported 4000 times

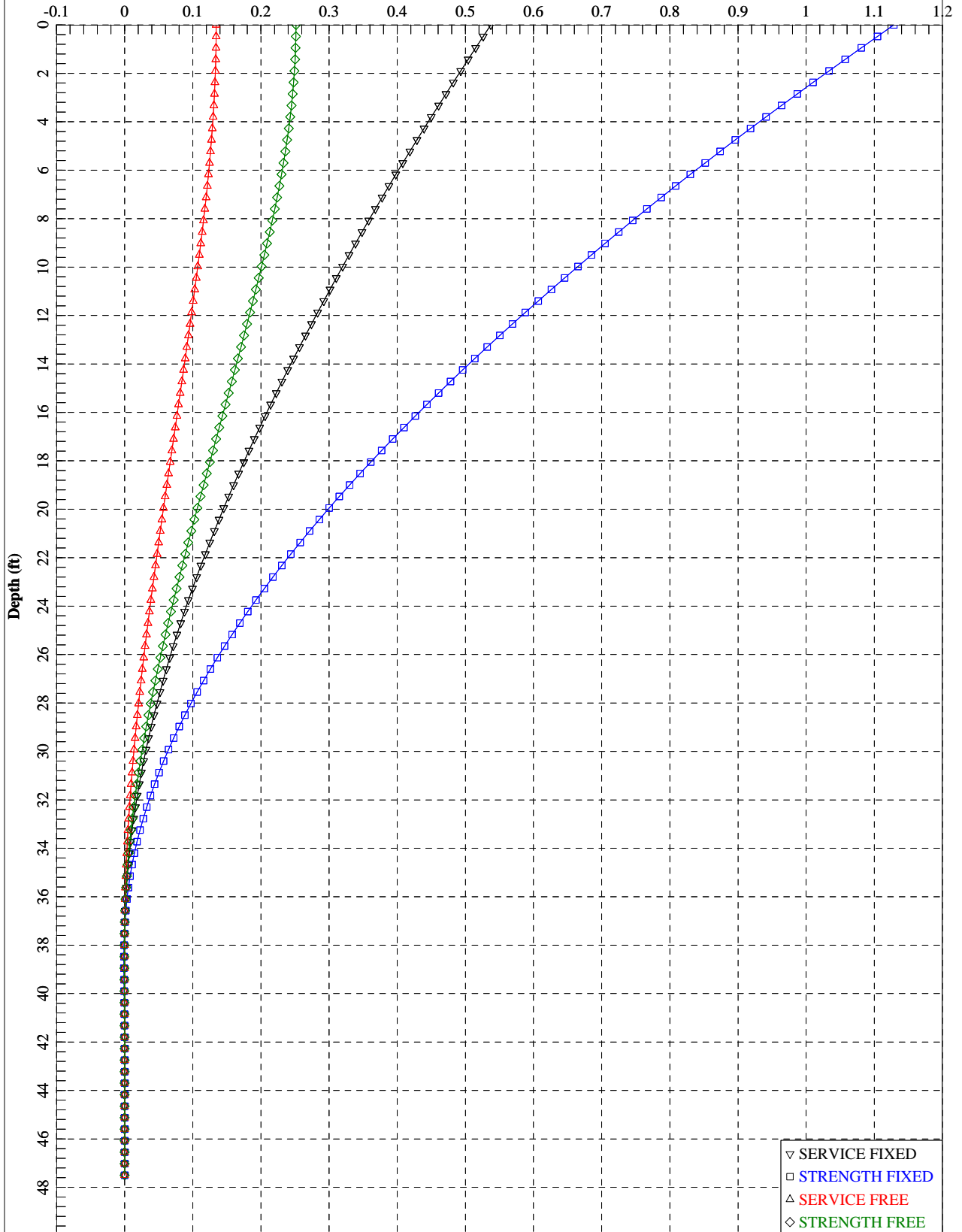
\*\*\*\* Warning \*\*\*\*

An unreasonable input value for uniaxial compressive strength has been specified for a soil defined using the vuggy limestone criteria. The input value is outside of the range of 1,000 to 2,500 psi (6,895 to 17,237 kPa). You should check your input data for correctness.

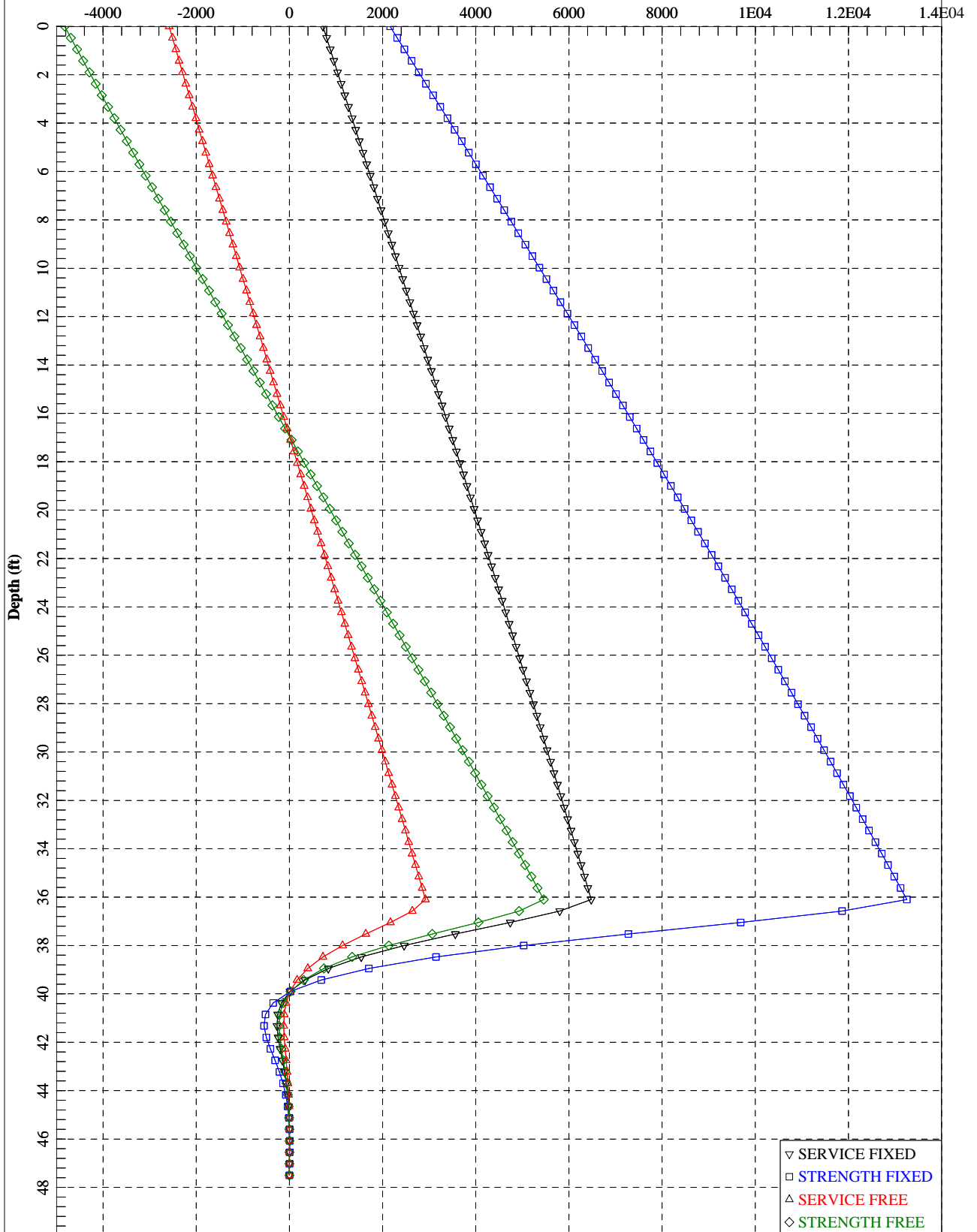
The analysis ended normally.

IB4\_\_B-8\_Long\_Scoured. I p7o

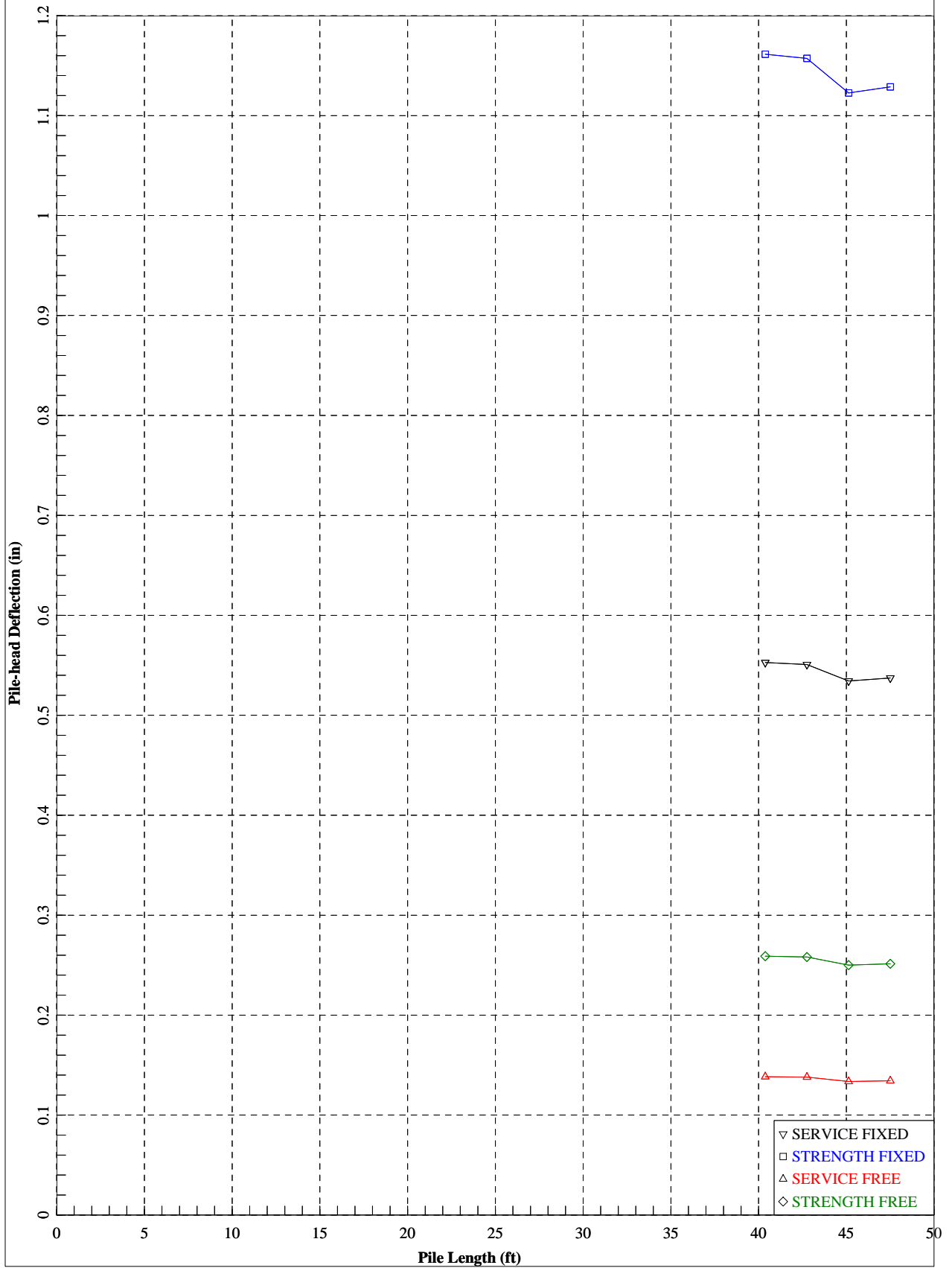
SC 557 Bridge over Crowders Creek - IB4 - Boring B-8 - 48" Dia. Drilled Shaft - Scoured Longitudinal Analysis  
Lateral Pile Deflection (inches)



SC 557 Bridge over Crowders Creek - IB4 - Boring B-8 - 48" Dia. Drilled Shaft - Scoured Longitudinal Analysis  
Bending Moment (in-kips)



SC 557 Bridge over Crowders Creek - IB4 - Boring B-8 - 48" Dia. Drilled Shaft - Scoured Longitudinal Analysis



=====  
LPile Plus for Windows, Version 2013-07.007

Analysis of Individual Piles and Drilled Shafts  
Subjected to Lateral Loading Using the p-y Method

© 1985-2013 by Ensoft, Inc.  
All Rights Reserved

=====  
This copy of LPile is used by:

Bradley Fischer  
F&ME

Serial Number of Security Device: 291490957

This copy of LPile is licensed for exclusive use by: F&ME Consultants, Columbia, Sout

Use of this program by any entity other than F&ME Consultants, Columbia, Sout  
is forbidden by the software license agreement.

-----  
Files Used for Analysis  
-----

Path to file locations: P:\Geotechnical\G4800's\G4843 - SC557 - York County\Report\Final\Bridge\LPile\  
Name of input data file: IB4\_\_B-8\_Trans\_Scoured.l p7d  
Name of output report file: IB4\_\_B-8\_Trans\_Scoured.l p7o  
Name of plot output file: IB4\_\_B-8\_Trans\_Scoured.l p7p  
Name of runtime message file: IB4\_\_B-8\_Trans\_Scoured.l p7r

-----  
Date and Time of Analysis  
-----

Date: July 31, 2018 Time: 9:39:30

-----  
Problem Title  
-----

Project Name: SC 557 over Crowders Creek

Job Number: G4843

Client: CALYX

Engineer: JFH

Description: IB4 - Boring B-8 - 48" Dia. Drilled Shaft - Scoured Trans.

-----  
 Program Options and Settings  
 -----

Engineering Units of Input Data and Computations:

- Engineering units are US Customary Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

Computational Options:

- Use unfactored loads in computations (conventional analysis)
- Compute pile response under loading and nonlinear bending properties of pile (only if nonlinear pile properties are input)
- Analysis uses p-y modification factors for p-y curves
- Analysis includes loading by lateral soil movements acting on pile
- Input of shear resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- No p-y curves to be computed and reported for user-specified depths
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1

-----  
 Pile Structural Properties and Geometry  
 -----

- Total number of pile sections = 3
- Total length of pile = 47.50 ft
- Depth of ground surface below top of pile = 36.00 ft

Pile diameter values used for p-y curve computations are defined using 6 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile.

Point	Depth X ft	Pile Diameter in
1	0.00000	42.0000000
2	9.000000	42.0000000
3	9.000000	48.0000000
4	37.500000	48.0000000



5	37.50000	42.0000000
6	47.50000	42.0000000

-----  
 Input Structural Properties:  
 -----

Pile Section No. 1:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Circular
Section Length	=	9.00000 ft
Top Width	=	42.00000 in
Bottom Width	=	42.00000 in
Top Area	=	1385.44236 Sq. in
Bottom Area	=	1385.44236 Sq. in
Moment of Inertia at Top	=	152745. in^4
Moment of Inertia at Bottom	=	152745. in^4
Elastic Modulus	=	3605000. lbs/in^2

Pile Section No. 2:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Circular
Section Length	=	28.50000 ft
Top Width	=	48.00000 in
Bottom Width	=	48.00000 in
Top Area	=	1809.55737 Sq. in
Bottom Area	=	1809.55737 Sq. in
Moment of Inertia at Top	=	260576. in^4
Moment of Inertia at Bottom	=	260576. in^4
Elastic Modulus	=	3605000. lbs/in^2

Pile Section No. 3:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Circular
Section Length	=	10.00000 ft
Top Width	=	42.00000 in
Bottom Width	=	42.00000 in
Top Area	=	1385.44236 Sq. in
Bottom Area	=	1385.44236 Sq. in
Moment of Inertia at Top	=	152745. in^4
Moment of Inertia at Bottom	=	152745. in^4
Elastic Modulus	=	3605000. lbs/in^2

-----  
 Ground Slope and Pile Batter Angles  
 -----

Ground Slope Angle	=	0.000 degrees
	=	0.000 radians
Pile Batter Angle	=	0.000 degrees
	=	0.000 radians

-----  
 Soil and Rock Layering Information  
 -----

The soil profile is modelled using 1 layers

Layer 1 is strong rock (vuggy limestone)

Distance from top of pile to top of layer = 36.00000 ft  
 Distance from top of pile to bottom of layer = 60.00000 ft  
 Effective unit weight at top of layer = 98.00000 pcf  
 Effective unit weight at bottom of layer = 98.00000 pcf  
 Uniaxial compressive strength at top of layer = 15000. psi  
 Uniaxial compressive strength at bottom of layer = 15000. psi

(Depth of lowest soil layer extends 12.50 ft below pile tip)

Summary of Soil Properties

Layer Num.	Layer Soil Type (p-y Curve Criteria)	Layer Depth ft	Effective Unit Wt. pcf	Uniaxial qu psi
1	Vuggy Limestone	36.000 60.000	98.000 98.000	15000. 15000.

p-y Modification Factors for Group Action

Distribution of p-y modifiers with depth defined using 2 points

Point No.	Depth X ft	p-mult	y-mult
1	36.000	1.0000	1.0000
2	100.000	1.0000	1.0000

Lateral Soil Movements

Profile of soil movement with depth defined using 2 points

Point No.	Depth X ft	Soil Movement in
1	0.00000	0.00000
2	0.00000	0.00000

Loading Type

-----  
 Static loading criteria were used when computing p-y curves for all analyses.  
 -----

-----  
 Pile-head Loading and Pile-head Fixity Conditions  
 -----

Number of loads specified = 4

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length
1	1	V = 15700. lbs	M = 1152000. in-lbs	640000.	Yes
2	1	V = 16100. lbs	M = 1224000. in-lbs	925000.	Yes
3	2	V = 15700. lbs	S = 0.0000 in/in	640000.	Yes
4	2	V = 16100. lbs	S = 0.0000 in/in	925000.	Yes

V = perpendicular shear force applied to pile head  
 M = bending moment applied to pile head  
 y = lateral deflection relative to pile axis  
 S = pile slope relative to original pile batter angle  
 R = rotational stiffness applied to pile head  
 Axial thrust is assumed to be acting axially for all pile batter angles.

-----  
 Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness  
 -----

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 3

Pile Section No. 1:  
 -----

Moment-curvature properties were derived from elastic section properties

Pile Section No. 2:  
 -----

Moment-curvature properties were derived from elastic section properties

Pile Section No. 3:  
 -----

Moment-curvature properties were derived from elastic section properties

-----  
 Computed Values of Pile Loading and Deflection  
 for Lateral Loading for Load Case Number 1  
 -----

Pile-head conditions are Shear and Moment (Loading Type 1)

I B4\_\_B-8\_Trans\_Scoured. I p7o

Shear force at pile head = 15700.0 lbs  
 Applied moment at pile head = 1152000.0 in-lbs  
 Axial thrust load on pile head = 640000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi *	Bending Stiffness lb-in^2	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.7027	1152000.	15700.	-0.002593	620.3279	5.506E+11	0.000	0.000	0.000
0.475	0.6880	1250927.	15700.	-0.002581	633.9288	5.506E+11	0.000	0.000	0.000
0.950	0.6733	1349807.	15700.	-0.002567	647.5233	5.506E+11	0.000	0.000	0.000
1.425	0.6587	1448637.	15700.	-0.002553	661.1107	5.506E+11	0.000	0.000	0.000
1.900	0.6442	1547411.	15700.	-0.002537	674.6906	5.506E+11	0.000	0.000	0.000
2.375	0.6298	1646127.	15700.	-0.002521	688.2625	5.506E+11	0.000	0.000	0.000
2.850	0.6155	1744781.	15700.	-0.002503	701.8258	5.506E+11	0.000	0.000	0.000
3.325	0.6013	1843369.	15700.	-0.002484	715.3801	5.506E+11	0.000	0.000	0.000
3.800	0.5872	1941887.	15700.	-0.002465	728.9248	5.506E+11	0.000	0.000	0.000
4.275	0.5732	2040332.	15700.	-0.002444	742.4594	5.506E+11	0.000	0.000	0.000
4.750	0.5593	2138700.	15700.	-0.002423	755.9834	5.506E+11	0.000	0.000	0.000
5.225	0.5456	2236988.	15700.	-0.002400	769.4964	5.506E+11	0.000	0.000	0.000
5.700	0.5319	2335190.	15700.	-0.002376	782.9977	5.506E+11	0.000	0.000	0.000
6.175	0.5185	2433305.	15700.	-0.002352	796.4869	5.506E+11	0.000	0.000	0.000
6.650	0.5051	2531328.	15700.	-0.002326	809.9634	5.506E+11	0.000	0.000	0.000
7.125	0.4920	2629255.	15700.	-0.002299	823.4268	5.506E+11	0.000	0.000	0.000
7.600	0.4789	2727082.	15700.	-0.002271	836.8766	5.506E+11	0.000	0.000	0.000
8.075	0.4661	2824807.	15700.	-0.002243	850.3122	5.506E+11	0.000	0.000	0.000
8.550	0.4534	2922425.	15700.	-0.002213	863.7331	5.506E+11	0.000	0.000	0.000
9.025	0.4408	3019933.	15700.	-0.002189	877.1394	9.394E+11	0.000	0.000	0.000
9.500	0.4284	3117374.	15700.	-0.002170	890.5311	9.394E+11	0.000	0.000	0.000
9.975	0.4161	3214746.	15700.	-0.002151	903.9082	9.394E+11	0.000	0.000	0.000
10.450	0.4039	3312047.	15700.	-0.002131	917.2707	9.394E+11	0.000	0.000	0.000
10.925	0.3918	3409274.	15700.	-0.002111	930.6189	9.394E+11	0.000	0.000	0.000
11.400	0.3798	3506426.	15700.	-0.002090	943.9528	9.394E+11	0.000	0.000	0.000
11.875	0.3680	3603501.	15700.	-0.002068	957.2722	9.394E+11	0.000	0.000	0.000
12.350	0.3563	3700495.	15700.	-0.002046	970.5771	9.394E+11	0.000	0.000	0.000
12.825	0.3447	3797408.	15700.	-0.002023	983.8674	9.394E+11	0.000	0.000	0.000
13.300	0.3332	3894237.	15700.	-0.002000	997.1431	9.394E+11	0.000	0.000	0.000
13.775	0.3219	3990979.	15700.	-0.001976	1010.4042	9.394E+11	0.000	0.000	0.000
14.250	0.3107	4087633.	15700.	-0.001951	1023.6507	9.394E+11	0.000	0.000	0.000
14.725	0.2996	4184197.	15700.	-0.001926	1036.8826	9.394E+11	0.000	0.000	0.000
15.200	0.2887	4280668.	15700.	-0.001901	1050.1000	9.394E+11	0.000	0.000	0.000
15.675	0.2779	4377044.	15700.	-0.001874	1063.3029	9.394E+11	0.000	0.000	0.000
16.150	0.2673	4473323.	15700.	-0.001848	1076.4913	9.394E+11	0.000	0.000	0.000
16.625	0.2569	4569504.	15700.	-0.001820	1089.6652	9.394E+11	0.000	0.000	0.000
17.100	0.2466	4665583.	15700.	-0.001792	1102.8246	9.394E+11	0.000	0.000	0.000
17.575	0.2364	4761559.	15700.	-0.001763	1115.9694	9.394E+11	0.000	0.000	0.000
18.050	0.2265	4857429.	15700.	-0.001734	1129.1000	9.394E+11	0.000	0.000	0.000
18.525	0.2167	4953192.	15700.	-0.001705	1142.2162	9.394E+11	0.000	0.000	0.000
19.000	0.2070	5048846.	15700.	-0.001674	1155.3181	9.394E+11	0.000	0.000	0.000
19.475	0.1976	5144387.	15700.	-0.001643	1168.4057	9.394E+11	0.000	0.000	0.000
19.950	0.1883	5239815.	15700.	-0.001612	1181.4790	9.394E+11	0.000	0.000	0.000
20.425	0.1792	5335127.	15700.	-0.001580	1194.5381	9.394E+11	0.000	0.000	0.000
20.900	0.1703	5430321.	15700.	-0.001547	1207.5829	9.394E+11	0.000	0.000	0.000
21.375	0.1616	5525394.	15700.	-0.001514	1220.6134	9.394E+11	0.000	0.000	0.000
21.850	0.1530	5620345.	15700.	-0.001480	1233.6296	9.394E+11	0.000	0.000	0.000
22.325	0.1447	5715172.	15700.	-0.001446	1246.6315	9.394E+11	0.000	0.000	0.000
22.800	0.1366	5809872.	15700.	-0.001411	1259.6191	9.394E+11	0.000	0.000	0.000
23.275	0.1286	5904444.	15700.	-0.001375	1272.5924	9.394E+11	0.000	0.000	0.000
23.750	0.1209	5998885.	15700.	-0.001339	1285.5514	9.394E+11	0.000	0.000	0.000

IB4_B-8_Trans_Scored.l p7o									
24. 225	0. 1134	6093193.	15700.	-0. 001302	914. 8824	9. 394E+11	0. 000	0. 000	0. 000
24. 700	0. 1060	6187366.	15700.	-0. 001265	923. 5561	9. 394E+11	0. 000	0. 000	0. 000
25. 175	0. 0989	6281402.	15700.	-0. 001227	932. 2171	9. 394E+11	0. 000	0. 000	0. 000
25. 650	0. 0921	6375299.	15700.	-0. 001189	940. 8654	9. 394E+11	0. 000	0. 000	0. 000
26. 125	0. 0854	6469056.	15700.	-0. 001150	949. 5007	9. 394E+11	0. 000	0. 000	0. 000
26. 600	0. 0790	6562669.	15700.	-0. 001110	958. 1228	9. 394E+11	0. 000	0. 000	0. 000
27. 075	0. 0727	6656136.	15700.	-0. 001070	966. 7315	9. 394E+11	0. 000	0. 000	0. 000
27. 550	0. 0668	6749457.	15700.	-0. 001030	975. 3266	9. 394E+11	0. 000	0. 000	0. 000
28. 025	0. 0610	6842627.	15700.	-0. 000988	983. 9080	9. 394E+11	0. 000	0. 000	0. 000
28. 500	0. 0555	6935647.	15700.	-0. 000946	992. 4754	9. 394E+11	0. 000	0. 000	0. 000
28. 975	0. 0502	7028513.	15700.	-0. 000904	1001. 0287	9. 394E+11	0. 000	0. 000	0. 000
29. 450	0. 0452	7121223.	15700.	-0. 000861	1009. 5676	9. 394E+11	0. 000	0. 000	0. 000
29. 925	0. 0404	7213776.	15700.	-0. 000818	1018. 0921	9. 394E+11	0. 000	0. 000	0. 000
30. 400	0. 0359	7306169.	15700.	-0. 000774	1026. 6018	9. 394E+11	0. 000	0. 000	0. 000
30. 875	0. 0316	7398400.	15700.	-0. 000729	1035. 0966	9. 394E+11	0. 000	0. 000	0. 000
31. 350	0. 0275	7490468.	15700.	-0. 000684	1043. 5764	9. 394E+11	0. 000	0. 000	0. 000
31. 825	0. 0238	7582370.	15700.	-0. 000638	1052. 0408	9. 394E+11	0. 000	0. 000	0. 000
32. 300	0. 0203	7674103.	15700.	-0. 000592	1060. 4899	9. 394E+11	0. 000	0. 000	0. 000
32. 775	0. 0170	7765667.	15700.	-0. 000545	1068. 9232	9. 394E+11	0. 000	0. 000	0. 000
33. 250	0. 0141	7857060.	15700.	-0. 000498	1077. 3408	9. 394E+11	0. 000	0. 000	0. 000
33. 725	0. 0114	7948278.	15700.	-0. 000450	1085. 7423	9. 394E+11	0. 000	0. 000	0. 000
34. 200	0. 008932	8039320.	15700.	-0. 000401	1094. 1276	9. 394E+11	0. 000	0. 000	0. 000
34. 675	0. 006785	8130184.	15700.	-0. 000352	1102. 4965	9. 394E+11	0. 000	0. 000	0. 000
35. 150	0. 004919	8220869.	15700.	-0. 000302	1110. 8489	9. 394E+11	0. 000	0. 000	0. 000
35. 625	0. 003337	8311371.	15700.	-0. 000252	1119. 1845	9. 394E+11	0. 000	0. 000	0. 000
36. 100	0. 002042	8401690.	-71608.	-0. 000202	1127. 5031	9. 394E+11	-30634.	85500000.	0. 000
36. 575	0. 001038	7496513.	-203311.	-0. 000153	1044. 1331	9. 394E+11	-15577.	85500000.	0. 000
37. 050	0. 000294	6085062.	-260274.	-0. 000112	914. 1335	9. 394E+11	-4409. 5904	85500000.	0. 000
37. 525	-0. 000240	4530208.	-262578.	-7. 025E-05	1084. 7776	5. 506E+11	3601. 2407	85500000.	0. 000
38. 000	-0. 000507	3092188.	-230647.	-3. 080E-05	887. 0728	5. 506E+11	7602. 6032	85500000.	0. 000
38. 475	-0. 000591	1901060.	-183708.	-4. 951E-06	723. 3117	5. 506E+11	8867. 2191	85500000.	0. 000
38. 950	-0. 000563	997956.	-134356.	1. 005E-05	599. 1493	5. 506E+11	8449. 2987	85500000.	0. 000
39. 425	-0. 000477	369332.	-89903.	1. 713E-05	512. 7235	5. 506E+11	7148. 1358	85500000.	0. 000
39. 900	-0. 000368	-27063.	-53799.	1. 890E-05	465. 6671	5. 506E+11	5520. 0952	85500000.	0. 000
40. 375	-0. 000261	-244110.	-26906.	1. 750E-05	495. 5075	5. 506E+11	3916. 0071	85500000.	0. 000
40. 850	-0. 000169	-333916.	-8540. 3253	1. 451E-05	507. 8544	5. 506E+11	2527. 9686	85500000.	0. 000
41. 325	-9. 570E-05	-341575.	2755. 4538	1. 101E-05	508. 9074	5. 506E+11	1435. 4627	85500000.	0. 000
41. 800	-4. 302E-05	-302584.	8685. 5374	7. 676E-06	503. 5467	5. 506E+11	645. 2684	85500000.	0. 000
42. 275	-8. 192E-06	-242616.	10875.	4. 854E-06	495. 3021	5. 506E+11	122. 8764	85500000.	0. 000
42. 750	1. 232E-05	-178647.	10698.	2. 674E-06	486. 5074	5. 506E+11	-184. 7879	85500000.	0. 000
43. 225	2. 229E-05	-120675.	9218. 7862	1. 125E-06	478. 5372	5. 506E+11	-334. 3404	85500000.	0. 000
43. 700	2. 514E-05	-73561.	7191. 2112	1. 193E-07	472. 0598	5. 506E+11	-377. 0894	85500000.	0. 000
44. 175	2. 365E-05	-38696.	5105. 5171	-4. 618E-07	467. 2664	5. 506E+11	-354. 7331	85500000.	0. 000
44. 650	1. 988E-05	-15355.	3244. 8608	-7. 415E-07	464. 0574	5. 506E+11	-298. 1288	85500000.	0. 000
45. 125	1. 520E-05	-1699. 1458	1745. 5795	-8. 298E-07	462. 1799	5. 506E+11	-227. 9348	85500000.	0. 000
45. 600	1. 042E-05	4550. 9158	650. 6900	-8. 150E-07	462. 5720	5. 506E+11	-156. 2370	85500000.	0. 000
46. 075	5. 904E-06	5724. 6666	-47. 0011	-7. 618E-07	462. 7334	5. 506E+11	-88. 5669	85500000.	0. 000
46. 550	1. 731E-06	4020. 6619	-373. 4128	-7. 114E-07	462. 4991	5. 506E+11	-25. 9635	85500000.	0. 000
47. 025	-2. 205E-06	1472. 9512	-353. 1267	-6. 830E-07	462. 1488	5. 506E+11	33. 0814	85500000.	0. 000
47. 500	-6. 055E-06	0. 000	0. 000	-6. 753E-07	461. 9463	5. 506E+11	90. 8227	42750000.	0. 000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 1:

Pile-head deflection = 0. 7027448 inches  
 Computed slope at pile head = -0. 0025930 radians  
 Maximum bending moment = 8401690. inch-lbs  
 Maximum shear force = -262578. lbs

Depth of maximum bending moment = 36.100000 feet below pile head  
 Depth of maximum shear force = 37.5250000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 3

-----  
 Pile-head Deflection vs. Pile Length for Load Case 1  
 -----

Boundary Condition Type 1, Shear and Moment

Shear = 15700. lb  
 Moment = 1152000. in-lb  
 Axial Load = 640000. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment in-lbs	Maximum Shear lbs
47.5000	0.7027448	8401690.	-262578.
45.1250	0.6990690	8399373.	-260421.
42.7500	0.7201726	8457522.	-270300.
40.3750	0.7225014	8458958.	-278572.
40.3750	0.000000	17249248295.	-1780108133.
40.3750	0.000000	17249248295.	-1780108133.
40.3750	0.000000	17249248295.	-1780108133.
40.3750	0.000000	17249248295.	-1780108133.
40.3750	0.000000	17249248295.	-1780108133.
40.3750	0.000000	17249248295.	-1780108133.
40.3750	0.000000	17249248295.	-1780108133.
40.3750	0.000000	17249248295.	-1780108133.
40.3750	0.000000	17249248295.	-1780108133.
40.3750	0.000000	17249248295.	-1780108133.
40.3750	0.000000	17249248295.	-1780108133.
40.3750	0.000000	17249248295.	-1780108133.
40.3750	0.000000	17249248295.	-1780108133.
40.3750	0.000000	17249248295.	-1780108133.
40.3750	0.000000	17249248295.	-1780108133.
40.3750	0.000000	17249248295.	-1780108133.
40.3750	0.000000	17249248295.	-1780108133.
40.3750	0.000000	17249248295.	-1780108133.

-----  
 Computed Values of Pile Loading and Deflection for Lateral Loading for Load Case Number 2  
 -----

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 16100.0 lbs  
 Applied moment at pile head = 1224000.0 in-lbs  
 Axial thrust load on pile head = 925000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.7463	1224000.	16100.	-0.002757	835.9372	5.506E+11	0.000	0.000	0.000

IB4\_B-8\_Trans\_Scored.l p7o

0.475	0.7306	1330275.	16100.	-0.002744	850.5483	5.506E+11	0.000	0.000	0.000
0.950	0.7150	1436477.	16100.	-0.002730	865.1494	5.506E+11	0.000	0.000	0.000
1.425	0.6995	1542601.	16100.	-0.002714	879.7398	5.506E+11	0.000	0.000	0.000
1.900	0.6840	1648641.	16100.	-0.002698	894.3185	5.506E+11	0.000	0.000	0.000
2.375	0.6687	1754590.	16100.	-0.002680	908.8849	5.506E+11	0.000	0.000	0.000
2.850	0.6535	1860444.	16100.	-0.002662	923.4381	5.506E+11	0.000	0.000	0.000
3.325	0.6384	1966197.	16100.	-0.002642	937.9774	5.506E+11	0.000	0.000	0.000
3.800	0.6234	2071842.	16100.	-0.002621	952.5019	5.506E+11	0.000	0.000	0.000
4.275	0.6085	2177374.	16100.	-0.002599	967.0109	5.506E+11	0.000	0.000	0.000
4.750	0.5937	2282787.	16100.	-0.002576	981.5035	5.506E+11	0.000	0.000	0.000
5.225	0.5791	2388075.	16100.	-0.002552	995.9790	5.506E+11	0.000	0.000	0.000
5.700	0.5646	2493234.	16100.	-0.002526	1010.4366	5.506E+11	0.000	0.000	0.000
6.175	0.5503	2598256.	16100.	-0.002500	1024.8754	5.506E+11	0.000	0.000	0.000
6.650	0.5361	2703136.	16100.	-0.002473	1039.2948	5.506E+11	0.000	0.000	0.000
7.125	0.5221	2807869.	16100.	-0.002444	1053.6939	5.506E+11	0.000	0.000	0.000
7.600	0.5083	2912448.	16100.	-0.002414	1068.0719	5.506E+11	0.000	0.000	0.000
8.075	0.4946	3016869.	16100.	-0.002384	1082.4281	5.506E+11	0.000	0.000	0.000
8.550	0.4811	3121125.	16100.	-0.002352	1096.7616	5.506E+11	0.000	0.000	0.000
9.025	0.4678	3225211.	16100.	-0.002326	808.2281	9.394E+11	0.000	0.000	0.000
9.500	0.4546	3329193.	16100.	-0.002306	817.8052	9.394E+11	0.000	0.000	0.000
9.975	0.4415	3433069.	16100.	-0.002286	827.3726	9.394E+11	0.000	0.000	0.000
10.450	0.4285	3536835.	16100.	-0.002264	836.9298	9.394E+11	0.000	0.000	0.000
10.925	0.4157	3640488.	16100.	-0.002243	846.4766	9.394E+11	0.000	0.000	0.000
11.400	0.4030	3744024.	16100.	-0.002220	856.0127	9.394E+11	0.000	0.000	0.000
11.875	0.3904	3847441.	16100.	-0.002197	865.5377	9.394E+11	0.000	0.000	0.000
12.350	0.3779	3950735.	16100.	-0.002174	875.0514	9.394E+11	0.000	0.000	0.000
12.825	0.3656	4053902.	16100.	-0.002149	884.5535	9.394E+11	0.000	0.000	0.000
13.300	0.3534	4156939.	16100.	-0.002124	894.0436	9.394E+11	0.000	0.000	0.000
13.775	0.3414	4259844.	16100.	-0.002099	903.5215	9.394E+11	0.000	0.000	0.000
14.250	0.3295	4362612.	16100.	-0.002073	912.9868	9.394E+11	0.000	0.000	0.000
14.725	0.3177	4465241.	16100.	-0.002046	922.4393	9.394E+11	0.000	0.000	0.000
15.200	0.3062	4567726.	16100.	-0.002019	931.8786	9.394E+11	0.000	0.000	0.000
15.675	0.2947	4670066.	16100.	-0.001991	941.3044	9.394E+11	0.000	0.000	0.000
16.150	0.2835	4772256.	16100.	-0.001962	950.7165	9.394E+11	0.000	0.000	0.000
16.625	0.2724	4874294.	16100.	-0.001933	960.1145	9.394E+11	0.000	0.000	0.000
17.100	0.2614	4976176.	16100.	-0.001903	969.4982	9.394E+11	0.000	0.000	0.000
17.575	0.2507	5077898.	16100.	-0.001872	978.8672	9.394E+11	0.000	0.000	0.000
18.050	0.2401	5179458.	16100.	-0.001841	988.2212	9.394E+11	0.000	0.000	0.000
18.525	0.2297	5280852.	16100.	-0.001809	997.5600	9.394E+11	0.000	0.000	0.000
19.000	0.2195	5382077.	16100.	-0.001777	1006.8832	9.394E+11	0.000	0.000	0.000
19.475	0.2094	5483131.	16100.	-0.001744	1016.1906	9.394E+11	0.000	0.000	0.000
19.950	0.1996	5584008.	16100.	-0.001710	1025.4817	9.394E+11	0.000	0.000	0.000
20.425	0.1899	5684707.	16100.	-0.001676	1034.7565	9.394E+11	0.000	0.000	0.000
20.900	0.1805	5785225.	16100.	-0.001641	1044.0145	9.394E+11	0.000	0.000	0.000
21.375	0.1712	5885557.	16100.	-0.001606	1053.2554	9.394E+11	0.000	0.000	0.000
21.850	0.1622	5985700.	16100.	-0.001570	1062.4790	9.394E+11	0.000	0.000	0.000
22.325	0.1533	6085653.	16100.	-0.001533	1071.6850	9.394E+11	0.000	0.000	0.000
22.800	0.1447	6185410.	16100.	-0.001496	1080.8730	9.394E+11	0.000	0.000	0.000
23.275	0.1363	6284970.	16100.	-0.001458	1090.0428	9.394E+11	0.000	0.000	0.000
23.750	0.1281	6384329.	16100.	-0.001420	1099.1941	9.394E+11	0.000	0.000	0.000
24.225	0.1201	6483483.	16100.	-0.001381	1108.3266	9.394E+11	0.000	0.000	0.000
24.700	0.1123	6582430.	16100.	-0.001341	1117.4399	9.394E+11	0.000	0.000	0.000
25.175	0.1048	6681167.	16100.	-0.001301	1126.5339	9.394E+11	0.000	0.000	0.000
25.650	0.0975	6779689.	16100.	-0.001260	1135.6082	9.394E+11	0.000	0.000	0.000
26.125	0.0904	6877995.	16100.	-0.001219	1144.6625	9.394E+11	0.000	0.000	0.000
26.600	0.0836	6976081.	16100.	-0.001177	1153.6966	9.394E+11	0.000	0.000	0.000
27.075	0.0770	7073943.	16100.	-0.001134	1162.7100	9.394E+11	0.000	0.000	0.000
27.550	0.0707	7171579.	16100.	-0.001091	1171.7027	9.394E+11	0.000	0.000	0.000
28.025	0.0646	7268986.	16100.	-0.001047	1180.6742	9.394E+11	0.000	0.000	0.000
28.500	0.0587	7366160.	16100.	-0.001003	1189.6243	9.394E+11	0.000	0.000	0.000

IB4_B-8_Trans_Scourd.l p7o									
28.975	0.0531	7463099.	16100.	-0.000958	1198.5527	9.394E+11	0.000	0.000	0.000
29.450	0.0478	7559799.	16100.	-0.000912	1207.4591	9.394E+11	0.000	0.000	0.000
29.925	0.0427	7656256.	16100.	-0.000866	1216.3432	9.394E+11	0.000	0.000	0.000
30.400	0.0379	7752469.	16100.	-0.000819	1225.2047	9.394E+11	0.000	0.000	0.000
30.875	0.0334	7848434.	16100.	-0.000772	1234.0434	9.394E+11	0.000	0.000	0.000
31.350	0.0291	7944148.	16100.	-0.000724	1242.8590	9.394E+11	0.000	0.000	0.000
31.825	0.0252	8039608.	16100.	-0.000675	1251.6512	9.394E+11	0.000	0.000	0.000
32.300	0.0214	8134810.	16100.	-0.000626	1260.4197	9.394E+11	0.000	0.000	0.000
32.775	0.0180	8229753.	16100.	-0.000577	1269.1642	9.394E+11	0.000	0.000	0.000
33.250	0.0149	8324432.	16100.	-0.000526	1277.8845	9.394E+11	0.000	0.000	0.000
33.725	0.0120	8418844.	16100.	-0.000476	1286.5802	9.394E+11	0.000	0.000	0.000
34.200	0.009444	8512987.	16100.	-0.000424	1295.2511	9.394E+11	0.000	0.000	0.000
34.675	0.007173	8606858.	16100.	-0.000372	1303.8970	9.394E+11	0.000	0.000	0.000
35.150	0.005199	8700454.	16100.	-0.000320	1312.5175	9.394E+11	0.000	0.000	0.000
35.625	0.003526	8793771.	16100.	-0.000267	1321.1123	9.394E+11	0.000	0.000	0.000
36.100	0.002158	8886807.	-76146.	-0.000213	1329.6813	9.394E+11	-32367.	85500000.	0.000
36.575	0.001097	7927949.	-215275.	-0.000162	1241.3670	9.394E+11	-16450.	85500000.	0.000
37.050	0.000310	6434381.	-275397.	-0.000119	1103.8041	9.394E+11	-4645.6390	85500000.	0.000
37.525	-0.000255	4789670.	-277749.	-7.423E-05	1326.1598	5.506E+11	3820.4502	85500000.	0.000
38.000	-0.000536	3268823.	-243926.	-3.252E-05	1117.0678	5.506E+11	8047.4343	85500000.	0.000
38.475	-0.000625	2009260.	-194254.	-5.202E-06	943.8979	5.506E+11	9381.3407	85500000.	0.000
38.950	-0.000596	1054387.	-142047.	1.065E-05	812.6181	5.506E+11	8936.9481	85500000.	0.000
39.425	-0.000504	389817.	-95032.	1.813E-05	721.2504	5.506E+11	7559.3689	85500000.	0.000
39.900	-0.000389	-29170.	-56853.	2.000E-05	671.6671	5.506E+11	5836.7813	85500000.	0.000
40.375	-0.000276	-258518.	-28419.	1.851E-05	703.1989	5.506E+11	4140.0103	85500000.	0.000
40.850	-0.000178	-353343.	-9004.7919	1.534E-05	716.2358	5.506E+11	2672.0408	85500000.	0.000
41.325	-0.000101	-361334.	2933.3993	1.164E-05	717.3345	5.506E+11	1516.7982	85500000.	0.000
41.800	-4.542E-05	-320025.	9198.1355	8.115E-06	711.6551	5.506E+11	681.3549	85500000.	0.000
42.275	-8.610E-06	-256561.	11508.	5.131E-06	702.9298	5.506E+11	129.1503	85500000.	0.000
42.750	1.307E-05	-188887.	11318.	2.825E-06	693.6257	5.506E+11	-195.9847	85500000.	0.000
43.225	2.360E-05	-127570.	9750.2981	1.187E-06	685.1957	5.506E+11	-353.9448	85500000.	0.000
43.700	2.660E-05	-77746.	7604.4087	1.246E-07	678.3456	5.506E+11	-398.9988	85500000.	0.000
44.175	2.502E-05	-40881.	5397.8182	-4.894E-07	673.2773	5.506E+11	-375.2435	85500000.	0.000
44.650	2.102E-05	-16206.	3429.7518	-7.849E-07	669.8848	5.506E+11	-315.3061	85500000.	0.000
45.125	1.607E-05	-1773.7842	1844.2057	-8.780E-07	667.9007	5.506E+11	-241.0258	85500000.	0.000
45.600	1.101E-05	4827.4012	686.5315	-8.622E-07	668.3205	5.506E+11	-165.1756	85500000.	0.000
46.075	6.240E-06	6061.7669	-50.9731	-8.058E-07	668.4902	5.506E+11	-93.5979	85500000.	0.000
46.550	1.826E-06	4254.8052	-395.7750	-7.524E-07	668.2418	5.506E+11	-27.3852	85500000.	0.000
47.025	-2.337E-06	1557.8662	-373.8967	-7.223E-07	667.8710	5.506E+11	35.0618	85500000.	0.000
47.500	-6.409E-06	0.000	0.000	-7.142E-07	667.6568	5.506E+11	96.1300	42750000.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 2:

Pile-head deflection = 0.7462519 inches  
 Computed slope at pile head = -0.0027574 radians  
 Maximum bending moment = 8886807. inch-lbs  
 Maximum shear force = -277749. lbs  
 Depth of maximum bending moment = 36.1000000 feet below pile head  
 Depth of maximum shear force = 37.5250000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 3

-----  
 Pile-head Deflection vs. Pile Length for Load Case 2  
 -----





IB4\_B-8\_Trans\_Scored.l p7o

4. 275	0. 1611	-2426627.	15700.	-0. 000264	795. 5687	5. 506E+11	0. 000	0. 000	0. 000
4. 750	0. 1595	-2336128.	15700.	-0. 000289	783. 1266	5. 506E+11	0. 000	0. 000	0. 000
5. 225	0. 1578	-2245541.	15700.	-0. 000312	770. 6724	5. 506E+11	0. 000	0. 000	0. 000
5. 700	0. 1560	-2154870.	15700.	-0. 000335	758. 2065	5. 506E+11	0. 000	0. 000	0. 000
6. 175	0. 1540	-2064117.	15700.	-0. 000357	745. 7295	5. 506E+11	0. 000	0. 000	0. 000
6. 650	0. 1519	-1973287.	15700.	-0. 000378	733. 2417	5. 506E+11	0. 000	0. 000	0. 000
7. 125	0. 1497	-1882381.	15700.	-0. 000398	720. 7437	5. 506E+11	0. 000	0. 000	0. 000
7. 600	0. 1474	-1791405.	15700.	-0. 000417	708. 2359	5. 506E+11	0. 000	0. 000	0. 000
8. 075	0. 1449	-1700361.	15700.	-0. 000435	695. 7188	5. 506E+11	0. 000	0. 000	0. 000
8. 550	0. 1424	-1609253.	15700.	-0. 000452	683. 1929	5. 506E+11	0. 000	0. 000	0. 000
9. 025	0. 1398	-1518084.	15700.	-0. 000465	493. 4986	9. 394E+11	0. 000	0. 000	0. 000
9. 500	0. 1371	-1426881.	15700.	-0. 000474	485. 0985	9. 394E+11	0. 000	0. 000	0. 000
9. 975	0. 1344	-1335647.	15700.	-0. 000482	476. 6955	9. 394E+11	0. 000	0. 000	0. 000
10. 450	0. 1316	-1244383.	15700.	-0. 000490	468. 2898	9. 394E+11	0. 000	0. 000	0. 000
10. 925	0. 1288	-1153092.	15700.	-0. 000497	459. 8815	9. 394E+11	0. 000	0. 000	0. 000
11. 400	0. 1259	-1061775.	15700.	-0. 000504	451. 4709	9. 394E+11	0. 000	0. 000	0. 000
11. 875	0. 1231	-970435.	15700.	-0. 000510	443. 0582	9. 394E+11	0. 000	0. 000	0. 000
12. 350	0. 1201	-879073.	15700.	-0. 000516	434. 6434	9. 394E+11	0. 000	0. 000	0. 000
12. 825	0. 1172	-787692.	15700.	-0. 000521	426. 2269	9. 394E+11	0. 000	0. 000	0. 000
13. 300	0. 1142	-696293.	15700.	-0. 000525	417. 8087	9. 394E+11	0. 000	0. 000	0. 000
13. 775	0. 1112	-604879.	15700.	-0. 000529	409. 3892	9. 394E+11	0. 000	0. 000	0. 000
14. 250	0. 1082	-513452.	15700.	-0. 000533	400. 9684	9. 394E+11	0. 000	0. 000	0. 000
14. 725	0. 1051	-422013.	15700.	-0. 000536	392. 5465	9. 394E+11	0. 000	0. 000	0. 000
15. 200	0. 1021	-330565.	15700.	-0. 000538	384. 1238	9. 394E+11	0. 000	0. 000	0. 000
15. 675	0. 0990	-239109.	15700.	-0. 000540	375. 7005	9. 394E+11	0. 000	0. 000	0. 000
16. 150	0. 0959	-147649.	15700.	-0. 000541	367. 2766	9. 394E+11	0. 000	0. 000	0. 000
16. 625	0. 0928	-56184.	15700.	-0. 000541	358. 8524	9. 394E+11	0. 000	0. 000	0. 000
17. 100	0. 0897	35281.	15700.	-0. 000541	356. 9271	9. 394E+11	0. 000	0. 000	0. 000
17. 575	0. 0866	126745.	15700.	-0. 000541	365. 3513	9. 394E+11	0. 000	0. 000	0. 000
18. 050	0. 0836	218207.	15700.	-0. 000540	373. 7753	9. 394E+11	0. 000	0. 000	0. 000
18. 525	0. 0805	309664.	15700.	-0. 000538	382. 1988	9. 394E+11	0. 000	0. 000	0. 000
19. 000	0. 0774	401114.	15700.	-0. 000536	390. 6217	9. 394E+11	0. 000	0. 000	0. 000
19. 475	0. 0744	492555.	15700.	-0. 000533	399. 0437	9. 394E+11	0. 000	0. 000	0. 000
19. 950	0. 0714	583985.	15700.	-0. 000530	407. 4648	9. 394E+11	0. 000	0. 000	0. 000
20. 425	0. 0683	675403.	15700.	-0. 000526	415. 8846	9. 394E+11	0. 000	0. 000	0. 000
20. 900	0. 0654	766805.	15700.	-0. 000522	424. 3031	9. 394E+11	0. 000	0. 000	0. 000
21. 375	0. 0624	858190.	15700.	-0. 000517	432. 7200	9. 394E+11	0. 000	0. 000	0. 000
21. 850	0. 0595	949557.	15700.	-0. 000511	441. 1352	9. 394E+11	0. 000	0. 000	0. 000
22. 325	0. 0566	1040902.	15700.	-0. 000505	449. 5484	9. 394E+11	0. 000	0. 000	0. 000
22. 800	0. 0537	1132225.	15700.	-0. 000499	457. 9596	9. 394E+11	0. 000	0. 000	0. 000
23. 275	0. 0509	1223522.	15700.	-0. 000492	466. 3684	9. 394E+11	0. 000	0. 000	0. 000
23. 750	0. 0481	1314792.	15700.	-0. 000484	474. 7747	9. 394E+11	0. 000	0. 000	0. 000
24. 225	0. 0454	1406033.	15700.	-0. 000476	483. 1783	9. 394E+11	0. 000	0. 000	0. 000
24. 700	0. 0427	1497243.	15700.	-0. 000467	491. 5791	9. 394E+11	0. 000	0. 000	0. 000
25. 175	0. 0400	1588420.	15700.	-0. 000458	499. 9768	9. 394E+11	0. 000	0. 000	0. 000
25. 650	0. 0375	1679562.	15700.	-0. 000448	508. 3712	9. 394E+11	0. 000	0. 000	0. 000
26. 125	0. 0349	1770666.	15700.	-0. 000437	516. 7623	9. 394E+11	0. 000	0. 000	0. 000
26. 600	0. 0325	1861731.	15700.	-0. 000426	525. 1497	9. 394E+11	0. 000	0. 000	0. 000
27. 075	0. 0301	1952755.	15700.	-0. 000415	533. 5334	9. 394E+11	0. 000	0. 000	0. 000
27. 550	0. 0277	2043736.	15700.	-0. 000402	541. 9130	9. 394E+11	0. 000	0. 000	0. 000
28. 025	0. 0255	2134672.	15700.	-0. 000390	550. 2885	9. 394E+11	0. 000	0. 000	0. 000
28. 500	0. 0233	2225560.	15700.	-0. 000377	558. 6597	9. 394E+11	0. 000	0. 000	0. 000
28. 975	0. 0212	2316399.	15700.	-0. 000363	567. 0263	9. 394E+11	0. 000	0. 000	0. 000
29. 450	0. 0192	2407187.	15700.	-0. 000348	575. 3881	9. 394E+11	0. 000	0. 000	0. 000
29. 925	0. 0172	2497922.	15700.	-0. 000334	583. 7451	9. 394E+11	0. 000	0. 000	0. 000
30. 400	0. 0154	2588601.	15700.	-0. 000318	592. 0970	9. 394E+11	0. 000	0. 000	0. 000
30. 875	0. 0136	2679223.	15700.	-0. 000302	600. 4436	9. 394E+11	0. 000	0. 000	0. 000
31. 350	0. 0119	2769786.	15700.	-0. 000286	608. 7847	9. 394E+11	0. 000	0. 000	0. 000
31. 825	0. 0103	2860287.	15700.	-0. 000269	617. 1202	9. 394E+11	0. 000	0. 000	0. 000
32. 300	0. 008851	2950725.	15700.	-0. 000251	625. 4499	9. 394E+11	0. 000	0. 000	0. 000

IB4_B-8_Trans_Scoured.l p7o									
32.775	0.007472	3041098.	15700.	-0.000233	633.7735	9.394E+11	0.000	0.000	0.000
33.250	0.006198	3131403.	15700.	-0.000214	642.0910	9.394E+11	0.000	0.000	0.000
33.725	0.005032	3221639.	15700.	-0.000195	650.4021	9.394E+11	0.000	0.000	0.000
34.200	0.003978	3311804.	15700.	-0.000175	658.7066	9.394E+11	0.000	0.000	0.000
34.675	0.003038	3401895.	15700.	-0.000155	667.0043	9.394E+11	0.000	0.000	0.000
35.150	0.002216	3491911.	15700.	-0.000134	675.2951	9.394E+11	0.000	0.000	0.000
35.625	0.001515	3581850.	15700.	-0.000112	683.5788	9.394E+11	0.000	0.000	0.000
36.100	0.000937	3671710.	-24365.	-9.017E-05	691.8552	9.394E+11	-14058.	85500000.	0.000
36.575	0.000487	3304741.	-85240.	-6.900E-05	658.0561	9.394E+11	-7301.3046	85500000.	0.000
37.050	0.000151	2700481.	-112487.	-5.078E-05	602.4015	9.394E+11	-2259.0456	85500000.	0.000
37.525	-9.215E-05	2022764.	-114986.	-3.212E-05	740.0440	5.506E+11	1382.2012	85500000.	0.000
38.000	-0.000216	1389878.	-101832.	-1.446E-05	653.0323	5.506E+11	3233.1976	85500000.	0.000
38.475	-0.000257	861986.	-81633.	-2.800E-06	580.4557	5.506E+11	3854.0801	85500000.	0.000
38.950	-0.000247	459281.	-60070.	4.038E-06	525.0902	5.506E+11	3712.0602	85500000.	0.000
39.425	-0.000211	177164.	-40474.	7.332E-06	486.3035	5.506E+11	3163.5527	85500000.	0.000
39.900	-0.000164	-2176.7377	-24452.	8.238E-06	462.2456	5.506E+11	2458.2460	85500000.	0.000
40.375	-0.000117	-101649.	-12445.	7.701E-06	475.9214	5.506E+11	1754.8660	85500000.	0.000
40.850	-7.610E-05	-144101.	-4190.0842	6.429E-06	481.7579	5.506E+11	1141.4502	85500000.	0.000
41.325	-4.370E-05	-149463.	931.4275	4.909E-06	482.4950	5.506E+11	655.5715	85500000.	0.000
41.800	-2.013E-05	-133519.	3660.4343	3.445E-06	480.3030	5.506E+11	301.9748	85500000.	0.000
42.275	-4.437E-06	-107759.	4710.7275	2.196E-06	476.7614	5.506E+11	66.5491	85500000.	0.000
42.750	4.900E-06	-79832.	4690.9045	1.225E-06	472.9220	5.506E+11	-73.5045	85500000.	0.000
43.225	9.527E-06	-54291.	4074.1450	5.307E-07	469.4105	5.506E+11	-142.9023	85500000.	0.000
43.700	1.095E-05	-33391.	3198.7625	7.685E-08	466.5371	5.506E+11	-164.2494	85500000.	0.000
44.175	1.040E-05	-17826.	2285.9270	-1.882E-07	464.3971	5.506E+11	-156.0437	85500000.	0.000
44.650	8.804E-06	-7330.1417	1464.8283	-3.184E-07	462.9541	5.506E+11	-132.0611	85500000.	0.000
45.125	6.773E-06	-1124.6528	798.9202	-3.622E-07	462.1009	5.506E+11	-101.5909	85500000.	0.000
45.600	4.675E-06	1780.1911	309.5291	-3.588E-07	462.1911	5.506E+11	-70.1253	85500000.	0.000
46.075	2.682E-06	2406.5970	-4.9985	-3.371E-07	462.2772	5.506E+11	-40.2353	85500000.	0.000
46.550	8.317E-07	1725.6683	-155.2233	-3.157E-07	462.1836	5.506E+11	-12.4752	85500000.	0.000
47.025	-9.172E-07	639.3549	-151.5687	-3.035E-07	462.0342	5.506E+11	13.7575	85500000.	0.000
47.500	-2.628E-06	0.000	0.000	-3.002E-07	461.9463	5.506E+11	39.4244	42750000.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 3:

Pile-head deflection = 0.1682021 inches  
 Computed slope at pile head = 0.000000 radians  
 Maximum bending moment = 3671710. inch-lbs  
 Maximum shear force = -114986. lbs  
 Depth of maximum bending moment = 36.1000000 feet below pile head  
 Depth of maximum shear force = 37.5250000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 3

-----  
 Pile-head Deflection vs. Pile Length for Load Case 3  
 -----

Boundary Condition Type 2, Shear and Slope

Shear = 15700. lb  
 Slope = 0.00000  
 Axial Load = 640000. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment In-lbs	Maximum Shear lbs
47.5000	0.1682021	3671710.	-114986.
45.1250	0.1673547	3677971.	-114059.
42.7500	0.1726854	3700937.	-118178.
40.3750	0.1731789	3694098.	-121666.
40.3750	0.000000	4060741766.	419566562.
40.3750	0.000000	4060741766.	419566562.
40.3750	0.000000	4060741766.	419566562.
40.3750	0.000000	4060741766.	419566562.
40.3750	0.000000	4060741766.	419566562.
40.3750	0.000000	4060741766.	419566562.
40.3750	0.000000	4060741766.	419566562.
40.3750	0.000000	4060741766.	419566562.
40.3750	0.000000	4060741766.	419566562.
40.3750	0.000000	4060741766.	419566562.
40.3750	0.000000	4060741766.	419566562.
40.3750	0.000000	4060741766.	419566562.
40.3750	0.000000	4060741766.	419566562.
40.3750	0.000000	4060741766.	419566562.
40.3750	0.000000	4060741766.	419566562.
40.3750	0.000000	4060741766.	419566562.

-----  
 Computed Values of Pile Loading and Deflection  
 for Lateral Loading for Load Case Number 4  
 -----

Pile-head conditions are Shear and Pile-head Rotation (Loading Type 2)

Shear force at pile head = 16100.0 lbs  
 Rotation of pile head = 0.000E+00 radians  
 Axial load at pile head = 925000.0 lbs

(Zero slope for this load indicates fixed-head conditions)

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in <sup>2</sup>	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.1739	-3342024.	16100.	0.000	1127.1317	5.506E+11	0.000	0.000	0.000
0.475	0.1738	-3250163.	16100.	-3.412E-05	1114.5023	5.506E+11	0.000	0.000	0.000
0.950	0.1735	-3158125.	16100.	-6.729E-05	1101.8485	5.506E+11	0.000	0.000	0.000
1.425	0.1730	-3065914.	16100.	-9.950E-05	1089.1709	5.506E+11	0.000	0.000	0.000
1.900	0.1724	-2973535.	16100.	-0.000131	1076.4704	5.506E+11	0.000	0.000	0.000
2.375	0.1715	-2880995.	16100.	-0.000161	1063.7475	5.506E+11	0.000	0.000	0.000
2.850	0.1705	-2788297.	16100.	-0.000190	1051.0031	5.506E+11	0.000	0.000	0.000
3.325	0.1694	-2695447.	16100.	-0.000219	1038.2377	5.506E+11	0.000	0.000	0.000
3.800	0.1680	-2602450.	16100.	-0.000246	1025.4521	5.506E+11	0.000	0.000	0.000
4.275	0.1665	-2509311.	16100.	-0.000273	1012.6469	5.506E+11	0.000	0.000	0.000
4.750	0.1649	-2416035.	16100.	-0.000298	999.8229	5.506E+11	0.000	0.000	0.000
5.225	0.1631	-2322627.	16100.	-0.000323	986.9808	5.506E+11	0.000	0.000	0.000
5.700	0.1612	-2229092.	16100.	-0.000346	974.1213	5.506E+11	0.000	0.000	0.000
6.175	0.1592	-2135435.	16100.	-0.000369	961.2451	5.506E+11	0.000	0.000	0.000
6.650	0.1570	-2041663.	16100.	-0.000390	948.3528	5.506E+11	0.000	0.000	0.000
7.125	0.1547	-1947778.	16100.	-0.000411	935.4452	5.506E+11	0.000	0.000	0.000
7.600	0.1523	-1853788.	16100.	-0.000431	922.5230	5.506E+11	0.000	0.000	0.000

IB4\_B-8\_Trans\_Scored.l p7o

8.075	0.1498	-1759696.	16100.	-0.000449	909.5868	5.506E+11	0.000	0.000	0.000
8.550	0.1472	-1665508.	16100.	-0.000467	896.6375	5.506E+11	0.000	0.000	0.000
9.025	0.1445	-1571229.	16100.	-0.000481	655.8905	9.394E+11	0.000	0.000	0.000
9.500	0.1417	-1476900.	16100.	-0.000490	647.2025	9.394E+11	0.000	0.000	0.000
9.975	0.1389	-1382524.	16100.	-0.000499	638.5101	9.394E+11	0.000	0.000	0.000
10.450	0.1361	-1288103.	16100.	-0.000507	629.8136	9.394E+11	0.000	0.000	0.000
10.925	0.1332	-1193641.	16100.	-0.000514	621.1133	9.394E+11	0.000	0.000	0.000
11.400	0.1302	-1099141.	16100.	-0.000521	612.4096	9.394E+11	0.000	0.000	0.000
11.875	0.1272	-1004606.	16100.	-0.000527	603.7025	9.394E+11	0.000	0.000	0.000
12.350	0.1242	-910039.	16100.	-0.000533	594.9926	9.394E+11	0.000	0.000	0.000
12.825	0.1211	-815443.	16100.	-0.000539	586.2799	9.394E+11	0.000	0.000	0.000
13.300	0.1180	-720820.	16100.	-0.000543	577.5648	9.394E+11	0.000	0.000	0.000
13.775	0.1149	-626175.	16100.	-0.000547	568.8477	9.394E+11	0.000	0.000	0.000
14.250	0.1118	-531509.	16100.	-0.000551	560.1286	9.394E+11	0.000	0.000	0.000
14.725	0.1087	-436827.	16100.	-0.000554	551.4080	9.394E+11	0.000	0.000	0.000
15.200	0.1055	-342130.	16100.	-0.000556	542.6861	9.394E+11	0.000	0.000	0.000
15.675	0.1023	-247423.	16100.	-0.000558	533.9632	9.394E+11	0.000	0.000	0.000
16.150	0.0991	-152707.	16100.	-0.000559	525.2396	9.394E+11	0.000	0.000	0.000
16.625	0.0959	-57987.	16100.	-0.000560	516.5155	9.394E+11	0.000	0.000	0.000
17.100	0.0928	36735.	16100.	-0.000560	514.5582	9.394E+11	0.000	0.000	0.000
17.575	0.0896	131456.	16100.	-0.000559	523.2823	9.394E+11	0.000	0.000	0.000
18.050	0.0864	226173.	16100.	-0.000558	532.0060	9.394E+11	0.000	0.000	0.000
18.525	0.0832	320882.	16100.	-0.000557	540.7291	9.394E+11	0.000	0.000	0.000
19.000	0.0800	415581.	16100.	-0.000554	549.4513	9.394E+11	0.000	0.000	0.000
19.475	0.0769	510267.	16100.	-0.000551	558.1722	9.394E+11	0.000	0.000	0.000
19.950	0.0737	604937.	16100.	-0.000548	566.8916	9.394E+11	0.000	0.000	0.000
20.425	0.0706	699587.	16100.	-0.000544	575.6092	9.394E+11	0.000	0.000	0.000
20.900	0.0675	794215.	16100.	-0.000540	584.3248	9.394E+11	0.000	0.000	0.000
21.375	0.0645	888818.	16100.	-0.000535	593.0380	9.394E+11	0.000	0.000	0.000
21.850	0.0615	983392.	16100.	-0.000529	601.7486	9.394E+11	0.000	0.000	0.000
22.325	0.0585	1077934.	16100.	-0.000523	610.4563	9.394E+11	0.000	0.000	0.000
22.800	0.0555	1172442.	16100.	-0.000516	619.1608	9.394E+11	0.000	0.000	0.000
23.275	0.0526	1266913.	16100.	-0.000508	627.8619	9.394E+11	0.000	0.000	0.000
23.750	0.0497	1361343.	16100.	-0.000500	636.5593	9.394E+11	0.000	0.000	0.000
24.225	0.0469	1455729.	16100.	-0.000492	645.2526	9.394E+11	0.000	0.000	0.000
24.700	0.0441	1550069.	16100.	-0.000483	653.9416	9.394E+11	0.000	0.000	0.000
25.175	0.0414	1644360.	16100.	-0.000473	662.6261	9.394E+11	0.000	0.000	0.000
25.650	0.0387	1738597.	16100.	-0.000463	671.3057	9.394E+11	0.000	0.000	0.000
26.125	0.0361	1832780.	16100.	-0.000452	679.9802	9.394E+11	0.000	0.000	0.000
26.600	0.0335	1926903.	16100.	-0.000441	688.6493	9.394E+11	0.000	0.000	0.000
27.075	0.0311	2020965.	16100.	-0.000429	697.3128	9.394E+11	0.000	0.000	0.000
27.550	0.0287	2114962.	16100.	-0.000416	705.9702	9.394E+11	0.000	0.000	0.000
28.025	0.0263	2208891.	16100.	-0.000403	714.6215	9.394E+11	0.000	0.000	0.000
28.500	0.0241	2302750.	16100.	-0.000389	723.2662	9.394E+11	0.000	0.000	0.000
28.975	0.0219	2396535.	16100.	-0.000375	731.9042	9.394E+11	0.000	0.000	0.000
29.450	0.0198	2490244.	16100.	-0.000360	740.5350	9.394E+11	0.000	0.000	0.000
29.925	0.0178	2583873.	16100.	-0.000345	749.1586	9.394E+11	0.000	0.000	0.000
30.400	0.0159	2677419.	16100.	-0.000329	757.7745	9.394E+11	0.000	0.000	0.000
30.875	0.0140	2770879.	16100.	-0.000312	766.3826	9.394E+11	0.000	0.000	0.000
31.350	0.0123	2864251.	16100.	-0.000295	774.9824	9.394E+11	0.000	0.000	0.000
31.825	0.0107	2957531.	16100.	-0.000277	783.5739	9.394E+11	0.000	0.000	0.000
32.300	0.009142	3050717.	16100.	-0.000259	792.1566	9.394E+11	0.000	0.000	0.000
32.775	0.007717	3143805.	16100.	-0.000240	800.7303	9.394E+11	0.000	0.000	0.000
33.250	0.006401	3236792.	16100.	-0.000221	809.2948	9.394E+11	0.000	0.000	0.000
33.725	0.005197	3329676.	16100.	-0.000201	817.8498	9.394E+11	0.000	0.000	0.000
34.200	0.004108	3422454.	16100.	-0.000181	826.3949	9.394E+11	0.000	0.000	0.000
34.675	0.003137	3515121.	16100.	-0.000160	834.9299	9.394E+11	0.000	0.000	0.000
35.150	0.002288	3607677.	16100.	-0.000138	843.4546	9.394E+11	0.000	0.000	0.000
35.625	0.001564	3700117.	16100.	-0.000116	851.9686	9.394E+11	0.000	0.000	0.000
36.100	0.000968	3792438.	-25261.	-9.311E-05	860.4718	9.394E+11	-14513.	85500000.	0.000

IB4_B-8_Trans_Scourd.l p7o										
36.575	0.000502	3413125.	-88098.	-7.125E-05	825.5357	9.394E+11	-7535.4980	85500000.	0.000	0.000
37.050	0.000155	2788875.	-116212.	-5.243E-05	768.0400	9.394E+11	-2329.1667	85500000.	0.000	0.000
37.525	-9.535E-05	2088861.	-118774.	-3.316E-05	954.8418	5.506E+11	1430.2933	85500000.	0.000	0.000
38.000	-0.000223	1435203.	-105176.	-1.492E-05	864.9742	5.506E+11	3341.0035	85500000.	0.000	0.000
38.475	-0.000265	890016.	-84307.	-2.885E-06	790.0197	5.506E+11	3981.4851	85500000.	0.000	0.000
38.950	-0.000256	474138.	-62032.	4.176E-06	732.8432	5.506E+11	3834.2570	85500000.	0.000	0.000
39.425	-0.000218	182810.	-41792.	7.576E-06	692.7903	5.506E+11	3267.3920	85500000.	0.000	0.000
39.900	-0.000169	-2370.5243	-25245.	8.510E-06	667.9827	5.506E+11	2538.7307	85500000.	0.000	0.000
40.375	-0.000121	-105068.	-12844.	7.954E-06	682.1019	5.506E+11	1812.1674	85500000.	0.000	0.000
40.850	-7.857E-05	-148882.	-4320.8253	6.640E-06	688.1256	5.506E+11	1178.5944	85500000.	0.000	0.000
41.325	-4.512E-05	-154395.	967.0181	5.070E-06	688.8836	5.506E+11	676.7893	85500000.	0.000	0.000
41.800	-2.078E-05	-137911.	3784.0182	3.557E-06	686.6174	5.506E+11	311.6318	85500000.	0.000	0.000
42.275	-4.569E-06	-111295.	4867.4875	2.267E-06	682.9580	5.506E+11	68.5328	85500000.	0.000	0.000
42.750	5.071E-06	-82446.	4846.0219	1.264E-06	678.9918	5.506E+11	-76.0646	85500000.	0.000	0.000
43.225	9.846E-06	-56063.	4208.3118	5.476E-07	675.3646	5.506E+11	-147.6933	85500000.	0.000	0.000
43.700	1.131E-05	-34477.	3303.7323	7.898E-08	672.3968	5.506E+11	-169.7030	85500000.	0.000	0.000
44.175	1.075E-05	-18402.	2360.6613	-1.947E-07	670.1867	5.506E+11	-161.1991	85500000.	0.000	0.000
44.650	9.094E-06	-7563.0910	1512.4793	-3.291E-07	668.6966	5.506E+11	-136.4087	85500000.	0.000	0.000
45.125	6.995E-06	-1155.9763	824.6797	-3.742E-07	667.8157	5.506E+11	-104.9245	85500000.	0.000	0.000
45.600	4.828E-06	1842.2037	319.2555	-3.707E-07	667.9101	5.506E+11	-72.4173	85500000.	0.000	0.000
46.075	2.769E-06	2487.4456	-5.5241	-3.483E-07	667.9988	5.506E+11	-41.5405	85500000.	0.000	0.000
46.550	8.577E-07	1782.9010	-160.5804	-3.262E-07	667.9019	5.506E+11	-12.8652	85500000.	0.000	0.000
47.025	-9.488E-07	660.2682	-156.6848	-3.135E-07	667.7476	5.506E+11	14.2321	85500000.	0.000	0.000
47.500	-2.716E-06	0.000	0.000	-3.101E-07	667.6568	5.506E+11	40.7450	42750000.	0.000	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 4:

Pile-head deflection = 0.1738785 inches  
 Computed slope at pile head = 0.000000 radians  
 Maximum bending moment = 3792438. inch-lbs  
 Maximum shear force = -118774. lbs  
 Depth of maximum bending moment = 36.1000000 feet below pile head  
 Depth of maximum shear force = 37.5250000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 3

-----  
 Pile-head Deflection vs. Pile Length for Load Case 4  
 -----

Boundary Condition Type 2, Shear and Slope

Shear = 16100. lb  
 Slope = 0.00000  
 Axial Load = 925000. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
47.5000	0.1738785	3792438.	-118774.
45.1250	0.1729973	3798742.	-117814.
42.7500	0.1785416	3823227.	-122096.
40.3750	0.1790541	3816249.	-125701.

40.3750	0.000000	4198507488.	433794939.
40.3750	0.000000	4198507488.	433794939.
40.3750	0.000000	4198507488.	433794939.
40.3750	0.000000	4198507488.	433794939.
40.3750	0.000000	4198507488.	433794939.
40.3750	0.000000	4198507488.	433794939.
40.3750	0.000000	4198507488.	433794939.
40.3750	0.000000	4198507488.	433794939.
40.3750	0.000000	4198507488.	433794939.
40.3750	0.000000	4198507488.	433794939.
40.3750	0.000000	4198507488.	433794939.
40.3750	0.000000	4198507488.	433794939.
40.3750	0.000000	4198507488.	433794939.
40.3750	0.000000	4198507488.	433794939.
40.3750	0.000000	4198507488.	433794939.
40.3750	0.000000	4198507488.	433794939.
40.3750	0.000000	4198507488.	433794939.
40.3750	0.000000	4198507488.	433794939.
40.3750	0.000000	4198507488.	433794939.
40.3750	0.000000	4198507488.	433794939.
40.3750	0.000000	4198507488.	433794939.

-----  
 Summary of Pile Response(s)  
 -----

Defini ti ons of Pile-head Loading Condi ti ons:

- Load Type 1: Load 1 = Shear, lbs, and Load 2 = Moment, in-lbs
- Load Type 2: Load 1 = Shear, lbs, and Load 2 = Slope, radians
- Load Type 3: Load 1 = Shear, lbs, and Load 2 = Rotational Sti ffness, in-lbs/radian
- Load Type 4: Load 1 = Top Deflection, inches, and Load 2 = Moment, in-lbs
- Load Type 5: Load 1 = Top Deflection, inches, and Load 2 = Slope, radians

Load Case No.	Load Type No.	Pile-head Condition 1 V(lbs) or y(inches)	Pile-head Condition 2 in-lb, rad., or in-lb/rad.	Axial Loading lbs	Pile-head Deflection inches	Maximum Moment in Pile in-lbs	Maximum Shear in Pile lbs	Pile-head Rotation radians
1	1	V = 15700.	M = 1152000.	640000.	0.70274476	8401690.	-262578.	-0.00259296
2	1	V = 16100.	M = 1224000.	925000.	0.74625195	8886807.	-277749.	-0.00275737
3	2	V = 15700.	S = 0.000	640000.	0.16820210	3671710.	-114986.	0.00000000
4	2	V = 16100.	S = 0.000	925000.	0.17387852	3792438.	-118774.	-0.00000000

-----  
 Summary of Warning Messages  
 -----

The following warning was reported 4000 times

\*\*\*\* Warning \*\*\*\*

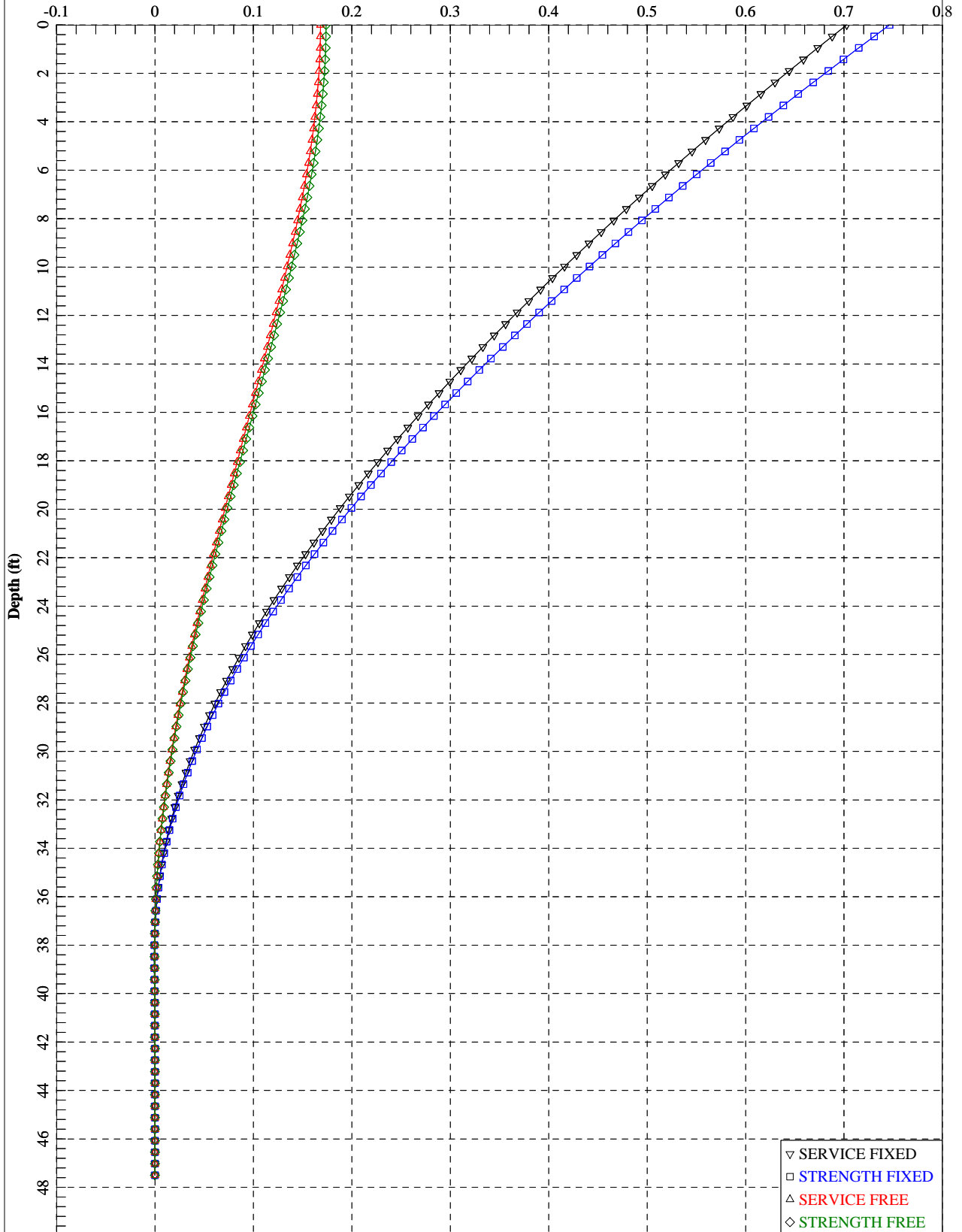
An unreasonable input value for uniaxial compressive strength has been specified for a soil defined using the vuggy limestone criteria. The input value is outside of the range of 1,000 to 2,500 psi (6,895 to 17,237 kPa). You should check your input data for correctness.

The analysis ended normally.

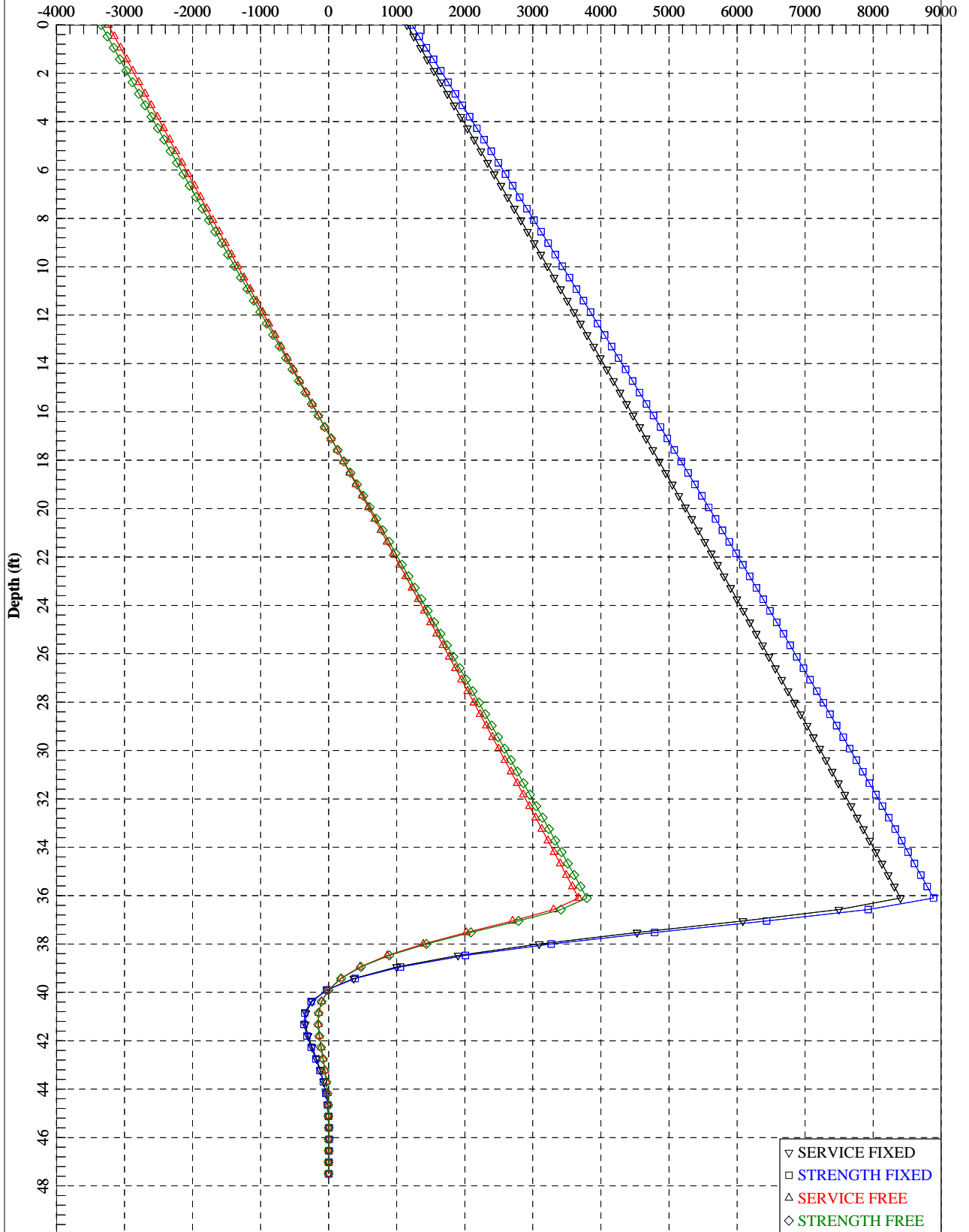
IB4\_\_B-8\_Trans\_Scoured. I p7o



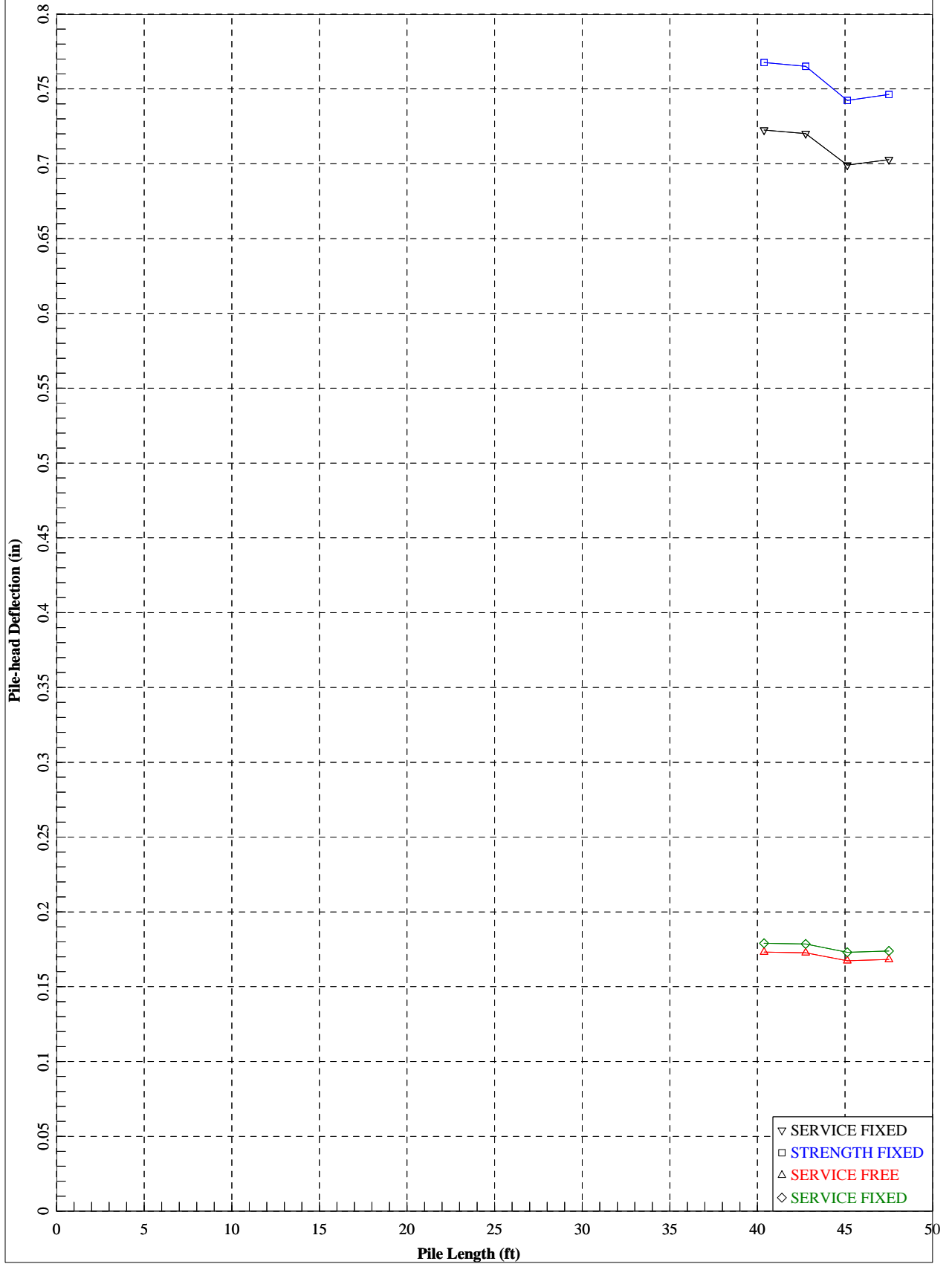
SC 557 Bridge over Crowders Creek - IB4 - Boring B-8 - 48" Dia. Drilled Shaft - Scoured Transverse Analysis  
Lateral Pile Deflection (inches)



SC 557 Bridge over Crowders Creek - IB4 - Boring B-8 - 48" Dia. Drilled Shaft - Scoured Transverse Analysis  
Bending Moment (in-kips)



SC 557 Bridge over Crowders Creek - IB4 - Boring B-8 - 48" Dia. Drilled Shaft - Scoured Transverse Analysis



=====  
LPile Plus for Windows, Version 2013-07.007

Analysis of Individual Piles and Drilled Shafts  
Subjected to Lateral Loading Using the p-y Method

© 1985-2013 by Ensoft, Inc.  
All Rights Reserved

=====  
This copy of LPile is used by:

Bradley Fischer  
F&ME

Serial Number of Security Device: 291490957

This copy of LPile is licensed for exclusive use by: F&ME Consultants, Columbia, Sout

Use of this program by any entity other than F&ME Consultants, Columbia, Sout  
is forbidden by the software license agreement.

-----  
Files Used for Analysis  
-----

Path to file locations: P:\Geotechnical\G4800's\G4843 - SC557 - York County\Report\Final\Bridge\LPile\  
Name of input data file: IB4\_\_B-9\_Long\_Scoured.l p7d  
Name of output report file: IB4\_\_B-9\_Long\_Scoured.l p7o  
Name of plot output file: IB4\_\_B-9\_Long\_Scoured.l p7p  
Name of runtime message file: IB4\_\_B-9\_Long\_Scoured.l p7r

-----  
Date and Time of Analysis  
-----

Date: July 31, 2018 Time: 9:44:45

-----  
Problem Title  
-----

Project Name: SC 557 over Crowders Creek

Job Number: G4843

Client: CALYX

Engineer: JFH

Description: IB4 - Boring B-9 - 48" Dia. Drilled Shaft - Scoured Long.

-----  
 Program Options and Settings  
 -----

Engineering Units of Input Data and Computations:

- Engineering units are US Customary Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

Computational Options:

- Use unfactored loads in computations (conventional analysis)
- Compute pile response under loading and nonlinear bending properties of pile (only if nonlinear pile properties are input)
- Analysis uses p-y modification factors for p-y curves
- Analysis includes loading by lateral soil movements acting on pile
- Input of shear resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- No p-y curves to be computed and reported for user-specified depths
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1

-----  
 Pile Structural Properties and Geometry  
 -----

- Total number of pile sections = 3
- Total length of pile = 39.50 ft
- Depth of ground surface below top of pile = 30.50 ft

Pile diameter values used for p-y curve computations are defined using 6 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile.

Point	Depth X ft	Pile Diameter in
1	0.00000	42.0000000
2	9.000000	42.0000000
3	9.000000	48.0000000
4	31.500000	48.0000000

5	31.50000	42.0000000
6	39.50000	42.0000000

-----  
 Input Structural Properties:  
 -----

Pile Section No. 1:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Circular
Section Length	=	9.00000 ft
Top Width	=	42.00000 in
Bottom Width	=	42.00000 in
Top Area	=	1385.44236 Sq. in
Bottom Area	=	1385.44236 Sq. in
Moment of Inertia at Top	=	152745. in^4
Moment of Inertia at Bottom	=	152745. in^4
Elastic Modulus	=	3605000. lbs/in^2

Pile Section No. 2:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Circular
Section Length	=	22.50000 ft
Top Width	=	48.00000 in
Bottom Width	=	48.00000 in
Top Area	=	1809.55737 Sq. in
Bottom Area	=	1809.55737 Sq. in
Moment of Inertia at Top	=	260576. in^4
Moment of Inertia at Bottom	=	260576. in^4
Elastic Modulus	=	3605000. lbs/in^2

Pile Section No. 3:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Circular
Section Length	=	8.00000 ft
Top Width	=	42.00000 in
Bottom Width	=	42.00000 in
Top Area	=	1385.44236 Sq. in
Bottom Area	=	1385.44236 Sq. in
Moment of Inertia at Top	=	152745. in^4
Moment of Inertia at Bottom	=	152745. in^4
Elastic Modulus	=	3605000. lbs/in^2

-----  
 Ground Slope and Pile Batter Angles  
 -----

Ground Slope Angle	=	0.000 degrees
	=	0.000 radians
Pile Batter Angle	=	0.000 degrees
	=	0.000 radians

-----  
 Soil and Rock Layering Information  
 -----

The soil profile is modelled using 1 layers

Layer 1 is strong rock (vuggy limestone)

Distance from top of pile to top of layer = 30.50000 ft  
 Distance from top of pile to bottom of layer = 60.00000 ft  
 Effective unit weight at top of layer = 98.00000 pcf  
 Effective unit weight at bottom of layer = 98.00000 pcf  
 Uniaxial compressive strength at top of layer = 15000. psi  
 Uniaxial compressive strength at bottom of layer = 15000. psi

(Depth of lowest soil layer extends 20.50 ft below pile tip)

Summary of Soil Properties

Layer Num.	Layer Soil Type (p-y Curve Criteria)	Layer Depth ft	Effective Unit Wt. pcf	Uniaxial qu psi
1	Vuggy Limestone	30.500 60.000	98.000 98.000	15000. 15000.

p-y Modification Factors for Group Action

Distribution of p-y modifiers with depth defined using 2 points

Point No.	Depth X ft	p-mult	y-mult
1	30.500	0.9300	1.0000
2	100.000	0.9300	1.0000

Lateral Soil Movements

Profile of soil movement with depth defined using 2 points

Point No.	Depth X ft	Soil Movement in
1	0.00000	0.00000
2	0.00000	0.00000

Loading Type

-----  
 Static loading criteria were used when computing p-y curves for all analyses.  
 -----

-----  
 Pile-head Loading and Pile-head Fixity Conditions  
 -----

Number of loads specified = 4

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length
1	1	V = 12500. lbs	M = 720000. in-lbs	640000.	Yes
2	1	V = 23200. lbs	M = 2160000. in-lbs	925000.	Yes
3	2	V = 12500. lbs	S = 0.0000 in/in	64000.	Yes
4	2	V = 23200. lbs	S = 0.0000 in/in	925000.	Yes

V = perpendicular shear force applied to pile head  
 M = bending moment applied to pile head  
 y = lateral deflection relative to pile axis  
 S = pile slope relative to original pile batter angle  
 R = rotational stiffness applied to pile head  
 Axial thrust is assumed to be acting axially for all pile batter angles.

-----  
 Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness  
 -----

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 3

Pile Section No. 1:  
 -----

Moment-curvature properties were derived from elastic section properties

Pile Section No. 2:  
 -----

Moment-curvature properties were derived from elastic section properties

Pile Section No. 3:  
 -----

Moment-curvature properties were derived from elastic section properties

-----  
 Computed Values of Pile Loading and Deflection  
 for Lateral Loading for Load Case Number 1  
 -----

Pile-head conditions are Shear and Moment (Loading Type 1)



I B4\_\_B-9\_Long\_Scoured. I p7o

Shear force at pile head = 12500.0 lbs  
 Applied moment at pile head = 720000.0 in-lbs  
 Axial thrust load on pile head = 640000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi *	Bending Stiffness lb-in^2	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.3566	720000.	12500.	-0.001521	560.9348	5.506E+11	0.000	0.000	0.000
0.395	0.3494	783853.	12500.	-0.001514	569.7136	5.506E+11	0.000	0.000	0.000
0.790	0.3422	847686.	12500.	-0.001507	578.4896	5.506E+11	0.000	0.000	0.000
1.185	0.3351	911497.	12500.	-0.001499	587.2626	5.506E+11	0.000	0.000	0.000
1.580	0.3280	975284.	12500.	-0.001491	596.0323	5.506E+11	0.000	0.000	0.000
1.975	0.3210	1039046.	12500.	-0.001483	604.7985	5.506E+11	0.000	0.000	0.000
2.370	0.3139	1102780.	12500.	-0.001473	613.5609	5.506E+11	0.000	0.000	0.000
2.765	0.3070	1166486.	12500.	-0.001464	622.3194	5.506E+11	0.000	0.000	0.000
3.160	0.3001	1230161.	12500.	-0.001453	631.0738	5.506E+11	0.000	0.000	0.000
3.555	0.2932	1293804.	12500.	-0.001443	639.8236	5.506E+11	0.000	0.000	0.000
3.950	0.2864	1357413.	12500.	-0.001431	648.5689	5.506E+11	0.000	0.000	0.000
4.345	0.2796	1420987.	12500.	-0.001419	657.3093	5.506E+11	0.000	0.000	0.000
4.740	0.2729	1484523.	12500.	-0.001407	666.0445	5.506E+11	0.000	0.000	0.000
5.135	0.2663	1548021.	12500.	-0.001394	674.7745	5.506E+11	0.000	0.000	0.000
5.530	0.2597	1611479.	12500.	-0.001380	683.4989	5.506E+11	0.000	0.000	0.000
5.925	0.2532	1674894.	12500.	-0.001366	692.2175	5.506E+11	0.000	0.000	0.000
6.320	0.2468	1738266.	12500.	-0.001351	700.9301	5.506E+11	0.000	0.000	0.000
6.715	0.2404	1801592.	12500.	-0.001336	709.6364	5.506E+11	0.000	0.000	0.000
7.110	0.2341	1864871.	12500.	-0.001320	718.3363	5.506E+11	0.000	0.000	0.000
7.505	0.2279	1928102.	12500.	-0.001304	727.0295	5.506E+11	0.000	0.000	0.000
7.900	0.2218	1991282.	12500.	-0.001287	735.7157	5.506E+11	0.000	0.000	0.000
8.295	0.2157	2054410.	12500.	-0.001270	744.3949	5.506E+11	0.000	0.000	0.000
8.690	0.2097	2117484.	12500.	-0.001252	753.0666	5.506E+11	0.000	0.000	0.000
9.085	0.2038	2180504.	12500.	-0.001237	754.5098	9.394E+11	0.000	0.000	0.000
9.480	0.1980	2243489.	12500.	-0.001226	756.3110	9.394E+11	0.000	0.000	0.000
9.875	0.1922	2306441.	12500.	-0.001214	756.1091	9.394E+11	0.000	0.000	0.000
10.270	0.1865	2369357.	12500.	-0.001203	757.9039	9.394E+11	0.000	0.000	0.000
10.665	0.1808	2432237.	12500.	-0.001190	757.6953	9.394E+11	0.000	0.000	0.000
11.060	0.1752	2495080.	12500.	-0.001178	758.4834	9.394E+11	0.000	0.000	0.000
11.455	0.1696	2557884.	12500.	-0.001165	759.2679	9.394E+11	0.000	0.000	0.000
11.850	0.1642	2620650.	12500.	-0.001152	759.0488	9.394E+11	0.000	0.000	0.000
12.245	0.1587	2683375.	12500.	-0.001139	759.8260	9.394E+11	0.000	0.000	0.000
12.640	0.1534	2746059.	12500.	-0.001125	760.5994	9.394E+11	0.000	0.000	0.000
13.035	0.1481	2808701.	12500.	-0.001111	761.3690	9.394E+11	0.000	0.000	0.000
13.430	0.1428	2871300.	12500.	-0.001097	762.1346	9.394E+11	0.000	0.000	0.000
13.825	0.1377	2933855.	12500.	-0.001082	762.8962	9.394E+11	0.000	0.000	0.000
14.220	0.1326	2996366.	12500.	-0.001067	763.6536	9.394E+11	0.000	0.000	0.000
14.615	0.1275	3058830.	12500.	-0.001052	764.4068	9.394E+11	0.000	0.000	0.000
15.010	0.1226	3121248.	12500.	-0.001036	765.1557	9.394E+11	0.000	0.000	0.000
15.405	0.1177	3183617.	12500.	-0.001020	765.9001	9.394E+11	0.000	0.000	0.000
15.800	0.1129	3245939.	12500.	-0.001004	766.6401	9.394E+11	0.000	0.000	0.000
16.195	0.1082	3308210.	12500.	-0.000988	767.3755	9.394E+11	0.000	0.000	0.000
16.590	0.1036	3370431.	12500.	-0.000971	768.1063	9.394E+11	0.000	0.000	0.000
16.985	0.0990	3432600.	12500.	-0.000954	768.8323	9.394E+11	0.000	0.000	0.000
17.380	0.0945	3494716.	12500.	-0.000936	769.5535	9.394E+11	0.000	0.000	0.000
17.775	0.0901	3556780.	12500.	-0.000918	770.2697	9.394E+11	0.000	0.000	0.000
18.170	0.0858	3618788.	12500.	-0.000900	770.9809	9.394E+11	0.000	0.000	0.000
18.565	0.0816	3680742.	12500.	-0.000882	771.6870	9.394E+11	0.000	0.000	0.000
18.960	0.0775	3742638.	12500.	-0.000863	772.3880	9.394E+11	0.000	0.000	0.000
19.355	0.0734	3804478.	12500.	-0.000844	773.0836	9.394E+11	0.000	0.000	0.000
19.750	0.0694	3866259.	12500.	-0.000825	773.7739	9.394E+11	0.000	0.000	0.000

IB4_B-9_Long_Scoured.l p7o									
20.145	0.0656	3927982.	12500.	-0.000805	715.4587	9.394E+11	0.000	0.000	0.000
20.540	0.0618	3989644.	12500.	-0.000785	721.1380	9.394E+11	0.000	0.000	0.000
20.935	0.0581	4051245.	12500.	-0.000765	726.8117	9.394E+11	0.000	0.000	0.000
21.330	0.0546	4112784.	12500.	-0.000744	732.4797	9.394E+11	0.000	0.000	0.000
21.725	0.0511	4174260.	12500.	-0.000723	738.1418	9.394E+11	0.000	0.000	0.000
22.120	0.0477	4235672.	12500.	-0.000702	743.7981	9.394E+11	0.000	0.000	0.000
22.515	0.0444	4297019.	12500.	-0.000681	749.4484	9.394E+11	0.000	0.000	0.000
22.910	0.0413	4358301.	12500.	-0.000659	755.0927	9.394E+11	0.000	0.000	0.000
23.305	0.0382	4419516.	12500.	-0.000637	760.7308	9.394E+11	0.000	0.000	0.000
23.700	0.0352	4480663.	12500.	-0.000614	766.3626	9.394E+11	0.000	0.000	0.000
24.095	0.0324	4541742.	12500.	-0.000591	771.9882	9.394E+11	0.000	0.000	0.000
24.490	0.0296	4602751.	12500.	-0.000568	777.6074	9.394E+11	0.000	0.000	0.000
24.885	0.0270	4663689.	12500.	-0.000545	783.2200	9.394E+11	0.000	0.000	0.000
25.280	0.0245	4724557.	12500.	-0.000521	788.8261	9.394E+11	0.000	0.000	0.000
25.675	0.0220	4785351.	12500.	-0.000497	794.4255	9.394E+11	0.000	0.000	0.000
26.070	0.0197	4846073.	12500.	-0.000473	800.0182	9.394E+11	0.000	0.000	0.000
26.465	0.0176	4906721.	12500.	-0.000448	805.6041	9.394E+11	0.000	0.000	0.000
26.860	0.0155	4967293.	12500.	-0.000423	811.1830	9.394E+11	0.000	0.000	0.000
27.255	0.0135	5027789.	12500.	-0.000398	816.7549	9.394E+11	0.000	0.000	0.000
27.650	0.0117	5088209.	12500.	-0.000373	822.3198	9.394E+11	0.000	0.000	0.000
28.045	0.0100	5148550.	12500.	-0.000347	827.8774	9.394E+11	0.000	0.000	0.000
28.440	0.008428	5208813.	12500.	-0.000321	833.4278	9.394E+11	0.000	0.000	0.000
28.835	0.006971	5268996.	12500.	-0.000294	838.9709	9.394E+11	0.000	0.000	0.000
29.230	0.005639	5329098.	12500.	-0.000268	844.5065	9.394E+11	0.000	0.000	0.000
29.625	0.004435	5389119.	12500.	-0.000240	850.0347	9.394E+11	0.000	0.000	0.000
30.020	0.003359	5449057.	12500.	-0.000213	855.5552	9.394E+11	0.000	0.000	0.000
30.415	0.002414	5508912.	12500.	-0.000185	861.0680	9.394E+11	0.000	0.000	0.000
30.810	0.001601	5568682.	-40429.	-0.000158	866.5731	9.394E+11	-22333.	66123000.	0.000
31.205	0.000921	5126603.	-123802.	-0.000131	825.8560	9.394E+11	-12846.	66123000.	0.000
31.600	0.000363	4395835.	-166259.	-9.869E-05	1066.3033	5.506E+11	-5068.8816	66123000.	0.000
31.995	-1.475E-05	3551066.	-177785.	-6.449E-05	950.1612	5.506E+11	205.7724	66123000.	0.000
32.390	-0.000248	2710828.	-169099.	-3.753E-05	834.6418	5.506E+11	3459.1891	66123000.	0.000
32.785	-0.000371	1948239.	-148648.	-1.748E-05	729.7980	5.506E+11	5169.6250	66123000.	0.000
33.180	-0.000414	1301748.	-122719.	-3.494E-06	640.9158	5.506E+11	5771.1397	66123000.	0.000
33.575	-0.000404	784886.	-95694.	5.487E-06	569.8557	5.506E+11	5631.7104	66123000.	0.000
33.970	-0.000362	394536.	-70389.	1.056E-05	516.1887	5.506E+11	5045.5302	66123000.	0.000
34.365	-0.000304	117535.	-48395.	1.277E-05	478.1056	5.506E+11	4234.7837	66123000.	0.000
34.760	-0.000241	-64322.	-30402.	1.300E-05	470.7896	5.506E+11	3357.1370	66123000.	0.000
35.155	-0.000180	-170752.	-16482.	1.198E-05	485.4220	5.506E+11	2516.1022	66123000.	0.000
35.550	-0.000127	-220646.	-6318.7271	1.030E-05	492.2816	5.506E+11	1772.2578	66123000.	0.000
35.945	-8.272E-05	-230716.	616.5115	8.357E-06	493.6661	5.506E+11	1154.0032	66123000.	0.000
36.340	-4.782E-05	-214852.	4932.4553	6.439E-06	491.4850	5.506E+11	667.0701	66123000.	0.000
36.735	-2.168E-05	-183995.	7230.1683	4.723E-06	487.2427	5.506E+11	302.4290	66123000.	0.000
37.130	-3.048E-06	-146339.	8047.6890	3.301E-06	482.0655	5.506E+11	42.5164	66123000.	0.000
37.525	9.613E-06	-107723.	7830.6327	2.207E-06	476.7565	5.506E+11	-134.1014	66123000.	0.000
37.920	1.788E-05	-72118.	6921.7248	1.433E-06	471.8613	5.506E+11	-249.4041	66123000.	0.000
38.315	2.320E-05	-42114.	5563.5675	9.417E-07	467.7363	5.506E+11	-323.6580	66123000.	0.000
38.710	2.681E-05	-19381.	3910.2575	6.770E-07	464.6109	5.506E+11	-373.9411	66123000.	0.000
39.105	2.962E-05	-5048.7203	2044.7500	5.719E-07	462.6404	5.506E+11	-413.1928	66123000.	0.000
39.500	3.223E-05	0.000	0.000	5.502E-07	461.9463	5.506E+11	-449.5709	33061500.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 1:

Pile-head deflection = 0.3565735 inches  
 Computed slope at pile head = -0.0015206 radians  
 Maximum bending moment = 5568682. inch-lbs  
 Maximum shear force = -177785. lbs

Depth of maximum bending moment = 30.810000 feet below pile head  
 Depth of maximum shear force = 31.9950000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 2

-----  
 Pile-head Deflection vs. Pile Length for Load Case 1  
 -----

Boundary Condition Type 1, Shear and Moment

Shear = 12500. lb  
 Moment = 720000. in-lb  
 Axial Load = 640000. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment in-lbs	Maximum Shear lbs
39.5000	0.3565735	5568682.	-177785.
37.5250	0.3561241	5562455.	-177577.
35.5500	0.3469454	5526989.	-173328.
33.5750	0.3556340	5529359.	-216421.
33.5750	0.000000	12271626478.	-1522912154.
33.5750	0.000000	12271626478.	-1522912154.
33.5750	0.000000	12271626478.	-1522912154.
33.5750	0.000000	12271626478.	-1522912154.
33.5750	0.000000	12271626478.	-1522912154.
33.5750	0.000000	12271626478.	-1522912154.
33.5750	0.000000	12271626478.	-1522912154.
33.5750	0.000000	12271626478.	-1522912154.
33.5750	0.000000	12271626478.	-1522912154.
33.5750	0.000000	12271626478.	-1522912154.
33.5750	0.000000	12271626478.	-1522912154.
33.5750	0.000000	12271626478.	-1522912154.
33.5750	0.000000	12271626478.	-1522912154.
33.5750	0.000000	12271626478.	-1522912154.
33.5750	0.000000	12271626478.	-1522912154.
33.5750	0.000000	12271626478.	-1522912154.
33.5750	0.000000	12271626478.	-1522912154.
33.5750	0.000000	12271626478.	-1522912154.
33.5750	0.000000	12271626478.	-1522912154.

-----  
 Computed Values of Pile Loading and Deflection  
 for Lateral Loading for Load Case Number 2  
 -----

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 23200.0 lbs  
 Applied moment at pile head = 2160000.0 in-lbs  
 Axial thrust load on pile head = 925000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in <sup>2</sup>	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.7528	2160000.	23200.	-0.003315	964.6223	5.506E+11	0.000	0.000	0.000

IB4\_B-9\_Long\_Scored.l p7o

0.395	0.7372	2284461.	23200.	-0.003296	981.7337	5.506E+11	0.000	0.000	0.000
0.790	0.7216	2408835.	23200.	-0.003275	998.8332	5.506E+11	0.000	0.000	0.000
1.185	0.7061	2533119.	23200.	-0.003254	1015.9202	5.506E+11	0.000	0.000	0.000
1.580	0.6908	2657307.	23200.	-0.003232	1032.9941	5.506E+11	0.000	0.000	0.000
1.975	0.6755	2781395.	23200.	-0.003208	1050.0542	5.506E+11	0.000	0.000	0.000
2.370	0.6603	2905378.	23200.	-0.003184	1067.0998	5.506E+11	0.000	0.000	0.000
2.765	0.6453	3029251.	23200.	-0.003158	1084.1304	5.506E+11	0.000	0.000	0.000
3.160	0.6304	3153010.	23200.	-0.003132	1101.1453	5.506E+11	0.000	0.000	0.000
3.555	0.6156	3276650.	23200.	-0.003104	1118.1438	5.506E+11	0.000	0.000	0.000
3.950	0.6010	3400166.	23200.	-0.003075	1135.1253	5.506E+11	0.000	0.000	0.000
4.345	0.5865	3523554.	23200.	-0.003046	1152.0892	5.506E+11	0.000	0.000	0.000
4.740	0.5721	3646809.	23200.	-0.003015	1169.0347	5.506E+11	0.000	0.000	0.000
5.135	0.5579	3769926.	23200.	-0.002983	1185.9614	5.506E+11	0.000	0.000	0.000
5.530	0.5438	3892901.	23200.	-0.002950	1202.8685	5.506E+11	0.000	0.000	0.000
5.925	0.5299	4015729.	23200.	-0.002916	1219.7554	5.506E+11	0.000	0.000	0.000
6.320	0.5162	4138405.	23200.	-0.002881	1236.6214	5.506E+11	0.000	0.000	0.000
6.715	0.5026	4260926.	23200.	-0.002845	1253.4660	5.506E+11	0.000	0.000	0.000
7.110	0.4892	4383285.	23200.	-0.002807	1270.2885	5.506E+11	0.000	0.000	0.000
7.505	0.4760	4505479.	23200.	-0.002769	1287.0882	5.506E+11	0.000	0.000	0.000
7.900	0.4630	4627503.	23200.	-0.002730	1303.8645	5.506E+11	0.000	0.000	0.000
8.295	0.4501	4749352.	23200.	-0.002689	1320.6169	5.506E+11	0.000	0.000	0.000
8.690	0.4375	4871023.	23200.	-0.002648	1337.3446	5.506E+11	0.000	0.000	0.000
9.085	0.4250	4992509.	23200.	-0.002614	971.0025	9.394E+11	0.000	0.000	0.000
9.480	0.4127	5113885.	23200.	-0.002589	982.1817	9.394E+11	0.000	0.000	0.000
9.875	0.4005	5235147.	23200.	-0.002563	993.3504	9.394E+11	0.000	0.000	0.000
10.270	0.3884	5356294.	23200.	-0.002536	1004.5084	9.394E+11	0.000	0.000	0.000
10.665	0.3764	5477322.	23200.	-0.002509	1015.6556	9.394E+11	0.000	0.000	0.000
11.060	0.3646	5598229.	23200.	-0.002481	1026.7916	9.394E+11	0.000	0.000	0.000
11.455	0.3529	5719013.	23200.	-0.002452	1037.9161	9.394E+11	0.000	0.000	0.000
11.850	0.3414	5839669.	23200.	-0.002423	1049.0290	9.394E+11	0.000	0.000	0.000
12.245	0.3299	5960197.	23200.	-0.002393	1060.1301	9.394E+11	0.000	0.000	0.000
12.640	0.3187	6080593.	23200.	-0.002363	1071.2189	9.394E+11	0.000	0.000	0.000
13.035	0.3075	6200854.	23200.	-0.002332	1082.2954	9.394E+11	0.000	0.000	0.000
13.430	0.2966	6320978.	23200.	-0.002300	1093.3593	9.394E+11	0.000	0.000	0.000
13.825	0.2857	6440962.	23200.	-0.002268	1104.4102	9.394E+11	0.000	0.000	0.000
14.220	0.2751	6560804.	23200.	-0.002235	1115.4481	9.394E+11	0.000	0.000	0.000
14.615	0.2645	6680500.	23200.	-0.002202	1126.4725	9.394E+11	0.000	0.000	0.000
15.010	0.2542	6800049.	23200.	-0.002168	1137.4834	9.394E+11	0.000	0.000	0.000
15.405	0.2440	6919447.	23200.	-0.002133	1148.4804	9.394E+11	0.000	0.000	0.000
15.800	0.2340	7038692.	23200.	-0.002098	1159.4633	9.394E+11	0.000	0.000	0.000
16.195	0.2241	7157782.	23200.	-0.002062	1170.4319	9.394E+11	0.000	0.000	0.000
16.590	0.2144	7276713.	23200.	-0.002026	1181.3859	9.394E+11	0.000	0.000	0.000
16.985	0.2049	7395483.	23200.	-0.001989	1192.3250	9.394E+11	0.000	0.000	0.000
17.380	0.1956	7514089.	23200.	-0.001951	1203.2491	9.394E+11	0.000	0.000	0.000
17.775	0.1864	7632530.	23200.	-0.001913	1214.1578	9.394E+11	0.000	0.000	0.000
18.170	0.1774	7750801.	23200.	-0.001874	1225.0511	9.394E+11	0.000	0.000	0.000
18.565	0.1686	7868901.	23200.	-0.001835	1235.9285	9.394E+11	0.000	0.000	0.000
18.960	0.1600	7986827.	23200.	-0.001795	1246.7899	9.394E+11	0.000	0.000	0.000
19.355	0.1516	8104576.	23200.	-0.001754	1257.6350	9.394E+11	0.000	0.000	0.000
19.750	0.1434	8222146.	23200.	-0.001713	1268.4636	9.394E+11	0.000	0.000	0.000
20.145	0.1354	8339534.	23200.	-0.001671	1279.2754	9.394E+11	0.000	0.000	0.000
20.540	0.1275	8456737.	23200.	-0.001629	1290.0703	9.394E+11	0.000	0.000	0.000
20.935	0.1199	8573753.	23200.	-0.001586	1300.8479	9.394E+11	0.000	0.000	0.000
21.330	0.1125	8690580.	23200.	-0.001542	1311.6080	9.394E+11	0.000	0.000	0.000
21.725	0.1053	8807214.	23200.	-0.001498	1322.3505	9.394E+11	0.000	0.000	0.000
22.120	0.0983	8923654.	23200.	-0.001453	1333.0750	9.394E+11	0.000	0.000	0.000
22.515	0.0915	9039896.	23200.	-0.001408	1343.7813	9.394E+11	0.000	0.000	0.000
22.910	0.0850	9155938.	23200.	-0.001362	1354.4692	9.394E+11	0.000	0.000	0.000
23.305	0.0786	9271778.	23200.	-0.001316	1365.1384	9.394E+11	0.000	0.000	0.000
23.700	0.0725	9387412.	23200.	-0.001269	1375.7888	9.394E+11	0.000	0.000	0.000

IB4_B-9_Long_Scored.l p7o									
24.095	0.0666	9502839.	23200.	-0.001221	1386.4200	9.394E+11	0.000	0.000	0.000
24.490	0.0609	9618055.	23200.	-0.001173	1397.0318	9.394E+11	0.000	0.000	0.000
24.885	0.0555	9733059.	23200.	-0.001124	1407.6241	9.394E+11	0.000	0.000	0.000
25.280	0.0503	9847847.	23200.	-0.001075	1418.1965	9.394E+11	0.000	0.000	0.000
25.675	0.0453	9962418.	23200.	-0.001025	1428.7488	9.394E+11	0.000	0.000	0.000
26.070	0.0405	10076768.	23200.	-0.000974	1439.2809	9.394E+11	0.000	0.000	0.000
26.465	0.0360	10190895.	23200.	-0.000923	1449.7924	9.394E+11	0.000	0.000	0.000
26.860	0.0318	10304797.	23200.	-0.000871	1460.2831	9.394E+11	0.000	0.000	0.000
27.255	0.0278	10418471.	23200.	-0.000819	1470.7529	9.394E+11	0.000	0.000	0.000
27.650	0.0240	10531914.	23200.	-0.000766	1481.2014	9.394E+11	0.000	0.000	0.000
28.045	0.0205	10645124.	23200.	-0.000713	1491.6285	9.394E+11	0.000	0.000	0.000
28.440	0.0173	10758099.	23200.	-0.000659	1502.0339	9.394E+11	0.000	0.000	0.000
28.835	0.0143	10870835.	23200.	-0.000604	1512.4173	9.394E+11	0.000	0.000	0.000
29.230	0.0116	10983332.	23200.	-0.000549	1522.7786	9.394E+11	0.000	0.000	0.000
29.625	0.009081	11095585.	23200.	-0.000493	1533.1175	9.394E+11	0.000	0.000	0.000
30.020	0.006876	11207592.	23200.	-0.000437	1543.4338	9.394E+11	0.000	0.000	0.000
30.415	0.004939	11319352.	23200.	-0.000380	1553.7273	9.394E+11	0.000	0.000	0.000
30.810	0.003272	11430862.	-84992.	-0.000323	1563.9977	9.394E+11	-45651.	66123000.	0.000
31.205	0.001880	10516460.	-255323.	-0.000267	1479.7781	9.394E+11	-26219.	66123000.	0.000
31.600	0.000738	9012741.	-341867.	-0.000202	1906.7647	5.506E+11	-10297.	66123000.	0.000
31.995	-3.552E-05	7277336.	-365096.	-0.000132	1668.1742	5.506E+11	495.5564	66123000.	0.000
32.390	-0.000512	5552790.	-346986.	-7.667E-05	1431.0767	5.506E+11	7145.7975	66123000.	0.000
32.785	-0.000762	3988583.	-304844.	-3.561E-05	1216.0232	5.506E+11	10635.	66123000.	0.000
33.180	-0.000850	2663179.	-251542.	-6.979E-06	1033.8013	5.506E+11	11855.	66123000.	0.000
33.575	-0.000829	1604023.	-196053.	1.139E-05	888.1843	5.506E+11	11558.	66123000.	0.000
33.970	-0.000742	804494.	-144133.	2.175E-05	778.2618	5.506E+11	10349.	66123000.	0.000
34.365	-0.000622	237448.	-99032.	2.624E-05	700.3021	5.506E+11	8681.4389	66123000.	0.000
34.760	-0.000493	-134555.	-62154.	2.668E-05	686.1560	5.506E+11	6878.8895	66123000.	0.000
35.155	-0.000369	-352002.	-33638.	2.459E-05	716.0514	5.506E+11	5152.9280	66123000.	0.000
35.550	-0.000260	-453661.	-12829.	2.112E-05	730.0279	5.506E+11	3627.3230	66123000.	0.000
35.945	-0.000169	-473806.	1360.8353	1.713E-05	732.7975	5.506E+11	2359.9379	66123000.	0.000
36.340	-9.765E-05	-440910.	10182.	1.319E-05	728.2749	5.506E+11	1362.2390	66123000.	0.000
36.735	-4.412E-05	-377392.	14870.	9.669E-06	719.5422	5.506E+11	615.5027	66123000.	0.000
37.130	-5.991E-06	-300031.	16526.	6.753E-06	708.9062	5.506E+11	83.5748	66123000.	0.000
37.525	1.990E-05	-220781.	16067.	4.512E-06	698.0106	5.506E+11	-277.5780	66123000.	0.000
37.920	3.678E-05	-147758.	14193.	2.925E-06	687.9712	5.506E+11	-513.0643	66123000.	0.000
38.315	4.763E-05	-86258.	11402.	1.918E-06	679.5159	5.506E+11	-664.4477	66123000.	0.000
38.710	5.496E-05	-39683.	8010.2426	1.376E-06	673.1126	5.506E+11	-766.7338	66123000.	0.000
39.105	6.068E-05	-10333.	4187.0381	1.161E-06	669.0774	5.506E+11	-846.4327	66123000.	0.000
39.500	6.597E-05	0.000	0.000	1.116E-06	667.6568	5.506E+11	-920.2501	33061500.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 2:

Pile-head deflection = 0.7528482 inches  
 Computed slope at pile head = -0.0033148 radians  
 Maximum bending moment = 11430862. inch-lbs  
 Maximum shear force = -365096. lbs  
 Depth of maximum bending moment = 30.8100000 feet below pile head  
 Depth of maximum shear force = 31.9950000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 2

-----  
 Pile-head Deflection vs. Pile Length for Load Case 2  
 -----

Boundary Condition Type 1, Shear and Moment

Shear = 23200. lb  
 Moment = 2160000. in-lb  
 Axial Load = 925000. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment in-lbs	Maximum Shear lbs
39.5000	0.7528482	11430862.	-365096.
37.5250	0.7518804	11418924.	-364751.
35.5500	0.7329239	11346506.	-356084.
33.5750	0.7509313	11356986.	-444239.
33.5750	0.000000	25926448422.	-3217479237.
33.5750	0.000000	25926448422.	-3217479237.
33.5750	0.000000	25926448422.	-3217479237.
33.5750	0.000000	25926448422.	-3217479237.
33.5750	0.000000	25926448422.	-3217479237.
33.5750	0.000000	25926448422.	-3217479237.
33.5750	0.000000	25926448422.	-3217479237.
33.5750	0.000000	25926448422.	-3217479237.
33.5750	0.000000	25926448422.	-3217479237.
33.5750	0.000000	25926448422.	-3217479237.
33.5750	0.000000	25926448422.	-3217479237.
33.5750	0.000000	25926448422.	-3217479237.
33.5750	0.000000	25926448422.	-3217479237.
33.5750	0.000000	25926448422.	-3217479237.
33.5750	0.000000	25926448422.	-3217479237.
33.5750	0.000000	25926448422.	-3217479237.
33.5750	0.000000	25926448422.	-3217479237.
33.5750	0.000000	25926448422.	-3217479237.

-----  
 Computed Values of Pile Loading and Deflection  
 for Lateral Loading for Load Case Number 3  
 -----

Pile-head conditions are Shear and Pile-head Rotation (Loading Type 2)

Shear force at pile head = 12500.0 lbs  
 Rotation of pile head = 0.000E+00 radians  
 Axial load at pile head = 64000.0 lbs

(Zero slope for this load indicates fixed-head conditions)

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.0870	-2184728.	12500.	0.000	346.5598	5.506E+11	0.000	0.000	0.000
0.395	0.0869	-2125475.	12500.	-1.855E-05	338.4135	5.506E+11	0.000	0.000	0.000
0.790	0.0868	-2066217.	12500.	-3.659E-05	330.2664	5.506E+11	0.000	0.000	0.000
1.185	0.0866	-2006953.	12500.	-5.412E-05	322.1186	5.506E+11	0.000	0.000	0.000
1.580	0.0863	-1947684.	12500.	-7.114E-05	313.9701	5.506E+11	0.000	0.000	0.000
1.975	0.0859	-1888410.	12500.	-8.766E-05	305.8208	5.506E+11	0.000	0.000	0.000
2.370	0.0854	-1829131.	12500.	-0.000104	297.6709	5.506E+11	0.000	0.000	0.000
2.765	0.0849	-1769847.	12500.	-0.000119	289.5203	5.506E+11	0.000	0.000	0.000
3.160	0.0843	-1710559.	12500.	-0.000134	281.3691	5.506E+11	0.000	0.000	0.000

IB4\_B-9\_Long\_Scored.l p7o

3.555	0.0836	-1651266.	12500.	-0.000149	273.2173	5.506E+11	0.000	0.000	0.000
3.950	0.0829	-1591968.	12500.	-0.000163	265.0648	5.506E+11	0.000	0.000	0.000
4.345	0.0821	-1532667.	12500.	-0.000176	256.9119	5.506E+11	0.000	0.000	0.000
4.740	0.0812	-1473362.	12500.	-0.000189	248.7583	5.506E+11	0.000	0.000	0.000
5.135	0.0803	-1414052.	12500.	-0.000201	240.6042	5.506E+11	0.000	0.000	0.000
5.530	0.0793	-1354739.	12500.	-0.000213	232.4497	5.506E+11	0.000	0.000	0.000
5.925	0.0783	-1295423.	12500.	-0.000225	224.2946	5.506E+11	0.000	0.000	0.000
6.320	0.0772	-1236103.	12500.	-0.000236	216.1391	5.506E+11	0.000	0.000	0.000
6.715	0.0761	-1176780.	12500.	-0.000246	207.9831	5.506E+11	0.000	0.000	0.000
7.110	0.0749	-1117454.	12500.	-0.000256	199.8267	5.506E+11	0.000	0.000	0.000
7.505	0.0736	-1058125.	12500.	-0.000265	191.6699	5.506E+11	0.000	0.000	0.000
7.900	0.0724	-998793.	12500.	-0.000274	183.5127	5.506E+11	0.000	0.000	0.000
8.295	0.0710	-939458.	12500.	-0.000282	175.3552	5.506E+11	0.000	0.000	0.000
8.690	0.0697	-880122.	12500.	-0.000290	167.1973	5.506E+11	0.000	0.000	0.000
9.085	0.0683	-820782.	12500.	-0.000296	110.9647	9.394E+11	0.000	0.000	0.000
9.480	0.0669	-761442.	12500.	-0.000300	105.4993	9.394E+11	0.000	0.000	0.000
9.875	0.0654	-702100.	12500.	-0.000304	100.0337	9.394E+11	0.000	0.000	0.000
10.270	0.0640	-642758.	12500.	-0.000307	94.5680	9.394E+11	0.000	0.000	0.000
10.665	0.0625	-583414.	12500.	-0.000310	89.1023	9.394E+11	0.000	0.000	0.000
11.060	0.0610	-524069.	12500.	-0.000313	83.6364	9.394E+11	0.000	0.000	0.000
11.455	0.0596	-464724.	12500.	-0.000316	78.1705	9.394E+11	0.000	0.000	0.000
11.850	0.0581	-405378.	12500.	-0.000318	72.7045	9.394E+11	0.000	0.000	0.000
12.245	0.0565	-346031.	12500.	-0.000320	67.2385	9.394E+11	0.000	0.000	0.000
12.640	0.0550	-286684.	12500.	-0.000321	61.7724	9.394E+11	0.000	0.000	0.000
13.035	0.0535	-227336.	12500.	-0.000323	56.3062	9.394E+11	0.000	0.000	0.000
13.430	0.0520	-167988.	12500.	-0.000324	50.8401	9.394E+11	0.000	0.000	0.000
13.825	0.0504	-108640.	12500.	-0.000324	45.3739	9.394E+11	0.000	0.000	0.000
14.220	0.0489	-49292.	12500.	-0.000325	39.9077	9.394E+11	0.000	0.000	0.000
14.615	0.0474	10057.	12500.	-0.000325	36.2940	9.394E+11	0.000	0.000	0.000
15.010	0.0458	69405.	12500.	-0.000325	41.7603	9.394E+11	0.000	0.000	0.000
15.405	0.0443	128754.	12500.	-0.000324	47.2265	9.394E+11	0.000	0.000	0.000
15.800	0.0427	188102.	12500.	-0.000323	52.6926	9.394E+11	0.000	0.000	0.000
16.195	0.0412	247450.	12500.	-0.000322	58.1588	9.394E+11	0.000	0.000	0.000
16.590	0.0397	306797.	12500.	-0.000321	63.6249	9.394E+11	0.000	0.000	0.000
16.985	0.0382	366145.	12500.	-0.000319	69.0910	9.394E+11	0.000	0.000	0.000
17.380	0.0367	425491.	12500.	-0.000317	74.5570	9.394E+11	0.000	0.000	0.000
17.775	0.0352	484837.	12500.	-0.000315	80.0230	9.394E+11	0.000	0.000	0.000
18.170	0.0337	544182.	12500.	-0.000312	85.4889	9.394E+11	0.000	0.000	0.000
18.565	0.0322	603526.	12500.	-0.000309	90.9547	9.394E+11	0.000	0.000	0.000
18.960	0.0308	662870.	12500.	-0.000306	96.4204	9.394E+11	0.000	0.000	0.000
19.355	0.0293	722212.	12500.	-0.000303	101.8861	9.394E+11	0.000	0.000	0.000
19.750	0.0279	781553.	12500.	-0.000299	107.3516	9.394E+11	0.000	0.000	0.000
20.145	0.0265	840893.	12500.	-0.000295	112.8170	9.394E+11	0.000	0.000	0.000
20.540	0.0251	900232.	12500.	-0.000290	118.2823	9.394E+11	0.000	0.000	0.000
20.935	0.0237	959569.	12500.	-0.000286	123.7475	9.394E+11	0.000	0.000	0.000
21.330	0.0224	1018905.	12500.	-0.000281	129.2126	9.394E+11	0.000	0.000	0.000
21.725	0.0211	1078240.	12500.	-0.000275	134.6775	9.394E+11	0.000	0.000	0.000
22.120	0.0198	1137572.	12500.	-0.000270	140.1422	9.394E+11	0.000	0.000	0.000
22.515	0.0185	1196903.	12500.	-0.000264	145.6068	9.394E+11	0.000	0.000	0.000
22.910	0.0173	1256232.	12500.	-0.000258	151.0712	9.394E+11	0.000	0.000	0.000
23.305	0.0161	1315560.	12500.	-0.000251	156.5355	9.394E+11	0.000	0.000	0.000
23.700	0.0149	1374885.	12500.	-0.000244	161.9995	9.394E+11	0.000	0.000	0.000
24.095	0.0137	1434208.	12500.	-0.000237	167.4634	9.394E+11	0.000	0.000	0.000
24.490	0.0126	1493529.	12500.	-0.000230	172.9271	9.394E+11	0.000	0.000	0.000
24.885	0.0116	1552847.	12500.	-0.000222	178.3905	9.394E+11	0.000	0.000	0.000
25.280	0.0105	1612164.	12500.	-0.000214	183.8538	9.394E+11	0.000	0.000	0.000
25.675	0.009537	1671477.	12500.	-0.000206	189.3168	9.394E+11	0.000	0.000	0.000
26.070	0.008581	1730788.	12500.	-0.000197	194.7795	9.394E+11	0.000	0.000	0.000
26.465	0.007666	1790097.	12500.	-0.000188	200.2421	9.394E+11	0.000	0.000	0.000
26.860	0.006795	1849403.	12500.	-0.000179	205.7043	9.394E+11	0.000	0.000	0.000

IB4_B-9_Long_Scoured.l p7o									
27.255	0.005967	1908706.	12500.	-0.000170	211.1664	9.394E+11	0.000	0.000	0.000
27.650	0.005185	1968006.	12500.	-0.000160	216.6281	9.394E+11	0.000	0.000	0.000
28.045	0.004450	2027303.	12500.	-0.000150	222.0896	9.394E+11	0.000	0.000	0.000
28.440	0.003763	2086597.	12500.	-0.000140	227.5507	9.394E+11	0.000	0.000	0.000
28.835	0.003127	2145888.	12500.	-0.000129	233.0116	9.394E+11	0.000	0.000	0.000
29.230	0.002542	2205175.	12500.	-0.000118	238.4722	9.394E+11	0.000	0.000	0.000
29.625	0.002009	2264459.	12500.	-0.000107	243.9325	9.394E+11	0.000	0.000	0.000
30.020	0.001531	2323740.	12500.	-9.505E-05	249.3925	9.394E+11	0.000	0.000	0.000
30.415	0.001108	2383017.	12500.	-8.318E-05	254.8521	9.394E+11	0.000	0.000	0.000
30.810	0.000742	2442290.	-12035.	-7.101E-05	260.3114	9.394E+11	-10352.	66123000.	0.000
31.205	0.000435	2268966.	-50944.	-5.912E-05	244.3476	9.394E+11	-6064.7346	66123000.	0.000
31.600	0.000182	1959378.	-71323.	-4.496E-05	315.5779	5.506E+11	-2534.1002	66123000.	0.000
31.995	8.511E-06	1592851.	-77610.	-2.967E-05	265.1861	5.506E+11	-118.7277	66123000.	0.000
32.390	-9.964E-05	1223651.	-74597.	-1.755E-05	214.4271	5.506E+11	1390.0074	66123000.	0.000
32.785	-0.000158	885678.	-66084.	-8.472E-06	167.9613	5.506E+11	2202.2505	66123000.	0.000
33.180	-0.000180	597183.	-54915.	-2.090E-06	128.2977	5.506E+11	2510.3728	66123000.	0.000
33.575	-0.000178	365088.	-43091.	2.052E-06	96.3883	5.506E+11	2478.5837	66123000.	0.000
33.970	-0.000161	188679.	-31910.	4.436E-06	72.1350	5.506E+11	2238.9899	66123000.	0.000
34.365	-0.000136	62575.	-22120.	5.517E-06	54.7977	5.506E+11	1892.0013	66123000.	0.000
34.760	-0.000108	-21020.	-14059.	5.696E-06	49.0846	5.506E+11	1509.3955	66123000.	0.000
35.155	-8.163E-05	-70703.	-7782.4273	5.301E-06	55.9152	5.506E+11	1138.7542	66123000.	0.000
35.550	-5.795E-05	-94801.	-3167.7743	4.589E-06	59.2282	5.506E+11	808.3567	66123000.	0.000
35.945	-3.813E-05	-100737.	8.6793	3.747E-06	60.0443	5.506E+11	531.9191	66123000.	0.000
36.340	-2.242E-05	-94721.	2010.7106	2.906E-06	59.2172	5.506E+11	312.8199	66123000.	0.000
36.735	-1.058E-05	-81677.	3101.9887	2.147E-06	57.4239	5.506E+11	147.6350	66123000.	0.000
37.130	-2.075E-06	-65315.	3520.4712	1.514E-06	55.1745	5.506E+11	28.9399	66123000.	0.000
37.525	3.769E-06	-48304.	3464.4482	1.025E-06	52.8356	5.506E+11	-52.5783	66123000.	0.000
37.920	7.642E-06	-32473.	3087.1901	6.773E-07	50.6592	5.506E+11	-106.6024	66123000.	0.000
38.315	1.019E-05	-19037.	2497.6632	4.556E-07	48.8120	5.506E+11	-142.1431	66123000.	0.000
38.710	1.196E-05	-8795.4623	1765.3544	3.358E-07	47.4039	5.506E+11	-166.8479	66123000.	0.000
39.105	1.337E-05	-2302.1092	927.8098	2.880E-07	46.5111	5.506E+11	-186.5464	66123000.	0.000
39.500	1.469E-05	0.000	0.000	2.781E-07	46.1946	5.506E+11	-204.9345	33061500.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 3:

Pile-head deflection = 0.0869647 inches  
 Computed slope at pile head = 0.000000 radians  
 Maximum bending moment = 2442290. inch-lbs  
 Maximum shear force = -77610. lbs  
 Depth of maximum bending moment = 30.8100000 feet below pile head  
 Depth of maximum shear force = 31.9950000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 2

-----  
 Pile-head Deflection vs. Pile Length for Load Case 3  
 -----

Boundary Condition Type 2, Shear and Slope

Shear = 12500. lb  
 Slope = 0.00000  
 Axial Load = 64000. lb





IB4\_B-9\_Long\_Scored.l p7o

6. 715	0. 1438	-2230051.	23200.	-0. 000465	974. 2532	5. 506E+11	0. 000	0. 000	0. 000
7. 110	0. 1415	-2118003.	23200.	-0. 000484	958. 8483	5. 506E+11	0. 000	0. 000	0. 000
7. 505	0. 1392	-2005874.	23200.	-0. 000501	943. 4324	5. 506E+11	0. 000	0. 000	0. 000
7. 900	0. 1368	-1893670.	23200.	-0. 000518	928. 0061	5. 506E+11	0. 000	0. 000	0. 000
8. 295	0. 1343	-1781394.	23200.	-0. 000534	912. 5700	5. 506E+11	0. 000	0. 000	0. 000
8. 690	0. 1317	-1669051.	23200.	-0. 000549	897. 1246	5. 506E+11	0. 000	0. 000	0. 000
9. 085	0. 1291	-1556645.	23200.	-0. 000560	884. 5473	5. 394E+11	0. 000	0. 000	0. 000
9. 480	0. 1264	-1444205.	23200.	-0. 000568	871. 1911	9. 394E+11	0. 000	0. 000	0. 000
9. 875	0. 1237	-1331732.	23200.	-0. 000575	858. 8320	9. 394E+11	0. 000	0. 000	0. 000
10. 270	0. 1210	-1219231.	23200.	-0. 000581	846. 4702	9. 394E+11	0. 000	0. 000	0. 000
10. 665	0. 1182	-1106702.	23200.	-0. 000587	834. 1059	9. 394E+11	0. 000	0. 000	0. 000
11. 060	0. 1154	-994149.	23200.	-0. 000592	822. 7393	9. 394E+11	0. 000	0. 000	0. 000
11. 455	0. 1126	-881573.	23200.	-0. 000597	811. 3708	9. 394E+11	0. 000	0. 000	0. 000
11. 850	0. 1098	-768978.	23200.	-0. 000601	800. 0004	9. 394E+11	0. 000	0. 000	0. 000
12. 245	0. 1069	-656367.	23200.	-0. 000605	789. 6284	9. 394E+11	0. 000	0. 000	0. 000
12. 640	0. 1040	-543740.	23200.	-0. 000608	779. 2552	9. 394E+11	0. 000	0. 000	0. 000
13. 035	0. 1011	-431102.	23200.	-0. 000610	769. 8808	9. 394E+11	0. 000	0. 000	0. 000
13. 430	0. 0982	-318454.	23200.	-0. 000612	761. 5055	9. 394E+11	0. 000	0. 000	0. 000
13. 825	0. 0953	-205799.	23200.	-0. 000613	753. 1296	9. 394E+11	0. 000	0. 000	0. 000
14. 220	0. 0924	-93140.	23200.	-0. 000614	745. 7532	9. 394E+11	0. 000	0. 000	0. 000
14. 615	0. 0895	19522.	23200.	-0. 000614	739. 9727	9. 394E+11	0. 000	0. 000	0. 000
15. 010	0. 0866	132183.	23200.	-0. 000614	734. 3492	9. 394E+11	0. 000	0. 000	0. 000
15. 405	0. 0837	244841.	23200.	-0. 000613	729. 7255	9. 394E+11	0. 000	0. 000	0. 000
15. 800	0. 0808	357494.	23200.	-0. 000611	725. 1012	9. 394E+11	0. 000	0. 000	0. 000
16. 195	0. 0779	470139.	23200.	-0. 000609	721. 4762	9. 394E+11	0. 000	0. 000	0. 000
16. 590	0. 0750	582773.	23200.	-0. 000607	718. 8502	9. 394E+11	0. 000	0. 000	0. 000
16. 985	0. 0721	695395.	23200.	-0. 000603	716. 2230	9. 394E+11	0. 000	0. 000	0. 000
17. 380	0. 0693	808001.	23200.	-0. 000600	714. 5945	9. 394E+11	0. 000	0. 000	0. 000
17. 775	0. 0665	920589.	23200.	-0. 000595	713. 9643	9. 394E+11	0. 000	0. 000	0. 000
18. 170	0. 0636	1033157.	23200.	-0. 000590	713. 3322	9. 394E+11	0. 000	0. 000	0. 000
18. 565	0. 0609	1145702.	23200.	-0. 000585	713. 6980	9. 394E+11	0. 000	0. 000	0. 000
18. 960	0. 0581	1258222.	23200.	-0. 000579	713. 0614	9. 394E+11	0. 000	0. 000	0. 000
19. 355	0. 0554	1370714.	23200.	-0. 000572	712. 4223	9. 394E+11	0. 000	0. 000	0. 000
19. 750	0. 0527	1483175.	23200.	-0. 000565	711. 7804	9. 394E+11	0. 000	0. 000	0. 000
20. 145	0. 0500	1595604.	23200.	-0. 000557	711. 1355	9. 394E+11	0. 000	0. 000	0. 000
20. 540	0. 0474	1707997.	23200.	-0. 000549	710. 4874	9. 394E+11	0. 000	0. 000	0. 000
20. 935	0. 0448	1820353.	23200.	-0. 000540	709. 8357	9. 394E+11	0. 000	0. 000	0. 000
21. 330	0. 0423	1932668.	23200.	-0. 000531	709. 1804	9. 394E+11	0. 000	0. 000	0. 000
21. 725	0. 0398	2044941.	23200.	-0. 000520	708. 5211	9. 394E+11	0. 000	0. 000	0. 000
22. 120	0. 0373	2157168.	23200.	-0. 000510	707. 8576	9. 394E+11	0. 000	0. 000	0. 000
22. 515	0. 0350	2269348.	23200.	-0. 000499	707. 1898	9. 394E+11	0. 000	0. 000	0. 000
22. 910	0. 0326	2381478.	23200.	-0. 000487	706. 5173	9. 394E+11	0. 000	0. 000	0. 000
23. 305	0. 0303	2493554.	23200.	-0. 000475	705. 8399	9. 394E+11	0. 000	0. 000	0. 000
23. 700	0. 0281	2605576.	23200.	-0. 000462	705. 1575	9. 394E+11	0. 000	0. 000	0. 000
24. 095	0. 0260	2717540.	23200.	-0. 000448	704. 4698	9. 394E+11	0. 000	0. 000	0. 000
24. 490	0. 0239	2829444.	23200.	-0. 000434	703. 7765	9. 394E+11	0. 000	0. 000	0. 000
24. 885	0. 0218	2941285.	23200.	-0. 000420	703. 0775	9. 394E+11	0. 000	0. 000	0. 000
25. 280	0. 0199	3053061.	23200.	-0. 000405	702. 3725	9. 394E+11	0. 000	0. 000	0. 000
25. 675	0. 0180	3164770.	23200.	-0. 000389	701. 6613	9. 394E+11	0. 000	0. 000	0. 000
26. 070	0. 0162	3276408.	23200.	-0. 000373	700. 9436	9. 394E+11	0. 000	0. 000	0. 000
26. 465	0. 0145	3387974.	23200.	-0. 000356	700. 2192	9. 394E+11	0. 000	0. 000	0. 000
26. 860	0. 0128	3499466.	23200.	-0. 000339	699. 4879	9. 394E+11	0. 000	0. 000	0. 000
27. 255	0. 0113	3610879.	23200.	-0. 000321	698. 7495	9. 394E+11	0. 000	0. 000	0. 000
27. 650	0. 009783	3722213.	23200.	-0. 000302	698. 0038	9. 394E+11	0. 000	0. 000	0. 000
28. 045	0. 008396	3833465.	23200.	-0. 000283	697. 2504	9. 394E+11	0. 000	0. 000	0. 000
28. 440	0. 007100	3944631.	23200.	-0. 000263	696. 4893	9. 394E+11	0. 000	0. 000	0. 000
28. 835	0. 005898	4055711.	23200.	-0. 000243	695. 7201	9. 394E+11	0. 000	0. 000	0. 000
29. 230	0. 004794	4166700.	23200.	-0. 000223	694. 9427	9. 394E+11	0. 000	0. 000	0. 000
29. 625	0. 003789	4277598.	23200.	-0. 000201	694. 1567	9. 394E+11	0. 000	0. 000	0. 000
30. 020	0. 002886	4388401.	23200.	-0. 000179	693. 3620	9. 394E+11	0. 000	0. 000	0. 000

IB4_B-9_Long_Scoured.l p7o									
30.415	0.002089	4499107.	23200.	-0.000157	925.5584	9.394E+11	0.000	0.000	0.000
30.810	0.001399	4609713.	-23046.	-0.000134	935.7457	9.394E+11	-19513.	66123000.	0.000
31.205	0.000819	4281801.	-96372.	-0.000112	905.5438	9.394E+11	-11426.	66123000.	0.000
31.600	0.000342	3697083.	-134749.	-8.479E-05	1175.9466	5.506E+11	-4766.9781	66123000.	0.000
31.995	1.523E-05	3005123.	-146550.	-5.594E-05	1080.8132	5.506E+11	-212.4863	66123000.	0.000
32.390	-0.000189	2308276.	-140817.	-3.308E-05	985.0078	5.506E+11	2631.5144	66123000.	0.000
32.785	-0.000298	1670465.	-124717.	-1.595E-05	897.3190	5.506E+11	4161.6639	66123000.	0.000
33.180	-0.000340	1126094.	-103618.	-3.915E-06	822.4767	5.506E+11	4740.9986	66123000.	0.000
33.575	-0.000335	688199.	-81292.	3.894E-06	762.2732	5.506E+11	4679.3701	66123000.	0.000
33.970	-0.000303	355413.	-60186.	8.386E-06	716.5203	5.506E+11	4226.0243	66123000.	0.000
34.365	-0.000256	117561.	-41709.	1.042E-05	683.8196	5.506E+11	3570.3808	66123000.	0.000
34.760	-0.000204	-40077.	-26497.	1.075E-05	673.1667	5.506E+11	2847.8223	66123000.	0.000
35.155	-0.000154	-133729.	-14657.	1.001E-05	686.0424	5.506E+11	2148.0751	66123000.	0.000
35.550	-0.000109	-179115.	-5953.3313	8.660E-06	692.2822	5.506E+11	1524.4454	66123000.	0.000
35.945	-7.188E-05	-190243.	36.1604	7.071E-06	693.8121	5.506E+11	1002.7663	66123000.	0.000
36.340	-4.225E-05	-178834.	3809.5276	5.482E-06	692.2436	5.506E+11	589.3718	66123000.	0.000
36.735	-1.991E-05	-154176.	5864.6488	4.049E-06	688.8536	5.506E+11	277.7680	66123000.	0.000
37.130	-3.865E-06	-123272.	6650.7496	2.855E-06	684.6048	5.506E+11	53.9201	66123000.	0.000
37.525	7.151E-06	-91152.	6542.1044	1.932E-06	680.1888	5.506E+11	-99.7620	66123000.	0.000
37.920	1.445E-05	-61270.	5827.9688	1.276E-06	676.0805	5.506E+11	-201.5610	66123000.	0.000
38.315	1.925E-05	-35914.	4713.9587	8.575E-07	672.5945	5.506E+11	-268.4854	66123000.	0.000
38.710	2.258E-05	-16589.	3331.1747	6.316E-07	669.9376	5.506E+11	-314.9677	66123000.	0.000
39.105	2.523E-05	-4340.4310	1750.4438	5.415E-07	668.2535	5.506E+11	-352.0074	66123000.	0.000
39.500	2.771E-05	0.000	0.000	5.228E-07	667.6568	5.506E+11	-386.5765	33061500.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 4:

Pile-head deflection = 0.1643959 inches  
 Computed slope at pile head = 0.000000 radians  
 Maximum bending moment = 4609713. inch-lbs  
 Maximum shear force = -146550. lbs  
 Depth of maximum bending moment = 30.810000 feet below pile head  
 Depth of maximum shear force = 31.9950000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 2

-----  
 Pile-head Deflection vs. Pile Length for Load Case 4  
 -----

Boundary Condition Type 2, Shear and Slope

Shear = 23200. lb  
 Slope = 0.00000  
 Axial Load = 925000. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
39.5000	0.1643959	4609713.	-146550.
37.5250	0.1641476	4597789.	-145883.
35.5500	0.1598449	4589303.	-143373.
33.5750	0.1638246	4541967.	-179631.

33.5750	0.000000	5555155271.	690154892.
33.5750	0.000000	5555155271.	690154892.
33.5750	0.000000	5555155271.	690154892.
33.5750	0.000000	5555155271.	690154892.
33.5750	0.000000	5555155271.	690154892.
33.5750	0.000000	5555155271.	690154892.
33.5750	0.000000	5555155271.	690154892.
33.5750	0.000000	5555155271.	690154892.
33.5750	0.000000	5555155271.	690154892.
33.5750	0.000000	5555155271.	690154892.
33.5750	0.000000	5555155271.	690154892.
33.5750	0.000000	5555155271.	690154892.
33.5750	0.000000	5555155271.	690154892.
33.5750	0.000000	5555155271.	690154892.
33.5750	0.000000	5555155271.	690154892.
33.5750	0.000000	5555155271.	690154892.
33.5750	0.000000	5555155271.	690154892.
33.5750	0.000000	5555155271.	690154892.
33.5750	0.000000	5555155271.	690154892.
33.5750	0.000000	5555155271.	690154892.
33.5750	0.000000	5555155271.	690154892.
33.5750	0.000000	5555155271.	690154892.

-----  
 Summary of Pile Response(s)  
 -----

Defi ni ti ons of Pile-head Loading Condi ti ons:

- Load Type 1: Load 1 = Shear, lbs, and Load 2 = Moment, in-lbs
- Load Type 2: Load 1 = Shear, lbs, and Load 2 = Slope, radians
- Load Type 3: Load 1 = Shear, lbs, and Load 2 = Rotational Sti ffness, in-lbs/radian
- Load Type 4: Load 1 = Top Deflection, inches, and Load 2 = Moment, in-lbs
- Load Type 5: Load 1 = Top Deflection, inches, and Load 2 = Slope, radi ans

Load Case No.	Load Type No.	Pile-head Condition 1 V(lbs) or y(inches)	Pile-head Condition 2 in-lb, rad., or in-lb/rad.	Axial Loading lbs	Pile-head Deflection inches	Maximum Moment in Pile in-lbs	Maximum Shear in Pile lbs	Pile-head Rotation radians
1	1	V = 12500.	M = 720000.	640000.	0.35657347	5568682.	-177785.	-0.00152056
2	1	V = 23200.	M = 2160000.	925000.	0.75284820	11430862.	-365096.	-0.00331477
3	2	V = 12500.	S = 0.000	64000.	0.08696471	2442290.	-77610.	0.00000000
4	2	V = 23200.	S = 0.000	925000.	0.16439592	4609713.	-146550.	0.00000000

-----  
 Summary of Warning Messages  
 -----

The following warning was reported 4000 times

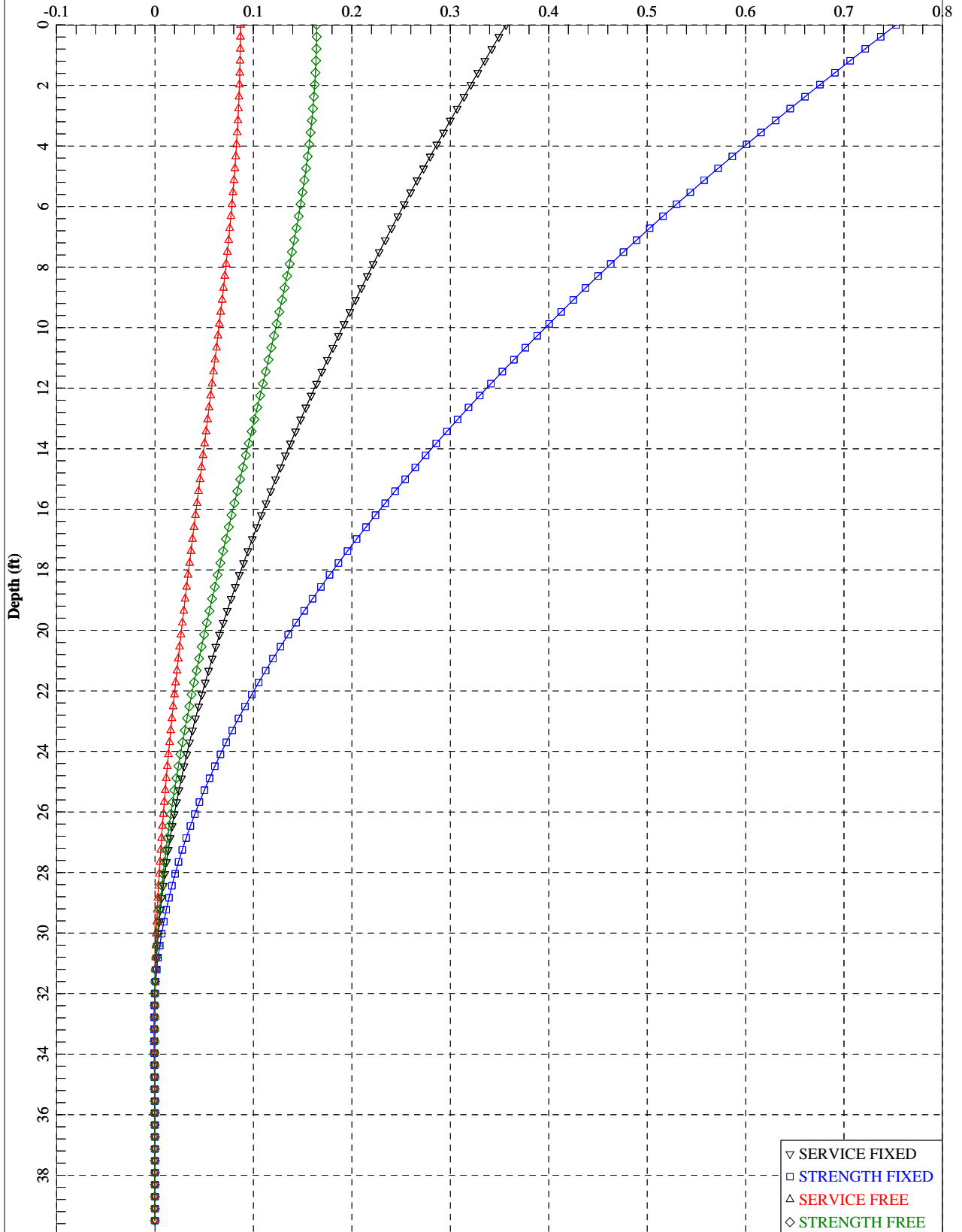
\*\*\*\* Warning \*\*\*\*

An unreasonable input value for uniaxial compressive strength has been specified for a soil defined using the vuggy limestone criteria. The input value is outside of the range of 1,000 to 2,500 psi (6,895 to 17,237 kPa). You should check your input data for correctness.

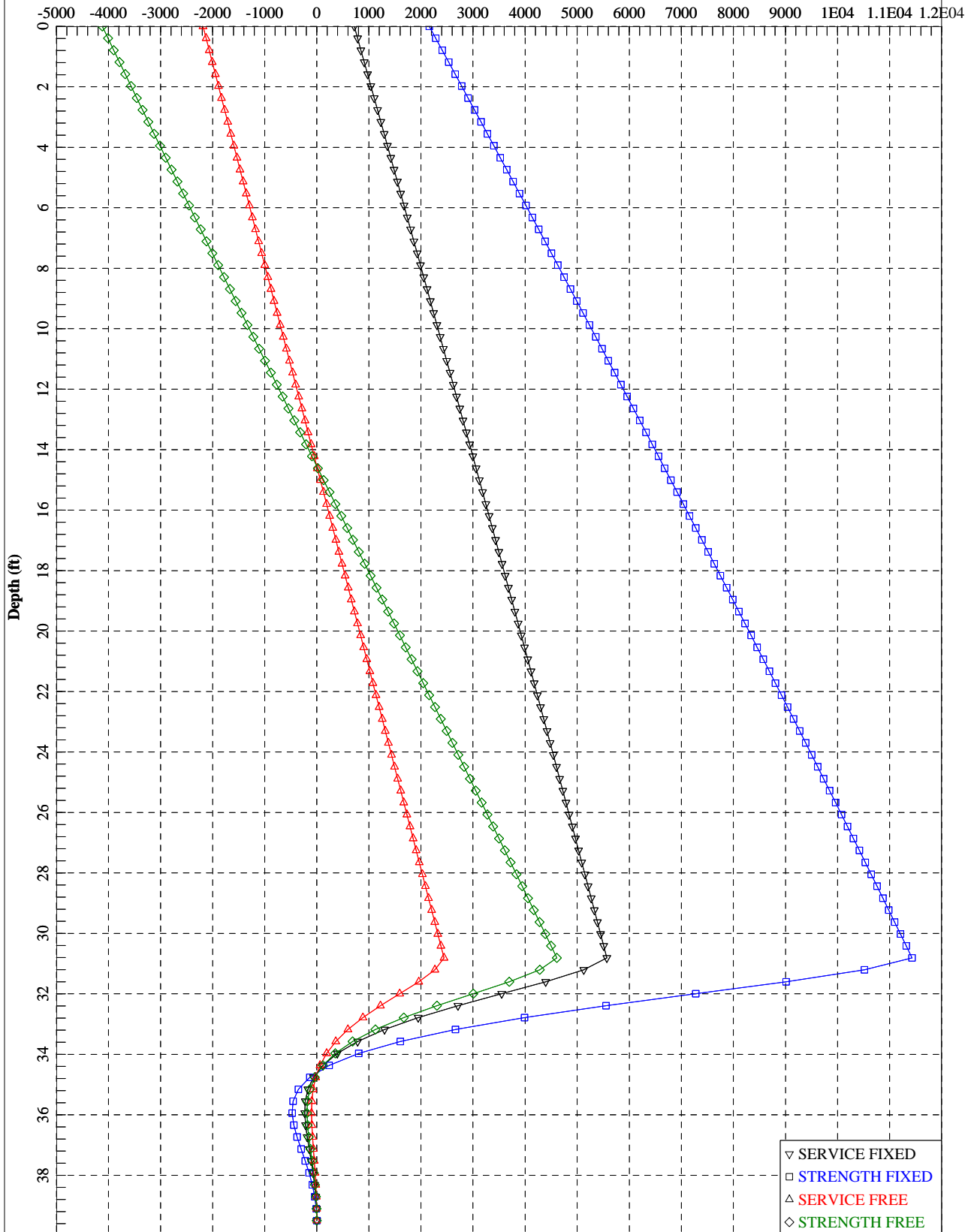
The analysis ended normally.

IB4\_\_B-9\_Long\_Scoured. I p7o

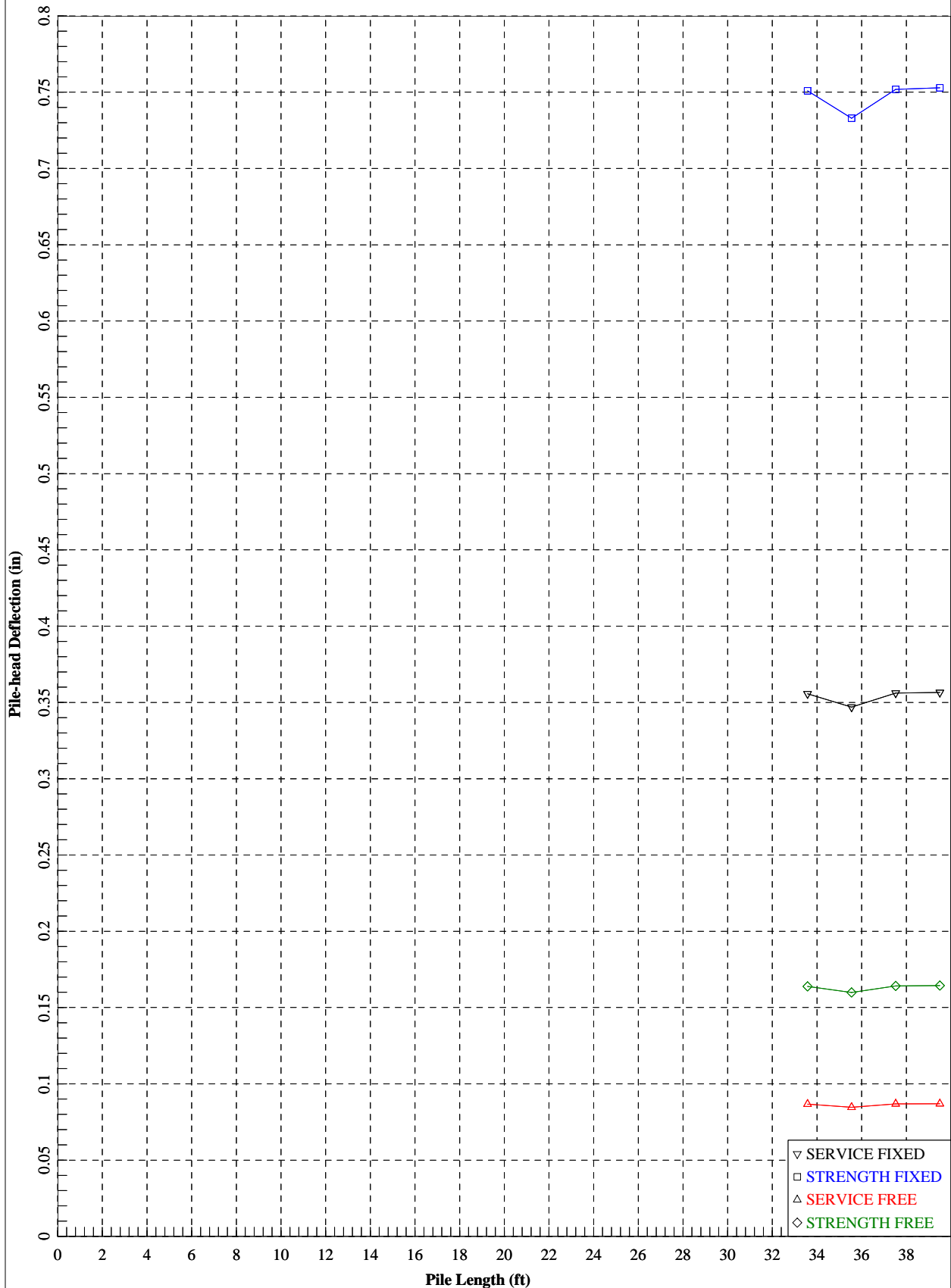
SC 557 Bridge over Crowders Creek - IB4 - Boring B-9 - 48" Dia. Drilled Shaft - Scoured Longitudinal Analysis  
Lateral Pile Deflection (inches)



SC 557 Bridge over Crowders Creek - IB4 - Boring B-9 - 48" Dia. Drilled Shaft - Scoured Longitudinal Analysis  
Bending Moment (in-kips)



SC 557 Bridge over Crowders Creek - IB4 - Boring B-9 - 48" Dia. Drilled Shaft - Scoured Longitudinal Analysis





=====  
LPile Plus for Windows, Version 2013-07.007

Analysis of Individual Piles and Drilled Shafts  
Subjected to Lateral Loading Using the p-y Method

© 1985-2013 by Ensoft, Inc.  
All Rights Reserved

=====  
This copy of LPile is used by:

Bradley Fischer  
F&ME

Serial Number of Security Device: 291490957

This copy of LPile is licensed for exclusive use by: F&ME Consultants, Columbia, Sout

Use of this program by any entity other than F&ME Consultants, Columbia, Sout  
is forbidden by the software license agreement.

-----  
Files Used for Analysis  
-----

Path to file locations: P:\Geotechnical\G4800's\G4843 - SC557 - York County\Report\Final\Bri dge\LPile\  
Name of input data file: IB4\_\_B-9\_Trans\_Scoured.l p7d  
Name of output report file: IB4\_\_B-9\_Trans\_Scoured.l p7o  
Name of plot output file: IB4\_\_B-9\_Trans\_Scoured.l p7p  
Name of runtime message file: IB4\_\_B-9\_Trans\_Scoured.l p7r

-----  
Date and Time of Analysis  
-----

Date: July 31, 2018 Time: 9:49:53

-----  
Problem Title  
-----

Project Name: SC 557 over Crowders Creek

Job Number: G4843

Client: CALYX

Engineer: JFH

Description: IB4 - Boring B-9 - 48" Dia. Drilled Shaft - Scoured Trans.

-----  
 Program Options and Settings  
 -----

Engineering Units of Input Data and Computations:

- Engineering units are US Customary Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

Computational Options:

- Use unfactored loads in computations (conventional analysis)
- Compute pile response under loading and nonlinear bending properties of pile (only if nonlinear pile properties are input)
- Analysis uses p-y modification factors for p-y curves
- Analysis includes loading by lateral soil movements acting on pile
- Input of shear resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- No p-y curves to be computed and reported for user-specified depths
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1

-----  
 Pile Structural Properties and Geometry  
 -----

- Total number of pile sections = 3
- Total length of pile = 39.50 ft
- Depth of ground surface below top of pile = 30.50 ft

Pile diameter values used for p-y curve computations are defined using 6 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile.

Point	Depth X ft	Pile Diameter in
1	0.00000	42.0000000
2	9.000000	42.0000000
3	9.000000	48.0000000
4	31.500000	48.0000000

5	31.50000	42.0000000
6	39.50000	42.0000000

-----  
 Input Structural Properties:  
 -----

Pile Section No. 1:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Circular
Section Length	=	9.00000 ft
Top Width	=	42.00000 in
Bottom Width	=	42.00000 in
Top Area	=	1385.44236 Sq. in
Bottom Area	=	1385.44236 Sq. in
Moment of Inertia at Top	=	152745. in^4
Moment of Inertia at Bottom	=	152745. in^4
Elastic Modulus	=	3605000. lbs/in^2

Pile Section No. 2:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Circular
Section Length	=	22.50000 ft
Top Width	=	48.00000 in
Bottom Width	=	48.00000 in
Top Area	=	1809.55737 Sq. in
Bottom Area	=	1809.55737 Sq. in
Moment of Inertia at Top	=	260576. in^4
Moment of Inertia at Bottom	=	260576. in^4
Elastic Modulus	=	3605000. lbs/in^2

Pile Section No. 3:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Circular
Section Length	=	8.00000 ft
Top Width	=	42.00000 in
Bottom Width	=	42.00000 in
Top Area	=	1385.44236 Sq. in
Bottom Area	=	1385.44236 Sq. in
Moment of Inertia at Top	=	152745. in^4
Moment of Inertia at Bottom	=	152745. in^4
Elastic Modulus	=	3605000. lbs/in^2

-----  
 Ground Slope and Pile Batter Angles  
 -----

Ground Slope Angle	=	0.000 degrees
	=	0.000 radians
Pile Batter Angle	=	0.000 degrees
	=	0.000 radians

-----  
 Soil and Rock Layering Information  
 -----

The soil profile is modelled using 1 layers

Layer 1 is strong rock (vuggy limestone)

Distance from top of pile to top of layer = 30.50000 ft  
 Distance from top of pile to bottom of layer = 60.00000 ft  
 Effective unit weight at top of layer = 98.00000 pcf  
 Effective unit weight at bottom of layer = 98.00000 pcf  
 Uniaxial compressive strength at top of layer = 15000. psi  
 Uniaxial compressive strength at bottom of layer = 15000. psi

(Depth of lowest soil layer extends 20.50 ft below pile tip)

Summary of Soil Properties

Layer Num.	Layer Soil Type (p-y Curve Criteria)	Layer Depth ft	Effective Unit Wt. pcf	Uniaxial qu psi
1	Vuggy Limestone	30.500 60.000	98.000 98.000	15000. 15000.

p-y Modification Factors for Group Action

Distribution of p-y modifiers with depth defined using 2 points

Point No.	Depth X ft	p-mult	y-mult
1	30.500	1.0000	1.0000
2	100.000	1.0000	1.0000

Lateral Soil Movements

Profile of soil movement with depth defined using 2 points

Point No.	Depth X ft	Soil Movement in
1	0.00000	0.00000
2	0.00000	0.00000

Loading Type

-----  
 Static loading criteria were used when computing p-y curves for all analyses.  
 -----

-----  
 Pile-head Loading and Pile-head Fixity Conditions  
 -----

Number of loads specified = 4

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length
1	1	V = 15700. lbs	M = 1152000. in-lbs	640000.	Yes
2	1	V = 16100. lbs	M = 1224000. in-lbs	925000.	Yes
3	2	V = 15700. lbs	S = 0.0000 in/in	640000.	Yes
4	2	V = 16100. lbs	S = 0.0000 in/in	925000.	Yes

V = perpendicular shear force applied to pile head  
 M = bending moment applied to pile head  
 y = lateral deflection relative to pile axis  
 S = pile slope relative to original pile batter angle  
 R = rotational stiffness applied to pile head  
 Axial thrust is assumed to be acting axially for all pile batter angles.

-----  
 Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness  
 -----

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 3

Pile Section No. 1:  
 -----

Moment-curvature properties were derived from elastic section properties

Pile Section No. 2:  
 -----

Moment-curvature properties were derived from elastic section properties

Pile Section No. 3:  
 -----

Moment-curvature properties were derived from elastic section properties

-----  
 Computed Values of Pile Loading and Deflection  
 for Lateral Loading for Load Case Number 1  
 -----

Pile-head conditions are Shear and Moment (Loading Type 1)

I B4\_\_B-9\_Trans\_Scoured. I p7o

Shear force at pile head = 15700.0 lbs  
 Applied moment at pile head = 1152000.0 in-lbs  
 Axial thrust load on pile head = 640000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi *	Bending Stiffness lb-in^2	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.4687	1152000.	15700.	-0.002033	620.3279	5.506E+11	0.000	0.000	0.000
0.395	0.4591	1232572.	15700.	-0.002023	631.4052	5.506E+11	0.000	0.000	0.000
0.790	0.4495	1313111.	15700.	-0.002012	642.4782	5.506E+11	0.000	0.000	0.000
1.185	0.4400	1393617.	15700.	-0.002001	653.5463	5.506E+11	0.000	0.000	0.000
1.580	0.4305	1474086.	15700.	-0.001988	664.6095	5.506E+11	0.000	0.000	0.000
1.975	0.4211	1554516.	15700.	-0.001975	675.6674	5.506E+11	0.000	0.000	0.000
2.370	0.4118	1634906.	15700.	-0.001962	686.7197	5.506E+11	0.000	0.000	0.000
2.765	0.4025	1715253.	15700.	-0.001947	697.7662	5.506E+11	0.000	0.000	0.000
3.160	0.3933	1795555.	15700.	-0.001932	708.8065	5.506E+11	0.000	0.000	0.000
3.555	0.3842	1875811.	15700.	-0.001916	719.8403	5.506E+11	0.000	0.000	0.000
3.950	0.3752	1956017.	15700.	-0.001900	730.8674	5.506E+11	0.000	0.000	0.000
4.345	0.3662	2036172.	15700.	-0.001883	741.8875	5.506E+11	0.000	0.000	0.000
4.740	0.3573	2116275.	15700.	-0.001865	752.9003	5.506E+11	0.000	0.000	0.000
5.135	0.3485	2196322.	15700.	-0.001846	763.9054	5.506E+11	0.000	0.000	0.000
5.530	0.3398	2276311.	15700.	-0.001827	774.9027	5.506E+11	0.000	0.000	0.000
5.925	0.3312	2356241.	15700.	-0.001807	785.8919	5.506E+11	0.000	0.000	0.000
6.320	0.3227	2436110.	15700.	-0.001786	796.8725	5.506E+11	0.000	0.000	0.000
6.715	0.3143	2515915.	15700.	-0.001765	807.8444	5.506E+11	0.000	0.000	0.000
7.110	0.3060	2595654.	15700.	-0.001743	818.8073	5.506E+11	0.000	0.000	0.000
7.505	0.2978	2675326.	15700.	-0.001720	829.7609	5.506E+11	0.000	0.000	0.000
7.900	0.2897	2754927.	15700.	-0.001697	840.7048	5.506E+11	0.000	0.000	0.000
8.295	0.2817	2834457.	15700.	-0.001673	851.6389	5.506E+11	0.000	0.000	0.000
8.690	0.2738	2913913.	15700.	-0.001648	862.5628	5.506E+11	0.000	0.000	0.000
9.085	0.2661	2993292.	15700.	-0.001628	873.4775	5.506E+11	0.000	0.000	0.000
9.480	0.2584	3072626.	15700.	-0.001613	884.3831	5.506E+11	0.000	0.000	0.000
9.875	0.2508	3151913.	15700.	-0.001597	895.2797	5.506E+11	0.000	0.000	0.000
10.270	0.2432	3231151.	15700.	-0.001581	906.1674	5.506E+11	0.000	0.000	0.000
10.665	0.2358	3310340.	15700.	-0.001564	917.0462	5.506E+11	0.000	0.000	0.000
11.060	0.2284	3389479.	15700.	-0.001547	927.9161	5.506E+11	0.000	0.000	0.000
11.455	0.2211	3468565.	15700.	-0.001530	938.7771	5.506E+11	0.000	0.000	0.000
11.850	0.2139	3547599.	15700.	-0.001512	949.6292	5.506E+11	0.000	0.000	0.000
12.245	0.2068	3626578.	15700.	-0.001494	960.4734	5.506E+11	0.000	0.000	0.000
12.640	0.1997	3705501.	15700.	-0.001476	971.3097	5.506E+11	0.000	0.000	0.000
13.035	0.1928	3784368.	15700.	-0.001457	982.1381	5.506E+11	0.000	0.000	0.000
13.430	0.1859	3863177.	15700.	-0.001438	992.9586	5.506E+11	0.000	0.000	0.000
13.825	0.1792	3941927.	15700.	-0.001418	1003.7711	5.506E+11	0.000	0.000	0.000
14.220	0.1725	4020616.	15700.	-0.001398	1014.5756	5.506E+11	0.000	0.000	0.000
14.615	0.1659	4099244.	15700.	-0.001377	1025.3721	5.506E+11	0.000	0.000	0.000
15.010	0.1594	4177809.	15700.	-0.001357	1036.1606	5.506E+11	0.000	0.000	0.000
15.405	0.1530	4256311.	15700.	-0.001335	1046.9411	5.506E+11	0.000	0.000	0.000
15.800	0.1468	4334747.	15700.	-0.001314	1057.7136	5.506E+11	0.000	0.000	0.000
16.195	0.1406	4413116.	15700.	-0.001292	1068.4781	5.506E+11	0.000	0.000	0.000
16.590	0.1345	4491419.	15700.	-0.001269	1079.2346	5.506E+11	0.000	0.000	0.000
16.985	0.1286	4569652.	15700.	-0.001246	1090.0031	5.506E+11	0.000	0.000	0.000
17.380	0.1227	4647815.	15700.	-0.001223	1100.7636	5.506E+11	0.000	0.000	0.000
17.775	0.1170	4725908.	15700.	-0.001199	1111.5161	5.506E+11	0.000	0.000	0.000
18.170	0.1113	4803928.	15700.	-0.001175	1122.2606	5.506E+11	0.000	0.000	0.000
18.565	0.1058	4881874.	15700.	-0.001151	1133.0071	5.506E+11	0.000	0.000	0.000
18.960	0.1004	4959746.	15700.	-0.001126	1143.7456	5.506E+11	0.000	0.000	0.000
19.355	0.0951	5037542.	15700.	-0.001101	1154.4761	5.506E+11	0.000	0.000	0.000
19.750	0.0900	5115260.	15700.	-0.001075	1165.2086	5.506E+11	0.000	0.000	0.000

IB4_B-9_Trans_Scored.l p7o									
20.145	0.0850	5192901.	15700.	-0.001049	831.9623	9.394E+11	0.000	0.000	0.000
20.540	0.0800	5270462.	15700.	-0.001023	839.1059	9.394E+11	0.000	0.000	0.000
20.935	0.0753	5347942.	15700.	-0.000996	846.2421	9.394E+11	0.000	0.000	0.000
21.330	0.0706	5425340.	15700.	-0.000969	853.3708	9.394E+11	0.000	0.000	0.000
21.725	0.0661	5502655.	15700.	-0.000941	860.4918	9.394E+11	0.000	0.000	0.000
22.120	0.0617	5579886.	15700.	-0.000913	867.6050	9.394E+11	0.000	0.000	0.000
22.515	0.0574	5657032.	15700.	-0.000885	874.7104	9.394E+11	0.000	0.000	0.000
22.910	0.0533	5734091.	15700.	-0.000856	881.8078	9.394E+11	0.000	0.000	0.000
23.305	0.0493	5811063.	15700.	-0.000827	888.8972	9.394E+11	0.000	0.000	0.000
23.700	0.0455	5887945.	15700.	-0.000797	895.9783	9.394E+11	0.000	0.000	0.000
24.095	0.0417	5964737.	15700.	-0.000768	903.0511	9.394E+11	0.000	0.000	0.000
24.490	0.0382	6041438.	15700.	-0.000737	910.1156	9.394E+11	0.000	0.000	0.000
24.885	0.0348	6118046.	15700.	-0.000707	917.1715	9.394E+11	0.000	0.000	0.000
25.280	0.0315	6194561.	15700.	-0.000676	924.2188	9.394E+11	0.000	0.000	0.000
25.675	0.0283	6270981.	15700.	-0.000644	931.2573	9.394E+11	0.000	0.000	0.000
26.070	0.0254	6347305.	15700.	-0.000612	938.2870	9.394E+11	0.000	0.000	0.000
26.465	0.0225	6423532.	15700.	-0.000580	945.3078	9.394E+11	0.000	0.000	0.000
26.860	0.0199	6499660.	15700.	-0.000547	952.3195	9.394E+11	0.000	0.000	0.000
27.255	0.0174	6575689.	15700.	-0.000514	959.3220	9.394E+11	0.000	0.000	0.000
27.650	0.0150	6651618.	15700.	-0.000481	966.3153	9.394E+11	0.000	0.000	0.000
28.045	0.0128	6727444.	15700.	-0.000447	973.2992	9.394E+11	0.000	0.000	0.000
28.440	0.0108	6803168.	15700.	-0.000413	980.2736	9.394E+11	0.000	0.000	0.000
28.835	0.008878	6878787.	15700.	-0.000379	987.2384	9.394E+11	0.000	0.000	0.000
29.230	0.007165	6954301.	15700.	-0.000344	994.1935	9.394E+11	0.000	0.000	0.000
29.625	0.005619	7029709.	15700.	-0.000308	1001.1388	9.394E+11	0.000	0.000	0.000
30.020	0.004241	7105009.	15700.	-0.000273	1008.0742	9.394E+11	0.000	0.000	0.000
30.415	0.003032	7180200.	15700.	-0.000237	1014.9996	9.394E+11	0.000	0.000	0.000
30.810	0.001996	7255282.	-55251.	-0.000200	1021.9149	9.394E+11	-29937.	71100000.	0.000
31.205	0.001133	6657633.	-166474.	-0.000165	966.8693	9.394E+11	-16992.	71100000.	0.000
31.600	0.000429	5678108.	-221999.	-0.000124	1242.5955	5.506E+11	-6435.7253	71100000.	0.000
31.995	-4.304E-05	4553840.	-235721.	-8.000E-05	1088.0265	5.506E+11	645.5950	71100000.	0.000
32.390	-0.000329	3443957.	-222484.	-4.557E-05	935.4354	5.506E+11	4939.8102	71100000.	0.000
32.785	-0.000475	2444970.	-193887.	-2.023E-05	798.0906	5.506E+11	7126.2064	71100000.	0.000
33.180	-0.000521	1606028.	-158474.	-2.792E-06	682.7495	5.506E+11	7816.1976	71100000.	0.000
33.575	-0.000502	942655.	-122119.	8.178E-06	591.5464	5.506E+11	7523.2448	71100000.	0.000
33.970	-0.000444	448287.	-88521.	1.416E-05	523.5787	5.506E+11	6653.3548	71100000.	0.000
34.365	-0.000367	103392.	-59696.	1.654E-05	476.1611	5.506E+11	5509.0977	71100000.	0.000
34.760	-0.000287	-117729.	-36445.	1.648E-05	478.1322	5.506E+11	4301.5609	71100000.	0.000
35.155	-0.000211	-242201.	-18746.	1.493E-05	495.2451	5.506E+11	3166.0782	71100000.	0.000
35.550	-0.000145	-295533.	-6078.7651	1.261E-05	502.5774	5.506E+11	2178.8311	71100000.	0.000
35.945	-9.150E-05	-299905.	2337.7958	1.005E-05	503.1784	5.506E+11	1372.4604	71100000.	0.000
36.340	-4.998E-05	-273432.	7367.1778	7.583E-06	499.5389	5.506E+11	749.6417	71100000.	0.000
36.735	-1.961E-05	-230110.	9841.0177	5.416E-06	493.5827	5.506E+11	294.1727	71100000.	0.000
37.130	1.364E-06	-180172.	10490.	3.650E-06	486.7171	5.506E+11	-20.4613	71100000.	0.000
37.525	1.499E-05	-130689.	9908.3883	2.312E-06	479.9140	5.506E+11	-224.8237	71100000.	0.000
37.920	2.328E-05	-86255.	8547.9525	1.378E-06	473.8050	5.506E+11	-349.1998	71100000.	0.000
38.315	2.805E-05	-49663.	6723.0884	7.931E-07	468.7742	5.506E+11	-420.7851	71100000.	0.000
38.710	3.080E-05	-22525.	4630.9476	4.824E-07	465.0431	5.506E+11	-461.9748	71100000.	0.000
39.105	3.263E-05	-5764.7773	2376.2400	3.606E-07	462.7389	5.506E+11	-489.3786	71100000.	0.000
39.500	3.422E-05	0.000	0.000	3.358E-07	461.9463	5.506E+11	-513.2543	35550000.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 1:

Pile-head deflection = 0.4686796 inches  
 Computed slope at pile head = -0.0020335 radians  
 Maximum bending moment = 7255282. inch-lbs  
 Maximum shear force = -235721. lbs

Depth of maximum bending moment = 30.810000 feet below pile head  
 Depth of maximum shear force = 31.995000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 2

-----  
 Pile-head Deflection vs. Pile Length for Load Case 1  
 -----

Boundary Condition Type 1, Shear and Moment

Shear = 15700. lb  
 Moment = 1152000. in-lb  
 Axial Load = 640000. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment in-lbs	Maximum Shear lbs
39.5000	0.4686796	7255282.	-235721.
37.5250	0.4680595	7247424.	-235787.
35.5500	0.4562605	7202706.	-230348.
33.5750	0.4659940	7204954.	-281961.
33.5750	0.000000	16084927710.	-1996143864.
33.5750	0.000000	16084927710.	-1996143864.
33.5750	0.000000	16084927710.	-1996143864.
33.5750	0.000000	16084927710.	-1996143864.
33.5750	0.000000	16084927710.	-1996143864.
33.5750	0.000000	16084927710.	-1996143864.
33.5750	0.000000	16084927710.	-1996143864.
33.5750	0.000000	16084927710.	-1996143864.
33.5750	0.000000	16084927710.	-1996143864.
33.5750	0.000000	16084927710.	-1996143864.
33.5750	0.000000	16084927710.	-1996143864.
33.5750	0.000000	16084927710.	-1996143864.
33.5750	0.000000	16084927710.	-1996143864.
33.5750	0.000000	16084927710.	-1996143864.
33.5750	0.000000	16084927710.	-1996143864.
33.5750	0.000000	16084927710.	-1996143864.

-----  
 Computed Values of Pile Loading and Deflection  
 for Lateral Loading for Load Case Number 2  
 -----

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 16100.0 lbs  
 Applied moment at pile head = 1224000.0 in-lbs  
 Axial thrust load on pile head = 925000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.4947	1224000.	16100.	-0.002150	835.9372	5.506E+11	0.000	0.000	0.000



IB4\_B-9\_Trans\_Scored.l p7o

0.395	0.4845	1309717.	16100.	-0.002139	847.7219	5.506E+11	0.000	0.000	0.000
0.790	0.4744	1395384.	16100.	-0.002127	859.4998	5.506E+11	0.000	0.000	0.000
1.185	0.4643	1480999.	16100.	-0.002115	871.2704	5.506E+11	0.000	0.000	0.000
1.580	0.4543	1566557.	16100.	-0.002102	883.0334	5.506E+11	0.000	0.000	0.000
1.975	0.4444	1652057.	16100.	-0.002088	894.7882	5.506E+11	0.000	0.000	0.000
2.370	0.4345	1737494.	16100.	-0.002073	906.5345	5.506E+11	0.000	0.000	0.000
2.765	0.4247	1822866.	16100.	-0.002058	918.2717	5.506E+11	0.000	0.000	0.000
3.160	0.4150	1908168.	16100.	-0.002042	929.9995	5.506E+11	0.000	0.000	0.000
3.555	0.4054	1993399.	16100.	-0.002025	941.7173	5.506E+11	0.000	0.000	0.000
3.950	0.3958	2078555.	16100.	-0.002008	953.4249	5.506E+11	0.000	0.000	0.000
4.345	0.3864	2163632.	16100.	-0.001989	965.1216	5.506E+11	0.000	0.000	0.000
4.740	0.3770	2248627.	16100.	-0.001970	976.8071	5.506E+11	0.000	0.000	0.000
5.135	0.3677	2333538.	16100.	-0.001951	988.4810	5.506E+11	0.000	0.000	0.000
5.530	0.3585	2418361.	16100.	-0.001930	1000.1427	5.506E+11	0.000	0.000	0.000
5.925	0.3494	2503092.	16100.	-0.001909	1011.7919	5.506E+11	0.000	0.000	0.000
6.320	0.3404	2587729.	16100.	-0.001887	1023.4281	5.506E+11	0.000	0.000	0.000
6.715	0.3315	2672268.	16100.	-0.001864	1035.0509	5.506E+11	0.000	0.000	0.000
7.110	0.3227	2756706.	16100.	-0.001841	1046.6598	5.506E+11	0.000	0.000	0.000
7.505	0.3140	2841040.	16100.	-0.001817	1058.2544	5.506E+11	0.000	0.000	0.000
7.900	0.3055	2925267.	16100.	-0.001792	1069.8343	5.506E+11	0.000	0.000	0.000
8.295	0.2970	3009384.	16100.	-0.001767	1081.3990	5.506E+11	0.000	0.000	0.000
8.690	0.2887	3093387.	16100.	-0.001740	1092.9481	5.506E+11	0.000	0.000	0.000
9.085	0.2805	3177273.	16100.	-0.001719	803.8129	9.394E+11	0.000	0.000	0.000
9.480	0.2724	3261089.	16100.	-0.001703	811.5326	9.394E+11	0.000	0.000	0.000
9.875	0.2644	3344833.	16100.	-0.001686	819.2457	9.394E+11	0.000	0.000	0.000
10.270	0.2564	3428503.	16100.	-0.001669	826.9520	9.394E+11	0.000	0.000	0.000
10.665	0.2486	3512097.	16100.	-0.001652	834.6513	9.394E+11	0.000	0.000	0.000
11.060	0.2408	3595613.	16100.	-0.001634	842.3435	9.394E+11	0.000	0.000	0.000
11.455	0.2331	3679050.	16100.	-0.001615	850.0283	9.394E+11	0.000	0.000	0.000
11.850	0.2255	3762405.	16100.	-0.001596	857.7056	9.394E+11	0.000	0.000	0.000
12.245	0.2180	3845677.	16100.	-0.001577	865.3753	9.394E+11	0.000	0.000	0.000
12.640	0.2105	3928864.	16100.	-0.001558	873.0371	9.394E+11	0.000	0.000	0.000
13.035	0.2032	4011964.	16100.	-0.001538	880.6909	9.394E+11	0.000	0.000	0.000
13.430	0.1960	4094975.	16100.	-0.001517	888.3365	9.394E+11	0.000	0.000	0.000
13.825	0.1888	4177896.	16100.	-0.001496	895.9738	9.394E+11	0.000	0.000	0.000
14.220	0.1818	4260724.	16100.	-0.001475	903.6026	9.394E+11	0.000	0.000	0.000
14.615	0.1748	4343458.	16100.	-0.001453	911.2227	9.394E+11	0.000	0.000	0.000
15.010	0.1680	4426096.	16100.	-0.001431	918.8339	9.394E+11	0.000	0.000	0.000
15.405	0.1613	4508636.	16100.	-0.001409	926.4362	9.394E+11	0.000	0.000	0.000
15.800	0.1546	4591077.	16100.	-0.001386	934.0292	9.394E+11	0.000	0.000	0.000
16.195	0.1481	4673415.	16100.	-0.001362	941.6129	9.394E+11	0.000	0.000	0.000
16.590	0.1417	4755651.	16100.	-0.001339	949.1871	9.394E+11	0.000	0.000	0.000
16.985	0.1354	4837781.	16100.	-0.001314	956.7515	9.394E+11	0.000	0.000	0.000
17.380	0.1293	4919804.	16100.	-0.001290	964.3061	9.394E+11	0.000	0.000	0.000
17.775	0.1232	5001718.	16100.	-0.001265	971.8507	9.394E+11	0.000	0.000	0.000
18.170	0.1173	5083522.	16100.	-0.001239	979.3851	9.394E+11	0.000	0.000	0.000
18.565	0.1115	5165213.	16100.	-0.001213	986.9092	9.394E+11	0.000	0.000	0.000
18.960	0.1058	5246789.	16100.	-0.001187	994.4227	9.394E+11	0.000	0.000	0.000
19.355	0.1002	5328250.	16100.	-0.001160	1001.9255	9.394E+11	0.000	0.000	0.000
19.750	0.0948	5409593.	16100.	-0.001133	1009.4175	9.394E+11	0.000	0.000	0.000
20.145	0.0895	5490816.	16100.	-0.001106	1016.8984	9.394E+11	0.000	0.000	0.000
20.540	0.0843	5571918.	16100.	-0.001078	1024.3682	9.394E+11	0.000	0.000	0.000
20.935	0.0792	5652896.	16100.	-0.001050	1031.8266	9.394E+11	0.000	0.000	0.000
21.330	0.0743	5733750.	16100.	-0.001021	1039.2735	9.394E+11	0.000	0.000	0.000
21.725	0.0696	5814476.	16100.	-0.000992	1046.7087	9.394E+11	0.000	0.000	0.000
22.120	0.0649	5895074.	16100.	-0.000962	1054.1320	9.394E+11	0.000	0.000	0.000
22.515	0.0604	5975542.	16100.	-0.000932	1061.5434	9.394E+11	0.000	0.000	0.000
22.910	0.0561	6055877.	16100.	-0.000902	1068.9425	9.394E+11	0.000	0.000	0.000
23.305	0.0519	6136078.	16100.	-0.000871	1076.3293	9.394E+11	0.000	0.000	0.000
23.700	0.0478	6216144.	16100.	-0.000840	1083.7037	9.394E+11	0.000	0.000	0.000

IB4_B-9_Trans_Scored.l p7o									
24.095	0.0439	6296072.	16100.	-0.000808	1091.0653	9.394E+11	0.000	0.000	0.000
24.490	0.0402	6375860.	16100.	-0.000776	1098.4141	9.394E+11	0.000	0.000	0.000
24.885	0.0366	6455508.	16100.	-0.000744	1105.7500	9.394E+11	0.000	0.000	0.000
25.280	0.0331	6535013.	16100.	-0.000711	1113.0726	9.394E+11	0.000	0.000	0.000
25.675	0.0298	6614373.	16100.	-0.000678	1120.3820	9.394E+11	0.000	0.000	0.000
26.070	0.0267	6693587.	16100.	-0.000645	1127.6779	9.394E+11	0.000	0.000	0.000
26.465	0.0237	6772653.	16100.	-0.000611	1134.9601	9.394E+11	0.000	0.000	0.000
26.860	0.0209	6851569.	16100.	-0.000576	1142.2286	9.394E+11	0.000	0.000	0.000
27.255	0.0183	6930333.	16100.	-0.000541	1149.4831	9.394E+11	0.000	0.000	0.000
27.650	0.0158	7008944.	16100.	-0.000506	1156.7234	9.394E+11	0.000	0.000	0.000
28.045	0.0135	7087400.	16100.	-0.000471	1163.9495	9.394E+11	0.000	0.000	0.000
28.440	0.0113	7165699.	16100.	-0.000435	1171.1611	9.394E+11	0.000	0.000	0.000
28.835	0.009335	7243840.	16100.	-0.000398	1178.3582	9.394E+11	0.000	0.000	0.000
29.230	0.007534	7321821.	16100.	-0.000362	1185.5404	9.394E+11	0.000	0.000	0.000
29.625	0.005907	7399639.	16100.	-0.000324	1192.7078	9.394E+11	0.000	0.000	0.000
30.020	0.004458	7477294.	16100.	-0.000287	1199.8601	9.394E+11	0.000	0.000	0.000
30.415	0.003187	7554783.	16100.	-0.000249	1206.9971	9.394E+11	0.000	0.000	0.000
30.810	0.002097	7632105.	-58463.	-0.000211	1214.1188	9.394E+11	-31461.	71100000.	0.000
31.205	0.001190	77092403.	-175332.	-0.000174	1156.1209	9.394E+11	-17851.	71100000.	0.000
31.600	0.000450	5971486.	-233640.	-0.000130	1488.6407	5.506E+11	-6752.2256	71100000.	0.000
31.995	-4.609E-05	4788637.	-248004.	-8.408E-05	1326.0178	5.506E+11	691.3688	71100000.	0.000
32.390	-0.000347	3621141.	-234032.	-4.789E-05	1165.5058	5.506E+11	5204.1541	71100000.	0.000
32.785	-0.000500	2570433.	-203922.	-2.124E-05	1021.0502	5.506E+11	7500.6779	71100000.	0.000
33.180	-0.000548	1688150.	-166654.	-2.908E-06	899.7505	5.506E+11	8224.0091	71100000.	0.000
33.575	-0.000528	990577.	-128407.	8.622E-06	803.8454	5.506E+11	7914.1349	71100000.	0.000
33.970	-0.000467	470779.	-93065.	1.491E-05	732.3814	5.506E+11	6997.9935	71100000.	0.000
34.365	-0.000386	108191.	-62749.	1.740E-05	682.5313	5.506E+11	5793.7193	71100000.	0.000
34.760	-0.000302	-124230.	-38297.	1.733E-05	684.7365	5.506E+11	4523.2285	71100000.	0.000
35.155	-0.000222	-255021.	-19688.	1.570E-05	702.7180	5.506E+11	3328.7708	71100000.	0.000
35.550	-0.000153	-311012.	-6370.7660	1.327E-05	710.4160	5.506E+11	2290.3943	71100000.	0.000
35.945	-9.616E-05	-315532.	2475.8803	1.057E-05	711.0374	5.506E+11	1442.3678	71100000.	0.000
36.340	-5.250E-05	-287633.	7760.5663	7.973E-06	707.2018	5.506E+11	787.4575	71100000.	0.000
36.735	-2.057E-05	-242032.	10358.	5.693E-06	700.9323	5.506E+11	308.5885	71100000.	0.000
37.130	1.477E-06	-189487.	11037.	3.836E-06	693.7083	5.506E+11	-22.1489	71100000.	0.000
37.525	1.579E-05	-137434.	10423.	2.429E-06	686.5518	5.506E+11	-236.9136	71100000.	0.000
37.920	2.450E-05	-90698.	8990.4674	1.447E-06	680.1263	5.506E+11	-367.5640	71100000.	0.000
38.315	2.951E-05	-52217.	7070.1319	8.321E-07	674.8358	5.506E+11	-442.7042	71100000.	0.000
38.710	3.239E-05	-23680.	4869.3737	5.054E-07	670.9125	5.506E+11	-485.8858	71100000.	0.000
39.105	3.430E-05	-6059.6999	2498.2835	3.774E-07	668.4899	5.506E+11	-514.5742	71100000.	0.000
39.500	3.597E-05	0.000	0.000	3.513E-07	667.6568	5.506E+11	-539.5539	35550000.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 2:

Pile-head deflection = 0.4946523 inches  
 Computed slope at pile head = -0.0021498 radians  
 Maximum bending moment = 7632105. inch-lbs  
 Maximum shear force = -248004. lbs  
 Depth of maximum bending moment = 30.8100000 feet below pile head  
 Depth of maximum shear force = 31.9950000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 2

-----  
 Pile-head Deflection vs. Pile Length for Load Case 2  
 -----



IB4\_B-9\_Trans\_Scored.l p7o

3.555	0.1059	-2095917.	15700.	-0.000188	750.1015	5.506E+11	0.000	0.000	0.000
3.950	0.1050	-2020900.	15700.	-0.000206	739.7878	5.506E+11	0.000	0.000	0.000
4.345	0.1040	-1945830.	15700.	-0.000223	729.4669	5.506E+11	0.000	0.000	0.000
4.740	0.1029	-1870710.	15700.	-0.000240	719.1390	5.506E+11	0.000	0.000	0.000
5.135	0.1017	-1795540.	15700.	-0.000255	708.8044	5.506E+11	0.000	0.000	0.000
5.530	0.1004	-1720324.	15700.	-0.000271	698.4634	5.506E+11	0.000	0.000	0.000
5.925	0.0991	-1645063.	15700.	-0.000285	688.1161	5.506E+11	0.000	0.000	0.000
6.320	0.0977	-1569758.	15700.	-0.000299	677.7630	5.506E+11	0.000	0.000	0.000
6.715	0.0963	-1494413.	15700.	-0.000312	667.4042	5.506E+11	0.000	0.000	0.000
7.110	0.0948	-1419029.	15700.	-0.000325	657.0401	5.506E+11	0.000	0.000	0.000
7.505	0.0932	-1343607.	15700.	-0.000337	646.6709	5.506E+11	0.000	0.000	0.000
7.900	0.0916	-1268151.	15700.	-0.000348	636.2968	5.506E+11	0.000	0.000	0.000
8.295	0.0899	-1192661.	15700.	-0.000358	625.9182	5.506E+11	0.000	0.000	0.000
8.690	0.0882	-1117141.	15700.	-0.000368	615.5353	5.506E+11	0.000	0.000	0.000
9.085	0.0864	-1041591.	15700.	-0.000376	449.6119	9.394E+11	0.000	0.000	0.000
9.480	0.0846	-966025.	15700.	-0.000381	442.6520	9.394E+11	0.000	0.000	0.000
9.875	0.0828	-890444.	15700.	-0.000385	435.6907	9.394E+11	0.000	0.000	0.000
10.270	0.0810	-814850.	15700.	-0.000390	428.7282	9.394E+11	0.000	0.000	0.000
10.665	0.0791	-739243.	15700.	-0.000394	421.7646	9.394E+11	0.000	0.000	0.000
11.060	0.0772	-663625.	15700.	-0.000397	414.7999	9.394E+11	0.000	0.000	0.000
11.455	0.0753	-587997.	15700.	-0.000400	407.8343	9.394E+11	0.000	0.000	0.000
11.850	0.0734	-512360.	15700.	-0.000403	400.8678	9.394E+11	0.000	0.000	0.000
12.245	0.0715	-436715.	15700.	-0.000406	393.9007	9.394E+11	0.000	0.000	0.000
12.640	0.0696	-361063.	15700.	-0.000408	386.9329	9.394E+11	0.000	0.000	0.000
13.035	0.0677	-285406.	15700.	-0.000409	379.9646	9.394E+11	0.000	0.000	0.000
13.430	0.0657	-209745.	15700.	-0.000410	372.9959	9.394E+11	0.000	0.000	0.000
13.825	0.0638	-134080.	15700.	-0.000411	366.0269	9.394E+11	0.000	0.000	0.000
14.220	0.0618	-58413.	15700.	-0.000412	359.0577	9.394E+11	0.000	0.000	0.000
14.615	0.0599	17255.	15700.	-0.000412	355.2669	9.394E+11	0.000	0.000	0.000
15.010	0.0579	92922.	15700.	-0.000412	362.2361	9.394E+11	0.000	0.000	0.000
15.405	0.0560	168588.	15700.	-0.000411	369.2052	9.394E+11	0.000	0.000	0.000
15.800	0.0540	244252.	15700.	-0.000410	376.1741	9.394E+11	0.000	0.000	0.000
16.195	0.0521	319912.	15700.	-0.000409	383.1427	9.394E+11	0.000	0.000	0.000
16.590	0.0501	395567.	15700.	-0.000407	390.1107	9.394E+11	0.000	0.000	0.000
16.985	0.0482	471215.	15700.	-0.000405	397.0783	9.394E+11	0.000	0.000	0.000
17.380	0.0463	546857.	15700.	-0.000402	404.0451	9.394E+11	0.000	0.000	0.000
17.775	0.0444	622490.	15700.	-0.000399	411.0112	9.394E+11	0.000	0.000	0.000
18.170	0.0425	698114.	15700.	-0.000396	417.9764	9.394E+11	0.000	0.000	0.000
18.565	0.0407	773727.	15700.	-0.000392	424.9406	9.394E+11	0.000	0.000	0.000
18.960	0.0388	849328.	15700.	-0.000388	431.9038	9.394E+11	0.000	0.000	0.000
19.355	0.0370	924916.	15700.	-0.000383	438.8657	9.394E+11	0.000	0.000	0.000
19.750	0.0352	1000490.	15700.	-0.000379	445.8263	9.394E+11	0.000	0.000	0.000
20.145	0.0334	1076049.	15700.	-0.000373	452.7856	9.394E+11	0.000	0.000	0.000
20.540	0.0316	1151591.	15700.	-0.000368	459.7433	9.394E+11	0.000	0.000	0.000
20.935	0.0299	1227116.	15700.	-0.000362	466.6994	9.394E+11	0.000	0.000	0.000
21.330	0.0282	1302621.	15700.	-0.000355	473.6537	9.394E+11	0.000	0.000	0.000
21.725	0.0265	1378107.	15700.	-0.000349	480.6062	9.394E+11	0.000	0.000	0.000
22.120	0.0249	1453572.	15700.	-0.000341	487.5568	9.394E+11	0.000	0.000	0.000
22.515	0.0233	1529015.	15700.	-0.000334	494.5053	9.394E+11	0.000	0.000	0.000
22.910	0.0217	1604434.	15700.	-0.000326	501.4517	9.394E+11	0.000	0.000	0.000
23.305	0.0202	1679828.	15700.	-0.000318	508.3958	9.394E+11	0.000	0.000	0.000
23.700	0.0187	1755197.	15700.	-0.000309	515.3375	9.394E+11	0.000	0.000	0.000
24.095	0.0173	1830539.	15700.	-0.000300	522.2768	9.394E+11	0.000	0.000	0.000
24.490	0.0159	1905853.	15700.	-0.000291	529.2135	9.394E+11	0.000	0.000	0.000
24.885	0.0145	1981138.	15700.	-0.000281	536.1475	9.394E+11	0.000	0.000	0.000
25.280	0.0132	2056392.	15700.	-0.000271	543.0787	9.394E+11	0.000	0.000	0.000
25.675	0.0120	2131615.	15700.	-0.000260	550.0070	9.394E+11	0.000	0.000	0.000
26.070	0.0108	2206806.	15700.	-0.000249	556.9323	9.394E+11	0.000	0.000	0.000
26.465	0.009600	2281962.	15700.	-0.000238	563.8545	9.394E+11	0.000	0.000	0.000
26.860	0.008500	2357084.	15700.	-0.000226	570.7734	9.394E+11	0.000	0.000	0.000

IB4_B-9_Trans_Scoured.l p7o									
27.255	0.007457	2432169.	15700.	-0.000214	577.6891	9.394E+11	0.000	0.000	0.000
27.650	0.006473	2507218.	15700.	-0.000201	584.6013	9.394E+11	0.000	0.000	0.000
28.045	0.005548	2582228.	15700.	-0.000189	591.5100	9.394E+11	0.000	0.000	0.000
28.440	0.004684	2657198.	15700.	-0.000175	598.4150	9.394E+11	0.000	0.000	0.000
28.835	0.003885	2732128.	15700.	-0.000162	605.3163	9.394E+11	0.000	0.000	0.000
29.230	0.003151	2807016.	15700.	-0.000148	612.2138	9.394E+11	0.000	0.000	0.000
29.625	0.002483	2881861.	15700.	-0.000133	619.1073	9.394E+11	0.000	0.000	0.000
30.020	0.001885	2956661.	15700.	-0.000119	625.9967	9.394E+11	0.000	0.000	0.000
30.415	0.001358	3031417.	15700.	-0.000104	632.8819	9.394E+11	0.000	0.000	0.000
30.810	0.000903	3106126.	-16396.	-8.815E-05	639.7629	9.394E+11	-13543.	71100000.	0.000
31.205	0.000522	2876517.	-67055.	-7.305E-05	618.6151	9.394E+11	-7832.4700	71100000.	0.000
31.600	0.000210	2470887.	-93094.	-5.516E-05	801.6538	5.506E+11	-3154.2802	71100000.	0.000
31.995	-7.762E-07	1994323.	-100542.	-3.594E-05	736.1339	5.506E+11	11.6425	71100000.	0.000
32.390	-0.000130	1517969.	-95876.	-2.083E-05	670.6428	5.506E+11	1956.9713	71100000.	0.000
32.785	-0.000198	1085544.	-84192.	-9.621E-06	611.1913	5.506E+11	2973.2512	71100000.	0.000
33.180	-0.000222	719892.	-69264.	-1.851E-06	560.9200	5.506E+11	3325.1412	71100000.	0.000
33.575	-0.000216	428929.	-53713.	3.094E-06	520.9173	5.506E+11	3236.4327	71100000.	0.000
33.970	-0.000192	210670.	-39205.	5.847E-06	490.9101	5.506E+11	2885.2048	71100000.	0.000
34.365	-0.000160	57229.	-26667.	7.000E-06	469.8145	5.506E+11	2405.0395	71100000.	0.000
34.760	-0.000126	-42177.	-16488.	7.064E-06	467.7451	5.506E+11	1889.8478	71100000.	0.000
35.155	-9.336E-05	-99123.	-8690.2958	6.456E-06	475.5741	5.506E+11	1400.4702	71100000.	0.000
35.550	-6.478E-05	-124601.	-3068.1121	5.493E-06	479.0769	5.506E+11	971.7592	71100000.	0.000
35.945	-4.129E-05	-128242.	702.7174	4.405E-06	479.5775	5.506E+11	619.3081	71100000.	0.000
36.340	-2.302E-05	-117966.	2988.9461	3.345E-06	478.1647	5.506E+11	345.3454	71100000.	0.000
36.735	-9.572E-06	-99927.	4147.7035	2.408E-06	475.6847	5.506E+11	143.5817	71100000.	0.000
37.130	-1.985E-07	-78660.	4495.0473	1.639E-06	472.7608	5.506E+11	2.9769	71100000.	0.000
37.525	5.966E-06	-57324.	4290.0221	1.054E-06	469.8275	5.506E+11	-89.4854	71100000.	0.000
37.920	9.791E-06	-37997.	3729.8752	6.435E-07	467.1703	5.506E+11	-146.8635	71100000.	0.000
38.315	1.207E-05	-21969.	2952.8719	3.854E-07	464.9667	5.506E+11	-180.9860	71100000.	0.000
38.710	1.344E-05	-10006.	2045.9936	2.477E-07	463.3220	5.506E+11	-201.6630	71100000.	0.000
39.105	1.441E-05	-2574.1595	1055.6203	1.936E-07	462.3002	5.506E+11	-216.2160	71100000.	0.000
39.500	1.528E-05	0.000	0.000	1.825E-07	461.9463	5.506E+11	-229.1934	35550000.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 3:

Pile-head deflection = 0.1101148 inches  
 Computed slope at pile head = 0.000000 radians  
 Maximum bending moment = 3106126. inch-lbs  
 Maximum shear force = -100542. lbs  
 Depth of maximum bending moment = 30.8100000 feet below pile head  
 Depth of maximum shear force = 31.9950000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 2

-----  
 Pile-head Deflection vs. Pile Length for Load Case 3  
 -----

Boundary Condition Type 2, Shear and Slope

Shear = 15700. lb  
 Slope = 0.00000  
 Axial Load = 640000. lb



IB4\_B-9\_Trans\_Scored.l p7o

6. 715	0. 0993	-1543116.	16100.	-0. 000322	879. 8106	5. 506E+11	0. 000	0. 000	0. 000
7. 110	0. 0978	-1465361.	16100.	-0. 000335	869. 1205	5. 506E+11	0. 000	0. 000	0. 000
7. 505	0. 0962	-1387551.	16100.	-0. 000347	858. 4228	5. 506E+11	0. 000	0. 000	0. 000
7. 900	0. 0945	-1309688.	16100.	-0. 000359	847. 7180	5. 506E+11	0. 000	0. 000	0. 000
8. 295	0. 0928	-1231776.	16100.	-0. 000370	837. 0063	5. 506E+11	0. 000	0. 000	0. 000
8. 690	0. 0910	-1153818.	16100.	-0. 000380	826. 2883	5. 506E+11	0. 000	0. 000	0. 000
9. 085	0. 0892	-1075816.	16100.	-0. 000388	810. 2612	9. 394E+11	0. 000	0. 000	0. 000
9. 480	0. 0873	-997790.	16100.	-0. 000393	603. 0747	9. 394E+11	0. 000	0. 000	0. 000
9. 875	0. 0854	-919742.	16100.	-0. 000398	595. 8862	9. 394E+11	0. 000	0. 000	0. 000
10. 270	0. 0835	-841673.	16100.	-0. 000402	588. 6958	9. 394E+11	0. 000	0. 000	0. 000
10. 665	0. 0816	-763587.	16100.	-0. 000406	581. 5038	9. 394E+11	0. 000	0. 000	0. 000
11. 060	0. 0797	-685483.	16100.	-0. 000410	574. 3101	9. 394E+11	0. 000	0. 000	0. 000
11. 455	0. 0777	-607364.	16100.	-0. 000413	567. 1151	9. 394E+11	0. 000	0. 000	0. 000
11. 850	0. 0758	-529231.	16100.	-0. 000416	559. 9188	9. 394E+11	0. 000	0. 000	0. 000
12. 245	0. 0738	-451087.	16100.	-0. 000419	552. 7215	9. 394E+11	0. 000	0. 000	0. 000
12. 640	0. 0718	-372933.	16100.	-0. 000421	545. 5232	9. 394E+11	0. 000	0. 000	0. 000
13. 035	0. 0698	-294771.	16100.	-0. 000422	538. 3242	9. 394E+11	0. 000	0. 000	0. 000
13. 430	0. 0678	-216602.	16100.	-0. 000424	531. 1245	9. 394E+11	0. 000	0. 000	0. 000
13. 825	0. 0658	-138428.	16100.	-0. 000424	523. 9245	9. 394E+11	0. 000	0. 000	0. 000
14. 220	0. 0638	-60252.	16100.	-0. 000425	516. 7241	9. 394E+11	0. 000	0. 000	0. 000
14. 615	0. 0618	17926.	16100.	-0. 000425	512. 8258	9. 394E+11	0. 000	0. 000	0. 000
15. 010	0. 0597	96104.	16100.	-0. 000425	520. 0263	9. 394E+11	0. 000	0. 000	0. 000
15. 405	0. 0577	174280.	16100.	-0. 000424	527. 2265	9. 394E+11	0. 000	0. 000	0. 000
15. 800	0. 0557	252451.	16100.	-0. 000423	534. 4264	9. 394E+11	0. 000	0. 000	0. 000
16. 195	0. 0537	330617.	16100.	-0. 000422	541. 6258	9. 394E+11	0. 000	0. 000	0. 000
16. 590	0. 0517	408776.	16100.	-0. 000420	548. 8245	9. 394E+11	0. 000	0. 000	0. 000
16. 985	0. 0497	486926.	16100.	-0. 000417	556. 0223	9. 394E+11	0. 000	0. 000	0. 000
17. 380	0. 0478	565065.	16100.	-0. 000415	563. 2192	9. 394E+11	0. 000	0. 000	0. 000
17. 775	0. 0458	643191.	16100.	-0. 000412	570. 4149	9. 394E+11	0. 000	0. 000	0. 000
18. 170	0. 0439	721304.	16100.	-0. 000408	577. 6093	9. 394E+11	0. 000	0. 000	0. 000
18. 565	0. 0419	799400.	16100.	-0. 000404	584. 8023	9. 394E+11	0. 000	0. 000	0. 000
18. 960	0. 0400	877478.	16100.	-0. 000400	591. 9936	9. 394E+11	0. 000	0. 000	0. 000
19. 355	0. 0381	955538.	16100.	-0. 000396	599. 1831	9. 394E+11	0. 000	0. 000	0. 000
19. 750	0. 0363	1033576.	16100.	-0. 000391	606. 3707	9. 394E+11	0. 000	0. 000	0. 000
20. 145	0. 0344	1111591.	16100.	-0. 000385	613. 5562	9. 394E+11	0. 000	0. 000	0. 000
20. 540	0. 0326	1189581.	16100.	-0. 000379	620. 7394	9. 394E+11	0. 000	0. 000	0. 000
20. 935	0. 0308	1267546.	16100.	-0. 000373	627. 9202	9. 394E+11	0. 000	0. 000	0. 000
21. 330	0. 0291	1345482.	16100.	-0. 000367	635. 0984	9. 394E+11	0. 000	0. 000	0. 000
21. 725	0. 0274	1423388.	16100.	-0. 000360	642. 2738	9. 394E+11	0. 000	0. 000	0. 000
22. 120	0. 0257	1501263.	16100.	-0. 000352	649. 4464	9. 394E+11	0. 000	0. 000	0. 000
22. 515	0. 0240	1579105.	16100.	-0. 000344	656. 6159	9. 394E+11	0. 000	0. 000	0. 000
22. 910	0. 0224	1656912.	16100.	-0. 000336	663. 7822	9. 394E+11	0. 000	0. 000	0. 000
23. 305	0. 0208	1734682.	16100.	-0. 000328	670. 9451	9. 394E+11	0. 000	0. 000	0. 000
23. 700	0. 0193	1812414.	16100.	-0. 000319	678. 1045	9. 394E+11	0. 000	0. 000	0. 000
24. 095	0. 0178	1890105.	16100.	-0. 000309	685. 2601	9. 394E+11	0. 000	0. 000	0. 000
24. 490	0. 0164	1967755.	16100.	-0. 000300	692. 4120	9. 394E+11	0. 000	0. 000	0. 000
24. 885	0. 0150	2045361.	16100.	-0. 000290	699. 5598	9. 394E+11	0. 000	0. 000	0. 000
25. 280	0. 0136	2122922.	16100.	-0. 000279	706. 7034	9. 394E+11	0. 000	0. 000	0. 000
25. 675	0. 0123	2200437.	16100.	-0. 000268	713. 8428	9. 394E+11	0. 000	0. 000	0. 000
26. 070	0. 0111	2277902.	16100.	-0. 000257	720. 9776	9. 394E+11	0. 000	0. 000	0. 000
26. 465	0. 009899	2355317.	16100.	-0. 000245	728. 1078	9. 394E+11	0. 000	0. 000	0. 000
26. 860	0. 008765	2432680.	16100.	-0. 000233	735. 2332	9. 394E+11	0. 000	0. 000	0. 000
27. 255	0. 007690	2509989.	16100.	-0. 000221	742. 3536	9. 394E+11	0. 000	0. 000	0. 000
27. 650	0. 006674	2587243.	16100.	-0. 000208	749. 4690	9. 394E+11	0. 000	0. 000	0. 000
28. 045	0. 005720	2664439.	16100.	-0. 000195	756. 5790	9. 394E+11	0. 000	0. 000	0. 000
28. 440	0. 004830	2741576.	16100.	-0. 000181	763. 6837	9. 394E+11	0. 000	0. 000	0. 000
28. 835	0. 004005	2818653.	16100.	-0. 000167	770. 7827	9. 394E+11	0. 000	0. 000	0. 000
29. 230	0. 003248	2895667.	16100.	-0. 000152	777. 8760	9. 394E+11	0. 000	0. 000	0. 000
29. 625	0. 002560	2972618.	16100.	-0. 000138	784. 9634	9. 394E+11	0. 000	0. 000	0. 000
30. 020	0. 001944	3049502.	16100.	-0. 000122	792. 0447	9. 394E+11	0. 000	0. 000	0. 000

IB4_B-9_Trans_Scourd.l p7o									
30.415	0.001400	3126319.	16100.	-0.000107	799.1199	9.394E+11	0.000	0.000	0.000
30.810	0.000931	3203067.	-16983.	-9.088E-05	806.1886	9.394E+11	-13959.	71100000.	0.000
31.205	0.000538	2966116.	-69197.	-7.532E-05	784.3645	9.394E+11	-8072.0282	71100000.	0.000
31.600	0.000217	2547739.	-96028.	-5.687E-05	1017.9302	5.506E+11	-3249.0365	71100000.	0.000
31.995	-9.768E-07	2056269.	-103694.	-3.705E-05	950.3609	5.506E+11	14.6519	71100000.	0.000
32.390	-0.000135	1565050.	-98872.	-2.147E-05	882.8261	5.506E+11	2019.8338	71100000.	0.000
32.785	-0.000204	1119152.	-86816.	-9.913E-06	821.5224	5.506E+11	3067.1520	71100000.	0.000
33.180	-0.000229	742125.	-71419.	-1.902E-06	769.6871	5.506E+11	3429.5106	71100000.	0.000
33.575	-0.000223	442122.	-55380.	3.195E-06	728.4414	5.506E+11	3337.6638	71100000.	0.000
33.970	-0.000198	217091.	-40419.	6.032E-06	697.5033	5.506E+11	2975.2235	71100000.	0.000
34.365	-0.000165	58899.	-27490.	7.220E-06	675.7544	5.506E+11	2479.9161	71100000.	0.000
34.760	-0.000130	-43578.	-16995.	7.286E-06	673.6481	5.506E+11	1948.5608	71100000.	0.000
35.155	-9.626E-05	-102274.	-8954.5344	6.658E-06	681.7179	5.506E+11	1443.8769	71100000.	0.000
35.550	-6.679E-05	-128526.	-3158.3076	5.665E-06	685.3270	5.506E+11	1001.7884	71100000.	0.000
35.945	-4.256E-05	-132265.	728.8490	4.542E-06	685.8411	5.506E+11	638.3621	71100000.	0.000
36.340	-2.373E-05	-121656.	3085.2175	3.449E-06	684.3826	5.506E+11	355.8862	71100000.	0.000
36.735	-9.858E-06	-103047.	4279.1152	2.482E-06	681.8241	5.506E+11	147.8681	71100000.	0.000
37.130	-1.946E-07	-81112.	4636.4788	1.690E-06	678.8084	5.506E+11	2.9183	71100000.	0.000
37.525	6.159E-06	-59108.	4424.4348	1.086E-06	675.7832	5.506E+11	-92.3883	71100000.	0.000
37.920	1.010E-05	-39178.	3846.3750	6.630E-07	673.0431	5.506E+11	-151.5187	71100000.	0.000
38.315	1.244E-05	-22650.	3044.8653	3.969E-07	670.7708	5.506E+11	-186.6710	71100000.	0.000
38.710	1.386E-05	-10316.	2109.5884	2.550E-07	669.0751	5.506E+11	-207.9606	71100000.	0.000
39.105	1.486E-05	-2653.5912	1088.3624	1.992E-07	668.0216	5.506E+11	-222.9364	71100000.	0.000
39.500	1.575E-05	0.000	0.000	1.878E-07	667.6568	5.506E+11	-236.2882	35550000.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 4:

Pile-head deflection = 0.1136106 inches  
 Computed slope at pile head = 0.000000 radians  
 Maximum bending moment = 3203067. inch-lbs  
 Maximum shear force = -103694. lbs  
 Depth of maximum bending moment = 30.8100000 feet below pile head  
 Depth of maximum shear force = 31.9950000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 2

-----  
 Pile-head Deflection vs. Pile Length for Load Case 4  
 -----

Boundary Condition Type 2, Shear and Slope

Shear = 16100. lb  
 Slope = 0.00000  
 Axial Load = 925000. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
39.5000	0.1136106	3203067.	-103694.
37.5250	0.1134332	3194855.	-103372.
35.5500	0.1104683	3188794.	-101233.
33.5750	0.1128623	3159252.	-124959.



33. 5750	0. 000000	3827057356.	475463917.
33. 5750	0. 000000	3827057356.	475463917.
33. 5750	0. 000000	3827057356.	475463917.
33. 5750	0. 000000	3827057356.	475463917.
33. 5750	0. 000000	3827057356.	475463917.
33. 5750	0. 000000	3827057356.	475463917.
33. 5750	0. 000000	3827057356.	475463917.
33. 5750	0. 000000	3827057356.	475463917.
33. 5750	0. 000000	3827057356.	475463917.
33. 5750	0. 000000	3827057356.	475463917.
33. 5750	0. 000000	3827057356.	475463917.
33. 5750	0. 000000	3827057356.	475463917.
33. 5750	0. 000000	3827057356.	475463917.
33. 5750	0. 000000	3827057356.	475463917.
33. 5750	0. 000000	3827057356.	475463917.

-----  
 Summary of Pile Response(s)  
 -----

Defi ni ti ons of Pile-head Loadi ng Condi ti ons:

- Load Type 1: Load 1 = Shear, lbs, and Load 2 = Moment, in-lbs
- Load Type 2: Load 1 = Shear, lbs, and Load 2 = Slope, radians
- Load Type 3: Load 1 = Shear, lbs, and Load 2 = Rotational Sti ffness, in-lbs/radian
- Load Type 4: Load 1 = Top Deflection, inches, and Load 2 = Moment, in-lbs
- Load Type 5: Load 1 = Top Deflection, inches, and Load 2 = Slope, radi ans

Load Case No.	Load Type No.	Pile-head Condition 1 V(lbs) or y(inches)	Pile-head Condition 2 in-lb, rad., or in-lb/rad.	Axial Loadi ng lbs	Pile-head Defl ecti on inches	Maxi mum Moment in Pile in-lbs	Maxi mum Shear in Pile lbs	Pile-head Rotati on radi ans
1	1	V = 15700.	M = 1152000.	640000.	0. 46867959	7255282.	-235721.	-0. 00203349
2	1	V = 16100.	M = 1224000.	925000.	0. 49465229	7632105.	-248004.	-0. 00214980
3	2	V = 15700.	S = 0. 000	640000.	0. 11011477	3106126.	-100542.	0. 00000000
4	2	V = 16100.	S = 0. 000	925000.	0. 11361059	3203067.	-103694.	0. 00000000

-----  
 Summary of Warni ng Messages  
 -----

The followi ng warni ng was reported 4000 times

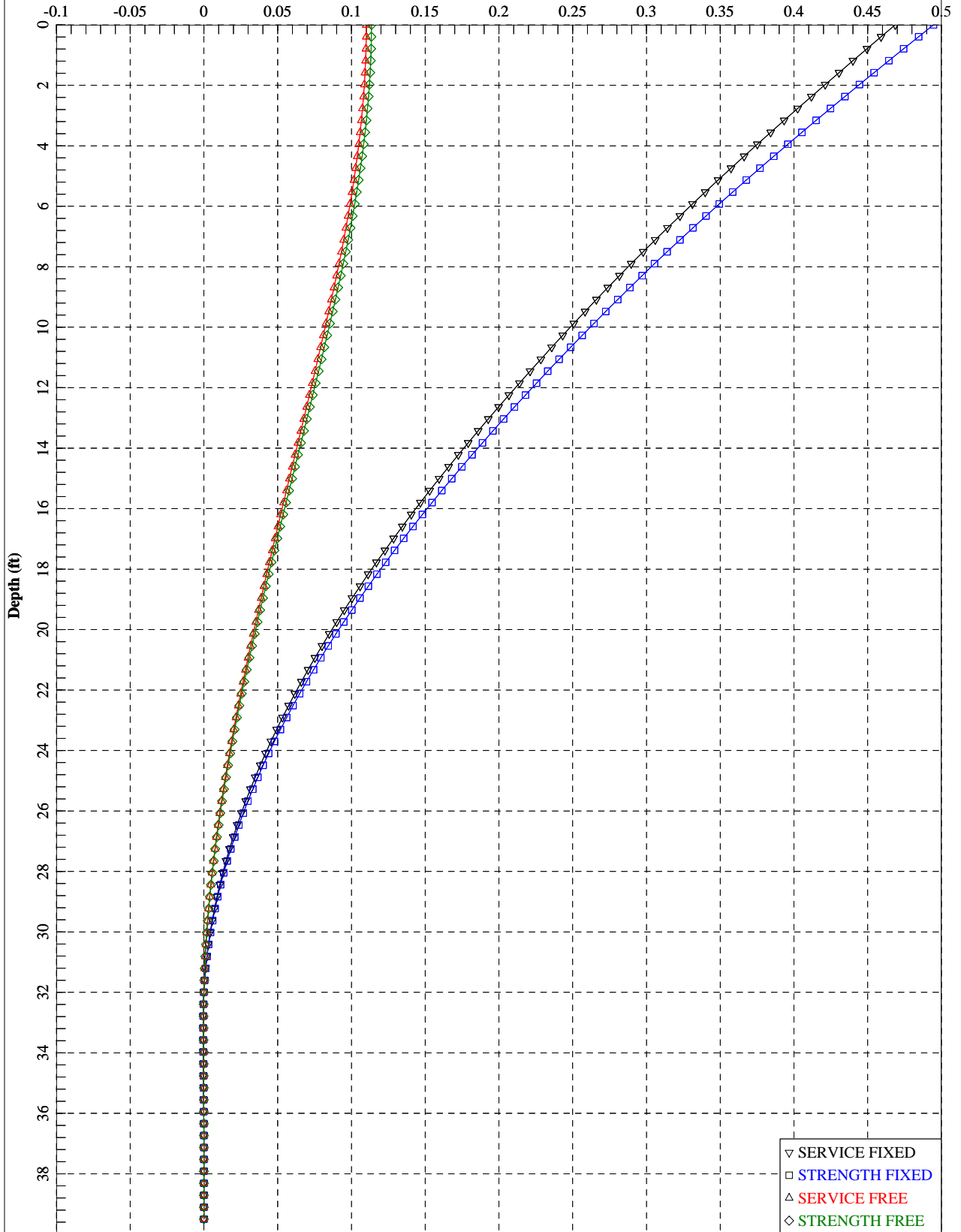
\*\*\*\* Warni ng \*\*\*\*

An unreasonable input value for uniaxial compressive strength has been specified for a soil defined using the vuggy limestone criteria. The input value is outside of the range of 1,000 to 2,500 psi (6,895 to 17,237 kPa). You should check your input data for correctness.

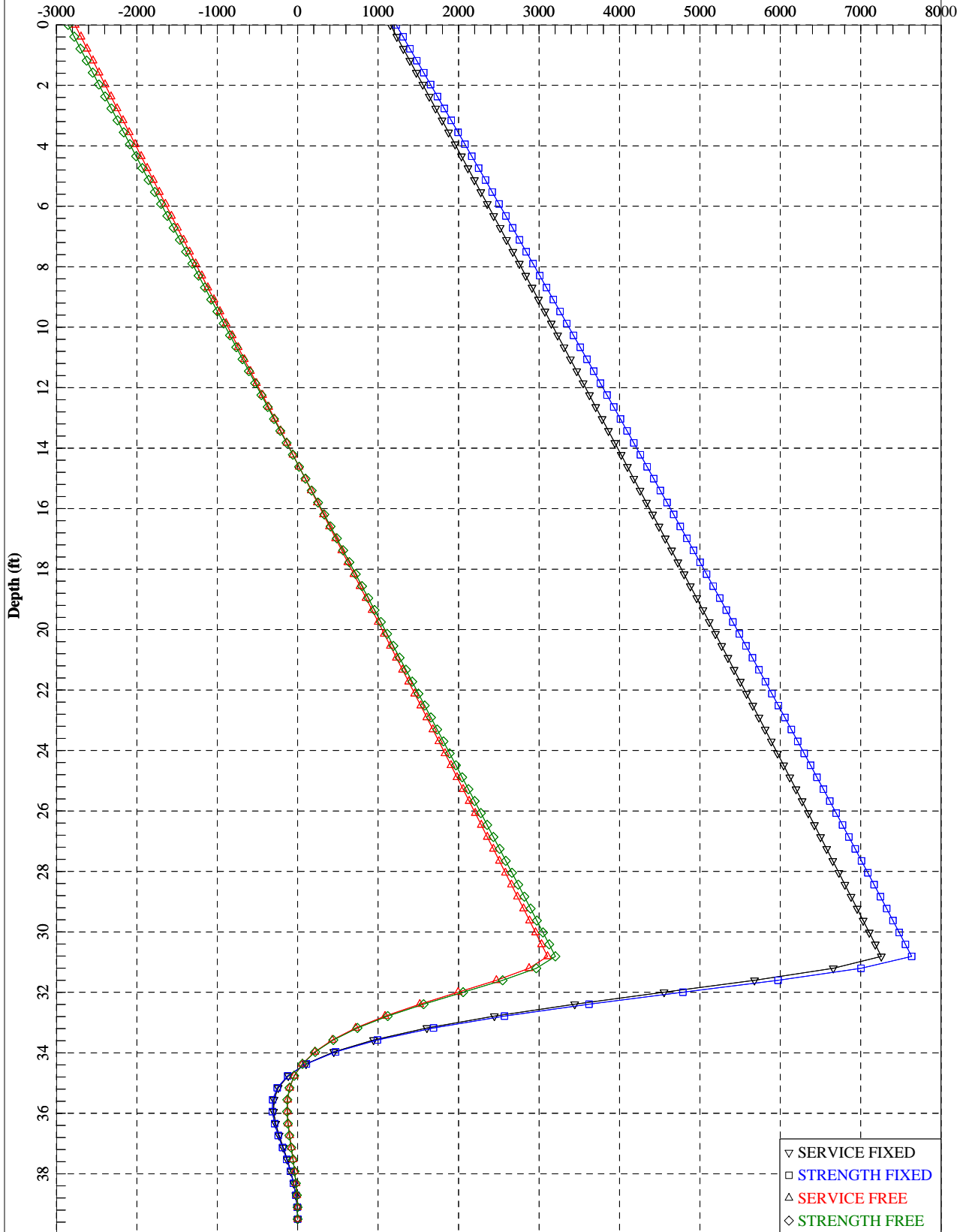
The analysis ended normally.

IB4\_\_B-9\_Trans\_Scoured. I p7o

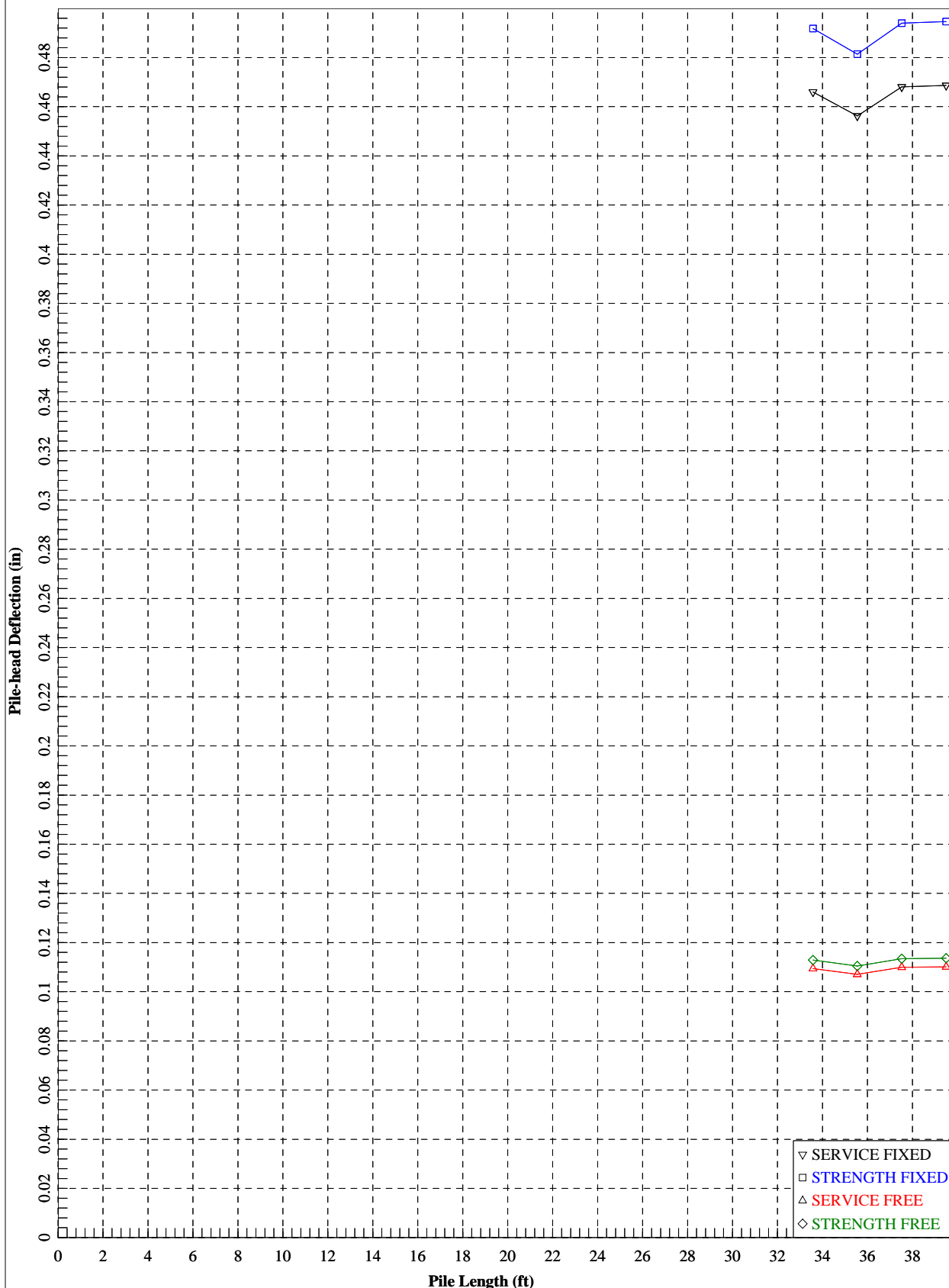
SC 557 Bridge over Crowders Creek - IB4 - Boring B-9 - 48" Dia. Drilled Shaft - Scoured Transverse Analysis  
Lateral Pile Deflection (inches)



SC 557 Bridge over Crowders Creek - IB4 - Boring B-9 - 48" Dia. Drilled Shaft - Scoured Transverse Analysis  
Bending Moment (in-kips)



SC 557 Bridge over Crowders Creek - IB4 - Boring B-9 - 48" Dia. Drilled Shaft - Scoured Transverse Analysis



**SC 557 Bridge over Crowders Creek  
Final Bridge Geotechnical Engineering Report**

---

# **APPENDIX**

## **SECTION 17 END BENT 5 DRIVEN PILE ANALYSES**

=====  
LPile Plus for Windows, Version 2013-07.007

Analysis of Individual Piles and Drilled Shafts  
Subjected to Lateral Loading Using the p-y Method

© 1985-2013 by Ensoft, Inc.  
All Rights Reserved

=====  
This copy of LPile is used by:

Bradley Fischer  
F&ME

Serial Number of Security Device: 291490957

This copy of LPile is licensed for exclusive use by: F&ME Consultants, Columbia, Sout

Use of this program by any entity other than F&ME Consultants, Columbia, Sout  
is forbidden by the software license agreement.

-----  
Files Used for Analysis  
-----

Path to file locations: P:\Geotechnical\G4800's\G4843 - SC557 - York County\Report\Final\Bridge\LPile\  
Name of input data file: EB5\_B-10\_Long.l p7d  
Name of output report file: EB5\_B-10\_Long.l p7o  
Name of plot output file: EB5\_B-10\_Long.l p7p  
Name of runtime message file: EB5\_B-10\_Long.l p7r

-----  
Date and Time of Analysis  
-----

Date: August 3, 2018 Time: 8:55:05

-----  
Problem Title  
-----

Project Name: SC 557 over Crowders Creek

Job Number: G4843

Client: CALYX

Engineer: JFH

Description: EB5 - HP14x73 Steel Pile - Longitudinal Analysis

-----  
 Program Options and Settings  
 -----

Engineering Units of Input Data and Computations:

- Engineering units are US Customary Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

Computational Options:

- Use unfactored loads in computations (conventional analysis)
- Compute pile response under loading and nonlinear bending properties of pile (only if nonlinear pile properties are input)
- Analysis uses p-y modification factors for p-y curves
- Analysis includes loading by lateral soil movements acting on pile
- Input of shear resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- No p-y curves to be computed and reported for user-specified depths
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1

-----  
 Pile Structural Properties and Geometry  
 -----

- Total number of pile sections = 1
- Total length of pile = 30.00 ft
- Depth of ground surface below top of pile = 0.00 ft

Pile diameter values used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile.

Point	Depth X ft	Pile Diameter in
1	0.00000	14.6000000
2	30.000000	14.6000000



Input Structural Properties:

Pile Section No. 1:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Strong H-Pile
Section Length	=	30.00000 ft
Flange Width	=	14.60000 in
Section Depth	=	13.60000 in
Flange Thickness	=	0.50500 in
Web Thickness	=	0.50500 in
Section Area	=	21.40000 Sq. in
Moment of Inertia	=	729.00000 in^4
Elastic Modulus	=	29000000. lbs/in^2

-----  
 Ground Slope and Pile Batter Angles  
 -----

Ground Slope Angle	=	0.000 degrees
	=	0.000 radians
Pile Batter Angle	=	0.000 degrees
	=	0.000 radians

-----  
 Soil and Rock Layering Information  
 -----

The soil profile is modelled using 3 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer	=	0.0000 ft
Distance from top of pile to bottom of layer	=	8.50000 ft
Effective unit weight at top of layer	=	125.00000 pcf
Effective unit weight at bottom of layer	=	125.00000 pcf
Friction angle at top of layer	=	30.00000 deg.
Friction angle at bottom of layer	=	30.00000 deg.
Subgrade k at top of layer	=	90.00000 pci
Subgrade k at bottom of layer	=	90.00000 pci

Layer 2 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer	=	8.50000 ft
Distance from top of pile to bottom of layer	=	29.50000 ft
Effective unit weight at top of layer	=	28.00000 pcf
Effective unit weight at bottom of layer	=	28.00000 pcf
Friction angle at top of layer	=	24.00000 deg.
Friction angle at bottom of layer	=	24.00000 deg.
Subgrade k at top of layer	=	20.00000 pci
Subgrade k at bottom of layer	=	20.00000 pci

Layer 3 is strong rock (vuggy limestone)

EB5\_B-10\_Long.l p7o

Distance from top of pile to top of layer = 29.50000 ft  
 Distance from top of pile to bottom of layer = 60.00000 ft  
 Effective unit weight at top of layer = 98.00000 pcf  
 Effective unit weight at bottom of layer = 98.00000 pcf  
 Uniaxial compressive strength at top of layer = 5000.00000 psi  
 Uniaxial compressive strength at bottom of layer = 5000.00000 psi

(Depth of lowest soil layer extends 30.00 ft below pile tip)

-----  
 Summary of Soil Properties  
 -----

Layer Num.	Layer Soil Type (p-y Curve Criteria)	Layer Depth ft	Effective Unit Wt. pcf	Angle of Friction deg.	Uni axial qu psi	kpy pci
1	Sand (Reese, et al.)	0.00	125.000	30.000	--	90.000
		8.500	125.000	30.000	--	90.000
2	Sand (Reese, et al.)	8.500	28.000	24.000	--	20.000
		29.500	28.000	24.000	--	20.000
3	Vuggy Limestone	29.500	98.000	--	5000.000	--
		60.000	98.000	--	5000.000	--

-----  
 p-y Modification Factors for Group Action  
 -----

Distribution of p-y modifiers with depth defined using 2 points

Point No.	Depth X ft	p-mult	y-mult
1	0.000	0.8700	1.0000
2	100.000	0.8700	1.0000

-----  
 Lateral Soil Movements  
 -----

Profile of soil movement with depth defined using 2 points

Point No.	Depth X ft	Soil Movement in
1	0.00000	0.00000
2	0.00000	0.00000

-----  
 Loading Type  
 -----

Static loading criteria were used when computing p-y curves for all analyses.

-----  
 Pile-head Loading and Pile-head Fixity Conditions  
 -----

Number of loads specified = 2

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length
1	1	V = 7800.00000 lbs	M = 0.0000 in-lbs	95000.	Yes
2	1	V = 11700. lbs	M = 0.0000 in-lbs	135000.	Yes

V = perpendicular shear force applied to pile head  
 M = bending moment applied to pile head  
 y = lateral deflection relative to pile axis  
 S = pile slope relative to original pile batter angle  
 R = rotational stiffness applied to pile head  
 Axial thrust is assumed to be acting axially for all pile batter angles.

-----  
 Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness  
 -----

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

-----  
 Moment-curvature properties were derived from elastic section properties

-----  
 Computed Values of Pile Loading and Deflection  
 for Lateral Loading for Load Case Number 1  
 -----

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 7800.0 lbs  
 Applied moment at pile head = 0.0 in-lbs  
 Axial thrust load on pile head = 95000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi *	Bending Stiffness lb-in <sup>2</sup>	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.1402	-1.811E-07	7800.0000	-0.001783	4439.2523	2.114E+10	0.000	0.000	0.000
0.300	0.1338	28690.	7768.4062	-0.001781	4726.5448	2.114E+10	-17.5521	472.3241	0.000
0.600	0.1274	57151.	7671.1991	-0.001774	5011.5427	2.114E+10	-36.4519	1030.2168	0.000
0.900	0.1210	85136.	7504.8838	-0.001761	5291.7766	2.114E+10	-55.9455	1664.3498	0.000
1.200	0.1147	112391.	7269.8237	-0.001745	5564.7003	2.114E+10	-74.6435	2342.8720	0.000

EB5\_B-10\_Long.l p7o

1. 500	0. 1084	138672.	6969. 6728	-0. 001723	5827. 8715	2. 114E+10	-92. 1070	3057. 5183	0. 000
1. 800	0. 1023	163751.	6611. 3124	-0. 001698	6079. 0083	2. 114E+10	-106. 9820	3765. 2071	0. 000
2. 100	0. 0962	187434.	6201. 6932	-0. 001668	6316. 1658	2. 114E+10	-120. 5842	4511. 2325	0. 000
2. 400	0. 0903	209544.	5748. 9981	-0. 001634	6537. 5648	2. 114E+10	-130. 9131	5220. 2122	0. 000
2. 700	0. 0845	229945.	5262. 0111	-0. 001596	6741. 8520	2. 114E+10	-139. 6352	5951. 5060	0. 000
3. 000	0. 0788	248522.	4750. 0303	-0. 001556	6927. 8835	2. 114E+10	-144. 7986	6616. 2320	0. 000
3. 300	0. 0733	265209.	4224. 5828	-0. 001512	7094. 9785	2. 114E+10	-147. 1167	7229. 0098	0. 000
3. 600	0. 0679	279973.	3698. 4658	-0. 001465	7242. 8263	2. 114E+10	-145. 1706	7696. 6386	0. 000
3. 900	0. 0627	292840.	3178. 2494	-0. 001417	7371. 6710	2. 114E+10	-143. 8385	8257. 1356	0. 000
4. 200	0. 0577	303826.	2667. 7698	-0. 001366	7481. 6778	2. 114E+10	-139. 7613	8719. 7517	0. 000
4. 500	0. 0529	312982.	2178. 7563	-0. 001313	7573. 3696	2. 114E+10	-131. 9129	8980. 9523	0. 000
4. 800	0. 0482	320411.	1724. 5264	-0. 001259	7647. 7594	2. 114E+10	-120. 4370	8986. 9418	0. 000
5. 100	0. 0438	326260.	1293. 5650	-0. 001204	7706. 3324	2. 114E+10	-118. 9860	9777. 6775	0. 000
5. 400	0. 0396	330549.	863. 7672	-0. 001148	7749. 2733	2. 114E+10	-119. 7906	10897.	0. 000
5. 700	0. 0355	333265.	433. 5695	-0. 001092	7776. 4753	2. 114E+10	-119. 2082	12075.	0. 000
6. 000	0. 0317	334417.	7. 9969	-0. 001035	7788. 0124	2. 114E+10	-117. 2211	13308.	0. 000
6. 300	0. 0281	334031.	-414. 3889	-0. 000978	7784. 1418	2. 114E+10	-117. 4378	15052.	0. 000
6. 600	0. 0247	332103.	-838. 1027	-0. 000921	7764. 8356	2. 114E+10	-117. 9587	17215.	0. 000
6. 900	0. 0215	328627.	-1261. 7064	-0. 000865	7730. 0273	2. 114E+10	-117. 3767	19698.	0. 000
7. 200	0. 0184	323610.	-1681. 0767	-0. 000810	7679. 7944	2. 114E+10	-115. 6068	22572.	0. 000
7. 500	0. 0156	317077.	-2087. 3332	-0. 000755	7614. 3697	2. 114E+10	-110. 0913	25369.	0. 000
7. 800	0. 0130	309098.	-2457. 0075	-0. 000702	7534. 4726	2. 114E+10	-95. 2834	26384.	0. 000
8. 100	0. 0106	299866.	-2773. 3092	-0. 000650	7442. 0296	2. 114E+10	-80. 4398	27399.	0. 000
8. 400	0. 008321	289575.	-3036. 3177	-0. 000600	7338. 9724	2. 114E+10	-65. 6761	28414.	0. 000
8. 700	0. 006251	278415.	-3179. 2482	-0. 000551	7227. 2231	2. 114E+10	-13. 7297	7907. 4952	0. 000
9. 000	0. 004351	267061.	-3221. 6543	-0. 000505	7113. 5296	2. 114E+10	-9. 8292	8132. 9992	0. 000
9. 300	0. 002615	255565.	-3250. 2743	-0. 000460	6998. 4047	2. 114E+10	-6. 0708	8358. 5032	0. 000
9. 600	0. 001035	243974.	-3265. 6450	-0. 000418	6882. 3429	2. 114E+10	-2. 4684	8584. 0072	0. 000
9. 900	-0. 000395	232338.	-3268. 3497	-0. 000377	6765. 8185	2. 114E+10	0. 9658	8809. 5112	0. 000
10. 200	-0. 001682	220700.	-3259. 0122	-0. 000339	6649. 2840	2. 114E+10	4. 2217	9035. 0152	0. 000
10. 500	-0. 002834	209105.	-3238. 2895	-0. 000302	6533. 1686	2. 114E+10	7. 2909	9260. 5192	0. 000
10. 800	-0. 003858	197591.	-3206. 8659	-0. 000268	6417. 8775	2. 114E+10	10. 1666	9486. 0232	0. 000
11. 100	-0. 004761	186198.	-3165. 4469	-0. 000235	6303. 7906	2. 114E+10	12. 8439	9711. 5272	0. 000
11. 400	-0. 005550	174961.	-3114. 7533	-0. 000204	6191. 2619	2. 114E+10	15. 3192	9937. 0312	0. 000
11. 700	-0. 006231	163912.	-3055. 5156	-0. 000175	6080. 6193	2. 114E+10	17. 5906	10163.	0. 000
12. 000	-0. 006812	153081.	-2988. 4693	-0. 000148	5972. 1639	2. 114E+10	19. 6574	10388.	0. 000
12. 300	-0. 007299	142496.	-2914. 3497	-0. 000123	5866. 1704	2. 114E+10	21. 5202	10614.	0. 000
12. 600	-0. 007699	132182.	-2833. 8872	-9. 980E-05	5762. 8866	2. 114E+10	23. 1811	10839.	0. 000
12. 900	-0. 008018	122161.	-2747. 8035	-7. 814E-05	5662. 5342	2. 114E+10	24. 6431	11065.	0. 000
13. 200	-0. 008262	112451.	-2656. 8078	-5. 816E-05	5565. 3086	2. 114E+10	25. 9101	11290.	0. 000
13. 500	-0. 008437	103071.	-2561. 5927	-3. 981E-05	5471. 3800	2. 114E+10	26. 9872	11516.	0. 000
13. 800	-0. 008548	94035.	-2462. 8317	-2. 303E-05	5380. 8936	2. 114E+10	27. 8801	11741.	0. 000
14. 100	-0. 008603	85355.	-2361. 1760	-7. 758E-06	5293. 9706	2. 114E+10	28. 5953	11967.	0. 000
14. 400	-0. 008604	77040.	-2257. 2520	6. 069E-06	5210. 7089	2. 114E+10	29. 1402	12192.	0. 000
14. 700	-0. 008559	69098.	-2151. 6594	1. 851E-05	5131. 1840	2. 114E+10	29. 5224	12418.	0. 000
15. 000	-0. 008471	61535.	-2044. 9691	2. 963E-05	5055. 4501	2. 114E+10	29. 7501	12643.	0. 000
15. 300	-0. 008346	54354.	-1937. 7215	3. 950E-05	4983. 5413	2. 114E+10	29. 8319	12869.	0. 000
15. 600	-0. 008187	47557.	-1830. 4257	4. 818E-05	4915. 4722	2. 114E+10	29. 7769	13094.	0. 000
15. 900	-0. 007999	41142.	-1723. 5580	5. 573E-05	4851. 2399	2. 114E+10	29. 5940	13320.	0. 000
16. 200	-0. 007785	35109.	-1617. 5618	6. 222E-05	4790. 8241	2. 114E+10	29. 2928	13545.	0. 000
16. 500	-0. 007551	29453.	-1512. 8465	6. 772E-05	4734. 1895	2. 114E+10	28. 8824	13771.	0. 000
16. 800	-0. 007298	24170.	-1409. 7876	7. 228E-05	4681. 2859	2. 114E+10	28. 3725	13996.	0. 000
17. 100	-0. 007030	19253.	-1308. 7269	7. 598E-05	4632. 0504	2. 114E+10	27. 7724	14222.	0. 000
17. 400	-0. 006751	14695.	-1209. 9722	7. 887E-05	4586. 4079	2. 114E+10	27. 0913	14447.	0. 000
17. 700	-0. 006462	10488.	-1113. 7984	8. 102E-05	4544. 2727	2. 114E+10	26. 3386	14673.	0. 000
18. 000	-0. 006167	6620. 6346	-1020. 4474	8. 247E-05	4505. 5495	2. 114E+10	25. 5231	14898.	0. 000
18. 300	-0. 005868	3084. 0148	-930. 1294	8. 330E-05	4470. 1348	2. 114E+10	24. 6536	15124.	0. 000
18. 600	-0. 005568	-133. 2742	-843. 0236	8. 355E-05	4440. 5869	2. 114E+10	23. 7386	15349.	0. 000
18. 900	-0. 005267	-3042. 9035	-759. 2789	8. 328E-05	4469. 7231	2. 114E+10	22. 7862	15575.	0. 000
19. 200	-0. 004968	-5657. 0459	-679. 0157	8. 254E-05	4495. 9004	2. 114E+10	21. 8044	15800.	0. 000

EB5\_B-10\_Long.l p7o

19.500	-0.004673	-7988.2737	-602.3267	8.138E-05	4519.2447	2.114E+10	20.8006	16026.	0.000
19.800	-0.004382	-10049.	-529.2783	7.984E-05	4539.8848	2.114E+10	19.7818	16251.	0.000
20.100	-0.004098	-11854.	-459.9122	7.798E-05	4557.9518	2.114E+10	18.7549	16477.	0.000
20.400	-0.003821	-13414.	-394.2464	7.583E-05	4573.5780	2.114E+10	17.7261	16702.	0.000
20.700	-0.003552	-14744.	-332.2774	7.343E-05	4586.8959	2.114E+10	16.7012	16928.	0.000
21.000	-0.003292	-15857.	-273.9810	7.082E-05	4598.0377	2.114E+10	15.6857	17153.	0.000
21.300	-0.003042	-16765.	-219.3147	6.805E-05	4607.1347	2.114E+10	14.6845	17379.	0.000
21.600	-0.002802	-17482.	-168.2183	6.513E-05	4614.3161	2.114E+10	13.7023	17604.	0.000
21.900	-0.002573	-18021.	-120.6164	6.211E-05	4619.7091	2.114E+10	12.7432	17830.	0.000
22.200	-0.002355	-18393.	-76.4195	5.901E-05	4623.4378	2.114E+10	11.8107	18055.	0.000
22.500	-0.002148	-18612.	-35.5256	5.586E-05	4625.6230	2.114E+10	10.9082	18281.	0.000
22.800	-0.001953	-18687.	2.1782	5.268E-05	4626.3817	2.114E+10	10.0384	18506.	0.000
23.100	-0.001769	-18632.	36.8139	4.950E-05	4625.8268	2.114E+10	9.2037	18732.	0.000
23.400	-0.001596	-18456.	68.5117	4.634E-05	4624.0665	2.114E+10	8.4062	18957.	0.000
23.700	-0.001435	-18170.	97.4079	4.323E-05	4621.2046	2.114E+10	7.6473	19183.	0.000
24.000	-0.001285	-17784.	123.6439	4.016E-05	4617.3396	2.114E+10	6.9283	19408.	0.000
24.300	-0.001146	-17308.	147.3646	3.718E-05	4612.5651	2.114E+10	6.2499	19634.	0.000
24.600	-0.001017	-16749.	168.7173	3.428E-05	4606.9694	2.114E+10	5.6127	19859.	0.000
24.900	-0.000899	-16116.	187.8499	3.148E-05	4600.6356	2.114E+10	5.0166	20085.	0.000
25.200	-0.000791	-15418.	204.9104	2.879E-05	4593.6413	2.114E+10	4.4614	20310.	0.000
25.500	-0.000692	-14661.	220.0448	2.623E-05	4586.0590	2.114E+10	3.9466	20536.	0.000
25.800	-0.000602	-13851.	233.3970	2.381E-05	4577.9560	2.114E+10	3.4712	20761.	0.000
26.100	-0.000520	-12996.	245.1065	2.152E-05	4569.3945	2.114E+10	3.0341	20987.	0.000
26.400	-0.000447	-12101.	255.3085	1.938E-05	4560.4316	2.114E+10	2.6337	21212.	0.000
26.700	-0.000381	-11171.	264.1319	1.740E-05	4551.1198	2.114E+10	2.2682	21438.	0.000
27.000	-0.000322	-10211.	271.6990	1.558E-05	4541.5072	2.114E+10	1.9357	21663.	0.000
27.300	-0.000269	-9225.8459	278.1243	1.393E-05	4531.6374	2.114E+10	1.6339	21889.	0.000
27.600	-0.000221	-8218.5051	283.5134	1.244E-05	4521.5501	2.114E+10	1.3601	22114.	0.000
27.900	-0.000179	-7193.0587	287.9626	1.113E-05	4511.2816	2.114E+10	1.1117	22340.	0.000
28.200	-0.000141	-6152.7860	291.5578	9.992E-06	4500.8646	2.114E+10	0.8856	22565.	0.000
28.500	-0.000107	-5100.6775	294.3735	9.034E-06	4490.3291	2.114E+10	0.6787	22791.	0.000
28.800	-7.624E-05	-4039.4763	296.4725	8.256E-06	4479.7025	2.114E+10	0.4875	23016.	0.000
29.100	-4.776E-05	-2971.7225	297.9049	7.659E-06	4469.0103	2.114E+10	0.3083	23242.	0.000
29.400	-2.110E-05	-1899.7995	298.7075	7.244E-06	4458.2764	2.114E+10	0.1375	23467.	0.000
29.700	4.397E-06	-825.9833	264.5272	7.012E-06	4447.5235	2.114E+10	-19.1266	15660000.	0.000
30.000	2.939E-05	0.000	0.000	6.942E-06	4439.2523	2.114E+10	-127.8329	7830000.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 1:

Pile-head deflection = 0.1402000 inches  
 Computed slope at pile head = -0.0017833 radians  
 Maximum bending moment = 334417. inch-lbs  
 Maximum shear force = 7800.000000 lbs  
 Depth of maximum bending moment = 6.0000000 feet below pile head  
 Depth of maximum shear force = 0.0000000 feet below pile head  
 Number of iterations = 12  
 Number of zero deflection points = 2

-----  
 Pile-head Deflection vs. Pile Length for Load Case 1  
 -----

Boundary Condition Type 1, Shear and Moment

Shear = 7800. lb

Moment = 0. in- lb  
 Axial Load = 95000. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment in-lbs	Maximum Shear lbs
30.0000	0.1402000	334417.	7800.0000000
28.5000	0.1405548	333986.	7800.0000000
27.0000	0.1404787	334034.	7800.0000000
25.5000	0.1404481	334173.	7800.0000000
24.0000	0.1404579	334101.	7800.0000000
22.5000	0.1405723	333966.	7800.0000000
21.0000	0.1406045	333888.	7800.0000000
19.5000	0.1414235	333143.	7800.0000000
18.0000	0.1438290	331348.	7800.0000000
16.5000	0.1503486	327141.	7799.9999999
15.0000	0.1649223	319848.	7800.0000000
13.5000	0.1961585	308569.	7800.0000000
12.0000	0.2632122	293827.	7800.0000000
10.5000	0.4092090	277929.	7800.0000005
9.0000	0.7097430	265283.	-8554.6446753

-----  
 Computed Values of Pile Loading and Deflection  
 for Lateral Loading for Load Case Number 2  
 -----

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 11700.0 lbs  
 Applied moment at pile head = 0.0 in-lbs  
 Axial thrust load on pile head = 135000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi *	Bending Stiffness lb-in^2	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.2676	2.717E-07	11700.	-0.003171	6308.4112	2.114E+10	0.000	0.000	0.000
0.300	0.2562	43661.	11662.	-0.003167	6745.6189	2.114E+10	-20.9205	294.0056	0.000
0.600	0.2448	87047.	11546.	-0.003156	7180.0754	2.114E+10	-43.8740	645.2672	0.000
0.900	0.2334	129857.	11345.	-0.003137	7608.7659	2.114E+10	-67.6607	1043.4181	0.000
1.200	0.2222	171780.	11060.	-0.003112	8028.5680	2.114E+10	-90.7637	1470.5925	0.000
1.500	0.2110	212512.	10694.	-0.003079	8436.4485	2.114E+10	-112.5702	1920.2661	0.000
1.800	0.2000	251768.	10254.	-0.003039	8829.5438	2.114E+10	-131.5302	2367.2916	0.000
2.100	0.1892	289298.	9748.8582	-0.002993	9205.3608	2.114E+10	-149.3289	2841.9972	0.000
2.400	0.1785	324869.	9185.7258	-0.002941	9561.5585	2.114E+10	-163.5225	3298.4836	0.000
2.700	0.1680	358294.	8575.1440	-0.002883	9896.2653	2.114E+10	-175.6896	3765.1704	0.000
3.000	0.1577	389412.	7928.2552	-0.002819	10208.	2.114E+10	-183.6931	4192.9949	0.000
3.300	0.1477	418118.	7256.0187	-0.002750	10495.	2.114E+10	-189.7716	4625.9136	0.000
3.600	0.1379	444329.	6570.0862	-0.002677	10758.	2.114E+10	-191.3020	4993.6783	0.000
3.900	0.1284	468024.	5875.6690	-0.002599	10995.	2.114E+10	-194.4853	5452.3869	0.000
4.200	0.1192	489160.	5175.1477	-0.002518	11207.	2.114E+10	-194.6932	5880.1252	0.000
4.500	0.1103	507732.	4482.1987	-0.002433	11393.	2.114E+10	-190.2785	6211.2917	0.000
4.800	0.1017	523797.	3813.8357	-0.002345	11554.	2.114E+10	-181.0342	6409.5027	0.000
5.100	0.0934	537471.	3158.8466	-0.002255	11690.	2.114E+10	-182.8486	7047.7568	0.000
5.400	0.0854	548732.	2492.8869	-0.002162	11803.	2.114E+10	-187.1290	7883.9895	0.000
5.700	0.0778	557522.	1814.8314	-0.002068	11891.	2.114E+10	-189.5685	8768.2620	0.000

EB5\_B-10\_Long.l p7o

6.000	0.0706	563809.	1131.4619	-0.001973	11954.	2.114E+10	-190.0812	9698.3592	0.000
6.300	0.0636	567586.	441.7717	-0.001876	11992.	2.114E+10	-193.0800	10924.	0.000
6.600	0.0570	568813.	-259.2668	-0.001779	12004.	2.114E+10	-196.3858	12393.	0.000
6.900	0.0508	567449.	-969.6809	-0.001683	11991.	2.114E+10	-198.2887	14047.	0.000
7.200	0.0449	563467.	-1684.2509	-0.001586	11951.	2.114E+10	-198.6947	15919.	0.000
7.500	0.0394	556864.	-2397.4157	-0.001491	11885.	2.114E+10	-197.5080	18049.	0.000
7.800	0.0342	547655.	-3103.2590	-0.001397	11792.	2.114E+10	-194.6272	20488.	0.000
8.100	0.0293	535878.	-3795.4795	-0.001305	11675.	2.114E+10	-189.9397	23308.	0.000
8.400	0.0248	521596.	-4467.3348	-0.001215	11532.	2.114E+10	-183.3132	26606.	0.000
8.700	0.0206	504894.	-4878.7107	-0.001127	11364.	2.114E+10	-45.2290	7907.4952	0.000
9.000	0.0167	487565.	-5027.9834	-0.001043	11191.	2.114E+10	-37.7002	8132.9992	0.000
9.300	0.0131	469706.	-5150.5214	-0.000961	11012.	2.114E+10	-30.3764	8358.5032	0.000
9.600	0.009766	451415.	-5247.1164	-0.000883	10829.	2.114E+10	-23.2875	8584.0072	0.000
9.900	0.006727	432785.	-5318.6626	-0.000808	10642.	2.114E+10	-16.4604	8809.5112	0.000
10.200	0.003952	413906.	-5366.1440	-0.000735	10453.	2.114E+10	-9.9182	9035.0152	0.000
10.500	0.001431	394864.	-5390.6228	-0.000667	10262.	2.114E+10	-3.6811	9260.5192	0.000
10.800	-0.000848	375741.	-5393.2277	-0.000601	10071.	2.114E+10	2.2339	9486.0232	0.000
11.100	-0.002896	356617.	-5375.1430	-0.000539	9879.4711	2.114E+10	7.8131	9711.5272	0.000
11.400	-0.004726	337564.	-5337.5975	-0.000480	9688.6812	2.114E+10	13.0455	9937.0312	0.000
11.700	-0.006349	318652.	-5281.8544	-0.000424	9499.3045	2.114E+10	17.9229	10163.	0.000
12.000	-0.007777	299946.	-5209.2012	-0.000371	9311.9898	2.114E+10	22.4400	10388.	0.000
12.300	-0.009020	281507.	-5120.9403	-0.000322	9127.3387	2.114E+10	26.5938	10614.	0.000
12.600	-0.0101	263388.	-5018.3804	-0.000275	8945.9057	2.114E+10	30.3839	10839.	0.000
12.900	-0.0110	245642.	-4902.8281	-0.000232	8768.1975	2.114E+10	33.8119	11065.	0.000
13.200	-0.0118	228313.	-4775.5798	-0.000191	8594.6737	2.114E+10	36.8816	11290.	0.000
13.500	-0.0124	211444.	-4637.9154	-0.000154	8425.7472	2.114E+10	39.5987	11516.	0.000
13.800	-0.0129	195070.	-4491.0907	-0.000119	8261.7845	2.114E+10	41.9706	11741.	0.000
14.100	-0.0132	179224.	-4336.3322	-8.750E-05	8103.1069	2.114E+10	44.0063	11967.	0.000
14.400	-0.0135	163933.	-4174.8314	-5.828E-05	7949.9919	2.114E+10	45.7163	12192.	0.000
14.700	-0.0137	149222.	-4007.7400	-3.162E-05	7802.6740	2.114E+10	47.1123	12418.	0.000
15.000	-0.0137	135108.	-3836.1655	-7.408E-06	7661.3465	2.114E+10	48.2069	12643.	0.000
15.300	-0.0137	121608.	-3661.1678	1.445E-05	7526.1633	2.114E+10	49.0140	12869.	0.000
15.600	-0.0136	108734.	-3483.7559	3.406E-05	7397.2402	2.114E+10	49.5481	13094.	0.000
15.900	-0.0135	96492.	-3304.8852	5.154E-05	7274.6572	2.114E+10	49.8245	13320.	0.000
16.200	-0.0133	84888.	-3125.4556	6.698E-05	7158.4604	2.114E+10	49.8587	13545.	0.000
16.500	-0.0130	73924.	-2946.3097	8.050E-05	7048.6638	2.114E+10	49.6669	13771.	0.000
16.800	-0.0127	63597.	-2768.2316	9.221E-05	6945.2516	2.114E+10	49.2654	13996.	0.000
17.100	-0.0123	53903.	-2591.9464	0.000102	6848.1803	2.114E+10	48.6708	14222.	0.000
17.400	-0.0119	44835.	-2418.1198	0.000111	6757.3806	2.114E+10	47.8996	14447.	0.000
17.700	-0.0115	36385.	-2247.3580	0.000118	6672.7601	2.114E+10	46.9681	14673.	0.000
18.000	-0.0111	28540.	-2080.2084	0.000123	6594.2049	2.114E+10	45.8928	14898.	0.000
18.300	-0.0106	21288.	-1917.1603	0.000127	6521.5818	2.114E+10	44.6895	15124.	0.000
18.600	-0.0102	14613.	-1758.6460	0.000130	6454.7409	2.114E+10	43.3740	15349.	0.000
18.900	-0.009699	8498.8954	-1605.0422	0.000132	6393.5168	2.114E+10	41.9615	15575.	0.000
19.200	-0.009220	2927.9898	-1456.6713	0.000133	6337.7313	2.114E+10	40.4668	15800.	0.000
19.500	-0.008739	-2118.7085	-1313.8037	0.000133	6329.6274	2.114E+10	38.9041	16026.	0.000
19.800	-0.008260	-6661.0347	-1176.6598	0.000133	6375.1129	2.114E+10	37.2870	16251.	0.000
20.100	-0.007785	-10720.	-1045.4119	0.000131	6415.7540	2.114E+10	35.6285	16477.	0.000
20.400	-0.007316	-14315.	-920.1868	0.000129	6451.7623	2.114E+10	33.9410	16702.	0.000
20.700	-0.006856	-17470.	-801.0682	0.000126	6483.3540	2.114E+10	32.2360	16928.	0.000
21.000	-0.006406	-20206.	-688.0996	0.000123	6510.7477	2.114E+10	30.5244	17153.	0.000
21.300	-0.005969	-22544.	-581.2865	0.000119	6534.1633	2.114E+10	28.8163	17379.	0.000
21.600	-0.005546	-24507.	-480.5995	0.000115	6553.8205	2.114E+10	27.1210	17604.	0.000
21.900	-0.005138	-26117.	-385.9769	0.000111	6569.9377	2.114E+10	25.4471	17830.	0.000
22.200	-0.004746	-27394.	-297.3278	0.000107	6582.7308	2.114E+10	23.8024	18055.	0.000
22.500	-0.004371	-28361.	-214.5346	0.000102	6592.4121	2.114E+10	22.1938	18281.	0.000
22.800	-0.004013	-29038.	-137.4560	9.695E-05	6599.1897	2.114E+10	20.6276	18506.	0.000
23.100	-0.003673	-29445.	-65.9296	9.197E-05	6603.2662	2.114E+10	19.1092	18732.	0.000
23.400	-0.003350	-29602.	0.2248	8.695E-05	6604.8383	2.114E+10	17.6432	18957.	0.000
23.700	-0.003047	-29528.	61.2031	8.191E-05	6604.0963	2.114E+10	16.2336	19183.	0.000

EB5\_B-10\_Long.l p7o

24.000	-0.002761	-29241.	117.2139	7.691E-05	6601.2229	2.114E+10	14.8835	19408.	0.000
24.300	-0.002493	-28759.	168.4757	7.197E-05	6596.3938	2.114E+10	13.5953	19634.	0.000
24.600	-0.002243	-28098.	215.2148	6.713E-05	6589.7765	2.114E+10	12.3708	19859.	0.000
24.900	-0.002009	-27275.	257.6624	6.241E-05	6581.5305	2.114E+10	11.2111	20085.	0.000
25.200	-0.001793	-26303.	296.0521	5.785E-05	6571.8069	2.114E+10	10.1165	20310.	0.000
25.500	-0.001593	-25199.	330.6181	5.347E-05	6560.7486	2.114E+10	9.0868	20536.	0.000
25.800	-0.001408	-23975.	361.5923	4.928E-05	6548.4902	2.114E+10	8.1211	20761.	0.000
26.100	-0.001238	-22644.	389.2025	4.531E-05	6535.1579	2.114E+10	7.2179	20987.	0.000
26.400	-0.001082	-21217.	413.6701	4.158E-05	6520.8702	2.114E+10	6.3752	21212.	0.000
26.700	-0.000939	-19706.	435.2083	3.809E-05	6505.7375	2.114E+10	5.5904	21438.	0.000
27.000	-0.000808	-18120.	454.0197	3.487E-05	6489.8629	2.114E+10	4.8604	21663.	0.000
27.300	-0.000688	-16471.	470.2950	3.193E-05	6473.3426	2.114E+10	4.1814	21889.	0.000
27.600	-0.000578	-14765.	484.2107	2.927E-05	6456.2660	2.114E+10	3.5495	22114.	0.000
27.900	-0.000477	-13013.	495.9277	2.690E-05	6438.7165	2.114E+10	2.9600	22340.	0.000
28.200	-0.000384	-11221.	505.5897	2.484E-05	6420.7721	2.114E+10	2.4078	22565.	0.000
28.500	-0.000298	-9396.5767	513.3213	2.308E-05	6402.5059	2.114E+10	1.8875	22791.	0.000
28.800	-0.000218	-7547.2186	519.2268	2.164E-05	6383.9869	2.114E+10	1.3933	23016.	0.000
29.100	-0.000142	-5679.1781	523.3890	2.051E-05	6365.2809	2.114E+10	0.9190	23242.	0.000
29.400	-7.023E-05	-3798.7578	525.8672	1.971E-05	6346.4509	2.114E+10	0.4578	23467.	0.000
29.700	-4.481E-07	-1912.0899	530.2001	1.922E-05	6327.5583	2.114E+10	1.9494	15660000.	0.000
30.000	6.816E-05	0.000	0.000	1.906E-05	6308.4112	2.114E+10	-296.5050	7830000.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 2:

Pile-head deflection = 0.2675779 inches  
 Computed slope at pile head = -0.0031705 radians  
 Maximum bending moment = 568813. inch-lbs  
 Maximum shear force = 11700. lbs  
 Depth of maximum bending moment = 6.6000000 feet below pile head  
 Depth of maximum shear force = 0.0000000 feet below pile head  
 Number of iterations = 13  
 Number of zero deflection points = 2

-----  
 Pile-head Deflection vs. Pile Length for Load Case 2  
 -----

Boundary Condition Type 1, Shear and Moment

Shear = 11700. lb  
 Moment = 0. in-lb  
 Axial Load = 135000. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment In-lbs	Maximum Shear lbs
30.0000	0.2675779	568813.	11700.
28.5000	0.2690023	567560.	11700.
27.0000	0.2683108	568092.	11700.
25.5000	0.2680483	568474.	11700.
24.0000	0.2681355	568148.	11700.
22.5000	0.2688513	567553.	11700.
21.0000	0.2689796	567368.	11700.



19. 5000	0. 2719187	565133.	11700.
18. 0000	0. 2788448	561247.	11700.
16. 5000	0. 2969476	552292.	11700.
15. 0000	0. 3348235	538418.	11700.
13. 5000	0. 4133514	518825.	11700.
12. 0000	0. 5772345	493006.	11700.
10. 5000	1. 0435664	491873.	-13628.

-----  
 Summary of Pile Response(s)  
 -----

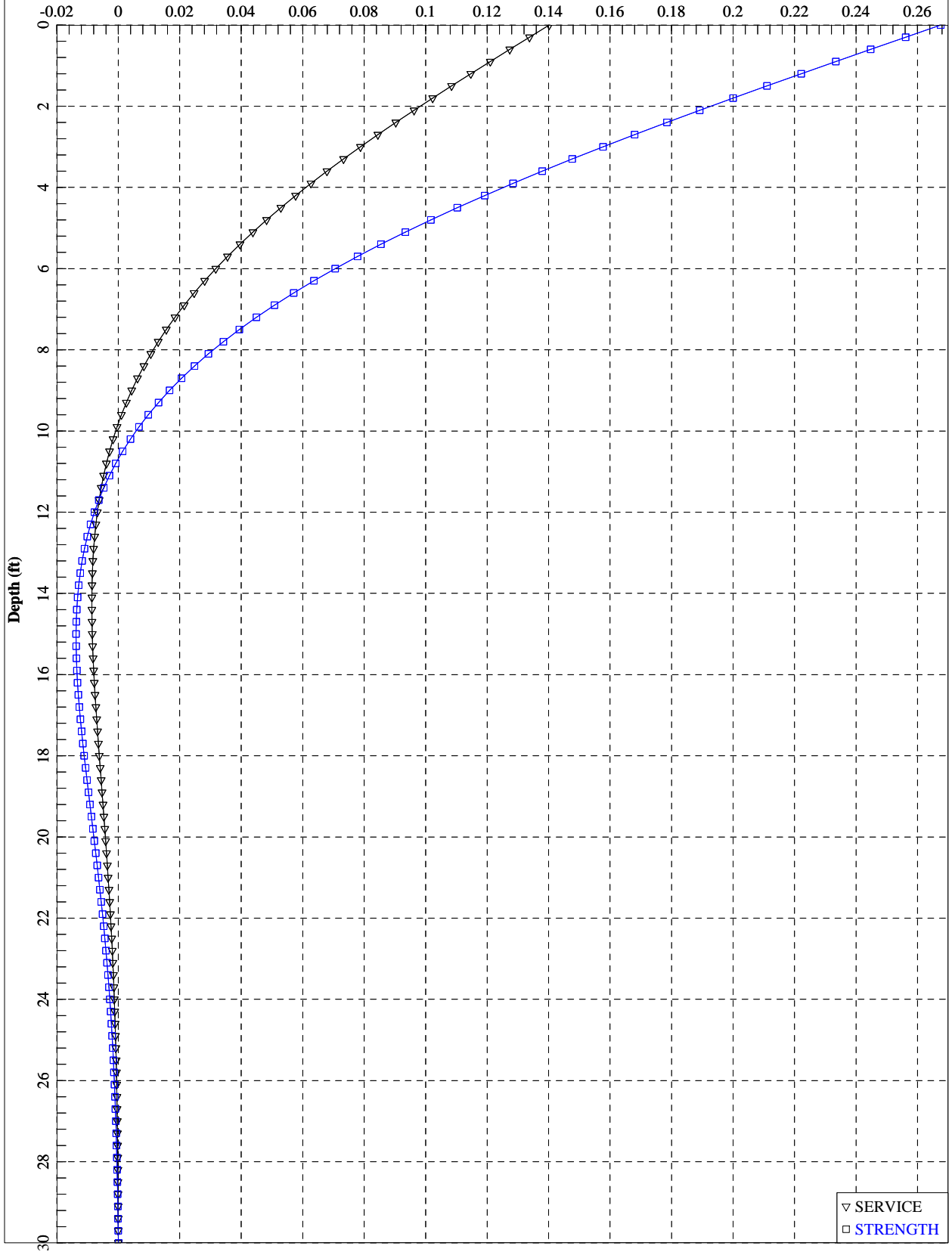
Defi ni ti ons of Pile-head Loading Condi ti ons:

- Load Type 1: Load 1 = Shear, lbs, and Load 2 = Moment, in-lbs
- Load Type 2: Load 1 = Shear, lbs, and Load 2 = Slope, radians
- Load Type 3: Load 1 = Shear, lbs, and Load 2 = Rotational Stiffness, in-lbs/radian
- Load Type 4: Load 1 = Top Deflection, inches, and Load 2 = Moment, in-lbs
- Load Type 5: Load 1 = Top Deflection, inches, and Load 2 = Slope, radians

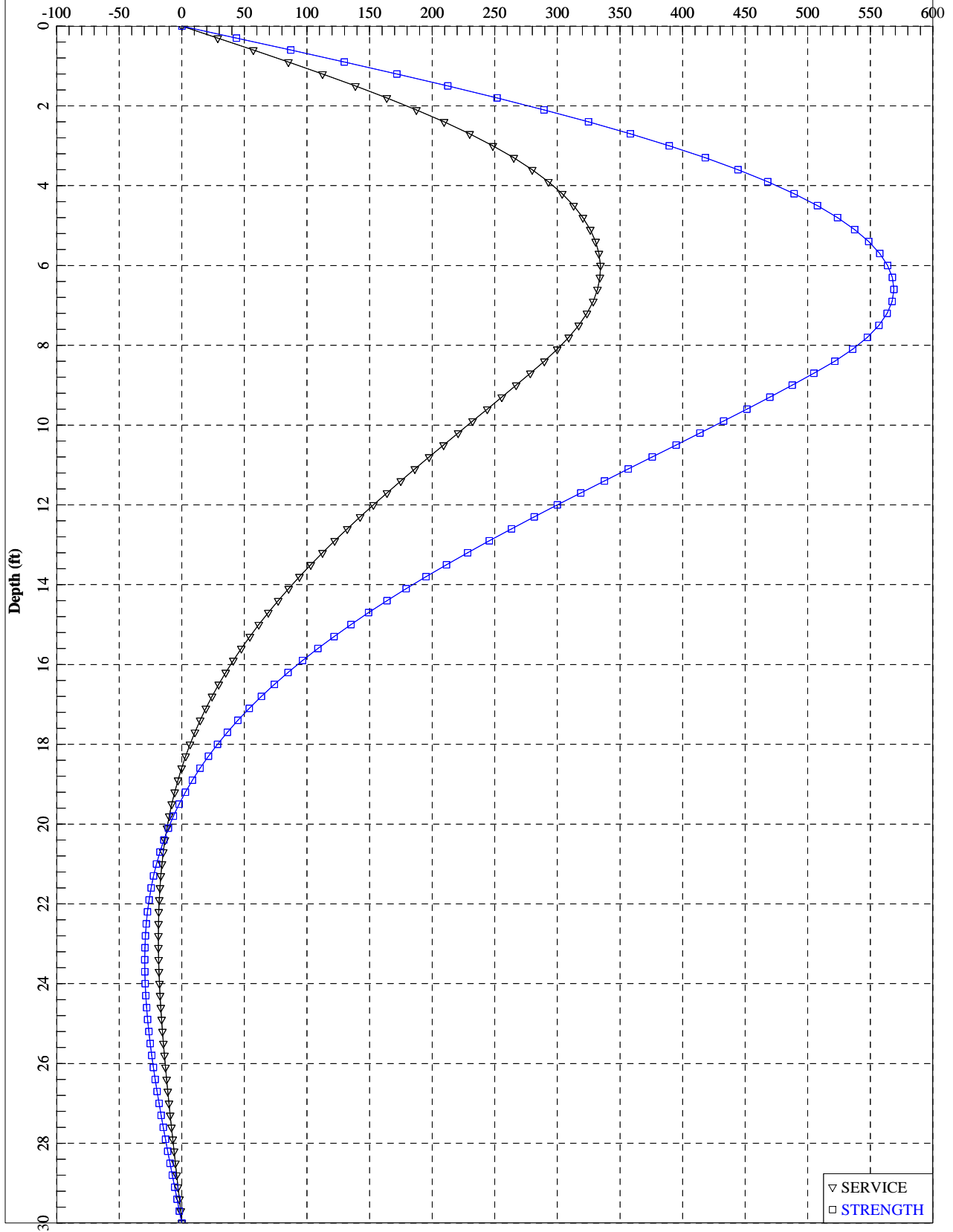
Load Case No.	Load Type No.	Pile-head Condition 1 V(lbs) or y(inches)	Pile-head Condition 2 in-lb, rad., or in-lb/rad.	Axi al Loading lbs	Pile-head Deflection inches	Maxi mum Moment in Pile in-lbs	Maxi mum Shear in Pile lbs	Pile-head Rotati on radi ans
1	1	V = 7800.0000	M = 0.000	95000.	0.14020001	334417.	7800.0000	-0.00178331
2	1	V = 11700.	M = 0.000	135000.	0.26757788	568813.	11700.	-0.00317053

The analysis ended normally.

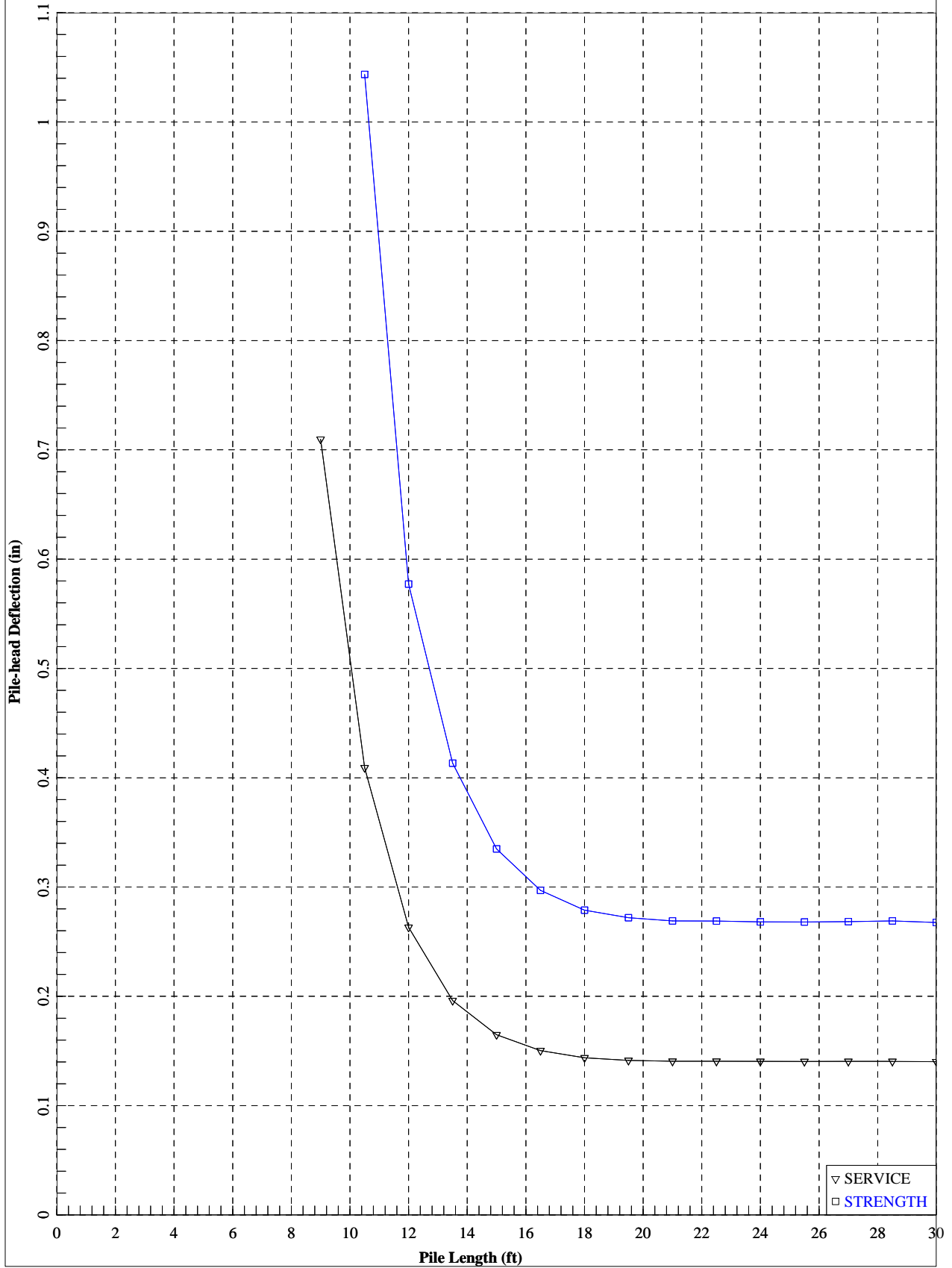
SC 557 Bridge over Crowders Creek - EB5 - HP 14x73 Steel Pile - Longitudinal Analysis  
Lateral Pile Deflection (inches)



SC 557 Bridge over Crowders Creek - EB5 - HP 14x73 Steel Pile - Longitudinal Analysis  
Bending Moment (in-kips)



SC 557 Bridge over Crowders Creek - EB5 - HP 14x73 Steel Pile - Longitudinal Analysis



=====  
LPile Plus for Windows, Version 2013-07.007

Analysis of Individual Piles and Drilled Shafts  
Subjected to Lateral Loading Using the p-y Method

© 1985-2013 by Ensoft, Inc.  
All Rights Reserved

=====  
This copy of LPile is used by:

Bradley Fischer  
F&ME

Serial Number of Security Device: 291490957

This copy of LPile is licensed for exclusive use by: F&ME Consultants, Columbia, Sout

Use of this program by any entity other than F&ME Consultants, Columbia, Sout  
is forbidden by the software license agreement.

-----  
Files Used for Analysis  
-----

Path to file locations: P:\Geotechnical\G4800's\G4843 - SC557 - York County\Report\Final\Bridge\LPile\  
Name of input data file: EB5\_B-10\_Trans.lp7d  
Name of output report file: EB5\_B-10\_Trans.lp7o  
Name of plot output file: EB5\_B-10\_Trans.lp7p  
Name of runtime message file: EB5\_B-10\_Trans.lp7r

-----  
Date and Time of Analysis  
-----

Date: August 3, 2018 Time: 8:58:27

-----  
Problem Title  
-----

Project Name: SC 557 over Crowders Creek

Job Number: G4843

Client: CALYX

Engineer: JFH

Description: EB5 - HP14x73 Steel Pile - Transverse Analysis

-----  
 Program Options and Settings  
 -----

Engineering Units of Input Data and Computations:

- Engineering units are US Customary Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

Computational Options:

- Use unfactored loads in computations (conventional analysis)
- Compute pile response under loading and nonlinear bending properties of pile (only if nonlinear pile properties are input)
- Analysis uses p-y modification factors for p-y curves
- Analysis includes loading by lateral soil movements acting on pile
- Input of shear resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- No p-y curves to be computed and reported for user-specified depths
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1

-----  
 Pile Structural Properties and Geometry  
 -----

- Total number of pile sections = 1
- Total length of pile = 30.00 ft
- Depth of ground surface below top of pile = 0.00 ft

Pile diameter values used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile.

Point	Depth X ft	Pile Diameter in
1	0.00000	13.6000000
2	30.000000	13.6000000

Input Structural Properties:

Pile Section No. 1:

Section Type	=	Elastic Pile
Cross-sectional Shape	=	Weak H-Pile
Section Length	=	30.00000 ft
Flange Width	=	14.60000 in
Section Depth	=	13.60000 in
Flange Thickness	=	0.50500 in
Web Thickness	=	0.50500 in
Section Area	=	21.40000 Sq. in
Moment of Inertia	=	261.00000 in^4
Elastic Modulus	=	29000000. lbs/in^2

-----  
 Ground Slope and Pile Batter Angles  
 -----

Ground Slope Angle	=	0.000 degrees
	=	0.000 radians
Pile Batter Angle	=	0.000 degrees
	=	0.000 radians

-----  
 Soil and Rock Layering Information  
 -----

The soil profile is modelled using 3 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer	=	0.0000 ft
Distance from top of pile to bottom of layer	=	8.50000 ft
Effective unit weight at top of layer	=	125.00000 pcf
Effective unit weight at bottom of layer	=	125.00000 pcf
Friction angle at top of layer	=	30.00000 deg.
Friction angle at bottom of layer	=	30.00000 deg.
Subgrade k at top of layer	=	90.00000 pci
Subgrade k at bottom of layer	=	90.00000 pci

Layer 2 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer	=	8.50000 ft
Distance from top of pile to bottom of layer	=	29.50000 ft
Effective unit weight at top of layer	=	28.00000 pcf
Effective unit weight at bottom of layer	=	28.00000 pcf
Friction angle at top of layer	=	24.00000 deg.
Friction angle at bottom of layer	=	24.00000 deg.
Subgrade k at top of layer	=	20.00000 pci
Subgrade k at bottom of layer	=	20.00000 pci

Layer 3 is strong rock (vuggy limestone)

Distance from top of pile to top of layer = 29.50000 ft  
 Distance from top of pile to bottom of layer = 60.00000 ft  
 Effective unit weight at top of layer = 98.00000 pcf  
 Effective unit weight at bottom of layer = 98.00000 pcf  
 Uniaxial compressive strength at top of layer = 5000.00000 psi  
 Uniaxial compressive strength at bottom of layer = 5000.00000 psi

(Depth of lowest soil layer extends 30.00 ft below pile tip)

-----  
 Summary of Soil Properties  
 -----

Layer Num.	Layer Soil Type (p-y Curve Criteria)	Layer Depth ft	Effective Unit Wt. pcf	Angle of Friction deg.	Uni axial qu psi	kpy pci
1	Sand (Reese, et al.)	0.00	125.000	30.000	--	90.000
		8.500	125.000	30.000	--	90.000
2	Sand (Reese, et al.)	8.500	28.000	24.000	--	20.000
		29.500	28.000	24.000	--	20.000
3	Vuggy Limestone	29.500	98.000	--	5000.000	--
		60.000	98.000	--	5000.000	--

-----  
 p-y Modification Factors for Group Action  
 -----

Distribution of p-y modifiers with depth defined using 2 points

Point No.	Depth X ft	p-mult	y-mult
1	0.000	0.9900	1.0000
2	100.000	0.9900	1.0000

-----  
 Lateral Soil Movements  
 -----

Profile of soil movement with depth defined using 2 points

Point No.	Depth X ft	Soil Movement in
1	0.00000	0.00000
2	0.00000	0.00000

-----  
 Loading Type  
 -----



Static loading criteria were used when computing p-y curves for all analyses.

-----  
 Pile-head Loading and Pile-head Fixity Conditions  
 -----

Number of loads specified = 2

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length
1	2	V = 700.00000 lbs	S = 0.0000 in/in	95000.	Yes
2	2	V = 1300.00000 lbs	S = 0.0000 in/in	135000.	Yes

V = perpendicular shear force applied to pile head  
 M = bending moment applied to pile head  
 y = lateral deflection relative to pile axis  
 S = pile slope relative to original pile batter angle  
 R = rotational stiffness applied to pile head  
 Axial thrust is assumed to be acting axially for all pile batter angles.

-----  
 Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness  
 -----

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Moment-curvature properties were derived from elastic section properties

-----  
 Computed Values of Pile Loading and Deflection  
 for Lateral Loading for Load Case Number 1  
 -----

Pile-head conditions are Shear and Pile-head Rotation (Loading Type 2)

Shear force at pile head = 700.0 lbs  
 Rotation of pile head = 0.000E+00 radians  
 Axial load at pile head = 95000.0 lbs

(Zero slope for this load indicates fixed-head conditions)

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.004985	-25278.	700.0000	0.000	5097.8415	7.569E+09	0.000	0.000	0.000
0.300	0.004963	-22756.	697.1343	-1.142E-05	5032.1327	7.569E+09	-1.5921	1154.7360	0.000
0.600	0.004903	-20251.	688.6070	-2.165E-05	4966.8651	7.569E+09	-3.1453	2309.4720	0.000

EB5\_B-10\_Trans. l p7o

0.900	0.004808	-17783.	674.6183	-3.070E-05	4902.5737	7.569E+09	-4.6262	3464.2080	0.000
1.200	0.004682	-15373.	655.4785	-3.858E-05	4839.7690	7.569E+09	-6.0070	4618.9440	0.000
1.500	0.004530	-13038.	631.5891	-4.534E-05	4778.9275	7.569E+09	-7.2649	5773.6800	0.000
1.800	0.004355	-10794.	603.4243	-5.100E-05	4720.4837	7.569E+09	-8.3823	6928.4160	0.000
2.100	0.004163	-8657.9894	571.5129	-5.563E-05	4664.8245	7.569E+09	-9.3463	8083.1520	0.000
2.400	0.003955	-6641.3771	536.4222	-5.927E-05	4612.2844	7.569E+09	-10.1485	9237.8880	0.000
2.700	0.003736	-4755.2095	498.7424	-6.198E-05	4563.1429	7.569E+09	-10.7847	10393.	0.000
3.000	0.003509	-3008.0384	459.0722	-6.383E-05	4517.6227	7.569E+09	-11.2543	11547.	0.000
3.300	0.003276	-1406.2334	418.0066	-6.488E-05	4475.8898	7.569E+09	-11.5599	12702.	0.000
3.600	0.003042	45.9840	376.1259	-6.520E-05	4440.4504	7.569E+09	-11.7072	13857.	0.000
3.900	0.002807	1346.4687	333.9853	-6.487E-05	4474.3327	7.569E+09	-11.7042	15012.	0.000
4.200	0.002574	2495.0475	292.1078	-6.395E-05	4504.2574	7.569E+09	-11.5611	16166.	0.000
4.500	0.002346	3493.3891	250.9770	-6.253E-05	4530.2678	7.569E+09	-11.2894	17321.	0.000
4.800	0.002124	4344.8520	211.0323	-6.067E-05	4552.4515	7.569E+09	-10.9021	18476.	0.000
5.100	0.001910	5054.3173	172.6655	-5.843E-05	4570.9357	7.569E+09	-10.4128	19631.	0.000
5.400	0.001704	5628.0101	136.2179	-5.589E-05	4585.8825	7.569E+09	-9.8358	20785.	0.000
5.700	0.001507	6073.3149	101.9796	-5.311E-05	4597.4843	7.569E+09	-9.1854	21940.	0.000
6.000	0.001321	6398.5887	70.1896	-5.014E-05	4605.9589	7.569E+09	-8.4757	23095.	0.000
6.300	0.001146	6612.9765	41.0364	-4.705E-05	4611.5444	7.569E+09	-7.7205	24249.	0.000
6.600	0.000982	6726.2310	14.6603	-4.387E-05	4614.4951	7.569E+09	-6.9329	25404.	0.000
6.900	0.000830	6748.5410	-8.8444	-4.067E-05	4615.0764	7.569E+09	-6.1252	26559.	0.000
7.200	0.000690	6690.3702	-29.4258	-3.747E-05	4613.5608	7.569E+09	-5.3089	27714.	0.000
7.500	0.000560	6562.3078	-47.0714	-3.432E-05	4610.2243	7.569E+09	-4.4942	28868.	0.000
7.800	0.000443	6374.9329	-61.8036	-3.125E-05	4605.3425	7.569E+09	-3.6904	30023.	0.000
8.100	0.000335	6138.6941	-73.6759	-2.827E-05	4599.1877	7.569E+09	-2.9054	31178.	0.000
8.400	0.000239	5863.8032	-82.7686	-2.542E-05	4592.0258	7.569E+09	-2.1461	32333.	0.000
8.700	0.000152	5560.1449	-87.3165	-2.270E-05	4584.1143	7.569E+09	-0.3805	8983.4993	0.000
9.000	7.552E-05	5250.6509	-88.3503	-2.013E-05	4576.0509	7.569E+09	-0.1938	9240.1073	0.000
9.300	7.553E-06	4937.7908	-88.7350	-1.771E-05	4567.8998	7.569E+09	-0.0199	9496.7153	0.000
9.600	-5.196E-05	4623.8692	-88.5175	-1.543E-05	4559.7210	7.569E+09	0.1408	9753.3233	0.000
9.900	-0.000104	4311.0199	-87.7458	-1.331E-05	4551.5701	7.569E+09	0.2879	10010.	0.000
10.200	-0.000148	4001.2010	-86.4690	-1.133E-05	4543.4982	7.569E+09	0.4214	10267.	0.000
10.500	-0.000185	3696.1927	-84.7364	-9.499E-06	4535.5516	7.569E+09	0.5412	10523.	0.000
10.800	-0.000216	3397.5964	-82.5973	-7.812E-06	4527.7721	7.569E+09	0.6473	10780.	0.000
11.100	-0.000241	3106.8362	-80.1002	-6.266E-06	4520.1967	7.569E+09	0.7400	11036.	0.000
11.400	-0.000261	2825.1607	-77.2929	-4.855E-06	4512.8581	7.569E+09	0.8196	11293.	0.000
11.700	-0.000276	2553.6478	-74.2219	-3.576E-06	4505.7842	7.569E+09	0.8865	11550.	0.000
12.000	-0.000287	2293.2091	-70.9318	-2.423E-06	4498.9988	7.569E+09	0.9413	11806.	0.000
12.300	-0.000294	2044.5964	-67.4656	-1.392E-06	4492.5215	7.569E+09	0.9844	12063.	0.000
12.600	-0.000297	1808.4088	-63.8640	-4.752E-07	4486.3680	7.569E+09	1.0165	12319.	0.000
12.900	-0.000297	1585.1008	-60.1655	3.318E-07	4480.5500	7.569E+09	1.0382	12576.	0.000
13.200	-0.000295	1374.9903	-56.4061	1.036E-06	4475.0758	7.569E+09	1.0503	12833.	0.000
13.500	-0.000290	1178.2682	-52.6193	1.643E-06	4469.9505	7.569E+09	1.0535	13089.	0.000
13.800	-0.000283	995.0077	-48.8358	2.160E-06	4465.1759	7.569E+09	1.0485	13346.	0.000
14.100	-0.000274	825.1734	-45.0837	2.593E-06	4460.7511	7.569E+09	1.0360	13602.	0.000
14.400	-0.000264	668.6319	-41.3883	2.948E-06	4456.6726	7.569E+09	1.0169	13859.	0.000
14.700	-0.000253	525.1609	-37.7725	3.232E-06	4452.9347	7.569E+09	0.9919	14116.	0.000
15.000	-0.000241	394.4596	-34.2560	3.450E-06	4449.5294	7.569E+09	0.9617	14372.	0.000
15.300	-0.000228	276.1575	-30.8564	3.610E-06	4446.4472	7.569E+09	0.9270	14629.	0.000
15.600	-0.000215	169.8246	-27.5883	3.716E-06	4443.6769	7.569E+09	0.8886	14885.	0.000
15.900	-0.000201	74.9797	-24.4643	3.774E-06	4441.2058	7.569E+09	0.8470	15142.	0.000
16.200	-0.000188	-8.9003	-21.4944	3.790E-06	4439.4842	7.569E+09	0.8030	15399.	0.000
16.500	-0.000174	-82.3725	-18.6865	3.768E-06	4441.3984	7.569E+09	0.7570	15655.	0.000
16.800	-0.000161	-146.0202	-16.0462	3.714E-06	4443.0567	7.569E+09	0.7098	15912.	0.000
17.100	-0.000147	-200.4452	-13.5774	3.632E-06	4444.4747	7.569E+09	0.6618	16169.	0.000
17.400	-0.000134	-246.2612	-11.2821	3.525E-06	4445.6683	7.569E+09	0.6134	16425.	0.000
17.700	-0.000122	-284.0875	-9.1607	3.399E-06	4446.6539	7.569E+09	0.5651	16682.	0.000
18.000	-0.000110	-314.5434	-7.2121	3.257E-06	4447.4473	7.569E+09	0.5174	16938.	0.000
18.300	-9.851E-05	-338.2424	-5.4338	3.102E-06	4448.0648	7.569E+09	0.4705	17195.	0.000
18.600	-8.764E-05	-355.7884	-3.8222	2.937E-06	4448.5219	7.569E+09	0.4248	17452.	0.000

EB5\_B-10\_Trans.l p7o

18.900	-7.737E-05	-367.7708	-2.3725	2.764E-06	4448.8341	7.569E+09	0.3806	17708.	0.000
19.200	-6.773E-05	-374.7610	-1.0790	2.588E-06	4449.0162	7.569E+09	0.3380	17965.	0.000
19.500	-5.874E-05	-377.3099	0.0645	2.409E-06	4449.0826	7.569E+09	0.2973	18221.	0.000
19.800	-5.039E-05	-375.9444	1.0652	2.230E-06	4449.0471	7.569E+09	0.2586	18478.	0.000
20.100	-4.268E-05	-371.1660	1.9305	2.052E-06	4448.9226	7.569E+09	0.2221	18735.	0.000
20.400	-3.561E-05	-363.4486	2.6684	1.878E-06	4448.7215	7.569E+09	0.1879	18991.	0.000
20.700	-2.916E-05	-353.2374	3.2873	1.707E-06	4448.4555	7.569E+09	0.1559	19248.	0.000
21.000	-2.332E-05	-340.9480	3.7953	1.542E-06	4448.1353	7.569E+09	0.1263	19504.	0.000
21.300	-1.806E-05	-326.9656	4.2012	1.383E-06	4447.7710	7.569E+09	0.0991	19761.	0.000
21.600	-1.336E-05	-311.6452	4.5134	1.231E-06	4447.3718	7.569E+09	0.0743	20018.	0.000
21.900	-9.196E-06	-295.3113	4.7404	1.087E-06	4446.9463	7.569E+09	0.0518	20274.	0.000
22.200	-5.536E-06	-278.2581	4.8904	9.505E-07	4446.5020	7.569E+09	0.0316	20531.	0.000
22.500	-2.352E-06	-260.7505	4.9717	8.224E-07	4446.0458	7.569E+09	0.0136	20787.	0.000
22.800	3.854E-07	-243.0245	4.9921	7.026E-07	4445.5840	7.569E+09	-0.002253	21044.	0.000
23.100	2.706E-06	-225.2882	4.9592	5.912E-07	4445.1219	7.569E+09	-0.0160	21301.	0.000
23.400	4.642E-06	-207.7227	4.8803	4.882E-07	4444.6643	7.569E+09	-0.0278	21557.	0.000
23.700	6.222E-06	-190.4837	4.7624	3.935E-07	4444.2151	7.569E+09	-0.0377	21814.	0.000
24.000	7.475E-06	-173.7023	4.6121	3.069E-07	4443.7779	7.569E+09	-0.0458	22071.	0.000
24.300	8.431E-06	-157.4866	4.4355	2.281E-07	4443.3554	7.569E+09	-0.0523	22327.	0.000
24.600	9.118E-06	-141.9230	4.2384	1.569E-07	4442.9499	7.569E+09	-0.0572	22584.	0.000
24.900	9.561E-06	-127.0775	4.0263	9.296E-08	4442.5632	7.569E+09	-0.0607	22840.	0.000
25.200	9.787E-06	-112.9975	3.8040	3.587E-08	4442.1963	7.569E+09	-0.0628	23097.	0.000
25.500	9.819E-06	-99.7129	3.5764	-1.471E-08	4441.8502	7.569E+09	-0.0637	23354.	0.000
25.800	9.681E-06	-87.2377	3.3474	-5.917E-08	4441.5252	7.569E+09	-0.0635	23610.	0.000
26.100	9.393E-06	-75.5711	3.1210	-9.789E-08	4441.2212	7.569E+09	-0.0623	23867.	0.000
26.400	8.976E-06	-64.6993	2.9007	-1.312E-07	4440.9380	7.569E+09	-0.0601	24123.	0.000
26.700	8.448E-06	-54.5966	2.6894	-1.596E-07	4440.6748	7.569E+09	-0.0572	24380.	0.000
27.000	7.827E-06	-45.2264	2.4900	-1.834E-07	4440.4306	7.569E+09	-0.0536	24637.	0.000
27.300	7.128E-06	-36.5431	2.3049	-2.028E-07	4440.2044	7.569E+09	-0.0493	24893.	0.000
27.600	6.367E-06	-28.4926	2.1361	-2.183E-07	4439.9947	7.569E+09	-0.0445	25150.	0.000
27.900	5.557E-06	-21.0139	1.9854	-2.300E-07	4439.7998	7.569E+09	-0.0392	25406.	0.000
28.200	4.710E-06	-14.0401	1.8544	-2.384E-07	4439.6181	7.569E+09	-0.0336	25663.	0.000
28.500	3.840E-06	-7.4991	1.7442	-2.435E-07	4439.4477	7.569E+09	-0.0276	25920.	0.000
28.800	2.957E-06	-1.3153	1.6557	-2.456E-07	4439.2866	7.569E+09	-0.0215	26176.	0.000
29.100	2.072E-06	4.5900	1.5896	-2.448E-07	4439.3719	7.569E+09	-0.0152	26433.	0.000
29.400	1.195E-06	10.2975	1.5463	-2.413E-07	4439.5206	7.569E+09	-0.008856	26689.	0.000
29.700	3.348E-07	15.8885	-1.4525	-2.351E-07	4439.6663	7.569E+09	-1.6572	17820000.	0.000
30.000	-4.978E-07	0.000	0.000	-2.313E-07	4439.2523	7.569E+09	2.4641	8910000.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 1:

Pile-head deflection = 0.0049851 inches  
 Computed slope at pile head = 0.000000 radians  
 Maximum bending moment = -25278. inch-lbs  
 Maximum shear force = 700.000000 lbs  
 Depth of maximum bending moment = 0.000000 feet below pile head  
 Depth of maximum shear force = 0.000000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 3

-----  
 Pile-head Deflection vs. Pile Length for Load Case 1  
 -----

Boundary Condition Type 2, Shear and Slope

Shear = 700. lb  
 Slope = 0.00000  
 Axial Load = 95000. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
30.0000	0.0049851	-25278.	700.0000000
28.5000	0.0049849	-25268.	700.0000000
27.0000	0.0049835	-25273.	700.0000000
25.5000	0.0049827	-25275.	700.0000000
24.0000	0.0049825	-25274.	700.0000000
22.5000	0.0049829	-25271.	700.0000000
21.0000	0.0049825	-25279.	700.0000000
19.5000	0.0049821	-25279.	700.0000000
18.0000	0.0049815	-25278.	700.0000000
16.5000	0.0049872	-25263.	700.0000000
15.0000	0.0050136	-25266.	700.0000000
13.5000	0.0050906	-25365.	700.0000000
12.0000	0.0052563	-25726.	700.0000000
10.5000	0.0055092	-26487.	700.0000000
9.0000	0.0057158	-27338.	700.0000000
7.5000	0.0058795	-28727.	700.0000000
6.0000	0.0059016	-28667.	700.0000000
4.5000	0.0068349	-24274.	700.0000000
3.0000	0.0125748	-16768.	700.0000002
1.5000	0.0498542	-8474.8022522	700.1667780

-----  
 Computed Values of Pile Loading and Deflection  
 for Lateral Loading for Load Case Number 2  
 -----

Pile-head conditions are Shear and Pile-head Rotation (Loading Type 2)

Shear force at pile head = 1300.0 lbs  
 Rotation of pile head = 0.000E+00 radians  
 Axial load at pile head = 135000.0 lbs

(Zero slope for this load indicates fixed-head conditions)

Depth X feet	Deflect. y inches	Bending Moment ln-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.009286	-47076.	1300.0000	0.000	7534.9239	7.569E+09	0.000	0.000	0.000
0.300	0.009245	-42391.	1294.6621	-2.128E-05	7412.8511	7.569E+09	-2.9655	1154.7360	0.000
0.600	0.009132	-37734.	1278.7788	-4.033E-05	7291.5243	7.569E+09	-5.8586	2309.4720	0.000
0.900	0.008955	-33145.	1252.7226	-5.719E-05	7171.9485	7.569E+09	-8.6171	3464.2080	0.000
1.200	0.008721	-28659.	1217.0720	-7.188E-05	7055.0826	7.569E+09	-11.1889	4618.9440	0.000
1.500	0.008437	-24312.	1172.5750	-8.448E-05	6941.8222	7.569E+09	-13.5317	5773.6800	0.000
1.800	0.008112	-20134.	1120.1152	-9.505E-05	6832.9843	7.569E+09	-15.6126	6928.4160	0.000
2.100	0.007753	-16155.	1060.6786	-0.000104	6729.2969	7.569E+09	-17.4077	8083.1520	0.000
2.400	0.007366	-12397.	995.3224	-0.000110	6631.3900	7.569E+09	-18.9013	9237.8880	0.000
2.700	0.006957	-8880.8838	925.1468	-0.000116	6539.7906	7.569E+09	-20.0852	10393.	0.000
3.000	0.006534	-5623.3327	851.2683	-0.000119	6454.9195	7.569E+09	-20.9584	11547.	0.000

EB5\_B-10\_Trans. l p7o

3.300	0.006101	-2636.1027	774.7965	-0.000121	6377.0913	7.569E+09	-21.5260	12702.	0.000
3.600	0.005663	72.7604	696.8129	-0.000122	6310.3069	7.569E+09	-21.7983	13857.	0.000
3.900	0.005226	2499.1011	618.3535	-0.000121	6373.5219	7.569E+09	-21.7903	15012.	0.000
4.200	0.004792	4642.4617	540.3933	-0.000119	6429.3642	7.569E+09	-21.5209	16166.	0.000
4.500	0.004367	6505.8383	463.8344	-0.000117	6477.9120	7.569E+09	-21.0118	17321.	0.000
4.800	0.003953	8095.3982	389.4966	-0.000113	6519.3258	7.569E+09	-20.2870	18476.	0.000
5.100	0.003553	9420.1671	318.1101	-0.000109	6553.8409	7.569E+09	-19.3721	19631.	0.000
5.400	0.003168	10492.	250.3119	-0.000104	6581.7581	7.569E+09	-18.2936	20785.	0.000
5.700	0.002802	11324.	186.6431	-9.903E-05	6603.4352	7.569E+09	-17.0780	21940.	0.000
6.000	0.002455	11932.	127.5492	-9.350E-05	6619.2777	7.569E+09	-15.7519	23095.	0.000
6.300	0.002129	12333.	73.3821	-8.773E-05	6629.7295	7.569E+09	-14.3410	24249.	0.000
6.600	0.001824	12545.	24.4030	-8.182E-05	6635.2648	7.569E+09	-12.8696	25404.	0.000
6.900	0.001540	12588.	-19.2119	-7.584E-05	6636.3791	7.569E+09	-11.3609	26559.	0.000
7.200	0.001278	12481.	-57.3665	-6.988E-05	6633.5815	7.569E+09	-9.8361	27714.	0.000
7.500	0.001037	12243.	-90.0374	-6.400E-05	6627.3875	7.569E+09	-8.3144	28868.	0.000
7.800	0.000817	11895.	-117.2667	-5.826E-05	6618.3124	7.569E+09	-6.8130	30023.	0.000
8.100	0.000617	11455.	-139.1545	-5.270E-05	6606.8652	7.569E+09	-5.3469	31178.	0.000
8.400	0.000437	10944.	-155.8512	-4.738E-05	6593.5436	7.569E+09	-3.9290	32333.	0.000
8.700	0.000276	10379.	-164.1644	-4.231E-05	6578.8294	7.569E+09	-0.6894	8983.4993	0.000
9.000	0.000133	9803.1884	-166.0192	-3.751E-05	6563.8200	7.569E+09	-0.3410	9240.1073	0.000
9.300	6.235E-06	9220.4045	-166.6626	-3.298E-05	6548.6363	7.569E+09	-0.0164	9496.7153	0.000
9.600	-0.000105	8635.2760	-166.1821	-2.874E-05	6533.3916	7.569E+09	0.2834	9753.3233	0.000
9.900	-0.000201	8051.8243	-164.6677	-2.477E-05	6518.1905	7.569E+09	0.5579	10010.	0.000
10.200	-0.000283	7473.7425	-162.2110	-2.108E-05	6503.1294	7.569E+09	0.8069	10267.	0.000
10.500	-0.000352	6904.3900	-158.9045	-1.766E-05	6488.2957	7.569E+09	1.0301	10523.	0.000
10.800	-0.000410	6346.7917	-154.8402	-1.450E-05	6473.7682	7.569E+09	1.2279	10780.	0.000
11.100	-0.000457	5803.6393	-150.1091	-1.162E-05	6459.6171	7.569E+09	1.4005	11036.	0.000
11.400	-0.000494	5277.2958	-144.8007	-8.980E-06	6445.9040	7.569E+09	1.5486	11293.	0.000
11.700	-0.000521	4769.8029	-139.0016	-6.591E-06	6432.6819	7.569E+09	1.6731	11550.	0.000
12.000	-0.000541	4282.8902	-132.7958	-4.438E-06	6419.9961	7.569E+09	1.7746	11806.	0.000
12.300	-0.000553	3817.9868	-126.2634	-2.511E-06	6407.8837	7.569E+09	1.8545	12063.	0.000
12.600	-0.000559	3376.2346	-119.4808	-8.003E-07	6396.3744	7.569E+09	1.9137	12319.	0.000
12.900	-0.000559	2958.5029	-112.5199	7.062E-07	6385.4910	7.569E+09	1.9535	12576.	0.000
13.200	-0.000554	2565.4046	-105.4482	2.020E-06	6375.2493	7.569E+09	1.9753	12833.	0.000
13.500	-0.000545	2197.3126	-98.3282	3.152E-06	6365.6592	7.569E+09	1.9803	13089.	0.000
13.800	-0.000531	1854.3776	-91.2174	4.116E-06	6356.7245	7.569E+09	1.9701	13346.	0.000
14.100	-0.000515	1536.5467	-84.1684	4.922E-06	6348.4438	7.569E+09	1.9460	13602.	0.000
14.400	-0.000496	1243.5807	-77.2286	5.584E-06	6340.8110	7.569E+09	1.9094	13859.	0.000
14.700	-0.000475	975.0734	-70.4404	6.111E-06	6333.8154	7.569E+09	1.8618	14116.	0.000
15.000	-0.000452	730.4695	-63.8412	6.517E-06	6327.4426	7.569E+09	1.8045	14372.	0.000
15.300	-0.000428	509.0827	-57.4632	6.812E-06	6321.6747	7.569E+09	1.7388	14629.	0.000
15.600	-0.000403	310.1134	-51.3343	7.006E-06	6316.4908	7.569E+09	1.6661	14885.	0.000
15.900	-0.000377	132.6652	-45.4776	7.112E-06	6311.8676	7.569E+09	1.5876	15142.	0.000
16.200	-0.000352	-24.2378	-39.9117	7.137E-06	6309.0427	7.569E+09	1.5045	15399.	0.000
16.500	-0.000326	-161.6363	-34.6511	7.093E-06	6312.6224	7.569E+09	1.4180	15655.	0.000
16.800	-0.000301	-280.6206	-29.7067	6.988E-06	6315.7224	7.569E+09	1.3290	15912.	0.000
17.100	-0.000276	-382.3168	-25.0853	6.830E-06	6318.3720	7.569E+09	1.2385	16169.	0.000
17.400	-0.000251	-467.8739	-20.7906	6.628E-06	6320.6010	7.569E+09	1.1474	16425.	0.000
17.700	-0.000228	-538.4521	-16.8233	6.389E-06	6322.4399	7.569E+09	1.0566	16682.	0.000
18.000	-0.000205	-595.2117	-13.1810	6.119E-06	6323.9186	7.569E+09	0.9669	16938.	0.000
18.300	-0.000184	-639.3032	-9.8590	5.826E-06	6325.0674	7.569E+09	0.8787	17195.	0.000
18.600	-0.000164	-671.8588	-6.8502	5.514E-06	6325.9156	7.569E+09	0.7928	17452.	0.000
18.900	-0.000144	-693.9842	-4.1458	5.189E-06	6326.4920	7.569E+09	0.7097	17708.	0.000
19.200	-0.000126	-706.7521	-1.7349	4.856E-06	6326.8247	7.569E+09	0.6297	17965.	0.000
19.500	-0.000109	-711.1959	0.3944	4.519E-06	6326.9405	7.569E+09	0.5533	18221.	0.000
19.800	-9.365E-05	-708.3050	2.2554	4.181E-06	6326.8651	7.569E+09	0.4807	18478.	0.000
20.100	-7.920E-05	-699.0208	3.8626	3.847E-06	6326.6233	7.569E+09	0.4122	18735.	0.000
20.400	-6.595E-05	-684.2332	5.2308	3.518E-06	6326.2380	7.569E+09	0.3479	18991.	0.000
20.700	-5.388E-05	-664.7783	6.3755	3.197E-06	6325.7311	7.569E+09	0.2881	19248.	0.000
21.000	-4.294E-05	-641.4366	7.3128	2.886E-06	6325.1230	7.569E+09	0.2326	19504.	0.000

EB5\_B-10\_Trans.l p7o

21.300	-3.310E-05	-614.9317	8.0585	2.587E-06	6324.4324	7.569E+09	0.1817	19761.	0.000
21.600	-2.431E-05	-585.9302	8.6288	2.302E-06	6323.6768	7.569E+09	0.1352	20018.	0.000
21.900	-1.652E-05	-555.0416	9.0396	2.030E-06	6322.8721	7.569E+09	0.0931	20274.	0.000
22.200	-9.689E-06	-522.8187	9.3066	1.774E-06	6322.0325	7.569E+09	0.0553	20531.	0.000
22.500	-3.750E-06	-489.7588	9.4450	1.533E-06	6321.1712	7.569E+09	0.0217	20787.	0.000
22.800	1.351E-06	-456.3051	9.4697	1.308E-06	6320.2996	7.569E+09	-0.007898	21044.	0.000
23.100	5.670E-06	-422.8483	9.3951	1.099E-06	6319.4280	7.569E+09	-0.0336	21301.	0.000
23.400	9.266E-06	-389.7286	9.2349	9.060E-07	6318.5651	7.569E+09	-0.0555	21557.	0.000
23.700	1.219E-05	-357.2379	9.0020	7.284E-07	6317.7186	7.569E+09	-0.0739	21814.	0.000
24.000	1.451E-05	-325.6221	8.7089	5.660E-07	6316.8949	7.569E+09	-0.0890	22071.	0.000
24.300	1.627E-05	-295.0840	8.3672	4.184E-07	6316.0992	7.569E+09	-0.1009	22327.	0.000
24.600	1.752E-05	-265.7852	7.9877	2.850E-07	6315.3359	7.569E+09	-0.1099	22584.	0.000
24.900	1.832E-05	-237.8497	7.5806	1.652E-07	6314.6081	7.569E+09	-0.1162	22840.	0.000
25.200	1.871E-05	-211.3655	7.1553	5.839E-08	6313.9181	7.569E+09	-0.1201	23097.	0.000
25.500	1.874E-05	-186.3884	6.7204	-3.620E-08	6313.2673	7.569E+09	-0.1216	23354.	0.000
25.800	1.845E-05	-162.9438	6.2837	-1.193E-07	6312.6565	7.569E+09	-0.1210	23610.	0.000
26.100	1.788E-05	-141.0297	5.8525	-1.916E-07	6312.0856	7.569E+09	-0.1186	23867.	0.000
26.400	1.707E-05	-120.6196	5.4332	-2.538E-07	6311.5538	7.569E+09	-0.1144	24123.	0.000
26.700	1.605E-05	-101.6641	5.0316	-3.067E-07	6311.0599	7.569E+09	-0.1087	24380.	0.000
27.000	1.486E-05	-84.0943	4.6528	-3.508E-07	6310.6022	7.569E+09	-0.1017	24637.	0.000
27.300	1.353E-05	-67.8233	4.3013	-3.870E-07	6310.1783	7.569E+09	-0.0935	24893.	0.000
27.600	1.208E-05	-52.7490	3.9810	-4.156E-07	6309.7855	7.569E+09	-0.0844	25150.	0.000
27.900	1.054E-05	-38.7561	3.6953	-4.374E-07	6309.4210	7.569E+09	-0.0744	25406.	0.000
28.200	8.929E-06	-25.7179	3.4469	-4.527E-07	6309.0813	7.569E+09	-0.0636	25663.	0.000
28.500	7.277E-06	-13.4986	3.2380	-4.620E-07	6308.7629	7.569E+09	-0.0524	25920.	0.000
28.800	5.602E-06	-1.9553	3.0704	-4.657E-07	6308.4622	7.569E+09	-0.0407	26176.	0.000
29.100	3.924E-06	9.0607	2.9452	-4.640E-07	6308.6473	7.569E+09	-0.0288	26433.	0.000
29.400	2.261E-06	19.7011	2.8632	-4.572E-07	6308.9245	7.569E+09	-0.0168	26689.	0.000
29.700	6.318E-07	30.1198	-2.7964	-4.453E-07	6309.1959	7.569E+09	-3.1274	17820000.	0.000
30.000	-9.457E-07	0.000	0.000	-4.382E-07	6308.4112	7.569E+09	4.6810	8910000.	0.000

\* The above values of total stress are combined axial and bending stresses.

Output Summary for Load Case No. 2:

Pile-head deflection = 0.0092855 inches  
 Computed slope at pile head = 0.000000 radians  
 Maximum bending moment = -47076. inch-lbs  
 Maximum shear force = 1300.000000 lbs  
 Depth of maximum bending moment = 0.000000 feet below pile head  
 Depth of maximum shear force = 0.000000 feet below pile head  
 Number of iterations = 6  
 Number of zero deflection points = 3

-----  
 Pile-head Deflection vs. Pile Length for Load Case 2  
 -----

Boundary Condition Type 2, Shear and Slope

Shear = 1300. lb  
 Slope = 0.00000  
 Axial Load = 135000. lb

Pile Length	Pile Head Deflection	Maximum Moment	Maximum Shear
-------------	----------------------	----------------	---------------

feet	inches	l n-l bs	l bs
30.0000	0.0092855	-47076.	1300.0000000
28.5000	0.0092851	-47058.	1300.0000000
27.0000	0.0092825	-47067.	1300.0000000
25.5000	0.0092810	-47070.	1300.0000000
24.0000	0.0092806	-47068.	1300.0000000
22.5000	0.0092814	-47063.	1300.0000000
21.0000	0.0092808	-47078.	1300.0000000
19.5000	0.0092800	-47079.	1300.0000000
18.0000	0.0092789	-47077.	1300.0000000
16.5000	0.0092894	-47048.	1300.0000000
15.0000	0.0093392	-47053.	1300.0000000
13.5000	0.0094851	-47240.	1300.0000000
12.0000	0.0098001	-47925.	1300.0000000
10.5000	0.0102812	-49373.	1300.0000000
9.0000	0.0106705	-50985.	1300.0000000
7.5000	0.0109771	-53626.	1300.0000000
6.0000	0.0110018	-53531.	1300.0000000
4.5000	0.0127080	-45258.	1300.0000001
3.0000	0.0233553	-31198.	1299.9999999
1.5000	0.3756500	-15845.	1299.9999847

Summary of Pile Response(s)

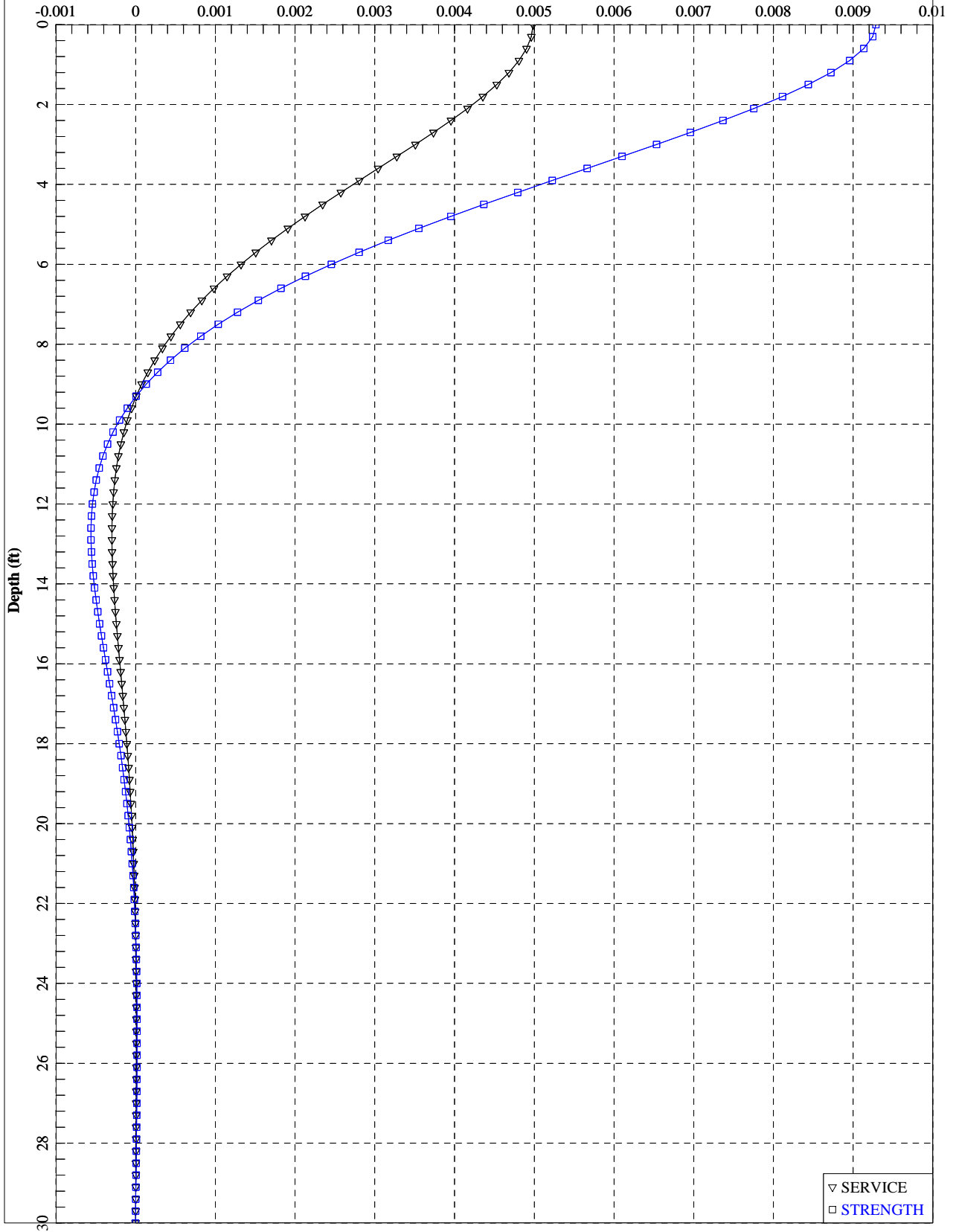
Defi ni ti ons of Pile-head Loadi ng Condi ti ons:

- Load Type 1: Load 1 = Shear, l bs, and Load 2 = Moment, i n-l bs
- Load Type 2: Load 1 = Shear, l bs, and Load 2 = Slope, radi ans
- Load Type 3: Load 1 = Shear, l bs, and Load 2 = Rotational Sti ffness, i n-l bs/radi an
- Load Type 4: Load 1 = Top Deflection, i nches, and Load 2 = Moment, i n-l bs
- Load Type 5: Load 1 = Top Deflection, i nches, and Load 2 = Slope, radi ans

Load Case No.	Load Type No.	Pile-head Condition 1 V(l bs) or y(i nches)	Pile-head Condition 2 i n-l b, rad., or i n-l b/rad.	Axi al Loading l bs	Pile-head Deflecti on i nches	Maxi mum Moment i n Pile i n-l bs	Maxi mum Shear i n Pile l bs	Pile-head Rotati on radi ans
1	2	V = 700.0000	S = 0.000	95000.	0.00498510	-25278.	700.0000	0.00000000
2	2	V = 1300.0000	S = 0.000	135000.	0.00928552	-47076.	1300.0000	-0.00000000

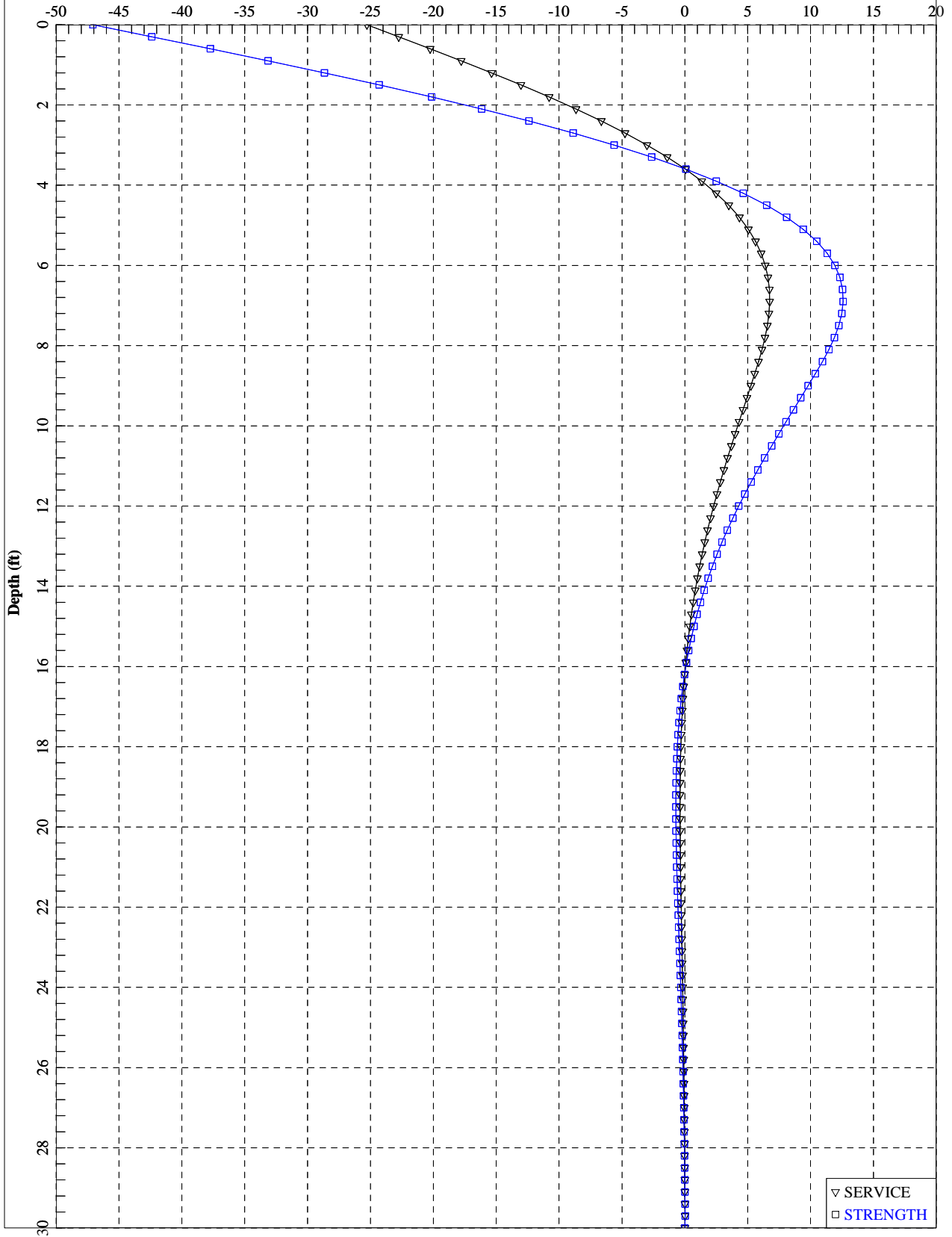
The analysi s ended normal l y.

SC 557 Bridge over Crowders Creek - EB5 - HP 14x73 Steel Pile - Transverse Analysis  
Lateral Pile Deflection (inches)

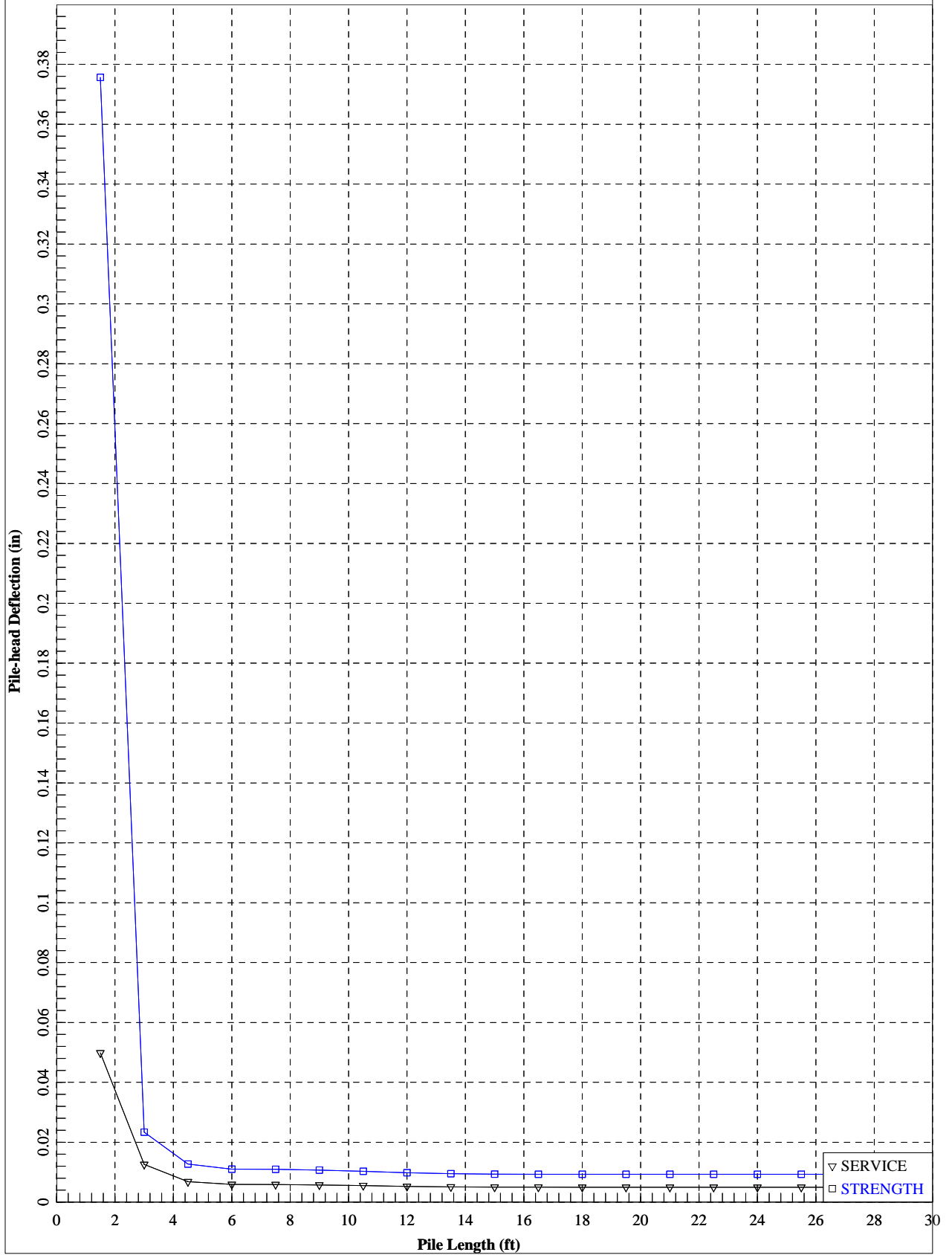




SC 557 Bridge over Crowders Creek - EB5 - HP 14x73 Steel Pile - Transverse Analysis  
Bending Moment (in-kips)



SC 557 Bridge over Crowders Creek - EB5 - HP 14x73 Steel Pile - Transverse Analysis



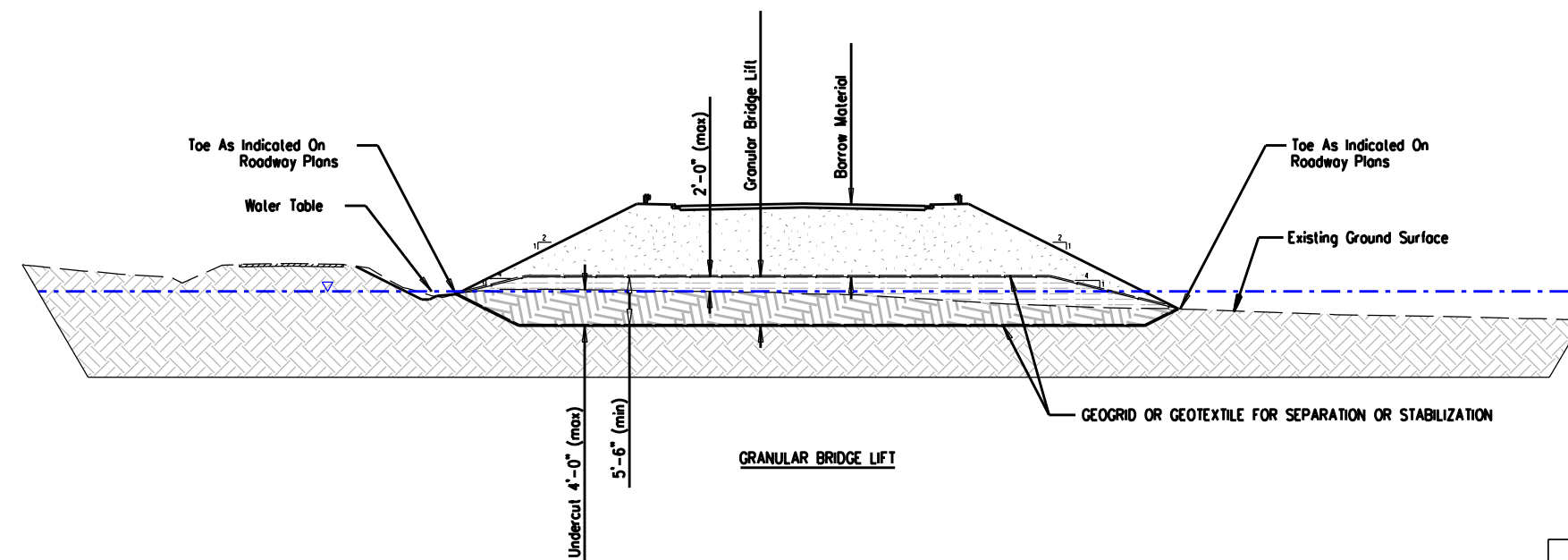
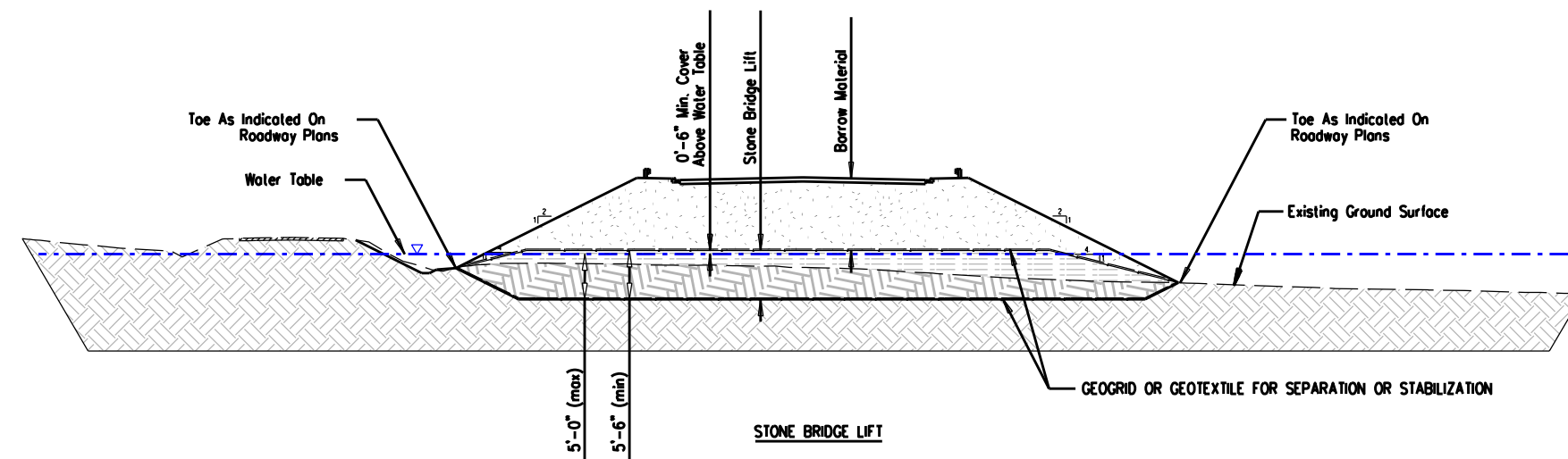
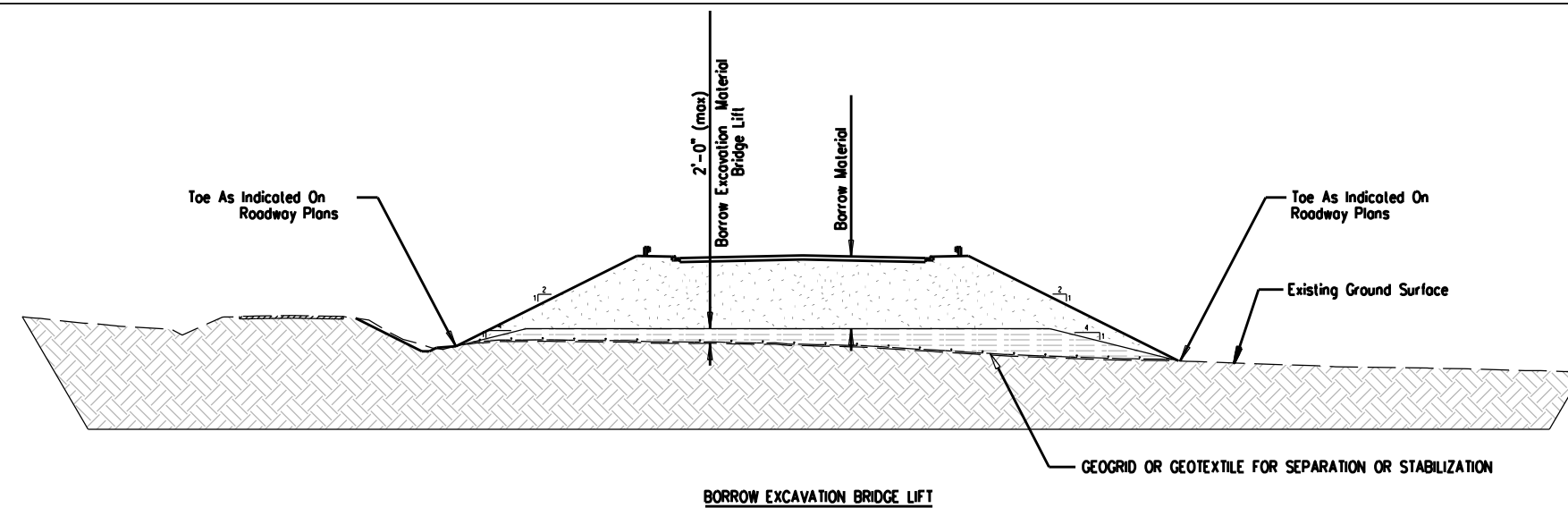
SC 557 Bridge over Crowders Creek  
Final Bridge Geotechnical Engineering Report

---

# APPENDIX

## SECTION 18 GEOTECHNICAL DRAWINGS & DETAILS

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD / ROUTE NO.	SHEET NO.
3	SC	YORK	0041800RD01	SC 557	G1



**LEGEND**

- BORROW MATERIAL
- EXISTING SOIL
- UNDERCUT SOIL
- BRIDGE LIFT

**BORROW MATERIAL**

- BELOW THE TOP 5 FT. OF EMBANKMENT, ANY SOIL THAT DOES NOT MEET THE DESCRIPTION OF MUCK MAY BE USED TO FORM EMBANKMENTS AS LONG AS IT IS STABLE WHEN COMPACTED TO THE REQUIRED DENSITY.
- IN THE TOP 5 FT. OF EMBANKMENT, ONLY THE FOLLOWING SOIL TYPES ARE ACCEPTABLE: A-1, A-2, A-3, A-4, A-5, AND A-6.

**MUCK EXCAVATION**

- ANY AREAS THAT ARE DISCOVERED TO DEFLECT AND/OR SETTLE MAY REQUIRE MUCK EXCAVATION AS DIRECTED BY THE RCE. THE RCE WILL DETERMINE THE LATERAL EXTENT OF THE UNDERCUTTING. THE UNDERCUTTING SHOULD NOT EXTEND BEYOND THE TOE OF SLOPE. THE FINAL DEPTH OF MUCK EXCAVATION SHALL NOT EXCEED 5 FEET, UNLESS OTHERWISE SPECIFIED IN THE PLANS AND/OR SPECIFICATIONS. CONTACT THE GEOTECHNICAL ENGINEER OF RECORD (GEOR) IF MUCK EXCAVATION NEEDS TO EXCEED 5 FEET, AND IT HAS NOT BEEN PREVIOUSLY SPECIFIED IN THE PLANS OR SPECIFICATIONS.
- IF THE UNDERCUTTING COMPLETELY REMOVES THE MATERIALS IDENTIFIED AS MUCK, THEN BRIDGE LIFT MATERIALS MAY BE PLACED DIRECTLY ON THE FIRM MATERIAL.
- IF BECAUSE THE DEPTH OF MUCKING REQUIRES THAT THE MUCK MATERIAL MUST BE LEFT IN PLACE, PLACE A STABILIZING GEOSYNTHETIC MEETING THE REQUIREMENTS OF SC-M-203-1 (07/2017), *GEOSYNTHETIC MATERIALS FOR SEPARATION AND STABILIZATION*. AFTER PLACEMENT OF THE INITIAL BRIDGE LIFT MATERIAL, EXPOSE APPROXIMATELY 1 SQUARE FOOT OF THE GEOSYNTHETIC FOR VISUAL OBSERVATION TO IDENTIFY ANY DAMAGE CAUSED BY THE PLACEMENT OF THE BRIDGE LIFT MATERIAL. AFTER ASCERTAINING THAT THE GEOSYNTHETIC HAS NOT BEEN DAMAGED, REPLACE THE BRIDGE LIFT MATERIAL EXCAVATED TO ALLOW OBSERVATION OF THE GEOSYNTHETIC. IF THE GEOSYNTHETIC APPEARS TO BE DAMAGED, EXPOSE A LARGER AREA AND CONTACT THE GEOR FOR INSTRUCTIONS. ANY DAMAGED AREAS SHALL BE REPAIRED BY THE CONTRACTOR AT NO EXPENSE TO THE DEPARTMENT.
- ANY RUTS THAT DEVELOP IN BRIDGE LIFT MATERIALS SHALL BE FILLED IN WITH SIMILAR BRIDGE LIFT MATERIALS. DO NOT BLADE DOWN THE RUTS, SINCE THIS WILL DECREASE THE THICKNESS OF THE BRIDGE LIFT.
- IN AREAS THAT REQUIRE MUCKING OR UNDERCUTTING, BORROW MATERIAL MAY BE PLACED AS THE BRIDGE LIFT AS LONG AS THE GRADE ON WHICH THE MATERIAL IS BEING PLACED IS AT LEAST 2 FEET ABOVE THE GROUNDWATER OR SURFACE WATER LEVEL. PLACE BORROW MATERIAL BRIDGE LIFTS IN SINGLE LIFT THICKNESSES NO GREATER THAN 2 FEET. DO NOT PLACE A BRIDGE LIFT CONSISTING OF BORROW MATERIAL WITHIN 3 FEET OF THE BASE OF THE PAVEMENT SECTION. PLACE ONLY COMPACTED BORROW MATERIAL SOIL OR STONE BRIDGE LIFT WITHIN THIS ZONE.
- IN THE EVENT THAT GROUNDWATER OR SURFACE WATER DOES NOT ALLOW BACKFILLING WITH BORROW MATERIAL SOIL, USE EITHER STONE OR GRANULAR BRIDGE LIFT MATERIALS MEETING THE REQUIREMENTS OF *BRIDGE LIFT MATERIALS* SUPPLEMENTAL TECHNICAL SPECIFICATION. PLACE THE BRIDGE LIFT MATERIALS IN SINGLE LIFT THICKNESSES NOT EXCEEDING 2 FEET. IF ADDITIONAL COMPACTED BORROW MATERIAL SOIL IS NEEDED TO REACH GRADE, PLACE A GEOTEXTILE FOR SEPARATION MEETING THE REQUIREMENTS OF SC-M-203-1 (07/2017), *GEOSYNTHETIC MATERIALS FOR SEPARATION AND STABILIZATION* BETWEEN THE STONE BRIDGE LIFT AND THE OVERLYING COMPACTED SOIL. AFTER THE PLACEMENT OF THE INITIAL LIFT OF COMPACTED MATERIAL, EXPOSE APPROXIMATELY 1 SQUARE FOOT OF GEOSYNTHETIC FOR VISUAL OBSERVATION TO IDENTIFY ANY DAMAGE CAUSED BY THE PLACEMENT OF THE COMPACTED MATERIAL. AFTER ASCERTAINING THAT THE GEOSYNTHETIC HAS NOT BEEN DAMAGED, REPLACE AND COMPACT THE MATERIAL EXCAVATED TO ALLOW OBSERVATION OF THE GEOSYNTHETIC. IF THE GEOSYNTHETIC APPEARS TO BE DAMAGED, EXPOSE A LARGER AREA AND CONTACT THE GEOR FOR INSTRUCTIONS. ANY DAMAGED AREAS SHALL BE REPAIRED BY THE CONTRACTOR AT NO EXPENSE TO THE DEPARTMENT.
- FOLLOWING RAINFALL EVENTS, PROOFROLLING THE EXISTING SURFICIAL SOILS MAY YIELD UNSATISFACTORY RESULTS. IN A DRY STATE, THE SOILS ARE ESTIMATED TO BE STABLE. IF WAITING FOR THE SOILS TO DRY IS NOT THE DESIRED OPTION, THEN THE CONSTRUCTOR SHALL EMPLOY MUCKING OPERATIONS.
- THE QUANTITIES ASSOCIATED WITH MUCKING AND UNDERCUTTING (I.E. MUCKING, BRIDGE LIFT MATERIAL, GEOGRID, AND GEOTEXTILE FOR SEPARATION OF SUB-GRADE AND SUB-BASE) ARE FOR BID ESTIMATION PURPOSES ONLY. DO NOT PURCHASE OR STOCKPILE THESE BID ITEMS ON SITE WITHOUT WRITTEN APPROVAL FROM THE RCE UNLESS SPECIFIC AREAS AND DETAILS ARE DEFINED IN THE PLANS.

**CONSTRUCTION RELATED VIBRATIONS**

- LEVEL 1 - SCDOT HAS ELECTED TO NOT MONITOR THE SITE. THEREFORE, NO EARTH-BORNE VIBRATION MONITORING IS REQUIRED.

4				
3				
2				
1				
REV. NO.	BY	DATE	DESCRIPTION OF REVISION	
TOPO.		DATE		
DWG.	JFH	DATE	6.27.19	GROUP - -
R/W		DATE		

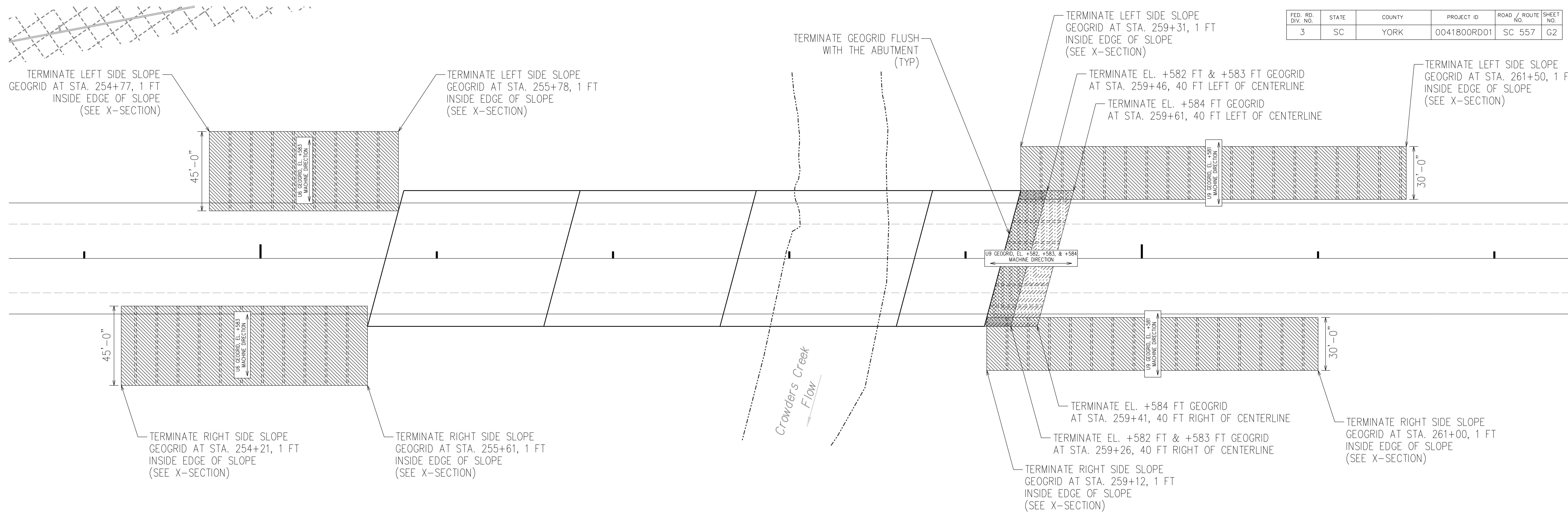
**SC 557 ROADWAY WIDENING & IMPROVEMENTS**

**GEOTECHNICAL GENERAL NOTES**

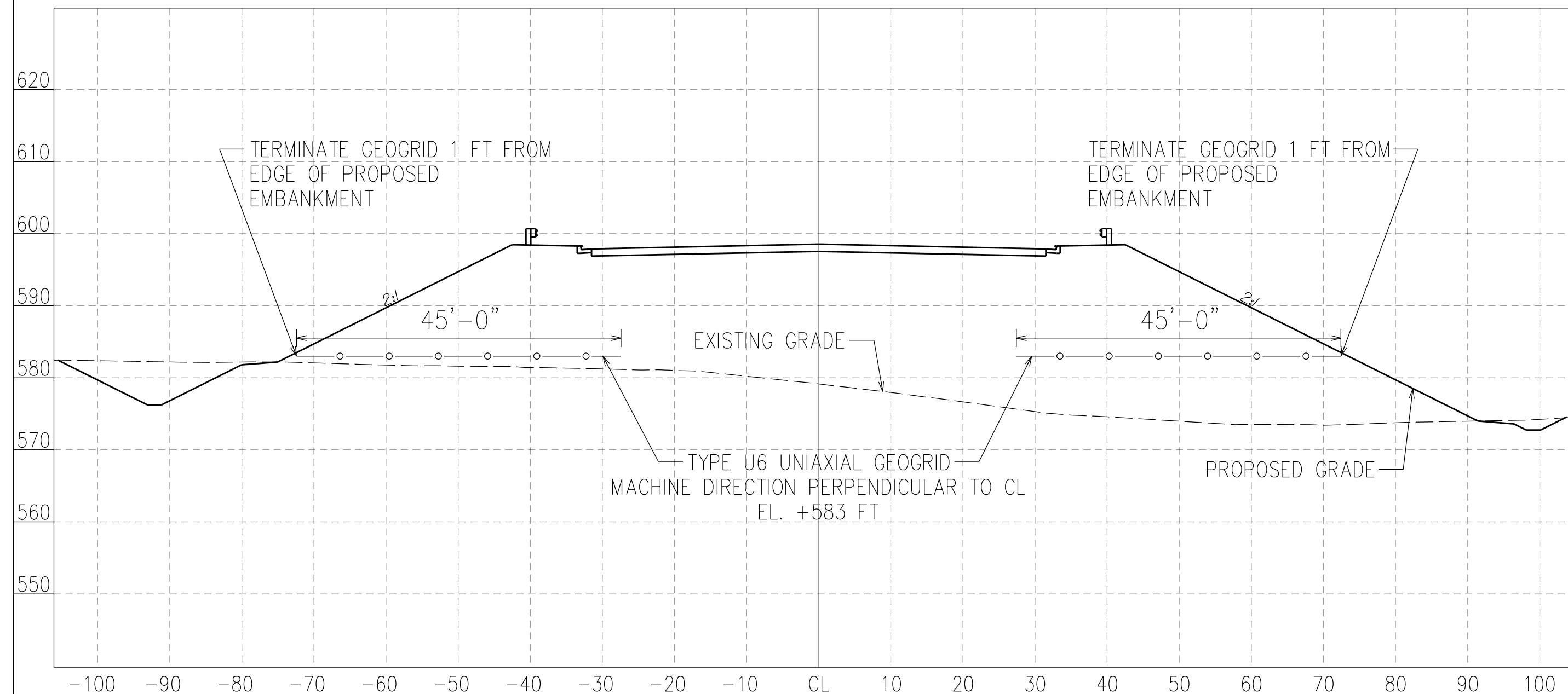
HRZ SCALE = NTS

VRT SCALE = NTS

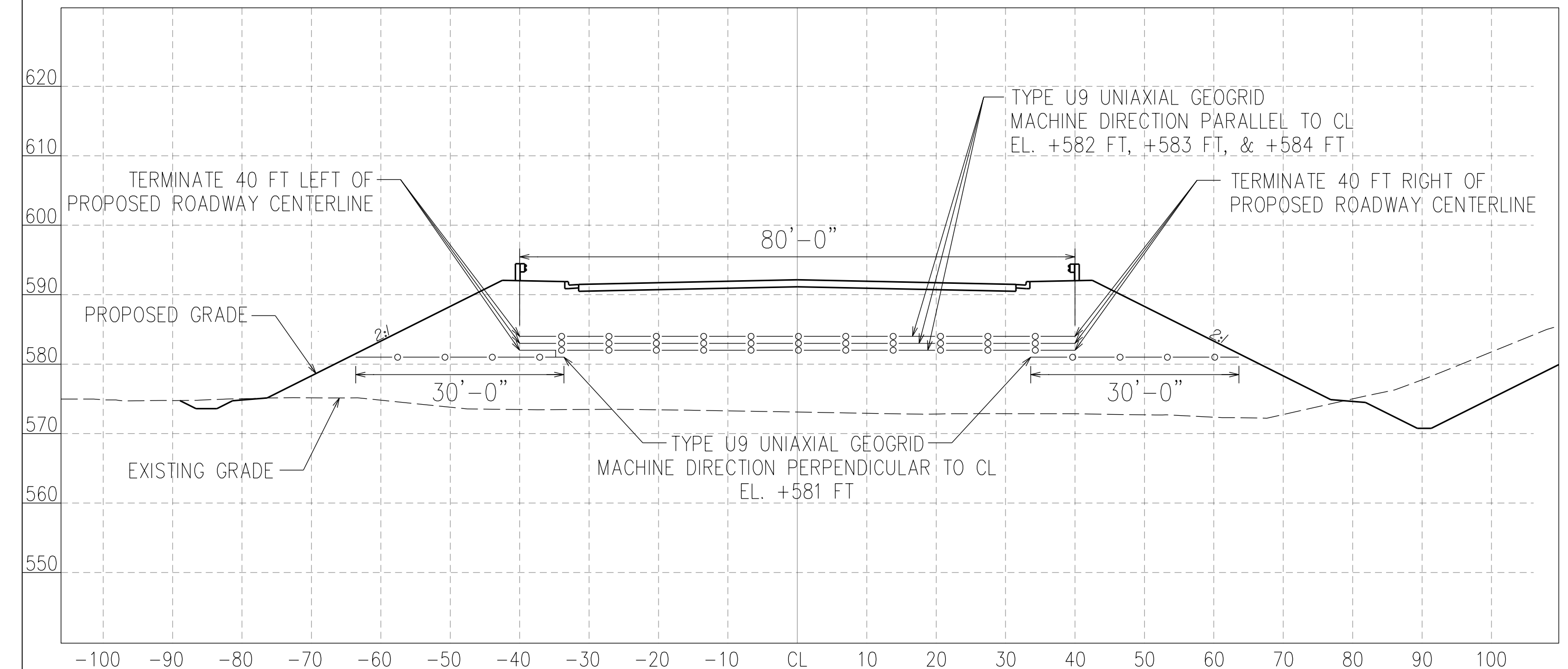
FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD / ROUTE NO.	SHEET NO.
3	SC	YORK	0041800RD01	SC 557	G2



BEGIN BRIDGE



END BRIDGE



NOTES

- ADJOINING GEOGRID ROLLS SHALL BE OVERLAPPED A MINIMUM OF 1.0 FT. NO SPLICING IN THE MACHINE DIRECTION IS ALLOWED. NO CUTTING THE GEOGRID IN THE MACHINE DIRECTION IS ALLOWED.
- REFERENCE THE SUPPLEMENTAL TECHNICAL SPECIFICATION FOR GEOGRID SOIL REINFORCEMENT, SC-M-203-2 (01/2020), FOR ADDITIONAL PROCEDURAL AND MATERIAL REQUIREMENTS.
- AT GEOGRID AND DRAINAGE PIPE CONFLICTS, BEND THE GEOGRID AROUND THE PIPE AND CONTINUE THE GEOGRID TO THE SPECIFIED TERMINATION LIMIT AT THE SPECIFIED ELEVATION.

REV. NO.	BY	DATE	DESCRIPTION OF REVISION
4			
3			
2			
1			
TOPO.	JFH	DATE 6.25.19	GROUP
DWG.			
R/W			



SC 557 BRIDGE OVER CROWDERS CREEK

SOIL REINFORCEMENT DETAILS

HRZ SCALE = NTS  
VRT SCALE = NTS



REVISED

# FINAL ROADWAY GEOTECHNICAL ENGINEERING REPORT

SC 557 Bridge over Crowders Creek  
York County, South Carolina



## PREPARED FOR

NV5

448 Lakeshore Parkway, Suite 215  
Rock Hill, South Carolina 29730



## PREPARED BY

F&ME Consultants, Inc.  
1825 Blanding Street  
Columbia, South Carolina 29205

SCDOT Project ID: 0041800RD01  
F&ME Project #: G4843.00

**MARCH 23, 2021**

March 23, 2021

Mr. Steve Drum, P.E.  
NV5  
448 Lakeshore Parkway, Suite 215  
Rock Hill, South Carolina 29730

Re: REVISED Final Roadway Geotechnical Engineering Report  
SC 557 Roadway Widening and Improvements  
York County, South Carolina  
Project ID 0041800RD01  
F&ME File No. G4843.00

Mr. Drum:

Submitted herein is the revised final roadway geotechnical report for the above referenced project. Revisions to our previously submitted report (dated June 13, 2019) were generated from SCDOT review comments (comment log dated March 4, 2020). Included is a general project description, a summary of the performed field investigation(s), our analysis of the subsurface findings, and our conclusions and recommendations for the proposed roadway embankments and the roadway structures. For geotechnical information associated with the bridge embankments at the SC 557 bridge over Crowders Creek, please refer to F&ME's Final Bridge Geotechnical Engineering Report.

Please notify us if there are any questions or if we may be of further assistance with the implementation of our recommendations.

Sincerely,



John F. Hamilton, P.E.  
Geotechnical Design Manager



Alex P. Ross, E.I.T.  
Geotechnical Associate

JFH:APR/jfh:apr



## TABLE OF CONTENTS

<b>1. INTRODUCTION</b>	<b>1</b>
<b>2. SUBSURFACE INVESTIGATION</b>	<b>2</b>
2.1. Preliminary Subsurface Investigation	2
2.2. Final Subsurface Investigation	2
2.3. Field Investigation Summary	3
<b>3. LABORATORY TESTING PROGRAM</b>	<b>4</b>
<b>4. GENERAL SITE GEOLOGY</b>	<b>5</b>
<b>5. SUBSURFACE CONDITIONS</b>	<b>6</b>
5.1 Soil Stratigraphy	6
5.2 Groundwater Conditions	6
<b>6. CONCLUSIONS AND RECOMMENDATIONS</b>	<b>7</b>
6.1. Site Preparation	7
6.2. Roadway Embankment Static Settlements	8
6.3. Roadway Embankment Slope Stability	10
6.4. 7'-0" x 8'-0" Reinforced Concrete Box Culvert	11
6.5. Cross-Line Pipe Culverts	12
6.6. Usability of Cut Soils	13
<b>7. ROADWAY PLAN NOTES</b>	<b>13</b>
<b>8. TEMPORARY SHORING</b>	<b>15</b>
<b>9. VIBRATION MONITORING</b>	<b>15</b>
<b>10. LIMITATIONS OF REPORT</b>	<b>15</b>

## APPENDIX

Section 1	Site Location Plan
Section 2	Boring Location Plans
Section 3	Generalized Subsurface Profiles
Section 4	Boring Logs
Section 5	Laboratory Test Results
Section 6	Embankment Static Settlement Analyses
Section 7	Embankment Slope Stability Analyses
Section 8	Cross-Line Pipe Culvert Analyses
Section 9	Box Culvert Analyses
Section 10	Geotechnical Quantity Estimate
Section 11	Geotechnical Drawings & Details



## 1. INTRODUCTION

The project is located on highway SC 557 near Lake Wylie in York County, South Carolina. A site location plan is presented in Section 1 of the Appendix as Figure 1.

It is our understanding that the project will consist of improving the existing two-lane corridor. The improvements include constructing new roadway embankments on a new alignment, adding drainage, and building a new bridge over Crowders Creek. The proposed roadway alignment starts and ends on the existing alignment and transitions onto the offset alignment approximately midway through the project. At a maximum, the new alignment is detailed at approximately 275 feet south of the existing alignment. The project also includes the widening of a portion of the existing SC 557 alignment from a two-lane to a five-lane roadway. Realignment and new intersections of S-46-27 (Ridge Road) and S-46-114 (Kingsburry Road) with SC 557 are also included. Roadway improvements will also be made at the intersection of S-46-152 (Riddle Mill Road/Bethel School Road) and SC 557.

The proposed project begins at Station 203+05.00 and ends at Station 333+97.00. The approximate length of the proposed SC 557 roadway project, less the bridge construction over Crowders Creek, is approximately 2.4 miles. In addition, approximately 1,200 linear feet of S-27 (Ridge Road) will be realigned between Station 15+45.00 and the new intersection with SC 557 at Station 27+38.89. Approximately 800 linear feet of S-114 (Kingsburry Road) will be realigned between the new intersection with SC 557 at Station 28+01.89 and Station 35+85.00. Approximately 590 linear feet of S-152 (Bethel School Road) will be improved between Station 10+70.00 and the intersection with SC 557 at Station 16+59.61. Approximately 530 linear feet of S-152 (Riddle Mill Road) will be improved between the intersection with SC 557 at Station 10+31.64 and Station 15+60.00.

Based on the roadway plans, the maximum fill height required to meet planned SC 557 roadway grade elevation is approximately twenty-seven (27) feet relative to the existing grade. The maximum fill height required to meet roadway grade elevations along S-27, S-114 and S-152 are approximately three (3), six (6) and three (3) feet, respectively, relative to the existing grade. The maximum cuts required to meet planned SC 557 and S-27 roadway grade elevations are approximately twenty-four (24) and seventeen (17) feet, respectively.

The preliminary and final subsurface investigations were performed by F&ME in general accordance with the 2010 GDM v1.2. The contract does not contemplate compliance with the GDM v2.0. F&ME has elected to use the analysis and design elements of the GDM v2.0 where it can be effectively implemented under the general conditions of our contract and where it will provide a benefit to the project. The final geotechnical analyses and the development of the final design recommendations were performed in general accordance with the GDM v2.0. Where the GDM does not offer design guidance, the AASHTO LRFD Specifications for Highway Bridges, 6<sup>th</sup> Ed., 2012 with the 2013 interim revisions were utilized.

## 2. SUBSURFACE INVESTIGATION

### 2.1. Preliminary Subsurface Investigation

Between September 17 and 21, 2012, ten (10) shallow manually advanced hand auger borings were performed along the planned roadway alignment. Dynamic cone penetrometer (DCP) tests were performed in accordance with Sowers and Hedges methodology for shallow in-situ soil testing at regular intervals throughout the soil test borings. Subsurface soil samples were obtained at visually discernable soil strata changes throughout the depths of the borings. The test borings were advanced to approximate depths ranging from 4 to 5.5 feet below existing ground surface.

In addition, one (1) standard penetration test (SPT) boring, RW-3, was advanced using a CME 550 drill rig. Hollow stem auger drilling methods were utilized to maintain a stable borehole. Standard spilt-spoon samples were obtained at standard sampling intervals throughout the depths of the soil test borings in general accordance with ASTM D-1586 to determine the relative densities and consistencies of the subsurface soils and to collect subsurface soil samples. Sampling in the top ten (10) feet below the surface was continuous, as specified by the SCDOT Geotechnical Design Manual. The tested hammer energy transfer ratio is shown on the boring logs. The hammer energy ratio, as provided to F&ME, was 83.2%.

### 2.2. Final Subsurface Investigation

F&ME performed a final subsurface investigation to supplement the preliminary subsurface investigation. On April 9 and 10, 2018, eighteen (18) shallow manually advanced hand auger borings were performed along the planned roadway alignments. Dynamic cone penetrometer (DCP) tests were performed in accordance with Sowers and Hedges methodology for shallow in-situ soil testing at regular intervals throughout the soil test borings. Subsurface soil samples were obtained at one-foot increments throughout the depths of the borings. The test borings were advanced to approximate depths ranging from three (3) to five (5) feet below existing ground surface.

Between June 1 and June 14, 2018, eighteen (18) soil test borings were performed along the planned roadway alignment. The soil test borings were advanced utilizing a CME 550X ATV-mounted drill rig and CME 45B trailer-mounted drill rig. Hollow stem auger drilling techniques were used to maintain a stable borehole. SPT tests were continuously obtained in the top ten (10) feet of each test boring. Following the continuous sampling, SPT samples were obtained at regular, five (5) foot intervals throughout the remaining depths of the borings. SPT samples were performed in general accordance with ASTM D-1586 to determine the relative densities and consistencies of the subsurface soils and to collect subsurface soil samples. During SPT testing of the encountered soils, an automatic hammer system was used. The energy ratios for the CME 550X hammer and the CME 45B hammer are 81% and 84%, respectively.

### 2.3. Field Investigation Summary

The survey coordinates of the borings performed during the preliminary and final subsurface investigation were collected by F&ME personnel utilizing a Trimble R8 GPS rover on the SC VRS system. The survey coordinates of the boring locations were placed on the provided CAD drawing (provided by NV5) for the proposed roadway alignment. Subsequently, the station and offset of each boring location relative to the proposed roadway alignment was determined.

The locations of the borings performed during the preliminary and final subsurface investigations are provided in the following table.

Soil Testing Location Table						
Test Number	Test Hole Locale	Alignment	Station	Offset from CL (ft)	Elevation (ft-MSL)	Depth (ft)
C-1	Roadway	SC 557	275+03	80 – RT	574.9	6.5
C-2	Roadway	SC 557	276+08	72 – LT	580.0	35.5
CL-1	Roadway	SC 557	205+17	45 – LT	647.2	5.0
CL-2	Roadway	SC 557	205+58	63 – RT	637.0	5.0
CL-3	Roadway	SC 557	212+99	63 – LT	636.4	5.0
CL-4	Roadway	SC 557	213+00	61 – RT	633.1	5.0
CL-5	Roadway	SC 557	219+85	79 – RT	636.1	5.0
CL-6	Roadway	SC 557	221+05	80 – RT	632.9	5.0
CL-7	Roadway	SC 557	226+61	134 – RT	618.2	5.0
CL-8	Roadway	SC 557	227+43	138 – RT	616.4	4.0
CL-9	Roadway	SC 557	237+58	63 – LT	628.8	5.0
CL-10	Roadway	SC 557	237+54	86 – RT	616.3	3.0
RW-1	Roadway	SC 557	212+46	23 – RT	631.9	5.0
RW-2	Roadway	SC 557	218+50	22 – RT	640.5	5.0
RW-3	Roadway	SC 557	226+71	24 – RT	618.9	25.0
RW-4	Roadway	SC 557	238+21	21 – LT	632.0	10.0
RW-5	Roadway	SC 557	244+21	26 – LT	631.3	5.0
RW-6	Roadway	SC 557	298+48	13 – LT	654.1	5.0
RW-7	Roadway	SC 557	308+47	29 – LT	664.8	5.0
RW-8	Roadway	SC 557	318+46	24 – RT	653.4	5.0
RW-9	Roadway	SC 557	324+45	26 – LT	645.2	5.0
RW-10	Roadway	SC 557	327+47	24 – RT	641.0	5.0
RW-11	Roadway	SC 557	204+00	20 – LT	649.5	5.0
RW-12	Roadway	SC 557	209+00	40 – RT	634.9	10.0
RW-13	Roadway	SC 557	214+00	30 – RT	635.7	10.0
RW-14	Roadway	SC 557	224+00	20 – RT	628.2	5.0
RW-15	Roadway	SC 557	229+00	41 – LT	615.6	15.0
RW-16	Roadway	SC 557	234+03	24 – LT	628.9	5.0
RW-17	Roadway	SC 557	249+00	20 – LT	612.4	11.0

RW-18	Begin Bridge Approach Embankment	SC 557	254+22	2 – RT	579.8	48.6
RW-19	End Bridge Approach Embankment	SC 557	260+60	3 – LT	572.7	21.1
RW-20	Roadway	SC 557	267+50	CL	588.2	35.3
RW-21	Roadway	SC 557	271+43	7 – RT	591.2	20.0
RW-22	Roadway	SC 557	275+59	CL	579.0	23.1
RW-23	Roadway	SC 557	281+00	30 – LT	618.5	8.5
RW-24	Roadway	SC 557	286+00	CL	624.2	9.5
RW-25	Roadway	SC 557	291+00	15 – RT	629.2	14.7
RW-26	Roadway	SC 557	296+00	CL	647.1	5.0
RW-27	Roadway	SC 557	306+00	CL	665.0	5.0
RW-28	Roadway	SC 557	316+00	15 – RT	656.2	5.0
RW-29	Roadway	SC 557	326+00	40 – LT	637.8	25.0
RW-30	Roadway	S-114	30+00	CL	635.6	10.0
RW-31	Roadway	S-27	24+00	1 – RT	650.9	35.0
RW-32	Roadway	S-27	21+00	CL	656.4	30.0
RW-33	Roadway	S-152	15+00	CL	622.7	5.0
RW-34	Roadway	S-152	13+00	CL	637.3	5.0

All of the collected soil samples performed for the preliminary and final subsurface investigations were examined and logged in the field by F&ME personnel, sealed in plastic bags, and transported to our laboratory for further examination and analyses. The soils were visually classified in the field based upon the Unified Soil Classification System.

We have provided a boring location plan in Section 2 of the Appendix displaying the locations of the borings performed during the preliminary and final subsurface investigations.

### 3. LABORATORY TESTING PROGRAM

F&ME performed laboratory testing on select soil samples from the test borings performed as part of the preliminary and final geotechnical investigations. F&ME’s laboratory test program was performed to determine representative physical and engineering soil properties. The laboratory program included moisture content, Atterberg limits, and grain size distribution. These tests were used to determine the strength and behavioral characteristics of the soils as well as to verify the field classifications by the AASHTO classification system and the Unified Soil Classification System (USCS).

The type and number of laboratory tests performed by F&ME are summarized in the following tables. These soil tests were conducted at F&ME’s AASHTO accredited laboratory in accordance with applicable ASTM/AASHTO standards.

Preliminary Subsurface Investigation Laboratory Testing	
Type of Test	Number of Tests
Moisture Content	10
Atterberg Limits	10
Grain Size	10

Final Subsurface Investigation Laboratory Testing	
Type of Test	Number of Tests
Moisture Content	63
Atterberg Limits	63
Grain Size	62

Data sheets presenting the results of the laboratory test program are provided in Section 5 of the Appendix.

#### 4. GENERAL SITE GEOLOGY

In general, this site is in the Piedmont geologic area of South Carolina. The Piedmont Unit is bounded on the west by the Blue Ridge Unit and on the east by the Coastal Plain Unit. The boundary between the Blue Ridge Unit and the Piedmont Unit is typically assumed to be the Brevard Fault zone. The common boundary between the Piedmont Unit and the Coastal Plain Unit is the "Fall Line". It is believed that the Piedmont is the remains of an ancient mountain chain that has been eroded with existing elevation ranging from 300 feet to 1,400 feet. The Piedmont is characterized by gently rolling topography, deeply weathered bedrock, and relatively few rock outcrops. It contains monadnocks that are isolated outcrops of bedrock (usually quartzite or granite) that are the result of the erosion of the mountains. The vertical stratigraphic sequence consists of 5 to 70 feet of weathered residual soils at the surface underlain by metamorphic and igneous basement rocks (granite, schist, and gneiss). The weathered soils (saprolites) are physically and chemically weathered rocks that can be soft/loose to very hard and dense, or friable and typically retain the structure of the parent rock. The geology of the Piedmont is complex with numerous rock types that were formed during the Paleozoic era (250 to 570 MYA).

The typical residual soil profile consists of clayey soils near the surface, where soil weathering is more advanced, underlain by sandy silts and silty sands. The boundary between soil and rock is not sharply defined. This transitional zone termed "partially weathered rock" (PWR) is normally found overlaying the parent bedrock. PWR is defined, for normal engineering purposes, as residual material with standard penetration test resistances in excess of 100 blows per foot. The PWR is considered in geotechnical engineering as an Intermediate Geo-Material (IGM). Weathering is facilitated by fractures, joints and by the presence of less resistant rock types. Consequently, the profile of the partially weathered rock and hard rock is quite irregular and erratic, even over short horizontal distances. Also, it is not unusual to find lenses and boulders of

hard rock and zones of partially weathered rock within the soil mantle, well above the general bedrock level.

## 5. SUBSURFACE CONDITIONS

The below soil descriptions, strata depths, and consistencies are generalized and were interpreted by F&ME based on the subsurface conditions as encountered in the test borings. We have included the soil test boring logs in Section 4 of the Appendix for detailed descriptions of the encountered soil conditions. As with any geologic formation, the depth and thickness of the soil strata will vary across the site. Although the test borings designate strata changes at specific depths in the description of the soil stratigraphy on the soil test boring logs, transitions between soil strata are generally gradual. Therefore, the outlined subsurface profile shown on the soil test boring logs should only be considered general on-site soil conditions and should not be utilized as an absolute indicator.

### 5.1 Soil Stratigraphy

The following table summarizes the soil stratification along the proposed roadway alignment.

Soil Stratification Table					
Geologic Formation	Elevation of Top of Layer (ft-MSL)	Depth to Top of Layer (ft)	USCS Soil Type	SPT N-Values (bpf)	Comments
Fill	+665	0	SP/SP-SC/ SM/SC	3 to 18	Existing Embankment
Piedmont Residuum	+663	2	SM/SC/CL/CH /CL-ML/ ML/MH	WOH to 86	Original Ground Surface
Partially Weathered Rock (PWR)	+616	49	SM/ML	100+	--
Bedrock	+615	50	--	--	Metagabbro/ Metadiorite

### 5.2 Groundwater Conditions

Within the performed soil test borings, the depth to groundwater was measured immediately following completion of the borings, 24-hours following completion of the borings, or both.

The measured groundwater table elevation ranges from approximately 567 ft-MSL to 626 ft-MSL based on the water table measurements. The surficial soils are either clayey or clay-like and are expected to be moisture sensitive. During and following periods of heavy rainfall, perched groundwater conditions may be observed on or in these soils. Perched groundwater is a temporary condition and is not indicative of the normal, static groundwater table elevation. For design purposes, F&ME has selected a water table elevation based on the borings performed relative to the embankment location.

## 6. CONCLUSIONS AND RECOMMENDATIONS

The conclusions and recommendations presented in this report are based upon the general soil conditions as encountered in the subsurface investigations, our analyses of the site and subsurface conditions, and our experience on similar projects. The recommendations do not reflect variations in subsurface conditions or the presence of undiscovered obstructions that could exist outside the soil testing locations or in unexplored areas of the site. If subsurface conditions are discovered during construction activities that deviate from the soils indicated on the soil testing logs, F&ME should be contacted to evaluate the impact of the identified conditions on the proposed roadway embankments and the proposed roadway structures.

### 6.1. Site Preparation

Based on the subsurface conditions as encountered in the field investigation, the soil subgrade below the planned roadway embankments, cross-line pipe culverts, and box culverts may be suitable at some locations and will likely be unstable when wet at other locations. The SCDOT understands the risks associated with unstable embankment subgrade material and has elected to eliminate the mucking and/or bridge lift quantities from the road plans unless the design requires that mucking/bridge lifts be performed. Mucking below the box culvert at Station 275+58 is required by the geotechnical design. The mucking quantities have been conveyed to the roadway designer for inclusion in the road plans. At other locations, F&ME's geotechnical design does not require that mucking operations be performed. For the locations where mucking quantities were not provided, SCDOT's RCE is responsible for determining the need and quantifying any mucking and/or bridge lifts during construction. If mucking and/or bridge lifts are needed, we have provided a Geotechnical General Notes sheet in Section 11 of the Appendix that provides additional information relative to these operations.

Temporary and permanent site drainage should be established as soon as possible to promote drainage away from the proposed embankment subgrade locations. Establishing good site drainage prior to construction and maintaining it thereafter can minimize the effects of surface run-off and shallow and/or fluctuating groundwater and can minimize the risk associated with mucking costs. Permanent site drainage should be established to prevent soils at and below the roadway subgrade and the foundation elements from becoming saturated and to minimize fluctuations in moisture contents. The shear strength of soils typically decreases with

increasing moisture content and saturation. Therefore, site drainage is the single most critical factor impacting construction and the long-term performance of the roadway.

Site preparation should be performed in accordance with Section 201 of the 2007 SCDOT Standard Specifications for Highway Construction, supplemental specifications, and/or special provisions. Where existing ground surface approximates final grade or where final roadway embankment fill heights will not exceed five (5) feet above existing grade, the ground surface below the embankment footprint should be stripped of any organic materials and topsoil to depths as required, and grubbing of tree root systems will be required. Stump holes and other holes resulting from obstruction removal shall be backfilled with suitable material and properly compacted. In planned roadway embankment areas where fill heights will exceed five (5) feet, stumps may be left in place as long as stumps do not extend more than eight (8) inches above ground line.

## 6.2. Roadway Embankment Static Settlements

Roadway embankments will require fill placement to meet the proposed grade. The maximum fill height is estimated to be approximately twenty-seven (27) feet relative to the existing grade at the proposed roadway centerline.

Deformations are predicted to occur in both coarse-grained and fine-grained soils. The majority of the predicted settlements are anticipated to occur during construction. To analyze the magnitude and time rate of consolidation of the fine-grained soils beneath the groundwater table, consolidation parameters from the performed laboratory consolidation testing from boring AP-3 were utilized. The Settle3D software, developed by Rocscience, was utilized to analyze the roadway embankments selected by F&ME.

The following table summarizes the results of the settlement analyses for the beginning of the bridge and end of the bridge approach embankments.

Settlement Analyses Summary			
Station	Drainage Type	Total Settlement (in.)	Time to Meet EV-01B
Sta. 206+00	N/A	0.19	0
Sta. 229+50	N/A	0.57	0
Sta. 237+50	N/A	0.44	0
Sta. 249+00	N/A	0.40	0
Sta. 253+50	Single	3.93	0
	Double	3.93	0
Sta. 261+00	Single	9.01	0
	Double	9.01	0



Sta. 270+00	Single	2.53	0
	Double	2.53	0
Sta. 279+00	N/A	0.28	0
Sta. 287+00	Single	1.23	0
	Double	1.23	0

Based on the results from the Settle3D analyses, the predicted deformations are estimated to occur rapidly as fill is placed, and any long-term, consolidation settlements are expected to meet the GDM performance limits without surcharging or ground improvement. The results from the settlement analyses compared to the GDM v2.0 performance limits are provided in the following tables. These reported values represent the maximum (ie. worst case) calculated settlement across the project.

Embankment (Pavement) Performance Limits			
Deformation ID No.	Service Limit State Performance Limit Description	Predicted Value	Performance Limit
EV-01A	Maximum Settlement from Elastic Compression + Primary Consolidation + Secondary Compression along the profile grade that occurs during the duration of the construction of the embankment commences at the start of construction and terminates just prior to paving operations. This deformation is used to adjust borrow requirements, if necessary	9"	No Limit
EV-01B	Maximum Settlement from Primary Consolidation + Secondary Compression along the profile grade over the design life of the embankment. The design life begins after the pavement has been placed (i.e., the settlement that occurs after EV-01A).	0"	3.00"
EV-03	Maximum Differential Settlement from Primary Consolidation + Secondary Compression occurring longitudinally along the profile grade after the roadway has been paved. Differential ratio is shown in parenthesis for informational purposes. (Inches per 50 Feet of Embankment Longitudinally)	0"	1.00" (1/600)

The Settle3D input properties and analyses results are provided in Section 6 of the Appendix.

### 6.3. Roadway Embankment Slope Stability

F&ME has performed static global slope stability analyses for the roadway embankment side slopes. F&ME utilized the computer software program *Slide* v. 7.009 developed by Rocscience for the global slope stability analyses. Three (3) slope stability methodologies were utilized: the Bishop Method, the Spencer Method, and the General Limit Equilibrium Method.

The subsurface soil stratigraphy, ground water conditions, and soil strength parameters utilized in these analyses were based on generalized conditions as indicated by the test borings performed along the roadway alignment. Roadway cross-sections, provided to F&ME, indicate that slopes are as shallow as 6H:1V and as steep as 2H:1V for the left and right side slopes of the roadway embankments.

For the side slope stability analyses, we have analyzed final constructed side slopes for the planned roadway embankment geometry at each discrete location. A uniform distributed live loading of 250 pounds per square foot (psf) was applied within planned pavement areas.

F&ME selected ten (10) fill cross-sections and one (1) cut cross-section along the SC 557 alignment to analyze for slope stability. One (1) fill cross-section was analyzed along the S-114 (Kingsburry Road) alignment and two (2) cut cross-sections were analyzed along the S-27 (Ridge Road) alignment.

The SLIDE output yields factors of safety results while the GDM design criteria lists resistance factors. In accordance with the GDM, the factor of safety results were inverted to convert the values to resistance factor results. The following table presents the calculated geotechnical resistance factor ( $\phi$ ) results from the slope stability analyses.

Global Embankment Slope Stability Results Summary							
Alignment	Station	Side Slope	Design Event	Resistance Factor, $\phi$			Design Criteria <sup>1</sup>
				Bishop Method	Spencer Method	GLE Method	
SC 557	206+00	Left	Static	0.24	0.24	0.24	0.75
		Right	Static	0.40	0.40	0.40	0.75
	229+50	Left	Static	0.45	0.45	0.45	0.75
		Right	Static	0.42	0.42	0.42	0.75
	237+50	Left	Static	0.16	0.16	0.16	0.75
		Right	Static	0.25	0.26	0.26	0.75
	249+00	Left	Static	0.19	0.19	0.19	0.75
	253+50	Left	Static	0.72	0.75	0.75	0.75
		Right	Static	0.73 <sup>2</sup>	0.75 <sup>2</sup>	0.75 <sup>2</sup>	0.75
	261+00	Left	Static	0.61 <sup>2</sup>	0.61 <sup>2</sup>	0.61 <sup>2</sup>	0.75
		Right	Static	0.62 <sup>2</sup>	0.63 <sup>2</sup>	0.63 <sup>2</sup>	0.75

SC 557	265+50	Right	Static	0.67	0.67	0.67	0.70 <sup>1</sup>
	270+00	Left	Static	0.18	0.18	0.18	0.75
		Right	Static	0.19	0.20	0.19	0.75
	276+00	Left	Static	0.64	0.67	0.67	0.75
		Right	Static	0.74 <sup>2</sup>	0.75 <sup>2</sup>	0.75 <sup>2</sup>	0.75
	279+00	Left	Static	0.61	0.61	0.61	0.75
Right		Static	0.30	0.30	0.30	0.75	
278+00	Left	Static	0.54	0.55	0.54	0.75	
S-27 (Ridge Rd.)	21+00	Right	Static	0.21	0.21	0.21	0.70 <sup>1</sup>
	24+00	Left	Static	0.14	0.14	0.13	0.70 <sup>1</sup>
		Right	Static	0.30	0.30	0.30	0.70 <sup>1</sup>
S-114 (Kingsbury Rd.)	30+50	Left	Static	0.22	0.22	0.22	0.75
		Right	Static	0.17	0.17	0.17	0.75

<sup>1</sup> Resistance Factor based on Global Stability Cut Section

<sup>2</sup> Geogrid soil reinforcement is required

The *Slide* output graphs depicting the slope geometry, soil strength parameters, soil profiles and the computer generated critical failure circles of each of the above listed slope stability analyses are presented in Section 7 of the Appendix.

#### 6.4. 7'-0" x 8'-0" Reinforced Concrete Box Culvert

A new, 7 ft x 8 ft reinforced concrete box culvert is planned at approximate SC 557 Station 275+50. The proposed box culvert is oriented southwest/northeast to the new SC 557 roadway alignment. Three (3) soil test borings were performed at the proposed box culvert location: C-1 at the downstream invert, RW-22 at the approximate middle of the proposed culvert, and C-2 at the upstream invert. In general, the subgrade conditions at the proposed culvert indicate poor consistency, fine-grained soils at the ground surface. A thin layer (~5 ft) of soft clay-like soil exists in the upper five (5) feet of boring RW-22, but most of this material will be removed to install the box culvert at the elevations shown in the roadway plans. This soft soil appears to be localized to the general area near boring RW-22, and this material was not observed in the other borings performed near the proposed box culvert invert location. Below the soft/loose material, where present, stiff to hard residuum was encountered.

The box culvert is considered a roadway structure, and, in accordance with the GDM v1.2, roadway structures require a geotechnical seismic evaluation. Based on the performed SSL calcs, neither seismic liquefaction nor seismic soil softening are anticipated at the box culvert location. As such, no ground improvements are required for acceptable seismic box culvert performance.

Following excavations below the bottom of the proposed box culvert, an approximate two (2) foot layer of soft silt is indicated in boring RW-22. For the geotechnical design, F&ME has elected to remove this material, where it is present, and backfill the excavated area with stone. We anticipate that the mucking can be performed as an open excavation, and temporary shoring is not required. The stone material will serve a variety of purposes, but its primary

purpose will be to provide sufficient bearing resistance for the Service and Strength limit states. If groundwater is encountered in the excavated area, normal methods of dewatering may be employed to facilitate the proposed culvert construction.

The bearing resistance calculations and settlement analyses are provided in Section 9 of the Appendix. The following table summarizes the performed box culvert bearing resistance calculations and settlement analyses.

Maximum Footing Reaction for Culvert	
Nominal Geotechnical Resistance	16.77 tsf
Geotechnical Resistance Factor	0.45
Factored Geotechnical Resistance	7.54 tsf
Settlement <sup>1</sup>	3.4 in

<sup>1</sup>Settlement analyses assume a distributed load equal to the factored geotechnical resistance

## 6.5. Cross-Line Pipe Culverts

Several cross-line pipe culverts are planned within the proposed corridor. SPT borings or manual auger borings were performed near the proposed ends of each cross-line pipe culvert. In general, the subgrade soils are predominantly fine-grained and above the water table. Perched water may be encountered at some locations when performing the undercut for the pipe foundation. The perched water can be removed through normal methods of construction dewatering. Immediately following excavation, these soils may be wet and unstable. Once the water is removed, they will gradually gain strength as they are allowed to dry. Stormwater should be temporarily directed away from the pipe culvert excavations during construction.

Settlement analyses were performed at the cross-line pipe culvert locations to evaluate the differential settlement along the pipe profile. The Settle3D software was used for these settlement analyses. The soil parameters used in the settlement analyses was based on the borings performed at the respective pipe culvert location. Based on the borings, no consolidation settlements are anticipated below the pipe culverts. The estimated settlement will occur rapidly as fill is placed above the culverts. The foundation preparation for the pipe culverts shall meet the requirements of SCDOT Supplemental Technical Specification for Permanent Pipe Culverts (SC-M-714). F&ME anticipates no unusual geotechnical constructability issues associated with the cross-line pipe culverts. The following table summarizes the performed settlement analyses.

Cross-Line Pipe Culvert Settlement Summary						
Cross-Line Pipe ID	Alignment	Diameter (in)	Station	Boring ID	Max. Total Settlement (in)	Differenetial Settlement <sup>1</sup> (in)
CLP-0601	SC 557	24	205+30	CL-1 & CL-2	0.54	0.54
CLP-0602	SC 557	30	213+00	CL-3 & CL-4	0.86	0.73
CLP-0701	S-114	24	28+50	CL-5 & CL-6	0.12	0.12
CLP-0702	S-1916	36	12+00	CL-7 & CL-8	0.87	0.87
CLP-0826	SC 557	24	237+59	CL-9 & CL-10	0.42	0.42

<sup>1</sup>Differential settlement reported over a maximum distance of fifty (50) feet

## 6.6. Usability of Cut Soils

In general, soil material noted in our investigation that will be excavated is suitable for “general” embankment fill considering that it does not meet the description of muck and it is deemed stable when compacted to the required density. The soil may not be suitable for top 18” subgrade fills and may require selective placement in the fill embankments depending upon construction location and sequencing. A majority of the proposed cut section along S-27 (Ridge Road) was classified as A-7 material, and we do not recommend that this material be used at any location of a new embankment.

## 7. ROADWAY PLAN NOTES

The following notes are provided on the Geotechnical General Notes sheet. The Geotechnical General Notes sheet shall be included with the roadway plans.

*Below the top 5 ft. of embankment, any soil that does not meet the description of muck may be used to form embankments as long as it is stable when compacted to the required density.*

*In the top 5 ft of the embankment, only the following soil types are acceptable: A-1, A-2, A-3, A-4, A-5, and A-6.*

*Any areas that are discovered to deflect and/or settle may require muck excavation as directed by the RCE. The RCE will determine the lateral extent of the undercutting. The undercutting should not extend beyond the toe of slope. The final depth of muck excavation shall not exceed 5 feet, unless otherwise specified in the plans and/or specifications. Contact the Geotechnical Engineer of Record (GEOR) if muck excavation needs to exceed 5 feet, and it has not been previously specified in the plans or specifications.*

*If the undercutting completely removes the materials identified as muck, then bridge lift materials may be placed directly on the firm material.*

*If because the depth of mucking requires that the muck material must be left in place, place a stabilizing geosynthetic meeting the requirements of SC-M-203-1 (07/2017), Geosynthetic Materials for Separation and Stabilization. After placement of the initial bridge lift material, expose approximately 1 square foot of the geosynthetic for visual observation to identify any damage caused by the placement of the bridge lift material. After ascertaining that the geosynthetic has not been damaged, replace the bridge lift material excavated to allow observation of the geosynthetic. If the geosynthetic appears to be damaged, expose a larger area and contact the GEOR for instructions. Any damaged areas shall be repaired by the Contractor at no expense to the Department.*

*Any ruts that develop in bridge lift materials shall be filled in with similar bridge lift materials. Do not blade down the ruts, since this will decrease the thickness of the bridge lift.*

*In areas that require mucking or undercutting, borrow material may be placed as the bridge lift as long as the grade on which the material is being placed is at least 2 feet above the groundwater or surface water level. Place borrow material bridge lifts in single lift thicknesses no greater than 2 feet. Do not place a bridge lift consisting of borrow material within 3 feet of the base of the pavement section. Place only compacted borrow material soil or stone bridge lift within this zone.*

*In the event that the groundwater or surface water does not allow backfilling with borrow material soil, use either stone or granular bridge lift materials meeting the requirements of bridge lift materials Supplemental Technical Specification. Place the bridge lift materials in single lift thicknesses not exceeding 2 feet. If additional compacted borrow material is needed to reach grade, place a geotextile for separation meeting the requirements of SC-M-203-1 (07/2017), Geosynthetic Materials for Separation and Stabilization between the stone bridge lift and the overlying compacted soil. After the placement of the initial lift of compacted material, expose approximately 1 square foot of the geosynthetic for visual observation to identify any damage caused by the placement of the compacted material. After ascertaining that the geosynthetic has not been damaged, replace and compact the material excavated to allow observation of the geosynthetic. If the geosynthetic appears to be damaged, expose a larger area and contact the GEOR for instructions. Any damaged areas shall be repaired by the Contractor at no expense to the Department.*

*Following rainfall events, proofrolling the existing surficial soils may yield unsatisfactory results. In a dry state, the soils are estimated to be stable. If waiting for the soils to dry is not the desired option, then the Contractor shall employ mucking operations.*

*The quantities associated with mucking and undercutting (i.e. mucking, bridge lift material, geogrid, and geotextile for separation of sub-grade and sub-base) are for bid estimation purposes only. Do not purchase or stockpile these bid items on site without written approval from the RCE unless specific areas and details are defined in the plans.*

## 8. TEMPORARY SHORING

Based on our understanding of the construction sequencing, we do not anticipate that temporary shoring walls will be required for construction of the roadway embankments or roadway structures. If it is determined that temporary shoring walls are necessary to facilitate construction, F&ME will provide temporary shoring design parameters for use by the Contractor in their design.

## 9. VIBRATION MONITORING

Residential and commercial structures are located within the vicinity of the project that may be affected by construction related earthborne vibrations. The closest structure to roadway compaction activities is approximately 70 feet. We estimate structures within a zone of 50 feet for vibratory compaction activities are susceptible to construction related earthborne vibrations. Since the nearest structures are not within these estimated influence zones, we do not anticipate that a vibration monitoring program will be required during construction.

The following notes are provided on the Geotechnical General Notes sheet. The Geotechnical General Notes sheet shall be included with the roadway plans.

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

## 10. LIMITATIONS OF REPORT

This report has been prepared in accordance with generally accepted geotechnical engineering practice for specific application to the referenced project. The conclusions and recommendations contained in this report are based upon the provided CAD documents, soil test borings, and testing result data, contained within, and applicable standards in this geographic area at the time this report was prepared. No other warranty, expressed or implied, is made.

In the event that any changes in nature, design, or location of the structure and/or foundation elements are planned, the recommendations contained in this report will not be considered valid unless the changes are reviewed and verified in writing.

# SC 557 Roadway Construction and Improvements Final Roadway Geotechnical Engineering Report

---

## APPENDIX

SECTION 1	SITE LOCATION PLAN
SECTION 2	BORING LOCATION PLANS
SECTION 3	GENERALIZED SUBSURFACE PROFILES
SECTION 4	BORING LOGS
SECTION 5	LABORATORY TEST RESULTS
SECTION 6	STATIC SETTLEMENT ANALYSES
SECTION 7	EMBANKMENT SLOPE STABILITY ANALYSES
SECTION 8	CROSS-LINE PIPE CULVERT ANALYSES
SECTION 9	BOX CULVERT ANALYSES
SECTION 10	GEOTECHNICAL QUANTITY ESTIMATE
SECTION 11	GEOTECHNICAL DRAWINGS & DETAILS

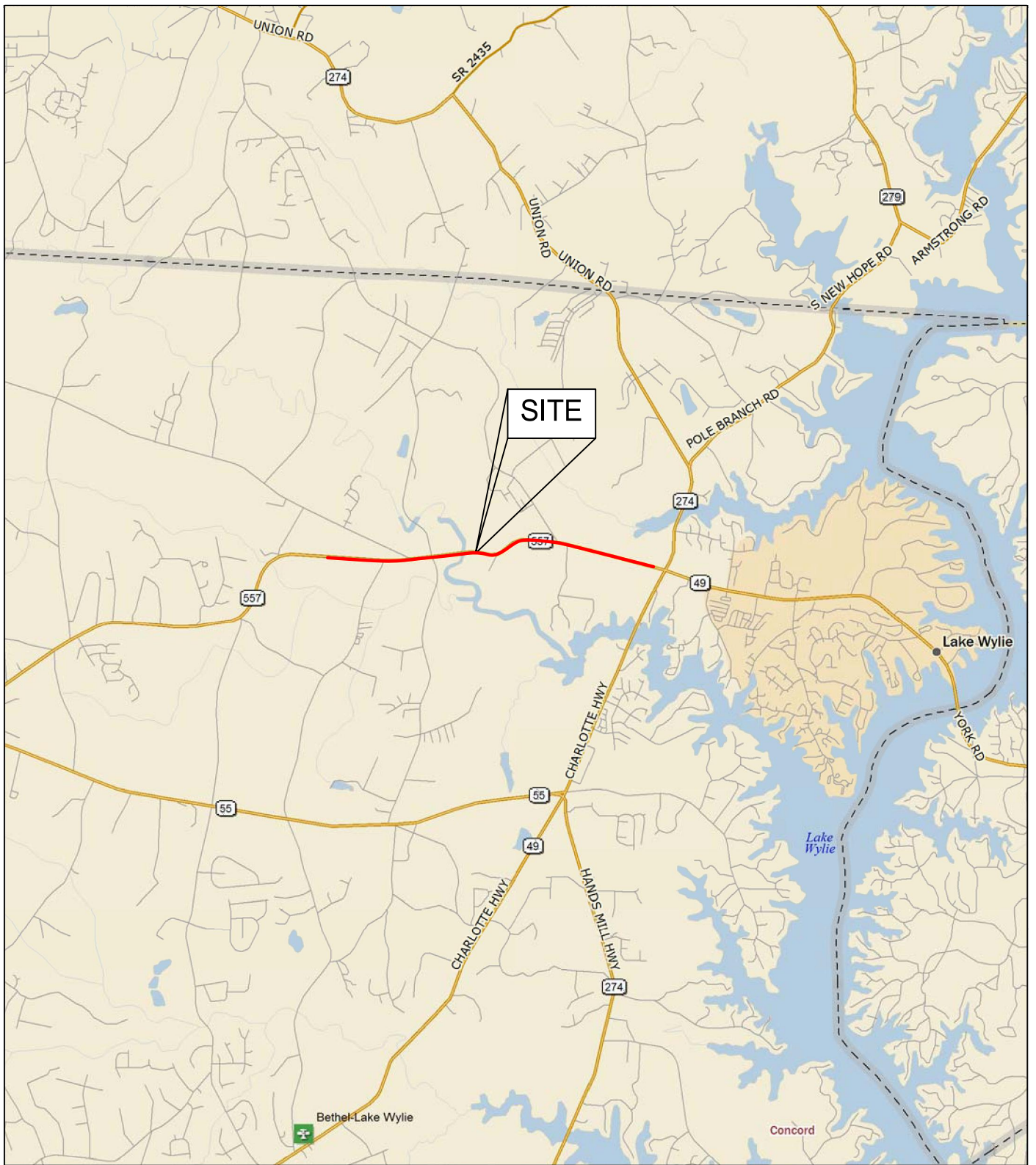


SC 557 Roadway Construction and Improvements  
Final Roadway Geotechnical Engineering Report

---

# APPENDIX

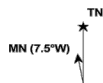
## SECTION 1 SITE LOCATION PLAN



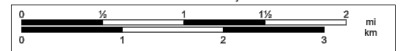
Data use subject to license.

© DeLorme, DeLorme Street Atlas USA® 2009.

www.delorme.com



Scale 1 : 75,000



1" = 1.18 mi

Data Zoom 11-4

**F&ME**  
CONSULTANTS

GEOTECHNICAL – ENVIRONMENTAL – MATERIALS  
COLUMBIA, SOUTH CAROLINA

SC 557 ROADWAY IMPROVEMENT PROJECT  
YORK COUNTY, SC

SITE LOCATION PLAN

F&ME JOB NO. 5503.020

SCALE = As Noted

FIGURE 1

4			
3			
2			
1			
REV.	BY	DATE	DESCRIPTION OF REVISION
TOPO.		DATE	
DWG. CTC		DATE 07.13.18	GROUP - -
R/W		DATE	

SC 557 Roadway Construction and Improvements  
Final Roadway Geotechnical Engineering Report

---

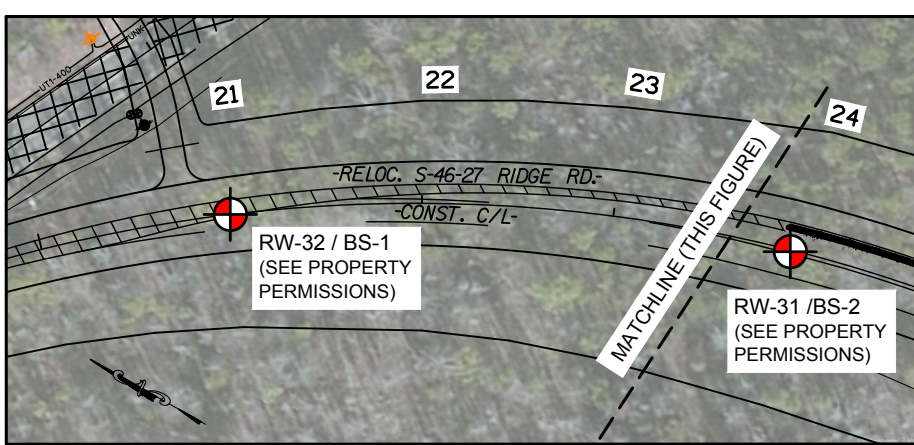
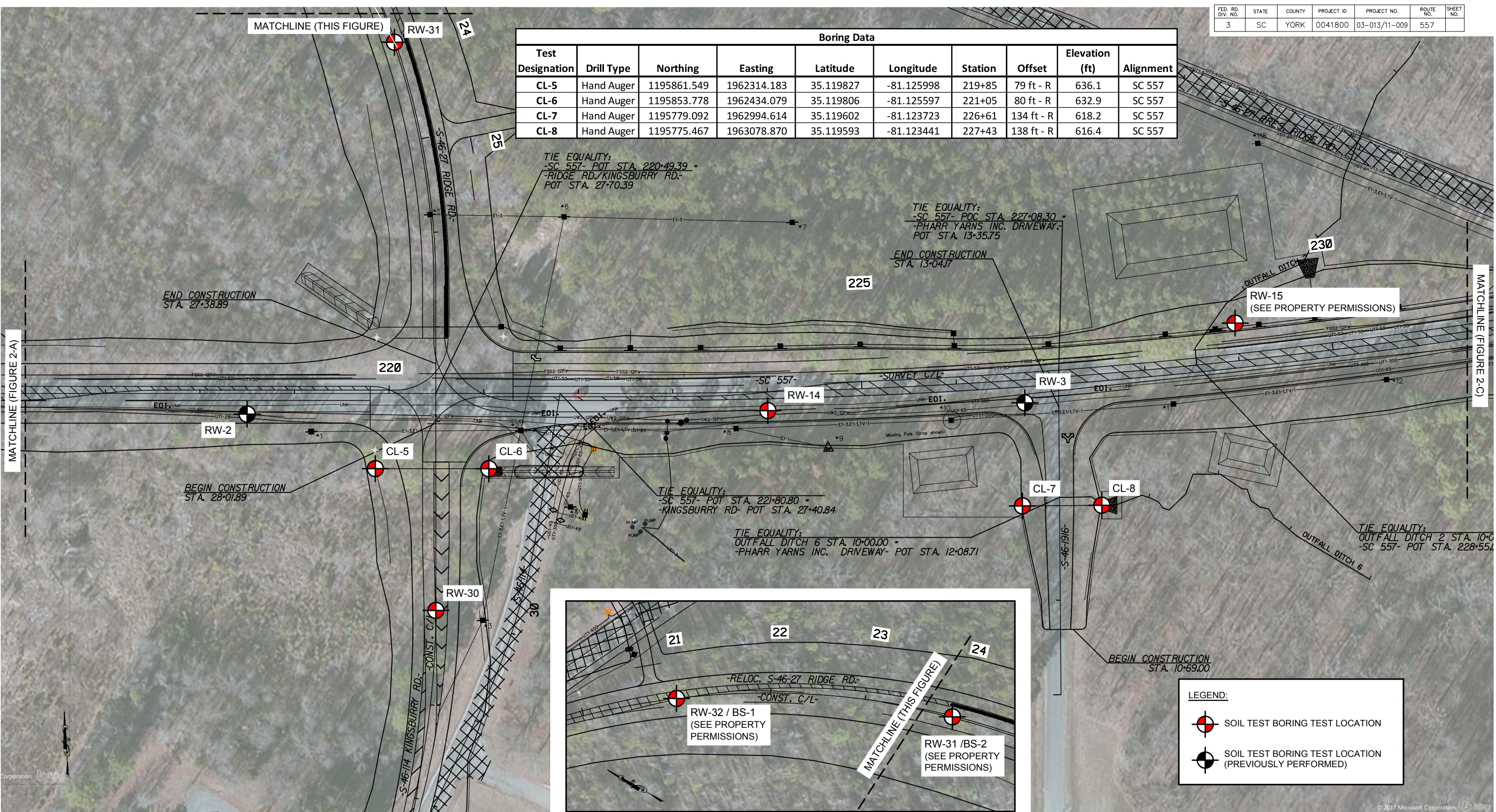
# APPENDIX

## SECTION 2 BORING LOCATION PLANS



FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	PROJECT NO.	ROUTE NO.	SHEET NO.
3	SC	YORK	0041800	03-013/11-009	557	

Boring Data									
Test Designation	Drill Type	Northing	Easting	Latitude	Longitude	Station	Offset	Elevation (ft)	Alignment
CL-5	Hand Auger	1195861.549	1962314.183	35.119827	-81.125998	219+85	79 ft - R	636.1	SC 557
CL-6	Hand Auger	1195853.778	1962434.079	35.119806	-81.125597	221+05	80 ft - R	632.9	SC 557
CL-7	Hand Auger	1195779.092	1962994.614	35.119602	-81.123723	226+61	134 ft - R	618.2	SC 557
CL-8	Hand Auger	1195775.467	1963078.870	35.119593	-81.123441	227+43	138 ft - R	616.4	SC 557



**LEGEND:**

- SOIL TEST BORING TEST LOCATION
- SOIL TEST BORING TEST LOCATION (PREVIOUSLY PERFORMED)

Boring Data									
Test Designation	Drill Type	Northing	Easting	Latitude	Longitude	Station	Offset	Elevation (ft)	Alignment
RW-14	SPT	1195896.975	1962732.561	35.119925	-81.124599	224+00	20 ft - R	628.2	SC 557
RW-15	SPT	1195959.487	1963231.276	35.120099	-81.122932	229+00	41 ft - L	615.6	SC 557
RW-30	Hand Auger	1195707.735	1962369.331	35.119404	-81.125813	30+00	CL	635.6	S-46-114
RW-31	SPT	1196310.220	1962362.679	35.121059	-81.125838	24+00	1 ft - R	650.9	S-46-27
RW-32	SPT	1196574.047	1962236.359	35.121784	-81.126261	21+00	CL	656.4	S-46-27
RW-2	SPT	1195927.330	1962182.763	35.120007	-81.126438	218+50	22 ft - R	640.5	SC 557
RW-3	SPT	1195888.350	1963004.274	35.119903	-81.123691	226+71	24 ft - R	618.9	SC 557

4			
3			
2			
1			
REV.	BY	DATE	DESCRIPTION OF REVISION
TOPO.		DATE	
DWG. CTC		DATE 07.13.18	GROUP --
R/W		DATE	

**F&ME CONSULTANTS**  
 GEOTECHNICAL – ENVIRONMENTAL – MATERIALS  
 COLUMBIA, SOUTH CAROLINA

SC 557 ROADWAY IMPROVEMENT PROJECT  
 YORK COUNTY, SC

BORING LOCATION PLAN

SCALE = 1"=100'

F&ME JOB NO. G4843.000  
 FIGURE 2-B

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	PROJECT NO.	ROUTE NO.	SHEET NO.
3	SC	YORK	0041800	03-013/11-009	557	



**LEGEND:**

- SOIL TEST BORING TEST LOCATION
- SOIL TEST BORING TEST LOCATION (PREVIOUSLY PERFORMED)

Boring Data									
Test Designation	Drill Type	Northing	Easting	Latitude	Longitude	Station	Offset	Elevation (ft)	Alignment
RW-16	SPT	1195986.414	1963731.699	35.120174	-81.121259	234+03	24 ft - L	628.9	SC 557
RW-33	Hand Auger	1195892.647	1964748.305	35.119920	-81.117860	15+00	CL	622.7	S-46-152
RW-34	Hand Auger	1196364.716	1964615.045	35.121216	-81.118307	13+00	CL	637.3	S-46-152
CL-9	Hand Auger	1196065.048	1964079.790	35.120391	-81.120096	237+58	63 ft - L	628.8	SC 557
CL-10	Hand Auger	1195916.520	1964093.064	35.119984	-81.120051	237+54	86 ft - R	616.3	SC 557
RW-4	SPT	1196030.778	1964147.000	35.120298	-81.119871	238+21	21 ft - L	632.0	SC 557
RW-5	SPT	1196104.593	1964742.319	35.120502	-81.117881	244+21	26 ft - L	631.3	SC 557

4			
3			
2			
1			
REV.	BY	DATE	DESCRIPTION OF REVISION
		DATE 07.13.18	GROUP - -
		DATE	

**F&ME CONSULTANTS**  
 GEOTECHNICAL – ENVIRONMENTAL – MATERIALS  
 COLUMBIA, SOUTH CAROLINA

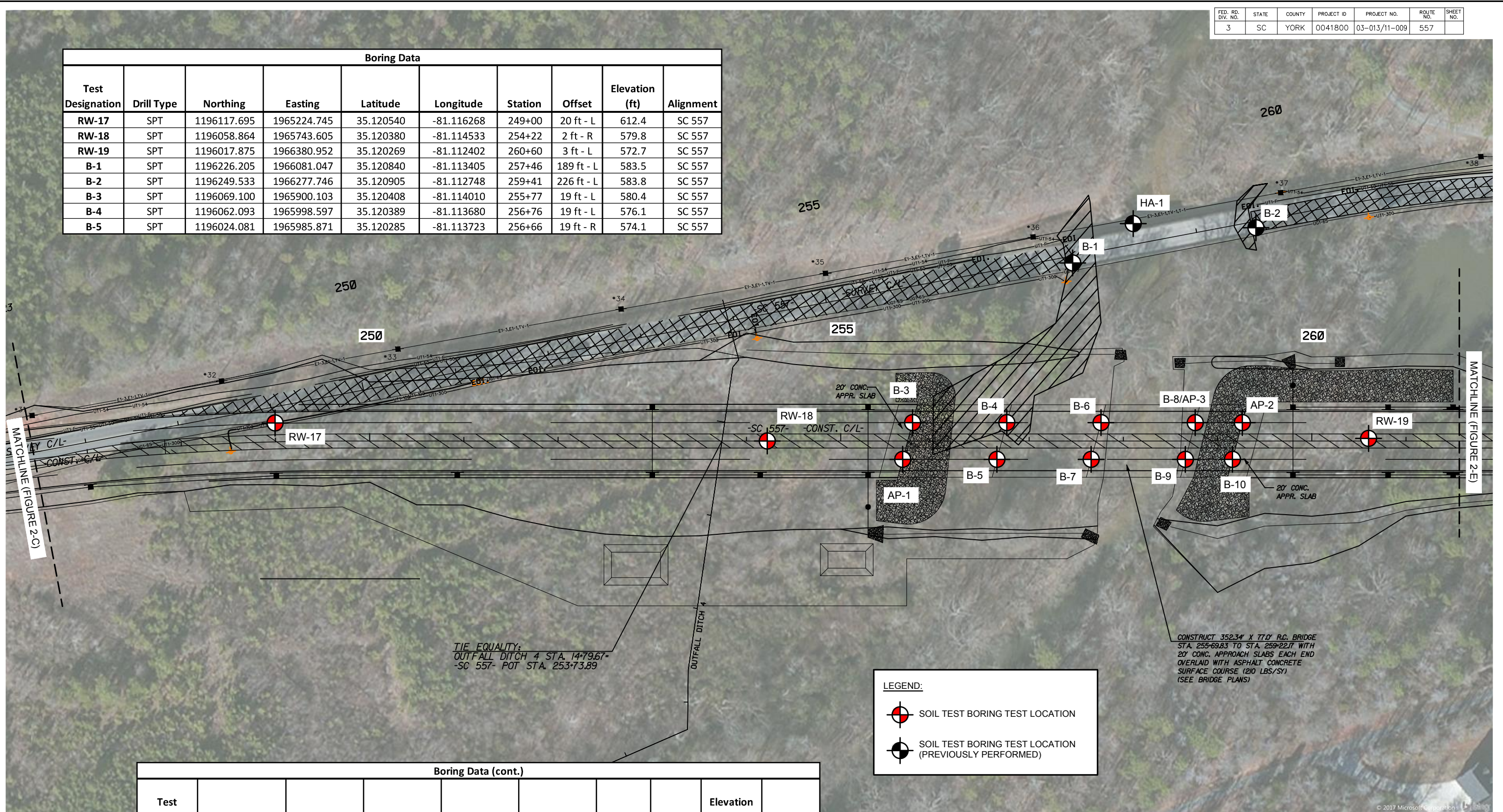
SC 557 ROADWAY IMPROVEMENT PROJECT  
 YORK COUNTY, SC

BORING LOCATION PLAN

SCALE = 1"=100'

F&ME JOB NO. G4843.000  
 FIGURE 2-C

Boring Data									
Test Designation	Drill Type	Northing	Easting	Latitude	Longitude	Station	Offset	Elevation (ft)	Alignment
RW-17	SPT	1196117.695	1965224.745	35.120540	-81.116268	249+00	20 ft - L	612.4	SC 557
RW-18	SPT	1196058.864	1965743.605	35.120380	-81.114533	254+22	2 ft - R	579.8	SC 557
RW-19	SPT	1196017.875	1966380.952	35.120269	-81.112402	260+60	3 ft - L	572.7	SC 557
B-1	SPT	1196226.205	1966081.047	35.120840	-81.113405	257+46	189 ft - L	583.5	SC 557
B-2	SPT	1196249.533	1966277.746	35.120905	-81.112748	259+41	226 ft - L	583.8	SC 557
B-3	SPT	1196069.100	1965900.103	35.120408	-81.114010	255+77	19 ft - L	580.4	SC 557
B-4	SPT	1196062.093	1965998.597	35.120389	-81.113680	256+76	19 ft - L	576.1	SC 557
B-5	SPT	1196024.081	1965985.871	35.120285	-81.113723	256+66	19 ft - R	574.1	SC 557



**LEGEND:**

- SOIL TEST BORING TEST LOCATION
- SOIL TEST BORING TEST LOCATION (PREVIOUSLY PERFORMED)

Boring Data (cont.)									
Test Designation	Drill Type	Northing	Easting	Latitude	Longitude	Station	Offset	Elevation (ft)	Alignment
B-6	SPT	1196055.728	1966099.245	35.120372	-81.113344	257+77	20 ft - L	575.2	SC 557
B-7	SPT	1196013.876	1966089.416	35.120257	-81.113376	257+70	22 ft - R	575.0	SC 557
B-8/AP-3	SPT/Auger Probe	1196047.754	1966198.735	35.120351	-81.113011	258+76	19 ft - L	574.4	SC 557
B-9	SPT	1196010.060	1966186.214	35.120247	-81.113053	258+67	19 ft - R	574.0	SC 557
B-10	SPT	1196006.220	1966235.425	35.120237	-81.112888	259+16	19 ft - R	573.2	SC 557
HA-1	Hand Auger	1196263.227	1966148.157	35.120942	-81.113181	258+10	231 ft - L	568.0	SC 557
AP-1	Auger Probe	1196030.747	1965885.897	35.120303	-81.114057	255+66	20 ft - R	575.6	SC 557
AP-2	Auger Probe	1196041.491	1966247.597	35.120333	-81.112848	259+26	17 ft - L	573.7	SC 557

4			
3			
2			
1			
REV.	BY	DATE	DESCRIPTION OF REVISION
TOPO.		DATE	
DWG. CTC		07.13.18	GROUP - -
R/W		DATE	

**F&ME CONSULTANTS**  
 GEOTECHNICAL – ENVIRONMENTAL – MATERIALS  
 COLUMBIA, SOUTH CAROLINA

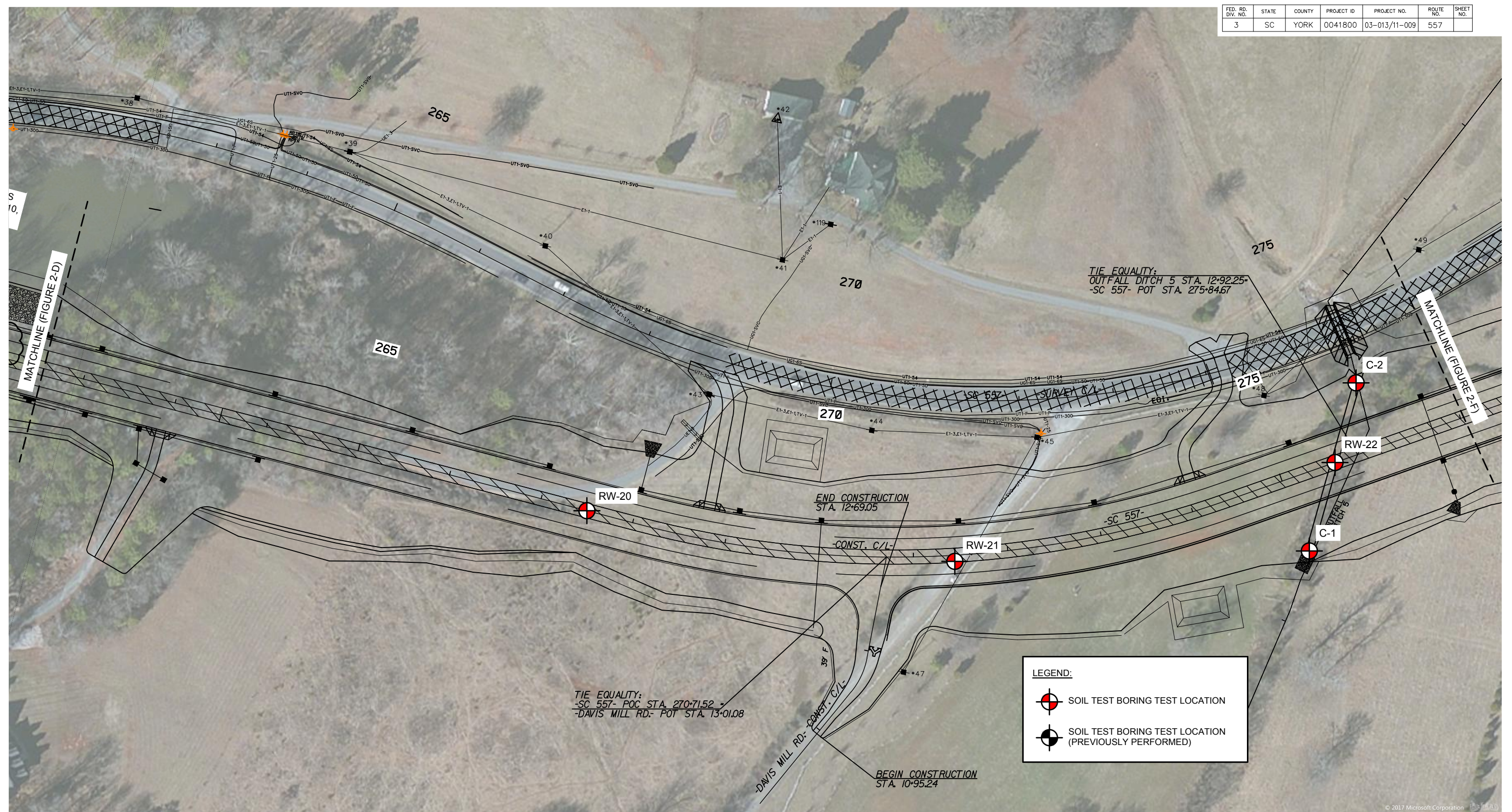
SC 557 ROADWAY IMPROVEMENT PROJECT  
 YORK COUNTY, SC

BORING LOCATION PLAN

F&ME JOB NO. G4843.000

SCALE = 1"=100'

FIGURE 2-D



Boring Data									
Test Designation	Drill Type	Northing	Easting	Latitude	Longitude	Station	Offset	Elevation (ft)	Alignment
RW-20	SPT	1195965.627	1967068.845	35.120128	-81.110102	267+50	CL	588.2	SC 557
RW-21	SPT	1195984.197	1967460.965	35.120180	-81.108791	271+43	7 ft - R	591.2	SC 557
RW-22	SPT	1196160.754	1967836.649	35.120666	-81.107535	275+59	CL	579.0	SC 557
C-1	SPT	1196063.532	1967827.675	35.120399	-81.107565	275+03	80 ft - R	574.9	SC 557
C-2	SPT	1196247.567	1967843.399	35.120904	-81.107513	276+08	72 ft - L	580.0	SC 557

4			
3			
2			
1			
REV.	BY	DATE	DESCRIPTION OF REVISION
TOPO.		DATE	
DWG. CTC		DATE 07.13.18	GROUP - -
R/W		DATE	

**F&ME**  
CONSULTANTS  
GEOTECHNICAL – ENVIRONMENTAL – MATERIALS  
COLUMBIA, SOUTH CAROLINA

SC 557 ROADWAY IMPROVEMENT PROJECT  
YORK COUNTY, SC

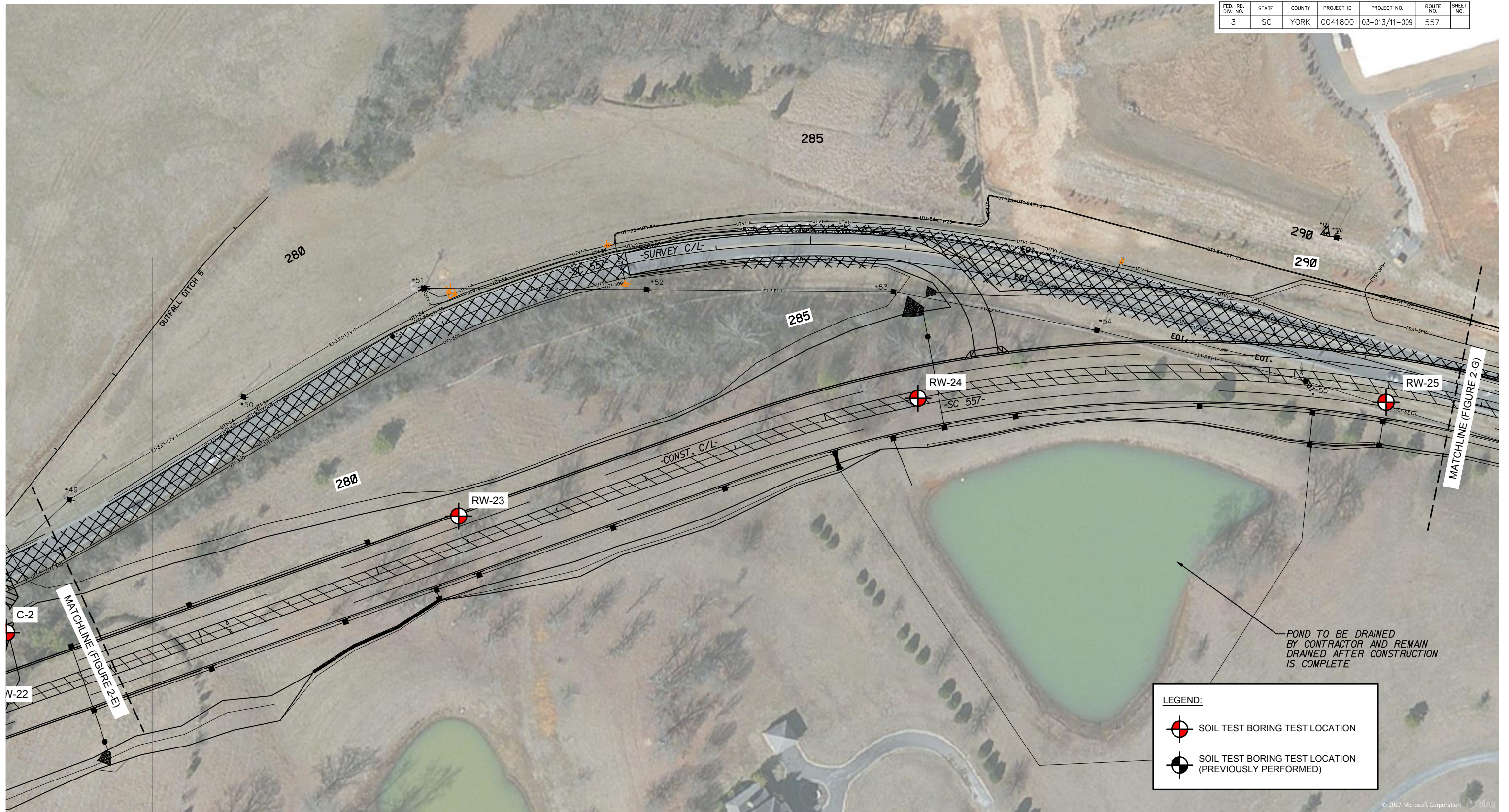
BORING LOCATION PLAN

SCALE = 1"=100'

F&ME JOB NO. G4843.000  
FIGURE 2-E



FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	PROJECT NO.	ROUTE NO.	SHEET NO.
3	SC	YORK	0041800	03-013/11-009	557	



Boring Data									
Test Designation	Drill Type	Northing	Easting	Latitude	Longitude	Station	Offset	Elevation (ft)	Alignment
RW-23	SPT	1196456.459	1968290.855	35.121479	-81.106018	281+00	30 ft - L	618.5	SC 557
RW-24	SPT	1196667.943	1968745.234	35.122062	-81.104499	286+00	CL	624.2	SC 557
RW-25	SPT	1196754.130	1969232.510	35.122300	-81.102870	291+00	15 ft - R	629.2	SC 557

4			
3			
2			
1			
REV.	BY	DATE	DESCRIPTION OF REVISION
TOPO.		DATE	
DWG. CTC		DATE 07.13.18	GROUP - -
R/W		DATE	

**LEGEND:**

- SOIL TEST BORING TEST LOCATION
- SOIL TEST BORING TEST LOCATION (PREVIOUSLY PERFORMED)

**F&ME**  
**CONSULTANTS**  
 GEOTECHNICAL – ENVIRONMENTAL – MATERIALS  
 COLUMBIA, SOUTH CAROLINA

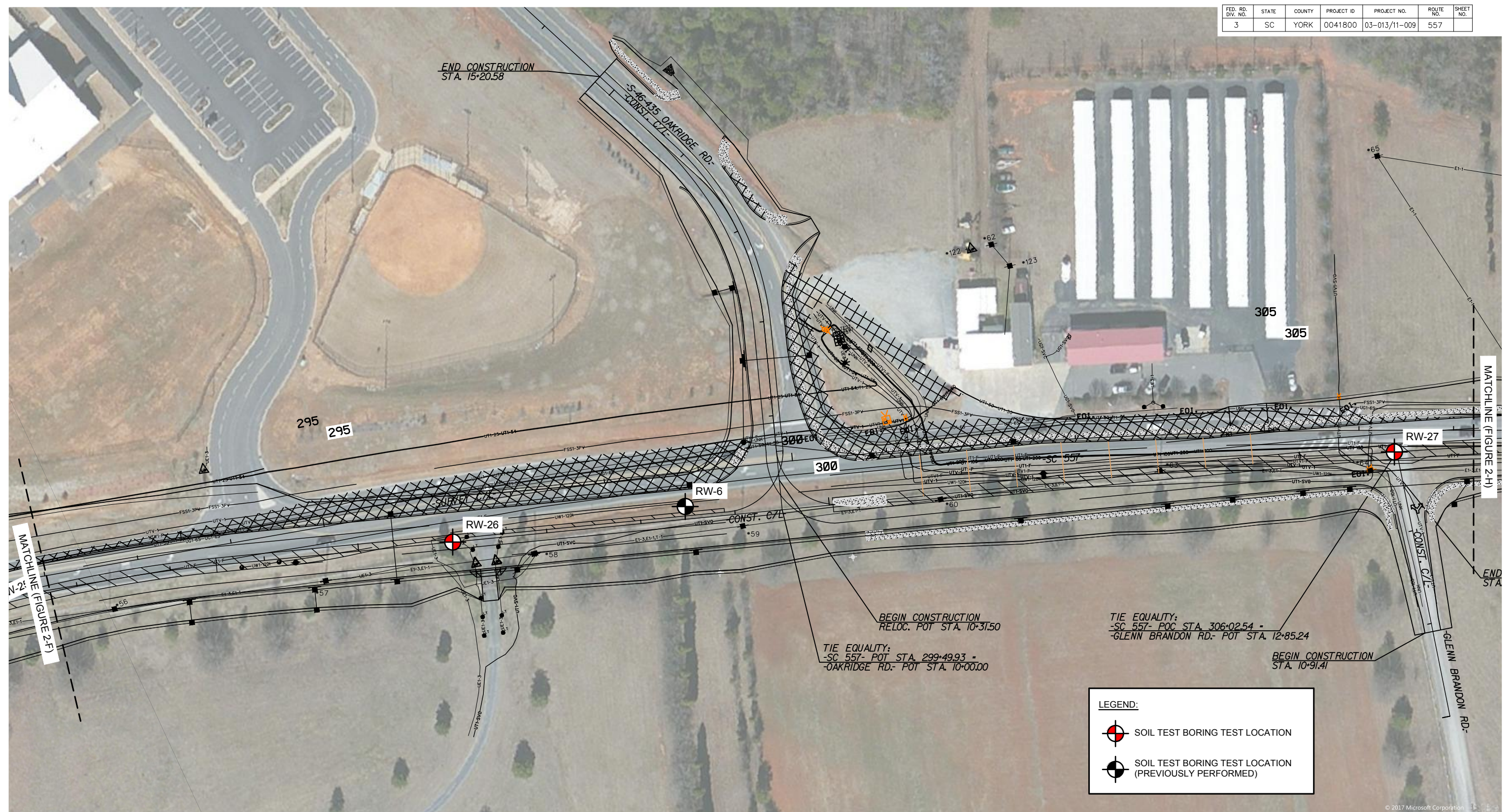
SC 557 ROADWAY IMPROVEMENT PROJECT  
 YORK COUNTY, SC

BORING LOCATION PLAN



SCALE = 1"=100'

F&ME JOB NO. G4843.000  
 FIGURE 2-F

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	PROJECT NO.	ROUTE NO.	SHEET NO.
3	SC	YORK	0041800	03-013/11-009	557	



**LEGEND:**

-  SOIL TEST BORING TEST LOCATION
-  SOIL TEST BORING TEST LOCATION (PREVIOUSLY PERFORMED)

Boring Data									
Test Designation	Drill Type	Northing	Easting	Latitude	Longitude	Station	Offset	Elevation (ft)	Alignment
RW-26	SPT	1196715.954	1969728.468	35.122196	-81.101212	296+00	CL	647.1	SC 557
RW-27	SPT	1196563.284	1970716.632	35.121779	-81.097908	306+00	CL	665.0	SC 557
RW-6	SPT	1196691.929	1969975.832	35.122131	-81.100385	298+48	13 ft - L	654.1	SC 557

4			
3			
2			
1			
REV.	BY	DATE	DESCRIPTION OF REVISION
TOPO.		DATE	
DWG. CTC		DATE 07.13.18	GROUP - -
R/W		DATE	

**F&ME**  
CONSULTANTS  
GEOTECHNICAL – ENVIRONMENTAL – MATERIALS  
COLUMBIA, SOUTH CAROLINA

SC 557 ROADWAY IMPROVEMENT PROJECT  
YORK COUNTY, SC

BORING LOCATION PLAN



F&ME JOB NO. G4843.000

SCALE = 1"=100'

FIGURE 2-G



**LEGEND:**

-  SOIL TEST BORING TEST LOCATION
-  SOIL TEST BORING TEST LOCATION (PREVIOUSLY PERFORMED)

Boring Data									
Test Designation	Drill Type	Northing	Easting	Latitude	Longitude	Station	Offset	Elevation (ft)	Alignment
RW-28	SPT	1196317.565	1971685.568	35.121107	-81.094667	316+00	15 ft - R	656.2	SC 557
RW-7	SPT	1196543.340	1970965.186	35.121725	-81.097076	308+47	29 ft - L	664.8	SC 557
RW-8	SPT	1196248.820	1971921.794	35.120919	-81.093877	318+46	24 ft - R	653.4	SC 557

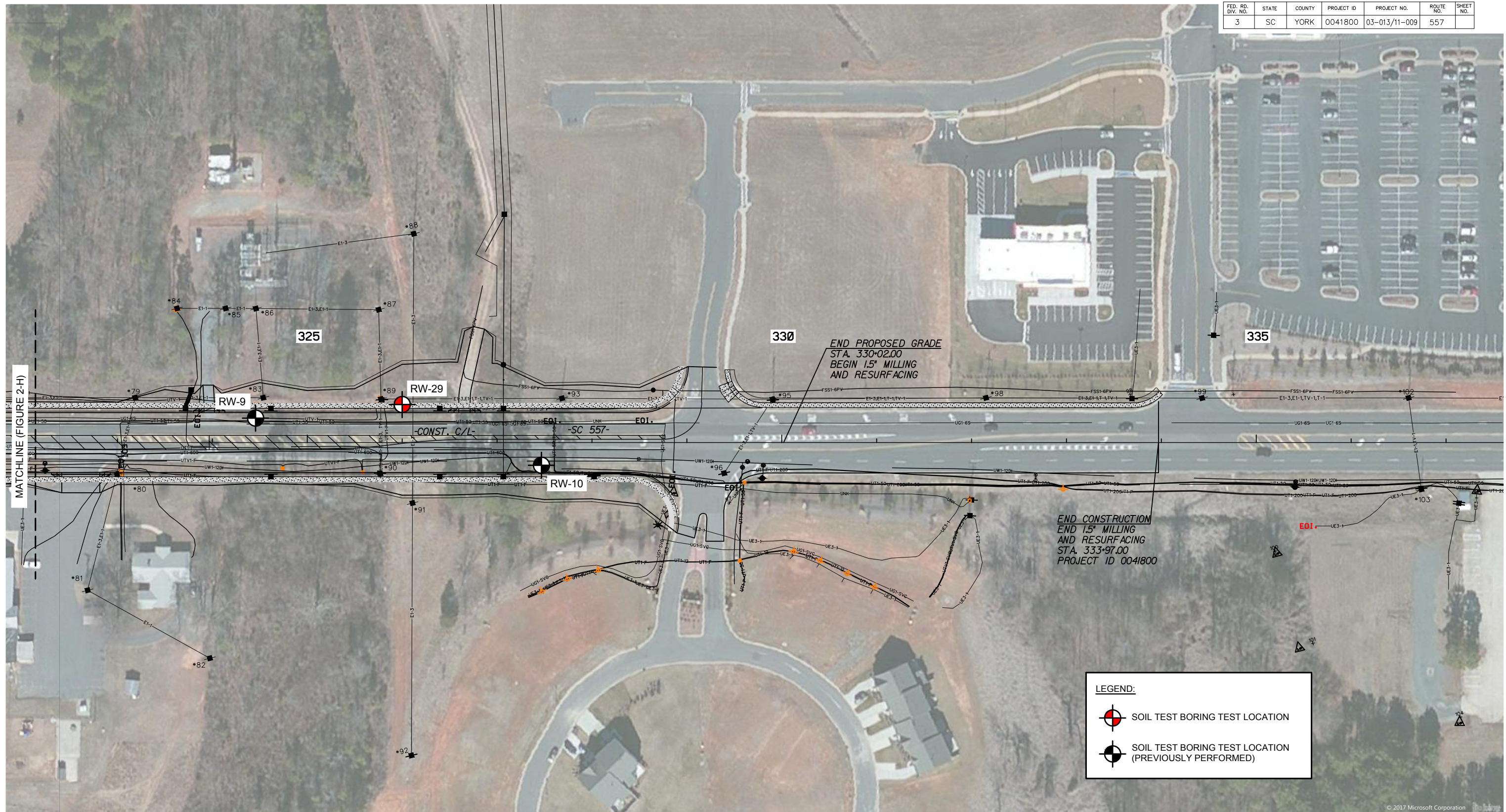
4			
3			
2			
1			
REV.	BY	DATE	DESCRIPTION OF REVISION
TOPO.	DATE		
DWG. CTC	DATE 07.13.18	GROUP	
R/W	DATE		

**F&ME**  
CONSULTANTS  
GEOTECHNICAL – ENVIRONMENTAL – MATERIALS  
COLUMBIA, SOUTH CAROLINA

SC 557 ROADWAY IMPROVEMENT PROJECT  
YORK COUNTY, SC



BORING LOCATION PLAN

SCALE = 1"=100'	F&ME JOB NO. G4843.000
	FIGURE 2-H



MATCHLINE (FIGURE 2-H)

**LEGEND:**

-  SOIL TEST BORING TEST LOCATION
-  SOIL TEST BORING TEST LOCATION (PREVIOUSLY PERFORMED)

Boring Data									
Test Designation	Drill Type	Northing	Easting	Latitude	Longitude	Station	Offset	Elevation (ft)	Alignment
RW-29	SPT	1196124.859	1972668.394	35.120580	-81.091381	326+00	40 ft - L	637.8	SC 557
RW-9	SPT	1196149.025	1972515.043	35.120646	-81.091893	324+45	26 ft - L	645.2	SC 557
RW-10	SPT	1196026.766	1972794.826	35.120311	-81.090958	327+47	24 ft - R	641.0	SC 557

4			
3			
2			
1			
REV.	BY	DATE	DESCRIPTION OF REVISION
TOPO.		DATE	
DWG. CTC		DATE 07.13.18	GROUP
R/W		DATE	

**F&ME**  
CONSULTANTS  
GEOTECHNICAL – ENVIRONMENTAL – MATERIALS  
COLUMBIA, SOUTH CAROLINA

SC 557 ROADWAY IMPROVEMENT PROJECT  
YORK COUNTY, SC

BORING LOCATION PLAN

SCALE = 1"=100'

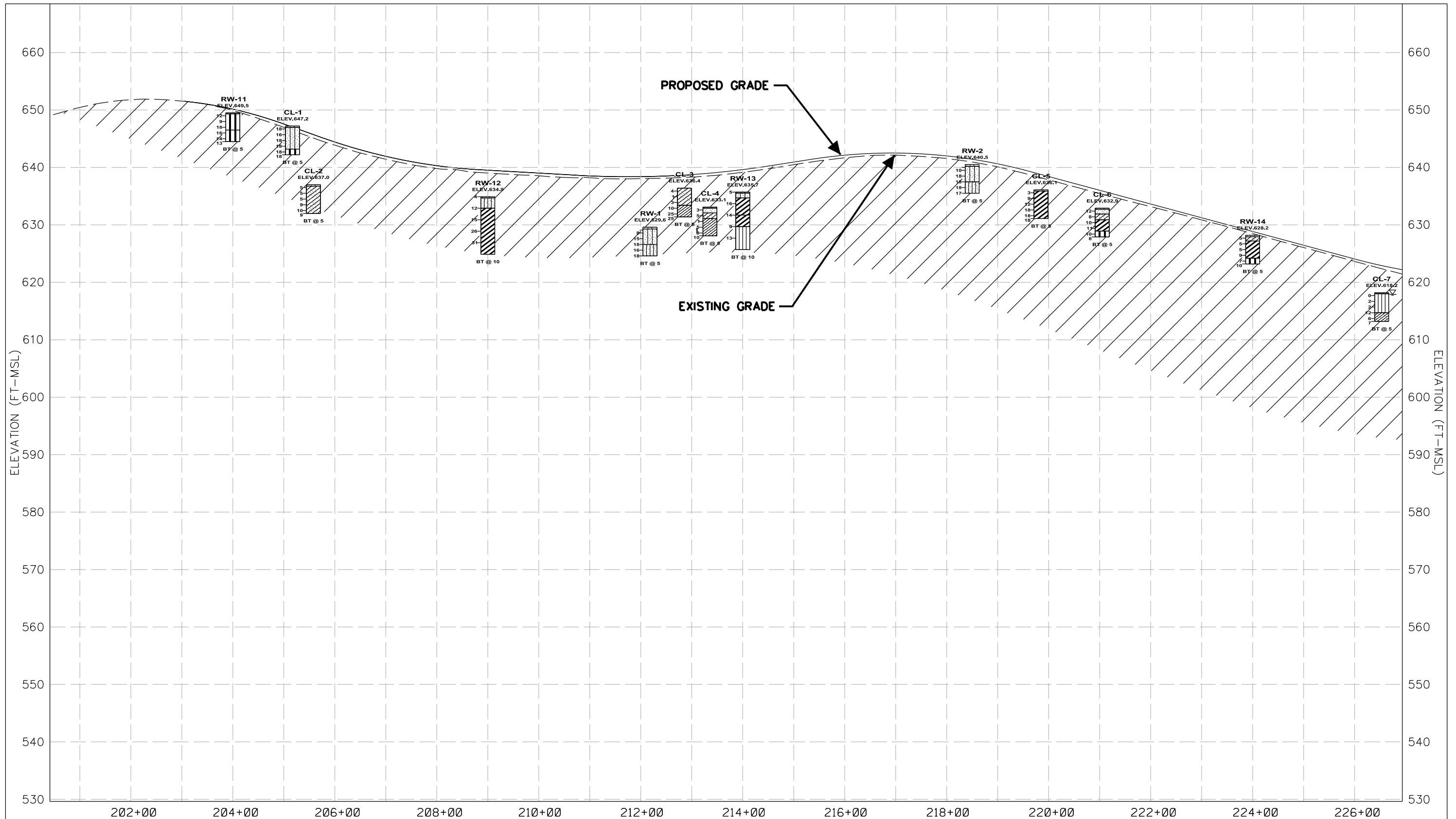
F&ME JOB NO. G4843.000  
FIGURE 2-I

**SC 557 Roadway Construction and Improvements  
Final Roadway Geotechnical Engineering Report**




---

# **APPENDIX**

## **SECTION 3 GENERALIZED SUBSURFACE PROFILES**



LEGEND

	RESIDIUM		BEDROCK
	PARTIALLY WEATHERED ROCK (PWR)		

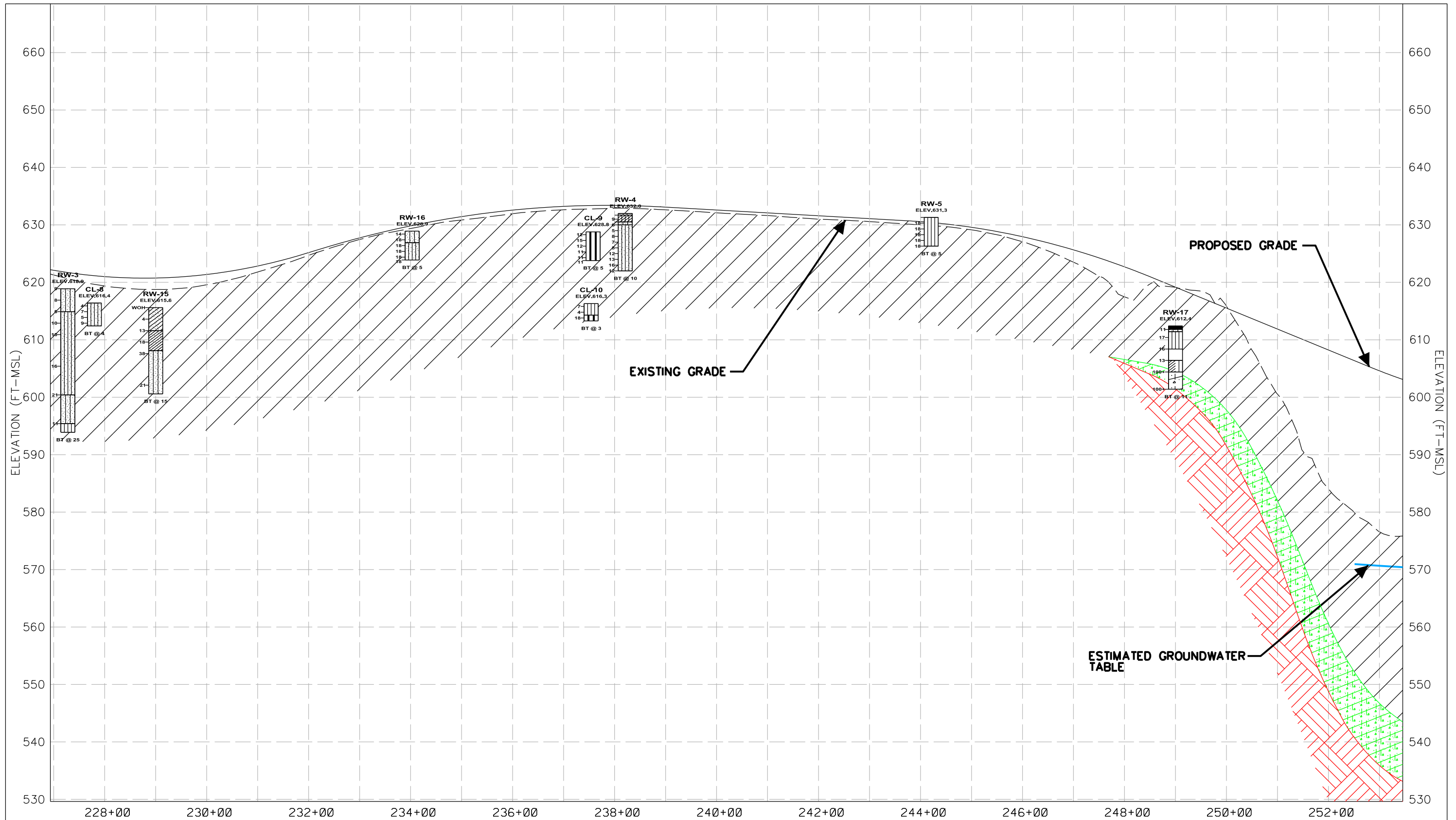
**F&ME**  
CONSULTANTS  
GEOTECHNICAL - ENVIRONMENTAL - MATERIALS  
COLUMBIA, SOUTH CAROLINA

SC 557 OVER CROWDERS CREEK  
YORK COUNTY, SOUTH CAROLINA




ROADWAY SUBSURFACE PROFILE

HRZ SCALE = NTS	F&ME JOB NO.: G4843
VRT SCALE = NTS	FIGURE 3-A

REV. NO.	BY	DATE	DESCRIPTION OF REVISION
4			
3			
2			
1			
TOPO.		DATE	
DWG.	BMF	DATE 7.23.18	GROUP -- --
R/W		DATE	



LEGEND

	RESIDUUM		BEDROCK
	PARTIALLY WEATHERED ROCK (PWR)		

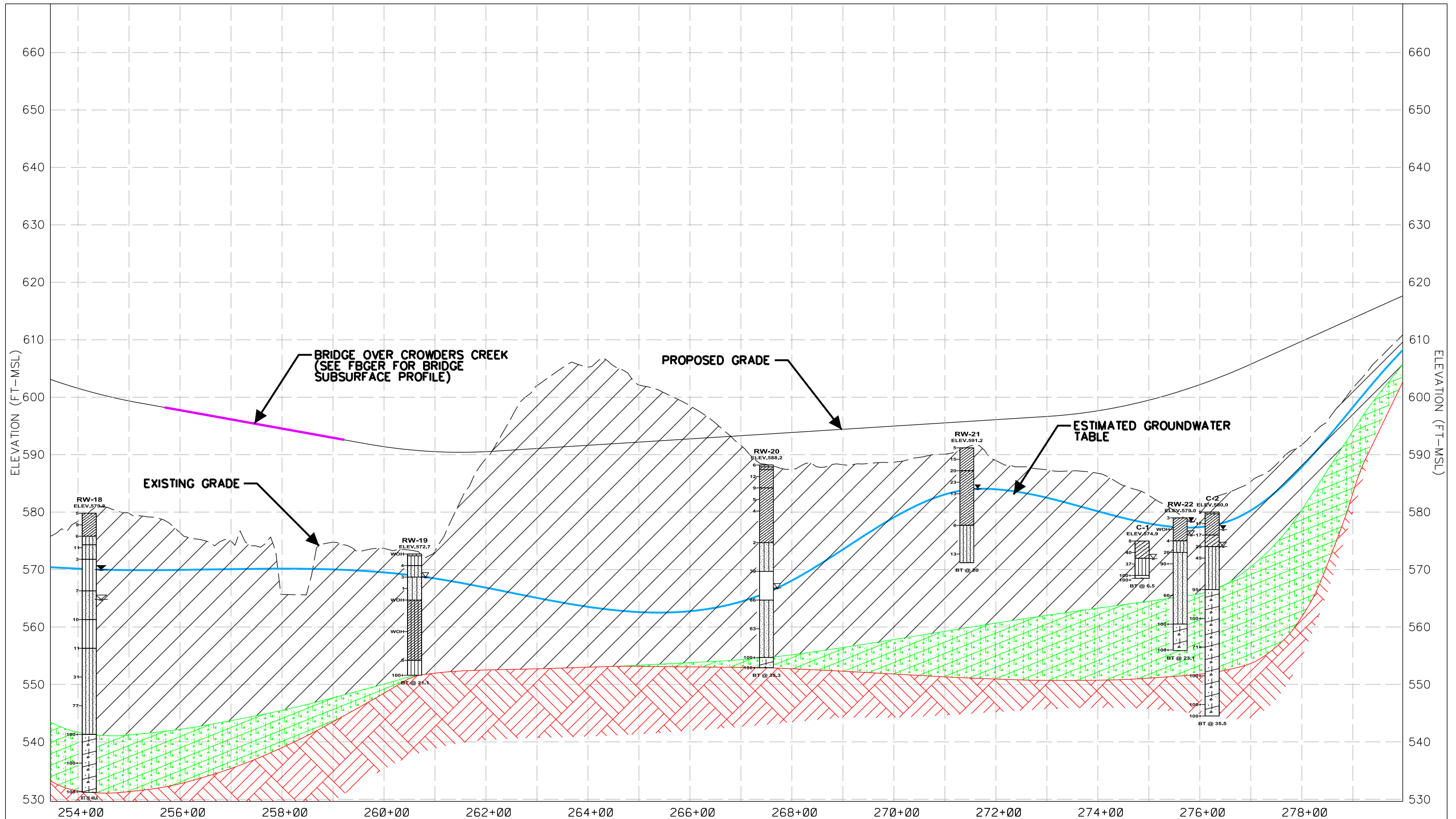
**F&ME**  
CONSULTANTS  
GEOTECHNICAL - ENVIRONMENTAL - MATERIALS  
COLUMBIA, SOUTH CAROLINA

SC 557 OVER CROWDERS CREEK  
YORK COUNTY, SOUTH CAROLINA




ROADWAY SUBSURFACE PROFILE

HRZ SCALE = NTS	F&ME JOB NO.: G4843
VRT SCALE = NTS	FIGURE 3-B

REV. NO.	BY	DATE	DESCRIPTION OF REVISION
4			
3			
2			
1			
TOPO.		DATE	
DWG.	BMF	DATE 7.23.18	GROUP -- --
R/W		DATE	



**LEGEND**

	RESIDIUM		BEDROCK
	PARTIALLY WEATHERED ROCK (PWR)		

**F&ME**  
CONSULTANTS  
GEOTECHNICAL - ENVIRONMENTAL - MATERIALS  
COLUMBIA, SOUTH CAROLINA

SC 557 OVER CROWDERS CREEK  
YORK COUNTY, SOUTH CAROLINA

ROADWAY SUBSURFACE PROFILE

HRZ SCALE = NTS

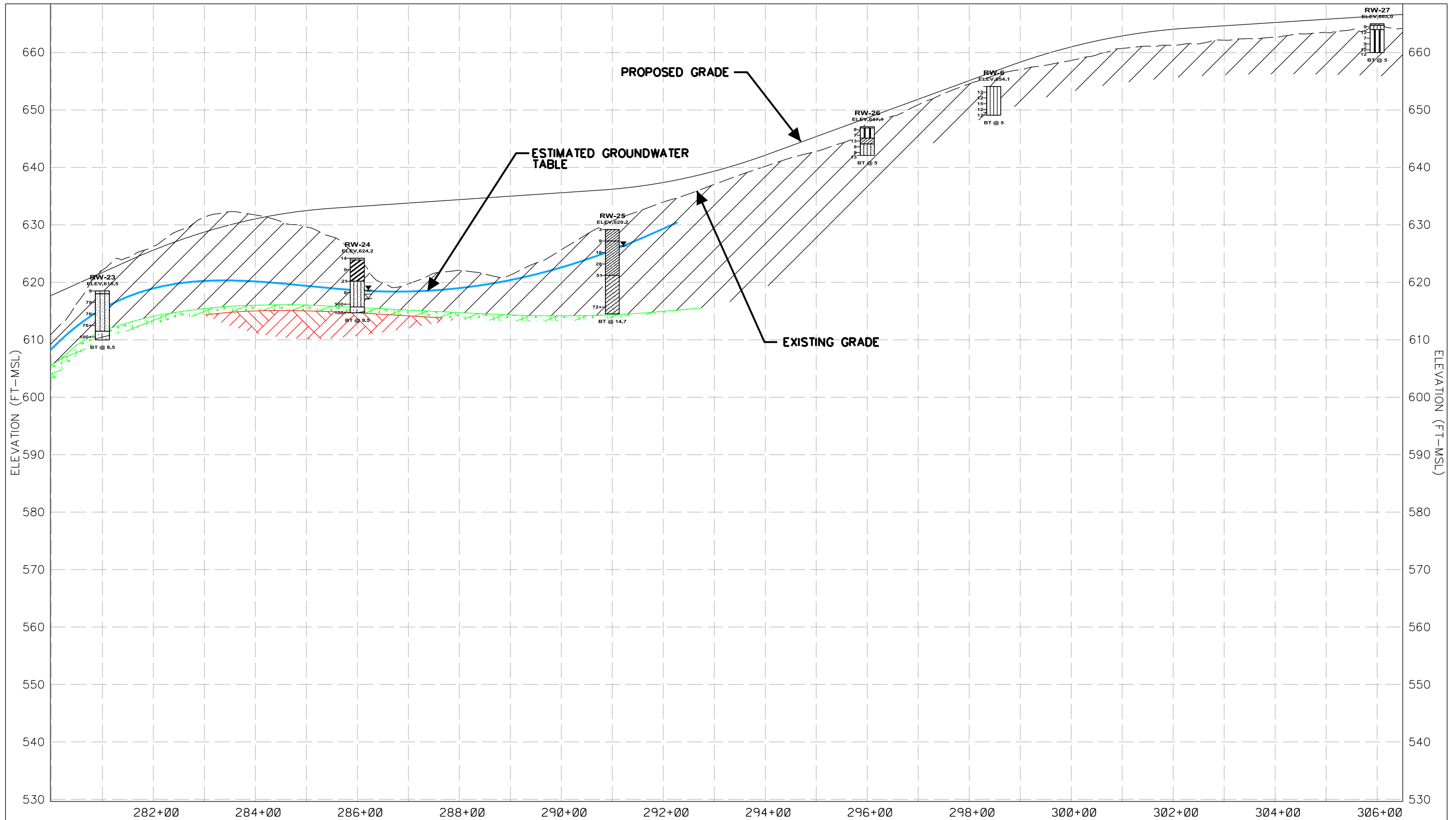
F&ME JOB NO.: G4843

VRT SCALE = NTS




FIGURE 3-C

4				
3				
2				
1				
REV. NO.	BY	DATE	DATE	DESCRIPTION OF REVISION
TOPO.				
DWG.	BMF	DATE	7.23.18	GROUP -- --
R/W		DATE		





LEGEND

	RESIDUUM		BEDROCK
	PARTIALLY WEATHERED ROCK (PWR)		

4			
3			
2			
1			
REV. NO.	BY	DATE	DESCRIPTION OF REVISION
TOPO.		DATE	
DWG.	BMF	DATE 7.23.18	GROUP -- --
R/W		DATE	

**F&ME**  
CONSULTANTS  
GEOTECHNICAL - ENVIRONMENTAL - MATERIALS  
COLUMBIA, SOUTH CAROLINA

SC 557 OVER CROWDERS CREEK  
YORK COUNTY, SOUTH CAROLINA

ROADWAY SUBSURFACE PROFILE

HRZ SCALE = NTS	F&ME JOB NO.: G4843
VRT SCALE = NTS	FIGURE 3-D



SC 557 Roadway Construction and Improvements  
Final Roadway Geotechnical Engineering Report

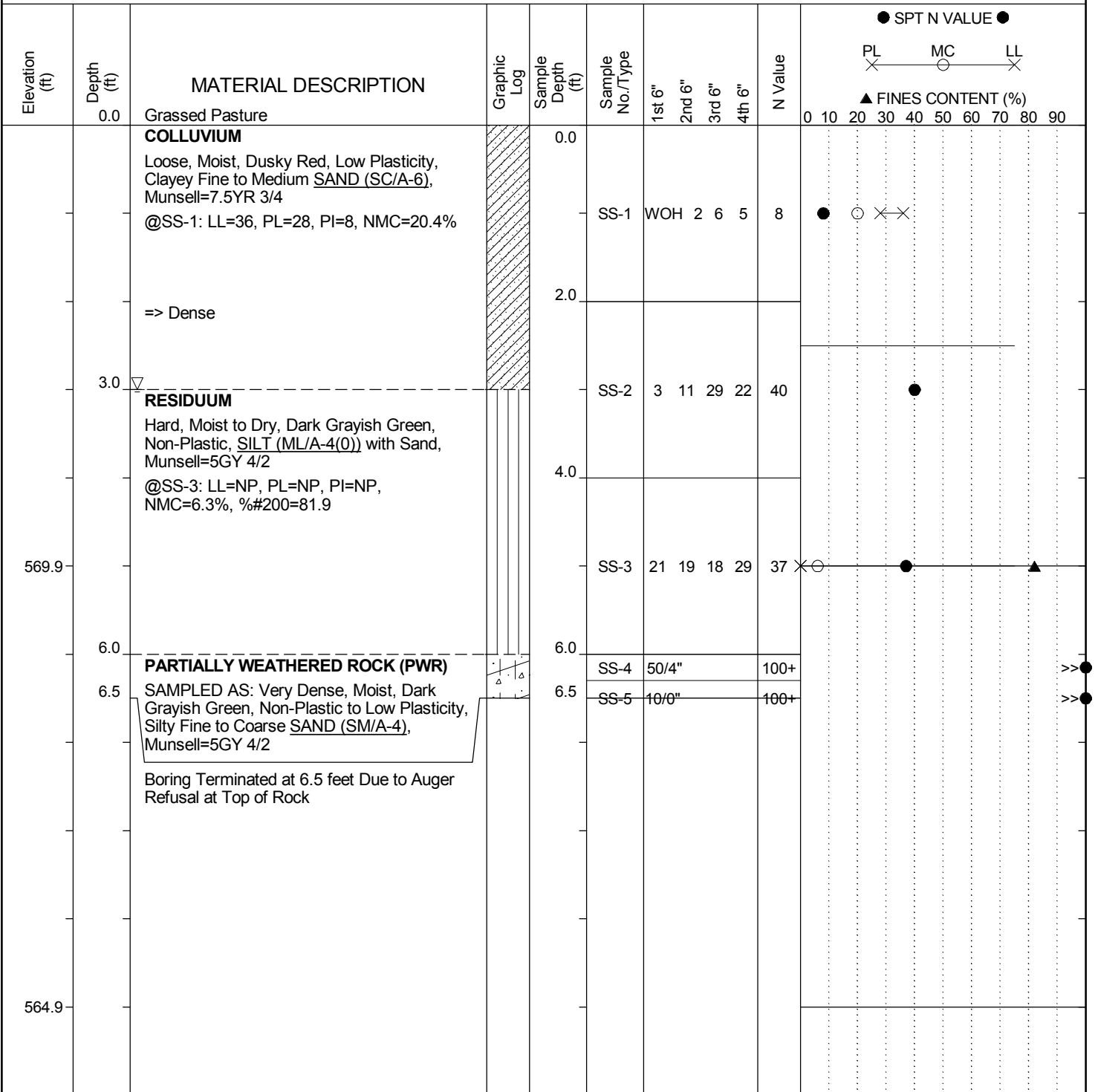
---

# APPENDIX

## SECTION 4 BORING LOGS

# SCDOT Soil Test Log

<b>Project ID:</b> G4843.000	<b>County:</b> York	<b>Boring No.:</b> C-1
<b>Site Description:</b> SC 557 Bridge over Crowders Creek		<b>Route:</b> SC 557
<b>Eng./Geo.:</b> R. Wessinger	<b>Boring Location:</b> 275+03	<b>Offset:</b> 80 ft - R
<b>Alignment:</b> Mainline	<b>Date Started:</b> 6/12/2018	<b>Date Completed:</b> 6/12/2018
<b>Elev.:</b> 574.9 ft	<b>Latitude:</b> 35.120399	<b>Longitude:</b> -81.107565
<b>Total Depth:</b> 6.5 ft	<b>Soil Depth:</b> 6.5 ft	<b>Core Depth:</b> 0 ft
<b>Bore Hole Diameter (in):</b> 6	<b>Sampler Configuration:</b>	<b>Liner Required:</b> Y (N)
<b>Drill Machine:</b> CME 550X	<b>Drill Method:</b> HSA	<b>Hammer Type:</b> Automatic
<b>Core Size:</b> N/A	<b>Driller:</b> D. Harris	<b>Groundwater:</b> TOB 3.0 ft
		<b>Energy Ratio:</b> 81%
		<b>24HR:</b> Cave 4.7-ft

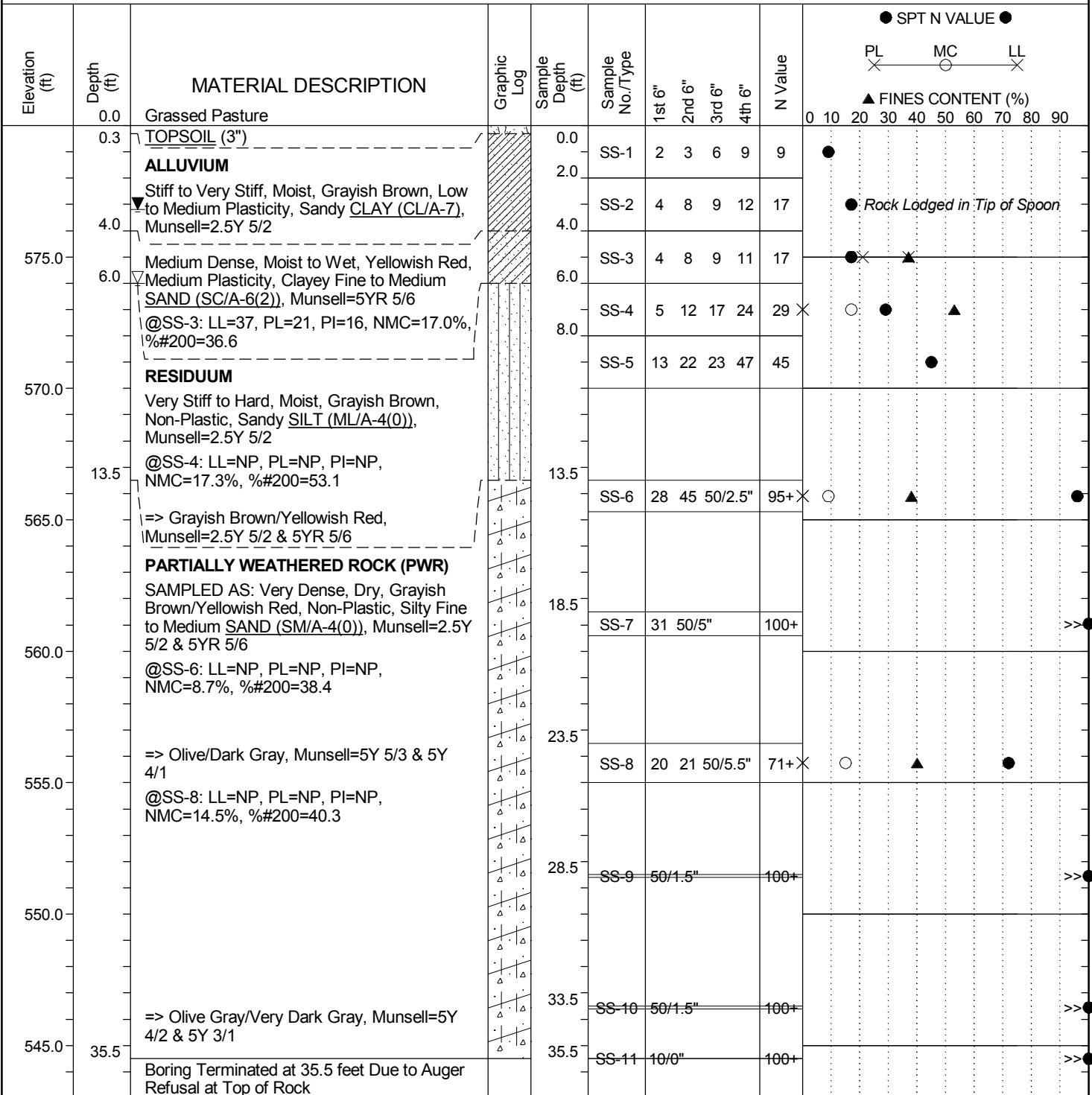


## LEGEND

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	

# SCDOT Soil Test Log

<b>Project ID:</b> G4843.000	<b>County:</b> York	<b>Boring No.:</b> C-2
<b>Site Description:</b> SC 557 Bridge over Crowders Creek		<b>Route:</b> SC 557
<b>Eng./Geo.:</b> R. Wessinger	<b>Boring Location:</b> 276+08	<b>Offset:</b> 72 ft - L
<b>Alignment:</b> Mainline	<b>Elev.:</b> 580.0 ft	<b>Latitude:</b> 35.120904
<b>Longitude:</b> -81.107513	<b>Date Started:</b> 6/11/2018	
<b>Total Depth:</b> 35.5 ft	<b>Soil Depth:</b> 35.5 ft	<b>Core Depth:</b> 0 ft
<b>Date Completed:</b> 6/11/2018	<b>Bore Hole Diameter (in):</b> 6	<b>Sampler Configuration:</b>
<b>Liner Required:</b> Y (N)	<b>Liner Used:</b> Y (N)	
<b>Drill Machine:</b> CME 550X	<b>Drill Method:</b> HSA	<b>Hammer Type:</b> Automatic
<b>Energy Ratio:</b> 81%	<b>Core Size:</b> N/A	<b>Driller:</b> D. Harris
<b>Groundwater:</b> TOB 6.0 ft	<b>24HR:</b> 3.2 ft	



## 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	

# SCDOT Manual Auger Log

Project ID: G4843.000		County: York		Boring No.: CL-1	
Site Description: SC 557 Bridge over Crowders Creek			Route: SC 557		
Driller: M. Touchberry	Boring Location: 205+17		Offset: 45 ft - L	Alignment: Mainline	
Elev.: 647.2 ft	Latitude: 35.120413	Longitude: -81.130871	Date Started: 4/9/2018		
Total Depth: 5 ft	Groundwater: TOB	Dry	24 hr	Backfilled	Date Completed: 4/9/2018
Dynamic Cone Penetrometer Test Procedure:			Sowers and Hedges (1966)		

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 1.75"	2nd 1.75"	3rd 1.75"	DCP-Value	● DCP-VALUE ● PL — MC — LL X — O — X ▲ FINES CONTENT (%)
	0.0	Woodland								
	0.3	TOPSOIL with Roots (3")								
	0.5	Medium Dense, Dry to Moist, Strong Brown, Non-Plastic to Low Plasticity, Silty Fine to Medium SAND (SM/A-4), Munsell=7.5YR 4/6			DS-1	3	9	25+	18	●
	1.5				DS-2	13	23	23	16	●
	2.5	=> Reddish Yellow, Munsell=5YR 5/8			DS-3	13	23	25+	18	●
	3.5				DS-4	12	25+		18	●
	4.0	Very Stiff, Moist, Reddish Yellow, High Plasticity, Elastic SILT (MH/A-7-5(20)) with Sand, Munsell=7.5 YR 6/8								
	4.5	@DS-5: LL=78, PL=53, PI=25, NMC=26.4%, %#200=78.1			DS-5	24	25+		18	● ○ X ▲
642.2	5.0	Boring Terminated at 5.0 feet								
						15	25+		18	●

## 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 G4843 - CURRENT - SC-557.GPJ FME2017.GDT 7/16/18







# SCDOT Manual Auger Log

<b>Project ID:</b> G4843.000	<b>County:</b> York	<b>Boring No.:</b> CL-4
<b>Site Description:</b> SC 557 Bridge over Crowders Creek		<b>Route:</b> SC 557
<b>Driller:</b> M. Touchberry	<b>Boring Location:</b> 213+00	<b>Offset:</b> 61 ft - R
<b>Alignment:</b> Mainline	<b>Date Started:</b> 4/9/2018	<b>Date Completed:</b> 4/9/2018
<b>Elev.:</b> 633.1 ft	<b>Latitude:</b> 35.119993	<b>Longitude:</b> -81.12828
<b>Total Depth:</b> 5 ft	<b>Groundwater:</b> TOB	<b>Backfilled:</b> 4.5 ft 24 hr
<b>Dynamic Cone Penetrometer Test Procedure:</b> Sowers and Hedges (1966)		

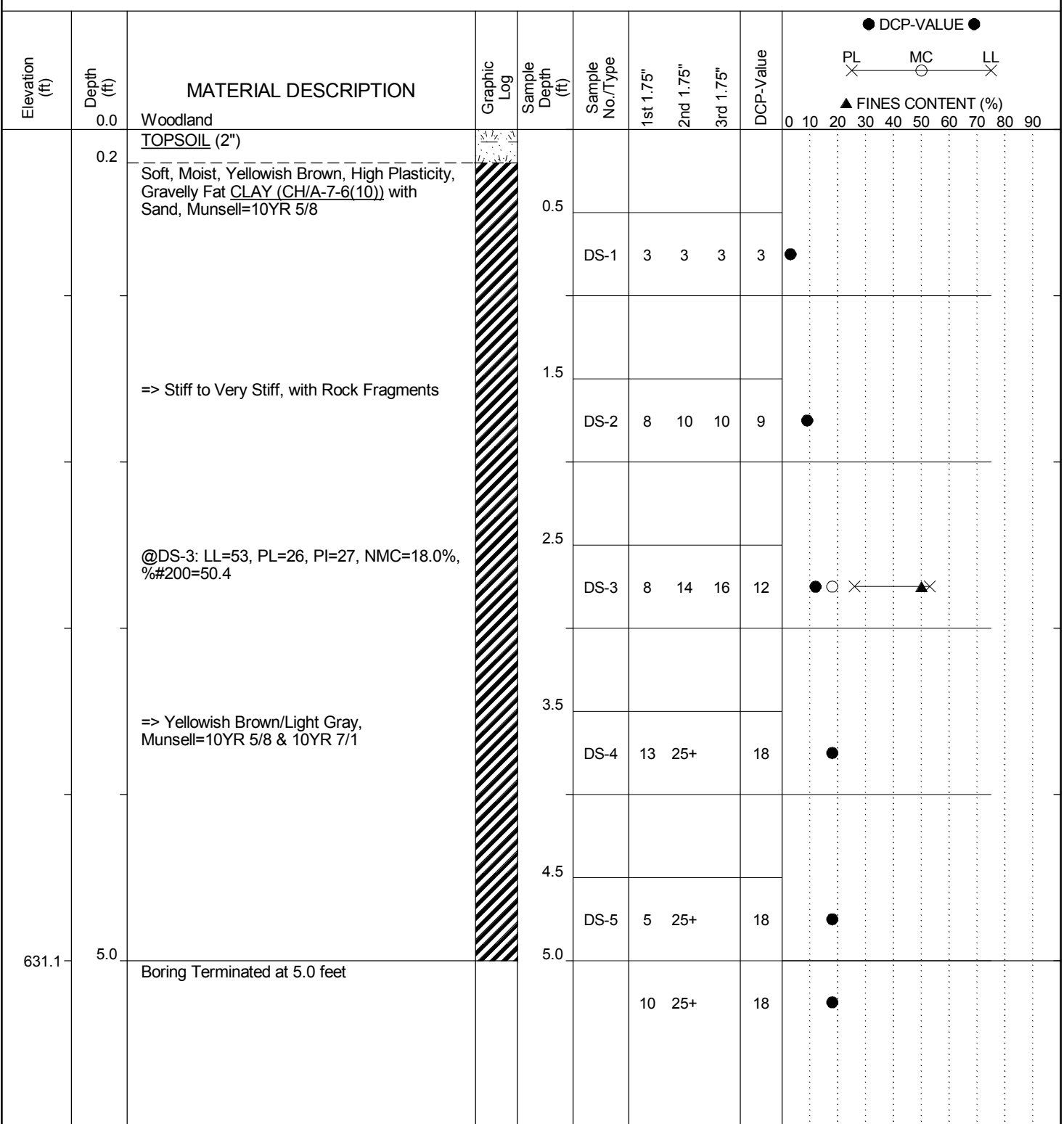
Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 1.75"	2nd 1.75"	3rd 1.75"	DCP-Value	DCP-VALUE ●	PL X	MC ○	LL X	▲ FINES CONTENT (%)
	0.0	Woodland												
	0.2	TOPSOIL (2")												
	0.5	Very Loose, Moist, Strong Brown, Non-Plastic, Fine to Medium SAND (SP-SC/A-2) with Clay, Munsell=7.5YR 4/6												
	1.0	Loose, Moist to Wet, Dark Yellowish Brown, Low Plasticity, Clayey Fine to Medium SAND (SC/A-4), Munsell=10YR 3/4												
	1.5				DS-1	3	4	2	3	●				
	2.0	Very Soft, Moist to Wet, Brown, Low Plasticity, Sandy Lean CLAY (CL/A-4(3)), Munsell=10YR 5/3												
	2.5	@DS-3: LL=28, PL=20, PI=8, NMC=25.4%, %#200=60.3												
	3.0				DS-2	4	4	6	5	●				
	3.5	=> Firm, Yellowish Brown, with Rock, Munsell=10YR 5/8												
	4.0													
	4.5				DS-3	1	1	1	1	●	X	X	▲	
	5.0	Boring Terminated at 5.0 feet												
628.1														
						10	12	13	10	●				

## 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: G4843.000		County: York		Boring No.: CL-5	
Site Description: SC 557 Bridge over Crowders Creek				Route: SC 557	
Driller: M. Touchberry		Boring Location: 219+85		Offset: 79 ft - R	Alignment: Mainline
Elev.: 636.1 ft	Latitude: 35.119827	Longitude: -81.125998	Date Started: 4/9/2018		
Total Depth: 5 ft	Groundwater: TOB	Dry	24 hr	Backfilled	Date Completed: 4/9/2018
Dynamic Cone Penetrometer Test Procedure:			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 G4843 - CURRENT - SC-557.GPJ FME2017.GDT 7/16/18

# SCDOT Manual Auger Log

Project ID: G4843.000		County: York		Boring No.: CL-6	
Site Description: SC 557 Bridge over Crowders Creek			Route: SC 557		
Driller: M. Touchberry	Boring Location: 221+05		Offset: 80 ft - R	Alignment: Mainline	
Elev.: 632.9 ft	Latitude: 35.119806	Longitude: -81.125597	Date Started: 4/9/2018		
Total Depth: 5 ft	Groundwater: TOB	Dry 24 hr	Backfilled	Date Completed: 4/9/2018	
Dynamic Cone Penetrometer Test Procedure:			Sowers and Hedges (1966)		

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 1.75"	2nd 1.75"	3rd 1.75"	DCP-Value	● DCP-VALUE ● PL — MC — LL X — O — X ▲ FINES CONTENT (%)
	0.0	Woodland								
	0.2	TOPSOIL (2")								
	0.5	Medium Dense, Moist, Dark Yellowish Brown, Non-Plastic, Fine to Coarse SAND (SP/A-1) with Rock, Munsell=10YR 3/6								
	1.0	Loose, Moist, Light Yellowish Brown, Low Plasticity, Clayey Fine to Medium SAND (SC/A-4), Munsell=2.5Y 6/4								
	2.0	Stiff, Moist, Yellowish Brown, High Plasticity, Sandy Fat CLAY (CH/A-7-6(16)), Munsell=10YR 5/8								
	2.5	@DS-3: LL=53, PL=27, PI=26, NMC=21.5%, % #200=64.3								
	3.5									
	4.0	Stiff to Firm, Moist, Reddish Yellow, High Plasticity, Elastic SILT (MH/A-7-5(20)), Munsell=7.5YR 6/8								
	4.5	@DS-5: LL=58, PL=31, PI=27, NMC=36.0%, % #200=79.1								
627.9	5.0	Boring Terminated at 5.0 feet								
						7	10	8	8	

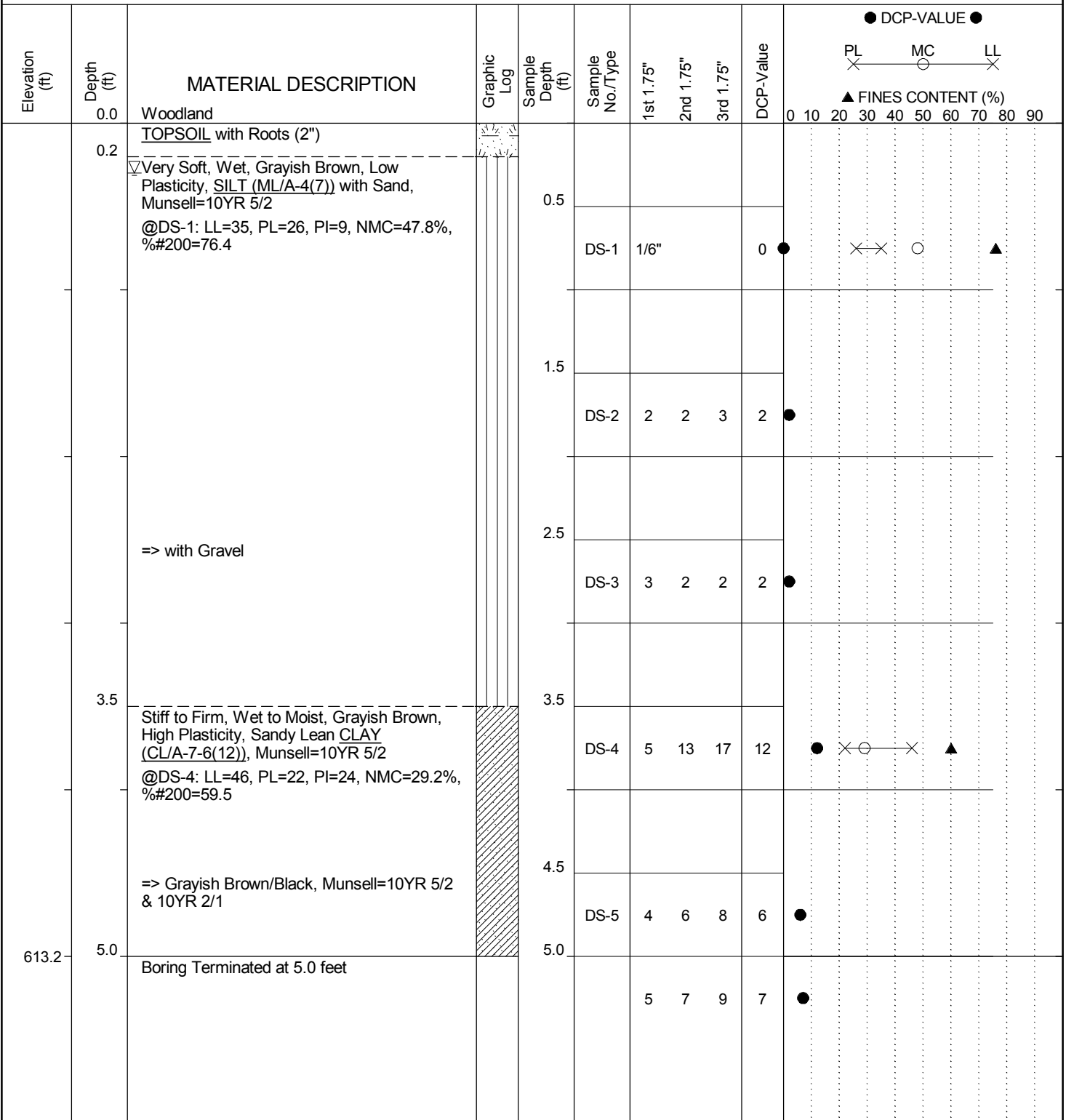
## LEGEND

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 G4843 - CURRENT - SC-557.GPJ FME2017.GDT 7/16/18

# SCDOT Manual Auger Log

Project ID: G4843.000			County: York		Boring No.: CL-7	
Site Description: SC 557 Bridge over Crowders Creek				Route: SC 557		
Driller: M. Touchberry		Boring Location: 226+61		Offset: 134 ft - R		Alignment: Mainline
Elev.: 618.2 ft	Latitude: 35.119602	Longitude: -81.123723		Date Started: 4/9/2018		
Total Depth: 5 ft	Groundwater: TOB	0.3 ft	24 hr	Backfilled	Date Completed: 4/9/2018	
Dynamic Cone Penetrometer Test Procedure:				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	

# SCDOT Manual Auger Log

<b>Project ID:</b> G4843.000	<b>County:</b> York	<b>Boring No.:</b> CL-8
<b>Site Description:</b> SC 557 Bridge over Crowders Creek		<b>Route:</b> SC 557
<b>Driller:</b> M. Touchberry	<b>Boring Location:</b> 227+43	<b>Offset:</b> 138 ft - R <b>Alignment:</b> Mainline
<b>Elev.:</b> 616.4 ft	<b>Latitude:</b> 35.119593	<b>Longitude:</b> -81.123441 <b>Date Started:</b> 4/9/2018
<b>Total Depth:</b> 4 ft	<b>Groundwater:</b> TOB	<b>Dry</b> 24 hr <b>Backfilled</b> <b>Date Completed:</b> 4/9/2018
<b>Dynamic Cone Penetrometer Test Procedure:</b>		Sowers and Hedges (1966)

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1.75" Intervals			DCP-Value	DCP-VALUE												
						1st	2nd	3rd		0	10	20	30	40	50	60	70	80	90			
616.4	0.0	Woodland								● DCP-VALUE ● PL X    MC ○    LL X ▲ FINES CONTENT (%)												
	0.5	Soft to Firm, Moist, Dark Yellowish Brown, Non-Plastic, Sandy SILT (ML/A-4(0)), Munsell=10YR 4/4		0.5	DS-1	2	3	6	4 ●													
	1.5	=> Dark Grayish Brown, Munsell=10YR 4/2 @DS-2: LL=NP, PL=NP, PI=NP, NMC=19.3%, %200=54.0 => Wet		1.5	DS-2	7	9	7	7 X ● ○ ▲													
	2.5			2.5	DS-3	6	5	6	5 ●													
	3.5	=> Brown, with Rock, Munsell=10YR 4/3		3.5	DS-4	4	7	12	9 ●													
	4.0	Boring Terminated at 4.0 feet due to Auger Refusal																				

### LEGEND

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

# SCDOT Manual Auger Log

Project ID: G4843.000			County: York		Boring No.: CL-9	
Site Description: SC 557 Bridge over Crowders Creek				Route: SC 557		
Driller: M. Touchberry		Boring Location: 237+58		Offset: 63 ft - L	Alignment: Mainline	
Elev.: 628.8 ft	Latitude: 35.120391		Longitude: -81.120096		Date Started: 4/10/2018	
Total Depth: 5 ft		Groundwater: TOB		Dry 24 hr	Backfilled	Date Completed: 4/10/2018
Dynamic Cone Penetrometer Test Procedure:				Sowers and Hedges (1966)		

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1st 1.75"	2nd 1.75"	3rd 1.75"	DCP-Value	● DCP-VALUE ● PL X MC O LL X ▲ FINES CONTENT (%)
623.8	0.0	Grassed Area								
	0.5	Stiff, Dry to Moist, Dark Reddish Brown, High Plasticity, Elastic SILT (MH/A-7-5(20)), Munsell=2.5YR 2.5/4		0.5	DS-1	5	14	17	12	●
	1.5	=> Dark Red, Munsell=2.5 YR 3/6  @DS-2: LL=62, PL=32, PI=30, NMC=25.6%, %#200=87.3		1.5	DS-2	14	21	19	15	● ○
	2.5			2.5	DS-3	11	13	19	12	●
	3.5	@DS-4: LL=66, PL=41, PI=25, NMC=31.2%, %#200=94.6		3.5	DS-4	10	13	14	11	● ○
	4.5	=> Red, Munsell=2.5 YR 4/8		4.5	DS-5	12	13	15	11	●
	5.0	Boring Terminated at 5.0 feet		5.0						
						10	14		11	●

## 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

<b>Project ID:</b> G4843.000	<b>County:</b> York	<b>Boring No.:</b> CL-10
<b>Site Description:</b> SC 557 Bridge over Crowders Creek	<b>Route:</b> SC 557	
<b>Driller:</b> M. Touchberry	<b>Boring Location:</b> 237+54	<b>Offset:</b> 86 ft - R
<b>Alignment:</b> Mainline	<b>Date Started:</b> 4/10/2018	
<b>Elev.:</b> 616.3 ft	<b>Latitude:</b> 35.119984	<b>Longitude:</b> -81.120051
<b>Total Depth:</b> 3 ft	<b>Groundwater:</b> TOB	<b>Date Completed:</b> 4/10/2018
<b>Dynamic Cone Penetrometer Test Procedure:</b>		Sowers and Hedges (1966)

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1.75" SPT			DCP-Value	FINES CONTENT (%)														
						1st	2nd	3rd		0	10	20	30	40	50	60	70	80	90					
616.3	0.0	Woodland																						
	0.5	Firm to Soft, Dry to Moist, Dusky Red, Low Plasticity, <u>SILT (ML/A-4)</u> , Munsell=10R 3/4			DS-1	3	7	8	7	●														
	1.5	=> Dusky Red/Reddish Black, with Rock Fragments, Munsell=10R 3/4 & 10R 2.5/1			DS-2	6	4	4	4	●														
	2.0	Very Stiff, Moist, Dusky Red, High Plasticity, Elastic <u>SILT (MH/A-7-5(20))</u> with Sand, Munsell=10R 3/4																						
	2.5	@DS-3: LL=58, PL=36, PI=22, NMC=28.3%, %#200=80.8			DS-3	9	25+		18	●	○	×	×							▲				
	3.0	Boring Terminated at 3.0 feet due to Auger Refusal																						

### LEGEND

<b>SAMPLER TYPE</b>		<b>DRILLING METHOD</b>	
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	

**SC 557 Roadway Improvements/Bridge Replacement  
York County, South Carolina  
G4843.00**

**LOG OF BORING No. RW-1**

Station: 212+44.60  
Offset: 24.1'-RT

Date Performed: 9/17/12

Notes:  
REF: Dynamic Cone for Shallow In-Situ Penetration Testing; Sowers & Hedges

Supervisor: J. Stewart

Ground Elevation (ft): 629.6

Water Level: None at T.O.B.

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample Type-No.	N Value	COMMENTS
	0.3	<u>TOPSOIL</u>		0.5			
		Loose to Medium Dense, Moist, Reddish Brown, Silty Fine to Medium <u>SAND (SM)</u> , Munsell=5YR 4/4		1.0	DS-1	8	
627.6		=> Yellowish Brown, Munsell=10YR 5/4, A-4(0), LL=NP, PL=NP, PI=NP, NMC=7.5%, %#200=44.3		2.0	DS-2	15	
	3.0	Very Stiff, Moist, Yellowish Brown, Fine to Medium Sandy <u>SILT (ML)</u> , Munsell=10YR 5/6 to 10YR 5/8		3.0	DS-3	18	
625.6				4.0		16	
	5.0	Hand Auger Terminated at 5.0 feet		5.0		18	
623.6							
621.6							
619.6							

LEGEND

SAMPLER TYPE		ABBREVIATIONS	
DS - Disturbed Sample	DT - Drive Tube	WOH- Weight Of Hammer	T.O.B.- Time Of Boring
ST - Shelby Tube	CU- Cuttings	MC - Moisture Content	
VS - Vane Shear	CT- Continuous Tube		

HAND AUGER LOG G4843-HA.GPJ SC\_DOT.GDT 5/13/13



**SC 557 Roadway Improvements/Bridge Replacement  
York County, South Carolina  
G4843.00**

**LOG OF BORING No. RW-2**

Station: 218+49.90  
Offset: 22.0'-RT

Date Performed: 9/17/12

Supervisor: J. Stewart

Ground Elevation (ft): 640.5

Water Level: None at T.O.B.

Notes:  
REF: Dynamic Cone for Shallow In-Situ Penetration Testing; Sowers & Hedges

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample Type-No.	N Value	COMMENTS
	0.3	<u>TOPSOIL</u>		0.5			
		Loose to Medium Dense, Moist, Brown, Silty Fine to Medium <u>SAND (SM)</u> , with Mica, Munsell=10YR 4/3 => Strong Brown, Munsell=7.5YR 5/6 & 7.5YR 5/8, A-4(1), LL=40, PL=33, PI=7, NMC=15.8%, %#200=45.7		1.0	DS-1	10	
638.5				2.0	DS-2	18	
	3.0	Very Stiff, Moist, Pale Brown, Fine to Medium Sandy <u>SILT (ML)</u> , Munsell=2.5Y 8/3		3.0	DS-3	18	
636.5				4.0		18	
	5.0	Hand Auger Terminated at 5.0 feet		5.0		17	
634.5							
632.5							
630.5							

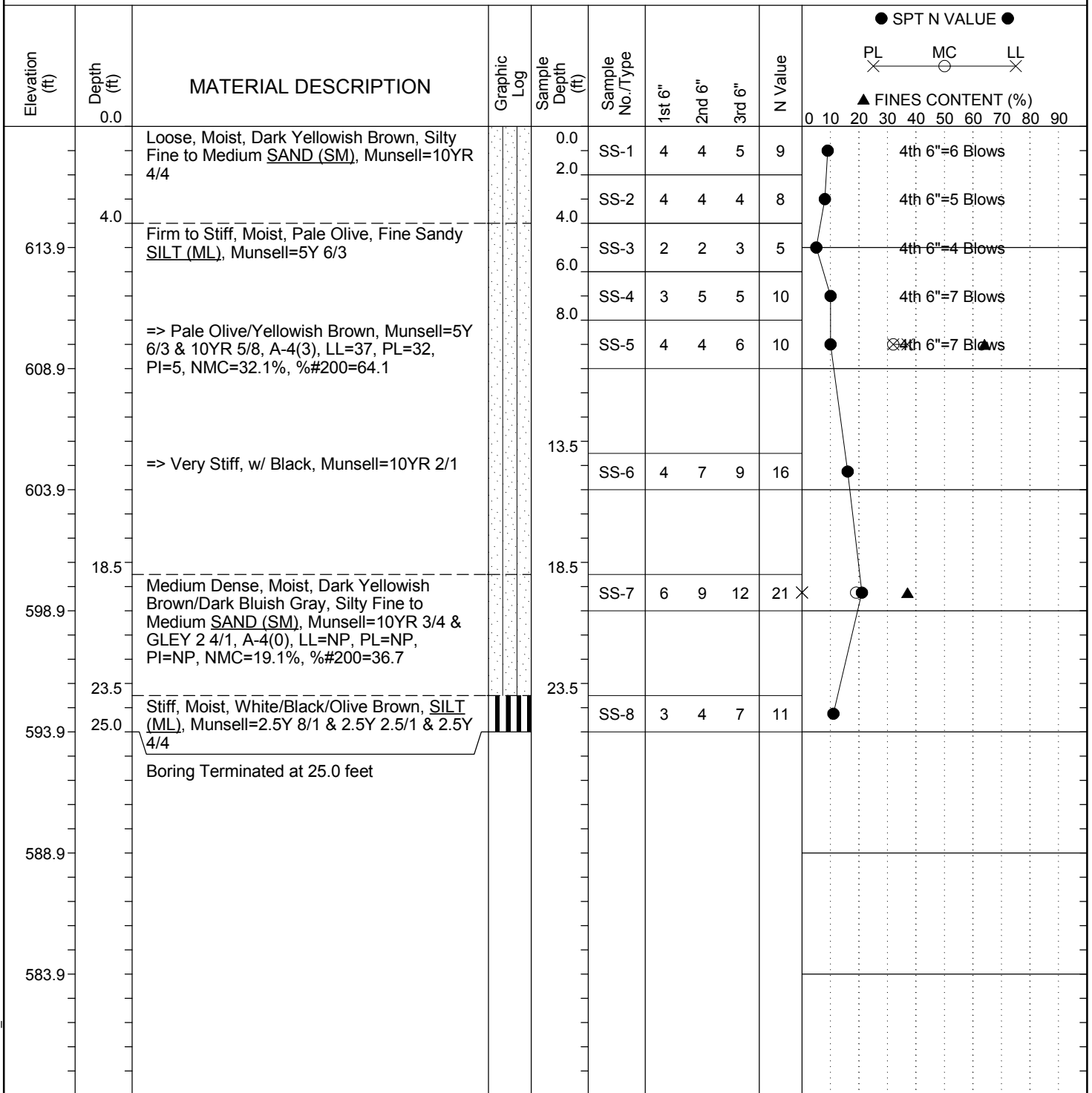
**LEGEND**

SAMPLER TYPE		ABBREVIATIONS	
DS - Disturbed Sample	DT - Drive Tube	WOH- Weight Of Hammer	T.O.B.- Time Of Boring
ST - Shelby Tube	CU- Cuttings	MC - Moisture Content	
VS - Vane Shear	CT- Continuous Tube		

HAND AUGER LOG G4843-HA.GPJ SC\_DOT.GDT 5/13/13

# SCDOT Soil Test Boring Log

<b>File No.:</b>	46.199B	<b>Project No. (PIN):</b>	03-013	<b>County:</b>	York	<b>Eng./Geo.:</b>	R. Wessinger
<b>Site Description:</b>	SC 557 Roadway Improvements & Bridge Replacement					<b>Route:</b>	SC 557
<b>Boring No.:</b>	RW-3	<b>Boring Location:</b>	226+70.9	<b>Offset:</b>	24.4'-RT	<b>Alignment:</b>	SC 557
<b>Elev.:</b>	618.9 ft	<b>Latitude:</b>	35.11990262	<b>Longitude:</b>	81.12369078	<b>Date Started:</b>	9/21/12
<b>Total Depth:</b>	25 ft	<b>Soil Depth:</b>	25 ft	<b>Core Depth:</b>	0 ft	<b>Date Completed:</b>	9/21/2012
<b>Bore Hole Diameter (in):</b>	6	<b>Sampler Configuration</b>		<b>Liner Required:</b>	Y (N)	<b>Liner Used:</b>	Y (N)
<b>Drill Machine:</b>	CME 550	<b>Drill Method:</b>	HSA	<b>Hammer Type:</b>	Automatic	<b>Energy Ratio:</b>	
<b>Core Size:</b>	N/A	<b>Driller:</b>	Ameridrill	<b>Groundwater:</b>	TOB Dry	<b>24HR</b>	Dry



## LEGEND

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

SC\_DOT\_G4843-SPT.GPJ SC\_DOT.GDT 5/13/13

**SC 557 Roadway Improvements/Bridge Replacement**  
**York County, South Carolina**  
**G4843.00**

**LOG OF BORING No. RW-4**

Station: 238+21.00  
Offset: 20.8'-LT

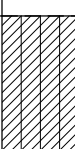

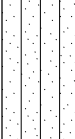
Date Performed: 9/17/12

Supervisor: J. Stewart

Ground Elevation (ft): 632.0

Water Level: None at T.O.B.

Notes:  
REF: Dynamic Cone for Shallow In-Situ Penetration Testing; Sowers & Hedges

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample Type-No.	N Value	COMMENTS
	0.3	<u>TOPSOIL</u> Stiff, Moist, Weak Red to Red, Silty <u>CLAY (CL-ML)</u> , Munsell=10YR 4/4 to 10R 4/6		0.3	DS-1	9	
	1.0			1.0			
	1.5			1.5	DS-2	6	
630.0	2.0	Loose, Moist, Dark Reddish Brown to Dark Red, Silty Fine to Medium <u>SAND (SM)</u> , Munsell=2.5YR 3/4 to 2.5YR 3/6		2.0	DS-3		
		Firm, Moist, Reddish Brown, Fine to Medium Sandy <u>SILT (ML)</u> , Munsell=2.5YR 4/4 => Munsell=2.5YR 3/4, A-4(4), LL=33, PL=24, PI=9, NMC=18.7%, %#200=60.4		3.0	DS-4	5	
				4.0		8	
628.0				5.0		7	
				6.0		8	
626.0				7.0		12	
		=> Stiff to Very Stiff		8.0		13	
624.0				9.0		16	
				10.0		12	
622.0	10.0	Hand Auger Terminated at 10.0 feet					

LEGEND

SAMPLER TYPE		ABBREVIATIONS	
DS - Disturbed Sample	DT - Drive Tube	WOH- Weight Of Hammer	T.O.B.- Time Of Boring
ST - Shelby Tube	CU- Cuttings	MC - Moisture Content	
VS - Vane Shear	CT - Continuous Tube		

HAND AUGER LOG G4843-HA.GPJ SC\_DOT.GDT 5/13/13

SC 557 Roadway Improvements/Bridge Replacement York County, South Carolina G4843.00				LOG OF BORING No. RW-5			
Date Performed: 9/17/12				Notes: REF: Dynamic Cone for Shallow In-Situ Penetration Testing; Sowers & Hedges			
Supervisor: J. Stewart							
Ground Elevation (ft): 631.3							
Water Level: None at T.O.B.							
Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample Type-No.	N Value	COMMENTS
629.3		Very Stiff, Moist, Red, <u>SILT (ML)</u> , with Fine to Medium Sand, Munsell=2.5YR 4/6, A-5(10), LL=42, PL=32, PI=10, NMC=19.6%, % $\#200$ =82.7  => Reddish Brown, w/ Partially Weathered Rock (PWR), Munsell=2.5YR 4/4		0.0	DS-1		
				1.0		18	
				2.0		18	
				3.0		18	DS-2
627.3				4.0		18	
	5.0	Hand Auger Terminated at 5.0 feet		5.0		18	
625.3							
623.3							
621.3							

LEGEND

SAMPLER TYPE		ABBREVIATIONS	
DS - Disturbed Sample	DT - Drive Tube	WOH- Weight Of Hammer	T.O.B.- Time Of Boring
ST - Shelby Tube	CU- Cuttings	MC - Moisture Content	
VS - Vane Shear	CT- Continuous Tube		

HAND AUGER LOG G4843-HA.GPJ SC\_DOT.GDT 5/13/13

<b>SC 557 Roadway Improvements/Bridge Replacement</b> <b>York County, South Carolina</b> <b>G4843.00</b>		<b>LOG OF BORING No. RW-6</b> Station: 298+48.90 Offset: 23.2'-RT	
Date Performed: 9/21/12		Notes: REF: Dynamic Cone for Shallow In-Situ Penetration Testing; Sowers & Hedges	
Supervisor: J. Stewart			
Ground Elevation (ft): 654.1			
Water Level: None at T.O.B.			

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample Type-No.	N Value	COMMENTS
		Stiff, Moist, Red, <u>SILT (ML)</u> , Munsell=2.5YR 4/6 to 2.5YR 4/8		0.0	DS-1		
				1.0		12	
652.1		=> Red, Munsell=2.5YR 5/8		2.0	DS-2	12	
				3.0		15	
650.1				4.0		12	
	5.0	=> Munsell=2.5YR 5/6 to 2.5YR 5/8, A-4(0), LL=NP, PL=NP, PI=NP, NMC=39.8%, %#200=95.3 Hand Auger Terminated at 5.0 feet		4.5			
				5.0	DS-3	12	
648.1							
646.1							
644.1							

LEGEND

<b>SAMPLER TYPE</b> DS - Disturbed Sample ST - Shelby Tube VS - Vane Shear		<b>DT - Drive Tube</b> CU - Cuttings CT - Continuous Tube		<b>ABBREVIATIONS</b> WOH- Weight Of Hammer MC - Moisture Content T.O.B.- Time Of Boring	
---	--	---	--	--	--

HAND AUGER LOG G4843-HA.GPJ SC\_DOT.GDT 5/13/13

**SC 557 Roadway Improvements/Bridge Replacement  
York County, South Carolina  
G4843.00**

**LOG OF BORING No. RW-7**

Station: 308+49.60  
Offset: 26.6'-LT

Date Performed: 9/21/12

Supervisor: J. Stewart

Ground Elevation (ft): 664.8

Water Level: None at T.O.B.


Notes:  
REF: Dynamic Cone for Shallow In-Situ Penetration Testing; Sowers & Hedges

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample Type-No.	N Value	COMMENTS
		Firm to Stiff, Moist, Dusky Red, Fine to Medium Sandy <u>SILT (ML)</u> , Munsell=10R 3/3		0.0	DS-1		
		=> Red, Munsell=10R 4/6, A-7-5(7), LL=47, PL=31, PI=16, NMC=20.3%, %#200=55.5		1.0	DS-2	7	
662.8				2.0		6	
				3.0		7	
660.8				4.0		9	
	5.0	Hand Auger Terminated at 5.0 feet		5.0		8	
658.8							
656.8							
654.8							

LEGEND

SAMPLER TYPE		ABBREVIATIONS	
DS - Disturbed Sample	DT - Drive Tube	WOH- Weight Of Hammer	T.O.B.- Time Of Boring
ST - Shelby Tube	CU- Cuttings	MC - Moisture Content	
VS - Vane Shear	CT- Continuous Tube		

HAND AUGER LOG G4843-HA.GPJ SC\_DOT.GDT 5/13/13

SC 557 Roadway Improvements/Bridge Replacement York County, South Carolina G4843.00				LOG OF BORING No. RW-8			
Date Performed: 9/21/12				Notes: REF: Dynamic Cone for Shallow In-Situ Penetration Testing; Sowers & Hedges			
Supervisor: J. Stewart							
Ground Elevation (ft): 653.4							
Water Level: None at T.O.B.							
Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample Type-No.	N Value	COMMENTS
651.4	0.5	Firm, Moist, Red, Fine to Coarse Sandy <u>LEAN CLAY (CL)</u> => Dusky Red, Munsell=10R 3/4, A-6(4), LL=35, PL=23, PI=12, NMC=17.6%, %#200=53.5		0.5	DS-1	8	
	1.0			1.0			
	2.0	=> Stiff to Very Stiff		2.0	18		
	3.0			3.0	18		
649.4	4.0			4.0	12		
	5.0	Hand Auger Terminated at 5.0 feet	5.0	12			
647.4							
645.4							
643.4							

LEGEND

SAMPLER TYPE		ABBREVIATIONS	
DS - Disturbed Sample	DT - Drive Tube	WOH- Weight Of Hammer	T.O.B.- Time Of Boring
ST - Shelby Tube	CU- Cuttings	MC - Moisture Content	
VS - Vane Shear	CT- Continuous Tube		

HAND AUGER LOG G4843-HA.GPJ SC\_DOT\_GDT 5/13/13

**SC 557 Roadway Improvements/Bridge Replacement  
York County, South Carolina  
G4843.00**

**LOG OF BORING No. RW-9**

Station: 324+48.70  
Offset: 25.6'-LT

Date Performed: 9/21/12

Notes:  
REF: Dynamic Cone for Shallow In-Situ Penetration Testing; Sowers & Hedges

Supervisor: J. Stewart

Ground Elevation (ft): 645.2

Water Level: None at T.O.B.

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample Type-No.	N Value	COMMENTS
		Soft to Firm, Moist, Weak Red to Red, Fine to Medium Sandy SILT (ML), with Mica, Munsell=10R 4/4 to 10R 4/6		0.0	DS-1		
				1.0		5	
643.2		=> Red, Munsell=2.5YR 5/6 to 2.5YR 5/8, A-4(0), LL=NP, PL=NP, PI=NP, NMC=24.5%, %#200=51.4		2.0	DS-2	4	
				3.0		5	
641.2				4.0		4	
		=> Light Red, Munsell=2.5YR 6/6		4.5			
	5.0	Hand Auger Terminated at 5.0 feet		5.0	DS-3	5	
639.2							
637.2							
635.2							

**LEGEND**

SAMPLER TYPE		ABBREVIATIONS	
DS - Disturbed Sample	DT - Drive Tube	WOH- Weight Of Hammer	T.O.B.- Time Of Boring
ST - Shelby Tube	CU- Cuttings	MC - Moisture Content	
VS - Vane Shear	CT- Continuous Tube		

HAND AUGER LOG G4843-HA.GPJ SC\_DOT.GDT 5/13/13



<b>SC 557 Roadway Improvements/Bridge Replacement</b> <b>York County, South Carolina</b> <b>G4843.00</b>		<b>LOG OF BORING No. RW-10</b> Station: 327+50.10 Offset: 24.0'-RT	
Date Performed: 9/21/12		Notes: REF: Dynamic Cone for Shallow In-Situ Penetration Testing; Sowers & Hedges	
Supervisor: J. Stewart			
Ground Elevation (ft): 641.0			
Water Level: None at T.O.B.			

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample Type-No.	N Value	COMMENTS
		Firm to Stiff, Moist, Red, <u>ELASTIC SILT (MH)</u> , with Fine to Medium Sand and Mica, Munsell=2.5YR 4/6		0.0	DS-1		
				1.0		15	
639.0		=> Red, Munsell=2.5YR 4/8		2.0	DS-2	8	
				3.0		9	
637.0		=> Red, Munsell=2.5YR 5/8, A-7-5(11), LL=50, PL=37, PI=13, NMC=24.7%, % #200=73.2		3.5	DS-3	11	
	5.0	Boring Terminated at 5.0 feet		4.0		10	
635.0				5.0			
633.0							
631.0							

LEGEND

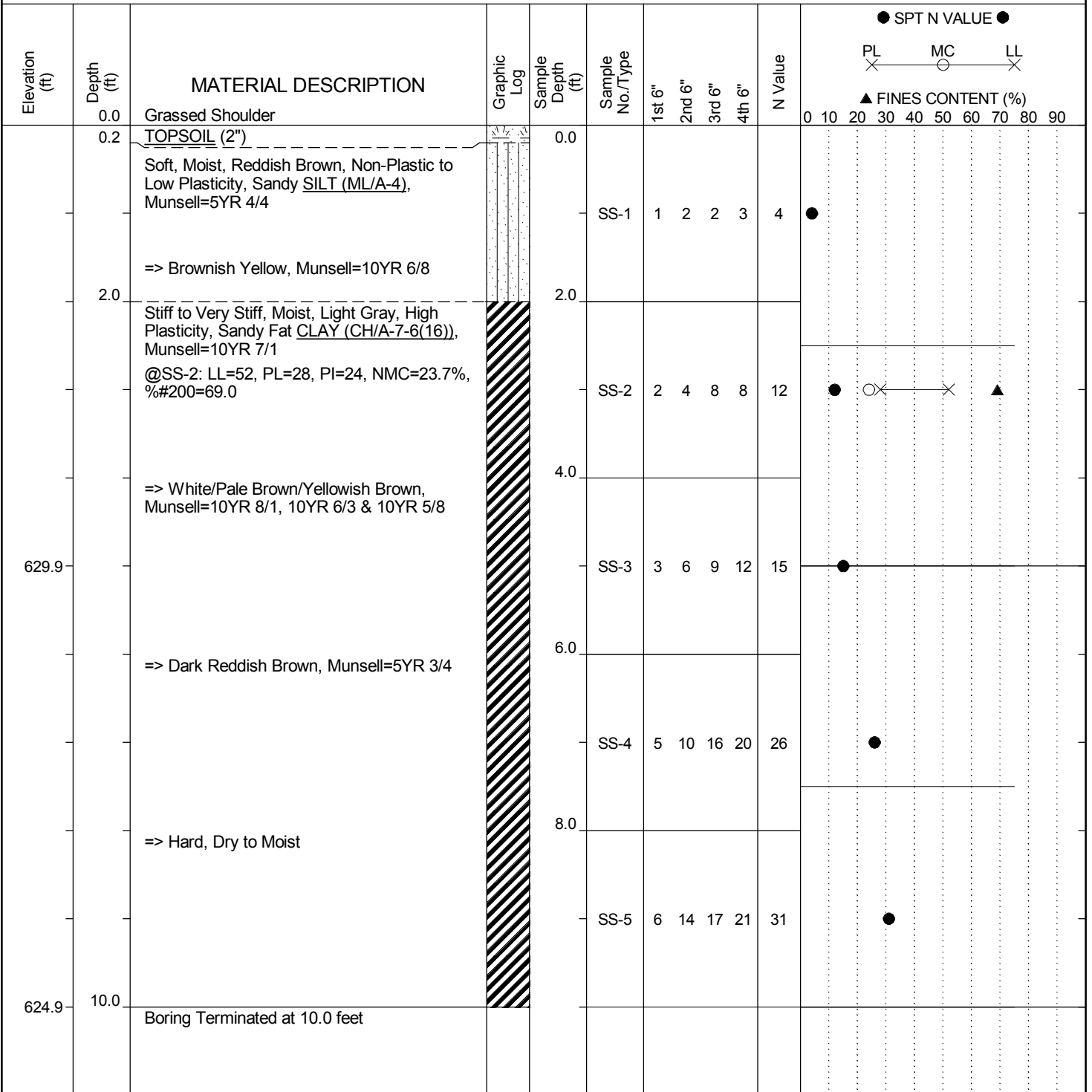
<b>SAMPLER TYPE</b> DS - Disturbed Sample ST - Shelby Tube VS - Vane Shear		<b>ABBREVIATIONS</b> DT - Drive Tube CU - Cuttings CT - Continuous Tube		WOH- Weight Of Hammer MC - Moisture Content T.O.B.- Time Of Boring	
---	--	--	--	--	--

HAND AUGER LOG G4843-HA.GPJ SC\_DOT.GDT 5/13/13



# SCDOT Soil Test Log

<b>Project ID:</b> G4843.000	<b>County:</b> York	<b>Boring No.:</b> RW-12
<b>Site Description:</b> SC 557 Bridge over Crowders Creek		<b>Route:</b> SC 557
<b>Eng./Geo.:</b> M. Touchberry	<b>Boring Location:</b> 209+00	<b>Offset:</b> 40 ft - R
<b>Alignment:</b> Mainline	<b>Elev.:</b> 634.9 ft	<b>Latitude:</b> 35.120117
<b>Longitude:</b> -81.129612	<b>Date Started:</b> 6/13/2018	
<b>Total Depth:</b> 10 ft	<b>Soil Depth:</b> 10 ft	<b>Core Depth:</b> 0 ft
<b>Date Completed:</b> 6/13/2018	<b>Bore Hole Diameter (in):</b> 6	<b>Sampler Configuration:</b>
<b>Liner Required:</b> Y (N)	<b>Liner Used:</b> Y (N)	
<b>Drill Machine:</b> CME 550X	<b>Drill Method:</b> HSA	<b>Hammer Type:</b> Automatic
<b>Energy Ratio:</b> 81%	<b>Core Size:</b> N/A	<b>Driller:</b> D. Harris
<b>Groundwater:</b> TOB Dry	<b>24HR:</b> Backfilled	



## LEGEND

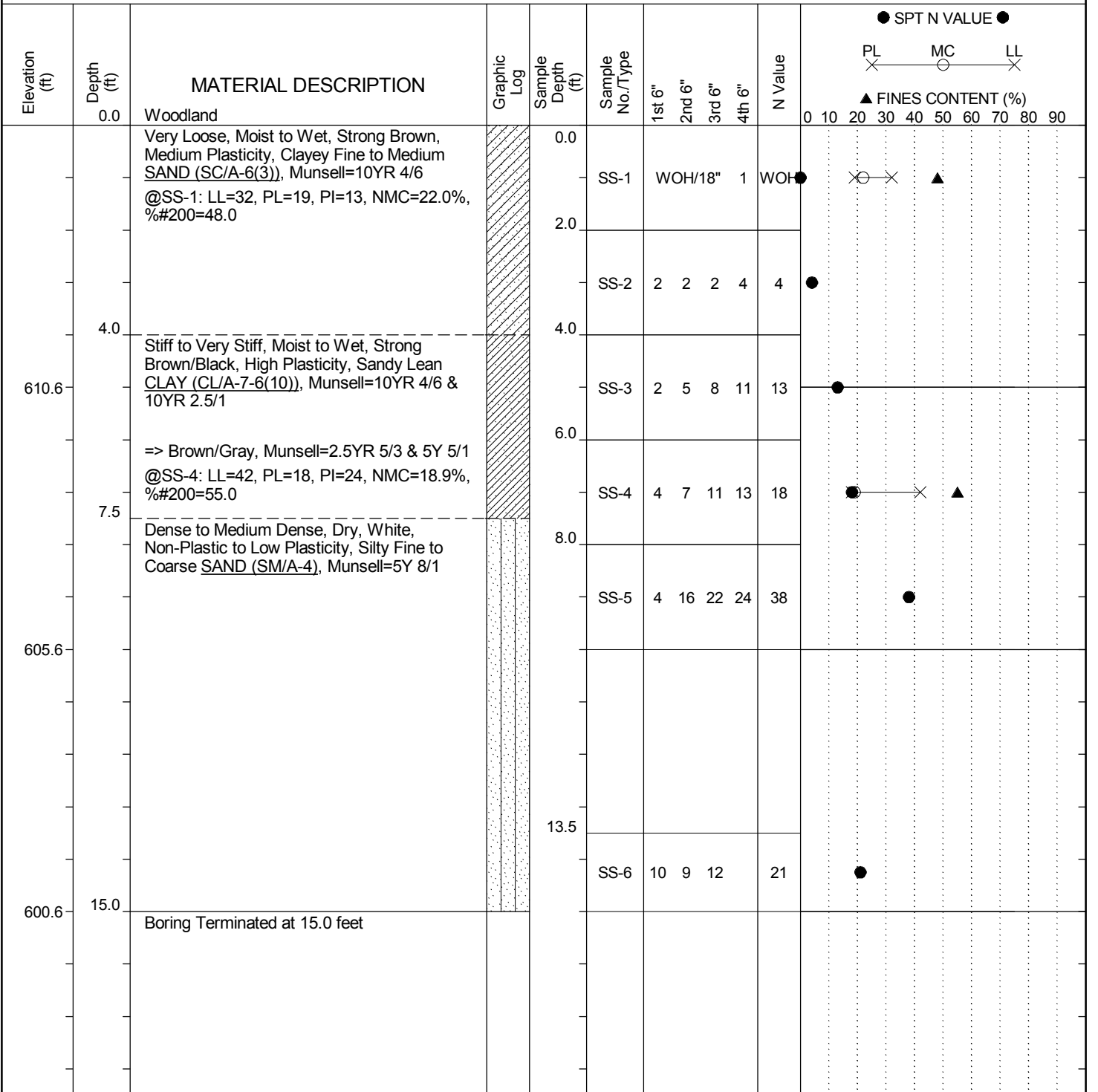
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	





# SCDOT Soil Test Log

<b>Project ID:</b> G4843.000	<b>County:</b> York	<b>Boring No.:</b> RW-15
<b>Site Description:</b> SC 557 Bridge over Crowders Creek		<b>Route:</b> SC 557
<b>Eng./Geo.:</b> R. Wessinger	<b>Boring Location:</b> 229+00	<b>Offset:</b> 41 ft - L
<b>Alignment:</b> Mainline	<b>Elev.:</b> 615.6 ft	<b>Latitude:</b> 35.120099
<b>Longitude:</b> -81.122932	<b>Date Started:</b> 6/12/2018	
<b>Total Depth:</b> 15 ft	<b>Soil Depth:</b> 15 ft	<b>Core Depth:</b> 0 ft
<b>Date Completed:</b> 6/12/2018	<b>Bore Hole Diameter (in):</b> 6	<b>Sampler Configuration:</b>
<b>Liner Required:</b> Y (N)	<b>Liner Used:</b> Y (N)	
<b>Drill Machine:</b> CME 550X	<b>Drill Method:</b> HSA	<b>Hammer Type:</b> Automatic
<b>Energy Ratio:</b> 81%	<b>Core Size:</b> N/A	<b>Driller:</b> D. Harris
<b>Groundwater:</b> TOB Dry	<b>24HR:</b> Cave 7.9-ft	



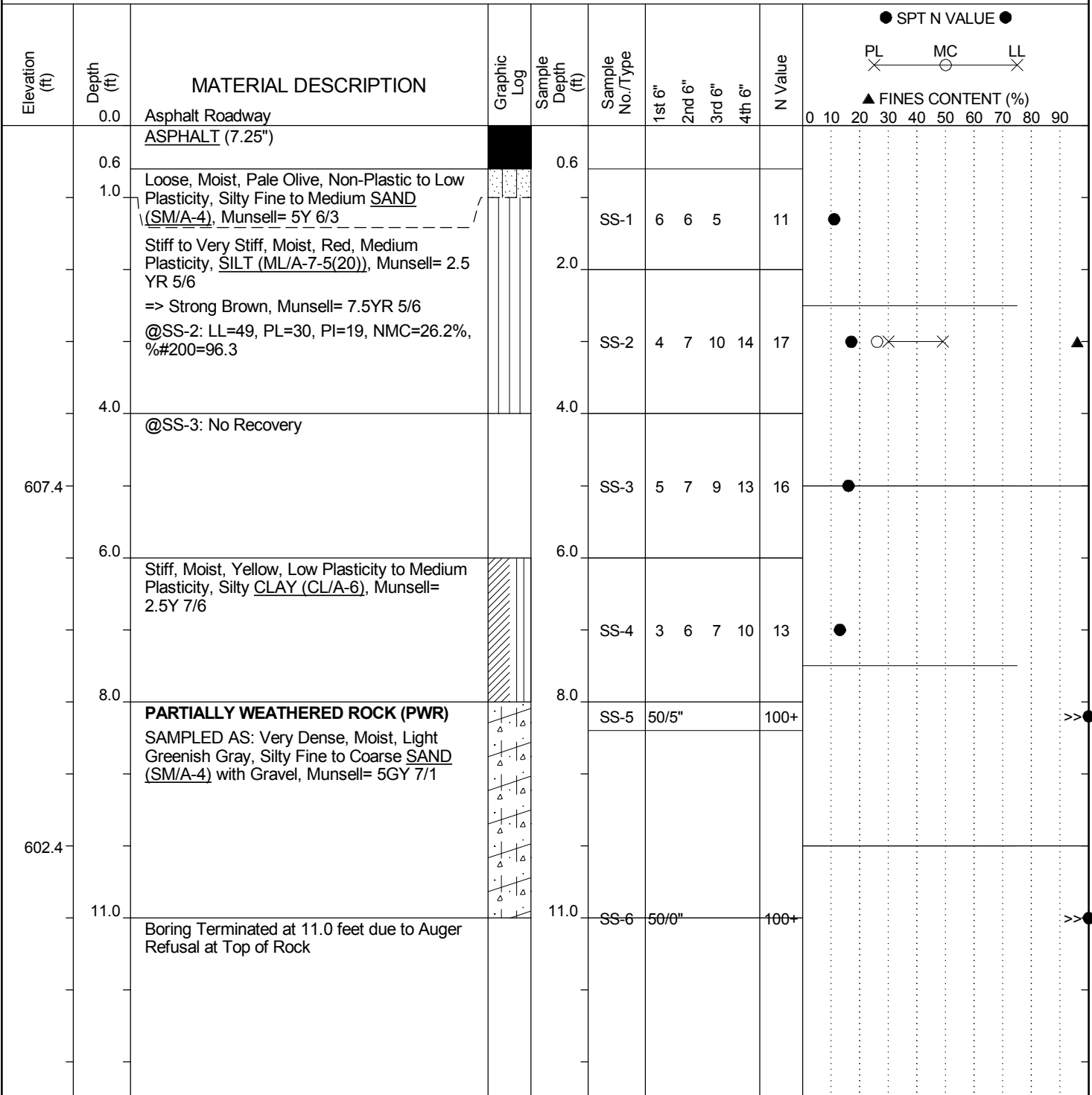
## LEGEND

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	



# SCDOT Soil Test Log

<b>Project ID:</b> G4843.000	<b>County:</b> York	<b>Boring No.:</b> RW-17
<b>Site Description:</b> SC 557 Bridge over Crowders Creek		<b>Route:</b> SC 557
<b>Eng./Geo.:</b> C. Piercy	<b>Boring Location:</b> 249+00	<b>Offset:</b> 20 ft - L
<b>Alignment:</b> Mainline	<b>Elev.:</b> 612.4 ft	<b>Latitude:</b> 35.12054
<b>Longitude:</b> -81.116268	<b>Date Started:</b> 6/14/2018	
<b>Total Depth:</b> 11 ft	<b>Soil Depth:</b> 10.4 ft	<b>Core Depth:</b> 0 ft
<b>Date Completed:</b> 6/14/2018	<b>Bore Hole Diameter (in):</b> 6	<b>Sampler Configuration:</b>
<b>Liner Required:</b> Y (N)	<b>Liner Used:</b> Y (N)	
<b>Drill Machine:</b> CME 45B	<b>Drill Method:</b> HSA	<b>Hammer Type:</b> Automatic
<b>Energy Ratio:</b> 84%	<b>Core Size:</b> N/A	<b>Driller:</b> L. Guempel
<b>Groundwater:</b> TOB Dry	<b>24HR:</b> Backfilled	



### LEGEND

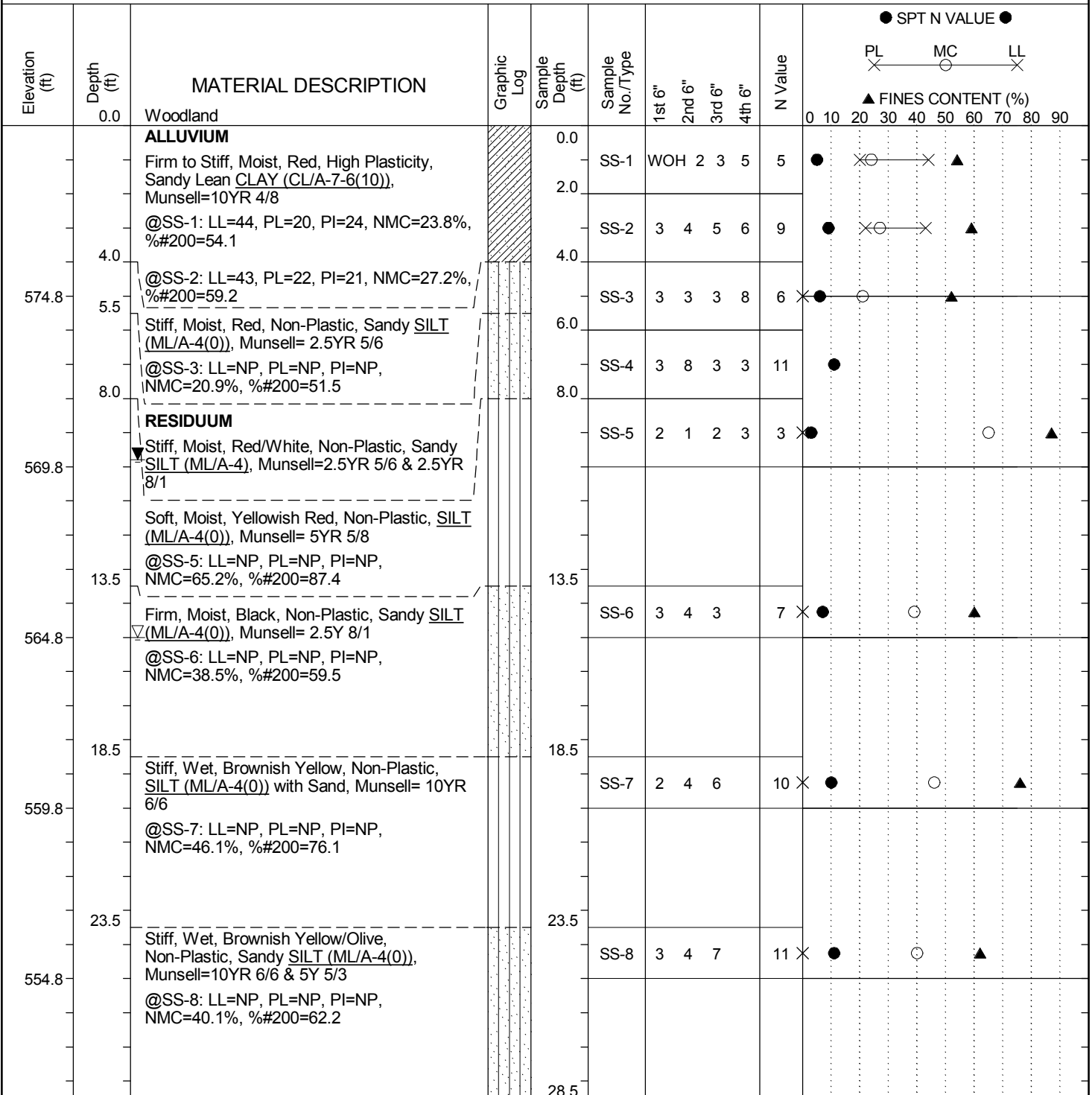
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	

SC\_DOT\_G4843 - CURRENT - SC-557.GPJ\_FME2017.GDT\_7/16/18



# SCDOT Soil Test Log

<b>Project ID:</b> G4843.000	<b>County:</b> York	<b>Boring No.:</b> RW-18
<b>Site Description:</b> SC 557 Bridge over Crowders Creek		<b>Route:</b> SC 557
<b>Eng./Geo.:</b> R. Wessinger	<b>Boring Location:</b> 254+22	<b>Offset:</b> 2 ft - R
<b>Alignment:</b> Mainline	<b>Elev.:</b> 579.8 ft	<b>Latitude:</b> 35.12038
<b>Longitude:</b> -81.114533	<b>Date Started:</b> 6/8/2018	
<b>Total Depth:</b> 48.6 ft	<b>Soil Depth:</b> 48.6 ft	<b>Core Depth:</b> 0 ft
<b>Date Completed:</b> 6/8/2018		
<b>Bore Hole Diameter (in):</b> 6	<b>Sampler Configuration</b>	<b>Liner Required:</b> Y (N)
<b>Liner Used:</b> Y (N)	<b>Drill Machine:</b> CME 550X	<b>Drill Method:</b> HSA
<b>Hammer Type:</b> Automatic	<b>Energy Ratio:</b> 81%	
<b>Core Size:</b> N/A	<b>Driller:</b> D. Harris	<b>Groundwater:</b> TOB 15 ft
<b>24HR:</b> 9.8 ft		



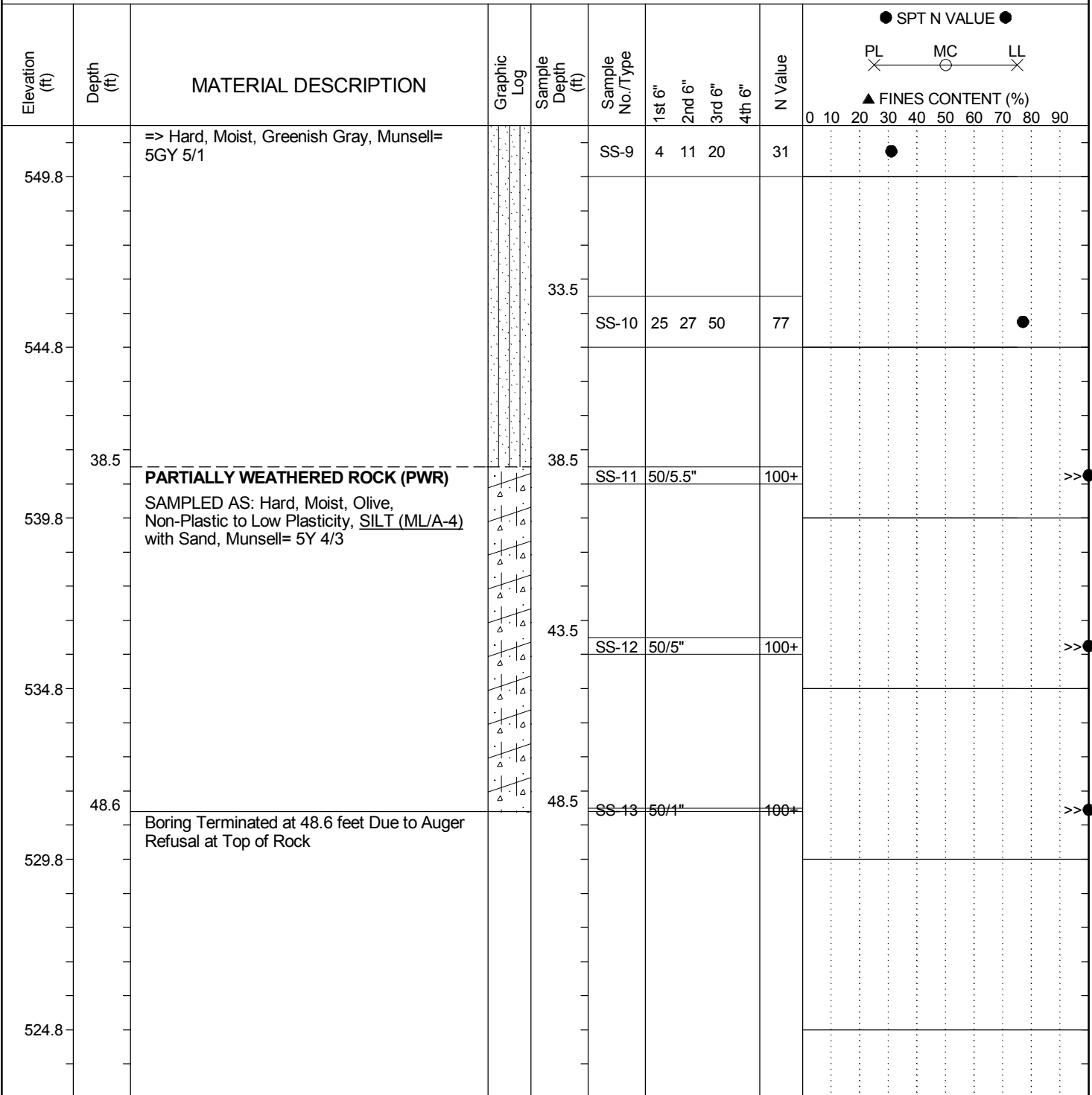
## LEGEND

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	

# SCDOT Soil Test Log

<b>Project ID:</b> G4843.000	<b>County:</b> York	<b>Boring No.:</b> RW-18
<b>Site Description:</b> SC 557 Bridge over Crowders Creek		<b>Route:</b> SC 557
<b>Eng./Geo.:</b> R. Wessinger	<b>Boring Location:</b> 254+22	<b>Offset:</b> 2 ft - R
<b>Alignment:</b> Mainline	<b>Date Started:</b> 6/8/2018	<b>Date Completed:</b> 6/8/2018
<b>Elev.:</b> 579.8 ft	<b>Latitude:</b> 35.12038	<b>Longitude:</b> -81.114533
<b>Total Depth:</b> 48.6 ft	<b>Soil Depth:</b> 48.6 ft	<b>Core Depth:</b> 0 ft
<b>Bore Hole Diameter (in):</b> 6	<b>Sampler Configuration</b>	<b>Liner Required:</b> Y (N)
<b>Liner Used:</b> Y (N)	<b>Drill Machine:</b> CME 550X	<b>Drill Method:</b> HSA
<b>Hammer Type:</b> Automatic	<b>Energy Ratio:</b> 81%	<b>Groundwater:</b> TOB 15 ft
<b>Core Size:</b> N/A	<b>Driller:</b> D. Harris	<b>24HR:</b> 9.8 ft

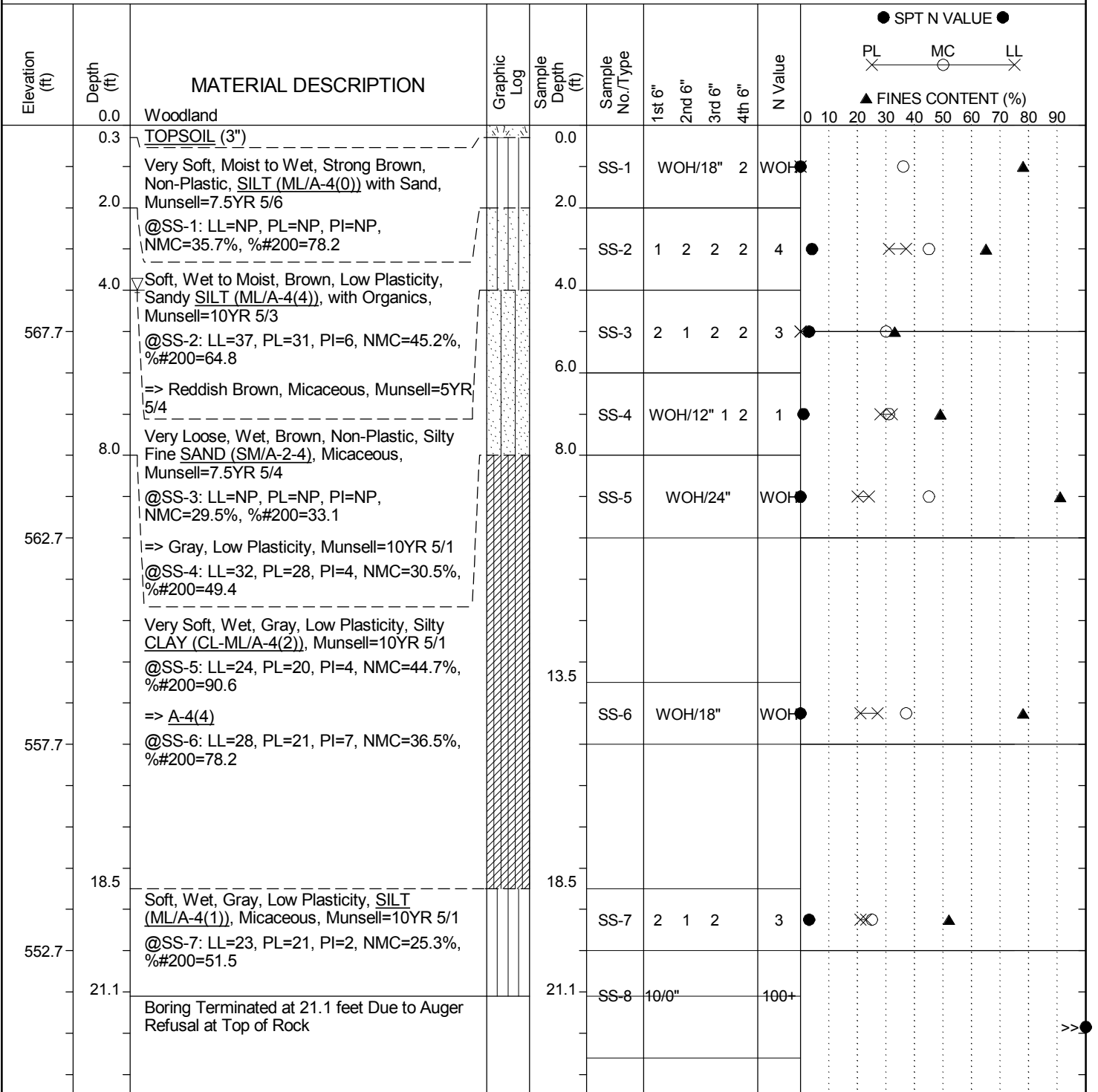


## LEGEND

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	

# SCDOT Soil Test Log

<b>Project ID:</b> G4843.000	<b>County:</b> York	<b>Boring No.:</b> RW-19
<b>Site Description:</b> SC 557 Bridge over Crowders Creek		<b>Route:</b> SC 557
<b>Eng./Geo.:</b> C. Piercy	<b>Boring Location:</b> 260+60	<b>Offset:</b> 3 ft - L
<b>Alignment:</b> Mainline	<b>Elev.:</b> 572.7 ft	<b>Latitude:</b> 35.120269
<b>Longitude:</b> -81.112402	<b>Date Started:</b> 6/1/2018	
<b>Total Depth:</b> 21.1 ft	<b>Soil Depth:</b> 21.1 ft	<b>Core Depth:</b> 0 ft
<b>Date Completed:</b> 6/1/2018	<b>Bore Hole Diameter (in):</b> 4	<b>Sampler Configuration:</b>
<b>Liner Required:</b> Y (N)	<b>Liner Used:</b> Y (N)	
<b>Drill Machine:</b> CME 550X	<b>Drill Method:</b> RW	<b>Hammer Type:</b> Automatic
<b>Energy Ratio:</b> 81%	<b>Core Size:</b> N/A	<b>Driller:</b> D. Harris
<b>Groundwater:</b> TOB 4.0 ft	<b>24HR:</b> Cave 2.0-ft	



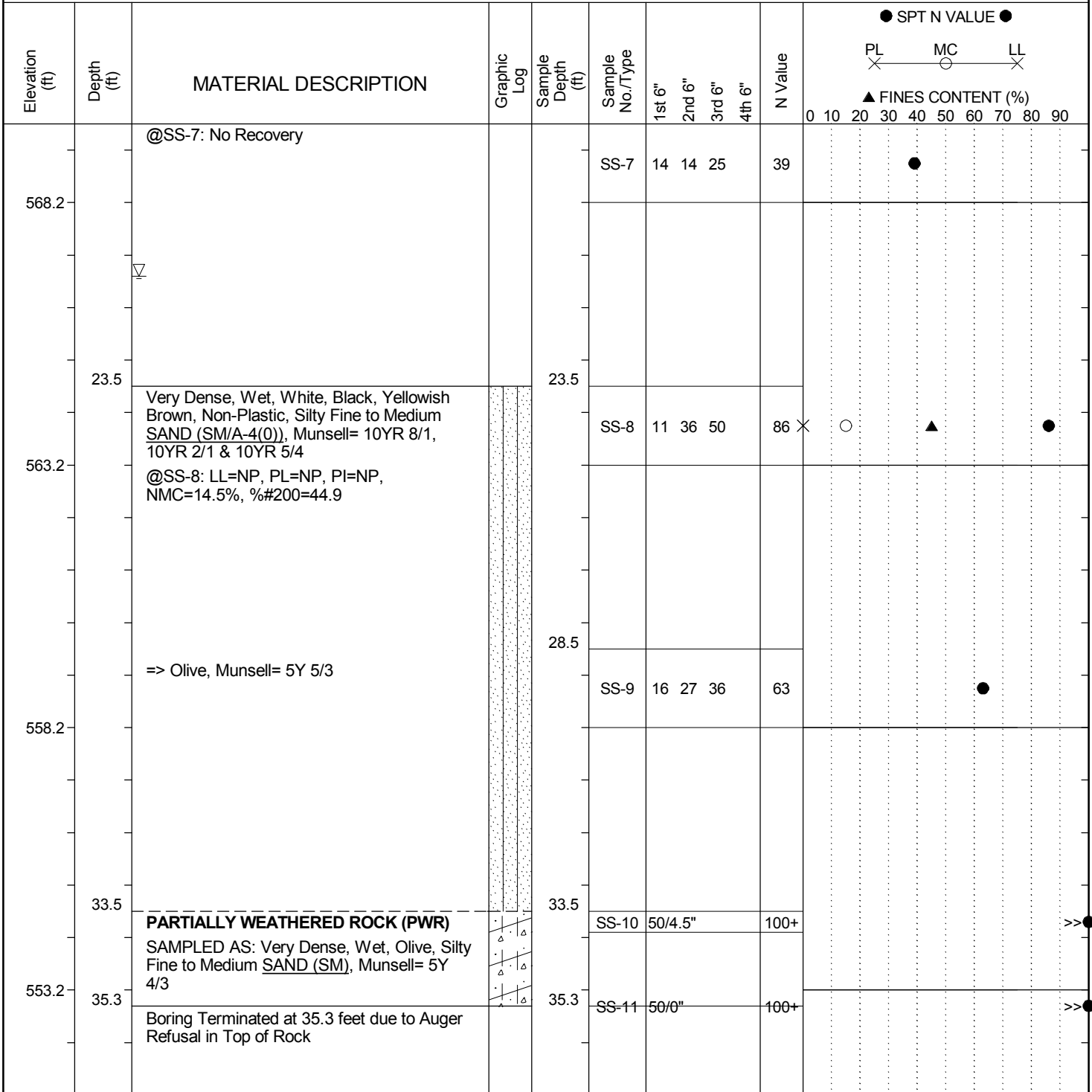
## LEGEND

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	



# SCDOT Soil Test Log

<b>Project ID:</b> G4843.000	<b>County:</b> York	<b>Boring No.:</b> RW-20
<b>Site Description:</b> SC 557 Bridge over Crowders Creek		<b>Route:</b> SC 557
<b>Eng./Geo.:</b> C. Piercy	<b>Boring Location:</b> 267+50	<b>Offset:</b> CL <b>Alignment:</b> Mainline
<b>Elev.:</b> 588.2 ft	<b>Latitude:</b> 35.120128	<b>Longitude:</b> -81.110102 <b>Date Started:</b> 6/14/2018
<b>Total Depth:</b> 35.3 ft	<b>Soil Depth:</b> 35.3 ft	<b>Core Depth:</b> 0 ft <b>Date Completed:</b> 6/14/2018
<b>Bore Hole Diameter (in):</b> 6	<b>Sampler Configuration</b>	<b>Liner Required:</b> Y (N) <b>Liner Used:</b> Y (N)
<b>Drill Machine:</b> CME 45B	<b>Drill Method:</b> HSA	<b>Hammer Type:</b> Automatic <b>Energy Ratio:</b> 84%
<b>Core Size:</b> N/A	<b>Driller:</b> L. Guempel	<b>Groundwater:</b> TOB 21.4 ft <b>24HR:</b> Backfilled



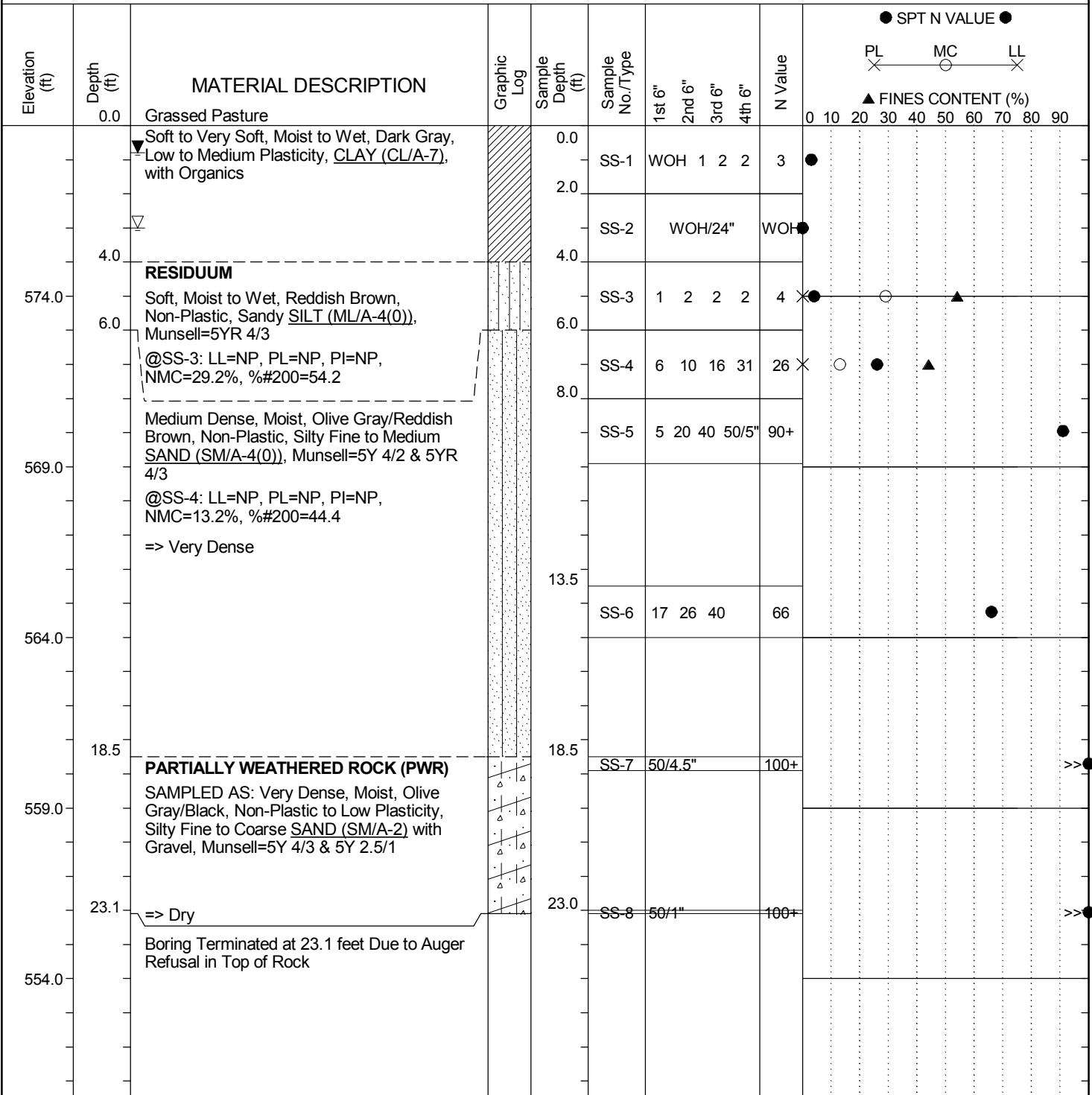
## LEGEND

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	



# SCDOT Soil Test Log

<b>Project ID:</b> G4843.000	<b>County:</b> York	<b>Boring No.:</b> RW-22
<b>Site Description:</b> SC 557 Bridge over Crowders Creek		<b>Route:</b> SC 557
<b>Eng./Geo.:</b> R. Wessinger	<b>Boring Location:</b> 275+59	<b>Offset:</b> CL
<b>Alignment:</b> Mainline		
<b>Elev.:</b> 579.0 ft	<b>Latitude:</b> 35.120666	<b>Longitude:</b> -81.107535
<b>Date Started:</b> 6/11/2018		
<b>Total Depth:</b> 23.1 ft	<b>Soil Depth:</b> 23.1 ft	<b>Core Depth:</b> 0 ft
<b>Date Completed:</b> 6/11/2018		
<b>Bore Hole Diameter (in):</b> 6	<b>Sampler Configuration</b>	<b>Liner Required:</b> Y (N)
<b>Liner Used:</b> Y (N)		
<b>Drill Machine:</b> CME 550X	<b>Drill Method:</b> HSA	<b>Hammer Type:</b> Automatic
<b>Energy Ratio:</b> 81%		
<b>Core Size:</b> N/A	<b>Driller:</b> D. Harris	<b>Groundwater:</b> TOB 3.0 ft
<b>24HR:</b> 0.8 ft		



## LEGEND

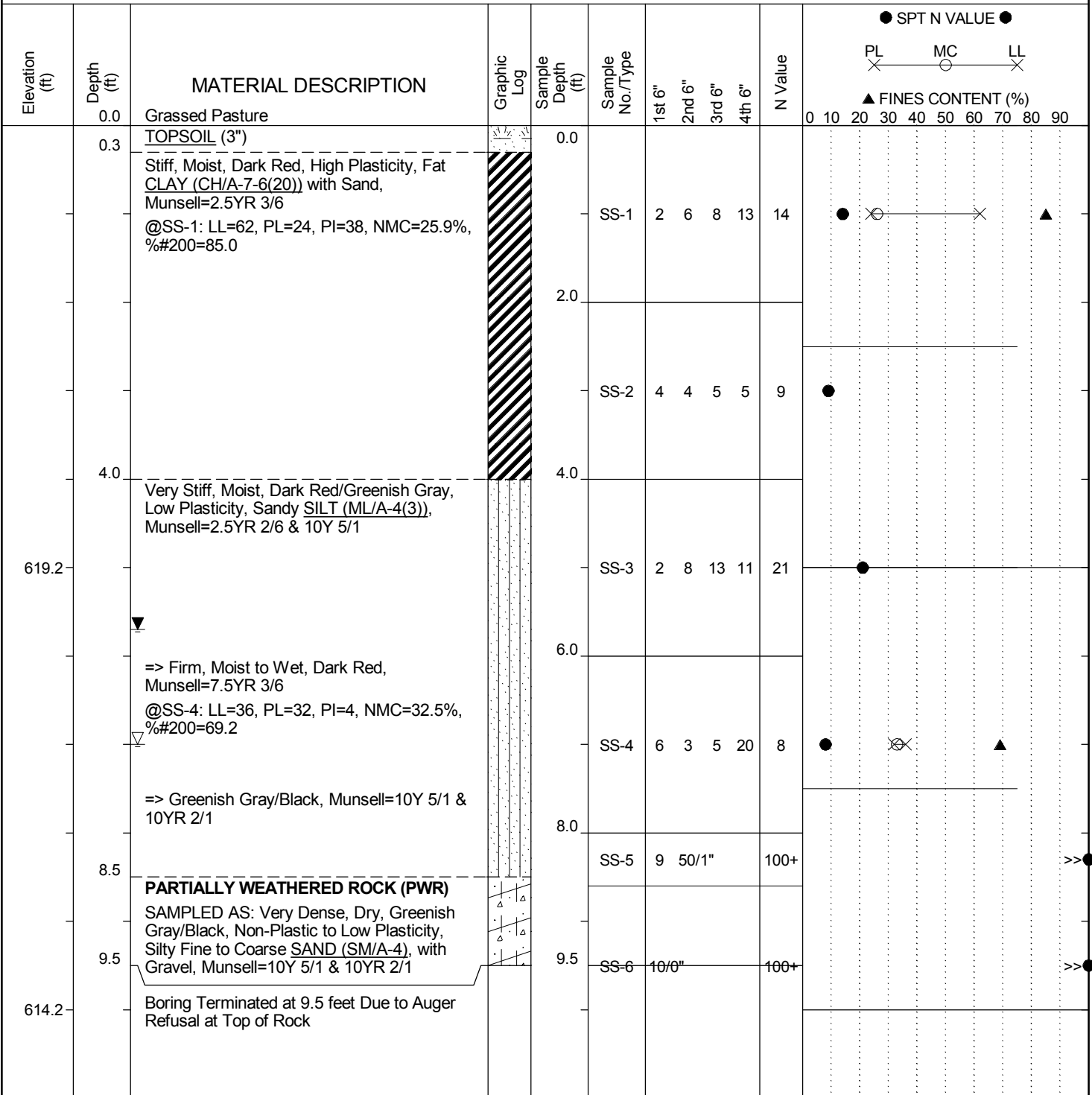
SAMPLER TYPE		DRILLING METHOD	
SS - Split Spoon	NQ - Rock Core, 1-7/8"	HSA - Hollow Stem Auger	RW - Rotary Wash
UD - Undisturbed Sample	CU - Cuttings	CFA - Continuous Flight Augers	RC - Rock Core
AWG - Rock Core, 1-1/8"	CT - Continuous Tube	DC - Driving Casing	





# SCDOT Soil Test Log

<b>Project ID:</b> G4843.000	<b>County:</b> York	<b>Boring No.:</b> RW-24
<b>Site Description:</b> SC 557 Bridge over Crowders Creek		<b>Route:</b> SC 557
<b>Eng./Geo.:</b> R. Wessinger	<b>Boring Location:</b> 286+00	<b>Offset:</b> CL <b>Alignment:</b> Mainline
<b>Elev.:</b> 624.2 ft	<b>Latitude:</b> 35.122062	<b>Longitude:</b> -81.104499 <b>Date Started:</b> 6/12/2018
<b>Total Depth:</b> 9.5 ft	<b>Soil Depth:</b> 9.5 ft	<b>Core Depth:</b> 0 ft <b>Date Completed:</b> 6/12/2018
<b>Bore Hole Diameter (in):</b> 6	<b>Sampler Configuration</b>	<b>Liner Required:</b> Y (N) <b>Liner Used:</b> Y (N)
<b>Drill Machine:</b> CME 550X	<b>Drill Method:</b> HSA	<b>Hammer Type:</b> Automatic <b>Energy Ratio:</b> 81%
<b>Core Size:</b> N/A	<b>Driller:</b> D. Harris	<b>Groundwater:</b> TOB 7.0 ft <b>24HR:</b> 5.7 ft

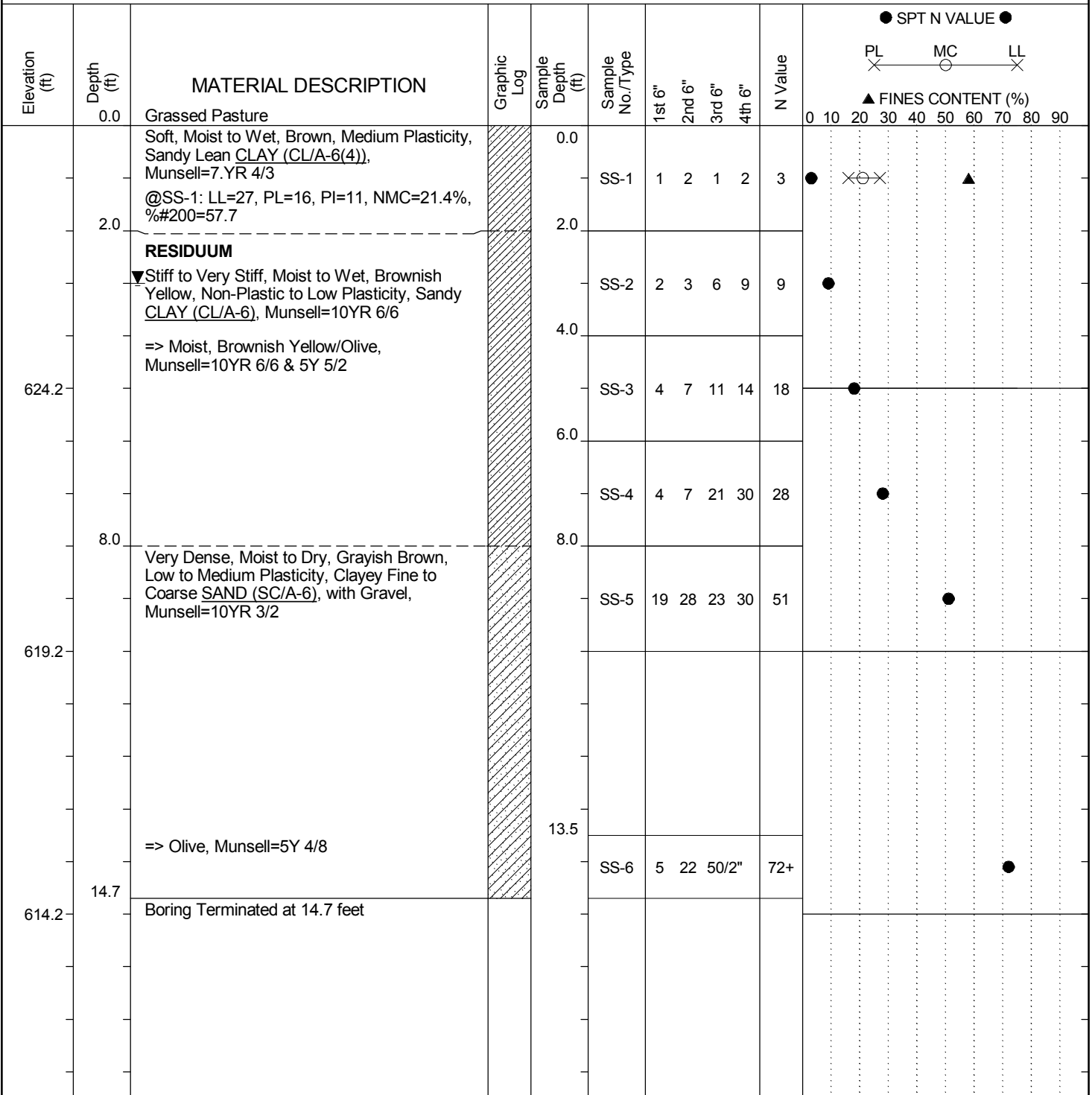


## LEGEND

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	

# SCDOT Soil Test Log

<b>Project ID:</b> G4843.000	<b>County:</b> York	<b>Boring No.:</b> RW-25
<b>Site Description:</b> SC 557 Bridge over Crowders Creek		<b>Route:</b> SC 557
<b>Eng./Geo.:</b> R. Wessinger	<b>Boring Location:</b> 291+00	<b>Offset:</b> 15 ft - R
<b>Alignment:</b> Mainline	<b>Elev.:</b> 629.2 ft	<b>Latitude:</b> 35.1223
<b>Longitude:</b> -81.10287	<b>Date Started:</b> 6/12/2018	
<b>Total Depth:</b> 14.7 ft	<b>Soil Depth:</b> 14.7 ft	<b>Core Depth:</b> 0 ft
<b>Date Completed:</b> 6/12/2018	<b>Bore Hole Diameter (in):</b> 6	<b>Sampler Configuration</b>
<b>Liner Required:</b> Y (N)	<b>Liner Used:</b> Y (N)	
<b>Drill Machine:</b> CME 550X	<b>Drill Method:</b> HSA	<b>Hammer Type:</b> Automatic
<b>Energy Ratio:</b> 81%	<b>Core Size:</b> N/A	<b>Driller:</b> D. Harris
<b>Groundwater:</b> TOB Dry	<b>24HR:</b> 3.0 ft	

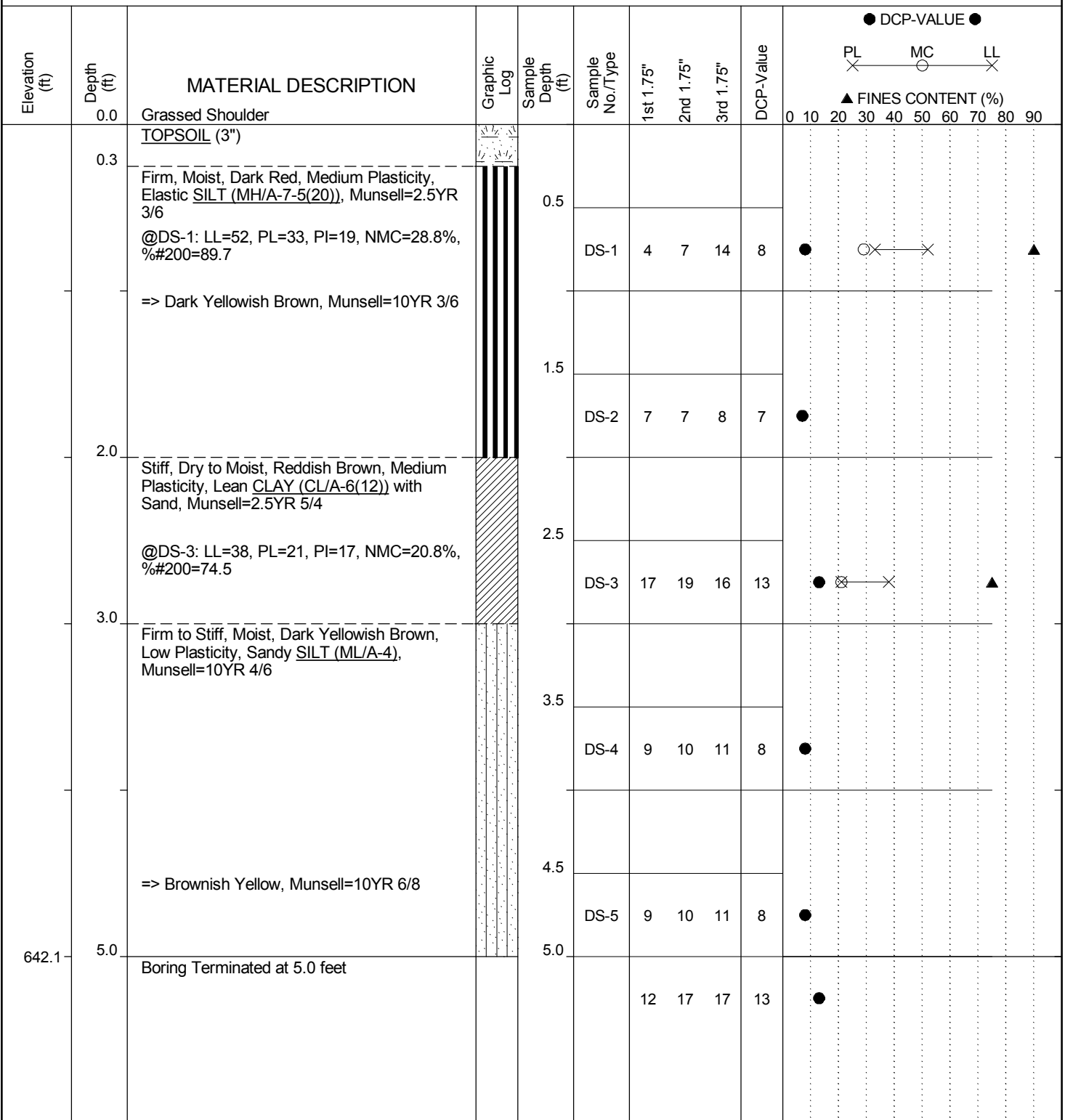


## LEGEND

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	

# SCDOT Manual Auger Log

<b>Project ID:</b> G4843.000				<b>County:</b> York		<b>Boring No.:</b> RW-26	
<b>Site Description:</b> SC 557 Bridge over Crowders Creek					<b>Route:</b> SC 557		
<b>Driller:</b> M. Touchberry		<b>Boring Location:</b> 296+00		<b>Offset:</b> CL		<b>Alignment:</b> Mainline	
<b>Elev.:</b> 647.1 ft		<b>Latitude:</b> 35.122196		<b>Longitude:</b> -81.101212		<b>Date Started:</b> 4/10/2018	
<b>Total Depth:</b> 5 ft		<b>Groundwater:</b> TOB		<b>Dry</b> 24 hr		<b>Backfilled</b>	
<b>Dynamic Cone Penetrometer Test Procedure:</b>							Sowers and Hedges (1966)



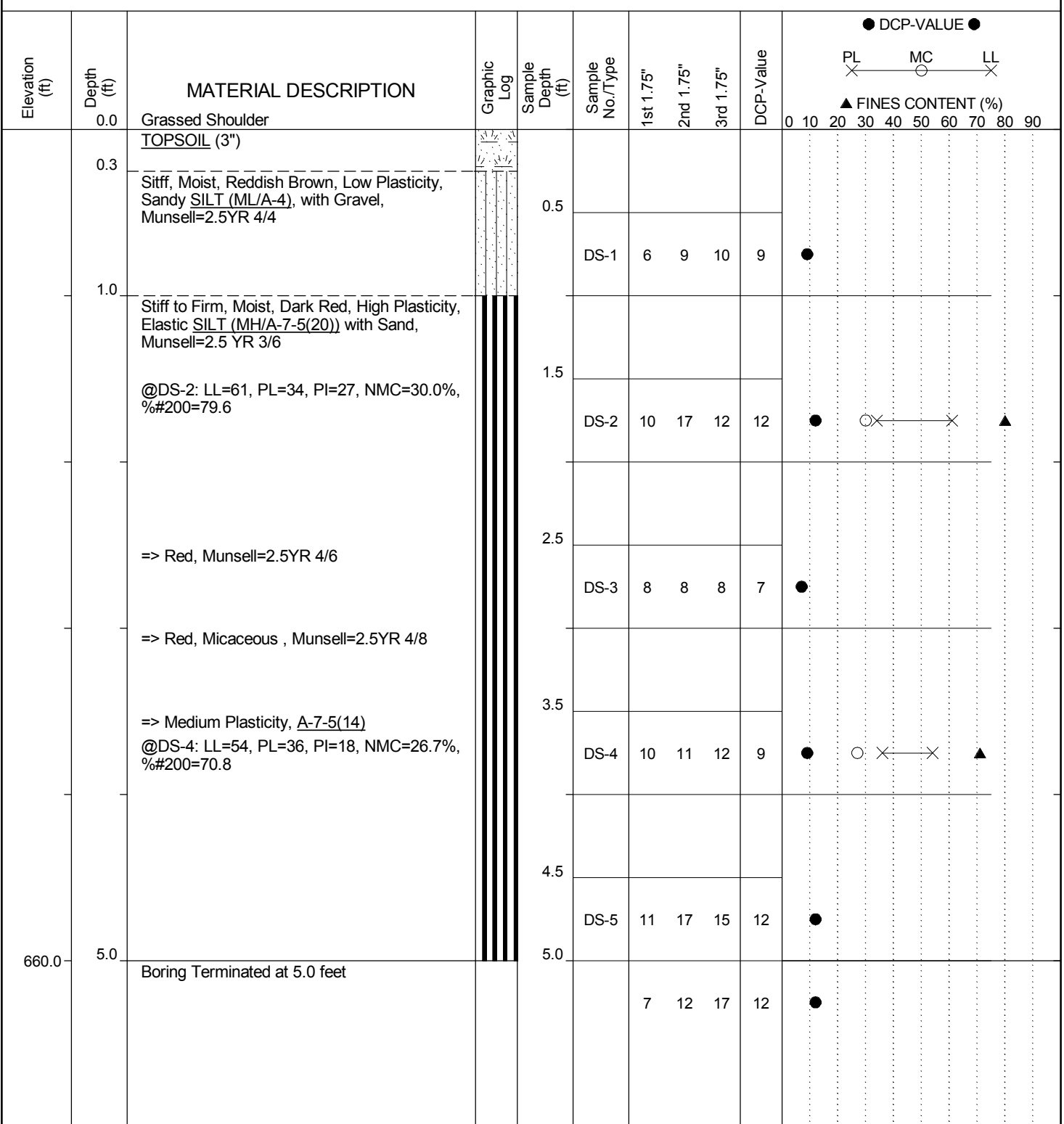
### LEGEND

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 G4843 - CURRENT - SC-557.GPJ FME2017.GDT 7/16/18

# SCDOT Manual Auger Log

Project ID: G4843.000			County: York		Boring No.: RW-27	
Site Description: SC 557 Bridge over Crowders Creek				Route: SC 557		
Driller: M. Touchberry		Boring Location: 306+00		Offset: CL	Alignment: Mainline	
Elev.: 665.0 ft	Latitude: 35.122131	Longitude: -81.100385		Date Started: 4/10/2018		
Total Depth: 5 ft	Groundwater: TOB	Dry	24 hr	Backfilled	Date Completed: 4/10/2018	
Dynamic Cone Penetrometer Test Procedure:				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 G4843 - CURRENT - SC-557.GPJ FME2017.GDT 7/16/18

# SCDOT Manual Auger Log

Project ID: G4843.000			County: York		Boring No.: RW-28	
Site Description: SC 557 Bridge over Crowders Creek				Route: SC 557		
Driller: M. Touchberry		Boring Location: 316+00		Offset: 15 ft - R	Alignment: Mainline	
Elev.: 656.2 ft	Latitude: 35.121107	Longitude: -81.094667		Date Started: 4/10/2018		
Total Depth: 5 ft	Groundwater: TOB	Dry	24 hr	Backfilled	Date Completed: 4/10/2018	
Dynamic Cone Penetrometer Test Procedure:				Sowers and Hedges (1966)		

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1.75" SPT			DCP-Value	FINES CONTENT (%)										
						1st 1.75"	2nd 1.75"	3rd 1.75"		PL	MC	LL	▲							
	0.0	Grassed Shoulder																		
	0.1	TOPSOIL (1")																		
	0.5	Firm, Moist, Reddish Brown, Low Plasticity, Sandy SILT (ML/A-4), Munsell=2.5YR 4/4			DS-1	6	6	9	7	●										
	1.0	Stiff, Moist, Dark Reddish Brown, High Plasticity, Sandy Elastic SILT (MH/A-7-5(15)), Munsell=2.5YR 3/3			DS-2	10	15	14	12	●										
	2.5	=> Soft to Firm, Reddish Brown, Munsell=2.5YR 4/4 @DS-3: LL=58, PL=36, PI=22, NMC=30.2%, %200=65.7 => Red, Munsell=10R 4/6			DS-3	7	4	5	4	●	○	×	×	▲						
	3.5				DS-4	4	4	4	4	●										
	4.5	=> A-7-5(16) @DS-5: LL=56, PL=33, PI=23, NMC=26.7%, %200=68.4			DS-5	4	6	8	6	●	○	×	×	▲						
651.2	5.0	Boring Terminated at 5.0 feet								●										
						6	7	5	5	●										

## 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 Soil Test Log

<b>Project ID:</b> G4843.000	<b>County:</b> York	<b>Boring No.:</b> RW-29
<b>Site Description:</b> SC 557 Bridge over Crowders Creek		<b>Route:</b> SC 557
<b>Eng./Geo.:</b> C. Piercy	<b>Boring Location:</b> 326+00	<b>Offset:</b> 40 ft - L
<b>Alignment:</b> Mainline	<b>Date Started:</b> 6/14/2018	<b>Date Completed:</b> 6/14/2018
<b>Elev.:</b> 637.8 ft	<b>Latitude:</b> 35.12058	<b>Longitude:</b> -81.091381
<b>Total Depth:</b> 25 ft	<b>Soil Depth:</b> 24.5 ft	<b>Core Depth:</b> 0 ft
<b>Bore Hole Diameter (in):</b> 6	<b>Sampler Configuration:</b>	<b>Liner Required:</b> Y (N)
<b>Liner Used:</b> Y (N)	<b>Drill Machine:</b> CME 45B	<b>Drill Method:</b> HSA
<b>Hammer Type:</b> Automatic	<b>Energy Ratio:</b> 84%	<b>Groundwater:</b> TOB Dry
<b>Core Size:</b> N/A	<b>Driller:</b> L. Guempel	<b>24HR:</b> Backfilled

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	SPT N VALUE				PL		MC		LL		FINES CONTENT (%)	
						1st 6"	2nd 6"	3rd 6"	4th 6"	N Value	0	10	20	30	40	50	60
637.8	0.0	Asphalt Roadway															
637.8	0.5	ASPHALT (6.5")		0.5													
632.8	1.0	Loose, Moist, Yellow, Silty Fine to Medium SAND (SM), Munsell= 2.5YR 7/6		2.0	SS-1	9	5	5		10							
632.8	4.0	Stiff, Moist, Red, High Plasticity, Sandy Fat CLAY (CH/A-7-6(20)), Munsell= 2.5YR 5/6 @SS-2: LL=56, PL=24, PI=32, NMC=27.4%, %200=68.7		4.0	SS-2	3	4	7	8	11							
632.8	5.0	=> Red, Munsell= 2.5YR 4/6		5.0	SS-3	3	4	6	8	10							
627.8	6.0	Stiff to Firm, Moist, Red, Low Plasticity, Sandy Elastic SILT (MH/A-5(9)), Munsell= 2.5YR 5/6 => Yellowish Red, Munsell= 5YR 5/8		6.0	SS-4	3	3	6	8	9							
627.8	8.0	@SS-4: LL=53, PL=43, PI=10, NMC=23.6%, %200=69.9 => Red/Yellowish Red, Munsell= 2.5YR 5/8 & 7.5YR 6/8		8.0	SS-5	3	3	5	7	8							
622.8	13.5	=> Reddish Yellow/Yellow, Munsell= 5YR 6/6 & 10YR 7/8		13.5	SS-6	3	3	5		8							
617.8	18.5	Stiff to Firm, Moist, Pale Brown, Non-Plastic, Sandy SILT (ML/A-4(0)), Munsell= 2.5YR 7/3 @SS-7: LL=NP, PL=NP, PI=NP, NMC=22.6%, %200=59.9		18.5	SS-7	3	4	6		10							
612.8	23.5	=> Pale Brown/White, Munsell= 2.5Y 7/4 & 2.5Y 8/1		23.5	SS-8	2	3	4		7							
612.8	25.0	Boring Terminated at 25.0 feet															

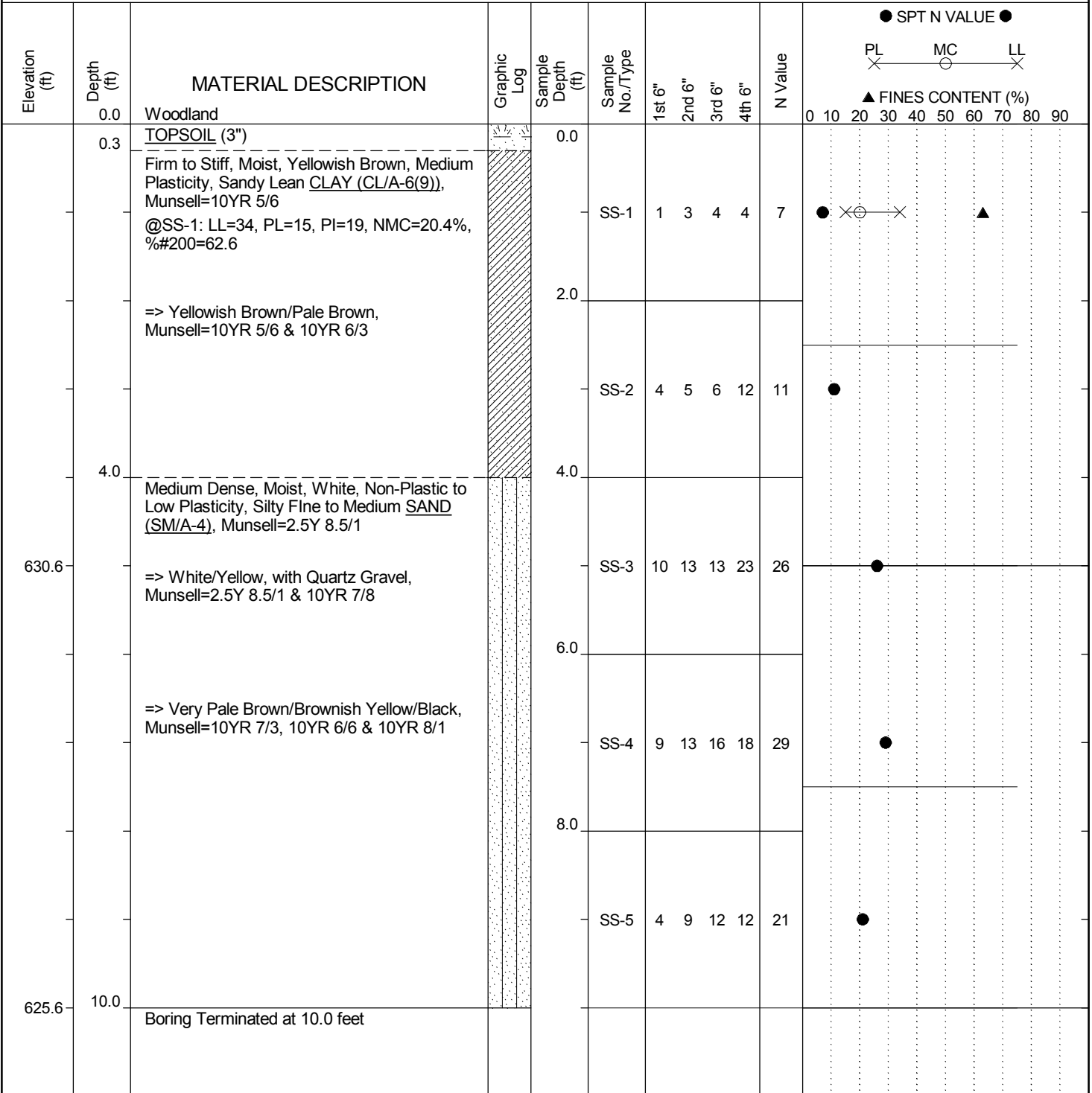
## LEGEND

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\_G4843 - CURRENT - SC-557.GPJ\_FME2017.GDT\_7/16/18

# SCDOT Soil Test Log

<b>Project ID:</b> G4843.000	<b>County:</b> York	<b>Boring No.:</b> RW-30
<b>Site Description:</b> SC 557 Bridge over Crowders Creek		<b>Route:</b> S-114
<b>Eng./Geo.:</b> M. Touchberry	<b>Boring Location:</b> 30+00	<b>Offset:</b> CL <b>Alignment:</b> Mainline
<b>Elev.:</b> 635.6 ft	<b>Latitude:</b> 35.119404	<b>Longitude:</b> -81.125813 <b>Date Started:</b> 6/13/2018
<b>Total Depth:</b> 10 ft	<b>Soil Depth:</b> 10 ft	<b>Core Depth:</b> 0 ft <b>Date Completed:</b> 6/13/2018
<b>Bore Hole Diameter (in):</b> 6	<b>Sampler Configuration</b>	<b>Liner Required:</b> Y (N) <b>Liner Used:</b> Y (N)
<b>Drill Machine:</b> CME 550X	<b>Drill Method:</b> HSA	<b>Hammer Type:</b> Automatic <b>Energy Ratio:</b> 81%
<b>Core Size:</b> N/A	<b>Driller:</b> D. Harris	<b>Groundwater:</b> TOB Dry <b>24HR:</b> Backfilled

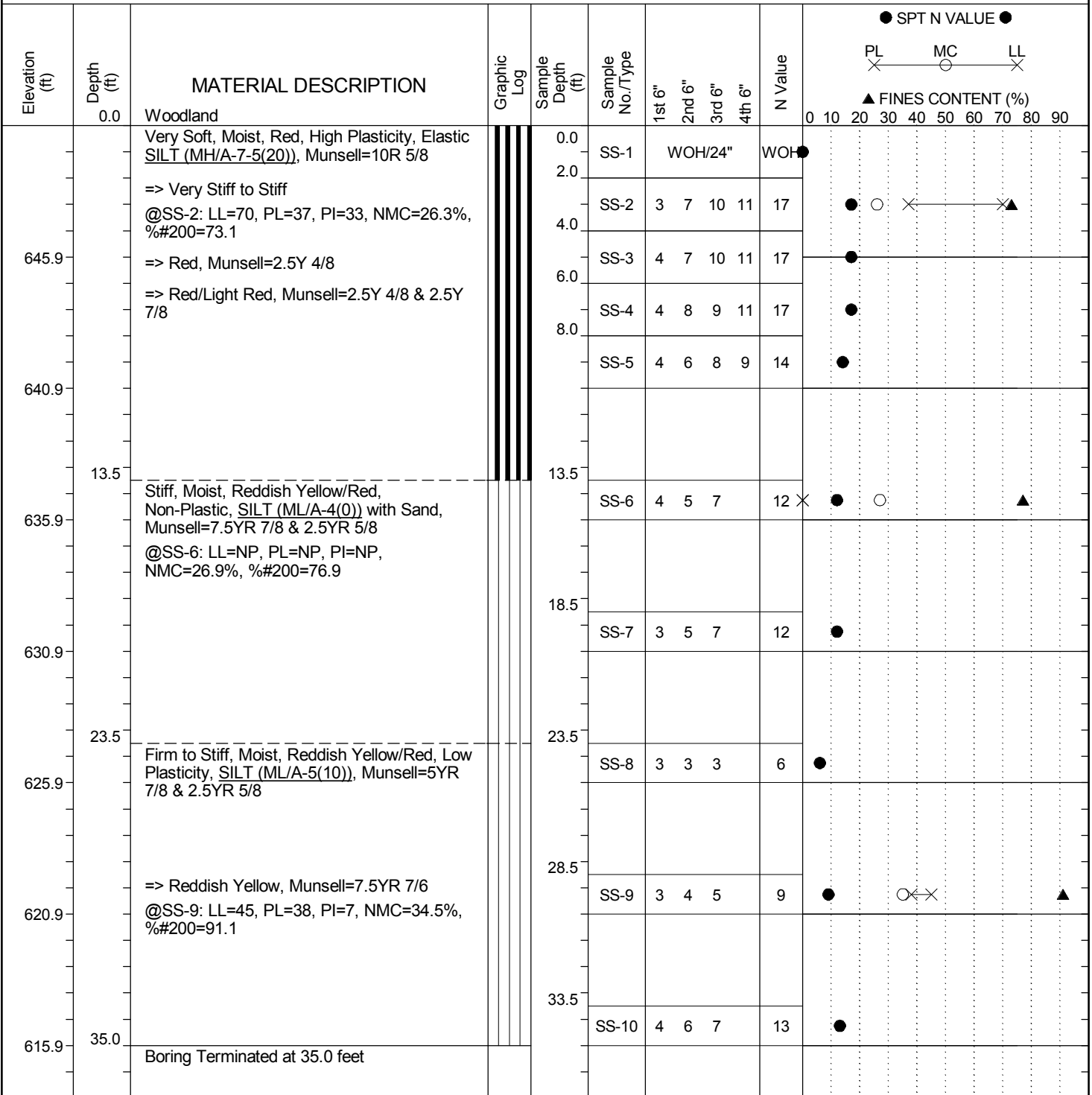


## LEGEND

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	

# SCDOT Soil Test Log

<b>Project ID:</b> G4843.000	<b>County:</b> York	<b>Boring No.:</b> RW-31
<b>Site Description:</b> SC 557 Bridge over Crowders Creek		<b>Route:</b> S-27
<b>Eng./Geo.:</b> R. Wessinger	<b>Boring Location:</b> 24+00	<b>Offset:</b> 1 ft - R
<b>Alignment:</b> Mainline	<b>Elev.:</b> 650.9 ft	<b>Latitude:</b> 35.121059
<b>Longitude:</b> -81.125838	<b>Date Started:</b> 6/12/2018	
<b>Total Depth:</b> 35 ft	<b>Soil Depth:</b> 35 ft	<b>Core Depth:</b> 0 ft
<b>Date Completed:</b> 6/12/2018	<b>Bore Hole Diameter (in):</b> 6	<b>Sampler Configuration:</b>
<b>Liner Required:</b> Y (N)	<b>Liner Used:</b> Y (N)	
<b>Drill Machine:</b> CME 550X	<b>Drill Method:</b> HSA	<b>Hammer Type:</b> Automatic
<b>Energy Ratio:</b> 81%	<b>Core Size:</b> N/A	<b>Driller:</b> D. Harris
<b>Groundwater:</b> TOB Dry	<b>24HR</b>	<b>Cave</b> 19.7-ft



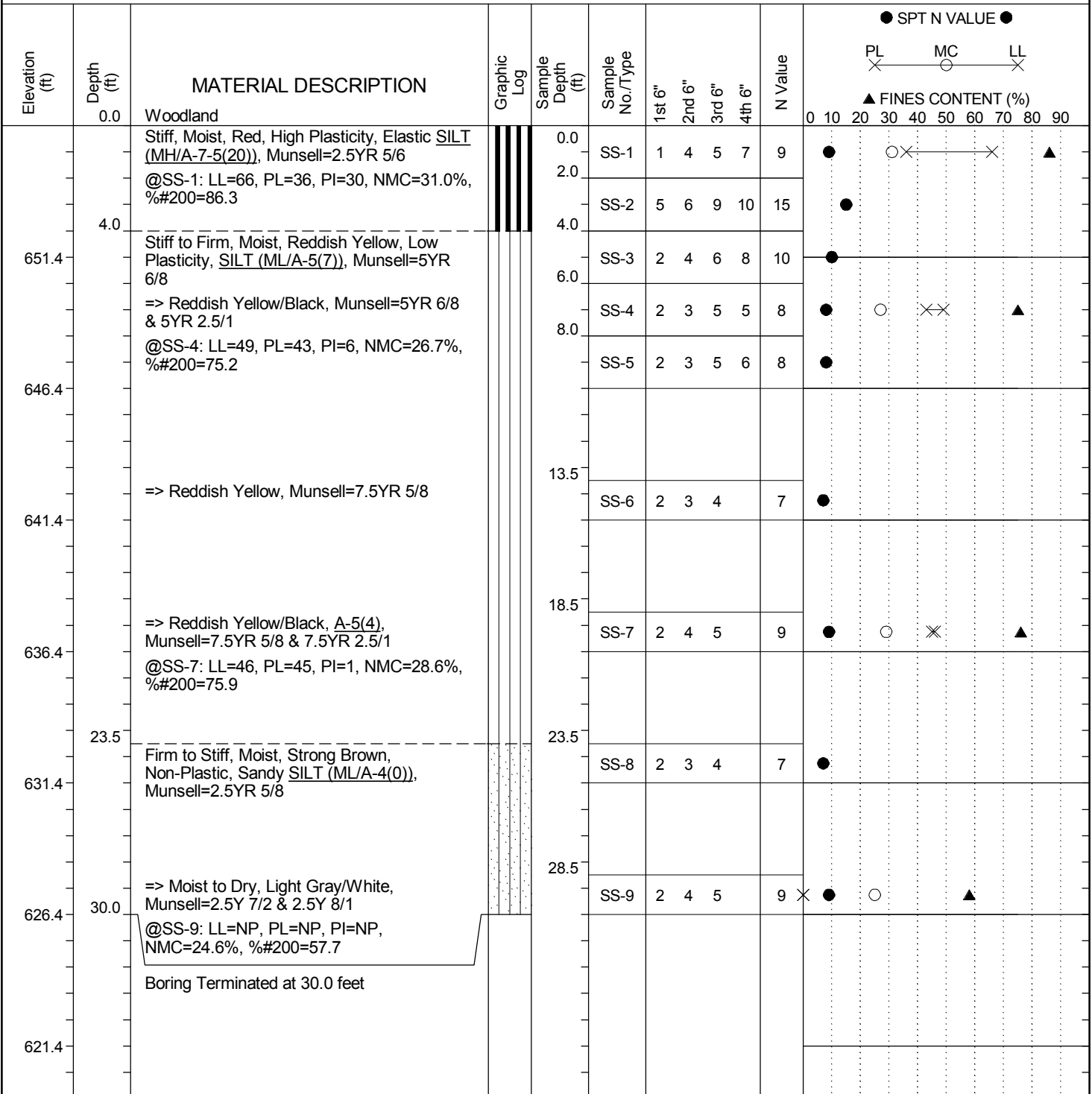
## LEGEND

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	



# SCDOT Soil Test Log

<b>Project ID:</b> G4843.000	<b>County:</b> York	<b>Boring No.:</b> RW-32
<b>Site Description:</b> SC 557 Bridge over Crowders Creek	<b>Route:</b> S-27	
<b>Eng./Geo.:</b> R. Wessinger	<b>Boring Location:</b> 21+00	<b>Offset:</b> CL
<b>Alignment:</b> Mainline		
<b>Elev.:</b> 656.4 ft	<b>Latitude:</b> 35.121784	<b>Longitude:</b> -81.126261
<b>Date Started:</b> 6/12/2018		
<b>Total Depth:</b> 30 ft	<b>Soil Depth:</b> 30 ft	<b>Core Depth:</b> 0 ft
<b>Date Completed:</b> 6/12/2018		
<b>Bore Hole Diameter (in):</b> 6	<b>Sampler Configuration</b>	<b>Liner Required:</b> Y (N)
<b>Liner Used:</b> Y (N)		
<b>Drill Machine:</b> CME 550X	<b>Drill Method:</b> HSA	<b>Hammer Type:</b> Automatic
<b>Energy Ratio:</b> 81%		
<b>Core Size:</b> N/A	<b>Driller:</b> D. Harris	<b>Groundwater:</b> TOB Dry
<b>24HR</b>	<b>Cave</b> 17.0 ft	



## 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	

# SCDOT Manual Auger Log

Project ID: G4843.000			County: York			Boring No.: RW-33		
Site Description: SC 557 Bridge over Crowders Creek					Route: S-152			
Driller: M. Touchberry		Boring Location: 15+00		Offset: CL		Alignment: Mainline		
Elev.: 622.7 ft		Latitude: 35.11992		Longitude: -81.11786		Date Started: 4/10/2018		
Total Depth: 5 ft		Groundwater: TOB		Dry 24 hr Backfilled		Date Completed: 4/10/2018		
Dynamic Cone Penetrometer Test Procedure:				Sowers and Hedges (1966)				

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1.75" SPT			DCP-Value	DCP-VALUE														
						1st	2nd	3rd		0	10	20	30	40	50	60	70	80	90					
	0.0	Grassed Shoulder								● DCP-VALUE ● PL — MC — LL X — O — X ▲ FINES CONTENT (%)														
	0.5	Stiff to Firm, Moist, Weak Red, Medium Plasticity, Sandy Lean CLAY (CL/A-6(8)), Munsell=10R 4/4		0.5	DS-1	7	9	14	9	●														
	1.5	=> Yellowish Red, Munsell=5YR 5/8 @DS-2: LL=36, PL=20, PI=16, NMC=18.6%, %200=64.0		1.5	DS-2	9	8	7	7	●	⊗	—	⊗	▲										
	2.0	Soft to Firm, Moist, Red, Low Plasticity, SILT (ML/A-4), Micaceous, Munsell=2.5YR 5/8		2.5	DS-3	3	3	3	3	●														
	3.5	=> Stiff		3.5	DS-4	5	5	5	5	●														
	4.5			4.5	DS-5	9	11	13	10	●														
617.7	5.0	Boring Terminated at 5.0 feet		5.0																				
						8	9	11	9	●														

### 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 G4843 - CURRENT - SC-557.GPJ FME2017.GDT 7/16/18

# SCDOT Manual Auger Log

Project ID: G4843.000			County: York		Boring No.: RW-34	
Site Description: SC 557 Bridge over Crowders Creek				Route: S-152		
Driller: M. Touchberry		Boring Location: 13+00		Offset: CL	Alignment: Mainline	
Elev.: 637.3 ft	Latitude: 35.121216	Longitude: -81.118307		Date Started: 4/10/2018		
Total Depth: 5 ft	Groundwater: TOB	Dry	24 hr	Backfilled	Date Completed: 4/10/2018	
Dynamic Cone Penetrometer Test Procedure:				Sowers and Hedges (1966)		

Elevation (ft)	Depth (ft)	MATERIAL DESCRIPTION	Graphic Log	Sample Depth (ft)	Sample No./Type	1.75" SPT			DCP-Value	PL - MC - LL										
						1st	2nd	3rd		FINES CONTENT (%)										
											0	10	20	30	40	50	60	70	80	90
	0.0	Grassed Shoulder																		
	0.3	TOPSOIL (4")																		
	0.5	Moist, Pale Brown, Fine to Medium, SAND (SP/A-1)		0.5																
		Firm to Stiff, Moist, Red, Medium Plasticity, SILT (ML/A-7-5(18)), Munsell=10R 4/6 @DS-1: LL=48, PL=30, PI=18, NMC=60.5%, % #200=86.0			DS-1	4	7	8	7	●		⊗		⊗						▲
		=> Red, Munsell=2.5YR 4/8		1.5																
		=> Dry to Moist, Red, Munsell=2.5YR 4/6			DS-2	8	9	8	8	●										
		=> Low Plasticity, A-5(9) @DS-3: LL=46, PL=40, PI=6, NMC=33.6%, % #200=88.7		2.5																
					DS-3	8	9	13	9	●			○	⊗	⊗					▲
				3.5																
					DS-4	11	13	15	11	●										
				4.5																
					DS-5	14	16	22	14	●										
632.3	5.0	Boring Terminated at 5.0 feet		5.0																
						18	17	19	14	●										

## 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	

SC 557 Roadway Construction and Improvements  
Final Roadway Geotechnical Engineering Report

---

# APPENDIX

## SECTION 5 LABORATORY TEST RESULTS

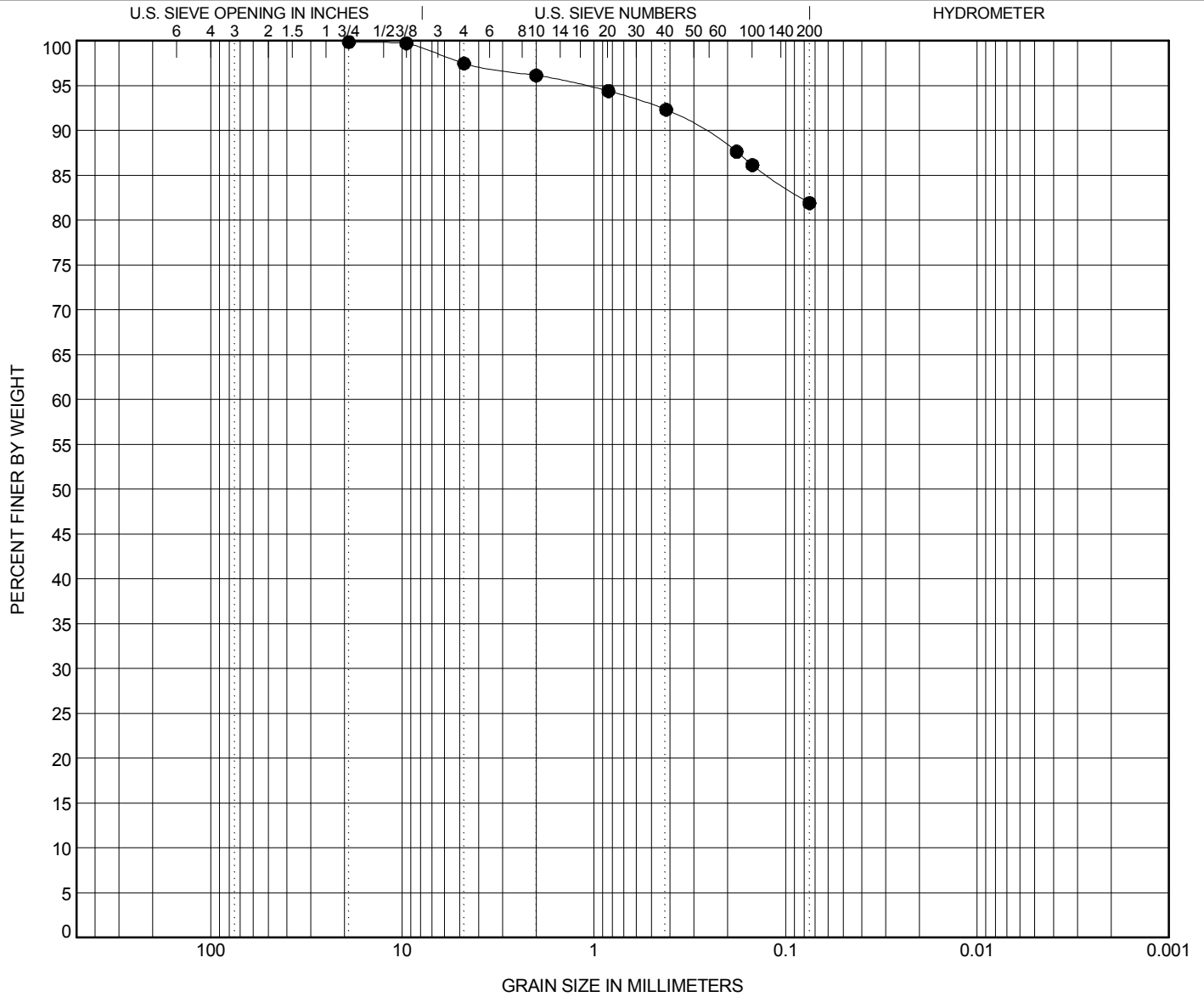


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● C-1	6.0	<b>SILT (ML) with Sand A-4(0)</b>					<b>NP</b>	<b>NP</b>	<b>NP</b>		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● C-1	6.0	19	1.13			2.4	15.6	81.9	

GRAIN SIZE - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 7/12/18

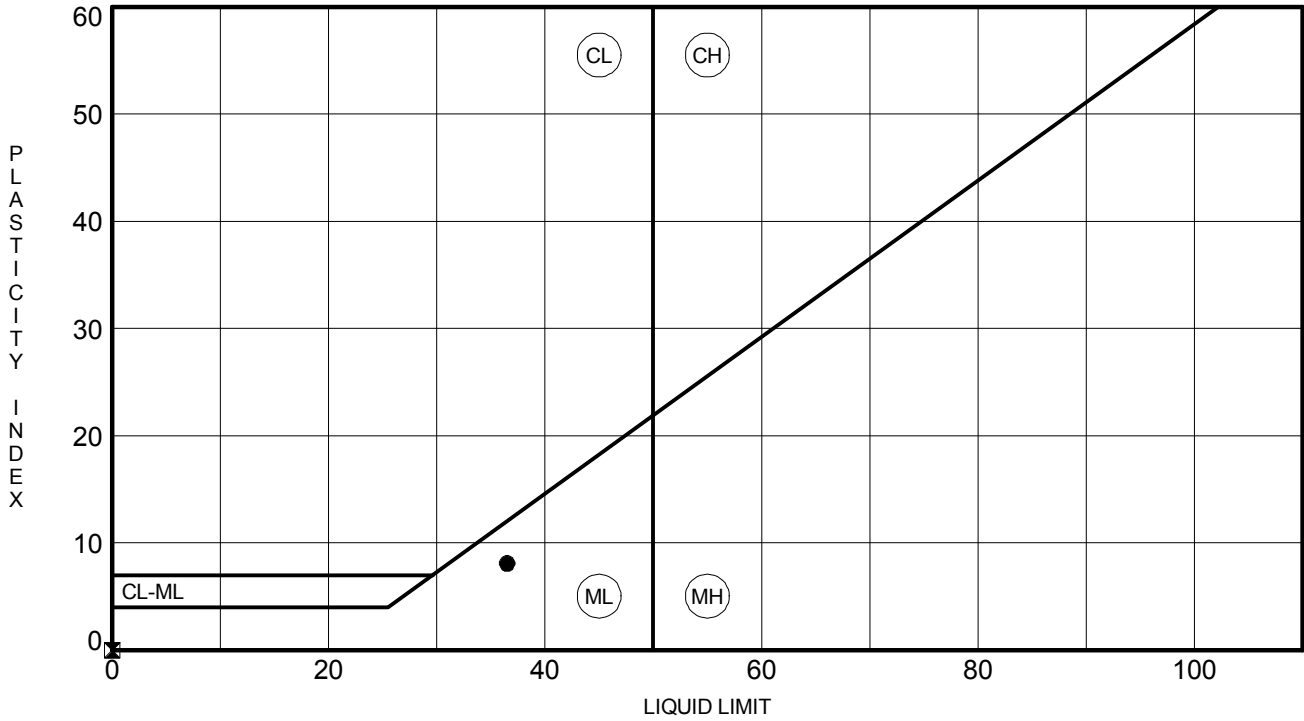


# ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● C-1	2.0	36	28	8		
☒ C-1	6.0	NP	NP	NP	82	SILT (ML) with Sand A-4(0)

ATTERBERG LIMITS - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 7/12/18

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

**PROJECT:** SC-557 Roadway Improvements/Bridge Replacement

**PROJECT NO.:** G4843

**SAMPLE NUMBER:** 18-1167

**DATE SAMPLE RECEIVED:** 6/26/2018

**DESCRIPTION OF SOIL:** VARIOUS

**TESTED BY:** MB

**DATE OF TESTING:** 6/26/2018

**DATE OF WEIGHING:** 6/27/2018

<b>BORING NO.</b>	C-1	C-1			
<b>SAMPLE NO.</b>	18-1167C SS-1	18-1167F SS-3			
<b>SAMPLE DEPTH</b>	0.0-2.0'	4.0-6.0'			
<b>WATER CONTENT, W%</b>	20.4	6.3			

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

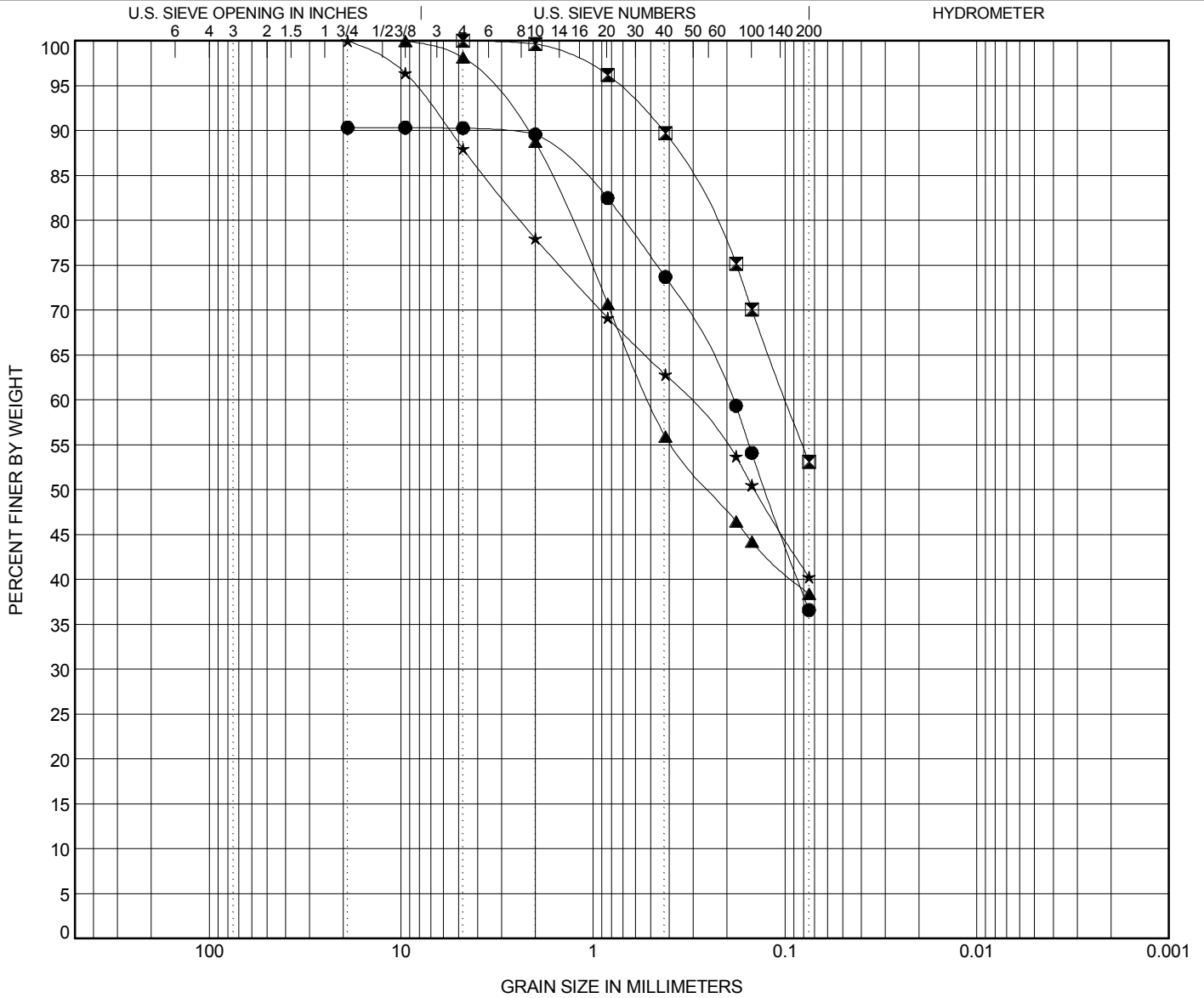


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● C-2	6.0	Clayey F/M SAND (SC) A-6(2)	37	21	16		
☒ C-2	8.0	Sandy SILT (ML) A-4(0)	NP	NP	NP		
▲ C-2	15.0	Silty F/M SAND (SM) A-4(0)	NP	NP	NP		
★ C-2	25.0	Silty F/M SAND (SM) A-4(0)	NP	NP	NP		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● C-2	6.0	19		0.127		0.1	53.7		36.6
☒ C-2	8.0	4.76	0.736			0.0	46.9		53.1
▲ C-2	15.0	9.52	3.554	0.247		1.8	59.7		38.4
★ C-2	25.0	19	8.467	0.144		12.0	47.7		40.3

GRAIN SIZE - SCDOT - G4843 - CURRENT - SC-557.GPJ FME2017.GDT 7/12/18



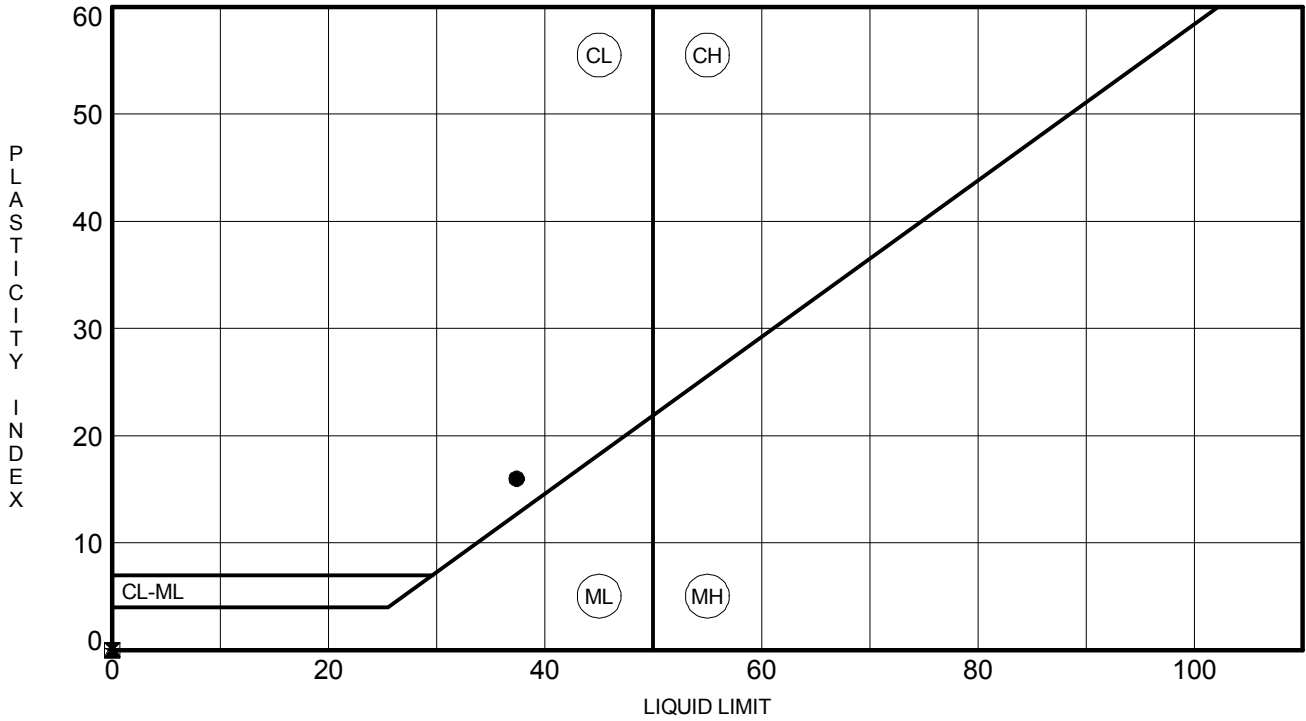


# ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● C-2	6.0	37	21	16	37	Clayey F/M SAND (SC) A-6(2)
☒ C-2	8.0	NP	NP	NP	53	Sandy SILT (ML) A-4(0)
▲ C-2	15.0	NP	NP	NP	38	Silty F/M SAND (SM) A-4(0)
★ C-2	25.0	NP	NP	NP	40	Silty F/M SAND (SM) A-4(0)

ATTERBERG LIMITS - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 7/12/18

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

**PROJECT:** SC-557 Roadway Improvements/Bridge Replacement

**PROJECT NO.:** G4843

**SAMPLE NUMBER:** 18-1168

**DATE SAMPLE RECEIVED:** 6/26/2018

**DESCRIPTION OF SOIL:**

VARIOUS

**TESTED BY:** MB

**DATE OF TESTING:** 6/26/2018

**DATE OF WEIGHING:** 6/27/2018

<b>BORING NO.</b>	C-2	C-2	C-2	C-2	
<b>SAMPLE NO.</b>	18-1168C SS-3	18-1168F SS-4	18-1168I SS-6	18-1168L SS-8	
<b>SAMPLE DEPTH</b>	4.0-6.0'	6.0-8.0'	13.5-15.0'	23.5-25.0'	
<b>WATER CONTENT, W%</b>	17.0	17.3	8.7	14.5	

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

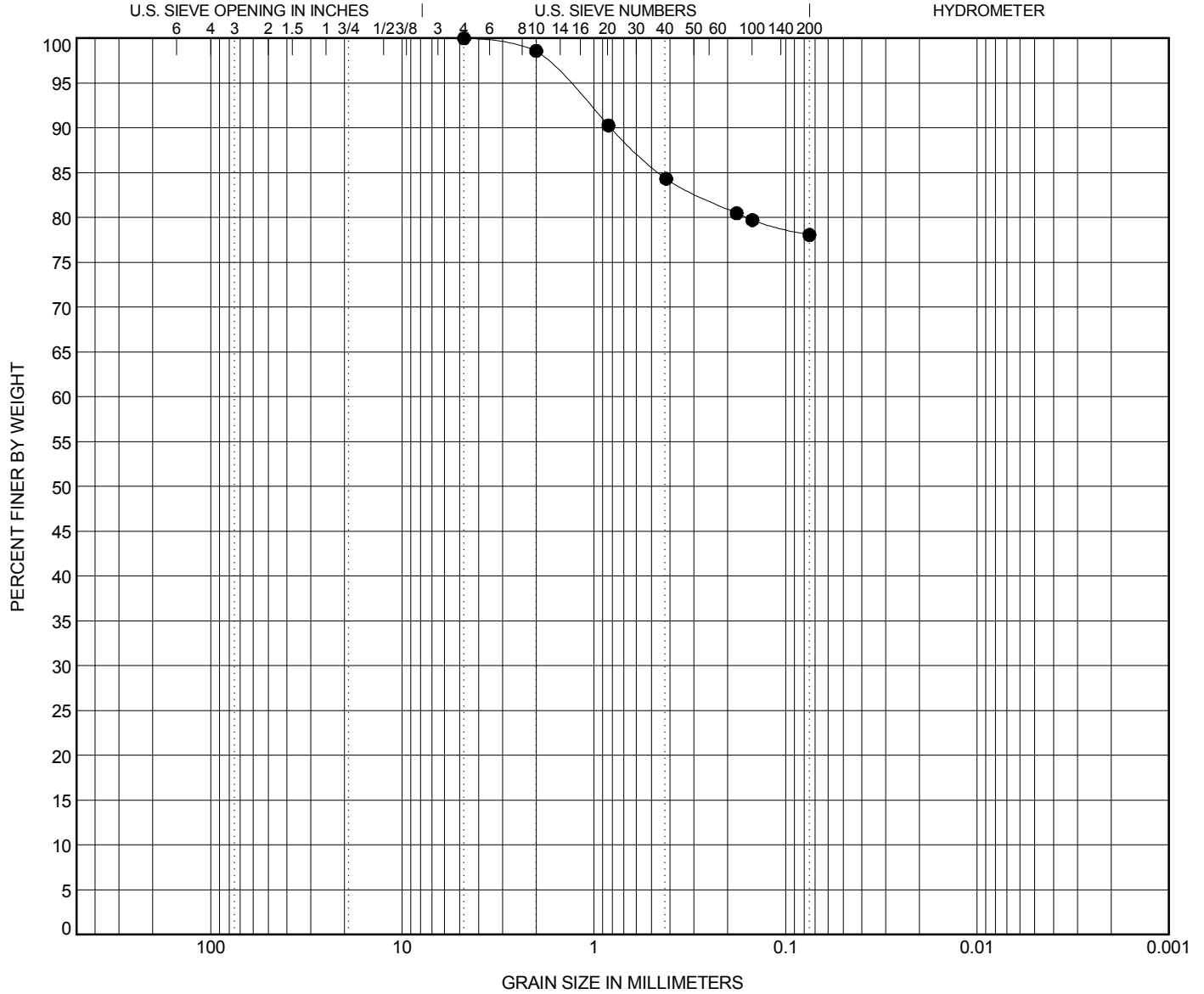


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● CL-1	5.0	Elastic SILT (MH) with Sand A-7-5(20)					78	53	25		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● CL-1	5.0	4.76	1.374			0.0	21.9	78.1	

GRAIN SIZE - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 5/16/18

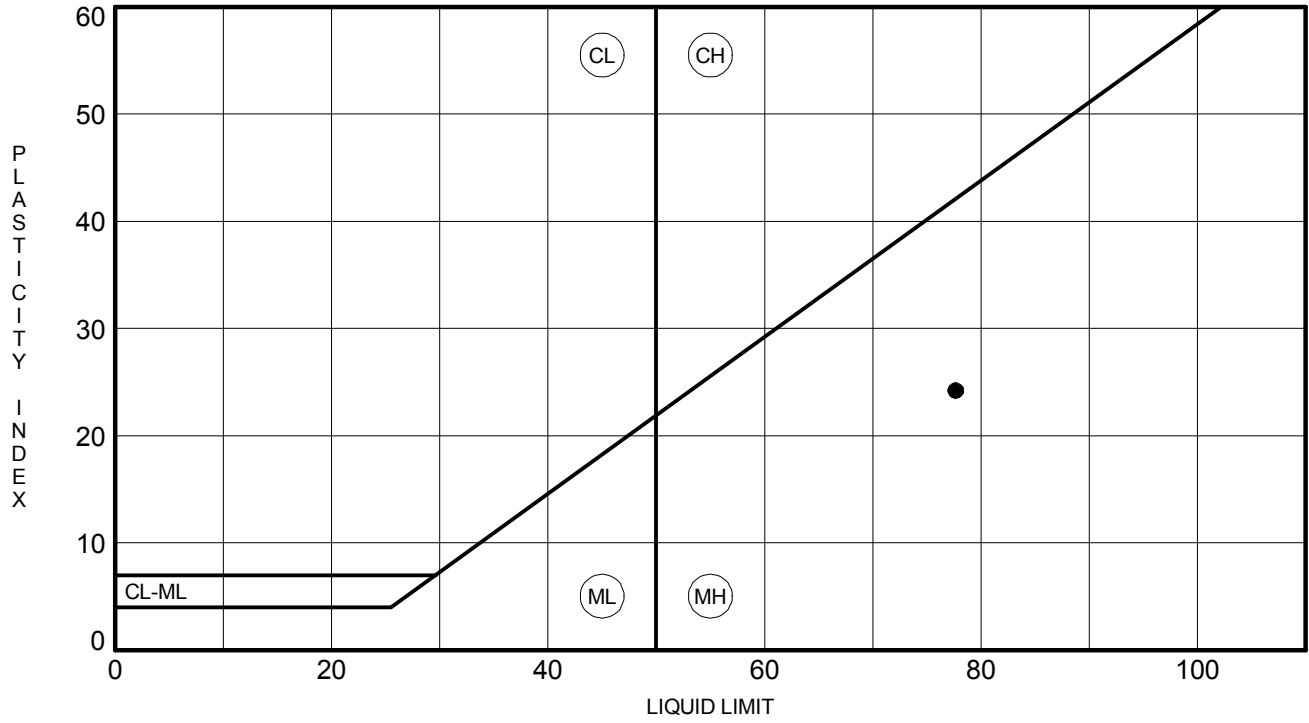


# ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● CL-1	5.0	78	53	25	78	Elastic SILT (MH) with Sand A-7-5(20)

ATTERBERG LIMITS - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 5/16/18

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

<b>PROJECT:</b> SC-557 Roadway Improvements/Bridge Replacement	<b>PROJECT NO.:</b> G4843
<b>SAMPLE NUMBER:</b> 18-0676	<b>DATE SAMPLE RECEIVED:</b> 4/24/2018
<b>DESCRIPTION OF SOIL:</b> Elastic SILT (MH) with Sand A-7-5(20)	
<b>TESTED BY:</b> MB	<b>DATE OF TESTING:</b> 5/3/2018
	<b>DATE OF WEIGHING:</b> 5/4/2018

<b>BORING NO.</b>	CL-1				
<b>SAMPLE NO.</b>	18-0676C DS-5				
<b>SAMPLE DEPTH</b>	4.5-5.0'				
<b>WATER CONTENT, W%</b>	26.4				

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

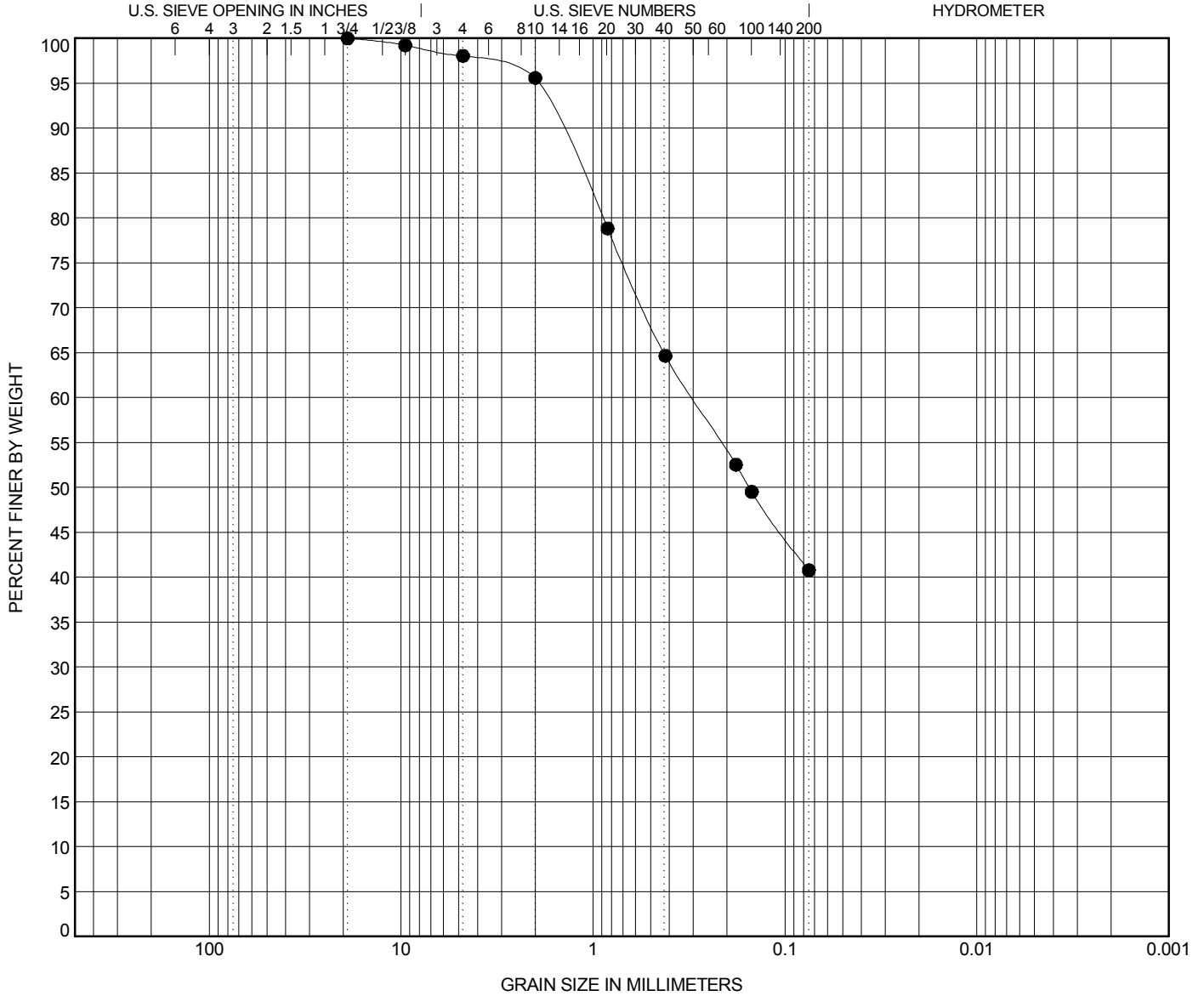


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● CL-2	2.0	<b>Clayey F/M SAND (SC) A-4(0)</b>					<b>23</b>	<b>14</b>	<b>9</b>		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● CL-2	2.0	<b>19</b>	<b>1.938</b>	<b>0.154</b>		<b>1.9</b>	<b>57.3</b>	<b>40.8</b>	

GRAIN SIZE - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 5/16/18

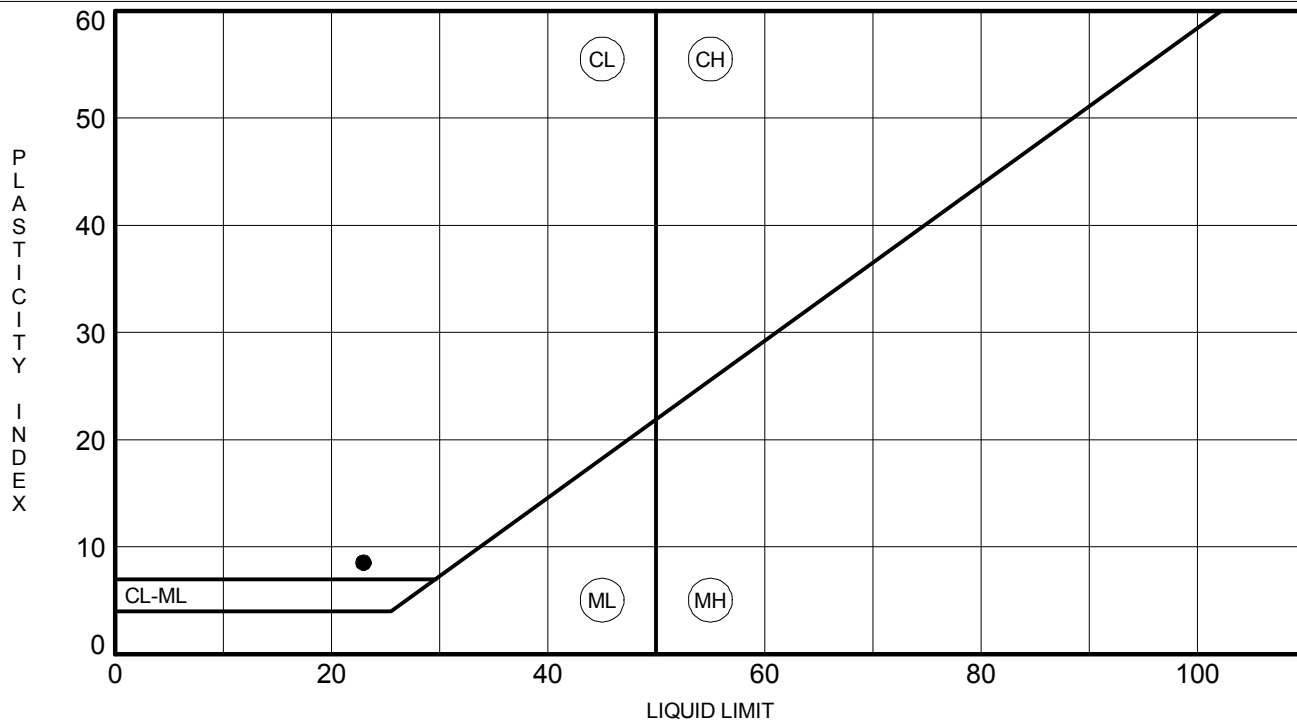


# ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● CL-2	2.0	23	14	9	41	Clayey F/M SAND (SC) A-4(0)

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

<b>PROJECT:</b> SC-557 Roadway Improvements/Bridge Replacement	<b>PROJECT NO.:</b> G4843
<b>SAMPLE NUMBER:</b> 18-0677	<b>DATE SAMPLE RECEIVED:</b> 4/24/2018
<b>DESCRIPTION OF SOIL:</b> Clayey F/M SAND (SC) A-4(0)	
<b>TESTED BY:</b> MB	<b>DATE OF TESTING:</b> 5/3/2018
	<b>DATE OF WEIGHING:</b> 5/4/2018

<b>BORING NO.</b>	CL-2				
<b>SAMPLE NO.</b>	18-0677C DS-2				
<b>SAMPLE DEPTH</b>	1.5-2.0'				
<b>WATER CONTENT, W%</b>	14.0				

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					



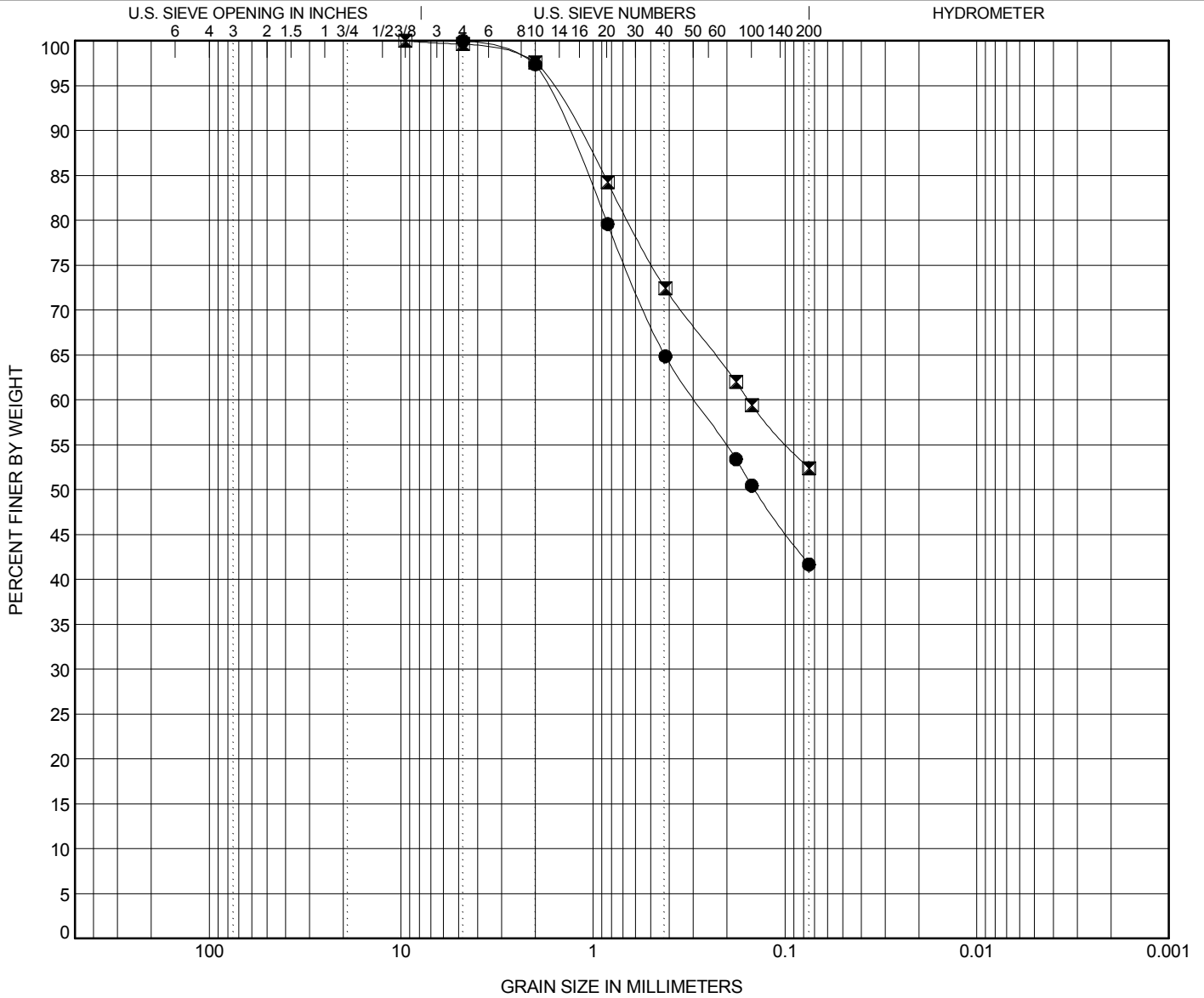


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● CL-3	2.0	Clayey F/M SAND (SC) A-6(1)	27	16	11		
■ CL-3	4.0	Sandy Lean CLAY (CL) A-6(3)	30	18	12		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● CL-3	2.0	4.76	1.78	0.144		0.0	58.3		41.7
■ CL-3	4.0	9.52	1.686			0.3	47.2		52.4

GRAIN SIZE - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 5/16/18

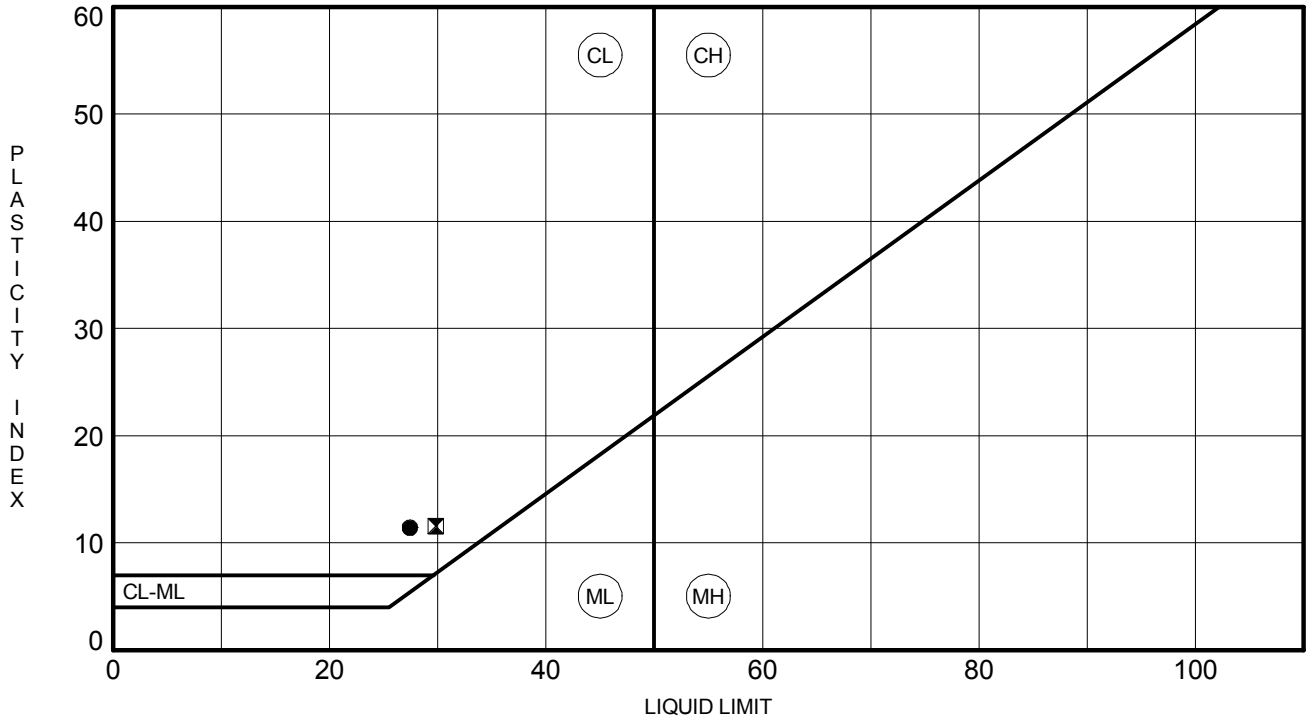


# ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● <b>CL-3</b>	<b>2.0</b>	<b>27</b>	<b>16</b>	<b>11</b>	<b>42</b>	<b>Clayey F/M SAND (SC) A-6(1)</b>
■ <b>CL-3</b>	<b>4.0</b>	<b>30</b>	<b>18</b>	<b>12</b>	<b>52</b>	<b>Sandy Lean CLAY (CL) A-6(3)</b>

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

<b>PROJECT:</b> SC-557 Roadway Improvements/Bridge Replacement	<b>PROJECT NO.:</b> G4843
<b>SAMPLE NUMBER:</b> 18-0678	<b>DATE SAMPLE RECEIVED:</b> 4/24/2018
<b>DESCRIPTION OF SOIL:</b>	VARIOUS
<b>TESTED BY:</b> MB	<b>DATE OF TESTING:</b> 5/3/2018
	<b>DATE OF WEIGHING:</b> 5/4/2018

<b>BORING NO.</b>	CL-3	CL-3			
<b>SAMPLE NO.</b>	18-0678C DS-2	18-0678F DS-4			
<b>SAMPLE DEPTH</b>	1.5-2.0'	3.5-4.0'			
<b>WATER CONTENT, W%</b>	16.6	12.5			

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

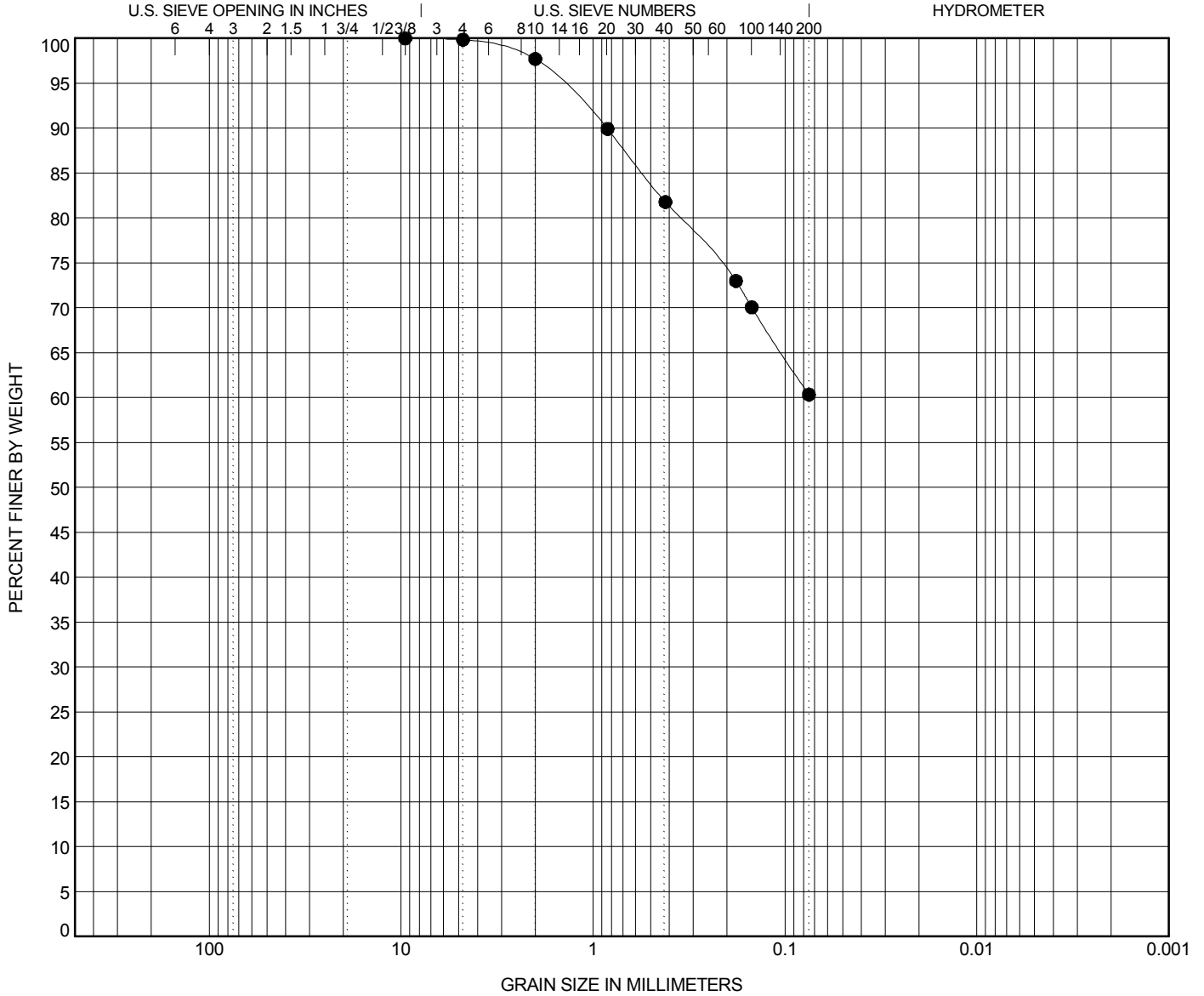


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● CL-4	3.0	<b>Sandy Lean CLAY (CL) A-4(3)</b>					<b>28</b>	<b>20</b>	<b>8</b>		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● CL-4	3.0	<b>9.52</b>	<b>1.478</b>			<b>0.1</b>	<b>39.5</b>	<b>60.3</b>	

GRAIN SIZE - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 5/16/18

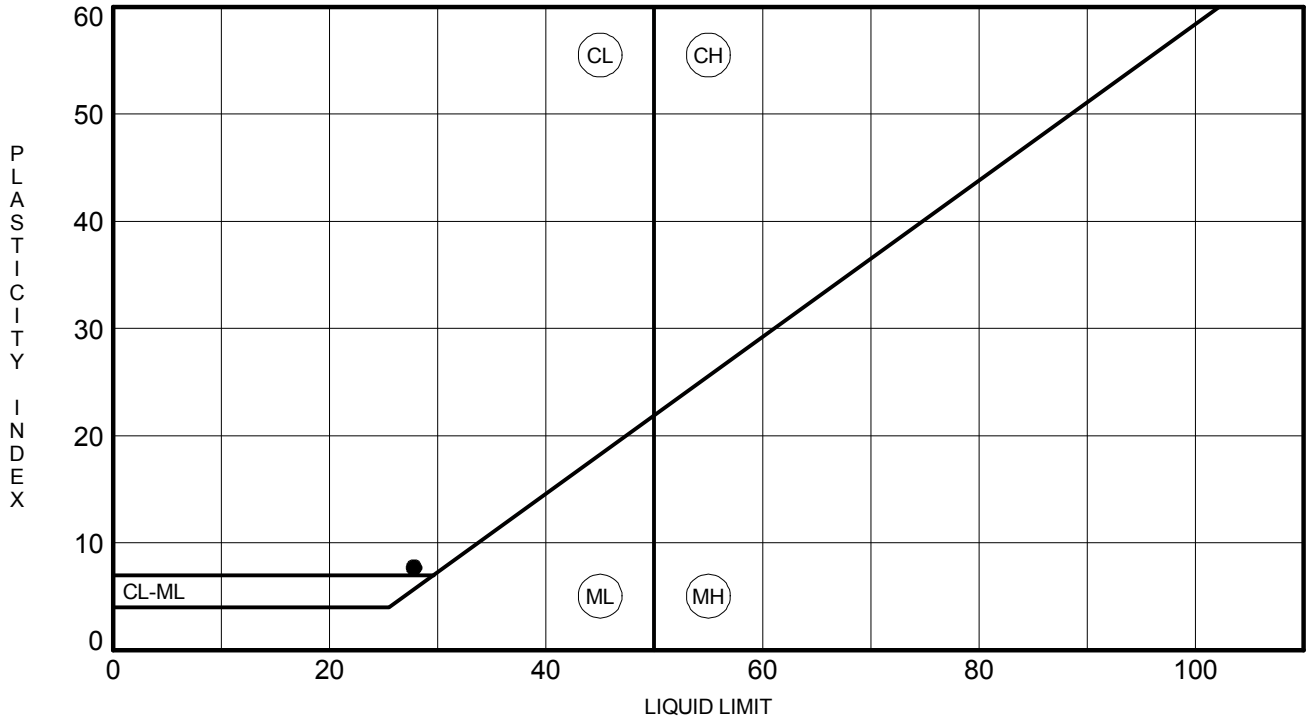


# ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● CL-4	3.0	28	20	8	60	Sandy Lean CLAY (CL) A-4(3)

ATTERBERG LIMITS - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 5/16/18

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

<b>PROJECT:</b>	SC-557 Roadway Improvements/Bridge Replacement	<b>PROJECT NO.:</b>	G4843
<b>SAMPLE NUMBER:</b>	18-0679	<b>DATE SAMPLE RECEIVED:</b>	4/24/2018
<b>DESCRIPTION OF SOIL:</b>	Sandy Lean CLAY (CL) A-4(3)		
<b>TESTED BY:</b>	MB	<b>DATE OF TESTING:</b>	5/3/2018
		<b>DATE OF WEIGHING:</b>	5/4/2018

<b>BORING NO.</b>	CL-4				
<b>SAMPLE NO.</b>	18-0679C DS-3				
<b>SAMPLE DEPTH</b>	2.5-3.0'				
<b>WATER CONTENT, W%</b>	25.4				

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

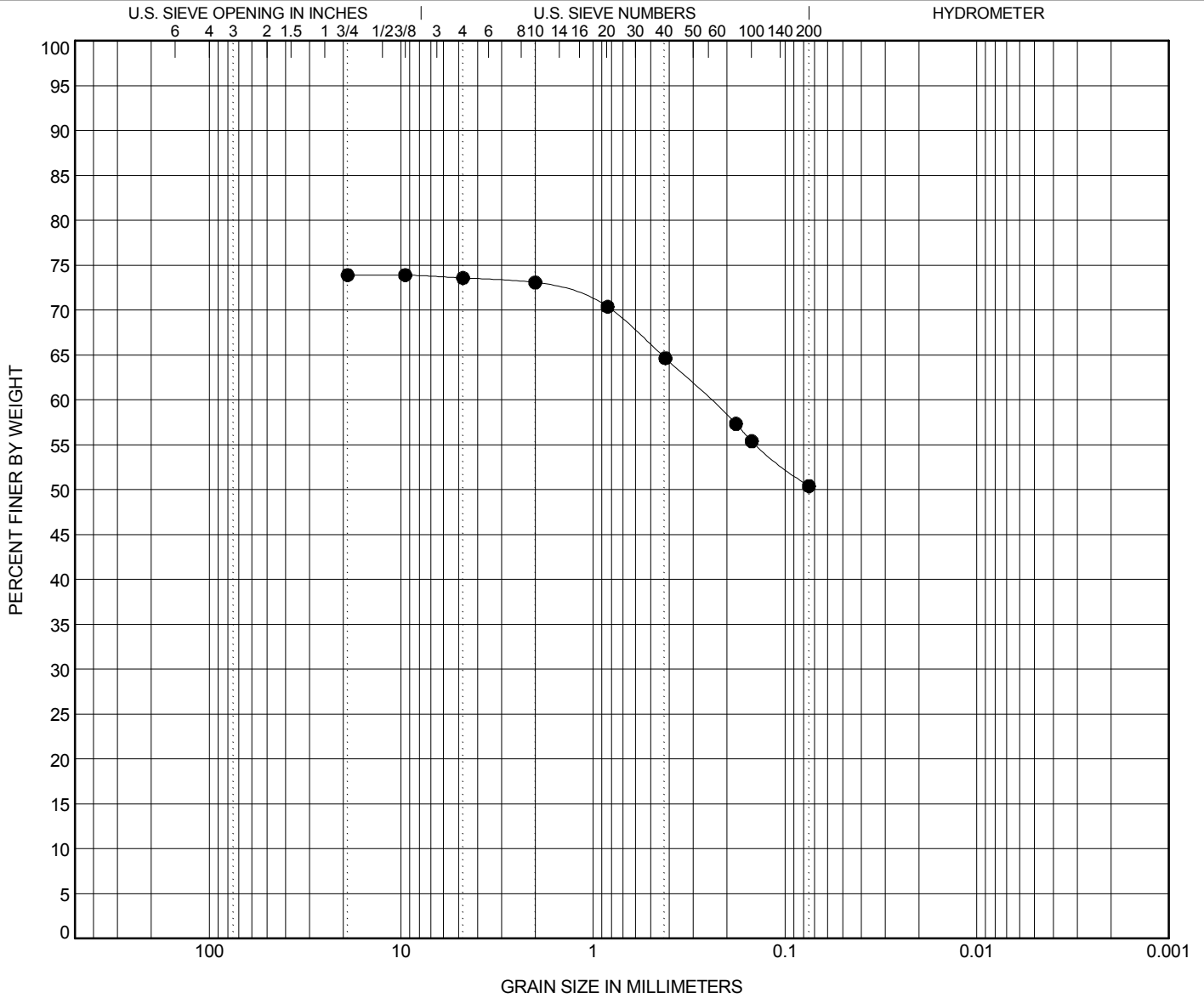


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● CL-5	3.0	Gravelly Fat CLAY (CH) with Sand A-7-6(10)					53	26	27		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● CL-5	3.0	19				0.3	23.2	50.4	

GRAIN SIZE - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 5/16/18

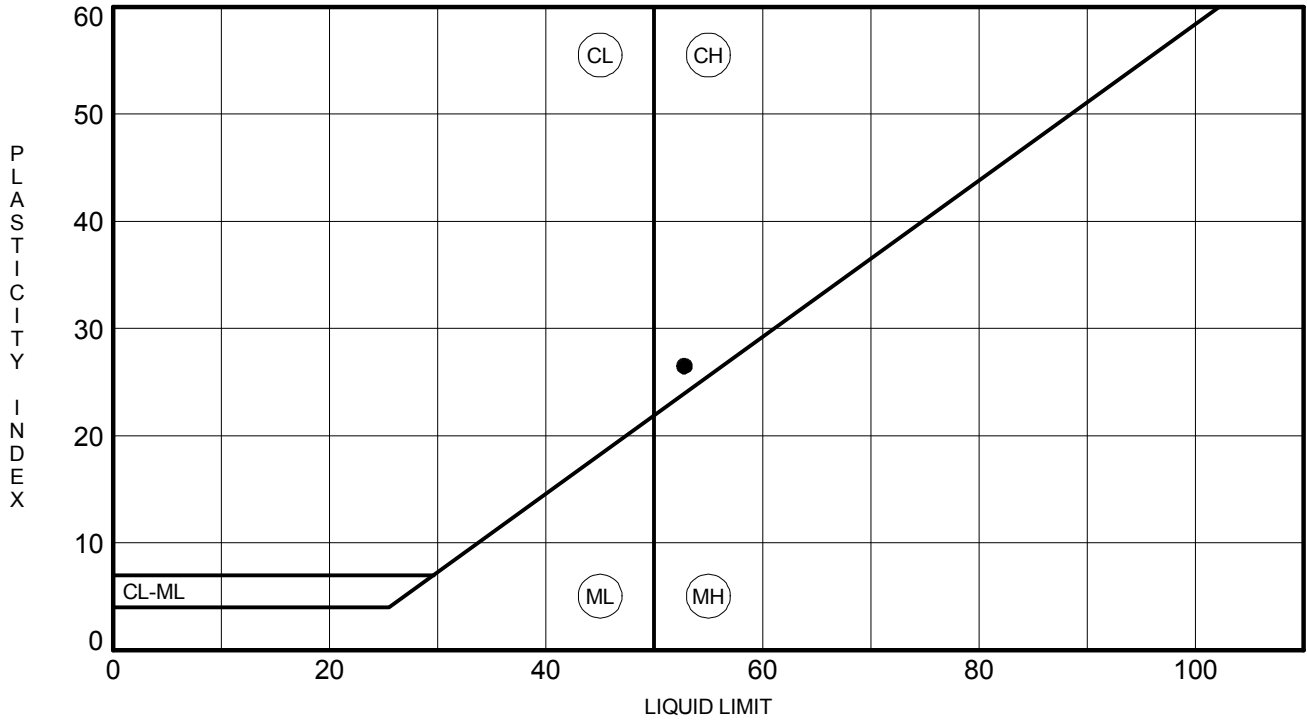


# ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● CL-5	3.0	53	26	27	50	Gravelly Fat CLAY (CH) with Sand A-7-6(10)

ATTERBERG LIMITS - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 5/16/18



**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

<b>PROJECT:</b>	SC-557 Roadway Improvements/Bridge Replacement	<b>PROJECT NO.:</b>	G4843
<b>SAMPLE NUMBER:</b>	18-0680	<b>DATE SAMPLE RECEIVED:</b>	4/24/2018
<b>DESCRIPTION OF SOIL:</b>	Gravelly Fat CLAY (CH) with Sand A-7-6(10)		
<b>TESTED BY:</b>	MB	<b>DATE OF TESTING:</b>	5/3/2018
		<b>DATE OF WEIGHING:</b>	5/4/2018

<b>BORING NO.</b>	CL-5				
<b>SAMPLE NO.</b>	18-0680C DS-3				
<b>SAMPLE DEPTH</b>	2.5-3.0'				
<b>WATER CONTENT, W%</b>	18.0				

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

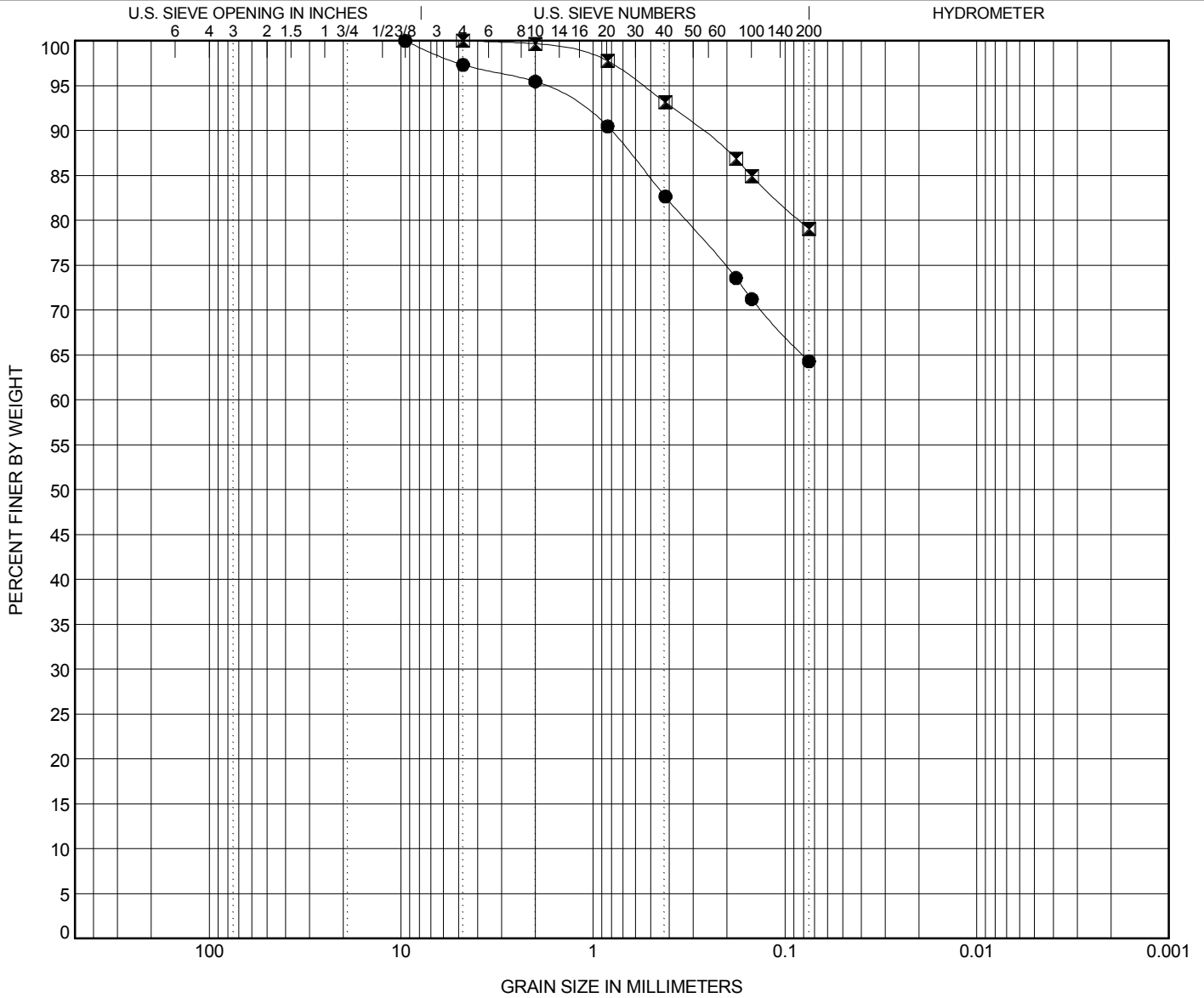


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● CL-6	3.0	<b>Sandy Fat CLAY (CH) A-7-6(16)</b>					<b>53</b>	<b>27</b>	<b>26</b>		
■ CL-6	5.0	<b>Elastic SILT (MH) with Sand A-7-5(20)</b>					<b>58</b>	<b>31</b>	<b>27</b>		
BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay		
● CL-6	3.0	<b>9.52</b>	<b>1.838</b>			<b>2.7</b>	<b>33.0</b>	<b>64.3</b>			
■ CL-6	5.0	<b>4.76</b>	<b>0.554</b>			<b>0.0</b>	<b>20.9</b>	<b>79.1</b>			

GRAIN SIZE - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 5/16/18

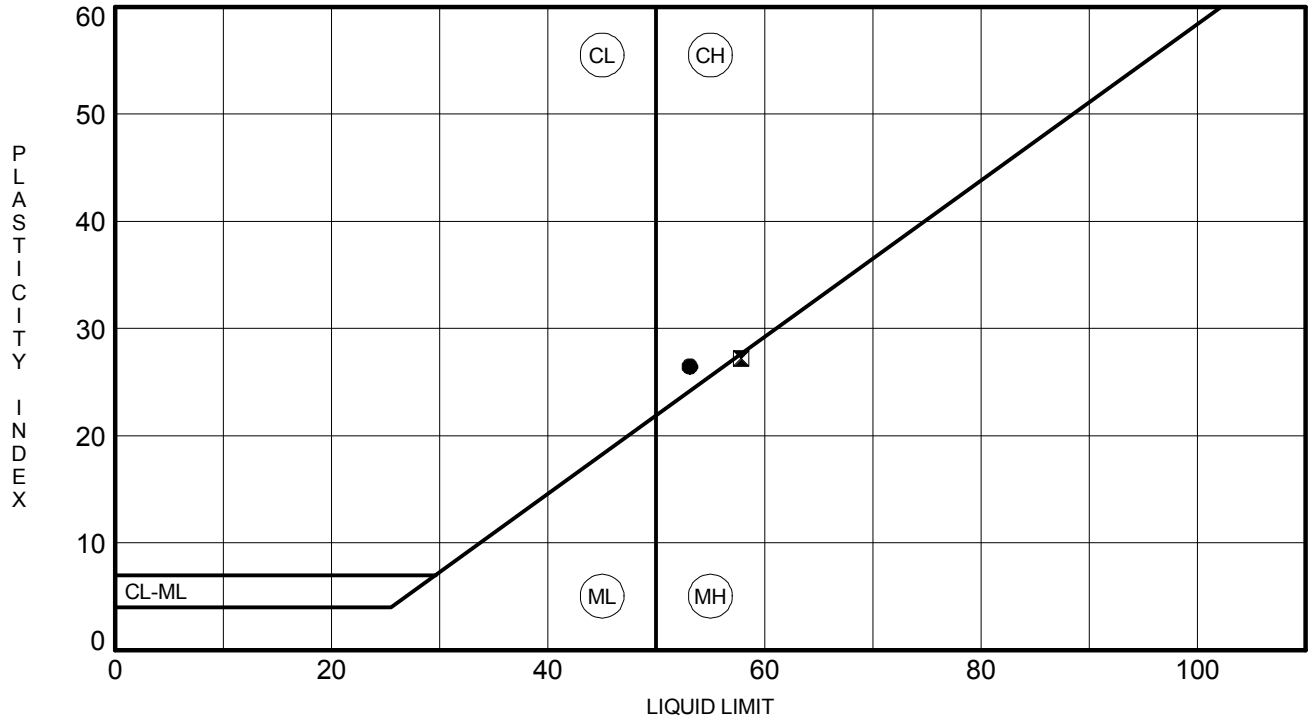


# ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● <b>CL-6</b>	<b>3.0</b>	<b>53</b>	<b>27</b>	<b>26</b>	<b>64</b>	<b>Sandy Fat CLAY (CH) A-7-6(16)</b>
▣ <b>CL-6</b>	<b>5.0</b>	<b>58</b>	<b>31</b>	<b>27</b>	<b>79</b>	<b>Elastic SILT (MH) with Sand A-7-5(20)</b>

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

<b>PROJECT:</b> SC-557 Roadway Improvements/Bridge Replacement	<b>PROJECT NO.:</b> G4843
<b>SAMPLE NUMBER:</b> 18-0681	<b>DATE SAMPLE RECEIVED:</b> 4/24/2018
<b>DESCRIPTION OF SOIL:</b>	VARIOUS
<b>TESTED BY:</b> MB	<b>DATE OF TESTING:</b> 5/3/2018
	<b>DATE OF WEIGHING:</b> 5/4/2018

<b>BORING NO.</b>	CL-6	CL-6			
<b>SAMPLE NO.</b>	18-0681C DS-3	18-0681F DS-5			
<b>SAMPLE DEPTH</b>	2.5-3.0'	4.5-5.0'			
<b>WATER CONTENT, W%</b>	21.5	36.0			

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

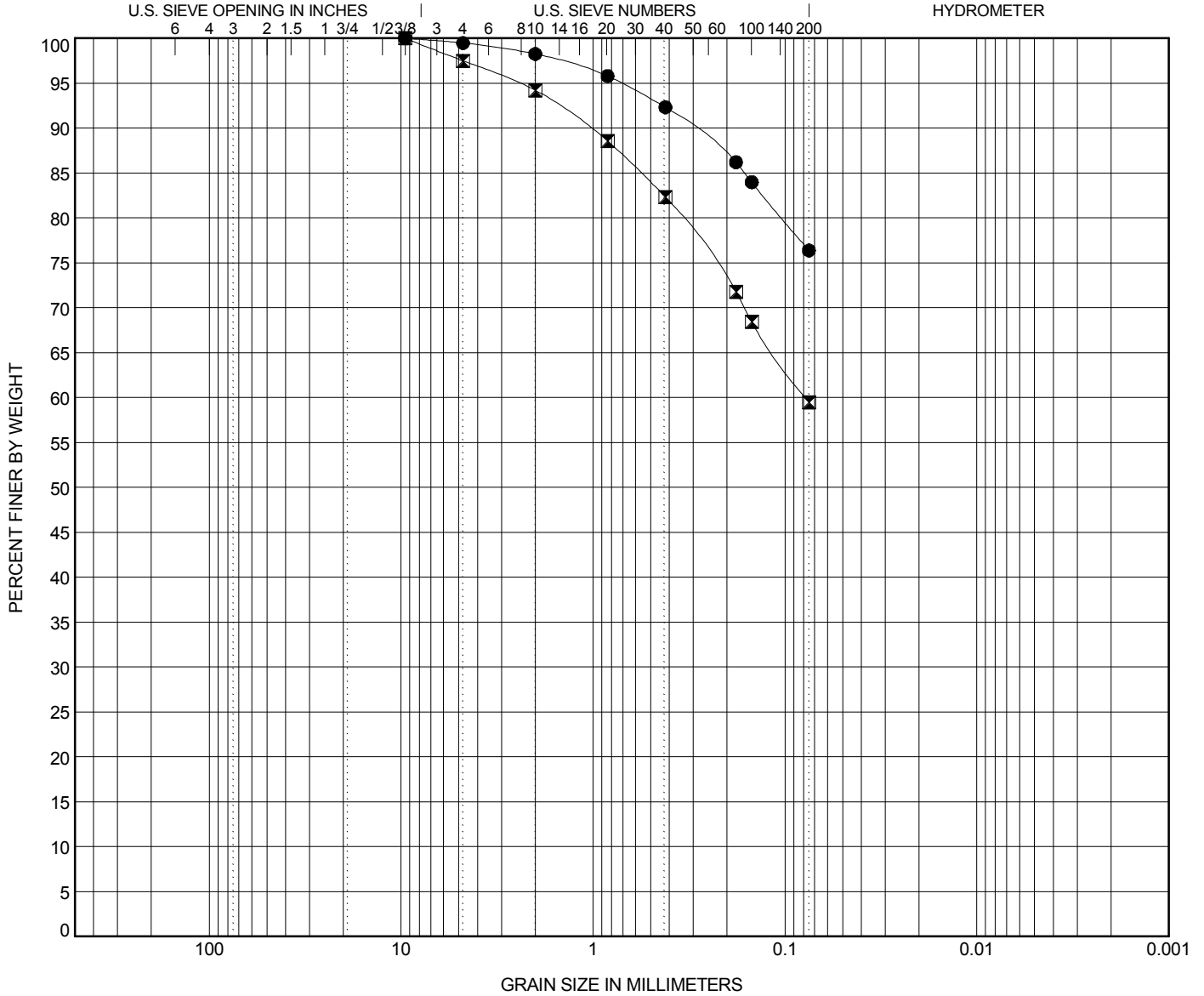


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● CL-7	1.0	<b>SILT (ML) with Sand A-4(7)</b>					<b>35</b>	<b>26</b>	<b>9</b>		
■ CL-7	4.0	<b>Sandy Lean CLAY (CL) A-7-6(12)</b>					<b>46</b>	<b>22</b>	<b>24</b>		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● CL-7	1.0	9.52	0.714			0.5	23.1	76.4	
■ CL-7	4.0	9.52	2.455			2.5	38.0	59.5	

GRAIN SIZE - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 5/16/18

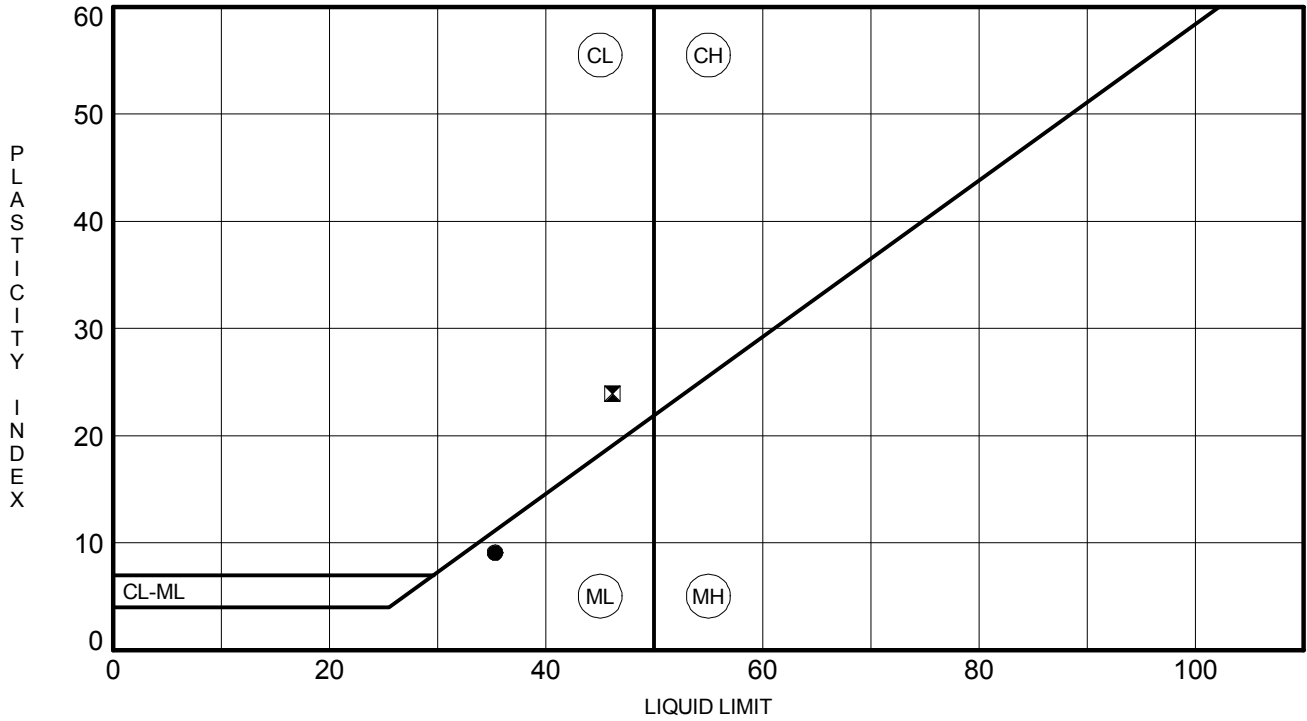


# ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● <b>CL-7</b>	<b>1.0</b>	<b>35</b>	<b>26</b>	<b>9</b>	<b>76</b>	<b>SILT (ML) with Sand A-4(7)</b>
☒ <b>CL-7</b>	<b>4.0</b>	<b>46</b>	<b>22</b>	<b>24</b>	<b>60</b>	<b>Sandy Lean CLAY (CL) A-7-6(12)</b>

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

<b>PROJECT:</b> SC-557 Roadway Improvements/Bridge Replacement	<b>PROJECT NO.:</b> G4843
<b>SAMPLE NUMBER:</b> 18-0682	<b>DATE SAMPLE RECEIVED:</b> 4/24/2018
<b>DESCRIPTION OF SOIL:</b>	VARIOUS
<b>TESTED BY:</b> MB	<b>DATE OF TESTING:</b> 5/3/2018
	<b>DATE OF WEIGHING:</b> 5/4/2018

<b>BORING NO.</b>	CL-7	CL-7			
<b>SAMPLE NO.</b>	18-0682C DS-1	18-0682F DS-4			
<b>SAMPLE DEPTH</b>	0.5-1.0'	3.5-4.0'			
<b>WATER CONTENT, W%</b>	47.8	29.2			

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

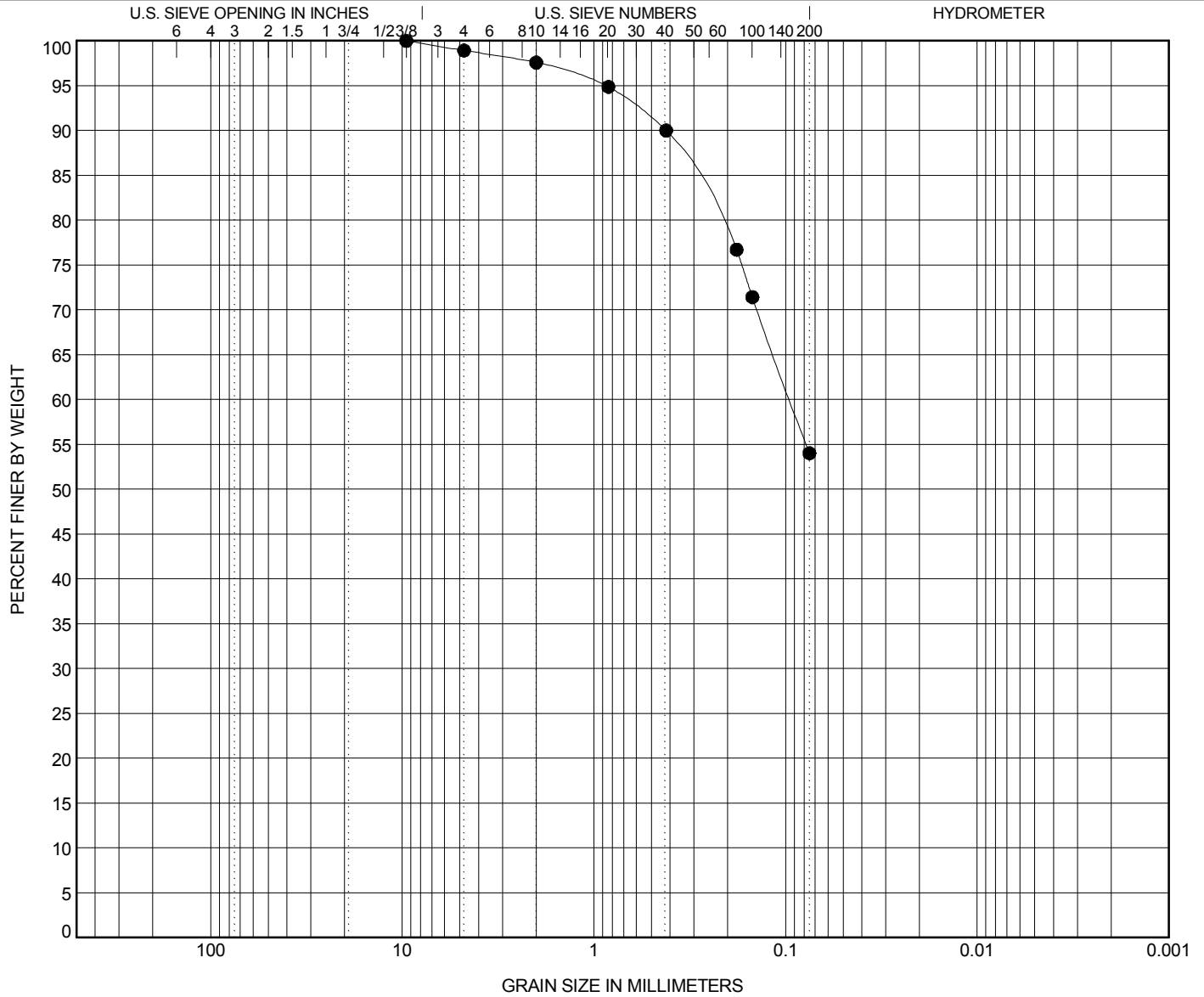


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● CL-8	2.0	<b>Sandy SILT (ML) A-4(0)</b>					<b>NP</b>	<b>NP</b>	<b>NP</b>		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● CL-8	2.0	9.52	0.873			1.1	44.9	54.0	

GRAIN SIZE - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 5/16/18



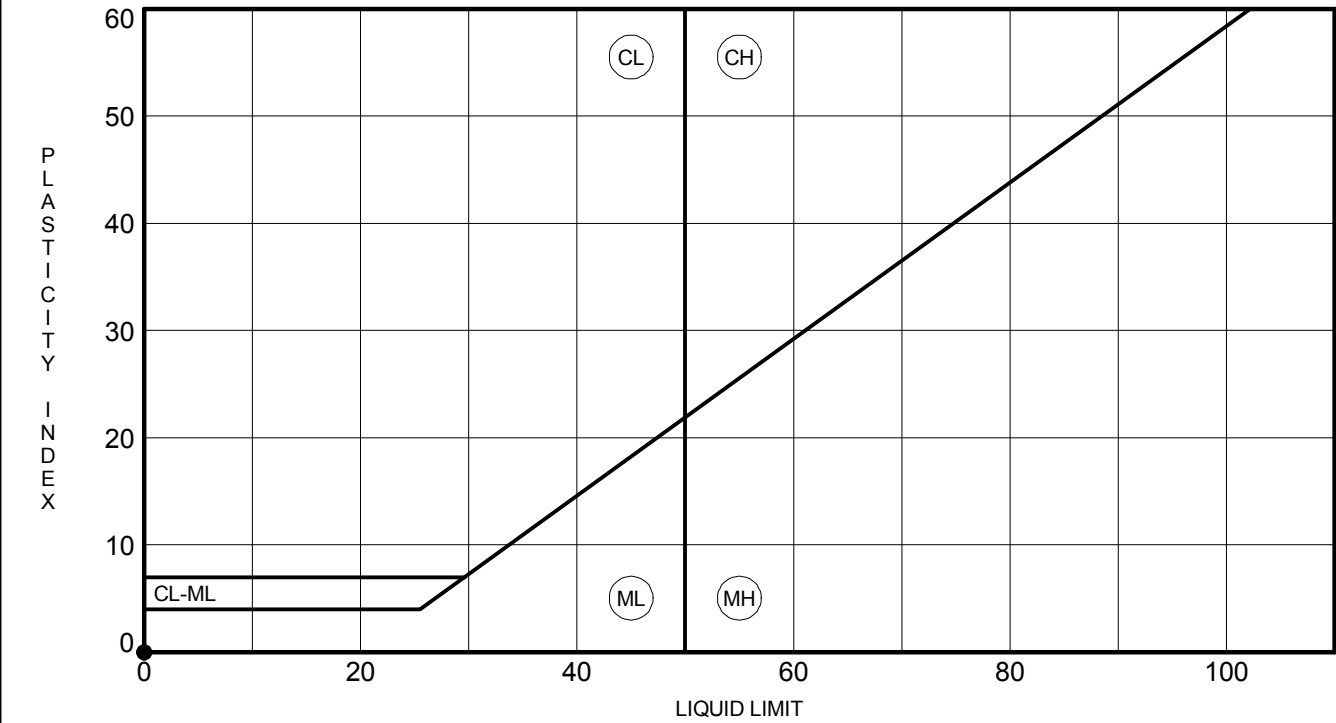


ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● CL-8	2.0	NP	NP	NP	54	Sandy SILT (ML) A-4(0)

ATTERBERG LIMITS - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 5/16/18

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

<b>PROJECT:</b>	SC-557 Roadway Improvements/Bridge Replacement	<b>PROJECT NO.:</b>	G4843
<b>SAMPLE NUMBER:</b>	18-0683	<b>DATE SAMPLE RECEIVED:</b>	4/24/2018
<b>DESCRIPTION OF SOIL:</b>	Sandy SILT (ML) A-4(0)		
<b>TESTED BY:</b>	MB	<b>DATE OF TESTING:</b>	5/3/2018
		<b>DATE OF WEIGHING:</b>	5/4/2018

<b>BORING NO.</b>	CL-8				
<b>SAMPLE NO.</b>	18-0683C DS-2				
<b>SAMPLE DEPTH</b>	1.5-2.0'				
<b>WATER CONTENT, W%</b>	19.3				

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

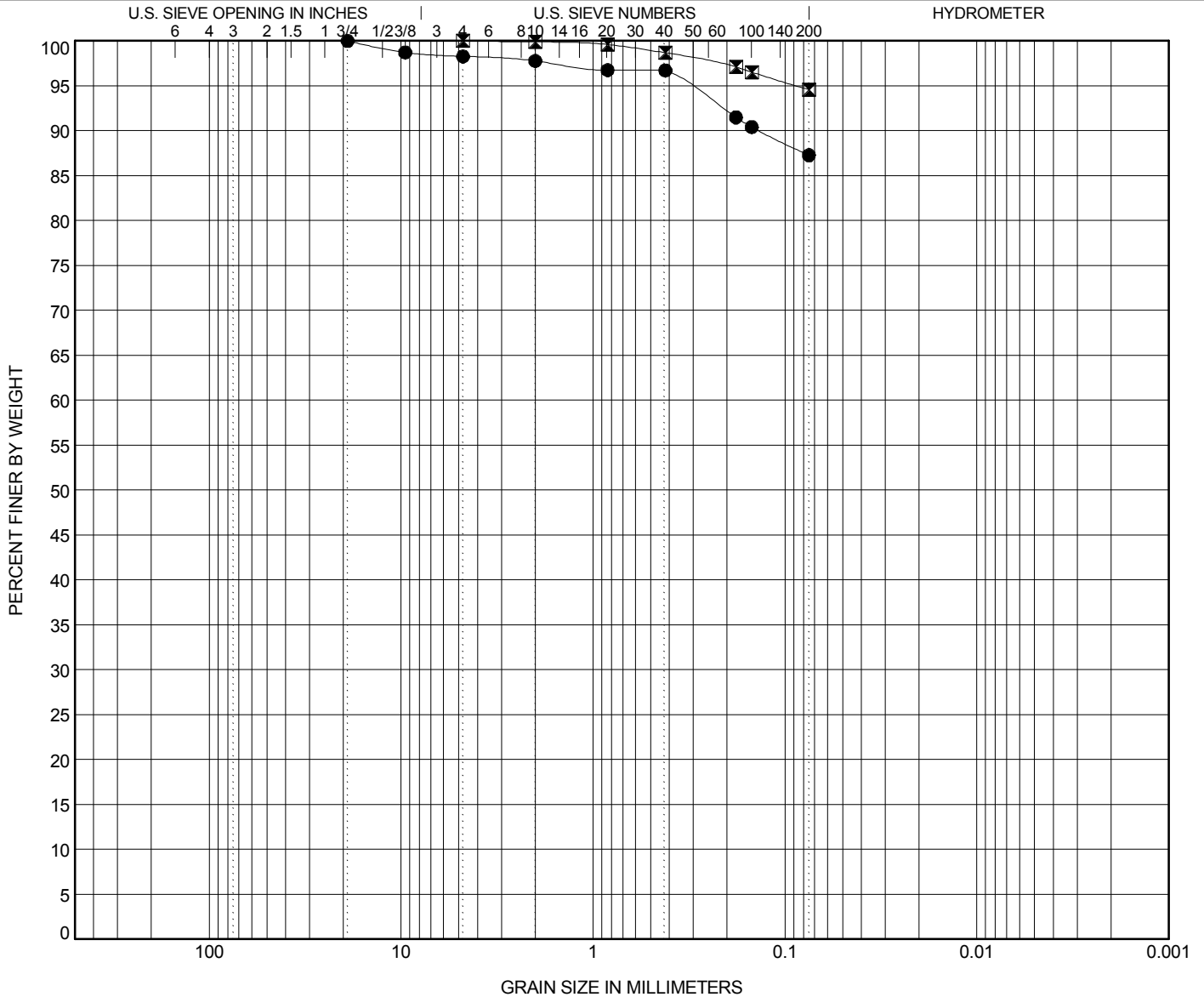


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● CL-9	2.0	Elastic SILT (MH) A-7-5(20)					62	32	30		
☒ CL-9	4.0	Elastic SILT (MH) A-7-5(20)					66	41	25		
BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay		
● CL-9	2.0	19	0.317			1.7	11.0	87.3			
☒ CL-9	4.0	4.76	0.087			0.0	5.4	94.6			

GRAIN SIZE - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 5/16/18

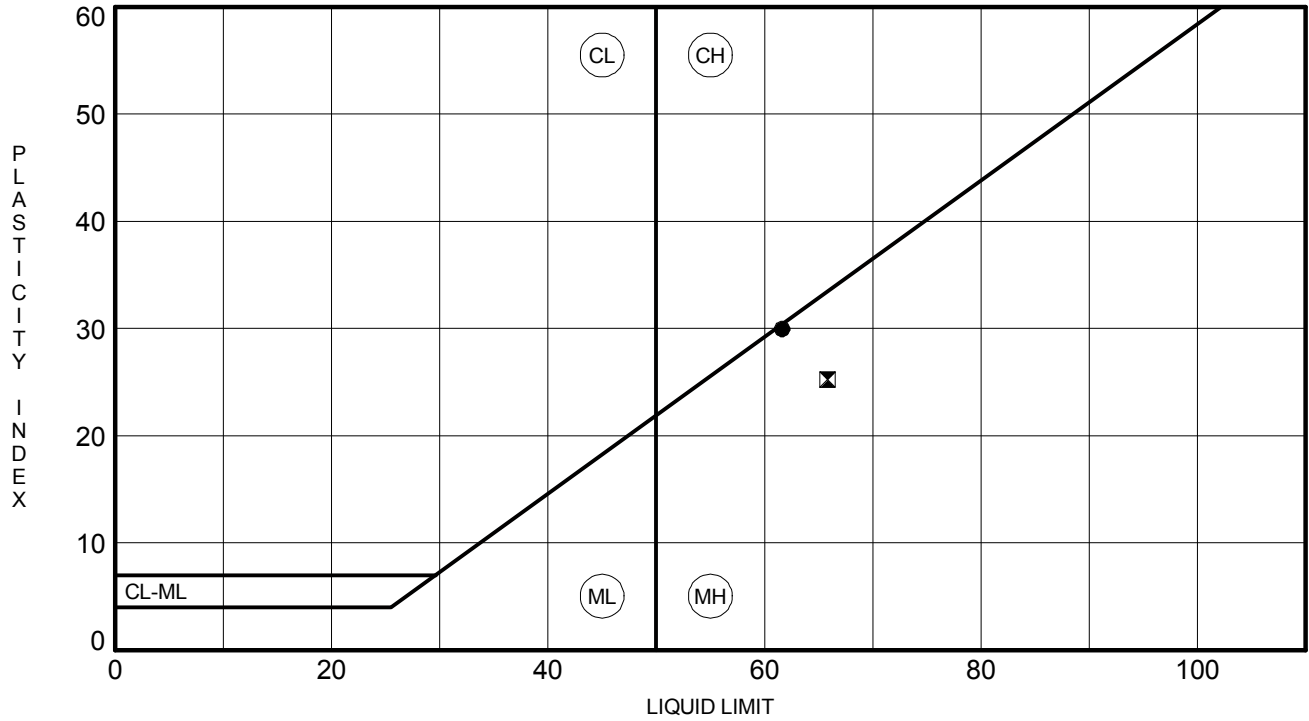


# ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● CL-9	2.0	62	32	30	87	Elastic SILT (MH) A-7-5(20)
✱ CL-9	4.0	66	41	25	95	Elastic SILT (MH) A-7-5(20)

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

<b>PROJECT:</b> SC-557 Roadway Improvements/Bridge Replacement	<b>PROJECT NO.:</b> G4843
<b>SAMPLE NUMBER:</b> 18-0684	<b>DATE SAMPLE RECEIVED:</b> 4/24/2018
<b>DESCRIPTION OF SOIL:</b>	VARIOUS
<b>TESTED BY:</b> MB	<b>DATE OF TESTING:</b> 5/3/2018
	<b>DATE OF WEIGHING:</b> 5/4/2018

<b>BORING NO.</b>	CL-9	CL-9			
<b>SAMPLE NO.</b>	18-0684C	18-0684F			
<b>SAMPLE DEPTH</b>	DS-2	DS-4			
<b>SAMPLE DEPTH</b>	1.5-2.0'	3.5-4.0'			
<b>WATER CONTENT, W%</b>	25.6	31.2			

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

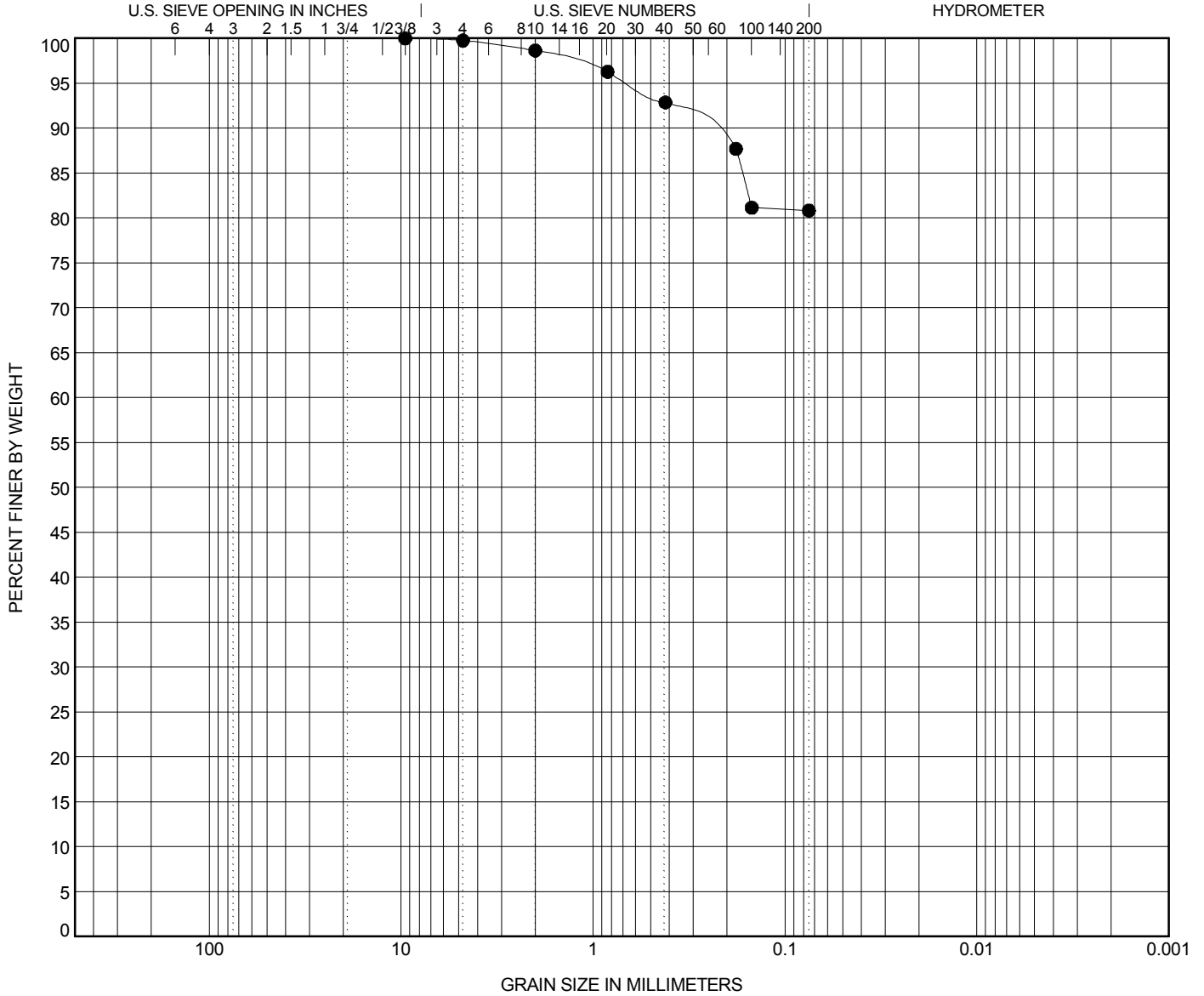


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● CL-10	3.0	Elastic SILT (MH) with Sand A-7-5(20)					58	36	22		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● CL-10	3.0	9.52	0.647			0.2	18.9	80.8	

GRAIN SIZE - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 5/16/18

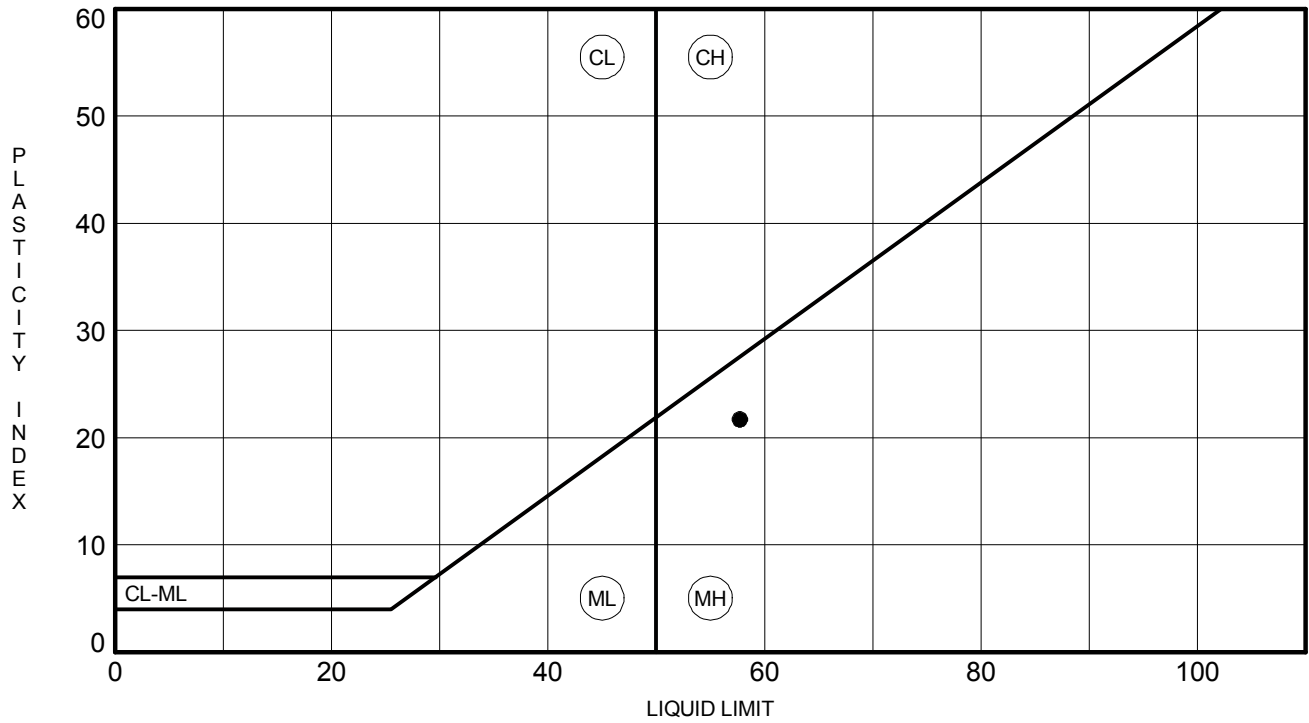


# ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● CL-10	3.0	58	36	22	81	Elastic SILT (MH) with Sand A-7-5(20)

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

<b>PROJECT:</b>	SC-557 Roadway Improvements/Bridge Replacement	<b>PROJECT NO.:</b>	G4843
<b>SAMPLE NUMBER:</b>	18-0685	<b>DATE SAMPLE RECEIVED:</b>	4/24/2018
<b>DESCRIPTION OF SOIL:</b>	Elastic SILT (MH) with Sand A-7-5(20)		
<b>TESTED BY:</b>	MB	<b>DATE OF TESTING:</b>	5/3/2018
		<b>DATE OF WEIGHING:</b>	5/4/2018

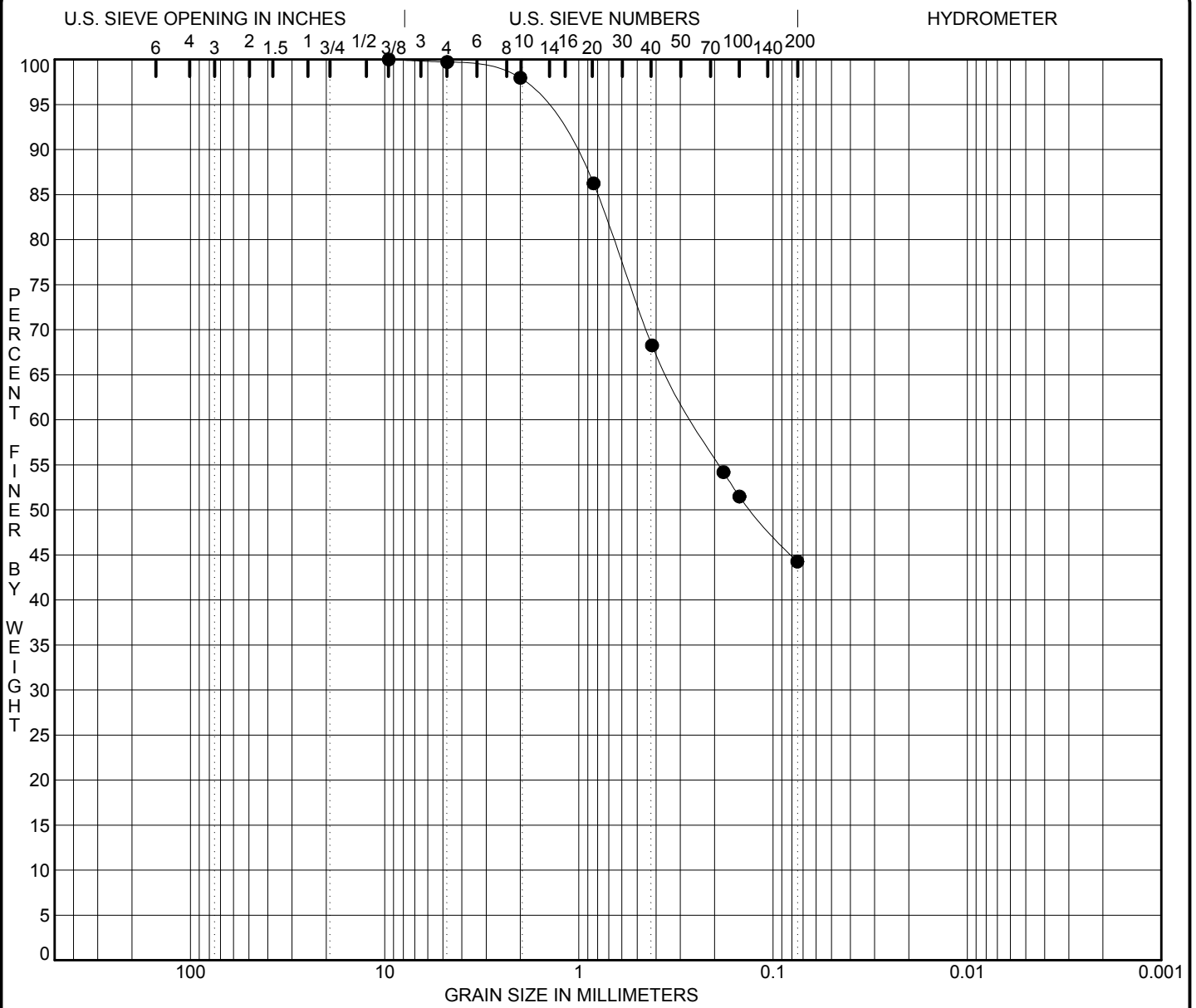
<b>BORING NO.</b>	CL-10				
<b>SAMPLE NO.</b>	18-0685C DS-3				
<b>SAMPLE DEPTH</b>	2.5-3.0'				
<b>WATER CONTENT, W%</b>	28.3				

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					





COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	MC%	LL	PL	PI	Cc	Cu
● RW-1 (0735B) 2.5	Yellowish Brown Silty F/M SAND (SM) A-4(0)	7.5	NP	NP	NP		

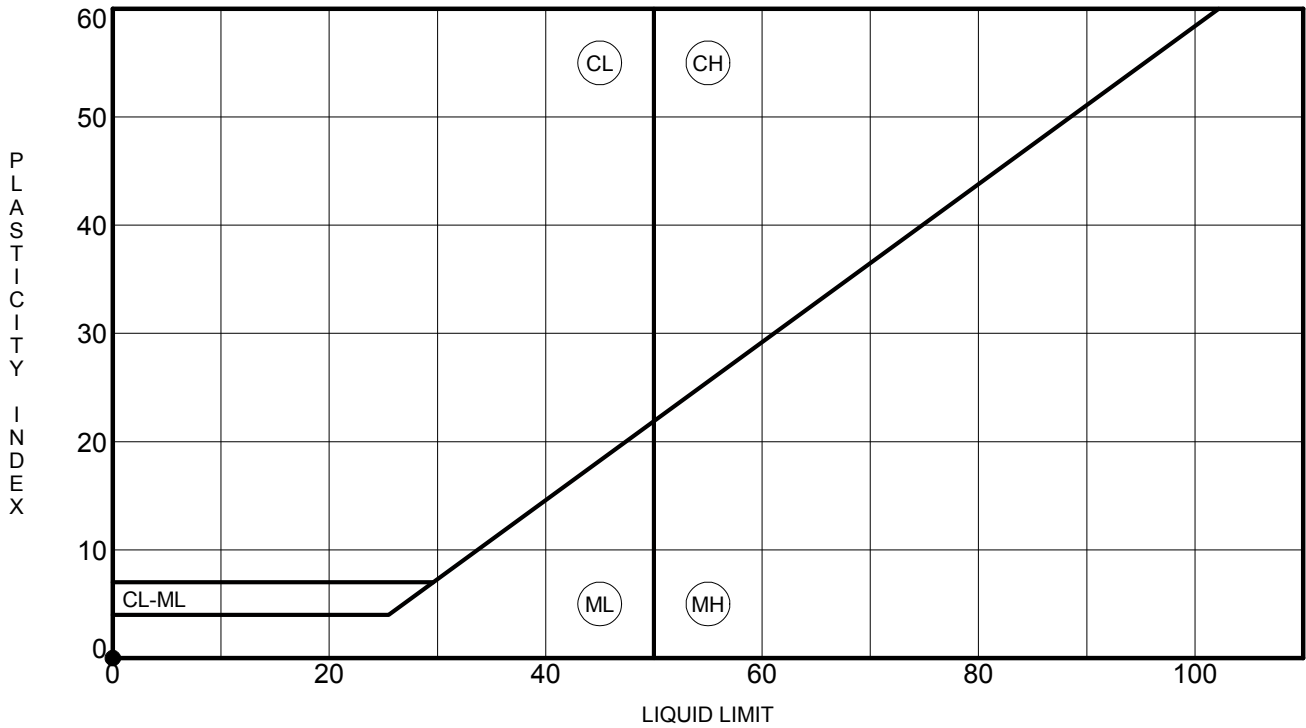
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● RW-1 (0735B) 2.5	9.52	0.26			0.3	55.4	44.3	

PROJECT **SC 557**  
 LOCATION **York County, South Carolina**

JOB NO. **G4843**  
 DATE **10/9/12**



### GRADATION CURVES



Specimen Identification	LL	PL	PI	Fines	Classification
● RW-1 (0735B)     2.5	NP	NP	NP	44	<b>Yellowish Brown Silty F/M SAND (SM) A-4(0)</b>

**ATTERBERG LIMITS' RESULTS**

Project: SC 557  
 Location: York County, South Carolina  
 Number: G4843



**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

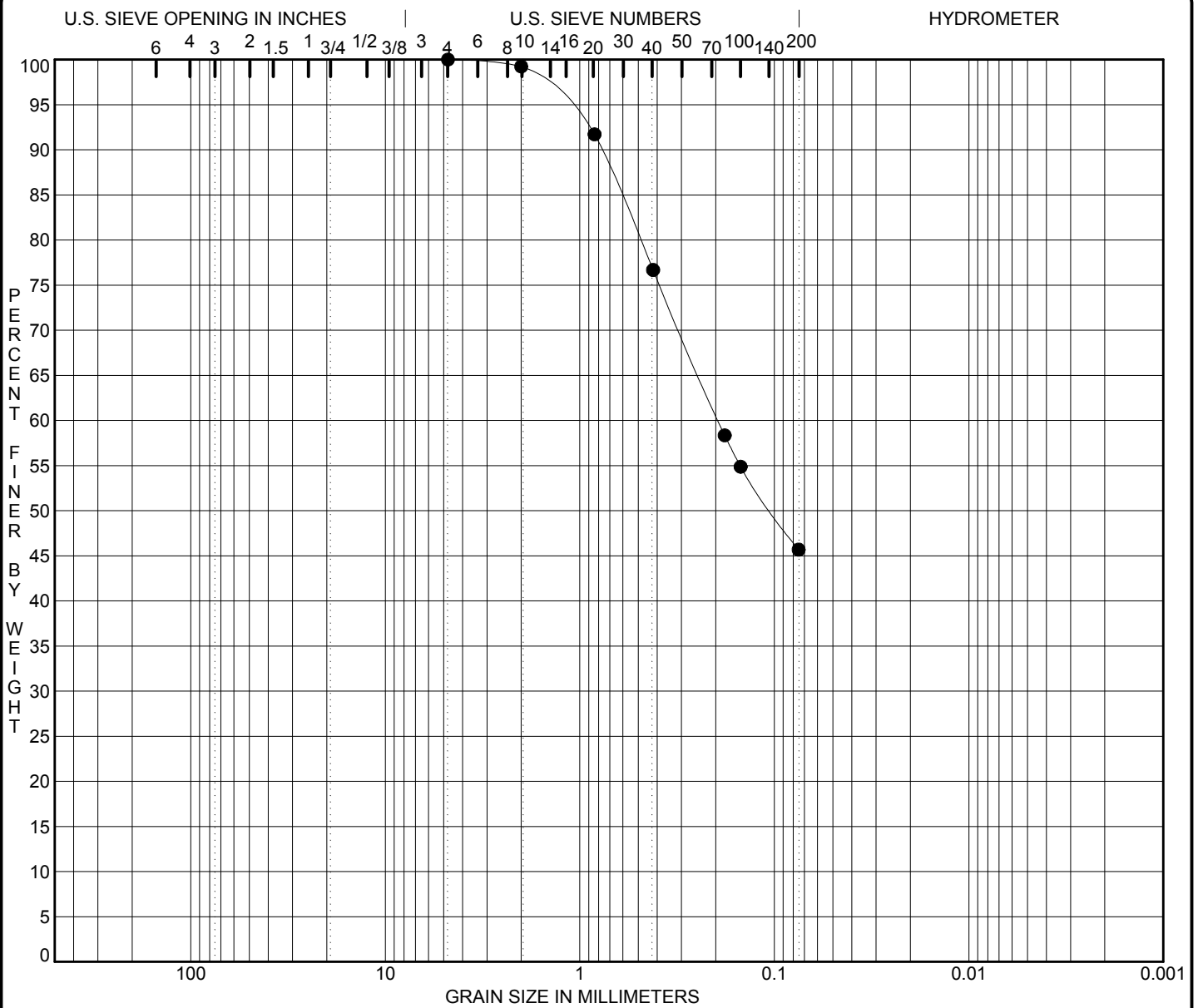
**PROJECT:** SC 557 **PROJECT NO.:** G4843  
**SAMPLE NUMBER:** 12-0735C **DATE SAMPLE RECEIVED:** 9/26/2012  
**DESCRIPTION OF SOIL:** Yellowish Brown Silty F/M Sand (SM) A-4(0)  
**TESTED BY:** KB **DATE OF TESTING:** 9/26/2012  
**DATE OF WEIGHING:** 9/27/2012

<b>BORING NO.</b>	RW-1				
<b>SAMPLE NO.</b>	12-0735C				
<b>SAMPLE DEPTH</b>	2.0'-2.5'				
<b>WATER CONTENT, W%</b>	7.5				

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification					MC%	LL	PL	PI	Cc	Cu
● RW-2 (0736B) 1.5	Strong Brown Silty F/M SAND (SM) A-4(1)					15.8	40	33	7		

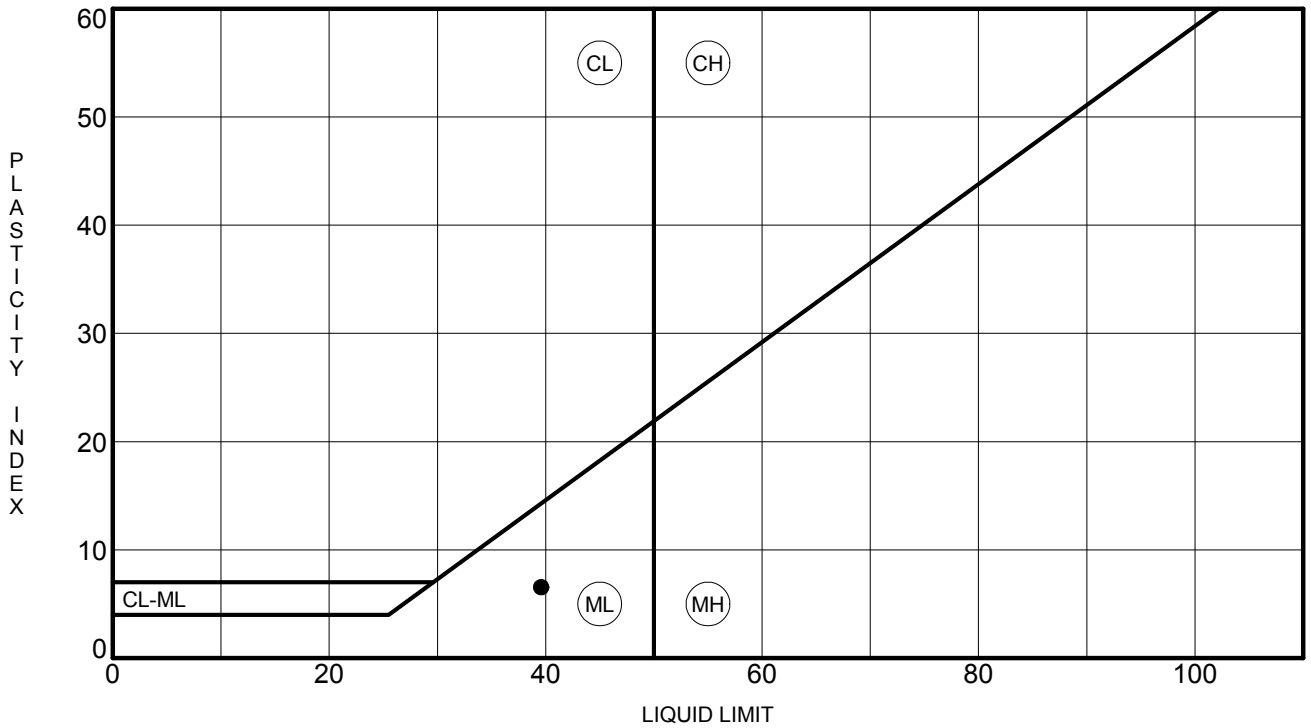
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● RW-2 (0736B) 1.5	4.76	0.19			0.0	54.3	45.7	

PROJECT **SC 557**  
 LOCATION **York County, South Carolina**

JOB NO. **G4843**  
 DATE **10/9/12**



### GRADATION CURVES



Specimen Identification	LL	PL	PI	Fines	Classification
● RW-2 (0736B)	1.5	40	33	7	46 Strong Brown Silty F/M SAND (SM) A-4(1)

**ATTERBERG LIMITS' RESULTS**

Project: SC 557  
 Location: York County, South Carolina  
 Number: G4843

US ATTERBERG LIMITS G4843LAB.GPJ US LAB.GDT 10/9/12



**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

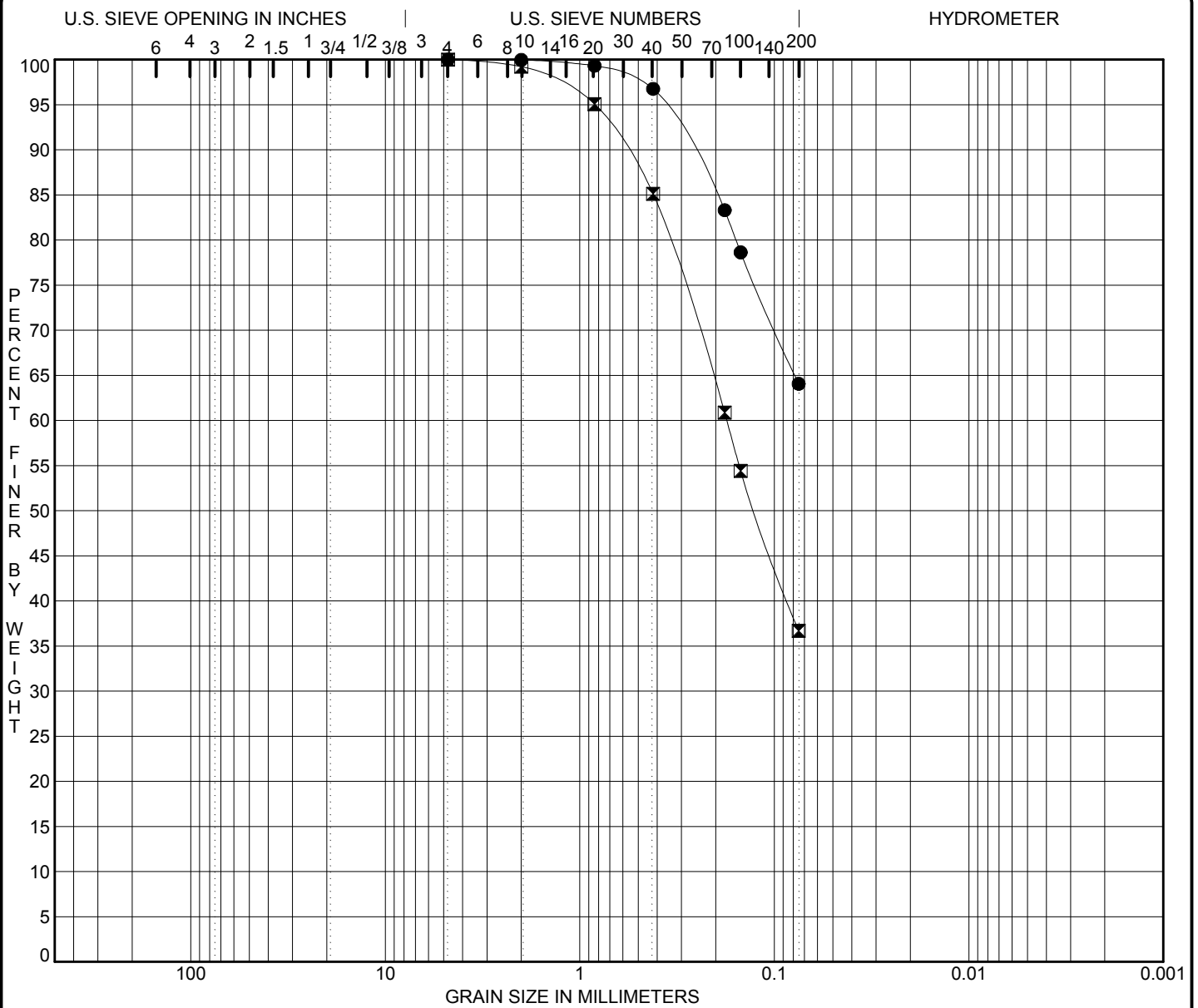
**PROJECT:** SC 557 **PROJECT NO.:** G4843  
**SAMPLE NUMBER:** 12-0726C **DATE SAMPLE RECEIVED:** 9/26/2012  
**DESCRIPTION OF SOIL:** Strong Brown Silty F/M Sand (SM) A-4(1)  
**TESTED BY:** KB **DATE OF TESTING:** 9/26/2012  
**DATE OF WEIGHING:** 9/27/2012

<b>BORING NO.</b>	RW-2				
<b>SAMPLE NO.</b>	12-0736C				
<b>SAMPLE DEPTH</b>	1.0'-1.5'				
<b>WATER CONTENT, W%</b>	15.8				

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	MC%	LL	PL	PI	Cc	Cu
● RW-3 (0733B)10.0	Pale Olive Fine Sandy SILT (ML) A-4(3)	32.1	37	32	5		
⊠ RW-3 (0733E)20.0	Dark Yellowish Brown Silty F/M SAND (SM) A-4(0)	19.1	NP	NP	NP		

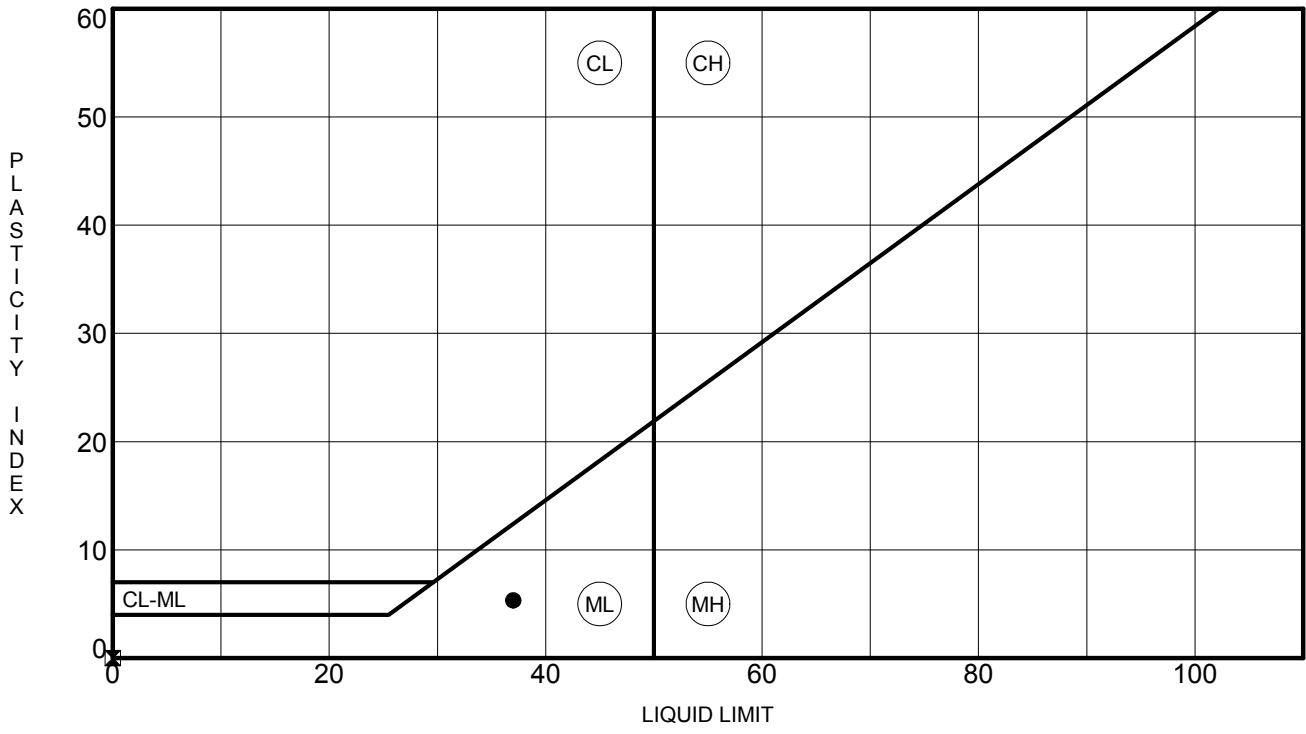
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● RW-3 (0733B)10.0	4.76				0.0	35.9	64.1	
⊠ RW-3 (0733E)20.0	4.76	0.18			0.0	63.3	36.7	

PROJECT **SC 557**  
 LOCATION **York County, South Carolina**

JOB NO. **G4843**  
 DATE **10/9/12**



### GRADATION CURVES



Specimen Identification	LL	PL	PI	Fines	Classification
● RW-3 (0733B)	10.0	37	32	5	64 Pale Olive Fine Sandy SILT (ML) A-4(3)
☒ RW-3 (0733E)	20.0	NP	NP	NP	37 Dark Yellowish Brown Silty F/M SAND (SM) A-4(0)

**ATTERBERG LIMITS' RESULTS**

Project: SC 557  
 Location: York County, South Carolina  
 Number: G4843



US ATTERBERG LIMITS G4843LAB.GPJ US LAB.GDT 10/9/12



**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

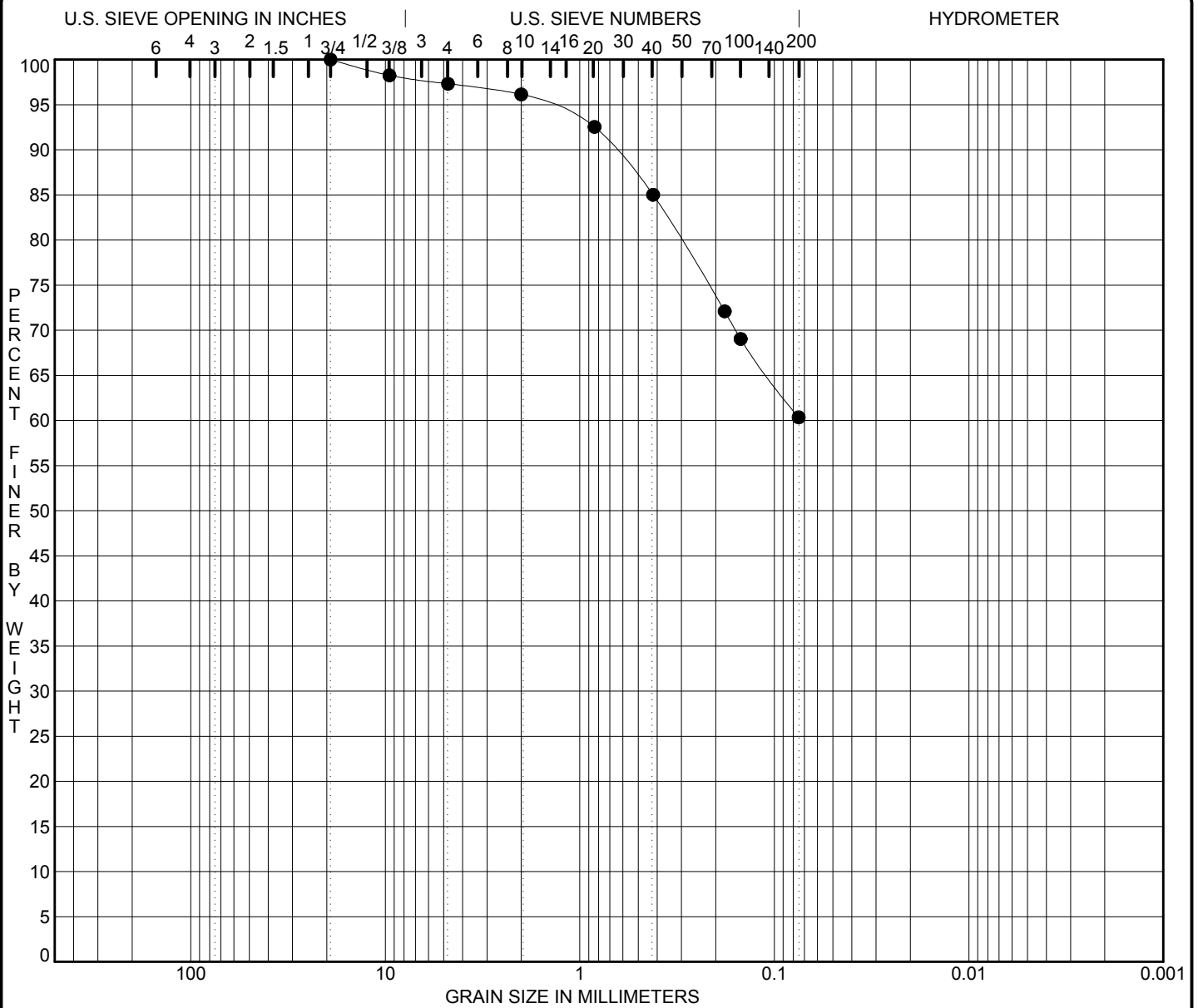
**PROJECT:** SC 557 **PROJECT NO.:** G4843  
**SAMPLE NUMBER:** 12-0733 **DATE SAMPLE RECEIVED:** 9/26/2012  
**DESCRIPTION OF SOIL:** Various  
**TESTED BY:** KB **DATE OF TESTING:** 9/26/2012  
**DATE OF WEIGHING:** 9/27/2012

<b>BORING NO.</b>	RW-3	RW-3			
<b>SAMPLE NO.</b>	12-0733C	12-0733F			
<b>SAMPLE DEPTH</b>	8.0'-10.0'	18.5'-20.0'			
<b>WATER CONTENT, W%</b>	32.1	19.1			

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	MC%	LL	PL	PI	Cc	Cu
● RW-4 (0737B) 3.5	Dark Reddish Brown F/M Sandy SILT (ML) A-4(4)	18.7	33	24	9		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● RW-4 (0737B) 3.5	19.10				2.7	37.0	60.4	

PROJECT **SC 557**  
 LOCATION **York County, South Carolina**

JOB NO. **G4843**  
 DATE **10/9/12**



### GRADATION CURVES



**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

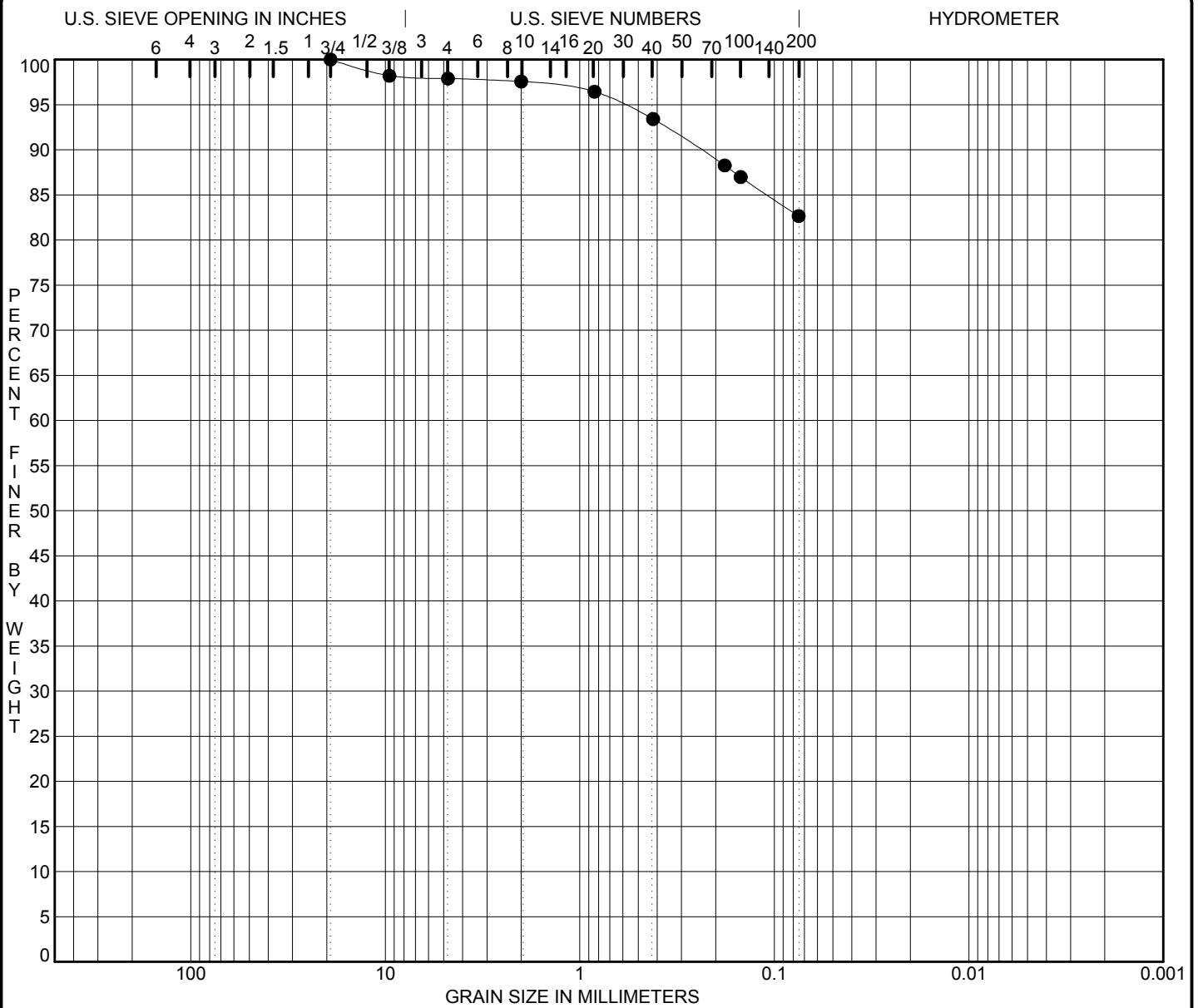
**PROJECT:** SC 557 **PROJECT NO.:** G4843  
**SAMPLE NUMBER:** 12-0737C **DATE SAMPLE RECEIVED:** 9/26/2012  
**DESCRIPTION OF SOIL:** Dark Reddish Brown F/M Sandy Silt (ML) A-4(4)  
**TESTED BY:** KB **DATE OF TESTING:** 9/26/2012  
**DATE OF WEIGHING:** 9/27/2012

<b>BORING NO.</b>	RW-4				
<b>SAMPLE NO.</b>	12-0737C				
<b>SAMPLE DEPTH</b>	3.0'-3.5'				
<b>WATER CONTENT, W%</b>	18.7				

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	MC%	LL	PL	PI	Cc	Cu
● RW-5 (0738B) 0.5	Red SILT w/ F/M Sand (ML) A-5(10)	19.6	42	32	10		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● RW-5 (0738B) 0.5	19.10				2.1	15.2	82.7	

PROJECT **SC 557**  
 LOCATION **York County, South Carolina**

JOB NO. **G4843**  
 DATE **10/9/12**



**GRADATION CURVES**



**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

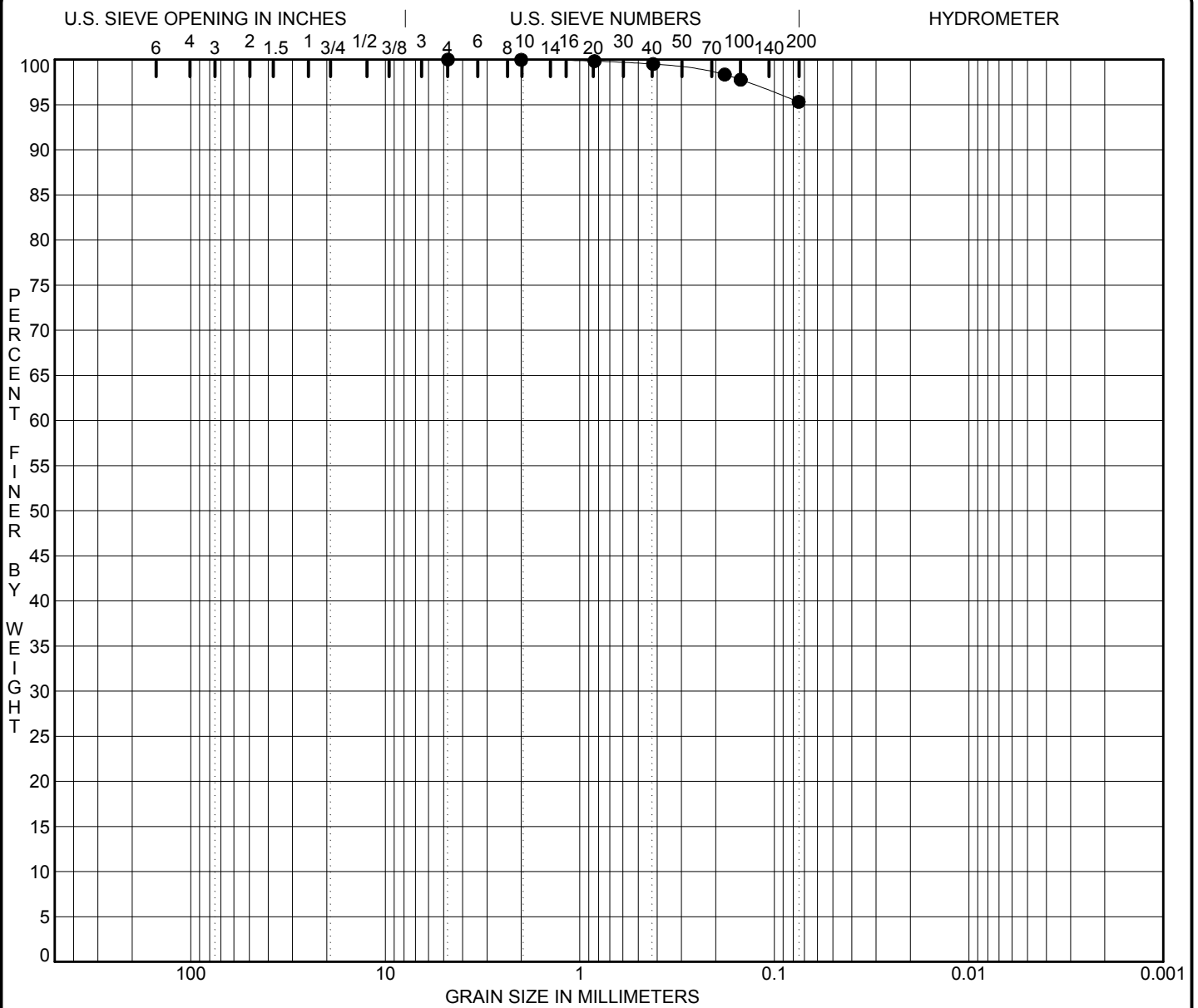
**PROJECT:** SC 557 **PROJECT NO.:** G4843  
**SAMPLE NUMBER:** 12-0738C **DATE SAMPLE RECEIVED:** 9/26/2012  
**DESCRIPTION OF SOIL:** Red Silt w/ F/M Sand (ML) A-5(10)  
**TESTED BY:** KB **DATE OF TESTING:** 9/26/2012  
**DATE OF WEIGHING:** 9/27/2012

<b>BORING NO.</b>	RW-5				
<b>SAMPLE NO.</b>	12-0738C				
<b>SAMPLE DEPTH</b>	0.0-5.0'				
<b>WATER CONTENT, W%</b>	19.6				

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification					MC%	LL	PL	PI	Cc	Cu
● RW-6 (0734B) 5.0	Red SILT (ML) A-4(0)					39.8	NP	NP	NP		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● RW-6 (0734B) 5.0	4.76				0.0	4.7	95.3	

PROJECT **SC 557**  
 LOCATION **York County, South Carolina**

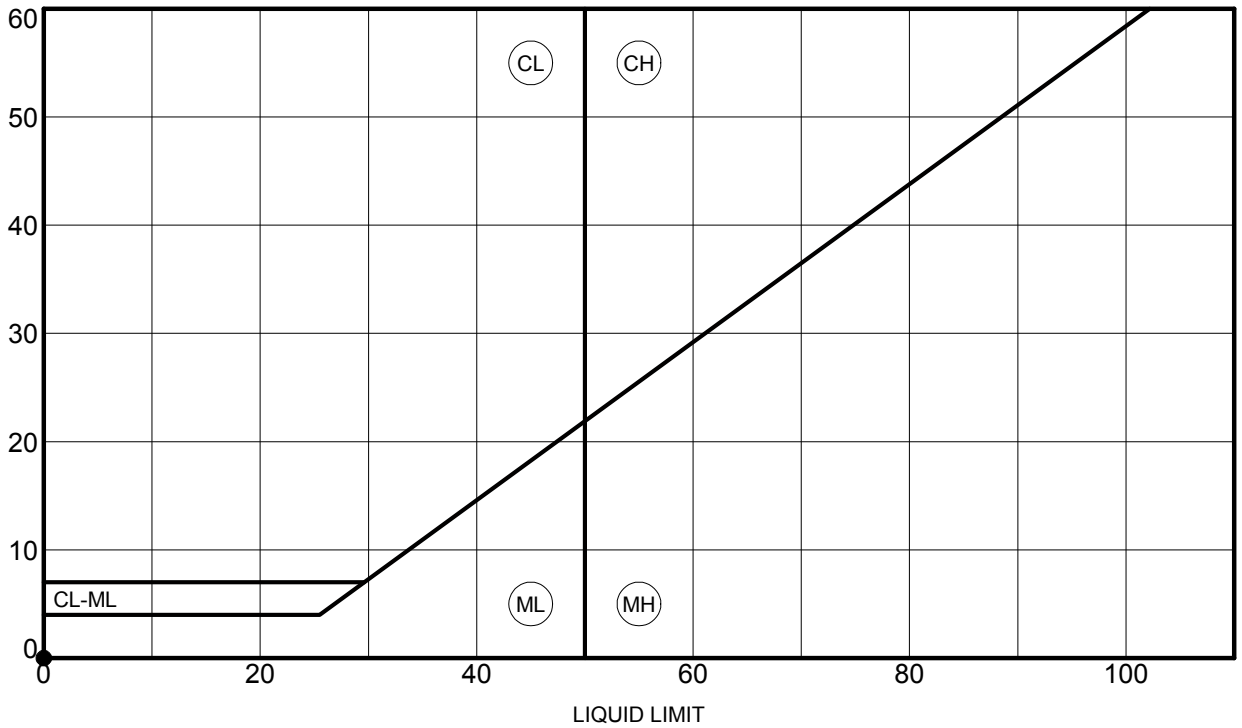
JOB NO. **G4843**  
 DATE **10/9/12**



### GRADATION CURVES



PLASTICITY INDEX



Specimen Identification	LL	PL	PI	Fines	Classification	
● RW-6 (0734B)	5.0	NP	NP	NP	95	Red SILT (ML) A-4(0)

**ATTERBERG LIMITS' RESULTS**

Project: SC 557  
 Location: York County, South Carolina  
 Number: G4843



**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

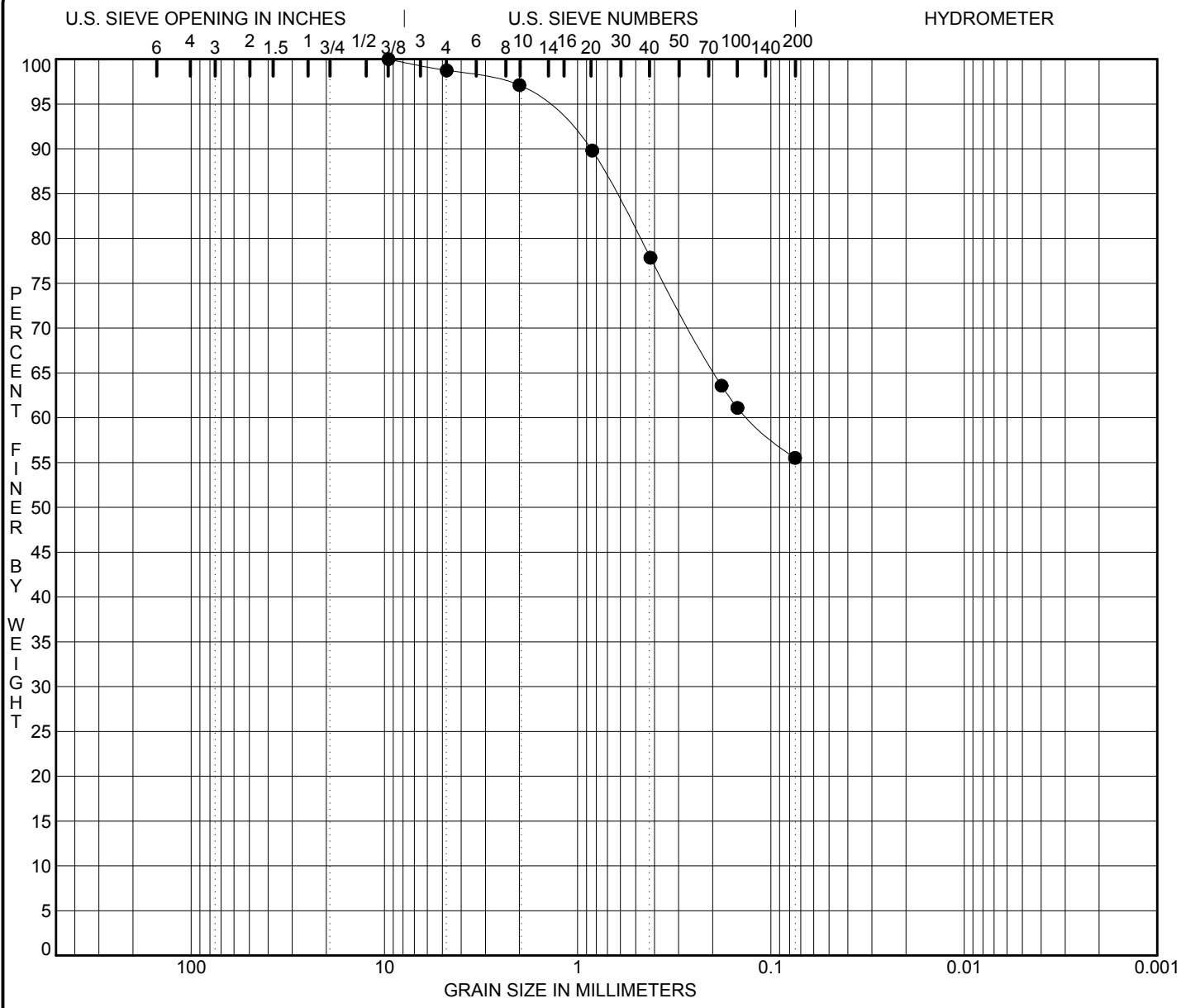
**PROJECT:** SC 557 **PROJECT NO.:** G4843  
**SAMPLE NUMBER:** 12-0734C **DATE SAMPLE RECEIVED:** 9/26/2012  
**DESCRIPTION OF SOIL:** Red Silt (ML) A-4(0)  
**TESTED BY:** KB **DATE OF TESTING:** 9/26/2012  
**DATE OF WEIGHING:** 9/27/2012

<b>BORING NO.</b>	RW-6				
<b>SAMPLE NO.</b>	12-0734C				
<b>SAMPLE DEPTH</b>	4.0'-5.0'				
<b>WATER CONTENT, W%</b>	39.8				

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	MC%	LL	PL	PI	Cc	Cu
● RW-7 (0740B) 1.5	Red F/M Sandy SILT (ML) A-7-5(7)	20.3	47	31	16		

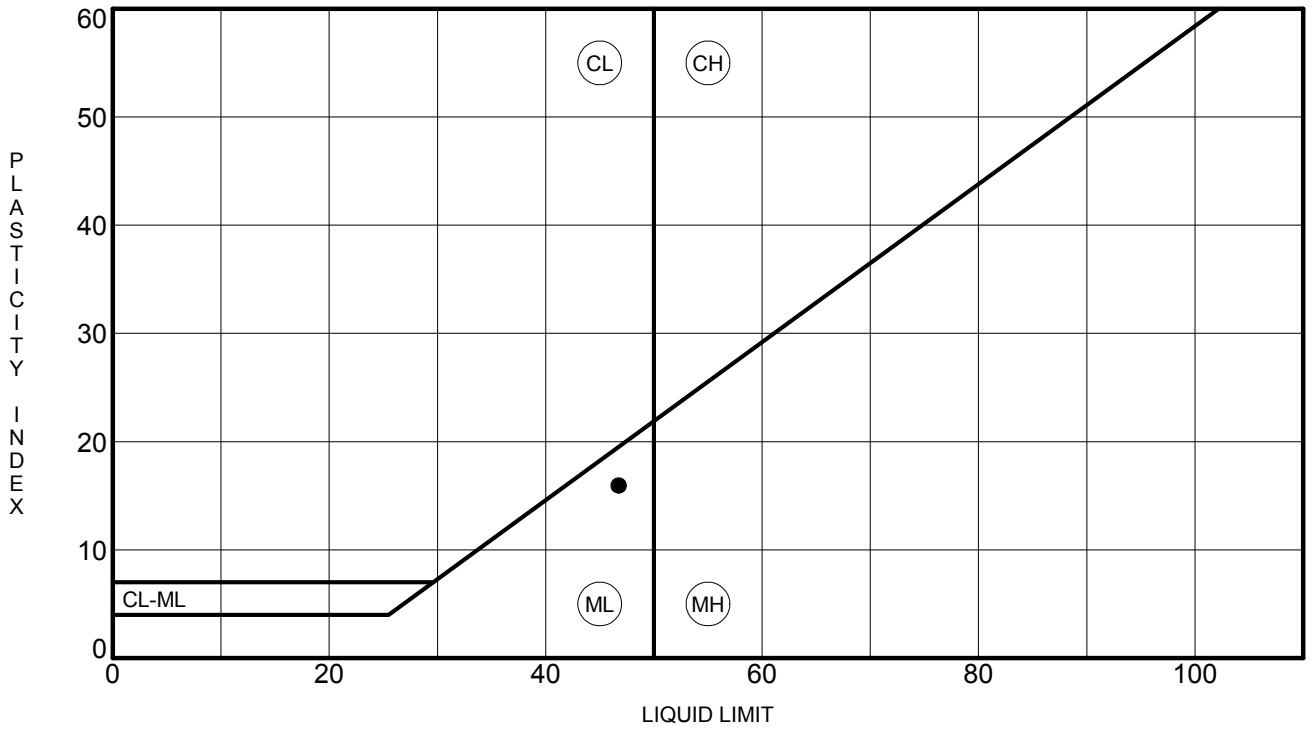
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● RW-7 (0740B) 1.5	9.52	0.13			1.3	43.2	55.5	

PROJECT **SC 557**  
 LOCATION York County, South Carolina

JOB NO. **G4843**  
 DATE 10/9/12



### GRADATION CURVES



Specimen Identification	LL	PL	PI	Fines	Classification	
● RW-7 (0740B)	1.5	47	31	16	56	Red F/M Sandy SILT (ML) A-7-5(7)

US ATTERBERG LIMITS G4843LAB.GPJ US LAB.GDT 10/9/12



**ATTERBERG LIMITS' RESULTS**

Project: SC 557  
Location: York County, South Carolina  
Number: G4843

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

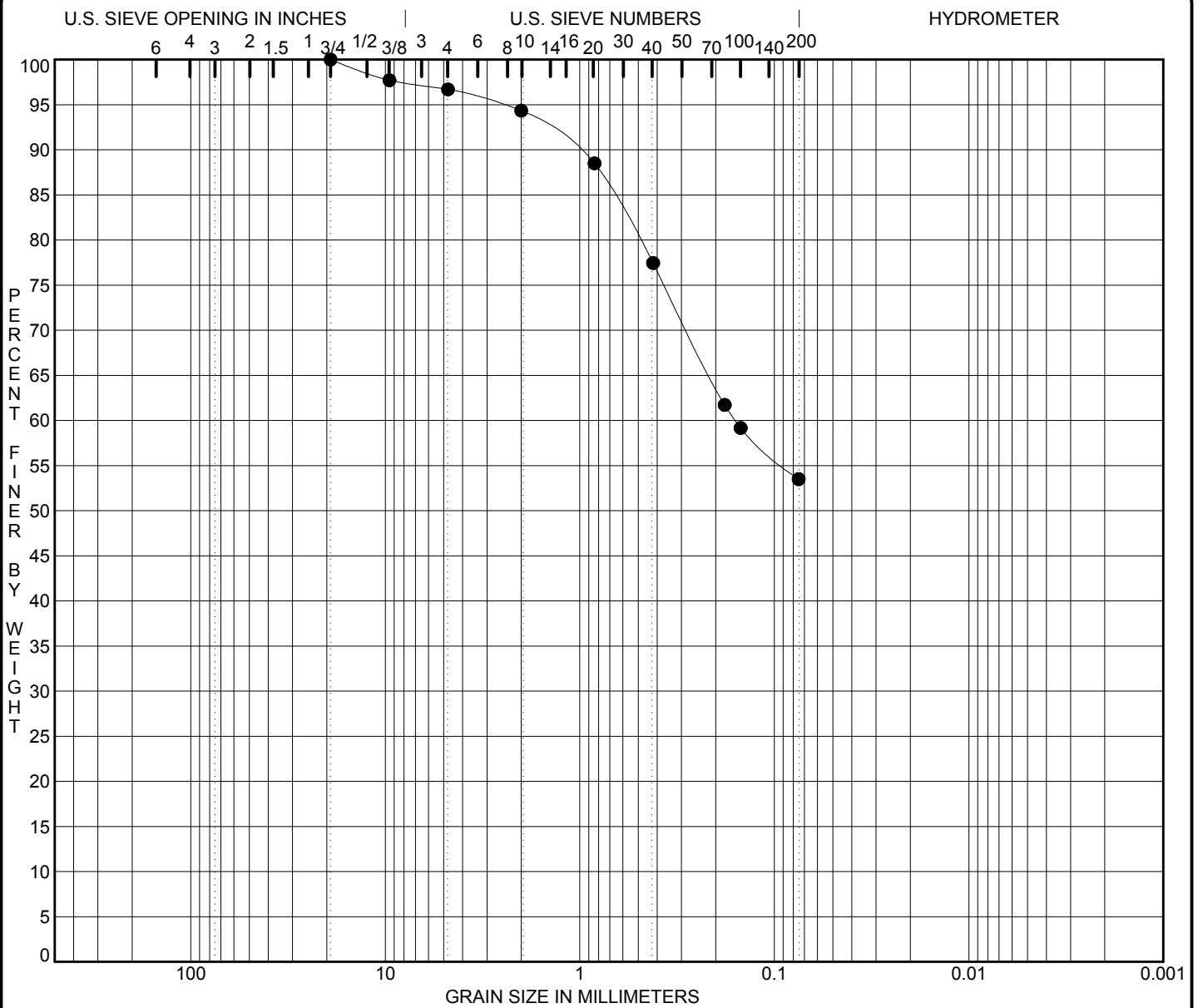
**PROJECT:** SC 557 **PROJECT NO.:** G4843  
**SAMPLE NUMBER:** 12-0740C **DATE SAMPLE RECEIVED:** 9/26/2012  
**DESCRIPTION OF SOIL:** Red F/M Sandy Silt (ML) A-7-5(7)  
**TESTED BY:** KB **DATE OF TESTING:** 9/26/2012  
**DATE OF WEIGHING:** 9/27/2012

<b>BORING NO.</b>	RW-7				
<b>SAMPLE NO.</b>	12-0740C				
<b>SAMPLE DEPTH</b>	1.0'-1.5'				
<b>WATER CONTENT, W%</b>	20.3				

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	MC%	LL	PL	PI	Cc	Cu
● RW-8 (0741B) 1.0	Dusky Red F/C Sandy Lean CLAY (CL) A-6(4)	17.6	35	23	12		

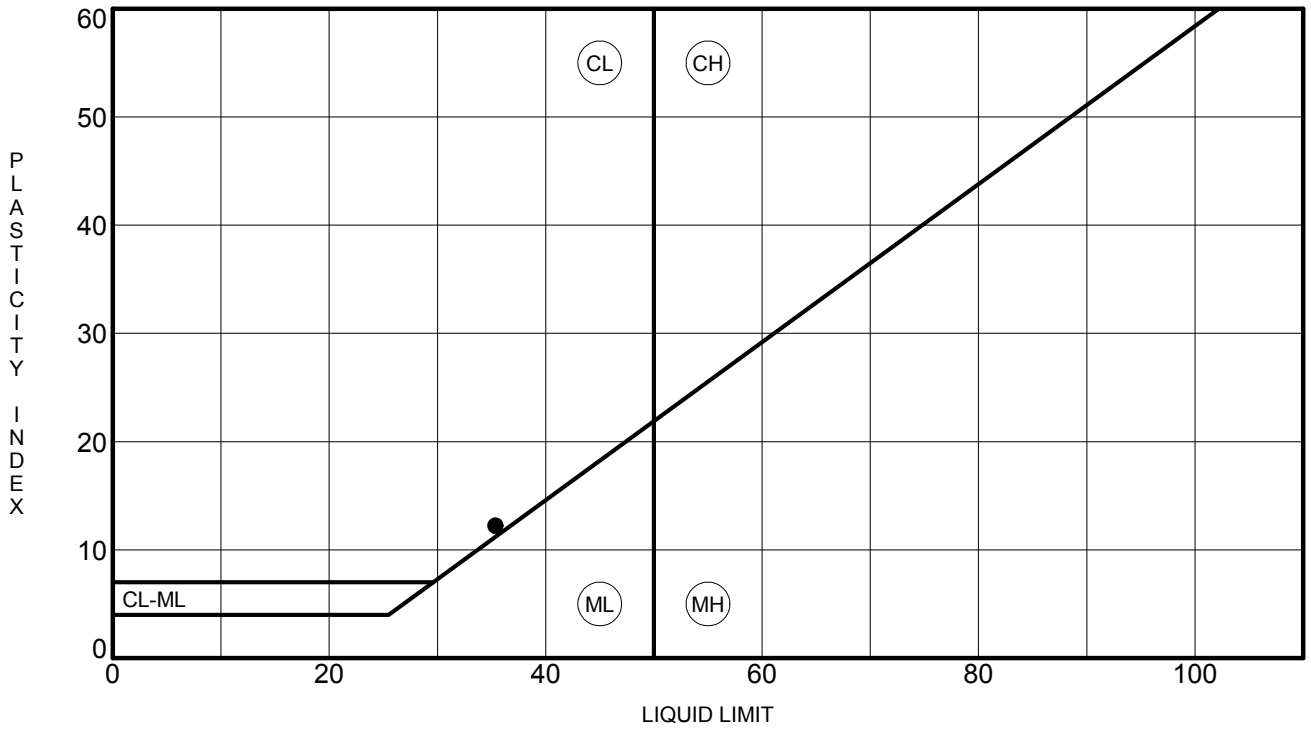
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● RW-8 (0741B) 1.0	19.10	0.16			3.3	43.2	53.5	

PROJECT **SC 557**  
 LOCATION **York County, South Carolina**

JOB NO. **G4843**  
 DATE **10/9/12**



### GRADATION CURVES



Specimen Identification	LL	PL	PI	Fines	Classification	
● RW-8 (0741B)	1.0	35	23	12	54	Dusky Red F/C Sandy Lean CLAY (CL) A-6(4)

US ATTBERG LIMITS G4843LAB.GPJ US LAB.GDT 10/9/12



**ATTERBERG LIMITS' RESULTS**

Project: SC 557  
 Location: York County, South Carolina  
 Number: G4843

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

**PROJECT:** SC 557 **PROJECT NO.:** G4843  
**SAMPLE NUMBER:** 12-0741C **DATE SAMPLE RECEIVED:** 9/26/2012  
**DESCRIPTION OF SOIL:** Dusky Red F/C Sandy Lean Clay (CL) A-6(4)  
**TESTED BY:** KB **DATE OF TESTING:** 9/26/2012  
**DATE OF WEIGHING:** 9/27/2012

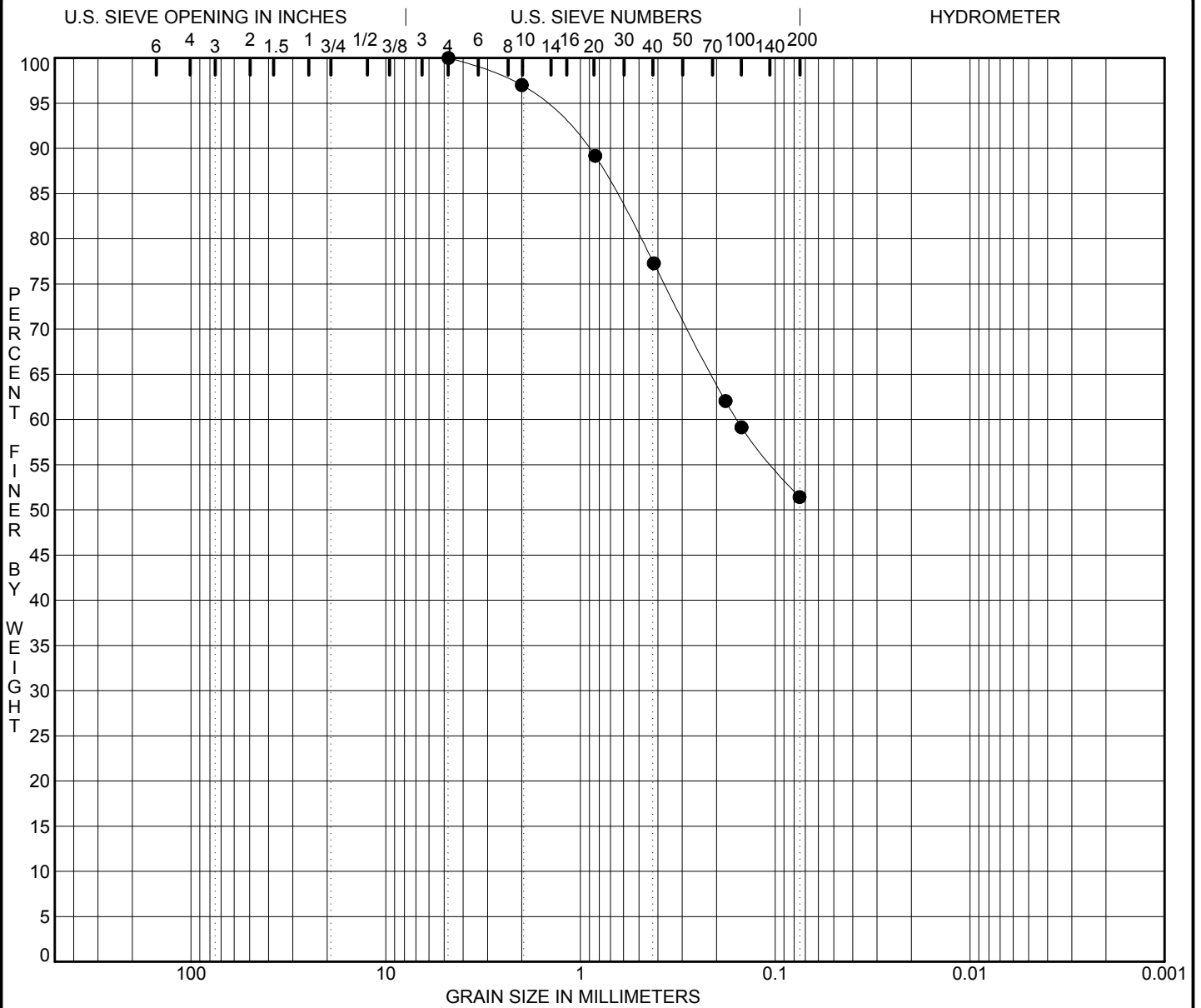
<b>BORING NO.</b>	RW-8				
<b>SAMPLE NO.</b>	12-0741C				
<b>SAMPLE DEPTH</b>	0.5"-1.0'				
<b>WATER CONTENT, W%</b>	17.6				

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					





COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification					MC%	LL	PL	PI	Cc	Cu
● RW-9 (0742B) 2.5	Red F/M Sandy SILT (ML) A-4(0)					24.5	NP	NP	NP		

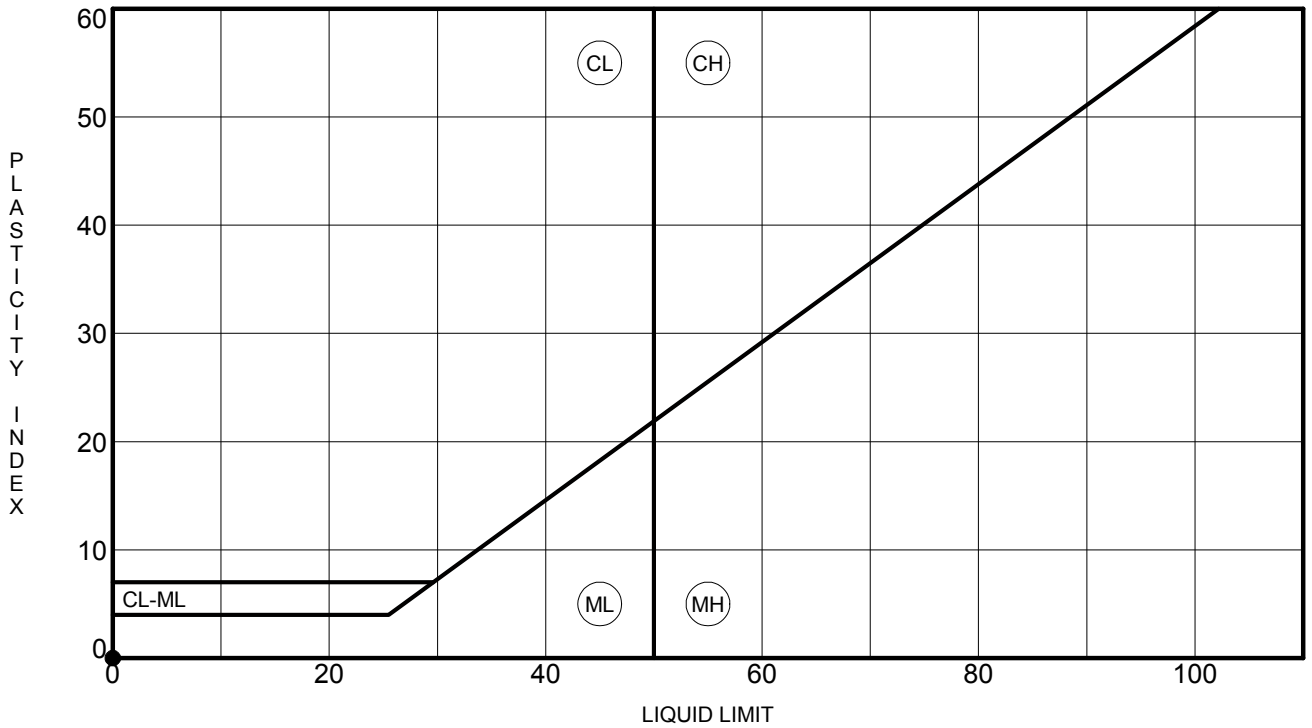
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● RW-9 (0742B) 2.5	4.76	0.16			0.0	48.6	51.4	

PROJECT **SC 557**  
 LOCATION York County, South Carolina

JOB NO. **G4843**  
 DATE **10/9/12**



### GRADATION CURVES



Specimen Identification	LL	PL	PI	Fines	Classification
● RW-9 (0742B) 2.5	NP	NP	NP	51	Red F/M Sandy SILT (ML) A-4(0)

US ATTERBERG LIMITS G4843LAB.GPJ US LAB.GDT 10/9/12

**ATTERBERG LIMITS' RESULTS**

Project: SC 557  
 Location: York County, South Carolina  
 Number: G4843



**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

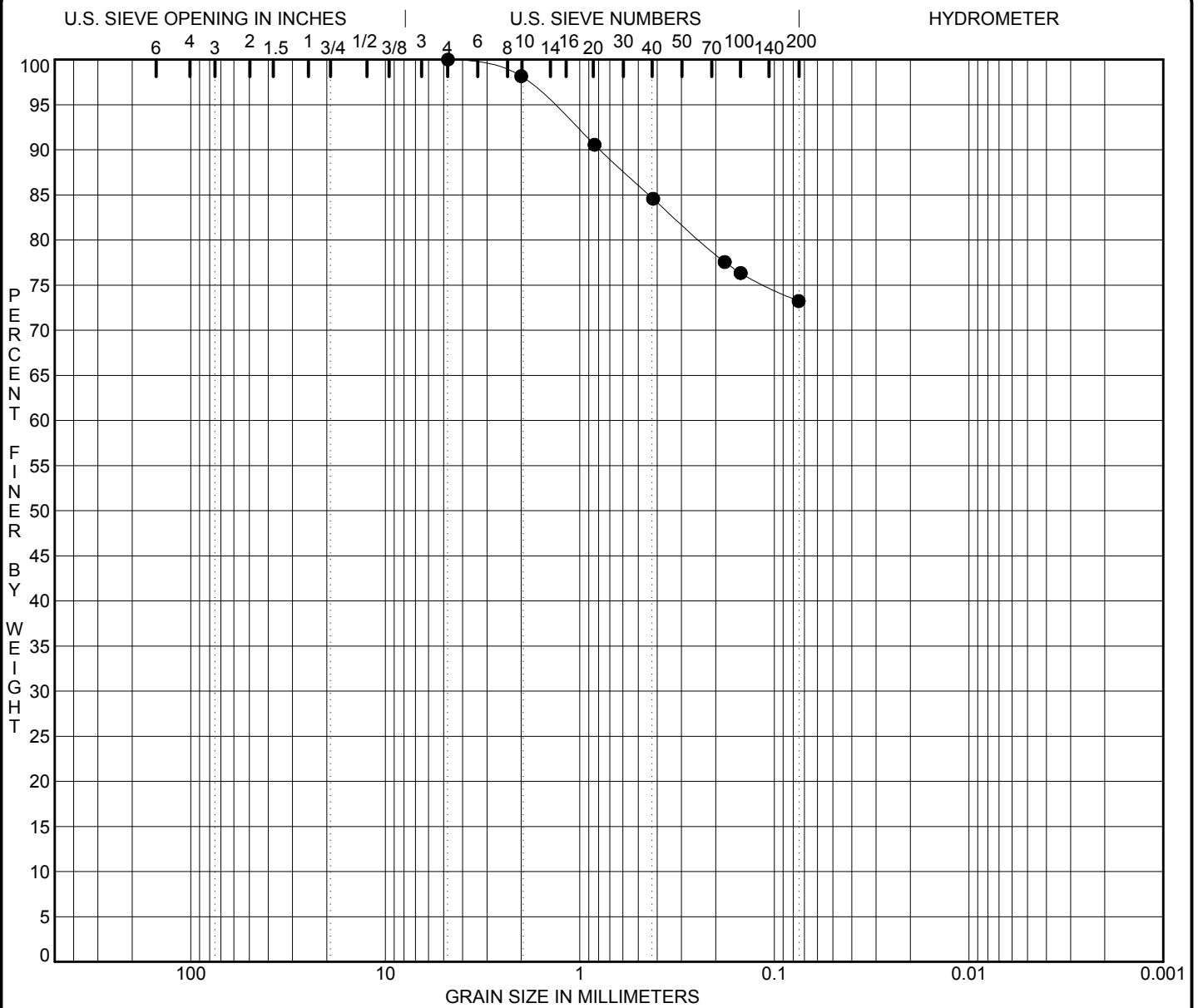
**PROJECT:** SC 557 **PROJECT NO.:** G4843  
**SAMPLE NUMBER:** 12-0742C **DATE SAMPLE RECEIVED:** 9/26/2012  
**DESCRIPTION OF SOIL:** Red F/M Sandy Silt (ML) A-4(0)  
**TESTED BY:** KB **DATE OF TESTING:** 9/26/2012  
**DATE OF WEIGHING:** 9/27/2012

<b>BORING NO.</b>	RW-9				
<b>SAMPLE NO.</b>	12-0742C				
<b>SAMPLE DEPTH</b>	2.0'-2.5'				
<b>WATER CONTENT, W%</b>	24.5				

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	MC%	LL	PL	PI	Cc	Cu
● RW-10 (0743B)4.0	Red Elastic SILT w/ F/M SAND (MH) A-7-5(11)	24.7	50	37	13		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● RW-10 (0743B)4.0	4.76				0.0	26.8	73.2	

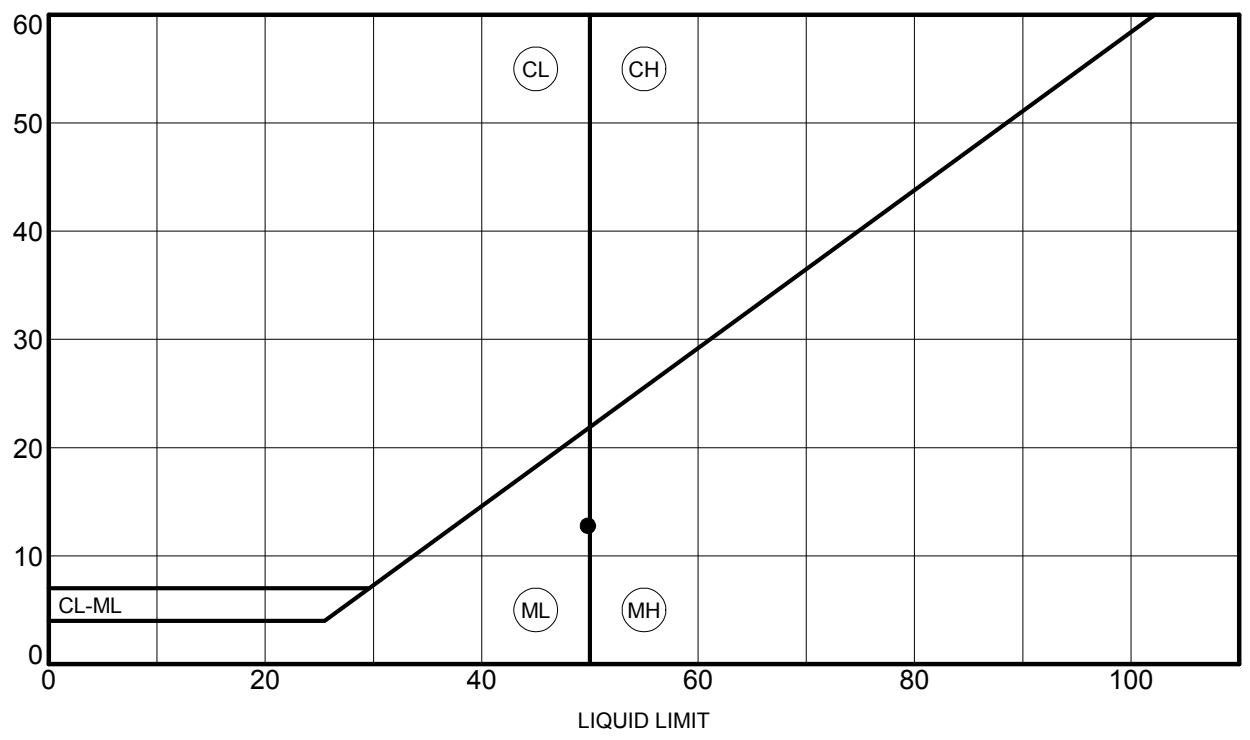
PROJECT **SC 557**  
 LOCATION **York County, South Carolina**

JOB NO. **G4843**  
 DATE **10/9/12**



### GRADATION CURVES

P L A S T I C I T Y  
I N D E X



Specimen Identification	LL	PL	PI	Fines	Classification	
● RW-10 (0743B)	4.0	50	37	13	73	Red Elastic SILT w/ F/M SAND (MH) A-7-5(11)

**ATTERBERG LIMITS' RESULTS**

Project: SC 557  
 Location: York County, South Carolina  
 Number: G4843



US ATTERBERG LIMITS G4843LAB.GPJ US LAB.GDT 10/9/12

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

**PROJECT:** SC 557 **PROJECT NO.:** G4843  
**SAMPLE NUMBER:** 12-0743C **DATE SAMPLE RECEIVED:** 9/26/2012  
**DESCRIPTION OF SOIL:** Red Elastic Silt w/ F/M Sand (MH) A-7-5(11)  
**TESTED BY:** KB **DATE OF TESTING:** 9/26/2012  
**DATE OF WEIGHING:** 9/27/2012

<b>BORING NO.</b>	RW-10				
<b>SAMPLE NO.</b>	12-0743C				
<b>SAMPLE DEPTH</b>	3.5'-4.0'				
<b>WATER CONTENT, W%</b>	24.7				

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

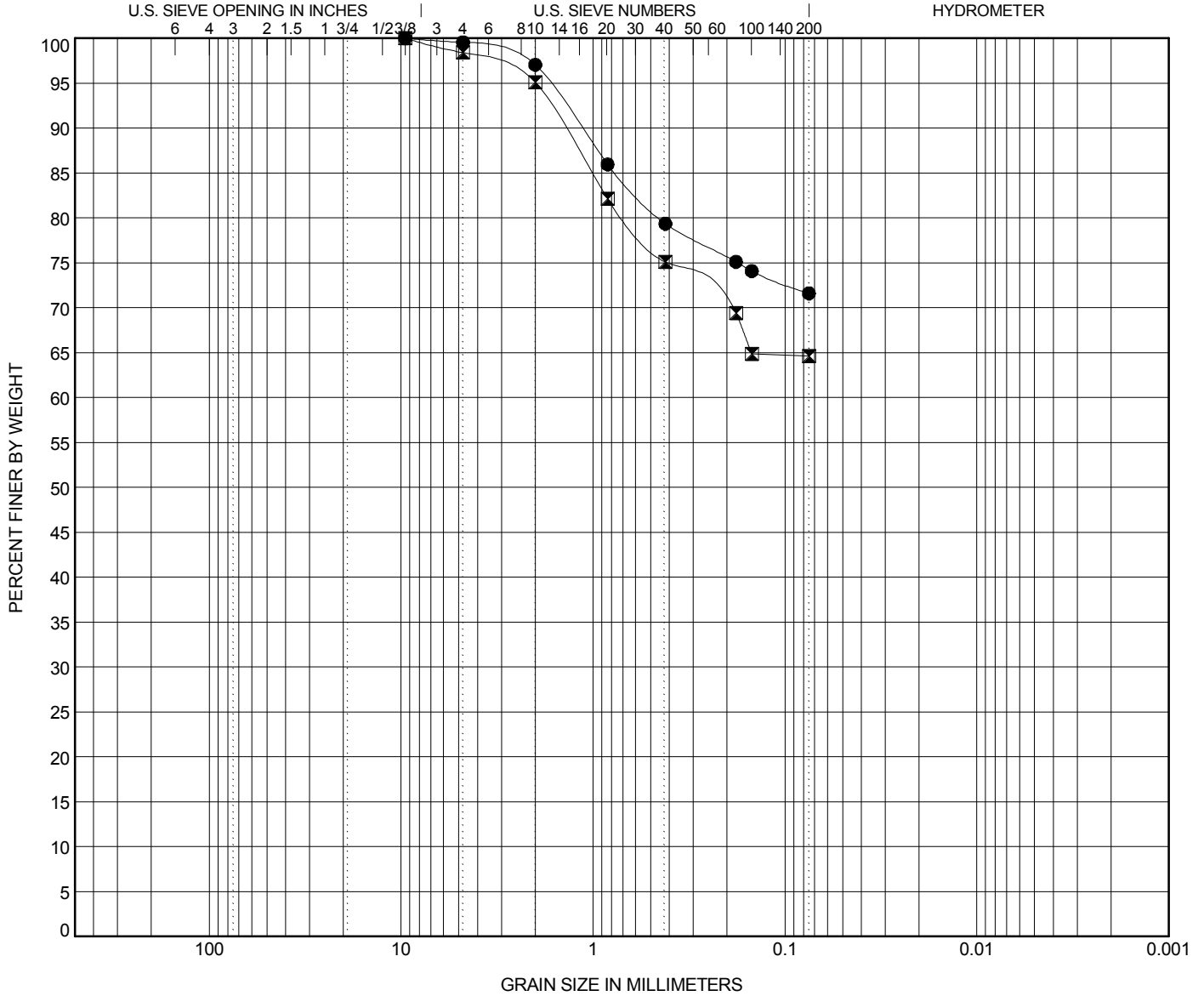


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● RW-11	2.0	Elastic SILT (MH) with Sand A-7-5(20)	72	44	28		
✕ RW-11	4.0	Sandy Elastic SILT (MH) A-7-5(17)	71	48	23		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● RW-11	2.0	9.52	1.701			0.4	27.9	71.6	
✕ RW-11	4.0	9.52	1.984			1.6	33.8	64.6	

GRAIN SIZE - SCDOT - G4843 - CURRENT - SC-557.GPJ FME2017.GDT 5/16/18

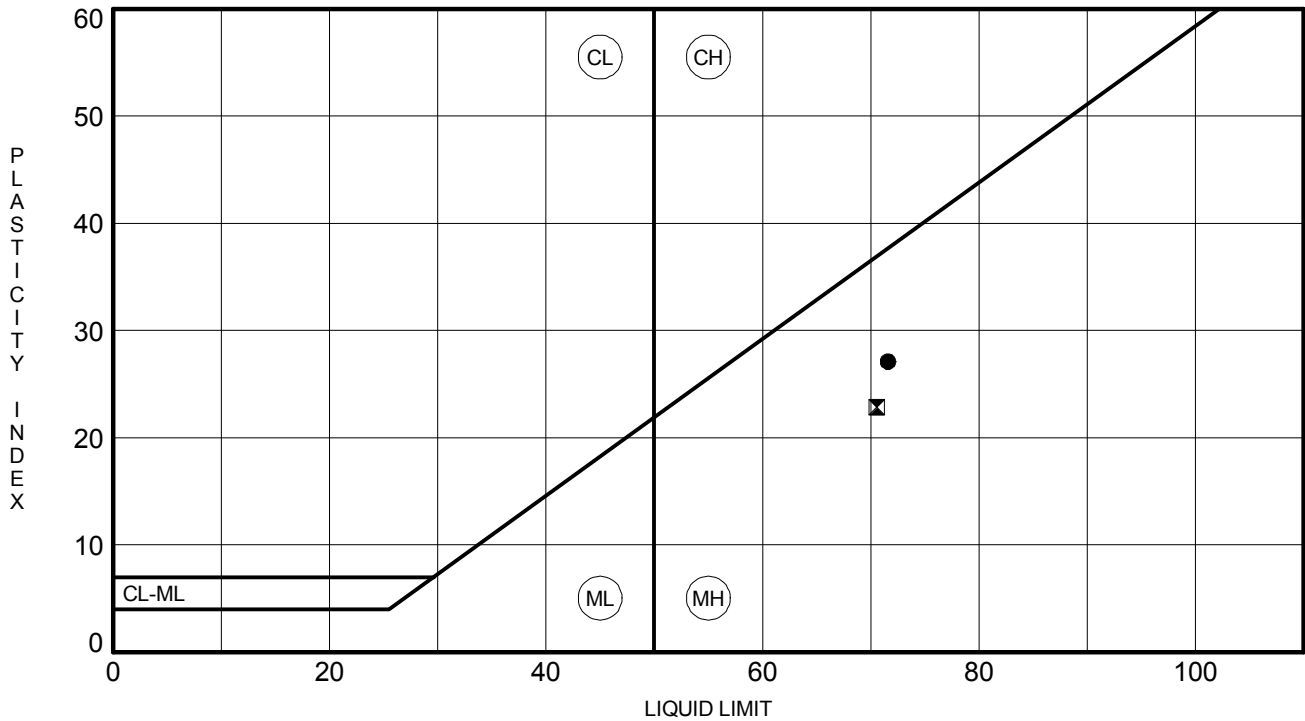


# ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● RW-11	2.0	72	44	28	72	Elastic SILT (MH) with Sand A-7-5(20)
☒ RW-11	4.0	71	48	23	65	Sandy Elastic SILT (MH) A-7-5(17)



**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

<b>PROJECT:</b> SC-557 Roadway Improvements/Bridge Replacement	<b>PROJECT NO.:</b> G4843
<b>SAMPLE NUMBER:</b> 18-0686	<b>DATE SAMPLE RECEIVED:</b> 4/24/2018
<b>DESCRIPTION OF SOIL:</b>	VARIOUS
<b>TESTED BY:</b> MB	<b>DATE OF TESTING:</b> 5/3/2018
	<b>DATE OF WEIGHING:</b> 5/4/2018

<b>BORING NO.</b>	RW-11	RW-11			
<b>SAMPLE NO.</b>	18-0686C DS-2	18-0686F DS-4			
<b>SAMPLE DEPTH</b>	1.5-2.0'	3.5-4.0'			
<b>WATER CONTENT, W%</b>	26.0	25.6			

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

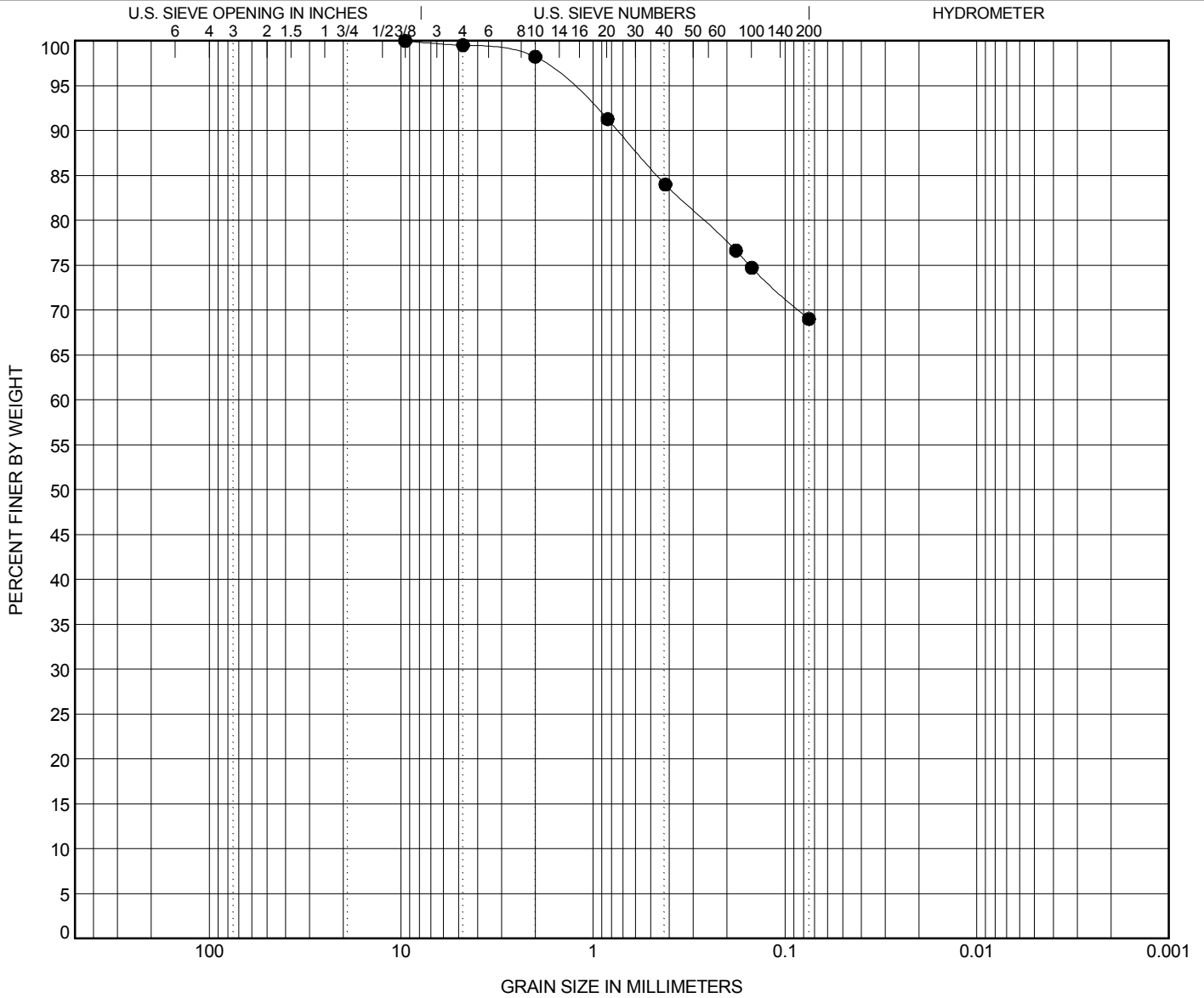


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● RW-12	4.0	<b>Sandy Fat CLAY (CH) A-7-6(16)</b>					<b>52</b>	<b>28</b>	<b>24</b>		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● RW-12	4.0	<b>9.52</b>	<b>1.335</b>			<b>0.5</b>	<b>30.5</b>	<b>69.0</b>	

GRAIN SIZE - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 7/12/18

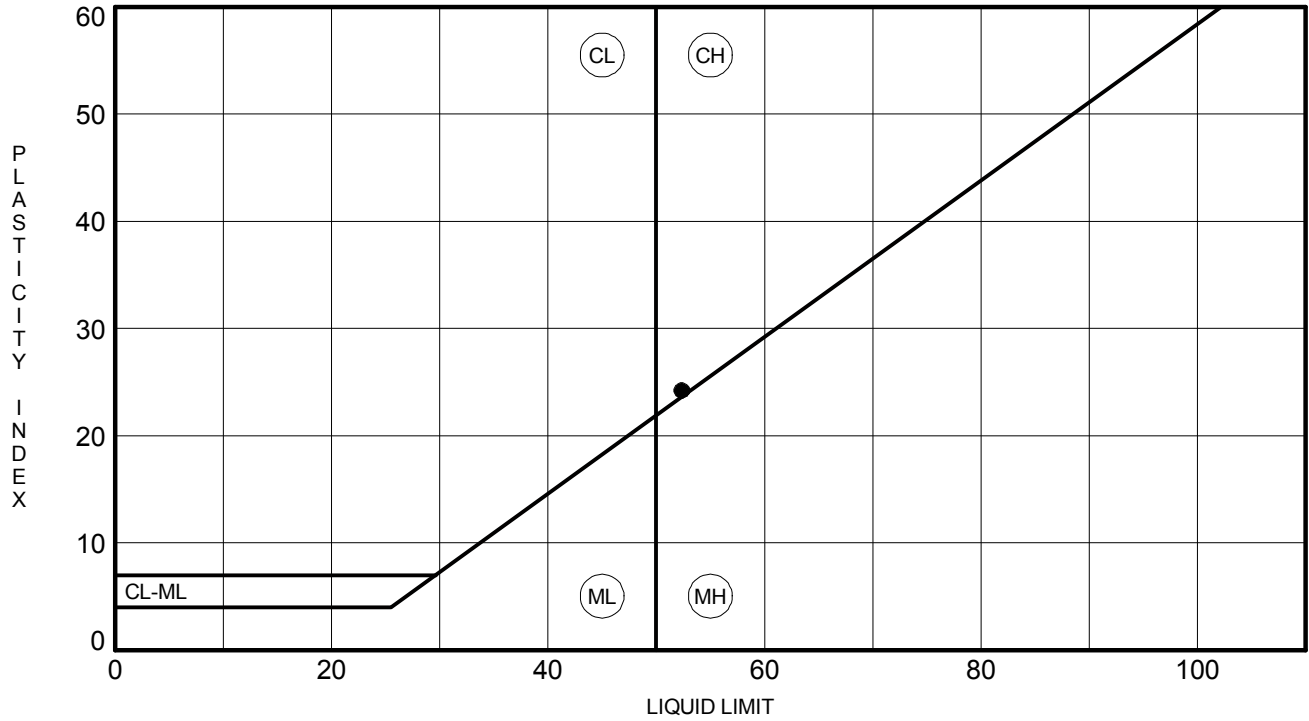


# ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● RW-12	4.0	52	28	24	69	Sandy Fat CLAY (CH) A-7-6(16)

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

**PROJECT:** SC-557 Roadway Improvements/Bridge Replacement

**PROJECT NO.:** G4843

**SAMPLE NUMBER:** 18-1194

**DATE SAMPLE RECEIVED:** 6/26/2018

**DESCRIPTION OF SOIL:** Sandy Fat CLAY (CH) A-7-6(16)

**TESTED BY:** MB

**DATE OF TESTING:** 6/26/2018

**DATE OF WEIGHING:** 6/27/2018

<b>BORING NO.</b>	RW-12				
<b>SAMPLE NO.</b>	18-1194C SS-2				
<b>SAMPLE DEPTH</b>	2.0-4.0'				
<b>WATER CONTENT, W%</b>	23.7				

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

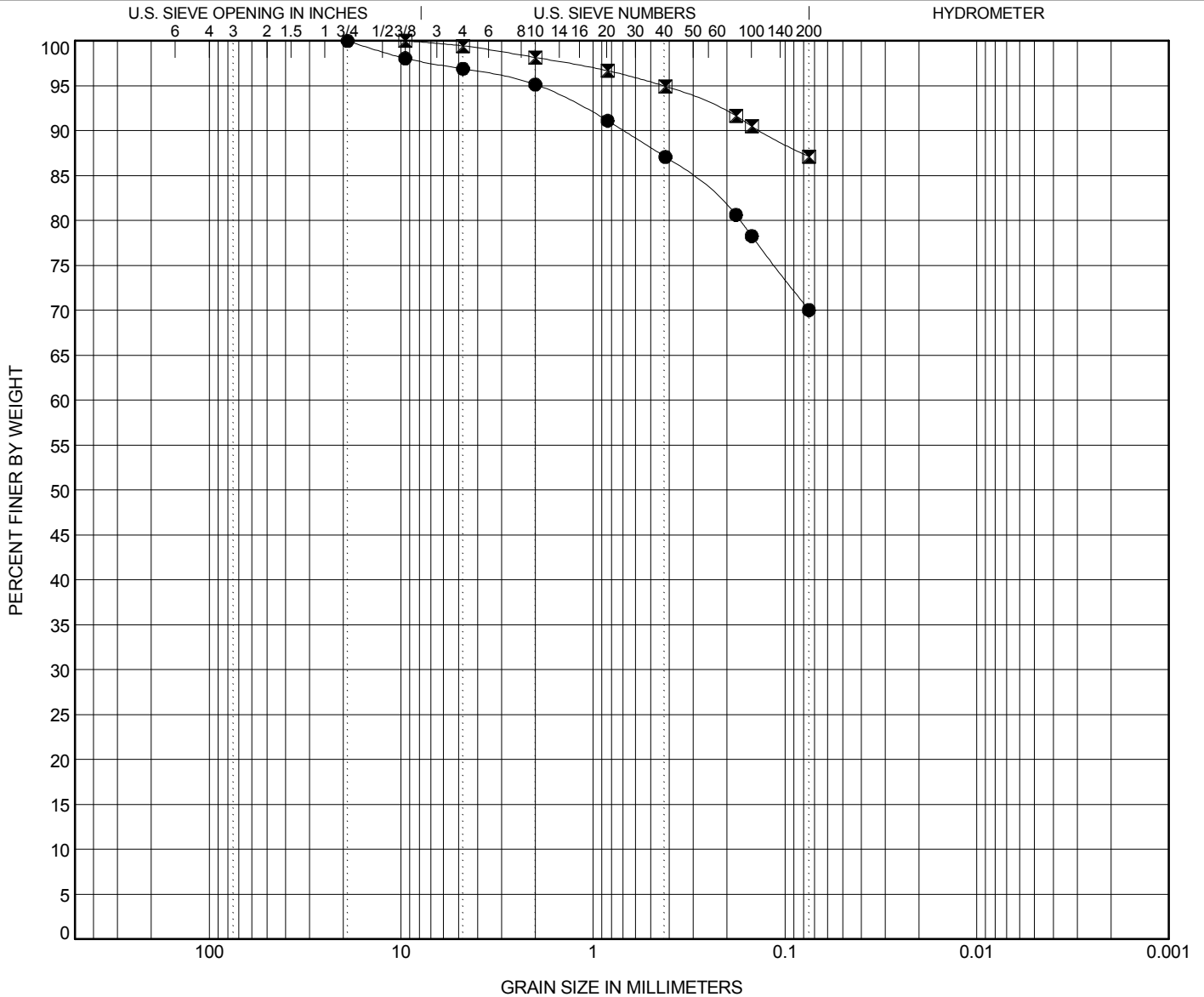


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● RW-13	4.0	Fat CLAY (CH) with Sand A-7-6(20)	57	29	28		
✕ RW-13	6.0	Fat CLAY (CH) A-7-6(20)	84	34	50		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● RW-13	4.0	19	1.934			3.1	26.9		70.0
✕ RW-13	6.0	9.52	0.428			0.6	12.3		87.1

GRAIN SIZE - SCDOT - G4843 - CURRENT - SC-557.GPJ FME2017.GDT 7/12/18

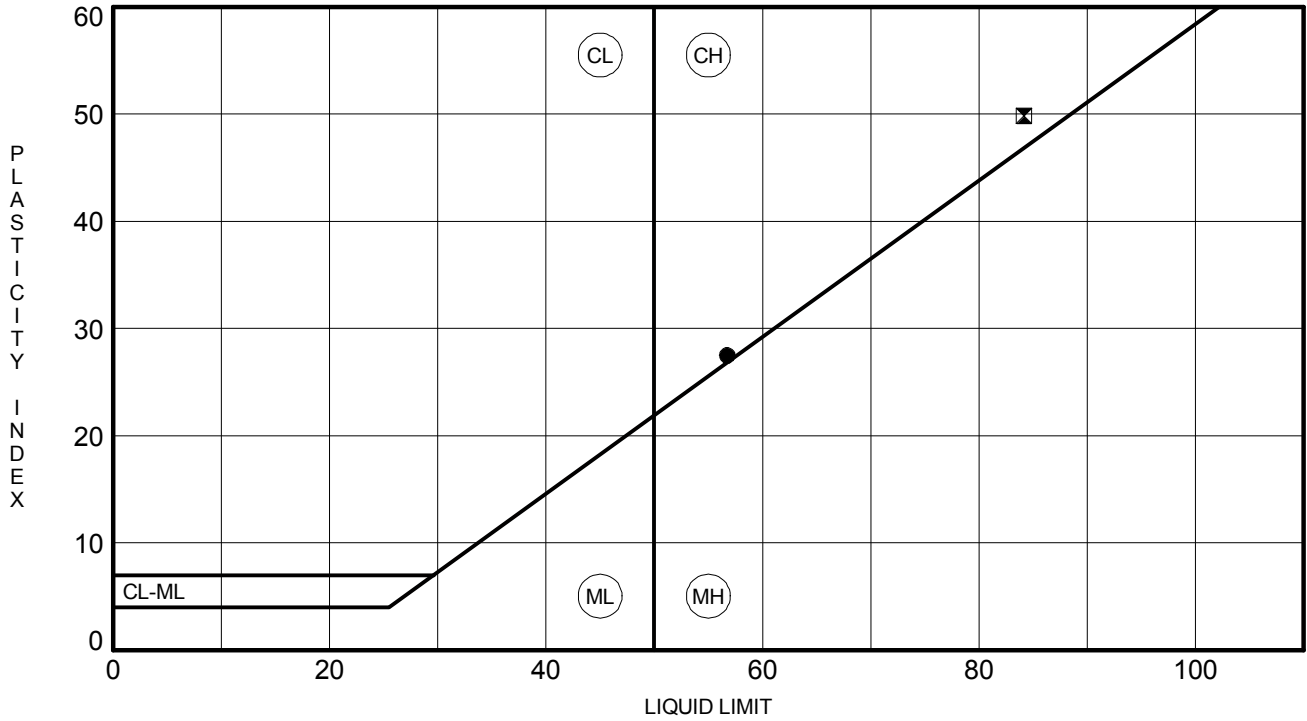


# ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● RW-13	4.0	57	29	28	70	Fat CLAY (CH) with Sand A-7-6(20)
☒ RW-13	6.0	84	34	50	87	Fat CLAY (CH) A-7-6(20)

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

**PROJECT:** SC-557 Roadway Improvements/Bridge Replacement

**PROJECT NO.:** G4843

**SAMPLE NUMBER:** 18-1195

**DATE SAMPLE RECEIVED:** 6/26/2018

**DESCRIPTION OF SOIL:**

VARIOUS

**TESTED BY:** MB

**DATE OF TESTING:** 6/26/2018

**DATE OF WEIGHING:** 6/27/2018

<b>BORING NO.</b>	RW-13	RW-13			
<b>SAMPLE NO.</b>	18-1195C SS-2	18-1195F SS-3			
<b>SAMPLE DEPTH</b>	2.0-4.0'	4.0-6.0'			
<b>WATER CONTENT, W%</b>	23.1	41.6			

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

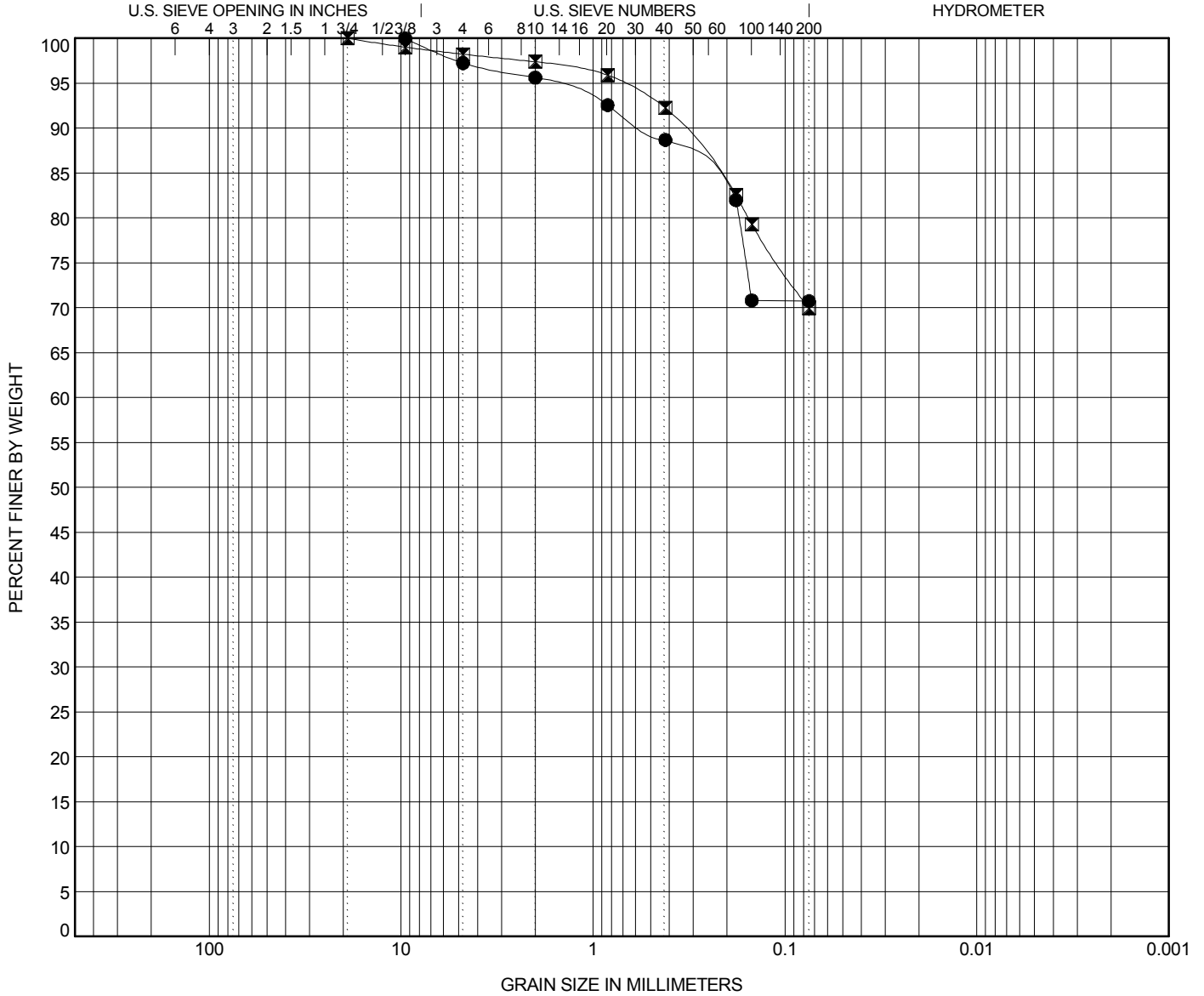


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● RW-14	2.0	Fat CLAY (CH) with Sand A-7-6(20)					54	25	29		
■ RW-14	5.0	Sandy Elastic SILT (MH) A-7-5(17)					57	34	23		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● RW-14	2.0	9.52	1.67			2.8	26.5	70.8	
■ RW-14	5.0	19	0.706			1.8	28.3	70.0	

GRAIN SIZE - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 5/16/18



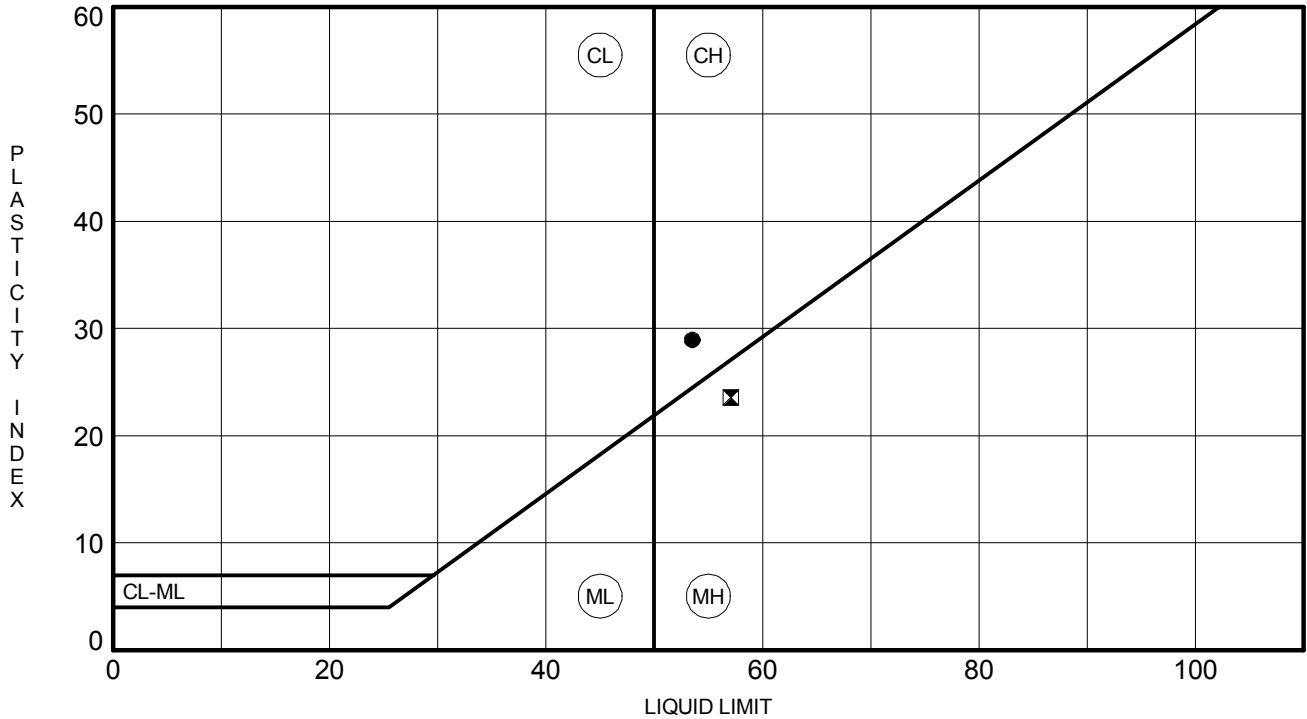


**ATTERBERG LIMITS' RESULTS**

**PROJECT ID** G4843.000

**PROJECT NAME** SC 557 Roadway Improvements/Bridge Replacement

**PROJECT COUNTY** York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● RW-14	2.0	54	25	29	71	<b>Fat CLAY (CH) with Sand A-7-6(20)</b>
☒ RW-14	5.0	57	34	23	70	<b>Sandy Elastic SILT (MH) A-7-5(17)</b>

ATTERBERG LIMITS - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 5/16/18

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

<b>PROJECT:</b> SC-557 Roadway Improvements/Bridge Replacement	<b>PROJECT NO.:</b> G4843
<b>SAMPLE NUMBER:</b> 18-0687	<b>DATE SAMPLE RECEIVED:</b> 4/24/2018
<b>DESCRIPTION OF SOIL:</b>	VARIOUS
<b>TESTED BY:</b> MB	<b>DATE OF TESTING:</b> 5/3/2018
	<b>DATE OF WEIGHING:</b> 5/4/2018

<b>BORING NO.</b>	RW-14	RW-14			
<b>SAMPLE NO.</b>	18-0687C DS-2	18-0687F DS-5			
<b>SAMPLE DEPTH</b>	1.5-2.0'	4.5-5.0'			
<b>WATER CONTENT, W%</b>	23.9	35.8			

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

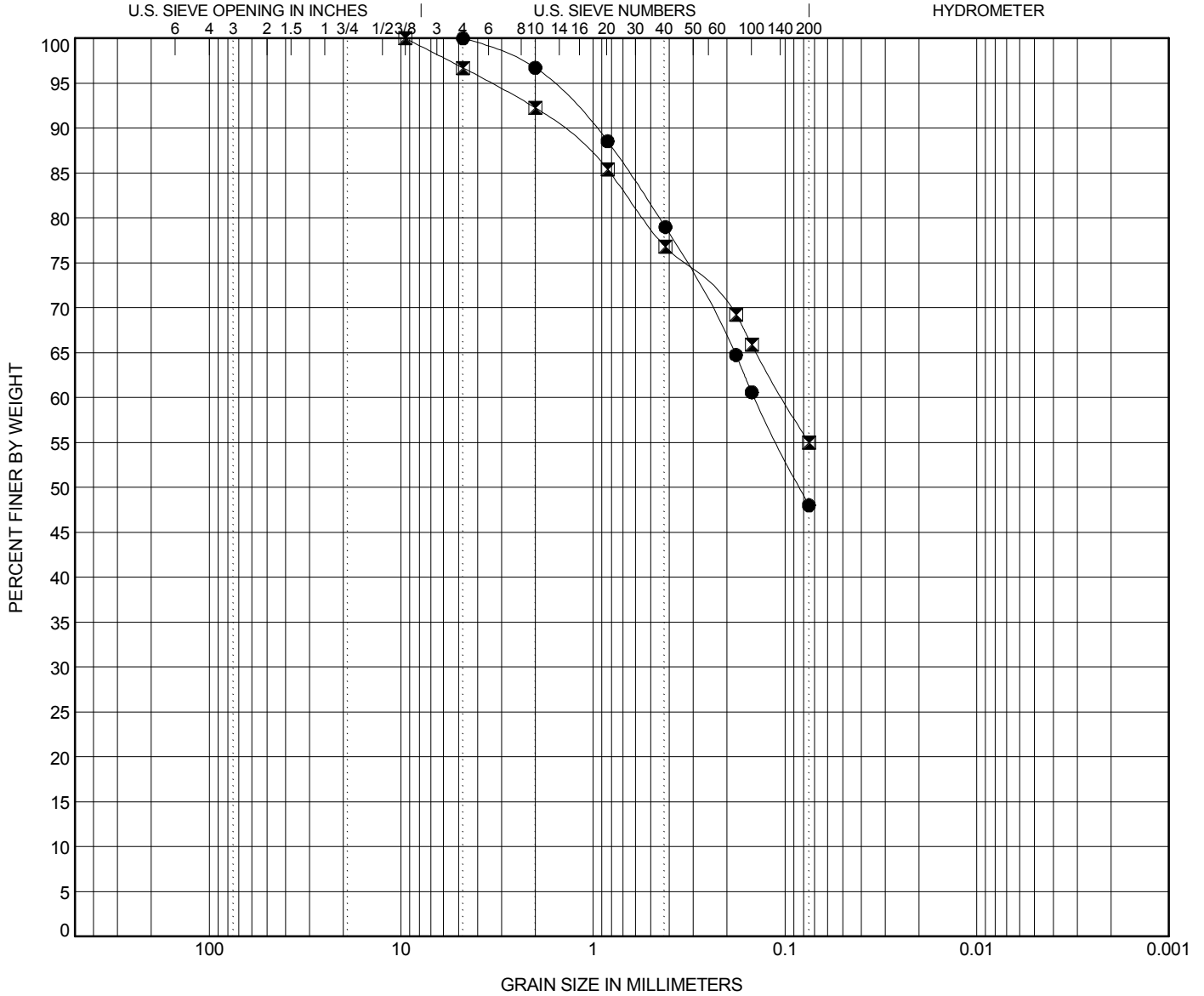


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● RW-15	2.0	Clayey F/M SAND (SC) A-6(3)	32	19	13		
☒ RW-15	8.0	Sandy Lean CLAY (CL) A-7-6(10)	42	18	24		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● RW-15	2.0	4.76	1.664	0.084		0.0	52.0		48.0
☒ RW-15	8.0	9.52	3.401			3.3	41.7		55.0

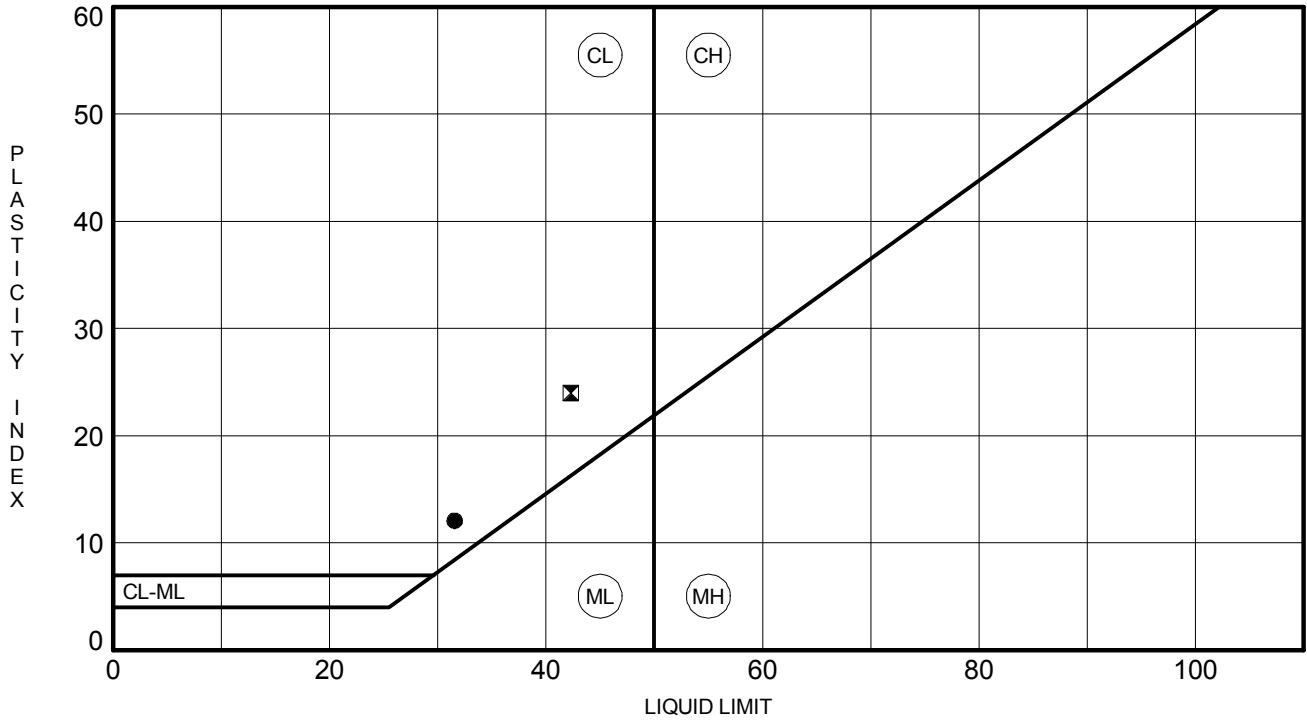


# ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● RW-15	2.0	32	19	13	48	Clayey F/M SAND (SC) A-6(3)
☒ RW-15	8.0	42	18	24	55	Sandy Lean CLAY (CL) A-7-6(10)

ATTERBERG LIMITS - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 7/12/18

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

**PROJECT:** SC-557 Roadway Improvements/Bridge Replacement

**PROJECT NO.:** G4843

**SAMPLE NUMBER:** 18-1174

**DATE SAMPLE RECEIVED:** 6/26/2018

**DESCRIPTION OF SOIL:**

VARIOUS

**TESTED BY:** MB

**DATE OF TESTING:** 6/26/2018

**DATE OF WEIGHING:** 6/27/2018

<b>BORING NO.</b>	RW-15	RW-15			
<b>SAMPLE NO.</b>	18-1174C SS-1	18-1174F SS-4			
<b>SAMPLE DEPTH</b>	0.0-2.0'	6.0-8.0'			
<b>WATER CONTENT, W%</b>	22.0	18.9			

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

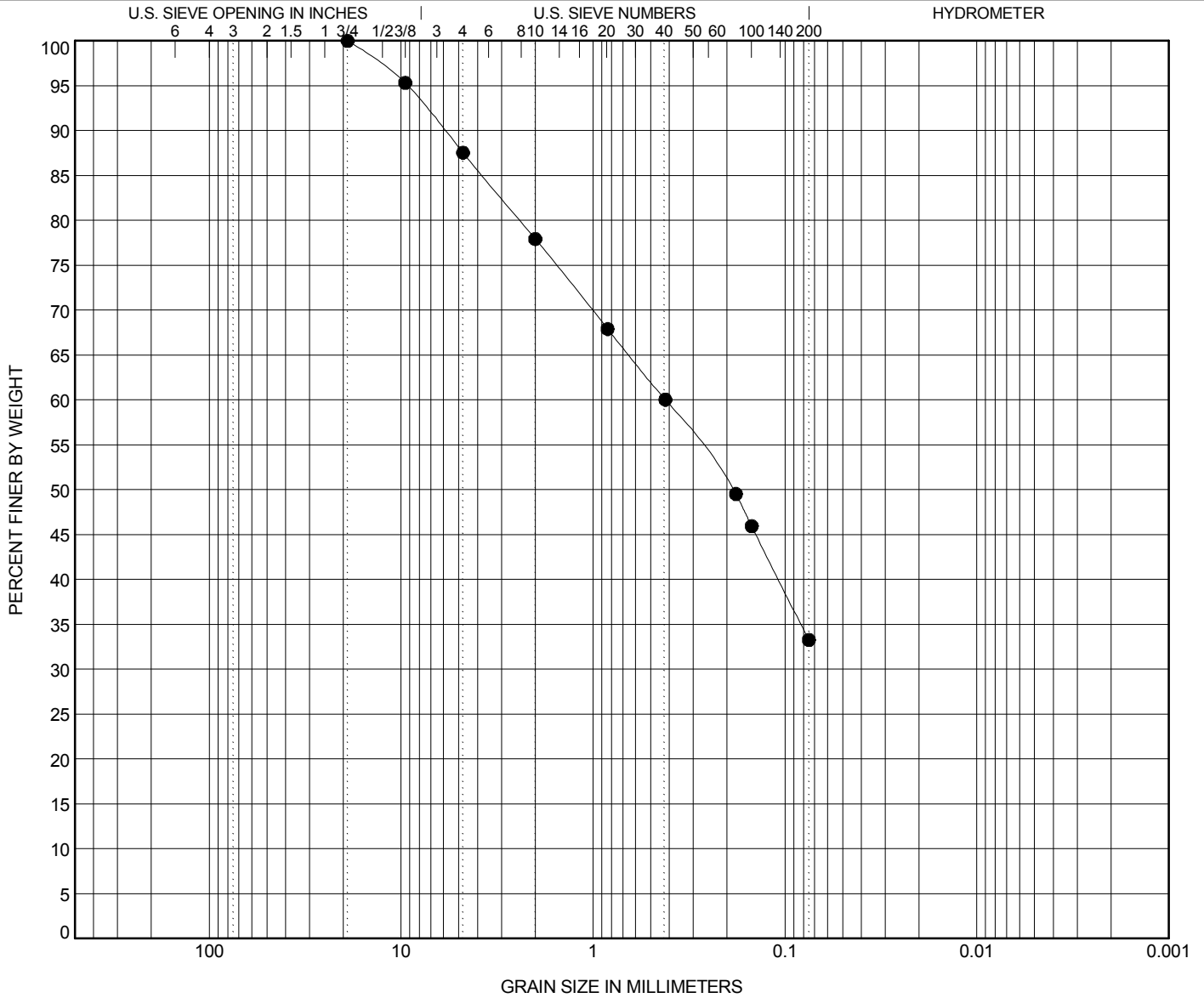


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● RW-16	2.0	<b>Silty Fine SAND (SM) A-2-4</b>					<b>NP</b>	<b>NP</b>	<b>NP</b>		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● RW-16	2.0	19	9.241	0.187		12.5	54.3	33.3	

GRAIN SIZE - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 5/16/18

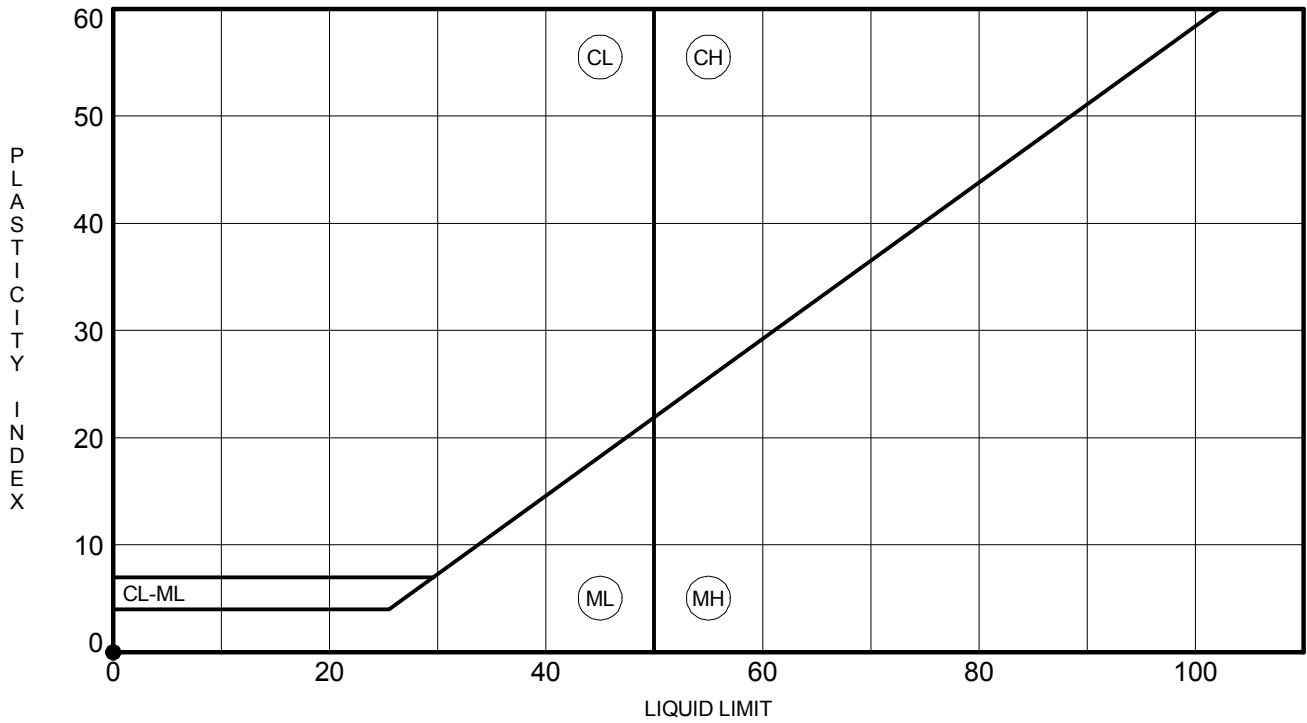


# ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● RW-16	2.0	NP	NP	NP	33	Silty Fine SAND (SM) A-2-4

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

<b>PROJECT:</b>	SC-557 Roadway Improvements/Bridge Replacement	<b>PROJECT NO.:</b>	G4843
<b>SAMPLE NUMBER:</b>	18-0688	<b>DATE SAMPLE RECEIVED:</b>	4/24/2018
<b>DESCRIPTION OF SOIL:</b>	Silty Fine SAND (SM) A-2-4		
<b>TESTED BY:</b>	MB	<b>DATE OF TESTING:</b>	5/3/2018
		<b>DATE OF WEIGHING:</b>	5/4/2018

<b>BORING NO.</b>	RW-16				
<b>SAMPLE NO.</b>	18-0688C DS-2				
<b>SAMPLE DEPTH</b>	1.5-2.0'				
<b>WATER CONTENT, W%</b>	9.8				

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					



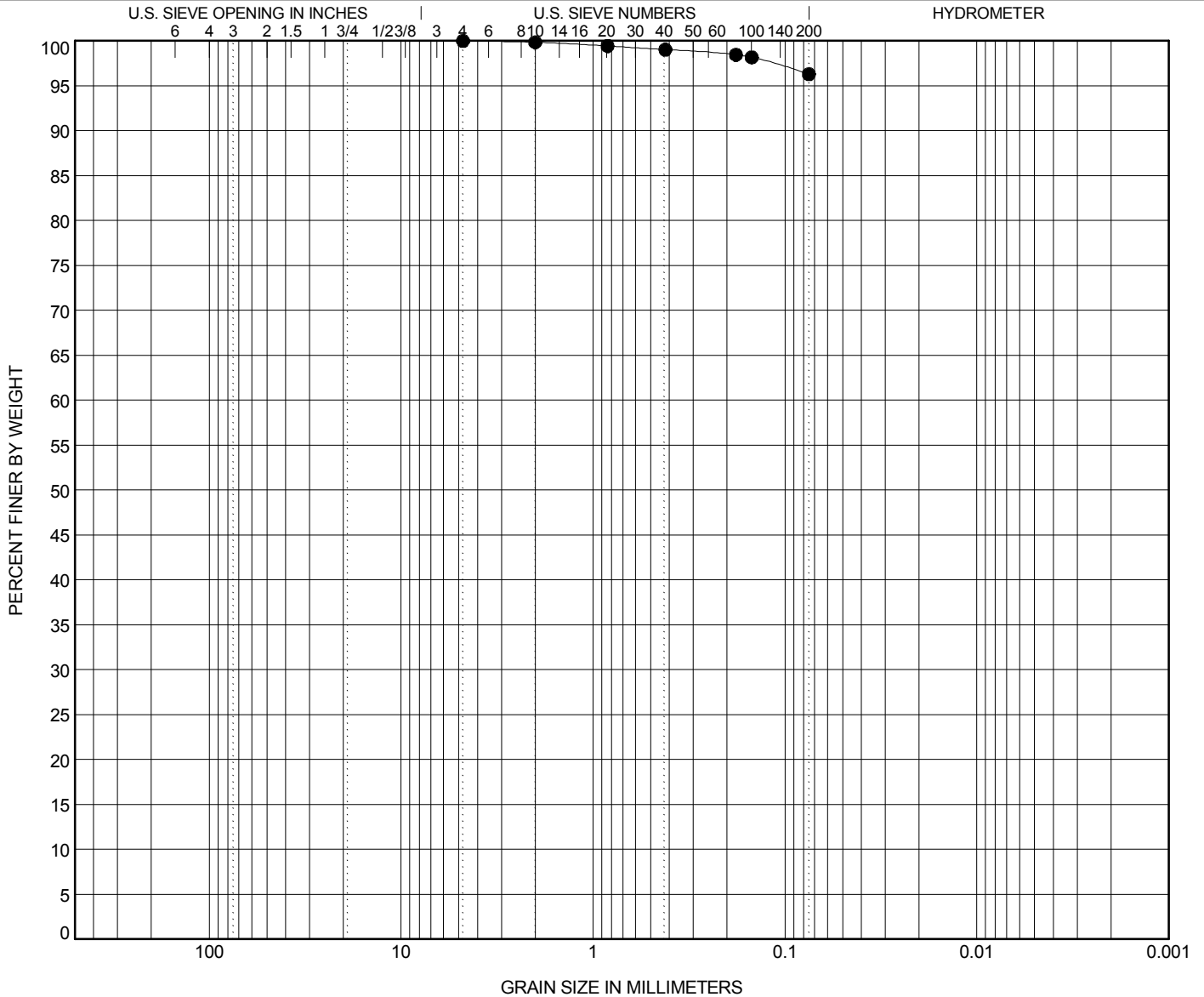


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● RW-17	4.0	<b>SILT (ML) A-7-5(20)</b>					<b>49</b>	<b>30</b>	<b>19</b>		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● RW-17	4.0	<b>4.76</b>				<b>0.0</b>	<b>3.7</b>	<b>96.3</b>	

GRAIN SIZE - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 7/12/18

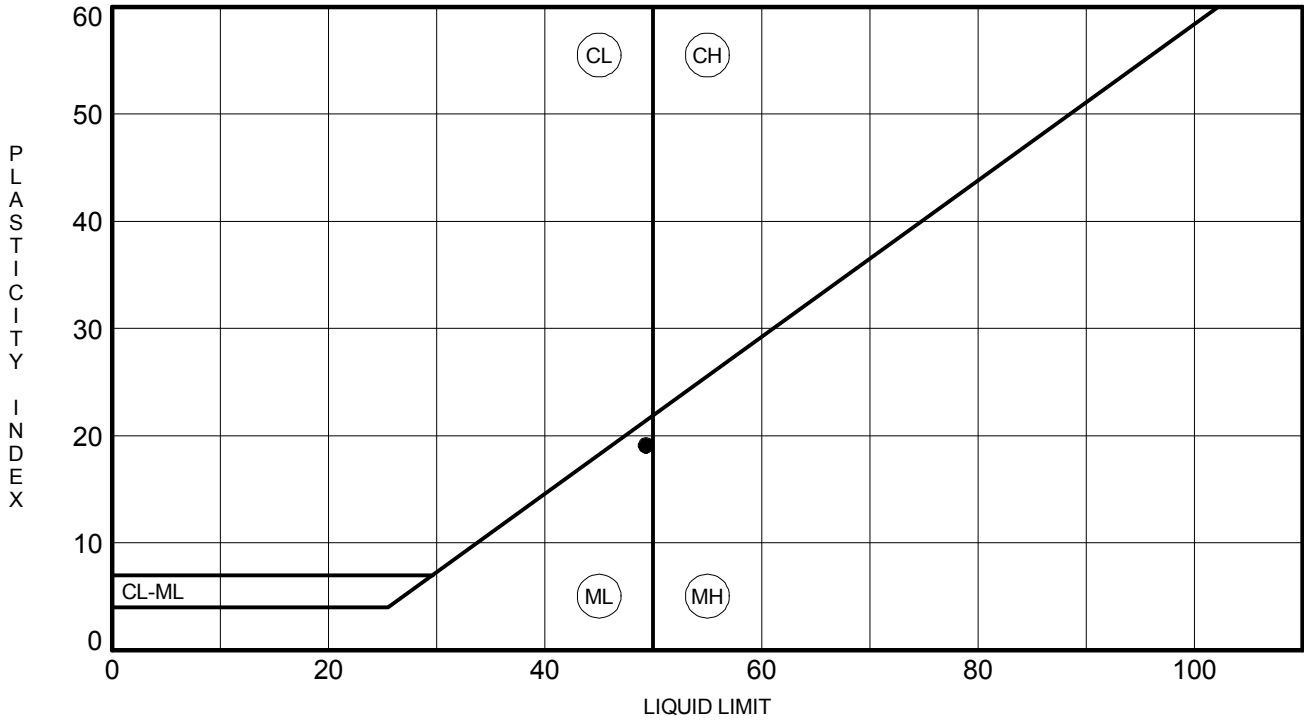


# ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● RW-17	4.0	49	30	19	96	SILT (ML) A-7-5(20)

ATTERBERG LIMITS - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 7/12/18

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

**PROJECT:** SC-557 Roadway Improvements/Bridge Replacement

**PROJECT NO.:** G4843

**SAMPLE NUMBER:** 18-1186

**DATE SAMPLE RECEIVED:** 6/26/2018

**DESCRIPTION OF SOIL:** SILT (ML) A-7-5(20)

**TESTED BY:** MB

**DATE OF TESTING:** 6/26/2018

**DATE OF WEIGHING:** 6/27/2018

<b>BORING NO.</b>	RW-17				
<b>SAMPLE NO.</b>	18-1186C SS-2				
<b>SAMPLE DEPTH</b>	2.0-4.0'				
<b>WATER CONTENT, W%</b>	26.2				

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

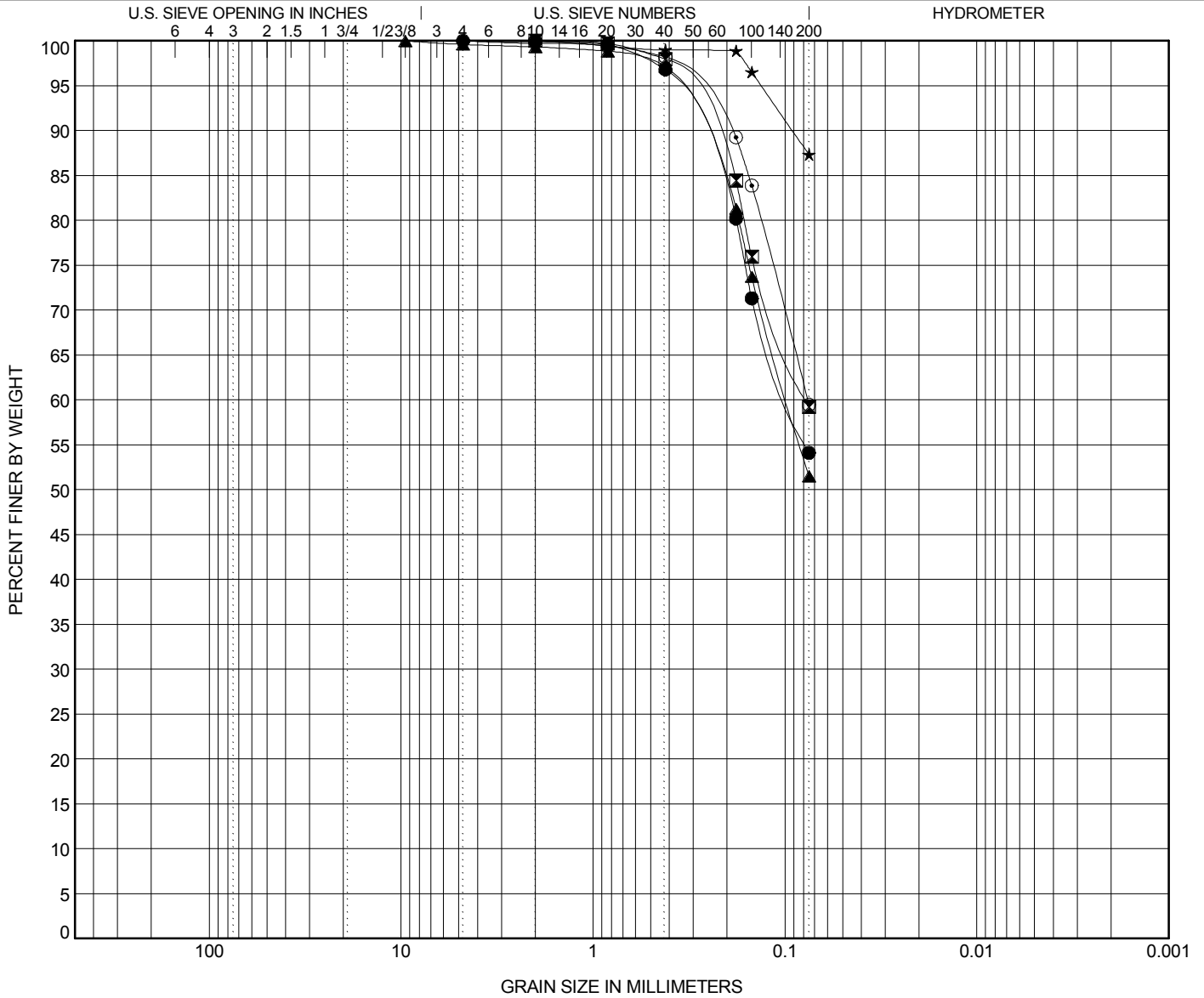


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Bridge over Crowders Creek

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● RW-18	2.0	Sandy Lean CLAY (CL) A-7-6(10)	44	20	24		
☒ RW-18	4.0	Sandy Lean CLAY (CL) A-7-6(10)	43	22	21		
▲ RW-18	6.0	Sandy SILT (ML) A-4(0)	NP	NP	NP		
★ RW-18	10.0	SILT (ML) A-4(0)	NP	NP	NP		
⊙ RW-18	15.0	Sandy SILT (ML) A-4(0)	NP	NP	NP		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● RW-18	2.0	4.76	0.383			0.0	45.9	54.1	
☒ RW-18	4.0	2	0.348			0.0	40.8	59.2	
▲ RW-18	6.0	9.52	0.375			0.4	48.1	51.5	
★ RW-18	10.0	4.76	0.133			0.0	12.6	87.4	
⊙ RW-18	15.0	2	0.31			0.0	40.5	59.5	

GRAIN SIZE - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 7/16/18

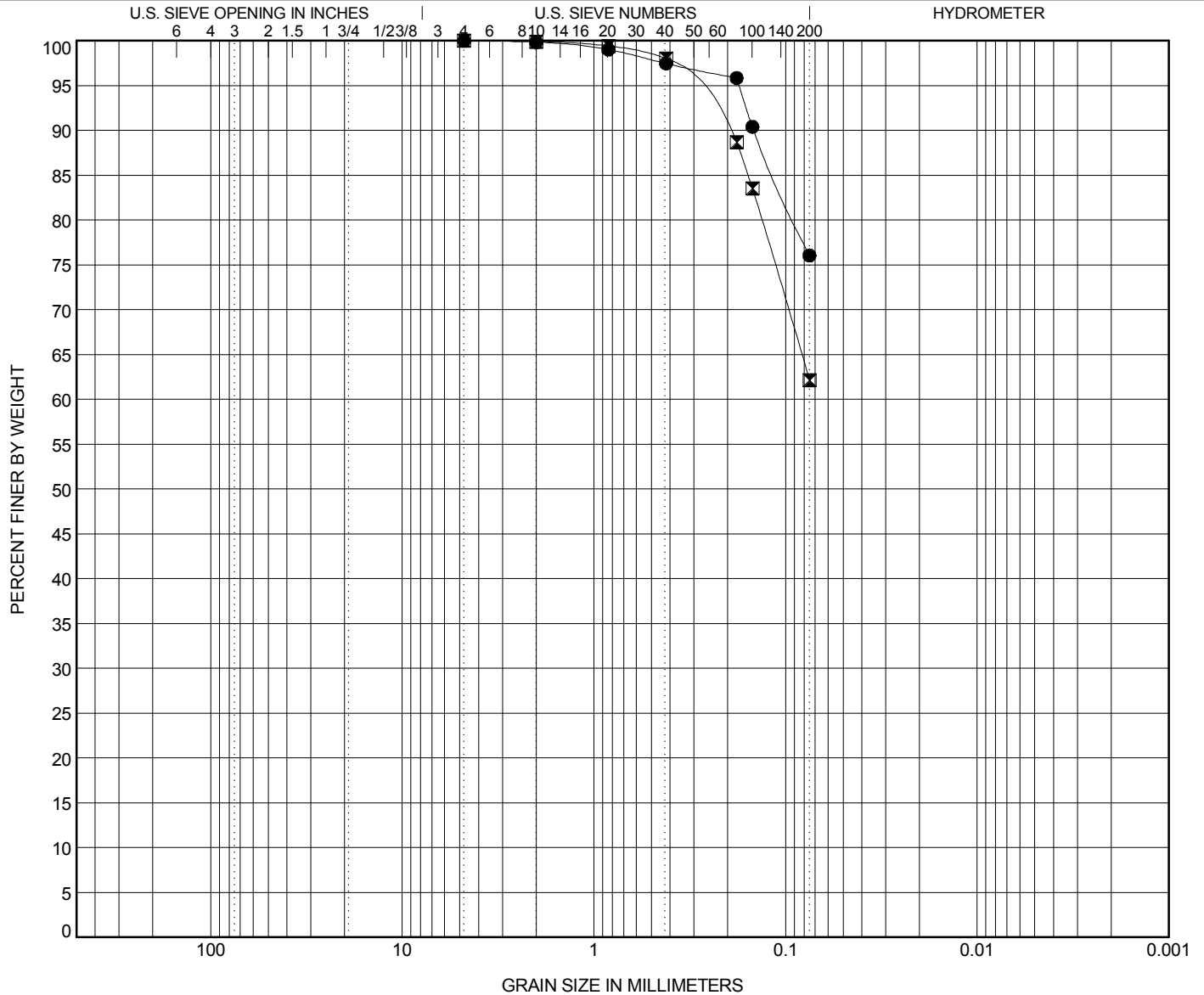


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Bridge over Crowders Creek

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● RW-18	20.0	<b>SILT (ML) with Sand A-4(0)</b>	<b>NP</b>	<b>NP</b>	<b>NP</b>		
☒ RW-18	25.0	<b>Sandy SILT (ML) A-4(0)</b>	<b>NP</b>	<b>NP</b>	<b>NP</b>		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● RW-18	20.0	<b>4.76</b>	<b>0.175</b>			<b>0.0</b>	<b>23.9</b>	<b>76.1</b>	
☒ RW-18	25.0	<b>4.76</b>	<b>0.318</b>			<b>0.0</b>	<b>37.8</b>	<b>62.2</b>	

GRAIN SIZE - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 7/16/18

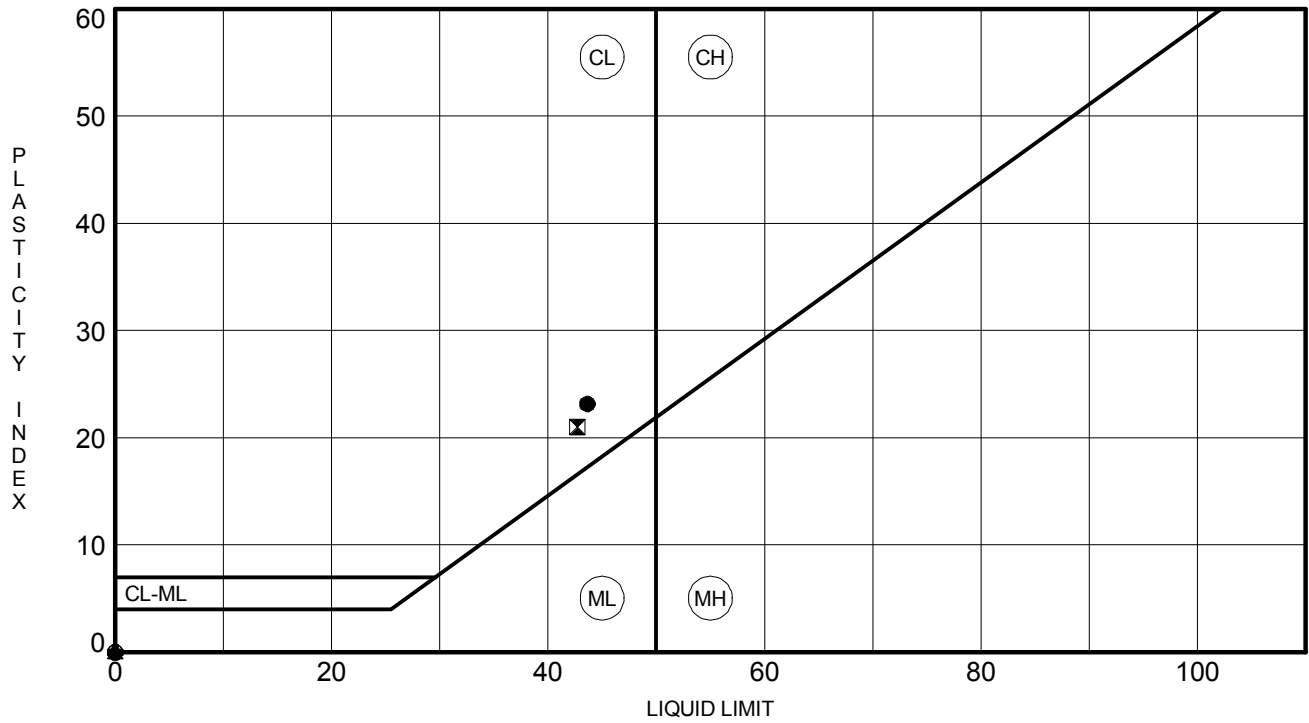


# ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Bridge over Crowders Creek

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● RW-18	2.0	44	20	24	54	Sandy Lean CLAY (CL) A-7-6(10)
⊠ RW-18	4.0	43	22	21	59	Sandy Lean CLAY (CL) A-7-6(10)
▲ RW-18	6.0	NP	NP	NP	52	Sandy SILT (ML) A-4(0)
★ RW-18	10.0	NP	NP	NP	87	SILT (ML) A-4(0)
⊙ RW-18	15.0	NP	NP	NP	59	Sandy SILT (ML) A-4(0)
⊕ RW-18	20.0	NP	NP	NP	76	SILT (ML) with Sand A-4(0)
○ RW-18	25.0	NP	NP	NP	62	Sandy SILT (ML) A-4(0)

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

**PROJECT:** SC-557 Roadway Improvements/Bridge Replacement

**PROJECT NO.:** G4843

**SAMPLE NUMBER:** 18-1150

**DATE SAMPLE RECEIVED:** 6/12/2018

**DESCRIPTION OF SOIL:**

Various

**TESTED BY:** MB

**DATE OF TESTING:** 6/12/2018

**DATE OF WEIGHING:** 6/13/2018

<b>BORING NO.</b>	RW-18	RW-18	RW-18	RW-18	RW-18
<b>SAMPLE NO.</b>	18-1150C SS-1	18-1150F SS-2	18-1150I SS-3	18-1150L SS-5	18-1150O SS-6
<b>SAMPLE DEPTH</b>	0.0-2.0'	2.0-4.0'	4.0-6.0'	8.0-10.0'	13.5-15.0'
<b>WATER CONTENT, W%</b>	23.8	27.2	20.9	65.2	38.5

<b>BORING NO.</b>	RW-18	RW-18			
<b>SAMPLE NO.</b>	18-1150R SS-7	18-1150U SS-8			
<b>SAMPLE DEPTH</b>	18.5-20.0'	23.5-25.0'			
<b>WATER CONTENT, W%</b>	46.1	40.1			

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

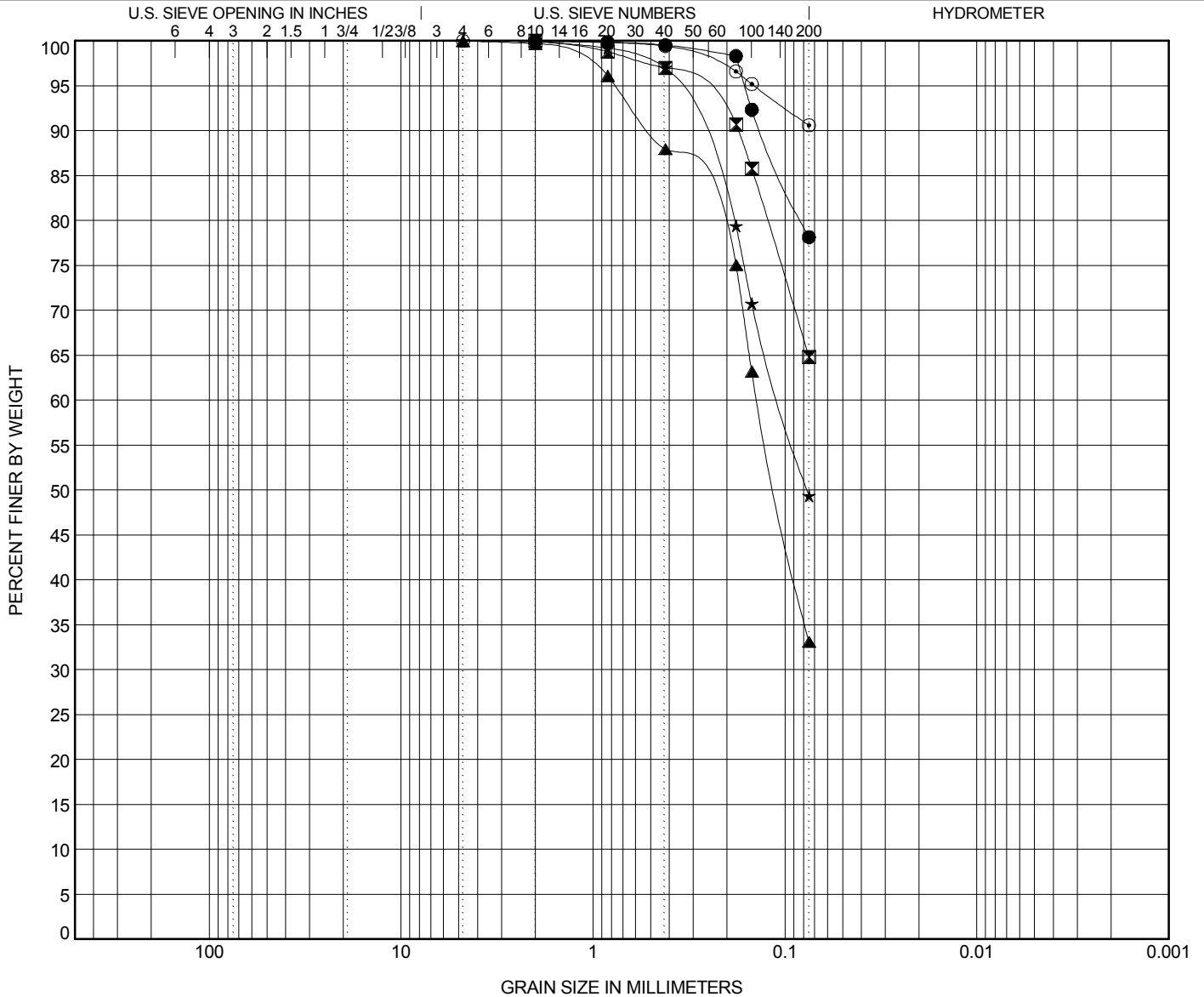


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● RW-19	2.0	SILT (ML) with Sand A-4(0)					NP	NP	NP		
☒ RW-19	4.0	Sandy SILT (ML) A-4(4)					37	31	6		
▲ RW-19	6.0	Silty Fine SAND (SM) A-2-4					NP	NP	NP		
★ RW-19	8.0	Silty Fine SAND (SM) A-2-4					32	28	4		
⊙ RW-19	10.0	Silty CLAY (CL-ML) A-4(2)					24	20	4		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● RW-19	2.0	2	0.162			0.0	21.8	78.2	
☒ RW-19	4.0	2	0.32			0.0	35.2	64.8	
▲ RW-19	6.0	4.76	0.762	0.11		0.0	66.9	33.1	
★ RW-19	8.0	4.76	0.381	0.077		0.0	50.6	49.4	
⊙ RW-19	10.0	4.76	0.144			0.0	9.4	90.6	

GRAIN SIZE - SCDOT - G4843 - CURRENT - SC-557.GPJ FME2017.GDT 6/18/18



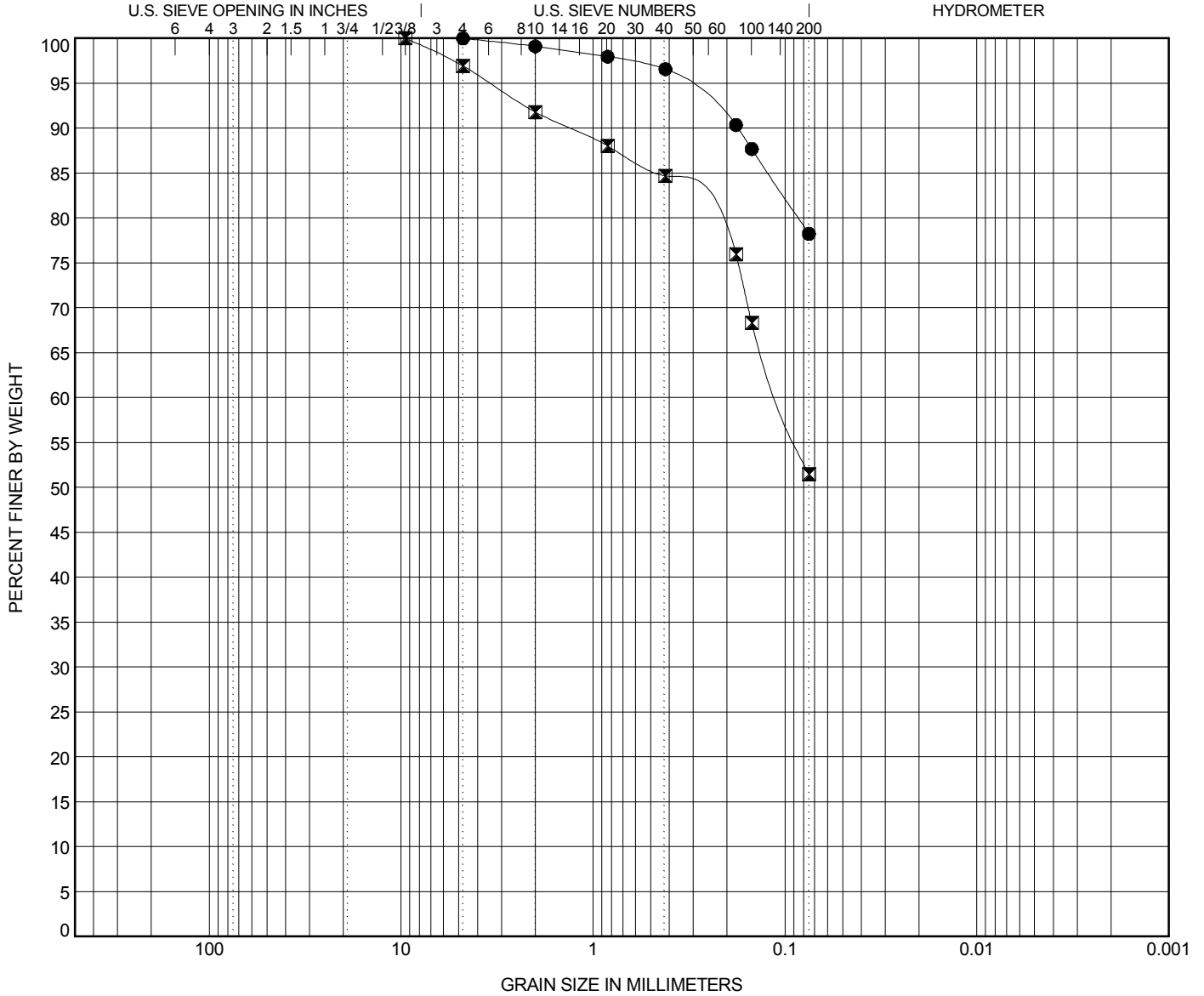


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● RW-19	15.0	<b>Silty CLAY (CL-ML) with Sand A-4(4)</b>	<b>28</b>	<b>21</b>	<b>7</b>		
☒ RW-19	20.0	<b>SILT (ML) A-4(1)</b>	<b>23</b>	<b>21</b>	<b>2</b>		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● RW-19	15.0	<b>4.76</b>	<b>0.338</b>			<b>0.0</b>	<b>21.8</b>	<b>78.2</b>	
☒ RW-19	20.0	<b>9.52</b>	<b>3.431</b>			<b>3.1</b>	<b>45.5</b>	<b>51.5</b>	

GRAIN SIZE - SCDOT - G4843 - CURRENT - SC-557.GPJ FME2017.GDT 6/18/18

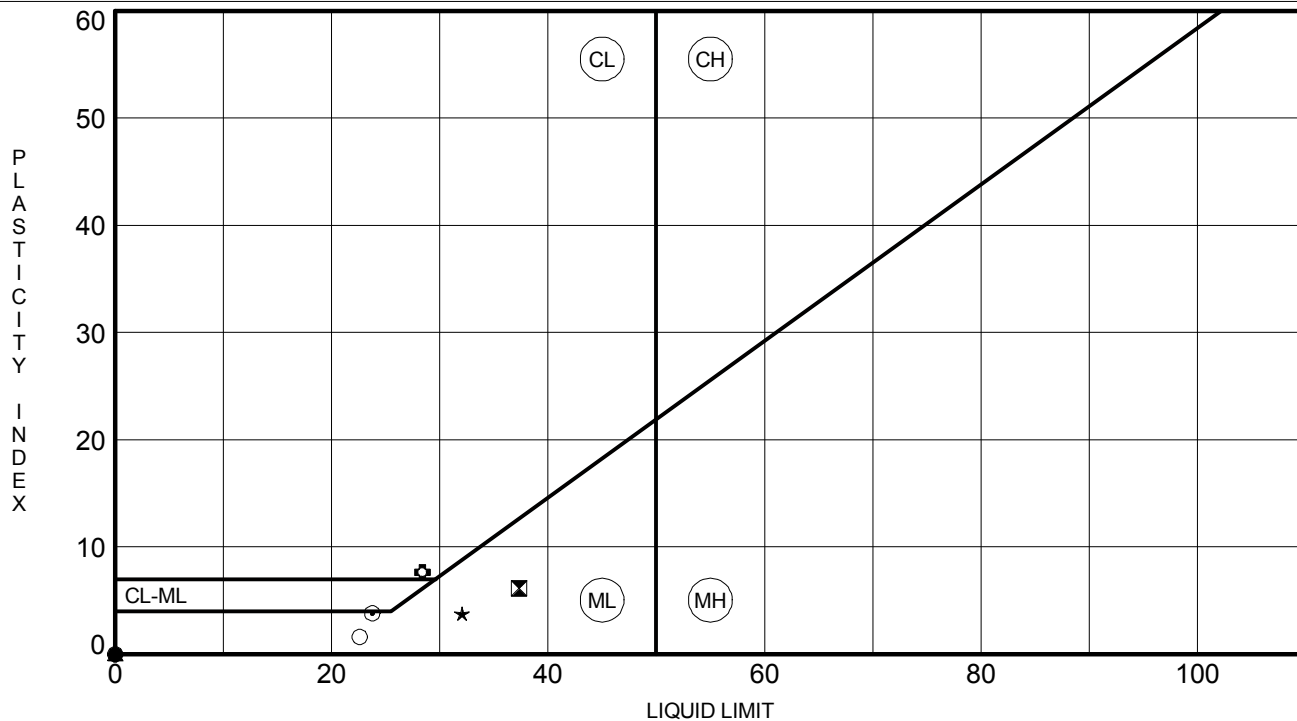


# ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● RW-19	2.0	NP	NP	NP	78	SILT (ML) with Sand A-4(0)
☒ RW-19	4.0	37	31	6	65	Sandy SILT (ML) A-4(4)
▲ RW-19	6.0	NP	NP	NP	33	Silty Fine SAND (SM) A-2-4
★ RW-19	8.0	32	28	4	49	Silty Fine SAND (SM) A-2-4
⊙ RW-19	10.0	24	20	4	91	Silty CLAY (CL-ML) A-4(2)
⊕ RW-19	15.0	28	21	7	78	Silty CLAY (CL-ML) with Sand A-4(4)
○ RW-19	20.0	23	21	2	51	SILT (ML) A-4(1)

ATTERBERG LIMITS - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 6/18/18

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

**PROJECT:** SC-557 Roadway Improvements/Bridge Replacement

**PROJECT NO.:** G4843

**SAMPLE NUMBER:** 18-1111

**DATE SAMPLE RECEIVED:** 6/12/2018

**DESCRIPTION OF SOIL:** Various

**TESTED BY:** MB

**DATE OF TESTING:** 6/12/2018

**DATE OF WEIGHING:** 6/13/2018

<b>BORING NO.</b>	RW-19	RW-19	RW-19	RW-19	RW-19
<b>SAMPLE NO.</b>	18-1111C SS-1	18-1111F SS-2	18-1111I SS-3	18-1111L SS-4	18-1111O SS-5
<b>SAMPLE DEPTH</b>	0.0-2.0'	2.0-4.0'	4.0-6.0'	6.0-8.0'	8.0-10.0'
<b>WATER CONTENT, W%</b>	35.7	45.2	29.5	30.5	44.7

<b>BORING NO.</b>	RW-19	RW-19			
<b>SAMPLE NO.</b>	18-1111R SS-6	18-1111U SS-7			
<b>SAMPLE DEPTH</b>	13.5-15.0'	18.5-20.0'			
<b>WATER CONTENT, W%</b>	36.5	25.3			

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

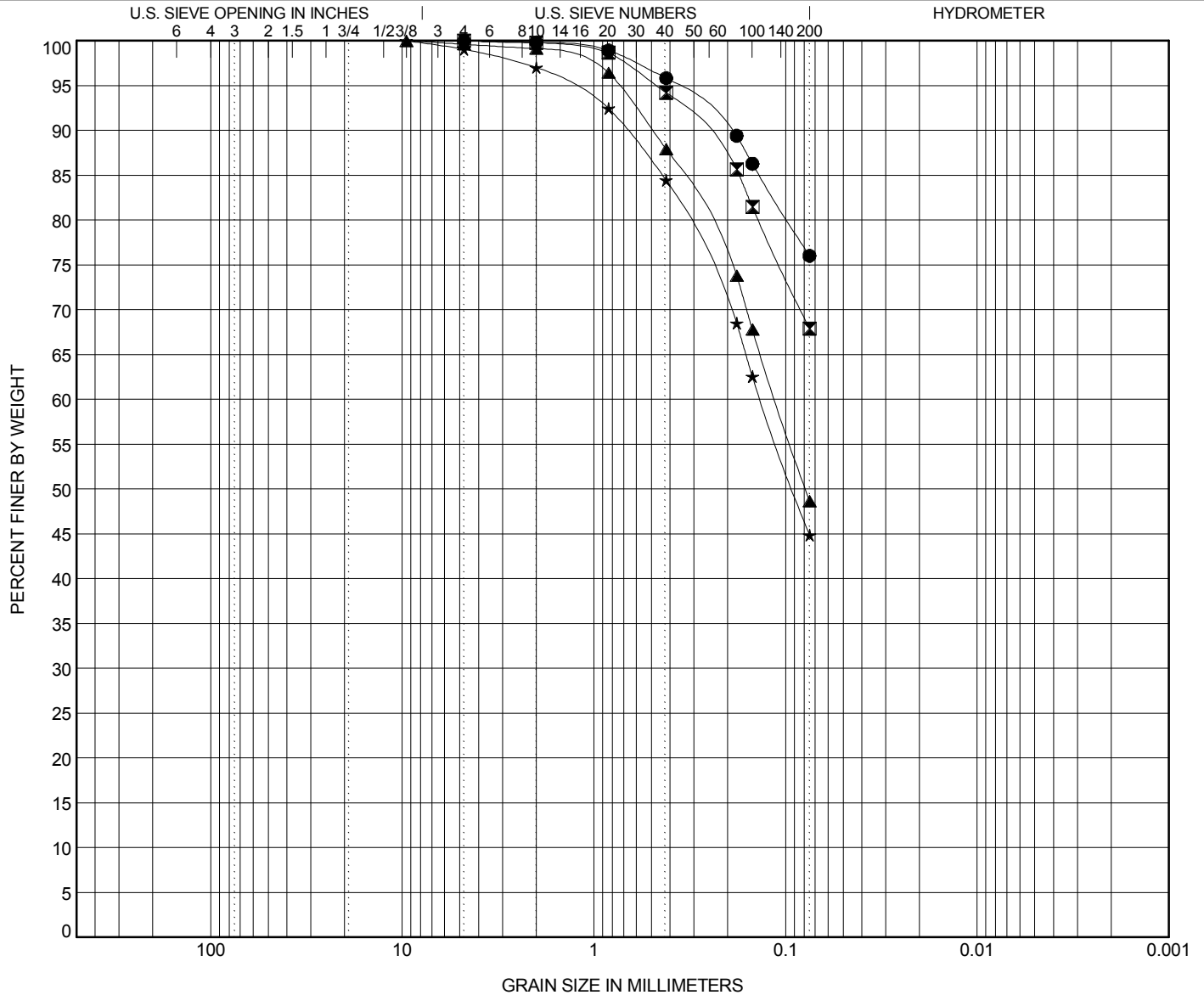


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● RW-20	4.0	Lean CLAY (CL) with Sand A-7-6(13)	41	24	17		
☒ RW-20	6.0	Sandy Lean CLAY (CL) A-6(9)	38	23	15		
▲ RW-20	15.0	Silty F/M SAND (SM) A-4(0)	NP	NP	NP		
★ RW-20	25.0	Silty F/M SAND (SM) A-4(0)	NP	NP	NP		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● RW-20	4.0	4.76	0.376			0.0	24.0	76.0	
☒ RW-20	6.0	4.76	0.474			0.0	32.1	67.9	
▲ RW-20	15.0	9.52	0.746	0.079		0.4	51.0	48.6	
★ RW-20	25.0	9.52	1.36	0.092		0.9	54.2	44.9	

GRAIN SIZE - SCDOT - G4843 - CURRENT - SC-557.GPJ FME2017.GDT 7/12/18

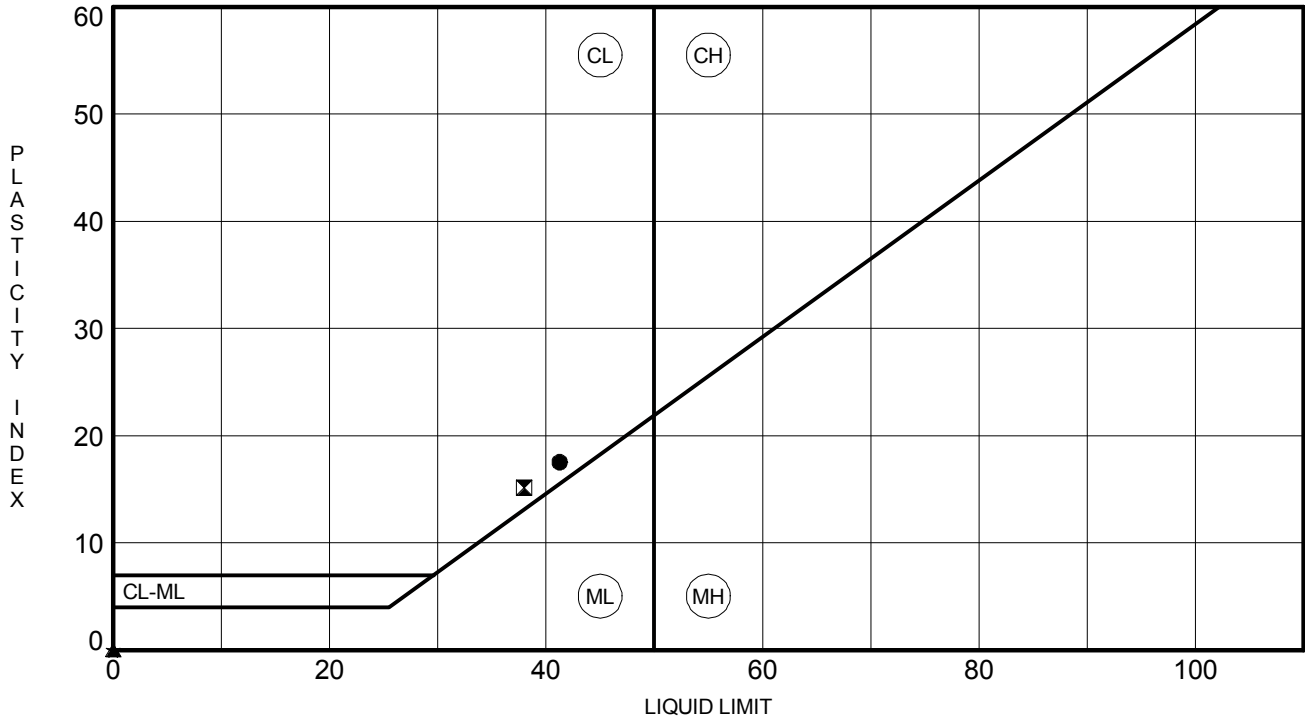


# ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● RW-20	4.0	41	24	17	76	Lean CLAY (CL) with Sand A-7-6(13)
☒ RW-20	6.0	38	23	15	68	Sandy Lean CLAY (CL) A-6(9)
▲ RW-20	15.0	NP	NP	NP	49	Silty F/M SAND (SM) A-4(0)
★ RW-20	25.0	NP	NP	NP	45	Silty F/M SAND (SM) A-4(0)

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

**PROJECT:** SC-557 Roadway Improvements/Bridge Replacement

**PROJECT NO.:** G4843

**SAMPLE NUMBER:** 18-1187

**DATE SAMPLE RECEIVED:** 6/26/2018

**DESCRIPTION OF SOIL:** VARIOUS

**TESTED BY:** MB

**DATE OF TESTING:** 6/26/2018

**DATE OF WEIGHING:** 6/27/2018

<b>BORING NO.</b>	RW-20	RW-20	RW-20	RW-20	
<b>SAMPLE NO.</b>	18-1187C SS-2	18-1187F SS-3	18-1187I SS-6	18-1187L SS-8	
<b>SAMPLE DEPTH</b>	2.0-4.0'	4.0-6.0'	13.5-15.0'	23.5-25.0'	
<b>WATER CONTENT, W%</b>	29.7	30.8	36.8	14.5	

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

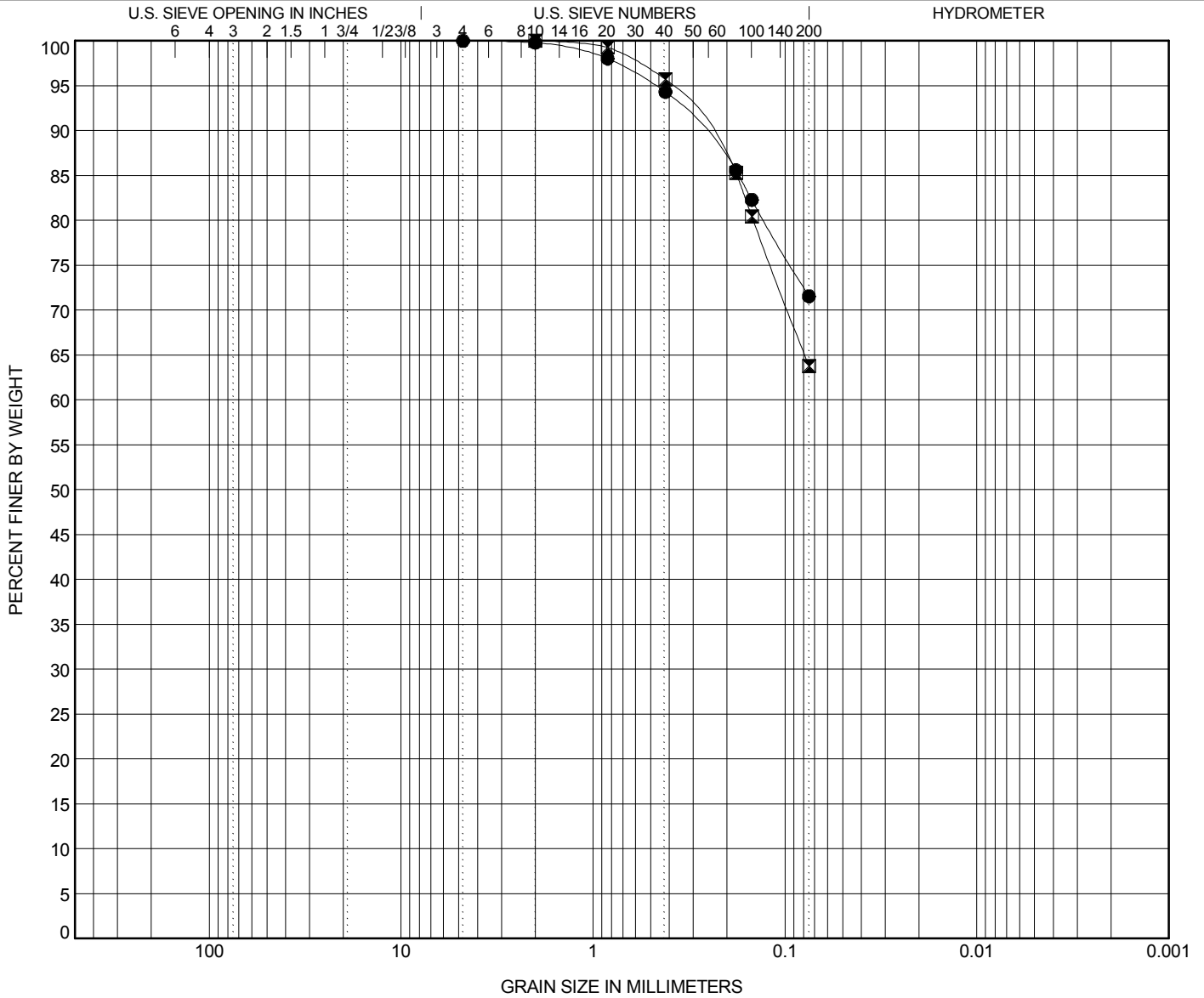


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● RW-21	4.0	Lean CLAY (CL) with Sand A-7-6(16)					44	21	23		
☒ RW-21	15.0	Sandy SILT (ML) A-4(0)					NP	NP	NP		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● RW-21	4.0	4.76	0.476			0.0	28.4	71.6	
☒ RW-21	15.0	2	0.396			0.0	36.2	63.8	

GRAIN SIZE - SCDOT - G4843 - CURRENT - SC-557.GPJ FME2017.GDT 7/12/18

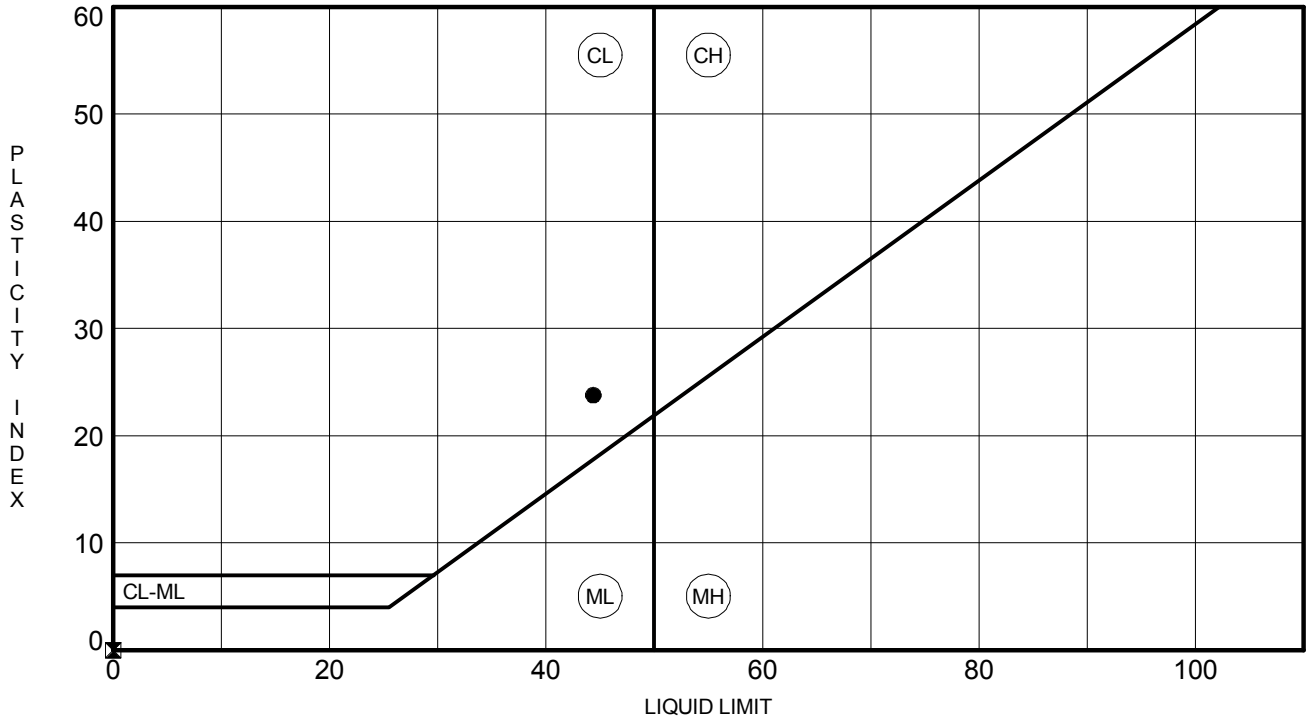


# ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● RW-21	4.0	44	21	23	72	Lean CLAY (CL) with Sand A-7-6(16)
☒ RW-21	15.0	NP	NP	NP	64	Sandy SILT (ML) A-4(0)

ATTERBERG LIMITS - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 7/12/18



**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

**PROJECT:** SC-557 Roadway Improvements/Bridge Replacement

**PROJECT NO.:** G4843

**SAMPLE NUMBER:** 18-1169

**DATE SAMPLE RECEIVED:** 6/26/2018

**DESCRIPTION OF SOIL:** VARIOUS

**TESTED BY:** MB

**DATE OF TESTING:** 6/26/2018

**DATE OF WEIGHING:** 6/27/2018

<b>BORING NO.</b>	RW-21	RW-21			
<b>SAMPLE NO.</b>	18-1169C SS-2	18-1169F SS-6			
<b>SAMPLE DEPTH</b>	2.0-4.0'	13.5-15.0'			
<b>WATER CONTENT, W%</b>	23.6	39.3			

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

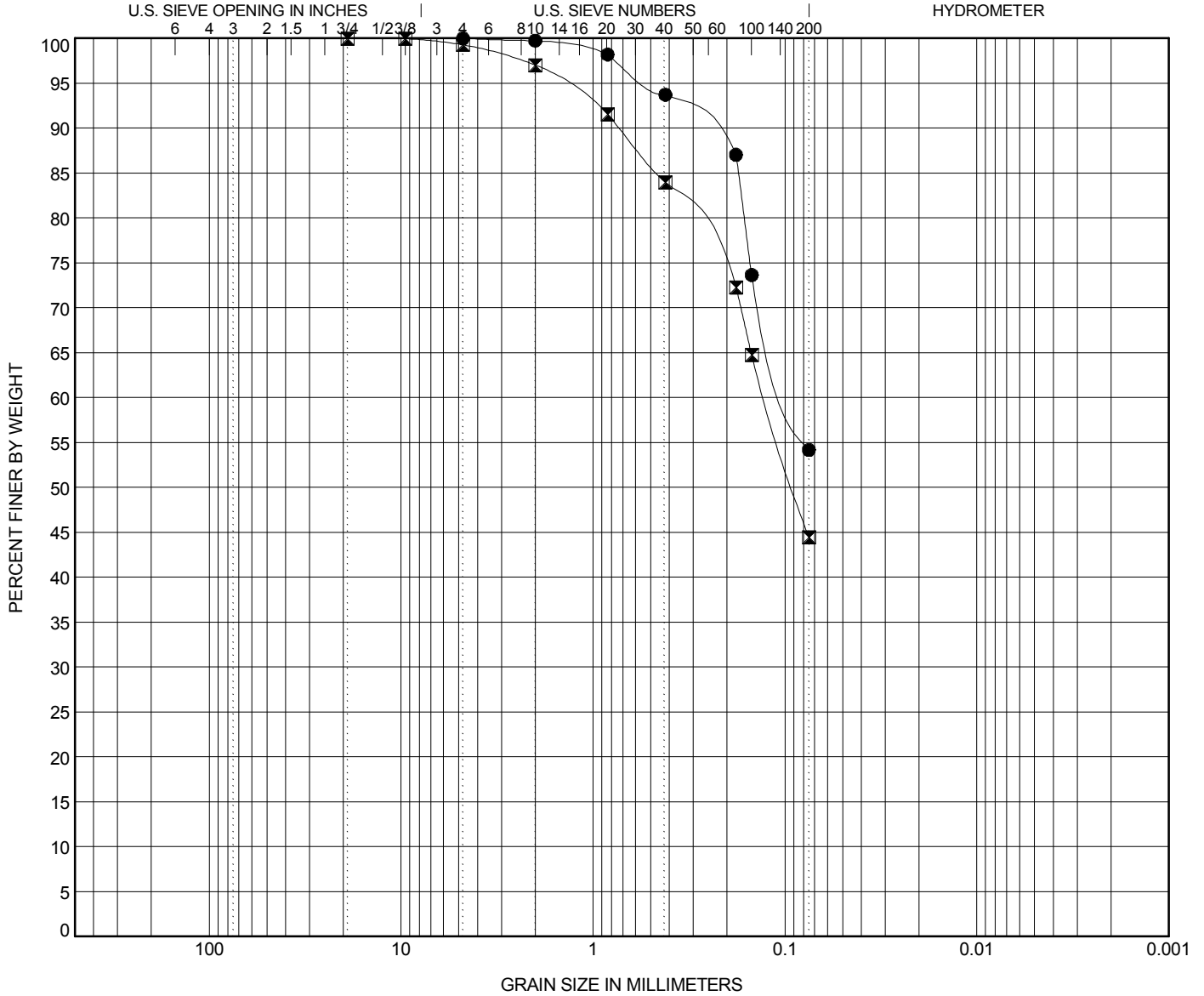


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● RW-22	6.0	<b>Sandy SILT (ML) A-4(0)</b>					<b>NP</b>	<b>NP</b>	<b>NP</b>		
☒ RW-22	8.0	<b>Silty F/M SAND (SM) A-4(0)</b>					<b>NP</b>	<b>NP</b>	<b>NP</b>		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● RW-22	6.0	4.76	0.511			0.0	45.8	54.2	
☒ RW-22	8.0	19.05	1.452	0.091		0.7	54.8	44.4	

GRAIN SIZE - SCDOT - G4843 - CURRENT - SC-557.GPJ FME2017.GDT 7/12/18



**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

**PROJECT:** SC-557 Roadway Improvements/Bridge Replacement

**PROJECT NO.:** G4843

**SAMPLE NUMBER:** 18-1170

**DATE SAMPLE RECEIVED:** 6/26/2018

**DESCRIPTION OF SOIL:** VARIOUS

**TESTED BY:** MB

**DATE OF TESTING:** 6/26/2018

**DATE OF WEIGHING:** 6/27/2018

<b>BORING NO.</b>	RW-22	RW-22			
<b>SAMPLE NO.</b>	18-1170C SS-3	18-1170F SS-4			
<b>SAMPLE DEPTH</b>	4.0-6.0'	6.0-8.0'			
<b>WATER CONTENT, W%</b>	29.2	13.2			

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

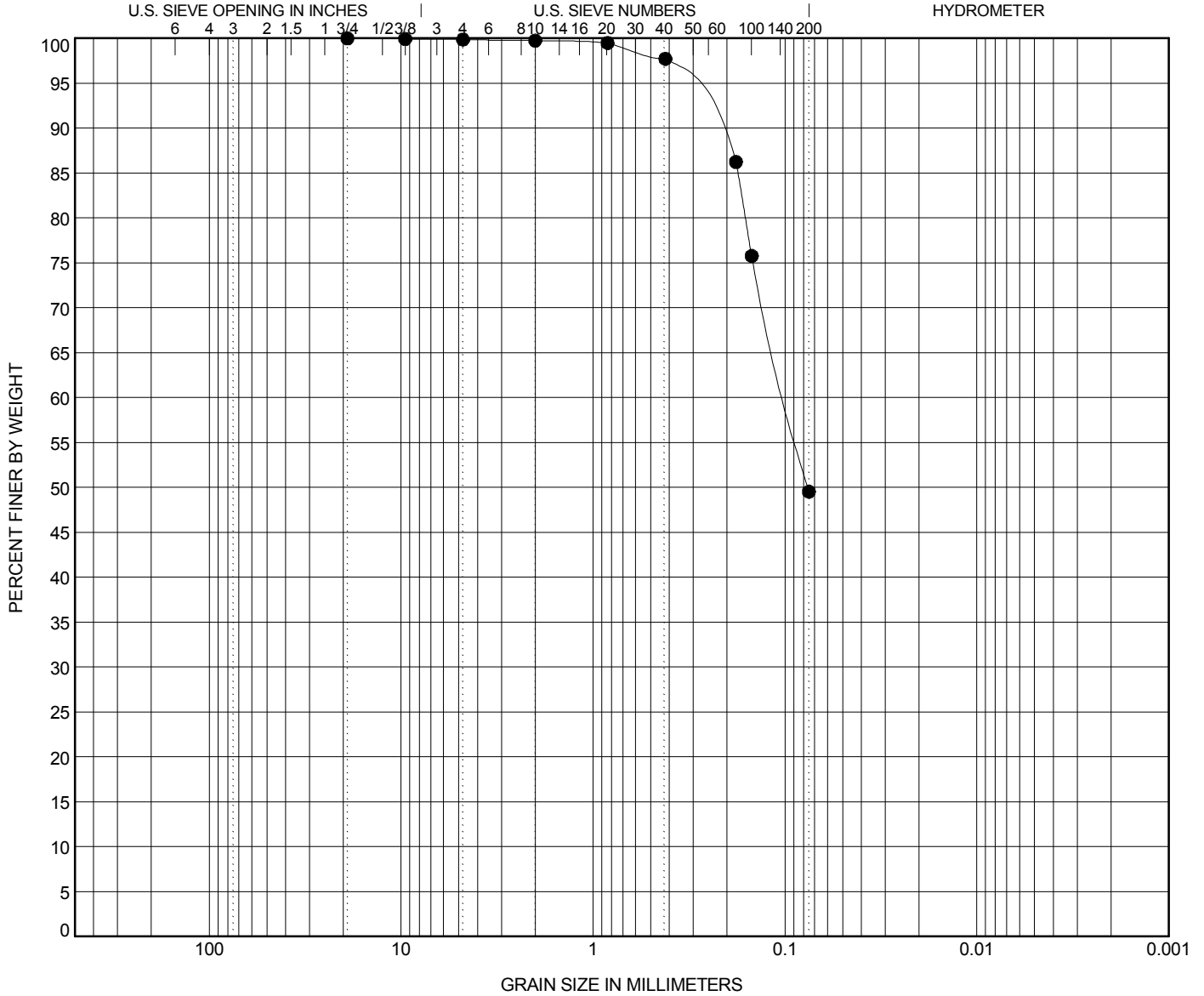


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● RW-23	2.0	<b>Silty F/M SAND (SM) A-4(0)</b>					<b>NP</b>	<b>NP</b>	<b>NP</b>		

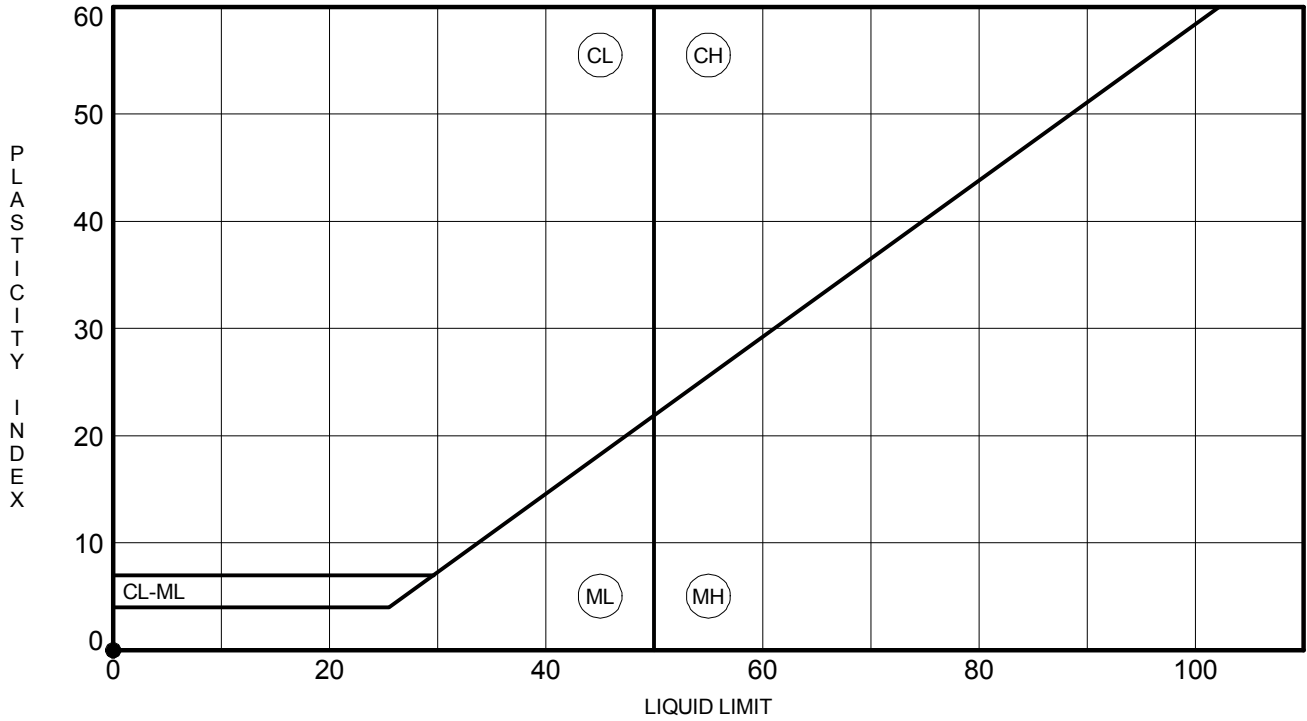
BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● RW-23	2.0	19.05	0.343	0.076		0.1	50.3	49.5	

GRAIN SIZE - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 7/12/18

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● RW-23	2.0	NP	NP	NP	50	Silty F/M SAND (SM) A-4(0)

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

**PROJECT:** SC-557 Roadway Improvements/Bridge Replacement

**PROJECT NO.:** G4843

**SAMPLE NUMBER:** 18-1171

**DATE SAMPLE RECEIVED:** 6/26/2018

**DESCRIPTION OF SOIL:** Silty F/M SAND (SM) A-4(0)

**TESTED BY:** MB

**DATE OF TESTING:** 6/26/2018

**DATE OF WEIGHING:** 6/27/2018

<b>BORING NO.</b>	RW-23				
<b>SAMPLE NO.</b>	18-1171C SS-1				
<b>SAMPLE DEPTH</b>	0.0-2.0'				
<b>WATER CONTENT, W%</b>	10.8				

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

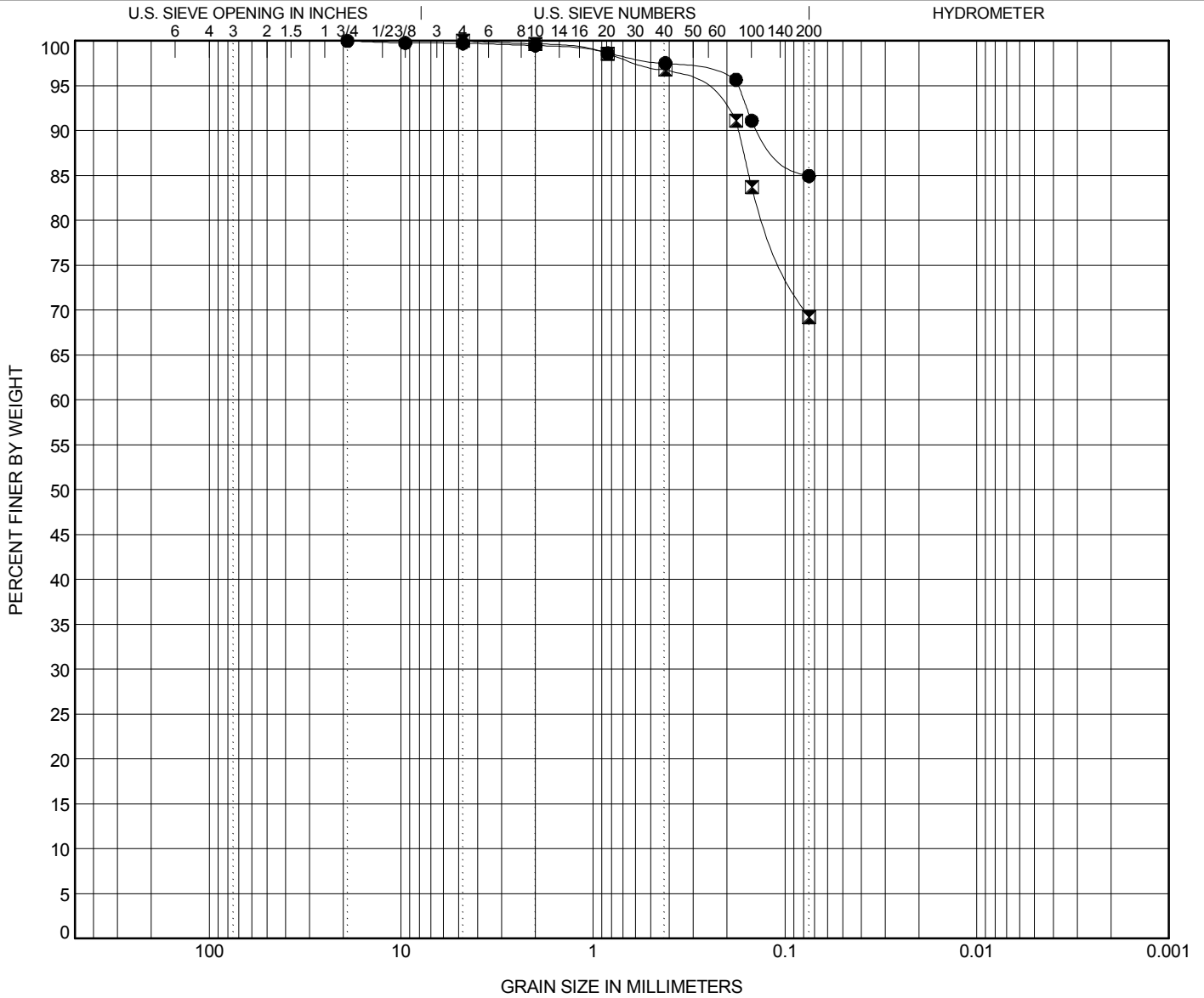


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● RW-24	2.0	<b>Fat CLAY (CH) with Sand A-7-6(20)</b>					<b>62</b>	<b>24</b>	<b>38</b>		
☒ RW-24	8.0	<b>Sandy SILT (ML) A-4(3)</b>					<b>36</b>	<b>32</b>	<b>4</b>		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● RW-24	2.0	<b>19.05</b>	<b>0.175</b>			<b>0.3</b>	<b>14.8</b>	<b>85.0</b>	
☒ RW-24	8.0	<b>4.76</b>	<b>0.321</b>			<b>0.0</b>	<b>30.8</b>	<b>69.2</b>	

GRAIN SIZE - SCDOT - G4843 - CURRENT - SC-557.GPJ FME2017.GDT 7/12/18



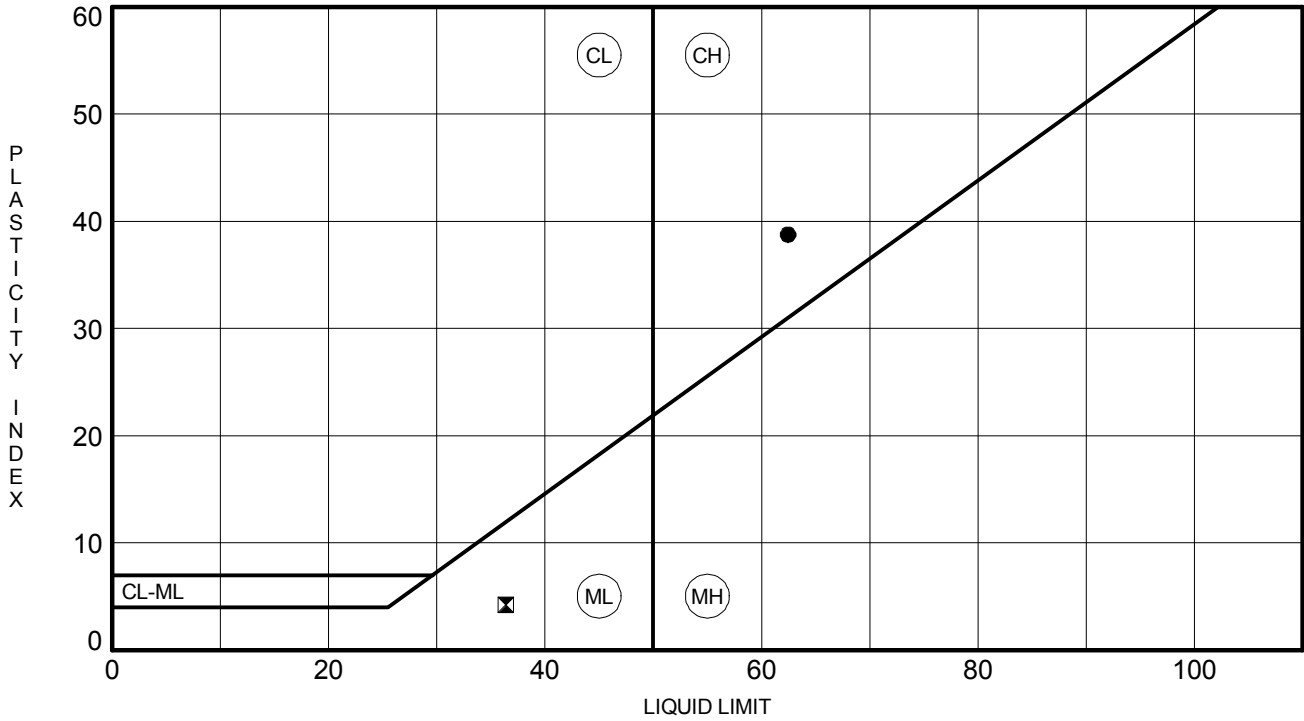


# ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● RW-24	2.0	62	24	38	85	Fat CLAY (CH) with Sand A-7-6(20)
☒ RW-24	8.0	36	32	4	69	Sandy SILT (ML) A-4(3)

ATTERBERG LIMITS - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 7/12/18

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

**PROJECT:** SC-557 Roadway Improvements/Bridge Replacement

**PROJECT NO.:** G4843

**SAMPLE NUMBER:** 18-1172

**DATE SAMPLE RECEIVED:** 6/26/2018

**DESCRIPTION OF SOIL:** VARIOUS

**TESTED BY:** MB

**DATE OF TESTING:** 6/26/2018

**DATE OF WEIGHING:** 6/27/2018

<b>BORING NO.</b>	RW-24	RW-24			
<b>SAMPLE NO.</b>	18-1172C SS-1	18-1172F SS-4			
<b>SAMPLE DEPTH</b>	0.0-2.0'	6.0-8.0'			
<b>WATER CONTENT, W%</b>	25.9	32.5			

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

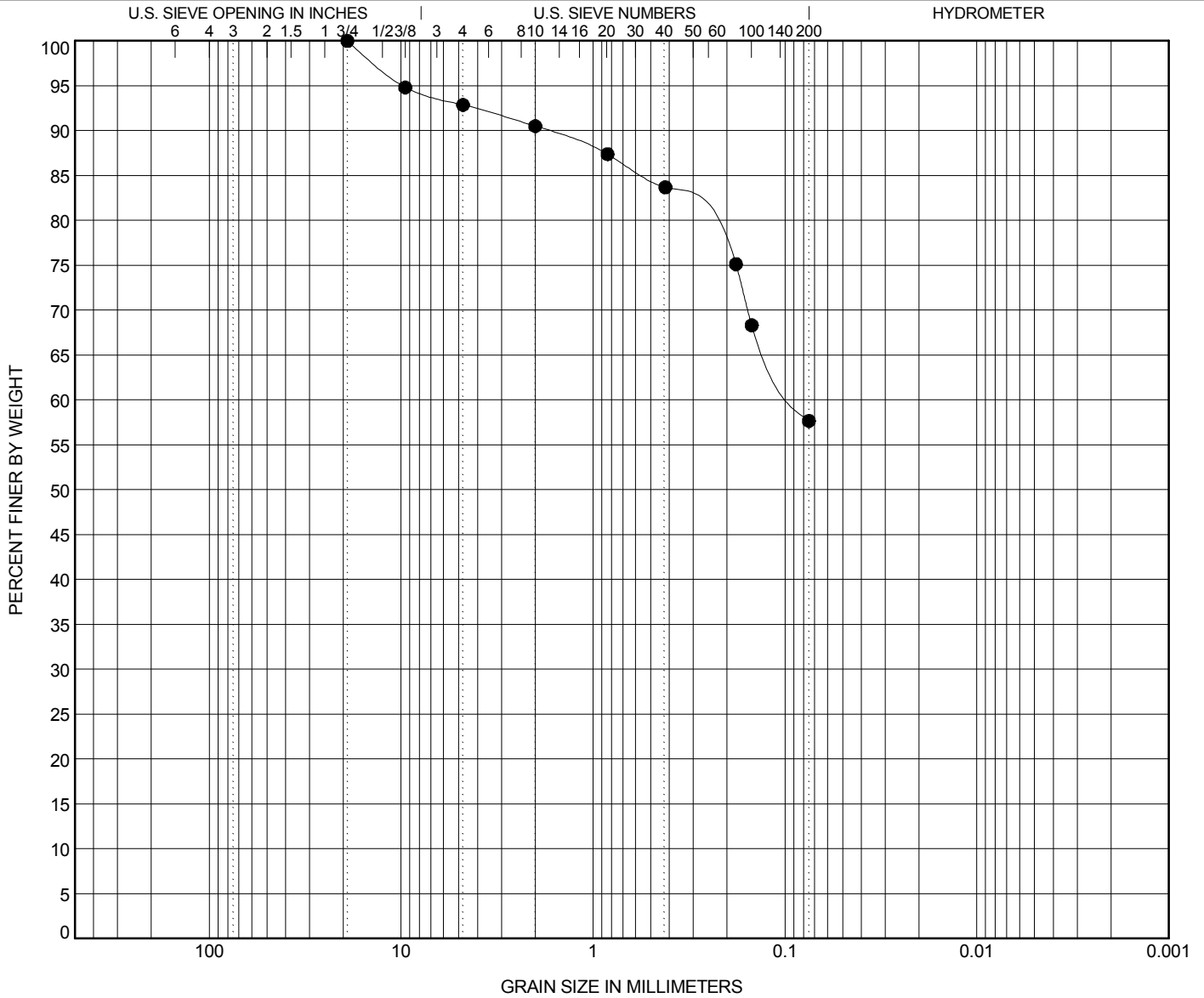


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● RW-25	2.0	<b>Sandy Lean CLAY (CL) A-6(4)</b>					27	16	11		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● RW-25	2.0	19.05	9.749			7.1	35.2	57.7	

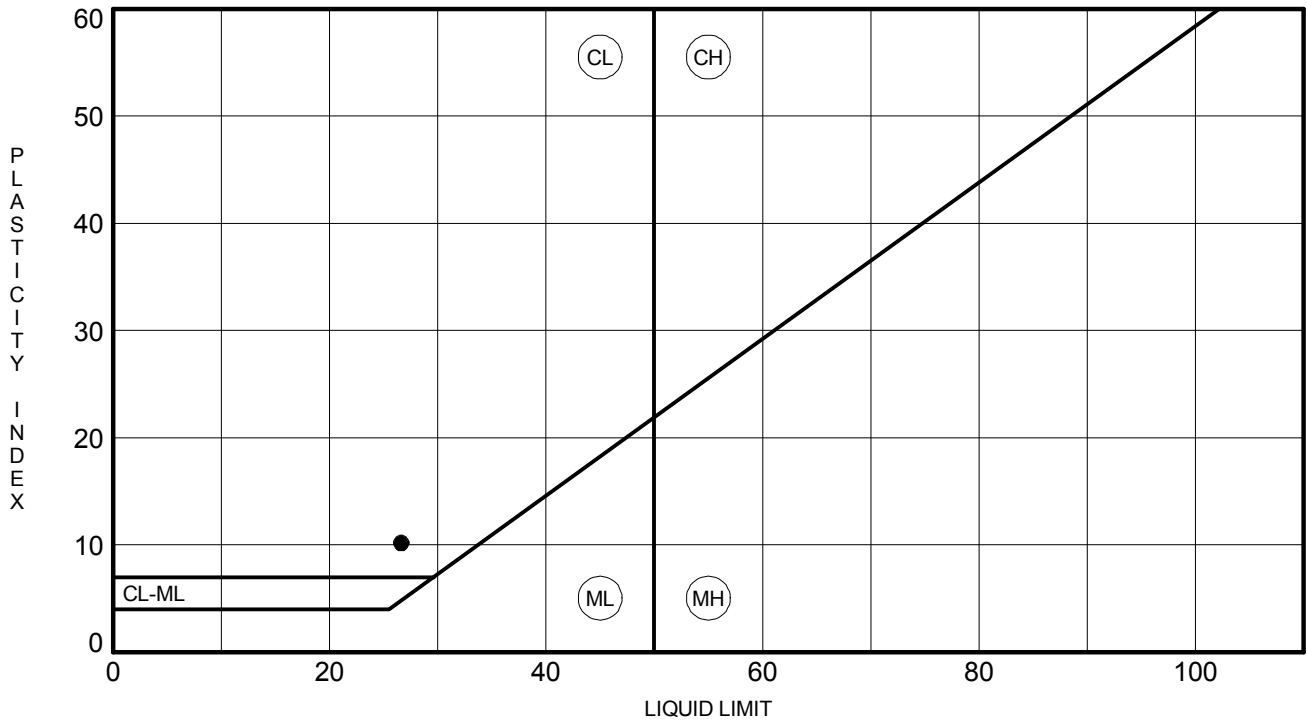
GRAIN SIZE - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 7/12/18



PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● RW-25	2.0	27	16	11	58	Sandy Lean CLAY (CL) A-6(4)

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

**PROJECT:** SC-557 Roadway Improvements/Bridge Replacement

**PROJECT NO.:** G4843

**SAMPLE NUMBER:** 18-1173

**DATE SAMPLE RECEIVED:** 6/26/2018

**DESCRIPTION OF SOIL:** Sandy Lean CLAY (CL) A-6(4)

**TESTED BY:** MB

**DATE OF TESTING:** 6/26/2018

**DATE OF WEIGHING:** 6/27/2018

<b>BORING NO.</b>	RW-25				
<b>SAMPLE NO.</b>	18-1173C SS-1				
<b>SAMPLE DEPTH</b>	0.0-2.0'				
<b>WATER CONTENT, W%</b>	21.4				

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

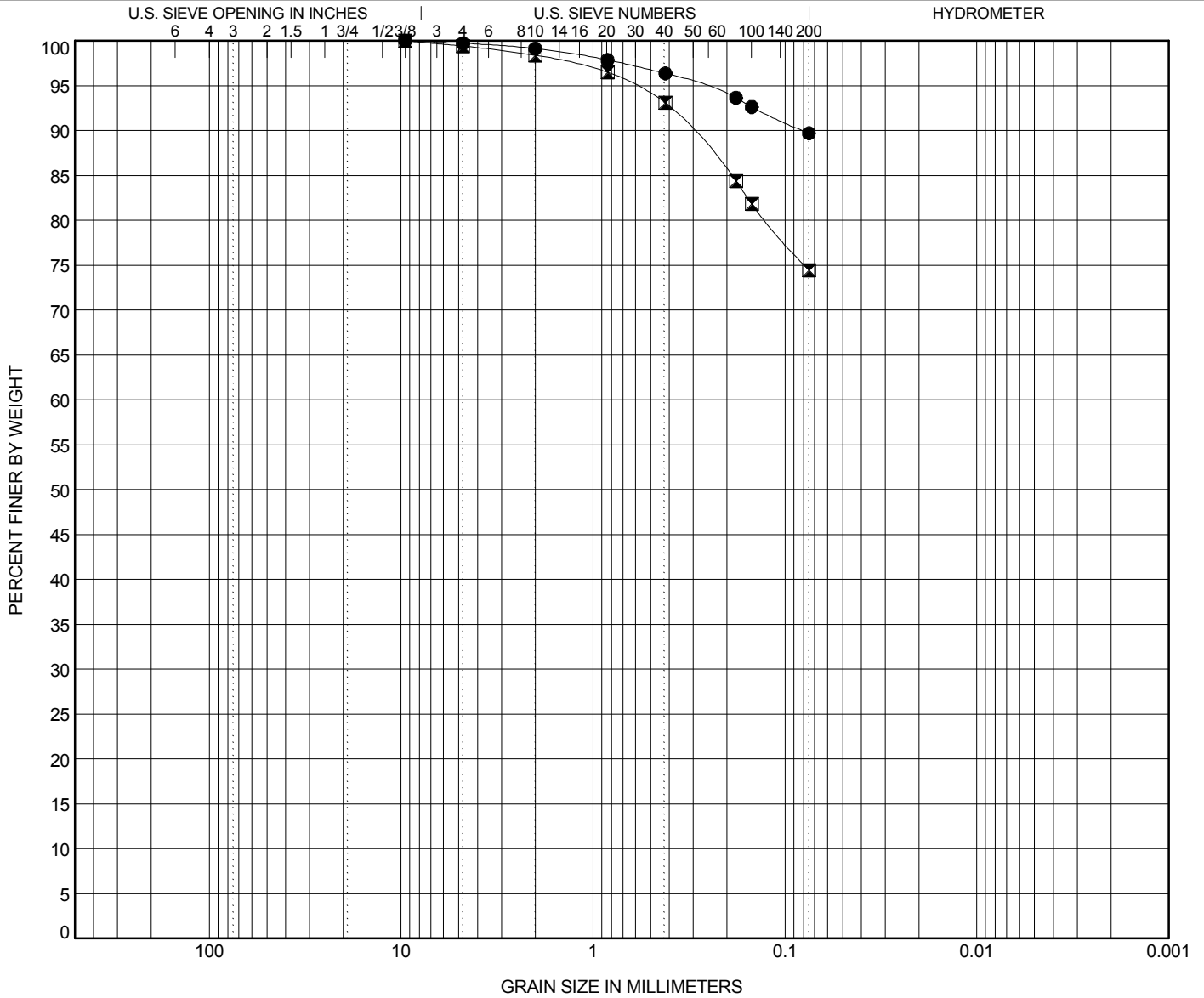


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● RW-26	1.0	Elastic SILT (MH) A-7-5(20)	52	33	19		
☒ RW-26	3.0	Lean CLAY (CL) with Sand A-6(12)	38	21	17		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● RW-26	1.0	9.52	0.272			0.3	10.0		89.7
☒ RW-26	3.0	9.52	0.617			0.6	25.0		74.5

GRAIN SIZE - SCDOT - G4843 - CURRENT - SC-557.GPJ FME2017.GDT 5/16/18

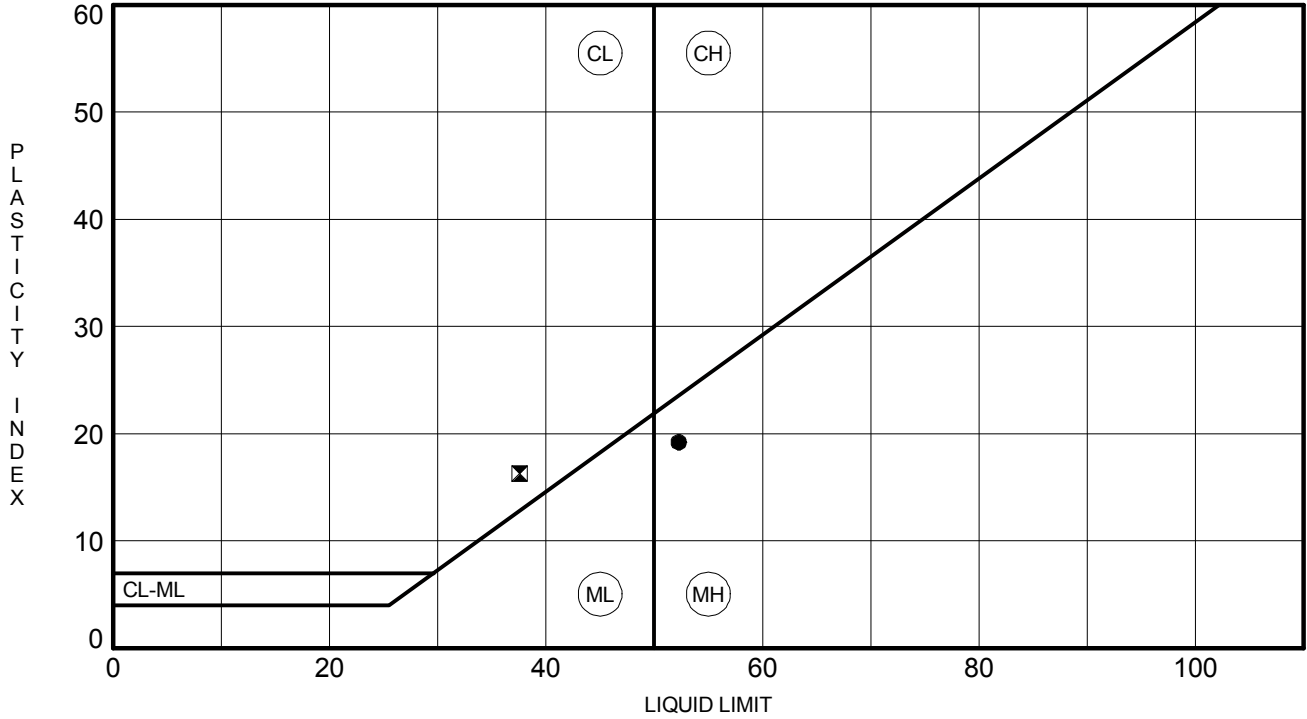


# ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● RW-26	1.0	52	33	19	90	Elastic SILT (MH) A-7-5(20)
■ RW-26	3.0	38	21	17	74	Lean CLAY (CL) with Sand A-6(12)

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

<b>PROJECT:</b> SC-557 Roadway Improvements/Bridge Replacement	<b>PROJECT NO.:</b> G4843
<b>SAMPLE NUMBER:</b> 18-0689	<b>DATE SAMPLE RECEIVED:</b> 4/24/2018
<b>DESCRIPTION OF SOIL:</b>	VARIOUS
<b>TESTED BY:</b> MB	<b>DATE OF TESTING:</b> 5/3/2018
	<b>DATE OF WEIGHING:</b> 5/4/2018

<b>BORING NO.</b>	RW-26	RW-26			
<b>SAMPLE NO.</b>	18-0689C DS-1	18-0689F DS-3			
<b>SAMPLE DEPTH</b>	0.5-1.0'	2.5-3.0'			
<b>WATER CONTENT, W%</b>	28.8	20.8			

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					



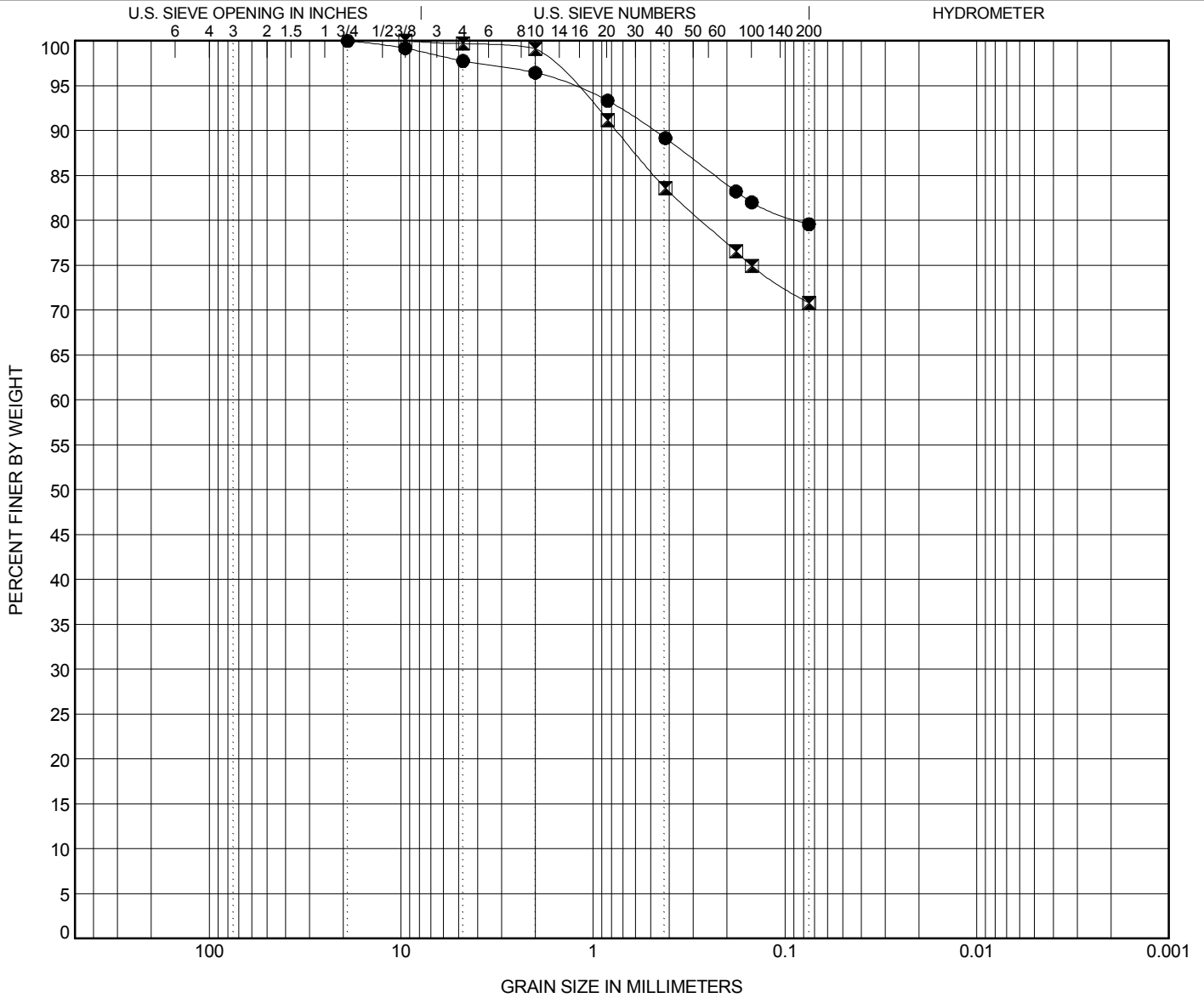


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● RW-27	2.0	Elastic SILT (MH) with Sand A-7-5(20)	61	34	27		
■ RW-27	4.0	Elastic SILT (MH) with Sand A-7-5(14)	54	36	18		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● RW-27	2.0	19	1.332			2.2	18.2		79.6
■ RW-27	4.0	9.52	1.272			0.3	28.9		70.8

GRAIN SIZE - SCDOT - G4843 - CURRENT - SC-557.GPJ FME2017.GDT 5/16/18

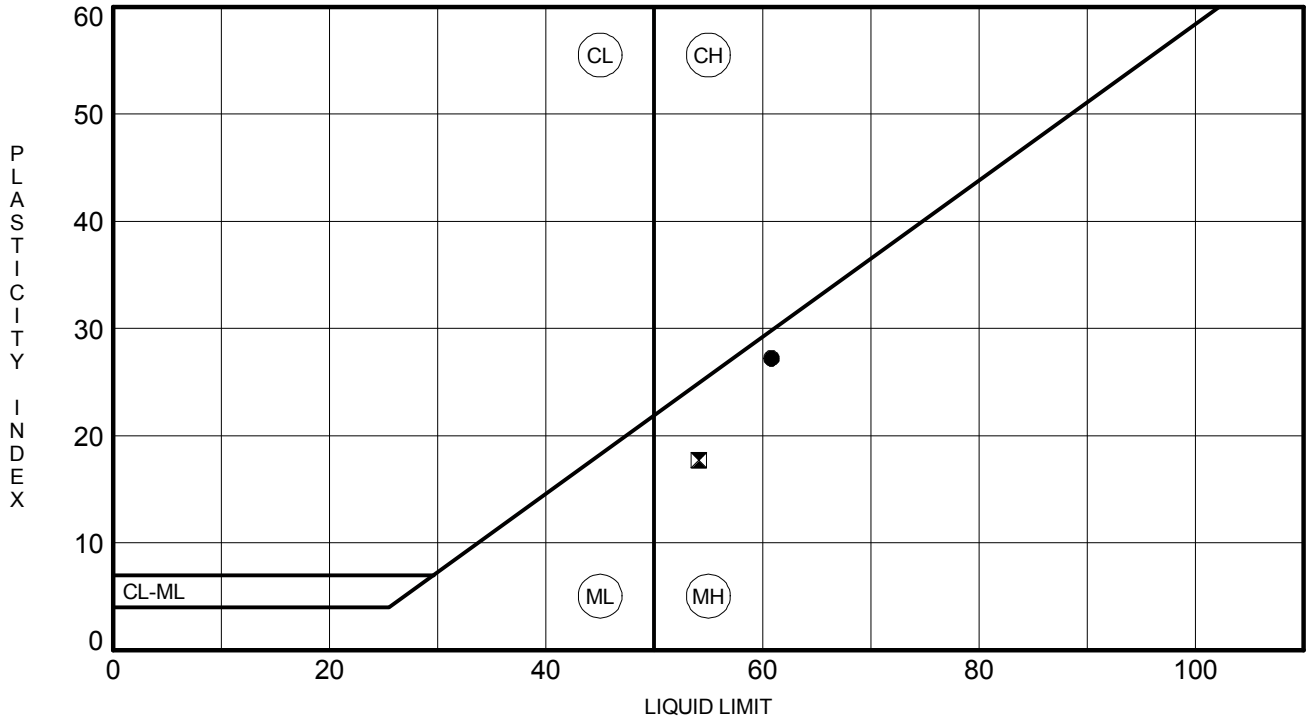


# ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● RW-27	2.0	61	34	27	80	Elastic SILT (MH) with Sand A-7-5(20)
☒ RW-27	4.0	54	36	18	71	Elastic SILT (MH) with Sand A-7-5(14)

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

<b>PROJECT:</b> SC-557 Roadway Improvements/Bridge Replacement	<b>PROJECT NO.:</b> G4843
<b>SAMPLE NUMBER:</b> 18-0690	<b>DATE SAMPLE RECEIVED:</b> 4/24/2018
<b>DESCRIPTION OF SOIL:</b>	VARIOUS
<b>TESTED BY:</b> MB	<b>DATE OF TESTING:</b> 5/3/2018
	<b>DATE OF WEIGHING:</b> 5/4/2018

<b>BORING NO.</b>	RW-27	RW-27			
<b>SAMPLE NO.</b>	18-0690C DS-2	18-0690F DS-4			
<b>SAMPLE DEPTH</b>	1.5-2.0'	3.5-4.0'			
<b>WATER CONTENT, W%</b>	30.0	26.7			

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

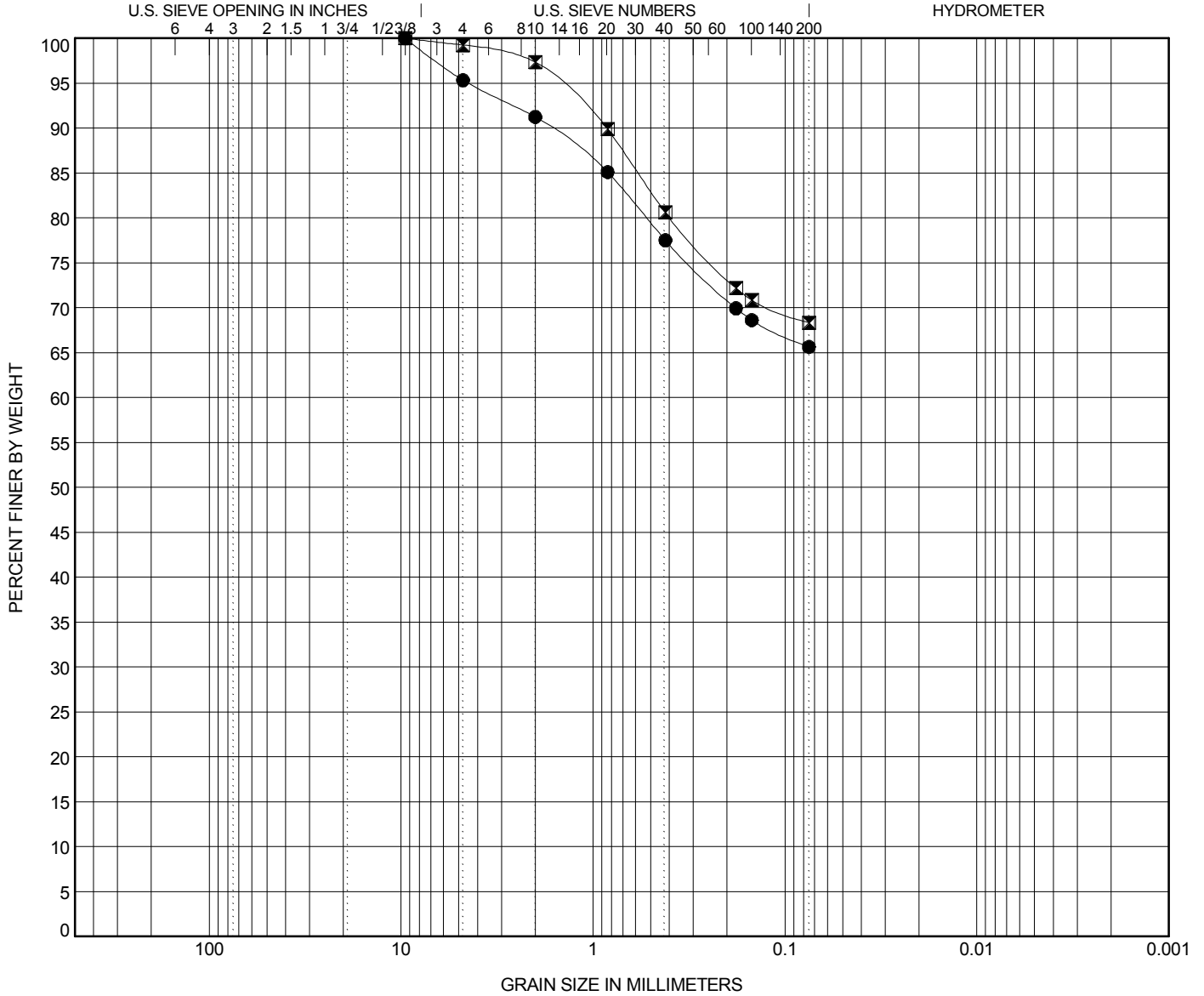


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● RW-28	3.0	Sandy Elastic SILT (MH) A-7-5(15)					58	36	22		
■ RW-28	5.0	Sandy Elastic SILT (MH) A-7-5(16)					56	33	23		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● RW-28	3.0	9.52	4.42			4.7	29.7	65.7	
■ RW-28	5.0	9.52	1.521			0.7	30.9	68.4	

GRAIN SIZE - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 5/16/18

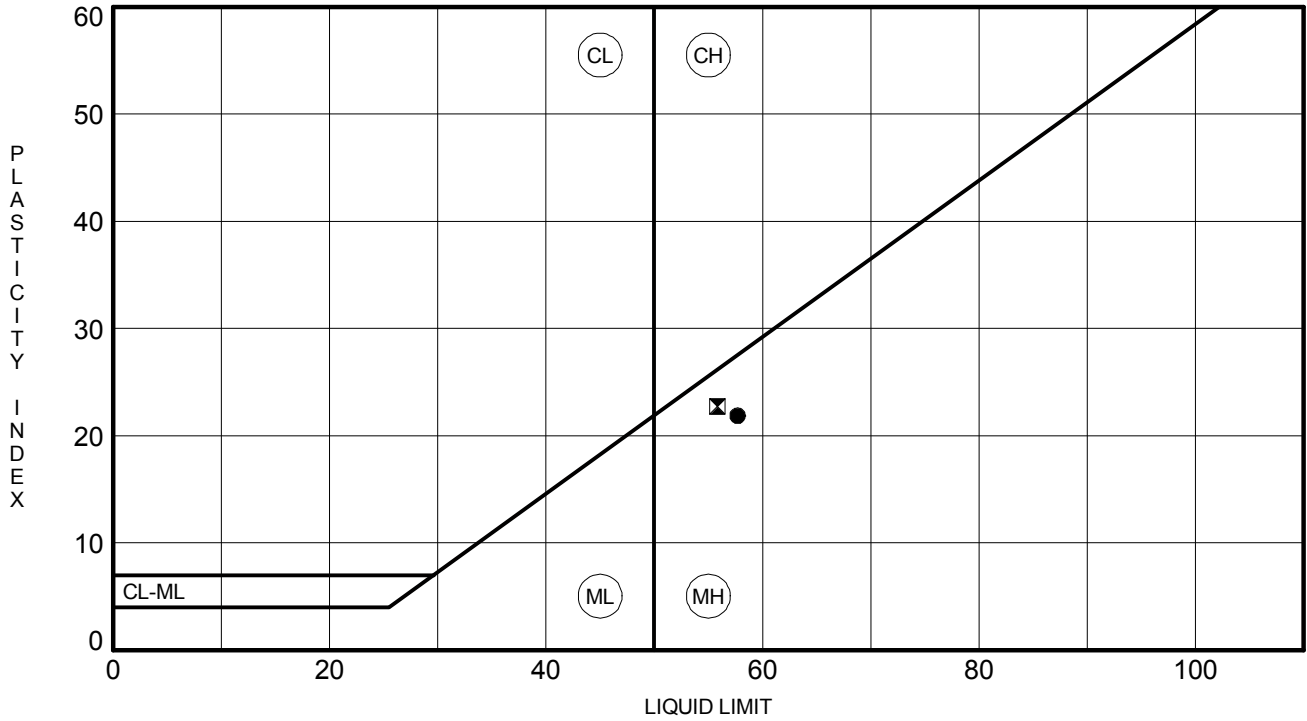


# ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● RW-28	3.0	58	36	22	66	Sandy Elastic SILT (MH) A-7-5(15)
⊠ RW-28	5.0	56	33	23	68	Sandy Elastic SILT (MH) A-7-5(16)

ATTERBERG LIMITS - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 5/16/18

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

<b>PROJECT:</b> SC-557 Roadway Improvements/Bridge Replacement	<b>PROJECT NO.:</b> G4843
<b>SAMPLE NUMBER:</b> 18-0691	<b>DATE SAMPLE RECEIVED:</b> 4/24/2018
<b>DESCRIPTION OF SOIL:</b>	VARIOUS
<b>TESTED BY:</b> MB	<b>DATE OF TESTING:</b> 5/3/2018
	<b>DATE OF WEIGHING:</b> 5/4/2018

<b>BORING NO.</b>	RW-28	RW-28			
<b>SAMPLE NO.</b>	18-0691C DS-3	18-0691F DS-5			
<b>SAMPLE DEPTH</b>	2.5-3.0'	4.5-5.0'			
<b>WATER CONTENT, W%</b>	30.2	26.7			

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

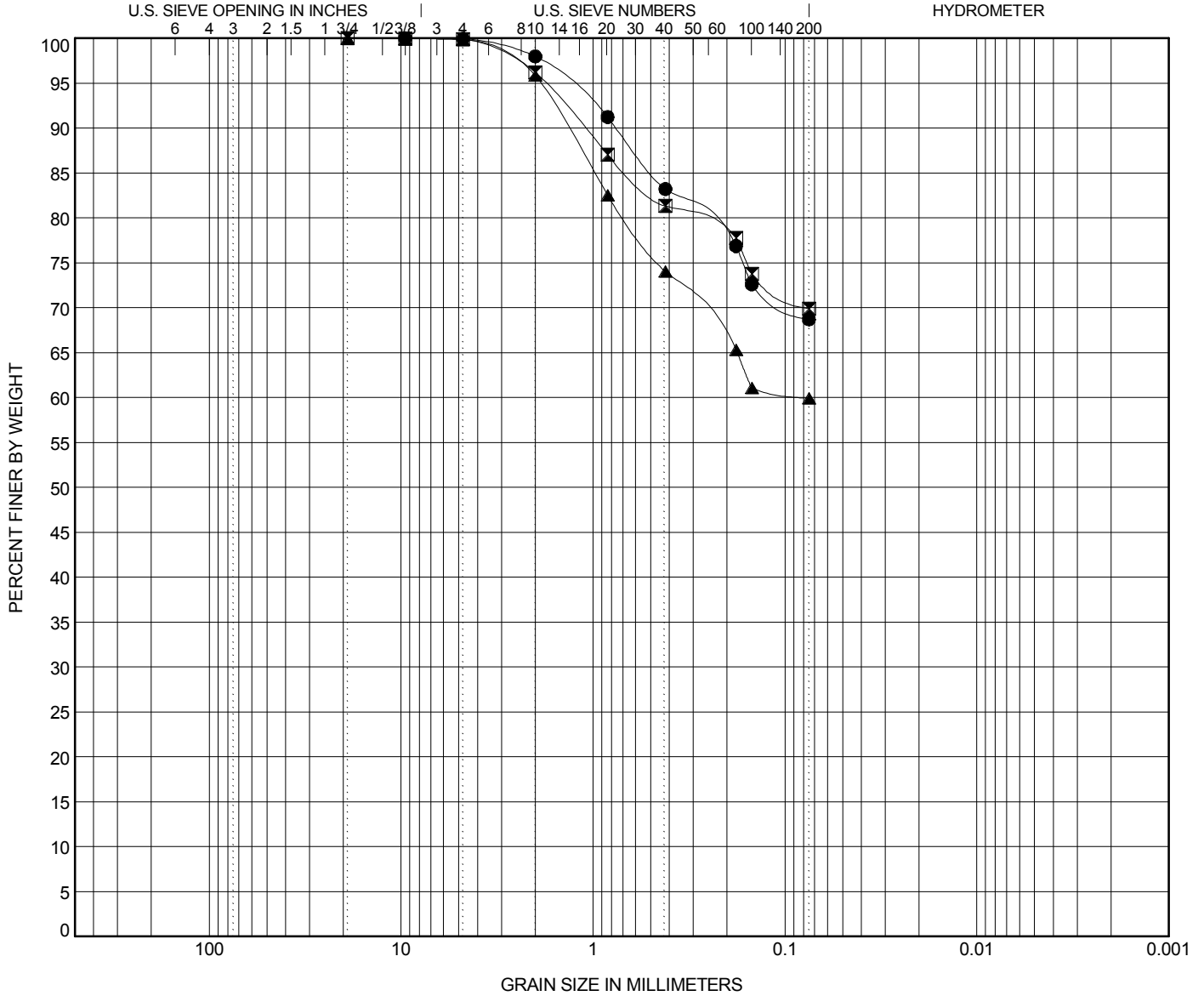


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● RW-29	4.0	<b>Sandy Fat CLAY (CH) A-7-6(20)</b>					<b>56</b>	<b>24</b>	<b>32</b>		
◻ RW-29	8.0	<b>Sandy Elastic SILT (MH) A-5(9)</b>					<b>53</b>	<b>43</b>	<b>10</b>		
▲ RW-29	20.0	<b>Sandy SILT (ML) A-4(0)</b>					<b>NP</b>	<b>NP</b>	<b>NP</b>		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● RW-29	4.0	<b>9.52</b>	<b>1.36</b>			<b>0.0</b>	<b>31.2</b>	<b>68.7</b>	
◻ RW-29	8.0	<b>19.05</b>	<b>1.782</b>			<b>0.1</b>	<b>30.0</b>	<b>69.9</b>	
▲ RW-29	20.0	<b>19.05</b>	<b>1.892</b>			<b>0.1</b>	<b>39.9</b>	<b>59.9</b>	

GRAIN SIZE - SCDOT - G4843 - CURRENT - SC-557.GPJ FME2017.GDT 7/12/18

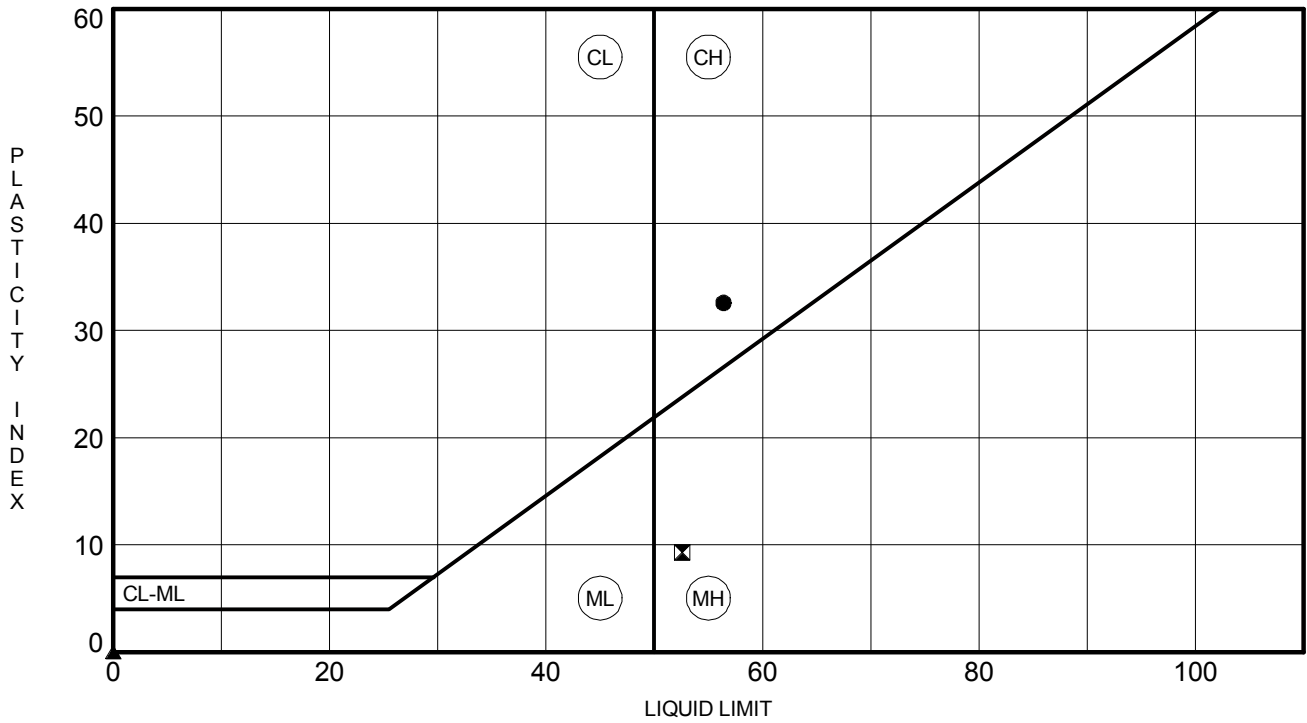


# ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● RW-29	4.0	56	24	32	69	Sandy Fat CLAY (CH) A-7-6(20)
☒ RW-29	8.0	53	43	10	70	Sandy Elastic SILT (MH) A-5(9)
▲ RW-29	20.0	NP	NP	NP	60	Sandy SILT (ML) A-4(0)



**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

**PROJECT:** SC-557 Roadway Improvements/Bridge Replacement

**PROJECT NO.:** G4843

**SAMPLE NUMBER:** 18-1188

**DATE SAMPLE RECEIVED:** 6/26/2018

**DESCRIPTION OF SOIL:**

VARIOUS

**TESTED BY:** MB

**DATE OF TESTING:** 6/26/2018

**DATE OF WEIGHING:** 6/27/2018

<b>BORING NO.</b>	RW-29	RW-29	RW-29		
<b>SAMPLE NO.</b>	18-1188C SS-2	18-1188F SS-4	18-1188I SS-7		
<b>SAMPLE DEPTH</b>	2.0-4.0'	6.0-8.0'	18.5-20.0'		
<b>WATER CONTENT, W%</b>	27.4	23.6	22.6		

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

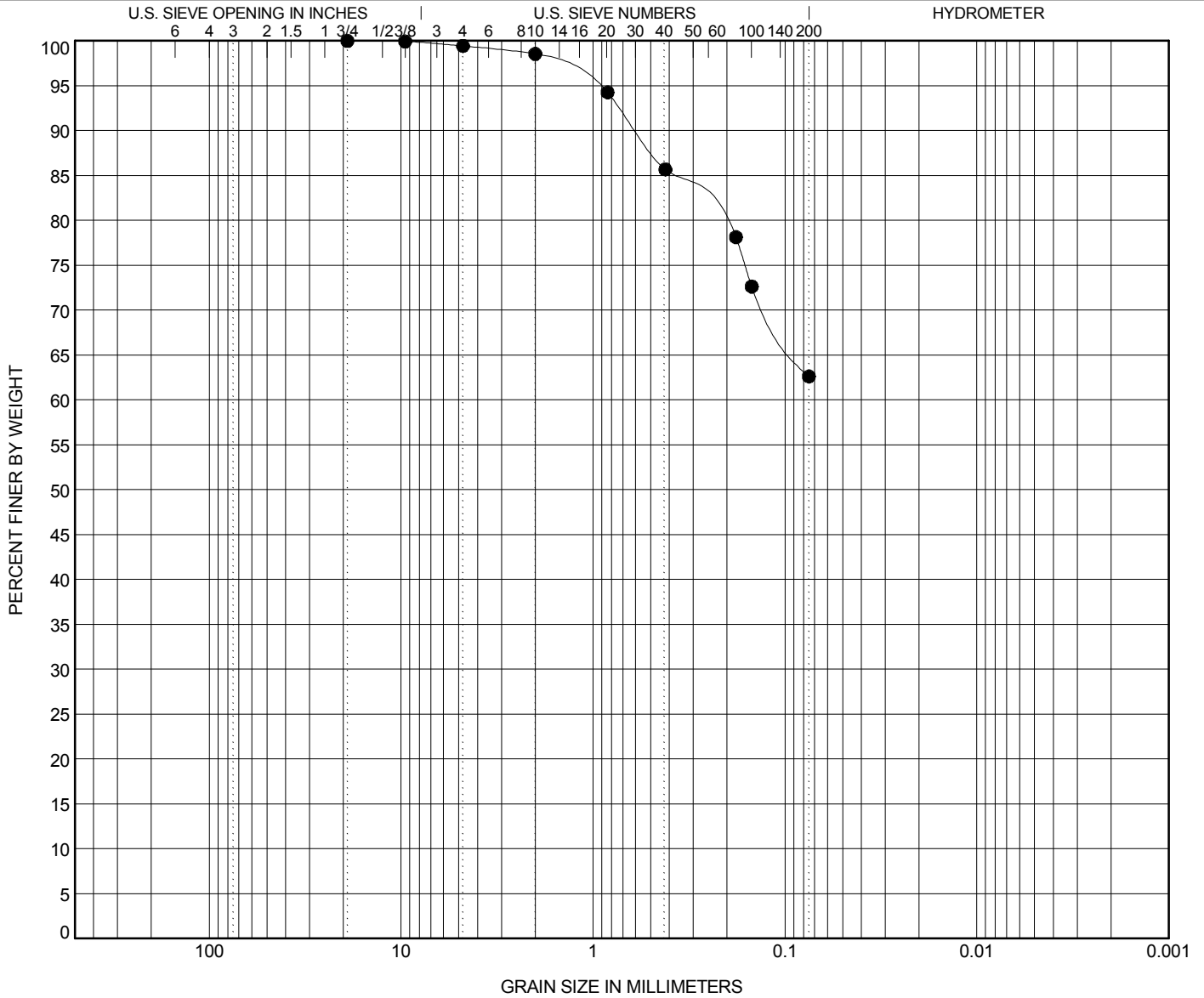


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● RW-30	2.0	Sandy Lean CLAY (CL) A-6(9)					34	15	19		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● RW-30	2.0	19.05	0.973			0.6	36.8	62.6	

GRAIN SIZE - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 7/12/18

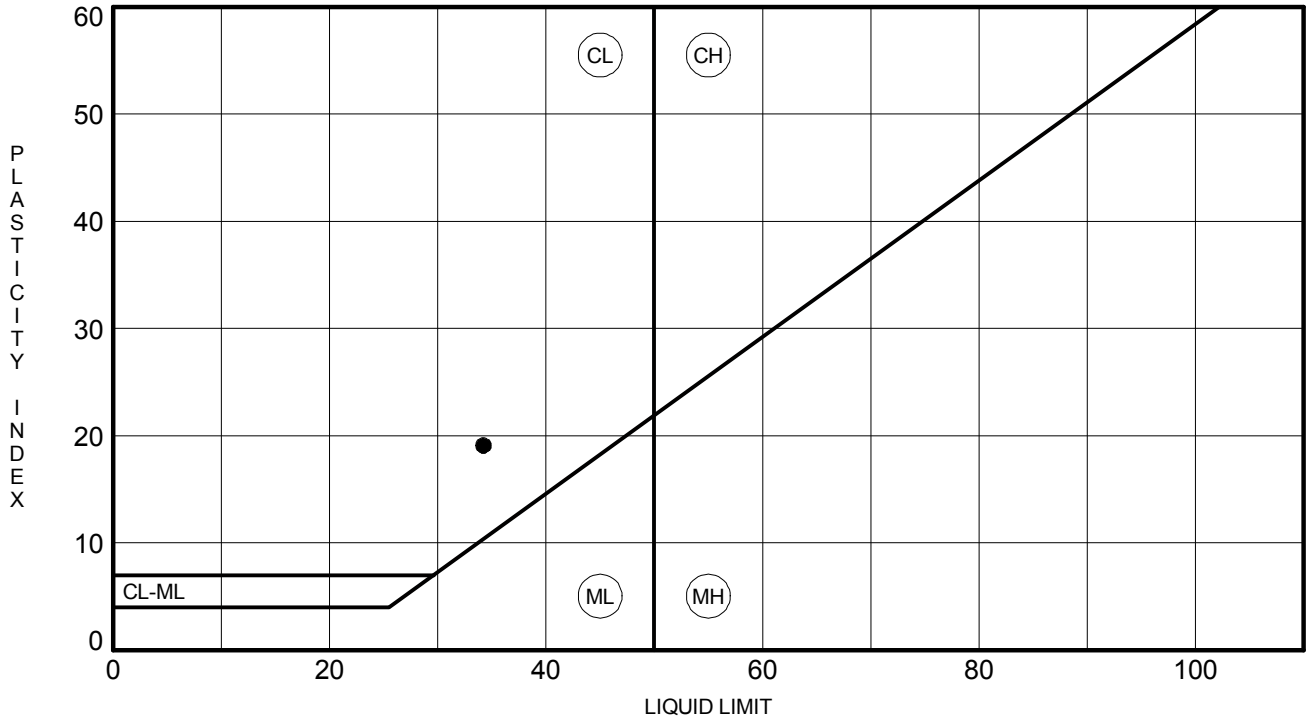


# ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● RW-30	2.0	34	15	19	63	Sandy Lean CLAY (CL) A-6(9)

ATTERBERG LIMITS - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 7/12/18

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

**PROJECT:** SC-557 Roadway Improvements/Bridge Replacement

**PROJECT NO.:** G4843

**SAMPLE NUMBER:** 18-1196

**DATE SAMPLE RECEIVED:** 6/26/2018

**DESCRIPTION OF SOIL:** Sandy Lean CLAY (CL) A-6(9)

**TESTED BY:** MB

**DATE OF TESTING:** 6/26/2018

**DATE OF WEIGHING:** 6/27/2018

<b>BORING NO.</b>	RW-30				
<b>SAMPLE NO.</b>	18-1196C SS-1				
<b>SAMPLE DEPTH</b>	0.0-2.0'				
<b>WATER CONTENT, W%</b>	20.4				

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

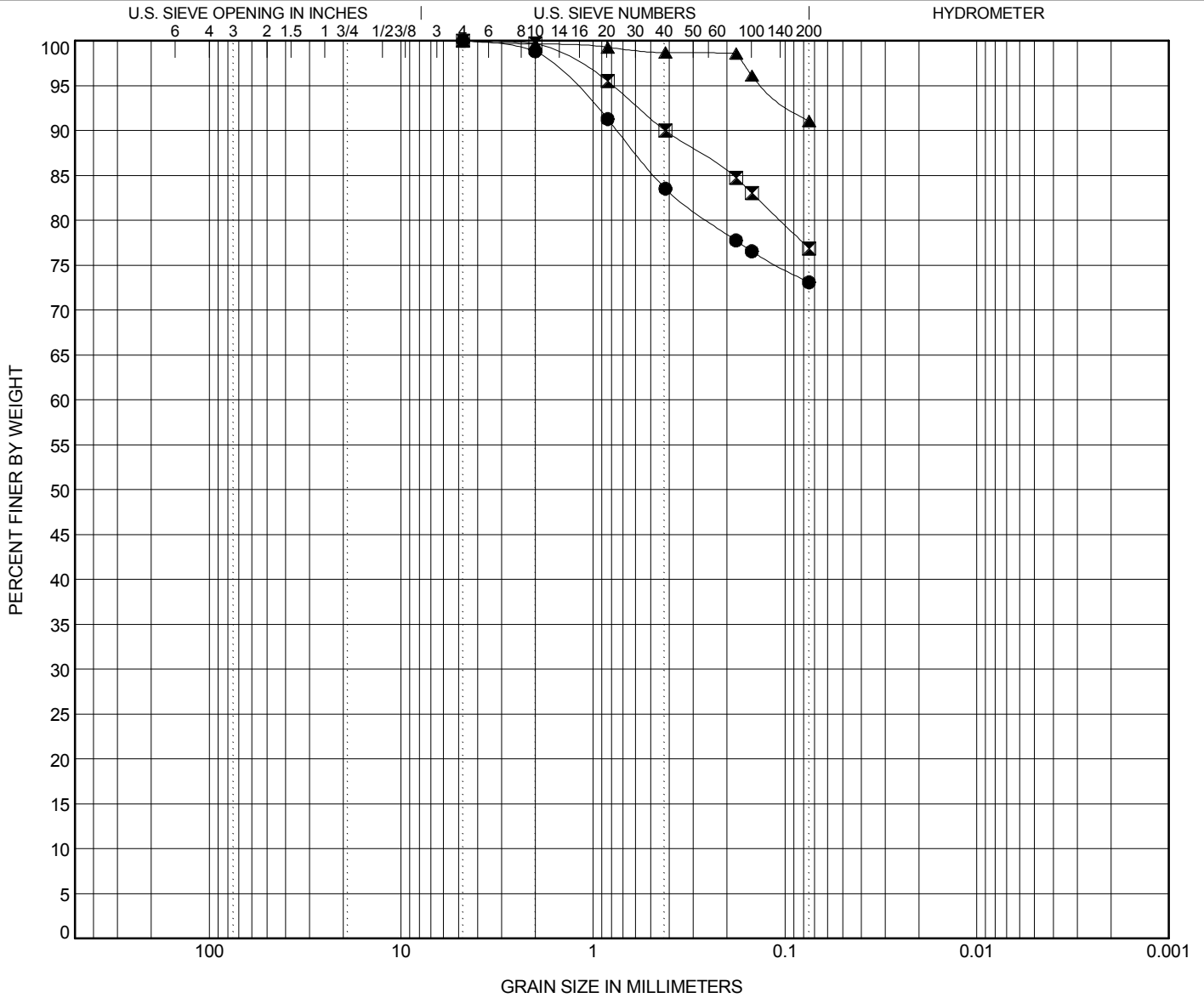


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● RW-31	4.0	Elastic SILT (MH) with Sand A-7-5(20)	70	37	33		
☒ RW-31	15.0	SILT (ML) with Sand A-4(0)	NP	NP	NP		
▲ RW-31	30.0	SILT (ML) A-5(10)	45	38	7		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● RW-31	4.0	4.76	1.285			0.0	26.9	73.1	
☒ RW-31	15.0	4.76	0.787			0.0	23.1	76.9	
▲ RW-31	30.0	4.76	0.128			0.0	8.9	91.1	

GRAIN SIZE - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 7/12/18

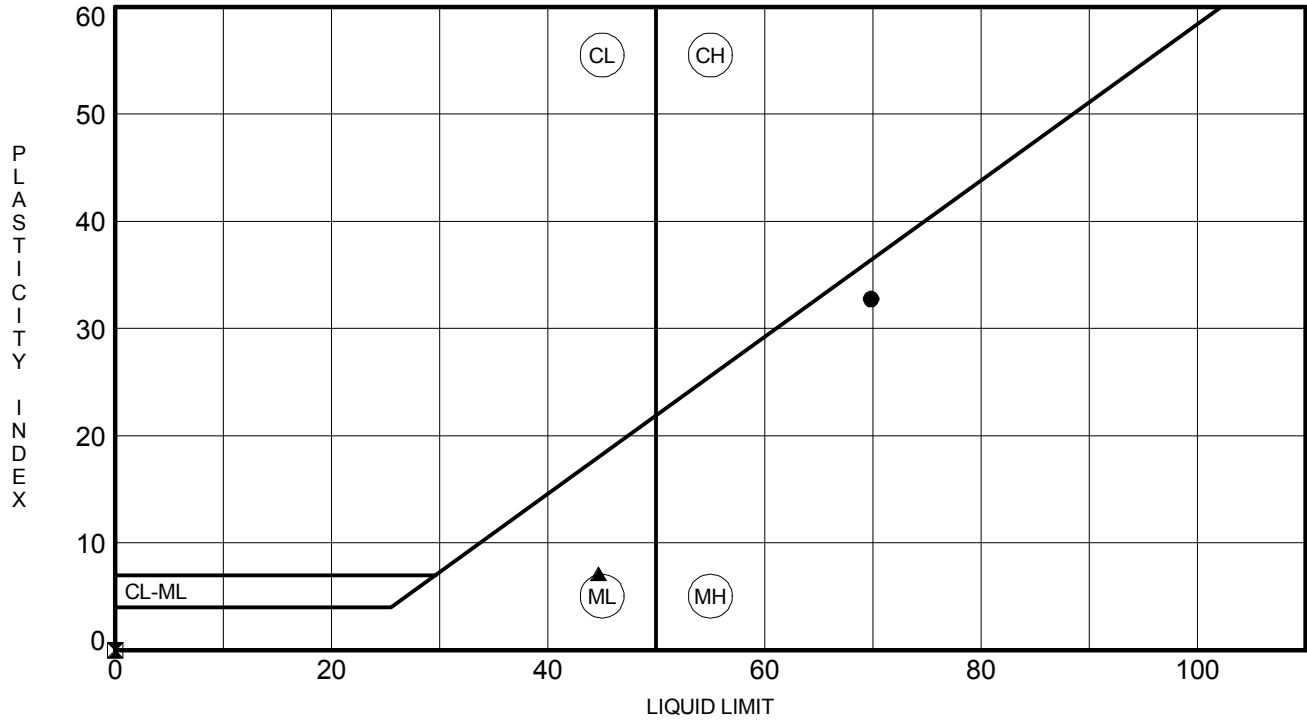


# ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● RW-31	4.0	70	37	33	73	Elastic SILT (MH) with Sand A-7-5(20)
☒ RW-31	15.0	NP	NP	NP	77	SILT (ML) with Sand A-4(0)
▲ RW-31	30.0	45	38	7	91	SILT (ML) A-5(10)

ATTERBERG LIMITS - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 7/12/18

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

**PROJECT:** SC-557 Roadway Improvements/Bridge Replacement

**PROJECT NO.:** G4843

**SAMPLE NUMBER:** 18-1175

**DATE SAMPLE RECEIVED:** 6/26/2018

**DESCRIPTION OF SOIL:** VARIOUS

**TESTED BY:** MB

**DATE OF TESTING:** 6/26/2018

**DATE OF WEIGHING:** 6/27/2018

<b>BORING NO.</b>	RW-31	RW-31	RW-31		
<b>SAMPLE NO.</b>	18-1175C SS-2	18-1175F SS-6	18-1175I SS-9		
<b>SAMPLE DEPTH</b>	2.0-4.0'	13.5-15.0'	28.5-30.0'		
<b>WATER CONTENT, W%</b>	26.3	26.9	34.5		

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

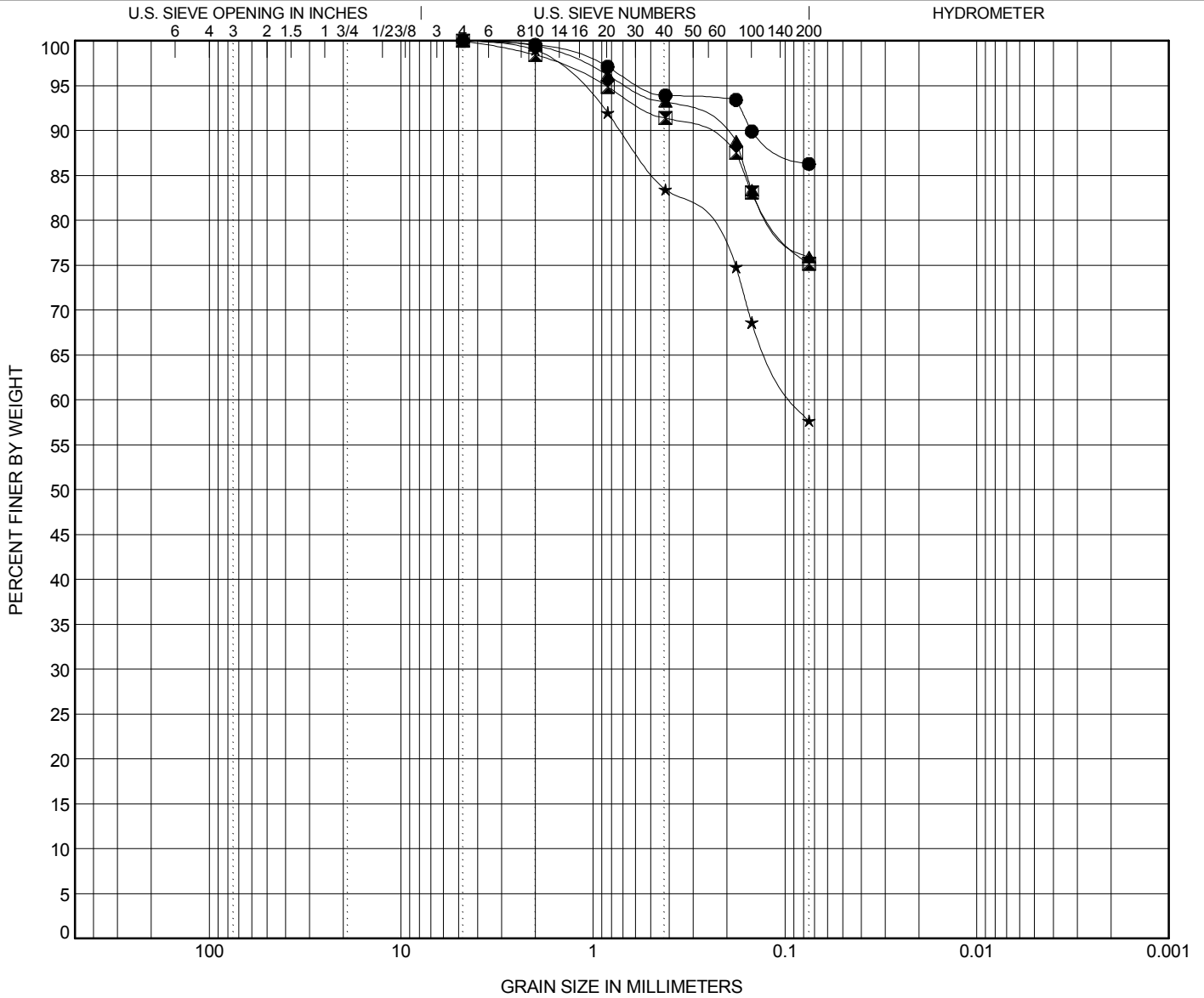


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● RW-32	2.0	Elastic SILT (MH) A-7-5(20)	66	36	30		
■ RW-32	8.0	SILT (ML) with Sand A-5(7)	49	43	6		
▲ RW-32	20.0	SILT (ML) with Sand A-5(4)	46	45	1		
★ RW-32	30.0	Sandy SILT (ML) A-4(0)	NP	NP	NP		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● RW-32	2.0	4.76	0.529			0.0	13.7	86.3	
■ RW-32	8.0	4.76	0.861			0.0	24.8	75.2	
▲ RW-32	20.0	4.76	0.633			0.0	24.1	75.9	
★ RW-32	30.0	4.76	1.216			0.0	42.3	57.7	

GRAIN SIZE - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 7/12/18



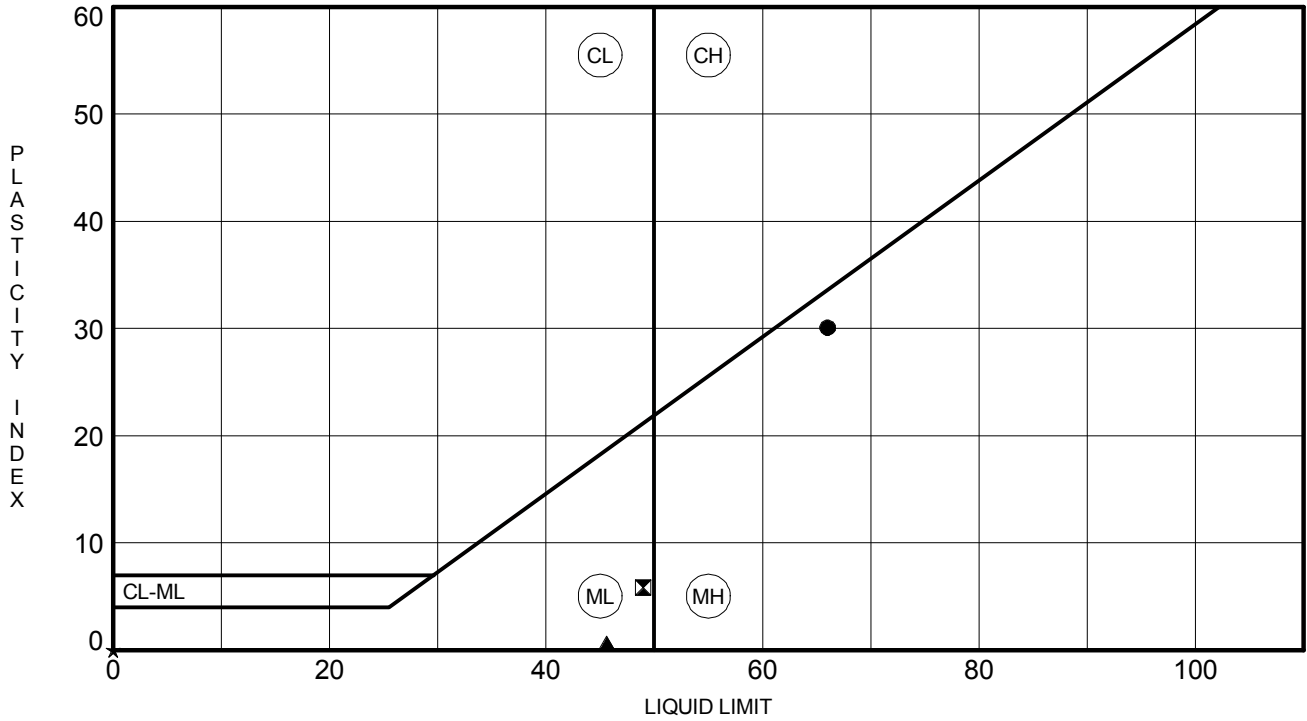


# ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● RW-32	2.0	66	36	30	86	Elastic SILT (MH) A-7-5(20)
☒ RW-32	8.0	49	43	6	75	SILT (ML) with Sand A-5(7)
▲ RW-32	20.0	46	45	1	76	SILT (ML) with Sand A-5(4)
★ RW-32	30.0	NP	NP	NP	58	Sandy SILT (ML) A-4(0)

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

**PROJECT:** SC-557 Roadway Improvements/Bridge Replacement

**PROJECT NO.:** G4843

**SAMPLE NUMBER:** 18-1176

**DATE SAMPLE RECEIVED:** 6/26/2018

**DESCRIPTION OF SOIL:** VARIOUS

**TESTED BY:** MB

**DATE OF TESTING:** 6/26/2018

**DATE OF WEIGHING:** 6/27/2018

<b>BORING NO.</b>	RW-32	RW-32	RW-32	RW-32	
<b>SAMPLE NO.</b>	18-1176C SS-1	18-1176F SS-4	18-1176I SS-7	18-1176L SS-9	
<b>SAMPLE DEPTH</b>	0.0-2.0'	6.0-8.0'	18.5-20.0'	28.5-30.0'	
<b>WATER CONTENT, W%</b>	31.0	26.7	28.6	24.6	

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

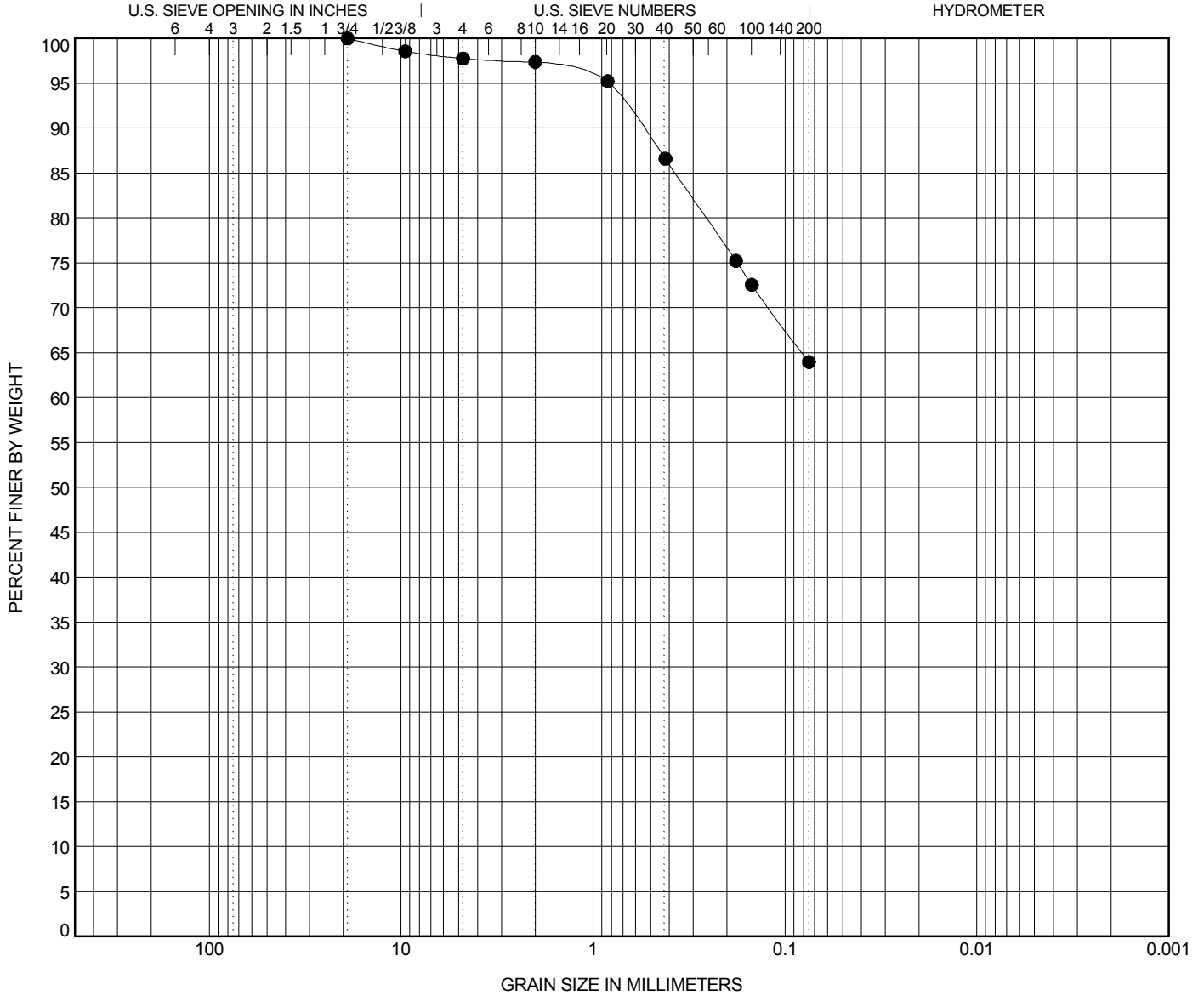


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification					LL	PL	PI	Cc	Cu
● RW-33	2.0	<b>Sandy Lean CLAY (CL) A-6(8)</b>					<b>36</b>	<b>20</b>	<b>16</b>		

BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● RW-33	2.0	<b>19</b>	<b>0.824</b>			<b>2.2</b>	<b>33.8</b>	<b>64.0</b>	

GRAIN SIZE - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 5/16/18

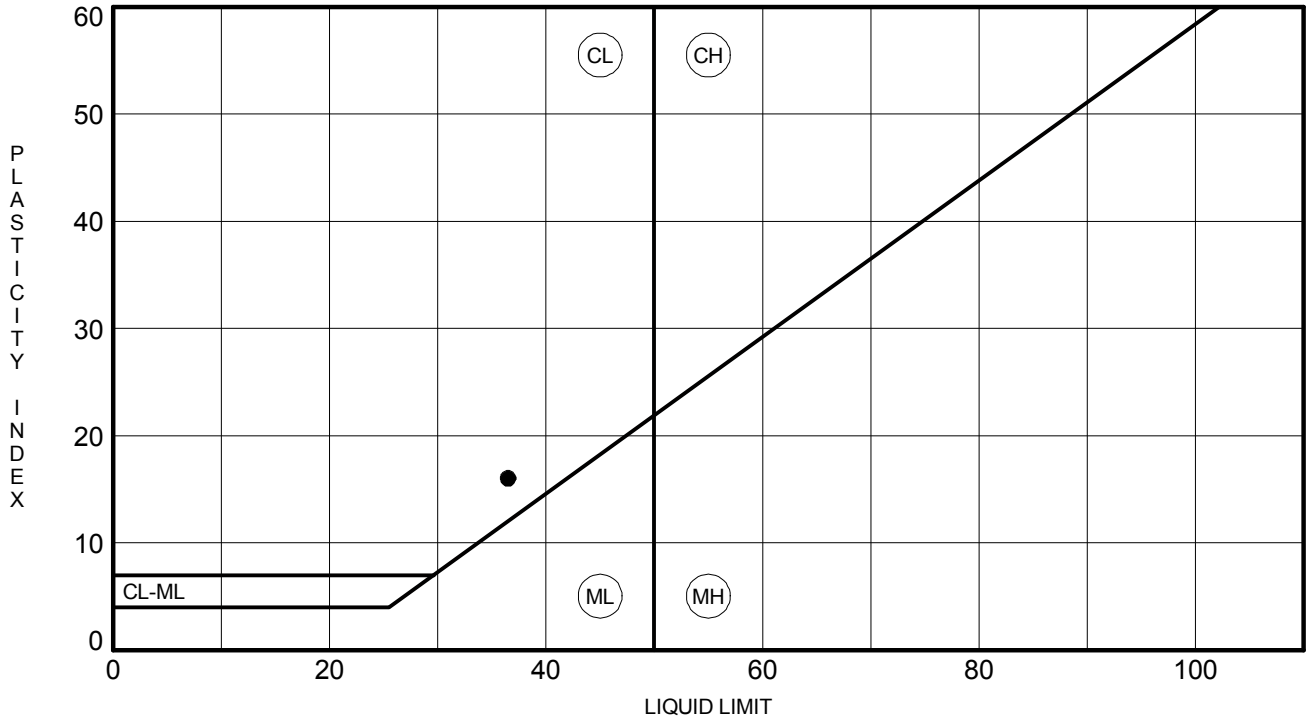


# ATTERBERG LIMITS' RESULTS

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● RW-33	2.0	36	20	16	64	Sandy Lean CLAY (CL) A-6(8)

ATTERBERG LIMITS - SCDOT G4843 - CURRENT - SC-557.GPJ FME2017.GDT 5/16/18

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

**PROJECT:** SC-557 Roadway Improvements/Bridge Replacement **PROJECT NO.:** G4843  
**SAMPLE NUMBER:** 18-0692 **DATE SAMPLE RECEIVED:** 4/24/2018  
**DESCRIPTION OF SOIL:** Sandy Lean CLAY (CL) A-6(8)  
**TESTED BY:** MB **DATE OF TESTING:** 5/3/2018  
**DATE OF WEIGHING:** 5/4/2018

<b>BORING NO.</b>	RW-33				
<b>SAMPLE NO.</b>	18-0692C DS-2				
<b>SAMPLE DEPTH</b>	1.5-2.0'				
<b>WATER CONTENT, W%</b>	18.6				

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

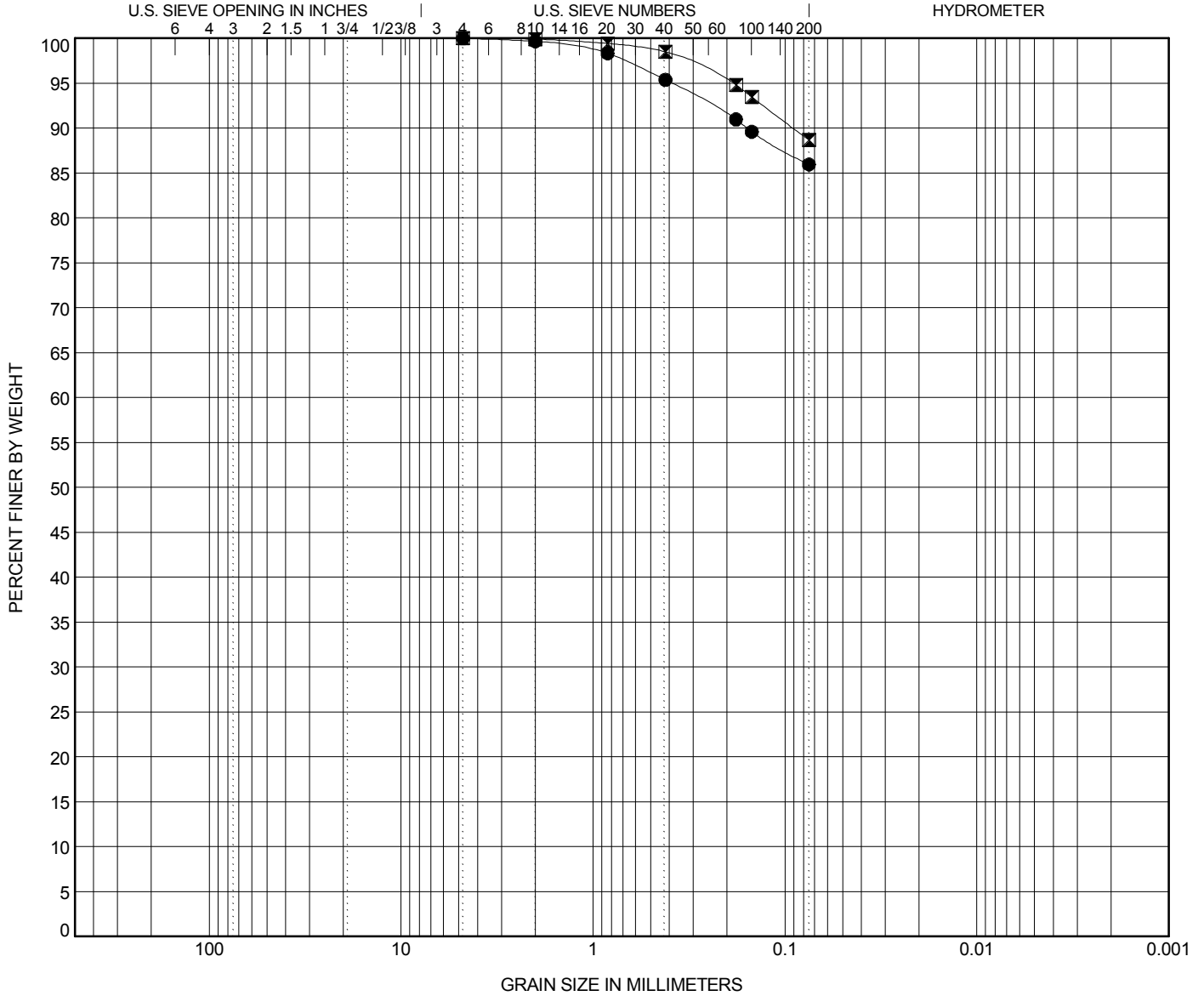


# GRAIN SIZE DISTRIBUTION

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● RW-34	1.0	SILT (ML) A-7-5(18)	48	30	18		
■ RW-34	3.0	SILT (ML) A-5(9)	46	40	6		

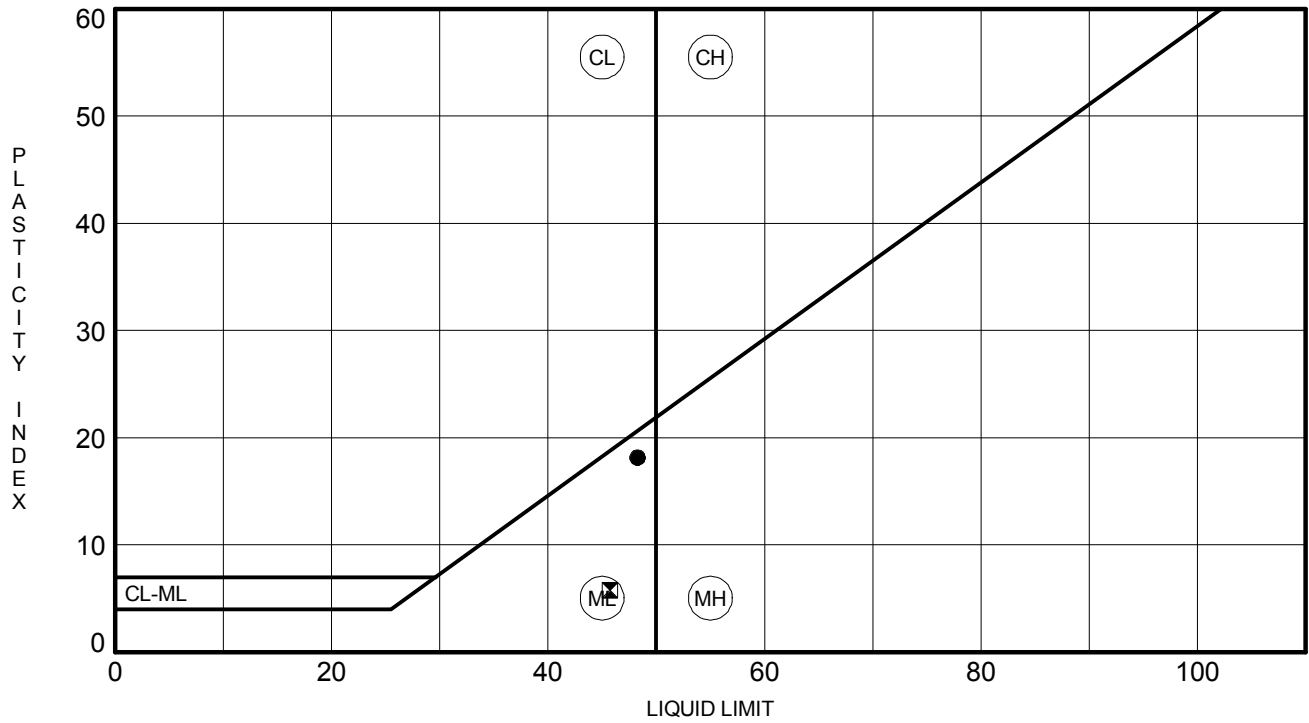
BOREHOLE	DEPTH	D100	D95	D50	D10	%Gravel	%Sand	%Silt	%Clay
● RW-34	1.0	4.76	0.389			0.0	14.0	86.0	
■ RW-34	3.0	4.76	0.187			0.0	11.3	88.7	

GRAIN SIZE - SCDOT - G4843 - CURRENT - SC-557.GPJ FME2017.GDT 5/16/18

PROJECT ID G4843.000

PROJECT NAME SC 557 Roadway Improvements/Bridge Replacement

PROJECT COUNTY York



BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
● RW-34	1.0	48	30	18	86	SILT (ML) A-7-5(18)
☒ RW-34	3.0	46	40	6	89	SILT (ML) A-5(9)

**F&ME CONSULTANTS**  
**3112 Devine Street**  
**Columbia, South Carolina 29205**

**MOISTURE CONTENT DETERMINATION**  
**(AASHTO T265)**

<b>PROJECT:</b> SC-557 Roadway Improvements/Bridge Replacement	<b>PROJECT NO.:</b> G4843
<b>SAMPLE NUMBER:</b> 18-0693	<b>DATE SAMPLE RECEIVED:</b> 4/24/2018
<b>DESCRIPTION OF SOIL:</b>	VARIOUS
<b>TESTED BY:</b> MB	<b>DATE OF TESTING:</b> 5/3/2018
	<b>DATE OF WEIGHING:</b> 5/4/2018

<b>BORING NO.</b>	RW-34	RW-34			
<b>SAMPLE NO.</b>	18-0693C DS-1	18-0693F DS-3			
<b>SAMPLE DEPTH</b>	0.5-1.0'	2.5-3.0'			
<b>WATER CONTENT, W%</b>	30.5	33.6			

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

<b>BORING NO.</b>					
<b>SAMPLE NO.</b>					
<b>SAMPLE DEPTH</b>					
<b>WATER CONTENT, W%</b>					

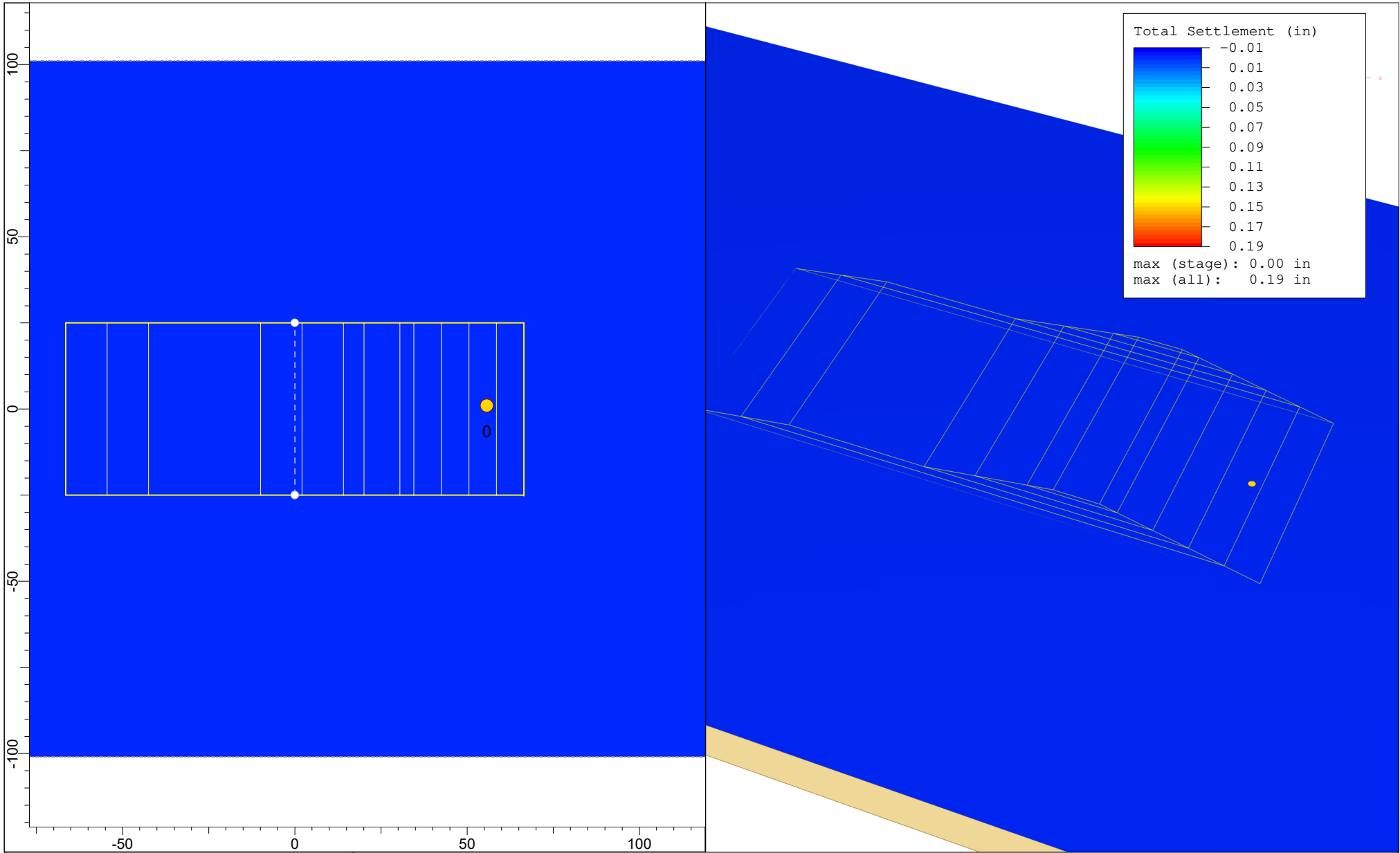


SC 557 Roadway Construction and Improvements  
Final Roadway Geotechnical Engineering Report

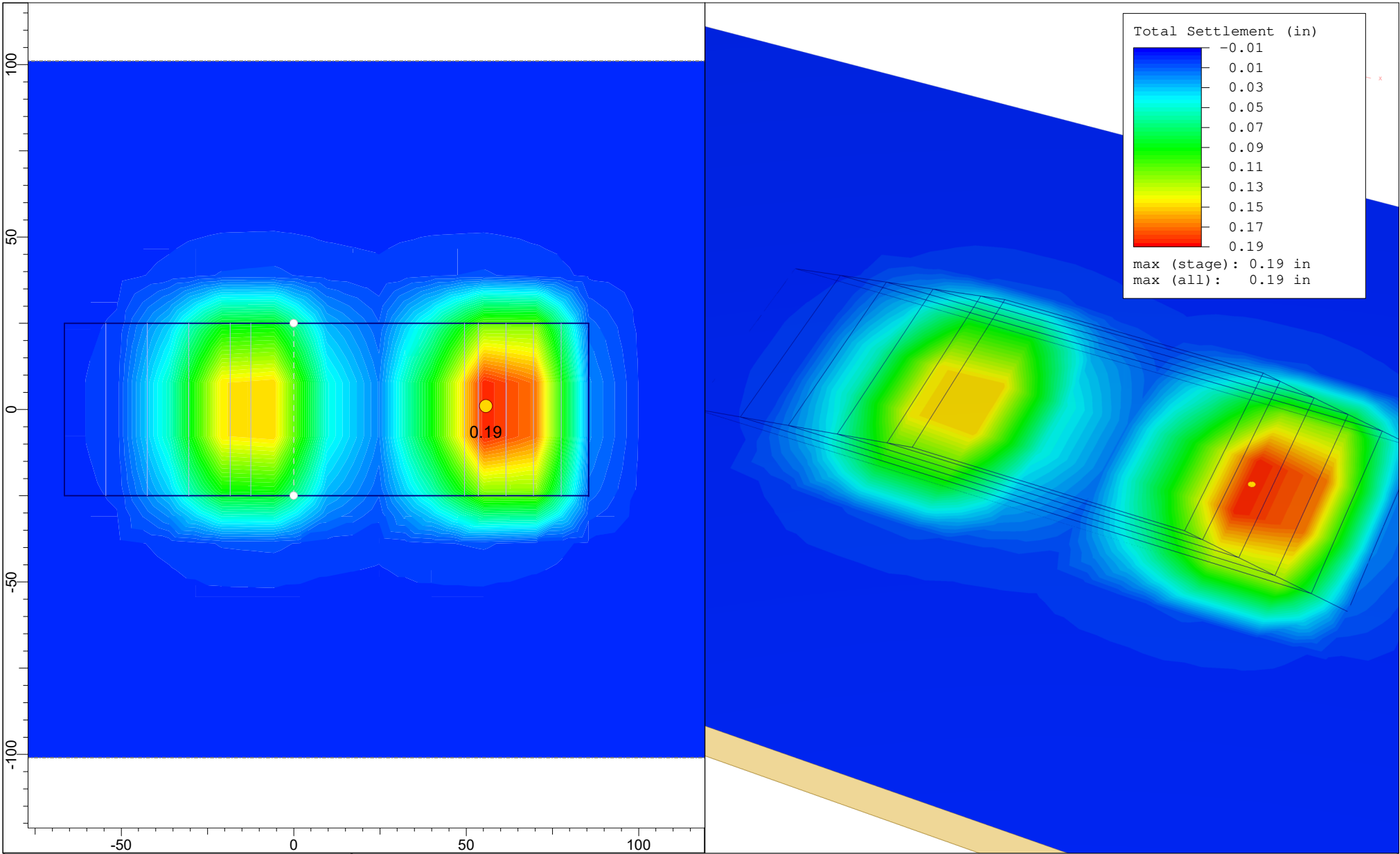
---

# APPENDIX

## SECTION 6 STATIC SETTLEMENT ANALYSES



<i>Project</i>	SC 557 Widening and Improvements		
<i>Analysis Description</i>	Station 206+00		
<i>Drawn By</i>	BMF	<i>Company</i>	F&ME
<i>STAGE</i>	Stage 1: 0 Days (Existing)	<i>File Name</i>	STA 206+00a.s3z



<i>Project</i>	SC 557 Widening and Improvements		
<i>Analysis Description</i>	Station 206+00		
<i>Drawn By</i>	BMF	<i>Company</i>	F&ME
<i>STAGE</i>	Stage 2: 50 Days (End Construction)	<i>File Name</i>	STA 206+00a.s3z

# Settle3D Analysis Information

## SC 557 Widening and Improvements

### Project Settings

Document Name	STA 206+00a
Project Title	SC 557 Widening and Improvements
Analysis	Station 206+00
Author	BMF
Company	F&ME
Date Created	8/7/2018, 12:13:49 PM
Stress Computation Method	Boussinesq
Time-dependent Consolidation Analysis	
Time Units	days
Permeability Units	feet/day
Use average properties to calculate layered stresses	
Improve consolidation accuracy	
Ignore negative effective stresses in settlement calculations	


### Stage Settings

Stage #	Name	Time [days]
1	Stage 1	0
2	Stage 2	10
3	Stage 3	20
4	Stage 4	30
5	Stage 5	40
6	Stage 6	50

### Results (relative to Stage: Stage 1 = 0 d)

Time taken to compute: 0 seconds

**Stage: Stage 1 = 0 d**


	<i>Project</i>		SC 557 Widening and Improvements	
	<i>Analysis Description</i>		Station 206+00	
	<i>Drawn By</i>	BMF	<i>Company</i>	F&ME
	<i>Date</i>	8/7/2018, 12:13:49 PM	<i>File Name</i>	STA 206+00a.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	0
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0
Effective Stress [ksf]	0	0
Total Stress [ksf]	0	0
Total Strain	0	0
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0	0
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0

### Stage: Stage 2 = 10 d

Data Type	Minimum	Maximum
Total Settlement [in]	-1.25276e-009	0.0808421
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	-1.25276e-009	0.0808421
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-5.27304e-006	0.24
Effective Stress [ksf]	-5.27304e-006	0.24
Total Stress [ksf]	-5.27304e-006	0.24
Total Strain	-1.61944e-008	0.000738462
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0	0.24
Over-consolidation Ratio	0	1.56617e-005
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	-2.26588e-008	0.00765168

### Stage: Stage 3 = 20 d


	Project		SC 557 Widening and Improvements	
	Analysis Description		Station 206+00	
	Drawn By	BMF	Company	F&ME
	Date	8/7/2018, 12:13:49 PM	File Name	STA 206+00a.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.14362
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.14362
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-4.91577e-007	0.446397
Effective Stress [ksf]	-4.91577e-007	0.446397
Total Stress [ksf]	-4.91577e-007	0.446397
Total Strain	-9.52028e-010	0.00137341
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0	0.446358
Over-consolidation Ratio	0	7.91803e-005
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	-1.96628e-008	0.0123607

#### Stage: Stage 4 = 30 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.161568
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.161568
Secondary Settlement [in]	0	0
Loading Stress [ksf]	1.41568e-007	0.471373
Effective Stress [ksf]	1.41568e-007	0.471373
Total Stress [ksf]	1.41568e-007	0.471373
Total Strain	4.37245e-010	0.00145037
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	1.42105e-007	0.471371
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0137921

#### Stage: Stage 5 = 40 d

	Project		SC 557 Widening and Improvements	
	Analysis Description		Station 206+00	
	Drawn By	BMF	Company	F&ME
	Date	8/7/2018, 12:13:49 PM	File Name	STA 206+00a.s3z


Data Type	Minimum	Maximum
Total Settlement [in]	0	0.177503
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.177503
Secondary Settlement [in]	0	0
Loading Stress [ksf]	5.07485e-007	0.53911
Effective Stress [ksf]	5.07485e-007	0.53911
Total Stress [ksf]	5.07485e-007	0.53911
Total Strain	1.56587e-009	0.00165862
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	5.08908e-007	0.539051
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0142688

### Stage: Stage 6 = 50 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.189105
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.189105
Secondary Settlement [in]	0	0
Loading Stress [ksf]	7.6481e-007	0.56419
Effective Stress [ksf]	7.6481e-007	0.56419
Total Stress [ksf]	7.6481e-007	0.56419
Total Strain	2.35912e-009	0.00173582
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	7.66714e-007	0.564143
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0144008

## Embankments

### 1. Embankment

	Project		SC 557 Widening and Improvements	
	Analysis Description		Station 206+00	
	Drawn By	BMF	Company	F&ME
	Date	8/7/2018, 12:13:49 PM	File Name	STA 206+00a.s3z

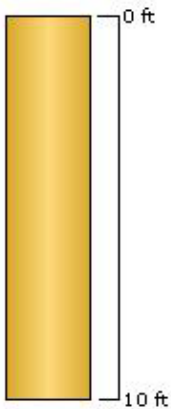
Center Line (0, -25) to (0, 25)  
 Number of Layers 5  
 Near End Angle 90 degrees  
 Far End Angle 90 degrees  
 Base Width 133

Layer	Stage	Left Bench Width (ft)	Left Angle (deg)	Height (ft)	Unit Weight (kips/ft <sup>3</sup> )	Right Angle (deg)	Right Bench Width (ft)
1	Stage 1 = 0 d	0	9.45	2	0.12	14.04	0
2	Stage 1 = 0 d	0	9.45	2	0.12	14.04	0
3	Stage 1 = 0 d	32.5	9.45	2	0.12	14.04	0
4	Stage 1 = 0 d	0	9.45	2	0.12	14.04	0
5	Stage 1 = 0 d	0	9.45	1	0.12	14.04	0


### Soil Layers


Ground Surface Drained: Yes

Layer #	Type	Thickness [ft]	Depth [ft]	Drained at Bottom
1	Silty Sand	10	0	No



### Soil Properties

Property	Silty Sand
Color	
Unit Weight [kips/ft <sup>3</sup> ]	0.115
Saturated Unit Weight [kips/ft <sup>3</sup> ]	0.12
Immediate Settlement	Enabled
Es [ksf]	325
E <sub>sur</sub> [ksf]	325
Undrained Su A [kips/ft <sup>2</sup> ]	0
Undrained Su S	0.2
Undrained Su m	0.8
Piezo Line ID	0

	Project		SC 557 Widening and Improvements	
	Analysis Description		Station 206+00	
	Drawn By	BMF	Company	F&ME
	Date	8/7/2018, 12:13:49 PM	File Name	STA 206+00a.s3z



## Groundwater

Groundwater method Piezometric Lines  
 Water Unit Weight 0.0624 kips/ft<sup>3</sup>

## Query Points


Point #	(X,Y) Location	Number of Divisions
1	55.75, 0.918	Auto: 31

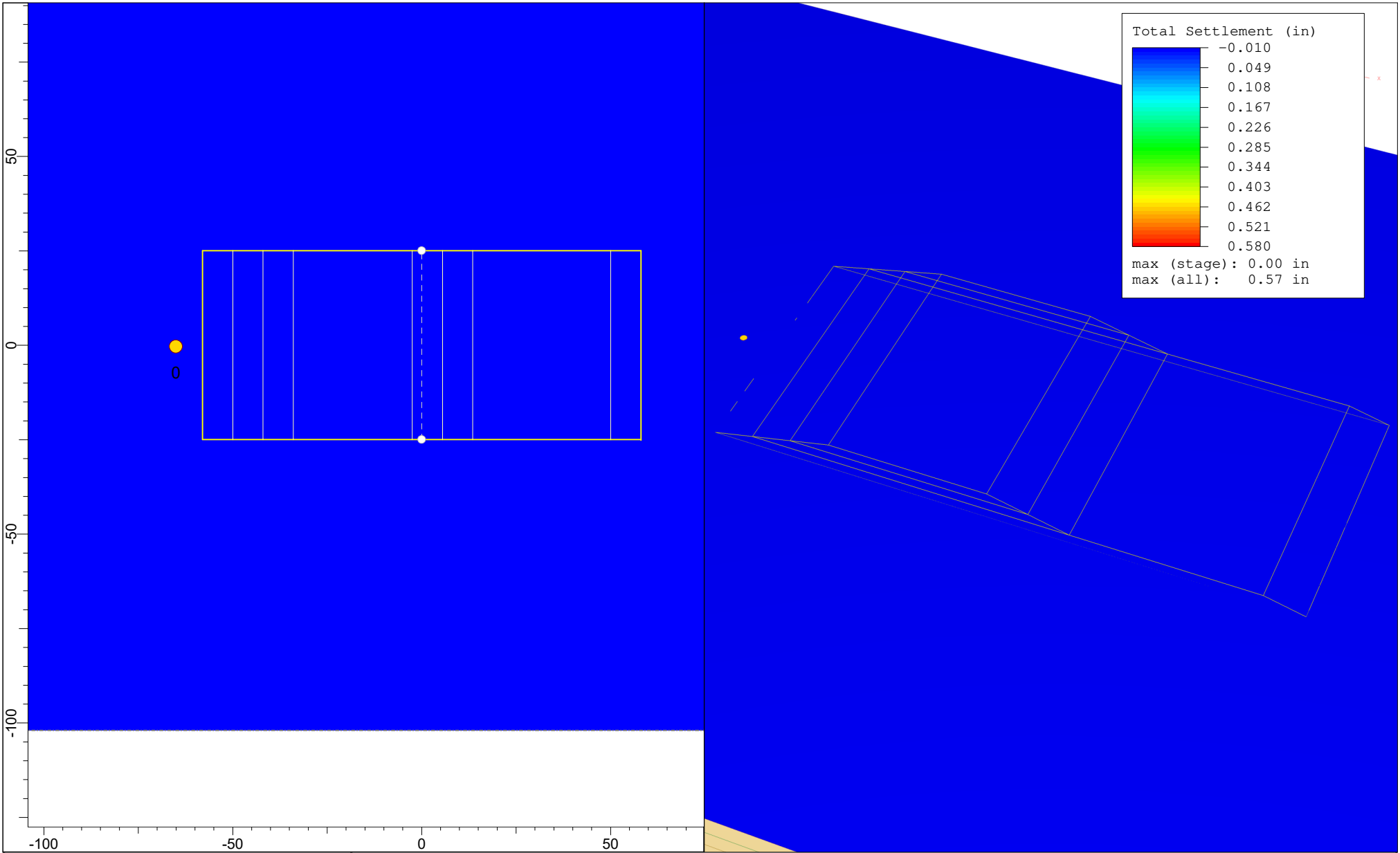
## Field Point Grid

Number of points 294  
 Expansion Factor 2

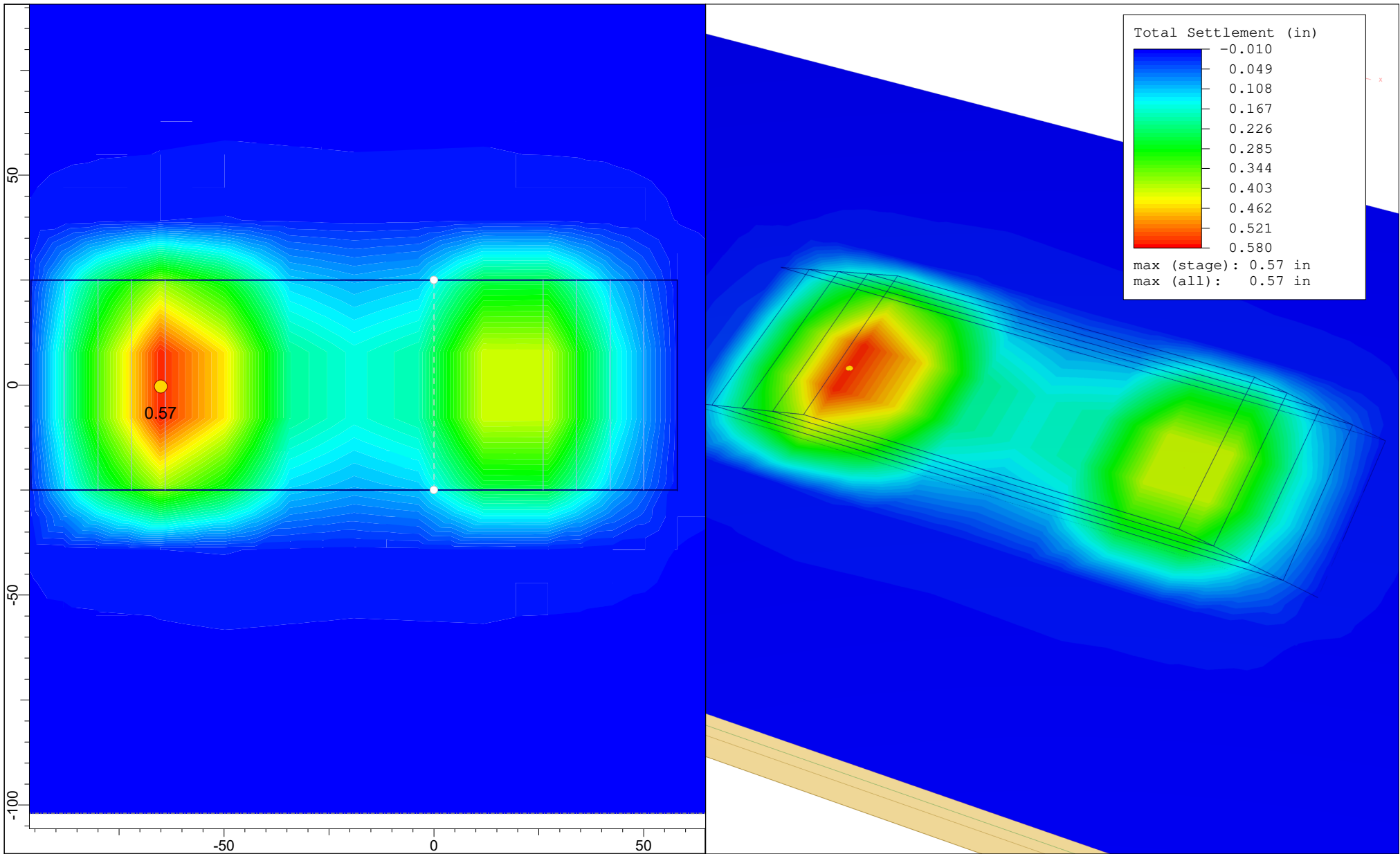
### Grid Coordinates

X [ft]	Y [ft]
161.5	101
161.5	-101
-142.5	-101
-142.5	101

	<i>Project</i>		SC 557 Widening and Improvements	
	<i>Analysis Description</i>		Station 206+00	
	<i>Drawn By</i>	BMF	<i>Company</i>	F&ME
	<i>Date</i>	8/7/2018, 12:13:49 PM	<i>File Name</i>	STA 206+00a.s3z



<i>Project</i>	SC 557 Widening and Improvements		
<i>Analysis Description</i>	Station 229+50		
<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
<i>STAGE</i>	Stage 1: 0 Days (Existing)	<i>File Name</i>	STA 229+50.s3z



<i>Project</i>	SC 557 Widening and Improvements		
<i>Analysis Description</i>	Station 229+50		
<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
<i>STAGE</i>	Stage 2: 40 Days (End Construction)	<i>File Name</i>	STA 229+50.s3z

# Settle3D Analysis Information

## SC 557 Widening and Improvements

### Project Settings

Document Name	STA 229+50
Project Title	SC 557 Widening and Improvements
Analysis	Station 229+50
Author	JFH
Company	F&ME
Stress Computation Method	Boussinesq
Time-dependent Consolidation Analysis	
Time Units	days
Permeability Units	feet/day
Use average properties to calculate layered stresses	
Improve consolidation accuracy	
Ignore negative effective stresses in settlement calculations	


### Stage Settings

Stage #	Name	Time [days]
1	Stage 1	0
2	Stage 2	10
3	Stage 3	20
4	Stage 4	30
5	Stage 5	40
6	Stage 6	500

### Results (relative to Stage: Stage 1 = 0 d)

Time taken to compute: 0.124754 seconds

### Stage: Stage 1 = 0 d


	<i>Project</i>		SC 557 Widening and Improvements	
	<i>Analysis Description</i>		Station 229+50	
	<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
	<i>Date</i>		<i>File Name</i>	STA 229+50.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	0
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0
Effective Stress [ksf]	0	0
Total Stress [ksf]	0	0
Total Strain	0	0
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0	0
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0

### Stage: Stage 2 = 10 d

Data Type	Minimum	Maximum
Total Settlement [in]	-2.3494e-006	0.158035
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	-2.3494e-006	0.158035
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-0.00188515	0.24
Effective Stress [ksf]	-0.00188515	0.24
Total Stress [ksf]	-0.00188515	0.24
Total Strain	-1.56995e-005	0.002
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0	0.24
Over-consolidation Ratio	0	0.00726388
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	-8.93148e-006	0.00813832

### Stage: Stage 3 = 20 d


	<i>Project</i> SC 557 Widening and Improvements	
	<i>Analysis Description</i> Station 229+50	
	<i>Drawn By</i> JFH	<i>Company</i> F&ME
	<i>Date</i>	<i>File Name</i> STA 229+50.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.316027
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.316027
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-0.000222354	0.479838
Effective Stress [ksf]	-0.000222354	0.479838
Total Stress [ksf]	-0.000222354	0.479838
Total Strain	-9.81769e-007	0.00399864
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0	0.479837
Over-consolidation Ratio	0	0.00190048
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	-8.88083e-006	0.0148432

#### Stage: Stage 4 = 30 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.465704
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.465704
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-0.000214644	0.716785
Effective Stress [ksf]	-0.000214644	0.716785
Total Stress [ksf]	-0.000214644	0.716785
Total Strain	-7.77173e-007	0.00597313
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0	0.716776
Over-consolidation Ratio	0	0.00154981
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	-8.57249e-006	0.020374


#### Stage: Stage 5 = 40 d

	Project		SC 557 Widening and Improvements	
	Analysis Description		Station 229+50	
	Drawn By	JFH	Company	F&ME
	Date		File Name	STA 229+50.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.572087
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.572087
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-0.000182488	0.89182
Effective Stress [ksf]	-0.000182488	0.89182
Total Stress [ksf]	-0.000182488	0.89182
Total Strain	-4.74249e-007	0.00743157
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0	0.891789
Over-consolidation Ratio	0	0.000814101
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	-7.28673e-006	0.024014

### Stage: Stage 6 = 500 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.572087
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.572087
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-0.000182488	0.89182
Effective Stress [ksf]	-0.000182488	0.89182
Total Stress [ksf]	-0.000182488	0.89182
Total Strain	-4.74249e-007	0.00743157
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0	0.891789
Over-consolidation Ratio	0	0.000814101
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	-7.28673e-006	0.024014

	Project		SC 557 Widening and Improvements	
	Analysis Description		Station 229+50	
	Drawn By	JFH	Company	F&ME
	Date		File Name	STA 229+50.s3z

## Embankments

### 1. Embankment

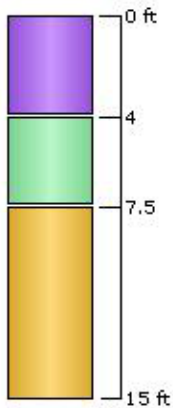
Center Line (0, -25) to (0, 25)  
 Number of Layers 4  
 Near End Angle 90 degrees  
 Far End Angle 90 degrees  
 Base Width 116

Layer	Stage	Left Bench Width (ft)	Left Angle (deg)	Height (ft)	Unit Weight (kips/ft <sup>3</sup> )	Right Angle (deg)	Right Bench Width (ft)
1	Stage 1 = 0 d	0	14.04	2	0.12	14.04	0
2	Stage 1 = 0 d	0	14.04	2	0.12	14.04	36.5
3	Stage 1 = 0 d	0	14.04	2	0.12	14.04	0
4	Stage 5 = 40 d	0	14.04	2	0.12	14.04	0


## Soil Layers

Ground Surface Drained: Yes




Layer #	Type	Thickness [ft]	Depth [ft]	Drained at Bottom
1	VL Clayey Sand	4	0	No
2	V. Stiff Sandy Clay	3.5	4	No
3	Dense Silty Sand	7.5	7.5	No



## Soil Properties

	Project		SC 557 Widening and Improvements	
	Analysis Description		Station 229+50	
	Drawn By	JFH	Company	F&ME
	Date		File Name	STA 229+50.s3z



Property	VL Clayey Sand	V. Stiff Sandy Clay	Dense Silty Sand
Color			
Unit Weight [kips/ft <sup>3</sup> ]	0.105	0.105	0.125
Saturated Unit Weight [kips/ft <sup>3</sup> ]	0.11	0.11	0.13
Immediate Settlement	Enabled	Enabled	Enabled
Es [ksf]	120	250	800
Esur [ksf]	120	250	800
Undrained Su A [kips/ft <sup>2</sup> ]	0	0	0
Undrained Su S	0.2	0.2	0.2
Undrained Su m	0.8	0.8	0.8
Piezo Line ID	0	0	0

## Groundwater

Groundwater method Piezometric Lines  
 Water Unit Weight 0.0624 kips/ft<sup>3</sup>

## Query Points


Point #	(X,Y) Location	Number of Divisions
1	-65.025, -0.341	Auto: 55

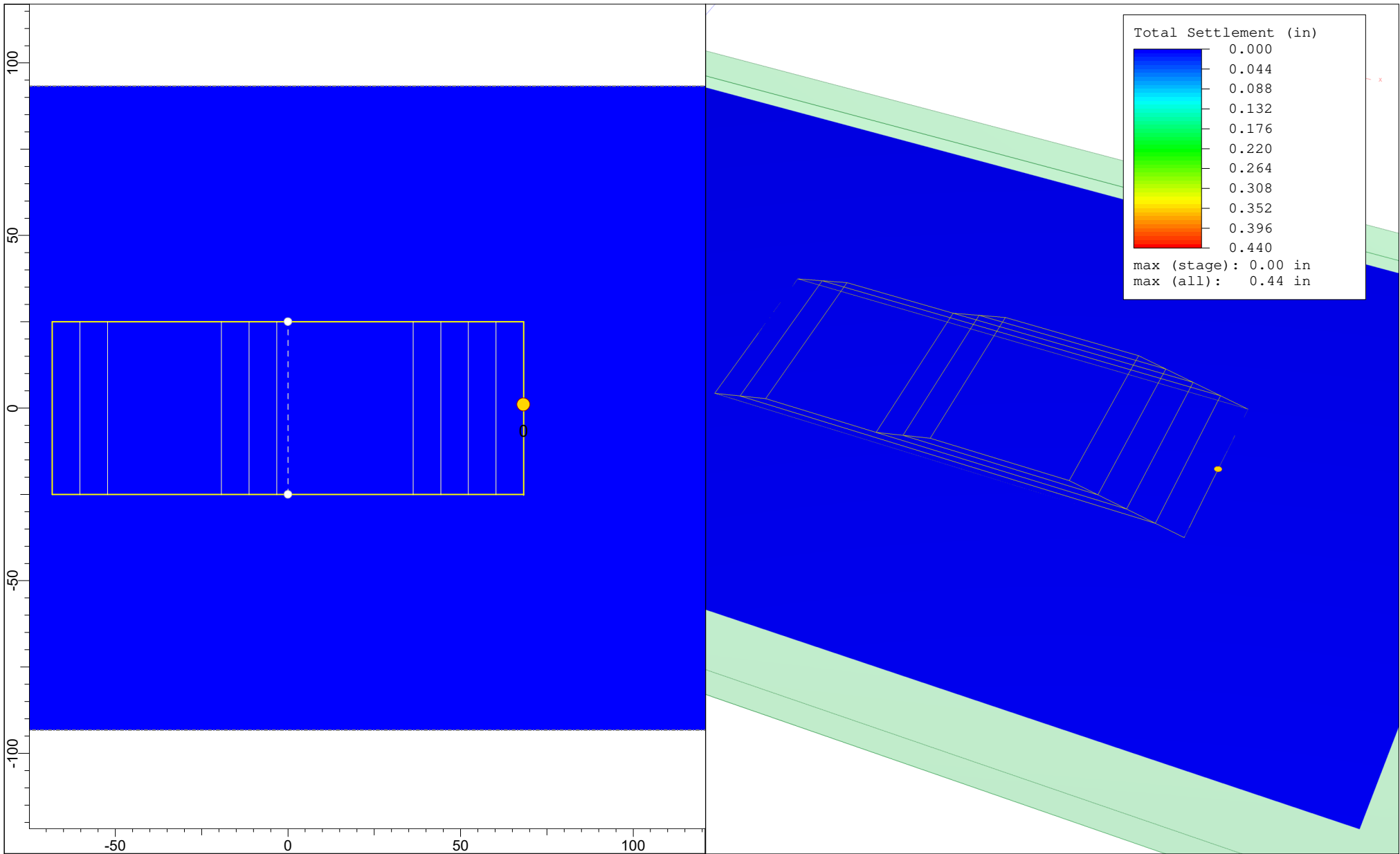
## Field Point Grid

Number of points 294  
 Expansion Factor 2

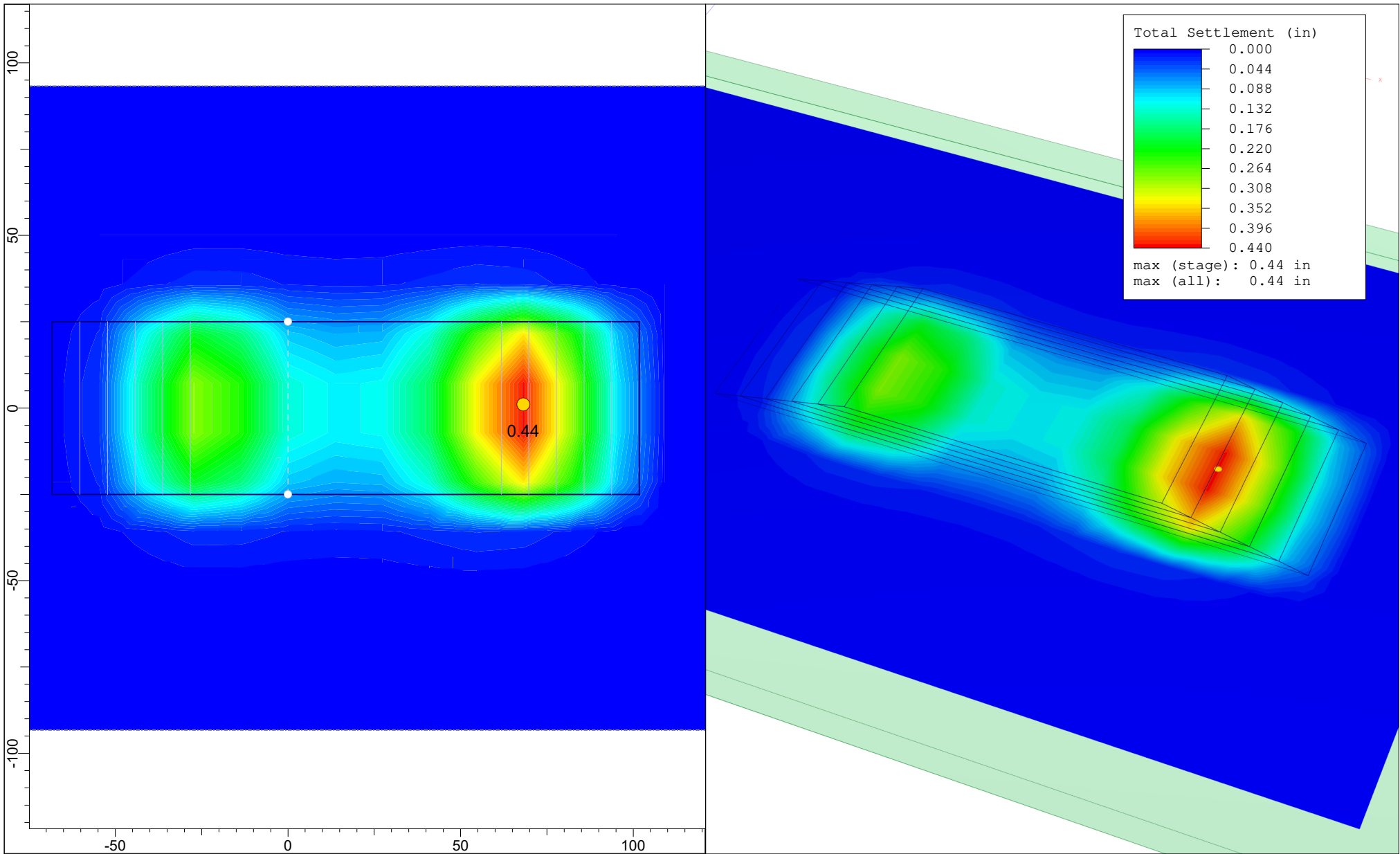
## Grid Coordinates

X [ft]	Y [ft]
135	102
135	-102
-173	-102
-173	102

	Project		SC 557 Widening and Improvements	
	Analysis Description		Station 229+50	
	Drawn By	JFH	Company	F&ME
	Date		File Name	STA 229+50.s3z



<i>Project</i>	SC 557 Widening and Improvements		
<i>Analysis Description</i>	Station 237+50		
<i>Drawn By</i>	BMF	<i>Company</i>	F&ME
<i>STAGE</i>	Stage 1: 0 Days (Existing)	<i>File Name</i>	STA 237+50.s3z



<i>Project</i>	SC 557 Widening and Improvements		
<i>Analysis Description</i>	Station 237+50		
<i>Drawn By</i>	BMF	<i>Company</i>	F&ME
<i>STAGE</i>	Stage 2: 50 Days (End Construction)	<i>File Name</i>	STA 237+50.s3z

# Settle3D Analysis Information

## SC 557 Widening and Improvements

### Project Settings

Document Name	STA 237+50
Project Title	SC 557 Widening and Improvements
Analysis	Station 237+50
Author	BMF
Company	F&ME
Stress Computation Method	Boussinesq
Time-dependent Consolidation Analysis	
Time Units	days
Permeability Units	feet/day
Use average properties to calculate layered stresses	
Improve consolidation accuracy	
Ignore negative effective stresses in settlement calculations	


### Stage Settings

Stage #	Name	Time [days]
1	Stage 1	0
2	Stage 2	10
3	Stage 3	20
4	Stage 4	30
5	Stage 5	40
6	Stage 6	50

### Results (relative to Stage: Stage 1 = 0 d)

Time taken to compute: 0 seconds

**Stage: Stage 1 = 0 d**


	<i>Project</i>		SC 557 Widening and Improvements	
	<i>Analysis Description</i>		Station 237+50	
	<i>Drawn By</i>	BMF	<i>Company</i>	F&ME
	<i>Date</i>		<i>File Name</i>	STA 237+50.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	0
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0
Effective Stress [ksf]	0	0
Total Stress [ksf]	0	0
Total Strain	0	0
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0	0
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0

### Stage: Stage 2 = 10 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.112278
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.112278
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-1.60525e-006	0.24
Effective Stress [ksf]	-1.60525e-006	0.24
Total Stress [ksf]	-1.60525e-006	0.24
Total Strain	-6.41391e-009	0.00096
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0	0.24
Over-consolidation Ratio	0	3.85879e-006
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	-3.87605e-009	0.0082587

### Stage: Stage 3 = 20 d


	<i>Project</i> SC 557 Widening and Improvements	
	<i>Analysis Description</i> Station 237+50	
	<i>Drawn By</i> BMF	<i>Company</i> F&ME
	<i>Date</i>	<i>File Name</i> STA 237+50.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.21542
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.21542
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-5.26109e-010	0.479615
Effective Stress [ksf]	-5.26109e-010	0.479615
Total Stress [ksf]	-5.26109e-010	0.479615
Total Strain	9.98568e-012	0.00191826
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	2.49642e-009	0.479564
Over-consolidation Ratio	0	3.03219e-006
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	-2.10439e-011	0.0143722

#### Stage: Stage 4 = 30 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.310478
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.310478
Secondary Settlement [in]	0	0
Loading Stress [ksf]	2.70393e-007	0.71736
Effective Stress [ksf]	2.70393e-007	0.71736
Total Stress [ksf]	2.70393e-007	0.71736
Total Strain	1.08567e-009	0.00286921
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	2.71417e-007	0.717302
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0182471

#### Stage: Stage 5 = 40 d

	Project		SC 557 Widening and Improvements	
	Analysis Description		Station 237+50	
	Drawn By	BMF	Company	F&ME
	Date		File Name	STA 237+50.s3z


Data Type	Minimum	Maximum
Total Settlement [in]	0	0.395785
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.395785
Secondary Settlement [in]	0	0
Loading Stress [ksf]	1.02297e-006	0.924236
Effective Stress [ksf]	1.02297e-006	0.924236
Total Stress [ksf]	1.02297e-006	0.924236
Total Strain	4.10349e-009	0.00369658
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	1.02587e-006	0.924145
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0221906

### Stage: Stage 6 = 50 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.43756
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.43756
Secondary Settlement [in]	0	0
Loading Stress [ksf]	3.0562e-006	1.00368
Effective Stress [ksf]	3.0562e-006	1.00368
Total Stress [ksf]	3.0562e-006	1.00368
Total Strain	1.22516e-008	0.0040144
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	3.0629e-006	1.0036
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0243558

## Embankments

### 1. Embankment

	Project		SC 557 Widening and Improvements	
	Analysis Description		Station 237+50	
	Drawn By	BMF	Company	F&ME
	Date		File Name	STA 237+50.s3z

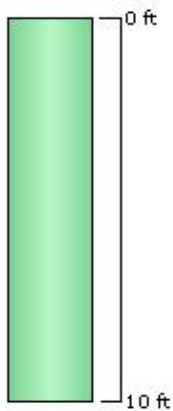
Center Line (0, -25) to (0, 25)  
 Number of Layers 5  
 Near End Angle 90 degrees  
 Far End Angle 90 degrees  
 Base Width 136.5

Layer	Stage	Left Bench Width (ft)	Left Angle (deg)	Height (ft)	Unit Weight (kips/ft <sup>3</sup> )	Right Angle (deg)	Right Bench Width (ft)
1	Stage 1 = 0 d	0	14.04	2	0.12	14.04	0
2	Stage 1 = 0 d	0	14.04	2	0.12	14.04	0
3	Stage 1 = 0 d	33	14.04	2	0.12	14.04	0
4	Stage 1 = 0 d	0	14.04	2	0.12	14.04	0
5	Stage 6 = 50 d	0	14.04	2	0.12	14.04	0


## Soil Layers


Ground Surface Drained: Yes

Layer #	Type	Thickness [ft]	Depth [ft]	Drained at Bottom
1	Stiff/V. Stiff Sandy Silt	10	0	No



## Soil Properties

Property	Stiff/V. Stiff Sandy Silt
Color	
Unit Weight [kips/ft <sup>3</sup> ]	0.11
Saturated Unit Weight [kips/ft <sup>3</sup> ]	0.115
Immediate Settlement	Enabled
Es [ksf]	250
E <sub>sur</sub> [ksf]	250
Undrained Su A [kips/ft <sup>2</sup> ]	0
Undrained Su S	0.2
Undrained Su m	0.8
Piezo Line ID	0

	Project		SC 557 Widening and Improvements	
	Analysis Description		Station 237+50	
	Drawn By	BMF	Company	F&ME
	Date		File Name	STA 237+50.s3z



## Groundwater

Groundwater method Piezometric Lines  
 Water Unit Weight 0.0624 kips/ft<sup>3</sup>

## Query Points


Point #	(X,Y) Location	Number of Divisions
1	68.227, 0.999	Auto: 31

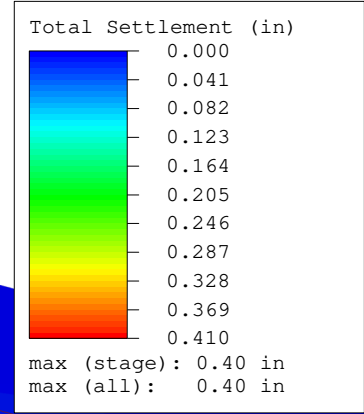
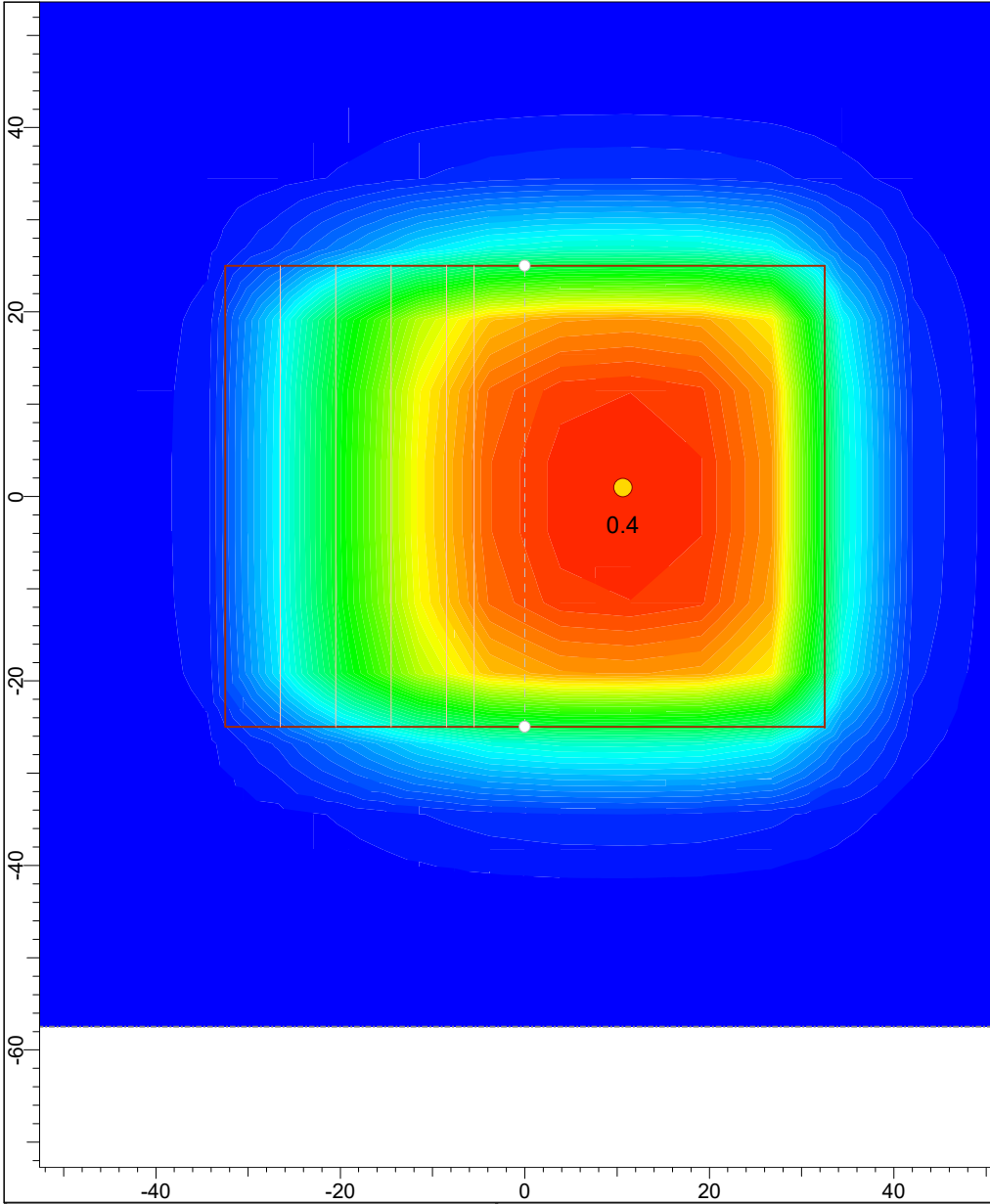
## Field Point Grid

Number of points 294  
 Expansion Factor 2

### Grid Coordinates

X [ft]	Y [ft]
186.75	110
186.75	-110
-153.25	-110
-153.25	110

	<i>Project</i>		SC 557 Widening and Improvements	
	<i>Analysis Description</i>		Station 237+50	
	<i>Drawn By</i>	BMF	<i>Company</i>	F&ME
	<i>Date</i>		<i>File Name</i>	STA 237+50.s3z



Total Settlement (in)

0.000
0.041
0.082
0.123
0.164
0.205
0.246
0.287
0.328
0.369
0.410

max (stage): 0.40 in  
max (all): 0.40 in



<i>Project</i>		SC 557 Widening and Improvements	
<i>Analysis Description</i>		Station 249+00	
<i>Drawn By</i>	BMF	<i>Company</i>	F&ME
<i>STAGE</i>	Stage 2: 50 Days (End Construction)	<i>File Name</i>	STA 249+00.s3z

# Settle3D Analysis Information

## SC 557 Widening and Improvements

### Project Settings

Document Name	STA 249+00
Project Title	SC 557 Widening and Improvements
Analysis	Station 249+00
Author	BMF
Company	F&ME
Stress Computation Method	Boussinesq
Time-dependent Consolidation Analysis	
Time Units	days
Permeability Units	feet/day
Use average properties to calculate layered stresses	
Improve consolidation accuracy	
Ignore negative effective stresses in settlement calculations	


### Stage Settings

Stage #	Name	Time [days]
1	Stage 1	0
2	Stage 2	10
3	Stage 3	20
4	Stage 4	30
5	Stage 5	40
6	Stage 6	50

### Results (relative to Stage: Stage 1 = 0 d)

Time taken to compute: 0.660001 seconds

**Stage: Stage 1 = 0 d**


	<i>Project</i>		SC 557 Widening and Improvements	
	<i>Analysis Description</i>		Station 249+00	
	<i>Drawn By</i>	BMF	<i>Company</i>	F&ME
	<i>Date</i>		<i>File Name</i>	STA 249+00.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	0
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0
Effective Stress [ksf]	0	0
Total Stress [ksf]	0	0
Total Strain	0	0
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0	0
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0

### Stage: Stage 2 = 10 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.0917109
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.0917109
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0.240001
Effective Stress [ksf]	0	0.240001
Total Stress [ksf]	0	0.240001
Total Strain	0	0.000960002
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0	0.240001
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.00860326

### Stage: Stage 3 = 20 d


	<i>Project</i>		SC 557 Widening and Improvements	
	<i>Analysis Description</i>		Station 249+00	
	<i>Drawn By</i>	BMF	<i>Company</i>	F&ME
	<i>Date</i>		<i>File Name</i>	STA 249+00.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.182729
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.182729
Secondary Settlement [in]	0	0
Loading Stress [ksf]	6.65098e-007	0.479913
Effective Stress [ksf]	6.65098e-007	0.479913
Total Stress [ksf]	6.65098e-007	0.479913
Total Strain	0	0.00191965
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	6.691e-007	0.479913
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0159698

#### Stage: Stage 4 = 30 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.272327
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.272327
Secondary Settlement [in]	0	0
Loading Stress [ksf]	4.48142e-006	0.719154
Effective Stress [ksf]	4.48142e-006	0.719154
Total Stress [ksf]	4.48142e-006	0.719154
Total Strain	0	0.0028766
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	4.49684e-006	0.719151
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0223399

#### Stage: Stage 5 = 40 d

	Project		SC 557 Widening and Improvements	
	Analysis Description		Station 249+00	
	Drawn By	BMF	Company	F&ME
	Date		File Name	STA 249+00.s3z


Data Type	Minimum	Maximum
Total Settlement [in]	0	0.359661
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.359661
Secondary Settlement [in]	0	0
Loading Stress [ksf]	1.36929e-005	0.956283
Effective Stress [ksf]	1.36929e-005	0.956283
Total Stress [ksf]	1.36929e-005	0.956283
Total Strain	0	0.0038251
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	1.37266e-005	0.956275
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0278834

### Stage: Stage 6 = 50 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.401361
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.401361
Secondary Settlement [in]	0	0
Loading Stress [ksf]	2.20951e-005	1.07231
Effective Stress [ksf]	2.20951e-005	1.07231
Total Stress [ksf]	2.20951e-005	1.07231
Total Strain	0	0.00428918
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	2.21413e-005	1.0723
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0302917

## Embankments

### 1. Embankment

	Project		SC 557 Widening and Improvements	
	Analysis Description		Station 249+00	
	Drawn By	BMF	Company	F&ME
	Date		File Name	STA 249+00.s3z

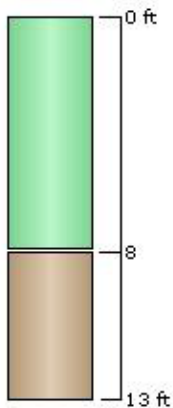
Center Line (0, -25) to (0, 25)  
 Number of Layers 5  
 Near End Angle 90 degrees  
 Far End Angle 90 degrees  
 Base Width 65

Layer	Stage	Left Bench Width (ft)	Left Angle (deg)	Height (ft)	Unit Weight (kips/ft <sup>3</sup> )	Right Angle (deg)	Right Bench Width (ft)
1	Stage 2 = 10 d	0	18.44	2	0.12	90	0
2	Stage 3 = 20 d	0	18.44	2	0.12	90	0
3	Stage 4 = 30 d	0	18.44	2	0.12	90	0
4	Stage 5 = 40 d	0	18.44	2	0.12	90	0
5	Stage 6 = 50 d	0	18.44	1	0.12	90	0


## Soil Layers



Ground Surface Drained: Yes

Layer #	Type	Thickness [ft]	Depth [ft]	Drained at Bottom
1	Stiff/V. Stiff Sandy Silt	8	0	No
2	Partially Weathered Rock (PWR)	5	8	No



## Soil Properties

	Project		SC 557 Widening and Improvements	
	Analysis Description		Station 249+00	
	Drawn By	BMF	Company	F&ME
	Date		File Name	STA 249+00.s3z

Property	Stiff/V. Stiff Sandy Silt	Partially Weathered Rock (PWR)
Color		
Unit Weight [kips/ft <sup>3</sup> ]	0.11	0.135
Saturated Unit Weight [kips/ft <sup>3</sup> ]	0.115	0.14
Immediate Settlement	Enabled	Disabled
Es [ksf]	250	
Esur [ksf]	250	
Undrained Su A [kips/ft <sup>2</sup> ]	0	0
Undrained Su S	0.2	0.2
Undrained Su m	0.8	0.8
Piezo Line ID	0	0

## Groundwater

Groundwater method Piezometric Lines  
 Water Unit Weight 0.0624 kips/ft<sup>3</sup>

## Query Points


Point #	(X,Y) Location	Number of Divisions
1	10.637, 0.938	Auto: 49

## Field Point Grid

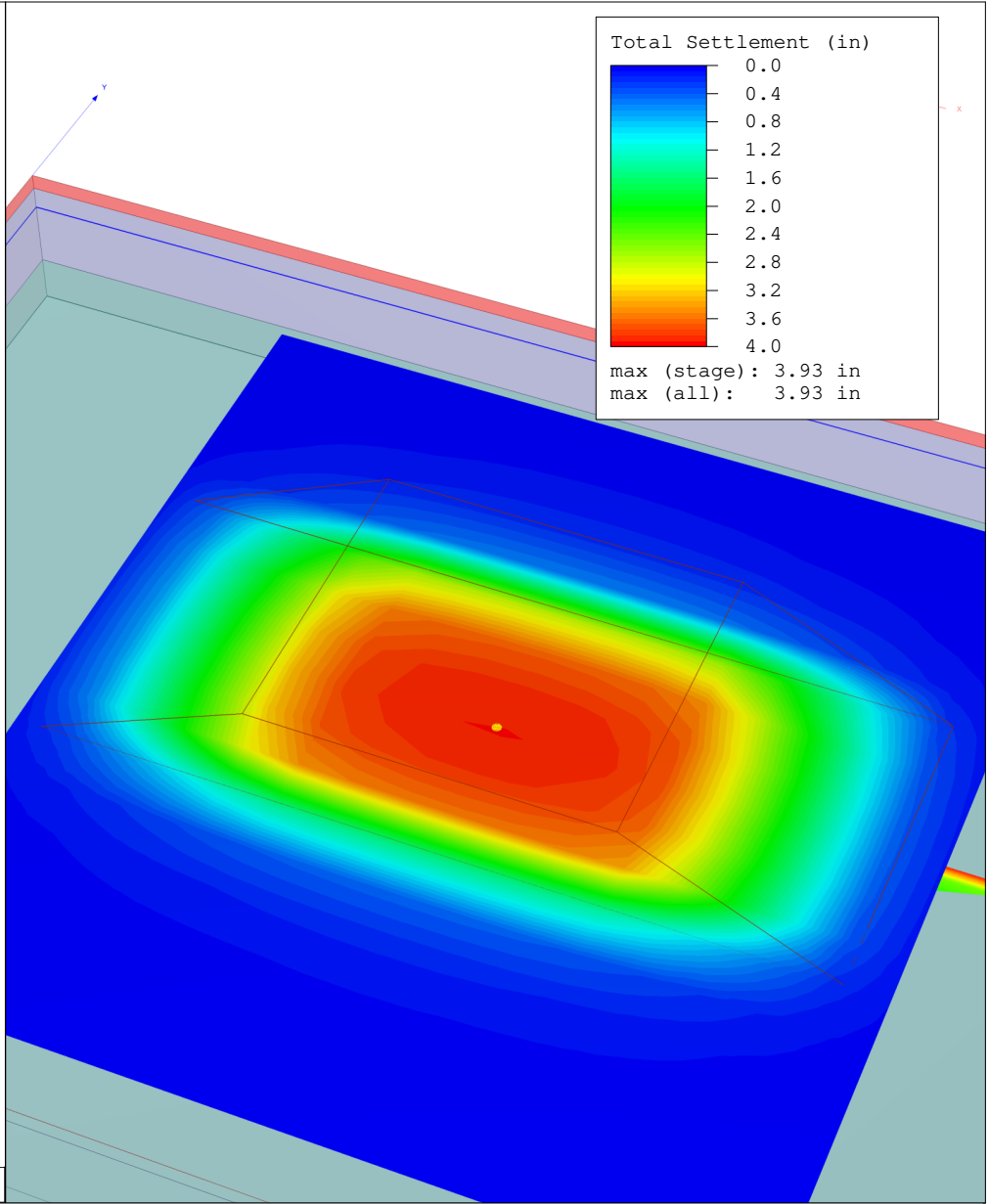
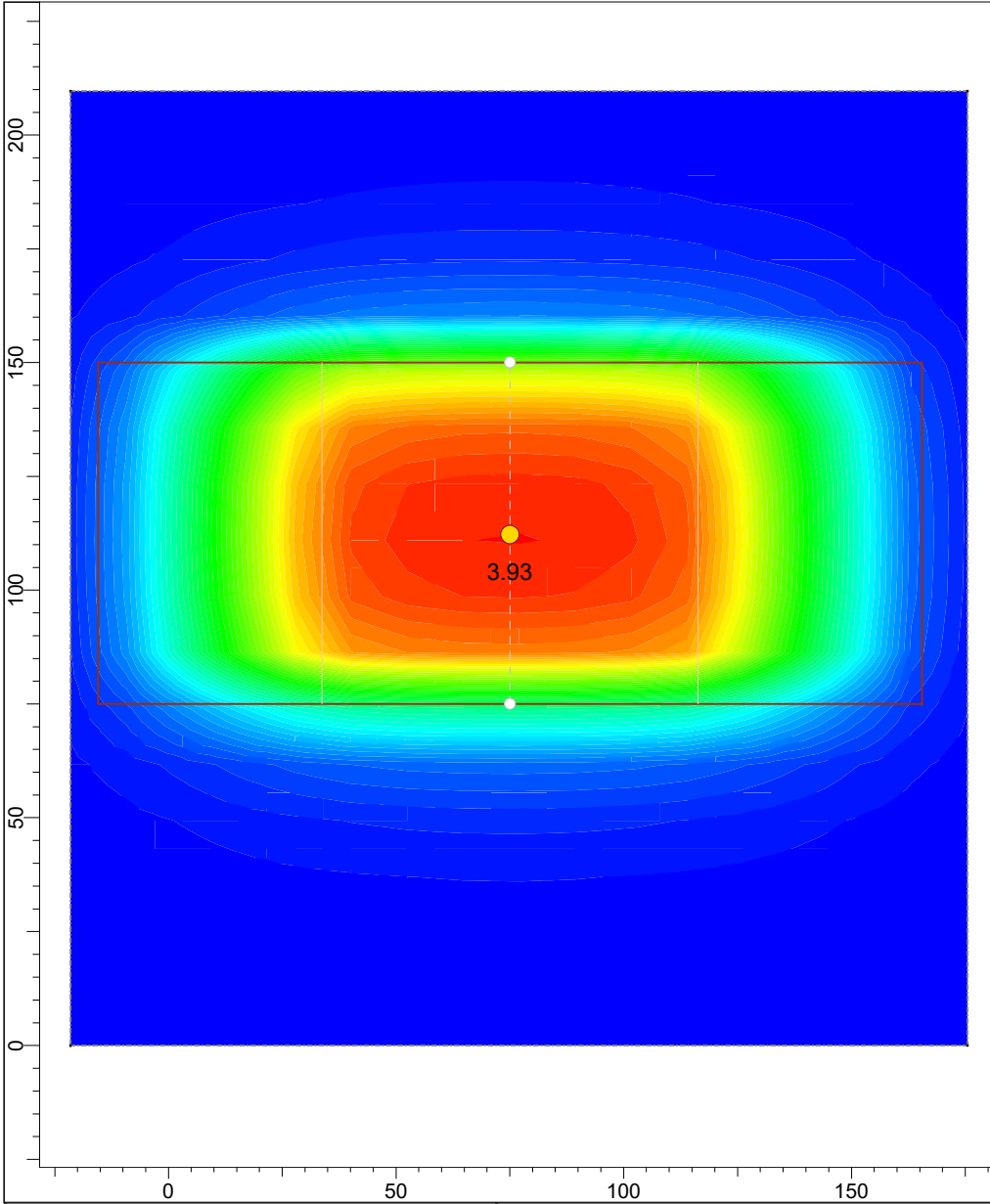
Number of points 288  
 Expansion Factor 2

### Grid Coordinates

X [ft]	Y [ft]
65	57.5
65	-57.5
-65	-57.5
-65	57.5

	Project		SC 557 Widening and Improvements	
	Analysis Description		Station 249+00	
	Drawn By	BMF	Company	F&ME
	Date		File Name	STA 249+00.s3z





<i>Project</i>	SC 557 Over Crowders Creek		
<i>Analysis Description</i>	Begin Bridge Embankment Single Drainage		
<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
<i>STAGE</i>	Stage 2:150 Days (End Construction)	<i>File Name</i>	Begin Bridge Embankment.s3z

# Settle3D Analysis Information

## SC 557 Over Crowders Creek

### Project Settings

Document Name	Begin Bridge Embankment
Project Title	SC 557 Over Crowders Creek
Analysis	Begin Bridge Embankment Single Drainage
Author	JFH
Company	F&ME
Stress Computation Method	Boussinesq
Time-dependent Consolidation Analysis	
Time Units	days
Permeability Units	feet/day
Use average properties to calculate layered stresses	
Improve consolidation accuracy	
Ignore negative effective stresses in settlement calculations	


### Stage Settings

Stage #	Name	Time [days]
1	Stage 1	0
2	Stage 2	150
3	Stage 3	200
4	Stage 4	250
5	Stage 5	300
6	Stage 6	350
7	Stage 7	400
8	Stage 8	500
9	Stage 9	600
10	Stage 10	700
11	Stage 11	800
12	Stage 12	900
13	Stage 13	1000

### Results

Time taken to compute: 0.632021 seconds

**Stage: Stage 1 = 0 d**


	<i>Project</i>		SC 557 Over Crowders Creek	
	<i>Analysis Description</i>		Begin Bridge Embankment Single Drainage	
	<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
	<i>Date</i>		<i>File Name</i>	Begin Bridge Embankment.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	0
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0
Effective Stress [ksf]	0	2.6454
Total Stress [ksf]	0	4.455
Total Strain	0	0
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	2.64471
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.52908

### Stage: Stage 2 = 150 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

### Stage: Stage 3 = 200 d


	<i>Project</i> SC 557 Over Crowders Creek	
	<i>Analysis Description</i> Begin Bridge Embankment Single Drainage	
	<i>Drawn By</i> JFH	<i>Company</i> F&ME
	<i>Date</i>	<i>File Name</i> Begin Bridge Embankment.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

#### Stage: Stage 4 = 250 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

#### Stage: Stage 5 = 300 d


	<i>Project</i> SC 557 Over Crowders Creek	
	<i>Analysis Description</i> Begin Bridge Embankment Single Drainage	
	<i>Drawn By</i> JFH	<i>Company</i> F&ME
	<i>Date</i>	<i>File Name</i> Begin Bridge Embankment.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

### Stage: Stage 6 = 350 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

### Stage: Stage 7 = 400 d


	<i>Project</i> SC 557 Over Crowders Creek	
	<i>Analysis Description</i> Begin Bridge Embankment Single Drainage	
	<i>Drawn By</i> JFH	<i>Company</i> F&ME
	<i>Date</i>	<i>File Name</i> Begin Bridge Embankment.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

### Stage: Stage 8 = 500 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

### Stage: Stage 9 = 600 d


	<i>Project</i> SC 557 Over Crowders Creek	
	<i>Analysis Description</i> Begin Bridge Embankment Single Drainage	
	<i>Drawn By</i> JFH	<i>Company</i> F&ME
	<i>Date</i>	<i>File Name</i> Begin Bridge Embankment.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

### Stage: Stage 10 = 700 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

### Stage: Stage 11 = 800 d


	<i>Project</i> SC 557 Over Crowders Creek	
	<i>Analysis Description</i> Begin Bridge Embankment Single Drainage	
	<i>Drawn By</i> JFH	<i>Company</i> F&ME
	<i>Date</i>	<i>File Name</i> Begin Bridge Embankment.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

### Stage: Stage 12 = 900 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

### Stage: Stage 13 = 1000 d

	Project SC 557 Over Crowders Creek	
	Analysis Description Begin Bridge Embankment Single Drainage	
	Drawn By JFH	Company F&ME
	Date	File Name Begin Bridge Embankment.s3z



Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

## Embankments

### 1. Embankment


Center Line (75, 75) to (75, 150)  
 Number of Layers 1  
 Near End Angle 90 degrees  
 Far End Angle 90 degrees  
 Base Width 181

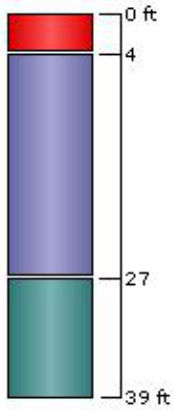
Layer	Stage	Left Bench Width (ft)	Left Angle (deg)	Height (ft)	Unit Weight (kips/ft <sup>3</sup> )	Right Angle (deg)	Right Bench Width (ft)
1	Stage 2 = 150 d	0	26	24	0.125	26	0

## Soil Layers

Ground Surface Drained: Yes

Layer #	Type	Thickness [ft]	Depth [ft]	Drained at Bottom
1	Soft Clay	4	0	No
2	Firm Silt	23	4	No
3	Hard Silt	12	27	No

	Project		SC 557 Over Crowders Creek	
	Analysis Description		Begin Bridge Embankment Single Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	Begin Bridge Embankment.s3z



### Soil Properties

Property	Firm Silt	Hard Silt	Soft Clay
Color			
Unit Weight [kips/ft <sup>3</sup> ]	0.11	0.115	0.1
Saturated Unit Weight [kips/ft <sup>3</sup> ]	0.115	0.12	0.105
Immediate Settlement	Enabled	Enabled	Enabled
Es [ksf]	500	400	100
E <sub>sur</sub> [ksf]	500	400	100
Undrained Su A [kips/ft <sup>2</sup> ]	0	0	0
Undrained Su S	0.2	0.2	0.2
Undrained Su m	0.8	0.8	0.8
Piezo Line ID	1	1	1

### Groundwater

Groundwater method Piezometric Lines  
 Water Unit Weight 0.0624 kips/ft<sup>3</sup>

### Piezometric Line Entities

ID	Depth (ft)
1	10 ft

### Query Points

Point #	(X,Y) Location	Number of Divisions
2	75, 112.162	Auto: 57


### Field Point Grid

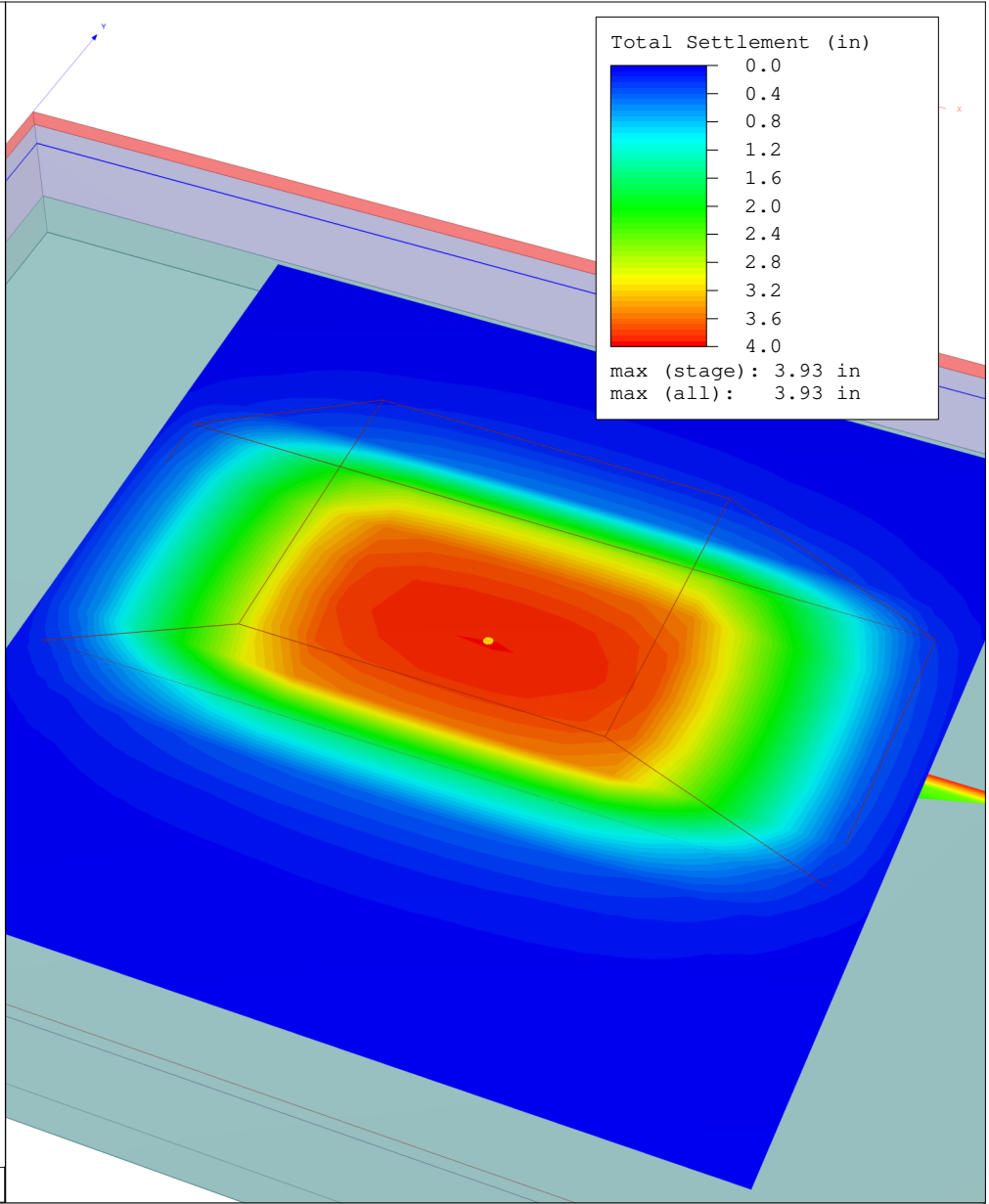
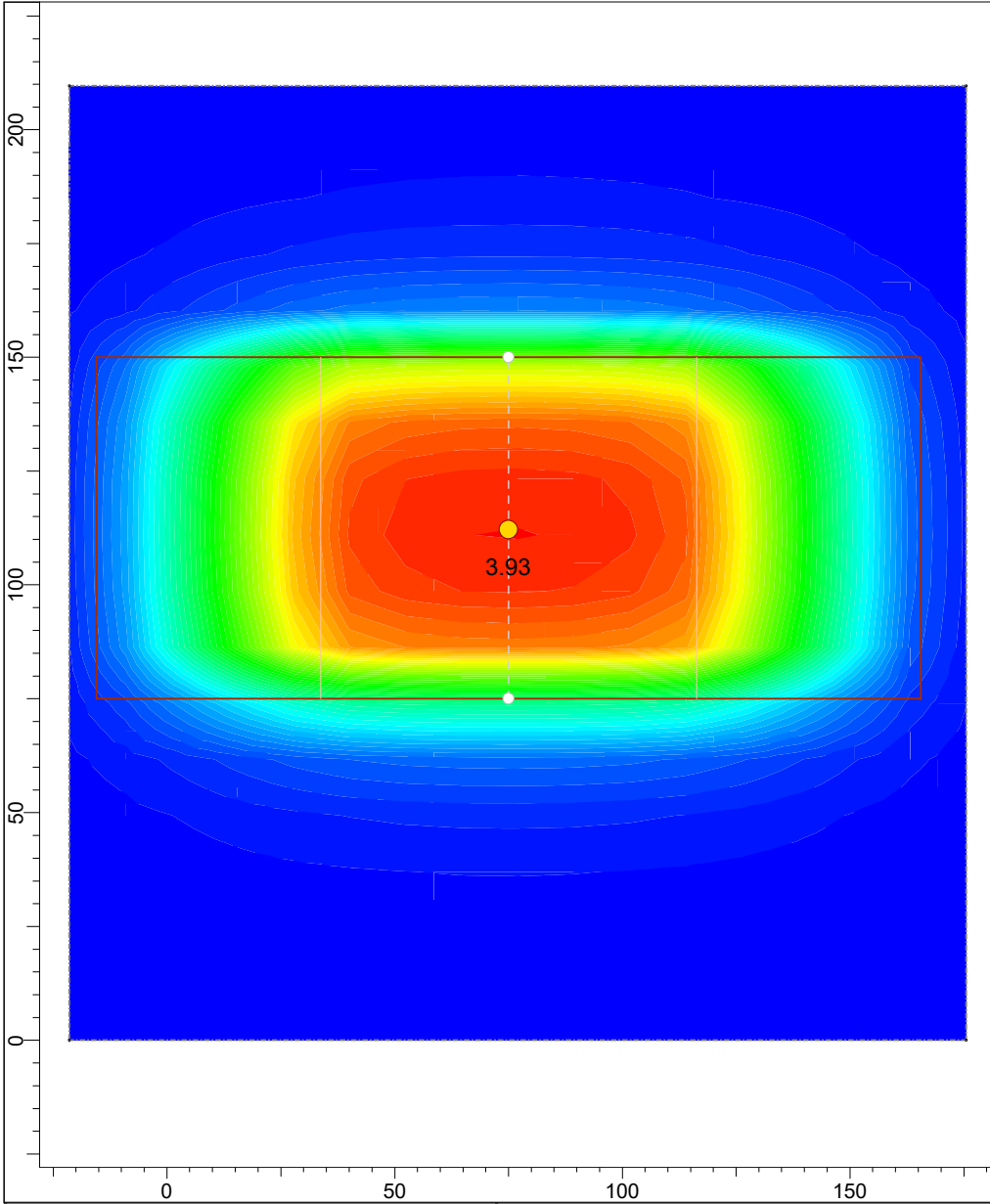
Number of points 306  
 Expansion Factor 2

### Grid Coordinates

	Project		SC 557 Over Crowders Creek	
	Analysis Description		Begin Bridge Embankment Single Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	Begin Bridge Embankment.s3z

X [ft]	Y [ft]
256	240.5
256	-15.5
-106	-15.5
-106	240.5

	<i>Project</i>		SC 557 Over Crowders Creek	
	<i>Analysis Description</i>		Begin Bridge Embankment Single Drainage	
	<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
	<i>Date</i>		<i>File Name</i>	Begin Bridge Embankment.s3z



<i>Project</i>	SC 557 Over Crowders Creek		
<i>Analysis Description</i>	Begin Bridge Embankment Double Drainage		
<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
<i>STAGE</i>	Stage 2:150 Days (End Construction)	<i>File Name</i>	Begin Bridge Embankment_DD.s3z

# Settle3D Analysis Information

## SC 557 Over Crowders Creek

### Project Settings

Document Name	Begin Bridge Embankment_DD
Project Title	SC 557 Over Crowders Creek
Analysis	Begin Bridge Embankment Double Drainage
Author	JFH
Company	F&ME
Stress Computation Method	Boussinesq
Time-dependent Consolidation Analysis	
Time Units	days
Permeability Units	feet/day
Use average properties to calculate layered stresses	
Improve consolidation accuracy	
Ignore negative effective stresses in settlement calculations	


### Stage Settings

Stage #	Name	Time [days]
1	Stage 1	0
2	Stage 2	150
3	Stage 3	160
4	Stage 4	250
5	Stage 5	300
6	Stage 6	350
7	Stage 7	400
8	Stage 8	500
9	Stage 9	600
10	Stage 10	700
11	Stage 11	800
12	Stage 12	900
13	Stage 13	1000

### Results

Time taken to compute: 0.639458 seconds

**Stage: Stage 1 = 0 d**


	<i>Project</i>		SC 557 Over Crowders Creek	
	<i>Analysis Description</i>		Begin Bridge Embankment Double Drainage	
	<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
	<i>Date</i>		<i>File Name</i>	Begin Bridge Embankment_DD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	0
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0
Effective Stress [ksf]	0	2.6454
Total Stress [ksf]	0	4.455
Total Strain	0	0
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	2.64471
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.52908

### Stage: Stage 2 = 150 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

### Stage: Stage 3 = 160 d


	Project		SC 557 Over Crowders Creek
	Analysis Description		Begin Bridge Embankment Double Drainage
	Drawn By	JFH	Company F&ME
	Date		File Name Begin Bridge Embankment_DD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

### Stage: Stage 4 = 250 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

### Stage: Stage 5 = 300 d


	<i>Project</i> SC 557 Over Crowders Creek	
	<i>Analysis Description</i> Begin Bridge Embankment Double Drainage	
	<i>Drawn By</i> JFH	<i>Company</i> F&ME
	<i>Date</i>	<i>File Name</i> Begin Bridge Embankment_DD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

### Stage: Stage 6 = 350 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

### Stage: Stage 7 = 400 d

	Project		SC 557 Over Crowders Creek	
	Analysis Description		Begin Bridge Embankment Double Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	Begin Bridge Embankment_DD.s3z




Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

### Stage: Stage 8 = 500 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

### Stage: Stage 9 = 600 d


	<i>Project</i> SC 557 Over Crowders Creek	
	<i>Analysis Description</i> Begin Bridge Embankment Double Drainage	
	<i>Drawn By</i> JFH	<i>Company</i> F&ME
	<i>Date</i>	<i>File Name</i> Begin Bridge Embankment_DD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

### Stage: Stage 10 = 700 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

### Stage: Stage 11 = 800 d


	Project SC 557 Over Crowders Creek	
	Analysis Description Begin Bridge Embankment Double Drainage	
	Drawn By JFH	Company F&ME
	Date	File Name Begin Bridge Embankment_DD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

### Stage: Stage 12 = 900 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

### Stage: Stage 13 = 1000 d

	<i>Project</i> SC 557 Over Crowders Creek	
	<i>Analysis Description</i> Begin Bridge Embankment Double Drainage	
	<i>Drawn By</i> JFH	<i>Company</i> F&ME
	<i>Date</i>	<i>File Name</i> Begin Bridge Embankment_DD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.92663
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.92663
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	3
Effective Stress [ksf]	0	4.94734
Total Stress [ksf]	0	6.75694
Total Strain	0	0.03
Pore Water Pressure [ksf]	0	1.8096
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.004	4.94703
Over-consolidation Ratio	1	1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.59965

## Embankments

### 1. Embankment


Center Line (75, 75) to (75, 150)  
 Number of Layers 1  
 Near End Angle 90 degrees  
 Far End Angle 90 degrees  
 Base Width 181

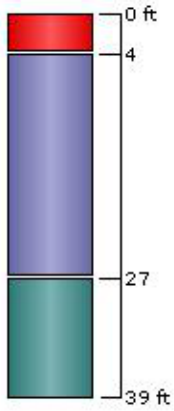
Layer	Stage	Left Bench Width (ft)	Left Angle (deg)	Height (ft)	Unit Weight (kips/ft <sup>3</sup> )	Right Angle (deg)	Right Bench Width (ft)
1	Stage 2 = 150 d	0	26	24	0.125	26	0

## Soil Layers




Ground Surface Drained: Yes

Layer #	Type	Thickness [ft]	Depth [ft]	Drained at Bottom
1	Soft Clay	4	0	Yes
2	Firm Silt	23	4	Yes
3	Hard Silt	12	27	Yes

	Project		SC 557 Over Crowders Creek	
	Analysis Description		Begin Bridge Embankment Double Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	Begin Bridge Embankment_DD.s3z



### Soil Properties

Property	Firm Silt	Hard Silt	Soft Clay
Color			
Unit Weight [kips/ft <sup>3</sup> ]	0.11	0.115	0.1
Saturated Unit Weight [kips/ft <sup>3</sup> ]	0.115	0.12	0.105
Immediate Settlement	Enabled	Enabled	Enabled
Es [ksf]	500	400	100
E <sub>sur</sub> [ksf]	500	400	100
Undrained Su A [kips/ft <sup>2</sup> ]	0	0	0
Undrained Su S	0.2	0.2	0.2
Undrained Su m	0.8	0.8	0.8
Piezo Line ID	1	1	1

### Groundwater

Groundwater method Piezometric Lines  
 Water Unit Weight 0.0624 kips/ft<sup>3</sup>

### Piezometric Line Entities

ID	Depth (ft)
1	10 ft


### Query Points

Point #	(X,Y) Location	Number of Divisions
2	75, 112.162	Auto: 57


### Field Point Grid

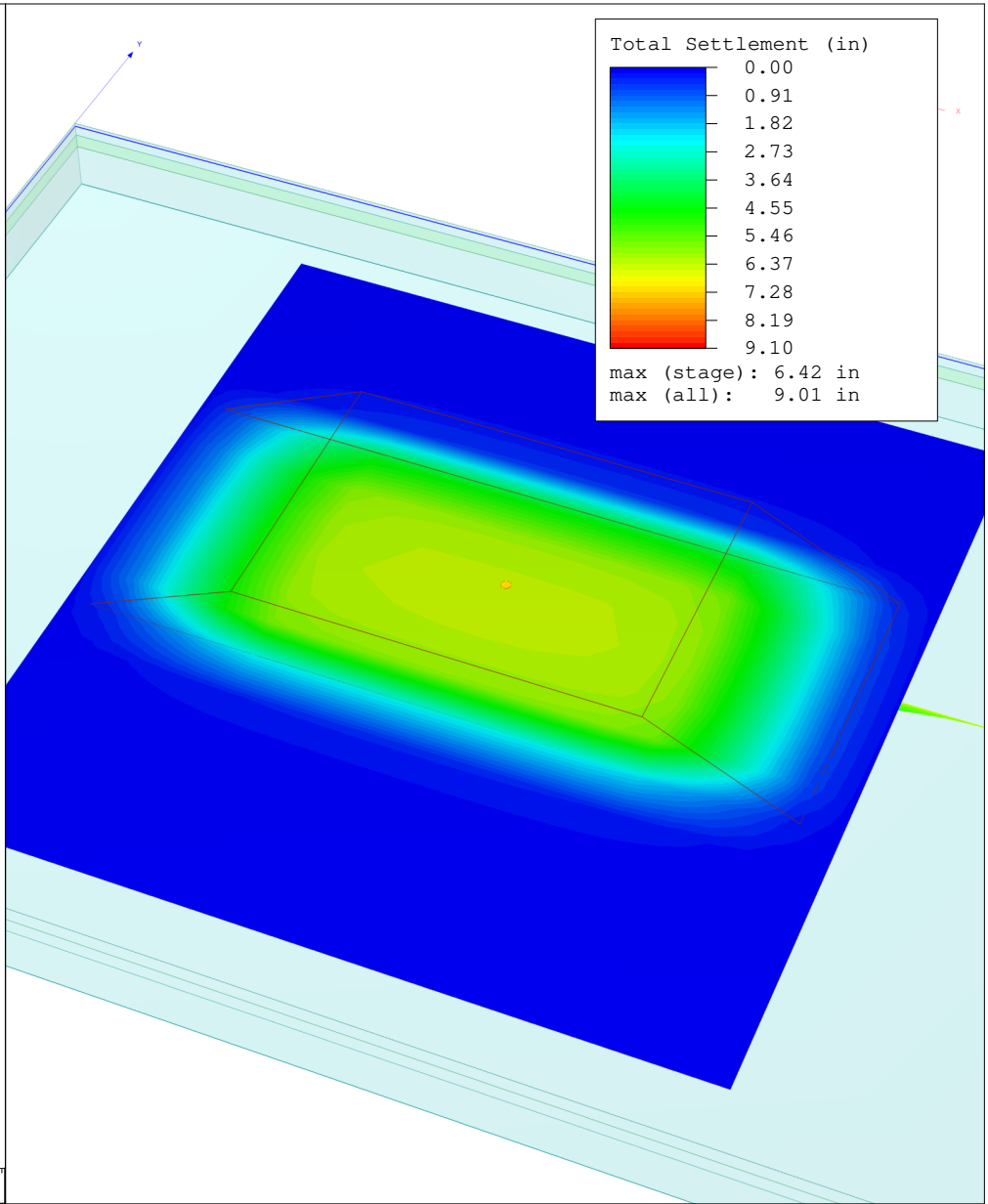
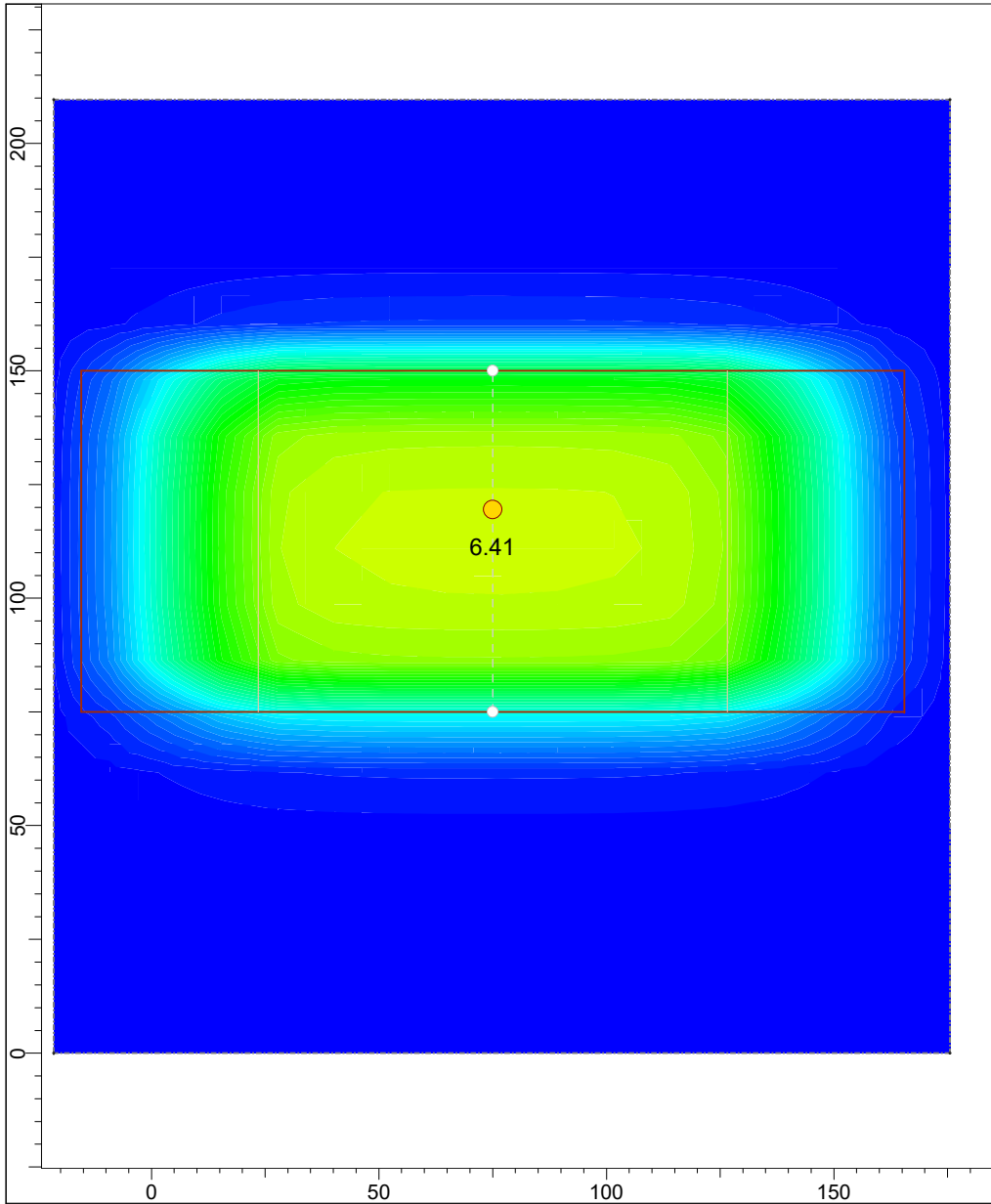
Number of points 306  
 Expansion Factor 2

### Grid Coordinates

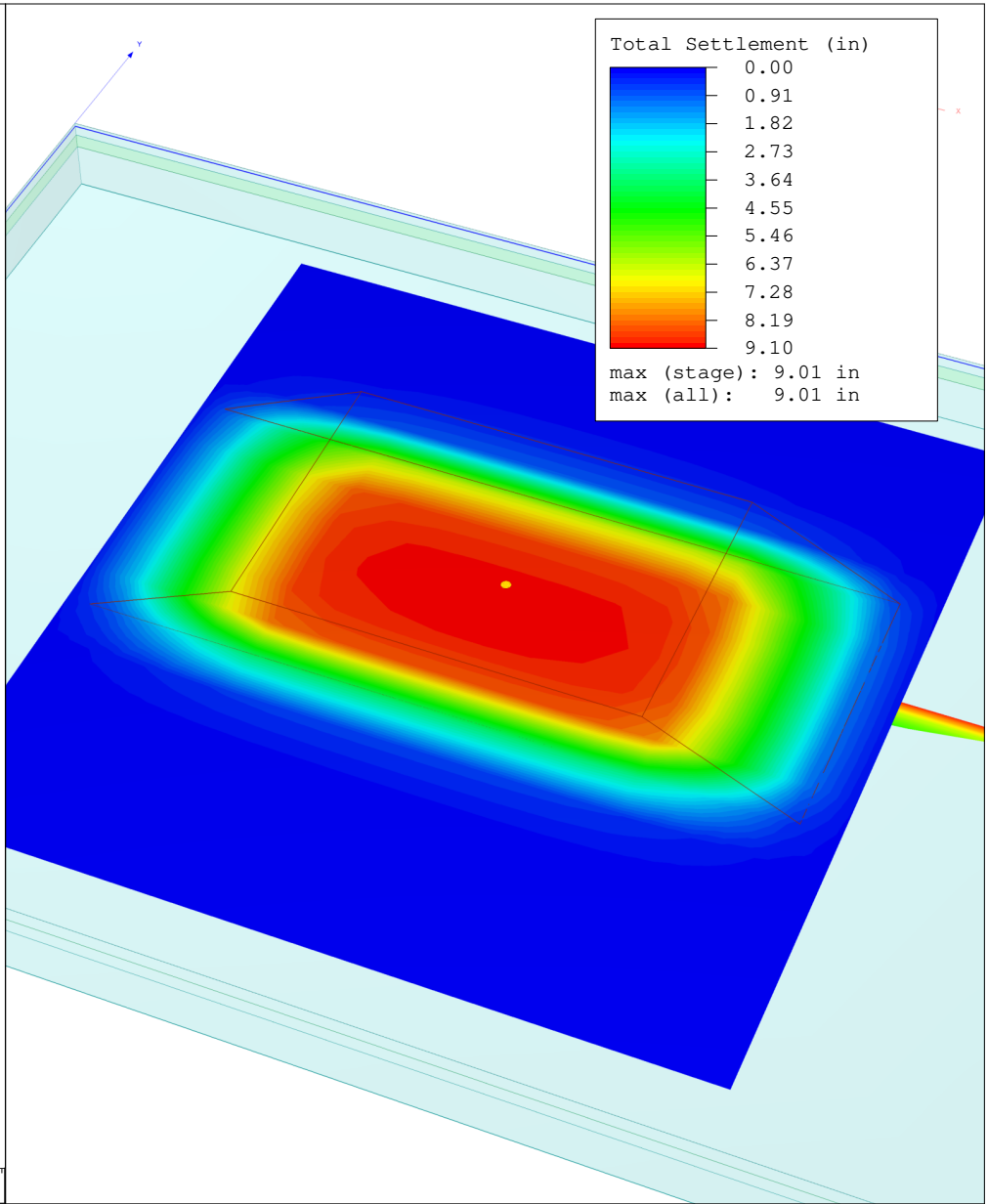
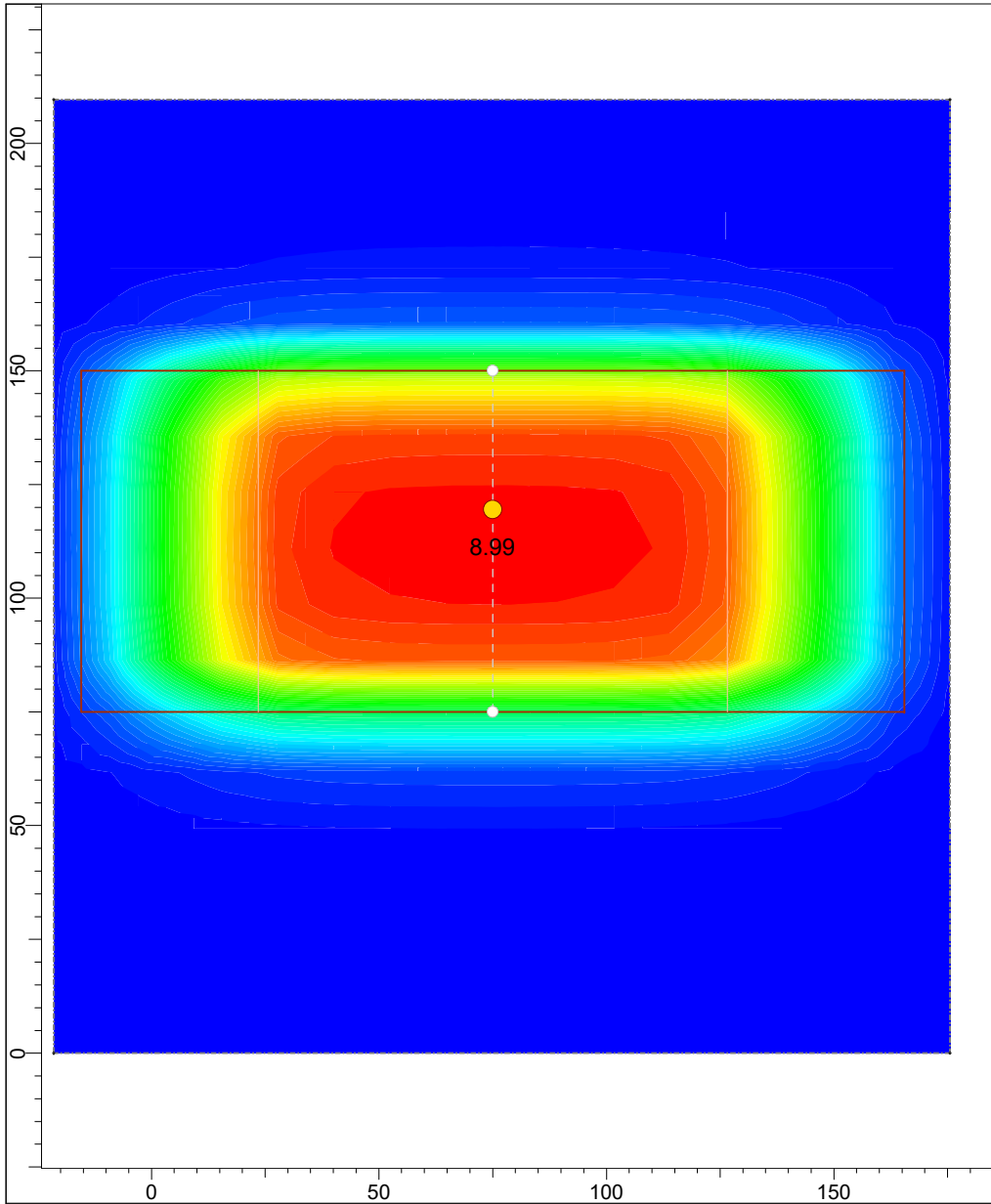
	Project		SC 557 Over Crowders Creek	
	Analysis Description		Begin Bridge Embankment Double Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	Begin Bridge Embankment_DD.s3z

X [ft]	Y [ft]
256	240.5
256	-15.5
-106	-15.5
-106	240.5

	<i>Project</i>		SC 557 Over Crowders Creek	
	<i>Analysis Description</i>		Begin Bridge Embankment Double Drainage	
	<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
	<i>Date</i>		<i>File Name</i>	Begin Bridge Embankment_DD.s3z



<i>Project</i>	SC 557 Over Crowders Creek		
<i>Analysis Description</i>	End Bridge Embankment Single Drainage		
<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
<i>STAGE</i>	Stage 2:150 Days (End Construction)	<i>File Name</i>	End Bridge Embankment.s3z



<i>Project</i>	SC 557 Over Crowders Creek		
<i>Analysis Description</i>	End Bridge Embankment Single Drainage		
<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
<i>STAGE</i>	Stage 7:400 Days (End Consolidation)	<i>File Name</i>	End Bridge Embankment.s3z



# Settle3D Analysis Information

## SC 557 Over Crowders Creek

### Project Settings

Document Name	End Bridge Embankment
Project Title	SC 557 Over Crowders Creek
Analysis	End Bridge Embankment Single Drainage
Author	JFH
Company	F&ME
Stress Computation Method	Boussinesq
Time-dependent Consolidation Analysis	
Time Units	days
Permeability Units	feet/day
Use average properties to calculate layered stresses	
Improve consolidation accuracy	
Ignore negative effective stresses in settlement calculations	


### Stage Settings

Stage #	Name	Time [days]
1	Stage 1	0
2	Stage 2	150
3	Stage 3	200
4	Stage 4	250
5	Stage 5	300
6	Stage 6	350
7	Stage 7	400
8	Stage 8	500
9	Stage 9	600
10	Stage 10	700
11	Stage 11	800
12	Stage 12	900
13	Stage 13	1000

### Results

Time taken to compute: 10.2699 seconds

**Stage: Stage 1 = 0 d**


	<i>Project</i>		SC 557 Over Crowders Creek	
	<i>Analysis Description</i>		End Bridge Embankment Single Drainage	
	<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
	<i>Date</i>		<i>File Name</i>	End Bridge Embankment.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	0
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0
Effective Stress [ksf]	0	0.867
Total Stress [ksf]	0	2.115
Total Strain	0	0
Pore Water Pressure [ksf]	0	1.248
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.102584
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.504517

### Stage: Stage 2 = 150 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	6.4235
Consolidation Settlement [in]	0	0.537981
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	2.46048
Total Stress [ksf]	0	4.34747
Total Strain	0	0.0970962
Pore Water Pressure [ksf]	0	3.48047
Excess Pore Water Pressure [ksf]	0	2.37498
Degree of Consolidation [%]	0	31.6422
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	30
Undrained Shear Strength	0	0.504517

### Stage: Stage 3 = 200 d


	Project		SC 557 Over Crowders Creek	
	Analysis Description		End Bridge Embankment Single Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	End Bridge Embankment.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	8.67675
Consolidation Settlement [in]	0	2.79123
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	2.64752
Total Stress [ksf]	0	4.34747
Total Strain	-2.53611e-005	0.0970962
Pore Water Pressure [ksf]	0	2.16971
Excess Pore Water Pressure [ksf]	0	0.921707
Degree of Consolidation [%]	0	92.9197
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.82654
Void Ratio	0	1.27006
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	98.5476
Undrained Shear Strength	0	0.606561

#### Stage: Stage 4 = 250 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	8.9114
Consolidation Settlement [in]	0	3.02588
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	2.84823
Total Stress [ksf]	0	4.34747
Total Strain	-9.05615e-007	0.0970962
Pore Water Pressure [ksf]	0	1.49924
Excess Pore Water Pressure [ksf]	0	0.251243
Degree of Consolidation [%]	0	98.2013
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.80067
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	99.6052
Undrained Shear Strength	0	0.640011

#### Stage: Stage 5 = 300 d


	<i>Project</i> SC 557 Over Crowders Creek	
	<i>Analysis Description</i> End Bridge Embankment Single Drainage	
	<i>Drawn By</i> JFH	<i>Company</i> F&ME
	<i>Date</i>	<i>File Name</i> End Bridge Embankment.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	8.98275
Consolidation Settlement [in]	0	3.09723
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.03103
Total Stress [ksf]	0	4.34747
Total Strain	-2.46678e-007	0.0970962
Pore Water Pressure [ksf]	0	1.31644
Excess Pore Water Pressure [ksf]	0	0.0684405
Degree of Consolidation [%]	0	99.5182
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.80018
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	99.8924
Undrained Shear Strength	0	0.648023

### Stage: Stage 6 = 350 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	9.00307
Consolidation Settlement [in]	0	3.11755
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.08083
Total Stress [ksf]	0	4.34747
Total Strain	-6.71869e-008	0.0970962
Pore Water Pressure [ksf]	0	1.26664
Excess Pore Water Pressure [ksf]	0	0.0186413
Degree of Consolidation [%]	0	99.8694
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.80005
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	99.9707
Undrained Shear Strength	0	0.650138

### Stage: Stage 7 = 400 d


	Project		SC 557 Over Crowders Creek	
	Analysis Description		End Bridge Embankment Single Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	End Bridge Embankment.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	9.00856
Consolidation Settlement [in]	0	3.12304
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09439
Total Stress [ksf]	0	4.34747
Total Strain	-1.82997e-008	0.0970962
Pore Water Pressure [ksf]	0	1.25308
Excess Pore Water Pressure [ksf]	0	0.00507736
Degree of Consolidation [%]	0	99.9645
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.80001
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	99.992
Undrained Shear Strength	0	0.65071

### Stage: Stage 8 = 500 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	9.01048
Consolidation Settlement [in]	0	3.12497
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.0991
Total Stress [ksf]	0	4.34747
Total Strain	-1.35672e-009	0.0970962
Pore Water Pressure [ksf]	0	1.24838
Excess Pore Water Pressure [ksf]	0	0.000376429
Degree of Consolidation [%]	0	99.9974
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	99.9994
Undrained Shear Strength	0	0.650907

### Stage: Stage 9 = 600 d


	Project		SC 557 Over Crowders Creek	
	Analysis Description		End Bridge Embankment Single Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	End Bridge Embankment.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	9.01063
Consolidation Settlement [in]	0	3.12512
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09944
Total Stress [ksf]	0	4.34747
Total Strain	0	0.0970962
Pore Water Pressure [ksf]	0	1.24803
Excess Pore Water Pressure [ksf]	0	2.78744e-005
Degree of Consolidation [%]	0	99.9998
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.650922

### Stage: Stage 10 = 700 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	9.01064
Consolidation Settlement [in]	0	3.12513
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09947
Total Stress [ksf]	0	4.34747
Total Strain	0	0.0970962
Pore Water Pressure [ksf]	0	1.248
Excess Pore Water Pressure [ksf]	0	2.0601e-006
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.650923

### Stage: Stage 11 = 800 d


	Project		SC 557 Over Crowders Creek	
	Analysis Description		End Bridge Embankment Single Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	End Bridge Embankment.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	9.01064
Consolidation Settlement [in]	0	3.12513
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09947
Total Stress [ksf]	0	4.34747
Total Strain	0	0.0970962
Pore Water Pressure [ksf]	0	1.248
Excess Pore Water Pressure [ksf]	0	1.52255e-007
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.650923

### Stage: Stage 12 = 900 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	9.01064
Consolidation Settlement [in]	0	3.12513
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09947
Total Stress [ksf]	0	4.34747
Total Strain	0	0.0970962
Pore Water Pressure [ksf]	0	1.248
Excess Pore Water Pressure [ksf]	0	1.12527e-008
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.650923

### Stage: Stage 13 = 1000 d

	<i>Project</i> SC 557 Over Crowders Creek	
	<i>Analysis Description</i> End Bridge Embankment Single Drainage	
	<i>Drawn By</i> JFH	<i>Company</i> F&ME
	<i>Date</i>	<i>File Name</i> End Bridge Embankment.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	9.01064
Consolidation Settlement [in]	0	3.12513
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09947
Total Stress [ksf]	0	4.34747
Total Strain	0	0.0970962
Pore Water Pressure [ksf]	0	1.248
Excess Pore Water Pressure [ksf]	0	8.3165e-010
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.650923

## Embankments

### 1. Embankment


Center Line (75, 75) to (75, 150)  
 Number of Layers 1  
 Near End Angle 90 degrees  
 Far End Angle 90 degrees  
 Base Width 181

Layer	Stage	Left Bench Width (ft)	Left Angle (deg)	Height (ft)	Unit Weight (kips/ft <sup>3</sup> )	Right Angle (deg)	Right Bench Width (ft)
1	Stage 2 = 150 d	0	26	19	0.125	26	0

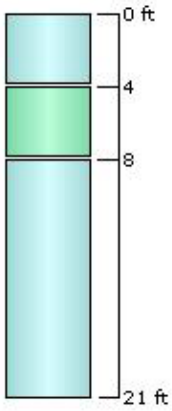
## Soil Layers

Ground Surface Drained: Yes



Layer #	Type	Thickness [ft]	Depth [ft]	Drained at Bottom
1	V. Soft Sandy Silt	4	0	No
2	V. Loose Silty Sand	4	4	No
3	V. Soft Sandy Silt	13	8	No

	Project		SC 557 Over Crowders Creek	
	Analysis Description		End Bridge Embankment Single Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	End Bridge Embankment.s3z





## Soil Properties

Property	V. Soft Sandy Silt	V. Loose Silty Sand
Color		
Unit Weight [kips/ft <sup>3</sup> ]	0.095	0.1
Saturated Unit Weight [kips/ft <sup>3</sup> ]	0.1	0.105
Immediate Settlement	Enabled	Enabled
Es [ksf]	100	100
E <sub>sur</sub> [ksf]	100	100
Primary Consolidation	Enabled	Disabled
Material Type	Non-Linear	
C <sub>c</sub>	0.071	
C <sub>r</sub>	0.027	
e <sub>0</sub>	1.27	
OCR	3.8	1
C <sub>v</sub> [ft <sup>2</sup> /d]	1.51	
B-bar	1	
Undrained Su A [kips/ft <sup>2</sup> ]	0	0
Undrained Su S	0.2	0.2
Undrained Su m	0.8	0.8
Piezo Line ID	1	1

## Groundwater


Groundwater method Piezometric Lines  
 Water Unit Weight 0.0624 kips/ft<sup>3</sup>

## Piezometric Line Entities

ID	Depth (ft)
1	1 ft

## Query Points

Point #	(X,Y) Location	Number of Divisions
2	75, 119.491	Auto: 57


	Project		SC 557 Over Crowders Creek	
	Analysis Description		End Bridge Embankment Single Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	End Bridge Embankment.s3z

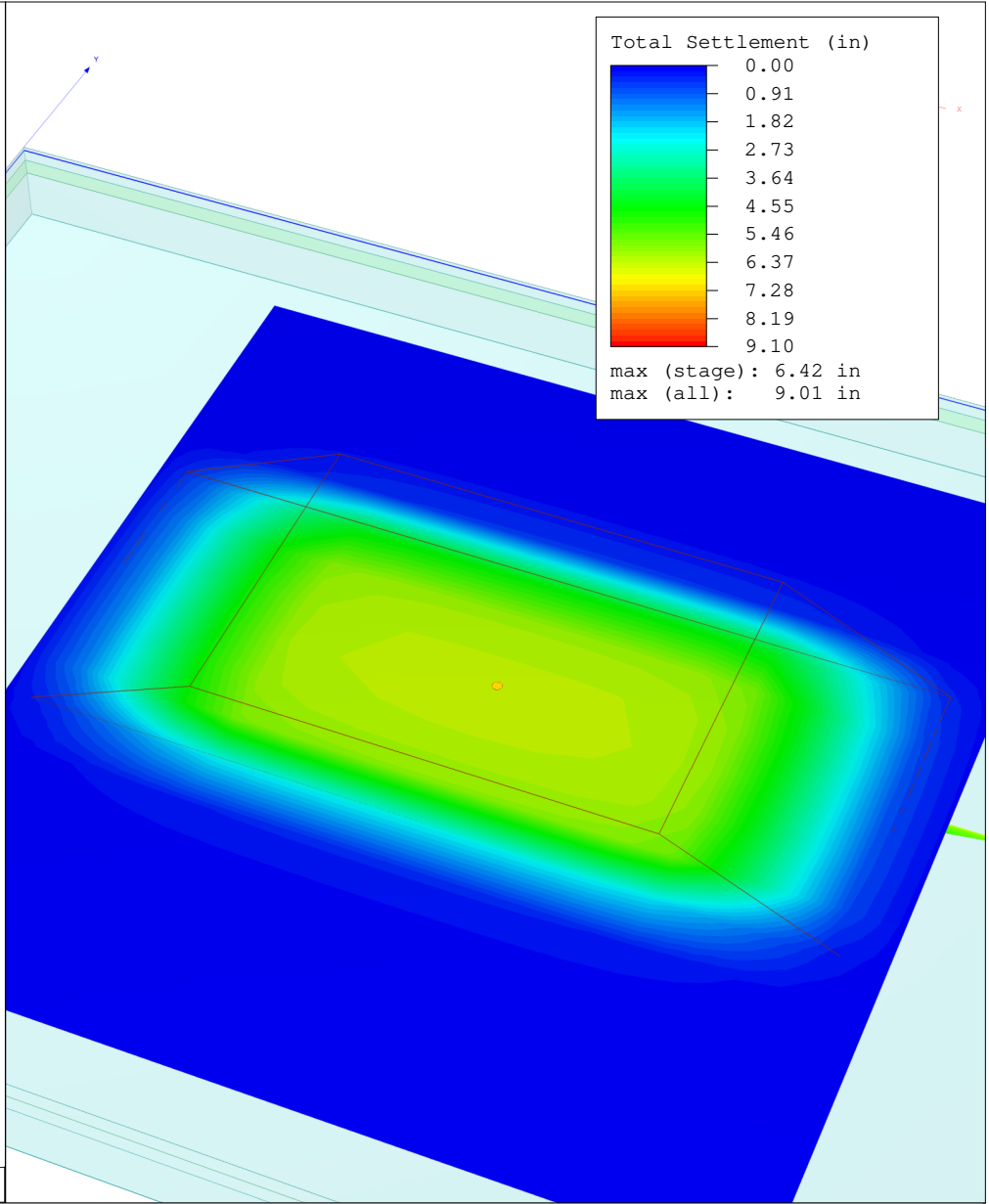
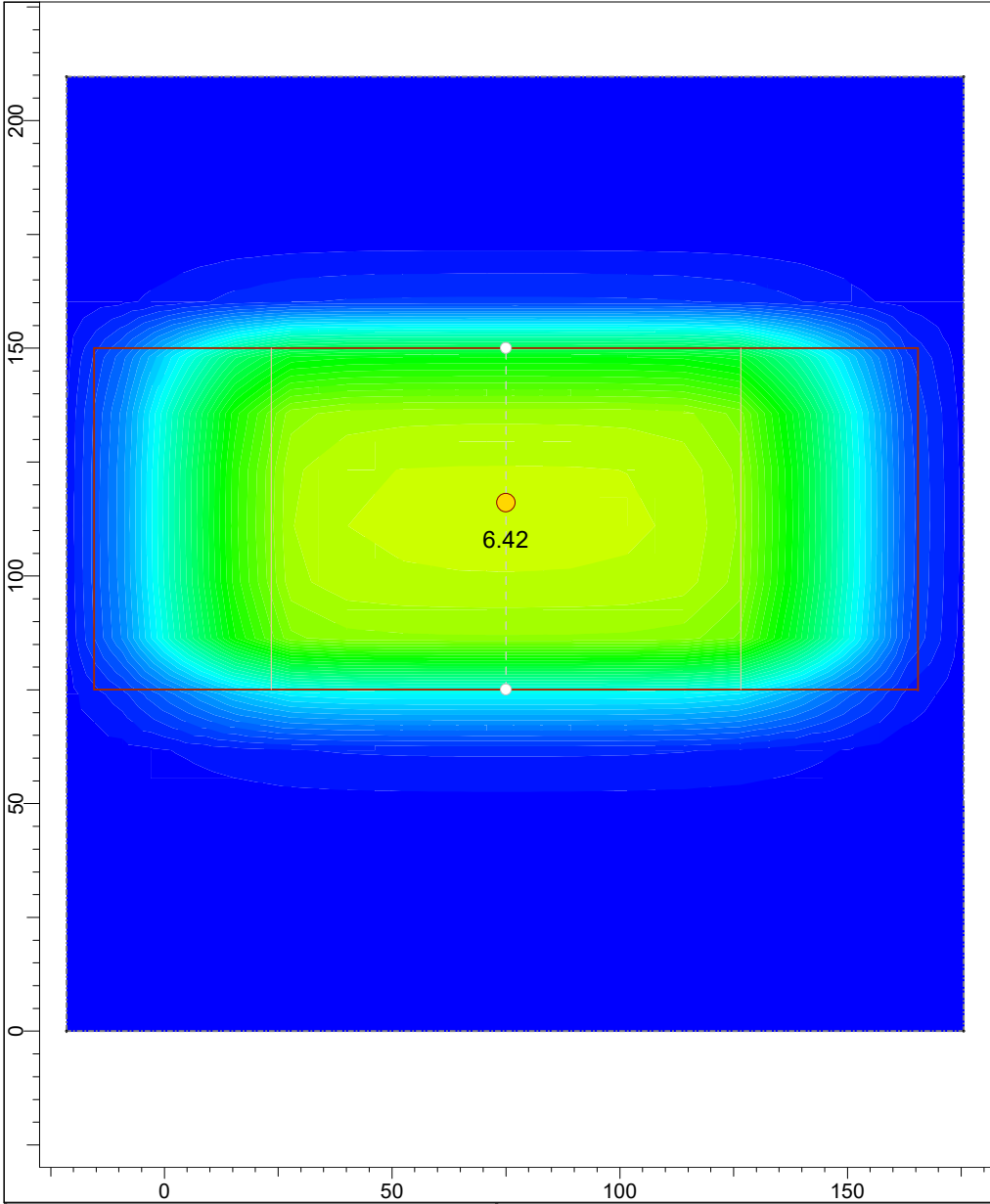
## Field Point Grid

Number of points 306  
 Expansion Factor 2

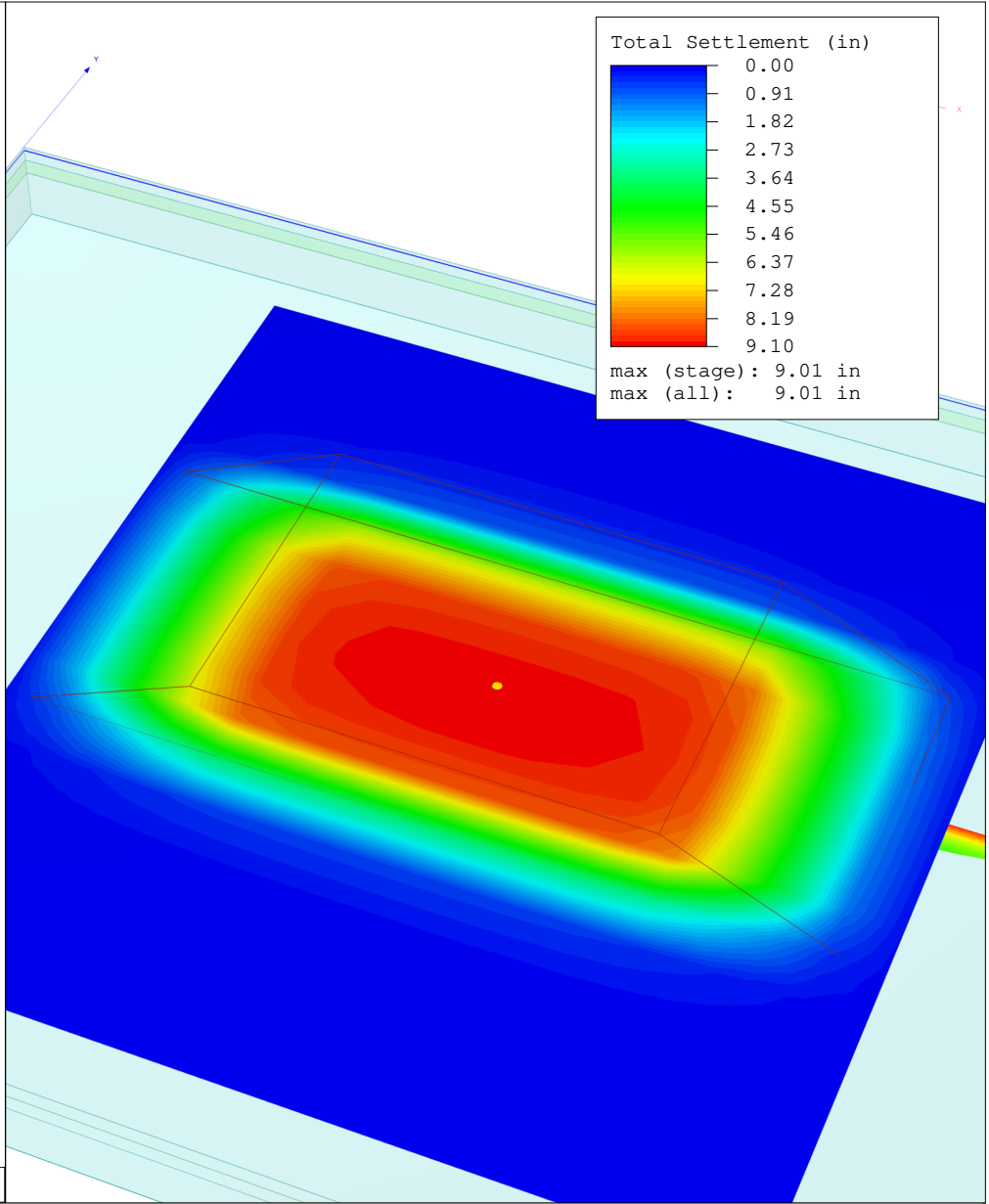
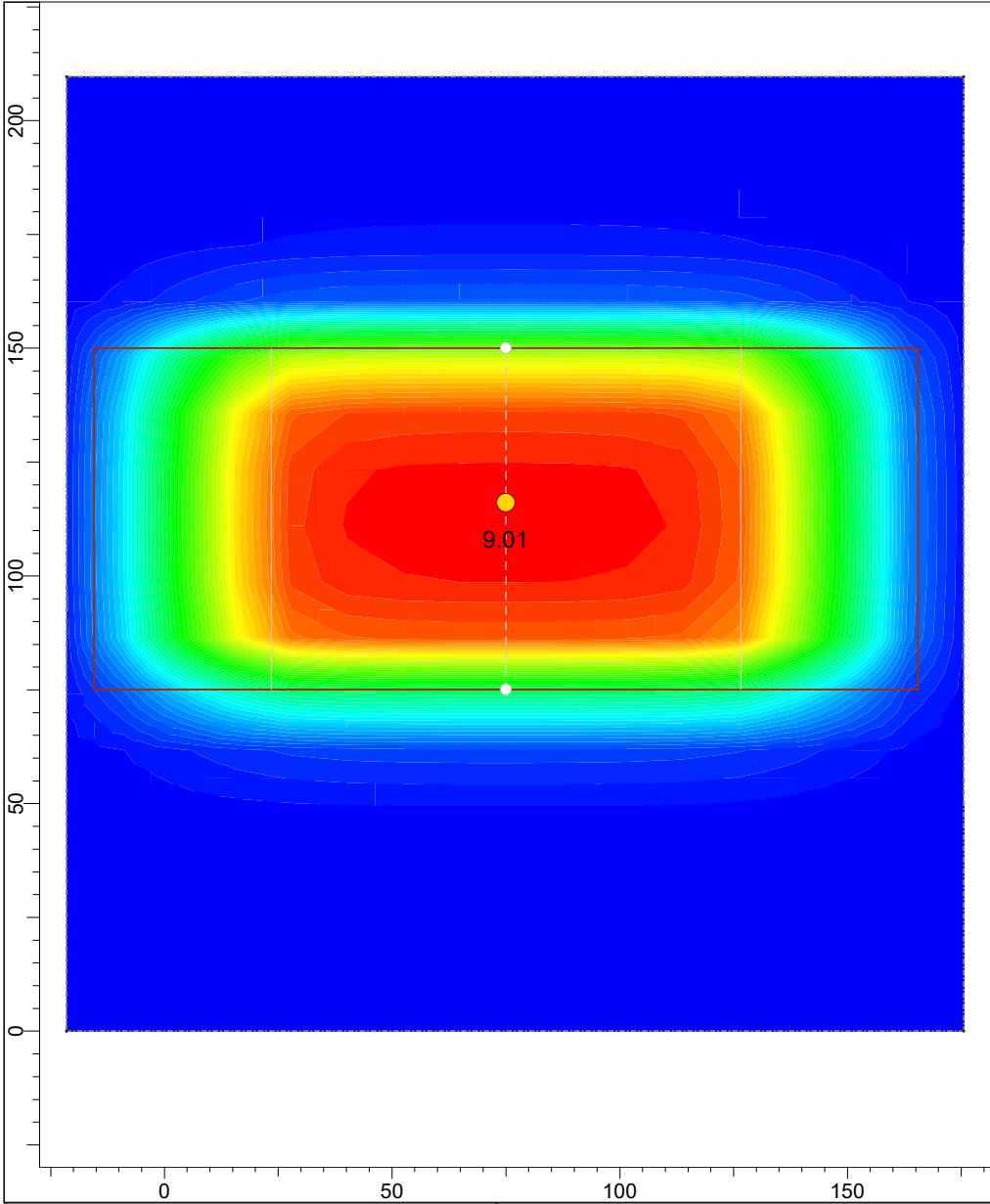
### Grid Coordinates

X [ft]	Y [ft]
256	240.5
256	-15.5
-106	-15.5
-106	240.5

	<i>Project</i>		SC 557 Over Crowders Creek	
	<i>Analysis Description</i>		End Bridge Embankment Single Drainage	
	<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
	<i>Date</i>		<i>File Name</i>	End Bridge Embankment.s3z



<i>Project</i>	SC 557 Over Crowders Creek		
<i>Analysis Description</i>	End Bridge Embankment Double Drainage		
<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
<i>STAGE</i>	Stage 2:150 Days (End Construction)	<i>File Name</i>	End Bridge Embankment_DD.s3z



<i>Project</i>	SC 557 Over Crowders Creek		
<i>Analysis Description</i>	End Bridge Embankment Double Drainage		
<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
<i>STAGE</i>	Stage 4:250 Days (End Consolidation)	<i>File Name</i>	End Bridge Embankment_DD.s3z

# Settle3D Analysis Information

## SC 557 Over Crowders Creek

### Project Settings

Document Name	End Bridge Embankment_DD
Project Title	SC 557 Over Crowders Creek
Analysis	End Bridge Embankment Double Drainage
Author	JFH
Company	F&ME
Stress Computation Method	Boussinesq
Time-dependent Consolidation Analysis	
Time Units	days
Permeability Units	feet/day
Use average properties to calculate layered stresses	
Improve consolidation accuracy	
Ignore negative effective stresses in settlement calculations	


### Stage Settings

Stage #	Name	Time [days]
1	Stage 1	0
2	Stage 2	150
3	Stage 3	200
4	Stage 4	250
5	Stage 5	300
6	Stage 6	350
7	Stage 7	400
8	Stage 8	500
9	Stage 9	600
10	Stage 10	700
11	Stage 11	800
12	Stage 12	900
13	Stage 13	1000

### Results

Time taken to compute: 9.61684 seconds

**Stage: Stage 1 = 0 d**


	<i>Project</i>		SC 557 Over Crowders Creek	
	<i>Analysis Description</i>		End Bridge Embankment Double Drainage	
	<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
	<i>Date</i>		<i>File Name</i>	End Bridge Embankment_DD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	0
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0
Effective Stress [ksf]	0	0.867
Total Stress [ksf]	0	2.115
Total Strain	0	0
Pore Water Pressure [ksf]	0	1.248
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.102584
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.504517

### Stage: Stage 2 = 150 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	6.4235
Consolidation Settlement [in]	0	0.537981
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	2.46048
Total Stress [ksf]	0	4.34747
Total Strain	0	0.0970962
Pore Water Pressure [ksf]	0	3.48047
Excess Pore Water Pressure [ksf]	0	2.37498
Degree of Consolidation [%]	0	31.6422
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	30
Undrained Shear Strength	0	0.504517

### Stage: Stage 3 = 200 d


	<i>Project</i> SC 557 Over Crowders Creek	
	<i>Analysis Description</i> End Bridge Embankment Double Drainage	
	<i>Drawn By</i> JFH	<i>Company</i> F&ME
	<i>Date</i>	<i>File Name</i> End Bridge Embankment_DD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	8.9977
Consolidation Settlement [in]	0	3.11219
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09947
Total Stress [ksf]	0	4.34747
Total Strain	0	0.0970962
Pore Water Pressure [ksf]	0	1.248
Excess Pore Water Pressure [ksf]	-9.81136e-021	0.0295706
Degree of Consolidation [%]	0	99.9991
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.650923

#### Stage: Stage 4 = 250 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	9.01052
Consolidation Settlement [in]	0	3.125
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09947
Total Stress [ksf]	0	4.34747
Total Strain	0	0.0970962
Pore Water Pressure [ksf]	0	1.248
Excess Pore Water Pressure [ksf]	-7.97292e-021	0.000289705
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.650923

#### Stage: Stage 5 = 300 d


	Project		SC 557 Over Crowders Creek	
	Analysis Description		End Bridge Embankment Double Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	End Bridge Embankment_DD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	9.01064
Consolidation Settlement [in]	0	3.12513
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09947
Total Stress [ksf]	0	4.34747
Total Strain	0	0.0970962
Pore Water Pressure [ksf]	0	1.248
Excess Pore Water Pressure [ksf]	-7.03023e-021	2.8223e-006
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.650923

### Stage: Stage 6 = 350 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	9.01064
Consolidation Settlement [in]	0	3.12513
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09947
Total Stress [ksf]	0	4.34747
Total Strain	0	0.0970962
Pore Water Pressure [ksf]	0	1.248
Excess Pore Water Pressure [ksf]	-6.61351e-021	2.73341e-008
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.650923

### Stage: Stage 7 = 400 d

	Project		SC 557 Over Crowders Creek
	Analysis Description		End Bridge Embankment Double Drainage
	Drawn By	JFH	Company F&ME
	Date		File Name End Bridge Embankment_DD.s3z




Data Type	Minimum	Maximum
Total Settlement [in]	0	9.01064
Consolidation Settlement [in]	0	3.12513
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09947
Total Stress [ksf]	0	4.34747
Total Strain	0	0.0970962
Pore Water Pressure [ksf]	0	1.248
Excess Pore Water Pressure [ksf]	-6.22148e-021	2.64732e-010
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.650923

### Stage: Stage 8 = 500 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	9.01064
Consolidation Settlement [in]	0	3.12513
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09947
Total Stress [ksf]	0	4.34747
Total Strain	0	0.0970962
Pore Water Pressure [ksf]	0	1.248
Excess Pore Water Pressure [ksf]	-5.82302e-021	2.41078e-014
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.650923

### Stage: Stage 9 = 600 d


	Project		SC 557 Over Crowders Creek	
	Analysis Description		End Bridge Embankment Double Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	End Bridge Embankment_DD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	9.01064
Consolidation Settlement [in]	0	3.12513
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09947
Total Stress [ksf]	0	4.34747
Total Strain	0	0.0970962
Pore Water Pressure [ksf]	0	1.248
Excess Pore Water Pressure [ksf]	-2.89312e-017	5.05221e-016
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.650923

### Stage: Stage 10 = 700 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	9.01064
Consolidation Settlement [in]	0	3.12513
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09947
Total Stress [ksf]	0	4.34747
Total Strain	0	0.0970962
Pore Water Pressure [ksf]	0	1.248
Excess Pore Water Pressure [ksf]	-4.06083e-017	4.46655e-016
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.650923

### Stage: Stage 11 = 800 d


	Project		SC 557 Over Crowders Creek	
	Analysis Description		End Bridge Embankment Double Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	End Bridge Embankment_DD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	9.01064
Consolidation Settlement [in]	0	3.12513
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09947
Total Stress [ksf]	0	4.34747
Total Strain	0	0.0970962
Pore Water Pressure [ksf]	0	1.248
Excess Pore Water Pressure [ksf]	-4.95223e-017	4.02555e-016
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.650923

### Stage: Stage 12 = 900 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	9.01064
Consolidation Settlement [in]	0	3.12513
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09947
Total Stress [ksf]	0	4.34747
Total Strain	0	0.0970962
Pore Water Pressure [ksf]	0	1.248
Excess Pore Water Pressure [ksf]	-6.00369e-017	3.67429e-016
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.650923

### Stage: Stage 13 = 1000 d

	Project		SC 557 Over Crowders Creek	
	Analysis Description		End Bridge Embankment Double Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	End Bridge Embankment_DD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	9.01064
Consolidation Settlement [in]	0	3.12513
Immediate Settlement [in]	0	5.88551
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	2.39284
Effective Stress [ksf]	0	3.09947
Total Stress [ksf]	0	4.34747
Total Strain	0	0.0970962
Pore Water Pressure [ksf]	0	1.248
Excess Pore Water Pressure [ksf]	-6.57947e-017	3.3875e-016
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.01805	3.29367
Over-consolidation Ratio	1	3.8
Void Ratio	0	1.27
Permeability [ft/d]	0	0.269757
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.650923

## Embankments

### 1. Embankment


Center Line (75, 75) to (75, 150)  
 Number of Layers 1  
 Near End Angle 90 degrees  
 Far End Angle 90 degrees  
 Base Width 181

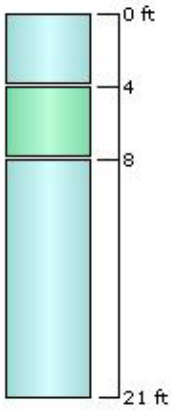
Layer	Stage	Left Bench Width (ft)	Left Angle (deg)	Height (ft)	Unit Weight (kips/ft <sup>3</sup> )	Right Angle (deg)	Right Bench Width (ft)
1	Stage 2 = 150 d	0	26	19	0.125	26	0

## Soil Layers



Ground Surface Drained: Yes

Layer #	Type	Thickness [ft]	Depth [ft]	Drained at Bottom
1	V. Soft Sandy Silt	4	0	Yes
2	V. Loose Silty Sand	4	4	Yes
3	V. Soft Sandy Silt	13	8	Yes

	Project		SC 557 Over Crowders Creek	
	Analysis Description		End Bridge Embankment Double Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	End Bridge Embankment_DD.s3z



## Soil Properties

Property	V. Soft Sandy Silt	V. Loose Silty Sand
Color		
Unit Weight [kips/ft <sup>3</sup> ]	0.095	0.1
Saturated Unit Weight [kips/ft <sup>3</sup> ]	0.1	0.105
Immediate Settlement	Enabled	Enabled
Es [ksf]	100	100
E <sub>sur</sub> [ksf]	100	100
Primary Consolidation	Enabled	Disabled
Material Type	Non-Linear	
C <sub>c</sub>	0.071	
C <sub>r</sub>	0.027	
e <sub>0</sub>	1.27	
OCR	3.8	1
C <sub>v</sub> [ft <sup>2</sup> /d]	1.51	
B-bar	1	
Undrained Su A [kips/ft <sup>2</sup> ]	0	0
Undrained Su S	0.2	0.2
Undrained Su m	0.8	0.8
Piezo Line ID	1	1

## Groundwater


Groundwater method Piezometric Lines  
 Water Unit Weight 0.0624 kips/ft<sup>3</sup>

## Piezometric Line Entities

ID	Depth (ft)
1	1 ft

## Query Points

Point #	(X,Y) Location	Number of Divisions
2	75, 116.031	Auto: 57


	Project		SC 557 Over Crowders Creek	
	Analysis Description		End Bridge Embankment Double Drainage	
	Drawn By	JFH	Company	F&ME
	Date		File Name	End Bridge Embankment_DD.s3z

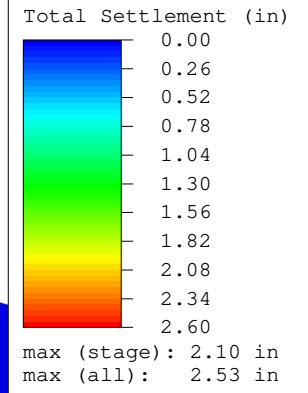
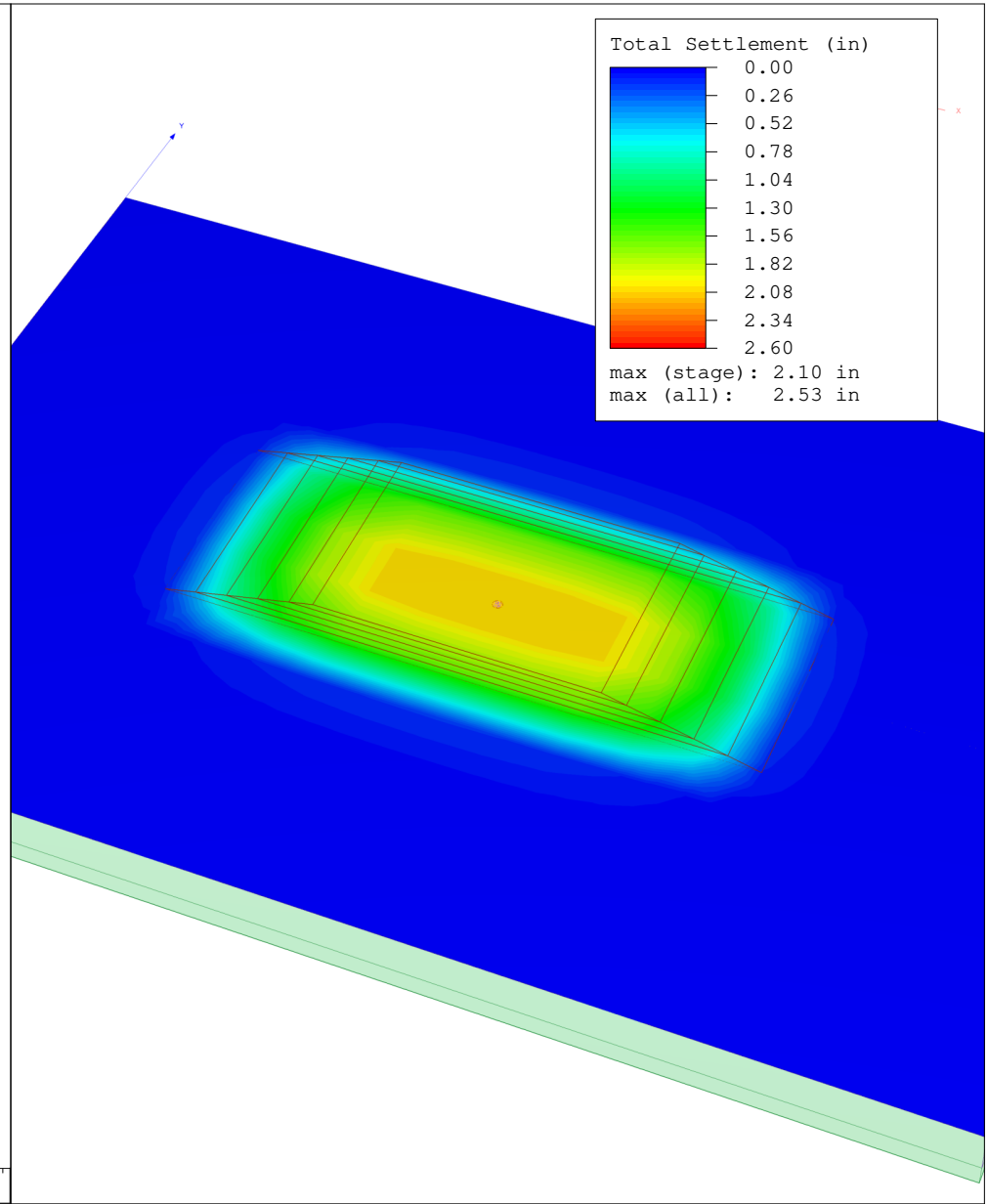
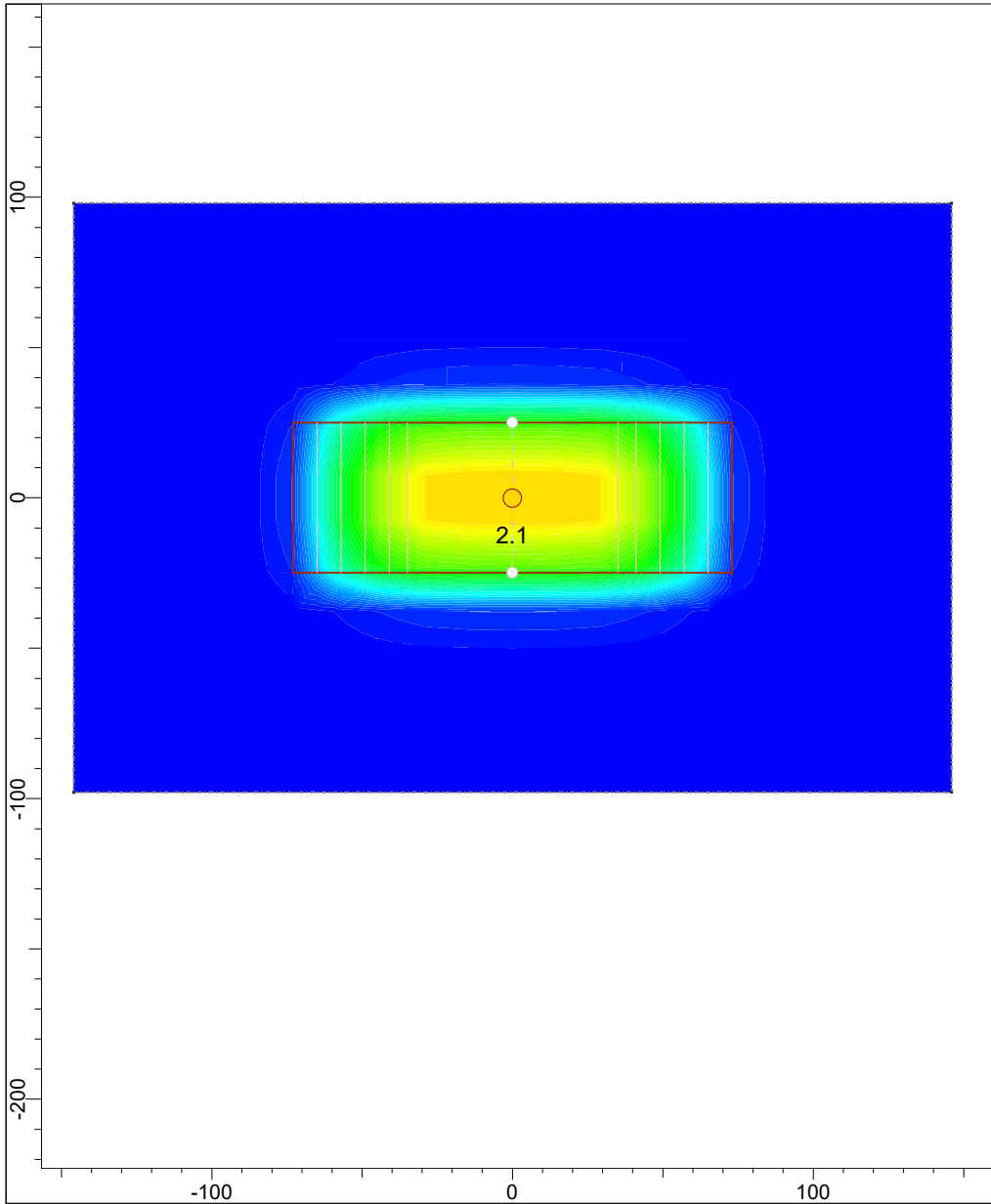
## Field Point Grid

Number of points 306  
 Expansion Factor 2

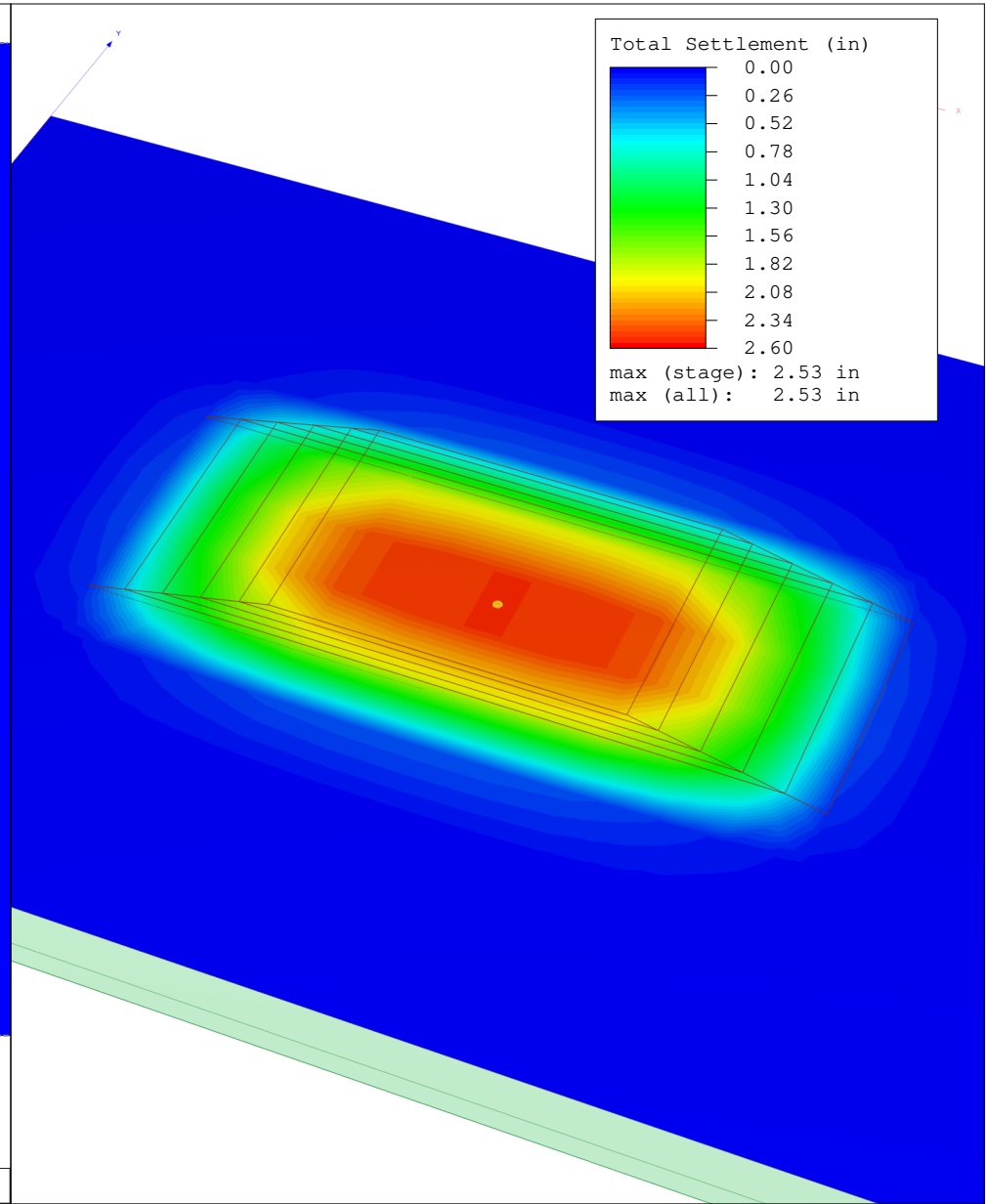
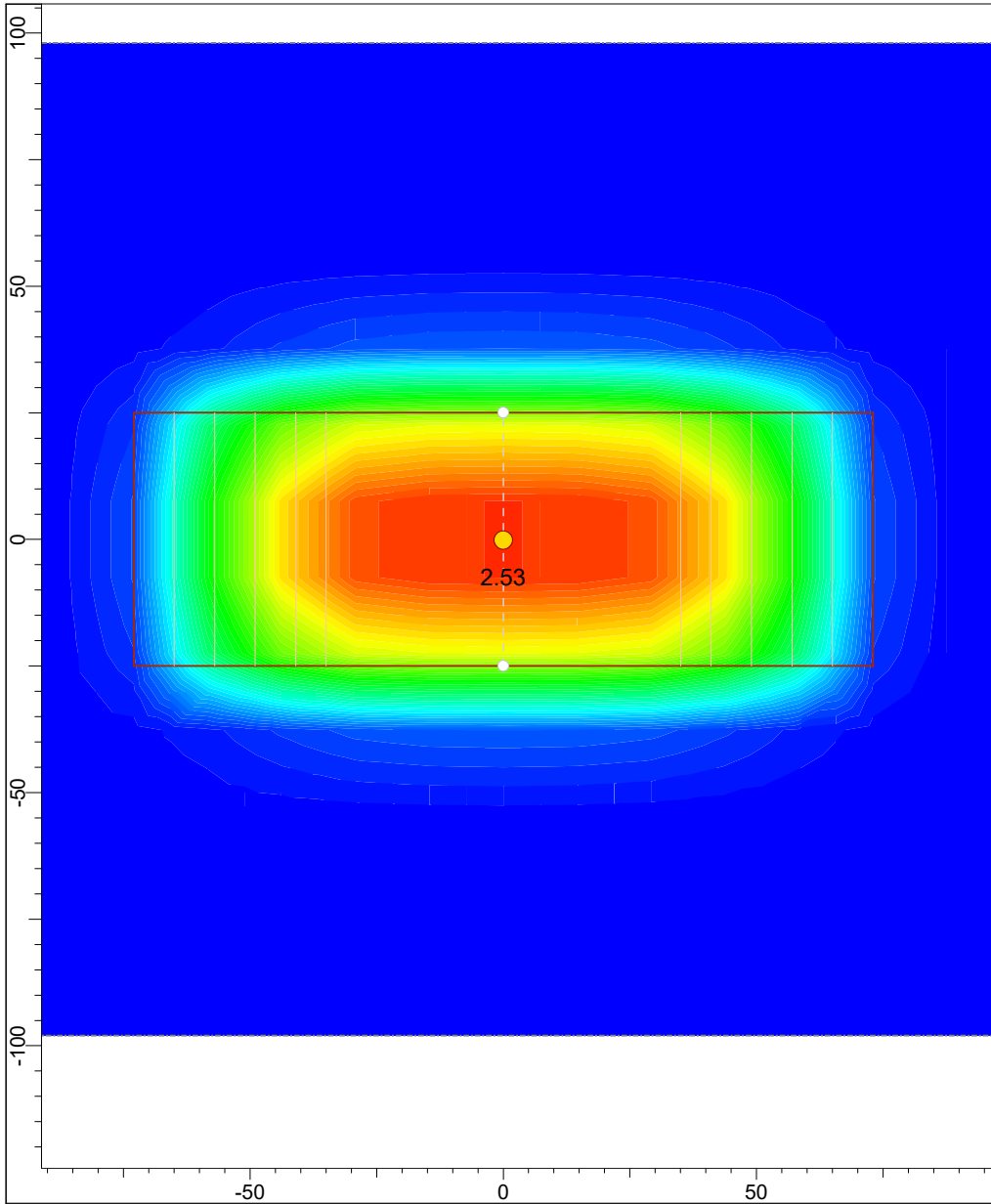
### Grid Coordinates


X [ft]	Y [ft]
256	240.5
256	-15.5
-106	-15.5
-106	240.5

	<i>Project</i>		SC 557 Over Crowders Creek	
	<i>Analysis Description</i>		End Bridge Embankment Double Drainage	
	<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
	<i>Date</i>		<i>File Name</i>	End Bridge Embankment_DD.s3z



Project	SC 557 Widening and Improvements		
Analysis Description	Station 270+00 - Single Drainage		
Drawn By	BMF	Company	F&ME
STAGE	Stage 2: 50 Days (End Construction)	File Name	STA 270+00_SD.s3z



	<i>Project</i> SC 557 Widening and Improvements		
	<i>Analysis Description</i> Station 270+00 - Single Drainage		
	<i>Drawn By</i> BMF	<i>Company</i> F&M	
	<i>STAGE</i> Stage 13: 230 Days (End Consolidation)	<i>File Name</i> STA 270+00_SD.s3z	



# Settle3D Analysis Information

## SC 557 Widening and Improvements

### Project Settings

Document Name	STA 270+00_SD
Project Title	SC 557 Widening and Improvements
Analysis	Station 270+00 - Single Drainage
Author	BMF
Company	F&ME
Stress Computation Method	Boussinesq
Time-dependent Consolidation Analysis	
Time Units	days
Permeability Units	feet/day
Use average properties to calculate layered stresses	
Improve consolidation accuracy	
Ignore negative effective stresses in settlement calculations	


### Stage Settings

Stage #	Name	Time [days]
1	Stage 1	0
2	Stage 2	10
3	Stage 3	20
4	Stage 4	30
5	Stage 5	40
6	Stage 6	50
7	Stage 7	60
8	Stage 8	70
9	Stage 9	80
10	Stage 10	95
11	Stage 11	110
12	Stage 12	140
13	Stage 13	230
14	Stage 14	410

### Results (relative to Stage: Stage 1 = 0 d)

Time taken to compute: 0 seconds

**Stage: Stage 1 = 0 d**


	<i>Project</i>		SC 557 Widening and Improvements	
	<i>Analysis Description</i>		Station 270+00 - Single Drainage	
	<i>Drawn By</i>	BMF	<i>Company</i>	F&ME
	<i>Date</i>		<i>File Name</i>	STA 270+00_SD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	0
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0
Effective Stress [ksf]	0	0
Total Stress [ksf]	0	0
Total Strain	0	0
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0	0
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0

### Stage: Stage 2 = 10 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.475198
Consolidation Settlement [in]	0	0.31084
Immediate Settlement [in]	0	0.164359
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0.24
Effective Stress [ksf]	-1.11022e-016	0.24
Total Stress [ksf]	0	0.24
Total Strain	0	0.0751859
Pore Water Pressure [ksf]	0	0.239588
Excess Pore Water Pressure [ksf]	0	0.239588
Degree of Consolidation [%]	0	61.3611
Pre-consolidation Stress [ksf]	0	0.238768
Over-consolidation Ratio	-2.8	8.88178e-016
Void Ratio	-0.170672	0
Permeability [ft/d]	0	1.80471
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	-1.11022e-016	0.0232502

### Stage: Stage 3 = 20 d


	<i>Project</i> SC 557 Widening and Improvements	
	<i>Analysis Description</i> Station 270+00 - Single Drainage	
	<i>Drawn By</i> BMF	<i>Company</i> F&ME
	<i>Date</i>	<i>File Name</i> STA 270+00_SD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.921107
Consolidation Settlement [in]	-0.000647369	0.594346
Immediate Settlement [in]	0	0.326761
Secondary Settlement [in]	0	0
Loading Stress [ksf]	5.02278e-008	0.479947
Effective Stress [ksf]	-0.0062565	0.479947
Total Stress [ksf]	5.02278e-008	0.479947
Total Strain	7.86702e-009	0.0853872
Pore Water Pressure [ksf]	0	0.438165
Excess Pore Water Pressure [ksf]	0	0.438165
Degree of Consolidation [%]	0	69.4796
Pre-consolidation Stress [ksf]	0	0.478714
Over-consolidation Ratio	-2.8	0.0298316
Void Ratio	-0.193829	-1.78581e-008
Permeability [ft/d]	0	1.80471
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	-0.000850595	0.0405661

### Stage: Stage 4 = 30 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	1.3504
Consolidation Settlement [in]	0	0.863849
Immediate Settlement [in]	0	0.486555
Secondary Settlement [in]	0	0
Loading Stress [ksf]	3.6795e-007	0.719521
Effective Stress [ksf]	-0.00013616	0.719521
Total Stress [ksf]	3.6795e-007	0.719521
Total Strain	2.74152e-008	0.0916818
Pore Water Pressure [ksf]	0	0.605768
Excess Pore Water Pressure [ksf]	0	0.605768
Degree of Consolidation [%]	0	75.0073
Pre-consolidation Stress [ksf]	0	0.718287
Over-consolidation Ratio	-2.8	0.000609629
Void Ratio	-0.208118	-6.22324e-008
Permeability [ft/d]	0	1.80471
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	-1.58479e-005	0.0544857

### Stage: Stage 5 = 40 d


	Project		SC 557 Widening and Improvements	
	Analysis Description		Station 270+00 - Single Drainage	
	Drawn By	BMF	Company	F&ME
	Date		File Name	STA 270+00_SD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	1.76479
Consolidation Settlement [in]	0	1.12196
Immediate Settlement [in]	0	0.642831
Secondary Settlement [in]	0	0
Loading Stress [ksf]	1.20564e-006	0.958075
Effective Stress [ksf]	1.43161e-008	0.958075
Total Stress [ksf]	1.20564e-006	0.958075
Total Strain	6.7625e-008	0.0963644
Pore Water Pressure [ksf]	0	0.731809
Excess Pore Water Pressure [ksf]	0	0.731809
Degree of Consolidation [%]	0	79.4817
Pre-consolidation Stress [ksf]	0	0.956839
Over-consolidation Ratio	-2.8	-1.37354e-006
Void Ratio	-0.218747	-1.53509e-007
Permeability [ft/d]	0	1.80471
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0661446

### Stage: Stage 6 = 50 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	2.09756
Consolidation Settlement [in]	0	1.34114
Immediate Settlement [in]	0	0.756422
Secondary Settlement [in]	0	0
Loading Stress [ksf]	2.38458e-006	1.13544
Effective Stress [ksf]	2.38458e-006	1.13544
Total Stress [ksf]	2.38458e-006	1.13544
Total Strain	1.23859e-007	0.0992617
Pore Water Pressure [ksf]	0	0.773096
Excess Pore Water Pressure [ksf]	0	0.773096
Degree of Consolidation [%]	0	83.424
Pre-consolidation Stress [ksf]	0	1.1342
Over-consolidation Ratio	-2.8	-2.73324e-005
Void Ratio	-0.225324	-2.8116e-007
Permeability [ft/d]	0	1.80471
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0737541

### Stage: Stage 7 = 60 d


	Project		SC 557 Widening and Improvements	
	Analysis Description		Station 270+00 - Single Drainage	
	Drawn By	BMF	Company	F&ME
	Date		File Name	STA 270+00_SD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	2.21477
Consolidation Settlement [in]	0	1.45835
Immediate Settlement [in]	0	0.756422
Secondary Settlement [in]	0	0
Loading Stress [ksf]	2.38458e-006	1.13544
Effective Stress [ksf]	2.38458e-006	1.13544
Total Stress [ksf]	2.38458e-006	1.13544
Total Strain	1.60445e-007	0.0992617
Pore Water Pressure [ksf]	0	0.65015
Excess Pore Water Pressure [ksf]	0	0.65015
Degree of Consolidation [%]	0	87.0596
Pre-consolidation Stress [ksf]	0	1.1342
Over-consolidation Ratio	-2.8	-6.35399e-005
Void Ratio	-0.225324	-3.64211e-007
Permeability [ft/d]	0	1.80471
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0738063

### Stage: Stage 8 = 70 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	2.28922
Consolidation Settlement [in]	0	1.5328
Immediate Settlement [in]	0	0.756422
Secondary Settlement [in]	0	0
Loading Stress [ksf]	2.38458e-006	1.13544
Effective Stress [ksf]	2.38458e-006	1.13544
Total Stress [ksf]	2.38458e-006	1.13544
Total Strain	1.60445e-007	0.0992617
Pore Water Pressure [ksf]	0	0.52132
Excess Pore Water Pressure [ksf]	0	0.52132
Degree of Consolidation [%]	0	89.8281
Pre-consolidation Stress [ksf]	0	1.1342
Over-consolidation Ratio	-2.8	-8.81254e-005
Void Ratio	-0.225324	-3.64211e-007
Permeability [ft/d]	0	1.80471
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0740336

### Stage: Stage 9 = 80 d


	Project		SC 557 Widening and Improvements	
	Analysis Description		Station 270+00 - Single Drainage	
	Drawn By	BMF	Company	F&ME
	Date		File Name	STA 270+00_SD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	2.3441
Consolidation Settlement [in]	0	1.58768
Immediate Settlement [in]	0	0.756422
Secondary Settlement [in]	0	0
Loading Stress [ksf]	2.38458e-006	1.13544
Effective Stress [ksf]	2.38458e-006	1.13544
Total Stress [ksf]	2.38458e-006	1.13544
Total Strain	1.60445e-007	0.0992617
Pore Water Pressure [ksf]	0	0.415002
Excess Pore Water Pressure [ksf]	0	0.415002
Degree of Consolidation [%]	0	91.9828
Pre-consolidation Stress [ksf]	0	1.1342
Over-consolidation Ratio	-2.8	-9.93801e-005
Void Ratio	-0.225324	-3.64211e-007
Permeability [ft/d]	0	1.80471
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0765102

### Stage: Stage 10 = 95 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	2.40233
Consolidation Settlement [in]	0	1.6459
Immediate Settlement [in]	0	0.756422
Secondary Settlement [in]	0	0
Loading Stress [ksf]	2.38458e-006	1.13544
Effective Stress [ksf]	2.38458e-006	1.13544
Total Stress [ksf]	2.38458e-006	1.13544
Total Strain	1.60445e-007	0.0992617
Pore Water Pressure [ksf]	0	0.294453
Excess Pore Water Pressure [ksf]	0	0.294453
Degree of Consolidation [%]	0	94.3699
Pre-consolidation Stress [ksf]	0	1.1342
Over-consolidation Ratio	-2.8	-9.93801e-005
Void Ratio	-0.225324	-3.64211e-007
Permeability [ft/d]	0	1.80471
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0833769

### Stage: Stage 11 = 110 d


	Project		SC 557 Widening and Improvements	
	Analysis Description		Station 270+00 - Single Drainage	
	Drawn By	BMF	Company	F&ME
	Date		File Name	STA 270+00_SD.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	2.44148
Consolidation Settlement [in]	0	1.68505
Immediate Settlement [in]	0	0.756422
Secondary Settlement [in]	0	0
Loading Stress [ksf]	2.38458e-006	1.13544
Effective Stress [ksf]	2.38458e-006	1.13544
Total Stress [ksf]	2.38458e-006	1.13544
Total Strain	1.60445e-007	0.0992617
Pore Water Pressure [ksf]	0	0.208906
Excess Pore Water Pressure [ksf]	0	0.208906
Degree of Consolidation [%]	0	96.0341
Pre-consolidation Stress [ksf]	0	1.1342
Over-consolidation Ratio	-2.8	-9.93801e-005
Void Ratio	-0.225324	-3.64211e-007
Permeability [ft/d]	0	1.80471
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0880622

### Stage: Stage 12 = 140 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	2.48681
Consolidation Settlement [in]	0	1.73039
Immediate Settlement [in]	0	0.756422
Secondary Settlement [in]	0	0
Loading Stress [ksf]	2.38458e-006	1.13544
Effective Stress [ksf]	2.38458e-006	1.13544
Total Stress [ksf]	2.38458e-006	1.13544
Total Strain	1.60445e-007	0.0992617
Pore Water Pressure [ksf]	0	0.105151
Excess Pore Water Pressure [ksf]	0	0.105151
Degree of Consolidation [%]	0	98.0208
Pre-consolidation Stress [ksf]	0	1.1342
Over-consolidation Ratio	-2.8	-9.93801e-005
Void Ratio	-0.225324	-3.64211e-007
Permeability [ft/d]	0	1.80471
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0935552

### Stage: Stage 13 = 230 d

	Project		SC 557 Widening and Improvements	
	Analysis Description		Station 270+00 - Single Drainage	
	Drawn By	BMF	Company	F&ME
	Date		File Name	STA 270+00_SD.s3z


Data Type	Minimum	Maximum
Total Settlement [in]	0	2.5251
Consolidation Settlement [in]	0	1.76868
Immediate Settlement [in]	0	0.756422
Secondary Settlement [in]	0	0
Loading Stress [ksf]	2.38458e-006	1.13544
Effective Stress [ksf]	2.38458e-006	1.13544
Total Stress [ksf]	2.38458e-006	1.13544
Total Strain	1.60445e-007	0.0992617
Pore Water Pressure [ksf]	0	0.0134055
Excess Pore Water Pressure [ksf]	0	0.0134055
Degree of Consolidation [%]	0	99.7495
Pre-consolidation Stress [ksf]	0	1.1342
Over-consolidation Ratio	-2.8	-9.93801e-005
Void Ratio	-0.225324	-3.64211e-007
Permeability [ft/d]	0	1.80471
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0995404

### Stage: Stage 14 = 410 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	2.53048
Consolidation Settlement [in]	0	1.77406
Immediate Settlement [in]	0	0.756422
Secondary Settlement [in]	0	0
Loading Stress [ksf]	2.38458e-006	1.13544
Effective Stress [ksf]	2.38458e-006	1.13544
Total Stress [ksf]	2.38458e-006	1.13544
Total Strain	1.60445e-007	0.0992617
Pore Water Pressure [ksf]	0	0.000217315
Excess Pore Water Pressure [ksf]	0	0.000217315
Degree of Consolidation [%]	0	99.9959
Pre-consolidation Stress [ksf]	0	1.1342
Over-consolidation Ratio	-2.8	-9.93801e-005
Void Ratio	-0.225324	-3.64211e-007
Permeability [ft/d]	0	1.80471
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.10053

## Embankments

### 1. Embankment

	Project		SC 557 Widening and Improvements	
	Analysis Description		Station 270+00 - Single Drainage	
	Drawn By	BMF	Company	F&ME
	Date		File Name	STA 270+00_SD.s3z



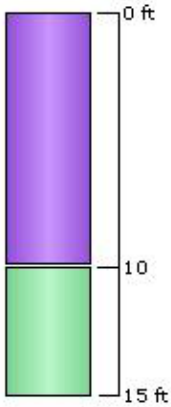
Center Line (0, -25) to (0, 25)  
 Number of Layers 5  
 Near End Angle 90 degrees  
 Far End Angle 90 degrees  
 Base Width 146

Layer	Stage	Left Bench Width (ft)	Left Angle (deg)	Height (ft)	Unit Weight (kips/ft <sup>3</sup> )	Right Angle (deg)	Right Bench Width (ft)
1	Stage 2 = 10 d	0	14.04	2	0.12	14.04	0
2	Stage 3 = 20 d	0	14.04	2	0.12	14.04	0
3	Stage 4 = 30 d	0	14.04	2	0.12	14.04	0
4	Stage 5 = 40 d	0	14.04	2	0.12	14.04	0
5	Stage 6 = 50 d	0	14.04	1.5	0.12	14.04	0


### Soil Layers



Ground Surface Drained: Yes

Layer #	Type	Thickness [ft]	Depth [ft]	Drained at Bottom
1	Stiff / V. Stiff Sandy Clay	10	0	No
2	Stiff Sandy Silt	5	10	No



### Soil Properties

	Project		SC 557 Widening and Improvements	
	Analysis Description		Station 270+00 - Single Drainage	
	Drawn By	BMF	Company	F&ME
	Date		File Name	STA 270+00_SD.s3z

Property	Stiff / V. Stiff Sandy Clay	Stiff Sandy Silt
Color		
Unit Weight [kips/ft <sup>3</sup> ]	0.11	0.1
Saturated Unit Weight [kips/ft <sup>3</sup> ]	0.115	0.105
Immediate Settlement	Enabled	Enabled
Es [ksf]	300	200
Esur [ksf]	300	200
Primary Consolidation	Enabled	Enabled
Material Type	Non-Linear	Non-Linear
Cc	0.071	0.55
Cr	0.027	0.06
e0	1.27	1.27
OCR	3.8	4.6
Cv [ft <sup>2</sup> /d]	1.51	1.01
B-bar	1	1
Undrained Su A [kips/ft <sup>2</sup> ]	0	0
Undrained Su S	0.2	0.2
Undrained Su m	0.8	0.8
Piezo Line ID	1	1

## Groundwater

Groundwater method Piezometric Lines  
 Water Unit Weight 0.0624 kips/ft<sup>3</sup>

## Piezometric Line Entities

ID	Depth (ft)
1	4 ft

## Query Points


Point #	(X,Y) Location	Number of Divisions
1	0, -0.165392	Auto: 55

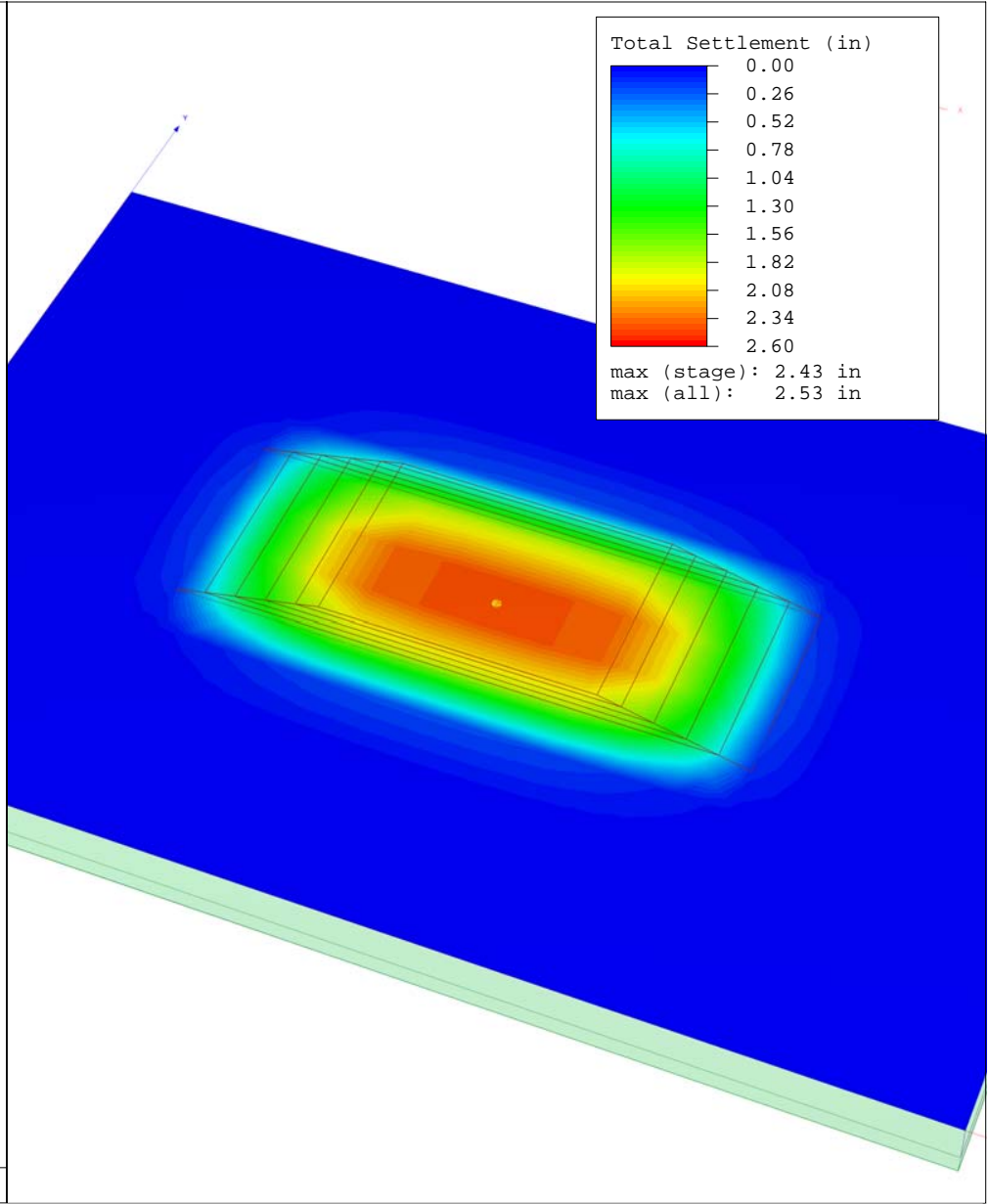
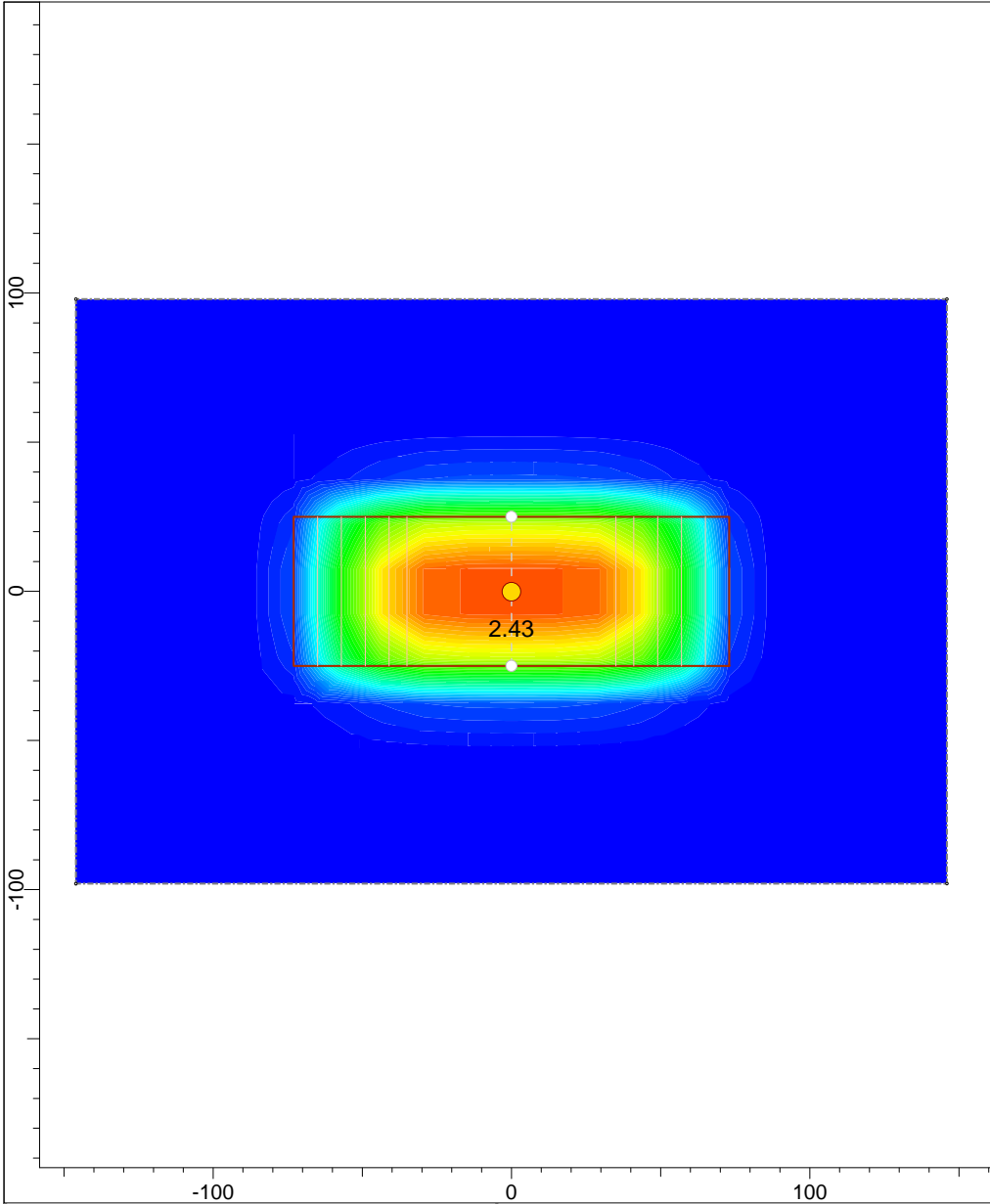
## Field Point Grid

Number of points 294  
 Expansion Factor 2

## Grid Coordinates

X [ft]	Y [ft]
146	98
146	-98
-146	-98
-146	98

	Project		SC 557 Widening and Improvements	
	Analysis Description		Station 270+00 - Single Drainage	
	Drawn By	BMF	Company	F&ME
	Date		File Name	STA 270+00_SD.s3z



Project	SC 557 Widening and Improvements		
Analysis Description	Station 270+00 - Double Drainage		
Drawn By	BMF	Company	F&ME
Date	Stage 6: End Embankment Construction	File Name	STA 270+00_DD.s3z

# Settle3D Analysis Information

## SC 557 Widening and Improvements

### Project Settings

---

Document Name	STA 270+00_DD
Project Title	SC 557 Widening and Improvements
Analysis	Station 270+00 - Double Drainage
Author	BMF
Company	F&ME
Stress Computation Method	Boussinesq
Time-dependent Consolidation Analysis	
Time Units	days
Permeability Units	feet/day
Use average properties to calculate layered stresses	
Improve consolidation accuracy	
Ignore negative effective stresses in settlement calculations	

### Stage Settings

---

Stage #	Name	Time [days]
1	Stage 1	0
2	Stage 2	10
3	Stage 3	20
4	Stage 4	30
5	Stage 5	40
6	Stage 6	50
7	Stage 7	60
8	Stage 8	70
9	Stage 9	80
10	Stage 10	95
11	Stage 11	110
12	Stage 12	140
13	Stage 13	230
14	Stage 14	410

### Results (relative to Stage: Stage 1 = 0 d)

---

Time taken to compute: 27.9183 seconds

**Stage: Stage 1 = 0 d**

Data Type	Minimum	Maximum
Total Settlement [in]	0	0
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0
Effective Stress [ksf]	0	0
Total Stress [ksf]	0	0
Total Strain	0	0
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0	0
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0

### Stage: Stage 2 = 10 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.475198
Consolidation Settlement [in]	0	0.31084
Immediate Settlement [in]	0	0.164359
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0.24
Effective Stress [ksf]	-1.11022e-016	0.24
Total Stress [ksf]	0	0.24
Total Strain	0	0.0751859
Pore Water Pressure [ksf]	0	0.239588
Excess Pore Water Pressure [ksf]	0	0.239588
Degree of Consolidation [%]	0	61.3611
Pre-consolidation Stress [ksf]	0	0.238768
Over-consolidation Ratio	-2.8	8.88178e-016
Void Ratio	-0.170672	0
Permeability [ft/d]	0	1.80471
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	-100	-100
Undrained Shear Strength	-1.11022e-016	0.0232502

### Stage: Stage 3 = 20 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	1.09879
Consolidation Settlement [in]	0	0.77203
Immediate Settlement [in]	0	0.326761
Secondary Settlement [in]	0	0
Loading Stress [ksf]	5.02278e-008	0.479947
Effective Stress [ksf]	5.02278e-008	0.479947
Total Stress [ksf]	5.02278e-008	0.479947
Total Strain	9.44122e-009	0.0853872
Pore Water Pressure [ksf]	0	0.240439
Excess Pore Water Pressure [ksf]	0	0.240439
Degree of Consolidation [%]	0	84.7994
Pre-consolidation Stress [ksf]	0	0.478714
Over-consolidation Ratio	-2.8	-4.37958e-006
Void Ratio	-0.193829	-2.14316e-008
Permeability [ft/d]	0	1.80471
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	-100	-23.3352
Undrained Shear Strength	0	0.0405661

### Stage: Stage 4 = 30 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	1.62435
Consolidation Settlement [in]	0	1.13779
Immediate Settlement [in]	0	0.486555
Secondary Settlement [in]	0	0
Loading Stress [ksf]	3.6795e-007	0.719521
Effective Stress [ksf]	3.6795e-007	0.719521
Total Stress [ksf]	3.6795e-007	0.719521
Total Strain	3.6649e-008	0.0916818
Pore Water Pressure [ksf]	0	0.237851
Excess Pore Water Pressure [ksf]	0	0.237851
Degree of Consolidation [%]	0	94.5213
Pre-consolidation Stress [ksf]	0	0.718287
Over-consolidation Ratio	-2.8	-1.61031e-005
Void Ratio	-0.208118	-8.31932e-008
Permeability [ft/d]	0	1.80471
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	-100	-9.90962
Undrained Shear Strength	0	0.0544857

### Stage: Stage 5 = 40 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	2.08444
Consolidation Settlement [in]	0	1.44161
Immediate Settlement [in]	0	0.642831
Secondary Settlement [in]	0	0
Loading Stress [ksf]	1.20564e-006	0.958075
Effective Stress [ksf]	1.20564e-006	0.958075
Total Stress [ksf]	1.20564e-006	0.958075
Total Strain	7.9543e-008	0.0963644
Pore Water Pressure [ksf]	0	0.234143
Excess Pore Water Pressure [ksf]	0	0.234143
Degree of Consolidation [%]	0	97.826
Pre-consolidation Stress [ksf]	0	0.956839
Over-consolidation Ratio	-2.8	-3.81704e-005
Void Ratio	-0.218747	-1.80563e-007
Permeability [ft/d]	0	1.80471
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	-100	-5.47853
Undrained Shear Strength	0	0.0715521

### Stage: Stage 6 = 50 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	2.43266
Consolidation Settlement [in]	0	1.67623
Immediate Settlement [in]	0	0.756422
Secondary Settlement [in]	0	0
Loading Stress [ksf]	2.38458e-006	1.13544
Effective Stress [ksf]	2.38458e-006	1.13544
Total Stress [ksf]	2.38458e-006	1.13544
Total Strain	1.38094e-007	0.0992617
Pore Water Pressure [ksf]	0	0.172234
Excess Pore Water Pressure [ksf]	0	0.172234
Degree of Consolidation [%]	0	99.1183
Pre-consolidation Stress [ksf]	0	1.1342
Over-consolidation Ratio	-2.8	-7.15264e-005
Void Ratio	-0.225324	-3.13473e-007
Permeability [ft/d]	0	1.80471
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	-98.5328	-2.8504
Undrained Shear Strength	0	0.0890152

### Stage: Stage 7 = 60 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	2.52935
Consolidation Settlement [in]	0	1.77293
Immediate Settlement [in]	0	0.756422
Secondary Settlement [in]	0	0
Loading Stress [ksf]	2.38458e-006	1.13544
Effective Stress [ksf]	2.38458e-006	1.13544
Total Stress [ksf]	2.38458e-006	1.13544
Total Strain	1.60445e-007	0.0992617
Pore Water Pressure [ksf]	0	0.00357531
Excess Pore Water Pressure [ksf]	0	0.00357531
Degree of Consolidation [%]	0	99.9998
Pre-consolidation Stress [ksf]	0	1.1342
Over-consolidation Ratio	-2.8	-9.93801e-005
Void Ratio	-0.225324	-3.64211e-007
Permeability [ft/d]	0	1.80471
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	-1.26355	-0.0319211
Undrained Shear Strength	0	0.100516

### Stage: Stage 8 = 70 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	2.53055
Consolidation Settlement [in]	0	1.77413
Immediate Settlement [in]	0	0.756422
Secondary Settlement [in]	0	0
Loading Stress [ksf]	2.38458e-006	1.13544
Effective Stress [ksf]	2.38458e-006	1.13544
Total Stress [ksf]	2.38458e-006	1.13544
Total Strain	1.60445e-007	0.0992617
Pore Water Pressure [ksf]	0	6.29545e-005
Excess Pore Water Pressure [ksf]	0	6.29545e-005
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0	1.1342
Over-consolidation Ratio	-2.8	-9.93801e-005
Void Ratio	-0.225324	-3.64211e-007
Permeability [ft/d]	0	1.80471
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	-0.0222488	-0.00045126
Undrained Shear Strength	0	0.100544

### Stage: Stage 9 = 80 d



Data Type	Minimum	Maximum
Total Settlement [in]	0	2.53057
Consolidation Settlement [in]	0	1.77415
Immediate Settlement [in]	0	0.756422
Secondary Settlement [in]	0	0
Loading Stress [ksf]	2.38458e-006	1.13544
Effective Stress [ksf]	2.38458e-006	1.13544
Total Stress [ksf]	2.38458e-006	1.13544
Total Strain	1.60445e-007	0.0992617
Pore Water Pressure [ksf]	0	1.10217e-006
Excess Pore Water Pressure [ksf]	0	1.10217e-006
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0	1.1342
Over-consolidation Ratio	-2.8	-9.93801e-005
Void Ratio	-0.225324	-3.64211e-007
Permeability [ft/d]	0	1.80471
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	-0.00038952	-6.3366e-006
Undrained Shear Strength	0	0.100547

### Stage: Stage 10 = 95 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	2.53057
Consolidation Settlement [in]	0	1.77415
Immediate Settlement [in]	0	0.756422
Secondary Settlement [in]	0	0
Loading Stress [ksf]	2.38458e-006	1.13544
Effective Stress [ksf]	2.38458e-006	1.13544
Total Stress [ksf]	2.38458e-006	1.13544
Total Strain	1.60445e-007	0.0992617
Pore Water Pressure [ksf]	0	2.52769e-009
Excess Pore Water Pressure [ksf]	0	2.52769e-009
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0	1.1342
Over-consolidation Ratio	-2.8	-9.93801e-005
Void Ratio	-0.225324	-3.64211e-007
Permeability [ft/d]	0	1.80471
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	-8.93314e-007	-1.04203e-008
Undrained Shear Strength	0	0.100547

### Stage: Stage 11 = 110 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	2.53057
Consolidation Settlement [in]	0	1.77415
Immediate Settlement [in]	0	0.756422
Secondary Settlement [in]	0	0
Loading Stress [ksf]	2.38458e-006	1.13544
Effective Stress [ksf]	2.38458e-006	1.13544
Total Stress [ksf]	2.38458e-006	1.13544
Total Strain	1.60445e-007	0.0992617
Pore Water Pressure [ksf]	0	5.71476e-012
Excess Pore Water Pressure [ksf]	0	5.71482e-012
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0	1.1342
Over-consolidation Ratio	-2.8	-9.93801e-005
Void Ratio	-0.225324	-3.64211e-007
Permeability [ft/d]	0	1.80471
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	-2.01966e-009	-1.68683e-011
Undrained Shear Strength	0	0.100547

### Stage: Stage 12 = 140 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	2.53057
Consolidation Settlement [in]	0	1.77415
Immediate Settlement [in]	0	0.756422
Secondary Settlement [in]	0	0
Loading Stress [ksf]	2.38458e-006	1.13544
Effective Stress [ksf]	2.38458e-006	1.13544
Total Stress [ksf]	2.38458e-006	1.13544
Total Strain	1.60445e-007	0.0992617
Pore Water Pressure [ksf]	-2.1684e-019	6.50521e-019
Excess Pore Water Pressure [ksf]	-5.66083e-019	2.72989e-017
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0	1.1342
Over-consolidation Ratio	-2.8	-9.93801e-005
Void Ratio	-0.225324	-3.64211e-007
Permeability [ft/d]	0	1.80471
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.100547

### Stage: Stage 13 = 230 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	2.53057
Consolidation Settlement [in]	0	1.77415
Immediate Settlement [in]	0	0.756422
Secondary Settlement [in]	0	0
Loading Stress [ksf]	2.38458e-006	1.13544
Effective Stress [ksf]	2.38458e-006	1.13544
Total Stress [ksf]	2.38458e-006	1.13544
Total Strain	1.60445e-007	0.0992617
Pore Water Pressure [ksf]	-2.1684e-019	5.42101e-019
Excess Pore Water Pressure [ksf]	-6.06896e-019	6.55276e-019
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0	1.1342
Over-consolidation Ratio	-2.8	-9.93801e-005
Void Ratio	-0.225324	-3.64211e-007
Permeability [ft/d]	0	1.80471
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.100547

### Stage: Stage 14 = 410 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	2.53057
Consolidation Settlement [in]	0	1.77415
Immediate Settlement [in]	0	0.756422
Secondary Settlement [in]	0	0
Loading Stress [ksf]	2.38458e-006	1.13544
Effective Stress [ksf]	2.38458e-006	1.13544
Total Stress [ksf]	2.38458e-006	1.13544
Total Strain	1.60445e-007	0.0992617
Pore Water Pressure [ksf]	-5.42101e-019	2.1684e-019
Excess Pore Water Pressure [ksf]	-6.47677e-019	6.0088e-019
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0	1.1342
Over-consolidation Ratio	-2.8	-9.93801e-005
Void Ratio	-0.225324	-3.64211e-007
Permeability [ft/d]	0	1.80471
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.100547

## Embankments

### 1. Embankment

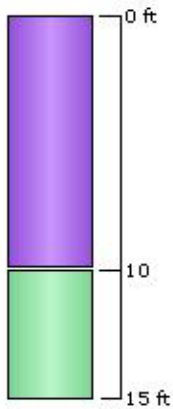
Center Line (0, -25) to (0, 25)  
 Number of Layers 5  
 Near End Angle 90 degrees  
 Far End Angle 90 degrees  
 Base Width 146

Layer	Stage	Left Bench Width (ft)	Left Angle (deg)	Height (ft)	Unit Weight (kips/ft <sup>3</sup> )	Right Angle (deg)	Right Bench Width (ft)
1	Stage 2 = 10 d	0	14.04	2	0.12	14.04	0
2	Stage 3 = 20 d	0	14.04	2	0.12	14.04	0
3	Stage 4 = 30 d	0	14.04	2	0.12	14.04	0
4	Stage 5 = 40 d	0	14.04	2	0.12	14.04	0
5	Stage 6 = 50 d	0	14.04	1.5	0.12	14.04	0



## Soil Layers

Ground Surface Drained: Yes

Layer #	Type	Thickness [ft]	Depth [ft]	Drained at Bottom
1	Stiff / V. Stiff Sandy Clay	10	0	Yes
2	Stiff Sandy Silt	5	10	Yes



## Soil Properties

Property	Stiff / V. Stiff Sandy Clay	Stiff Sandy Silt
Color		
Unit Weight [kips/ft <sup>3</sup> ]	0.11	0.1
Saturated Unit Weight [kips/ft <sup>3</sup> ]	0.115	0.105
Immediate Settlement	Enabled	Enabled
Es [ksf]	300	200
Esur [ksf]	300	200
Primary Consolidation	Enabled	Enabled
Material Type	Non-Linear	Non-Linear
Cc	0.071	0.55
Cr	0.027	0.06
e0	1.27	1.27
OCR	3.8	4.6
Cv [ft <sup>2</sup> /d]	1.51	1.01
B-bar	1	1
Undrained Su A [kips/ft <sup>2</sup> ]	0	0
Undrained Su S	0.2	0.2
Undrained Su m	0.8	0.8
Piezo Line ID	1	1

## Groundwater

Groundwater method Piezometric Lines  
 Water Unit Weight 0.0624 kips/ft<sup>3</sup>

### Piezometric Line Entities

ID	Depth (ft)
1	4 ft

### Query Points

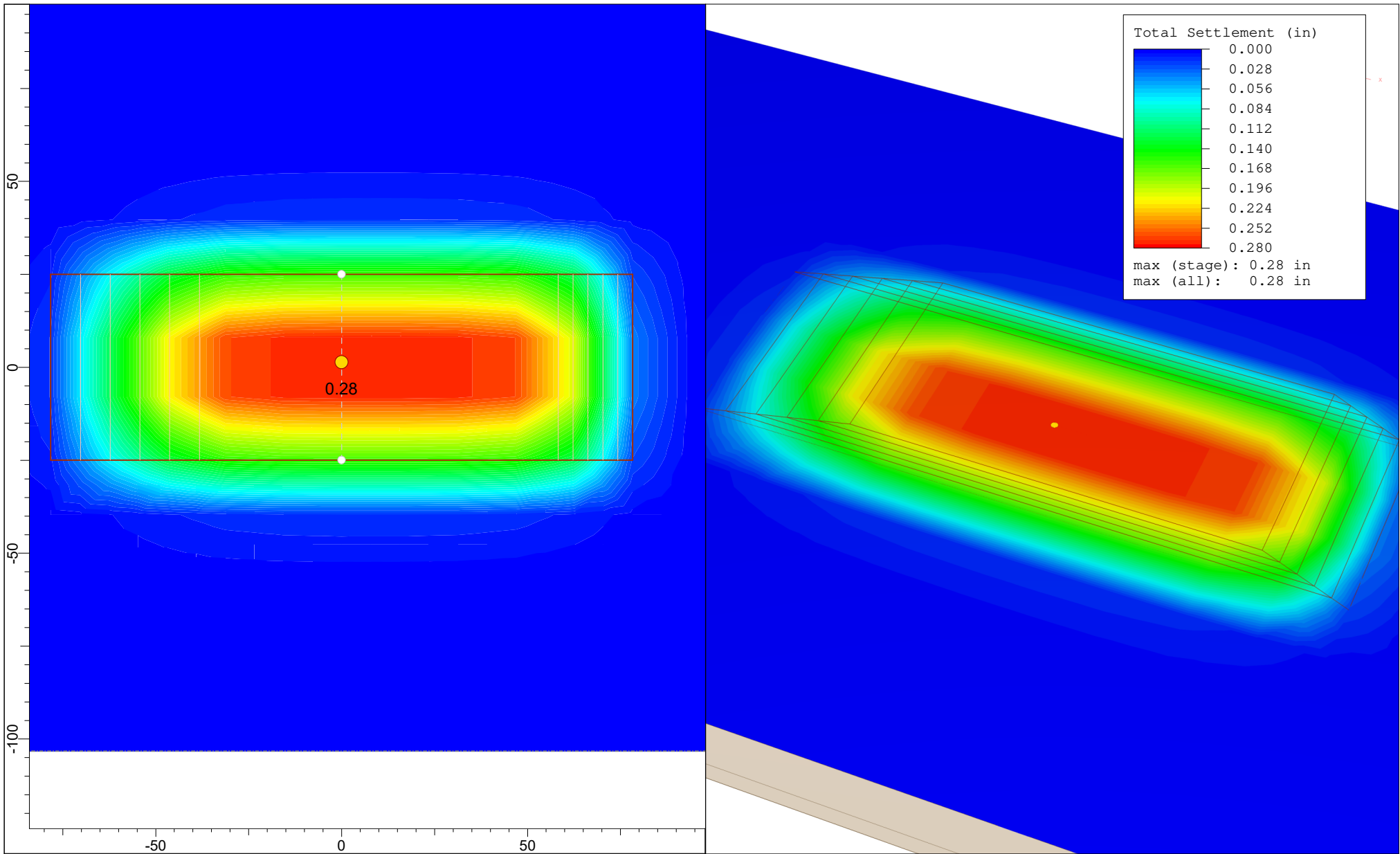
Point #	(X,Y) Location	Number of Divisions
1	0, -0.165392	Auto: 55

### Field Point Grid

Number of points 294  
 Expansion Factor 2

### Grid Coordinates

X [ft]	Y [ft]
146	98
146	-98
-146	-98
-146	98



<i>Project</i>	SC 557 Widening and Improvements		
<i>Analysis Description</i>	Station 279+00		
<i>Drawn By</i>	BMF	<i>Company</i>	F&ME
<i>STAGE</i>	Stage 6: 50 Days (End Construction)	<i>File Name</i>	STA 279+00.s3z

# Settle3D Analysis Information

## SC 557 Widening and Improvements

### Project Settings

Document Name	STA 279+00
Project Title	SC 557 Widening and Improvements
Analysis	Station 279+00
Author	BMF
Company	F&ME
Stress Computation Method	Boussinesq
Time-dependent Consolidation Analysis	
Time Units	days
Permeability Units	feet/day
Use average properties to calculate layered stresses	
Improve consolidation accuracy	
Ignore negative effective stresses in settlement calculations	


### Stage Settings

Stage #	Name	Time [days]
1	Stage 1	0
2	Stage 2	10
3	Stage 3	20
4	Stage 4	30
5	Stage 5	40
6	Stage 6	50

### Results (relative to Stage: Stage 1 = 0 d)

Time taken to compute: 0.10296 seconds

**Stage: Stage 1 = 0 d**


	<i>Project</i>		SC 557 Widening and Improvements	
	<i>Analysis Description</i>		Station 279+00	
	<i>Drawn By</i>	BMF	<i>Company</i>	F&ME
	<i>Date</i>		<i>File Name</i>	STA 279+00.s3z

Data Type	Minimum	Maximum
Total Settlement [in]	0	0
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0
Effective Stress [ksf]	0	0
Total Stress [ksf]	0	0
Total Strain	0	0
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0	0
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0

### Stage: Stage 2 = 10 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.0567152
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.0567152
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0.240009
Effective Stress [ksf]	0	0.240009
Total Stress [ksf]	0	0.240009
Total Strain	0	0.000342869
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0	0.240009
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.00853652

### Stage: Stage 3 = 20 d

	<i>Project</i>		SC 557 Widening and Improvements	
	<i>Analysis Description</i>		Station 279+00	
	<i>Drawn By</i>	BMF	<i>Company</i>	F&ME
	<i>Date</i>		<i>File Name</i>	STA 279+00.s3z




Data Type	Minimum	Maximum
Total Settlement [in]	0	0.112887
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.112887
Secondary Settlement [in]	0	0
Loading Stress [ksf]	4.0399e-008	0.479946
Effective Stress [ksf]	4.0399e-008	0.479946
Total Stress [ksf]	4.0399e-008	0.479946
Total Strain	0	0.000685637
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	4.07033e-008	0.479946
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0157346

#### Stage: Stage 4 = 30 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.168324
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.168324
Secondary Settlement [in]	0	0
Loading Stress [ksf]	3.02423e-007	0.719524
Effective Stress [ksf]	3.02423e-007	0.719524
Total Stress [ksf]	3.02423e-007	0.719524
Total Strain	0	0.00102789
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	3.03712e-007	0.719522
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0220186

#### Stage: Stage 5 = 40 d

	Project		SC 557 Widening and Improvements	
	Analysis Description		Station 279+00	
	Drawn By	BMF	Company	F&ME
	Date		File Name	STA 279+00.s3z


Data Type	Minimum	Maximum
Total Settlement [in]	0	0.22281
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.22281
Secondary Settlement [in]	0	0
Loading Stress [ksf]	1.0173e-006	0.958127
Effective Stress [ksf]	1.0173e-006	0.958127
Total Stress [ksf]	1.0173e-006	0.958127
Total Strain	0	0.00136875
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	1.02038e-006	0.958122
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0276348

### Stage: Stage 6 = 50 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.276063
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.276063
Secondary Settlement [in]	0	0
Loading Stress [ksf]	2.38073e-006	1.19488
Effective Stress [ksf]	2.38073e-006	1.19488
Total Stress [ksf]	2.38073e-006	1.19488
Total Strain	0	0.00170695
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	2.38636e-006	1.19487
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0326667

## Embankments

### 1. Embankment

	Project		SC 557 Widening and Improvements	
	Analysis Description		Station 279+00	
	Drawn By	BMF	Company	F&ME
	Date		File Name	STA 279+00.s3z

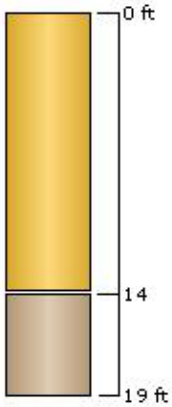
Center Line (0, 25) to (0, -25)  
 Number of Layers 5  
 Near End Angle 90 degrees  
 Far End Angle 90 degrees  
 Base Width 156.5

Layer	Stage	Left Bench Width (ft)	Left Angle (deg)	Height (ft)	Unit Weight (kips/ft <sup>3</sup> )	Right Angle (deg)	Right Bench Width (ft)
1	Stage 2 = 10 d	0	26.57	2	0.12	14.04	0
2	Stage 3 = 20 d	0	26.57	2	0.12	14.04	0
3	Stage 4 = 30 d	0	26.57	2	0.12	14.04	0
4	Stage 5 = 40 d	0	26.57	2	0.12	14.04	0
5	Stage 6 = 50 d	0	26.57	2	0.12	14.04	0


### Soil Layers



Ground Surface Drained: Yes

Layer #	Type	Thickness [ft]	Depth [ft]	Drained at Bottom
1	Dense / V. Dense Silty Sand	14	0	No
2	Partially Weathered Rock (PWR)	5	14	No



### Soil Properties

	Project		SC 557 Widening and Improvements	
	Analysis Description		Station 279+00	
	Drawn By	BMF	Company	F&ME
	Date		File Name	STA 279+00.s3z

Property	Partially Weathered Rock (PWR)	Dense / V. Dense Silty Sand
Color		
Unit Weight [kips/ft <sup>3</sup> ]	0.135	0.12
Saturated Unit Weight [kips/ft <sup>3</sup> ]	0.14	0.125
Immediate Settlement	Disabled	Enabled
Es [ksf]		700
Esur [ksf]		700
Undrained Su A [kips/ft <sup>2</sup> ]	0	0
Undrained Su S	0.2	0.2
Undrained Su m	0.8	0.8
Piezo Line ID	1	1

## Groundwater

Groundwater method Piezometric Lines  
 Water Unit Weight 0.0624 kips/ft<sup>3</sup>

## Piezometric Line Entities

ID	Depth (ft)
1	5 ft
2	7.5 ft

## Query Points


Point #	(X,Y) Location	Number of Divisions
1	0, 1.35243	Auto: 65

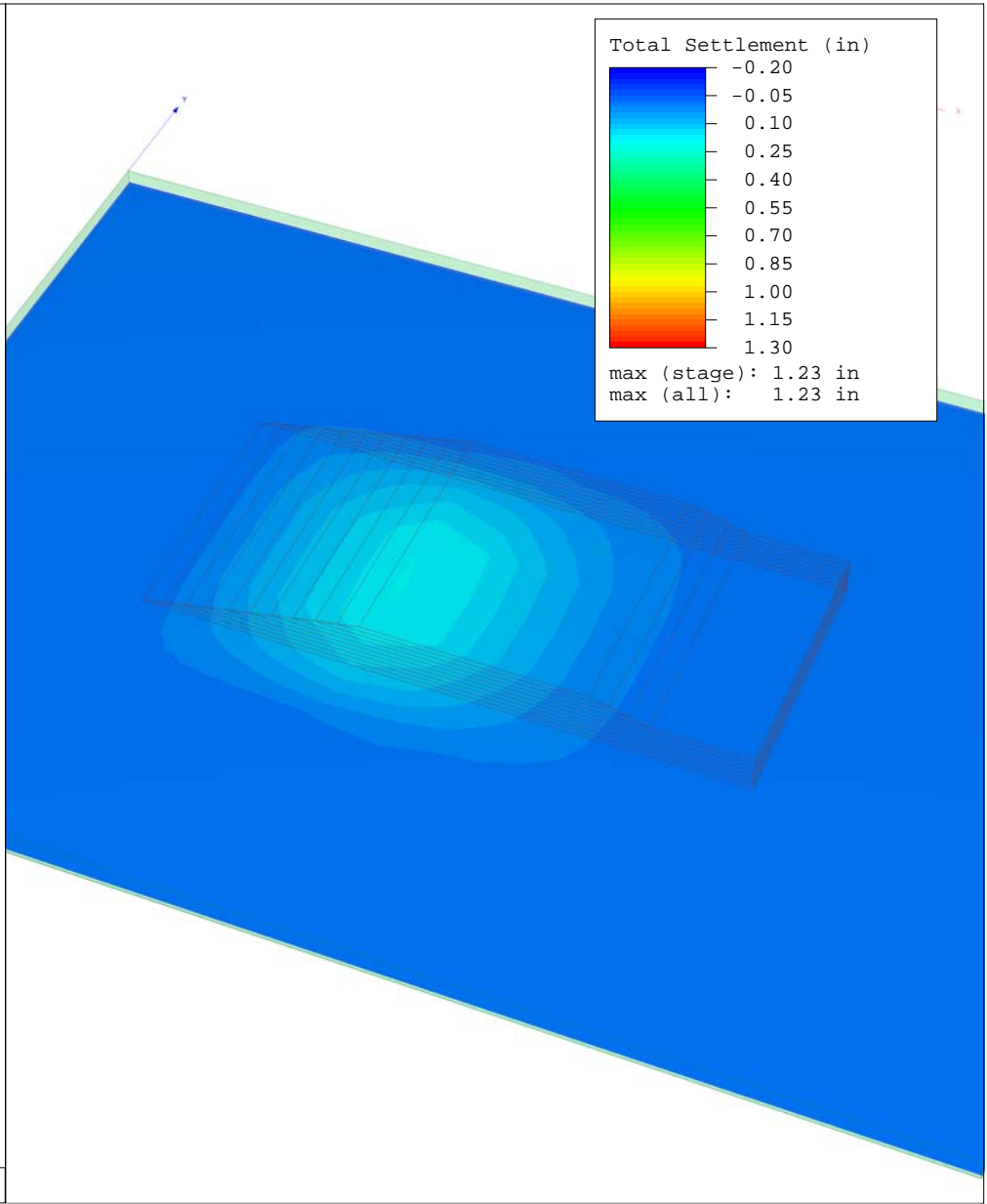
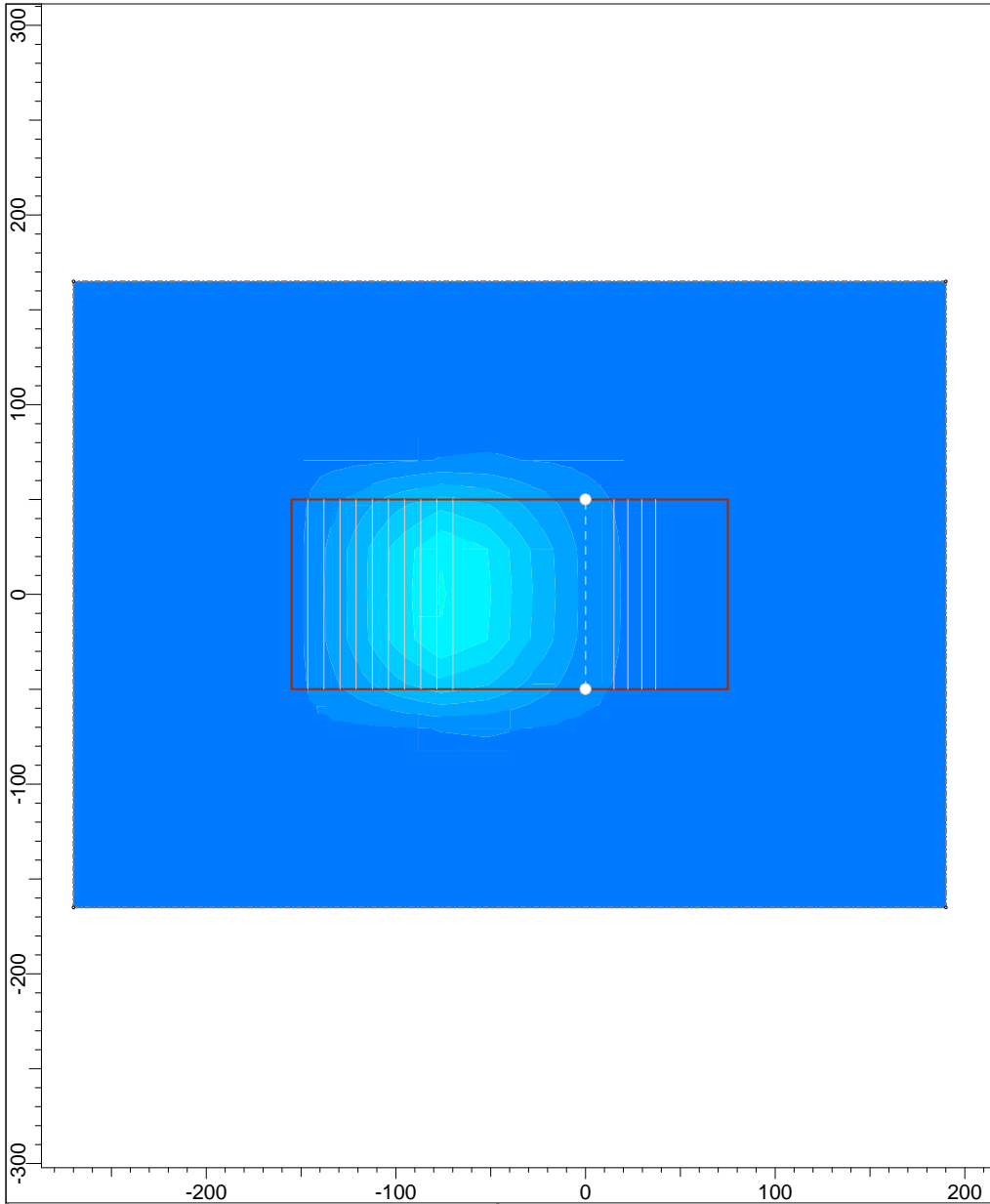
## Field Point Grid

Number of points 294  
 Expansion Factor 2

## Grid Coordinates

X [ft]	Y [ft]
156.5	103.25
156.5	-103.25
-156.5	-103.25
-156.5	103.25

	Project		SC 557 Widening and Improvements	
	Analysis Description		Station 279+00	
	Drawn By	BMF	Company	F&ME
	Date		File Name	STA 279+00.s3z



Project	SC 557 Widening and Improvements		
Analysis Description	Station 287+00 Single Drainage		
Drawn By	BMF	Company	F&ME
Date		File Name	STA 287+00_SD.s3z

# Settle3D Analysis Information

## SC 557 Widening and Improvements

### Project Settings

---

Document Name	STA 287+00_SD
Project Title	SC 557 Widening and Improvements
Analysis	Station 287+00 Single Drainage
Author	BMF
Company	F&ME
Stress Computation Method	Boussinesq
Time-dependent Consolidation Analysis	
Time Units	days
Permeability Units	feet/day
Use average properties to calculate layered stresses	
Improve consolidation accuracy	
Ignore negative effective stresses in settlement calculations	

### Stage Settings

---

Stage #	Name	Time [days]
1	Stage 1	0
2	Stage 2	10
3	Stage 3	20
4	Stage 4	30
5	Stage 5	40
6	Stage 6	50
7	Stage 7	60
8	Stage 8	70
9	Stage 9	80
10	Stage 10	90
11	Stage 11	100
12	Stage 12	110
13	Stage 13	120
14	Stage 14	130
15	Stage 15	160
16	Stage 16	190

### Results (relative to Stage: Stage 2 = 10 d)

---

Time taken to compute: 26.1118 seconds

**Stage: Stage 1 = 0 d**

Data Type	Minimum	Maximum
Total Settlement [in]	-0.186689	1.74935e-009
Consolidation Settlement [in]	-0.0717068	0
Immediate Settlement [in]	-0.115026	1.16839e-007
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-0.24	9.46362e-007
Effective Stress [ksf]	-2.0465	9.46362e-007
Total Stress [ksf]	-0.24	9.46362e-007
Total Strain	-0.0501085	1.27168e-008
Pore Water Pressure [ksf]	-0.238382	2.04649
Excess Pore Water Pressure [ksf]	-0.238382	2.04649
Degree of Consolidation [%]	-100	24.4917
Pre-consolidation Stress [ksf]	-0.234424	0
Over-consolidation Ratio	-9.25556e-006	2.79124
Void Ratio	-2.88672e-008	0.113746
Permeability [ft/d]	-0.278622	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	-100	0
Undrained Shear Strength	-0.20988	1.10136e-007

### Stage: Stage 2 = 10 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0
Effective Stress [ksf]	0	0
Total Stress [ksf]	0	0
Total Strain	0	0
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0	0
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0

### Stage: Stage 3 = 20 d

Data Type	Minimum	Maximum
Total Settlement [in]	-1.07675e-007	0.171438
Consolidation Settlement [in]	-4.10469e-008	0.0565529
Immediate Settlement [in]	-6.66281e-008	0.114885
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-8.87038e-007	0.239982
Effective Stress [ksf]	-1.77571e-006	0.239982
Total Stress [ksf]	-8.87038e-007	0.239982
Total Strain	-5.62845e-009	0.0105277
Pore Water Pressure [ksf]	-0.120559	0.0311776
Excess Pore Water Pressure [ksf]	-0.120559	0.0311776
Degree of Consolidation [%]	-12.3412	96.0357
Pre-consolidation Stress [ksf]	0	0.239982
Over-consolidation Ratio	-0.625796	1.09817e-006
Void Ratio	-0.0238979	1.27766e-008
Permeability [ft/d]	-0.278622	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	-33.9737	77.2644
Undrained Shear Strength	-2.06655e-007	0.0273927

### Stage: Stage 4 = 30 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.33552
Consolidation Settlement [in]	-3.1751e-008	0.106141
Immediate Settlement [in]	0	0.22938
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-9.4397e-007	0.479825
Effective Stress [ksf]	-1.75235e-006	0.479825
Total Stress [ksf]	-9.4397e-007	0.479825
Total Strain	-6.10042e-009	0.0171935
Pore Water Pressure [ksf]	-0.144517	0.0968053
Excess Pore Water Pressure [ksf]	-0.144517	0.0968053
Degree of Consolidation [%]	-17.6554	99.3788
Pre-consolidation Stress [ksf]	0	0.479825
Over-consolidation Ratio	-0.983654	1.28971e-006
Void Ratio	-0.0390292	1.38479e-008
Permeability [ft/d]	0	0.00199016
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	-76.1504	93.4234
Undrained Shear Strength	-2.03937e-007	0.0538659

### Stage: Stage 5 = 40 d



Data Type	Minimum	Maximum
Total Settlement [in]	0	0.492678
Consolidation Settlement [in]	0	0.150083
Immediate Settlement [in]	0	0.342596
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-4.19279e-007	0.718929
Effective Stress [ksf]	-4.19279e-007	0.718929
Total Stress [ksf]	-4.19279e-007	0.718929
Total Strain	-2.62876e-009	0.0222692
Pore Water Pressure [ksf]	-0.149504	0.187216
Excess Pore Water Pressure [ksf]	-0.149504	0.187216
Degree of Consolidation [%]	-18.5981	98.8878
Pre-consolidation Stress [ksf]	0	0.718928
Over-consolidation Ratio	-1.2405	5.14066e-007
Void Ratio	-0.050551	5.96729e-009
Permeability [ft/d]	0	0.00199016
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	-81.6305	96.8455
Undrained Shear Strength	-4.8795e-008	0.0794045

### Stage: Stage 6 = 50 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.641453
Consolidation Settlement [in]	0	0.187973
Immediate Settlement [in]	0	0.453998
Secondary Settlement [in]	0	0
Loading Stress [ksf]	2.47809e-007	0.95784
Effective Stress [ksf]	2.47809e-007	0.95784
Total Stress [ksf]	2.47809e-007	0.95784
Total Strain	3.77186e-009	0.0264036
Pore Water Pressure [ksf]	-0.191503	0.21739
Excess Pore Water Pressure [ksf]	-0.191503	0.21739
Degree of Consolidation [%]	-23.1922	98.349
Pre-consolidation Stress [ksf]	0	0.957836
Over-consolidation Ratio	-1.82646	0
Void Ratio	-0.0599361	-8.56211e-009
Permeability [ft/d]	0	0.0029189
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	-81.6305	98.0412
Undrained Shear Strength	0	0.103811

### Stage: Stage 7 = 60 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.792617
Consolidation Settlement [in]	0	0.226491
Immediate Settlement [in]	0	0.566126
Secondary Settlement [in]	0	0
Loading Stress [ksf]	6.15279e-007	1.19544
Effective Stress [ksf]	3.65405e-007	1.19544
Total Stress [ksf]	6.15279e-007	1.19544
Total Strain	8.76665e-009	0.0300281
Pore Water Pressure [ksf]	-0.219521	0.225384
Excess Pore Water Pressure [ksf]	-0.219521	0.225384
Degree of Consolidation [%]	-24.3876	98.8537
Pre-consolidation Stress [ksf]	0	1.19543
Over-consolidation Ratio	-2.35258	0
Void Ratio	-0.0681638	-1.99003e-008
Permeability [ft/d]	0	0.278622
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	-92.0174	98.6084
Undrained Shear Strength	0	0.12622

### Stage: Stage 8 = 70 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.936077
Consolidation Settlement [in]	0	0.261369
Immediate Settlement [in]	0	0.674708
Secondary Settlement [in]	0	0
Loading Stress [ksf]	1.33216e-006	1.42872
Effective Stress [ksf]	5.17858e-007	1.42872
Total Stress [ksf]	1.33216e-006	1.42872
Total Strain	1.75914e-008	0.0332331
Pore Water Pressure [ksf]	-0.229054	0.226914
Excess Pore Water Pressure [ksf]	-0.229054	0.226914
Degree of Consolidation [%]	-23.422	99.1611
Pre-consolidation Stress [ksf]	0	1.42871
Over-consolidation Ratio	-2.50313	0
Void Ratio	-0.0754392	-3.99325e-008
Permeability [ft/d]	0	0.278622
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	-94.009	98.9318
Undrained Shear Strength	0	0.145785

### Stage: Stage 9 = 80 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	1.06493
Consolidation Settlement [in]	0	0.291337
Immediate Settlement [in]	0	0.773595
Secondary Settlement [in]	0	0
Loading Stress [ksf]	2.61156e-006	1.64647
Effective Stress [ksf]	1.3021e-006	1.64647
Total Stress [ksf]	2.61156e-006	1.64647
Total Strain	3.24646e-008	0.0359829
Pore Water Pressure [ksf]	-0.233005	0.224937
Excess Pore Water Pressure [ksf]	-0.233005	0.224937
Degree of Consolidation [%]	-21.5773	99.3582
Pre-consolidation Stress [ksf]	0	1.64645
Over-consolidation Ratio	-2.50313	0
Void Ratio	-0.0816812	-7.36947e-008
Permeability [ft/d]	0	0.278622
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	-97.8579	99.1395
Undrained Shear Strength	0	0.167165

### Stage: Stage 10 = 90 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	1.16554
Consolidation Settlement [in]	0	0.314547
Immediate Settlement [in]	0	0.850992
Secondary Settlement [in]	0	0
Loading Stress [ksf]	4.82125e-006	1.81793
Effective Stress [ksf]	1.50672e-006	1.81793
Total Stress [ksf]	4.82125e-006	1.81793
Total Strain	5.67721e-008	0.0380187
Pore Water Pressure [ksf]	-0.234961	0.218649
Excess Pore Water Pressure [ksf]	-0.234961	0.218649
Degree of Consolidation [%]	-20.482	99.5064
Pre-consolidation Stress [ksf]	0	1.81791
Over-consolidation Ratio	-2.50313	0
Void Ratio	-0.0863024	-1.28873e-007
Permeability [ft/d]	0	0.278622
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	-98.6285	99.3049
Undrained Shear Strength	0	0.185966

### Stage: Stage 11 = 100 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	1.22908
Consolidation Settlement [in]	0	0.329363
Immediate Settlement [in]	0	0.899718
Secondary Settlement [in]	0	0
Loading Stress [ksf]	8.23111e-006	1.91835
Effective Stress [ksf]	8.23111e-006	1.9562
Total Stress [ksf]	8.23111e-006	1.91835
Total Strain	9.29451e-008	0.0391663
Pore Water Pressure [ksf]	-0.236174	0.216237
Excess Pore Water Pressure [ksf]	-0.236174	0.216237
Degree of Consolidation [%]	-19.5308	99.6526
Pre-consolidation Stress [ksf]	0	1.91832
Over-consolidation Ratio	-2.50313	0
Void Ratio	-0.0889075	-2.10985e-007
Permeability [ft/d]	0	0.278622
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	-98.6285	99.4268
Undrained Shear Strength	0	0.200384

### Stage: Stage 12 = 110 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	1.2307
Consolidation Settlement [in]	0	0.330987
Immediate Settlement [in]	0	0.899718
Secondary Settlement [in]	0	0
Loading Stress [ksf]	8.23111e-006	1.91835
Effective Stress [ksf]	8.23111e-006	2.05807
Total Stress [ksf]	8.23111e-006	1.91835
Total Strain	9.29451e-008	0.0391663
Pore Water Pressure [ksf]	-0.239386	9.29491e-007
Excess Pore Water Pressure [ksf]	-0.239386	9.29491e-007
Degree of Consolidation [%]	-0.000715667	100
Pre-consolidation Stress [ksf]	0	1.91832
Over-consolidation Ratio	-2.50313	0
Void Ratio	-0.0889075	-2.10985e-007
Permeability [ft/d]	0	0.278622
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	-0.000652175	100
Undrained Shear Strength	0	0.209649

### Stage: Stage 13 = 120 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	1.23071
Consolidation Settlement [in]	0	0.330987
Immediate Settlement [in]	0	0.899718
Secondary Settlement [in]	0	0
Loading Stress [ksf]	8.23111e-006	1.91835
Effective Stress [ksf]	8.23111e-006	2.05807
Total Stress [ksf]	8.23111e-006	1.91835
Total Strain	9.29451e-008	0.0391663
Pore Water Pressure [ksf]	-0.239386	9.29491e-007
Excess Pore Water Pressure [ksf]	-0.239386	9.29491e-007
Degree of Consolidation [%]	-6.08825e-008	100
Pre-consolidation Stress [ksf]	0	1.91832
Over-consolidation Ratio	-2.50313	0
Void Ratio	-0.0889075	-2.10985e-007
Permeability [ft/d]	0	0.278622
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	-5.54021e-008	100
Undrained Shear Strength	0	0.209649

### Stage: Stage 14 = 130 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	1.23071
Consolidation Settlement [in]	0	0.330987
Immediate Settlement [in]	0	0.899718
Secondary Settlement [in]	0	0
Loading Stress [ksf]	8.23111e-006	1.91835
Effective Stress [ksf]	8.23111e-006	2.05807
Total Stress [ksf]	8.23111e-006	1.91835
Total Strain	9.29451e-008	0.0391663
Pore Water Pressure [ksf]	-0.239386	9.29491e-007
Excess Pore Water Pressure [ksf]	-0.239386	9.29491e-007
Degree of Consolidation [%]	-1.42109e-014	100
Pre-consolidation Stress [ksf]	0	1.91832
Over-consolidation Ratio	-2.50313	0
Void Ratio	-0.0889075	-2.10985e-007
Permeability [ft/d]	0	0.278622
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	-4.39115e-012	100
Undrained Shear Strength	0	0.209649

### Stage: Stage 15 = 160 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	1.23071
Consolidation Settlement [in]	0	0.330987
Immediate Settlement [in]	0	0.899718
Secondary Settlement [in]	0	0
Loading Stress [ksf]	8.23111e-006	1.91835
Effective Stress [ksf]	8.23111e-006	2.05807
Total Stress [ksf]	8.23111e-006	1.91835
Total Strain	9.29451e-008	0.0391663
Pore Water Pressure [ksf]	-0.239386	9.29491e-007
Excess Pore Water Pressure [ksf]	-0.239386	9.29491e-007
Degree of Consolidation [%]	-1.42109e-014	100
Pre-consolidation Stress [ksf]	0	1.91832
Over-consolidation Ratio	-2.50313	0
Void Ratio	-0.0889075	-2.10985e-007
Permeability [ft/d]	0	0.278622
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.209649

### Stage: Stage 16 = 190 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	1.23071
Consolidation Settlement [in]	0	0.330987
Immediate Settlement [in]	0	0.899718
Secondary Settlement [in]	0	0
Loading Stress [ksf]	8.23111e-006	1.91835
Effective Stress [ksf]	8.23111e-006	2.05807
Total Stress [ksf]	8.23111e-006	1.91835
Total Strain	9.29451e-008	0.0391663
Pore Water Pressure [ksf]	-0.239386	9.29491e-007
Excess Pore Water Pressure [ksf]	-0.239386	9.29491e-007
Degree of Consolidation [%]	-1.42109e-014	100
Pre-consolidation Stress [ksf]	0	1.91832
Over-consolidation Ratio	-2.50313	0
Void Ratio	-0.0889075	-2.10985e-007
Permeability [ft/d]	0	0.278622
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.209649

## Embankments

### 1. Embankment

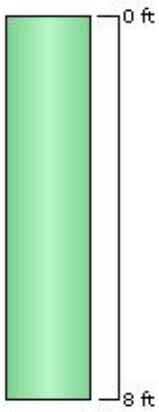
Center Line (0, -50) to (0, 50)  
 Number of Layers 10  
 Near End Angle 90 degrees  
 Far End Angle 90 degrees  
 Base Width 150

Layer	Stage	Left Bench Width (ft)	Left Angle (deg)	Height (ft)	Unit Weight (kips/ft <sup>3</sup> )	Right Angle (deg)	Right Bench Width (ft)
1	Stage 1 = 0 d	0	13.23	2	0.12	90	0
2	Stage 1 = 0 d	0	13.23	2	0.12	90	0
3	Stage 1 = 0 d	0	13.23	2	0.12	90	0
4	Stage 1 = 0 d	0	13.23	2	0.12	90	0
5	Stage 1 = 0 d	0	13.23	2	0.12	90	0
6	Stage 1 = 0 d	0	13.23	2	0.12	90	0
7	Stage 1 = 0 d	0	13.23	2	0.12	90	0
8	Stage 1 = 0 d	0	13.23	2	0.12	15.22	38
9	Stage 1 = 0 d	0	13.23	2	0.12	15.22	0
10	Stage 1 = 0 d	0	13.23	2	0.12	15.22	0


## Soil Layers

Ground Surface Drained: Yes

Layer #	Type	Thickness [ft]	Depth [ft]	Drained at Bottom
1	Firm Sandy Silt	8	0	No



## Soil Properties

Property	Firm Sandy Silt
Color	
Unit Weight [kips/ft <sup>3</sup> ]	0.95
Saturated Unit Weight [kips/ft <sup>3</sup> ]	0.1
Immediate Settlement	Enabled
Es [ksf]	200
E <sub>sur</sub> [ksf]	200
Primary Consolidation	Enabled
Material Type	Non-Linear
C <sub>c</sub>	0.071
C <sub>r</sub>	0.027
e <sub>0</sub>	1.27
OCR	3.8
C <sub>v</sub> [ft <sup>2</sup> /d]	1.51
B-bar	1
Undrained Su A [kips/ft <sup>2</sup> ]	0
Undrained Su S	0.2
Undrained Su m	0.8
Piezo Line ID	1

## Groundwater

---

Groundwater method Piezometric Lines  
 Water Unit Weight 0.0624 kips/ft<sup>3</sup>

### Piezometric Line Entities

ID	Depth (ft)
1	6 ft

## Field Point Grid

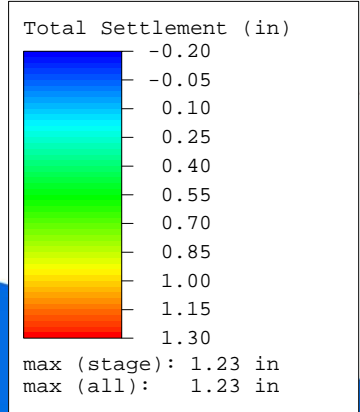
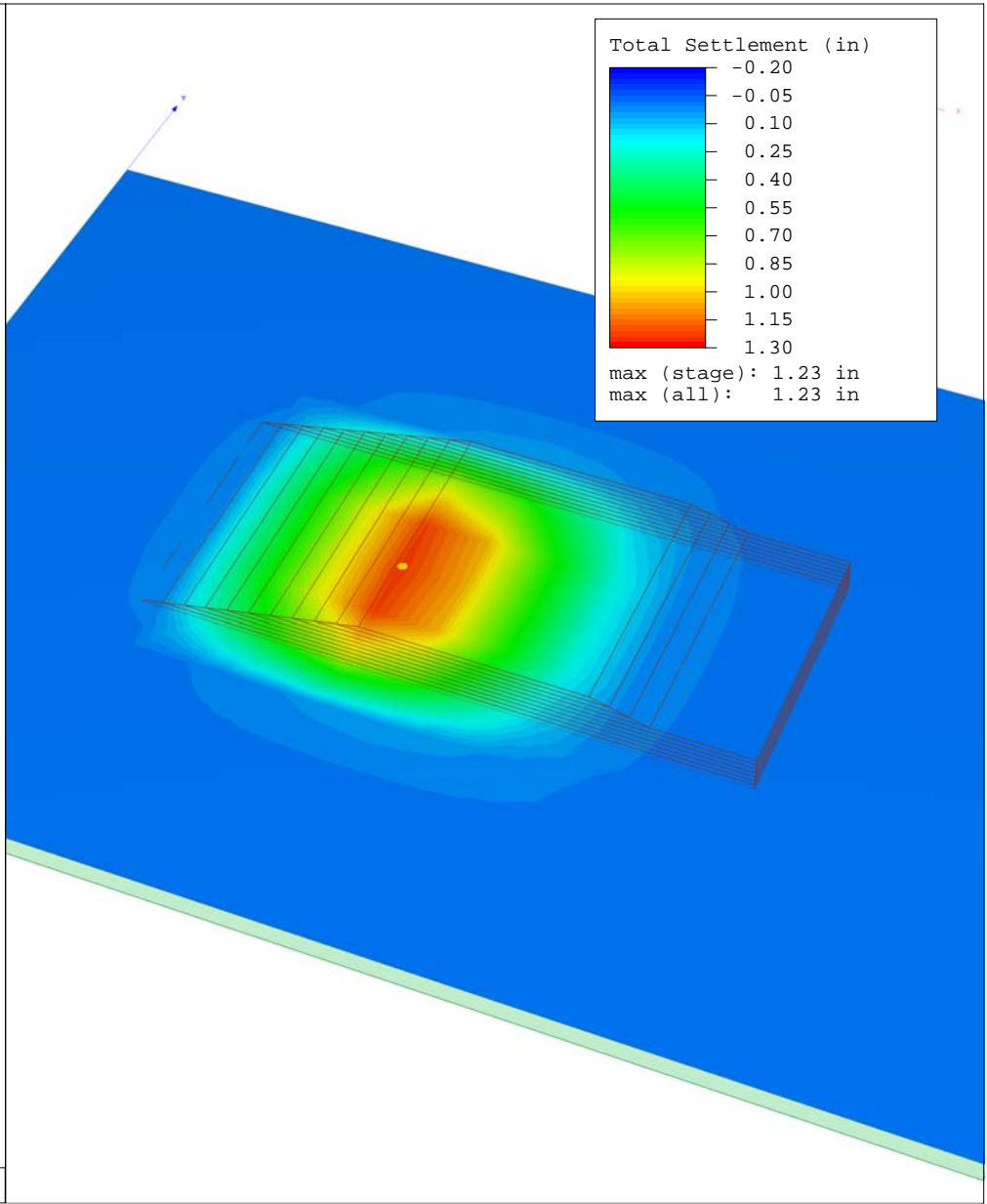
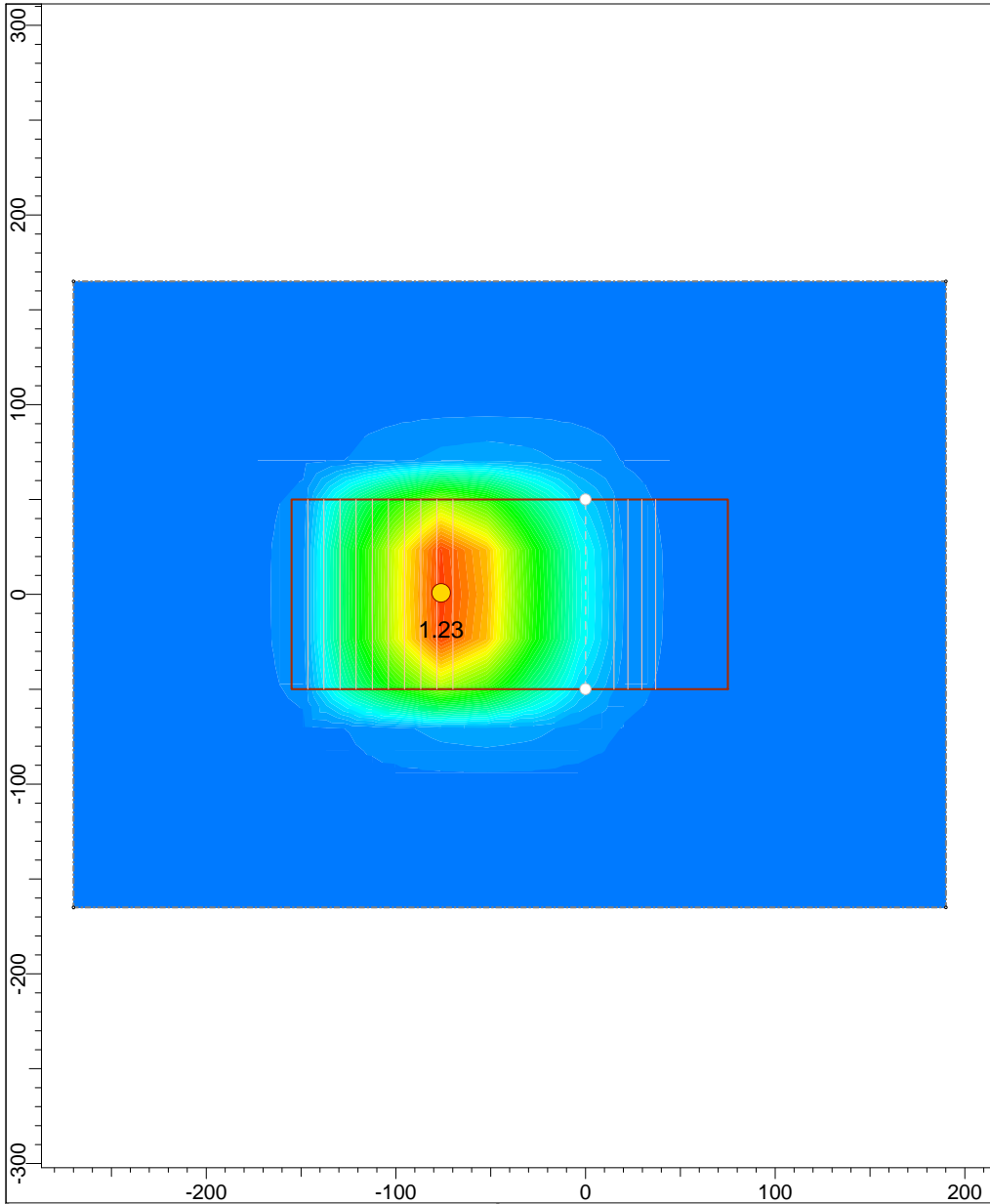
---

Number of points 300  
 Expansion Factor 2

### Grid Coordinates

X [ft]	Y [ft]
190	165
190	-165
-270	-165
-270	165





Project		SC 557 Widening and Improvements	
Analysis Description		Station 287+00 - Double Drainage	
Drawn By	BMF	Company	F&ME
Date		File Name	STA 287+00_DD.s3z

# Settle3D Analysis Information

## SC 557 Widening and Improvements

### Project Settings

---

Document Name	STA 287+00_DD
Project Title	SC 557 Widening and Improvements
Analysis	Station 287+00 - Double Drainage
Author	BMF
Company	F&ME
Stress Computation Method	Boussinesq
Time-dependent Consolidation Analysis	
Time Units	days
Permeability Units	feet/day
Use average properties to calculate layered stresses	
Improve consolidation accuracy	
Ignore negative effective stresses in settlement calculations	

### Stage Settings

---

Stage #	Name	Time [days]
1	Stage 1	0
2	Stage 2	10
3	Stage 3	20
4	Stage 4	30
5	Stage 5	40
6	Stage 6	50
7	Stage 7	60
8	Stage 8	70
9	Stage 9	80
10	Stage 10	90
11	Stage 11	100
12	Stage 12	110
13	Stage 13	120
14	Stage 14	130
15	Stage 15	160
16	Stage 16	190

### Results (relative to Stage: Stage 2 = 10 d)

---

Time taken to compute: 27.2302 seconds

**Stage: Stage 1 = 0 d**

Data Type	Minimum	Maximum
Total Settlement [in]	-0.186689	1.74935e-009
Consolidation Settlement [in]	-0.0717068	0
Immediate Settlement [in]	-0.115026	1.16839e-007
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-0.24	9.46362e-007
Effective Stress [ksf]	-2.0465	9.46362e-007
Total Stress [ksf]	-0.24	9.46362e-007
Total Strain	-0.0501085	1.27168e-008
Pore Water Pressure [ksf]	-0.238382	2.04649
Excess Pore Water Pressure [ksf]	-0.238382	2.04649
Degree of Consolidation [%]	-100	24.4913
Pre-consolidation Stress [ksf]	-0.234463	0
Over-consolidation Ratio	-9.25556e-006	2.79124
Void Ratio	-2.88672e-008	0.113746
Permeability [ft/d]	-0.278622	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	-100	0
Undrained Shear Strength	-0.20988	1.10136e-007

### Stage: Stage 2 = 10 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0
Effective Stress [ksf]	0	0
Total Stress [ksf]	0	0
Total Strain	0	0
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0	0
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0

### Stage: Stage 3 = 20 d

Data Type	Minimum	Maximum
Total Settlement [in]	-1.08116e-007	0.171438
Consolidation Settlement [in]	-4.14875e-008	0.0565532
Immediate Settlement [in]	-6.66281e-008	0.114885
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-8.87038e-007	0.239982
Effective Stress [ksf]	-1.77581e-006	0.239982
Total Stress [ksf]	-8.87038e-007	0.239982
Total Strain	-5.62845e-009	0.0105277
Pore Water Pressure [ksf]	-0.120559	0.0325161
Excess Pore Water Pressure [ksf]	-0.120559	0.0325161
Degree of Consolidation [%]	-12.3464	96.0812
Pre-consolidation Stress [ksf]	0	0.239982
Over-consolidation Ratio	-0.625796	1.09834e-006
Void Ratio	-0.0238979	1.27766e-008
Permeability [ft/d]	-0.278622	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	-33.9812	77.201
Undrained Shear Strength	-2.06666e-007	0.0273927

### Stage: Stage 4 = 30 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.335521
Consolidation Settlement [in]	-3.24183e-008	0.106141
Immediate Settlement [in]	0	0.22938
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-9.4397e-007	0.479825
Effective Stress [ksf]	-1.75245e-006	0.479825
Total Stress [ksf]	-9.4397e-007	0.479825
Total Strain	-6.10042e-009	0.0171935
Pore Water Pressure [ksf]	-0.144517	0.0968814
Excess Pore Water Pressure [ksf]	-0.144517	0.0968814
Degree of Consolidation [%]	-17.6601	97.0207
Pre-consolidation Stress [ksf]	0	0.479825
Over-consolidation Ratio	-0.983654	1.28971e-006
Void Ratio	-0.0390292	1.38479e-008
Permeability [ft/d]	0	0.00199016
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	-76.1618	93.4035
Undrained Shear Strength	-2.03948e-007	0.0538659

### Stage: Stage 5 = 40 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.492679
Consolidation Settlement [in]	0	0.150083
Immediate Settlement [in]	0	0.342596
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-4.19279e-007	0.718929
Effective Stress [ksf]	-4.19279e-007	0.718929
Total Stress [ksf]	-4.19279e-007	0.718929
Total Strain	-2.62876e-009	0.0222692
Pore Water Pressure [ksf]	-0.149504	0.187216
Excess Pore Water Pressure [ksf]	-0.149504	0.187216
Degree of Consolidation [%]	-18.6041	98.9182
Pre-consolidation Stress [ksf]	0	0.718928
Over-consolidation Ratio	-1.2405	5.14066e-007
Void Ratio	-0.050551	5.96729e-009
Permeability [ft/d]	0	0.00199016
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	-81.6362	96.8357
Undrained Shear Strength	-4.8795e-008	0.0794045

### Stage: Stage 6 = 50 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.641453
Consolidation Settlement [in]	0	0.187974
Immediate Settlement [in]	0	0.453998
Secondary Settlement [in]	0	0
Loading Stress [ksf]	2.47809e-007	0.95784
Effective Stress [ksf]	2.47809e-007	0.95784
Total Stress [ksf]	2.47809e-007	0.95784
Total Strain	3.77186e-009	0.0264036
Pore Water Pressure [ksf]	-0.191503	0.21739
Excess Pore Water Pressure [ksf]	-0.191503	0.21739
Degree of Consolidation [%]	-23.1985	98.3493
Pre-consolidation Stress [ksf]	0	0.957836
Over-consolidation Ratio	-1.82646	0
Void Ratio	-0.0599361	-8.56211e-009
Permeability [ft/d]	0	0.0029189
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	-81.6362	98.035
Undrained Shear Strength	0	0.103811

### Stage: Stage 7 = 60 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.792617
Consolidation Settlement [in]	0	0.226491
Immediate Settlement [in]	0	0.566126
Secondary Settlement [in]	0	0
Loading Stress [ksf]	6.15279e-007	1.19544
Effective Stress [ksf]	3.65321e-007	1.19544
Total Stress [ksf]	6.15279e-007	1.19544
Total Strain	8.76665e-009	0.0300281
Pore Water Pressure [ksf]	-0.219521	0.225384
Excess Pore Water Pressure [ksf]	-0.219521	0.225384
Degree of Consolidation [%]	-24.3937	98.8539
Pre-consolidation Stress [ksf]	0	1.19543
Over-consolidation Ratio	-2.35258	0
Void Ratio	-0.0681638	-1.99003e-008
Permeability [ft/d]	0	0.278622
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	-92.0285	98.6041
Undrained Shear Strength	0	0.12622

### Stage: Stage 8 = 70 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.936077
Consolidation Settlement [in]	0	0.261369
Immediate Settlement [in]	0	0.674708
Secondary Settlement [in]	0	0
Loading Stress [ksf]	1.33216e-006	1.42881
Effective Stress [ksf]	5.17786e-007	1.42881
Total Stress [ksf]	1.33216e-006	1.42881
Total Strain	1.75914e-008	0.0332331
Pore Water Pressure [ksf]	-0.229054	0.226914
Excess Pore Water Pressure [ksf]	-0.229054	0.226914
Degree of Consolidation [%]	-23.428	99.1612
Pre-consolidation Stress [ksf]	0	1.4288
Over-consolidation Ratio	-2.50313	0
Void Ratio	-0.0754392	-3.99325e-008
Permeability [ft/d]	0	0.278622
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	-94.0159	98.9285
Undrained Shear Strength	0	0.145785

### Stage: Stage 9 = 80 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	1.06518
Consolidation Settlement [in]	0	0.291348
Immediate Settlement [in]	0	0.773829
Secondary Settlement [in]	0	0
Loading Stress [ksf]	2.61156e-006	1.647
Effective Stress [ksf]	1.3021e-006	1.647
Total Stress [ksf]	2.61156e-006	1.647
Total Strain	3.24646e-008	0.0359875
Pore Water Pressure [ksf]	-0.233005	0.224937
Excess Pore Water Pressure [ksf]	-0.233005	0.224937
Degree of Consolidation [%]	-21.5834	99.3583
Pre-consolidation Stress [ksf]	0	1.64698
Over-consolidation Ratio	-2.50313	0
Void Ratio	-0.0816916	-7.36947e-008
Permeability [ft/d]	0	0.278622
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	-97.8637	99.1369
Undrained Shear Strength	0	0.167165

### Stage: Stage 10 = 90 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	1.16646
Consolidation Settlement [in]	0	0.314714
Immediate Settlement [in]	0	0.851743
Secondary Settlement [in]	0	0
Loading Stress [ksf]	4.82125e-006	1.81969
Effective Stress [ksf]	1.50673e-006	1.81969
Total Stress [ksf]	4.82125e-006	1.81969
Total Strain	5.67721e-008	0.0380371
Pore Water Pressure [ksf]	-0.234961	0.218649
Excess Pore Water Pressure [ksf]	-0.234961	0.218649
Degree of Consolidation [%]	-20.4881	99.5065
Pre-consolidation Stress [ksf]	0	1.81966
Over-consolidation Ratio	-2.50313	0
Void Ratio	-0.0863442	-1.28873e-007
Permeability [ft/d]	0	0.278622
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	-98.6358	99.3043
Undrained Shear Strength	0	0.185966

### Stage: Stage 11 = 100 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	1.23072
Consolidation Settlement [in]	0	0.329693
Immediate Settlement [in]	0	0.901031
Secondary Settlement [in]	0	0
Loading Stress [ksf]	8.23111e-006	1.92151
Effective Stress [ksf]	8.23111e-006	1.9562
Total Stress [ksf]	8.23111e-006	1.92151
Total Strain	9.29451e-008	0.0392
Pore Water Pressure [ksf]	-0.236174	0.216237
Excess Pore Water Pressure [ksf]	-0.236174	0.216237
Degree of Consolidation [%]	-19.5371	99.6526
Pre-consolidation Stress [ksf]	0	1.92148
Over-consolidation Ratio	-2.50313	0
Void Ratio	-0.088984	-2.10985e-007
Permeability [ft/d]	0	0.278622
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	-98.6358	99.4264
Undrained Shear Strength	0	0.200384

### Stage: Stage 12 = 110 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	1.23236
Consolidation Settlement [in]	0	0.331333
Immediate Settlement [in]	0	0.901031
Secondary Settlement [in]	0	0
Loading Stress [ksf]	8.23111e-006	1.92151
Effective Stress [ksf]	8.23111e-006	2.05887
Total Stress [ksf]	8.23111e-006	1.92151
Total Strain	9.29451e-008	0.0392
Pore Water Pressure [ksf]	-0.239386	9.29491e-007
Excess Pore Water Pressure [ksf]	-0.239386	9.29491e-007
Degree of Consolidation [%]	-1.42109e-014	100
Pre-consolidation Stress [ksf]	0	1.92148
Over-consolidation Ratio	-2.50313	0
Void Ratio	-0.088984	-2.10985e-007
Permeability [ft/d]	0	0.278622
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.209669

### Stage: Stage 13 = 120 d



Data Type	Minimum	Maximum
Total Settlement [in]	0	1.23236
Consolidation Settlement [in]	0	0.331333
Immediate Settlement [in]	0	0.901031
Secondary Settlement [in]	0	0
Loading Stress [ksf]	8.23111e-006	1.92151
Effective Stress [ksf]	8.23111e-006	2.05887
Total Stress [ksf]	8.23111e-006	1.92151
Total Strain	9.29451e-008	0.0392
Pore Water Pressure [ksf]	-0.239386	9.29491e-007
Excess Pore Water Pressure [ksf]	-0.239386	9.29491e-007
Degree of Consolidation [%]	-1.42109e-014	100
Pre-consolidation Stress [ksf]	0	1.92148
Over-consolidation Ratio	-2.50313	0
Void Ratio	-0.088984	-2.10985e-007
Permeability [ft/d]	0	0.278622
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.209669

### Stage: Stage 14 = 130 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	1.23236
Consolidation Settlement [in]	0	0.331333
Immediate Settlement [in]	0	0.901031
Secondary Settlement [in]	0	0
Loading Stress [ksf]	8.23111e-006	1.92151
Effective Stress [ksf]	8.23111e-006	2.05887
Total Stress [ksf]	8.23111e-006	1.92151
Total Strain	9.29451e-008	0.0392
Pore Water Pressure [ksf]	-0.239386	9.29491e-007
Excess Pore Water Pressure [ksf]	-0.239386	9.29491e-007
Degree of Consolidation [%]	-1.42109e-014	100
Pre-consolidation Stress [ksf]	0	1.92148
Over-consolidation Ratio	-2.50313	0
Void Ratio	-0.088984	-2.10985e-007
Permeability [ft/d]	0	0.278622
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.209669

### Stage: Stage 15 = 160 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	1.23236
Consolidation Settlement [in]	0	0.331333
Immediate Settlement [in]	0	0.901031
Secondary Settlement [in]	0	0
Loading Stress [ksf]	8.23111e-006	1.92151
Effective Stress [ksf]	8.23111e-006	2.05887
Total Stress [ksf]	8.23111e-006	1.92151
Total Strain	9.29451e-008	0.0392
Pore Water Pressure [ksf]	-0.239386	9.29491e-007
Excess Pore Water Pressure [ksf]	-0.239386	9.29491e-007
Degree of Consolidation [%]	-1.42109e-014	100
Pre-consolidation Stress [ksf]	0	1.92148
Over-consolidation Ratio	-2.50313	0
Void Ratio	-0.088984	-2.10985e-007
Permeability [ft/d]	0	0.278622
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.209669

### Stage: Stage 16 = 190 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	1.23236
Consolidation Settlement [in]	0	0.331333
Immediate Settlement [in]	0	0.901031
Secondary Settlement [in]	0	0
Loading Stress [ksf]	8.23111e-006	1.92151
Effective Stress [ksf]	8.23111e-006	2.05887
Total Stress [ksf]	8.23111e-006	1.92151
Total Strain	9.29451e-008	0.0392
Pore Water Pressure [ksf]	-0.239386	9.29491e-007
Excess Pore Water Pressure [ksf]	-0.239386	9.29491e-007
Degree of Consolidation [%]	-1.42109e-014	100
Pre-consolidation Stress [ksf]	0	1.92148
Over-consolidation Ratio	-2.50313	0
Void Ratio	-0.088984	-2.10985e-007
Permeability [ft/d]	0	0.278622
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.209669

## Embankments

### 1. Embankment

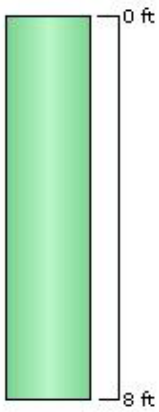
Center Line (0, -50) to (0, 50)  
 Number of Layers 10  
 Near End Angle 90 degrees  
 Far End Angle 90 degrees  
 Base Width 150

Layer	Stage	Left Bench Width (ft)	Left Angle (deg)	Height (ft)	Unit Weight (kips/ft <sup>3</sup> )	Right Angle (deg)	Right Bench Width (ft)
1	Stage 1 = 0 d	0	13.23	2	0.12	90	0
2	Stage 1 = 0 d	0	13.23	2	0.12	90	0
3	Stage 1 = 0 d	0	13.23	2	0.12	90	0
4	Stage 1 = 0 d	0	13.23	2	0.12	90	0
5	Stage 1 = 0 d	0	13.23	2	0.12	90	0
6	Stage 1 = 0 d	0	13.23	2	0.12	90	0
7	Stage 1 = 0 d	0	13.23	2	0.12	90	0
8	Stage 1 = 0 d	0	13.23	2	0.12	15.22	38
9	Stage 1 = 0 d	0	13.23	2	0.12	15.22	0
10	Stage 1 = 0 d	0	13.23	2	0.12	15.22	0


## Soil Layers

Ground Surface Drained: Yes

Layer #	Type	Thickness [ft]	Depth [ft]	Drained at Bottom
1	Firm Sandy Silt	8	0	Yes



## Soil Properties

Property	Firm Sandy Silt
Color	
Unit Weight [kips/ft <sup>3</sup> ]	0.95
Saturated Unit Weight [kips/ft <sup>3</sup> ]	0.1
Immediate Settlement	Enabled
Es [ksf]	200
Esur [ksf]	200
Primary Consolidation	Enabled
Material Type	Non-Linear
Cc	0.071
Cr	0.027
e0	1.27
OCR	3.8
Cv [ft <sup>2</sup> /d]	1.51
B-bar	1
Undrained Su A [kips/ft <sup>2</sup> ]	0
Undrained Su S	0.2
Undrained Su m	0.8
Piezo Line ID	1

## Groundwater

Groundwater method Piezometric Lines  
 Water Unit Weight 0.0624 kips/ft<sup>3</sup>

## Piezometric Line Entities

ID	Depth (ft)
1	6 ft

## Query Points

Point #	(X,Y) Location	Number of Divisions
1	-76.139, 0.789	Auto: 49

## Field Point Grid

Number of points 300  
 Expansion Factor 2

## Grid Coordinates

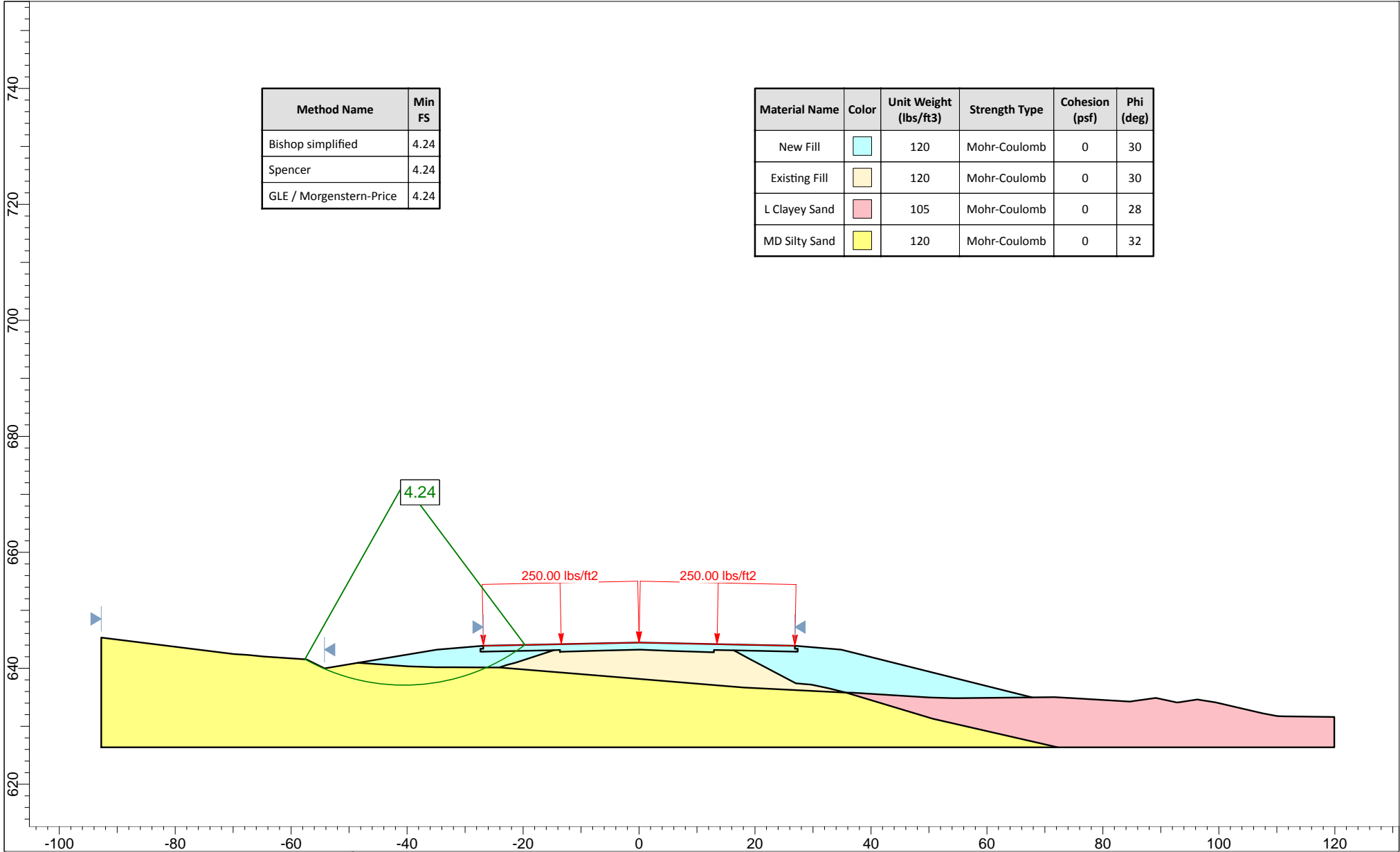
X [ft]	Y [ft]
190	165
190	-165
-270	-165
-270	165

SC 557 Roadway Construction and Improvements  
Final Roadway Geotechnical Engineering Report

---


# APPENDIX

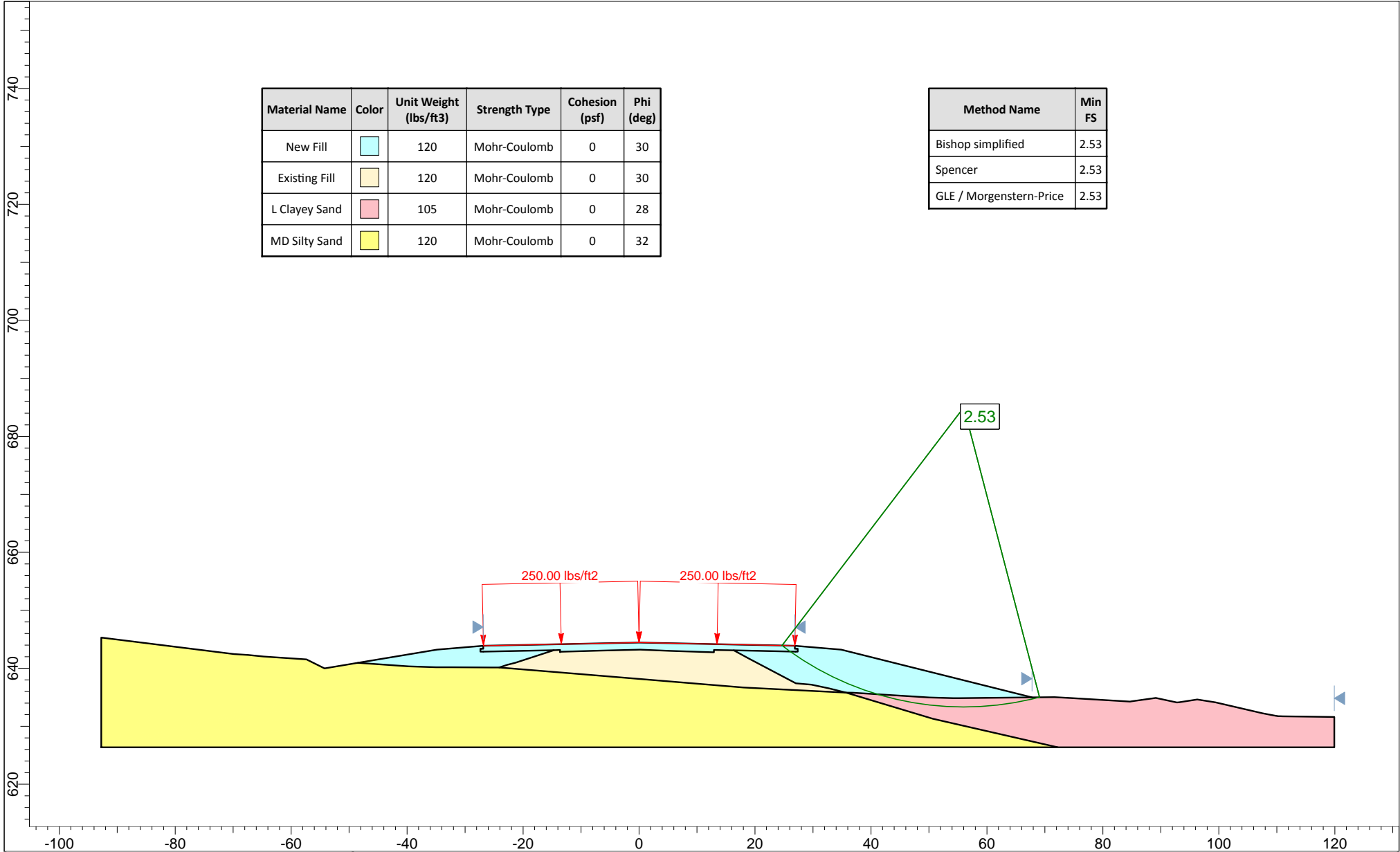
## SECTION 7 EMBANKMENT SLOPE STABILITY ANALYSES



Method Name	Min FS
Bishop simplified	4.24
Spencer	4.24
GLE / Morgenstern-Price	4.24

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
New Fill	Cyan	120	Mohr-Coulomb	0	30
Existing Fill	Orange	120	Mohr-Coulomb	0	30
L Clayey Sand	Pink	105	Mohr-Coulomb	0	28
MD Silty Sand	Yellow	120	Mohr-Coulomb	0	32

	Project			SC 557 Widening and Improvements		
	Analysis Description			SC 557 - STA 206+00 - LT Side Slope - Static		
	Drawn By	BMF	Scale	1:275	Company	F&ME
	Date	6/27/2018, 5:34 PM		File Name	STA 206+00_LT Side Slope_Static.slim	

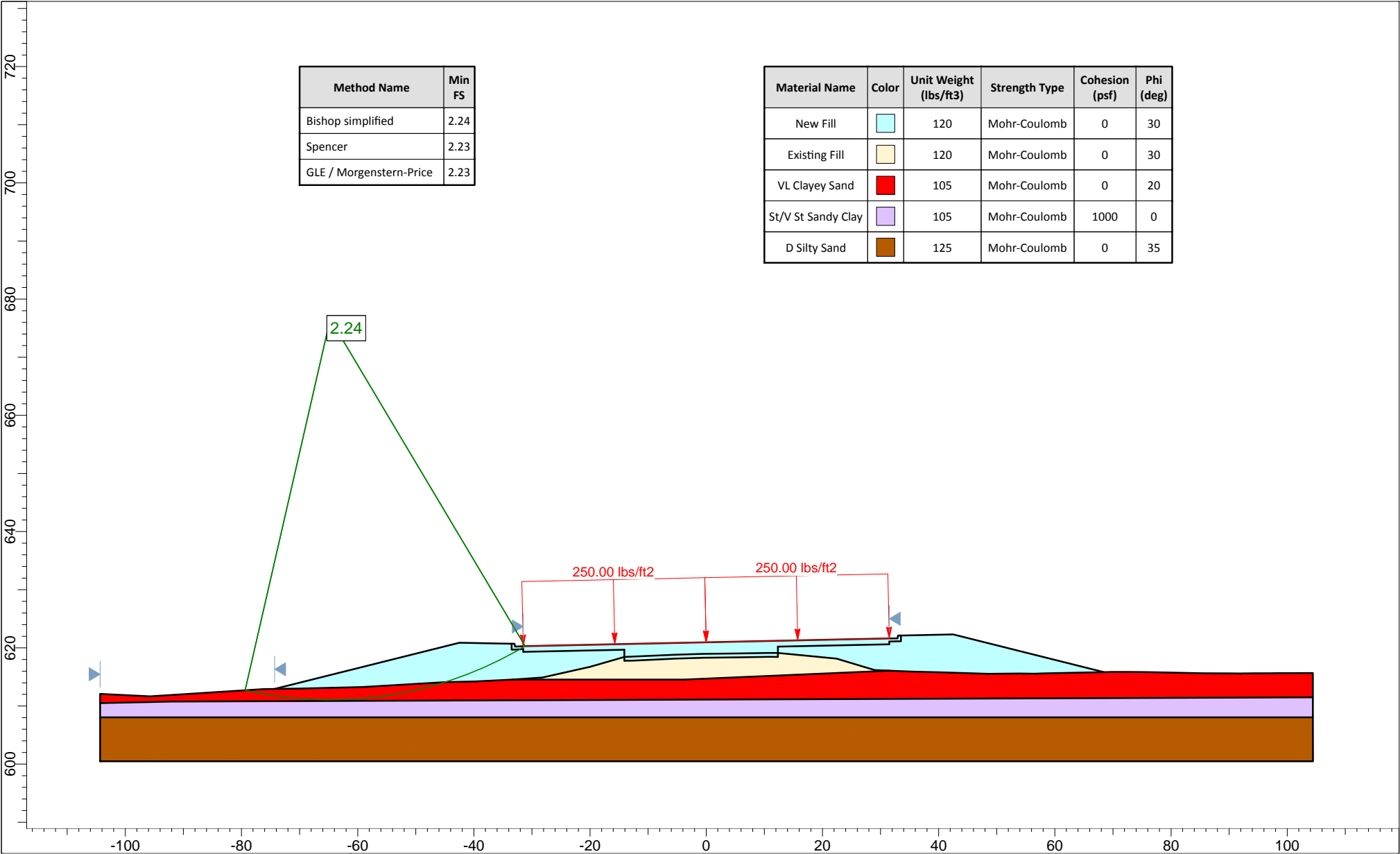


Material Name	Color	Unit Weight (lbs/ft <sup>3</sup> )	Strength Type	Cohesion (psf)	Phi (deg)
New Fill	<span style="color: cyan;">■</span>	120	Mohr-Coulomb	0	30
Existing Fill	<span style="color: yellow;">■</span>	120	Mohr-Coulomb	0	30
L Clayey Sand	<span style="color: pink;">■</span>	105	Mohr-Coulomb	0	28
MD Silty Sand	<span style="color: yellow;">■</span>	120	Mohr-Coulomb	0	32

Method Name	Min FS
Bishop simplified	2.53
Spencer	2.53
GLE / Morgenstern-Price	2.53



Project		SC 557 Widening and Improvements	
Analysis Description		SC 557 - STA 206+00 - RT Side Slope - Static	
Drawn By	BMF	Scale	1:275
Date	6/27/2018, 5:34 PM	Company	F&ME
		File Name	STA 206+00_RT Side Slope_Static.slim



Method Name	Min FS
Bishop simplified	2.24
Spencer	2.23
GLE / Morgenstern-Price	2.23






Material Name	Color	Unit Weight (lbs/ft <sup>3</sup> )	Strength Type	Cohesion (psf)	Phi (deg)
New Fill	<span style="color: cyan;">■</span>	120	Mohr-Coulomb	0	30
Existing Fill	<span style="color: yellow;">■</span>	120	Mohr-Coulomb	0	30
VL Clayey Sand	<span style="color: red;">■</span>	105	Mohr-Coulomb	0	20
St/V St Sandy Clay	<span style="color: purple;">■</span>	105	Mohr-Coulomb	1000	0
D Silty Sand	<span style="color: brown;">■</span>	125	Mohr-Coulomb	0	35



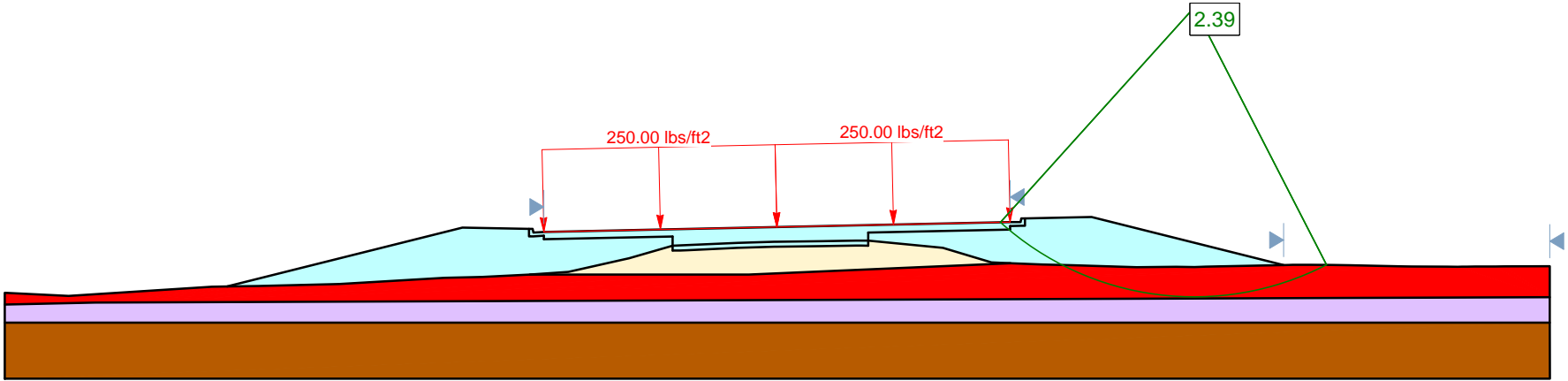
Project		SC 557 Widening and Improvements	
Analysis Description		SC 557 - STA 229+50 - LT Side Slope - Static	
Drawn By	BMF	Scale	1:275
Date	6/27/2018, 5:34 PM	Company	F&ME
		File Name	STA 229+50_LT Side Slope_Static.slim



720  
700  
680  
660  
640  
620  
600

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
New Fill		120	Mohr-Coulomb	0	30
Existing Fill		120	Mohr-Coulomb	0	30
VL Clayey Sand		105	Mohr-Coulomb	0	20
St/V St Sandy Clay		105	Mohr-Coulomb	1000	0
D Silty Sand		125	Mohr-Coulomb	0	35





Method Name	Min FS
Bishop simplified	2.39
Spencer	2.38
GLE / Morgenstern-Price	2.38

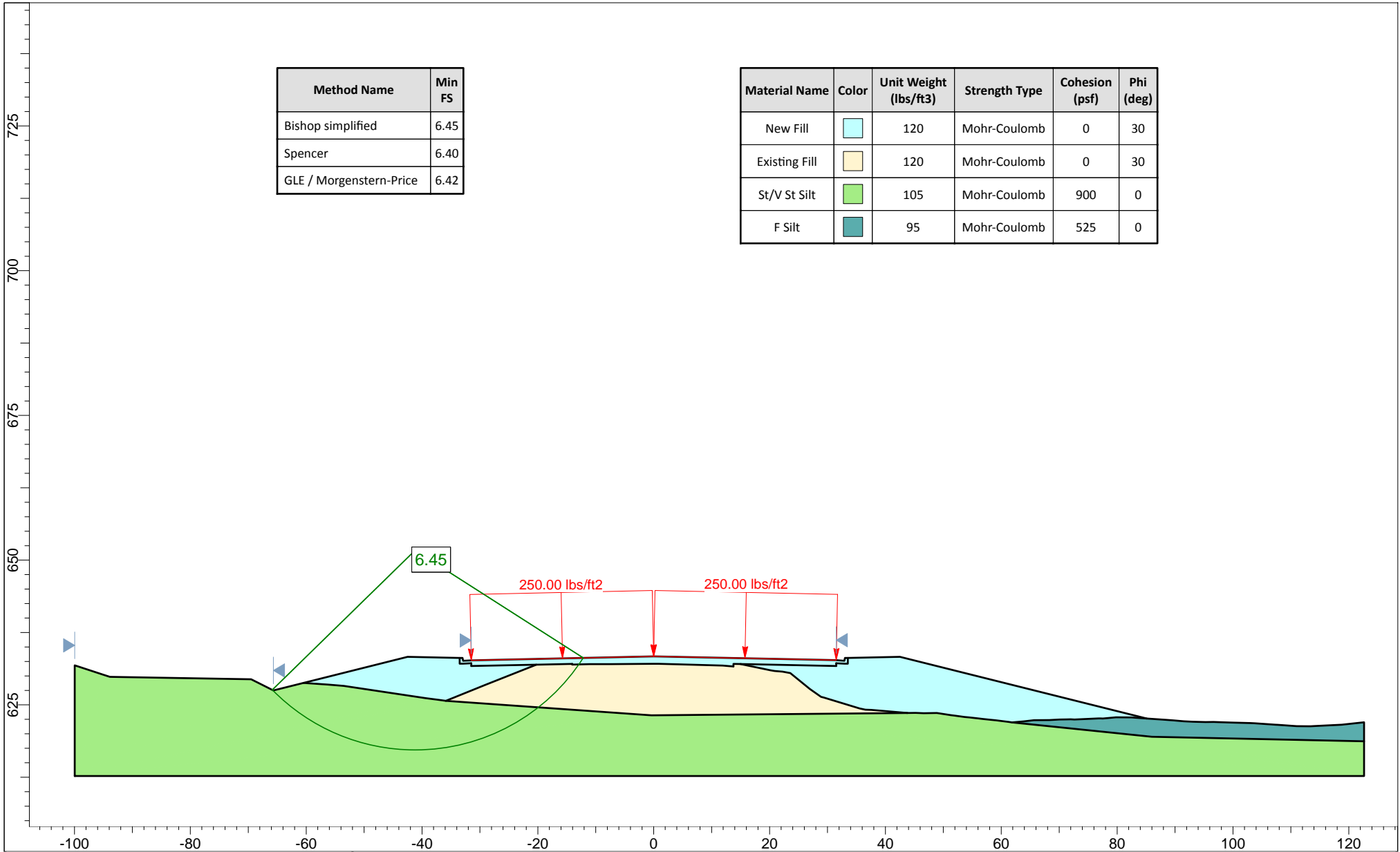



SLIDEINTERPRET 7.009

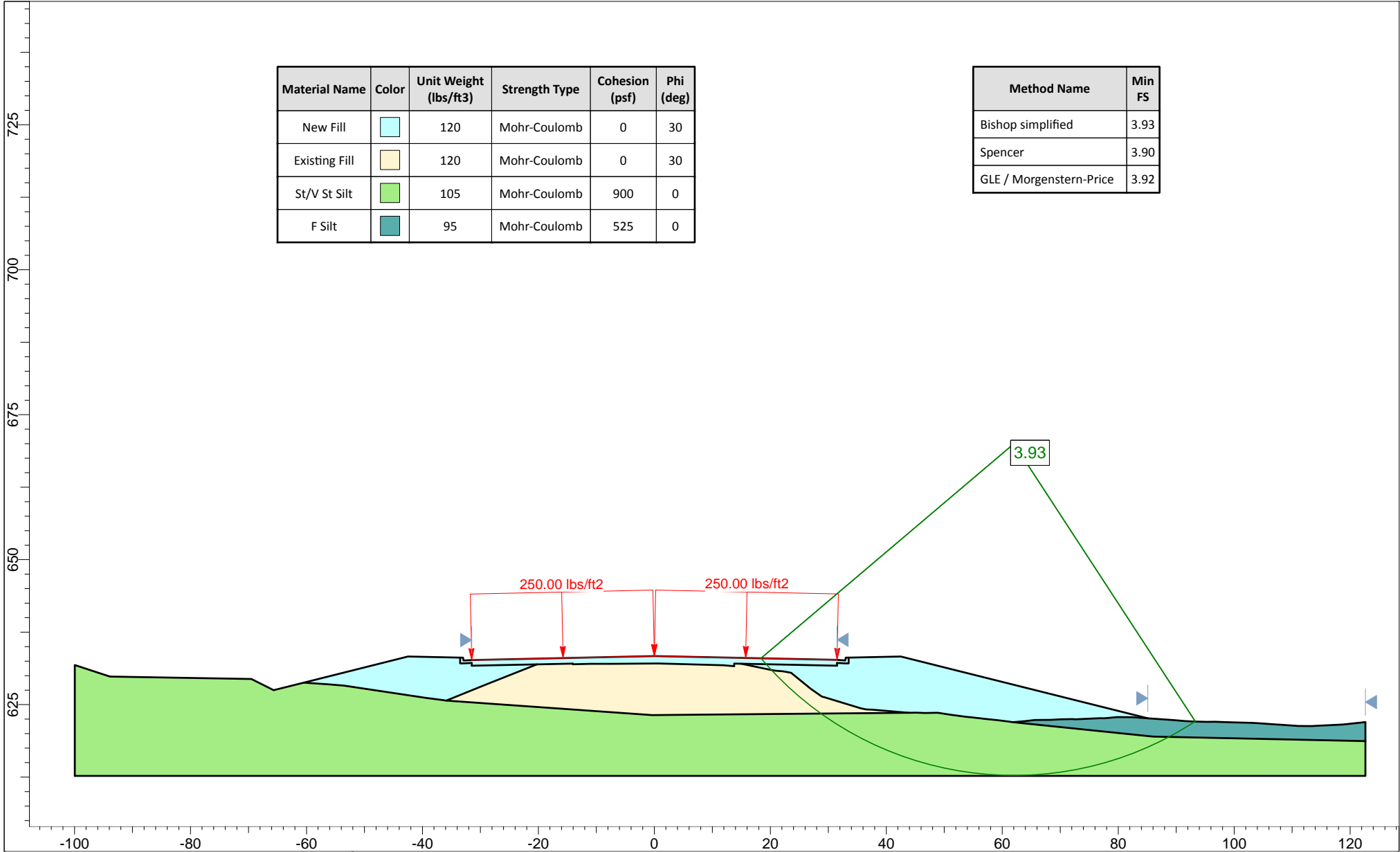
Project		SC 557 Widening and Improvements	
Analysis Description		SC 557 - STA 229+50 - RT Side Slope - Static	
Drawn By	BMF	Scale	1:275
Date	6/27/2018, 5:34 PM	Company	F&ME
		File Name	STA 229+50_RT Side Slope_Static.slim

Method Name	Min FS
Bishop simplified	6.45
Spencer	6.40
GLE / Morgenstern-Price	6.42

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
New Fill		120	Mohr-Coulomb	0	30
Existing Fill		120	Mohr-Coulomb	0	30
St/V St Silt		105	Mohr-Coulomb	900	0
F Silt		95	Mohr-Coulomb	525	0



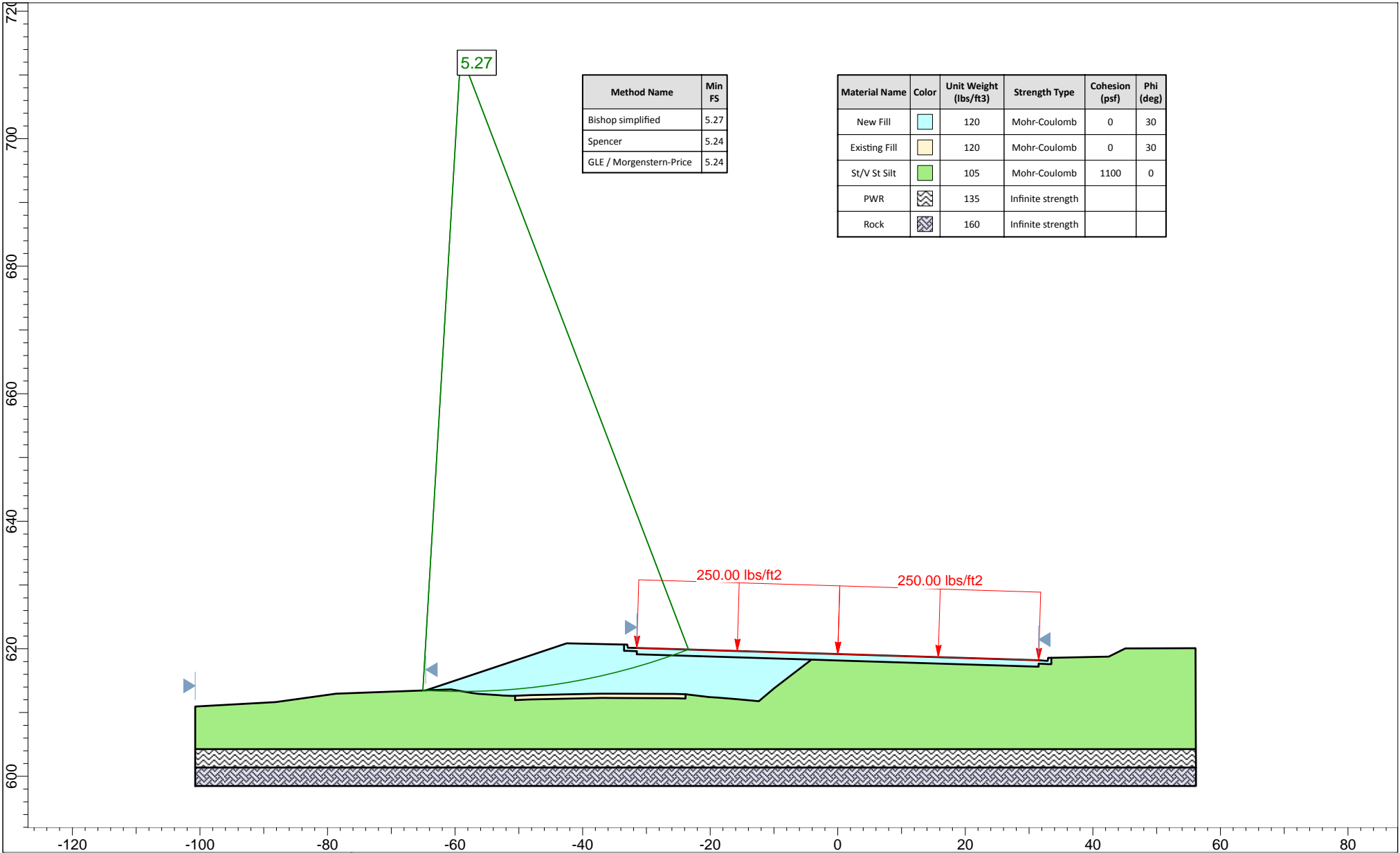
	Project				SC 557 Widening and Improvements	
	Analysis Description				SC 557 - STA 237+50 - LT Side Slope - Static	
	Drawn By	BMF	Scale	1:275	Company	F&ME
	Date	6/27/2018, 5:34 PM		File Name	STA 237+50_LT Side Slope_Static.slim	



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
New Fill	<span style="color: cyan;">■</span>	120	Mohr-Coulomb	0	30
Existing Fill	<span style="color: yellow;">■</span>	120	Mohr-Coulomb	0	30
St/V St Silt	<span style="color: green;">■</span>	105	Mohr-Coulomb	900	0
F Silt	<span style="color: teal;">■</span>	95	Mohr-Coulomb	525	0

Method Name	Min FS
Bishop simplified	3.93
Spencer	3.90
GLE / Morgenstern-Price	3.92

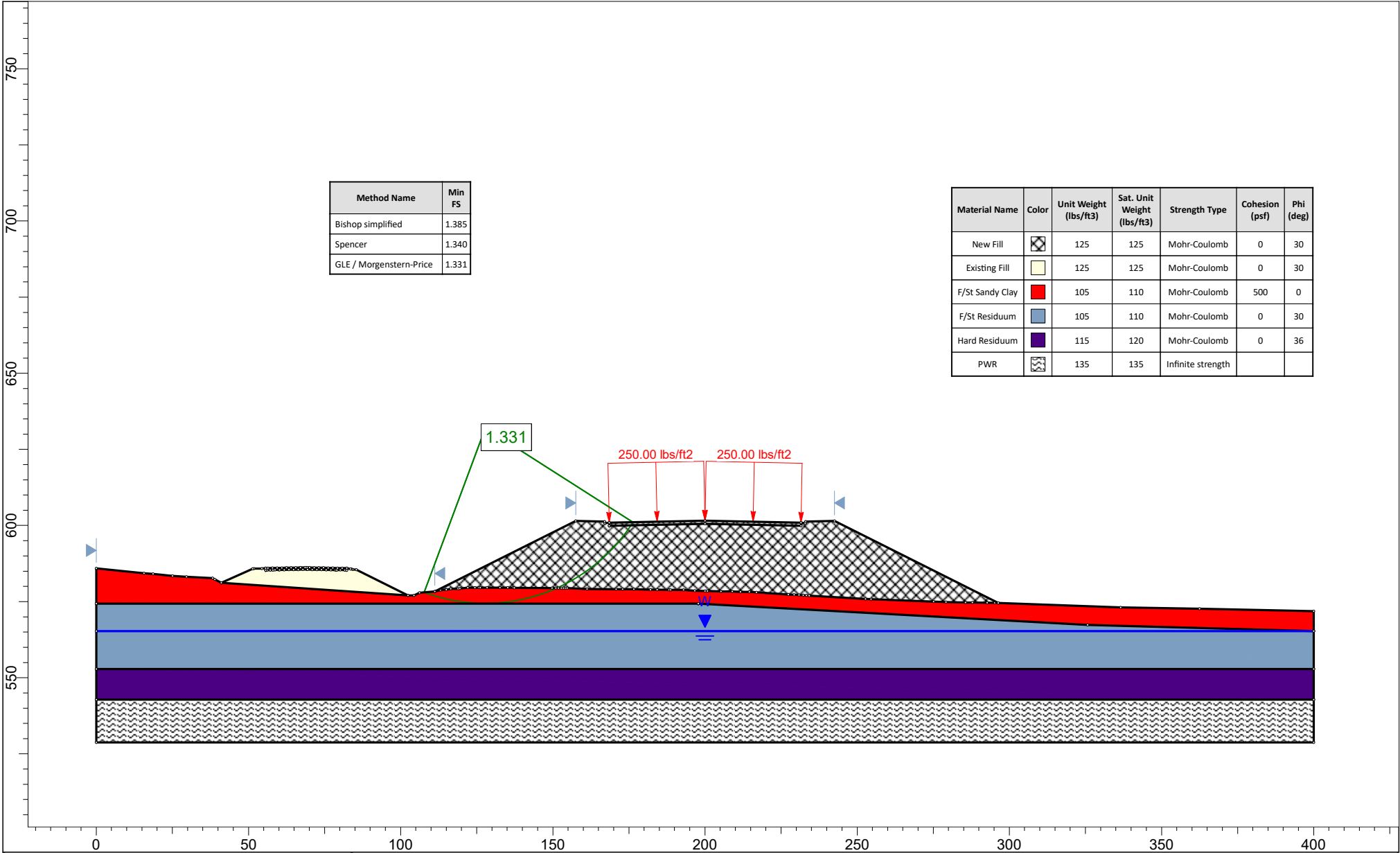
<h1 style="margin: 0;">F&amp;ME</h1> <h2 style="margin: 0;">CONSULTANTS</h2> <p style="font-size: small; margin: 0;">SLIDEINTERPRET 7.009</p>	Project			SC 557 Widening and Improvements		
	Analysis Description			SC 557 - STA 237+50 - RT Side Slope - Static		
	Drawn By	BMF	Scale	1:275	Company	F&ME
	Date	6/27/2018, 5:34 PM		File Name	STA 237+50_RT Side Slope_Static.slim	



<h1 style="margin: 0;">F&amp;ME</h1> <h2 style="margin: 0;">CONSULTANTS</h2> <small>SLIDEINTERPRET 7.009</small>	Project			
	SC 557 Widening and Improvements			
	Analysis Description			
	SC 557 - STA 249+00 - LT Side Slope - Static			
Drawn By	BMF	Scale	1:250	Company
				F&ME
Date	6/27/2018, 5:34 PM		File Name	STA 249+00_LT Side Slope_Static.slim

Method Name	Min FS
Bishop simplified	1.385
Spencer	1.340
GLE / Morgenstern-Price	1.331

Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
New Fill		125	125	Mohr-Coulomb	0	30
Existing Fill		125	125	Mohr-Coulomb	0	30
F/St Sandy Clay		105	110	Mohr-Coulomb	500	0
F/St Residuum		105	110	Mohr-Coulomb	0	30
Hard Residuum		115	120	Mohr-Coulomb	0	36
PWR		135	135	Infinite strength		



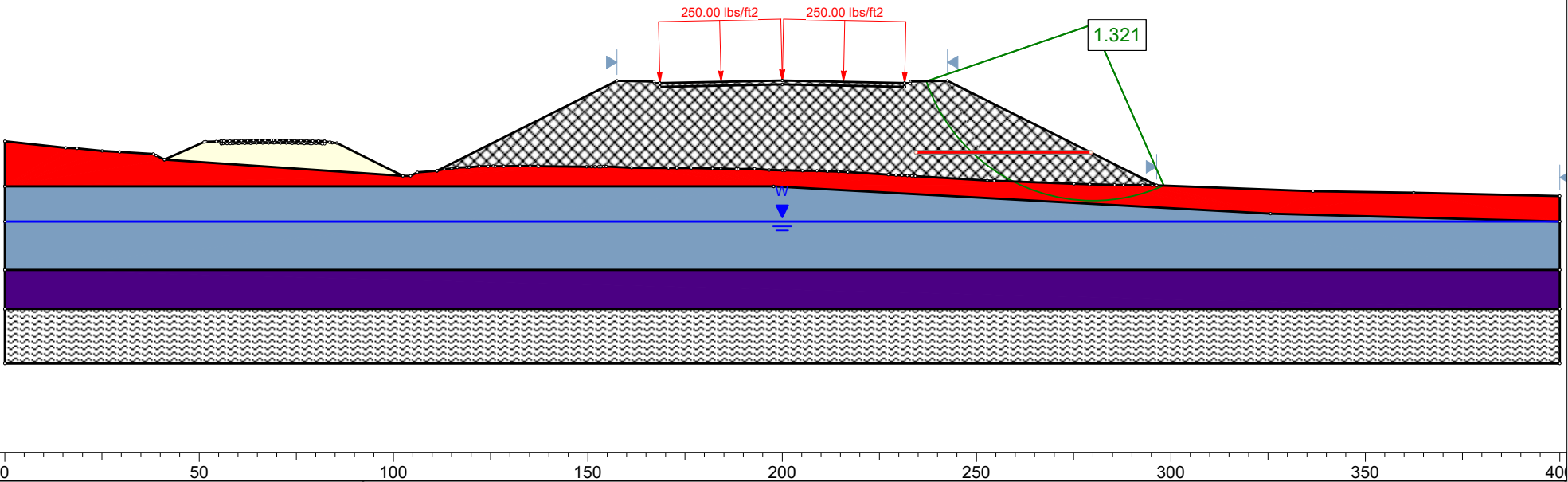
	Project		SC 557 Over Crowders Creek	
	Analysis Description		Begin Bridge Embankment-LT Side Slope - Static	
	Drawn By	JFH	Scale	1:524
			F&ME	
		File Name		Begin Bridge Emb_LT Side Slope_Static.slim

74  
700  
650  
600  
550  
0 50 100 150 200 250 300 350 400

Support Name	Color	Type	Force Application	Friction Angle (deg)	Force Orientation	Anchorage	Tensile Strength (lbs/ft)
LTDS = 3600	<span style="color: red;">■</span>	GeoTextile	Passive (Method B)	20	Bisector of Parallel and Tangent	None	3600

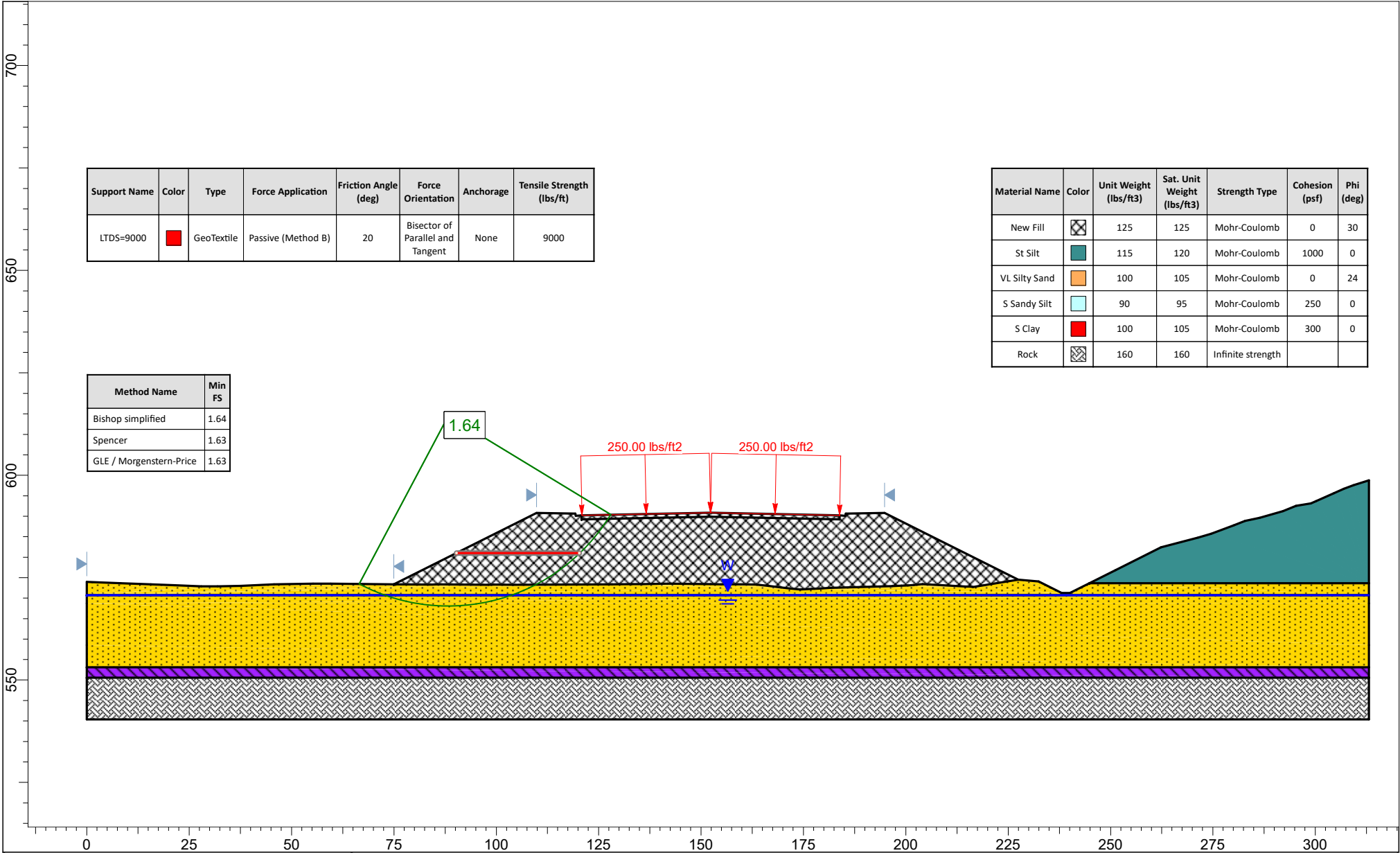
Method Name	Min FS
Bishop simplified	1.374
Spencer	1.330
GLE / Morgenstern-Price	1.321

Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
New Fill	<span style="color: black;">▣</span>	125	125	Mohr-Coulomb	0	30
Existing Fill	<span style="color: yellow;">▣</span>	125	125	Mohr-Coulomb	0	30
F/St Sandy Clay	<span style="color: red;">▣</span>	105	110	Mohr-Coulomb	500	0
F/St Residium	<span style="color: blue;">▣</span>	105	110	Mohr-Coulomb	0	30
Hard Residium	<span style="color: purple;">▣</span>	115	120	Mohr-Coulomb	0	36
PWR	<span style="color: gray;">▣</span>	135	135	Infinite strength		



SLIDEINTERPRET 8.026


Project		SC 557 Over Crowders Creek	
Analysis Description		Begin Bridge Embankment - RT Side Slope - Static	
Drawn By	JFH	Scale	1:472
		Company	F&ME
		File Name	Begin Bridge Emb_RT Side Slope_Static.slim

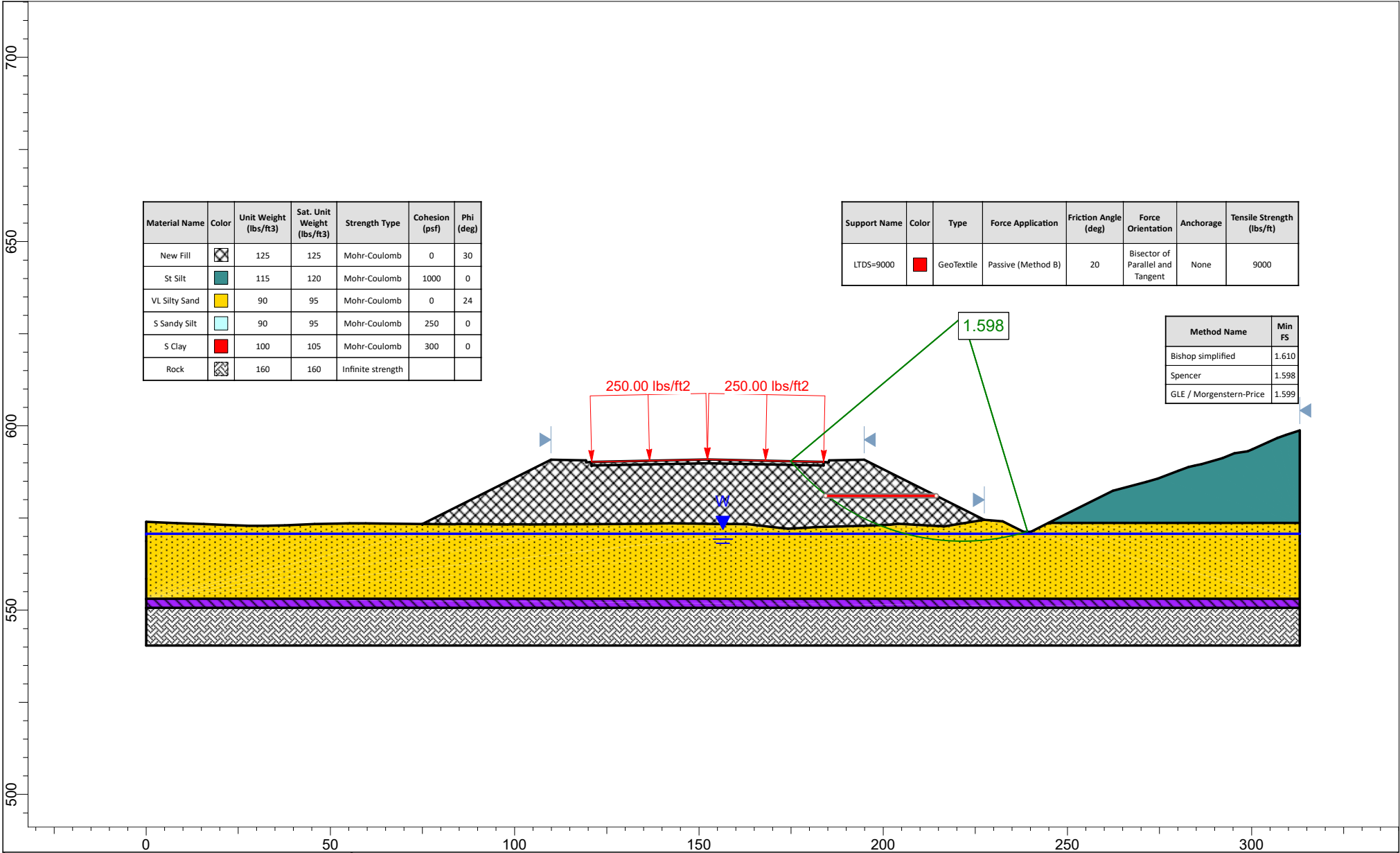


Support Name	Color	Type	Force Application	Friction Angle (deg)	Force Orientation	Anchorage	Tensile Strength (lbs/ft)
LTDS-9000	Red	GeoTextile	Passive (Method B)	20	Bisector of Parallel and Tangent	None	9000

Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
New Fill	Cross-hatched	125	125	Mohr-Coulomb	0	30
St Silt	Teal	115	120	Mohr-Coulomb	1000	0
VL Silty Sand	Orange	100	105	Mohr-Coulomb	0	24
S Sandy Silt	Light Blue	90	95	Mohr-Coulomb	250	0
S Clay	Red	100	105	Mohr-Coulomb	300	0
Rock	Grey Hatched	160	160	Infinite strength		

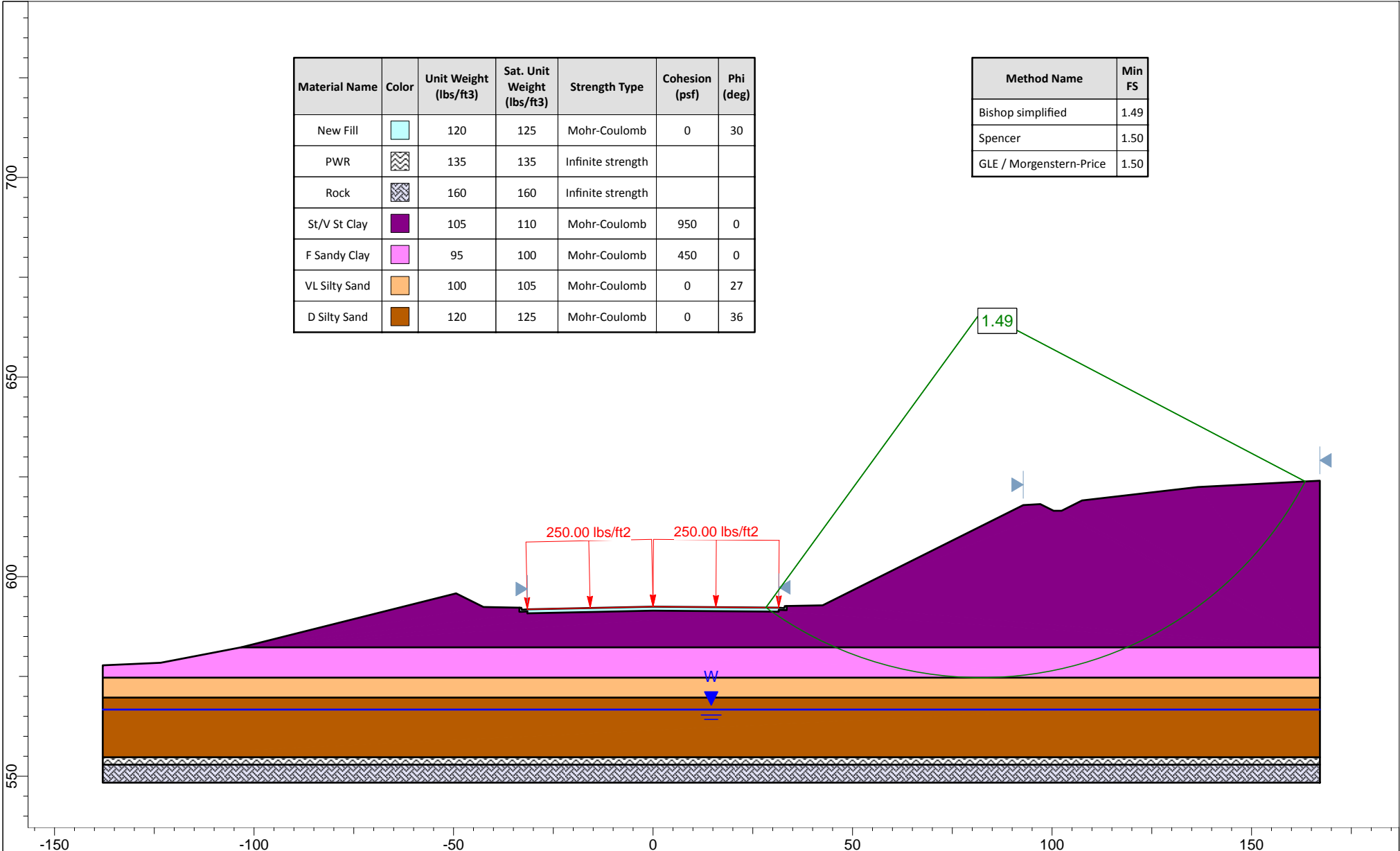
Method Name	Min FS
Bishop simplified	1.64
Spencer	1.63
GLE / Morgenstern-Price	1.63

	Project: SC 557 Over Crowders Creek	
	Analysis Description: End Bridge Embankment - LT Side Slope - Static	
	Drawn By: JFH	Scale: 1:390
	F&ME	
File Name: End Bridge Embankment_LT Side Slope_Static.slim		



Project		SC 557 Over Crowders Creek	
Analysis Description		End Bridge Embankment - RT Side Slope - Static	
Drawn By	JFH	Scale	1:433
		F&ME	
		File Name	End Bridge Embankment_RT Side Slope_Static.slim

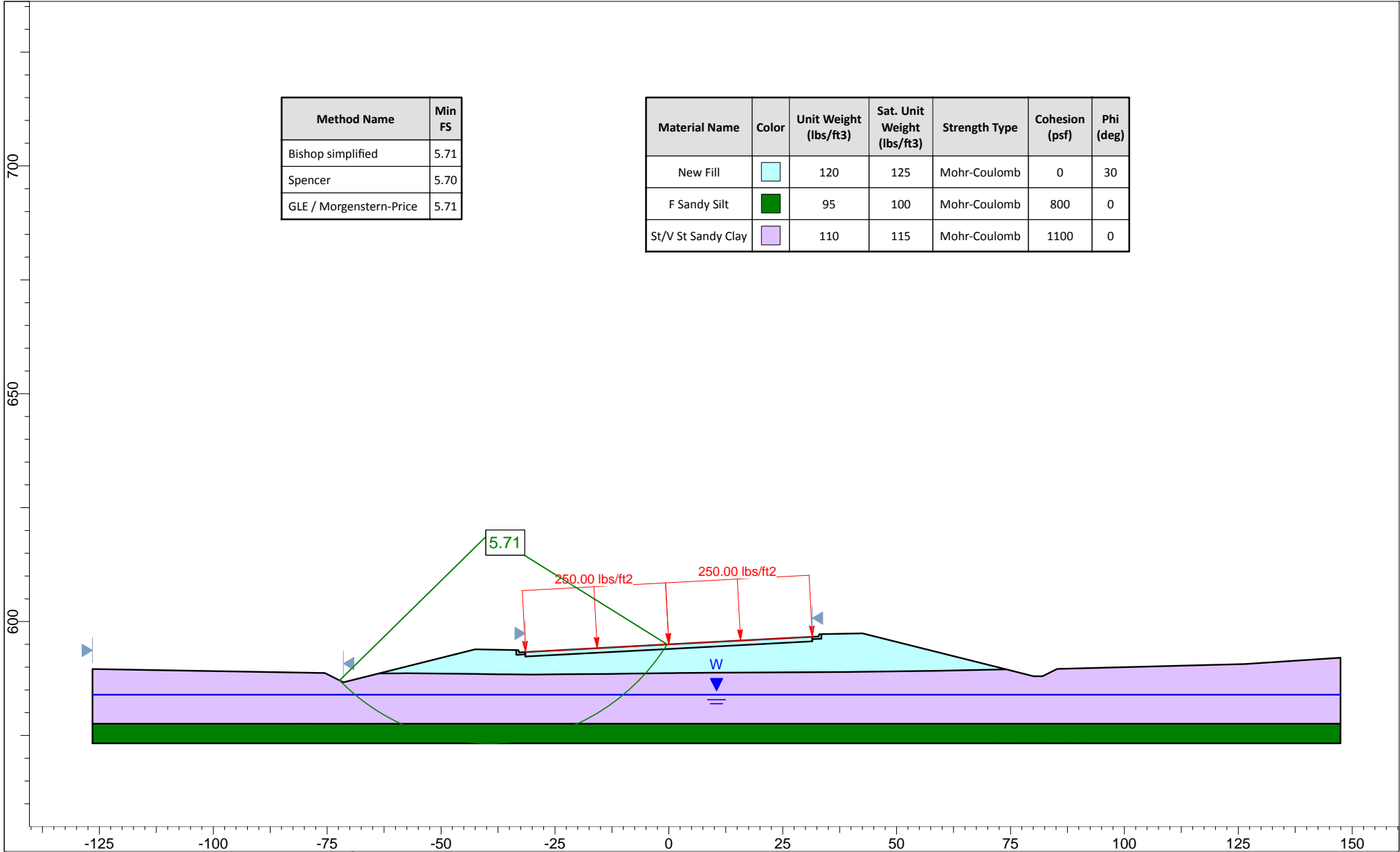




Material Name	Color	Unit Weight (lbs/ft <sup>3</sup> )	Sat. Unit Weight (lbs/ft <sup>3</sup> )	Strength Type	Cohesion (psf)	Phi (deg)
New Fill		120	125	Mohr-Coulomb	0	30
PWR		135	135	Infinite strength		
Rock		160	160	Infinite strength		
St/V St Clay		105	110	Mohr-Coulomb	950	0
F Sandy Clay		95	100	Mohr-Coulomb	450	0
VL Silty Sand		100	105	Mohr-Coulomb	0	27
D Silty Sand		120	125	Mohr-Coulomb	0	36

Method Name	Min FS
Bishop simplified	1.49
Spencer	1.50
GLE / Morgenstern-Price	1.50

<h1 style="margin: 0;">F&amp;ME</h1> <h2 style="margin: 0;">CONSULTANTS</h2> <p style="font-size: small; margin: 0;">SLIDEINTERPRET 7.009</p>	Project			SC 557 Widening and Improvements		
	Analysis Description			SC 557 - STA 265+50 - RT Side Slope - Static		
	Drawn By	BMF	Scale	1:400	Company	F&ME
	Date	6/27/2018, 5:34 PM		File Name	STA 265+50_RT Side Slope_Static.slim	

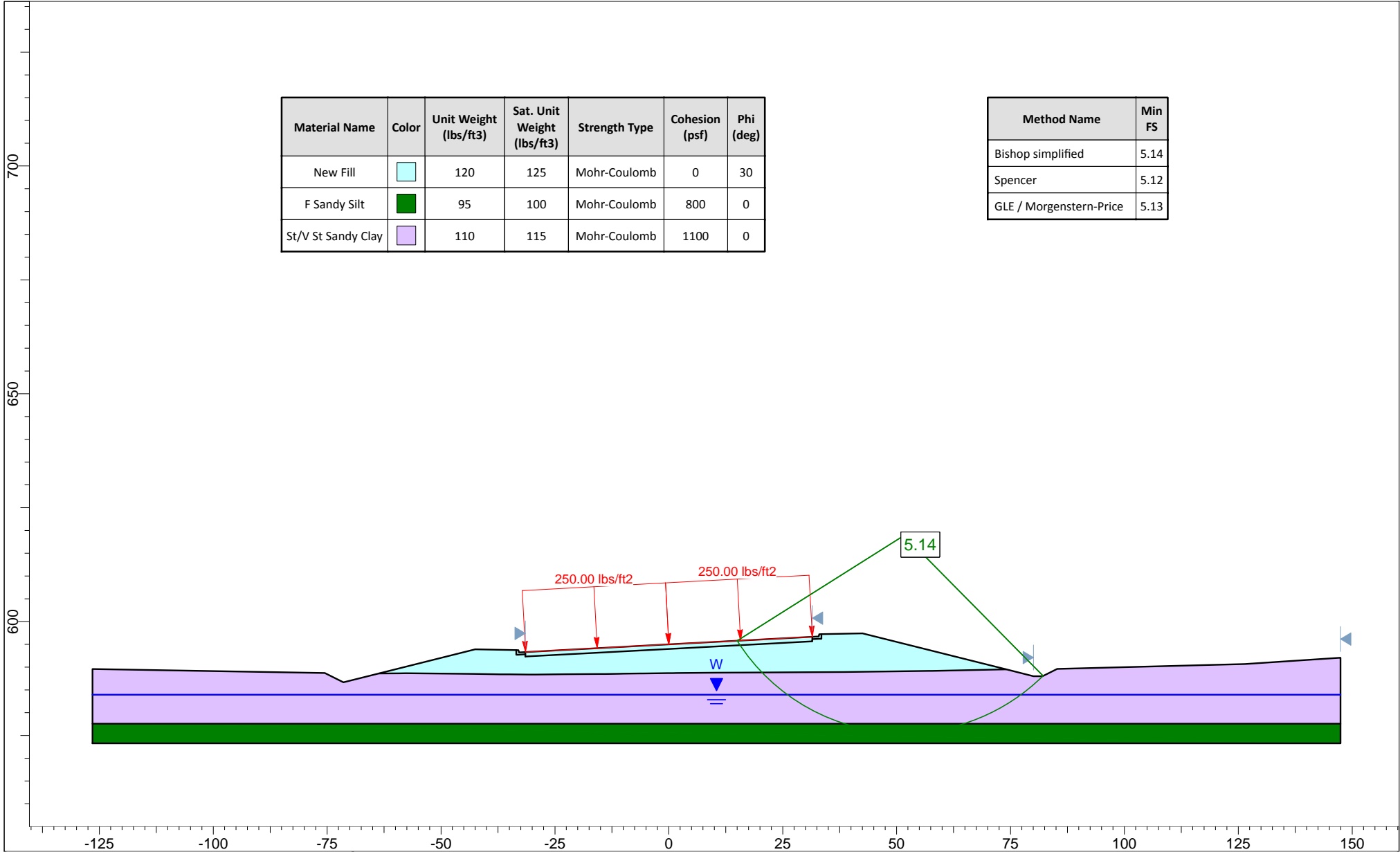


Method Name	Min FS
Bishop simplified	5.71
Spencer	5.70
GLE / Morgenstern-Price	5.71

Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
New Fill	<span style="color: cyan;">■</span>	120	125	Mohr-Coulomb	0	30
F Sandy Silt	<span style="color: green;">■</span>	95	100	Mohr-Coulomb	800	0
St/V St Sandy Clay	<span style="color: purple;">■</span>	110	115	Mohr-Coulomb	1100	0



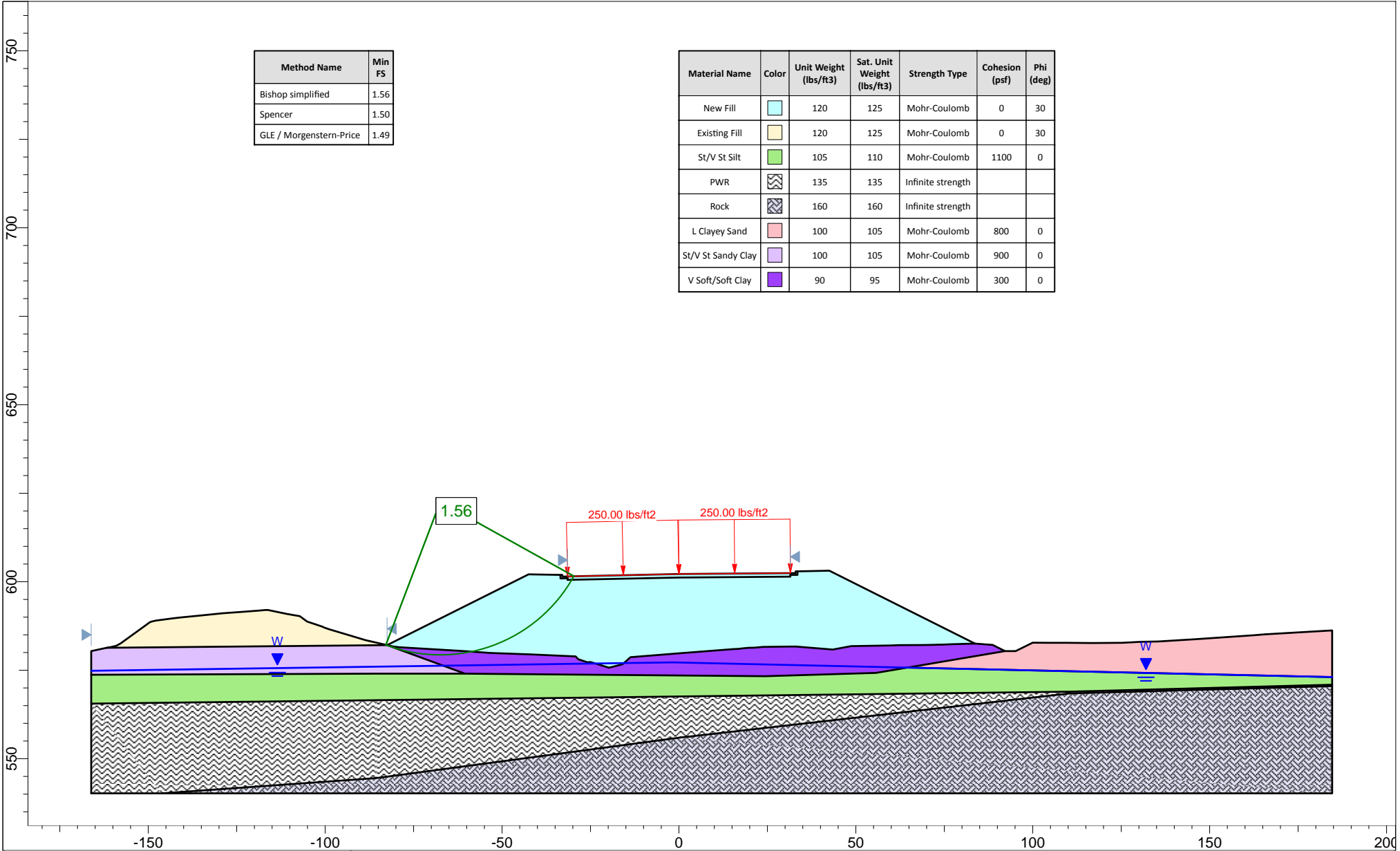
<i>Project</i>		SC 557 Widening and Improvements	
<i>Analysis Description</i>		SC 557 - STA 270+00 - LT Side Slope - Static	
<i>Drawn By</i>	BMF	<i>Scale</i>	1:350
<i>Date</i>	6/27/2018, 5:34 PM	<i>Company</i>	F&ME
		<i>File Name</i>	STA 270+00_LT Side Slope_Static.slim



Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
New Fill	<span style="color: cyan;">■</span>	120	125	Mohr-Coulomb	0	30
F Sandy Silt	<span style="color: green;">■</span>	95	100	Mohr-Coulomb	800	0
St/V St Sandy Clay	<span style="color: purple;">■</span>	110	115	Mohr-Coulomb	1100	0

Method Name	Min FS
Bishop simplified	5.14
Spencer	5.12
GLE / Morgenstern-Price	5.13

<h1 style="margin: 0;">F&amp;ME</h1> <h2 style="margin: 0;">CONSULTANTS</h2> <small>SLIDEINTERPRET 7.009</small>	Project			SC 557 Widening and Improvements		
	Analysis Description			SC 557 - STA 270+00 - RT Side Slope - Static		
	Drawn By	BMF	Scale	1:350	Company	F&ME
	Date	6/27/2018, 5:34 PM		File Name	STA 270+00_RT Side Slope_Static.slim	

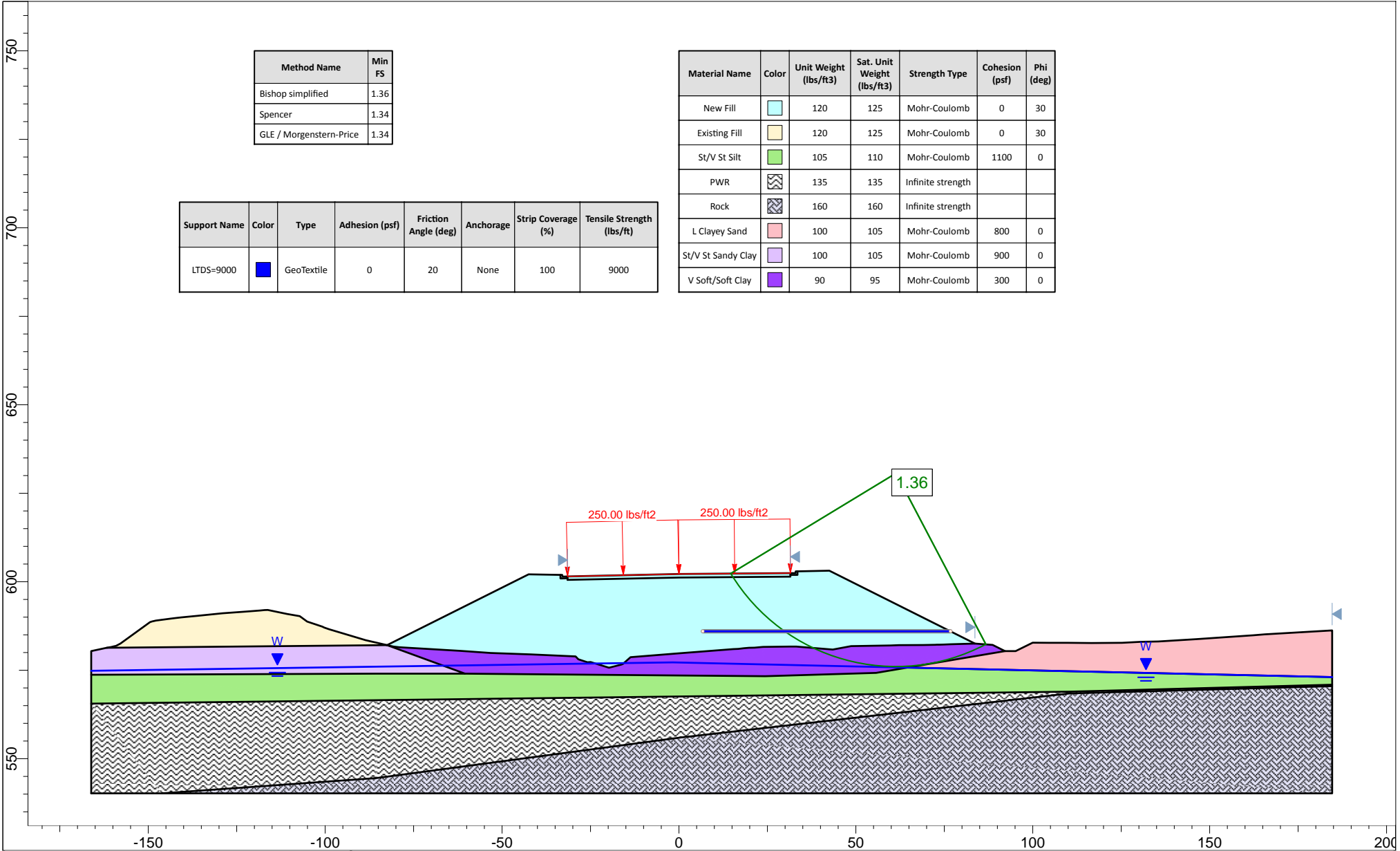


Method Name	Min FS
Bishop simplified	1.56
Spencer	1.50
GLE / Morgenstern-Price	1.49

Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
New Fill	Cyan	120	125	Mohr-Coulomb	0	30
Existing Fill	Yellow	120	125	Mohr-Coulomb	0	30
St/V St Silt	Green	105	110	Mohr-Coulomb	1100	0
PWR	Hatched	135	135	Infinite strength		
Rock	Cross-hatched	160	160	Infinite strength		
L Clayey Sand	Pink	100	105	Mohr-Coulomb	800	0
St/V St Sandy Clay	Purple	100	105	Mohr-Coulomb	900	0
V Soft/Soft Clay	Dark Purple	90	95	Mohr-Coulomb	300	0



Project		SC 557 over Crowders Creek	
Analysis Description		SC 557 - STA 276+00 - LT Side Slope - Static	
Drawn By	BMF	Scale	1:450
Date	6/27/2018, 5:34 PM	Company	F&ME
		File Name	STA 276+00_LT Side Slope_Static.slim



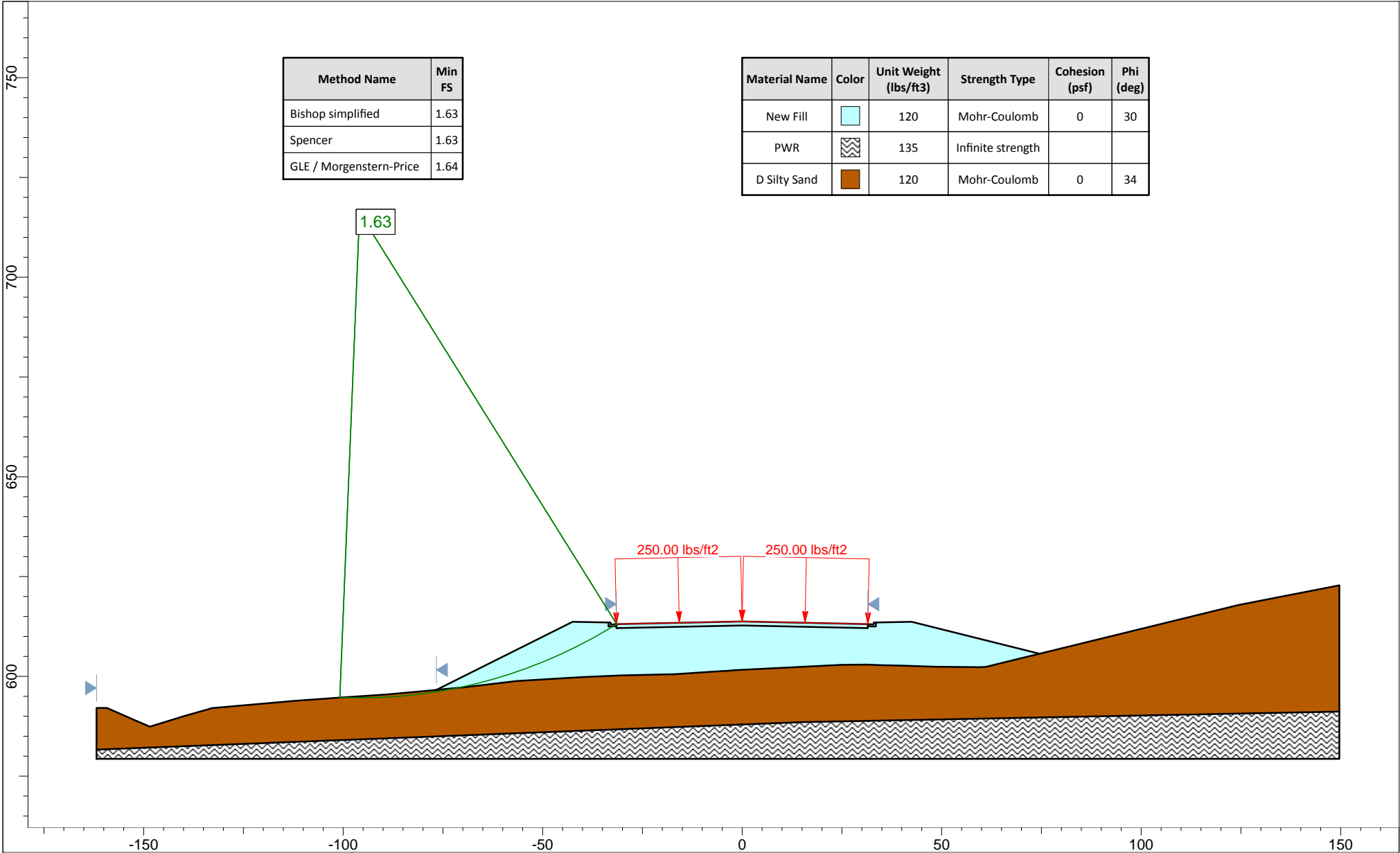
Method Name	Min FS
Bishop simplified	1.36
Spencer	1.34
GLE / Morgenstern-Price	1.34

Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
New Fill	Cyan	120	125	Mohr-Coulomb	0	30
Existing Fill	Yellow	120	125	Mohr-Coulomb	0	30
St/V St Silt	Green	105	110	Mohr-Coulomb	1100	0
PWR	Hatched	135	135	Infinite strength		
Rock	Hatched	160	160	Infinite strength		
L Clayey Sand	Pink	100	105	Mohr-Coulomb	800	0
St/V St Sandy Clay	Purple	100	105	Mohr-Coulomb	900	0
V Soft/Soft Clay	Dark Purple	90	95	Mohr-Coulomb	300	0

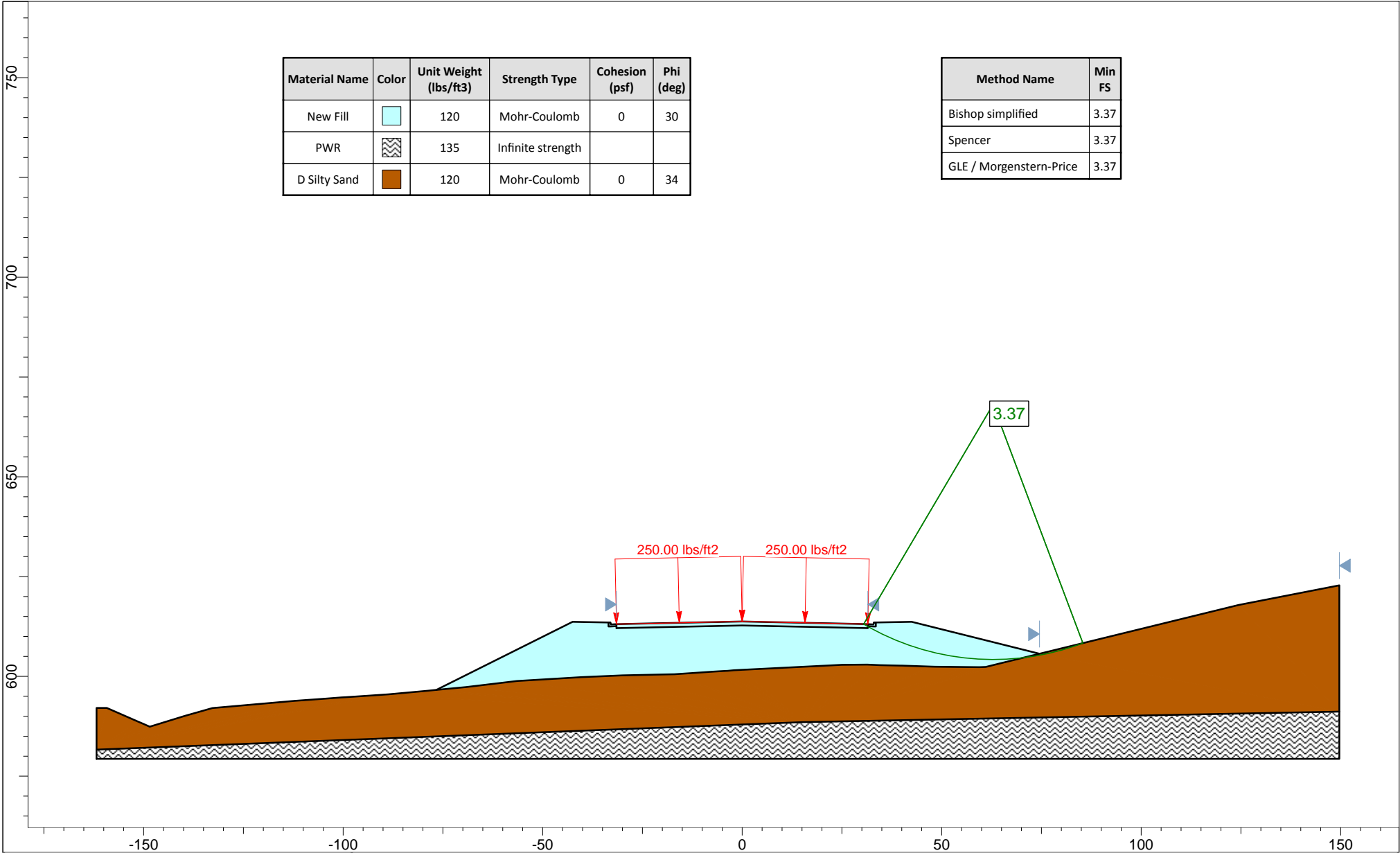
Support Name	Color	Type	Adhesion (psf)	Friction Angle (deg)	Anchorage	Strip Coverage (%)	Tensile Strength (lbs/ft)
LTDS=9000	Blue	GeoTextile	0	20	None	100	9000



Project		SC 557 over Crowders Creek	
Analysis Description		SC 557 - STA 276+00 - RT Side Slope - Static	
Drawn By	BMF	Scale	1:450
Date	6/27/2018, 5:34 PM	Company	F&ME
		File Name	STA 276+00_RT Side Slope_Static.slim



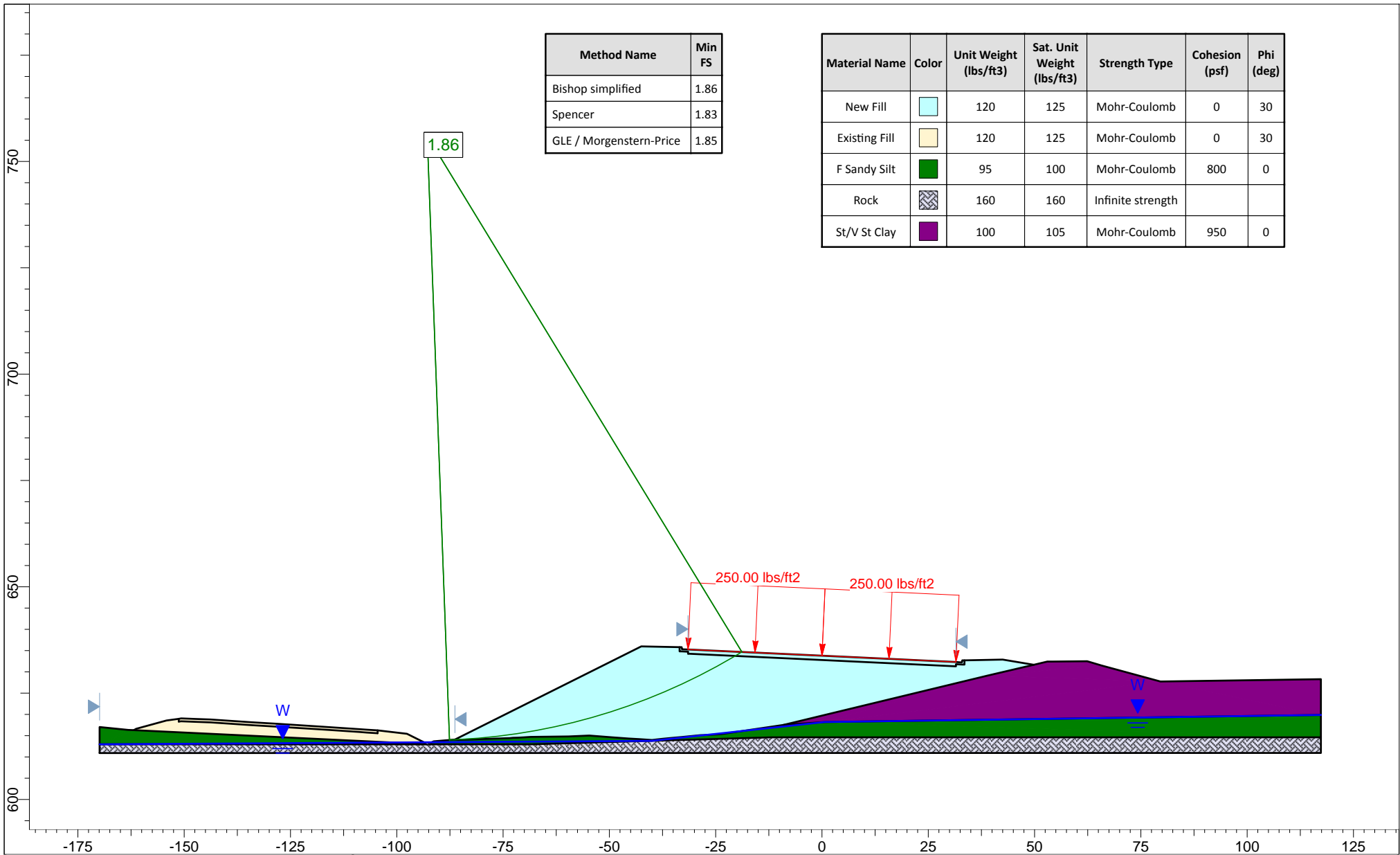
<h1 style="margin: 0;">F&amp;ME</h1> <h2 style="margin: 0;">CONSULTANTS</h2> <small>SLIDEINTERPRET 7.009</small>	Project			
	SC 557 Widening and Improvements			
	Analysis Description			
	SC 557 - STA 279+00 - LT Side Slope - Static			
Drawn By	BMF	Scale	1:400	Company
				F&ME
Date	6/27/2018, 5:34 PM		File Name	
			STA 279+00_LT Side Slope_Static.slim	



Material Name	Color	Unit Weight (lbs/ft <sup>3</sup> )	Strength Type	Cohesion (psf)	Phi (deg)
New Fill		120	Mohr-Coulomb	0	30
PWR		135	Infinite strength		
D Silty Sand		120	Mohr-Coulomb	0	34

Method Name	Min FS
Bishop simplified	3.37
Spencer	3.37
GLE / Morgenstern-Price	3.37

<h1 style="margin: 0;">F&amp;ME</h1> <h2 style="margin: 0;">CONSULTANTS</h2> <p style="font-size: small; margin: 0;">SLIDEINTERPRET 7.009</p>	Project			SC 557 Widening and Improvements		
	Analysis Description			SC 557 - STA 279+00 - RT Side Slope - Static		
	Drawn By	BMF	Scale	1:400	Company	F&ME
	Date	6/27/2018, 5:34 PM		File Name	STA 279+00_RT Side Slope_Static.slim	



<h1 style="margin: 0;">F&amp;ME</h1> <h2 style="margin: 0;">CONSULTANTS</h2> <small>SLIDEINTERPRET 7.009</small>	Project			SC 557 Widening and Improvements		
	Analysis Description			SC 557 - STA 287+00 - LT Side Slope - Static		
	Drawn By	BMF	Scale	1:375	Company	F&ME
	Date	6/27/2018, 5:34 PM		File Name	STA 287+00_LT Side Slope_Static.slim	

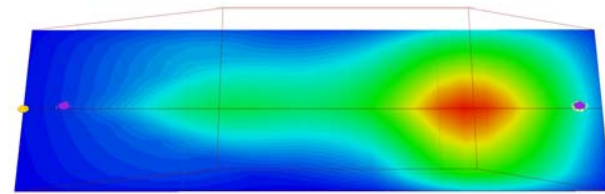
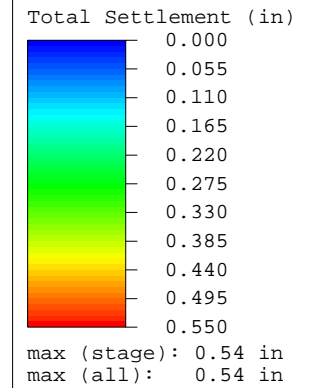
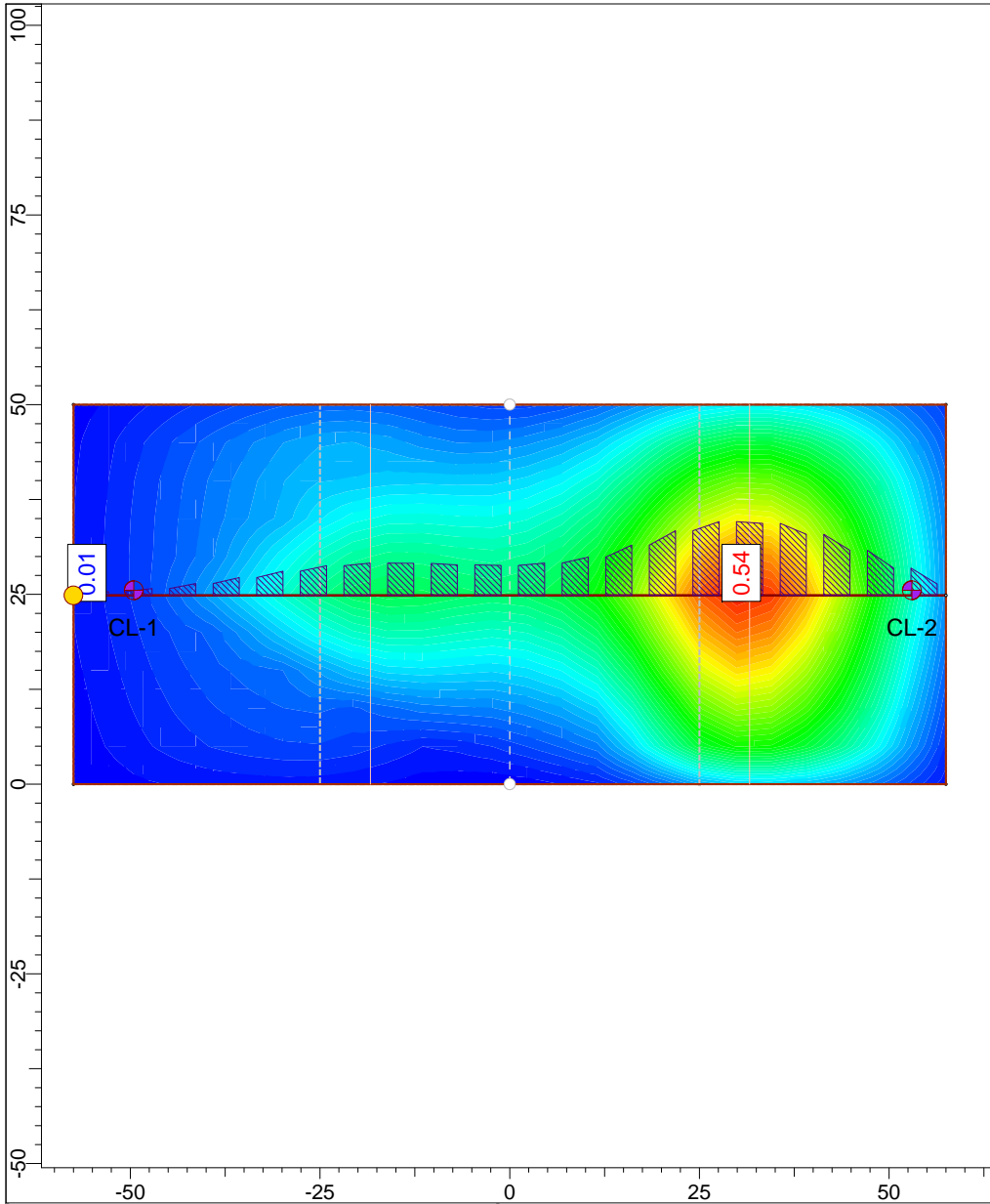


SC 557 Roadway Construction and Improvements  
Final Roadway Geotechnical Engineering Report

---

# APPENDIX

## SECTION 8 CROSS-LINE PIPE CULVERT ANALYSES



Project	SC 557 Widening & Improvements		
Analysis Description	24" Dia. Cross-Line Pipe Culvert @ SC 557 Station 205+34		
Drawn By	JFH	Company	F&ME
Date		File Name	cl-1 and cl-2.s3z

# Settle3D Analysis Information

## SC 557 Widening & Improvements

### Project Settings

---

Document Name	cl-1 and cl-2
Project Title	SC 557 Widening & Improvements
Analysis	24" Dia. Cross-Line Pipe Culvert @ SC 557 Station 205+34
Author	JFH
Company	F&ME
Stress Computation Method	Boussinesq
Time-dependent Consolidation Analysis	
Time Units	days
Permeability Units	feet/day
Use average properties to calculate layered stresses	
Improve consolidation accuracy	
Ignore negative effective stresses in settlement calculations	

### Stage Settings

---

Stage #	Name	Time [days]
1	Stage 1	0
2	Stage 2	1000
3	Stage 3	1100
4	Stage 4	1200
5	Stage 5	1300
6	Stage 6	1400
7	Stage 7	1500
8	Stage 8	1600
9	Stage 9	1700
10	Stage 10	1800

### Results (relative to Stage: Stage 2 = 1000 d)

---

Time taken to compute: 0.699764 seconds

**Stage: Stage 1 = 0 d**

Data Type	Minimum	Maximum
Total Settlement [in]	0	0
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0
Effective Stress [ksf]	0	0
Total Stress [ksf]	0	0
Total Strain	0	0
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0	0
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0

### Stage: Stage 2 = 1000 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0
Effective Stress [ksf]	0	0
Total Stress [ksf]	0	0
Total Strain	0	0
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0	0
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0

### Stage: Stage 3 = 1100 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.542148
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.542148
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-2.72536e-012	0.6875
Effective Stress [ksf]	-2.72536e-012	0.6875
Total Stress [ksf]	-2.72536e-012	0.6875
Total Strain	1.56733e-008	0.0034375
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	1.56733e-005	0.6875
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0193534

### Stage: Stage 4 = 1200 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.542148
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.542148
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-2.72536e-012	0.6875
Effective Stress [ksf]	-2.72536e-012	0.6875
Total Stress [ksf]	-2.72536e-012	0.6875
Total Strain	1.56733e-008	0.0034375
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	1.56733e-005	0.6875
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0193534

### Stage: Stage 5 = 1300 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.542148
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.542148
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-2.72536e-012	0.6875
Effective Stress [ksf]	-2.72536e-012	0.6875
Total Stress [ksf]	-2.72536e-012	0.6875
Total Strain	1.56733e-008	0.0034375
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	1.56733e-005	0.6875
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0193534

### Stage: Stage 6 = 1400 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.542148
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.542148
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-2.72536e-012	0.6875
Effective Stress [ksf]	-2.72536e-012	0.6875
Total Stress [ksf]	-2.72536e-012	0.6875
Total Strain	1.56733e-008	0.0034375
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	1.56733e-005	0.6875
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0193534

### Stage: Stage 7 = 1500 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.542148
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.542148
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-2.72536e-012	0.6875
Effective Stress [ksf]	-2.72536e-012	0.6875
Total Stress [ksf]	-2.72536e-012	0.6875
Total Strain	1.56733e-008	0.0034375
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	1.56733e-005	0.6875
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0193534

### Stage: Stage 8 = 1600 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.542148
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.542148
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-2.72536e-012	0.6875
Effective Stress [ksf]	-2.72536e-012	0.6875
Total Stress [ksf]	-2.72536e-012	0.6875
Total Strain	1.56733e-008	0.0034375
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	1.56733e-005	0.6875
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0193534

### Stage: Stage 9 = 1700 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.542148
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.542148
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-2.72536e-012	0.6875
Effective Stress [ksf]	-2.72536e-012	0.6875
Total Stress [ksf]	-2.72536e-012	0.6875
Total Strain	1.56733e-008	0.0034375
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	1.56733e-005	0.6875
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0193534

### Stage: Stage 10 = 1800 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.542148
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.542148
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-2.72536e-012	0.6875
Effective Stress [ksf]	-2.72536e-012	0.6875
Total Stress [ksf]	-2.72536e-012	0.6875
Total Strain	1.56733e-008	0.0034375
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	1.56733e-005	0.6875
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0193534

## Embankments

### 1. Embankment

Center Line (0, 0) to (0, 50)  
 Number of Layers 1  
 Near End Angle 90 degrees  
 Far End Angle 90 degrees  
 Base Width 50

Layer	Stage	Left Bench Width (ft)	Left Angle (deg)	Height (ft)	Unit Weight (kips/ft <sup>3</sup> )	Right Angle (deg)	Right Bench Width (ft)
1	Stage 1 = 0 d	0	9	3.5	0.115	15	0



## 2. Embankment

Center Line (0, 0) to (0, 50)  
 Number of Layers 1  
 Near End Angle 90 degrees  
 Far End Angle 90 degrees  
 Base Width 115

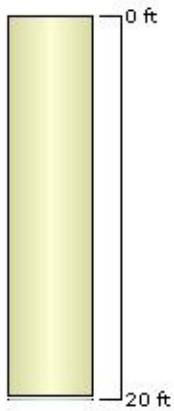
Layer	Stage	Left Bench Width (ft)	Left Angle (deg)	Height (ft)	Unit Weight (kips/ft <sup>3</sup> )	Right Angle (deg)	Right Bench Width (ft)
1	Stage 3 = 1100 d	0	8	5.5	0.125	12	0

## Soil Layers

Ground Surface Drained: Yes

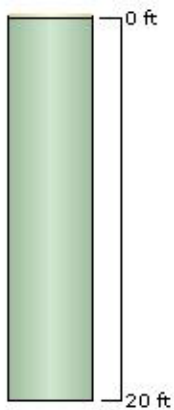
### CL-1: (-49.536, 25.525)

Layer #	Type	Thickness [ft]	Depth [ft]	Drained at Bottom
1	Stiff ML	20	0	No
2	Loose SC	0	20	No





### CL-2: (53.0388, 25.525)

Layer #	Type	Thickness [ft]	Depth [ft]	Drained at Bottom
1	Stiff ML	0	0	No
2	Loose SC	20	0	No



## Soil Properties

Property	Stiff ML	Loose SC
Color		
Unit Weight [kips/ft <sup>3</sup> ]	0.115	0.105
Saturated Unit Weight [kips/ft <sup>3</sup> ]	0.115	0.11
Immediate Settlement	Enabled	Enabled
Es [ksf]	1000	200
E <sub>sur</sub> [ksf]	1000	200
Undrained Su A [kips/ft <sup>2</sup> ]	0	0
Undrained Su S	0.2	0.2
Undrained Su m	0.8	0.8
Piezo Line ID	0	0

## Groundwater

Groundwater method Piezometric Lines  
 Water Unit Weight 0.0624 kips/ft<sup>3</sup>

## Query Lines

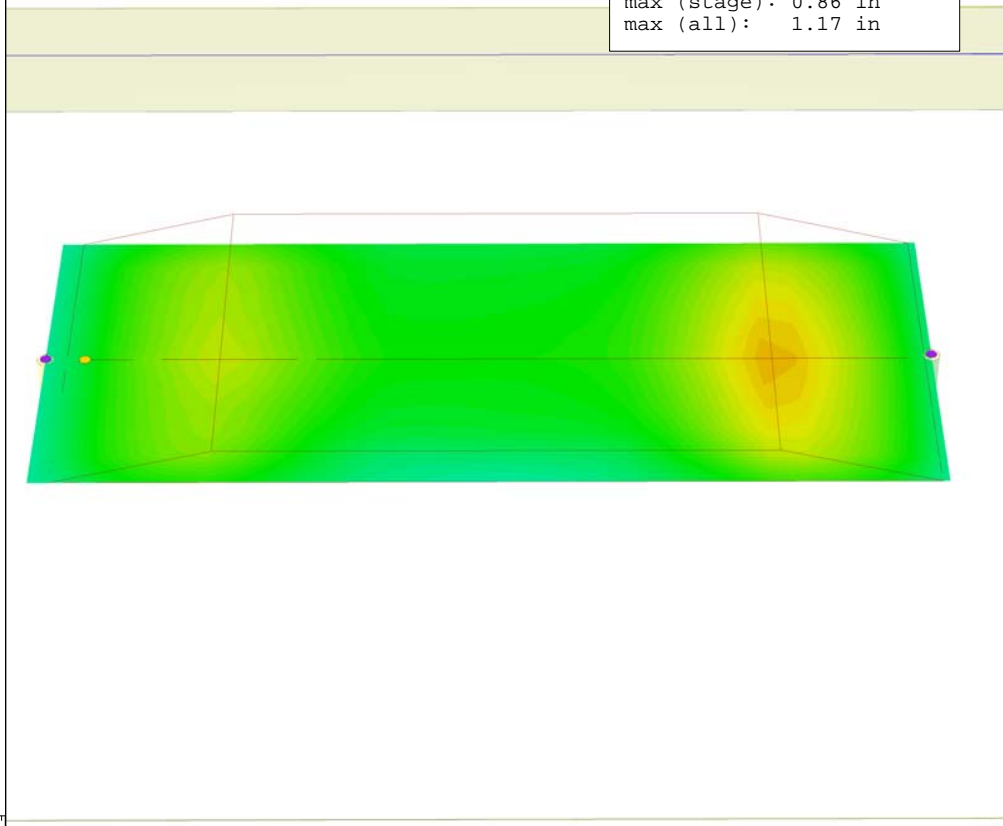
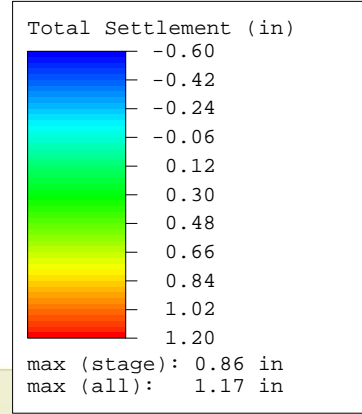
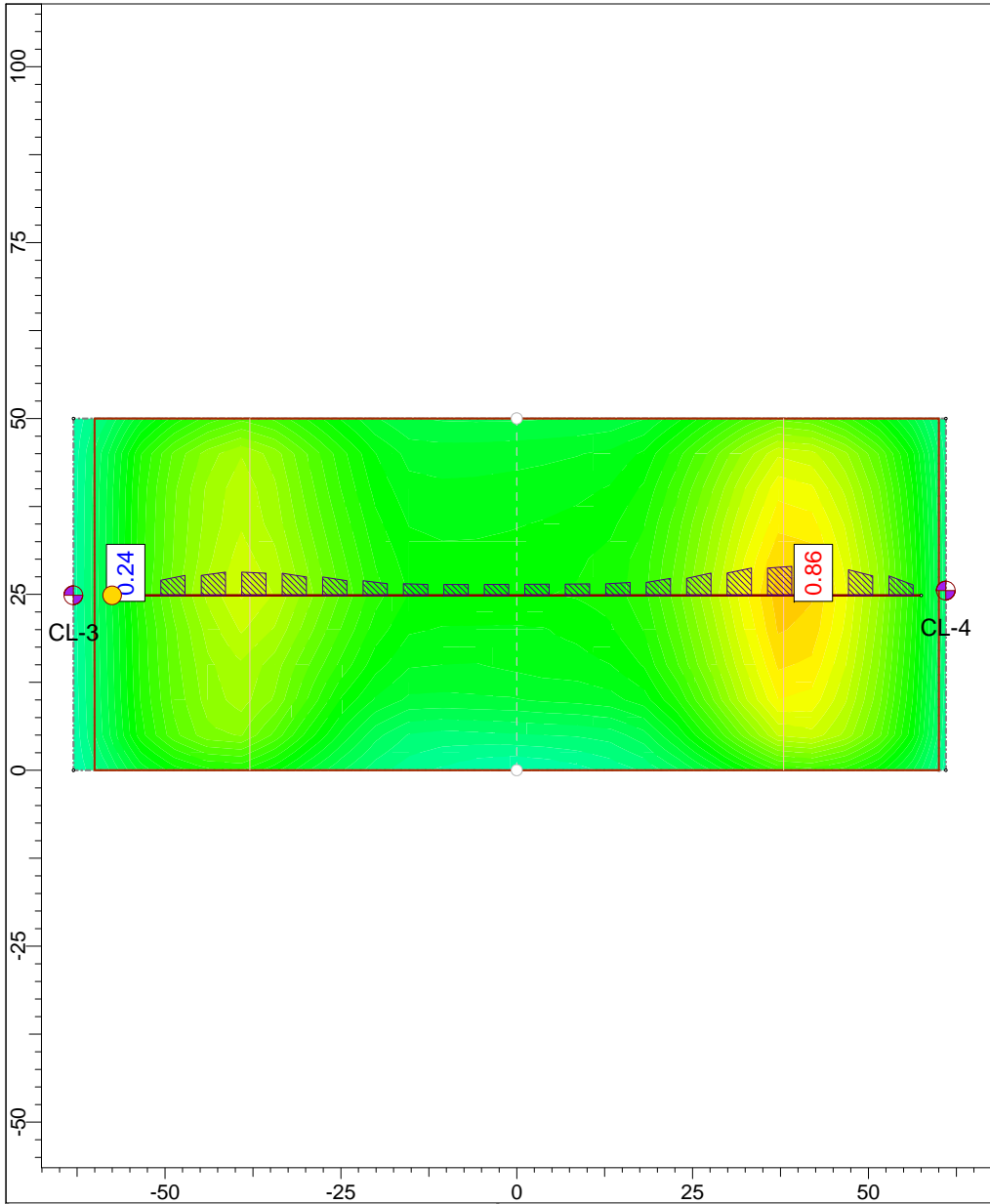
Line #	Start Location	End Location	Horizontal Divisions	Vertical Divisions
1	-57.5, 24.8582	57.5, 24.8582	20	Auto: 31

## Field Point Grid

Number of points 286  
 Expansion Factor 1

### Grid Coordinates

X [ft]	Y [ft]
115	107.5
115	-57.5
-115	-57.5
-115	107.5



Project		SC 557 Widening & Improvements	
Analysis Description		30" Dia. Cross-Line Pipe Culvert @ SC 557 Station 213+00	
Drawn By	JFH	Company	F&ME
Date		File Name	cl-3 and cl-4.s3z

# Settle3D Analysis Information

## SC 557 Widening & Improvements

### Project Settings

---

Document Name	cl-3 and cl-4
Project Title	SC 557 Widening & Improvements
Analysis	30" Dia. Cross-Line Pipe Culvert @ SC 557 Station 213+00
Author	JFH
Company	F&ME
Stress Computation Method	Boussinesq
Time-dependent Consolidation Analysis	
Time Units	days
Permeability Units	feet/day
Use average properties to calculate layered stresses	
Improve consolidation accuracy	
Ignore negative effective stresses in settlement calculations	

### Stage Settings

---

Stage #	Name	Time [days]
1	Stage 1	0
2	Stage 2	1000
3	Stage 3	1100
4	Stage 4	1200
5	Stage 5	1300
6	Stage 6	1400
7	Stage 7	1500
8	Stage 8	1600
9	Stage 9	1700
10	Stage 10	1800

### Results (relative to Stage: Stage 2 = 1000 d)

---

Time taken to compute: 6.5502 seconds

**Stage: Stage 1 = 0 d**

Data Type	Minimum	Maximum
Total Settlement [in]	-0.558098	0
Consolidation Settlement [in]	-0.558098	0
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0
Effective Stress [ksf]	-0.505057	0
Total Stress [ksf]	-1.11022e-015	1.77636e-015
Total Strain	-0.00548661	0
Pore Water Pressure [ksf]	0	0.505057
Excess Pore Water Pressure [ksf]	0	0.505057
Degree of Consolidation [%]	-100	0
Pre-consolidation Stress [ksf]	0	0
Over-consolidation Ratio	0	1.26273
Void Ratio	0	0.0124546
Permeability [ft/d]	-0.00329783	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	-100	0
Undrained Shear Strength	-0.0498348	0

### Stage: Stage 2 = 1000 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0
Effective Stress [ksf]	0	0
Total Stress [ksf]	0	0
Total Strain	0	0
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0	0
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0

### Stage: Stage 3 = 1100 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.864511
Consolidation Settlement [in]	-2.22045e-016	0.557241
Immediate Settlement [in]	0	0.322035
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0.411356
Effective Stress [ksf]	-2.22045e-016	0.411356
Total Stress [ksf]	0	0.411356
Total Strain	0	0.00956848
Pore Water Pressure [ksf]	0	0.334614
Excess Pore Water Pressure [ksf]	0	0.334614
Degree of Consolidation [%]	-59.3314	1.42109e-014
Pre-consolidation Stress [ksf]	0	0.411355
Over-consolidation Ratio	-0.883181	8.88178e-016
Void Ratio	-0.0217205	0
Permeability [ft/d]	-0.076722	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	-100	0
Undrained Shear Strength	-3.33067e-016	0.0292044

### Stage: Stage 4 = 1200 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	1.1703
Consolidation Settlement [in]	0	0.856954
Immediate Settlement [in]	0	0.322035
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0.411356
Effective Stress [ksf]	0	0.411356
Total Stress [ksf]	0	0.411356
Total Strain	0	0.00956848
Pore Water Pressure [ksf]	-3.03577e-018	1.25412e-006
Excess Pore Water Pressure [ksf]	-2.92689e-018	1.25412e-006
Degree of Consolidation [%]	-0.000177825	1.42109e-014
Pre-consolidation Stress [ksf]	0	0.411355
Over-consolidation Ratio	-0.883181	0
Void Ratio	-0.0217205	0
Permeability [ft/d]	-0.076722	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	-0.000280296	0
Undrained Shear Strength	0	0.0292044

### Stage: Stage 5 = 1300 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	1.1703
Consolidation Settlement [in]	0	0.856954
Immediate Settlement [in]	0	0.322035
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0.411356
Effective Stress [ksf]	0	0.411356
Total Stress [ksf]	0	0.411356
Total Strain	0	0.00956848
Pore Water Pressure [ksf]	-3.03577e-018	3.94396e-012
Excess Pore Water Pressure [ksf]	-3.23312e-018	3.94394e-012
Degree of Consolidation [%]	-5.62906e-010	1.42109e-014
Pre-consolidation Stress [ksf]	0	0.411355
Over-consolidation Ratio	-0.883181	0
Void Ratio	-0.0217205	0
Permeability [ft/d]	-0.076722	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	-8.88051e-010	0
Undrained Shear Strength	0	0.0292044

### Stage: Stage 6 = 1400 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	1.1703
Consolidation Settlement [in]	0	0.856954
Immediate Settlement [in]	0	0.322035
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0.411356
Effective Stress [ksf]	0	0.411356
Total Stress [ksf]	0	0.411356
Total Strain	0	0.00956848
Pore Water Pressure [ksf]	-2.1684e-018	2.27682e-018
Excess Pore Water Pressure [ksf]	-3.23007e-018	1.11234e-017
Degree of Consolidation [%]	-1.42109e-014	1.42109e-014
Pre-consolidation Stress [ksf]	0	0.411355
Over-consolidation Ratio	-0.883181	0
Void Ratio	-0.0217205	0
Permeability [ft/d]	-0.076722	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0292044

### Stage: Stage 7 = 1500 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	1.1703
Consolidation Settlement [in]	0	0.856954
Immediate Settlement [in]	0	0.322035
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0.411356
Effective Stress [ksf]	0	0.411356
Total Stress [ksf]	0	0.411356
Total Strain	0	0.00956848
Pore Water Pressure [ksf]	-1.84314e-018	2.27682e-018
Excess Pore Water Pressure [ksf]	-3.12266e-018	3.4443e-018
Degree of Consolidation [%]	-1.42109e-014	1.42109e-014
Pre-consolidation Stress [ksf]	0	0.411355
Over-consolidation Ratio	-0.883181	0
Void Ratio	-0.0217205	0
Permeability [ft/d]	-0.076722	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0292044

### Stage: Stage 8 = 1600 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	1.1703
Consolidation Settlement [in]	0	0.856954
Immediate Settlement [in]	0	0.322035
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0.411356
Effective Stress [ksf]	0	0.411356
Total Stress [ksf]	0	0.411356
Total Strain	0	0.00956848
Pore Water Pressure [ksf]	-2.1684e-018	2.27682e-018
Excess Pore Water Pressure [ksf]	-3.22452e-018	3.3029e-018
Degree of Consolidation [%]	-1.42109e-014	1.42109e-014
Pre-consolidation Stress [ksf]	0	0.411355
Over-consolidation Ratio	-0.883181	0
Void Ratio	-0.0217205	0
Permeability [ft/d]	-0.076722	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0292044

### Stage: Stage 9 = 1700 d



Data Type	Minimum	Maximum
Total Settlement [in]	0	1.1703
Consolidation Settlement [in]	0	0.856954
Immediate Settlement [in]	0	0.322035
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0.411356
Effective Stress [ksf]	0	0.411356
Total Stress [ksf]	0	0.411356
Total Strain	0	0.00956848
Pore Water Pressure [ksf]	-2.1684e-018	2.27682e-018
Excess Pore Water Pressure [ksf]	-3.11366e-018	3.44386e-018
Degree of Consolidation [%]	-1.42109e-014	1.42109e-014
Pre-consolidation Stress [ksf]	0	0.411355
Over-consolidation Ratio	-0.883181	0
Void Ratio	-0.0217205	0
Permeability [ft/d]	-0.076722	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0292044

### Stage: Stage 10 = 1800 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	1.1703
Consolidation Settlement [in]	0	0.856954
Immediate Settlement [in]	0	0.322035
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0.411356
Effective Stress [ksf]	0	0.411356
Total Stress [ksf]	0	0.411356
Total Strain	0	0.00956848
Pore Water Pressure [ksf]	-2.1684e-018	2.27682e-018
Excess Pore Water Pressure [ksf]	-3.21902e-018	3.26092e-018
Degree of Consolidation [%]	-1.42109e-014	1.42109e-014
Pre-consolidation Stress [ksf]	0	0.411355
Over-consolidation Ratio	-0.883181	0
Void Ratio	-0.0217205	0
Permeability [ft/d]	-0.076722	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0292044

## Embankments

### 1. Embankment

Center Line (0, 0) to (0, 50)  
 Number of Layers 1  
 Near End Angle 90 degrees  
 Far End Angle 90 degrees  
 Base Width 120

Layer	Stage	Left Bench Width (ft)	Left Angle (deg)	Height (ft)	Unit Weight (kips/ft <sup>3</sup> )	Right Angle (deg)	Right Bench Width (ft)
1	Stage 1 = 0 d	0	6	4.5	0.115	6	0

## 2. Embankment

Center Line (0, 0) to (0, 50)  
 Number of Layers 1  
 Near End Angle 90 degrees  
 Far End Angle 90 degrees  
 Base Width 120

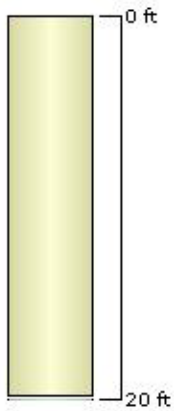
Layer	Stage	Left Bench Width (ft)	Left Angle (deg)	Height (ft)	Unit Weight (kips/ft <sup>3</sup> )	Right Angle (deg)	Right Bench Width (ft)
1	Stage 3 = 1100 d	0	14	5.5	0.125	14	0

## Soil Layers

Ground Surface Drained: Yes

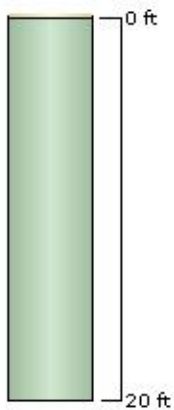
### CL-3: (-63, 24.8582)

Layer #	Type	Thickness [ft]	Depth [ft]	Drained at Bottom
1	Stiff CL	20	0	Yes
2	Soft CL	0	20	Yes





### CL-4: (61, 25.525)

Layer #	Type	Thickness [ft]	Depth [ft]	Drained at Bottom
1	Stiff CL	0	0	Yes
2	Soft CL	20	0	Yes



## Soil Properties

Property	Stiff CL	Soft CL
Color		
Unit Weight [kips/ft <sup>3</sup> ]	0.115	0.105
Saturated Unit Weight [kips/ft <sup>3</sup> ]	0.115	0.11
Immediate Settlement	Enabled	Enabled
Es [ksf]	750	200
Esur [ksf]	750	200
Primary Consolidation	Enabled	Enabled
Material Type	Non-Linear	Non-Linear
Cc	0.027	0.027
Cr	0.071	0.071
e0	1.27	1.27
OCR	3.8	3.8
Cv [ft <sup>2</sup> /d]	1.51	1.51
B-bar	1	1
Undrained Su A [kips/ft <sup>2</sup> ]	0	0
Undrained Su S	0.2	0.2
Undrained Su m	0.8	0.8
Piezo Line ID	1	1

## Groundwater

Groundwater method Piezometric Lines  
 Water Unit Weight 0.0624 kips/ft<sup>3</sup>

### Piezometric Line Entities

ID	Depth (ft)
1	9 ft

## Query Lines

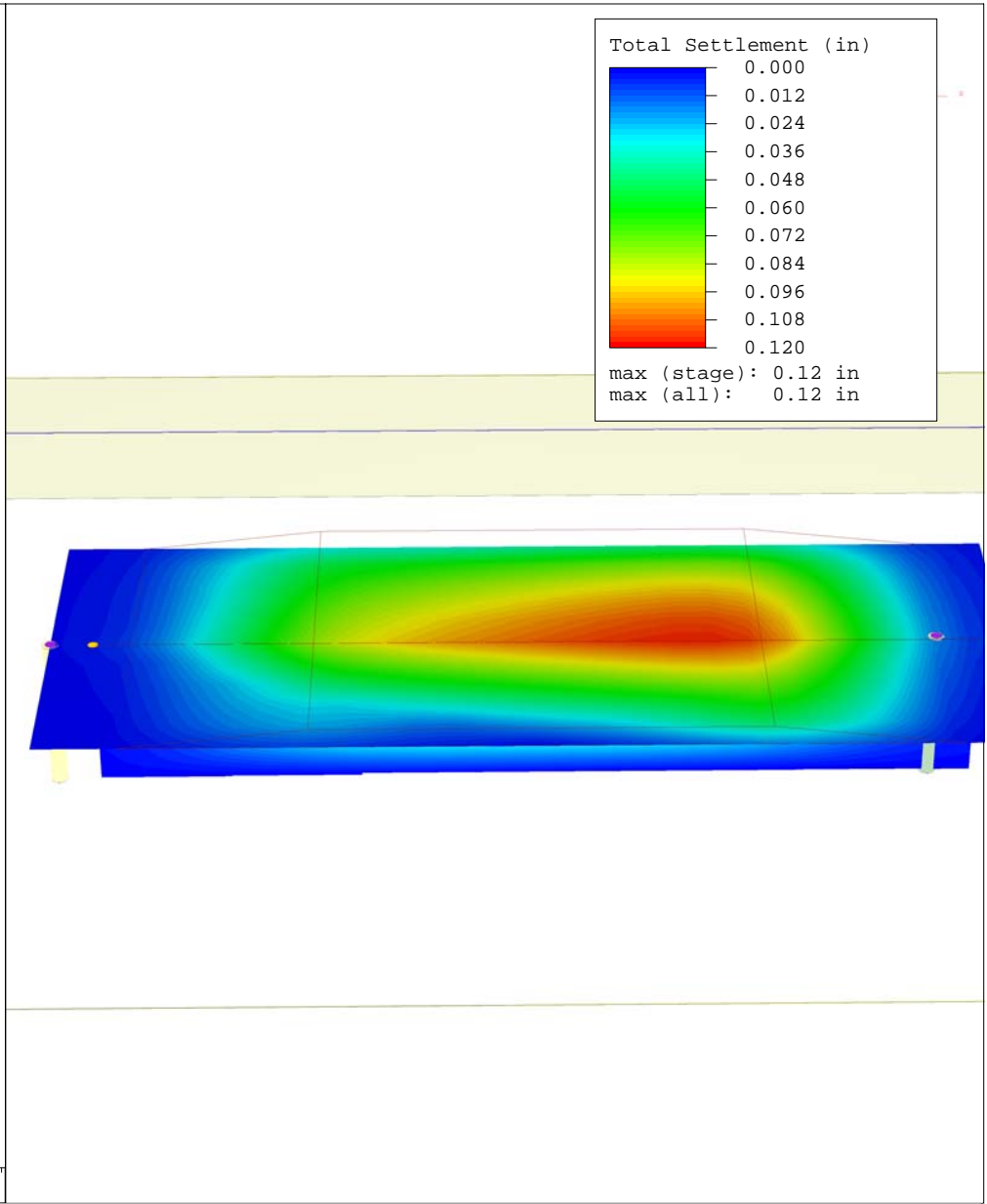
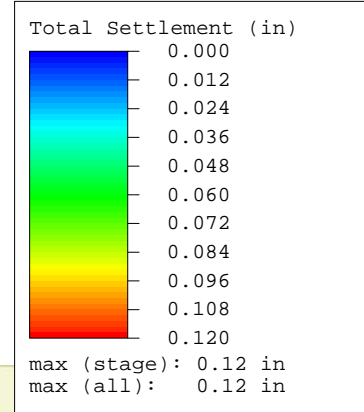
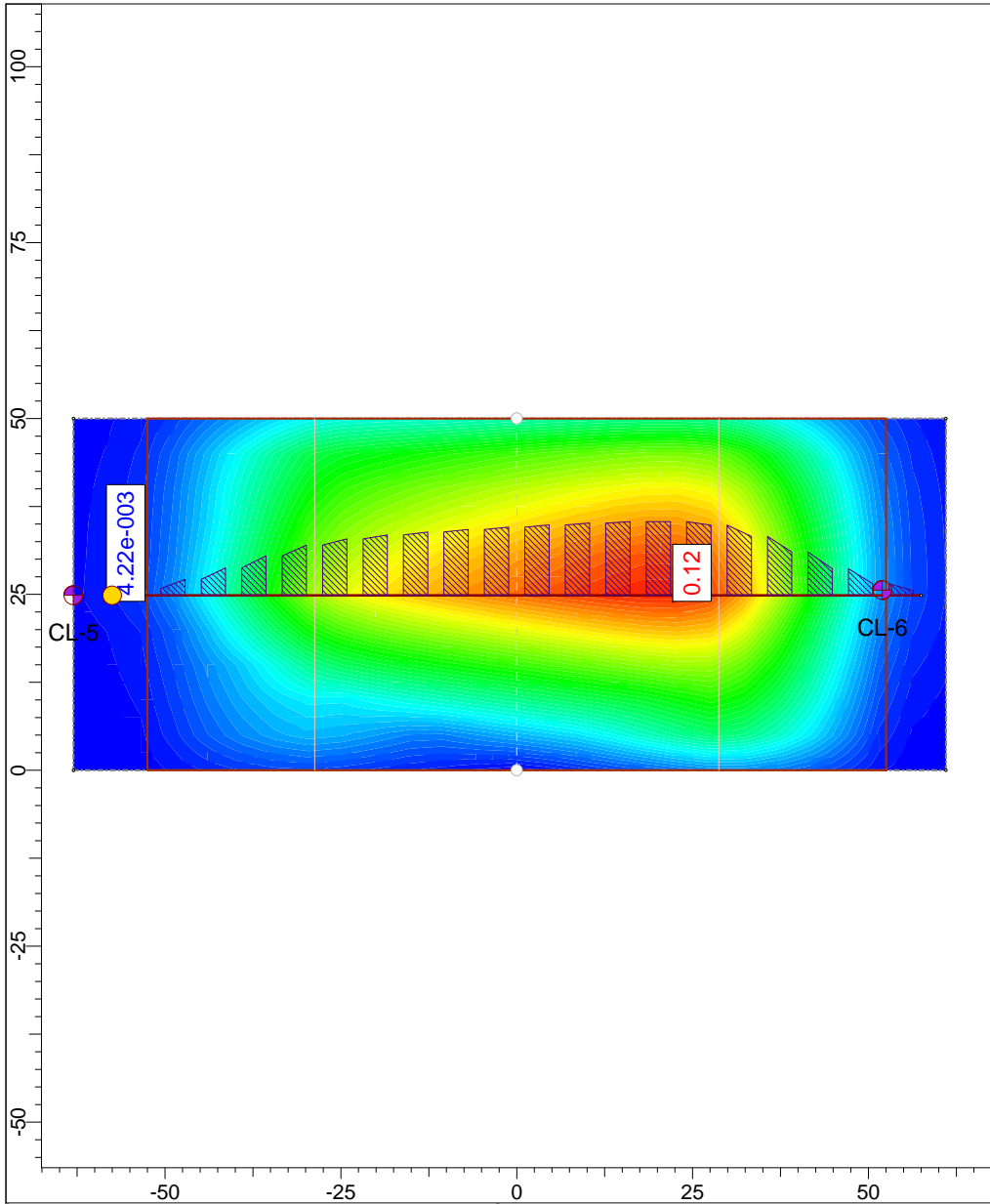
Line #	Start Location	End Location	Horizontal Divisions	Vertical Divisions
1	-57.5, 24.8582	57.5, 24.8582	20	Auto: 43

## Field Point Grid

Number of points 297  
 Expansion Factor 1

### Grid Coordinates

X [ft]	Y [ft]
120	109
120	-59
-122	-59
-122	109



<i>Project</i>		SC 557 Widening & Improvements	
<i>Analysis Description</i>		24" Dia. Cross-Line Pipe Culvert @ Ridge Rd. Station 28+50	
<i>Drawn By</i>	JFH	<i>Company</i>	F&ME
<i>Date</i>		<i>File Name</i>	cl-5 and cl-6.s3z

# Settle3D Analysis Information

## SC 557 Widening & Improvements

### Project Settings

---

Document Name	cl-5 and cl-6
Project Title	SC 557 Widening & Improvements
Analysis	24" Dia. Cross-Line Pipe Culvert @ Ridge Rd. Station 28+50
Author	JFH
Company	F&ME
Stress Computation Method	Boussinesq
Time-dependent Consolidation Analysis	
Time Units	days
Permeability Units	feet/day
Use average properties to calculate layered stresses	
Improve consolidation accuracy	
Ignore negative effective stresses in settlement calculations	

### Stage Settings

---

Stage #	Name	Time [days]
1	Stage 1	0
2	Stage 2	1000
3	Stage 3	1100
4	Stage 4	1200
5	Stage 5	1300
6	Stage 6	1400
7	Stage 7	1500
8	Stage 8	1600
9	Stage 9	1700
10	Stage 10	1800

### Results

---

Time taken to compute: 0.627192 seconds

**Stage: Stage 1 = 0 d**

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.117487
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.117487
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0.3125
Effective Stress [ksf]	0	1.83669
Total Stress [ksf]	0	2.52309
Total Strain	0	0.000625
Pore Water Pressure [ksf]	0	0.6864
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.001881	6.12948
Over-consolidation Ratio	1	3.8
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.957998

### Stage: Stage 2 = 1000 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.117487
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.117487
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0.3125
Effective Stress [ksf]	0	1.83669
Total Stress [ksf]	0	2.52309
Total Strain	0	0.000625
Pore Water Pressure [ksf]	0	0.6864
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.001881	6.12948
Over-consolidation Ratio	1	3.8
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.957998

### Stage: Stage 3 = 1100 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.117487
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.117487
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0.3125
Effective Stress [ksf]	0	1.83669
Total Stress [ksf]	0	2.52309
Total Strain	0	0.000625
Pore Water Pressure [ksf]	0	0.6864
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.001881	6.12948
Over-consolidation Ratio	1	3.8
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.957998

### Stage: Stage 4 = 1200 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.117487
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.117487
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0.3125
Effective Stress [ksf]	0	1.83669
Total Stress [ksf]	0	2.52309
Total Strain	0	0.000625
Pore Water Pressure [ksf]	0	0.6864
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.001881	6.12948
Over-consolidation Ratio	1	3.8
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.957998

### Stage: Stage 5 = 1300 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.117487
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.117487
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0.3125
Effective Stress [ksf]	0	1.83669
Total Stress [ksf]	0	2.52309
Total Strain	0	0.000625
Pore Water Pressure [ksf]	0	0.6864
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.001881	6.12948
Over-consolidation Ratio	1	3.8
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.957998

### Stage: Stage 6 = 1400 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.117487
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.117487
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0.3125
Effective Stress [ksf]	0	1.83669
Total Stress [ksf]	0	2.52309
Total Strain	0	0.000625
Pore Water Pressure [ksf]	0	0.6864
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.001881	6.12948
Over-consolidation Ratio	1	3.8
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.957998

### Stage: Stage 7 = 1500 d



Data Type	Minimum	Maximum
Total Settlement [in]	0	0.117487
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.117487
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0.3125
Effective Stress [ksf]	0	1.83669
Total Stress [ksf]	0	2.52309
Total Strain	0	0.000625
Pore Water Pressure [ksf]	0	0.6864
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.001881	6.12948
Over-consolidation Ratio	1	3.8
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.957998

### Stage: Stage 8 = 1600 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.117487
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.117487
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0.3125
Effective Stress [ksf]	0	1.83669
Total Stress [ksf]	0	2.52309
Total Strain	0	0.000625
Pore Water Pressure [ksf]	0	0.6864
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.001881	6.12948
Over-consolidation Ratio	1	3.8
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.957998

### Stage: Stage 9 = 1700 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.117487
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.117487
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0.3125
Effective Stress [ksf]	0	1.83669
Total Stress [ksf]	0	2.52309
Total Strain	0	0.000625
Pore Water Pressure [ksf]	0	0.6864
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.001881	6.12948
Over-consolidation Ratio	1	3.8
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.957998

### Stage: Stage 10 = 1800 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.117487
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.117487
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0.3125
Effective Stress [ksf]	0	1.83669
Total Stress [ksf]	0	2.52309
Total Strain	0	0.000625
Pore Water Pressure [ksf]	0	0.6864
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.001881	6.12948
Over-consolidation Ratio	1	3.8
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.957998

## Embankments

### 1. Embankment

Center Line (0, 0) to (0, 50)  
 Number of Layers 1  
 Near End Angle 90 degrees  
 Far End Angle 90 degrees  
 Base Width 105

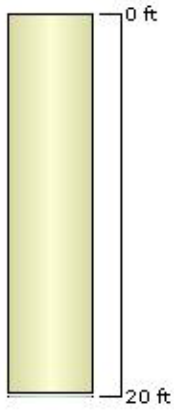
Layer	Stage	Left Bench Width (ft)	Left Angle (deg)	Height (ft)	Unit Weight (kips/ft <sup>3</sup> )	Right Angle (deg)	Right Bench Width (ft)
1	Stage 1 = 0 d	0	6	2.5	0.125	6	0

## Soil Layers

Ground Surface Drained: Yes

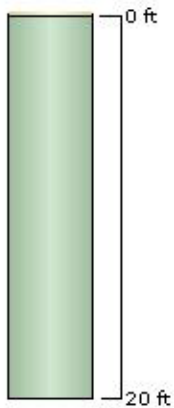
### CL-5: (-63, 24.8582)

Layer #	Type	Thickness [ft]	Depth [ft]	Drained at Bottom
1	Stiff CL	20	0	Yes
2	Firm CL/ML	0	20	Yes





### CL-6: (52, 25.5887)

Layer #	Type	Thickness [ft]	Depth [ft]	Drained at Bottom
1	Stiff CL	0	0	Yes
2	Firm CL/ML	20	0	Yes



## Soil Properties

Property	Stiff CL	Firm CL/ML
Color		
Unit Weight [kips/ft <sup>3</sup> ]	0.115	0.11
Saturated Unit Weight [kips/ft <sup>3</sup> ]	0.115	0.11
Immediate Settlement	Enabled	Enabled
Es [ksf]	1000	500
E <sub>sur</sub> [ksf]	100	500
Undrained Su A [kips/ft <sup>2</sup> ]	0	0
Undrained Su S	0.2	0.2
Undrained Su m	0.8	0.8
Piezo Line ID	1	1

## Groundwater

Groundwater method Piezometric Lines  
 Water Unit Weight 0.0624 kips/ft<sup>3</sup>

## Piezometric Line Entities

ID	Depth (ft)
1	9 ft

## Query Lines

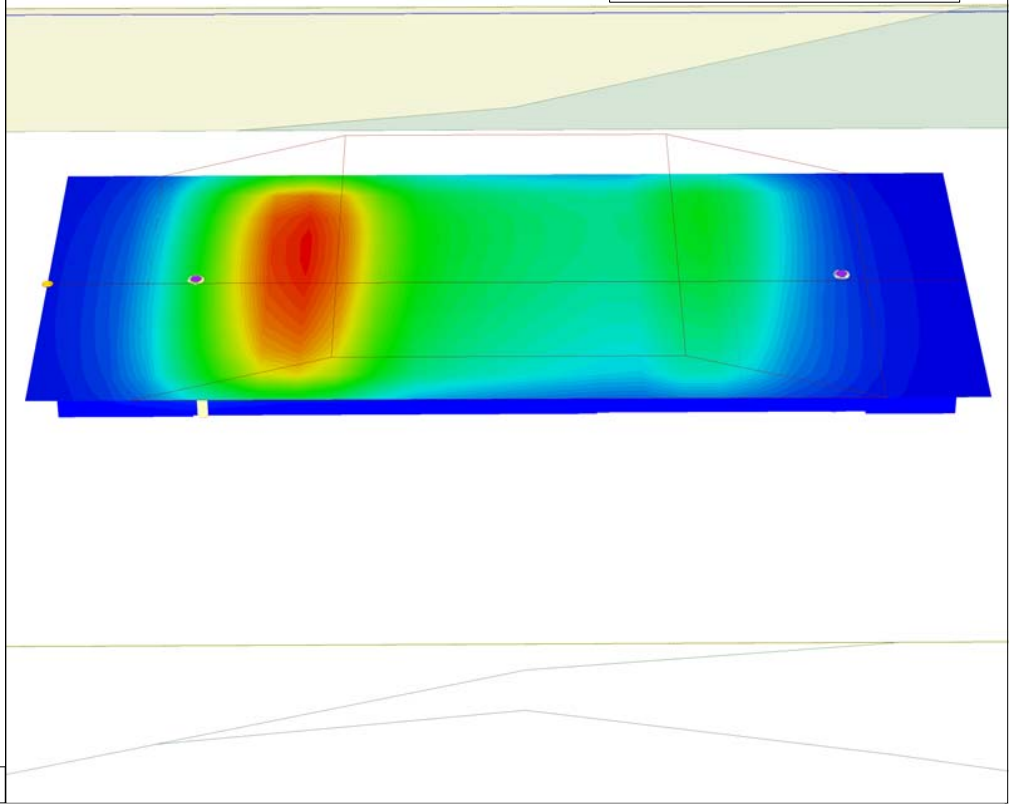
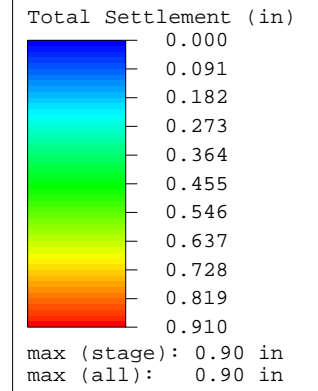
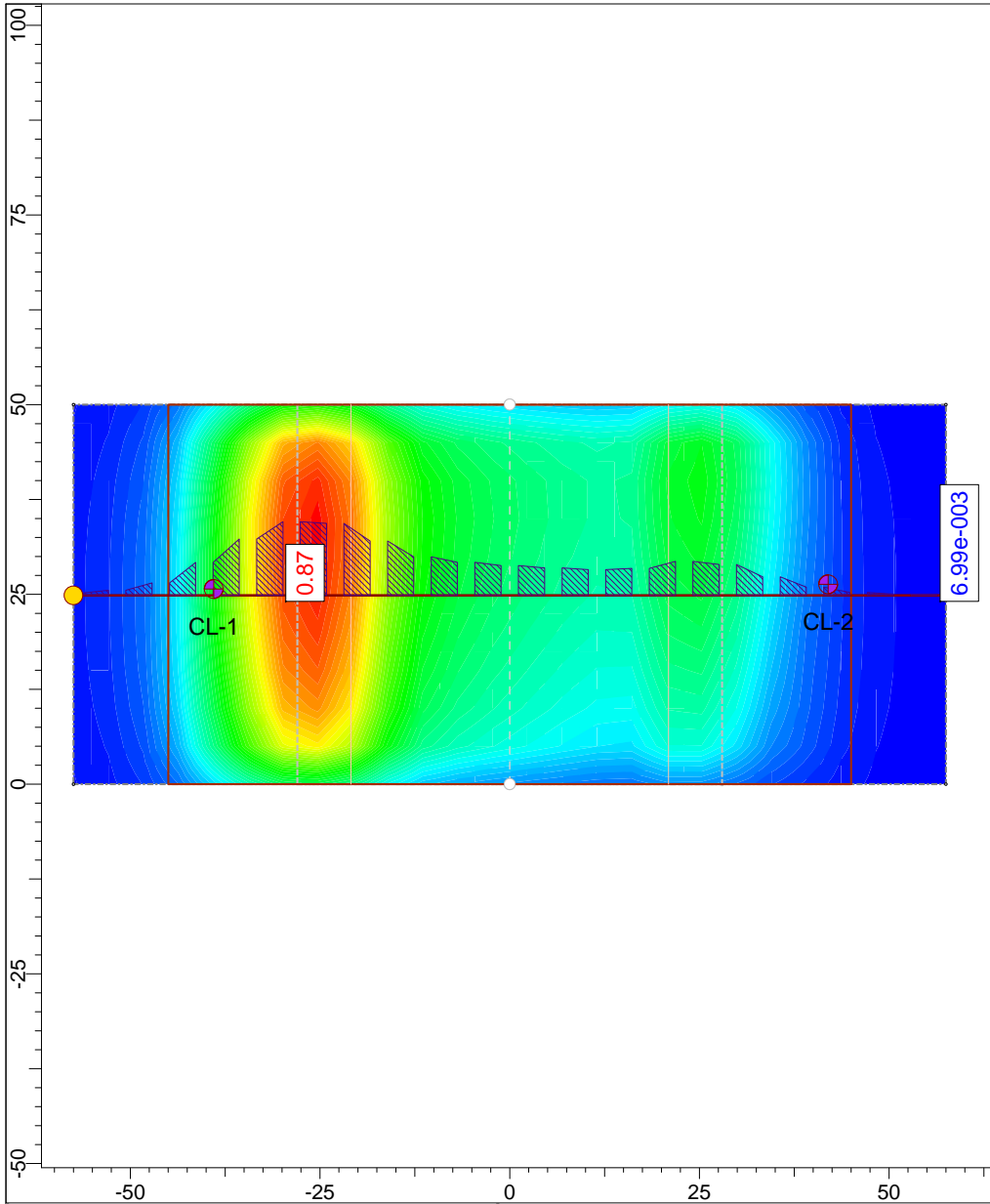
Line #	Start Location	End Location	Horizontal Divisions	Vertical Divisions
1	-57.5, 24.8582	57.5, 24.8582	20	Auto: 43

## Field Point Grid

Number of points 297  
 Expansion Factor 1

## Grid Coordinates

X [ft]	Y [ft]
105	102.5
105	-52.5
-115.5	-52.5
-115.5	102.5



SETTLE3D 3.020

Project		SC 557 Widening & Improvements	
Analysis Description		36" Dia. Cross-Line Pipe Culvert @ Pharr Rd. Station 12+00	
Drawn By	JFH	Company	F&ME
Date		File Name	cl-7 and cl-8.s3z

# Settle3D Analysis Information

## SC 557 Widening & Improvements

### Project Settings

---

Document Name	cl-7 and cl-8
Project Title	SC 557 Widening & Improvements
Analysis	36" Dia. Cross-Line Pipe Culvert @ Pharr Rd. Station 12+00
Author	JFH
Company	F&ME
Stress Computation Method	Boussinesq
Time-dependent Consolidation Analysis	
Time Units	days
Permeability Units	feet/day
Use average properties to calculate layered stresses	
Improve consolidation accuracy	
Ignore negative effective stresses in settlement calculations	

### Stage Settings

---

Stage #	Name	Time [days]
1	Stage 1	0
2	Stage 2	1000
3	Stage 3	1100
4	Stage 4	1200
5	Stage 5	1300
6	Stage 6	1400
7	Stage 7	1500
8	Stage 8	1600
9	Stage 9	1700
10	Stage 10	1800

### Results (relative to Stage: Stage 2 = 1000 d)

---

Time taken to compute: 0.868567 seconds

**Stage: Stage 1 = 0 d**

Data Type	Minimum	Maximum
Total Settlement [in]	0	0
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0
Effective Stress [ksf]	0	0
Total Stress [ksf]	0	0
Total Strain	0	0
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0	0
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0

### Stage: Stage 2 = 1000 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0
Effective Stress [ksf]	0	0
Total Stress [ksf]	0	0
Total Strain	0	0
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0	0
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0

### Stage: Stage 3 = 1100 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.901419
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.901419
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-8.77343e-012	0.513083
Effective Stress [ksf]	-8.77343e-012	0.513083
Total Stress [ksf]	-8.77343e-012	0.513083
Total Strain	0	0.00513082
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	3.12907e-010	0.513082
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0132131

### Stage: Stage 4 = 1200 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.901419
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.901419
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-8.77343e-012	0.513083
Effective Stress [ksf]	-8.77343e-012	0.513083
Total Stress [ksf]	-8.77343e-012	0.513083
Total Strain	0	0.00513082
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	3.12907e-010	0.513082
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0132131

### Stage: Stage 5 = 1300 d



Data Type	Minimum	Maximum
Total Settlement [in]	0	0.901419
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.901419
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-8.77343e-012	0.513083
Effective Stress [ksf]	-8.77343e-012	0.513083
Total Stress [ksf]	-8.77343e-012	0.513083
Total Strain	0	0.00513082
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	3.12907e-010	0.513082
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0132131

### Stage: Stage 6 = 1400 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.901419
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.901419
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-8.77343e-012	0.513083
Effective Stress [ksf]	-8.77343e-012	0.513083
Total Stress [ksf]	-8.77343e-012	0.513083
Total Strain	0	0.00513082
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	3.12907e-010	0.513082
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0132131

### Stage: Stage 7 = 1500 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.901419
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.901419
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-8.77343e-012	0.513083
Effective Stress [ksf]	-8.77343e-012	0.513083
Total Stress [ksf]	-8.77343e-012	0.513083
Total Strain	0	0.00513082
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	3.12907e-010	0.513082
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0132131

### Stage: Stage 8 = 1600 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.901419
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.901419
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-8.77343e-012	0.513083
Effective Stress [ksf]	-8.77343e-012	0.513083
Total Stress [ksf]	-8.77343e-012	0.513083
Total Strain	0	0.00513082
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	3.12907e-010	0.513082
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0132131

### Stage: Stage 9 = 1700 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.901419
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.901419
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-8.77343e-012	0.513083
Effective Stress [ksf]	-8.77343e-012	0.513083
Total Stress [ksf]	-8.77343e-012	0.513083
Total Strain	0	0.00513082
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	3.12907e-010	0.513082
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0132131

### Stage: Stage 10 = 1800 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.901419
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0.901419
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-8.77343e-012	0.513083
Effective Stress [ksf]	-8.77343e-012	0.513083
Total Stress [ksf]	-8.77343e-012	0.513083
Total Strain	0	0.00513082
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	3.12907e-010	0.513082
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0132131

## Embankments

### 1. Embankment

Center Line (0, 0) to (0, 50)  
 Number of Layers 1  
 Near End Angle 90 degrees  
 Far End Angle 90 degrees  
 Base Width 56

Layer	Stage	Left Bench Width (ft)	Left Angle (deg)	Height (ft)	Unit Weight (kips/ft <sup>3</sup> )	Right Angle (deg)	Right Bench Width (ft)
1	Stage 1 = 0 d	0	18	4.5	0.115	22	0

## 2. Embankment

Center Line (0, 0) to (0, 50)  
 Number of Layers 1  
 Near End Angle 90 degrees  
 Far End Angle 90 degrees  
 Base Width 90

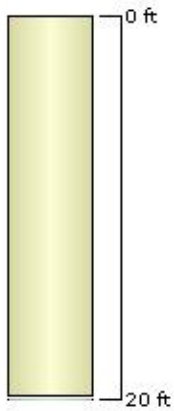
Layer	Stage	Left Bench Width (ft)	Left Angle (deg)	Height (ft)	Unit Weight (kips/ft <sup>3</sup> )	Right Angle (deg)	Right Bench Width (ft)
1	Stage 3 = 1100 d	0	14	6	0.125	14	0

## Soil Layers

Ground Surface Drained: Yes

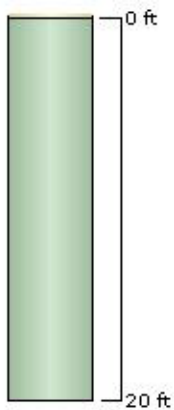
### CL-1: (-39, 25.6807)

Layer #	Type	Thickness [ft]	Depth [ft]	Drained at Bottom
1	Soft ML	20	0	No
2	Firm ML	0	20	No





### CL-2: (42, 26.306)

Layer #	Type	Thickness [ft]	Depth [ft]	Drained at Bottom
1	Soft ML	0	0	No
2	Firm ML	20	0	No



## Soil Properties

Property	Soft ML	Firm ML
Color		
Unit Weight [kips/ft <sup>3</sup> ]	0.115	0.105
Saturated Unit Weight [kips/ft <sup>3</sup> ]	0.115	0.11
Immediate Settlement	Enabled	Enabled
Es [ksf]	100	400
Esur [ksf]	100	400
Undrained Su A [kips/ft <sup>2</sup> ]	0	0
Undrained Su S	0.2	0.2
Undrained Su m	0.8	0.8
Piezo Line ID	1	0

## Groundwater

Groundwater method Piezometric Lines  
 Water Unit Weight 0.0624 kips/ft<sup>3</sup>

### Piezometric Line Entities

ID	Depth (ft)
1	1 ft

## Query Lines

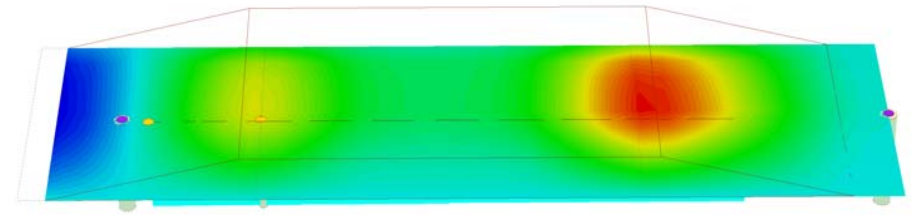
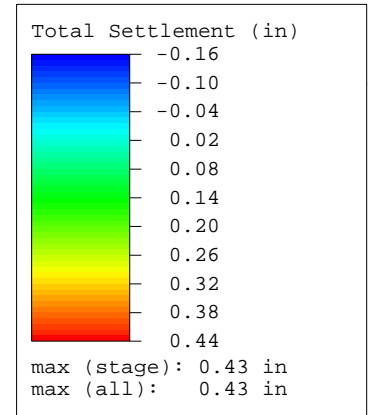
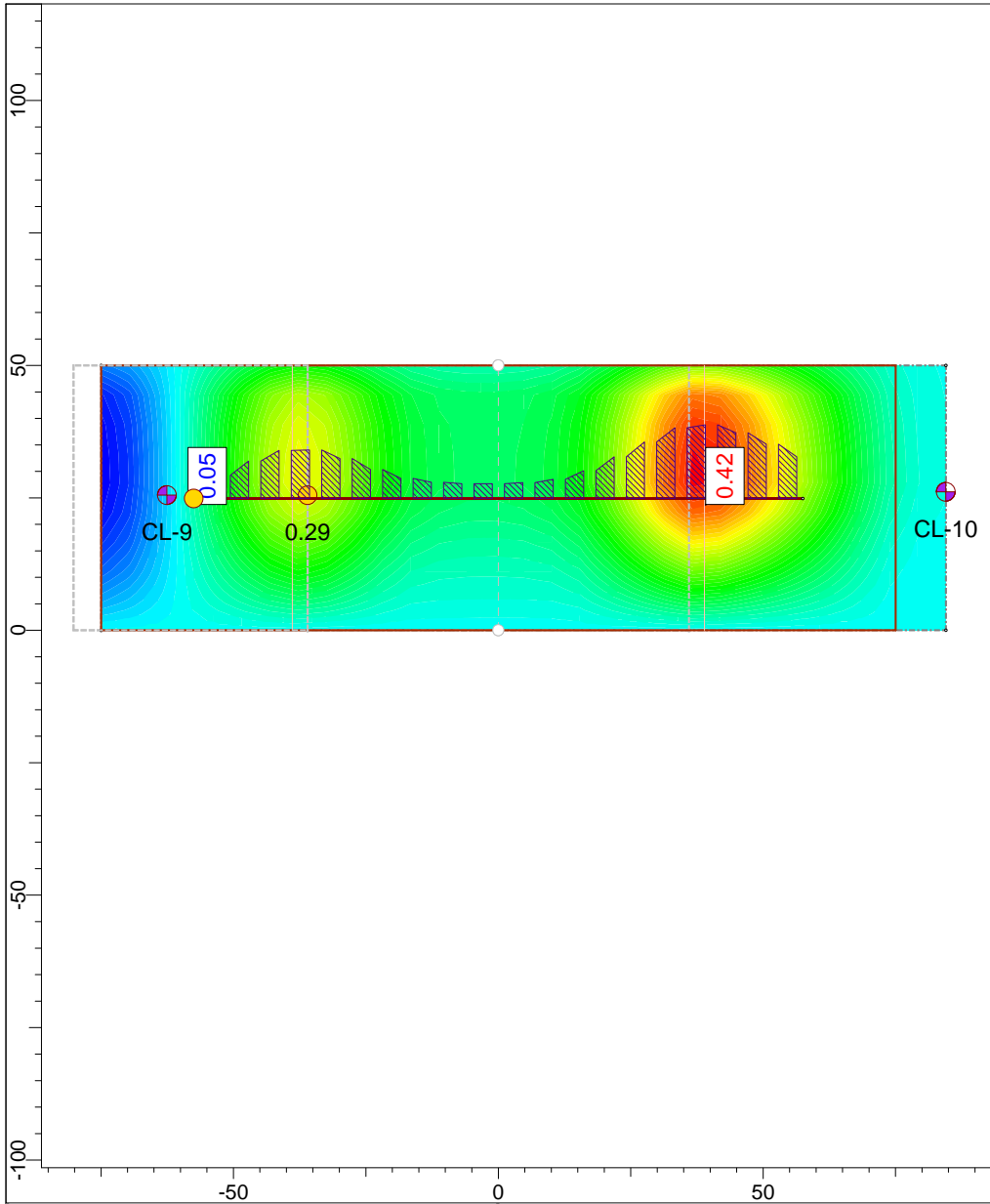
Line #	Start Location	End Location	Horizontal Divisions	Vertical Divisions
1	-57.5, 24.8582	57.5, 24.8582	20	Auto: 37

## Field Point Grid

Number of points 286  
 Expansion Factor 1

### Grid Coordinates

X [ft]	Y [ft]
90	95
90	-45
-90	-45
-90	95



Project		SC 557 Widening & Improvements	
Analysis Description		24" Dia. Cross-Line Pipe Culvert @ SC 557 Station 237+59	
Drawn By	JFH	Company	F&ME
Date		File Name	cl-9 and cl-10.s3z

# Settle3D Analysis Information

## SC 557 Widening & Improvements

### Project Settings

---

Document Name	cl-9 and cl-10
Project Title	SC 557 Widening & Improvements
Analysis	24" Dia. Cross-Line Pipe Culvert @ SC 557 Station 237+59
Author	JFH
Company	F&ME
Stress Computation Method	Boussinesq
Time-dependent Consolidation Analysis	
Time Units	days
Permeability Units	feet/day
Use average properties to calculate layered stresses	
Improve consolidation accuracy	
Ignore negative effective stresses in settlement calculations	

### Stage Settings

---

Stage #	Name	Time [days]
1	Stage 1	0
2	Stage 2	1000
3	Stage 3	1100
4	Stage 4	1200
5	Stage 5	1300
6	Stage 6	1400
7	Stage 7	1500
8	Stage 8	1600
9	Stage 9	1700
10	Stage 10	1800

### Results (relative to Stage: Stage 2 = 1000 d)

---

Time taken to compute: 0.81898 seconds

**Stage: Stage 1 = 0 d**

Data Type	Minimum	Maximum
Total Settlement [in]	0	0
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0
Effective Stress [ksf]	0	0
Total Stress [ksf]	0	0
Total Strain	0	0
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0	0
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0

### Stage: Stage 2 = 1000 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	0
Effective Stress [ksf]	0	0
Total Stress [ksf]	0	0
Total Strain	0	0
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0	0
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0

### Stage: Stage 3 = 1100 d



Data Type	Minimum	Maximum
Total Settlement [in]	-0.159933	0.434445
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	-0.159933	0.434445
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-0.566384	1.12391
Effective Stress [ksf]	-0.566384	1.12391
Total Stress [ksf]	-0.566384	1.12391
Total Strain	-0.00113248	0.00224781
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0	1.12391
Over-consolidation Ratio	0	19993.1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	-0.0131481	0.0272201

### Stage: Stage 4 = 1200 d

Data Type	Minimum	Maximum
Total Settlement [in]	-0.159933	0.434445
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	-0.159933	0.434445
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-0.566384	1.12391
Effective Stress [ksf]	-0.566384	1.12391
Total Stress [ksf]	-0.566384	1.12391
Total Strain	-0.00113248	0.00224781
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0	1.12391
Over-consolidation Ratio	0	19993.1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	-0.0131481	0.0272201

### Stage: Stage 5 = 1300 d

Data Type	Minimum	Maximum
Total Settlement [in]	-0.159933	0.434445
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	-0.159933	0.434445
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-0.566384	1.12391
Effective Stress [ksf]	-0.566384	1.12391
Total Stress [ksf]	-0.566384	1.12391
Total Strain	-0.00113248	0.00224781
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0	1.12391
Over-consolidation Ratio	0	19993.1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	-0.0131481	0.0272201

### Stage: Stage 6 = 1400 d

Data Type	Minimum	Maximum
Total Settlement [in]	-0.159933	0.434445
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	-0.159933	0.434445
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-0.566384	1.12391
Effective Stress [ksf]	-0.566384	1.12391
Total Stress [ksf]	-0.566384	1.12391
Total Strain	-0.00113248	0.00224781
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0	1.12391
Over-consolidation Ratio	0	19993.1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	-0.0131481	0.0272201

### Stage: Stage 7 = 1500 d

Data Type	Minimum	Maximum
Total Settlement [in]	-0.159933	0.434445
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	-0.159933	0.434445
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-0.566384	1.12391
Effective Stress [ksf]	-0.566384	1.12391
Total Stress [ksf]	-0.566384	1.12391
Total Strain	-0.00113248	0.00224781
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0	1.12391
Over-consolidation Ratio	0	19993.1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	-0.0131481	0.0272201

### Stage: Stage 8 = 1600 d

Data Type	Minimum	Maximum
Total Settlement [in]	-0.159933	0.434445
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	-0.159933	0.434445
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-0.566384	1.12391
Effective Stress [ksf]	-0.566384	1.12391
Total Stress [ksf]	-0.566384	1.12391
Total Strain	-0.00113248	0.00224781
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0	1.12391
Over-consolidation Ratio	0	19993.1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	-0.0131481	0.0272201

### Stage: Stage 9 = 1700 d

Data Type	Minimum	Maximum
Total Settlement [in]	-0.159933	0.434445
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	-0.159933	0.434445
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-0.566384	1.12391
Effective Stress [ksf]	-0.566384	1.12391
Total Stress [ksf]	-0.566384	1.12391
Total Strain	-0.00113248	0.00224781
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0	1.12391
Over-consolidation Ratio	0	19993.1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	-0.0131481	0.0272201

### Stage: Stage 10 = 1800 d

Data Type	Minimum	Maximum
Total Settlement [in]	-0.159933	0.434445
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	-0.159933	0.434445
Secondary Settlement [in]	0	0
Loading Stress [ksf]	-0.566384	1.12391
Effective Stress [ksf]	-0.566384	1.12391
Total Stress [ksf]	-0.566384	1.12391
Total Strain	-0.00113248	0.00224781
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0	1.12391
Over-consolidation Ratio	0	19993.1
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	-0.0131481	0.0272201

## Embankments

### 1. Embankment

Center Line (0, 0) to (0, 50)  
 Number of Layers 2  
 Near End Angle 90 degrees  
 Far End Angle 90 degrees  
 Base Width 72

Layer	Stage	Left Bench Width (ft)	Left Angle (deg)	Height (ft)	Unit Weight (kips/ft <sup>3</sup> )	Right Angle (deg)	Right Bench Width (ft)
1	Stage 1 = 0 d	0	90	2.7	0.115	22	0
2	Stage 1 = 0 d	0	18	5.8	0.115	22	0

**2. Embankment**

Center Line (0, 0) to (0, 50)  
 Number of Layers 1  
 Near End Angle 90 degrees  
 Far End Angle 90 degrees  
 Base Width 150

Layer	Stage	Left Bench Width (ft)	Left Angle (deg)	Height (ft)	Unit Weight (kips/ft <sup>3</sup> )	Right Angle (deg)	Right Bench Width (ft)
1	Stage 3 = 1100 d	0	14	9	0.125	14	0

**3. Embankment**

Center Line (-58.1, 0) to (-58.1, 50)  
 Number of Layers 2  
 Near End Angle 90 degrees  
 Far End Angle 90 degrees  
 Base Width 44.2

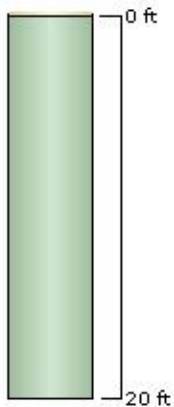
Layer	Stage	Left Bench Width (ft)	Left Angle (deg)	Height (ft)	Unit Weight (kips/ft <sup>3</sup> )	Right Angle (deg)	Right Bench Width (ft)
1	Stage 1 = 0 d	0	90	2.6	0.115	90	0
2	Stage 1 = 0 d	0	90	2.7	0.115	3.5	0

**Soil Layers**

Ground Surface Drained: Yes

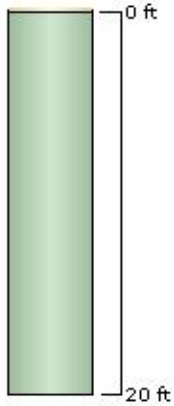
**CL-9: (-62.53, 25.484)**

Layer #	Type	Thickness [ft]	Depth [ft]	Drained at Bottom
1	Soft ML	0	0	No
2	Firm ML	20	0	No



**CL-10: (84.498, 26.106)**

Layer #	Type	Thickness [ft]	Depth [ft]	Drained at Bottom
1	Soft ML	0	0	No
2	Firm ML	20	0	No



**Soil Properties**

Property	Soft ML	Firm ML
Color		
Unit Weight [kips/ft <sup>3</sup> ]	0.115	0.11
Saturated Unit Weight [kips/ft <sup>3</sup> ]	0.115	0.11
Immediate Settlement	Enabled	Enabled
Es [ksf]	100	500
E <sub>sur</sub> [ksf]	100	500
Undrained Su A [kips/ft <sup>2</sup> ]	0	0
Undrained Su S	0.2	0.2
Undrained Su m	0.8	0.8
Piezo Line ID	0	0

**Groundwater**

Groundwater method Piezometric Lines  
 Water Unit Weight 0.0624 kips/ft<sup>3</sup>

**Query Points**

Point #	(X,Y) Location	Number of Divisions
1	-36, 25.4932	Auto: 31

**Query Lines**

Line #	Start Location	End Location	Horizontal Divisions	Vertical Divisions
1	-57.5, 24.8582	57.5, 24.8582	20	Auto: 31

**Field Point Grid**

Number of points 310  
Expansion Factor 1

**Grid Coordinates**

X [ft]	Y [ft]
154.298	119.8
154.298	-69.8
-150	-69.8
-150	119.8

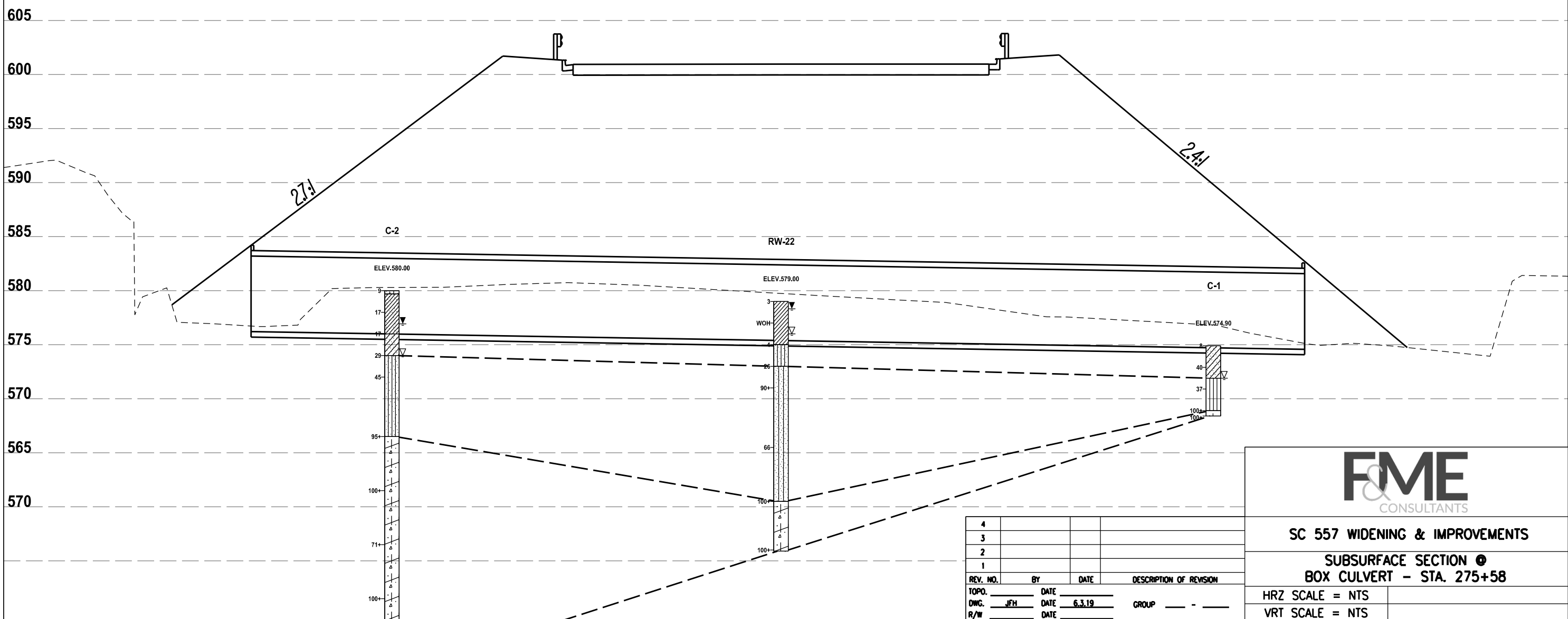
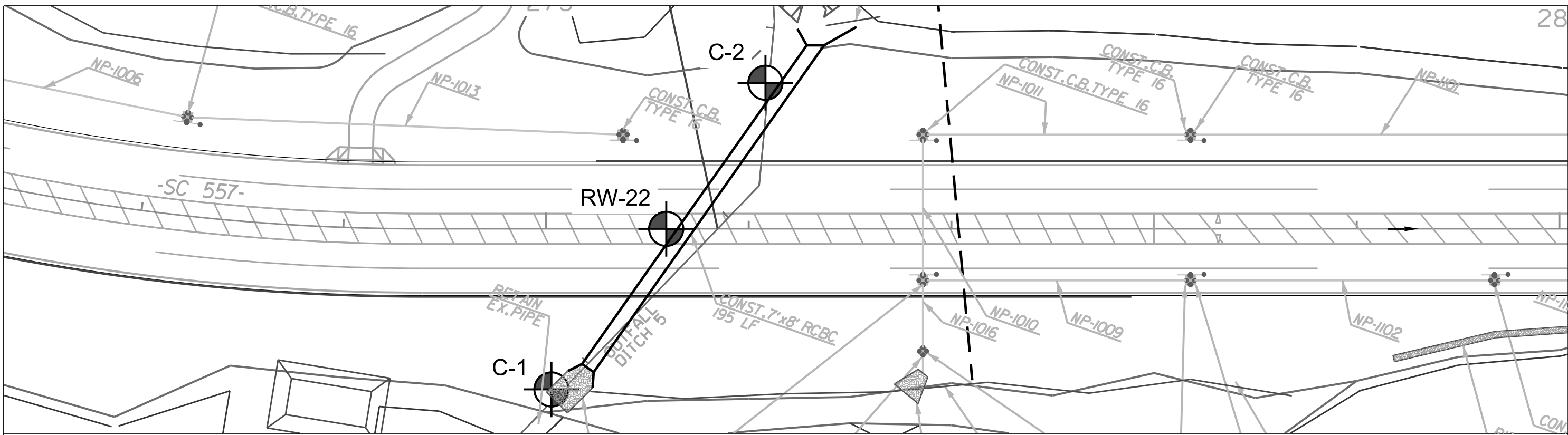
SC 557 Roadway Construction and Improvements  
Final Roadway Geotechnical Engineering Report

---

# APPENDIX

## SECTION 9 BOX CULVERT ANALYSES





**SC 557 WIDENING & IMPROVEMENTS**

**SUBSURFACE SECTION @  
BOX CULVERT - STA. 275+58**

HRZ SCALE = NTS  
VRT SCALE = NTS

REV. NO.	BY	DATE	DESCRIPTION OF REVISION
4			
3			
2			
1			
TOPO.		DATE	
DWG.	JFH	DATE 6.3.19	GROUP - -
R/W		DATE	

Project: SC 557 over Crowders Creek  
 Location : Station 276+00 (RW-22)  
 Calc. By: JFH  
 Date: 6/28/2019  
 Method: SCDOT Geotechnical Design Manual (2010), Chapter 13; Idriss & Boulanger (2008)

Depth to Groundwater =	1.0	ft
------------------------	-----	----

Soil Fill Unit Weight =	125	pcf
Soil Fill Height =	25.0	ft

Design Event =	FEE
Peak Ground Acceleration, PGA (%g) =	0.04
Earthquake Magnitude, $M_w$ =	7.3
Max. RF defining on-set of Liquefaction =	0.85

RW-22		High Overburden Correction																				Age Correction		Static Shear Stress Ratio Correction		CRR* <sub>eq,7.5</sub>	(D/C)* <sub>SL</sub>	EQ Hazard Desc.	SSL Potential					
SPT Test Interval	USCS Desig.	$\gamma$	$\gamma'$	$\sigma_v$	$\sigma'_v$	$N_{meas}$	$C_R$	$C_S$	$C_B$	$C_E$	$C_N$	$N'_{1,60}$	FC	PI	$\Delta N_{1,60}$	$N'_{1,60,CS}$	$\alpha$	$\beta$	$r_d$	$\sigma_{v,ob}$	$\sigma'_{v,ob}$	CSR <sub>PEAK</sub>	CSR <sub>EQ</sub>	MSF	CSR <sub>eq,7.5</sub>					$C_o$	$K_o$	$K_{OR}$	$K_{\alpha}$	
ft	dim	pcf	pcf	ksf	ksf	dim	dim	dim	dim	dim	dim	dim	%	dim	dim	dim	dim	dim	dim	dim	dim	ksf	ksf	dim	dim	dim	dim	dim	dim	dim	dim			
0.0	2.0	SC-SM	105	42.6	0.210	0.085	4	0.75	1.00	1.00	1.35	1.70	6.9	54	NP	5.5	12.4	-1.114	0.117	0.76955	3.34	3.21	0.032	0.021	1.054	0.020	0.082	0.97	1.00	1.00	0.131	0.15	Sand-Like	No SSL
2.0	4.0	SM	105	42.6	0.420	0.170	26	0.75	1.00	1.00	1.35	1.70	44.8	44	NP	5.5	50.3	-1.115	0.117	0.76939	3.55	3.30	0.033	0.022	1.054	0.020	0.300	0.87	1.00	1.00	--	0.00	Sand-Like	No SSL
4.0	6.0	SM	105	42.6	0.630	0.256	90	0.75	1.00	1.00	1.35	1.06	96.7	44	NP	5.5	102.2	-1.116	0.117	0.76923	3.76	3.38	0.034	0.022	1.054	0.021	-0.162	1.08	1.00	1.00	--	0.00	Sand-Like	No SSL
6.0	8.0	ML	105	42.6	0.840	0.341	66	0.85	1.00	1.00	1.35	1.14	86.0	44	NP	5.5	91.5	-1.117	0.117	0.76907	3.97	3.47	0.035	0.023	1.054	0.022	-0.211	1.10	1.00	1.00	--	0.00	Sand-Like	No SSL

SPT Test Interval	Layer Thickness	$N_{1,60,CS}$	$\gamma_{lim}$	$F_a$	$\gamma_{max}$	$\Delta LDI$	LD	$\epsilon_v$	$\Delta S$
ft	ft	dim	dim	dim	dim	in	in	%	in
0.0	2.0								
2.0	4.0								
4.0	6.0								
6.0	8.0								

S = 0.00

SPT Test Interval	$N_{1,60,CS}$	$\tau_{ci} / \sigma'_{vc}$	$R_u$	$\phi_{ci}$	$\tau_{ci}$
ft	dim	dim	%	deg	psf
0.0	2.0				
2.0	4.0				
4.0	6.0				
6.0	8.0				

$\tau_{ci} / \sigma'_{vc}$  = Liquefaction Residual Shear Strength Ratio  
 $R_u$  = Excess Pore Pressure Ratio  
 $\phi_{ci}$  = Internal Friction Angle for Cyclic Liquefaction  
 $\tau_{ci}$  = Liquefaction Residual Shear Strength

$\gamma_{lim}$  = Limiting Shear Strain; Limiting shear strain is further limited to 50% of the computed value (Idriss & Boulanger, 2008)  
 $\gamma_{max}$  = Maximum Shear Strain;  $\gamma_{max} = \gamma_{lim}$  if  $FS_{li} \leq F_a$  (Idriss & Boulanger, 2008)  
 $LDI$  = Lateral Displacement Index  
 $\epsilon_v$  = Volumetric Strain  
 $\Delta S$  = Liquefaction Induced Vertical Displacement

Project: SC 557 over Crowders Creek  
 Location : Station 276+00 (RW-22)  
 Calc. By: JFH  
 Date: 6/28/2019  
 Method: SCDOT Geotechnical Design Manual (2010); Chapter 13; Idriss & Boulanger (2008)

Depth to Groundwater = 1.0 ft	Soil Fill Unit Weight = 125 pcf	Design Event = SEE
	Soil Fill Height = 25.0 ft	Peak Ground Acceleration, PGA (%g) = 0.11
		Earthquake Magnitude, M <sub>w</sub> = 7.3
		Max. RF defining on-set of Liquefaction = 0.9

RW-22		High Overburden Correction																				Age Correction		Static Shear Stress Ratio Correction		CRR* <sub>eq,7.5</sub>	(D/C) <sub>SL</sub>	EQ Hazard Desc.	SSL Potential				
SPT Test Interval	USCS Desig.	γ	γ'	σ <sub>v</sub>	σ' <sub>v</sub>	N <sub>reqs</sub>	C <sub>R</sub>	C <sub>S</sub>	C <sub>B</sub>	C <sub>E</sub>	C <sub>N</sub>	N <sub>1,60</sub>	FC	PI	ΔN <sub>1,60</sub>	N <sub>1,60,CS</sub>	α	β	r <sub>d</sub>	σ <sub>v,OB</sub>	σ' <sub>v,OB</sub>	CSR <sub>PEAK</sub>	CSR <sub>EQ</sub>	MSF	CSR <sub>eq,7.5</sub>					C <sub>o</sub>	K <sub>o</sub>	K <sub>OR</sub>	K <sub>α</sub>
ft	dim	pcf	pcf	ksf	ksf	dim	dim	dim	dim	dim	dim	dim	%	dim	dim	dim	dim	dim	dim	dim	ksf	ksf	dim	dim	dim	dim	dim	dim	dim	dim	dim	dim	
0.0 - 2.0	SC-SM	105	42.6	0.210	0.085	4	0.75	1.00	1.00	1.35	1.70	6.9	54	NP	5.5	12.4	-1.114	0.117	0.76955	3.34	3.21	0.088	0.057	1.054	0.054	0.082	0.97	1.00	1.00	0.131	0.41	Sand-Like	No SSL
2.0 - 4.0	SM	105	42.6	0.420	0.170	26	0.75	1.00	1.00	1.35	1.70	44.8	44	NP	5.5	50.3	-1.115	0.117	0.76939	3.55	3.30	0.091	0.059	1.054	0.056	0.300	0.87	1.00	1.00	--	0.00	Sand-Like	No SSL
4.0 - 6.0	SM	105	42.6	0.630	0.256	90	0.75	1.00	1.00	1.35	1.06	96.7	44	NP	5.5	102.2	-1.116	0.117	0.76923	3.76	3.38	0.094	0.061	1.054	0.058	-0.162	1.08	1.00	1.00	--	0.00	Sand-Like	No SSL
6.0 - 8.0	ML	105	42.6	0.840	0.341	66	0.85	1.00	1.00	1.35	1.14	86.0	44	NP	5.5	91.5	-1.117	0.117	0.76907	3.97	3.47	0.097	0.063	1.054	0.060	-0.211	1.10	1.00	1.00	--	0.00	Sand-Like	No SSL

Liquefaction Induced Displacements									
SPT Test Interval	Layer Thickness	N <sub>1,60,CS</sub>	γ <sub>lim</sub>	F <sub>α</sub>	γ <sub>max</sub>	ΔLDI	LD	ε <sub>v</sub>	ΔS
ft	ft	dim	dim	dim	dim	in	in	%	in
0.0 - 2.0									
2.0 - 4.0									
4.0 - 6.0									
6.0 - 8.0									
									S = 0.00

Residual Soil Strength Parameters					
SPT Test Interval	N <sub>1,60,CS</sub>	τ <sub>rl</sub> / σ' <sub>v,cs</sub>	R <sub>u</sub>	φ <sub>rl</sub>	τ <sub>rl</sub>
ft	dim	dim	%	deg	psf
0.0 - 2.0					
2.0 - 4.0					
4.0 - 6.0					
6.0 - 8.0					

γ<sub>lim</sub> = Limiting Shear Strain; Limiting shear strain is further limited to 50% of the computed value (Idriss & Boulanger, 2008)  
 γ<sub>max</sub> = Maximum Shear Strain; γ<sub>max</sub> = γ<sub>lim</sub> if FS<sub>cs</sub> ≤ F<sub>α</sub> (Idriss & Boulanger, 2008)  
 LDI = Lateral Displacement Index  
 ε<sub>v</sub> = Volumetric Strain  
 S = Liquefaction Induced Vertical Displacement

τ<sub>rl</sub> / σ'<sub>v,cs</sub> = Liquefaction Residual Shear Strength Ratio  
 R<sub>u</sub> = Excess Pore Pressure Ratio  
 φ<sub>rl</sub> = Internal Friction Angle for Cyclic Liquefaction  
 τ<sub>rl</sub> = Liquefaction Residual Shear Strength

Project: SC 557 over Crowders Creek  
 Location: Station 276+00 (C-1)  
 Calc. By: JFH  
 Date: 6/28/2019  
 Method: SCDOT Geotechnical Design Manual (2010), Chapter 13; Idriss & Boulanger (2008)

Depth to Groundwater =	1.0	ft
------------------------	-----	----

Soil Fill Unit Weight =	125	pcf
Soil Fill Height =	25.0	ft

Design Event =	FEE
Peak Ground Acceleration, PGA (%g) =	0.04
Earthquake Magnitude, $M_w$ =	7.3
Max. RF defining on-set of Liquefaction =	0.85

C-1		High Overburden Correction																				Age Correction		Static Shear Stress Ratio Correction		CRR* <sub>eq,7.5</sub>	(D/C)* <sub>SL</sub>	EQ Hazard Desc.	SSL Potential					
SPT Test Interval	USCS Desig.	$\gamma$	$\gamma'$	$\sigma_v$	$\sigma'_v$	$N_{meas}$	$C_R$	$C_S$	$C_B$	$C_E$	$C_N$	$N'_{1,60}$	FC	PI	$\Delta N_{1,60}$	$N'_{1,60,CS}$	$\alpha$	$\beta$	$r_d$	$\sigma_{v,OB}$	$\sigma'_{v,OB}$	CSR <sub>PEAK</sub>	CSR <sub>EQ</sub>	MSF	CSR <sub>eq,7.5</sub>					$C_\alpha$	$K_\alpha$	$K_{OR}$	$K_\alpha$	
ft	dim	pcf	pcf	ksf	ksf	dim	dim	dim	dim	dim	dim	dim	%	dim	dim	dim	dim	dim	dim	dim	dim	ksf	ksf	dim	dim	dim	dim	dim	dim	dim	dim			
0.0	2.0	SC	105	42.6	0.210	0.085	8	0.75	1.00	1.00	1.35	1.70	13.8	55	8	5.5	19.3	-1.114	0.117	0.76955	3.34	3.21	0.032	0.021	1.009	0.021	0.106	0.96	1.00	1.00	0.189	0.11	Clay-Like	No Strength Loss
2.0	4.0	SC/ML	105	42.6	0.420	0.170	40	0.75	1.00	1.00	1.35	1.54	62.6	81	NP	5.5	68.1	-1.115	0.117	0.76939	3.55	3.30	0.033	0.022	1.054	0.020	-0.788	1.10	1.00	1.00	--	0.00	Sand-Like	No SSL
4.0	6.0	ML	105	42.6	0.630	0.256	37	0.75	1.00	1.00	1.35	1.52	57.0	81	NP	5.5	62.5	-1.116	0.117	0.76923	3.76	3.38	0.034	0.022	1.054	0.021	-2.824	1.10	1.00	1.00	--	0.00	Sand-Like	No SSL

SPT Test Interval	Layer Thickness	$N_{1,60,CS}$	$\gamma_{lim}$	$F_a$	$\gamma_{max}$	$\Delta LDI$	LD	$\epsilon_v$	$\Delta S$
ft	ft	dim	dim	dim	dim	in	in	%	in
0.0	2.0								
2.0	4.0								
4.0	6.0								

S = 0.00

SPT Test Interval	$N_{1,60,CS}$	$\tau_{ci} / \sigma'_{vc}$	$R_u$	$\phi_{ci}$	$\tau_{ci}$
ft	dim	dim	%	deg	psf
0.0	2.0				
2.0	4.0				
4.0	6.0				

$\tau_{ci} / \sigma'_{vc}$  = Liquefaction Residual Shear Strength Ratio  
 $R_u$  = Excess Pore Pressure Ratio  
 $\phi_{ci}$  = Internal Friction Angle for Cyclic Liquefaction  
 $\tau_{ci}$  = Liquefaction Residual Shear Strength

$\gamma_{lim}$  = Limiting Shear Strain; Limiting shear strain is further limited to 50% of the computed value (Idriss & Boulanger, 2008)  
 $\gamma_{max}$  = Maximum Shear Strain;  $\gamma_{max} = \gamma_{lim}$  if  $FS_{li} \leq F_a$  (Idriss & Boulanger, 2008)  
 LDI = Lateral Displacement Index  
 $\epsilon_v$  = Volumetric Strain  
 S = Liquefaction Induced Vertical Displacement

Project: SC 557 over Crowders Creek  
 Location : Station 276+00 (C-1)  
 Calc. By: JFH  
 Date: 6/28/2019  
 Method: SCDOT Geotechnical Design Manual (2010); Chapter 13; Idriss & Boulanger (2008)

Depth to Groundwater = 1.0 ft	Soil Fill Unit Weight = 125 pcf	Design Event = SEE
	Soil Fill Height = 25.0 ft	Peak Ground Acceleration, PGA (%g) = 0.11
		Earthquake Magnitude, M <sub>w</sub> = 7.3
		Max. RF defining on-set of Liquefaction = 0.9

C-1		High Overburden Correction																				Age Correction		Static Shear Stress Ratio Correction		CRR* <sub>eq,7.5</sub>	(D/C) <sub>SL</sub>	EQ Hazard Desc.	SSL Potential				
SPT Test Interval	USCS Desig.	γ	γ'	σ <sub>v</sub>	σ' <sub>v</sub>	N <sub>reqs</sub>	C <sub>R</sub>	C <sub>S</sub>	C <sub>B</sub>	C <sub>E</sub>	C <sub>N</sub>	N <sub>1,60</sub>	FC	PI	ΔN <sub>1,60</sub>	N <sub>1,60,CS</sub>	α	β	r <sub>d</sub>	σ <sub>v,OB</sub>	σ' <sub>v,OB</sub>	CSR <sub>PEAK</sub>	CSR <sub>EQ</sub>	MSF	CSR <sub>eq,7.5</sub>					C <sub>o</sub>	K <sub>o</sub>	K <sub>OR</sub>	K <sub>α</sub>
ft	dim	pcf	pcf	ksf	ksf	dim	dim	dim	dim	dim	dim	dim	%	dim	dim	dim	dim	dim	dim	dim	ksf	ksf	dim	dim	dim	dim	dim	dim	dim	dim	dim		
0.0 - 2.0	SC	105	42.6	0.210	0.085	8	0.75	1.00	1.00	1.35	1.70	13.8	55	8	5.5	19.3	-1.114	0.117	0.76955	3.34	3.21	0.088	0.057	1.009	0.057	0.106	0.96	1.00	1.00	0.189	0.30	Clay-Like	No Strength Loss
2.0 - 4.0	SC/ML	105	42.6	0.420	0.170	40	0.75	1.00	1.00	1.35	1.54	62.6	81	NP	5.5	68.1	-1.115	0.117	0.76939	3.55	3.30	0.091	0.059	1.054	0.056	-0.788	1.10	1.00	1.00	--	0.00	Sand-Like	No SSL
4.0 - 6.0	ML	105	42.6	0.630	0.256	37	0.75	1.00	1.00	1.35	1.52	57.0	81	NP	5.5	62.5	-1.116	0.117	0.76923	3.76	3.38	0.094	0.061	1.054	0.058	-2.824	1.10	1.00	1.00	--	0.00	Sand-Like	No SSL

SPT Test Interval	Layer Thickness	N <sub>1,60,CS</sub>	Y <sub>lim</sub>	F <sub>a</sub>	Y <sub>max</sub>	ΔLDI	LD	ε <sub>v</sub>	ΔS
ft	ft	dim	dim	dim	dim	in	in	%	in
0.0 - 2.0									
2.0 - 4.0									
4.0 - 6.0									

SPT Test Interval	N <sub>1,60,CS</sub>	τ <sub>rl</sub> / σ' <sub>v,cs</sub>	R <sub>u</sub>	φ <sub>rl</sub>	τ <sub>rl</sub>
ft	dim	dim	%	deg	psf
0.0 - 2.0					
2.0 - 4.0					
4.0 - 6.0					

Y<sub>lim</sub> = Limiting Shear Strain; Limiting shear strain is further limited to 50% of the computed value (Idriss & Boulanger, 2008)  
 Y<sub>max</sub> = Maximum Shear Strain; Y<sub>max</sub> = Y<sub>lim</sub> if FS<sub>cs</sub> ≤ F<sub>a</sub> (Idriss & Boulanger, 2008)  
 LDI = Lateral Displacement Index  
 ε<sub>v</sub> = Volumetric Strain  
 S = Liquefaction Induced Vertical Displacement

τ<sub>rl</sub> / σ'<sub>v,cs</sub> = Liquefaction Residual Shear Strength Ratio  
 R<sub>u</sub> = Excess Pore Pressure Ratio  
 φ<sub>rl</sub> = Internal Friction Angle for Cyclic Liquefaction  
 τ<sub>rl</sub> = Liquefaction Residual Shear Strength

Project: SC 557 over Crowders Creek  
 Location : Station 276+00 (C-2)  
 Calc. By: JFH  
 Date: 6/28/2019  
 Method: SCDOT Geotechnical Design Manual (2010), Chapter 13; Idriss & Boulanger (2008)

Depth to Groundwater =	0.0	ft
------------------------	-----	----

Soil Fill Unit Weight =	125	pcf
Soil Fill Height =	25.0	ft

Design Event =	FEE
Peak Ground Acceleration, PGA (%g) =	0.04
Earthquake Magnitude, $M_w$ =	7.3
Max. RF defining on-set of Liquefaction =	0.85

C-2																						High Overburden Correction		Age Correction		Static Shear Stress Ratio Correction									
SPT Test Interval	USCS Desig.	$\gamma$	$\gamma'$	$\sigma_v$	$\sigma'_v$	$N_{meas}$	$C_R$	$C_S$	$C_B$	$C_E$	$C_N$	$N'_{1,60}$	FC	PI	$\Delta N_{1,60}$	$N'_{1,60,CS}$	$\alpha$	$\beta$	$r_d$	$\sigma_{v,OB}$	$\sigma'_{v,OB}$	CSR <sub>PEAK</sub>	CSR <sub>EQ</sub>	MSF	CSR <sub>EQ,7.5</sub>	$C_\alpha$	$K_\alpha$	$K_{OR}$	$K_\alpha$	CRR <sub>EQ,7.5</sub>	(D/C) <sub>SL</sub>	EQ Hazard Desc.	SSL Potential		
ft	dim	pcf	pcf	ksf	ksf	dim	dim	dim	dim	dim	dim	dim	%	dim	dim	dim	dim	dim	dim	dim	ksf	ksf	dim	dim	dim	dim	dim	dim	dim	dim	dim	dim	dim	dim	dim
0.0	2.0	ML	105	42.6	0.210	0.085	29	0.75	1.00	1.00	1.35	1.70	49.9	53	NP	5.5	55.4	-1.114	0.117	0.76955	3.34	3.21	0.032	0.021	1.054	0.020	0.300	0.88	1.00	1.00	--	0.00	Sand-Like	No SSL	
2.0	4.0	ML	105	42.6	0.420	0.170	45	0.75	1.00	1.00	1.35	1.47	66.9	53	NP	5.5	72.4	-1.115	0.117	0.76939	3.55	3.30	0.033	0.022	1.054	0.020	-0.511	1.10	1.00	1.00	--	0.00	Sand-Like	No SSL	

Liquefaction Induced Displacements									
SPT Test Interval	Layer Thickness	$N_{1,60,CS}$	$\gamma_{lim}$	$F_a$	$\gamma_{max}$	$\Delta LDI$	LD	$\epsilon_v$	$\Delta S$
ft	ft	dim	dim	dim	dim	in	in	%	in
0.0	2.0								
2.0	4.0								

S = 0.00

Residual Soil Strength Parameters					
SPT Test Interval	$N_{1,60,CS}$	$\tau_{rl} / \sigma'_{vo}$	$R_u$	$\phi_{rl}$	$\tau_{rl}$
ft	dim	dim	%	deg	psf
0.0	2.0				
2.0	4.0				

$\tau_{rl} / \sigma'_{vo}$  = Liquefaction Residual Shear Strength Ratio  
 $R_u$  = Excess Pore Pressure Ratio  
 $\phi_{rl}$  = Internal Friction Angle for Cyclic Liquefaction  
 $\tau_{rl}$  = Liquefaction Residual Shear Strength

$\gamma_{lim}$  = Limiting Shear Strain; Limiting shear strain is further limited to 50% of the computed value (Idriss & Boulanger, 2008)  
 $\gamma_{max}$  = Maximum Shear Strain;  $\gamma_{max} = \gamma_{lim}$  if  $FS_{li} \leq F_a$  (Idriss & Boulanger, 2008)  
 LDI = Lateral Displacement Index  
 $\epsilon_v$  = Volumetric Strain  
 S = Liquefaction Induced Vertical Displacement

Project: SC 557 over Crowders Creek  
 Location : Station 276+00 (C-2)  
 Calc. By: JFH  
 Date: 6/28/2019  
 Method: SCDOT Geotechnical Design Manual (2010); Chapter 13; Idriss & Boulanger (2008)

Depth to Groundwater = 0.0 ft	Soil Fill Unit Weight = 125 pcf	Design Event = SEE
	Soil Fill Height = 25.0 ft	Peak Ground Acceleration, PGA (%g) = 0.11
		Earthquake Magnitude, $M_w$ = 7.3
		Max. RF defining on-set of Liquefaction = 0.9

C-2		High Overburden Correction																				Age Correction		Static Shear Stress Ratio Correction		CRR <sub>eq,7.5</sub>	(D/C) <sub>SL</sub>	EQ Hazard Desc.	SSL Potential				
SPT Test Interval	USCS Desig.	$\gamma$	$\gamma'$	$\sigma_v$	$\sigma'_v$	$N_{reqs}$	$C_R$	$C_S$	$C_B$	$C_E$	$C_N$	$N_{1,60}$	FC	PI	$\Delta N_{1,60}$	$N'_{1,60,CS}$	$\alpha$	$\beta$	$r_d$	$\sigma_{v,OB}$	$\sigma'_{v,OB}$	CSR <sub>PEAK</sub>	CSR <sub>eq</sub>	MSF	CSR <sub>eq,7.5</sub>					$C_o$	$K_o$	$K_{OR}$	$K_{\alpha}$
ft	dim	pcf	pcf	ksf	ksf	dim	dim	dim	dim	dim	dim	dim	%	dim	dim	dim	dim	dim	dim	dim	ksf	ksf	dim	dim	dim	dim	dim	dim	dim	dim	dim		
0.0 - 2.0	ML	105	42.6	0.210	0.085	29	0.75	1.00	1.00	1.35	1.70	49.9	53	NP	5.5	55.4	-1.114	0.117	0.76955	3.34	3.21	0.088	0.057	1.054	0.054	0.300	0.88	1.00	1.00	--	0.00	Sand-Like	No SSL
2.0 - 4.0	ML	105	42.6	0.420	0.170	45	0.75	1.00	1.00	1.35	1.47	66.9	53	NP	5.5	72.4	-1.115	0.117	0.76939	3.55	3.30	0.091	0.059	1.054	0.056	-0.511	1.10	1.00	1.00	--	0.00	Sand-Like	No SSL

Liquefaction Induced Displacements									
SPT Test Interval	Layer Thickness	$N_{1,60,CS}$	$V_{lim}$	$F_a$	$V_{max}$	$\Delta LDI$	LD	$\epsilon_v$	$\Delta S$
ft	ft	dim	dim	dim	dim	in	in	%	in
0.0 - 2.0									
2.0 - 4.0									
									S = 0.00

Residual Soil Strength Parameters					
SPT Test Interval	$N_{1,60,CS}$	$\tau_{rl} / \sigma'_{v,c}$	$R_w$	$\phi_{rl}$	$\tau_{rl}$
ft	dim	dim	%	deg	psf
0.0 - 2.0					
2.0 - 4.0					

$V_{lim}$  = Limiting Shear Strain; Limiting shear strain is further limited to 50% of the computed value (Idriss & Boulanger, 2008)  
 $V_{max}$  = Maximum Shear Strain;  $V_{max} = V_{lim}$  if  $FS_{c_1} \leq F_a$  (Idriss & Boulanger, 2008)  
 LD = Lateral Displacement Index  
 $\epsilon_v$  = Volumetric Strain  
 S = Liquefaction Induced Vertical Displacement

$\tau_{rl} / \sigma'_{v,c}$  = Liquefaction Residual Shear Strength Ratio  
 $R_w$  = Excess Pore Pressure Ratio  
 $\phi_{rl}$  = Internal Friction Angle for Cyclic Liquefaction  
 $\tau_{rl}$  = Liquefaction Residual Shear Strength



Project: SC 557 Widening & Improvements

Date: 6/18/2019

Analysis: Bearing Capacity Analysis for Box Culvert at Station 275+58 (assumes no mucking below bottom of culvert)

**Foundation Soils**

USCS = ML  
 $N_{meas} = 4$  bpf  
 $\gamma = 105$  pcf  
 $\phi = 30$  deg  
 $c = 0$  psf

**Box Culvert Length**

$L = 195$  ft

*Theoretical Estimation of Bearing Capacity (AASHTO LRFD Bridge Design Specifications, Eq. 10.6.3.1.2a-1)*

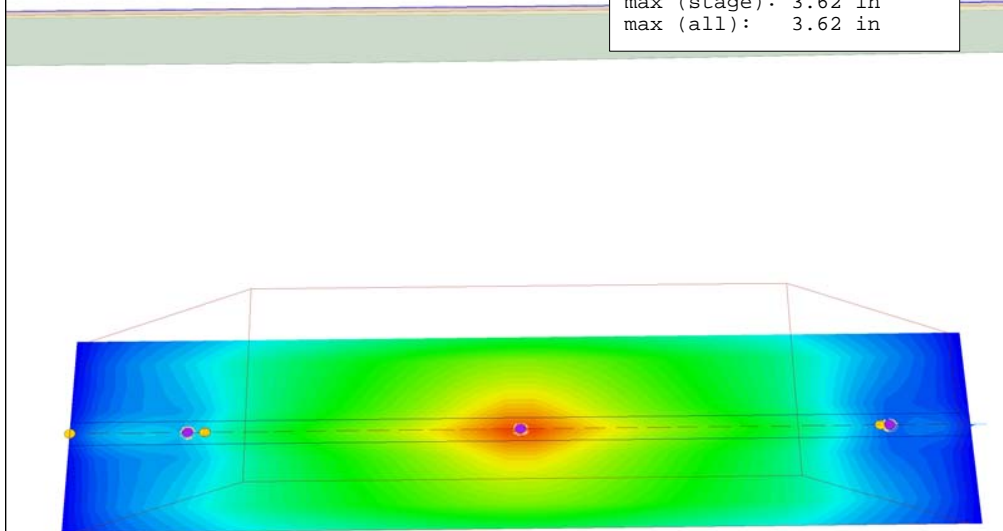
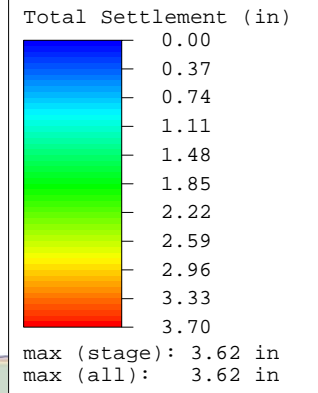
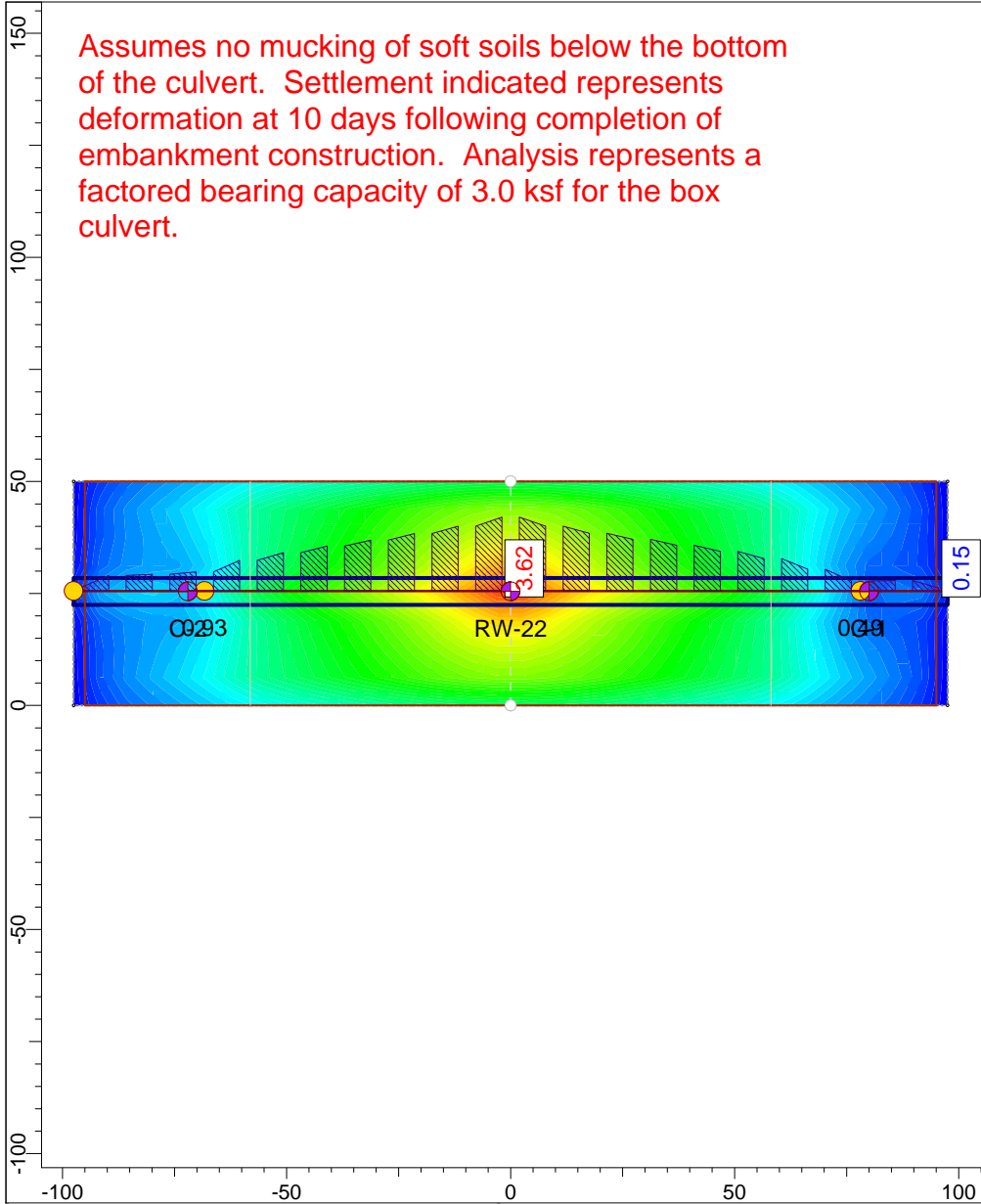
$$q_n = cN_{cm} + \gamma D_f N_{qm} C_{wq} + 0.5\gamma B N_{ym} C_{wy}$$

D <sub>f</sub> (ft)	γ (pcf)	c (psf)	B (ft)	N <sub>cm</sub>	N <sub>qm</sub>	N <sub>ym</sub>	N <sub>c</sub>	N <sub>q</sub>	N <sub>γ</sub>	s <sub>c</sub>	s <sub>q</sub>	s <sub>γ</sub>	d <sub>q</sub>	C <sub>wq</sub>	C <sub>wy</sub>	q <sub>n</sub> (psf)	Resistance Factor (Φ)	
																	Static	Seismic
2	105	0	8	30.895	18.401	22.035	30.14	18.40	22.40	1.025	1.000	0.984	1	0.5	0.5	6559.44	0.45	1.00

$q_R = \Phi q_n = 1.48$  tsf     *Static*  
 $3.28$  tsf     *Seismic*



Assumes no mucking of soft soils below the bottom of the culvert. Settlement indicated represents deformation at 10 days following completion of embankment construction. Analysis represents a factored bearing capacity of 3.0 ksf for the box culvert.



Project	SC 557 Widening & Improvements		
Analysis Description	Box Culvert @ 275+58 - w/o Mucking		
Drawn By	John Hamilton	Company	F&ME
Date		File Name	Box Culvert @ Sta. 276+00.s3z

# Settle3D Analysis Information

## SC 557 Widening & Improvements

### Project Settings

---

Document Name	Box Culvert @ Sta. 276+00
Project Title	SC 557 Widening & Improvements
Analysis	Box Culvert @ 275+58 - w/o Mucking
Author	John Hamilton
Company	F&ME
Stress Computation Method	Boussinesq
Time-dependent Consolidation Analysis	
Time Units	days
Permeability Units	feet/day
Use average properties to calculate layered stresses	
Improve consolidation accuracy	
Ignore negative effective stresses in settlement calculations	

### Stage Settings

---

Stage #	Name	Time [days]
1	Stage 1	0
2	Stage 2	10
3	Stage 3	20
4	Stage 4	30
5	Stage 5	40
6	Stage 6	50
7	Stage 7	60
8	Stage 8	70
9	Stage 9	80
10	Stage 10	90
11	Stage 11	100
12	Stage 12	200
13	Stage 13	300
14	Stage 14	400
15	Stage 15	500
16	Stage 16	600
17	Stage 17	700
18	Stage 18	800
19	Stage 19	900
20	Stage 20	1000

### Results

---

Time taken to compute: 2.67868 seconds

**Stage: Stage 1 = 0 d**

Data Type	Minimum	Maximum
Total Settlement [in]	0	1.82323
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	1.82323
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	5.23746
Effective Stress [ksf]	0	1.60792
Total Stress [ksf]	0	5.99042
Total Strain	0	0.01125
Pore Water Pressure [ksf]	0	5.63403
Excess Pore Water Pressure [ksf]	0	5.23746
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.00019687	1.60726
Over-consolidation Ratio	1	85.3337
Void Ratio	0	1.27
Permeability [ft/d]	0	24.7326
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	10
Undrained Shear Strength	0	0.321583

### Stage: Stage 2 = 10 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.62276
Consolidation Settlement [in]	0	1.79954
Immediate Settlement [in]	0	1.82323
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	5.23746
Effective Stress [ksf]	0	5.5711
Total Stress [ksf]	0	5.99042
Total Strain	3.60082e-007	0.126438
Pore Water Pressure [ksf]	0	1.80678
Excess Pore Water Pressure [ksf]	-8.24606e-017	1.26452e-005
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.0045303	5.56546
Over-consolidation Ratio	1	11.6471
Void Ratio	0	1.27
Permeability [ft/d]	0	24.7326
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.382197

### Stage: Stage 3 = 20 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.62276
Consolidation Settlement [in]	0	1.79954
Immediate Settlement [in]	0	1.82323
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	5.23746
Effective Stress [ksf]	0	5.5711
Total Stress [ksf]	0	5.99042
Total Strain	3.60082e-007	0.126438
Pore Water Pressure [ksf]	0	1.80678
Excess Pore Water Pressure [ksf]	-2.39571e-016	4.95968e-011
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.0045303	5.56546
Over-consolidation Ratio	1	11.6471
Void Ratio	0	1.27
Permeability [ft/d]	0	24.7326
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.382197

### Stage: Stage 4 = 30 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.62276
Consolidation Settlement [in]	0	1.79954
Immediate Settlement [in]	0	1.82323
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	5.23746
Effective Stress [ksf]	0	5.5711
Total Stress [ksf]	0	5.99042
Total Strain	3.60082e-007	0.126438
Pore Water Pressure [ksf]	0	1.80678
Excess Pore Water Pressure [ksf]	-1.39199e-016	2.04134e-016
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.0045303	5.56546
Over-consolidation Ratio	1	11.6471
Void Ratio	0	1.27
Permeability [ft/d]	0	24.7326
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.382197

### Stage: Stage 5 = 40 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.62276
Consolidation Settlement [in]	0	1.79954
Immediate Settlement [in]	0	1.82323
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	5.23746
Effective Stress [ksf]	0	5.5711
Total Stress [ksf]	0	5.99042
Total Strain	3.60082e-007	0.126438
Pore Water Pressure [ksf]	0	1.80678
Excess Pore Water Pressure [ksf]	-1.27083e-016	9.40163e-017
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.0045303	5.56546
Over-consolidation Ratio	1	11.6471
Void Ratio	0	1.27
Permeability [ft/d]	0	24.7326
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.382197

### Stage: Stage 6 = 50 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.62276
Consolidation Settlement [in]	0	1.79954
Immediate Settlement [in]	0	1.82323
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	5.23746
Effective Stress [ksf]	0	5.5711
Total Stress [ksf]	0	5.99042
Total Strain	3.60082e-007	0.126438
Pore Water Pressure [ksf]	0	1.80678
Excess Pore Water Pressure [ksf]	-7.51934e-017	1.17662e-016
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.0045303	5.56546
Over-consolidation Ratio	1	11.6471
Void Ratio	0	1.27
Permeability [ft/d]	0	24.7326
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.382197

### Stage: Stage 7 = 60 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.62276
Consolidation Settlement [in]	0	1.79954
Immediate Settlement [in]	0	1.82323
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	5.23746
Effective Stress [ksf]	0	5.5711
Total Stress [ksf]	0	5.99042
Total Strain	3.60082e-007	0.126438
Pore Water Pressure [ksf]	0	1.80678
Excess Pore Water Pressure [ksf]	-1.09062e-016	7.53323e-017
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.0045303	5.56546
Over-consolidation Ratio	1	11.6471
Void Ratio	0	1.27
Permeability [ft/d]	0	24.7326
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.382197

### Stage: Stage 8 = 70 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.62276
Consolidation Settlement [in]	0	1.79954
Immediate Settlement [in]	0	1.82323
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	5.23746
Effective Stress [ksf]	0	5.5711
Total Stress [ksf]	0	5.99042
Total Strain	3.60082e-007	0.126438
Pore Water Pressure [ksf]	0	1.80678
Excess Pore Water Pressure [ksf]	-1.02306e-016	6.21862e-017
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.0045303	5.56546
Over-consolidation Ratio	1	11.6471
Void Ratio	0	1.27
Permeability [ft/d]	0	24.7326
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.382197

### Stage: Stage 9 = 80 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.62276
Consolidation Settlement [in]	0	1.79954
Immediate Settlement [in]	0	1.82323
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	5.23746
Effective Stress [ksf]	0	5.5711
Total Stress [ksf]	0	5.99042
Total Strain	3.60082e-007	0.126438
Pore Water Pressure [ksf]	0	1.80678
Excess Pore Water Pressure [ksf]	-9.60216e-017	5.13521e-017
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.0045303	5.56546
Over-consolidation Ratio	1	11.6471
Void Ratio	0	1.27
Permeability [ft/d]	0	24.7326
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.382197

### Stage: Stage 10 = 90 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.62276
Consolidation Settlement [in]	0	1.79954
Immediate Settlement [in]	0	1.82323
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	5.23746
Effective Stress [ksf]	0	5.5711
Total Stress [ksf]	0	5.99042
Total Strain	3.60082e-007	0.126438
Pore Water Pressure [ksf]	0	1.80678
Excess Pore Water Pressure [ksf]	-9.01651e-017	4.24152e-017
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.0045303	5.56546
Over-consolidation Ratio	1	11.6471
Void Ratio	0	1.27
Permeability [ft/d]	0	24.7326
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.382197

### Stage: Stage 11 = 100 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.62276
Consolidation Settlement [in]	0	1.79954
Immediate Settlement [in]	0	1.82323
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	5.23746
Effective Stress [ksf]	0	5.5711
Total Stress [ksf]	0	5.99042
Total Strain	3.60082e-007	0.126438
Pore Water Pressure [ksf]	0	1.80678
Excess Pore Water Pressure [ksf]	-2.79335e-017	8.5547e-017
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.0045303	5.56546
Over-consolidation Ratio	1	11.6471
Void Ratio	0	1.27
Permeability [ft/d]	0	24.7326
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.382197

### Stage: Stage 12 = 200 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.62276
Consolidation Settlement [in]	0	1.79954
Immediate Settlement [in]	0	1.82323
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	5.23746
Effective Stress [ksf]	0	5.5711
Total Stress [ksf]	0	5.99042
Total Strain	3.60082e-007	0.126438
Pore Water Pressure [ksf]	0	1.80678
Excess Pore Water Pressure [ksf]	-2.41569e-017	6.96964e-017
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.0045303	5.56546
Over-consolidation Ratio	1	11.6471
Void Ratio	0	1.27
Permeability [ft/d]	0	24.7326
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.382197

### Stage: Stage 13 = 300 d



Data Type	Minimum	Maximum
Total Settlement [in]	0	3.62276
Consolidation Settlement [in]	0	1.79954
Immediate Settlement [in]	0	1.82323
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	5.23746
Effective Stress [ksf]	0	5.5711
Total Stress [ksf]	0	5.99042
Total Strain	3.60082e-007	0.126438
Pore Water Pressure [ksf]	0	1.80678
Excess Pore Water Pressure [ksf]	-2.22969e-017	6.76424e-017
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.0045303	5.56546
Over-consolidation Ratio	1	11.6471
Void Ratio	0	1.27
Permeability [ft/d]	0	24.7326
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.382197

### Stage: Stage 14 = 400 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.62276
Consolidation Settlement [in]	0	1.79954
Immediate Settlement [in]	0	1.82323
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	5.23746
Effective Stress [ksf]	0	5.5711
Total Stress [ksf]	0	5.99042
Total Strain	3.60082e-007	0.126438
Pore Water Pressure [ksf]	0	1.80678
Excess Pore Water Pressure [ksf]	-2.19868e-017	6.6713e-017
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.0045303	5.56546
Over-consolidation Ratio	1	11.6471
Void Ratio	0	1.27
Permeability [ft/d]	0	24.7326
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.382197

### Stage: Stage 15 = 500 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.62276
Consolidation Settlement [in]	0	1.79954
Immediate Settlement [in]	0	1.82323
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	5.23746
Effective Stress [ksf]	0	5.5711
Total Stress [ksf]	0	5.99042
Total Strain	3.60082e-007	0.126438
Pore Water Pressure [ksf]	0	1.80678
Excess Pore Water Pressure [ksf]	-2.23915e-017	6.57969e-017
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.0045303	5.56546
Over-consolidation Ratio	1	11.6471
Void Ratio	0	1.27
Permeability [ft/d]	0	24.7326
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.382197

### Stage: Stage 16 = 600 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.62276
Consolidation Settlement [in]	0	1.79954
Immediate Settlement [in]	0	1.82323
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	5.23746
Effective Stress [ksf]	0	5.5711
Total Stress [ksf]	0	5.99042
Total Strain	3.60082e-007	0.126438
Pore Water Pressure [ksf]	0	1.80678
Excess Pore Water Pressure [ksf]	-2.13764e-017	6.48938e-017
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.0045303	5.56546
Over-consolidation Ratio	1	11.6471
Void Ratio	0	1.27
Permeability [ft/d]	0	24.7326
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.382197

### Stage: Stage 17 = 700 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.62276
Consolidation Settlement [in]	0	1.79954
Immediate Settlement [in]	0	1.82323
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	5.23746
Effective Stress [ksf]	0	5.5711
Total Stress [ksf]	0	5.99042
Total Strain	3.60082e-007	0.126438
Pore Water Pressure [ksf]	0	1.80678
Excess Pore Water Pressure [ksf]	-2.15757e-017	6.40036e-017
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.0045303	5.56546
Over-consolidation Ratio	1	11.6471
Void Ratio	0	1.27
Permeability [ft/d]	0	24.7326
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.382197

### Stage: Stage 18 = 800 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.62276
Consolidation Settlement [in]	0	1.79954
Immediate Settlement [in]	0	1.82323
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	5.23746
Effective Stress [ksf]	0	5.5711
Total Stress [ksf]	0	5.99042
Total Strain	3.60082e-007	0.126438
Pore Water Pressure [ksf]	0	1.80678
Excess Pore Water Pressure [ksf]	-2.12162e-017	6.31261e-017
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.0045303	5.56546
Over-consolidation Ratio	1	11.6471
Void Ratio	0	1.27
Permeability [ft/d]	0	24.7326
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.382197

### Stage: Stage 19 = 900 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.62276
Consolidation Settlement [in]	0	1.79954
Immediate Settlement [in]	0	1.82323
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	5.23746
Effective Stress [ksf]	0	5.5711
Total Stress [ksf]	0	5.99042
Total Strain	3.60082e-007	0.126438
Pore Water Pressure [ksf]	0	1.80678
Excess Pore Water Pressure [ksf]	-2.08629e-017	6.22611e-017
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.0045303	5.56546
Over-consolidation Ratio	1	11.6471
Void Ratio	0	1.27
Permeability [ft/d]	0	24.7326
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.382197

### Stage: Stage 20 = 1000 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.62276
Consolidation Settlement [in]	0	1.79954
Immediate Settlement [in]	0	1.82323
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	5.23746
Effective Stress [ksf]	0	5.5711
Total Stress [ksf]	0	5.99042
Total Strain	3.60082e-007	0.126438
Pore Water Pressure [ksf]	0	1.80678
Excess Pore Water Pressure [ksf]	-6.14998e-017	2.02272e-017
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	0.0045303	5.56546
Over-consolidation Ratio	1	11.6471
Void Ratio	0	1.27
Permeability [ft/d]	0	24.7326
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	1.51
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	100
Undrained Shear Strength	0	0.382197

## Loads

### 1. Rectangular Load

Length	195 ft
Width	6 ft
Rotation angle	0 degrees
Load Type	Flexible
Area of Load	1170 ft <sup>2</sup>
Load	3 ksf
Depth	6 ft
Installation Stage	Stage 1 = 0 d

### Coordinates

X [ft]	Y [ft]
-97.5	22.4337
97.5	22.4337
97.5	28.4337
-97.5	28.4337

## Embankments

### 1. Embankment

Center Line (0, 0) to (0, 50)  
 Number of Layers 1  
 Near End Angle 90 degrees  
 Far End Angle 90 degrees  
 Base Width 190

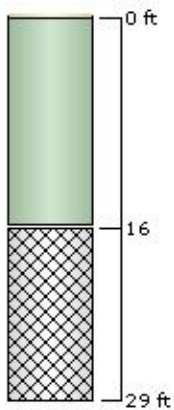
Layer	Stage	Left Bench Width (ft)	Left Angle (deg)	Height (ft)	Unit Weight (kips/ft <sup>3</sup> )	Right Angle (deg)	Right Bench Width (ft)
1	Stage 1 = 0 d	0	26	18	0.125	26	0

## Soil Layers

Ground Surface Drained: Yes

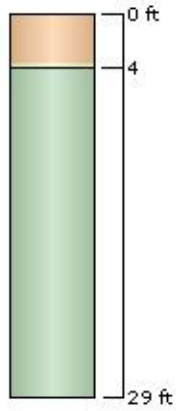
### C-2: (-72, 25.4337)

Layer #	Type	Thickness [ft]	Depth [ft]	Drained at Bottom
1	Soft ML	0	0	Yes
2	Firm SC	0	0	Yes
3	Hard ML	16	0	Yes



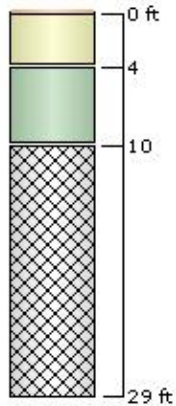
### RW-22: (0, 25.4337)

Layer #	Type	Thickness [ft]	Depth [ft]	Drained at Bottom
1	Soft ML	4	0	Yes
2	Firm SC	0	4	Yes
3	Hard ML	25	4	Yes



**C-1: (80, 25.4337)**

Layer #	Type	Thickness [ft]	Depth [ft]	Drained at Bottom
1	Soft ML	0	0	Yes
2	Firm SC	4	0	Yes
3	Hard ML	6	4	Yes



**Soil Properties**

Property	Firm SC	Hard ML	Soft ML
Color			
Unit Weight [kips/ft <sup>3</sup> ]	0.11	0.12	0.105
Saturated Unit Weight [kips/ft <sup>3</sup> ]	0.11	0.12	0.105
Immediate Settlement	Enabled	Enabled	Enabled
Es [ksf]	500	750	200
E <sub>sur</sub> [ksf]	500	750	200
Primary Consolidation	Disabled	Disabled	Enabled
Material Type			Non-Linear
C <sub>c</sub>			0.071
C <sub>r</sub>			0.027
e <sub>0</sub>			1.27
P <sub>c</sub> [ksf]		0.62	
OCR	1		3.8
C <sub>v</sub> [ft <sup>2</sup> /d]			1.51
B-bar			1
Undrained Su A [kips/ft <sup>2</sup> ]	0	0	0
Undrained Su S	0.2	0.2	0.2
Undrained Su m	0.8	0.8	0.8
Piezo Line ID	1	1	1

## Groundwater

Groundwater method Piezometric Lines  
 Water Unit Weight 0.0624 kips/ft<sup>3</sup>

### Piezometric Line Entities

ID	Depth (ft)
1	0 ft

### Query Points

Point #	(X,Y) Location	Number of Divisions
1	-68.2845, 25.542	Auto: 61
2	78.0739, 25.542	Auto: 53

### Query Lines

Line #	Start Location	End Location	Horizontal Divisions	Vertical Divisions
1	-97.5, 25.542	97.5, 25.542	20	Auto: 61

### Field Point Grid

Number of points 306  
 Expansion Factor 1

### Grid Coordinates

X [ft]	Y [ft]
195	147.5
195	-97.5
-195	-97.5
-195	147.5



Project: SC 557 Widening & Improvements

Date: 6/18/2019

Analysis: Bearing Capacity Analysis for Box Culvert at Station 275+58 (assumes mucking below bottom of culvert)

**Foundation Soils**

USCS = SM  
 $N_{meas}$  = 26 bpf  
 $\gamma$  = 120 pcf  
 $\phi$  = 40 deg  
 $c$  = 0 psf

**Box Culvert Length**

**L** = 195 ft

*Theoretical Estimation of Bearing Capacity (AASHTO LRFD Bridge Design Specifications, Eq. 10.6.3.1.2a-1)*

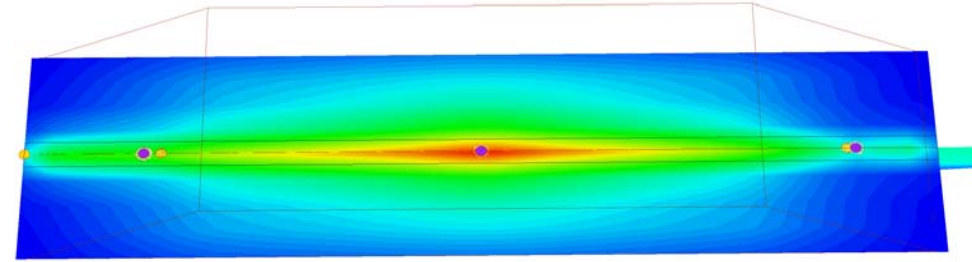
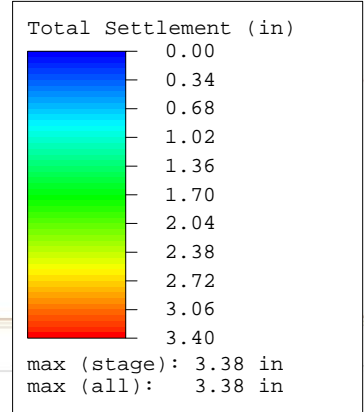
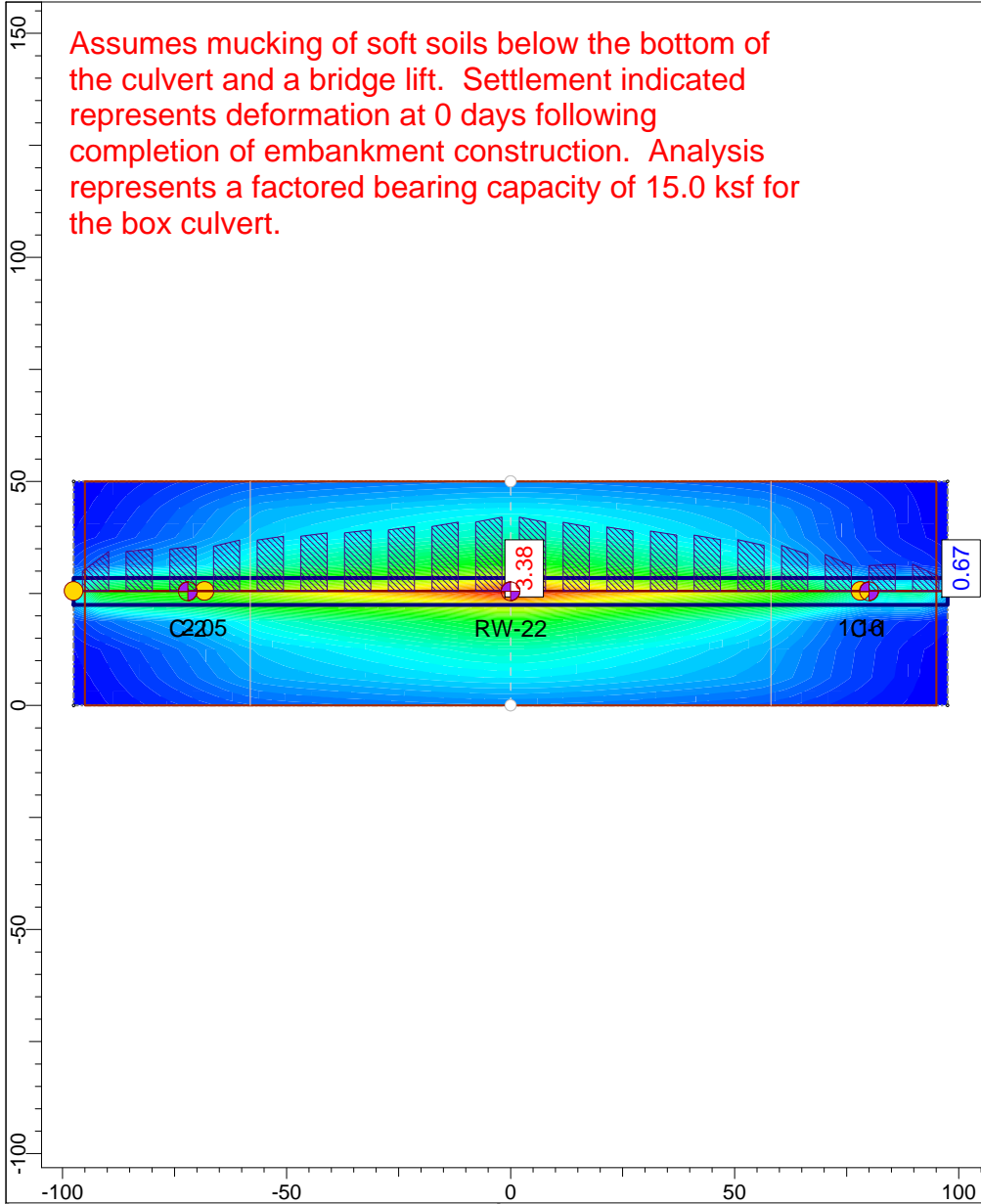
$$q_n = cN_{cm} + \gamma D_f N_{qm} C_{wq} + 0.5\gamma B N_{ym} C_{wy}$$

D <sub>f</sub> (ft)	$\gamma$ (pcf)	c (psf)	B (ft)	N <sub>cm</sub>	N <sub>qm</sub>	N <sub>ym</sub>	N <sub>c</sub>	N <sub>q</sub>	N <sub><math>\gamma</math></sub>	s <sub>c</sub>	s <sub>q</sub>	s <sub><math>\gamma</math></sub>	d <sub>q</sub>	C <sub>wq</sub>	C <sub>wy</sub>	q <sub>n</sub> (psf)	Resistance Factor ( $\Phi$ )	
																	Static	Seismic
2	120	0	8	77.947	64.195	107.615	75.31	64.20	109.41	1.035	1.000	0.984	1	0.5	0.5	33531.05	0.45	1.00

$q_R = \Phi q_n =$  7.54 tsf     *Static*  
 16.77 tsf     *Seismic*



Assumes mucking of soft soils below the bottom of the culvert and a bridge lift. Settlement indicated represents deformation at 0 days following completion of embankment construction. Analysis represents a factored bearing capacity of 15.0 ksf for the box culvert.



Project		SC 557 Widening & Improvements	
Analysis Description		Box Culvert @ 275+58 - w/ Mucking	
Drawn By	John Hamilton	Company	F&ME
Date		File Name	Box Culvert @ Sta. 276+00_Muck.s3z

# Settle3D Analysis Information

## SC 557 Widening & Improvements

### Project Settings

---

Document Name	Box Culvert @ Sta. 276+00_Muck
Project Title	SC 557 Widening & Improvements
Analysis	Box Culvert @ 275+58 - w/ Mucking
Author	John Hamilton
Company	F&ME
Stress Computation Method	Boussinesq
Time-dependent Consolidation Analysis	
Time Units	days
Permeability Units	feet/day
Use average properties to calculate layered stresses	
Improve consolidation accuracy	
Ignore negative effective stresses in settlement calculations	

### Stage Settings

---

Stage #	Name	Time [days]
1	Stage 1	0
2	Stage 2	10
3	Stage 3	20
4	Stage 4	30
5	Stage 5	40
6	Stage 6	50
7	Stage 7	60
8	Stage 8	70
9	Stage 9	80
10	Stage 10	90
11	Stage 11	100
12	Stage 12	200
13	Stage 13	300
14	Stage 14	400
15	Stage 15	500
16	Stage 16	600
17	Stage 17	700
18	Stage 18	800
19	Stage 19	900
20	Stage 20	1000

### Results

---

Time taken to compute: 1.13458 seconds

**Stage: Stage 1 = 0 d**

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.38266
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.38266
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	17.2375
Effective Stress [ksf]	0	17.5766
Total Stress [ksf]	0	17.9696
Total Strain	0	0.0229831
Pore Water Pressure [ksf]	0	1.80678
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.000135618	17.5745
Over-consolidation Ratio	1	10.218
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.424239

### Stage: Stage 2 = 10 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.38266
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.38266
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	17.2375
Effective Stress [ksf]	0	17.5766
Total Stress [ksf]	0	17.9696
Total Strain	0	0.0229831
Pore Water Pressure [ksf]	0	1.80678
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.000135618	17.5745
Over-consolidation Ratio	1	10.218
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.424239

### Stage: Stage 3 = 20 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.38266
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.38266
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	17.2375
Effective Stress [ksf]	0	17.5766
Total Stress [ksf]	0	17.9696
Total Strain	0	0.0229831
Pore Water Pressure [ksf]	0	1.80678
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.000135618	17.5745
Over-consolidation Ratio	1	10.218
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.424239

### Stage: Stage 4 = 30 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.38266
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.38266
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	17.2375
Effective Stress [ksf]	0	17.5766
Total Stress [ksf]	0	17.9696
Total Strain	0	0.0229831
Pore Water Pressure [ksf]	0	1.80678
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.000135618	17.5745
Over-consolidation Ratio	1	10.218
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.424239

### Stage: Stage 5 = 40 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.38266
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.38266
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	17.2375
Effective Stress [ksf]	0	17.5766
Total Stress [ksf]	0	17.9696
Total Strain	0	0.0229831
Pore Water Pressure [ksf]	0	1.80678
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.000135618	17.5745
Over-consolidation Ratio	1	10.218
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.424239

### Stage: Stage 6 = 50 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.38266
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.38266
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	17.2375
Effective Stress [ksf]	0	17.5766
Total Stress [ksf]	0	17.9696
Total Strain	0	0.0229831
Pore Water Pressure [ksf]	0	1.80678
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.000135618	17.5745
Over-consolidation Ratio	1	10.218
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.424239

### Stage: Stage 7 = 60 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.38266
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.38266
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	17.2375
Effective Stress [ksf]	0	17.5766
Total Stress [ksf]	0	17.9696
Total Strain	0	0.0229831
Pore Water Pressure [ksf]	0	1.80678
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.000135618	17.5745
Over-consolidation Ratio	1	10.218
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.424239

### Stage: Stage 8 = 70 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.38266
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.38266
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	17.2375
Effective Stress [ksf]	0	17.5766
Total Stress [ksf]	0	17.9696
Total Strain	0	0.0229831
Pore Water Pressure [ksf]	0	1.80678
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.000135618	17.5745
Over-consolidation Ratio	1	10.218
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.424239

### Stage: Stage 9 = 80 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.38266
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.38266
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	17.2375
Effective Stress [ksf]	0	17.5766
Total Stress [ksf]	0	17.9696
Total Strain	0	0.0229831
Pore Water Pressure [ksf]	0	1.80678
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.000135618	17.5745
Over-consolidation Ratio	1	10.218
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.424239

### Stage: Stage 10 = 90 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.38266
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.38266
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	17.2375
Effective Stress [ksf]	0	17.5766
Total Stress [ksf]	0	17.9696
Total Strain	0	0.0229831
Pore Water Pressure [ksf]	0	1.80678
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.000135618	17.5745
Over-consolidation Ratio	1	10.218
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.424239

### Stage: Stage 11 = 100 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.38266
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.38266
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	17.2375
Effective Stress [ksf]	0	17.5766
Total Stress [ksf]	0	17.9696
Total Strain	0	0.0229831
Pore Water Pressure [ksf]	0	1.80678
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.000135618	17.5745
Over-consolidation Ratio	1	10.218
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.424239

### Stage: Stage 12 = 200 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.38266
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.38266
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	17.2375
Effective Stress [ksf]	0	17.5766
Total Stress [ksf]	0	17.9696
Total Strain	0	0.0229831
Pore Water Pressure [ksf]	0	1.80678
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.000135618	17.5745
Over-consolidation Ratio	1	10.218
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.424239

### Stage: Stage 13 = 300 d



Data Type	Minimum	Maximum
Total Settlement [in]	0	3.38266
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.38266
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	17.2375
Effective Stress [ksf]	0	17.5766
Total Stress [ksf]	0	17.9696
Total Strain	0	0.0229831
Pore Water Pressure [ksf]	0	1.80678
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.000135618	17.5745
Over-consolidation Ratio	1	10.218
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.424239

### Stage: Stage 14 = 400 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.38266
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.38266
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	17.2375
Effective Stress [ksf]	0	17.5766
Total Stress [ksf]	0	17.9696
Total Strain	0	0.0229831
Pore Water Pressure [ksf]	0	1.80678
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.000135618	17.5745
Over-consolidation Ratio	1	10.218
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.424239

### Stage: Stage 15 = 500 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.38266
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.38266
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	17.2375
Effective Stress [ksf]	0	17.5766
Total Stress [ksf]	0	17.9696
Total Strain	0	0.0229831
Pore Water Pressure [ksf]	0	1.80678
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.000135618	17.5745
Over-consolidation Ratio	1	10.218
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.424239

### Stage: Stage 16 = 600 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.38266
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.38266
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	17.2375
Effective Stress [ksf]	0	17.5766
Total Stress [ksf]	0	17.9696
Total Strain	0	0.0229831
Pore Water Pressure [ksf]	0	1.80678
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.000135618	17.5745
Over-consolidation Ratio	1	10.218
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.424239

### Stage: Stage 17 = 700 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.38266
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.38266
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	17.2375
Effective Stress [ksf]	0	17.5766
Total Stress [ksf]	0	17.9696
Total Strain	0	0.0229831
Pore Water Pressure [ksf]	0	1.80678
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.000135618	17.5745
Over-consolidation Ratio	1	10.218
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.424239

### Stage: Stage 18 = 800 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.38266
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.38266
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	17.2375
Effective Stress [ksf]	0	17.5766
Total Stress [ksf]	0	17.9696
Total Strain	0	0.0229831
Pore Water Pressure [ksf]	0	1.80678
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.000135618	17.5745
Over-consolidation Ratio	1	10.218
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.424239

### Stage: Stage 19 = 900 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.38266
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.38266
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	17.2375
Effective Stress [ksf]	0	17.5766
Total Stress [ksf]	0	17.9696
Total Strain	0	0.0229831
Pore Water Pressure [ksf]	0	1.80678
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.000135618	17.5745
Over-consolidation Ratio	1	10.218
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.424239

### Stage: Stage 20 = 1000 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.38266
Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	3.38266
Secondary Settlement [in]	0	0
Loading Stress [ksf]	0	17.2375
Effective Stress [ksf]	0	17.5766
Total Stress [ksf]	0	17.9696
Total Strain	0	0.0229831
Pore Water Pressure [ksf]	0	1.80678
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0.000135618	17.5745
Over-consolidation Ratio	1	10.218
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft <sup>2</sup> /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.424239

## Loads

### 1. Rectangular Load

Length	195 ft
Width	6 ft
Rotation angle	0 degrees
Load Type	Flexible
Area of Load	1170 ft <sup>2</sup>
Load	15 ksf
Depth	6 ft
Installation Stage	Stage 1 = 0 d

### Coordinates

X [ft]	Y [ft]
-97.5	22.4337
97.5	22.4337
97.5	28.4337
-97.5	28.4337

## Embankments

### 1. Embankment

Center Line (0, 0) to (0, 50)  
 Number of Layers 1  
 Near End Angle 90 degrees  
 Far End Angle 90 degrees  
 Base Width 190

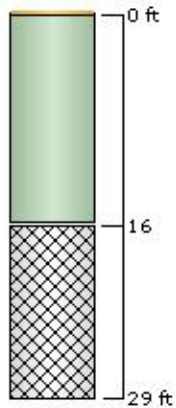
Layer	Stage	Left Bench Width (ft)	Left Angle (deg)	Height (ft)	Unit Weight (kips/ft <sup>3</sup> )	Right Angle (deg)	Right Bench Width (ft)
1	Stage 1 = 0 d	0	26	18	0.125	26	0

## Soil Layers

Ground Surface Drained: Yes

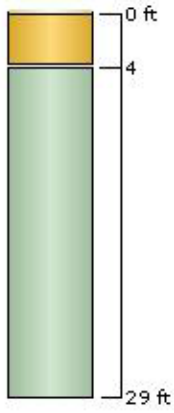
### C-2: (-72, 25.4337)

Layer #	Type	Thickness [ft]	Depth [ft]	Drained at Bottom
1	Soft ML	0	0	Yes
2	Firm SC	0	0	Yes
3	Sand Bridge Lift	0	0	Yes
4	Hard ML	16	0	Yes



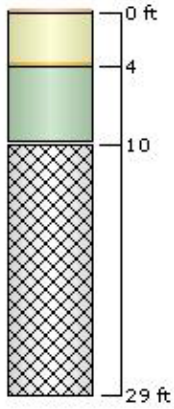
### RW-22: (0, 25.4337)

Layer #	Type	Thickness [ft]	Depth [ft]	Drained at Bottom
1	Soft ML	0	0	Yes
2	Firm SC	0	0	Yes
3	Sand Bridge Lift	4	0	Yes
4	Hard ML	25	4	Yes







**C-1: (80, 25.4337)**

Layer #	Type	Thickness [ft]	Depth [ft]	Drained at Bottom
1	Soft ML	0	0	Yes
2	Firm SC	4	0	Yes
3	Sand Bridge Lift	0	4	Yes
4	Hard ML	6	4	Yes



**Soil Properties**

Property	Firm SC	Hard ML	Soft ML	Sand Bridge Lift
Color				
Unit Weight [kips/ft <sup>3</sup> ]	0.11	0.12	0.105	0.115
Saturated Unit Weight [kips/ft <sup>3</sup> ]	0.11	0.12	0.105	0.115
Immediate Settlement	Enabled	Enabled	Enabled	Enabled
Es [ksf]	500	750	200	500
Esur [ksf]	500	750	200	500
Primary Consolidation	Disabled	Disabled	Enabled	Disabled
Material Type			Non-Linear	
Cc			0.071	
Cr			0.027	
e0			1.27	
Pc [ksf]		0.62		
OCR	1		3.8	1
Cv [ft <sup>2</sup> /d]			1.51	
B-bar			1	
Undrained Su A [kips/ft <sup>2</sup> ]	0	0	0	0
Undrained Su S	0.2	0.2	0.2	0.2
Undrained Su m	0.8	0.8	0.8	0.8
Piezo Line ID	1	1	1	1

## Groundwater

Groundwater method Piezometric Lines  
 Water Unit Weight 0.0624 kips/ft<sup>3</sup>

## Piezometric Line Entities

ID	Depth (ft)
1	0 ft

## Query Points

Point #	(X,Y) Location	Number of Divisions
1	-68.2845, 25.542	Auto: 61
2	78.0739, 25.542	Auto: 53

## Query Lines

Line #	Start Location	End Location	Horizontal Divisions	Vertical Divisions
1	-97.5, 25.542	97.5, 25.542	20	Auto: 61

## Field Point Grid

Number of points 306  
 Expansion Factor 1

## Grid Coordinates

X [ft]	Y [ft]
195	147.5
195	-97.5
-195	-97.5
-195	147.5





**SC 557 Roadway Construction and Improvements  
Final Roadway Geotechnical Engineering Report**

---

# **APPENDIX**

## **SECTION 10 GEOTECHNICAL QUANTITY ESTIMATE**

Project: SC 557 Bridge Replacement over Crowders Creek  
 Subject: Geotechnical Quantities Estimate  
 Date: 3/15/2021



**Geogrid for Slope Stability**

		Geogrid Length	Geogrid Area	
		ft	ft <sup>2</sup>	
Begin Bridge; LT Side Slope	254+77	45	4545	Geogrid; Type U6; Begin Br.; EL. +583
	255+78	45		
Begin Bridge; RT Side Slope	254+21	45	6300	Geogrid; Type U6; Begin Br.; EL. +583
	255+61	45		
End Bridge; End Slope	259+22	80	2400	Geogrid; Type U9; Begin Br; EL +582 & +583
	259+37	80		
	259+22	80	2400	Geogrid; Type U9; Begin Br; EL +584
	259+52	80		
End Bridge; LT Side Slope	259+31	30	6570	Geogrid; Type U9; Begin Br.; EL. +581
	261+50	30		
End Bridge; RT Side Slope	259+12	30	5640	Geogrid; Type U9; Begin Br.; EL. +581
	261+00	30		
Box Culvert @ ~276+00, RT Side Slope	275+08	70	7000	Geogrid; Type U9; Begin Br; EL +586
	276+08	70		

Total Geogrid Reinforcement (Uniaxial) - Type U6 = 11930 SF => Includes 10% Contingency  
*SCDOT Pay Item No.: 2037000* 1326 SY

Total Geogrid Reinforcement (Uniaxial) - Type U9 = 26411 SF => Includes 10% Contingency  
*SCDOT Pay Item No.: 2037000* 2935 SY

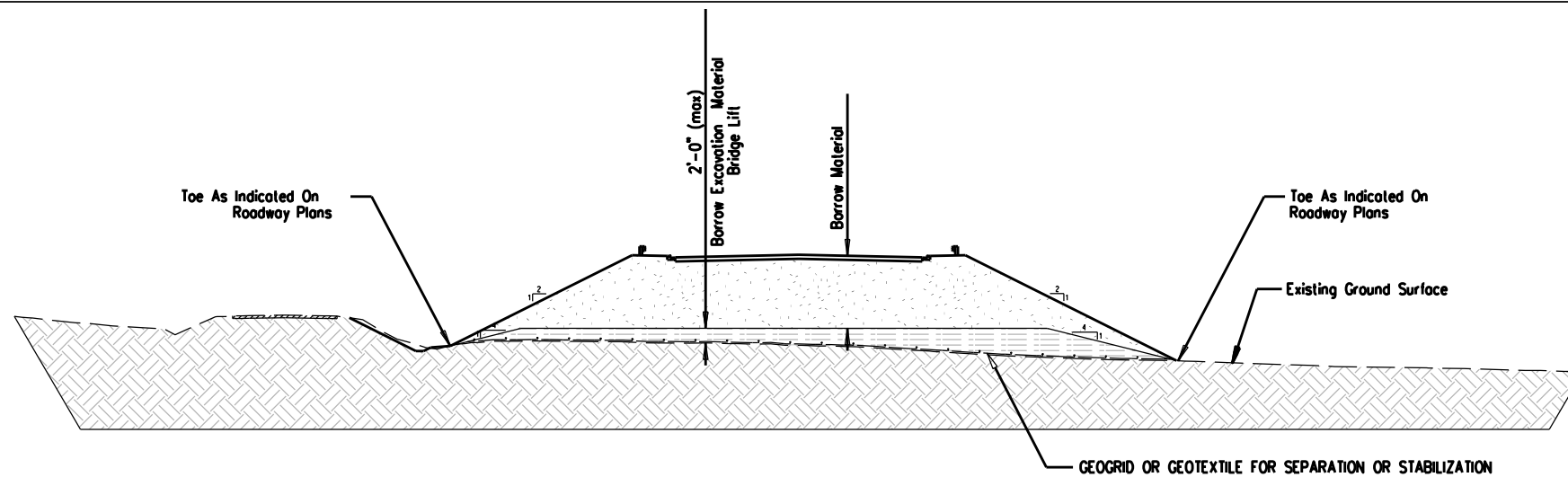
**SC 557 Roadway Construction and Improvements  
Final Roadway Geotechnical Engineering Report**

---

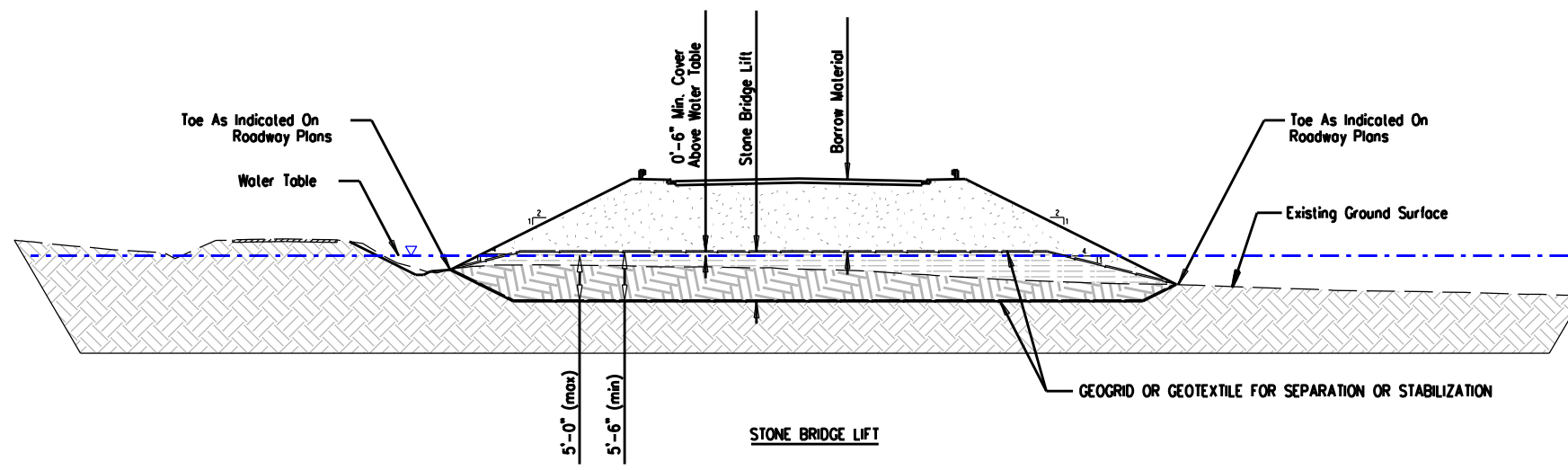
# **APPENDIX**

## **SECTION 11 GEOTECHNICAL DRAWINGS & DETAILS**

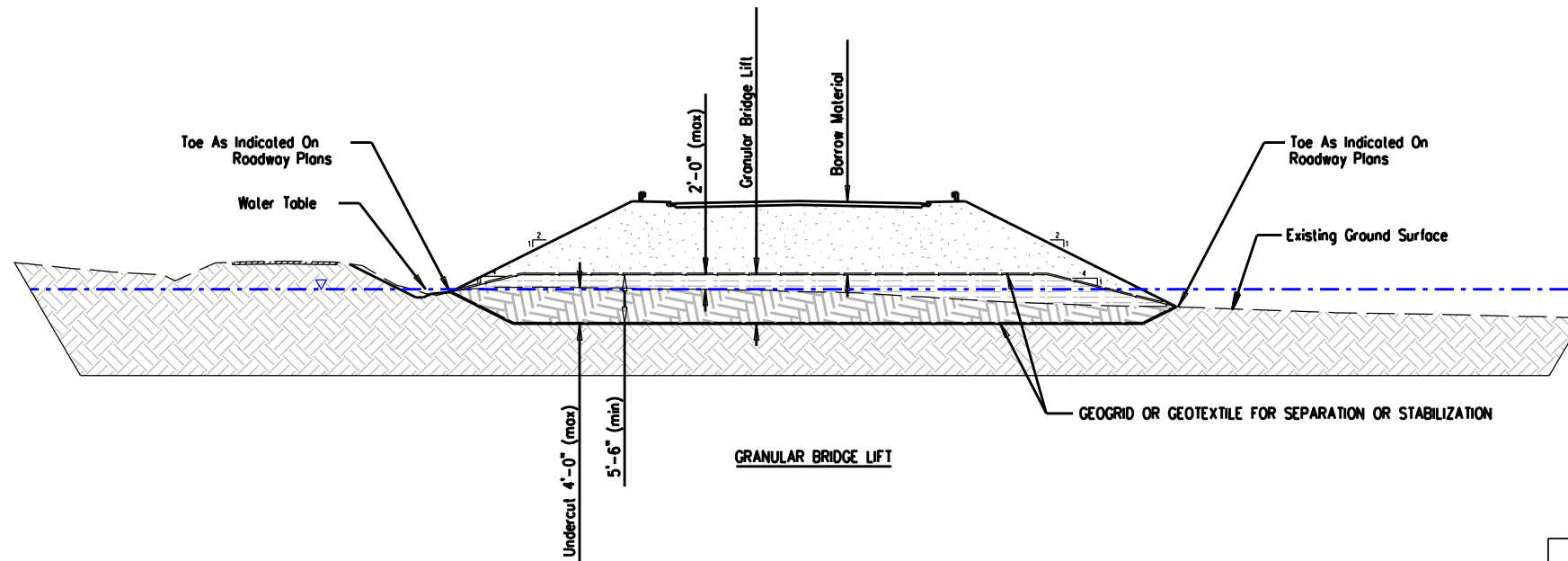
FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD / ROUTE NO.	SHEET NO.
3	SC	YORK	0041800RD01	SC 557	G1



**BORROW EXCAVATION BRIDGE LIFT**



**STONE BRIDGE LIFT**



**GRANULAR BRIDGE LIFT**

**LEGEND**

- BORROW MATERIAL
- EXISTING SOIL
- UNDERCUT SOIL
- BRIDGE LIFT

**BORROW MATERIAL**

- BELOW THE TOP 5 FT. OF EMBANKMENT, ANY SOIL THAT DOES NOT MEET THE DESCRIPTION OF MUCK MAY BE USED TO FORM EMBANKMENTS AS LONG AS IT IS STABLE WHEN COMPACTED TO THE REQUIRED DENSITY.
- IN THE TOP 5 FT. OF EMBANKMENT, ONLY THE FOLLOWING SOIL TYPES ARE ACCEPTABLE: A-1, A-2, A-3, A-4, A-5, AND A-6.

**MUCK EXCAVATION**

- ANY AREAS THAT ARE DISCOVERED TO DEFLECT AND/OR SETTLE MAY REQUIRE MUCK EXCAVATION AS DIRECTED BY THE RCE. THE RCE WILL DETERMINE THE LATERAL EXTENT OF THE UNDERCUTTING. THE UNDERCUTTING SHOULD NOT EXTEND BEYOND THE TOE OF SLOPE. THE FINAL DEPTH OF MUCK EXCAVATION SHALL NOT EXCEED 5 FEET, UNLESS OTHERWISE SPECIFIED IN THE PLANS AND/OR SPECIFICATIONS. CONTACT THE GEOTECHNICAL ENGINEER OF RECORD (GEOR) IF MUCK EXCAVATION NEEDS TO EXCEED 5 FEET, AND IT HAS NOT BEEN PREVIOUSLY SPECIFIED IN THE PLANS OR SPECIFICATIONS.
- IF THE UNDERCUTTING COMPLETELY REMOVES THE MATERIALS IDENTIFIED AS MUCK, THEN BRIDGE LIFT MATERIALS MAY BE PLACED DIRECTLY ON THE FIRM MATERIAL.
- IF BECAUSE THE DEPTH OF MUCKING REQUIRES THAT THE MUCK MATERIAL MUST BE LEFT IN PLACE, PLACE A STABILIZING GEOSYNTHETIC MEETING THE REQUIREMENTS OF SC-M-203-1 (07/2017), *GEOSYNTHETIC MATERIALS FOR SEPARATION AND STABILIZATION*. AFTER PLACEMENT OF THE INITIAL BRIDGE LIFT MATERIAL, EXPOSE APPROXIMATELY 1 SQUARE FOOT OF THE GEOSYNTHETIC FOR VISUAL OBSERVATION TO IDENTIFY ANY DAMAGE CAUSED BY THE PLACEMENT OF THE BRIDGE LIFT MATERIAL. AFTER ASCERTAINING THAT THE GEOSYNTHETIC HAS NOT BEEN DAMAGED, REPLACE THE BRIDGE LIFT MATERIAL EXCAVATED TO ALLOW OBSERVATION OF THE GEOSYNTHETIC. IF THE GEOSYNTHETIC APPEARS TO BE DAMAGED, EXPOSE A LARGER AREA AND CONTACT THE GEOR FOR INSTRUCTIONS. ANY DAMAGED AREAS SHALL BE REPAIRED BY THE CONTRACTOR AT NO EXPENSE TO THE DEPARTMENT.
- ANY RUTS THAT DEVELOP IN BRIDGE LIFT MATERIALS SHALL BE FILLED IN WITH SIMILAR BRIDGE LIFT MATERIALS. DO NOT BLADE DOWN THE RUTS, SINCE THIS WILL DECREASE THE THICKNESS OF THE BRIDGE LIFT.
- IN AREAS THAT REQUIRE MUCKING OR UNDERCUTTING, BORROW MATERIAL MAY BE PLACED AS THE BRIDGE LIFT AS LONG AS THE GRADE ON WHICH THE MATERIAL IS BEING PLACED IS AT LEAST 2 FEET ABOVE THE GROUNDWATER OR SURFACE WATER LEVEL. PLACE BORROW MATERIAL BRIDGE LIFTS IN SINGLE LIFT THICKNESSES NO GREATER THAN 2 FEET. DO NOT PLACE A BRIDGE LIFT CONSISTING OF BORROW MATERIAL WITHIN 3 FEET OF THE BASE OF THE PAVEMENT SECTION. PLACE ONLY COMPACTED BORROW MATERIAL SOIL OR STONE BRIDGE LIFT WITHIN THIS ZONE.
- IN THE EVENT THAT GROUNDWATER OR SURFACE WATER DOES NOT ALLOW BACKFILLING WITH BORROW MATERIAL SOIL, USE EITHER STONE OR GRANULAR BRIDGE LIFT MATERIALS MEETING THE REQUIREMENTS OF *BRIDGE LIFT MATERIALS* SUPPLEMENTAL TECHNICAL SPECIFICATION. PLACE THE BRIDGE LIFT MATERIALS IN SINGLE LIFT THICKNESSES NOT EXCEEDING 2 FEET. IF ADDITIONAL COMPACTED BORROW MATERIAL SOIL IS NEEDED TO REACH GRADE, PLACE A GEOTEXTILE FOR SEPARATION MEETING THE REQUIREMENTS OF SC-M-203-1 (07/2017), *GEOSYNTHETIC MATERIALS FOR SEPARATION AND STABILIZATION* BETWEEN THE STONE BRIDGE LIFT AND THE OVERLYING COMPACTED SOIL. AFTER THE PLACEMENT OF THE INITIAL LIFT OF COMPACTED MATERIAL, EXPOSE APPROXIMATELY 1 SQUARE FOOT OF GEOSYNTHETIC FOR VISUAL OBSERVATION TO IDENTIFY ANY DAMAGE CAUSED BY THE PLACEMENT OF THE COMPACTED MATERIAL. AFTER ASCERTAINING THAT THE GEOSYNTHETIC HAS NOT BEEN DAMAGED, REPLACE AND COMPACT THE MATERIAL EXCAVATED TO ALLOW OBSERVATION OF THE GEOSYNTHETIC. IF THE GEOSYNTHETIC APPEARS TO BE DAMAGED, EXPOSE A LARGER AREA AND CONTACT THE GEOR FOR INSTRUCTIONS. ANY DAMAGED AREAS SHALL BE REPAIRED BY THE CONTRACTOR AT NO EXPENSE TO THE DEPARTMENT.
- FOLLOWING RAINFALL EVENTS, PROOFROLLING THE EXISTING SURFICIAL SOILS MAY YIELD UNSATISFACTORY RESULTS. IN A DRY STATE, THE SOILS ARE ESTIMATED TO BE STABLE. IF WAITING FOR THE SOILS TO DRY IS NOT THE DESIRED OPTION, THEN THE CONSTRUCTOR SHALL EMPLOY MUCKING OPERATIONS.
- THE QUANTITIES ASSOCIATED WITH MUCKING AND UNDERCUTTING (I.E. MUCKING, BRIDGE LIFT MATERIAL, GEOGRID, AND GEOTEXTILE FOR SEPARATION OF SUB-GRADE AND SUB-BASE) ARE FOR BID ESTIMATION PURPOSES ONLY. DO NOT PURCHASE OR STOCKPILE THESE BID ITEMS ON SITE WITHOUT WRITTEN APPROVAL FROM THE RCE UNLESS SPECIFIC AREAS AND DETAILS ARE DEFINED IN THE PLANS.

**CONSTRUCTION RELATED VIBRATIONS**

- LEVEL 1 - SCDOT HAS ELECTED TO NOT MONITOR THE SITE. THEREFORE, NO EARTH-BORNE VIBRATION MONITORING IS REQUIRED.



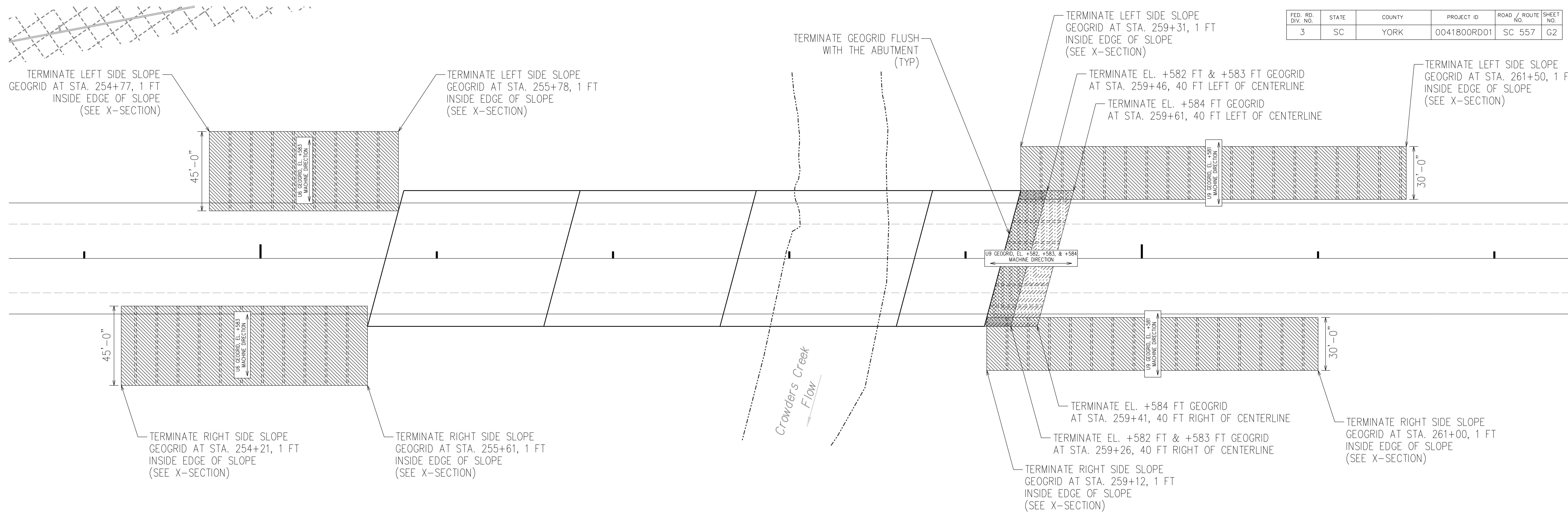
**SC 557 ROADWAY WIDENING & IMPROVEMENTS**

**GEOTECHNICAL GENERAL NOTES**

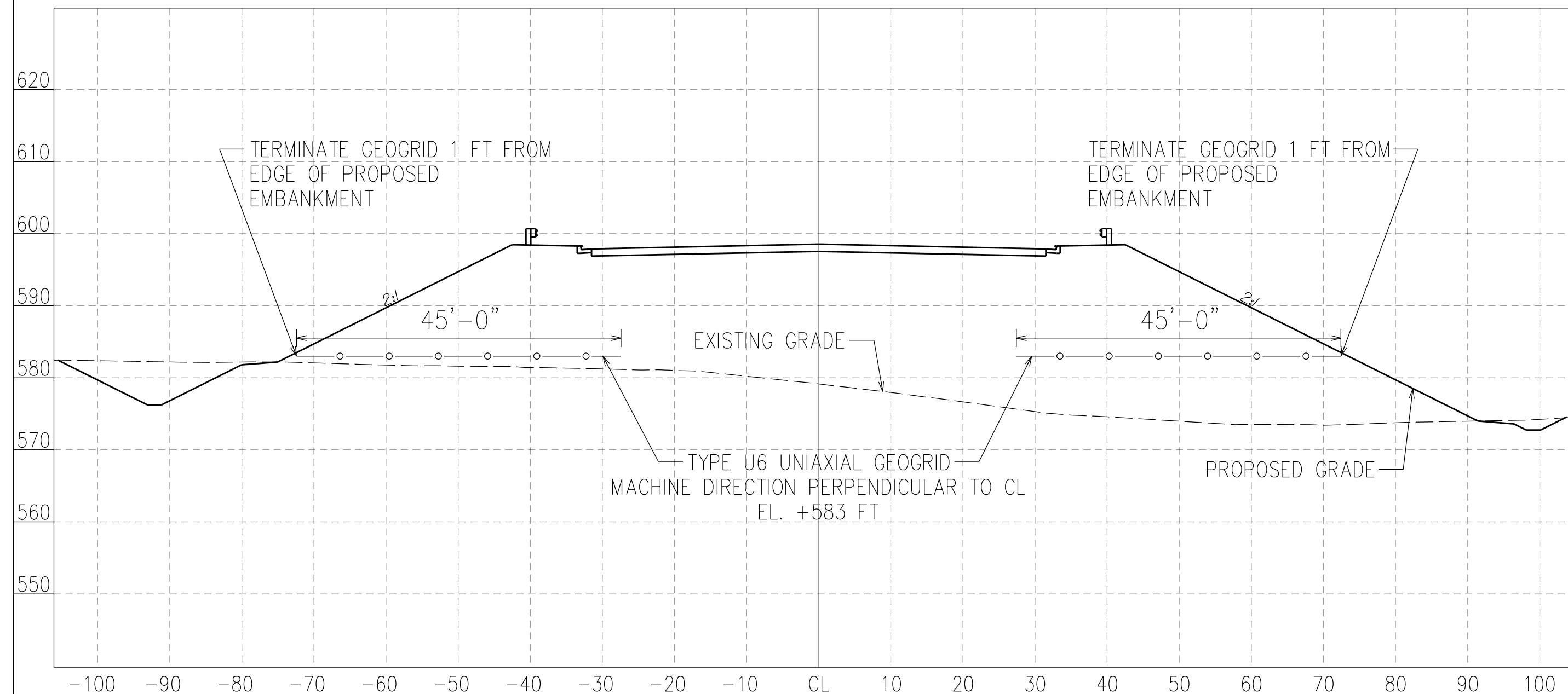
HRZ SCALE = NTS  
VRT SCALE = NTS

4				
3				
2				
1				
REV. NO.	BY	DATE	DESCRIPTION OF REVISION	
TOPO.		DATE		
DWG.	JFH	DATE 6.27.19	GROUP	-
R/W		DATE		

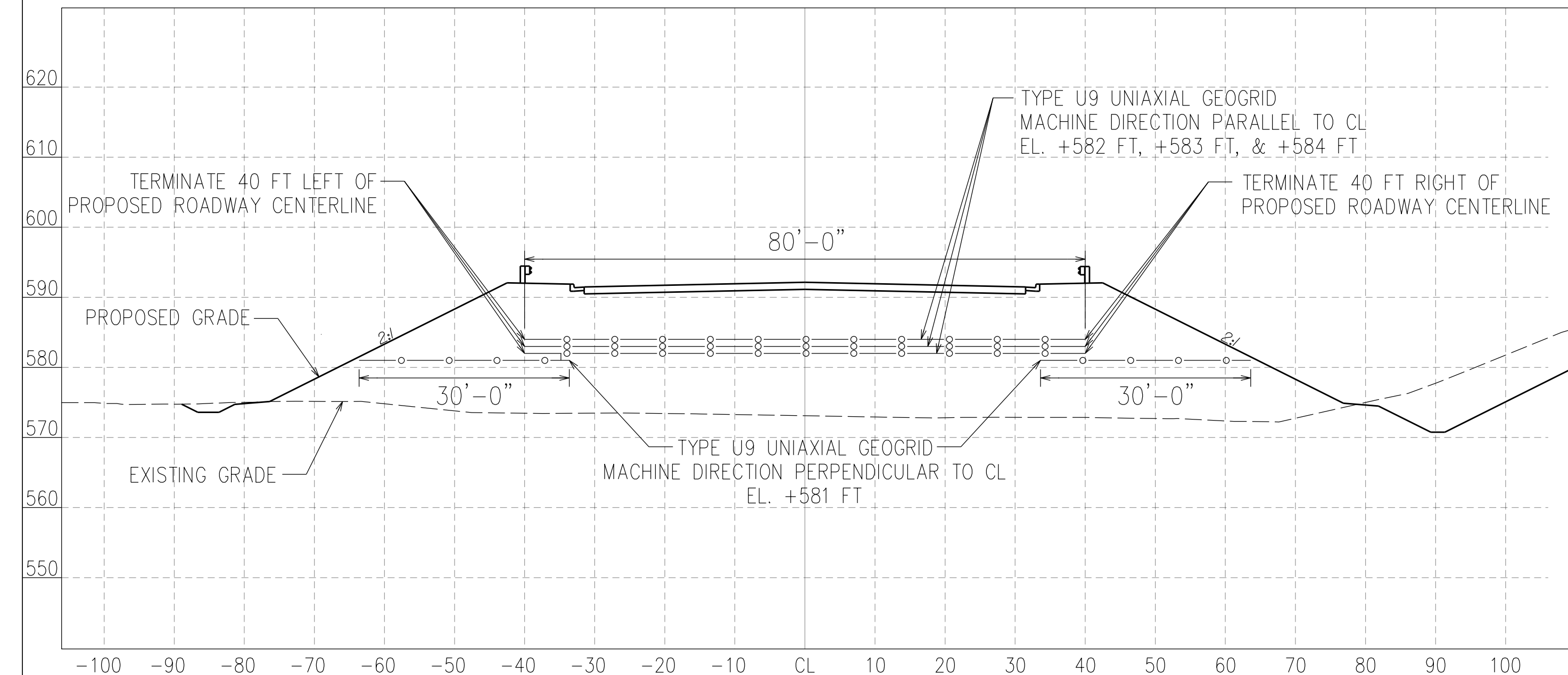
FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD / ROUTE NO.	SHEET NO.
3	SC	YORK	0041800RD01	SC 557	G2



BEGIN BRIDGE



END BRIDGE



NOTES

- ADJOINING GEOGRID ROLLS SHALL BE OVERLAPPED A MINIMUM OF 1.0 FT. NO SPLICING IN THE MACHINE DIRECTION IS ALLOWED. NO CUTTING THE GEOGRID IN THE MACHINE DIRECTION IS ALLOWED.
- REFERENCE THE SUPPLEMENTAL TECHNICAL SPECIFICATION FOR GEOGRID SOIL REINFORCEMENT, SC-M-203-2 (01/2020), FOR ADDITIONAL PROCEDURAL AND MATERIAL REQUIREMENTS.
- AT GEOGRID AND DRAINAGE PIPE CONFLICTS, BEND THE GEOGRID AROUND THE PIPE AND CONTINUE THE GEOGRID TO THE SPECIFIED TERMINATION LIMIT AT THE SPECIFIED ELEVATION.

4			
3			
2			
1			
REV. NO.	BY	DATE	DESCRIPTION OF REVISION
TOPO.		DATE	
DWG.	JFH	DATE 6.25.19	GROUP - - -
R/W		DATE	



SC 557 BRIDGE OVER CROWDERS CREEK

SOIL REINFORCEMENT DETAILS

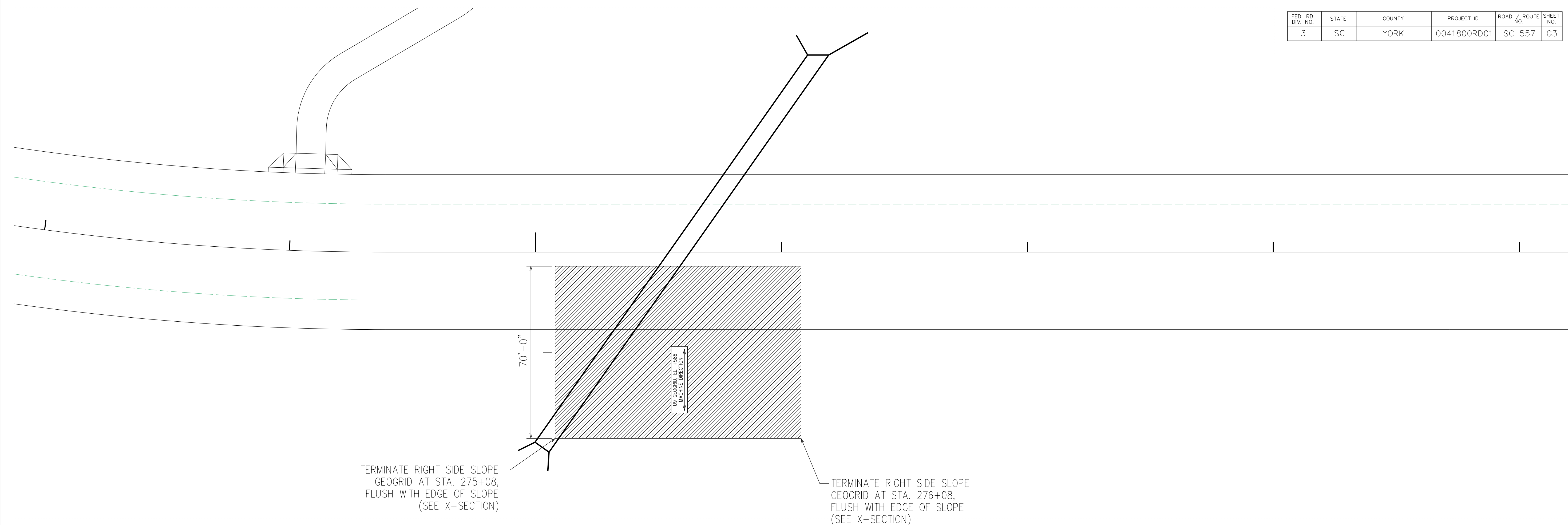
HRZ SCALE = NTS  
VRT SCALE = NTS

275+00

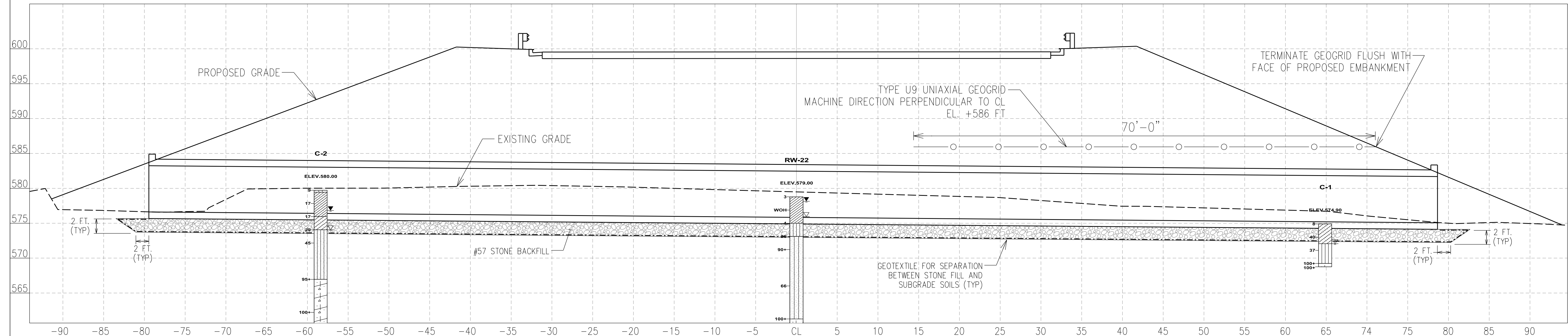
276+00

277+00

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD / ROUTE NO.	SHEET NO.
3	SC	YORK	0041800RD01	SC 557	G3



STATION 275+58



NOTES

- ADJOINING GEOGRID ROLLS SHALL BE OVERLAPPED A MINIMUM OF 1.0 FT. NO SPLICING IN THE MACHINE DIRECTION IS ALLOWED. NO CUTTING THE GEOGRID IN THE MACHINE DIRECTION IS ALLOWED.
- REFERENCE THE GEOGRID SOIL REINFORCEMENT SUPPLEMENTAL TECHNICAL SPECIFICATION (SC-M-203-2) FOR ADDITIONAL PROCEDURAL AND MATERIAL REQUIREMENTS.
- AT GEOGRID AND DRAINAGE PIPE CONFLICTS, BEND THE GEOGRID AROUND THE PIPE AND CONTINUE THE GEOGRID TO THE SPECIFIED TERMINATION LIMIT AT THE SPECIFIED ELEVATION.

- BELOW AN AREA TWO (2) FEET AROUND THE FOOTPRINT OF THE PROPOSED BOX CULVERT, EXCAVATE A MINIMUM OF TWO (2) FEET OF SOIL AND BACKFILL THE EXCAVATED AREA WITH #57 STONE TO THE BOTTOM OF CULVERT ELEVATION. IF FOLLOWING THE TWO (2) FOOT EXCAVATION, POOR SOILS STILL EXIST, CONTINUE EXCAVATION UNTIL COMPETENT SOILS ARE ENCOUNTERED. USE A PROBE ROD AND FIELD JUDGEMENT TO DETERMINE WHEN SOILS ARE CONSIDERED "COMPETENT". PRIOR TO STONE PLACEMENT, PLACE A SEPARATION GEOTEXTILE LAYER IN THE EXCAVATED AREA. OVERLAP ADJACENT GEOTEXTILE LAYERS A MINIMUM OF ONE (1) FT.
- IF GROUNDWATER IS ENCOUNTERED DURING THE EXCAVATIONS, LOCALIZED METHODS OF DEWATERING ARE ALLOWED, AS NEEDED, TO FACILITATE THE EXCAVATION AND BACKFILL PLACEMENT. STONE BACKFILL MAY BE PLACED IN OPEN WATER CONDITIONS IN ACCORDANCE WITH THE SCDOT STANDARD SPECIFICATIONS.

4			
3			
2	JFH	3.15.21	UPDATE NOTES
1	JFH	7.13.20	ADD EXCAVATION NOTES
REV. NO.	BY	DATE	DESCRIPTION OF REVISION
TOPO.	JFH	DATE	6.25.19
DWG.	JFH	DATE	6.25.19
R/W		DATE	

**F&ME**  
CONSULTANTS

**SC 557 ROADWAY WIDENING & IMPROVEMENTS  
BOX CULVERT AT 275+58**

**GEOTECHNICAL DETAILS**

HRZ SCALE = NTS

VRT SCALE = NTS



**Planning & Development Services**  
 18 W. Liberty Street  
 York, SC 29745  
 (803) 909-7200 Residential  
 (803) 909-7238 Commercial  
 (803) 909-7227 Fax  
 www.yorkcountygov.com

Letter of Notification for Plan Review

Review of: **SC 557 Widening & Bridge Replacement- Digital** Status: **Approved**  
**Floodplain Modifications**  
 Digital

<b>To:</b>	David Bocker NV5 448 Lakeshore Parkway 704-566-4342 david.bocker@nv5.com	<b>Project:</b>	20200906 SC 557 Widening & Bridge Replacem SC 557 SC 557 Roadway Widening & Bridge Replacement over Crowders Creek
------------	--	-----------------	---

We have completed our review of the plan identified above. The plan was approved per attached comments, if any. This letter is not to be construed as a zoning compliance, grading, or building permit, certificate of occupancy, or a substitute for any permit or certificate required by any state or federal government entity.

For approved commercial site plans, once the owner/developer has received NPDES approval (if applicable) for the project (this is issued by SCDHEC and can take up to 14 days from the date the project is approved by York County), you may contact the Environmental Compliance Office (Stormwater) at (803) 909-7157 to schedule the pre-construction meeting. This meeting will occur on-site with county staff members, the financially responsible person, site engineer, and the contractor (who must be licensed in South Carolina through the SC Labor Licensing Board). Your preliminary grading permit and zoning compliance will be issued at the pre-construction meeting. Once this meeting has occurred, building permits can be applied for.

*\*Note for online users\**  
 Building plans submitted online do not require paper copies to be submitted upon approval of the plans. Approved plans can be viewed and/or printed at <https://evolvepublic.yorkcountygov.com/> under applicant login.

All other online plan submittals will need to submit 7 complete sets of paper copies for stamping purposes.

Sincerely,

Bea McCarter  
 Development Coordinator  
 803-909-7238

## Review Comments

The following comments are grouped as "Review Comments" or "Advisory Comments". "Review Comments" are items related to your plan review that require action on your part. "Advisory Comments" are informational notes that may be important in the future and are for your information.

[Floodplain - Tammy Marain - tammy.marain@yorkcountygov.com](mailto:tammy.marain@yorkcountygov.com)

Approved

### Review Comments:

If any changes are made to the current proposed plan that will directly or indirectly change regulatory floodplain boundaries/levels/velocities, you must resubmit for approval of the revisions before proceeding. A copy of the plan has been added to this submittal.

---



**SC 557 Roadway Improvement Project  
York County, SC**

**Flood Study**



PREPARED BY:



FOR:



REVIEWED BY:



## INDEX

### FLOOD STUDY (NO RISE/NO IMPACT CERTIFICATION)

- HEC-RAS Model Narrative
- Water Surface Elevation Comparison Table
- Vicinity Map
- HEC-RAS Output
  - Published Data
  - Effective Model (HEC-RAS 3.1.2)
  - Duplicate Effective (HEC-RAS 3.1.2)
  - Duplicate Effective (HEC-RAS 4.1.0)
  - Corrected Effective (HEC-RAS 4.1.0)
  - Revised (HEC-RAS 4.1.0)
- No Rise Certification
- Topographic Workmap (Attached)
- Triple Profile (Attached)

# **FLOOD STUDY NARRATIVE**

**By: NV5 Engineers & Consultants for  
York County**

**SCDOT Pin #41800**  
*SC 557 Bridge Replacement over Crowders Creek  
in York County, South Carolina*

**March 10, 2020**

**ROAD: SC-557**

**PIN: 41800**

**DATE: 3/10/2019**

**STREAM: Crowders Creek**

## **HEC-RAS Model Narrative**

### **INTRODUCTION**

The South Carolina Department of Transportation (SCDOT) proposes the replacement of the SC 557 bridge over the Crowders Creek York County, SC. The existing main bridge is located on SC 557 between Riddle Mill Road (S46-152) and Oakridge Road (S46-435) over the Crowders Creek. The bridge is 192' long (6 @ 32') with a clear roadway width of 27'-6". The proposed bridge replacement will be along a proposed alignment south of the existing alignment. The portion of the Crowders Creek that the bridge crosses is a Federal Emergency Management Agency (FEMA) regulated stream, containing a limited detailed flood study without a published floodway.

The proposed main structure over the river is a Type IV Prestressed Beams bridge. The bridge is 350' long (1 @ 100', 1 @ 100', 1 @ 100', 1 @ 50') with a clear roadway width of 66'-0" with an overall bridge width of 80' (out to out). The existing bridge and a portion of approach roadway fill will be removed as part of this project.

The purpose of this flood study is to provide a "No-Rise / No Impact" Certification for the proposed bridge on SC 557 over Crowders Creek. All of the results are tabulated in a Water Surface Elevation Comparison table provided herein. The results show a maximum decrease in the base flood elevation of 0.60 foot upstream of the proposed project. Additionally, the model shows the proposed model ties into the effective base flood elevation at the downstream and upstream limits of the revision. There are no insurable structures located within the floodplain upstream or downstream of the proposed SC 557 Bridge crossing in the vicinity of the project at the time of this study.

There were 3 alternatives evaluated for this project (bridge replacement to the north, bridge replacement to the south, and staged construction). The preferred alternative was bridge replacement and roadway realignment to the south which fulfills project goals by giving consideration to social, economic, environmental, historic resources, technical and other factors. All factors listed above were considered by various stakeholders in choosing the preferred design alternative.

The area of the proposed project is shown on panel 0176E, map number 45091C0176E with an effective date of September 26, 2008 for York County. According to these effective maps, this study is located within a limited detailed study (Zone AE). The effective model was received from South Carolina Department of Natural Resources (SCDNR) via Watershed Concepts by request of York County in an electronic format on May 29, 2008. The original model was created in HEC-RAS (Version 3.1.2). The effective study was last published in the FIS on September 26, 2008.

Changes in the flood hazards that will be caused by the proposed project are determined by comparing the hydraulic modeling for the proposed project (referred to as the revised model) to the hydraulic modeling used to prepare the FIS (referred to as the effective model). The effective HEC-RAS Version 3.1.2 model is the model as it was received from SCDNR. The effective HEC-RAS Version 3.1.2 model becomes the duplicate effective HEC-RAS Version 4.1.0 model when it is run in HEC-RAS Version 4.1.0. The corrected effective model is produced from the duplicate effective HEC-RAS Version 4.1.0 model in order to show additional cross sections, correct any errors and incorporate more detailed topographic information than shown in the duplicate effective model. The revised model is then compared to the corrected effective model to determine any changes to the flood hazards.

## **METHODOLOGY**

Since there has been no recent construction within the floodplain of the project area, only 5 models were prepared:

- *Published Data* – This only consists of the published data received from FEMA
- *Effective HEC-RAS Model* – This model consists of output from model received from FEMA.
- *Duplicate Effective Model (HEC-RAS 3.1.2)* – In this model, an attempt was made to duplicate the effective HEC-RAS Model in the same version as the effective model.
- *Duplicate Effective Model (HEC-RAS 4.1.0)* – In this model, an attempt was made to duplicate the effective HEC-RAS Model in the latest version of HEC-RAS. Any differences in water-surface elevations can be attributed to the newer version of HEC-RAS.
- *Corrected Effective Model* – In this model the Duplicate Effective model was built upon by adding and removing cross sections at locations to facilitate analysis of the existing bridge and updated topographic data. Also, any errors that were obvious in the effective model were corrected at this time.
- *Revised Model* – In this model the proposed conditions were modeled including the proposed roadway bridges.

These models were run for the 100 year flood event. The latest version of HEC-RAS, version 4.1.0, will be used for this Flood Study.

The work map prepared for this submittal contains survey provided by York County and topography generated from supplemental DTM information provided by CALYX. This data was provided on the NAVD 1988 vertical datum. The published data and effective HEC-RAS model are shown on NAVD 88 datum. Therefore, no datum conversion or adjustment was required. All summary tables are shown using the NAVD 1988.

### **Published Data**

The published data consists of data contained within the Flood Insurance Study (FIS) for York County which shows an effective date of September 26, 2008.

### **Effective Model**

The effective model was received from South Carolina Department of Natural Resources (SCDNR) via Watershed Concepts by request of York County in an electronic format on May 29, 2008. The original model was created in HEC-RAS (Version 3.1.2). Output was compared to the published data. All 100 YR water surface elevations matched between the published data and effective model.

### **Duplicate Effective (HEC-RAS 3.1.2) Model**

The Duplicate Effective model merely consisted of running the Effective model in HEC-RAS Version 3.1.2. The purpose of this model is to duplicate the output generated in the effective model. The following steps were completed to generate output for the Duplicate Effective (HEC-RAS 3.1.2) model:

- Open the HEC-RAS project file in HEC-RAS 3.1.2 and run.

The above model results matched the Effective Model as follows:

- 100 YR water surface elevations for all sections matched exactly.

### **Duplicate Effective (HEC-RAS 4.1.0) Model**

The Duplicate Effective model merely consisted of running the Effective model in HEC-RAS Version 4.1.0. The purpose of this model is to duplicate the output generated in the effective model. Any differences found can be directly attributed to the newer version of HEC-RAS. The following steps were completed to generate output for the Duplicate Effective model:

- Open the HEC-RAS project file in HEC-RAS 4.1.0 and run.

The above model results matched the Duplicate Effective (HEC-RAS 3.1.2) Model as follows:

- 100 YR water surface elevations decreased a maximum of 0.01 foot between Sections 32873 and 43193.

### **Corrected Effective Model**

The following changes were made to the Duplicate Effective model thus creating the Corrected Effective model:

- The Corrected Effective HEC-RAS model models the existing SC 557 bridge (over Crowders Creek). The alignment of existing SC 557 is perpendicular to the flood flow of Crowders Creek (See included workmap for a graphical representation of SC 557 and Crowders Creek).

- Sections 27119, 27717, 27810 and 27900, 28196 and 28435 were added upstream and downstream of the SC 557 bridge to more accurately model the topographic features in this area. The channel and overbank information was obtained based on recent surveys performed by CALYX. Geo-referencing information was included as well. Reach lengths were adjusted as necessary. N-values were verified and remained the same as what was used in the effective model.
- Sections 26802, 27610, 27953, 28087, 28293 and 28793 were updated based on new survey data provided by CALYX. Location of section 27610 was shifted slightly on right side of creek looking downstream.
- The SC 557 roadway deck for the bridge was adjusted based on the new surveys. The low steel (low chord) of the bridge was adjusted and bridge rail was added based on updated surveys.
- The bridge deck width of 29 feet was revised to 29.5 feet due to updated survey.
- Internal bridge sections were updated based on soundings taken at the upstream and downstream face of the bridge during the field review.
- Piers have been revised to show the actual span arrangements and pier width based on recent surveys performed by CALYX.
- The contraction coefficient of 0.3 and expansion coefficient 0.5 were added to the new section 28196 since it is located within the contraction of flow upstream of the bridge.
- The contraction coefficient of 0.3 and expansion coefficient 0.5 were replaced with contraction coefficient of 0.1 and expansion coefficient 0.3 for section 28293 due to the new section 28196 upstream of the bridge.
- The duplicate effective model has an n-value of 10.0 for section 27953 in the right overbank area which has the effect of creating an ineffective area. In an effort for consistency with the upstream and downstream sections, the n-value of 10.0 was replaced with true n-value data in this area and an ineffective flow area was added to properly model the low floodplain area that does not convey active flow.
- Ineffective flow areas were adjusted to accurately model the contraction and expansion of flow through bridge crossing SC 557 at sections 27953, and 28087. Ineffective flow stations were added to sections 27610, 27717, 27810 and 27900.

The above model results matched the Duplicate Effective (HEC-RAS 4.0) model as follows:

- Changes in the 100 YR water surface elevations range from a decrease of 0.14 foot to an increase of 1.03 feet between Sections 26802 and 43846.
- All other sections matched exactly.

These increases in the base flood elevations can be attributed to more accurate survey data (specifically within the Crowders Creek and bed) obtained within the project vicinity. The effective model uses a standard 4 foot channel below the top of bank throughout the project area. Compared to the recent survey data which shows a shallow channel with averaging 2 foot depths, the channel conveyance area is greatly reduced thereby raising the base flood elevations.

## Revised Model

The following changes were made to the Corrected Effective model thus creating the Revised model:

- The proposed SC 557 bridge is downstream of the existing bridge at the same location as section 27810. The proposed bridge section was set as 27810 and the cross section 27810 was deleted.
- The SC 557 bridge deck/width and pier arrangement/widths were revised to match the proposed conditions.
- The proposed SC 557 bridge is on a 15 degree skew to allow for the piers to align perpendicular to flood flow. The revised model reflects the skew showing and all bridges dimensions/parameters have been adjusted accordingly.
- The distance between the upstream cross section and the bridge deck was updated in the Deck/Roadway editor for the SC 557 bridge.
- Since the proposed SC 557 bridge is being relocated downstream, the existing bridge (section 28030) will be removed for the revised model. The existing bridge interior sections 28015.5 and 28044.5 were retained in an effort to model the existing roadway embankment remaining after project completion. The overbank n-values for these sections were set as 0.06 for the removed existing roadway.
- Portions of existing roadway fill and natural ground will be excavated at and downstream of the existing bridge being removed: thus sections 27900, 27953, 28015.5 and 28044.5 have been adjusted accordingly.
- Contraction and expansion coefficients were adjusted to 0.3 and 0.5 for sections 27900 and 27717 due to the proposed bridge.
- Contraction and expansion coefficients were adjusted to 0.1 and 0.3 for sections 28087 and 28196 due to the removal of the existing bridge.
- The ineffective flow areas were adjusted at sections 27610, 27717, 27900, 27953, 28015.5 and 28044.5, based on the new bridge ends and excavation in the vicinity of the existing bridge.

The above model results matched the Corrected Effective Model as follows:

- 100 YR water surface elevations decreased a maximum of 1.46 feet between sections 27717 to 43846.
- All other sections matched exactly.

These decreases in base flood elevations can be attributed to the proposed bridge being located downstream of the existing bridge in a natural floodplain. The proposed bridge and roadway excavation within the floodplain allow more flood flow and the contraction as well as expansion of flow is altered where the existing roadway embankment has been excavated. This contributes to the decrease in water surface elevations.



## **Summary and Conclusions**

The resulting base flood elevations (BFE) for all runs at all sections are assembled in a BFE Summary Table provided herein. These results show a no rise to the BFE (maximum decrease of 1.46 feet); therefore a “No Rise / No Impact” Certification is required. When comparing the Corrected Effective model to the Revised mode, there was never an increase in the water surface elevations.

These improvements are necessary to maintain bridge infrastructure in this area of York County. The completion of the SC 557 Bridge Replacement will thus benefit the region while meeting necessary FEMA requirements.

A BFE Summary Table has been provided within this study as a means for comparing the various models analyzed. A topographic workmap is also included showing the location of the proposed bridge, cross sections, and FEMA floodplain boundaries.

**WATER SURFACE ELEVATION COMPARISON**

COMMUNITY NAME		FLOODING SOURCE				PROJECT	
York County		Crowders Creek				SC-557 Bridge Replacement	
X-SECT		Published	Effective (HEC-RAS 3.1.2)	Duplicate Effective (HEC-RAS 3.1.2)	Duplicate Effective (HEC-RAS 4.1.0)	Corrected Effective (HEC-RAS 4.1.0)	Revised (HEC-RAS 4.1.0)
Cross Section	RAS Sect No.	100 YR WSEL	100 YR WSEL	100 YR WSEL	100 YR WSEL	100 YR WSEL	100 YR WSEL
243	24274	579.7	579.70	579.70	579.70	579.70	579.70
253	25292	579.5	579.49	579.49	579.49	579.49	579.49
258	25793	580.5	580.49	580.49	580.49	580.49	580.49
264	26393	580.7	580.71	580.71	580.71	580.71	580.71
268	26802	581.1	581.12	581.12	581.12	581.36	581.36
	27119	Added Section				581.80	581.80
276	27610	582.5	582.50	582.50	582.50	582.59	582.59
	27717	Added Section				582.79	582.79
	27810	Added Section - Proposed SC 557 Bridge				583.03	Prop. SC 557 Bridge
	27900	Added Section				583.09	583.09
280	27953	582.6	582.63	582.63	582.63	583.35	583.35
	28015.5	Internal Section					583.39
	28030	SC 557 - Existing Bridge					
	28044.5	Internal Section					583.39
281	28087	583.5	583.52	583.52	583.52	583.38	582.94
	28196	Added Section				584.58	583.98
283	28293	584.0	583.96	583.96	583.96	584.81	584.24
	28435	Added Section				585.03	584.46
288	28793	584.3	584.26	584.26	584.26	585.27	584.75
294	29393	584.4	584.37	584.37	584.37	585.40	584.90
299	29897	584.4	584.43	584.43	584.43	585.44	584.95
306	30593	584.7	584.74	584.74	584.74	585.69	584.23
312	31180	585.0	585.00	585.00	585.00	585.89	584.45
318	31765	585.4	585.38	585.38	585.38	586.21	585.80
325	32460	585.8	585.79	585.79	585.79	586.57	586.19
328	32807	585.8	585.84	585.84	585.84	586.60	586.23
	32840	SC 152 Bridge					
329	32873	586.2	586.18	586.18	586.17	586.89	586.54
331	33081	586.9	586.89	586.89	586.89	587.54	587.22
336	33626	587.4	587.36	587.36	587.36	587.97	587.67
342	34193	587.5	587.47	587.47	587.47	588.06	587.77
348	34796	587.9	587.85	587.85	587.85	588.42	588.14

**WATER SURFACE ELEVATION COMPARISON**

COMMUNITY NAME		FLOODING SOURCE				PROJECT	
York County		Crowders Creek				SC-557 Bridge Replacement	
X-SECT		Published	Effective (HEC-RAS 3.1.2)	Duplicate Effective (HEC-RAS 3.1.2)	Duplicate Effective (HEC-RAS 4.1.0)	Corrected Effective (HEC-RAS 4.1.0)	Revised (HEC-RAS 4.1.0)
Cross Section	RAS Sect No.	100 YR WSEL	100 YR WSEL	100 YR WSEL	100 YR WSEL	100 YR WSEL	100 YR WSEL
353	35304	588.1	588.06	588.06	588.06	588.60	588.33
360	35993	588.4	588.44	588.44	588.44	588.97	588.71
367	36655	588.8	588.75	588.75	588.75	589.23	588.99
373	37273	589.2	589.18	589.18	589.18	589.63	589.40
377	37750	589.3	589.34	589.34	589.34	589.77	589.56
384	38421	589.8	589.77	589.77	589.77	590.17	589.97
390	38993	590.2	590.16	590.16	590.16	590.54	590.35
397	39665	590.6	590.62	590.62	590.62	590.97	590.79
402	40171	591.2	591.17	591.17	591.17	591.48	591.33
408	40817	591.7	591.67	591.67	591.67	591.97	591.82
414	41393	592.1	592.09	592.09	592.09	592.35	592.22
420	41993	592.7	592.65	592.65	592.65	592.89	592.77
426	42566	593.1	593.09	593.09	593.08	593.31	593.20
432	43193	593.6	593.57	593.57	593.56	593.77	593.66
438	43846	594.2	594.19	594.19	594.19	594.37	594.28
	43897	Brandon Road Bridge					
439	43943	595.9	595.90	595.90	595.90	595.90	595.90
443	44335	596.8	596.77	596.77	596.77	596.77	596.77
450	44992	597.6	597.60	597.60	597.60	597.60	597.60
456	45576	598.3	598.29	598.29	598.29	598.29	598.29
462	46164	598.8	598.84	598.84	598.84	598.84	598.84
468	46779	599.4	599.41	599.41	599.41	599.41	599.41
474	47374	600.1	600.10	600.10	600.10	600.10	600.10
480	47993	600.9	600.85	600.85	600.85	600.85	600.85
486	48577	601.6	601.60	601.60	601.60	601.60	601.60
492	49193	602.3	602.33	602.33	602.33	602.33	602.33
499	49859	603.3	603.29	603.29	603.29	603.29	603.29
504	50393	604.0	603.98	603.98	603.98	603.98	603.98
510	50993	604.7	604.73	604.73	604.73	604.73	604.73
519	51895	605.4	605.36	605.36	605.36	605.36	605.36
524	52413	605.7	605.73	605.73	605.73	605.73	605.73
529	52906	606.1	606.13	606.13	606.13	606.13	606.13
532	53225	606.3	606.30	606.30	606.30	606.30	606.30

**WATER SURFACE ELEVATION COMPARISON**

COMMUNITY NAME		FLOODING SOURCE				PROJECT	
York County		Crowders Creek				SC-557 Bridge Replacement	
X-SECT		Published	Effective (HEC-RAS 3.1.2)	Duplicate Effective (HEC-RAS 3.1.2)	Duplicate Effective (HEC-RAS 4.1.0)	Corrected Effective (HEC-RAS 4.1.0)	Revised (HEC-RAS 4.1.0)
Cross Section	RAS Sect No.	100 YR WSEL	100 YR WSEL	100 YR WSEL	100 YR WSEL	100 YR WSEL	100 YR WSEL
	53266	Kendrick Road Bridge					
533	53287	606.8	606.84	606.84	606.84	606.84	606.84
539	53914	608.0	608.01	608.01	608.01	608.01	608.01
546	54593	608.6	608.57	608.57	608.57	608.57	608.57
552	55193	609.2	609.17	609.17	609.17	609.17	609.17
558	55793	610.1	610.06	610.06	610.06	610.06	610.06
564	56393	610.9	610.94	610.94	610.94	610.94	610.94
570	56993	611.8	611.84	611.84	611.84	611.84	611.84
576	57593	612.5	612.50	612.50	612.50	612.50	612.50
581	58091	613.1	613.11	613.11	613.11	613.11	613.11
590	59039	614.3	614.25	614.25	614.25	614.25	614.25
594	59393	614.5	614.52	614.52	614.52	614.52	614.52
601	60078	615.1	615.11	615.11	615.11	615.11	615.11
606	60593	615.8	615.77	615.77	615.77	615.77	615.77
611	61144	616.2	616.16	616.16	616.16	616.16	616.16
617	61655	616.7	616.70	616.70	616.70	616.70	616.70
623	62330	617.3	617.30	617.30	617.30	617.30	617.30
629	62928	617.7	617.72	617.72	617.72	617.72	617.72

\* Elevations above are referenced to the NAVD 88 vertical datum.

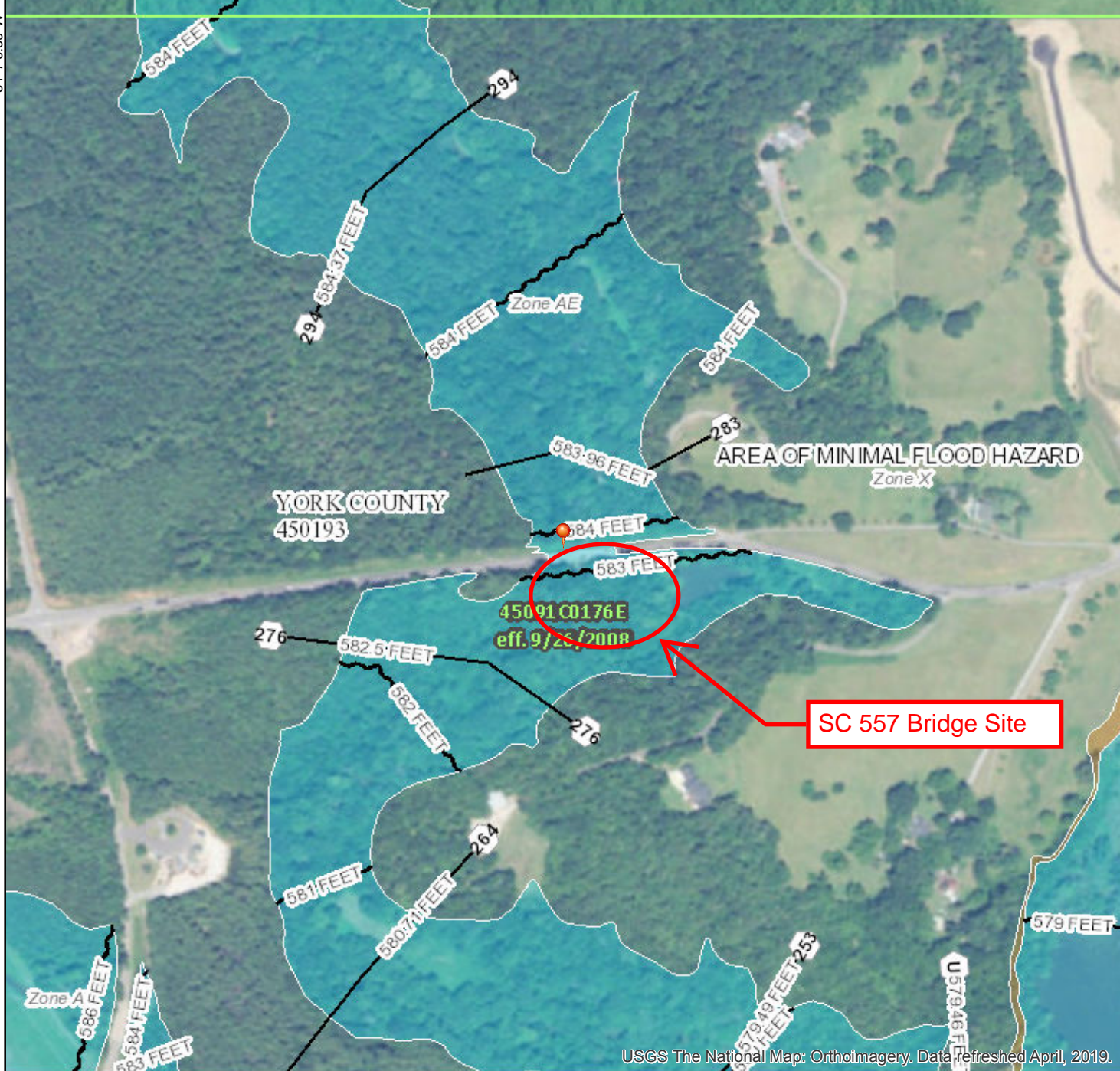
# VICINITY MAP



# National Flood Hazard Layer FIRMette



35°7'30.49"N



## Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

- |                                    |   |
|------------------------------------|---|
| <b>SPECIAL FLOOD HAZARD AREAS</b>  | <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #e0ffff; border: 1px solid black; margin-right: 5px;"></span> Without Base Flood Elevation (BFE)<br/><i>Zone A, V, A99</i></li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #e0ffff; border: 1px solid black; margin-right: 5px;"></span> With BFE or Depth <i>Zone AE, AO, AH, VE, AR</i></li> <li><span style="display: inline-block; width: 15px; height: 10px; background: repeating-linear-gradient(45deg, transparent, transparent 2px, #000 2px, #000 4px); border: 1px solid black; margin-right: 5px;"></span> Regulatory Floodway</li> </ul>   |
| <b>OTHER AREAS OF FLOOD HAZARD</b> | <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #ffcc99; border: 1px solid black; margin-right: 5px;"></span> 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile <i>Zone X</i></li> <li><span style="display: inline-block; width: 15px; height: 10px; background: repeating-linear-gradient(-45deg, transparent, transparent 2px, #ccc 2px, #ccc 4px); border: 1px solid black; margin-right: 5px;"></span> Future Conditions 1% Annual Chance Flood Hazard <i>Zone X</i></li> <li><span style="display: inline-block; width: 15px; height: 10px; background: repeating-linear-gradient(45deg, transparent, transparent 2px, #ccc 2px, #ccc 4px); border: 1px solid black; margin-right: 5px;"></span> Area with Reduced Flood Risk due to Levee. See Notes. <i>Zone X</i></li> <li><span style="display: inline-block; width: 15px; height: 10px; background: repeating-linear-gradient(-45deg, transparent, transparent 2px, #ccc 2px, #ccc 4px); border: 1px solid black; margin-right: 5px;"></span> Area with Flood Risk due to Levee <i>Zone D</i></li> </ul>      |
| <b>OTHER AREAS</b>                 | <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #fff; border: 1px solid black; margin-right: 5px;"></span> NO SCREEN Area of Minimal Flood Hazard <i>Zone X</i></li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #fff; border: 2px solid blue; margin-right: 5px;"></span> Effective LOMRs</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: #fff; border: 1px solid orange; margin-right: 5px;"></span> Area of Undetermined Flood Hazard <i>Zone D</i></li> </ul>  |
| <b>GENERAL STRUCTURES</b>          | <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; border-bottom: 2px dashed black; margin-right: 5px;"></span> Channel, Culvert, or Storm Sewer</li> <li><span style="display: inline-block; width: 15px; border-bottom: 2px dashed gray; margin-right: 5px;"></span> Levee, Dike, or Floodwall</li> </ul>  |
| <b>OTHER FEATURES</b>              | <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; border-left: 1px solid black; margin-right: 5px;"></span> <b>B</b> 20.2 Cross Sections with 1% Annual Chance Water Surface Elevation</li> <li><span style="display: inline-block; width: 15px; border-left: 1px dashed black; margin-right: 5px;"></span> 17.5 Coastal Transect</li> <li><span style="display: inline-block; width: 15px; border-bottom: 1px solid black; margin-right: 5px;"></span> Base Flood Elevation Line (BFE)</li> <li><span style="display: inline-block; width: 15px; border-bottom: 1px solid red; margin-right: 5px;"></span> Limit of Study</li> <li><span style="display: inline-block; width: 15px; border-bottom: 1px solid yellow; margin-right: 5px;"></span> Jurisdiction Boundary</li> <li><span style="display: inline-block; width: 15px; border-bottom: 1px dashed black; margin-right: 5px;"></span> Coastal Transect Baseline</li> <li><span style="display: inline-block; width: 15px; border-bottom: 1px solid blue; margin-right: 5px;"></span> Profile Baseline</li> <li><span style="display: inline-block; width: 15px; border-bottom: 1px solid blue; margin-right: 5px;"></span> Hydrographic Feature</li> </ul> |
| <b>MAP PANELS</b>                  | <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; border: 1px solid green; margin-right: 5px;"></span> Digital Data Available</li> <li><span style="display: inline-block; width: 15px; height: 10px; border: 1px dashed gray; margin-right: 5px;"></span> No Digital Data Available</li> <li><span style="display: inline-block; width: 15px; height: 10px; border: 1px solid gray; margin-right: 5px;"></span> Unmapped</li> </ul>  |



The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/7/2019 at 6:54:50 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

USGS The National Map: Orthoimagery. Data refreshed April, 2019.

0 250 500 1,000 1,500 2,000 Feet 1:6,000 35°7'1.06"N

81°76.39"W

81°6'28.93"W

**Table 6: Limited Detailed Base Flood Elevation Data**

<b>Cross Section</b>	<b>Stream Station<sup>2</sup></b>	<b>Flood Discharge (cfs)</b>	<b>1% Annual Chance Water-Surface Elevation (feet NAVD 88)<sup>3</sup></b>
<b>Creekside Branch Tributary 7</b>			
001	126	546	633.5
005	490	546	635.1
009	902	546	638.1
<b>Crowders Creek</b>			
243	24,274	14,206	579.7
253	25,292	12,543	579.5
258	25,793	12,543	580.5
264	26,393	12,543	580.7
268	26,802	12,543	581.1
276	27,610	12,543	582.5
280	27,953	12,543	582.6
281	28,087	12,543	583.5
283	28,293	12,543	584.0
288	28,793	12,543	584.3
294	29,393	12,543	584.4
299	29,897	12,543	584.4
306	30,593	12,543	584.7
312	31,180	12,543	585.0
318	31,765	12,543	585.4
325	32,460	12,543	585.8
328	32,807	12,468	585.8
329	32,873	12,468	586.2
331	33,081	12,468	586.9
336	33,626	12,468	587.4
342	34,193	12,468	587.5
348	34,796	12,468	587.9
353	35,304	12,468	588.1
360	35,993	12,468	588.4
367	36,655	12,468	588.8
373	37,273	12,468	589.2
377	37,750	12,468	589.3
384	38,421	12,468	589.8
390	38,993	12,468	590.2
397	39,665	12,468	590.6
402	40,171	12,468	591.2
408	40,817	12,468	591.7
414	41,393	12,468	592.1
420	41,993	12,468	592.7
426	42,566	12,468	593.1
432	43,193	12,468	593.6
438	43,846	12,312	594.2
439	43,943	12,312	595.9
443	44,335	12,312	596.8
450	44,992	12,312	597.6

**Table 6: Limited Detailed Base Flood Elevation Data**

<b>Cross Section</b>	<b>Stream Station<sup>2</sup></b>	<b>Flood Discharge (cfs)</b>	<b>1% Annual Chance Water-Surface Elevation (feet NAVD 88)<sup>3</sup></b>
<b>Crowders Creek, cont.</b>			
456	45,576	12,312	598.3
462	46,164	12,312	598.8
468	46,779	12,312	599.4
474	47,374	12,312	600.1
480	47,993	12,312	600.9
486	48,577	12,312	601.6
492	49,193	12,312	602.3
499	49,859	12,312	603.3
504	50,393	12,312	604.0
510	50,993	12,312	604.7
519	51,895	12,312	605.4
524	52,413	12,312	605.7
529	52,906	12,312	606.1
532	53,225	12,312	606.3
533	53,287	12,312	606.8
539	53,914	12,083	608.0
546	54,593	12,083	608.6
552	55,193	12,083	609.2
558	55,793	12,083	610.1
564	56,393	12,083	610.9
570	56,993	12,083	611.8
576	57,593	12,083	612.5
581	58,091	12,083	613.1
590	59,039	12,083	614.3
594	59,393	12,083	614.5
601	60,078	12,083	615.1
606	60,593	11,781	615.8
611	61,144	11,781	616.2
617	61,655	11,781	616.7
623	62,330	11,781	617.3
629	62,928	11,781	617.7
<b>Crowders Creek Tributary 1</b>			
002	175	1,218	615.4
005	475	1,218	615.4
007	740	1,218	615.4
011	1,087	1,218	618.1
013	1,270	1,218	619.8
015	1,507	1,218	621.0
018	1,811	1,218	621.8
<b>Crowders Creek Tributary 2</b>			
019	1,945	1,609	575.9
025	2,500	1,609	575.9
030	3,000	1,609	575.9
035	3,500	1,609	577.5



## EFFECTIVE (HEC-RAS 3.1.2)

HEC-RAS Plan: 100Year River: Crowders Creek Reach: Reach-1 Profile: 100-year

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	62928	100-year	11781.00	596.53	617.72		618.46	0.000774	7.26	3274.35	835.72	0.28
Reach-1	62330	100-year	11781.00	595.48	617.30		618.01	0.000707	7.08	3107.59	747.46	0.27
Reach-1	61655	100-year	11781.00	595.10	616.70		617.50	0.000779	7.38	2563.66	554.54	0.28
Reach-1	61144	100-year	11781.00	594.94	616.16		617.07	0.000880	7.75	1904.31	249.43	0.30
Reach-1	60593	100-year	11781.00	594.77	615.77		616.57	0.000824	7.44	2143.84	177.97	0.29
Reach-1	60078	100-year	12083.00	594.06	615.11		616.09	0.000948	8.00	1701.12	134.84	0.31
Reach-1	59393	100-year	12083.00	593.82	614.52		615.43	0.000926	7.82	1967.58	145.50	0.30
Reach-1	59039	100-year	12083.00	593.70	614.25		615.09	0.000893	7.65	2524.46	315.26	0.30
Reach-1	58091	100-year	12083.00	592.81	613.11		614.15	0.001057	8.25	1760.08	173.94	0.32
Reach-1	57593	100-year	12083.00	592.56	612.50		613.59	0.001136	8.45	1635.78	148.64	0.33
Reach-1	56993	100-year	12083.00	592.26	611.84		612.90	0.001153	8.41	1865.63	268.17	0.34
Reach-1	56393	100-year	12083.00	591.96	610.94		612.15	0.001282	8.90	1580.88	210.07	0.36
Reach-1	55793	100-year	12083.00	591.66	610.06		611.34	0.001409	9.14	1589.59	218.12	0.38
Reach-1	55193	100-year	12083.00	591.36	609.17		610.46	0.001517	9.27	1597.59	140.60	0.39
Reach-1	54593	100-year	12083.00	588.48	608.57		609.65	0.001054	8.38	1635.70	134.15	0.33
Reach-1	53914	100-year	12083.00	586.69	608.01		608.96	0.000861	7.89	1776.88	152.00	0.30
Reach-1	53287	100-year	12312.00	585.90	606.84	597.54	608.16	0.001450	9.34	1528.17	107.97	0.37
Reach-1	53266		Bridge									
Reach-1	53225	100-year	12312.00	585.65	606.30	597.22	607.71	0.001563	9.60	1440.02	128.18	0.38
Reach-1	52906	100-year	12312.00	585.19	606.13		607.13	0.000930	8.10	1766.83	172.45	0.31
Reach-1	52413	100-year	12312.00	584.40	605.73		606.67	0.000856	7.87	1871.99	150.66	0.30
Reach-1	51895	100-year	12312.00	584.03	605.36		606.22	0.000809	7.65	2274.61	254.36	0.29
Reach-1	50993	100-year	12312.00	583.88	604.73		605.47	0.000765	7.33	2875.04	359.75	0.28
Reach-1	50393	100-year	12312.00	583.91	603.98		604.94	0.000979	8.08	2284.31	360.44	0.32
Reach-1	49859	100-year	12312.00	583.88	603.29		604.36	0.001132	8.50	1822.70	175.52	0.34
Reach-1	49193	100-year	12312.00	583.47	602.33		603.54	0.001298	8.92	1657.12	174.57	0.36
Reach-1	48577	100-year	12312.00	583.01	601.60		602.72	0.001275	8.76	1815.17	159.07	0.36
Reach-1	47993	100-year	12312.00	582.31	600.85		601.98	0.001278	8.75	1853.57	171.68	0.36
Reach-1	47374	100-year	12312.00	581.08	600.10		601.21	0.001199	8.62	1785.36	141.42	0.35
Reach-1	46779	100-year	12312.00	579.91	599.41		600.51	0.001137	8.54	1705.91	126.93	0.34
Reach-1	46164	100-year	12312.00	578.73	598.84		599.82	0.000994	8.15	1907.39	148.02	0.32
Reach-1	45576	100-year	12312.00	578.16	598.29		599.24	0.000968	8.05	2066.71	185.74	0.32
Reach-1	44992	100-year	12312.00	577.59	597.60		598.65	0.000999	8.35	1723.23	129.39	0.33
Reach-1	44335	100-year	12312.00	577.47	596.77		597.94	0.001151	8.75	1612.33	127.30	0.35
Reach-1	43943	100-year	12312.00	577.40	595.90	588.37	597.31	0.001769	9.85	1769.86	320.14	0.41
Reach-1	43897		Bridge									
Reach-1	43846	100-year	12312.00	577.15	594.19	588.13	596.14	0.002604	11.29	1231.85	117.15	0.49
Reach-1	43193	100-year	12468.00	573.96	593.57		594.68	0.001083	8.58	1726.13	137.73	0.34

## EFFECTIVE (HEC-RAS 3.1.2)

HEC-RAS Plan: 100Year River: Crowders Creek Reach: Reach-1 Profile: 100-year (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	42566	100-year	12468.00	571.85	593.09		594.04	0.000831	7.93	2296.16	406.36	0.30
Reach-1	41993	100-year	12468.00	570.95	592.65		593.57	0.000773	7.76	1969.27	191.16	0.29
Reach-1	41393	100-year	12468.00	570.77	592.09		593.08	0.000842	8.01	1756.29	138.94	0.31
Reach-1	40817	100-year	12468.00	570.56	591.67		592.58	0.000812	7.81	3088.67	588.81	0.30
Reach-1	40171	100-year	12468.00	569.57	591.17		592.06	0.000770	7.73	2033.26	165.52	0.29
Reach-1	39665	100-year	12468.00	569.57	590.62		591.64	0.000880	8.12	1721.24	132.91	0.31
Reach-1	38993	100-year	12468.00	568.91	590.16		591.04	0.000783	7.71	2077.69	176.69	0.30
Reach-1	38421	100-year	12468.00	568.03	589.77		590.59	0.000718	7.49	2131.02	150.95	0.28
Reach-1	37750	100-year	12468.00	566.29	589.34		590.14	0.000624	7.26	2101.43	182.13	0.27
Reach-1	37273	100-year	12468.00	565.86	589.18		589.82	0.000527	6.73	2958.99	374.42	0.25
Reach-1	36655	100-year	12468.00	565.45	588.75		589.47	0.000569	6.99	2532.65	267.46	0.26
Reach-1	35993	100-year	12468.00	564.88	588.44		589.09	0.000520	6.73	3739.95	829.70	0.25
Reach-1	35304	100-year	12468.00	564.65	588.06		588.73	0.000536	6.80	2639.54	208.66	0.25
Reach-1	34796	100-year	12468.00	564.45	587.85		588.44	0.000496	6.54	3735.98	478.02	0.24
Reach-1	34193	100-year	12468.00	564.08	587.47		588.13	0.000510	6.81	2853.69	259.28	0.25
Reach-1	33626	100-year	12468.00	563.88	587.36		587.82	0.000394	6.00	4283.99	366.66	0.22
Reach-1	33081	100-year	12468.00	563.68	586.89		587.55	0.000515	6.81	3001.23	283.90	0.25
Reach-1	32873	100-year	12468.00	563.60	586.18	575.22	587.27	0.001092	8.72	2056.98	191.71	0.33
Reach-1	32840		Bridge									
Reach-1	32807	100-year	12468.00	563.35	585.84	574.96	586.94	0.001106	8.75	2001.83	189.48	0.33
Reach-1	32460	100-year	12543.00	563.22	585.79		586.47	0.000559	6.96	2995.05	279.37	0.26
Reach-1	31765	100-year	12543.00	562.95	585.38		586.08	0.000572	7.01	2988.22	333.68	0.26
Reach-1	31180	100-year	12543.00	562.67	585.00		585.73	0.000599	7.15	2751.98	289.09	0.27
Reach-1	30593	100-year	12543.00	562.67	584.74		585.36	0.000546	6.78	3514.89	449.71	0.26
Reach-1	29897	100-year	12543.00	562.27	584.43		584.97	0.000499	6.49	4039.18	486.19	0.24
Reach-1	29393	100-year	12543.00	562.27	584.37		584.70	0.000359	5.50	5874.29	586.68	0.21
Reach-1	28793	100-year	12543.00	561.82	584.26		584.48	0.000268	4.80	7285.82	671.56	0.18
Reach-1	28293	100-year	12543.00	561.52	583.96		584.31	0.000365	5.60	5308.69	446.44	0.21
Reach-1	28087	100-year	12543.00	561.40	583.52	571.50	584.14	0.000585	6.74	3199.24	418.00	0.26
Reach-1	28030		Bridge									
Reach-1	27953	100-year	12543.00	561.41	582.63	571.51	583.37	0.000720	7.27	3655.57	964.11	0.28
Reach-1	27610	100-year	12543.00	561.43	582.50		583.04	0.000660	7.08	5137.05	614.95	0.27
Reach-1	26802	100-year	12543.00	561.48	581.12		582.26	0.001252	9.31	2642.79	287.62	0.37
Reach-1	26393	100-year	12543.00	561.51	580.71		581.73	0.001164	8.70	2832.57	352.21	0.35
Reach-1	25793	100-year	12543.00	561.51	580.49		581.05	0.000729	6.89	4308.77	450.79	0.28
Reach-1	25292	100-year	12543.00	561.38	579.49		580.51	0.001442	9.21	3312.23	422.24	0.38
Reach-1	24274	100-year	14206.00	561.18	579.70	572.20	579.77	0.000226	3.78	15680.40	1567.06	0.16

## DUPLICATE EFFECTIVE (HEC-RAS 3.1.2)

HEC-RAS Plan: 100Year River: Crowders Creek Reach: Reach-1 Profile: 100-year

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	62928	100-year	11781.00	596.53	617.72		618.46	0.000774	7.26	3274.35	835.72	0.28
Reach-1	62330	100-year	11781.00	595.48	617.30		618.01	0.000707	7.08	3107.59	747.46	0.27
Reach-1	61655	100-year	11781.00	595.10	616.70		617.50	0.000779	7.38	2563.66	554.54	0.28
Reach-1	61144	100-year	11781.00	594.94	616.16		617.07	0.000880	7.75	1904.31	249.43	0.30
Reach-1	60593	100-year	11781.00	594.77	615.77		616.57	0.000824	7.44	2143.84	177.97	0.29
Reach-1	60078	100-year	12083.00	594.06	615.11		616.09	0.000948	8.00	1701.12	134.84	0.31
Reach-1	59393	100-year	12083.00	593.82	614.52		615.43	0.000926	7.82	1967.58	145.50	0.30
Reach-1	59039	100-year	12083.00	593.70	614.25		615.09	0.000893	7.65	2524.46	315.26	0.30
Reach-1	58091	100-year	12083.00	592.81	613.11		614.15	0.001057	8.25	1760.08	173.94	0.32
Reach-1	57593	100-year	12083.00	592.56	612.50		613.59	0.001136	8.45	1635.78	148.64	0.33
Reach-1	56993	100-year	12083.00	592.26	611.84		612.90	0.001153	8.41	1865.63	268.17	0.34
Reach-1	56393	100-year	12083.00	591.96	610.94		612.15	0.001282	8.90	1580.88	210.07	0.36
Reach-1	55793	100-year	12083.00	591.66	610.06		611.34	0.001409	9.14	1589.59	218.12	0.38
Reach-1	55193	100-year	12083.00	591.36	609.17		610.46	0.001517	9.27	1597.59	140.60	0.39
Reach-1	54593	100-year	12083.00	588.48	608.57		609.65	0.001054	8.38	1635.70	134.15	0.33
Reach-1	53914	100-year	12083.00	586.69	608.01		608.96	0.000861	7.89	1776.88	152.00	0.30
Reach-1	53287	100-year	12312.00	585.90	606.84	597.54	608.16	0.001450	9.34	1528.17	107.97	0.37
Reach-1	53266		Bridge									
Reach-1	53225	100-year	12312.00	585.65	606.30	597.22	607.71	0.001563	9.60	1440.02	128.18	0.38
Reach-1	52906	100-year	12312.00	585.19	606.13		607.13	0.000930	8.10	1766.83	172.45	0.31
Reach-1	52413	100-year	12312.00	584.40	605.73		606.67	0.000856	7.87	1871.99	150.66	0.30
Reach-1	51895	100-year	12312.00	584.03	605.36		606.22	0.000809	7.65	2274.61	254.36	0.29
Reach-1	50993	100-year	12312.00	583.88	604.73		605.47	0.000765	7.33	2875.04	359.75	0.28
Reach-1	50393	100-year	12312.00	583.91	603.98		604.94	0.000979	8.08	2284.31	360.44	0.32
Reach-1	49859	100-year	12312.00	583.88	603.29		604.36	0.001132	8.50	1822.70	175.52	0.34
Reach-1	49193	100-year	12312.00	583.47	602.33		603.54	0.001298	8.92	1657.12	174.57	0.36
Reach-1	48577	100-year	12312.00	583.01	601.60		602.72	0.001275	8.76	1815.17	159.07	0.36
Reach-1	47993	100-year	12312.00	582.31	600.85		601.98	0.001278	8.75	1853.57	171.68	0.36
Reach-1	47374	100-year	12312.00	581.08	600.10		601.21	0.001199	8.62	1785.36	141.42	0.35
Reach-1	46779	100-year	12312.00	579.91	599.41		600.51	0.001137	8.54	1705.91	126.93	0.34
Reach-1	46164	100-year	12312.00	578.73	598.84		599.82	0.000994	8.15	1907.39	148.02	0.32
Reach-1	45576	100-year	12312.00	578.16	598.29		599.24	0.000968	8.05	2066.71	185.74	0.32
Reach-1	44992	100-year	12312.00	577.59	597.60		598.65	0.000999	8.35	1723.23	129.39	0.33
Reach-1	44335	100-year	12312.00	577.47	596.77		597.94	0.001151	8.75	1612.33	127.30	0.35
Reach-1	43943	100-year	12312.00	577.40	595.90	588.37	597.31	0.001769	9.85	1769.86	320.14	0.41
Reach-1	43897		Bridge									
Reach-1	43846	100-year	12312.00	577.15	594.19	588.13	596.14	0.002604	11.29	1231.85	117.15	0.49
Reach-1	43193	100-year	12468.00	573.96	593.57		594.68	0.001083	8.58	1726.13	137.73	0.34

## DUPLICATE EFFECTIVE (HEC-RAS 3.1.2)

HEC-RAS Plan: 100Year River: Crowders Creek Reach: Reach-1 Profile: 100-year (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	42566	100-year	12468.00	571.85	593.09		594.04	0.000831	7.93	2296.16	406.36	0.30
Reach-1	41993	100-year	12468.00	570.95	592.65		593.57	0.000773	7.76	1969.27	191.16	0.29
Reach-1	41393	100-year	12468.00	570.77	592.09		593.08	0.000842	8.01	1756.29	138.94	0.31
Reach-1	40817	100-year	12468.00	570.56	591.67		592.58	0.000812	7.81	3088.67	588.81	0.30
Reach-1	40171	100-year	12468.00	569.57	591.17		592.06	0.000770	7.73	2033.26	165.52	0.29
Reach-1	39665	100-year	12468.00	569.57	590.62		591.64	0.000880	8.12	1721.24	132.91	0.31
Reach-1	38993	100-year	12468.00	568.91	590.16		591.04	0.000783	7.71	2077.69	176.69	0.30
Reach-1	38421	100-year	12468.00	568.03	589.77		590.59	0.000718	7.49	2131.02	150.95	0.28
Reach-1	37750	100-year	12468.00	566.29	589.34		590.14	0.000624	7.26	2101.43	182.13	0.27
Reach-1	37273	100-year	12468.00	565.86	589.18		589.82	0.000527	6.73	2958.99	374.42	0.25
Reach-1	36655	100-year	12468.00	565.45	588.75		589.47	0.000569	6.99	2532.65	267.46	0.26
Reach-1	35993	100-year	12468.00	564.88	588.44		589.09	0.000520	6.73	3739.95	829.70	0.25
Reach-1	35304	100-year	12468.00	564.65	588.06		588.73	0.000536	6.80	2639.54	208.66	0.25
Reach-1	34796	100-year	12468.00	564.45	587.85		588.44	0.000496	6.54	3735.98	478.02	0.24
Reach-1	34193	100-year	12468.00	564.08	587.47		588.13	0.000510	6.81	2853.69	259.28	0.25
Reach-1	33626	100-year	12468.00	563.88	587.36		587.82	0.000394	6.00	4283.99	366.66	0.22
Reach-1	33081	100-year	12468.00	563.68	586.89		587.55	0.000515	6.81	3001.23	283.90	0.25
Reach-1	32873	100-year	12468.00	563.60	586.18	575.22	587.27	0.001092	8.72	2056.98	191.71	0.33
Reach-1	32840		Bridge									
Reach-1	32807	100-year	12468.00	563.35	585.84	574.96	586.94	0.001106	8.75	2001.83	189.48	0.33
Reach-1	32460	100-year	12543.00	563.22	585.79		586.47	0.000559	6.96	2995.05	279.37	0.26
Reach-1	31765	100-year	12543.00	562.95	585.38		586.08	0.000572	7.01	2988.22	333.68	0.26
Reach-1	31180	100-year	12543.00	562.67	585.00		585.73	0.000599	7.15	2751.98	289.09	0.27
Reach-1	30593	100-year	12543.00	562.67	584.74		585.36	0.000546	6.78	3514.89	449.71	0.26
Reach-1	29897	100-year	12543.00	562.27	584.43		584.97	0.000499	6.49	4039.18	486.19	0.24
Reach-1	29393	100-year	12543.00	562.27	584.37		584.70	0.000359	5.50	5874.29	586.68	0.21
Reach-1	28793	100-year	12543.00	561.82	584.26		584.48	0.000268	4.80	7285.82	671.56	0.18
Reach-1	28293	100-year	12543.00	561.52	583.96		584.31	0.000365	5.60	5308.69	446.44	0.21
Reach-1	28087	100-year	12543.00	561.40	583.52	571.50	584.14	0.000585	6.74	3199.24	418.00	0.26
Reach-1	28030		Bridge									
Reach-1	27953	100-year	12543.00	561.41	582.63	571.51	583.37	0.000720	7.27	3655.57	964.11	0.28
Reach-1	27610	100-year	12543.00	561.43	582.50		583.04	0.000660	7.08	5137.05	614.95	0.27
Reach-1	26802	100-year	12543.00	561.48	581.12		582.26	0.001252	9.31	2642.79	287.62	0.37
Reach-1	26393	100-year	12543.00	561.51	580.71		581.73	0.001164	8.70	2832.57	352.21	0.35
Reach-1	25793	100-year	12543.00	561.51	580.49		581.05	0.000729	6.89	4308.77	450.79	0.28
Reach-1	25292	100-year	12543.00	561.38	579.49		580.51	0.001442	9.21	3312.23	422.24	0.38
Reach-1	24274	100-year	14206.00	561.18	579.70	572.20	579.77	0.000226	3.78	15680.40	1567.06	0.16

## DUPLICATE EFFECTIVE (HEC-RAS 4.1.0)

HEC-RAS Plan: Dup Eff River: Crowders Creek Reach: Reach-1 Profile: 100-year

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	62928	100-year	11781.00	596.53	617.72		618.46	0.000774	7.26	3274.25	835.70	0.28
Reach-1	62330	100-year	11781.00	595.48	617.30		618.01	0.000707	7.08	3107.50	747.46	0.27
Reach-1	61655	100-year	11781.00	595.10	616.70		617.50	0.000779	7.38	2563.59	554.53	0.28
Reach-1	61144	100-year	11781.00	594.94	616.16		617.07	0.000880	7.75	1904.28	249.43	0.30
Reach-1	60593	100-year	11781.00	594.77	615.77		616.57	0.000824	7.44	2143.82	177.97	0.29
Reach-1	60078	100-year	12083.00	594.06	615.11		616.09	0.000948	8.00	1701.10	134.83	0.31
Reach-1	59393	100-year	12083.00	593.82	614.52		615.43	0.000926	7.82	1967.57	145.50	0.30
Reach-1	59039	100-year	12083.00	593.70	614.25		615.09	0.000893	7.65	2524.46	315.26	0.30
Reach-1	58091	100-year	12083.00	592.81	613.11		614.15	0.001057	8.25	1760.08	173.94	0.32
Reach-1	57593	100-year	12083.00	592.56	612.50		613.59	0.001136	8.45	1635.79	148.64	0.33
Reach-1	56993	100-year	12083.00	592.26	611.84		612.90	0.001153	8.41	1865.65	268.18	0.34
Reach-1	56393	100-year	12083.00	591.96	610.94		612.15	0.001281	8.90	1580.89	210.07	0.36
Reach-1	55793	100-year	12083.00	591.66	610.06		611.34	0.001409	9.14	1589.61	218.12	0.38
Reach-1	55193	100-year	12083.00	591.36	609.17		610.46	0.001517	9.27	1597.60	140.60	0.39
Reach-1	54593	100-year	12083.00	588.48	608.57		609.65	0.001054	8.38	1635.70	134.15	0.33
Reach-1	53914	100-year	12083.00	586.69	608.01		608.96	0.000861	7.89	1776.88	152.00	0.30
Reach-1	53287	100-year	12312.00	585.90	606.84	597.54	608.16	0.001450	9.34	1528.17	107.97	0.37
Reach-1	53266		Bridge									
Reach-1	53225	100-year	12312.00	585.65	606.30	597.22	607.71	0.001563	9.60	1440.03	128.18	0.38
Reach-1	52906	100-year	12312.00	585.19	606.13		607.13	0.000930	8.10	1766.83	172.45	0.31
Reach-1	52413	100-year	12312.00	584.40	605.73		606.67	0.000856	7.87	1871.99	150.66	0.30
Reach-1	51895	100-year	12312.00	584.03	605.36		606.22	0.000809	7.65	2274.62	254.36	0.29
Reach-1	50993	100-year	12312.00	583.88	604.73		605.47	0.000765	7.33	2875.04	359.75	0.28
Reach-1	50393	100-year	12312.00	583.91	603.98		604.94	0.000979	8.08	2284.31	360.44	0.32
Reach-1	49859	100-year	12312.00	583.88	603.29		604.36	0.001132	8.50	1822.70	175.52	0.34
Reach-1	49193	100-year	12312.00	583.47	602.33		603.54	0.001299	8.92	1657.11	174.57	0.36
Reach-1	48577	100-year	12312.00	583.01	601.60		602.72	0.001275	8.76	1815.15	159.07	0.36
Reach-1	47993	100-year	12312.00	582.31	600.85		601.98	0.001278	8.75	1853.54	171.68	0.36
Reach-1	47374	100-year	12312.00	581.08	600.10		601.21	0.001199	8.62	1785.34	141.42	0.35
Reach-1	46779	100-year	12312.00	579.91	599.41		600.51	0.001137	8.54	1705.88	126.93	0.34
Reach-1	46164	100-year	12312.00	578.73	598.84		599.82	0.000994	8.15	1907.37	148.02	0.32
Reach-1	45576	100-year	12312.00	578.16	598.29		599.24	0.000968	8.05	2066.67	185.73	0.32
Reach-1	44992	100-year	12312.00	577.59	597.60		598.65	0.000999	8.35	1723.21	129.38	0.33
Reach-1	44335	100-year	12312.00	577.47	596.77		597.94	0.001152	8.75	1612.30	127.29	0.35
Reach-1	43943	100-year	12312.00	577.40	595.90	588.37	597.31	0.001769	9.85	1769.79	320.14	0.41
Reach-1	43897		Bridge									
Reach-1	43846	100-year	12312.00	577.15	594.19	588.13	596.14	0.002604	11.29	1231.80	117.14	0.49
Reach-1	43193	100-year	12468.00	573.96	593.56		594.68	0.001083	8.58	1726.06	137.72	0.34

## DUPLICATE EFFECTIVE (HEC-RAS 4.1.0)

HEC-RAS Plan: Dup Eff River: Crowders Creek Reach: Reach-1 Profile: 100-year (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	42566	100-year	12468.00	571.85	593.08		594.04	0.000831	7.94	2295.92	406.32	0.30
Reach-1	41993	100-year	12468.00	570.95	592.65		593.57	0.000773	7.76	1969.13	191.16	0.29
Reach-1	41393	100-year	12468.00	570.77	592.09		593.08	0.000842	8.01	1756.18	138.93	0.31
Reach-1	40817	100-year	12468.00	570.56	591.67		592.58	0.000812	7.81	3088.17	588.75	0.30
Reach-1	40171	100-year	12468.00	569.57	591.17		592.06	0.000770	7.73	2033.11	165.52	0.29
Reach-1	39665	100-year	12468.00	569.57	590.62		591.64	0.000880	8.12	1721.10	132.90	0.31
Reach-1	38993	100-year	12468.00	568.91	590.16		591.04	0.000784	7.71	2077.49	176.68	0.30
Reach-1	38421	100-year	12468.00	568.03	589.77		590.59	0.000719	7.49	2130.84	150.93	0.28
Reach-1	37750	100-year	12468.00	566.29	589.34		590.13	0.000624	7.26	2101.19	182.09	0.27
Reach-1	37273	100-year	12468.00	565.86	589.18		589.82	0.000527	6.73	2958.46	374.39	0.25
Reach-1	36655	100-year	12468.00	565.45	588.75		589.47	0.000569	6.99	2532.26	267.41	0.26
Reach-1	35993	100-year	12468.00	564.88	588.44		589.09	0.000521	6.73	3738.59	829.64	0.25
Reach-1	35304	100-year	12468.00	564.65	588.06		588.72	0.000536	6.80	2639.19	208.64	0.25
Reach-1	34796	100-year	12468.00	564.45	587.85		588.44	0.000496	6.54	3735.13	478.00	0.24
Reach-1	34193	100-year	12468.00	564.08	587.47		588.13	0.000510	6.81	2853.20	259.25	0.25
Reach-1	33626	100-year	12468.00	563.88	587.36		587.81	0.000394	6.00	4283.27	366.64	0.22
Reach-1	33081	100-year	12468.00	563.68	586.89		587.55	0.000515	6.81	3000.64	283.88	0.25
Reach-1	32873	100-year	12468.00	563.60	586.17	575.22	587.27	0.001093	8.72	2056.60	191.69	0.33
Reach-1	32840		Bridge									
Reach-1	32807	100-year	12468.00	563.35	585.84	574.96	586.94	0.001106	8.75	2001.83	189.48	0.33
Reach-1	32460	100-year	12543.00	563.22	585.79		586.47	0.000559	6.96	2995.05	279.37	0.26
Reach-1	31765	100-year	12543.00	562.95	585.38		586.08	0.000572	7.01	2988.20	333.67	0.26
Reach-1	31180	100-year	12543.00	562.67	585.00		585.73	0.000599	7.15	2751.96	289.09	0.27
Reach-1	30593	100-year	12543.00	562.67	584.74		585.36	0.000546	6.78	3514.87	449.71	0.26
Reach-1	29897	100-year	12543.00	562.27	584.43		584.97	0.000499	6.49	4039.15	486.19	0.24
Reach-1	29393	100-year	12543.00	562.27	584.37		584.70	0.000359	5.50	5874.25	586.68	0.21
Reach-1	28793	100-year	12543.00	561.82	584.26		584.48	0.000268	4.80	7285.78	671.56	0.18
Reach-1	28293	100-year	12543.00	561.52	583.96		584.31	0.000365	5.60	5308.66	446.44	0.21
Reach-1	28087	100-year	12543.00	561.40	583.52	571.50	584.14	0.000585	6.74	3199.21	418.00	0.26
Reach-1	28030		Bridge									
Reach-1	27953	100-year	12543.00	561.41	582.63	571.51	583.37	0.000720	7.27	3655.57	964.11	0.28
Reach-1	27610	100-year	12543.00	561.43	582.50		583.04	0.000660	7.08	5137.05	614.95	0.27
Reach-1	26802	100-year	12543.00	561.48	581.12		582.26	0.001252	9.31	2642.79	287.62	0.37
Reach-1	26393	100-year	12543.00	561.51	580.71		581.73	0.001164	8.70	2832.57	352.21	0.35
Reach-1	25793	100-year	12543.00	561.51	580.49		581.05	0.000729	6.89	4308.77	450.79	0.28
Reach-1	25292	100-year	12543.00	561.38	579.49		580.51	0.001442	9.21	3312.23	422.24	0.38
Reach-1	24274	100-year	14206.00	561.18	579.70	572.20	579.77	0.000226	3.78	15680.41	1567.06	0.16

## CORRECTED EFFECTIVE (HEC-RAS 4.1.0)

HEC-RAS Plan: Cor Eff River: Crowders Creek Reach: Reach-1 Profile: 100-year

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	62928	100-year	11781.00	596.53	617.72		618.46	0.000774	7.26	3274.25	835.70	0.28
Reach-1	62330	100-year	11781.00	595.48	617.30		618.01	0.000707	7.08	3107.50	747.46	0.27
Reach-1	61655	100-year	11781.00	595.10	616.70		617.50	0.000779	7.38	2563.59	554.53	0.28
Reach-1	61144	100-year	11781.00	594.94	616.16		617.07	0.000880	7.75	1904.28	249.43	0.30
Reach-1	60593	100-year	11781.00	594.77	615.77		616.57	0.000824	7.44	2143.82	177.97	0.29
Reach-1	60078	100-year	12083.00	594.06	615.11		616.09	0.000948	8.00	1701.10	134.83	0.31
Reach-1	59393	100-year	12083.00	593.82	614.52		615.43	0.000926	7.82	1967.57	145.50	0.30
Reach-1	59039	100-year	12083.00	593.70	614.25		615.09	0.000893	7.65	2524.46	315.26	0.30
Reach-1	58091	100-year	12083.00	592.81	613.11		614.15	0.001057	8.25	1760.08	173.94	0.32
Reach-1	57593	100-year	12083.00	592.56	612.50		613.59	0.001136	8.45	1635.79	148.64	0.33
Reach-1	56993	100-year	12083.00	592.26	611.84		612.90	0.001153	8.41	1865.65	268.18	0.34
Reach-1	56393	100-year	12083.00	591.96	610.94		612.15	0.001281	8.90	1580.89	210.07	0.36
Reach-1	55793	100-year	12083.00	591.66	610.06		611.34	0.001409	9.14	1589.61	218.12	0.38
Reach-1	55193	100-year	12083.00	591.36	609.17		610.46	0.001517	9.27	1597.60	140.60	0.39
Reach-1	54593	100-year	12083.00	588.48	608.57		609.65	0.001054	8.38	1635.71	134.15	0.33
Reach-1	53914	100-year	12083.00	586.69	608.01		608.96	0.000861	7.89	1776.89	152.00	0.30
Reach-1	53287	100-year	12312.00	585.90	606.84	597.54	608.16	0.001450	9.34	1528.18	107.97	0.37
Reach-1	53266		Bridge									
Reach-1	53225	100-year	12312.00	585.65	606.30	597.22	607.71	0.001563	9.60	1440.03	128.19	0.38
Reach-1	52906	100-year	12312.00	585.19	606.13		607.13	0.000930	8.10	1766.84	172.45	0.31
Reach-1	52413	100-year	12312.00	584.40	605.73		606.67	0.000856	7.87	1872.00	150.66	0.30
Reach-1	51895	100-year	12312.00	584.03	605.36		606.22	0.000809	7.65	2274.63	254.37	0.29
Reach-1	50993	100-year	12312.00	583.88	604.73		605.47	0.000765	7.33	2875.07	359.75	0.28
Reach-1	50393	100-year	12312.00	583.91	603.98		604.94	0.000979	8.08	2284.33	360.45	0.32
Reach-1	49859	100-year	12312.00	583.88	603.29		604.36	0.001132	8.50	1822.71	175.52	0.34
Reach-1	49193	100-year	12312.00	583.47	602.33		603.54	0.001298	8.92	1657.12	174.57	0.36
Reach-1	48577	100-year	12312.00	583.01	601.60		602.72	0.001275	8.76	1815.16	159.07	0.36
Reach-1	47993	100-year	12312.00	582.31	600.85		601.98	0.001278	8.75	1853.55	171.68	0.36
Reach-1	47374	100-year	12312.00	581.08	600.10		601.21	0.001199	8.62	1785.35	141.42	0.35
Reach-1	46779	100-year	12312.00	579.91	599.41		600.51	0.001137	8.54	1705.90	126.93	0.34
Reach-1	46164	100-year	12312.00	578.73	598.84		599.82	0.000994	8.15	1907.38	148.02	0.32
Reach-1	45576	100-year	12312.00	578.16	598.29		599.24	0.000968	8.05	2066.69	185.73	0.32
Reach-1	44992	100-year	12312.00	577.59	597.60		598.65	0.000999	8.35	1723.23	129.39	0.33
Reach-1	44335	100-year	12312.00	577.47	596.77		597.94	0.001151	8.75	1612.31	127.30	0.35
Reach-1	43943	100-year	12312.00	577.40	595.90	588.37	597.31	0.001769	9.85	1769.84	320.14	0.41
Reach-1	43897		Bridge									
Reach-1	43846	100-year	12312.00	577.15	594.37	588.13	596.27	0.002510	11.16	1252.39	119.64	0.48
Reach-1	43193	100-year	12468.00	573.96	593.77		594.86	0.001044	8.49	1753.98	139.54	0.34

# CORRECTED EFFECTIVE (HEC-RAS 4.1.0)

HEC-RAS Plan: Cor Eff River: Crowders Creek Reach: Reach-1 Profile: 100-year (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	42566	100-year	12468.00	571.85	593.31		594.24	0.000800	7.84	2388.17	421.65	0.30
Reach-1	41993	100-year	12468.00	570.95	592.89		593.78	0.000742	7.67	2015.30	193.49	0.29
Reach-1	41393	100-year	12468.00	570.77	592.35		593.31	0.000806	7.90	1793.06	141.78	0.30
Reach-1	40817	100-year	12468.00	570.56	591.97		592.83	0.000766	7.66	3265.37	615.76	0.29
Reach-1	40171	100-year	12468.00	569.57	591.48		592.35	0.000730	7.60	2085.96	167.95	0.29
Reach-1	39665	100-year	12468.00	569.57	590.97		591.94	0.000832	7.98	1767.32	135.35	0.31
Reach-1	38993	100-year	12468.00	568.91	590.54		591.38	0.000734	7.55	2145.17	180.05	0.29
Reach-1	38421	100-year	12468.00	568.03	590.17		590.96	0.000676	7.36	2192.77	160.22	0.28
Reach-1	37750	100-year	12468.00	566.29	589.77		590.53	0.000583	7.11	2182.00	192.82	0.26
Reach-1	37273	100-year	12468.00	565.86	589.63		590.23	0.000485	6.54	3131.25	384.68	0.24
Reach-1	36655	100-year	12468.00	565.45	589.23		589.91	0.000526	6.81	2663.57	277.63	0.25
Reach-1	35993	100-year	12468.00	564.88	588.97		589.55	0.000463	6.45	4185.29	847.91	0.23
Reach-1	35304	100-year	12468.00	564.65	588.60		589.22	0.000492	6.62	2752.73	214.83	0.24
Reach-1	34796	100-year	12468.00	564.45	588.42		588.96	0.000444	6.29	4009.90	484.72	0.23
Reach-1	34193	100-year	12468.00	564.08	588.06		588.68	0.000463	6.59	3009.31	268.54	0.24
Reach-1	33626	100-year	12468.00	563.88	587.97		588.39	0.000355	5.79	4509.10	374.39	0.21
Reach-1	33081	100-year	12468.00	563.68	587.54		588.15	0.000462	6.57	3188.33	292.18	0.24
Reach-1	32873	100-year	12468.00	563.60	586.89	575.22	587.90	0.000967	8.38	2175.00	207.66	0.31
Reach-1	32840		Bridge									
Reach-1	32807	100-year	12468.00	563.35	586.60	574.96	587.61	0.000973	8.39	2114.58	198.40	0.31
Reach-1	32460	100-year	12543.00	563.22	586.57		587.18	0.000487	6.65	3214.23	283.08	0.24
Reach-1	31765	100-year	12543.00	562.95	586.21		586.84	0.000496	6.69	3290.98	382.95	0.25
Reach-1	31180	100-year	12543.00	562.67	585.89		586.54	0.000512	6.79	3017.33	304.42	0.25
Reach-1	30593	100-year	12543.00	562.67	585.69		586.22	0.000456	6.37	3949.41	466.47	0.23
Reach-1	29897	100-year	12543.00	562.27	585.44		585.90	0.000406	6.03	4546.11	507.42	0.22
Reach-1	29393	100-year	12543.00	562.27	585.40		585.68	0.000290	5.09	6489.59	604.22	0.19
Reach-1	28793	100-year	12543.00	564.94	585.27		585.46	0.000340	4.85	7656.99	687.95	0.19
Reach-1	28435	100-year	12543.00	565.87	585.03		585.30	0.000528	5.59	5879.56	493.99	0.24
Reach-1	28293	100-year	12543.00	565.60	584.81	576.30	585.21	0.000630	6.37	4748.14	455.29	0.26
Reach-1	28196	100-year	12543.00	565.10	584.58	576.41	585.13	0.000750	6.79	3614.43	437.36	0.29
Reach-1	28087	100-year	12543.00	564.55	583.38	578.56	584.75	0.002053	10.94	2586.29	362.47	0.46
Reach-1	28030		Bridge									
Reach-1	27953	100-year	12543.00	565.51	583.35	575.75	583.91	0.000800	6.30	2950.69	1143.52	0.29
Reach-1	27900	100-year	12543.00	564.83	583.09	576.66	583.81	0.001045	7.69	3387.86	1056.72	0.33
Reach-1	27810	100-year	12543.00	565.57	583.03	577.06	583.71	0.000984	7.71	3710.31	945.37	0.33
Reach-1	27717	100-year	12543.00	565.04	582.79	577.69	583.59	0.001387	8.74	3425.13	650.71	0.38
Reach-1	27610	100-year	12543.00	566.23	582.59	577.65	583.43	0.001498	8.66	3148.95	609.79	0.39
Reach-1	27119	100-year	12543.00	565.90	581.80		582.67	0.001569	8.96	3248.34	347.22	0.40

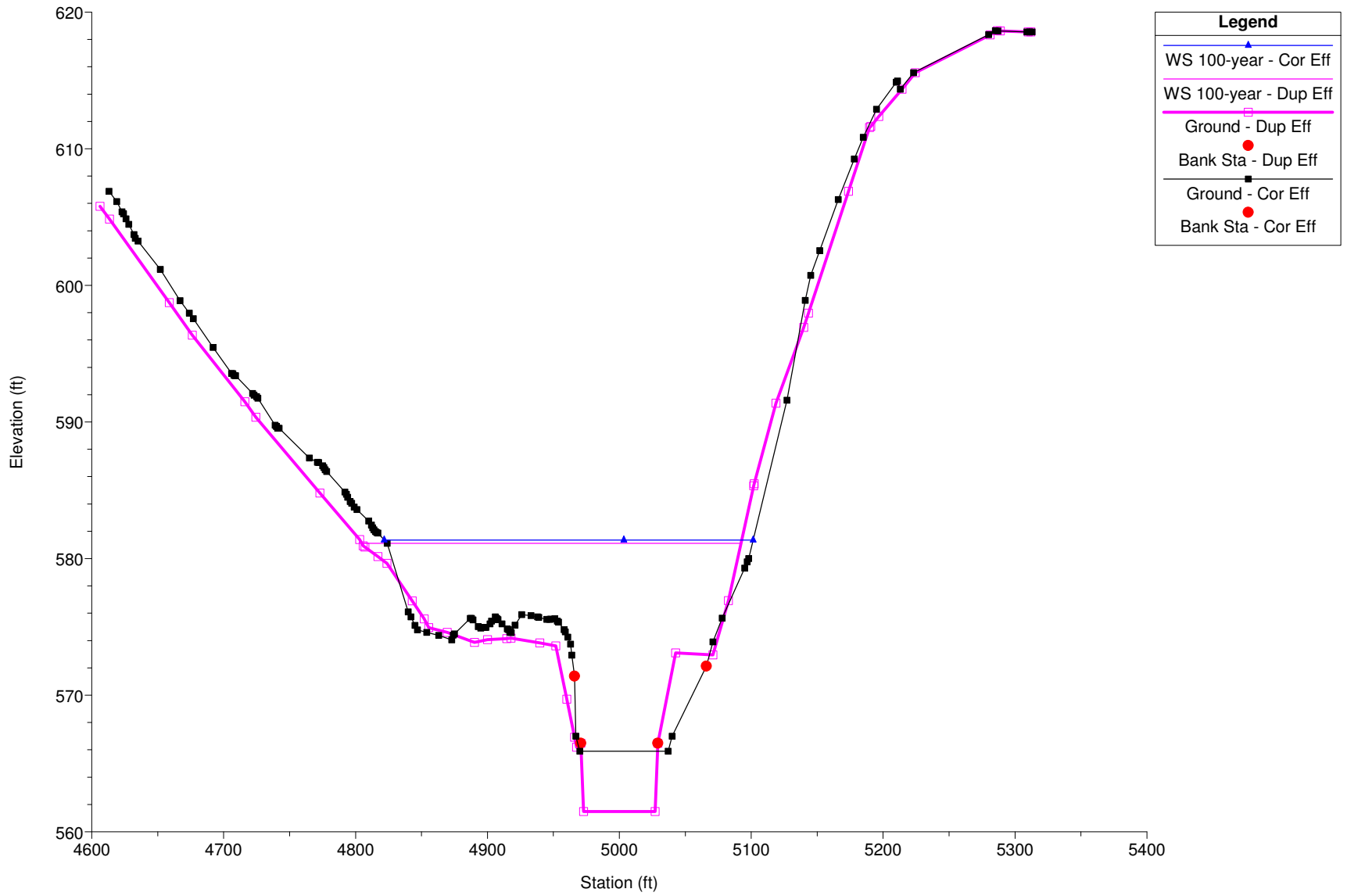


## CORRECTED EFFECTIVE (HEC-RAS 4.1.0)

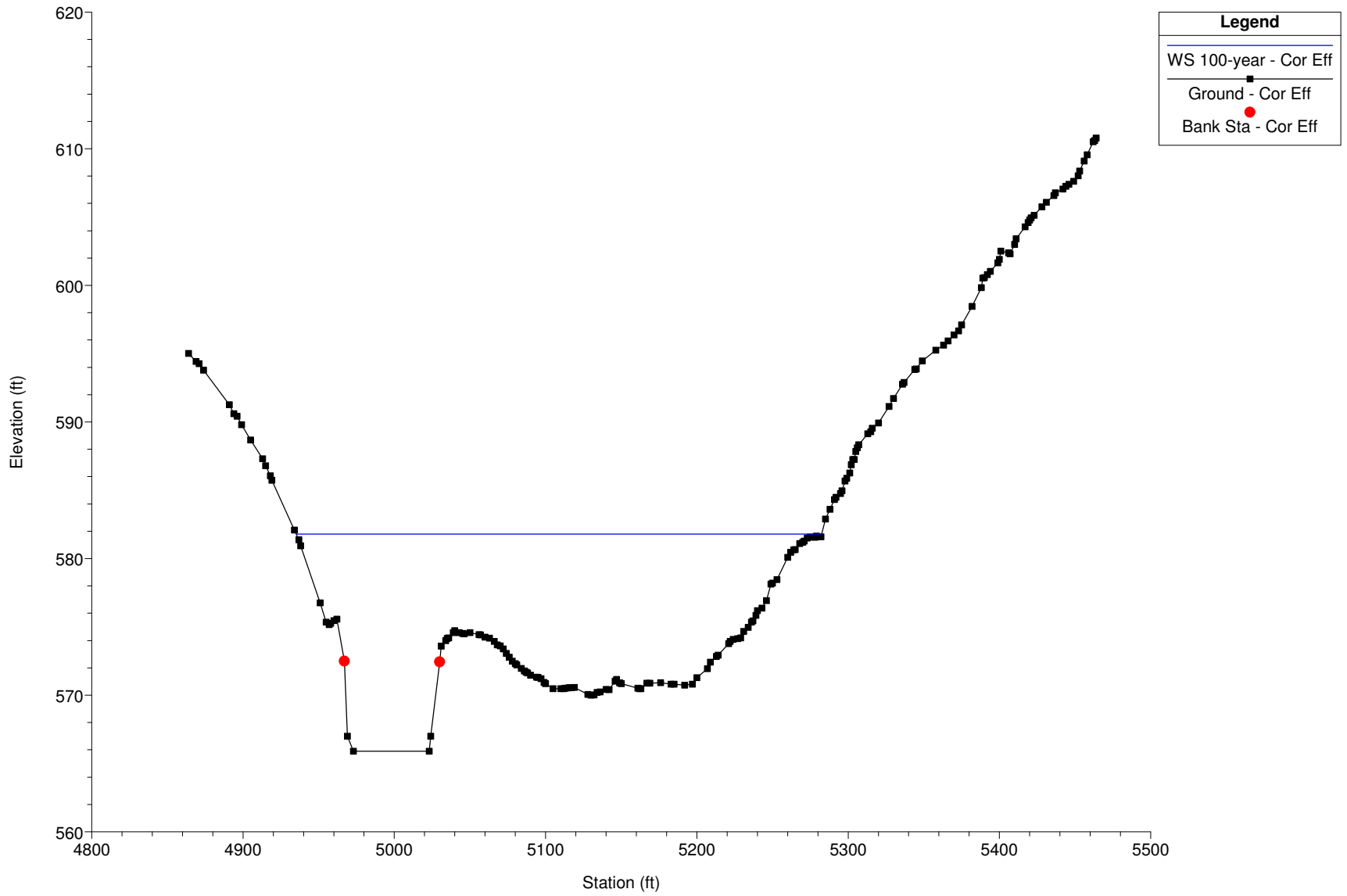
HEC-RAS Plan: Cor Eff River: Crowders Creek Reach: Reach-1 Profile: 100-year (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	26802	100-year	12543.00	565.90	581.36		582.24	0.001223	7.88	2446.78	279.70	0.37
Reach-1	26393	100-year	12543.00	561.51	580.71		581.73	0.001164	8.70	2832.57	352.21	0.35
Reach-1	25793	100-year	12543.00	561.51	580.49		581.05	0.000729	6.89	4308.77	450.79	0.28
Reach-1	25292	100-year	12543.00	561.38	579.49		580.51	0.001442	9.21	3312.23	422.24	0.38
Reach-1	24274	100-year	14206.00	561.18	579.70	572.20	579.77	0.000226	3.78	15680.41	1567.06	0.16

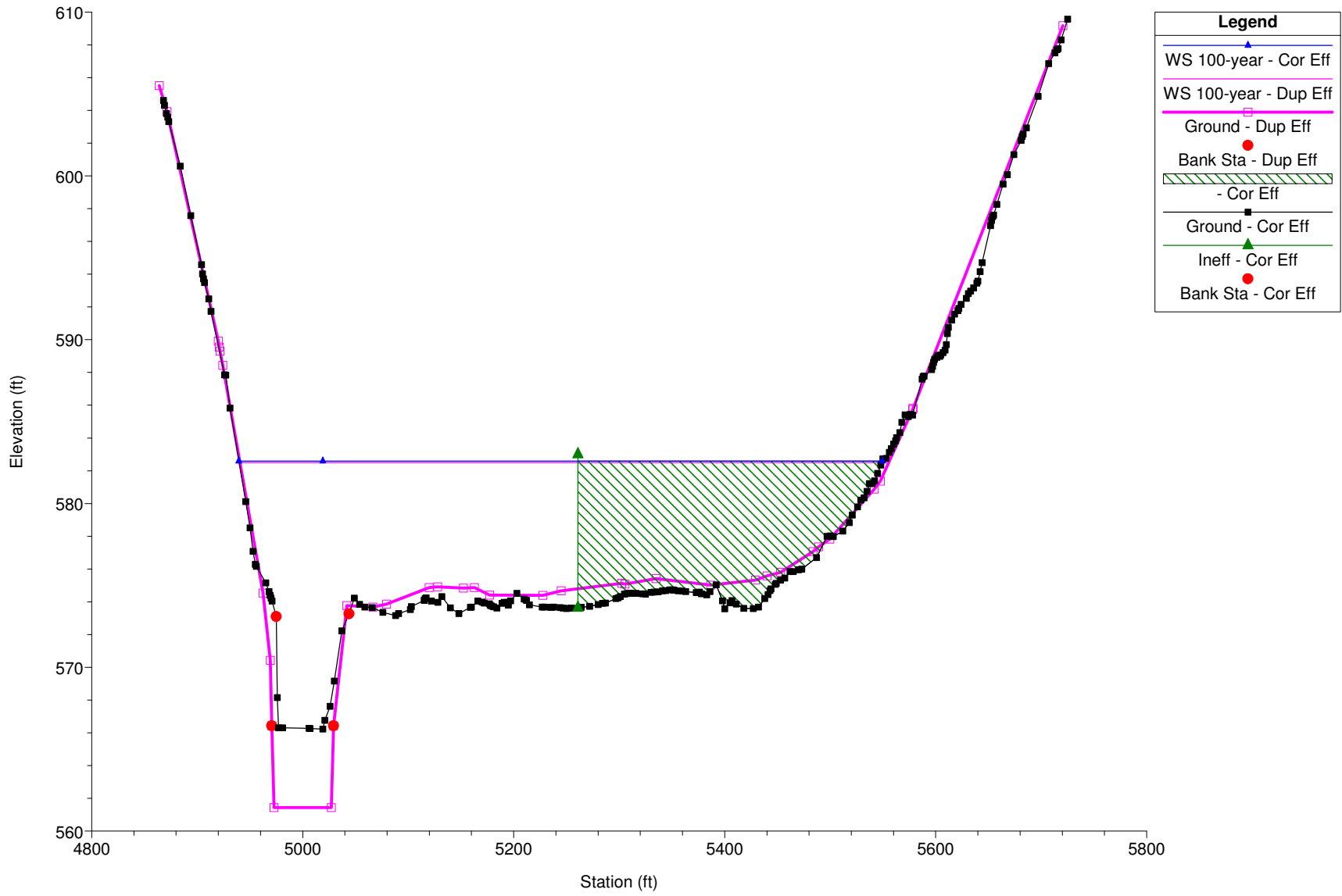
Crowders Creek Limited Detail Study Plan: 1) Cor Eff 2) Dup Eff  
Crowders Creek 45.0



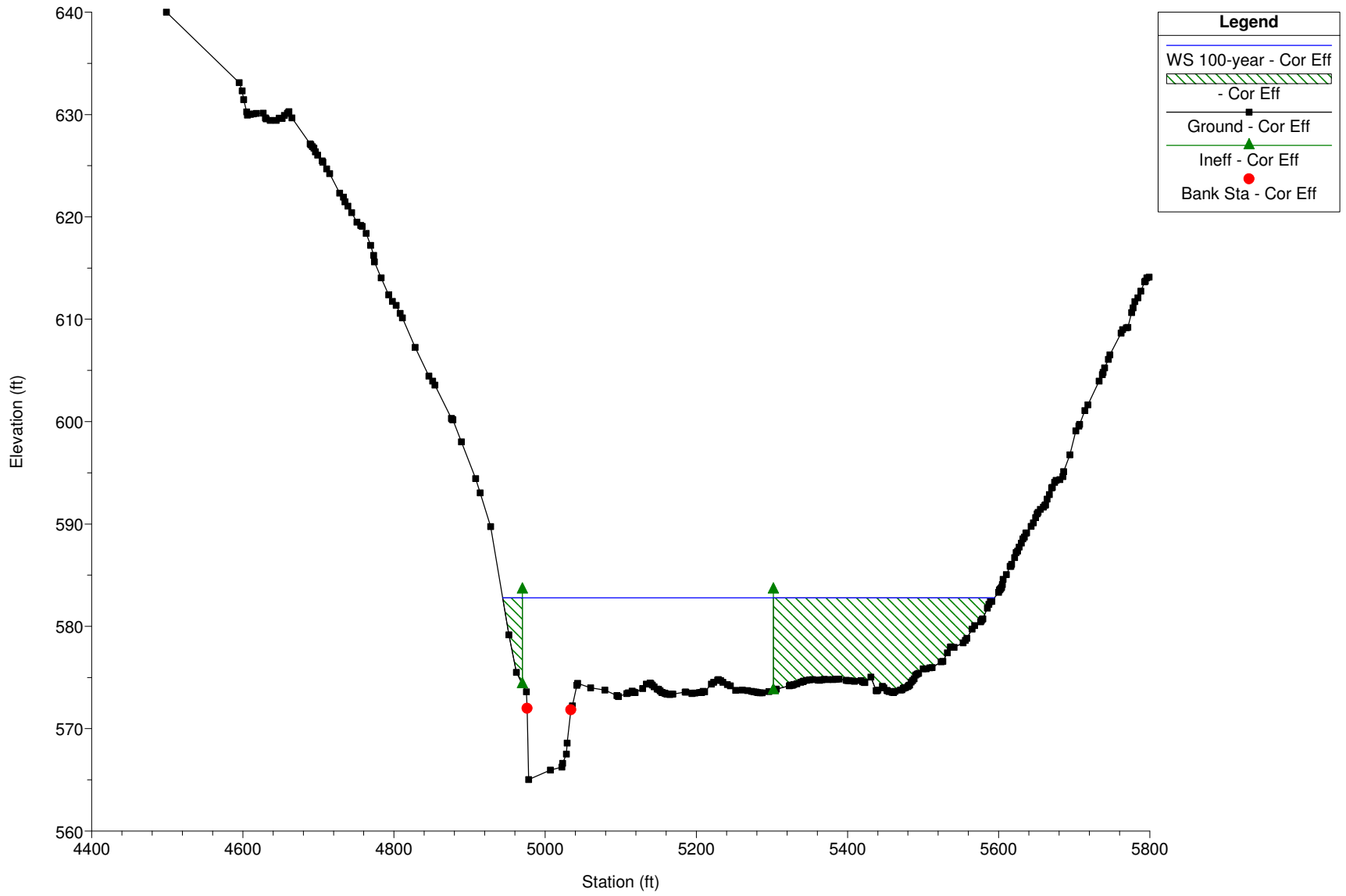
Crowders Creek Limited Detail Study Plan: 1) Cor Eff 2) Dup Eff



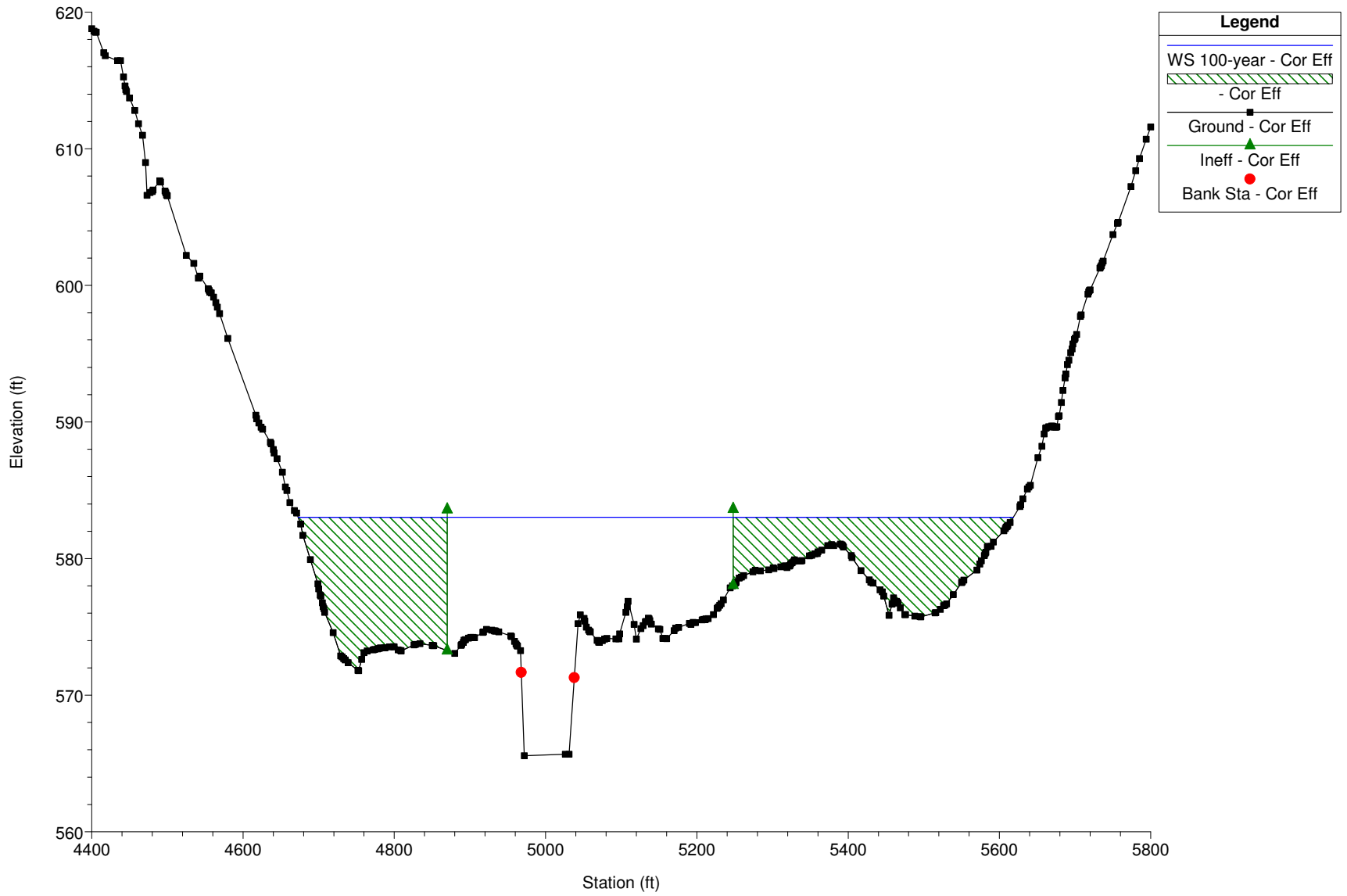
Crowders Creek Limited Detail Study Plan: 1) Cor Eff 2) Dup Eff  
Crowders Creek 46.0



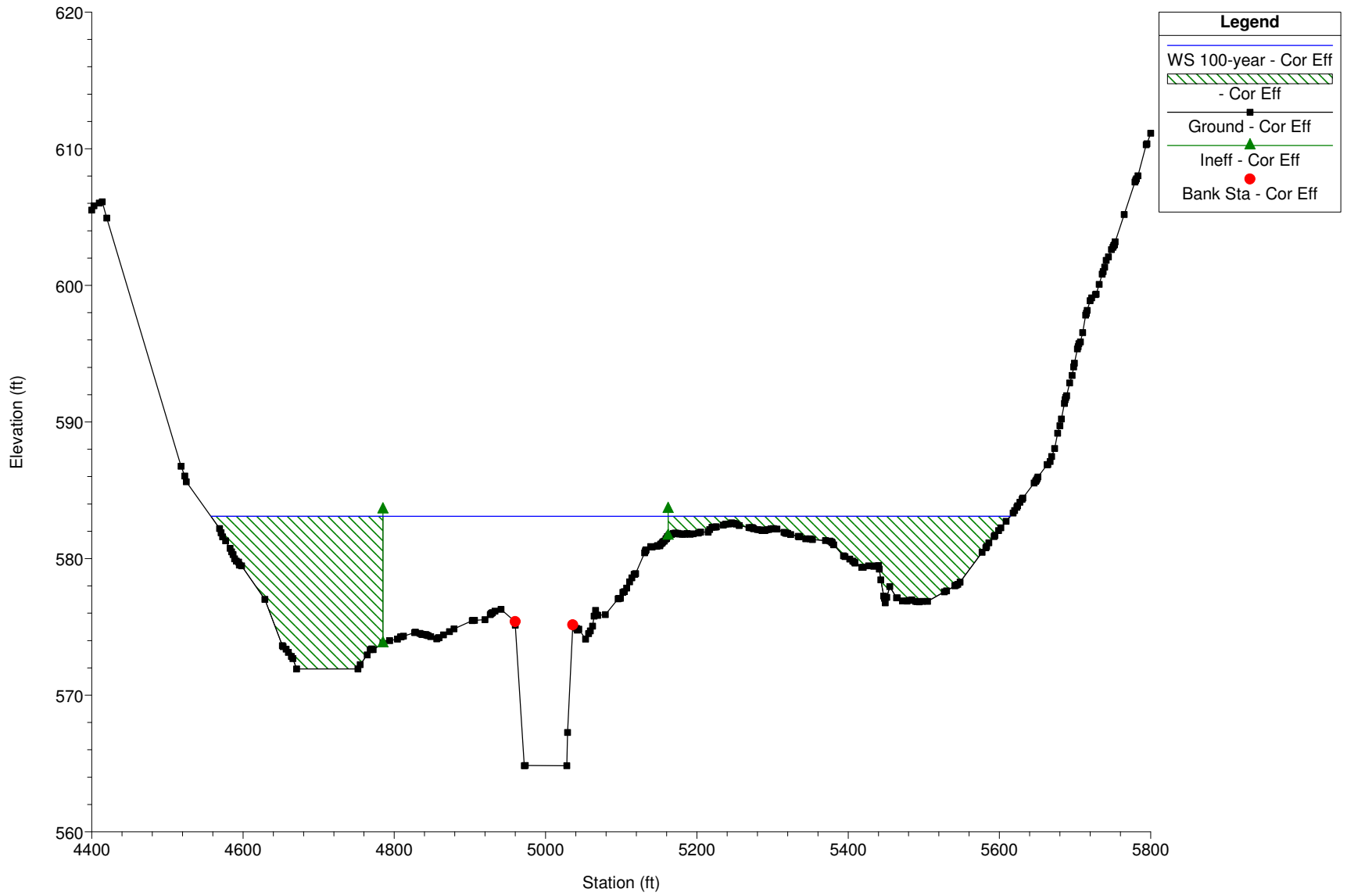
Crowders Creek Limited Detail Study Plan: 1) Cor Eff 2) Dup Eff



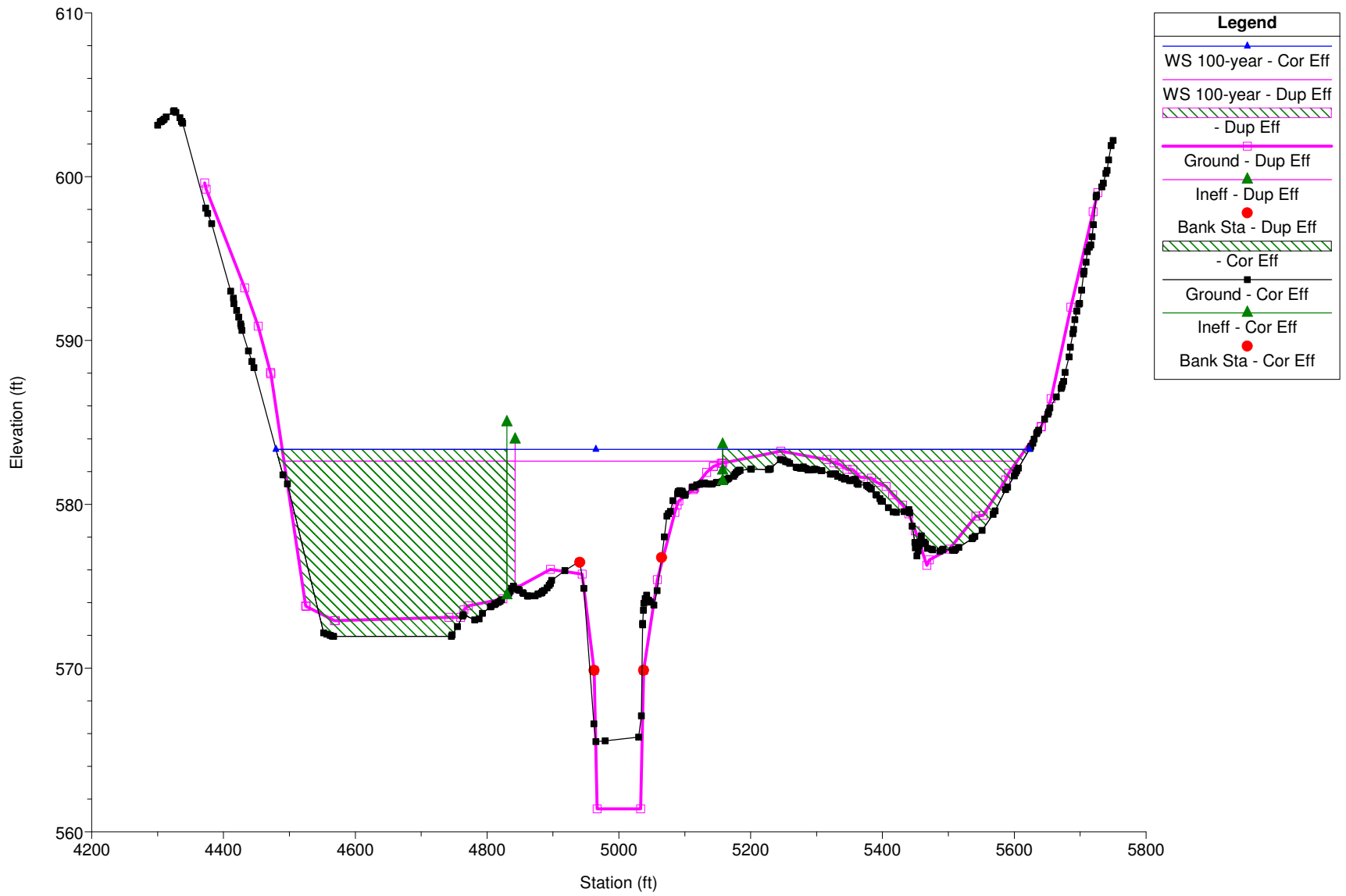
Crowders Creek Limited Detail Study Plan: 1) Cor Eff 2) Dup Eff



Crowders Creek Limited Detail Study Plan: 1) Cor Eff 2) Dup Eff

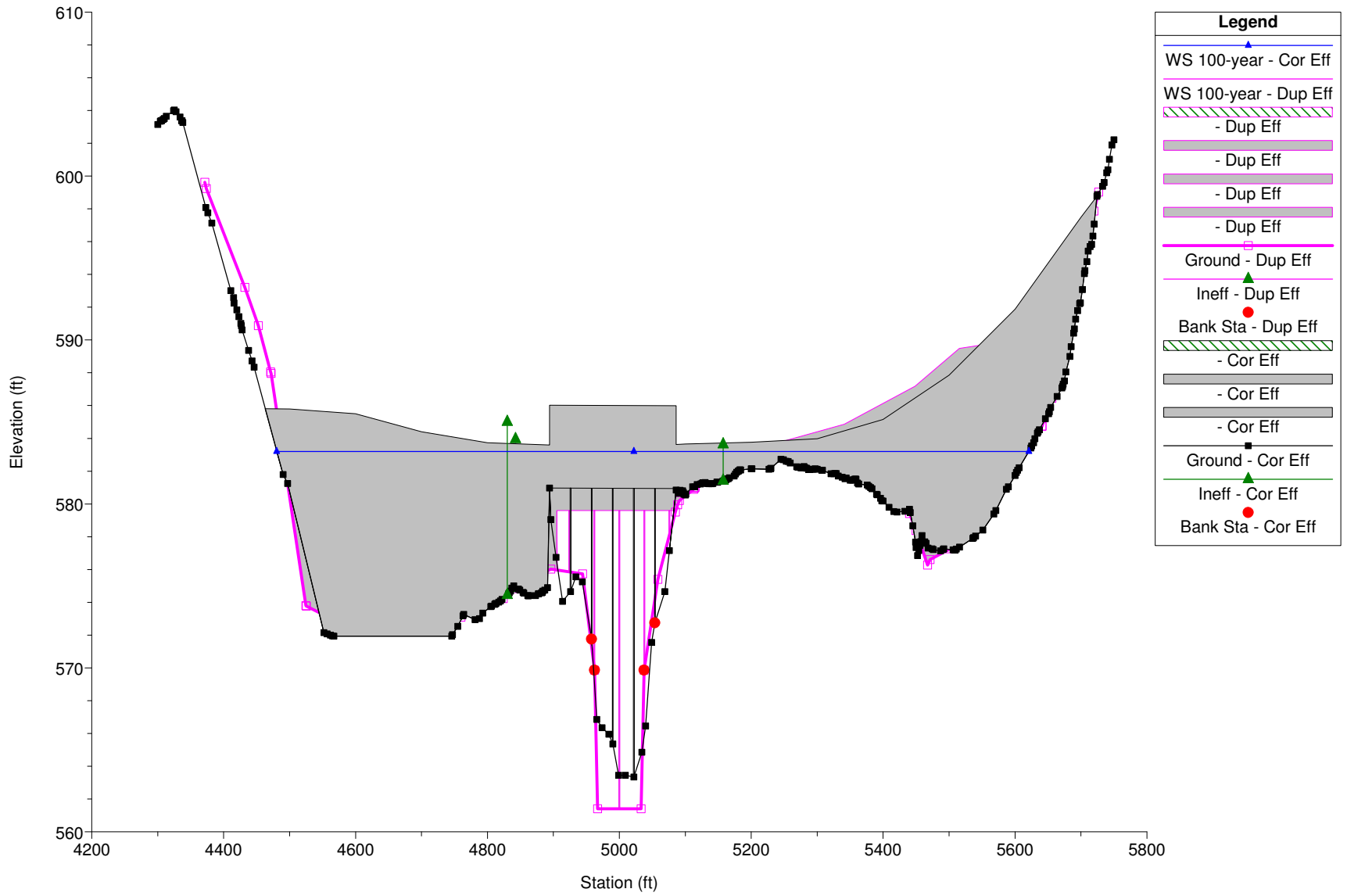


Crowders Creek Limited Detail Study Plan: 1) Cor Eff 2) Dup Eff  
Croders Creek 46.4

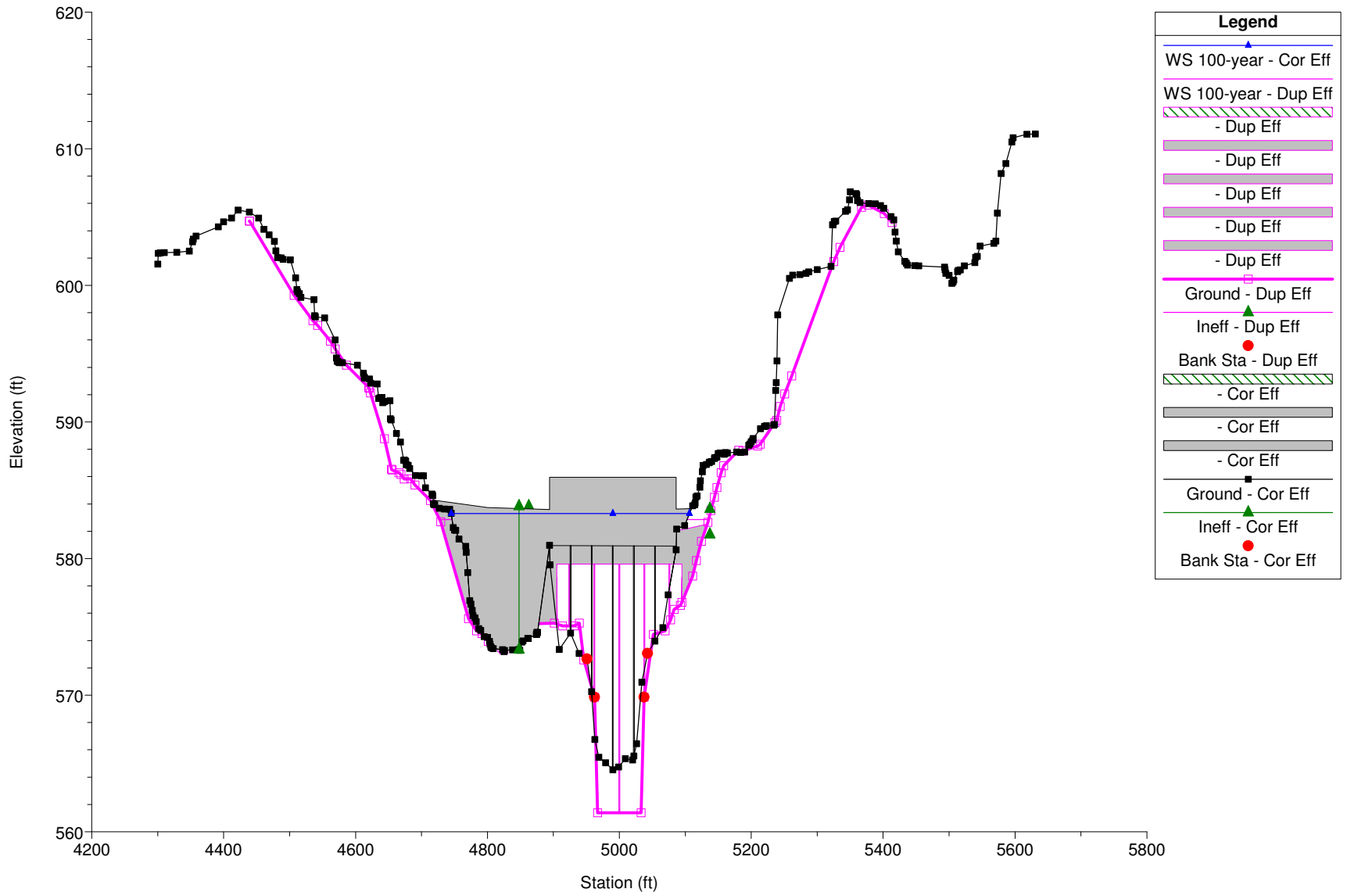




Crowders Creek Limited Detail Study Plan: 1) Cor Eff 2) Dup Eff  
 Hwy 557-TOR Structure ID: LDS\_CRO\_CRK\_01 Approximate Survey Stru



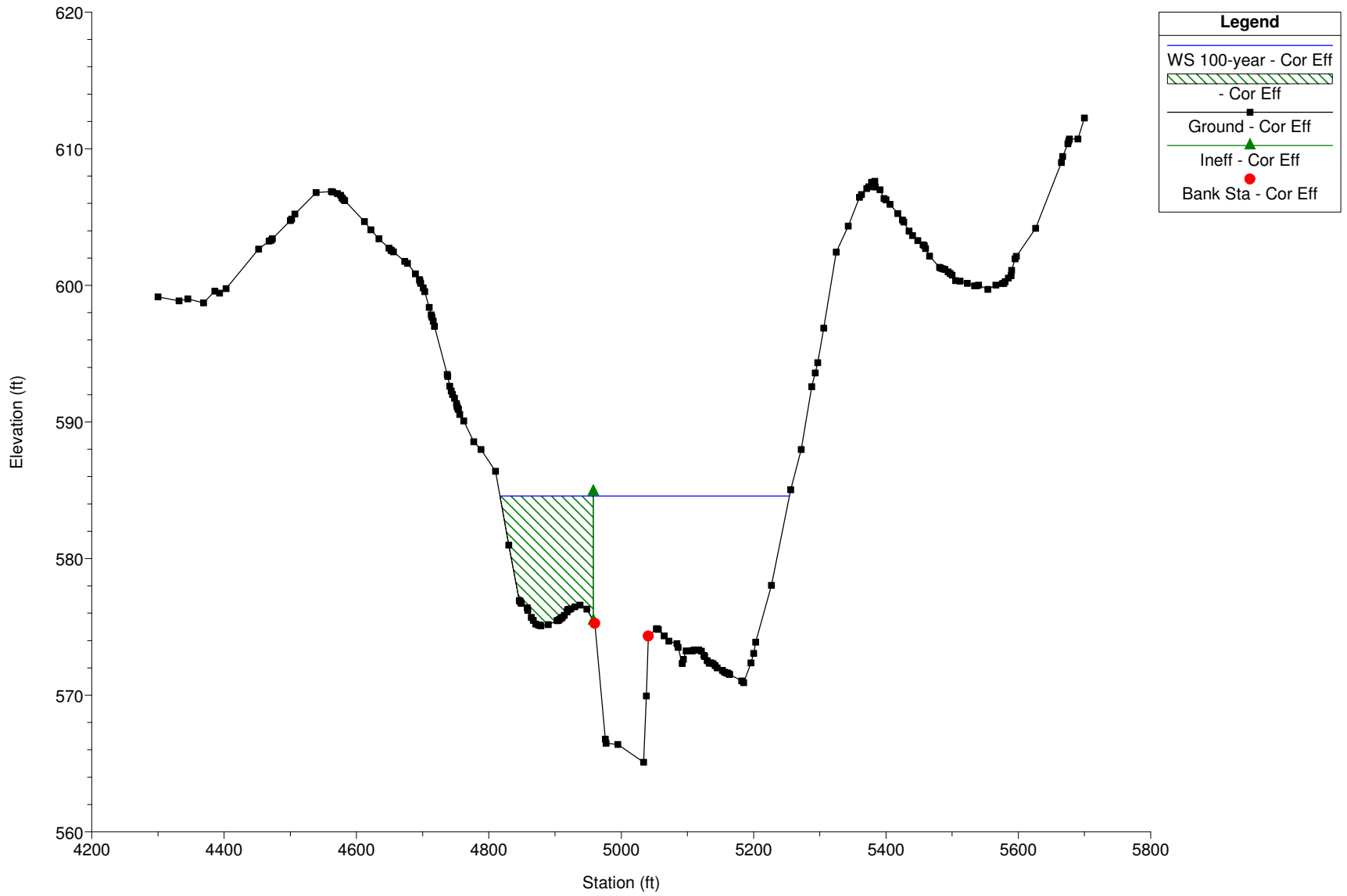
Crowders Creek Limited Detail Study Plan: 1) Cor Eff 2) Dup Eff  
 Hwy 557-TORStructure ID: LDS\_CRO\_CRK\_01Approximate Survey Stru



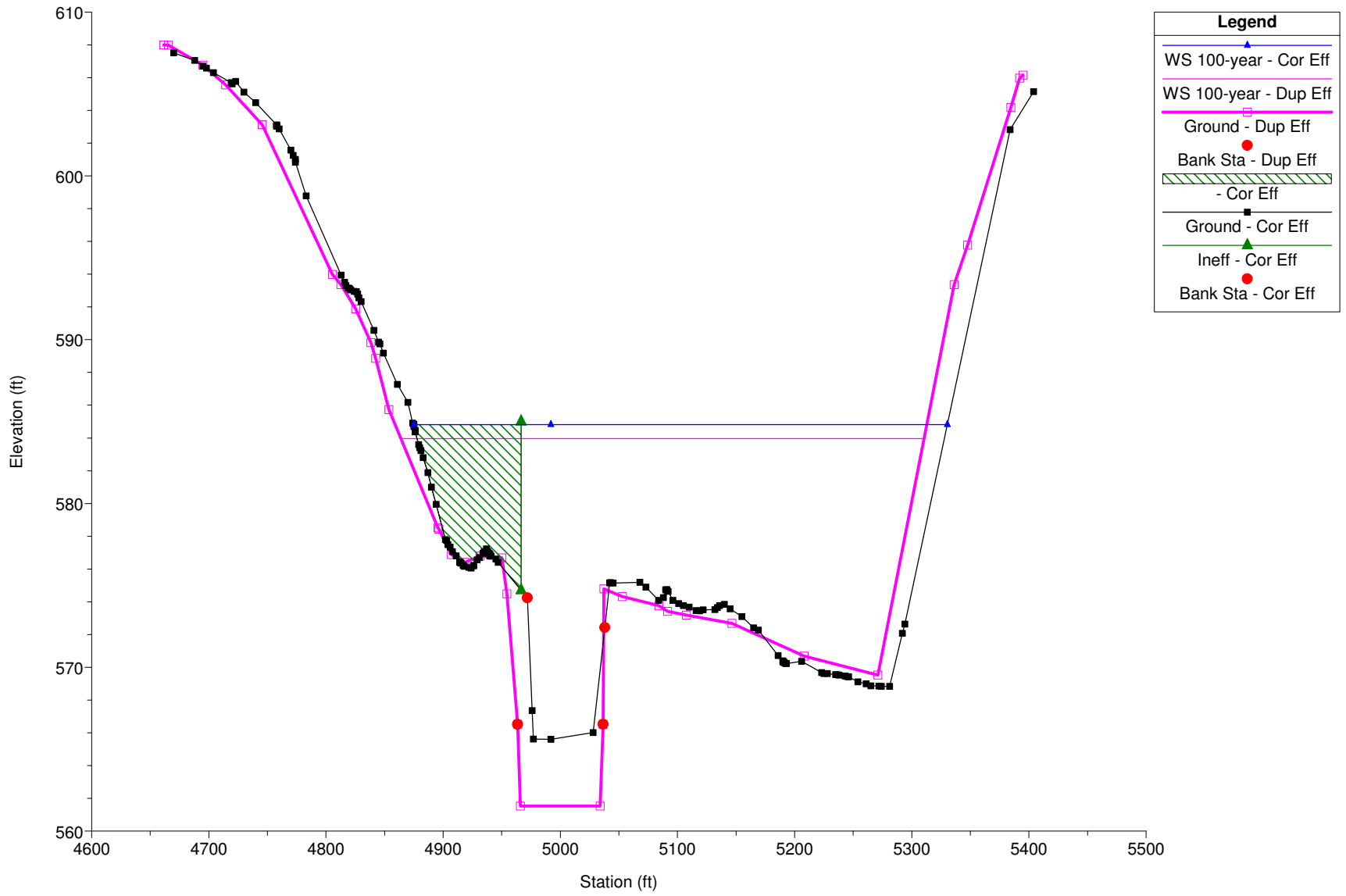
- Legend**
- WS 100-year - Cor Eff
  - WS 100-year - Dup Eff
  - Dup Eff
  - Dup Eff
  - Dup Eff
  - Dup Eff
  - Dup Eff
  - Ground - Dup Eff
  - Ineff - Dup Eff
  - Bank Sta - Dup Eff
  - Cor Eff
  - Cor Eff
  - Cor Eff
  - Ground - Cor Eff
  - Ineff - Cor Eff
  - Bank Sta - Cor Eff



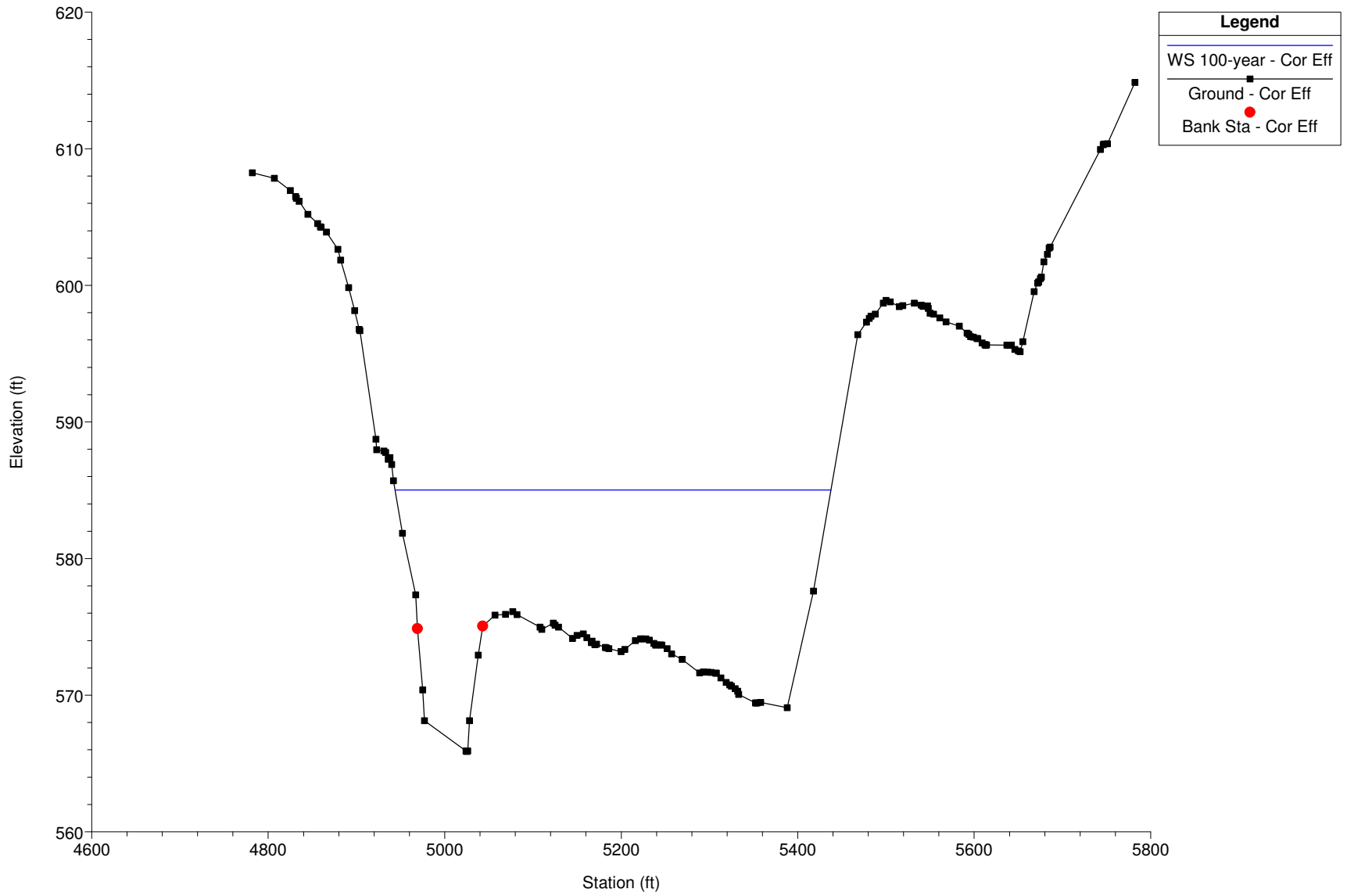
Crowders Creek Limited Detail Study Plan: 1) Cor Eff 2) Dup Eff



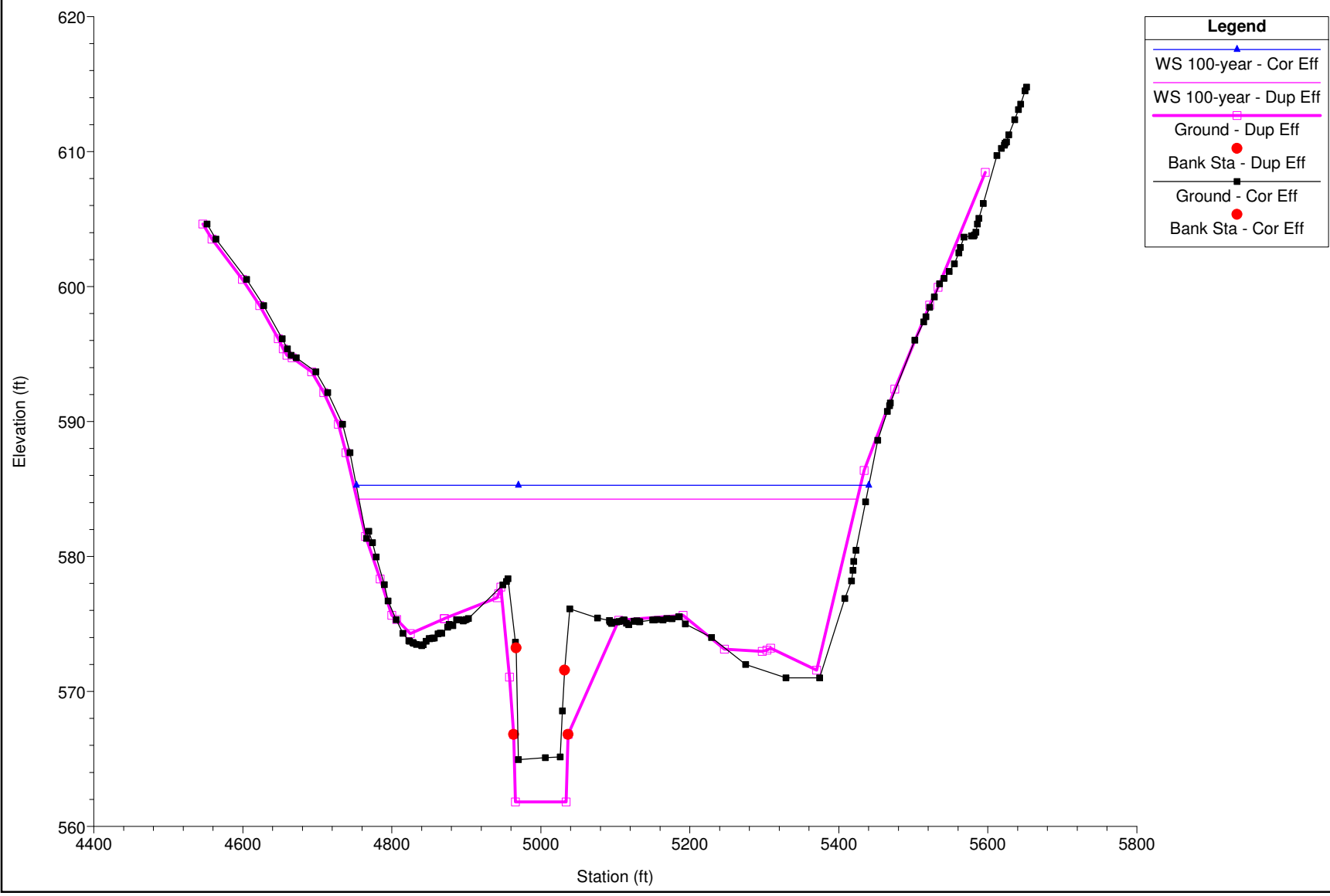
Crowders Creek Limited Detail Study Plan: 1) Cor Eff 2) Dup Eff  
 Crowders Creek 47.0



Crowders Creek Limited Detail Study Plan: 1) Cor Eff 2) Dup Eff



Crowders Creek Limited Detail Study Plan: 1) Cor Eff 2) Dup Eff  
Crowders Creek 48.0



# REVISED (HEC-RAS 4.1.0)

HEC-RAS Plan: Revised River: Crowders Creek Reach: Reach-1 Profile: 100-year

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	62928	100-year	11781.00	596.53	617.72		618.46	0.000774	7.26	3274.25	835.70	0.28
Reach-1	62330	100-year	11781.00	595.48	617.30		618.01	0.000707	7.08	3107.50	747.46	0.27
Reach-1	61655	100-year	11781.00	595.10	616.70		617.50	0.000779	7.38	2563.59	554.53	0.28
Reach-1	61144	100-year	11781.00	594.94	616.16		617.07	0.000880	7.75	1904.26	249.43	0.30
Reach-1	60593	100-year	11781.00	594.77	615.77		616.57	0.000824	7.44	2143.81	177.97	0.29
Reach-1	60078	100-year	12083.00	594.06	615.11		616.09	0.000948	8.00	1701.10	134.83	0.31
Reach-1	59393	100-year	12083.00	593.82	614.52		615.43	0.000926	7.82	1967.56	145.50	0.30
Reach-1	59039	100-year	12083.00	593.70	614.25		615.09	0.000893	7.65	2524.44	315.26	0.30
Reach-1	58091	100-year	12083.00	592.81	613.11		614.15	0.001057	8.25	1760.07	173.94	0.32
Reach-1	57593	100-year	12083.00	592.56	612.50		613.59	0.001136	8.45	1635.76	148.63	0.33
Reach-1	56993	100-year	12083.00	592.26	611.84		612.90	0.001153	8.41	1865.62	268.17	0.34
Reach-1	56393	100-year	12083.00	591.96	610.94		612.15	0.001282	8.90	1580.87	210.07	0.36
Reach-1	55793	100-year	12083.00	591.66	610.06		611.34	0.001409	9.14	1589.57	218.12	0.38
Reach-1	55193	100-year	12083.00	591.36	609.17		610.46	0.001517	9.27	1597.56	140.59	0.39
Reach-1	54593	100-year	12083.00	588.48	608.57		609.65	0.001054	8.38	1635.68	134.14	0.33
Reach-1	53914	100-year	12083.00	586.69	608.01		608.96	0.000861	7.89	1776.86	152.00	0.30
Reach-1	53287	100-year	12312.00	585.90	606.84	597.54	608.16	0.001450	9.34	1528.16	107.97	0.37
Reach-1	53266		Bridge									
Reach-1	53225	100-year	12312.00	585.65	606.30	597.22	607.71	0.001563	9.60	1439.99	128.18	0.38
Reach-1	52906	100-year	12312.00	585.19	606.13		607.13	0.000930	8.10	1766.79	172.44	0.31
Reach-1	52413	100-year	12312.00	584.40	605.73		606.67	0.000856	7.87	1871.94	150.66	0.30
Reach-1	51895	100-year	12312.00	584.03	605.36		606.22	0.000809	7.65	2274.54	254.33	0.29
Reach-1	50993	100-year	12312.00	583.88	604.73		605.47	0.000765	7.33	2874.89	359.74	0.28
Reach-1	50393	100-year	12312.00	583.91	603.98		604.93	0.000979	8.08	2284.13	360.43	0.32
Reach-1	49859	100-year	12312.00	583.88	603.29		604.36	0.001132	8.50	1822.60	175.51	0.34
Reach-1	49193	100-year	12312.00	583.47	602.33		603.54	0.001299	8.93	1657.00	174.56	0.36
Reach-1	48577	100-year	12312.00	583.01	601.60		602.72	0.001275	8.76	1815.02	159.06	0.36
Reach-1	47993	100-year	12312.00	582.31	600.85		601.98	0.001278	8.75	1853.39	171.66	0.36
Reach-1	47374	100-year	12312.00	581.08	600.10		601.20	0.001199	8.62	1785.19	141.41	0.35
Reach-1	46779	100-year	12312.00	579.91	599.41		600.51	0.001137	8.54	1705.74	126.92	0.34
Reach-1	46164	100-year	12312.00	578.73	598.84		599.82	0.000994	8.15	1907.18	148.01	0.32
Reach-1	45576	100-year	12312.00	578.16	598.29		599.23	0.000968	8.05	2066.40	185.72	0.32
Reach-1	44992	100-year	12312.00	577.59	597.60		598.65	0.000999	8.35	1723.00	129.32	0.33
Reach-1	44335	100-year	12312.00	577.47	596.77		597.93	0.001152	8.75	1612.04	127.27	0.35
Reach-1	43943	100-year	12312.00	577.40	595.90	588.37	597.31	0.001770	9.85	1769.30	320.09	0.41
Reach-1	43897		Bridge									
Reach-1	43846	100-year	12312.00	577.15	594.28	588.13	596.20	0.002557	11.23	1241.89	118.37	0.49
Reach-1	43193	100-year	12468.00	573.96	593.66		594.77	0.001064	8.54	1739.80	138.62	0.34



# REVISED (HEC-RAS 4.1.0)

HEC-RAS Plan: Revised River: Crowders Creek Reach: Reach-1 Profile: 100-year (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	42566	100-year	12468.00	571.85	593.20		594.14	0.000815	7.89	2341.22	413.92	0.30
Reach-1	41993	100-year	12468.00	570.95	592.77		593.68	0.000758	7.72	1991.97	192.32	0.29
Reach-1	41393	100-year	12468.00	570.77	592.22		593.19	0.000824	7.96	1774.41	140.35	0.30
Reach-1	40817	100-year	12468.00	570.56	591.82		592.70	0.000789	7.74	3175.47	597.75	0.30
Reach-1	40171	100-year	12468.00	569.57	591.33		592.21	0.000750	7.66	2059.38	166.73	0.29
Reach-1	39665	100-year	12468.00	569.57	590.79		591.79	0.000856	8.05	1744.09	134.13	0.31
Reach-1	38993	100-year	12468.00	568.91	590.35		591.21	0.000758	7.63	2111.22	178.37	0.29
Reach-1	38421	100-year	12468.00	568.03	589.97		590.78	0.000697	7.43	2161.51	154.81	0.28
Reach-1	37750	100-year	12468.00	566.29	589.56		590.33	0.000603	7.19	2141.22	187.48	0.26
Reach-1	37273	100-year	12468.00	565.86	589.40		590.02	0.000505	6.63	3044.84	379.57	0.24
Reach-1	36655	100-year	12468.00	565.45	588.99		589.69	0.000547	6.90	2597.84	273.17	0.25
Reach-1	35993	100-year	12468.00	564.88	588.71		589.32	0.000491	6.59	3963.13	838.84	0.24
Reach-1	35304	100-year	12468.00	564.65	588.33		588.97	0.000513	6.71	2696.06	211.77	0.24
Reach-1	34796	100-year	12468.00	564.45	588.14		588.70	0.000469	6.41	3873.62	481.40	0.23
Reach-1	34193	100-year	12468.00	564.08	587.77		588.41	0.000485	6.70	2931.63	263.96	0.24
Reach-1	33626	100-year	12468.00	563.88	587.67		588.11	0.000374	5.89	4397.29	370.57	0.21
Reach-1	33081	100-year	12468.00	563.68	587.22		587.85	0.000487	6.68	3095.41	288.10	0.24
Reach-1	32873	100-year	12468.00	563.60	586.54	575.22	587.59	0.001026	8.54	2116.87	201.97	0.32
Reach-1	32840		Bridge									
Reach-1	32807	100-year	12468.00	563.35	586.23	574.96	587.28	0.001035	8.56	2059.31	194.04	0.32
Reach-1	32460	100-year	12543.00	563.22	586.19		586.83	0.000521	6.79	3106.76	281.27	0.25
Reach-1	31765	100-year	12543.00	562.95	585.80		586.47	0.000535	6.86	3136.03	368.15	0.25
Reach-1	31180	100-year	12543.00	562.67	585.45		586.14	0.000552	6.96	2886.17	296.95	0.26
Reach-1	30593	100-year	12543.00	562.67	585.23		585.80	0.000497	6.56	3736.28	458.89	0.24
Reach-1	29897	100-year	12543.00	562.27	584.95		585.45	0.000448	6.25	4298.54	500.16	0.23
Reach-1	29393	100-year	12543.00	562.27	584.90		585.20	0.000321	5.28	6190.18	595.75	0.20
Reach-1	28793	100-year	12543.00	564.94	584.75		584.96	0.000388	5.07	7298.94	684.33	0.20
Reach-1	28435	100-year	12543.00	565.87	584.46		584.78	0.000621	6.01	5600.74	491.03	0.26
Reach-1	28293	100-year	12543.00	565.60	584.24	576.30	584.67	0.000715	6.64	4540.03	452.08	0.28
Reach-1	28196	100-year	12543.00	565.10	583.98	576.39	584.58	0.000857	7.09	3437.36	432.65	0.31
Reach-1	28087	100-year	12543.00	564.55	582.94	578.62	584.36	0.002208	11.16	2542.57	361.88	0.47
Reach-1	28044.5	100-year	12543.00	564.55	583.39		584.09	0.000832	7.16	2408.67	308.62	0.31
Reach-1	28015.5	100-year	12543.00	563.35	583.39		584.05	0.000704	6.83	2551.62	437.22	0.29
Reach-1	27953	100-year	12543.00	565.51	583.35	575.57	584.00	0.000887	6.64	2372.90	1143.44	0.31
Reach-1	27900	100-year	12543.00	564.83	583.09	576.57	583.90	0.001127	7.99	3293.86	1056.72	0.34
Reach-1	27810		Bridge									
Reach-1	27717	100-year	12543.00	565.04	582.79	577.73	583.59	0.001390	8.75	3466.51	650.73	0.38
Reach-1	27610	100-year	12543.00	566.23	582.59	577.62	583.43	0.001488	8.63	3169.34	609.84	0.39

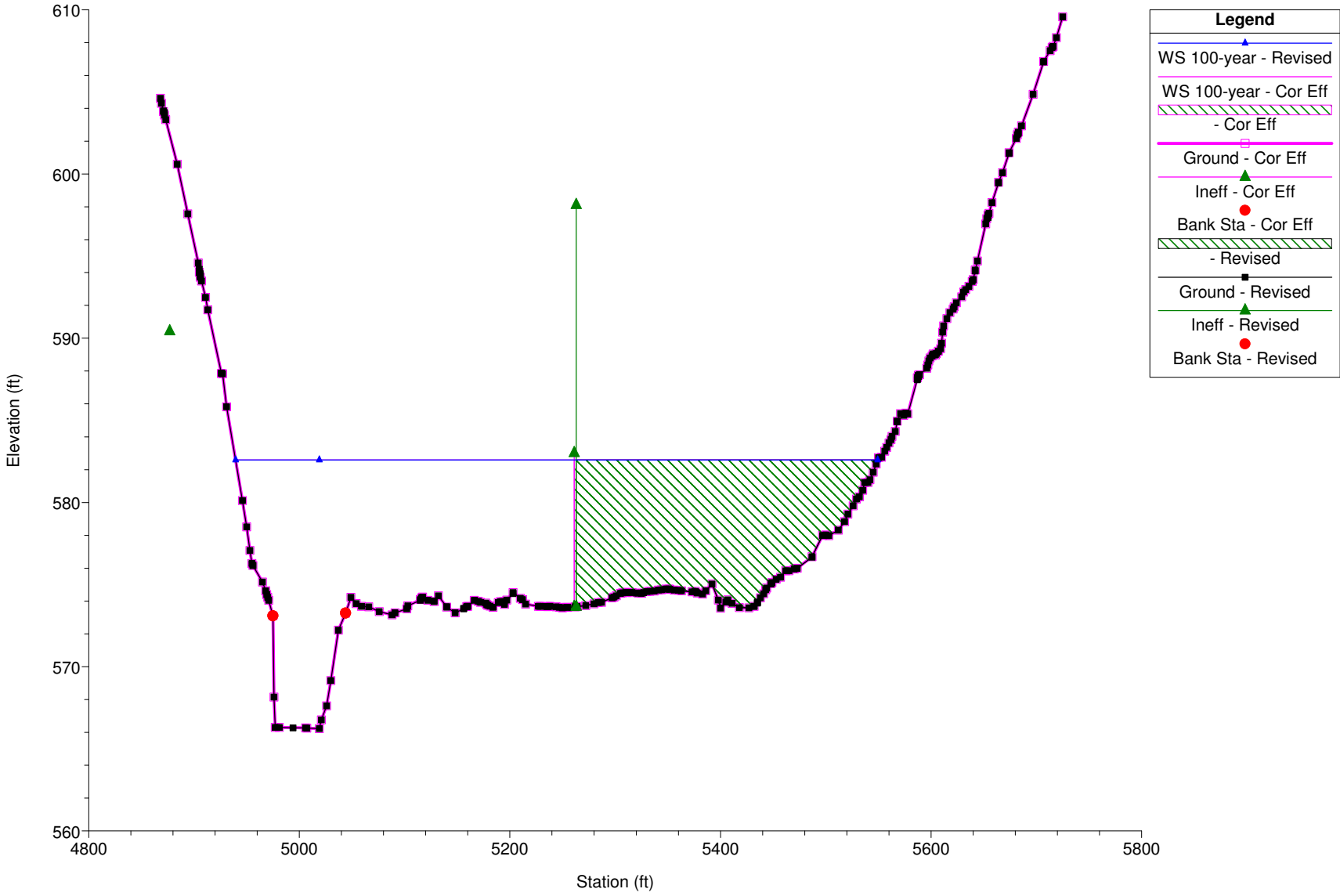
## REVISED (HEC-RAS 4.1.0)

HEC-RAS Plan: Revised River: Crowders Creek Reach: Reach-1 Profile: 100-year (Continued)

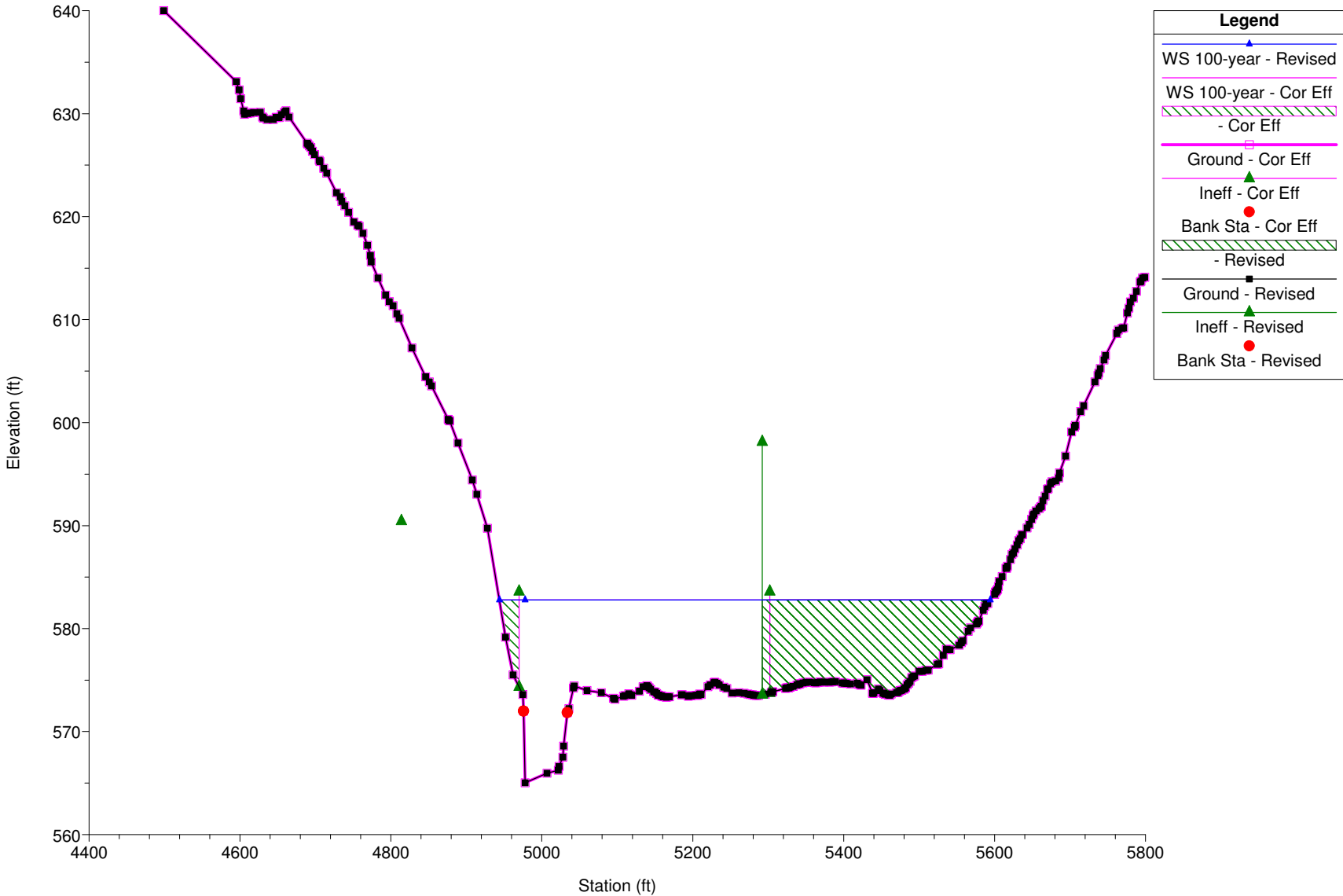
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	27119	100-year	12543.00	565.90	581.80		582.67	0.001569	8.96	3248.97	347.00	0.40
Reach-1	26802	100-year	12543.00	565.90	581.36		582.24	0.001226	7.88	2445.77	279.50	0.37
Reach-1	26393	100-year	12543.00	561.51	580.71		581.73	0.001164	8.70	2832.57	352.21	0.35
Reach-1	25793	100-year	12543.00	561.51	580.49		581.05	0.000729	6.89	4308.77	450.79	0.28
Reach-1	25292	100-year	12543.00	561.38	579.49		580.51	0.001442	9.21	3312.23	422.24	0.38
Reach-1	24274	100-year	14206.00	561.18	579.70	572.20	579.77	0.000226	3.78	15680.41	1567.06	0.16

Crowders Creek Limited Detail Study Plan: 1) Revised 2) Cor Eff

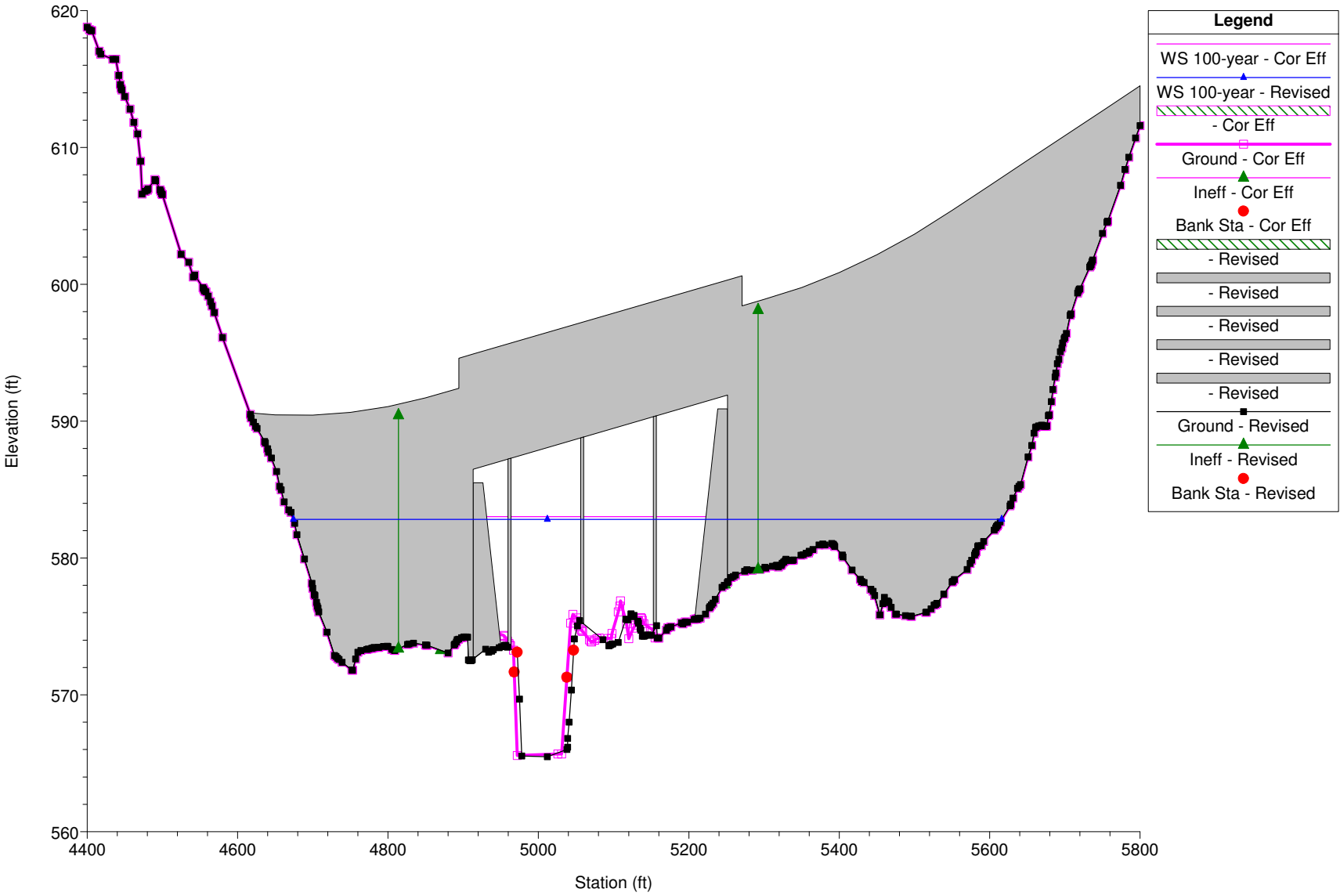
Crowders Creek 46.0



Crowders Creek Limited Detail Study Plan: 1) Revised 2) Cor Eff

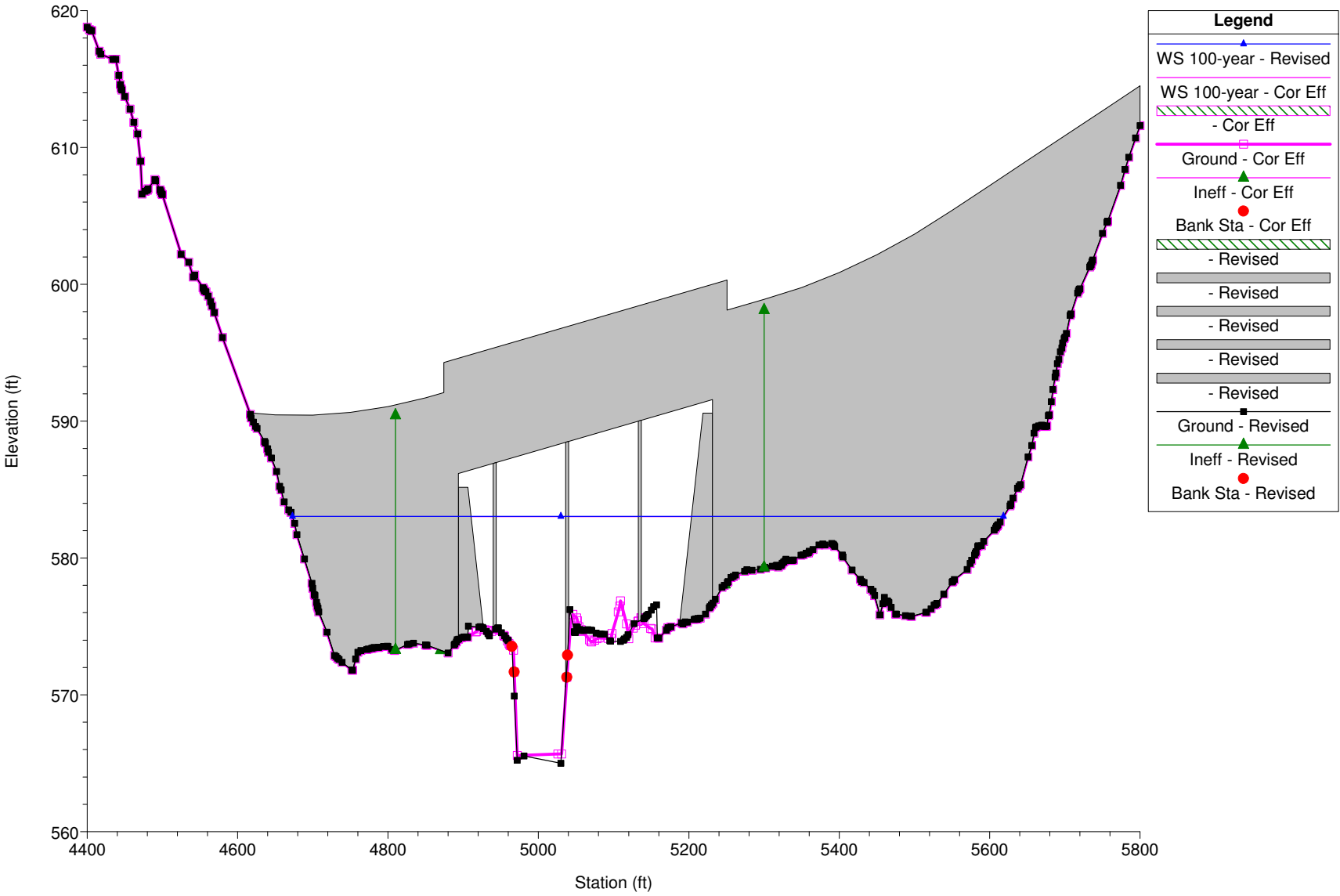


Crowders Creek Limited Detail Study Plan: 1) Revised 2) Cor Eff  
 SC 557 Proposed Bridge

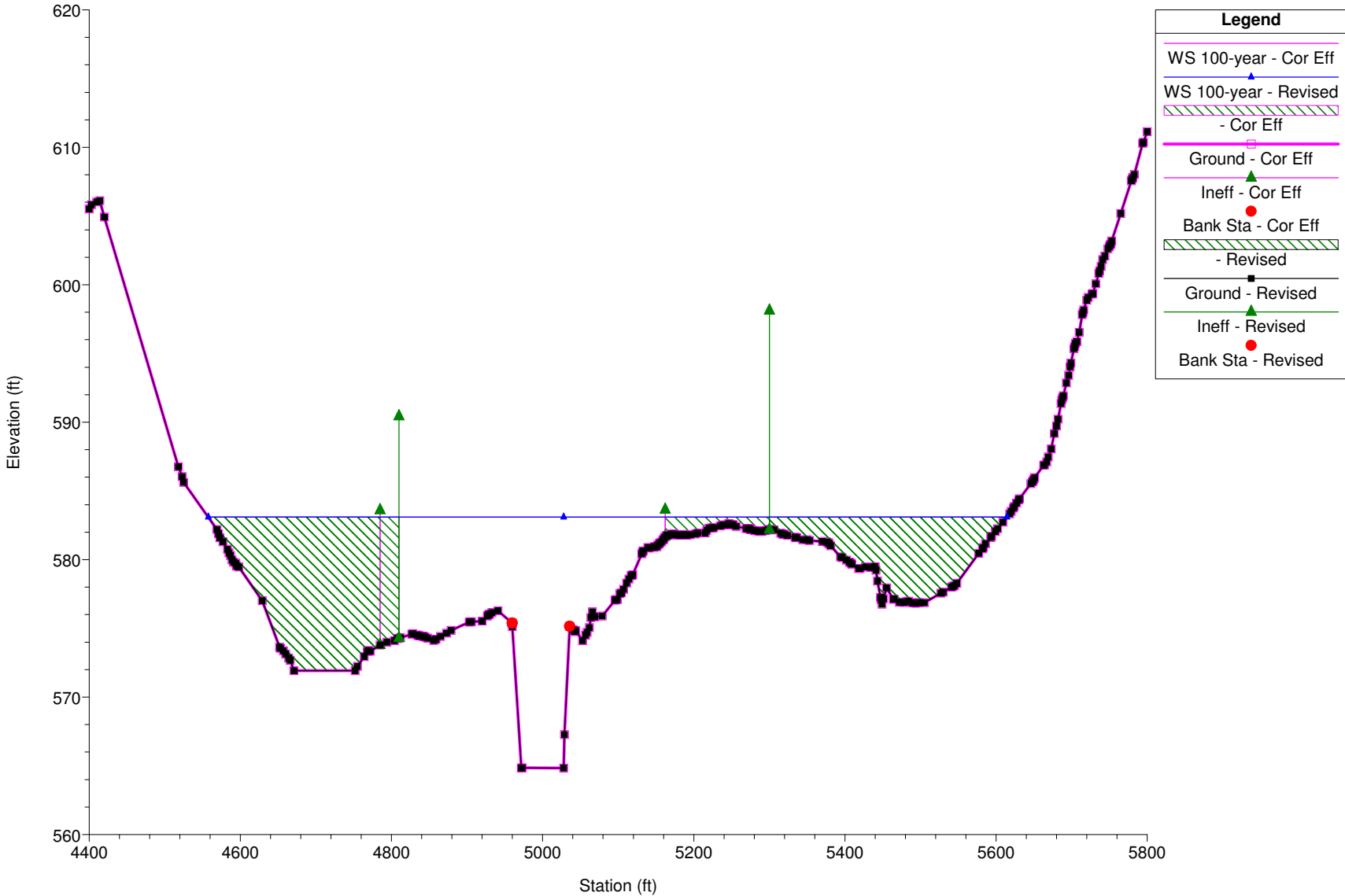


Crowders Creek Limited Detail Study Plan: 1) Revised 2) Cor Eff

SC 557 Proposed Bridge

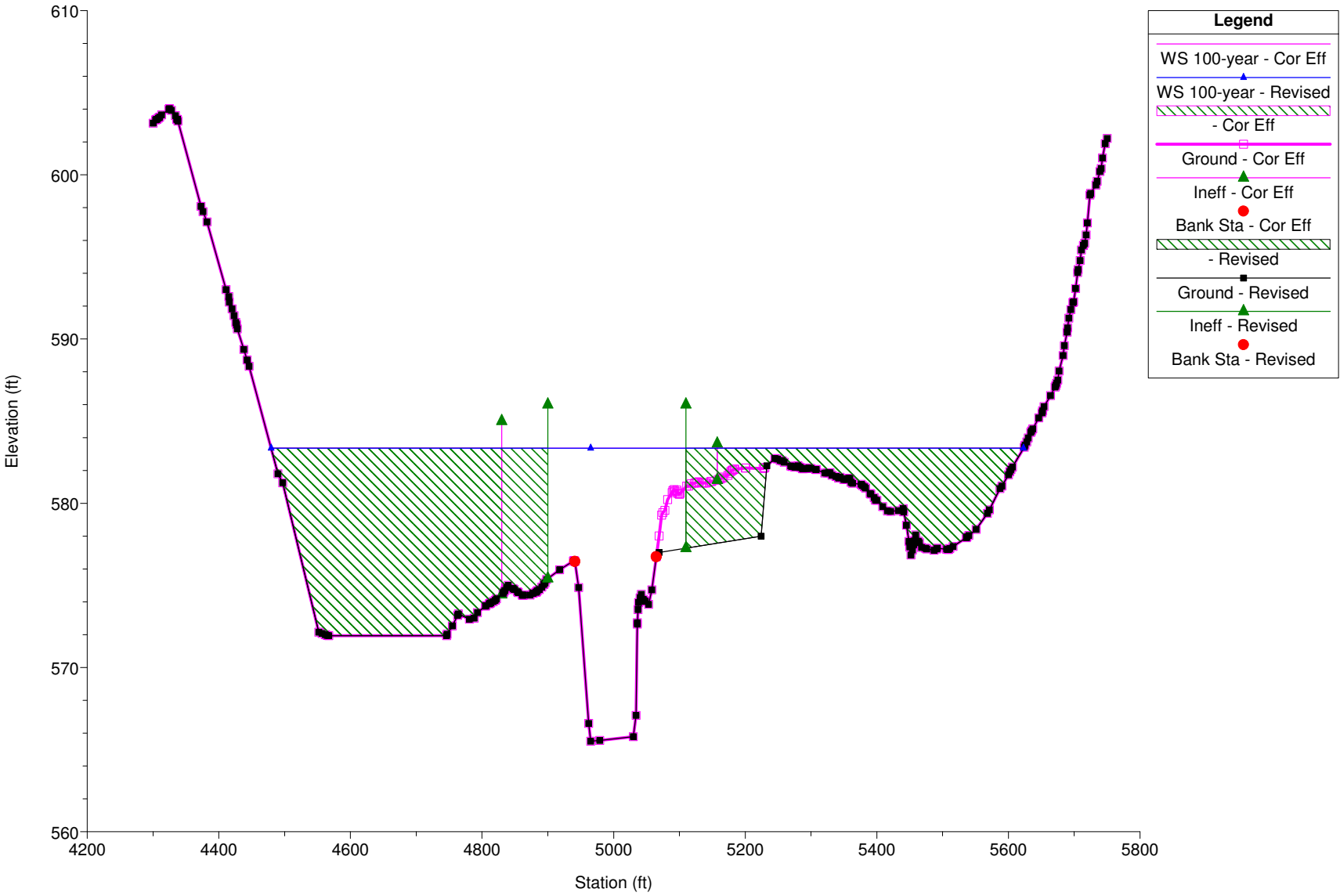


Crowders Creek Limited Detail Study Plan: 1) Revised 2) Cor Eff



Crowders Creek Limited Detail Study Plan: 1) Revised 2) Cor Eff

Croders Creek 46.4





South Carolina Department of Transportation

**ENGINEERING "NO-RISE" CERTIFICATION**

This document is to certify that I am duly qualified engineer licensed to practice in the State of

South Carolina

*(State)*

. It is to further certify that the attached technical data supports

the fact that proposed

SC 557 Bridge over Crowders Creek

*(Name of Development)*

will not increase the 100-year

flood elevations on

Crowders Creek

*(Name of Stream)*

at published

cross sections in the Flood Insurance Study for,

York County

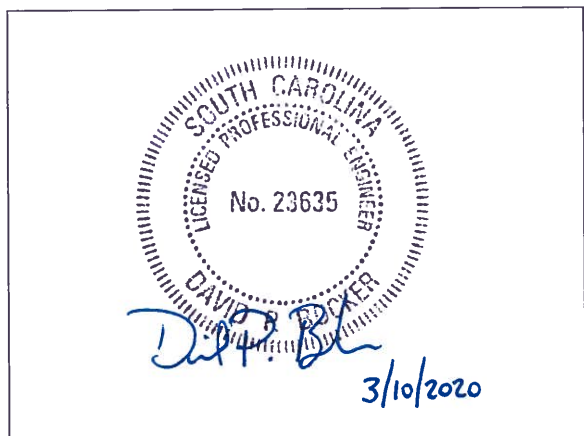
*(Name of community)*

, dated

September 26, 2008

*(Date)*

in the vicinity of the proposed development.



**SEAL, SIGNATURE AND DATE**

David P. Bocker, P.E.

*Name*

Water Resources Group Manager

*Title*

NV5 Engineers & Consultants

7500 E. Independence Blvd., Suite 100

Charlotte, NC 27227

*Address*

<b>FOR COMMUNITY USE ONLY:</b>		
Community Approval		
<input checked="" type="checkbox"/> Approved	<input type="checkbox"/> Disapproved	
<u>Tammy Marain, CFM</u>	<u></u>	<u>Environmental Compliance Manager</u>
Community Official's Name	Community Official's Signature	Title

FEMA, MT

PLANS PREPARED BY:  
**CALYX**  
 ENGINEERS + CONSULTANTS  
 7500 EAST INDEPENDENCE  
 BOULEVARD, SUITE 100  
 CHARLOTTE, NC 28227  
 phone: 704.537.7300  
 CALYXengineers.com

Project Engineer: David P. Bocker, PE

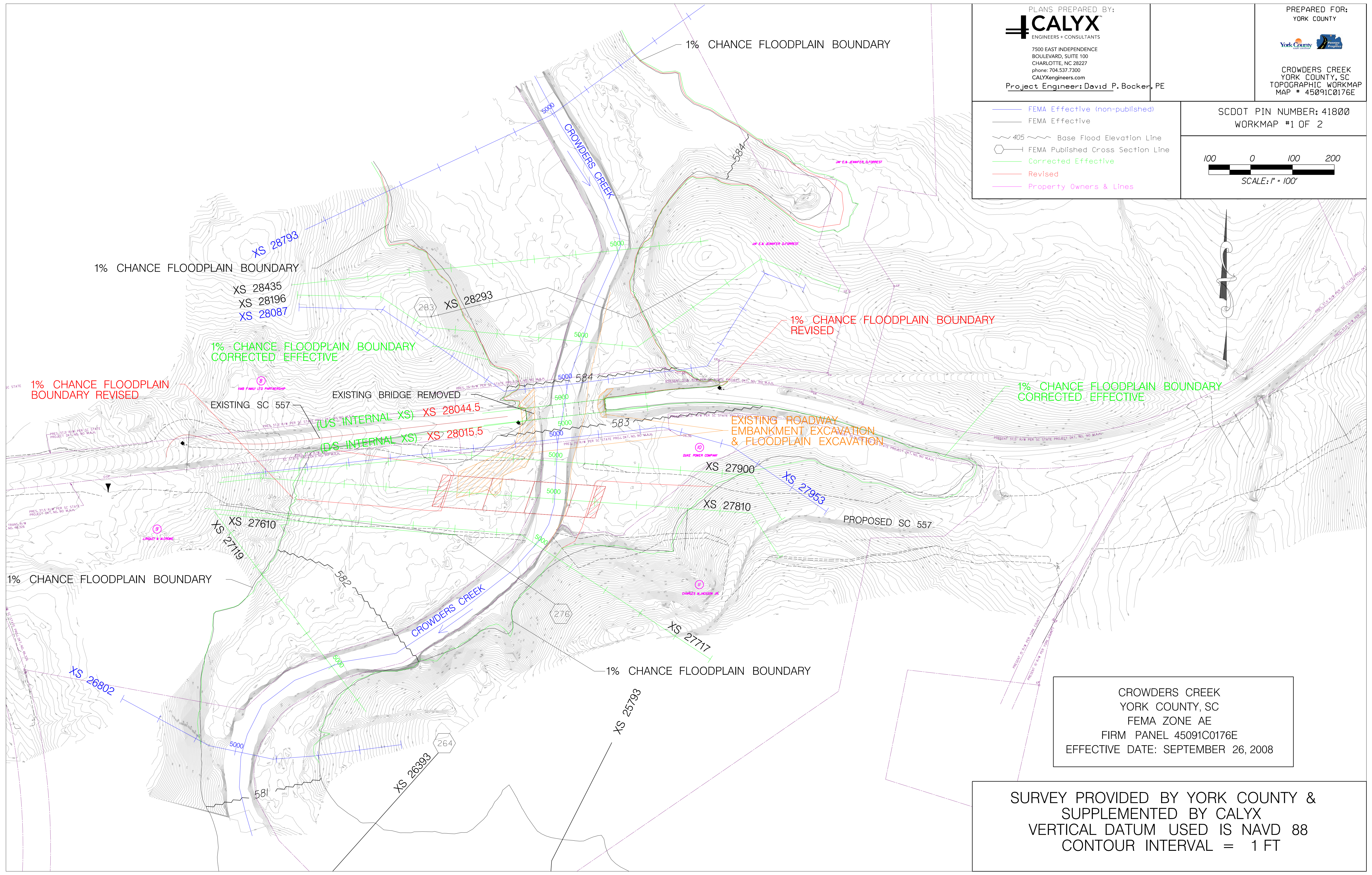
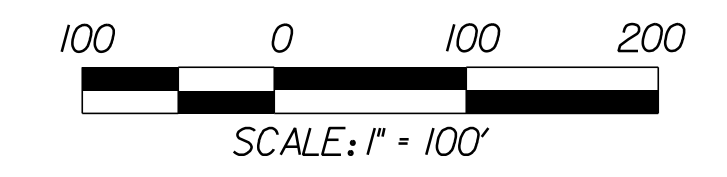
PREPARED FOR:  
 YORK COUNTY



CROWDERS CREEK  
 YORK COUNTY, SC  
 TOPOGRAPHIC WORKMAP  
 MAP # 45091C0176E

- FEMA Effective (non-published)
- FEMA Effective
- ~ 405 Base Flood Elevation Line
- FEMA Published Cross Section Line
- Corrected Effective
- Revised
- Property Owners & Lines

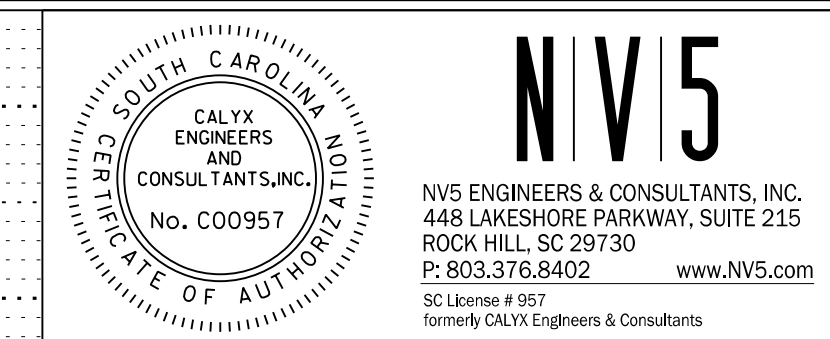
SCDOT PIN NUMBER: 41800  
 WORKMAP #1 OF 2



CROWDERS CREEK  
 YORK COUNTY, SC  
 FEMA ZONE AE  
 FIRM PANEL 45091C0176E  
 EFFECTIVE DATE: SEPTEMBER 26, 2008

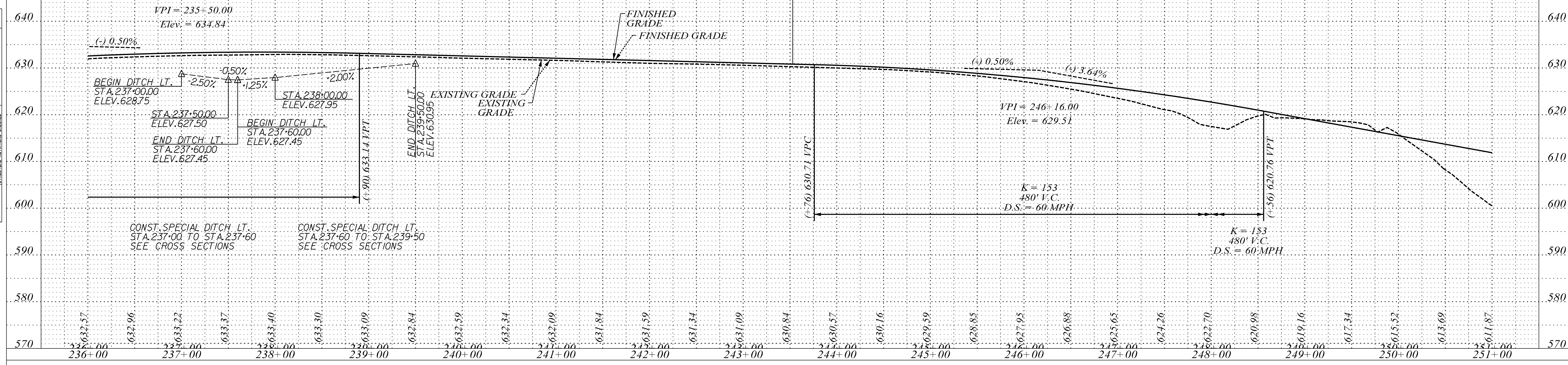
SURVEY PROVIDED BY YORK COUNTY &  
 SUPPLEMENTED BY CALYX  
 VERTICAL DATUM USED IS NAVD 88  
 CONTOUR INTERVAL = 1 FT

FED. ROAD DIST. NO.	STATE	COUNTY	PROJECT ID	PROJECT NO.	ROUTE	SHEET NO.	TOTAL SHEETS
3	SC	YORK	0041800	03-013/11-009	557	17	

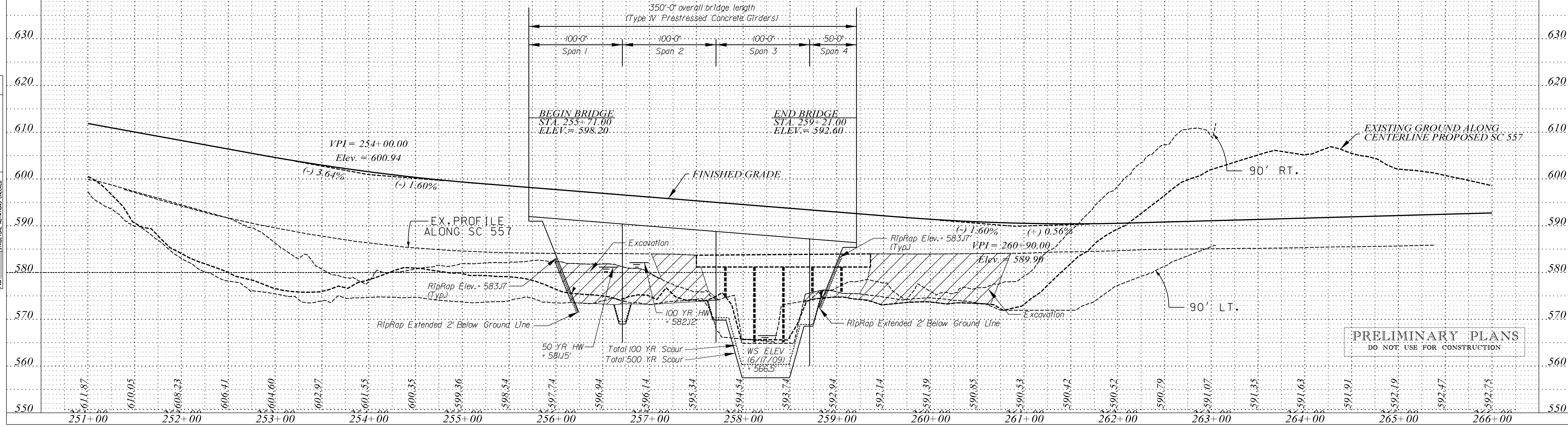


### -SC 557-

-SC 557- POT. STA. 243+52.93 =  
 S-46-152(RIDDLE MILL RD.)- PQT. STA. 10+00.00  
 S-46-152(BETHEL SCHOOL RD.)- POT. STA. 16+92.23



### -SC 557- TRIPLE PROFILE



**PRELIMINARY PLANS**  
 DO NOT USE FOR CONSTRUCTION

DATE	BY	PROFILE	DATE
		DATE	
		DATE	
		DATE	

DATE	BY	PROFILE	DATE
		DATE	
		DATE	
		DATE	

PROFILE SHEET NO. \_\_\_\_\_  
 DATE \_\_\_\_\_  
 BY \_\_\_\_\_  
 CHECKED \_\_\_\_\_  
 DATE \_\_\_\_\_  
 BY \_\_\_\_\_

**LIMITED PHASE I ENVIRONMENTAL  
SITE ASSESSMENT**

**RIGHT-OF-WAY WIDENING OF  
S.C. HIGHWAY 557**

**STATIONS 205+92.00 TO 330+05.00  
BETWEEN CLOVER & LAKE WYLIE  
YORK COUNTY, SOUTH CAROLINA**

**REPORT PREPARED FOR:**



**MULKEY ENGINEERS & CONSULTANTS**

**7500 East Independence Blvd.  
Suite 100  
Charlotte, North Carolina 28227**

**BY:**

**F&ME CONSULTANTS  
Geotechnical / Environmental / Materials  
3112 Devine Street  
Columbia, South Carolina 29205  
(803) 254-4540**

**September 28, 2012**

**G4843.000**

**TABLE OF CONTENTS**

**A. SUMMARY ..... 1**

**B. INTRODUCTION..... 2**

1. Purpose ..... 2

2. Scope of Services ..... 2

3. Significant Assumptions..... 2

4. Limitations and Exceptions of Assessment..... 2

    4.1 Observations Made Under Conditions Stated..... 2

    4.2 Information Provided by State and Local Offices ..... 3

    4.3 Visual Observations Made of the Site ..... 3

    4.4 Tests and Analyses Performed ..... 3

    4.5 Physical Characteristics of the Site..... 3

    4.6 Findings and Conclusions..... 3

    4.7 Groundwater ..... 3

    4.8 Quantitative Laboratory Tests ..... 3

    4.9 Conclusions and Recommendations Based Upon Laboratory Data ..... 4

    4.10 Chemical Analyses ..... 4

    4.11 Further Environmental and Geotechnical Engineering Services ..... 4

    4.12 Radon Investigation ..... 4

    4.13 Limiting Conditions and Methodology Used ..... 4

    4.14 Data Gap Reporting and Analysis per All Appropriate Inquiries (AAI) ..... 5

5. Special Terms and Conditions..... 5

6. User Reliance ..... 5

7. Dissemination of Report..... 5

**C. SITE DESCRIPTION..... 5**

1. Location and Legal Description ..... 5

2. Site and Vicinity Characteristics ..... 5

    2.1 Site Characteristics ..... 5

        2.1.1 Site Observations..... 5

        2.1.2 Observed Surface Conditions ..... 6

        2.1.3 General Subsurface Conditions ..... 6

        2.1.4 General Groundwater Conditions..... 6

        2.1.5 General Area Geology ..... 6

2.1.6	Site Reconnaissance to Assess On-Site Conditions.....	6
2.1.7	Review of Utility Locations .....	7
3.	Current Use of the Property.....	7
4.	Description of Structures, Roads, and Other Improvements on the Site (Including Heating/ Cooling System, Sewage Disposal, and Source of Potable Water .....	7
5.	Current Uses of the Adjoining Properties .....	7
5.1	Adjacent Property .....	7
5.2	Minimum Search Distance .....	7
<b>D.</b>	<b>USER-PROVIDED INFORMATION.....</b>	<b>9</b>
1.	Title Records .....	9
1.1	Title Search to Delineate Current and Past Ownership .....	9
1.1.1	Current Ownership .....	9-50
1.1.2	Previous Ownership.....	9-50
2.	Environmental Liens or Activity and User Limitations .....	51
3.	Specialized Knowledge .....	51
4.	Commonly Known or Reasonably Ascertainable Information .....	52
4.1	Zoning.....	52
4.2	FEMA Flood Map Review .....	52
4.3	Wetlands Inventory Review .....	52
5.	Valuation Reduction for Environmental Issues.....	52
6.	Owner, Property Manager, and Occupant Information .....	52
7.	Reason for Performing the Limited Phase I .....	52
<b>E.</b>	<b>RECORDS REVIEW.....</b>	<b>52</b>
1.	Standard Environmental Record Sources .....	52
1.1	Review of Environmentally Related Permits .....	52
1.2	Review of Well Records.....	53
1.3	Inquiry to Regulatory Agencies Concerning Potential Environmental Problems .....	53
2.	Additional Environmental Record Sources .....	53
3.	Physical Setting Source(s).....	54
4.	Historical Use Information on the Property .....	54
5.	Historical Use Information of Adjoining Properties .....	54
<b>F.</b>	<b>SITE RECONNAISSANCE .....</b>	<b>54</b>
1.	Methodology and Limiting Conditions .....	54
1.1	Hazardous Substances in Connection with Identified Uses.....	54
1.2	Hazardous Substance Containers and Unidentified Substance Containers .....	54

1.3	Storage Tanks .....	54
1.3.1	Review of Storage Tanks Registration and Information .....	54
1.4	Suspected Presence of Lead-Based Paint and/or Lead in Drinking Water .....	54
1.5	Indication of PCB's .....	54
1.6	Indication of Solid Waste Disposal .....	55
2.	General Site Setting .....	55
3.	Exterior Observations .....	55
4.	Interior Observations .....	55
<b>G.</b>	<b>INTERVIEWS.....</b>	<b>55</b>
1.	Interview with Owner .....	55
2.	Interview with Site Manager .....	55
3.	Interview with Occupants .....	55
4.	Interviews with Local Government Officials .....	55
5.	Interviews with Others .....	55
<b>H.</b>	<b>FINDINGS .....</b>	<b>55</b>
<b>I.</b>	<b>OPINION .....</b>	<b>56</b>
<b>J.</b>	<b>CONCLUSIONS .....</b>	<b>56</b>
<b>K.</b>	<b>DEVIATIONS .....</b>	<b>56</b>
<b>L.</b>	<b>ADDITIONAL SERVICES.....</b>	<b>56</b>
1.	Archeological Sites.....	56
2.	Endangered Species.....	56
<b>M.</b>	<b>REFERENCES.....</b>	<b>56</b>
<b>N.</b>	<b>SIGNATURE OF ENVIRONMENTAL PROFESSIONALS.....</b>	<b>57</b>
<b>O.</b>	<b>QUALIFICATIONS OF ENVIRONMENTAL PROFESSIONALS .....</b>	<b>57</b>
<b>P.</b>	<b>APPENDICES .....</b>	<b>58</b>
1)	Site Vicinity Map	
2)	Site Plan	
3)	Site Photographs	
4)	Historical Research Documentation	
5)	Regulatory Records Documentation	
6)	Interview Documentation	
7)	Special Contractual Conditions between User and Environmental Professional	
8)	Property Deeds	
9)	40 CFR Part 312	

**LIMITED PHASE I ENVIRONMENTAL SITE ASSESSMENT**  
**RIGHT-OF-WAY WIDENING**  
**S.C. HIGHWAY 557**  
**STATIONS 205+92.00 TO 330+05.00**  
**BETWEEN CLOVER & LAKE WYLIE**  
**YORK COUNTY, SOUTH CAROLINA**

COLUMBIA OFFICE  
3112 Devine Street  
Columbia, SC 29205  
P 803.254.4540  
F 803.254.4542

BEAUFORT OFFICE  
26 John Galt Road, Suite A  
Beaufort, SC 29906  
P 843.522.0246  
F 803.254.4542

## A. SUMMARY

F&ME CONSULTANTS has performed this Limited Phase I Environmental Site Assessment (Limited Phase I) on the portions of properties that will be affected by the widening of the right-of-way along S.C. Highway 557 (Station 205+92.00 to Station 330+05.00), located between the towns of Clover and Lake Wylie in York County, South Carolina. This assessment was performed on behalf of Mulkey Engineers and Consultants.

This Limited Phase I was conducted in general compliance with the procedures and guidelines outlined in the South Carolina State Budget and Control Board Guidelines for Obtaining Studies for Land Acquisitions (11-16-10) and ASTM E1527-05. The assessment consisted of reasonably ascertainable: title search, historical records review, historical photographs review, and review of South Carolina Department of Health and Environmental Control (SCDHEC) records. No interviews of owners/operators were performed as a part of this Limited Phase I

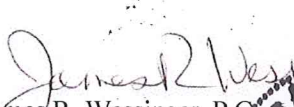
The areas along the existing roadway and within the proposed right-of-way were visually inspected on December 29, 2009, and again on July 5, 2012. The visual inspections included noting the present usage of adjoining and surrounding properties within the approximate recommended minimum search distance. During the site inspection, the ASTM E1528-06 Transaction Screen Questionnaire was completed as required.

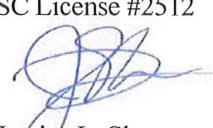
We have recorded our findings, recommendations, and our responses to the ASTM Questionnaires herein. No Phase II Environmental Site Assessment is recommended at this time. Refer to Section H, Findings, and Section J, Conclusions, for more information.

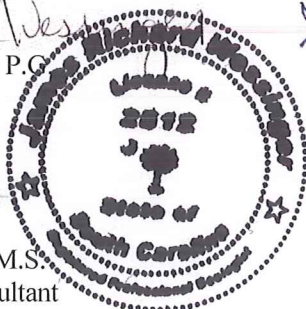
If there are any questions concerning this Limited Phase I Environmental Site Assessment, or if we can be of any further assistance on this project, please do not hesitate to contact us at (803) 254-4540. We appreciate the opportunity to provide this service.

Sincerely,

F&ME CONSULTANTS

  
James R. Wessinger, P.G.  
Staff Geologist  
SC License #2512

  
Jessica L. Shannon, M.S.  
Environmental Consultant



  
Glynn M. Ellen  
Senior Environmental Consultant





---

---

## **B. INTRODUCTION**

### **1. Purpose**

F&ME CONSULTANTS has performed this Limited Phase I Environmental Site Assessment (Limited Phase I) on behalf of Mulkey Engineers and Consultants on the portions of properties that will be affected by the widening of the right-of-way (i.e. proposed right-of-way) along S.C. Highway 557 (Station 205+92.00 to Station 330+05.00), located between the towns of Clover and Lake Wylie in York County, South Carolina. This assessment was performed to evaluate, to the extent feasible, environmental data concerning the general site conditions with respect to the potential for environmental situations that could potentially impact the proposed right-of-way. Visual inspections of the proposed right-of-way were made in December 29, 2009, and again on July 5, 2012, in order to identify evidence of recognized environmental concerns, if any.

Based upon the information obtained from the visual reconnaissance, maps, aerial photographs, and records search, our findings and conclusions are presented herein.

### **2. Scope of Services**

The scope of services involved the following tasks for fifty-four (54) properties located within seventy-five (75) feet from either side of the centerline of the proposed right-of-way, as well as adjacent properties that may contribute an environmental impact to the proposed right-of-way:

- Visual site inspection
- Walking and driving the affected areas (where possible)
- Completion of ASTM E1528-06 Transaction Screen Questionnaire by Environmental Professionals
- Recording observations
- Property title search
- Reviewing historical mapping and aerial photographs
- Reviewing the South Carolina Department of Health and Environmental Control (SCDHEC) Freedom of Information (FOI) records made available

### **3. Significant Assumptions**

There are no significant assumptions pertaining to the properties affected by the proposed right-of-way.

### **4. Limitations and Exceptions of Assessment**

All work products and reports provided by F&ME Consultants, in connection with the performance of Environmental Site Assessments (i.e., Phase I, Phase II, and any remediation related services), including all work performed under this Limited Phase I Environmental Site Assessment for Professional Services and any follow-up work, are subject to the following limitations:

#### **4.1 Observations Made Under Conditions Stated**

The observations described in this Limited Phase I are made under the conditions stated herein. The findings and conclusions presented in this Limited Phase I are based solely upon the services described herein, and not on scientific tasks or procedures beyond the special terms and conditions of described services or the time and budgetary constraints imposed by the Client. The work described in this Limited Phase I has been performed in general accordance with the S.C. State Budget and Control Board Policy for Obtaining Environmental Studies for Land Acquisition and Criteria for Environmental Studies (11-16-10), ASTM E1527-05, and ASTM E1528-06. No interviews of owners/ operators were performed as a function of this Limited Phase I.

---

---

## **4.2 Information Provided by State and Local Offices**

In preparing this Limited Phase I, F&ME Consultants has relied on information provided by state and local offices, information and representation made by other parties, and information contained in the files of state and/or local agencies made available to F&ME Consultants as referenced herein. To the extent that such files are missing, incomplete or not provided to F&ME Consultants, F&ME Consultants is not responsible. If there are gaps in the information provided by the various officials, other parties, or agencies, F&ME Consultants does not attempt to independently verify the accuracy or completeness of all information reviewed or received to be incorporated into this Limited Phase I.

## **4.3 Visual Observations Made of the Site**

Visual observations made of the proposed right-of-way are as indicated within this Limited Phase I. Where portions of the proposed right-of-way are inaccessible or limited, F&ME Consultants renders no opinion as to the presence or absence of potential environmental concerns, either indirectly or directly from the proposed right-of-way, adjoining/adjacent properties or contents of on-site/off-site building structures.

## **4.4 Tests and Analyses Performed**

Unless otherwise stated or specified in this Limited Phase I, F&ME Consultants has not performed any testing or analyses to determine the presence or concentration of environmental concerns (i.e. asbestos containing building materials, polychlorinated biphenyls, radon, hydrocarbons, lead-based paint, lead in drinking water, etc.) either on the proposed right-of-way or on adjoining/adjacent properties that may environmentally impact the proposed right-of-way.

## **4.5 Physical Characteristics of the Site**

The purpose of this Limited Phase I is to address the physical characteristics of the proposed right-of-way with respect to the potential presence of environmental concerns as of the date of the visual inspection. This includes the review of records made available by the various agencies covering the areas within the proposed right-of-way with respect to federal, state and local laws, regulations and environmental concerns. Therefore, no warranty or guarantee, either stated or implied, is given concerning the authenticity of the various agencies or the completeness of federal, state or local records.

## **4.6 Findings and Conclusions**

The findings and conclusions of this Limited Phase I are based, in part, upon the information obtained from the records made available by others and from the visual inspection of the proposed right-of-way. If variations or latent conditions arise or become evident, it will be necessary to re-evaluate the findings and conclusions presented in this Limited Phase I.

## **4.7 Groundwater**

Depths to groundwater throughout the proposed right-of-way will be largely controlled by rainfall frequency, intensity, storm water movement, Crowders Creek surface levels, and depth to rock. Therefore, groundwater levels should not be considered static. Furthermore, the scope of this phase of assessment does not include investigating groundwater quality or levels unless specifically stated.

## **4.8 Quantitative Laboratory Tests**

Except as noted within the text of this Limited Phase I, no quantitative/qualitative laboratory testing has been performed as part of this assessment of the proposed right-of-way. Where such analyses have been conducted by an outside laboratory (and made available), F&ME Consultants has relied exclusively upon the laboratory data provided, and has not conducted an independent evaluation of the reliability of these tests.

---

---

## **4.9 Conclusions and Recommendations Based Upon Laboratory Data**

If the conclusions and recommendations contained in the Limited Phase I are based in part upon various types of laboratory data, then the conclusions and recommendations are contingent upon the validity of such data. These data, if obtained, are reviewed and interpretations are included in this Limited Phase I. If indicated within this Limited Phase I, some of these data may be preliminary “screening” level data and should be confirmed with quantitative/qualitative analyses if more specific information is necessary. Moreover, variations in the types and concentrations of contaminants and variations in their flow paths may occur due to seasonal water table fluctuations, past disposal practices, the passage of time, and other factors. Should additional chemical data become available in the future, these data may alter the basis of the conclusions and recommendations presented herein.

### **4.10 Chemical Analyses**

Chemical analyses are typically performed for Phase II Environmental Site Assessments, and are targeted for particular compounds. Generally, they will not represent an exhaustive analysis of the soil, ground water, or surface water within the proposed right-of-way. Therefore, there is the potential for compounds to be present. No chemical analyses were performed as a function of this assessment.

### **4.11 Further Environmental and Geotechnical Engineering Services**

In the event that this Limited Phase I Environmental Site Assessment results in the need for further exploration or the construction and/or implementation of remedial measures, it is recommended that F&ME Consultants be retained to provide these services. This is to allow F&ME Consultants and the Client to observe consistency with the concepts and recommendations contained herein, and to allow the development of changes to the remedial program in the event that subsurface conditions or other conditions differ from those anticipated. This Limited Phase I does not include recommendations associated with the structural capacity/ integrity of the soils within the proposed right-of-way. No portion of this report should be used as an engineering assessment of the site soils.

### **4.12 Radon Investigation**

No analytical laboratory radon data was collected as a function of this Limited Phase I. Therefore, this Limited Phase I report does not constitute a radon investigation report.

### **4.13 Limiting Conditions and Methodology Used**

Field operations were limited to a site inspection and observation of the surrounding areas. The site inspection consisted of a visual inspection of the properties to document any evidence of recognized negative environmental conditions that may presently exist. The surrounding areas were visually observed (by vehicle and on foot) to assess present usages and any possible negative environmental impact they may have on the proposed right-of-way.

The basic premise for the Phase I Environmental Site Assessment is a visual inspection of the subject property, specifically the portions of properties to be included in the proposed right-of-way, and reasonably ascertainable historical records review to document the present and past usage of these properties. This is done to determine the present environmental status, and to indicate whether a Phase II Environmental Site Assessment is warranted. This Limited Phase I differs from a full Phase I in that no interviews of owners/ operators of the affected properties were performed. This Limited Phase I will be utilized in the development of the NEPA document for the project and interviews of owners/ operators are not necessary.

---

---

#### **4.14 Data Gap Reporting and Analysis per All Appropriate Inquiries (AAI)**

If data gaps concerning the proposed right-of-way and adjoining and adjacent properties are identified, regardless of cause (i.e., intentional or unintentional withholding or loss of information), F&ME Consultants will endeavor to comment on the significance of these data gaps. However, F&ME Consultants cannot and does not warrant or guarantee that no significant events, releases, or negative conditions arose during periods of time or which no records are available.

#### **5. Special Terms and Conditions**

Mulkey Engineers and Consultants (Client) has requested this Limited Phase I Environmental Site Assessment. The formats as stated in the South Carolina State Budget and Control Board Policy for Environmental Studies for Land Acquisitions (11-16-10), ASTM E1528-06, and ASTM E1527-05 were utilized as the guidelines for this Limited Phase I Environmental Site Assessment.

#### **6. User Reliance**

F&ME Consultants has performed this Limited Phase I on the portions of the properties along S.C. Highway 557 that are included in the proposed right-of-way as requested. Our findings and conclusions are present herein. This assessment has been performed in general accordance with the South Carolina Budget and Control Policy for Environmental Studies for Land Acquisitions (11-16-10), ASTM E1528-06, and ASTM E1527-05.

This user reliance section is provided as verification that the Client, their lenders, successors, and assigns may rely on the findings, conclusions, and recommendations provided in this report. Reliance is subject to the same limitations as stated for professional services. F&ME Consultants has not conducted any evaluation of the portions of the properties included within the proposed right-of-way since the final inspection performed July 5, 2012. Furthermore, no interviews with owners/ operators of affected properties were performed.

#### **7. Dissemination of Report**

This Limited Phase I report has been prepared exclusively for the Client and shall not be disseminated in whole or in part to other parties without prior consent from the Client.

### **C. SITE DESCRIPTION**

#### **1. Location and Legal Description**

The areas of assessment, hereafter referred to as “proposed right-of-way”, are located within seventy-five (75) feet from either side of the present centerline of S.C. Highway 557 as well as the proposed centerline of the new S.C. Highway 557 segment. Refer to Appendix P2, Site Plan, for the preliminary roadway improvement plans as provided to F&ME by Mulkey Engineers and Consultants on June 8, 2012. The proposed right-of-way begins west of the intersections of S.C. Highway 557 and Ridge Road at station 205+92.00 toward Clover, S.C., and extends eastward to its terminus east of the intersection of S.C. Highway 557 and Highway 274 near Lake Wylie, S.C., at station 330+05.00. Refer to Appendices P1, P2, P4, and P8 for maps, aerial photographs, and legal descriptions.

#### **2. Site and Vicinity Characteristics**

##### **2.1 Site Characteristics**

The proposed right-of-way contains the items listed under 2.1.1 below and exhibits a surrounding surface relief of approximately 564 to 663 feet (mean sea level) according to the 1985 USGS Clover, South Carolina and 1993 Lake Wylie, South Carolina – North Carolina quadrangle maps.

##### **2.1.1 Site Observations**

On the dates of the visual site inspections, the following (as a minimum) were observed in or adjacent to the areas of assessment:

- Paved roadways
- Above ground utilities
- Transmission Lines/ Corridor
- Below ground utilities
- Single family residences/ Neighborhoods
- Agricultural/ Cultivated land
- Woods and surface vegetation
- Paved & unpaved drives
- Construction materials laydown yard
- Fire hydrants
- Ponds
- Crowders Creek
- Self storage facility
- Paved parking areas
- Various types of fencing
- Roadway signage
- Business signage
- Mailboxes
- Guardrails
- Lumber
- Traffic Signals
- Stormwater outfalls/ riprap

### **2.1.2 Observed Surface Conditions**

At present, the proposed right-of-way contains the items previously noted and no unusual surface stains or distressed vegetation were observed during the visual site inspections.

### **2.1.3 General Subsurface Conditions**

Surface soils within the proposed right-of-way, as noted by the U.S. Department of Agriculture, Natural Resource Conservation Service, for York County, S.C., are defined as belonging to the following soil series:

- Cecil (CcB3, CdB2 and CcC3)
- Enon (EnD3, EsB2, EsC2 and EsE2)
- Lloyd (LaB3, LaC3, LdB2 and LdD2)
- Mixed alluvial (Mn, Mw)
- Wilkes Complex (WkE)

### **2.1.4 General Groundwater Conditions**

Depths of groundwater throughout the site will be largely controlled by rainfall frequency, intensity, storm water movement, Crowders Creek levels, and depth to rock. Therefore, reference to groundwater in this area should not be considered static. Furthermore, the scope of this Limited Phase I does not include investigating groundwater quality or levels unless specifically stated.

### **2.1.5 General Area Geology**

The proposed right-of-way is geologically located in the Charlotte Belt of the Piedmont Province of South Carolina. The Piedmont Province exhibits rolling to undulating land surfaces dissected by dendritically patterned streams. The Charlotte Belt includes medium- to high-rank metamorphic rocks and a complicated sequence of igneous intrusions. In general, the metamorphic rocks include mica schist, biotite gneiss, quartzite and amphibolites. The igneous rocks include gabbro, granitics of varying composition and diabase intrusions.

### **2.1.6 Site Reconnaissance to Assess On-Site Conditions**

As previously stated, F&ME Consultants has visually inspected the portions of properties included within the proposed right-of-way to assess on-site conditions. There are no environmental conditions identified that require immediate attention.

---

---

### 2.1.7 Review of Utility Locations

The visual site inspections indicated above and below ground utilities within the proposed right-of-way. Electrical power, natural gas, and telephone services are available through the servicing utility companies. Fire hydrants were also noted within the proposed right-of-way.

### 3. Current Use of the Property

The portions of the properties included within the proposed right-of-way appear to be used, as a minimum, for the following purposes:

- Stormwater drainage/ ditches
- Above & below-ground utilities
- Unpaved roads
- Pastures
- Driveways
- Parking lots
- Ponds
- Vacant lots
- Woods

### 4. Description of Structures, Roads, and Other Improvements on the Site (Including Heating/Cooling System, Sewage Disposal, and Source of Potable Water)

There are improvements on both sides of the proposed right-of-way within seventy-five (75) feet of the existing and proposed centerlines of S.C. Highway 557. These improvements consist mostly of residences, parking lots, paved drives, paved connector roads, and property fences.

Water and sewer services are provided by Clover Water Service to the west and Carolina Water Service to the east.

### 5. Current Uses of the Adjoining Properties

The vicinity surrounding the subject right-of-way is predominately rural and contains cultivated fields, residences, and paved and unpaved roads. Current uses of the adjoining properties appear to be as follows:

- Single family residences
- Woods
- Surface vegetation
- Unpaved roads
- Duke Power Substation
- Farms
- Cultivated fields
- Churches
- Bank of America
- Oakridge Middle School
- Ponds
- Pastures
- Ditches
- Parking lots
- Vacant lots

#### 5.1 Adjacent Property

- 1) North – Woods, transmission line corridor, commercial businesses, paved and unpaved roads, and single family residences.
- 2) East – Woods, single family residences and commercial businesses.
- 3) South – Woods, transmission line corridor, pastures, and single family residences.
- 4) West – Primarily cultivated fields and woods, residences, woods, and paved and unpaved roads.

#### 5.2 Minimum Search Distance

The inspection criteria included visual inspections and records search of properties within the recommended appropriate minimum search distance as prescribed by ASTM E1528-06, ASTM E1527-05, and ASTM E2247-08. The object of this search is an attempt to determine if there are facilities that would impact the current environmental status of the proposed right-of-way addition. The following types of records were searched for properties located within the appropriate minimum search distance:

<u>Search Distance</u>	<u>Type of Records Searched</u>
0.5 mile	<ul style="list-style-type: none"> <li>• Comprehensive Environmental Response, Compensation, &amp; Liability Information System (Federal; CERCLIS), as well as the No Further Response Action Planned list (CERCLIS NFRAP)</li> <li>• Resource Conservation &amp; Recovery Act, Non-Corrective Action Sites which are Treatment, Storage &amp; Disposal Sites (Federal; RCRA non-CORRACTS TSD)</li> <li>• Leading Underground Storage Tank (LUST) and solid waste/ landfill facilities (State)</li> <li>• Brownfield Sites (Federal)</li> <li>• Deleted National Priorities List Sites (Federal; deleted NPL)</li> </ul>
1.0 mile	<ul style="list-style-type: none"> <li>• National Priorities List (Federal; NPL)</li> <li>• Resource Conservation &amp; Recovery Act, Corrective Action Sites (Federal; RCRA CORRACTS)</li> </ul>
Property & Adjoining Properties	<ul style="list-style-type: none"> <li>• Resource Conservation &amp; Recovery Act Generators (Federal; RCRA Generators)</li> </ul>
Property Only	<ul style="list-style-type: none"> <li>• Emergency Response Notification System (Federal; ERNS)</li> </ul>

The following properties are listed with SCDHEC due to the presence of documented leaking underground storage tanks within the 0.5-mile radius:

<u>Facility Name</u>	<u>Address</u>	<u>UST Site ID #</u>
• Bethel Lumber Company	HWY 49 & HWY 557, Lake Wylie, SC	9363
• J.L. Chambers Grocery	49 & 557, Lake Wylie, SC	14380
• Lake Wylie Mini Storage*	5580 HWY 557, Lake Wylie, SC	14507

\*Formerly Alexander Auto & Tire Service

These three (3) facilities have all been listed as “No Further Action” sites by SCDHEC, meaning that the contaminants of concern were found to be in concentrations below regulatory requirements, indicating that the sites are not considered to be threats to human health. None of these properties appear to present a negative environmental impact on the proposed right-of-way.

---

---

## D. USER-PROVIDED INFORMATION

### 1. Title Records

#### 1.1 Title Search to Delineate Current and Past Ownership

Current and past reasonably ascertainable ownerships were reviewed in and obtained from the York County Office of the Register of Deeds and Tax Assessor's Offices located in York, S.C., and furnished by "A" Search & Re-Search Co., LLC, West Columbia, S.C.

Ownerships for the tract are noted as follows:

##### 1.1.1 Current Ownership

###### South Side

**TMS Number:** 5620000039

**GRANTOR:** B. D. Farmer, III – 10% undivided interest; Branstrom Development LLC – 10% undivided interest; Mark W. Ervin – 80% undivided interest

**GRANTEE:** Bethel Commons Associates LLC

**BOOK:** 1739      **PAGE:** 298

**DATED:** 01/09/97      **RECORDED:** 01/13/97

##### 1.1.2 Previous Ownership

**TMS Number:** 5620000039

**GRANTOR:** Nichols Family Partnership No. 1

**GRANTEE:** B. D. Farmer, III – 10% undivided interest; Branstrom Development LLC – 10% undivided interest; Mark W. Ervin – 80% undivided interest

**BOOK:** 1720      **PAGE:** 271

**DATED:** 12/18/96      **RECORDED:** 12/20/96

**GRANTOR:** William A. Nichols and Eleanor R. Nichols

**GRANTEE:** Nichols Family Partnership No. 1

**BOOK:** 336      **PAGE:** 80

**DATED:** 11/05/91      **RECORDED:** 11/11/91



---

---

### 1.1.1 Current Ownership

#### South Side

**TMS Number:** 561000025

**GRANTOR:** Christopher L. Orr, William G. Rudd, III, and Andrew C. Miller

**GRANTEE:** Michael N. Beam and Linda Beam

**BOOK:** 280           **PAGE:** 264

**DATED:** 07/29/91   **RECORDED:** 08/02/91

### 1.1.2 Previous Ownership

**TMS Number:** 561000025

**GRANTOR:** William Steven Russell

**GRANTEE:** Christopher L. Orr, William G. Rudd, III, and Andrew C. Miller

**BOOK:** 236           **PAGE:** 295

**DATED:** 03/11/91   **RECORDED:** 05/13/91

**GRANTOR:** Simonini Builders, Inc.

**GRANTEE:** William Steven Russell

**BOOK:** 962           **PAGE:** 251

**DATED:** 06/29/87   **RECORDED:** 06/30/87

**GRANTOR:** Margaret H. Love

**GRANTEE:** Simonini Builders, Inc.

**BOOK:** 802           **PAGE:** 42

**DATED:** 01/31/85   **RECORDED:** 02/04/85

**GRANTOR:** Kenneth E. Harper

**GRANTEE:** Margaret H. Love

**BOOK:** 660           **PAGE:** 81

**DATED:** 01/18/82   **RECORDED:** 04/13/82

**GRANTOR:** Estate of Paul Harper

**GRANTEE:** Kenneth E. Harper, Lois H. Alexander, Margaret H. Love, Reginal A. Harper & Edith H. Grier

**BOOK:** 700/20564   **PAGE:**

**DATED:** 12/31/82   **RECORDED:** 12/31/82

---

---

**TMS Number:** 561000025  
**GRANTOR:** Bess Sanders Harper  
**GRANTEE:** Paul C. Harper  
**BOOK:** 517/15824 **PAGE:**  
**DATED:** 12/31/68 **RECORDED:** 12/31/68

---

### 1.1.1 Current Ownership

#### South Side

**TMS Number:** 561000004  
**GRANTOR:** Simonini Builders, Inc.  
**GRANTEE:** William A. Powell, Jr.  
**BOOK:** 938 **PAGE:** 312  
**DATED:** 02/27/87 **RECORDED:** 03/05/87

### 1.1.2 Previous Ownership

**TMS Number:** 561000004  
**GRANTOR:** Edith H. Grier  
**GRANTEE:** Simonini Builders, Inc.  
**BOOK:** 806 **PAGE:** 158  
**DATED:** 03/01/85 **RECORDED:** 03/04/85

**GRANTOR:** Kenneth E. Harper, Lois H. Alexander, Margaret H. Love, Reginald A. Harper & Edith H. Grier  
**GRANTEE:** Edith H. Grier  
**BOOK:** 660 **PAGE:** 87  
**DATED:** 01/18/82 **RECORDED:** 04/13/82

**GRANTOR:** Estate of Paul C. Harper  
**GRANTEE:** Kenneth E. Harper, Lois H. Alexander, Margaret H. Love, Reginald A. Harper & Edith H. Grier  
**BOOK:** 700/20564 **PAGE:**  
**DATED:** 12/31/82 **RECORDED:** 01/03/83

**GRANTOR:** Bess Sanders Harper  
**GRANTEE:** Paul C. Harper  
**BOOK:** 517/15824 **PAGE:**  
**DATED:** 12/31/68 **RECORDED:** 01/01/69

---

---

### 1.1.1 Current Ownership

#### South Side

**TMS Number:** 561000029  
**GRANTOR:** William A. Powell, Jr.  
**GRANTEE:** Solomon Enterprises, Inc.  
**BOOK:** 1001      **PAGE:** 172  
**DATED:** 01/16/88      **RECORDED:** 01/18/88

### 1.1.2 Previous Ownership

**TMS Number:** 561000029  
**GRANTOR:** Simonini Builders, Inc.  
**GRANTEE:** William A. Powell, Jr.  
**BOOK:** 138      **PAGE:** 312  
**DATED:** 02/27/87      **RECORDED:** 05/05/87

**GRANTOR:** Edith H. Grier  
**GRANTEE:** Simonini Builders, Inc.  
**BOOK:** 806      **PAGE:** 158  
**DATED:** 03/04/85      **RECORDED:** 03/04/85

**GRANTOR:** Kenneth E. Harper, Lois H. Alexander, Margaret H. Love, Reginald A. Harper & Edith H. Grier  
**GRANTEE:** Edith H. Grier  
**BOOK:** 660      **PAGE:** 87  
**DATED:** 01/18/82      **RECORDED:** 04/13/82

**GRANTOR:** Estate of Paul Harper  
**GRANTEE:** Kenneth E. Harper, Lois H. Alexander, Margaret H. Love, Reginald A. Harper & Edith H. Grier  
**BOOK:** 700/20564      **PAGE:**  
**DATED:** 01/01/82      **RECORDED:** 01/01/82

**GRANTOR:** Bess Sanders Harper  
**GRANTEE:** Paul C. Harper  
**BOOK:** 517/15824      **PAGE:**  
**DATED:** 12/31/68      **RECORDED:** 12/31/68

---

---

### 1.1.1 Current Ownership

#### South Side

**TMS Number:** 561000031

**GRANTOR:** SC Department of Transportation

**GRANTEE:** Lewis J. Alexander & Lois H. Alexander

**BOOK:** 224                   **PAGE:** 241

**DATED:** 12/11/90           **RECORDED:** 01/30/91

### 1.1.2 Previous Ownership

**TMS Number:** 561000031

**GRANTOR:** Lois H. Alexander

**GRANTEE:** Lewis J. Alexander & Lois H. Alexander

**BOOK:** 663                   **PAGE:** 110

**DATED:** 05/14/82           **RECORDED:** 05/17/82

**GRANTOR:** Kenneth E. Harper, Lois H. Alexander, Margaret H. Love, Reginald A. Harper & Edith H. Grier

**GRANTEE:** Lois H. Alexander

**BOOK:** 660                   **PAGE:** 79

**DATED:** 01/18/82           **RECORDED:** 04/13/82

**GRANTOR:** Kenneth E. Harper, Lois H. Alexander, Margaret H. Love, Reginald A. Harper & Edith H. Grier

**GRANTEE:** Margaret H. Love

**BOOK:** 660                   **PAGE:** 81

**DATED:** 01/18/82           **RECORDED:** 04/13/82

**GRANTOR:** Estate of Paul Harper

**GRANTEE:** Kenneth E. Harper, Lois H. Alexander, Margaret H. Love, Reginald A. Harper & Edith H. Grier

**BOOK:** 700/20564           **PAGE:**

**DATED:** 01/01/82           **RECORDED:** 01/01/82

**GRANTOR:** Bess Sanders Harper

**GRANTEE:** Paul C. Harper

**BOOK:** 517/15824           **PAGE:**

**DATED:** 12/31/68           **RECORDED:** 12/31/68

---

---

### 1.1.1 Current Ownership

#### South Side

**TMS Number:** 5610101004

**GRANTOR:** Lois H. Alexander, aka Mary H. Alexander

**GRANTEE:** Olson Development LLC

**BOOK:** 7185      **PAGE:** 26

**DATED:** 06/20/05      **RECORDED:** 06/23/05

### 1.1.2 Previous Ownership

**TMS Number:** 5610101004

**GRANTOR:** Estate of Lewis J. Alexander

**GRANTEE:** Lois H. Alexander

**BOOK:** 05 ES 46 0557      **PAGE:**

**DATED:** 10/20/04      **RECORDED:** 01/03/05

**GRANTOR:** Lois H. Alexander

**GRANTEE:** Lewis J. Alexander & Lois H. Alexander

**BOOK:** 663      **PAGE:** 110

**DATED:** 05/14/82      **RECORDED:** 05/17/82

**GRANTOR:** Kenneth E. Harper, Lois H. Alexander, Margaret H. Love, Reginald A. Harper & Edith H. Grier

**GRANTEE:** Lois H. Alexander

**BOOK:** 660      **PAGE:** 78

**DATED:** 01/18/82      **RECORDED:** 04/13/82

**GRANTOR:** Estate of Paul Harper

**GRANTEE:** Kenneth E. Harper, Lois H. Alexander, Margaret H. Love, Reginald A. Harper & Edith H. Grier

**BOOK:** 700/20564      **PAGE:**

**DATED:** 01/01/82      **RECORDED:** 01/01/82

**GRANTOR:** Bess Sanders Harper

**GRANTEE:** Paul C. Harper

**BOOK:** 517/15824      **PAGE:**

**DATED:** 12/31/68      **RECORDED:** 12/31/68

---

---

### 1.1.1 Current Ownership

#### South Side

**TMS Number:** 561000001

**GRANTOR:** B&C Enterprises, Herman Brown, J. Richard Caldwell, & Barbara H. Caldwell

**GRANTEE:** Trustees of Pine Grove Baptist Church

**BOOK:** 4816           **PAGE:** 315

**DATED:** 11/22/02   **RECORDED:** 11/26/02

### 1.1.2 Previous Ownership

**TMS Number:** 561000001

**GRANTOR:** Carothers Williams Funeral Service & Memorial Gardens, Inc.

**GRANTEE:** B&C Enterprises, Herman Brown, J. Richard Caldwell, & Barbara H. Caldwell

**BOOK:** 11           **PAGE:** 61

**DATED:** 01/25/90   **RECORDED:** 01/26/90

**GRANTOR:** Hugh P. Love and Margaret H. Love

**GRANTEE:** Carothers Williams Funeral Home, Inc.

**BOOK:** 861           **PAGE:** 101

**DATED:** 01/03/86   **RECORDED:** 01/06/86

**GRANTOR:** Paul C. Harper

**GRANTEE:** Hugh P. Love and Margaret H. Love

**BOOK:** 258           **PAGE:** 336

**DATED:** 12/29/58   **RECORDED:** 01/13/59

---

### 1.1.1 Current Ownership

#### South Side

**TMS Number:** 561000005

**GRANTOR:** Glen V. Beattie, Fred S. Taylor & Harold Perkins, Trustees of Pine Grove Baptist Church

**GRANTEE:** Pine Grove Baptist Church of York County

**BOOK:** 547           **PAGE:** 1084

**DATED:** 05/06/77   **RECORDED:** 05/16/77

---

---

### 1.1.2 Previous Ownership

**TMS Number:** 561000005

**GRANTOR:** Charles Moten, Trustees of Sandy Plains Baptist Church

**GRANTEE:** Glen V. Beattie, Trustees of Pine Grove Baptist Church

**BOOK:** 325           **PAGE:** 544

**DATED:** 06/30/64   **RECORDED:** 07/01/64

**GRANTOR:** Marshall Baine Alexander, Grace D. Alexander and Mrs. Hester J. Davis

**GRANTEE:** Pine Grove Baptist Church

**BOOK:** 428           **PAGE:** 432

**DATED:** 11/12/71   **RECORDED:** 11/22/71

**GRANTOR:** Rufus J. Davis

**GRANTEE:** Marshall Baine Alexander, Grace D. Alexander and Mrs. Hester J. Davis

**BOOK:** 197           **PAGE:** 229

**DATED:** 09/17/53   **RECORDED:** 09/30/53

---

### 1.1.1 Current Ownership

#### South Side

**TMS Number:** 563000009

**GRANTOR:** Pine Grove Baptist Church

**GRANTEE:** Kenneth A. Alexander

**BOOK:** 6928           **PAGE:** 274

**DATED:** 02/23/05   **RECORDED:** 03/08/05

### 1.1.2 Previous Ownership

**TMS Number:** 563000009

**GRANTOR:** Jessica L. Alexander, ½ Interest

**GRANTEE:** Kenneth D. Alexander

**BOOK:** 3353           **PAGE:** 228

**DATED:** 11/13/00   **RECORDED:** 11/27/00

---

**TMS Number:** 563000009  
**GRANTOR:** Grace D. Alexander  
**GRANTEE:** Kenneth D. Alexander & Jessica L. Alexander  
**BOOK:** 99           **PAGE:** 253  
**DATED:** 06/25/90   **RECORDED:** 07/26/90

**GRANTOR:** Hester J. Davis  
**GRANTEE:** Grace D. Alexander  
**BOOK:** 682           **PAGE:** 65  
**DATED:** 11/19/82   **RECORDED:** 11/24/82

**GRANTOR:** Estate of H. K. Davis  
**GRANTEE:** Hester J. Davis  
**BOOK:** 301/9667   **PAGE:**  
**DATED:** 07/22/38   **RECORDED:** 08/24/38

---

#### 1.1.1 Current Ownership

##### South Side

**TMS Number:** 561000037  
**GRANTOR:** Trustees Pine Grove Baptist Church  
**GRANTEE:** Kenneth D. Alexander  
**BOOK:** 6928           **PAGE:** 278  
**DATED:** 02/23/05   **RECORDED:** 03/08/05

#### 1.1.2 Previous Ownership

**TMS Number:** 561000037  
**GRANTOR:** Margaret H. Love  
**GRANTEE:** Trustees Pine Grove Baptist Church  
**BOOK:** 864           **PAGE:** 261  
**DATED:** 01/03/86   **RECORDED:** 01/24/86



---

---

**TMS Number:** 561000037

**GRANTOR:** Kenneth E. Harper, Lois H. Alexander, Margaret H. Love, Reginald A. Harper & Edith H. Grier

**GRANTEE:** Margaret H. Love

**BOOK:** 660           **PAGE:** 81

**DATED:** 01/18/82   **RECORDED:** 04/13/82

**GRANTOR:** Estate of Paul Harper

**GRANTEE:** Kenneth E. Harper, Lois H. Alexander, Margaret H. Love, Reginald A. Harper & Edith H. Grier

**BOOK:** 700/20564   **PAGE:**

**DATED:** 01/01/82   **RECORDED:** 01/01/82

**GRANTOR:** Bess Sanders Harper

**GRANTEE:** Paul C. Harper

**BOOK:** 517/15824   **PAGE:**

**DATED:** 12/31/68   **RECORDED:** 12/31/68

---

### 1.1.1 Current Ownership

#### South Side

**TMS Number:** 561000030

**GRANTOR:** Trustees Pine Grove Baptist Church

**GRANTEE:** Kenneth D. Alexander

**BOOK:** 6928           **PAGE:** 278

**DATED:** 02/23/05   **RECORDED:** 03/08/05

### 1.1.2 Previous Ownership

**TMS Number:** 561000030

**GRANTOR:** Margaret H. Love

**GRANTEE:** Trustees Pine Grove Baptist Church

**BOOK:** 864           **PAGE:** 261

**DATED:** 01/03/86   **RECORDED:** 01/24/86

---

---

**TMS Number:** 561000030

**GRANTOR:** Kenneth E. Harper, Lois H. Alexander, Margaret H. Love, Reginald A. Harper & Edith H. Grier

**GRANTEE:** Margaret H. Love

**BOOK:** 660           **PAGE:** 81

**DATED:** 01/18/82   **RECORDED:** 04/13/82

**GRANTOR:** Estate of Paul Harper

**GRANTEE:** Kenneth E. Harper, Lois H. Alexander, Margaret H. Love, Reginald A. Harper & Edith H. Grier

**BOOK:** 700/20564   **PAGE:**

**DATED:** 01/01/82   **RECORDED:** 01/01/82

**GRANTOR:** Bess Sanders Harper

**GRANTEE:** Paul C. Harper

**BOOK:** 517/15824   **PAGE:**

**DATED:** 12/31/68   **RECORDED:** 12/31/68

---

### 1.1.1 Current Ownership

#### South Side

**TMS Number:** 563000023

**GRANTOR:** Grace D. Alexander

**GRANTEE:** Kenneth D. Alexander

**BOOK:** 9923           **PAGE:** 72

**DATED:** 03/20/08   **RECORDED:** 03/28/08

### 1.1.2 Previous Ownership

**TMS Number:** 563000023

**GRANTOR:** Hester J. Davis

**GRANTEE:** Grace D. Alexander

**BOOK:** 682           **PAGE:** 65

**DATED:** 11/18/82   **RECORDED:** 11/29/82

**TMS Number:** 563000023

**GRANTOR:** Estate of H. K. Davis

**GRANTEE:** Hester J. Davis

**BOOK:** 301/9667   **PAGE:**

**DATED:** 07/22/38   **RECORDED:** 08/24/38

---

---

### 1.1.1 Current Ownership

#### South Side

**TMS Number:** 480000002

**GRANTOR:** Estate of Stephen H. Van Every, Jr.

**GRANTEE:** Helen M. Van Every, Trustee of Helen M. Van Every Revocable Living Trust

**BOOK:** 1202      **PAGE:** 297

**DATED:** 02/28/95      **RECORDED:** 03/07/95

### 1.1.2 Previous Ownership

**TMS Number:** 480000002

**GRANTOR:** Helen M. Van Every, Trustee of Helen M. Van Every Revocable Living Trust

**GRANTEE:** Stephen H. Van Every, Jr.

**BOOK:** 326      **PAGE:** 32

**DATED:** 10/18/91      **RECORDED:** 10/22/91

**GRANTOR:** Helen M. Van Every

**GRANTEE:** Helen M. Van Every, Trustee of Helen M. Van Every Revocable Living Trust

**BOOK:** 235      **PAGE:** 295

**DATED:** 05/03/91      **RECORDED:** 05/10/91

**GRANTOR:** NCNB National Bank of North Carolina, Trustee of Stephen H. Van Every, Sr. Revocable Living Trust

**GRANTEE:** Helen M. Van Every

**BOOK:** 33      **PAGE:** 248

**DATED:** 03/13/90      **RECORDED:** 03/15/90

**GRANTOR:** Stephen H. Van Every, Sr.

**GRANTEE:** Stephen H. Van Every, Sr. Revocable Living Trust

**BOOK:** 1132      **PAGE:** 43

**DATED:** 11/02/89      **RECORDED:** 11/07/89

**GRANTOR:** Bethel Realty Co., Inc.

**GRANTEE:** Stephen H. Van Every, Sr.

**BOOK:** 512      **PAGE:** 321

**DATED:** 05/16/75      **RECORDED:** 05/19/75

---

---

**TMS Number:** 480000002

**GRANTOR:** Herbert Kirsh, Leroy Pendleton, V. Marshall Stine, Fred C. Robinson and Chester A. Wingate

**GRANTEE:** Bethel Realty Co., Inc.

**BOOK:** 461           **PAGE:** 201

**DATED:** 08/23/73   **RECORDED:** 08/23/73

**GRANTOR:** Virginia H. Davis & Floyd M. Davis, Jr.

**GRANTEE:** Herbert Kirsh, Leroy Pendleton, V. Marshall Stine, Fred C. Robinson and Chester A. Wingate

**BOOK:** 435           **PAGE:** 335

**DATED:** 03/22/72   **RECORDED:** 03/23/73

**GRANTOR:** Sarah E. Davis

**GRANTEE:** Virginia H. Davis & Floyd M. Davis, Jr.

**BOOK:** 71           **PAGE:** 60

**DATED:** 02/15/28   **RECORDED:** 02/15/28

---

### 1.1.1 Current Ownership

#### South Side

**TMS Number:** 480000004

**GRANTOR:** Estate of Stephen H. Van Every, Jr.

**GRANTEE:** Helen M. Van Every, Trustee of Helen M. Van Every Revocable Living Trust

**BOOK:** 1202           **PAGE:** 297

**DATED:** 02/28/95   **RECORDED:** 03/07/95

### 1.1.2 Previous Ownership

**TMS Number:** 480000004

**GRANTOR:** Helen M. Van Every, Trustee of Helen M. Van Every Revocable Living Trust

**GRANTEE:** Stephen H. Van Every, Jr.

**BOOK:** 326           **PAGE:** 32

**DATED:** 10/18/91   **RECORDED:** 10/22/91

**GRANTOR:** Helen M. Van Every

**GRANTEE:** Helen M. Van Every, Trustee of Helen M. Van Every Revocable Living Trust

**BOOK:** 235           **PAGE:** 295

**DATED:** 05/03/91   **RECORDED:** 05/10/91

---

---

**TMS Number:**

**480000004**

**GRANTOR:** NCNB National Bank of North Carolina Trustee of Stephen H. Van Every, Sr.  
Revocable Living Trust

**GRANTEE:** Helen M. Van Every

**BOOK:** 33                      **PAGE:** 248

**DATED:** 03/13/90              **RECORDED:** 03/15/90

**GRANTOR:** Stephen H. Van Every, Sr.

**GRANTEE:** Stephen H. Van Every, Sr. Revocable Living Trust

**BOOK:** 1132                      **PAGE:** 43

**DATED:** 11/02/89              **RECORDED:** 11/07/89

**GRANTOR:** Bethel Realty Co., Inc.

**GRANTEE:** Stephen H. Van Every, Sr.

**BOOK:** 512                      **PAGE:** 321

**DATED:** 05/16/75              **RECORDED:** 05/19/75

**GRANTOR:** Herbert Kirsh, Leroy Pendleton, V. Marshall Stine, Fred C. Robinson and Chester  
A. Wingate

**GRANTEE:** Bethel Realty Co., Inc.

**BOOK:** 461                      **PAGE:** 201

**DATED:** 08/23/73              **RECORDED:** 08/23/73

**GRANTOR:** Virginia H. Davis & Floyd M. Davis, Jr.

**GRANTEE:** : Herbert Kirsh, Leroy Pendleton, V. Marshall Stine, Fred C. Robinson and  
Chester A. Wingate

**BOOK:** 435                      **PAGE:** 335

**DATED:** 03/22/72              **RECORDED:** 03/23/72

**GRANTOR:** Sarah E. Davis

**GRANTEE:** Virginia H. Davis & Floyd M. Davis, Jr.

**BOOK:** 71                      **PAGE:** 60

**DATED:** 02/15/28              **RECORDED:** 02/15/28

---

---

### 1.1.1 Current Ownership

#### South Side

**TMS Number:** 480000001  
**GRANTOR:** Charles M. Jackson, Jr.  
**GRANTEE:** John Edward Jackson  
**BOOK:** 3437      **PAGE:** 319  
**DATED:** 02/08/01      **RECORDED:** 02/08/01

### 1.1.2 Previous Ownership

**TMS Number:** 480000001  
**GRANTOR:** Elizabeth D. Jackson  
**GRANTEE:** John Edwards Jackson & Charles M. Jackson, Jr.  
**BOOK:** 3090      **PAGE:** 336  
**DATED:** 04/10/00      **RECORDED:** 04/17/00

**GRANTOR:** Estate of Charles Hope Jackson  
**GRANTEE:** Elizabeth D. Jackson  
**BOOK:** 3090      **PAGE:** 332  
**DATED:** 04/10/00      **RECORDED:** 04/17/00

**GRANTOR:** Estate of Roy Jackson  
**GRANTEE:** Charles Hope Jackson  
**BOOK:** 466/14247      **PAGE:**  
**DATED:** 03/21/64      **RECORDED:** 01/08/65

---

### 1.1.1 Current Ownership

#### South Side

**TMS Number:** 480000007  
**GRANTOR:** Charles M. Jackson, Jr.  
**GRANTEE:** John Edward Jackson  
**BOOK:** 3437      **PAGE:** 316  
**DATED:** 02/08/01      **RECORDED:** 02/08/01

---

---

### 1.1.2 Previous Ownership

**TMS Number:** 480000007

**GRANTOR:** Elizabeth D. Jackson

**GRANTEE:** John Edward Jackson & Charles M. Jackson, Jr.

**BOOK:** 3090      **PAGE:** 336

**DATED:** 04/10/00      **RECORDED:** 04/17/00

**GRANTOR:** Estate of Charles Hope Jackson

**GRANTEE:** Elizabeth D. Jackson

**BOOK:** 3090      **PAGE:** 332

**DATED:** 04/10/00      **RECORDED:** 04/17/00

**GRANTOR:** Estate of Roy Jackson

**GRANTEE:** Charles Hope Jackson

**BOOK:** 466/14247      **PAGE:** 229

**DATED:** 03/21/64      **RECORDED:** 01/08/65

---

### 1.1.1 Current Ownership

#### South Side

**TMS Number:** 480000005

**GRANTOR:** Bobby T. Gann and Richard B. Amick

**GRANTEE:** York Amusement Company, Inc.

**BOOK:** 1499      **PAGE:** 146

**DATED:** 03/01/96      **RECORDED:** 04/12/96

### 1.1.2 Previous Ownership

**TMS Number:** 480000005

**GRANTOR:** H. Eugene Hand, Trustee A. B. Hand Trust

**GRANTEE:** Bobby T. Gann and Richard B. Amick dba York Amusement Company, Inc.

**BOOK:** 149      **PAGE:** 112

**DATED:** 10/30/90      **RECORDED:** 10/31/90

---

---

**TMS Number:** 480000005  
**GRANTOR:** Estate of A. B. Hand  
**GRANTEE:** H. Eugene Hand, Trustee A. B. Hand Trust  
**BOOK:** 70/00239      **PAGE:**  
**DATED:** 06/15/90      **RECORDED:** 06/15/90

**GRANTOR:** Estate of Lucielle Garin Hand  
**GRANTEE:** A. B. Hand  
**BOOK:** 689/20244      **PAGE:** 229  
**DATED:** 12/31/80      **RECORDED:** 12/31/80

**GRANTOR:** J. I. Hovis  
**GRANTEE:** A. B. Hand and Lucielle Garin Hand  
**BOOK:** 180      **PAGE:** 321  
**DATED:** 02/09/52      **RECORDED:** 02/09/52

**GRANTOR:** A. B. Hand  
**GRANTEE:** Bobby T. Gann and Richard B. Amick, dba York Amusement Company, Inc.  
**BOOK:** 695      **PAGE:** 238  
**DATED:** 03/02/83      **RECORDED:** 03/29/83

**GRANTOR:** Estate of Lucielle Garin Hand  
**GRANTEE:** A. B. Hand  
**BOOK:** 689/20244      **PAGE:**  
**DATED:** 12/31/80      **RECORDED:** 12/31/80

**GRANTOR:** J. I. Hovis  
**GRANTEE:** A. B. Hand and Lucielle Garin Hand  
**BOOK:** 180      **PAGE:** 321  
**DATED:** 02/09/52      **RECORDED:** 02/09/52



---

---

### 1.1.1 Current Ownership

#### South Side

**TMS Number:** 479000002  
**GRANTOR:** Pharr Yarns, LLC  
**GRANTEE:** Belmont Land and Investment Company, LLC  
**BOOK:** 7866      **PAGE:** 93  
**DATED:** 08/29/05      **RECORDED:** 03/15/06

### 1.1.2 Previous Ownership

**TMS Number:** 479000002  
**GRANTOR:** The County of York, State of South Carolina  
**GRANTEE:** Pharr Yarns, LLC  
**BOOK:** 538      **PAGE:** 135  
**DATED:** 09/27/76      **RECORDED:** 10/15/76  
  
**GRANTOR:** Hudson Hosiery Company  
**GRANTEE:** York County  
**BOOK:** 385      **PAGE:** 22  
**DATED:** 12/01/68      **RECORDED:** 12/27/68

---

### 1.1.1 Current Ownership

#### South Side

**TMS Number:** 4790000015  
**GRANTOR:** York County  
**GRANTEE:** Pharr Yarns, Inc.  
**BOOK:** 85      **PAGE:** 300  
**DATED:** 09/05/89      **RECORDED:** 06/28/90

### 1.1.2 Previous Ownership

**TMS Number:** 4790000015  
**GRANTOR:** Chadbourn Gotham, Inc.  
**GRANTEE:** York County  
**BOOK:** 385      **PAGE:** 22  
**DATED:** 12/01/68      **RECORDED:** 01/24/69

---

---

### 1.1.1 Current Ownership

#### South Side

**TMS Number:** 4790000020

**GRANTOR:** Estate of Joe L. Brackett

**GRANTEE:** Marcell M. Brackett

**BOOK:** 5293      **PAGE:** 33

**DATED:** 05/11/03      **RECORDED:** 05/19/03

### 1.1.2 Previous Ownership

**TMS Number:** 4790000020

**GRANTOR:** Pharr Yarns, Inc.

**GRANTEE:** Joe L. Brackett & Marcelle M. Brackett

**BOOK:** 539      **PAGE:** 413

**DATED:** 11/08/76      **RECORDED:** 11/15/76

**GRANTOR:** County of York

**GRANTEE:** Pharr Yarns, Inc.

**BOOK:** 538      **PAGE:** 135

**DATED:** 09/27/76      **RECORDED:** 10/15/76

**GRANTOR:** Hudson Hosiery Company

**GRANTEE:** York County

**BOOK:** 385      **PAGE:** 22

**DATED:** 12/01/68      **RECORDED:** 12/27/68

---

### 1.1.1 Current Ownership

#### South Side

**TMS Number:** 4790000005

**GRANTOR:** L. A. Brandon

**GRANTEE:** Marion B. Peoples

**BOOK:** 393      **PAGE:** 89

**DATED:** 12/20/65      **RECORDED:** 08/08/66

### 1.1.2 Previous Ownership

None identified for this tract.

---

---

### 1.1.1 Current Ownership

#### North Side

**TMS Number:** 5620000257  
**GRANTOR:** Crescent Resources LLC  
**GRANTEE:** Wachovia Bank National Association  
**BOOK:** 10482      **PAGE:** 30  
**DATED:** 12/12/08      **RECORDED:** 12/31/08

### 1.1.2 Previous Ownership

**TMS Number:** 5620000257  
**GRANTOR:** M. W. Davis Properties LLC  
**GRANTEE:** Crescent Resources LLC  
**BOOK:** 7361      **PAGE:** 264  
**DATED:** 08/23/05      **RECORDED:** 08/26/05

**GRANTOR:** Mildred W. Davis  
**GRANTEE:** M. W. Davis Properties LLC  
**BOOK:** 4586      **PAGE:** 192  
**DATED:** 08/27/02      **RECORDED:** 08/28/02

**GRANTOR:** Mildred W. Davis  
**GRANTEE:** M. W. Davis Properties LLC  
**BOOK:** 3215      **PAGE:** 229  
**DATED:** 07/07/00      **RECORDED:** 08/01/00

**GRANTOR:** South Carolina Department of Transportation  
**GRANTEE:** Mildred W. Davis  
**BOOK:** 2030      **PAGE:** 97  
**DATED:** 10/13/97      **RECORDED:** 11/04/97

**GRANTOR:** Dwight L. Davis  
**GRANTEE:** Mildred W. Davis  
**BOOK:** 1038      **PAGE:** 11  
**DATED:** 07/14/88      **RECORDED:** 07/21/88

---

**TMS Number:** 562000257  
**GRANTOR:** H & S Lumber Co.  
**GRANTEE:** Dwight L. Davis & Mildred W. Davis  
**BOOK:** 640      **PAGE:** 52  
**DATED:** 08/31/81      **RECORDED:** 09/03/81

**GRANTOR:** L. H. Hicks  
**GRANTEE:** H & S Lumber Co.  
**BOOK:** 464      **PAGE:** 66  
**DATED:** 05/07/73      **RECORDED:** 05/29/79

**GRANTOR:** James C. Evans  
**GRANTEE:** L. H. Hicks  
**BOOK:** 277      **PAGE:** 155  
**DATED:** 08/02/60      **RECORDED:** 08/04/60

**GRANTOR:** Duke Power Company  
**GRANTEE:** South Carolina Department of Transportation  
**BOOK:** 274      **PAGE:** 911  
**DATED:** 01/06/38      **RECORDED:** 01/06/38

---

### 1.1.1 Current Ownership

#### North Side

**TMS Number:** 562000055  
**GRANTOR:** J. H. Hopkins & Jerry Meeham  
**GRANTEE:** Southern Bell Telephone and Telegraph Company  
**BOOK:** 456      **PAGE:** 64  
**DATED:** 02/02/73      **RECORDED:** 02/02/73

### 1.1.2 Previous Ownership

None identified for this tract.

---

---

### 1.1.1 Current Ownership

#### North Side

**TMS Number:** 5640000076  
**GRANTOR:** Crescent Resources, LLC  
**GRANTEE:** Ernst-Luce California, LLC  
**BOOK:** 10666      **PAGE:** 181  
**DATED:** 03/27/09      **RECORDED:** 04/01/09

### 1.1.2 Previous Ownership

**TMS Number:** 5640000076  
**GRANTOR:** Duke Power Company  
**GRANTEE:** Crescent Resources, Inc.  
**BOOK:** 397      **PAGE:** 361  
**DATED:** 05/01/69      **RECORDED:** 05/01/69

---

### 1.1.1 Current Ownership

#### North Side

**TMS Number:** 5640000075  
**GRANTOR:** Crescent Resources, LLC  
**GRANTEE:** Lowes Home Centers, LLC  
**BOOK:** 9736      **PAGE:** 74  
**DATED:** 01/02/08      **RECORDED:** 01/10/08

### 1.1.2 Previous Ownership

**TMS Number:** 5640000075  
**GRANTOR:** Duke Power Company  
**GRANTEE:** Crescent Resources, Inc.  
**BOOK:** 397      **PAGE:** 361  
**DATED:** 05/01/69      **RECORDED:** 05/01/69

---

---

### 1.1.1 Current Ownership

#### North Side

**TMS Number:** 5640000074  
**GRANTOR:** Crescent Resources, LLC  
**GRANTEE:** Bank of America, N. A.  
**BOOK:** 10485      **PAGE:** 115  
**DATED:** 12/12/08      **RECORDED:** 01/02/09

### 1.1.2 Previous Ownership

**TMS Number:** 5640000074  
**GRANTOR:** Duke Power Company  
**GRANTEE:** South Carolina Department of Transportation  
**BOOK:** 397      **PAGE:** 361  
**DATED:** 05/01/69      **RECORDED:** 05/01/69

---

### 1.1.1 Current Ownership

#### North Side

**TMS Number:** 5640000073  
**GRANTOR:** South Carolina Department of Transportation  
**GRANTEE:** Crescent Resources, LLC  
**BOOK:** 8777      **PAGE:** 238  
**DATED:** 01/12/07      **RECORDED:** 01/26/07

### 1.1.2 Previous Ownership

**TMS Number:** 5640000073  
**GRANTOR:** Duke Power Company  
**GRANTEE:** South Carolina Department of Transportation  
**BOOK:** 397      **PAGE:** 361  
**DATED:** 05/01/69      **RECORDED:** 05/01/69

---

---

### 1.1.1 Current Ownership

#### North Side

**TMS Number:** 5640000071  
**GRANTOR:** South Carolina Department of Transportation  
**GRANTEE:** Crescent Resources, LLC  
**BOOK:** 8777      **PAGE:** 238  
**DATED:** 01/12/07      **RECORDED:** 01/26/07

### 1.1.2 Previous Ownership

**TMS Number:** 5640000071  
**GRANTOR:** Duke Power Company  
**GRANTEE:** South Carolina Department of Transportation  
**BOOK:** 397      **PAGE:** 361  
**DATED:** 05/01/69      **RECORDED:** 05/01/69

---

### 1.1.1 Current Ownership

#### North Side

**TMS Number:** 5640000072  
**GRANTOR:** South Carolina Department of Transportation  
**GRANTEE:** Crescent Resources, LLC  
**BOOK:** 8777      **PAGE:** 238  
**DATED:** 01/12/07      **RECORDED:** 01/26/07

### 1.1.2 Previous Ownership

**TMS Number:** 5640000072  
**GRANTOR:** Duke Power Company  
**GRANTEE:** South Carolina Department of Transportation  
**BOOK:** 397      **PAGE:** 361  
**DATED:** 05/01/69      **RECORDED:** 05/01/69

---

---

### 1.1.1 Current Ownership

#### North Side

**TMS Number:** 563000007  
**GRANTOR:** Hattie C. Wright  
**GRANTEE:** Wateree Power Company  
**BOOK:** 64                   **PAGE:** 133  
**DATED:** 08/13/25       **RECORDED:** 08/13/25

### 1.1.2 Previous Ownership

None identified for this tract.

---

### 1.1.1 Current Ownership

#### North Side

**TMS Number:** 563000003  
**GRANTOR:** Estate of Alice Ratchford Jackson  
**GRANTEE:** Harold Edward Jackson  
**BOOK:** 07 ES 46 393       **PAGE:**  
**DATED:** 05/22/07           **RECORDED:** 05/29/07

### 1.1.2 Previous Ownership

**TMS Number:** 563000003  
**GRANTOR:** Estate of Marion Q. Jackson  
**GRANTEE:** Alice Ratchford Jackson  
**BOOK:** 07 ES 46 392       **PAGE:** 544  
**DATED:** 05/19/07           **RECORDED:** 05/29/07

**GRANTOR:** Mrs. Hester J. Davis, Evelyn D. Boyd and Rufus J. Davis  
**GRANTEE:** Marion Q. Jackson  
**BOOK:** 139                   **PAGE:** 11  
**DATED:** 01/24/48           **RECORDED:** 01/24/48



---

---

### 1.1.1 Current Ownership

#### North Side

**TMS Number:** 563000022  
**GRANTOR:** Grace D. Alexander  
**GRANTEE:** Kenneth D. Alexander  
**BOOK:** 1603      **PAGE:** 341  
**DATED:** 07/30/96      **RECORDED:** 08/08/96

### 1.1.2 Previous Ownership

**TMS Number:** 563000022  
**GRANTOR:** Hester J. Davis  
**GRANTEE:** Grace D. Alexander  
**BOOK:** 682      **PAGE:** 65  
**DATED:** 11/18/82      **RECORDED:** 11/29/82

**GRANTOR:** Estate of H. K. Davis  
**GRANTEE:** Hester J. Davis  
**BOOK:** 301/9667      **PAGE:** 432  
**DATED:** 07/22/38      **RECORDED:** 08/24/38

---

### 1.1.1 Current Ownership

#### North Side

**TMS Number:** 563000024  
**GRANTOR:** Grace D. Alexander  
**GRANTEE:** Kelly A. Goldberg  
**BOOK:** 9923      **PAGE:** 75  
**DATED:** 03/20/08      **RECORDED:** 03/28/08

### 1.1.2 Previous Ownership

**TMS Number:** 563000024  
**GRANTOR:** Hester J. Davis  
**GRANTEE:** Grace D. Alexander  
**BOOK:** 682      **PAGE:** 65  
**DATED:** 11/18/82      **RECORDED:** 11/29/82

---

**TMS Number:** 563000024  
**GRANTOR:** Estate of H. K. Davis  
**GRANTEE:** Hester J. Davis  
**BOOK:** 301/9667      **PAGE:**  
**DATED:** 07/22/38      **RECORDED:** 08/24/38

---

**1.1.1 Current Ownership**

**North Side**

**TMS Number:** 563000004  
**GRANTOR:** Hester J. Davis  
**GRANTEE:** Grace D. Alexander  
**BOOK:** 682      **PAGE:** 65  
**DATED:** 11/01/82      **RECORDED:** 11/24/82

**1.1.2 Previous Ownership**

**TMS Number:** 563000004  
**GRANTOR:** Estate of H. K. Davis  
**GRANTEE:** Hester J. Davis  
**BOOK:** 301/9667      **PAGE:**  
**DATED:** 07/22/38      **RECORDED:** 08/24/38

---

**1.1.1 Current Ownership**

**North Side**

**TMS Number:** 563000021  
**GRANTOR:** Kenneth D. Alexander  
**GRANTEE:** Lake Wylie Enterprises, Inc.  
**BOOK:** 3106      **PAGE:** 103  
**DATED:** 04/28/00      **RECORDED:** 05/02/00

**1.1.2 Previous Ownership**

**TMS Number:** 563000021  
**GRANTOR:** Grace D. Alexander  
**GRANTEE:** Kenneth D. Alexander  
**BOOK:** 3106      **PAGE:** 103  
**DATED:** 04/27/00      **RECORDED:** 05/01/00

---

**TMS Number:** 563000021  
**GRANTOR:** Hester J. Davis  
**GRANTEE:** Grace D. Alexander  
**BOOK:** 682           **PAGE:** 65  
**DATED:** 11/18/82   **RECORDED:** 11/29/82

**GRANTOR:** Estate of H. K. Davis  
**GRANTEE:** Hester J. Davis  
**BOOK:** 301/9667   **PAGE:**  
**DATED:** 07/22/38   **RECORDED:** 08/24/38

---

### 1.1.1 Current Ownership

#### North Side

**TMS Number:** 563000005  
**GRANTOR:** M. B. Alexander  
**GRANTEE:** Lake Wylie Enterprises  
**BOOK:** 801           **PAGE:** 125  
**DATED:** 09/08/93   **RECORDED:** 09/10/93

### 1.1.2 Previous Ownership

**TMS Number:** 563000005  
**GRANTOR:** Grace D. Alexander  
**GRANTEE:** Marshall B. Alexander  
**BOOK:** 682           **PAGE:** 68  
**DATED:** 11/01/82   **RECORDED:** 11/24/82

**GRANTOR:** Hester J. Davis  
**GRANTEE:** Grace D. Alexander  
**BOOK:** 682           **PAGE:** 65  
**DATED:** 11/01/82   **RECORDED:** 11/24/82

**GRANTOR:** Estate of H. K. Davis  
**GRANTEE:** Hester J. Davis  
**BOOK:** 301/9667   **PAGE:**  
**DATED:** 07/22/38   **RECORDED:** 08/24/38

---

---

### 1.1.1 Current Ownership

#### North Side

**TMS Number:** 563000002  
**GRANTOR:** M. B. Alexander  
**GRANTEE:** Bethel Volunteer Fire Department  
**BOOK:** 891           **PAGE:** 119  
**DATED:** 09/08/93   **RECORDED:** 12/23/93

### 1.1.2 Previous Ownership

**TMS Number:** 563000002  
**GRANTOR:** Grace D. Alexander  
**GRANTEE:** Marshall B. Alexander  
**BOOK:** 682           **PAGE:** 68  
**DATED:** 11/18/82   **RECORDED:** 11/29/82

**GRANTOR:** Hester J. Davis  
**GRANTEE:** Grace D. Alexander  
**BOOK:** 682           **PAGE:** 65  
**DATED:** 11/18/82   **RECORDED:** 11/29/82

**GRANTOR:** Estate of H. K. Davis  
**GRANTEE:** Hester J. Davis  
**BOOK:** 301/9667   **PAGE:**  
**DATED:** 07/22/38   **RECORDED:** 08/24/38

---

### 1.1.1 Current Ownership

#### North Side

**TMS Number:** 478000072  
**GRANTOR:** Atwood H. Davis  
**GRANTEE:** County of York  
**BOOK:** 409           **PAGE:** 599  
**DATED:** 11/23/70   **RECORDED:** 11/30/70

---

---

### 1.1.2 Previous Ownership

**TMS Number:** 478000072  
**GRANTOR:** Estate of W. Guy Davis  
**GRANTEE:** Atwood H. Davis  
**BOOK:** 407/12730 **PAGE:**  
**DATED:** 12/31/58 **RECORDED:** 12/31/58

---

### 1.1.1 Current Ownership

#### North Side

**TMS Number:** 4780000152  
**GRANTOR:** Trustees of Clover School District Number Two of York County  
**GRANTEE:** Bethel Volunteer Fire Department  
**BOOK:** 8737 **PAGE:** 73  
**DATED:** 11/02/06 **RECORDED:** 01/10/07

### 1.1.2 Previous Ownership

**TMS Number:** 4780000152  
**GRANTOR:** Sara M. Lindsay  
**GRANTEE:** Trustees of Clover School District Number Two of York County  
**BOOK:** 7459 **PAGE:** 67  
**DATED:** 09/30/05 **RECORDED:** 10/03/05

**GRANTOR:** Estate of Emily D. Lindsay  
**GRANTEE:** Sara M. Lindsay  
**BOOK:** 1045 **PAGE:** 290  
**DATED:** 08/25/88 **RECORDED:** 08/31/88

**GRANTOR:** Helen D. Riddle  
**GRANTEE:** Emily D. Lindsay  
**BOOK:** 475 **PAGE:** 191  
**DATED:** 11/29/73 **RECORDED:** 12/03/73

---

---

**TMS Number:** 4780000152  
**GRANTOR:** Estate of Mrs. Atwood H. Davis  
**GRANTEE:** Helen D. Riddle & Emily D. Lindsay  
**BOOK:** 507/17158    **PAGE:**  
**DATED:** 12/31/58    **RECORDED:** 11/13/64

---

**1.1.1 Current Ownership**

**North Side**

**TMS Number:** 4780000098  
**GRANTOR:** Sara M. Lindsay  
**GRANTEE:** Clover School District Number Two  
**BOOK:** 7459    **PAGE:** 67  
**DATED:** 09/30/05    **RECORDED:** 10/03/05

**1.1.2 Previous Ownership**

**TMS Number:** 4780000098  
**GRANTOR:** Estate of Emily D. Lindsay  
**GRANTEE:** Sara M. Lindsay  
**BOOK:** 1045    **PAGE:** 290  
**DATED:** 08/25/88    **RECORDED:** 08/30/88

**GRANTOR:** Helen D. Riddle  
**GRANTEE:** Emily D. Lindsay  
**BOOK:** 475    **PAGE:** 191  
**DATED:** 11/29/73    **RECORDED:** 12/03/73

**GRANTOR:** Estate of Atwood H. Davis  
**GRANTEE:** Helen D. Riddle  
**BOOK:** 507/17158    **PAGE:**  
**DATED:** 12/31/58    **RECORDED:** 11/13/64

---

---

### 1.1.1 Current Ownership

#### North Side

**TMS Number:** 4780000151  
**GRANTOR:** Betty Riddle  
**GRANTEE:** Clover School District Number Two  
**BOOK:** 10481      **PAGE:** 29  
**DATED:** 12/23/08      **RECORDED:** 12/31/08

### 1.1.2 Previous Ownership

**TMS Number:** 4780000151  
**GRANTOR:** Estate of Helen Davis Riddle  
**GRANTEE:** Betty Riddle  
**BOOK:** 2152      **PAGE:** 263  
**DATED:** 03/03/98      **RECORDED:** 03/04/98

**GRANTOR:** Emily D. Lindsay  
**GRANTEE:** Helen D. Riddle  
**BOOK:** 475      **PAGE:** 194  
**DATED:** 11/29/73      **RECORDED:** 12/03/73

**GRANTOR:** Estate of Mrs. Atwood H. Davis  
**GRANTEE:** Helen D. Riddle & Emily D. Lindsay  
**BOOK:** 507/17158      **PAGE:**  
**DATED:** 12/31/58      **RECORDED:** 11/13/64

---

### 1.1.1 Current Ownership

#### North Side

**TMS Number:** 4780000004  
**GRANTOR:** Estate of Helen Davis Riddle  
**GRANTEE:** Betty Riddle  
**BOOK:** 2152      **PAGE:** 263  
**DATED:** 03/03/98      **RECORDED:** 03/04/98

---

---

### 1.1.2 Previous Ownership

**TMS Number:** 478000004  
**GRANTOR:** Emily D. Lindsay  
**GRANTEE:** Helen D. Riddle  
**BOOK:** 475           **PAGE:** 194  
**DATED:** 11/29/73   **RECORDED:** 12/03/73

**GRANTOR:** Estate of Mrs. Atwood H. Davis  
**GRANTEE:** Helen H. Riddle and Emily D. Lindsay  
**BOOK:** 507/17158   **PAGE:** 432  
**DATED:** 12/31/58   **RECORDED:** 11/13/64

---

### 1.1.1 Current Ownership

#### North Side

**TMS Number:** 4780000146  
**GRANTOR:** Betty Riddle  
**GRANTEE:** Jay E. Forrest and Jennifer D. Forrest  
**BOOK:** 6810           **PAGE:** 29  
**DATED:** 01/05/05   **RECORDED:** 01/10/05

### 1.1.2 Previous Ownership

**TMS Number:** 4780000146  
**GRANTOR:** Estate of Helen Davis Riddle  
**GRANTEE:** Betty Riddle  
**BOOK:** 2152           **PAGE:** 263  
**DATED:** 03/03/98   **RECORDED:** 03/04/98

**GRANTOR:** Emily D. Lindsay  
**GRANTEE:** Helen D. Riddle  
**BOOK:** 475           **PAGE:** 194  
**DATED:** 11/29/73   **RECORDED:** 12/03/73



---

**TMS Number:** 4780000146  
**GRANTOR:** Estate of Mrs. Atwood H. Davis  
**GRANTEE:** Helen D. Riddle & Emily D. Lindsay  
**BOOK:** 507/17158    **PAGE:**  
**DATED:** 12/31/58    **RECORDED:** 11/13/64

---

**1.1.1 Current Ownership**

**North Side**

**TMS Number:** 4780000148  
**GRANTOR:** The Crowders Creek Company  
**GRANTEE:** KMB Equity Limited Partnership  
**BOOK:** 7035    **PAGE:** 47  
**DATED:** 04/20/05    **RECORDED:** 04/23/05

**1.1.2 Previous Ownership**

**TMS Number:** 4780000148  
**GRANTOR:** LJL Partnership (49.67 AC)  
**GRANTEE:** Crowders Creek Company  
**BOOK:** 133    **PAGE:** 164  
**DATED:** 09/27/90    **RECORDED:** 10/01/90

**GRANTOR:** Crescent Resources, Inc. (49.67 AC)  
**GRANTEE:** LJL Partnership  
**BOOK:** 133    **PAGE:** 160  
**DATED:** 09/27/90    **RECORDED:** 10/01/90

**GRANTOR:** Duke Power Company  
**GRANTEE:** Crescent Resources, Inc. (49.67 AC)  
**BOOK:** 397    **PAGE:** 361  
**DATED:** 05/01/69    **RECORDED:** 12/22/69

**GRANTOR:** Wateree Power Company  
**GRANTEE:** R. D. Riddle  
**BOOK:** 65    **PAGE:** 570  
**DATED:** 04/06/29    **RECORDED:** 04/06/29

---

---

**TMS Number:** 4780000148  
**GRANTOR:** A. B. Hand Trust (22.98 AC)  
**GRANTEE:** Crowders Creek Company  
**BOOK:** 451           **PAGE:** 1  
**DATED:** 04/24/92   **RECORDED:** 05/01/92

**GRANTOR:** Estate of A. B. Hand  
**GRANTEE:** H. Eugene Hand, Trustee A. B. Hand Trust  
**BOOK:** 70           **PAGE:** 239  
**DATED:** 06/08/90   **RECORDED:** 06/14/90

**GRANTOR:** Margaret Grey Tingen  
**GRANTEE:** A. Bryan Hand and Luceille Garin Hand  
**BOOK:** 154           **PAGE:** 186  
**DATED:** 01/23/50   **RECORDED:** 01/23/50

---

#### 1.1.1 Current Ownership

##### North Side

**TMS Number:** 4770000043  
**GRANTOR:** H. Eugene Hand, Trustee A. B. Hand Trust  
**GRANTEE:** Curtin Development  
**BOOK:** 2738           **PAGE:** 328  
**DATED:** 06/02/99   **RECORDED:** 06/10/99

#### 1.1.2 Previous Ownership

**TMS Number:** 4770000043  
**GRANTOR:** Estate of A. B. Hand Trust  
**GRANTEE:** H. Eugene Hand, Trustee A. B. Hand Trust  
**BOOK:** 70           **PAGE:** 239  
**DATED:** 06/08/90   **RECORDED:** 06/14/90

**GRANTOR:** Estate of Lucielle Garin Hand  
**GRANTEE:** A. B. Hand  
**BOOK:** 689/20244   **PAGE:**  
**DATED:** 12/31/80   **RECORDED:** 12/31/80

---

---

**TMS Number:** 477000043  
**GRANTOR:** J. I. Hovis  
**GRANTEE:** A. B. Hand and Lucielle Garin Hand  
**BOOK:** 180           **PAGE:** 321  
**DATED:** 02/09/52   **RECORDED:** 05/27/52

---

**1.1.1 Current Ownership**

**North Side**

**TMS Number:** 477000090  
**GRANTOR:** Curtin Development  
**GRANTEE:** KMB Family Limited Partnership  
**BOOK:** 5975           **PAGE:** 286  
**DATED:** 03/25/05   **RECORDED:** 03/30/05

**1.1.2 Previous Ownership**

**TMS Number:** 477000090  
**GRANTOR:** H. Eugene Hand, Trustee A. B. Hand Trust  
**GRANTEE:** Curtin Development  
**BOOK:** 2738           **PAGE:** 328  
**DATED:** 06/02/99   **RECORDED:** 06/10/99

**GRANTOR:** H. Eugene Hand, Trustee A. B. Hand Trust  
**GRANTEE:** Curtin Development  
**BOOK:** 2397           **PAGE:** 208  
**DATED:** 07/02/98   **RECORDED:** 09/16/98

**GRANTOR:** Estate of A. B. Hand  
**GRANTEE:** H. Eugene Hand, Trustee A. B. Hand Trust  
**BOOK:** 70           **PAGE:** 239  
**DATED:** 06/08/90   **RECORDED:** 06/14/90

**GRANTOR:** Estate of Lucielle Garin Hand  
**GRANTEE:** A. B. Hand  
**BOOK:** 689/20244   **PAGE:**  
**DATED:** 12/31/80   **RECORDED:** 12/31/80

---

---

**TMS Number:** 477000090  
**GRANTOR:** J. I. Hovis  
**GRANTEE:** A. B. Hand & Lucielle Garin Hand  
**BOOK:** 180           **PAGE:** 321  
**DATED:** 02/09/52   **RECORDED:** 05/27/52

---

### 1.1.1 Current Ownership

#### North Side

**TMS Number:** 477000008  
**GRANTOR:** H. Eugene Hand, trustee of the A. B. Hand Trust under the Last Will of A. B. Hand  
**GRANTEE:** Robert Burkett and Erjola 550 Kinderkamack LLC  
**BOOK:** 2738           **PAGE:**  
**DATED:** 06/02/98   **RECORDED:** 06/10/98

### 1.1.2 Previous Ownership

**TMS Number:** 477000008  
**GRANTOR:** Estate of A. B. Hand  
**GRANTEE:** H. Eugene Hand, Trustees of the A. B. Hand Trust  
**BOOK:** 79/ 0239   **PAGE:**  
**DATED:** 06/15/90   **RECORDED:** 06/15/90

**GRANTOR:** Estate of Luceille G. Hand  
**GRANTEE:** A. B. Hand  
**BOOK:** 689/ 20244   **PAGE:**  
**DATED:** 12/31/80   **RECORDED:** 12/31/80

**GRANTOR:** J. I. Hovis  
**GRANTEE:** A. B. Hand and Luceille Hand  
**BOOK:** 180           **PAGE:** 321  
**DATED:** 02/09/52   **RECORDED:** 05/27/52

---

---

### 1.1.1 Current Ownership

#### North Side

**TMS Number:** 4770000006

**GRANTOR:** Robert Patrick Marvin

**GRANTEE:** Linda P. Martin and William P. Martin, Co-trustees under Robert Patrick Martin irrevocable Trust

**BOOK:** 5542      **PAGE:** 256

**DATED:** 08/04/03      **RECORDED:** 08/07/03

### 1.1.2 Previous Ownership

**TMS Number:** 4770000006

**GRANTOR:** Estate of Elizabeth P. Keel

**GRANTEE:** William Brandon Martin/ Robert Patrick Martin, a minor

**BOOK:** 4281      **PAGE:** 176

**DATED:** 03/28/02      **RECORDED:** 04/02/02

**GRANTOR:** Estate of Mabel B. Patrick

**GRANTEE:** Elizabeth P. Keel

**BOOK:** 458/ 14038      **PAGE:**

**DATED:** 03/24/63      **RECORDED:** 03/24/63

---

### 1.1.1 Current Ownership

#### North Side

**TMS Number:** 4770000005

**GRANTOR:** Mabel B. Patrick

**GRANTEE:** Trustees of Mount Harmony Church

**BOOK:** 118      **PAGE:** 197

**DATED:** 06/23/45      **RECORDED:** 06/23/45

### 1.1.2 Previous Ownership

None identified for this tract.

---

---

### 1.1.1 Current Ownership

#### North Side

**TMS Number:** 4770000013  
**GRANTOR:** Thomas Hoover  
**GRANTEE:** Sally H. Hoover  
**BOOK:** 705      **PAGE:** 350  
**DATED:** 05/06/93      **RECORDED:** 05/11/93

### 1.1.2 Previous Ownership

**TMS Number:** 4770000013  
**GRANTOR:** Launiu L. Hoover, aka Launiu L. Goode  
**GRANTEE:** Thomas H. Hoover  
**BOOK:** 1013      **PAGE:** 347  
**DATED:** 03/28/88      **RECORDED:** 03/28/88

**GRANTOR:** Verna Jean Teleska  
**GRANTEE:** Thomas H. Hoover  
**BOOK:** 545      **PAGE:** 417  
**DATED:** 03/22/77      **RECORDED:** 03/30/77

**GRANTOR:** Estate of Esther J. Patrick  
**GRANTEE:** Verna (Jean) Patrick (Teleska) and Launiu L. (Goode) Hoover  
**BOOK:** 635/ 18861      **PAGE:**  
**DATED:** 07/09/76      **RECORDED:** 07/09/76

**GRANTOR:** Estate of R. M. Patrick  
**GRANTEE:** Esther J. Patrick and Verna (Jean) Patrick (Teleska)  
**BOOK:** 322/ 10240      **PAGE:**  
**DATED:** 03/04/46      **RECORDED:** 03/04/46

---

---

### 1.1.1 Current Ownership

#### North Side

**TMS Number:** 4770000035  
**GRANTOR:** John D. Hoover and Beth B. Hoover  
**GRANTEE:** Falls Home Builders, Inc.  
**BOOK:** 11139      **PAGE:** 29  
**DATED:** 11/20/09      **RECORDED:** 11/24/09

### 1.1.2 Previous Ownership

**TMS Number:** 4770000035  
**GRANTOR:** Thomas H. Hoover & Sally H. Hoover  
**GRANTEE:** John D. Hoover & Beth B. Hoover  
**BOOK:** 1343      **PAGE:** 264  
**DATED:** 09/18/95      **RECORDED:** 09/21/95

**GRANTOR:** Thomas H. Hoover, ½ Interest  
**GRANTEE:** Sally Hoover  
**BOOK:** 705      **PAGE:** 350  
**DATED:** 05/06/93      **RECORDED:** 05/06/93

**GRANTOR:** Launiu L. Hoover  
**GRANTEE:** Thomas H. Hoover  
**BOOK:** 1013      **PAGE:** 347  
**DATED:** 03/08/88      **RECORDED:** 03/28/88

**GRANTOR:** Thomas H. Hoover  
**GRANTEE:** Launui L. Hoover  
**BOOK:** 1021      **PAGE:** 328  
**DATED:** 05/05/88      **RECORDED:** 05/05/88

**GRANTOR:** Verna Jean Teleska  
**GRANTEE:** Thomas H. Hoover  
**BOOK:** 545      **PAGE:** 412  
**DATED:** 03/22/77      **RECORDED:** 05/30/77

---

**TMS Number:** 4770000035  
**GRANTOR:** Estate of Esther J. Patrick  
**GRANTEE:** Verna (Jean) Patrick (Teleska) and Launiu L. (Goode) Hoover  
**BOOK:** 635/18861 **PAGE:**  
**DATED:** 07/09/76 **RECORDED:** 07/09/76

**GRANTOR:** Estate of R. M. Patrick  
**GRANTEE:** Esther J. Patrick and Verna (Jean) Patrick (Teleska)  
**BOOK:** 322/10240 **PAGE:**  
**DATED:** 03/04/46 **RECORDED:** 03/04/46

---

### 1.1.1 Current Ownership

#### North Side

**TMS Number:** 4770000034  
**GRANTOR:** Fannie Mae aka Federal National Mortgage Association  
**GRANTEE:** Theresa H. Faile  
**BOOK:** 5643 **PAGE:** 200  
**DATED:** 08/13/03 **RECORDED:** 09/04/03

### 1.1.2 Previous Ownership

**TMS Number:** 4770000034  
**GRANTOR:** J. Buford Grier, Sr., Master in Equity for York County  
**GRANTEE:** Federal National Mortgage Association  
**BOOK:** 5031 **PAGE:** 234  
**DATED:** 02/03/03 **RECORDED:** 02/18/03

**GRANTOR:** Thomas H. Hoover and Sally H. Hoover  
**GRANTEE:** Ronald A. Hoover and Susan M. Hoover  
**BOOK:** 1343 **PAGE:** 264  
**DATED:** 09/18/95 **RECORDED:** 09/21/95

**GRANTOR:** Thomas H. Hoover, 1/2 Interest  
**GRANTEE:** Sally H. Hoover  
**BOOK:** 705 **PAGE:** 350  
**DATED:** 05/06/93 **RECORDED:** 05/12/93



---

**TMS Number:** 4770000034  
**GRANTOR:** Thomas H. Hoover  
**GRANTEE:** Launiu L. Hoover  
**BOOK:** 1021      **PAGE:** 328  
**DATED:** 05/05/88      **RECORDED:** 05/05/88

**GRANTOR:** Verna Jean Teleska  
**GRANTEE:** Thomas H. Hoover  
**BOOK:** 545      **PAGE:** 412  
**DATED:** 03/22/77      **RECORDED:** 05/30/77

**GRANTOR:** Estate of Esther J. Patrick  
**GRANTEE:** Verna (Jean) Patrick (Teleska) and Launiu L. (Goode) Hoover  
**BOOK:** 635/18861      **PAGE:**  
**DATED:** 07/09/76      **RECORDED:** 07/09/76

**GRANTOR:** Estate of R. M. Patrick  
**GRANTEE:** Estate of J. Patrick and Verna (Jean) Patrick (Teleska)  
**BOOK:** 322/10240      **PAGE:**  
**DATED:** 03/04/46      **RECORDED:** 03/04/46

---

### 1.1.1 Current Ownership

#### North Side

**TMS Number:** 4770000048  
**GRANTOR:** Budnick Associates, Inc.  
**GRANTEE:** Richard J. Rusnak and Jane E. Rusnak  
**BOOK:** 6569      **PAGE:** 194  
**DATED:** 09/21/04      **RECORDED:** 09/23/04

### 1.1.2 Previous Ownership

**TMS Number:** 4770000048  
**GRANTOR:** May Green Properties, LLC  
**GRANTEE:** Budnick Associates, Inc.  
**BOOK:** 5058      **PAGE:** 97  
**DATED:** 02/10/03      **RECORDED:** 02/28/03

---

---

**TMS Number:** 477000048  
**GRANTOR:** George Davis Patrick  
**GRANTEE:** May Green Properties, LLC  
**BOOK:** 4381      **PAGE:** 311  
**DATED:** 04/17/02      **RECORDED:** 06/21/02

**GRANTOR:** Verna (Jean) Patrick (Teleska)  
**GRANTEE:** George Davis Patrick  
**BOOK:** 544      **PAGE:** 399  
**DATED:** 02/14/77      **RECORDED:** 03/11/77

**GRANTOR:** Elizabeth P. Keel  
**GRANTEE:** George Davis Patrick  
**BOOK:** 544      **PAGE:** 391  
**DATED:** 02/14/77      **RECORDED:** 03/11/77

**GRANTOR:** George Patrick  
**GRANTEE:** George Davis Patrick  
**BOOK:** 531      **PAGE:** 440  
**DATED:** 05/31/76      **RECORDED:** 05/31/76

**GRANTOR:** Fannie P. Hope and Lesslie P. Brandon  
**GRANTEE:** George Patrick  
**BOOK:** 112      **PAGE:** 82  
**DATED:** 12/12/42      **RECORDED:** 12/12/42

*Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding approximately forty (40)-year period based on York County records. This is not an attempt to certify a clear title. Therefore, all names, dates, and references shown are not to be considered absolute or guaranteed, and should be researched and verified by a title search attorney. Furthermore, where "None identified for this tract" under the subsection Previous Ownership, this statement is meant to indicate that no documents were uncovered under the search criteria applied.*

## **2. Environmental Liens or Activity and User Limitations**

No environmental liens were reported during the records search. No environmental activities are currently in progress as noted by SCDHEC records. The only user limitations may be expressed in the deeds, building codes, and/or York County zoning.

## **3. Specialized Knowledge**

There is no specialized knowledge of liens or user limitations for the proposed right-of-way. However, user limitations may be expressed in the deeds, building codes, and/or York County zoning.

---

---

#### **4. Commonly Known or Reasonably Ascertainable Information**

##### **4.1 Zoning**

The properties located within the proposed right-of-way are zoned as “Rural” (RUD, RUD-1), “Residential” (RD-I), “Business” (BD-I, BD-III), and “Industrial” (ID) in York County.

##### **4.2 FEMA Flood Map Review**

The proposed right-of-way is located on FEMA’s York County, S.C. Community Panels #45091C0160E, #45091C0176E and #45091C0177E, dated September 26, 2008. The panels revealed that the subject proposed right-of-way is within an area with two FEMA zones; the first is “Zone AE” (shaded on map), indicating that “base flood elevations [are] determined”. The second area is “Zone X” (not shaded on map), indicating that these “areas [are] determined to be outside the 0.2% annual chance floodplain”. The FEMA maps also include the following information:

- **Special flood hazard areas subject to inundation by the 1% annual chance flood**

The 1% chance 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.

##### **4.3 Wetlands Inventory Review**

The National Wetlands Inventory mapping, obtained on-line, indicated that there are no wetlands within seventy-five feet of either side of the existing right-of-way. However, based on the realignment of the new bridge and its approaches, it appears that there is a pond located within the proposed right-of-way near STA 260+80.00. This pond is classified as PUBHh, meaning that it is a man-made freshwater pond that is permanently flooded (see Appendix P4).

#### **5. Valuation Reduction for Environmental Issues**

Valuation reduction due to environmental concerns is an appraisal monetary issue. F&ME does not represent itself as an appraisal organization qualified to express property value.

#### **6. Owner, Property Manager, and Occupant Information**

This Limited Phase I did not include requesting information pertaining to the various owners of the properties affected by the proposed right-of-way.

#### **7. Reason for Performing the Limited Phase I**

According to the information received by F&ME, a Limited Phase I is a required component of the NEPA document required for this project. F&ME has been asked to provide this Limited Phase I as an assurance, to the extent records by others are made available and reasonably possible to obtain, that no negative environmental conditions or concerns exist within the proposed right-of-way or adjoining/adjacent properties that would appear to incur future liability to the proposed right-of-way area.

### **E. RECORDS REVIEW**

#### **1. Standard Environmental Record Sources**

##### **1.1 Review of Environmentally Related Permits**

Information pertaining to environmental permits, recorded problems, and well records was requested in writing from the South Carolina Department of Health and Environmental Control (SCDHEC) Freedom of Information Office. As indicated by SCDHEC, files were located pertaining to permitting for storm water and private wells associated with properties affected by the proposed right-of-way of S.C. Highway 557.

---

---

## 1.2 Review of Well Records

Information pertaining to well records was requested in writing from the South Carolina Department of Health and Environmental Control (SCDHEC) Freedom of Information Office. As stated by SCDHEC, multiple files were located pertaining to private well and storm water permits. These permits are associated with the following locations: Bethel Volunteer Fire Department (storm water permit # SCR107648), Oakridge Middle School (private well permit # SCW46094170) and a private residence (private well permit # SCW46068533). Additionally, groundwater monitoring wells had been installed at the Lake Wylie Mini Storage facility due to previous underground storage tank issues. See Section F, Site Reconnaissance, for more information. If other wells are located within the new right-of-way, they will have to be decommissioned in accordance with SCDHEC Well Standards and Regulations R.61-71 (latest edition).

## 1.3 Inquiry to Regulatory Agencies Concerning Potential Environmental Problems

Information from SCDHEC pertaining to the following items has been requested:

- 1) Information pertaining to the removal or installation of above ground and underground storage tanks;
- 2) Issuance of any environmentally related permit and well record;
- 3) Issuance of any license (or complaints against) to store hazardous substances and/or petroleum products on the subject property or adjacent properties and any actions taken;
- 4) Issuance of any license (or complaints) regarding waste disposal on the subject property or adjacent properties; and
- 5) Brownfield site on the subject property or adjacent properties.

The SCDHEC Freedom of Information Office was contacted to provide information pertaining to past or present reporting of any environmentally related conditions (refer to letters in Appendix P5, Regulatory Records Documentation).

The SCDHEC records requested were those pertaining to sites identified by federal and state entities as environmental concerns. The records to be reviewed were those pertaining to facilities existing on and within the appropriate minimum search distance of the subject property as stipulated by ASTM E1527-05 and ASTM E1528-06. Particular attention was directed at sites or facilities listed by address, name, and/or described location in the SCDHEC records to determine their location within the noted one-half and one-mile minimum search distances from the subject property.

Additionally, three facilities within 0.5-miles of the proposed right-of-way were included on the Leaking Underground Storage Tank (LUST) list. However, all three have been listed as “No Further Action” sites by SCDHEC, meaning that the contaminants of concern were found to be in concentrations below regulatory requirements, indicating that the sites are not considered to be threats to human health.

## 2. Additional Environmental Record Sources

Records reviewed consisted of the SCDHEC Bureau of Land and Waste Management Site Assessment Section, SCDHEC Bureau of Air Quality, and SCDHEC Bureau of Groundwater Protection. These records represent the SCDHEC, State, and National priority listings. Records were located pertaining to environmental concerns on properties within 0.5 and 1.0 mile. Refer to Appendix P5, Regulatory Records Documentation.

Based on the information obtained from the USEPA’s Facility Registry System, Pharr Yarns (ID # SCD987578499) was the only facility identified as a Resource Conservation and Recovery Act (RCRA) generator located on a property affected by the proposed right-of-way. This facility is classified as a Conditionally-Exempt Small Quantity Generator (CESQG). This facility is considered to be a handler, and is therefore not classified as a Treatment, Storage and Disposal (TSD) site. The actual facility is outside the proposed right-of-way, and should not result in adverse affects on the

---

---

subject property. SCDHEC's FOI office also indicated that the Bureau of Air Quality contains files regarding the Pharr Yarns facility; however, this information does not appear to have a negative impact on the anticipated uses of the proposed right-of-way, which include the widening and realignment of S.C. Highway 557.

### **3. Physical Setting Source(s)**

The physical setting sources, in the immediate vicinity of the proposed right-of-way, are predominately woods, residences, cultivated fields, pastures, commercial businesses, and the towns of Clover and Lake Wylie.

### **4. Historical Use Information on the Property**

The historical use of the property, as indicated by the information obtained, available aerial photographs for the years 1938, 1949, 1964, 1970, 1979, 1995, 2002, 2005, 2010, and 2011, and mapping, appears to have been for timber, agriculture, rural residential, and recreational activities. Due to the lack of continuous aerial photographs, data gaps exist. However, these data gaps do not appear significant given the consistent observations of the available aerial photographs.

### **5. Historical Use Information of Adjoining Properties**

Historical uses of adjoining properties, as indicated by the York County Tax Assessor's records and aerial photographs, were predominately woods, cultivated fields, residences, and commercial establishments in the Towns of Clover and Lake Wylie.

## **F. SITE RECONNAISSANCE**

### **1. Methodology and Limiting Conditions**

#### **1.1 Hazardous Substances in Connection with Identified Uses**

Hazardous substances were not observed within the proposed right-of-way.

#### **1.2 Hazardous Substance Containers and Unidentified Substance Containers**

No hazardous substance containers or unidentified substance containers were observed within the proposed right-of-way on the dates of the visual site inspections.

#### **1.3 Storage Tanks**

SCDHEC's records revealed that an underground storage tank is registered on a property affected by the proposed right-of-way.

##### **1.3.1 Review of Storage Tanks Registration and Information**

A review of the past and current SCDHEC Leaking Underground Storage Tank (LUST) list indicates evidence of a leaking underground storage tank (UST) located on a property within the scope of this assessment. Based on the records reviewed, the identified UST site (Site # 14507), located on the Lake Wylie Mini Storage property, had a release event in 1993. SCDHEC required groundwater monitoring of the site, which ultimately led to a "No Further Action" (NFA) declaration on the site in 2007. For a site to be deemed "NFA", the contaminants of concern must appear in concentrations below regulatory requirements, and the site is therefore not considered a threat to human health.

#### **1.4 Suspected Presence of Lead-Based Paint and/or Lead in Drinking Water**

No laboratory analyses were performed during this inspection for the existence of lead-based paint and/or lead in drinking water.

#### **1.5 Indication of PCB's**

PCB containers were not identified within the proposed right-of-way. Furthermore, a review of the EPA's PCB Transformer Registration Database indicated that no PCB-containing transformers are registered in the subject area.

---

---

## **1.6 Indication of Solid Waste Disposal**

Solid waste disposal was observed in two areas, near Stations 220+00 and 243+00 on the north side of the highway. This waste consisted of household garbage (i.e. plastic containers, cans, bottles, etc.), PVC pipe debris, and asphalt shingles.

### **2. General Site Setting**

The general site setting is predominately woods, pastures, cultivated fields, residential, churches, a school, and the Towns of Clover and Lake Wylie. None of the adjoining/adjacent properties appear to contribute negative environmental concerns to the proposed right-of-way.

### **3. Exterior Observations**

Exterior observations refer to the building structures on the proposed properties. The site plans show no building structures within the proposed right-of-way.

### **4. Interior Observations**

Interior observations refer to the building structures on the proposed properties. The site plans show no building structures within the proposed right-of-way.

## **G. INTERVIEWS**

### **1. Interview with Owner**

ASTM Transaction Screen Questionnaires were not distributed among the property owners due to the limited scope and intended use of this Limited Phase I Environmental Site Assessment.

### **2. Interview with Site Manager**

ASTM Transaction Screen Questionnaires were not distributed among the site managers due to the limited scope and intended use of this Limited Phase I Environmental Site Assessment.

### **3. Interview with Occupants**

ASTM Transaction Screen Questionnaires were not distributed among the occupants due to the limited scope and intended use of this Limited Phase I Environmental Site Assessment.

### **4. Interviews with Local Government Officials**

No government officials were interviewed. The only governmental agency contacted has been SCDHEC Freedom of Information Office for information concerning environmental problems on the right-of-way tract. As stated by SCDHEC FOI (Appendix P5), no current files were located pertaining to negative environmental conditions within the proposed right-of-way areas.

### **5. Interviews with Others**

No interviews with others were conducted due to the SCDHEC FOI records review notification and site inspection.

## **H. FINDINGS**

The objective of this Limited Phase I Environmental Site Assessment was to determine the presence or the potential presence of recognized negative environmental conditions within the proposed right-of-way and adjoining/adjacent properties that would impact or contribute to future liability associated with the proposed right-of-way.

To meet this objective, criteria as generally set forth by the South Carolina State Budget and Control Board Policy for Obtaining Studies for Land Acquisitions (Nov. 16, 2010), ASTM E1528-06, and ASTM E1527-05 were utilized, with respect to a visual inspection and reasonably ascertainable historical records review.

F&ME Consultants has performed this Limited Phase I Environmental Site Assessment in general accordance with the scope and limitations of the above referenced guidelines for the Client. The findings

---

---

of this assessment have revealed no obvious evidence of environmental concerns. Therefore, no Phase II Environmental Site Assessment is recommended at this time.

## **I. OPINION**

Based upon the observations made on the dates of the site inspections and information obtained during the records review, no further environmental site assessment and/or investigations are recommended.

## **J. CONCLUSIONS**

Based upon the current data, site reconnaissance, and information obtained, no Phase II Environmental Site Assessment is recommended as of the date of the site inspection.

F&ME has performed this Limited Phase I Environmental Site Assessment on the proposed right-of-way in general conformance with the scope and limitations of ASTM Practices E1527-05. Any exceptions to, or deletions from, this practice are described in Section B, subsections 2, 4, 5, and 6 of this report. This assessment has revealed no evidence of recognized environmental conditions in connection with the proposed right-of-way.

## **K. DEVIATIONS**

This Limited Phase I Environmental Site Assessment excluded the process of interviewing property owners/ operators. However, F&ME's Environmental Professionals did complete the ASTM E1528-06 Transaction Screen Questionnaire pertaining to conditions observed at the time of the site inspection (see Appendix P6). See Appendix P7, Special Contractual Conditions between User and Environmental Professional for a description of the terms of this Limited Phase I.

## **L. ADDITIONAL SERVICES**

### **1. Archeological Sites**

During records searches, an archeological site, 38YK87, was identified located east of the intersection of Ridge Road (S.C. 27) and S.C. Highway 557. In the identifying document entitled "Phase I and II Archeological Study of Duke Power Company's Catawba to Peacock Proposed Transmission Line", a report dated February, 1984, the investigator described the location as being "too heavily disturbed to be considered as having sufficient research potential for inclusion on the National Register of Historic Sites." Furthermore, the report recommended that construction be allowed to continue due to the deteriorated condition of the identified site. See Appendix P4 for the full text of the report. If any sites of potential archaeological significance are located on the property, the South Carolina Institute of Archaeology and Anthropology, Columbia, S.C. [(803) 777-8170] is to be notified to inspect the property and review their records.

### **2. Endangered Species**

If any rare and/or endangered species are encountered on the property, the South Carolina Department of Natural Resources, Heritage Trust Program, Columbia, S.C. [(803) 734-3917] is to be notified to inspect the property and review their records.

## **M. REFERENCES**

- 1) South Carolina State Budget and Control Board, Procurement Services Division, Procedures and Guidelines outlined in the South Carolina State Budget and Control Board "Guidelines for Obtaining Environmental Studies for Land Acquisition," Nov. 16, 2010.
- 2) American Society of Testing and Materials (ASTM), "Standard Practice for Environmental Site Assessments, Phase I Environmental Site Assessment Process," ASTM E1527-05.
- 3) American Society of Testing and Materials (ASTM), "Environmental Site Assessment Transaction Screen Questionnaire," ASTM E1528-06.
- 4) South Carolina Department of Health and Environmental Control, Freedom of Information Office.
- 5) CAROLINA GEOLOGICAL SOCIETY, GUIDEBOOK FOR 1965 ANNUAL MEETING, p1, Butler, James Robert, Guide To The Geology of York County, South Carolina

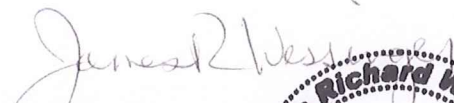
- 6) "Soil Survey of York County, South Carolina," 1965.
- 7) FEMA flood map information obtained on-line.
- 8) Available aerial photographs obtained on-line and from the University of South Carolina's Thomas Cooper Library, Columbia, South Carolina.
- 9) National Wetlands Inventory mapping information obtained on-line.
- 10) Professional Service Industries, Inc., "Phase I and II Archeological Study of Duke Power Company's Catawba to Peacock Proposed Transmission Line," 1984.
- 11) Property deeds – "A" Search and Re-Search Company, LLC.
- 12) U.S.E.P.A. - EPA-560-F-05-242, Oct. 2005: "The new ASTM E1527-05 Phase I Environmental Site Assessment Standard is consistent and compliant with EPA's final rule and may be used to comply with the provisions of the all appropriate inquires (AAI) final rule." Obtained on-line.
- 13) U.S.E.P.A. – Envirofacts Facility Registry System records obtained on-line.

**N. SIGNATURE OF ENVIRONMENTAL PROFESSIONALS**

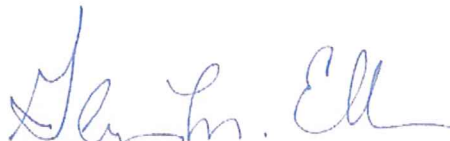
I declare that, to the best of my professional knowledge and belief, I meet the definition of environmental professional as defined in §312.10 of 40 CFR 312.


I have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. I have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

**F&ME CONSULTANTS**

  
 James R. Wessinger, P.  
 Staff Geologist  
 SC License #2512



  
 Glynn M. Ellen  
 Senior Environmental Consultant

  
 Jessica L. Shannon, M.S.  
 Environmental Consultant

**O. QUALIFICATIONS OF ENVIRONMENTAL PROFESSIONALS**

See following pages.



**James R. Wessinger, P.G.**  
**Staff Geologist**  
**F&ME Consultants**

**PROJECT ASSIGNMENT:** Geotechnical/Geophysical Investigations,  
Environmental Projects  
and Site Evaluations

**EDUCATION:** Bachelor of Science, Geology  
University of South Carolina, 1984

**REGISTRATION:** Professional Geologist, South Carolina  
#2512

**RELATED PROJECT EXPERIENCE:**

Mr. Wessinger is a project manager for environmental and geological projects for F&ME Consultants. These project management duties include stratigraphy, seismicity studies, environmental assessments and geophysical/geotechnical investigations and mineral exploration.

Mr. Wessinger has over 20 years of experience in geological, geotechnical, and environmental evaluations. Mr. Wessinger's main focus has been in environmental studies and geotechnical investigations. These have included environmental site assessments, monitoring well installation, groundwater contamination, building material evaluations, and mold abatement/remediation. He has a wide range of experience in mechanical, chemical, and soils engineering.

As project manager and staff geologist for F&ME Consultants, Mr. Wessinger has been primarily responsible for conducting geotechnical fieldwork for private concerns, state, and local governments.

Mr. Wessinger has, additionally, performed asbestos containing building materials inspections. These projects have included over 500 facilities for military bases, commercial, industrial, educational entities, and state agencies.

[WWW.FMECOL.COM](http://WWW.FMECOL.COM)

COLUMBIA OFFICE  
3112 Devine Street  
Columbia, SC 29205  
P 803.254.4540  
F 803.254.4542

BEAUFORT OFFICE  
26 John Galt Road, Suite A  
Beaufort, SC 29906  
P 843.522.0246  
F 803.254.4542



**AASHTO ACCREDITED  
LABORATORY**

---

---

SELECTED PROJECT EXPERIENCE:

**Performed Phase I Environmental Site Assessments**

Performed fieldwork and assistance to Robert Powell for land acquisitions in various counties in South Carolina.

**Asbestos Inspections**

As an asbestos inspector, Mr. Wessinger has inspected upwards of 500 buildings throughout South Carolina and Savannah, Georgia Air National Guard Base

**CMC Landfill Liner Investigation, Gilbert, SC**

Mr. Wessinger oversaw the testing of this liner installation and monitored the quality of the installation, including compaction and moisture level, for the contractor installing the liner. This project also included experimental soil addition and problem analysis to determine the best course of action to decrease the permeability of the liner.

**Installation of Groundwater Monitoring Wells**

Mr. Wessinger provided oversight of monitoring well installations, SCDOT Maintenance/Section Sheds

**Mineral Exploration**

Mr. Wessinger provided project management and field work for the exploration of mineral resources for a major South Carolina corporation

**Foundation Drilling and Soil Materials Evaluation**

Mr. Wessinger has managed geotechnical investigations at numerous schools, housing projects, South Carolina Department of Transportation, military and industrial complexes and other sites throughout the state of South Carolina.

**GLYNN M. ELLEN**  
**Senior Environmental Consultant**

**CERTIFICATION:**

Asbestos Consultant / Building Inspector, South  
Carolina # 21457  
Asbestos Consultant / Management Planner, South  
Carolina # 22641  
Asbestos Consultant / Project Designer, South  
Carolina # 00098  
Asbestos Consultant / Supervisor, South Carolina #  
00455  
Asbestos Consultant (NIOSH 582) / Air Sampler,  
South Carolina # 00079  
SC Level A Well Driller Certification/ #1039  
Niton Lead XRF Spectrum Analyzer

**RELATED PROJECT EXPERIENCE:**

Mr. Ellen has twenty-three (23) years of experience in the geotechnical, environmental and construction materials testing industry.

Mr. Ellen has worked as a senior field and laboratory technician, engineering and well drilling supervisor and an asbestos building materials inspector. During this time Mr. Ellen has gained extensive hands on experience in environmental sampling and testing. Presently, Mr. Ellen is a senior project manager with a specialty in environmental engineering. He is responsible for project evaluation and planning, field inspection and sampling protocol, client co-ordination before, during and after on-site inspection and sampling, review of field data, evaluation of field data, chain-of-custody packaging and protocol for all samples, collection and evaluation of field sampling data, development of preliminary report information and remediation contractor project management.

He has extensive experience in asbestos investigations and abatement project design. He has a wide range of experience in asbestos identification, inspection, sampling, and delineation. Mr. Ellen has been lead inspector and asbestos sampler for operation and maintenance plans and re-inspections. He has utilized existing documents and assisted with the update of numerous O&M manuals. During previous asbestos re-inspection projects, Mr. Ellen developed a unique method of delineating the asbestos homogeneous areas in buildings and their respective square footage which enables our clients and F&ME personnel quick and easy access to the hazardous materials in each facility and results in meticulous reports that are user-friendly. This method has led to cost-saving benefits for our clients who can refer to our reports and their plans for future work, influencing the design of future renovations and saving our clients from facing massive fines. He has worked in dozens of schools across the state, and was instrumental in the Budget &

[WWW.FMECOL.COM](http://WWW.FMECOL.COM)

COLUMBIA OFFICE  
3112 Devine Street  
Columbia, SC 29205  
P 803.254.4540  
F 803.254.4542

BEAUFORT OFFICE  
26 John Galt Road, Suite A  
Beaufort, SC 29906  
P 843.522.0246  
F 803.254.4542



**AASHTO ACCREDITED  
LABORATORY**

---

---

Control Board's Statewide AHERA Level IV inspections which encompassed 11,000,000 ft<sup>2</sup> of government-owned buildings. Mr. Ellen was instrumental in the initial start-up phases of the Region II – Department of Public Services asbestos survey and the Statewide Phase IV Asbestos Survey. He was instrumental in developing a color system to delineate asbestos homogeneous areas during re-inspections and updates for Richland School District One, and utilized that same technique to complete the re-inspection for the Department of Public Safety – Region II.

Presently Mr. Ellen is a senior level engineering assistant with a specialty in environmental issues. His duties range from geotechnical and environmental investigations, groundwater geology, stratigraphic profiling to soil index testing (permeability testing, consolidation testing, triaxial shear testing and hydrometer analysis determinations), asbestos and lead based paint sampling and laboratory analysis. He is responsible for the coordination of outside laboratory analysis. He has been lead inspector and asbestos sampler for operation and maintenance plans and re-inspections. During the re-inspections projects, Mr. Ellen developed a unique method of delineating the asbestos homogeneous area and their respective square footage, which enables our clients and F&ME personnel quick and easy access to the situation in each facility.

Mr. Ellen has managed and implemented groundwater assessment programs for the SC Department of Mental Health, Department of Public Safety, and the Department of Education (School bus maintenance facilities).

**SELECTED PROJECT EXPERIENCE:**

**Marshbrook Plaza**

Phase I Environmental Site Assessment  
*Richland County, SC*

**Chapin Elementary School**

Asbestos Investigation  
*Lexington County, SC*

**Chapin High School**

Asbestos Investigation  
*Lexington County, SC*

**Chapin High School**

Lead-Based Paint Investigation  
*Lexington County, SC*

**City of Cayce Utility Compound**

Asbestos Inspection  
*Lexington County, SC*

**Criminal Justice Academy**

Indoor Air Quality Study  
*Richland County, SC*

**Forest Lake Club**

Asbestos Investigation, Mold Evaluation  
*Richland County, SC*

**Gilbert Elementary School**

Asbestos Investigation  
*Lexington County, SC*

**Leaphart Elementary School**

Asbestos Investigation  
*Lexington County, SC*

**Lexington Elementary School**

Asbestos Investigation  
*Lexington County, SC*

**Lexington Middle School**

Asbestos Investigation  
*Lexington County, SC*

**Midlands Technical College**

Asbestos Investigation  
*Richland County, SC*

**Park North Apartments**

Asbestos Investigation  
*Lexington County, SC*

**Saxe Gotha Elementary School**

Asbestos Investigation  
*Lexington County, SC*

**White Knoll Elementary School**

Asbestos Investigation  
*Lexington County, SC*

**William Peak Residence**

Asbestos Investigation  
*Fairfield County, SC*

**JESSICA L. SHANNON, M.S.**  
**Environmental Consultant**  
**F&ME Consultants**

**EDUCATION:**

Bachelor of Science, Zoology  
North Carolina State University, 2004  
Master of Science, Marine Science  
University of South Carolina, 2008

**CERTIFICATIONS:**

Asbestos Consultant/ Management Planner,  
SC MP-00159  
Asbestos Consultant/ Air Sampler,  
SC AS-00260  
Asbestos Consultant/ Supervisor,  
SC SA-01392  
Confined Space Entry Certified  
40-Hr HAZWOPER Training

**RELATED PROJECT EXPERIENCE:**

Ms. Shannon has more than five years of experience as an Environmental Consultant for F&ME Consultants. Her experience includes assisting with Phase I Environmental Site Assessments; performing environmental compliance inspections on roadway/ bridge construction projects; conducting asbestos inspections, bulk sample collection, and report generation; providing asbestos abatement air monitoring and analysis; producing project-specific QAPP Contractor Addenda; assisting in groundwater monitoring sample collection and report review; and performing indoor mold investigations and indoor air quality assessments. Ms. Shannon has also written and/or updated storm water pollution prevention plans (SWP3), spill prevention, control and countermeasure plans (SPCC), a solid waste landfill post-closure care plan, and the sampling and analysis plan and work plan for the Langley Pond ESA Phase II. She has served a number of clients including, but not limited to, the University of South Carolina, SC Criminal Justice Academy, Lexington School District One, and SCDOT.

In addition to project-specific work, Ms. Shannon has developed materials which directly benefit F&ME's Environmental Division, including a Respiratory Protection Program for F&ME's asbestos-certified consultants. She has also modified and/ or developed forms which aid in the documentation and organization of indoor air quality and asbestos air monitoring data.

[WWW.FMECOL.COM](http://WWW.FMECOL.COM)

COLUMBIA OFFICE  
3112 Devine Street  
Columbia, SC 29205  
P 803.254.4540  
F 803.254.4542

BEAUFORT OFFICE  
26 John Galt Road, Suite A  
Beaufort, SC 29906  
P 843.522.0246  
F 803.254.4542



**AASHTO ACCREDITED  
LABORATORY**

---

---

Prior to joining F&ME's team, Ms. Shannon had seven years of research experience in environmental laboratories, with a focus on the ecological effects of toxic algal species in aquatic environments. As an undergraduate, Ms. Shannon oversaw freshwater (potable and non-potable) sampling expeditions that spanned the state of North Carolina during a five (5) year EPA-funded program. She also cultured algal organisms and analyzed water samples for nutrient concentrations. During her master's thesis project, Ms. Shannon designed original research that combined existing nutrient and abiotic data sets with original data. This data set was ultimately applied to the development of a predictive model to screen potential sites for the occurrence of Avian Vacuolar Myelinopathy (AVM), a condition that has crippled some aquatic bird populations across the southeastern United States, and threatens the reestablishment of the bald eagle.

**SELECTED PROJECT EXPERIENCE:**

**SC Department of Health and Environmental Control – QAPP Contractor Addendum Directive Response Development**

Coordinated with SCDHEC personnel and analytical laboratory personnel to satisfy "new" QAPP requirements

**SC Department of Natural Resources – 4.88-Acre Sassafras Mountain Addition Phase I ESA**

Assisted with report production  
Provided report review

**Palmetto Citizens Federal Credit Union – Marshbrook Plaza Phase I ESA**

Performed data collection  
Interfaced with SCDHEC  
Provided report review

**Tanger Outlet Centers, Hwys 501 & 17, Myrtle Beach, SC – Asbestos Inspections**

Serves as primary client contact  
Performed inspections on vacated suites  
Review, revise reports

**SC Department of Transportation, Statewide – SPCC/ SWP3 Plan Updates**

Existing document review  
Visited all maintenance facilities and section sheds in three (3) districts  
Updated existing plans, including text and site maps  
Interface with SCDOT Maintenance Engineers & Staff

**Aiken County Parks, Recreation and Tourism Department – Langley Pond Phase II**

Developed Sampling & Analysis Plan, Work Plan  
Collected Samples of the Pond's Water and Bottom Sediments  
Established Chemical Parameters  
Co-Authored Report for Submittal to SCDHEC for Brownfields Consideration

**Fairfield County Post-Closure Care Plan – Fairfield County Council**

Interfaced with SCDHEC to Ensure Regulatory Compliance  
Developed Post-Closure Care Plan for Submission to SCDHEC

---

---

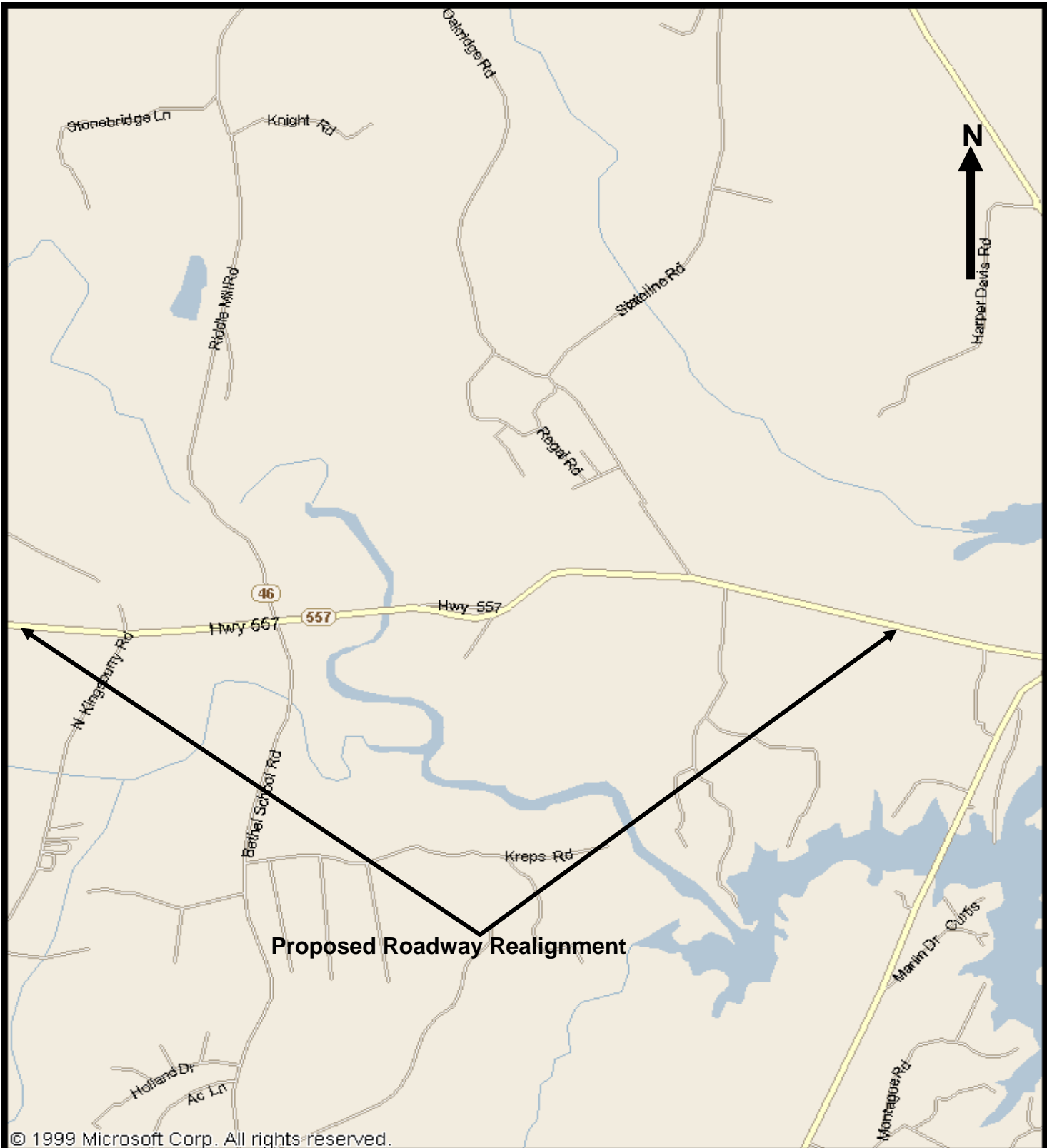
**P. APPENDICES**

- 1) Site Vicinity Map
- 2) Site Plan
- 3) Site Photographs
- 4) Historical Research Documentation
- 5) Regulatory Records Documentation
- 6) Interview Documentation
- 7) Special Contractual Conditions between User and Environmental Professional
- 8) Property Deeds
- 9) 40 CFR Part 312

---

## **1. Site Vicinity Map**





© 1999 Microsoft Corp. All rights reserved.

**F&ME**  
CONSULTANTS

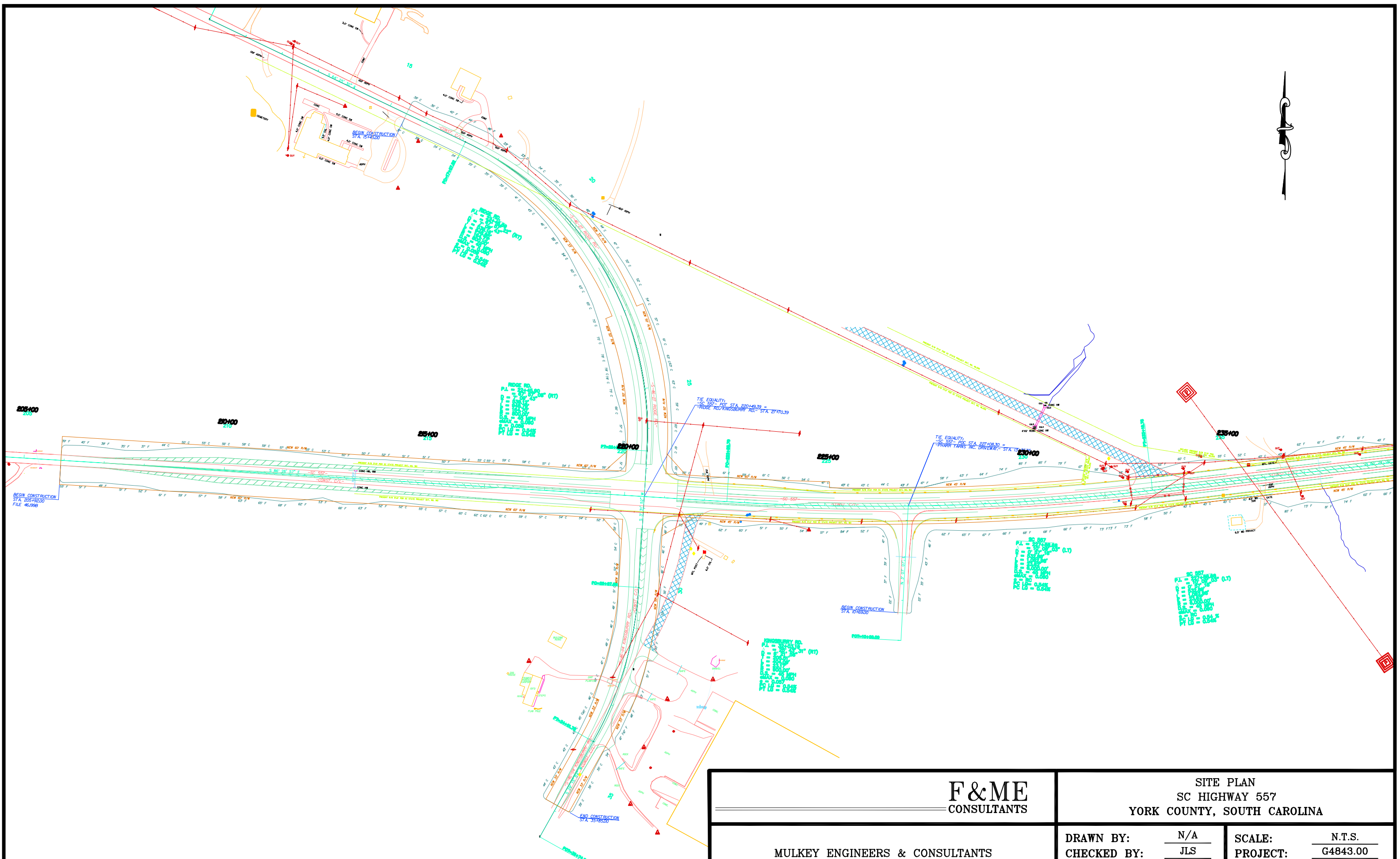
**SITE VICINITY MAP**  
**SC HIGHWAY 557**  
**York County, South Carolina**

MULKEY ENGINEERS & CONSULTANTS

Drawn By:	GME	Scale:	N.T.S.
Checked By:	JLS	Project:	G4843.00
Approved By:	SCE		

---

## **2. Site Plan**



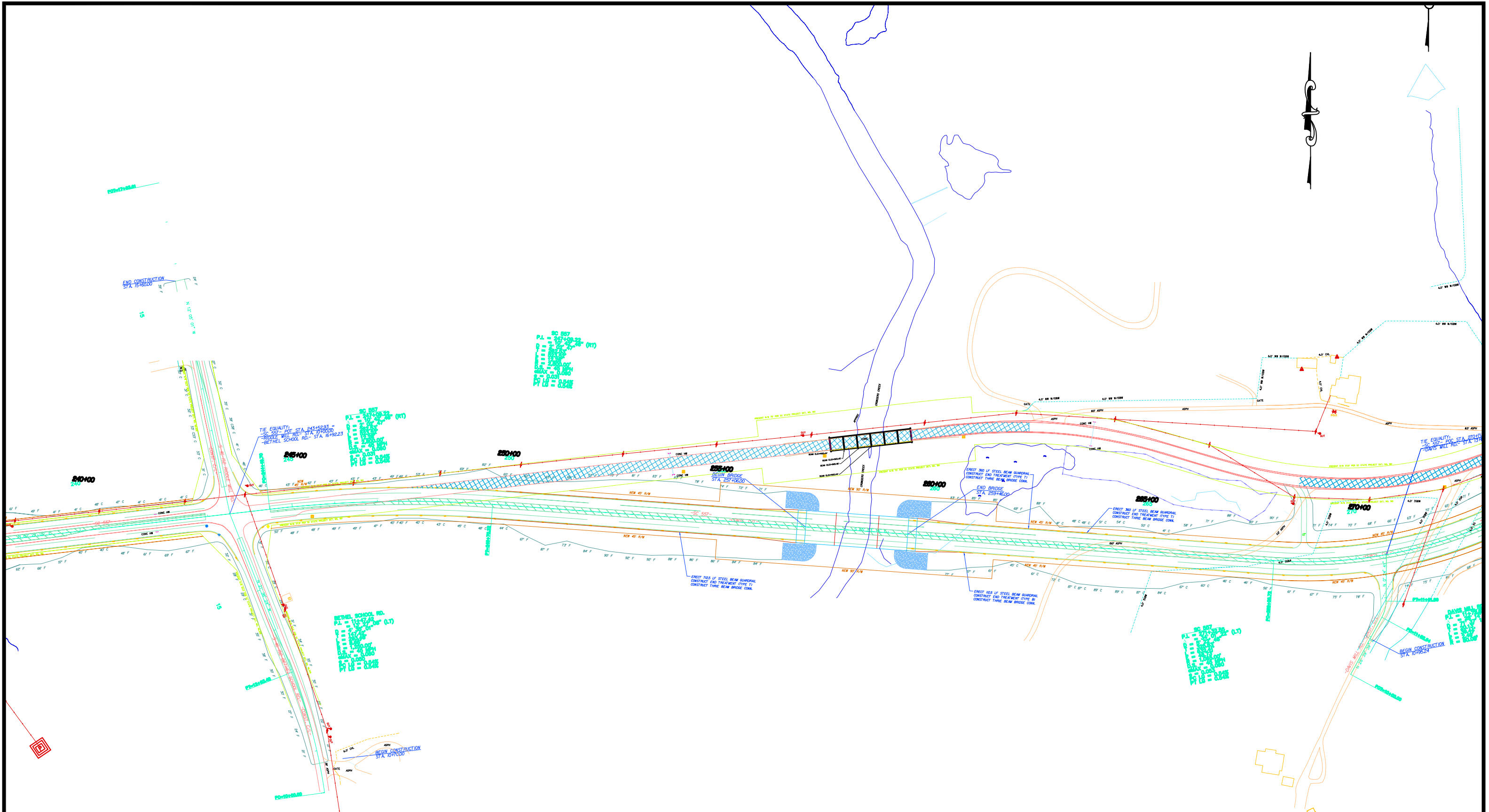
**F&ME**  
CONSULTANTS

SITE PLAN  
SC HIGHWAY 557  
YORK COUNTY, SOUTH CAROLINA

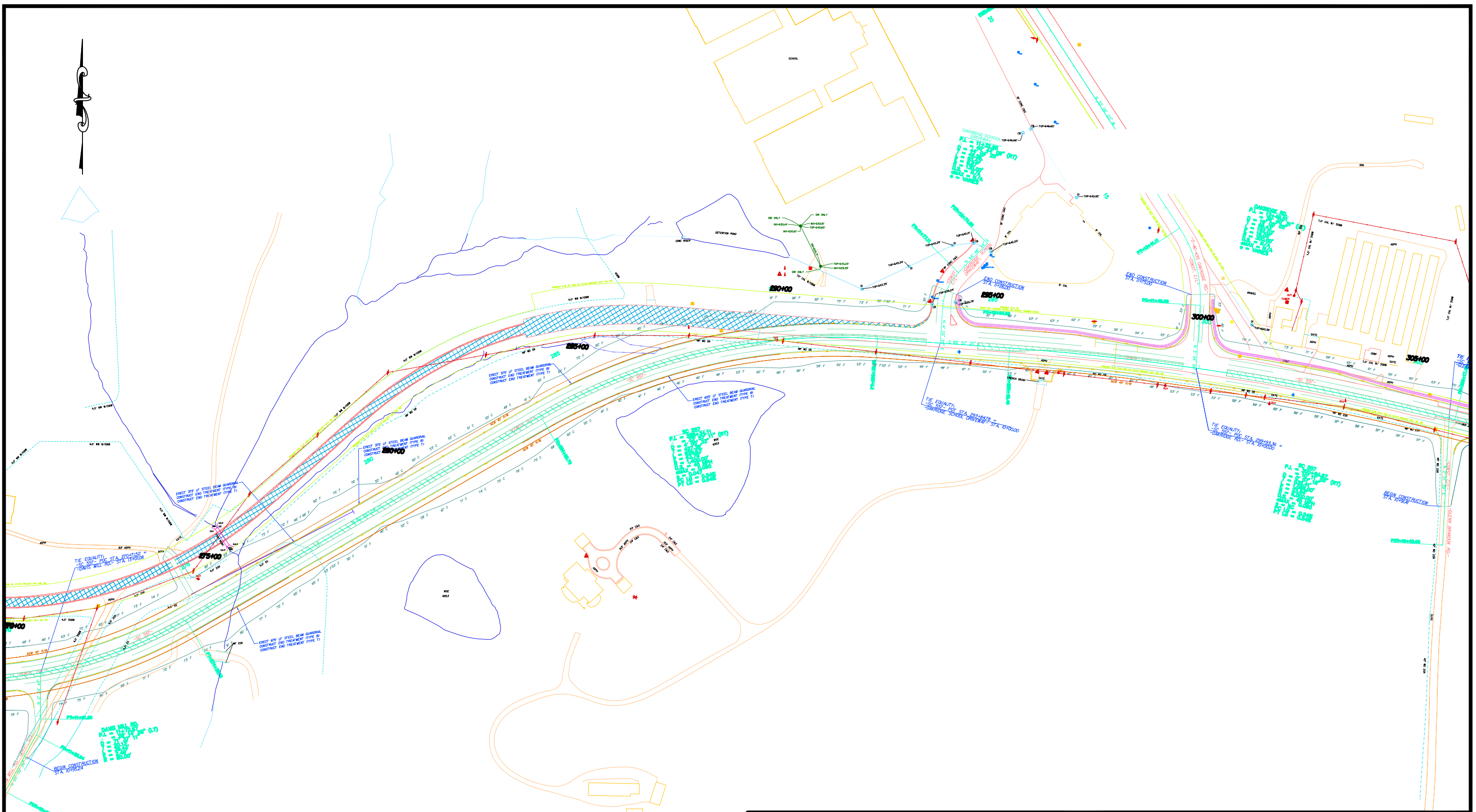
MULKEY ENGINEERS & CONSULTANTS

DRAWN BY:	N/A
CHECKED BY:	JLS
APPROVED BY:	GME

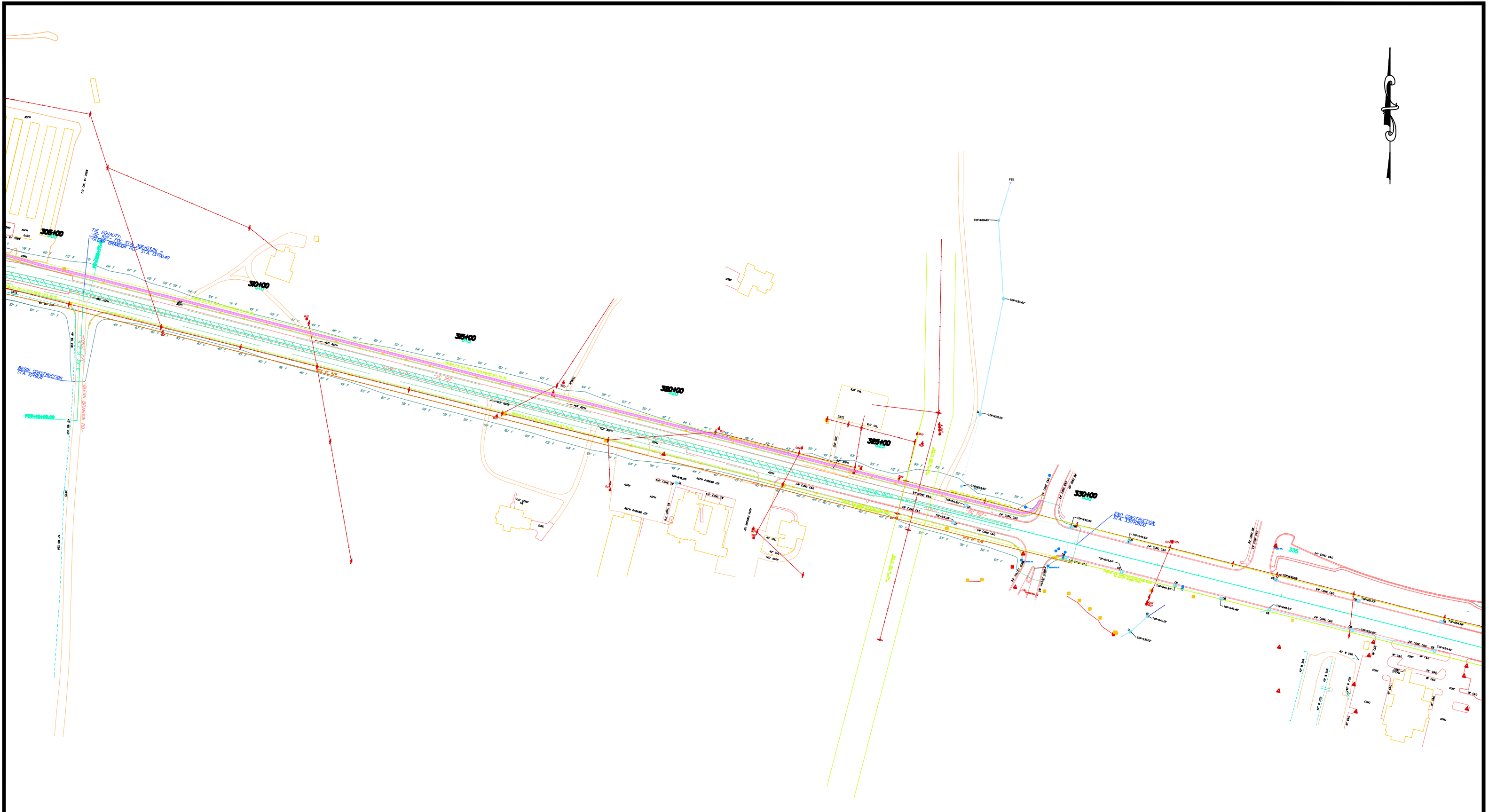
SCALE:	N.T.S.
PROJECT:	G4843.00
FIGURE:	N/A



<b>F&amp;ME</b> CONSULTANTS		SITE PLAN SC HIGHWAY 557 YORK COUNTY, SOUTH CAROLINA	
MULKEY ENGINEERS & CONSULTANTS		DRAWN BY: <u>N/A</u> CHECKED BY: <u>JLS</u> APPROVED BY: <u>GME</u>	SCALE: <u>N.T.S.</u> PROJECT: <u>G4843.00</u> FIGURE: <u>N/A</u>



<b>F&amp;ME</b> CONSULTANTS		SITE PLAN SC HIGHWAY 557 YORK COUNTY, SOUTH CAROLINA	
MULKEY ENGINEERS & CONSULTANTS		DRAWN BY: N/A CHECKED BY: JLS APPROVED BY: GME	SCALE: N.T.S. PROJECT: G4843.00 FIGURE: N/A



<b>F&amp;ME</b> CONSULTANTS		SITE PLAN SC HIGHWAY 557 YORK COUNTY, SOUTH CAROLINA	
MULKEY ENGINEERS & CONSULTANTS		DRAWN BY: <u>          N/A          </u> CHECKED BY: <u>          JLS          </u> APPROVED BY: <u>          GME          </u>	SCALE: <u>          N.T.S.          </u> PROJECT: <u>          G4843.00          </u> FIGURE: <u>          N/A          </u>

---

### **3. Site Photographs**

---

## **2012 Site Visit Photographs**









---

**2009 Site Visit Photographs**



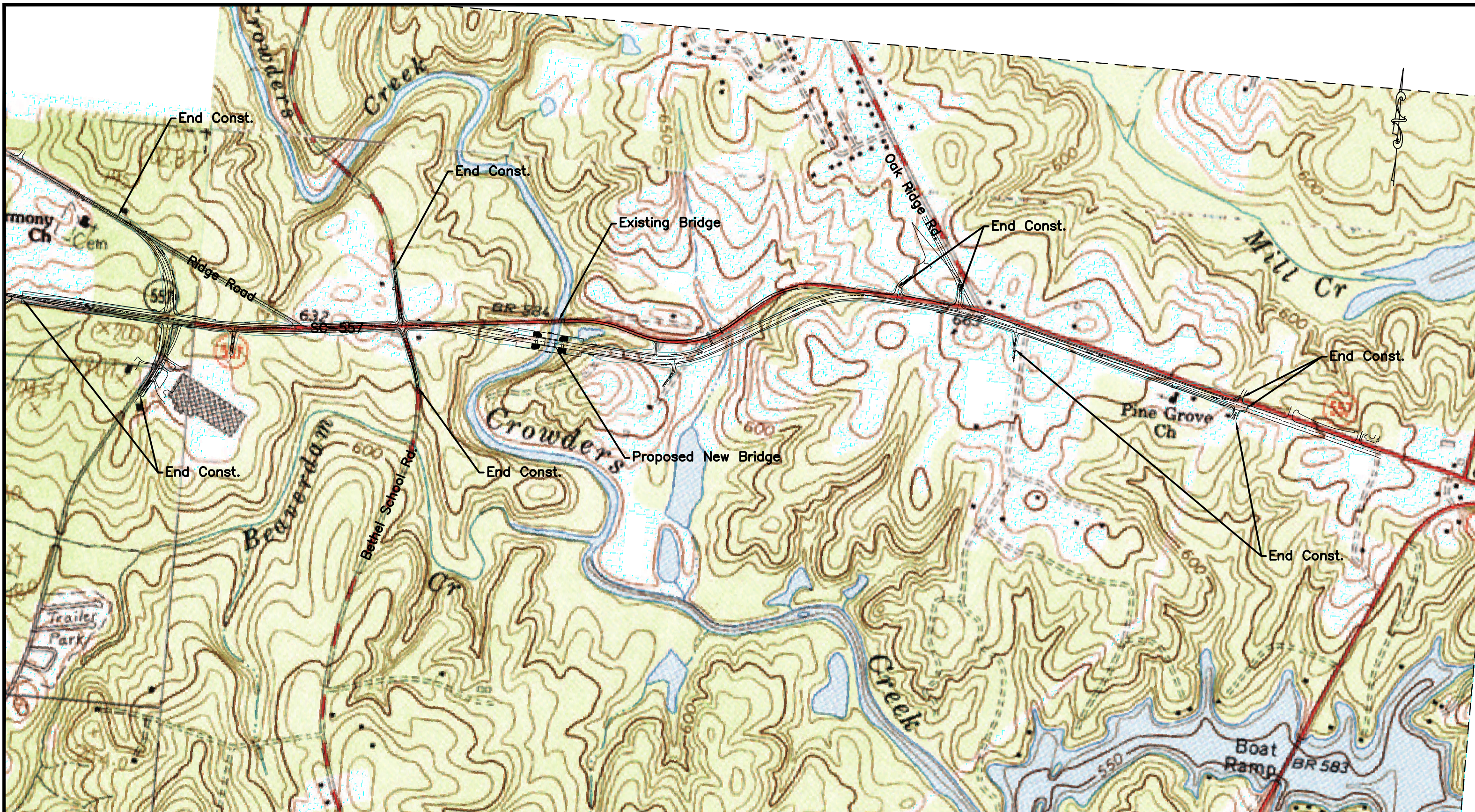




---

#### **4. Historical Research Documentation**





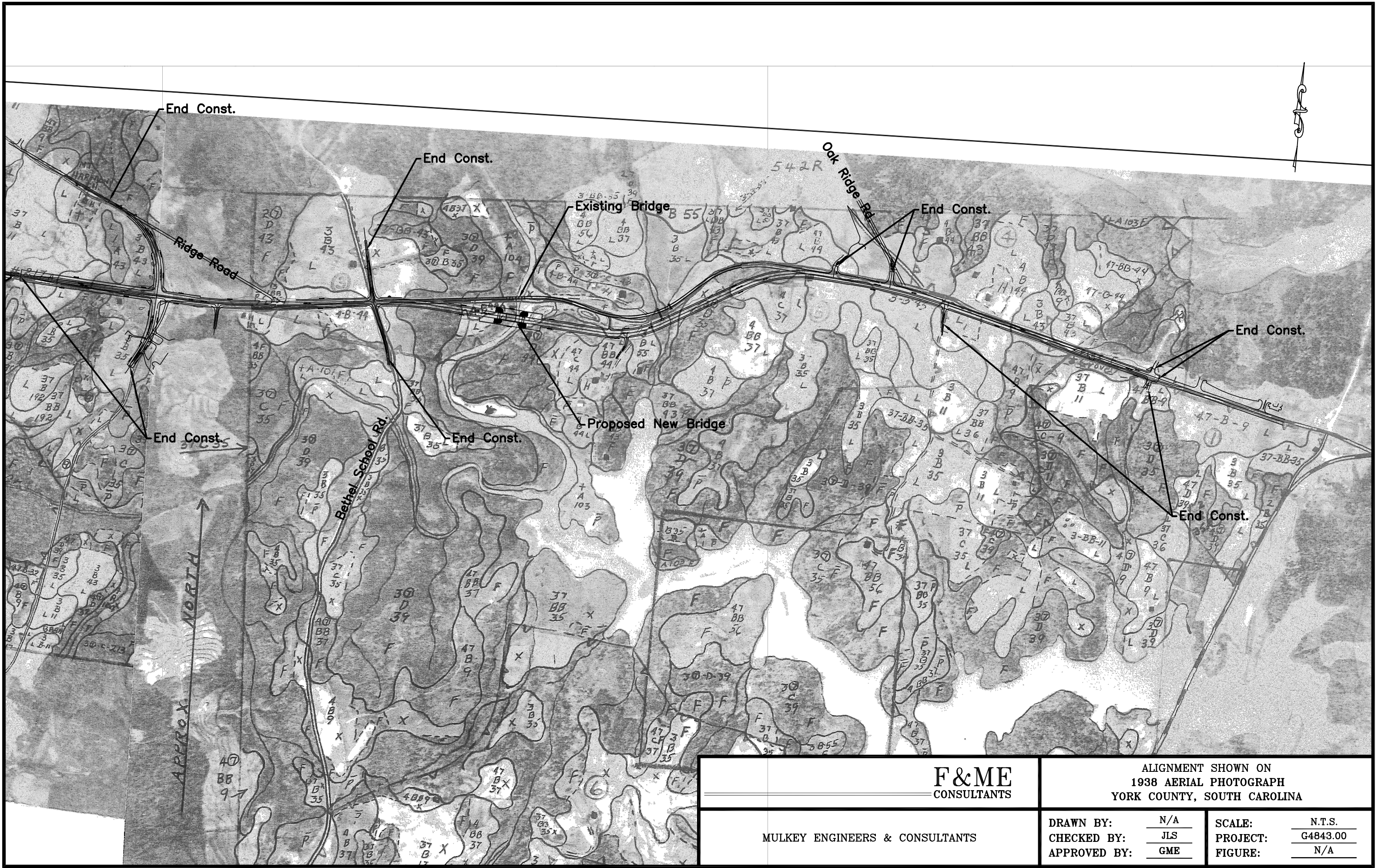
**F&ME**  
CONSULTANTS

ALIGNMENT SHOWN ON  
USGS SC, NC 1993 QUADRANGLE MAPS  
CONTOUR INTERVAL 10 FEET  
YORK COUNTY, SOUTH CAROLINA

MULKEY ENGINEERS & CONSULTANTS

DRAWN BY:	N/A
CHECKED BY:	JLS
APPROVED BY:	GME

SCALE:	N.T.S.
PROJECT:	G4843.00
FIGURE:	N/A



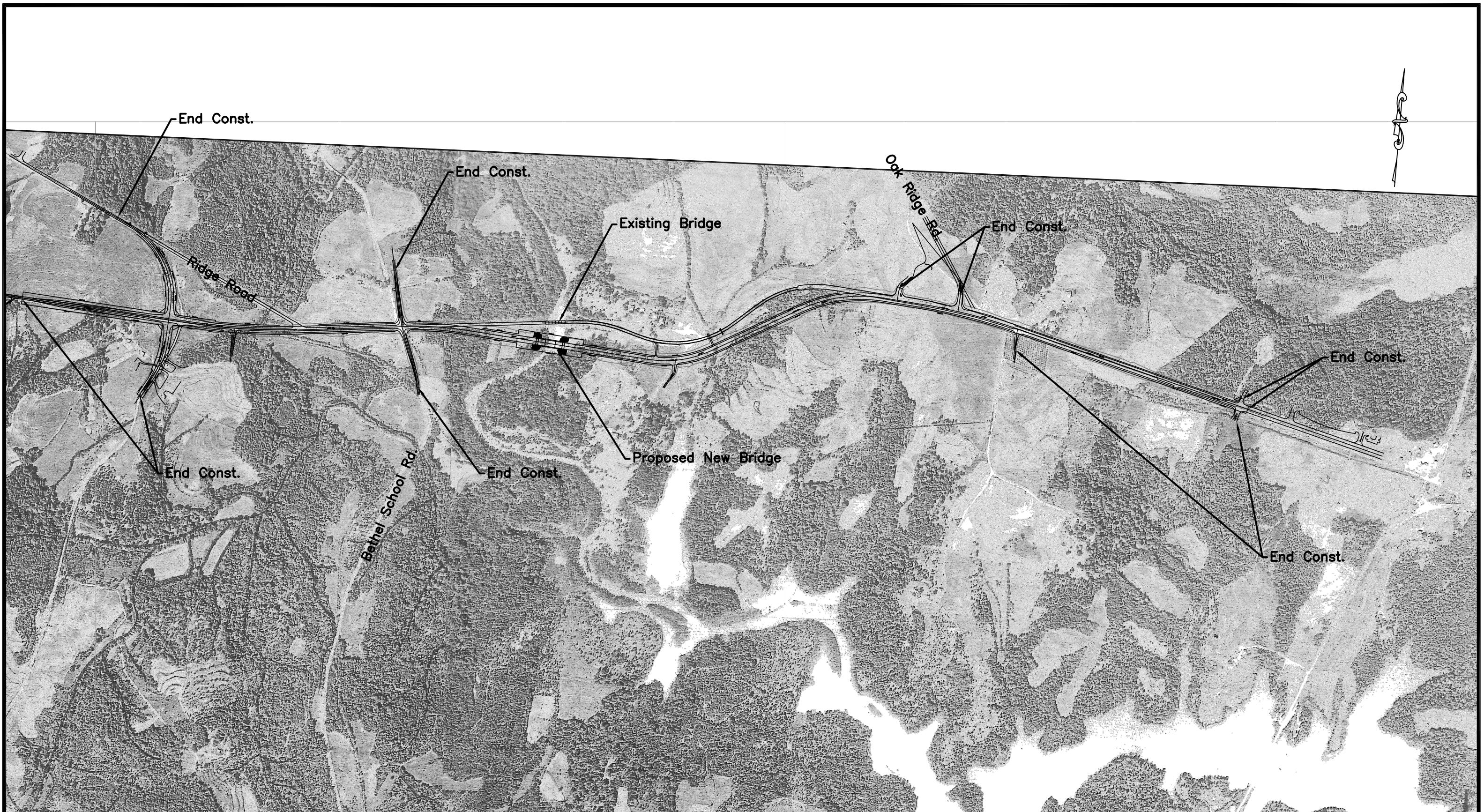
**F&ME**  
CONSULTANTS

ALIGNMENT SHOWN ON  
1938 AERIAL PHOTOGRAPH  
YORK COUNTY, SOUTH CAROLINA

MULKEY ENGINEERS & CONSULTANTS

DRAWN BY:	N/A
CHECKED BY:	JLS
APPROVED BY:	GME

SCALE:	N.T.S.
PROJECT:	G4843.00
FIGURE:	N/A



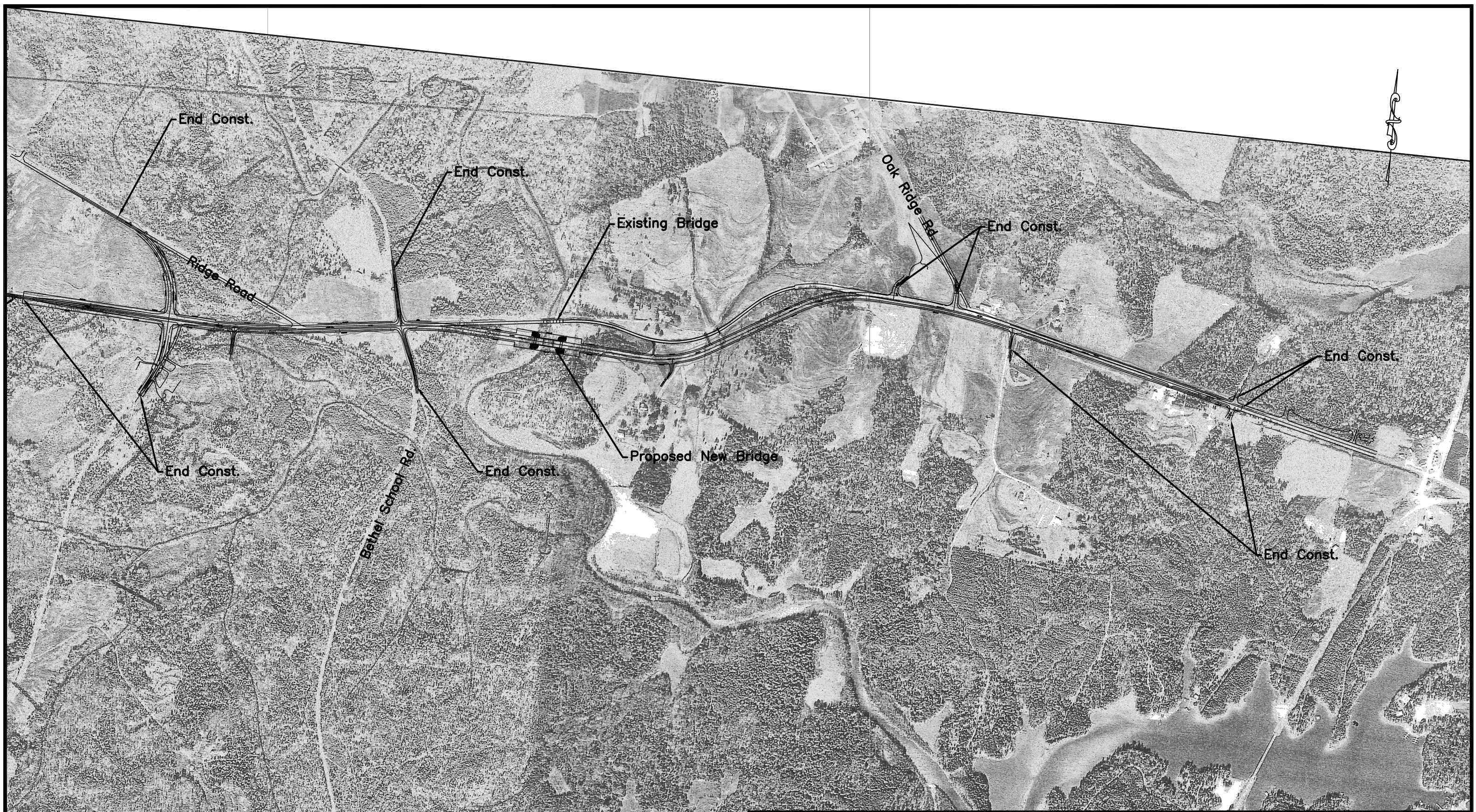
**F&ME**  
CONSULTANTS

ALIGNMENT SHOWN ON  
1949 AERIAL PHOTOGRAPH  
YORK COUNTY, SOUTH CAROLINA

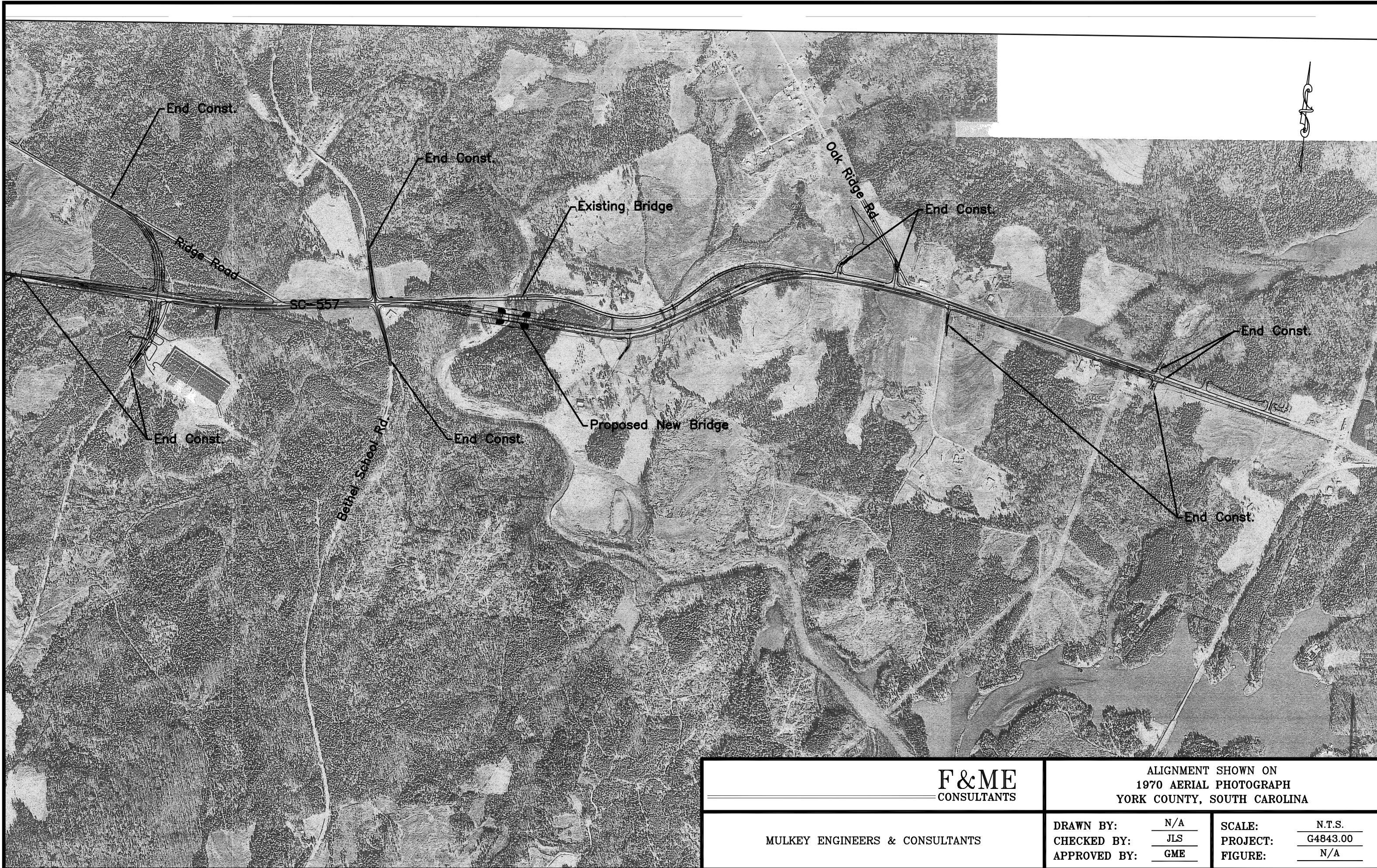
MULKEY ENGINEERS & CONSULTANTS

DRAWN BY:	N/A
CHECKED BY:	JLS
APPROVED BY:	GME

SCALE:	N.T.S.
PROJECT:	G4843.00
FIGURE:	N/A



<b>F &amp; ME</b> CONSULTANTS		ALIGNMENT SHOWN ON 1964 AERIAL PHOTOGRAPH YORK COUNTY, SOUTH CAROLINA	
MULKEY ENGINEERS & CONSULTANTS		DRAWN BY: <u>N/A</u> CHECKED BY: <u>JLS</u> APPROVED BY: <u>GME</u>	SCALE: <u>N.T.S.</u> PROJECT: <u>G4843.00</u> FIGURE: <u>N/A</u>



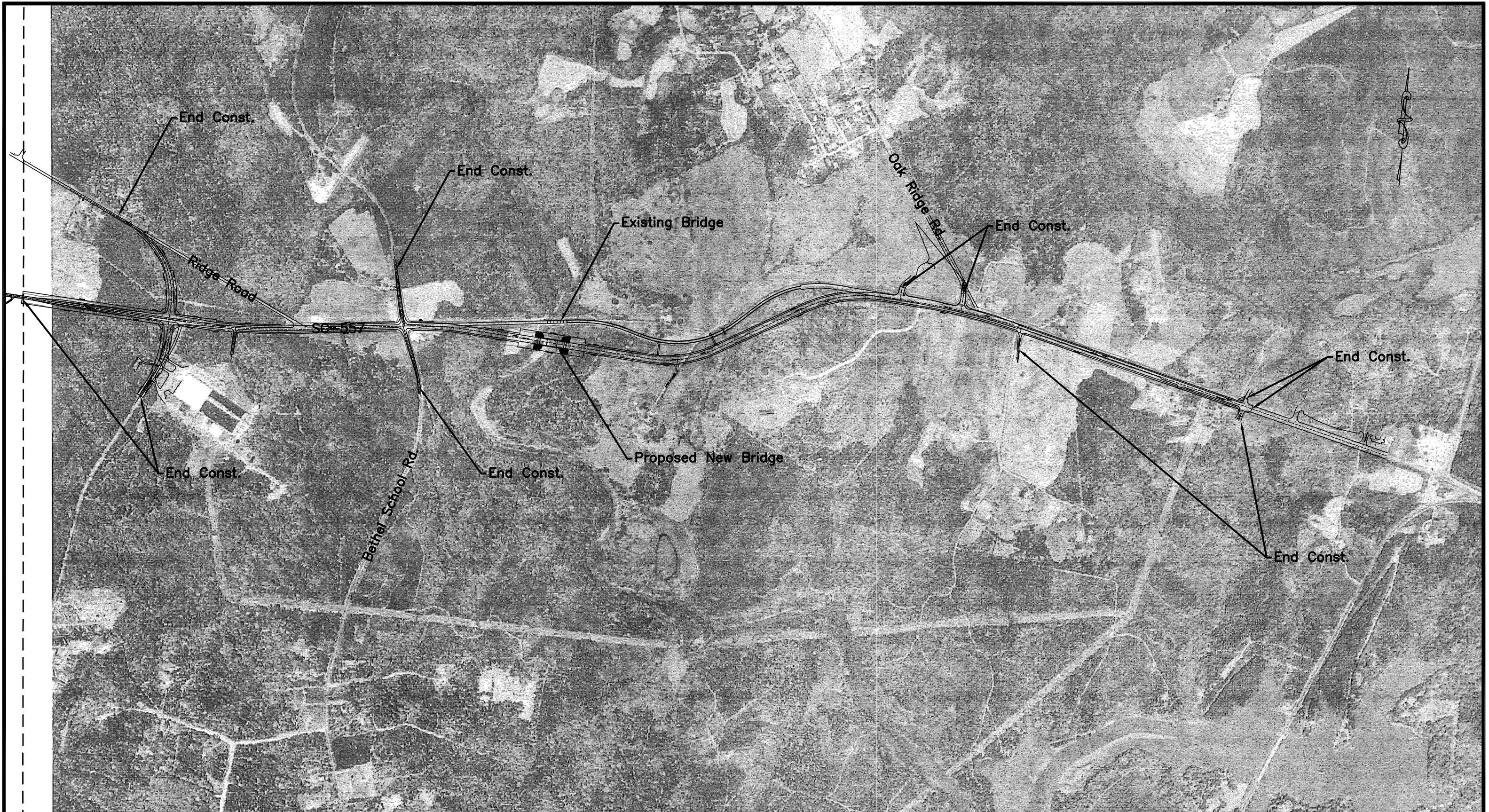
**F&ME**  
CONSULTANTS

ALIGNMENT SHOWN ON  
1970 AERIAL PHOTOGRAPH  
YORK COUNTY, SOUTH CAROLINA

MULKEY ENGINEERS & CONSULTANTS

DRAWN BY: N/A  
CHECKED BY: JLS  
APPROVED BY: GME

SCALE: N.T.S.  
PROJECT: G4843.00  
FIGURE: N/A



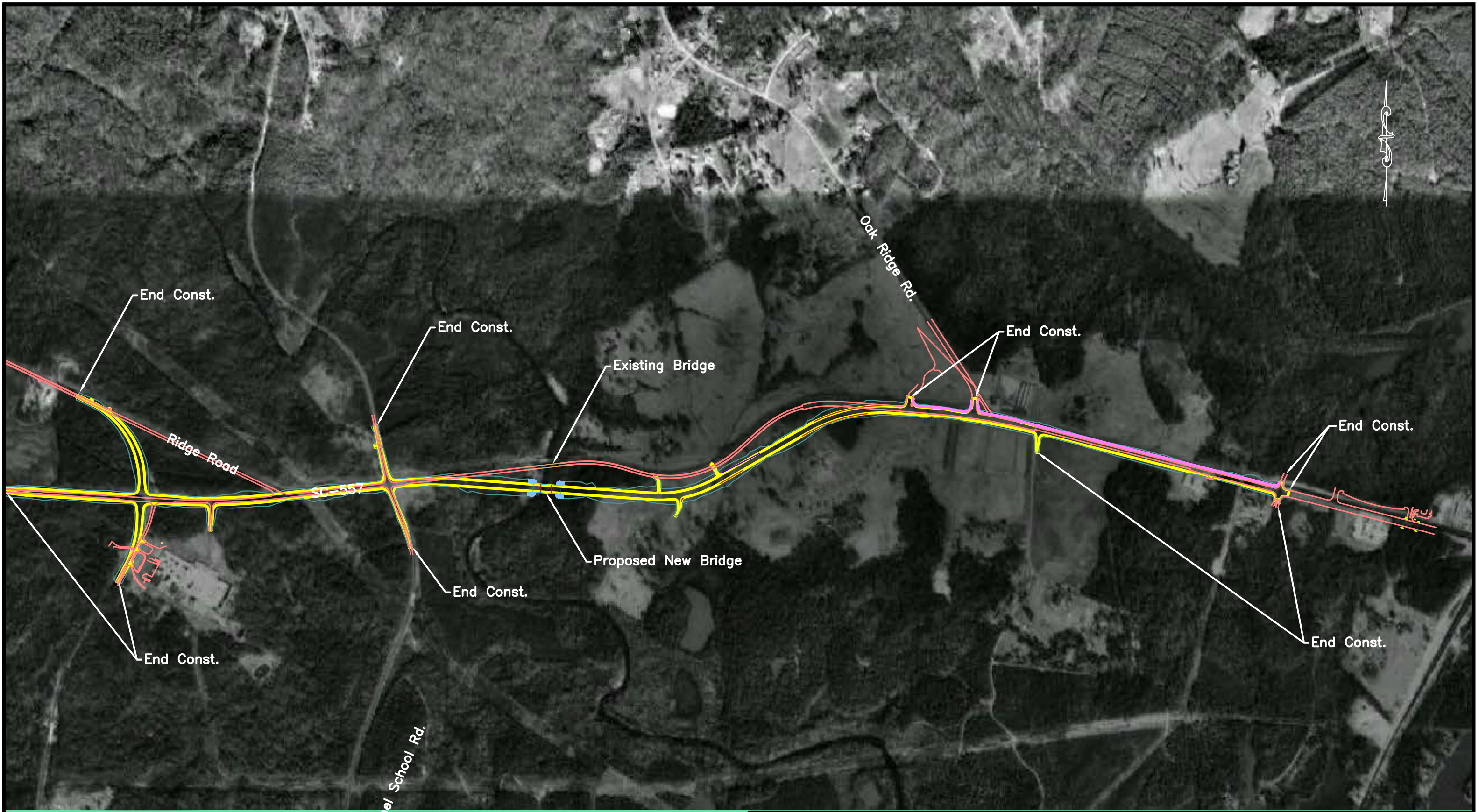
**F&ME**  
CONSULTANTS

ALIGNMENT SHOWN ON  
1979 AERIAL PHOTOGRAPH  
YORK COUNTY, SOUTH CAROLINA

MULKEY ENGINEERS & CONSULTANTS

DRAWN BY:           N/A            
 CHECKED BY:           JLS            
 APPROVED BY:           GME          

SCALE:           N.T.S.            
 PROJECT:           G4843.00            
 FIGURE:           N/A



MULKEY ENGINEERS & CONSULTANTS

**F&ME**  
CONSULTANTS

ALIGNMENT SHOWN ON  
1995 AERIAL PHOTOGRAPH  
YORK COUNTY, SOUTH CAROLINA

DRAWN BY: N/A  
CHECKED BY: JLS  
APPROVED BY: GME

SCALE: N.T.S.  
PROJECT: G4843.00  
FIGURE: N/A



  
 F&ME  
 CONSULTANTS

ALIGNMENT SHOWN ON  
 2002 AERIAL PHOTOGRAPH  
 YORK COUNTY, SOUTH CAROLINA

MULKEY ENGINEERS & CONSULTANTS

DRAWN BY:	<u>N/A</u>
CHECKED BY:	<u>JLS</u>
APPROVED BY:	<u>GME</u>

SCALE:	<u>N.T.S.</u>
PROJECT:	<u>G4843.00</u>
FIGURE:	<u>N/A</u>





**F&ME**  
CONSULTANTS

ALIGNMENT SHOWN ON  
2005 AERIAL PHOTOGRAPH  
YORK COUNTY, SOUTH CAROLINA

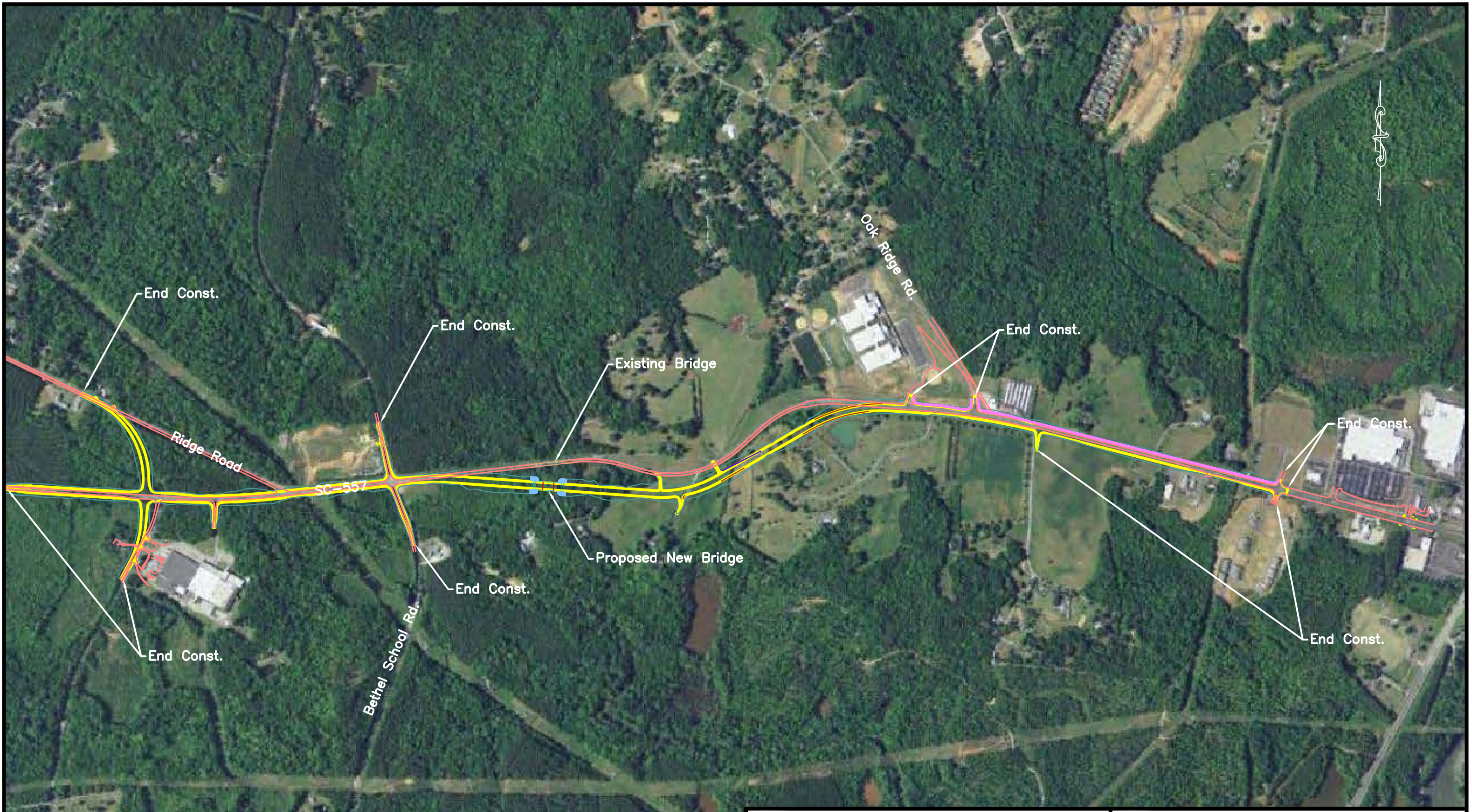
MULKEY ENGINEERS & CONSULTANTS

DRAWN BY: N/A  
CHECKED BY: JLS  
APPROVED BY: GME

SCALE: N.T.S.  
PROJECT: G4843.00  
FIGURE: N/A



<b>F&amp;ME</b> CONSULTANTS		ALIGNMENT SHOWN ON 2010 AERIAL PHOTOGRAPH YORK COUNTY, SOUTH CAROLINA	
MULKEY ENGINEERS & CONSULTANTS		DRAWN BY: <u>N/A</u> CHECKED BY: <u>JLS</u> APPROVED BY: <u>GME</u>	SCALE: <u>N.T.S.</u> PROJECT: <u>G4843.00</u> FIGURE: <u>N/A</u>



  
**F&ME**  
 CONSULTANTS

ALIGNMENT SHOWN ON  
 2011 AERIAL PHOTOGRAPH  
 YORK COUNTY, SOUTH CAROLINA

MULKEY ENGINEERS & CONSULTANTS

DRAWN BY:	N/A
CHECKED BY:	JLS
APPROVED BY:	GME

SCALE:	N.T.S.
PROJECT:	G4843.00
FIGURE:	N/A



U.S. Fish and Wildlife Service

# National Wetlands Inventory

SC 557 Freshwater Pond

Aug 15, 2012



## Wetlands

-  Freshwater Emergent
-  Freshwater Forested/Shrub
-  Estuarine and Marine Deepwater
-  Estuarine and Marine
-  Freshwater Pond
-  Lake
-  Riverine
-  Other

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

User Remarks:



U.S. Fish &amp; Wildlife Service

**National Wetlands Inventory**

Branch of Resource and Mapping Support

Enter Classification code:  (Example: **L1UB1Hx**)For geographically specific information\* (optional), please enter a State code:  (Example: **TX** for Texas)**DECODE**Description for code **PUBHh** :

**P** System **PALUSTRINE**: The Palustrine System includes all nontidal wetlands dominated by trees, shrubs, emergents, mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean derived salts is below 0.5 ppt. Wetlands lacking such vegetation are also included if they exhibit all of the following characteristics: 1. are less than 8 hectares ( 20 acres ); 2. do not have an active wave-formed or bedrock shoreline feature; 3. have at low water a depth less than 2 meters (6.6 feet) in the deepest part of the basin; 4. have a salinity due to ocean-derived salts of less than 0.5 ppt.

Subsystem :

**UB** Class **UNCONSOLIDATED BOTTOM**: Includes all wetlands and deepwater habitats with at least 25% cover of particles smaller than stones (less than 6-7 cm), and a vegetative cover less than 30%.

Subclass :

Modifier(s):

**H** WATER REGIME **Permanently Flooded**: Water covers the land surface throughout the year in all years.

**h** SPECIAL MODIFIER **Diked/Impounded**: These wetlands have been created or modified by a man-made barrier or dam which obstructs the inflow or outflow of water. The descriptors 'diked' and 'impounded' have been combined into a single modifier since the observed effect on wetlands is similar. They have been combined here due to image interpretation limitations. For clarification of the extent of impoundment see discussion of Lacustrine System limits.

Professional  
A  
MD

38 YK 87, 157-178  
(N<sup>o</sup> MAP)

SITED: 31 GSP 1-3

Phases I and II Archeological Study  
of  
Duke Power Company's  
Catawba to Peacock  
Proposed Transmission Line

Prepared for  
Duke Power Company

By  
Paul E. Brockington, Jr.  
Principal Investigator

Professional Service Industries, Inc.  
Soil Systems Division

February 1984

SUMMARY

Phase I and II surveys of the Catawba-Peacock Transmission Line were extremely successful. The primary study focus was to evaluate Piedmont site density patterns while providing management information to Duke Power Company. Better data on site density and location now exists through the implementation of the two-phased approach. Several tentative patterns were observed in the data which would have been impossible without the Phase II monitoring survey. At the same time, the Phase I survey was shown by Phase II to have provided all necessary management information. Phase II did not discover major, National Register sites not found in Phase I. It is hoped that future transmission line corridor studies can be performed in such a manner to provide efficient management information and useful research data.

## PHASE I RESULTS

Phase I of the study was accomplished in October, 1982. The first task was to examine State site records for the area to be affected by the Catawba to Peacock line so as to identify known sites. Both South Carolina and North Carolina State Historic Preservation Officer (SHPO) and State Archeologist staffs were consulted and files were inspected. No recorded sites were documented near the project area. A small, previously undocumented family graveyard was recorded by Duke Power Company during their initial centerline surveying. As such graveyards are not usually eligible for inclusion on the National Register of Historic Places, further examination of this small plot was not undertaken. Duke Power Company flagged and fenced the plot, and no impact will occur to it.

Using topographic maps (7.5 minute U.S.G.S. quadrangles) we identified several areas subjectively considered to have high site potential. These areas within the project corridor were selected because of their position as bluffs or terraces overlooking streams. All of these areas were in the southern portion of the project corridor (in South Carolina) in proximity to the Catawba River Valley. The northern portion of the project corridor is farther from a major river drainage and contains fewer streams with prominent terraces or bluffs. Figure 2 shows the areas selected as having relatively higher site potential.

The high potential areas were field checked for evidence of sites. Shovel tests were excavated and soil was examined for artifacts. Shovel tests were at 50 meter intervals except where ground surface visibility was good enough to allow omitting the test. No artifacts or other site evidence were found in these tested areas.



Also field checked were all areas shown on recent air photos (provided by Duke Power Company) as clear of vegetation. These included several cultivated fields, eroded/disturbed areas, and pastures with very thin grass cover. In these areas the ground was walked at 30 meter intervals with close visual inspection for artifacts on the surface. These areas included approximately three miles (20%) of the 15 mile project corridor. One prehistoric site was discovered.

Figure 3 shows the area of site 38YK87 in York County, South Carolina. This site was discovered in a highly disturbed roadside clearing/parking area adjacent to South Carolina Highway 557. Artifacts extend across the highway into a sparsely grassed pasture area. Artifacts included lithic debitage, uniface, and projectile points/knives, all of quartz. No ceramics were found. Points included one small Guilford and two fragmentary Savannah River Stemmed/Otarre specimens, dating the probable occupation of the site to the mid-late Archaic. Three small uniface were also found; these could have been used as scrapers although little evidence of wear (step-fracture type retouch) was present. A representative sample of debitage, including small flakes of bifacial retouch as well as larger primary and secondary reduction flakes, was collected.

A single one meter square test pit was excavated in the least disturbed portion of the site. All fill was screened through 1/4 inch mesh, and excavation was extended to 20 cm below present ground surface. At that point hard-packed B or C-horizon type clay was encountered. Artifacts were found only in the top 20 cm, and included 17 quartz flakes and one flake of schist-like material. One of the quartz flakes was possibly used as a unifacial tool, but no well-shaped or or heavily used tools were present.

38YK87

①

SITE-1

10/7/82

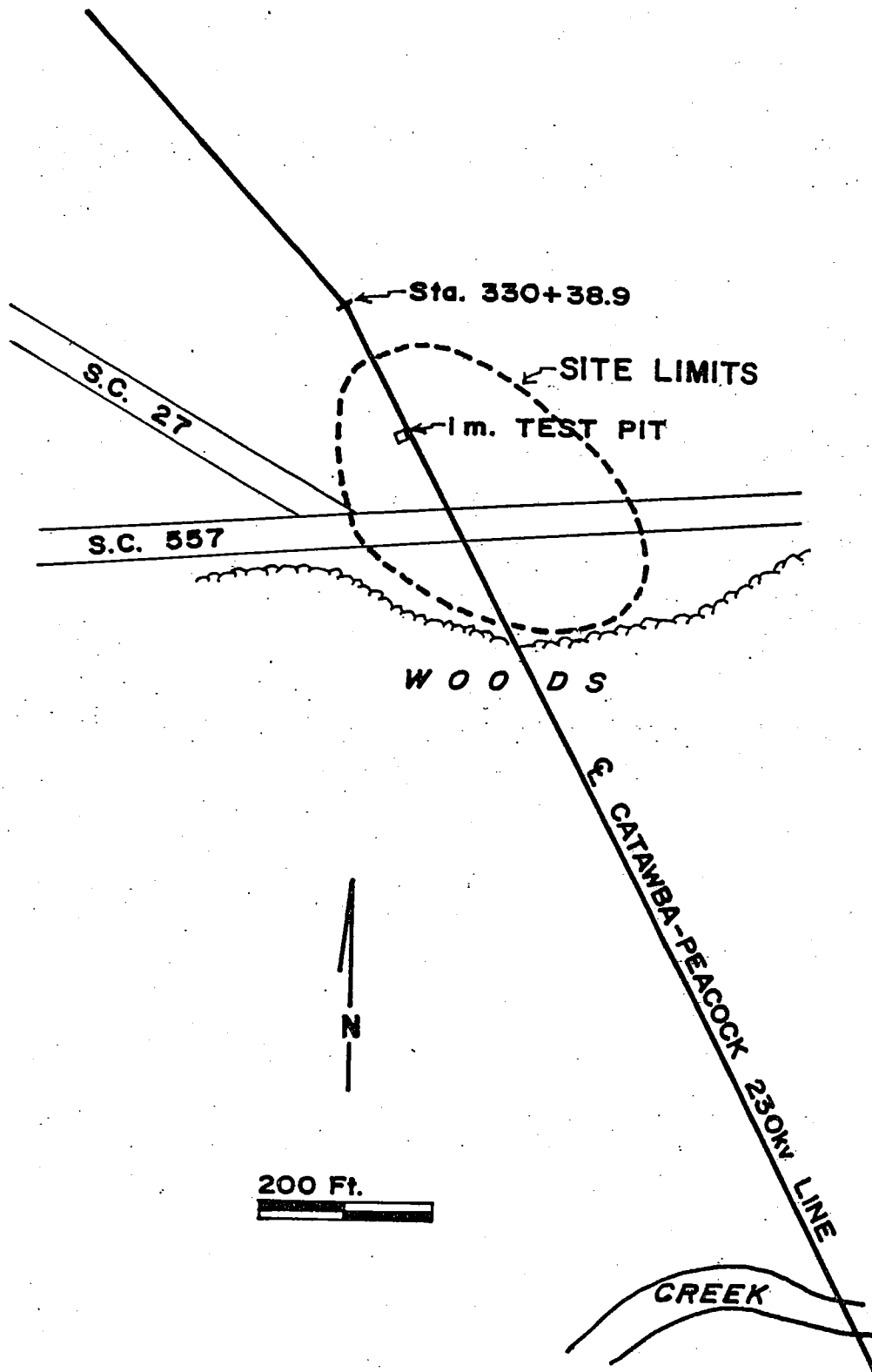


Figure 3. Sketch map of site 38YK87.

Soil stratigraphy in the single test pit excavated indicated that the original A (and most of the B) soil horizon had been eroded away. In the area of the test pit, cultivation in years past had created a plow zone within the B/C residuum that now contains all remaining artifacts. In the area south of the highway, erosion and possible heavy machinery clearing has removed even more of the original surface.

It is our recommendation that the site is too heavily disturbed to be considered as having sufficient research potential for inclusion on the National Register of Historic Sites. Construction of a state highway through the site and severe erosion has so destroyed site integrity that little more work could be done. We recommend that construction be allowed to proceed, but that the site be revisited during the monitoring phase, after corridor disking, to make an intensive surface collection (so that tool proportions and activities can be inferred) and to better establish site size and artifact density. This information will be useful for future comparative studies of such sites in the region and can be accomplished quite efficiently in the field (one-two hours).

---

## **5. Regulatory Records Documentation**

## Jessica Shannon

---

**From:** Young, LeAnn [younglr@dhec.sc.gov]  
**Sent:** Wednesday, July 18, 2012 12:53 PM  
**To:** Jessica Shannon  
**Subject:** Re: FOI Request Update

Jessica,

I have completed the research on the following requests:

1206207  
1206208  
1206210  
1206211  
1206212  
1206213

Nothing comes up in any of our databases for the exact addresses that you have given us, the only thing that comes up is Pharr Yarns Inc., it doesn't have an address in our system just SC HWY 557, the only files available for that is Bureau of Air Quality files. Would you be interested in that?

1206209 - There are no files available for this one at all. I am mailing out a no files letter for this one.

For the others, if you need documentation of what we have available I can send out individual letters stating that we have a Bureau of Air Quality file.

Please let me know how you would like me to proceed.

Thanks,

**LeAnn Young**  
**Administrative Coordinator I - Freedom of Information Office**  
**SC Department of Health & Environmental Control**  
**(803) 898-3880 Voice**  
**(803) 898-3816 Fax**

On Tue, Jul 17, 2012 at 4:46 PM, Mew, Karla A. <[mewka@dhec.sc.gov](mailto:mewka@dhec.sc.gov)> wrote:  
Jessica,

I am following up with my staff they were assigned to. I will have someone contact you as soon as possible.

Have a great evening!

Karla A. Mew  
Director, Freedom of Information Office

SC Department of Health & Environmental Control  
(803) 898-3817 Voice  
(803) 898-3816 Fax

On Tue, Jul 17, 2012 at 4:06 PM, Jessica Shannon <[jshannon@fmecol.com](mailto:jshannon@fmecol.com)> wrote:

Hi Karla,

I wanted to check in with you regarding the status of a series of FOI requests submitted last month. They are request numbers 1206207, 1206208, 1206209, 1206210, 1206212 and 1206213.

Thank you!

Regards,

**Jessica Shannon**

*Environmental Professional*

3112 Devine Street | Columbia, SC 29205

**F&ME**

P 803.254.4540 | F 803.254.4542 | C 803.518.2618

**CONSULTANTS**

[jshannon@fmecol.com](mailto:jshannon@fmecol.com) | [www.fmecol.com](http://www.fmecol.com)

*Geotechnical • Environmental • Materials*

June 19, 2012

Ms. Karla Mew, Director  
Freedom of Information Coordinator, EQC  
SC Department of Health and Environmental Control  
2600 Bull Street  
Columbia, South Carolina 29201

WWW.FMECOL.COM

COLUMBIA OFFICE  
3112 Devine Street  
Columbia, SC 29205  
P 803.254.4540  
F 803.254.4542

BEAUFORT OFFICE  
26 John Galt Road, Suite A  
Beaufort, SC 29906  
P 843.522.0246  
F 803.254.4542

Re: Request for information pertaining to environmental problems  
5300-5400 SC Hwy 557  
(Between the Towns of Clover and Lake Wylie)  
York County, South Carolina

Dear Ms. Mew:

This is a request for information pertaining to any environmental problems that may have been registered with you for the above referenced property.

Any information pertaining to environmental problems may consist of the following:

- 1) Information pertaining to the removal or installation of above ground and underground storage tanks;
- 2) Issuance of any environmentally related permit and well record;
- 3) Issuance of any license (or complaints against) to store hazardous substances and/or petroleum products on the subject property or adjacent properties and any action taken;
- 4) Issuance of any license (or complaints) regarding waste disposal on the subject property or adjacent properties; and
- 5) Brownfield site on the subject property or adjacent properties.

If you have any questions, please do not hesitate to contact us. We would appreciate your response as soon as is convenient.

Regards,

F&ME CONSULTANTS



Jessica L. Shannon  
Environmental Professional



AASHTO ACCREDITED  
LABORATORY



South Carolina Department of Health  
and Environmental Control

Freedom of Information Center / Sims/Aycock Building  
2600 Bull St, Columbia, SC 29201

Ms. Jessica L. Shannon  
F&ME CONSULTANTS  
3112 DEVINE ST  
COLUMBIA, SC 29205

6/22/2012

Request Number: 1206207

Re: 5300-5400 SC HWY 557  
York County, SC

Dear Ms. Jessica L. Shannon,

Your request for the above referenced information has been received by the Freedom of Information Center. The Freedom of Information staff are currently researching and compiling this information. You will be notified by our office when the research process is complete and files are ready for your review or files are ready to be copied.

If we are unable to locate files on a facility, based on the information submitted, you will be notified by mail.

Any requested department reports, publications or materials, other than facility files, will be mailed to you when completed.

Further inquiries regarding your request should include your above mentioned Freedom of Information Request Number. We can be reached at (803) 898 - 3882.

Sincerely,

Karla Mew, Director  
Freedom of Information Center  
Office of Director

South Carolina Department of Health and Environmental Control

2600 Bull Street ~ Columbia, SC 29201 ~ Phone (803) 898-3432 ~www.scdhec.gov





Freedom of Information Center / Sims/Aycock Building  
2600 Bull St, Columbia, SC 29201

Ms. Jessica L. Shannon  
F&ME CONSULTANTS  
3112 DEVINE ST  
COLUMBIA, SC 29205

7/20/2012

Request Number: 1206207

Re: 5300-5400 SC HWY 557  
York County, SC

Dear Ms. Jessica L. Shannon,

After researching requested information, we have found that the Agency maintains files in the following program areas:

Bureau of Water

Bureau of Air Quality

Bureau of Underground Storage Tank Management

Bureau of Land and Waste Management

The Underground Storage Tanks and Land and Waste Management files are located at :

FOI Satellite Office  
Stern Business Center  
8911 Farrow Road  
Columbia SC

Please contact the FOI Center at (803) 898 - 3882 to schedule an appointment to review the requested department files. If you wish, a copy of the files may be made and mailed to you. If there is a maximum amount which you do not wish to exceed in copying charges, please let us know. (Copying charges are \$.25 per page)

If we do not hear from you within 10 days from the date of this letter, we will assume that the information is no longer required and your request will be considered complete.

Note: If you are not able to make the appointment, please inform our office within 24 hours of the appointment time. There will be a \$15.00 reshelving fee for missed appointments.

South Carolina Department of Health and Environmental Control

2600 Bull Street ~ Columbia, SC 29201 ~ Phone (803) 898-3432 ~www.scdhec.gov

June 19, 2012

Ms. Karla Mew, Director  
Freedom of Information Coordinator, EQC  
SC Department of Health and Environmental Control  
2600 Bull Street  
Columbia, South Carolina 29201

WWW.FMECOL.COM

COLUMBIA OFFICE  
3112 Devine Street  
Columbia, SC 29205  
P 803.254.4540  
F 803.254.4542

BEAUFORT OFFICE  
26 John Galt Road, Suite A  
Beaufort, SC 29906  
P 843.522.0246  
F 803.254.4542

Re: Request for information pertaining to environmental problems  
125 Kingsberry Road  
(Between the Towns of Clover and Lake Wylie)  
York County, South Carolina

Dear Ms. Mew:

This is a request for information pertaining to any environmental problems that may have been registered with you for the above referenced property.

Any information pertaining to environmental problems may consist of the following:

- 1) Information pertaining to the removal or installation of above ground and underground storage tanks;
- 2) Issuance of any environmentally related permit and well record;
- 3) Issuance of any license (or complaints against) to store hazardous substances and/or petroleum products on the subject property or adjacent properties and any action taken;
- 4) Issuance of any license (or complaints) regarding waste disposal on the subject property or adjacent properties; and
- 5) Brownfield site on the subject property or adjacent properties.

If you have any questions, please do not hesitate to contact us. We would appreciate your response as soon as is convenient.

Regards,

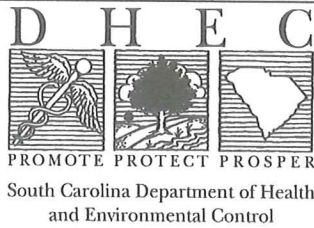
F&ME CONSULTANTS



Jessica L. Shannon  
Environmental Professional



AASHTO ACCREDITED  
LABORATORY



Freedom of Information Center / Sims/Aycock Building  
2600 Bull St, Columbia, SC 29201

Ms. Jessica Shannon  
F&ME CONSULTANTS  
3112 DEVINE ST  
COLUMBIA, SC 29205

6/22/2012

Request Number: 1206208

Re: 125 Kingsberry Road  
York County, SC

Dear Ms. Jessica Shannon,

Your request for the above referenced information has been received by the Freedom of Information Center. The Freedom of Information staff are currently researching and compiling this information. You will be notified by our office when the research process is complete and files are ready for your review or files are ready to be copied.

If we are unable to locate files on a facility, based on the information submitted, you will be notified by mail.

Any requested department reports, publications or materials, other than facility files, will be mailed to you when completed.

Further inquiries regarding your request should include your above mentioned Freedom of Information Request Number. We can be reached at (803) 898 - 3882.

Sincerely,

A handwritten signature in cursive script that reads 'Karla A. Mew'.

Karla Mew, Director  
Freedom of Information Center  
Office of Director



South Carolina Department of Health  
and Environmental Control

Freedom of Information Center / Sims/Aycock Building  
2600 Bull St, Columbia, SC 29201

Ms. Jessica Shannon  
F&ME CONSULTANTS  
3112 DEVINE ST  
COLUMBIA, SC 29205

7/20/2012

Request Number: 1206208

Re: 125 Kingsberry Road  
York County, SC

Dear Ms. Jessica Shannon,

After researching requested information, we have found that the Agency maintains files in the following program areas:

Bureau of Water

Bureau of Air Quality

Bureau of Underground Storage Tank Management

Bureau of Land and Waste Management

The Underground Storage Tanks and Land and Waste Management files are located at :

FOI Satellite Office  
Stern Business Center  
8911 Farrow Road  
Columbia SC

Please contact the FOI Center at (803) 898 - 3882 to schedule an appointment to review the requested department files. If you wish, a copy of the files may be made and mailed to you. If there is a maximum amount which you do not wish to exceed in copying charges, please let us know. (Copying charges are \$.25 per page)

If we do not hear from you within 10 days from the date of this letter, we will assume that the information is no longer required and your request will be considered complete.

Note: If you are not able to make the appointment, please inform our office within 24 hours of the appointment time. There will be a \$15.00 reshelving fee for missed appointments.

South Carolina Department of Health and Environmental Control

2600 Bull Street ~ Columbia, SC 29201 ~ Phone (803) 898-3432 ~www.scdhec.gov

June 19, 2012

Ms. Karla Mew, Director  
Freedom of Information Coordinator, EQC  
SC Department of Health and Environmental Control  
2600 Bull Street  
Columbia, South Carolina 29201

WWW.FMECOL.COM

COLUMBIA OFFICE  
3112 Devine Street  
Columbia, SC 29205  
P 803.254.4540  
F 803.254.4542

BEAUFORT OFFICE  
26 John Galt Road, Suite A  
Beaufort, SC 29906  
P 843.522.0246  
F 803.254.4542

Re: Request for information pertaining to environmental problems  
6100 - 6285 Ridge Road SC Hwy 557  
(Between the Towns of Clover and Lake Wylie)  
York County, South Carolina

Dear Ms. Mew:

This is a request for information pertaining to any environmental problems that may have been registered with you for the above referenced property.

Any information pertaining to environmental problems may consist of the following:

- 1) Information pertaining to the removal or installation of above ground and underground storage tanks;
- 2) Issuance of any environmentally related permit and well record;
- 3) Issuance of any license (or complaints against) to store hazardous substances and/or petroleum products on the subject property or adjacent properties and any action taken;
- 4) Issuance of any license (or complaints) regarding waste disposal on the subject property or adjacent properties; and
- 5) Brownfield site on the subject property or adjacent properties.

If you have any questions, please do not hesitate to contact us. We would appreciate your response as soon as is convenient.

Regards,

F&ME CONSULTANTS



Jessica L. Shannon  
Environmental Professional



AASHTO ACCREDITED  
LABORATORY



South Carolina Department of Health  
and Environmental Control

Freedom of Information Center / Sims/Aycock Building  
2600 Bull St, Columbia, SC 29201

Ms. Jessica Shannon  
F&ME CONSULTANTS  
3112 DEVINE ST  
COLUMBIA, SC 29205

6/22/2012

Request Number: 1206209

Re: 6100-6285 Ridge Road SC HWY 557  
York County, SC

Dear Ms. Jessica Shannon,

Your request for the above referenced information has been received by the Freedom of Information Center. The Freedom of Information staff are currently researching and compiling this information. You will be notified by our office when the research process is complete and files are ready for your review or files are ready to be copied.

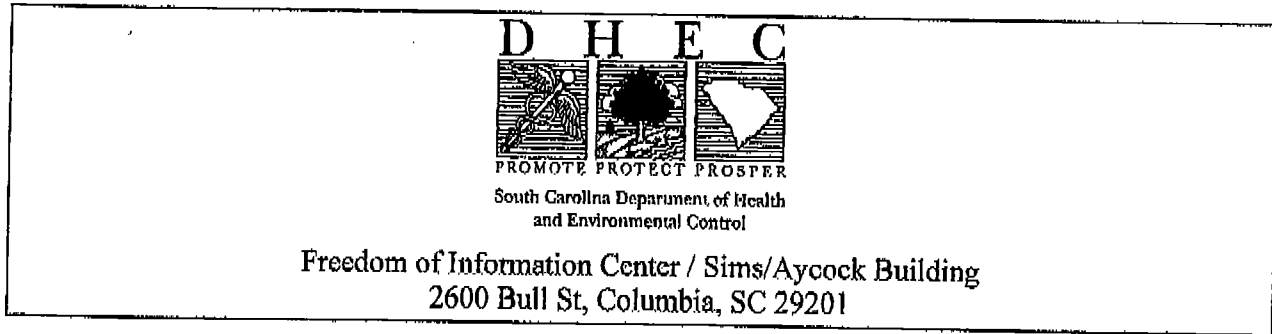
If we are unable to locate files on a facility, based on the information submitted, you will be notified by mail.

Any requested department reports, publications or materials, other than facility files, will be mailed to you when completed.

Further inquiries regarding your request should include your above mentioned Freedom of Information Request Number. We can be reached at (803) 898 - 3882.

Sincerely,

Karla Mew, Director  
Freedom of Information Center  
Office of Director



Ms. Jessica Shannon  
F&ME CONSULTANTS  
3112 DEVINE ST  
COLUMBIA, SC 29205

7/25/2012

Request Number: 1206209

Re: 6100-6285 Ridge Road SC HWY 557  
York County, SC

Dear Ms. Jessica Shannon,

This is to advise you that the Freedom of Information Center could not locate any files on the referenced subject, company individual, and /or address as submitted.

If you feel that the information you requested may be found under another name or description, please submit the additional information by fax (803) 898 - 3816 referencing the above Request Number.

If you have any questions or require further assistance, please contact our office at (803) 898 - 3882.

Sincerely,

*Karla A. Mew*

Karla Mew,  
Director Freedom of Information Center  
Office of Director

June 19, 2012

Ms. Karla Mew, Director  
Freedom of Information Coordinator, EQC  
SC Department of Health and Environmental Control  
2600 Bull Street  
Columbia, South Carolina 29201

WWW.FMECOL.COM

COLUMBIA OFFICE  
3112 Devine Street  
Columbia, SC 29205  
P 803.254.4540  
F 803.254.4542

BEAUFORT OFFICE  
26 John Galt Road, Suite A  
Beaufort, SC 29906  
P 843.522.0246  
F 803.254.4542

Re: Request for information pertaining to environmental problems  
5901-6200 SC Hwy 557  
(Between the Towns of Clover and Lake Wylie)  
York County, South Carolina

Dear Ms. Mew:

This is a request for information pertaining to any environmental problems that may have been registered with you for the above referenced property.

Any information pertaining to environmental problems may consist of the following:

- 1) Information pertaining to the removal or installation of above ground and underground storage tanks;
- 2) Issuance of any environmentally related permit and well record;
- 3) Issuance of any license (or complaints against) to store hazardous substances and/or petroleum products on the subject property or adjacent properties and any action taken;
- 4) Issuance of any license (or complaints) regarding waste disposal on the subject property or adjacent properties; and
- 5) Brownfield site on the subject property or adjacent properties.

If you have any questions, please do not hesitate to contact us. We would appreciate your response as soon as is convenient.

Regards,

F&ME CONSULTANTS

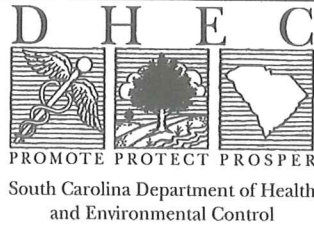


Jessica L. Shannon  
Environmental Professional



AASHTO ACCREDITED  
LABORATORY





Freedom of Information Center / Sims/Aycock Building  
2600 Bull St, Columbia, SC 29201

Ms. Jessica Shannon  
F&ME CONSULTANTS  
3112 DEVINE ST  
COLUMBIA, SC 29205

6/22/2012

Request Number: 1206210

Re: 5901-6200 SC HWY 557  
York County, SC

Dear Ms. Jessica Shannon,

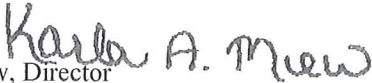
Your request for the above referenced information has been received by the Freedom of Information Center. The Freedom of Information staff are currently researching and compiling this information. You will be notified by our office when the research process is complete and files are ready for your review or files are ready to be copied.

If we are unable to locate files on a facility, based on the information submitted, you will be notified by mail.

Any requested department reports, publications or materials, other than facility files, will be mailed to you when completed.

Further inquiries regarding your request should include your above mentioned Freedom of Information Request Number. We can be reached at (803) 898 - 3882.

Sincerely,

  
Karla Mew, Director  
Freedom of Information Center  
Office of Director



Freedom of Information Center / Sims/Aycock Building  
2600 Bull St, Columbia, SC 29201

Ms. Jessica Shannon  
F&ME CONSULTANTS  
3112 DEVINE ST  
COLUMBIA, SC 29205

7/20/2012

Request Number: 1206210

Re: 5901-6200 SC HWY 557  
York County, SC

Dear Ms. Jessica Shannon,

After researching requested information, we have found that the Agency maintains files in the following program areas:

- Bureau of Water
- Bureau of Air Quality
- Bureau of Underground Storage Tank Management
- Bureau of Land and Waste Management

The Underground Storage Tanks and Land and Waste Management files are located at :

FOI Satellite Office  
Stern Business Center  
8911 Farrow Road  
Columbia SC

Please contact the FOI Center at (803) 898 - 3882 to schedule an appointment to review the requested department files. If you wish, a copy of the files may be made and mailed to you. If there is a maximum amount which you do not wish to exceed in copying charges, please let us know. (Copying charges are \$.25 per page)

If we do not hear from you within 10 days from the date of this letter, we will assume that the information is no longer required and your request will be considered complete.

Note: If you are not able to make the appointment, please inform our office within 24 hours of the appointment time. There will be a \$15.00 reshelving fee for missed appointments.

June 19, 2012

Ms. Karla Mew, Director  
Freedom of Information Coordinator, EQC  
SC Department of Health and Environmental Control  
2600 Bull Street  
Columbia, South Carolina 29201

Re: Request for information pertaining to environmental problems  
5401-5500 SC Hwy 557  
(Between the Towns of Clover and Lake Wylie)  
York County, South Carolina

Dear Ms. Mew:

This is a request for information pertaining to any environmental problems that may have been registered with you for the above referenced property.

Any information pertaining to environmental problems may consist of the following:

- 1) Information pertaining to the removal or installation of above ground and underground storage tanks;
- 2) Issuance of any environmentally related permit and well record;
- 3) Issuance of any license (or complaints against) to store hazardous substances and/or petroleum products on the subject property or adjacent properties and any action taken;
- 4) Issuance of any license (or complaints) regarding waste disposal on the subject property or adjacent properties; and
- 5) Brownfield site on the subject property or adjacent properties.

If you have any questions, please do not hesitate to contact us. We would appreciate your response as soon as is convenient.

Regards,

F&ME CONSULTANTS



Jessica L. Shannon  
Environmental Professional

WWW.FMECOL.COM

COLUMBIA OFFICE  
3112 Devine Street  
Columbia, SC 29205  
P 803.254.4540  
F 803.254.4542

BEAUFORT OFFICE  
26 John Galt Road, Suite A  
Beaufort, SC 29906  
P 843.522.0246  
F 803.254.4542



AASHTO ACCREDITED  
LABORATORY



South Carolina Department of Health  
and Environmental Control

Freedom of Information Center / Sims/Aycock Building  
2600 Bull St, Columbia, SC 29201

Ms. Jessica Shannon  
F&ME CONSULTANTS  
3112 DEVINE ST  
COLUMBIA, SC 29205

7/20/2012

Request Number: 1206211

Re: 5401-5500 SC HWY 557  
York County, SC

Dear Ms. Jessica Shannon,

Your request for the above referenced information has been received by the Freedom of Information Center. The Freedom of Information staff are currently researching and compiling this information. You will be notified by our office when the research process is complete and files are ready for your review or files are ready to be copied.

If we are unable to locate files on a facility, based on the information submitted, you will be notified by mail.

Any requested department reports, publications or materials, other than facility files, will be mailed to you when completed.

Further inquiries regarding your request should include your above mentioned Freedom of Information Request Number. We can be reached at (803) 898 - 3882.

Sincerely,

Karla Mew, Director  
Freedom of Information Center  
Office of Director

---

South Carolina Department of Health and Environmental Control

2600 Bull Street ~ Columbia, SC 29201 ~ Phone (803) 898-3432 ~www.scdhec.gov



Freedom of Information Center / Sims/Aycock Building  
2600 Bull St, Columbia, SC 29201

Ms. Jessica Shannon  
F&ME CONSULTANTS  
3112 DEVINE ST  
COLUMBIA, SC 29205

7/20/2012

Request Number: 1206211

Re: 5401-5500 SC HWY 557  
York County, SC

Dear Ms. Jessica Shannon,

After researching requested information, we have found that the Agency maintains files in the following program areas:

Bureau of Water

Bureau of Air Quality

Bureau of Underground Storage Tank Management

Bureau of Land and Waste Management

The Underground Storage Tanks and Land and Waste Management files are located at :

FOI Satellite Office  
Stern Business Center  
8911 Farrow Road  
Columbia SC

Please contact the FOI Center at (803) 898 - 3882 to schedule an appointment to review the requested department files. If you wish, a copy of the files may be made and mailed to you. If there is a maximum amount which you do not wish to exceed in copying charges, please let us know. (Copying charges are \$.25 per page)

If we do not hear from you within 10 days from the date of this letter, we will assume that the information is no longer required and your request will be considered complete.

Note: If you are not able to make the appointment, please inform our office within 24 hours of the appointment time. There will be a \$15.00 reshelving fee for missed appointments.

June 19, 2012

Ms. Karla Mew, Director  
Freedom of Information Coordinator, EQC  
SC Department of Health and Environmental Control  
2600 Bull Street  
Columbia, South Carolina 29201

WWW.FMECOL.COM

COLUMBIA OFFICE  
3112 Devine Street  
Columbia, SC 29205  
P 803.254.4540  
F 803.254.4542

BEAUFORT OFFICE  
26 John Galt Road, Suite A  
Beaufort, SC 29906  
P 843.522.0246  
F 803.254.4542

Re: Request for information pertaining to environmental problems  
5501-5600 SC Hwy 557  
(Between the Towns of Clover and Lake Wylie)  
York County, South Carolina

Dear Ms. Mew:

This is a request for information pertaining to any environmental problems that may have been registered with you for the above referenced property.

Any information pertaining to environmental problems may consist of the following:

- 1) Information pertaining to the removal or installation of above ground and underground storage tanks;
- 2) Issuance of any environmentally related permit and well record;
- 3) Issuance of any license (or complaints against) to store hazardous substances and/or petroleum products on the subject property or adjacent properties and any action taken;
- 4) Issuance of any license (or complaints) regarding waste disposal on the subject property or adjacent properties; and
- 5) Brownfield site on the subject property or adjacent properties.

If you have any questions, please do not hesitate to contact us. We would appreciate your response as soon as is convenient.

Regards,

F&ME CONSULTANTS



Jessica L. Shannon  
Environmental Professional



AASHTO ACCREDITED  
LABORATORY



South Carolina Department of Health  
and Environmental Control

Freedom of Information Center / Sims/Aycock Building  
2600 Bull St, Columbia, SC 29201

Ms. Jessica Shannon  
F&ME CONSULTANTS  
3112 DEVINE ST  
COLUMBIA, SC 29205

6/22/2012

Request Number: 1206212

Re: 5501-5600 SC HWY 557  
York County, SC

Dear Ms. Jessica Shannon,

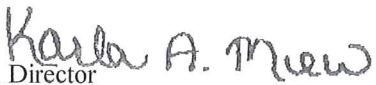
Your request for the above referenced information has been received by the Freedom of Information Center. The Freedom of Information staff are currently researching and compiling this information. You will be notified by our office when the research process is complete and files are ready for your review or files are ready to be copied.

If we are unable to locate files on a facility, based on the information submitted, you will be notified by mail.

Any requested department reports, publications or materials, other than facility files, will be mailed to you when completed.

Further inquiries regarding your request should include your above mentioned Freedom of Information Request Number. We can be reached at (803) 898 - 3882.

Sincerely,

  
Karla Mew, Director  
Freedom of Information Center  
Office of Director

South Carolina Department of Health and Environmental Control

2600 Bull Street ~ Columbia, SC 29201 ~ Phone (803) 898-3432 ~www.scdhec.gov



South Carolina Department of Health  
and Environmental Control

Freedom of Information Center / Sims/Aycock Building  
2600 Bull St, Columbia, SC 29201

Ms. Jessica Shannon  
F&ME CONSULTANTS  
3112 DEVINE ST  
COLUMBIA, SC 29205

7/20/2012

Request Number: 1206212

Re: 5501-5600 SC HWY 557  
York County, SC

Dear Ms. Jessica Shannon,

After researching requested information, we have found that the Agency maintains files in the following program areas:

Bureau of Water

Bureau of Air Quality

Bureau of Underground Storage Tank Management

Bureau of Land and Waste Management

The Underground Storage Tanks and Land and Waste Management files are located at :

FOI Satellite Office  
Stern Business Center  
8911 Farrow Road  
Columbia SC

Please contact the FOI Center at (803) 898 - 3882 to schedule an appointment to review the requested department files. If you wish, a copy of the files may be made and mailed to you. If there is a maximum amount which you do not wish to exceed in copying charges, please let us know. (Copying charges are \$.25 per page)

If we do not hear from you within 10 days from the date of this letter, we will assume that the information is no longer required and your request will be considered complete.

Note: If you are not able to make the appointment, please inform our office within 24 hours of the appointment time. There will be a \$15.00 reshelving fee for missed appointments.

South Carolina Department of Health and Environmental Control

2600 Bull Street ~ Columbia, SC 29201 ~ Phone (803) 898-3432 ~www.scdhec.gov



June 19, 2012

Ms. Karla Mew, Director  
Freedom of Information Coordinator, EQC  
SC Department of Health and Environmental Control  
2600 Bull Street  
Columbia, South Carolina 29201

Re: Request for information pertaining to environmental problems  
5601-5900 SC Hwy 557  
(Between the Towns of Clover and Lake Wylie)  
York County, South Carolina

Dear Ms. Mew:

This is a request for information pertaining to any environmental problems that may have been registered with you for the above referenced property.

Any information pertaining to environmental problems may consist of the following:

- 1) Information pertaining to the removal or installation of above ground and underground storage tanks;
- 2) Issuance of any environmentally related permit and well record;
- 3) Issuance of any license (or complaints against) to store hazardous substances and/or petroleum products on the subject property or adjacent properties and any action taken;
- 4) Issuance of any license (or complaints) regarding waste disposal on the subject property or adjacent properties; and
- 5) Brownfield site on the subject property or adjacent properties.

If you have any questions, please do not hesitate to contact us. We would appreciate your response as soon as is convenient.

Regards,

F&ME CONSULTANTS



Jessica L. Shannon  
Environmental Professional

WWW.FMECOL.COM

COLUMBIA OFFICE  
3112 Devine Street  
Columbia, SC 29205  
P 803.254.4540  
F 803.254.4542

BEAUFORT OFFICE  
26 John Galt Road, Suite A  
Beaufort, SC 29906  
P 843.522.0246  
F 803.254.4542



AASHTO ACCREDITED  
LABORATORY



South Carolina Department of Health  
and Environmental Control

Freedom of Information Center / Sims/Aycock Building  
2600 Bull St, Columbia, SC 29201

Ms. Jessica Shannon  
F&ME CONSULTANTS  
3112 DEVINE ST  
COLUMBIA, SC 29205

6/22/2012

Request Number: 1206213

Re: 5601-5900 SC HWY 557  
York County, SC

Dear Ms. Jessica Shannon,

Your request for the above referenced information has been received by the Freedom of Information Center. The Freedom of Information staff are currently researching and compiling this information. You will be notified by our office when the research process is complete and files are ready for your review or files are ready to be copied.

If we are unable to locate files on a facility, based on the information submitted, you will be notified by mail.

Any requested department reports, publications or materials, other than facility files, will be mailed to you when completed.

Further inquiries regarding your request should include your above mentioned Freedom of Information Request Number. We can be reached at (803) 898 - 3882.

Sincerely,

Karla Mew, Director  
Freedom of Information Center  
Office of Director



South Carolina Department of Health  
and Environmental Control

Freedom of Information Center / Sims/Aycock Building  
2600 Bull St, Columbia, SC 29201

Ms. Jessica Shannon  
F&ME CONSULTANTS  
3112 DEVINE ST  
COLUMBIA, SC 29205

7/20/2012

Request Number: 1206213

Re: 5601-5900 SC HWY 557  
York County, SC

Dear Ms. Jessica Shannon,

After researching requested information, we have found that the Agency maintains files in the following program areas:

Bureau of Water

Bureau of Air Quality

Bureau of Underground Storage Tank Management

Bureau of Land and Waste Management

The Underground Storage Tanks and Land and Waste Management files are located at :

FOI Satellite Office  
Stern Business Center  
8911 Farrow Road  
Columbia SC

Please contact the FOI Center at (803) 898 - 3882 to schedule an appointment to review the requested department files. If you wish, a copy of the files may be made and mailed to you. If there is a maximum amount which you do not wish to exceed in copying charges, please let us know. (Copying charges are \$.25 per page)

If we do not hear from you within 10 days from the date of this letter, we will assume that the information is no longer required and your request will be considered complete.

Note: If you are not able to make the appointment, please inform our office within 24 hours of the appointment time. There will be a \$15.00 reshelving fee for missed appointments.

South Carolina Department of Health and Environmental Control

2600 Bull Street ~ Columbia, SC 29201 ~ Phone (803) 898-3432 ~www.scdhec.gov

BOARD:  
Paul C. Aughty, 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

January 8, 2010


Mr. Robert Powell  
F&ME Consultants  
3112 Devine Street  
Columbia, South Carolina 29205

Dear Mr. Powell,

I am writing you today in response to 2 of your Freedom of Information requests. The numbers are 0909099 & 0909223. As before, we could not send a no files letter because we did find some record of files. These files ranged from private well permits, drinking water permits to UST Files that had been NFA'd. You have seen everything that we could provide.

If you have further questions about these requests feel free to contact me @ (803) 898-3817.

Sincerely yours,



Jody M. Hamm, Director  
Freedom of Information Office

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

MR. ROBERT S. POWELL P.G.  
F&ME CONSULTANTS

09/28/2009

3112 DEVINE STREET  
COLUMBIA, SC 29205-

Request Number : 0909223

RE: MULTIPLE SITES  
YORK CO.

DEAR MR. POWELL

Your request for the above referenced information has been received by the Freedom of Information Center. The Freedom of Information staff are currently researching and compiling this information. You will be notified by our office when the research process is complete and files are ready for your review or files are ready to be copied.

If we are unable to locate files on a facility, based on the information submitted, you will be notified by mail.

Any requested department reports, publications or materials, other than facility files, will be mailed to you when completed.

Further inquiries regarding your request should include your above mentioned Freedom of Information Request Number. We can be reached at (803) 898-3882.

Sincerely,

Jody M. Hamm, Coordinator  
Freedom Of Information Center  
Office of Commissioner

10/28/09

From: Whitney P. Carswell  
To: Scott, Susan  
Date: 10/9/2009 10:16 AM  
Subject: FOI Request(s)

Hey Susan,

I would scan these requests in but the way the client sent it is a little confusing & it would be a lot of pages that you wouldn't even need. He would like to review the following files:

*Team*

- ~~SCR108233 (SW inactive, '07), 109 N. Buncombe Rd., Greer, SC~~
- ~~SCR107861 (SW inactive, '04), 109 N. Buncombe Rd., Greer, SC~~
- ~~4670119 (DW inactive, '03), 7192 SC Hwy 97, Smyrna, SC (35 pgs. wx)~~
- ~~4670254 (DW-active), 5301 SC Hwy 557, York Co. (56 pgs. wx)~~
- ~~SCR107648 (SW-active), 5600 SC Hwy 557, York Co.~~

*Crenville Delegates*

He will probably come in towards the end of next week to review these files. Please pull anything you have for these.

I hope you have a great weekend! =)

Thanks,  
Whitney

*39031004 - webX - 78 pages  
Cardinal Bened*

*46030902 - Less than 1 acre - No  
Bethel Fire Dept file  
Volunteer - await*

# F&ME CONSULTANTS

GEOTECHNICAL • ENVIRONMENTAL • MATERIALS

# 0909223

September 28, 2009

10/28/09 @ 9:00  
(FIR -> c(0))

Mr. Jody M. Hamm  
Freedom of Information Coordinator, EQC  
SC Department of Health and Environmental Control  
2600 Bull Street  
Columbia, South Carolina 29201

(drinking water)  
a)  
5301 - 4670254 (OW)  
(56 pgs - WY)

COLUMBIA OFFICE  
3112 Devine Street  
Columbia, SC 29205  
ph (803) 254-4540  
fx (803) 254-4542

MYRTLE BEACH OFFICE  
1903 Legion Street  
Myrtle Beach, SC 29577  
ph (843) 626-9253  
fx (843) 448-0681

Re: Request for information pertaining to environmental problems  
5300 through 5400 S.C. Highway 557  
(Between the Towns of Clover and Lake Wylie)  
York County, South Carolina

NO UST  
NO AIR  
NO CW  
NO TK

Dear Mr. Hamm:

This is a request for information pertaining to any environmental problems that may have been registered with you for the above referenced property.

Any information pertaining to environmental problems may consist of the following:

- 1) Information pertaining to the removal or installation of above ground and underground storage tanks;
- 2) Issuance of any environmentally related permit and well record;
- 3) Issuance of any license (or complaints against) to store hazardous substances and/or petroleum products on the subject property or adjacent properties and any action taken;
- 4) Issuance of any license (or complaints) regarding waste disposal on the subject property or adjacent properties; and
- 5) Brownfield site on the subject property or adjacent properties.

If you have any questions, please do not hesitate to contact us. We would appreciate your response as soon as is convenient.

Sincerely yours,

F&ME CONSULTANTS

*Robert S. Powell*  
Robert S. Powell, P.G.  
Chief Geologist



AASHTO ACCREDITED  
LABORATORY

www.fmecol.com

# RECEIVED

SEP 28 2009

Freedom of  
Information Office

# F&ME CONSULTANTS

GEOTECHNICAL • ENVIRONMENTAL • MATERIALS

September 28, 2009

Mr. Jody M. Hamm  
Freedom of Information Coordinator, EQC  
SC Department of Health and Environmental Control  
2600 Bull Street  
Columbia, South Carolina 29201

NO UST  
NO air  
NO water  
NO GW  
NO TK

**COLUMBIA OFFICE**  
3112 Devine Street  
Columbia, SC 29205  
ph (803) 254-4540  
fx (803) 254-4542

**MYRTLE BEACH OFFICE**  
1903 Legion Street  
Myrtle Beach, SC 29577  
ph (843) 626-9253  
fx (843) 448-0681

Re: Request for information pertaining to environmental problems  
5401 through 5500 S.C. Highway 557  
(Between the Towns of Clover and Lake Wylie)  
York County, South Carolina

Dear Mr. Hamm:

This is a request for information pertaining to any environmental problems that may have been registered with you for the above referenced property.

Any information pertaining to environmental problems may consist of the following:

- 1) Information pertaining to the removal or installation of above ground and underground storage tanks;
- 2) Issuance of any environmentally related permit and well record;
- 3) Issuance of any license (or complaints against) to store hazardous substances and/or petroleum products on the subject property or adjacent properties and any action taken;
- 4) Issuance of any license (or complaints) regarding waste disposal on the subject property or adjacent properties; and
- 5) Brownfield site on the subject property or adjacent properties.

If you have any questions, please do not hesitate to contact us. We would appreciate your response as soon as is convenient.

Sincerely yours,

F&ME CONSULTANTS

*Robert S. Powell*  
Robert S. Powell, P.G.  
Chief Geologist



AASHTO ACCREDITED  
LABORATORY

www.fmecol.com



# F&ME CONSULTANTS

10/28/09 @ 9:00  
(FIR → C10)  
GEOTECHNICAL • ENVIRONMENTAL • MATERIALS

0909223

September 28, 2009

5580-

UST# 14507 → NFA-2007

(135 pgs. WX)

COLUMBIA OFFICE  
3112 Devine Street  
Columbia, SC 29205  
ph (803) 254-4540  
fx (803) 254-4542

Mr. Jody M. Hamm  
Freedom of Information Coordinator, EQC  
SC Department of Health and Environmental Control  
2600 Bull Street  
Columbia, South Carolina 29201

5600 - (a) SCR107648

(STORM WATER)

MYRTLE BEACH OFFICE  
1903 Legion Street  
Myrtle Beach, SC 29577  
ph (843) 626-9253  
fx (843) 448-0681

Re: Request for information pertaining to environmental problems  
5501 through 5600 S.C. Highway 557  
(Between the Towns of Clover and Lake Wylie)  
York County, South Carolina

no air  
no WW  
no TK

Dear Mr. Hamm:

This is a request for information pertaining to any environmental problems that may have been registered with you for the above referenced property.

Any information pertaining to environmental problems may consist of the following:

- 1) Information pertaining to the removal or installation of above ground and underground storage tanks;
- 2) Issuance of any environmentally related permit and well record;
- 3) Issuance of any license (or complaints against) to store hazardous substances and/or petroleum products on the subject property or adjacent properties and any action taken;
- 4) Issuance of any license (or complaints) regarding waste disposal on the subject property or adjacent properties; and
- 5) Brownfield site on the subject property or adjacent properties.

If you have any questions, please do not hesitate to contact us. We would appreciate your response as soon as is convenient.

Sincerely yours,

F&ME CONSULTANTS

*Robert S. Powell*  
Robert S. Powell, P.G.  
Chief Geologist



AASHTO ACCREDITED  
LABORATORY

www.fmecol.com



C. Earl Hunter, Commissioner

*Promoting and protecting the health of the public and the environment.*

**NOV 30 2007**

MS GRACE ALEXANDER  
ESTATE OF M B ALEXANDER  
5580 HWY 557  
LAKE WYLIE SC 29710

Re: **Conditional No Further Action**  
Lake Wylie Mini Storage, 5580 Hwy 557, Lake Wylie, SC  
**UST Permit #14507; CA #31156**  
Release Reported: February 18, 1993  
Groundwater Sampling Report received November 19, 2007  
York County

Dear Ms. Alexander:

The Underground Storage Tank (UST) Program of the South Carolina Department of Health and Environmental Control (SCDHEC) has reviewed the referenced report. Based on data obtained from the risk-based assessment and verification monitoring, the above referenced UST release does not present a significant threat to human health or the environment. Therefore, no further action regarding this release will be required at this time. This decision is based on the following assumptions and conditions:

**Assumptions and Conditions:**

- 1) The property on which the UST release occurred and properties adjacent to the site are currently commercial/residential and are reasonably anticipated to remain commercial/residential in the future based on existing zoning ordinances.
- 2) Groundwater is not currently being used and is reasonably anticipated not to be used in the future within the actual or predicted area of petroleum impact. The groundwater should not be used as a source of drinking water or for irrigation within the area of petroleum impact.
- 3) All petroleum chemicals of concern (CoC) associated with the referenced UST release are below the Site-Specific Target Levels (SSTL) in soil and ground water, and groundwater monitoring has verified that natural attenuation is occurring. Based on these site-specific conditions, the CoC will not exceed Risk Based Screening Levels (RBSL) at any potential receptors and/or exposure points.
- 4) Land use should not change (e.g., from commercial to residential) without notifying the Bureau of the proposed use. Any site excavation activities may encounter petroleum-impacted soil that must be disposed of in a method approved by the Department.
- 5) If CoC from the referenced release are detected at levels that present a risk to human health or the environment, this office, under authority established in the South Carolina UST Control Regulations (SCUSTCR) R.61-92 Part 280, may require additional site rehabilitation.
- 6) This correspondence does not exempt the UST system from any additional requirements (e.g., notification, operation, release detection, and closure) of the SCUSTCR, the SUPERB Act or any other non-UST activities where there may be Department involvement.
- 7) The Bureau will be notified within 30 days of any changes to any of the above assumptions and conditions until all petroleum constituents are at or below RBSL. If site conditions are changed without Department approval, the owner or operator will be in violation of a Department order enforceable pursuant to the 1976 Code Section 44-2-140.

UST PERMIT  
BOOKETING

5

Ms. Alexander  
Page 2

The referenced release has been placed on a registry of releases in the SCDHEC Freedom of Information office. The release will remain on this registry until all petroleum CoC have attenuated by natural and biological means to the RBSL. If you choose to remove the release from the registry in the future, laboratory analysis must document that each CoC is at or below the RBSL. Samples may be collected from temporary or the existing permanent monitoring wells; however, these sampling and laboratory analytical costs will not be compensated from the SUPERB Account.

**The Department intends to report this closure to the United States Environmental Protection Agency. If for any reason you disagree with this decision not to require any further environmental rehabilitation activities, please contact me in writing within thirty (30) days of the date of this letter. After this 30-day period, any significant increase in levels of petroleum chemicals of concern will be attributed to current UST operations and will be considered a new release.**

The following options are offered:

- Option 1: You may choose to abandon all of the monitoring wells at this time. Should you choose to abandon the wells, cost agreement #31156 has been approved for the abandonment of up to 452 feet of well. Upon approval and proper abandonment of the wells in accordance with South Carolina Well Standards and Regulations (R. 61-71), a final payment for cleanup actions associated with this release will be issued from the SUPERB Account.
- Option 2: You may choose to keep some or all of the wells for future monitoring in order to verify that the intrinsic remediation process has been successful in reducing all CoC concentrations below RBSL. The SUPERB Account will not be responsible for the future maintenance, monitoring, and abandonment of these wells. Additionally, the SUPERB Account will not provide compensation for future soil and/or groundwater sampling and/or laboratory analysis to document further natural attenuation to RBSL.

Please complete the attached option form and return it to my attention within 30 days from the date of this letter. Should you choose to abandon any monitoring wells, a report of abandonment is due within 60 days from the date of this letter. On all correspondence related to this facility, please reference the UST Permit # 14507. If there are any questions concerning this project, please contact me at (803) 896-6397, via email at [thomadl@dhec.sc.gov](mailto:thomadl@dhec.sc.gov) or by fax at (803) 896-6245.

Sincerely,



Debra L. Thoma, Hydrogeologist  
Northeastern SC Corrective Action Section  
Assessment & Corrective Action Division  
Underground Storage Tank Program  
Bureau of Land & Waste Management

enc: MW Option Form  
Approved Cost Agreement

cc: Robert Thompson, ECS, 13504 South Point Blvd., Unit F., Charlotte, NC, 28273 (w/ enc.)  
Al Haseldon, Haseldon, Owen, & Boloyan, 4609 Charlotte Hwy., Lake Wylie, SC, 29710 (w/ enc.)  
Technical file (w/o enc.)

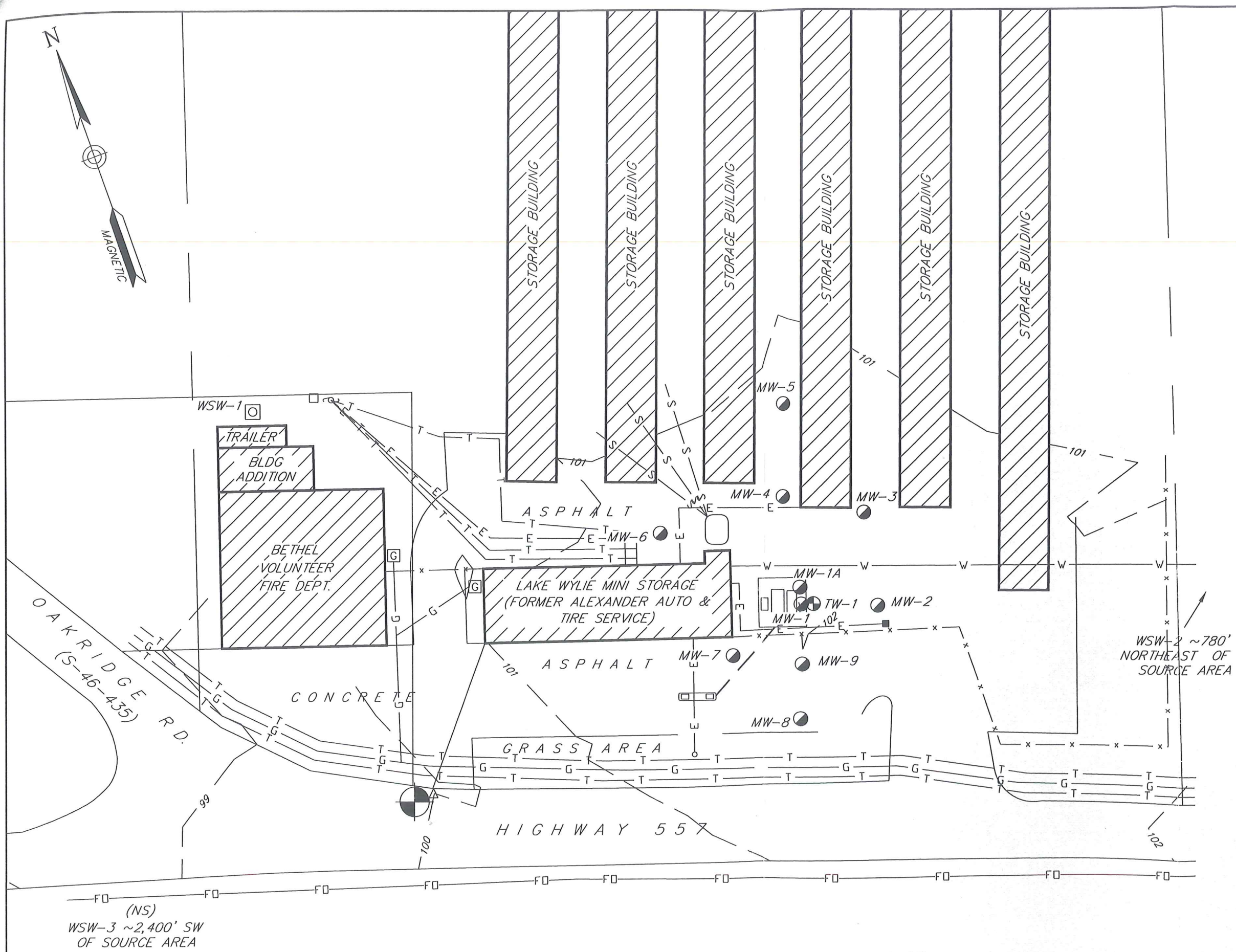
# Approved Cost Agreement 31156

Facility: 14507 ALEXANDER AUTO & TIRE SERVICE

THOMADL

PO Number:

<u>Task / Description</u>	<u>Categories</u>	<u>Item Description</u>	<u>Qty / Pct</u>	<u>Unit Price</u>	<u>Amount</u>
04 MOB/DEMOB		A EQUIPMENT	1.0000	550.00	550.00
		B PERSONNEL	1.0000	275.00	275.00
08 ABANDONMENT		ABANDONMENT	452.0000	5.00	2,260.00
19 RPT/PROJECT MNGT & COORDINATIO		PCT PERCENT	0.1500	3,085.00	462.75
<b>Total Amount</b>					<b>3,547.75</b>



**Legend**

- Shallow (Water Table) Monitoring Well
- Telescoping Monitoring Well
- Fence
- Electronic Gate Sensor Box
- Natural Gas Meter
- Power Pole
- Septic Tank
- Telephone Pedestal
- Water Supply Well
- Former Dispenser Island
- Former Product Line
- Fiber Optic Line
- Natural Gas Line
- Septic Line
- Underground Electric Line
- Underground Telephone Line
- Water Line from WSW-2
- Property Line
- 96 Topographic Contour with Elevation (Feet)
- Benchmark: PK Nail in Asphalt with Assumed Elevation = 100.00'

**General Notes:**

All locations, dimensions, and property lines depicted on this plan are approximate. This plan should not be used for construction or land conveyance purposes.

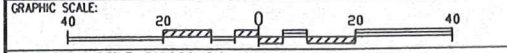


13504 South Point Boulevard • Charlotte, NC 28273  
Phone: 704-583-2711 Fax: 704-583-2744

PROJECT: **LAKE WYLIE MINI STORAGE**  
5580 HIGHWAY 557  
CLOVER, SOUTH CAROLINA

TITLE: **SITE PLAN**

CLIENT: **GRACE ALEXANDER**



COMPUTER CADFILE: 810630-Site.dwg

DRAWN BY:	DESIGNED BY:	CHECKED BY:	APPROVED BY:
RH	RH	RT	JR
SCALE:	DATE:	JOB NO.:	FIGURE NO.:
1"=40'	02/08/07	14-810630	2

NOTE: FIELD SURVEY CONDUCTED ON SEPTEMBER 9, 2000 BY TRICO ENGINEERING CONSULTANTS, INC. UNDER THE SUPERVISION OF PAUL E. SEXTON, S.C.P.L.S. NO. 19885.

(NS)  
WSW-3 ~2,400' SW OF SOURCE AREA

# F&ME CONSULTANTS

GEOTECHNICAL • ENVIRONMENTAL • MATERIALS

September 28, 2009

Mr. Jody M. Hamm  
Freedom of Information Coordinator, EQC  
SC Department of Health and Environmental Control  
2600 Bull Street  
Columbia, South Carolina 29201

5650- (priv. well)  
SCW46094170 (107)

COLUMBIA OFFICE  
3112 Devine Street  
Columbia, SC 29205  
ph (803) 254-4540  
fx (803) 254-4542

MYRTLE BEACH OFFICE  
1903 Legion Street  
Myrtle Beach, SC 29577  
ph (843) 626-9253  
fx (843) 448-0681

Re: Request for information pertaining to environmental problems  
5601 through 5900 S.C. Highway 557  
(Between the Towns of Clover and Lake Wylie)  
York County, South Carolina

NO UST  
NO air  
NO water  
NO GW  
NO TK

Dear Mr. Hamm:

This is a request for information pertaining to any environmental problems that may have been registered with you for the above referenced property.

Any information pertaining to environmental problems may consist of the following:

- 1) Information pertaining to the removal or installation of above ground and underground storage tanks;
- 2) Issuance of any environmentally related permit and well record;
- 3) Issuance of any license (or complaints against) to store hazardous substances and/or petroleum products on the subject property or adjacent properties and any action taken;
- 4) Issuance of any license (or complaints) regarding waste disposal on the subject property or adjacent properties; and
- 5) Brownfield site on the subject property or adjacent properties.

If you have any questions, please do not hesitate to contact us. We would appreciate your response as soon as is convenient.

Sincerely yours,

F&ME CONSULTANTS

*Robert S. Powell*  
Robert S. Powell, P.G.  
Chief Geologist



AASHTO ACCREDITED  
LABORATORY

www.fmecol.com

# F&ME CONSULTANTS

GEOTECHNICAL • ENVIRONMENTAL • MATERIALS

September 28, 2009

Mr. Jody M. Hamm  
Freedom of Information Coordinator, EQC  
SC Department of Health and Environmental Control  
2600 Bull Street  
Columbia, South Carolina 29201

(priv. well)  
5912-SCWH(0068533  
(105)

**COLUMBIA OFFICE**  
3112 Devine Street  
Columbia, SC 29205  
ph (803) 254-4540  
fx (803) 254-4542

**MYRTLE BEACH OFFICE**  
1903 Legion Street  
Myrtle Beach, SC 29577  
ph (843) 626-9253  
fx (843) 448-0681

Re: Request for information pertaining to environmental problems  
5901 through 6200 S.C. Highway 557  
(Between the Towns of Clover and Lake Wylie)  
York County, South Carolina

no UST  
no air  
no water  
no LULU  
no TF

Dear Mr. Hamm:

This is a request for information pertaining to any environmental problems that may have been registered with you for the above referenced property.

Any information pertaining to environmental problems may consist of the following:

- 1) Information pertaining to the removal or installation of above ground and underground storage tanks;
- 2) Issuance of any environmentally related permit and well record;
- 3) Issuance of any license (or complaints against) to store hazardous substances and/or petroleum products on the subject property or adjacent properties and any action taken;
- 4) Issuance of any license (or complaints) regarding waste disposal on the subject property or adjacent properties; and
- 5) Brownfield site on the subject property or adjacent properties.

If you have any questions, please do not hesitate to contact us. We would appreciate your response as soon as is convenient.

Sincerely yours,

F&ME CONSULTANTS

*Robert S. Powell*  
Robert S. Powell, P.G.  
Chief Geologist



AASHTO ACCREDITED  
LABORATORY

www.fmecol.com

# F&ME CONSULTANTS

GEOTECHNICAL • ENVIRONMENTAL • MATERIALS

September 28, 2009

Mr. Jody M. Hamm  
Freedom of Information Coordinator, EQC  
SC Department of Health and Environmental Control  
2600 Bull Street  
Columbia, South Carolina 29201

Re: Request for information pertaining to environmental problems  
6201 through 6500 S.C. Highway 557  
(Between the Towns of Clover and Lake Wylie)  
York County, South Carolina

Dear Mr. Hamm:

This is a request for information pertaining to any environmental problems that may have been registered with you for the above referenced property.

Any information pertaining to environmental problems may consist of the following:

- 1) Information pertaining to the removal or installation of above ground and underground storage tanks;
- 2) Issuance of any environmentally related permit and well record;
- 3) Issuance of any license (or complaints against) to store hazardous substances and/or petroleum products on the subject property or adjacent properties and any action taken;
- 4) Issuance of any license (or complaints) regarding waste disposal on the subject property or adjacent properties; and
- 5) Brownfield site on the subject property or adjacent properties.

If you have any questions, please do not hesitate to contact us. We would appreciate your response as soon as is convenient.

Sincerely yours,

F&ME CONSULTANTS

*Robert S. Powell*  
Robert S. Powell, P.G.  
Chief Geologist

no air  
no water  
no UST  
no LGW  
no TK

COLUMBIA OFFICE  
3112 Devine Street  
Columbia, SC 29205  
ph (803) 254-4540  
fx (803) 254-4542

MYRTLE BEACH OFFICE  
1903 Legion Street  
Myrtle Beach, SC 29577  
ph (843) 626-9253  
fx (843) 448-0681



AASHTO ACCREDITED  
LABORATORY

www.fmecol.com



# F&ME CONSULTANTS

GEOTECHNICAL • ENVIRONMENTAL • MATERIALS

September 28, 2009

Mr. Jody M. Hamm  
Freedom of Information Coordinator, EQC  
SC Department of Health and Environmental Control  
2600 Bull Street  
Columbia, South Carolina 29201

NO UST  
NO AIR  
NO WATER  
NO LUL  
NO TK

COLUMBIA OFFICE  
3112 Devine Street  
Columbia, SC 29205  
ph (803) 254-4540  
fx (803) 254-4542

MYRTLE BEACH OFFICE  
1903 Legion Street  
Myrtle Beach, SC 29577  
ph (843) 626-9253  
fx (843) 448-0681

Re: Request for information pertaining to environmental problems  
125 Kingsbury Road  
(Between the Towns of Clover and Lake Wylie)  
York County, South Carolina

Dear Mr. Hamm:

This is a request for information pertaining to any environmental problems that may have been registered with you for the above referenced property.

Any information pertaining to environmental problems may consist of the following:

- 1) Information pertaining to the removal or installation of above ground and underground storage tanks;
- 2) Issuance of any environmentally related permit and well record;
- 3) Issuance of any license (or complaints against) to store hazardous substances and/or petroleum products on the subject property or adjacent properties and any action taken;
- 4) Issuance of any license (or complaints) regarding waste disposal on the subject property or adjacent properties; and
- 5) Brownfield site on the subject property or adjacent properties.

If you have any questions, please do not hesitate to contact us. We would appreciate your response as soon as is convenient.

Sincerely yours,

F&ME CONSULTANTS

*Robert S. Powell*  
Robert S. Powell, P.G.  
Chief Geologist



www.fmecol.com

# F&ME CONSULTANTS

GEOTECHNICAL • ENVIRONMENTAL • MATERIALS

September 28, 2009

Mr. Jody M. Hamm  
Freedom of Information Coordinator, EQC  
SC Department of Health and Environmental Control  
2600 Bull Street  
Columbia, South Carolina 29201

no UST  
no air  
no water  
no GW  
no TK

**COLUMBIA OFFICE**  
3112 Devine Street  
Columbia, SC 29205  
ph (803) 254-4540  
fx (803) 254-4542

**MYRTLE BEACH OFFICE**  
1903 Legion Street  
Myrtle Beach, SC 29577  
ph (843) 626-9253  
fx (843) 448-0681

Re: Request for information pertaining to environmental problems  
6100 through 6285 Ridge Road  
(Between the Towns of Clover and Lake Wylie)  
York County, South Carolina

Dear Mr. Hamm:

This is a request for information pertaining to any environmental problems that may have been registered with you for the above referenced property.

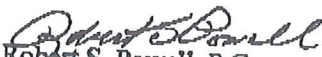
Any information pertaining to environmental problems may consist of the following:

- 1) Information pertaining to the removal or installation of above ground and underground storage tanks;
- 2) Issuance of any environmentally related permit and well record;
- 3) Issuance of any license (or complaints against) to store hazardous substances and/or petroleum products on the subject property or adjacent properties and any action taken;
- 4) Issuance of any license (or complaints) regarding waste disposal on the subject property or adjacent properties; and
- 5) Brownfield site on the subject property or adjacent properties.

If you have any questions, please do not hesitate to contact us. We would appreciate your response as soon as is convenient.

Sincerely yours,

F&ME CONSULTANTS

  
Robert S. Powell, P.G.  
Chief Geologist



AASHTO ACCREDITED  
LABORATORY

www.fmecol.com

---

## **6. Interview Documentation**

The only “interview” documentation related to this Limited Phase I Environmental Site Assessment consisted of ASTM 1528-06 Transaction Screen Questionnaires that were filled in by F&ME Consultants at the time of the visual site inspection.



# ENVIRONMENTAL SITE ASSESSMENT TRANSACTION SCREEN QUESTIONNAIRE

This document is an excerpt of Practice E1528-06: Standard Practice for Environmental Site Assessments: Transaction Screen Process, which is under the jurisdiction of ASTM Committee E50 on Environmental Assessment as is the direct responsibility of Subcommittee E50.02 on Commercial Real Estate Transactions. This questionnaire represents only Sections 5 and 6 of Practice E 1528-06 and should not be construed as being the complete standard. It is necessary to refer to the full standard prior to using this questionnaire. COPYRIGHT © 2006 ASTM INTERNATIONAL, West Conshohocken, PA. Prior edition copyrighted 2000. Stock # ADJE152806. For the complete standard, or to order additional copies of this questionnaire, contact ASTM Customer service at (610) 832-9585.

## 5. Introduction to Transaction Screen Questionnaire

5.1 *Process*--The *transaction screen process* consists of asking questions contained within the *transaction screen questionnaire of owners and occupants of the property*, observing site conditions at the property with direction provided by the *transaction screen questionnaire*, and, to the extent *reasonably ascertainable*, conducting limited research regarding certain government records and certain standard historical sources. The questions asked of *owners* are the same questions as those asked of *occupants*.

5.2 *Guide*--The *transaction screen questionnaire* is followed by a guide designed to assist the person completing the *transaction screen questionnaire*. The guide to the *transaction screen questionnaire* is set out in Sections 7-10 of this practice. The guide is divided into three sections: Guide for Owner/Occupant Inquiry, Guide to Site Visit, and Guide to Government Records/Historical Sources Inquiry.

5.2.1 To assist the *user*, its employee or agent, or the preparer in preparing a report, the guide repeats each of the questions set out in the *transaction screen questionnaire* in both the guide for *owner/occupant* inquiry and the guide to *site visit*. The questions regarding government records/historical sources inquiry are also repeated in the guide to that section.

5.2.2 The guide also describes the procedures to be followed to determine if reliance upon the information in a prior *transaction screen* is appropriate under this practice.

5.2.3 A *user*, his employee or agent, or *preparer* conducting the *transaction screen process* should not use the *transaction screen questionnaire* without reference to or without familiarity with the guide based on prior use of the guide.

5.3 The *user* may either conduct the *transaction screen process*, or delegate it to an employee or agent or may contract with a third party to prepare the questionnaire on behalf of the *user*. No matter who prepares the questionnaire, the *user* remains responsible for the decision to conduct limited environmental *due diligence* and the impact of that decision on risk management.

5.4 The *preparer* conducting the *transaction screen process* should use good faith efforts in determining answers to the questions set forth in the *transaction screen questionnaire*. The *user* should take time and care to check whatever records are in the *user's* possession and forward relevant information or specialized knowledge to the *preparer*.

5.5 *Knowledge*--All answers should be given to the best of the *owner's* or *occupant's* knowledge. The most knowledgeable person available should be chosen to answer the questions.

5.5.1 While the person conducting the *transaction screen* has an obligation to ask the questions in the *transaction screen questionnaire*, others may have no obligation to answer them.

5.5.2 The *transaction screen questionnaire* and the *transaction screen guide* sometimes include the phrase "to the best of your knowledge." This phrase does not impose a constructive knowledge standard. It is intended as an assurance to the person being questioned that he or she is not obligated to search out information he or she does not currently have in order to answer the particular question.

5.6 *Conclusions Regarding Affirmative or Unknown Answers*--Once a *transaction screen questionnaire* has been completed, it shall be presented to the user. Subject to 5.6 through 5.7, an affirmative, unknown, or no response is presumed to be a *potential environmental concern*. If any of the questions set forth in the *transaction screen questionnaire* are answered in the affirmative, the *preparer* must document the reason for the affirmative answer. If any of the questions are not answered or the answer is unknown, the *user* should document such nonresponse or answer of unknown and evaluate it in light of the other information obtained in the *transaction screen process*, including, in particular, the site visit and the government records/historical sources inquiry. If the *user* decides no further inquiry is warranted after receiving no response, an answer of unknown, or an affirmative answer, the *user* must document the reasons for any such conclusion.

5.6.1 Upon obtaining an affirmative answer, an answer of unknown or no response, the *user* should first refer to the guide. The guide may provide sufficient explanation to allow a *user* to conclude that no further inquiry is appropriate with respect to the particular question.

5.6.2 If the guide to a particular question does not, in itself, permit a user to conclude that no further inquiry is appropriate, then the user should consider other information obtained from the *transaction screen process* relating to this question. For example, while on the site performing a *site visit*, a person may find a storage tank on the *property* and therefore answer Question 10 of the *transaction screen questionnaire* in the affirmative. However, during or subsequent to the *owner/occupant* inquiry, the *owner* may establish that substances now or historically contained in the tank (for example, water) are not likely to cause contamination.

5.6.3 If either the guide to the question or other information obtained during the *transaction screen process* does not permit a *user* to conclude no further inquiry is appropriate with respect to such question, then the user must determine, in the exercise of the *user's* reasonable business judgment, based upon the totality of unresolved affirmative answers or answers of unknown received during the *transaction screen process*, whether further inquiry may be limited to those specific issues identified as of concern.

5.7 *Presumption*--A presumption exists that further inquiry is necessary if an affirmative answer is given to a question or because the answer was unknown or no response was given. In rebutting this presumption, the *user* should evaluate information obtained from each component of the *transaction screen process* and consider whether sufficient information has been obtained to conclude that no further inquiry is necessary. The *user* must determine, in the exercise of the *user's* reasonable business judgment, the scope of such further inquiry.

5.8 *Further Inquiry*--Upon completing the *transaction screen questionnaire*, if the *user* concludes that further inquiry or action is needed (for example, consult with an environmental consultant, contractor, governmental authority, or perform additional governmental and/or historical records review), the *user* should proceed with such inquiry. (Note that if the *user* determines to proceed with a Phase I Environment Site Assessment, the *user* may apply the current Practice E 1527 or alternatively the provisions of EPA's regulation "Standards and Practices for All Appropriate Inquiries," 40 C.F.R. Part 312.)

5.9 *Signature*--The user and the *preparer* of the *transaction screen questionnaire* must complete and sign the questionnaire as provided at the end of the questionnaire.

**6. Transaction Screen Questionnaire**

6.1 *Persons to Be Questioned*-The following questions should be asked of (1) the current owner of the *property*, (2) any major occupant of the *property* or, if the property does not have any *major occupants*, at least 10 % of the occupants of the *property*, and (3) in addition to the current owner and the occupants identified in (2), any *occupant* likely to be using, treating, generating, storing, or disposing of *hazardous substances* or *petroleum products* on or from the *property*. A major occupant is any *occupant* using at least 40 % of the leasable area of the *property* or any anchor tenant when the *property* is a

shopping center. In a multifamily *property* containing both residential and commercial uses, the *preparer* does not need to ask questions of the residential *occupants*. The *preparer* should ask each person to answer all questions to the best of the respondent's *actual knowledge* and in good faith. When completing the *site visit* column, the *preparer* should be sure to observe the *property* and any buildings and other structures on the *property*. The guide to this *transaction screen questionnaire* (see Sections 7-10) provides further details on the appropriate use of this questionnaire. (See Note 2.)  
NOTE 2-Unk = "unknown" or "no response."

Description of Site Address:

S.C. Highway 557

Between the Towns of Clover and Lake Wylie, South Carolina

Question	Owner	Occupants (if applicable)	Observed During Site Visit	If yes, provide description
1a. Is the property used for an industrial use?	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input checked="" type="radio"/>	Pharr Yarns located at 6199 HWY 557, but does not appear to pose any environmental threats.
1b. Is any adjoining property used for an industrial use?	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input checked="" type="radio"/> No <input type="radio"/>	
2a. Did you observe evidence or do you have any prior knowledge that the property has been used for an industrial use in the past?	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input checked="" type="radio"/>	
2b. Did you observe evidence or do you have any prior knowledge that any adjoining property has been used for an industrial use in the past?	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input checked="" type="radio"/>	
3a. Is the property used as a gasoline station, motor repair facility, commercial printing facility, dry cleaners, photo developing laboratory, junkyard or landfill, or as a waste treatment, storage, disposal, processing, or recycling facility (if applicable, identify which)?	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input checked="" type="radio"/>	
3b. Is any adjoining property used as a gasoline station, motor repair facility, commercial printing facility, dry cleaners, photo developing laboratory, junkyard or landfill, or as a waste treatment, storage, disposal, processing, or recycling facility (if applicable, identify which)?	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input checked="" type="radio"/>	
4a. Did you observe evidence or do you have any prior knowledge that the property has been used as a gasoline station, motor repair facility, commercial printing facility, dry cleaners, photo developing laboratory, junkyard or landfill, or as a waste treatment, storage, disposal, processing, or recycling facility (if applicable, identify which)?	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input checked="" type="radio"/>	
4b. Did you observe evidence or do you have any prior knowledge that any adjoining property has been used as a gasoline station, motor repair facility, commercial printing facility, dry cleaners, photo developing laboratory, junkyard or landfill, or as a waste treatment, storage, disposal, processing, or recycling facility (if applicable, identify which)?	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input checked="" type="radio"/>	
5a. Are there currently any damaged or discarded automotive or industrial batteries, pesticides, paints, or other chemicals in individual containers of >5 gal (19 L) in volume or 50 gal (190 L) in the aggregate, stored on or used at the property or at the facility?	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input checked="" type="radio"/>	
5b. Did you observe evidence or do you have any prior knowledge that there have been previously any damaged or discarded automotive or industrial batteries, or pesticides, paints, or other chemicals in individual containers of >5 gal (19 L) in volume or 50 gal (190 L) in the aggregate, stored on or used at the property or at the facility?	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input checked="" type="radio"/>	
6a. Are there currently any industrial drums (typically 55 gal (208 L)) or sacks of chemicals located on the property or at the facility?	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input checked="" type="radio"/>	
6b. Did you observe evidence or do you have any prior knowledge that there have been previously any industrial drums (typically 55 gal (208 L)) or sacks of chemicals located on the property or at the facility?	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input checked="" type="radio"/>	
7a. Did you observe evidence or do you have any prior knowledge that fill dirt has been brought onto the property that originated from a contaminated site?	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input checked="" type="radio"/>	

\* Unk = "unknown" or "no response"

Copyright © 2006 ASTM INTERNATIONAL, West Conshohocken, PA

This document is an excerpt of E 1528-06, Standard Practice for Environmental Site Assessments: Transaction Screen Process, which is under the jurisdiction of ASTM Committee E50 on Environmental Assessments and is the direct responsibility of Subcommittee E50.02 on Commercial Real Estate Transactions. This questionnaire represents only Sections 5 and 6 of Practice E 1528-06 and should not be construed as being the complete standard. It is necessary to refer to the full standard prior to using this questionnaire. For the complete standard, or to order additional copies of this questionnaire, contact ASTM Customer Service at (610) 832-9585.

Question	Owner			Occupants (if applicable)			Observed During Site Visit		If yes, provide description
7b. Did you observe evidence or do you have any prior knowledge that fill dirt has been brought onto the property that is of an unknown origin?	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
8a. Are there currently any pits, ponds, or lagoons located on the property in connection with waste treatment or waste disposal?	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
8b. Did you observe evidence or do you have any prior knowledge that there have been previously, any pits, ponds, or lagoons located on the property in connection with waste treatment or waste disposal?	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
9a. Is there currently any stained soil on the property?	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
9b. Did you observe evidence or do you have any prior knowledge that there has been previously, any stained soil on the property?	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
10a. Are there currently any registered or unregistered storage tanks (above or underground) located on the property?	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
10b. Did you observe evidence or do you have any prior knowledge that there have been previously, any registered or unregistered storage tanks (above or underground) located on the property?	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
11a. Are there currently any vent pipes, fill pipes, or access ways indicating a fill pipe protruding from the ground on the property or adjacent to any structure located on the property?	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
11b. Did you observe evidence or do you have any prior knowledge that there have been previously, any vent pipes, fill pipes, or access ways indicating a fill pipe protruding from the ground on the property or adjacent to any structure located on the property?	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
12a. Is there currently evidence of leaks, spills or staining by substances other than water, or foul odors, associated with any flooring, drains, walls, ceilings, or exposed grounds on the property?	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
12b. Did you observe evidence or do you have any prior knowledge that there have been previously any leaks, spills, or staining by substances other than water, or foul odors, associated with any flooring drains, walls, ceilings or exposed grounds on the property?	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
13a. If the property is served by a private well or non-public water system, is there evidence or do you have prior knowledge that contaminants have been identified in the well or system that exceed guidelines applicable to the water system?	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
13b. If the property is served by a private well or non-public water system, is there evidence or do you have prior knowledge that the well has been designated as contaminated by any government environment health agency?	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
14. Does the owner or occupant of the property have any knowledge of environmental liens or governmental notification relating to past or recurrent violations of environmental laws with respect to the property or any facility located on the property?	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>			
15a. Has the owner or occupant of the property been informed of the past existence of hazardous substances or petroleum products with respect to the property or any facility located on the property?	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>			
15b. Has the owner or occupant of the property been informed of the current existence of hazardous substances or petroleum products with respect to the property or any facility located on the property?	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>			
15c. Has the owner or occupant of the property been informed of the past existence of environmental violations with respect to the property or any facility located on the property?	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>			
15d. Has the owner or occupant of the property been informed of the current existence of environmental violations with respect to the property or any facility located on the property?	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>			

Question	Owner	Occupants (if applicable)	Observed During Site Visit	If yes, provide description
16. Does the owner or occupant of the property have any knowledge of any environmental site assessment of the property or facility that indicated the presence of hazardous substances or petroleum products on, or contamination of, the property or recommended further assessment of the property?	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>		
17. Does the owner or occupant of the property know of any past, threatened, or pending lawsuits or administrative proceedings concerning a release or threatened release of any hazardous substance or petroleum products involving the property by any owner or occupant of the property?	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>		
18a. Does the property discharge waste-water (not including sanitary waste or storm water) onto or adjacent to the property and/or into a storm water system?	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input checked="" type="radio"/>	
18b. Does the property discharge waste water (not including sanitary waste or storm water) onto or adjacent to the property and/or into a sanitary sewer system?	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input checked="" type="radio"/>	
19. Did you observe evidence or do you have any prior knowledge that any hazardous substances or petroleum products, unidentified waste materials, tires, automotive or industrial batteries, or any other waste materials have been dumped above grade, buried and/or burned on the property?	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input checked="" type="radio"/> No <input type="radio"/>	Evidence of some household debris
20. Is there a transformer, capacitor, or any hydraulic equipment for which there are any records indicating the presence of PCBs?	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input checked="" type="radio"/>	

**Government Records/Historical Sources Inquiry**  
(See guide, Section 10)

21. Do any of the following federal, state, or tribal government record systems list the property or any property within the search distance noted below (where available):	Approximate Minimum Search Distance, miles (kilometres)	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
Federal NPL site	1.0	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
Federal Delisted NPL site	0.5	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
Federal CERCLIS	0.5	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
Federal CERCLIS NFRAP site	0.5	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
Federal RCRA CORRACTS facilities	1.0	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
Federal RCRA non-CORRACTS TSD	0.5	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
Federal RCRA generators	property and adjoining properties	Yes <input checked="" type="radio"/>	No <input type="radio"/>	
Federal institutional control/engineering control registries	property only			
Federal ERNS	property only	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
State and tribal lists of hazardous waste sites identified for investigation or remediation:				
State-and tribal-equivalent NPL	1.0	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
State-and tribal-equivalent	0.5	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
State-and tribal-landfill and/or solid waste disposal site lists	0.5	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
State-and tribal-leaking storage tank lists	0.5	Yes <input checked="" type="radio"/>	No <input type="radio"/>	
State and tribal registered storage tank lists	property and adjoining properties	Yes <input checked="" type="radio"/>	No <input type="radio"/>	
State and tribal institutional control/engineering control registries	property only	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
State and tribal voluntary cleanup sites	0.5	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
State and tribal Brownfield sites	0.5	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
22. Based upon a review of fire insurance maps (10.2.3) or local street directories (10.2.3), all as specified in the guide, are any buildings or other improvements on the property or on an adjoining property identified as having been used for an industrial use or uses likely to lead to contamination of the property?		Yes <input type="radio"/>	No <input checked="" type="radio"/>	Unavailable <input type="radio"/>

**Result** See item 1B above.

**The Owner questionnaire answers were provided was completed by:**

Name \_\_\_\_\_  
Title \_\_\_\_\_  
Firm \_\_\_\_\_  
Address \_\_\_\_\_  
Phone Number \_\_\_\_\_  
Date \_\_\_\_\_  
Role (s) at the site \_\_\_\_\_  
Number of years at the site \_\_\_\_\_  
Relationship to use (e.g. principal, employee, agent, consultant) \_\_\_\_\_

**The Occupant questionnaire answers were provided by:**

Name \_\_\_\_\_  
Title \_\_\_\_\_  
Firm \_\_\_\_\_  
Address \_\_\_\_\_  
Phone Number \_\_\_\_\_  
Date \_\_\_\_\_  
Role (s) at the site \_\_\_\_\_  
Number of years at the site \_\_\_\_\_  
Relationship to use (e.g. principal, employee, agent, consultant) \_\_\_\_\_

**The Site Visit questionnaire was completed by:**

Name James R. Wessinger, P.G.  
Title Professional Geologist  
Firm F&ME Consultants, Inc.  
Address 3112 Devine Street  
Columbia, South Carolina 29205  
Phone Number (803) 254-4540  
Date July 5, 2012  
Role (s) at the site Consultant  
Number of years at the site N/A  
Relationship to use (e.g. principal, employee, agent, consultant) Consultant

*It is the user's responsibility to draw conclusions regarding affirmative or unknown answers.*

**The Government Records and Historical Sources Inquiry questionnaire was completed by:**

Name James R. Wessinger, P.G.  
Title Professional Geologist  
Firm F&ME Consultants, Inc.  
Address 3112 Devine Street  
Columbia, South Carolina 29205  
Phone Number (803) 254-4540  
Date July 24, 2012  
Role (s) at the site Consultant  
Number of years at the site N/A  
Relationship to use (e.g. principal, employee, agent, consultant) Consultant

**User's relationship to the site (for example, owner, prospective purchaser, lender, etc.)**

If the preparer (s) is different from the user, complete the following:

Name of User Mulkey Engineers and Consultants  
User's Address 701 Gervais Street, Suite 120  
Columbia, South Carolina 29201  
User's Phone Number (803) 933-9810

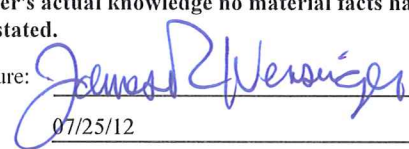
Copies of the completed questionnaires have been filed at:

F&ME Consultants  
3112 Devine Street  
Columbia, South Carolina 29201

Copies of the completed questionnaires have been mailed or delivered to:

Mulkey Engineers and Consultants  
701 Gervais Street, Suite 120  
Columbia, South Carolina 29201

**Preparer represents that to the best of the preparer's knowledge the above statements and facts are true and correct and to the best of the preparer's actual knowledge no material facts have been suppressed or misstated.**

Signature:   
Date: 07/25/12

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_



To order additional copies of this questionnaire,  
contact ASTM International, Customer Service.

phone: (610) 832-9585

fax: (610) 9555

e-mail: [service@astm.org](mailto:service@astm.org)



100 Barr Harbor Drive  
PO Box C700  
West Conshohocken, PA 19428-2959



# ENVIRONMENTAL SITE ASSESSMENT TRANSACTION SCREEN QUESTIONNAIRE

This document is an excerpt of Practice E1528-06: Standard Practice for Environmental Site Assessments: Transaction Screen Process, which is under the jurisdiction of ASTM Committee E50 on Environmental Assessment as is the direct responsibility of Subcommittee E50.02 on Commercial Real Estate Transactions. This questionnaire represents only Sections 5 and 6 of Practice E 1528-06 and should not be construed as being the complete standard. It is necessary to refer to the full standard prior to using this questionnaire. COPYRIGHT © 2006 ASTM INTERNATIONAL, West Conshohocken, PA. Prior edition copyrighted 2000. Stock # ADJE152806. For the complete standard, or to order additional copies of this questionnaire, contact ASTM Customer service at (610) 832-9585.

## 5. Introduction to Transaction Screen Questionnaire

5.1 *Process*--The *transaction screen process* consists of asking questions contained within the *transaction screen questionnaire of owners and occupants of the property*, observing site conditions at the property with direction provided by the *transaction screen questionnaire*, and, to the extent *reasonably ascertainable*, conducting limited research regarding certain government records and certain standard historical sources. The questions asked of *owners* are the same questions as those asked of *occupants*.

5.2 *Guide*--The *transaction screen questionnaire* is followed by a guide designed to assist the person completing the *transaction screen questionnaire*. The guide to the *transaction screen questionnaire* is set out in Sections 7-10 of this practice. The guide is divided into three sections: Guide for Owner/Occupant Inquiry, Guide to Site Visit, and Guide to Government Records/Historical Sources Inquiry.

5.2.1 To assist the *user*, its employee or agent, or the preparer in preparing a report, the guide repeats each of the questions set out in the *transaction screen questionnaire* in both the guide for *owner/occupant inquiry* and the guide to *site visit*. The questions regarding government records/historical sources inquiry are also repeated in the guide to that section.

5.2.2 The guide also describes the procedures to be followed to determine if reliance upon the information in a prior *transaction screen* is appropriate under this practice.

5.2.3 A *user*, his employee or agent, or *preparer* conducting the *transaction screen process* should not use the *transaction screen questionnaire* without reference to or without familiarity with the guide based on prior use of the guide.

5.3 The *user* may either conduct the *transaction screen process*, or delegate it to an employee or agent or may contract with a third party to prepare the questionnaire on behalf of the *user*. No matter who prepares the questionnaire, the *user* remains responsible for the decision to conduct limited environmental *due diligence* and the impact of that decision on risk management.

5.4 The *preparer* conducting the *transaction screen process* should use good faith efforts in determining answers to the questions set forth in the *transaction screen questionnaire*. The *user* should take time and care to check whatever records are in the *user's* possession and forward relevant information or specialized knowledge to the *preparer*.

5.5 *Knowledge*--All answers should be given to the best of the *owner's* or *occupant's* knowledge. The most knowledgeable person available should be chosen to answer the questions.

5.5.1 While the person conducting the *transaction screen* has an obligation to ask the questions in the *transaction screen questionnaire*, others may have no obligation to answer them.

5.5.2 The *transaction screen questionnaire* and the *transaction screen guide* sometimes include the phrase "to the best of your knowledge." This phrase does not impose a constructive knowledge standard. It is intended as an assurance to the person being questioned that he or she is not obligated to search out information he or she does not currently have in order to answer the particular question.

5.6 *Conclusions Regarding Affirmative or Unknown Answers*--Once a *transaction screen questionnaire* has been completed, it shall be presented to the user. Subject to 5.6 through 5.7, an affirmative, unknown, or no response is presumed to be a *potential environmental concern*. If any of the questions set forth in the *transaction screen questionnaire* are answered in the affirmative, the *preparer* must document the reason for the affirmative answer. If any of the questions are not answered or the answer is unknown, the *user* should document such nonresponse or answer of unknown and evaluate it in light of the other information obtained in the *transaction screen process*, including, in particular, the site visit and the government records/historical sources inquiry. If the *user* decides no further inquiry is warranted after receiving no response, an answer of unknown, or an affirmative answer, the *user* must document the reasons for any such conclusion.

5.6.1 Upon obtaining an affirmative answer, an answer of unknown or no response, the *user* should first refer to the guide. The guide may provide sufficient explanation to allow a *user* to conclude that no further inquiry is appropriate with respect to the particular question.

5.6.2 If the guide to a particular question does not, in itself, permit a user to conclude that no further inquiry is appropriate, then the user should consider other information obtained from the *transaction screen process* relating to this question. For example, while on the site performing a *site visit*, a person may find a storage tank on the *property* and therefore answer Question 10 of the *transaction screen questionnaire* in the affirmative. However, during or subsequent to the *owner/occupant inquiry*, the *owner* may establish that substances now or historically contained in the tank (for example, water) are not likely to cause contamination.

5.6.3 If either the guide to the question or other information obtained during the *transaction screen process* does not permit a *user* to conclude no further inquiry is appropriate with respect to such question, then the user must determine, in the exercise of the *user's* reasonable business judgment, based upon the totality of unresolved affirmative answers or answers of unknown received during the *transaction screen process*, whether further inquiry may be limited to those specific issues identified as of concern.

5.7 *Presumption*--A presumption exists that further inquiry is necessary if an affirmative answer is given to a question or because the answer was unknown or no response was given. In rebutting this presumption, the *user* should evaluate information obtained from each component of the *transaction screen process* and consider whether sufficient information has been obtained to conclude that no further inquiry is necessary. The *user* must determine, in the exercise of the *user's* reasonable business judgment, the scope of such further inquiry.

5.8 *Further Inquiry*--Upon completing the *transaction screen questionnaire*, if the *user* concludes that further inquiry or action is needed (for example, consult with an environmental consultant, contractor, governmental authority, or perform additional governmental and/or historical records review), the *user* should proceed with such inquiry. (Note that if the *user* determines to proceed with a Phase I Environment Site Assessment, the *user* may apply the current Practice E 1527 or alternatively the provisions of EPA's regulation "Standards and Practices for All Appropriate Inquiries," 40 C.F.R. Part 312.)

5.9 *Signature*--The user and the *preparer* of the *transaction screen questionnaire* must complete and sign the questionnaire as provided at the end of the questionnaire.

**6. Transaction Screen Questionnaire**

6.1 *Persons to Be Questioned*-The following questions should be asked of (1) the current owner of the *property*, (2) any major occupant of the *property* or, if the property does not have any *major occupants*, at least 10 % of the occupants of the *property*, and (3) in addition to the current owner and the occupants identified in (2), any *occupant* likely to be using, treating, generating, storing, or disposing of *hazardous substances* or *petroleum products* on or from the *property*. A major occupant is any *occupant* using at least 40 % of the leasable area of the *property* or any anchor tenant when the *property* is a

shopping center. In a multifamily *property* containing both residential and commercial uses, the *preparer* does not need to ask questions of the residential *occupants*. The *preparer* should ask each person to answer all questions to the best of the respondent's *actual knowledge* and in good faith. When completing the *site visit* column, the *preparer* should be sure to observe the *property* and any buildings and other structures on the *property*. The guide to this *transaction screen questionnaire* (see Sections 7-10) provides further details on the appropriate use of this questionnaire. (See Note 2.)  
NOTE 2-Unk = "unknown" or "no response."

Description of Site Address:

S.C. Highway 557

Between the Towns of Clover and Lake Wylie, South Carolina

Question	Owner	Occupants (if applicable)	Observed During Site Visit	If yes, provide description
1a. Is the property used for an industrial use?	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input checked="" type="radio"/>	Pharr Yarns located at 6199 HWY 557, but does not appear to pose any environmental threats.
1b. Is any adjoining property used for an industrial use?	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input checked="" type="radio"/> No <input type="radio"/>	
2a. Did you observe evidence or do you have any prior knowledge that the property has been used for an industrial use in the past?	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input checked="" type="radio"/>	
2b. Did you observe evidence or do you have any prior knowledge that any adjoining property has been used for an industrial use in the past?	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input checked="" type="radio"/>	
3a. Is the property used as a gasoline station, motor repair facility, commercial printing facility, dry cleaners, photo developing laboratory, junkyard or landfill, or as a waste treatment, storage, disposal, processing, or recycling facility (if applicable, identify which)?	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input checked="" type="radio"/>	
3b. Is any adjoining property used as a gasoline station, motor repair facility, commercial printing facility, dry cleaners, photo developing laboratory, junkyard or landfill, or as a waste treatment, storage, disposal, processing, or recycling facility (if applicable, identify which)?	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input checked="" type="radio"/>	
4a. Did you observe evidence or do you have any prior knowledge that the property has been used as a gasoline station, motor repair facility, commercial printing facility, dry cleaners, photo developing laboratory, junkyard or landfill, or as a waste treatment, storage, disposal, processing, or recycling facility (if applicable, identify which)?	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input checked="" type="radio"/>	
4b. Did you observe evidence or do you have any prior knowledge that any adjoining property has been used as a gasoline station, motor repair facility, commercial printing facility, dry cleaners, photo developing laboratory, junkyard or landfill, or as a waste treatment, storage, disposal, processing, or recycling facility (if applicable, identify which)?	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input checked="" type="radio"/>	
5a. Are there currently any damaged or discarded automotive or industrial batteries, pesticides, paints, or other chemicals in individual containers of >5 gal (19 L) in volume or 50 gal (190 L) in the aggregate, stored on or used at the property or at the facility?	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input checked="" type="radio"/>	
5b. Did you observe evidence or do you have any prior knowledge that there have been previously any damaged or discarded automotive or industrial batteries, or pesticides, paints, or other chemicals in individual containers of >5 gal (19 L) in volume or 50 gal (190 L) in the aggregate, stored on or used at the property or at the facility?	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input checked="" type="radio"/>	
6a. Are there currently any industrial drums (typically 55 gal (208 L)) or sacks of chemicals located on the property or at the facility?	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input checked="" type="radio"/>	
6b. Did you observe evidence or do you have any prior knowledge that there have been previously any industrial drums (typically 55 gal (208 L)) or sacks of chemicals located on the property or at the facility?	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input checked="" type="radio"/>	
7a. Did you observe evidence or do you have any prior knowledge that fill dirt has been brought onto the property that originated from a contaminated site?	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input checked="" type="radio"/>	

\* Unk = "unknown" or "no response"

Copyright © 2006 ASTM INTERNATIONAL, West Conshohocken, PA

This document is an excerpt of E 1528-06, Standard Practice for Environmental Site Assessments: Transaction Screen Process, which is under the jurisdiction of ASTM Committee E50 on Environmental Assessments and is the direct responsibility of Subcommittee E50.02 on Commercial Real Estate Transactions. This questionnaire represents only Sections 5 and 6 of Practice E 1528-06 and should not be construed as being the complete standard. It is necessary to refer to the full standard prior to using this questionnaire. For the complete standard, or to order additional copies of this questionnaire, contact ASTM Customer Service at (610) 832-9585.

Question	Owner			Occupants (if applicable)			Observed During Site Visit		If yes, provide description
7b. Did you observe evidence or do you have any prior knowledge that fill dirt has been brought onto the property that is of an unknown origin?	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
8a. Are there currently any pits, ponds, or lagoons located on the property in connection with waste treatment or waste disposal?	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
8b. Did you observe evidence or do you have any prior knowledge that there have been previously, any pits, ponds, or lagoons located on the property in connection with waste treatment or waste disposal?	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
9a. Is there currently any stained soil on the property?	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
9b. Did you observe evidence or do you have any prior knowledge that there has been previously, any stained soil on the property?	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
10a. Are there currently any registered or unregistered storage tanks (above or underground) located on the property?	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
10b. Did you observe evidence or do you have any prior knowledge that there have been previously, any registered or unregistered storage tanks (above or underground) located on the property?	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
11a. Are there currently any vent pipes, fill pipes, or access ways indicating a fill pipe protruding from the ground on the property or adjacent to any structure located on the property?	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
11b. Did you observe evidence or do you have any prior knowledge that there have been previously, any vent pipes, fill pipes, or access ways indicating a fill pipe protruding from the ground on the property or adjacent to any structure located on the property?	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
12a. Is there currently evidence of leaks, spills or staining by substances other than water, or foul odors, associated with any flooring, drains, walls, ceilings, or exposed grounds on the property?	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
12b. Did you observe evidence or do you have any prior knowledge that there have been previously any leaks, spills, or staining by substances other than water, or foul odors, associated with any flooring drains, walls, ceilings or exposed grounds on the property?	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
13a. If the property is served by a private well or non-public water system, is there evidence or do you have prior knowledge that contaminants have been identified in the well or system that exceed guidelines applicable to the water system?	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
13b. If the property is served by a private well or non-public water system, is there evidence or do you have prior knowledge that the well has been designated as contaminated by any government environment health agency?	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
14. Does the owner or occupant of the property have any knowledge of environmental liens or governmental notification relating to past or recurrent violations of environmental laws with respect to the property or any facility located on the property?	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>			
15a. Has the owner or occupant of the property been informed of the past existence of hazardous substances or petroleum products with respect to the property or any facility located on the property?	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>			
15b. Has the owner or occupant of the property been informed of the current existence of hazardous substances or petroleum products with respect to the property or any facility located on the property?	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>			
15c. Has the owner or occupant of the property been informed of the past existence of environmental violations with respect to the property or any facility located on the property?	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>			
15d. Has the owner or occupant of the property been informed of the current existence of environmental violations with respect to the property or any facility located on the property?	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>	Yes <input type="radio"/>	No <input type="radio"/>	Unk <input type="radio"/>			

Question	Owner	Occupants (if applicable)	Observed During Site Visit	If yes, provide description
16. Does the owner or occupant of the property have any knowledge of any environmental site assessment of the property or facility that indicated the presence of hazardous substances or petroleum products on, or contamination of, the property or recommended further assessment of the property?	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>		
17. Does the owner or occupant of the property know of any past, threatened, or pending lawsuits or administrative proceedings concerning a release or threatened release of any hazardous substance or petroleum products involving the property by any owner or occupant of the property?	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>		
18a. Does the property discharge waste-water (not including sanitary waste or storm water) onto or adjacent to the property and/or into a storm water system?	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input checked="" type="radio"/>	
18b. Does the property discharge waste water (not including sanitary waste or storm water) onto or adjacent to the property and/or into a sanitary sewer system?	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input checked="" type="radio"/>	
19. Did you observe evidence or do you have any prior knowledge that any hazardous substances or petroleum products, unidentified waste materials, tires, automotive or industrial batteries, or any other waste materials have been dumped above grade, buried and/or burned on the property?	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input checked="" type="radio"/> No <input type="radio"/>	Evidence of some household debris
20. Is there a transformer, capacitor, or any hydraulic equipment for which there are any records indicating the presence of PCBs?	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input type="radio"/> Unk <input type="radio"/>	Yes <input type="radio"/> No <input checked="" type="radio"/>	

**Government Records/Historical Sources Inquiry**  
(See guide, Section 10)

21. Do any of the following federal, state, or tribal government record systems list the property or any property within the search distance noted below (where available):	Approximate Minimum Search Distance, miles (kilometres)	Yes <input type="radio"/> No <input checked="" type="radio"/>
Federal NPL site	1.0	Yes <input type="radio"/> No <input checked="" type="radio"/>
Federal Delisted NPL site	0.5	Yes <input type="radio"/> No <input checked="" type="radio"/>
Federal CERCLIS	0.5	Yes <input type="radio"/> No <input checked="" type="radio"/>
Federal CERCLIS NFRAP site	0.5	Yes <input type="radio"/> No <input checked="" type="radio"/>
Federal RCRA CORRACTS facilities	1.0	Yes <input type="radio"/> No <input checked="" type="radio"/>
Federal RCRA non-CORRACTS TSD	0.5	Yes <input type="radio"/> No <input checked="" type="radio"/>
Federal RCRA generators	property and adjoining properties	Yes <input checked="" type="radio"/> No <input type="radio"/>
Federal institutional control/engineering control registries	property only	
Federal ERNS	property only	Yes <input type="radio"/> No <input checked="" type="radio"/>
State and tribal lists of hazardous waste sites identified for investigation or remediation:		
State-and tribal-equivalent NPL	1.0	Yes <input type="radio"/> No <input checked="" type="radio"/>
State-and tribal-equivalent	0.5	Yes <input type="radio"/> No <input checked="" type="radio"/>
State-and tribal-landfill and/or solid waste disposal site lists	0.5	Yes <input type="radio"/> No <input checked="" type="radio"/>
State-and tribal-leaking storage tank lists	0.5	Yes <input checked="" type="radio"/> No <input type="radio"/>
State and tribal registered storage tank lists	property and adjoining properties	Yes <input checked="" type="radio"/> No <input type="radio"/>
State and tribal institutional control/engineering control registries	property only	Yes <input type="radio"/> No <input checked="" type="radio"/>
State and tribal voluntary cleanup sites	0.5	Yes <input type="radio"/> No <input checked="" type="radio"/>
State and tribal Brownfield sites	0.5	Yes <input type="radio"/> No <input checked="" type="radio"/>
22. Based upon a review of fire insurance maps (10.2.3) or local street directories (10.2.3), all as specified in the guide, are any buildings or other improvements on the property or on an adjoining property identified as having been used for an industrial use or uses likely to lead to contamination of the property?		Yes <input type="radio"/> No <input checked="" type="radio"/> Unavailable <input type="radio"/>

**Result** See item 1B above.

The Owner questionnaire answers were provided was completed by:

Name \_\_\_\_\_  
Title \_\_\_\_\_  
Firm \_\_\_\_\_  
Address \_\_\_\_\_  
Phone number \_\_\_\_\_  
Date \_\_\_\_\_  
Role(s) at the site \_\_\_\_\_  
Number of years at the site \_\_\_\_\_  
Relationship to user (for example, principal, employee, agent, consultant) \_\_\_\_\_

The Government Records and Historical Sources Inquiry questionnaire

was completed by:  
Name Glynn M. Ellen  
Title Senior Environmental Consultant  
Firm F&ME Consultants  
Address 3112 Devine St.  
Columbia, SC 29205  
Phone number (803) 254-4540  
Date July 5, 2012  
Relationship to site Consultant  
Relationship to user (for example, principal, employee, agent, consultant) Consultant

The Occupant questionnaire answers were provided by:

Name \_\_\_\_\_  
Title \_\_\_\_\_  
Firm \_\_\_\_\_  
Address \_\_\_\_\_  
Phone number \_\_\_\_\_  
Date \_\_\_\_\_  
Role(s) at the site \_\_\_\_\_  
Number of years at the site \_\_\_\_\_  
Relationship to user (for example, principal, employee, agent, consultant) \_\_\_\_\_

User's relationship to the site (for example, owner, prospective purchaser, lender, etc.)

If the preparer (s) is different from the user, complete the following:  
Name of User Mulkey Engineers and Consultants  
User's address 701 Gervais St., Suite 120  
Columbia, SC 29201  
User's phone number (803) 933-9810  
Copies of the completed questionnaires have been filed at:  
F&ME Consultants  
3112 Devine St.  
Columbia, SC 29205

Copies of the completed questionnaires have been mailed or delivered to:

Mulkey Engineers and Consultants  
701 Gervais St., Suite 120  
Columbia, SC 29201

The Site Visit questionnaire was completed by:

Name Glynn M. Ellen  
Title Senior Environmental Consultant  
Firm F&ME Consultants  
Address 3112 Devine St.  
Columbia, SC 29205  
Phone number (803) 254-4540  
Date July 5, 2012  
Relationship to site Consultant  
Relationship to user (for example, principal, employee, agent, consultant) Consultant

Preparer represents that to the best of the preparer's knowledge the above statements and facts are true and correct and to the best of the preparer's actual knowledge no material facts have been suppressed or misstated.

Signature [Signature]  
Date 7/25/12  
Signature \_\_\_\_\_  
Date \_\_\_\_\_  
Signature \_\_\_\_\_  
Date \_\_\_\_\_

It is the user's responsibility to draw conclusions regarding affirmative or unknown answers.



---

---

## **7. Special Contractual Conditions between User and Environmental Professional**

This Limited Phase I Environmental Site Assessment differs from a full Phase I in that no interviews of owners/ operators of the affected properties were performed.

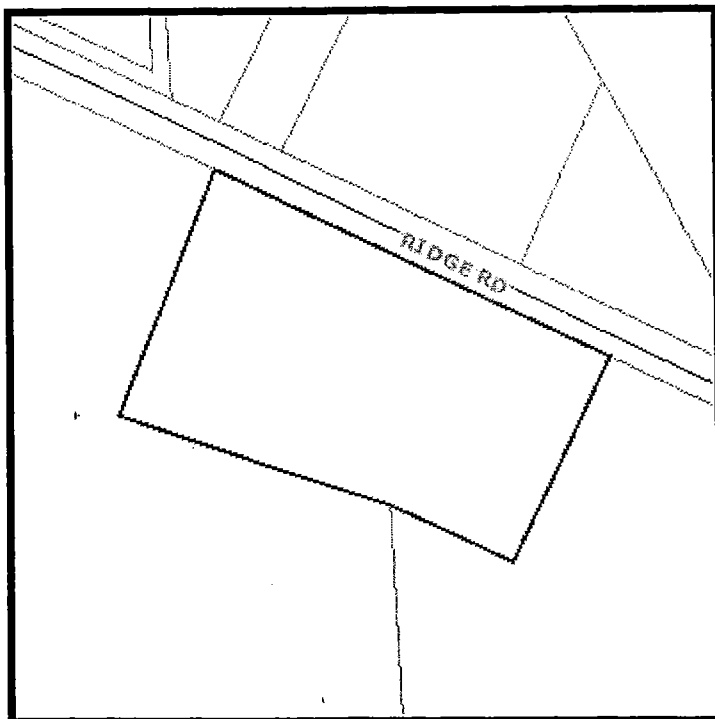
---

## **8. Property Deeds**



**Property Report for Parcel Number:**  
4770000005

Inquiry Date:



**Owner**

**Owner Name:** CHURCH MOUNT HARMON TRUSTEES  
**Address:** PO BOX 193  
**City/State:** CLOVER S.C. 2  
**Zip Code:** 29710

Disclaimer: While every effort is made to keep information provided over f accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

**Parcel Number:** 4770000005  
**Total Lots:** 0  
**Total Acres:** 0  
**Deed Book:** 118  
**Deed Book Page:** 197  
**Platt Book:**  
**Platt Book Page:**  
**School District:** 2  
**Municipality:**  
**Fire Code:** BE-I  
**Property Location:** HWY 27

**Land Value:** \$0  
**AG Use:**  
**AG Use Value:**  
**Previous Owner:**  
**Tax Bill Information:**  
**Zoning:**  
**Sale Price:** \$0  
**Sale Date:** 0/0/0  
**Census Tract:**  
**Voter District:**

**Building/Structure**

**Prop. Classification:**  
**Heating Type:**  
**Living Area(Sq. Ft.):**  
**Basement:** NO  
**Bathrooms:**  
**Total Imp. Value:**

**Number of Stories:**  
**Year Built:**  
**Garage Area:** NO  
**Fireplace:**  
**Bldg. Value:** \$0

**Assessment**

**Total Assessed Value:** \$0

**Total Market Value\*:** \$0

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 477-00-00-005 Legal HWY 27

DEED

Grantor MABEL B PATRICK

Grantee TRUSTEES OF MOUNT HARMONY CHURCH

Book 118 Page 197

Dated 6/23/1945 Recorded 6/23/1945

1-1-2 Previous Ownership

Grantor N A

Grantee

Book Page

Dated Recorded

**Disclaimer:** The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.

THE STATE OF SOUTH CAROLINA, }

YORK COUNTY.

KNOW ALL MEN BY THESE PRESENTS, That I, LABEL B. PATRICK

in the State aforesaid .....in consideration of the sum of

SEVENTY FIVE DOLLARS (75.00) DOLLARS

to ME ~~in hand paid at and before the signing of these presents~~ by Trustees of Mount Harmony Church

in the State aforesaid (~~the receipt whereof is hereby acknowledged~~), have granted, bargained, sold and released, and by these presents do grant, bargain sell and release, unto the said Trustees of Mount Harmony Church all that certain piece, parcel or tract

of land lying, being and situated in the State of South Carolina, County of York; and bounded b the lands of Mabel B. Patrick on South and west and Mount Harmony Church lot on the East and running with South Carolina State highway No. 264 on North and having courses and distances as follows:

Beginning at stake at S.W. corner of Church lot and running N. 69.5 W. 334 feet to iron stake, thence N. 22.5 E. 368 feet to iron stake in road, thence S 63 E. 100 feet to point in road, thence S. 22.5 W 342 feet to stake, thence S. 68.5 E. 234 ft. to beginning corner and containing 37/100 acres more or less.

118 @ 197

DEED BOOK 118

TO HAVE AND TO HOLD, all and singular, the said premises before mentioned unto the said Trustees of Mount Harmony church and their successors

Heirs and Assigns forever.

AND I do hereby bind BY

Heirs Executors and Administrators, to warrant and forever defend, all and singular, the said premises unto the said Trustees of Mount Harmony Church and their successors

and against every person and against every person and all other persons whomsoever lawfully claiming or to claim the same or any part thereof.

WITNESS my Hand and Seal this 23 day of June in the year of our Lord one thousand nine hundred and forty five and in the one hundred and seventy fifth year of the Sovereignty and Independence of the United States of America.

Signed, Sealed and Delivered in the Presence of:

A. P. Jackson

Edgar Clawson

Mabel B. Patrick

(Seal)

(Seal)

THE STATE OF SOUTH CAROLINA, York County.

PERSONALLY appeared before me A. P. Jackson

and made oath that he saw the within named Mabel B. Patrick her for the uses and purposes therein mentioned sign, seal, and as her act and deed, deliver the within written Deed, and that he

with Edgar Clawson

witnessed the execution thereof.

SWORN to before me, this 23

day of June, A. D. 1945

J. H. Patrick (N. Seal)

Notary Public, S. C.

A. P. Jackson

THE STATE OF SOUTH CAROLINA, York County.

RENUNCIATION OF DOWER

I, Notary Public, S. C.,

do hereby certify unto all whom it may concern that Mrs. the wife of the within named did this day appear before me, and upon being privately and separately examined by me, did declare that she does freely, voluntarily, and without any compulsion, dread or fear of any person or persons whomsoever, renounce, release and forever relinquish unto the within named

Heirs and Assigns, all her interest and estate, and also all her right and claim of dower of, in or to, all and singular, the premises within mentioned and released.

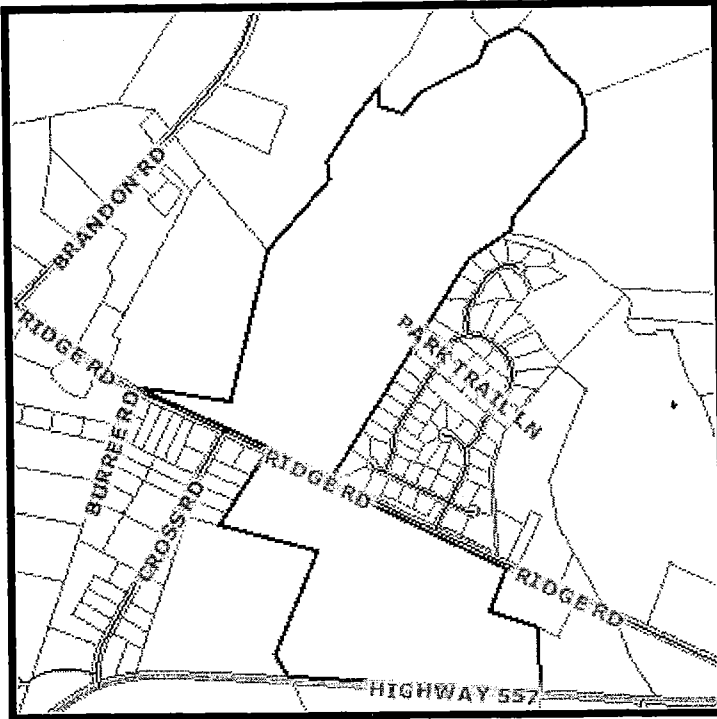
Given under my Hand and Seal, this

day of, A. D. 19

Notary Public, S. C.

**Property Report for Parcel Number:**  
4770000006

Inquiry Date:



**Owner**

**Owner Name:** MARTIN LINDA & WILLI/ CO TRUSTEES  
**Address:** 6270 CAMPBELL RD  
**City/State:** YORK S C  
**Zip Code:** 29745

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

**Parcel Number:** 4770000006  
**Total Lots:** 0  
**Total Acres:** 193.08  
**Deed Book:** 5542  
**Deed Book Page:** 256  
**Platt Book:** 142  
**Platt Book Page:** 84  
**School District:** 2  
**Municipality:**  
**Fire Code:** BE-I  
**Property Location:** RIDGE RD 193.08 AC

**Land Value:** \$1544600  
**AG Use:**  
**AG Use Value:**  
**Previous Owner:** MARTIN ROBERT PAT ETAL  
**Tax Bill Information:**  
**Zoning:**  
**Sale Price:** \$5  
**Sale Date:** 8/7/03  
**Census Tract:**  
**Voter District:**

**Building/Structure**

**Prop. Classification:**  
**Heating Type:**  
**Living Area(Sq. Ft.):**  
**Basement:** NO  
**Bathrooms:**  
**Total Imp. Value:**

**Number of Stories:**  
**Year Built:**  
**Garage Area:** NO  
**Fireplace:**  
**Bldg. Value:** \$0

**Assessment**



F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 477-00-00-006 Legal 193.08 AC RIDGE RD PLAT 142 / 084

DEED

Grantor ROBERT PATRICK MARVIN

NOTE POA From Robert Patrick Martin (a minor) - To William P Martin / Linda P Martin Bk.Pg 5541 / 0186

Grantee LINDA P MARTIN AND WILLIAM P MARTIN Co-Trustees under ROBERT PATRICK MARTIN irrevocable Trust

Book 5542 Page 256

Dated 8/4/2003 Recorded 8/7/2003

1-1-2 Previous Ownership

Grantor ESTATE OF ELIZABETH P KEEL

Grantee WILLIAM BRANDON MARTIN / ROBERT PATRICK MARTIN a minor

Book 4281 Page 176

Dated 3/28/2002 Recorded 4/2/2002

Grantor ESTATE OF MABEL B PATRICK

Grantee ELIZABETH P KEEL

PROBATE 458 / 14038

Dated 3/24/1963 Recorded 3/24/1963

**Disclaimer:** The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.

STATE OF SOUTH CAROLINA )  
 )  
COUNTY OF YORK )

GENERAL WARRANTY DEED

KNOW ALL MEN BY THESE PRESENTS, That Robert Patrick Martin ("Grantor"), in the State aforesaid, for and in consideration of the sum of Five (\$5.00) Dollars to him paid by Linda P. Martin and William P. Martin, Co-Trustees under Robert Patrick Martin Irrevocable Trust dated August 4, 2003 ("Grantee"), in the State aforesaid, the receipt whereof is hereby acknowledged, has granted, bargained, sold and released, and by these presents does grant, bargain, sell and release unto the said Grantee, its SUCCESSORS AND ASSIGNS:

ALL OF HIS INTEREST IN THE FOLLOWING PROPERTY:

See attached Exhibit "A"

Grantee's Address: 6270 Campbell Road  
York, SC 29745

000140399  
RECORDED 08/07/2003 11:28:38AM  
Bk:05542 Pg:00256 Pages:4  
Fee:10.00 State:0.00  
County:0.00 Exempt:-----  
David Hamilton, Clerk of Court  
York County, SC

This conveyance is made subject to easements and restrictions of record and otherwise affecting the property.

Together with all and singular, the rights, members, hereditaments and appurtenances to the said premises belonging or in anywise incident or appertaining.

To Have and to Hold all and singular the premises before mentioned unto the said Grantee, its Successors and Assigns forever, And he does hereby bind himself and his Heirs, Executors and Administrators to warrant and forever defend all and singular the said premises unto the said Grantee, its Successors and Assigns, against him and his Heirs and against every person whomsoever lawfully claiming, or to claim, the same or any part thereof.

WITNESS his Hand and Seal this 4th day of August, 2003.

[Signature]  
Witness

[Signature] (SEAL)  
Robert Patrick Martin

[Signature]  
Witness

RECORDED  
YORK COUNTY  
TAX ASSOCIATION'S OFFICE  
DATE 8-7-03  
TAX MAP NO. 477-6  
INITIALS AC / HJ

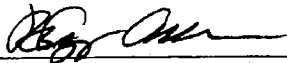
BK 05542 PG 0256

①

STATE OF SOUTH CAROLINA )  
  )     **ACKNOWLEDGEMENT**  
COUNTY OF RICHLAND         )

I, Rita Bragg Cullum, do hereby certify that Robert Patrick Martin personally appeared before me this day and acknowledged the due execution of the foregoing instrument.

Witness my hand and seal this the 4th day of August, 2003.

  
\_\_\_\_\_  
Notary Public for South Carolina  
My Commission Expires: 09/06/2005

BK 05542 P00257



**Exhibit A**

All that certain piece, parcel or tract of land lying, being and situate in Bethel Township, York County, South Carolina, on the northern side of S. C. Highway 557, containing ONE HUNDRED NINETY-FIVE AND 918/1000 (195.918) ACRES, more or less, and being more particularly shown and described on plat of property surveyed for Elizabeth P. Keel Estate, prepared by Baird Engineering, Inc., dated May 8, 2001, which plat, recorded in Plat Book C-46, Page 9 in the Office of the Clerk of Court for York County, South Carolina, is incorporated into and made a part of this description by reference. ✓

This being the identical property acquired by Robert Patrick Martin by Deed of Distribution of the Estate of Elizabeth P. Keel, dated March 28, 2002, and recorded in the Office of the Clerk of Court for York County in Deed Book 04281 at Page 00176 on April 2, 2002. See York County Probate File No. 2001-ES-46-00906. ✓

TMS #s 477-00-00-006 and 477-00-00-014

BK05542 PB0258

STATE OF SOUTH CAROLINA )  
COUNTY OF RICHLAND )

**AFFIDAVIT FOR EXEMPT TRANSFERS**

**PERSONALLY** appeared before me the undersigned, who being duly sworn, deposes and says:

1. I have read the information on the back of this affidavit and I understand such information.
2. The property being transferred is located at Bethel Township, York County, South Carolina, bearing York County Tax Map Numbers 477-00-00-006 and 477-00-00-014, were transferred by Robert Patrick Martin to Linda P. Martin and William P. Martin, Co-Trustees under Robert Patrick Martin Irrevocable Trust dated August 4, 2003, on August 4, 2003.
3. The deed is exempt from the deed recording fee because transferring realty to a corporation, a partnership, or a trust in order to become, or as, a stockholder, partner, or trust beneficiary of the entity provided 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 such stock or interest held by the grantor. However, 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; the consideration paid is less than \$100.00 (South Carolina Code Section 12-24-40(1)).
4. As required by Code Section 12-24-70, I state that I am a responsible person who was connected with the transaction as: the Grantor.
5. 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.

  
Robert Patrick Martin

SWORN to before me this 4th

day of August, 2003.

  
Notary Public for South Carolina

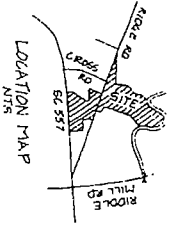
My Commission Expires: 09/06/2005

3K 05542 P00259

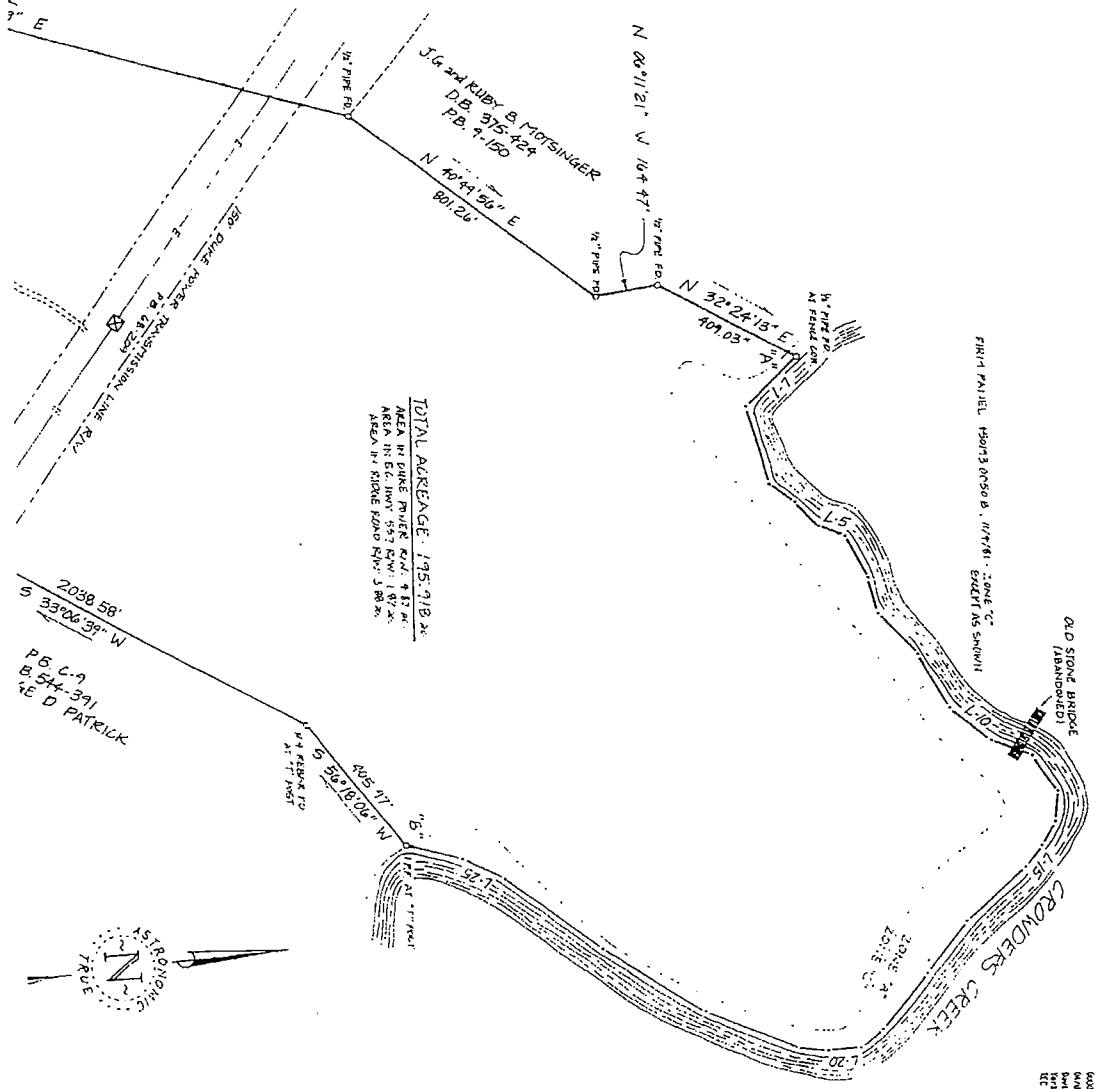


PROPERTY LINE FOLLOWS  
STREAM BANK FROM "A" TO "B"

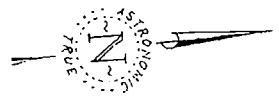
- L-1 S 37°53'54" E 187.95'
- L-2 N 77°53'03" E 213.07'
- L-3 N 40°04'40" E 83.67'
- L-4 N 48°58'51" E 86.64'
- L-5 N 28°08'51" E 72.02'
- L-6 N 65°58'04" E 121.48'
- L-7 N 78°32'25" E 98.05'
- L-8 N 67°52'13" E 151.39'
- L-9 N 65°19'40" E 167.40'
- L-10 N 44°18'51" E 198.00'
- L-11 N 34°23'34" E 116.24'
- L-12 N 58°45'40" E 82.66'
- L-13 S 78°18'47" E 71.51'
- L-14 S 61°18'47" E 67.03'
- L-15 S 47°05'15" E 67.03'
- L-16 S 37°08'10" E 170.45'
- L-17 S 42°41'00" E 188.17'
- L-18 S 43°18'35" E 73.80'
- L-19 S 33°27'58" E 84.74'
- L-20 S 00°24'21" E 84.74'
- L-21 S 10°44'45" W 68.80'
- L-22 S 20°28'01" W 216.17'
- L-23 S 35°55'32" W 309.80'
- L-24 S 40°10'45" W 310.60'
- L-25 S 30°59'15" W 123.02'
- L-26 S 17°32'05" W 155.75'



OF PLEASANT GROVE  
T CHURCH  
3-162  
-135



TOTAL AREA: 195,918 sq. ft.  
AREA IN BONE PRIMER: 43.5 ac.  
AREA IN EC. HWY 553: 1.87 ac.  
AREA IN RIDDLE RD: 3.88 ac.

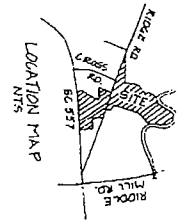


QUASIMO W. C. ...  
REGISTERED PROFESSIONAL SURVEYOR  
STATE OF MISSOURI  
NO. 1000

File @ 9

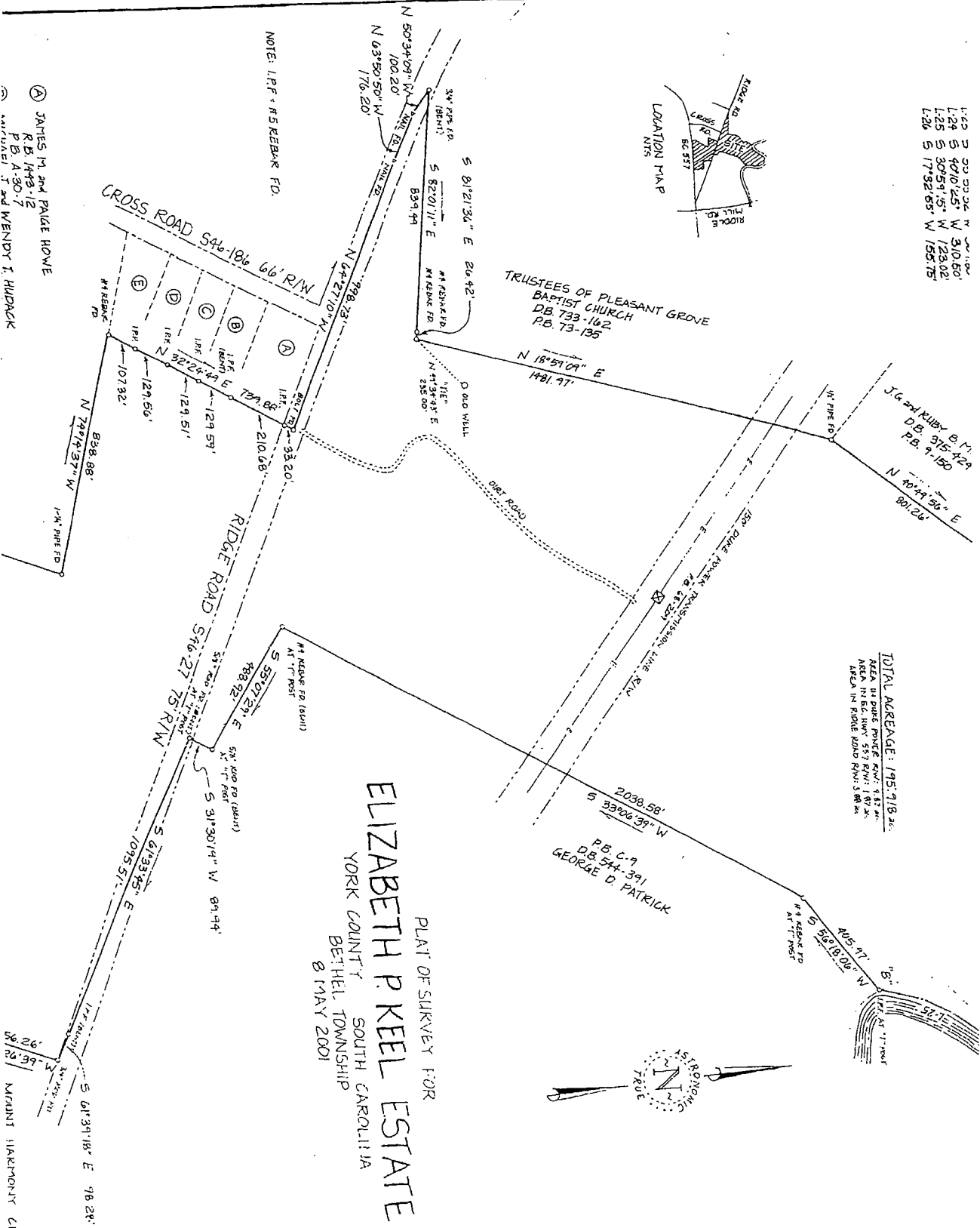
File @ 9

L.29 T. 33 S. 26 E. T. 11 S.  
 L.29 S. 40°10'45" W. 310.50'  
 L.29 S. 30°51'45" W. 123.02'  
 L.29 S. 17°32'55" W. 155.75'



NOTE: 1. P.F. & R.S. REBAR F.O.

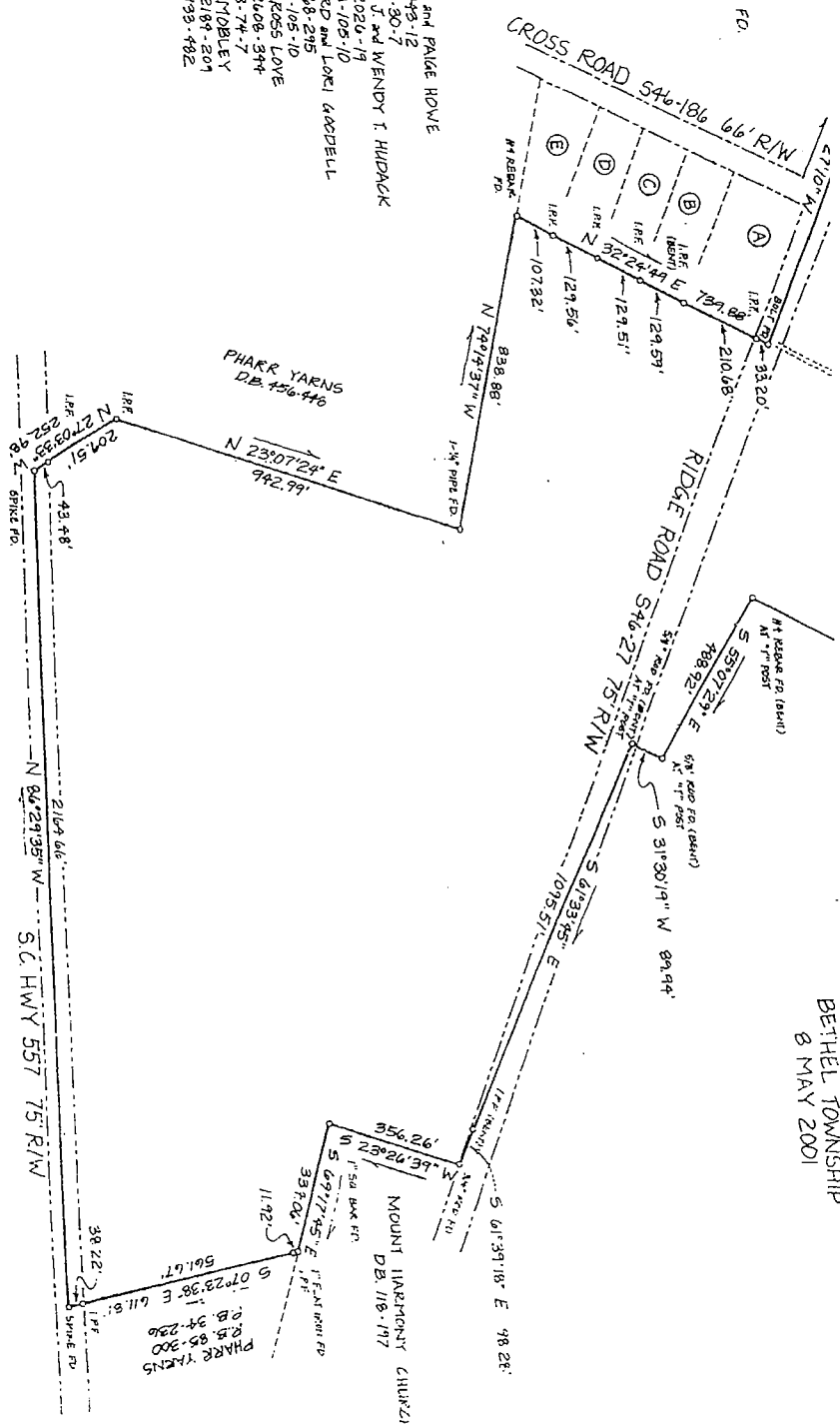
Ⓐ JAMES M. and PAULINE HOWE  
 R.B. 1443-12  
 P.B. A-30-7  
 WIFE: I. and WENDY I. HUPACK



NOTE: L.P.F. = #5 REBAR F.O.

BETHEL TOWNSHIP  
8 MAY 2001

- (A) JAMES M. and PAULINE HOWE  
R.B. 1443-12  
P.B. A-30-7
- (B) MICHAEL J. and WENDY I. HUDACK  
R.B. 2020-19  
P.B. A-105-10
- (C) W. RUDOLPH and LOREL GACCELL  
R.B. 908-295  
P.B. A-105-10
- (D) DONALD ROSS LOVE  
R.B. 2608-344  
P.B. B-74-7
- (E) RICK W. NOBLEY  
R.B. 2189-204  
P.B. 133-482

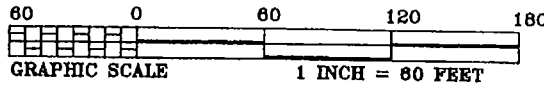


BAIRD ENGINEERING, INC.  
316 N. BAIRD, R5, M.L.S.  
2100 W. MAIN ROAD  
DUNWOODY, GA. 30110  
(404) 851-2441  
© 2001 BY BAIRD ENGINEERING, INC.

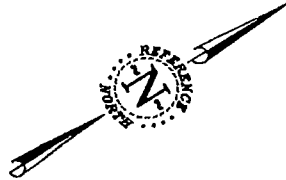
"AND NEW LOTS OR PROPERTY LINES ESTABLISHED"

"TRAVELER'S SURVEY"  
I HEREBY STATE TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND TO THE BEST OF MY INFORMATION AND BELIEF, THAT THE ABOVE PROPERTY LINES AND DISTANCES ARE CORRECT AND ACCURATELY REPRESENT THE TRUE AND CORRECT POSITION OF THE PROPERTY LINES AND DISTANCES AS SHOWN ON THE ABOVE MAP AND THAT I AM NOT PROVIDING ANY GUARANTEE OR WARRANTY OF ANY KIND FOR THE ACCURACY OF THE ABOVE PROPERTY LINES AND DISTANCES.

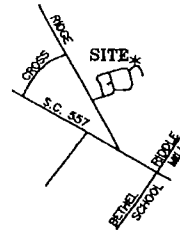
\_\_\_\_\_  
G. P. BAIRD, INC.



REFERENCE: P.B. C-246-10; Tract 54 & a 50' future road R/W combined, Patrick Place.  
FIRM Panel 450193 0050 B, 4 Nov 81. Zone "C".

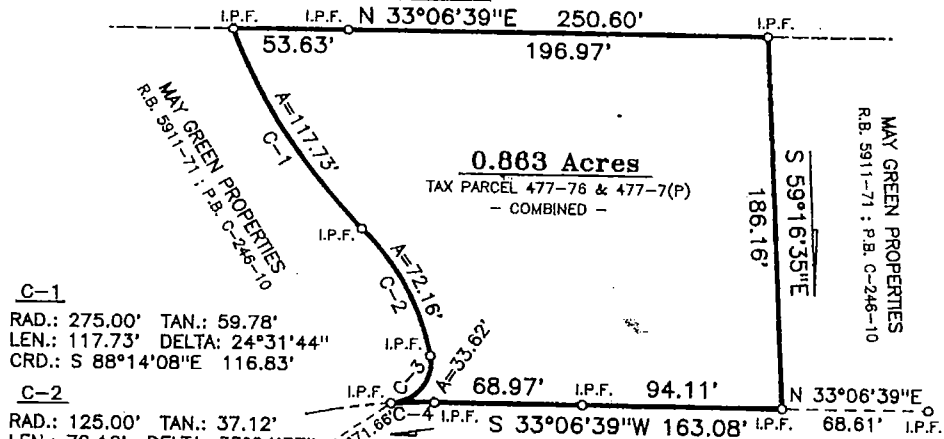


All Corners Are #5 Rebar  
Unless Otherwise Noted.  
I.P.F. - Found ; I.P.S. - Set



LINDA & WILLIAM P. MARTIN  
R.B. 5542-256 ; P.B. C-46-9

LOCATION MAP  
N.T.S.



**C-1**  
RAD.: 275.00' TAN.: 59.78'  
LEN.: 117.73' DELTA: 24°31'44"  
CRD.: S 88°14'08"E 116.83'

**C-2**  
RAD.: 125.00' TAN.: 37.12'  
LEN.: 72.16' DELTA: 33°04'37"  
CRD.: S 83°57'42"E 71.16'

**C-3**  
RAD.: 20.00' TAN.: 22.33'  
LEN.: 33.62' DELTA: 96°18'07"  
CRD.: S 19°16'22"E 29.80'

**C-4**  
RAD.: 275.00' TAN.: 10.16'  
LEN.: 20.31' DELTA: 4°13'55"  
CRD.: N 30°59'41"E 20.31'

**0.863 Acres**  
TAX PARCEL 477-76 & 477-7(P)  
- COMBINED -

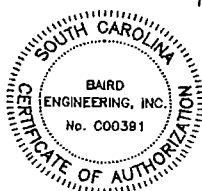
**SLIPPERY ROCK COVE Y-F2-101**  
**PLAT RECOMBINATION APPROVED**

This plat is approved for recording in the office of the Clerk of Court of York County, South Carolina, Subdivision and Zoning Code of York County, Section 155.428, Subdivision # \_\_\_\_\_

COMMISSION AGENT MCB DATE 10-5-04

PLAT OF SURVEY FOR RECOMBINATION  
**Tract 54 ~ Patrick Place**  
BETHEL TOWNSHIP  
YORK COUNTY SOUTH CAROLINA

FILED FOR RECORD 10/11/2004  
AT 09:45 AM BDDK 00142 PAGE 00084  
David Hamilton - Clerk of Court  
York County Courthouse  
Instrument Number: 000207174



**BAIRD ENGINEERING, INC.**  
SURVEYORS • ENGINEERS • PLANNERS  
3219 BAIRD ROAD  
CLOVER, SC 29710  
803/831-2661  
COA No. 000381



I hereby state to the best of my knowledge, information and belief, and in my professional opinion, the survey shown hereon was made in accordance with the requirements of the "Minimum Standards Manual for the Practice of Land Surveying in South Carolina", and meets or exceeds the requirements for a "Class A" survey as specified therein.

*David Baird*  
S.C. REG. NO. 6488 CLOVER, S.C.  
F.B. JOB No. 011101 T1

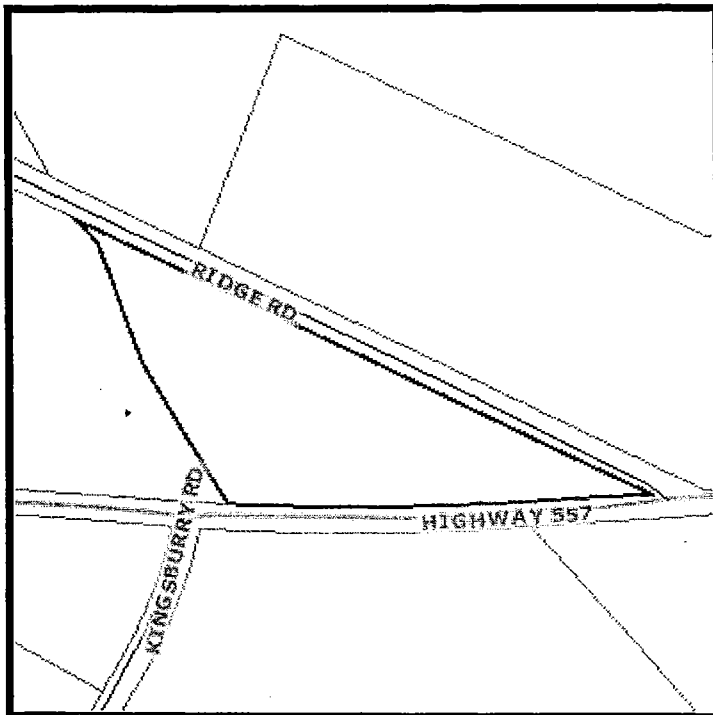
© 2004 by Baird Engineering, Inc.

84

142 @ 84

**Property Report for Parcel Number:**  
4770000008

Inquiry Date:



**Owner**

**Owner Name:** BURKETT ROBERT & ERJOL  
KINDERKAMACK LLC  
**Address:** 6104 CREEKVIEW CT  
**City/State:** HARRISBURG NC  
**Zip Code:** 28075

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

**Parcel Number:** 4770000008  
**Total Lots:** 0  
**Total Acres:** 11  
**Deed Book:** 2738  
**Deed Book Page:** 269  
**Platt Book:** B113  
**Platt Book Page:** 5  
**School District:** 2  
**Municipality:**  
**Fire Code:** BE-I  
**Property Location:** HWY 557

**Land Value:** \$165000  
**AG Use:**  
**AG Use Value:**  
**Previous Owner:** HAND H EUGENE TRU  
**Tax Bill Information:**  
**Zoning:**  
**Sale Price:** \$118840  
**Sale Date:** 6/10/99  
**Census Tract:**  
**Voter District:**

**Building/Structure**

**Prop. Classification:**  
**Heating Type:**  
**Living Area(Sq. Ft.):**  
**Basement:** NO  
**Bathrooms:**  
**Total Imp. Value:**

**Number of Stories:**  
**Year Built:**  
**Garage Area:** NO  
**Fireplace:**  
**Bldg. Value:** \$0

**Assessment**

**Total Assessed Value:** \$9900

**Total Market Value\*:** \$165000

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 477-00-00-008 Legal HWY 557 - PLAT B113 / 005

DEED

Grantor H EUGENE HAND Trustee of the A B HAND Trust under the Last Will of A B HAND  
Grantee ROBERT BURKETT AND ERJOLA 550 KINDERKAMACK LLC  
Book 2738 Page 269 ✓  
Dated 6/2/1998 Recorded 6/10/1998

1-1-2 Previous Ownership

Grantor ESTATE OF A B HAND  
Grantee H EUGENE HAND Trustee of the A B HAND Trust  
PROBATE 79 / 0239  
Dated 6/15/1990 Recorded 6/15/1990 ✓

Grantor ESTATE OF LUCEILLE G HAND  
Grantee A B HAND  
PROBATE 689 / 20244 ✓  
Dated 12/31/1980 Recorded 12/31/1980

Grantor J I HOVIS  
Grantee A B HAND AND LUCEILLE HAND  
Book 180 Page 321  
Dated 2/9/1952 Recorded 5/27/1952 ✓

**Disclaimer:** The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.



309 40  
130.90

FILED-RECEIVED

STATE OF SOUTH CAROLINA BOOK \_\_\_\_\_ PAGE \_\_\_\_\_ Haselden, Owen & Boloyan  
COUNTY OF YORK JUN 10 11 04 AM '99 P.O. Box 173  
Clover, SC 29710

TITLE TO REAL ESTATE

KNOW ALL MEN BY THESE PRESENTS, That I, H. EUGENE HAND, TRUSTEE OF THE A. B. HAND TRUST UNDER THE LAST WILL AND TESTAMENT OF A. B. HAND, for an consideration of the sum of ONE HUNDRED EIGHTEEN THOUSAND EIGHT HUNDRED FORTY AND 50/100'S, (\$118,840.50) to them in hand paid at and before the sealing of these presents, by ROBERT BURKETT AND ERJOLA 550 KINDERKAMACK, L.L.C., in the State aforesaid, (the receipt whereof is hereby acknowledged), has granted, bargained, sold and released unto ROBERT BURKETT AND ERJOLA 550 KINDERKAMACK, L.L.C., his/her or their heirs, successors and assigns, the following described property:

All that certain piece, parcel or tract of land lying being and situate at the intersection of S. C. Hwy 557 and Ridge Road in Bethel Township, York County, South Carolina and being more particularly described as follows: BEGINNING at a spike set at the intersection of S. C. Hwy 557 and Ridge Road, ("tie" to spike in intersection S. C. Hwy 557 and 546-152 (N83-16-46E 948.96 feet) ) and running thence with S. C. Hwy 557 S84-16-55W 109.80 feet to a spike found; thence ARC=555.01 feet and Radius= 5752.14 feet (CH=N86-08-50E 554.79 feet) to a spike; thence N85-01-34W 442.19 feet to an iron pin found; thence N39-44-30W 460.74 feet to an iron pin found; thence N26-10-51W 389.00 feet to a rebar found; thence N22-07-36W 73.01 feet to a spike found on Ridge Road; thence with Ridge Road S64-31-04E 1769.11 feet to a spike set, the point of beginning. Containing 11.055 acres total and being more particularly shown and described on a Plat of Survey of R. R. Crossing, L.L.C., drawn by Joe H. Baird, P.E & L.S. dated May 24, 1999 and recorded in the Office of the Clerk of Court for York County, South Carolina in plat Book 813, page 5 and incorporated herein by reference.

This a portion of the property conveyed to H. Eugene Hand, Trustee, A. B. Hand Trust, by deed of Estate of A. B. Hand dated June 8, 1990, recorded June 14, 1990, in Record Book 70, page 239, Office of the Clerk of Court for York County, South Carolina.

Grantees Address:  
6104 CREEKVIEW CT  
FAIRSBURG NE 68075  
YORK COUNTY  
TAX ASSESSOR'S OFFICE

STATE OF SOUTH CAROLINA  
YORK COUNTY SC 06/10/99  
Stamp # 6 \$118,840.50  
STATE FEE \$309.40

COUNTY CONVEYANCE FEE  
YORK COUNTY SC 06/10/99  
Stamp # 6 \$118,840.50  
COUNTY FEE \$130.90

DATE 6-10-99  
TAX MAP NO. 477-41  
INITIALS Bm JS

269

RECORDED  
RECORD  
VOL 278 PG 269  
YORK COUNTY, S.C.

19 @ 279

W.L. 2  
10 @ 239

1

The above described property is conveyed subject to all easements, restrictions, and rights of way, if any, appearing of record in the chain of title of the subject property or visible upon an actual, physical inspection of the subject property.

TOGETHER with all and singular, the rights, members, hereditaments and appurtenances to the said premises belonging or in anywise incident or appertaining.

TO HAVE AND TO HOLD all and singular the premises before mentioned unto the said GRANTEE(S), their heirs, successors and assigns, forever.

AND Grantors do hereby bind themselves and their successors and assigns, to warrant and forever defend all and singular the said premises unto the said Robert Burkett and ERJOLA Kinderkamack, L.L.C. his, her or their heirs and assigns, against themselves and their successors and assigns and against every person whomsoever lawfully claiming, or to claim the same or any part thereof

WITNESS the Hand and Seal of the Grantor this 24<sup>th</sup> day of JUNE, in the year of our Lord one thousand nine hundred ninety nine and in the two hundred and twenty-third year of the Sovereignty and Independence of the United States of America.

SIGNED, SEALED AND DELIVERED

IN THE PRESENCE OF:

[Signature]

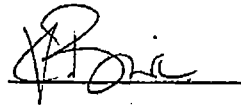
H. Eugene Hand, Trustee of the A.B. Hand Trust  
Trustee under the will of  
A. B. Hand

H. EUGENE HAND, TRUSTEE OF  
THE A. B. HAND TRUST UNDER  
THE LAST WILL AND  
TESTAMENT OF A. B. HAND

[Signature]

STATE OF Fl. )  
COUNTY OF SARASOTA )      PROBATE

PERSONALLY APPEARED before me the undersigned witness and made oath that s/he saw the within-named Grantors, sign, seal, and as their act and deed, deliver the within-written Deed for the uses and purposes therein mentioned; and that s/he with the other witness whose signature appears above the witnessed the execution thereof.



SWORN TO before me this

2 day of JUNE, 1999

 (SEAL)

Notary Public for State of FL  
My Commission Expires: 9/18/01

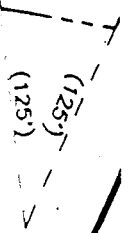


S46-1916 66' R/W

CH

A=555.01'  
CH: N 86°08'50"E 554.79'

R=5752.14'



SPIKE SET

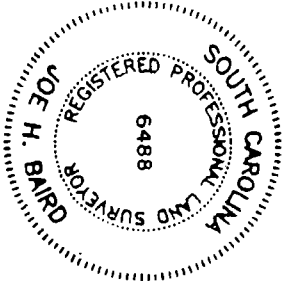
109.80'

S 84°16'55"W

SPIKE SET

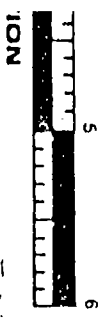
"TIE" TO SPIKE IN BKT.  
SC HWY 557 & S46-152  
N 83°18'46"E 948.96'

TAX PARCEL : 477-8 (PARTIAL)  
ZONE : ID



"BOUNDARY SURVEY"  
I hereby state to the best of my knowledge, information and belief, and in my professional opinion, the Survey shown hereon was made in accordance with the requirements of the Minimum Standards Manual for the Practice of Land Surveying in South Carolina, and meets or exceeds the requirements for a "Class A" Survey as specified therein.

*Joe H. Boyd*  
SC REG. NO. 6488 CLOVER, S.C.  
JOB NO. 990511  
F.B. FILE



B1113 @ S

107 5

5

F.I.R.M. PANEL 450193 0050 B. DATED 4 NOV 1981. ZONE "C".  
PROPERTY NOT LOCATED IN A SPECIAL FLOOD HAZARD AREA

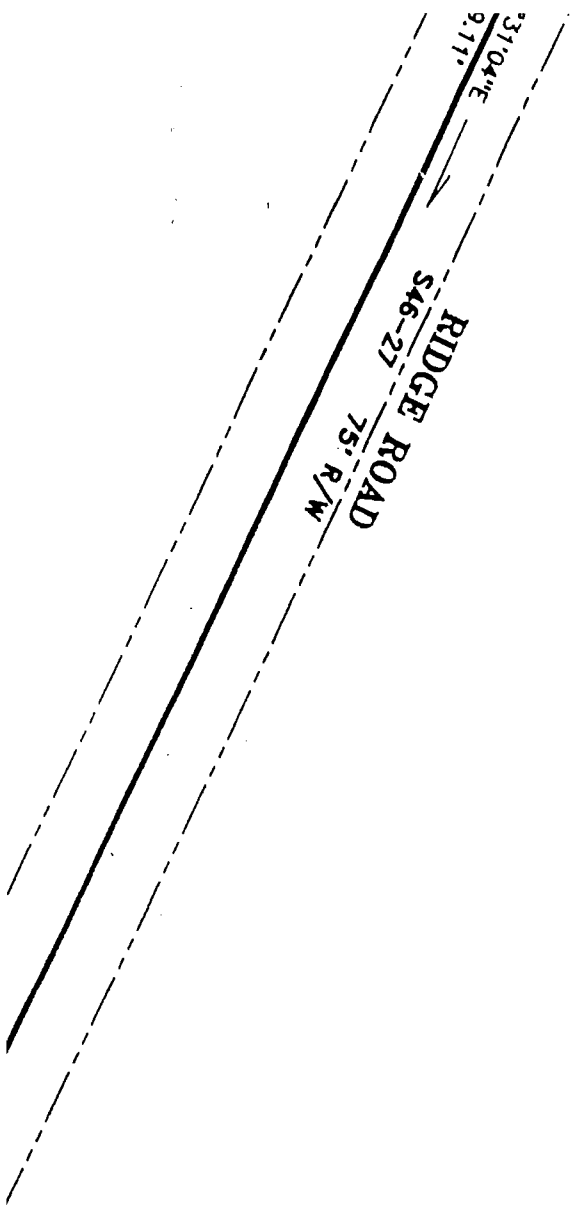
PLAT OF SURVEY FOR

**R. R. CROSSING, LLC**

BETHEL TOWNSHIP

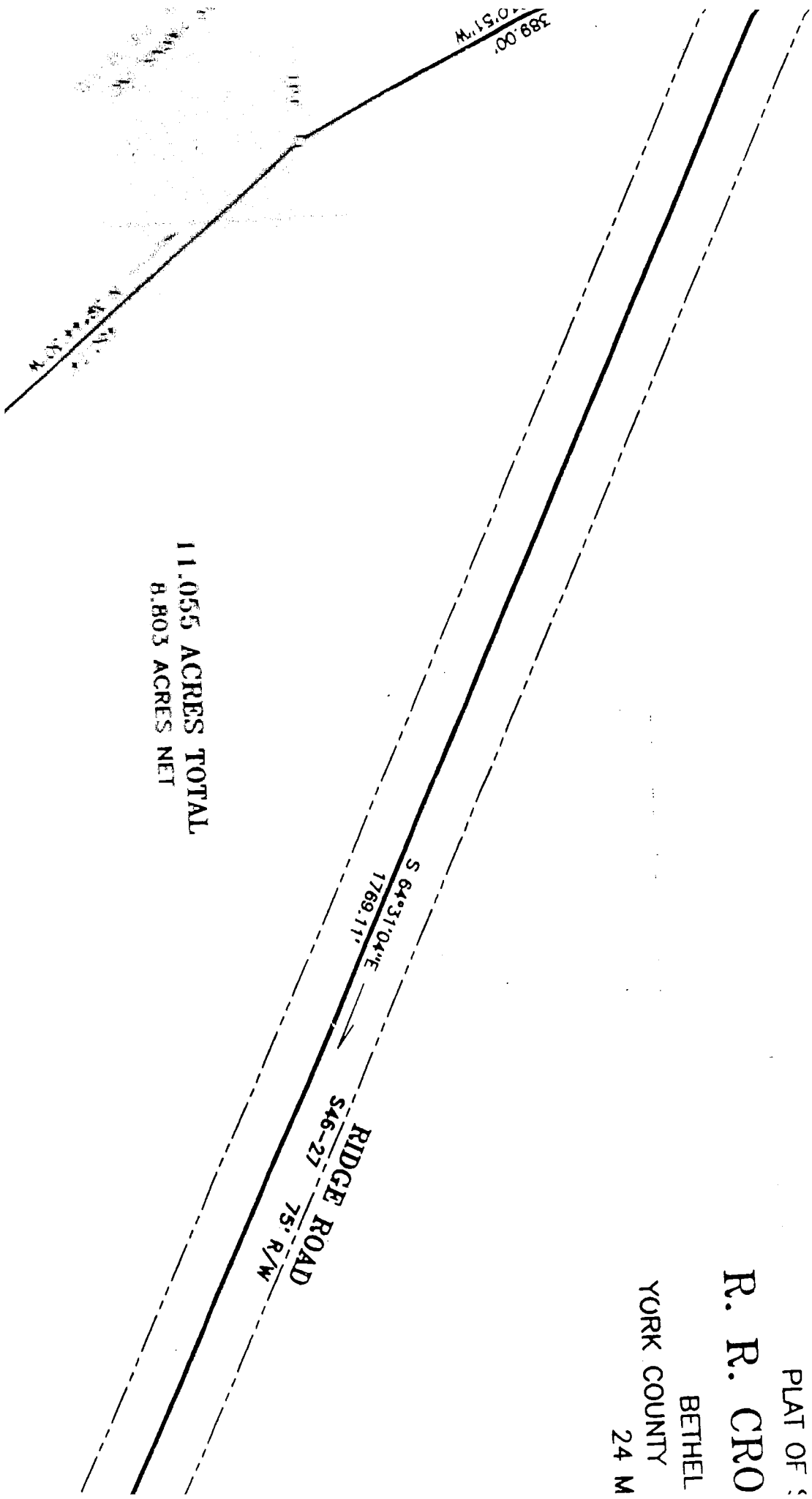
YORK COUNTY SOUTH CAROLINA

24 MAY 1999



PLAT OF :  
**R. R. CRO**  
BETHEL  
YORK COUNTY  
24 M

11.055 ACRES TOTAL  
8.803 ACRES NET



NO. 12121

S.C. HWY 557  
75' R/W

KINGSBURY ROAD  
S46-114 66' R/W

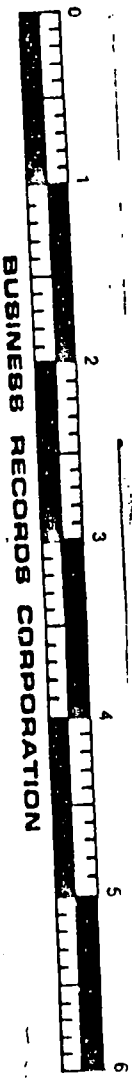
1 P.F.

442.19'  
N 85°01'34"W

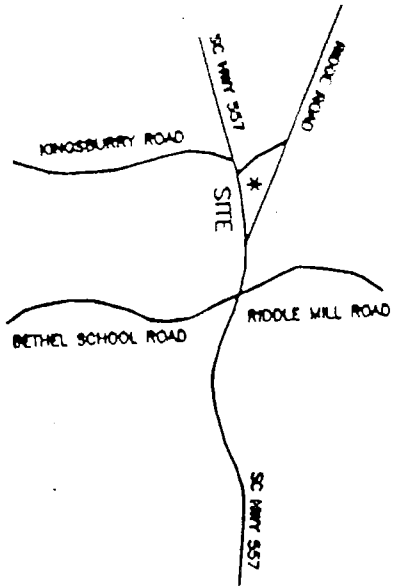
S46-1916 66' R/W

SPIKE

A=555.01'  
CH: N 86°08'50"E



BUSINESS RECORDS CORPORATION



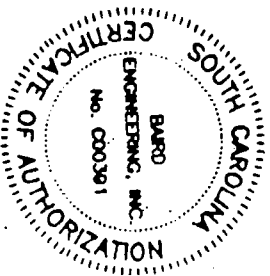
LOCATION MAP  
N.T.S.

S.C. HWY 557  
75' R/W

KINGSBURY ROAD  
S46-114 66' R/W

I.P.F. 0

BAIRD ENGINEERING, INC.  
SURVEYORS • ENGINEERS • PLANNERS  
JOE H. BAIRD, P.E. & L.S.  
5420 EAST HIGHWAY 55  
CLOVER, S.C. 29710  
803/831-2661  
S.C. CERTIFICATE OF AUTHORIZATION NO. 000391  
1999 BY BAIRD ENGINEERING, INC.

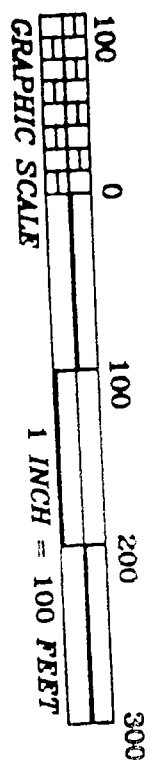




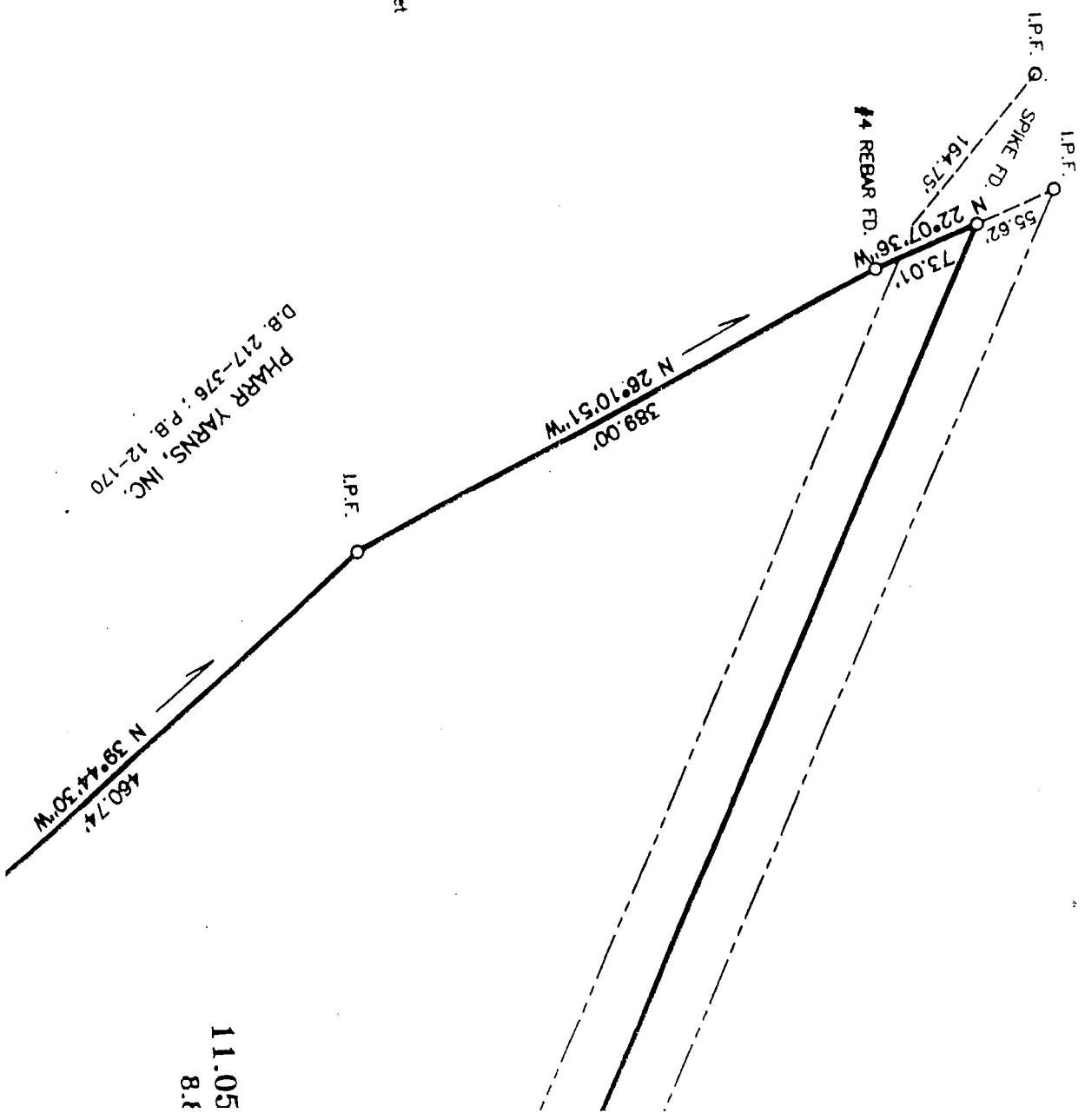
FILED-RECEIVED  
BOOK B113 PAGE 5

JUN 10 11 03 AM '99

DAVID HAMILTON  
CLERK OF COURT  
FOUR COUNTY, SC



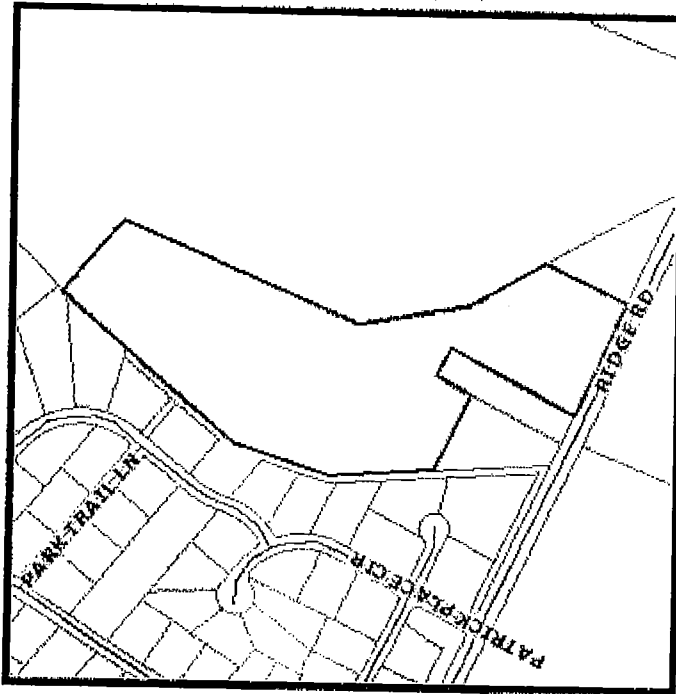
All Corners Are #5 Rebar  
Unless Otherwise Noted.  
I.P.F. = Found ; I.P.S. = Set



11.05  
8.1

Property Report for Parcel Number:  
4770000013

Inquiry Date: 11/2/2009



**Owner Name:**  
HOOVER THOMAS H &  
SALLY H  
**Address:**  
6273 RIDGE RD  
**City/State:**  
CLOVER S C  
**Zip Code:**  
29710

**Owner**

*Gayle -  
I left this out -  
Please added to stuff -*

*Robert*

*Give me a call -  
I'm not sure you  
have everything -*

*[Signature]*

*11-2-09*

Disclaimer: While every effort is made to keep information provided over the internet accurate and up-to-date, York County does not certify the authenticity or accuracy of such information. No warranties, express or implied, are provided for the records and/or mapping data herein, or for their use or interpretation by the User.

<b>Parcel Number:</b>	4770000013	<b>Land Value:</b>	\$161500
<b>Total Lots:</b>	0	<b>AG Use:</b>	
<b>Total Acres:</b>	19	<b>AG Use Value:</b>	
<b>Deed Book:</b>	705	<b>Previous Owner:</b>	HOOVER THOMAS H
<b>Deed Book Page:</b>	350	<b>Tax Bill Information:</b>	
<b>Platt Book:</b>	80	<b>Zoning:</b>	
<b>Platt Book Page:</b>	375	<b>Sale Price:</b>	\$0
<b>School District:</b>	2	<b>Sale Date:</b>	5/11/93
<b>Municipality:</b>		<b>Census Tract:</b>	

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 477-00-00-013 Legal HWY 557 - PLAT 375 @ 2

DEED

Grantor THOMAS HOOVER  
Grantee SALLY H HOOVER  
Book 705 Page 350  
Dated 5/6/1993 Recorded 5/11/1993

1-1-2 Previous Ownership

Grantor LAUNIU L HOOVER fka LAUNIU L GOODE  
Grantee THOMAS H HOOVER  
Book 1013 Page 347  
Dated 3/28/1988 Recorded 3/28/1988

Grantor VERNA JEAN TELESKA  
Grantee THOMAS H HOOVER  
Book 545 Page 417  
Dated 3/22/1977 Recorded 3/30/1977

Grantor ESTATE OF ESTHER J PATRICK  
Grantee VERNA (JEAN) PATRICK (TELESKA) and LAUNIU L (GOODE) HOOVER  
PROBATE 635 / 18861  
Dated 7/9/1976 Recorded 7/9/1976

Grantor ESTATE OF R M PATRICK  
Grantee ESTHER J PATRICK and VERNA (JEAN) PATRICK (TELESKA)  
PROBATE 322 / 10240  
Dated 3/4/1946 Recorded 3/4/1946

**Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.**

State of South Carolina,  
COUNTY OF YORK

Know All Men by These Presents, That I, Thomas H. Hoover  
(hereinafter whether singular or plural the "Grantor")

RECORDED  
YORK COUNTY  
TAX ADJUSTER'S OFFICE  
DATE 5/12/93  
TAX ID NO 47713  
INITIALS *R.H.H. J.H.*  
FILED-RECEIVED  
BOOK 28 PAGE 322  
MAY 11 11 59 AM '93  
M.H. GARROLL, JR.  
C.C.P. & S.S.  
YORK COUNTY, S.C.

In the State aforesaid, for and In consideration of the  
sum of \$1.00 Plus Love and Affection Dollars

to the Grantor paid by Sally H. Hoover, 6273 Ridge Road (hereinafter  
Clover, SC 29710  
whether singular or plural the "Grantee") has granted, bargained, sold and released, and by these presents does grant,

bargain, sell and release unto the said ~~Grantee or her heirs and assigns~~ Sally H. Hoover,  
an undivided one-half interest in and to the following described  
property, to wit:

All that certain piece, parcel or tract of land located in Bethel Township, York County, South Carolina, containing 21.07 acres and being more particularly described as follows: BEGINNING at a point in the edge of S.C. Highway 46-27 (Ridge Road) and running thence N 68-00 W 108.18 feet to a point in said highway, thence N 58-27 W 389.23 feet to an iron in said highway; thence N 00-23-39 W 978.16 feet to an old iron; thence N 42-26-36 E 935.00 feet to an old iron; thence S 42-12 E 323.39 feet to an old iron; thence S 25-19-012 W 821.00 feet to an iron; thence S 8-26 E 367.62 feet to an iron; thence S 19-00 E 283.96 feet to a point; thence S 34-08-08 W 361.91 feet to a point in said highway; this being the beginning point.

The above described property is shown as Tract A on plat of property of Thomas H. Hoover and Launio L. Hoover drawn by Edwin Faires, SCRLS, dated June 19, 1985, said plat being recorded in Plat Book 80, Page 375, Office of the Clerk of Court for York County, South Carolina and incorporated herein by reference. ✓

This is a portion of the property conveyed to Thomas H. Hoover by deed of Verna Jean Teleska dated March 22, 1977, and recorded March 30, 1977 in Deed Book 545, Page 417 and by deed of Launio L. Hoover recorded March 28, 1988, in Deed Book 1013, Page 347, both in the Office of the Clerk of Court for York County, South Carolina.

TOGETHER with all and singular, the rights, members, hereditaments and appurtenances to the said premises belonging or in anywise incident or appertaining.

To HAVE AND TO HOLD all and singular the premises before mentioned unto the said Grantee, her

Heirs and Assigns forever.

And the Grantor does hereby bind himself and his Heirs, Executors and Administrators, to warrant and forever defend all and singular the said premises unto the said Grantee and the Grantee's Heirs and Assigns, against the Grantor and the Grantor's Heirs and against every person whomsoever lawfully claiming, or to claim, the same or any part thereof.

WITNESS the Hand and Seal of the Grantor this 6th day of May  
in the year of our Lord one thousand nine hundred and ninety-three  
and in the two hundredth and seventeenth year of the Sovereignty  
and Independence of the United States of America.

SIGNED, SEALED AND DELIVERED  
IN THE PRESENCE OF

Donna J. Howell  
James H. [Signature]

Thomas H. Hoover (SEAL)  
Thomas H. Hoover (SEAL)

STATE OF SOUTH CAROLINA. }  
YORK COUNTY. }

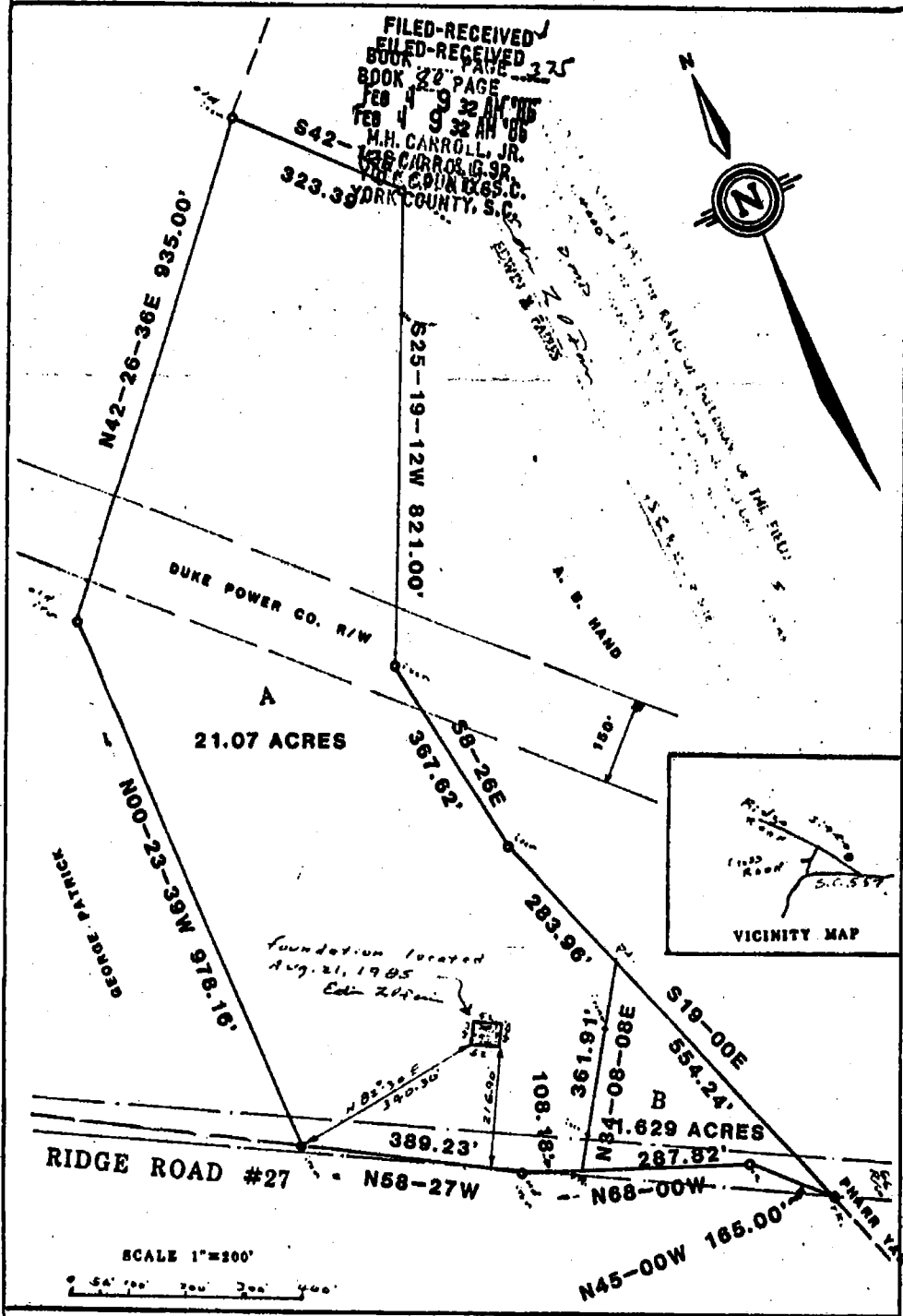
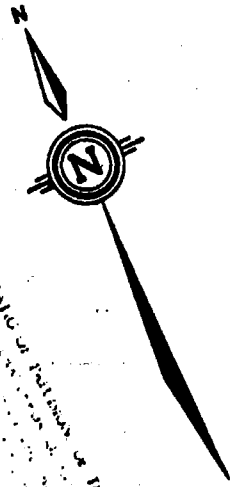
PERSONALLY appeared before me the undersigned witness and made oath that s/he saw the within named Grantor sign, seal and, as the Grantor's act and deed, deliver the within-written Deed for the uses and purposes therein mentioned and that s/he, with the other witness whose signature appears above witnessed the execution thereof.

SWORN to before me this 6th

day of May, 19 93  
[Signature] (L.S.)  
Notary Public of S. C.  
My Commission Expires: 8/7/96

[Signature]  
Witness

FILED-RECEIVED  
 BOOK 22 PAGE 325  
 FEB 4 9 32 AM '86  
 YORK COUNTY, S.C.

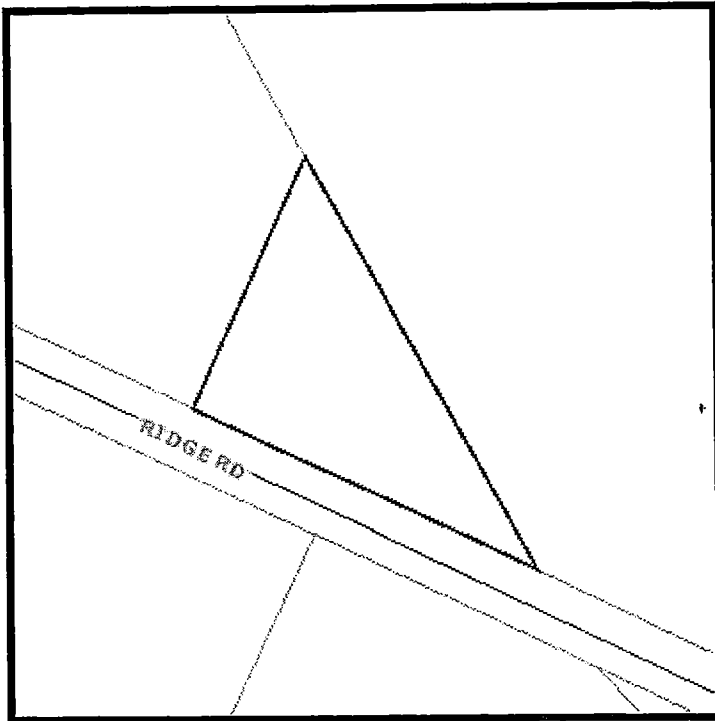


PROPERTY OF  
**THOMAS H. HOOVER LAUNIU L.**  
 YORK COUNTY, SOUTH CAROLINA  
 BETHEL TW' SP.

SURVEYED JUNE 19, 1985 BY EDWIN FAIRES - S.C.R.L.S. 68618

**Property Report for Parcel Number:**  
4770000018

Inquiry Date:



**Owner**

**Owner Name:** HOOVER JOHN DOUGLA  
BETH B  
**Address:** 6253 RIDGE ROAD  
**City/State:** CLOVER SC  
**Zip Code:** 29710

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

<b>Parcel Number:</b>	4770000018	<b>Land Value:</b>	\$36000
<b>Total Lots:</b>	1	<b>AG Use:</b>	
<b>Total Acres:</b>	0	<b>AG Use Value:</b>	
<b>Deed Book:</b>	4233	<b>Previous Owner:</b>	HOOVER JOHN DOUGI
<b>Deed Book Page:</b>	38	<b>Tax Bill Information:</b>	
<b>Platt Book:</b>		<b>Zoning:</b>	
<b>Platt Book Page:</b>		<b>Sale Price:</b>	\$5
<b>School District:</b>	2	<b>Sale Date:</b>	3/7/02
<b>Municipality:</b>		<b>Census Tract:</b>	
<b>Fire Code:</b>	BE-I	<b>Voter District:</b>	
<b>Property Location:</b>	RIDGE RD TRACT B (1.629 ACRES)		

**Building/Structure**

<b>Prop. Classification:</b>		<b>Number of Stories:</b>	
<b>Heating Type:</b>		<b>Year Built:</b>	
<b>Living Area(Sq. Ft.):</b>		<b>Garage Area:</b>	NO
<b>Basement:</b>	NO	<b>Fireplace:</b>	
<b>Bathrooms:</b>		<b>Bldg. Value:</b>	\$193000
<b>Total Imp. Value:</b>			

**Assessment**



F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 477-00-00-18 Legal 1.629 AC RIDGE RD TRT B

DEED

Grantor JOHN DOUGLAS HOOVER

Grantee BETH B HOOVER

Book 4233 Page 38

Dated 11/28/2001 Recorded 3/7/2002

1-1-2 Previous Ownership

Grantor LAUNIU L GOODE fka LAUNIU L HOOVER

Grantee JOHN DOUGLAS HOOVER

Book 1839 Page 38

Dated 5/1/1997 Recorded 5/2/1997

Grantor THOMAS H HOOVER

Grantee LAUNIU L HOOVER

Book 1021 Page 328

Dated 5/5/1988 Recorded 5/5/1988

Grantor VERNA JEAN TELESKA

Grantee THOMAS H HOOVER

Book 545 Page 412

Dated 3/22/1977 Recorded 5/30/1977

Grantor ESTATE OF ESTHER J PATRICK

Grantee VERNA (JEAN) PATRICK (TELESKA) and LAUNIU L (GOODE) HOOVER

PROBATE 635 / 18861

Dated 7/9/1976 Recorded 7/9/1976

Grantor ESTATE OF R M PATRICK  
Grantee ESTHER J PATRICK and VERNA (JEAN) PATRICK (TELESKA)  
PROBATE 322 / 10240  
Dated 3/4/1946 Recorded 3/4/1946

***Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.***

RH01-0237

Space above this line for recording information

000058837  
RECORDED 03/07/2002 02:20:27PM  
Bk:04233 Pg:00038 Pages:4  
Fee:10.00 State:0.00  
County:0.00 Exempt:  
David Hamilton, Clerk of Court  
York County, SC

STATE OF SOUTH CAROLINA )  
COUNTY OF YORK )

TITLE TO REAL ESTATE

KNOW ALL MEN BY THESE PRESENTS THAT, JOHN DOUGLAS HOOVER herein referred to as Grantor for and in consideration of the sum of FIVE DOLLARS 00/100 (\$5.00) LOVE AND AFFECTION paid by BETH B. HOOVER, hereinafter referred to as Grantee in the State aforesaid, the receipt of which is hereby acknowledged, ha granted, bargained, sold and released, and by these presents does grant, bargain, sell and release unto the said Grantee, heirs, successors, and assigns forever:

ONE-HALF INTEREST IN AND TO THE FOLLOWING:

All that certain piece, parcel, or tract of land with improvements thereon, if any, situate, lying and being in Bethel Township, York County, South Carolina containing One and 629/1000 (1.629) acres, more or less, and being more particularly described as Tract B according to plat of property of Thomas H. Hoover and Launiu L. Hoover prepared by Edwin Faires, SCRLS, dated June 19, 1985, which plat, recorded in Plat Book 1021, Page 329, Office of the Clerk of Court for York County, South Carolina is by reference incorporated herein as past of this description.

Handwritten circle containing "Tract B Plat" with a checkmark to the left.

This being the same property conveyed to John Douglas Hoover by deed of Launiu L. Goode, f/k/a Launiu L. Hoover, dated 5-1-1992 and recorded 5-2-1997, in Deed Book 1839, at Page 38, in the York County Records.

TMS # 477-00-00-018

RECORDED  
YORK COUNTY  
TAX ASSESSOR'S OFFICE

DATE 3-7-02  
TAX MAP NO. 477-18  
INITIALS AC / JN

This conveyance is made subject to Easements, Restrictions, Covenants, and Conditions of record, including matters shown on recorded plats.

Grantee: 6253 Ridge Road  
Clover, SC 29710

TOGETHER with all and singular, the rights, members, hereditaments and appurtenances to the said premises belonging or in anywise incident or appertaining.

TO HAVE AND TO HOLD all and singular the premises before mentioned unto the said Grantee, his heirs, and assigns forever.

AND THE GRANTOR does hereby bind Grantor, executors and administrators, to warrant and forever defend all and singular the said premises unto the said Grantee, his heirs, and assigns, against Grantor and Grantor and against every person whomsoever lawfully claiming or to claim the same or any part thereof.

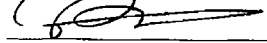
Handwritten initials "JH"

BK 04233 PG 0038

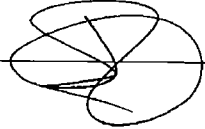
Handwritten circle containing the number "1"

WITNESS Hand and Seal this 28th day of November, in the year of our Lord 2001

Signed, Sealed and Delivered  
in the Presence of:

  
\_\_\_\_\_

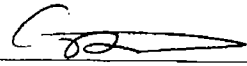
  
\_\_\_\_\_  
JOHN DOUGLAS HOOVER

  
\_\_\_\_\_

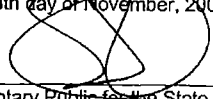
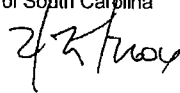
STATE OF SOUTH CAROLINA  
COUNTY OF YORK

Personally appeared before me the undersigned and made oath that she saw the within named Grantor sign,  
seal and as act and deed, deliver the within-written Deed for the uses and purposes therein mentioned, and  
that she with the other witness subscribed aboved witnessed the execution thereof.

SWORN to before me this  
28th day of November, 2001

  
\_\_\_\_\_

Notary Public for the State of South Carolina  
My Commission Expires:

  
\_\_\_\_\_  


BK 04233 PG 0039

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 is located at 6253 Ridge Road, Clover, SC 29710  
bearing York County Tax Map Number 47700-00-018, was transferred  
by John Douglas Hoover - one-half interest  
to Beth B. Hoover on 11-28-01.

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):  
Family member  
(If exempt, please skip items 4 - 7, and go to item 8 of this affidavit.)

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. 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: Attorney

BK 04233 PGO 040

9. I understand that a person required to furnish this affidavit who wilfully 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.

  
Responsible Person Connected with the Transaction

SWORN to before me this 28<sup>th</sup>  
day of November 19 2001  
Notary Public for Jones Daniel Lucero  
My Commission Expires: 2/25/04

C. Dawn Watkins  
Print or Type Name Here

### INFORMATION

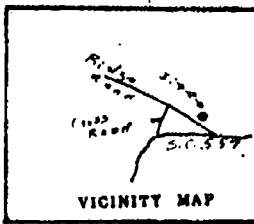
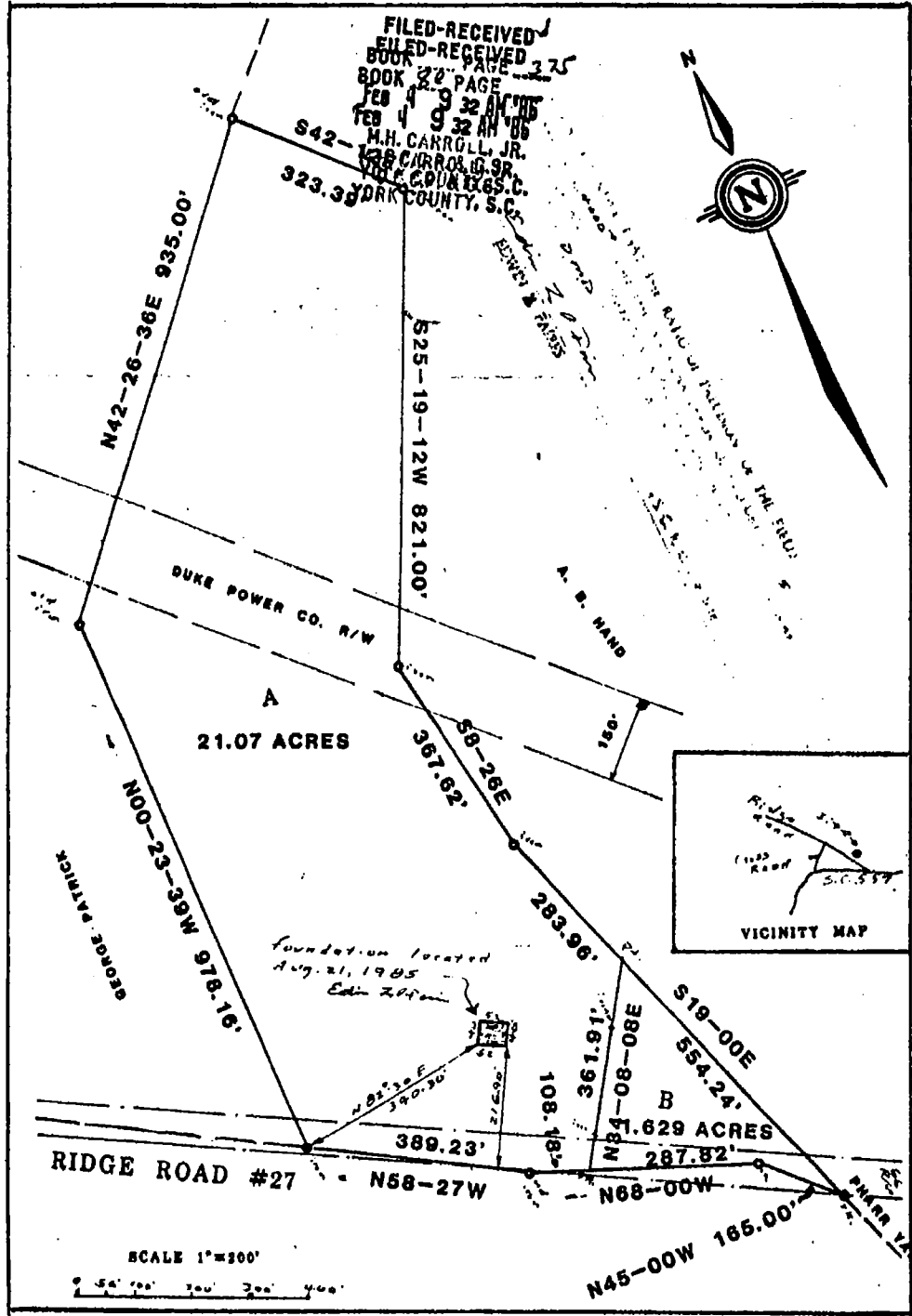
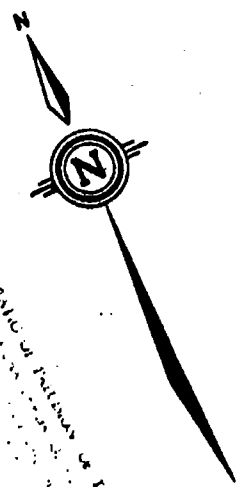
Except as provided in this paragraph, the term "value" means "the consideration paid or to be paid in money or money's worth for the realty." Consideration paid or to be paid in money's worth includes, but is not limited to, other realty, personal property, stocks, bonds, partnership interest and other 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. 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 12-6-10(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 in order to become, or as, a stockholder, partner, or trust beneficiary of the entity provided 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 such stock or interest held by the grantor. However, 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 12-6-10(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; and,
- (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.

BK 04233 P60041

FILED-RECEIVED  
 FILED-RECEIVED  
 BOOK 22 PAGE 375  
 FEB 4 9 32 AM '85  
 FEB 4 9 32 AM '85  
 M.H. CARROLL, JR.  
 YORK COUNTY, S.C.



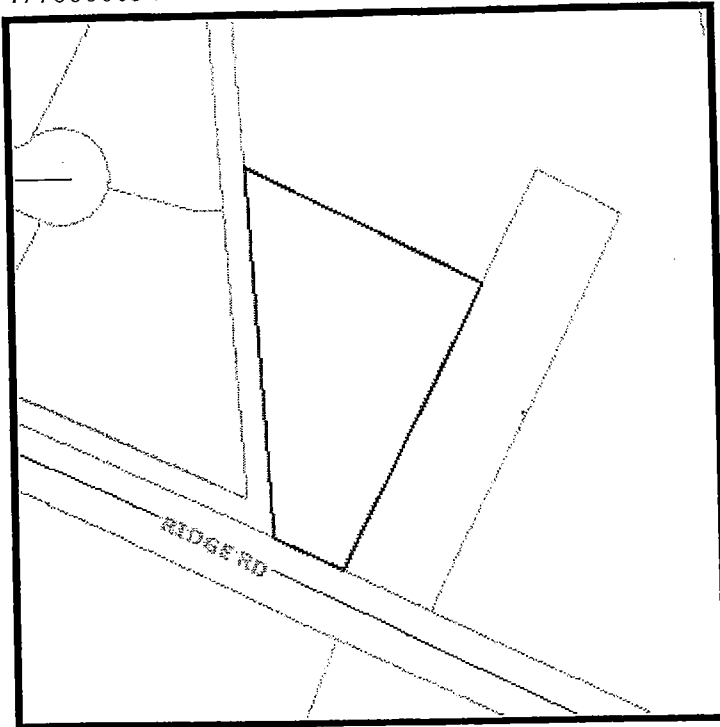
Foundation located  
 Aug. 21, 1985  
 Edw. Fairnes

PROPERTY OF  
**THOMAS H. HOOVER LAUNIU L.**  
 YORK COUNTY, SOUTH CAROLINA  
 BETHEL TW'SP.

SURVEYED JUNE 19, 1986 BY EDWIN FAIRNES - S.C.R.L.S. #6618

**Property Report for Parcel Number:**  
4770000034

Inquiry Date:



**Owner**

**Owner Name:** FAILE THERESA H  
**Address:** 6285 RIDGE RD  
**City/State:** CLOVER SC  
**Zip Code:** 29710

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

**Parcel Number:** 4770000034  
**Total Lots:** 1  
**Total Acres:** 0  
**Deed Book:** 5643  
**Deed Book Page:** 200  
**Platt Book:** 131  
**Platt Book Page:** 89  
**School District:** 2  
**Municipality:**  
**Fire Code:** BE-I  
**Property Location:** ( 1.422 AC )

**Land Value:** \$36000  
**AG Use:**  
**AG Use Value:**  
**Previous Owner:** FEDERAL NATIONAL MORTGAGE  
**Tax Bill Information:**  
**Zoning:**  
**Sale Price:** \$1  
**Sale Date:** 9/4/03  
**Census Tract:**  
**Voter District:**

**Building/Structure**

**Prop. Classification:**  
**Heating Type:**  
**Living Area(Sq. Ft.):**  
**Basement:** NO  
**Bathrooms:**  
**Total Imp. Value:**

**Number of Stories:**  
**Year Built:**  
**Garage Area:** NO  
**Fireplace:**  
**Bldg. Value:** \$211000

**Assessment**



F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 477-00-00-034 Legal 1.422 AC

DEED

Grantor FANNIE MAE fka FEDERAL NATIONAL MORTGAGE ASSOCIATION

Grantee THERESA H FAILE

Book 5643 Page 200

Dated 8/13/2003 Recorded 9/4/2003

1-1-2 Previous Ownership

Grantor J BUFORD GRIER SR - MASTER IN EQUITY FOR YORK COUNTY

Grantee FEDERAL NATIONAL MORTGAGE ASSOCIATION

Book 5031 Page 234

Dated 2/3/2003 Recorded 2/18/2003

Grantor THOMAS H HOOVER AND SALLY H HOOVER

Grantee RONALD A HOOVER AND SUSAN M HOOVER

Book 1343 Page ~~281~~ 264

Dated 9/18/1995 Recorded 9/21/1995

Grantor THOMAS H HOOVER 1/2 INTEREST

Grantee SALLY HOOVER

Book 705 Page 350

Dated 5/6/1993 Recorded 5/12/1993

Grantor THOMAS H HOOVER  
Grantee LAUNIU L HOOVER  
Book 1021 Page 328  
Dated 5/5/1988 Recorded 5/5/1988

Grantor VERNA JEAN TELESKA  
Grantee THOMAS H HOOVER  
Book 545 Page 412  
Dated 3/22/1977 Recorded 5/30/1977

Grantor ESTATE OF ESTHER J PATRICK  
Grantee VERNA (JEAN) PATRICK (TELESKA) and LAUNIU L (GOODE) HOOVER  
PROBATE 635 / 18861  
Dated 7/9/1976 Recorded 7/9/1976

Grantor ESTATE OF R M PATRICK  
Grantee ESTHER J PATRICK and VERNA (JEAN) PATRICK (TELESKA)  
PROBATE 322 / 10240  
Dated 3/4/1946 Recorded 3/4/1946

***Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.***

AFTER RECORDING  
RETURN TO:  
AFTER RECORDING  
RETURN TO:  
JANE M. RANDALL  
ATTORNEY AT LAW  
P.O. BOX 966  
ROCK HILL, SC 29731

000146014  
RECORDED 09/04/2003 01:38:28PM  
Bk:05643 Pg:00200 Pages:4  
Fee:10.00 State:0.00  
County:0.00 Exempt:  
David Hamilton, Clerk of Court  
York County, SC

REO #: A030114

STATE OF SOUTH CAROLINA )  
COUNTY OF YORK ) SPECIAL WARRANTY DEED

KNOW ALL MEN BY THESE PRESENTS, that FANNIE MAE A/K/A FEDERAL NATIONAL MORTGAGE ASSOCIATION, Two Galleria Tower, 13455 Noel Road, Suite 950, Dallas, Texas 75240-5003, (hereinafter called "Grantor"), for and in consideration of the sum of One and no/100 (\$1.00) Dollar to it in hand paid at and before the sealing of these presents, by THERESA FAILE (hereinafter called "Grantee") in the State aforesaid, (the receipt of which is hereby acknowledged) has granted, bargained, sold and released, and by these Presents does grant, bargain, sell and release, unto the Grantee his heirs, successors and assigns:

THIS PROPERTY IS MORE COMMONLY KNOWN AS 6285 RIDGE ROAD, CLOVER, SC 29710 AND IS MORE PARTICULARLY DESCRIBED IN EXHIBIT "A" ATTACHED HERETO AND MADE A PART HEREOF BY REFERENCE.

Subject to all easements and restrictions of record and otherwise affecting the property, and matters an accurate survey would reveal.

TOGETHER with all and singular the Rights, Members, Hereditaments and Appurtenances to the Premises belonging, or in any wise incident or appertaining.

TO HAVE AND TO HOLD, all and singular the premises before mentioned unto the Grantee, his Heirs, Successors and Assigns forever, and the Grantor does hereby bind itself and its successors, to warrant and forever defend all and singular the premises unto the Grantee, His Heirs, Successors, and Assigns against the lawful claim of any person claiming by, through or under the Grantor.

IN WITNESS WHEREOF, Grantor has caused these presents to be executed in its name by its undersigned officer(s) and its seal to be hereto affixed.

Date: 8/13/03

Signed, sealed and delivered in the presence of:



FANNIE MAE a/k/a FEDERAL  
NATIONAL MORTGAGE  
ASSOCIATION

By: [Signature] (Seal)  
Sheryl Martin - Vice President

Witness: Teresa M. Foley

Attest: [Signature]  
Daborah Komerda - Asst. Secretary

Witness: [Signature] Donna Ghassemi

RECORDED  
YORK COUNTY  
TAX ASSESSOR'S OFFICE

DATE 9-5-03  
TAX MAP NO. 477-34  
INITIALS ac kj

specwd form (08/26/02)

BK05643 PG0200

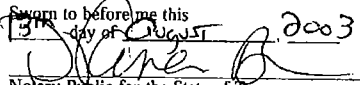
①

STATE OF TEXAS ) ss.  
COUNTY OF DALLAS)

Personally appeared before me the undersigned witness who, being duly sworn, says that (s)he saw the within-named Grantor by its officer(s) as its act and deed, sign, seal and deliver the within Deed, and that (s)he with the other witness whose signature appears above witnessed the execution thereof.

  
Teresa M. Foley

Sworn to before me this  
3<sup>rd</sup> day of AUGUST 2003

  
Notary Public for the State of Texas  
My commission expires:

(Seal)



This document prepared by:  
Reta S. Hampton, Attorney  
SC Bar No. 14308  
Morris & Schneider, P.C.  
4555 Mansell Road, Suite 215  
Alpharetta, GA 30022  
(770) 664-4461 Fax: (770) 664-8890

EX05643 P00201

**EXHIBIT A**

ALL that certain piece, parcel or tract of land located on Ridge Road , Bethel Township, York County, South Carolina, containing 1.422 acres and being more particularly described as follows:  
BEGINNING at a point in Ridge Road located approximately 0.5 miles from SC 557 and running thence N. 58-27-00 W. 64.69 feet to a point; thence N. 00-22-22 W. 422.56 feet to an iron; thence S. 6111-17 E. 270.67 feet to an iron; thence S. 28-48-43 W. 372.01 feet to a point; this being the beginning point. The above described property is shown on plat of survey for Ronald A. Hoover, by Joe H. Baird, PE & LS, dated June 16, 1995, said plat being recorded in Plat Book 131 at Page 89, Office of the Clerk of Court for York County, South Carolina, and incorporated herein by reference. ✓

Derivation: This being the same property conveyed unto Federal National Mortgage Association, the Grantor herein, by deed of J. Buford Grier, Sr., Master in Equity for York County, SC, dated February 3, 2003, recorded February 18, 2003, in Record Book 5031 at Page 234 in the aforesaid Clerk's Office. ✓

*Grantee Address: 6285 Ridge Rd. Clover SC 29710*

**EX05643 PB0202**

STATE OF SOUTH CAROLINA)  
COUNTY OF YORK )

AFFIDAVIT

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 is located at 6285 RIDGE ROAD, CLOVER, SC 29710 bearing YORK County Tax Map Number 477-00-00-034 as transferred:

by FANNIE MAE AKA FEDERAL NATIONAL MORTGAGE ASSOCIATION to THERESA H. FAILE ON AUGUST 13, 2003.

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): #3 (If exempt, please skip items 4 - 7, and go to item 8 of this affidavit.)

4. Check one of the following if either item 3(a) or 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 encumbrances existed on the land, tenement, or realty before the transfer and remained on the land, tenement, or realty after 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: \_\_\_\_\_

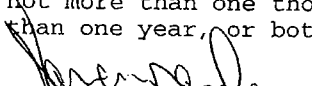
(If no amount is listed, place zero here)

(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 deed recording fee due is: \$0.00

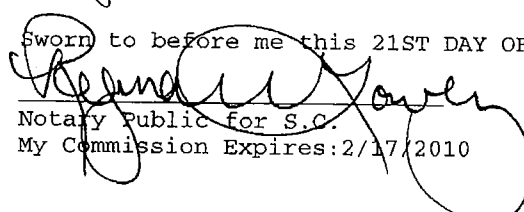
8. As required by Code Section 12-24-70, I state that I am a responsible person who was connection with the transaction as: closing attorney

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 for not more than one year, or both.

  
Jane M. Randall, Atty

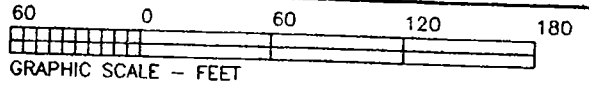
Responsible Person Connected with the Transaction

Sworn to before me this 21ST DAY OF AUGUST, 2003

  
Notary Public for S.C.

My Commission Expires: 2/17/2010

FILED-RECORDED  
 BOOK 131 P. 59  
 SEP 20 2 45 P.M. 1995  
 I.P.S.

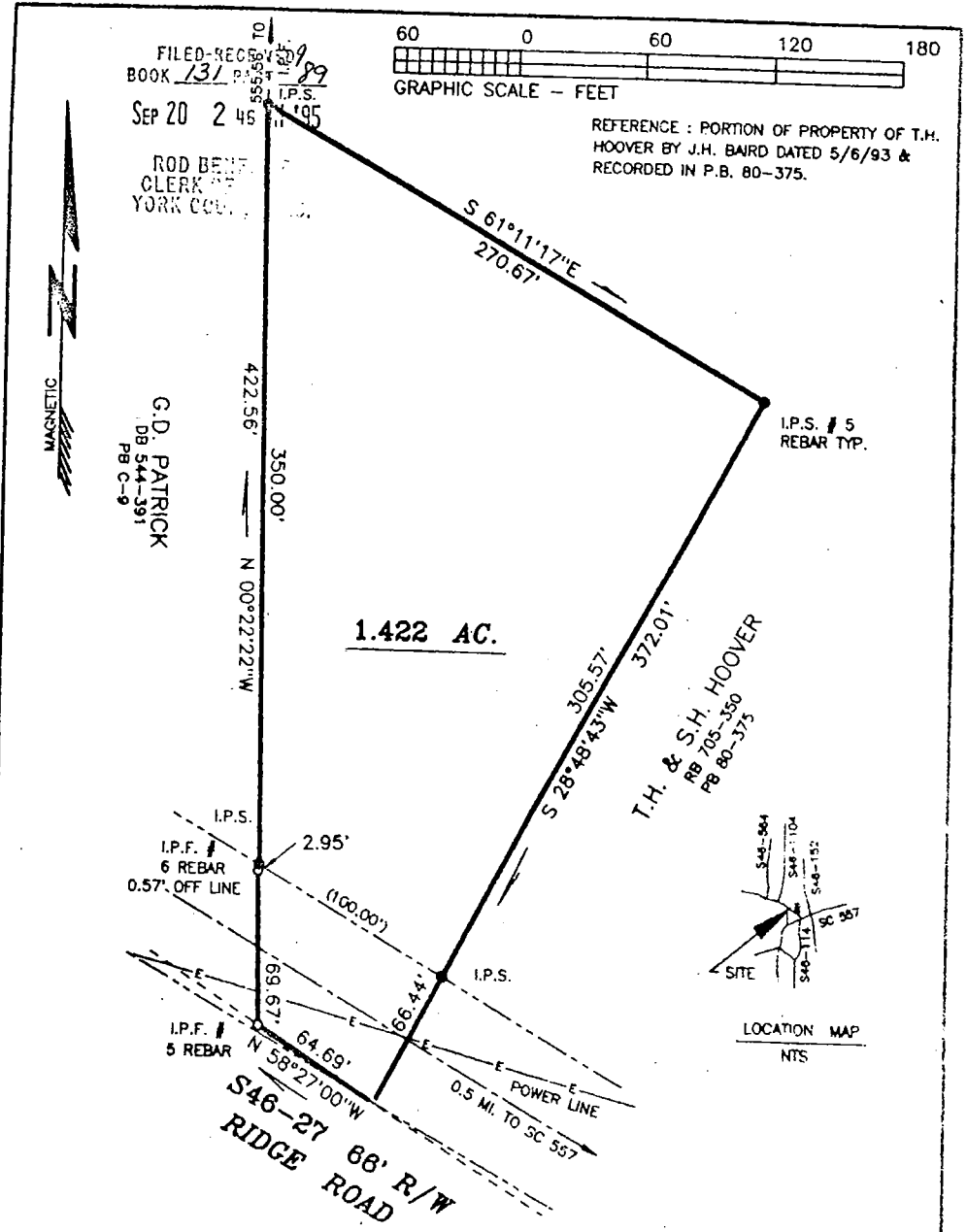


REFERENCE : PORTION OF PROPERTY OF T.H. HOOVER BY J.H. BAIRD DATED 5/6/93 & RECORDED IN P.B. 80-375.

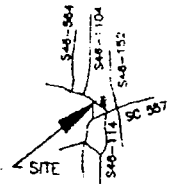
ROD BENE...  
 CLERK OF...  
 YORK COUNTY

G.D. PATRICK  
 DB 544-391  
 PB C-9

I.P.S. # 5  
 REBAR TYP.

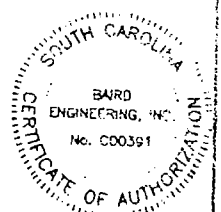


T.H. & S.H. HOOVER  
 RB 705-350  
 PB 80-375

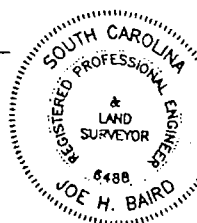


LOCATION MAP  
 NTS

PLAT OF SURVEY FOR  
**RONALD A. HOOVER**  
 BETHEL TOWNSHIP  
 YORK COUNTY SOUTH CAROLINA  
 SCALE : 1" = 60' JUNE 16 , 1995



BAIRD ENGINEERING, INC.  
 SURVEYORS • ENGINEERS • PLANNERS  
 JOE H. BAIRD, P.E. & L.S.  
 5420 EAST HIGHWAY 55  
 CLOVER, S.C. 29710  
 803/831-2661



I Hereby State To The Best Of my knowledge, Information And Belief, And in My Professional Opinion, The Survey Herein Was Made in Accordance With The Requirements Of The "Minimum Standards Manual For The Practice Of Land Surveying in South Carolina", And It Is Or Exceeds The Requirements For A Class "A" Survey As Specified Therein.

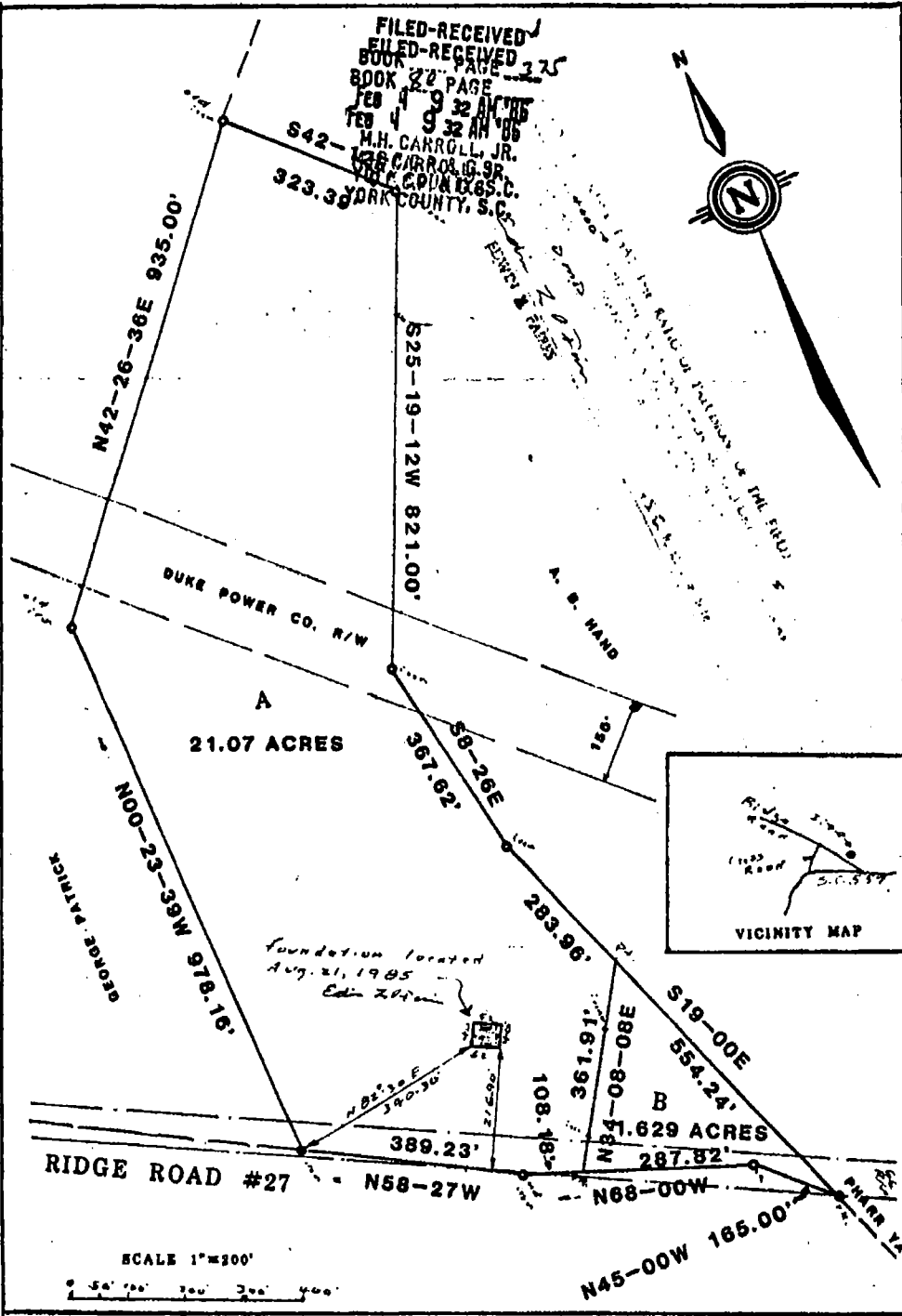
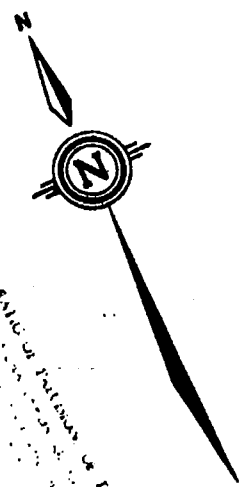
*Joe H. Baird*

S.C. REG. NO. 6488 CLOVER, S.C.  
 F.B. 88-11 JOB No. 9502R

S.C. CERTIFICATE OF AUTHORIZATION NO. 000391

121 @ 89

FILED-RECEIVED  
 FILED-RECEIVED  
 BOOK 22 PAGE 375  
 BOOK 22 PAGE 375  
 FEB 4 9 32 AM '85  
 FEB 4 9 32 AM '85  
 M.H. CARROLL, JR.  
 128 CARROLL ST.  
 YORK COUNTY, S.C.



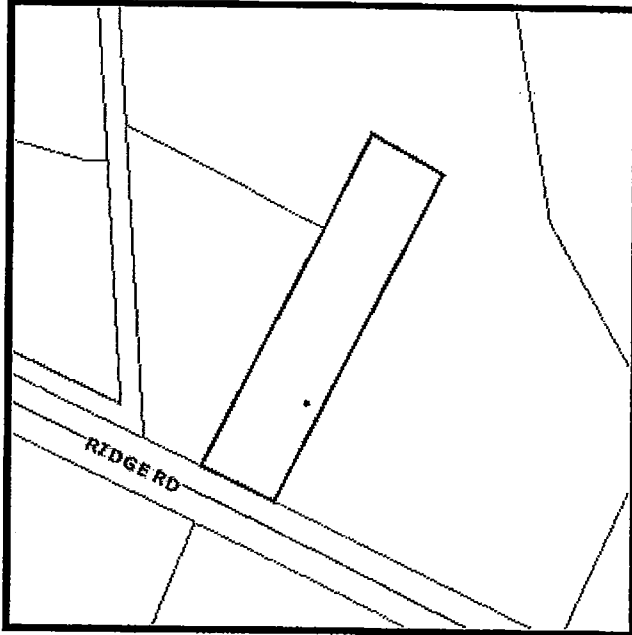
PROPERTY OF  
**THOMAS H. HOOVER LAUNIU L.**  
 YORK COUNTY, SOUTH CAROLINA  
 BETHEL TW'SP.

SURVEYED JUNE 19, 1985 BY EDWIN FAIRES - S.C.R.L.S. #5618



**Property Report for Parcel Number:**  
4770000035

Inquiry Date: 11/29/2009



**Owner**

**Owner Name:** FALLS HOME BUILDERS INC  
**Address:** PO BOX 664  
**City/State:** BLACKSBURG SC  
**Zip Code:** 29702

Disclaimer: While every effort is made to keep information provided over the internet accurate and up-to-date, York County does not certify the authenticity or accuracy of such information. No warranties, express or implied, are provided for the records and/or mapping data herein, or for their use or interpretation by the User.

**Property**

**Parcel Number:** 4770000035  
**Total Lots:** 1  
**Total Acres:** 0  
**Deed Book:** 11139  
**Deed Book Page:** 29  
**Platt Book:** 131  
**Platt Book Page:** 90  
**School District:** 2  
**Municipality:**  
**Fire Code:** BE-I  
**Property Location:** (1.158 AC)

**Land Value:** \$30000  
**AG Use:**  
**AG Use Value:**  
**Previous Owner:** HOOVER JOHN D & BETH B  
**Tax Bill Information:**  
**Zoning:**  
**Sale Price:** \$30000  
**Sale Date:** 11/24/09  
**Census Tract:**  
**Voter District:**

**Building/Structure**

**Prop. Classification:**  
**Heating Type:**  
**Living Area(Sq. Ft.):**  
**Basement:** NO  
**Bathrooms:**  
**Total Imp. Value:**

**Number of Stories:**  
**Year Built:**  
**Garage Area:** NO  
**Fireplace:**  
**Bldg. Value:** \$0

**Assessment**

**Total Assessed Value:** \$1800  
**Total Tax Value:** \$30000

**Total Market Value\*:** \$30000

\* - This property may have been re-valued due to an Assessable Transfer of Interest

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 477-00-00-035 Legal 1.158 AC PLAT 131 - 90

DEED

Grantor JOHN D HOOVER AND BETH B HOOVER  
Grantee FALLS HOME BUILDERS INC  
Book 11139 Page 29  
Dated 11/20/2009 Recorded 11/24/2009

1-1-2 Previous Ownership

Grantor THOMAS H HOOVER AND SALLY H HOOVER  
Grantee JOHN D HOOVER AND BETH B HOOVER  
Book 1343 Page 264  
Dated 9/18/1995 Recorded 9/21/1995

Grantor THOMAS H HOOVER 1/2 INTEREST  
Grantee SALLY HOOVER  
Book 705 Page 350  
Dated 5/6/1993 Recorded 5/6/1993

Grantor LAUNIU L HOOVER  
Grantee THOMAS H HOOVER  
Book 1013 Page 347  
Dated 3/8/1988 Recorded 3/28/1988

Grantor THOMAS H HOOVER  
Grantee LAUNUI L HOOVER  
Book 1021 Page 328  
Dated 5/5/1988 Recorded 5/5/1988

Grantor VERNA JEAN TELESKA  
Grantee THOMAS H HOOVER  
Book 545 Page 412  
Dated 3/22/1977 Recorded 5/30/1977

Grantor ESTATE OF ESTHER J PATRICK  
Grantee VERNA (JEAN) PATRICK (TELESKA) and LAUNIU L (GOODE) HOOVER  
PROBATE 635 / 18861  
Dated 7/9/1976 Recorded 7/9/1976

Grantor ESTATE OF R M PATRICK  
Grantee ESTHER J PATRICK and VERNA (JEAN) PATRICK (TELESKA)  
PROBATE 322 / 10240  
Dated 3/4/1946 Recorded 3/4/1946

***Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.***



The above described property is conveyed subject to all easements, conditions and restrictive covenants imposed upon property in the chain of title, if any, but are not intended to be reimposed hereby by reference thereto.

TOGETHER with all and singular, the rights, members, hereditaments and appurtenances to the said premises belonging or in anywise incident or appertaining.

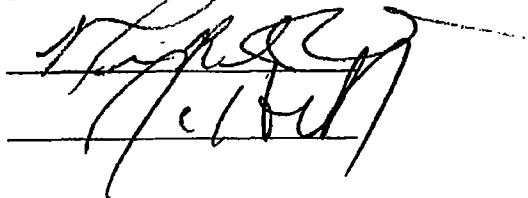
TO HAVE AND TO HOLD all and singular the premises before mentioned unto the said **Falls Home Builders, Inc.**, its heirs, administrators and assigns, forever.

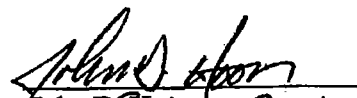
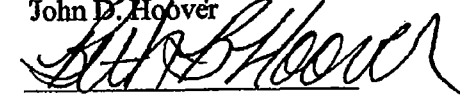
AND Grantor(s) do/does hereby bind themselves and their Heirs, Representatives and Administrators, to warrant and forever defend all and singular the said premises unto the said Grantee and the Grantee's Heirs and Assigns, against the Grantor and the Grantor's Heirs and against every person whomsoever lawfully claiming, or to claim, the same or any part thereof.

WITNESS the Hand and Seal of the Grantor this 20 day of Nov, in the year of our Lord two thousand nine and in the two hundred and thirty fourth year of the Sovereignty and Independence of the United States of America.

SIGNED, SEALED AND DELIVERED

IN THE PRESENCE OF:

  
\_\_\_\_\_  
\_\_\_\_\_

  
John D. Hoover  
  
Beth B. Hoover

STATE OF SOUTH CAROLINA )  
 )  
COUNTY OF YORK )

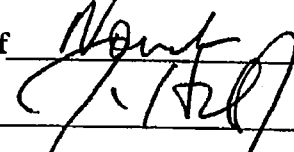
PROBATE

PERSONALLY APPEARED before me the undersigned witness and made oath that s/he saw the within named Grantor sign, seal and, as the Grantor's act and deed, deliver the within-written Deed for the uses and purposes therein mentioned and that s/he, with the other witness whose signature appears above, witnessed the execution thereof.



SWORN TO before me this 20

Day of August, 2009

  
\_\_\_\_\_  
(SEAL)

Notary Public for South Carolina  
My Commission expires: 6/1/16

STATE OF SOUTH CAROLINA  
COUNTY OF YORK

FILED-RECEIVED ✓  
BOOK \_\_\_\_\_ PAGE \_\_\_\_\_

SEP 20 2 48 PM '95

Haselden, Owen & Boloyan  
P.O. Box 173  
Clover, SC 29710  
ROD BENFIELD  
CLERK OF COURT  
YORK COUNTY, S.C.

**TITLE TO REAL ESTATE**

KNOW ALL MEN BY THESE PRESENTS, That We, Thomas H. Hoover and Sally H. Hoover, for and in consideration of the sum of One Dollar Plus Love and Affection, to them in hand paid at and before the sealing of these presents, by JOHN D. HOOVER AND BETH B. HOOVER, 2129 Kingstree Circle Gastonia, NC 28054, in the State aforesaid, (the receipt whereof is hereby acknowledged), has granted, bargained, sold and released unto John D. Hoover and Beth B. Hoover, their heirs, successors and assigns, the following described property:

All that certain piece, parcel or tract of land located on Ridge Road, Bethel Township, York County, South Carolina, containing 1.158 acres and being more particularly described as follows: BEGINNING at a point in Ridge Road located approximately 0.5 miles from SC 557 and running thence N 58-27-00 W 100.11 feet to a point; thence N 28-48-43 E 502.04 feet to an iron; thence S 61-11-17 E 100.00 feet to an iron; thence S 28-48-43 W 506.82 feet to the beginning point. The above described property is shown on plat of survey for John D. Hoover, by Joe H. Baird, PE & LS, dated June 19, 1995, said plat being recorded in Plat Book 131, Page 70, Office of the Clerk of Court for York County, South Carolina and incorporated herein by reference.

This is a portion of the property described in deed recorded May 11, 1993 in Record Book 705, Page 350, Office of the Clerk of Court for York County, South Carolina.

The above described property is conveyed subject to all easements, restrictions, and rights of way, if any, appearing of record in the chain of title of the subject property or visible upon an actual, physical inspection of the subject property.

RECORDED  
YORK COUNTY  
TAX ASSESSOR'S OFFICE  
DATE 9/21/95  
TAX MAP NO. 477-35  
INITIALS RHB/HAC 264

RECORDED  
RECORD  
VOL 1343 PG 264  
YORK COUNTY S.C.

TOGETHER with all and singular, the rights, members, hereditaments and appurtenances to the said premises belonging or in anywise incident or appertaining.

TO HAVE AND TO HOLD all and singular the premises before mentioned unto the said John D. Hoover and Beth B. Hoover, their heirs, successors and assigns, forever.

AND Grantors do hereby bind themselves and their successors and assigns, to warrant and forever defend all and singular the said premises unto the said John D. Hoover and Beth B. Hoover, their heirs and assigns, against themselves and their successors and assigns and against every person whomsoever lawfully claiming, or to claim, the same or any part thereof.

WITNESS the Hand and Seal of the Grantor this 16 day of September, in the year of our Lord one thousand nine hundred ninety five and in the two hundred and twentieth year of the Sovereignty and Independence of the United States of America.

SIGNED, SEALED AND DELIVERED  
IN THE PRESENCE OF:

John A. [unclear]  
Elizabeth M. [unclear]

Thomas H. Hoover  
Thomas H. Hoover

Sally M. Hoover  
Sally M. Hoover



STATE OF SOUTH CAROLINA  
COUNTY OF YORK

PROBATE

PERSONALLY APPEARED before me Teresa C. Beatty and  
made oath that She saw the within-named Grantors, sign, seal, and  
as their act and deed, deliver the within-written Deed for the uses  
and purposes therein mentioned; and that She with  
Elizabeth R. Glenn witnessed the execution thereof.

Teresa C. Beatty

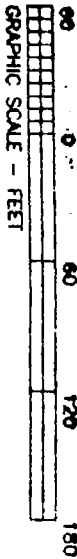
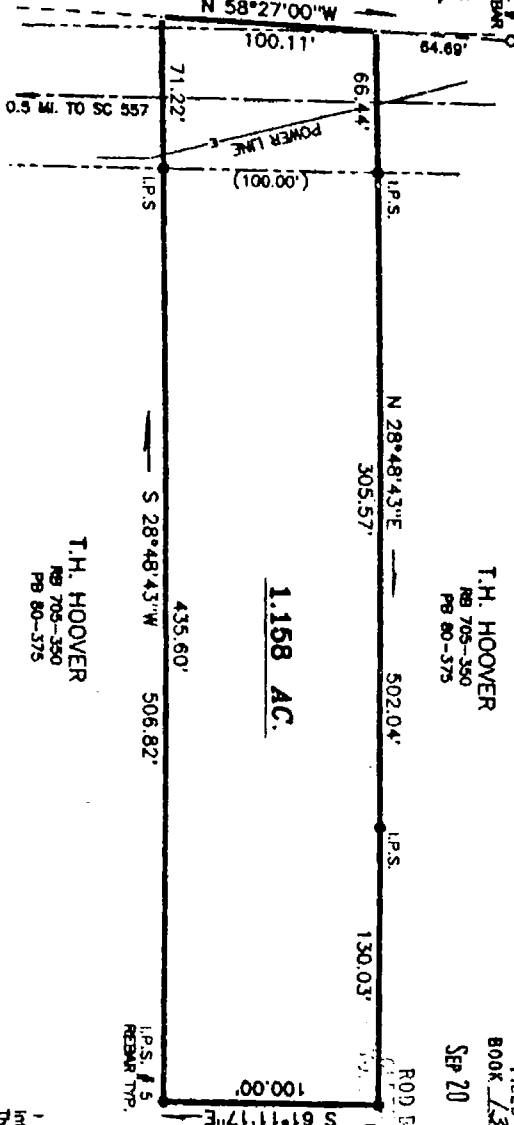
SWORN TO before me this

18 day of September, 1995.

Elizabeth R. Glenn (SEAL)  
Notary Public for South Carolina  
My Commission Expires 6-22-02



RIDGE ROAD S46-27 66' R/W



REFERENCE: PORTION OF PROPERTY OF T.H. HOOVER  
BY J.M. BAIRD DATED 5/8/93 & RECORDED IN PB 80-375.

T.H. HOOVER  
PB 705-350  
PB 80-375

FILED-RECEIVED  
BOOK 131 PAGE 50  
SEP 20 2 47 PM '95

1.158 AC.

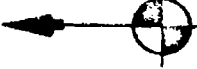
T.H. HOOVER  
PB 705-350  
PB 80-375

PLAT OF SURVEY FOR  
**JOHN D. HOOVER**

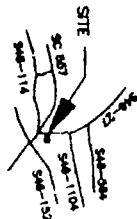
BETHEL TOWNSHIP  
YORK COUNTY SOUTH CAROLINA  
SCALE: 1" = 60'  
JUNE 19, 1995

BAIRD ENGINEERING, INC.  
SURVEYORS • ENGINEERS • PLANNERS  
JOE H. BAIRD, P.E. & L.S.  
5420 EAST HIGHWAY 55  
CLOVER, S.C. 29710  
803/831-2861

S.C. CERTIFICATE OF AUTHORIZATION NO. 000391

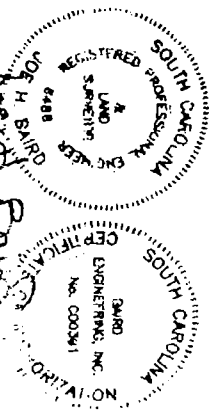


LOCATION MAP  
NTS

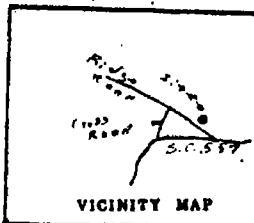
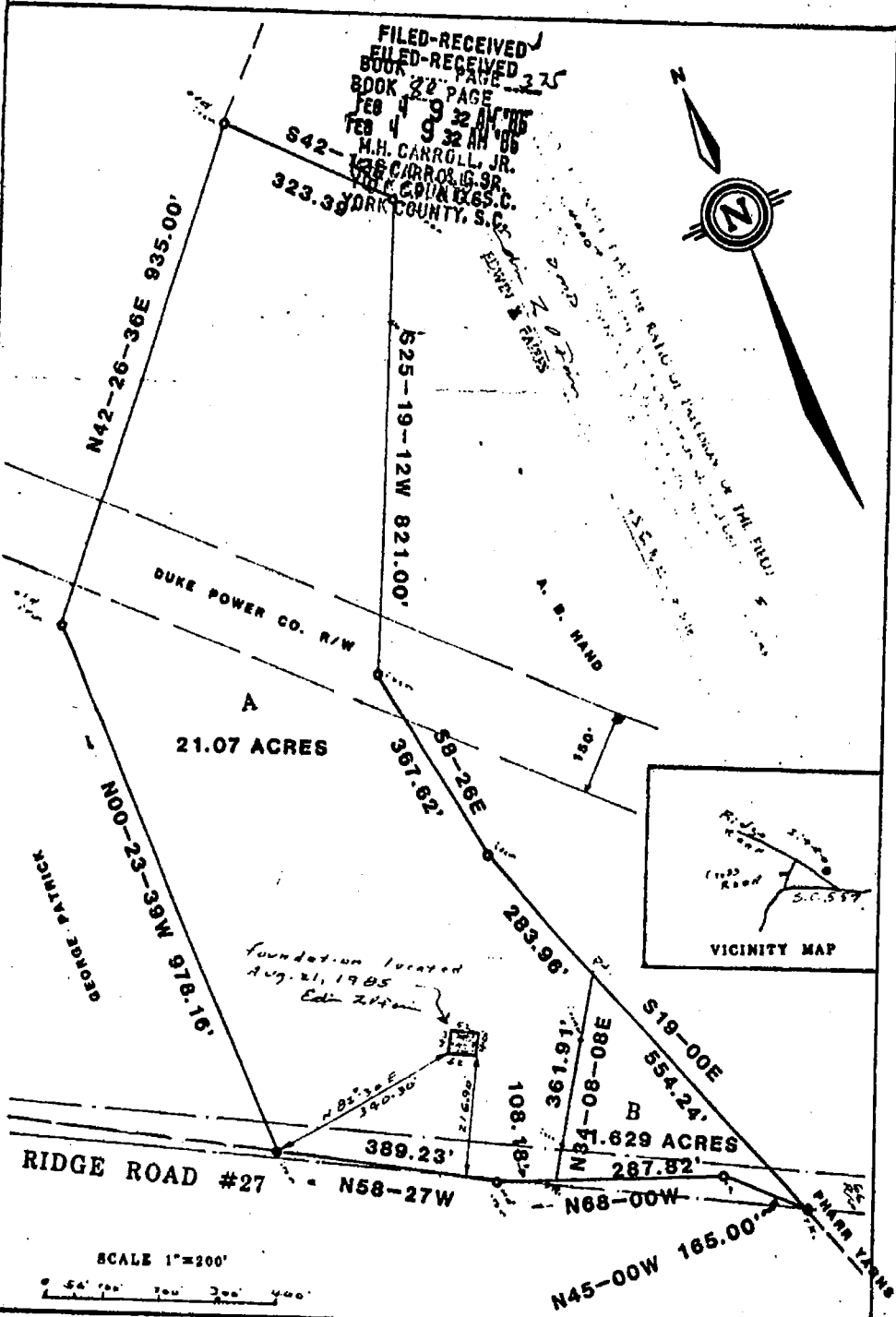
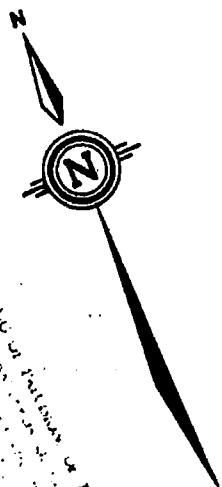


I Herby State That To The Best Of My Knowledge, Information And Belief, And In My Professional Judgment The Survey Shown Hereon Was Made In Accordance With The Requirements Of The "Minimum Standards Manual For The Practice Of Land Surveying - South Carolina", And Meets Or Exceeds The Requirements For A Class "A" Survey As Specified Therein.

S.C. REG. NO. 000391  
F.B. 88  
DWG # 950028A  
08



FILED-RECEIVED  
 FILED-RECEIVED  
 BOOK 22 PAGE 375  
 FEB 4 9 32 AM '06  
 M.H. CARROLL, JR.  
 YORK COUNTY, S.C.



SCALE 1"=200'

0 50 100 200 400

PROPERTY OF  
**THOMAS H. HOOVER LAUNIU L.**  
 YORK COUNTY, SOUTH CAROLINA  
 BETHEL TW'SP.

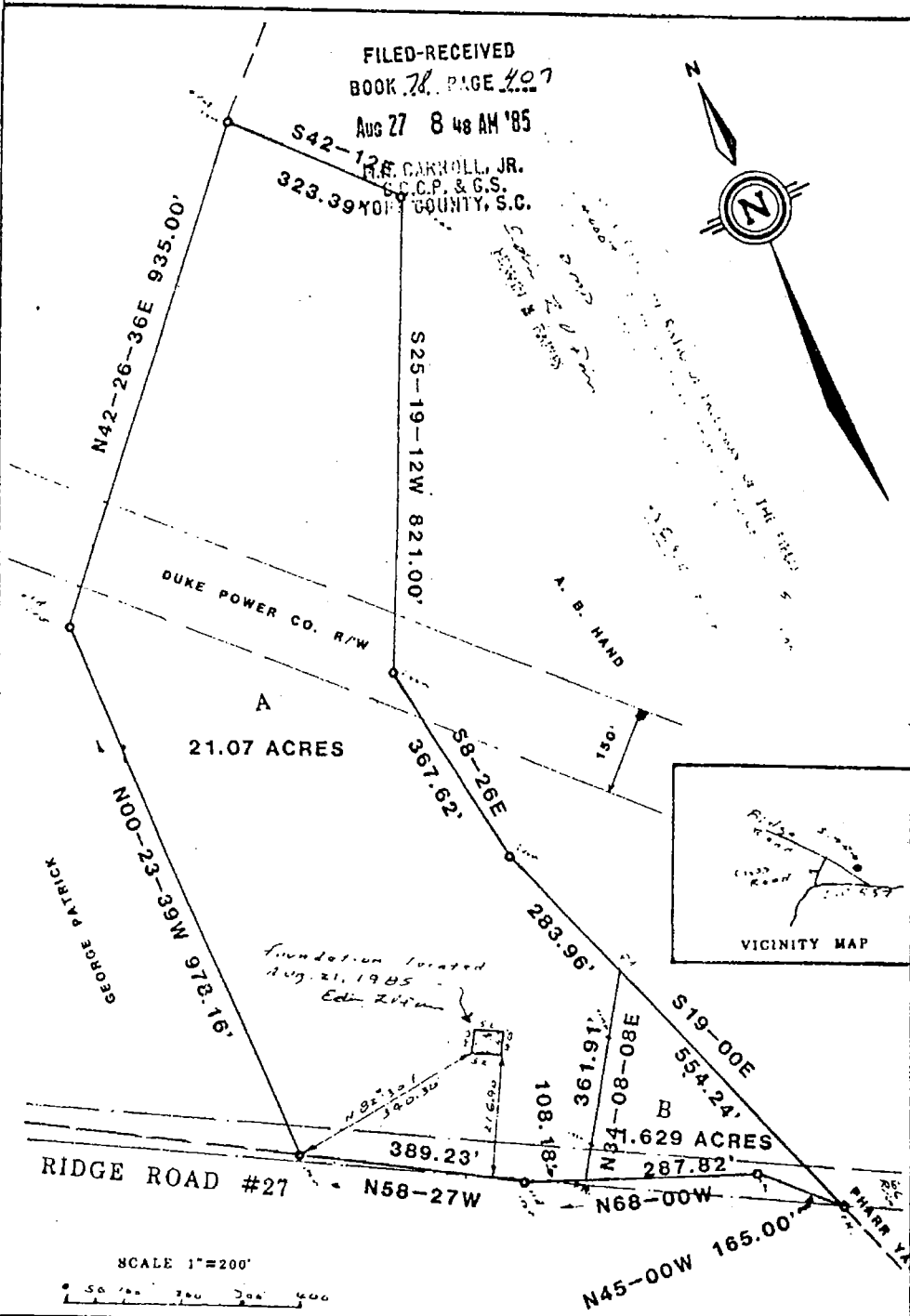
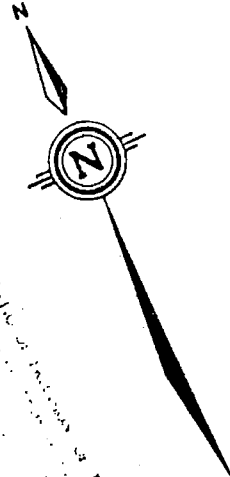
SURVEYED JUNE 19, 1906 BY EDWIN FAIRES - S.C.R.L.S. #5618

80  
 275

FILED-RECEIVED  
BOOK 78 PAGE 407

AUG 27 8 48 AM '85

H.E. CARROLL, JR.  
S.C.P. & G.S.  
YORK COUNTY, S.C.



A  
21.07 ACRES

B  
1.629 ACRES

SCALE 1"=200'  
0 50 100 200 300 400

PROPERTY OF  
**THOMAS H. HOOVER LAUNIU L.**  
YORK COUNTY, SOUTH CAROLINA  
BETHEL TW'SP.

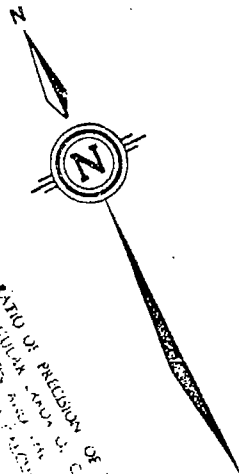
SURVEYED JUNE 19, 1985 BY EDWIN FAIRES -S.C.R.L.S. #5619

28 © 407

FILED-RECEIVED  
BOOK 28, PAGE 281

JUL 11 10 12 AM '85

THOMAS H. HOOVER, JR.  
YORK COUNTY, S.C.



EDWIN FAIRES  
S.C.R.L.S. #5615

S42-12E  
323.39'

S25-19-12W 821.00'

DUKE POWER CO. R/W

A  
21.07 ACRES

GEORGE PATRICK  
N00-23-39  
M68-97.8  
S78-16'

S8-26E  
367.62'

283.96'

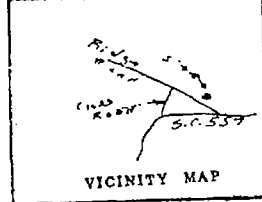
S19-00E  
554.24'

B  
41.629 ACRES

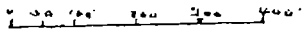
RIDGE ROAD #27  
N58-27W  
389.23'

N68-00W  
287.82'

N45-00W 165.00'



SCALE 1"=200'



PROPERTY OF  
**THOMAS H. HOOVER LAUNIU L.**  
YORK COUNTY, SOUTH CAROLINA  
BETHEL TW'SP.

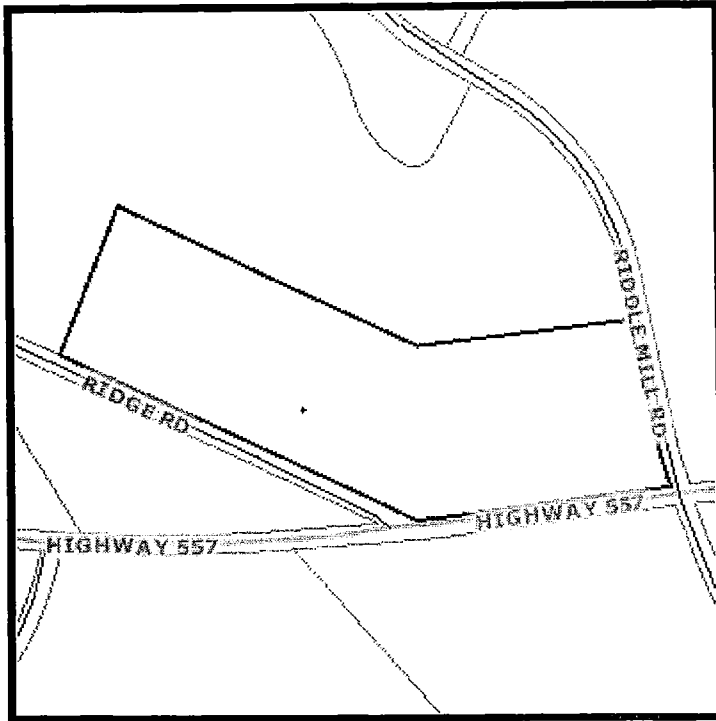
SURVEYED JUNE 19, 1985 BY EDWIN FAIRES - S.C.R.L.S. #5615

78 @ 184

**Property Report for Parcel Number:**

4770000043

Inquiry Date:



**Owner**

**Owner Name:** CURTIN DEVELOPMENT PARTNERSHIP  
**Address:** PO BOX 38220  
**City/State:** CHARLOTTE N C  
**Zip Code:** 28278

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

<b>Parcel Number:</b>	4770000043	<b>Land Value:</b>	\$404500
<b>Total Lots:</b>	0	<b>AG Use:</b>	
<b>Total Acres:</b>	28.89	<b>AG Use Value:</b>	
<b>Deed Book:</b>	2738	<b>Previous Owner:</b>	HAND H EUGENE TRU
<b>Deed Book Page:</b>	328	<b>Tax Bill Information:</b>	
<b>Platt Book:</b>	B11	<b>Zoning:</b>	
<b>Platt Book Page:</b>	4	<b>Sale Price:</b>	\$0
<b>School District:</b>	2	<b>Sale Date:</b>	6/10/99
<b>Municipality:</b>		<b>Census Tract:</b>	
<b>Fire Code:</b>	BE-I	<b>Voter District:</b>	
<b>Property Location:</b>	RIDGE RD/HWY 557 (28.89AC)		

**Building/Structure**

<b>Prop. Classification:</b>		<b>Number of Stories:</b>	
<b>Heating Type:</b>		<b>Year Built:</b>	
<b>Living Area(Sq. Ft.):</b>		<b>Garage Area:</b>	NO
<b>Basement:</b>	NO	<b>Fireplace:</b>	
<b>Bathrooms:</b>		<b>Bldg. Value:</b>	\$9000
<b>Total Imp. Value:</b>			

**Assessment**

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 477-00-00-043 Legal 28.89 AC RIDGE RD PLAT B11-004

DEED

Grantor H EUGENE HAND Trustee A B HAND TRUST  
Grantee CURTIN DEVELOPMENT  
Book 2738 Page 328  
Dated 6/2/1999 Recorded 6/10/1999

1-1-2 Previous Ownership

Grantor ESTATE OF A B HAND  
Grantee H EUGENE HAND Trustee A B HAND TRUST  
Book 70 Page 239  
Dated 6/8/1990 Recorded 6/14/1990

Grantor ESTATE OF LUCIELLE GARIN HAND  
Grantee A B HAND  
PROBATE 689 / 20244  
Dated 12/31/1980 Recorded 12/31/1980

Grantor J I HOVIS  
Grantee A B HAND AND LUCIELLE GARIN HAND  
Book 180 Page 321  
Dated 2/9/1952 Recorded 5/27/1952

**Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.**

FILED-RECORDED  
BOOK...  
JUN 10 11 19 AM '99

Exempt of 12

**CORRECTIVE DEED**

WHEREAS, the deed recorded September 17, 1998, in Book 2397, page 208 was executed incorrectly and,  
WHEREAS, this deed was prepared in order to correct said error.

STATE OF SOUTH CAROLINA ) Haselden, Owen & Boloyan  
                                  ) P.O Box 173  
COUNTY OF YORK          ) Clover, SC 29710

**TITLE TO REAL ESTATE**

KNOW ALL MEN BY THESE PRESENTS, That **I, H. EUGENE HAND, TRUSTEE OF THE A. B. HAND TRUST UNDER THE LAST WILL AND TESTAMENT OF A. B. HAND**, for an in consideration of the sum of (SEE PREAMBLE) to them in hand paid at and before the sealing of these presents, by **CURTIN DEVELOPMENT PARTNERSHIP, ,,** in the State aforesaid, (the receipt whereof is hereby acknowledged), has granted, bargained, sold and released unto **CURTIN DEVELOPMENT PARTNERSHIP, his/her or their heirs, successors and assigns, the following described property:**

All that certain piece, parcel or tract of land situate on Riddle Mill Road, S46-152, containing 107.009 acres, being more particularly shown and designated as Tract A on plat entitled "Plat of Survey for Curtin Development Partnership" dated May 20, 1998 prepared by Baird Engineering, Inc., said plat being recorded in Plat Book B-11, page 4, Office of the Clerk of Court for York County, South Carolina, and incorporated herein by reference.

This a portion of the property conveyed to H. Eugene Hand, Trustee, A. B. Hand Trust, by deed of Estate of A. B. Hand dated June 8, 1990, recorded June 14, 1990, in Record Book 70, page 239, Office of the Clerk of Court for York County, South Carolina.

Grantees Address:  
**P. O. BOX 241717  
CHARLOTTE, NC 28224**

The above described property is conveyed subject to all easements, restrictions, and rights of way, if any, appearing of record in the chain of title of the subject property or visible upon an actual, physical inspection of the subject property.

TOGETHER with all and singular, the rights, members, hereditaments

**RECORDED**  
YORK COUNTY  
TAX ASSESSOR'S OFFICE  
DATE 6-11-99  
TAX MAP NO. 477-44  
INITIALS Bm K

3 328

RECORDED  
RECORD  
VOL. 212 PG 328  
YORK COUNTY, SC

179 @ 239

~~A~~  
①



AND Grantors do hereby bind themselves and their successors and assigns, to warrant and forever defend all and singular the said premises unto the said **CURTIN DEVELOPMENT PARTNERSHIP** his, her or their heirs and assigns, against themselves and their successors and assigns and against every person whomsoever lawfully claiming, or to claim the same or any part thereof

WITNESS the Hand and Seal of the Grantor this 2nd day of June in the year of our Lord one thousand nine hundred ninety nine and in the two hundred and twenty-third year of the Sovereignty and Independence of the United States of America.

**SIGNED, SEALED AND DELIVERED**

IN THE PRESENCE OF:

U. Fair

H. Eugene Hand, Trustee of A. B. Hand Trust under the Last Will and Testament of A. B. Hand

**H. EUGENE HAND, TRUSTEE OF  
THE A. B. HAND TRUST UNDER  
THE LAST WILL AND  
TESTAMENT OF A. B. HAND**

Kathleen Spat

STATE OF Fl. )  
COUNTY OF SARASOTA )

PROBATE

PERSONALLY APPEARED before me the undersigned witness and made oath that s/he saw the within-named Grantors, sign, seal, and as their act and deed, deliver the within-written Deed for the uses and purposes therein mentioned; and that s/he with the other witness whose signature appears above the witnessed the execution thereof.

b. B.

SWORN TO before me this

2 day of June, 1999

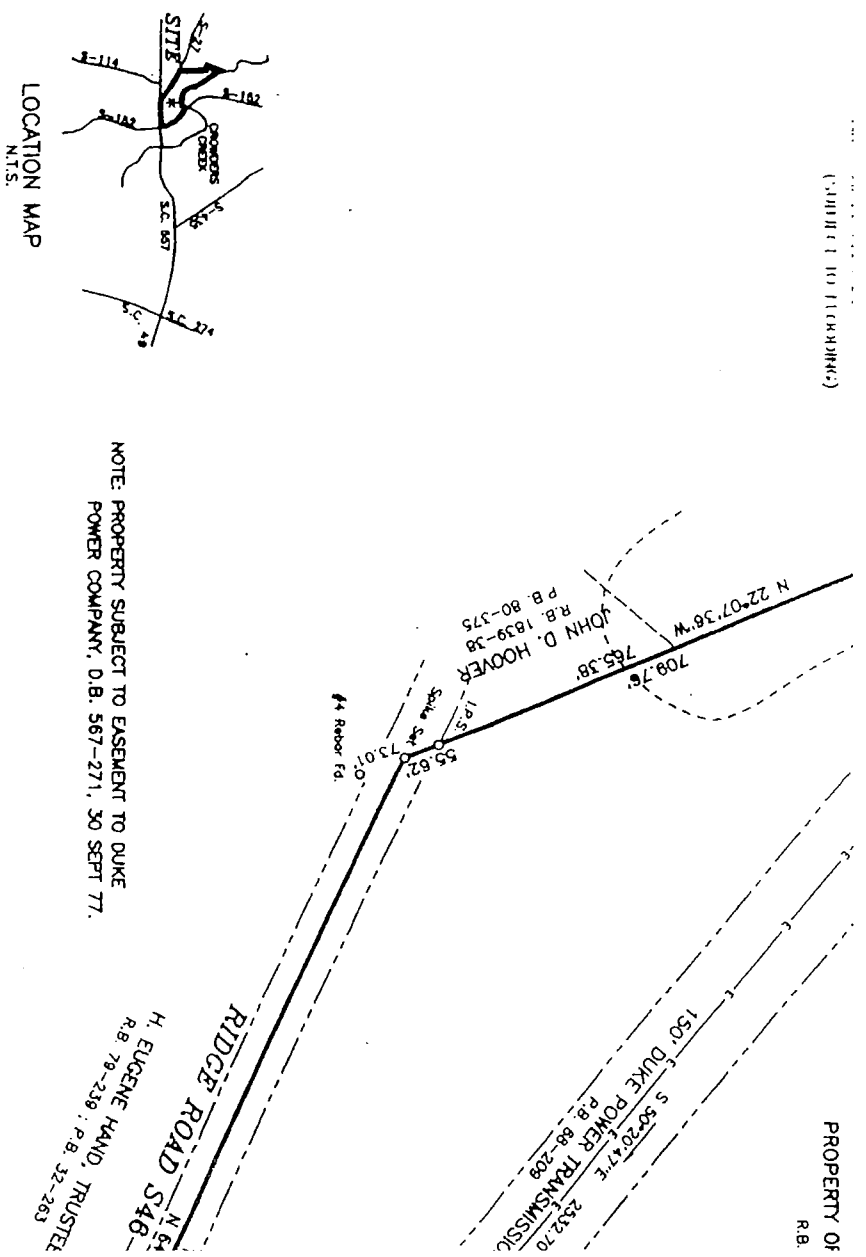
Kathleen Esposito (SEAL)

Notary Public for Fl.  
My Commission Expires: 9/15/01



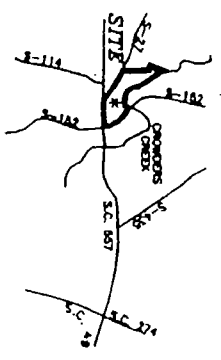
(SUBJECT TO EASEMENTS)

PROPERTY OF  
R.B.

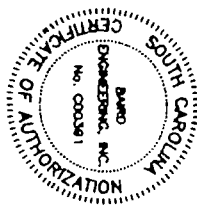


NOTE: PROPERTY SUBJECT TO EASEMENT TO DUKE POWER COMPANY, O.B. 567-271, 30 SEPT 77.

LOCATION MAP  
N.T.S.



**BAIRD ENGINEERING, INC.**  
 SURVEYORS • ENGINEERS • PLANNERS  
 JOE H. BAIRD, P.E. & L.S.  
 5420 EAST HIGHWAY 54  
 CLOVER, S.C. 28710  
 803/831-2661  
 S.C. CERTIFICATE OF AUTHORIZATION NO. C00381  
 © 1998 BY BAIRD ENGINEERING, INC.



**PLAT APPROVED**

This plat is approved for recording in the office of the Clerk of Court of York County, South Carolina, section 16.1 Subdivision # 1 of the York County Code.  
 COMMISSIONER AGENT CLD DATE: 9-16-



*Bill @ pooh*

4

# URTIN DEVELOPMENT PARTNERSHIP

PLAT OF SURVEY FOR

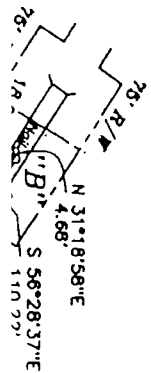
BETHEL TOWNSHIP

YORK COUNTY SOUTH CAROLINA

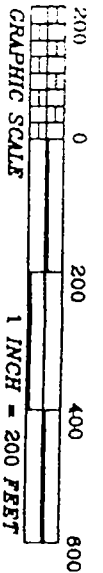
20 MAY 1998

PROPERTY LINE FOLLOWS CREEK BANK "A" TO "B"

L-1	S 37°23'31"E	63.80'
L-2	S 17°17'38"W	50.33'
L-3	S 28°23'10"W	50.14'
L-4	S 10°24'48"W	59.51'
L-5	S 22°32'05"E	82.47'
L-6	S 32°38'12"E	53.38'
L-7	S 55°05'33"E	60.71'
L-8	N 80°32'55"E	160.37'
L-9	N 73°08'39"E	66.58'
L-10	S 71°07'03"E	78.01'
L-11	S 15°08'28"E	122.54'
L-12	S 11°36'49"E	55.53'
L-13	S 14°21'33"E	119.10'
L-14	S 24°52'36"E	150.74'
L-15	S 38°02'21"E	148.84'
L-16	S 22°27'12"E	234.14'
L-17	S 13°17'00"E	176.42'
L-18	S 32°25'10"E	103.21'
L-19	S 40°41'39"E	143.34'
L-20	S 35°21'23"E	234.44'
L-21	S 28°33'11"E	148.52'
L-22	S 21°33'00"E	189.17'
L-23	S 29°09'45"E	89.77'
L-24	S 44°42'18"E	172.23'
L-25	S 83°33'35"E	55.07'
L-26	N 68°36'53"E	62.70'
L-27	N 28°25'20"E	348.84'



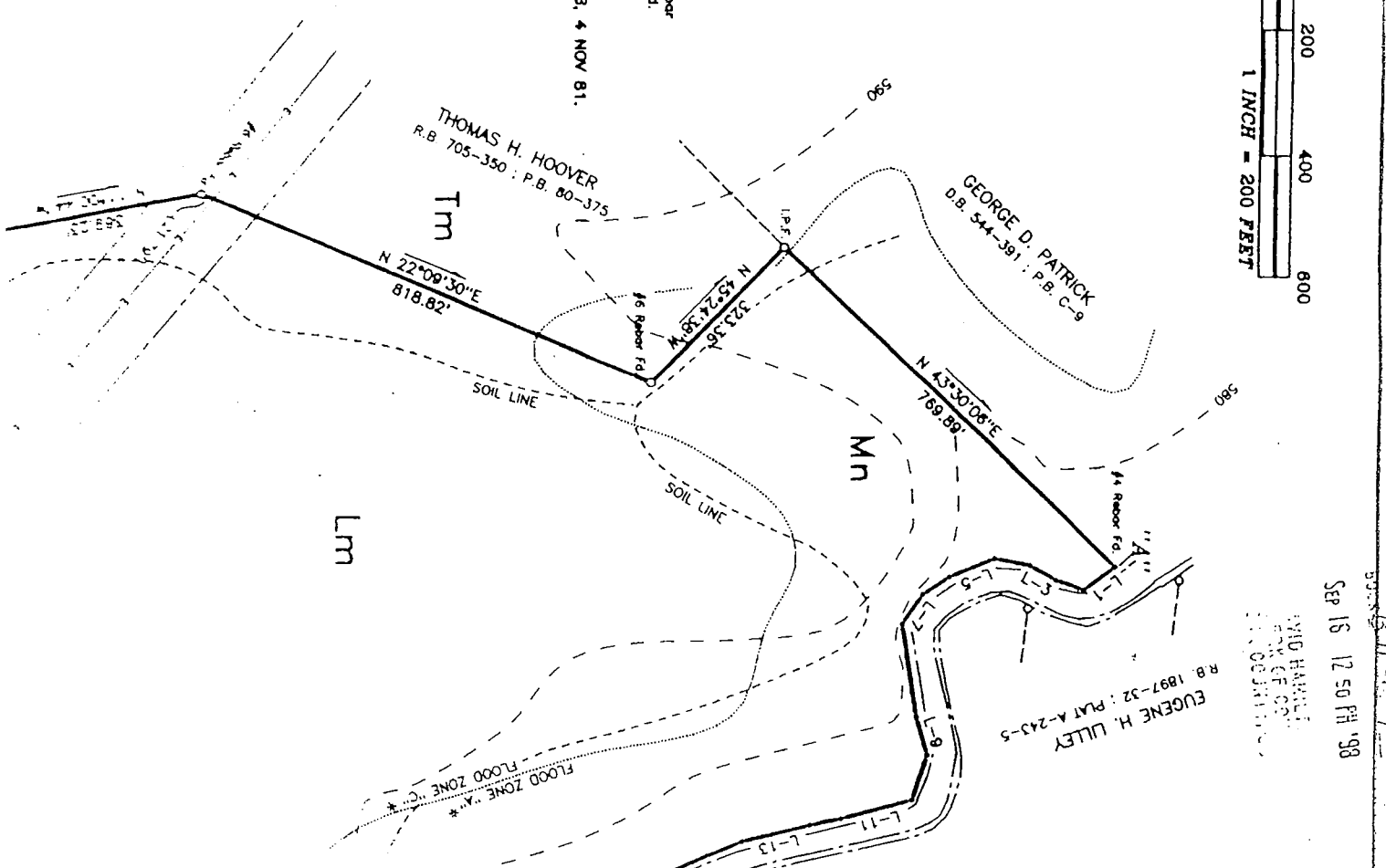
(B)  
3.450 ACRES



All Corners Are #5 Rebar  
Unless Otherwise Noted.

\* FROM PANEL 450193 0050 B, 4 NOV 81.

1/4" = 100'  
1" = 400'  
1/2" = 200'



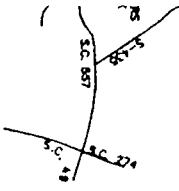
SEP 15 12 50 PM '98

WILD HARBOR  
ROW OF CO  
1000 JAMES ST

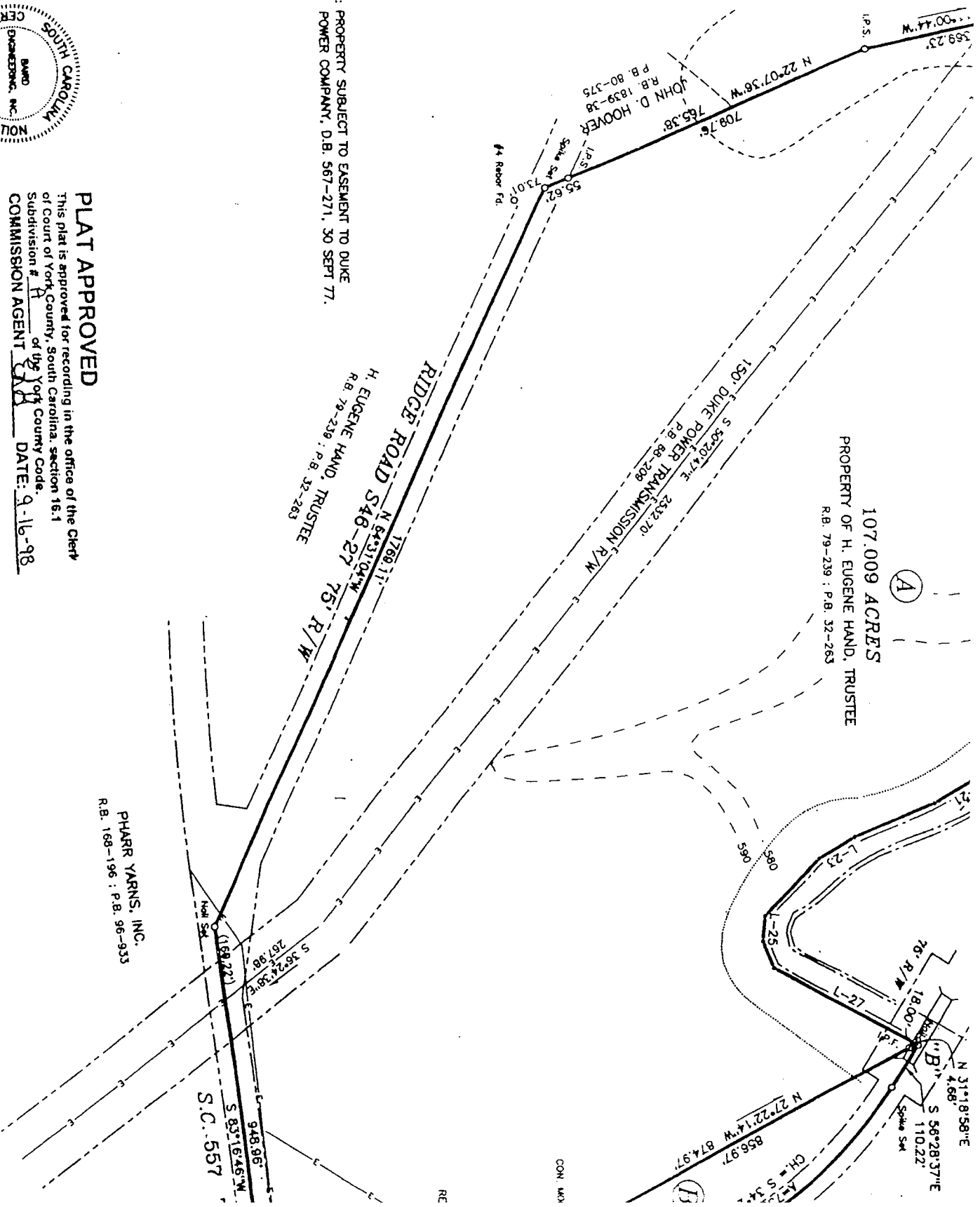
EUGENE H. WILEY  
R.B. 1897-32; PLAT A-243-5

ATUM  
 LOTD  
 AIXED ALLUML  
 SUBJECT TO FLOODING)

DN MAP  
 S:



NOTE: PROPERTY SUBJECT TO EASEMENT TO DUKE  
 POWER COMPANY, D.B. 567-271, 30 SEPT 77.



107.009 ACRES  
 PROPERTY OF H. EUGENE HAND, TRUSTEE  
 R.B. 79-239 ; P.B. 32-263

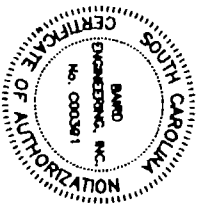
RIDGE ROAD S46-27  
 H. EUGENE HAND, TRUSTEE  
 R.B. 79-239 ; P.B. 32-263

JOHN D. HOOVER  
 R.B. 1839-38  
 P.B. 80-375

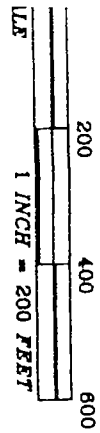
PHARR YARNS, INC.  
 R.B. 168-196 ; P.B. 96-933

**PLAT APPROVED**

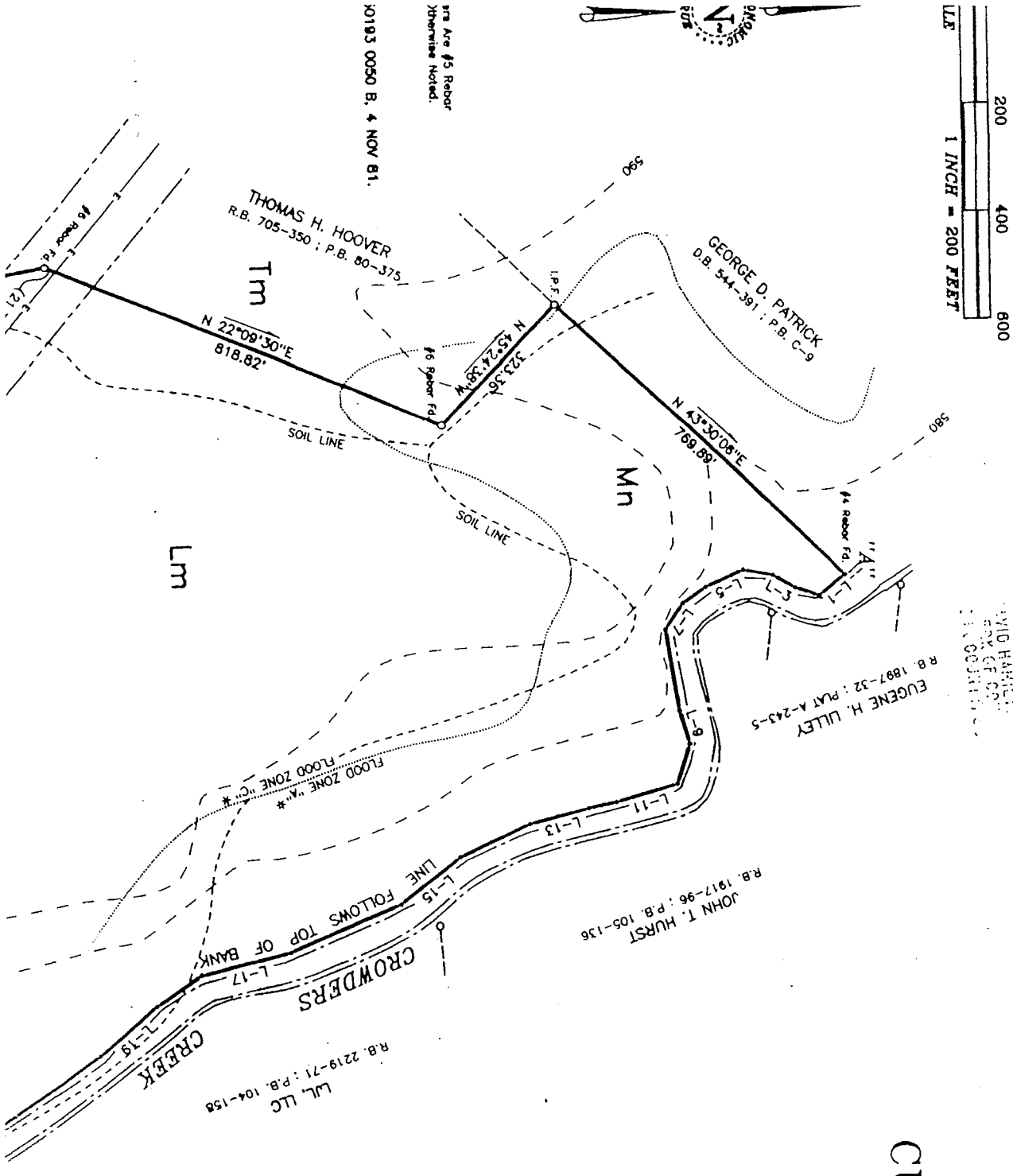
This plat is approved for recording in the office of the Clerk  
 of Court of York County, South Carolina, section 16.1  
 Subdivision # H of the York County Code.  
 COMMISSION AGENT DA DATE: 9-16-98



ENGINEERING, INC.  
 ENGINEERS & PLANNERS  
 2, P.E. & L.S.  
 HIGHWAY 55  
 28710  
 861  
 F AUTHORIZATION NO. 000391  
 D ENGINEERING, INC.



See also #5 Report  
 Therein noted:  
 30193 0050 B, 4 NOV 81.



FILED-RECORDED  
 BOOK 271 PAGE 1  
 Sep 16 12 50 PM '98  
 CLYD HARRIS  
 REC'D OF REC  
 YORK COUNTY

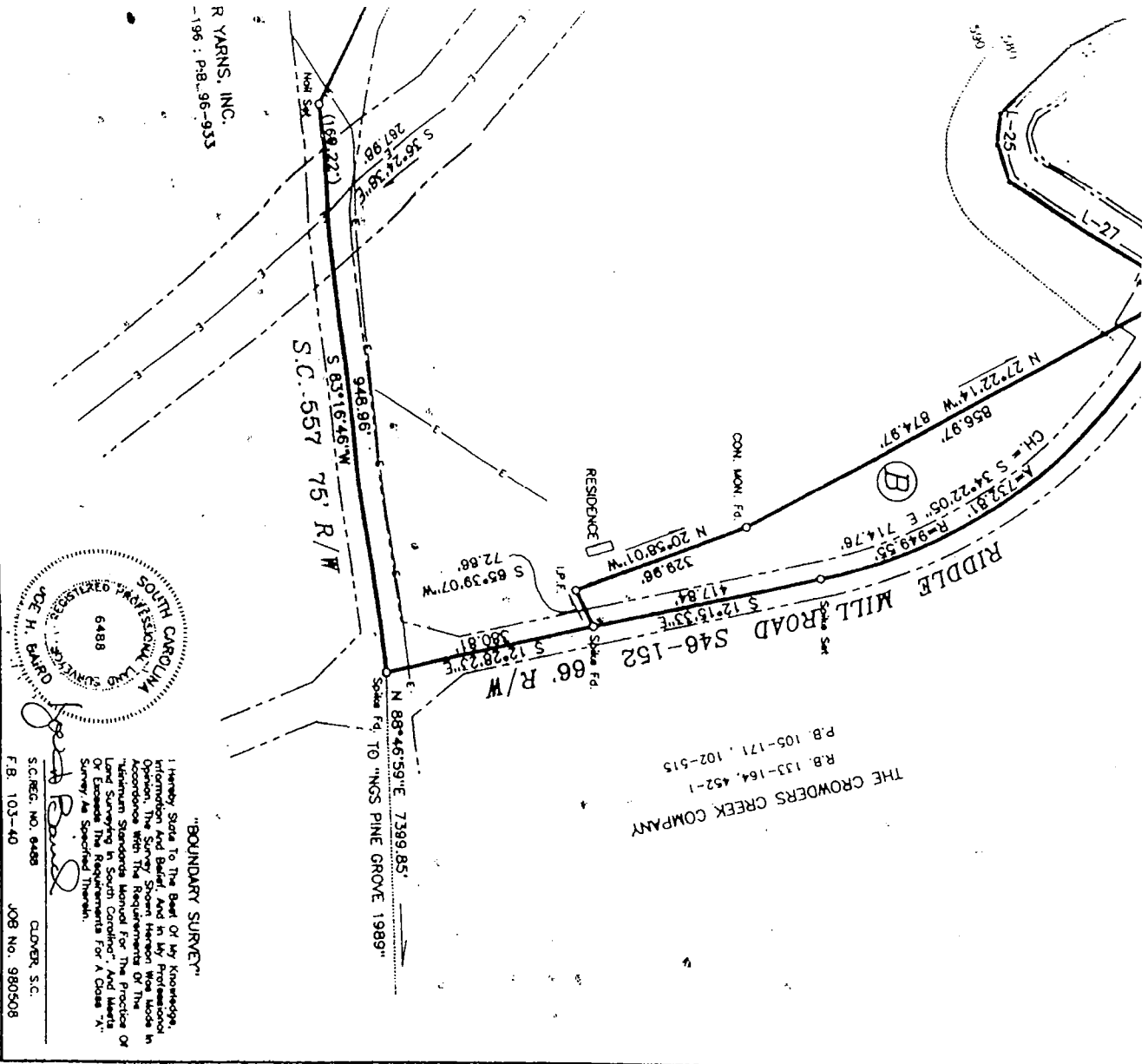
PLAT OF SURVEY  
 CURTIN DEVELOPMENT  
 BETHEL TOWNSHIP  
 YORK COUNTY SOUTH  
 20 MAY 1998

PROPERTY LINE FOLLOWS CREEK BANK

Line	Bearing	Distance	Area
L-1	S 37°23'31"E		63.6
L-2	S 17°17'38"W		50.2
L-3	S 28°23'10"W		50.1
L-4	S 10°24'48"W		59.6
L-5	S 22°32'05"E		82.4
L-6	S 32°38'12"E		53.2
L-7	S 55°05'33"E		60.7
L-8	N 80°32'55"E		160.3
L-9	N 73°08'39"E		66.4
L-10	S 71°07'03"E		78.1
L-11	S 15°08'28"E		122.6
L-12	S 11°36'49"E		55.4
L-13	S 14°21'33"E		119.4
L-14	S 24°52'36"E		150.1
L-15	S 38°02'21"E		148.1
L-16	S 22°27'12"E		234.4
L-17	S 13°17'00"E		176.4
L-18	S 32°25'10"E		103.4
L-19	S 40°41'39"E		143.4
L-20	S 35°21'23"E		234.4
L-21	S 29°33'11"E		148.4
L-22	S 21°33'00"E		189.4
L-23	S 29°09'45"E		89.4
L-24	S 44°42'18"E		172.4
L-25	S 83°33'35"E		45.4
L-26	N 60°36'53"E		62.4
L-27	N 28°25'20"E		148.4



R YARNS, INC.  
 -196 : P.B. 96-933



THE CROWDERS CREEK COMPANY  
 R.B. 133-164, 452-1  
 P.B. 105-171, 102-515

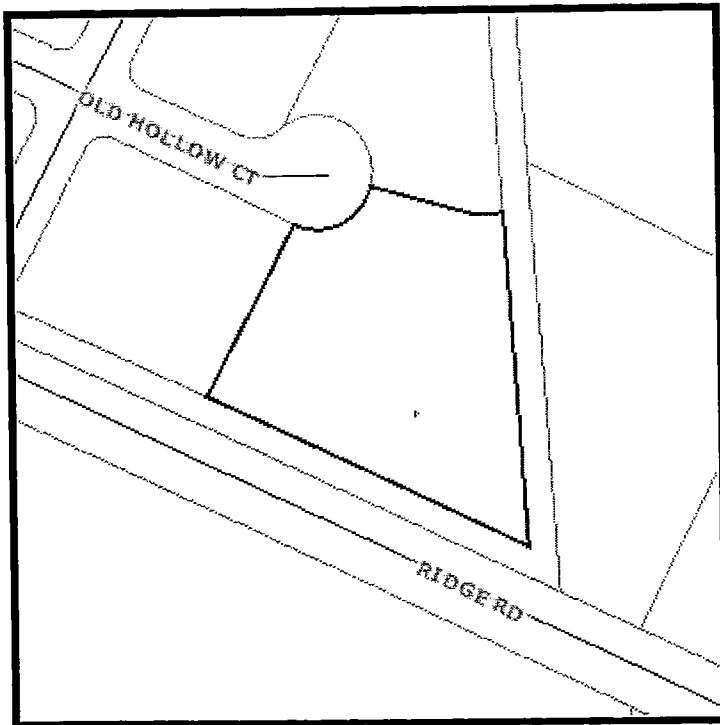
"BOUNDARY SURVEY"  
 I Herby State To The Best Of My Knowledge,  
 Information and Belief, and in My Professional  
 Opinion, The Survey Shown Herein Was Made in  
 Accordance With The Requirements Of The  
 Minimum Standards Manual For The Practice Of  
 Land Surveying In South Carolina, And Meets  
 Or Exceeds The Requirements For A Close X  
 Survey, As Specified Therein.  
 JOE H. BOWEN  
 S.C. REG. NO. 6488 CLOVER, S.C.  
 F.B. 103-40 JOB NO. 980508



**Property Report for Parcel Number:**

4770000048

Inquiry Date:



**Owner**

**Owner Name:**

RUSNAK RICHARD J & E

**Address:**

614 OLD HOLLOW COU

**City/State:**

CLOVER S C

**Zip Code:**

29710

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the mapping data herein, or for their use or interpretation by the User.

**Property**

**Parcel Number:** 4770000048  
**Total Lots:** 1  
**Total Acres:** 0  
**Deed Book:** 6569  
**Deed Book Page:** 194  
**Platt Book:** C320  
**Platt Book Page:** 2  
**School District:** 2  
**Municipality:**  
**Fire Code:** BE-I  
**Property Location:** LOT 2 PATRICK PLACE  
 MP 1 SEC1

**Land Value:** \$48000  
**AG Use:**  
**AG Use Value:**  
**Previous Owner:** BUDNICK ASSOCIATE  
**Tax Bill Information:**  
**Zoning:**  
**Sale Price:** \$290950  
**Sale Date:** 9/23/04  
**Census Tract:**  
**Voter District:**

**Building/Structure**

**Prop. Classification:**  
**Heating Type:**  
**Living Area(Sq. Ft.):**  
**Basement:** NO  
**Bathrooms:**  
**Total Imp. Value:**

**Number of Stories:**  
**Year Built:**  
**Garage Area:** NO  
**Fireplace:**  
**Bldg. Value:** \$225000

**Assessment**

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 477-00-00-048 Legal LOT 2 PATRICK PLACE PLAT C 320 / 002

DEED

Grantor BUDNICK ASSOCIATES INC  
Grantee RICHARD J RUSNAK AND JANE E RUSNAK  
Book 6569 Page 194  
Dated 9/21/2004 Recorded 9/23/2004

1-1-2 Previous Ownership

Grantor MAY GREEN PROPERTIES LLC  
Grantee BUDNICK ASSOCIATES INC  
Book 5058 Page 97  
Dated 2/10/2003 Recorded 2/28/2003

Grantor GEORGE DAVIS PATRICK  
Grantee MAY GREEN PROPERTIES LLC  
Book 4381 Page 311  
Dated 4/17/2002 Recorded 6/21/2002

Grantor VERNA (JEAN) PATRICK (TELESKA)  
Grantee GEORGE DAVIS PATRICK  
Book 544 Page 399  
Dated 2/14/1977 Recorded 3/11/1977

Grantor ELIZABETH P KEEL  
Grantee GEORGE DAVIS PATRICK  
Book 544 Page 391  
Dated 2/14/1977 Recorded 3/11/1977

Grantor GEORGE PATRICK  
Grantee GEORGE DAVIS PATRICK  
Book 531 Page 440  
Dated 5/31/1976 Recorded 5/31/1976

Grantor FANNIE P HOPE & LESSLIE P BRANDON  
Grantee GEORGE PATRICK  
Book 112 Page 82  
Dated 12/12/1942 Recorded 12/12/1942

***Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.***



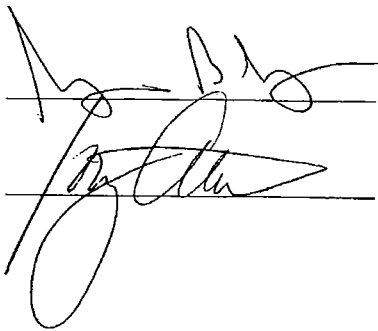
TO HAVE AND TO HOLD, all and singular the premises before mentioned unto the said GRANTEE, heirs and assigns, forever.

AND THE SAID **BUDNICK ASSOCIATES, INC.**, does hereby bind itself and its successors, to warrant and forever defend all and singular the said premises unto the said **RICHARD J. RUSNAK AND JANE E. RUSNAK**, their Heirs and Assigns, against itself and its successors and against every person whomsoever lawfully claiming or to claim the same, or any part thereof.

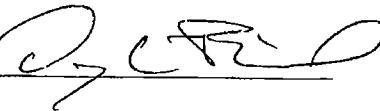
IN WITNESS WHEREOF **BUDNICK ASSOCIATES, INC.**, has caused these presents to be executed in its name by DANNY BUDNICK its VICE PRESIDENT (officer), its corporate seal hereto affixed this 21 day of SEPT in the year of our Lord, Two Thousand and Four, and in the two hundred and twenty-ninth year of the Sovereignty and Independence of the United States of America.

Signed, Sealed and Delivered

In Presence of:



BUDNICK ASSOCIATES, INC.,

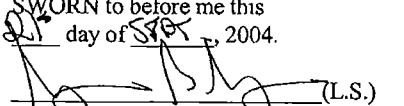
By: 

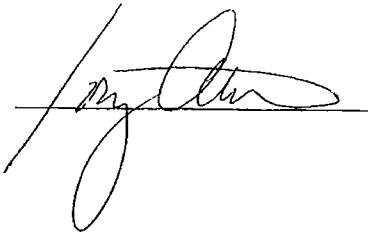
Its: VICE PRESIDENT

STATE OF SOUTH CAROLINA    )  
  )    PROBATE  
COUNTY OF YORK                )

PERSONALLY APPEARED before me the undersigned witness and made oath that s/he saw the within-named **BUDNICK ASSOCIATES, INC.**, by DAWN BUDNICK its VICE PRESIDENT (OFFICER) sign the within Deed, and the said Corporation, by said officers, seal said Deed, and, as its act and deed, deliver the same, and that s/he with the other witness whose name appears above witnessed the execution thereof.

SWORN to before me this  
day of SEP, 2004.

 (L.S.)  
Notary Public for South Carolina  
My Commission Expires: 9-9-2007



BK06569 P00196



"NO NEW LOTS OR PROPERTY LINES ESTABLISHED."

All Corners are #5 Rebar  
Unless Otherwise noted.  
I.P.F. = Found  
I.P.S. = Set



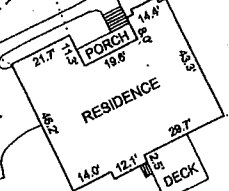
**OLD HOLLOW CT.**  
Y-F2-98

**NORVELLE G. & FRAN P. SIMMONS**  
R.B. 5822-37  
P.B. C-204-7

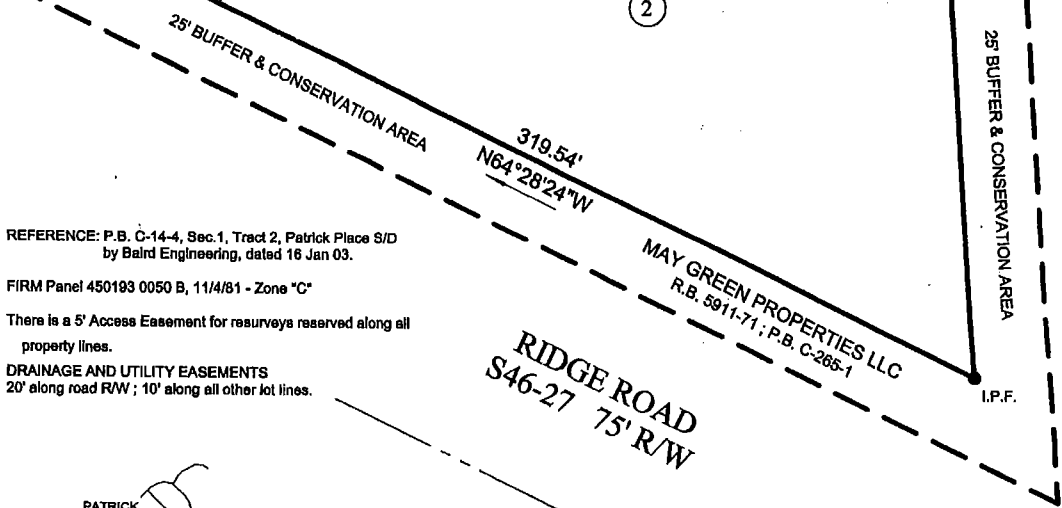
C-1  
R=50.00'  
A=87.82'  
CH=N65°21'01"E  
76.96'

**MAY GREEN PROPERTIES LLC**  
R.B. 4786-133  
P.B. C-143-4

000204853 BK  
09/23/2004 10:32:06AM  
David Hamilton, Clerk of Court  
York County, SC  
REC FEE:10.00



1.332 Acres

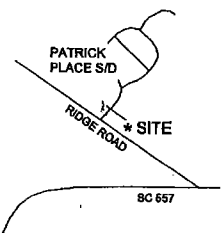


REFERENCE: P.B. C-14-4, Sec.1, Tract 2, Patrick Place S/D  
by Baird Engineering, dated 16 Jan 03.

FIRM Panel 450193 0050 B, 11/4/81 - Zone "C"

There is a 5' Access Easement for resurveys reserved along all  
property lines.

DRAINAGE AND UTILITY EASEMENTS  
20' along road RW; 10' along all other lot lines.



LOCATION MAP  
Not to Scale

PLAT OF SURVEY FOR  
**Richard J. & Jane E. Rusnak**  
BETHEL TOWNSHIP  
YORK COUNTY SOUTH CAROLINA  
20 SEPTEMBER 2004

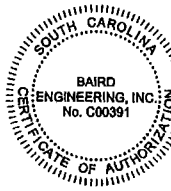
"LOAN/CLOSING SURVEY"

I hereby state to the best of my knowledge information  
and belief, and in my professional opinion, the survey  
shown hereon was made in accordance with the require-  
ments of the "Minimum Standards Manual for the Practice  
of Land Surveying in South Carolina", and meets or ex-  
ceeds the requirements for a "Class A" survey as specified  
therein. Also, there are no visible encroachments or pro-  
jections other than shown.

*David Baird*  
S.C. REG. NO. 6488  
P.B. 135-49

BAIRD ENGINEERING, INC.  
SURVEYORS \* ENGINEERS \* PLANNERS

3219 Baird Road  
Clover, S.C. 29710  
(803) 831-2661



S.C. Certificate of Authorization No. C00391

CLOVER, S.C.  
JOB NO. 040919

4320  
C  
2



**TREE REQUIREMENT LEGEND**

Minimum Number of Trees to be Planted (5 ~ 36")

- Medium Density
- High Density
- Medium Density
- High Density

**TRACT AREAS**

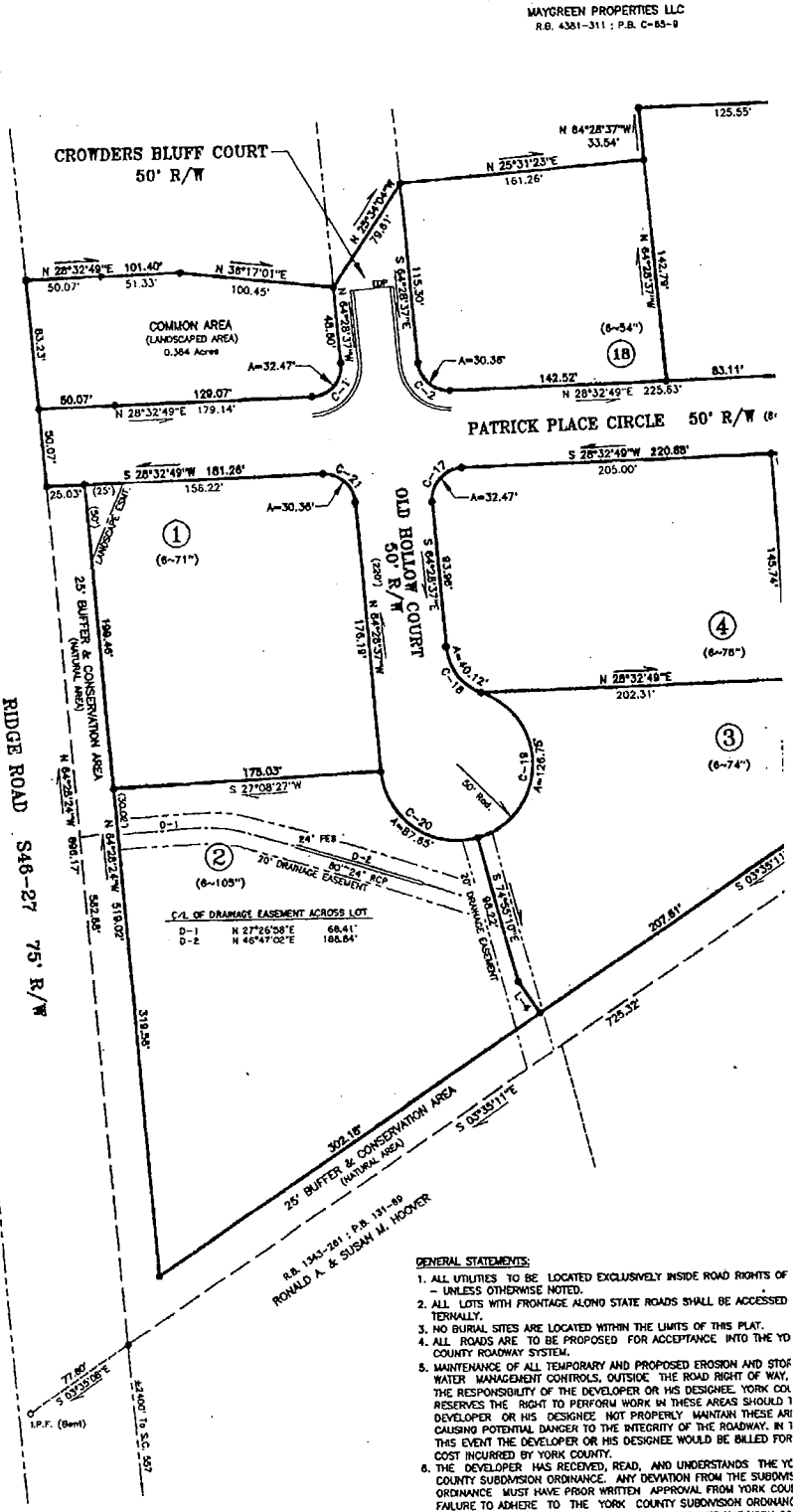
TRACT 1	- 0.791 Acres
TRACT 2	- 1.332 Acres
TRACT 3	- 0.702 Acres
TRACT 4	- 0.745 Acres
TRACT 5	- 0.839 Acres
TRACT 6	- 0.818 Acres
TRACT 7	- 0.540 Acres
TRACT 8	- 0.570 Acres
TRACT 18	- 0.511 Acres
TRACT 19	- 0.505 Acres
TRACT 20	- 0.503 Acres
TRACT 37	- 0.517 Acres
TRACT 38	- 0.594 Acres
TRACT 62	- 0.500 Acres
TRACT 63	- 0.588 Acres



**BAIRD ENGINEERING, INC.**  
 SURVEYORS • ENGINEERS • PLANNERS

3219 BAIRD ROAD  
 CLOVER, SC 29710  
 803/831-2681  
 COA No. 000391

© 2003 by Baird Engineering, Inc.



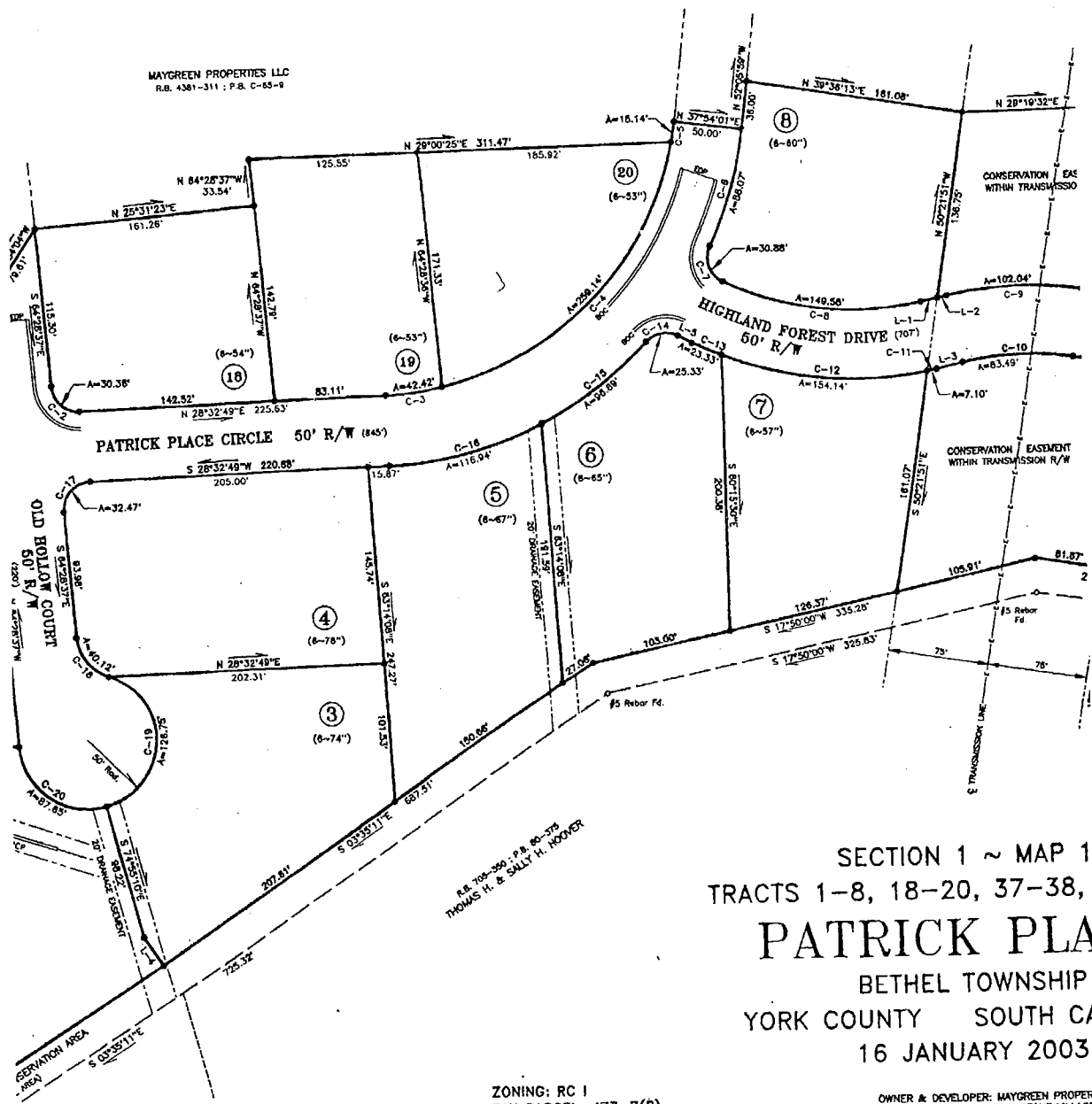
**C/L of DRAINAGE EASEMENT ACROSS LOT**

D-1	N 27°26'58"E	68.41'
D-2	N 46°47'02"E	168.64'

- GENERAL STATEMENTS:**
- ALL UTILITIES TO BE LOCATED EXCLUSIVELY INSIDE ROAD RIGHTS OF - UNLESS OTHERWISE NOTED.
  - ALL LOTS WITH FRONTAGE ALONG STATE ROADS SHALL BE ACCESSED TERRIALLY.
  - NO BURIAL SITES ARE LOCATED WITHIN THE LIMITS OF THIS PLAT.
  - ALL ROADS ARE TO BE PROPOSED FOR ACCEPTANCE INTO THE YORK COUNTY ROADWAY SYSTEM.
  - MAINTENANCE OF ALL TEMPORARY AND PROPOSED EROSION AND STOR WATER MANAGEMENT CONTROLS, OUTSIDE THE ROAD RIGHT OF WAY, THE RESPONSIBILITY OF THE DEVELOPER OR HIS DESIGNEE. YORK COU RESERVES THE RIGHT TO PERFORM WORK IN THESE AREAS SHOULD DEVELOPER OR HIS DESIGNEE NOT PROPERLY MAINTAIN THESE ARE CAUSING POTENTIAL DANGER TO THE INTEGRITY OF THE ROADWAY. IN THIS EVENT THE DEVELOPER OR HIS DESIGNEE WOULD BE BILLED FOR COST INCURRED BY YORK COUNTY.
  - THE DEVELOPER HAS RECEIVED, READ, AND UNDERSTANDS THE YORK COUNTY SUBDIVISION ORDINANCE. ANY DEVIATION FROM THE SUBDIVISION ORDINANCE MUST HAVE PRIOR WRITTEN APPROVAL FROM YORK COUNTY FAILURE TO ADHERE TO THE YORK COUNTY SUBDIVISION ORDINANCE COULD RESULT IN NONACCEPTANCE OF ROADWAYS INTO THE YORK COUNTY ROAD MAINTENANCE SYSTEM AND DENIAL OF PLAT.

*Handwritten signature: EWA @ 04*





MAYGREEN PROPERTIES LLC  
R.B. 4361-3111; P.B. C-65-9

R.B. 108-290; P.B. 80-978  
THOMAS H. & SALLY H. HOOVER

SECTION 1 ~ MAP 1  
TRACTS 1-8, 18-20, 37-38,  
**PATRICK PLACE**  
BETHEL TOWNSHIP  
YORK COUNTY SOUTH CAROLINA  
16 JANUARY 2003

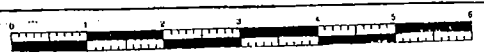
ZONING: RC I  
TAX PARCEL: 477-7(P)  
TOTAL AREA: 14.791 Acres  
AREA IN R/W: 2.619 Acres  
OLD HOLLOW CT. R/W - 0.365 Ac.  
CROWDERS BLUFF CT. - 0.121 Ac.  
PATRICK PLACE CIR. R/W - 0.970 Ac.  
HIGHLAND FOREST DR. R/W - 0.790 Ac.  
PARK TRAIL LN. R/W - 0.204 Ac.  
RESERVED 50' R/W - 0.169 Ac.  
AREA IN COMMON AREA - 0.364 Ac.  
AREA IN DUKE POWER R/W - 0.990 Ac.  
(NOT INCLUDING AREA IN ROAD R/W OR BUFFER & CONSERVATION AREA)  
AREA IN BUFFER AND CONSERVATION AREA - 1.170 Ac.  
SETBACKS: FRONT & ALONG ROAD R/W - 35'  
REAR - 25'  
SIDE - 10'  
DRAINAGE AND UTILITY EASEMENTS:  
20' ALONG ROAD R/W  
10' ALONG ALL OTHER LOT LINES

OWNER & DEVELOPER: MAYGREEN PROPERTIES  
104 STONE VILLAGE  
FORT MILL, SOUTH CAROLINA

**FINAL PLAT APPROVAL**  
The subdivision plat shown hereon has been found to comply with the York County subdivision Regulations and has been approved for recording in the office of the Clerk of Court of York County, South Carolina.  
*M. J. Scott* 2-3-03  
Date

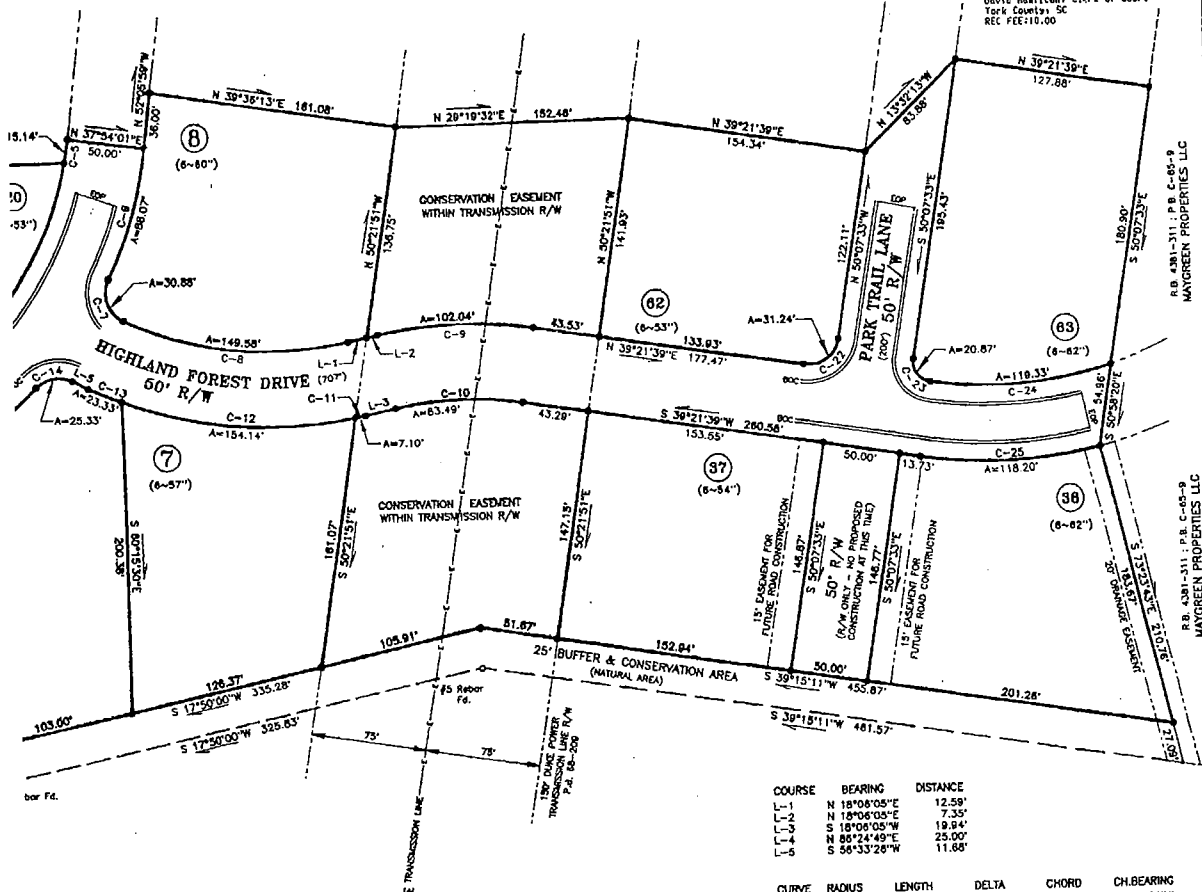
- GENERAL STATEMENTS:**
1. ALL UTILITIES TO BE LOCATED EXCLUSIVELY INSIDE ROAD RIGHTS OF WAY - UNLESS OTHERWISE NOTED.
  2. ALL LOTS WITH FRONTAGE ALONG STATE ROADS SHALL BE ACCESSED INTERNALLY.
  3. NO BURIAL SITES ARE LOCATED WITHIN THE UNITS OF THIS PLAT.
  4. ALL ROADS ARE TO BE PROPOSED FOR ACCEPTANCE INTO THE YORK COUNTY ROADWAY SYSTEM.
  5. MAINTENANCE OF ALL TEMPORARY AND PROPOSED EROSION AND STORM-WATER MANAGEMENT CONTROLS, OUTSIDE THE ROAD RIGHT OF WAY, IS THE RESPONSIBILITY OF THE DEVELOPER OR HIS DESIGNEE. YORK COUNTY RESERVES THE RIGHT TO PERFORM WORK IN THESE AREAS SHOULD THE DEVELOPER OR HIS DESIGNEE NOT PROPERLY MAINTAIN THESE AREAS CAUSING POTENTIAL DANGER TO THE INTEGRITY OF THE ROADWAY. IN THIS EVENT THE DEVELOPER OR HIS DESIGNEE WOULD BE BILLED FOR ANY COST INCURRED BY YORK COUNTY.
  6. THE DEVELOPER HAS RECEIVED, READ, AND UNDERSTANDS THE YORK COUNTY SUBDIVISION ORDINANCE. ANY DEVIATION FROM THE SUBDIVISION ORDINANCE MUST HAVE PRIOR WRITTEN APPROVAL FROM YORK COUNTY. FAILURE TO ADHERE TO THE YORK COUNTY SUBDIVISION ORDINANCE COULD RESULT IN NONACCEPTANCE OF ROADWAYS INTO THE YORK COUNTY ROAD MAINTENANCE SYSTEM AND DENIAL OF PLAT.

31-88  
M. HOOVER



MAYGREEN PROPERTIES LLC  
R.B. 4381-311; P.B. C-65-9

000107425 R1-C-113 Pg. 2  
02/03/2003 02:15:23 PM  
David Hamilton, Clerk of Court  
York County, SC  
REC FEE=10.00



SECTION 1 ~ MAP 1  
TRACTS 1-8, 18-20, 37-38, & 62-63  
**PATRICK PLACE**  
BETHEL TOWNSHIP  
YORK COUNTY SOUTH CAROLINA  
16 JANUARY 2003

OWNER & DEVELOPER: MAYGREEN PROPERTIES, LLC  
104 STONE VILLAGE DRIVE  
FORT MILL, SOUTH CAROLINA 29708

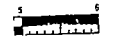
- (p) Acres
- Acres
- R/W - 0.365 Ac.
- F CT. - 0.121 Ac.
- IR, R/W - 0.970 Ac.
- T DR, R/W - 0.790 Ac.
- R/W - 0.204 Ac.
- /W - 0.169 Ac.
- EA - 0.364 Ac.
- R R/W - 0.990 Ac.
- AD R/W OR BUFFER & CONSERVATION AREA - 1.170 Ac.
- ALONG ROAD R/W - 35'

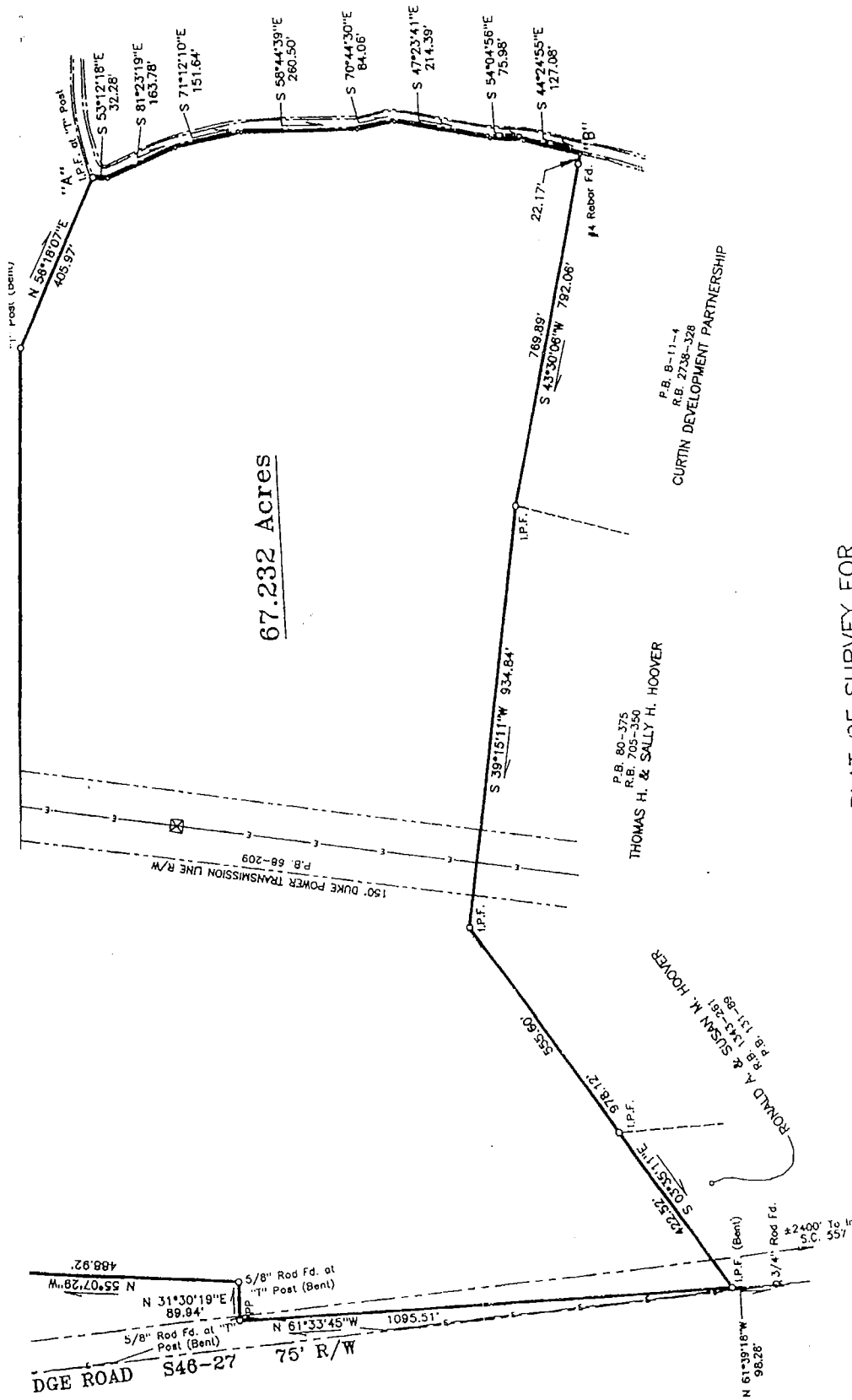
**FINAL PLAT APPROVAL**  
The subdivision plat shown hereon has been found to comply with the York County subdivision Regulations and has been approved for recording in the office of the Clerk of Court of York County, South Carolina.  
*Mike Scott*, 2-3-03  
*Zoray Adams*, Title

- NOTES**
1. REFERENCE: P.B. C-65-9, Property of Maygreen Properties LLC by Boird Engineering, Inc., dated 28 Feb 02.
  2. All corners are monumented with new #5 Rebar Pins unless noted otherwise.
  3. There is a 5' Access Easement for resurveys reserved along all property lines.
  4. All Common Areas and Buffer & Conservation areas will be maintained by the Patrick Place Homeowners Association.
  5. No Bury Pits are located in the portion of Patrick Place shown on this plat per information provided by the developer.
  6. FIRM Panel 450193 0050 B, 11/4/81 - Zone "C"
  7. No lots in this development will project into the Duke Power Transmission Line R/W. This area will be reserved as a Buffer & Conservation Area.
  8. The bench mark for this development is a nail in the intersection of S.C. 557 and Patrick Place Circle. The elevation is 671.09' and the datum is assumed.

**"BOUNDARY SURVEY"**  
I, hereby state to the best of my knowledge, information and belief, and in my professional opinion, the survey shown hereon was made in accordance with the requirements of the Minimum Standards Manual for the Practice of Land Surveying in South Carolina, and meets or exceeds the requirements for a "Class A" survey as specified therein.  
*David H. Baird*  
SOUTH CAROLINA SURVEYORS  
6488  
DAVID H. BAIRD  
C/REC. NO. 6488 CLOVER, S.C.  
JOB NO. 011101F1

EASEMENTS:  
R/W  
OTHER LOT LINES





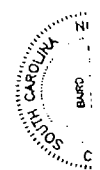
67.232 Acres

P.B. 80-375  
 R.B. 705-350  
 THOMAS H. & SALLY H. HOOVER  
  
 P.B. B-11-4  
 R.B. 2738-328  
 CURTIN DEVELOPMENT PARTNERSHIP

PLAT OF SURVEY FOR  
**MAYGREEN PROPERTIES, LLC**  
 BETHEL TOWNSHIP  
 YORK COUNTY SOUTH CAROLINA  
 28 FEBRUARY 2002



265 @ 9

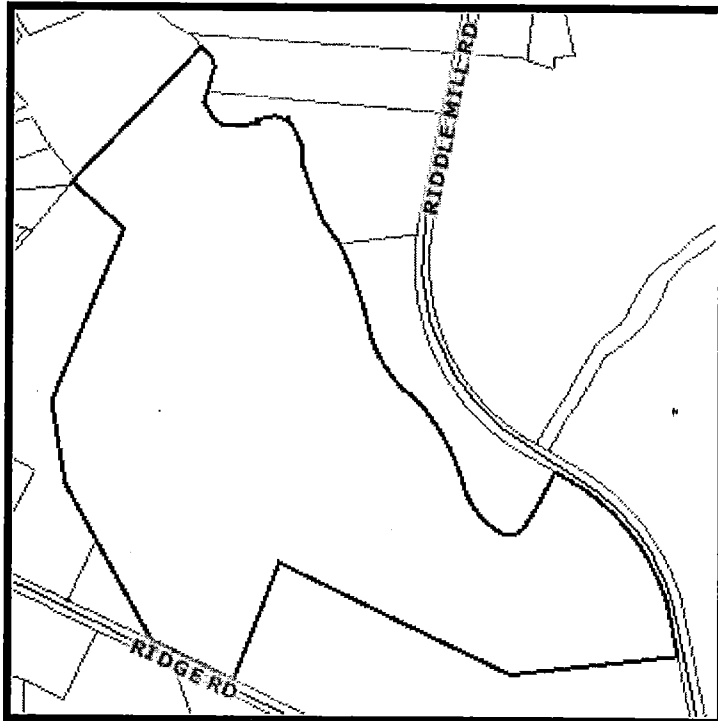


J. ENGINEERING, INC.  
 P.L.L.C.  
 P.L.L.C. ENGINEERS • PLANNERS

265 @ 9

**Property Report for Parcel Number:**  
4770000090

Inquiry Date: 1



**Owner**

**Owner Name:** KMB FAMILY LIMITED PARTNERSHIP % BELK STO SERVICES INC  
**Address:** 2801 W TYVOLA ROAD  
**City/State:** CHARLOTTE NC  
**Zip Code:** 282174500

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

**Parcel Number:** 4770000090  
**Total Lots:** 0  
**Total Acres:** 81.58  
**Deed Book:** 6975  
**Deed Book Page:** 286  
**Platt Book:** C374  
**Platt Book Page:** 8  
**School District:** 2  
**Municipality:**  
**Fire Code:** BE-I  
**Property Location:** RIDGE ROAD (81.583AC)

**Land Value:** \$856600  
**AG Use:**  
**AG Use Value:**  
**Previous Owner:** CURTIN DEV PARTNEI 477-43  
**Tax Bill Information:**  
**Zoning:**  
**Sale Price:** \$941800  
**Sale Date:** 3/29/05  
**Census Tract:**  
**Voter District:**

**Building/Structure**

**Prop. Classification:**  
**Heating Type:**  
**Living Area(Sq. Ft.):**  
**Basement:** NO  
**Bathrooms:**  
**Total Imp. Value:**

**Number of Stories:**  
**Year Built:**  
**Garage Area:** NO  
**Fireplace:**  
**Bldg. Value:** \$0

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 477-00-00-090 Legal 81.58 AC RIDGE RD

DEED

Grantor CURTIN DEVELOPMENT  
Grantee KMB FAMILY LIMITED PARTNERSHIP  
Book 5975 Page 286  
Dated 3/25/2005 Recorded 3/30/2005

1-1-2 Previous Ownership  
Corrective Deed

Grantor H EUGENE HAND Trustee A B HAND TRUST  
Grantee CURTIN DEVELOPMENT  
Book 2738 Page 328  
Dated 6/2/1999 Recorded 6/10/1999

Grantor H EUGENE HAND Trustee A B HAND TRUST  
Grantee CURTIN DEVELOPMENT  
Book 2397 Page 208  
Dated 7/2/1998 Recorded 9/16/1998

Grantor ESTATE OF A B HAND  
Grantee H EUGENE HAND Trustee A B HAND TRUST  
Book 70 Page 239  
Dated 6/8/1990 Recorded 6/14/1990

Grantor ESTATE OF LUCIELLE GARIN HAND  
Grantee A B HAND  
PROBATE 689 / 20244  
Dated 12/31/1980 Recorded 12/31/1980

Grantor J I HOVIS  
Grantee A B HAND AND LUCIELLE GARIN HAND  
Book 180 Page 321  
Dated 2/9/1952 Recorded 5/27/1952

***Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.***

**Property Report for Parcel Number:**  
4780000004

Inquiry Date:



**Owner**

**Owner Name:** RIDDLE BETTY D  
**Address:** 5830 HWY 557  
**City/State:** CLOVER SC  
**Zip Code:** 29710

Disclaimer: While every effort is made to keep information provided over time accurate and up-to-date, York County does not certify the authenticity or accuracy of such information. No warranties, express or implied, are provided for the reliability of the mapping data herein, or for their use or interpretation by the User.

**Property**

<b>Parcel Number:</b>	4780000004	<b>Land Value:</b>	\$806800
<b>Total Lots:</b>	0	<b>AG Use:</b>	
<b>Total Acres:</b>	62.06	<b>AG Use Value:</b>	
<b>Deed Book:</b>	2152	<b>Previous Owner:</b>	RIDDLE HELEN D
<b>Deed Book Page:</b>	263	<b>Tax Bill Information:</b>	
<b>Platt Book:</b>	45	<b>Zoning:</b>	
<b>Platt Book Page:</b>	77	<b>Sale Price:</b>	\$0
<b>School District:</b>	2	<b>Sale Date:</b>	3/4/98
<b>Municipality:</b>		<b>Census Tract:</b>	
<b>Fire Code:</b>	BE-I	<b>Voter District:</b>	
<b>Property Location:</b>	62.06 AC / HWY 557		

**Building/Structure**

<b>Prop. Classification:</b>		<b>Number of Stories:</b>	
<b>Heating Type:</b>		<b>Year Built:</b>	
<b>Living Area(Sq. Ft.):</b>		<b>Garage Area:</b>	NO
<b>Basement:</b>	NO	<b>Fireplace:</b>	
<b>Bathrooms:</b>		<b>Bldg. Value:</b>	\$78000
<b>Total Imp. Value:</b>			

**Assessment**

<b>Total Assessed Value:</b>	\$3745	<b>Total Market Value*:</b>	\$884800
------------------------------	--------	-----------------------------	----------

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 478-00-00-004 Legal 62.06 AC HYW 557 PLAT 45 / 77

DEED

Grantor ESTATE OF HELEN DAVIS RIDDLE  
Grantee BETTY RIDDLE  
Book 2152 Page 263  
Dated 3/3/1998 Recorded 3/4/1998

1-1-2 Previous Ownership

Grantor EMILY D LINDSAY  
Grantee HELEN D RIDDLE  
Book 475 Page 194  
Dated 11/29/1973 Recorded 12/3/1973

Grantor ESTATE OF MRS. ATWOOD H DAVIS  
Grantee HELEN H RIDDLE AND EMILY D LINDSAY  
PROBATE 507 / 17158  
Dated 12/31/1958 Recorded 11/13/1964

**Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.**



STATE OF SOUTH CAROLINA  
COUNTY OF

York

PROBATE COURT

IN THE MATTER OF

ESTATE OF HELEN DAVIS RIDDLE

CASE NUMBER

98ES4600065

DEED OF DISTRIBUTION

WHEREAS, the decedent died on the 11TH day of JANUARY, 1998; and,

WHEREAS, the estate of the decedent is being administered in the Probate Court for YORK County, South Carolina in File # 98ES4600065; and,

WHEREAS, the grantee herein is either a beneficiary or heir at law, as appropriate, of the decedent; and,

WHEREAS, the undersigned Personal Representative is the duly appointed and qualified fiduciary in this matter; and,

NOW, THEREFORE, in accordance with the laws of the State of South Carolina, the Personal Representative has granted bargained, sold and released, and by these Presents does grant, bargain, sell and release to:

Name: Betty D. Riddle  
Address: 13509 Stephendale Drive  
Charlotte, NC 28273

the following described property:

See Attached Description.

RECORDED  
TAX DEPARTMENT OFFICE  
DATE 3-14-98  
TAX MAP NO. 110-48-329-11  
INITIALS RNR/ML

RECORDED  
RECORD  
VOL 2152 PG 263  
YORK COUNTY, S.C.

RECORDED  
MAR 14 1998  
YORK COUNTY, S.C.

TOGETHER with all and singular, the Rights, Members, Hereditaments and Appurtenances to the said Premises/Property belonging, or in anywise incident or appertaining.

TO HAVE AND TO HOLD, all and singular, the said Premises/Property unto the said Betty D. Riddle, her

~~heirs~~ and assigns forever.

IN WITNESS WHEREOF, the undersigned, as Personal Representative of the estate of the decedent, has executed this Deed, this 3 day of March, 1998

SIGNED, SEALED AND DELIVERED  
IN THE PRESENCE OF

Estate of: HELEN DAVIS RIDDLE  
by Signature: Betty D. Riddle, Per. Repre.  
Betty D. Riddle, Per. Repre.

Witness: Jesse H. Plewice

Witness: WMBred

STATE OF SOUTH CAROLINA  
COUNTY OF YORK

PROBATE

PERSONALLY appeared before me the undersigned witness

\_\_\_\_\_ and made oath that he/she saw the within named  
Personal Representative(s) sign, seal, and as their act and deed, deliver the within written Deed, and that he/she with  
the other witness subscribed above witnessed the execution thereof.

SWORN to before me this 3rd day of  
March, 1998

Witness Signature: Jesse H. Plewice

WMBred  
Notary Public for South Carolina  
My Commission Expires: 3/7/98

All those pieces and parcels of land fronting on the northern side of S. C. Highway #557 and located in Bethel Township, York County, South Carolina, and having the following courses and distances, to wit:

Tract #1: Beginning at a point in S. C. Highway #557, the southwest corner of the property hereinafter described, said point being in bridge over Crowders Creek, and running along the eastern high water mark of said creek and designated by traverse as N 7-47 W 811 feet to point near Creek in property line of Lane; thence along the property line of Lane N 58-57 E 1083.4 feet to point, common corner of Johnson property; thence with property line of Johnson N 61-40 E 957.0 feet to a point; thence with another property line now or formerly of Johnson S 56-32 E 784.0 feet to a point; thence with the division line between tracts 1 and 3 on plat hereinafter described S 13-10 E 937.3 feet to point in S. C. Highway #557; thence with the following lines in said highway S 89-01 W 100 feet; S 82-58 W 100 feet; S 77-15 W 100 feet; S 71-53 W 100 feet; S 65-13 W 100 feet; S 59-45 W 100 feet; S 53-55 W 100 feet; S 50-34 W 300 feet; S 53-01 W 100 feet; S 59-49 W 100 feet; S 65-37 W 100 feet to southeast corner of tract #2 on plat hereinafter described; thence N 17-50 W 350 feet to a point; thence N 86-46 W 571.5 feet to a point; thence S 16-54 W 350 feet to point in aforesaid highway; thence with the following lines in said highway N 73-06 W 100 feet; N 77-22 W 100 feet; N 82-22 W 100 feet; N 86-43 W 100 feet; S 88-21 W 100 feet; S 85-51 W 120 feet to the beginning point. This property is designated as tract #1 and shown to contain 70.89 acres on plat of the property of Helen D. Riddle and Emily D. Lindsay as drawn by John Quinn Hall, Reg. Surveyor, dated November 15, 1973, and filed in Plat Book 45, Page 77, Office of the Clerk of Court for York County, S. C. By reference said plat is incorporated herein and made a part of the description of this property.

Tract #2: Beginning at a point in S. C. Highway No. 557, this being the southwest corner of the property hereinafter described, and running thence N 16-54 E 350 feet to a point; thence S 86-46 E 571.5 feet to a point; thence S 17-50 E 350 feet to a point in said highway; thence with the following lines in S. C. Highway #557; S 72-10 W 100 feet; S 77-36 W 100 feet; S 83-42 W 100 feet; N 89-42 W 100 feet; N 84-00 W 100 feet; N 77-47 W 100 feet; thence N 72-06 W 200 feet to the beginning point. This property is designated as tract #2 and shown to contain 6.07 acres on the plat of Helen D. Riddle and Emily D. Lindsay as drawn by John Quinn Hall, Reg. Surveyor, dated November 15, 1973, and filed in Plat Book 45, Page 77, Office of the Clerk of Court for York County, S. C. By reference said plat is incorporated herein and made a part of the description of this property.

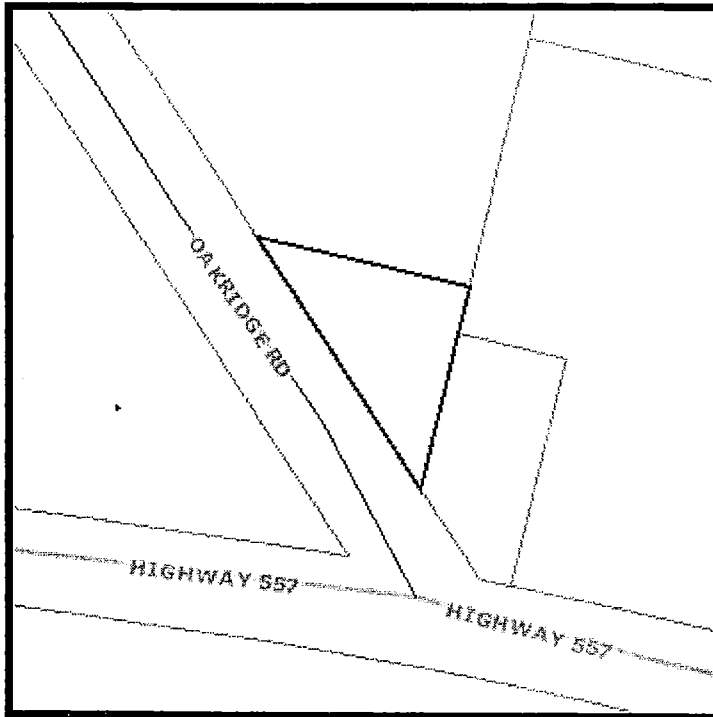
Also, all that piece, parcel of tract of land located on the south side of S. C. Highway #55 in Bethel Township, York County, South Carolina, and having the following courses and distances, to wit: Beginning at a point in S. C. Highway #55, the northwest corner of the property hereinafter described, and a common corner of Green Pond Church Cemetery, and running from said point along a line in said highway S 65-19 E 408 feet to a point, the division line between tracts 1 and 2 on plat hereinafter described thence with said division line S 23-30 W 1932.5 feet to a point; thence continuing with said division line S 62-25 W 993.8 feet to an iron; thence along Boyd property line N 82-14 W 350 feet to a point; thence S 78-16 W 39.6 feet to a point in Boyd line; thence N 14-16 E 134.5 feet to a point; thence N 32-16 E 1644.3 feet to an iron in Quinn property line; thence with Quinn line S 78 E 423.7 feet to an iron; thence with Quinn line N 6 E 639.5 feet to a rock; thence with cemetery line S 87-45 E 256.9 feet to an iron; thence with cemetery line N 3-49 E 302 feet to the beginning point. This property is designated as tract #1 and shown to contain 39.12 acres on the plat of Helen D. Riddle and Emily D. Lindsay as drawn by John Quinn Hall, Reg. Surveyor, dated November 15, 1973, and filed in Plat Book 45, Page 78, Office of the Clerk of Court for York County, S. C. By reference said plat is incorporated herein and made a part of the description of said property.

The within conveyance is made subject to any and all outstanding easements, rights of way and restrictive covenants of record, in place, visible or in the chain of title.

Derivation Clause: The above three tracts of real property were conveyed to Helen D. Riddle by deed of Emily D. Lindsay dated November 29, 1973 and recorded December 3, 1973 in Deed Book 475 at page 194, RMC Office for York County, SC. The above described real property was inherited by Betty D. Riddle through the estate of her mother, Helen Davis Riddle who died testate a resident of York County, SC, on January 11, 1998. See York County Probate Court File No. 98ES4600065.

**Property Report for Parcel Number:**  
4780000072

Inquiry Date:



**Owner**

**Owner Name:**

YORK COUNTY (RURAL DEPT)

**Address:**

**City/State:**

**Zip Code:**

0

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

**Parcel Number:** 4780000072  
**Total Lots:** 0  
**Total Acres:** 0  
**Deed Book:** 409  
**Deed Book Page:** 599  
**Platt Book:** 38  
**Platt Book Page:** 170  
**School District:** 2  
**Municipality:**  
**Fire Code:** BE-I  
**Property Location:** HWY 435

**Land Value:** \$0  
**AG Use:**  
**AG Use Value:**  
**Previous Owner:**  
**Tax Bill Information:**  
**Zoning:**  
**Sale Price:** \$0  
**Sale Date:** 0/0/0  
**Census Tract:**  
**Voter District:**

**Building/Structure**

**Prop. Classification:**  
**Heating Type:**  
**Living Area(Sq. Ft.):**  
**Basement:** NO  
**Bathrooms:**  
**Total Imp. Value:**

**Number of Stories:**  
**Year Built:**  
**Garage Area:** NO  
**Fireplace:**  
**Bldg. Value:** \$0

**Assessment**

**Total Assessed Value:** \$0

**Total Market Value\*:** \$0

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 478-00-00-072 Legal HWY 435 PLAT 38 - 170

DEED

Grantor ATWOOD H DAVIS

Grantee COUNTY OF YORK

Book 409 Page 599

Dated 11/23/1970 Recorded 11/30/1970

1-1-2 Previous Ownership

Grantor ESTATE OF W GUY DAVIS

Grantee ATWOOD H DAVIS

PROBATE 407 / 12730

Dated 12/31/1958 Recorded 12/31/1958

***Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.***

# State of South Carolina,

COUNTY OF YORK

**Know All Men by These Presents,** That I, Atwood H. Davis

FILED & RECORDED  
NOV 30 8 40 AM '79  
THAS L. CARROLL  
C. C. P. & O. S.  
YORK COUNTY, S. C.

in the State aforesaid, for in consideration of the  
sum of GIFT  
to me paid by County of York  
in the State aforesaid

have granted, bargained, sold and released, and by these presents do grant, bargain, sell and release unto the said  
County of York, its successors and assigns

ALL that certain tract of land situate in Bethel Township, County and State aforesaid and described as follows: BEGINNING at a point in center of S.C. Highway 557 said point of beginning being the southernmost corner of lot herein described and running thence N. 27-12 W. 242.7 feet to nail in cap in center of S.C. Highway S-435 thence S. 76-51 E. 159 feet to an iron; thence, with other property of Grantee, S. 13-43 W. 185 feet to point of beginning, being triangular in shape and bounded on the North by other property of Grantor, on the East by property of Grantee and on the West by S.C. Highway S-435 and a portion of S.C. Highway 557, and being more particularly described on plat of property of Bethel Volunteer Fire Dept. dated November 16, 1970, John Quinn Hall, Registered Surveyor, said plat being incorporated herein and made a part hereof for a more accurate description as if more fully set forth.

IT IS mutually agreed by and between the Grantor and the Grantee herein that in the event the above described property should at any time cease to be used as a Rural Fire Department in substantially the same manner with comparable equipment as presently utilized, then Title shall automatically revert to the Grantor, her heirs and assigns.

209 @ 599

TOGETHER with all and singular, the rights, members, hereditaments and appurtenances to the said premises belonging or in anywise incident or appertaining.

To HAVE AND TO HOLD all and singular the premises before mentioned unto the said

County of York, its Successors

~~Heirs~~ and Assigns forever.

And I do hereby bind myself, my Heirs, Executors and Administrators, to warrant and forever defend all and singular the said premises unto the said

County of York, its Successors

~~Heirs~~ and Assigns, against me and my Heirs and against every person whomsoever lawfully claiming, or to claim, the same or any part thereof.

WITNESS my Hand and Seal this 23rd day of November

in the year of our Lord one thousand nine hundred and Seventy

and in the one hundred and Ninety-Fourth

year of the Sovereignty

and Independence of the United States of America.

SIGNED, SEALED AND DELIVERED IN THE PRESENCE OF

*Andy B. McClinton*  
*Foster C. Brandon*  
*Boyd D. Johnson*

*Atwood H. Davis*  
*Atwood H. Davis* (SEAL)  
*By Mrs. Helen D. Riddle* (SEAL)

STATE OF SOUTH CAROLINA, }  
YORK COUNTY. }

PERSONALLY appeared before me Foster C. Brandon

and made oath that he saw the within-named Atwood H. Davis

sign, seal and, as her act and deed, deliver the within-written Deed for the uses and purposes therein mentioned and that he, with Boyd D. Johnson witnessed the execution thereof.

SWORN to before me this 23rd day of November, 1970

*Andy B. McClinton* (L. S.)  
Notary Public of S. C.

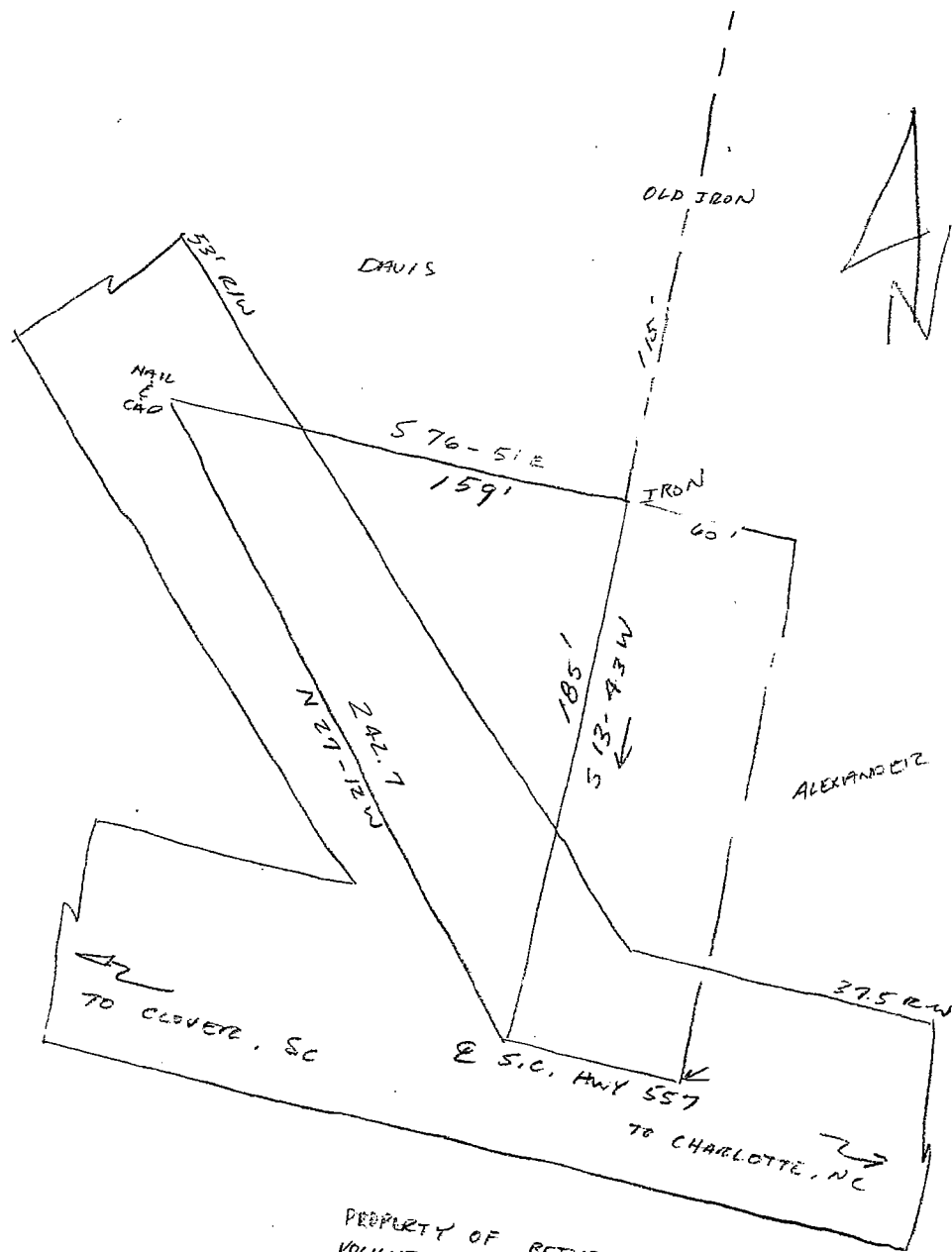
*Foster C. Brandon*

My Commission expires:

STATE OF SOUTH CAROLINA, }  
COUNTY. }

GRANTOR FEMALE  
NO RENUNCIATION OF DOWER



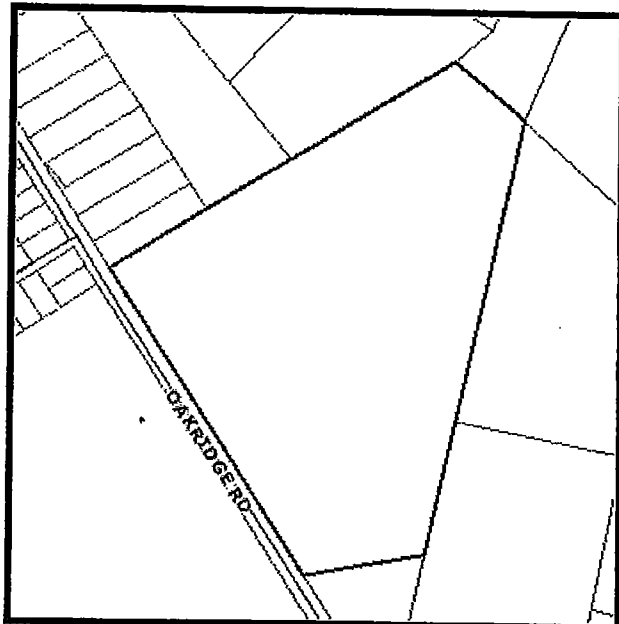


PROPERTY OF BETHEL  
VOLUNTEER FIRE DEPT

SCALE 1" = 50'

**Property Report for Parcel Number:**  
4780000098

Inquiry Date: 11/29/2009



**Owner**

**Owner Name:** CLOVER SCHOOL DISTRICT #2  
**Address:** PO BOX 99  
**City/State:** CLOVER S.C.  
**Zip Code:** 29710

Disclaimer: While every effort is made to keep information provided over the internet accurate and up-to-date, York County does not certify the authenticity or accuracy of such information. No warranties, express or implied, are provided for the records and/or mapping data herein, or for their use or interpretation by the User.

**Property**

<b>Parcel Number:</b>	4780000098	<b>Land Value:</b>	\$0
<b>Total Lots:</b>	0	<b>AG Use:</b>	
<b>Total Acres:</b>	0	<b>AG Use Value:</b>	
<b>Deed Book:</b>	7459	<b>Previous Owner:</b>	LINDSAY SARA M
<b>Deed Book Page:</b>	67	<b>Tax Bill Information:</b>	
<b>Platt Book:</b>	D32	<b>Zoning:</b>	
<b>Platt Book Page:</b>	4	<b>Sale Price:</b>	\$1500000
<b>School District:</b>	2	<b>Sale Date:</b>	10/3/05
<b>Municipality:</b>		<b>Census Tract:</b>	
<b>Fire Code:</b>	BE-I	<b>Voter District:</b>	
<b>Property Location:</b>	OAKRIDGE RD (34.45 AC)		

**Building/Structure**

<b>Prop. Classification:</b>		<b>Number of Stories:</b>	
<b>Heating Type:</b>		<b>Year Built:</b>	
<b>Living Area(Sq. Ft.):</b>		<b>Garage Area:</b>	NO
<b>Basement:</b>	NO	<b>Fireplace:</b>	
<b>Bathrooms:</b>		<b>Bldg. Value:</b>	\$0
<b>Total Imp. Value:</b>			

**Assessment**

<b>Total Assessed Value:</b>	\$0	<b>Total Market Value*:</b>	\$0
<b>Total Tax Value:</b>	\$0		

\* - This property may have been re-valued due to an Assessable Transfer of Interest

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 478-00-00-0098 Legal OAKRIDGE RD 34.45 AC

DEED

Grantor SARA M LINDSAY  
Grantee CLOVER SCHOOL DISTRICT NUMBER TWO  
Book 7459 Page 67  
Dated 9/30/2005 Recorded 10/3/2005

1-1-2 Previous Ownership

Grantor ESTATE OF EMILY D LINDSAY  
Grantee SARA M LINDSAY  
Book 1045 Page 290  
Dated 8/25/1988 Recorded 8/30/1988

Grantor HELEN D RIDDLE  
Grantee EMILY D LINDSAY  
Book 475 Page 191  
Dated 11/29/1973 Recorded 12/3/1973

Grantor ESTATE OF ATWOOD H DAVIS  
Grantee HELEN RIDDLE  
PROBATE 507 / 17158  
Dated 12/31/1958 Recorded 11/13/1964

**Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.**

3,900.00  
1,450.00

000258572  
RECORDED 10/03/2005 11:30:42AM  
Bk:07459 Pg:00067 Pages:3  
Fee:10.00 State:3900.00  
County:1650.00 Exempt:-----  
David Hamilton, Clerk of Court  
York County, SC

NO NEW LOT LINES )  
STATE OF SOUTH CAROLINA )  
 )  
COUNTY OF YORK )

RECORDED  
YORK COUNTY  
TAX ASSESSOR'S OFFICE

Haselden, Owen & Boloyan  
P.O. Box 173  
Clover, SC 29710

DATE 10-4-05  
TAX MAP NO. 478-98  
INITIALS TS / d/1

TITLE TO REAL ESTATE

**KNOW ALL MEN BY THESE PRESENTS**, That I, **Sara M. Lindsay**, in the State aforesaid, for and in consideration of the sum of One Million Five Hundred Thousand and NO/100 (\$1,500,000.00) Dollars , to me in hand paid at and before the sealing of these presents, by **Clover School District Number Two, P.O. Box 99, Clover, South Carolina, 29710.** In the State aforesaid, ( the receipt whereof is hereby acknowledged), has granted, bargained, sold and released unto **Clover School District Number Two**, its heirs, administrators and assigns forever, the following described property:

All that certain piece, parcel or tract of land lying being and situated on both sides of Oakridge Road (S46-435) in Bethel Township, York County, South Carolina, containing a total of 67.566 acres, said property being divided into a 35.497 acre tract of property on the east side of Oakridge Road and a 32.069 acre tract of property on the west side of Oakridge Road, said property being shown on plat of property of Sara M. Lindsay surveyed for Clover School District No. Two, by Joe H. Baird, PE & LS, dated July 14, 2005, said plat being recorded in Book D32, Page 4, Office of the Clerk of Court for York County, South Carolina and incorporated herein by reference.

This is the identical property described as Tract 1 in Deed of Distribution from Estate of Emily D. Lindsay to Sara M. Lindsay recorded August 30, 1988 in Record Book 1045, Page 290, Office of the Clerk of Court for York County, South Carolina.

The above described property is conveyed subject to all easements, conditions and restrictive covenants imposed upon property in the chain of title, if any, but are not intended to be reimposed hereby by reference thereto.

TOGETHER with all and singular, the rights, members, hereditaments and appurtenances to the said premises belonging or in anywise incident or appertaining.

TO HAVE AND TO HOLD all and singular the premises before mentioned unto the said **Clover School District Number Two**, its heirs, administrators and assigns, forever.

AND Grantor(s) do/does hereby bind herself and her Heirs, Representatives and Administrators, to warrant and forever defend all and singular the said premises unto the said Grantee and the Grantee's Heirs and Assigns, against the Grantor and the Grantor's Heirs and against every person whomsoever lawfully claiming, or to claim, the same or any part thereof.

WITNESS the Hand and Seal of the Grantor this 30 day of Sept in the year of our Lord two thousand five and in the two hundred and thirtieth year of the Sovereignty and Independence of the United States of America.

SIGNED, SEALED AND DELIVERED

IN THE PRESENCE OF:

*Ann C. Hague*  
*(J. H. H.)*

*Sara M. Lindsay*  
Sara M. Lindsay

307459 PG0068

STATE OF SOUTH CAROLINA )  
 )  
COUNTY OF YORK )

PROBATE

PERSONALLY APPEARED before me the undersigned witness and made oath that s/he saw the within named Grantor sign, seal and, as the Grantor's act and deed, deliver the within-written Deed for the uses and purposes therein mentioned and that s/he, with the other witness whose signature appears above, witnessed the execution thereof.

*Ann C. Hogue*

SWORN TO before me this 30

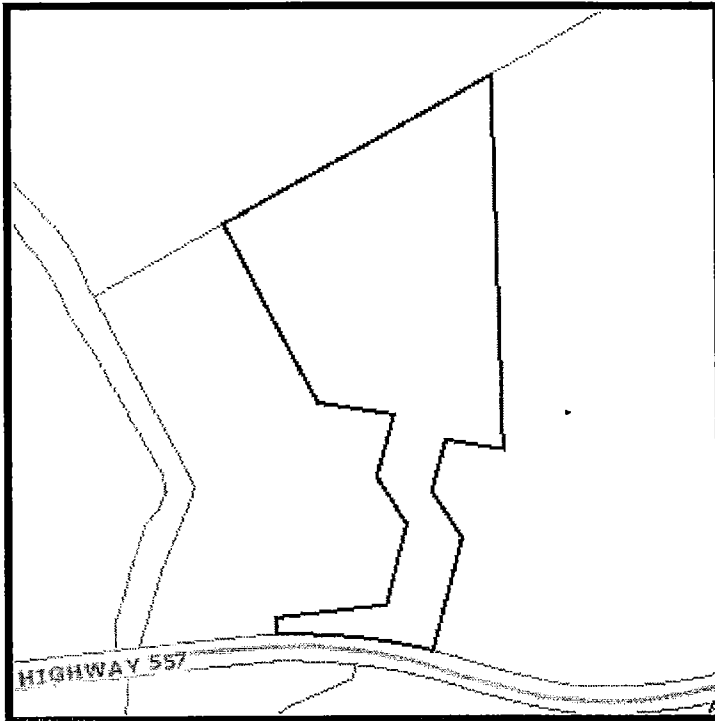
Day of September 2005.

J. H. Hill (SEAL)

Notary Public for South Carolina  
My Commission expires: 7/29/06

**Property Report for Parcel Number:**  
4780000146

Inquiry Date:



**Owner**

**Owner Name:**

FORREST JAY E & JEN  
D

**Address:**

5912 HWY 557

**City/State:**

CLOVER S C

**Zip Code:**

29710

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

**Parcel Number:** 4780000146  
**Total Lots:** 0  
**Total Acres:** 9.94  
**Deed Book:** 6810  
**Deed Book Page:** 29  
**Platt Book:** C349  
**Platt Book Page:** 6  
**School District:** 2  
**Municipality:**  
**Fire Code:** BE-I  
**Property Location:** HWY 557 (9.939AC)

**Land Value:** \$134200  
**AG Use:**  
**AG Use Value:**  
**Previous Owner:** FORREST JAY E & JEN  
**Tax Bill Information:**  
**Zoning:**  
**Sale Price:** \$1  
**Sale Date:** 1/10/05  
**Census Tract:**  
**Voter District:**

**Building/Structure**

**Prop. Classification:**  
**Heating Type:**  
**Living Area(Sq. Ft.):**  
**Basement:** NO  
**Bathrooms:**  
**Total Imp. Value:**

**Number of Stories:**  
**Year Built:**  
**Garage Area:** NO  
**Fireplace:**  
**Bldg. Value:** \$264000

**Assessment**

**Total Assessed Value:** \$11129

**Total Market Value\*:** \$398200

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 478-00-00-146 Legal 9.939 AC HWY 557 PLAT C349 / 6

DEED

Grantor BETTY RIDDLE  
Grantee JAY E FORREST AND JENNIFER D FORREST  
Book 6810 Page 29  
Dated 1/5/2005 Recorded 1/10/2005

1-1-2 Previous Ownership

Grantor ESTATE OF HELEN DAVIS RIDDLE  
Grantee BETTY RIDDLE  
Book 2152 Page 263  
Dated 3/3/1998 Recorded 3/4/1998

Grantor EMILY D LINDSAY  
Grantee HELEN D RIDDLE  
Book 475 Page 194  
Dated 11/29/1973 Recorded 12/3/1973

Grantor ESTATE OF MRS ATWOOD H DVAIS  
Grantee HELEN D RIDDLE AND EMILY D LINDSAY  
PROBATE 507 / 17158  
Dated 12/31/1958 Recorded 11/13/1964

**Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.**



After recording, please return document to:  
Carolyn W. Rogers  
HARPER & ROGERS, P.A.  
P.O. Box 229  
Rock Hill, SC 29731-6229

**RECORDED**  
**YORK COUNTY**  
**TAX ASSESSOR'S OFFICE**

000219434  
RECORDED 01/10/2005 09:41:04AM  
Bk:06810 Pg:00029 Pages:5  
Fee:10.00 State:0.00  
County:0.00 Exempt:  
Dale J. Robinson, Clerk of Court  
HARPER & ROGERS, P.A.  
P.O. Box 229  
Rock Hill, SC 29731-6229

DATE 1-10-05  
TAX MAP NO. out of 478 - 4  
INITIALS AC / JH

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

**TITLE TO REAL ESTATE**  
**(Title Not Examined)**

**KNOW ALL PERSONS BY THESE PRESENTS**, that **Betty D. Riddle** in the State aforesaid, for and in consideration of the sum of \* \* GIFT \* \* to me paid by **Jay E. Forrest and Jennifer D. Forrest** of 1570 Springpoint Road, Rock Hill, South Carolina 29732, (the receipt and sufficiency whereof is hereby acknowledged), have granted, bargained, sold and released, and by these presents do grant, bargain, sell and release unto the said **Jay E. Forrest and Jennifer D. Forrest**, their heirs and assigns, an undivided sixty-six percent (66%) interest, which constitutes all my remaining interest, in and to the following described property, to wit:

See Exhibit A attached hereto and incorporated herein by reference.

TOGETHER with all and singular, the rights, members, hereditaments and appurtenances to the said premises belonging, or in anywise incident or appertaining.

TO HAVE AND TO HOLD, all and singular the said premises before mentioned unto the said **Jay E. Forrest and Jennifer D. Forrest**, their heirs and assigns forever.

And I do hereby bind myself and my heirs, executors and administrators, to warrant and forever defend all and singular the said premises unto the said **Jay E. Forrest and Jennifer D. Forrest**, their heirs and assigns, against me and my heirs and assigns, and against all other persons whomsoever lawfully claiming,

BK 06810 PG 0029

1

or to claim, the same or any part thereof.

WITNESS my Hand and Seal this 5<sup>th</sup> day of January, in the year of our Lord two thousand five (2005) and in the two hundred and twenty-ninth year of the Sovereignty and Independence of the United States of America.

SIGNED, SEALED AND DELIVERED  
IN THE PRESENCE OF:

Jackie S. Johnson

Betty D. Riddle  
Betty D. Riddle

Carolyn W. Rogers

THE STATE OF SOUTH CAROLINA )  
COUNTY OF YORK )

PERSONALLY APPEARED before me the undersigned and made oath that (s)he saw the within named Betty D. Riddle sign, seal, and as her act and deed deliver the within written Deed; and that (s)he with Carolyn W. Rogers, witnessed the execution thereof.

Jackie S. Johnson

SWORN to before me this 5<sup>th</sup>  
day of January, 2005.

Carolyn W. Rogers (L.S.)  
Notary Public for South Carolina  
Commission Expires: 3-12-14

EXHIBIT A

All that certain piece, parcel or lot of land lying, being and situate on the northern side of S. C. Highway 557 in Bethel Township, York County, South Carolina, and being shown as 9.939 acres on a plat entitled "Plat of Survey for Jay E. & Jennifer D. Forrest", prepared by Baird Engineering, Inc., dated 29 November 2004, recorded December 30, 2004, in Plat Book C349, at page 6, and being more particularly described according to said plat, as follows: BEGINNING at a n iron pin set on the northern edge of the right of way for S. C. Highway 557 and running thence N 00 57 08 E 50.00 feet to an iron pin set; then running S 83 26 22 E 262.04 feet to an iron pin set; then running N 14 59 56 E 201.29 to an iron pin set; then N 32 47 25 W 135.97 feet to an iron pin set; then N 15 44 01 E 158.31 to an iron pin set; then N 80 54 03 W 182.79 feet to an iron pin set; then N 27 49 40 W 484.17 feet to an iron pin set 5 feet from old property line; then N 56 57 21 E 739.90 feet to a new property corner 5 feet from old property line which point is S 56 58 35 W 416.61 feet from a 1/2 inch pipe found on old corner; then S 01 32 58 E 899.00 feet from new property corner to an iron pin set; then N 80 54 03 W 140.38 feet to an iron pin set; then S 15 44 01 W 128.85 feet to an iron pin set; then S 32 47 25 E 135.27 to an iron pin set; then S 14 59 56 W 291.85 feet to an iron pin set on the right of way for S. C. Highway 557; then turning and running with the right of way for S. C. Highway 557 N 75 57 24 W 124.71 feet to an iron pin set; then running in a counter-clockwise curving direction N 83 26 22 W 225.05 feet (Rad.: 1240.28'; Tan.: 112.99'; Len.: 225.36'; Delta: 10-24-39) to the point of beginning.

DERIVATION: Being a portion of the property inherited by Betty D. Riddle from the Estate of Helen Davis Riddle, Probate Court Case File No. 98ES4600065, as shown by the deed of distribution dated March 3, 1998, recorded March 4, 1998, in Record Book 2152, at page 263, Office of the Clerk of Court for York County, SC.

Tax Map Number: a portion of TMS 478-00-00-004.

The within described property is conveyed subject to a reservation by Grantor for herself and her heirs, successors and assigns, of a perpetual easement for access as shown on the above referenced plat, which easement shall run with the land, together with other existing easements, and to restrictive covenants, if any, appearing in the chain of title or apparent upon a reasonable inspection of the premises, which said restrictions, if any, are not intended to be reimposed hereby.

BK06810 PG0031

STATE OF SOUTH CAROLINA )  
 )  
COUNTY OF YORK )

AFFIDAVIT

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 is located at 5830 Highway 57, Clover, South Carolina, bearing York County Tax Map Number portion of 478-00-00-004, was transferred by Betty D. Riddle to Jay E. Forrest and Jennifer D. Forrest on January 5, 2005.
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) X exempt from the deed recording fee because (See information section of affidavit):  
#4 (If exempt, please skip items 4-7, and go to item 8 on this affidavit.)
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 X 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. If "Yes," the amount of the outstanding balance of this lien or encumbrance is: \_\_\_\_\_  
\_\_\_\_\_.

BK06810 PG0032

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: -0-.

8. As required by Code Section 12-24-70, I state that I am a responsible person who was connected with the transaction as: deed preparer.

9. I understand that a person required to furnish this affidavit who wilfully 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.

Responsible Person Connected with the Transaction

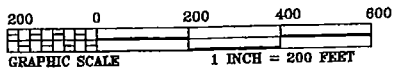
SWORN to before me this 5<sup>th</sup>  
day of January, 2005.

Carolyn W. Rogers  
Carolyn W. Rogers

Jacqueline S. Johnson  
Notary Public for SC  
My Commission Expires: 06-11

"OFFICIAL SEAL"  
Jacqueline S. Johnson  
Notary Public  
State of South Carolina  
Comm. Exp. 06-06-2011

SK06811 PG0033



All Corners Are #5 Rebar  
Unless Otherwise Noted.  
I.P.F. - Found; L.P.S. - Set

000218321 BK: 0349 PG: 6  
12/30/2004 02:37:04PM  
David Hamilton, Clerk of Court  
York County, SC  
REC FEE:10.00

THE CROWDERS CREEK CO.  
R.B. 284-308

1/2" Pipe Fd. - Old Corner  
5' on line from new  
Property Corner

BETTY D. RIDDLE  
R.B. 2135-263; P.B. 45-77  
TAX PARCEL 478-4

L.P.S. on old P/L  
5' on line from new  
Property Corner

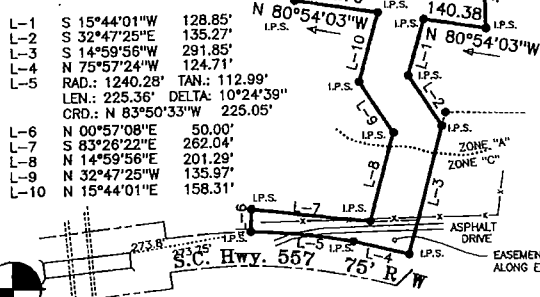
9.939 Acres  
TAX PARCEL 478-4(P)

PLAT OF SURVEY FOR  
**Jay E. & Jennifer D. Forrest**  
BETHEL TOWNSHIP  
YORK COUNTY SOUTH CAROLINA  
29 NOVEMBER 2004

PLAT APPROVED

This plat is approved for recording in the office  
of the Clerk of Court of York County, South  
Carolina, Subdivision and Zoning Code of York  
County, Section 155.428, Subdivision #  
COMMISSION AGENT MCB DATE 12-6-04  
\*This lot(s) subject to tree Ordinance.

FIRM Panel 450193 0050 B, 4 Nov 81.  
Zones as shown on plot.



**BAIRD ENGINEERING, INC.**  
SURVEYORS • ENGINEERS • PLANNERS  
3219 BAIRD ROAD  
CLOVER, SC 29710  
803/831-2661  
COA No. 000391

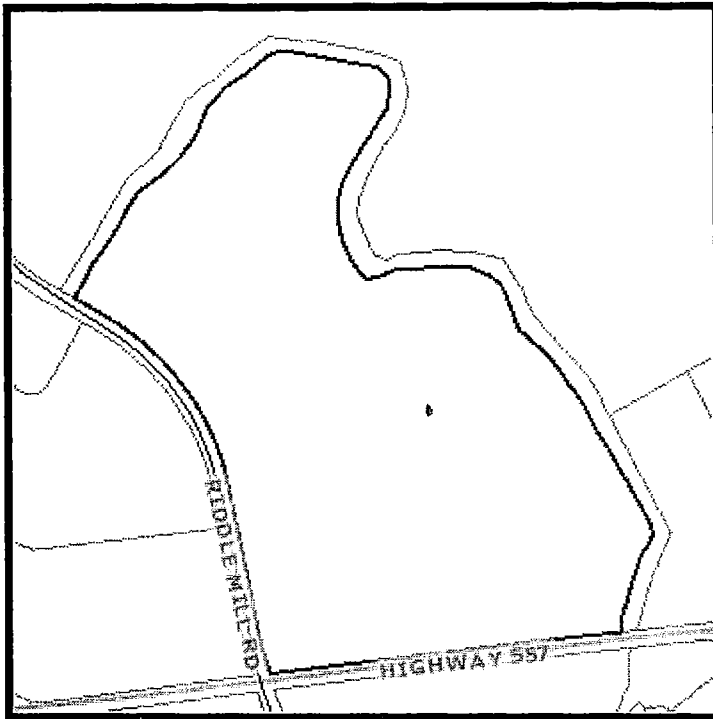
"BOUNDARY SURVEY"  
I hereby state to the best of my knowledge,  
information and belief, and in my professional  
opinion, the survey shown hereon was made in  
accordance with the requirements of the  
"Minimum Standards Manual for the Practice of  
Land Surveying in South Carolina", and meets  
or exceeds the requirements for a "Class A"  
survey as specified therein.  
*Joe H. Baird*  
S.C. REG. NO. 6488 CLOVER, S.C.  
F.B. file JOB No. 041027

*0349 @ 6*

**Property Report for Parcel Number:**

4780000148

Inquiry Date:



**Owner**

**Owner Name:** KMB FAMILY LIMITED PARTNERSHIP % BELK STORE SERVICES INC  
**Address:** 2801 WEST TYVOLA ROAD  
**City/State:** CHARLOTTE NC  
**Zip Code:** 282174500

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

<b>Parcel Number:</b>	4780000148	<b>Land Value:</b>	\$928700
<b>Total Lots:</b>	0	<b>AG Use:</b>	
<b>Total Acres:</b>	68.79	<b>AG Use Value:</b>	
<b>Deed Book:</b>	7035	<b>Previous Owner:</b>	THE CROWDERS CK C 6,84,5
<b>Deed Book Page:</b>	47	<b>Tax Bill Information:</b>	
<b>Platt Book:</b>	C381	<b>Zoning:</b>	
<b>Platt Book Page:</b>	1	<b>Sale Price:</b>	\$2558002
<b>School District:</b>	2	<b>Sale Date:</b>	4/22/05
<b>Municipality:</b>		<b>Census Tract:</b>	
<b>Fire Code:</b>	BE-I	<b>Voter District:</b>	
<b>Property Location:</b>	TR A (68.789AC) RIDDLE MILL RD		

**Building/Structure**

<b>Prop. Classification:</b>		<b>Number of Stories:</b>	
<b>Heating Type:</b>		<b>Year Built:</b>	
<b>Living Area(Sq. Ft.):</b>		<b>Garage Area:</b>	NO
<b>Basement:</b>	NO	<b>Fireplace:</b>	
<b>Bathrooms:</b>		<b>Bldg. Value:</b>	\$0
<b>Total Imp. Value:</b>			

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 478-00-00-148 Legal TR 1 68.789 AC RIDDLE MILL RD PLAT C381 / 001

DEED

Grantor THE CROWDERS CREEK COMPANY dba CROWDERS CREEK COMPANY

Grantee KMB EQUITY LIMITED PARTNERSHIP

Book 7035 Page 47

Dated 4/20/2005 Recorded 4/23/2005

1-1-2 Previous Ownership

Grantor L J L PARTNERSHIP (49.67 AC)

Grantee CROWDERS CREEK COMPANY

Book 133 Page 164

Dated 9/27/1990 Recorded 10/1/1990

Grantor CRESCENT RESOURCES INC (49.67 AC)

Grantee L J L PARTNERSHIP

Book 133 Page 160

Dated 9/27/1990 Recorded 10/1/1990

Grantor DUKE POWER COMPANY

Grantee CRESCENT RESOURCES INC (49.67 AC)

Book 397 Page 361

Dated 5/1/1969 Recorded 12/22/1969



Grantor	WATEREE POWER COMPANY		
Grantee	R D RIDDLE		
Book	65	Page	570
Dated	4/6/1929	Recorded	4/6/1929

Grantor	A B HAND TRUST (22.98 AC)		
Grantee	CROWDERS CREEK COMPANY		
Book	451	Page	1
Dated	4/24/1992	Recorded	5/1/1992

Grantor	ESTATE OF A B HAND		
Grantee	H EUGENE HAND Trustee A B HAND TRUST		
Book	70	Page	239
Dated	6/8/1990	Recorded	6/14/1990

Grantor	MARGARET GREY TINGEN		
Grantee	A BRYAN HAND AND LUCEILLE GARIN HAND		
Book	154	Page	186
Dated	1/23/1950	Recorded	1/23/1950

**Disclaimer:** The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.



**Tax Map Numbers 478-00-00-005, 478-00-00-006, 478-00-00-084 and 478-00-00-137**

The above-described property is conveyed subject to the following exceptions:

1. Ad valorem real property taxes for 2005 and subsequent years.
2. Restrictions appearing of record in a Deed recorded in Book 397 at Page 361 in the Office of the Clerk of Court for York County (the "Clerk's Office").
3. Right of way easement to that portion of the above-described property within the rights of way of Riddle Mill Road and S.C. Hwy. 557, as shown on a plat entitled "Plat of 'ALTA/ACSM Land Title Survey' for KMB Family Limited Partnership" (the "Survey"), drawn by Baird Engineering, Inc., dated March 18, 2005 and recorded in Plat Book C-381 at Page 1 in the Clerk's Office.
4. Rights of others thereto entitled in and to the continued uninterrupted flow of the branches located on the above-described property, as shown on the Survey.
5. The following matters shown on the Survey: (a) electric lines and (b) Lake Wylie and Catawba River Buffer.

TOGETHER with all and singular, the rights, members, hereditaments and appurtenances to the said premises belonging or in anywise incident or appertaining.

TO HAVE AND TO HOLD all and singular the premises before mentioned unto the said Grantee, its successors and assigns, forever.

AND Grantor does hereby bind itself and its successors and assigns to warrant and forever defend all and singular the said premises unto the said Grantee, its Successors and Assigns, against the Grantor and the Grantor's Successors and against every person whomsoever lawfully claiming, or to claim, the same or any part thereof.

WITNESS the Hand and Seal of the Grantor this 20th day of April, in the year of our Lord two thousand five and in the two hundred and twenty-ninth year of the Sovereignty and Independence of the United States of America.

BK 07035 PG 0048

SIGNED, SEALED AND DELIVERED

IN THE PRESENCE OF:

*She D Lane*  
Witness #1

*Ann C. Hogue*  
Witness #2

The Crowders Creek Company,  
a/k/a Crowders Creek Company  
a South Carolina General Partnership  
(SEAL)

By: *Alford Haselden* (SEAL)  
Alford Haselden,  
Duly Authorized General Partner

*Frank C. Falls* (SEAL)  
Frank C. Falls  
Duly Authorized General Partner

STATE OF SOUTH CAROLINA )  
  )  
COUNTY OF YORK              )

PROBATE

PERSONALLY APPEARED before me the undersigned witness and made oath that s/he saw the within named Grantor sign, seal, by and through Alford Haselden and Frank C. Falls, each a duly authorized general partner of Grantor, and, as the Grantor's act and deed, deliver the within-written Title to Real Estate for the uses and purposes therein mentioned and that s/he, with the other witness whose signature appears above, witnessed the execution thereof.

SWORN TO before me this 20th  
Day of April, 2005.

*She D Lane* (SEAL)

*Ann C. Hogue*  
Witness #2

BK07035 PG0049

EXHIBIT A

LEGAL DESCRIPTION

All those certain pieces, parcels or tracts of land lying, being and situate in Bethel Township, York County, South Carolina, as shown as "A", containing approximately 68.789 acres, and "B", containing approximately 153.646 acres, containing in the aggregate approximately 222.435 acres, on a plat entitled "Plat of 'ALTA/ACSM Land Title Survey' for KMB Family Limited Partnership", drawn by Baird Engineering, Inc., dated March 18, 2005 and recorded April 19, 2005 in Plat Book C-381 at Page 1 in the Office of the Clerk of Court for York County, and being more particularly described as follows:

TRACT A

Beginning at a spike found under the pavement in the intersection of the centerlines of S.C. 557 and Riddle Mill Road (S46-152), said point also being N 86°31'02"E, 900.13 feet from SCGS monument "557 27"; Thence following the center of Riddle Mill Road N 12°17'07"W, 624.28 feet to a nail found; Thence N 12°12'58"W, 175.01 feet to a spike found; Thence along a curve to the left having a radius of 949.55 feet and an arc length of 732.81 feet, being subtended by a chord of N 34°19'12"W, 714.76 feet to a spike found; Thence N 56°25'44"W for a distance of 110.22 feet to a nail found in the bridge over Crowders Creek and in the center of a 150 foot right-of-way of Riddle Mill Road; Thence leaving said road and running within the aforesaid right of way to a point on the top of the bank on the southern side of Crowders Creek N 30°45'04"E, 63.35 feet; Thence following lines to points along the top of the bank on the southern side of Crowders Creek N 26°29'32"E, 92.39 feet; N 36°09'53"E, 97.98 feet; N 31°57'29"E, 65.42 feet; N 28°05'00"E, 105.82 feet; N 33°22'51"E, 76.06 feet; N 55°19'33"E, 67.37 feet; N 52°46'18"E, 54.26 feet; N 46°05'25"E, 93.05 feet; N 34°44'22"E, 106.25 feet; N 22°22'27"E, 112.88 feet; N 41°54'46"E, 112.74 feet; N 56°43'03"E, 105.44 feet; N 49°51'51"E, 55.24 feet; N 51°45'25"E, 54.94 feet; N 70°32'19"E, 43.67 feet; S 88°03'37"E, 47.63 feet; S 81°10'16"E, 59.20 feet; S 78°52'21"E, 88.41 feet; S 79°25'25"E, 70.26 feet; S 80°31'47"E, 132.12 feet; S 41°07'21"E, 69.63 feet; S 03°26'59"E, 36.52 feet; S 10°25'42"W, 79.27 feet; S 34°16'52"W, 56.70 feet; S 31°07'51"W, 85.33 feet; S 32°43'37"W, 101.35 feet; S 26°25'43"W, 100.50 feet; S 09°13'03"W, 8.94 feet; S 21°35'09"W, 30.67 feet; S 05°13'24"W, 71.44 feet; S 04°34'48"E, 58.41 feet; S 13°06'02"E, 65.12 feet; S 23°55'12"E, 78.44 feet; S 31°47'00"E, 53.52 feet; S 42°05'08"E, 45.83 feet; N 76°22'53"E, 63.08 feet; N 66°29'03"E, 68.76 feet; S 80°11'34"E, 30.53 feet; N 84°07'10"E, 84.81 feet; N 89°24'07"E, 168.90 feet; S 63°18'42"E, 29.87 feet; S 68°24'25"E, 54.81 feet; S 51°32'07"E, 54.24 feet; S 27°02'37"E, 39.00 feet; S 20°01'08"E, 153.98 feet; S 48°52'18"E, 96.11 feet; S 48°40'47"E, 59.37 feet; S 37°28'50"E, 77.44 feet; S 32°40'06"E, 52.27 feet; S 40°58'05"E, 44.28 feet; S 34°37'17"E, 56.82 feet; S 26°52'23"E, 46.13 feet; S 26°21'59"E, 63.23 feet; S 32°37'13"E, 52.21 feet; S 33°28'31"E, 40.59 feet; S 29°47'36"E, 53.69 feet; S 29°23'24"E, 43.29 feet; S 31°54'52"E, 49.60 feet; S 25°15'51"E, 41.70 feet; S 30°37'50"E, 50.56 feet; S 19°29'35"E, 42.00 feet; S 12°58'51"E, 44.12 feet; S 21°43'55"W, 45.52 feet; S 37°24'23"W, 51.35 feet; S 18°49'41"W, 53.87 feet; S 18°09'30"W, 69.34 feet; S 14°10'26"W, 65.30 feet; S 20°28'08"W, 52.32 feet; S 03°25'55"W, 52.26 feet; thence S 03°25'55"W, 22.77 feet to a point in a bridge and in the center of the 150' right-of-way of S.C. 557; thence with the center of

S.C. 557 S 83°25'46"W, 1470.23 feet to a spike found at the point of beginning, being 68.789 acres.

TRACT B

Beginning at a nail set in the bridge over Crowders Creek and in the center of the 150 foot right-of-way of Riddle Mill Road, said nail being N 06°50'34"E, 1531.92 feet from SCGS monument "557 27", and also N 56°25'44"W, 61.52 feet from the nail found in said bridge on tract A, Thence with the center of Riddle Mill Road N 57°28'44"W, 152.16 feet to a nail set, Thence along a curve to the right having a radius of 954.93 feet and an arc length of 1155.51 feet, being subtended by a chord N 22°48'48"W, 1086.29 feet to a nail set; Thence N 11°51'07"E, 742.61 feet to a spike found, thence leaving said road and running with the line of Haselden, Owen & Boloyan S 85°06'56"E, 300.51 feet to a #5 rebar found, crossing a #5 rebar set on line at 33.66 feet; Thence along with the following four lines of Warren J. Pernick (now or formerly): (1) S 83°06'56"E, 127.39 feet to a #5 rebar found; (2) N 06°29'20"E, 45.00 feet to a #5 rebar found; (3) Thence N 75°58'13"E, 107.99 feet to a #5 rebar found; and (4) N 14°02'38"W, 177.02 feet to a #5 rebar found; Thence with the following two lines of Jeffrey A. & Kattie R. Pernick (now or formerly): (1) N 75°56'07"E, 917.70 feet to a #5 rebar found, crossing a #5 rebar found at 728.97 feet, and a bent 3/4" pipe found at 812.73 feet; and (2) N 75°40'42"E, 1127.43 feet to a #5 rebar found; Thence with the following two lines of Dewitt & Sarah H. Marr (now or formerly): (1) N 75°40'42"E, 216.59 feet to a 1/2" pipe found; and (2) N 75°50'05"E, 454.73 feet to a #5 rebar set on line, said #5 rebar being S 75-50-05 W 108.59 feet from a 5/8" bent rod found; Thence along the line of LJI Partnership (now or formerly) S 16°47'42"W, 70.35 feet to a #5 rebar found with stones; Thence along with the following three lines of Bessie J. Johnson (now or formerly): (1) S 16°47'42"W, 1400.59 feet to a #8 rebar found; (2) S 85°09'37"E, 763.16 feet to a bent #4 rebar found; and (3) S 22°53'29"E, 930.73 feet to a 1/2" pipe found; Thence along with the following two lines of Betty D. Riddle (now or formerly): (1) S 56°58'39"W, 416.55 feet to a 1/2" pipe found; and (2) S 57°00'39"W, 1096.80 feet to a point on the top of the northern bank of Crowders Creek, crossing a #5 rebar found on line at 742.08 feet, and a #5 rebar set at 1076.79 feet; thence following lines to points along the top of the northern bank of Crowders Creek N 31°31'09"W, 19.76 feet; N 24°55'03"W, 89.34 feet; N 34°21'23"W, 71.81 feet; N 42°37'03"W, 107.76 feet; N 43°05'55"W, 100.02 feet; N 39°44'08"W, 128.22 feet; N 20°26'04"W, 88.93 feet; N 32°46'41"W, 77.65 feet; N 29°35'48"W, 64.75 feet; N 77°55'23"W, 114.47 feet; N 86°04'37"W, 122.17 feet; S 86°53'20"W, 105.98 feet; S 81°04'50"W, 80.60 feet; S 65°40'18"W, 44.37 feet; N 66°01'13"W, 51.33 feet; N 24°23'17"W, 91.77 feet; N 20°28'27"W, 84.44 feet; N 11°30'53"E, 70.68 feet; N 21°02'27"E, 91.54 feet; N 26°48'35"E, 64.44 feet; N 30°33'39"E, 76.73 feet; N 37°53'28"E, 68.26 feet; N 20°33'54"E, 25.85 feet; N 27°48'52"E, 57.59 feet; N 11°39'58"E, 79.00 feet; N 13°48'23"W, 78.90 feet; N 23°39'04"W, 48.64 feet; N 71°17'28"W, 64.07 feet; N 75°51'41"W, 108.90 feet; N 79°48'40"W, 82.60 feet; N 76°27'15"W, 94.07 feet; S 81°54'52"W, 41.62 feet; N 80°45'57"W, 65.43 feet; S 83°08'38"W, 68.07 feet; S 58°52'07"W, 54.05 feet; S 56°08'09"W, 84.31 feet; S 48°14'41"W, 82.86 feet; S 47°36'18"W, 43.97 feet; S 56°48'17"W, 76.00 feet; S 47°28'58"W, 72.43 feet; S 32°21'54"W, 72.31 feet; S 29°24'14"W, 91.07 feet; S 24°58'22"W, 48.19 feet; S 36°55'27"W, 42.97 feet; S 51°41'08"W, 75.97 feet; S 44°16'35"W, 70.52 feet; S 30°16'19"W, 75.37 feet; S 30°40'48"W, 138.71 feet;

S 20°25'03"W, 22.12 feet; S 32°51'27"W, 99.38 feet; S 30°52'21"W, 80.43 feet;  
S 30°52'21"W, 91.65 feet to a nail set at the beginning, being 153.646 acres.

Being the all of the property conveyed by (i) L.J.L. Partnership, Robert C. Lane and Jacqueline M. Lane to The Crowders Creek Company by instrument recorded in Book 109 at Page 86 in the Office of the Clerk of Court of York County (the "Clerk's Office"), (ii) Robert C. Lane and Jacquelyn M. Lane to Crowders Creek Company by instrument recorded in Book 284 at Page 306 in the Clerk's Office, (iii) James D. Lane, Carolyn B. Lane, Russell E. Jones and Leila J. Jones to The Crowders Creek Company by instrument recorded in Book 284 at Page 309 in the Clerk's Office, and (iv) by H. Eugene Hand, Trustee for the A.B. Hand Trust pursuant to the Last Will and Testament of A.B. Hand to The Crowders Creek Company by instrument recorded in Book 452 at Page 1 in the Clerk's Office, and being a portion of the property conveyed by L.J.L. Partnership to Crowders Creek Company by instrument recorded in Book 133 at Page 164 in the Clerk's Office.

CHAR2\846858v7

BK 07035<sup>3</sup> PG 052

STATE OF SOUTH CAROLINA )  
COUNTY OF YORK )

AFFIDAVIT

PERSONALLY appeared before me the undersigned, who being duly sworn, depose and say:

1. We have read the information on this affidavit and we understand such information.
2. The property being transferred is approximately 222 acres east of Riddle Mill Road in York County, South Carolina having Tax Map Numbers 478-00-00-005, 478-00-00-006, 478-00-00-084 and 478-00-00-137 was transferred by The Crowders Creek Company a/k/a Crowders Creek Company, a South Carolina general partnership, to KMB Family Limited Partnership, a North Carolina limited partnership on April 21, 2005.
3. Check one of the following: The deed is
  - (a)  X  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): \_\_\_\_\_ (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)  X  The fee is computed on the consideration paid or to be paid in money or money's worth in the amount of \$2,558,002.50.
  - (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  X  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. If "Yes," the amount of the outstanding balance of this lien or encumbrance is: N/A.



- 6. The deed recording fee is computed as follows:
  - (a) Place the amount listed in item 4 above here: \$2,558,002.50
  - (b) Place the amount listed in item 5 above here: 0.00  
(If no amount is listed, place zero here.)
  - (c) Subtract Line 6(b) from Line 6(a) and place result here: \$2,558,002.50

7. The deed recording fee due is based on the amount listed on Line 6(c) above and the deed recording fee due is: \$9,466.45.

8. As required by Code Section 12-24-70, we are the responsible duly authorized general partners who were connected with the transaction.

9. We 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.

THE CROWDERS CREEK COMPANY a/k/a  
CROWDERS CREEK COMPANY, a South  
Carolina general partnership [SEAL]

By: *Alford Haselden* [SEAL]  
Name: Alford Haselden  
Title: Duly Authorized General Partner

By: *Frank C. Falls* [SEAL]  
Name: Frank C. Falls  
Title: Duly Authorized General Partner

SWORN to before me this 20<sup>th</sup>  
day of April, 2005.

*Joe D. Lane*  
Notary Public for SC  
My Commission Expires 2/2/14

[NOTARIAL SEAL]

**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



**LEGAL DESCRIPTION**

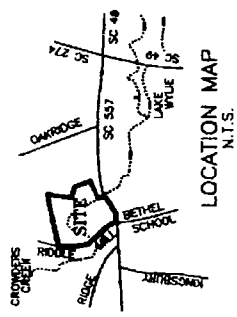
All those certain places, parcels of land lying, being and situate in Bethel Township, York County, South Carolina, as shown and described as two tracts of land with a total of 222.435 acres on a plot entitled "Plat of 'ALTA/ACSM Land Title Survey' for KMB Family Limited Partnership", drawn by Baird Engineering, Inc., dated March 18, 2005, and being more particularly described as follows:

**TRACT A**

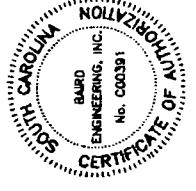
Beginning at a spike found under the pavement at the intersection of the centerlines of S.C. 557 and Riddle Mill Road (S48-152), solid point ultra leveling N 86°31'02"E, 900.13 feet from SCGS monument 557 27"; thence following the center of Riddle Mill Road N 12°17'07"W, 624.28 feet to a nail found; thence N 12°12'58"W, 175.01 feet to a spike found; thence along a curve to the left having a radius of 949.55 feet and an arc length of 732.81 feet, being subtended by an chord of N 34°19'12"W, 714.76 feet to a spike found; thence N 56°25'44"W for a distance of 110.22 feet to a nail found in the bridge over Crowders Creek and in the center of a 150 foot right-of-way of Riddle Mill Road; thence leaving said road and running within the forecasted right of way to a point on the top of the bank on the southern side of Crowders Creek N 30°45'04"E, 63.35 feet; thence following lines to points along the southern side of Crowders Creek N 26°29'32"E, 92.38 feet; N 36°09'53"E, 97.98 feet; N 31°57'29"E, 65.42 feet; N 28°05'00"E, 105.92 feet; N 33°22'51"E, 112.80 feet; N 41°54'40"E, 112.74 feet; N 56°43'03"E, 67.37 feet; N 52°46'18"E, 54.25 feet; N 46°05'25"E, 93.05 feet; N 33°44'22"E, 106.25 feet; N 31°02'19"E, 69.63 feet; S 03°26'59"E, 36.32 feet; S 21°35'09"W, 30.67 feet; S 78°52'21"E, 105.44 feet; N 49°51'51"E, 55.24 feet; N 80°31'47"E, 30.12 feet; S 41°07'21"E, 69.63 feet; S 03°26'59"E, 36.32 feet; S 21°35'09"W, 30.67 feet; S 34°16'52"W, 71.44 feet; S 31°07'51"W, 85.33 feet; S 13°06'02"E, 65.12 feet; S 26°55'12"E, 78.44 feet; S 31°47'00"E, 53.52 feet; S 42°05'08"E, 45.83 feet; S 05°11'32"W, 71.44 feet; S 04°34'48"E, 58.43 feet; S 80°11'34"E, 30.53 feet; S 64°07'10"E, 64.88 feet; N 89°24'07"E, 168.90 feet; S 63°18'42"E, 29.87 feet; S 68°22'53"E, 63.03 feet; S 11°32'07"E, 54.24 feet; S 27°02'37"E, 38.00 feet; S 29°01'08"E, 153.98 feet; S 48°52'23"E, 96.11 feet; S 48°40'47"E, 59.37 feet; S 37°28'10"E, 77.44 feet; S 32°40'08"E, 52.27 feet; S 40°38'05"E, 44.28 feet; S 34°37'17"E, 56.13 feet; S 26°21'59"E, 63.23 feet; S 32°37'13"E, 52.21 feet; S 35°28'31"E, 40.59 feet; S 29°47'36"E, 43.29 feet; S 21°43'52"E, 49.60 feet; S 25°15'51"E, 41.70 feet; S 30°37'30"E, 50.56 feet; S 19°28'35"E, 42.00 feet; S 12°58'51"E, 44.12 feet; S 21°43'55"W, 45.52 feet; S 37°24'23"W, 51.35 feet; S 18°49'41"W, 53.87 feet; S 18°09'30"W, 69.34 feet; S 14°10'28"W, 65.30 feet; S 20°28'08"W, 52.32 feet; thence S 03°25'55"W, 22.77 feet to a spike found at a point in a bridge and in the center of the 150' right-of-way of S.C. 557; thence with the center of S.C. 557 S83°25'46"W, 1470.23 feet to a spike found at the point of beginning, being 68.788 acres.

**TRACT B**

Beginning at a nail set in the bridge over Crowders Creek and in the center of the 150 foot right-of-way of Riddle Mill Road, said nail being N 06°50'34"E, 1531.92 feet from SCGS monument 557 27"; and also N 56°25'44"W, 61.52 feet from the nail found in said bridge on tract A, thence with the center of Riddle Mill Road N 57°28'44"W, 152.16 feet to a nail set; thence along a curve to the right having a radius of 954.93 feet and an arc length of 1155.51 feet, being subtended by a chord N 22°48'48"W, 1086.29 feet to a nail set; thence N 11°51'07"E, 742.61 feet to a spike found, thence leaving said road and running with the line of Hoeselien, Owen & Bolyan S 85°08'56"E, 300.51 feet to a #5 rebar found, crossing a #5 rebar set on line at 33.66 feet; thence along with the following four lines of Warren J. Pernick (now or formerly): (1) S 83°08'56"E, 127.39 feet to a #5 rebar found; (2) N 06°29'20"E, 45.00 feet to a #5 rebar found; (3) Thence N 75°58'13"E, 107.89 feet to a #5 rebar found; and (4) N 14°02'38"W, 177.02 feet to a #5 rebar found; thence with the following two lines of Jeffrey A. & Kettie R. Pernick (now or formerly): (1) N 75°58'07"E, 917.70 feet to a #5 rebar found, crossing a #5 rebar set on line, said #5 rebar being S 75°50'05"W 108.59 feet from a 5/8" bent rod found; and (2) N 75°40'42"E, 1127.43 feet to a #5 rebar found; thence with the following two lines of Dawit & Sarah H. Marr (now or formerly): (1) N 75°40'42"E, 216.59 feet to a 1/2" pipe found; and (2) N 75°50'05"E, 454.73 feet to a #5 rebar found; thence along with the following three lines of Basia J. Johnson (now or formerly): (1) S 16°47'42"W, 70.35 feet to a #5 rebar found with stones; thence along with the following rod found; thence along the line of L.L. Partnership (now or formerly): (1) S 16°47'42"W, 1400.59 feet to a #8 rebar found; (2) S 85°09'37"E, 763.16 feet to a bent #4 rebar found; and (3) S 22°53'29"E, 930.73 feet to a 1/2" pipe found; thence along with the following two lines of Betty D. Riddle (now or formerly): (1) S 58°53'39"W, 416.55 feet to a 1/2" pipe found; and (2) S 57°40'39"W, 1086.80 feet to a point on the top of the northern bank of Crowders Creek, crossing a #5 rebar found on line at 742.08 feet; and a #5 rebar set on 1078.79 feet; thence following lines to points along the top of the northern bank of Crowders Creek N 31°31'09"W, 18.76 feet; N 24°55'03"W, 89.34 feet; N 34°21'23"W, 71.81 feet; N 42°37'03"W, 107.76 feet; N 43°05'55"W, 100.02 feet; N 36°44'08"W, 128.22 feet; N 20°26'04"W, 88.93 feet; N 30°48'41"W, 77.65 feet; N 29°55'48"W, 64.75 feet; N 86°04'37"W, 114.47 feet; N 86°53'20"W, 105.98 feet; S 61°04'50"W, 80.50 feet; N 65°40'18"W, 44.37 feet; N 66°01'13"W, 51.33 feet; N 24°23'17"W, 91.77 feet; N 20°33'52"E, 84.44 feet; N 11°30'53"E, 70.68 feet; N 21°02'27"E, 91.54 feet; N 26°48'35"E, 64.44 feet; N 30°33'38"E, 76.73 feet; N 37°53'28"E, 25.65 feet; N 27°48'52"E, 57.59 feet; N 11°39'58"E, 79.00 feet; N 13°48'23"W, 78.90 feet; N 23°33'04"W, 48.64 feet; N 71°17'28"W, 64.07 feet; N 75°51'41"W, 108.80 feet; N 79°48'40"W, 82.60 feet; N 78°27'15"W, 94.07 feet; S 81°54'52"W, 41.62 feet; N 80°48'57"W, 65.43 feet; S 83°08'56"E, 68.07 feet; S 58°52'07"W, 54.03 feet; S 56°08'08"W, 84.31 feet; S 48°14'41"W, 82.65 feet; S 47°36'18"W, 43.97 feet; S 47°28'58"W, 72.43 feet; S 32°21'54"W, 72.31 feet; S 29°24'14"W, 91.07 feet; S 24°58'22"W, 48.19 feet; S 36°55'27"W, 42.97 feet; S 51°41'08"W, 75.97 feet; S 44°16'35"W, 70.52 feet; S 30°16'19"W, 75.37 feet; S 30°40'48"W, 138.71 feet; S 20°25'03"W, 22.12 feet; S 32°51'27"W, 99.38 feet; S 30°52'21"W, 80.43 feet; S 30°52'21"W, 91.65 feet to a nail set at the beginning, being 153.646 acres.

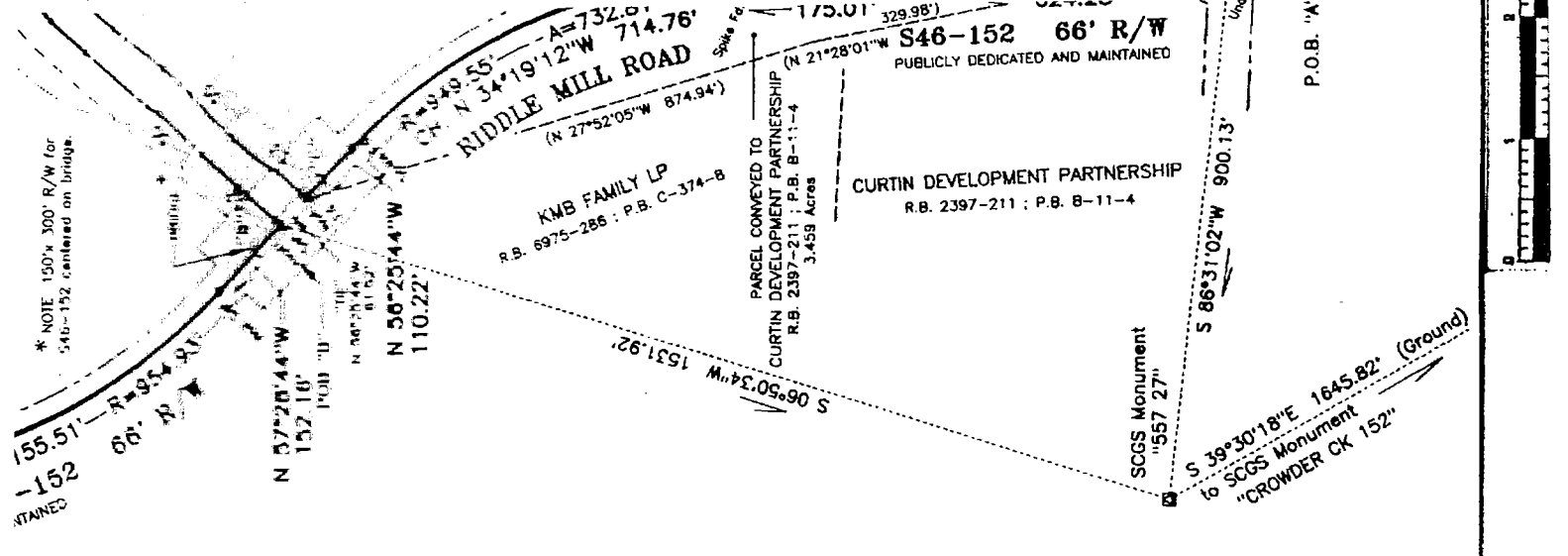


**BAIRD ENGINEERING, INC.**  
 SURVEYORS • ENGINEERS • PLANNERS  
 3219 BAIRD ROAD  
 CLOVER, SC 29710  
 803/831-2661  
 COA No. 000391  
 © 2005 by Baird Engineering, Inc.



Note : All distances shown are horizontal.

PLAT OF "ALTA/ACSM LAND TITLE SURVEY" FOR  
**KMB Family  
 Limited Partnership**  
 BETHEL TOWNSHIP  
 YORK COUNTY SOUTH CAROLINA  
 18 MARCH 2005

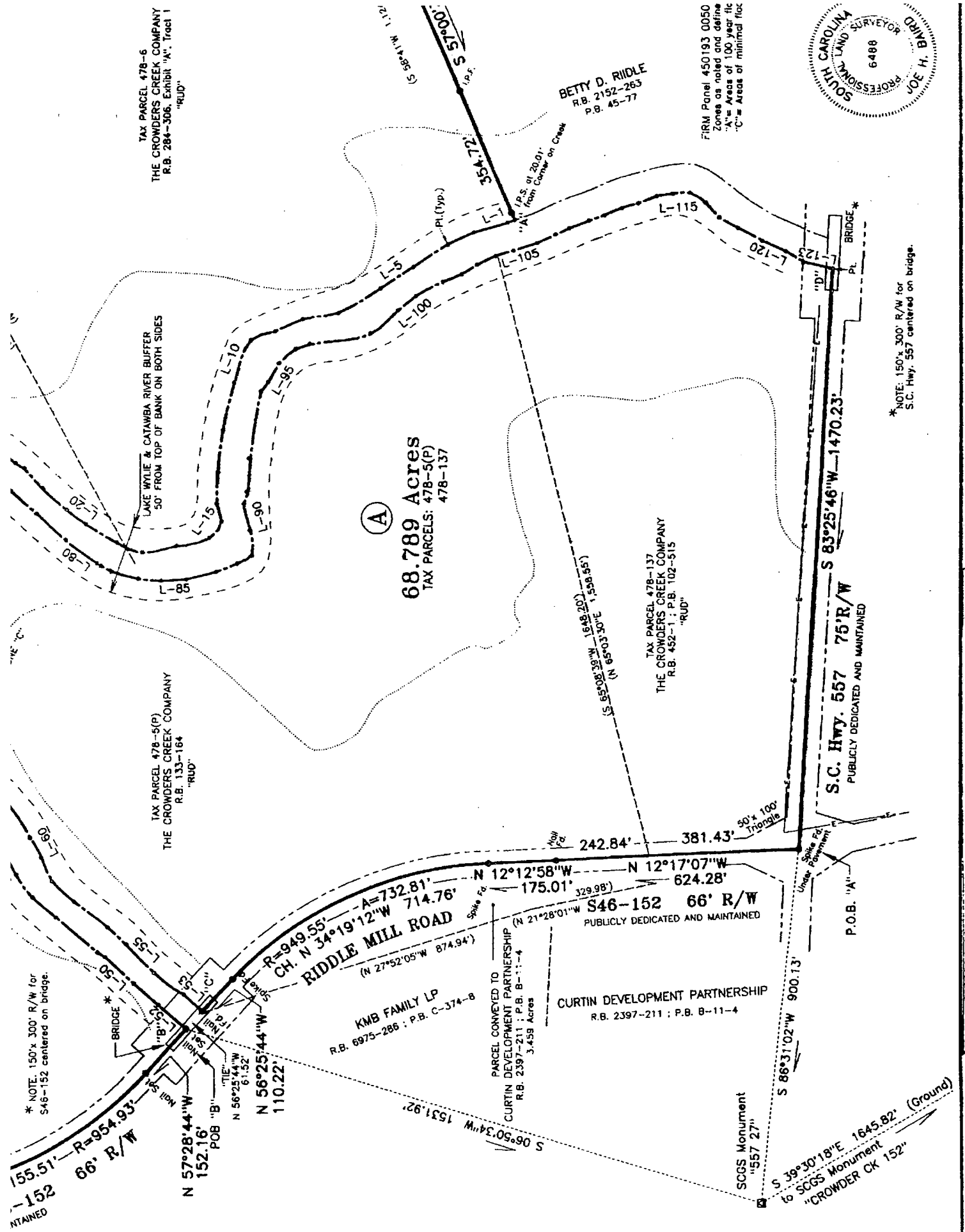
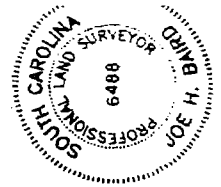


P.O.B. "A"

TAX PARCEL 478-6  
THE CROWDERS CREEK COMPANY  
R.B. 284-306; Exhibit "A", Tract 1  
"RUD"

BETTY D. RIDDLE  
R.B. 2152-263  
P.B. 45-77

FIRM Panel 450193 0050  
Zones as noted and define  
"A" Areas of 100 year flc  
"C" Areas of minimal flc



\* NOTE: 150'x 300' R/W for  
S.C. Hwy. 557 centered on bridge.



cts of  
inc.,

ded by o  
and  
the

die Milr  
lth the  
ving  
Thence  
lattie R.  
2.73  
'42"E.  
' bent  
wing  
found;  
416.55  
in line  
.76  
W. 88.93  
V. 80.60  
l. 54 feet;  
' feet;  
' feet;  
' feet;

FOR

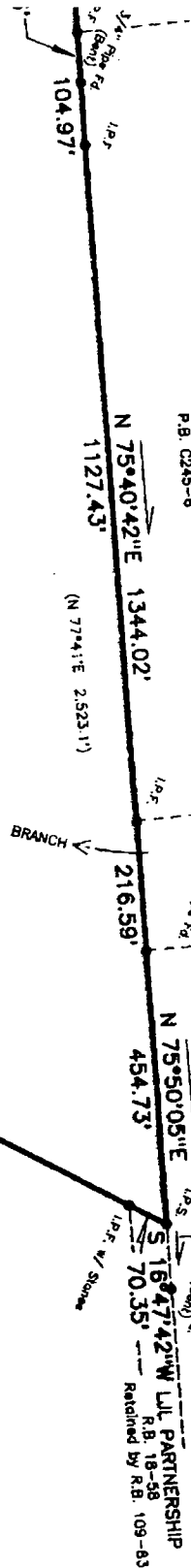


"JNES ESTABLISHED"

JEFFREY A. & KATIE R. PERNICK  
R.B. 5978-36  
P.B. 0245-6

DEWITT & SARAH H. MARR  
D.B. 732-119  
P.B. 54-151

DEWITT & SARAH H. MARR  
D.B. 732-116  
P.B. 54-151

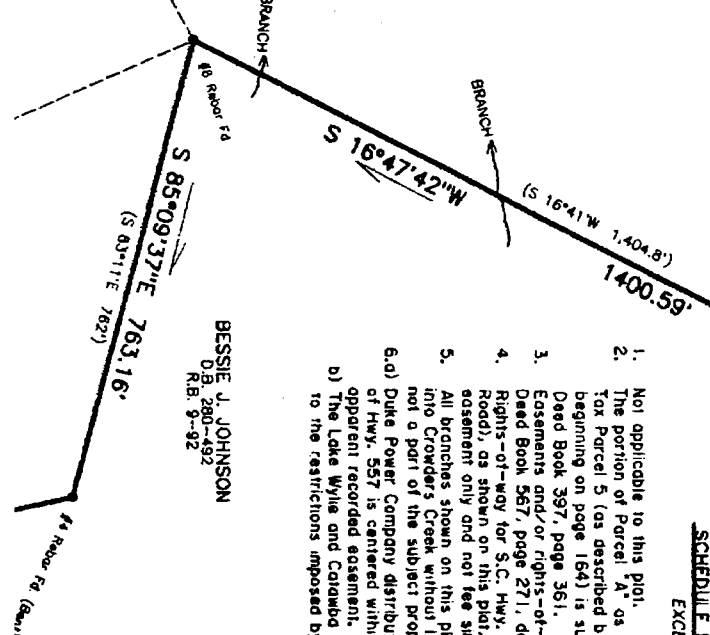
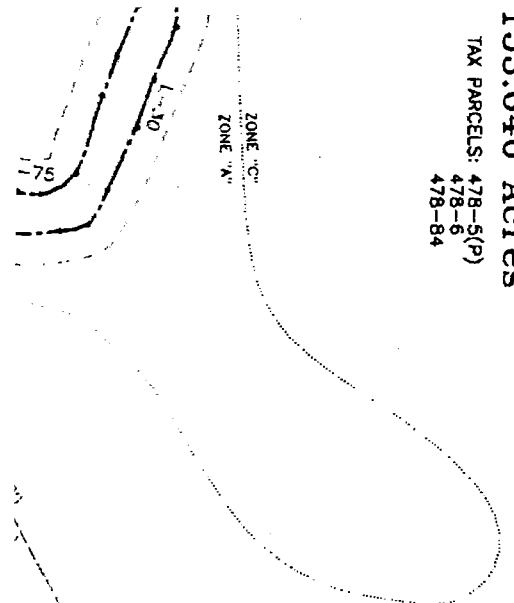


L.L. PARTNERSHIP  
R.B. 18-88  
Retained by R.B. 109-83

(B)

153.646 Acres  
TAX PARCELS: 478-5(P)  
478-6  
478-84

X(P)  
COMPANY  
B. 33-83

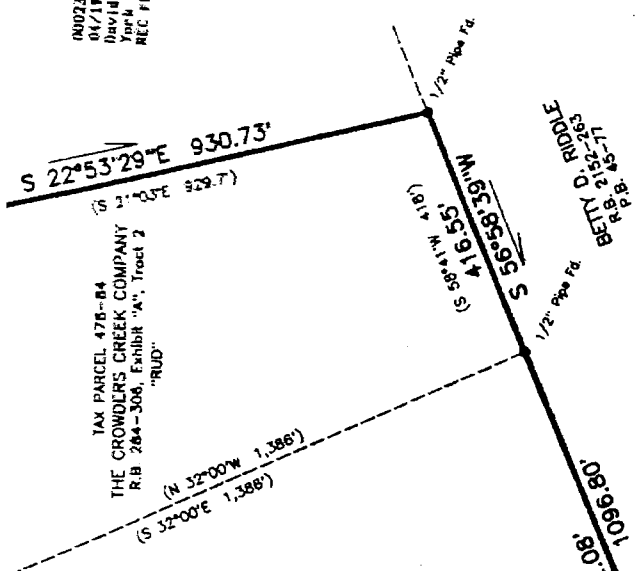


BESSIE J. JOHNSON  
D.B. 290-492  
R.B. 9-92

Investors Title Insurance Company Commitment No. 20050001100A2  
SCHEDULE B - SECTION II  
EXCEPTIONS

1. Not applicable to this plot.
  2. The portion of Parcel 'A' as shown hereon which includes a portion of Tax Parcel 5 (as described by deed recorded in Record Book 133, beginning on page 184) is subject to the restrictions of record in Deed Book 397, page 361.
  3. Easements and/or rights-of-way to Duke Power Company recorded in Deed Book 587, page 271, do not affect this property.
  4. Rights-of-way for S.C. Hwy. 557 and for S-46-152 (Riddle Mill Road), as shown on this plat, were granted for right-of-way easement only and not fee simple.
  5. All branches shown on this plat flow onto the subject property and into Crowder's Creek without leaving the property. Crowder's Creek is not a part of the subject property.
- 6.a) Duke Power Company distribution line shown near the northern margin of Hwy. 557 is centered within a typical 30' right-of-way with no apparent recorded easement.  
b) The Lake Wylie and Catawba River Buffer shown on this plat is subject to the restrictions imposed by Ordinance of York County.

000227779, MK, C-381, P. 1  
 04/17/2005 10:00:27AM  
 York County, Clerk of Court  
 REC FILED: 05



TAX PARCEL 478-6  
 THE CROWLERS CREEK COMPANY  
 R.B. 284-306, Exhibit "A", Tract 1  
 "RUD"

BETTY D. RIDGLE  
 R.B. 2152-263  
 P.B. 45-77

**(A)**  
**789 Acres**  
 PARCELS: 478-5(P)  
 478-137

**Total Area: 222.435 Acres**

Note: Boundary lines for each vesting deed are shown by dashed lines.

**PLAT RECOMBINATION APPROVED**  
 This plat is approved for recording in the office  
 of the Clerk of Court of York County, South  
 Carolina, Subdivision and Zoning Code of York  
 County, Section 155.428, Subdivision #  
**COMMISSION AGENT (S) DATE 4-14-17**

FIRM Panel 450193 0050 B, 4 Nov 81  
 Zones as noted and defined by FEMA on the referenced panel.  
 "A" = Areas of 100 year flood.  
 "C" = Areas of minimal flooding.

"ALTA/ACSM Land Title Survey"

To: Investors Title Insurance Company & KMB Family Limited Partnership  
 This is to certify that this map or plat and the survey on which it is based were made in accordance with "Minimum Standard Detail Requirements for ALTA/ACSM Land Surveys", jointly established and adopted by ALTA, ACSM and NSPS in 1989, and includes items 1, 2, 3, 4, 7, 8, 11a, and 13 of Table A thereof. Pursuant to the Accuracy Standards as adopted by ALTA, NSPS, and ACSM and in effect on the date of this certification, undersigned further certifies that proper field procedures, instrumentation and adequate survey personnel were employed in order to achieve results comparable to those outlined in the "Minimum Angle, Distance and Closure Requirements for Survey Measurements Which Central Land Boundaries for ALTA/ACSM Land Title Surveys."



*John Baird*

S.C. REG. NO. 6488 CLOVER, S.C.  
 F.B. 103-4D JOB No. 050222

\* NOTE: 150'±, 300' R/W for  
 S.C. Hwy. 557 centered on bridge.

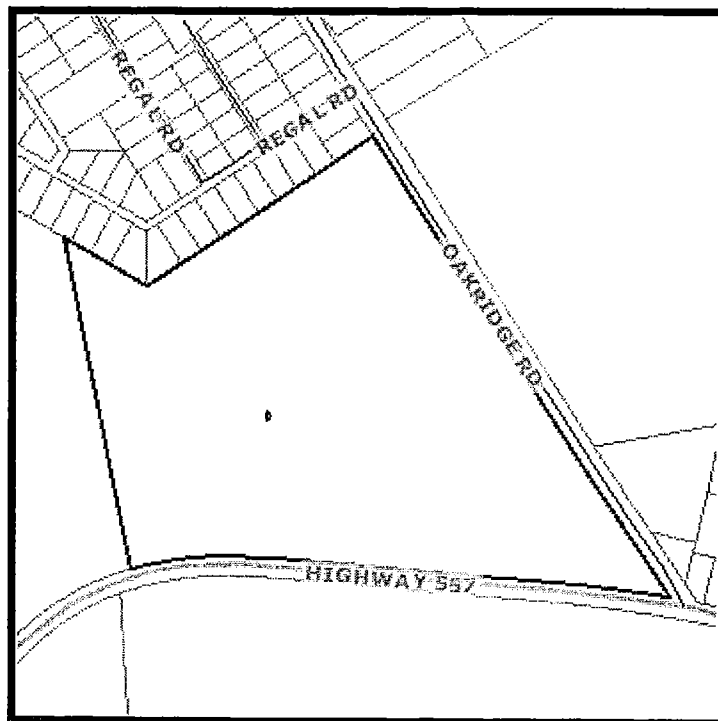
83°25'48" W - 1470.23'

37 COMPANY  
 -515

1

**Property Report for Parcel Number:**  
4780000151

Inquiry Date:



**Owner**

**Owner Name:** CLOVER SCHOOL DIST #2  
**Address:** PO BOX 99  
**City/State:** CLOVER SC  
**Zip Code:** 29710

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

<b>Parcel Number:</b>	4780000151	<b>Land Value:</b>	\$0
<b>Total Lots:</b>	0	<b>AG Use:</b>	
<b>Total Acres:</b>	0	<b>AG Use Value:</b>	
<b>Deed Book:</b>	10481	<b>Previous Owner:</b>	BETTY D RIDDLE 478-
<b>Deed Book Page:</b>	29	<b>Tax Bill Information:</b>	
<b>Platt Book:</b>	D32	<b>Zoning:</b>	
<b>Platt Book Page:</b>	4	<b>Sale Price:</b>	\$125000
<b>School District:</b>	2	<b>Sale Date:</b>	12/31/08
<b>Municipality:</b>		<b>Census Tract:</b>	
<b>Fire Code:</b>	BE-I	<b>Voter District:</b>	
<b>Property Location:</b>	37.07 AC / SC HWY 557		

**Building/Structure**

<b>Prop. Classification:</b>		<b>Number of Stories:</b>	
<b>Heating Type:</b>		<b>Year Built:</b>	
<b>Living Area(Sq. Ft.):</b>		<b>Garage Area:</b>	NO
<b>Basement:</b>	NO	<b>Fireplace:</b>	
<b>Bathrooms:</b>		<b>Bldg. Value:</b>	\$0
<b>Total Imp. Value:</b>			

**Assessment**

<b>Total Assessed Value:</b>	\$0	<b>Total Market Value*:</b>	\$0
------------------------------	-----	-----------------------------	-----



F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 478-00-00-151 Legal 37.07 AC HWY 557 PLAT D 32 / 004

DEED

Grantor BETTY RIDDLE  
Grantee CLOVER SCHOOL DISTRICT NUMBER TWO  
Book 10481 Page 29  
Dated 12/23/2008 Recorded 12/31/2008

1-1-2 Previous Ownership

Grantor ESTATE OF HELEN DAVIS RIDDLE  
Grantee BETTY RIDDLE  
Book 2152 Page 263  
Dated 3/3/1998 Recorded 3/4/1998

Grantor EMILY D LINDSAY  
Grantee HELEN D RIDDLE  
Book 475 Page 194  
Dated 11/29/1973 Recorded 12/3/1973

Grantor ESTATE OF MRS ATWOOD H DAVIS  
Grantee HELEN D RIDDLE AND EMILY D LINDSAY  
PROBATE 507 / 17158  
Dated 12/31/1958 Recorded 11/13/1964

*Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.*

200800046548  
 Filed for Record in  
 YORK COUNTY, SC  
 DAVID HAMILTON  
 12-31-2008 At 10:55 am.  
 DEED 10.00  
 State Tax 325.00  
 County Tax 137.50  
 OR Vol 10481 Page 29 - 31

325.00  
 137.50

NO NEW LOT LINES  
 STATE OF SOUTH CAROLINA )  
 )  
 COUNTY OF YORK )

RECORDED  
 YORK COUNTY  
 TAX ASSESSOR'S OFFICE

Haselden, Owen & Boloyan  
 P.O. Box 173  
 Clover, SC 29710

DATE 12-31-09  
 TAX MAP NO. map 9478-4  
 INITIALS TS/CAK

TITLE TO REAL ESTATE

**KNOW ALL MEN BY THESE PRESENTS**, That I, **Betty D. Ridde** in the State aforesaid, for and in consideration of the sum of One Hundred Twenty Five Thousand and NO/100 (\$125,000.00) Dollars, to me in hand paid at and before the sealing of these presents, by **Clover School District Number Two, P.O. Box 99, Clover, South Carolina, 29710**. In the State aforesaid, ( the receipt whereof is hereby acknowledged), has granted, bargained, sold and released unto **Clover School District Number Two**, its heirs and assigns forever, the following described property:

All that certain piece, parcel or tract of land located on SC Highway 557, Bethel Township, York County, South Carolina, containing 5.00 acres and being more particularly described as follows: Beginning at a rebar in SC Highway 557 approximately 1456 feet from Oakridge Road and the southeastern corner of the property herein described and running thence on a curve (R=992.43 - Ch = 216.90) to a rebar; thence N 09-00-38 W 1118.24 feet to a axle; thence S 52-04-07 E 313.99 feet to a rebar; thence S 09-00-38 E 921.86 feet to a rebar, this being the beginning point. The above described property is shown as Parcel B on plat prepared for Clover School District No. Two by Hucks & Associates, PC, dated December 17, 2008, said plat being recorded in Plat Book 12369, Page 4, Office of the Clerk of Court for York County, South Carolina and incorporated herein by reference.

**Derivation:** This is a portion of that property described in deed recorded in Record Book 2152, Page 263, Office of the Clerk of Court for York County, South Carolina.

(1)

The above described property is conveyed subject to all easements, conditions and restrictive covenants imposed upon property in the chain of title, if any, but are not intended to be reimposed hereby by reference thereto.

TOGETHER with all and singular, the rights, members, hereditaments and appurtenances to the said premises belonging or in anywise incident or appertaining.

TO HAVE AND TO HOLD all and singular the premises before mentioned unto the said **Clover School District Number Two**, its heirs, administrators and assigns, forever.

AND Grantor(s) do/does hereby bind herself and her Heirs, Representatives and Administrators, to warrant and forever defend all and singular the said premises unto the said Grantee and the Grantee's Heirs and Assigns, against the Grantor and the Grantor's Heirs and against every person whomsoever lawfully claiming, or to claim, the same or any part thereof.

WITNESS the Hand and Seal of the Grantor this 23 day of Dec, in the year of our Lord two thousand eight and in the two hundred and thirty third year of the Sovereignty and Independence of the United States of America.

SIGNED, SEALED AND DELIVERED

IN THE PRESENCE OF:

Kenneth E. King  
[Signature]

Betty D. Riddle  
Betty D. Riddle

STATE OF SOUTH CAROLINA )  
 )  
COUNTY OF YORK )

PROBATE

PERSONALLY APPEARED before me the undersigned witness and made oath that s/he saw the within named Grantor sign, seal and, as the Grantor's act and deed, deliver the within-written Deed for the uses and purposes therein mentioned and that s/he, with the other witness whose signature appears above, witnessed the execution thereof.

*Kenneth E. Love*

SWORN TO before me this 23

Day of August, 2008.

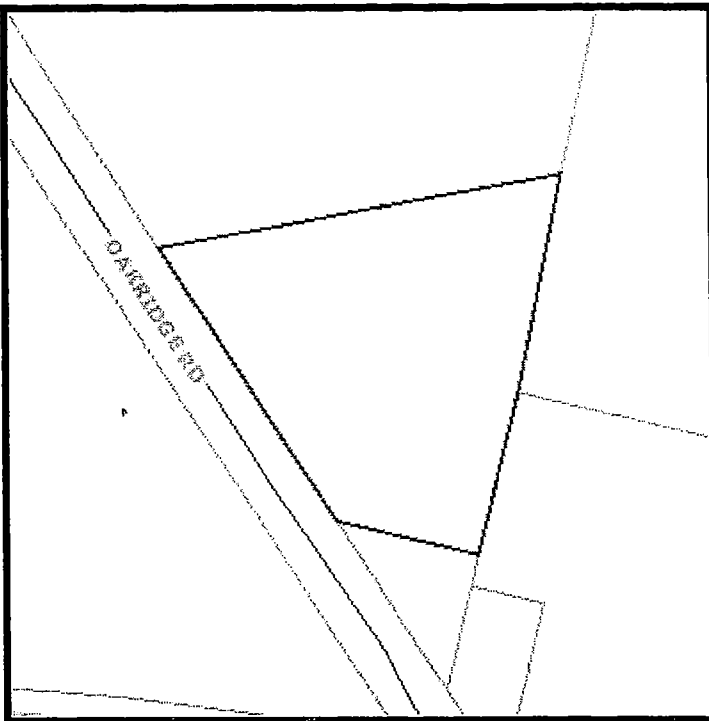
*[Signature]* (SEAL)

Notary Public for South Carolina

My Commission expires: 6/1/16

**Property Report for Parcel Number:**  
4780000152

Inquiry Date:



**Owner**  
**Owner Name:** BETHEL VOLUNTEER FI  
 DEPT  
**Address:** 5600 HWY 557  
**City/State:** LAKE WYLIE SC  
**Zip Code:** 29710

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

**Parcel Number:** 4780000152  
**Total Lots:** 0  
**Total Acres:** 0  
**Deed Book:** 8737  
**Deed Book Page:** 73  
**Platt Book:** D143  
**Platt Book Page:** 667  
**School District:** 2  
**Municipality:**  
**Fire Code:** BE-I  
**Property Location:** 2.049 AC / OAK RIDGE  
 RD

**Land Value:** \$24000  
**AG Use:**  
**AG Use Value:**  
**Previous Owner:** CLOVER SCHOOL DIS'  
 Y.C.  
**Tax Bill Information:**  
**Zoning:**  
**Sale Price:** \$1  
**Sale Date:** 1/10/07  
**Census Tract:**  
**Voter District:**

**Building/Structure**

**Prop. Classification:**  
**Heating Type:**  
**Living Area(Sq. Ft.):**  
**Basement:** NO  
**Bathrooms:**  
**Total Imp. Value:**

**Number of Stories:**  
**Year Built:**  
**Garage Area:** NO  
**Fireplace:**  
**Bldg. Value:** \$0

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 478-00-00-152 Legal 2.049 AC / OAK RIDGE RD PLAT 143 / 667

DEED

Grantor TRUSTEES OF CLOVER SCHOOL DISTRICT NO 2 OF YORK COUNTY

Grantee BETHEL VOLUNTEER FIRE DEPARTMENT

Book 8737 Page 73

Dated 11/2/2006 Recorded 1/10/2007

1-1-2 Previous Ownership

Grantor SARA M LINDSAY

Grantee TRUSTEES OF CLOVER SCHOOL DISTRICT NO 2 OF YORK COUNTY

Book 7459 Page 67

Dated 9/30/2005 Recorded 10/3/2005

Grantor ESTATE OF EMILY D LINDSAY

Grantee SARA M LINDSAY

Book 1045 Page 290

Dated 8/25/1988 Recorded 8/31/1988

Grantor HELEN D RIDDLE

Grantee EMILY D LINDSAY

Book 475 Page 191

Dated 11/29/1973 Recorded 12/3/1973

Grantor ESTATE OF MRS ATWOOD H DAVIS  
Grantee HELEN D RIDDLE AND EMILY D LINDSAY  
PROBATE 507 / 17158  
Dated 12/31/1958 Recorded 11/13/1964

***Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.***

NO NEW LOT LINES  
STATE OF SOUTH CAROLINA )  
COUNTY OF YORK

**RECORDED**

YORK COUNTY  
TAX ASSESSOR'S OFFICE

000333053  
RECORDED 01/10/2007 09:33:41AM  
Bk:08737 Ps:00073 Pages:3  
Fee:10.00 State:0.00  
County:0.00 Exempt:-----  
David Hamilton, Clerk of Court  
York County, SC  
Hassell, Owen & Bolyan  
P.O. Box 173  
Clover, SC 29710

DATE 1-10-07  
(out of)  
TAX MAP NO. 478-72  
INITIALS TS / dN

TITLE TO REAL ESTATE

**KNOW ALL MEN BY THESE PRESENTS, That, Trustees of Clover School**

**District No. 2 of York County, in the State aforesaid, for and in consideration of the**  
sum of (Gift), to it in hand paid at and before the sealing of these presents, by **Bethel**

**Volunteer Fire Department** 5600 Highway 557, Lake Wylie SC 29710

In the State aforesaid, ( the receipt whereof is hereby acknowledged), has granted,

bargained, sold and released unto **Bethel Volunteer Fire Department**, its successors

and assigns forever, the following described property:

Located at the intersection of Oakridge Road and Highway 557 in Bethel Township, York County, SC; beginning at an old axle with flange approximately 160 feet north of the center line intersection of the above roads, the northernmost corner of the previous BVFD property; proceeding N 71-14-53 W 113.17 feet along previous BVFD property to an iron on the right-of-way of Oakridge Road; thence N 26-16-54 W 336.05 feet with the right-of-way to a 3/4 inch iron pipe, a new corner of Clover School District No. 2, thence N 79-47-06 E 401.20 feet along school property to a 3/4 inch iron pipe on a line of Lake Wylie Enterprizes; thence S 18-45-07 W 432.00 feet along Lake Wylie Enterprizes land to the point of beginning; all bearings magnetic; enclosing an area of 2.049 acres as shown on plat dated October 10, 2006, drawn by G.R. Ferguson, PE/PLS 3992"

DERIVATION: Portion of the property described in deed recorded in Book 7459, Page 67, Office of the Clerk of Court for York County, South Carolina.

The above described property is conveyed subject to the condition that the premises be used as a fire department. It is understood and agreed by the grantor and grantee herein that in the event the above described property is not utilized as a fire department, title to the said property shall automatically revert to the grantor, its successors and assigns.

BK 08737 PG 0073

(1)



TOGETHER with all and singular, the rights, members, hereditaments and appurtenances to the said premises belonging or in anywise incident or appertaining.

TO HAVE AND TO HOLD all and singular the premises before mentioned unto the said **Bethel Volunteer Fire Department**, its successors and assigns, subject to the condition that it be used as a fire department. That in the event property is not used as a fire department, then title to said property shall automatically revert to the grantee, its Successors and Assigns.

AND Grantor does hereby bind itself and its Successors and Assigns, to warrant and forever defend all and singular the said premises unto the said Grantee and the Grantee's Successors and Assigns, against the Grantor and the Grantor's Successors and Assigns.

WITNESS the Hand and Seal of the Grantor this 2 day of November, in the year of our Lord two thousand six and in the two hundred and thirty first year of the Sovereignty and Independence of the United States of America.

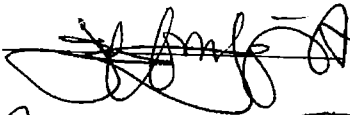
SIGNED, SEALED AND DELIVERED  
IN THE PRESENCE OF:

Trustees of Clover School District  
No. 2 of York County

Judy C Miller

Kenneth E. Love

By:



Attest:

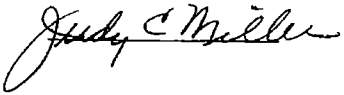
Jamie Lynn Bass Barbee

BK88737PG0074

STATE OF SOUTH CAROLINA )  
  )  
COUNTY OF YORK                  )

PROBATE

PERSONALLY APPEARED before me the undersigned witness and made oath that s/he saw the within named Grantor sign, seal and, as the Grantor's act and deed, deliver the within-written Deed for the uses and purposes therein mentioned and that s/he, with the other witness whose signature appears above, witnessed the execution thereof.



SWORN TO before me this 2

Day of November, 2006.

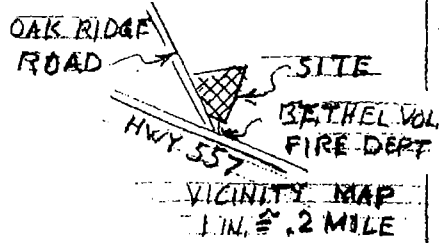
Kenneth E. Love (SEAL)

Notary Public for South Carolina  
My Commission expires: 2-18-2015

BK00737PG0075

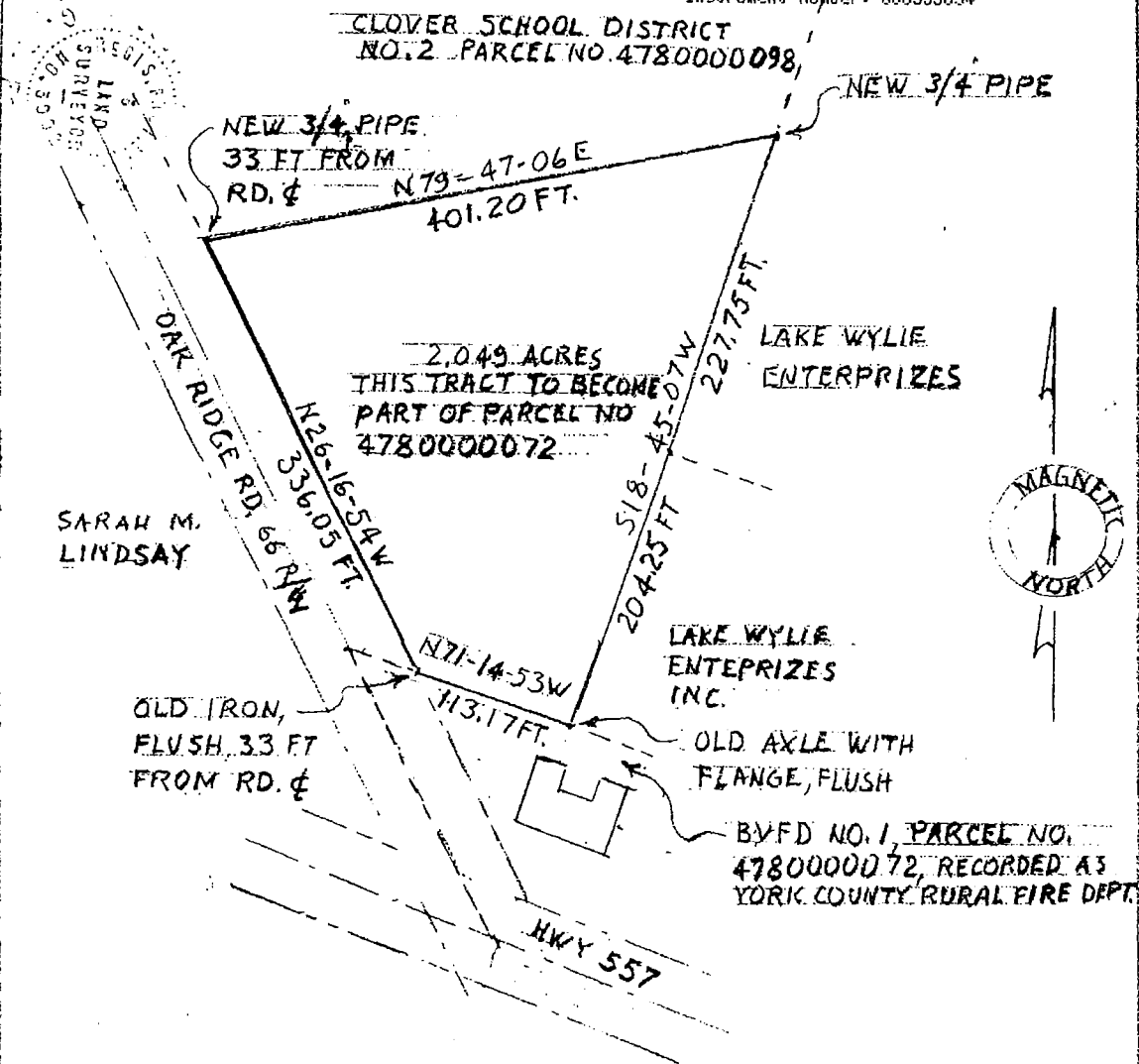
I HEREBY STATE THAT TO THE BEST OF MY KNOWLEDGE, INFORMATION, AND BELIEF, THE SURVEY SHOWN HEREBON WAS MADE IN ACCORDANCE WITH THE REQUIREMENTS OF THE MINIMUM STANDARDS MANUAL FOR THE PRACTICE OF LAND SURVEYING IN SOUTH CAROLINA, AND MEETS OR EXCEEDS THE REQUIREMENTS FOR A CLASS C SURVEY AS SPECIFIED THEREIN, AND THAT THIS PROPERTY IS NOT IN A FLOOD-ZONE

G. R. Ferguson OCT 10, 2006



FILED FOR RECORD 01/10/2007  
 AT 09:34:45AM BOOK 00143 PAGE 00667  
 David Hamilton - Clerk of Court  
 York County Courthouse  
 Instrument Number: 00033054

CLOVER SCHOOL DISTRICT  
 NO. 2 PARCEL NO. 4780000098,



**PLAT RECOMBINATION APPROVED**

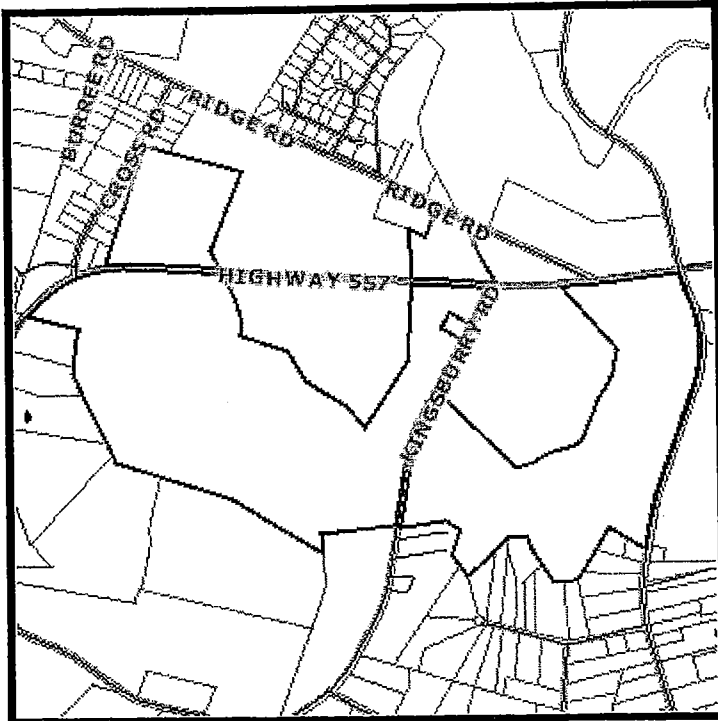
This plat is approved for recording in the office of the Clerk of Court of York County, South Carolina, Subdivision and Zoning Code of York County, Section 155.428, Subdivision # B  
 COMMISSION AGENT MBA DATE 1-8-07

**BOUNDARY SURVEY**

SURVEY FOR BETHEL VOLUNTEER FIRE DEPARTMENT, LOCATED AT THE JUNCTION OF OAK RIDGE RD. AND HWY 557, BETHEL TOWNSHIP, YORK COUNTY, S.C.  
 DATE SURVEY COMPLETED: OCT. 10, 2006  
 SCALE: 1 IN. = 100 FT. 0 50 FT 100 150  
 SURVEYED BY: G. R. FERGUSON  
 P.E./P.L.S. 3992  
 1611 RIDGE RD, CLOVER, S.C., 29710

**Property Report for Parcel Number:**  
4790000002

Inquiry Date:



**Owner**

**Owner Name:** BELMONT LAND & INVEST  
COMPANY LLC  
**Address:** 100 MAIN ST  
**City/State:** MCADENVILLE NC  
**Zip Code:** 28101

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

**Parcel Number:** 4790000002  
**Total Lots:** 0  
**Total Acres:** 363.38  
**Deed Book:** 7866  
**Deed Book Page:** 93  
**Platt Book:** 34  
**Platt Book Page:** 236  
**School District:** 2  
**Municipality:**  
**Fire Code:** BE-I  
**Property Location:** HWY 114

**Land Value:** \$1998600  
**AG Use:**  
**AG Use Value:**  
**Previous Owner:** PHARR YARNS INC  
**Tax Bill Information:**  
**Zoning:**  
**Sale Price:** \$1  
**Sale Date:** 3/15/06  
**Census Tract:**  
**Voter District:**

**Building/Structure**

**Prop. Classification:**  
**Heating Type:**  
**Living Area(Sq. Ft.):**  
**Basement:** NO  
**Bathrooms:**  
**Total Imp. Value:**

**Number of Stories:**  
**Year Built:**  
**Garage Area:** NO  
**Fireplace:**  
**Bldg. Value:** \$0

**Assessment**

**Total Assessed Value:** \$1176

**Total Market Value\*:** \$1998600

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 479-00-00-002 Legal 363.38 AC PLAT 34 / 0236

DEED

Grantor PHARR YARNS LLC  
Grantee BELMONT LAND AND INVESTMENT COMPANY LLC  
Book 7866 Page 93  
Dated 8/29/2005 Recorded 3/15/2006

1-1-2 Previous Ownership

Grantor THE COUNTY OF YORK, STATE OF SOUTH CAROLINA  
Grantee PHARR YARNS INC  
Book 538 Page 135  
Dated 9/27/1976 Recorded 10/15/1976


Grantor HUDSON HOSIERY COMPANY  
Grantee YORK COUNTY  
Book 385 Page 22  
Dated 12/1/1968 Recorded 12/27/1968

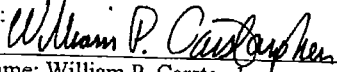
**Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.**

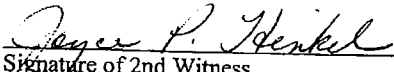


SIGNED, SEALED AND DELIVERED  
IN THE PRESENCE OF

PHARR YARNS, LLC

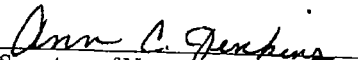
  
Signature of 1<sup>st</sup> Witness

By:   
Name: William P. Carstarphen  
Its: President

  
Signature of 2nd Witness

STATE OF NORTH CAROLINA  
COUNTY OF GASTON

I, Ann C. Jenkins, a notary public for North Carolina, do hereby certify that William P. Carstarphen personally appeared before me in his capacity as President of Pharr Yarns, LLC, and being authorized to do so, acknowledged the due execution of the foregoing instrument on behalf of Pharr Yarns, LLC, this 29<sup>th</sup> day of August, 2005.

  
Signature of Notary Public

My commission expires: March 11, 2008

BK07866PG0094

EXHIBIT A

BEING all of that certain tract or parcel of real property located in Bethel Township, York County, South Carolina, containing approximately 430 acres, and being more particularly described as follows:

BEGINNING at a spike marking the intersection of the centerline of Bethel School Road (S46-152) (35' right-of-way) and the centerline of S.C. Highway 557 (37.5' right-of-way), said spike being the Beginning Point; thence from said Beginning Point with the centerline of Bethel School Road the following six (6) courses and distances: (1) South 21-22-01 East 474.07 feet to a nail, (2) South 09-29-20 East 407.42 feet to a spike, (3) South 04-25-29 West 268.90 feet to a spike in bridge, (4) South 13-43-49 West 209.10 feet to a spike, (5) South 19-14-03 West 1394.60 feet to a spike, and (6) South 10-41-47 West 499.50 feet to a spike; thence with the common line of the property now or formerly owned by R.D. & Carolyn A. Griffith (as recorded in Record Book 1286, Page 65 and Plat Book A3, Page 9 of the York County Public Registry) the following two (2) courses and distances: (1) North 58-10-16 West 493.00 feet to a #5 rebar (passing through a #5 rebar at 36.54 feet and a  $\frac{3}{4}$ " rod at 260.33 feet), and (2) South 31-00-00 West 299.70 feet to a #5 rebar; thence with the common line of the property now or formerly owned by Imogene R. Marlowe (Deed Book 1062, Page 92) South 30-21-30 West 299.89 feet to a #5 rebar; thence with the common line of the property now or formerly owned by M.C. & Margie G. Huffstetler (Deed Book 553, Page 506 and Plat Book 40, Page 192) South 30-21-30 West 142.32 feet to a "T" post; thence South 86-59-06 West 170.21 feet to a #5 rebar; thence South 86-59-06 West 99.86 feet to a "T" post; thence North 32-27-44 West 224.99 feet to a #5 rebar; thence with the common line of the property now or formerly owned by D.A. Yandle (Record Book 2063, Page 341; Tract "C" on Plat Book 95, Page 67) the following three (3) courses and distances: (1) North 32-34-47 West 199.42 feet to a "T" post, (2) North 19-31-06 West 180.08 feet to a "T" post, and (3) South 86-59-23 West 200.14 feet to a "T" post; thence South 43-57-28 West 200.31 feet to a #4 rebar; thence South 43-59-58 West 330.18 feet to a "T" post; thence South 72-35-42 West 149.92 feet to a "T" post; thence North 36-32-19 West 150.00 feet to a #5 rebar; thence with the common line of the property now or formerly owned by W.C. Rutledge (Deed Book 529, Page 846 and Plat Book 42, Page 180) the following four (4) courses and distances: (1) North 36-07-37 West 150.00 feet to a point under building (passing through a #5 rebar at 130.00 feet), (2) North 18-05-02 East 300.00 feet to a #5 rebar (passing through a #5 rebar at 22.96 feet), (3) North 58-51-58 West 200.00 feet to a #5 rebar, and (4) South 81-28-02 West 500.00 feet to a #5 rebar located in the right-of-way of Kingsbury Road (S46-114) (33' right-of-way) (passing through a #5 rebar at 476.51 feet located in the easterly margin of the right-of-way of Kingsbury Road); thence with the common line of the property now or formerly owned by R.W. Barnett (Deed Book 1037, Page 224 and Deed Book 878, Page 1) the following four (4) courses and distances: (1) South 83-07-03 West 854.92 feet to a 2" pipe (passing through a #5 rebar at 45.56 feet marking the westerly margin of the right-of-way of Kingsbury Road), (2) South 02-24-23 East 220.51 feet to a #4 rebar, (3) North 55-39-49 West 1187.93 feet to a  $\frac{1}{2}$ " pipe, and (4) North 75-16-44 West 845.74 feet to a #5 rebar; thence with the common line of the property now or formerly owned by D.M. & Kerry L. Coates (Record Book 1028, Page 338 and Plat Book 3, Page 322) (the "Coates Property") North 75-16-44 West 518.72 feet; thence with the common line of the Coates Property and the property now or formerly owned by V.M. Stine III & D.S. Killian (Deed Book 762, Page 191 and Plat Book 68, Page 269) North 24-26-48 West 241.28 feet to a #4 rebar; thence with the common line of the property now or formerly owned by Francis S. Davis (Record Book 626, Page 196 and Plat Book 68, Page 269) North 24-23-06 West 698.70 feet to a #5 rebar; thence with the common line of the property now or formerly owned by T.G. & Karen G. Burton (Record Book 1371, Page 330 and Plat Book 131, Page 218) the following two (2) courses and distances: (1) North 24-23-06 West 274.16 feet to a #6 rebar (passing through a #4 rebar at 54.23 feet), and (2) North 03-40-43 East 75.10 feet to a 1" angle; thence with the common line of the property now or formerly owned by C.A. & Christal D. Bandy (Record Book 626, Page 196 and Plat Book 68, Page 269) the following three (3) courses and distances: (1) North 03-40-43 East 287.87 feet to a  $\frac{1}{2}$ " pipe, (2) North 23-00-24 East 77.13 feet to a #5 rebar, and (3) North 69-18-00 West 588.49 feet (passing through a #5 rebar at 548.93 feet) to a spike located in the centerline of S.C. Highway 557; thence with the centerline of S.C. Highway 557 with the arc of a circular curve to the right having a radius of 1424.32 feet, a chord bearing and distance of North 59-21-45 East 989.31 feet, and an arc length of 1010.36 feet to a spike; thence with the common line of the property now or formerly owned by D.A. & Victoria B. Campbell (Record Book 1014, Page 326) North 22-54-06 East 269.08 feet to a 1-1/2" pipe; thence with the common line of the property now



or formerly owned by C.T. & Trinna B. Meek (Deed Book 843, Page 72 and Plat Book 78, Page 580) North 19-12-26 East 304.89 feet to a ¾" pipe (passing through a #6 rebar at 144.07 feet); thence with the common line of the property now or formerly owned by C.H. & Dorothy B. Perkins (Deed Book 433, Page 319 and Deed Book 580, Page 223 and Plat Book 56, Page 78) North 19-12-26 East 866.34 feet to a 3" pipe (passing through a ¾" axle at 252.94 feet); thence with the common line of the property now or formerly owned by C.E. & Hope Williamson (Record Book 1815, Page 221 and Plat Book A105, Page 10) South 75-03-26 East 277.34 feet to a #4 rebar; thence with the common line of the property now or formerly owned by Elizabeth P. Keel (Will Book 458, Page 14037) (the "Keel Property") the following three (3) courses and distances: (1) South 74-14-37 East 838.88 feet to a 1-1/2" pipe at stone, (2) South 23-07-43 West 943.00 feet to a #5 rebar, and (3) South 27-04-12 East 253.00 feet to a spike over culvert in S.C. Highway 557 (passing through #5 rebar at 209.45 feet in northerly margin of right-of-way of S.C. Highway 557); thence with the common line of the property now or formerly owned by Marion B. Peoples (Deed Book 393, Page 89) the following nine (9) courses and distances: (1) South 27-04-12 East 335.00 feet to a #5 rebar (passing through a #5 rebar at 43.55 feet in the southerly margin of the right-of-way of S.C. Highway 557), (2) South 15-46-53 East 322.66 feet to a #5 rebar, (3) South 03-00-17 West 132.00 feet to 1-1/2" pipe, (4) South 73-30-22 East 544.15 feet to a 1-1/2" pipe, (5) South 32-27-32 East 394.93 feet to a 1-1/2" pipe, (6) South 58-12-55 East 562.67 feet to a 1-1/2" pipe, (7) South 40-34-54 East 283.61 feet to a sweet gum, (8) North 33-39-36 East 881.46 feet to a #5 rebar, and (9) North 02-45-35 East 875.00 feet to a spike over culvert in S.C. Highway 557 (passing through a #5 rebar at 837.50 feet in the southerly margin of the right-of-way of S.C. Highway 557); thence with the common line of the Keel Property North 07-23-32 West 611.57 feet to a 1" flat iron (passing through a #5 rebar at 38.20 feet in the northerly margin of the right-of-way of S.C. Highway 557); thence with the common line of the property now or formerly owned by Mount Harmony Methodist Church Trustees (Deed Book 118, Page 197) North 19-21-28 East 317.93 feet to a #5 rebar located in the southerly margin of the right-of-way of Ridge Road (S46-27) (37.5' right-of-way); thence within the right-of-way of Ridge Road the following two (2) courses and distances: (1) South 71-14-03 East 375.06 feet to a #5 rebar, and (2) South 48-10-51 East 164.75 feet to a #4 rebar; thence with the common line of the property now or formerly owned by H.E. Hand, Trustee of A.B. Hand Trust (Record Book 79, Page 239 and Plat Book 32, Page 263) the following two (2) courses and distances: (1) South 26-10-51 East 389.00 feet to a #5 rebar, and (2) South 39-44-30 East 460.74 feet to a #5 rebar located in the northerly margin of the right-of-way of S.C. Highway 557; thence within the right-of-way of S.C. Highway 557 South 85-01-34 East 442.19 feet to a spike located in the centerline of S.C. Highway 557; thence with the centerline of S.C. Highway 557 the following two (2) courses and distances: (1) with the arc of a circular curve to the left having a radius of 5752.14 feet, a chord bearing and distances of North 86-08-50 East 554.79 feet, and an arc length of 555.01 feet, and (2) North 83-23-00 East 1058.74 feet to the point and place of BEGINNING.

**LESS AND EXCEPT** all of that certain tract or parcel of real property located in Bethel Township, York County, South Carolina, owned by Joe L. & Marcelle M. Brackett (as recorded in Deed Book 539, Page 413 and Plat Book 50, Page 57 of the York County Public Registry) containing approximately 1.378 acres, and being more particularly described as follows:

To find the Beginning Point commence at a spike over culvert located in the centerline of S.C. Highway 557 (37.5' right-of-way) and marking the northeastern corner of the property now or formerly owned by Marion B. Peoples (Deed Book 393, Page 89) (the "Peoples Property") and proceed with the easterly boundary of the Peoples Property South 02-45-35 West 875.00 feet to a #5 rebar (passing through a #5 rebar at 37.50 feet); thence leaving the easterly boundary of the Peoples Property North 43-40-58 East 476.88 feet to a #5 rebar, said rebar being the Beginning Point; thence from said point and place of BEGINNING the following four (4) courses and distances: (1) North 28-53-55 East 200.02 feet to a #5 rebar, (2) South 61-12-02 East 299.92 feet to a #5 rebar located in the westerly margin of the right-of-way of Kingsbury Road (S46-114) (33' right-of-way), (3) with the westerly margin of the right-of-way of Kingsbury Road South 28-52-02 West 200.08 feet to a #5 rebar, and (4) leaving the westerly margin of the right-of-way of Kingsbury Road North 61-11-19 West 300.03 feet to the point and place of BEGINNING.

BK 07866PG0096

The foregoing legal description was derived from that certain survey entitled "Partial Site Plan for Pharr Yarns, Inc., Bethel Township, York County, South Carolina" dated June 11, 1998 and last revised July 29, 1998, drawn by Baird Engineering, Inc., Joe H. Baird (P.L.S. No. 6488), said survey being used in aid of the foregoing legal description.

**LESS AND EXCEPT** all of that certain tract or parcel of real property located in Bethel Township, York County, South Carolina conveyed to Mount Harmony Methodist Church Trustees by Deed recorded in Record Book 2551 at Page 56 of the York County Public Registry and more particularly described as follows:

**BEGINNING** at an iron pin set which is located just south of the southerly margin of the right-of-way of Ridge Road (S 46-27), a 75 foot right-of-way, which iron pin set also marks the northeasterly corner of that certain tract or parcel conveyed to Mount Harmony Methodist Church Trustees by deed recorded in Deed Book 118 at Page 197 in the York County Clerk of Court's Office; thence from said **POINT OF BEGINNING** along and with the easterly boundary of said parcel owned by Mount Harmony Methodist Church Trustees (now or formerly) as previously referred to, S. 19-21-28 W. 317.93 feet to a 1" flat iron found; thence S. 07-23-32 E. 11.91 feet to an iron pin set; thence S. 64-29-05 E. 118.53 feet to an iron pin set; thence N. 25-30-55 E. 344.93 feet to an iron pin set which is located within the right-of-way of said Ridge Road; thence N. 71-14-03 W. 160.22 feet to an iron pin set which marks the **POINT OR PLACE OF BEGINNING** and containing 1.093 acres and designated as Parcel A on boundary survey prepared by Joe H. Baird, P.E. & L.S. designated Plat of Survey for Mount Harmony Methodist Church, Trustees dated November 13, 1998 and which has been recorded in the Office of the Clerk of Court for York County, South Carolina in Map or Plat Book B-47 at Page 8.

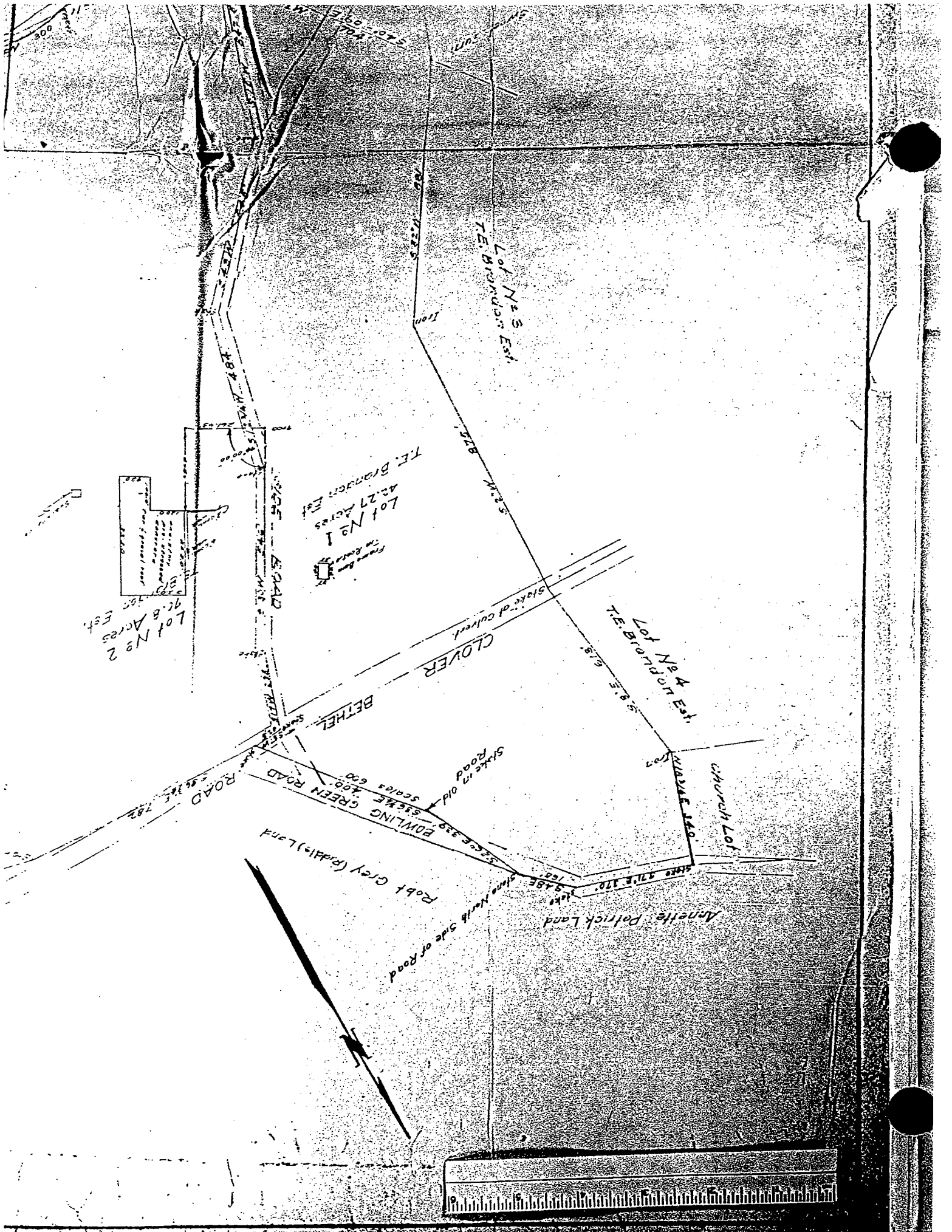
**LESS AND EXCEPT** all of that certain tract or parcel of real property located in Bethel Township, York County, South Carolina to be retained by Pharr Yarns, LLC, containing approximately 64.1488 acres and being more particularly described as follows:

**BEGINNING** at an existing iron rod located in the right-of-way of S.C. Highway 557 (75' public right-of-way) and marking the southwestern corner of the property now or formerly owned by H.E. Hand, Trustee of A.B. Hand Trust (as recorded in Deed Book 79, Page 239 and Deed Book 32, Page 263 of the York County Public Registry) (the "Hand Property"), said iron rod being the Beginning Point; thence from said Beginning Point within the right-of-way of S.C. Highway 557 and the southern boundary line of the Hand Property the following two (2) courses and distances: (1) South 85-01-34 East 442.12 feet to a PK nail set, and (2) with the arc of a circular curve to the left having a radius of 5752.14 feet, a chord bearing and distance of North 87-36-59 East 259.98 feet and an arc length of 260.00 feet to a PK nail set; thence leaving the right-of-way of S.C. Highway 557 a new line South 41-43-24 East 988.45 feet to a calculated point located in Beaver Dam Creek (passing through new iron rods at 46.42 feet (right-of-way) and 975.71 feet (top of creek bank)); thence with the centerline of the creek the following twenty (20) courses and distances: (1) South 17-25-07 West 82.76 feet to a calculated point, (2) South 07-18-17 West 161.50 feet to a calculated point, (3) South 22-08-10 West 145.46 feet to a calculated point, (4) South 33-27-16 West 112.32 feet to a calculated point, (5) South 36-45-51 West 97.95 feet to a calculated point, (6) South 22-10-43 West 113.36 feet to a calculated point, (7) South 17-52-55 West 78.41 feet to a calculated point, (8) South 25-13-21 West 113.07 feet to a calculated point, (9) South 21-48-05 West 150.03 feet to a calculated point, (10) South 31-29-02 West 52.99 feet to a calculated point, (11) South 45-12-28 West 51.05 feet to a calculated point, (12) South 63-35-38 West 62.79 feet to a calculated point, (13) South 71-43-54 West 93.79 feet to a calculated point, (14) South 77-03-37 West 98.36 feet to a calculated point, (15) South 71-59-29 West 102.67 feet to a calculated point, (16) South 66-23-50 West 93.87 feet to a calculated point, (17) South 53-45-58 West 92.55 feet to a calculated point, (18) South 73-15-00 West 104.60 feet to a calculated point, (19) South 68-31-11 West 65.00 feet to a calculated point, and (20) South 74-33-26 West 39.03 feet to a calculated point; thence leaving the centerline of the creek a new line North 46-05-07 West 1257.84 feet to a railroad spike set in the centerline of Kingsbury Road (S46-114; 66' public right-of-way) (passing through a new iron rod at 18.09 feet (top of creek bank) and 1223.74 feet (right-of-way)); thence with the centerline of Kingsbury Road the following three (3) courses and distances: (1) North 29-17-47 East 950.60 feet to a PK nail set, (2) with the arc of a circular curve to the left having a radius of 863.07 feet, a chord bearing and distance of North 20-22-43 East 247.72 feet and an arc length of 248.57 feet to a PK nail set, and (3) North 12-41-12

East 125.90 feet to a PK nail set in the right-of-way of S.C. Highway 557; thence within the right-of-way of S.C. Highway 557 North 78-27-42 East 124.59 feet to the point and place of BEGINNING.

The foregoing legal description was derived from that certain survey entitled "Boundary Survey Made at the Request of Pharr Yarns, Inc., Bethel Township, York County, South Carolina, PID # 4790000015 & 479000002, Deed Book 85 Page 300" dated December 13, 2005, drawn by R.B. Pharr & Associates, P.A., J. Jeffrey Cobb (SCPLS No. 9667), said survey being used in aid of the foregoing legal description.

BK07866PG0098



Lot No 1  
42.27 Acres  
T.E. Brandon Est.

Lot No 2  
90.8 Acres  
T.E. Brandon Est.

Lot No 3  
T.E. Brandon Est.

Lot No 4  
T.E. Brandon Est.

Church Lot

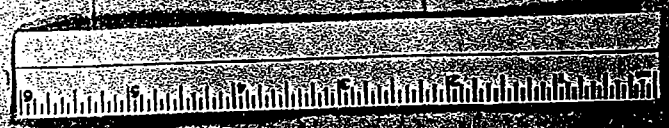
Annette Patrick Land

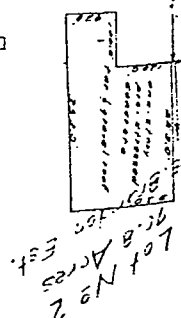
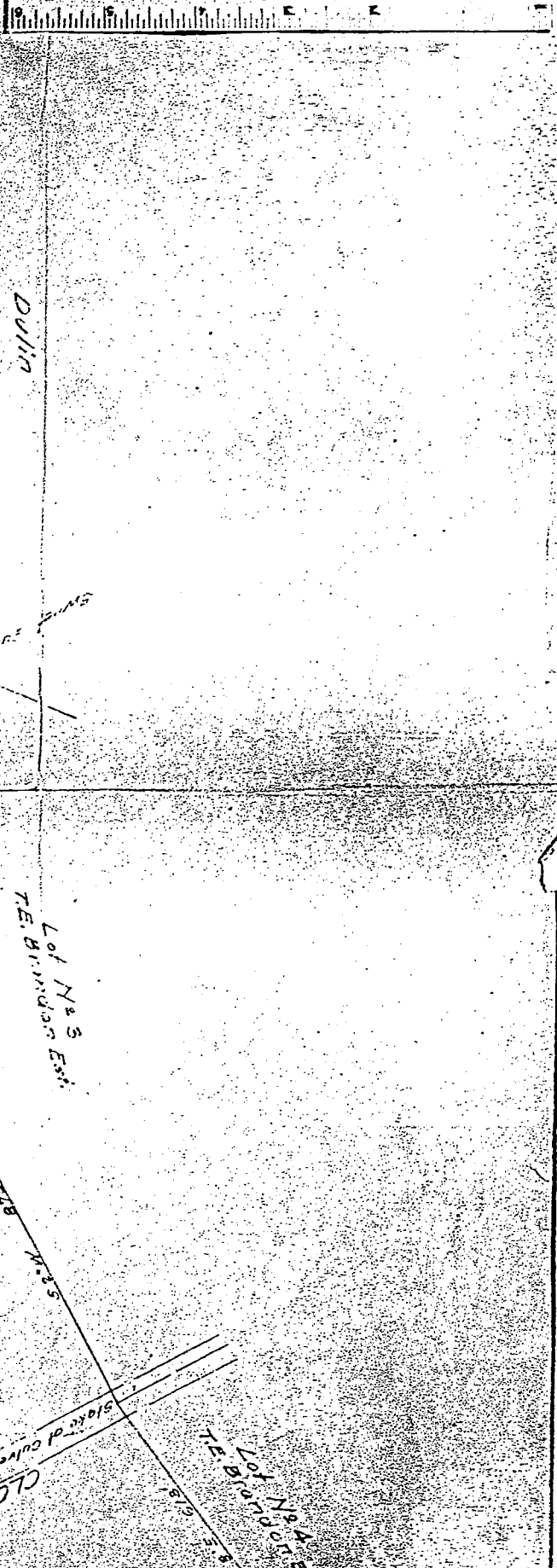
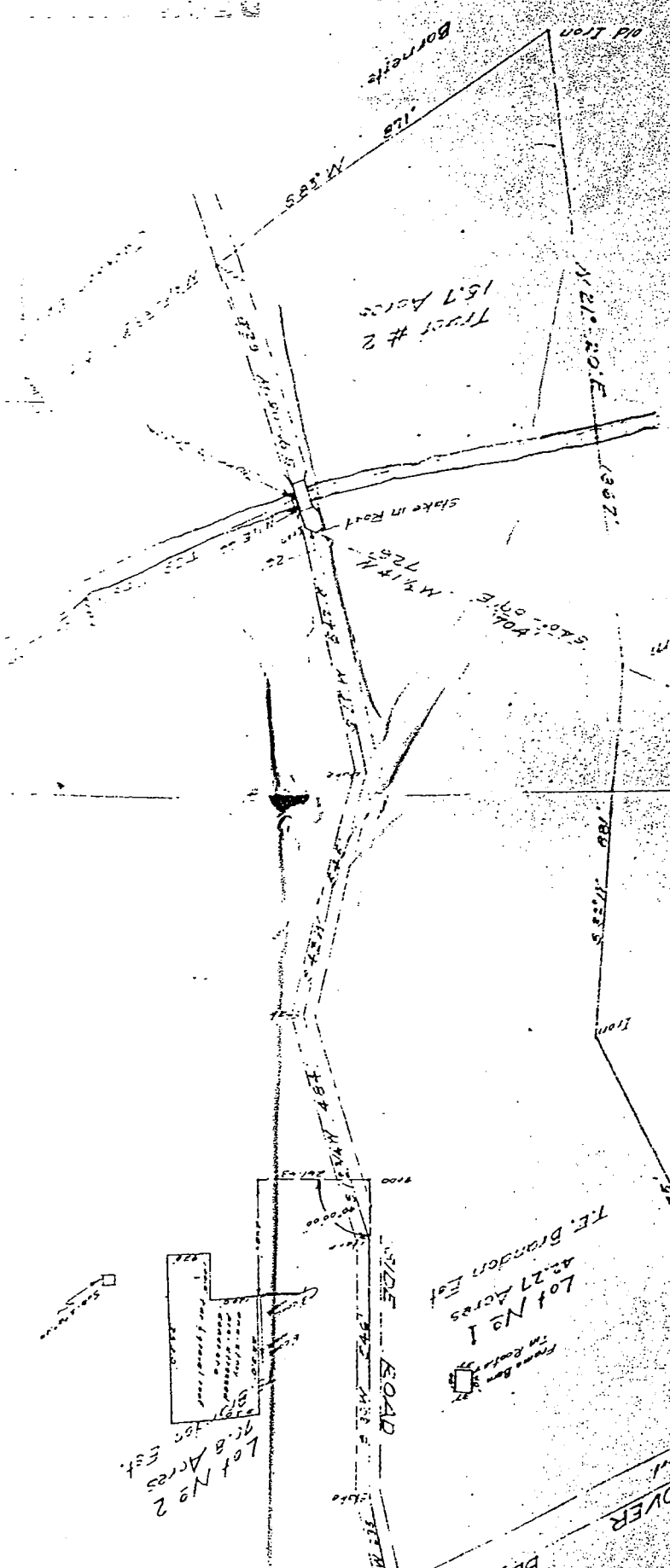
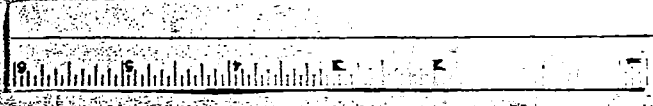
Robt Grey (Rabbit) Land

Edwling Green Road  
State in old  
Road 400  
Scale 600

CLOVER

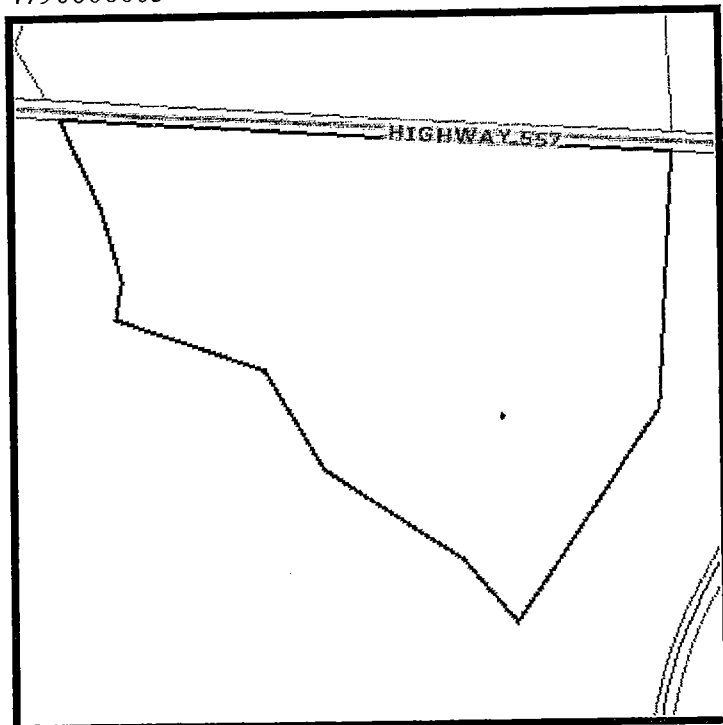
BETHEL





**Property Report for Parcel Number:**  
4790000005

Inquiry Date:



**Owner**

**Owner Name:** PEOPLES MARION B % ES  
MARIAN B PEOPLES  
**Address:** 804 ANDERSON ST  
**City/State:** BRISTOL TN  
**Zip Code:** 37620

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

**Parcel Number:** 4790000005  
**Total Lots:** 0  
**Total Acres:** 50.82  
**Deed Book:** 393  
**Deed Book Page:** 89  
**Platt Book:**  
**Platt Book Page:**  
**School District:** 2  
**Municipality:**  
**Fire Code:** BE-I  
**Property Location:** HWY 55

**Land Value:** \$609800  
**AG Use:**  
**AG Use Value:**  
**Previous Owner:**  
**Tax Bill Information:**  
**Zoning:**  
**Sale Price:** \$0  
**Sale Date:** 0/0/0  
**Census Tract:**  
**Voter District:**

**Building/Structure**

**Prop. Classification:**  
**Heating Type:**  
**Living Area(Sq. Ft.):**  
**Basement:** NO  
**Bathrooms:**  
**Total Imp. Value:**

**Number of Stories:**  
**Year Built:**  
**Garage Area:** NO  
**Fireplace:**  
**Bldg. Value:** \$0

**Assessment**

**Total Assessed Value:** \$214

**Total Market Value\*:** \$609800

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 479-00-00-005 Legal HYW 55

DEED

Grantor L A BRANDON

Grantee MARION B PEOPLES

Book 393 Page 89

Dated 12/20/1965 Recorded 8/8/1966

1-1-2 Previous Ownership

Grantor NA

Grantee

Book Page

Dated Recorded

**Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.**

FILED & RECORDED  
AUG 8 10 59 AM '00  
THAS L. CARROLL  
C. C. & G. S.  
YORK COUNTY, S. C.

STATE OF SOUTH CAROLINA  
COUNTY OF YORK

KNOW ALL MEN BY THESE PRESENTS, That I, L. A. Brandon, of Greensboro, North Carolina, for and ~~in consideration of the sum of ONE HUNDRED (100) DOLLARS~~ ~~of which sum I have received in hand paid by my daughter, Marian B. Peoples, of Bristol, Tennessee, have granted, bargained, sold and released, and by these presents do grant, bargain, sell and release unto the said MARIAN B. PEOPLES:~~

ALL that certain piece or parcel or tract of land situate, lying and being in Bethel Township, in the County of York, in the State of South Carolina, and lying on the Clover-Bethel road, and being particularly described as Tract No. 3, of the T. E. Brandon estate lands, according to a plat thereof made by I. B. Faires, Surveyor, on February 12 and 13, 1940, beginning at a sweet gum, corner of Tract No. 1, and running thence N. 41 1/2 W. 283.5 feet to iron; thence N. 58 1/2 W. 565 feet to iron; thence N. 33 W. 397 feet to iron; thence N. 73 1/2 W. 547 feet to stone and iron on branch; thence N. 8 E. 132 feet to stake; thence N. 17 W. 264 feet to stake; thence W. 25 1/2 W. 335 feet to stake in Clover-Bethel road; thence with said road S. 87 1/2 E. 2165.5 feet to stake at Culvert, Clover-Bethel road; thence S. 2 W. 375 feet to iron; thence S. 32 W. 881 feet to the beginning corner, containing Fifty and 82/100 (50.82) acres, more or less, and being bounded on the North by the Clover-Bethel road, on the East by Tract No. 1 of the estate lands of T. E. Brandon, on the South and West by lands of Dr. T. E. Dulin; and being the same property described in that certain Deed from Mrs. Mabel B. Patrick, et al to the said L. A. Brandon, dated May 11, 1940, and of record in Book 102 of Deeds, page 16, in said State of South Carolina, County of York, and also recorded in Book T. of Deeds, page 14 in said County and State, to which records reference is made.

TOGETHER with all and singular, the rights, members, hereditaments and appurtenances to the said premises belonging or in anywise incident or appertaining.

TO HAVE AND TO HOLD all and singular the premises before mentioned unto the said MARIAN B. PEOPLES, her heirs and assigns forever.

And I do hereby bind myself, my Heirs, Executors and Administrators, to warrant and forever defend all and singular the said premises unto the said Marian B. Peoples, her heirs and assigns, against me and my heirs and against every person whomsoever lawfully claiming, or to claim, the same or any part thereof.

LAW OFFICES  
WOOLSEY, LEONARD  
& KING  
BRISTOL, TENN.-VA.

293 @ 29



WITNESS my hand and seal this 14th day of December, in the year of our Lord one thousand nine hundred and sixty-five, and in the one hundred and seventh-ninth year of the Sovereignty and Independence of the United States of America.

Signed, Sealed and Delivered in the presence of

L. A. Brandon (Seal)  
L. A. Brandon

June A. Testenman  
Hazel O. Curtis

STATE OF NORTH CAROLINA

COUNTY OF Guilford

Personally appeared before me, June A. Testenman, who made oath that she saw the within named L. A. BRANDON sign, seal and as his act and deed, deliver the within written Deed for the uses and purposes therein mentioned; and that he with Hazel O. Curtis witnessed the execution thereof.

SWORN to before me this 20th )  
day of December 19 65 )

June A. Testenman

(L.S.)

Notary Public of North Carolina

Hazel O. Curtis  
STATE OF NORTH CAROLINA

RENUNCIATION OF DOWER

COUNTY OF Guilford

I, Hazel O. Curtis, do hereby certify unto all whom it may concern, that MRS. MAYE B. BRANDON the wife of the within named L. A. BRANDON did this day appear before me, and upon being privately and separately examined by me, did declare that she does freely, voluntarily and without any compulsion, dread, or fear of any person or persons whomsoever, renounce, release and forever relinquish unto the within named MARIAN B. PECPLES, her heirs and assigns, all her interest and estate, and also all her right and claim of Dower of, in or to all and singular the premises within mentioned and released.

Given under my Hand and Seal, this 20th

day of December

Anno Domini 19 65

Maye B. Brandon (SEAL)  
Maye B. Brandon

(L.S.)

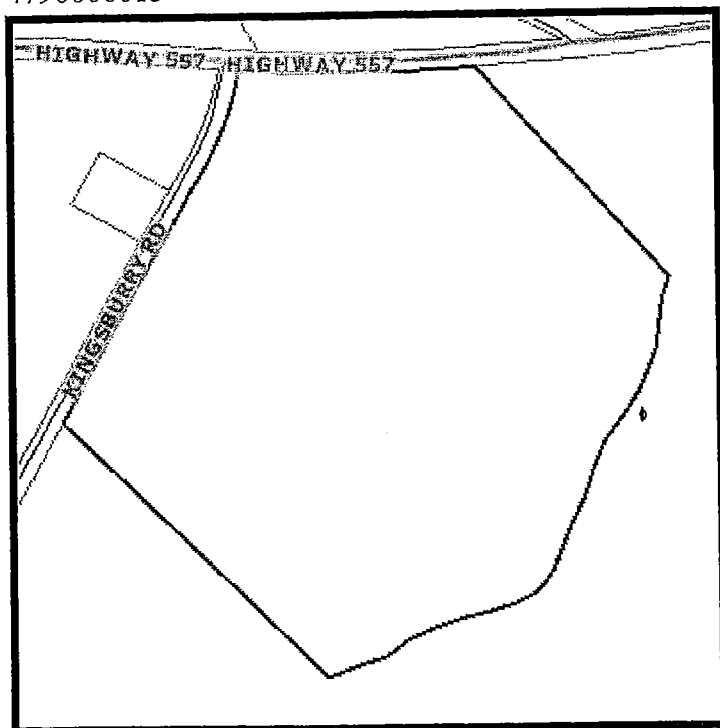
Notary Public of North Carolina

Hazel O. Curtis

Commission Expires November 4, 1966

**Property Report for Parcel Number:**  
4790000015

Inquiry Date:



**Owner**  
**Owner Name:** PHARR YARNS INC  
**Address:** P O BOX 1939  
**City/State:** MCADENVILLE N C  
**Zip Code:** 28101

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

**Parcel Number:** 4790000015  
**Total Lots:** 0  
**Total Acres:** 39.15  
**Deed Book:** 85  
**Deed Book Page:** 300  
**Platt Book:** 34  
**Platt Book Page:** 236  
**School District:** 2  
**Municipality:**  
**Fire Code:** BE-I  
**Property Location:** SCTC 646-00166 ( 25 ACRES )

**Land Value:** \$391500  
**AG Use:**  
**AG Use Value:**  
**Previous Owner:** PHARR YARNS INC  
**Tax Bill Information:**  
**Zoning:**  
**Sale Price:** \$0  
**Sale Date:** 6/27/90  
**Census Tract:**  
**Voter District:**

**Building/Structure**

**Prop. Classification:**  
**Heating Type:**  
**Living Area(Sq. Ft.):**  
**Basement:** NO  
**Bathrooms:**  
**Total Imp. Value:**

**Number of Stories:**  
**Year Built:**  
**Garage Area:** NO  
**Fireplace:**  
**Bldg. Value:** \$0

**Assessment**

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 479-00-00-015 Legal 25 AC SCTC 646-00166

DEED

Grantor YORK COUNTY

Grantee PHARR YARNS INC

Book 85 Page 300

Dated 9/5/1989 Recorded 6/28/1990

1-1-2 Previous Ownership

Grantor CHADBURN GOTHAM INC

Grantee YORK COUNTY

Book 385 Page 22

Dated 12/1/1968 Recorded 1/24/1969

**Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.**

STATE OF SOUTH CAROLINA )  
COUNTY OF YORK )

TITLE TO REAL ESTATE

*CAB*  
C.A.B.

KNOW ALL MEN BY THESE PRESENTS that YORK COUNTY, SOUTH CAROLINA, for and in consideration of the sum of One and No/100 (\$1.00) Dollar ~~XXXXXX~~ to it in hand paid at and before the sealing of these presents by PHARR YARNS, INC., a North Carolina corporation, in the State aforesaid, the receipt of which is hereby acknowledged, has granted, bargained, sold and released, and by these Presents does grant, bargain, sell and release unto the said PHARR YARNS, INC., the property described in Exhibit "A" attached hereto and made a part hereof.

This is the same property conveyed to the Grantor herein by deed of Chadbourn Gotham, Inc. dated and recorded on December 1st, 1968 in Book 385 at Page 22 in the Office of the Clerk of Court for York County, South Carolina. See instrument dated January 24, 1969, recorded in Deed Book 386 at page 195.  
TMS NO. 1479-00-00-015

Grantee's Address: Highway 557, Clover, S. C. 29710.

RECORDED  
BOOK PAGE  
JUN 27 4 03 PM '90  
YORK COUNTY, S.C.

TOGETHER with all and singular, the Rights, Members, Hereditaments, and Appurtenances to the said premises belonging, or in anywise incident or appertaining.

TO HAVE AND TO HOLD, all and singular, the said premises before mentioned unto the said PHARR YARNS, INC. and its Assigns forever.

IN WITNESS WHEREOF, YORK COUNTY, SOUTH CAROLINA has caused these presents to be executed in its name by the Chairman of York County Council duly authorized, and its seal to be hereto affixed this 5th day of June in the year of our Lord one thousand nine hundred eighty-nine and in the two hundred and fourteenth year of the Sovereignty and Independence of the United States of America.

WITNESSES:

YORK COUNTY, SOUTH CAROLINA

Nancy B. Moore  
Shirley S. Sellers

By Caldwell A. Harris  
Chairman, York County Council

RECORDED  
YORK COUNTY  
TAX ASSESSOR'S OFFICE

DATE 6-28-90  
TAX MAP NO. 1479-2415  
INITIALS CAH

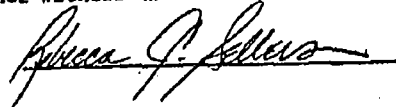
RECORDED  
RECORD  
VOL. 85 PG. 300  
YORK COUNTY, S.C.

STATE OF SOUTH CAROLINA  
COUNTY OF YORK

PERSONALLY appeared before me the undersigned witness and made oath that (s)he saw the within named York County, South Carolina by Caldwell A. Barron, Chairman of York County Council sign, seal, and as its act and deed, deliver the within written Title to Real Estate, and that (s)he with the other witness above-named witnessed the execution thereof.

SWORN to before me this 5<sup>th</sup>  
day of ~~July~~ September 1989.

Nancy B. Moore L.S.  
Notary Public for South Carolina  
My Commission Expires: 11/1/90



**EXHIBIT "A"**

**Legal Description of Property**

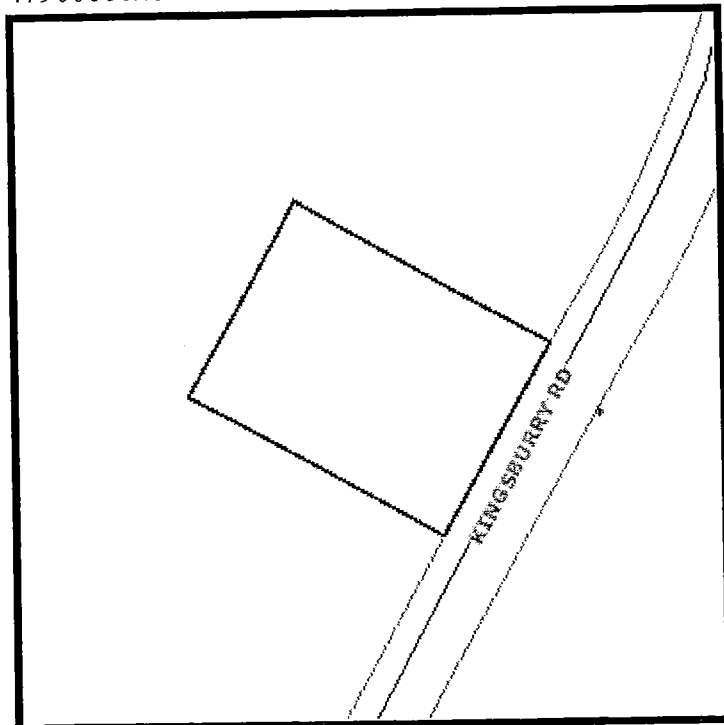
All that certain piece, parcel or tract of land lying and being situated in Bethel Township, York County, South Carolina, in School District Number 2, containing 242.58 acres, more or less, and being more particularly described by metes and bounds on a map thereof made by the office of J. W. Spratt, C. S., dated July, 1956, as revised in December, 1968, and recorded in the Office of the Clerk of Court for York County, South Carolina, in Plat Book 34, Pages 236-237, reference to which plat is hereby made, and such plat is incorporated herein by reference for a more particular description. The said property is bounded on the North by lands of Annette Patrick, Robert Gray, Bowling Green Road, Clover-Bethel Road; on the East by a County Road and lands of Jackson Estate; on the South by lands of Jackson Estate and Barnette lands; and on the West by Dulin lands and lands of T. E. Brandon Estate and church lot.

ALSO

All of the air conditioning equipment and sprinkler system installed or to be installed on the Leased Land (described above) or in the Building as defined in the Lease;

**Property Report for Parcel Number:**  
4790000020

Inquiry Date:



**Owner**  
**Owner Name:** BRACKETT MARCELL  
**Address:** PO BOX 112  
**City/State:** CLOVER S C  
**Zip Code:** 29710

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, York County does not certify the authenticity of ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

**Parcel Number:** 4790000020  
**Total Lots:** 1  
**Total Acres:** 0  
**Deed Book:** 5293  
**Deed Book Page:** 33  
**Platt Book:** 50  
**Platt Book Page:** 57  
**School District:** 2  
**Municipality:**  
**Fire Code:** BE-I  
**Property Location:** HWY 114

**Land Value:** \$28000  
**AG Use:**  
**AG Use Value:**  
**Previous Owner:** BRACKETT JOE L & MARCELLE M  
**Tax Bill Information:**  
**Zoning:**  
**Sale Price:** \$1  
**Sale Date:** 5/19/03  
**Census Tract:**  
**Voter District:**

**Building/Structure**

**Prop. Classification:**  
**Heating Type:**  
**Living Area(Sq. Ft.):**  
**Basement:** NO  
**Bathrooms:**  
**Total Imp. Value:**

**Number of Stories:**  
**Year Built:**  
**Garage Area:** NO  
**Fireplace:**  
**Bldg. Value:** \$66000

**Assessment**

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 479-00-00-020 Legal HYW 114

DEED

Grantor ESTATE OF JOE L BRACKETT  
Grantee MARCELLE M BRACKETT  
Book 5293 Page 33  
Dated 5/11/2003 Recorded 5/19/2003

1-1-2 Previous Ownership

Grantor PHARR YARNS INC  
Grantee JOE L BRACKETT AND MARCELLE M BRACKETT  
Book 539 Page 413  
Dated 11/8/1976 Recorded 11/15/1976

Grantor COUNTY OF YORK  
Grantee PHARR YARNS INC  
Book 538 Page 135  
Dated 9/27/1976 Recorded 10/15/1976

Grantor HUDSON HOSIERY COMPANY  
Grantee YORK COUNTY  
Book 385 Page 22  
Dated 12/1/1968 Recorded 12/27/1968

**Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.**



STATE OF SOUTH CAROLINA

PROBATE COURT

COUNTY OF YORK

IN THE MATTER OF ESTATE OF JOE L. BRACKETT  
CASE NUMBER 99-ES-46-00071

000125965  
RECORDED 05/19/2003 11:17:41AM  
Bk:05293 Pg:00033 Pages:2  
Fee:10.00 State:0.00  
County:0.00 Exempt:-----  
David Hamilton, Clerk of Court  
York County, SC

**DEED OF DISTRIBUTION**

WHEREAS, the decedent died on the 19th day of January, 1999; and,

WHEREAS, the estate of the decedent is being administered in the Probate Court for York County, South Carolina in File #99-ES-46-00071; and,

WHEREAS, the grantee herein is either a beneficiary or heir at law, as appropriate, of the decedent; and,

WHEREAS, the undersigned Personal Representative is the duly appointed and qualified fiduciary in this matter; and,

NOW, THEREFORE, in accordance with the laws of the State of South Carolina, the Personal Representative has granted, bargained, sold and released, and by these Presents does grant, bargain, sell and release to:

Name: Marcelle M. Brackett  
Address: Post Office Box 112  
Clover, South Carolina 29710

**RECORDED**  
YORK COUNTY  
TAX ASSESSOR'S OFFICE

DATE 5-19-03

the decedent's interest in and to the following described properties TAX MAP NO. 479-20

**PARCEL 1:**

INITIALS AC / JN

Situated in the City of Kings Mountain, Number Four Township, Cleveland County, North Carolina and BEGINNING at an iron stake in the Northern margin of Bridges Drive, which iron stake is S. 89 Deg. 30 min. W. 219.17 Feet from the Northwest corner of Bridges Street, and runs thence N. 01 Deg. 26 Min. E. 125.45 Feet to a MK; thence N. 81 Deg. 24 Min. W. 72.4 Feet to an iron stake; thence S. 04 Deg. 56 Min. W. 129.75 Feet to an iron stake in the Northern margin of Bridges Drive; thence along the Norther margin of Bridges Drive at a radius of 407.21, 74.5 Feet; thence along the Northern margin of Bridges Drive at a radius of 407.21, 5.5 Feet to the BEGINNING and being Lot No. 7 in Block "B" as shown on a map or Plat now on record in the Office of the Register of Deeds for Cleveland County in Plat Book 8 at Page 18. ✓

For reference see Deed from G. A. Bridges and wife, to J. Wilson Crawford dated December 28, 1960 now on record in the Office of the Register of Deeds for Cleveland County in Book 8-Z at Page 651; and Deed from J. Wilson Crawford and wife, Eloise S. Crawford to Joe L. Brackett and wife, Marcelle M. Brackett, dated June 16, 1961, now on record in the Office of the Register of Deeds for Cleveland County in Book 9-E at Page 248.

**PARCEL 2:**

All that certain tract or parcel of land lying and being situate in Bethel Township, York County, South Carolina, containing 1.377 acres, fronting on S. C. Highway #S-46-114, the boundaries of which are described by courses and distances on a plat prepared by Robinson & Sawyer, Inc., Engineers and Surveyors, dated July 25, 1974, as follows: BEGINNING at an iron on the northern margin of the right-of-way of S. C. Hwy. #S-46-114, at a point lying 500.0 feet from the center line of S. C. Highway #557, and running thence S 27 - 05 W 200.00 feet to an iron; thence N 62 - 55 W 300.00 feet to an iron; thence N 27- 05 E 200.00 feet to an iron; thence S 62 55 E 300.0 feet to an iron, the BEGINNING POINT.

The plat on which the foregoing courses and distances are shown is recorded in Plat Book 50, Page 57, Office of the Clerk of Court for York County, South Carolina, and is incorporated herein by reference for a more particular description of the property hereby conveyed. ✓

The property herein described was conveyed to Pharr Yarns, Inc. by County of York, State of South Carolina, by deed dated September 27, 1976, recorded on October 15, 1976, in Deed Book 538, Page 135, Office of the Clerk of Court for York County, South Carolina; and thereafter deeded to Joe L. Brackett and Marcelle M. Brackett by deed of Pharr Yarns, Inc. recorded in York County Deed Book 539 at Page 413.

11-8-76  
11-12-76

TOGETHER with all and singular, the Rights, Members, Hereditaments and Appurtenances to the said Premises/Property belonging, or in anywise incident or appertaining.

TO HAVE AND TO HOLD, all and singular, the said Premises/Property unto the said Marcelle M. Brackett, her heirs and assigns forever.

IN WITNESS WHEREOF, the undersigned, as Personal Representative of the estate of the decedent, has executed this Deed, this 11 day of May, 2003.

SIGNED, SEALED AND DELIVERED  
IN THE PRESENCE OF

Estate of: Joe L. Brackett  
by Signature: Marcelle M. Brackett  
Marcelle M. Brackett,  
As Personal Representative

Witness: [Signature]

Witness: [Signature]

BK 05293 PG 0034

THIS IS TO CERTIFY THAT ON THE 25th DAY OF July 1974 I SURVEYED THE PROPERTY SHOWN ON THIS PLAN, AND THAT THE PROPERTY LINES, WALLS AND BUILDINGS ARE AS SHOWN HEREON, THAT THE BUILDINGS LOCATED ON SAID LOT DO NOT ENCRUCH ON ADJACENT PROPERTY OR STREETS, AND THAT NO ADJACENT BUILDING OR WALL ENCRUCHES ON SAID PREMISES

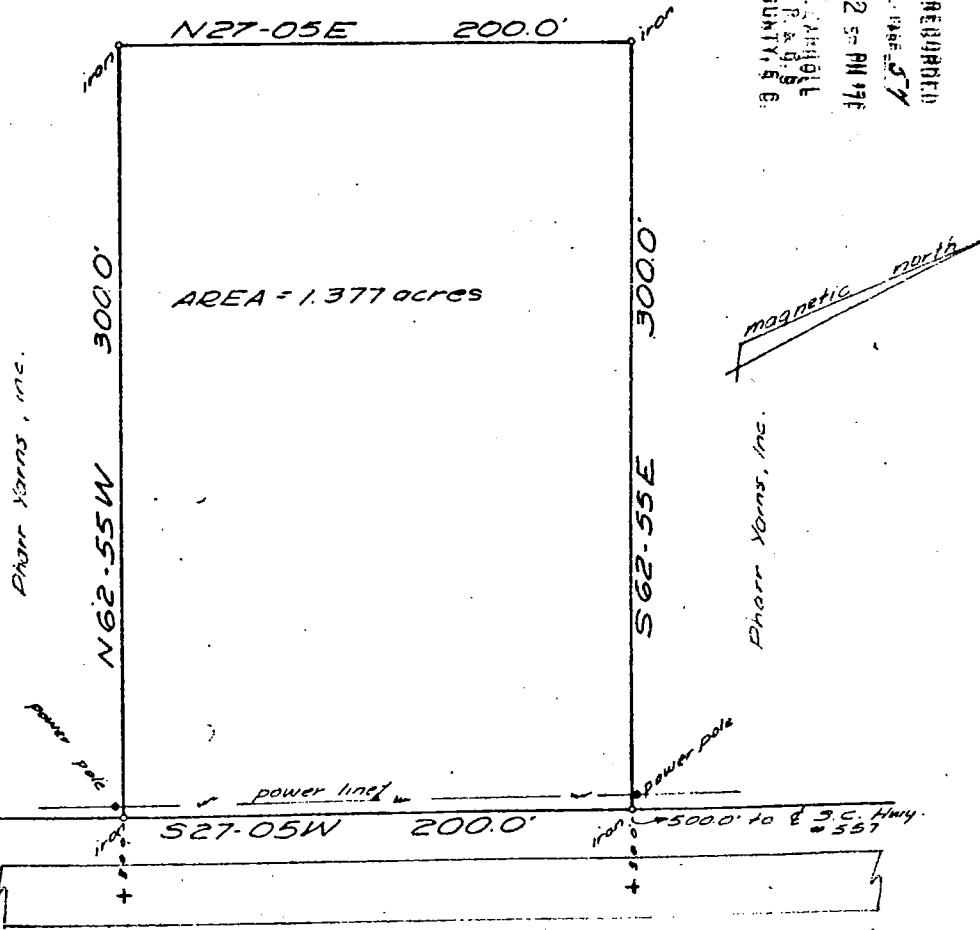
ROBINSON & SAWYER, INC.  
ENGINEERS & SURVEYORS  
GASTONIA, NORTH CAROLINA

SIGNED Bill E. Sawyer

REG. NO. 3126

Pharr Yarns, Inc.

FILED & RECORDED  
BOOK 50 PAGE 57  
AUG 23 2 57 PM 1974  
THAD L. HIGHT  
C.C.P. & S.B.  
YORK COUNTY, S.C.



S.C. HWY. NO S-46-114  
60' RIW - 28' paved  
YORK COUNTY, SOUTH CAROLINA  
SURVEY FOR  
**JOE BRACKETT**

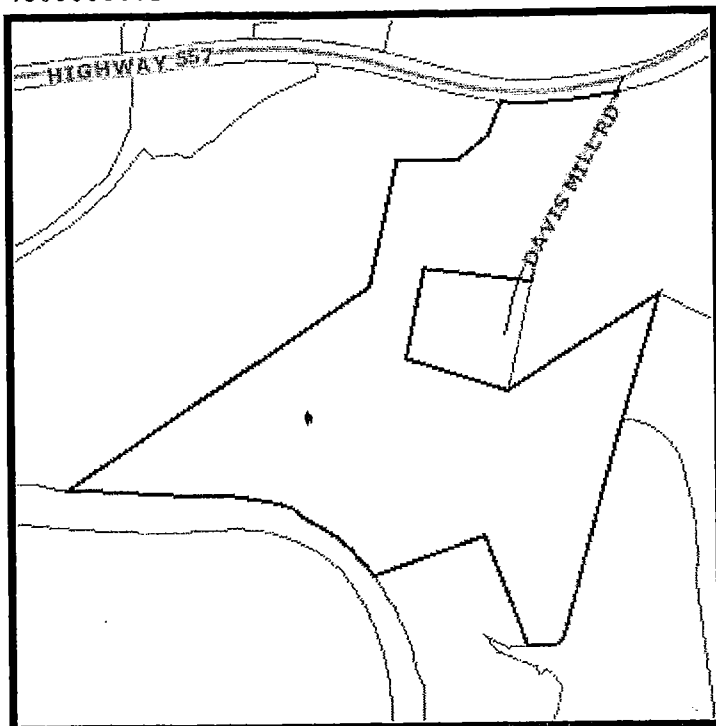
SCALE 1" = 50' DATE July 25 1974

LOT... BLOCK... PLAT BOOK... PAGE... DEED BOOK... PAGE...

50 @ 57-114

**Property Report for Parcel Number:**  
4800000001

Inquiry Date:



**Owner**

**Owner Name:** JACKSON JOHN EDWA  
**Address:** 197 DAVIS MILL ROAD  
**City/State:** CLOVER SC  
**Zip Code:** 29710

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

<b>Parcel Number:</b>	4800000001	<b>Land Value:</b>	\$318200
<b>Total Lots:</b>	0	<b>AG Use:</b>	
<b>Total Acres:</b>	23.57	<b>AG Use Value:</b>	
<b>Deed Book:</b>	3437	<b>Previous Owner:</b>	JACKSON JOHN EDWA
<b>Deed Book Page:</b>	319	<b>Tax Bill Information:</b>	
<b>Platt Book:</b>	B255	<b>Zoning:</b>	
<b>Platt Book Page:</b>	7	<b>Sale Price:</b>	\$1
<b>School District:</b>	2	<b>Sale Date:</b>	2/8/01
<b>Municipality:</b>		<b>Census Tract:</b>	
<b>Fire Code:</b>	BE-I	<b>Voter District:</b>	
<b>Property Location:</b>	TRACT 1 / 23.57 AC / HWY 557		

**Building/Structure**

<b>Prop. Classification:</b>		<b>Number of Stories:</b>	
<b>Heating Type:</b>		<b>Year Built:</b>	
<b>Living Area(Sq. Ft.):</b>		<b>Garage Area:</b>	NO
<b>Basement:</b>	NO	<b>Fireplace:</b>	
<b>Bathrooms:</b>		<b>Bldg. Value:</b>	\$0
<b>Total Imp. Value:</b>			

**Assessment**

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 480-00-00-001 Legal TRT 1 23.57 AC HWY 557

DEED

Grantor CHARLES M JACKSON JR  
Grantee JOHN EDWARD JACKSON  
Book 3437 Page 319  
Dated 2/8/2001 Recorded 2/8/2001

1-1-2 Previous Ownership

Grantor ELIZABETH D JACKSON  
Grantee JOHN EDWARD JACKSON (50%) AND CHARLES M JACKSON JR (50%)  
Book 3090 Page 336  
Dated 4/10/2000 Recorded 4/17/2000

Grantor ESTATE OF CHARLES HOPE JACKSON  
Grantee ELIZABETH D JACKSON  
Book 3090 Page 332  
Dated 4/10/2000 Recorded 4/17/2000

Grantor ESTATE OF ROY JACKSON  
Grantee CHARLES HOPE JACKSON  
PROBATE 466 / 14247  
Dated 3/21/1964 Recorded 1/8/1965

**Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.**

STATE OF SOUTH CAROLINA  
COUNTY OF YORK  
Deed prepared only  
Title not examined

00003816  
RECORDED 02/08/2001 11:24:38AM  
Bk:03437 Pg:00319 Pages:3  
Fee:10.00 State:0.00  
County:0.00 Exempt:

David Hamilton, Clerk of Court  
Haselden, Owen & Blaylock  
P.O. Box 173 York County, SC  
Clover, SC 29710

TITLE TO REAL ESTATE

KNOW ALL MEN BY THESE PRESENTS, That I, Charles M. Jackson, Jr., for and in consideration of the sum of division of property, to him in hand paid at and before the sealing of these presents, by JOHN EDWARD JACKSON, 197 Davis Mill Road, Clover, SC 29710, in the State aforesaid, (the receipt whereof is hereby acknowledged), has granted, bargained, sold and released unto JOHN EDWARD JACKSON, his heirs, successors and assigns, all my right, title and interest in and to the following described property:

All that certain piece, parcel or tract of land located on South Carolina Highway 557, Bethel Township, York County, South Carolina, containing 23.57 acres and being more particularly shown and described as Tract 1 on plat of property prepared by Precision Surveyors, Inc. dated 8/9/00, said plat being recorded in Plat Book B-255, Page 7, Office of the Clerk of Court for York County, South Carolina and incorporated herein by reference.

This is a portion of the property described in deed recorded in Record Book 3090, Page 336, Office of the Clerk of Court for York County, South Carolina.

The above described property is conveyed subject to all easements, restrictions, and rights of way, if any, appearing of record in the chain of title of the subject property or visible upon an actual, physical inspection of the subject property.

TOGETHER with all and singular, the rights, members, hereditaments and appurtenances to the said premises belonging or in anywise incident or appertaining.

RECORDED  
YORK COUNTY  
TAX ASSESSOR'S OFFICE

3816 Bk:3437 Pg:319

DATE 2-8-01  
TAX MAP NO. 480-1  
INITIALS AC / d/n

(1)

TO HAVE AND TO HOLD all and singular the premises before mentioned unto the said John Edward Jackson, his heirs, successors and assigns, forever.

AND Grantor does hereby bind himself and his heirs, successors and assigns, to warrant and forever defend all and singular the said premises unto the said John Edward Jackson, his heirs and assigns, against himself and his heirs, successors and assigns and against every person whomsoever lawfully claiming, or to claim, the same or any part thereof.

WITNESS the Hand and Seal of the Grantor this 3<sup>rd</sup> day of February, in the year of our Lord two thousand and in the two hundred and twenty fifth year of the Sovereignty and Independence of the United States of America.

SIGNED, SEALED AND DELIVERED  
IN THE PRESENCE OF:

Anna C. Hooper  
See D. Lane

Charles M. Jackson, Jr.  
Charles M. Jackson, Jr.

STATE OF SOUTH CAROLINA )  
 )  
COUNTY OF YORK )

PROBATE

PERSONALLY APPEARED before me Ann C. Hogue and  
made oath that She saw the within-named Grantor, sign, seal, and  
as his act and deed, deliver the within-written Deed for the uses  
and purposes therein mentioned; and that She with \_\_\_\_\_  
Sue B Love witnessed the execution thereof.

Ann C. Hogue

SWORN TO before me this

2nd day of July, 2000.

Sue B Love (SEAL)  
Notary Public for South Carolina  
My Commission Expires 7/25/2004

3816 Bk:3437 Pg:321



**SUBDIVISION SURVEY OF**

**A 7.613 ACRE TRACT, LOCATED AT THE  
INTERSECTION OF KENWOOD LANE AND OLD FRIENDSHIP ROAD  
CATAWBA TOWNSHIP, YORK COUNTY, SOUTH CAROLINA  
PROPERTY SHOWN BEING A PORTION OF TAX PARCEL 752-21**

**REFERENCE: PLAT BY A. ALLAN WALLWORK R.L.S.  
FOR GEORGE T. RATEREE, DATED SEPTEMBER 18, 1998  
RECORD BOOK 2430, PAGE 163**

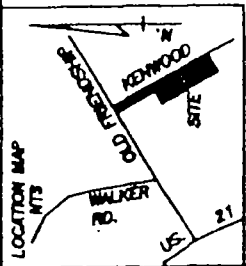
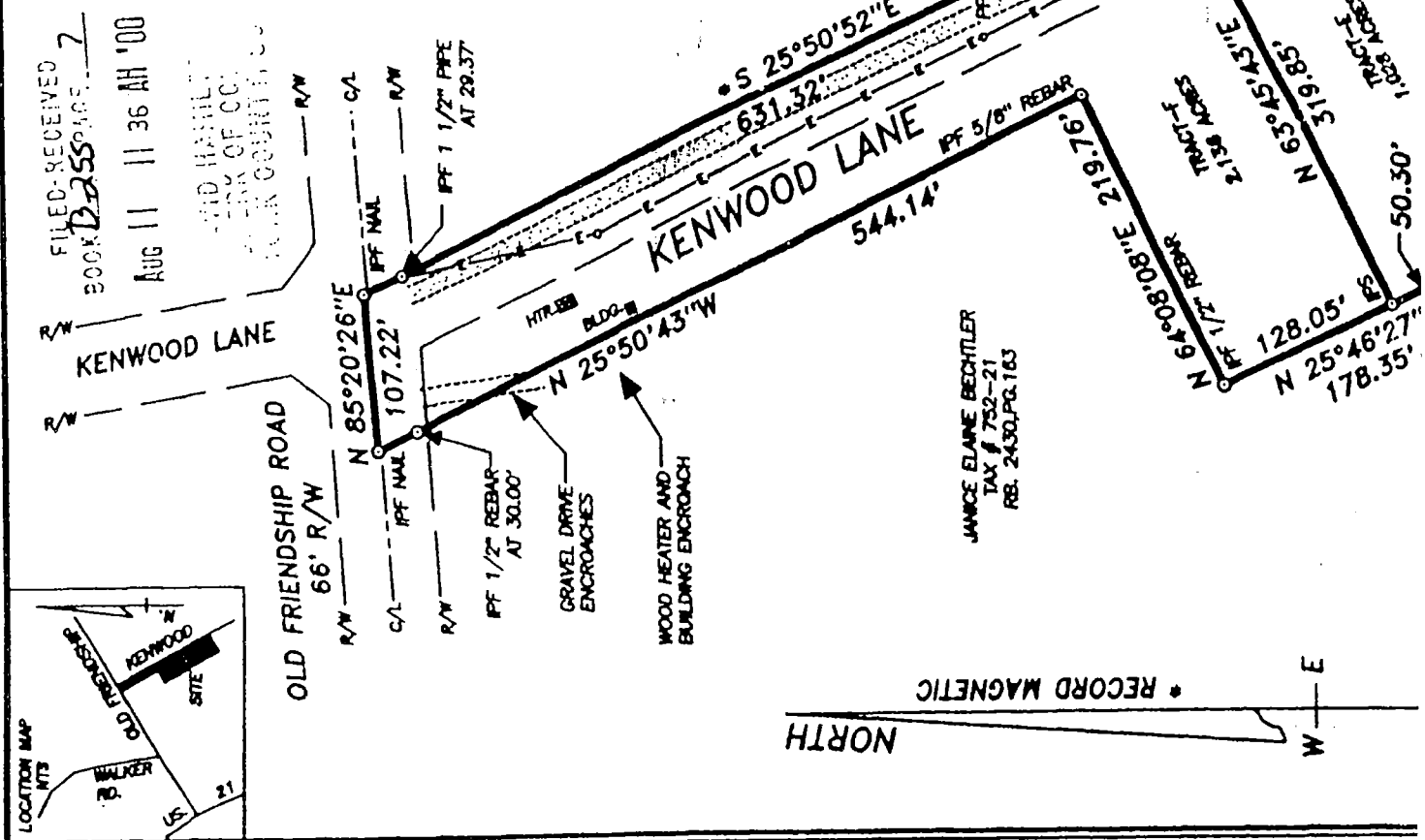
**SURVEYED JULY 20, 2000**

**TRACTS TO BE CONVEYED**

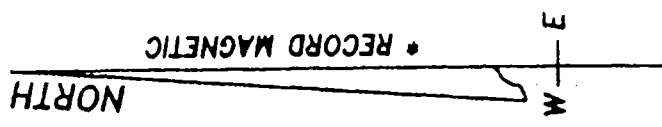
TRACT	TO
A	DAVID GILLES
B	MARCIA GILLES
C	RICHARD GILLES
D	DENNIS AND CINDY GILLES
E	JOHN GILLES
F	CHRISTOPHER GILLES

NORRINE COLLINS  
TAX # 752-20  
RB. 2162, PG. 302

JANICE ELAINE BECHTLER  
TAX # 752-21  
RB. 2430, PG. 163



FILED: RECEIVED  
BOOK 2430, PAGE 163  
AUG 11 11 36 AM '00  
YORK COUNTY, SOUTH CAROLINA



50' ACCESS EASEMENT  
KENWOOD LANE ( GRAVEL )

2.18 ACRES TRACT F  
N 63°45'43\"/>

870.42'  
631.32'  
140.00'

OLD FRIENDSHIP ROAD  
66' R/W  
N 85°20'26\"/>

KENWOOD LANE  
S 25°50'52\"/>

N 25°50'43\"/>

219.79'  
N 64°08'08\"/>

PF 1/2\"/>

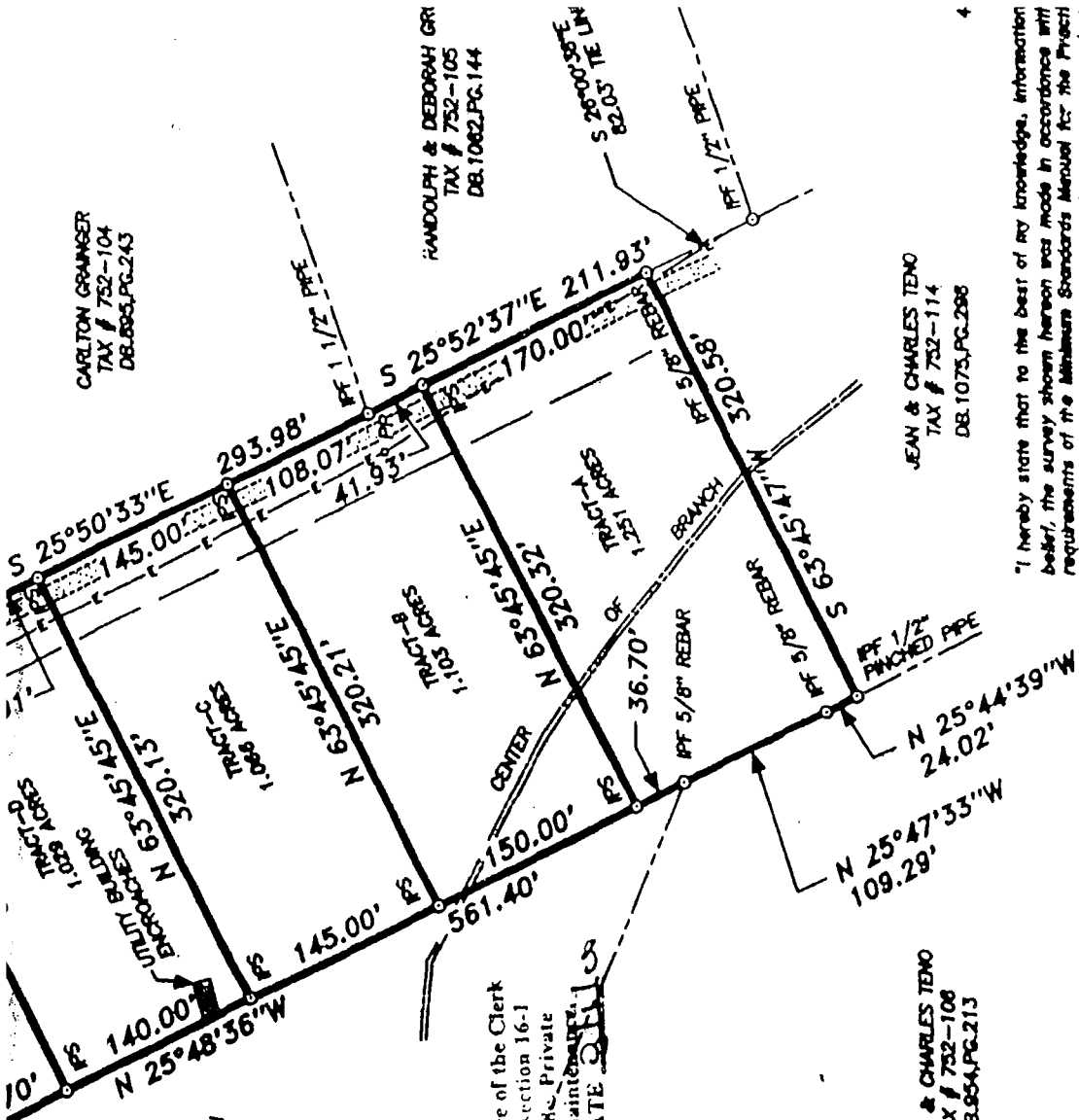
PF 1/2\"/>

PF 1/2\"/>

PF 5/8\"/>

GRAVEL DRIVE ENCROACHES

WOOD HEATER AND BUILDING ENCROACH



CARLTON GRANGER  
TAX # 752-104  
DB.885,PG.243

RANDOLPH & DEBORAH GRI  
TAX # 752-105  
DB.1082,PG.144

JEAN & CHARLES TENO  
TAX # 752-114  
DB.1075,PG.288

FRANKLIN D. McLELLAN  
TAX # 752-733  
RB.1284,PG.44

MARIA & CHARLES TENO  
TAX # 752-108  
DB.954,PG.213

**PLAT EXEMPTION**

This plat is approved for recording in the office of the Clerk of Court of York County, South Carolina per section 16-1 (a) of the South Carolina Code of Laws, Title 16, Chapter 1, in compliance with the provisions of the South Carolina Code of Laws, Title 16, Chapter 1, Section 16-1-10, which provides for county road maintenance access easement not eligible for county road maintenance. COMMISSION AGENT DATE 03/11/15

\* This plat is subject to Tree Ordinance.

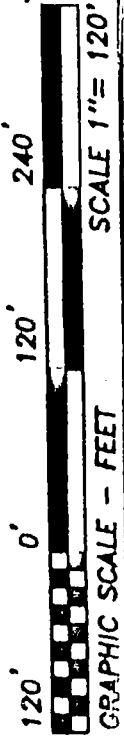
**LEGEND**

- PF - IRON PIN SET 3/4" REBAR UNLESS OTHERWISE NOTED
  - PF - IRON PIN FOUND
  - MMG - MAG NAIL SET
  - P1 - POINT
  - C/L - CENTER LINE
  - R/W - RIGHT-OF-WAY
  - LP - LIGHT POLE
  - PP - POWER POLE
- NOTES: PROPERTY NOT LOCATED WITHIN A DESIGNATED FLOOD ZONE AREA AS DETERMINED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY UNLESS OTHERWISE NOTED.

John F. Miller, Jr.  
Land Surveyor  
1087 Malvern St.  
Beaufort, NC 28520  
Tel: (252) 388-8825

I hereby state that to the best of my knowledge, information and belief, the survey shown hereon was made in accordance with the requirements of the Minimum Standards Manual for the Practice of Land Surveying in South Carolina, and meets or exceeds the requirements for a class A survey as specified therein, and there are no encroachments, projections, or setbacks affecting the property other than shown.

*John F. Miller, Jr.*  
John F. Miller, Jr. SCRS 1



BUSINESS

FILED-RECEIVED  
BOOK B-255

AUG 11 11 32 AM '00

REC'D  
COUNTY CLERK  
TOLSON, MISSOURI

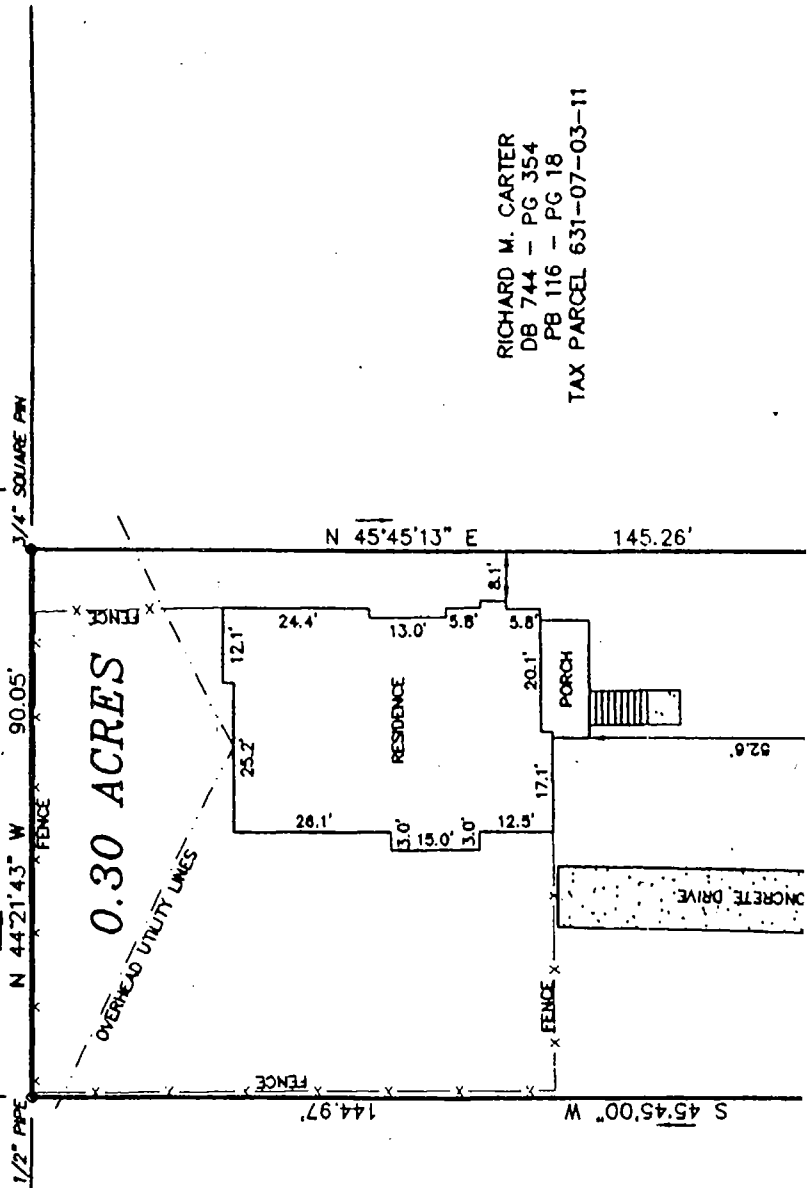


### VICINITY MAP

(NOT TO SCALE)

LAURA F. HOLLADAY  
DB 926 - PG 100  
PB 3 - PG 246  
TAX PARCEL 631-07-03-07

JUDY LESSLIE FUNSTON  
DB 765 - PG 4  
PB 117 - PG 38  
TAX PARCEL 631-07-03-06



RICHARD M. CARTER  
DB 744 - PG 354  
PB 116 - PG 18  
TAX PARCEL 631-07-03-11

SHANE K. BAKER et al  
DB 1474 - PG 257  
PB 4 - PG 279  
TAX PARCEL 631-07-03-16

3/4" SQUARE PIN

90.04'

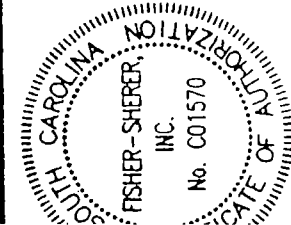
S 44°10'32" E

5/8" REBAR

S 45°33'34" E 772.61' TO A MAG NAIL IN CENTERLINE  
INTERSECTION OF JOHN ST. & CHERRY RD.  
(THE LINE)

JOHN STREET 50' R/W

NEW LOTS OR PROPERTY LINES ESTABLISHED.



FISHER - SHERER  
INC.  
ENGINEERING & SURVEYING  
2051 EBENEZER ROAD  
ROCK HILL, S.C. 29732  
803-327-1232  
800-535-9920

O. C01570

PROPERTY SURVEYED FOR  
**DAVID G. PEARCE**  
LOCATED AT 1059 JOHN STREET  
IN THE CITY OF ROCK HILL  
YORK COUNTY, SOUTH CAROLINA  
JULY 12, 2000

THIS PROPERTY IS DESIGNATED AS BEING THE SAME AS THAT SHOWN  
ON PLAT OF PROPERTY OF ROBERT L. WALDRON & DIANNE L. WALDRON  
RECORDED IN PLAT BOOK 94, PAGE 834.  
TAX PARCEL 631-07-03-18

reby state that to the best of my knowledge, information, and belief, the  
y shown herein was made in accordance with the requirements of the  
um Standards Manual for the Practice of Land Surveying in South Carolina,  
meets or exceeds the requirements for a Class A survey as specified  
in; also there are no visible encroachments or projections other than shown.  
is to certify that I have consulted the Federal Insurance Administration Flood  
rd Boundary Map and found that the above described is not located in  
eical flood hazard area.

*Robert R. Medford*  
ROBERT R. MEDFORD S.C. P.L.S. 11065

REVISIONS

MONUMENTS LEGEND

FOUND SET  
IRON PIPE O    
IRON PIN •

SCALE 1" = 30'



**Property Report for Parcel Number:**

4800000002

Inquiry Date:



**Owner**

**Owner Name:**

VAN EVERY HELEN M  
TRUSTEE

**Address:**

111 S LONGFELLOW LAN

**City/State:**

MOORESVILLE N C

**Zip Code:**

28117

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

**Parcel Number:** 4800000002  
**Total Lots:** 0  
**Total Acres:** 71.08  
**Deed Book:** 1202  
**Deed Book Page:** 297  
**Platt Book:** 44  
**Platt Book Page:** 156  
**School District:** 2  
**Municipality:**  
**Fire Code:** BE-I  
**Property Location:** HWY 557 (71.082 AC)

**Land Value:** \$924000  
**AG Use:**  
**AG Use Value:**  
**Previous Owner:** VAN EVERY STEPHEN  
**Tax Bill Information:**  
**Zoning:**  
**Sale Price:** \$500000  
**Sale Date:** 3/6/95  
**Census Tract:**  
**Voter District:**

**Building/Structure**

**Prop. Classification:**  
**Heating Type:**  
**Living Area(Sq. Ft.):**  
**Basement:** NO  
**Bathrooms:**  
**Total Imp. Value:**

**Number of Stories:**  
**Year Built:**  
**Garage Area:** NO  
**Fireplace:**  
**Bldg. Value:** \$657000

**Assessment**

**Total Assessed Value:** \$27027

**Total Market Value\*:** \$1581000

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 480-00-00-002 Legal 71.082 AC - HWY 557

DEED

Grantor ESTATE OF STEPHEN H VAN EVERY JR  
Grantee HELEN M VAN EVERY Trustee of HELEN M VAN EVERY REVOCABLE LIVING TRUST  
Book 1202 Page 297  
Dated 2/28/1995 Recorded 3/7/1995

1-1-2 Previous Ownership

Grantor HELEN M VAN EVERY Trustee of HELEN M VAN EVERY REVOCABLE LIVING TRUST  
Grantee STEPHEN H VAN EVERY JR  
Book 326 Page 32  
Dated 10/18/1991 Recorded 10/22/1991

Grantor HELEN M VAN EVERY  
Grantee HELEN M VAN EVERY Trustee of HELEN M VAN EVERY REVOCABLE LIVING TRUST  
Book 235 Page 295  
Dated 5/3/1991 Recorded 5/10/1991

Grantor NCNB NATIONAL BANK OF NORTH CAROLINA Trustee of STEPHEN H VAN EVERY SR REVOCABLE LIVING TRUST  
Grantee HELEN M VAN EVERY  
Book 33 Page 248  
Dated 3/13/1990 Recorded 3/15/1990

Grantor STEPHEN H VAN EVERY SR  
Grantee STEPHEN H VAN EVERY SR REVOCABLE LIVING TRUST  
Book 1132 Page 43  
Dated 11/2/1989 Recorded 11/7/1989

Grantor     BETHEL REALTY CO INC  
Grantee     STEPHEN H VAN EVERY SR  
Book       512                    Page           321  
Dated       5/16/1975            Recorded       5/19/1975

Grantor     HERBERT KIRSH, LEROY PENDLETON, V MARSHALL STINE, FRED C ROBINSON AND CHESTER A WINGATE  
Grantee     BETHEL REALTY CO INC  
Book        461                    Page           201  
Dated       8/23/1973            Recorded       8/23/1973

Grantor     VIRGINIA H DAVIS AND FLOYD M DAVIS JR  
Grantee     HERBERT KIRSH, LEROY PENDLETON, V MARSHALL STINE, FRED C ROBINSON AND CHESTER A WINGATE  
Book        435                    Page           335  
Dated       3/22/1972            Recorded       3/23/1973

Grantor     SARAH E DAVIS  
Grantee     VIRGINIA H DAVIS AND FLOYD M DAVIS JR  
Book        71                     Page           60  
Dated       2/15/1928            Recorded       2/15/1928

***Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.***

2,470.00  
1334

FILED-RECEIVED  
BOOK  
Mar 6 11 13 AM '95  
ROD DENNIS  
CLERK OF COURSE  
YORK COUNTY, S.C.

KENNEDY COVINGTON LOBDELL & HICKMAN, L.L.P.  
ATTORNEYS-AT-LAW  
ROCK HILL, SC  
TITLE TO REAL ESTATE  
TITLE NOT EXAMINED  
DATE 3-7-95  
TAX ASSESSOR'S OFFICE  
YORK COUNTY  
MAP NO. 4180-214

KNOW ALL MEN BY THESE PRESENTS, that Henry C. Lomax, as

Personal Representative of the Estate of Stephen H. Van Every, Jr. (hereinafter referred to as "Grantor") for and in consideration of the sum of FULL VALUE - SEE

AFFIDAVIT OF TRUE CONSIDERATION to Grantor in hand paid at and before the sealing of these presents by Helen M. Van Every, Trustee of the Helen M. Van Every Revocable Living Trust Agreement Dated October 24, 1989 (hereinafter referred to as "Grantee"), of 5 Dune Oaks Run, DeBordieu Colony, Georgetown, South Carolina 29440 (the receipt whereof is hereby acknowledged), has granted, bargained, sold and released, and by these Presents does grant, bargain, sell and release unto the said Grantee, her Successors and Assigns, the following described property, to wit:

SEE ATTACHED EXHIBIT "A" FOR LEGAL DESCRIPTION.

The within described property is conveyed subject to all restrictive covenants, easements and rights-of-way of way of record or apparent upon a reasonable inspection of the premises.

COUNTY CONVEYANCE TAX PAID \$ 1330.00

TOGETHER with all and singular the Rights, Members, Hereditaments and Appurtenances to the said premises belonging, or in anywise incident or appertaining.

TO HAVE AND TO HOLD, all and singular, the said Premises before mentioned, unto the said Grantee, her Successors and Assigns, forever.

STATE OF SOUTH CAROLINA  
SOUTH CAROLINA TAX COMMISSION  
DOCUMENTARY TAX  
MAR-ESS TAX  
999,999

STATE OF SOUTH CAROLINA  
SOUTH CAROLINA TAX COMMISSION  
DOCUMENTARY TAX  
MAR-ESS TAX  
999,999

RECORDED  
RECORD  
VOL 1202 PG 297  
YORK COUNTY, S.C.



AND Grantor, as Personal Representative aforesaid, hereby binds Grantor, as Personal Representative, and the Grantor's Successors and Assigns, as such Personal Representative, to warrant and defend all and singular the said premises unto the said Grantee, her Successors and their Assigns, against the Grantor, as Personal Representative, the Successors and Assigns of the Grantor, and does further covenant that he has not done or suffered anything whereby the said premises have been encumbered in any way whatsoever by the said Grantor as Personal Representative as aforesaid.

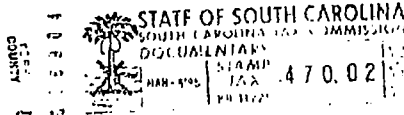
Witness the Hand(s) and Seal(s) of the Grantor this 28th day of February in the year of our Lord one thousand nine hundred and ninety-five and in the two hundred and nineteenth year of the Sovereignty and Independence of the United States of America.

Signed, sealed and delivered  
in the presence of

THE ESTATE OF STEPHEN H.  
VAN EVERY, JR.

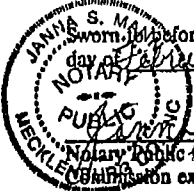
Mary D. [Signature]  
Patricia A. Wood

BY: [Signature]  
Henry C. Longax  
As Personal Representative



STATE OF NORTH CAROLINA )  
COUNTY OF MECKLENBURG )

PERSONALLY APPEARED before me the undersigned witness and made oath that s/he saw the within named Seller sign, seal and as his act and deed, deliver the within written Title to Real Estate; and that s/he with the other witness above-named witnessed the execution thereof.

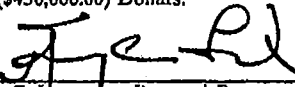
  
Sworn before me this 28th  
day of February, 1995.  
Janice S. Mann  
Notary Public for North Carolina  
Commission expires: 9-19-99

Tracy D. Duce  
Janice S. Mann

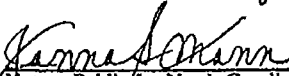
STATE OF SOUTH CAROLINA }  
COUNTY OF YORK }

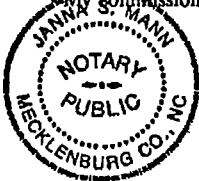
AFFIDAVIT OF TRUE CONSIDERATION

PERSONALLY appeared before me Henry C. Lomax, as Personal Representative of the Estate of Stephen H. Van Every, Jr., who first being duly sworn, states that he is familiar with the transfer of fee simple title of the property described on Exhibit "A" attached hereto located in York County, South Carolina, by Henry C. Lomax, as Personal Representative of the Estate of Stephen H. Van Every, Jr. ("Grantor") to Helen M. Van Every, Trustee of the Helen M. Van Every Revocable Living Trust Agreement Dated October 24, 1989 ("Grantee"), as shown by the within Title to Real Estate; that the affiant of his own knowledge avers that the actual consideration paid by the Grantee and received by the Grantor was Five Hundred Thousand and No/100 (\$500,000.00) Dollars plus forgiveness of Note due the Grantee from the late Stephen H. Van Every, Jr. in the amount of Four Hundred Fifty Thousand and No/100 (\$450,000.00) Dollars.

 (SEAL)  
Henry C. Lomax as Personal Representative of  
the Estate of Stephen H. Van Every, Jr.

SWORN to before me this  
28th day of February, 1995.

 (L.S.)  
Notary Public for North Carolina  
My commission expires: 9-19-99



**EXHIBIT "A"**

**PARCEL 1:**

All that certain piece, parcel or tract of land consisting of 71.082 acres, more or less, and being shown and described on plat prepared by General Surveyors, Inc. dated May 16, 1975 and recorded in Plat Book 44, at Page 156, reference to which said plat is hereby made for a more particular description of the premises.

**PARCEL 2:**

All that certain piece, parcel or tract of land consisting of 26.200 acres, more or less, and being shown and described on plat prepared by General Surveyors, Inc. dated May 16, 1975, entitled "Boundary Survey of Stephen H. Van Every" and recorded in Plat Book 44, at Page 156, reference to which plat is hereby made for a more particular description of the premises.

**TAX MAP NUMBERS:** 480-00-00-002 and 480-00-00-004

**DERIVATION:** Deed from Helen M. Van Every, as Trustee of the Helen M. Van Every Revocable Living Trust Agreement to Stephen H. Van Every, Jr. dated October 18, 1991, recorded October 22, 1991 in Record Book 326, Page 32. See also Quitclaim Deed from Helen M. Van Every, as Trustee of the Helen M. Van Every Revocable Living Trust Agreement to Stephen H. Van Every, Jr. dated May 19, 1993, recorded May 23, 1993 in Record Book 717, Page 151, Office of the Clerk of Court for York County, South Carolina.

BOUNDARY SURVEY OF  
**STEPHEN H. VAN EVERY, SR.**  
PROPERTY

Berkeley Township York County, South Carolina

Date: May 16, 1979

General Surveyors, Inc.  
210 Latta Arcade

Charlotte, North Carolina

James M. Honeycutt, S.C.E.L.S. # 5087  
316-5763

Scale: 1" = 100'

*James M. Honeycutt*  
Surveyor

69.901 Acres Net Area Tract I  
25.544 Acres Net Area Tract II  
95.445 Acres Total



107.10' N. 87°18'00"E  
133.30'

S 04°00'48"W 812.87' (total from g) Sandy Clay Road

800.44'

S 14°5'48"W 105.47'

S 15° 53'

S.C. NO. 235

S.C. NO. 557

66.4%

100% APPROVED  
10/10/10 10:00 AM

490  
250

71,002 AC  
- 1,781 AC  
69,301 AC

TRAC

EV OF  
EVERY, SR.

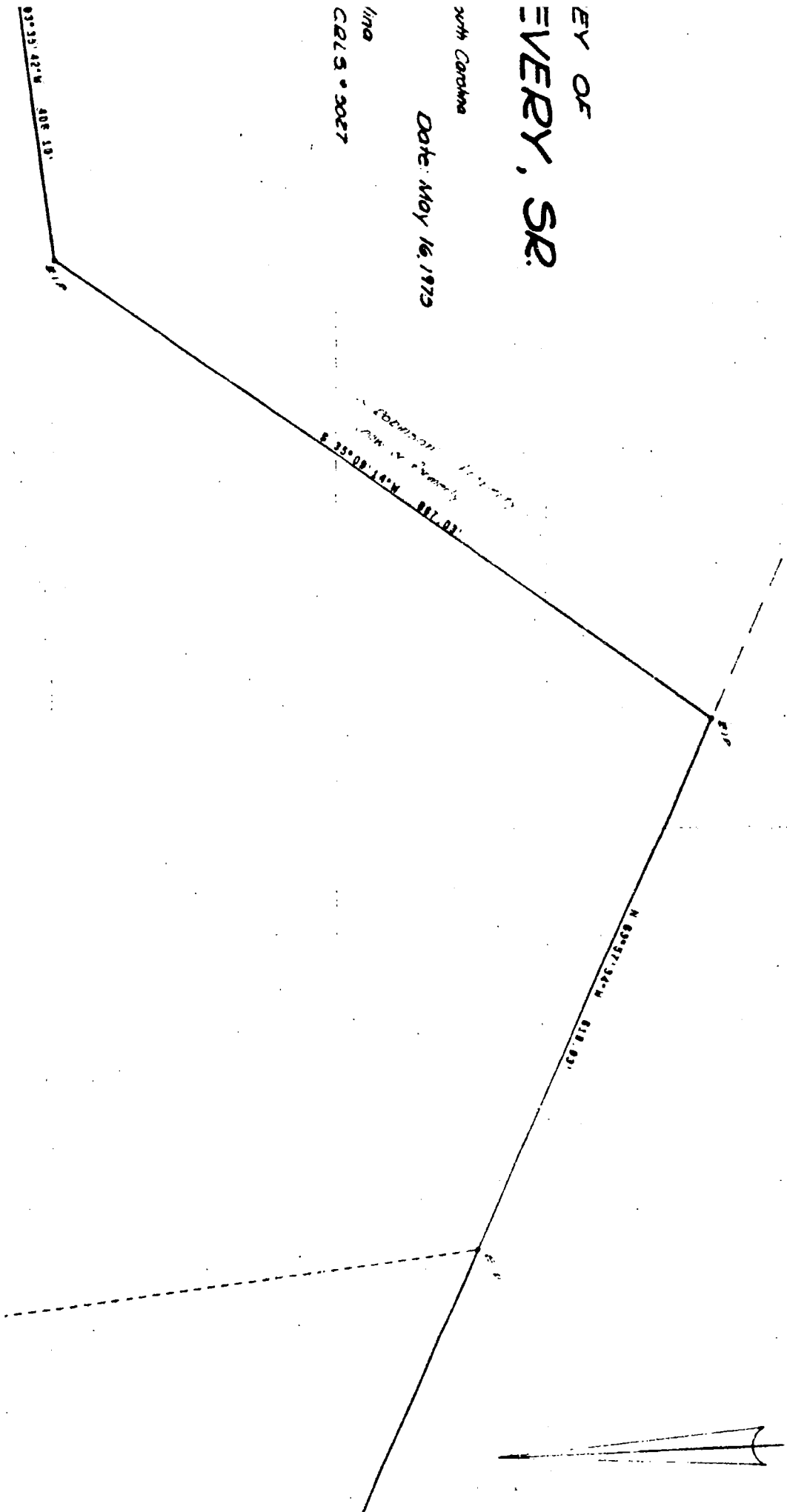
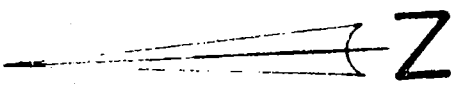
with Corchma

Date: May 16, 1975

line

CALG \* 3027

FILED & RECORDED  
May 19 10 40 AM '75  
THAD L. STROHL  
C. C. P. & O. S. C.  
YORK COUNTY, S. C.



83° 33' 42\"/>

208.10'

107.78' N 81° 10' 55\"/>

N 82° 57' 30\"/>

TRACT I

71.082 ACRES GROSS  
- 1.781 ACRES IN R/W  

---

69.301 ACRES NET

N 05°58'53"W  
1308.48'  
1991.23' (total to C)

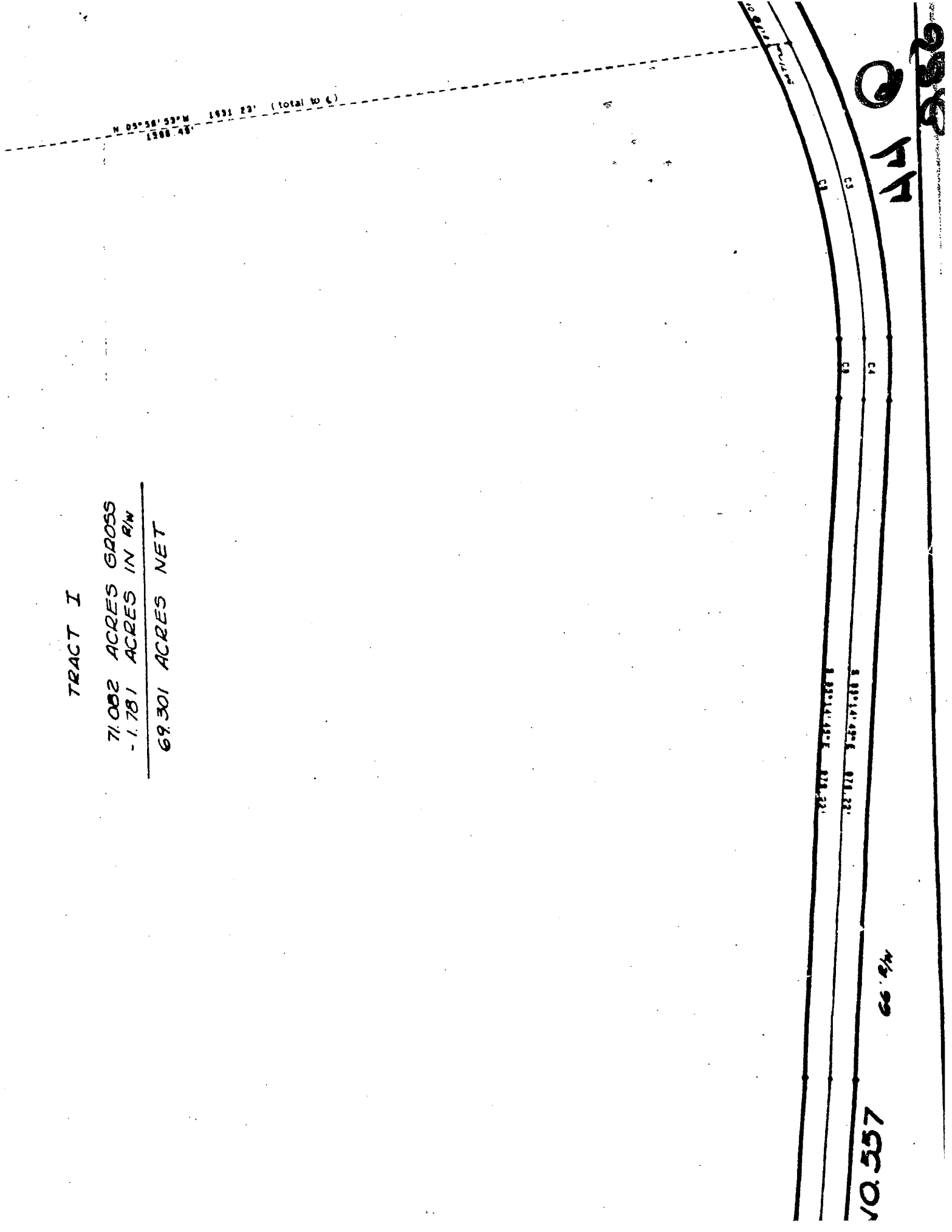
10.557

66' 9/4"

1.8914482 074.22'  
1.8914482 074.22'

44 0

500





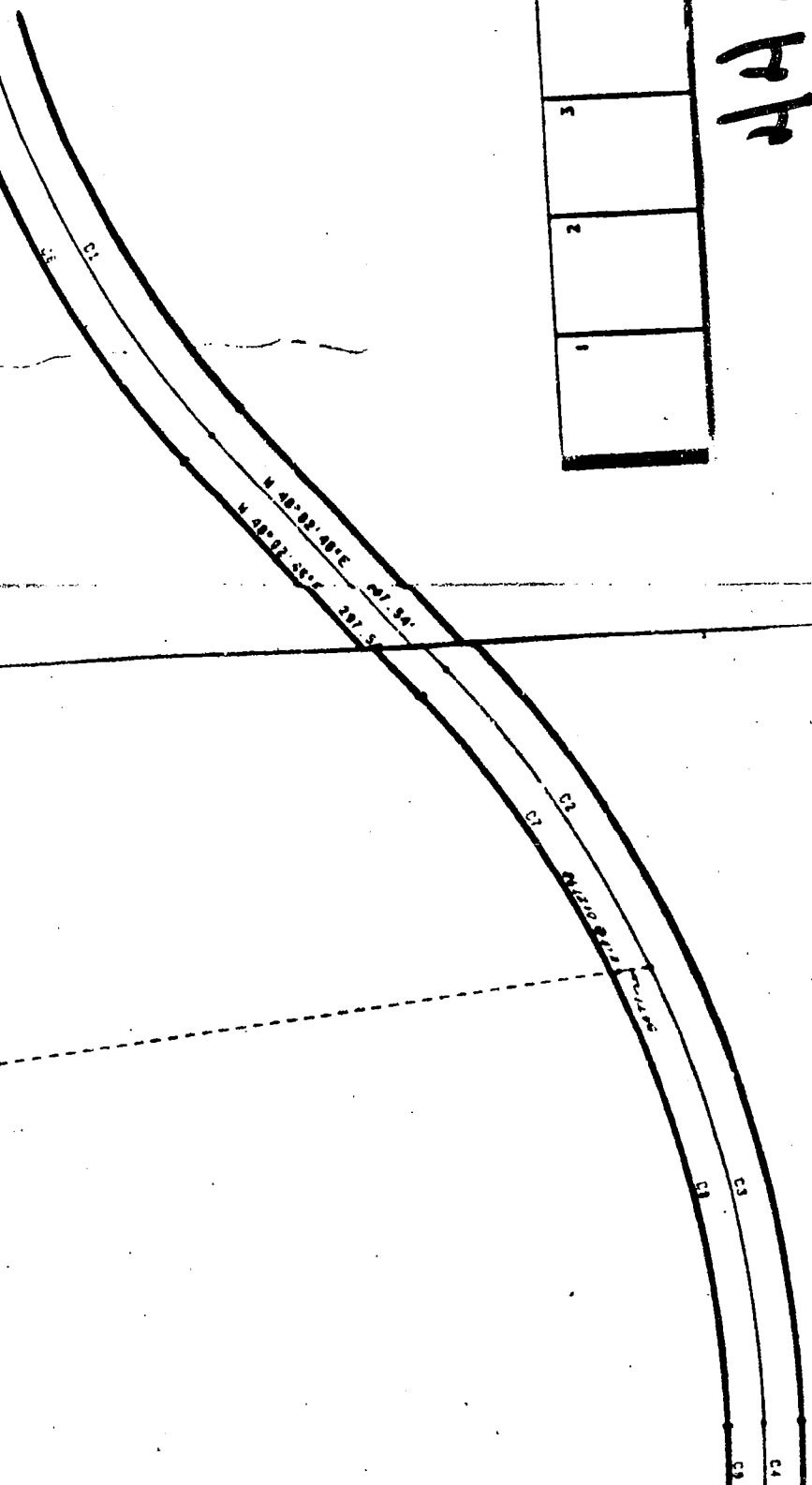
TRACT II

26.200 ACRES GROSS  
- 0.751 ACRES IN R/W  
25.449 ACRES NET

Virginia Harbor Drive  
(R/W of Highway)  
N 20° 58' 53" E 489.00'  
S 19.88' (100') W 50.0'

519.00' (100')  
TO CORNER, SC

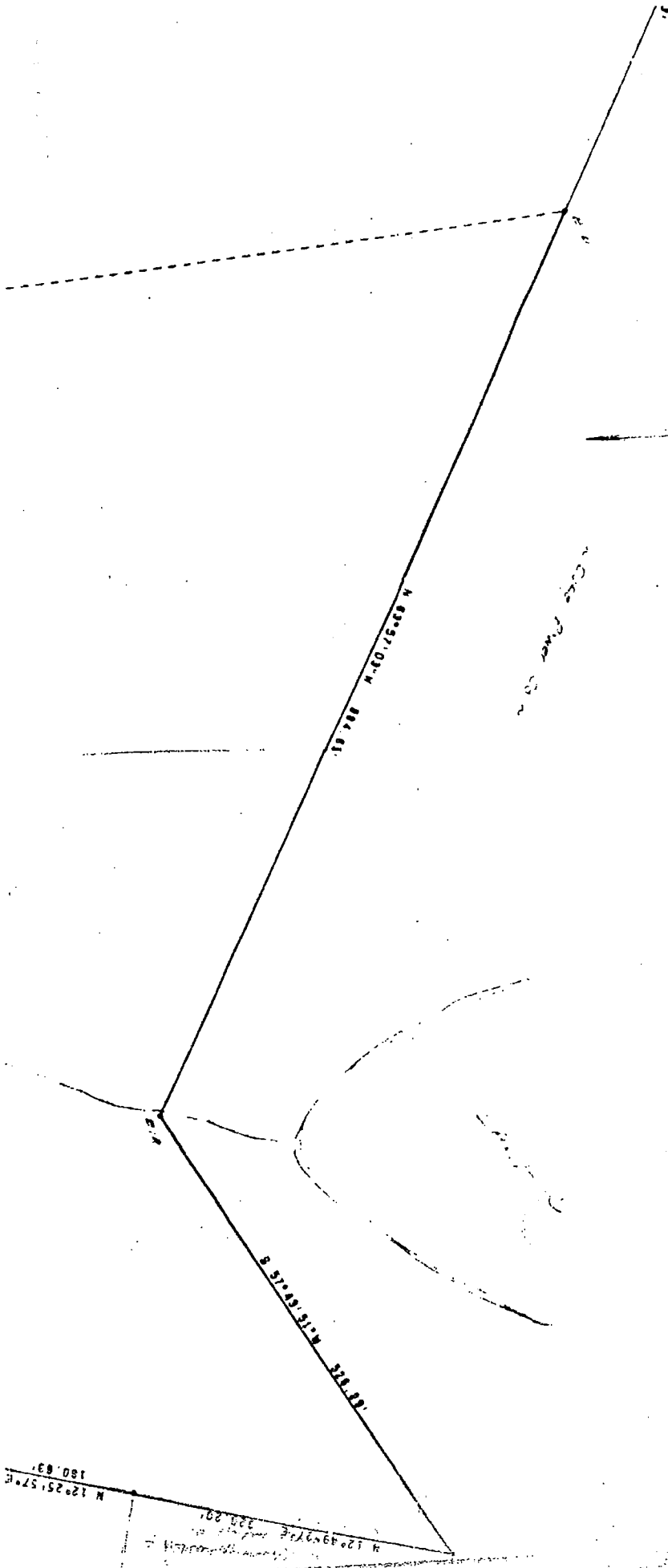
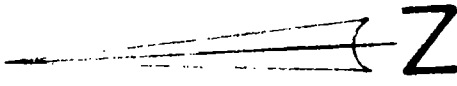
N 05° 58' 53" W 1881.23' (total to C)



6	
5	
4	
3	
2	
1	

MH 2  
954

FIELD RECORD  
 1936  
 MAY 19 10 40 AM '36  
 THAD L. FATHOLL  
 C. E. C. P. & O. S.  
 YORK COUNTY, S. C.



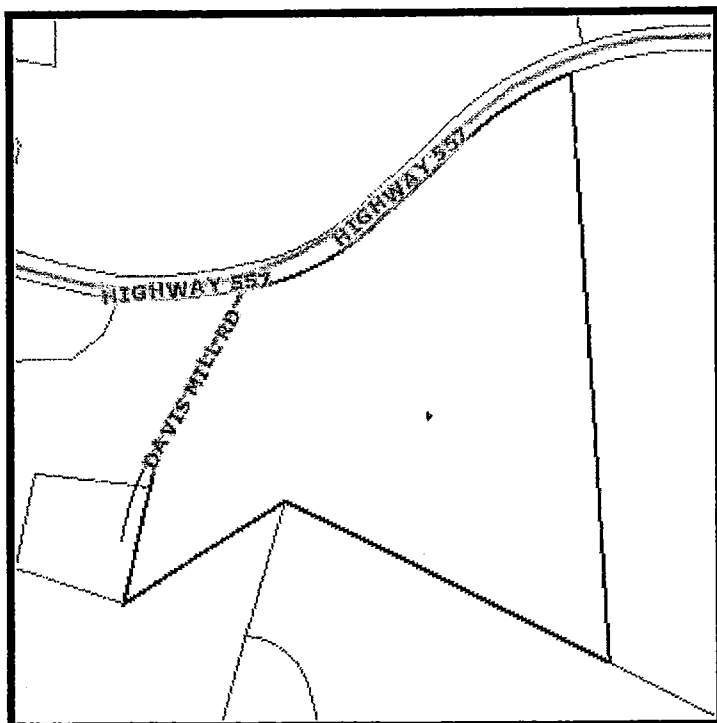
CURVE TABLE

Curve No.	Bearing	Chord Distance	Radius	Δ	Arc Distance	Tangent Distance
1	N 60°18'40"E	369.03'	888.57'	24°31'48"	371.88'	188.82'
2	N 57°55'33"E	308.10'	871.82'	18°07'32"	307.38'	154.88'
3	N 77°58'44"E	397.81'	871.82'	23°38'49"	400.44'	203.10'
4	S 82°43'48"E	78.10'	812.47'	04°56'07"	78.13'	38.58'
5	S 80°27'38"E	933.89'	933.71'	08°34'53"	933.85'	488.88'
6	N 81°24'53"E	418.81'	801.57'	28°44'14"	420.72'	214.28'
7	N 56°47'02"E	285.34'	838.82'	17°28'29"	288.27'	144.78'
8	N 77°38'12"E	394.34'	838.82'	24°15'53"	397.58'	201.78'
9	S 87°43'48"E	78.24'	819.47'	04°56'07"	78.27'	38.18'
10	S 80°25'45"E	984.29'	9320.71'	08°39'00"	985.48'	488.81'

11 ft

**Property Report for Parcel Number:**  
4800000004

Inquiry Date:



**Owner**

**Owner Name:** VAN EVERY HELEN M TRUSTEE  
**Address:** 111 S LONGFELLOW LAN  
**City/State:** MOORESVILLE NC  
**Zip Code:** 28117

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the mapping data herein, or for their use or interpretation by the User.

**Property**

**Parcel Number:** 4800000004  
**Total Lots:** 0  
**Total Acres:** 26.2  
**Deed Book:** 1202  
**Deed Book Page:** 297  
**Platt Book:** 44  
**Platt Book Page:** 156  
**School District:** 2  
**Municipality:**  
**Fire Code:** BE-I  
**Property Location:** ( 26.20 ACRES )

**Land Value:** \$393000  
**AG Use:**  
**AG Use Value:**  
**Previous Owner:** VAN EVERY STEPHEN  
**Tax Bill Information:**  
**Zoning:**  
**Sale Price:** \$500000  
**Sale Date:** 3/6/95  
**Census Tract:**  
**Voter District:**

**Building/Structure**

**Prop. Classification:**  
**Heating Type:**  
**Living Area(Sq. Ft.):**  
**Basement:** NO  
**Bathrooms:**  
**Total Imp. Value:**

**Number of Stories:**  
**Year Built:**  
**Garage Area:** NO  
**Fireplace:**  
**Bldg. Value:** \$27000

**Assessment**

**Total Assessed Value:** \$1125  
**Total Market Value\*:** \$420000

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 480-00-00-004 Legal 71.082 AC - HWY 557

DEED

Grantor ESTATE OF STEPHEN H VAN EVERY JR  
Grantee HELEN M VAN EVERY Trustee of HELEN M VAN EVERY REVOCABLE LIVING TRUST  
Book 1202 Page 297  
Dated 2/28/1995 Recorded 3/7/1995

1-1-2 Previous Ownership

Grantor HELEN M VAN EVERY Trustee of HELEN M VAN EVERY REVOCABLE LIVING TRUST  
Grantee STEPHEN H VAN EVERY JR  
Book 326 Page 32  
Dated 10/18/1991 Recorded 10/22/1991

Grantor HELEN M VAN EVERY  
Grantee HELEN M VAN EVERY Trustee of HELEN M VAN EVERY REVOCABLE LIVING TRUST  
Book 235 Page 295  
Dated 5/3/1991 Recorded 5/10/1991

Grantor NCNB NATIONAL BANK OF NORTH CAROLINA Trustee of STEPHEN H VAN EVERY SR REVOCABLE LIVING TRUST  
Grantee HELEN M VAN EVERY  
Book 33 Page 248  
Dated 3/13/1990 Recorded 3/15/1990

Grantor STEPHEN H VAN EVERY SR  
Grantee STEPHEN H VAN EVERY SR REVOCABLE LIVING TRUST  
Book 1132 Page 43  
Dated 11/2/1989 Recorded 11/7/1989

Grantor BETHEL REALTY CO INC  
Grantee STEPHEN H VAN EVERY SR  
Book 512 Page 321  
Dated 5/16/1975 Recorded 5/19/1975

Grantor HERBERT KIRSH, LEROY PENDLETON, V MARSHALL STINE, FRED C ROBINSON AND CHESTER A WINGATE  
Grantee BETHEL REALTY CO INC  
Book 461 Page 201  
Dated 8/23/1973 Recorded 8/23/1973

Grantor VIRGINIA H DAVIS AND FLOYD M DAVIS JR  
Grantee HERBERT KIRSH, LEROY PENDLETON, V MARSHALL STINE, FRED C ROBINSON AND CHESTER A WINGATE  
Book 435 Page 335  
Dated 3/22/1972 Recorded 3/23/1973

Grantor SARAH E DAVIS  
Grantee VIRGINIA H DAVIS AND FLOYD M DAVIS JR  
Book 71 Page 60  
Dated 2/15/1928 Recorded 2/15/1928

***Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.***

AND Grantor, as Personal Representative aforesaid, hereby binds Grantor, as Personal Representative, and the Grantor's Successors and Assigns, as such Personal Representative, to warrant and defend all and singular the said premises unto the said Grantee, her Successors and their Assigns, against the Grantor, as Personal Representative, the Successors and Assigns of the Grantor, and does further covenant that he has not done or suffered anything whereby the said premises have been encumbered in any way whatsoever by the said Grantor as Personal Representative as aforesaid.

Witness the Hand(s) and Seal(s) of the Grantor this 28th day of February in the year of our Lord one thousand nine hundred and ninety-five and in the two hundred and nineteenth year of the Sovereignty and Independence of the United States of America.

Signed, sealed and delivered  
in the presence of

THE ESTATE OF STEPHEN H.  
VAN EVERY, JR.

Mary D. [Signature]  
Patricia A. Hood

BY: [Signature]  
Henry C. Longax  
As Personal Representative

STATE OF SOUTH CAROLINA  
SOUTH CAROLINA DEPARTMENT OF REVENUE  
DOCUMENTARY TAX  
MAR-1992 TAX 470.02

STATE OF NORTH CAROLINA }  
COUNTY OF MECKLENBURG }

PERSONALLY APPEARED before me the undersigned witness and made oath that s/he saw the within named Seller sign, seal and as his act and deed, deliver the within written Title to Real Estate; and that s/he with the other witness above-named witnessed the execution thereof.

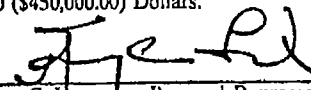
Tracy D. Dune  
James J. Mann

sworn before me this 28th  
day of February, 1995.  
NOTARY  
PUBLIC  
James J. Mann  
Notary Public for North Carolina  
Commission expires: 9-19-99

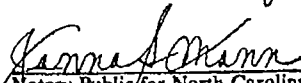
STATE OF SOUTH CAROLINA )  
COUNTY OF YORK )

AFFIDAVIT OF TRUE CONSIDERATION

PERSONALLY appeared before me Henry C. Lomax, as Personal Representative of the Estate of Stephen H. Van Every, Jr., who first being duly sworn, states that he is familiar with the transfer of fee simple title of the property described on Exhibit "A" attached hereto located in York County, South Carolina, by Henry C. Lomax, as Personal Representative of the Estate of Stephen H. Van Every, Jr. ("Grantor") to Helen M. Van Every, Trustee of the Helen M. Van Every Revocable Living Trust Agreement Dated October 24, 1989 ("Grantee"), as shown by the within Title to Real Estate; that the affiant of his own knowledge avers that the actual consideration paid by the Grantee and received by the Grantor was Five Hundred Thousand and No/100 (\$500,000.00) Dollars plus forgiveness of Note due the Grantee from the late Stephen H. Van Every, Jr. in the amount of Four Hundred Fifty Thousand and No/100 (\$450,000.00) Dollars.

 (SEAL)  
Henry C. Lomax, as Personal Representative of  
the Estate of Stephen H. Van Every, Jr.

SWORN to before me this  
25th day of February, 1995.

 (L.S.)  
Notary Public for North Carolina  
My commission expires: 9-19-99

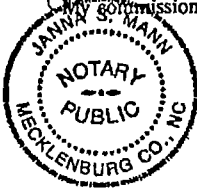




EXHIBIT "A"

PARCEL 1:

All that certain piece, parcel or tract of land consisting of 71.082 acres, more or less, and being shown and described on plat prepared by General Surveyors, Inc. dated May 16, 1975 and recorded in Plat Book 44, at Page 156, reference to which said plat is hereby made for a more particular description of the premises.

PARCEL 2:

All that certain piece, parcel or tract of land consisting of 26.200 acres, more or less, and being shown and described on plat prepared by General Surveyors, Inc. dated May 16, 1975, entitled "Boundary Survey of Stephen H. Van Every" and recorded in Plat Book 44, at Page 156, reference to which plat is hereby made for a more particular description of the premises.

TAX MAP NUMBERS: 480-00-00-002 and 480-00-00-004

DERIVATION: Deed from Heien M. Van Every, as Trustee of the Helen M. Van Every Revocable Living Trust Agreement to Stephen H. Van Every, Jr. dated October 18, 1991, recorded October 22, 1991 in Record Book 326, Page 32. See also Quitclaim Deed from Helen M. Van Every, as Trustee of the Helen M. Van Every Revocable Living Trust Agreement to Stephen H. Van Every, Jr. dated May 19, 1993, recorded May 25, 1993 in Record Book 717, Page 151, Office of the Clerk of Court for York County, South Carolina.

# BOUNDARY SURVEY OF STEPHEN H. VAN EVERY, SR.

## PROPERTY

Berne Township York County, South Carolina

Scale: 1"=100'

General Surveyors, Inc.  
210 Lotts Arcade

Charlotte, North Carolina

James M. Honeycutt, S.C.E.S. # 3027  
3765763

Date: May 16, 1979



*James H. Starnes*  
Surveyor General

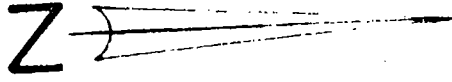
69 301 ACRES Net Area Tract I  
2 25441 ACRES Net Area Tract II  
405 2700 Acres Total

S 10324.40' W 133 20'

S 07 11' 40" W 400 11'

107711  
107712  
107713  
107714  
107715  
107716  
107717  
107718  
107719  
107720  
107721  
107722  
107723  
107724  
107725  
107726  
107727  
107728  
107729  
107730  
107731  
107732  
107733  
107734  
107735  
107736  
107737  
107738  
107739  
107740  
107741  
107742  
107743  
107744  
107745  
107746  
107747  
107748  
107749  
107750  
107751  
107752  
107753  
107754  
107755  
107756  
107757  
107758  
107759  
107760  
107761  
107762  
107763  
107764  
107765  
107766  
107767  
107768  
107769  
107770  
107771  
107772  
107773  
107774  
107775  
107776  
107777  
107778  
107779  
107780  
107781  
107782  
107783  
107784  
107785  
107786  
107787  
107788  
107789  
107790  
107791  
107792  
107793  
107794  
107795  
107796  
107797  
107798  
107799  
107800





FILED & RECORDED

BOOK #4 PAGE 132

MAY 19 10 40 AM '72

THAD L. FAHOLL  
C. E. P. & O. S.  
YORK COUNTY, S. C.

N 89°37'34"W 818.00'

N 35°08'40"E 107.00'  
EDMUNDSON  
S. C. P. & O. S.  
YORK COUNTY, S. C.

EVERY OF  
EVERY, SR.

with Carolina

Date: May 16, 1972

ina

2013 \* 2027

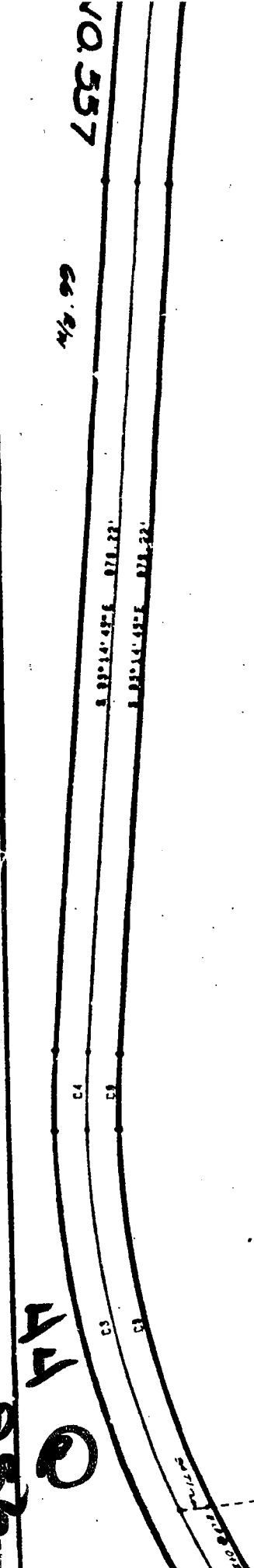
S 33° 42' W 408.15'

TRACT I

71.082 ACRES GROSS  
- 1.781 ACRES IN R/W  

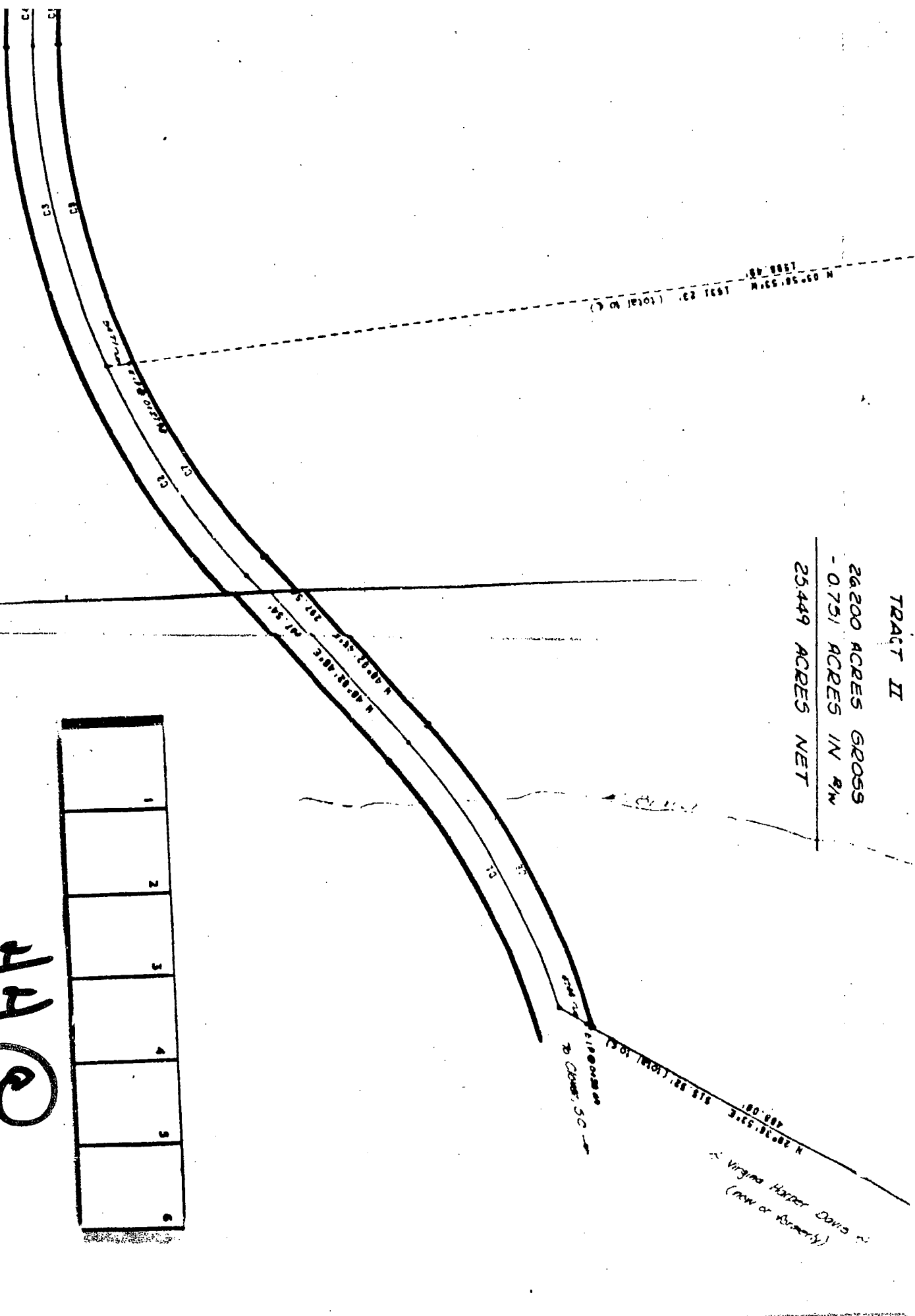
---

69.301 ACRES NET



TRACT II

26200 ACRES GROSS  
- 0.751 ACRES IN R/W  
25449 ACRES NET



1
2
3
4
5
6

44 @

~~1520~~ 1520

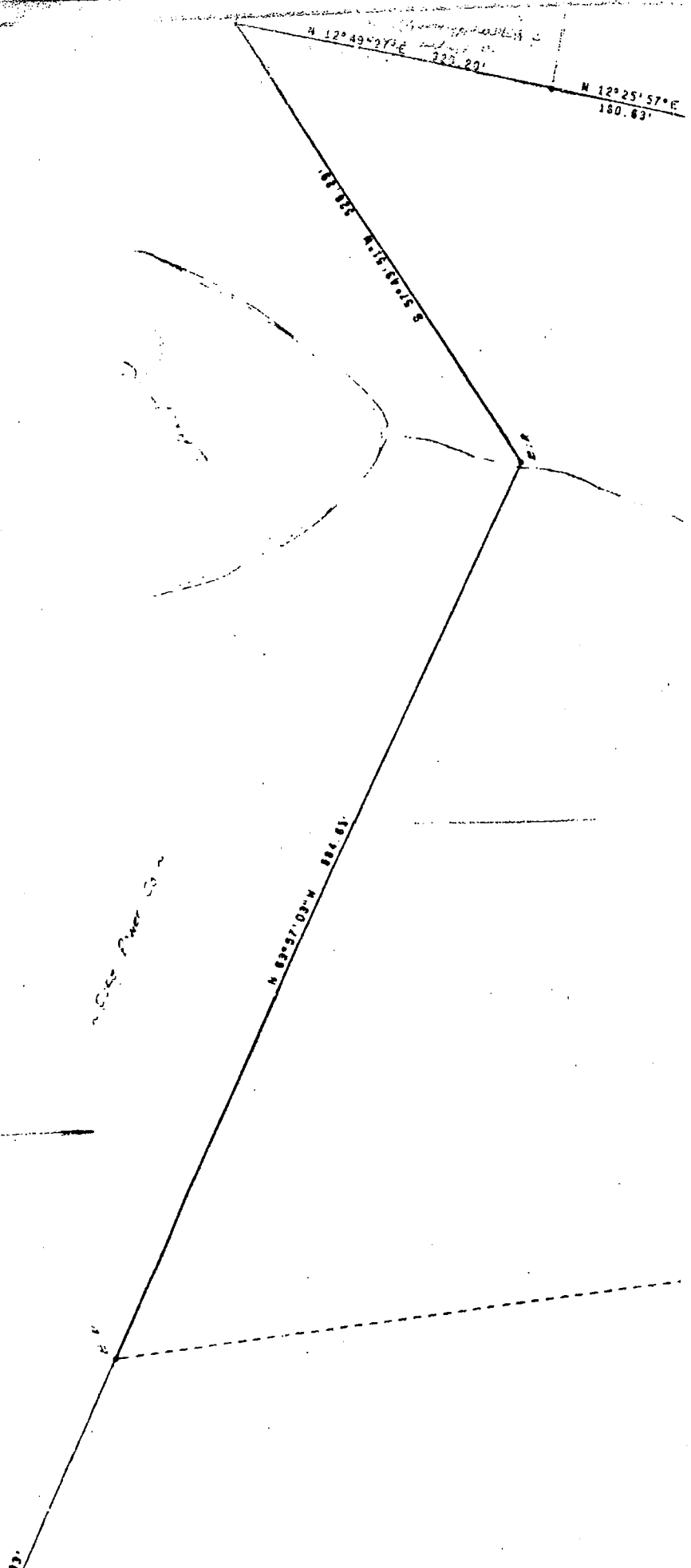
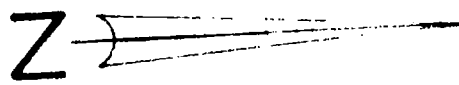
FILED & RECORDED  
 BOOK # 44 PAGE 132

MAY 19 10 40 AM '96

THAD L. STROHL  
 C. C. P. & O. S.  
 YORK COUNTY, S. C.

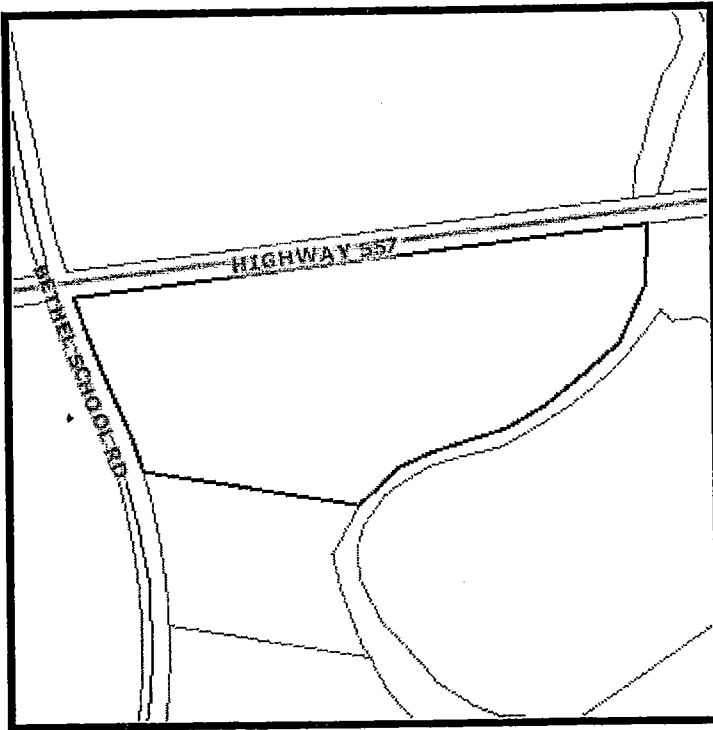
CURVE TABLE

Curve No.	Chord Bearing	Chord Distance	Radius	Δ	Arc Distance	Tangent Distance
1	N 60°18'40"E	369.03'	689.57'	24°31'49"	371.68'	189.89'
2	N 37°05'53"E	308.10'	871.62'	18°07'32"	307.38'	154.89'
3	N 77°58'44"E	597.81'	871.62'	23°38'49"	400.44'	283.10'
4	S 07°43'48"E	78.18'	312.47'	04°58'07"	78.13'	39.59'
5	S 80°27'28"E	933.88'	933.71'	38°34'33"	585.05'	488.68'
6	N 81°24'53"E	416.81'	601.57'	28°44'34"	423.72'	214.26'
7	N 56°47'01"E	285.18'	538.82'	17°28'29"	288.27'	144.26'
8	N 77°38'12"E	394.54'	538.82'	24°15'53"	387.58'	201.78'
9	S 07°43'48"E	78.24'	879.47'	04°58'07"	78.27'	38.18'
10	S 00°25'45"E	994.28'	9920.71'	08°36'00"	885.48'	488.81'



**Property Report for Parcel Number:**  
4800000005

Inquiry Date:



**Owner**

**Owner Name:** YORK AMUSEMENT COM  
INC  
**Address:** 116 S MAIN ST  
**City/State:** CLOVER S S  
**Zip Code:** 29710

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

<b>Parcel Number:</b>	4800000005	<b>Land Value:</b>	\$277400
<b>Total Lots:</b>	0	<b>AG Use:</b>	
<b>Total Acres:</b>	15	<b>AG Use Value:</b>	
<b>Deed Book:</b>	1499	<b>Previous Owner:</b>	GANN BOBBY T & RIC AMICK
<b>Deed Book Page:</b>	146	<b>Tax Bill Information:</b>	
<b>Platt Book:</b>	106	<b>Zoning:</b>	
<b>Platt Book Page:</b>	98	<b>Sale Price:</b>	\$88228
<b>School District:</b>	2	<b>Sale Date:</b>	4/12/96
<b>Municipality:</b>		<b>Census Tract:</b>	
<b>Fire Code:</b>	BE-I	<b>Voter District:</b>	
<b>Property Location:</b>	HWY 557 (2.362 AC & 13.038 AC)		

**Building/Structure**

<b>Prop. Classification:</b>		<b>Number of Stories:</b>	
<b>Heating Type:</b>		<b>Year Built:</b>	
<b>Living Area(Sq. Ft.):</b>		<b>Garage Area:</b>	NO
<b>Basement:</b>	NO	<b>Fireplace:</b>	
<b>Bathrooms:</b>		<b>Bldg. Value:</b>	\$0
<b>Total Imp. Value:</b>			



F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 480-00-00-005 Legal HWY 557 - 2.362 AC / 13.038 AC

DEED

Grantor BOBBY T GANN AND RICHARD B AMICK  
Grantee YORK AMUSEMENT COMPANY INC  
Book 1499 Page 146  
Dated 3/1/1996 Recorded 4/12/1996

1-1-2 Previous Ownership

**AC 13.038**

Grantor H EUGENE HAND Trustee A B HAND TRUST  
Grantee BOBBY T GANN AND RICHARD B AMICK dba YORK AMUSEMENT COMPANY INC  
Book 149 Page 112  
Dated 10/30/1990 Recorded 10/31/1990

Grantor ESTATE OF A B HAND  
Grantee H EUGENE HAND Trustee A B HAND TRUST  
PROBATE 70 / 00239  
Dated 6/15/1990 Recorded 6/15/1990

Grantor ESTATE OF LUCIELLE GARIN HAND  
Grantee A B HAND  
PROBATE 689 / 20244  
Dated 12/31/1980 Recorded 12/31/1980

Grantor J I HOVIS  
Grantee A B HAND AND LUCIELLE GARIN HAND  
Book 180 Page 321  
Dated 2/9/1952 Recorded 2/9/1952

## 1-1-2 Previous Ownership

AC 2.37

Grantor A B HAND  
Grantee BOBBY T GANN AND RICHARD B AMICK dba YORK AMUSEMENT COMPANY INC  
Book 695 Page 238  
Dated 3/2/1983 Recorded 3/29/1983

Grantor ESTATE OF LUCIELLE GARIN HAND  
Grantee A B HAND  
PROBATE 689 / 20244  
Dated 12/31/1980 Recorded 12/31/1980

Grantor J I HOVIS  
Grantee A B HAND AND LUCIELLE GARIN HAND  
Book 180 Page 321  
Dated 2/9/1952 Recorded 2/9/1952

***Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.***

238.10  
123.90

FILED-RECEIVED  
BOOK PAGE  
APR 12 4 52 PM '96

Prepared by Melvin L. Roberts & Assoc.  
NO CERTIFICATE OF TITLE GIVEN

STATE OF SOUTH CAROLINA )  
COUNTY OF YORK )

TITLE TO REAL ESTATE  
GENERAL WARRANTY DEED

KNOW ALL MEN BY THESE PRESENTS, That we, Bobby T. Gann and Richard B. Amick, in the State and County aforesaid, for and in consideration of Eighty-Eight Thousand Two Hundred Twenty-Eight and No/100 (\$88,228.00) Dollars, to us in hand paid at and before the sealing of these presents by York Amusement Company, Inc., receipt whereof is hereby acknowledged, have granted, bargained, sold, and released, and by these presents do grant, bargain, sell and release unto the said York Amusement Company, Inc., 116 S. Main Street, Clover, S. C. 29710, its heirs and assigns forever the following described property:

Tract 1:  
All that certain tract of land located in Bethel Township, York County, South Carolina, containing 13.038 acres and being more particularly shown and described on a Boundary Survey for Bobby T. Gann and Richard D. Amick drawn by Joe H. Baird, PE & LS, dated September 7, 1990, said plat being recorded in Plat Book 106, Page 98, Office of the Clerk of Court for York County, South Carolina and incorporated herein by reference.

This is a portion of that property conveyed to H. Eugene Hand, Trustee, A.B. Hand Trust by deed of Estate of A.B. Hand dated June 8, 1990, in Record Book 79, Page 239.

DERIVATION: This being the identical property conveyed to Bobby T. Gann and Richard B. Amick, d/b/a York Amusement Company by H. Eugene Hand, Trustee, A.B. Hand Trust by deed dated October 30, 1990, and recorded October 31, 1990, in Record Book 149, Page 112.

Tract 2:  
All that certain tract of land located in Bethel Township, York County, South Carolina, being more particularly described as follows: Beginning at a new iron on the edge of the right-of-ways of the intersection of S.C. Highway No. 557 and Highway S 46-152 and running thence N 83-17-06 E 357.07 feet to a new iron; thence S 22-00 E 300.28 feet to a new iron; thence S 83-17-06 W 357.07 feet to a new iron; thence N 22-00 W 300.28 feet to a new iron; this being the beginning point. The above described tract contains 2.37 acres and is more

RECEIVED  
123.90  
PAID  
CLERK OF COURT  
STATE OF SOUTH CAROLINA  
YORK COUNTY  
238.10

LD  
4-15-96  
5205  
R#112

RECORDED  
VOL. 1499 PG. 146  
COUNTY, E.C.

particularly described on plat of property of Richard D. Amick and Bobby T. Gann, dated 1-11-82, and prepared by Bradford M. Hucks and Son, Land Surveyors, and recorded in Plat Book 69, Page 169, Office of the Clerk of Court for York County, South Carolina, said plat being incorporated herein by reference.

This is a portion of the property devised to Antris Bryant Hand under the terms of the Last Will and Testament of Lucielle G. Hand as recorded in Case 689, File 20244, Office of the Probate Judge, York County, South Carolina.

DERIVATION: This is the identical property conveyed by A. B. Hand to Bobby T. Gann and Richard B. Amick, d/b/a York Amusement Company, by deed dated March 2, 1983 and recorded March 29, 1983, in Deed Book 695, Page 238, Office of the Clerk of Court for York County, South Carolina.

The above described property is conveyed subject to all easements, rights of way or restrictions appearing of record, in the chain of title, shown on the above-referenced survey, or visible on an actual physical examination of the subject premises.

TOGETHER with all and singular the rights, members, hereditments and appurtenances whatsoever, to the said premises belonging, or in any wise incident or appertaining.

TO HAVE AND TO HOLD, all and singular the said premises above-mentioned, unto the said York Amusement Company, Inc., its heirs, executors, administrators, successors, and assigns forever.

And I, do hereby bind my heirs, executors, administrators, successors, and assigns to warrant and forever defend all and singular the premises unto the said York Amusement Company, Inc., its heirs, executors, administrators, successors, and assigns, against me and my heirs, executors, administrators, successors, and assigns, and all other persons whomsoever lawfully claiming, or to claim the same, or any part thereof.

Witness My Hand and Seal this 1 day of March, 1996.

**SIGNED, SEALED AND DELIVERED  
IN THE PRESENCE OF**

D. D. O'Neil

Richard B. Amick (Seal)  
Richard B. Amick

Melvin L. Roberts

Bobby T. Gann (Seal)  
Bobby T. Gann

D. D. O'Neil

Melvin L. Roberts

STATE OF SOUTH CAROLINA )  
  )  
COUNTY OF YORK                    )

PROBATE

Personally appeared before me Melvin L. Roberts  
and made oath that (s)he saw the within named grantors,  
sign, seal and as their act and deed, deliver the within  
written Deed, and that (s)he with Daniel D. D'Agostino  
witnessed the execution thereof.

Melvin L. Roberts

Sworn to before me this  
1 day of March, 1996.

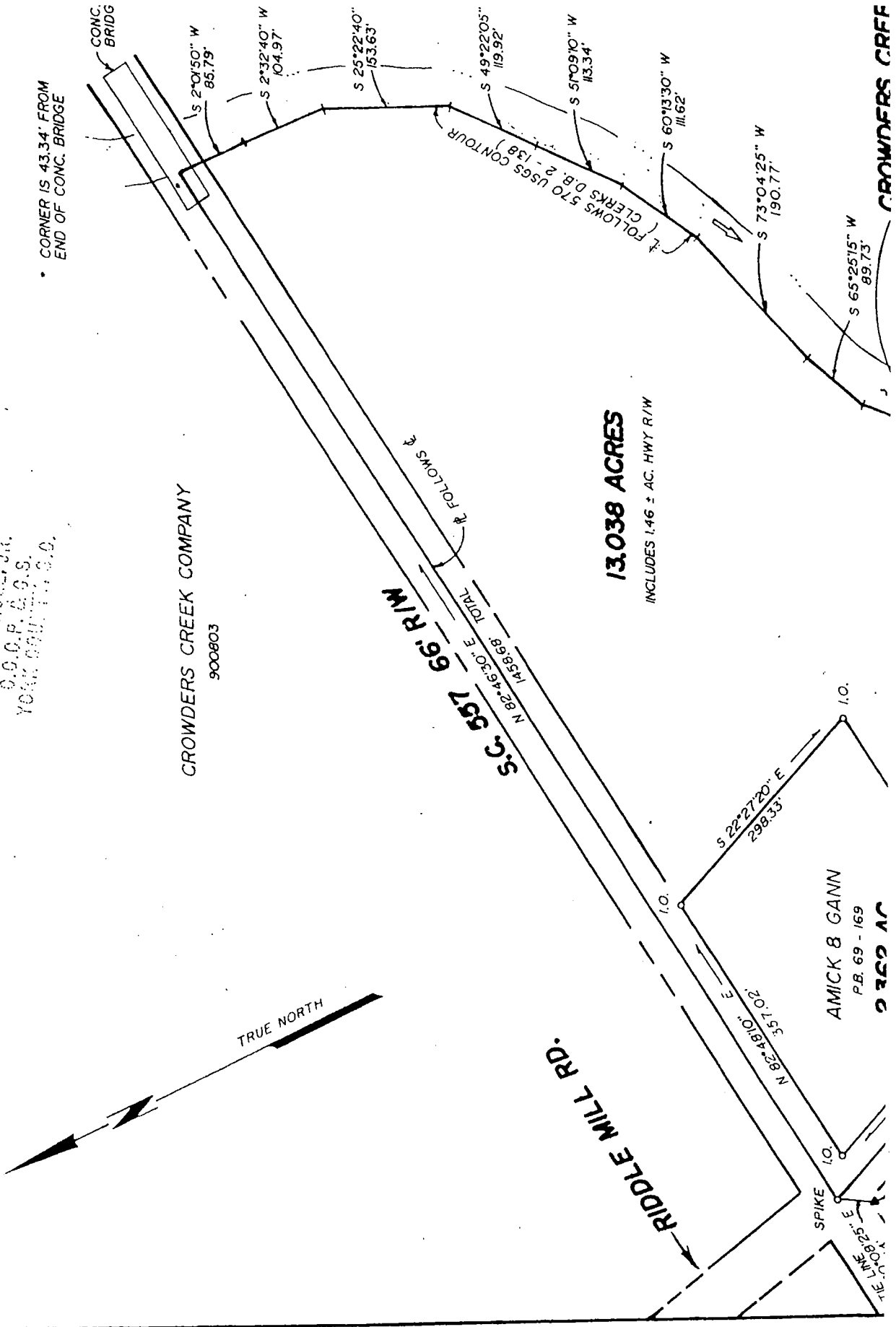
D. D. O'Neil  
Notary Public for South Carolina  
My Commission Expires: Sept 15, 2004



FILED-RECEIVED  
 BOOK *106* PAGE *58*

OCT 31 10 45 AM '90

H.H. CARROLL, JR.  
 S.O.C.P. & S.S.  
 YORK COUNTY, S.C.



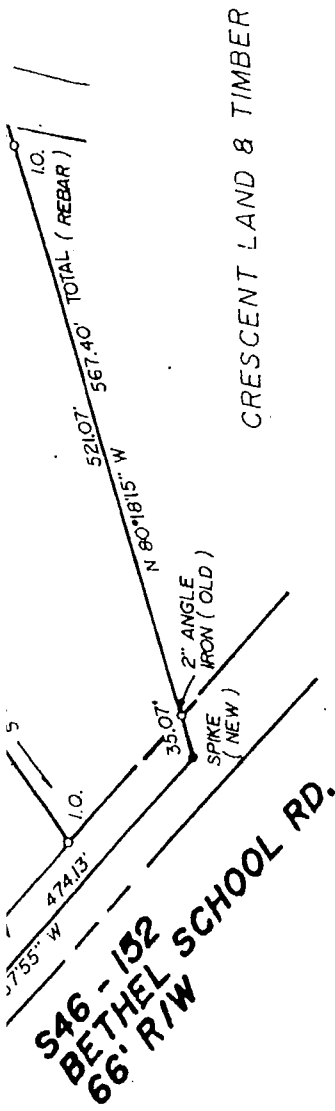
• CORNER IS 43.34' FROM  
 END OF CONC. BRIDGE

13.038 ACRES

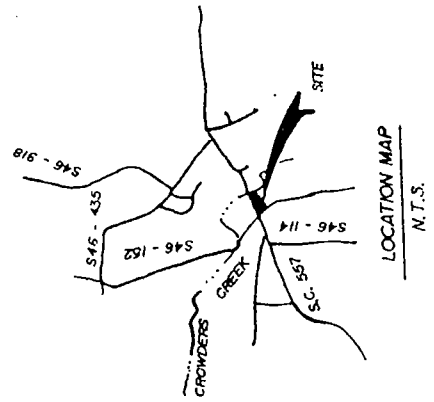
INCLUDES 1.46 ± AC. HWY R/W

CROWDERS CREEK

106 @ 98



THE 2.362 ACRE PARCEL CURRENTLY OWNED BY GANN & AMICK IS NOT INCLUDED IN THE 13.038 ACRE TRACT SHOWN HEREON. TOTAL ACREAGE IS 15.400 ACRES FOR THE TWO TRACTS (INCLUDING HIGHWAY RIGHT-OF-WAY).



# BOBBY T. GANN & RICHARD D. AMICK

BETHEL TOWNSHIP  
 YORK COUNTY, SOUTH CAROLINA  
 SEPTEMBER 7, 1990

SCALE 1" = 150'



**BAIRD ENGINEERING**  
 ENGINEERS, SURVEYORS, PLANNERS  
 JOE H. BAIRD, P.E. & L.S. 803/831-2681  
 P. O. BOX 5064  
 1401 SOUTHERN PLACE  
 CLOVER / LAKE WYLIE, S. C. 29710

I HEREBY CERTIFY THAT THE PRECISION OF THE TRIADJUST SURVEY IS  $\frac{1}{100,000}$  HEREON; THE AREA WAS DETE BY D.H.D.; AND MONUMENTS BEEN PLACED AS SHOWN HERE

*Joe H. Baird*  
 S.C. REG. NO. 6488 C.L.I.

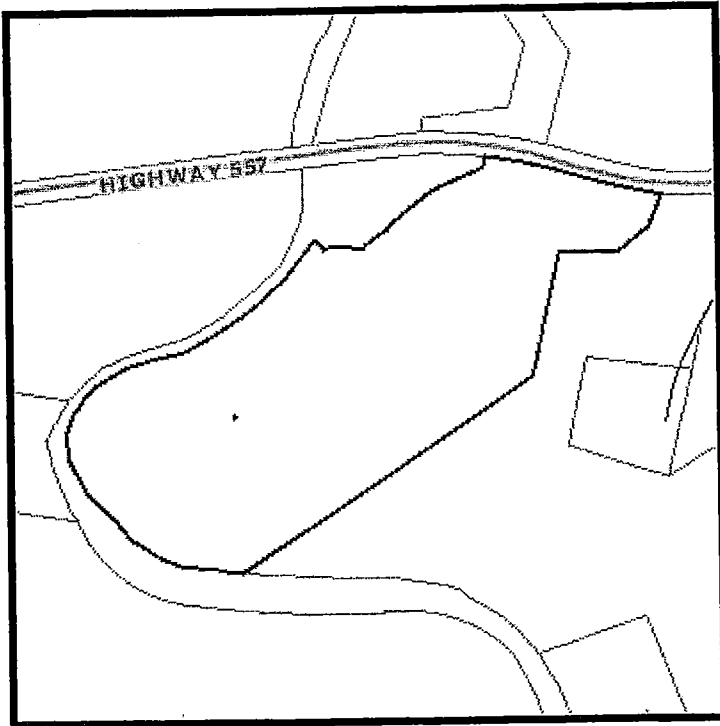
900823



**Property Report for Parcel Number:**

Inquiry Date:

4800000007



**Owner**

**Owner Name:** JACKSON CHARLES M  
**Address:** 5881 HIGHWAY 557  
**City/State:** CLOVER SC  
**Zip Code:** 29710

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, Ybrk County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

**Parcel Number:** 4800000007  
**Total Lots:** 0  
**Total Acres:** 23.57  
**Deed Book:** 3437  
**Deed Book Page:** 316  
**Platt Book:** B255  
**Platt Book Page:** 7  
**School District:** 2  
**Municipality:**  
**Fire Code:** BE-I  
**Property Location:** TRACT 2 / 23.57 AC / HWY 557

**Land Value:** \$330000  
**AG Use:**  
**AG Use Value:**  
**Previous Owner:** JACKSON JOHN EDWA CHARLES  
**Tax Bill Information:**  
**Zoning:**  
**Sale Price:** \$1  
**Sale Date:** 2/8/01  
**Census Tract:**  
**Voter District:**

**Building/Structure**

**Prop. Classification:**  
**Heating Type:**  
**Living Area(Sq. Ft.):**  
**Basement:** NO  
**Bathrooms:**  
**Total Imp. Value:**

**Number of Stories:**  
**Year Built:**  
**Garage Area:** NO  
**Fireplace:**  
**Bldg. Value:** \$373000



F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 480-00-00-007 Legal TRT 2 23.57 AC HWY 557

DEED

Grantor CHARLES M JACKSON JR  
Grantee JOHN EDWARD JACKSON  
Book 3437 Page 316  
Dated 2/8/2001 Recorded 2/8/2001

1-1-2 Previous Ownership

Grantor ELIZABETH D JACKSON  
Grantee JOHN EDWARD JACKSON (50%) AND CHARLES M JACKSON JR (50%)  
Book 3090 Page 336  
Dated 4/10/2000 Recorded 4/17/2000

Grantor ESTATE OF CHARLES HOPE JACKSON  
Grantee ELIZABETH D JACKSON  
Book 3090 Page 332  
Dated 4/10/2000 Recorded 4/17/2000

Grantor ESTATE OF ROY JACKSON  
Grantee CHARLES HOPE JACKSON  
PROBATE 466 / 14247  
Dated 3/21/1964 Recorded 1/8/1965

**Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.**

3815 Bk:3437 Pg:316

STATE OF SOUTH CAROLINA  
COUNTY OF YORK  
Deed prepared only  
Title not examined

4

000003815

RECORDED 02/08/2001 11:20:20AM

Haselden, Owen Bk:3437 Pg:316  
P.O. Box 173 Fee:10.00 State:0.00  
Clover, SC 29710 Tax:0.00 Exempt:-----  
David Hamilton, Clerk of Court  
YORK COUNTY, SC

TITLE TO REAL

KNOW ALL MEN BY THESE PRESENTS, That I, John Edward Jackson, for and in consideration of the sum of division of property, to him in hand paid at and before the sealing of these presents, by CHARLES M. JACKSON, JR., 5196 South Hwy 321, Clover, SC 29710, in the State aforesaid, (the receipt whereof is hereby acknowledged), has granted, bargained, sold and released unto CHARLES M. JACKSON, JR., his heirs, successors and assigns, all my right, title and interest in and to the following described property:

All that certain piece, parcel or tract of land located on South Carolina Highway 557, Bethel Township, York County, South Carolina, containing 23.57 acres and being more particularly shown and described as Tract 2 on plat of property prepared by Precision Surveyors, Inc. dated 8/9/00, said plat being recorded in Plat Book B-255, Page 7, Office of the Clerk of Court for York County, South Carolina and incorporated herein by reference.

This is a portion of the property described in deed recorded in Record Book 3090, Page 336, Office of the Clerk of Court for York County, South Carolina.

The above described property is conveyed subject to all easements, restrictions, and rights of way, if any, appearing of record in the chain of title of the subject property or visible upon an actual, physical inspection of the subject property.

TOGETHER with all and singular, the rights, members, hereditaments and appurtenances to the said premises belonging or

RECORDED in whole or in part incident or appertaining.

YORK COUNTY

TAX ASSESSOR'S OFFICE

3815 Bk:3437 Pg:316

DATE 2-8-01  
TAX MAP NO. 480-1  
INITIALS AC / d/n

(1)

TO HAVE AND TO HOLD all and singular the premises before mentioned unto the said Charles M. Jackson, Jr., his heirs, successors and assigns, forever.

AND Grantor does hereby bind himself and his heirs, successors and assigns, to warrant and forever defend all and singular the said premises unto the said Charles M. Jackson, Jr., his heirs and assigns, against himself and his heirs, successors and assigns and against every person whomsoever lawfully claiming, or to claim, the same or any part thereof.

WITNESS the Hand and Seal of the Grantor this 2nd day of February, in the year of our Lord two thousand and in the two hundred and twenty fifth year of the Sovereignty and Independence of the United States of America.

SIGNED, SEALED AND DELIVERED  
IN THE PRESENCE OF:

Anna C. Hooper  
Samuel S. Lane

John Edward Jackson  
John Edward Jackson

STATE OF SOUTH CAROLINA )  
 )  
COUNTY OF YORK )

PROBATE

PERSONALLY APPEARED before me ANN C. Hoque and  
made oath that She saw the within-named Grantor, sign, seal, and  
as his act and deed, deliver the within-written Deed for the uses  
and purposes therein mentioned; and that She with Steve B  
Love witnessed the execution thereof.

Ann C. Hoque

SWORN TO before me this

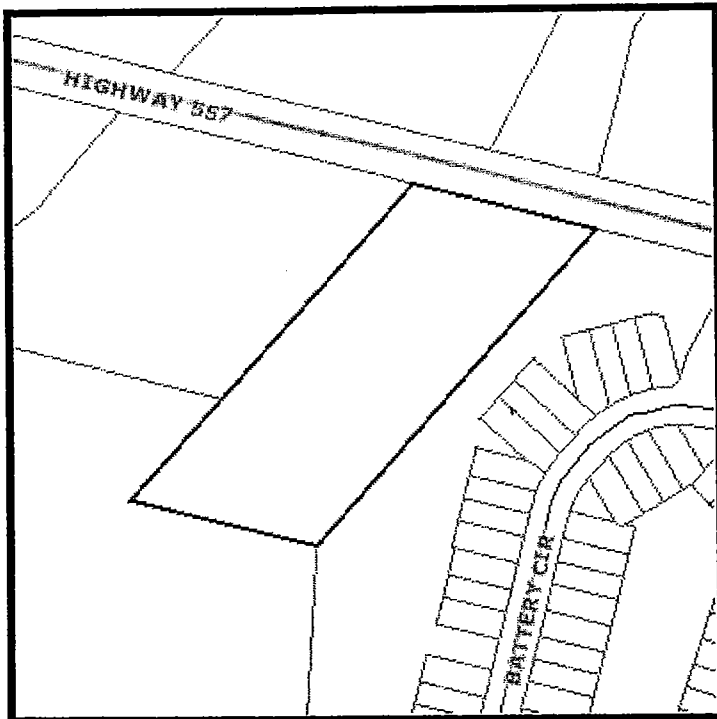
           day of           , 2000.

Ann S. Love (SEAL)  
Notary Public for South Carolina  
My Commission Expires 3/25/2004

**Property Report for Parcel Number:**

5610000001

Inquiry Date:



**Owner**

**Owner Name:** TRUSTEES OF PINE GROV  
**BAPTIST CHURCH**  
**Address:** 5415 HWY 557  
**City/State:** CLOVER S C  
**Zip Code:** 29710

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

**Parcel Number:** 5610000001  
**Total Lots:** 0  
**Total Acres:** 0  
**Deed Book:** 4816  
**Deed Book Page:** 315  
**Platt Book:** 104  
**Platt Book Page:** 60  
**School District:** 2  
**Municipality:**  
**Fire Code:** BE-I  
**Property Location:** TRACT A ( 3 ACRES )

**Land Value:** \$0  
**AG Use:**  
**AG Use Value:**  
**Previous Owner:** B & C ENTERPRISES  
**Tax Bill Information:**  
**Zoning:**  
**Sale Price:** \$90000  
**Sale Date:** 11/26/02  
**Census Tract:**  
**Voter District:**

**Building/Structure**

**Prop. Classification:**  
**Heating Type:**  
**Living Area(Sq. Ft.):**  
**Basement:** NO  
**Bathrooms:**  
**Total Imp. Value:**

**Number of Stories:**  
**Year Built:**  
**Garage Area:** NO  
**Fireplace:**  
**Bldg. Value:** \$0

**Assessment**

**Total Assessed Value:** \$0

**Total Market Value\*:** \$0

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 561-00-00-001 Legal TRT 1 - 3 AC

DEED

Grantor B & C ENTERPRISES - Herman Brown, J Richard Caldwell and Barbara H Caldwell

Grantee TRUSTEES OF PINE GROVE BAPTIST CHURCH

Book 4816 Page 315

Dated 11/22/2002 Recorded 11/26/2002

1-1-2 Previous Ownership

Grantor CAROTHERS WILLIAMS FUNERAL SERVICE AND MEMORIAL GARDENS INC

Grantee B & C ENTERPRISES - Herman Brown, J Richard Caldwell and Barbara H Caldwell

Book 11 Page 61

Dated 1/25/1990 Recorded 1/26/1990

Grantor HUGH P LOVE AND MARGARET H LOVE

Grantee CAROTHERS FUNERAL HOME INC

Book 861 Page 101

Dated 1/3/1986 Recorded 1/6/1986

Grantor PAUL C HARPER

Grantee HUGH P LOVE AND MARGARET H LOVE

Book 258 Page 336

Dated 12/29/1958 Recorded 1/13/1959

***Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.***





This is the identical property conveyed to B& C Enterprises, a South Carolina Partnership comprised of Herman Brown, J. Richard Caldwell and Barbara H. Caldwell by deed of Carothers Williams Funeral Service and Memorial Gardens, inc., f/k/a Carothers Funeral Home, Inc., recorded January 25, 1990 in Record Book 11, Page 61, Office of the Clerk of Court for York County, South Carolina. ✓

The above property is conveyed subject to restrictions recorded in Book 861, Page 101, Office of the Clerk of Court for York County, South Carolina and other easements appearing in the chain of title.

The above described property is conveyed subject to all easements, conditions and restrictive covenants imposed upon property in the chain of title, if any, but are not intended to be reimposed hereby by reference thereto.

TOGETHER with all and singular, the rights, members, hereditaments and appurtenances to the said premises belonging or in anywise incident or appertaining.

TO HAVE AND TO HOLD all and singular the premises before mentioned unto the said TRUSTEES OF PINE GROVE BAPTIST CHURCH, their heirs, administrators and assigns, forever.

AND Grantor(s) do/does hereby bind themselves and their Heirs, Representatives and Administrators, to warrant and forever defend all and singular the said premises unto the said Grantee and the Grantee's Heirs and Assigns, against the Grantor and the Grantor's Heirs and against every person whomsoever lawfully claiming, or to claim, the same or any part thereof.

BK04816 PG0316

WITNESS the Hand and Seal of the Grantor this 22<sup>nd</sup> day of November, in the year of our Lord two thousand two and in the two hundred and twenty-seventh year of the Sovereignty and Independence of the United States of America.

SIGNED, SEALED AND DELIVERED  
IN THE PRESENCE OF:

Susan R. Caldwell  
Ann C. Hogue

B & C Enterprises, a South Carolina  
Partnership

Herman Brown  
Herman Brown  
J. Richard Caldwell  
J. Richard Caldwell

Barbara H. Caldwell  
Barbara H. Caldwell

STATE OF SOUTH CAROLINA )  
  )  
COUNTY OF YORK            )

PROBATE

PERSONALLY APPEARED before me the undersigned witness and made oath that s/he saw the within named Grantor sign, seal and, as the Grantor's act and deed, deliver the within-written Deed for the uses and purposes therein mentioned and that s/he, with the other witness whose signature appears above, witnessed the execution thereof.

Susan R. Caldwell

SWORN TO before me this 22<sup>nd</sup>

Day of November, 2002.

Ann C. Hogue (SEAL)

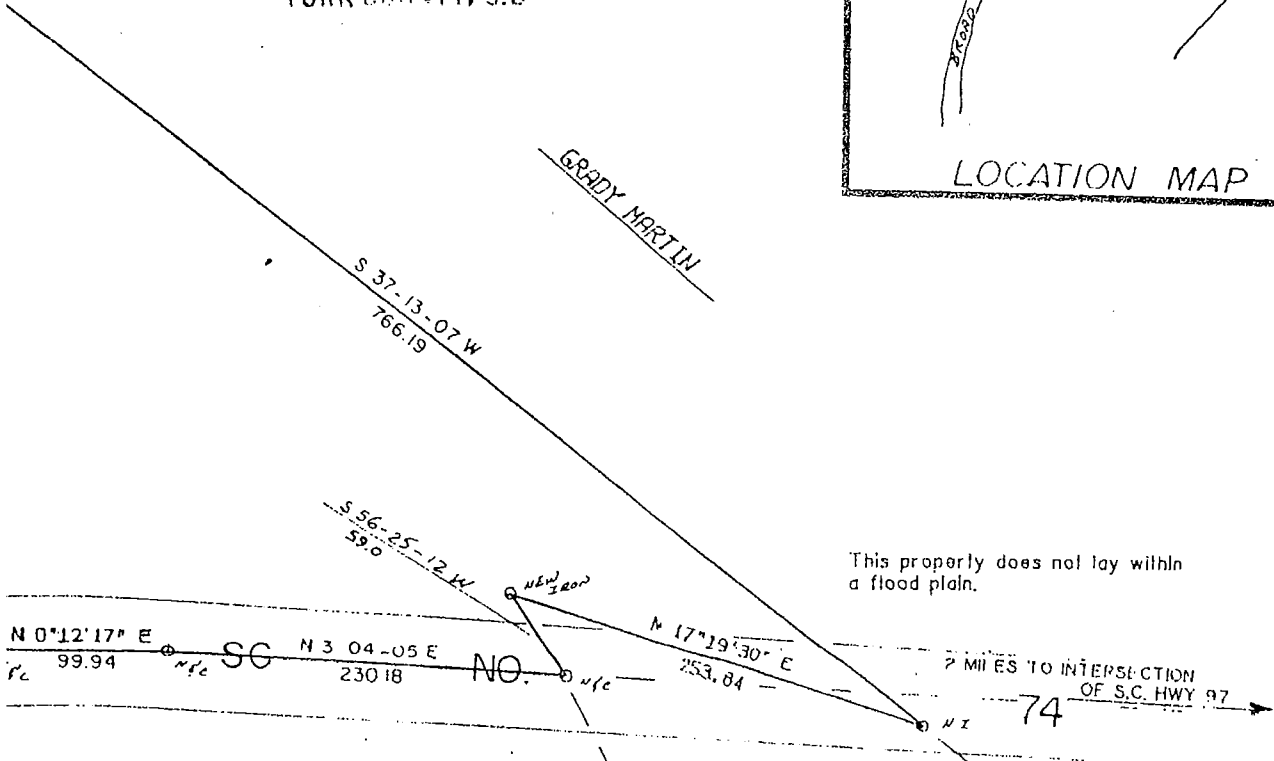
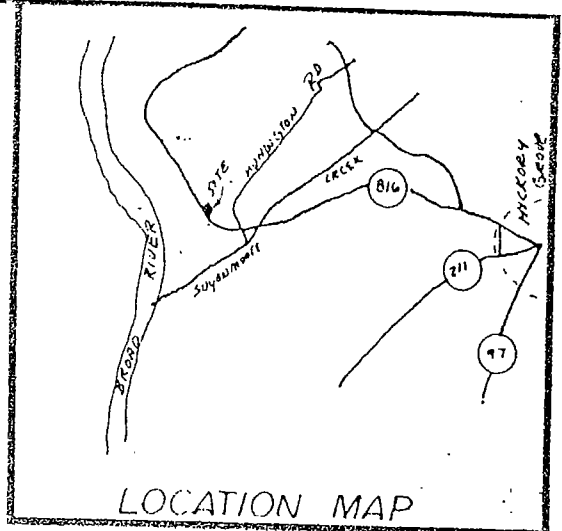
Notary Public for South Carolina

My Commission expires: 1-16-2007

BK04816 PG0317

FILED-RECEIVED  
 BOOK 104 PAGE 60  
 JAN 23 9 07 AM '90

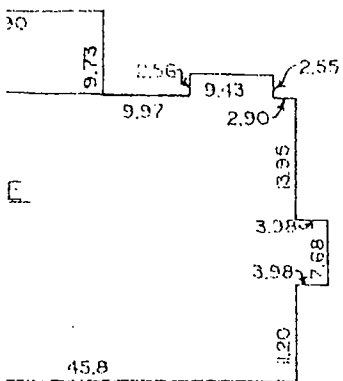
M.H. CHANDLER, JR.  
 C.C.P. & G.S.  
 YORK COUNTY, S.C.



CLYDE L. HUMPHRIES  
 I hereby certify that the measurements as shown hereon are correct and there are no encroachments or projections other than shown.

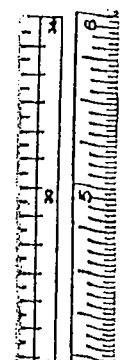
I hereby certify that the ratio of precision of the field survey is 1/10000 as shown hereon and the area was determined by the D.M.D. method of area calculations.

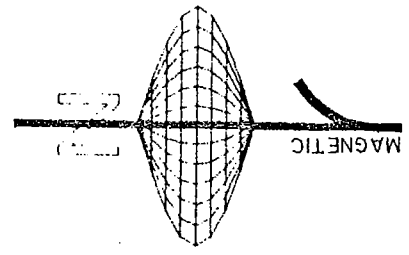
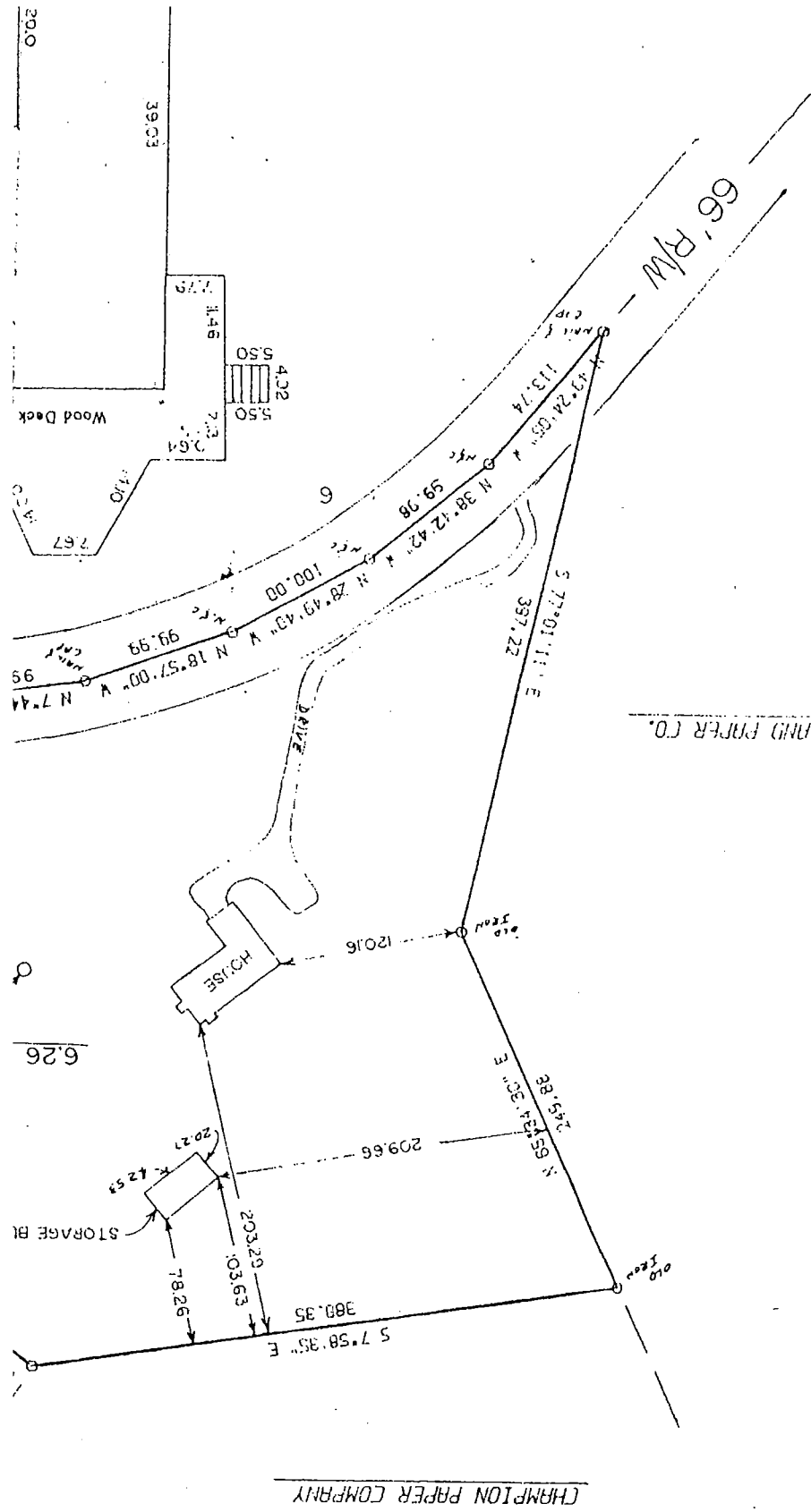
*Terry W. ...*  
 SC. 1106-113



SCALE: 1" = 20'

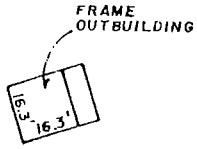
REVISIONS	HOWARD G. SELIGMAN JR.
ADDED NOTE 1/16/90	2030 MARTIN ROAD HICKORY GROVE, S.C. 29717
	Broad River Twp. York Co. S.C.





E.W. RHYNE  
D.B. 137-254  
P.B. 22-152

N 0° 26' 30" W  
544.54'



1.96 AC.

I.O.

L.M. ROBINSON et al.  
D.B. 1056-232  
P.B. 9-95

167.79'  
N 89° 58' 05" E

474.66'  
S 0° 22' 35" E

I.O.

REC'D-MCDONALD  
BOOK 104 PAGE 60  
JAN 23 9 00 AM '90  
M.H. BARNHART  
C.C.P. & S.S.  
YORK COUNTY, S.C.

LOCATION SURVEY FOR

**GLEND A ANN McDONALD**

WYLLIE TOWNSHIP

WYLLIE, SOUTH CAROLINA

DECEMBER 29, 1989

ENGINEERING

MEASUREMENTS, PLANNERS

E. & L. S. 803/831-2661

PLACE  
WYLLIE, S. C. 29710



I HEREBY CERTIFY THAT THE RATIO OF PRECISION OF THE UNADJUSTED FIELD SURVEY IS 1/10,000 AS SHOWN HEREON; THE AREA WAS DETERMINED BY D.M.D.; MONUMENTS HAVE BEEN PLACED AS SHOWN HEREON; THERE ARE NO ENCROACHMENTS OR PROJECTIONS OTHER THAN SHOWN; THE PROPERTY IS NOT WITHIN A FLOOD ZONE UNLESS SHOWN OTHERWISE.

*Joe H. Baird*

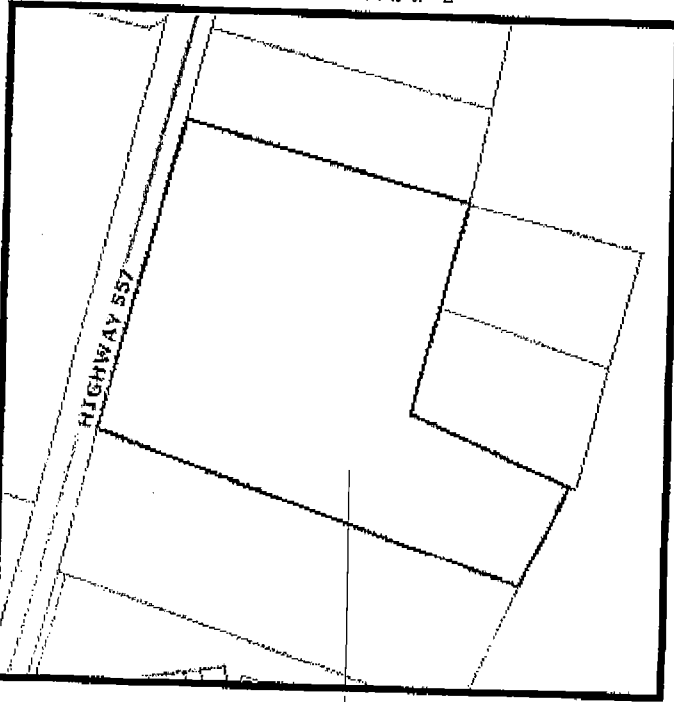
S.C. (S.F.) NO. 6488

WYLLIE, S.C.



**Property Report for Parcel Number:**  
5610000004

Inquiry Date: 11/2/2009



**Owner**  
 POWELL WILLIAM A JR  
 21 DUCK HOOK CIRCLE  
 LAKE WYLIE S C  
 29710

**Owner Name:**  
**Address:**  
**City/State:**  
**Zip Code:**

Disclaimer: While every effort is made to keep information provided over the internet accurate and up-to-date, York County does not certify the authenticity or accuracy of such information. No warranties, express or implied, are provided for the records and/or mapping data herein, or for their use or interpretation by the User.

<b>Parcel Number:</b>	5610000004	<b>Land Value:</b>	\$630000
<b>Total Lots:</b>	0	<b>AG Use:</b>	
<b>Total Acres:</b>	7	<b>AG Use Value:</b>	
<b>Deed Book:</b>	938	<b>Previous Owner:</b>	SIMONINI BUILDERS INC
<b>Deed Book Page:</b>	312	<b>Tax Bill Information:</b>	
<b>Platt Book:</b>	65	<b>Zoning:</b>	
<b>Platt Book Page:</b>	50	<b>Sale Price:</b>	\$172670
<b>School District:</b>	2	<b>Sale Date:</b>	3/5/87
<b>Municipality:</b>		<b>Census Tract:</b>	

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 561-00-00-004 Legal

DEED

Grantor SIMONINI BUILDERS INC

Grantee WILLIAM A POWELL JR

Book 938 Page 312

Dated 2/27/1987 Recorded 3/5/1987

1-1-2 Previous Ownership

Grantor EDITH H GRIER

Grantee SIMONINI BUILDERS INC

Book 806 Page 158

Dated 3/1/1985 Recorded 3/4/1985

Grantor KENNETH E HARPER, LOIS H ALEXANDER, MARGARET H LOVE, REGINALD A HARPER AND EDITH H GRIER

Grantee EDITH H GRIER

Book 660 Page 87

Dated 1/18/1982 Recorded 4/13/1982

Grantor ESTATE OF PAUL C HARPER

Grantee KENNETH E HARPER, LOIS H ALEXANDER, MARGARET H LOVE, REGINALD A HARPER AND EDITH H GRIER

PROBATE 700 /20564

Dated 12/31/1982 Recorded 1/3/1983



Grantor BESS SANDERS HARPER

Grantee PAUL C HARPER

PROBATE 517 / 15824

Dated 12/31/1968 Recorded 1/1/1969

***Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.***

FILED-RECEIVED No. 116—Title to Real Estate by a Corporation

BOOK 231 PAGE 312

Haselden and Owen  
P. O. Box 173  
Clover, SC 29710

The State of South Carolina,

MAR 5 1 06 PM '87

COUNTY OF YORK.  
COUNTY  
CONVEYANCE  
TAX  
\$ 190.30  
PAID

M.H. CARROLL, JR.  
C.C.C.P. & G.S.  
YORK COUNTY, S.C.

KNOW ALL MEN BY THESE PRESENTS, That

SIMONINI BUILDERS, INC.

5  
1  
5  
1  
1  
0  
YORK  
COUNTY

STATE OF SOUTH CAROLINA  
SOUTH CAROLINA TAX COMMISSION  
DOCUMENTARY  
TAX STAMP  
MAR-5'87 380.60  
R.B. 11221

in the State aforesaid,

in consideration of the sum of

One Hundred Seventy Two Thousand Six Hundred Seventy and No/100 (\$172,670.00) Dollars

to it in hand paid at and before the sealing of these presents, by

William A. Powell, Jr.  
4134 Charlotte Hwy, Clover, SC 29710  
(the receipt whereof is hereby acknowledged)

in the State aforesaid,

has granted, bargained, sold and released, and by these Presents does grant, bargain, sell and release, unto the said

WILLIAM A. POWELL, JR., his heirs and assigns forever:

All that certain tract of land, containing 11.146 acres, more or less, in Bethel Township, of York County, State of South Carolina, on S. C. Highway 557, said tract of land being more particularly described as Tract 3 according to plat of survey of Paul C. Harper Estate prepared by Bradford M. Hucks & Son, Surveyor, on the 17th day of November, 1981, which plat, recorded in Plat Book 65, Page 50, Office of the Clerk of Court for York County, South Carolina, is by reference incorporated herein as part of this description.

This is the identical property conveyed to Simonini Builders, Inc. by deed of Edith H. Grier dated March 1, 1985, recorded March 4, 1985 in Deed Book 806, Page 158, Office of the Clerk of Court for York County, South Carolina.

The premises above described is subject to the following restrictive covenants, which shall be covenants running with the land:

(a) The only commercial use for which the premises may be used is for light commercial development. Light commercial development includes, but is not limited to, such uses as professional office buildings, nurseries, storage buildings, banks, storage areas for vehicles, boats and trailers, the use of one or two mobile homes for property management purposes, warehouses and retail stores. Use of the premises for automobile or mobile home sales is expressly prohibited.

(b) The premises shall not be used in any way that is obnoxious or unsightly, such as for junk yards, outdoor machine shops, residential mobile home parks or campgrounds. The use of flood lights for safety purposes is expressly permitted.

(c) There shall be no use of the premises resulting in the emission of noxious odors, fumes or noise. The normal emission of automotive vehicles is specifically permitted.

RECORDED

YORK COUNTY  
TAX ASSESSOR'S OFFICE

(continued)

DATE 3-6-87

TAX MAP NO. 561-4

INITIALS KWR

312

1

(d) The premises shall not be used for any industrial or manufacturing facility.

(e) Building setback lines shall be 20 feet from the Southern and Western boundaries of the premises to be conveyed (being the remaining common borders with Paul C. Harper Estate lands). This restriction does not prevent the purchaser from building fences, putting down paving or gravel, installing lights and light poles, or otherwise using the area other than for buildings.

(f) Nothing herein shall restrict the use of the property for residential purposes including multifamily dwelling units.

TOGETHER with all and singular the Rights, Members, Hereditaments and Appurtenances to the said Premises belonging, or in anywise incident or appertaining.

TO HAVE AND TO HOLD, all and singular the said premises before mentioned unto the said

WILLIAM A. POWELL, JR., his

Heirs and Assigns forever.

And the said Simonini Builders, Inc.

does hereby bind itself

and its successors, to warrant and forever defend all and singular the said premises unto the said William A. Powell, Jr., his Heirs and Assigns, against itself and its successors and against every person whomsoever lawfully claiming or to claim the same, or any part thereof.

IN WITNESS WHEREOF

SIMONINI BUILDERS, INC.

has caused

these presents to be executed in its name by Alfred R. Simonini its

(Insert name of President or Vice-President)

President, and by DAVID SIMONINI its Asst. Secretary

(Insert name of Secretary or Treasurer)

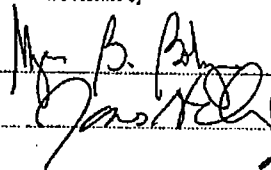
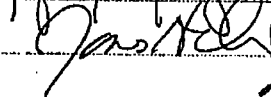
and its corporate seal to be hereto affixed this 27th day of February

in the year of our Lord, one thousand nine hundred and hundred and eleventh

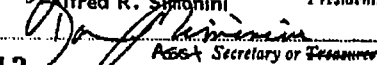
eighty-seven and in the two year of the Sovereignty and Independence of the United States of America.

Signed, Sealed and Delivered in Presence of

SIMONINI BUILDERS, INC.

  
Witness  
  
Witness

By:  (Seal)  
Alfred R. Simonini President.

  
Asst. Secretary or Treasurer.

313

The State of South Carolina,

COUNTY OF YORK

PERSONALLY appeared before me Myron B. Polog (Insert name of Witness)

who, in oath, says that he saw the within-named Simonini Builders, Inc. (Insert name of Corporation)

by Alfred R. Simonini its (Insert name of President or Vice-President)

President and David Simonini its Assisted Secretary (Insert name of Secretary or Treasurer)

sign the within Deed, and the said Corporation, by said officers, seal said Deed, and, as its act and deed, deliver the same, and that he with James H. Owen Jr. (Insert name of other Witness) witnessed the execution thereof.

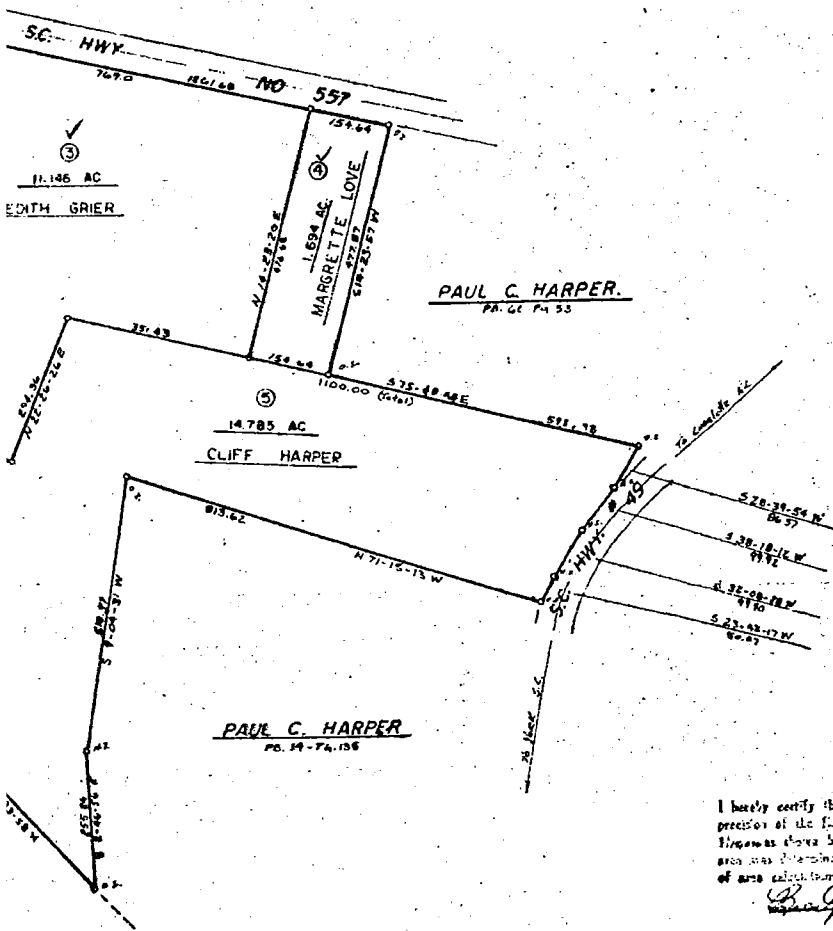
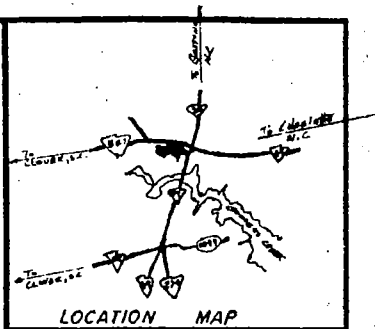
Myron B. Polog (Witness)

SWORN to before me, this 27th day of February, A. D. 19 87

James H. Owen Jr. (Seal)  
Notary Public, S. C.

My Commission expires: 8/7/90

FILED-RECEIVED  
 BOOK 65 PAGE 22  
 JAN 21 10 10 AM '82  
 M.H. CARROLL, JR.  
 C.S.C. & S.S.  
 YORK COUNTY, S.C.



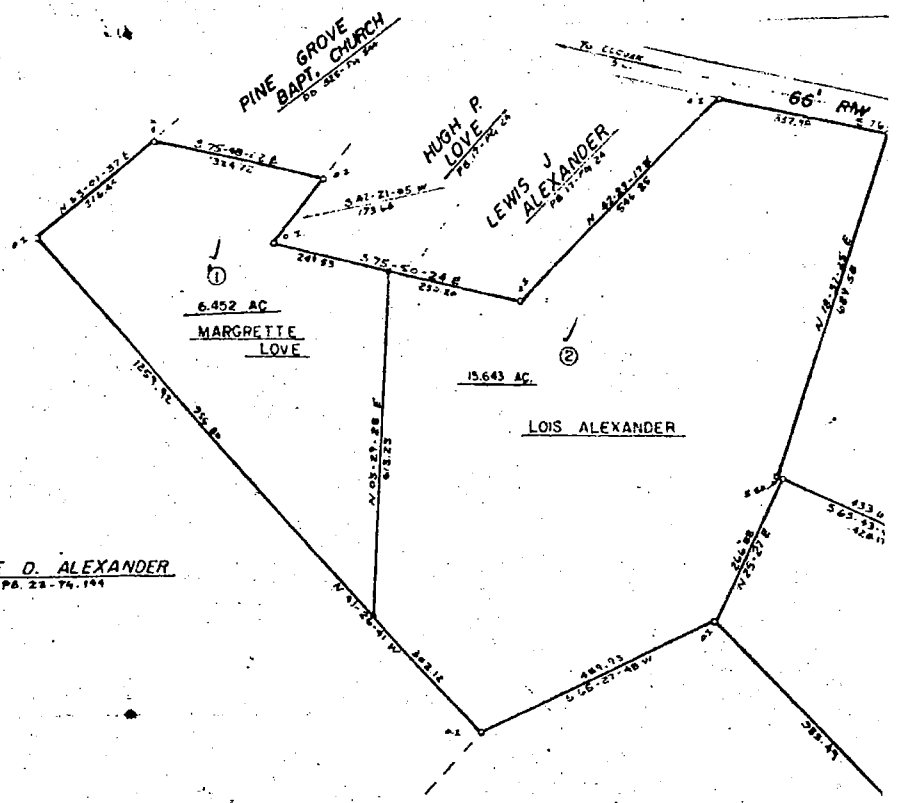
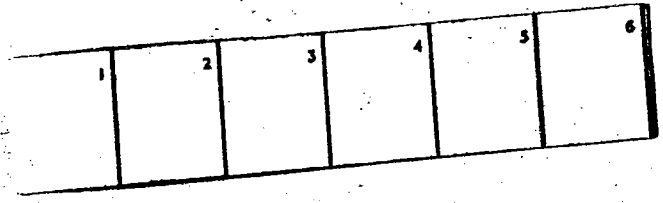
I hereby certify that the ratio of precision of the field survey is 1/100,000 as shown herein and the area was determined by D. S. D. method of area calculation.  
*Bradford M. Hucks*

**FINAL PLAT APPROVAL**

The subdivision plat shown hereon has been found to comply with the York County subdivision Regulations and has been approved for recording in the office of the Clerk of Court of York County, South Carolina.

*Thomas C. Ryan*, 1-20-82  
 Date  
 Director of Planning

REVISIONS	PAUL C. HARPER EST.
	BETHEL TWP. YORK CO. SC.
	BRADFORD M. HUCKS & SON
	LAND SURVEYORS & LAND PLANNING
	748 GREENWAY DR. ROCK HILL, S.C. 29730
	SCALE: DATE: FILE NO:
	1" = 300' 11-17-81 6-81

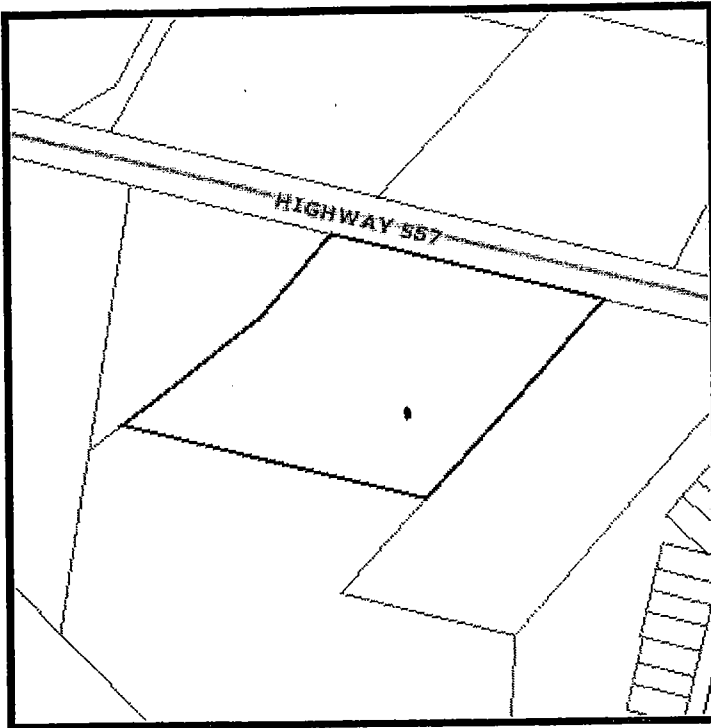


50

CRESCENT TIMBER  
DB. 317- PA. 24

**Property Report for Parcel Number:**  
5610000005

Inquiry Date:



**Owner**  
**Owner Name:** CHURCH PINE GROVE B OF YORK  
**Address:**  
**City/State:** CLOVER S.C. 2  
**Zip Code:** 29710

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

**Parcel Number:** 5610000005  
**Total Lots:** 0  
**Total Acres:** 0  
**Deed Book:** 547  
**Deed Book Page:** 1084  
**Platt Book:**  
**Platt Book Page:**  
**School District:** 2  
**Municipality:**  
**Fire Code:** BE-I  
**Property Location:** HWY 557

**Land Value:** \$0  
**AG Use:**  
**AG Use Value:**  
**Previous Owner:**  
**Tax Bill Information:**  
**Zoning:**  
**Sale Price:** \$0  
**Sale Date:** 0/0/0  
**Census Tract:**  
**Voter District:**

**Building/Structure**

**Prop. Classification:**  
**Heating Type:**  
**Living Area(Sq. Ft.):**  
**Basement:** NO  
**Bathrooms:**  
**Total Imp. Value:**

**Number of Stories:**  
**Year Built:**  
**Garage Area:** NO  
**Fireplace:**  
**Bldg. Value:** \$0

**Assessment**

**Total Assessed Value:** \$0

**Total Market Value\*:** \$0

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 561-00-00-005 Legal HWY 557

DEED

Grantor GLEN V BEATTIE, FRED S TAYLOR AND HAROLD PERKINS Trustees of PINE GROVE BAPTIST CHURCH and PINE GROVE BAPTIST CHURCH unincorporated association by GLENN V BEATTIE, FRED S TAYLOR AND HAROLD PERKINS as Trustees  
Grantee PINE GROVE BAPTIST CHURCH OF YORK COUNTY  
Book 547 Page 1084  
Dated 5/6/1977 Recorded 5/16/1977

1-1-2 Previous Ownership

Trt 1

Grantor CHARLES MOTEN Trustees of SANDY PLAINS BAPTIST CHURCH  
Grantee GLENN V BEATY Trustees of PINE GROVE BAPTIST CHURCH  
Book 325 Page 544  
Dated 6/30/1964 Recorded 7/1/1964

Trt 2

Grantor MARSHALL BAINÉ ALEXANDER, GRACE D ALEXANDER AND MRS. HESTER J DAVIS  
Grantee PINE GROVE BAPTIST CHURCH  
Book 428 Page 432  
Dated 11/12/1971 Recorded 11/22/1971

Grantor RUFUS J DAVIS  
Grantee MARSHALL BAINÉ ALEXANDER, GRACE D ALEXANDER AND MRS. HESTER J DAVIS  
Book 197 Page 229  
Dated 9/17/1953 Recorded 9/30/1953



***Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.***

State of South Carolina,  
County of York

FILED & RECORDED  
BOOK 11 PAGE 118  
MAY 16 11 18 AM '77  
THAD L. CARROLL  
C. C. P. & S.  
YORK COUNTY, S. C.

**Know All Men by These Presents,** That we, Glenn V. Beattie, Fred S. Taylor and Harold Perkins, as Trustees of Pine Grove Baptist Church, and Pine Grove Baptist Church, an unincorporated association, by Glenn V. Beattie, Fred S. Taylor and Harold Perkins, as Trustees,

in the State aforesaid, for and in consideration of the

sum of \$5.00 and confirmation of title in an eleemosynary corporation

to us paid by Pine Grove Baptist Church of York County, a corporation,  
in the State aforesaid Route 2, Box 178, Clover, S. C. 29710

have granted, bargained, sold and released, and by these presents do grant, bargain, sell and release unto the said

Pine Grove Baptist Church of York County, a corporation, its successors and assigns:

**Tract No. 1:** All that certain piece, parcel or tract of land lying, being and situate in York County, South Carolina, and being more particularly described as follows: BEGINNING at a stake in the center of an old abandoned road, a corner of the land conveyed by Duke Power Company to Paul Harper and a corner of the land conveyed by Paul Harper to Duke Power Company, and runs thence S. 42-33 W. 218.7 feet to an iron pipe; thence N. 53-09 E. 250 feet to an iron pipe; thence N. 42-33 E. 200.2 feet to a point in the center of S. C. Highway N. 557; thence with the center line of said highway S. 75-40 E. 282.6 feet to a corner of the land conveyed by the Power Company to Paul Harper; thence S. 42-33 W. 202.5 feet to point of beginning, containing 2.5 acres, more or less, being shown on print of Catawba Sta. File No. 338, dated July 15, 1958, and being the identical property conveyed by Charles Moten, et al., Trustees of Sandy Plains Baptist Church, to Glenn V. Beatty, et al., as Trustees of Pine Grove Baptist Church, by deed dated June, 1964, recorded July 1, 1964, in Deed Book 325 at page 544, Office of Clerk of Court for York County.

**Tract No. 2:** All that certain piece, parcel or tract of land located in Bethel Township, York County, South Carolina, and having the following courses and distances, to wit: BEGINNING at an old iron, the southwest corner of the property property of Pine Grove Baptist Church, and running from said old iron N. 1-00 E. 326 feet to an iron near the southern edge of S. C. Highway No. 557; thence along the southern edge of S. C. Highway No. 557 S. 75-47 E. 288.3 feet to a point; thence along the property line of Pine Grove Baptist Church S. 41 W. 155.3 feet to an old iron; thence continuing along the property line of Pine Grove Baptist Church S. 53 W. 229.5 feet to the beginning iron. Said tract contains 1.13 acres according to plat of property of Pine Grove Baptist Church as drawn by John Quinn Hall, Registered Surveyor, dated July 23, 1971. This is the identical property conveyed by Marshall Baine Alexander, Grace D. Alexander and

Mrs. Hester J. Davis, by deed dated November 12, 1971, recorded November 22, 1971, in Deed Book 428 at page 432, Office of Clerk of Court for York County, South Carolina, to Pine Grove Baptist Church.

15861

TOGETHER with all and singular, the rights, members, hereditaments and appurtenances to the said premises belonging or in anywise incident or appertaining.

To HAVE AND TO HOLD all and singular the premises before mentioned unto the said Pine Grove Baptist Church of York County, its successors

~~Heirs~~ and Assigns forever.

And we do hereby bind ourselves, our successors in office ~~to~~ warrant and forever defend all and singular the said premises unto the said

Pine Grove Baptist Church of York County, its successors

~~Heirs~~ and Assigns, against us and our successors in office ~~to~~ against every person whomsoever lawfully claiming, or to claim, the same or any part thereof.

WITNESS OUR Hands and Seals this 6th day of May in the year of our Lord one thousand nine hundred and seventy-seven and in the <sup>two</sup>~~one~~ hundred and first year of the Sovereignty and Independence of the United States of America.

SIGNED, SEALED AND DELIVERED IN THE PRESENCE OF  
*Wm. B. ...*  
*Lucille A. Robinson*

BY: *Glenn W. Beattie* (SEAL)  
*Fred S. Taylor* (SEAL)  
*Harold Perkins* (SEAL)  
TRUSTEES

AND AS TRUSTEES OF PINE GROVE BAPTIST CHURCH

STATE OF SOUTH CAROLINA, }  
York COUNTY. }

PERSONALLY appeared before me Lucille N. Robinson

and made oath that she saw the within-named Pine Grove Baptist Church, an unincor-  
porated association, by Glenn V. Beattie, Fred S. Taylor and C. Howard Perk  
trustees, and as Trustees of Pine Grove Baptist Church,  
sign, seal and, as their act and deed, deliver the within-written Deed for the uses and purposes therein men-  
tioned and that he, with Melvin B. McKeown, Jr. witnessed the  
execution thereof.

SWORN to before me this 6th  
day of May, 1977  
*[Signature]* (L.S.)  
Notary Public of S. C.  
My Commission Expires Nov. 13, 1980

*Lucille N. Robinson*

STATE OF SOUTH CAROLINA, }  
COUNTY. }

RENUNCIATION OF DOWER

I, \_\_\_\_\_, do hereby certify  
unto all whom it may concern, that Mrs.  
the wife of the within-named  
did this day appear before me, and upon being privately and separately examined by me, did declare that she does freely,  
voluntarily and without any compulsion, dread, or fear of any person or persons whomsoever, renounce, release and for-  
ever relinquish unto the within-named

heirs  
and assigns, all her interest and estate, and also all her right and claim of Dower of, in or to all and singular the premises  
within mentioned and released.

Given under my Hand and Seal, this  
day of  
Anno Domini 19\_\_\_\_\_  
\_\_\_\_\_  
Notary Public of S. C. (L.S.)

\_\_\_\_\_  
\_\_\_\_\_

State of South Carolina,

County of York

Pine Grove Baptist Church

TO

Pine Grove Baptist Church  
of York County

**TITLE TO REAL ESTATE**

I hereby certify that the within Deed was filed for record in my office at 11:15 A. M. o'clock on the 16th day of May, 1977, and was immediately entered upon the proper indexes and duly recorded in Book 547 of Deeds, page 1054

Mad. S. Crull  
Clerk of Court of Common Pleas and General Sessions for Yrd County, S. C.

I hereby certify that the within Deed has been this        day of       , A. D. 19       , Recorded.

In Book        of Deeds, page       

for        Auditor        County       

The R. L. Bryan Company, Columbia, S. C.

**RECORDED**  
YORK COUNTY  
TAX ASSESSOR'S OFFICE

DATE 5/16/77  
TAX MAP NO. 581-5-4-3-2-7  
INITIALS [Signature]

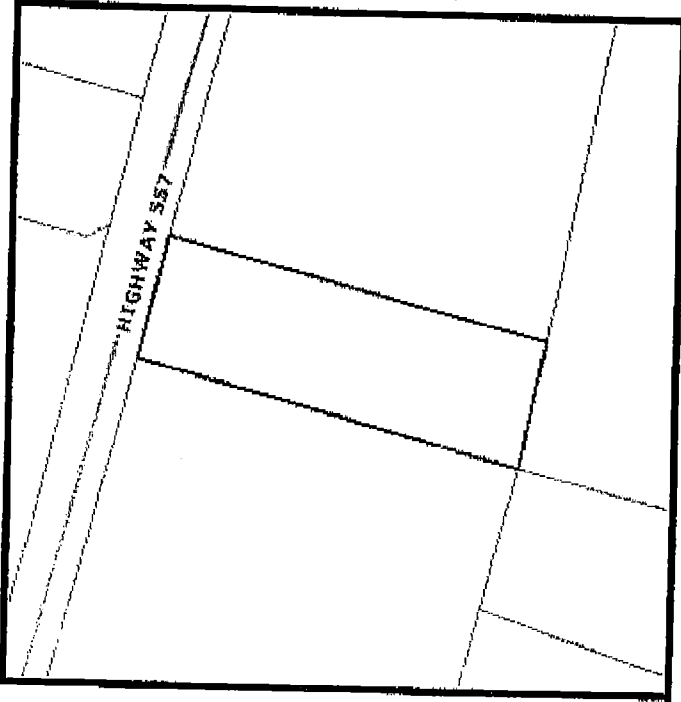
1087

1087

11987

**Property Report for Parcel Number:  
5610000025**

Inquiry Date: 11/2/2009



**Owner Name:** BEAM MICHAEL N & LINDA B  
**Address:** PO BOX 205  
**City/State:** CHERRYVILLE N.C.  
**Zip Code:** 28021

Disclaimer: While every effort is made to keep information provided over the internet accurate and up-to-date, York County does not certify the authenticity or accuracy of such information. No warranties, express or implied, are provided for the records and/or mapping data herein, or for their use or interpretation by the User.

<b>Parcel Number:</b>	5610000025	<b>Land Value:</b>	\$250000
<b>Total Lots:</b>	1	<b>AG Use:</b>	
<b>Total Acres:</b>	0	<b>AG Use Value:</b>	
<b>Deed Book:</b>	280	<b>Previous Owner:</b>	BEAM MICHAEL N BEAM & LINDA B
<b>Deed Book Page:</b>	264	<b>Tax Bill Information:</b>	
<b>Platt Book:</b>	65	<b>Zoning:</b>	
<b>Platt Book Page:</b>	50	<b>Safe Price:</b>	\$88000
<b>School District:</b>	2	<b>Safe Date:</b>	7/29/91

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 561-00-00-025 Legal

DEED

Grantor CHRISTOPHER L ORR, WILLIAM G RUDD III AND ANDREW C MILLER  
Grantee MICHAEL N BEAM AND LINDA BEAM BEAM  
Book 280 Page 264  
Dated 7/29/1991 Recorded 8/2/1991

1-1-2 Previous Ownership

Grantor WILLIAM STEVEN RUSSELL  
Grantee CHRISTOPHER L ORR, WILLIAM G RUDD III AND ANDREW C MILLER  
Book 236 Page 295  
Dated 3/11/1991 Recorded 5/13/1991

Grantor SIMONINI BUILDERS INC  
Grantee WILLIAM STEVEN RUSSELL  
Book 962 Page 251  
Dated 6/29/1987 Recorded 6/30/1987

Grantor MARGARET H LOVE  
Grantee SIMONINI BUILDERS INC  
Book 802 Page 42  
Dated 1/31/1985 Recorded 2/4/1985

Grantor KENNETH E HARPER  
Grantee MARGARET H LOVE  
Book 660 Page 81  
Dated 1/18/1982 Recorded 4/13/1982

Grantor ESTATE OF PAUL HARPER  
Grantee KENNETH E HARPER, LOIS H ALEXANDER, MARGARET H LOVE, REGINAL A HARPER AND EDITH H GRIER  
PROBATE 700 / 20564  
Dated 12/31/1982 Recorded 12/31/1982

Grantor BESS SANDERS HARPER  
Grantee PAUL C HARPER  
PROBATE 517 / 15824  
Dated 12/31/1968 Recorded 12/31/1968

***Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.***





The within described property is conveyed subject to existing easements and to restrictions, if any, appearing in the chain of title, which said restrictions, if any, are not intended to be reimposed hereby.

TOGETHER with all and singular the Rights, Members, Hereditaments and Appurtenances to the

said Premises belonging, or in anywise incident or appertaining.

TO HAVE AND TO HOLD, all and singular the said Premises before mentioned, unto the said

MICHAEL N. BEAM and LINDA BEAM BEAM, their

Heirs and Assigns forever.

And We do hereby bind ourselves and our

Administrators, to warrant and forever defend all and singular the said Premises unto the said

MICHAEL N. BEAM and LINDA BEAM BEAM, their

Heirs and Assigns against us and our

Heirs

and all other persons whomsoever lawfully claiming, or to claim the same, or any part thereof.

Witness our Hands and Seals this 29th day of July in the

year of our Lord one thousand nine hundred and ninety-one

hundred and sixteenth

year of the Sovereignty and Independence of the United

States of America.

Signed, sealed and delivered

in the presence of

*George B. Brown*  
As to Christopher R. Orr and

William G. Rudd, II

WILLIAM G. RUDD, III  
[Seal]

CHRISTOPHER L. ORR  
[Seal]

ANDREW C. MILLER  
[Seal]

As to Andrew C. Miller

*George B. Brown*

Notary Public for South Carolina  
My Commission Expires: 4/18/2000  
(L.S.)

SWORN to before me this  
29th day of July, 1991.

PERSONALLY APPEARED before me the undersigned and made oath that s/he  
saw the within named Andrew C. Miller sign, seal and as his act and deed,  
deliver the within written Deed; and that s/he with Carroll M. Pitts, Jr.  
witnessed the execution thereof.

*Carroll M. Pitts, Jr.*

STATE OF SOUTH CAROLINA  
COUNTY OF YORK

TITLE OR RANK:

The foregoing instrument was acknowledged before me this \_\_\_\_\_ day of \_\_\_\_\_ by \_\_\_\_\_

STATE OF \_\_\_\_\_  
COUNTY OF \_\_\_\_\_

My Commission expires: 4/18/2000

Notary Public for S.C.

July 29, 1991  
*Carroll M. Pitts, Jr.*

Sworn to before me this 29th day of

*Carroll M. Pitts, Jr.*

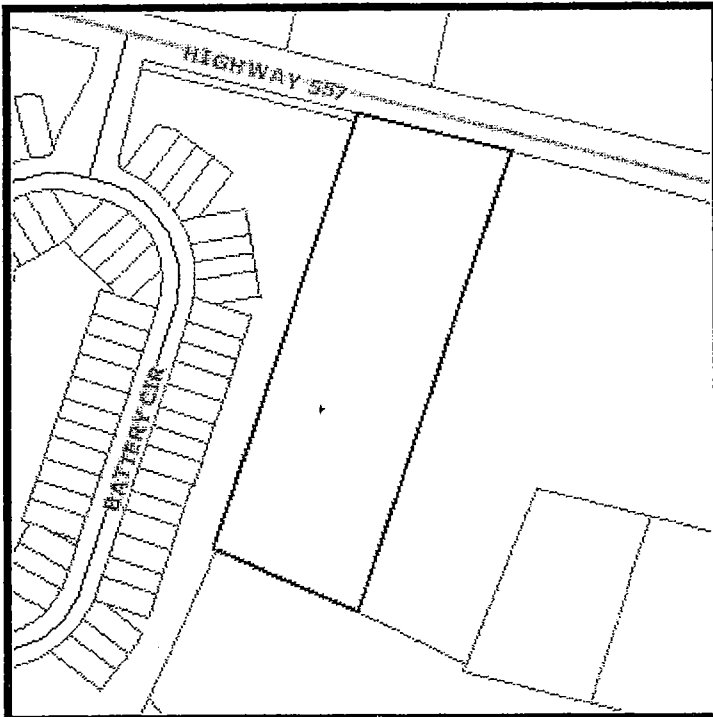
Carroll M. Pitts, Jr.  
sign, seal and as their  
act and deed, deliver the within written Deed; and that s/he with

III  
made oath that s/he saw the within named Christopher L. Orr and William G. Rudd,  
and  
PERSONALLY APPEARED before me the undersigned

THE STATE OF SOUTH CAROLINA,  
YORK COUNTY

**Property Report for Parcel Number:**  
5610000029

Inquiry Date:



**Owner**  
**Owner Name:** SOLOMON ENTERPRISE  
**Address:** P O BOX 2636  
**City/State:** GASTONIA N C  
**Zip Code:** 28053

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

**Parcel Number:** 5610000029  
**Total Lots:** 0  
**Total Acres:** 4  
**Deed Book:** 1001  
**Deed Book Page:** 172  
**Platt Book:** 88  
**Platt Book Page:** 533  
**School District:** 2  
**Municipality:**  
**Fire Code:** BE-I  
**Property Location:** ( 4 ACRES )

**Land Value:** \$360000  
**AG Use:**  
**AG Use Value:**  
**Previous Owner:** POWELL WILLIAM A J  
**Tax Bill Information:**  
**Zoning:**  
**Sale Price:** \$140000  
**Sale Date:** 1/18/88  
**Census Tract:**  
**Voter District:**

**Building/Structure**

**Prop. Classification:**  
**Heating Type:**  
**Living Area(Sq. Ft.):**  
**Basement:** NO  
**Bathrooms:**  
**Total Imp. Value:**

**Number of Stories:**  
**Year Built:**  
**Garage Area:** NO  
**Fireplace:**  
**Bldg. Value:** \$0

**Assessment**

**Total Assessed Value:** \$21600

**Total Market Value\*:** \$360000

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 561-00-00-029 Legal 4 AC PLAT 88 - 533

DEED

Grantor WILLIAM A POWELL JR  
Grantee SOLOMON ENTERPRISES INC  
Book 1001 Page 172  
Dated 1/16/1988 Recorded 1/18/1988

1-1-2 Previous Ownership

Grantor SIMONINI BUILDERS INC  
Grantee WILLIAM A POWELL JR  
Book 138 Page 312  
Dated 2/27/1987 Recorded 5/5/1987

Grantor EDITH H GRIER  
Grantee SIMONINI BUILDERS INC  
Book 806 Page 158  
Dated 3/4/1985 Recorded 3/4/1985

Grantor KENNETH E HARPER, LOIS H ALEXANDER, MARGARET H LOVE, REGINALD A HARPER AND EDITH H GRIER  
Grantee EDITH H GRIER  
Book 660 Page 87  
Dated 1/18/1982 Recorded 4/13/1982

Grantor ESTATE OF PAUL HARPER

Grantee KENNETH E HARPER, LOIS H ALEXANDER, MARGARET H LOVE, REGINALD A HARPER AND EDITH H GRIER

PROBATE 700 / 20564

Dated 1/1/1982 Recorded 1/1/1982

Grantor BESS SANDERS HARPER

Grantee PAUL C HARPER

PROBATE 517 / 15824

Dated 12/31/1968 Recorded 12/31/1968

***Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.***

State of South Carolina,  
COUNTY OF YORK.

Haselden and Owen  
P. O. Box 173  
Clover, South Carolina 29710

FILED-RECEIVED  
BOOK 1201 PAGE 172  
JAN 18 12 57 PM '88  
M.H. CARROLL, JR.  
CLERK OF S.C.S.  
YORK COUNTY, S.C.

Know All Men by These Presents, That  
(hereinafter whether singular or plural the "Grantor")

I, WILLIAM A. POWELL, JR.,

COUNTY  
CONVEYANCE  
TAX  
\$ 154.<sup>00</sup>  
PAID

STATE OF SOUTH CAROLINA  
SOUTH CAROLINA TAX COMMISSION  
DOCUMENTARY TAX STAMP  
JAN 18 88 308.00  
P.B. 11221

in the State aforesaid, for and in consideration of the  
sum of One Hundred Forty Thousand and no/100 (\$140,000.00) Dollars

to the Grantor paid by SOLOMON ENTERPRISES, LTD., A North Carolina Limited Partnership, P.O. Box 859, Gastonia, NC 28053 (hereinafter  
whether singular or plural the "Grantee") has granted, bargained, sold and released, and by these presents does grant,

bargain, sell and release unto the said ~~XXXXXX~~ SOLOMON ENTERPRISES, LTD., A North Carolina Limited Partnership, its successors, heirs and assigns:

All that certain piece, parcel or tract of land, lying, being and situate on the southern edge of South Carolina Highway 557, York County, South Carolina, and being more particularly described as follows: Beginning at an old iron on the southern edge of South Carolina Highway 557 and running thence S. 75-58-17 E. 245.70 feet to a new iron in the edge of South Carolina Highway 557; thence S. 18-38-42 W. 733.58 feet to a new iron; thence N. 65-43-17 W. 246.0 feet to an old iron; thence N. 18-38-15 E. 689.66 feet to an old iron on the edge of South Carolina Highway 557, the point of beginning. Containing 4.0 acres, more or less, and being more particularly shown as a portion of Tract 3, Property of T. J. Solomon, drawn by J. B. Fisher, S.C. R.L.S., dated December 16, 1987, and recorded in the Office of the Clerk of Court for York County, in Plat Book 88, Page 533.

This is a portion of the property conveyed to William A. Powell, Jr. by deed of Simonini Builders, Inc. dated February 27, 1987, and recorded March 5, 1987, in Book 138, Page 312, Office of the Clerk of Court for York County, South Carolina.

RECORDED  
YORK COUNTY

TAX ASSESSOR'S OFFICE

DATE 1-19-88  
TAX MAP NO. 561-29  
INITIALS R.P.R.

TOGETHER with all and singular, the rights, members, hereditaments and appurtenances to the said premises belonging or in anywise incident or appertaining.

To HAVE AND TO HOLD all and singular the premises before mentioned unto the said Grantee,  
its, successors,

Heirs and Assigns forever.

And the Grantor does hereby bind himself and his Heirs, Executors and Administrators, to warrant and forever defend all and singular the said premises unto the said Grantee and the Grantee's Heirs and Assigns, against the Grantor and the Grantor's Heirs and against every person whomsoever lawfully claiming, or to claim, the same or any part thereof.

WITNESS the Hand and Seal of the Grantor this 16th day of January  
in the year of our Lord one thousand nine hundred and eighty-eight  
and in the two hundredth and twelfth year of the Sovereignty  
and Independence of the United States of America.

SIGNED, SEALED AND DELIVERED  
IN THE PRESENCE OF

James B. Lane  
W. B. Lane

William A. Powell, Jr. (SEAL)  
WILLIAM A. POWELL, JR. (SEAL)



STATE OF SOUTH CAROLINA. }  
YORK COUNTY. }

PERSONALLY appeared before me the undersigned witness and made oath that s/he saw the within named Grantor sign, seal and, as the Grantor's act and deed, deliver the within-written Deed for the uses and purposes therein mentioned and that s/he, with the other witness whose signature appears above witnessed the execution thereof.

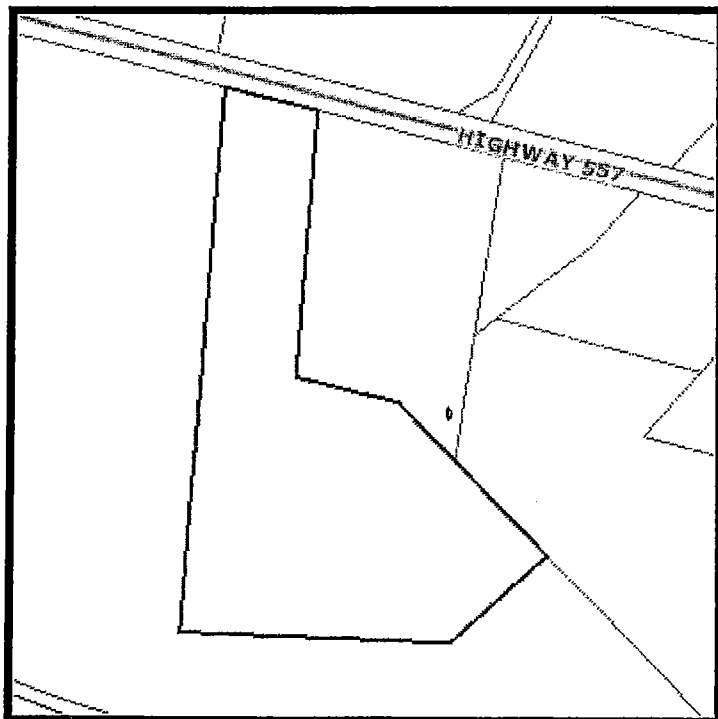
SWORN to before me this 16th

day of January, 1988  
My B. M. (L.S.)  
Notary Public of S. C.  
My Commission Expires: 4-15-97

James B. Lane  
Witness

**Property Report for Parcel Number:**  
5610000030

Inquiry Date:



**Owner**  
**Owner Name:** ALEXANDER KENNETH  
**Address:** 5485 HWY 557  
**City/State:** LAKE WYLIE S C  
**Zip Code:** 29710

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

**Parcel Number:** 5610000030  
**Total Lots:** 0  
**Total Acres:** 10.01  
**Deed Book:** 6928  
**Deed Book Page:** 278  
**Platt Book:** C369  
**Platt Book Page:** 3 ✓  
**School District:** 2  
**Municipality:**  
**Fire Code:** BE-I  
**Property Location:** APPROX 10.01 AC HWY 557

**Land Value:** \$200200  
**AG Use:**  
**AG Use Value:**  
**Previous Owner:** TRUSTEES OF PINE GF BAPTIST  
**Tax Bill Information:**  
**Zoning:**  
**Sale Price:** \$1  
**Sale Date:** 3/8/05  
**Census Tract:**  
**Voter District:**

**Building/Structure**

**Prop. Classification:**  
**Heating Type:**  
**Living Area(Sq. Ft.):**  
**Basement:** NO  
**Bathrooms:**  
**Total Imp. Value:**

**Number of Stories:**  
**Year Built:**  
**Garage Area:** NO  
**Fireplace:**  
**Bldg. Value:** \$0

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 561-00-00-030 Legal APX 10.01 AC HWY 557

DEED

Grantor Trustees PINE GROVE BAPTIST CHURCH  
Grantee KENNETH D ALEXANDER  
Book 6928 Page 278  
Dated 2/23/2005 Recorded 3/8/2005

1-1-2 Previous Ownership

Grantor MARGARET H LOVE  
Grantee Trustees PINE GROVE BAPTIST CHURCH  
Book 864 Page 261  
Dated 1/3/1986 Recorded 1/24/1986

Grantor KENNETH E HARPER, LOIS H ALEXANDER, MARGARET H LOVE, REGINALD A HARPER AND EDITH H GRIER  
Grantee MARGARET H LOVE  
Book 660 Page 81  
Dated 1/18/1982 Recorded 4/13/1982

Grantor ESTATE OF PAUL HARPER  
Grantee KENNETH E HARPER, LOIS H ALEXANDER, MARGARET H LOVE, REGINALD A HARPER AND EDITH H GRIER  
PROBATE 700 / 20564  
Dated 1/1/1982 Recorded 1/1/1982

Grantor BESS SANDERS HARPER

Grantee PAUL C HARPER

PROBATE 517 / 15824

Dated 12/31/1968 Recorded 12/31/1968

***Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.***



AND THE SAID TRUSTEES, PINE GROVE BAPTIST CHURCH, does hereby bind itself and its successors, to warrant and forever defend all and singular the said premises unto the said KENNETH D. ALEXANDER, their Heirs and Assigns, against itself and its successors and against every person whomsoever lawfully claiming or to claim the same, or any part thereof.

IN WITNESS WHEREOF TRUSTEES, PINE GROVE BAPTIST CHURCH, has caused these presents to be executed in its name by James Bingham Paul Deese, its Trustees, this 23rd day of February in the year of our Lord, Two Thousand and Five, and in the two hundred and twenty-ninth year of the Sovereignty and Independence of the United States of America.

Signed, Sealed and Delivered

In Presence of:

Duncan  
(witness # 1)

[Signature]  
(witness # 2)

TRUSTEES, PINE GROVE BAPTIST CHURCH,

By: James Bingham, Trustee

Its: Paul Deese, Trustee

STATE OF SOUTH CAROLINA )  
 ) ) PROBATE  
COUNTY OF YORK )

PERSONALLY APPEARED before me the undersigned witness and made oath that s/he saw the within-named **TRUSTEES, PINE GROVE BAPTIST CHURCH** by James Singham its Trustees sign the within Deed, and the said Trustees, Pine Grove Baptist Church, by said officers, seal said Deed, and, as its act and deed, deliver the same, and that s/he with the other witness whose name appears above witnessed the execution thereof.

SWORN to before me this  
23rd day of February, 2005.

Dustin  
(witness # 1)

[Signature] (L.S.)  
Notary Public for South Carolina  
My Commission Expires: 4-1-2007

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 is located at 5415 Hwy 557  
bearing York County Tax Map Number 561-24(P), was transferred  
by Pine Grove Baptist Church  
to Kenneth D. Alexander 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):  
5  
(If exempt, please skip items 4 - 7, and go to item 8 of this affidavit.)

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. 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: Attorney

BK06928 P00281



9. I understand that a person required to furnish this affidavit who wilfully 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.

D. Thomas B. Boyan

Responsible Person Connected with the Transaction

SWORN to before me this 23  
day of February 20 05

THOMAS B. BOYAN  
Print or Type Name Here

Notary Public for S.C.  
My Commission Expires: 4-12-06

### 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. 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:

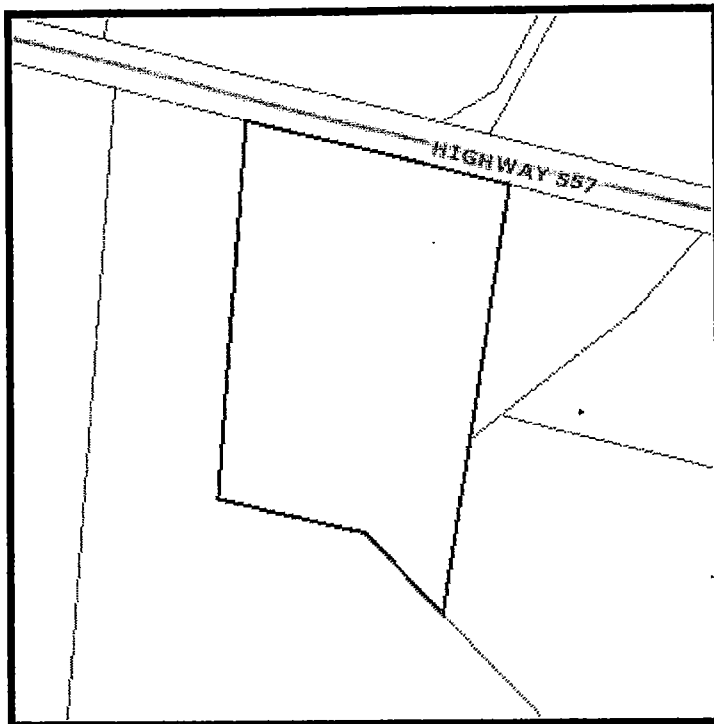
- (1) transferring realty in which the value of the realty, as defined in Code Section 12-24-30, is equal to or less than one hundred dollars;
- (2) transferring realty to the federal government or to a state, its agencies and departments, and its political subdivisions, including school districts;
- (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 in order to become, or as, a stockholder, partner, or trust beneficiary of the entity provided 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 such stock or interest held by the grantor. However, 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. A 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; and
- (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 mortgagee or deed pursuant to foreclosure proceedings.
- (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.

106928 PG0282

**Property Report for Parcel Number:**

5610000037

Inquiry Date:



**Owner**

**Owner Name:** ALEXANDER KENNETH  
**Address:** 5485 HWY 557  
**City/State:** LAKE WYLIE S.C.  
**Zip Code:** 29710

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

<b>Parcel Number:</b>	5610000037	<b>Land Value:</b>	\$132500
<b>Total Lots:</b>	0	<b>AG Use:</b>	
<b>Total Acres:</b>	5.3	<b>AG Use Value:</b>	
<b>Deed Book:</b>	6928	<b>Previous Owner:</b>	TRUSTEES OF PINE GF BAPTIST
<b>Deed Book Page:</b>	278	<b>Tax Bill Information:</b>	
<b>Platt Book:</b>	C369	<b>Zoning:</b>	
<b>Platt Book Page:</b>	3	<b>Sale Price:</b>	\$1
<b>School District:</b>	2	<b>Sale Date:</b>	3/8/05
<b>Municipality:</b>		<b>Census Tract:</b>	
<b>Fire Code:</b>	BE-I	<b>Voter District:</b>	
<b>Property Location:</b>	(5.303 AC) S C HWY 557		

**Building/Structure**

<b>Prop. Classification:</b>		<b>Number of Stories:</b>	
<b>Heating Type:</b>		<b>Year Built:</b>	
<b>Living Area(Sq. Ft.):</b>		<b>Garage Area:</b>	NO
<b>Basement:</b>	NO	<b>Fireplace:</b>	
<b>Bathrooms:</b>		<b>Bldg. Value:</b>	\$193500
<b>Total Imp. Value:</b>			

**Assessment**

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 561-00-00-037 Legal 5.303 AC - HWY 557

DEED

Grantor Trustees PINE GROVE BAPTIST CHURCH  
Grantee KENNETH D ALEXANDER  
Book 6928 Page 278  
Dated 2/23/2005 Recorded 3/8/2005

1-1-2 Previous Ownership

Grantor MARGARET H LOVE  
Grantee Trustees PINE GROVE BAPTIST CHURCH  
Book 864 Page 261  
Dated 1/3/1986 Recorded 1/24/1986

Grantor KENNETH E HARPER, LOIS H ALEXANDER, MARGARET H LOVE, REGINALD A HARPER AND EDITH H GRIER  
Grantee MARGARET H LOVE  
Book 660 Page 81  
Dated 1/18/1982 Recorded 4/13/1982

Grantor ESTATE OF PAUL HARPER  
Grantee KENNETH E HARPER, LOIS H ALEXANDER, MARGARET H LOVE, REGINALD A HARPER AND EDITH H GRIER  
PROBATE 700 / 20564  
Dated 1/1/1982 Recorded 1/1/1982

Grantor BESS SANDERS HARPER

Grantee PAUL C HARPER

PROBATE 517 / 15824

Dated 12/31/1968 Recorded 12/31/1968

***Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.***



AND THE SAID TRUSTEES, PINE GROVE BAPTIST CHURCH, does hereby bind itself and its successors, to warrant and forever defend all and singular the said premises unto the said KENNETH D. ALEXANDER, their Heirs and Assigns, against itself and its successors and against every person whomsoever lawfully claiming or to claim the same, or any part thereof.

IN WITNESS WHEREOF TRUSTEES, PINE GROVE BAPTIST CHURCH, has caused these presents to be executed in its name by <sup>James Bingham</sup> ~~Paul Deese~~, its Trustees, this 23rd day of February in the year of our Lord, Two Thousand and Five, and in the two hundred and twenty-ninth year of the Sovereignty and Independence of the United States of America.

Signed, Sealed and Delivered

In Presence of:

TRUSTEES, PINE GROVE BAPTIST CHURCH,

By: James Bingham, Trustee

Its: Paul Deese, Trustee

Dwain Low  
(witness # 1)

[Signature]  
(witness #2)

STATE OF SOUTH CAROLINA )  
 )  
COUNTY OF YORK ) PROBATE

PERSONALLY APPEARED before me the undersigned witness and made oath that s/he saw the within-named **TRUSTEES, PINE GROVE BAPTIST CHURCH** by James Bingham its Trustees sign the within Deed, and the said Trustees, Pine Grove Baptist Church, by said officers, seal said Deed, and, as its act and deed, deliver the same, and that s/he with the other witness whose name appears above witnessed the execution thereof.

SWORN to before me this  
23rd day of February, 2005.

[Signature] (L.S.)  
Notary Public for South Carolina  
My Commission Expires: 12/31/2007

[Signature]  
(witness # 1)

BK06928 PG0280

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 is located at 5415 Hwy 557  
bearing York County Tax Map Number 561-24 (P), was transferred  
by Pine Grove Baptist Church  
to Kenneth D. Alexander 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):  
5  
(If exempt, please skip items 4 - 7, and go to item 8 of this affidavit.)

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. 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: Attorney

BK06928 P00281



9. I understand that a person required to furnish this affidavit who wilfully 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.

Donald B. Boyan

Responsible Person Connected with the Transaction

SWORN to before me this 23  
day of February 20 05

Donald B. Boyan  
Print or Type Name Here

Notary Public for S.C.  
My Commission Expires: 4-12-06

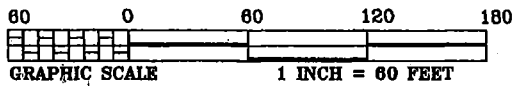
### INFORMATION

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. 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:

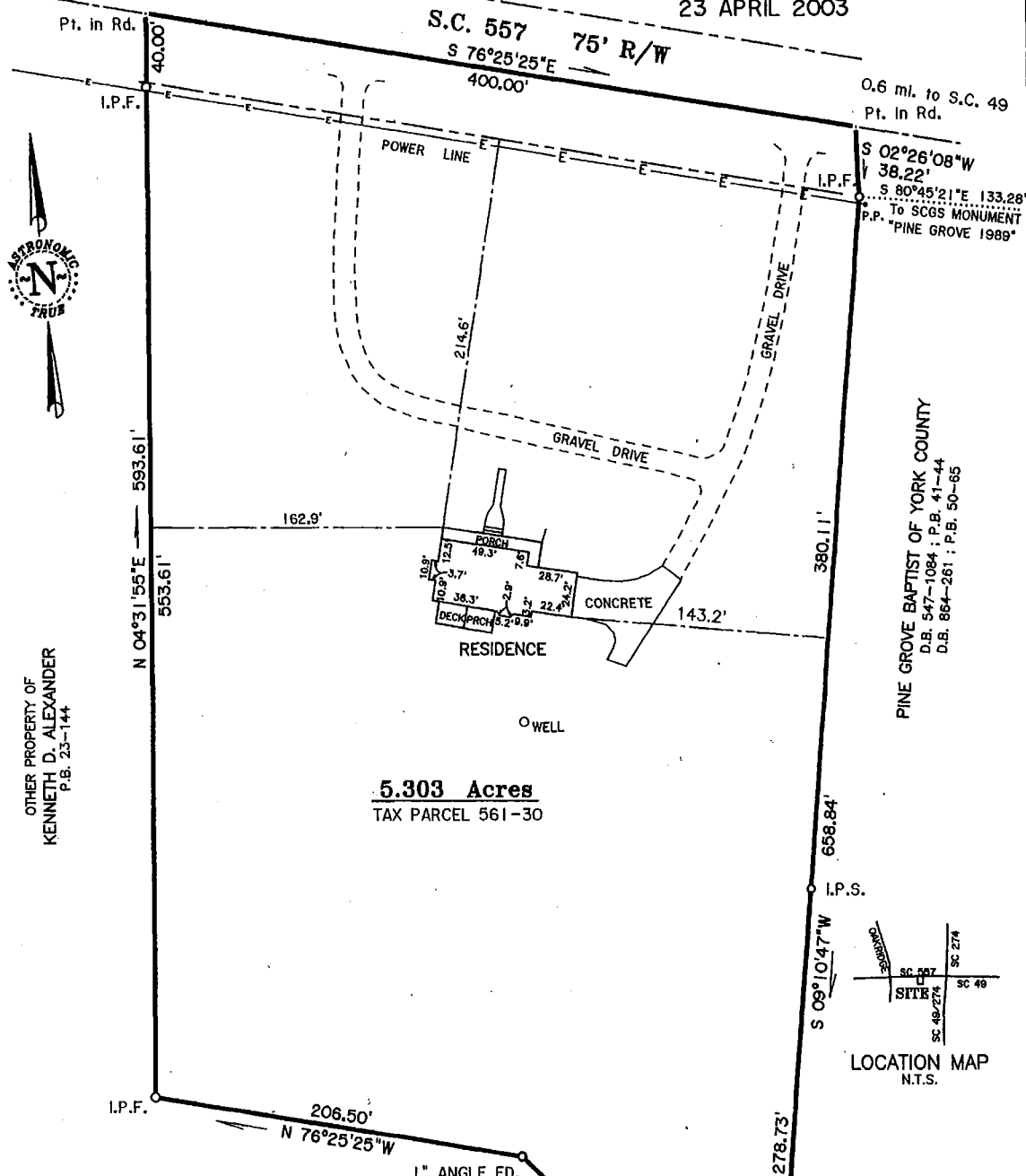
- (1) transferring realty in which the value of the realty, as defined in Code Section 12-24-30, is equal to or less than one hundred dollars;
- (2) transferring realty to the federal government or to a state, its agencies and departments, and its political subdivisions, including school districts;
- (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 in order to become, or as, a stockholder, partner, or trust beneficiary of the entity provided 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 such stock or interest held by the grantor. However, 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 given 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. A 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; and
- (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 mortgagee or deed pursuant to foreclosure proceedings;
- (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.

06928 00282



PLAT OF SURVEY FOR  
**Kenneth D. Alexander**

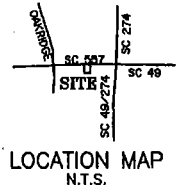
BETHEL TOWNSHIP  
YORK COUNTY SOUTH CAROLINA  
23 APRIL 2003



OTHER PROPERTY OF  
**KENNETH D. ALEXANDER**  
P.B. 23-144

PINE GROVE BAPTIST OF YORK COUNTY  
D.B. 547-1084 ; P.B. 41-44  
D.B. 864-261 ; P.B. 50-65

**5.303 Acres**  
TAX PARCEL 561-30



"CLOSING/LOAN SURVEY"  
I hereby state to the best of my knowledge, information and belief and in my professional opinion, the survey shown hereon was made in accordance with the requirements of the "Minimum Standards Manual for the Practice of Land Surveying in South Carolina", and meets or exceeds the requirements for a "Class A" survey as specified therein. Also, there are no visible encroachments or projections other than shown.

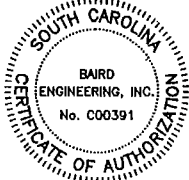


000226840 BK C-369 PG: 3  
03/08/2005 10:43:13AM  
David Hamilton, Clerk of Court  
York County, SC  
FEE: 10.00

*Joe H. Baird*  
S.C. REG. NO. 6488 CLOVER, S.C.  
F.B. JOB NO. 900314B

**BAIRD ENGINEERING, INC.**  
SURVEYORS • ENGINEERS • PLANNERS

3219 BAIRD ROAD  
CLOVER, SC 29710  
803/831-2661  
COA No. 000391



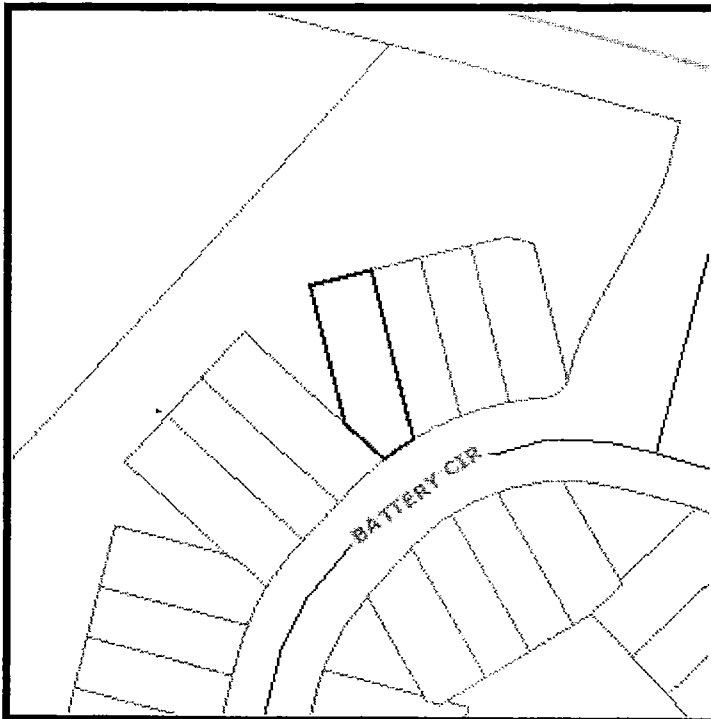
All Corners Are #5 Rebar  
Unless Otherwise Noted.  
I.P.F.— Found ; I.P.S.— Set

FIRM Panel 450193 0050 B, 4 Nov 81. Zone "C".

" NO NEW LOTS OR PROPERTY LINES ESTABLISHED "

**Property Report for Parcel Number:**  
5610101004

Inquiry Date:



**Owner**

**Owner Name:** OLSON DEVELOPMENT  
**Address:** 17206 LANCASTER HWY  
**City/State:** CHARLOTTE NC  
**Zip Code:** 282772003

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

**Parcel Number:** 5610101004  
**Total Lots:** 1  
**Total Acres:** 0  
**Deed Book:** 7185  
**Deed Book Page:** 26  
**Platt Book:** D293  
**Platt Book Page:** 1  
**School District:** 2  
**Municipality:**  
**Fire Code:** BE-I

**Land Value:** \$52000  
**AG Use:**  
**AG Use Value:**  
**Previous Owner:** EST OF LEWIS J ALEX.  
**Tax Bill Information:**  
**Zoning:**  
**Sale Price:** \$950000  
**Sale Date:** 6/23/05  
**Census Tract:**  
**Voter District:**

**Property Location:** LOT 4 HARPERS GREEN  
TOWNHOME

**Building/Structure**

**Prop. Classification:**  
**Heating Type:**  
**Living Area(Sq. Ft.):**  
**Basement:** NO  
**Bathrooms:**  
**Total Imp. Value:**

**Number of Stories:**  
**Year Built:**  
**Garage Area:** NO  
**Fireplace:**  
**Bldg. Value:** \$0

**Assessment**

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 561-01-01-004 Legal LOT 4 HARPERS GREEN TOWNHOUSE

DEED

Grantor LOIS H ALEXANDER aka MARY H ALEXANDER - PER REP OF ESTATE OF LEWIS J ALEXANDER

Grantee OLSON DEVELOPMENT LLC

Book 7185 Page 26

Dated 6/20/2005 Recorded 6/23/2005

1-1-2 Previous Ownership

Grantor ESTATE OF LEWIS J ALEXANDER

Grantee LOIS H ALEXANDER

PROBATE 05 ES 46 0557

Dated 10/20/2004 Recorded 1/3/2005

Grantor LOIS H ALEXANDER

Grantee LEWIS J AND LOIS H ALEXANDER

Book 663 Page 110

Dated 5/14/1982 Recorded 5/17/1982

Grantor KENNETH E HARPER, LOIS H ALEXANDER, MARGARET H LOVE, REGINALD A HARPER AND EDITH H GRIER

Grantee LOIS H ALEXANDER

Book 660 Page 78

Dated 1/18/1982 Recorded 4/13/1982

Grantor ESTATE OF PAUL HARPER

Grantee KENNETH E HARPER, LOIS H ALEXANDER, MARGARET H LOVE, REGINALD A HARPER AND EDITH H GRIER

PROBATE 700 / 20564

Dated 1/1/1982 Recorded 1/1/1982

Grantor BESS SANDERS HARPER

Grantee PAUL C HARPER

PROBATE 517 / 15824

Dated 12/31/1968 Recorded 12/31/1968

***Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.***

THE STATE OF SOUTH CAROLINA DEPARTMENT OF REVENUE OFFICE TITLE TO REAL ESTATE  
COUNTY OF YORK

DATE 6-23-05  
TAX MAP NO. 561-26 + 2

0/470  
19x

KNOW ALL PERSONS BY THESE PRESENTS, that we, Lois H. Alexander, a/k/a Mary H. Alexander, individually and as Personal Representatives of the Estate of Lewis J. Alexander; 2005ES4600557, hereinafter whether singular or plural the "Grantor", for and in consideration of sum of Nine Hundred Fifty Thousand Dollars (\$950,000.00) to me in hand paid by Olson Development, LLC, 15105-D John Delaney Dr., No. 341, Charlotte, NC 28277, hereinafter whether singular or plural the "Grantee", the receipt of which is acknowledged, have granted, bargained, sold, and released, and by these presents grant, bargain, sell, and release to such Grantee the following described property:

000242397  
RECORDED 06/23/2005 09:11:16AM  
Bk:07185 Pg:00026 Pages:2  
Fee:10.00 State:2470.00  
County:1045.00 Exempt:-----  
David Hamilton, Clerk of Court  
90 S. Columbia Highway 557, Bethel

Tract I:

ALL that certain piece, parcel or tract of land located on SC Highway 557, Bethel Township, York County, South Carolina, being all of Tract B, containing 3.0 acres, more or less, as shown and described on a plat entitled "Plat of Property of Paul C. Harper," prepared by E. L. Faires, R. L.S., dated August 9, 1958, recorded in the Office of the Clerk of Court for York County, South Carolina in Plat Book 17, Page 24, to which plat reference is hereby made for a more particular description by dimensions, metes and bounds of the above-numbered piece, parcel or tract of land.

Tax Parcel Number: 561-00-00-002

This is the identical property conveyed to Lewis J. Alexander and Mary H. Alexander, a/k/a Lois H. Alexander, by Deed from Paul C. Harper dated December 29, 1958, recorded January 13, 1959, in Book 258, Page 333, Office of the Clerk of Court for York County, South Carolina; Lewis J. Alexander having passed away October 20, 2004 leaving all his property to Lois H. Alexander.

Tract II:

ALL that certain piece, parcel or tract of land located on SC Highway 557, Bethel Township, York County, South Carolina, being all of Tract 2, containing 15.643 acres, more or less, as shown and described on a plat entitled "Paul C. Harper Estate" prepared by Bradford M. Hucks & Son, dated November 17, 1981, recorded in the Office of the Clerk of Court for York County, South Carolina in Plat Book 65, Page 50, to which plat reference is hereby made for a more particular description by dimensions, metes and bounds of the above-numbered piece, parcel or tract of land; less and except that 0.082 acre parcel conveyed to SC Department of Highways & Transportation by Deed recorded in Book 224, Page 241.

Tax Parcel Number: 561-00-00-026

This is a portion of the property conveyed to Lois H. Alexander by Deed from Kenneth E. Harper, Lois H. Alexander, Reginald A. Harper and Edith H. Grier dated January 18, 1982, recorded April 13, 1982, in Book 660, Page 78, Office of the Clerk of Court for York

County, South Carolina; Lois H. Alexander having conveyed a 1/2 interest in the property to Lewis J. Alexander by Deed recorded in Book 663, Page 110; Lewis J. Alexander having passed away October 20, 2004 leaving all his property to Lois H. Alexander

Together with all and singular, the right, members, hereditaments, and appurtenances belonging to or in any manner incident or appertaining to the described property; to have and to hold all and singular the premises mentioned, to Grantee, Grantee's heirs, and assigns forever. And I bind myself, individually and as Personal Representatives of the Estate of Lewis J. Alexander, my anf Lewis J. Alexander's heirs, executors, and administrators, to warrant and forever defend all and singular the premises to Grantee, Grantee's heirs, and assigns, against Grantor and Grantor's heirs, and against every person whomsoever lawfully claiming or to claim the described property, or any part thereof.

WITNESS the hand and seal of the Grantor this the 20<sup>th</sup> day of JUNE, 2005.

GRANTOR:

SIGNED SEALED AND DELIVERED  
IN THE PRESENCE OF:

Lois H. Alexander (SEAL)

Lois H. Alexander, individually and as  
Personal Representative of the Estate  
of Lewis J. Alexander

Laurel Hadder  
Witness

[Signature]  
Witness

**STATE OF SOUTH CAROLINA  
COUNTY OF YORK**

Personally appeared before me the undersigned witness and made oath that s/he saw the within named Grantor sign, seal and, as the Grantor's act and deed, deliver the within-written Deed for the uses and purposes therein mentioned and that s/he, with the other witness whose signature appears above witnessed the execution thereof.

SWORN to before me this 20<sup>th</sup> day of  
JUNE, 2005

Laurel Hadder  
Witness

Notary Public [Signature] (L.S.)

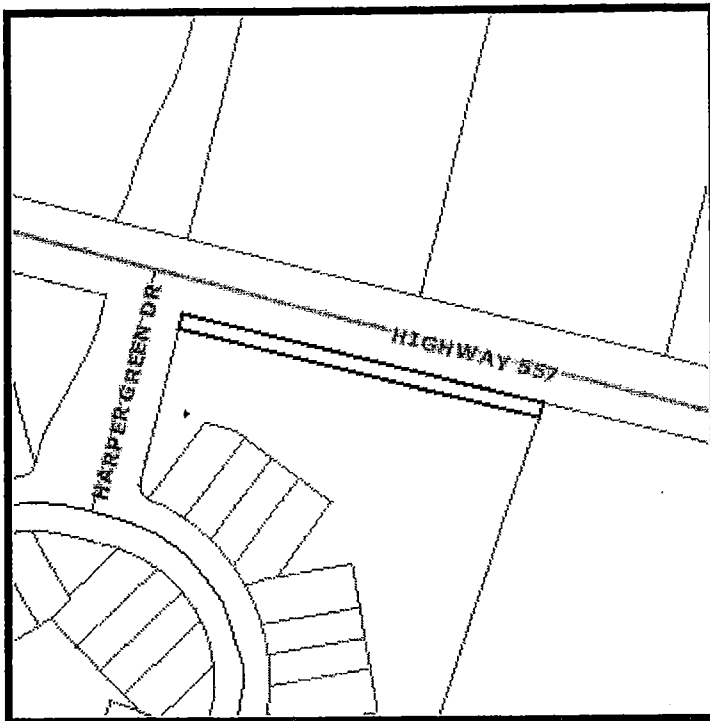
My Commission Expires: 12/13

Prepared by and mail to:  
David M. Hadder, Atty. At Law, P.A.  
1516 Village Harbor Dr., Lake Wylie, SC 29710

BK07185 PG0027

**Property Report for Parcel Number:**  
5610000031

Inquiry Date:



**Owner**  
**Owner Name:** S C DEPT OF HWYS & PUBI TRANSPORTATION  
**Address:**  
**City/State:** COLUMBIA S C  
**Zip Code:** 0

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

**Parcel Number:** 5610000031  
**Total Lots:** 0  
**Total Acres:** 0  
**Deed Book:** 224  
**Deed Book Page:** 241  
**Platt Book:** 000  
**Platt Book Page:** 00  
**School District:** 2  
**Municipality:**  
**Fire Code:** BE-I  
**Property Location:** (.082 AC)

**Land Value:** \$0  
**AG Use:**  
**AG Use Value:**  
**Previous Owner:** ALEXANDER LEWIS J  
**Tax Bill Information:**  
**Zoning:**  
**Sale Price:** \$1400  
**Sale Date:** 5/18/91  
**Census Tract:**  
**Voter District:**

**Building/Structure**

**Prop. Classification:**  
**Heating Type:**  
**Living Area(Sq. Ft.):**  
**Basement:** NO  
**Bathrooms:**  
**Total Imp. Value:**

**Number of Stories:**  
**Year Built:**  
**Garage Area:** NO  
**Fireplace:**  
**Bldg. Value:** \$0

**Assessment**

**Total Assessed Value:** \$0

**Total Market Value\*:** \$0



F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 561-00-00-031 Legal .082 AC

DEED

Grantor S C DEPARTMENT OF TRANSPORTATION

Grantee LEWIS J AND LOIS H ALEXANDER

Book 224 Page 241

Dated 12/11/1990 Recorded 1/30/1991

1-1-2 Previous Ownership

Grantor LOIS H ALEXANDER

Grantee LEWIS J AND LOIS H ALEXANDER

Book 663 Page 110

Dated 5/14/1982 Recorded 5/17/1982

Grantor KENNETH E HARPER, LOIS H ALEXANDER, MARGARET H LOVE, REGINALD A HARPER AND EDITH H GRIER

Grantee LOIS H ALEXANDER

Book 660 Page 79

Dated 1/18/1982 Recorded 4/13/1982

Grantor KENNETH E HARPER, LOIS H ALEXANDER, MARGARET H LOVE, REGINALD A HARPER AND EDITH H GRIER

Grantee MARGARET H LOVE

Book 660 Page 81

Dated 1/18/1982 Recorded 4/13/1982

Form B01B (Revised 05-25-88)

THE STATE OF SOUTH CAROLINA

TITLE TO REAL ESTATE

COUNTY OF YORK

APPROXIMATE SURVEY STATION

Road/Route No. S. C. Route 49/274

FILED-RECEIVED

329+70 TO 333+12 Right

File No. 46,774

BOOK PAGE

Project No. F-0088(75)

APR 18 1 15 PM '91

KNOW ALL MEN BY THESE PRESENTS, That I (or we) Lewis J. and Lois H. Alexander

5373 Highway 557, York County, South Carolina 29710

PAYMENT REQUESTED consideration of the sum of One Thousand Four Hundred and No/One Hundred Dollars (\$1,400.00) 2-1-91

and other valuable consideration to me (or us) in hand paid at and before the sealing and delivering thereof, by the South Carolina Department of Highways and Public Transportation, Columbia, South Carolina, receipt of which is hereby acknowledged, have granted, bargained, sold and released, and by these presents do grant, bargain, sell and release, unto the said South Carolina Department of Highways and Public Transportation, its successors and assigns, all that certain real property in fee simple absolute from Crowders Creek

to Buater Boyd Bridge (Lake Wylie) on Route No. S. C. Route 49/274 State and County aforesaid, as shown by the plans prepared by the South Carolina Department of Highways and Public Transportation and dated April 26, 1990, said property being herein conveyed to have a width of 40 feet, that is 40 feet on the right side of the survey centerline of the highway as shown on the reference plans.

SPECIAL PROVISIONS:

The above consideration is for 0.082 acre of land and all improvements thereon, if any. This is a portion of the property that was acquired from Lois H. Alexander on May 14, 1982 as reflected in Deed Book 663, page 110, and recorded on May 17, 1982 in the records of York County and shown as Tax Map Number 521-26. This is a portion of the property that was acquired from Kenneth E. Harper, Lois H. Alexander, Paul Clifton Harper, Margaret H. Love, Reginald A. Harper and Edith H. Grier on January 18, 1982 as reflected in Deed Book 660, page 79 and recorded April 13, 1982 in the records of York County and shown as Tax Map Number 521-26. This also being a portion of the property that was acquired from Paul C. Harper, who died testate on November 30, 1979 as reflected (OVER) Together with, all and singular, the rights, members, hereditaments and appurtenances thereunto belonging, or in any wise incident or appertaining.

And I (or we) do hereby bind my (or our) heirs, executors and administrators, to warrant and forever defend all and singular the said premises unto the said South Carolina Department of Highways and Public Transportation, its successors and assigns, against me (or us) and my (or our) heirs and against every person whomsoever lawfully claiming, or to claim, the same or any part thereof.

TO HAVE AND TO HOLD in fee simple, absolute and singular the said property and the rights hereinbefore granted, unto the said South Carolina Department of Highways and Public Transportation, its successors and assigns forever.

IN WITNESS WHEREOF, I (or we) have hereunto set my (or our) hand(s) and seal(s) this 11th day of

December, in the year of our Lord, One Thousand Nine Hundred and Ninety

Signed, sealed and delivered in the presence of:

1st Witness: L. A. Bradley
2nd Witness: L. H. Alexander

Lewis J. Alexander (L.S.)
Lois H. Alexander (L.S.)

NOTE: All right of way agreements must be in writing and are subject to rejection by the South Carolina Department of Highways and Public Transportation.

THE STATE OF SOUTH CAROLINA

COUNTY OF York

Personally appeared before me the undersigned witness and made oath that s/he is the grantor sign, seal and as the grantor's act and deed, deliver the within written deed; that s/he is the other witness whose signature appears above witnessed the execution thereof.

Sworn to before me this 11th day of December, A.D. 1990

L. A. Bradley (L.S.)

My Commission Expires 3/31/1995

RECORDED

YORK COUNTY

TAX ASSESSOR'S OFFICE

TAX MAP NO.

INITIALS

L. A. Bradley 1st Witness sign here

Recorded 1-30-91 By: REC File

Tract 72

RECORD VOL 224 PG 241 YORK COUNTY, S.C.

241

DIRECTOR, RIGHTS OF WAY SCDHPT-P.O. BOX 191 COLUMBIA, SOUTH CAROLINA 29...

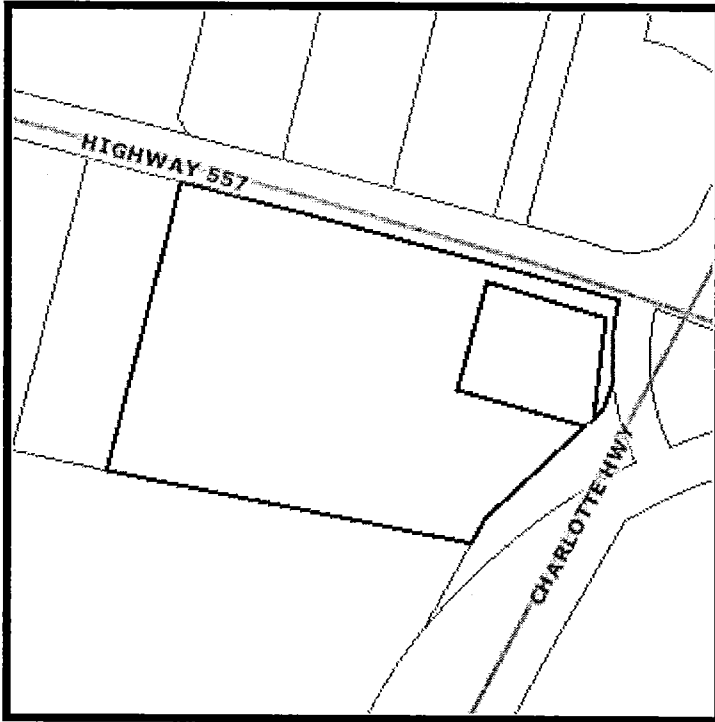
**SPECIAL PROVISIONS (CONT.):**

**in Probate Case 700, File 20364, in the records for York County.**

*Dipt King*

**Property Report for Parcel Number:**  
5620000039

Inquiry Date: 1



**Owner**

**Owner Name:** BETHEL COMMONS ASSO  
% MARK W ERWIN  
**Address:** 501 EAST MOREHEAD  
**City/State:** CHARLOTTE N C  
**Zip Code:** 28202

Disclaimer: While every effort is made to keep information provided over t  
accurate and up-to-date, York County does not certify the authenticity or ac  
such information. No warranties, express or implied, are provided for the re  
mapping data herein, or for their use or interpretation by the User.

**Property**

**Parcel Number:** 5620000039  
**Total Lots:** 0  
**Total Acres:** 6.28  
**Deed Book:** 1739  
**Deed Book Page:** 298  
**Platt Book:** A180  
**Platt Book Page:** 6  
**School District:** 2  
**Municipality:**  
**Fire Code:** BE-I

**Land Value:** \$1256000  
**AG Use:**  
**AG Use Value:**  
**Previous Owner:** FARMER B D III ETAL  
**Tax Bill Information:**  
**Zoning:**  
**Sale Price:** \$0  
**Sale Date:** 1/10/97  
**Census Tract:**  
**Voter District:**

**Property Location:** (7.11 AC) FOOD LION  
SHOP CTR

**Building/Structure**

**Prop. Classification:**  
**Heating Type:**  
**Living Area(Sq. Ft.):**  
**Basement:** NO  
**Bathrooms:**  
**Total Imp. Value:**

**Number of Stories:**  
**Year Built:**  
**Garage Area:** NO  
**Fireplace:**  
**Bldg. Value:** \$2029000

**Assessment**

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 562-00-00-039 Legal

DEED

Grantor B D FARMER III - 10% UNDIVIDED INTEREST  
Grantor BRANSTROM DEVELOPMENT LLC - 10% UNDIVIDED INTEREST  
Grantor MARK W ERVIN - 80% UNDIVIDED INTEREST  
Grantee BETHEL COMMONS ASSOCIATES LLC  
Book 1739 Page 298  
Dated 1/9/1997 Recorded 1/13/1997

1-1-2 Previous Ownership

Grantor NICHOLS FAMILY PARTNERSHIP NO 1  
Grantee B D FARMER III - 10% UNDIVIDED INTEREST  
Grantee BRANSTROM DEVELOPMENT LLC - 10% UNDIVIDED INTEREST  
Grantee MARK W ERVIN - 80% UNDIVIDED INTEREST  
Book 1720 Page 271  
Dated 12/18/1996 Recorded 12/20/1996

Grantor WILLIAM A NICHOLS AND ELEANOR R NICHOLS  
Grantee NICHOLS FAMILY PARTNERSHIP NO 1  
Book 336 Page 80  
Dated 11/5/1991 Recorded 11/11/1991

FILED-RECEIVED  
BOOK \_\_\_\_\_ PAGE \_\_\_\_\_

File No. 96-10-1142

STATE OF SOUTH CAROLINA  
COUNTY OF YORK

JUN 10 2 03 PM '97  
DAVID H. HARRIS  
CLERK OF COURT  
YORK COUNTY, SC

TITLE TO REAL ESTATE

TO ALL WHOM THESE PRESENTS SHALL CONCERN:

KNOW ALL MEN BY THESE PRESENTS, that WE, B.D. FARMER, III, BRANSTROM DEVELOPMENT, L.L.C., a North Carolina limited liability company, and MARK W. ERWIN, for and in consideration of TRANSFER OF PROPERTY FROM GRANTORS TO A LIMITED LIABILITY COMPANY OF WHICH GRANTORS ARE PARTNERS OR MEMBERS, to me in hand paid at and before the sealing of these presents, the receipt whereof is hereby acknowledged, do hereby grant, bargain, sell and release unto BETHEL COMMONS ASSOCIATES, LLC, a North Carolina limited liability company, its successors and/or assigns, whose address is 501 East  
North David St. Charlotte NC 28202 all of our right, title and interest in and to the following described property, to wit:

TRACT NO. 1: All that certain piece, parcel or lot of land lying and being situated on S.C. Highway 49 (Charlotte Highway) in Bethel Township, York County, South Carolina, containing 0.438 acres, more or less, and being more particularly described on plat of Erwin Capital, Inc., drawn by Baird Engineering, Inc., October 22, 1996, which plat, recorded in Plat Book A-180 at Page 5, in the Office of the Clerk of Court for York County, is by reference incorporated herein as a part of this description. This is a portion of the property conveyed by deed from Thomas F. Boyd to J.L. Chambers, recorded December 12, 1946, in Deed Book 127, Page 250, Office of the Clerk of Court for York County, SC. This being the identical property conveyed by deed from Emma Sue Y. Chambers to B.D. Farmer, III, Branstrom Development, L.L.C., a North Carolina limited liability company, and Mark W. Erwin, recorded December 19, 1996, in Record Book 1720, Page 268, Office of the Clerk of Court for York County, SC.

RECC

TAX ASSESS

DATE

1-13-97

TAX MAP NO.

562-47 39

INITIALS

R.H.H. 75

1

298

RECORDED  
INDEXED  
VOL. 1739, PG. 298  
YORK COUNTY, SC

(1)

TRACT NO. 21. All that certain piece, parcel or tract of land lying, being and situated in Bethel Township, York County, South Carolina, on the southern side of S.C. Highway 557, at its intersection with S.C. Highway 274, containing SEVEN AND 111/1000 (7.111) ACRES, more or less, as shown on topographic survey for Erwin Capital, Inc., prepared by Baird Engineering, Inc., October 22, 1996, which plat, recorded in the Office of the Clerk of Court for York County, South Carolina, in Plat Book A-180, Page 6, is incorporated herein and made a part of this description by reference. This is the identical property conveyed by deed from Nichols Family Partnership No. 1 to B.D. Farmer, III, Branstrom Development, L.L.C., a North Carolina limited liability company, and Mark W. Erwin, recorded December 19, 1996, in Record Book 1720, Page 271, Office of the Clerk of Court for York County, SC.

This conveyance is made subject to existing easements and rights-of-way of record, and to restrictions appearing in the chain of title, which said 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, BETHEL COMMONS ASSOCIATES, LLC, a North Carolina limited liability company, its successors and/or assigns, for its own use, and benefit forever.

AND we do hereby bind ourselves, our successors, heirs, assigns, and Executors and Administrators, to warrant and forever defend, all and singular, the said premises unto the said BETHEL COMMONS ASSOCIATES, LLC, a North Carolina limited liability company, its successors and/or assigns, against us and our successors and/or heirs, and all persons whomsoever lawfully claiming, or to claim the same or any part thereof.

IN WITNESS WHEREOF, we have hereunto set our hands and seals,

this 9<sup>th</sup> day of January, in the year of our Lord one thousand nine hundred ninety-seven, and in the two hundred and twenty-first year of the sovereignty and independence of the United States of America.

SIGNED, SEALED AND DELIVERED  
IN THE PRESENCE OF:

Beth R. Williams  
Lara S. Dixon  
(As to E.D. Farmer, III)

[Signature]  
E.D. Farmer, III (L.S.)

SIGNED, SEALED AND DELIVERED  
IN THE PRESENCE OF:

[Signature]  
Beth R. Williams  
(As to Branstrom Development, L.L.C.)

BRANSTROM DEVELOPMENT, L.L.C.  
A North Carolina Limited Liability Company  
By: [Signature]  
Title: [Signature]

SIGNED, SEALED AND DELIVERED  
IN THE PRESENCE OF:

[Signature]  
[Signature]  
(As to Mark W. Erwin)

[Signature]  
Mark W. Erwin (L.S.)

STATE OF NORTH CAROLINA }  
COUNTY OF Mecklenburg }

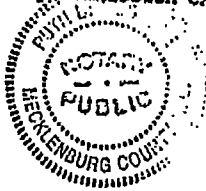
PROBATE

Personally appeared before me Lara S. Dixon and made oath that (s)he saw E.D. Farmer, III, sign, seal and deliver the within deed; and that deponent together with Beth R. Williams signed their names as witnesses thereof.

Sworn to before me, this 8th day of January, 1997.

[Signature] (L.S.)  
Notary Public for North Carolina  
My commission expires: 11-16-99

Lara S. Dixon  
Witness



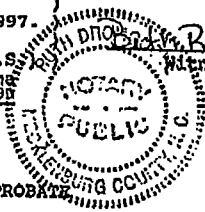


STATE OF NORTH CAROLINA }  
COUNTY OF Mecklenburg } PROBATE

Personally appeared before me Beth S. Williams  
and made oath that (s)he saw Branstrom Development, L.L.C., a North  
Carolina Limited Liability Company by William J. Branstrom  
its Manager, sign, seal and deliver the within deed; and  
that deponent together with Andrew R. Vigor signed their  
names as witnesses thereof.

Sworn to before me, this 8th  
day of January, 1997.

Beth S. Williams (L.S.)  
Notary Public for North Carolina  
My commission expires: 11-16-98



STATE OF NORTH CAROLINA }  
COUNTY OF Mecklenburg } PROBATE

Personally appeared before me William F. Potts, Jr.  
and made oath that (s)he saw Mark W. Erwin sign, seal and deliver  
the within deed; and that deponent together with Eric M.  
Potts signed their names as witnesses thereof.

Sworn to before me, this 2<sup>nd</sup>  
day of January, 1997.

William F. Potts, Jr. (L.S.)  
Notary Public for North Carolina  
My commission expires: 11-16-99



STATE OF SOUTH CAROLINA )  
COUNTY OF YORK )

AFFIDAVIT

PERSONALLY appeared before me the undersigned, who being duly sworn, deposes and says:

1. Property located at Highway 49 and 274, Lake Wylie, SC bearing York County  
Tax Map Number \_\_\_\_\_, was transferred by B.D. Farmer, III, et al  
Bethel Commons Associates, LLC, on \_\_\_\_\_  
a North Carolina limited liability company

The transaction was (Check one):

- A. \_\_\_\_\_ an arm's length real property transaction and the sales price paid or to be paid in money or money's worth was \$ \_\_\_\_\_ \*
- B. \_\_\_\_\_ not an arm's length real property transaction and the fair market value of the property is \$ \_\_\_\_\_ \*
- C. The above transaction is exempt, or partially exempt, from the recording fee as set forth in S.C. Code Ann. Section 12-24-10 et seq. because the deed is (See back of affidavit.):  
transfer of property from grantors to a limited liability company  
of which grantors are partners or members §12-24-40(10)
- D. As required by Code Section 12-24-70, I state that I am a responsible person who was connected with the transaction as: Purchaser

I further understand that a person required to furnish this affidavit who wilfully 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.

Erwin Capison, Inc. by  
[Signature]  
Purchaser, Legal Representative of the Purchaser, or  
other Responsible Person Connected with the Transaction

SWORN to before me this 9th  
day of Sept 19 99  
[Signature]  
Notary Public for North Carolina  
My Commission Expires: 11-16-99

\* The fee is based on the real property's value. Value means the realty's fair market value. In arm's length real property transactions, this value is the sales price to be paid in money or money's worth (e.g. stocks, personal property, other realty, forgiveness of debt, mortgages assumed or placed on the realty as a result of the transaction). However, a deduction is allowed from this value for the amount of any lien or encumbrance existing on land, tenement, or realty before the transfer and remaining on it after the transfer.

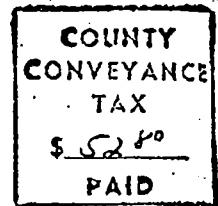
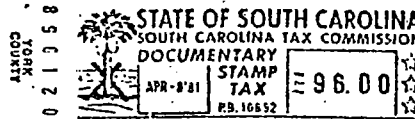
Haselden and Owen  
P. O. Box 173  
Clover, S. C. 29710

State of South Carolina,  
COUNTY OF YORK.

676  
FILED: INDEXED  
BOOK  
APR 8 2 19 PM '81  
M. CARROLL, JR.  
C.C.S.A.S.S.  
YORK COUNTY, S.C.

Know All Men by These Presents, That

We, Kenneth E. Harper, Lois H. Alexander, Paul Clifton Harper, Margaret H. Love, Edith H. Grier and Reginald A. Harper



in the State aforesaid, for and in consideration of the

sum of Forty Eight Thousand and No/100 (\$48,000.00) Dollars

to us paid by William A. Nichols  
3406 Harvard, Dallas, Texas 75205

in the State aforesaid

have granted, bargained, sold and released, and by these presents do grant, bargain, sell and release unto the said WILLIAM A. NICHOLS, his heirs and assigns forever:

All that piece, parcel or tract of land containing 8.0 acres, being situate in Bethel Township, York County, South Carolina, on South Carolina Highway 557, and having metes and bounds as shown on a plat of the premises entitled "A Part of Paul C. Harper Estate", prepared by F. Michael Trammell, S.C.R.L.S., dated February 10, 1981. Said plat is recorded in Plat Book 62, Page 53, R.M.C. Office for York County, South Carolina, and is incorporated by reference as a part of this description. Reference is made thereto for a more complete description of the premises herein conveyed.

This is a portion of that property devised to the grantors herein by the Last Will and Testament of Paul C. Harper found in Case 700, File 20564, Office of the Probate Judge for York County, South Carolina.

The grantors hereby convey to the grantee, his heirs and assigns any right of easement or other right of way they may have, whether by grant or by prescription, in and to the use of that certain roadway designated and shown as an "existing 10 foot road" on the plat of the premises referred to hereinabove.

The premises above described is subject to the following restrictive covenants, which shall be covenants running with the land:

(a) To use for light commercial development. Light commercial development includes, but is not limited to, such uses as professional office buildings, nurseries, storage buildings, banks, storage areas for vehicles, boats, and trailers, the use of one or two mobile homes for property management purposes, warehouses and retail stores. Use of the premises for automobile or mobile home sales is expressly prohibited.

(b) The premises shall not be used in any way that is obnoxious or unsightly, such as for junk yards, outdoor machine shops, residential mobile home parks or campgrounds. The use of flood lights for safety purposes is expressly permitted.

(c) There shall be no use of the premises resulting in the emission of noxious odors, fumes or noise. The normal emission of automotive vehicles is specifically permitted.

676

5669  
676

(d) The premises shall not be used for any industrial or manufacturing facility.

(e) Building set back lines shall be 20 feet from the Southern and Western boundaries of the premises to be conveyed (being the remaining common borders with Paul C. Harper Estate lands). This restriction does not prevent the Purchaser from building fences, putting down paving or gravel, installing lights and light poles, or otherwise using the area other than for buildings.

TOGETHER with all and singular, the rights, members, hereditaments and appurtenances to the said premises belonging or in anywise incident or appertaining.

To HAVE AND TO HOLD all and singular the premises before mentioned unto the said William A. Nichols, his

Heirs and Assigns forever.

And we do hereby bind ourselves and our Heirs, Executors

and Administrators, to warrant and forever defend all and singular the said premises unto the said

William A. Nichols, his

Heirs and Assigns, against us and our Heirs and against every

person whomsoever lawfully claiming, or to claim, the same or any part thereof.

WITNESS OUR Hands and Seals this 3<sup>rd</sup> day of April in the year of our Lord one thousand nine hundred and eighty-one and in the two hundred and fifth year of the Sovereignty and Independence of the United States of America.

SIGNED, SEALED AND DELIVERED IN THE PRESENCE OF

Yvonne H. Owen }  
Alex C. Blague }  
James H. Owen }

Kenneth E. Harper (SEAL) 2-2-81  
Lois H. Alexander (SEAL) 4-3-81  
Paul Clayton Harper (SEAL) 4-2-81  
Margaret H. Love (SEAL) 3-31-81  
Edith H. Grier (SEAL) 4-3-81  
Reginald A. Harper (SEAL) 3-31-81

STATE OF SOUTH CAROLINA )  
COUNTY OF YORK ) PROBATE

679

PERSONALLY appeared before me Ann C. Hogue and made oath that she saw the within-named Paul Clifton Harper and Kenneth E. Harper, sign, seal and as their act and deed, deliver the within-written Deed for the uses and purposes therein mentioned and that she, with Yvonne N. Owen witnessed the execution thereof.

*Ann C. Hogue*

SWORN to before me this 3<sup>rd</sup>  
day of April, 1981

*James H. Love, Jr.* (SEAL)  
Notary Public for S.C.  
My Commission expires: 9/22/86

RECORDED  
YORK COUNTY  
TAX ASSESSOR'S OFFICE  
DATE 4/19/81  
TAX MAP NO. 562-39  
INITIALS SHL/

STATE OF SOUTH CAROLINA,  
County of YORK  
Kenneth E. Harper, Lois H.  
Alexander, Paul Clifton Harper,  
Margaret H. Love, Edith H. Grier,  
Reginald A. ~~W~~ Harper

TO  
William A. Nichols  
**TITLE TO REAL ESTATE**

I hereby certify that the within Deed was filed for record in my office at 2:19 p.m. o'clock on the 7<sup>th</sup> day of April 1981, and was immediately entered upon the proper indexes and duly recorded in Book 629 of Deeds, page 676  
*M. H. Cassell, Jr.*  
Clerk of Court of Common Pleas and General Sessions  
for York County, S. C.

I hereby certify that the within Deed has been this \_\_\_\_\_ day of \_\_\_\_\_, A. D. 19\_\_\_\_, Recorded in Book \_\_\_\_\_ of Deeds, page \_\_\_\_\_ for \_\_\_\_\_ Auditor \_\_\_\_\_ County \_\_\_\_\_

The E. L. Ryan Company, Columbia, S. C.

679

1404  
594

FILED-RECEIVED  
BOOK \_\_\_\_\_ PAGE \_\_\_\_\_ FILE NO. 96-10-1142

STATE OF SOUTH CAROLINA  
COUNTY OF YORK  
SPECIAL WARRANTY DEED

ROD BENFIELD  
CLERK OF COURT  
YORK COUNTY, S.C.

KNOW ALL MEN BY THESE PRESENTS that Nichols Family Partnership NO. 1, a South Carolina partnership ("Grantor"), in consideration of the sum of Five Hundred Forty Thousand and NO/100 Dollars (\$540,000.00) cash in hand paid to it and NO other consideration, delivered at or before the sealing and delivery of these presents by B.D. FARMER, III, BRANSTROM DEVELOPMENT, L.L.C., a North Carolina limited liability company, AND MARK W. ERWIN, as their interests may appear, the receipt of which is hereby acknowledged, has granted, bargained, sold and released and by these presents, does grant, bargain, sell and release unto B.D. FARMER, III (a 10% undivided interest as tenant-in-common), BRANSTROM DEVELOPMENT, L.L.C., a North Carolina limited liability company (a 10% undivided interest as tenant-in-common), AND MARK W. ERWIN (an 80% undivided interest as tenant-in-common), their heirs, successors and assigns, all of Grantor's right, title and interest in and to all of that certain property located in York County, South Carolina, and more particularly described on Exhibit A attached hereto and incorporated herein by this reference (the "Property").

STATE OF SOUTH CAROLINA

GRANTEE'S ADDRESS: c/o Mark W. Erwin  
Erwin Capital  
501 East Morehead Street  
Charlotte, NC 28202

YORK COUNTY S.C. Assessment of \$540,000.00  
Stamp # 12 \$540,000.00  
STATE FEE \$1404.00

TMS NO.:

RECORDED  
YORK COUNTY  
TAX ASSESSOR'S OFFICE

COUNTY CONVEYANCE FEE

RECORDED  
RECORD  
VOL. 1780 PG. 271  
YORK COUNTY, S.C.

DATE 12-20-96  
TAX MAP NO. 502-97  
INITIALS RHE-TS  
271

YORK COUNTY S.C. Assessment of \$540,000.00  
Stamp # 12 \$540,000.00  
COUNTY FEE \$594.00

2

TOGETHER with all and singular the rights, members, hereditaments, and appurtenances to the said property belonging or in anywise incident or appertaining thereto.

TO HAVE AND TO HOLD, subject to (i) all valid and enforceable easements, restrictions and conditions of record; (ii) matters which would be revealed by a current and accurate survey or inspection of the property; (iii) ad valorem property taxes for the current and subsequent years; and (iv) all applicable governmental laws, ordinances and regulations; all and singular the property unto the said B.D. FARMER, III (a 10% undivided interest as tenant-in-common), BRANSTROM DEVELOPMENT, L.L.C., a North Carolina limited liability company (a 10% undivided interests as tenant-in-common), and MARK W. ERWIN (an 80% undivided interest as tenant-in-common), their respective heirs, successors and assigns, forever.

AND Grantor does hereby bind itself, and its heirs, successors and assigns, to warrant and forever defend all and singular the premises unto the said B.D. FARMER, III (a 10% undivided interest as tenant-in-common), BRANSTROM DEVELOPMENT, L.L.C., a North Carolina limited liability company (a 10% undivided interests as tenant-in-common), and MARK W. ERWIN (an 80% undivided interest as tenant-in-common), their respective heirs, successors and assigns, against every person whomsoever lawfully claiming the same or any part thereof, by, through or under Grantor, but not otherwise.

IN WITNESS WHEREOF, Grantor has caused these presents to be executed under seal, this 18<sup>th</sup> day of December, in the

year of our Lord, one thousand nine hundred ninety-six and in the two hundred and twenty-first year of the sovereignty and independence of the United States of America.

SIGNED, SEALED AND DELIVERED  
IN THE PRESENCE OF:

NICHOLS FAMILY  
PARTNERSHIP NO. 1

[Signature]  
[Signature]

By: [Signature]  
Title General Partner

STATE OF NORTH CAROLINA }  
COUNTY OF MECKLENBURG }

Personally appeared before the undersigned witness and made oath that he/she saw the within-named Nichols Family Partnership NO. 1 by its duly authorized officer sign, seal and as its act and deed deliver the within-written instrument, and that he/she with the other witness subscribed above witnessed the execution thereof.

[Signature]  
Witness

Sworn to and subscribed before  
me, this 18 day of December,  
1996.  
[Signature] (L.S.)  
Notary Public for North Carolina  
My commission expires: Dec 30, 2000

(NOTARY SEAL)



EXHIBIT A  
DESCRIPTION OF REAL PROPERTY

All that certain piece, parcel or tract of land lying, being and situated in Bethel Township, York County, South Carolina, on the southern side of S.C. Highway 557, at its intersection with S.C. Highway 274, containing SEVEN AND 111/1000 (7.111) ACRES, more or less, as shown on topographic survey for Erwin Capital, Inc., prepared by Baird Engineering, Inc., October 22, 1996, which plat, recorded in the Office of the Clerk of Court for York County, South Carolina, in Plat Book A-180, Page 6, is incorporated herein and made a part of this description by reference.

This is a portion of the property conveyed to Grantor by deed of William A. Nichols and Eleanor R. Nichols dated November 5, 1991, recorded in the Office of the Clerk of Court for York County, South Carolina, on November 11, 1991, in Record Book 336, at Page 80.

RECORDED  
YORK COUNTY  
TAX ASSESSORS OFFICE  
DATE 11/11/91  
TAX MAP NO. 100  
INITIALS

STATE OF SOUTH CAROLINA

COUNTY OF YORK

FILED-RECEIVED  
BOOK PAGE  
Nov 11 9 44 AM '91

KENNEDY COVINGTON LOBDELL & HICKMAN  
ATTORNEYS-AT-LAW  
ROCK HILL, SC  
TITLE TO REAL ESTATE  
TITLE NOT EXAMINED

KNOW ALL MEN BY THESE PRESENTS, that WILLIAM A. NICHOLS  
AND ELEANOR R. NICHOLS (hereinafter referred to as "Grantor") for  
and in consideration of the sum of -- BONA FIDE GIFT, FUNDING OF  
PARTNERSHIP -- to me/us in hand paid at and before the sealing of

these presents by NICHOLS FAMILY PARTNERSHIP NO. 1 (hereinafter  
referred to as "Grantee"), c/o William A. Nichols and Eleanor R.  
Nichols, 4 Crowders Ridge, Lake Wylie, SC 29710 (the receipt  
whereof is hereby acknowledged), have/has granted, bargained, sold  
and released, and by these Presents do/does grant, bargain, sell  
and release unto the said Grantee, his, her, its or their Heirs,  
Successors and Assigns, the following described property, to wit:

All that piece, parcel or tract of land containing 8.0 acres, being  
situate in Bethel Township, York County, South Carolina, on South  
Carolina Highway 557, and having metes and bounds as shown on a  
plat of the premises entitled "A Part of Paul C. Harper Estate",  
prepared by F. Michael Trammell, S.C.R.L.S., dated February 10,  
1981. Said plat is recorded in Plat Book 62, Page 53, R.M.C.  
Office for York County, South Carolina, and is incorporated by  
reference as a part of this description. Reference is made thereto  
for a more complete description of the premises herein conveyed.

**DERIVATION:** Being the identical property conveyed to William A.  
Nichols by deed of Kenneth E. Harper, et al, dated April 2, 1981  
and recorded April 8, 1981 in Deed Book 629 at Page 676 in the  
Office of the Clerk of Court for York County, South Carolina.

**A N D**

All that piece, parcel or tract of land containing 0.2385 Acre,  
being situate in Bethel Township, York County, South Carolina, on  
South Carolina Highway 557, and having metes and bounds as shown  
on a plat of the premises entitled "Survey for William A. Nichols",  
prepared by F. Michael Trammell, S.C.R.L.S., dated February 16,  
1981. Said plat is recorded in Plat Book 62, Page 98, R.M.C.  
Office for York County, South Carolina, and is incorporated by  
reference as a part of this description. Reference is made thereto  
for a more complete description of the premises herein conveyed.

**DERIVATION:** Being the identical property conveyed to William A.  
Nichols by deed of Lawrence H. Harris dated April 7, 1981 and  
recorded April 8, 1981 in Deed Book 629 at Page 680 in the Office  
of the Clerk of Court for York County, South Carolina.

A one-half interest in each of the above properties conveyed to  
Eleanor R. Nichols by deed of William A. Nichols dated November 5,  
1991 and recorded November 11, 1991 in Record Book 336 at Page  
78 in the office of the Clerk of Court for York County, S.C.

The within described property is conveyed subject to all  
restrictive covenants, easements and rights-of-way of record  
or apparent upon a reasonable inspection of the premises.

TOGETHER with all and singular the Rights, Members,  
Hereditaments and Appurtenances to the said premises belonging, or  
in anywise incident or appertaining.

RECORDED  
RECORD  
336-80

3

STATE OF SOUTH CAROLINA  
COUNTY OF YORK

FILED-RECEIVED  
BOOK PAGE  
Nov 11 9 43 AM  
M.H. CARROLL, JR.  
C.O.C.P. & C.S.  
YORK COUNTY, S.C.

KENNEDY COVINGTON LOBDELL & HICKMAN  
ATTORNEYS-AT-LAW  
ROCK HILL, S.C.  
TITLE TO REAL ESTATE  
YORK COUNTY, S.C. TITLE NOT EXAMINED

RECORDED  
DATE TAX REC. YORK COUNTY CLERK'S OFFICE  
11-9-81  
111-39  
DML

KNOW ALL MEN BY THESE PRESENTS, that WILLIAM A. NICHOLS

(hereinafter referred to as "Grantor") for and in consideration of the sum of -- LOVE AND AFFECTION -- to me/us in hand paid at and before the sealing of these presents by ELEANOR R. NICHOLS (hereinafter referred to as "Grantee"), of 4 Crowders Ridge, Lake Wylie, SC 29710 (the receipt whereof is hereby acknowledged), have/has granted, bargained, sold and released, and by these Presents do/does grant, bargain, sell and release unto the said Grantee, his, her, its or their Heirs, Successors and Assigns, a one-half (1/2) undivided interest in the following described property, to wit:

All that piece, parcel or tract of land containing 8.0 acres, being situate in Bethel Township, York County, South Carolina, on South Carolina Highway 557, and having metes and bounds as shown on a plat of the premises entitled "A Part of Paul C. Harper Estate", prepared by F. Michael Trammell, S.C.R.L.S., dated February 10, 1981. Said plat is recorded in Plat Book 62, Page 53, R.M.C. Office for York County, South Carolina, and is incorporated by reference as a part of this description. Reference is made thereto for a more complete description of the premises herein conveyed.

DERIVATION: Being the identical property conveyed to William A. Nichols by deed of Kenneth E. Harper, et al, dated April 2, 1981 and recorded April 8, 1981 in Deed Book 629 at Page 676 in the Office of the Clerk of Court for York County, South Carolina.

A N D

All that piece, parcel or tract of land containing 0.2385 Acre, being situate in Bethel Township, York County, South Carolina, on South Carolina Highway 557, and having metes and bounds as shown on a plat of the premises entitled "Survey for William A. Nichols", prepared by F. Michael Trammell, S.C.R.L.S., dated February 16, 1981. Said plat is recorded in Plat Book 62, Page 98, R.M.C. Office for York County, South Carolina, and is incorporated by reference as a part of this description. Reference is made thereto for a more complete description of the premises herein conveyed.

DERIVATION: Being the identical property conveyed to William A. Nichols by deed of Lawrence H. Harris dated April 7, 1981 and recorded April 8, 1981 in Deed Book 629 at Page 680 in the Office of the Clerk of Court for York County, South Carolina.

The within described property is conveyed subject to all restrictive covenants, easements and rights-of-way of way of record or apparent upon a reasonable inspection of the premises.

TOGETHER with all and singular the Rights, Members, Hereditaments and Appurtenances to the said premises belonging, or in anywise incident or appertaining.

RECORDED  
RECORD  
VOL-336 PG 78  
YORK COUNTY, S.C.

(4)

TO HAVE AND TO HOLD, all and singular, the said Premises before mentioned, unto the said Grantee, his, her, its or their Heirs, Successors and Assigns, forever.

AND the Grantor does hereby bind the Grantor and the Grantor's Heirs, Executors and Administrators, to warrant and forever defend all and singular the said premises unto the said Grantee, and the Grantee's Heirs, Successors and Assigns, against the Grantor and the Grantor's Heirs and all other persons whosoever lawfully claiming, or to claim the same, or any party thereof.

Witness the Hand(s) and Seal(s) of the Grantor this 5 day of November in the year of our Lord one thousand nine hundred and ninety-one and in the two hundred and sixteenth year of the Sovereignty and Independence of the United States of America.

Signed, sealed and delivered in the presence of

Ernie B. Ahrens  
Kay Johnson

William A. Nichols (SEAL)  
WILLIAM A. NICHOLS

STATE OF SOUTH CAROLINA  
COUNTY OF YORK

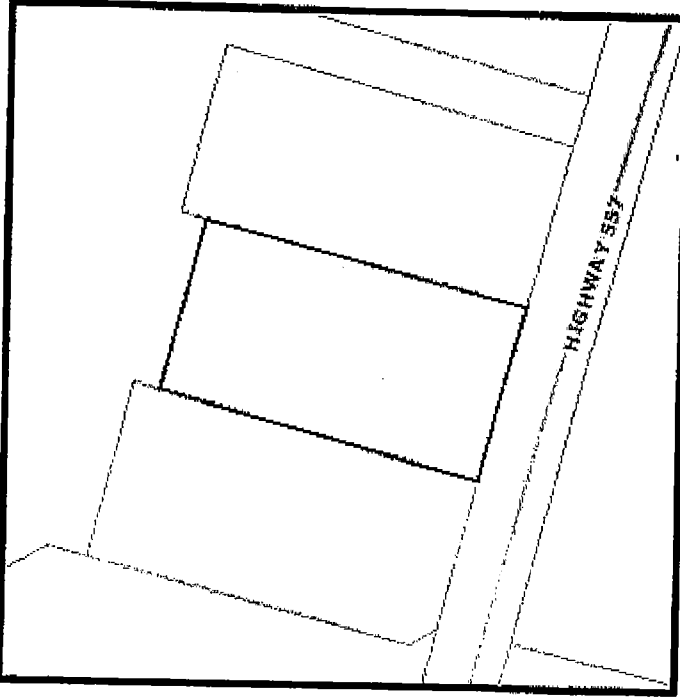
PERSONALLY APPEARED before me the undersigned witness and made oath that s/he saw the within named Grantor(s) sign, seal and as his, her or their act and deed, deliver the within written Deed; and that s/he with the other witness above-named witnessed the execution thereof.

Sworn to before me this 5 }  
day of November, 1991. }

Ernie B. Ahrens  
[Seal] Paul B. Peterson  
Notary Public for S.C. My Commission Expires  
My commission expires: August 31, 1998

**Property Report for Parcel Number:**  
5620000055

Inquiry Date: 11/2/2009



**Owner**  
 SOUTHERN BELL TELEPHONE &  
 TELEGRAPH CO  
 Address: PO BOX 2211  
 City/State: ATLANTA GA  
 Zip Code: 30301

Disclaimer: While every effort is made to keep information provided over the internet accurate and up-to-date, York County does not certify the authenticity or accuracy of such information. No warranties, express or implied, are provided for the records and/or mapping data herein, or for their use or interpretation by the User.

<b>Parcel Number:</b>	5620000055	<b>Land Value:</b>	\$0
<b>Total Lots:</b>	0	<b>AG Use:</b>	
<b>Total Acres:</b>	2	<b>AG Use Value:</b>	
<b>Deed Book:</b>	456	<b>Previous Owner:</b>	J H HOPKINS
<b>Deed Book Page:</b>	64	<b>Tax Bill Information:</b>	
<b>Platt Book:</b>	97	<b>Zoning:</b>	
<b>Platt Book Page:</b>	198	<b>Sale Price:</b>	\$23100
<b>School District:</b>	2	<b>Sale Date:</b>	2/2/73
<b>Municipality:</b>		<b>Census Tract:</b>	

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 562-00-00-055 Legal

DEED

Grantor J H HOPKINS AND JERRY MEEHAM

Grantee SOUTHERN BELL TELEPHONE AND TELEGRAPH COMPANY

Book 456 Page 64

Dated 2/2/1973 Recorded 2/2/1973

1-1-2 Previous Ownership

Grantor

Grantee

Book Page

Dated Recorded

**Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.**

COUNTY  
 CONVEYANCE  
 TAX  
 \$ 25 85  
 PAID

FILED & RECORDED  
 No. 3004 PAGE  
 FEB 23 3 34 PM '73  
 THAD H. CARROLL  
 S. C. DEPT. OF REGISTRY  
 YORK COUNTY, S. C.

STATE OF SOUTH CAROLINA )  
 COUNTY OF YORK )

KNOW ALL MEN BY THESE PRESENTS that:

J. H. HOPKINS and JERRY MEEHAN  
 hereinafter called "Grantor," in consideration of the sum of  
 Twenty-three thousand one hundred (\$23,100.00) ----- Dollars  
 to it in hand paid, the receipt whereof is hereby acknowledged,  
 has granted, bargained, sold and released, and by these presents  
 does grant, bargain, sell and release unto SOUTHERN BELL  
 TELEPHONE & TELEGRAPH COMPANY, hereinafter called "Grantee", all  
 that certain tract of land more particularly described as follows:



BEGINNING at the northwesterly corner of the J. S. Riddle property and runs thence with the westerly line of said property S 14-23 W 374.4 ft. to a point in the center line of S. C. Hwy. NO. 557; thence with the center line of said highway N 75-32 W 180.0 ft.; thence N 14-23 E 374.4 ft.; thence S 75-32 E 180.0 ft. to the BEGINNING, containing 1.54 acres, as shown on print dated January 16, 1973, marked Catawba Dwg. No. 409, copy of which is attached hereto and made a part hereof, and BEING part of the property described in deed of Mattie C. Wright to Wateree Power Company dated August 13, 1925, and recorded in Book 64 at page 133 of the York County Registry, and described in deed of T. E. McMackin, Clerk of Court of York County, to Wateree Power Company dated August 13, 1925, and recorded in said Registry in Plat Book 2 at page 595.

*See page 68*

This conveyance is made subject to the following restriction:

No building shall be located nearer to the highway right of way limit than 25 feet and shall not be located nearer than 15 feet from the side and rear lines, said setback lines being shown on the print attached hereto.

TOGETHER with all and singular the rights, members, hereditaments and appurtenances to the said premises belonging, or in anywise incident or appertaining.

TO HAVE AND TO HOLD all and singular the said premises before mentioned unto the Grantee hereinabove named, its successors and assigns, forever, except that this property is subject to the

restriction set out above and subject to the right of way for S. C. Hwy. No. 557 and right of way for the York County Electric Co-Operative.

And the said Grantor does hereby bind Grantor and Grantor's heirs, executors and administrators to warrant and forever defend all and singular the said premises unto the Grantee hereinabove named, and the Grantee's successors and assigns against the Grantor, Grantor's heirs and assigns, and against every person whomsoever lawfully claiming or to claim the same or any part thereof, except that this property is subject to the restriction set out above and subject to the right of way for S. C. Hwy. No. 557 and right of way for the York County Electric Co-Operative.

WITNESS Grantor's hand and seal this 2 day of Feb in the year of our Lord 1973 and in the 197<sup>th</sup> year of the Independence of the United States of America.

Signed, Sealed and Delivered in the Presence of:

[Signature]  
[Signature]

J. H. Hopkins (SEAL)  
J. H. Hopkins  
Jerry Meehan (SEAL)  
Jerry Meehan



STATE OF SOUTH CAROLINA )  
                                  :  
COUNTY OF OCONEE )

PERSONALLY appeared before me SARA F. BURNE and  
made oath that he saw the within named

\*\*\* J. H. HOPKINS and JERRY MEEHAN \*\*\*

sign, seal and as thems act and deed deliver the within written deed,  
and that he with W. J. Fiddor witnessed the execution  
thereof.

SWORN to before me this 2 )  
                                  ) )  
day of Feb., 1923. ) )  
                                  ) )  
W. J. Fiddor ) )  
Notary Public ) )

Sara F. Burne



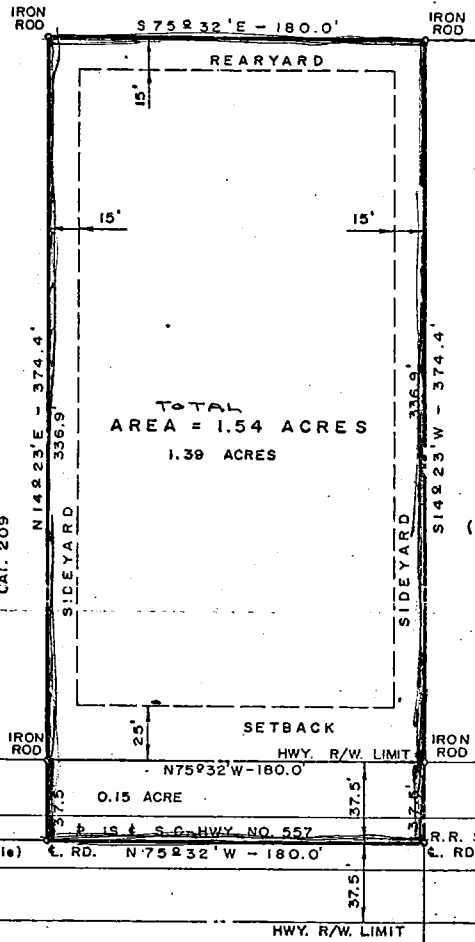
CRESCENT LAND & TIMBER CORP.  
( H. L. WRIGHT EST. )  
REF. CAT. DWG. NO. 315  
CAT. 209



DUKE POWER COMPANY  
( BETHEL CHURCH RETAIL SUBSTA. LOT )  
REF. DWG. NO. 105 - 53

CRESCENT LAND & TIMBER CORP.  
( H. L. WRIGHT EST. )  
REF. CAT. DWG. NO. 315  
CAT. 209

J. S. RIDDLE  
(DUKE POWER COMPANY)  
REF. CAT. DWG. NO. 261



R.R. SPIKE 1826.1' 15' S. O. HWY. NO. 557  
E. RD. (not to scale) E. RD. N 75° 32' W - 180.0' R.R. SPIKE TO S.C. HWY. NO. 49

PAUL HARPER  
( NOW OR FORMERLY )

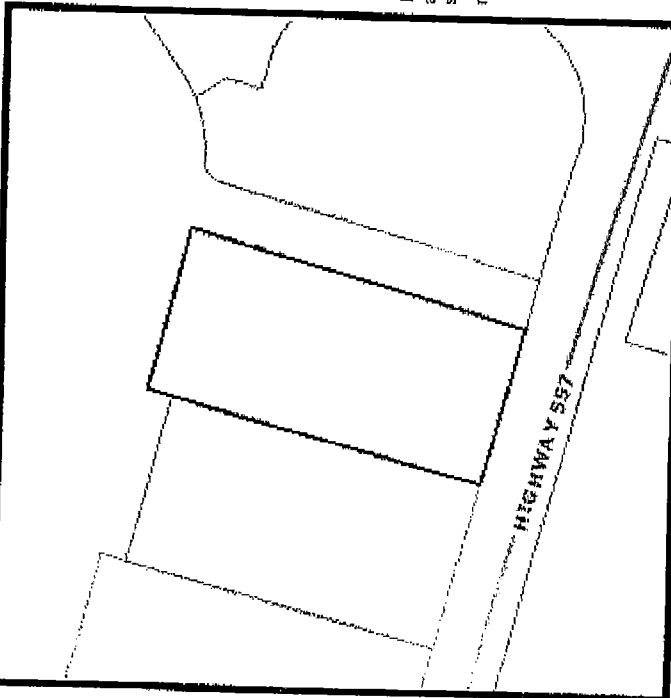
NORTH CAROLINA  
MECKLENBURG COUNTY  
I certify that this map was drawn from an actual survey made by me and that the error of closure as calculated is 1/100,000. Boundaries, not surveyed, if any, are noted. Dred discharges are recorded in Book \_\_\_\_\_ Page \_\_\_\_\_  
Witness my hand and seal this 31<sup>st</sup> day of JANUARY 1973  
*Douglas P. Moore* L-892  
Surveyor or Engineer

STATE OF NORTH CAROLINA  
MECKLENBURG COUNTY  
*Frankie B. Jones*  
a Notary Public of Mecklenburg County, North Carolina, do hereby certify that *Douglas P. Moore* the \_\_\_\_\_  
party, personally appeared before me this day and acknowledged the due execution of the foregoing instrument.  
Witness my hand and Notarial Seal this 31<sup>st</sup> day of JANUARY 1973  
*Frankie B. Jones*  
Notary Public  
My Commission Expires Sept. 6, 1974

CRESCENT LAND & TIMBER CORP.  
CATAWABA STATION LANDS  
BEING PORTION OF H.L. WRIGHT TR., CAT.-209  
BETHEL TOWNSHIP  
YORK COUNTY, S.C.  
SCALE: 1" = 60'  
BOOK NO. 1154  
JANUARY 16, 1973  
CAT. DWG. NO. 409

**Property Report for Parcel Number:  
5620000257**

Inquiry Date: 11/2/2009



**Owner Name:** WACHOVIA BANK NA  
**Address:** 201 N TRYON ST 21ST FL NC-0114  
**City/State:** CHARLOTTE NC  
**Zip Code:** 28288

**Owner**

NORTH SIDE  
Hwy 557

4 TRACTS

Disclaimer: While every effort is made to keep information provided over the internet accurate and up-to-date, York County does not certify the authenticity or accuracy of such information. No warranties, express or implied, are provided for the records and/or mapping data herein, or for their use or interpretation by the User.

<b>Parcel Number:</b>	5620000257	<b>Land Value:</b>	\$820000
<b>Total Lots:</b>	1	<b>AG Use:</b>	
<b>Total Acres:</b>	0	<b>AG Use Value:</b>	
<b>Deed Book:</b>	10482	<b>Previous Owner:</b>	WACHOVIA BANK NA
<b>Deed Book Page:</b>	30	<b>Tax Bill Information:</b>	
<b>Platt Book:</b>	D285	<b>Zoning:</b>	
<b>Platt Book Page:</b>	7	<b>Sale Price:</b>	\$850000
<b>School District:</b>	2	<b>Sale Date:</b>	12/31/08
<b>Municipality:</b>		<b>Census Tract:</b>	

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 562-00-00-257 Legal

DEED

Grantor CRESCENT RESOURCE LLC  
Grantor WACHOVIA BANK NATIONAL ASSOCIATION  
Book 10482 Page 30  
Dated 12/12/2008 Recorded 12/31/2008

1-1-2 Previous Ownership

Trt 0.30 acs

Grantor M W DAVIS PROPERTIES LLC  
Grantee CRESCENT RESOURCES LLC  
Book 7361 Page 264  
Dated 8/23/2005 Recorded 8/26/2005

Grantor MILDRED W DAVIS  
Grantee M W DAVIS PROPERTIES LLC  
Book 4586 Page 192  
Dated 8/27/2002 Recorded 8/28/2002

Grantor SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION  
Grantee MILDRED W DAVIS  
Book 2030 Page 97  
Dated 10/13/1997 Recorded 11/4/1997

Grantor DUKE POWER COMPANY  
Grantee SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION  
Book 274 Page 911  
Dated 1/6/1938 Recorded 1/6/1938

Trt 5.04 AC Quit Claim Deed

Grantor MILDRED W DAVIS

Grantee M W DAVIS PROPERTIES LLC

Book 3215 Page 229

Dated 7/7/2000 Recorded 8/1/2000

Grantor DWIGHT L DAVIS

Grantee MILDRED W DAVIS

Book 1038 Page 11

Dated 7/14/1988 Recorded 7/21/1988

Grantor H & S LUMBER CO

Grantee DWIGHT L DAVIS AND MILDRED W DAVIS

Book 640 Page 52

Dated 8/31/1981 Recorded 9/3/1981

Grantor L H HICKS

Grantee H & S LUMBER CO

Book 464 Page 66

Dated 5/7/1973 Recorded 5/29/1979

Grantor JAMES C EVANS

Grantee L H HICKS

Book 277 Page 155

Dated 8/2/1960 Recorded 8/4/1960

**Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.**

Legal Assistants & Land  
Title Services, Inc.  
504 East Main Street  
P.O. Box 1016  
Rock Hill, SC 29731

2210.00  
935.00

AFTER RECORDING, MAIL TO:  
Benton Williamson  
Haynesworth Sinkler Boyd, P.A.  
1201 Main Street, Suite 2200  
Columbia, SC 29201

RECORDED  
YORK COUNTY  
TAX ASSESSOR'S OFFICE

DATE 1-2-09  
TAX MAP NO. 562-257

200800046607  
Filed for Record in  
YORK COUNTY, SC  
DAVID HAMILTON  
12-31-2008 At 01:55 pm.  
DEED 10.00  
State Tax 2210.00  
County Tax 935.00  
DR Vol 10482 Page 30 - 36

STATE OF SOUTH CAROLINA INITIALS TS/CMR SPECIAL WARRANTY DEED  
COUNTY OF YORK

KNOW ALL MEN BY THESE PRESENTS, that **CRESCENT RESOURCES, LLC**, a Georgia limited liability company (the "Grantor"), in consideration of the sum of One Dollar (\$1.00) and other valuable consideration to it in hand paid at and before the sealing of these presents by **WACHOVIA BANK, NATIONAL ASSOCIATION** (the "Grantee"), with a mailing address of 201 N. Tryon Street, 21<sup>st</sup> Floor, NC-0114, Charlotte, North Carolina 28288, in the form of cash, the receipt whereof is hereby acknowledged, has granted, bargained, sold and released and by these presents does grant, bargain, sell and release unto the Grantee, and its successors and assigns, the following described property, to wit:

**SEE EXHIBIT A ATTACHED HERETO AND MADE A PART HEREOF BY THIS REFERENCE.**

DERIVATION: Being a part of the premises conveyed to Grantor (i) by Deed from M.W. Davis Properties, LLC to Grantor recorded in Book 7360, Page 264 in the Registry, and (ii) by Deed from Duke Power Company to Grantor recorded in Book 397, Page 361 in the Registry,.

✓  
✓

TMS: 562-00-00-257.

TOGETHER with all and singular the Rights, Members, Heriditaments and Appurtenances to the said Premises belonging, or in anywise incident or appertaining.

TO HAVE AND TO HOLD, all and singular the said premises before mentioned unto the Grantee, its successors and assigns forever.

And the Grantor does hereby bind itself and its successors, that it has not done or suffered anything to be done whereby the premises has been encumbered, and that it will warrant and forever defend all and singular the said premises unto the Grantee, its successors and assigns against itself and its successors and against every other person whomsoever lawfully claiming, or to claim the same, or any part thereof, through or under Grantor, but not otherwise, subject only to the matters set forth on Exhibit B attached hereto and made a part hereof by this reference.

①

In Witness Whereof, the Grantor has caused these presents to be executed in its name by its duly authorized \_\_\_\_\_ President, this 12 day of December, 2008.

Signed, sealed and delivered  
In the presence of:

[Signature]  
Kathleen Keebler

**CRESCENT RESOURCES, LLC**, a Georgia limited liability company

By: [Signature]  
Name: \_\_\_\_\_  
Its: Patrick T. Henry  
President Commercial Division

State of Georgia )  
County of Dekalb )

**Probate**

PERSONALLY appeared before me the undersigned witness and made oath that s/he saw the within CRESCENT RESOURCES, LLC, a Georgia limited liability company, by Patrick Henry, its \_\_\_\_\_ President, sign, seal, and as its act and deed, deliver the within written instrument; and that s/he, with the other witness subscribed above, witnessed the execution thereof.

[Signature]  
Witness

SWORN to before me this 12  
day of December, 2008 .

[Signature]  
Notary Public of Georgia

My Commission Expires: Sept 7, 2012

[NOTARIAL SEAL]





**EXHIBIT A**

**LEGAL DESCRIPTION**

OUTPARCEL J – TAX MAP NUMBER 5620000257.

All of that certain piece, parcel or tract of land situate and being in the City of Lake Wylie, York County, State of South Carolina, shown and designated as "Outparcel J" on a plat entitled "Subdivision Plat Survey for Lowe's Home Center, Inc." prepared by Freeland & Associates, Inc., dated 10/27/2006, last revised 5/28/2008, and recorded in Book D327, Page 4 of the York County Clerk's Office. ✓

Together with any appurtenant rights the Property may have in the easements for access, ingress and egress over and across the Wal-Mart Tract and the Lowe's Tract, described in Section 5.1 of the instrument entitled "Easements With Covenants and Restrictions Affecting Land" dated January 8, 2008, recorded at Record Book 9736, page 81.

**EXHIBIT B**

**PERMITTED EXCEPTIONS**

1. The lien of ad valorem taxes for the year 2008 and subsequent years.
2. All restrictions, encumbrances, reservations, limitations, conditions, easements, agreements or other matters of record affecting the Property.
3. The Declaration of Outparcel Restrictions and Covenants, executed by Grantor, which declaration was recorded on June 24, 2008 in Book 10135 at Page 16 in the Office of the Clerk of Court for York County, South Carolina.
4. The Easements with Covenants and Restrictions Affecting Land, executed by Grantor, Wal-Mart Real Estate Business Trust, and Lowe's Home Centers, which was recorded on January 10, 2008 in Book 9736 at Page 81 in the Office of the Clerk of Court for York County, South Carolina, as amended by that First Amendment to Easements with Covenants and Restrictions Affecting Land, recorded at Book 10415 at Page 13 in the Office of the clerk of Court for York County, South Carolina.
5. Such state of facts as would be disclosed by an accurate survey and inspection of the Property.

STATE OF SOUTH CAROLINA

AFFIDAVIT

COUNTY OF YORK

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.

The property being transferred is described on Exhibit A attached hereto and incorporated herein by reference. The property is being transferred by **Crescent Resources, LLC**, a Georgia limited liability company (the "Transferor"), to **Wachovia Bank, National Association**, a national banking association (the "Buyer").

3. Check one of the following: The deed is

(a)   x   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): \_\_\_\_\_  
(If exempt, please skip items 4 - 7, and go to item 8 of this affidavit.)

4. Check one of the following if either item 3(a) or 3(b) above has been checked (See Information section of this affidavit.):

(a)   x   The fee is computed on the consideration paid or to be paid in money or money's worth in the amount of   \$850,000.00  .

(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   x   to the following: A lien or encumbrances existed on the land, tenement, or realty before the transfer and remained on the land, tenement, or realty after 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: \$850,000.00

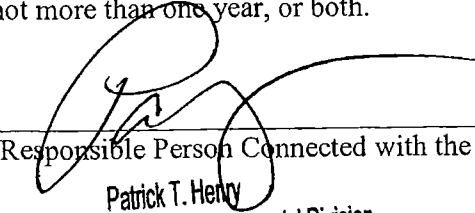
(b) Place the amount listed in item 5 above here: 0  
(If no amount is listed, place zero here)

(c) Subtract Line 6(b) from Line 6(a) and place result here: \$850,000.00

7. The deed recording fee due is based on the amount listed on Line 6(c) above and deed recording fee due is: \$3,145.00.

8. As required by Code Section 12-24-70, I state that I am a responsible person who was connected with the transaction as: \_\_\_\_\_ of Transferor.

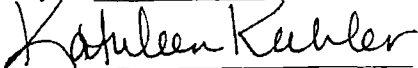
9. I understand that a person required to furnish this affidavit who willfully furnishes a false or fraudulent affidavit is guilty of a misdemeanor and, upon conviction, must be fined not more than one thousand dollars or imprisoned for not more than one year, or both.

  
\_\_\_\_\_  
Responsible Person Connected with the Transaction

Patrick T. Henry  
President Commercial Division

\_\_\_\_\_  
Print or Type Name Here

Sworn to before me this 12  
day of December, 2008

  
\_\_\_\_\_  
Notary Public

My Commission Expires: 9/7/08



**EXHIBIT A**

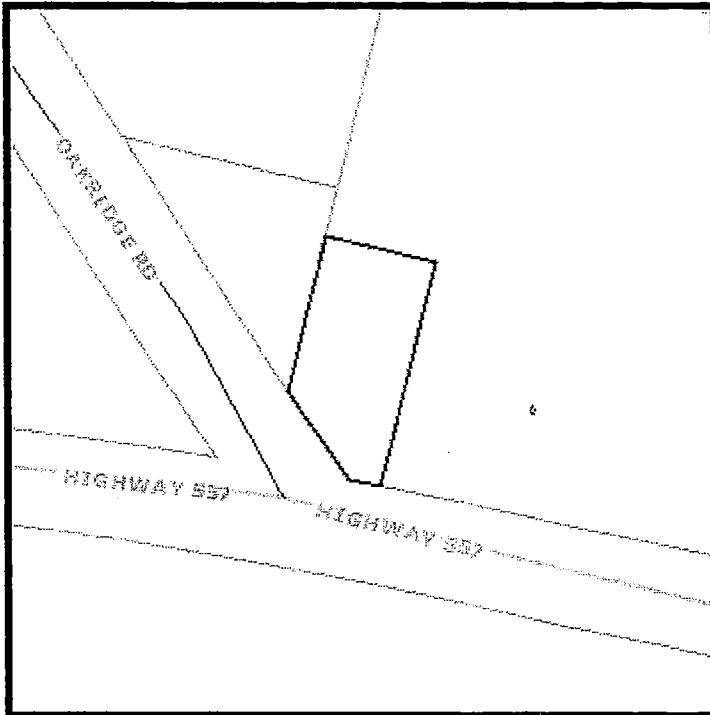
**LEGAL DESCRIPTION**

OUTPARCEL J – TAX MAP NUMBER 5620000257.

All of that certain piece, parcel or tract of land situate and being in the City of Lake Wylie, York County, State of South Carolina, shown and designated as "Outparcel J" on a plat entitled "Subdivision Plat Survey for Lowe's Home Center, Inc." prepared by Freeland & Associates, Inc., dated 10/27/2006, last revised 5/28/2008, and recorded in Book D327, Page 4 of the York County Clerk's Office. ✓

**Property Report for Parcel Number:**  
5630000002

Inquiry Date:



**Owner**

**Owner Name:** YORK COUNTY  
**Address:** P O BOX 66  
**City/State:** YORK S C  
**Zip Code:** 29745

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

**Parcel Number:** 5630000002  
**Total Lots:** 0  
**Total Acres:** 0  
**Deed Book:** 891  
**Deed Book Page:** 119  
**Platt Book:** 117  
**Platt Book Page:** 282  
**School District:** 2  
**Municipality:**  
**Fire Code:** BE-I  
**Property Location:** HWY 557

**Land Value:** \$0  
**AG Use:**  
**AG Use Value:**  
**Previous Owner:**  
**Tax Bill Information:**  
**Zoning:**  
**Sale Price:** \$0  
**Sale Date:** 12/22/93  
**Census Tract:**  
**Voter District:**

**Building/Structure**

**Prop. Classification:**  
**Heating Type:**  
**Living Area(Sq. Ft.):**  
**Basement:** NO  
**Bathrooms:**  
**Total Imp. Value:**

**Number of Stories:**  
**Year Built:**  
**Garage Area:** NO  
**Fireplace:**  
**Bldg. Value:** \$0

**Assessment**

**Total Assessed Value:** \$0  
**Total Market Value\*:** \$0

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 563-00-00-002 Legal

DEED

Grantor M B ALEXANDER  
Grantee BETHEL VOLUNTEER FIRE DEPARTMENT  
Book 891 Page 119  
Dated 9/8/1993 Recorded 12/23/1993

1-1-2 Previous Ownership

Grantor GRACE D ALEXANDER  
Grantee MARSHALL B ALEXANDER  
Book 682 Page 68  
Dated 11/18/1982 Recorded 11/29/1982

Grantor HESTER J DAVIS  
Grantee GRACE D ALEXANDER  
Book 682 Page 65  
Dated 11/18/1982 Recorded 11/29/1982

Grantor ESTATE OF H K DAVIS  
Grantee HESTER J DAVIS  
PROBATE 301 / 9667  
Dated 7/22/1938 Recorded 8/24/1938

**Disclaimer:** The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.

HASELDEN, OWEN & BOLOYAN  
303 North Main Street  
P. O. Box 173  
Clover, SC 29710

# State of South Carolina,

COUNTY OF YORK.

FILED-RECORDED  
BOOK 281 PAGE 114  
DEC 22 10 59 AM '93  
H.H. CARROLL, JR.  
C.C.C.P. & S.C.  
YORK COUNTY, S.C.

**Know All Men by These Presents,** That  
(hereinafter whether singular or plural the "Grantor")

I, M. B. ALEXANDER,

RECORDED

TAX ASSESSOR'S OFFICE

DATE 12-23-93

TAX MAP NO. 563-2

INITIALS RHMC

in the State aforesaid, for and in consideration of the sum of 500.00 DOLLARS (\$500.00) to the Grantor paid by BETHEL VOLUNTEER FIRE DEPARTMENT (hereinafter whether singular or plural the "Grantee") has granted, bargained, sold and released, and by these presents does grant, bargain, sell and release unto the said Grantee the following described property: Bethel Volunteer Fire Department, its successors and assigns:

All that certain piece, parcel or lot of land located on S.C. Highway 557 near the intersection of Highway S 46-435 in Bethel Township, York County, South Carolina, and being more particularly described as follows: BEGINNING at a point in the centerline of S.C. Highway 557, this being the Southeastern corner of the lot herein conveyed, thence with the centerline of said highway N 76-08-10 W 15.03 feet to another point in the centerline of said highway; thence, N 13-43-00 E 183.99 feet to an iron; thence S 76-37- E 15 feet to an iron; thence, S 13-46-00 W 184.20 feet to the BEGINNING POINT. The foregoing lot of land contains .06 acre according to a plat of the premises prepared by Joe H. Baird, P.E. and L.S., entitled "Boundary Survey for Alexander Auto & Tire Service," said plat being incorporated as a part of this description, same being recorded in Plat Book 112, Page 282, Office of the York County Clerk of Court.

This is the same property conveyed to M. B. Alexander by deed of Grace D. Alexander dated November 1, 1982, and recorded November 24, 1982, in Deed Book 682, Page 68, Office of the York County Clerk of Court.

17



TOGETHER with all and singular, the rights, members, hereditaments and appurtenances to the said premises belonging or in anywise incident or appertaining.

To HAVE AND TO HOLD all and singular the premises before mentioned unto the said Grantee, its successors

Heirs and Assigns forever.

And the Grantor does hereby bind himself and his Heirs, Executors and Administrators, to warrant and forever defend all and singular the said premises unto the said Grantee and the Grantee's Heirs and Assigns, against the Grantor and the Grantor's Heirs and against every person whomsoever lawfully claiming, or to claim, the same or any part thereof.

WITNESS the Hand and Seal of the Grantor this 8th day of September in the year of our Lord one thousand nine hundred and ninety-three and in the two hundredth and eighteenth year of the Sovereignty and Independence of the United States of America.

SIGNED, SEALED AND DELIVERED IN THE PRESENCE OF

Amos C. Hogue  
Grantor

} M. B. Alexander (SEAL)  
M. B. Alexander (SEAL)

STATE OF SOUTH CAROLINA. }  
York COUNTY. }

PERSONALLY appeared before me the undersigned witness and made oath that s/he saw the within named Grantor sign, seal and, as the Grantor's act and deed, deliver the within-written Deed for the uses and purposes therein mentioned and that s/he, with the other witness whose signature appears above witnessed the execution thereof.

SWORN to before me this 8<sup>th</sup>

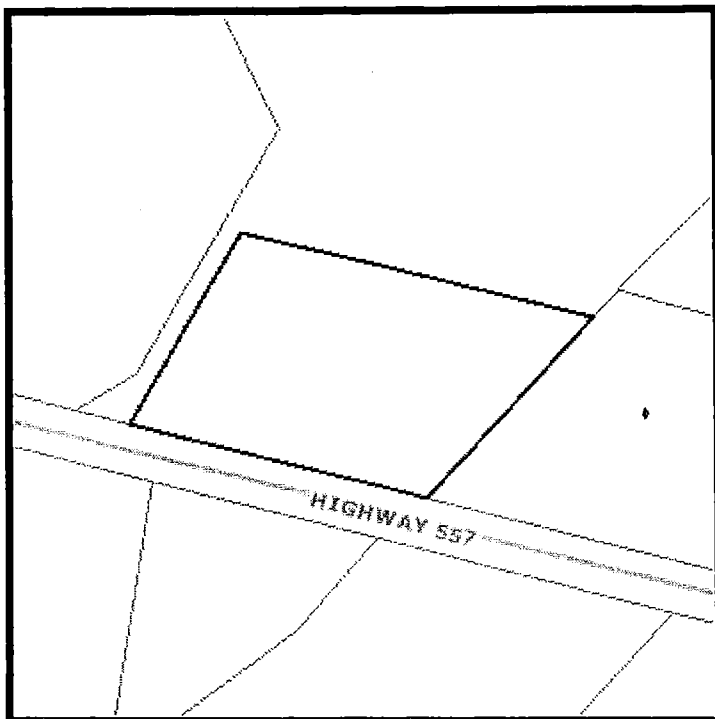
day of Sept 1993 }  
[Signature] (L.S.)  
Notary Public of S. C.

My Commission Expires: 8/7/96

[Signature]  
Witness

Inquiry Date:

**Property Report for Parcel Number:**  
5630000003



**Owner**

**Owner Name:** JACKSON HAROLD ED  
**Address:** PO BOX 1062  
**City/State:** GASTONIA N C  
**Zip Code:** 28053

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

**Parcel Number:** 5630000003  
**Total Lots:** 0  
**Total Acres:** 3.01  
**Deed Book:** 9118  
**Deed Book Page:** 300  
**Platt Book:**  
**Platt Book Page:**  
**School District:** 2  
**Municipality:**  
**Fire Code:** BE-I  
**Property Location:** HWY 557

**Land Value:** \$105400  
**AG Use:**  
**AG Use Value:**  
**Previous Owner:** JACKSON MARION Q  
**Tax Bill Information:**  
**Zoning:**  
**Sale Price:** \$1  
**Sale Date:** 5/25/07  
**Census Tract:**  
**Voter District:**

**Building/Structure**

**Prop. Classification:**  
**Heating Type:**  
**Living Area(Sq. Ft.):**  
**Basement:** NO  
**Bathrooms:**  
**Total Imp. Value:**

**Number of Stories:**  
**Year Built:**  
**Garage Area:** NO  
**Fireplace:**  
**Bldg. Value:** \$0

**Assessment**

**Total Assessed Value:** \$6324

**Total Market Value\*:** \$105400

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 563-00-00-003 Legal HYW 557

DEED

Grantor ESTATE OF ALICE RATCHFORD JACKSON

Grantee HAROLD EDWARD JACKSON

PROBATE 07ES 46 393

Dated 5/22/2007 Recorded 5/29/2007

1-1-2 Previous Ownership

Grantor ESTATE OF MARION Q JACKSON

Grantee ALICE RATCHFORD JACKSON AKA ALICE R JACKSON

PROBATE 07ES 46 392

Dated 5/19/2007 Recorded 5/29/2007

Grantor MRS HESTER J DAVIS, EVELYN D BOYD AND RUFUS J DAVIS being the wife and two children of HAROLD K DAVIS (deceased) the only other child and heir GRACE DAVIS not being of age and we having agreed to deed our interest in the below described property to

Grantee MARION Q JACKSON

Book 139 Page 11

Dated 1/24/1948 Recorded 1/24/1948

**Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.**

DEED PREPARED ONLY  
TITLE NOT EXAMINED

STATE OF SOUTH CAROLINA )  
 )  
COUNTY OF: YORK )  
 )  
IN THE MATTER OF: Alice Ratchford Jackson )

000354980  
RECORDED 05/25/2007 01:16:36PM  
Bk:09118 Pg:00300 Pages:3  
Fee:10.00 State:0.00  
County:0.00 Exempt:-----  
David Hamilton, Clerk of Court  
IN THE PROBATE COURT

DEED OF DISTRIBUTION

CASE NUMBER: 07-ES-46-393

WHEREAS, Marion Q. Jackson died on September 19, 2001 and his estate was administered in the General Court of Justice for Gaston County, North Carolina in File No. 01-E-1293; and,

WHEREAS, an exemplified copy of the last will and testament of Marion Q. Jackson has been filed in the Probate Court for York County, South Carolina in File # 07-ES-46-392 and is incorporated herein by reference; and,

WHEREAS, Alice Ratchford Jackson, a/k/a Alice R. Jackson, was the sole beneficiary under the last will and testament of Marion Q. Jackson, and pursuant thereto, inherited all of Marion Q. Jackson's interest in the real property described below; and,

WHEREAS, Alice Ratchford Jackson, the decedent in the above-captioned matter, died on February 5, 2007; and,

WHEREAS, the estate of the decedent is being administered in the Probate Court for York County, South Carolina in File # 07-ES-46-393; and,

WHEREAS, the grantee herein is either a beneficiary or heir at law, as appropriate, of the above-captioned decedent; and,

WHEREAS, the undersigned Personal Representative is the duly appointed and qualified fiduciary in this matter; and,

NOW, THEREFORE, in accordance with the laws of the State of South Carolina, the Personal Representative has granted, bargained, sold and released, and by these Presents do grant, bargain, sell and release to:

Name: Harold Edward Jackson

Address: P.O. Box 1062

Gastonia, NC 28053

the following described property:

See Exhibit A, incorporated herein by reference.

RECORDED  
YORK COUNTY  
TAX ASSESSOR'S OFFICE  
DATE 5/29/07  
TAX MAP NO. 563-3  
INITIALS TS Kj

BK 09118 PG 0300

(Handwritten initials)

✓

✓

(Handwritten number 1)

TOGETHER with all and singular the Rights Members Hereditaments and Appurtenances to the said Premises/Property belonging or in anywise incident or appertaining.

TO HAVE AND TO HOLD, all and singular, the said Premises/Property unto the said Harold Edward Jackson, their heirs and assigns forever.

IN WITNESS WHEREOF the undersigned as Personal Representative of the estate of the decedent has executed this Deed, on this 22<sup>nd</sup> day of May, 2007.

SIGNED, SEALED AND DELIVERED

ESTATE OF ALICE RATCHFORD JACKSON

IN THE PRESENCE OF

by Signature:

Harold Edward Jackson  
Harold Edward Jackson

Ann M. Boling  
Witness 1's Signature

Lesley M. Jackson  
Witness 2's Signature (Can be Notary)

STATE OF SOUTH CAROLINA )  
COUNTY OF YORK )

PROBATE

PERSONALLY APPEARED before me the Ann M. Boling (print witness 1's name) and made oath that he/she saw the within named Personal Representative(s) sign, seal, and as their act and deed, deliver the within written Deed, and that he/she with Lesley M. Jackson (print witness 2's name) witnessed the execution thereof.

Ann M. Boling  
Witness 1's Signature

Sworn to and subscribed before me this 22<sup>nd</sup> day of May, 2007

Lesley M. Jackson (SEAL)  
(Notary signature here)

Notary Public for South Carolina \*  
My Commission Expires: 10-27-2015

- Notary can also serve as Witness 2, above

EXHIBIT A

York County Tax Map # 563-00-00-003

All that 3.01 acres of land in Bethel Township, described on a plat and survey made of M. Q. Jackson property made by I. B. Faires, N.C. Reg. Land Surv. Oct. 3, 1947 and described on said plat as beginning in the center of the Clover-Charlotte Highway. The said beginning point is located by beginning at an iron, corner of Mrs. H. K. Davis, N. G. Brandon and Duke Power Co. corner, and running thence N 45 degrees 39 minutes E 252.1 ft. to the beginning point in center of highway. From this beginning point in center of Highway running thence N 74 57 W 387 ft. to point in road, thence N 32-30 E 21.5 ft. to iron, thence N 32-30 E 321.5 ft. to iron, thence S 74-57 E 472.1 ft. to iron, thence S 45-39 W 356.5 ft. to iron edge of highway right of way, thence S 45-39 W 30.7 ft. to the beginning point.

For a further description reference is hereby made to the plat and survey mentioned above and it is hereby incorporated into and made a part of the description in this deed.

The deed being given subject to rightways of power line and highway, if any, and to the undivided interest of Grace Davis.

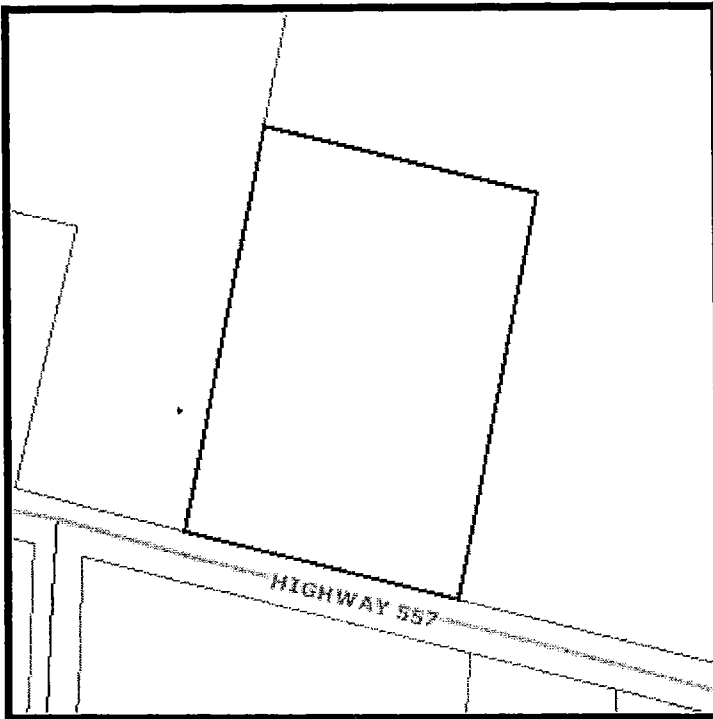
This lot is carved out of the tract conveyed by Mrs. Sarah E. Davis, etal to Harold K. Davis as recorded in Book 71 page 61 of deeds, CCC Pls. York County.

This is the identical property conveyed to Marion Q. Jackson by Deed of Mrs. Hester J. Davis, Evelyn D. Boyd and Rufus J. Davis being the wife and two children of Harold K. Davis, deceased, the only other child and heir Grace Davis, not being of age, dated January 24, 1948 and recorded June 10, 1948 in Record Book 139 at Page 11 in the Office of the Clerk of Court for York County, South Carolina. This is also the identical property conveyed by operation of law to Alice Ratchford Jackson, a/k/a Alice R. Jackson, pursuant to the last will and testament of Marion Q. Jackson, an exemplified copy of which is filed in the Probate Court for York County, South Carolina in File # 07-ES-46-392. ✓

8K09118PG0302

**Property Report for Parcel Number:**  
5630000004

Inquiry Date:



**Owner**  
**Owner Name:** ALEXANDER GRACE I  
**Address:** 5520 HWY 557  
**City/State:** CLOVER S.C. 2  
**Zip Code:** 29710

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

**Parcel Number:** 5630000004  
**Total Lots:** 0  
**Total Acres:** 5  
**Deed Book:** 682  
**Deed Book Page:** 65  
**Platt Book:** D370  
**Platt Book Page:** 8  
**School District:** 2  
**Municipality:**  
**Fire Code:** BE-I  
**Property Location:** HWY 557 (5 AC)

**Land Value:** \$125000  
**AG Use:**  
**AG Use Value:**  
**Previous Owner:** ALEXANDER GRACE I  
**Tax Bill Information:**  
**Zoning:**  
**Sale Price:** \$1  
**Sale Date:** 11/24/82  
**Census Tract:**  
**Voter District:**

**Building/Structure**

**Prop. Classification:**  
**Heating Type:**  
**Living Area(Sq. Ft.):**  
**Basement:** NO  
**Bathrooms:**  
**Total Imp. Value:**

**Number of Stories:**  
**Year Built:**  
**Garage Area:** NO  
**Fireplace:**  
**Bldg. Value:** \$48000

**Assessment**

**Total Assessed Value:** \$2927

**Total Market Value\*:** \$173000



F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 563-00-00-004      Legal      5.00 AC PLAT D370 / 008

DEED

Grantor      HESTER J DAVIS  
Grantee      GRACE D ALEXANDER  
Book      682      Page      65  
Dated      11/1/1982      Recorded      11/24/1982

1-1-2 Previous Ownership

Grantor      ESTATE OF H K DAVIS  
Grantee      HESTER J DAVIS  
PROBATE      301 / 9667  
Dated      7/22/1938      Recorded      8/24/1938

**Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.**

State of South Carolina,

COUNTY OF YORK

Haselden, Owen and Poore  
P. O. Box 173  
Clover, S. C.

**RECORDED**  
YORK COUNTY  
TAX ASSESSOR'S OFFICE

DATE 11/29/82  
TAX MAP NO. 563-4  
INITIALS HPD

Know All Men by These Presents, That I, Hester J. Davis

FILED - RECORDED  
BOOK 65-2-1-65  
NOV 24 11 19 AM '82  
M.H. GARDNER JR.  
C. G. GARDNER  
YORK COUNTY, S.C.

hereinafter referred to as Grantor(s)  
in the State aforesaid, for and in consideration of the  
sum of One Dollar (\$1.00) plus Love and Affection  
to me paid by Grace D. Alexander, Route 5, Clover, S.C. 29710  
as Grantee(s) in the State aforesaid (the receipt of which is hereby acknowledged)

have granted, bargained, sold and released, and by these presents do grant, bargain, sell and release unto the said  
Grantee(s) Grace D. Alexander, all my right, title and interest in and to  
the following described property, to wit:

"All that piece, parcel or tract of land lying and being situated in  
Clover School District No. Two, Bethel Township, York County, South Carolina,  
and beginning at a point in the center of the Clover-Charlotte Road, said  
point being located 17 feet South of an iron; thence running from said  
point across the Gastonia Road North 12 degrees 45 minutes East 2194 feet  
to an iron stake; thence South 48 degrees East 1414 feet to an iron stake  
in ditch; thence South 55 degrees 45 minutes East 1525 feet to an iron  
stake; thence South 41 degrees 56 minutes West 1387 feet to a stake; thence  
53 degrees 09 minutes West 527 feet to a stake; thence South 41 degrees 17  
minutes East 1260 feet to a stake; thence South 49 degrees 33 minutes West  
704 feet to a post oak; thence North 84 degrees 24 minutes West 331 feet  
to a stone; thence North 0.29 degrees East 410 feet to a stone; thence  
North 69 degrees 13 minutes West 1127 feet to a stone; thence 4 degrees  
East 488.6 feet to an iron stake; thence North 4 degrees East 945 feet  
across an iron located 20 feet south of a point in the center of the Clover-  
Charlotte Highway; thence along the center of said Highway North 73 degrees  
30 minutes West 223 feet to stake in said road; thence North 81 degrees  
45 minutes West 224 feet to the beginning point in said Clover-Charlotte  
Road; said tract containing 144.3 acres, more or less as shown on Lot No.  
3 on plat of R. J. Davis drawn by I. B. Faires, dated January, 1928  
and recorded in Plat Book 23, Page 144.  
Less and Except the following described properties:

Tract 1 - All that tract of land conveyed to M. O. Jackson and de-  
scribed as follows: Beginning at a point in the center of the Clover-  
Charlotte Highway and running North 32 degrees 30 minutes East 321.5 feet  
This being the same (a part of the) property heretofore conveyed to the Grantor(s) by Deed of

recorded \_\_\_\_\_, 19 \_\_\_\_\_, Deed Book  
\_\_\_\_\_, at page \_\_\_\_\_

to a point; thence South 74 degrees 57 minutes East 472.1 feet to a point on the old line; thence South 41 degrees 56 minutes 356.5 feet to a point in the Clover-Charlotte Road; thence along the Clover-Charlotte Road North 74 degrees 57 minutes West 387 feet to the beginning corner in said Highway. For a further and more detailed description of the property of M. Q. Jackson, see the plat, dated October, 1947. This is the same property conveyed to Marion Q. Jackson by deed recorded in Deed Book 139, page 11, R.M.C. Office for York County, South Carolina.

Tract 2 - All that certain tract of land containing 2.05 acres as shown and described on deed from Hester J. Davis to Marshall B. Alexander and Grace D. Alexander recorded in Deed Book 292, Page 50, Office of the Clerk of Court for York County, South Carolina.

Tract 3 - All that certain tract of land containing 1.13 Acres as shown and described on deed from Hester J. Davis, et al to Pine Grove Baptist Church, recorded in Deed Book 428, Page 432, Office of the Clerk of Court for York County, South Carolina.

This is a portion of the property inherited by the Grantee from her husband H. K. Davis.

Together with all and singular, the rights, members, hereditaments and appurtenances to the said premises belonging or in anywise incident or appertaining.

To HAVE AND TO HOLD all and singular the premises before mentioned unto the said Grantee(s) her Heirs and Assigns forever.

And the Grantor(s) do hereby bind Grantor(s) Heirs, Executors and Administrators, to warrant and forever defend all and singular the said premises unto the said Grantee(s) her

Heirs and Assigns, against Grantor(s) and Grantor(s) Heirs and against every person whomsoever lawfully claiming, or to claim the same or any part thereof.

WITNESS Hand and Seal this 18<sup>th</sup> day of November  
in the year of our Lord one thousand nine hundred and eighty-two  
and in the two hundredth and seventh year of the Sovereignty  
and Independence of the United States of America.

SIGNED, SEALED AND DELIVERED  
BY THE PRESENCE OF

*[Signature]*  
1<sup>st</sup> WITNESS  
*[Signature]*  
2<sup>nd</sup> WITNESS

*[Signature]* (SEAL)  
HESTER J. DAVIS (SEAL)

STATE OF SOUTH CAROLINA,  
YORK COUNTY.

PERSONALLY appeared before me the undersigned and made oath that s/he saw the within-named Grantor(s) sign, seal and, as his/her/their act and deed, deliver the within-written Deed for the uses and purposes therein mentioned, and that s/he, with the other witness subscribed above witnessed the execution thereof.

SWORN to before me this 18<sup>th</sup>

day of November 1982  
*James H. [Signature]*  
Notary Public of South Carolina

*Elizabeth Davis Alexander*  
(WITNESS)

My Commission Expires: 9/21/86

STATE OF SOUTH CAROLINA,  
COUNTY.

RENUNCIATION OF DOWER

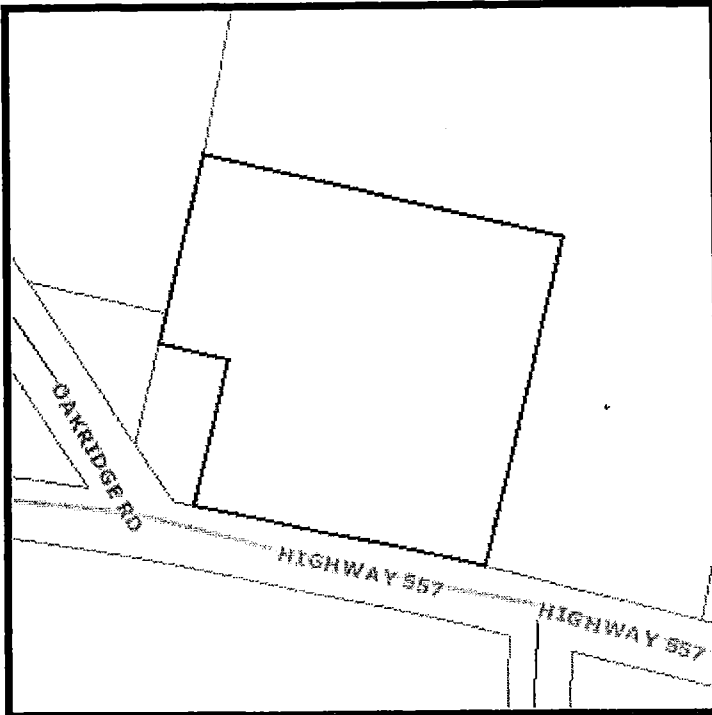
I, \_\_\_\_\_, do hereby certify unto all whom it may concern, that Mrs. \_\_\_\_\_ the wife of the within-named Grantor did this day appear before me, and upon being privately and separately examined by me, did declare that she does freely, voluntarily and without any compulsion, dread, or fear of any person or persons whomsoever, renounce, release and forever relinquish unto the within-named Grantee(s) Heirs and Assigns, all her interest and estate, and also all her right and claim of Dower of, in or to all and singular the premises within mentioned and released.

Given under my Hand and Seal, this \_\_\_\_\_ day of \_\_\_\_\_, 19

Notary Public of South Carolina  
My Commission Expires: \_\_\_\_\_

**Property Report for Parcel Number:**  
5630000005

Inquiry Date:



**Owner**

**Owner Name:** LAKE WYLIE ENTERPRISE INC  
**Address:** PO BOX 230  
**City/State:** CLOVER S C  
**Zip Code:** 29710

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

<b>Parcel Number:</b>	5630000005	<b>Land Value:</b>	\$120000
<b>Total Lots:</b>	0	<b>AG Use:</b>	
<b>Total Acres:</b>	3.18	<b>AG Use Value:</b>	
<b>Deed Book:</b>	801	<b>Previous Owner:</b>	ALEXANDER M B
<b>Deed Book Page:</b>	125	<b>Tax Bill Information:</b>	
<b>Platt Book:</b>	117	<b>Zoning:</b>	
<b>Platt Book Page:</b>	282	<b>Sale Price:</b>	\$167500
<b>School District:</b>	2	<b>Sale Date:</b>	9/9/93
<b>Municipality:</b>		<b>Census Tract:</b>	
<b>Fire Code:</b>	BE-I	<b>Voter District:</b>	
<b>Property Location:</b>	HWY 557 (3.18 ACRES)		

**Building/Structure**

<b>Prop. Classification:</b>		<b>Number of Stories:</b>	
<b>Heating Type:</b>		<b>Year Built:</b>	
<b>Living Area(Sq. Ft.):</b>		<b>Garage Area:</b>	NO
<b>Basement:</b>	NO	<b>Fireplace:</b>	
<b>Bathrooms:</b>		<b>Bldg. Value:</b>	\$710500
<b>Total Imp. Value:</b>			

**Assessment**

<b>Total Assessed Value:</b>	\$49830	<b>Total Market Value*:</b>	\$830500
------------------------------	---------	-----------------------------	----------

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 563-00-00-005 Legal 3.18 AC

DEED

Grantor M B ALEXANDER  
Grantee LAKE WYLIE ENTERPRISES  
Book 801 Page 125  
Dated 9/8/1993 Recorded 9/10/1993

1-1-2 Previous Ownership

Grantor GRACE D ALEXANDER  
Grantee MARSHALL B ALEXANDER  
Book 682 Page 68  
Dated 11/1/1982 Recorded 11/24/1982

Grantor HESTER J DAVIS  
Grantee GRACE D ALEXANDER  
Book 682 Page 65  
Dated 11/1/1982 Recorded 11/24/1982

Grantor ESTATE OF H K DAVIS  
Grantee HESTER J DAVIS  
PROBATE 301 / 9667  
Dated 7/22/1938 Recorded 8/24/1938

*Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.*

HASELDEN, OWEN & BOLOYAN  
303 North Main Street  
P. O. Box 173  
Clover, SC 29710

435.50  
234.50

# State of South Carolina,

COUNTY OF YORK

COUNTY  
CONVEYANCE  
TAX

\$ 234.50  
PAID RECORDED

Know All Men by These Presents, That  
(hereinafter whether singular or plural the "Grantor")

I, M. B. ALEXANDER,

DATE: 9-10-93  
TAX: 563.50  
H.M. CARROLL, JR.  
YORK COUNTY, S.C.  
SEP 9 11 58 AM '93  
FILED-RECEIVED  
BOOK 107  
PAGE 188

STATE OF SOUTH CAROLINA  
SOUTH CAROLINA TAX COMMISSION  
DOCUMENTARY  
STAMP  
SEP-9-93 TAX 435.50  
PS 11224

in the State aforesaid, for and in consideration of the sum of One HUNDRED SIXTY SEVEN THOUSAND FIVE HUNDRED and no/100 Dollars to the Grantor paid by LAKE WYLIE ENTERPRISES, INC. (hereinafter whether singular or plural the "Grantee") has granted, bargained, sold and released, and by these presents does grant, bargain, sell and release unto the said ~~Grantor~~ LAKE WYLIE ENTERPRISES, INC., their successors and assigns:

All that certain piece, parcel or tract of land located on S.C. Highway 557 near the intersection with Highway S 46-435 in Bethel Township, York County, South Carolina, and being more particularly described as follows: BEGINNING at a point in the centerline of S.C. Highway 557, this being the southeastern corner of the tract herein conveyed, thence with the centerline of said highway N 76-08-10 W 315.29 feet to another point in the centerline of said highway; thence N 13-46-00 E 184.20 feet to an iron; thence, N 76-37 W 74.85 feet to an iron; thence, N 13-43 E 204.09 feet to an iron; thence, S 76-51 E 390 feet to an iron; thence, S 13-43 W 392.53 feet to the BEGINNING POINT. The foregoing tract of land contains 3.18 acres according to plat of the premises prepared May 30, 1985, revised 8/15/91, by Joe H. Baird, P.E. and L.S., entitled "Boundary Survey for Alexander Auto & Tire Service," said plat being incorporated as a part of this description, same being recorded in Plat Book 117, Page 282, Office of the York County Clerk of Court.

This is the same property conveyed to M. B. Alexander by deed of Grace D. Alexander dated November 1, 1982, and recorded November 24, 1982, in Dead Book 682, Page 68, Office of the York County Clerk of Court.

①

TOGETHER with all and singular, the rights, members, hereditaments and appurtenances to the said premises belonging or in anywise incident or appertaining.

TO HAVE AND TO HOLD all and singular the premises before mentioned unto the said Grantee, ITS SUCCESSORS,

Heirs and Assigns forever.

And the Grantor does hereby bind himself and his Heirs, Executors and Administrators, to warrant and forever defend all and singular the said premises unto the said Grantee and the Grantee's Heirs and Assigns, against the Grantor and the Grantor's Heirs and against every person whomsoever lawfully claiming, or to claim, the same or any part thereof.

WITNESS the Hand and Seal of the Grantor this 8th day of September in the year of our Lord one thousand nine hundred and ninety-three and in the two hundredth and eighteenth year of the Sovereignty and Independence of the United States of America.

SIGNED, SEALED AND DELIVERED IN THE PRESENCE OF

Sever C. Beatty  
Jan 17 1903

} M. B. Alexander (SEAL)  
M. B. ALEXANDER (SEAL)



STATE OF SOUTH CAROLINA. }  
YORK COUNTY. }

PERSONALLY appeared before me the undersigned witness and made oath that s/he saw the within named Grantor sign, seal and, as the Grantor's act and deed, deliver the within-written Deed for the uses and purposes therein mentioned and that s/he, with the other witness whose signature appears above witnessed the execution thereof.

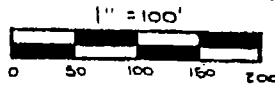
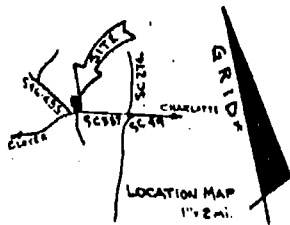
SWORN to before me this 8<sup>th</sup>

day of September, 19 93

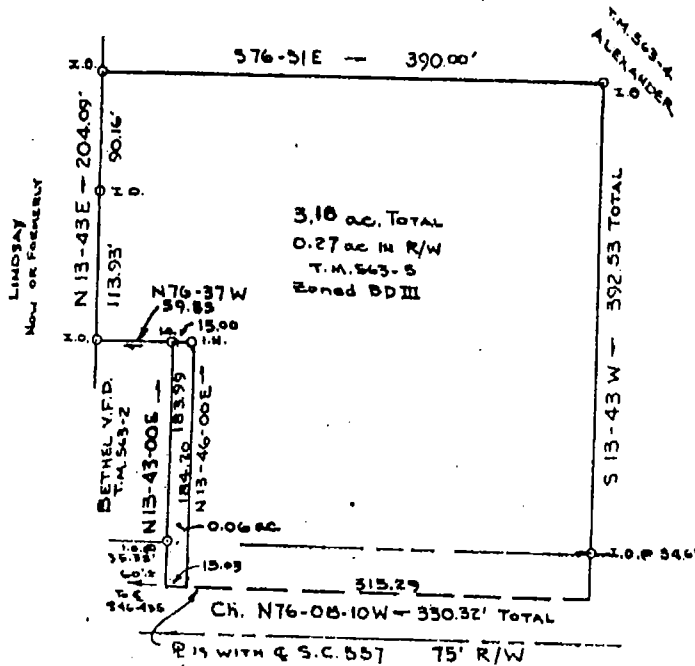
James H. Hill (L.S.)  
Notary Public of S. C.

My Commission Expires: 8/1/96

James C. Butler  
Witness



MERID NORTH BASED ON  
1961 SURVEY BY E.L. FAIRES



3.18 ac. TOTAL  
0.27 ac IN R/W  
T.M. 543-5  
Zoned BDIII

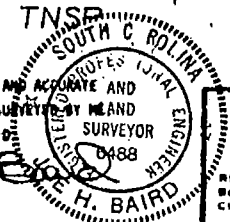
FILED-RECORDED  
BOOK 117 - PAGE 282  
SEP 9 11 50 AM '93  
M.H. GIBBONS, JR.  
C.O.C. 10102  
YORK COUNTY, S.C.

0.06 ac Tract Surveyed 5/31/86  
For Bethel V.F.D. and Added  
To This Plat 8/15/91.

BOUNDARY SURVEY FOR  
ALEXANDER AUTO & TIRE SERVICE

YORK COUNTY SOUTH CAROLINA  
BETHEL TNSR MAY 30, 1985

I CERTIFY THIS PLAT AS A TRUE AND ACCURATE AND  
REPRESENTATION OF THE PROPERTY SURVEYED BY ME AND  
E.O.C. < 1/1500. AREA BY D.N.S.



JOE H. BAIRD, P.E. & L.S.  
Land Surveyor

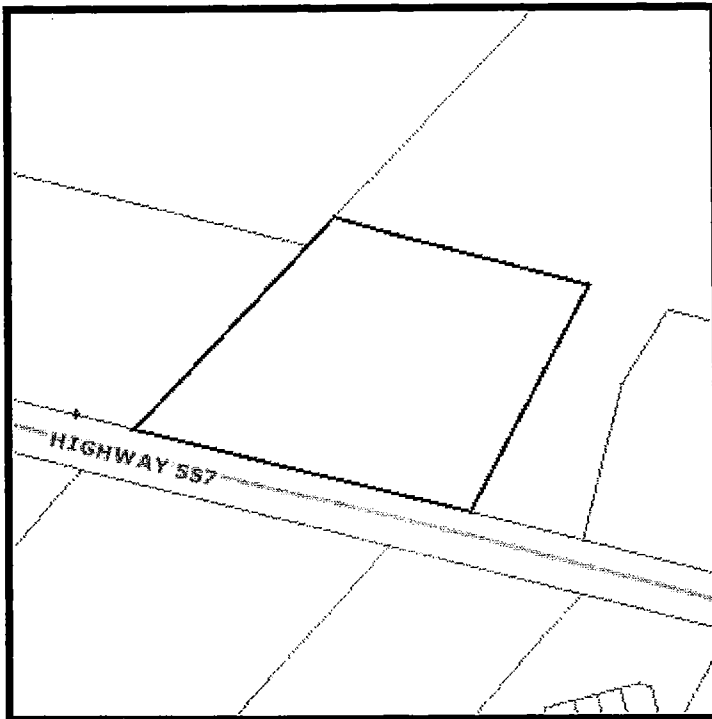
S.C. REG. NO. 6488

Pl. 5, Box 100  
Baird Road  
Clover, S.C. 29710

883A31-0710  
883A31-0710

**Property Report for Parcel Number:**  
5630000007

Inquiry Date:



**Owner**

**Owner Name:** DUKE POWER COMPANY A  
PROPERTY TAX DIVISION  
**Address:** P O BOX 1244 MAIL CODE I  
**City/State:** CHARLOTTE NC  
**Zip Code:** 282011244

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

**Parcel Number:** 5630000007  
**Total Lots:** 0  
**Total Acres:** 3  
**Deed Book:** 64  
**Deed Book Page:** 133  
**Platt Book:**  
**Platt Book Page:**  
**School District:** 2  
**Municipality:**  
**Fire Code:** BE-I  
**Property Location:** HWY 557

**Land Value:** \$0  
**AG Use:**  
**AG Use Value:**  
**Previous Owner:**  
**Tax Bill Information:**  
**Zoning:**  
**Sale Price:** \$0  
**Sale Date:** 0/0/0  
**Census Tract:**  
**Voter District:**

**Building/Structure**

**Prop. Classification:**  
**Heating Type:**  
**Living Area(Sq. Ft.):**  
**Basement:** NO  
**Bathrooms:**  
**Total Imp. Value:**

**Number of Stories:**  
**Year Built:**  
**Garage Area:** NO  
**Fireplace:**  
**Bldg. Value:** \$0

**Assessment**

**Total Assessed Value:** \$0

**Total Market Value\*:** \$0

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 563-00-00-007 Legal

DEED

Grantor HATTIE C WRIGHT

Grantee WATEREE POWER COMPANY

Book 64 Page 133

Dated 8/13/1925 Recorded 8/13/1925

1-1-2 Previous Ownership

Grantor

Grantee

Book Page

Dated Recorded

**Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.**



TO HAVE AND TO HOLD, all and singular, the said premises before mentioned unto the said Wateree Power Company, a corporation  
under the laws of South Carolina, its successors.

~~XXXX~~ and Assigns forever.

AND I do hereby bind myself and my  
Heirs, Executors and Administrators, to warrant and forever defend, all and singular, the said premises unto the said  
Wateree Power Company, its successors  
~~XXXX~~ and Assigns, against me and my Heirs  
and all other persons whomsoever lawfully claiming or to claim the same, or any part thereof.

WITNESS my Hand and Seal, this 13th day of August in the year of our Lord  
one thousand nine hundred and twenty five and in the one hundred and fiftieth year of the  
Sovereignty and Independence of the United States of America.

Signed, Sealed and Delivered in the Presence of

Annie L. Wallace } Mattie C. Wright (Seal)  
Jno R. Hart } (Seal)

THE STATE OF SOUTH CAROLINA, }  
YORK COUNTY }

PERSONALLY appeared before me Miss Annie Wallace  
and made oath that she saw the within named Mattie C. Wright  
sign, seal, and as ~~her~~ her act and deed, deliver the within written Deed and that she  
with for the use and purpose therein mentioned  
witnessed the execution thereof.

Annie L. Wallace

SWORN to before me, this 13th  
day of August A. D. 1925  
Jno R. Hart (L.S.)  
Notary Public, S. C.

THE STATE OF SOUTH CAROLINA, }  
YORK COUNTY }

RENUNCIATION OF DOWER.

I, \_\_\_\_\_, Notary Public, S. C.  
do hereby certify unto all whom it may concern that Mrs. \_\_\_\_\_  
the wife of the within named \_\_\_\_\_ did this day appear before me and, upon being  
privately and separately examined by me, did declare that she does freely, voluntarily, and without any compulsion, dread or fear of any person or persons whomsoever, renounce,  
release and forever relinquish unto the within named \_\_\_\_\_  
Heirs and Assigns, all her interest and estate, and also her right and claim of dower of, in or to, all and singular, the premises within mentioned and released.

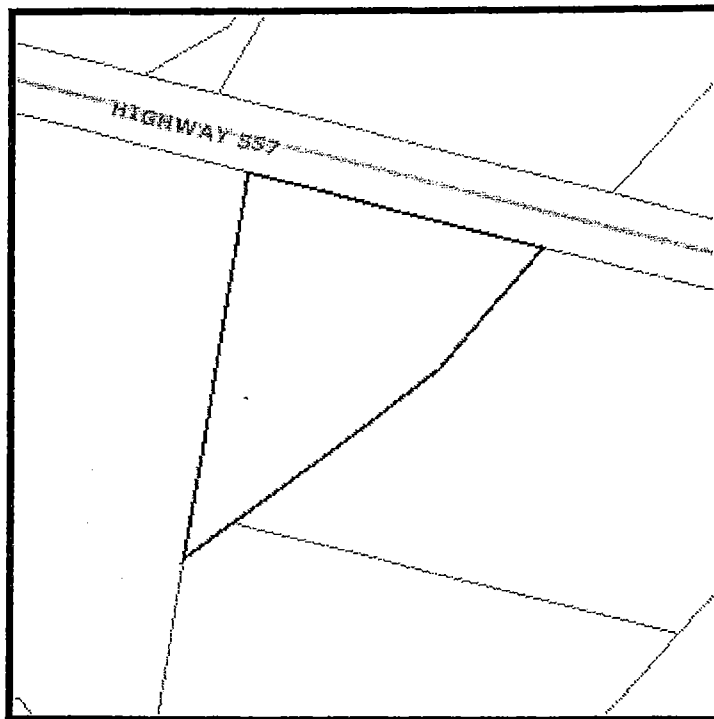
Given under my Hand and Seal, this \_\_\_\_\_  
day of \_\_\_\_\_, Anno Domini, 192\_\_\_\_  
\_\_\_\_\_  
Notary Public, S. C.

Filed August 13, 1925 4:00 P.M.  
Recorded this 13 day of August, 1925.

**Property Report for Parcel Number:**

5630000009

Inquiry Date:



**Owner**

**Owner Name:**

CHURCH PINE GROVE  
BAPTIST

**Address:**

OF YORK COUNTY

**City/State:**

**Zip Code:**

0

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

**Parcel Number:** 5630000009  
**Total Lots:** 0  
**Total Acres:** 0  
**Deed Book:** 6928  
**Deed Book Page:** 274  
**Platt Book:** C369  
**Platt Book Page:** 3  
**School District:** 2  
**Municipality:**  
**Fire Code:** BE-I  
**Property Location:** HWY 557 1.13 AC & .175 AC

**Land Value:** \$0  
**AG Use:**  
**AG Use Value:**  
**Previous Owner:** KENNETH D ALEXANI  
**Tax Bill Information:**  
**Zoning:**  
**Sale Price:** \$1  
**Sale Date:** 3/8/05  
**Census Tract:**  
**Voter District:**

**Building/Structure**

**Prop. Classification:**  
**Heating Type:**  
**Living Area(Sq. Ft.):**  
**Basement:** NO  
**Bathrooms:**  
**Total Imp. Value:**

**Number of Stories:**  
**Year Built:**  
**Garage Area:** NO  
**Fireplace:**  
**Bldg. Value:** \$0

**Assessment**

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 563-00-00-009 Legal 1.13 & .175 AC HWY 557

DEED

Grantor PINE GROVE BAPTIST CHURCH  
Grantee KENNETH A ALEXANDER  
Book 6928 Page 274  
Dated 2/23/2005 Recorded 3/8/2005

1-1-2 Previous Ownership

Grantor JESSICA L ALEXANDER 1/2 INTEREST  
Grantee KENNETH D ALEXANDER  
Book 3353 Page 228  
Dated 11/13/2000 Recorded 11/27/2000

Grantor GRACE D ALEXANDER  
Grantee KENNETH D ALEXANDER AND JESSICA L ALEXANDER  
Book 99 Page 253  
Dated 6/25/1990 Recorded 7/26/1990

Grantor HESTER J DAVIS  
Grantee GRACE D ALEXANDER  
Book 682 Page 65  
Dated 11/19/1982 Recorded 11/24/1982



Grantor ESTATE OF H K DAVIS

Grantee HESTER J DAVIS

PROBATE 301 / 9667

Dated 7/22/1938 Recorded 8/24/1938

***Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.***

000226838  
RECORDED 03/08/2005 10:35:43AM  
Bk:06928 Pg:00274 Pages:4  
Fee:10.00 State:0.00  
County:0.00 Exempt:  
David Hamilton, Clerk of Court  
York County, SC

**DEED ONLY PREPARED**  
**TITLE NOT EXAMINED**

STATE OF SOUTH CAROLINA  
COUNTY OF YORK

) Haselden, Owen & Boloyan  
) P.O Box 173  
) Clover, SC 29710

**TITLE TO REAL ESTATE**

KNOW ALL MEN BY THESE PRESENTS, That I, **KENNETH D. ALEXANDER** for an in consideration of the sum of (SEE AFFIDVAIT) to them in hand paid at and before the sealing of these presents, by **TRUSTEES, PINE GROVE BAPTIST CHURCH**, in the State aforesaid, (the receipt whereof is hereby acknowledged), has granted, bargained, sold and released unto **TRUSTEES, PINE GROVE BAPTIST CHURCH**, his/her or their heirs, successors and assigns, the following described property:

All that certain piece, parcel or tract of land lying being and situate in Bethel Township, York County, SC and being more particularly described as follows: BEGINNING at an iron pin found on the edge of right of way for South Carolina Highway 557, approximately 0.6 miles from South Carolina Hwy 49, (S80-10-13E 133.28 feet from SCGS Monument "Pine Grove 1989")(tie line) and running thence S03-00-44 W 339.92 feet to a pipe found; thence S53-01-37 W 58.37 feet to an iron pin set; thence N09-46-12 E 380.07 feet to an iron pin found on the edge of right of way from SC Hwy 557, the point of beginning. Being more particularly shown and described as **TRACT "A" containing 0.175A** on a Plat of Survey for Pine Grove Baptist Church drawn by Joe H. Baird, P.L.S. dated April 23, 2003 and recorded in the Office of the Clerk of Court for York County, South Carolina in Plat Book C-369, page 3 and incorporated herein by reference.

This is a portion of the property conveyed to Kenneth D. Alexander and Jessica L. Alexander by deed of Grace D. Alexander, dated June 25, 1990, recorded July 26, 1990 in Book 99, page 253, in the Office of the Clerk of Court for York County, South Carolina. Reference is also made Deed from Jessica L. Alexander conveying her one-half interest to Kenneth D. Alexander recorded in Book 3353, page 228 in the Office of the Clerk of Court for York County, South Carolina.

**Grantees Address:**  
5415 Hwy 557  
Clover, SC 29710

The above described property is conveyed subject to all easements, restrictions, and rights of way, if any, appearing of record in the chain of title of the subject property or visible upon an actual, physical inspection of the subject property.

**RECORDED**  
YORK COUNTY  
TAX ASSessor's OFFICE

DATE 3-8-05  
TAX MAP NO. 561-30  
INITIALS AC / dn

**BK06928 PG0274**

(1)

TOGETHER with all and singular, the rights, members, hereditaments

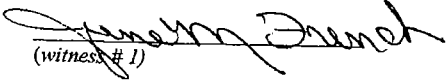
and appurtenances to the said premises belonging or in anywise incident or appertaining.

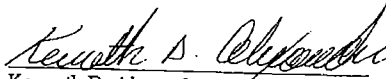
TO HAVE AND TO HOLD all and singular the premises before mentioned unto the said GRANTEE(S), their heirs, successors and assigns, forever.

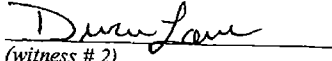
AND Grantors do hereby bind themselves and their successors and assigns, to warrant and forever defend all and singular the said premises unto the said **TRUSTEES, PINE GROVE BAPTIST CHURCH** his, her or their heirs and assigns, against themselves and their successors and assigns and against every person whomsoever lawfully claiming, or to claim the same or any part thereof

WITNESS the Hand and Seal of the Grantor this 23<sup>rd</sup> day of February, in the year of our Lord Two Thousand and Five and in the two hundred and twenty-ninth year of the Sovereignty and Independence of the United States of America.

SIGNED, SEALED AND DELIVERED  
IN THE PRESENCE OF:

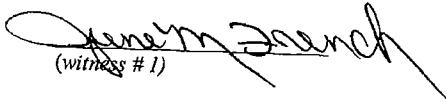
  
(witness # 1)

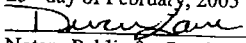
  
Kenneth D. Alexander

  
(witness # 2)

STATE OF SOUTH CAROLINA     )  
  )     PROBATE  
COUNTY OF YORK                )

PERSONALLY APPEARED before me the undersigned witness and made oath that s/he saw the within-named Grantors, sign, seal, and as their act and deed, deliver the within-written Deed for the uses and purposes therein mentioned; and that s/he with the other witness whose signature appears above the witnessed the execution thereof.

  
(witness # 1)

SWORN TO before me this  
23<sup>rd</sup> day of February, 2005  
 (SEAL)  
Notary Public for South Carolina  
My Commission Expires: 10-16-2008

BK06928 PB0275

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 is located at 5485 Hwy 557  
bearing York County Tax Map Number 561-30(P), was transferred  
by Kenneth D. Alexander  
to Pine Grove Baptist Church 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):  
# 5  
(If exempt, please skip items 4 - 7, and go to item 8 of this affidavit.)

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. 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: Attorney

BK06928 PG0276

9. I understand that a person required to furnish this affidavit who wilfully 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.

*O. Howard B. Adams*

*Myron B. Bowman*  
Responsible Person Connected with the Transaction

SWORN to before me this 23<sup>rd</sup>  
day of Feb 20 08

Print or Type Name Here

Notary Public for SC  
My Commission Expires: 4-12-06

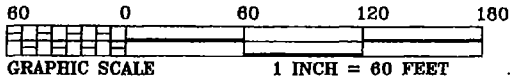
### INFORMATION

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. 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 in order to become, or as, a stockholder, partner, or trust beneficiary of the entity provided 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 such stock or interest held by the grantor. However, 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. A 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; and,
- (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 mortgagee or deed pursuant to foreclosure proceedings.
- (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.

06928 00277



All Corners Are #5 Rebar  
Unless Otherwise Noted.  
I.P.F. - Found ; I.P.S. - Set

S.C. Hwy. 557  
75' R/W

0.6 mi. to S.C. 49  
I.P.F. S 80°10'13"E 133.28'  
I.P.F. at 13.31' SCGS MONUMENT  
"PINE GROVE 1989"

000226841 BK: C-369 PG: 3  
03/08/2005 10:37:25AM  
David Hamilton, Clerk of Court  
York County, SC  
REC FEE:10.00

PINE GROVE BAPTIST OF YORK COUNTY  
D.B. 547-1084 ; P.B. 41-44

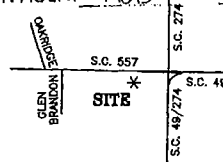
**0.175 Acres**

TAX PARCEL 561-30(P)  
FOR COMBINATION WITH  
TAX PARCEL 563-9

**PLAT RECOMBINATION APPROVED**

This plat is approved for recording in the office  
of the Clerk of Court of York County, South  
Carolina, Subdivision and Zoning Code of York  
County, Section 155.428, Subdivision #

COMMISSION AGENT MUB DATE 2-24-05



LOCATION MAP  
N.T.S.

KENNETH D. ALEXANDER  
R.B. 3353-228 ; P.B. 105-140

N 09°46'12"E 380.07'

S 03°00'44"W 339.92'

(A)

1" Pipe Fd.

I.P.S.

PINE GROVE BAPTIST OF YORK COUNTY  
D.B. 884-261 ; P.B. 50-65

S 09°46'12"W 278.73'

N 53°01'37"E 217.97'

(B)

**0.487 Acres**

TAX PARCEL 561-24(P)  
FOR COMBINATION WITH  
TAX PARCEL 561-30

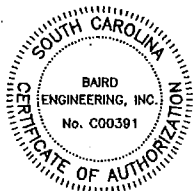
N 41°27'24"W 191.59'

1" Angle Iron Fd. (Bent)

I.P.S.

# PLAT OF SURVEY FOR Pine Grove Baptist Church

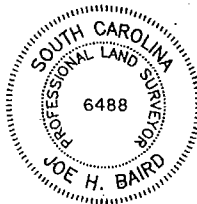
BETHEL TOWNSHIP  
YORK COUNTY SOUTH CAROLINA  
23 APRIL 2003



BAIRD ENGINEERING, INC.  
SURVEYORS • ENGINEERS • PLANNERS

3219 BAIRD ROAD  
CLOVER, SC 29710  
803/831-2661  
COA No. 000391

© 2003 by Baird Engineering, Inc.



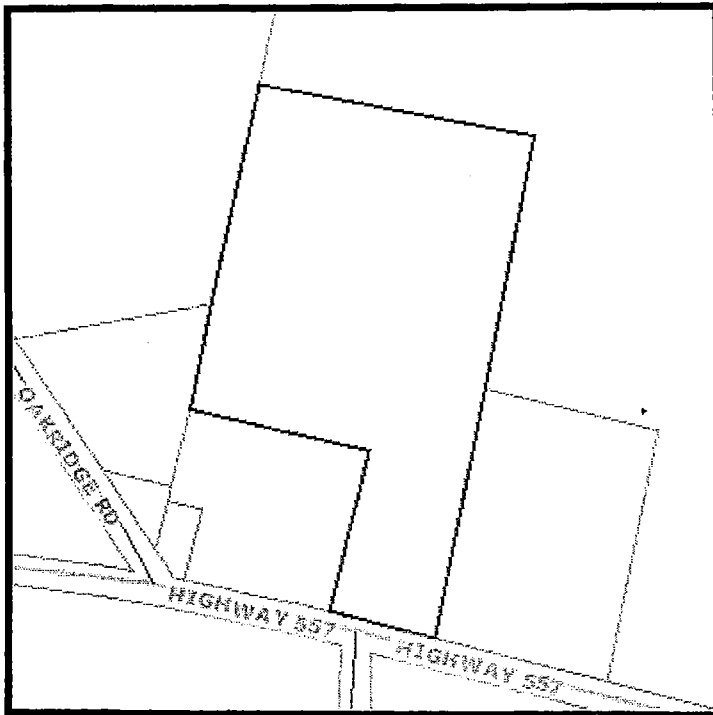
"BOUNDARY SURVEY"

I hereby state to the best of my knowledge,  
information and belief, and in my professional  
opinion, the survey shown hereon was made in  
accordance with the requirements of the  
"Minimum Standards Manual for the Practice of  
Land Surveying in South Carolina", and meets  
or exceeds the requirements for a "Class A"  
survey as specified therein.

*Joe H. Baird*  
S.C. REG. NO. 6488 CLOVER, S.C.  
F.B. JOB No. 030102B

**Property Report for Parcel Number:**  
5630000021

Inquiry Date:



**Owner**

**Owner Name:** LAKE WYLIE ENTERPRI  
INC  
**Address:** PO BOX 230  
**City/State:** CLOVER S.C.  
**Zip Code:** 29710

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

**Parcel Number:** 5630000021  
**Total Lots:** 0  
**Total Acres:** 12  
**Deed Book:** 3106  
**Deed Book Page:** 103  
**Platt Book:** D370  
**Platt Book Page:** 8  
**School District:** 2  
**Municipality:**  
**Fire Code:** BE-I  
**Property Location:** SC HWY 557

**Land Value:** \$240000  
**AG Use:**  
**AG Use Value:**  
**Previous Owner:** KENNETH D ALEXANI  
**Tax Bill Information:**  
**Zoning:**  
**Sale Price:** \$180000  
**Sale Date:** 5/1/00  
**Census Tract:**  
**Voter District:**

**Building/Structure**

**Prop. Classification:**  
**Heating Type:**  
**Living Area(Sq. Ft.):**  
**Basement:** NO  
**Bathrooms:**  
**Total Imp. Value:**

**Number of Stories:**  
**Year Built:**  
**Garage Area:** NO  
**Fireplace:**  
**Bldg. Value:** \$0

**Assessment**

**Total Assessed Value:** \$14400

**Total Market Value\*:** \$240000

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 563-00-00-021 Legal 12.00 AC PLAT D370 / 008

DEED

Grantor KENNETH D ALEXANDER  
Grantee LAKE WYLIE ENTERPRISES INC  
Book 3106 Page 103  
Dated 4/28/2000 Recorded 5/2/2000

1-1-2 Previous Ownership

Grantor GRACE D ALEXANDER  
Grantee KENNETH D ALEXANDER  
Book 3106 Page 100  
Dated 4/27/2000 Recorded 5/1/2000

Grantor HESTER J DAVIS  
Grantee GRACE D ALEXANDER  
Book 682 Page 65  
Dated 11/18/1982 Recorded 11/29/1982

Grantor ESTATE OF H K DAVIS  
Grantee HESTER J DAVIS  
PROBATE 301 / 9667  
Dated 7/22/1938 Recorded 8/24/1938

**Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.**



STATE OF SOUTH CAROLINA  
COUNTY OF YORK

STATE OF SOUTH CAROLINA

YORK COUNTY, S.C. 29002/01/2000  
Stamp # 20 \$180,000.00

STATE FEE \$468.00

FILED-RECEIVED  
BOOK PAGE

May 1 12 02 PM '00

COUNTY CONVEYANCE FEE

YORK COUNTY, S.C. 29002/01/2000  
Stamp # 20 \$180,000.00

COUNTY FEE \$198.00

RECORDED

DAVID HAMILTON, Haselden, Owen & Boloyan  
CLERK OF COURT P.O. Box 173  
YORK COUNTY, S.C. Clover, SC 29710 TAX ASSESSOR'S OFFICE

DATE 5-2-00  
TITLE TO REAL ESTATE  
TAX MAP NO. 563.23

INITIALS Tc KO

KNOW ALL MEN BY THESE PRESENTS, That I, Kenneth D. Alexander, for and in consideration of the sum of One Hundred Eighty Thousand and no/100 (\$180,000.00) to me in hand paid at and before the sealing of these presents, by Lake Wylie Enterprises, Inc., 5580 Highway 557, Lake Wylie, South Carolina 29710, in the State aforesaid, (the receipt whereof is hereby acknowledged), has granted, bargained, sold and released unto Lake Wylie Enterprises, Inc., their heirs, successors and assigns, the following described property:

All that certain piece, parcel or tract of land situated on S.C. Highway 557 in Bethel Township, York County, South Carolina, being more particularly described as follows: BEGINNING at an iron in the centerline of S.C. Highway 557, this being the southeastern corner of the property herein described, thence, with the centerline of said highway N 76-20-41 W 162.28 feet to an iron; thence continuing with the centerline of said highway N 77-26-49 W 57.72 feet to an iron; thence, N 11-24-08 E 393.01 feet to an iron; thence, N 79-04-54 W 390.01 feet to an iron rebar; thence, N 11-29-15 E 714.52 feet to an iron; thence, S 79-04-54 E 608.82 feet to an iron; thence, S 11-24-08 W 1116.91 feet to the Beginning Point. Said tract of land contains 12.00 acres as more particularly set forth on plat entitled Plat of Survey for Grace D. Alexander, prepared by Baird Engineering, Inc., Joe H. Baird, P.E. & L.S., dated March 15, 2000, and recorded in Plat Book 2-223, Page 2, Office of the York County Clerk of Court.

This is the identical property conveyed to Kenneth D. Alexander by deed of Grace D. Alexander dated 4-27-00 and recorded 5-1-00 in Book 3106, page 100, office of the Clerk of Court for York County, South Carolina.

The above described property is conveyed subject to all easements, restrictions, and rights of way, if any, appearing of record in the chain of title of the subject property or visible upon an actual, physical inspection of the subject property.

RECORDED  
RECORD  
VOL. 3106 PG. 103  
YORK COUNTY, S.C.

TOGETHER with all and singular, the rights, members, hereditaments and appurtenances to the said premises belonging or in anywise incident or appertaining.

TO HAVE AND TO HOLD all and singular the premises before mentioned unto the said Lake Wylie Enterprises, Inc., its heirs, successors and assigns, forever.

AND Grantor does hereby bind himself and his heirs, successors and assigns, to warrant and forever defend all and singular the said premises unto the said Lake Wylie Enterprises, Inc., its heirs and assigns, against himself and his heirs, successors and assigns and against every person whomsoever lawfully claiming, or to claim, the same or any part thereof.

WITNESS the Hand and Seal of the Grantor this 28 day of April, in the year of our Lord two thousand and in the two hundred and twenty fourth year of the Sovereignty and Independence of the United States of America.

SIGNED, SEALED AND DELIVERED  
IN THE PRESENCE OF:

Lugh K. McConce

Luc D. Lane

Kenneth D. Alexander  
Kenneth D. Alexander

STATE OF SOUTH CAROLINA )  
COUNTY OF YORK )

PROBATE

PERSONALLY APPEARED before me Leigh K. McConnell and  
made oath that S he saw the within-named Grantor, sign, seal, and  
as his act and deed, deliver the within-written Deed for the uses  
and purposes therein mentioned; and that S he with \_\_\_\_\_  
Sheela Love witnessed the execution thereof.

Leigh K. McConnell

SWORN TO before me this

28<sup>th</sup> day of April, 2000.

Sheela Love (SEAL)  
Notary Public for South Carolina  
My Commission Expires 3/21/2004



FILED - 12 00 74 '20

ROBERT B. & CAROL F. RHYNE  
R.B. 2951-147  
PLAT C&B. B. 11-22

CRESCENT RESOURCES, INC.  
D.B. 397-361  
T.M. 564-2

KELLY A. GOLDBERG  
R.B. 1803-341  
PLAT C&B. A. 134-B  
T.M. 563-22

TRUSTEES OF PINE GROVE  
BAPTIST CHURCH  
D.B. 864-261  
P.B. 65-50  
T.M. 561-24

LOIS I  
ALE  
D.B.  
P.B.  
T.M. 5

OLDE HOME PLACE Y-G2-14  
535.72

APRIL B. & DOUGLAS A.  
REALMUTO  
R.B. 2223-341  
PLAT C&B. A. 204-6  
T.M. 561-14,32

47.854 AC.

12.000 AC.

5.000 AC.

38.030 AC.

LAKE WYLIE  
ENTERPRISES  
R.B. 601-125  
P.B. 111-108  
T.M. 563-5

S.C. 557 75' R/W

HELEN M. VAN EVERY, TRUSTEE  
R.B. 100-124  
P.B. 100-124  
T.M. 560-1

CLAY BRANDON FOLD  
(No Record R/W) Y-G2-13  
R.B. 100-124  
P.B. 100-124  
T.M. 560-1

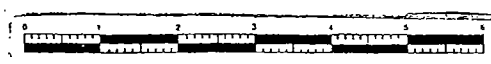
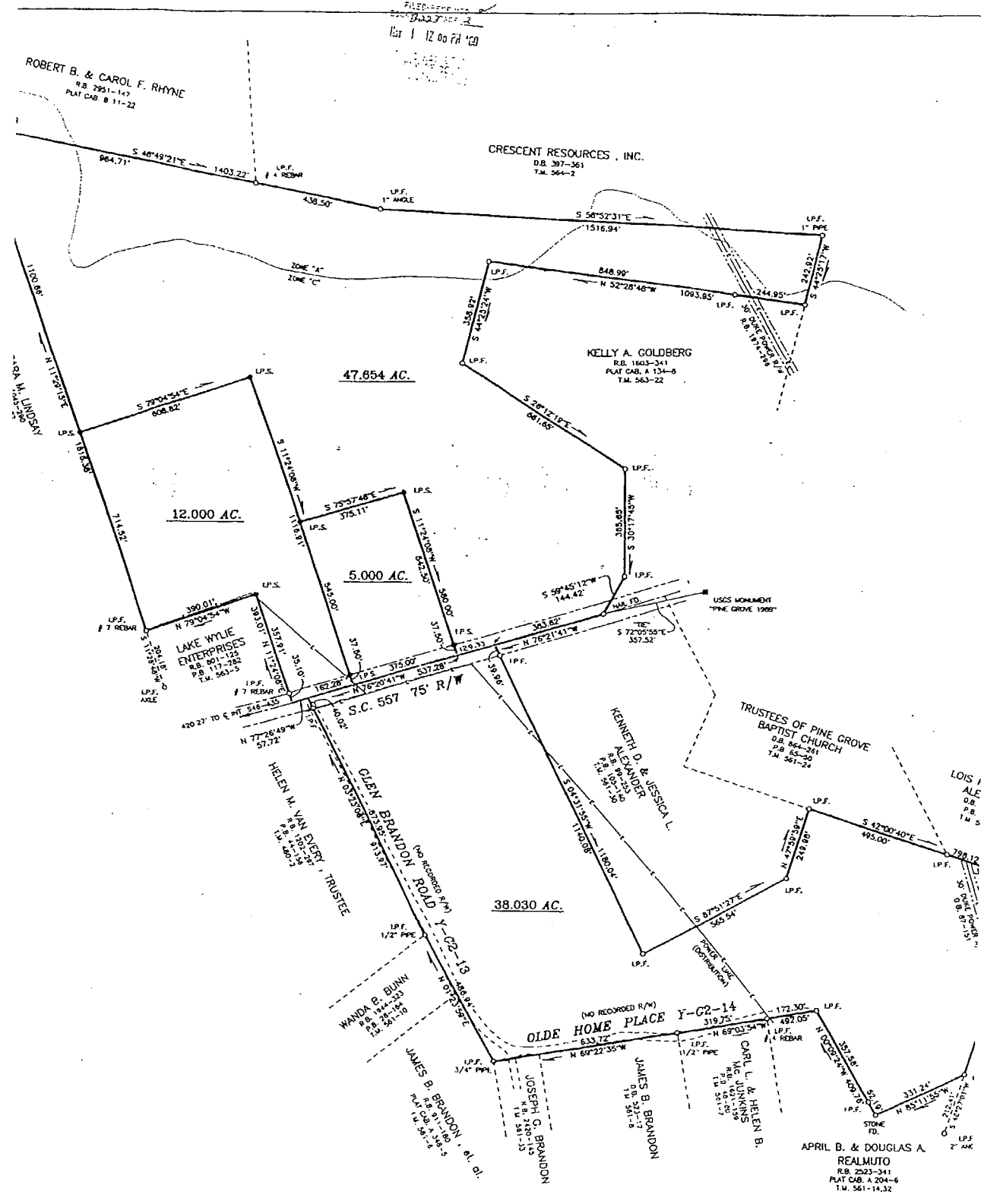
WANDA E. BUNN  
R.B. 144-223  
P.B. 28-16  
T.M. 561-10

JAMES B. BRANDON, et. al.  
R.B. 518-145  
P.B. 518-145  
T.M. 561-15

JOSEPH C. BRANDON  
R.B. 210-115  
P.B. 581-13  
T.M. 561-13

JAMES B. BRANDON  
R.B. 521-17  
P.B. 521-17  
T.M. 561-17

CARL L. & HELEN B.  
JACK J. JENKINS  
R.B. 101-159  
P.B. 101-159  
T.M. 561-17

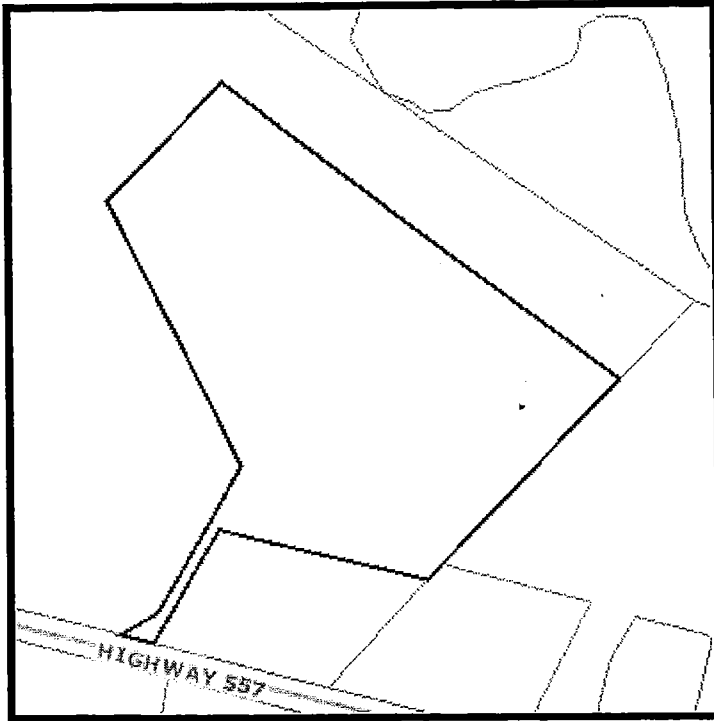




**Property Report for Parcel Number:**

5630000022

Inquiry Date:



**Owner**  
**Owner Name:** GOLDBERG KELLY A  
**Address:** 5472 HWY 557  
**City/State:** CLOVER S C  
**Zip Code:** 29710

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

**Parcel Number:** 5630000022  
**Total Lots:** 0  
**Total Acres:** 15  
**Deed Book:** 1603  
**Deed Book Page:** 341  
**Platt Book:** A134  
**Platt Book Page:** 8  
**School District:** 2  
**Municipality:**  
**Fire Code:** BE-I  
**Property Location:** HWY 557

**Land Value:** \$270000  
**AG Use:**  
**AG Use Value:**  
**Previous Owner:** ALEXANDER GRACE I  
**Tax Bill Information:**  
**Zoning:**  
**Sale Price:** \$0  
**Sale Date:** 8/6/96  
**Census Tract:**  
**Voter District:**

**Building/Structure**

**Prop. Classification:**  
**Heating Type:**  
**Living Area(Sq. Ft.):**  
**Basement:** NO  
**Bathrooms:**  
**Total Imp. Value:**

**Number of Stories:**  
**Year Built:**  
**Garage Area:** NO  
**Fireplace:**  
**Bldg. Value:** \$270500

**Assessment**

**Total Assessed Value:** \$11564

**Total Market Value\*:** \$540500

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 563-00-00-022 Legal 15.00 AC PLAT A134 / 008

DEED

Grantor GRACE D ALEXANDER  
Grantee KENNETH D ALEXANDER  
Book 1603 Page 341  
Dated 7/30/1996 Recorded 8/8/1996

1-1-2 Previous Ownership

Grantor HESTER J DAVIS  
Grantee GRACE D ALEXANDER  
Book 682 Page 65  
Dated 11/18/1982 Recorded 11/29/1982

Grantor ESTATE OF H K DAVIS  
Grantee HESTER J DAVIS  
PROBATE 301 / 9667  
Dated 7/22/1938 Recorded 8/24/1938

**Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.**



DEED PREPARED ONLY  
TITLE NOT EXAMINED

STATE OF SOUTH CAROLINA  
COUNTY OF YORK

FILED-RECEIVED  
BOOK \_\_\_\_\_ PAGE \_\_\_\_\_

AUG 6 2 37 PM '96

ROD B...  
CL...  
YORK...

Haselden, Owen & Boloyan  
P.O. Box 173  
Clover, SC 29710

RECORDED  
YORK COUNTY

TAX ASSESSOR'S OFFICE

DATE 8-8-96

TAX MAP NO. 503-004

INITIALS RH & YJ

TITLE TO REAL ESTATE

KNOW ALL MEN BY THESE PRESENTS, That I, Grace D. Alexander, for and in consideration of the sum of One Dollar Plus Love and Affection, Mother to Daughter, to me in hand paid at and before the sealing of these presents, by KELLY A. GOLDBERG, 12409 Woodside Falls Rd, Pineville, NC 28134 in the State aforesaid, (the receipt whereof is hereby acknowledged), has granted, bargained, sold and released unto Kelly A. Goldberg, her heirs, successors and assigns, the following described property:

All that certain piece, parcel or tract of land located on SC Highway 557, Bethel Township, York County, South Carolina, containing 15.000 acres and being more particularly described as follows: BEGINNING at a point in SC Highway 557 and running thence N 76-26-39 W 100.0 feet to a point; thence N 59-44-01 E 144.42 feet to an iron; thence N 30-19-01 E 365.61 feet to an iron; thence N 26-11-17 W 648.61 feet to an iron; thence N 44-26-28 E 358.74 feet to an iron; thence S 52-28-18 E 1093.90 feet to an iron; thence S 44-26-28 W 553.84 feet to a spindle; thence S 43-19-27 W 47.61 feet to an axle; thence N 76-26-32 W 470.36 feet to an axle; thence S 30-19-01 W 319.15 feet to an iron. The above described property is shown on the plat of survey for Kelly A. Goldberg, by Joe H. Baird, dated July 5, 1996, said plat being recorded in Plat Book A133, Page 10, Office of the Clerk of Court for York County, South Carolina and incorporated herein by reference.

This is a portion of the property conveyed to Grace D. Alexander by deed recorded November 24, 1982 in Record Book 602, Page 65, Office of the Clerk of Court for York County, South Carolina.

The above described property is conveyed subject to all easements, restrictions, and rights of way, if any, appearing of record in the chain of title of the subject property or visible upon an actual, physical inspection of the subject property.

341

RECORDED  
BOOK  
VOL 1603 PG 341  
YORK COUNTY, S.C.

1

STATE OF SOUTH CAROLINA  
COUNTY OF YORK

PROBATE

PERSONALLY APPEARED before me Elizabeth R. Glenn and  
made oath that she saw the within-named Grantor, sign, seal, and  
as her act and deed, deliver the within-written Deed for the uses  
and purposes therein mentioned; and that she with Sue B. Love  
\_\_\_\_\_ witnessed the execution thereof.

Elizabeth R. Glenn

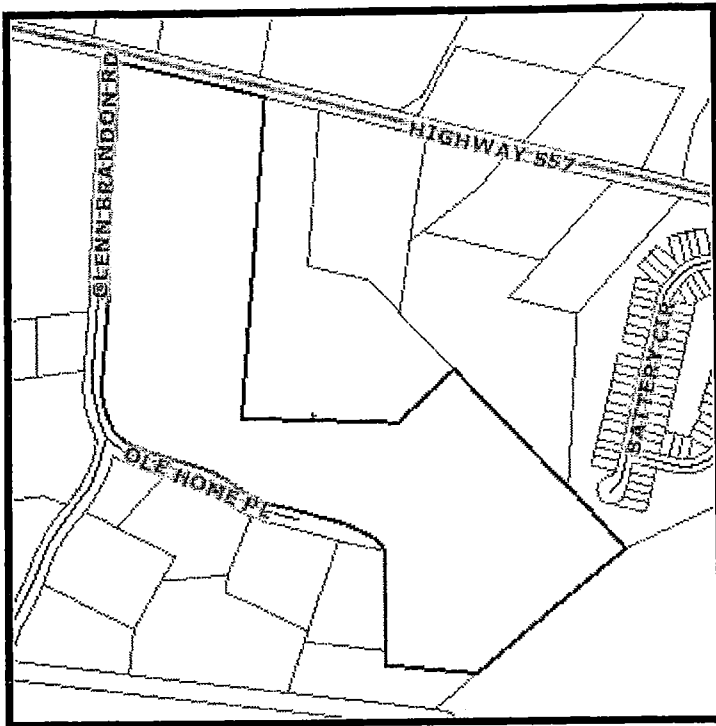
SWORN TO before me this

30th day of July, 1996.

Sue B. Love (SEAL)  
Notary Public for South Carolina  
My Commission Expires 3/25/2001

**Property Report for Parcel Number:**  
5630000023

Inquiry Date:



**Owner**

**Owner Name:** ALEXANDER GRACE D & KENNETH D ALEXANDER  
**Address:** 5520 HWY 557  
**City/State:** LAKE WYLIE S.C.  
**Zip Code:** 29710

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

**Parcel Number:** 5630000023  
**Total Lots:** 0  
**Total Acres:** 38.03  
**Deed Book:** 9923  
**Deed Book Page:** 72  
**Platt Book:** D370  
**Platt Book Page:** 8  
**School District:** 2  
**Municipality:**  
**Fire Code:** BE-I  
**Property Location:** HWY 557 (38.03 AC)

**Land Value:** \$570500  
**AG Use:**  
**AG Use Value:**  
**Previous Owner:** ALEXANDER GRACE I  
KENNETH D  
**Tax Bill Information:**  
**Zoning:**  
**Sale Price:** \$1  
**Sale Date:** 3/28/08  
**Census Tract:**  
**Voter District:**

**Building/Structure**

**Prop. Classification:**  
**Heating Type:**  
**Living Area(Sq. Ft.):**  
**Basement:** NO  
**Bathrooms:**  
**Total Imp. Value:**

**Number of Stories:**  
**Year Built:**  
**Garage Area:** NO  
**Fireplace:**  
**Bldg. Value:** \$0

**Assessment**

F&ME Project No G 4843  
HIWAY 557

F&ME Consultants  
Chain-of-Ownership

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 563-00-00-023 Legal 38.03 AC PLAT D370 / 008

DEED

Grantor GRACE D ALEXANDER  
Grantee KENNETH D ALEXANDER  
Book 9923 Page 72  
Dated 3/20/2008 Recorded 3/28/2008

1-1-2 Previous Ownership

Grantor HESTER J DAVIS  
Grantee GRACE D ALEXANDER  
Book 682 Page 65  
Dated 11/18/1982 Recorded 11/29/1982

Grantor ESTATE OF H K DAVIS  
Grantee HESTER J DAVIS  
PROBATE 301 / 9667  
Dated 7/22/1938 Recorded 8/24/1938

**Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.**

RECORDED

YORK COUNTY

TAX ASSESSOR'S OFFICE

DATE 3/31/08

TAX MAP NO. 563-23

INITIALS TS Ky

200800011964  
Filed for Record in  
YORK COUNTY, SC  
DAVID HAMILTON  
03-28-2008 At 01:23 PM.  
DEED INT 10.00  
State Tax .00  
County Tax .00  
OR Vol 9923 Page 72 - 74

DEED PREPARED ONLY  
TITLE NOT EXAMINED  
NO NEW LOT LINES

STATE OF SOUTH CAROLINA  
COUNTY OF YORK

Haselden, Owen & Boloyan  
P.O. Box 173  
Clover, SC 29710

TITLE TO REAL ESTATE

KNOW ALL MEN BY THESE PRESENTS, That I, Grace D. Alexander, for and in consideration of the sum of One Dollar Plus Love and Affection, to (Mother to Son), to me in hand paid at and before the sealing of these presents, by KENNETH D. ALEXANDER, 5485 Highway 557, Clover, SC 29710, in the State aforesaid, (the receipt whereof is hereby acknowledged), has granted, bargained, sold and released unto Kenneth D. Alexander, his heirs, successors and assigns an undivided 2.89% interest, in and to the following described property, to wit:

All that certain piece, parcel or tract of land located on south side of SC Highway 557 in Bethel Township, York County, South Carolina, containing 38.030 acres as shown and described on plat of property of Grace D. Alexander by Joe H. Baird, P.E. & L.S., dated March 15, 2000, and recorded in Plat Book B223, Page 2, Office of the Clerk of Court for York County, South Carolina. This property is bounded by property of Kenneth D. Alexander, Pine Grove Baptist Church, Lois Alexander, Crescent Resources, and Olde Home Place Road.

This is a portion of property described in Deed book 682, Page 5, office of the Clerk of Court for York County, South Carolina.

The above described property is conveyed subject to all easements, restrictions, and rights of way, if any, appearing of record in the chain of title of the subject property or visible upon an actual, physical inspection of the subject property.

①

TOGETHER with all and singular, the rights, members, hereditaments and appurtenances to the said premises belonging or in anywise incident or appertaining.

TO HAVE AND TO HOLD all and singular the premises before mentioned unto the said Kenneth D. Alexander, his heirs, successors and assigns, forever.

AND Grantor does hereby bind herself and her successors and assigns, to warrant and forever defend all and singular the said premises unto the said Kenneth D. Alexander, his heirs and assigns, against herself and her successors and assigns and against every person whomsoever lawfully claiming, or to claim, the same or any part thereof.

WITNESS the Hand and Seal of the Grantor this 20<sup>th</sup> day of March, in the year of our Lord two thousand eight and in the two hundred and thirty second year of the Sovereignty and Independence of the United States of America.

SIGNED, SEALED AND DELIVERED  
IN THE PRESENCE OF:

J. G. Hill  
Ann C. Hogue

Grace D. Alexander  
Grace D. Alexander



**Property Report for Parcel Number:**  
5630000024

Inquiry Date:



**Owner**

**Owner Name:** ALEXANDER GRACE D & A GOLDBERG  
**Address:** 5520 HWY 557  
**City/State:** LAKE WYLIE SC  
**Zip Code:** 29710

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

**Parcel Number:** 5630000024  
**Total Lots:** 0  
**Total Acres:** 47.65  
**Deed Book:** ~~9932~~ 9923  
**Deed Book Page:** 75  
**Platt Book:** D370  
**Platt Book Page:** 8  
**School District:** 2  
**Municipality:**  
**Fire Code:** BE-I  
**Property Location:** SC HWY 557 (47.654 AC)

**Land Value:** \$714800  
**AG Use:**  
**AG Use Value:**  
**Previous Owner:** ALEXANDER GRACE I KELLY A  
**Tax Bill Information:**  
**Zoning:**  
**Sale Price:** \$1  
**Sale Date:** 3/28/08  
**Census Tract:**  
**Voter District:**

**Building/Structure**

**Prop. Classification:**  
**Heating Type:**  
**Living Area(Sq. Ft.):**  
**Basement:** NO  
**Bathrooms:**  
**Total Imp. Value:**

**Number of Stories:**  
**Year Built:**  
**Garage Area:** NO  
**Fireplace:**  
**Bldg. Value:** \$0

**Assessment**



F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 563-00-00-024 Legal 47.654 AC - PLAT D370 / 8

DEED

Grantor GRACE D ALEXANDER  
Grantee KELLY A GOLDBERG  
Book 9923 Page 75  
Dated 3/20/2008 Recorded 3/28/2008

1-1-2 Previous Ownership

Grantor HESTER J DAVIS  
Grantee GRACE D ALEXANDER  
Book 682 Page 65  
Dated 11/18/1982 Recorded 11/29/1982

Grantor ESTATE OF H K DAVIS  
Grantee HESTER J DAVIS  
PROBATE 301 / 9667  
Dated 7/22/1938 Recorded 8/24/1938

**Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.**

RECORDED

YORK COUNTY

TAX ASSESSOR'S OFFICE

200800011965  
Filed for Record in  
YORK COUNTY, SC  
DAVID HAMILTON  
03-28-2008 At 01:23 pm.  
DEED INT 10.00  
State Tax .00  
County Tax .00  
DR Vol 9923 Page 75 - 77

DEED PREPARED ONLY  
TITLE NOT EXAMINED  
NO NEW LOT LINES

DATE 3/31/08

TAX MAP NO. 563-24

INITIALS IS Kj

STATE OF SOUTH CAROLINA  
COUNTY OF YORK

Haselden, Owen & Boloyan  
P.O. Box 173  
Clover, SC 29710

TITLE TO REAL ESTATE

KNOW ALL MEN BY THESE PRESENTS, That I, Grace D. Alexander, for and in consideration of the sum of One Dollar Plus Love and Affection, to (Mother to Daughter), to me in hand paid at and before the sealing of these presents, by KELLY A. GOLDBERG, 5472 Highway 557, Lake Wylie, SC 29710, in the State aforesaid, (the receipt whereof is hereby acknowledged), has granted, bargained, sold and released unto Kelly A. Goldberg, her heirs, successors and assigns an undivided 3.41% interest, in and to the following described property, to wit:

All that certain piece, parcel or tract of land located on north side of SC Highway 557 in Bethel Township, York County, South Carolina, containing 47.654 acres as shown and described on plat of property of Grace D. Alexander by Joe H. Baird, P.E. & L.S., dated March 15, 2000, and recorded in Plat Book B223, Page 2, Office of the Clerk of Court for York County, South Carolina. This property is bounded by property of Kelly A. Goldberg, Crescent Resources, Sara M. Lindsey, Lake Wylie Enterprises and Grace Alexander.

This is a portion of property described in Deed book 682, Page 5, office of the Clerk of Court for York County, South Carolina.

The above described property is conveyed subject to all easements, restrictions, and rights of way, if any, appearing of record in the chain of title of the subject property or visible upon an actual, physical inspection of the subject property.



TOGETHER with all and singular, the rights, members, hereditaments and appurtenances to the said premises belonging or in anywise incident or appertaining.

TO HAVE AND TO HOLD all and singular the premises before mentioned unto the said Kelly A. Goldberg, her heirs, successors and assigns, forever.

AND Grantor does hereby bind herself and her successors and assigns, to warrant and forever defend all and singular the said premises unto the said Kelly A. Goldberg, her heirs and assigns, against herself and her successors and assigns and against every person whomsoever lawfully claiming, or to claim, the same or any part thereof.

WITNESS the Hand and Seal of the Grantor this 20<sup>th</sup> day of March, in the year of our Lord two thousand eight and in the two hundred and thirty second year of the Sovereignty and Independence of the United States of America.

SIGNED, SEALED AND DELIVERED  
IN THE PRESENCE OF:

[Signature]  
Ann C. Hogue

[Signature]  
Grace D. Alexander

STATE OF SOUTH CAROLINA )  
COUNTY OF YORK )

PROBATE

PERSONALLY APPEARED before me James H. Owen, Jr. and made oath that he saw the within-named Grantor, sign, seal, and as her act and deed, deliver the within-written Deed for the uses and purposes therein mentioned; and that he with Ann C. Hogue witnessed the execution thereof.

[Signature]

SWORN TO before me this 20<sup>th</sup> day of March, 2008.

Ann C. Hogue (SEAL)  
Notary Public for South Carolina  
My Commission Expires 1-11-2017

**Property Report for Parcel Number:**  
5640000071

Inquiry Date:



**Owner**

**Owner Name:** CRESCENT RESOURCE;  
**Address:** 400 S TRYON ST STE 13  
**City/State:** CHARLOTTE NC  
**Zip Code:** 282850107

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

<b>Parcel Number:</b>	5640000071	<b>Land Value:</b>	\$1313100
<b>Total Lots:</b>	0	<b>AG Use:</b>	
<b>Total Acres:</b>	14.59	<b>AG Use Value:</b>	
<b>Deed Book:</b>	8777	<b>Previous Owner:</b>	SC DEPT OF TRANSP
<b>Deed Book Page:</b>	238	<b>Tax Bill Information:</b>	
<b>Platt Book:</b>	D285	<b>Zoning:</b>	
<b>Platt Book Page:</b>	7	<b>Sale Price:</b>	\$595000
<b>School District:</b>	2	<b>Sale Date:</b>	1/26/07
<b>Municipality:</b>		<b>Census Tract:</b>	
<b>Fire Code:</b>	BE-I	<b>Voter District:</b>	
<b>Property Location:</b>	14.592 AC/OUT PARCEL K/HWY 557		

**Building/Structure**

<b>Prop. Classification:</b>		<b>Number of Stories:</b>	
<b>Heating Type:</b>		<b>Year Built:</b>	
<b>Living Area(Sq. Ft.):</b>		<b>Garage Area:</b>	NO
<b>Basement:</b>	NO	<b>Fireplace:</b>	
<b>Bathrooms:</b>		<b>Bldg. Value:</b>	\$0
<b>Total Imp. Value:</b>			

**Assessment**

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 564-00-00-071 Legal 14.592 AC OUT PARCEL K HWY 557

DEED

Grantor SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION

Grantee CRESCENT RESOURCES LLC

Book 8777 Page 238

Dated 1/12/2007 Recorded 1/26/2007

1-1-2 Previous Ownership

Grantor DUKE POWER COMPANY

Grantee SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION

Book 397 Page 361

Dated 5/1/1969 Recorded 12/22/1969

**Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.**

000335533  
RECORDED 01/26/2007 02:16:19PM  
Bk:08777 Pg:00238 Pages:5  
Fee:10.00 State:1547.00  
County:654.50 Exempt:  
David Hamilton, Clerk of Court  
York County, SC

1547.00  
654.50

**RECORDED**

YORK COUNTY

STATE OF SOUTH CAROLINA ASSESSOR'S OFFICE

COUNTY OF YORK

DATE 1-29-07 QUITCLAIM DEED  
TAX MAP NO. 564-45  
INITIALS TS / d/n

WHEREAS, pursuant to Section 57-5-340, Code of Laws of South Carolina, 1976, as amended, the South Carolina Department of Transportation has authority to dispose of the premises hereinbelow described, which premises are no longer required for purposes of the South Carolina Department of Transportation; Now Therefore,

KNOW ALL MEN BY THESE PRESENTS, that the South Carolina Department of Transportation ("Grantor"), for and in consideration of the sum of Five Hundred Ninety-five Thousand and No/100 Dollars (\$595,000.00) to it in hand paid, receipt of which is hereby acknowledged, does hereby remise, release and quitclaim unto Crescent Resources, LLC ("Grantee"), 400 South Tryon Street, Suite 1300, Charlotte, North Carolina 28202, all its right, title, interest in or to the following described property:

All that certain piece, parcel, or tract of land containing approximately 3.51 acres of land, situate, lying, and being on the West side of SC Route 274 Relocated near Lake Wylie in York County, State of South Carolina, and being shown on the South Carolina Department of Transportation Plans for SC Route 49, File No. 46.774, Sheets 35 and 36. Said property being more particularly described as follows:

Beginning at a point on the Northern-most corner of the subject parcel on the present 37.5-foot right of way line of the abandoned portion of SC Route 274 and on the new 55-foot right of way line of SC Route 274 Relocated, approximately 55 feet left of approximate survey station 18+50 of SC Route 274 Relocated; thence in a Southerly direction for a distance of approximately 1284 feet along the new 55-foot right of way line of SC Route 274 Relocated to a point on the new 55-foot right of way and on the base line of the new 25 x 25 foot triangle and control of access line of SC Route 274 Relocated, approximately 55 feet left of approximate survey station 5+55 of SC Route 274 Relocated; thence continuing in a Southerly direction for a distance of approximately 158 feet along the new 55-foot right of way and control of access line of SC Route 274 Relocated to a point on the Southern property line of the subject parcel; thence in a Westerly direction for a distance of approximately 93 feet along Southern property line of the subject parcel to a point on the present 37.5-foot right of way line of the abandoned portion of SC Route 274; thence in a Northerly direction for a distance of approximately 170 feet along the present 37.5-foot right of way line of the abandoned portion of SC Route 274 to a point on the new 33-foot right of way line of the Frontage Road; thence in a Westerly direction for a distance of approximately 72 feet along the new 33-foot right of way line of the Frontage Road to a point on the base line of the new 25 x 25 foot triangle and the new transitional right of way line of the Frontage Road; thence

in a Southwesterly direction for a distance of approximately 35 feet along the base line of the new 25 x 25 foot triangle and the new transitional right of way line of the Frontage Road to a point on the new 33-foot right of way line of the Frontage Road; thence in a Southerly direction for a distance of approximately 165 feet along the new 33-foot right of way line of the Frontage Road to a point on the new transitional right of way line of the Frontage Road; thence in a Westerly direction for a distance of approximately 66 feet along the new transitional right of way line of the Frontage Road to a point on the new 33-foot right of way line of the Frontage Road; thence in a Northerly direction for a distance of approximately 270 feet along the new 33-foot right of way line of the Frontage Road to a point; thence in a Easterly direction for a distance of approximately 165 feet along the new 33-foot right of way line of the Frontage Road to a point on the present 37.5-foot right of way line of the abandoned portion of SC Route 274; thence in a Northerly direction for a distance of approximately 1155 feet along the present 37.5-foot right of way line of the abandoned portion of SC Route 274 to the point of beginning. Being bounded on the North and East by SC Route 274 Relocated, and on the South and West by lands of the Grantee herein.

This being a portion of the property acquired by the South Carolina Department of Transportation from Duke Power Company by Deed to Right of Way dated January 6, 1938, and being filed in the South Carolina Department of Transportation Deed Vault in Columbia, South Carolina under SC Route 274, Project 911; and from Crescent Resources, Inc. by Title to Real Estate dated October 20, 1993 (Tract 11) and recorded on January 10, 1994 in Deed Book 906 at Page 224, and from Crescent Resources, Inc. by Title to Real Estate dated October 20, 1993 (Tract 74) and recorded on January 21, 1994 in Deed Book 916 at Page 85, both in the Clerk of Court's Office for York County, and filed in the South Carolina Department of Transportation Deed Vault in Columbia, South Carolina under SC Route 49, File No. 46.774.

Also conveyed herein is the right to access the Grantee's adjoining property, said access to be a right in/right out break in the control of access along SC Route 274 Relocated, on the left, between approximate survey stations 2+80 and 3+30.

This being a portion of the property acquired by the South Carolina Department of Transportation from Duke Power Company by Deed to Right of Way dated January 6, 1938, and being filed in the South Carolina Department of Transportation Deed Vault in Columbia, South Carolina under SC Route 274, Project 911.

This conveyance is being made subject to any and all existing public utility rights of user, reservations, easements, rights of way, control of access, zoning ordinances and restrictions or protective covenants that may appear on record or on the premises, other than those hereby released.

**TOGETHER** with all and singular, the rights, members, hereditaments and appurtenances to the said premises belonging, or in anywise incident or appertaining.



Signed, sealed and delivered  
in the presence of

SOUTH CAROLINA DEPARTMENT OF  
TRANSPORTATION



Wendy B. Whitener

By: Tony L. Chapman (L.S.)  
Acting Executive Director

Jeri Whitener

By: Morgan F. Denny (L.S.)  
Acting Deputy Director of Finance and Administration

THE STATE OF SOUTH CAROLINA

)

COUNTY OF RICHLAND

)

PROBATE

Personally appeared before me the undersigned witness, who being duly sworn, says he/she saw the within named South Carolina Department of Transportation, by its duly authorized officers Tony L. Chapman, Acting Executive Director and Morgan F. Denny, Acting Deputy Director of Finance and Administration, sign, seal with its corporate seal, and as its act and deed deliver the within written instrument, and that he/she with the other witness whose name appears witness the execution thereof.

SWORN to before me this 12<sup>th</sup>

Wendy B. Whitener  
(above witness)

day of January, 2007

Jeri Whitener

NOTARY PUBLIC FOR THE STATE OF: SOUTH CAROLINA

My Commission Expires: October 5, 2008

STATE OF SOUTH CAROLINA )  
 )  
COUNTY OF YORK )

South Carolina Department )  
of Transportation, )  
Grantor )  
to )  
Crescent Resources, LLC )  
Grantee. )

AFFIDAVIT OF TRUE CONSIDERATION

Personally appeared before me the undersigned Affiant, who being duly sworn, says that (s), he is an employee of the Grantor and is familiar with the deed above referenced dated January 12, 2007 and the true consideration for the transfer is Five Hundred Ninety Five Thousand and no/100 Dollars (\$595,000.00).

To the best of Affiant's knowledge, this transfer is not exempt from the deed recording fee required by Section 12-24-10 of the S. C. Code of Laws, 1976, as amended. Pursuant to Section 12-24-20 of the Code of Laws, 1976, as amended, because this deed is a deed from the State, the deed-recording fee is the liability of the Grantee.

SWORN TO BEFORE ME  
this 12<sup>th</sup> day of January, 2007

Mary E. G. G. Allen  
Notary Public for South Carolina  
My commission expires: 2-12-11

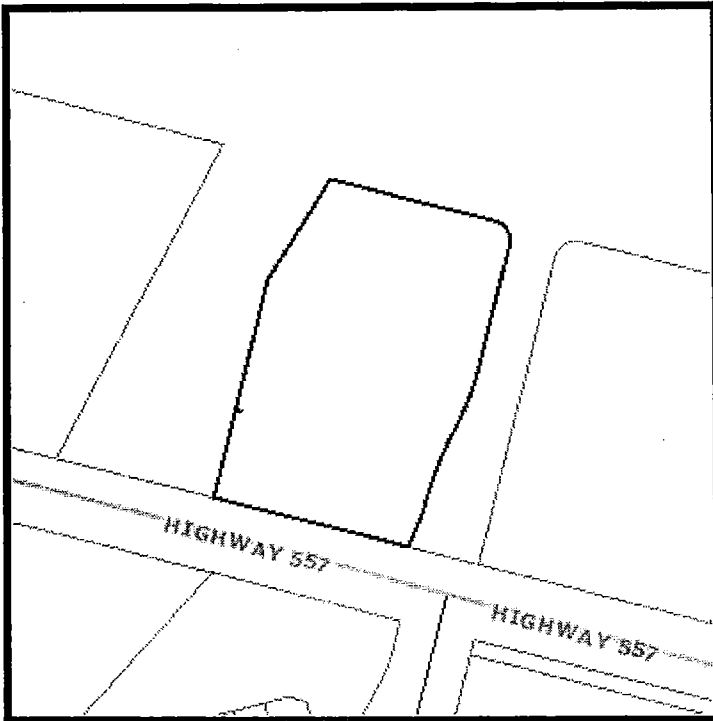
Judy McCormick  
(Signature)

Judy McCormick  
(Judy McCormick)

**Property Report for Parcel Number:**

5640000072

Inquiry Date:



**Owner**

**Owner Name:** CRESCENT RESOURCE;  
**Address:** 400 S TRYON ST STE 13  
**City/State:** CHARLOTTE NC  
**Zip Code:** 282850107

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

<b>Parcel Number:</b>	5640000072	<b>Land Value:</b>	\$825000
<b>Total Lots:</b>	1	<b>AG Use:</b>	
<b>Total Acres:</b>	0	<b>AG Use Value:</b>	
<b>Deed Book:</b>	8777	<b>Previous Owner:</b>	SC DEPT OF TRANSP
<b>Deed Book Page:</b>	238	<b>Tax Bill Information:</b>	
<b>Platt Book:</b>	D285	<b>Zoning:</b>	
<b>Platt Book Page:</b>	7	<b>Sale Price:</b>	\$595000
<b>School District:</b>	2	<b>Sale Date:</b>	1/26/07
<b>Municipality:</b>		<b>Census Tract:</b>	
<b>Fire Code:</b>	BE-I	<b>Voter District:</b>	
<b>Property Location:</b>	1.369 AC/OUT PARCEL D/HWY 557		

**Building/Structure**

<b>Prop. Classification:</b>		<b>Number of Stories:</b>	
<b>Heating Type:</b>		<b>Year Built:</b>	
<b>Living Area(Sq. Ft.):</b>		<b>Garage Area:</b>	NO
<b>Basement:</b>	NO	<b>Fireplace:</b>	
<b>Bathrooms:</b>		<b>Bldg. Value:</b>	\$0
<b>Total Imp. Value:</b>			

**Assessment**

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 564-00-00-072 Legal 1.369 AC OUT PARCEL D HWY 557

DEED

Grantor SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION

Grantee CRESCENT RESOURCES LLC

Book 8777 Page 238

Dated 1/12/2007 Recorded 1/26/2007

1-1-2 Previous Ownership

Grantor DUKE POWER COMPANY

Grantee SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION

Book 397 Page 361

Dated 5/1/1969 Recorded 12/22/1969

**Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.**

000335323  
RECORDED 01/26/2007 02:16:19PM  
BK:08777 Ps:00238 Fees:5  
Fee:10.00 State:1547.00  
County: York  
COURT: York County, SC  
DAVID HAMILTON, Clerk of Court  
COURT: York County, SC

**RECORDED**  
YORK COUNTY  
STATE OF SOUTH CAROLINA  
ASSESSOR'S OFFICE

QUITCLAIM DEED DATE 1-29-07  
COUNTY OF YORK TAX MAP NO. 564-45  
INITIALS TS / JLN

WHEREAS, pursuant to Section 57-5-340, Code of Laws of South Carolina, 1976, as amended, the South Carolina Department of Transportation has authority to dispose of the premises

hereinbelow described, which premises are no longer required for purposes of the South Carolina Department of Transportation; Now Therefore,

**KNOW ALL MEN BY THESE PRESENTS**, that the South Carolina Department of

Transportation ("Grantor"), for and in consideration of the sum of Five Hundred Ninety-five Thousand and No/100 Dollars (\$595,000.00) to it in hand paid, receipt of which is hereby

acknowledged, does hereby remise, release and quitclaim unto Crescent Resources, LLC

("Grantee"), 400 South Tryon Street, Suite 1300, Charlotte, North Carolina 28202, all its right, title,

interest in or to the following described property:  
All that certain piece, parcel, or tract of land containing approximately 3.51 acres of land, situate, lying, and being on the West side of SC Route 274 Relocated near Lake Wylie in York County, State of South Carolina, and being shown on the South Carolina Department of Transportation Plans for SC Route 49, File No. 46.774, Sheets 35 and 36. Said property being more particularly described as follows:

Beginning at a point on the Northern-most corner of the subject parcel on the present 37.5-foot right of way line of SC Route 274 Relocated, approximately 55 feet left of approximate survey station 18+50 of SC Route 274 Relocated; thence in a Southerly direction for a distance of approximately 1284 feet along the new 55-foot right of way line of SC Route 274 Relocated to a point on the new 55-foot right of way line of the new 25 x 25 foot triangle and control of access of SC Route 274 Relocated, approximately 55 feet left of approximate survey station 5+55 of SC Route 274 Relocated; thence continuing in a Southerly direction for a distance of approximately 158 feet along the new 55-foot right of way and control of access line of SC Route 274 Relocated to a point on the Southern property line of the subject parcel; thence in a Westerly direction for a distance of approximately 93 feet along Southern property line of the subject parcel to a point on the present 37.5-foot right of way line of the abandoned portion of SC Route 274; thence in a Northerly direction for a distance of approximately 170 feet along the present 37.5-foot right of way line of the abandoned portion of SC Route 274 to a point on the new 33-foot right of way line of the Frontage Road; thence in a Westerly direction for a distance of approximately 72 feet along the new 33-foot right of way line of the Frontage Road to a point on the base line of the new 25 x 25 foot triangle and the new transitional right of way line of the Frontage Road; thence

BK 08777 PG 0238

in a Southwesterly direction for a distance of approximately 35 feet along the base line of the new 25 x 25 foot triangle and the new transitional right of way line of the Frontage Road to a point on the new 33-foot right of way line of the Frontage Road; hence in a Southerly direction for a distance of approximately 165 feet along the new 33-foot right of way line of the Frontage Road to a point on the new transitional right of way line for a distance of approximately 66 feet along the new transitional right of way line of the Frontage Road; hence in a Northerly direction for a distance of approximately 270 feet along the new 33-foot right of way line of the Frontage Road to a point; hence in a Easterly direction for a distance of approximately 165 feet along the new 33-foot right of way line of the Frontage Road to a point on the present 37.5-foot right of way line of the abandoned portion of SC Route 274; hence in a Northerly direction for a distance of approximately 1155 feet along the present 37.5-foot right of way line of the abandoned portion of SC Route 274 to the point of beginning. Being bounded on the North and East by SC Route 274 Relocated, and on the South and West by lands of the Grantee herein.

This being a portion of the property acquired by the South Carolina Department of Transportation from Duke Power Company by Deed to Right of Way dated January 6, 1938, and being filed in the South Carolina Department of Transportation Deed Vault in Columbia, South Carolina under SC Route 274, Project 911; and from Crescent Resources, Inc. by Title to Real Estate dated October 20, 1993 (Tract 11) and recorded on January 10, 1994 in Deed Book 906 at Page 224, and from Crescent Resources, Inc. by Title to Real Estate dated October 20, 1993 (Tract 74) and recorded on January 21, 1994 in Deed Book 916 at Page 85, both in the Clerk of Court's Office for York County, and filed in the South Carolina Department of Transportation Deed Vault in Columbia, South Carolina under SC Route 49, File No. 46.774.

Also conveyed herein is the right to access the Grantee's adjoining property, said access to be a right in/right out break in the control of access along SC Route 274 Relocated, on the left, between approximate survey stations 2+80 and 3+30.

This being a portion of the property acquired by the South Carolina Department of Transportation from Duke Power Company by Deed to Right of Way dated January 6, 1938, and being filed in the South Carolina Department of Transportation Deed Vault in Columbia, South Carolina under SC Route 274, Project 911.

This conveyance is being made subject to any and all existing public utility rights of user, reservations, easements, rights of way, control of access, zoning ordinances and restrictions or protective covenants that may appear on record or on the premises, other than those hereby released. **TOGETHER** with all and singular, the rights, members, hereditaments and appurtenances to the said premises belonging, or in anywise incident or appertaining.

BK 08777 PG 0239

SOUTH CAROLINA DEPARTMENT OF  
TRANSPORTATION

By: *[Signature]* (L.S.)  
Acting Executive Director

By: *[Signature]* (L.S.)  
Acting Deputy Director of Finance and Administration

*[Circular Stamp]*

Signed, sealed and delivered  
in the presence of

*[Signature]*

*[Signature]*

THE STATE OF SOUTH CAROLINA  
COUNTY OF RICHLAND

)  
)  
)  
PROBATE

Personally appeared before me the undersigned witness, who being duly sworn, says he/she saw the within named South Carolina Department of Transportation, by its duly authorized officers Tony L. Chapman, Acting Executive Director and Morgan F. Denny, Acting Deputy Director of Finance and Administration, sign, seal with its corporate seal, and as its act and deed deliver the within written instrument, and that he/she with the other witness whose name appears witness the execution thereof.

SWORN to before me this 12<sup>th</sup> day of January, 2007

*[Signature]*  
(above witness)

NOTARY PUBLIC FOR THE STATE OF: SOUTH CAROLINA

My Commission Expires: October 5, 2008

SWORN TO BEFORE ME  
this 12<sup>th</sup> day of January, 2007  
Troy E. Johnson  
Notary Public for South Carolina  
My commission expires: 2-12-11

(Signature)  
Judy McCormick  
(Judy McCormick)

To the best of Affiant's knowledge, this transfer is not exempt from the deed recording fee required by Section 12-24-10 of the S. C. Code of Laws, 1976, as amended. Pursuant to Section 12-24-20 of the Code of Laws, 1976, as amended, because this deed is a deed from the State, the deed-recording fee is the liability of the Grantee.

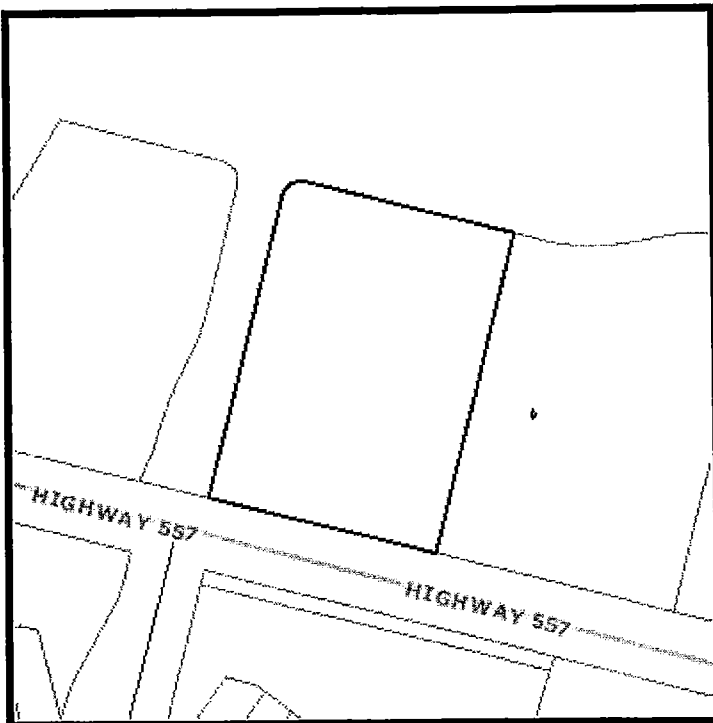
Personally appeared before me the undersigned Affiant, who being duly sworn, says that (s), he is an employee of the Grantor and is familiar with the deed above referenced dated January 12, 2007 and the true consideration for the transfer is Five Hundred Ninety Five Thousand and no/100 Dollars (\$595,000.00).

STATE OF SOUTH CAROLINA )  
COUNTY OF YORK )  
South Carolina Department )  
of Transportation, )  
Grantor )  
to )  
Crescent Resources, LLC )  
Grantee. )  
AFFIDAVIT OF TRUE CONSIDERATION )



**Property Report for Parcel Number:**  
5640000073

Inquiry Date:



**Owner**

**Owner Name:** CRESCENT RESOURCE;  
**Address:** 400 S TRYON ST STE 13  
**City/State:** CHARLOTTE NC  
**Zip Code:** 282850107

Disclaimer: While every effort is made to keep information provided over f accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

<b>Parcel Number:</b>	5640000073	<b>Land Value:</b>	\$825000
<b>Total Lots:</b>	1	<b>AG Use:</b>	
<b>Total Acres:</b>	0	<b>AG Use Value:</b>	
<b>Deed Book:</b>	8777	<b>Previous Owner:</b>	SC DEPT OF TRANSPOR
<b>Deed Book Page:</b>	238	<b>Tax Bill Information:</b>	
<b>Platt Book:</b>	D285	<b>Zoning:</b>	
<b>Platt Book Page:</b>	7	<b>Sale Price:</b>	\$595000
<b>School District:</b>	2	<b>Sale Date:</b>	1/26/07
<b>Municipality:</b>		<b>Census Tract:</b>	
<b>Fire Code:</b>	BE-I	<b>Voter District:</b>	
<b>Property Location:</b>	1.515 AC/OUT PARCEL C/HWY 557		

**Building/Structure**

<b>Prop. Classification:</b>		<b>Number of Stories:</b>	
<b>Heating Type:</b>		<b>Year Built:</b>	
<b>Living Area(Sq. Ft.):</b>		<b>Garage Area:</b>	NO
<b>Basement:</b>	NO	<b>Fireplace:</b>	
<b>Bathrooms:</b>		<b>Bldg. Value:</b>	\$0
<b>Total Imp. Value:</b>			

**Assessment**

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 564-00-00-073 Legal 1.515 AC OUT PARCEL C HWY 557

DEED

Grantor SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION

Grantee CRESCENT RESOURCES LLC

Book 8777 Page 238

Dated 1/12/2007 Recorded 1/26/2007

1-1-2 Previous Ownership

Grantor DUKE POWER COMPANY

Grantee SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION

Book 397 Page 361

Dated 5/1/1969 Recorded 12/22/1969

**Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.**

000335533  
RECORDED 01/26/2007 02:16:19PM  
Bk:08777 Pg:00238 Pages:5  
Fee:10.00 State:1547.00  
County:654.50 Exempt:  
David Hamilton, Clerk of Court  
York County, SC

1547.00  
654.50

**RECORDED**

YORK COUNTY

STATE OF SOUTH CAROLINA TAX ASSESSOR'S OFFICE

COUNTY OF YORK

DATE 1-29-07 QUITCLAIM DEED

TAX MAP NO. 564-45

INITIALS TS / dN

WHEREAS, pursuant to Section 57-5-340, Code of Laws of South Carolina, 1976, as amended, the South Carolina Department of Transportation has authority to dispose of the premises hereinbelow described, which premises are no longer required for purposes of the South Carolina Department of Transportation; Now Therefore,

KNOW ALL MEN BY THESE PRESENTS, that the South Carolina Department of Transportation ("Grantor"), for and in consideration of the sum of Five Hundred Ninety-five Thousand and No/100 Dollars (\$595,000.00) to it in hand paid, receipt of which is hereby acknowledged, does hereby remise, release and quitclaim unto Crescent Resources, LLC ("Grantee"), 400 South Tryon Street, Suite 1300, Charlotte, North Carolina 28202, all its right, title, interest in or to the following described property:

All that certain piece, parcel, or tract of land containing approximately 3.51 acres of land, situate, lying, and being on the West side of SC Route 274 Relocated near Lake Wylie in York County, State of South Carolina, and being shown on the South Carolina Department of Transportation Plans for SC Route 49, File No. 46.774, Sheets 35 and 36. Said property being more particularly described as follows:

Beginning at a point on the Northern-most corner of the subject parcel on the present 37.5-foot right of way line of the abandoned portion of SC Route 274 and on the new 55-foot right of way line of SC Route 274 Relocated, approximately 55 feet left of approximate survey station 18+50 of SC Route 274 Relocated; thence in a Southerly direction for a distance of approximately 1284 feet along the new 55-foot right of way line of SC Route 274 Relocated to a point on the new 55-foot right of way and on the base line of the new 25 x 25 foot triangle and control of access line of SC Route 274 Relocated, approximately 55 feet left of approximate survey station 5+55 of SC Route 274 Relocated; thence continuing in a Southerly direction for a distance of approximately 158 feet along the new 55-foot right of way and control of access line of SC Route 274 Relocated to a point on the Southern property line of the subject parcel; thence in a Westerly direction for a distance of approximately 93 feet along Southern property line of the subject parcel to a point on the present 37.5-foot right of way line of the abandoned portion of SC Route 274; thence in a Northerly direction for a distance of approximately 170 feet along the present 37.5-foot right of way line of the abandoned portion of SC Route 274 to a point on the new 33-foot right of way line of the Frontage Road; thence in a Westerly direction for a distance of approximately 72 feet along the new 33-foot right of way line of the Frontage Road to a point on the base line of the new 25 x 25 foot triangle and the new transitional right of way line of the Frontage Road; thence

in a Southwesterly direction for a distance of approximately 35 feet along the base line of the new 25 x 25 foot triangle and the new transitional right of way line of the Frontage Road to a point on the new 33-foot right of way line of the Frontage Road; thence in a Southerly direction for a distance of approximately 165 feet along the new 33-foot right of way line of the Frontage Road to a point on the new transitional right of way line of the Frontage Road; thence in a Westerly direction for a distance of approximately 66 feet along the new transitional right of way line of the Frontage Road to a point on the new 33-foot right of way line of the Frontage Road; thence in a Northerly direction for a distance of approximately 270 feet along the new 33-foot right of way line of the Frontage Road to a point; thence in a Easterly direction for a distance of approximately 165 feet along the new 33-foot right of way line of the Frontage Road to a point on the present 37.5-foot right of way line of the abandoned portion of SC Route 274; thence in a Northerly direction for a distance of approximately 1155 feet along the present 37.5-foot right of way line of the abandoned portion of SC Route 274 to the point of beginning. Being bounded on the North and East by SC Route 274 Relocated, and on the South and West by lands of the Grantee herein.

This being a portion of the property acquired by the South Carolina Department of Transportation from Duke Power Company by Deed to Right of Way dated January 6, 1938, and being filed in the South Carolina Department of Transportation Deed Vault in Columbia, South Carolina under SC Route 274, Project 911; and from Crescent Resources, Inc. by Title to Real Estate dated October 20, 1993 (Tract 11) and recorded on January 10, 1994 in Deed Book 906 at Page 224, and from Crescent Resources, Inc. by Title to Real Estate dated October 20, 1993 (Tract 74) and recorded on January 21, 1994 in Deed Book 916 at Page 85, both in the Clerk of Court's Office for York County, and filed in the South Carolina Department of Transportation Deed Vault in Columbia, South Carolina under SC Route 49, File No. 46.774.

Also conveyed herein is the right to access the Grantee's adjoining property, said access to be a right in/right out break in the control of access along SC Route 274 Relocated, on the left, between approximate survey stations 2+80 and 3+30.

This being a portion of the property acquired by the South Carolina Department of Transportation from Duke Power Company by Deed to Right of Way dated January 6, 1938, and being filed in the South Carolina Department of Transportation Deed Vault in Columbia, South Carolina under SC Route 274, Project 911.

This conveyance is being made subject to any and all existing public utility rights of user, reservations, easements, rights of way, control of access, zoning ordinances and restrictions or protective covenants that may appear on record or on the premises, other than those hereby released.

**TOGETHER** with all and singular, the rights, members, hereditaments and appurtenances to the said premises belonging, or in anywise incident or appertaining.

**TO HAVE AND TO HOLD**, all and singular, the said premises before mentioned unto **Crescent Resources, LLC**, Its Successors, and Assigns forever.

W

**WITNESS** the hand and seal of the South Carolina Department of Transportation this 12th day of January, in the year of our Lord Two Thousand Seven and in the Two Hundred and Thirty-first year of the Sovereignty and Independence of the United States of America.

Signed, sealed and delivered  
in the presence of

Wendy Burlington  
Jeri Whitener

SOUTH CAROLINA DEPARTMENT OF  
TRANSPORTATION

By: Tony L. Chapman (L.S.)  
Acting Executive Director

By: Morgan F. Denny (L.S.)  
Acting Deputy Director of Finance and Administration

THE STATE OF SOUTH CAROLINA  
COUNTY OF RICHLAND

)  
)  
)

PROBATE

Personally appeared before me the undersigned witness, who being duly sworn, says he/she saw the within named South Carolina Department of Transportation, by its duly authorized officers Tony L. Chapman, Acting Executive Director and Morgan F. Denny, Acting Deputy Director of Finance and Administration, sign, seal with its corporate seal, and as its act and deed deliver the within written instrument, and that he/she with the other witness whose name appears witness the execution thereof.

SWORN to before me this 12<sup>th</sup>

Wendy Burlington  
(above witness)

day of January, 2007

Jeri Whitener

NOTARY PUBLIC FOR THE STATE OF: SOUTH CAROLINA

My Commission Expires: October 5, 2008

STATE OF SOUTH CAROLINA )  
COUNTY OF YORK )

South Carolina Department )  
of Transportation, )  
Grantor )  
to )  
Crescent Resources, LLC )  
Grantee. )

AFFIDAVIT OF TRUE CONSIDERATION

Personally appeared before me the undersigned Affiant, who being duly sworn, says that (s), he is an employee of the Grantor and is familiar with the deed above referenced dated January 12, 2007 and the true consideration for the transfer is Five Hundred Ninety Five Thousand and no/100 Dollars (\$595,000.00).

To the best of Affiant's knowledge, this transfer is not exempt from the deed recording fee required by Section 12-24-10 of the S. C. Code of Laws, 1976, as amended. Pursuant to Section 12-24-20 of the Code of Laws, 1976, as amended, because this deed is a deed from the State, the deed-recording fee is the liability of the Grantee.

SWORN TO BEFORE ME  
this 12<sup>th</sup> day of January, 2007

Mary E. Johnson Allen  
Notary Public for South Carolina  
My commission expires: 2-12-11

Judy McCormick  
(Signature)

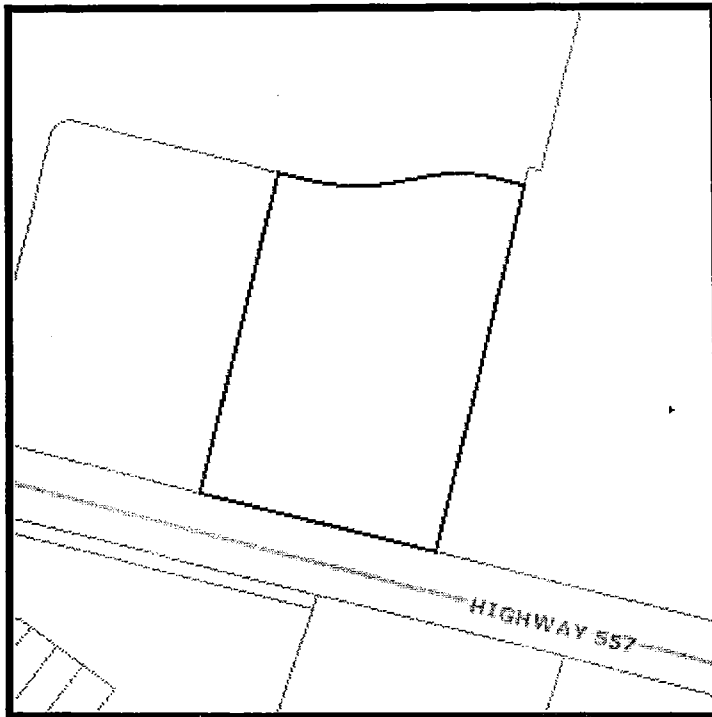
Judy McCormick  
(Judy McCormick)

BK 08777 PG 0242

**Property Report for Parcel Number:**

5640000074

Inquiry Date:



**Owner**

**Owner Name:** BANK OF AMERICA NA  
**Address:** 101 N TRYON ST NC1-0C  
**City/State:** CHARLOTTE NC  
**Zip Code:** 28255

Disclaimer: While every effort is made to keep information provided over t accurate and up-to-date, York County does not certify the authenticity or ac such information. No warranties, express or implied, are provided for the re mapping data herein, or for their use or interpretation by the User.

**Property**

<b>Parcel Number:</b>	5640000074	<b>Land Value:</b>	\$825000
<b>Total Lots:</b>	1	<b>AG Use:</b>	
<b>Total Acres:</b>	0	<b>AG Use Value:</b>	
<b>Deed Book:</b>	10485	<b>Previous Owner:</b>	CRESCENT RESOURCE
<b>Deed Book Page:</b>	115	<b>Tax Bill Information:</b>	
<b>Platt Book:</b>	D285	<b>Zoning:</b>	
<b>Platt Book Page:</b>	7	<b>Sale Price:</b>	\$850000
<b>School District:</b>	2	<b>Sale Date:</b>	1/2/09
<b>Municipality:</b>		<b>Census Tract:</b>	
<b>Fire Code:</b>	BE-I	<b>Voter District:</b>	
<b>Property Location:</b>	1.707 AC/OUT PARCEL B/HWY 557		

**Building/Structure**

<b>Prop. Classification:</b>		<b>Number of Stories:</b>	
<b>Heating Type:</b>		<b>Year Built:</b>	
<b>Living Area(Sq. Ft.):</b>		<b>Garage Area:</b>	NO
<b>Basement:</b>	NO	<b>Fireplace:</b>	
<b>Bathrooms:</b>		<b>Bldg. Value:</b>	\$0
<b>Total Imp. Value:</b>			

**Assessment**



F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 564-00-00-074 Legal 1.707 AC - OUT PARCEL HWY 557

DEED

Grantor CRESCENT RESOURCES LLC  
Grantee BANK OF AMERICA NA  
Book 10485 Page 115  
Dated 12/12/2008 Recorded 1/2/2009

1-1-2 Previous Ownership

Grantor DUKE POWER COMPANY  
Grantee CRESCENT RESOURCES INC  
Book 397 Page 361  
Dated 5/1/1969 Recorded 5/1/1969

**Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.**

2210.00  
935.00

RECORDED  
YORK COUNTY  
TAX ASSESSOR'S OFFICE  
DATE 1-5-09  
TAX MAP NO. 564-74  
INITIALS IS Kj

200900046778  
Filed for Record in  
YORK COUNTY, SC  
DAVID HAMILTON  
01-02-2009 At 03:09 pm.  
DEED 10.00  
State Tax 2210.00  
County Tax 935.00  
OR Vol 10485 Page 115 - 120

Reserved for Recorder's Use

After recording, return to:

Prepared by:

**SPECIAL WARRANTY DEED**

THE STATE OF SOUTH CAROLINA §  
  §  
COUNTY OF YORK                                 §

KNOW ALL PERSONS BY THESE PRESENTS THAT, CRESCENT RESOURCES, LLC, a limited liability company (herein referred to as "Grantor") for and in consideration of the sum of Ten Dollars (\$10.00) in hand paid to Grantor by BANK OF AMERICA, N.A., a national banking association (herein referred to as "Grantee") whose mailing address for tax purposes is Bank of America, N.A. Corporate Real Estate Assessments, 101 North Tryon Street, NC1-001-03-81, Charlotte, NC 28255, and other good and valuable consideration, the receipt and sufficiency of which consideration are hereby acknowledged, has GRANTED, SOLD AND CONVEYED , and by these presents does GRANT, SELL AND CONVEY unto Grantee that certain tract of real property located in York County, South Carolina, as more particularly described by metes and bounds to wit:

See Exhibit "A" attached hereto, incorporated herein and made a part hereof for all purposes (the "Property"),

DERIVATION: Being a part of the premises conveyed to Grantor by Deed from Duke Power Company to Grantor recorded in Book 397, Page 361 in the York County Public Registry.

TMS: 564-00-00-074.

TOGETHER WITH AND SUBJECT TO the easements and restrictions appurtenant to the Property created by that certain Declaration of Easements with Covenants and Restrictions Affecting Land executed by Grantor, Lowe's Home Centers, Inc. and Wal-Mart Real Estate Business Trust, recorded in the York County Public Registry, as amended, and (ii) that certain Declaration of Outparcel Restrictions and Covenants dated June 23, 2008, executed by Grantor and recorded in the York County Public Registry, as amended.

TOGETHER WITH, all and singular the Rights, Members, Hereditaments and Appurtenances to the said Property belonging, or in anywise incident or appertaining.

TO HAVE AND TO HOLD, all and singular the Property unto the Grantee and its successors and assigns forever; and Grantor does hereby bind itself and its successors and assigns to WARRANT AND FOREVER DEFEND all and singular the Property unto Grantee, its successors and assigns, against every person whomsoever lawfully claiming by, through or under Grantor, but not otherwise, subject to all of the matters of record.

Taxes and assessments for the year 2008 have been prorated between the parties hereto as of the effective date of this Deed, and Grantee assumes liability for the payment thereof.

EXECUTED AND SEALED as of the 12 day of December, 2008.

Signed, sealed and delivered in the presence of:

[Signature]

Kathleen Keebler

SELLER:  
CRESCENT RESOURCES, LLC

a Georgia limited liability company

By: [Signature]  
Name: Patrick T. Henry  
Title: President Commercial Division

State of Georgia )  
County of DeKalb )

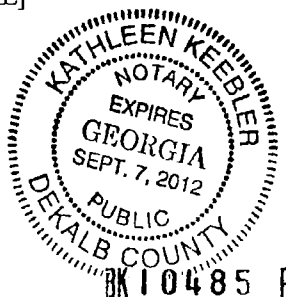
Acknowledgement

I, the undersigned Notary Public for Georgia, do hereby certify that Patrick Henry, the President of Crescent Resources, LLC, personally appeared before me this day and acknowledged the due execution of the foregoing instrument. Witness my hand and official seal this 12 day of December, 2008.

[Signature]  
Notary Public for Georgia

My Commission Expires: Sept 7, 2012

[NOTARIAL SEAL]



BK 10485 PG 0116

---

**EXHIBIT "A" TO LIMITED WARRANTY DEED**

**Legal Description**

All of that certain tract of land being identified as "Outparcel B" (1.707 Acres) on that plat entitled "Subdivision Plat Survey for Lowe's Home Centers, Inc." prepared by Freeland & Associates, Inc., and recorded June 24, 2008 in Plat Cabinet D, Slide 327, Page 4, in the Office of the Clerk of Court for York County, South Carolina.

STATE OF SOUTH CAROLINA

AFFIDAVIT

COUNTY OF YORK

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.

The property being transferred is described on Exhibit A attached hereto and incorporated herein by reference. The property is being transferred by **Crescent Resources, LLC**, a Georgia limited liability company (the "Transferor"), to **Bank of America, N.A.**, a national banking association (the "Buyer").

3. Check one of the following: The deed is

- (a)   x   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): \_\_\_\_\_  
(If exempt, please skip items 4 - 7, and go to item 8 of this affidavit.)

4. Check one of the following if either item 3(a) or 3(b) above has been checked (See Information section of this affidavit.):

- (a)   x   The fee is computed on the consideration paid or to be paid in money or money's worth in the amount of   \$850,000.00  .
- (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   x   to the following: A lien or encumbrances existed on the land, tenement, or realty before the transfer and remained on the land, tenement, or realty after 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: \$850,000.00

(b) Place the amount listed in item 5 above here: 0  
(If no amount is listed, place zero here)

(c) Subtract Line 6(b) from Line 6(a) and place result here: \$850,000.00

7. The deed recording fee due is based on the amount listed on Line 6(c) above and deed recording fee due is: \$3,145.00.

8. As required by Code Section 12-24-70, I state that I am a responsible person who was connected with the transaction as: President of Transferor.

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 for not more than one year, or both.

\_\_\_\_\_  
Responsible Person Connected with the Transaction

Patrick T. Henry  
President, Commercial Division

\_\_\_\_\_  
Print or Type Name Here

Sworn to before me this 12  
day of December, 2008

Kathleen Keebler

Notary Public

My Commission Expires: 9/7/2012



**EXHIBIT A**

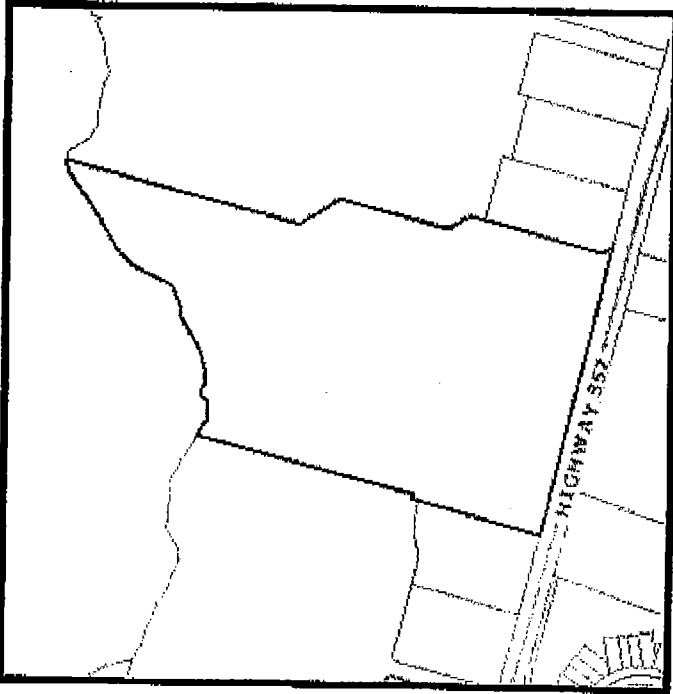
**LEGAL DESCRIPTION**

OUTPARCEL B – TAX MAP NUMBER 5640000074.

All of that certain piece, parcel or tract of land situate and being in the City of Lake Wylie, York County, State of South Carolina, shown and designated as “Outparcel B” on a plat entitled “Subdivision Plat Survey for Lowe’s Home Center, Inc.” prepared by Freeland & Associates, Inc., dated 10/27/2006, last revised 5/28/2008, and recorded in Book D327, Page 4 of the York County Clerk’s Office.

**Property Report for Parcel Number:  
5640000075**

Inquiry Date: 11/2/2009



**Owner**

**Owner Name:** LOWES HOME CENTERS INC  
**ATTN:** PROPERTY TAX DEPT  
**Address:** PO BOX 1111  
**City/State:** NORTH WILKSBORO NC  
**Zip Code:** 286560001

Disclaimer: While every effort is made to keep information provided over the internet accurate and up-to-date, York County does not certify the authenticity or accuracy of such information. No warranties, express or implied, are provided for the records and/or mapping data herein, or for their use or interpretation by the User.

**Property**

<b>Parcel Number:</b>	5640000075	<b>Land Value:</b>	\$2715300
<b>Total Lots:</b>	0	<b>AG Use:</b>	
<b>Total Acres:</b>	19.34	<b>AG Use Value:</b>	
<b>Deed Book:</b>	9736	<b>Previous Owner:</b>	CRESCENT RESOURCES INC
<b>Deed Book Page:</b>	74	<b>Tax Bill Information:</b>	
<b>Platt Book:</b>	D285	<b>Zoning:</b>	
<b>Platt Book Page:</b>	7	<b>Sale Price:</b>	\$2800000
<b>School District:</b>	2	<b>Sale Date:</b>	1/10/08
<b>Municipality:</b>		<b>Census Tract:</b>	



F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 564-00-00-075 Legal 19.34 AC PLAT D285 / 007

DEED

Grantor CRESCENT RESOURCES LLC  
Grantee LOWES HOMES CENTERS LLC  
Book 9736 Page 74  
Dated 1/2/2008 Recorded 1/10/2008

1-1-2 Previous Ownership

Grantor DUKE POWER COMPANY  
Grantee CRESCENT RESOURCES INC  
Book 397 Page 361  
Dated 5/1/1969 Recorded 5/1/1969

**Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.**

RECORDED  
YORK COUNTY  
TAX ASSESSOR'S OFFICE

200800001148  
Filed for Record in  
YORK COUNTY, SC  
DAVID HAMILTON  
01-10-2008 At 09:06 am.  
DEED  
State Tax 10.00  
County Tax 7280.00  
OR Vol 9736 Page 74 -

AFTER RECORDING, MAIL TO:  
H. Manning Unger  
Moore & Van Allen PLLC  
40 Calhoun Street, Suite 300  
Charleston, South Carolina 29401-3535

DATE 1-10-08  
(out of)  
TAX MAP NO. 562-1  
INITIALS TS / JN

564-45

STATE OF SOUTH CAROLINA  
COUNTY OF YORK

SPECIAL WARRANTY DEED

7280.00  
3080.00

KNOW ALL MEN BY THESE PRESENTS, that **CRESCENT RESOURCES, LLC**, a Georgia limited liability company (the "**Grantor**"), in consideration of the sum of One Dollar (\$1.00) and other valuable consideration to it in hand paid at and before the sealing of these presents by **LOWE'S HOME CENTERS, INC.**, a North Carolina corporation (the "**Grantee**"), with a mailing address of P.O. Box 1111, North Wilkesboro, North Carolina 28656-0001, Attn: Property Tax Department, in the form of cash, the receipt whereof is hereby acknowledged, has granted, bargained, sold and released and by these presents does grant, bargain, sell and release unto the Grantee, and its successors and assigns, the following described property, to wit:

**SEE EXHIBIT A ATTACHED HERETO AND INCORPORATED HEREIN BY REFERENCE**

DERIVATION: Being a part of the premises conveyed to Grantor by Deed from Duke Power Company to Grantor recorded in Book 397, Page 361 in the York County Public Registry.

TMS: Portion of 564-00-00-045.

TOGETHER WITH AND SUBJECT TO the easements and restrictions appurtenant to the above-described property created by that certain declaration of Easements with Covenants and Restrictions Affecting Land executed by Grantor, Grantee and Wal-Mart Real Estate Business Trust, to be recorded subsequent to recordation of this deed.

TOGETHER with all and singular the Rights, Members, Heriditaments and Appurtenances to the said Premises belonging, or in anywise incident or appertaining.

TO HAVE AND TO HOLD, all and singular the said premises before mentioned unto the Grantee, its successors and assigns forever.

And the Grantor does hereby bind itself and its successors, that it has not done or suffered anything to be done whereby the premises has been encumbered, and that it will warrant and forever defend all and singular the said premises unto the Grantee, its successors and assigns against itself and its successors and against every other person whomsoever lawfully claiming, or to claim the same, or any part thereof, through or under Grantor, but not otherwise, subject only to the matters set forth on Exhibit B attached hereto and made a part hereof by this reference.

[signatures begin on the following page]

In Witness Whereof, the Grantor has caused these presents to be executed in its name by its duly authorized Res. Div. President, this 2nd day of January, 2008.

Signed, sealed and delivered  
In the presence of:

**CRESCENT RESOURCES, LLC**, a Georgia  
limited liability company

Judith M. Roller  
Julie M. Hill

By: [Signature]  
Name: H. Thomas Webb III  
Its: President Residential Division

State of North Carolina )

Probate

County of Mecklenburg )

PERSONALLY appeared before me the undersigned witness and made oath that s/he saw the within CRESCENT RESOURCES, LLC, a Georgia limited liability company, by H. Thomas Webb III, its Res. Div. President, sign, seal, and as its act and deed, deliver the within written instrument; and that s/he, with the other witness subscribed above, witnessed the execution thereof.

Judith M. Roller  
Witness

SWORN to before me this 2nd  
day of January, 2008

[Signature]  
Notary Public of North Carolina

My Commission Expires My Commission Expires August 17, 2008

[NOTARIAL SEAL]

## EXHIBIT A

### LEGAL DESCRIPTION

All of that certain piece, parcel or tract of land situate and being in Bethel Township, York County, State of South Carolina, shown and designated as "Lowe's Tract" on a plat entitled "Subdivision Plat Survey for Lowe's Home Centers, Inc.," prepared by Freeland & Associates, Inc., dated October 27, 2006, last revised October 12, 2007, and recorded in Plat Cabinet D, Slide 285, Page 7 of the Office of the Clerk of Court for York County, and being more particularly described as follows:

Commencing at the NGS Monument "Willow" N 1206840.8627, E 1975366.0528; thence along a tie line S 00-45-57 E for 9264.00 feet to an iron pin located on the full pond level of Lake Wylie (Mill Pond Creek) and the western right of way of SC Highway 274 (R/W Varies); thence along said right of way with a curve concave to the southeast having a radius of 1692.02 feet, an arc length of 315.85 feet and a chord bearing and distance of S 16-11-26 W for 315.40 feet to an iron pin; thence with a curve concave to the southeast having a radius of 2902.29 feet, an arc length of 15.84 feet and a chord bearing and distance of S 15-41-38 W for 15.84 feet to an iron pin; thence with a curve concave to the southeast having a radius of 1692.02 feet, an arc length of 299.58 feet and a chord bearing and distance of S 05-07-07 W for 299.19 feet to an iron pin; thence S 00-21-10 E for 358.90 feet to an iron pin; thence with a curve concave to the northwest having a radius of 1582.02 feet, an arc length of 789.38 feet and a chord bearing and distance of S 13-56-29 W for 781.22 feet to an iron pin; thence S 30-08-18 W for 254.80 feet to an iron pin on the mitered right of way of SC Highway 274 (R/W Varies) and SC Highway 557 (R/W Varies); thence with a curve concave to the northwest having a radius of 100.00 feet, an arc length of 167.11 feet and a chord bearing and distance of S 59-18-38 W for 148.34 feet to an iron pin; thence along the northern right of way of SC Highway 557 (R/W Varies) with a curve concave to the southwest having a radius of 9842.75 feet, an arc length of 477.85 feet and a chord bearing and distance of N 74-47-53 W for 477.81 feet to an iron pin; thence N 75-47-04 W for 94.03 feet to an iron pin; thence N 75-45-53 W for 153.53 feet to a point being the Point of Beginning; thence continuing along said right of way N 75-45-53 W for 806.94 feet to a point; thence leaving said right of way along the common line of Outparcel B N 14-13-41 E for 348.92 feet to a point; thence along the common line of Outparcel K N 14-13-41 E for 17.50 feet to a point; thence S 75-46-19 E for 11.45 feet to a point; thence N 14-13-41 E for 616.95 feet to a point on the full pond level of Lake Wylie (Mill Creek Pond); thence along said line the following twenty-three courses and distances: S 63-02-05 E for 24.84 feet to a point; thence S 50-23-12 E for 21.55 feet to a point; thence S 82-51-16 E for 31.09 feet to a point; thence N 85-00-09 E for 22.32 feet to a point; thence N 44-01-03 E for 23.94 feet to a point; thence S 88-00-00 E for 14.28 feet to a point; thence S 57-38-44 E for 25.44 feet to a point; thence N 84-39-15 E for 34.72 feet to a point; thence N 72-29-05 E for 56.68 feet to a point; thence N 59-52-36 E for 106.61 feet to a point; thence N 82-32-46 E for 30.09 feet to a point; thence N 67-51-47 E for 55.53 feet to a point; thence N 25-16-30 E for 52.84 feet to a point; thence N 24-01-01 E for 41.44 feet to a point; thence N 24-20-21 E for 32.02 feet to a point; thence N 44-04-26 E for 52.91 feet to a point; thence N 59-51-05 E for 55.59 feet to a point; thence N 57-34-20 E for 67.40 feet to a point; thence N 55-56-42 E for 36.84 feet to a point; thence N 52-34-04 E for 58.77 feet to a point; thence N 59-00-40 E for 38.80 feet to a point; thence N 74-26-54 E for 23.84 feet to a point; thence S 82-40-36 E for 6.50 feet to a point; thence along the common line of Wal-Mart Tract S 14-13-42 W for 670.28 feet to a point; thence S 31-46-33 E for 130.92 feet to a point; thence S 14-13-41 W for 308.61 feet to a point; thence S 30-25-09 E for 71.53 feet to a point; thence S 14-13-41 W for 42.89 feet to a point; thence along the common line of Outparcel A S 14-13-41 W for 339.01 feet to a point; thence S 30-46-19 E for 35.36 feet to a point being the Point of Beginning. Said tract contains 842,492 SQ.FT. or 19.340 acres, more or less.

## EXHIBIT B

### PERMITTED EXCEPTIONS

1. The lien of ad valorem taxes for the year 2008 and subsequent years.
2. Right of Way Agreement dated February 18, 2003 and recorded March 24, 2003 in Book 5123 at page 251 of the York County Records (the "Registry"), as amended by Amendment and Restatement of Right of Way Agreement dated January \_\_, 2008 and recorded in Book 9736, at page 48 of the Office of the Clerk of Court.
3. Rights of upper and lower riparian owners in and to the waters of Lake Wylie crossing or adjoining the property, and the natural flow thereof, free from diminution or pollution.
4. Rights, privileges and easements contained in the Deed from Duke Power Company to Crescent Land and Timber Corp. dated May 1, 1969 and recorded December 22, 1969 in Book 397 at page 361 of the Office of the Clerk of Court.
5. Matters disclosed by (a) that certain plat entitled "Subdivision Plat Survey for Lowe's Home Centers, Inc." prepared by Freeland & Associates, Inc., dated October 27, 2006, last revised October 12, 2007, and recorded in Plat Cabinet D, Slide 285, Page 7 of the Office of the Clerk of Court, (b) that certain survey entitled "ALTA/ASCM Land Title Survey for Lowe's Home Centers, Inc." prepared by Freeland & Associates, Inc., dated October 27, 2006, last revised December 20, 2007, and/or (c) that certain plat entitled "Wetlands Buffers for Mill Creek Commons" prepared by Freeland & Associates, Inc., dated October 27, 2006, and recorded in Plat Cabinet D, Slide 285, Page 6 of the Office of the Clerk of Court.
6. Declaration of Restrictive Covenants made by Crescent Resources, LLC, dated January \_\_, 2008 and recorded in Book 9736 at page 1 of the Office of the Clerk of Court..
7. Sewer Line Easement Agreement by Crescent Resources, LLC, for the benefit of Carolina Water Services, Inc., dated October 6, 2003 and recorded October 10, 2003 in Book 5766 at page 265 of the Office of the Clerk of Court.
8. Sewer and Water Line Easement Agreement by Crescent Resources, LLC, for the benefit of Carolina Water Services, Inc., dated January \_\_, 2008 and recorded in Book 9736 at page 28 of the Office of the Clerk of Court.

STATE OF SOUTH CAROLINA

AFFIDAVIT

COUNTY OF CHARLESTON

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.

The property being transferred is described on Exhibit A attached hereto and incorporated herein by reference. The property is being transferred by **Crescent Resources, LLC**, a Georgia limited liability company (the "Transferor"), to **Lowe's Home Centers, Inc.**, a North Carolina corporation (the "Buyer").

3. Check one of the following: The deed is

(a)   x   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): \_\_\_\_\_  
(If exempt, please skip items 4 - 7, and go to item 8 of this affidavit.)

4. Check one of the following if either item 3(a) or 3(b) above has been checked (See Information section of this affidavit.):

(a)   x   The fee is computed on the consideration paid or to be paid in money or money's worth in the amount of   \$2,800,000.00  .

(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   x   to the following: A lien or encumbrances existed on the land, tenement, or realty before the transfer and remained on the land, tenement, or realty after 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: \$2,800,000.00

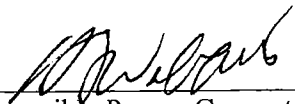
(b) Place the amount listed in item 5 above here: 0  
(If no amount is listed, place zero here)

(c) Subtract Line 6(b) from Line 6(a) and place result here: \$2,800,000.00

7. The deed recording fee due is based on the amount listed on Line 6(c) above and deed recording fee due is: \$10,360.00.00.

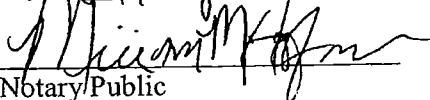
8. As required by Code Section 12-24-70, I state that I am a responsible person who was connected with the transaction as: President, Residential Division of Transferor.

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 for not more than one year, or both.

  
Responsible Person Connected with the Transaction

H. THOMAS Webb, III  
Print or Type Name Here

Sworn to before me this 2nd  
day of January, 2008

  
Notary Public

My Commission Expires: My Commission Expires August 17, 2008

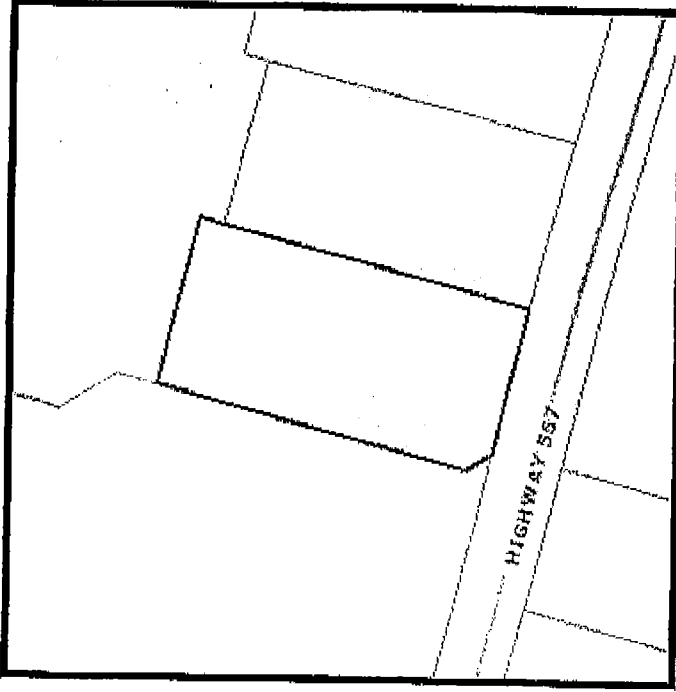
All of that certain piece, parcel or tract of land situate and being in Bethel Township, York County, State of South Carolina, shown and designated as "Lowe's Tract" on a plat entitled "Subdivision Plat Survey for Lowe's Home Centers, Inc.," prepared by Freeland & Associates, Inc., dated October 27, 2006, last revised October 12, 2007, and recorded in Plat Cabinet D, Slide 285, Page 7 of the Office of the Clerk of Court for York County, and being more particularly described as follows:

Commencing at the NGS Monument "Willow" N 1206840.8627, E 1975366.0528; thence along a tie line S 00-45-57 E for 9264.00 feet to an iron pin located on the full pond level of Lake Wylie (Mill Pond Creek) and the western right of way of SC Highway 274 (R/W Varies); thence along said right of way with a curve concave to the southeast having a radius of 1692.02 feet, an arc length of 315.85 feet and a chord bearing and distance of S 16-11-26 W for 315.40 feet to an iron pin; thence with a curve concave to the southeast having a radius of 2902.29 feet, an arc length of 15.84 feet and a chord bearing and distance of S 15-41-38 W for 15.84 feet to an iron pin; thence with a curve concave to the southeast having a radius of 1692.02 feet, an arc length of 299.58 feet and a chord bearing and distance of S 05-07-07 W for 299.19 feet to an iron pin; thence S 00-21-10 E for 358.90 feet to an iron pin; thence with a curve concave to the northwest having a radius of 1582.02 feet, an arc length of 789.38 feet and a chord bearing and distance of S 13-56-29 W for 781.22 feet to an iron pin; thence S 30-08-18 W for 254.80 feet to an iron pin on the mitered right of way of SC Highway 274 (R/W Varies) and SC Highway 557 (R/W Varies); thence with a curve concave to the northwest having a radius of 100.00 feet, an arc length of 167.11 feet and a chord bearing and distance of S 59-18-38 W for 148.34 feet to an iron pin; thence along the northern right of way of SC Highway 557 (R/W Varies) with a curve concave to the southwest having a radius of 9842.75 feet, an arc length of 477.85 feet and a chord bearing and distance of N 74-47-53 W for 477.81 feet to an iron pin; thence N 75-47-04 W for 94.03 feet to an iron pin; thence N 75-45-53 W for 153.53 feet to a point being the Point of Beginning; thence continuing along said right of way N 75-45-53 W for 806.94 feet to a point; thence leaving said right of way along the common line of Outparcel B N 14-13-41 E for 348.92 feet to a point; thence along the common line of Outparcel K N 14-13-41 E for 17.50 feet to a point; thence S 75-46-19 E for 11.45 feet to a point; thence N 14-13-41 E for 616.95 feet to a point on the full pond level of Lake Wylie (Mill Creek Pond); thence along said line the following twenty-three courses and distances: S 63-02-05 E for 24.84 feet to a point; thence S 50-23-12 E for 21.55 feet to a point; thence S 82-51-16 E for 31.09 feet to a point; thence N 85-00-09 E for 22.32 feet to a point; thence N 44-01-03 E for 23.94 feet to a point; thence S 88-00-00 E for 14.28 feet to a point; thence S 57-38-44 E for 25.44 feet to a point; thence N 84-39-15 E for 34.72 feet to a point; thence N 72-29-05 E for 56.68 feet to a point; thence N 59-52-36 E for 106.61 feet to a point; thence N 82-32-46 E for 30.09 feet to a point; thence N 67-51-47 E for 55.53 feet to a point; thence N 25-16-30 E for 52.84 feet to a point; thence N 24-01-01 E for 41.44 feet to a point; thence N 24-20-21 E for 32.02 feet to a point; thence N 44-04-26 E for 52.91 feet to a point; thence N 59-51-05 E for 55.59 feet to a point; thence N 57-34-20 E for 67.40 feet to a point; thence N 55-56-42 E for 36.84 feet to a point; thence N 52-34-04 E for 58.77 feet to a point; thence N 59-00-40 E for 38.80 feet to a point; thence N 74-26-54 E for 23.84 feet to a point; thence S 82-40-36 E for 6.50 feet to a point; thence along the common line of Wal-Mart Tract S 14-13-42 W for 670.28 feet to a point; thence S 31-46-33 E for 130.92 feet to a point; thence S 14-13-41 W for 308.61 feet to a point; thence S 30-25-09 E for 71.53 feet to a point; thence S 14-13-41 W for 42.89 feet to a point; thence along the common line of Outparcel A S 14-13-41 W for 339.01 feet to a point; thence S 30-46-19 E for 35.36 feet to a point being the Point of Beginning. Said tract contains 842,492 SQ.FT. or 19.340 acres, more or less.



**Property Report for Parcel Number:  
5640000076**

Inquiry Date: 11/2/2009



**Owner**

**Owner Name:** ERNST LUCE CALIFORNIA LLC %  
 MCDONALDS USA LLC-0760  
**Address:** PO BOX 182571  
**City/State:** COLUMBUS OH  
**Zip Code:** 432182571

Disclaimer: While every effort is made to keep information provided over the internet accurate and up-to-date, York County does not certify the authenticity or accuracy of such information. No warranties, express or implied, are provided for the records and/or mapping data herein, or for their use or interpretation by the User.

**Property**

<b>Parcel Number:</b>	5640000076	<b>Land Value:</b>	\$1200000
<b>Total Lots:</b>	1	<b>AG Use:</b>	
<b>Total Acres:</b>	0	<b>AG Use Value:</b>	
<b>Deed Book:</b>	10666	<b>Previous Owner:</b>	CRESCENT RESOURCES INC
<b>Deed Book Page:</b>	181	<b>Tax Bill Information:</b>	
<b>Platt Book:</b>	D285	<b>Zoning:</b>	
<b>Platt Book Page:</b>	7	<b>Sale Price:</b>	\$1250000
<b>School District:</b>	2	<b>Sale Date:</b>	4/1/09
<b>Municipality:</b>		<b>Census Tract:</b>	

F&ME Consultants  
Chain-of-Ownership

F&ME Project No G 4843  
HIWAY 557

Ownerships of the tract are noted as follows:

1.1.1 Current Ownership

Parcel I. D. Number: 564-00-00-076 Legal

DEED

Grantor	CRESCENT RESOURCES LLC		
Grantee	ERNST-LUCE CALIFORNIA LLC		
Book	10666	Page	181
Dated	3/27/2009	Recorded	4/1/2009

1-1-2 Previous Ownership

Grantor	DUKE POWER COMPANY		
Grantee	CRESCENT RESOURCES INC		
Book	397	Page	361
Dated	5/1/1969	Recorded	5/1/1969

**Disclaimer: The purpose of this section of the report is to show the apparent chain-of-ownership for the preceding forty (40) year period. This is not an attempt to certify a clear title. Therefore, all names, dates and references shown are not to be considered absolute or guaranteed and should be researched and verified by a title search attorney.**

3250.00  
1375.00

PREPARED BY:  
Robinson, Bradshaw & Hinson, P.A.  
101 N. Tryon Street, Suite 1900  
Charlotte, NC 28246  
Attn: Jeffrey P. Kapp

200900057049  
Filed for Record in  
YORK COUNTY, SC  
DAVID HAMILTON  
04-01-2009 At 03:23 pm.  
DEED 11.00  
State Tax 3250.00  
County Tax 1375.00  
DR Vol 10666 Page 181 - 187

**STATE OF SOUTH CAROLINA**

**SPECIAL WARRANTY DEED**

**COUNTY OF YORK**

KNOW ALL MEN BY THESE PRESENTS, that **CRESCENT RESOURCES, LLC**, a Georgia limited liability company (the "**Grantor**"), in consideration of the sum of One Dollar (\$1.00) and other valuable consideration to it in hand paid at and before the sealing of these presents by **ERNST-LUCE CALIFORNIA, LLC**, a Delaware limited liability company (the "**Grantee**"), with a mailing address of 12401 Helena Street, Los Angeles, California 90049, in the form of cash, the receipt whereof is hereby acknowledged, has granted, bargained, sold and released and by these presents does grant, bargain, sell and release unto the Grantee, and its successors and assigns, the following described property, to wit:

**SEE EXHIBIT A ATTACHED HERETO AND MADE A PART HEREOF BY THIS REFERENCE.**

DERIVATION: Being a part of the premises conveyed to Grantor by Deed by Deed from Duke Power Company to Grantor recorded in Book 397, Page 361 in the York County Clerk's Office. ✓

TMS: 564-00-00-076.

THE ABOVE-REFERENCED PARCEL IS CONVEYED TOGETHER WITH AND SUBJECT TO all easements and restrictions created by that Easement with Covenants and Restrictions Affecting Land, dated January 8, 2008, and recorded in Book 9736 at Page 81 in the York County Clerk's Office, as amended by a First Amendment dated as of November 7, 2008 and recorded in Book 10415 at Page 13 in the York County Clerk's Office, and by that certain Declaration of Outparcel Restrictions and Covenants dated June 23, 2008 executed by Grantor and recorded in Book 10135 at Page 16 in the York County Clerk's Office. ✓ ✓

TOGETHER with all and singular the Rights, Members, Heriditaments and Appurtenances to the said Premises belonging, or in anywise incident or appertaining.

TO HAVE AND TO HOLD, all and singular the said premises before mentioned unto the Grantee, its successors and assigns forever.

And the Grantor does hereby bind itself and its successors, that it has not done or suffered anything to be done whereby the premises has been encumbered, and that it will warrant and forever defend all and singular the said premises unto the Grantee, its successors and assigns against itself and its successors and against every other person whomsoever lawfully claiming, or to claim the same, or any part thereof, through or under Grantor, but not otherwise, subject only to the matters set forth on Exhibit B attached hereto and made a part hereof by this reference.

[signatures begin on the following page]

**RECORDED**

YORK COUNTY

TAX ASSESSOR'S OFFICE

DATE 4-2-09  
TAX MAP NO. 564-76  
INITIALS TS / JH

In Witness Whereof, the Grantor has caused these presents to be executed in its name by its duly authorized ✓ President, this 27 day of March, 2009.

Signed, sealed and delivered  
In the presence of:

[Signature]  
[Signature]

**CRESCENT RESOURCES, LLC**, a Georgia limited liability company

By: [Signature]  
Name: Patrick T. Henry  
Its: President Commercial Division

State of Georgia )  
County of DeKalb )

Probate

PERSONALLY appeared before me the undersigned witness and made oath that s/he saw the within CRESCENT RESOURCES, LLC, a Georgia limited liability company, by Patricia Henry, its  President, sign, seal, and as its act and deed, deliver the within written instrument and that s/he, with the other witness subscribed above, witnessed the execution thereof.

[Signature]  
Witness

SWORN to before me this 27  
day of March, 2008

[Signature]  
Notary Public of Georgia

My Commission Expires: Sept 7, 2012

[NOTARIAL SEAL]



**EXHIBIT A**

**LEGAL DESCRIPTION**

**OUTPARCEL A – TAX MAP NUMBER 564-00-00-076.**

All of that certain piece, parcel or tract of land situate and being in the City of Lake Wylie, York County, State of South Carolina, shown and designated as "Outparcel A" on a plat entitled "Subdivision Plat Survey for Lowe's Home Center, Inc." prepared by Freeland & Associates, Inc., dated 10/27/2006, last revised 5/28/2008, and recorded in Book D327, Page 4 of the York County Clerk's Office.

**EXHIBIT B**

**PERMITTED EXCEPTIONS**

1. The lien of ad valorem taxes not yet due and payable, but constituting a lien on the subject property.
2. Municipal, zoning and subdivision laws and ordinances.
3. Rights-of-way of public streets.
4. Such matters and conditions as would be revealed by a current, accurate physical survey and/or inspection of the Property.
5. Ground Lease dated July 17, 2008, between Crescent Resources, LLC and McDonald's USA, LLC, as amended by a First Amendment to Ground Lease dated November 10, 2008 and by a Second Amendment to Ground Lease dated as of November 14, 2008.
6. Easement with Covenants and Restrictions Affecting Land, dated January 8, 2008, and recorded in Book 9736 at Page 81 in the York County Clerk's Office, as amended by a First Amendment dated as of November 7, 2008 and recorded in Book 10415 at Page 13 in the York County Clerk's Office.
7. Declaration of Outparcel Restrictions and Covenants dated June 23, 2008 executed by Grantor and recorded in Book 10135 at Page 16 in the York County Clerk's Office.
8. All restrictions, encumbrances, reservations, limitations, conditions, easements, agreements or other matters of record affecting the Property.

STATE OF SOUTH CAROLINA

AFFIDAVIT

COUNTY OF YORK

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 is located in Bethel Township, York County, South Carolina, is shown and delineated as "Outparcel A" containing approximately 1.491 acres in the aggregate, on that plat entitled "Subdivision Plat Survey for Lowe's Home Center, Inc." prepared by Freeland & Associates, Inc., dated October 27, 2006, last revised May 28, 2008, and recorded June 24, 2008 in Plat Cabinet D, Slide 327, Page 4, in the Office of the Clerk of Court for York County, South Carolina, and is a portion of York County Tax Map Number. 564-00-00-076. The property is being transferred by **Crescent Resources, LLC**, a Georgia limited liability company (the "Transferor"), to **Ernst-Luce California, LLC**, a Delaware limited liability company (the "Buyer").
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): \_\_\_\_\_  
(If exempt, please skip items 4 - 7, and go to item 8 of this affidavit.)
4. Check one of the following if either item 3(a) or 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 \$1,250,000.00.
  - (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 encumbrances existed on the land, tenement, or realty before the transfer and remained on the land, tenement, or realty after 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: \$1,250,000.00

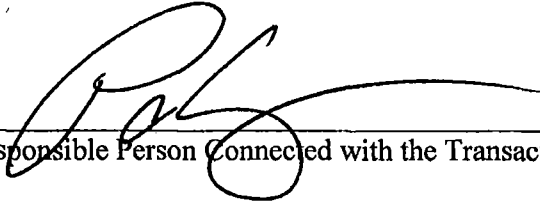
(b) Place the amount listed in item 5 above here: \_\_\_\_\_  
(If no amount is listed, place zero here)

(c) Subtract Line 6(b) from Line 6(a) and place result here: \$1,250,000.00

7. The deed recording fee due is based on the amount listed on Line 6(c) above and deed recording fee due is: \$4,625.00.

8. As required by Code Section 12-24-70, I state that I am a responsible person who was connected with the transaction as: a President of Transferor.

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 for not more than one year, or both.

  
\_\_\_\_\_

Responsible Person Connected with the Transaction

Patrick T. Henry

Print or Type Name Here

Sworn to before me this 27 day of March, 2009



Notary Public

My Commission Expires: Sept. 7, 2012



---

**9. 40 CFR Part 312**

[Home Page](#) > [Executive Branch](#) > [Code of Federal Regulations](#) > [Electronic Code of Federal Regulations](#)



**e-CFR Data is current as of July 12, 2012**

## **Title 40: Protection of Environment**

[Browse Previous](#) | [Browse Next](#)

### **PART 312—INNOCENT LANDOWNERS, STANDARDS FOR CONDUCTING ALL APPROPRIATE INQUIRIES**

---

#### **Section Contents**

##### [Subpart A—Introduction](#)

[§ 312.1 Purpose, applicability, scope and disclosure obligations.](#)

##### [Subpart B—Definitions and References](#)

[§ 312.10 Definitions.](#)

[§ 312.11 References.](#)

##### [Subpart C—Standards and Practices](#)

[§ 312.20 All appropriate inquiries.](#)

[§ 312.21 Results of inquiry by an environmental professional.](#)

[§ 312.22 Additional inquiries.](#)

[§ 312.23 Interviews with past and present owners, operators, and occupants.](#)

[§ 312.24 Reviews of historical sources of information.](#)

[§ 312.25 Searches for recorded environmental cleanup liens.](#)

[§ 312.26 Reviews of Federal, State, Tribal, and local government records.](#)

[§ 312.27 Visual inspections of the facility and of adjoining properties.](#)

[§ 312.28 Specialized knowledge or experience on the part of the defendant.](#)

[§ 312.29 The relationship of the purchase price to the value of the property, if the property was not contaminated.](#)

[§ 312.30 Commonly known or reasonably ascertainable information about the property.](#)

[§ 312.31 The degree of obviousness of the presence or likely presence of contamination at the property, and the ability to detect the contamination by appropriate investigation.](#)

---

**Authority:** Section 101(35)(B) of CERCLA, as amended, 42 U.S.C. 9601(35)(B).

**Source:** 70 FR 66107, Nov. 1, 2005, unless otherwise noted.

#### **Subpart A—Introduction**

[↑ top](#)

### § 312.1 Purpose, applicability, scope and disclosure obligations.

[↑ top](#)

(a) *Purpose.* The purpose of this section is to provide standards and practices for “all appropriate inquiries” for the purposes of CERCLA sections 101(35)(B)(i)(I) and 101(35)(B)(ii) and (iii).

(b) *Applicability.* The requirements of this part are applicable to:

(1) Persons seeking to establish:

(i) The innocent landowner defense pursuant to CERCLA sections 101(35) and 107(b)(3);

(ii) The bona fide prospective purchaser liability protection pursuant to CERCLA sections 101(40) and 107(r);

(iii) The contiguous property owner liability protection pursuant to CERCLA section 107(q); and

(2) persons conducting site characterization and assessments with the use of a grant awarded under CERCLA section 104(k)(2)(B).

(c) *Scope.* (1) Persons seeking to establish one of the liability protections under paragraph (b)(1) of this section must conduct investigations as required in this part, including an inquiry by an environmental professional, as required under §312.21, and the additional inquiries defined in §312.22, to identify conditions indicative of releases or threatened releases, as defined in CERCLA section 101(22), of hazardous substances, as defined in CERCLA section 101(14).

(2) Persons identified in paragraph (b)(2) of this section must conduct investigations required in this part, including an inquiry by an environmental professional, as required under §312.21, and the additional inquiries defined in §312.22, to identify conditions indicative of releases and threatened releases of hazardous substances, as defined in CERCLA section 101(22), and as applicable per the terms and conditions of the grant or cooperative agreement, releases and threatened releases of:

(i) Pollutants and contaminants, as defined in CERCLA section 101(33);

(ii) Petroleum or petroleum products excluded from the definition of “hazardous substance” as defined in CERCLA section 101(14); and

(iii) Controlled substances, as defined in 21 U.S.C. 802.

(d) *Disclosure obligations.* None of the requirements of this part limits or expands disclosure obligations under any federal, state, tribal, or local law, including the requirements under CERCLA sections 101(40)(c) and 107(q)(1)(A)(vii) requiring persons, including environmental professionals, to provide all legally required notices with respect to the discovery of releases of hazardous substances. It is the obligation of each person, including environmental professionals, conducting the inquiry to determine his or her respective disclosure obligations under federal, state, tribal, and local law and to comply with such disclosure requirements.

#### Subpart B—Definitions and References

[↑ top](#)

§ 312.10 Definitions.

[↑ top](#)

(a) Terms used in this part and not defined below, but defined in either CERCLA or 40 CFR part 300 (the National Oil and Hazardous Substances Pollution Contingency Plan) shall have the definitions provided in CERCLA or 40 CFR part 300.

(b) When used in this part, the following terms have the meanings provided as follows:

*Abandoned property* means: property that can be presumed to be deserted, or an intent to relinquish possession or control can be inferred from the general disrepair or lack of activity thereon such that a reasonable person could believe that there was an intent on the part of the current owner to surrender rights to the property.

*Adjoining properties* means: any real property or properties the border of which is (are) shared in part or in whole with that of the subject property, or that would be shared in part or in whole with that of the subject property but for a street, road, or other public thoroughfare separating the properties.

*Data gap* means: a lack of or inability to obtain information required by the standards and practices listed in subpart C of this part despite good faith efforts by the environmental professional or persons identified under §312.1(b), as appropriate, to gather such information pursuant to §§312.20(e)(1) and 312.20(e)(2).

*Date of acquisition or purchase date* means: the date on which a person acquires title to the property.

*Environmental Professional means:*

(1) a person who possesses sufficient specific education, training, and experience necessary to exercise professional judgment to develop opinions and conclusions regarding conditions indicative of releases or threatened releases (see §312.1(c)) on, at, in, or to a property, sufficient to meet the objectives and performance factors in §312.20(e) and (f).

(2) Such a person must:

(i) Hold a current Professional Engineer's or Professional Geologist's license or registration from a state, tribe, or U.S. territory (or the Commonwealth of Puerto Rico) and have the equivalent of three (3) years of full-time relevant experience; or

(ii) Be licensed or certified by the federal government, a state, tribe, or U.S. territory (or the Commonwealth of Puerto Rico) to perform environmental inquiries as defined in §312.21 and have the equivalent of three (3) years of full-time relevant experience; or

(iii) Have a Baccalaureate or higher degree from an accredited institution of higher education in a discipline of engineering or science and the equivalent of five (5) years of full-time relevant experience; or

(iv) Have the equivalent of ten (10) years of full-time relevant experience.

(3) An environmental professional should remain current in his or her field through participation in continuing education or other activities.

(4) The definition of environmental professional provided above does not preempt state professional licensing or registration requirements such as those for a professional geologist, engineer, or site remediation professional. Before commencing work, a person should determine the applicability of state professional licensing or registration laws to the activities to be undertaken as part of the inquiry identified in §312.21(b).

(5) A person who does not qualify as an environmental professional under the foregoing definition may assist in the conduct of all appropriate inquiries in accordance with this part if such person is under the supervision or responsible charge of a person meeting the definition of an environmental professional provided above when conducting such activities.

*Relevant experience*, as used in the definition of environmental professional in this section, means: participation in the performance of all appropriate inquiries investigations, environmental site assessments, or other site investigations that may include environmental analyses, investigations, and remediation which involve the understanding of surface and subsurface environmental conditions and the processes used to evaluate these conditions and for which professional judgment was used to develop opinions regarding conditions indicative of releases or threatened releases (see §312.1(c)) to the subject property.

*Good faith* means: the absence of any intention to seek an unfair advantage or to defraud another party; an honest and sincere intention to fulfill one's obligations in the conduct or transaction concerned.

*Institutional controls* means: non-engineered instruments, such as administrative and/or legal controls, that help to minimize the potential for human exposure to contamination and/or protect the integrity of a remedy.

#### § 312.11 References.

[↑ top](#)

The following industry standards may be used to comply with the requirements set forth in §§312.23 through 312.31:

(a) The procedures of ASTM International Standard E1527–05 entitled “Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process.”

(b) The procedures of ASTM International Standard E2247–08 entitled “Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process for Forestland or Rural Property.” This standard is available from ASTM International at <http://www.astm.org> , 1–610–832–9585.

[70 FR 66107, Nov. 1, 2005, as amended at 73 FR 78655, Dec. 23, 2008]

#### Subpart C—Standards and Practices

[↑ top](#)

#### § 312.20 All appropriate inquiries.

[↑ top](#)

(a) “All appropriate inquiries” pursuant to CERCLA section 101(35)(B) must be conducted within one year prior to the date of acquisition of the subject property and must include:

- (1) An inquiry by an environmental professional (as defined in §312.10), as provided in §312.21;
- (2) The collection of information pursuant to §312.22 by persons identified under §312.1(b); and
- (3) Searches for recorded environmental cleanup liens, as required in §312.25.

(b) Notwithstanding paragraph (a) of this section, the following components of the all appropriate inquiries must be conducted or updated within 180 days of and prior to the date of acquisition of the subject property:

- (1) Interviews with past and present owners, operators, and occupants (see §312.23);
- (2) Searches for recorded environmental cleanup liens (see §312.25);
- (3) Reviews of federal, tribal, state, and local government records (see §312.26);
- (4) Visual inspections of the facility and of adjoining properties (see §312.27); and
- (5) The declaration by the environmental professional (see §312.21(d)).

(c) All appropriate inquiries may include the results of and information contained in an inquiry previously conducted by, or on the behalf of, persons identified under §312.1(b) and who are responsible for the inquiries for the subject property, provided:

- (1) Such information was collected during the conduct of all appropriate inquiries in compliance with the requirements of CERCLA sections 101(35)(B), 101(40)(B) and 107(q)(A)(viii);
- (2) Such information was collected or updated within one year prior to the date of acquisition of the subject property;
- (3) Notwithstanding paragraph (b)(2) of this section, the following components of the inquiries were conducted or updated within 180 days of and prior to the date of acquisition of the subject property:
  - (i) Interviews with past and present owners, operators, and occupants (see §312.23);
  - (ii) Searches for recorded environmental cleanup liens (see §312.25);
  - (iii) Reviews of federal, tribal, state, and local government records (see §312.26);
  - (iv) Visual inspections of the facility and of adjoining properties (see §312.27); and
  - (v) The declaration by the environmental professional (see §312.21(d)).

(4) Previously collected information is updated to include relevant changes in the conditions of the property and specialized knowledge, as outlined in §312.28, of the persons conducting the all appropriate inquiries for the subject property, including persons identified in §312.1(b) and the environmental professional, defined in §312.10.

(d) All appropriate inquiries can include the results of report(s) specified in §312.21(c), that have been prepared by or for other persons, provided that:

- (1) The report(s) meets the objectives and performance factors of this regulation, as specified in paragraphs (e) and (f) of this section; and

(2) The person specified in §312.1(b) and seeking to use the previously collected information reviews the information and conducts the additional inquiries pursuant to §§312.28, 312.29 and 312.30 and the all appropriate inquiries are updated in paragraph (b)(3) of this section, as necessary.

(e) *Objectives.* The standards and practices set forth in this part for All Appropriate Inquiries are intended to result in the identification of conditions indicative of releases and threatened releases of hazardous substances on, at, in, or to the subject property.

(1) In performing the all appropriate inquiries, as defined in this section and provided in the standards and practices set forth this subpart, the persons identified under §312.1(b)(1) and the environmental professional, as defined in §312.10, must seek to identify through the conduct of the standards and practices set forth in this subpart, the following types of information about the subject property:

(i) Current and past property uses and occupancies;

(ii) Current and past uses of hazardous substances;

(iii) Waste management and disposal activities that could have caused releases or threatened releases of hazardous substances;

(iv) Current and past corrective actions and response activities undertaken to address past and on-going releases of hazardous substances;

(v) Engineering controls;

(vi) Institutional controls; and

(vii) Properties adjoining or located nearby the subject property that have environmental conditions that could have resulted in conditions indicative of releases or threatened releases of hazardous substances to the subject property.

(2) In the case of persons identified in §312.1(b)(2), the standards and practices for All Appropriate Inquiries set forth in this part are intended to result in the identification of conditions indicative of releases and threatened releases of hazardous substances, pollutants, contaminants, petroleum and petroleum products, and controlled substances (as defined in 21 U.S.C. 802) on, at, in, or to the subject property. In performing the all appropriate inquiries, as defined in this section and provided in the standards and practices set forth in this subpart, the persons identified under §312.1(b) and the environmental professional, as defined in §312.10, must seek to identify through the conduct of the standards and practices set forth in this subpart, the following types of information about the subject property:

(i) Current and past property uses and occupancies;

(ii) Current and past uses of hazardous substances, pollutants, contaminants, petroleum and petroleum products, and controlled substances (as defined in 21 U.S.C. 802);

(iii) Waste management and disposal activities;

(iv) Current and past corrective actions and response activities undertaken to address past and on-going releases of hazardous substances pollutants, contaminants, petroleum and petroleum products, and controlled substances (as defined in 21 U.S.C. 802);



(v) Engineering controls;

(vi) Institutional controls; and

(vii) Properties adjoining or located nearby the subject property that have environmental conditions that could have resulted in conditions indicative of releases or threatened releases of hazardous substances, pollutants, contaminants, petroleum and petroleum products, and controlled substances (as defined in 21 U.S.C. 802) to the subject property.

(f) *Performance factors.* In performing each of the standards and practices set forth in this subpart and to meet the objectives stated in paragraph (e) of this section, the persons identified under §312.1(b) or the environmental professional as defined in §312.10 (as appropriate to the particular standard and practice) must seek to:

(1) Gather the information that is required for each standard and practice listed in this subpart that is publicly available, obtainable from its source within reasonable time and cost constraints, and which can practicably be reviewed; and

(2) Review and evaluate the thoroughness and reliability of the information gathered in complying with each standard and practice listed in this subpart taking into account information gathered in the course of complying with the other standards and practices of this subpart.

(g) To the extent there are data gaps (as defined in §312.10) in the information developed as part of the inquiries in paragraph (e) of this section that affect the ability of persons (including the environmental professional) conducting the all appropriate inquiries to identify conditions indicative of releases or threatened releases in each area of inquiry under each standard and practice such persons should identify such data gaps, identify the sources of information consulted to address such data gaps, and comment upon the significance of such data gaps with regard to the ability to identify conditions indicative of releases or threatened releases of hazardous substances [and in the case of persons identified in §312.1(b)(2), hazardous substances, pollutants, contaminants, petroleum and petroleum products, and controlled substances (as defined in 21 U.S.C. 802)] on, at, in, or to the subject property. Sampling and analysis may be conducted to develop information to address data gaps.

(h) Releases and threatened releases identified as part of the all appropriate inquiries should be noted in the report of the inquiries. These standards and practices however are not intended to require the identification in the written report prepared pursuant to §312.21(c) of quantities or amounts, either individually or in the aggregate, of hazardous substances pollutants, contaminants, petroleum and petroleum products, and controlled substances (as defined in 21 U.S.C. 802) that because of said quantities and amounts, generally would not pose a threat to human health or the environment.

#### § 312.21 Results of inquiry by an environmental professional.

[↑ top](#)

(a) Persons identified under §312.1(b) must undertake an inquiry, as defined in paragraph (b) of this section, by an environmental professional, or conducted under the supervision or responsible charge of, an environmental professional, as defined in §312.10. Such inquiry is hereafter referred to as “the inquiry of the environmental professional.”

(b) The inquiry of the environmental professional must include the requirements set forth in §§312.23

(interviews with past and present owners \* \* \*), 312.24 (reviews of historical sources \* \* \*), 312.26 (reviews of government records), 312.27 (visual inspections), 312.30 (commonly known or reasonably ascertainable information), and 312.31 (degree of obviousness of the presence \* \* \* and the ability to detect the contamination \* \* \*). In addition, the inquiry should take into account information provided to the environmental professional as a result of the additional inquiries conducted by persons identified in §312.1(b) and in accordance with the requirements of §312.22.

(c) The results of the inquiry by an environmental professional must be documented in a written report that, at a minimum, includes the following:

(1) An opinion as to whether the inquiry has identified conditions indicative of releases or threatened releases of hazardous substances [and in the case of inquiries conducted for persons identified in §312.1(b)(2) conditions indicative of releases and threatened releases of pollutants, contaminants, petroleum and petroleum products, and controlled substances (as defined in 21 U.S.C. 802)] on, at, in, or to the subject property;

(2) An identification of data gaps (as defined in §312.10) in the information developed as part of the inquiry that affect the ability of the environmental professional to identify conditions indicative of releases or threatened releases of hazardous substances [and in the case of inquiries conducted for persons identified in §312.1(b)(2) conditions indicative of releases and threatened releases of pollutants, contaminants, petroleum and petroleum products, and controlled substances (as defined in 21 U.S.C. 802)] on, at, in, or to the subject property and comments regarding the significance of such data gaps on the environmental professional's ability to provide an opinion as to whether the inquiry has identified conditions indicative of releases or threatened releases on, at, in, or to the subject property. If there are data gaps such that the environmental professional cannot reach an opinion regarding the identification of conditions indicative of releases and threatened releases, such data gaps must be noted in the environmental professional's opinion in paragraph (c)(1) of this section; and

(3) The qualifications of the environmental professional(s).

(d) The environmental professional must place the following statements in the written document identified in paragraph (c) of this section and sign the document:

“[I, We] declare that, to the best of [my, our] professional knowledge and belief, [I, we] meet the definition of Environmental Professional as defined in §312.10 of this part.”

“[I, We] have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. [I, We] have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.”

#### § 312.22 Additional inquiries.

[↑ top](#)

(a) Persons identified under §312.1(b) must conduct the inquiries listed in paragraphs (a)(1) through (a)(4) below and may provide the information associated with such inquiries to the environmental professional responsible for conducting the activities listed in §312.21:

(1) As required by §312.25 and if not otherwise obtained by the environmental professional, environmental cleanup liens against the subject property that are filed or recorded under federal, tribal, state, or local law;

(2) As required by §312.28, specialized knowledge or experience of the person identified in §312.1(b);

(3) As required by §312.29, the relationship of the purchase price to the fair market value of the subject property, if the property was not contaminated; and

(4) As required by §312.30, and if not otherwise obtained by the environmental professional, commonly known or reasonably ascertainable information about the subject property.

**§ 312.23 Interviews with past and present owners, operators, and occupants.**

[↑ top](#)

(a) Interviews with owners, operators, and occupants of the subject property must be conducted for the purposes of achieving the objectives and performance factors of §312.20(e) and (f).

(b) The inquiry of the environmental professional must include interviewing the current owner and occupant of the subject property. If the property has multiple occupants, the inquiry of the environmental professional shall include interviewing major occupants, as well as those occupants likely to use, store, treat, handle or dispose of hazardous substances [and in the case of inquiries conducted for persons identified in §312.1(b)(2) pollutants, contaminants, petroleum and petroleum products, and controlled substances (as defined in 21 U.S.C. 802)], or those who have likely done so in the past.

(c) The inquiry of the environmental professional also must include, to the extent necessary to achieve the objectives and performance factors of §312.20(e) and (f), interviewing one or more of the following persons:

(1) Current and past facility managers with relevant knowledge of uses and physical characteristics of the property;

(2) Past owners, occupants, or operators of the subject property; or

(3) Employees of current and past occupants of the subject property.

(d) In the case of inquiries conducted at “abandoned properties,” as defined in §312.10, where there is evidence of potential unauthorized uses of the subject property or evidence of uncontrolled access to the subject property, the environmental professional's inquiry must include interviewing one or more (as necessary) owners or occupants of neighboring or nearby properties from which it appears possible to have observed uses of, or releases at, such abandoned properties for the purpose of gathering information necessary to achieve the objectives and performance factors of §312.20(e) and (f).

**§ 312.24 Reviews of historical sources of information.**

[↑ top](#)

(a) Historical documents and records must be reviewed for the purposes of achieving the objectives and performance factors of §312.20(e) and (f). Historical documents and records may include, but are not limited to, aerial photographs, fire insurance maps, building department records, chain of title documents, and land use records.

(b) Historical documents and records reviewed must cover a period of time as far back in the history of the subject property as it can be shown that the property contained structures or from the time the property was first used for residential, agricultural, commercial, industrial, or governmental purposes. For the purpose of achieving the objectives and performance factors of §312.20(e) and (f), the environmental professional may

exercise professional judgment in context of the facts available at the time of the inquiry as to how far back in time it is necessary to search historical records.

**§ 312.25 Searches for recorded environmental cleanup liens.**

[↑ top](#)

(a) All appropriate inquiries must include a search for the existence of environmental cleanup liens against the subject property that are filed or recorded under federal, tribal, state, or local law.

(b) All information collected regarding the existence of such environmental cleanup liens associated with the subject property by persons to whom this part is applicable per §312.1(b) and not by an environmental professional, may be provided to the environmental professional or retained by the applicable party.

**§ 312.26 Reviews of Federal, State, Tribal, and local government records.**

[↑ top](#)

(a) Federal, tribal, state, and local government records or data bases of government records of the subject property and adjoining properties must be reviewed for the purposes of achieving the objectives and performance factors of §312.20(e) and (f).

(b) With regard to the subject property, the review of federal, tribal, and state government records or data bases of such government records and local government records and data bases of such records should include:

(1) Records of reported releases or threatened releases, including site investigation reports for the subject property;

(2) Records of activities, conditions, or incidents likely to cause or contribute to releases or threatened releases as defined in §312.1(c), including landfill and other disposal unit location records and permits, storage tank records and permits, hazardous waste handler and generator records and permits, federal, tribal and state government listings of sites identified as priority cleanup sites, and spill reporting records;

(3) CERCLIS records;

(4) Public health records;

(5) Emergency Response Notification System records;

(6) Registries or publicly available lists of engineering controls; and

(7) Registries or publicly available lists of institutional controls, including environmental land use restrictions, applicable to the subject property.

(c) With regard to nearby or adjoining properties, the review of federal, tribal, state, and local government records or databases of government records should include the identification of the following:

(1) Properties for which there are government records of reported releases or threatened releases. Such records or databases containing such records and the associated distances from the subject property for which such information should be searched include the following:

- (i) Records of NPL sites or tribal- and state-equivalent sites (one mile);
  - (ii) RCRA facilities subject to corrective action (one mile);
  - (iii) Records of federally-registered, or state-permitted or registered, hazardous waste sites identified for investigation or remediation, such as sites enrolled in state and tribal voluntary cleanup programs and tribal- and state-listed brownfields sites (one-half mile);
  - (iv) Records of leaking underground storage tanks (one-half mile); and
- (2) Properties that previously were identified or regulated by a government entity due to environmental concerns at the property. Such records or databases containing such records and the associated distances from the subject property for which such information should be searched include the following:
- (i) Records of delisted NPL sites (one-half mile);
  - (ii) Registries or publicly available lists of engineering controls (one-half mile); and
  - (iii) Records of former CERCLIS sites with no further remedial action notices (one-half mile).
- (3) Properties for which there are records of federally-permitted, tribal-permitted or registered, or state-permitted or registered waste management activities. Such records or data bases that may contain such records include the following:
- (i) Records of RCRA small quantity and large quantity generators (adjoining properties);
  - (ii) Records of federally-permitted, tribal-permitted, or state-permitted (or registered) landfills and solid waste management facilities (one-half mile); and
  - (iii) Records of registered storage tanks (adjoining property).
- (4) A review of additional government records with regard to sites identified under paragraphs (c)(1) through (c)(3) of this section may be necessary in the judgment of the environmental professional for the purpose of achieving the objectives and performance factors of §312.20(e) and (f).
- (d) The search distance from the subject property boundary for reviewing government records or databases of government records listed in paragraph (c) of this section may be modified based upon the professional judgment of the environmental professional. The rationale for such modifications must be documented by the environmental professional. The environmental professional may consider one or more of the following factors in determining an alternate appropriate search distance:
- (1) The nature and extent of a release;
  - (2) Geologic, hydrogeologic, or topographic conditions of the subject property and surrounding environment;
  - (3) Land use or development densities;
  - (4) The property type;
  - (5) Existing or past uses of surrounding properties;

- (6) Potential migration pathways (e.g., groundwater flow direction, prevalent wind direction); or
- (7) Other relevant factors.

**§ 312.27 Visual inspections of the facility and of adjoining properties.**

[↑ top](#)

(a) For the purpose of achieving the objectives and performance factors of §312.20(e) and (f), the inquiry of the environmental professional must include:

(1) A visual on-site inspection of the subject property and facilities and improvements on the subject property, including a visual inspection of the areas where hazardous substances may be or may have been used, stored, treated, handled, or disposed. Physical limitations to the visual inspection must be noted.

(2) A visual inspection of adjoining properties, from the subject property line, public rights-of-way, or other vantage point (e.g., aerial photography), including a visual inspection of areas where hazardous substances may be or may have been stored, treated, handled or disposed. Physical limitations to the inspection of adjacent properties must be noted.

(b) Persons conducting site characterization and assessments using a grant awarded under CERCLA section 104(k)(2)(B) must include in the inquiries referenced in §312.27(a) visual inspections of areas where hazardous substances, and may include, as applicable per the terms and conditions of the grant or cooperative agreement, pollutants and contaminants, petroleum and petroleum products, and controlled substances as defined in 21 U.S.C. 802 may be or may have been used, stored, treated, handled or disposed at the subject property and adjoining properties.

(c) Except as noted in this subsection, a visual on-site inspection of the subject property must be conducted. In the unusual circumstance where an on-site visual inspection of the subject property cannot be performed because of physical limitations, remote and inaccessible location, or other inability to obtain access to the property, provided good faith (as defined in §312.10) efforts have been taken to obtain such access, an on-site inspection will not be required. The mere refusal of a voluntary seller to provide access to the subject property does not constitute an unusual circumstance. In such unusual circumstances, the inquiry of the environmental professional must include:

(1) Visually inspecting the subject property via another method (such as aerial imagery for large properties), or visually inspecting the subject property from the nearest accessible vantage point (such as the property line or public road for small properties);

(2) Documentation of efforts undertaken to obtain access and an explanation of why such efforts were unsuccessful; and

(3) Documentation of other sources of information regarding releases or threatened releases at the subject property that were consulted in accordance with §312.20(e). Such documentation should include comments by the environmental professional on the significance of the failure to conduct a visual on-site inspection of the subject property with regard to the ability to identify conditions indicative of releases or threatened releases on, at, in, or to the subject property, if any.

**§ 312.28 Specialized knowledge or experience on the part of the defendant.**

[↑ top](#)

(a) Persons to whom this part is applicable per §312.1(b) must take into account, their specialized knowledge of the subject property, the area surrounding the subject property, the conditions of adjoining properties, and any other experience relevant to the inquiry, for the purpose of identifying conditions indicative of releases or threatened releases at the subject property, as defined in §312.1(c).

(b) All appropriate inquiries, as outlined in §312.20, are not complete unless the results of the inquiries take into account the relevant and applicable specialized knowledge and experience of the persons responsible for undertaking the inquiry (as described in §312.1(b)).

**§ 312.29 The relationship of the purchase price to the value of the property, if the property was not contaminated.**

[↑ top](#)

(a) Persons to whom this part is applicable per §312.1(b) must consider whether the purchase price of the subject property reasonably reflects the fair market value of the property, if the property were not contaminated.

(b) Persons who conclude that the purchase price of the subject property does not reasonably reflect the fair market value of that property, if the property were not contaminated, must consider whether or not the differential in purchase price and fair market value is due to the presence of releases or threatened releases of hazardous substances.

(c) Persons conducting site characterization and assessments with the use of a grant awarded under CERCLA section 104(k)(2)(B) and who know that the purchase price of the subject property does not reasonably reflect the fair market value of that property, if the property were not contaminated, must consider whether or not the differential in purchase price and fair market value is due to the presence of releases or threatened releases of hazardous substances, pollutants, contaminants, petroleum and petroleum products, or controlled substances as defined in 21 U.S.C. 802.

**§ 312.30 Commonly known or reasonably ascertainable information about the property.**

[↑ top](#)

(a) Throughout the inquiries, persons to whom this part is applicable per §312.1(b) and environmental professionals conducting the inquiry must take into account commonly known or reasonably ascertainable information within the local community about the subject property and consider such information when seeking to identify conditions indicative of releases or threatened releases, as set forth in §312.1(c), at the subject property.

(b) Commonly known information may include information obtained by the person to whom this part applies in §312.1(b) or by the environmental professional about releases or threatened releases at the subject property that is incidental to the information obtained during the inquiry of the environmental professional.

(c) To the extent necessary to achieve the objectives and performance factors of §312.20(e) and (f), persons to whom this part is applicable per §312.1(b) and the environmental professional must gather information from varied sources whose input either individually or taken together may provide commonly known or reasonably ascertainable information about the subject property; the environmental professional may refer to one or more of the following sources of information:

- (1) Current owners or occupants of neighboring properties or properties adjacent to the subject property;
- (2) Local and state government officials who may have knowledge of, or information related to, the subject property;
- (3) Others with knowledge of the subject property; and
- (4) Other sources of information (e.g., newspapers, Web sites, community organizations, local libraries and historical societies).

**§ 312.31 The degree of obviousness of the presence or likely presence of contamination at the property, and the ability to detect the contamination by appropriate investigation.**

[↑ top](#)

(a) Persons to whom this part is applicable per §312.1(b) and environmental professionals conducting an inquiry of a property on behalf of such persons must take into account the information collected under §312.23 through 312.30 in considering the degree of obviousness of the presence of releases or threatened releases at the subject property.

(b) Persons to whom this part is applicable per §312.1(b) and environmental professionals conducting an inquiry of a property on behalf of such persons must take into account the information collected under §312.23 through 312.30 in considering the ability to detect contamination by appropriate investigation. The inquiry of the environmental professional should include an opinion regarding additional appropriate investigation, if any.

[Browse Previous](#) | [Browse Next](#)

---

For questions or comments regarding e-CFR editorial content, features, or design, email [ecfr@nara.gov](mailto:ecfr@nara.gov).

For questions concerning e-CFR programming and delivery issues, email [webteam@gpo.gov](mailto:webteam@gpo.gov).

[Section 508 / Accessibility](#)