

REFERENCE: R-3300B

PROJECT: 40237

SEE SHEET 3 FOR PLAN SHEET LAYOUT  
AT TIME OF INVESTIGATION

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**STATE OF NORTH CAROLINA**  
DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL ENGINEERING UNIT

**ROADWAY**  
**SUBSURFACE INVESTIGATION**

COUNTY PENDER  
PROJECT DESCRIPTION NC 417 (HAMPSTEAD BYPASS)  
FROM SOUTH OF NC 210 TO US-17  
NORTH OF HAMPSTEAD  
SITE DESCRIPTION HIGHWAY 17 NORTH AND  
SLOOP POINT LOOP ROAD SUBSIDANCE  
INVESTIGATION

**INVENTORY ADDENDUM**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3300B	1	16

**CAUTION NOTICE**

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1919 T07-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

- NOTES:
1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
  2. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PERSONNEL

L. G. PUGH

D. T. CHALMERS, CWD

EDDIE SWAIN

INVESTIGATED BY S. V. HUDSON, LG

DRAWN BY S. V. HUDSON, LG

CHECKED BY J. L. STONE, LG

SUBMITTED BY S. V. HUDSON, LG

DATE MAY 2020



SIGNATURE

DATE

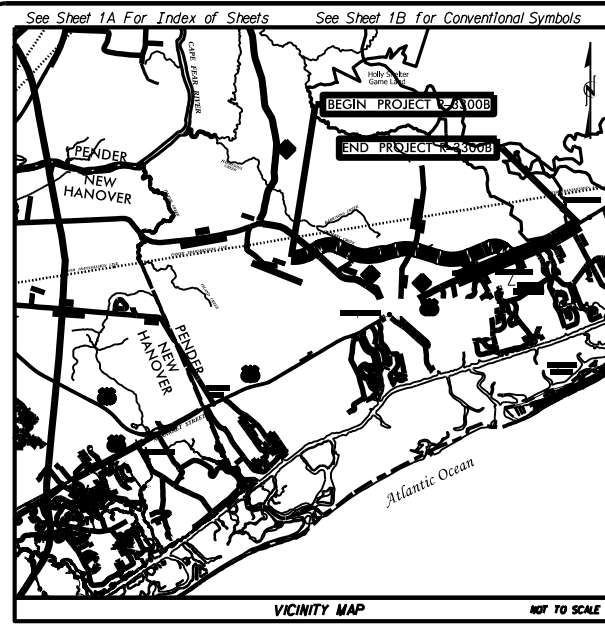
**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

# NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT SUBSURFACE INVESTIGATION SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS																																																											
<p>SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 208, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</p>	<p>WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.</p>	<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL, SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p>	<p><b>ALLUVIUM (ALLUV.)</b> - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. <b>AQUIFER</b> - A WATER BEARING FORMATION OR STRATA. <b>ARENACEOUS</b> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. <b>ARGILLACEOUS</b> - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. <b>ARTESIAN</b> - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. <b>CALCAREOUS (CALC.)</b> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. <b>COLLUVIUM</b> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. <b>CORE RECOVERY (REC.)</b> - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. <b>DIKE</b> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. <b>DIP</b> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. <b>DIP DIRECTION (DIP AZIMUTH)</b> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. <b>FAULT</b> - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. <b>FISSILE</b> - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. <b>FLOAT</b> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL. <b>FLOOD PLAIN (FP)</b> - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. <b>FORMATION (FM)</b> - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. <b>JOINT</b> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. <b>LEDGE</b> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. <b>LENS</b> - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. <b>MOTTLED (MOT.)</b> - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. <b>PERCHED WATER</b> - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. <b>RESIDUAL (RES.) SOIL</b> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. <b>ROCK QUALITY DESIGNATION (RQD)</b> - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. <b>SAPROLITE (SAP.)</b> - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. <b>SILL</b> - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. <b>SLICKENSIDE</b> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. <b>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT)</b> - NUMBER OF BLOWS (IN OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. <b>STRATA CORE RECOVERY (SCREC.)</b> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. <b>STRATA ROCK QUALITY DESIGNATION (SROD)</b> - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. <b>TOPSOIL (TS)</b> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																											
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<p>ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION</p> <p>SOIL SYMBOL</p> <p>ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT</p> <p>INFERRED SOIL BOUNDARY</p> <p>INFERRED ROCK LINE</p> <p>ALLUVIAL SOIL BOUNDARY</p>	<p>DIP &amp; DIP DIRECTION OF ROCK STRUCTURES</p> <p>TEST BORING</p> <p>AUGER BORING</p> <p>CORE BORING</p> <p>MONITORING WELL</p> <p>PIEZOMETER INSTALLATION</p>	<p>SLOPE INDICATOR INSTALLATION</p> <p>CONE PENETROMETER TEST</p> <p>SOUNDING ROD</p> <p>TEST BORING WITH CORE</p> <p>SPT N-VALUE</p>																																																												
RECOMMENDATION SYMBOLS																																																														
<p>UNDERCUT</p> <p>SHALLOW UNDERCUT</p> <p>UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE</p> <p>UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK</p> <p>UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL</p>																																																														
ABBREVIATIONS																																																														
<p>AR - AUGER REFUSAL</p> <p>BT - BORING TERMINATED</p> <p>CL - CLAY</p> <p>CPT - CONE PENETRATION TEST</p> <p>CSE - COARSE</p> <p>DMT - DILATOMETER TEST</p> <p>DPT - DYNAMIC PENETRATION TEST</p> <p>ϕ - VOID RATIO</p> <p>F - FINE</p> <p>FOSS. - FOSSILIFEROUS</p> <p>FRAC. - FRACTURED, FRACTURES</p> <p>FRAGS. - FRAGMENTS</p> <p>HI. - HIGHLY</p>	<p>MED. - MEDIUM</p> <p>MICA - MICACEOUS</p> <p>MOD. - MODERATELY</p> <p>NP - NON PLASTIC</p> <p>ORG. - ORGANIC</p> <p>PMT - PRESSUREMETER TEST</p> <p>SAP. - SAPROLITIC</p> <p>SD. - SAND, SANDY</p> <p>SL. - SILTY, SILTY</p> <p>SLI. - SLIGHTLY</p> <p>TCR - TRIAXIAL REFUSAL</p> <p>W - MOISTURE CONTENT</p> <p>V - VERY</p>	<p>VST - VANE SHEAR TEST</p> <p>WEA. - WEATHERED</p> <p>W. - UNIT WEIGHT</p> <p>W. - DRY UNIT WEIGHT</p> <p>SAMPLE ABBREVIATIONS</p> <p>S - BULK</p> <p>SS - SPLIT SPOON</p> <p>ST - SHELBY TUBE</p> <p>RS - ROCK</p> <p>RT - RECOMPACTED TRIAXIAL</p> <p>CBR - CALIFORNIA BEARING RATIO</p>																																																												
EQUIPMENT USED ON SUBJECT PROJECT																																																														
<p>DRILL UNITS:</p> <p><input type="checkbox"/> CME-45C</p> <p><input type="checkbox"/> CME-55</p> <p><input checked="" type="checkbox"/> CME-550</p> <p><input type="checkbox"/> VANE SHEAR TEST</p> <p><input type="checkbox"/> PORTABLE HOIST</p> <p><input checked="" type="checkbox"/> CPT</p>	<p>ADVANCING TOOLS:</p> <p><input type="checkbox"/> CLAY BITS</p> <p><input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER</p> <p><input type="checkbox"/> 8" HOLLOW AUGERS</p> <p><input type="checkbox"/> HARD FACED FINGER BITS</p> <p><input type="checkbox"/> TUNG-CARBIDE INSERTS</p> <p><input checked="" type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER</p> <p><input checked="" type="checkbox"/> TRICONE <input type="checkbox"/> 2 1/4" STEEL TEETH</p> <p><input type="checkbox"/> TRICONE <input type="checkbox"/> TUNG-CARB.</p> <p><input type="checkbox"/> CORE BIT</p>	<p>HAMMER TYPE:</p> <p><input type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL</p> <p>CORE SIZE:</p> <p><input type="checkbox"/> -B <input type="checkbox"/> -H</p> <p><input type="checkbox"/> -N</p> <p>HAND TOOLS:</p> <p><input type="checkbox"/> POST HOLE DIGGER</p> <p><input type="checkbox"/> HAND AUGER</p> <p><input type="checkbox"/> SOUNDING ROD</p> <p><input type="checkbox"/> VANE SHEAR TEST</p>																																																												
ROCK HARDNESS																																																														
<p>VERY HARD</p> <p>HARD</p> <p>MODERATELY HARD</p> <p>MEDIUM HARD</p> <p>SOFT</p> <p>VERY SOFT</p>	<p>CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</p> <p>CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</p> <p>CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.</p> <p>CAN BE GROUDED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.</p> <p>CAN BE GROUDED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.</p> <p>CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.</p>																																																													
FRACTURE SPACING																																																														
<table border="1"><thead><tr><th>TERM</th><th>SPACING</th></tr></thead><tbody><tr><td>VERY WIDE</td><td>MORE THAN 10 FEET</td></tr><tr><td>WIDE</td><td>3 TO 10 FEET</td></tr><tr><td>MODERATELY CLOSE</td><td>1 TO 3 FEET</td></tr><tr><td>CLOSE</td><td>0.16 TO 1 FOOT</td></tr><tr><td>VERY CLOSE</td><td>LESS THAN 0.16 FEET</td></tr></tbody></table>	TERM	SPACING	VERY WIDE	MORE THAN 10 FEET	WIDE	3 TO 10 FEET	MODERATELY CLOSE	1 TO 3 FEET	CLOSE	0.16 TO 1 FOOT	VERY CLOSE	LESS THAN 0.16 FEET																																																		
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<p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p> <p>FRIABLE</p> <p>MODERATELY INDURATED</p> <p>INDURATED</p> <p>EXTREMELY INDURATED</p>	<p>RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</p> <p>GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</p> <p>GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</p> <p>SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</p>																																																													
BENCH MARK: BORING AND SOUNDING LOCATIONS AND ELEVATIONS OBTAINED WITH A RTK VRS SURVEY GRADE GLOBAL POSITIONING SYSTEM. ELEVATION: FEET																																																														
NOTES: FIAD = FILLED IMMEDIATELY AFTER DRILLING																																																														
			<p> = CPT DATA OUT OF RANGE</p>																																																											
			<p>DATE: 8-15-14</p>																																																											

06-MAY-2020 11:31 S:\wpmk\T9\PROJECT\2020\220033 STANTEC SLOOP POINT LOOP SINKHOLE\R3300B-GEO\_RDWY\_SloopPointSinkhole\CADD\_GEO\TECH\Site\_Sub\VR3300B\_rdy\_tsh.dgn  
 06/08/19  
 SHUDSON-PC AT SHUDSON-PC

**CONTRACT: TIP PROJECT: R-3300B**



STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

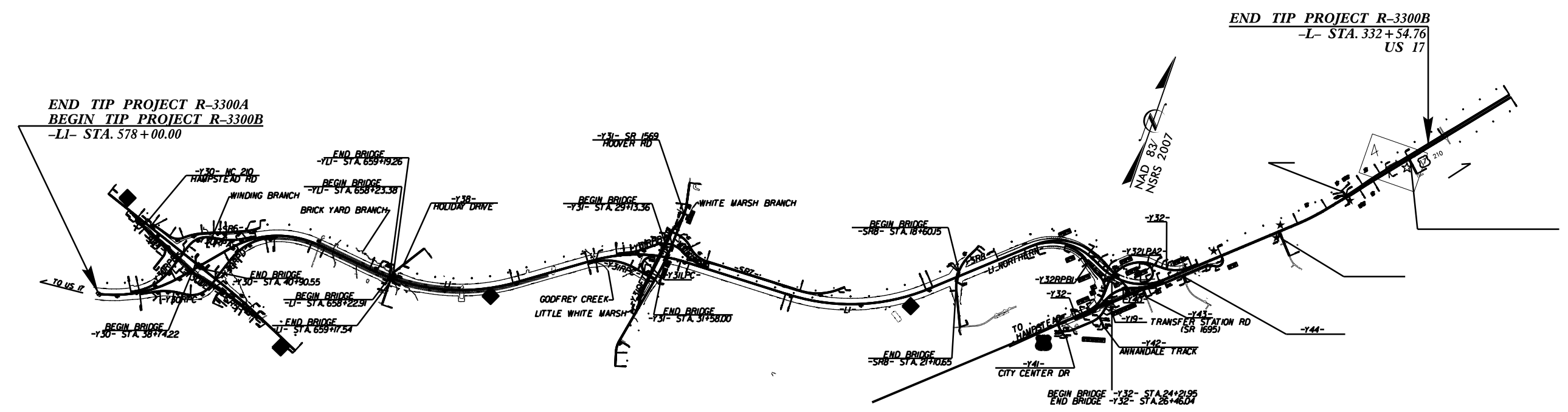


STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3300B	3	16
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
40237.1.1	N/A	PE	
40237.2.1	N/A	R/W	

**PENDER COUNTY**

**LOCATION: NC 417 (HAMPSTEAD BYPASS) FROM SOUTH OF NC 210 TO EAST OF SR 1563 (SLOOP POINT LOOP ROAD).**

**TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURES, SIGNALS, AND CULVERTS**



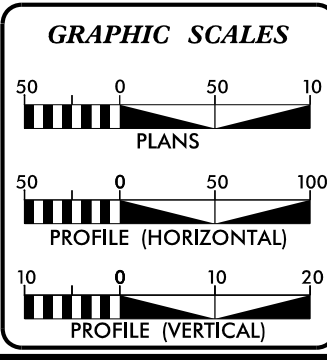
END TIP PROJECT R-3300A  
BEGIN TIP PROJECT R-3300B  
-LI- STA. 578+00.00

END TIP PROJECT R-3300B  
-L- STA. 332+54.76  
US 17

☆  
☆

-PART OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF HAMPSTEAD.  
-THIS IS A CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.  
-CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY MODIFIED METHOD III.

**INCOMPLETE PLANS**  
DO NOT USE FOR R/W ACQUISITION  
DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED



**DESIGN DATA**

ADT 2016 =	N/A
ADT 2040 =	55,400
DHV =	8 %
D =	60 %
T =	6 % *
V =	70 MPH
*(TTST 2% + DUALS 4%)	
FUNC CLASS =	FREWAY
REGIONAL TIER	

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT R-3300B	=	6.893 MILES
LENGTH STRUCTURE TIP PROJECT R-3300B	=	0.023 MILES
TOTAL LENGTH TIP PROJECT R-3300B	=	6.916 MILES

PREPARED IN THE OFFICE OF:  
**Stantec**  
STANTEC CONSULTING  
801 Jones Franklin Road | Suite 300 | Raleigh, NC 27606  
Tel. (919) 851-6866 | Fax. (919) 851-7024 | www.stantec.com  
License No. P-0072

FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
2018 STANDARD SPECIFICATIONS

**RIGHT OF WAY DATE:**  
APRIL 1, 2019

**LETTING DATE:**  
SEPTEMBER 10, 2020

**MICHAEL D. LINDGREN, P.E.**  
PROJECT ENGINEER

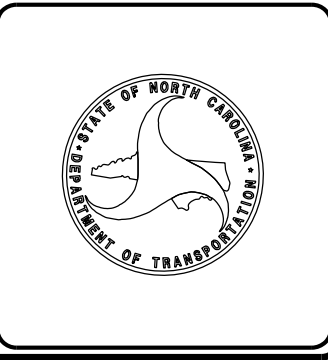
**TRACE HOWELL, P.E.**  
NCDOT DIVISION 3 CONTACT

**HYDRAULICS ENGINEERS**

SIGNATURE: \_\_\_\_\_ P.E.

**ROADWAY DESIGN ENGINEER**

SIGNATURE: \_\_\_\_\_ P.E.



WBS Number: 40237.1.1  
 TIP Number: R-3300B  
 F.A .Project N/A  
 County: Pender  
 Description: NC 417 (Hampstead Bypass) From South of NC 210 to US-17 North of Hampstead  
 Site Description: Highway 17 North and Sloop Point Loop Road Subsidence Investigation  
 CATLIN Number: 220033  
 SUBJECT: Geotechnical Inventory Report Addendum

**Project Description**

This project begins at the northern terminus of NCDOT TIP Project R-3300A, north of Wilmington and extends northward for approximately 6± miles. This Geotechnical Investigation Addendum (Addendum) was confined to an area of observed subsidence along existing US Highway 17 North (Alignment -LRT-) between approximate Stations 317+00 and 330+00. Alignment -LRT- was previously investigated by Falcon Engineering under TIP U-5732.

Fieldwork associated with this Addendum was conducted from in March 2020. Twelve Cone Penetration Tests (CPT) borings were advanced at approximately 100 foot intervals along -LRT- then three (3) Standard Penetration Tests (SPT) borings were advanced adjacent to three (3) of the CPT borings to facilitate collection of representative soil samples in addition to identifying materials which the CPT was unable to penetrate. Representative soil samples have been collected for visual classification in the field and for laboratory analysis. A subsurface profile along the area of investigation including laboratory analytical results is included in this report.

**Areas of Special Geotechnical Interest**

- 1) The entire area of investigation exhibit high groundwater.
- 2) The following sections contain organic soils that have the potential to cause embankment/subgrade and or slope stability problems during construction.

<u>Line</u>	<u>Station (±)</u>
-LRT-	317+00 to 319+73
-LRT-	320+13 to 321+90
-LRT-	326+13 to 327+84

- 3) No cohesive soils that have the potential to cause embankment/subgrade and or slope stability problems during construction were identified during this Addendum investigation.

- 4) No water wells were encountered.
- 5) No ponds were encountered in the vicinity of this investigation.

**Physiography and Geology**

This project corridor is located within the Coastal Plain Physiographic Province. Topography along the project is nearly flat to gently sloping. Ground elevations range from 20± to 65± feet above sea level.

Surficial soils in this area are generally classified as alluvial and undivided coastal plain sediments.

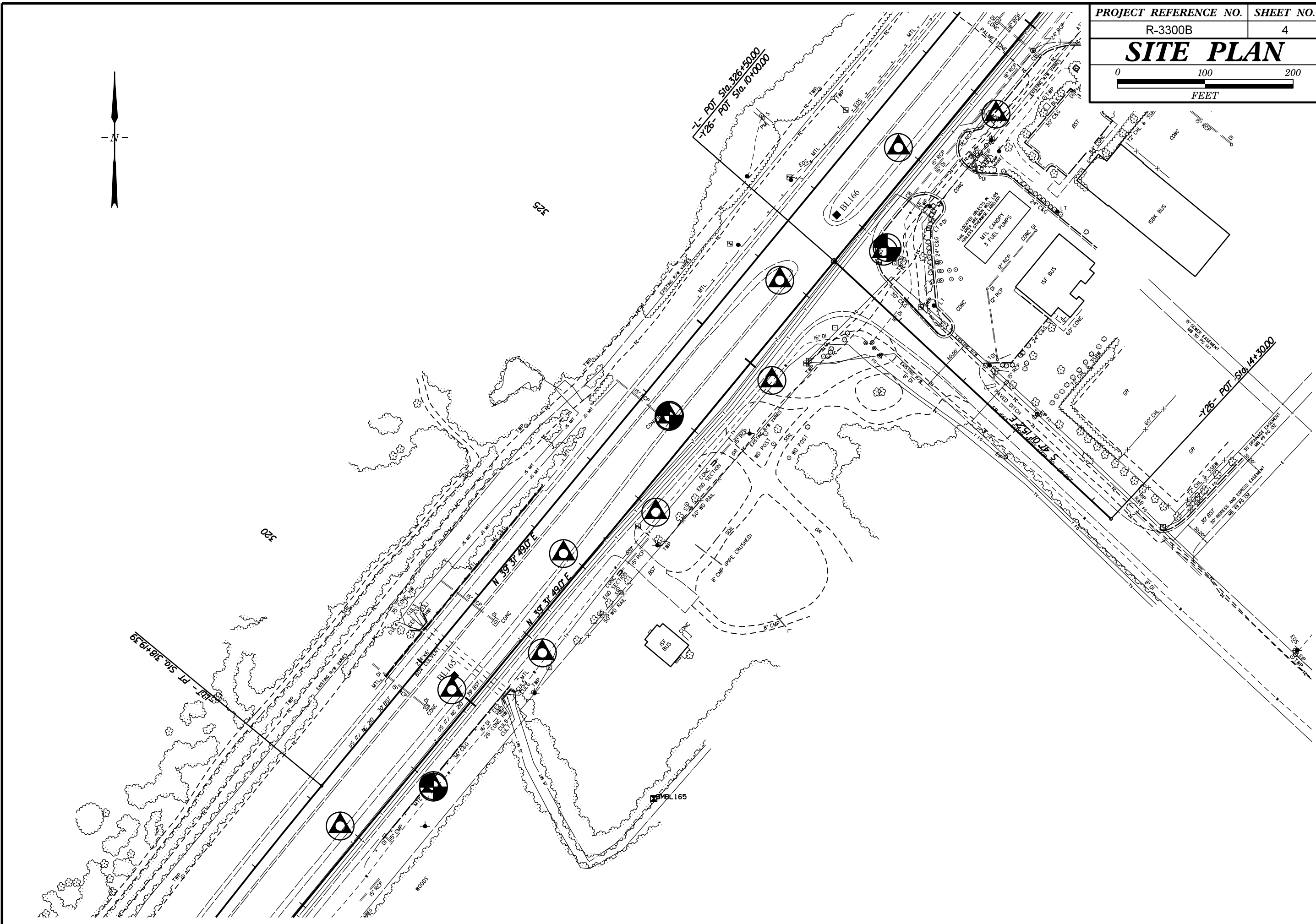
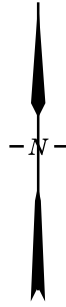
**Ground Water**

Groundwater was measured in open boreholes 24 hours subsequent to borehole completion of SPT borings at depths ranging from 3.2 feet to 7.6 feet below existing land surface (BLS). Pore pressure measurements were used from the CPT borings to estimate groundwater depths; these estimated values ranged from 3.4 to 8.9 feet BLS with an average depth of 5.8 feet BLS.

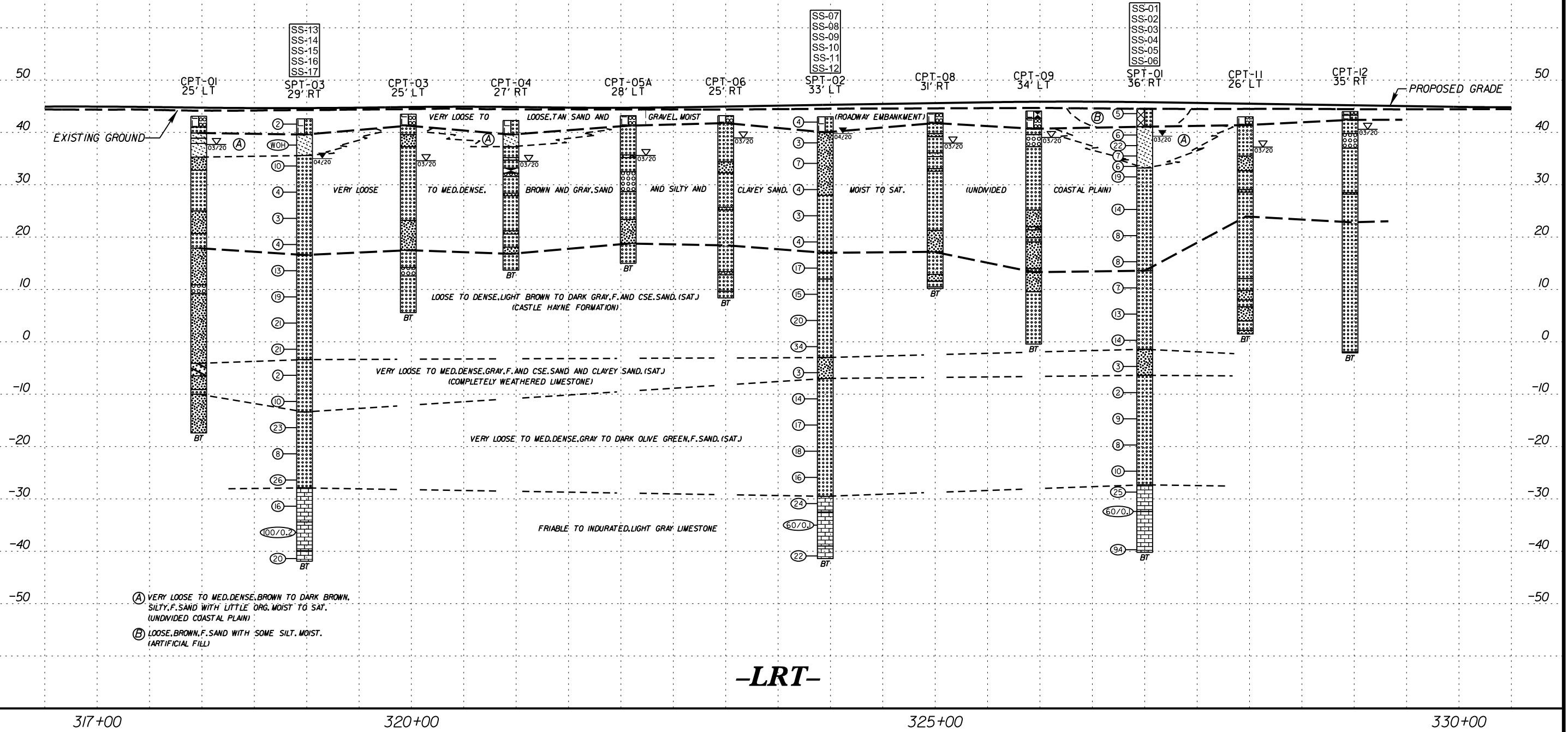
**Soils**

Soils encountered along the area of investigation include roadway embankment, artificial fill, undivided coastal plain sediments, and those belonging to the Castle Hayne Formation.

- Roadway Embankment soils were identified adjacent to existing roadways and consists of 2± to 3± feet of very loose to loose, sand and silty sand (A-3, A-2-4, and A-1).
- Artificial fill consisting of 3± feet of loose sand (A-3) was encountered adjacent to an existing business located near the intersection of US 17 North and Sloop Point Loop Road.
- Undivided Coastal Plain (U.C.P) soils primarily consist of approximately 23 feet of very loose to medium dense sand and clayey and clayey sand (A-3, A-2-4 and A-2-6). Organic soils were also encountered above the sands. They are primarily comprised of 4± to 8± feet of very loose to medium dense silty sand with trace to moderate organic matter. Laboratory analysis of these organic soils returned organic contents ranging from 3.1% to 4.2%.
- The Castle Hayne Formation underlies the U.C.P. soils along the area of investigation at an average elevation of approximately 17 feet. A loose to dense layer of fine and coarse sand was identified to an average elevation of -3± where an approximate two (2) to three (3) foot thick layer of very loose to medium sand and clayey sand that resembled “completely” weathered limestone was encountered. Very loose to medium dense sand was described beneath the weathered limestone to an average elevation of -28± feet where friable to moderately indurated limestone was encountered in the SPT borings to their termination ranging from 84.5 to 84.8 feet BLS.



SAMPLE NUMBER	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P. I.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
							SS-13	29 ft RT	318+98	4.0 - 5.5	A-2-4(0)	NP	NP		
SS-14	29 ft RT	318+98	18.0 - 19.5	A-3(0)	NP	NP	8.0	90.6	1.4	0.0	99.3	95	2	-	-
SS-15	29 ft RT	318+98	28.0 - 29.5	A-3(0)	NP	NP	41.4	50.0	3.6	5.0	99.6	83	10	-	-
SS-16	29 ft RT	318+98	48.0 - 49.5	A-3(0)	NP	NP	11.1	81.6	3.3	4.0	98.5	93	8	-	-
SS-17	29 ft RT	318+98	58.0 - 59.5	A-3(0)	NP	NP	1.3	94.3	3.4	1.0	99.9	99	6	-	-
SS-07	33 ft LT	323+95	4.0 - 5.5	A-2-4(0)	NP	NP	3.0	79.8	9.1	8.1	100	100	19	-	3.7
SS-08	33 ft LT	323+95	17.9 - 19.4	A-3(0)	NP	NP	2.9	95.2	0.9	1.0	99.7	99	2	-	-
SS-09	33 ft LT	323+95	27.9 - 29.4	A-3(0)	NP	NP	42.3	50.2	3.3	4.2	99.9	81	9	-	-
SS-10	33 ft LT	323+95	37.9 - 39.4	A-3(0)	NP	NP	0.7	92.5	3.6	3.2	99.9	100	8	-	-
SS-11	33 ft LT	323+95	47.9 - 49.4	A-2-4(0)	NP	NP	41.3	38.3	8.9	11.6	95.5	72	21	-	-
SS-12	33 ft LT	323+95	62.9 - 64.4	A-3(0)	NP	NP	1.6	93.8	3.6	1.0	100	99	6	-	-
SS-01	36 ft RT	327+00	6.1 - 7.6	A-2-4(0)	NP	NP	6.8	79.0	4.1	10.1	100	98	15	-	3.1
SS-02	36 ft RT	327+00	10.1 - 11.4	A-2-4(0)	NP	NP	4.1	81.1	9.8	5.1	100	100	16	-	3.4
SS-03	36 ft RT	327+00	18.3 - 19.8	A-3(0)	NP	NP	3.9	94.8	1.3	0.0	100	99	2	-	-
SS-04	36 ft RT	327+00	38.3 - 39.8	A-3(0)	NP	NP	82.6	14.1	1.3	2.0	99.5	52	3	-	-
SS-05	36 ft RT	327+00	48.3 - 49.8	A-2-4(0)	NP	NP	72.5	15.3	3.8	8.4	92.9	52	13	-	-
SS-06	36 ft RT	327+00	63.3 - 64.8	A-3(0)	NP	NP	0.6	95.6	1.8	2.0	100	100	5	-	-



**-LRT-**

07-MAY-2020 14:26  
 S:\p\mk\g\PROJECT\2020\220033 STANTEC SLOOP POINT LOOP SINKHOLE\3300B\_GEO\_RDWY\_SloopPointSinkhole\CADD\_GEO\TECH\Plan\Prof\3300B\_GEO\_RDWY\_sinkhole.pfl.dgn  
 5/28/20

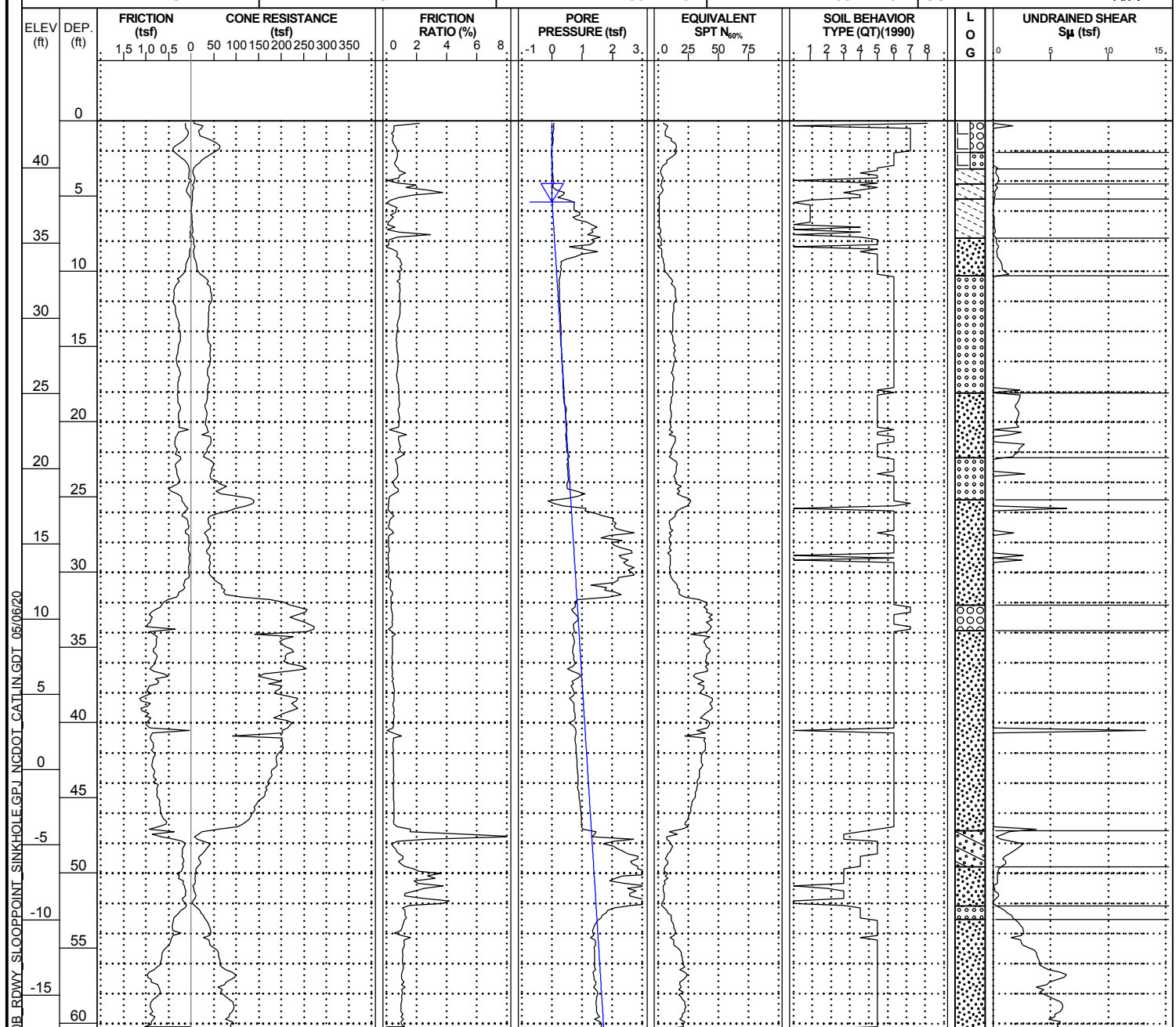


***APPENDIX I***  
***BORING LOGS***

# CONE PENETROMETER TEST BORING REPORT

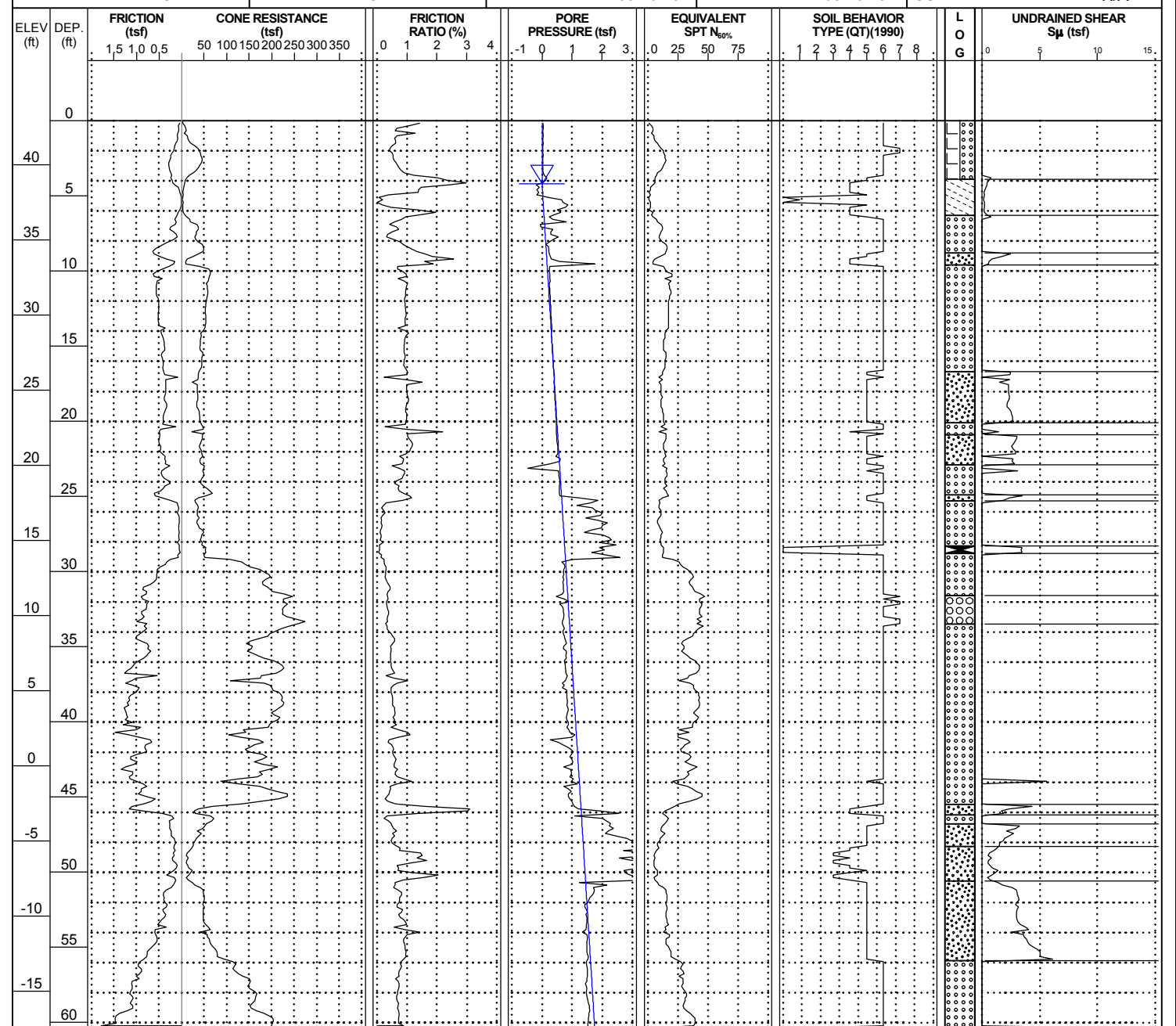


<b>WBS:</b> 40237.1.1	<b>TIP:</b> R-3300B	<b>COUNTY:</b> PENDER	<b>GEOLOGIST:</b> S. HUDSON
<b>SITE DESCRIPTION:</b> HWY 17 NORTH AND SLOOP POINT LOOP ROAD			<b>GROUND WTR (ft)</b>
<b>BORING NO.:</b> CPT-01	<b>STATION:</b> 317+97	<b>OFFSET:</b> 25 ft LT	<b>ALIGNMENT:</b> -L-
<b>COLLAR ELEV.:</b> 43.1 ft	<b>TOTAL DEPTH:</b> 60.5 ft	<b>NORTHING:</b> 243,728	<b>EASTING:</b> 2,405,807
<b>CPT RIG/MAX. DOWN PRESSURE:</b> CATLIN CPT/DPT-01 / 9 tons - NO ANCHORS		<b>CONE TYPE:</b> TYPE II PIEZOCONE	<b>CONE ID:</b> DSG0867
<b>DRILLER:</b> EDDIE SWAIN	<b>OPERATOR:</b> CATLIN	<b>START DATE:</b> 03/17/20	<b>COMP. DATE:</b> 03/17/20
		<b>SURF. WATER DEPTH:</b> N/A	



Boring Terminated at  
Elevation -17.4 ft  
(0 HR. GROUNDWATER  
ESTIMATED FROM PORE  
PRESSURE)

<b>WBS:</b> 40237.1.1	<b>TIP:</b> R-3300B	<b>COUNTY:</b> PENDER	<b>GEOLOGIST:</b> S. HUDSON
<b>SITE DESCRIPTION:</b> HWY 17 NORTH AND SLOOP POINT LOOP ROAD			<b>GROUND WTR (ft)</b>
<b>BORING NO.:</b> CPT-02	<b>STATION:</b> 318+99	<b>OFFSET:</b> 28 ft RT	<b>ALIGNMENT:</b> -L-
<b>COLLAR ELEV.:</b> 42.9 ft	<b>TOTAL DEPTH:</b> 60.5 ft	<b>NORTHING:</b> 243,774	<b>EASTING:</b> 2,405,913
<b>CPT RIG/MAX. DOWN PRESSURE:</b> CATLIN CPT/DPT-01 / 9 tons - NO ANCHORS		<b>CONE TYPE:</b> TYPE II PIEZOCONE	<b>CONE ID:</b> DSG0867
<b>DRILLER:</b> EDDIE SWAIN	<b>OPERATOR:</b> CATLIN	<b>START DATE:</b> 03/16/20	<b>COMP. DATE:</b> 03/16/20
		<b>SURF. WATER DEPTH:</b> N/A	



Boring Terminated at  
Elevation -17.6 ft  
(0 HR. GROUNDWATER  
ESTIMATED FROM PORE  
PRESSURE)

NCDOI CPT DOUBLE (PORTRAIT) NO-LITH. R3300B\_RDWY\_SLOOPPOINT\_SINKHOLE.GPJ\_NCDOT\_CATLIN.GDT\_05/06/20

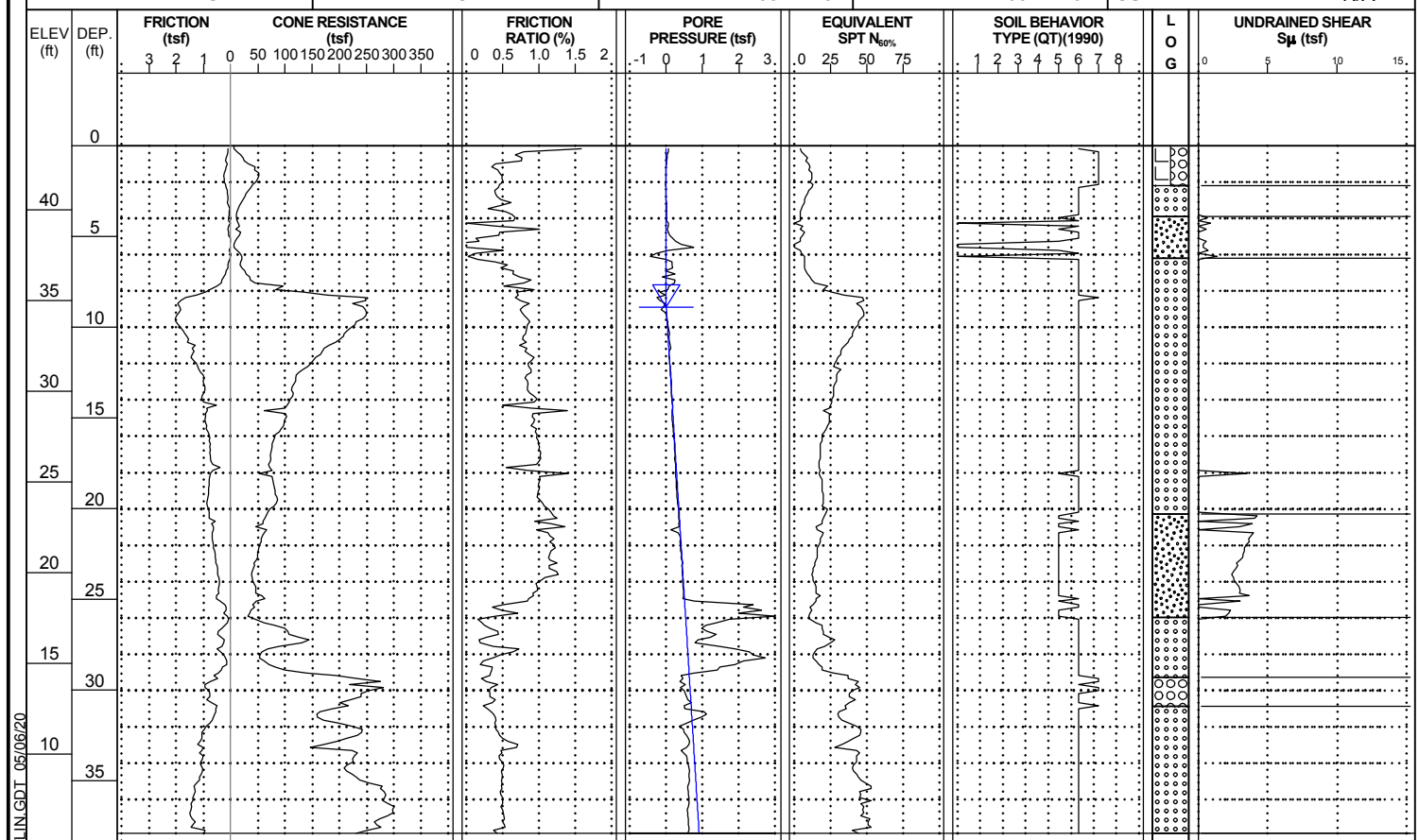




# CONE PENETROMETER TEST BORING REPORT

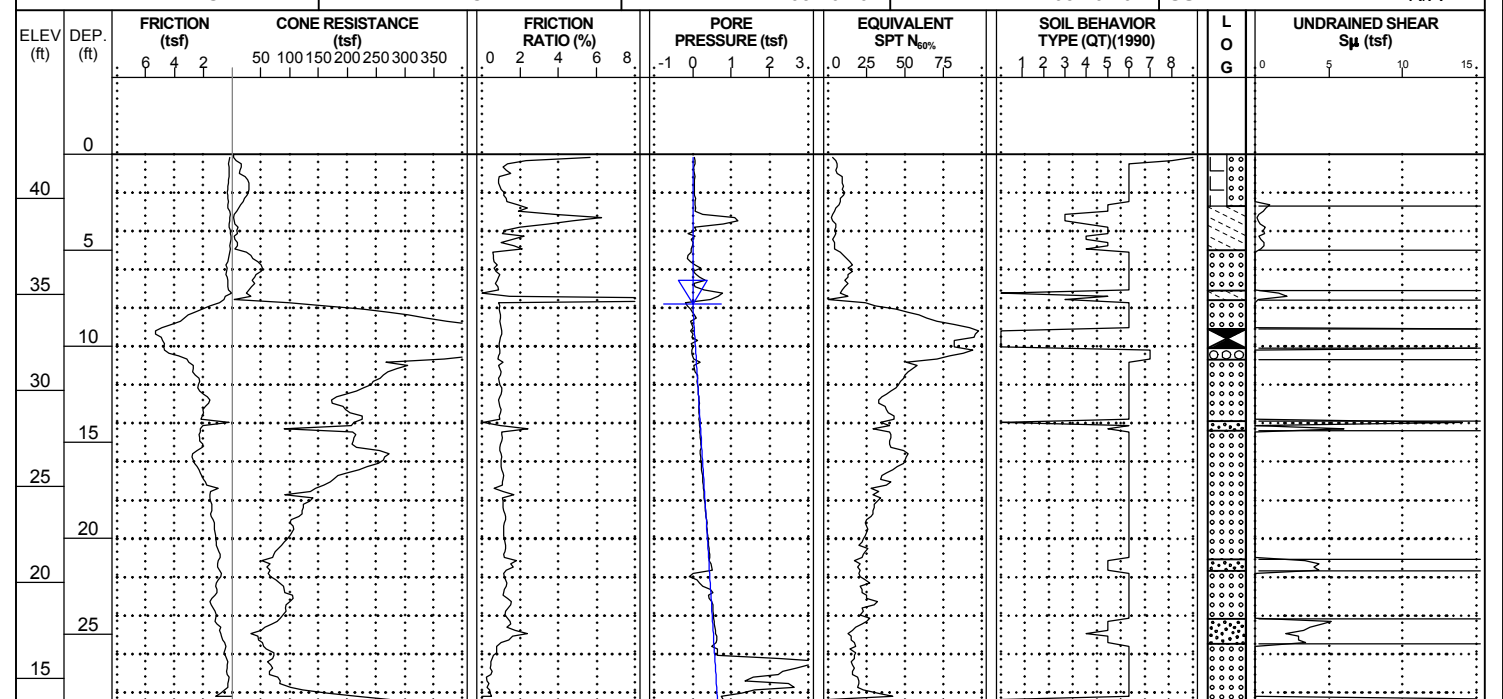


<b>WBS:</b> 40237.1.1	<b>TIP:</b> R-3300B	<b>COUNTY:</b> PENDER	<b>GEOLOGIST:</b> S. HUDSON
<b>SITE DESCRIPTION:</b> HWY 17 NORTH AND SLOOP POINT LOOP ROAD			<b>GROUND WTR (ft)</b>
<b>BORING NO.:</b> CPT-03	<b>STATION:</b> 319+97	<b>OFFSET:</b> 25 ft LT	<b>ALIGNMENT:</b> -L-
<b>COLLAR ELEV.:</b> 43.5 ft	<b>TOTAL DEPTH:</b> 37.9 ft	<b>NORTHING:</b> 243,883	<b>EASTING:</b> 2,405,934
<b>CPT RIG/MAX. DOWN PRESSURE:</b> CATLIN CPT/DPT-01 / 9 tons - NO ANCHORS		<b>CONE TYPE:</b> TYPE II PIEZOCONE	<b>CONE ID:</b> DSG0867
<b>DRILLER:</b> EDDIE SWAIN	<b>OPERATOR:</b> CATLIN	<b>START DATE:</b> 03/17/20	<b>COMP. DATE:</b> 03/17/20
		<b>SURF. WATER DEPTH:</b> N/A	



Boring Terminated WITH  
CONE PENETRATION  
TEST REFUSAL at  
Elevation 5.6 ft  
(0 HR. GROUNDWATER  
ESTIMATED FROM PORE  
PRESSURE)

<b>WBS:</b> 40237.1.1	<b>TIP:</b> R-3300B	<b>COUNTY:</b> PENDER	<b>GEOLOGIST:</b> S. HUDSON
<b>SITE DESCRIPTION:</b> HWY 17 NORTH AND SLOOP POINT LOOP ROAD			<b>GROUND WTR (ft)</b>
<b>BORING NO.:</b> CPT-04	<b>STATION:</b> 320+95	<b>OFFSET:</b> 27 ft RT	<b>ALIGNMENT:</b> -L-
<b>COLLAR ELEV.:</b> 42.3 ft	<b>TOTAL DEPTH:</b> 28.6 ft	<b>NORTHING:</b> 243,925	<b>EASTING:</b> 2,406,037
<b>CPT RIG/MAX. DOWN PRESSURE:</b> CATLIN CPT/DPT-01 / 9 tons - NO ANCHORS		<b>CONE TYPE:</b> TYPE II PIEZOCONE	<b>CONE ID:</b> DSG0867
<b>DRILLER:</b> EDDIE SWAIN	<b>OPERATOR:</b> CATLIN	<b>START DATE:</b> 03/16/20	<b>COMP. DATE:</b> 03/16/20
		<b>SURF. WATER DEPTH:</b> N/A	



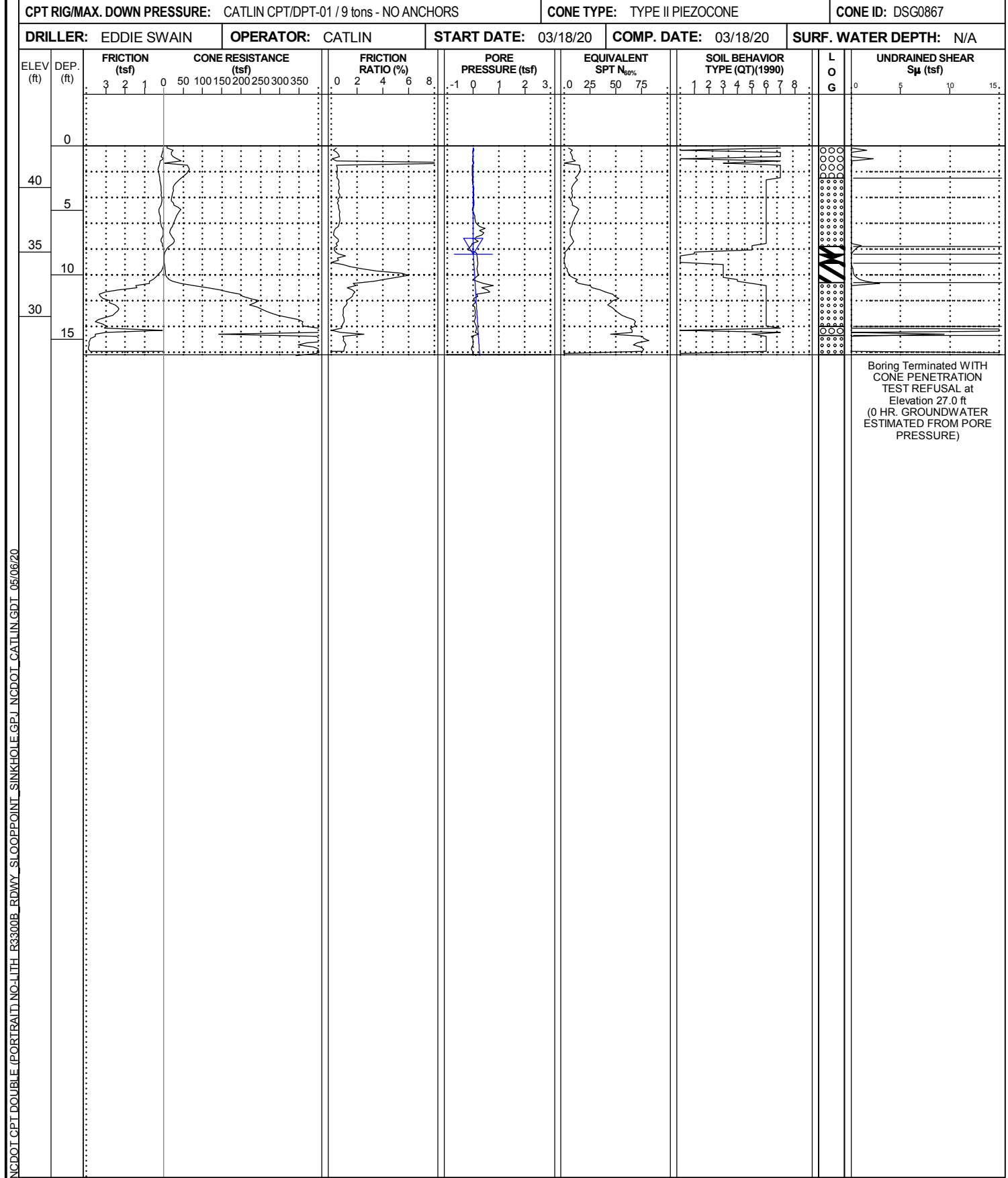
Boring Terminated WITH  
CONE PENETRATION  
TEST REFUSAL at  
Elevation 13.7 ft  
(0 HR. GROUNDWATER  
ESTIMATED FROM PORE  
PRESSURE)

NCDOI CPT DOUBLE (PORTRAIT) NO-LITH\_R3300B\_RDWY\_SLOOPPOINT\_SINKHOLE.GPJ\_NCDOT\_CATLIN.GDT\_06/06/20

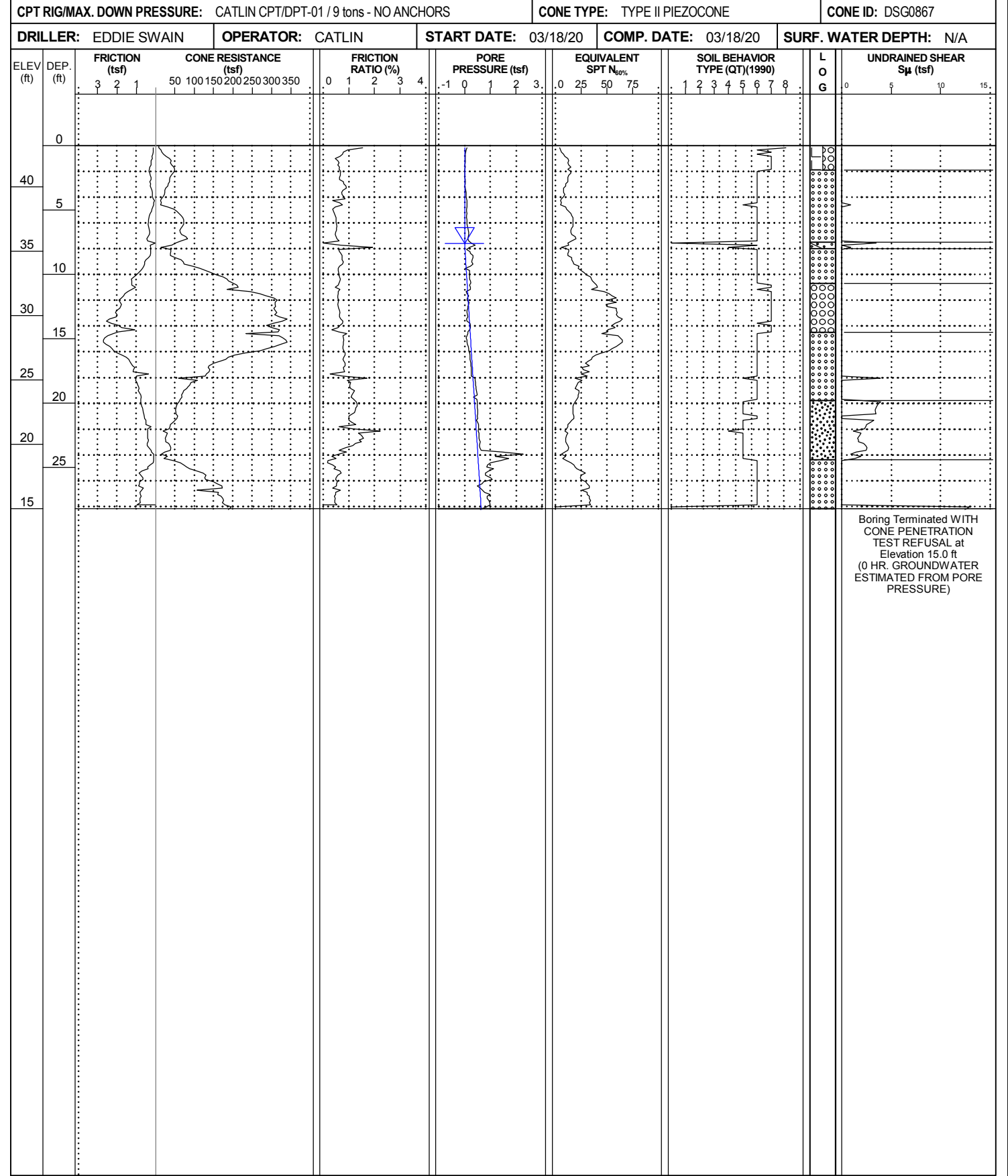
# CONE PENETROMETER TEST BORING REPORT



<b>WBS:</b> 40237.1.1	<b>TIP:</b> R-3300B	<b>COUNTY:</b> PENDER	<b>GEOLOGIST:</b> S. HUDSON
<b>SITE DESCRIPTION:</b> HWY 17 NORTH AND SLOOP POINT LOOP ROAD			<b>GROUND WTR (ft)</b>
<b>BORING NO.:</b> CPT-05	<b>STATION:</b> 321+97	<b>OFFSET:</b> 26 ft LT	<b>ALIGNMENT:</b> -L-
<b>COLLAR ELEV.:</b> 43.2 ft	<b>TOTAL DEPTH:</b> 16.2 ft	<b>NORTHING:</b> 244,038	<b>EASTING:</b> 2,406,061
<b>CPT RIG/MAX. DOWN PRESSURE:</b> CATLIN CPT/DPT-01 / 9 tons - NO ANCHORS		<b>CONE TYPE:</b> TYPE II PIEZOCONE	<b>CONE ID:</b> DSG0867
<b>DRILLER:</b> EDDIE SWAIN	<b>OPERATOR:</b> CATLIN	<b>START DATE:</b> 03/18/20	<b>COMP. DATE:</b> 03/18/20
		<b>SURF. WATER DEPTH:</b> N/A	



<b>WBS:</b> 40237.1.1	<b>TIP:</b> R-3300B	<b>COUNTY:</b> PENDER	<b>GEOLOGIST:</b> S. HUDSON
<b>SITE DESCRIPTION:</b> HWY 17 NORTH AND SLOOP POINT LOOP ROAD			<b>GROUND WTR (ft)</b>
<b>BORING NO.:</b> CPT-05A	<b>STATION:</b> 322+07	<b>OFFSET:</b> 28 ft LT	<b>ALIGNMENT:</b> -L-
<b>COLLAR ELEV.:</b> 43.2 ft	<b>TOTAL DEPTH:</b> 28.2 ft	<b>NORTHING:</b> 244,047	<b>EASTING:</b> 2,406,066
<b>CPT RIG/MAX. DOWN PRESSURE:</b> CATLIN CPT/DPT-01 / 9 tons - NO ANCHORS		<b>CONE TYPE:</b> TYPE II PIEZOCONE	<b>CONE ID:</b> DSG0867
<b>DRILLER:</b> EDDIE SWAIN	<b>OPERATOR:</b> CATLIN	<b>START DATE:</b> 03/18/20	<b>COMP. DATE:</b> 03/18/20
		<b>SURF. WATER DEPTH:</b> N/A	

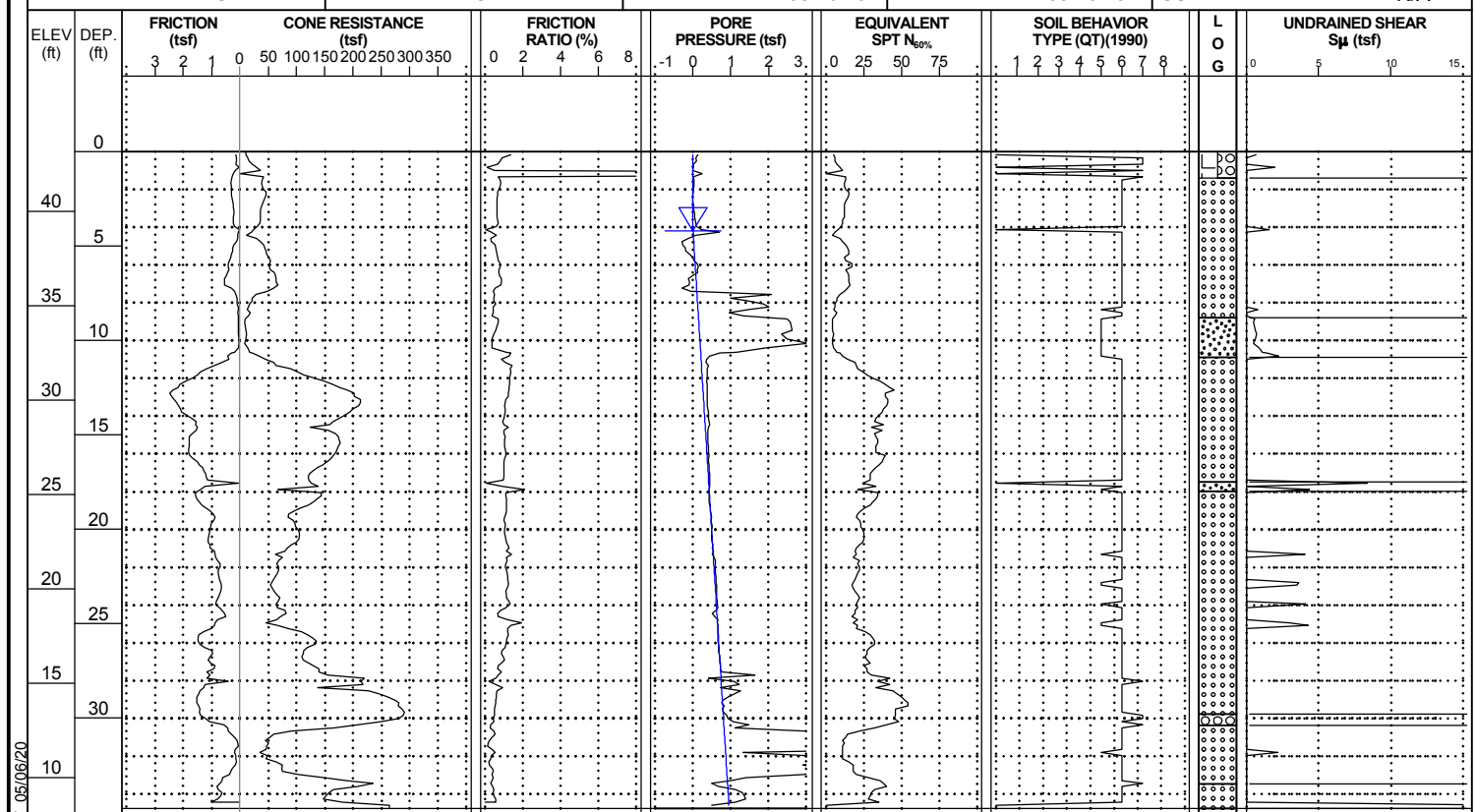


NCDOT CPT DOUBLE (PORTRAIT) NO-LITH\_R3300B\_RDWY\_SLOOPPOINT\_SINKHOLE.GPJ\_NCDOT\_CATLIN.GDT\_05/06/20

# CONE PENETROMETER TEST BORING REPORT

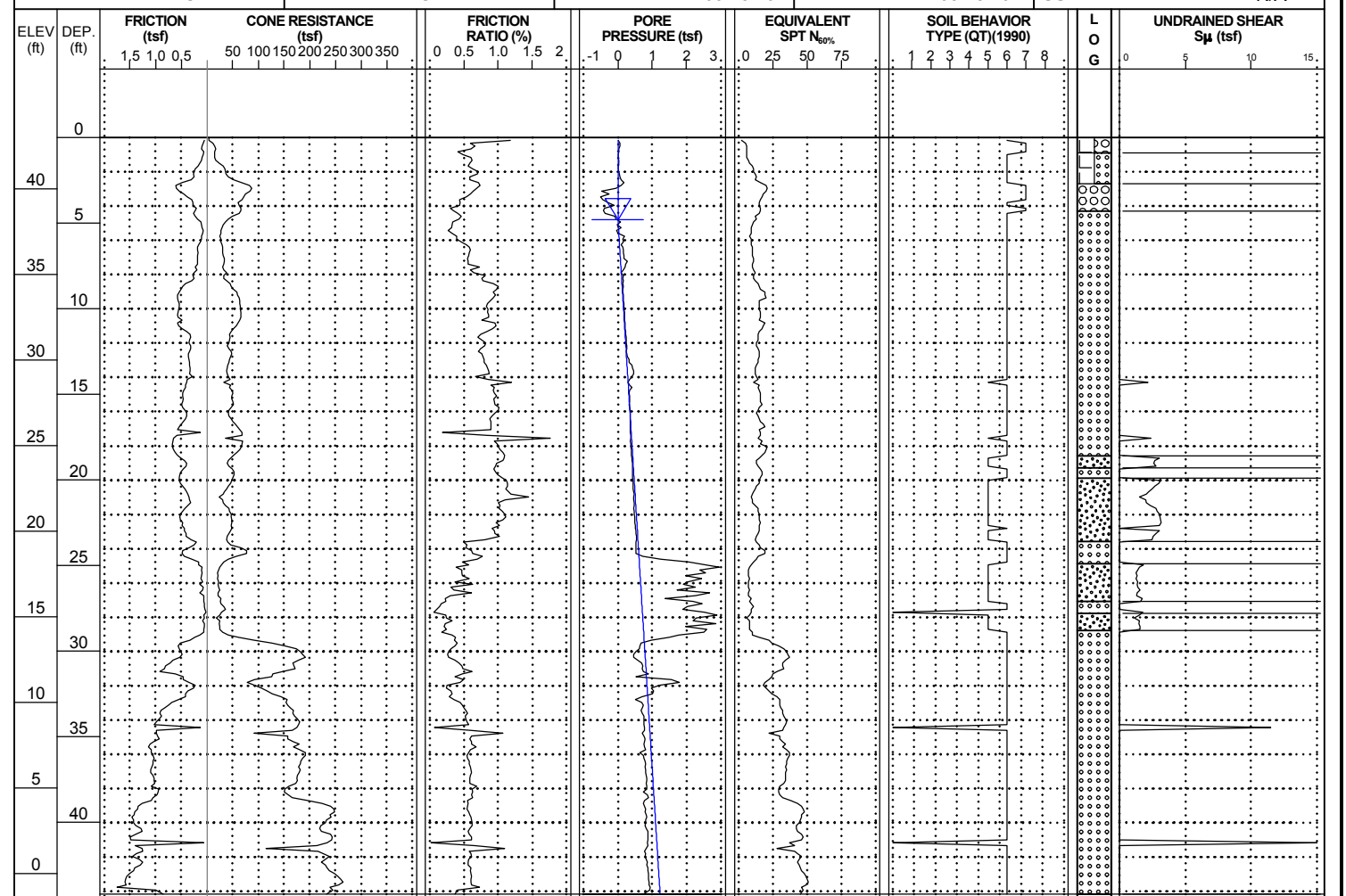


<b>WBS:</b> 40237.1.1	<b>TIP:</b> R-3300B	<b>COUNTY:</b> PENDER	<b>GEOLOGIST:</b> S. HUDSON
<b>SITE DESCRIPTION:</b> HWY 17 NORTH AND SLOOP POINT LOOP ROAD			<b>GROUND WTR (ft)</b>
<b>BORING NO.:</b> CPT-06	<b>STATION:</b> 323+00	<b>OFFSET:</b> 25 ft RT	<b>ALIGNMENT:</b> -L-
<b>COLLAR ELEV.:</b> 43.2 ft	<b>TOTAL DEPTH:</b> 34.8 ft	<b>NORTHING:</b> 244,085	<b>EASTING:</b> 2,406,166
<b>CPT RIG/MAX. DOWN PRESSURE:</b> CATLIN CPT/DPT-01 / 9 tons - NO ANCHORS		<b>CONE TYPE:</b> TYPE II PIEZOCONE	<b>CONE ID:</b> DSG0867
<b>DRILLER:</b> EDDIE SWAIN	<b>OPERATOR:</b> CATLIN	<b>START DATE:</b> 03/16/20	<b>COMP. DATE:</b> 03/16/20
		<b>SURF. WATER DEPTH:</b> N/A	



Boring Terminated WITH  
CONE PENETRATION  
TEST REFUSAL at  
Elevation 8.4 ft  
(0 HR. GROUNDWATER  
ESTIMATED FROM PORE  
PRESSURE)

<b>WBS:</b> 40237.1.1	<b>TIP:</b> R-3300B	<b>COUNTY:</b> PENDER	<b>GEOLOGIST:</b> S. HUDSON
<b>SITE DESCRIPTION:</b> HWY 17 NORTH AND SLOOP POINT LOOP ROAD			<b>GROUND WTR (ft)</b>
<b>BORING NO.:</b> CPT-07	<b>STATION:</b> 323+94	<b>OFFSET:</b> 33 ft LT	<b>ALIGNMENT:</b> -L-
<b>COLLAR ELEV.:</b> 43.0 ft	<b>TOTAL DEPTH:</b> 44.2 ft	<b>NORTHING:</b> 244,194	<b>EASTING:</b> 2,406,181
<b>CPT RIG/MAX. DOWN PRESSURE:</b> CATLIN CPT/DPT-01 / 9 tons - NO ANCHORS		<b>CONE TYPE:</b> TYPE II PIEZOCONE	<b>CONE ID:</b> DSG0867
<b>DRILLER:</b> EDDIE SWAIN	<b>OPERATOR:</b> CATLIN	<b>START DATE:</b> 03/18/20	<b>COMP. DATE:</b> 03/18/20
		<b>SURF. WATER DEPTH:</b> N/A	



Boring Terminated WITH  
CONE PENETRATION  
TEST REFUSAL at  
Elevation -1.2 ft  
(0 HR. GROUNDWATER  
ESTIMATED FROM PORE  
PRESSURE)

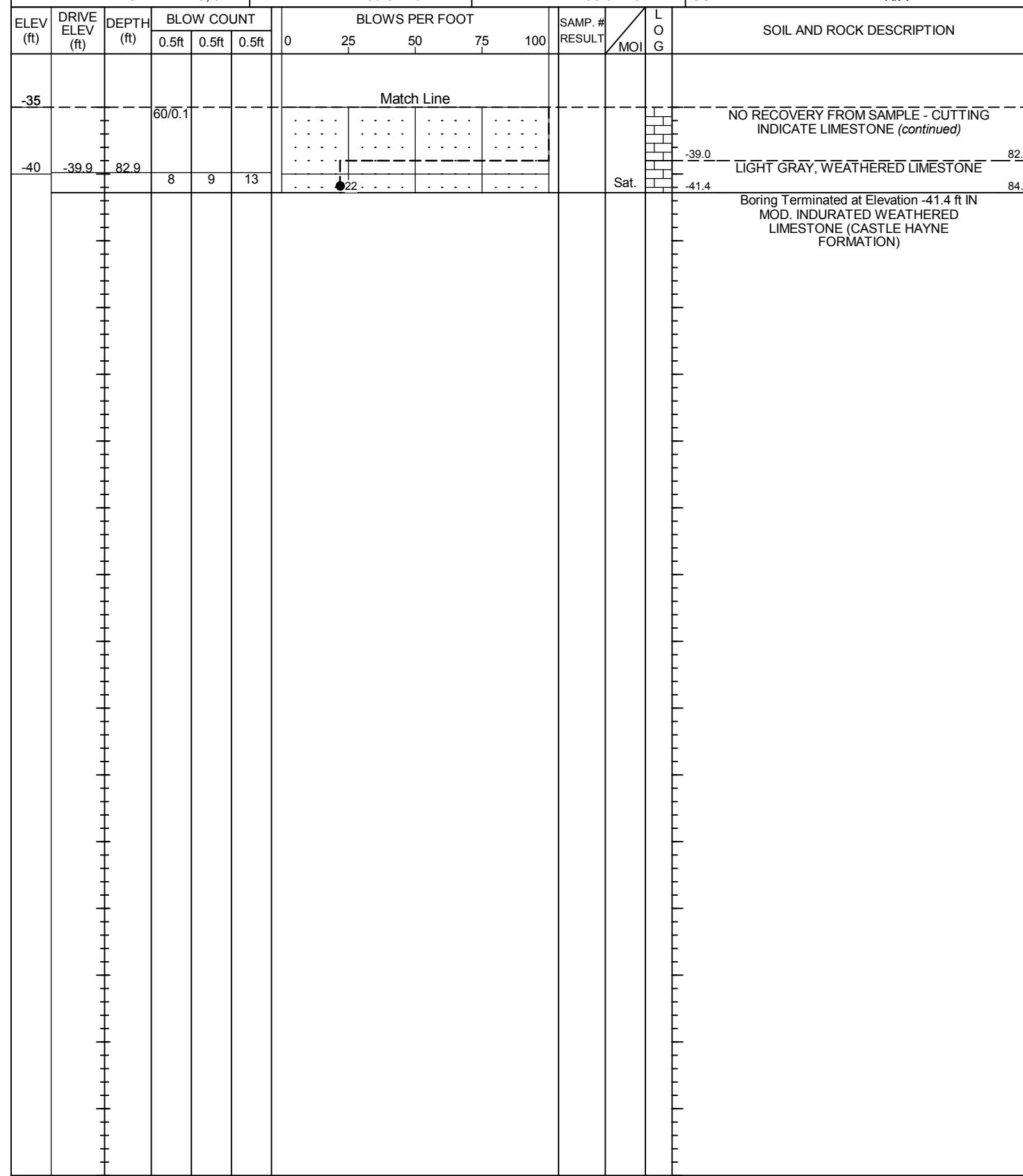
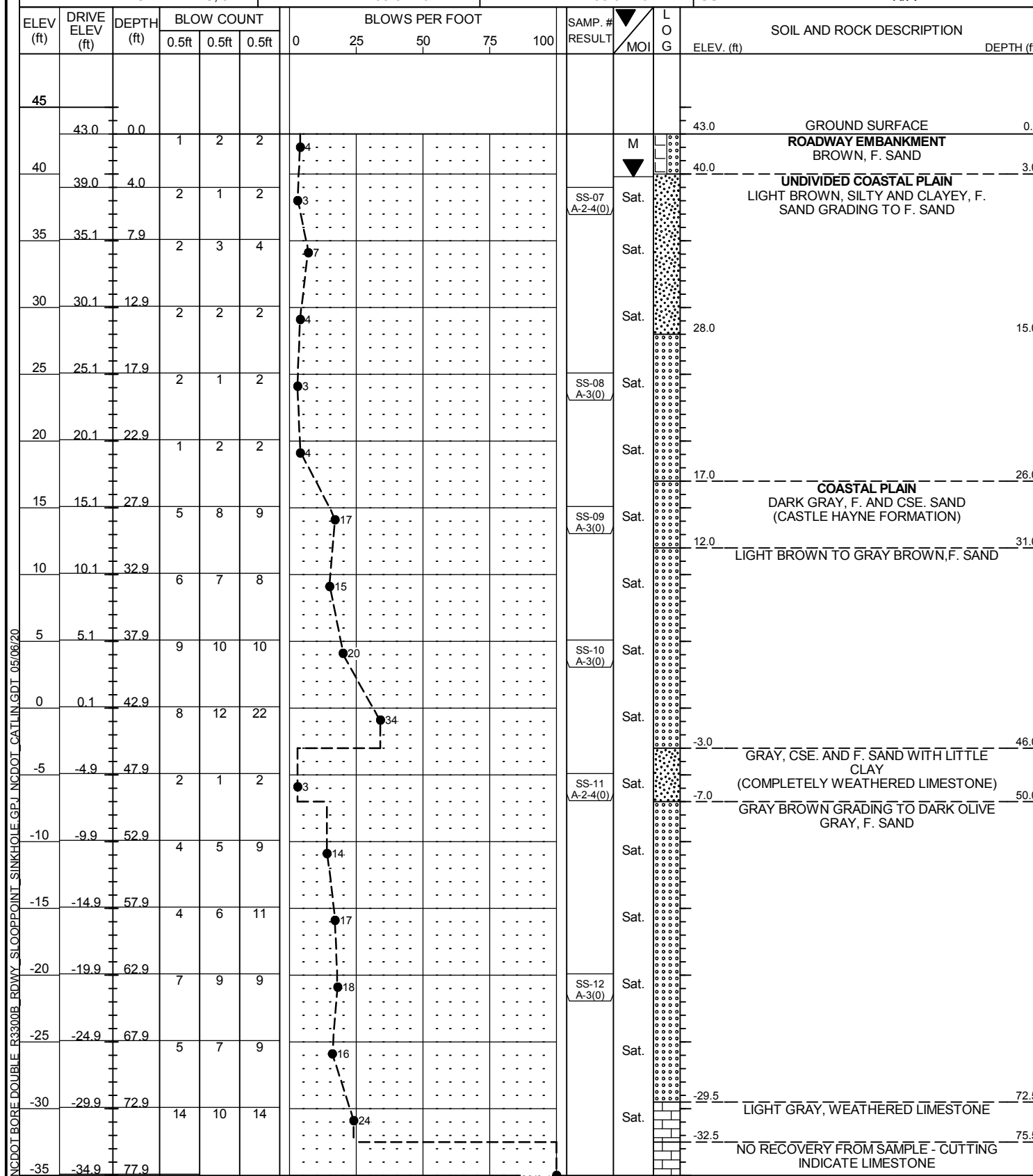
NCDOI CPT DOUBLE (PORTRAIT) NO-LITH\_R3300B\_RDWY\_SLOOPPOINT\_SINKHOLE.GPJ\_NCDOT\_CATLIN.GPT\_03/06/20

# GEOTECHNICAL BORING REPORT BORE LOG



WBS: 40237.1.1	TIP: R-3300B	COUNTY: PENDER	GEOLOGIST: L. PUGH
SITE DESCRIPTION: HWY 17 NORTH AND SLOOP POINT LOOP ROAD			GROUND WTR (ft)
BORING NO.: SPT-02	STATION: 323+95	OFFSET: 33 ft LT	ALIGNMENT: -L-
COLLAR ELEV.: 43.0 ft	TOTAL DEPTH: 84.4 ft	NORTHING: 244,195	EASTING: 2,406,182
DRILL RIG/HAMMER EFF./DATE: CAT1303 CME-550 93.7% 03/11/2020			DRILL METHOD: MUD ROTARY
DRILLER: D.T. CHALMERS, JR.			HAMMER TYPE: AUTOMATIC
START DATE: 03/31/20	COMP. DATE: 03/31/20	SURFACE WATER DEPTH: N/A	

WBS: 40237.1.1	TIP: R-3300B	COUNTY: PENDER	GEOLOGIST: L. PUGH
SITE DESCRIPTION: HWY 17 NORTH AND SLOOP POINT LOOP ROAD			GROUND WTR (ft)
BORING NO.: SPT-02	STATION: 323+95	OFFSET: 33 ft LT	ALIGNMENT: -L-
COLLAR ELEV.: 43.0 ft	TOTAL DEPTH: 84.4 ft	NORTHING: 244,195	EASTING: 2,406,182
DRILL RIG/HAMMER EFF./DATE: CAT1303 CME-550 93.7% 03/11/2020			DRILL METHOD: MUD ROTARY
DRILLER: D.T. CHALMERS, JR.			HAMMER TYPE: AUTOMATIC
START DATE: 03/31/20	COMP. DATE: 03/31/20	SURFACE WATER DEPTH: N/A	



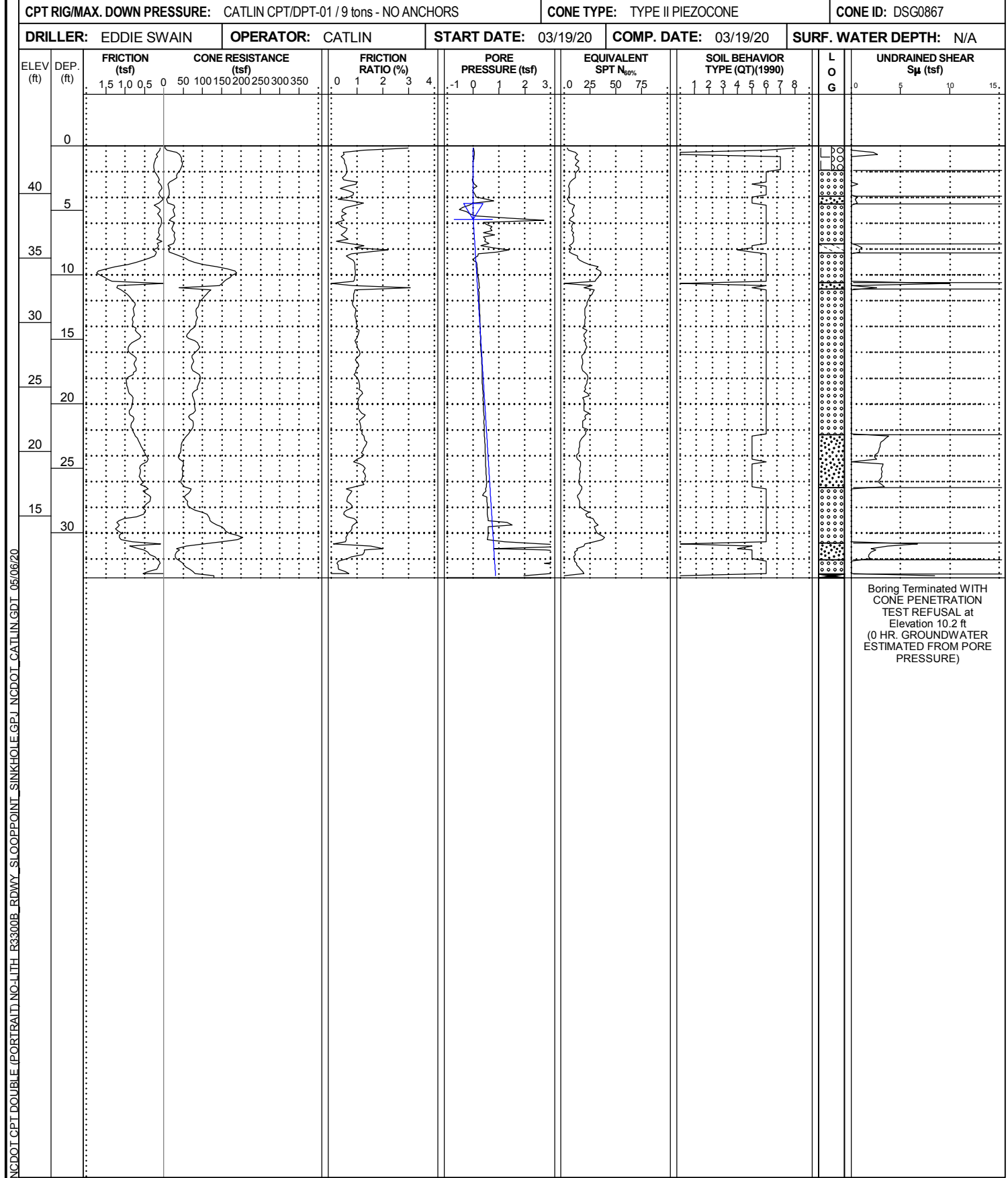
NCDOT BORE DOUBLE R3300B\_RDWAY\_SLOOPPOINT\_SINKHOLE\_GDT\_05/06/20



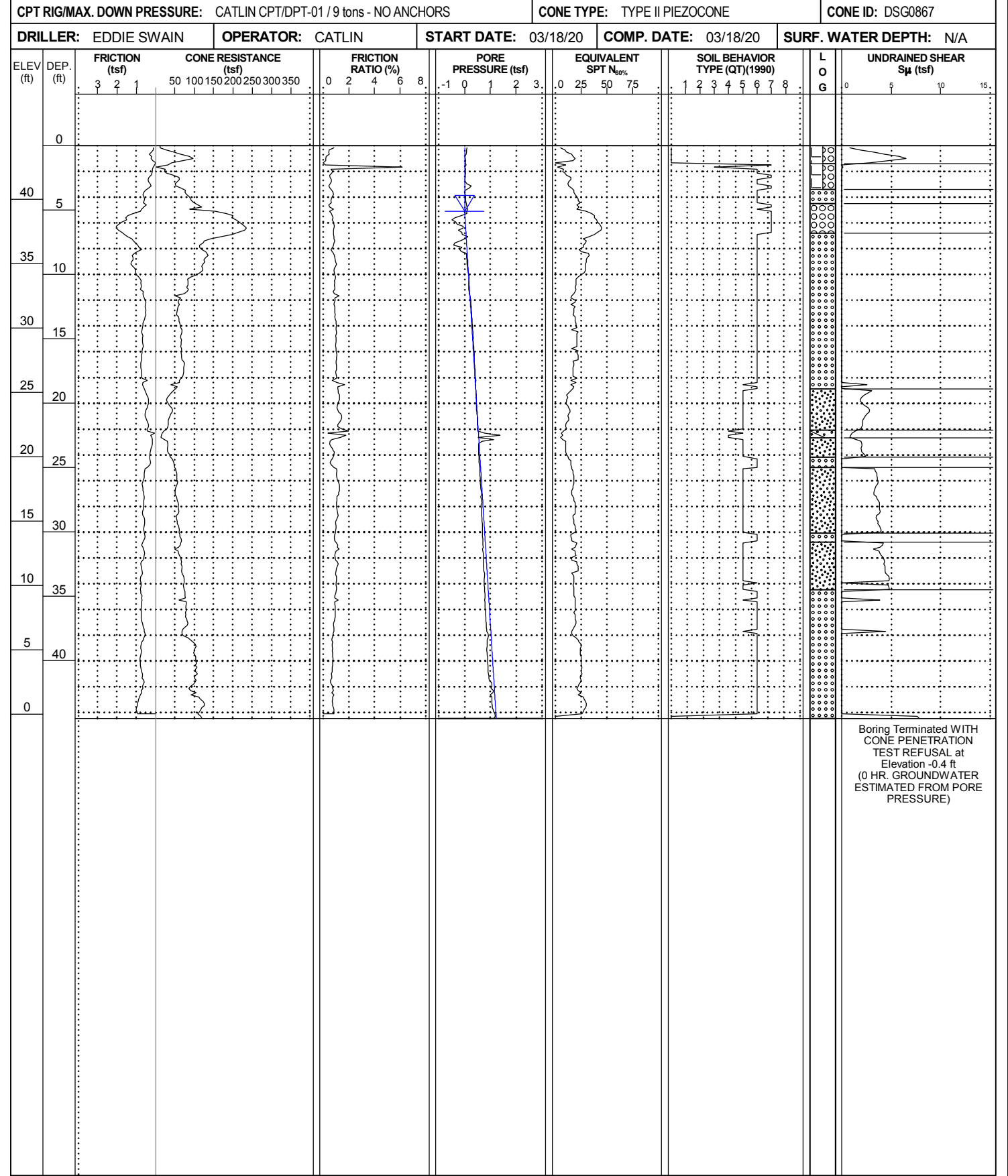
# CONE PENETROMETER TEST BORING REPORT



<b>WBS:</b> 40237.1.1	<b>TIP:</b> R-3300B	<b>COUNTY:</b> PENDER	<b>GEOLOGIST:</b> S. HUDSON
<b>SITE DESCRIPTION:</b> HWY 17 NORTH AND SLOOP POINT LOOP ROAD			<b>GROUND WTR (ft)</b>
<b>BORING NO.:</b> CPT-08	<b>STATION:</b> 325+00	<b>OFFSET:</b> 31 ft RT	<b>ALIGNMENT:</b> -L-
<b>COLLAR ELEV.:</b> 43.7 ft	<b>TOTAL DEPTH:</b> 33.5 ft	<b>NORTHING:</b> 244,235	<b>EASTING:</b> 2,406,298
<b>CPT RIG/MAX. DOWN PRESSURE:</b> CATLIN CPT/DPT-01 / 9 tons - NO ANCHORS		<b>CONE TYPE:</b> TYPE II PIEZOCONE	<b>CONE ID:</b> DSG0867
<b>DRILLER:</b> EDDIE SWAIN	<b>OPERATOR:</b> CATLIN	<b>START DATE:</b> 03/19/20	<b>COMP. DATE:</b> 03/19/20
		<b>SURF. WATER DEPTH:</b> N/A	



<b>WBS:</b> 40237.1.1	<b>TIP:</b> R-3300B	<b>COUNTY:</b> PENDER	<b>GEOLOGIST:</b> S. HUDSON
<b>SITE DESCRIPTION:</b> HWY 17 NORTH AND SLOOP POINT LOOP ROAD			<b>GROUND WTR (ft)</b>
<b>BORING NO.:</b> CPT-09	<b>STATION:</b> 325+94	<b>OFFSET:</b> 34 ft LT	<b>ALIGNMENT:</b> -L-
<b>COLLAR ELEV.:</b> 44.1 ft	<b>TOTAL DEPTH:</b> 44.5 ft	<b>NORTHING:</b> 244,349	<b>EASTING:</b> 2,406,307
<b>CPT RIG/MAX. DOWN PRESSURE:</b> CATLIN CPT/DPT-01 / 9 tons - NO ANCHORS		<b>CONE TYPE:</b> TYPE II PIEZOCONE	<b>CONE ID:</b> DSG0867
<b>DRILLER:</b> EDDIE SWAIN	<b>OPERATOR:</b> CATLIN	<b>START DATE:</b> 03/18/20	<b>COMP. DATE:</b> 03/18/20
		<b>SURF. WATER DEPTH:</b> N/A	

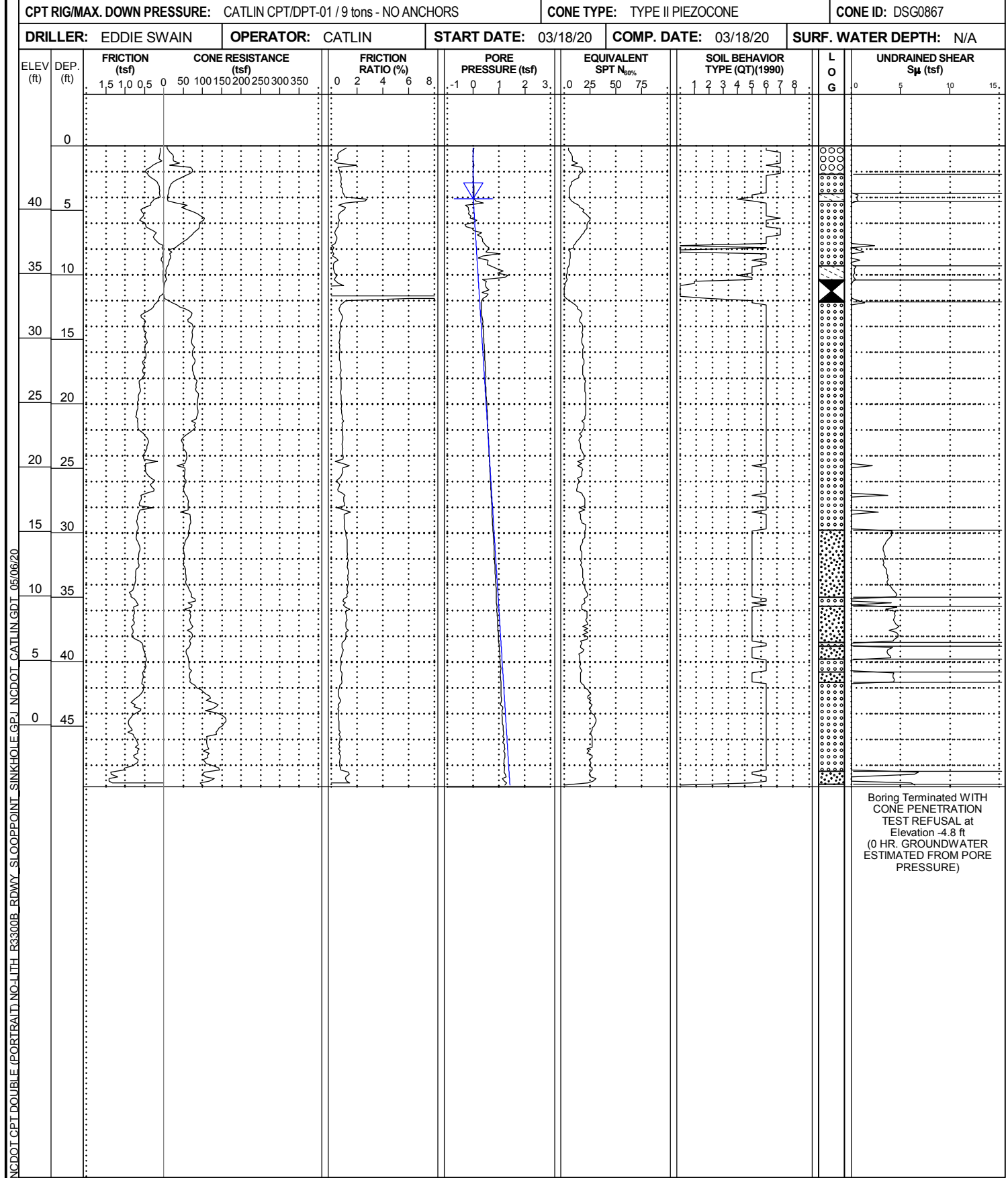




# CONE PENETROMETER TEST BORING REPORT

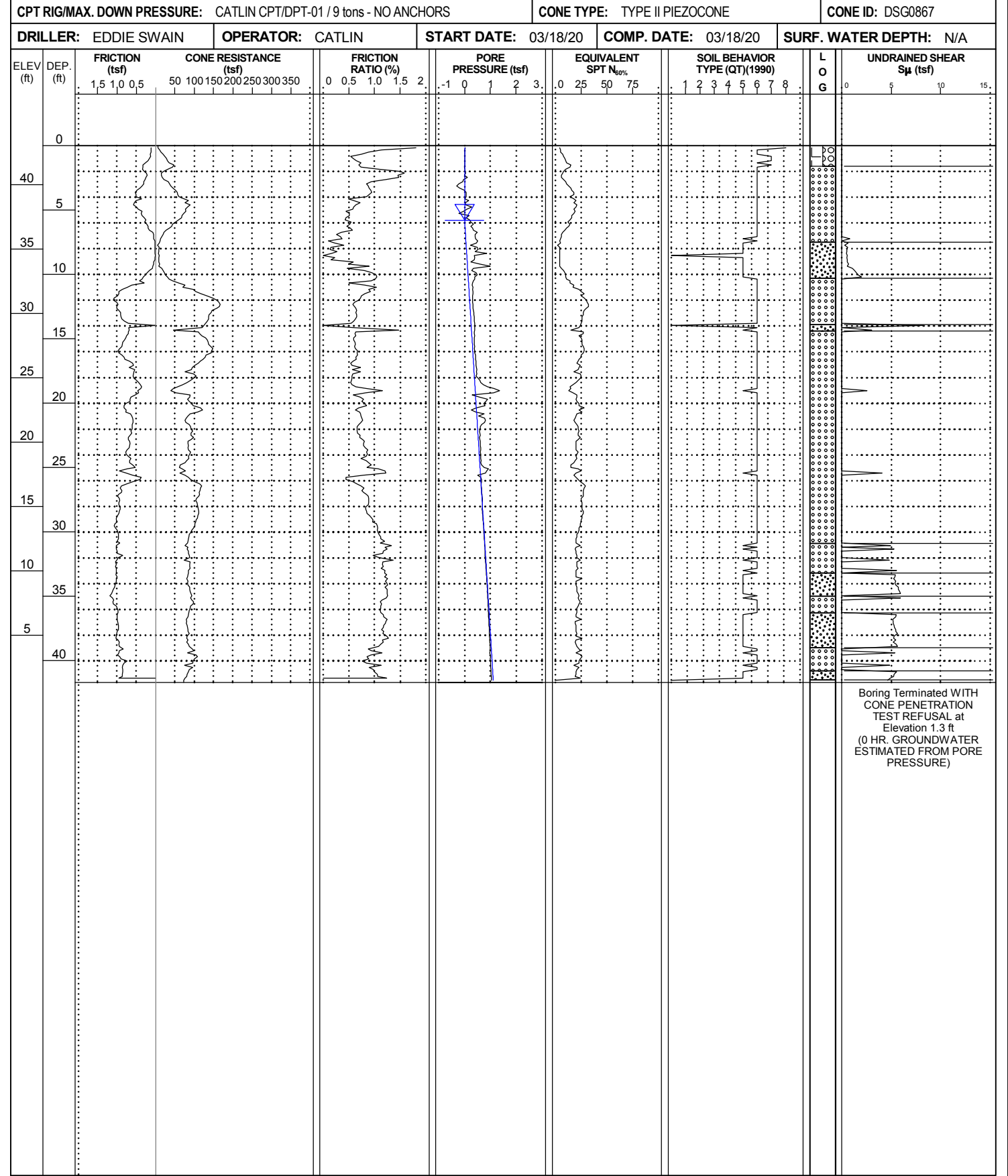


<b>WBS:</b> 40237.1.1	<b>TIP:</b> R-3300B	<b>COUNTY:</b> PENDER	<b>GEOLOGIST:</b> S. HUDSON
<b>SITE DESCRIPTION:</b> HWY 17 NORTH AND SLOOP POINT LOOP ROAD			<b>GROUND WTR (ft)</b>
<b>BORING NO.:</b> CPT-10	<b>STATION:</b> 326+94	<b>OFFSET:</b> 36 ft RT	<b>ALIGNMENT:</b> -L-
<b>COLLAR ELEV.:</b> 44.9 ft	<b>TOTAL DEPTH:</b> 49.7 ft	<b>NORTHING:</b> 244,382	<b>EASTING:</b> 2,406,425
<b>CPT RIG/MAX. DOWN PRESSURE:</b> CATLIN CPT/DPT-01 / 9 tons - NO ANCHORS		<b>CONE TYPE:</b> TYPE II PIEZOCONE	<b>CONE ID:</b> DSG0867
<b>DRILLER:</b> EDDIE SWAIN	<b>OPERATOR:</b> CATLIN	<b>START DATE:</b> 03/18/20	<b>COMP. DATE:</b> 03/18/20
		<b>SURF. WATER DEPTH:</b> N/A	



Boring Terminated WITH  
CONE PENETRATION  
TEST REFUSAL at  
Elevation -4.8 ft  
(0 HR. GROUNDWATER  
ESTIMATED FROM PORE  
PRESSURE)

<b>WBS:</b> 40237.1.1	<b>TIP:</b> R-3300B	<b>COUNTY:</b> PENDER	<b>GEOLOGIST:</b> S. HUDSON
<b>SITE DESCRIPTION:</b> HWY 17 NORTH AND SLOOP POINT LOOP ROAD			<b>GROUND WTR (ft)</b>
<b>BORING NO.:</b> CPT-11	<b>STATION:</b> 327+96	<b>OFFSET:</b> 26 ft LT	<b>ALIGNMENT:</b> -L-
<b>COLLAR ELEV.:</b> 43.0 ft	<b>TOTAL DEPTH:</b> 41.7 ft	<b>NORTHING:</b> 244,500	<b>EASTING:</b> 2,406,442
<b>CPT RIG/MAX. DOWN PRESSURE:</b> CATLIN CPT/DPT-01 / 9 tons - NO ANCHORS		<b>CONE TYPE:</b> TYPE II PIEZOCONE	<b>CONE ID:</b> DSG0867
<b>DRILLER:</b> EDDIE SWAIN	<b>OPERATOR:</b> CATLIN	<b>START DATE:</b> 03/18/20	<b>COMP. DATE:</b> 03/18/20
		<b>SURF. WATER DEPTH:</b> N/A	



Boring Terminated WITH  
CONE PENETRATION  
TEST REFUSAL at  
Elevation 1.3 ft  
(0 HR. GROUNDWATER  
ESTIMATED FROM PORE  
PRESSURE)

# GEOTECHNICAL BORING REPORT BORE LOG

<b>WBS:</b> 40237.1.1	<b>TIP:</b> R-3300B	<b>COUNTY:</b> PENDER	<b>GEOLOGIST:</b> L. PUGH
<b>SITE DESCRIPTION:</b> HWY 17 NORTH AND SLOOP POINT LOOP ROAD			<b>GROUND WTR (ft)</b>
<b>BORING NO.:</b> SPT-01	<b>STATION:</b> 327+00	<b>OFFSET:</b> 36 ft RT	<b>ALIGNMENT:</b> -L-
<b>COLLAR ELEV.:</b> 44.6 ft	<b>TOTAL DEPTH:</b> 84.8 ft	<b>NORTHING:</b> 244,386	<b>EASTING:</b> 2,406,429
<b>DRILL RIG/HAMMER EFF./DATE:</b> CAT1303 CME-550 93.7% 03/11/2020		<b>DRILL METHOD:</b> MUD ROTARY	<b>HAMMER TYPE:</b> AUTOMATIC
<b>DRILLER:</b> D.T. CHALMERS, JR.	<b>START DATE:</b> 03/30/20	<b>COMP. DATE:</b> 03/30/20	<b>SURFACE WATER DEPTH:</b> N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. # RESULT	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
45	44.6	0.0	1	2	3									GROUND SURFACE	0.0
														<b>ARTIFICIAL FILL</b> BROWN, F. SAND WITH SOME SILT	
40	40.5	4.1	4	3	3									<b>UNDIVIDED COASTAL PLAIN</b> DARK BROWN, SILTY, F. SAND WITH LITTLE (3.1-3.4%) ORGANICS	3.5
	38.5	6.1	6	10	12						SS-01 A-2-4(0)	Sat.			
	36.5	8.1	3	4	3										
35	34.5	10.1	1	1	5						SS-02 A-2-4(0)	Sat.			
	32.5	12.1	6	9	10									GRAY BROWN, F. SAND	11.4
30															
25	26.3	18.3	4	6	8						SS-03 A-3(0)	Sat.			
20	21.3	23.3	3	3	5										
15	16.3	28.3	3	3	5										
10	11.3	33.3	2	3	4									<b>COASTAL PLAIN</b> GRAY, CSE. AND F. SAND (CASTLE HAYNE FORMATION)	31.0
5	6.3	38.3	2	5	8						SS-04 A-3(0)	Sat.			
0	1.3	43.3	5	6	8										
-5	-3.7	48.3	2	2	1						SS-05 A-2-4(0)	Sat.		GRAY, CLAYEY, CSE. AND F. SAND (COMPLETELY WEATHERED LIMESTONE)	46.0
-10	-8.7	53.3	1	1	1									GRAY GRADING TO GREEN GRAY, F. SAND	51.0
-15	-13.7	58.3	4	3	6										
-20	-18.7	63.3	3	4	4						SS-06 A-3(0)	Sat.			
-25	-23.7	68.3	2	4	6										
-30	-27.7	72.3	12	12	13									GREEN AND GRAY, F. SAND WITH SOME SILT AND LIMESTONE FRAGS. WEATHERED LIMESTONE (DRILLER NOTED SLIGHT RIG CHATTER AT 71.9')	71.9
-35	-32.3	76.9	60/0.1											LIGHT GRAY, LIMESTONE	77.0

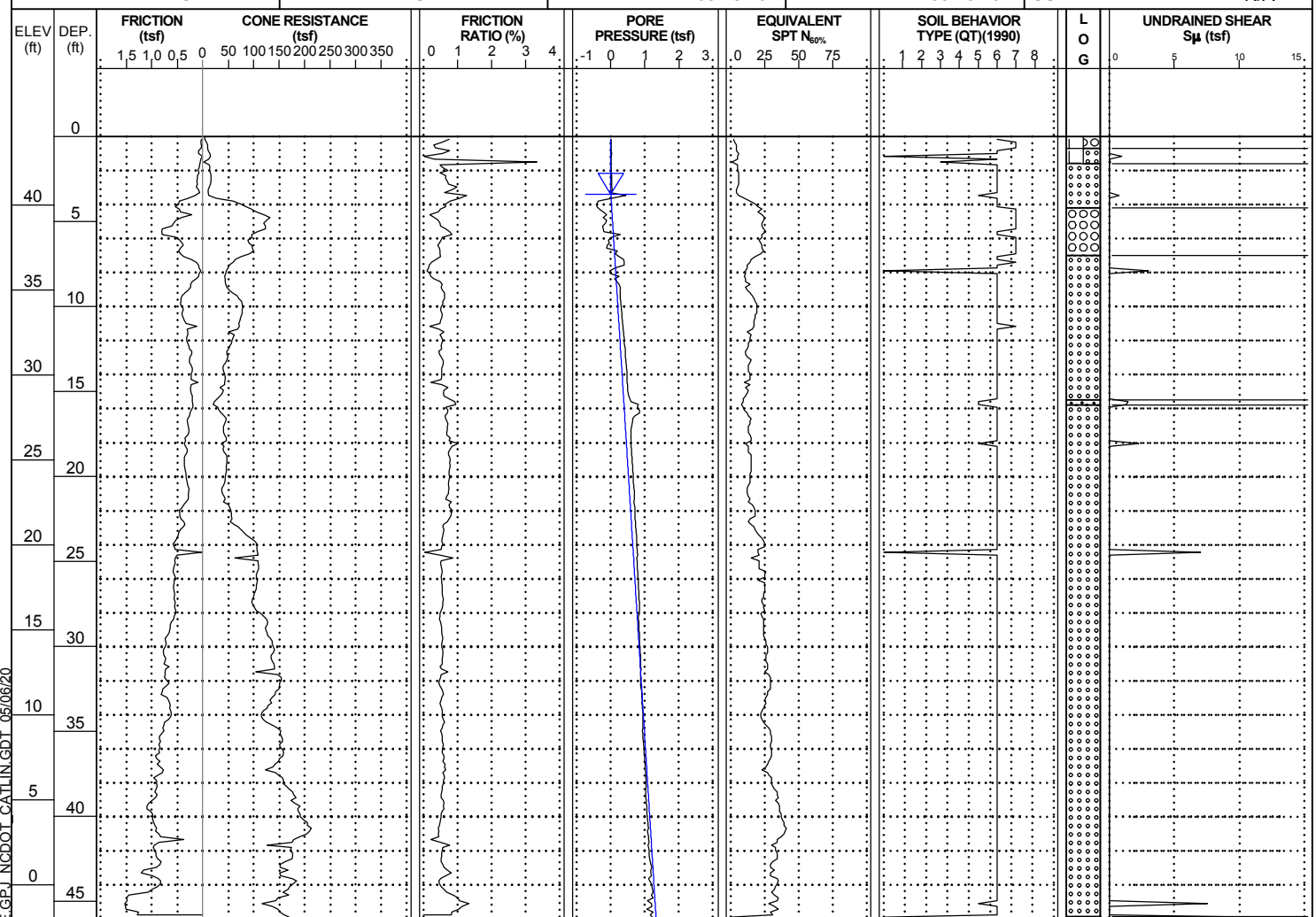
NCDOT BORE DOUBLE R3300B\_RDWAY\_SLOOPPOINT\_SINKHOLE\_GPJ\_NCDOT\_CATLIN.GDT\_05/06/20

<b>WBS:</b> 40237.1.1	<b>TIP:</b> R-3300B	<b>COUNTY:</b> PENDER	<b>GEOLOGIST:</b> L. PUGH
<b>SITE DESCRIPTION:</b> HWY 17 NORTH AND SLOOP POINT LOOP ROAD			<b>GROUND WTR (ft)</b>
<b>BORING NO.:</b> SPT-01	<b>STATION:</b> 327+00	<b>OFFSET:</b> 36 ft RT	<b>ALIGNMENT:</b> -L-
<b>COLLAR ELEV.:</b> 44.6 ft	<b>TOTAL DEPTH:</b> 84.8 ft	<b>NORTHING:</b> 244,386	<b>EASTING:</b> 2,406,429
<b>DRILL RIG/HAMMER EFF./DATE:</b> CAT1303 CME-550 93.7% 03/11/2020		<b>DRILL METHOD:</b> MUD ROTARY	<b>HAMMER TYPE:</b> AUTOMATIC
<b>DRILLER:</b> D.T. CHALMERS, JR.	<b>START DATE:</b> 03/30/20	<b>COMP. DATE:</b> 03/30/20	<b>SURFACE WATER DEPTH:</b> N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. # RESULT	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
-35														Match Line	
														LIGHT GRAY, LIMESTONE (continued)	
-40	-38.7	83.3	47	49	45									Boring Terminated at Elevation -40.2 ft IN INDURATED WEATHERED LIMESTONE (CASTLE HAYNE FORMATION)	84.8

# CONE PENETROMETER TEST BORING REPORT

WBS: 40237.1.1		TIP: R-3300B		COUNTY: PENDER		GEOLOGIST: S. HUDSON	
SITE DESCRIPTION: HWY 17 NORTH AND SLOOP POINT LOOP ROAD							GROUND WTR (ft)
BORING NO.: CPT-12		STATION: 328+96		OFFSET: 35 ft RT		ALIGNMENT: -L-	
COLLAR ELEV.: 44.0 ft		TOTAL DEPTH: 46.1 ft		NORTHING: 244,538		EASTING: 2,406,553	
CPT RIG/MAX. DOWN PRESSURE: CATLIN CPT/DPT-01 / 9 tons - NO ANCHORS				CONE TYPE: TYPE II PIEZOCONE		CONE ID: DSG0867	
DRILLER: EDDIE SWAIN		OPERATOR: CATLIN		START DATE: 03/18/20		COMP. DATE: 03/18/20	
						SURF. WATER DEPTH: N/A	



Boring Terminated WITH  
CONE PENETRATION  
TEST REFUSAL at  
Elevation -2.1 ft  
(0 HR. GROUNDWATER  
ESTIMATED FROM PORE  
PRESSURE)

NCDOT CPT DOUBLE (PORTRAIT) NO-LITH\_R3300B\_RDWY\_SLOOPPOINT\_SINKHOLE.GPJ\_NCDOT\_CATLIN.GPJ\_05/06/20