ID: R-2633BA

CONTRACT: C203199

CONTENTS:

NOTE: SEE SHEET 2B FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

LINE	STATION	PLAN	PROFILE	XSECTS
-L-	8+00.00 – 445+28.39	4 – 33	42 – 57	80–84
-RP_A1-	10+00.00 – 30+04.11	6	59 – 60	NONE
-LP_A1-	10+00.00 – 22+55.13	6	60	NONE
-RP_D1-	10+00.00 – 32+04.37	6	61	NONE
-LP_D1-	10+00.00 – 23+67.72	6	62	NONE
-RP_B2-	10+00.00 – 29+91.64	14 – 15	64 – 65	NONE
-LP_B2-	10+00.00 – 21+34.89	15	65	NONE
-RP_C2-	10+00.00 – 26+56.89	15	66	NONE
-RP_D2-	10+00.00 – 24+32.22	15 – 16	66 – 67	NONE
-RP_C3-	10+00.00 – 30+27.42	21 – 22	72 – 73	NONE
-RP_D3-	10+00.00 – 26+60.30	22 – 23	73 – 74	NONE
-RP_A3-	10+00.00 – 31+55.71	22 – 23	71	NONE
-LP_A3-	10+00.00 – 23+38.68	22	72	NONE
-RP_B4-	10+00.00 – 33+41.66	32 – 33	77	NONE
-RP_C4-	10+00.00 – 27+05.63	32 – 33	78	NONE
-Y1-	34+77.68 – 55+11.79	33	79	NONE
-Y5-	10+00.00 – 46+00.00	6, 34 – 35	58 – 59	NONE
-Y7-	10+00.00 – 55+00.00	15, 36 – 37	63 – 64	NONE
-Y8-	13+40.00 – 72+40.00	22, 38 – 41	68 – 70	NONE
-Y8A-	10+00.00 – 25+27.59	38, 38A	76	NONE
-Y8B-	10+00.00 – 22+50.00	22, 38A	76	NONE
-Y9-	10+00.00 – 16+50.00	39	74	NONE
-SVRD5-	10+00.00 – 18+38.53	35	62	NONE
-SVRD5A-	10+00.00 – 13+23.94	35	62	NONE
-SVRD9-	10+00.00 – 13+94.81	38	75	NONE
-SVRD10-	10+00.00 – 20+97.15	22, 39	75	NONE
CONE PENETRATION TESTING			85	
CPT LOGS			86 – 399	

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

STATE PROJECT 34491.1.2 I.D. NO. R-2633B

F.A. PROJECT STPNHF-17(1)

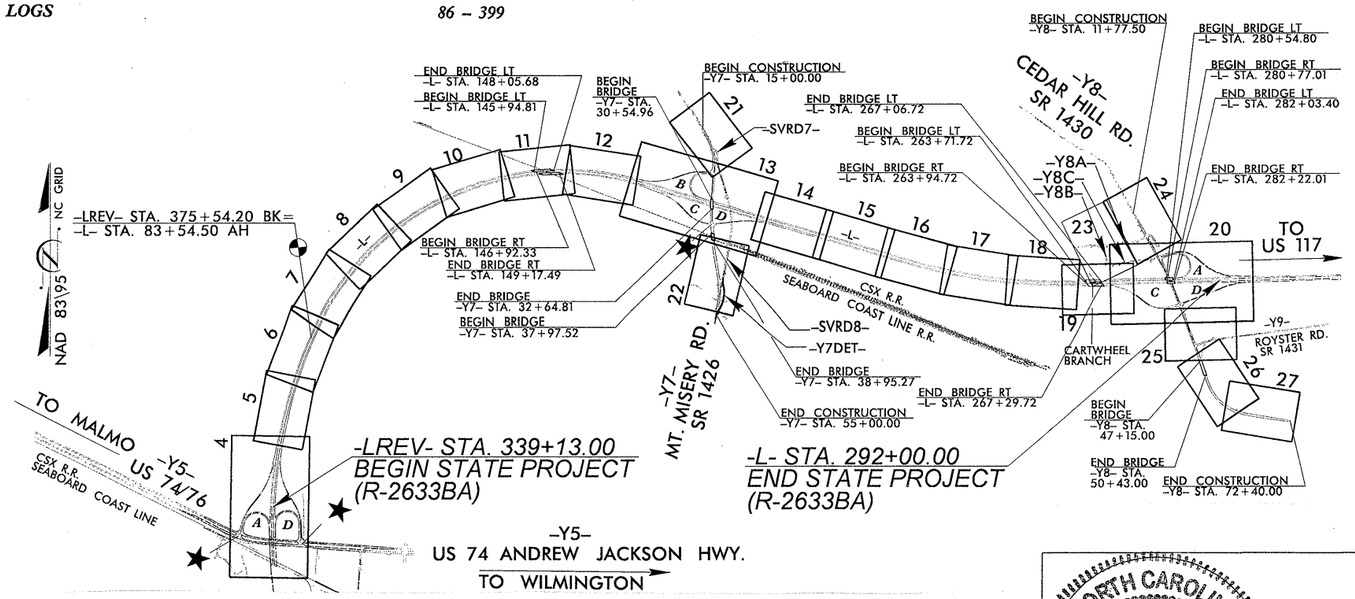
COUNTY BRUNSWICK/NEW HANOVER

PROJECT DESCRIPTION US 17 (WILMINGTON BYPASS)

FROM EAST OF US 74/76 IN BRUNSWICK CO. TO

US 421 NORTH OF WILMINGTON IN NEW HANOVER CO.

INVENTORY REPORT



NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - 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.

DRAWN BY: T. PEREZ

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2633BA	1	399

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
34491.1.2	STPNHF-17(1)	P.E.
34491.2.3		R/W
34491.3.GVS3	NHS-0017(124)	CONST.

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WAS 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 UNIT @ (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA IS PART OF THE CONTRACT.

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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 THIS 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.

This inventory is for R-2633B, which includes R-2633BA and R-2633BB. Please refer to the respective portions for your needs.

This project contains 1 ADDENDUM. Refer to it as well as to this Subsurface Investigation.

PERSONNEL J. S. JOHNSON
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S. LOWE
P. PHELPS
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INVESTIGATED BY S&ME, INC.

CHECKED BY A.F. RIGGS, JR.

SUBMITTED BY S&ME, INC.

DATE FEBRUARY 25, 2008

NORTH CAROLINA LICENSED GEOLOGIST SEAL 1753 2/27/08 SHANE JOHNSON SEAL

SIGNATURE

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14155 2/27/08 ABNER F RIGGS, JR. SEAL

SIGNATURE

ID	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
R-2633B	34491.1.2	2	399

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR WEATHERED EARTH MATERIALS WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:

VERY STIFF, GRAY SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤35% PASSING #200)						SILT-CLAY MATERIALS (>35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2			A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6 A-2-7				A-7-5 A-7-6			
SYMBOL													
% PASSING #10 #40 #200	50 MX 30 MX 15 MX	50 MX 25 MX	51 MN 10 MX	35 MX	35 MX	35 MX 35 MX	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
LIQUID LIMIT PLASTIC INDEX	6 MX		N.P.	40 MX 10 MX	41 MN 10 MX	40 MX 41 MN 11 MN 11 MN	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
GROUP INDEX	0		0	0		4 MX	8 MX	12 MX	16 MX	No MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND			SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD						FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

P.I. OF A-7-5 ≤ L.L. - 30 : P.I. OF A-7-6 > L.L. - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE	<4	N/A
	LOOSE	4 TO 10	
	MEDIUM DENSE	10 TO 30	
	DENSE	30 TO 50	
	VERY DENSE	>50	
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT	<2	<0.25
	SOFT	2 TO 4	0.25 TO 0.5
	MEDIUM STIFF	4 TO 8	0.5 TO 1
	STIFF	8 TO 15	1 TO 2
	VERY STIFF	15 TO 30	2 TO 4
	HARD	>30	>4

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	2.0	0.42	0.25	0.075	0.053

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F. SD.)	SILT (SL.)	CLAY (CL.)

GRAIN SIZE	MM	305	75	2.0	0.25	0.05	0.005
	IN.	12"	3"				

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT		
PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
OM — OPTIMUM MOISTURE SL — SHRINKAGE LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NONPLASTIC	0-5	VERY LOW
LOW PLASTICITY	6-15	SLIGHT
MED. PLASTICITY	16-25	MEDIUM
HIGH PLASTICITY	26 OR MORE	HIGH

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YEL-BRN, BLUE-GRAY) MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION

WELL GRADED- INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE
UNIFORM- INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED)
GAP-GRADED- INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS ARE DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LIQUID LIMIT LESS THAN 30
MODERATELY COMPRESSIBLE	LIQUID LIMIT 31-50
HIGHLY COMPRESSIBLE	LIQUID LIMIT GREATER THAN 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT- CLAY SOILS	OTHER MATERIAL	
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	20 - 35%
HIGHLY ORGANIC	>10%	>20%	HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING.
- STATIC WATER LEVEL AFTER 24 HOURS.
- PW — PERCHED WATER, SATURATED ZONE OR WATER BEARING STRATA
- SPRING OR SEEPAGE
- HC — HOLE CAVED

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL OTHER THAN ROADWAY EMBANKMENTS
- INFERRED SOIL BOUNDARIES
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 — DIP/DIP DIRECTION OF ROCK STRUCTURES
- O - WATER SUPPLY WELL
- SPT, DPT, DMT, VST, PMT — TEST BORING
- CPT TEST BORING
- GEO-PROBE
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION

SAMPLE DESIGNATIONS

- S- BULK SAMPLE
- SS- SPLIT SPOON SAMPLE
- ST- SHELBY TUBE SAMPLE
- RS- ROCK SAMPLE
- RT- RECOMPACTED TRIAXIAL SAMPLE
- CBR - CBR SAMPLE
- SPT N-VALUE

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F. - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED
FRAGS. - FRAGMENTS
MED. - MEDIUM
PMT - PRESSUREMETER TEST
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT
W - MOISTURE CONTENT
V. - VERY
VST - VANE SHEAR TEST
HVS - HAND VANE SHEAR

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [X] MOBILE B- 57
- [ ] BK-51
- [ ] CME-550x
- [ ] CME-750
- [ ] PORTABLE HOIST
- [X] OTHER ATV CPT RIG
- [X] OTHER TRACK CPT RIG

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [ ] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [ ] CASING [ ] W/ ADVANCER
- [X] TRICONE 2-7/8 " STEEL TEETH
- [ ] TRICONE _____ " TUNG.-CARB.
- [ ] CORE BIT
- [X] OTHER 3-1/4" H.S.A.
- [ ] OTHER _____

HAMMER TYPE:
- [ ] AUTOMATIC
- [X] MANUAL

CORE SIZE:
- [ ] -B_____
- [ ] -N_____
- [ ] -H_____

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [X] HAND AUGER
- [ ] SOUNDING ROD
- [X] VANE SHEAR TEST
- [X] OTHER STEEL PROBE ROD

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WHEN TESTED, WOULD YIELD SPT REFUSAL. 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 FOLOWS:

WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT YIELDS SPT N VALUES > 100 BLOWS PER FOOT.
CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V. SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCKS EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, YIELDS SPT N VALUES > 100 BPF*
VERY SEVERE (V. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, YIELDS SPT N VALUES < 100 BPF*
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGISTS PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGISTS PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGISTS PICK.
SOFT	CAN BE GROVED 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.
VERY SOFT	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 FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FEET
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	> 4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND DEFINITIONS

ALLUVIUM (ALLUV.) - SOILS WHICH HAVE BEEN TRANSPORTED BY WATER.

AQUIFER - A WATER BEARING FORMATION OR STRATA.

ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.

ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.

ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IS IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.

CALCAREOUS (CALC.) - SOILS WHICH CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.

COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.

CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.

DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.

DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.

FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.

FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.

FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.

FLOOD PLAIN (F.P.) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.

FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.

JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.

LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.

LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.

MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.

PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.

RESIDUAL SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (R.Q.D.) - 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.

SAPROLITE (SAP.) - RESIDUAL SOIL WHICH RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.

SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, WHICH HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS

SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.

STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR B.P.F.) 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 LESS THAN 0.1 FOOT PENETRATION WITH 60 BLOWS.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

STRATA ROCK QUALITY DESIGNATION (S.R.Q.D.) - 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.

TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK:

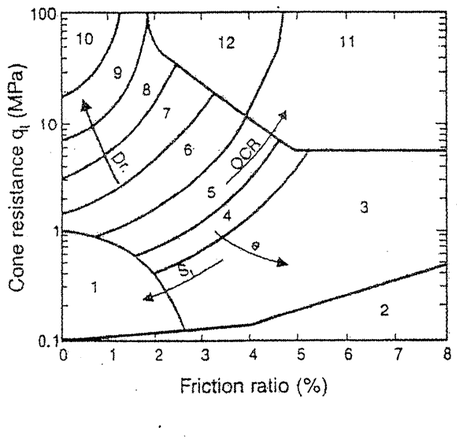
ELEVATION:

NOTES: COLLAR ELEVATIONS WERE OBTAINED FROM PROFILE SHEETS PROVIDED BY NCDOT.

REVISED 09/15/00

CPT Soil Profiling and Classification [1]

Soil samples are not recovered during CPT testing; however, it is possible to obtain an approximate soil classification using from cone resistance q_c and friction ratio R_f. Literature has shown that q_c is relatively high in sands and low in clays. Further, R_f is relatively low sands and high in clays. Soil types based on CPT results are usually referred to as soil behavior type (SBT). Soil classification charts have been adapted and improved based on expanded databases. One of the most commonly used behavior type charts, Figure 1, is suggested by Robertson (1986). Using q_c and R_f, this chart gives reasonable predictions of soil behavior up to 60 feet in depth.



Zone	Soil behaviour type
1	Sensitive fine grained
2	Organic material
3	Clay
4	Silty Clay to clay
5	Clayey silt to silty clay
6	Sandy silt to clayey silt
7	Silty sand to sandy silt
8	Sand to silty sand
9	Sand
10	Gravelly sand to sand
11	Very stiff fine grained*
12	Sand to clayey sand*

* Overconsolidated or cemented

Figure 1: Soil behavior type classification chart (after Robertson, 1986)

Since both penetration resistance and sleeve friction increase with depth due to the increase of effective overburden stress (σ_{vo}), CPT data requires correction (normalization). Robertson (1990) developed a normalized CPT soil behavior chart, Figure 2, using normalized friction ratio, R_f, and normalized cone resistance, Q_t.

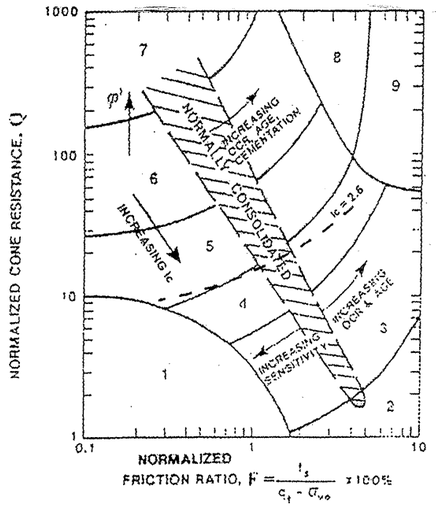
$$F_r = \left[f_{sc}/\left(q_c - \sigma_{v_0}\right)\right]\times 100 \qquad Q_t = \left(q_c - \sigma_{v_0}\right)/\sigma'_{v_0}$$

The Equivalent Soil Description for the CPT boring logs were based on correlations with the above soil behavior type classification chart using CPT data. The soils obtained from adjacent SPT soil test borings, performed by others, were visually classified and verified in the laboratory using the AASHTO soil classification system. These were correlated with the CPT data and presented on the CPT boring logs and cross sections.

[1] Jefferies, M. G. and Davies M. P. (1993), "Use of CPT to Estimate Equivalent SPT N_{60}", Geotechnical Testing Journal , Philadelphia, Pennsylvania.

Robertson, P. K. (1989) "Soil Classification using Cone Penetration Test", Canadian Geotechnical Journal, Edmonton, Alberta.

Robertson, P. K. (1998) "Cone Penetration Testing for Geotechnical and Environmental Site Investigation", ConeTec Inc.



Zone	Soil Behaviour Type	I_c
1	Sensitive, fine grained	N/A
2	Organic soils – peats	> 3.6
3	Clays – silty clay to clay	2.95 – 3.6
4	Silt mixtures – clayey silt to silty clay	2.60 – 2.95
5	Sand mixtures – silty sand to sandy silt	2.05 – 2.6
6	Sands – clean sand to silty sand	1.31 – 2.05
7	Gravelly sand to dense sand	< 1.31
8	Very stiff sand to clayey sand*	N/A
9	Very stiff, fine grained*	N/A

* Heavily overconsolidated or cemented

Figure 2: Normalized soil behavior type classification chart (after Robertson, 1990)

Note the charts are based on a broad sampling and are not regionally specific. Overlap in some zones should be expected and adjusted based on local experience.

Proposed by Jeffries and Davies (1993), the following equation combines the normalized cone parameters into a soil behavior type index, I_c.

$$I_c = \left(\left(3.47 - \log Q_T\right)^2 + \left(\log F_r + 1.22\right)^2\right)^{0.5}$$

Collecting additional parameters such as the pore water pressure during testing improves soil classification.

Correlation between CPT Data and SPT N_{60}

Standard penetration test (SPT) N-values can be correlated to CPT cone penetration resistance, q_c. The following equation was developed by Jeffries and Davies (1993):

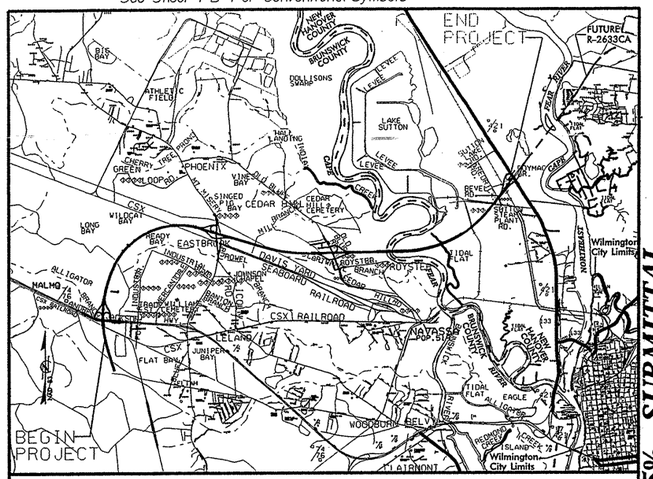
$$\frac{\left(q_c/P_a\right)}{N_{60}} = 8.5\left(1 - \frac{I_c}{4.6}\right)$$

Where I_c is the aforementioned soil behavior type index and q_c is normalized by P_a (atmospheric pressure). Corrections for the grain size influence are included in the equation.

TIP PROJECT: R-2633B

CONTRACT:

See Sheet 1-A For Index of Sheets
See Sheet 1-B For Conventional Symbols



VICINITY MAP FOR STATE PROJECT R-2633B

25% SUBMITTAL

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

BRUNSWICK & NEW HANOVER COUNTIES

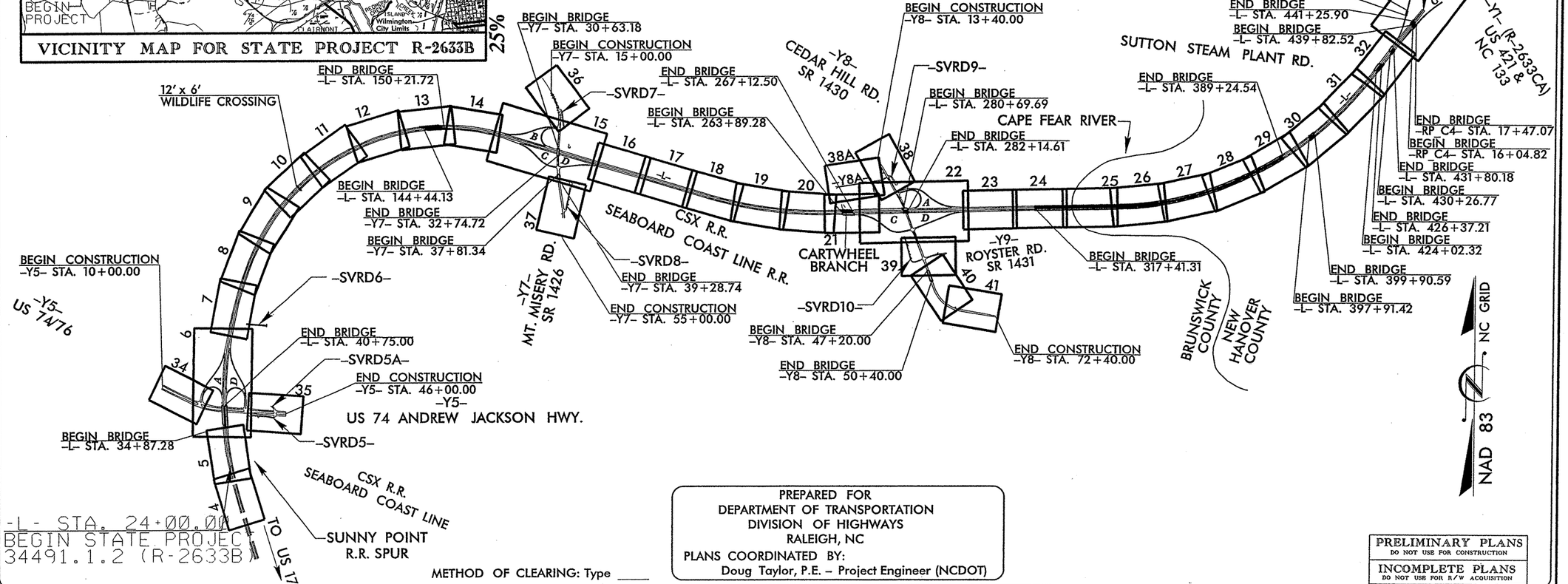
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2633B	2B	399

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34491.1.2	STPNHF-17(1)	P.E.

LOCATION: US 17 (WILMINGTON BYPASS) FROM EAST OF US 74/76 IN BRUNSWICK COUNTY TO US 421 NORTH OF WILMINGTON IN NEW HANOVER COUNTY

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

-L- STA. 445+28.39
END STATE PROJECT
34491.1.2 (R-2633B)



METHOD OF CLEARING: Type ____

PREPARED FOR
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, NC
PLANS COORDINATED BY:
Doug Taylor, P.E. – Project Engineer (NCDOT)

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

GRAPHIC SCALES

PLANS: 50′ 25′ 0 50′ 100′
PROFILE (HORIZONTAL): 50′ 25′ 0 50′ 100′
PROFILE (VERTICAL): 10′ 5′ 0 10′ 20′

DESIGN DATA

ADT 2009 = 16,400
ADT 2025 = 24,900
DHV = 12 %
D = 60 %
T = 15 % *
V = 70 MPH
* TTST 10% DUAL 5%
FUNC. CLASS. = INTERSTATE

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2633B = 6.16 Miles
LENGTH STRUCTURES TIP PROJECT R-2633B = 1.82 Miles
TOTAL LENGTH STATE TIP PROJECT R-2633B = 7.98 Miles

THIS IS A FULL CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS SHOWN ON THE PLANS.

Prepared In the Office of:
LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: June 15, 2007

LETTING DATE: June 16, 2009

Brian K. Eason, P.E.
PROJECT ENGINEER

Jeffrey R. Hext
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER

P.E.
SIGNATURE:

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

P.E.
STATE HIGHWAY DESIGN ENGINEER

$$$$$SYSTIME$$$$$
$$$$$USERNAME$$$$$

STATE PROJECT: 34491.1.2
FEDERAL PROJECT: STPNHF-17(1)
TIP NUMBER: R-2633B
COUNTY: Brunswick / New Hanover

DESCRIPTION: US 17 (Wilmington Bypass) from US 74/76 east of Malmo in Brunswick County to US 421 north of Wilmington in New Hanover County

SUBJECT: Roadway Subsurface Investigation – Inventory Report

Project Description

This project is located in northeastern Brunswick County and northwestern New Hanover County and extends from south of US 74/76 just west of its intersection with Enterprise Drive in Brunswick County to the existing Highway 17 Bypass at US 421 north of Wilmington in New Hanover County. The project will begin south of US 74/76 and extend north over the CSX railroad and US 74/76, continue north and east across the CSX railroad, continue east across Mt. Misery Road, continue east across Cedar Hill Road, continue east across the Cape Fear River, continue northeast across the CSX railroad, Sutton Steam Plant Road and two other railroads and connect to the existing Wilmington Bypass (Highway 17) at US 421 north of Wilmington, North Carolina. This project consists of a four-lane highway along 6.16 miles of new alignment, associated ramps and loops at four intersections (US 74/76, Mt. Misery Road, Cedar Hill Road and US 421), ten service roads, and 3.21 miles along existing alignments or realigning existing alignments (including seven –Y- lines). Mt. Misery Road will be realigned to the west of the existing Mt. Misery Road. There are fourteen bridge structures proposed for this project. Structures on –L- will be located over CSX railroad and US 74/76 (-Y5) (Station 34+87.28 to 40+75.00 –L-), over CSX railroad (Station 144+44.13 to 150+21.72 -L-), over Cartwheel Branch (263+89.28 to 267+12.50 –L-), over Cedar Hill Road (-Y8) (280+69.69 to 282+14.61 –L-), over the Cape Fear River (317+41.31 to 389+24.54 –L-), over a railroad (397+91.42 to 399+90.59-L-), over Suttons Steam Plant Road and a railroad (424+02.32 to 426+02.32 –L-), over Fredrickson Road (430+26.77 to 431+80.18 –L-) and over a railroad (439+82.52 to 441+25.90-L-). Structures on Mt. Misery Road (-Y7-) go over -L- (30+63.18 to 32+74.72-Y7-) and over CSX Railroad (37+81.32 to 39+28.74 –Y7-). The structure on Cedar Hill Road (-Y8-) goes of a creek (47+20.00 to 50+40.00 –Y8-). The structure on –RP_C4- crosses over a railroad (16+04.82 to 17+47.07 –RPC4-) and the structure on –RP_B4- crosses over a railroad (20+54.95 to 22+54.95 –RPB4-).

A geotechnical investigation was conducted between September 25, 2006 and January 9, 2007 using cone penetration testing and soil test borings. Three hundred and fourteen (314) cone penetration soundings were performed using an all-terrain direct push rig and a track direct push rig between September 25, 2006 and November 9, 2006. During the CPT soundings, eight pore water dissipation tests were performed at various borings and depths. Drilling was conducted between December 5, 2006 and January 9, 2007. Drilling consisted of advancing 3-1/4 inch diameter hollow stem augers with standard penetration tests at six (6) locations with a Mobile B-57 drill rig mounted on an all terrain vehicle. Sixteen Shelby tubes were pushed in the locations of the pore water dissipation tests. Two vane shear tests were performed at the same depths as the pore water dissipation tests in boring B-6, push (C-61).

In addition, several shallow hand augers borings were performed in low-lying wet areas across the project at several CPT locations to determine organic contents and shear strength properties of the upper soils. Hand vane shear tests were also performed at several locations in wet low-lying areas across the project. Representative soil samples were collected for visual classification in the field and for laboratory analysis by the S&ME soil testing laboratory.

The following survey lines were investigated.

Line	Station		
-L-	24+00.00	to	445+28.39
-RP_A1-	10+00.00	to	30+04.11
-LP_A1-	10+00.00	to	22+55.13
-RP_D1-	10+00.00	to	32+04.37
-LP_D1-	10+00.00	to	23+67.72
-RP_B2-	10+00.00	to	29+91.64
-LP_B2-	10+00.00	to	21+34.89
-RP_C2-	10+00.00	to	26+56.89
-RP_D2-	10+00.00	to	24+32.22
-RP_C3-	10+00.00	to	30+27.42
-RP_D3-	10+00.00	to	26+60.30
-RP_A3-	10+00.00	to	31+55.71
-LP_A3-	10+00.00	to	23+38.68
-RP_B4-	10+00.00	to	33+41.66
-RP-C4-	10+00.00	to	27+05.63
-Y1-	34+77.68	to	55+11.79
-Y5-	10+00.00	to	46+00.00
-Y7-	10+00.00	to	55+00.00
-Y8-	13+40.00	to	72+40.00
-Y8A-	10+00.00	to	25+27.59
-Y8B-	10+00.00	to	22+50.00
-Y9-	10+00.00	to	16+50.00
-SVRD5-	10+00.00	to	18+38.53
-SVRD5A-	10+00.00	to	13+23.94
-SVRD9-	10+00.00	to	13+94.81
-SVRD10	10+00.00	to	20+97.15

Areas of Special Geotechnical Interest

1) Groundwater: Shallow groundwater conditions were encountered in portions of the entire project. The majority of the portion of the project south of the Cape Fear River was found to exhibit shallow groundwater conditions. Groundwater is present on or near the ground surface in the following areas

-L-	46+25	to	50+50
-L-	54+00	to	64+25
-L-	70+00	to	72+00
-L-	90+00	to	96+45
-L-	101+00	to	104+00
-L-	107+00	to	136+60
-L-	139+50	to	140+50
-L-	149+50	to	150+50
-L-	183+50	to	184+50
-L-	187+50	to	190+60
-L-	195+45	to	205+35
-L-	209+00	to	217+00
-L-	219+00	to	223+20
-L-	226+75	to	233+15
-L-	235+75	to	237+00
-L-	253+00	to	259+00
-L-	280+75	to	281+30
-L-	281+75	to	282+75
-L-	291+00	to	291+90
-L-	294+50	to	295+25
-L-	303+00	to	307+00
-L-	314+50	to	315+50
-L-	414+00	to	415+25
-LP_A1-	13+00	to	17+70
-LP_A1-	17+90	to	18+80
-RP_A1-	10+00	to	14+65
-RP_A1-	19+25	to	19+80
-RP_A1-	21+60	to	24+75
-RP_A1-	25+10	to	26+25
-LP_D1-	13+00	to	22+65
-RP_D1-	10+00	to	17+35
-RP_D1-	25+00	to	31+00
-RP_B2-	22+00	to	24+00
-RP_C2-	22+50	to	24+50
-RP_D2-	16+00	to	17+50
-RP_C3-	17+75	to	22+00
-RP_D3-	13+75	to	22+00
-LP_A3-	12+00	to	13+75
-RP_B4-	26+90	to	29+25
-Y7-	41+50	to	43+50
-Y8	13+40	to	18+50
-Y8-	20+00	to	32+50

Groundwater was found to be above or within 6 feet of the proposed grade.

Line	Station		
-RP_D1-	25+00	to	31+00
-LP_D1-	17+00	to	22+65
-LP_A1-	17+50	to	22+00
-RP_B2-	22+00	to	24+00
-RP_C3-	23+75	to	30+27.42
-LP_A3-	20+00	to	23+38.68
-RP_B4-	32+00	to	33+41.66
-Y8-	13+40	to	44+50
-Y8-	55+00	to	72+40
-SVRD9-	10+00	to	13+94.81

2) Highly Plastic Soils: No areas contain soils that have plasticity indices of 20 or higher within the upper 3 feet of grade within the proposed construction limits:

3) Organic or Loose /Soft Soils : The following areas contains relatively soft or loose, organic, wet soils which have the potential for subgrade problems during construction. In addition, these soils may contain cohesive or organic soils which may cause embankment stability or long term settlement problems.

Line	Station		
-L-	46+25	to	47+70
-L-	49+60	to	50+50
-L-	54+00	to	64+25
-L-	81+50	to	84+75
-L-	94+10	to	96+45
-L-	105+50	to	136+60
-L-	157+25	to	164+50
-L-	187+50	to	190+60
-L-	195+45	to	205+35
-L-	210+30	to	233+15
-L-	235+75	to	237+00
-LP_A1-	15+25	to	17+70
-LP_A1-	17+90	to	18+80
-RP_A1-	10+00	to	14+65
-RP_A1-	19+25	to	19+80
-RP_A1-	21+60	to	24+75
-RP_A1-	25+10	to	26+25
-LP_D1-	13+00	to	22+65
-RP_D1-	10+00	to	17+35
-RP_D1-	25+00	to	31+00
-Y7-	41+50	to	43+50

4) Water Wells: Water wells were located within the proposed construction limits at the following locations.

Line	Station	Offset
-L-	41+76	51 ft LT
-RP_B2-	26+82	36 ft LT
-RP_B2-	25+23	24 ft LT
-RP_B2-	29+09	31 ft LT
-L-	184+25	59 ft LT
-Y7-	33+37	118 ft LT
-RP_C2-	17+52	3 ft LT
-RP_C2-	19+90	130 ft LT
-RP_D2-	21+66	103 ft LT
-RP_C3-	29+58	5 ft RT
-Y8-	33+85	50 ft RT
-Y8-	35+57	56 ft RT
-L-	280+11	49 ft RT
-L-	431+54	30 ft RT
-L-	435+60	40 ft RT
-RP_C4-	15+04	240 ft RT
-RP_C4-	13+78	189 ft RT
-RP_B4-	14+81	111 ft LT

Physiography and Geology

The site is located within the lower eastern portion of the Coastal Plain Physiographic and Geologic Province of North Carolina in Brunswick and New Hanover Counties. The Coastal Plain Province is typically characterized by marine and eolian sediments that were deposited during the transgressive and regressive depositional sequences of the oceans moving into and out of North Carolina. As such, the Coastal Plain Province is characterized by subdued topographic features and flat, low-lying terrain. The geology of the north east quadrant of Brunswick County and the northwest quadrant of New Hanover County, near the project site, primarily consists of Undifferentiated Surface Deposits of Quaternary Age. In addition, loose, wet and organic soils common to pocosins are also present on this project. Typically, the Undifferentiated Deposits consist of sands with localized zones of fine-grained silts and clays. These deposits are underlain by the Peedee Formation of the Upper Cretaceous Age. The Peedee Formation consists of dark gray silts and clays interbedded with gray sand, calcareous sandstone, and limestone. Throughout most of New Hanover County, the Castle Hayne limestone of Middle and Upper Eocene Age typically lies between the undifferentiated surface deposits and the Peedee Formation. However, according to the "Geology and Groundwater Resources of New Hanover County, North Carolina, 1970" the Castle Hayne limestone appears to have been eroded and is not present within the northwest quadrant of New Hanover County in the vicinity of the project corridor.

Soils Properties

Soils present on this project are separated into three major categories based on origin. These categories include Undifferentiated Coastal Plain Deposits, roadway embankment fill soils and artificial fill soils.

Undifferentiated Coastal Plain deposits are the most prevalent soil type and are common to this physiographic region. A portion of the Undifferentiated Coastal Plain deposits encountered on this project consist loose/soft, wet, low-lying areas. The surficial soils in the low-lying areas predominately consist of very loose to medium dense brown, gray and black clayey and silty coarse to fine sand (A-3, A-2-4, A-2-5, A-2-6, A-2-7) with varying amounts of organic material including muck and very soft to soft gray, dark gray and black fine to coarse sandy silt (A-4, A-5) with varying amounts of organic material and very soft to soft dark gray moderately to highly organic silty coarse to fine sandy clay (A-7-5, A-7-6) and muck. The surficial sands have organic contents ranging from 1.2 to 12.9 percent. The surficial silts and clays have organic contents ranging from 1.3 to 25.2 percent. Hand held Vane Shear tests indicates undrained shear strengths ranging from 125 psf to 1337 psf and remolded strengths of 63 psf to 313 psf. The surficial silts and clays have low to moderate plasticity indices (1 to 17) and are below 20 for the entire project. Loose, wet, and organic containing soils are present within the construction limits in low-lying areas south of the Cape Fear River at the following locations:

Line	Station		
-L-	46+25	to	47+70
-L-	49+60	to	50+50
-L-	54+00	to	64+25
-L-	81+50	to	84+75
-L-	94+10	to	96+45
-L-	105+50	to	136+60
-L-	157+25	to	164+50
-L-	187+50	to	190+60
-L-	195+45	to	205+35
-L-	210+30	to	233+15
-L-	235+75	to	237+00
-LP_A1-	15+25	to	17+70
-LP_A1-	17+90	to	18+80
-RP_A1-	10+00	to	14+65
-RP_A1-	19+25	to	19+80
-RP_A1-	21+60	to	24+75
-RP_A1-	25+10	to	26+25
-LP_D1-	13+00	to	22+65
-RP_D1-	10+00	to	17+35
-RP_D1-	25+00	to	31+00
-Y7-	41+50	to	43+50

The wet, loose and organic sands and silts are slightly compressible while the wet, soft and organic clays are moderately compressible. Soils with high to moderate organic content are highly compressible.

Undifferentiated Coastal Plain deposits in the upland portions of the project and below the surficial loose, wet and organic soils in the low-lying areas consists of very loose to very dense clayey and silty fine to coarse sands (A-3, A-1-b, A-2-4, A-2-6, A-2-7) with clay layers, very soft to hard fine sandy silts (A-4) and very soft to very stiff fine sandy and silty clays (A-7-5, A-7-6). Typically the uplands are located north of the Cape Fear River and portions of the project south of the Cape Fear River. The upland surficial soils typically consist of a very

loose to medium dense silty fine to coarse sand (A-3, A-2-4). Typically, any near surface silts and clays encountered on the project have low to moderate plasticity indices and are below 20 for the entire project.

Roadway embankment soils were found in association with the interchange of US 421 and the Wilmington Bypass. These soils consist of loose to medium dense silty fine to coarse sand (A-2-4).

Artificial fill was encountered at two isolated areas. A stock pile of sandy topsoil is located between approximately stations (415+65 to 416+52 -L-). The stock pile is approximately 8 to 10 feet high. A truck parking area consisting of approximately 1.5 feet of crushed aggregate base course (CABC) stone is located between approximately stations (426+80 to 430+50 -L-).

Groundwater

Groundwater was measured in several of the CPT sounding holes and hand auger borings at the time of drilling. In addition, groundwater levels were calculated from pore pressure measurements acquired from the CPT data. Groundwater depths in the low-lying areas range from the ground surface to about 11 feet below the existing ground surface. Groundwater depths in the upland areas ranged from about 1 to 18 feet below existing grades.

Geotechnical Descriptive Analysis

For descriptive purposes, the project has been divided into two segments. The division of the alignments into two segments is based on the near surface and subsurface materials.

Segment I

-L-	46+25	to	47+70
-L-	49+60	to	50+50
-L-	54+00	to	64+25
-L-	81+50	to	84+75
-L-	94+10	to	96+45
-L-	105+50	to	136+60
-L-	157+25	to	164+50
-L-	187+50	to	190+60
-L-	195+45	to	205+35
-L-	210+30	to	233+15
-L-	235+75	to	237+00
-LP_A1-	15+25	to	17+70
-LP_A1-	17+90	to	18+80
-RP_A1-	10+00	to	14+65
-RP_A1-	19+25	to	19+80
-RP_A1-	21+60	to	23+75
-RP_A1-	25+10	to	26+25
-LP_D1-	13+00	to	22+65
-RP_D1-	10+00	to	17+35
-RP_D1-	25+00	to	31+00
-Y7-	41+50	to	43+50

Segment I consists of portions of the alignments south of the Cape Fear River where roadway embankment fill will be placed over very loose to loose sands and very soft to soft silts and clays with varying organic matter contents, wet to saturated moisture contents and shallow groundwater conditions. Portions of these sections have groundwater/standing water on the surface. Approximately 15 percent of the investigated alignment falls within Segment I.

Groundwater conditions are typically at the ground surface or within three feet of the ground surface.

Soils encountered consist of sands, silts and clays with areas of muck to depths of 1.0 to 6.0 feet beneath the ground surface. The description of soils is described in the Soil Properties section.

Segment II consists of the remaining alignments which consist of fills over Upland Coastal Plain deposits as described in the Soil Properties section of this report. These sections consist of widening existing roadways and new alignments with typical construction methods. Segment II makes up approximately 85 percent of the investigated alignment.

S&ME appreciates the opportunity to be your geotechnical consultant on this project. If you have any questions or need additional information in regard to this report, please contact us.

Very truly yours,
S&ME, Inc.

J. Shane Johnson., P.G.
Project Geologist
N.C. Registration No. 1753

NORTH CAROLINA LICENSED GEOLOGIST SEAL 1753 2/27/08 J. SHANE JOHNSON

Abner F. Riggs, Jr., P.E.
Chief Geotechnical Engineer
N.C. Registration No. 14155

NORTH CAROLINA PROFESSIONAL SEAL 14155 2/27/08 ENGINEER ABNER F. RIGGS, JR.

Attachments

Appendix A

Shelby Tubes

The following Shelby tubes were taken for tests to determine the engineering properties of the soil:

Shelby Tube	Line	Station	Depth (ft)	Test Performed
ST-1	-L-	51+00	23.8-25.8	CU Triaxial Shear Testing and Consolidation Testing
ST-2	-L-	51+00	25.5-27.5	UU Triaxial Shear Testing
ST-3	-L-	101+00	10.3-12.3	CU Triaxial Shear Testing and Consolidation Testing
ST-4	-L-	101+00	17.8-19.8	CU Triaxial Shear Testing and Consolidation Testing
ST-5	-L-	101+00	9.8-11.8	UU Triaxial Shear Testing
ST-6	-L-	101+00	16.5-18.5	UU Triaxial Shear Testing
ST-7	-L-	136+00	13.5-15.5	Consolidation Testing
ST-8	-L-	136+00	13.5-15.5	CU Triaxial Shear Testing
ST-9	-L-	140+00	6.0-8.0	CU Triaxial Shear Testing and Consolidation Testing
ST-10	-L-	140+00	6.0-8.0	UU Triaxial Shear Testing
ST-11	-L-	412+00	31.8-33.8	Consolidation Testing
ST-12	-L-	412+00	32.8-34.8	CU Triaxial Shear Testing
ST-14	-L-	150+00	18.0-20.0	UU Triaxial Shear Testing
ST-15	-L-	150+00	12.0-14.0	CU Triaxial Shear Testing and Consolidation Testing
ST-16	-L-	150+00	18.0-20.0	CU Triaxial Shear Testing and Consolidation Testing

Earthwork Balance Sheet

Volumes in Cubic Yards

PROJECT: R-2633BA COUNTY: Brunswick DATE: 26-Aug-13 COMPILED BY: BKE (LOCHNER) SHEET__ OF __ SHEETS

STATION	STATION	EXCAVATION					EMBANKMENT				BORROW	WASTE			
		TOTAL UNCLASS.	ROCK	UNDERCUT	UNSUIT. UNCLASS.	SUITABLE UNCLASS.	TOTAL	ROCK	EARTH	EMBANK. +25%		ROCK	SUITABLE	UNSUIT.	TOTAL
SUMMARY #1															
-LREV- 339+13	369+50	240				240	131,497		131,497	164,371	164,131				
RP-A1REV 16+00	22+20						11,895		11,895	14,869	14,869				
RP_D1REV 17+50	22+50						4,381		4,381	5,476	5,476				
SUMMARY #1	SUBTOTAL	240				240	147,773		147,773	184,716	184,476				
SUMMARY #2															
LREV 369+50	375+54.20 LB						33,374		33,374	41,718	41,718				
-L- 83+54.50 LA	114+00						138,575		138,575	173,219	173,219				
SUMMARY #2	SUBTOTAL						171,949		171,949	214,936	214,936				
SUMMARY #3															
-L- 114+00	145+67.97 BEG. BRIDGE						229,512		229,512	286,890	286,890				
SUMMARY #3	SUBTOTAL						229,512		229,512	286,890	286,890				
SUMMARY #4															
-L- 150+85.29 End Bridge	172+00	76				76	311,617		311,617	389,521	389,445				
SUMMARY #4	SUBTOTAL	76				76	311,617		311,617	389,521	389,445				
SUMMARY #5															
-L- 172+00	202+00	993		6,797		993	111,981		111,981	139,976	138,983			6,797	6,797
RP_B2 18+00	29+00	1,483				1,483	7,941		7,941	9,926	8,443				
LP_B2 14+00	17+00						1,974		1,974	2,468	2,468				
RP_C2 17+50	26+00	81				81	112,322		112,322	140,403	140,322				
RP_D2 18+00	23+50						40,063		40,063	50,079	50,079				
Y7 15+00	30+54.96 Beg. Bridge	333				333	53,310		53,310	66,638	66,305				
Y7 32+64.81 End Bridge	37+97.52 Beg. Bridge						86,683		86,683	108,354	108,354				
Y7 38+95.27 End Bridge	55+00	698				698	101,766		101,766	127,208	126,510				
SVRD8 32+01.16	37+50	217				217	1,383		1,383	1,729	1,512				
-Y7DET- 12+50	18+50	27				27	4,343		4,343	5,429	5,402				
-Y7DET- REMOVAL 12+50	18+50	5,429				5,429							5,429		5,429
SUMMARY #5	SUBTOTAL	9,261		6,797		9,261	521,766		521,766	652,208	648,376		5,429	6,797	12,226
SUMMARY #6															
-L- 202+00	232+00			2,525			142,841		142,841	178,551	178,551			2,525	2,525
SUMMARY #6	SUBTOTAL			2,525			142,841		142,841	178,551	178,551			2,525	2,525
SUMMARY #7															
-L- 232+00	264+02.78 Beg. Bridge						185,076		185,076	231,345	231,345				
SUMMARY #7	SUBTOTAL						185,076		185,076	231,345	231,345				
PAGE 1 TOTALS		9,577		9,322		9,577	1,710,534		1,710,534	2,138,168	2,134,020		5,429	9,322	14,751

ALL BRIDGE STATIONS ON -L- ARE TAKEN FROM NBL.

Earthwork Balance Sheet

Volumes in Cubic Yards

PROJECT R-2633BA COUNTY: Brunswick DATE: 26-Aug-13 COMPILED BY: BKE (LOCHNER) SHEET__ OF __ SHEETS

STATION	STATION	EXCAVATION					EMBANKMENT				BORROW	WASTE			
		TOTAL UNCLASS.	ROCK	UNDERCUT	UNSUIT. UNCLASS.	SUITABLE UNCLASS.	TOTAL	ROCK	EARTH	EMBANK. +25%		ROCK	SUITABLE	UNSUIT.	TOTAL
SUMMARY #8															
-L- 267+28.78 End Bridge	280+77.01 Beg. Bridge						222,172		222,172	277,715	277,715				
-RP_C3 18+00	29+50	3,757				3,757	16,984		16,984	21,230	17,473				
-Y8A- 10+50	24+75	1,435				1,435	115		115	144			1,291		1,291
-Y8B- 10+50	14+00	608				608							608		608
-Y8C- 10+00	19+50	1,287				1,287	150		150	188			1,100		1,100
-Y8D- 10+12	25+50	296				296	3,540		3,540	4,425	4,129				
SUMMARY #8	SUBTOTAL	7,383				7,383	242,961		242,961	303,701	299,317		2,999		2,999
SUMMARY #9															
-L- 282+22.01 End Bridge	292+00 End Project	206				206	139,922		139,922	174,903	174,697				
-LP_A3- 13+50	16+50						13,189		13,189	16,486	16,486				
-Y8- 13+50	47+15.00 Beg. Bridge	9,251				9,251	8,698		8,698	10,873	1,622				
-Y8- 50+43.00 End Bridge	72+40	6,701				6,701	7,985		7,985	9,981	3,280				
-Y9- 10+50	16+50	1,616				1,616	321		321	401			1,215		1,215
SUMMARY #9	SUBTOTAL	17,774				17,774	170,115		170,115	212,644	196,085		1,215		1,215
	SUBTOTAL														
	SUBTOTAL														
	SUBTOTAL														
	SHEET 2 TOTAL	25,157				25,157	413,076		413,076	516,345	495,402		4,214		4,214

NOTE: EARTHWORK QUANTITIES ARE CALCULATED BY THE ROADWAY DESIGN UNIT. THESE EARTHWORK QUANTITIES ARE BASED IN PART ON SUBSURFACE DATA PROVIDED BY THE GEOTECHNICAL ENGINEERING UNIT.

Earthwork Balance Sheet

Volumes in Cubic Yards

PROJECT: _____ COUNTY: Brunswick DATE: _____ COMPILED BY: _____ SHEET__ OF __ SHEETS

STATION	STATION	EXCAVATION					EMBANKMENT				BORROW	WASTE			
		TOTAL UNCLASS.	ROCK	UNDERCUT	UNSUIT. UNCLASS.	SUITABLE UNCLASS.	TOTAL	ROCK	EARTH	EMBANK. +25%		ROCK	SUITABLE	UNSUIT.	TOTAL
	TOTAL FROM SHEET 1	9,577	-	9,322	-	9,577	1,710,534	-	1,710,534	2,138,168	2,134,020	-	5,429	9,322	14,751
	TOTAL FROM SHEET 2	25,157	-	-	-	25,157	413,076	-	413,076	516,345	495,402	-	4,214	-	4,214
TOTAL		34,734		9,322		34,734	2,123,610		2,123,610	2,654,513	2,629,422		9,642	9,322	18,964
MATERIAL FOR SHOULDER CONSTRUCTION							30,540		30,540	38,175	38,175				
LOSS DUE TO CLEARING & GRUBBING															
ADDITIONAL UNDERCUT				7,000			7,000		7,000	8,750	8,750			7,000	7,000
SELECT GRANULAR MATERIAL, CLASS III										-70,500	-70,500				
SELECT GRANULAR MATERIAL										-30,900	-30,900				
SURCHARGE & REMOVAL		28,800				28,800				28,800	28,800		28,800		28,800
WASTE IN LIEU OF BORROW											-9,642		-9,642		-9,642
PROJECT TOTAL		63,534		16,322		63,534	2,161,150		2,161,150	2,628,838	2,594,105		28,800	16,322	45,122
EST. 5% TO REPLACE TOP SOIL ON BORROW PIT											129,705				
GRAND TOTAL		63,534		16,322		63,534	2,161,150		2,161,150	2,628,838	2,723,810		28,800	16,322	45,122
SAY		**63,600**		**16,400**							**2,723,900**				

NOTE: EARTHWORK QUANTITIES ARE CALCULATED BY THE ROADWAY DESIGN UNIT. THESE EARTHWORK QUANTITIES ARE BASED IN PART ON SUBSURFACE DATA PROVIDED BY THE GEOTECHNICAL ENGINEERING UNIT.
EST. DDE = 22,600 CY EST. SHALLOW UNDERCUT = 1,000 CY

LOCHNER

H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	04
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

-L-
PI Sta 50+09.64
△ = 40° 43' 04.0" (RT)
D = 0° 34' 54.1"
L = 7,000.00'
T = 3,655.14'
R = 9,850.00'

NAD 83

10 15 20

POT Sta. 8+00.00

PCSta. 13+54.50

-BL- 52 PINC 238+88.54

-BL- 53 PINC 243+95.78

BM52 ELEVATION 76.09'
-BL- STA 238+59.03'LT
NR SPIKE IN BASE OF O" PINE

19.36ft. RCP

24" RCP

18.08ft. RCP

N 17° 02' 06.7" W

N 16° 59' 00.0" W

N 14° 32' 10.7" W

-L- (FUTURE)

N 14° 00' 05.6" W

N 21° 50' 07" E
560.33'

GENERAL WOOD PRESERVING COMPANY, INC.
DB 572 PG 949
MB 9 PG 11

R/W WILL BE ACQUIRED UNDER TJP.PROJECT R-2633B
CONSTRUCTION WILL BE COMPLETED UNDER TJP.PROJECT R-2633A

MATCH TO SHEET 5 -L- STA. 21+00.00

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE NAD 83/95 STATE PLANE COORDINATES FOR THE NCGS MONUMENT "PHOENIX 2"
WITH STATE PLANE GRID COORDINATES OF
NORTHING: 196121.992(ft) EASTING: 2278129.037(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 1.00002789978
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "PHOENIX 2" TO -L- STATION 8+00.00 IS
S 2° 05' 43.45" E 12,845.18'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NGVD 88

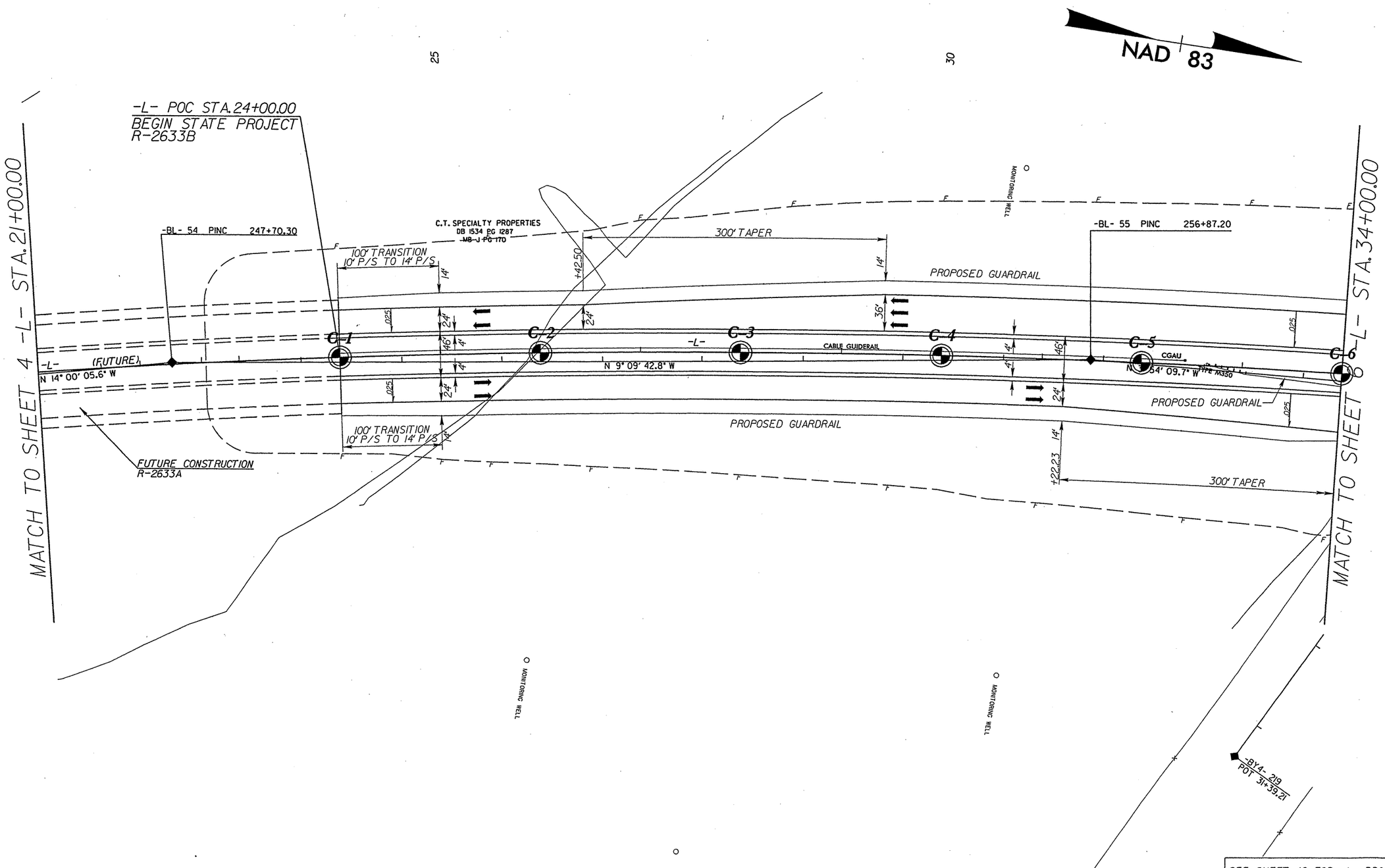
SEE SHEET 42 FOR FUTURE PROFILE

-L-
PI Sta 50+09.64
Δ = 40° 43' 04.0" (RT)
D = 0° 34' 54.1"
L = 7,000.00'
T = 3,655.14'
R = 9,850.00'
e = 2.5%

LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	05
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION



SEE SHEET 42 FOR -L- PROFILE

REVISIONS

MATCH TO SHEET 34 -Y5- STA.20+00.00

MATCH TO SHEET 35 -Y5- STA.36+00.00

MATCH TO SHEET 7 -L- STA.60+70.00

MATCH TO SHEET 6 -L- STA.34+00.00

ORGANIC OR LOOSE SOILS

A

D

-Y5- US 74/76

SR 438

2009 ADT
2025 ADT
(ADT in hundreds)

BEGIN BRIDGE -L- STA. 34+87.28

END BRIDGE -L- STA. 40+75.00

BRIDGE/ PAVEMENT RELATIONSHIP SKETCH

NAD 83

LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612

PROJECT REFERENCE NO. R-2633B
SHEET NO. 8

RDWAY DESIGN ENGINEER

STRUCTURES ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

-L-
PI Sta 50+09.64
Δ = 40° 43' 04.2" (RT)
D = 0° 34' 54.1"
L = 1,000.00'
T = 365.14'
R = 9,850.00'
e = 2.5%

-Y5-
PI Sta 27+29.43
Δ = 22° 31' 21.9" (LT)
D = 2° 45' 42.1"
L = 825.50'
T = 418.05'
R = 2,100.00'
e = 6.0%

-RP_A-
Pts Sta 14+00.00
Ls = 300.00'
LT = 200.00'
ST = 100.00'

-RP_B-
PI Sta 11+06.08
Δ = 15° 39' 27.8" (RT)
D = 3° 49' 11.0"
L = 409.48'
T = 206.05'
R = 1,500.00'
e = 6.0%

Pts Sta 20+08.58
Ls = 300.00'
LT = 200.00'
ST = 100.00'

-RP_N-
Pts Sta 23+42.80
Ls = 200.00'
LT = 133.42'
ST = 66.73'

PI Sta 24+08.39
Δ = 6° 29' 03.9" (LT)
D = 6° 21' 58.3"
L = 99.06'
T = 49.59'
R = 900.00'
e = 6.0%

Pts Sta 26+11.28
Ls = 200.00'
LT = 133.42'
ST = 66.73'

-LP_M-
Pts Sta 12+39.18
Ls = 300.00'
LT = 239.12'
ST = 119.95'

PI Sta 16+52.30
Δ = 99° 31' 53.1" (LT)
D = 22° 08' 12.8"
L = 451.66'
T = 307.30'
R = 260.00'
e = 6.0%

Pts Sta 18+86.81
Ls = 250.00'
LT = 168.73'
ST = 85.21'

POCSta. 40+10.00 -L-=
POT Sta. 27+00.00 -RP_M-
(47.00' LT)
Δ = 2° 18' 05.00"

-RP_M-
Pts Sta 14+00.14
Ls = 300.00'
LT = 200.14'
ST = 100.13'

PI Sta 17+56.38
Δ = 90° 58' 31.5" (LT)
D = 4° 24' 28.5"
L = 656.68'
T = 535.50'
R = 1,300.00'
e = 7.0%

Pts Sta 20+56.80
Ls = 300.00'
LT = 200.14'
ST = 100.13'

-RP_N-
Pts Sta 23+93.02
Ls = 200.00'
LT = 133.44'
ST = 66.77'

PI Sta 25+69.16
Δ = 61° 07' 37.2" (RT)
D = 7° 09' 43.7"
L = 223.59'
T = 122.57'
R = 800.00'
e = 6.0%

Pts Sta 27+46.59
Ls = 200.00'
LT = 133.44'
ST = 66.77'

-LP_N-
Pts Sta 12+03.60
Ls = 300.00'
LT = 201.60'
ST = 103.28'

PI Sta 17+48.98
Δ = 123° 59' 51.5" (RT)
D = 22° 08' 12.8"
L = 549.59'
T = 388.98'
R = 260.00'
e = 6.0%

Pts Sta 21+30.31
Ls = 200.00'
LT = 134.39'
ST = 67.62'

SCSta. 13+00.00

-RP_P-
Pts Sta 18+00.14
Ls = 300.00'
LT = 200.14'
ST = 100.13'

PI Sta 19+55.50
Δ = 28° 58' 31.5" (LT)
D = 4° 24' 28.5"
L = 656.68'
T = 535.50'
R = 1,300.00'
e = 7.0%

Pts Sta 20+56.80
Ls = 300.00'
LT = 200.14'
ST = 100.13'

-RP_Q-
Pts Sta 23+93.02
Ls = 200.00'
LT = 133.44'
ST = 66.77'

PI Sta 25+69.16
Δ = 61° 07' 37.2" (RT)
D = 7° 09' 43.7"
L = 223.59'
T = 122.57'
R = 800.00'
e = 6.0%

Pts Sta 27+46.59
Ls = 200.00'
LT = 133.44'
ST = 66.77'

-LP_P-
Pts Sta 12+03.60
Ls = 33° 03' 18.9"
Ls = 300.00'
LT = 201.60'
ST = 103.28'

PI Sta 17+48.98
Δ = 123° 59' 51.5" (RT)
D = 22° 08' 12.8"
L = 549.59'
T = 388.98'
R = 260.00'
e = 6.0%

Pts Sta 21+30.31
Ls = 22° 02' 12.8"
Ls = 200.00'
LT = 134.39'
ST = 67.62'

SEE SHEETS 62 FOR -SVR05- PROFILE | SEE SHEETS 58 & 59 FOR -Y5- PROFILE | SEE SHEETS 59 & 60 FOR -RP_A- PROFILE | SEE SHEET 61 FOR -RP_D- PROFILE | SEE SHEETS 42 & 43 FOR -L- PROFILE | SEE SHEET 60 FOR -LP_A- PROFILE | SEE SHEET 62 FOR -LP_D- PROFILE

GRAPHIC SCALE
50 25 0 50 100
PLANS

LOCATION: US 17 WILMINGTON BYPASS @ US 74/76
TIP NO.: R-2633B COUNTY: BRUNSWICK
DESIGNED BY: Jeff R. Hunt
CHECKED BY: Brian K. Esson DATE: February 2005

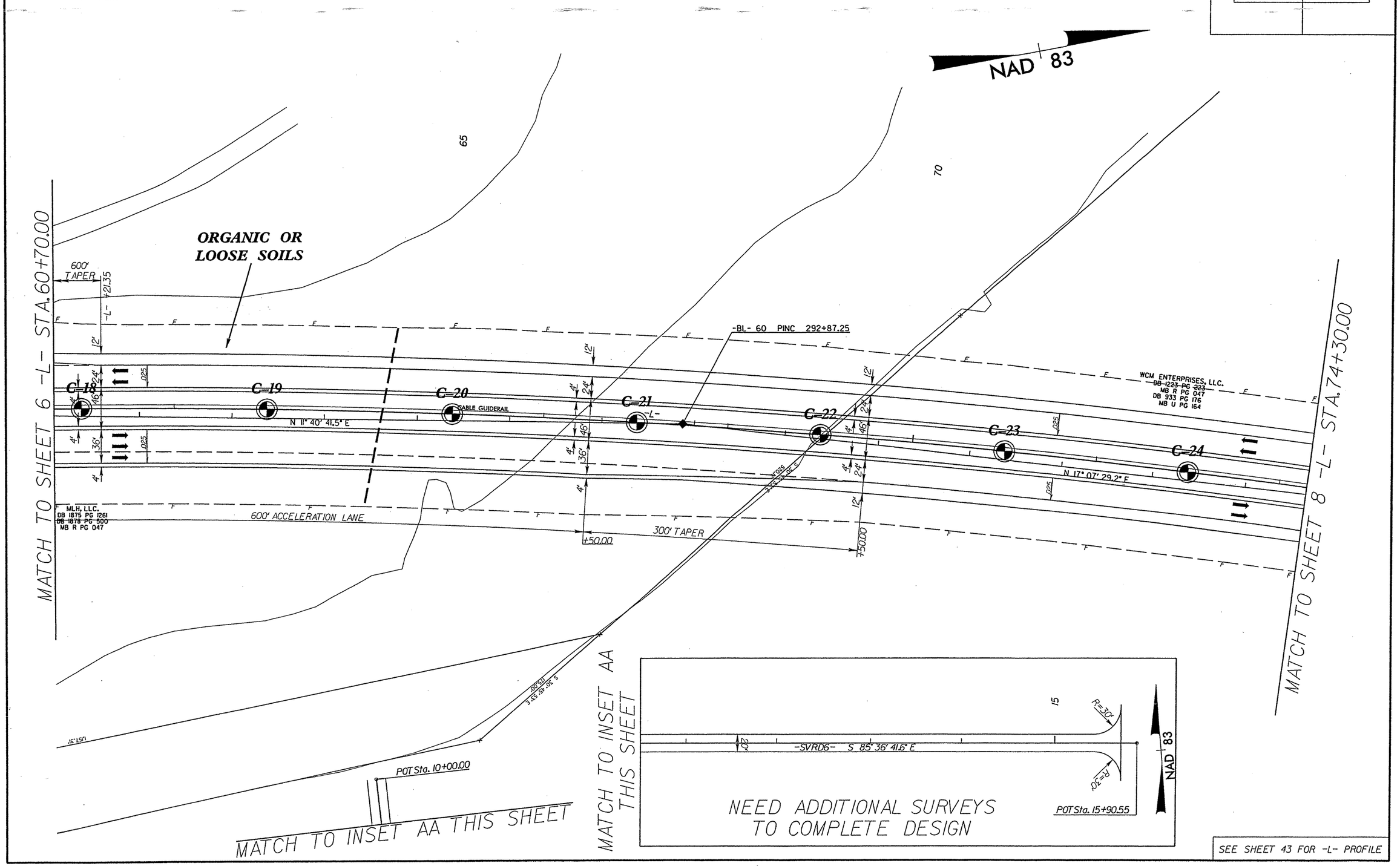
PROJECT REFERENCE NO.	SHEET NO.
R-2633B	07
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

-L-
PI Sta 50+09.64
Δ = 40° 43' 04.0" (RT)
D = 0° 34' 54.1"
L = 7,000.00'
T = 3,655.14'
R = 9,850.00'
e = 2.5%



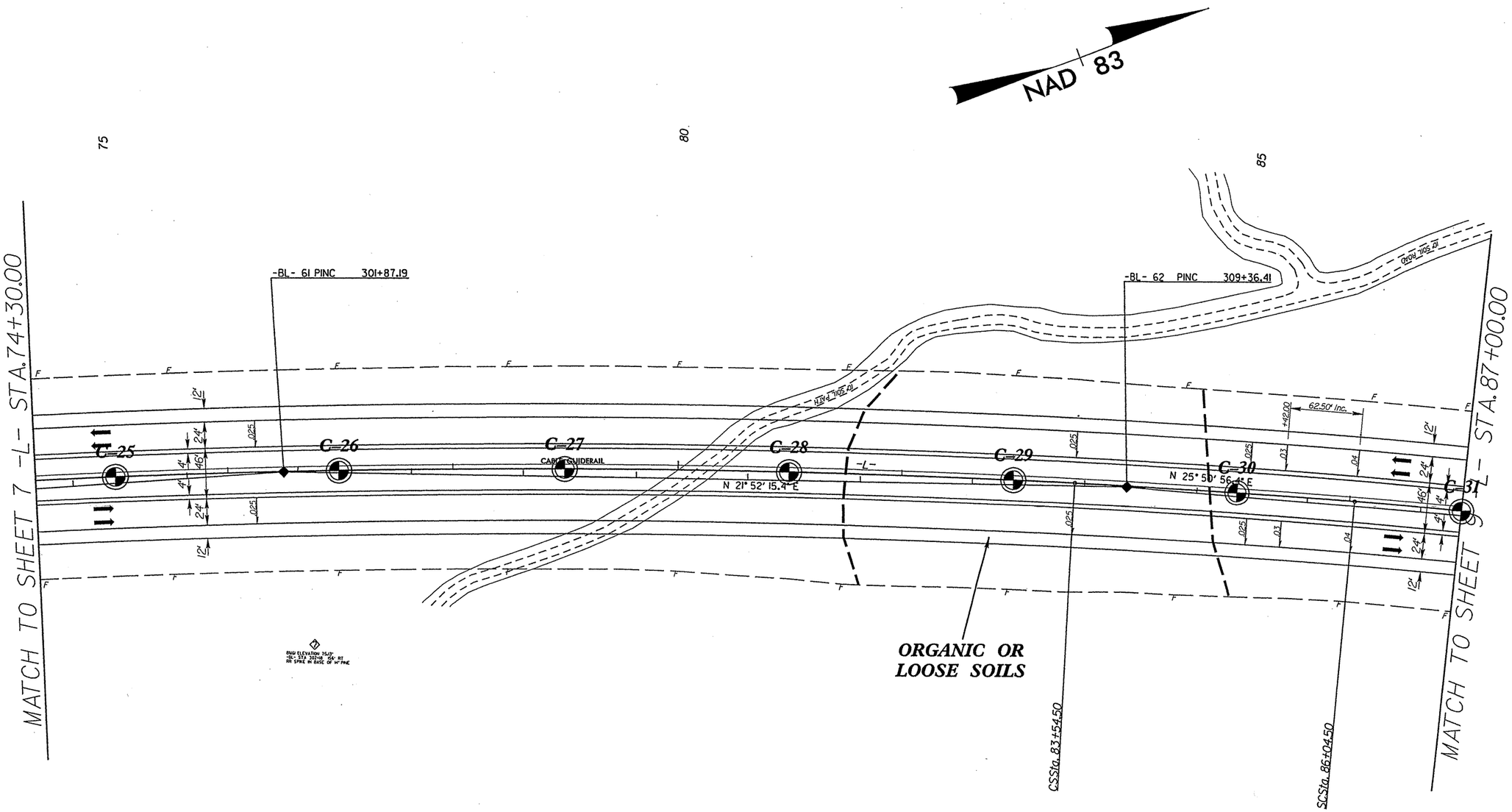
SEE SHEET 43 FOR -L- PROFILE

-L-	-L-	
PI Sta 50+09.64	PIs Sta 84+90.46	PI Sta 133+87.91
Δ = 40° 43' 04.0" (RT)	Θs = 0° 43' 37.5"	Δ = 79° 30' 50.4" (RT)
D = 0° 34' 54.1"	Θs = 1° 14' 44.1"	D = 0° 59' 47.2"
L = 7,000.00'	Ls = 250.00'	L = 7,979.74'
T = 3,655.14'	LT = 135.96'	T = 4,783.41'
R = 9,850.00'	ST = 114.06'	R = 5,750.00'
e = 2.5%		e = 4.0%

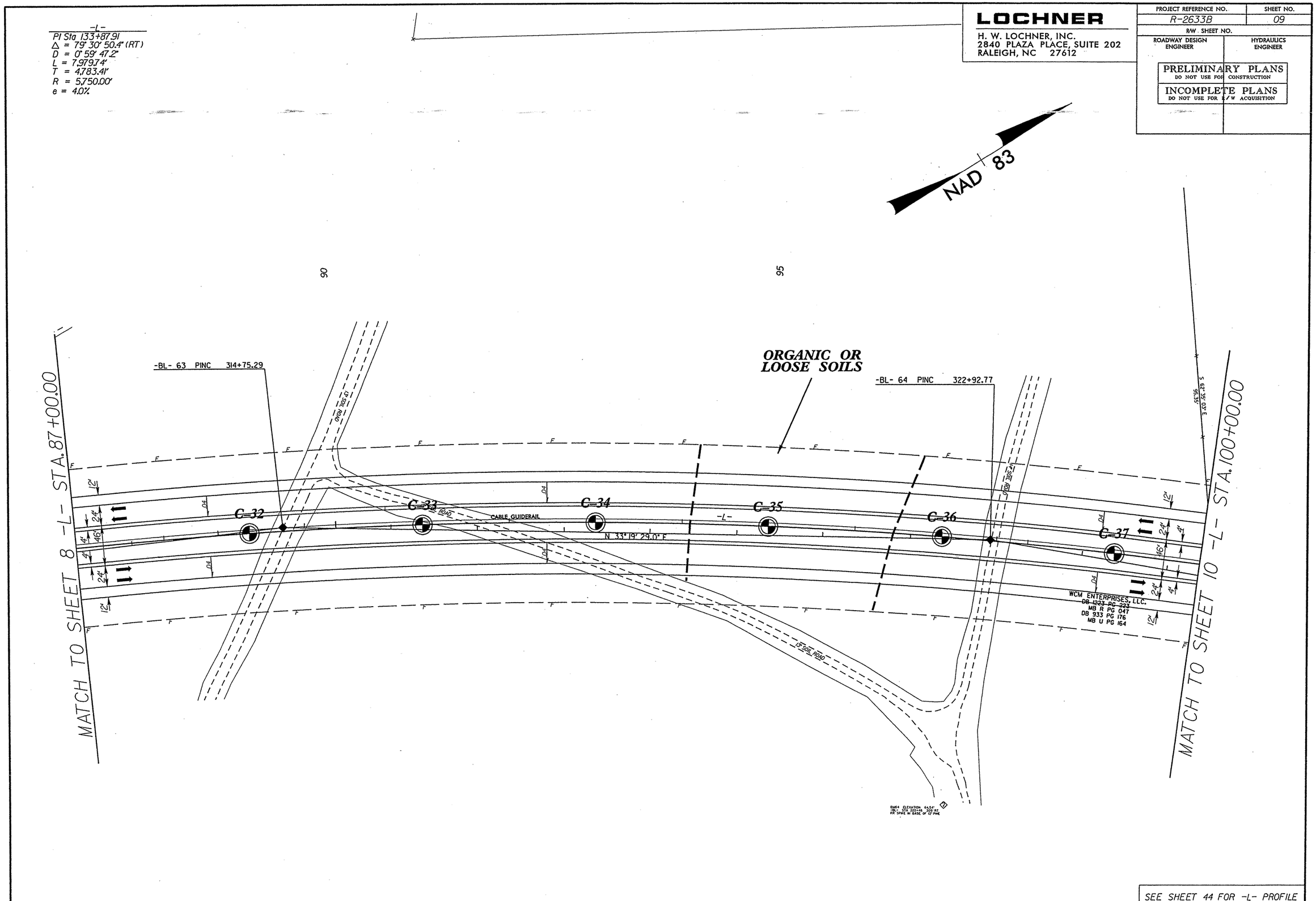
LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	08
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION



SEE SHEET 44 FOR -L- PROFILE



-L-
PI Sta 133+87.91
Δ = 79° 30' 50.4" (RT)
D = 0° 59' 47.2"
L = 7,979.74'
T = 4,783.41'
R = 5,750.00'
e = 4.0%
LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
PROJECT REFERENCE NO.
R-2633B
SHEET NO.
09
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
NAD 83
90
95
ORGANIC OR LOOSE SOILS
-BL- 63 PINC 314+75.29
-BL- 64 PINC 322+92.77
MATCH TO SHEET 8 -L- STA.87+00.00
MATCH TO SHEET 10 -L- STA.100+00.00
C-32
C-33
C-34
C-35
C-36
C-37
CABLE GUIDERAIL
N 33° 19' 29.0" E
13' SOIL ROAD
WCM ENTERPRISES, LLC.
DB 1223 PG 223
MB R PG 047
DB 933 PG 176
MB U PG 164
SEE SHEET 44 FOR -L- PROFILE

-L-
PI Sta 133+87.91
Δ = 79° 30' 50.4" (RT)
D = 0° 59' 47.2"
L = 7,979.74'
T = 4,783.41'
R = 5,750.00'
e = 4.0%

LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

NAD 83

105

110

MATCH TO SHEET 9 -L- STA. 100+00.00

MATCH TO SHEET 11 -L- STA. 112+00.00

12' X 6' RCBC
WILDLIFE CROSSING

-BL- 65 PINC 331+87.53

ORGANIC OR LOOSE SOILS

PROPOSED GUARDRAIL

C-38 C-39 C-40 C-41 C-42 C-43 C-44

B-2 / B-2A

CABLE GUIDERAIL

N 41° 40' 15.8" E

N 49° 34' 10.4" E

-L-

8:1 CAT-1

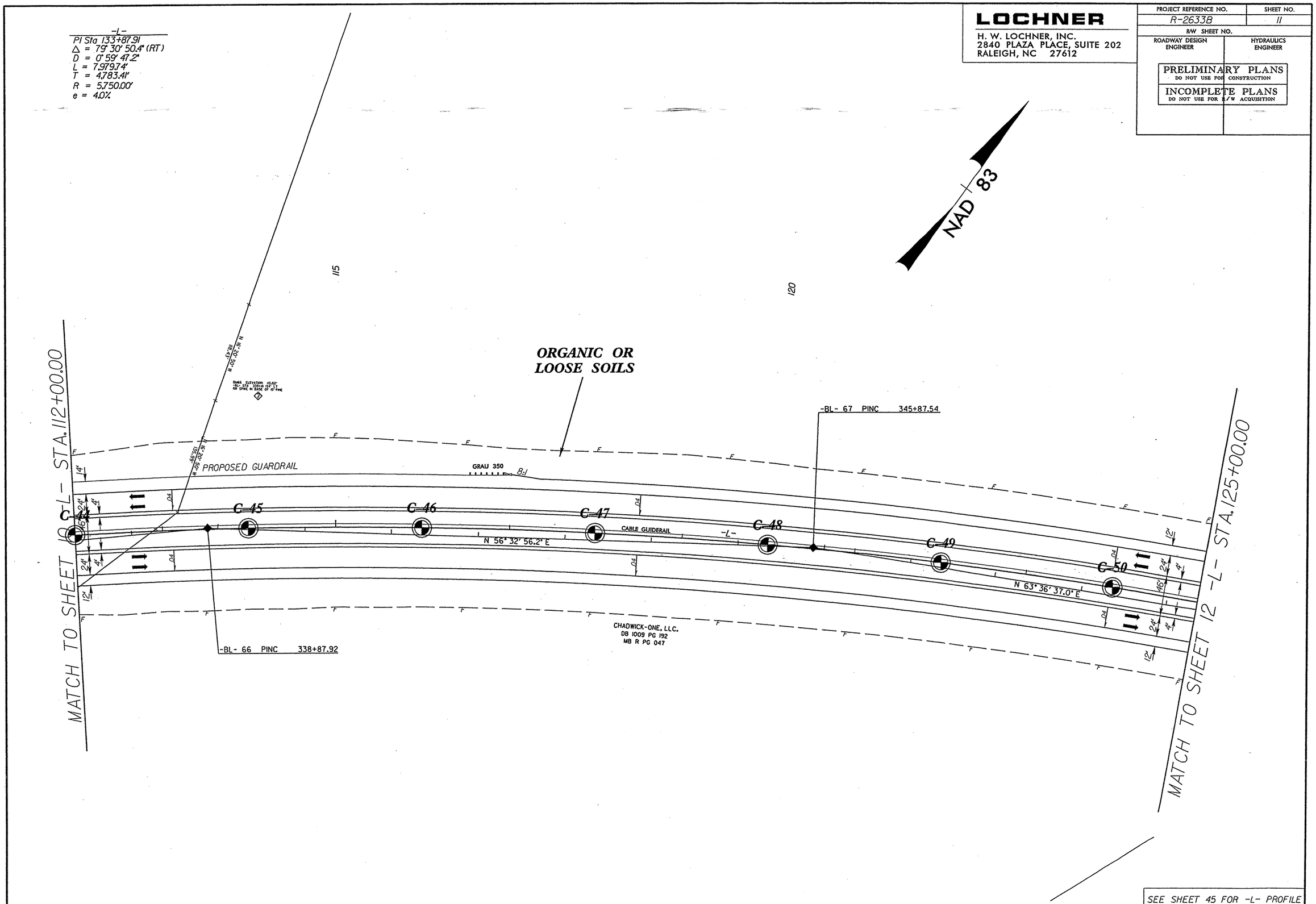
8:1 GRAU 350

MLH, LLC.
DB 1908 PG 874
DB 1878 PG 497
DB 1878 PG 500
MB R PG 047

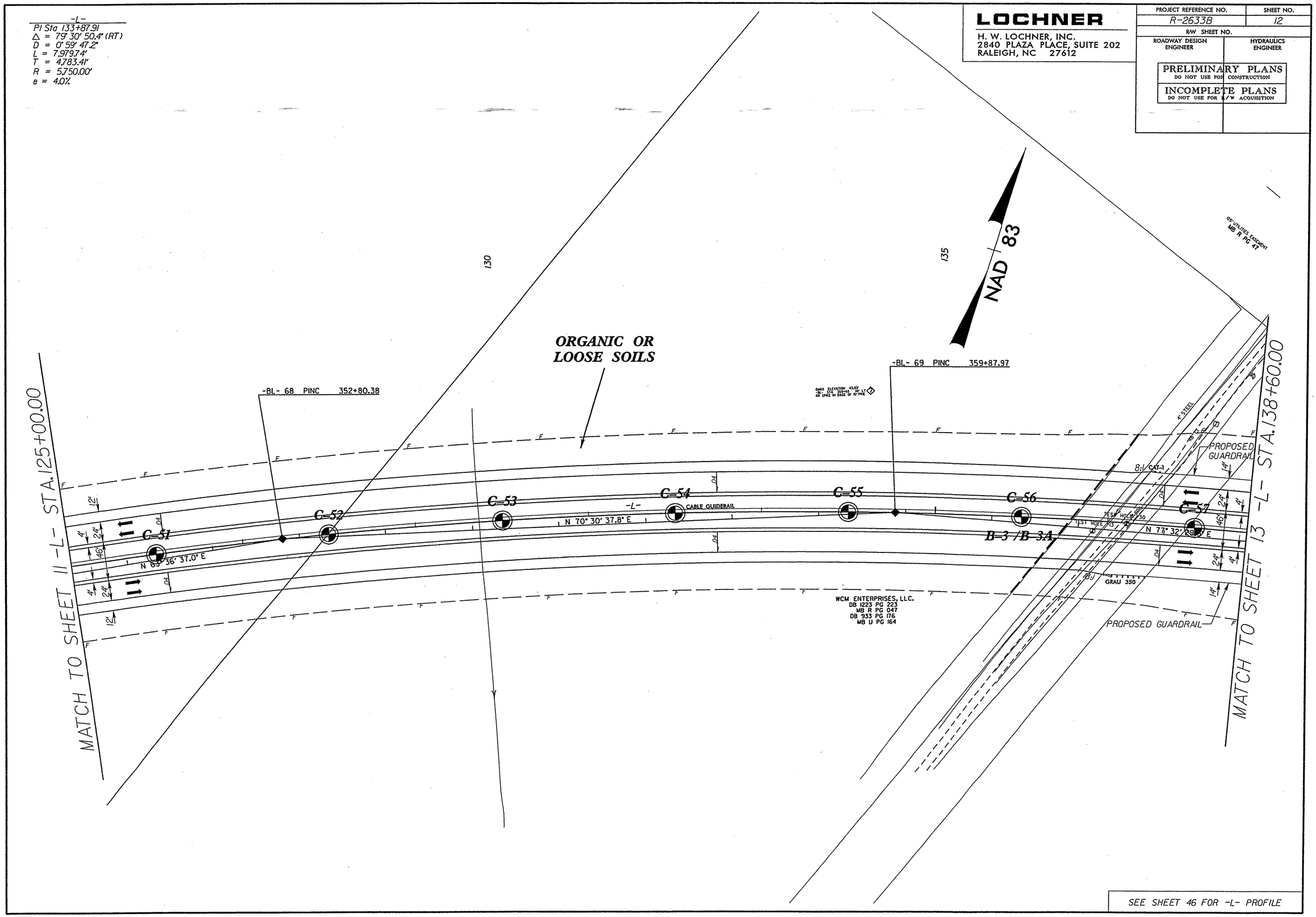
S 62° 55' 03" E
76.73'

N 17° 28' 39" E
1,258.33'

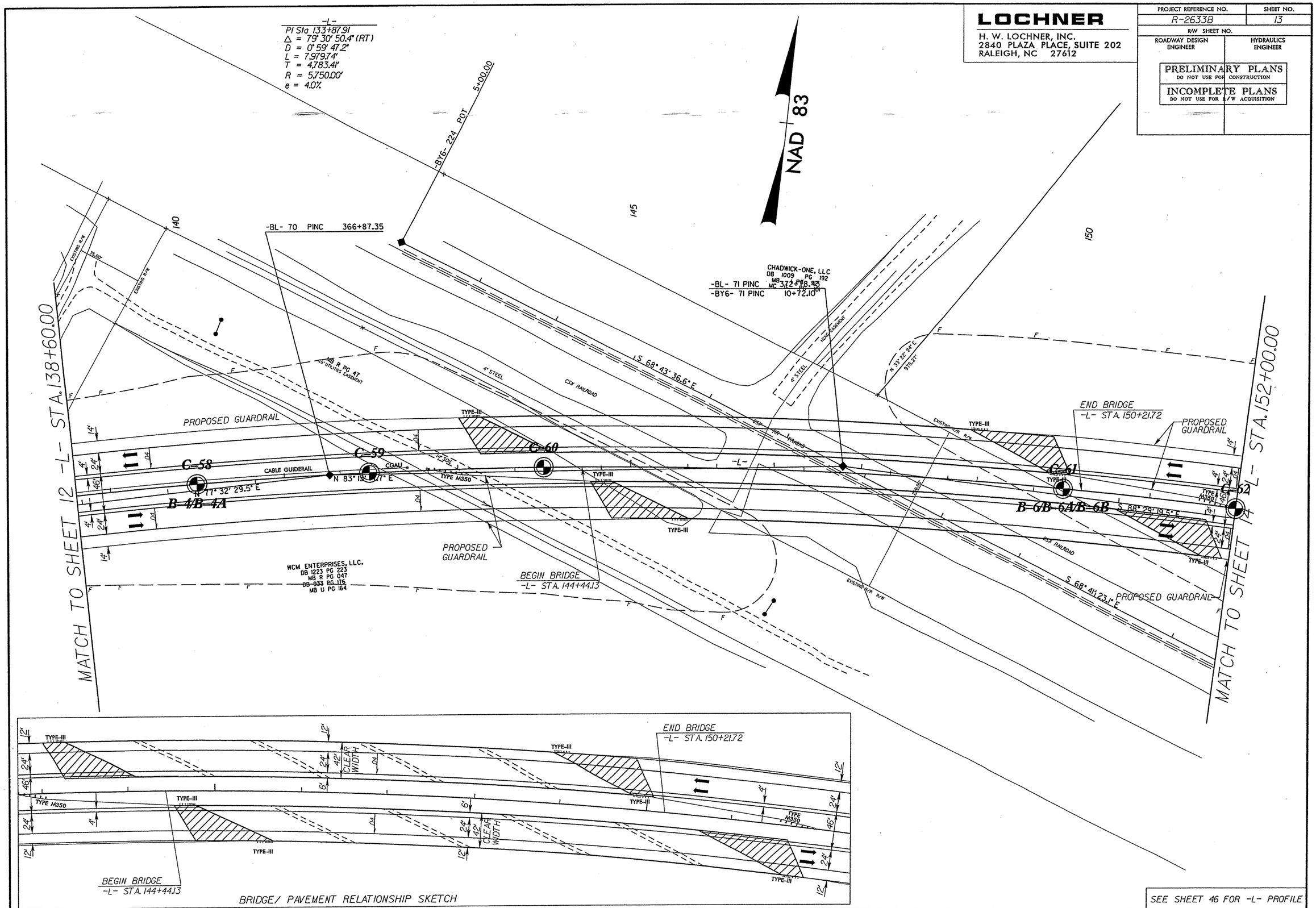
SEE SHEET 45 FOR -L- PROFILE



LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
PROJECT REFERENCE NO.
R-2633B
SHEET NO.
11
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
-L-
PI Sta 133+87.91
Δ = 79° 30' 50.4" (RT)
D = 0° 59' 47.2"
L = 7,979.74'
T = 4,783.41'
R = 5,750.00'
e = 4.0%
NAD 83
115
120
ORGANIC OR LOOSE SOILS
-BL- 67 PINC 345+87.54
PROPOSED GUARDRAIL
GRAU 350
8:1
C-44
C-45
C-46
C-47
C-48
C-49
C-50
CABLE GUIDERAIL
-L-
N 56° 32' 56.2" E
N 63° 36' 37.0" E
-BL- 66 PINC 338+87.92
CHADWICK-ONE, LLC.
DB 1009 PG 192
MB R PG 047
MATCH TO SHEET 10 -L- STA.112+00.00
MATCH TO SHEET 12 -L- STA.125+00.00
SEE SHEET 45 FOR -L- PROFILE



-L-
PI Sta 133+87.91
Δ = 79° 30' 50.4" (RT)
D = 0° 59' 47.2"
L = 7,979.74'
T = 4,783.41'
R = 5,750.00'
e = 4.0%
LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
PROJECT REFERENCE NO.
R-2633B
SHEET NO.
12
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
NAD 83
130
135
ORGANIC OR LOOSE SOILS
-BL- 68 PINC 352+80.38
-BL- 69 PINC 359+87.97
MATCH TO SHEET 11 -L- STA.125+00.00
MATCH TO SHEET 13 -L- STA.138+60.00
C-51
C-52
C-53
C-54
C-55
C-56
C-57
B-3 /B-3A
N 83° 36' 37.0" E
N 70° 30' 37.8" E
N 77° 32' 29.0" E
CABLE GUIDERAIL
PROPOSED GUARDRAIL
PROPOSED GUARDRAIL
4" STEEL
8:1 CAT-1
GRAU 350
WCM ENTERPRISES, LLC.
DB 1223 PG 223
MB R PG 047
DB 933 PG 176
MB U PG 164
SEE SHEET 46 FOR -L- PROFILE

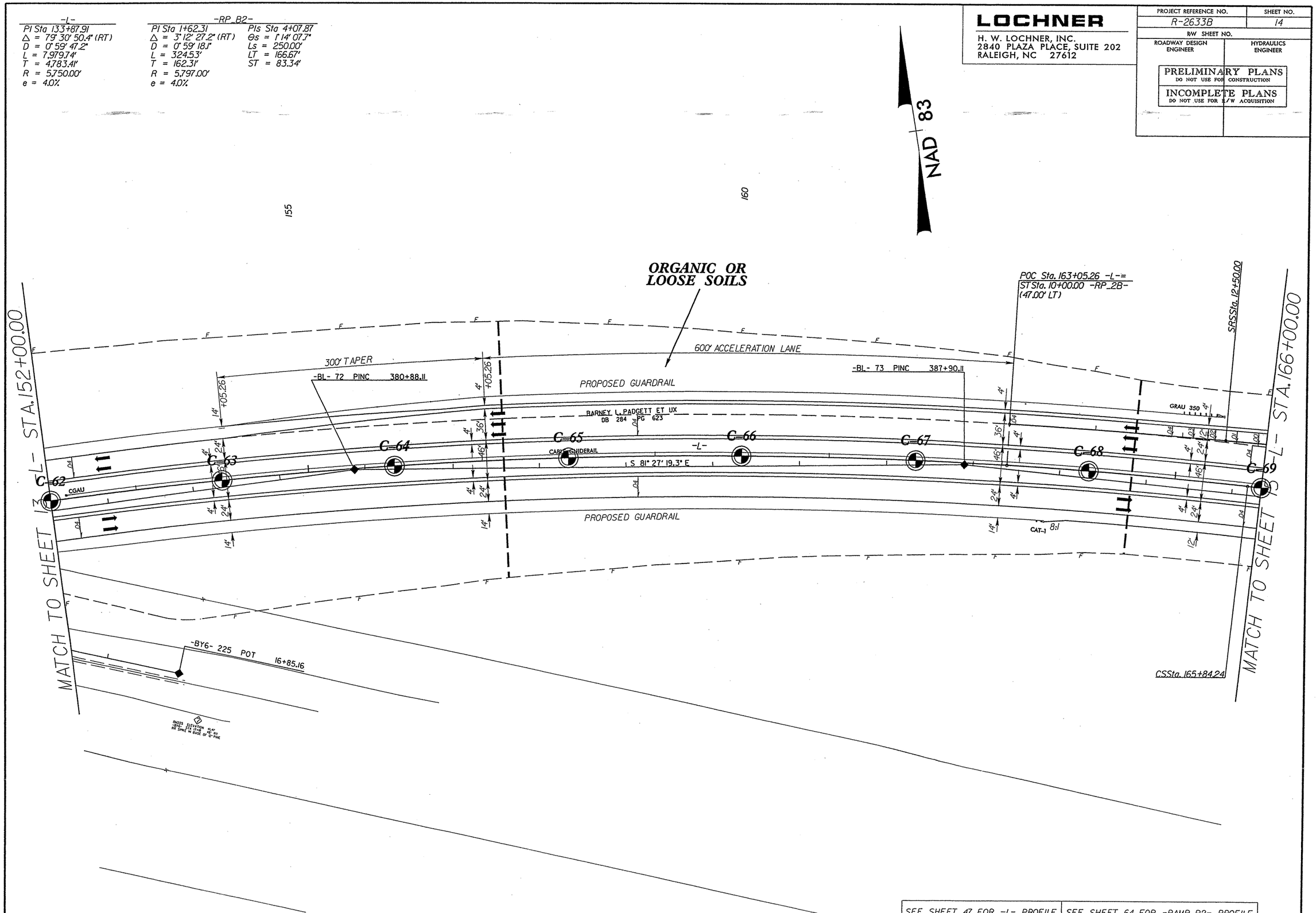

LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
PROJECT REFERENCE NO.
R-2633B
SHEET NO.
13
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
-L-
PI Sta 133+87.91
Δ = 79° 30' 50.4" (RT)
D = 0° 59' 47.2"
L = 7,979.74'
T = 4,783.41'
R = 5,750.00'
e = 4.0%
NAD 83
-BY6- 224 POT 5+00.00
-BL- 70 PINC 366+87.35
CHADWICK-ONE, LLC
DB 1009 PG 192
-BL- 71 PINC
-BY6- 71 PINC 10+72.10
MB R PG 47
45' UTILITIES EASEMENT
4" STEEL
CSX RAILROAD
S 68° 43' 36.6" E
N 33° 22' 24" E
975.27'
PROPOSED GUARDRAIL
TYPE-III
C-58
C-59
C-60
C-61
C-62
CABLE GUIDERAIL
CGAU
N 83° 13' 47" E
N 77° 32' 29.5" E
B-4/B-4A
B-6/B-6A/B-6B
S 88° 29' 19.5" E
TYPE M350
PROPOSED GUARDRAIL
BEGIN BRIDGE
-L- STA. 144+44.13
WCM ENTERPRISES, LLC.
DB 1223 PG 223
MB R PG 047
DB 933 PG 176
MB U PG 164
S 68° 41' 23.1" E
END BRIDGE
-L- STA. 150+21.72
MATCH TO SHEET 12 -L- STA. 138+60.00
MATCH TO SHEET 14 -L- STA. 152+00.00
140
145
150
CLEAR WIDTH
BEGIN BRIDGE
-L- STA. 144+44.13
BRIDGE/ PAVEMENT RELATIONSHIP SKETCH
SEE SHEET 46 FOR -L- PROFILE

-L-	-RP_B2-	
PI Sta 133+87.91	PI Sta 1+62.31	PIs Sta 4+07.87
Δ = 79° 30' 50.4" (RT)	Δ = 3° 12' 27.2" (RT)	Θs = 1° 14' 07.7"
D = 0° 59' 47.2"	D = 0° 59' 18.1"	Ls = 250.00'
L = 7,979.74'	L = 324.53'	LT = 166.67'
T = 4,783.41'	T = 162.31'	ST = 83.34'
R = 5,750.00'	R = 5,797.00'	
e = 4.0%	e = 4.0%	

LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION



SEE SHEET 47 FOR -L- PROFILE | SEE SHEET 64 FOR -RAMP_B2- PROFILE

REVISIONS

LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	15
NW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS — NOT TO BE USED FOR CONSTRUCTION
INCOMPLETE PLANS — DO NOT USE FOR R/W ACQUISITION

MATCH TO SHEET 36 -Y7- STA. 23+50.00

NAD 83

ORGANIC OR LOOSE SOILS

MATCH TO SHEET 37 -Y7- STA. 39+50.00

MATCH TO SHEET -L- STA. 166+00.00

MATCH TO SHEET -L- STA. 194+00.00

PROPOSED GUARDRAIL

SEE SHEET 67 FOR -SVR07- PROFILE
SEE SHEET 66 FOR -RP_C2- PROFILE
SEE SHEETS 66 & 67 FOR -RP_D2- PROFILE
SEE SHEETS 64 & 65 FOR -RP_B2- PROFILE
SEE SHEET 65 FOR -LP_B2- PROFILE
SEE SHEET 63 FOR -Y7- PROFILE
SEE SHEETS 47 & 48 FOR -L- PROFILE

NOTE: ALL DRIVEWAY RADII ARE TO BE 10', UNLESS OTHERWISE NOTED.

GRAPHIC SCALE
50 25 0 50 100
PLANS

LOCATION: US 17 WILMINGTON BYPASS @ -Y7- MT. MISERY ROAD (SR1426)
TIP NO.: R-2633B COUNTY: BRUNSWICK
DESIGNED BY: Jeff R. Hast
CHECKED BY: Brian K. Eason DATE: November 2005

BEGIN BRIDGE -Y7- STA. 30+63.18 — END BRIDGE -Y7- STA. 32+74.72
BRIDGE/ PAVEMENT RELATIONSHIP SKETCH

BEGIN BRIDGE -Y7- STA. 37+81.34 — END BRIDGE -Y7- STA. 39+28.74
BRIDGE/ PAVEMENT RELATIONSHIP SKETCH

-Y7- ISR 1426 MT. MISERY RD.
2009 ADT
2025 ADT
(ADT in hundreds)

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

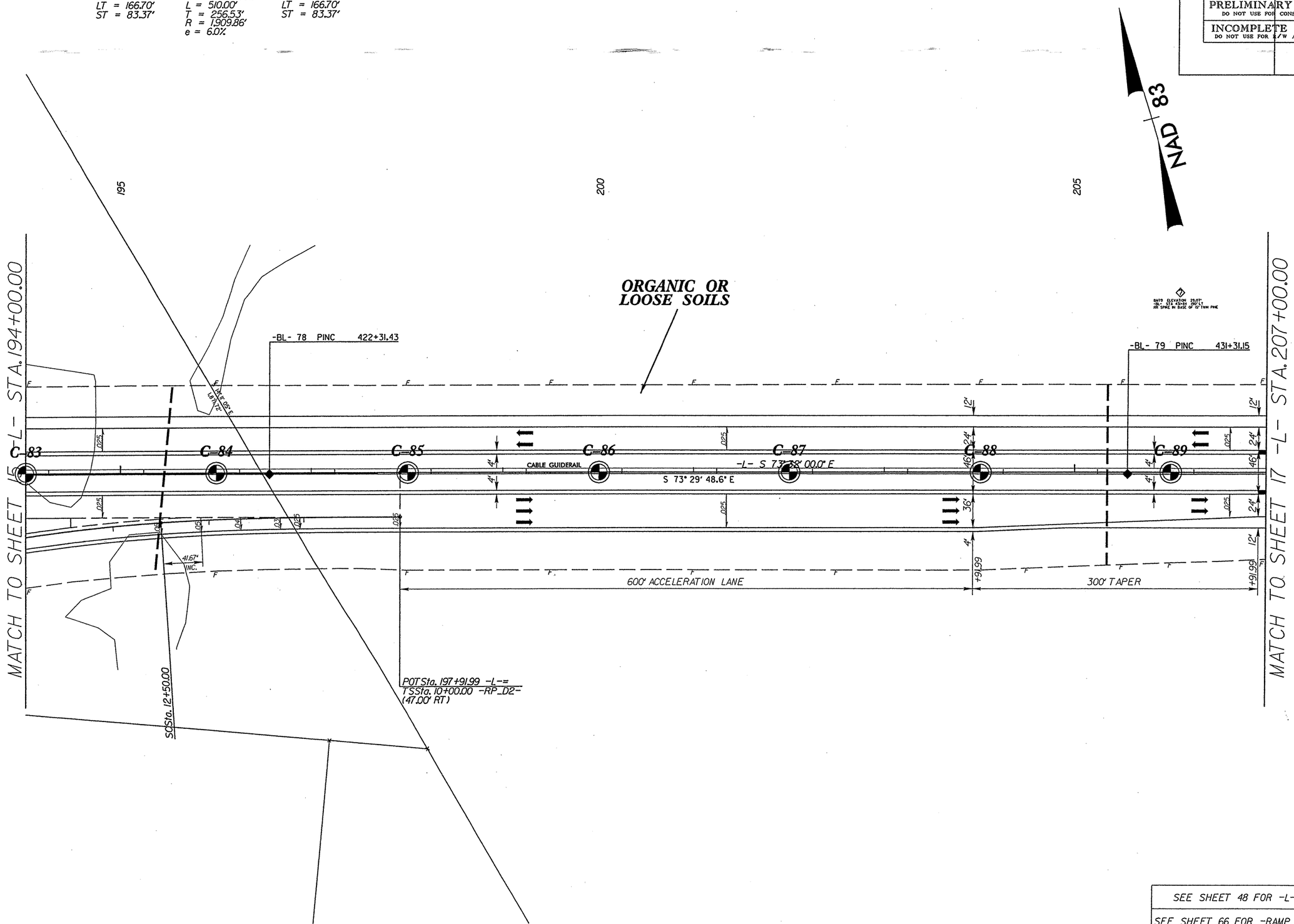
LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

-RP_D2-

PIs Sta 11+66.70	PI Sta 15+06.53	PIs Sta 18+43.37
Θs = 3° 45' 00.0"	Δ = 15° 18' 00.0" (LT)	Θs = 3° 45' 00.0"
Ls = 250.00'	D = 3° 00' 00.0"	Ls = 250.00'
LT = 166.70'	L = 510.00'	LT = 166.70'
ST = 83.37'	T = 256.53'	ST = 83.37'
	R = 1,909.86'	
	e = 6.0%	



SEE SHEET 48 FOR -L- PROFILE

SEE SHEET 66 FOR -RAMP_D2- PROFILE

LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

NAD 83

210 215 220

MATCH TO SHEET 16 -L- STA. 207+00.00

MATCH TO SHEET 18 -L- STA. 221+00.00

ORGANIC OR LOOSE SOILS

-BL- 80 PINC 441+29.52

C-90 C-91 C-92 C-93 C-94 C-95 C-96

CABLE GUIDERAIL

-L- S 73° 32' 00.0" E

S 73° 32' 47.2" E

S 73° 33' 42.7" E

S 21° 56' 21" W 1596.02'

LINCOLN DEVELOPMENT CO., INC.
DB 254 PG 20
MB 4 PG 156

12' 24' 46' 4' 4' 24' 12' .025

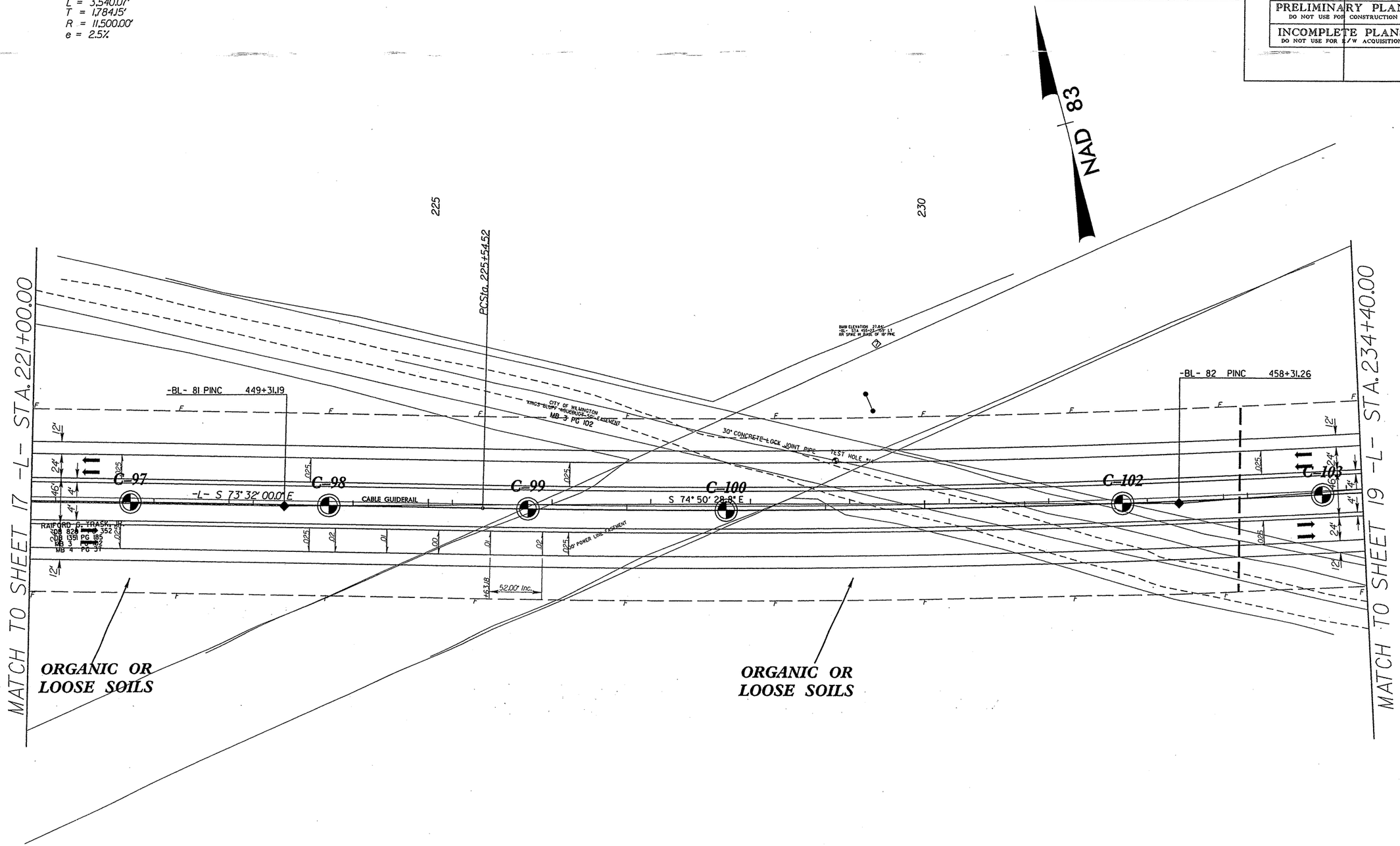
SEE SHEET 49 FOR -L- PROFILE

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

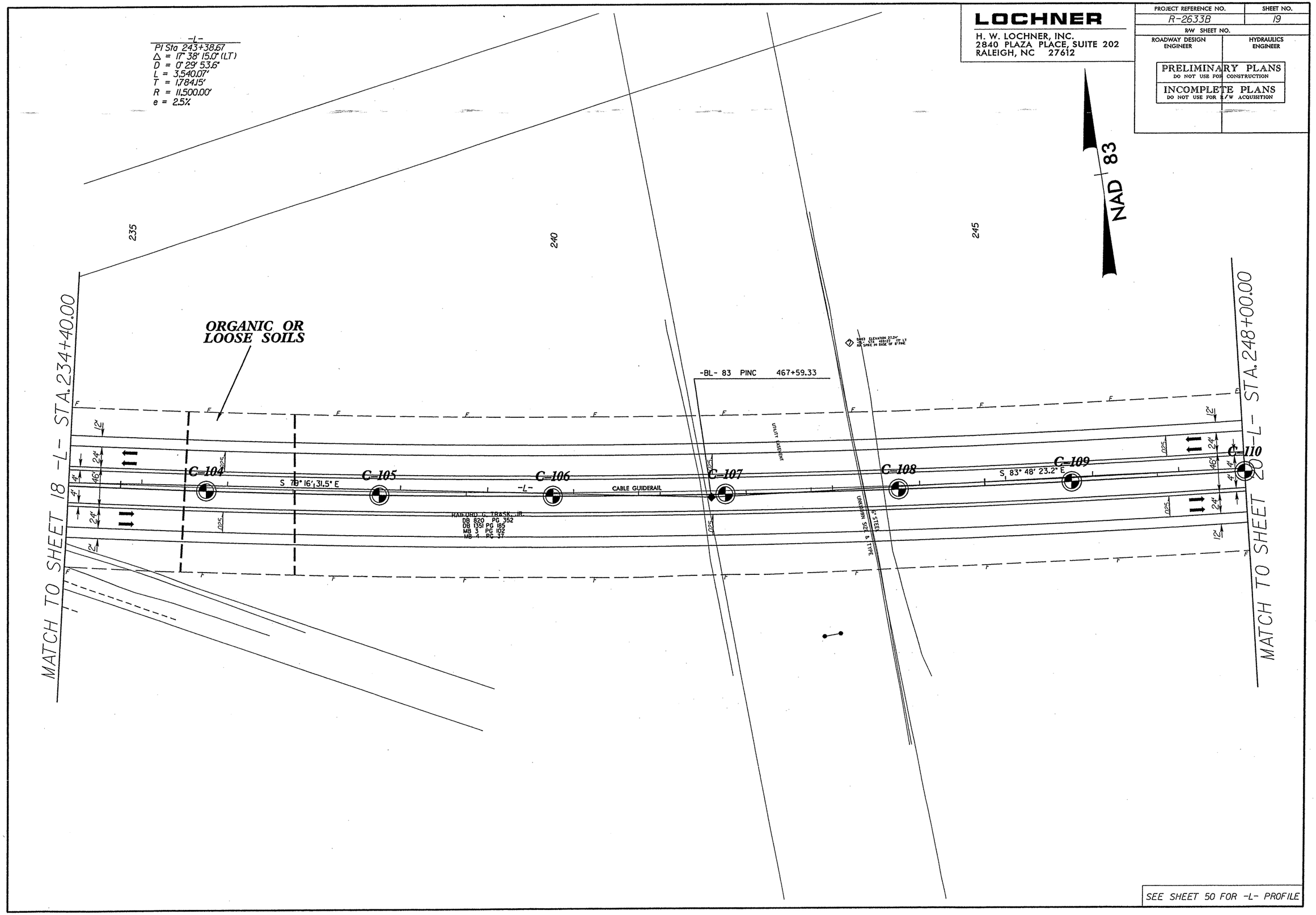
LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

-L-
PI Sta 243+38.67
△ = 17° 38' 15.0" (LT)
D = 0° 29' 53.6"
L = 3,540.07'
T = 1,784.15'
R = 11,500.00'
e = 2.5%



SEE SHEET 49 FOR -L- PROFILE


LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
PROJECT REFERENCE NO.
R-2633B
SHEET NO.
19
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
-L-
PI Sta 243+38.67
Δ = 17° 38' 15.0" (LT)
D = 0° 29' 53.6"
L = 3,540.07'
T = 1,784.15'
R = 11,500.00'
e = 2.5%
NAD 83
235
240
245
ORGANIC OR LOOSE SOILS
-BL- 83 PINC 467+59.33
MATCH TO SHEET 18 -L- STA. 234+40.00
MATCH TO SHEET 20 -L- STA. 248+00.00
C-104
C-105
C-106
C-107
C-108
C-109
C-110
S 78° 16' 31.5" E
S 83° 48' 23.2" E
-L-
CABLE GUIDERAIL
RAILFORD G. TRASK, JR.
DB 820 PG 352
DB 1351 PG 185
MB 3 PG 102
MB 4 PG 37
UTILITY EASEMENT
UNKNOWN SIZE & TYPE
6" STEEL
SEE SHEET 50 FOR -L- PROFILE

-L-
PI Sta 243+38.67
Δ = 17° 38' 15.0" (LT)
D = 0° 29' 53.6"
L = 3,540.07'
T = 1,784.15'
R = 11,500.00'
e = 2.5%

LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	20
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

NAD 83

250 255 260

MATCH TO SHEET 19 -L- STA. 248+00.00

-BL- 84 PINC 475+04.23

-BL- 85 PINC 482+31.28

C-110 C-111 C-112 C-113 C-114 C-115 C-116

S 86° 59' 58.5" E

N 89° 19' 40.9" E

-L-

CABLE GUIDERAIL

PROPOSED GUARDRAIL

8:1 CAT-1

8:1 GRAU 350

MATCH TO SHEET 21 -L- STA. 260+60.00

SEE SHEET 50 FOR -L- PROFILE

-L-
PI Sta 243+38.67
Δ = 17° 38' 15.0" (LT)
D = 0° 29' 53.6"
L = 3,540.07'
T = 1,784.15'
R = 11,500.00'
e = 2.5%

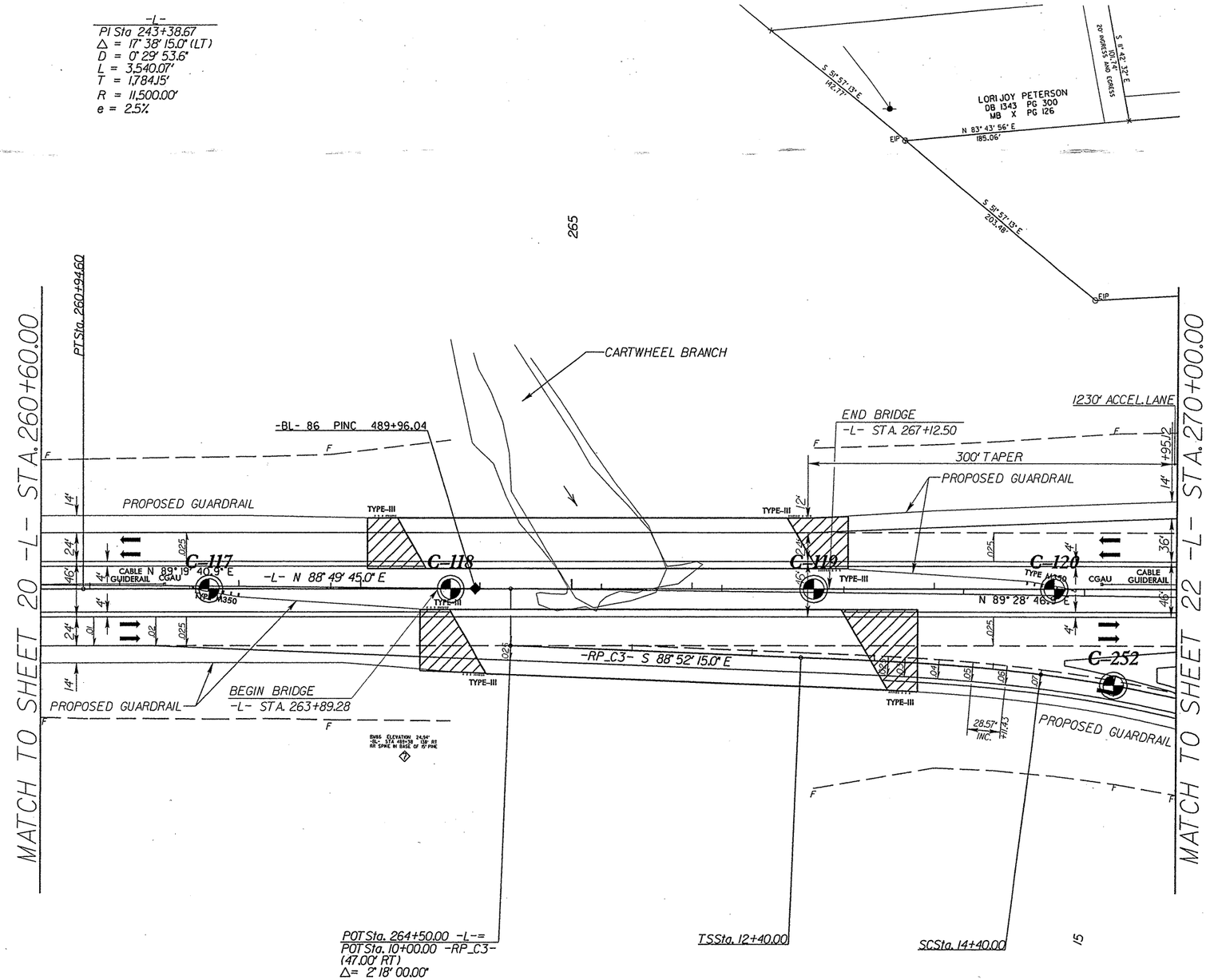
LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612

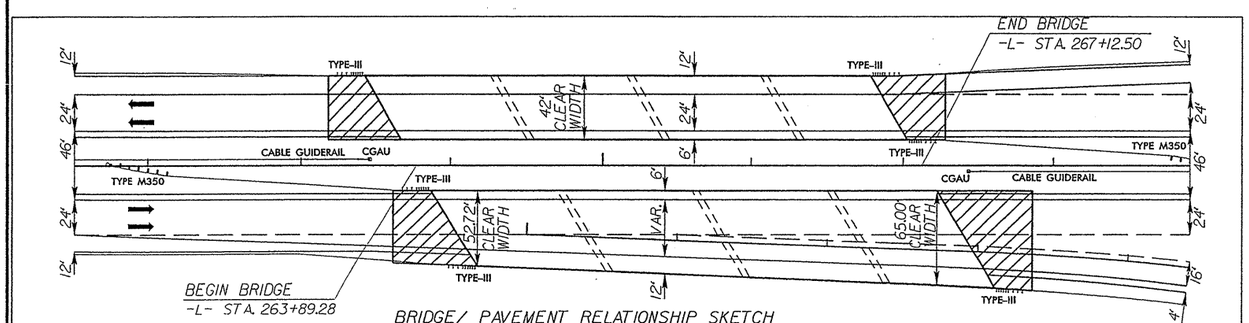
PROJECT REFERENCE NO.	SHEET NO.
R-2633B	21
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

NAD 83





BRIDGE/ PAVEMENT RELATIONSHIP SKETCH

SEE SHEETS 72 FOR -RP_C3- PROFILE

SEE SHEET 51 FOR -L- PROFILE

REVISIONS

-Y8- (SR 1430) CEDAR HILL RD.

82 228 -L- 90 249

3/0 8/39 9/24 12/32

53/148 63/175

2009 ADT
2025 ADT
(ADT in hundreds)

MATCH TO SHEET 38 -Y8- STA 22+50.00

MATCH TO SHEET 38A -Y8B- STA 22+50.00

MATCH TO SHEET 21 -L- STA 270+00.00

MATCH TO SHEET 23 -L- STA 298+00.00

MATCH TO SHEET 39 -Y8- STA 37+00.00

NAD 83

A

B

C

D

LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	22

R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

-RP_A1-
PI Sta 13+83.39
Ds = 5°07'00.0"
Ls = 200.00'
LT = 133.39'
ST = 66.72'

PI Sta 17+47.01
Δ = 58°03'42.3" (RT)
D = 5°07'00.0"
L = 506.24'
T = 297.14'
R = 1145.92'
e = 6.50%

-RP_A2-
PI Sta 20+97.95
Ds = 5°00'00.0"
Ls = 200.00'
LT = 133.39'
ST = 66.72'

PI Sta 23+64.85
Ds = 11°27'33.0"
Ls = 200.00'
LT = 133.61'
ST = 66.92'

PI Sta 26+36.87
Δ = 44°40'56.6" (LT)
D = 11°27'33.0"
L = 389.84'
T = 205.47'
R = 500.00'
e = 7.00%

-YA-
PI Sta 28+70.08
Δ = 7°55'27.2" (RT)
D = 5°07'19.4"
L = 345.52'
T = 172.89'
R = 1119.00'
e = 6.00%

-RP_A3-
PI Sta 11+34.38
Ds = 22°05'12.8"
Ls = 200.00'
LT = 134.39'
ST = 67.62'

PI Sta 13+94.45
Δ = 150°41'45.2" (LT)
D = 22°05'12.8"
L = 663.94'
T = 994.49'
R = 260.00'
e = 8.00%

PI Sta 18+52.46
Ds = 22°05'12.8"
Ls = 200.00'
LT = 134.39'
ST = 67.62'

-RP_C3-
PI Sta 13+77.39
Ds = 5°07'00.0"
Ls = 200.00'
LT = 133.39'
ST = 66.72'

PI Sta 17+18.04
Δ = 27°27'43.5" (RT)
D = 5°09'00.0"
L = 547.24'
T = 278.94'
R = 1145.92'
e = 7.0%

PI Sta 20+13.56
Ds = 5°01'00.0"
Ls = 200.00'
LT = 133.39'
ST = 66.72'

PI Sta 23+20.36
Ds = 8°27'33.0"
Ls = 200.00'
LT = 133.61'
ST = 66.92'

PI Sta 28+62.43
Δ = 38°37'05.9" (LT)
D = 11°27'33.0"
L = 337.12'
T = 173.72'
R = 500.00'
e = 7.0%

-RP_D3-
PI Sta 11+33.37
Ds = 3°52'16.8"
Ls = 200.00'
LT = 133.39'
ST = 66.70'

PI Sta 13+40.13
Δ = 62°45'09.4" (LT)
D = 3°52'16.8"
L = 598.12'
T = 342.79'
R = 1480.00'
e = 6.5%

PI Sta 15+93.82
Ds = 3°52'16.8"
Ls = 200.00'
LT = 133.39'
ST = 66.70'

-RP_D2-
PI Sta 11+33.37
Ds = 3°52'16.8"
Ls = 200.00'
LT = 133.39'
ST = 66.70'

PI Sta 13+40.13
Δ = 62°45'09.4" (LT)
D = 3°52'16.8"
L = 598.12'
T = 342.79'
R = 1480.00'
e = 6.5%

PI Sta 15+93.82
Ds = 3°52'16.8"
Ls = 200.00'
LT = 133.39'
ST = 66.70'

-RP_D3-
PI Sta 11+33.37
Ds = 3°52'16.8"
Ls = 200.00'
LT = 133.39'
ST = 66.70'

PI Sta 13+40.13
Δ = 62°45'09.4" (LT)
D = 3°52'16.8"
L = 598.12'
T = 342.79'
R = 1480.00'
e = 6.5%

PI Sta 15+93.82
Ds = 3°52'16.8"
Ls = 200.00'
LT = 133.39'
ST = 66.70'

BRIDGE/ PAVEMENT RELATIONSHIP SKETCH

NOTE: ALL DRIVEWAY RADII ARE TO 10', UNLESS OTHERWISE NOTED.

SEE SHEET 75 FOR -SVA08- PROFILE	SEE SHEET 76 FOR -Y8B- PROFILE	SEE SHEETS 51 & 52 FOR -L- PROFILE	SEE SHEETS 73 & 74 FOR -RP_D3- PROFILE	SEE SHEETS 68 & 69 FOR -Y8- PROFILE	GRAPHIC SCALE 50 25 0 50 100 PLANS
	SEE SHEET 75 FOR -SVA09- PROFILE	SEE SHEET 72 FOR -LP_A3- PROFILE	SEE SHEET 71 FOR -RP_A3- PROFILE	SEE SHEETS 72 & 73 FOR -RP_C3- PROFILE	

LOCATION: US 17 WILMINGTON BYPASS @ -Y8- CEDAR HILL ROAD (SR1430)

TIP NO.: R-2633B COUNTY: BRUNSWICK

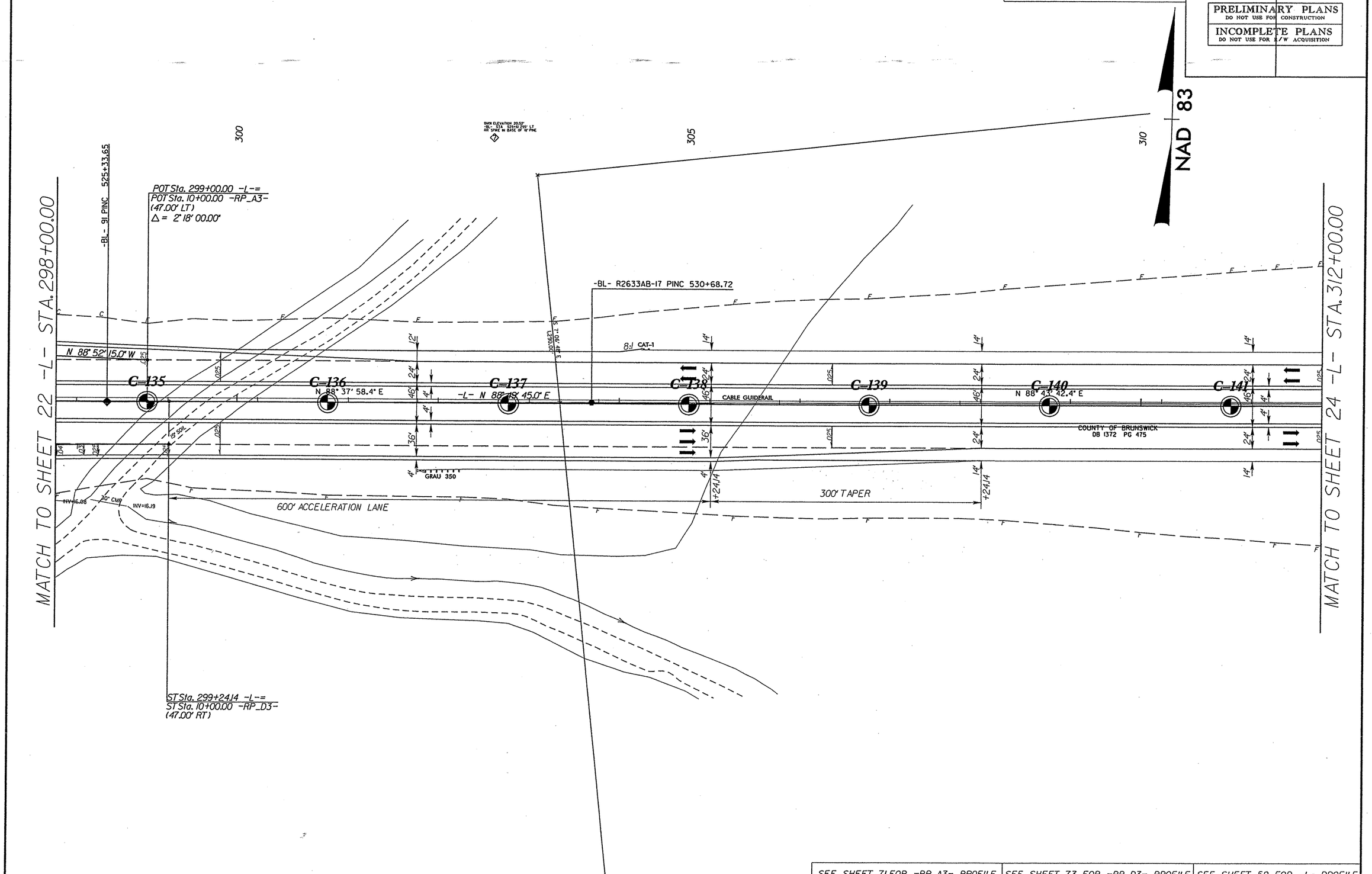
DESIGNED BY: Jeff R. Hord

CHECKED BY: Brian K. Eason DATE: February 2005

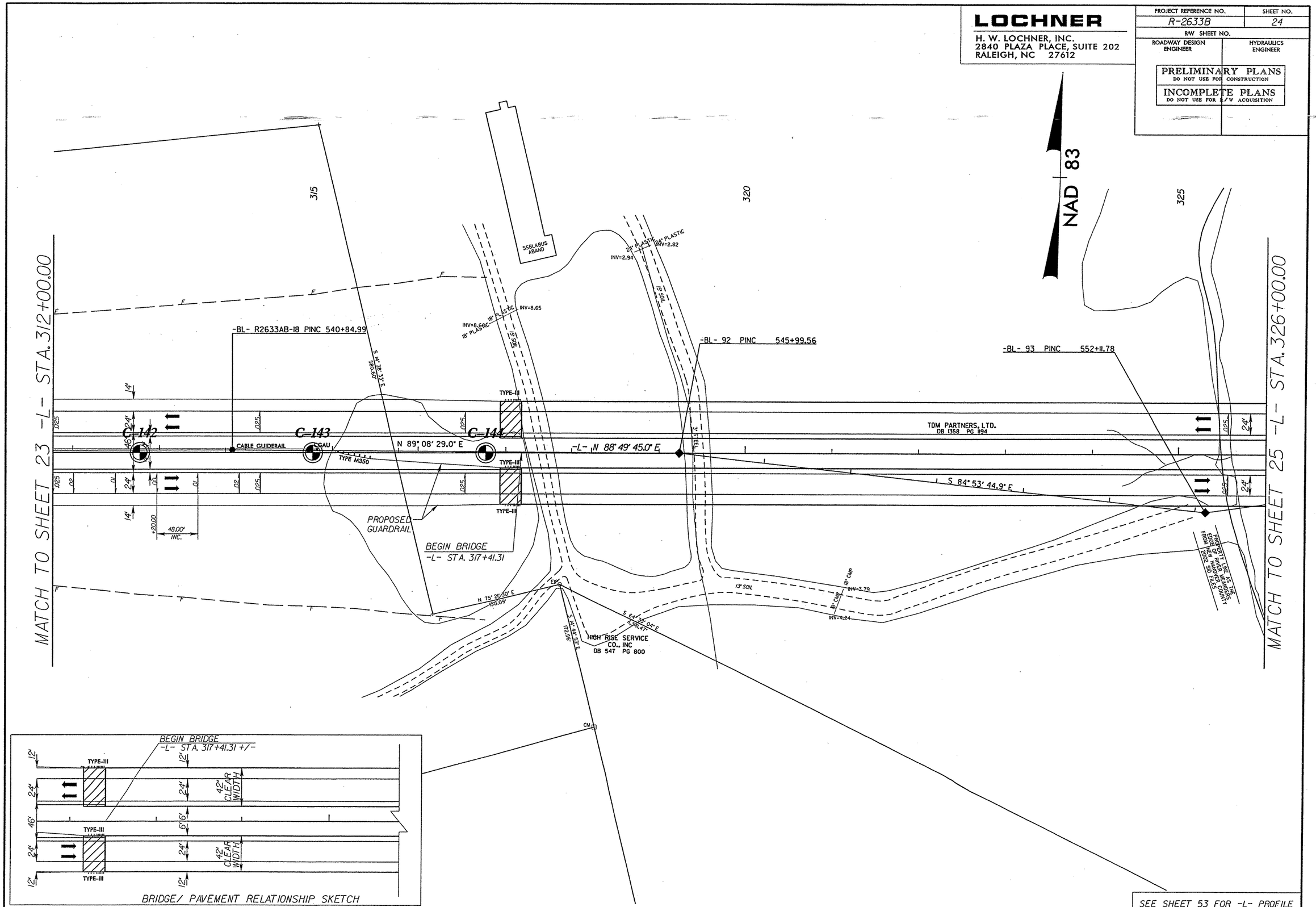
LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612

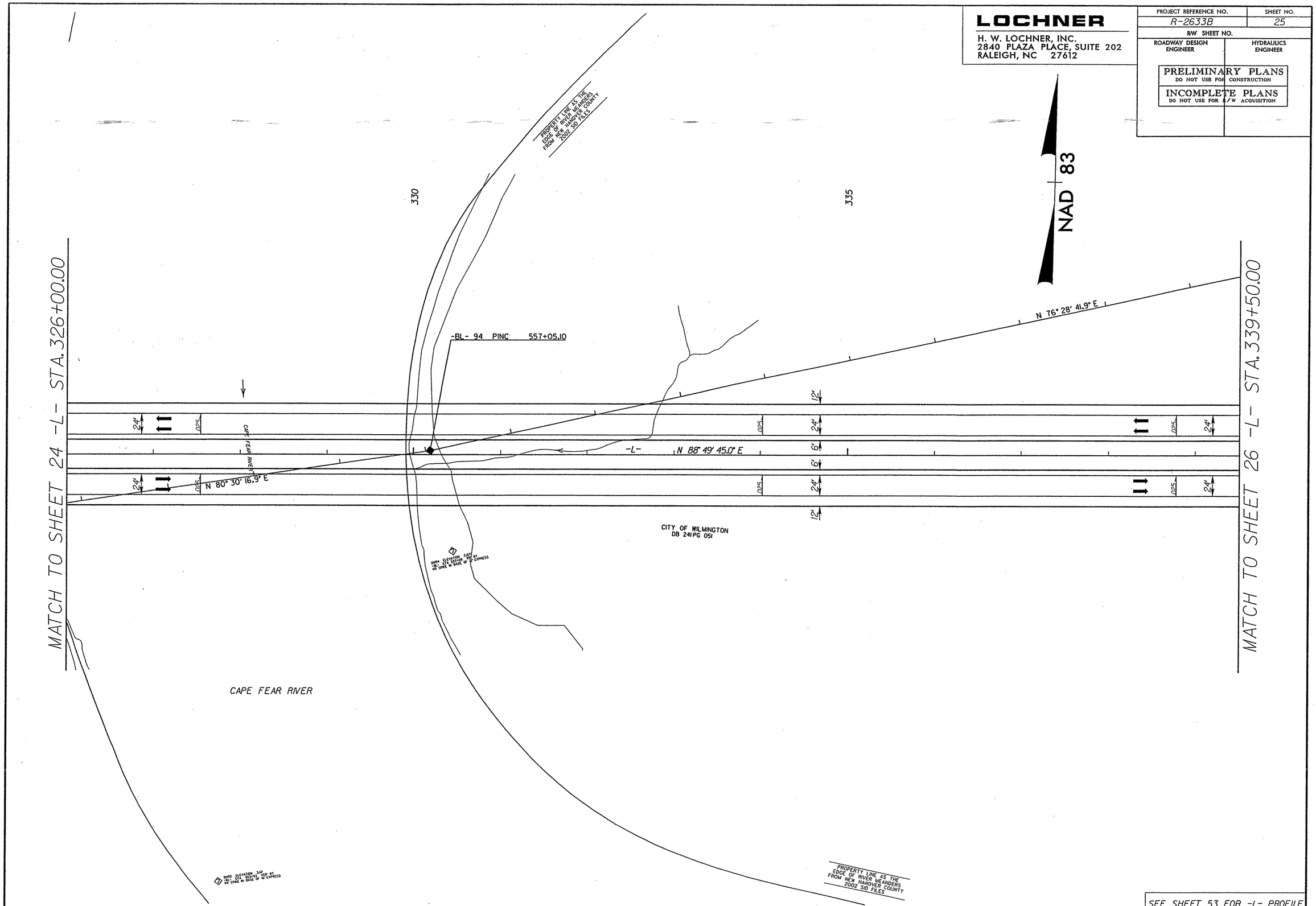
PROJECT REFERENCE NO.	SHEET NO.
R-2633B	23
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION



SEE SHEET 71 FOR -RP_A3- PROFILE	SEE SHEET 73 FOR -RP_D3- PROFILE	SEE SHEET 52 FOR -L- PROFILE


LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
PROJECT REFERENCE NO.
R-2633B
SHEET NO.
24
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
NAD 83
MATCH TO SHEET 23 -L- STA. 312+00.00
MATCH TO SHEET 25 -L- STA. 326+00.00
315
320
325
-BL- R2633AB-18 PINC 540+84.99
-BL- 92 PINC 545+99.56
-BL- 93 PINC 552+11.78
C-142
C-143
C-144
CABLE GUIDERAIL
CGAU
TYPE M350
N 89° 08' 29.0" E
-L- N 88° 49' 45.0" E
S 84° 53' 44.9" E
TDM PARTNERS, LTD.
DB 1358 PG 1194
PROPOSED GUARDRAIL
BEGIN BRIDGE
-L- STA. 317+41.31
HIGH RISE SERVICE CO., INC
DB 547 PG 800
PROPERTY LINE AS THE EDGE OF RIVER MEANDERS FROM NEW HANOVER COUNTY 2002 SID FILES
SSBLKBUS ABAND
BEGIN BRIDGE
-L- STA. 317+41.31 +/-
42' CLEAR WIDTH
BRIDGE/ PAVEMENT RELATIONSHIP SKETCH
SEE SHEET 53 FOR -L- PROFILE


LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
PROJECT REFERENCE NO.
R-2633B
SHEET NO.
25
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
NAD 83
330
335
PROPERTY LINE AS THE EDGE OF RIVER MEANDERS FROM NEW HANOVER COUNTY 2002 SID FILES
-BL- 94 PINC 557+05.10
N 76° 28' 41.9" E
N 88° 49' 45.0" E
N 80° 30' 16.9" E
-L-
CAPE FEAR RIVER
CITY OF WILMINGTON
DB 241 PG 051
MATCH TO SHEET 24 -L- STA. 326+00.00
MATCH TO SHEET 26 -L- STA. 339+50.00
24'
12'
6'
.025
CAPE FEAR RIVER
SEE SHEET 53 FOR -L- PROFILE

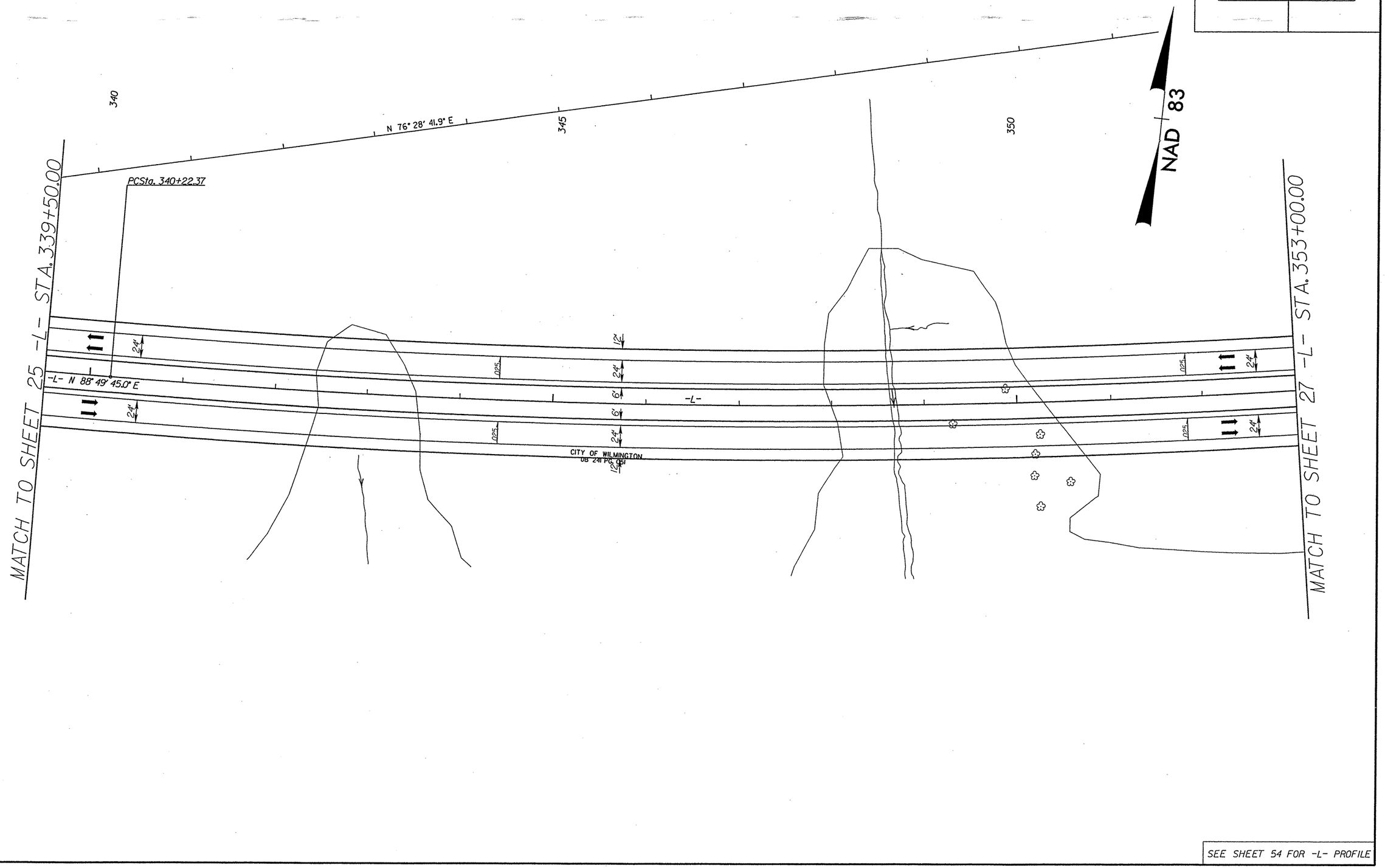
-L-
PI Sta. 383+94.77
Δ = 51° 49' 22.8" (LT)
D = 0° 38' 11.8"
L = 8,140.34'
T = 4,372.40'
R = 9,000.00'
e = 2.5%

LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612

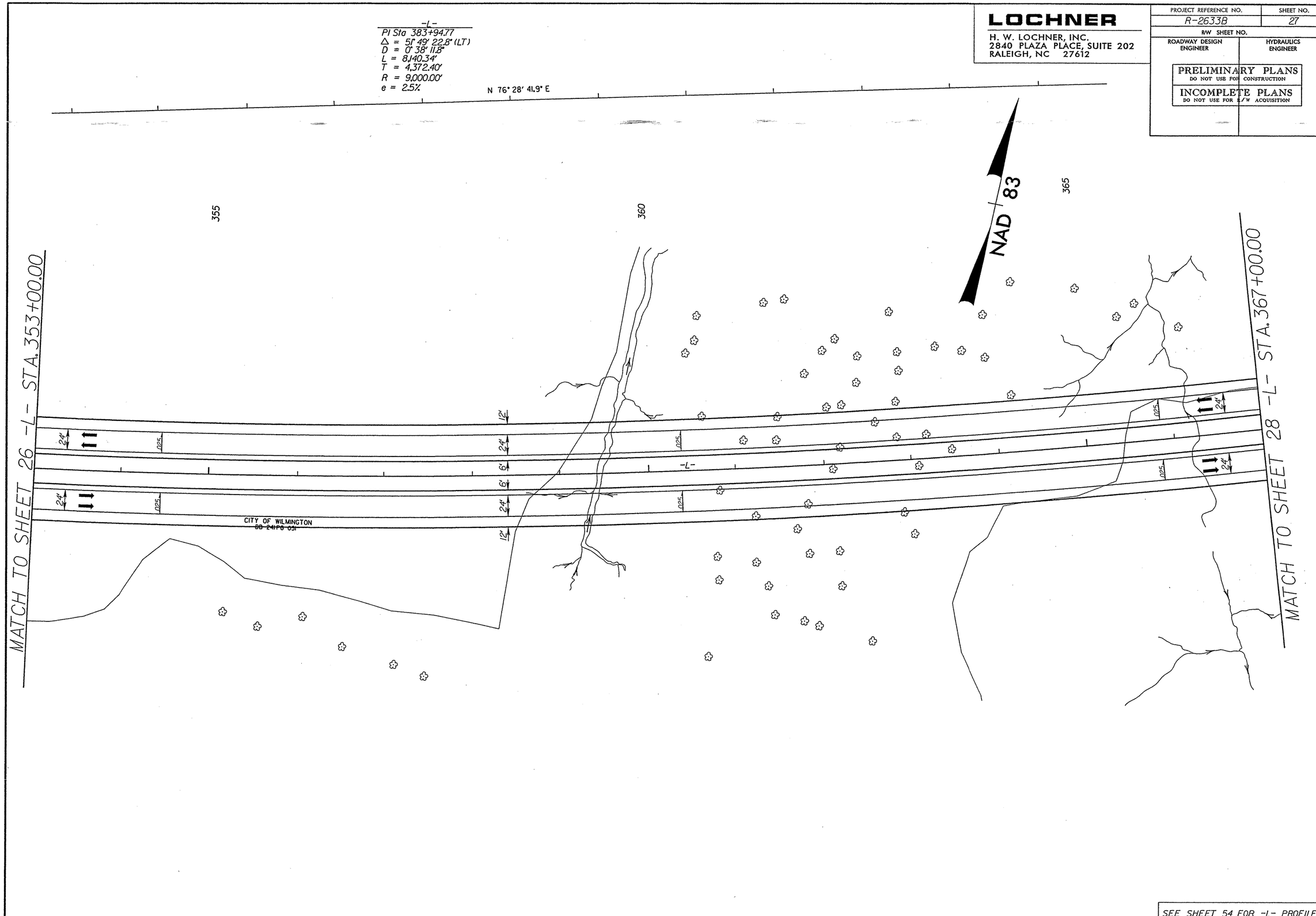
PROJECT REFERENCE NO.	SHEET NO.
R-2633B	26
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION



SEE SHEET 54 FOR -L- PROFILE



LOCHNER

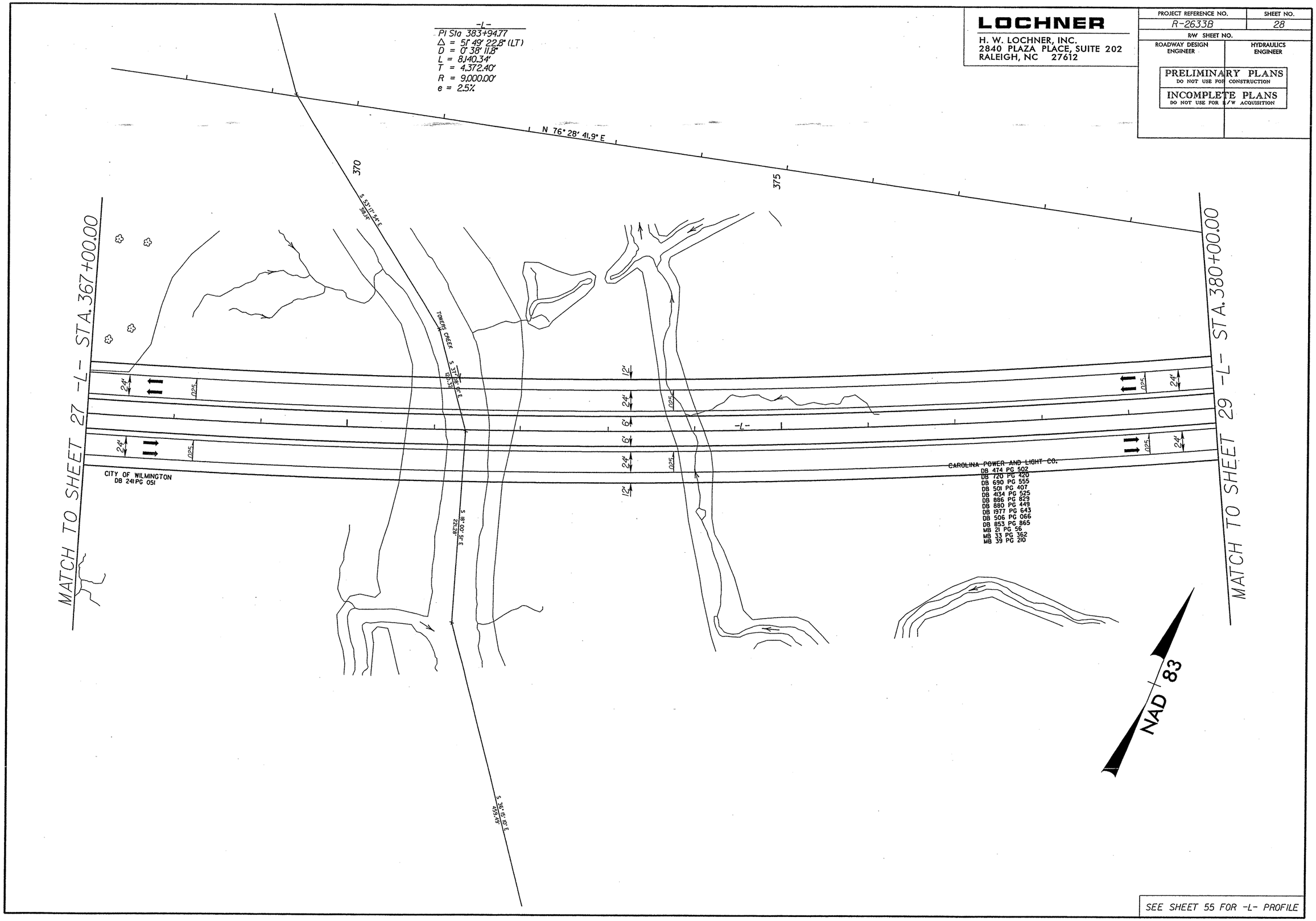
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	27
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

SEE SHEET 54 FOR -L- PROFILE



LOCHNER

H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	28
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

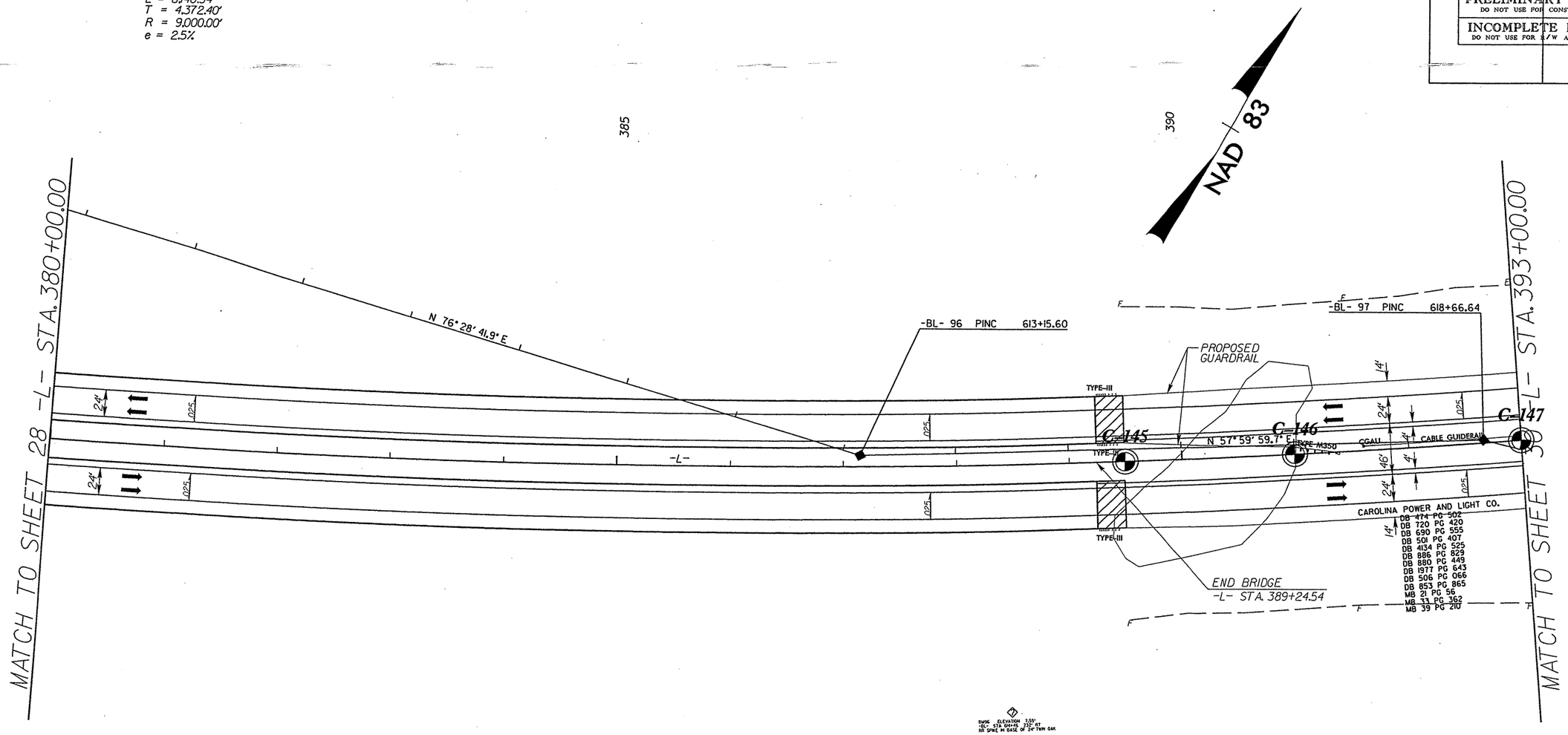
SEE SHEET 55 FOR -L- PROFILE

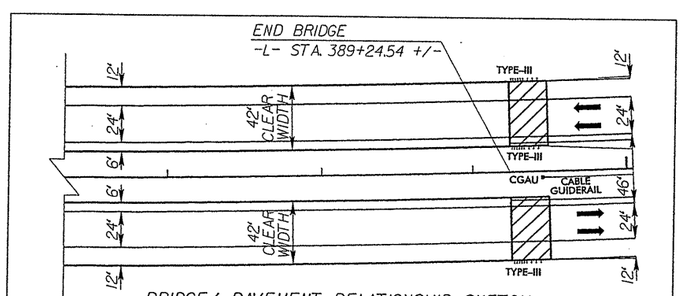
LOCHNER	PROJECT REFERENCE NO.	SHEET NO.
H. W. LOCHNER, INC. 2840 PLAZA PLACE, SUITE 202 RALEIGH, NC 27612	R-2633B	29
	R/W SHEET NO.	
	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

-L-
PI Sta 383+94.77
Δ = 51° 49' 22.8" (LT)
D = 0° 38' 11.8"
L = 8,140.34'
T = 4,372.40'
R = 9,000.00'
e = 2.5%





BRIDGE/ PAVEMENT RELATIONSHIP SKETCH

SEE SHEET 55 FOR -L- PROFILE

LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	30
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

-L-
PI Sta 383+94.77
Δ = 51° 49' 22.8" (LT)
D = 0° 38' 11.8"
L = 8,140.34'
T = 4,372.40'
R = 9,000.00'
e = 2.5%

NAD 83

-BY9A- 263
PINC 9+52.22

S 15° 13' 19.7" E

S 18° 14' 42.2" E

-BL- 98 PINC 629+99.09

BEGIN BRIDGE
-L- STA. 397+91.42

PROPOSED GUARDRAIL

C-147 C-148 C-150 C-151 C-152 C-153 C-154

CABLE GUIDERAIL CGAU TYPE M350 GRAU 350 8:1 CAT-1 8:1

TYPE-III

N 48° 16' 21.3" E

N 73° 51' 40.2" E

N 24° 06' 24.7" E

END BRIDGE
-L- STA. 399+90.59

-BL- R2633AB-14 PINC 624+88.30
-BY9A- R2633AB-14 PINC 14+03.21

S 31° 25' 31.4" E

EXISTING RAILROAD R/W

100.00'

395 400 405

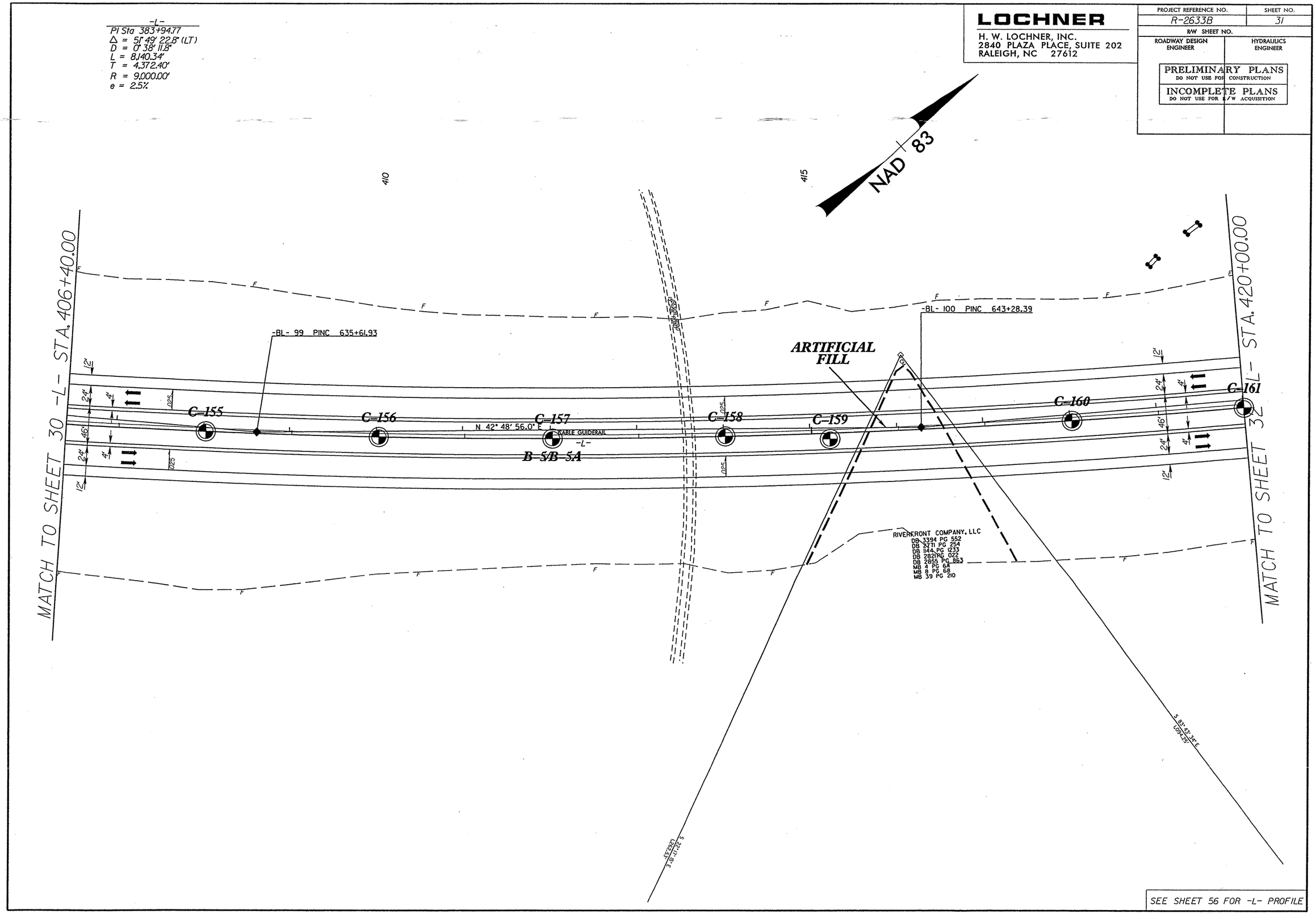
MATCH TO SHEET 29 -L- STA. 393+00.00

MATCH TO SHEET 31 -L- STA. 406+40.00

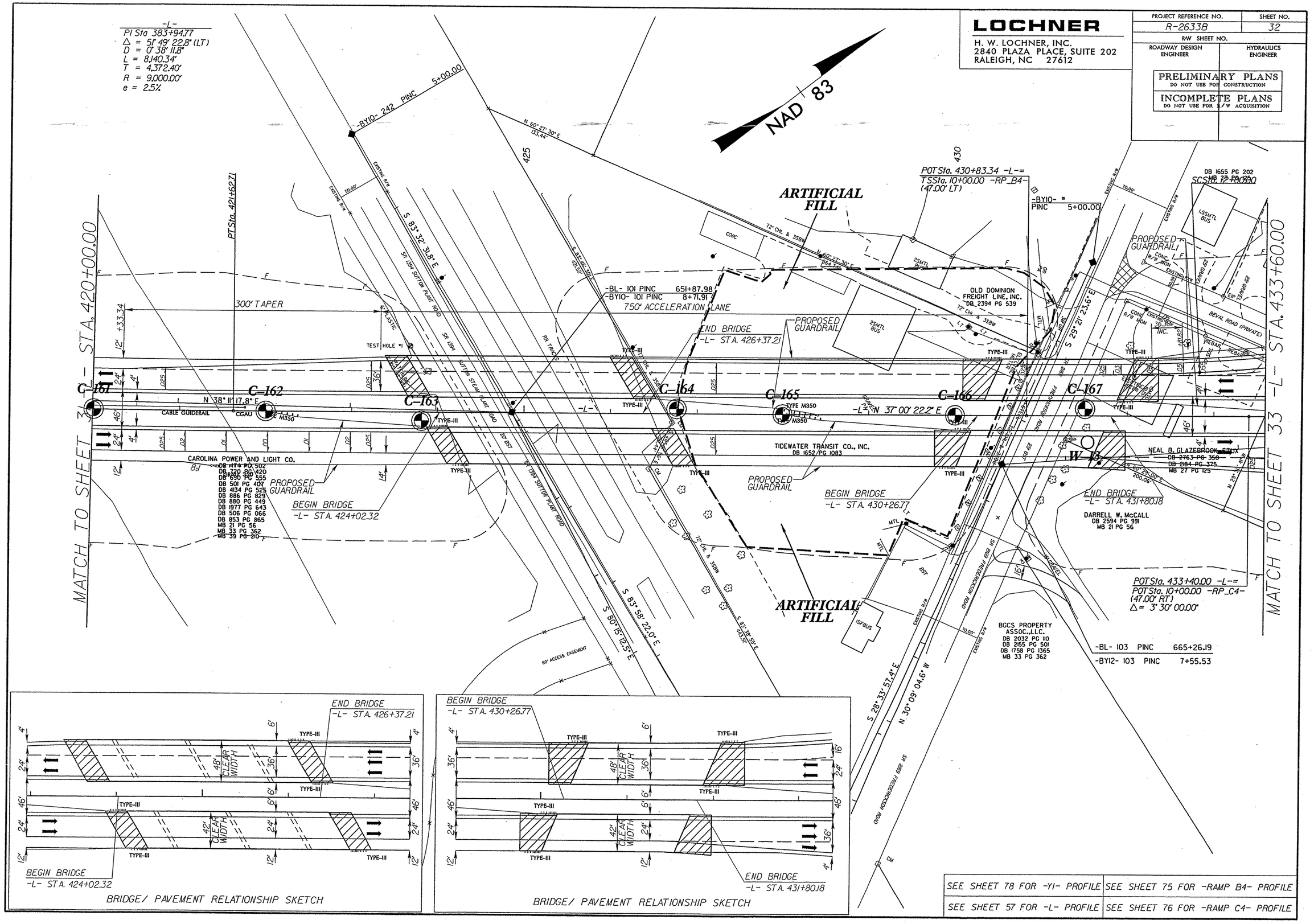
BM4 ELEVATION 17.24'
-BY9A- STA. 13+33 97' RT
AN SPIKE SET AT THE BASE OF A 12" PINE

BRIDGE/ PAVEMENT RELATIONSHIP SKETCH

SEE SHEET 56 FOR -L- PROFILE



-L-
PI Sta 383+94.77
Δ = 51° 49' 22.8" (LT)
D = 0° 38' 11.8"
L = 8,140.34'
T = 4,372.40'
R = 9,000.00'
e = 2.5%
LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
PROJECT REFERENCE NO.
R-2633B
SHEET NO.
31
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
NAD 83
410
415
MATCH TO SHEET 30 -L- STA. 406+40.00
MATCH TO SHEET 32 -L- STA. 420+00.00
-BL- 99 PINC 635+61.93
-BL- 100 PINC 643+28.39
ARTIFICIAL FILL
C-155
C-156
C-157
C-158
C-159
C-160
C-161
N 42° 48' 56.0" E
CABLE GUIDERAIL
-L-
B-5/B-5A
RIVERFRONT COMPANY, LLC
DB 3394 PG 552
DB 2771 PG 254
DB 1144 PG 1233
DB 2821 PG 022
DB 2855 PG 863
MB 4 PG 64
MB 8 PG 68
MB 39 PG 210
S 83° 43' 34" E
1,094.25'
S 22° 17' 15" E
1,262.53'
SEE SHEET 56 FOR -L- PROFILE


LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
PROJECT REFERENCE NO.
R-2633B
SHEET NO.
32
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
-L-
PI Sta 383+94.77
Δ = 51° 49' 22.8" (LT)
D = 0° 38' 11.8"
L = 8,140.34'
T = 4,372.40'
R = 9,000.00'
e = 2.5%
NAD 83
-BYIO- 242 PINC 5+00.00
N 60° 27' 30" E 133.44'
425
430
POT Sta. 430+83.34 -L-=
TSSta. 10+00.00 -RP_B4-
(47.00' LT)
-BYIO- #
PINC 5+00.00
DB 1655 PG 202
SCSta. 12+00.00
ARTIFICIAL FILL
PT Sta. 421+62.71
S 83° 32' 31.8" E
SR 1394 SUTTON PLANT ROAD
300' TAPER
-BL- 101 PINC 651+87.98
-BYIO- 101 PINC 8+71.91
750' ACCELERATION LANE
END BRIDGE
-L- STA. 426+37.21
PROPOSED GUARDRAIL
OLD DOMINION FREIGHT LINE, INC.
DB 2394 PG 539
S 29° 21' 23.6" E
PROPOSED GUARDRAIL
BEVAL ROAD (PRIVATE)
MATCH TO SHEET 31 -L- STA. 420+00.00
MATCH TO SHEET 33 -L- STA. 433+60.00
C-161
C-162
C-163
C-164
C-165
C-166
C-167
N 38° 11' 17.8" E
CABLE GUIDERAIL
CGAU
TYPE M350
TYPE-III
-L-
N 37° 00' 22.2" E
TIDEWATER TRANSIT CO., INC.
DB 1652 PG 1083
CAROLINA POWER AND LIGHT CO.
DB 474 PG 502
DB 720 PG 420
DB 690 PG 555
DB 501 PG 407
DB 4134 PG 525
DB 886 PG 829
DB 880 PG 449
DB 1977 PG 643
DB 506 PG 066
DB 853 PG 865
MB 21 PG 56
MB 33 PG 362
MB 39 PG 210
PROPOSED GUARDRAIL
BEGIN BRIDGE
-L- STA. 424+02.32
PROPOSED GUARDRAIL
BEGIN BRIDGE
-L- STA. 430+26.77
NEAL B. GLAZEBROOK, ETUX
DB 2763 PG 350
DB 2184 PG 375
MB 27 PG 125
END BRIDGE
-L- STA. 431+80.18
DARRELL W. McCALL
DB 2594 PG 991
MB 21 PG 56
POT Sta. 433+40.00 -L-=
POT Sta. 10+00.00 -RP_C4-
(47.00' RT)
Δ = 3° 30' 00.00"
ARTIFICIAL FILL
ISFBUS
S 83° 58' 22.0" E
S 80° 15' 12.5" E
60' ACCESS EASEMENT
BGCS PROPERTY ASSOC., LLC.
DB 2032 PG 110
DB 2155 PG 501
DB 1758 PG 1365
MB 33 PG 362
-BL- 103 PINC 665+26.19
-BYI2- 103 PINC 7+55.53
S 28° 33' 57.4" E
N 30° 09' 04.6" W
SR 2169 FREDERICKSON ROAD
END BRIDGE
-L- STA. 426+37.21
TYPE-III
48' CLEAR WIDTH
42' CLEAR WIDTH
BEGIN BRIDGE
-L- STA. 424+02.32
BRIDGE/ PAVEMENT RELATIONSHIP SKETCH
BEGIN BRIDGE
-L- STA. 430+26.77
END BRIDGE
-L- STA. 431+80.18
BRIDGE/ PAVEMENT RELATIONSHIP SKETCH
SEE SHEET 78 FOR -Y1- PROFILE
SEE SHEET 75 FOR -RAMP B4- PROFILE
SEE SHEET 57 FOR -L- PROFILE
SEE SHEET 76 FOR -RAMP C4- PROFILE

REVISIONS

LOCHNER
H. W. LOCHNER, INC.
3840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	33
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR ACQUISITION

-RP B4-
PI's Sta 11+33.35
Δa = 3°00'00.0"
Ls = 200.00
LT = 133.39
ST = 66.69

PI Sta 15+04.73
Δ = 18°07'54.4" (LT)
D = 3°00'00.0"
Ls = 604.36'
T = 304.73'
R = 1,909.86'
e = 5.5%

-RP B4-
PI's Sta 18+11.05
Δa = 3°00'00.0"
Ls = 200.00
LT = 133.39
ST = 66.69

-RP B4-
PI's Sta 21+31.98
Δa = 4°27'33.0"
Ls = 200.00
LT = 133.61
ST = 66.82

PI Sta 25+52.05
Δ = 39°54'41.0" (RT)
D = 11°27'33.0"
L = 287.22'
T = 147.69
R = 500.00
e = 7.0%

-RP C4-
PI's Sta 18+35.49
Δa = 2°23'14.4"
Ls = 200.00
LT = 133.39
ST = 66.69

-RP C4-
PI's Sta 22+53.65
Δ = 11°57'54.3" (RT)
D = 2°23'14.4"
L = 501.15'
T = 251.5'
R = 2,400.00'
e = 4.5%

-RP C4-
PI's Sta 25+70.02
Δa = 2°23'14.4"
Ls = 200.00
LT = 133.39
ST = 66.69

SOUTH ATLANTIC SERVICES, INC
DB 832 PG 329
DB 1009 PG 548
DB 1009 PG 551
DB 1012 PG 1227
DB 1024 PG 339
DB 2878 PG 574

END CONSTRUCTION
TIE TO PROJECT R-2633CA
(UNDER CONSTRUCTION)
-Y1- STA 37+24.25

YELLOW FREIGHT SYSTEM, INC.
DB 3174 PG 140
DB 3174 PG 308

-RP C4- 21+31.34
181.93' LT.

-RP C4- 21+67.31
140.69' LT.

ST Sta. 20+04.36

CS Sta. 18+04.36

-RP B4- POC Sta. 30+81.02
-LPI BK- POT Sta. 10+07.59

PT Sta. 30+19.57

TS Sta. 26+04.36

SC Sta. 28+04.36

5' Monolithic Island

-RP B4- STA 33+41.66
END CONSTRUCTION
TIE TO EXISTING

-Y1- POT Sta. 41+56.29 =
-RP B4- POT Sta. 33+13.06

-Y1- POT Sta. 41+80.30 =
-LPI BK- POT Sta. 12+29.92

-L- POT Sta. 45+17.02 =
-Y1- POT Sta. 46+39.46

B
ROADWAY EMBANKMENT FILL

-L- POC STA. 445+28.39
END STATE PROJECT
R-2633B

350' PAVEMENT TRANSITION FROM PROPOSED R-2633B (ENGLISH) TO EXISTING R-2633C (METRIC)

900' TAPER TO EXISTING (BOTH SIDES)

50' TAPER

-RP B4- STA. 22+40.27

-BL-Ø14 PINC 675+92.05
@B113- 104 PINC 12+86.63

-RP B4- STA. 20+54.95

-L- STA. 439+18.52

-RP C4- STA. 18+04.82

-RP C4- STA. 17+47.07

-L- STA. 433+25.50

-RP C4- STA. 27+10.63
END CONSTRUCTION
TIE TO EXISTING

-Y1- POT Sta. 49+55.16 =
-RP C4- POT Sta. 27+48.94

-Y1- (US 421)
2009 ADT
2025 ADT
(ADT in hundreds)

NOTE: CONSTRUCTED UNDER TIP# R-2633CA

NOTE: ALL DRIVEWAY RADII ARE TO 10', UNLESS OTHERWISE NOTED.

MATCH TO SHEET 32 -L- STA 433+60.00

W-17 W-16 W-15 W-14

C-290 C-291 C-292 C-293 C-294 C-295 C-296 C-297 C-298 C-299 C-169 C-170 C-283 C-284 C-285 C-286 C-287 C-288

PROPOSED GUARDRAIL

BEGIN BRIDGE -L- STA. 439+18.52
CAT-1 TYPE-SB TYPE-SI
VARIES
TYPE-SI TYPE-SB CAT-1
END BRIDGE -L- STA. 433+25.50
BRIDGE/ PAVEMENT RELATIONSHIP SKETCH

END BRIDGE -RP B4- STA. 22+40.27
TYPE-SI TYPE-SB
-RP B4-
GRAU 350
BEGIN BRIDGE -RP B4- STA. 20+54.95
BRIDGE/ PAVEMENT RELATIONSHIP SKETCH

END BRIDGE -RP C4- STA. 17+47.07
TYPE-SI GRAU 350 TYPE-SB
-RP C4-
BEGIN BRIDGE -RP C4- STA. 18+04.82
BRIDGE/ PAVEMENT RELATIONSHIP SKETCH

SEE SHEET 57 FOR -L- PROFILE
SEE SHEET 59 FOR -Y1- PROFILE
SEE SHEET 77 FOR -RAMP B4- PROFILE
SEE SHEET 78 FOR -RAMP C4- PROFILE

GRAPHIC SCALE
50 25 0 50 100
PLANS

LOCATION: US 17 WILMINGTON BYPASS @ US 421	
TIP NO.: R-2633B	COUNTY: NEW HANOVER
DESIGNED BY: Jeff R. Head	
CHECKED BY: Brian K. Eason	DATE: November 2005

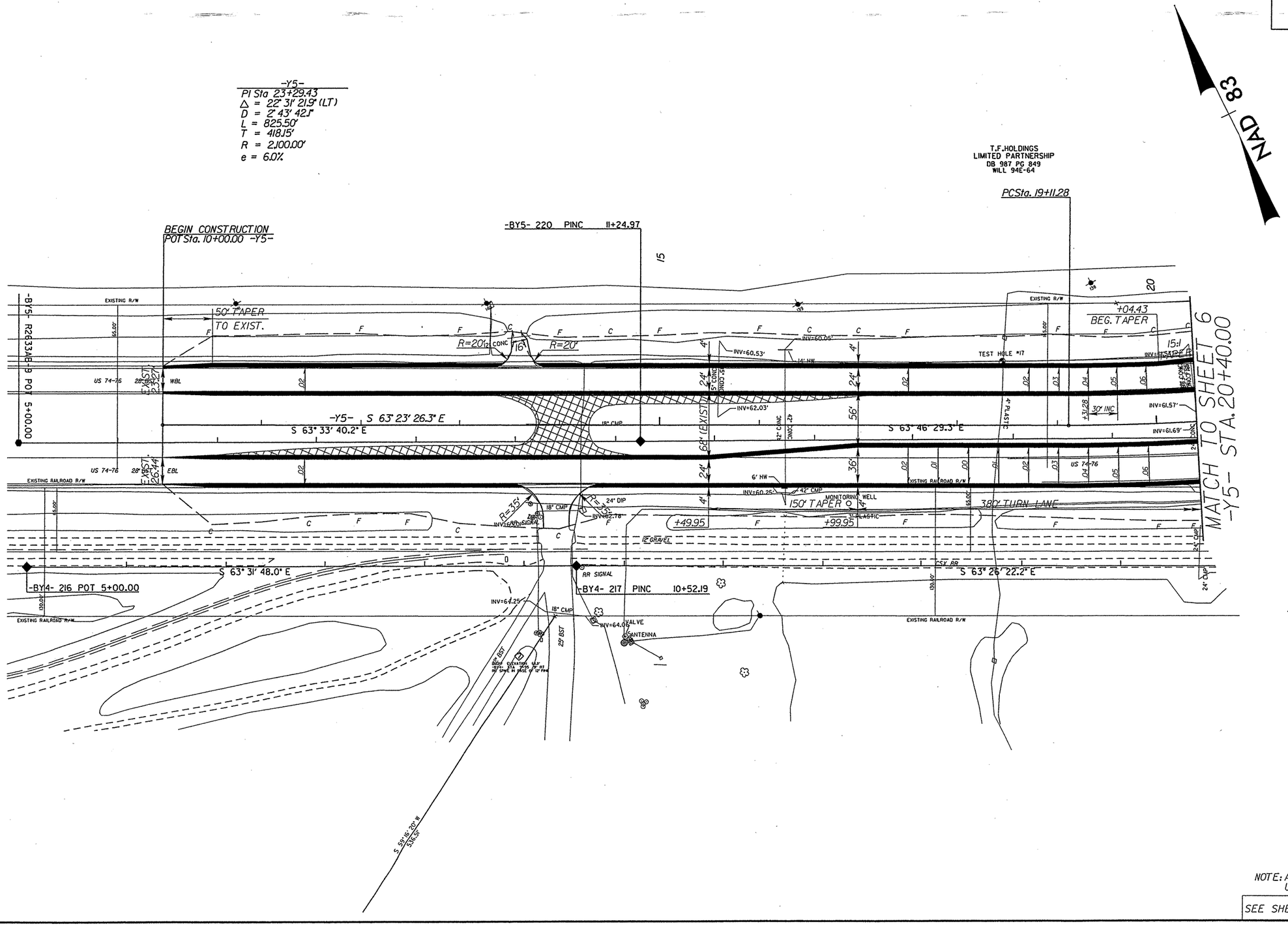
LOCHNER

H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	34
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

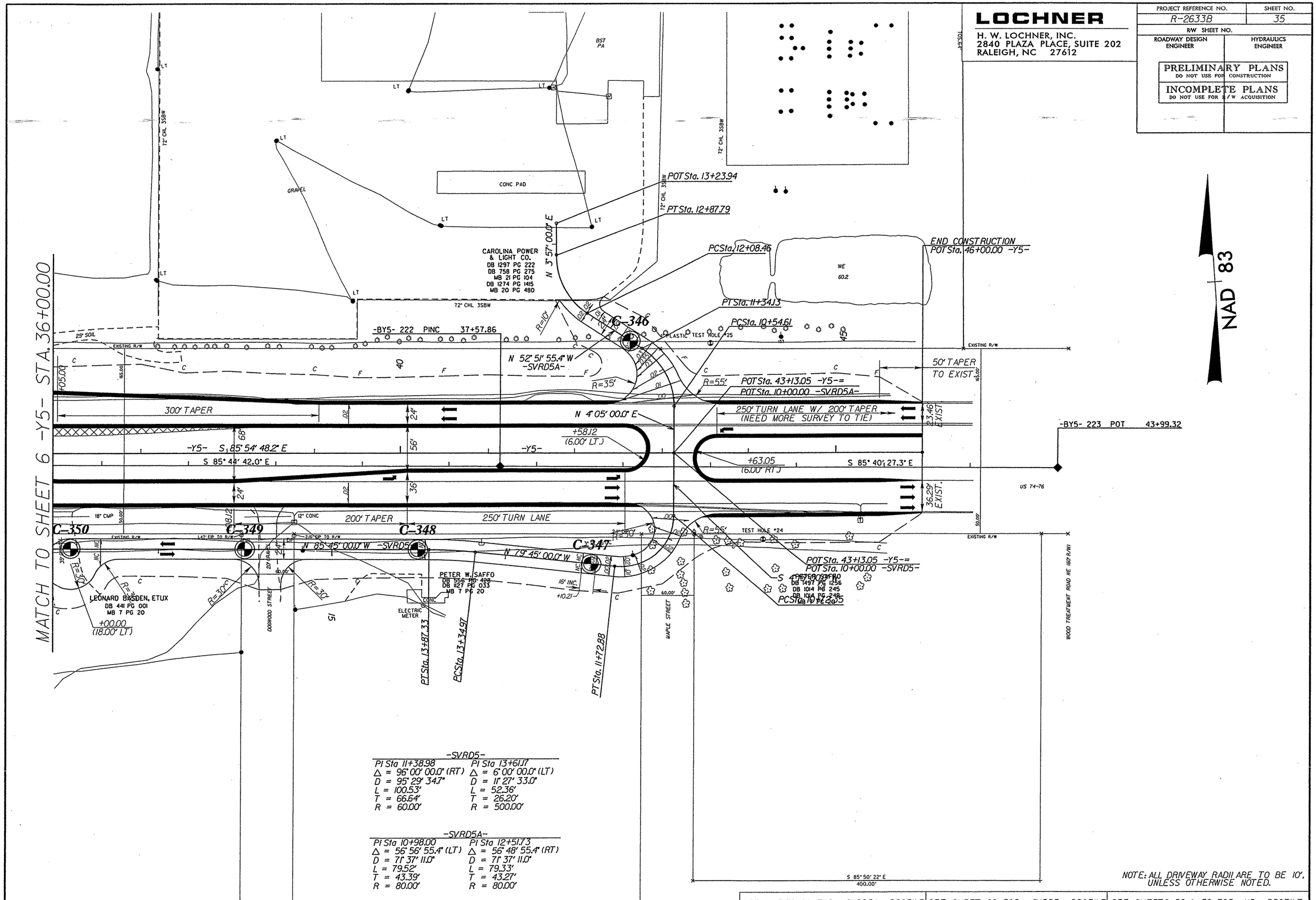
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION



NOTE: ALL DRIVEWAY RADII ARE TO BE 10', UNLESS OTHERWISE NOTED.

SEE SHEETS 58 & 59 FOR -Y5- PROFILE



-SVRD5-

PI Sta 11+38.98	PI Sta 13+61.17
Δ = 96° 00' 00.0" (RT)	Δ = 6° 00' 00.0" (LT)
D = 95° 29' 34.7"	D = 11° 27' 33.0"
L = 100.53'	L = 52.36'
T = 66.64'	T = 26.20'
R = 60.00'	R = 500.00'

-SVRD5A-

PI Sta 10+98.00	PI Sta 12+51.73
Δ = 56° 56' 55.4" (LT)	Δ = 56° 48' 55.4" (RT)
D = 71° 37' 11.0"	D = 71° 37' 11.0"
L = 79.52'	L = 79.33'
T = 43.39'	T = 43.27'
R = 80.00'	R = 80.00'

NOTE: ALL DRIVEWAY RADII ARE TO BE 10', UNLESS OTHERWISE NOTED.

SEE SHEET 62 FOR -SVRD5A- PROFILE | SEE SHEET 62 FOR -SVRD5- PROFILE | SEE SHEETS 58 & 59 FOR -Y5- PROFILE

LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	36
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

-Y7-

PI Sta 14+00.93	PIs Sta 18+67.29	PI Sta 21+34.33
Δ = 9° 36' 16.6" (RT)	Θs = 1° 52' 21.1"	Δ = 15° 33' 42.2" (RT)
D = 1° 29' 59.6"	Θs = 5° 58' 14.3"	D = 4° 46' 28.7"
L = 640.35'	Ls = 250.00'	L = 325.92'
T = 320.93'	LT = 146.94'	T = 163.97'
R = 3,820.00'	ST = 103.43'	R = 1,200.00'
		e = 8.0%

-SVRD7-

PI Sta 10+87.08	PI Sta 14+52.06
Δ = 84° 45' 00.0" (RT)	Δ = 9° 45' 00.0" (LT)
D = 81° 51' 04.0"	D = 6° 59' 14.2"
L = 103.54'	L = 139.54'
T = 63.86'	T = 69.94'
R = 70.00'	R = 820.00'
e = 4.0%	e = NC

NAD 83

POT Sta. 10+00.00

BEGIN CONSTRUCTION
POCSta. 15+00.00 -Y7-

-BY7- 226 POT 5+00.00

-BY7- 227 PINC 10+64.59

S 34° 32' 40.1" E

PCSta. 10+80.00

S 54° 16' 20" W 252.68'

CSSta. 17+20.35

SCSta. 19+70.35

PCSta. 10+23.21
N 88° 25' 00.0" E

S 24° 45' 12.7" E

S 6° 50' 00.0" E

POCSta. 19+96.22 -Y7-=
POT Sta. 10+00.00 -SVRD7-

CSSta. 22+96.28

PTSta. 11+26.76

PCSta. 13+82.68

MATCH TO SHEET 15
-Y7- STA. 23+50.00

MATTHEW G. FERRELL
DB 1150 PG 1

RADFORD S. GURGANIOUS, JR ET UX
DB 1083 PG 1223
MC L PG 278

RAIFORD S. GURGANIOUS ET UX
DB 458 PG 459
MC L PG 278

LOUISE VERZAAL JOYNER
DB 1243 PG 872
PG 271

OSCAR LONG ET UX
DB 452 PG 390
DB 1390 PG 1279

LONG ACRES SUBDIVISION INC.
DB 965 PG 255

BARNEY L. PADGETT ET UX
DB 284 PG 623

WILLIAM IVEY, JR.
DB 1367 PG 39
MB PG 821

HTR
2SFD
ISFD
ISBLKD
S

500' MEDIAN TAPER
100' TAPER
30' CONCRETE MEDIAN TAPER
R=55'
R=77'
R=180'
C-235
TEST HOLE
KING'S BLUFF ADDITIONAL RIGHT OF WAY AND SLOPE EASEMENT
KING'S BLUFF DRIVEWAY EASEMENT AND RIGHT OF WAY EASEMENT
CAS REGULATOR
CM
EIP
EXISTING R/W
LOI R/W TO EIP
3.55' R/W TO EIP
22' CONC
12' ASPHALT
WT. MISER RD. (SR 1412)

NOTE: ALL DRIVEWAY RADII ARE TO BE 10', UNLESS OTHERWISE NOTED.

SEE SHEET 63 FOR -Y7- PROFILE
SEE SHEET 67 FOR -SVRD7- PROFILE

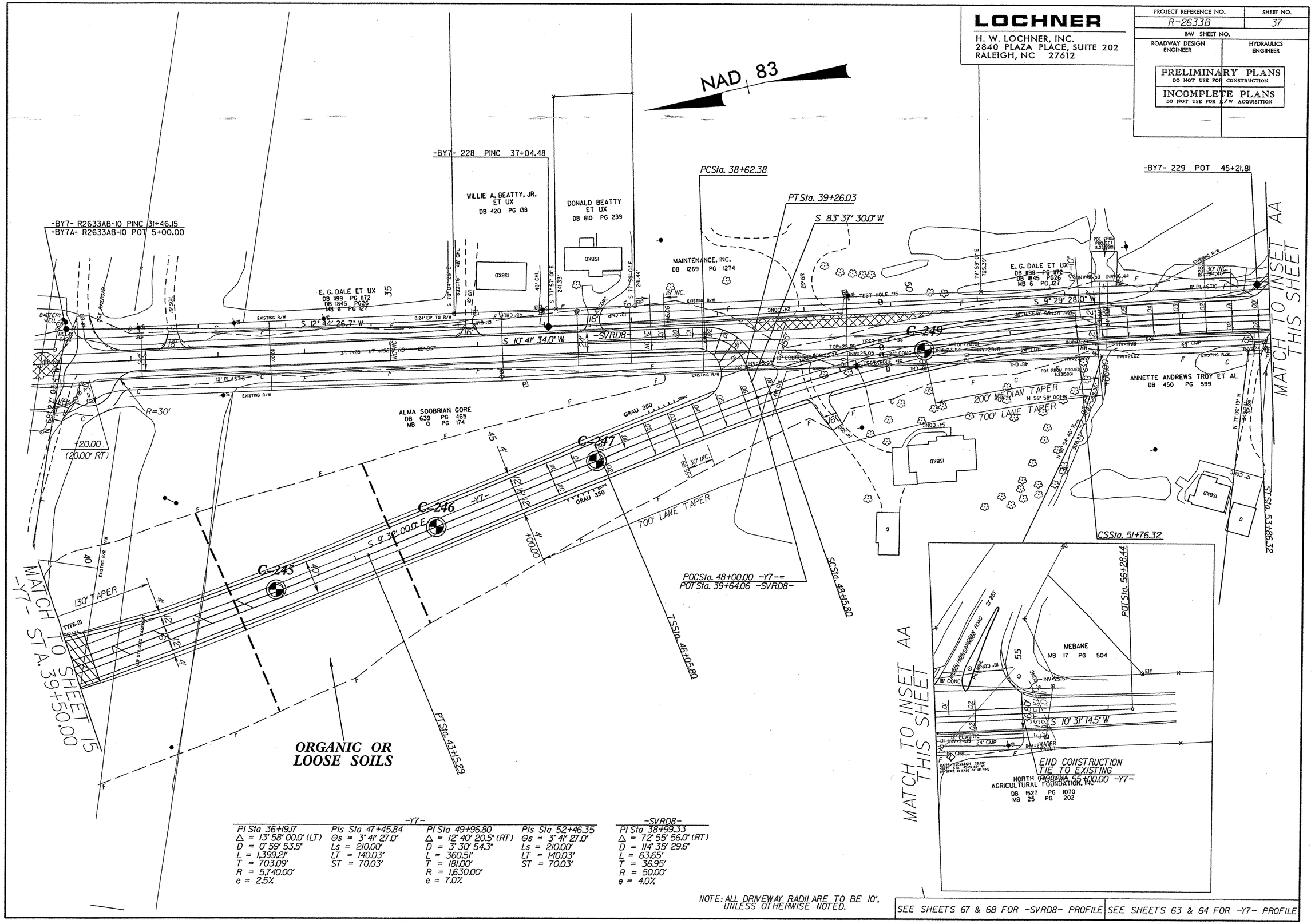
LOCHNER

H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	37
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION



-Y7-

PI Sta 36+19.17	PIs Sta 47+45.84	PI Sta 49+96.80	PIs Sta 52+46.35
Δ = 13° 58' 00.0" (LT)	Θs = 3° 41' 27.0"	Δ = 12° 40' 20.5" (RT)	Θs = 3° 41' 27.0"
D = 0° 59' 53.5"	Ls = 210.00'	D = 3° 30' 54.3"	Ls = 210.00'
L = 1,399.21'	LT = 140.03'	L = 360.51'	LT = 140.03'
T = 703.09'	ST = 70.03'	T = 181.00'	ST = 70.03'
R = 5,740.00'		R = 1,630.00'	
e = 2.5%		e = 7.0%	

-SVRD8-

PI Sta 38+99.33
Δ = 72° 55' 56.0" (RT)
D = 114° 35' 29.6"
L = 63.65'
T = 36.95'
R = 50.00'
e = 4.0%

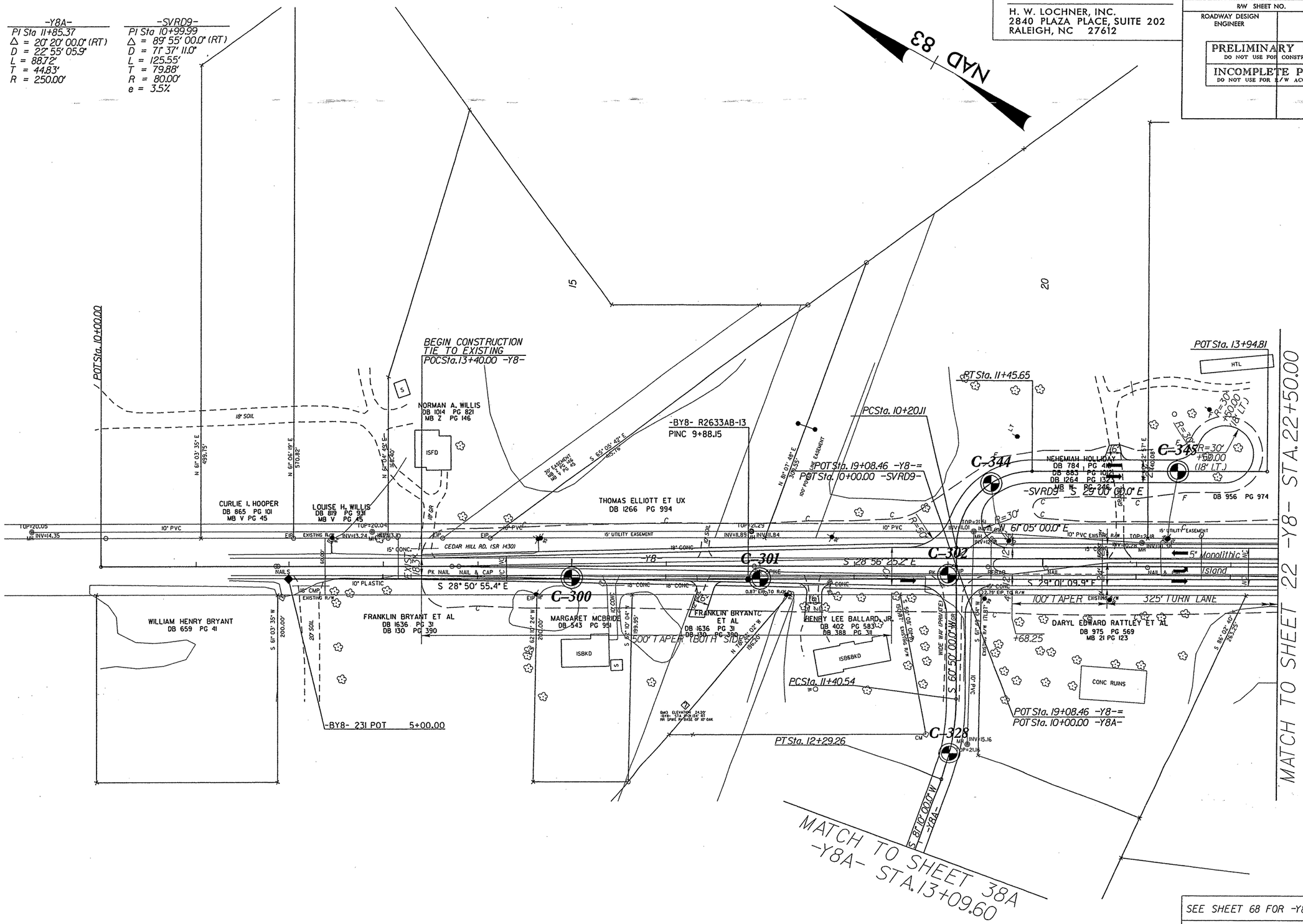
NOTE: ALL DRIVEWAY RADII ARE TO BE 10', UNLESS OTHERWISE NOTED.

SEE SHEETS 67 & 68 FOR -SVRD8- PROFILE | SEE SHEETS 63 & 64 FOR -Y7- PROFILE

LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	38
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION



SEE SHEET 68 FOR -Y8- PROFILE
SEE SHEET 76 FOR -Y8A- PROFILE
SEE SHEET 75 FOR -SVRD9- PROFILE

NOTE: ALL DRIVEWAY RADII ARE TO 10', UNLESS OTHERWISE NOTED.

LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	38A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

NAD 83

NOTE: NEED SURVEYS IN THIS AREA TO COMPLETE DESIGN.

POT Sta. 25+27.59

POT Sta. 14+38.53 -Y8A-=
POT Sta. 10+00.00 -Y8B-

C-334 C-333 C-332 C-331 C-330 C-329

S 88°10' 00.0" W
-Y8A-

20'

R=30'

R=30'

S 9°05'00.2" E
-Y8B-

C-335

20'

25

20

15

MATCH TO SHEET 38
-Y8A- STA. 13+09.60

MATCH TO SHEET 22
-Y8B- STA. 22+50.00

SEE SHEET 76 FOR -Y8A- PROFILE

SEE SHEET 76 FOR -Y8B- PROFILE

LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	39
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

MATCH TO SHEET 22 -Y8- STA. 37+00.00

-BY8- 233 PINC 30+64.91

-SVRD10-
PI Sta 13+57.98
Δ = 94° 45' 00.0" (RT)
D = 57° 17' 44.8"
L = 165.37'
T = 108.65'
R = 100.00'
e = 4.0%

-Y8-
PI Sta 43+19.33
Δ = 2° 12' 58.0" (RT)
D = 0° 22' 55.1"
L = 580.18'
T = 290.12'
R = 15,000.00'
e = NC

-Y9-
PI Sta 13+54.45
Δ = 12° 56' 55.2" (RT)
D = 3° 57' 05.2"
L = 327.70'
T = 164.55'
R = 1,450.00'
e = 4.0%

NAD 83

PCSta. 40+29.20

END CONSTRUCTION TIE TO EXISTING POT Sta. 16+50.00

PT Sta. 15+17.60

50' TAPER

100' TAPER

POCSta. 43+82.30 -Y8-=
POT Sta. 10+00.00 -SVRD10-
POT Sta. 10+00.00 -Y9-

PCSta. 11+89.90

PROPOSED GUARDRAIL

PT Sta. 46+09.38

PT Sta. 14+14.70

-BY8- 234 PINC 37+84.51
-BY9- 234 POT 14+46.54

PCSta. 12+49.33

S 19° 24' 00.0" E

MATCH TO SHEET 40 -Y8- STA. 46+50.00

SEE SHEET 75 FOR -SVRD10- PROFILE
SEE SHEET 74 FOR -Y9- PROFILE
SEE SHEET 69 FOR -Y8- PROFILE

LOCHNER

H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	40
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

-Y8-
PIs Sta 52+68.24 PI Sta 57+60.90
θs = 7° 27' 37.4" Δ = 46° 12' 00.0" (LT)
Ls = 250.00' D = 5° 58' 05.9"
LT = 166.81' L = 774.09'
ST = 83.47' T = 409.47'
R = 960.00'
e = 8.0%

NAD 83

MATCH TO SHEET 39 -Y8- STA. 46+50.00

MATCH TO SHEET 41 -Y8- STA. 59+50.00

BEGIN BRIDGE
-Y8- STA. 47+20.00

END BRIDGE
-Y8- STA. 50+40.00

TSSta. 51+01.42

SCSta. 53+51.42

-BY8- 235 PINC 45+51.06

ESTATE OF ESSIE E. BLIZZARD DB 1504 PG 51 MB 4 PG 31

LINCOLN DEVELOPEMENT COMPANY, INC. DB 284 PG 652

S 19° 24' 00.0" E

S 10° 48' 33.5" E

S 59° 43' 40.4" E

N 87° 56' 37" W

C-316 C-317 C-318 C-319 C-320

PROPOSED GUARDRAIL

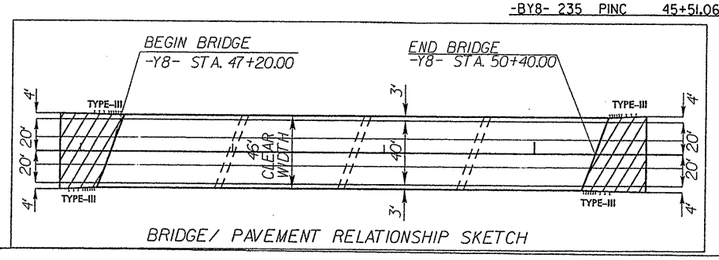
GRAU 350

TYPE-III

10" PVC

60" PLASTIC

30" CONCRETE LOCK JOINT PIPE



BRIDGE/ PAVEMENT RELATIONSHIP SKETCH

SEE SHEETS 69 & 70 FOR -Y8- PROFILE

LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612

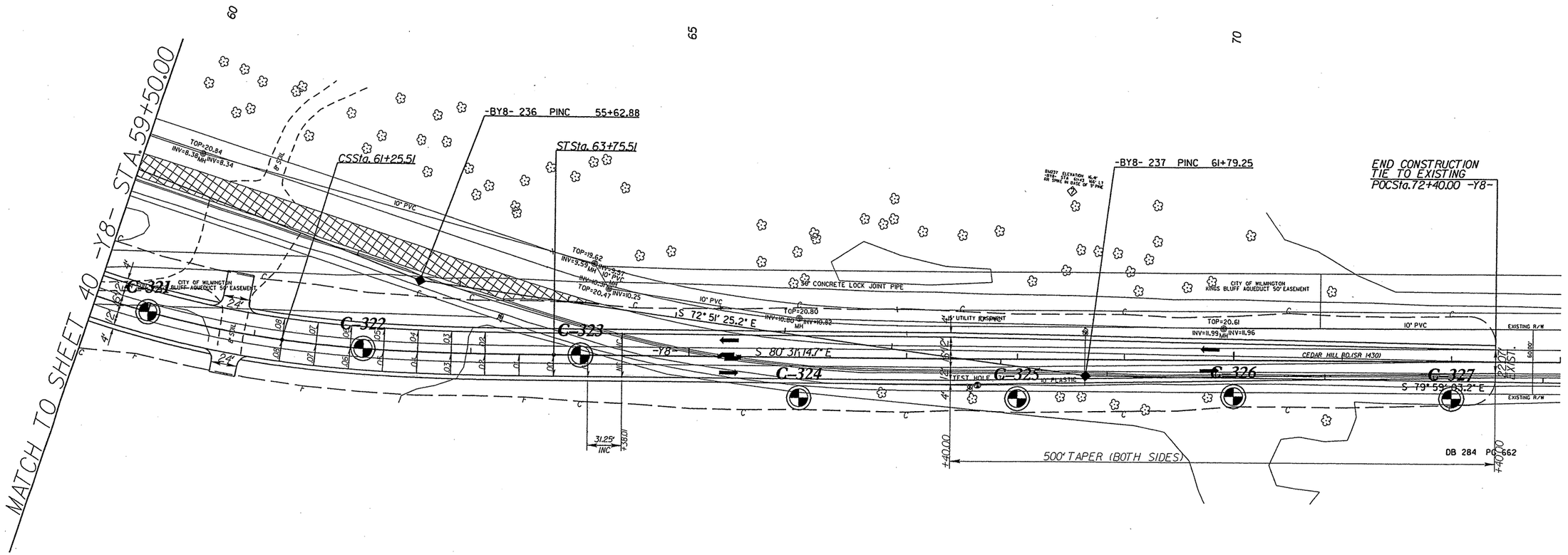
PROJECT REFERENCE NO.	SHEET NO.
R-2633B	41
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

-Y8-
PI Sta 57+60.90
Δ = 46° 12' 00.0" (LT)
D = 5° 58' 05.9"
L = 774.09'
T = 409.47'
R = 960.00'

PIs Sta 62+08.98
θs = 1° 27' 37.4"
Ls = 250.00'
LT = 166.81'
ST = 83.47'

NAD 83

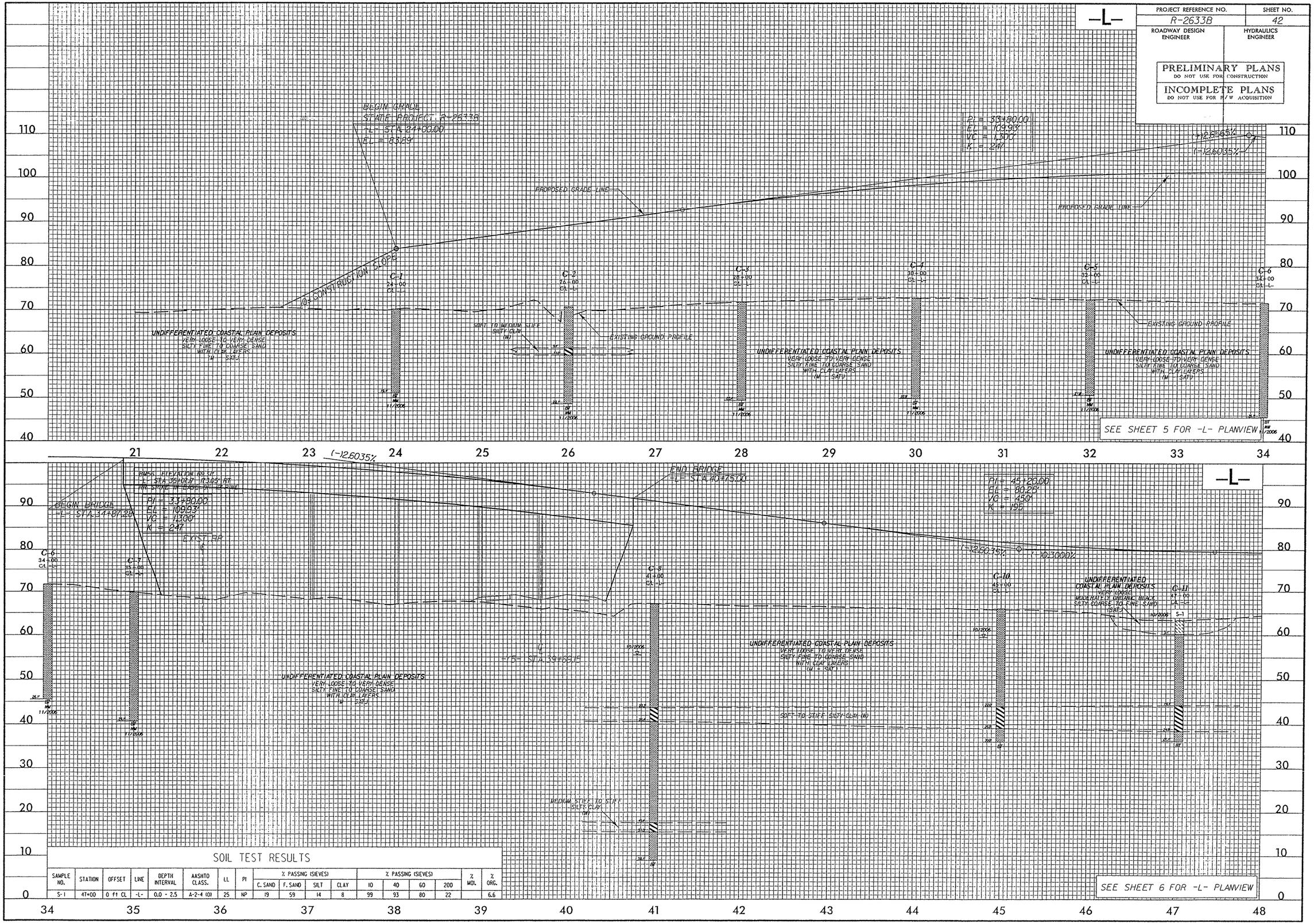


SEE SHEET 70 FOR -Y8- PROFILE

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	42
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION



SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	AASHTO CLASS.	LL	PI	% PASSING (SIEVES) C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	60	200	% MOI.	% ORG.
S-1	47+00	0 ft CL	-L-	0.0 - 2.5	A-2-4 (0)	25	NP	19	59	14	8	99	93	80	22		6.6

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	43
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

HAND VANE SHEAR TEST RESULTS

SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	S(psf)	$S_{REMOLDED}$ (psf)
HVS-1	55+00	0 ft CL	-L-	1.0 - 1.5	365	261
HVS-2	57+00	0 ft CL	-L-	1.0 - 1.5	804	104
HVS-3	59+00	0 ft CL	-L-	1.0 - 1.5	856	251

RIGID ELEVATION DATA
-L1- STA. 59+09.45 9955' RT.
RR SPIKE IN BASE OF 10" PINE

-L-

PI = 62+00.00
EL = 75.2'
VC = 300'
K = 250

PROPOSED GRADE LINE

EXISTING GROUND PROFILE

(-)0.3000%

C-13 51+00 CL -L-
B-1/B-1A 51+00 CL -L-
SS-1 SS-2 ST-1 ST-2 PPDT-1
UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO VERY DENSE SILTY FINE TO COARSE SAND WITH CLAY LAYERS (M - SAP.)
SOFT TO MEDIUM STIFF GRAY SILTY CLAY WITH SANDY SILT LAYERS (M)
C-12 49+00 CL -L-
HA-1 50+00 CL -L-
VERY LOOSE DARK GRAY MODERATELY ORGANIC SILTY COARSE TO FINE SAND (SAP.)
S-2
MEDIUM DENSE BROWN MODERATELY ORGANIC COARSE TO FINE SAND WITH TRACE OF SILT AND CLAY (SAP.)
C-14 53+00 CL -L-
VERY LOOSE TO SOFT GRAY SILTY CLAY (M)
UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE BLACK SILTY COARSE TO FINE SAND WITH LITTLE ORGANICS (SAP.)
C-15 55+00 CL -L-
HVS-1 S-3
UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO VERY DENSE SILTY FINE TO COARSE SAND WITH CLAY LAYERS (M - SAP.)
C-16 57+00 CL -L-
HVS-2
UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY SOFT BLACK FINE SANDY SILT WITH LITTLE ORGANICS (M)
C-17 59+00 CL -L-
HVS-3
VERY LOOSE TO VERY DENSE SILTY FINE TO COARSE SAND WITH CLAY LAYERS (M - SAP.)
10/2006

SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	AASHTO CLASS.	LL	PI	% PASSING (SIEVES) C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	60	200	% MOI.	% ORG.	WET UNIT WEIGHT (pcf)	COMPRESSION INDEX	Cv (ft²/day)	t_{50} (min)	Φ (Degrees)	c_r (psi)	Φ (Degrees)	c' (psi)
S-2	50+00	0 ft CL	-L-	0.0 - 1.0	A-2-4 (0)	19	NP	15	70	10	5	100	99	85	15		6.1								
SS-1	51+00	0 ft CL	-L-	3.8 - 5.3	A-3 (0)	27	NP	18	78	1	3	99	98	81	4		8.3								
SS-2	51+00	0 ft CL	-L-	18.8 - 20.3	A-2-4 (0)	20	6	22	55	10	13	99	95	77	28										
ST-1	51+00	0 ft CL	-L-	23.8 - 25.8	A-4 (0)	22	NP	17	43	18	22	100	94	ND	46	32.2		120.1	0.217	0.176	11.11	0	6.5	8	5.2
ST-2	51+00	0 ft CL	-L-	25.5 - 27.5	A-6 (17)	40	20	3	19	34	44	100	99	ND	84			120.4							
S-3	55+00	0 ft CL	-L-	0.5 - 2.5	A-2-4 (0)	35	7	14	69	10	7	100	97	86	18		4.7								

SEE SHEET 6 FOR -L- PLANVIEW

-L-

PI = 62+00.00
EL = 79.2'
VC = 300'
K = 250

PROPOSED GRADE LINE

EXISTING GROUND PROFILE

(-)0.3000%

(+)0.9000%

C-18 61+00 CL -L-
UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE BLACK MODERATELY ORGANIC SILTY COARSE TO FINE SAND (SAP.)
VERY LOOSE TO VERY DENSE SILTY FINE TO COARSE SAND WITH CLAY LAYERS (M - SAP.)
C-19 63+00 CL -L-
S-4
C-20 65+00 CL -L-
C-21 67+00 CL -L-
UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO VERY DENSE SILTY FINE TO COARSE SAND WITH CLAY LAYERS (M - SAP.)
C-22 69+00 CL -L-
C-23 71+00 CL -L-
C-24 73+00 CL -L-
PI = 73+00.00
EL = 85.11'
VC = 1500'
K = 1583
10/2006

SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	AASHTO CLASS.	LL	PI	% PASSING (SIEVES) C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	60	200	% MOI.	% ORG.	WET UNIT WEIGHT (pcf)	COMPRESSION INDEX	Cv (ft²/day)	t_{50} (min)
S-4	63+00	0 ft CL	-L-	1.0 - 2.0	A-2-5 (0)	49	6	15	58	17	10	99	93	84	28		7.8				

SEE SHEET 7 FOR -L- PLANVIEW

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	44
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

-L-

BMG1 ELEVATION: 75.53'
NAD 1983 2011 (EPOCH 2010.0000)
N: 534,764.540 E: 1,647,497.841
RR SPIKE IN BASE OF 12" PINE

PROPOSED GRADE LINE

EXISTING GROUND PROFILE

G-25
75+00
CL -L-

G-26
77+00
CL -L-

G-27
79+00
CL -L-

G-28
81+00
CL -L-

G-29
83+00
CL -L-

G-30
85+00
CL -L-

G-31
87+00
CL -L-

10/2006

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO VERY DENSE
SILTY FINE TO COARSE SAND
WITH CLAY LAYERS
(M - SAT.)

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE BLACK
SILTY FINE TO COARSE SAND
WITH TRACE OF ORGANICS
(WT)

SOFT TO MEDIUM STIFF
SILTY CLAY
WITH SAND SEAMS
(WT)

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO VERY DENSE
SILTY FINE TO COARSE SAND
WITH CLAY LAYERS
(M - SAT.)

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO VERY DENSE
SILTY FINE TO COARSE SAND
WITH CLAY LAYERS
(M - SAT.)

I=10.3000%

SEE SHEET 8 FOR -L- PLANVIEW

-L-

BMG4 ELEVATION: 64.54'
N: 531,925.204 E: 1,651,358.871
RR SPIKE IN BASE OF 12" PINE

PROPOSED GRADE LINE

EXISTING GROUND PROFILE

PI = 95+50.00
EA = 78.36
VC = 700'
K = 537

I=10.3000%

I=11.5026%

G-32
89+00
CL -L-

G-33
91+00
CL -L-

G-34
93+00
CL -L-

G-35
95+00
CL -L-

G-36
97+00
CL -L-

G-37
99+00
CL -L-

10/2006

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO VERY DENSE
SILTY FINE TO COARSE SAND
WITH CLAY LAYERS
(M - SAT.)

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE BLACK
SILTY FINE TO COARSE SAND
WITH TRACE OF ORGANICS
(WT)

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO VERY DENSE
SILTY FINE TO COARSE SAND
WITH CLAY LAYERS
(M - SAT.)

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO VERY DENSE
SILTY FINE TO COARSE SAND
WITH CLAY LAYERS
(M - SAT.)

SEE SHEET 9 FOR -L- PLANVIEW

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	45
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

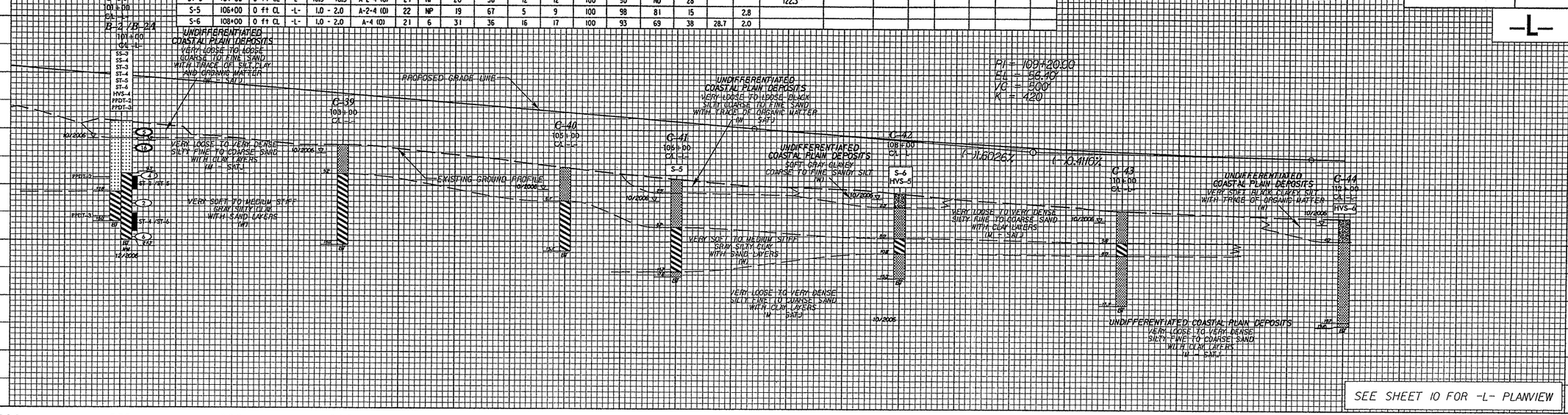
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	AASHTO CLASS.	LL	PI	% PASSING (SIEVES) C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	60	200	% MOI.	% ORG.	WET UNIT WEIGHT (pcf)	COMPRESSION INDEX	C_v (ft^2/day)	t_{90} (min)	ϕ (Degrees)	c_u (psi)	ϕ (Degrees)	c' (psi)
SS-3	101+00	0 ft CL	-L-	1.0 - 2.5	A-3 (0)	30	NP	20	71	3	6	100	97	80	9		2.5								
SS-4	101+00	0 ft CL	-L-	3.8 - 5.3	A-3 (0)	21	NP	5	91	3	1	100	100	95	7										
ST-3	101+00	0 ft CL	-L-	10.3 - 12.3	A-7-5 (23)	53	21	7	3	44	46	100	95	ND	91	84.9		94.7	1.03	0.088	22.6	10	2	11	3.4
ST-4	101+00	0 ft CL	-L-	17.8 - 19.8	A-2-4 (0)	21	2	20	55	13	12	100	88	ND	30										
ST-4	101+00	0 ft CL	-L-	17.8 - 19.8	A-6 (7)	31	15	4	42	34	20	100	99	ND	66	38.6		115.3	0.362	0.080	25.0	3	4.2	6	3.8
ST-5	101+00	0 ft CL	-L-	9.8 - 11.8	A-7-6 (15)	43	15	2	11	36	51	100	99	ND	88			98.4							
ST-6	101+00	0 ft CL	-L-	16.5 - 18.5	A-7-6 (17)	45	21	8	12	39	41	98	96	ND	80			95.9							
ST-6	101+00	0 ft CL	-L-	16.5 - 18.5	A-2-4 (0)	20	NP	23	53	12	12	100	94	ND	27			112.2							
ST-6	101+00	0 ft CL	-L-	16.5 - 18.5	A-2-4 (0)	21	NP	20	56	12	12	100	90	ND	28			122.3							
S-5	106+00	0 ft CL	-L-	1.0 - 2.0	A-2-4 (0)	22	NP	19	67	5	9	100	98	81	15		2.8								
S-6	108+00	0 ft CL	-L-	1.0 - 2.0	A-4 (0)	21	6	31	36	16	17	100	93	69	38	28.7	2.0								

HAND VANE SHEAR TEST RESULTS

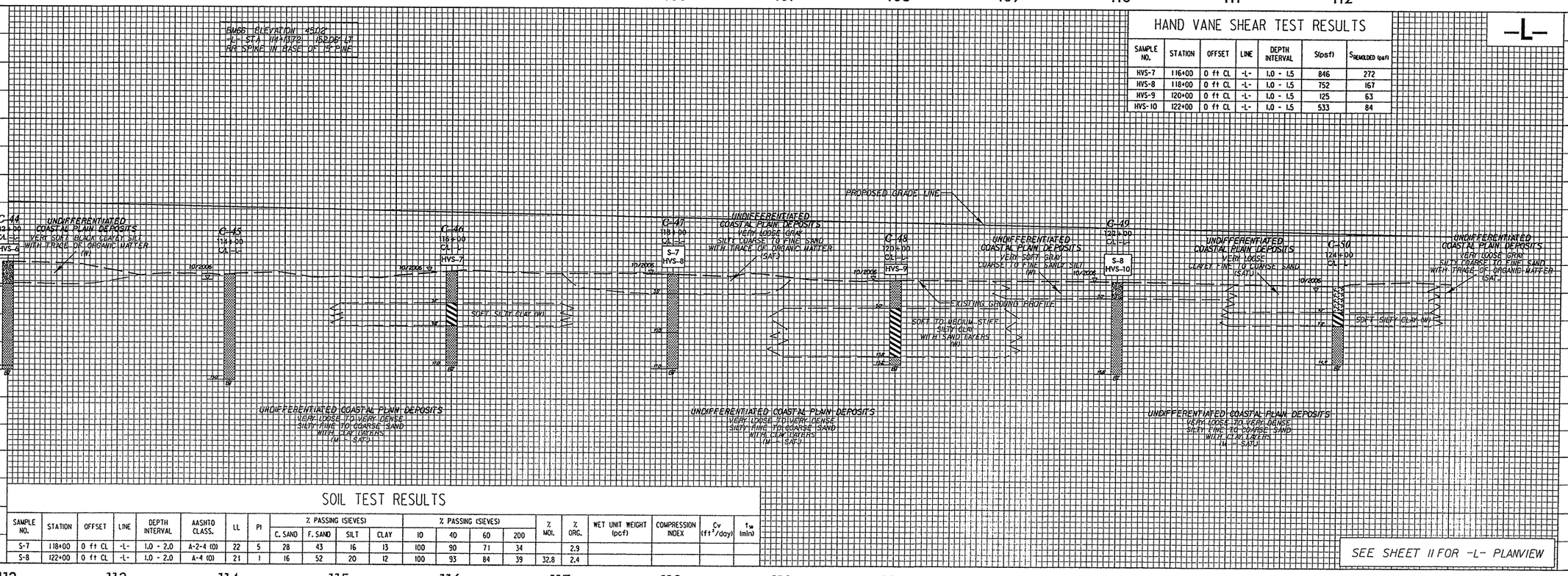
SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	S(psf)	$S_{REMOLDED}$ (psf)
HVS-4	101+00	0 ft CL	-L-	1.0 - 1.5	752	251
HVS-5	108+00	0 ft CL	-L-	1.0 - 1.5	574	240
HVS-6	112+00	0 ft CL	-L-	1.0 - 1.5	480	125



SEE SHEET 10 FOR -L- PLANVIEW

HAND VANE SHEAR TEST RESULTS

SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	S(psf)	$S_{REMOLDED}$ (psf)
HVS-7	116+00	0 ft CL	-L-	1.0 - 1.5	846	272
HVS-8	118+00	0 ft CL	-L-	1.0 - 1.5	752	167
HVS-9	120+00	0 ft CL	-L-	1.0 - 1.5	125	63
HVS-10	122+00	0 ft CL	-L-	1.0 - 1.5	533	84



SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	AASHTO CLASS.	LL	PI	% PASSING (SIEVES) C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	60	200	% MOI.	% ORG.	WET UNIT WEIGHT (pcf)	COMPRESSION INDEX	C_v (ft^2/day)	t_{90} (min)
S-7	118+00	0 ft CL	-L-	1.0 - 2.0	A-2-4 (0)	22	5	28	43	16	13	100	90	71	34		2.9				
S-8	122+00	0 ft CL	-L-	1.0 - 2.0	A-4 (0)	21	1	16	52	20	12	100	93	84	39	32.8	2.4				

SEE SHEET 11 FOR -L- PLANVIEW

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	46
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

HAND VANE SHEAR TEST RESULTS

SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	S(psf)	$S_{REMOLDED}$ (psf)
HVS-11	132+00	0 ft CL	-L-	1.0 - 1.5	741	136

BM89 ELEVATION 45.83'
-L- STA 134+22.77 140.09' LT
RR SPIKE IN BASE OF 15" PINE

SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	AASHTO CLASS.	LL	PI	% PASSING (SIEVES) C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	60	200	% MOI.	% ORG.	WET UNIT WEIGHT (pcf)	COMPRESSION INDEX	C_v (ft^2/day)	t_{50} (min)	ϕ (Degrees)	c_u (psf)	ϕ (Degrees)	c' (psf)
S-9	126+00	0 ft CL	-L-	1.0 - 2.0	A-2-4 (0)	21	1	12	60	19	9	98	94	86	34		2.6								
S-10	130+00	0 ft CL	-L-	1.0 - 2.0	A-4 (0)	22	4	11	53	15	21	100	97	89	43	33	3.1								
S-11	134+00	0 ft CL	-L-	1.0 - 2.0	A-2-4 (0)	16	1	14	56	15	15	100	97	86	34		1.2								
SS-5	136+00	0 ft CL	-L-	1.0 - 2.5	A-2-4 (0)	17	14	29	48	9	14	99	91	70	25										
SS-6	136+00	0 ft CL	-L-	18.5 - 20.0	A-3 (0)	22	NP	67	25	3	5	99	66	33	10										
ST-7	136+00	0 ft CL	-L-	13.5 - 15.5	A-7-6 (21)	49	20	3	8	37	52	100	99	ND	90	33.2		118.3	0.312	0.081	25.000				
ST-8	136+00	0 ft CL	-L-	13.5 - 15.5	A-7-6 (22)	47	27	7	13	44	36	98	96	ND	81			112.7				15	0	ND	ND

SEE SHEET 12 FOR -L- PLANVIEW

SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	AASHTO CLASS.	LL	PI	% PASSING (SIEVES) C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	60	200	% MOI.	% ORG.	WET UNIT WEIGHT (pcf)	COMPRESSION INDEX	C_v (ft^2/day)	t_{50} (min)	ϕ (Degrees)	c_u (psf)	ϕ (Degrees)	c' (psf)
SS-7	140+00	0 ft CL	-L-	3.7 - 5.2	A-2-6 (0)	27	11	19	51	10	20	99	95	80	34										
SS-8	140+00	0 ft CL	-L-	28.8 - 30.3	A-3 (0)	23	NP	20	74	3	3	100	94	80	8										
ST-9	140+00	0 ft CL	-L-	6.0 - 8.0	A-7-6 (22)	44	30	8	19	31	42	100	98	ND	77			124.5	0.160	0.00003	19.749	13	0	19	0
ST-10	140+00	0 ft CL	-L-	6.0 - 8.0	A-6 (6)	39	18	22	28	22	28	99	89	ND	52										
ST-10	140+00	0 ft CL	-L-	6.0 - 8.0	A-7-6 (30)	48	28	0	6	34	60	100	100	ND	97			112.9							
ST-13	150+00	0 ft CL	-L-	12.0 - 14.0	A-6 (3)	31	12	18	30	33	19	90	85	ND	49										
ST-14	150+00	0 ft CL	-L-	18.0 - 20.3	A-6 (11)	38	18	14	17	37	32	99	94	ND	70			100.4							
ST-15	150+00	0 ft CL	-L-	12.0 - 14.0	A-7-6 (11)	42	18	20	15	29	36	100	84	ND	68			94.3	0.885	0.042	43.073	20	0	30	0.84
ST-15	150+00	0 ft CL	-L-	12.0 - 14.0	A-7-6 (20)	46	20	2	12	43	43	100	99	ND	89										
ST-15	150+00	0 ft CL	-L-	12.0 - 14.0	A-7-5 (12)	49	17	21	14	33	32	100	86	ND	68										
ST-16	150+00	0 ft CL	-L-	18.0 - 20.0	A-7-5 (14)	50	14	11	10	35	44	100	93	ND	80			91.2	1.255	0.006	256.000	0	2.4	0	2.7
ST-16	150+00	0 ft CL	-L-	18.0 - 20.0	A-6 (11)	39	16	14	14	28	44	100	95	ND	73										

VANE SHEAR TEST RESULTS

SAMPLE NO.	STATION	OFFSET	LINE	DEPTH	S_U (psf)	$S_{REMOLDED}$ (psf)
VS-1	150+00	0 ft CL	-L-	13	58	17
VS-2	150+00	0 ft CL	-L-	19	54	17

SEE SHEET 13 FOR -L- PLANVIEW

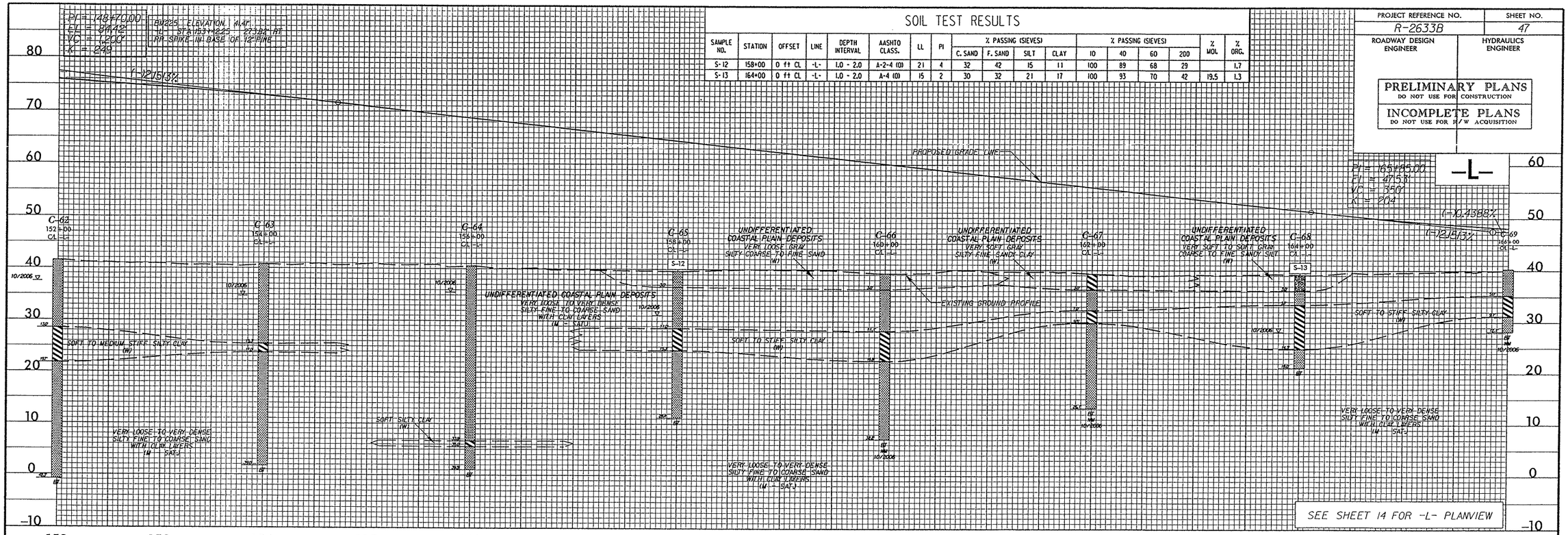
PROJECT REFERENCE NO.	SHEET NO.
R-2633B	47
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	AASHTO CLASS.	LL	PI	% PASSING (SIEVES) C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	60	200	% MOI.	% ORG.
S-12	158+00	0 ft CL	-L-	1.0 - 2.0	A-2-4 (0)	21	4	32	42	15	11	100	89	68	29		1.7
S-13	164+00	0 ft CL	-L-	1.0 - 2.0	A-4 (0)	15	2	30	32	21	17	100	93	70	42	19.5	1.3



PROJECT REFERENCE NO.	SHEET NO.
R-2633B	48
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

-L-

BM77 ELEVATION 33.54'
-L- STA 186+83.76 177.85' LT
RR SPIKE IN BASE OF 12" OAK

PI = 182+50.00
EL = 40.22'
VC = 200'
K = 243

PI = 188+80.00
EL = 42.65'
VC = 1,060'
K = 1154

PI = 199+40.00
EL = 36.89'
VC = 290'
K = 348

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
MEDIUM DENSE TO VERY LOOSE CLAYEY FINE SAND (W)

MEDIUM STIFF SILTY CLAY (W)

VERY LOOSE TO VERY DENSE SILTY FINE TO COARSE SAND (W - SAT.)

VERY SOFT TO STIFF SILTY CLAY (W)

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO VERY DENSE SILTY FINE TO COARSE SAND (W - SAT.)

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
SOFT TO VERY SOFT GRAY CLAYEY FINE TO COARSE SANDY SILT WITH TRACE ORGANIC MATERIAL (W)

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
SOFT TO VERY SOFT DARK GRAY SILTY COARSE TO FINE SANDY CLAY (MUCK) (W)

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO VERY DENSE SILTY FINE TO COARSE SAND (W - SAT.)

PROPOSED GRADE LINE

EXISTING GROUND PROFILE

C-76 180+00 CL -L-
C-77 182+00 CL -L-
C-78 184+00 CL -L-
C-79 185+00 CL -L-
C-80 188+00 CL -L-
C-81 190+00 CL -L-
C-82 192+00 CL -L-
C-83 194+00 CL -L-

S-14
S-15

(-)0.4388% (+)0.3852% (+)0.3852% (-)0.5336%

10/2006

SEE SHEET 15 FOR -L- PLANVIEW

SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	AASHTO CLASS.	LL	PI	% PASSING (SIEVES) C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	60	200	% MOI.	% ORG.
S-14	188+00	0 ft CL	-L-	0.0 - 1.0	A-5 (0)	44	6	37	28	15	20	97	77	62	37	66.6	3.6
S-15	190+00	0 ft CL	-L-	0.0 - 1.0	A-7-5 (7)	66	19	22	27	35	16	88	77	68	48	219.6	25.2

HAND VANE SHEAR TEST RESULTS

SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	S(psf)	$S_{REMOLDED}$ (psf)
HVS-12	198+00	0 ft CL	-L-	1.0 - 1.5	1065	167
HVS-13	202+00	0 ft CL	-L-	1.0 - 1.5	940	115

BM79 ELEVATION 29.07'
-L- STA 206+08.46 187.79' LT
RR SPIKE IN BASE OF 15" TWIN PINE

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY SOFT TO STIFF DARK GRAY CLAYEY FINE TO COARSE SAND (W) (SAT.)

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE DARK GRAY HIGHLY ORGANIC SILTY COARSE TO FINE SAND (MUCK) (SAT.)

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO LOOSE SILTY FINE TO COARSE SAND (W)

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO VERY DENSE SILTY FINE TO COARSE SAND (W - SAT.)

C-83 194+00 CL -L-
C-84 196+00 CL -L-
C-85 198+00 CL -L-
C-86 200+00 CL -L-
C-87 202+00 CL -L-
C-88 204+00 CL -L-
C-89 206+00 CL -L-

S-16 HVS-12
S-17 HVS-13

(-)0.5336% (+)0.3000% (-)0.5336%

SEE SHEET 16 FOR -L- PLANVIEW

SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	AASHTO CLASS.	LL	PI	% PASSING (SIEVES) C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	60	200	% MOI.	% ORG.
S-16	198+00	0 ft CL	-L-	1.0 - 2.0	A-5 (0)	47	9	26	37	21	16	97	86	71	38	65.2	9.1
S-17	202+00	0 ft CL	-L-	1.0 - 2.0	A-2-7 (0)	55	14	30	41	20	9	98	82	69	30		12.9

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	49
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

-L-

HAND VANE SHEAR TEST RESULTS

SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	S(psf)	$S_{REMOLDED}$ (psf)
HVS-14	214+00	0 ft CL	-L-	1.0 - 1.5	888	104
HVS-15	216+00	0 ft CL	-L-	1.0 - 1.5	334	178
HVS-16	218+00	0 ft CL	-L-	1.0 - 1.5	919	209

PI = 210+60.00
EL = 40.35'
VC = 1980'
K = 329

(+)0.3000% (-)0.3002%

PROPOSED GRADE LINE

C-90 208+00 CL -L-

C-91 210+00 CL -L-

C-92 212+00 CL -L-

C-93 214+00 CL -L-

C-94 216+00 CL -L-

C-95 218+00 CL -L-

C-96 220+00 CL -L-

S-18

S-19 HVS-14

S-20 HVS-15

HVS-16

10/2006

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE SILTY FINE TO COARSE SAND WITH TRACE OF ORGANICS
(W - SAT.)

SOFT TO MEDIUM STIFF SILTY CLAY (W)

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO VERY DENSE
SILTY FINE TO COARSE SAND
(W - SAT.)

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE BLACK MODERATELY ORGANIC SILTY CLAYEY COARSE TO FINE SAND
(SAT.)

VERY LOOSE TO VERY DENSE
SILTY FINE TO COARSE SAND
(W - SAT.)

SOFT TO MEDIUM STIFF SILTY CLAY (W)

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO LOOSE
SILTY FINE TO COARSE SAND
(W - SAT.)

EXISTING GROUND PROFILE

VERY LOOSE TO VERY DENSE
SILTY FINE TO COARSE SAND
(W - SAT.)

SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	AASHTO CLASS.	LL	PI	% PASSING (SIEVES)				% PASSING (SIEVES)				% MOL	% ORG.
								C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
S-18	210+00	0 ft CL	-L-	1.0 - 2.0	A-2-4 (0)	21	NP	48	38	4	10	99	75	52	15		1.9
S-19	214+00	0 ft CL	-L-	1.0 - 2.0	A-2-4 (0)	34	NP	26	46	11	17	99	89	73	30		5.1
S-20	216+00	0 ft CL	-L-	1.0 - 1.5	A-2-4 (0)	33	NP	25	42	14	19	100	90	75	35		7.6

SEE SHEET 17 FOR -L- PLANVIEW

HAND VANE SHEAR TEST RESULTS

SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	S(psf)	$S_{REMOLDED}$ (psf)
HVS-17	222+00	0 ft CL	-L-	1.0 - 1.5	564	303
HVS-18	228+00	0 ft CL	-L-	1.0 - 1.5	679	251
HVS-19	232+00	0 ft CL	-L-	1.0 - 1.5	950	230

BMDI ELEVATION 27.84'
-L- STA. 229+52.92, 154.33' LT
RR SPIKE IN BASE OF 16" PINE

PI = 227+30.00
EL = 35.34'
VC = 360'
K = 600

(+)0.3000% (-)0.3000%

PROPOSED GRADE LINE

C-97 222+00 CL -L-

C-98 224+00 CL -L-

C-99 226+00 CL -L-

C-100 228+00 CL -L-

C-102 232+00 CL -L-

C-103 234+00 CL -L-

S-21 HVS-17

S-22 HVS-18

HVS-19

10/2006

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO LOOSE
SILTY FINE TO COARSE SAND
(W - SAT.)

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE BLACK MODERATELY ORGANIC SILTY CLAYEY COARSE TO FINE SAND
(SAT.)

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO LOOSE
SILTY FINE TO COARSE SAND
(W - SAT.)

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO VERY DENSE
SILTY FINE TO COARSE SAND
(W - SAT.)

SOFT TO MEDIUM STIFF SILTY CLAY (W)

VERY LOOSE TO VERY DENSE
SILTY FINE TO COARSE SAND
(W - SAT.)

EXISTING GROUND PROFILE

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO VERY DENSE
SILTY FINE TO COARSE SAND
(W - SAT.)

SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	AASHTO CLASS.	LL	PI	% PASSING (SIEVES)				% PASSING (SIEVES)				% MOL	% ORG.
								C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
S-21	222+00	0 ft CL	-L-	1.0 - 1.5	A-2-4 (0)	19	NP	30	53	8	9	100	91	70	18		5.1
S-22	228+00	0 ft CL	-L-	1.0 - 1.5	A-2-4 (0)	17	NP	33	47	7	13	100	88	67	21		5.2

SEE SHEET 18 FOR -L- PLANVIEW

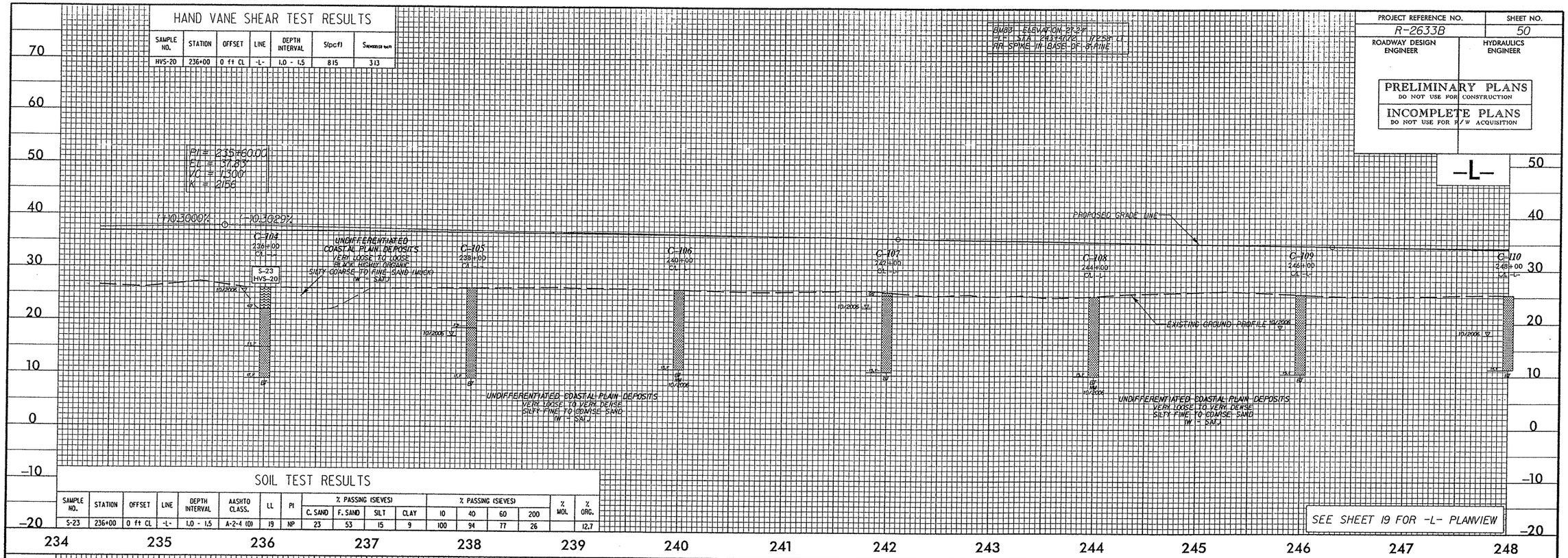
PROJECT REFERENCE NO.	SHEET NO.
R-2633B	50
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

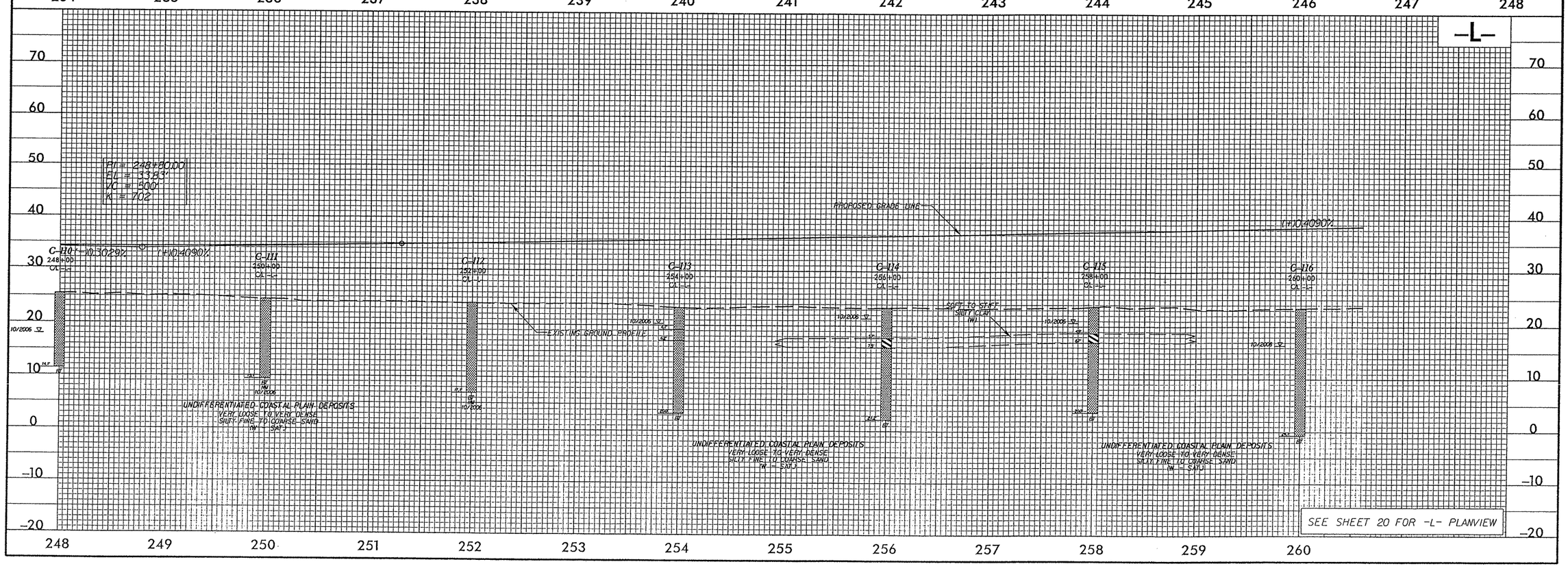
HAND VANE SHEAR TEST RESULTS

SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	S(pcf)	$S_{NORMALIZED}$ (pcf)
HVS-20	236+00	0 ft CL	-L-	1.0 - 1.5	815	313



SOIL TEST RESULTS

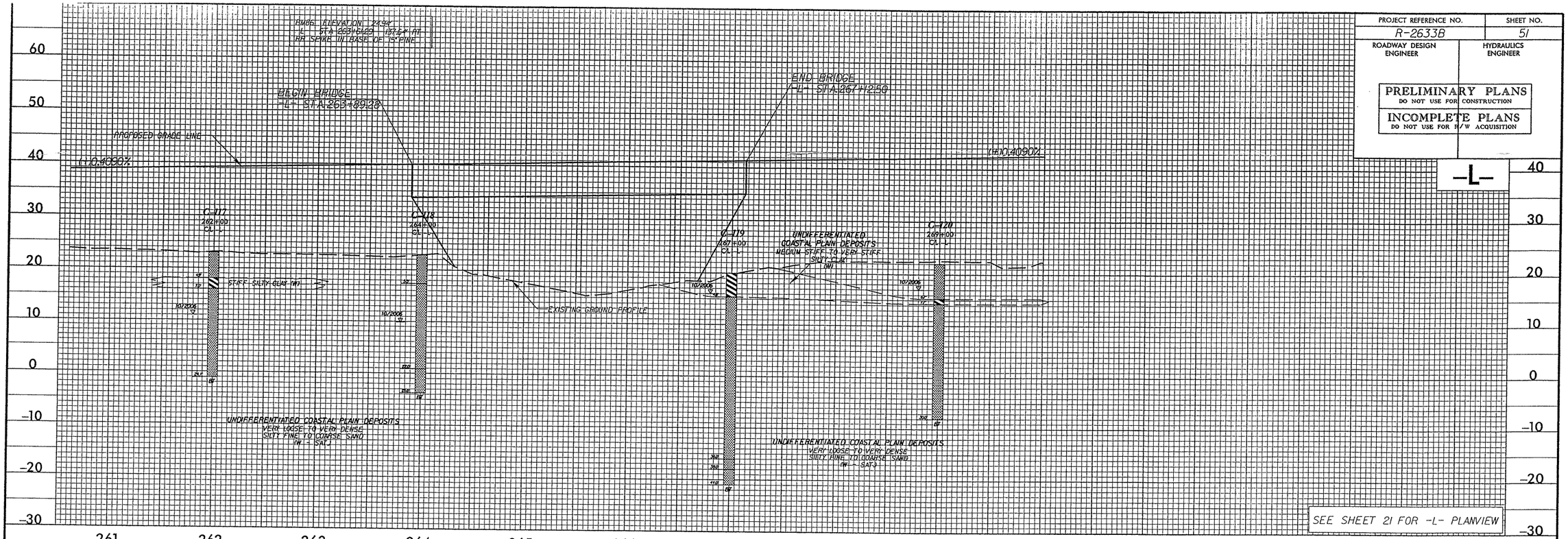
SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	AASHTO CLASS.	LL	PI	% PASSING (SIEVES) C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	60	200	% MOI.	% ORG.
S-23	236+00	0 ft CL	-L-	1.0 - 1.5	A-2-4 (0)	19	NP	23	53	15	9	100	94	77	26		12.7

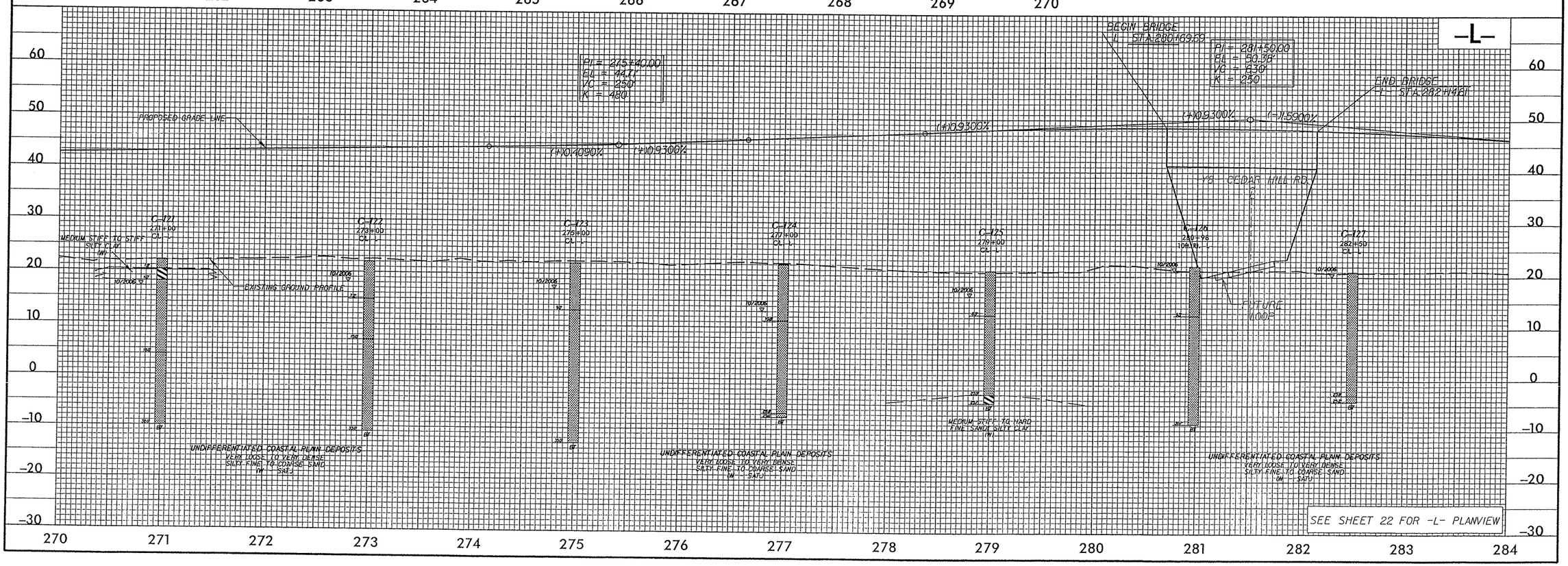


PROJECT REFERENCE NO.	SHEET NO.
R-2633B	51
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

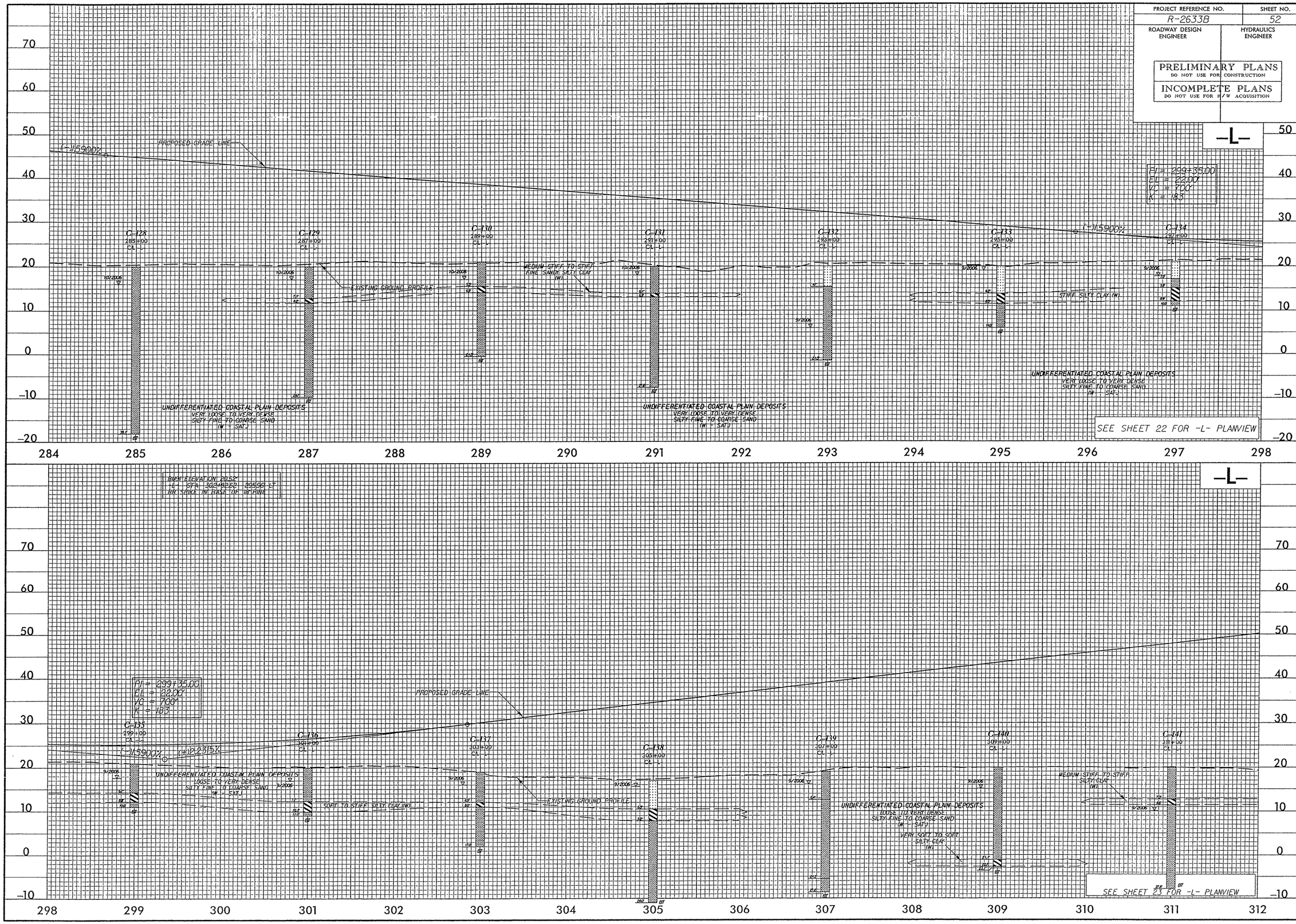




PROJECT REFERENCE NO.	SHEET NO.
R-2633B	52
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

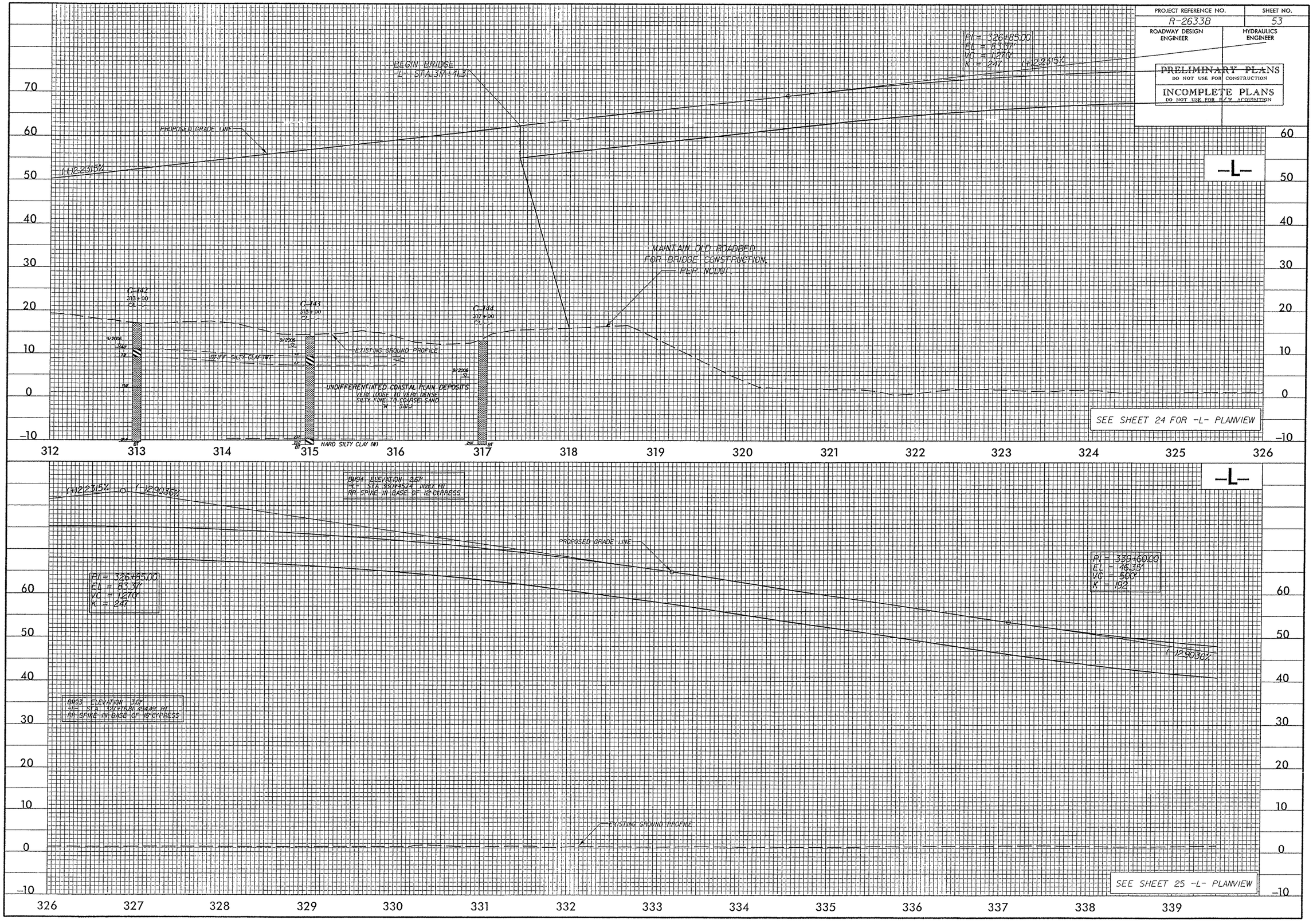
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION



PROJECT REFERENCE NO.	SHEET NO.
R-2633B	53
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION



PROJECT REFERENCE NO.	SHEET NO.
R-2633B	54
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PI = 339+60.00
EL = 46.35'
VC = 500'
K = 192

-L-

PROPOSED GRADE LINE

(-)3.9036%

(-)0.3000%

(-)0.3000%

EXISTING GROUND PROFILE

SEE SHEET 26 FOR -L- PLANVIEW

60 50 40 30 20 10 0 -10

340 341 342 343 344 345 346 347 348 349 350 351 352 353

-L-

PROPOSED GRADE LINE

(-)0.3000%

(-)0.3000%

EXISTING GROUND PROFILE

SEE SHEET 27 FOR -L- PLANVIEW

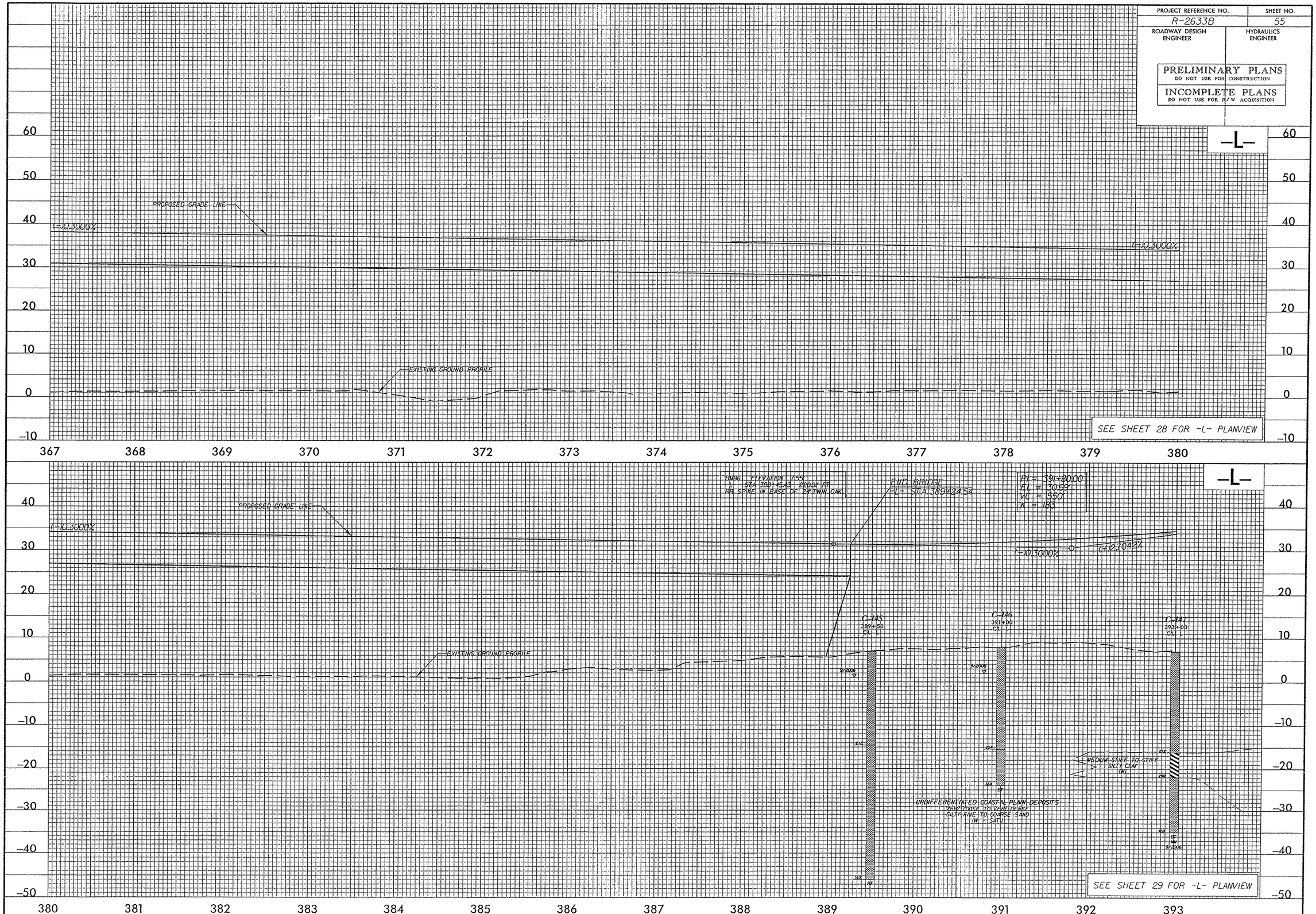
60 50 40 30 20 10 0 -10

353 354 355 356 357 358 359 360 361 362 363 364 365 366 367

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	55
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION



PROJECT REFERENCE NO.	SHEET NO.
R-2633B	56
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

(PRELIMINARY PLANS
NOT TO BE USED FOR CONSTRUCTION)

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

-L-

PI = 391+80.00
EL = 3089'
VC = 550'
K = 183

BM4 ELEVATION 17.24'
RED CHI SPK IN BASE 3.48' S 32.38' BT
TIRR STA 367 +81 ± BASE OF A 12 PINE

(-)1.270 42%

(-)1.560 1%

PI = 400+00.00
EL = 5228'
VC = 1090'
K = 255

PROPOSED GRADE LINE

END BRIDGE
FT STA 399+90.59

RR
CL

RR
CL

RR
CL

C-148
395+00
CL -L-

C-150
398+00
CL -L-

C-151
400+68
28 LT CL

EXISTING GROUND PROFILE

C-152
402+00
CL -L-

C-153
404+00
CL -L-

C-154
406+00
CL -L-

9/2006

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO VERY DENSE
SILTY FINE TO COARSE SAND
(W - SAT.)

SOFT TO HARD
FINE SANDY SILTY CLAY
(W)

MEDIUM STIFF TO STIFF
SILTY CLAY
(W)

VERY LOOSE TO VERY DENSE
SILTY FINE TO COARSE SAND
(W - SAT.)

MEDIUM DENSE TO DENSE
SILTY FINE TO COARSE SAND
(W - SAT.)

SEE SHEET 30 FOR -L- PLANVIEW

393 394 395 396 397 398 399 400 401 402 403 404 405 406

SOIL TEST RESULTS

-L-

SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	AASHTO CLASS.	LL	PI	% PASSING (SIEVES) C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	60	200	% MOI.	% ORG.	WET UNIT WEIGHT (pcf)	COMPRESSION INDEX	Cv (ft²/day)	t_{50} (min)	ϕ (Degrees)	c_u (psi)	ϕ (Degrees)	c' (psi)
SS-9	412+00	0 ft CL	-L-	8.8 - 10.3	A-3 (0)	17	NP	83	15	1	1	100	60	17	2										
SS-10	412+00	0 ft CL	-L-	23.8 - 25.3	A-1-b (0)	14	NP	88	10	1	1	96	38	12	2										
SS-11	412+00	0 ft CL	-L-	28.8 - 30.3		17	34									136.5	15.2								
ST-11	412+00	0 ft CL	-L-	31.8 - 33.8	A-2-4 (0)	15	NP	21	54	13	12	100	95	ND	31			129.3	0.070	1.97	1.0				
ST-12	412+00	0 ft CL	-L-	32.8 - 34.8	A-4 (0)	18	3	15	50	15	20	100	96	ND	40										
ST-12	412+00	0 ft CL	-L-	32.8 - 34.8	A-6 (3)	24	11	9	43	18	30	100	98	ND	55			129.3				ND	8.6	ND	ND

PI = 413+00.00
EL = 3257'
VC = 500'
K = 190

(-)1.560 1%

PROPOSED GRADE LINE

(+)1.069 4%

C-155
408+00
CL -L-

C-156
410+00
CL -L-

EXISTING GROUND PROFILE

C-157
412+00
CL -L-

B-5 / B-5A
412+00
CL -L-

SS-9
SS-10
SS-11
ST-11
ST-12
PPDT-8

C-158
414+00
CL -L-

C-159
415+21
7ft RT -L-

ARTIFICIAL FILL
SANDY TOPSOIL

C-160
418+00
CL -L-

C-161
420+00
CL -L-

9/2006

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO VERY DENSE
SILTY FINE TO COARSE SAND
(W - SAT.)

MEDIUM STIFF TO HARD
FINE SANDY SILTY CLAY
WITH SAND LAYERS
(W)

STIFF GRAY
MODERATELY ORGANIC
SILTY CLAY
WITH SAND LAYERS
(W)

MEDIUM STIFF TO HARD
FINE SANDY SILTY CLAY
(W)

MEDIUM DENSE TO VERY DENSE
SILTY FINE SAND
(SAT.)

MEDIUM DENSE GRAY
CLAYEY FINE SAND WITH CLAY LAYERS
AND TRACE OF ORGANIC MATTER
(SAT.)

PPDT-8

ST-11 / ST-12

12/2006

SEE SHEET 31 FOR -L- PLANVIEW

407 408 409 410 411 412 413 414 415 416 417 418 419 420

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	57

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PI = 434+30.00
EL = 55.35'
VC = 200'
K = 380

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

-L-

BEGIN BRIDGE
-L- STA 424+02.32

(+)1.0694%

(+)0.5432%

PROPOSED GRADE LINE

END BRIDGE ELEVATION 16.81'
-L- STA 426+56.76 44.30'Rt
RR SPIKE IN BASE OF 16" PINE

BEGIN BRIDGE
-L- STA 430+26.44

END BRIDGE
-L- STA 431+80.18

EXISTING GROUND PROFILE

C-161
420+00
CL -L-

C-162
422+00
CL -L-

C-163
423+81
10ft Rt -L-

C-164
426+76
6ft Lt -L-

C-165
428+00
CL -L-

C-166
430+00
CL -L-

C-167
431+50
6ft Lt -L-

9/2006

MEDIUM STIFF SILTY CLAY (M)

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO VERY DENSE
SILTY FINE TO COARSE SAND
(W - SAT.)

SOFT TO STIFF SILTY CLAY (M)

SOFT TO MEDIUM STIFF FINE SAND, SILTY CLAY (M)

ARTIFICIAL FILL, CASE STONE

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO VERY DENSE
SILTY FINE TO COARSE SAND
(W - SAT.)

SEE SHEET 32 FOR -L- PLANVIEW

PI = 434+30.00
EL = 55.35'
VC = 200'
K = 380

PROPOSED GRADE LINE

(+)1.0694%

(+)0.5432%

BEGIN BRIDGE
-L- STA 439+32.52

BM245 ELEVATION 26.06'
4 STA 439+13.91 39.33' RT
RR SPIKE IN BASE OF 10" PINE

PI = 442+33.11
EL = 59.71'
VC = 984.25'
K = 491

(+)0.5432%

END GRADE
STATE PROJECT R-2633B
TIE TO STATE PROJECT R-2633CA
(UNDER CONSTRUCTION)
-L- STA 445+28.89
ELEVATION = 55.00'

END BRIDGE
-L- STA 441+25.90

EXISTING GROUND PROFILE

EXISTING CONSTRUCTION SLOPE (STATE PROJECT R-2633CA)

C-169
436+00
CL -L-

C-171
439+50
CL -L-

9/2006

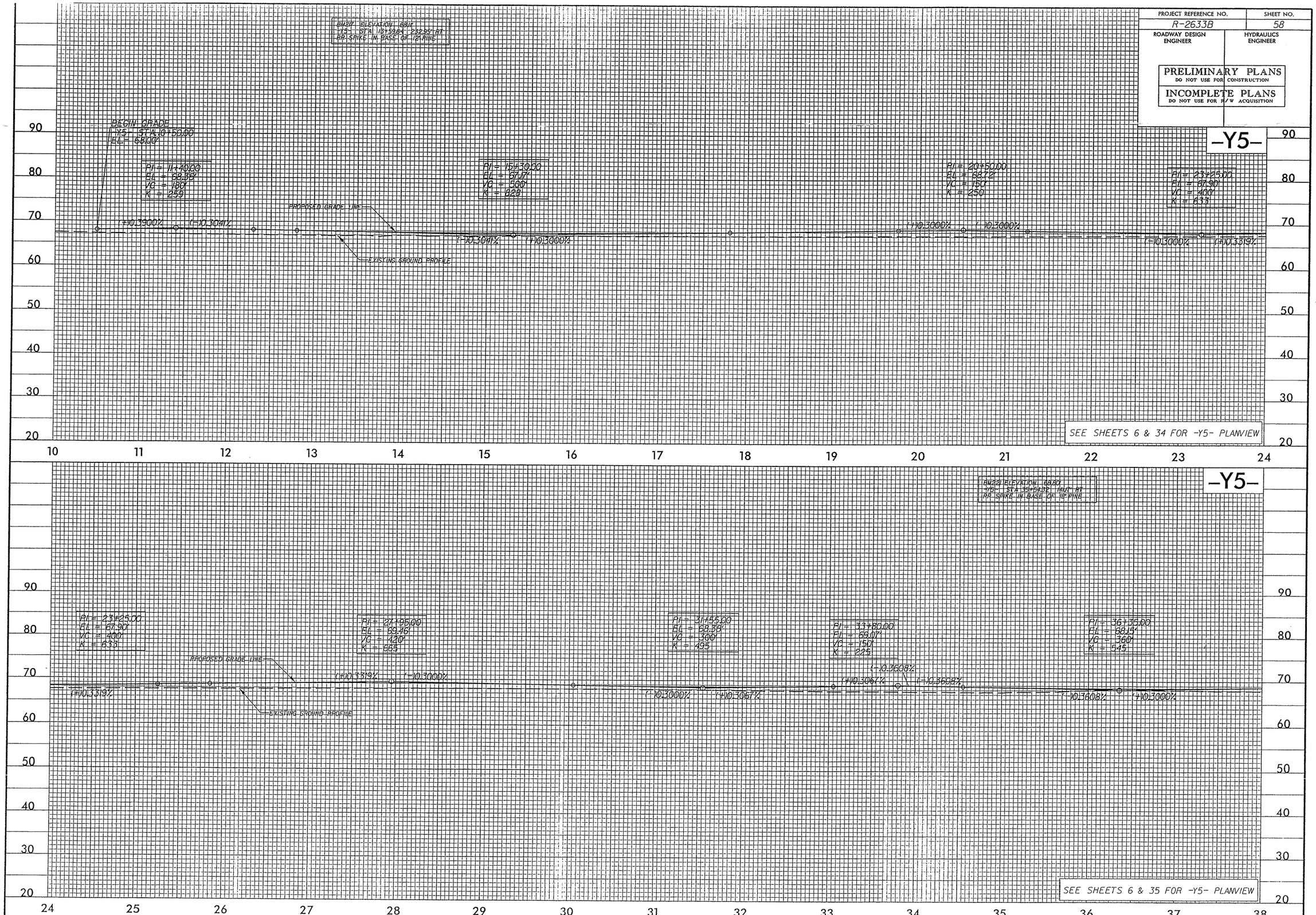
UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO VERY DENSE
SILTY FINE TO COARSE SAND
(W - SAT.)

SEE SHEET 33 FOR -L- PLANVIEW

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	58
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION



PROJECT REFERENCE NO.	SHEET NO.
R-2633B	59

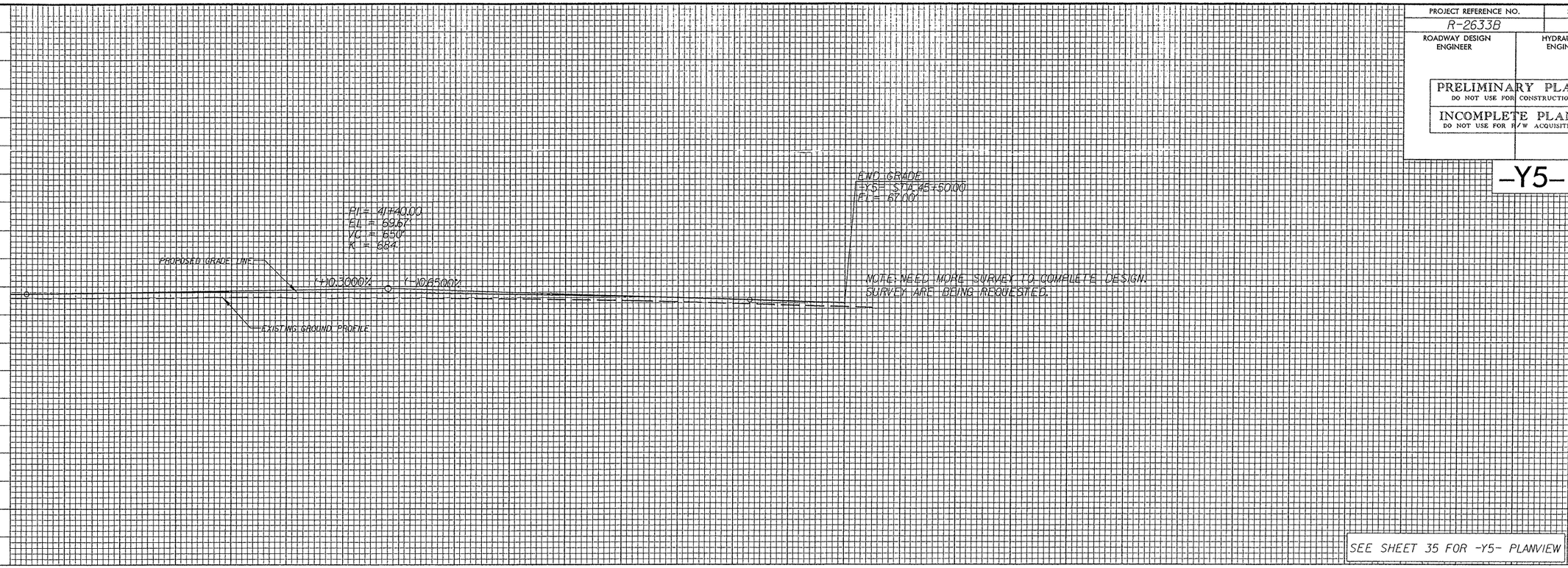
ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

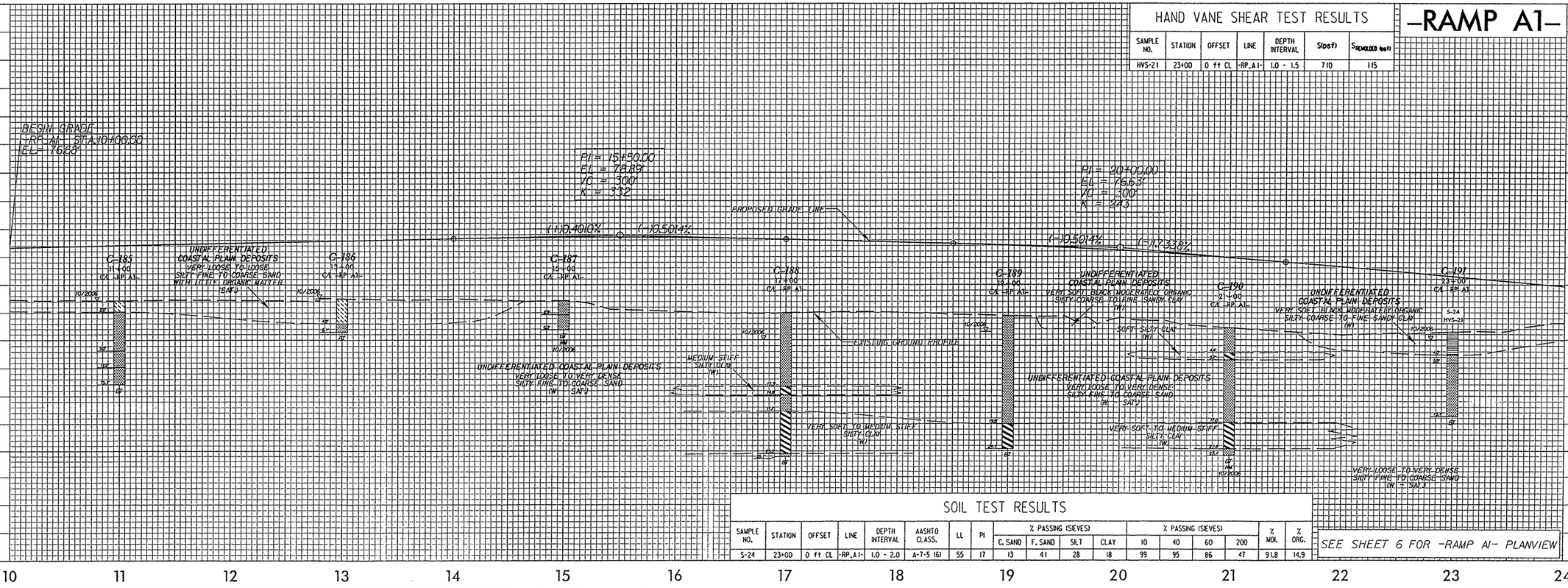
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

-Y5-



SEE SHEET 35 FOR -Y5- PLANVIEW

-RAMP A1-



HAND VANE SHEAR TEST RESULTS

SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	S(psf)	$S_{REMOLDED}$ (psf)
HVS-21	23+00	0 ft CL	-RP_A1-	1.0 - 1.5	710	115

SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	AASHTO CLASS.	LL	PI	% PASSING (SIEVES)				% PASSING (SIEVES)				% MOI.	% ORG.
								C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
S-24	23+00	0 ft CL	-RP_A1-	1.0 - 2.0	A-7-5 (6)	55	17	13	41	28	18	99	95	86	47	91.8	14.9

SEE SHEET 6 FOR -RAMP A1- PLANVIEW

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	60

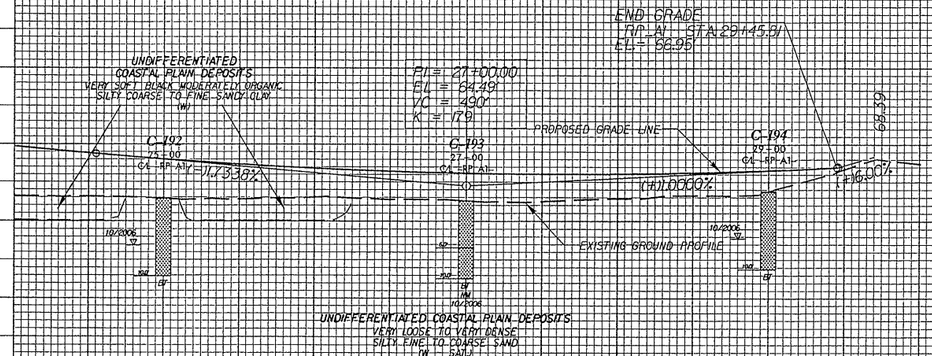
ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

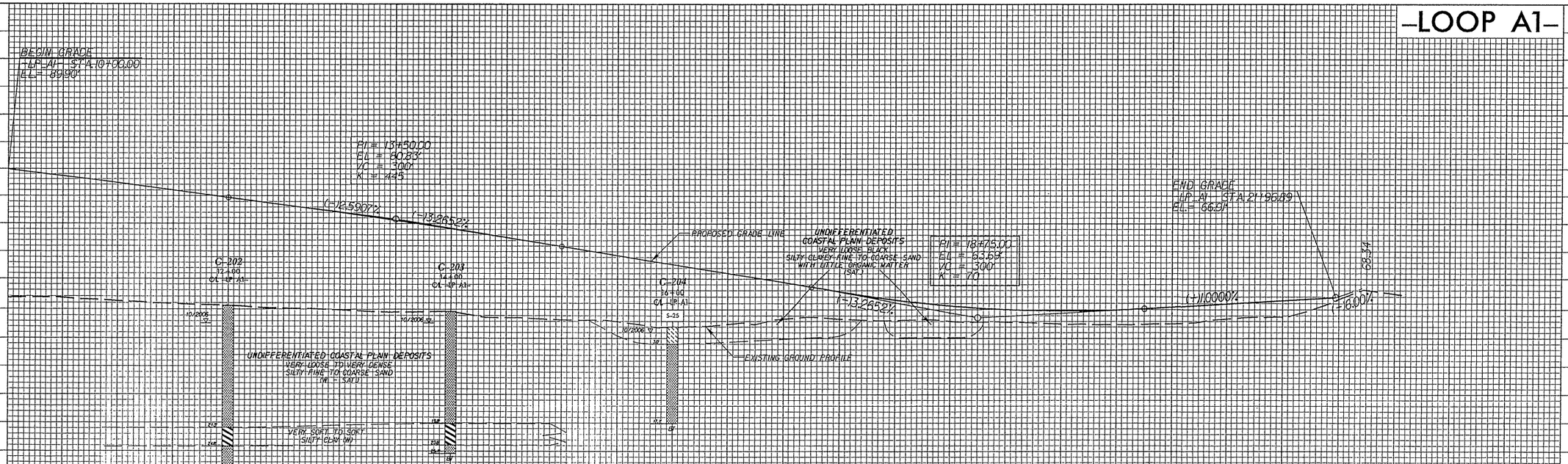
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

-RAMP A1-



SEE SHEET 6 FOR -RAMP A1- PLANVIEW

-LOOP A1-



SEE SHEET 6 FOR -LOOP A1- PLANVIEW

SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	AASHTO CLASS.	LL	PI	% PASSING (SIEVES)				% PASSING (SIEVES)				% MOI.	% ORG.
								C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
S-25	16+00	0 ft CL	-LP_A1-	1.0 - 2.0	A-2-4 (0)	23	2	17	57	11	15	99	97	82	26		3.2

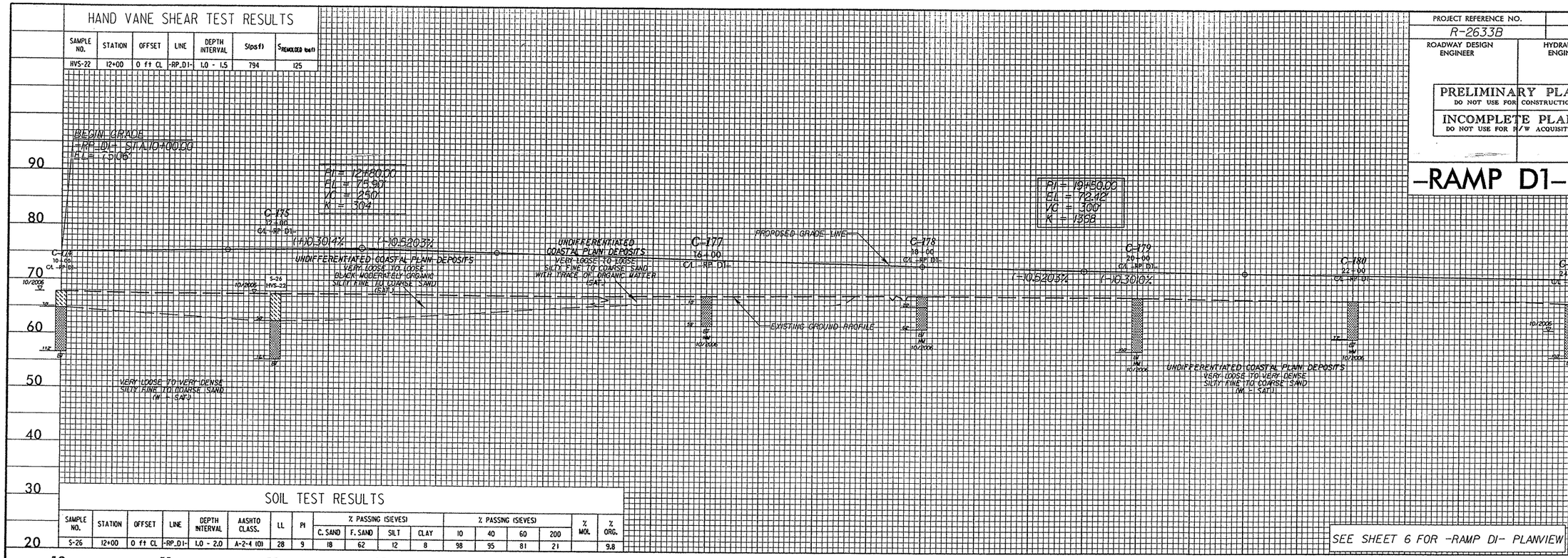
PROJECT REFERENCE NO.	SHEET NO.
R-2633B	61
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

HAND VANE SHEAR TEST RESULTS

SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	S(psf)	$S_{REMOLDED}$ (psf)
HVS-22	12+00	0 ft CL	-RP_D1-	1.0 - 1.5	794	125



SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	AASHTO CLASS.	LL	PI	% PASSING (SIEVES) C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	60	200	% MOI.	% ORG.
S-26	12+00	0 ft CL	-RP_D1-	1.0 - 2.0	A-2-4 (0)	28	9	18	62	12	8	98	95	81	21		9.8

SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	AASHTO CLASS.	LL	PI	% PASSING (SIEVES) C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	60	200	% MOI.	% ORG.
S-27	28+00	0 ft CL	-RP_D1-	1.0 - 2.0	A-2-4 (0)	24	4	20	59	11	10	98	95	79	21		4.1
S-28	30+50	0 ft CL	-RP_D1-	1.0 - 2.0	A-2-4 (0)	26	4	13	56	14	17	100	99	86	32		5.0

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	62
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

HAND VANE SHEAR TEST RESULTS

SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	S(pcf)	$S_{REMOLDED}$ (pcf)
HVS-23	14+00	0 ft CL	-LP_D1-	1.0 - 1.5	627	63
HVS-24	16+00	0 ft CL	-LP_D1-	1.0 - 1.5	1086	209

SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	AASHTO CLASS.	LL	PI	% PASSING (SIEVES)				% PASSING (SIEVES)				% MOI.	% ORG.
								C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
S-29	14+00	0 ft CL	-LP_D1-	1.0 - 2.0	A-4 (1)	39	8	14	43	22	21	99	97	86	44	45.8	6.8
S-30	16+00	0 ft CL	-LP_D1-	1.0 - 2.0	A-2-4 (0)	18	2	15	71	6	8	100	99	85	15		3.5

-LOOP D1-

BEGIN GRADE
-LP_D1- STA 10+60.00
EL.= 68.70'

PI = 12+20.00
EL = 82.91'
VC = 310'
K = 267

(-)2.630%

(-)3.790%

C-195
10+00
CL -LP_D1-

C-196
12+00
CL -LP_D1-

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO LOOSE BLACK OLIVEY COARSE TO FINE SANDY SILT WITH LITTLE ORGANIC MATTER (W)

10/2006

C-197
14+00
CL -LP_D1-

S-29
HVS-23

PI = 15+45.00
EL = 70.59'
VC = 200'
K = 57

(-)3.790%

C-198
16+00
CL -LP_D1-

S-30
HVS-24

(-)10.301%

PROPOSED GRADE LINE

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE BLACK CLAYEY COARSE TO FINE SAND WITH TRACE OF SILT AND LITTLE ORGANIC MATTER (SAT)

EXISTING GROUND PROFILE

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO VERY DENSE SILTY FINE TO COARSE SAND (W - SAT)

STIFF TO SOFT SILTY CLAY (W)

END GRADE
-LP_D1- STA 23+09.15
EL.= 68.26'

68.26

(+)12.00%

SEE SHEET 6 FOR -LOOP D1- PLANVIEW

-SVRD5-
-SVRD5A-

BEGIN GRADE
-SVRD5- STA 10+70.00
EL.= 67.85'

PI = 11+20.00
EL = 67.20'
VC = 100'
K = 64

68.27

(+)2.00%

(-)0.538%

C-347
12+00
CL -SVRD5-

PROPOSED GRADE LINE

(-)0.900%

EXISTING GROUND PROFILE

PI = 13+60.00
EL = 68.02'
VC = 180'
K = 115

C-348
14+00
CL -SVRD5-

(-)0.885%

PI = 15+50.00
EL = 67.13'
VC = 150'
K = 127

C-349
16+00
CL -SVRD5-

(-)0.360%

PI = 17+00.00
EL = 64.58'
VC = 150'
K = 111

C-350
18+00
CL -SVRD5-

(-)1.050%

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO VERY DENSE SILTY FINE TO COARSE SAND (W - SAT)

END GRADE
-SVRD5- STA 18+00.00
EL.= 66.53'

SEE SHEET 35 FOR -SVRD5- PLANVIEW

BEGIN GRADE
-SVRD5A- STA 10+58.00
EL.= 67.29'

PI = 11+45.00
EL = 64.73'
VC = 170'
K = 41

C-346
11+30
CL -SVRD5A-

PROPOSED GRADE LINE

(-)3.634%

(+)0.483%

EXISTING GROUND PROFILE

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO VERY DENSE SILTY FINE TO COARSE SAND (W - SAT)

END GRADE
-SVRD5A1- STA 12+13.54
EL.= 65.15'

SEE SHEET 35 FOR -SVRD5A- PLANVIEW

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	63
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

-Y7-

BEGIN GRADE
-Y7- STA 15+00.00
EL = 35.00'

PROPOSED GRADE LINE

EXISTING GROUND PROFILE

(+)0.3000%

PI = 23+90.00
EL = 37.67'
VC = 5'
K = 118

C-235
22+00
CL -Y7-

C-236
24+00
CL -Y7-

(+)0.1000%

(-)4.6247%

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO VERY DENSE
SILTY FINE TO COARSE SAND
(W - SAT.)

C-237
28+00
CL -Y7-

PI = 30+20.00
EL = 66.80'
VC = 6.30'
K = 146

(+)4.6247%

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
LOOSE SILTY CLAYEY FINE TO COARSE SAND
(W)

C-238
28+00
CL -Y7-

SEE SHEETS 15 & 36 FOR -Y7- PLANVIEW

-Y7-

PI = 30+20.00
EL = 66.80'
VC = 8.30'
K = 146

BEGIN BRIDGE
-Y7- STA 30+63.18

(+)4.6247%

(+)0.3000%

END BRIDGE
-Y7- STA 32+14.72

PROPOSED GRADE LINE

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
LOOSE SILTY CLAYEY FINE TO COARSE SAND
(W)

C-239
30+63
CL -Y7-

SOFT TO MEDIUM STIFF SILTY CLAY (W)

C-240
32+75
CL -Y7-

EXISTING GROUND PROFILE

C-242
36+00
CL -Y7-

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO VERY DENSE
SILTY FINE TO COARSE SAND
(W - SAT.)

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
LOOSE CLAYEY FINE SAND
(W)

STIFF TO VERY STIFF SILTY CLAY (W)

C-243
37+88
CL -Y7-

BEGIN BRIDGE
-Y7- STA 37+18.34

PI = 40+20.00
EL = 69.80'
VC = 7.00'
K = 144

(+)0.3000%

(-)4.5520%

END BRIDGE
-Y7- STA 39+28.74

C-244
39+39
CL -Y7-

SOFT TO MEDIUM STIFF SILTY CLAY (W)

C-245
42+00
CL -Y7-

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE ORGANIC MODERATELY ORGANIC CLAYEY COARSE TO FINE SAND WITH TRACE OF SHELL
(W)

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO VERY DENSE
SILTY FINE TO COARSE SAND
(W - SAT.)

VERY LOOSE TO VERY DENSE
SILTY FINE TO COARSE SAND
(W - SAT.)

SEE SHEETS 15 & 37 FOR -Y7- PLANVIEW

HAND VANE SHEAR TEST RESULTS

SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	S(psf)	$S_{REMOLDED}$ (psf)
HVS-25	42+00	0 ft CL	-Y7-	1.0 - 1.5	1337	209

SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	AASHTO CLASS.	LL	PI	% PASSING (SIEVES) C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	60	200	% MOI.	% ORG.
S-31	42+00	0 ft CL	-Y7-	1.0 - 1.5	A-2-4 (0)	20	NP	25	53	8	14	100	94	75	24		5.7

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	64

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

BM229 ELEVATION 28.80'
-Y7- STA 54+16.48 46' RT
RR SPIKE IN BASE OF -18" PINE

-Y7-

PI = 40+20.00
EL = 69.80'
VC = 700'
K = 144

(-)4.5520%

PI = 49+00.00
EL = 29.74
VC = 600'
K = 123

(-)4.5580%

(+)0.3200%

END GRADE
-Y7- STA 55+00.00
EL= 51.65'

PROPOSED GRADE LINE

EXISTING GROUND PROFILE

C-246
44+00
CL -Y7-

C-247
46+00
CL -Y7-

C-249
50+00
CL -Y7-

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE (BLACK, MODERATELY ORGANIC CLAYEY COARSE TO FINE SAND WITH TRACE OF SILT
(W)

SOFT TO MEDIUM STIFF FINE SANDY SILTY CLAY
(W)

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO VERY DENSE
SILTY FINE TO COARSE SAND
(W - SAT.)

VERY LOOSE TO VERY DENSE
SILTY FINE TO COARSE SAND
(W - SAT.)

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO VERY DENSE
SILTY FINE TO COARSE SAND
(W - SAT.)

10/2006

SEE SHEET 37 FOR -Y7- PLANVIEW

-RAMP B2-

BEGIN GRADE
-RP B2- STA 10+00.00
EL= 54.50'

PI = 11+70.00
EL = 50.86'
VC = 140'
K = 211

PI = 13+20.00
EL = 48.67'
VC = 160'
K = 117

PI = 14+50.00
EL = 46.77'
VC = 90'
K = 135

PI = 16+00.00
EL = 44.94'
VC = 200'
K = 715

PI = 23+00.00
EL = 39.72'
VC = 200'
K = 162

(-)12.1326%

(-)1.4700%

(-)1.4700%

(-)1.6931%

(-)1.6931%

(-)1.0225%

(-)1.0745%

(-)1.0745%

(+)0.4917%

C-214
17+00
CL -RP 2B-

C-215
19+00
CL -RP 2B-

C-216
21+00
CL -RP 2B-

C-217
23+00
CL -RP B2-

PROPOSED GRADE LINE

EXISTING GROUND PROFILE

SOFT TO MEDIUM STIFF SILTY CLAY
(W)

SOFT TO MEDIUM STIFF SILTY CLAY
(W)

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO MEDIUM DENSE
SILTY FINE TO COARSE SAND
(W = SAT.)

VERY LOOSE TO MEDIUM DENSE
SILTY FINE TO COARSE SAND
(W = SAT.)

VERY LOOSE TO MEDIUM DENSE
SILTY FINE TO COARSE SAND
(W = SAT.)

10/2006

SEE SHEETS 14 & 15 FOR -RAMP B2- PLANVIEW

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	65

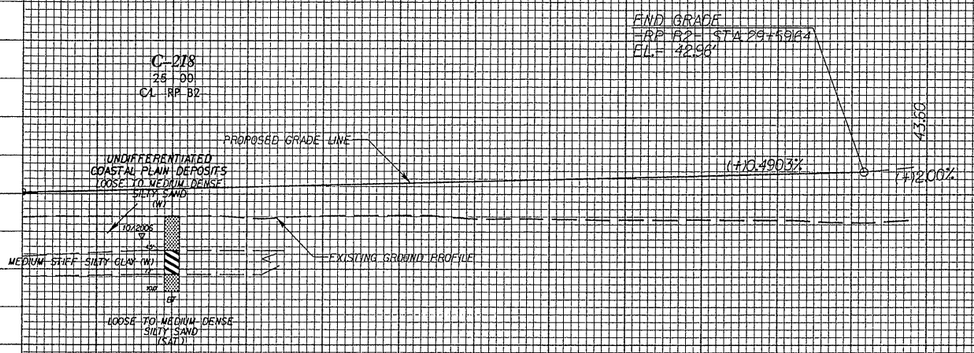
ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

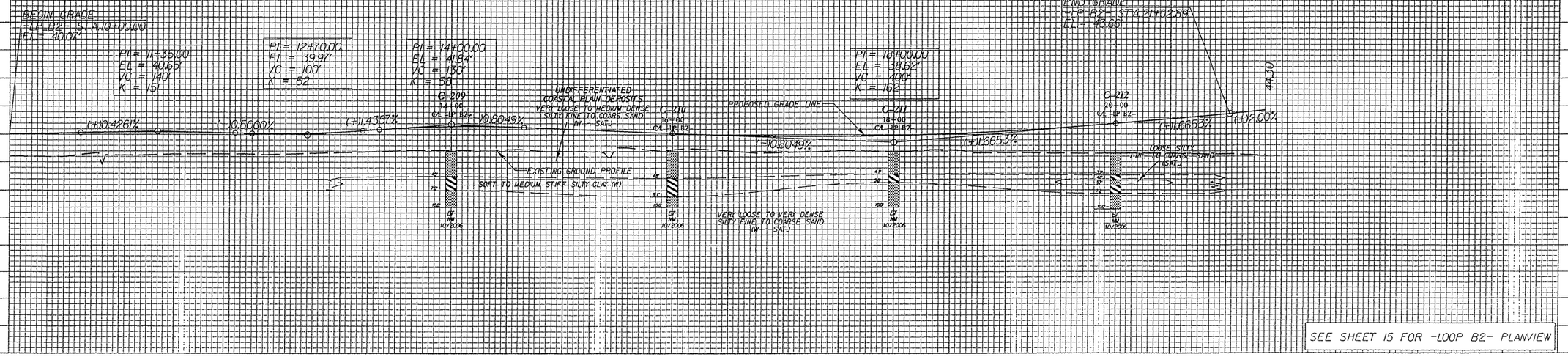
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

-RAMP B2-



SEE SHEET 15 FOR -RAMP B2- PLANVIEW

-LOOP B2-



SEE SHEET 15 FOR -LOOP B2- PLANVIEW

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	66
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

-RAMP C2-

BEGIN GRADE
-RP_C2- STA 10+00.00
EL = 15.81'

PROPOSED GRADE LINE

PI = 17+00.00
EL = 41.69'
VC = 550'
K = 98

(-)0.5888%

(+)5.0000%

PI = 22+90.00
EL = 71.19'
VC = 630'
K = 112

(+)5.0000%

(-)0.6311%

C-221 12+00 CL -RP C2-

C-222 14+00 CL -RP C2-

C-223 16+00 CL -RP C2-

C-224 18+00 CL -RP C2-

C-225 20+00 CL -RP C2-

C-226 22+00 CL -RP C2-

C-227 24+00 CL -RP C2-

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO VERY DENSE
SILTY FINE TO COARSE SAND
(W - SAT)

SOFT TO MEDIUM STIFF SILTY CLAY (W)

EXISTING GROUND PROFILE

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
LOOSE CLAYEY FINE TO COARSE SAND
(W - SAT)

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO VERY DENSE
SILTY FINE TO COARSE SAND
(W - SAT)

SOFT TO MEDIUM STIFF SILTY CLAY (W)

LOOSE TO MEDIUM DENSE
CLAYEY FINE TO COARSE SAND
WITH CLAY LAYERS
(SAT)

VERY LOOSE TO VERY DENSE
SILTY FINE TO COARSE SAND
(W - SAT)

SEE SHEET 15 FOR -RAMP C2- PLANVIEW

-RAMP C2-
-RAMP D2-

END GRADE
-RP_C2- STA 26+36.44
EL = 58.00'

PROPOSED GRADE LINE

(-)2.3829%

BEGIN GRADE
-RP_D2- STA 10+00.00
EL = 37.18'

PI = 12+00.00
EL = 38.73'
VC = 390'
K = 468

(+)0.5330%

(-)0.3000%

PROPOSED GRADE LINE

C-228 15+00 CL -RP D2-

EXISTING GROUND PROFILE

PI = 17+15.00
EL = 37.46'
VC = 460'
K = 98

(-)0.3000%

(+)4.4159%

PROPOSED GRADE LINE

C-229 17+00 CL -RP D2-

C-230 19+00 CL -RP D2-

EXISTING GROUND PROFILE

C-227 24+00 CL -RP C2-

LOOSE TO MEDIUM DENSE
CLAYEY FINE TO COARSE SAND
WITH CLAY LAYERS
(SAT)

EXISTING GROUND PROFILE

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO VERY DENSE
SILTY FINE TO COARSE SAND
(W - SAT)

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO VERY DENSE
SILTY FINE TO COARSE SAND
(W - SAT)

VERY SOFT TO SOFT
SILTY CLAY
(W)

SEE SHEET 15 FOR -RAMP C2- PLANVIEW

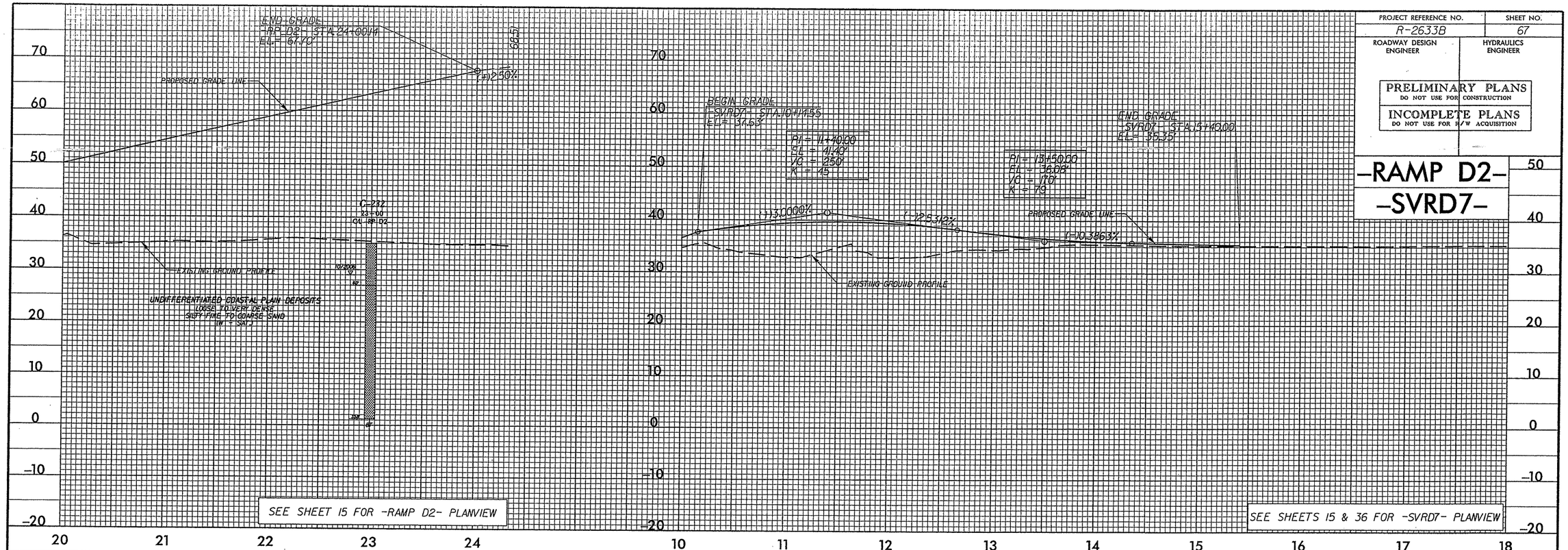
SEE SHEETS 15 & 16 FOR -RAMP D2- PLANVIEW

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	67
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

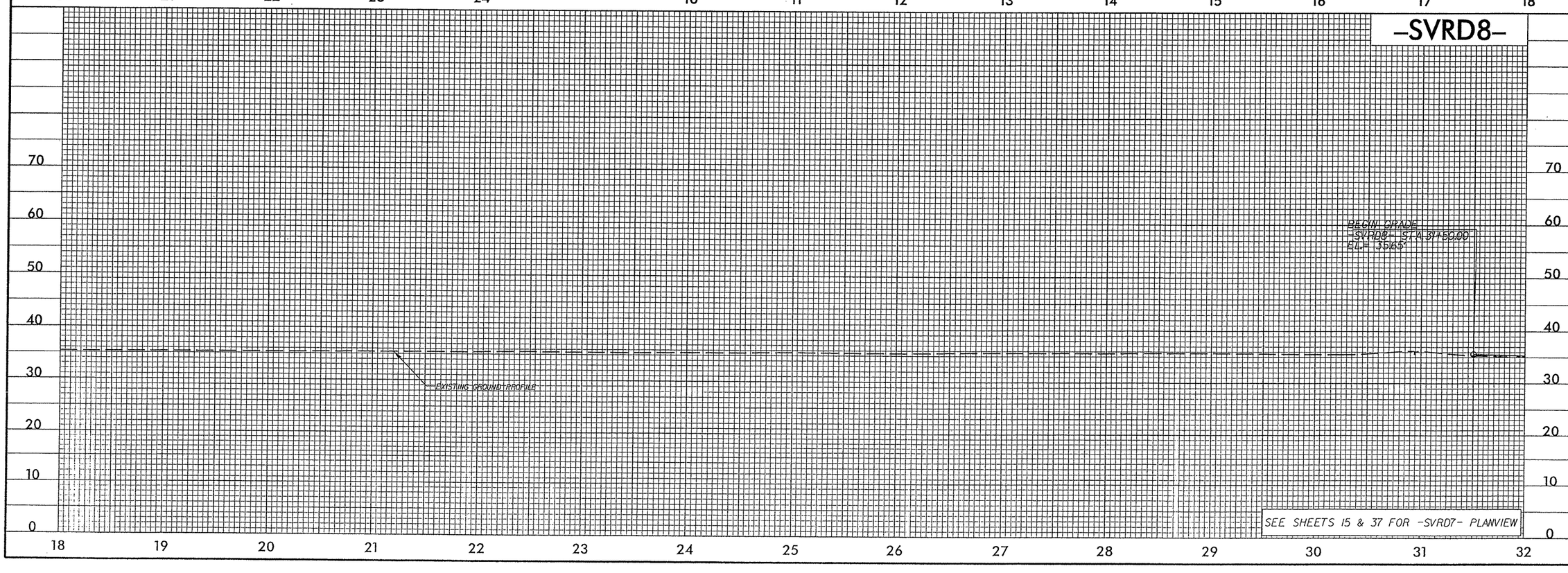
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

-RAMP D2-
-SVRD7-



-SVRD8-

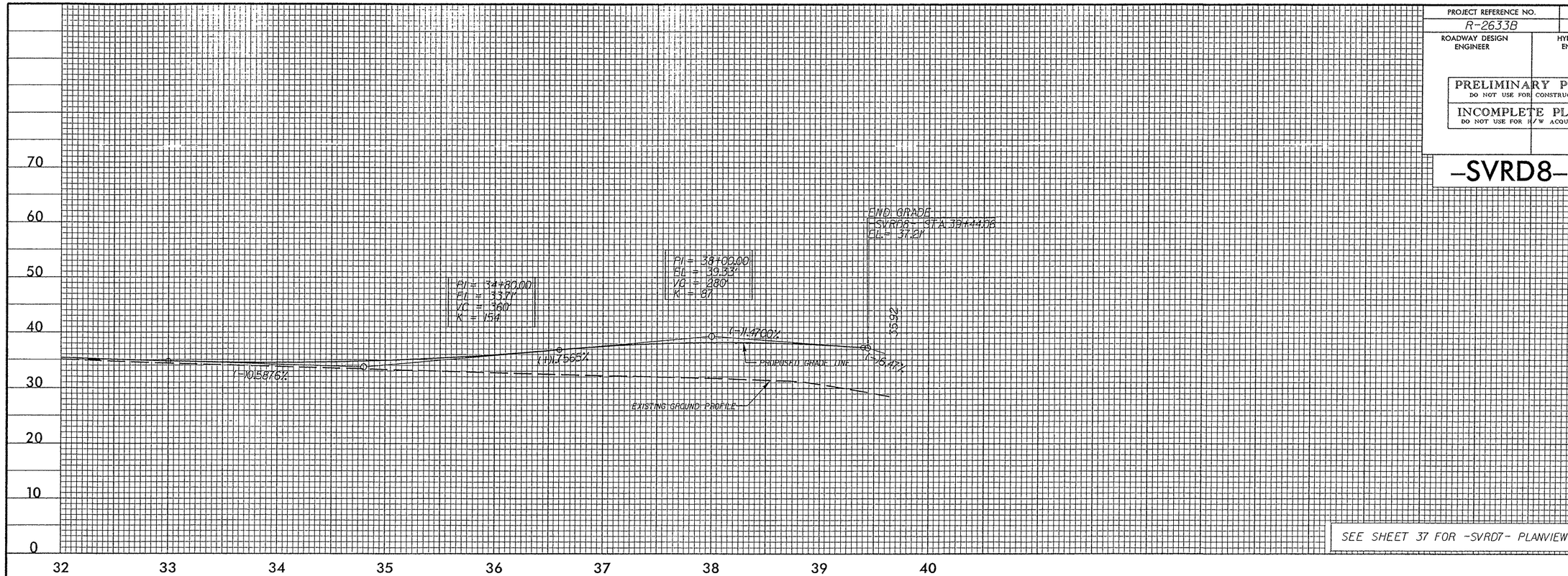


PROJECT REFERENCE NO.	SHEET NO.
R-2633B	68
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

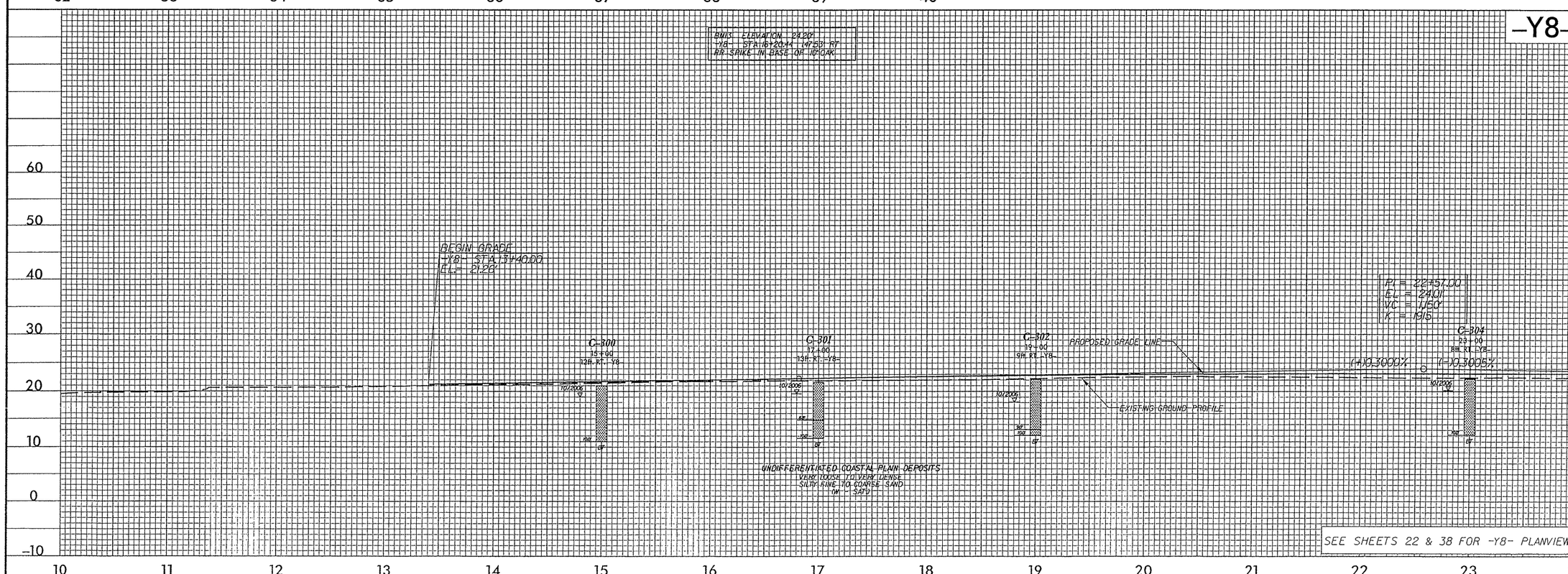
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

-SVRD8-



-Y8-



PROJECT REFERENCE NO.	SHEET NO.
R-2633B	69
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

-Y8-

BM233 ELEVATION 23.14'
-Y8- STA 37+43.14 - 14.30' LT.
RR SPIKE IN BASE OF 20" PINE

PI = 29+10.00
EL = 22.04'
VC = 140'
K = 228

PI = 33+10.00
EL = 23.30'
VC = 200'
K = 917

PI = 38+10.00
EL = 21.80'
VC = 140'
K = 233

C-305
25+00
66ft LT. -Y8-

C-306
27+00
48ft LT. -Y8-

C-307
31+00
48ft LT. -Y8-

C-308
33+00
48ft LT. -Y8-

C-309
36+00
48ft LT. -Y8-

C-310
38+00
45ft LT. -Y8-

(+)0.3005%

(+)0.3140%

PROPOSED GRADE LINE

EXISTING GROUND PROFILE

(-)0.3000%

(-)0.3000%

10/2006

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO VERY DENSE
SILTY FINE TO COARSE SAND
(W = SAT.)

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO VERY DENSE
SILTY FINE TO COARSE SAND
(W = SAT.)

SEE SHEETS 22 & 39 FOR -Y8- PLANVIEW

-Y8-

BM231 ELEVATION 11.46'
-Y8- STA 41+12.21 - 28.51' LT.
RR SPIKE IN BASE OF 18" PINE

PI = 38+10.00
EL = 21.80'
VC = 140'
K = 233

PI = 39+60.00
EL = 22.25'
VC = 160'
K = 116

PI = 41+50.00
EL = 20.26'
VC = 200'
K = 6999

PI = 43+50.00
EL = 18.16'
VC = 200'
K = 267

PI = 51+80.00
EL = 15.64'
VC = 270'
K = 104

C-310
38+00
45ft LT. -Y8-

C-311
40+00
45ft LT. -Y8-

C-312
42+00
45ft LT. -Y8-

C-316
50+40
CL -Y8-

C-317
52+00
CL -Y8

BEGIN BRIDGE
-Y8- STA 47+20.00

END BRIDGE
-Y8- STA 50+40.00

(+)0.3000%

(-)1.0789%

(-)1.0500%

(-)0.3000%

(-)0.3000%

(+)1.0883%

PROPOSED GRADE LINE

EXISTING GROUND PROFILE

STIFF SILTY CLAY (W)

10/2006

11/2006

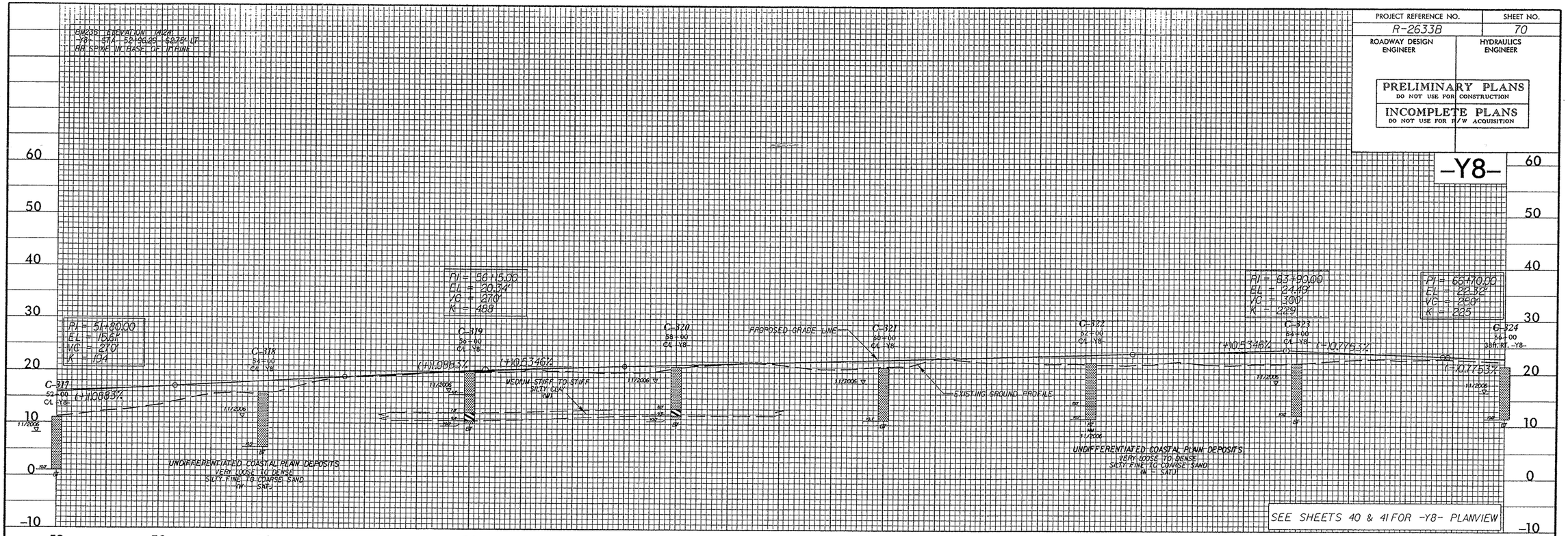
UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO VERY DENSE
SILTY FINE TO COARSE SAND
(W = SAT.)

SEE SHEETS 39 & 40 FOR -Y8- PLANVIEW

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	70
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION



PROJECT REFERENCE NO.	SHEET NO.
R-2633B	71

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

-RAMP A3-

BEGIN GRADE
-RP-A3- STA 10+50.00
EL= 24.67'

PI = 11+43.00
EL = 24.53'
VC = 225'
K = 176

(-)0.0944%

(+)1.1867%

C-267
11+00
C4 -RP-A3-

PI = 15+00.00
EL = 28.77'
VC = 380'
K = 429

(+)1.1867%

(+)0.3000%

PROPOSED GRADE LINE

C-268
17+00
C4 -RP-A3-

SOFT TO MEDIUM STIFF SILTY CLAY (M)

EXISTING GROUND PROFILE

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO DENSE
SILTY FINE TO COARSE SAND
(M - SAT.)

PI = 18+70.00
EL = 29.88'
VC = 360'
K = 599

(+)0.3000%

(-)0.3010%

C-269
19+00
C4 -RP-A3-

PROPOSED GRADE LINE

C-270
21+00
C4 -RP-A3-

EXISTING GROUND PROFILE

MEDIUM STIFF SILTY CLAY (M)

C-271
23+00
C4 -RP-A3-

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO DENSE
SILTY FINE TO COARSE SAND
(M - SAT.)

SEE SHEETS 22 & 23 FOR -RAMP A3- PLANVIEW

-RAMP A3-

PI = 26+10.00
EL = 27.95'
VC = 200'
K = 534

(-)0.3010%

(-)0.9000%

C-273
27+00
C4 -RP-A3-

PROPOSED GRADE LINE

C-274
29+00
C4 -RP-A3-

EXISTING GROUND PROFILE

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO MEDIUM DENSE
SILTY FINE TO COARSE SAND
(M - SAT.)

END GRADE
-RP-A3- STA 31+22.87
EL = 22.43'

23.00'

(+)2.00%

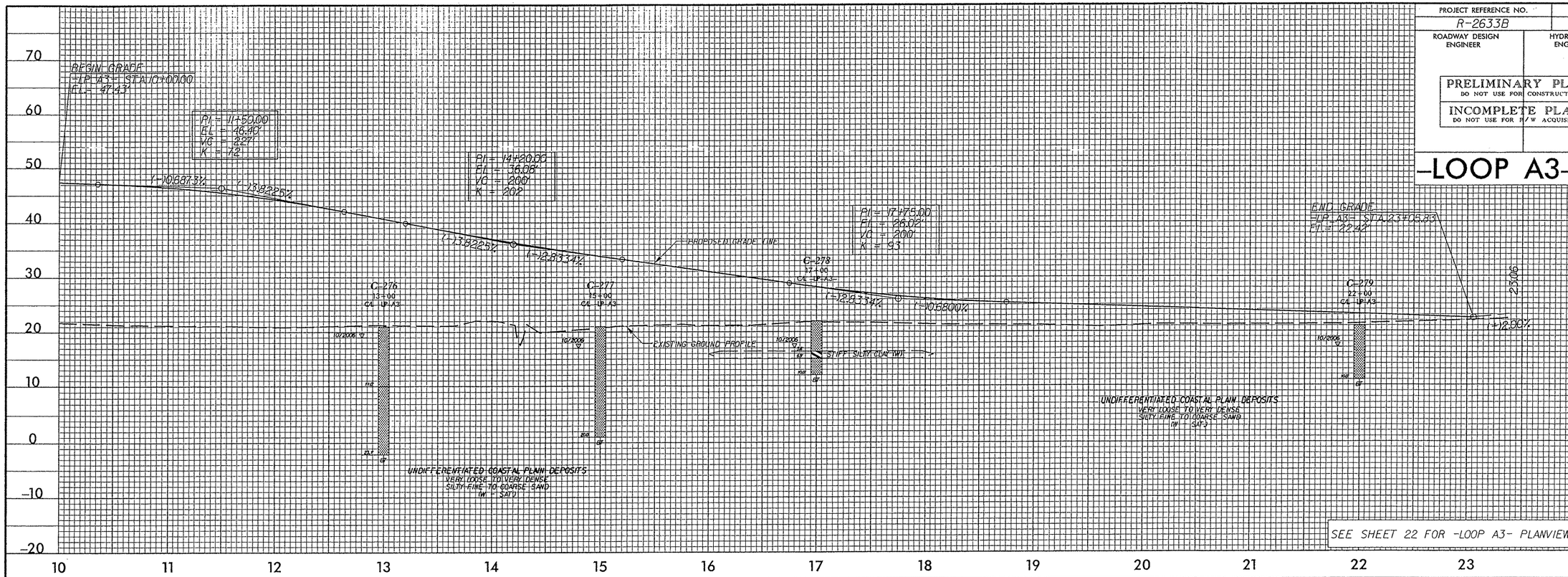
SEE SHEET 22 FOR -RAMP A3- PLANVIEW

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	72
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

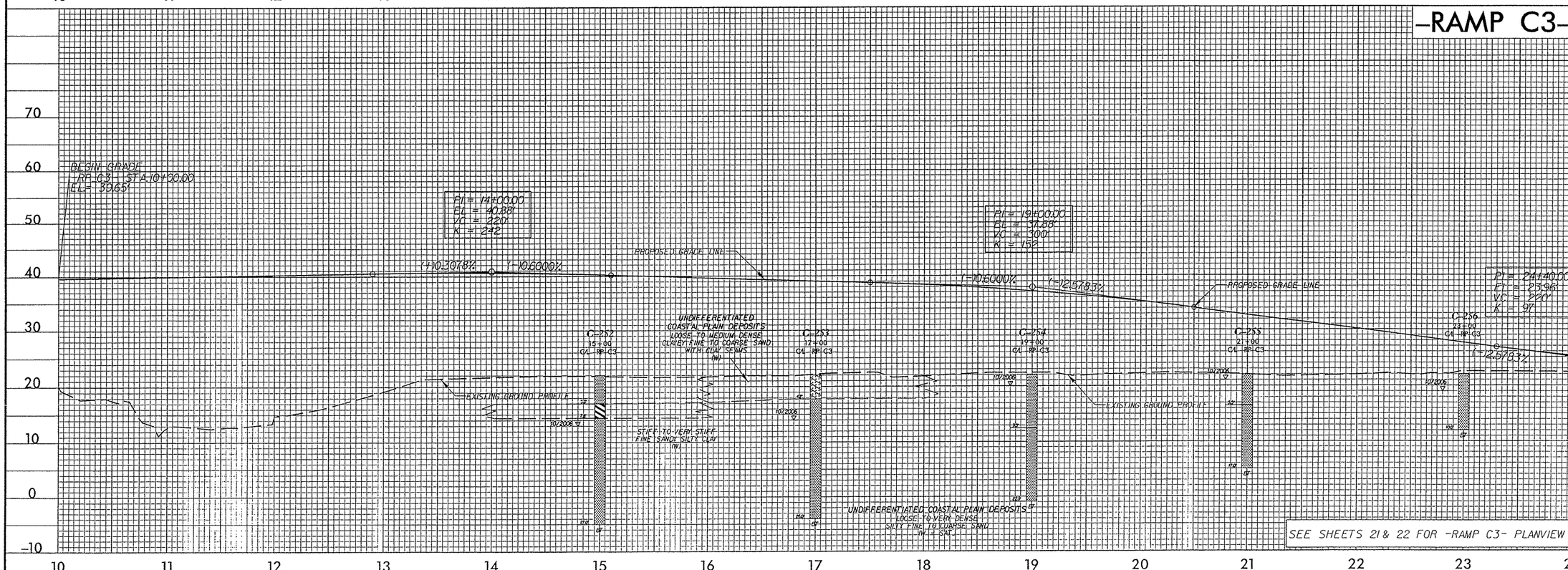
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

-LOOP A3-



-RAMP C3-

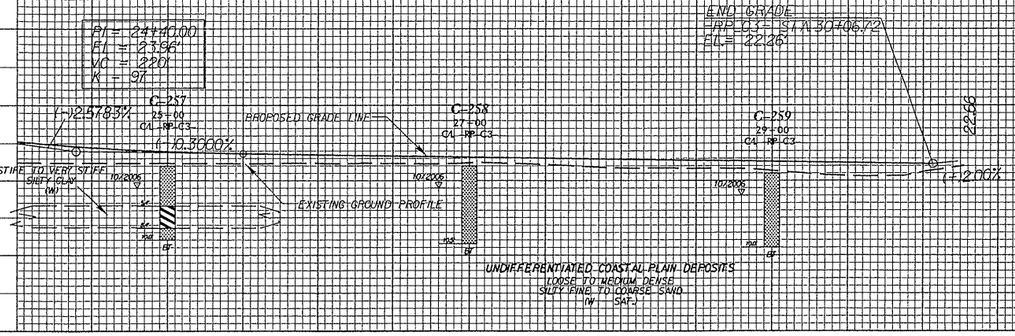


PROJECT REFERENCE NO.	SHEET NO.
R-2633B	73
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

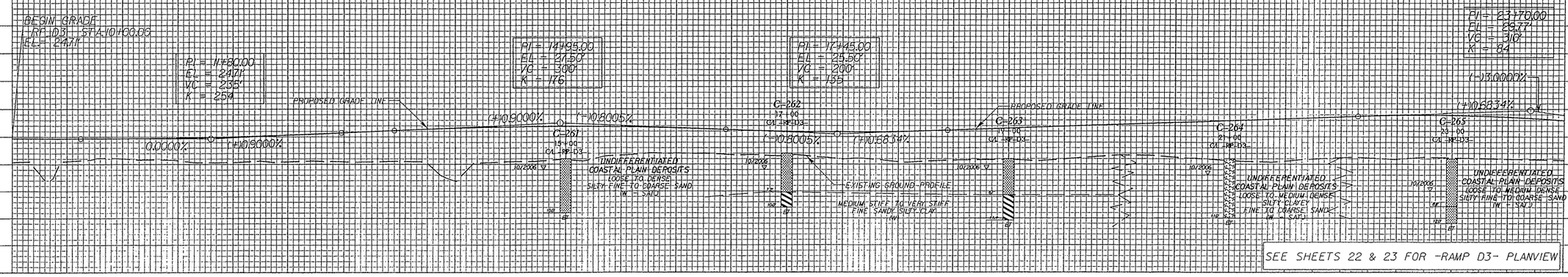
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

-RAMP C3-



SEE SHEET 22 FOR -RAMP C3- PLANVIEW

-RAMP D3-



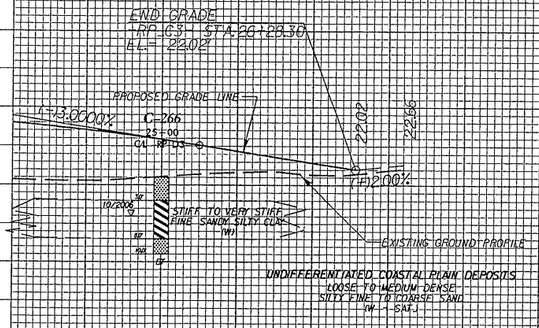
SEE SHEETS 22 & 23 FOR -RAMP D3- PLANVIEW

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	74
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

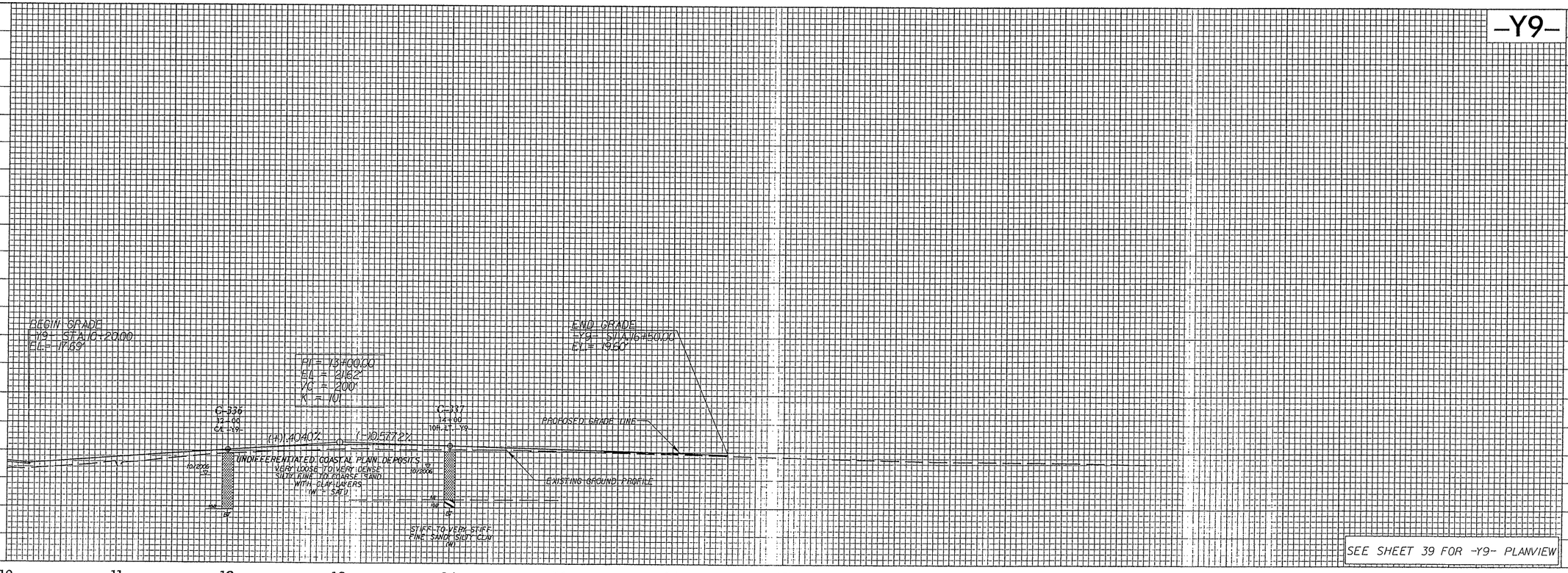
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

-RAMP D3-



SEE SHEET 22 FOR -RAMP D3- PLANVIEW

-Y9-



SEE SHEET 39 FOR -Y9- PLANVIEW

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	75
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

-SVRD10-

BEGIN GRADE
-SVRD10- STA.10+21.00
EL.= 11.67'

PI = 16+00.00
EL = 24.02'
VC = 200'
K = 112

END GRADE
-SVRD10- STA.20+67.67
EL.= 22.58'

PI = 19+00.00
EL = 21.96'
VC = 100'
K = 90

C-339
12+00
CL -SVRD10-

C-340
14+00
CL -SVRD10-

C-341
16+00
CL -SVRD10-

C-342
18+00
CL -SVRD10-

C-343
20+00
CL -SVRD10-

PROPOSED GRADE LINE

EXISTING GROUND PROFILE

(+)1.0994%

(-)1.0584%

(-)0.6845%

(+)0.4243%

MEDIUM DENSE CLAYEY FINE TO COARSE SAND (W - SAT.)

STIFF TO HARD FINE SANDY SILTY CLAY (W)

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO VERY DENSE
CLAYEY SILTY FINE TO COARSE SAND
WITH CLAY LAYERS
(W - SAT.)

SEE SHEETS 22 & 39 FOR -SVRD8- PLANVIEW

-SVRD9-

BEGIN GRADE
-SVRD9- STA.10+20.00
EL.= 22.43'

END GRADE
-SVRD9- STA.13+60.00
EL.= 23.42'

C-344
11+00
CL -SVRD9-

C-345
13+00
CL -SVRD9-

(+)0.3000%

MEDIUM STIFF TO STIFF SILTY CLAY (W)

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
LOOSE TO VERY DENSE
SILTY FINE TO COARSE SAND
(W - SAT.)

SEE SHEET 38 FOR -SVRD9- PLANVIEW

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	76

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

-Y8A-

SEE SHEET 38A FOR -Y8A- PLANVIEW

-Y8B-

SEE SHEET 38A FOR -Y8A- PLANVIEW

SEE SHEETS 22 & 38A FOR -Y8B- PLANVIEW

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	77
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

-RAMP B4-

BEGIN GRADE
-RP_B4- STA.10+00.00
EL.= 51.04'

PI = 12+45.00
EL = 53.61'
VC = 420'
K = 67.8

PI = 15+00.00
EL = 54.80'
VC = 90'
K = 10.9

BEGIN BRIDGE
-RP_B4- STA.20+54.95

PI = 21+20.00
EL = 62.73'
VC = 470'
K = 84

(+)1.044%
(-)0.4546%
(-)0.4546%
(+)2.838%
(+)2.838%
(+)2.942%

PROPOSED GRADE LINE

END BRIDGE
-RP_B4- STA.22+40.27

C-290
14+00
C/L -RP_B4-

C-291
16+00
C/L -RP_B4-

C-292
18+00
C/L -RP_B4-

C-293
20+50
C/L -RP_B4-

C-294
22+10
C/L -RP_B4-

9/2006

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO VERY DENSE
SILTY FINE TO COARSE SAND
(W - SM)

EXISTING GROUND PROFILE

MEDIUM STIFF SILTY CLAY (W)

STIFF SILTY CLAY (W)

SOFT TO STIFF SILTY CLAY (W)

EXIST. RR

SEE SHEETS 32 & 33 FOR -RAMP B4- PLANVIEW

-RAMP B4-

PI = 29+23.68
EL = 28.28'
VC = 270'
K = 98

END GRADE
-RP_B4- STA.33+41.66
EL = 25.16'

PI = 32+35.00
EL = 23.41'
VC = 120'
K = 91

(-)1.294%
(-)1.545%
(-)1.545%
(-)0.303%
(+)2.000%
2.376

C-295
25+00
C/L -RP_B4-

C-296
27+00
C/L -RP_B4-

C-297
29+00
C/L -RP_B4-

C-298
31+19
21ft. LT. -RP_B4-

C-299
33+00
C/L -RP_B4-

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
LOOSE TO VERY DENSE
SILTY FINE TO COARSE SAND
(W - SM)

EXISTING GROUND PROFILE

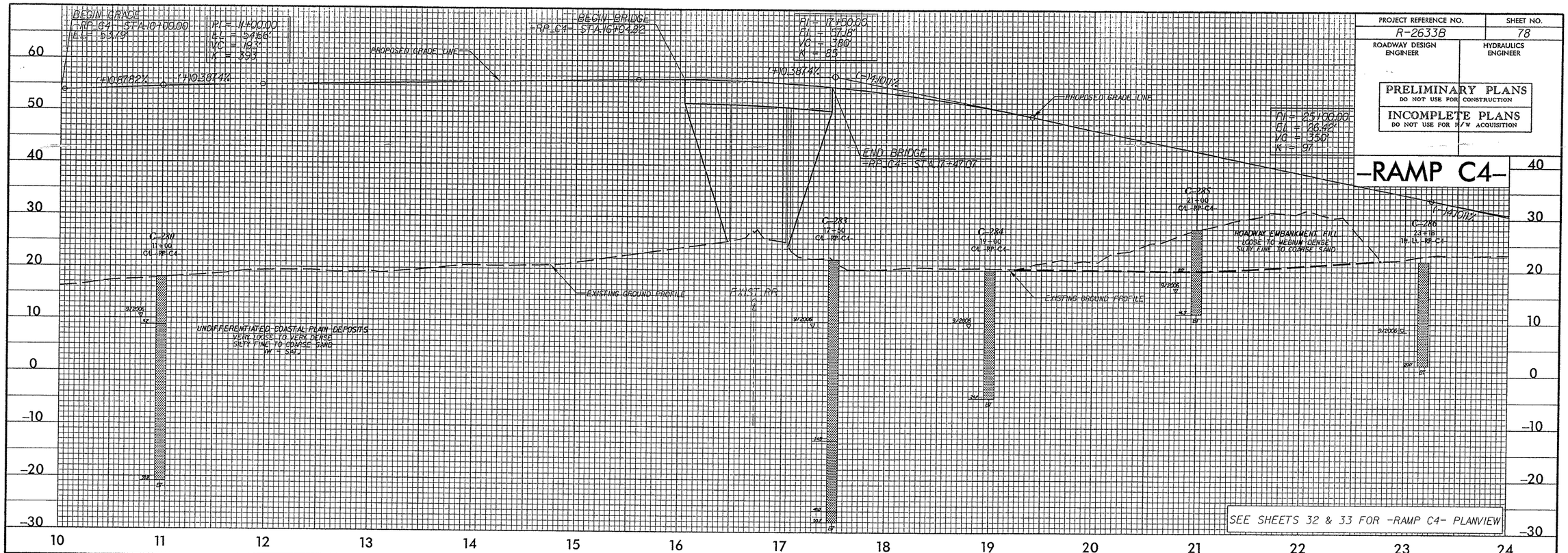
MEDIUM STIFF SILTY CLAY (W)

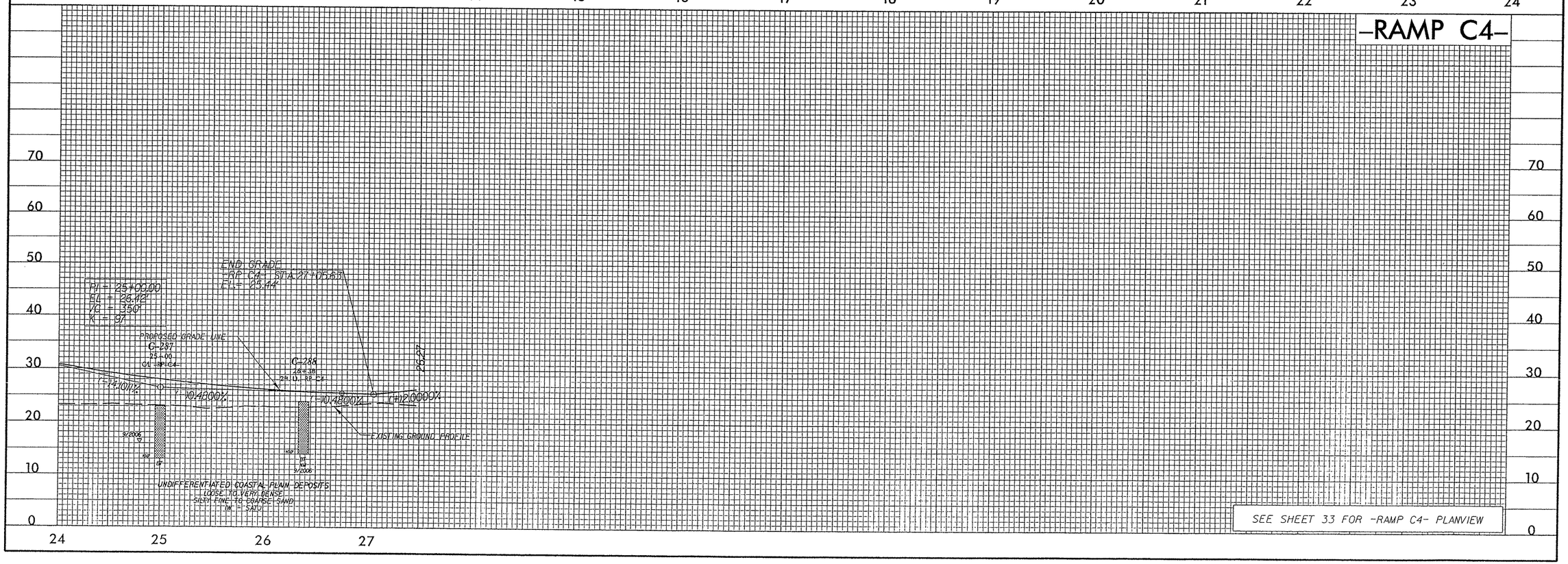
SEE SHEET 33 FOR -RAMP B4- PLANVIEW

PROJECT REFERENCE NO.	SHEET NO.
R-2633B	78
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION





PROJECT REFERENCE NO.	SHEET NO.
R-2633B	79
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

-Y1-

BEGIN GRADE
-Y1- STA 34+77.88
EL= 21.68'

PI = 37+40.15
EL = 22.77'
VC = 13'
K = 723

PI = 41+50.25
EL = 23.74'
VC = 13'
K = 109

PI = 46+25.97
EL = 25.43'
VC = 15'
K = 2298

PROPOSED GRADE LINE

(+)0.4176%

(+)0.2360%

(-)0.2360%

(-)0.3544%

(+)0.3544%

(+)0.2665%

EXISTING GROUND PROFILE

SEE SHEET 33 FOR -Y1- PLANVIEW

-Y1-

END GRADE
-Y1- STA 56+11.79
EL = 27.98'

PI = 52+49.33
EL = 27.09'
VC = 13'
K = 1788

PROPOSED GRADE LINE

(-)0.2665%

(+)0.5399%

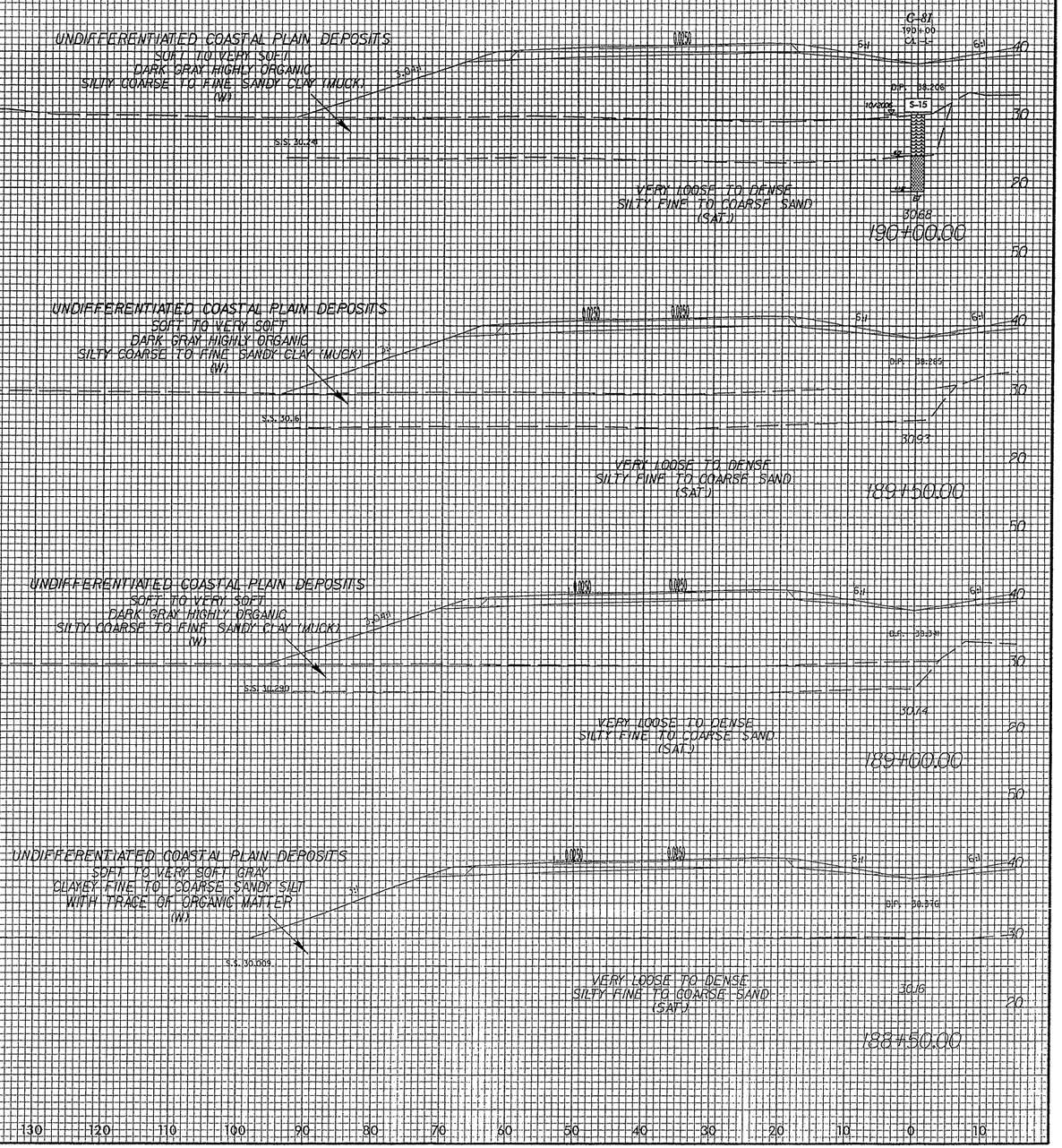
EXISTING GROUND PROFILE

SEE SHEET 33 FOR -Y1- PLANVIEW

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2633B	80

SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	AASHTO CLASS.	LL	PI	% PASSING (SIEVES)				% PASSING (SIEVES)				% MOI.	% ORG.
								C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
S-15	190+00	0 ft CL	-L-	0.0 - 1.0	A-7-5 (0)	66	19	22	27	35	16	88	77	68	48	219.6	25.2



0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2633B	81

290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10

50 40 30 20

S.S. 32.48

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO VERY DENSE
SILTY FINE TO COARSE SAND
(W = SAT.)

32.21
192+00.00

S.S. 32.332

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO VERY DENSE
SILTY FINE TO COARSE SAND
(W = SAT.)

32.01
191+50.00

S.S. 32.051

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE TO VERY DENSE
SILTY FINE TO COARSE SAND
(W = SAT.)

31.73
191+00.00

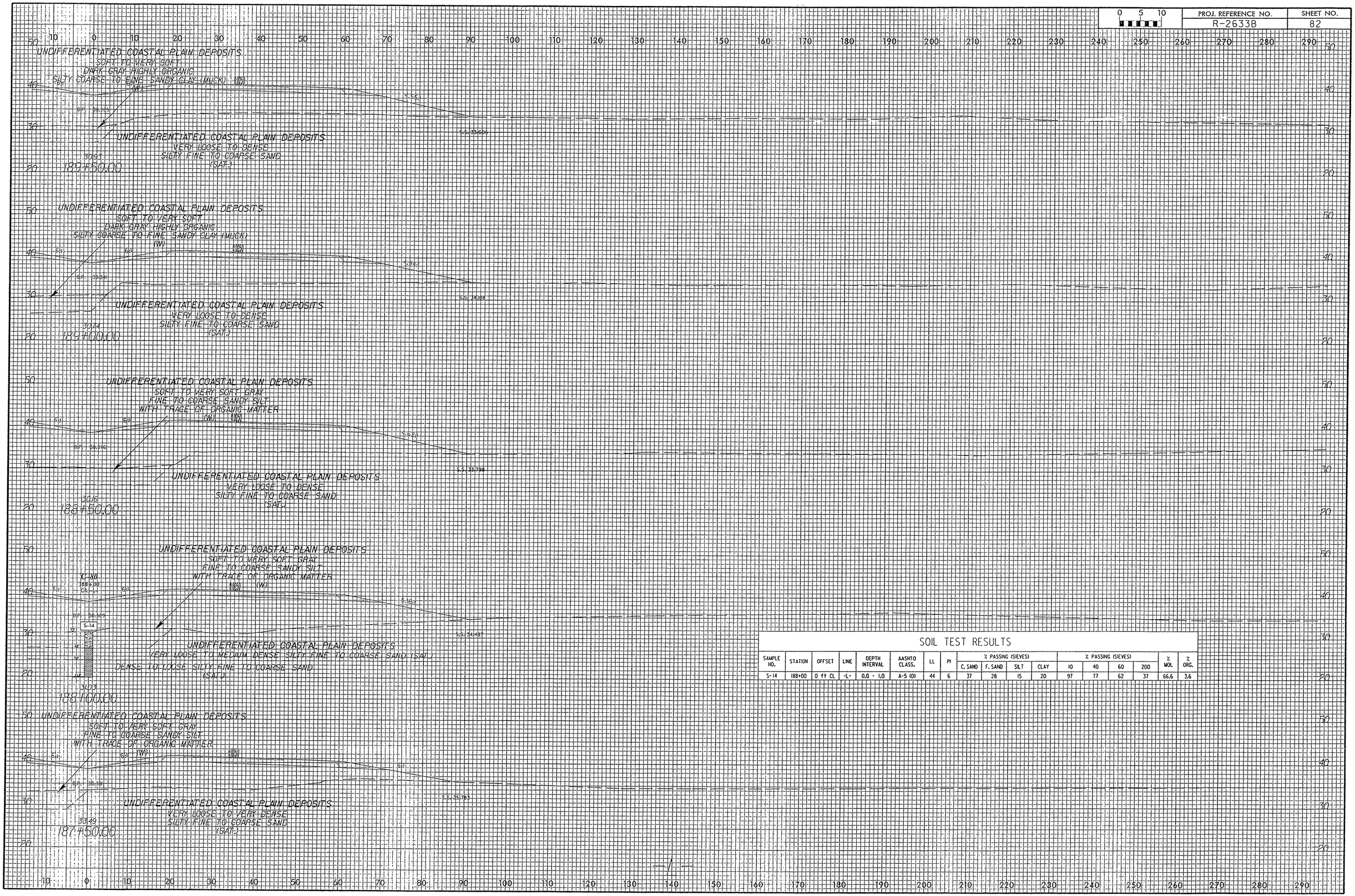
UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
SOFT TO VERY SOFT
DARK GRAY HIGHLY ORGANIC
SILTY COARSE TO FINE SANDY CLAY (MUCKY)
(W)

S.S. 34.85

VERY LOOSE TO DENSE
SILTY FINE TO COARSE SAND
(SAT.)

30.77
190+50.00

PROJ. REFERENCE NO.	SHEET NO.
R-2633B	82



SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	AASHTO CLASS.	LL	PI	% PASSING (SIEVES) C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	60	200	% MOI.	% ORG.
S-14	188+00	0 ft CL	-L-	0.0 - 1.0	A-5 (0)	44	6	37	28	15	20	97	77	62	37	66.6	3.6

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2633B	83

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY LOOSE DARK GRAY HIGHLY ORGANIC SILTY COARSE TO FINE SAND (MUCK) (SAT.)

28.10
201+00.00
VERY LOOSE TO VERY DENSE SILTY FINE TO COARSE SAND (SAT.)

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY SOFT DARK GRAY CLAYEY FINE TO COARSE SANDY SILT WITH LITTLE ORGANIC MATTER (W)

28.10
200+50.00
VERY LOOSE TO VERY DENSE SILTY FINE TO COARSE SAND (W - SAT.)

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY SOFT DARK GRAY CLAYEY FINE TO COARSE SANDY SILT WITH LITTLE ORGANIC MATTER (W)

C-86
200+00
CL

VERY LOOSE TO VERY DENSE SILTY FINE TO COARSE SAND (W - SAT.)

28.25
200+00.00

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY SOFT DARK GRAY CLAYEY FINE TO COARSE SANDY SILT WITH LITTLE ORGANIC MATTER (W)

28.31
199+50.00
VERY LOOSE TO VERY DENSE SILTY FINE TO COARSE SAND (W - SAT.)

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS
VERY SOFT DARK GRAY CLAYEY FINE TO COARSE SANDY SILT WITH LITTLE ORGANIC MATTER (W)

28.34
199+00.00
VERY LOOSE TO VERY DENSE SILTY FINE TO COARSE SAND (W - SAT.)

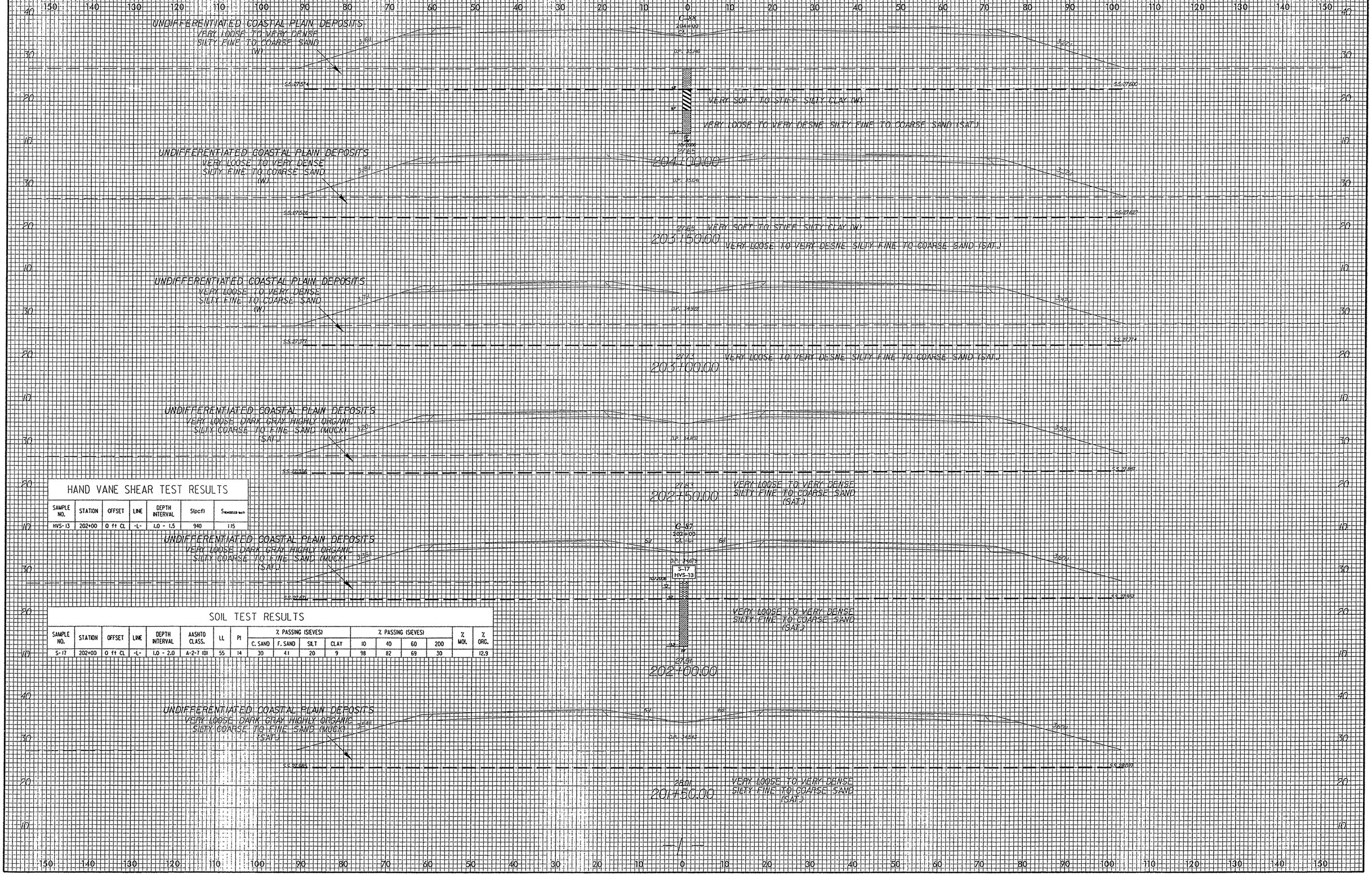
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2633B	84

HAND VANE SHEAR TEST RESULTS

SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	S(pcf)	$S_{REMOLDED}$ (pcf)
HVS-13	202+00	0 ft CL	-L-	1.0 - 1.5	940	115

SOIL TEST RESULTS

SAMPLE NO.	STATION	OFFSET	LINE	DEPTH INTERVAL	AASHTO CLASS.	LL	PI	% PASSING (SIEVES)				% PASSING (SIEVES)				% MOI.	% ORG.
								C. SAND	F. SAND	SILT	CLAY	10	40	60	200		
S-17	202+00	0 ft CL	-L-	1.0 - 2.0	A-2-7 (0)	55	14	30	41	20	9	98	82	69	30		12.9



Cone Penetration Testing[1]

The cone penetration test (CPT) consists of hydraulically pushing a metal cone of specific dimensions into the ground. The CPT borings were performed using an integrated electronic cone system. The cone method used was designed in accordance with ASTM D 3341-94 having a tip area of 10 cm^2 and a sleeve friction area of 150 cm^2. The peizometer element consists of a 5 mm plastic porous element located immediately behind the cone tip. The cone utilized during this exploration is capable of measuring tip resistance, sleeve friction and dynamic pore pressures. Soil resistance at the cone tip and sleeve are measured by electronic sensors. The cone resistance, q_c, is the total force acting on the cone divided by the projected area of the cone; and the side friction, f_{sc}, is the total frictional force acting on the sleeve divided by its surface area. Data is typically expressed in terms of the friction ratio, R_f (f_{sc}/q_c x 100). Tip and sleeve values can be used to estimate soil properties and soil classification. Additional sensors can measure changes in pore pressure within the soil caused by the penetration of the cone. Pore pressures dissipation measurements were conducted at internals, which were noted to have an increase in the in-situ pore pressure during the real time soil property measurements of the cone.

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[1] Jefferies, M. G. and Davies M. P. (1993), "Use of CPT to Estimate Equivalent SPT N_{60}", Geotechnical Testing Journal , Philadelphia, Pennsylvania.

Robertson, P. K. (1989) "Soil Classification using Cone Penetration Test", Canadian Geotechnical Journal, Edmonton, Alberta.

Robertson, P. K. (1998) "Cone Penetration Testing for Geotechnical and Environmental Site Investigation", ConeTec Inc.

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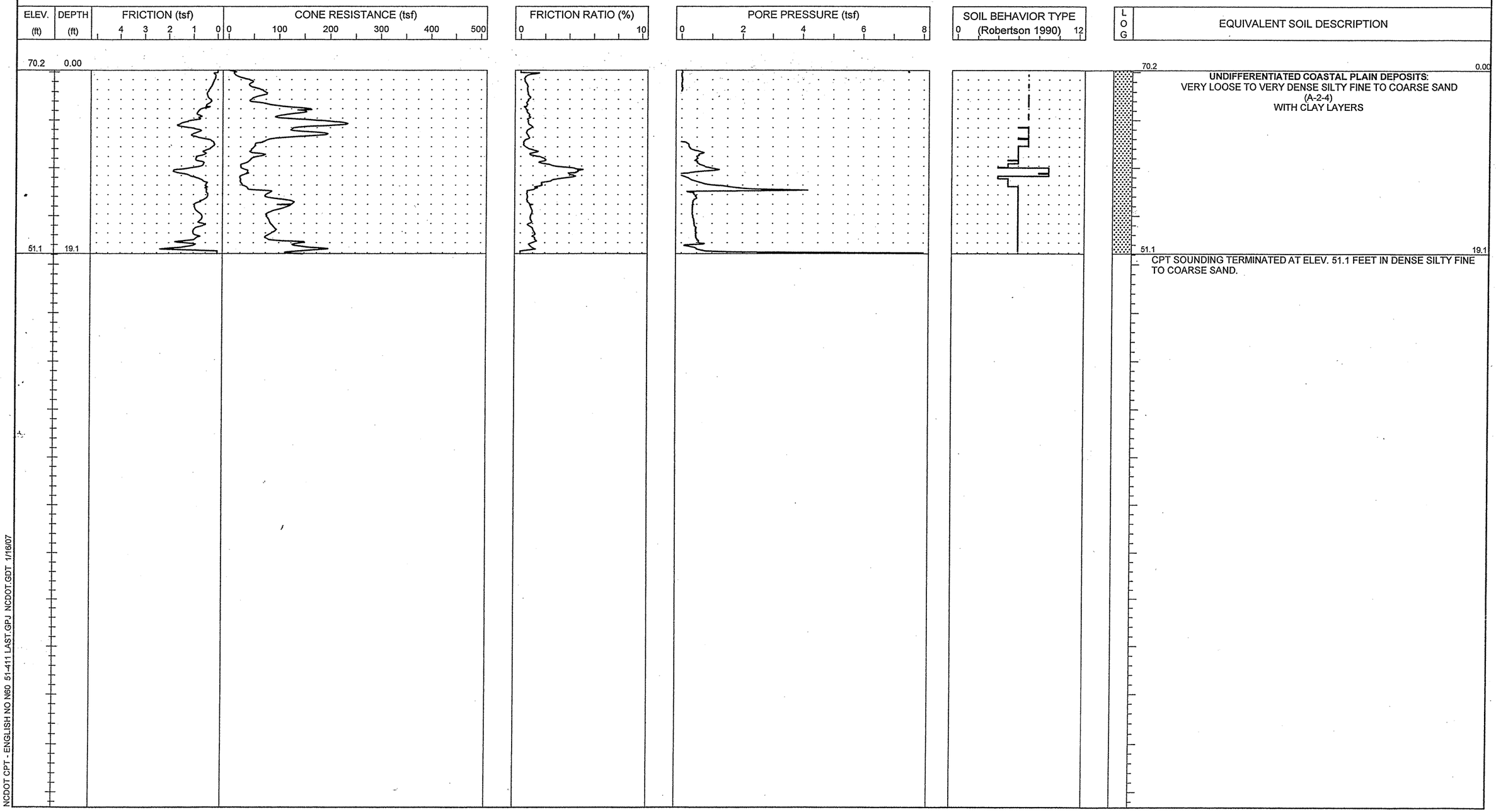
BORING LOG

PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 19.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C- 1	**BORING LOCATION** 24+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** N/M	**DATE STARTED** 11/9/06	**COMPLETED** 11/9/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 70.2 ft	**NORTHING** 184,829.9	**EASTING** 2,278,184.9		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



NCDOT CPT - ENGLISH NO N60 51-411 LAST.GPJ NCDOT.GDT 1/16/07

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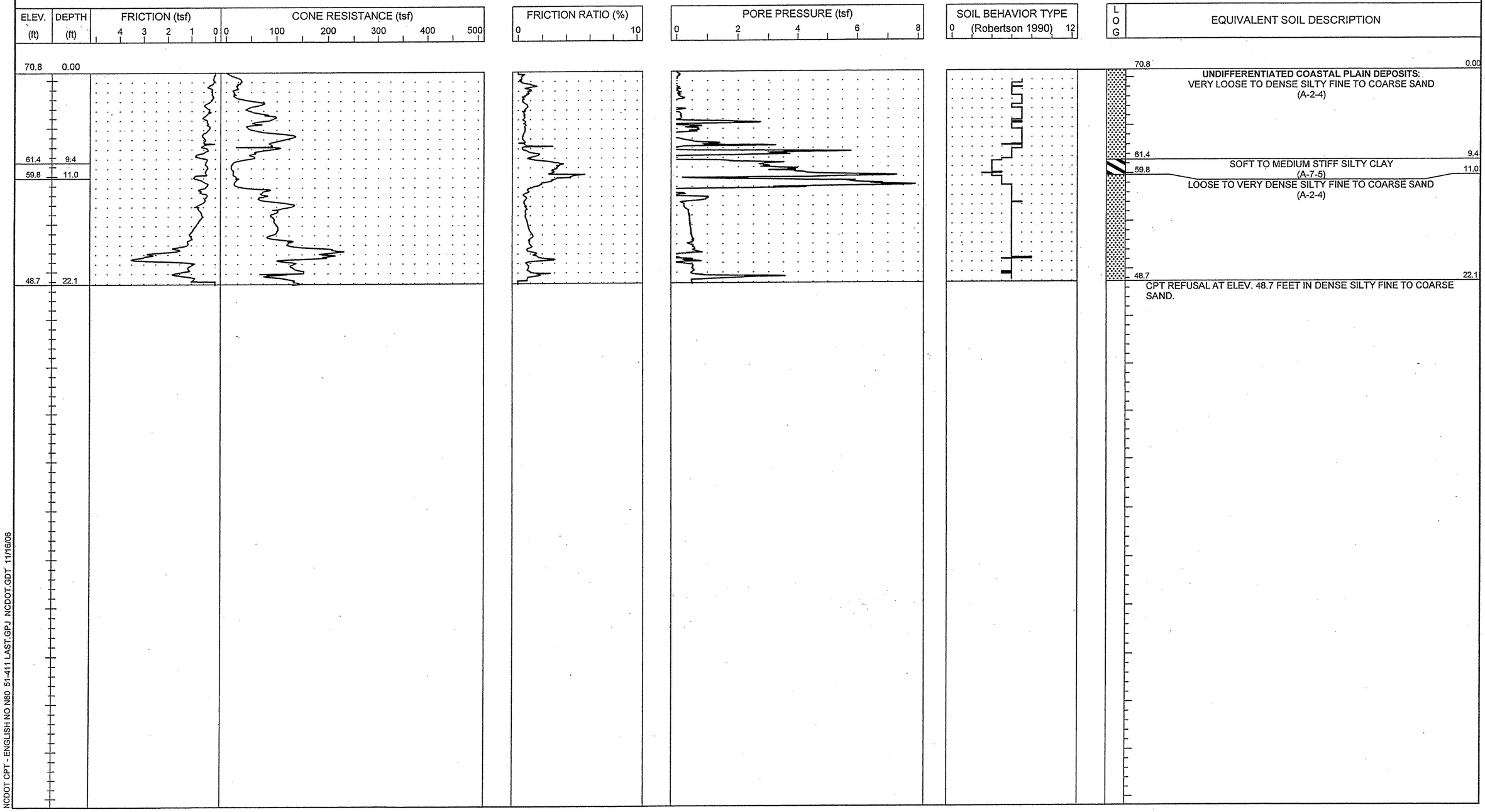
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 22.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C- 2	**BORING LOCATION** 26+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** N/M	**DATE STARTED** 11/9/06	**COMPLETED** 11/9/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 70.8 ft	**NORTHING** 185,026.7	**EASTING** 2,278,149.1		**24 HR.** N/M	**DRILLER:** A. MARTIN	**TECHNICIAN** J. WALKER	



L O G

EQUIVALENT SOIL DESCRIPTION

70.8 — 0.00

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS:
VERY LOOSE TO DENSE SILTY FINE TO COARSE SAND
(A-2-4)

61.4 — 9.4

SOFT TO MEDIUM STIFF SILTY CLAY
(A-7-5)

59.8 — 11.0

LOOSE TO VERY DENSE SILTY FINE TO COARSE SAND
(A-2-4)

48.7 — 22.1

CPT REFUSAL AT ELEV. 48.7 FEET IN DENSE SILTY FINE TO COARSE SAND.

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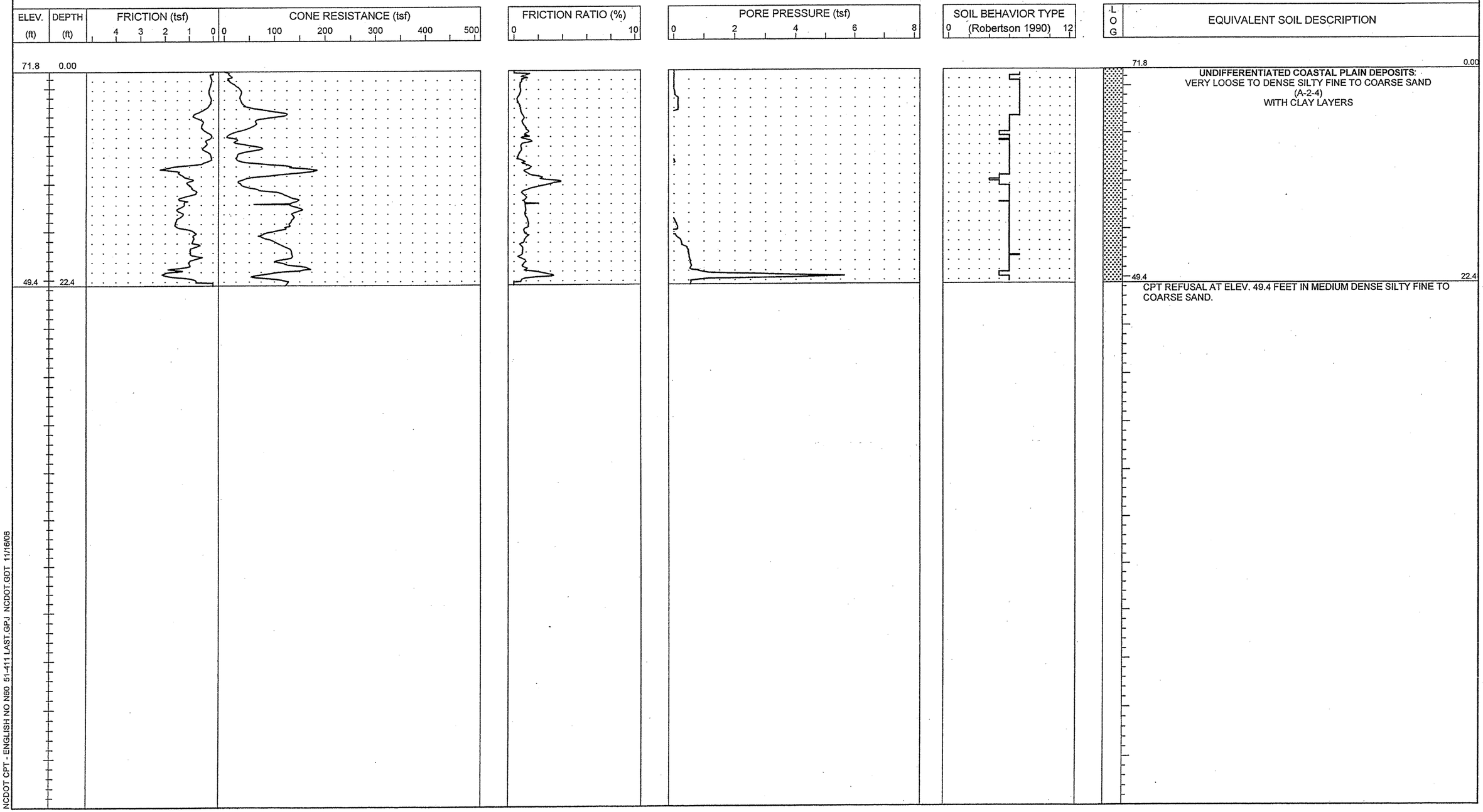
BORING LOG

PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 22.4 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C- 3	**BORING LOCATION** 28+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** N/M	**DATE STARTED** 11/9/06	**COMPLETED** 11/9/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 71.8 ft	**NORTHING** 185,224.2	**EASTING** 2,278,117.3		**24 HR.** N/M	**DRILLER:** A. MARTIN	**TECHNICIAN** J. WALKER	



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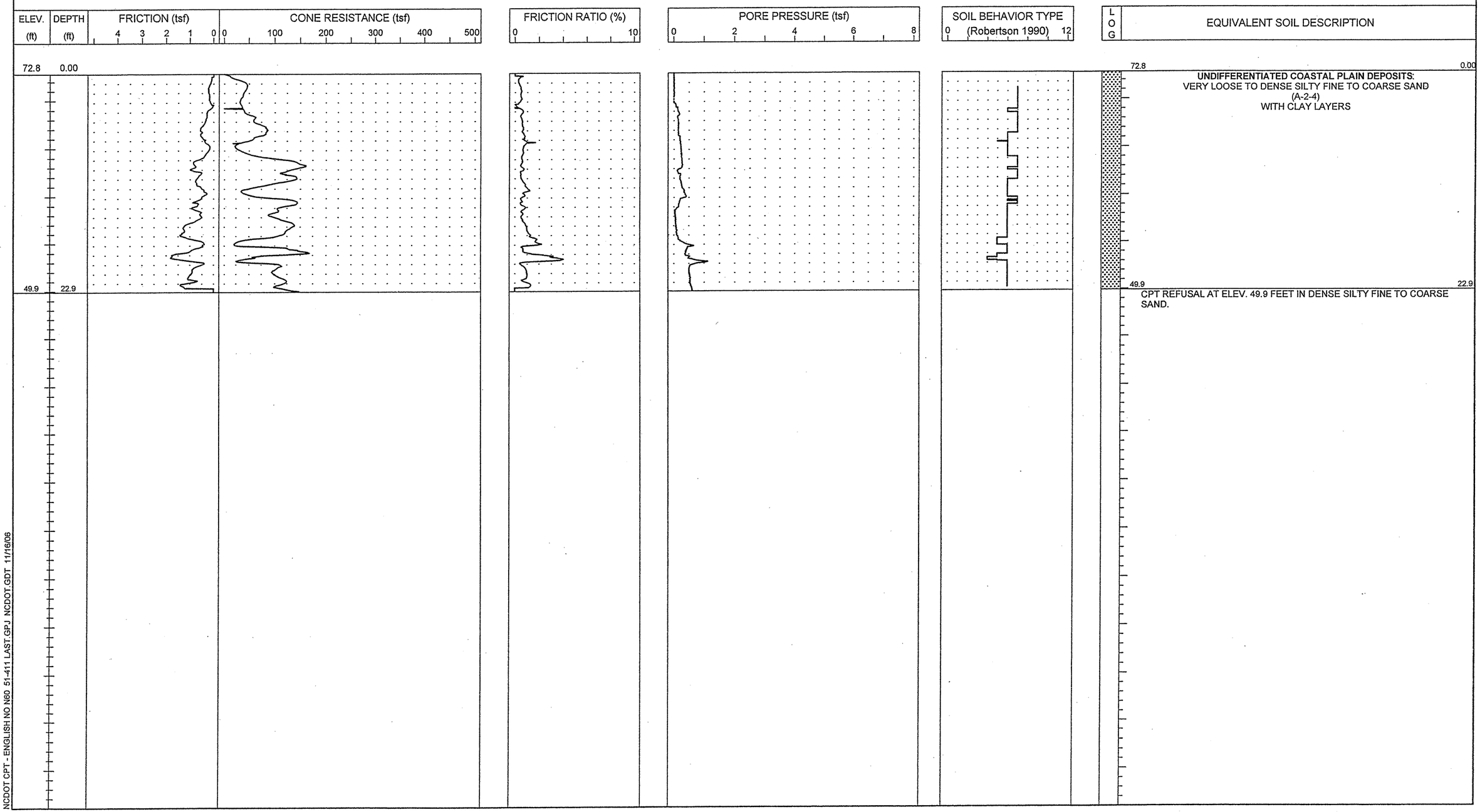
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 22.9 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C- 4	**BORING LOCATION** 30+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** N/M	**DATE STARTED** 11/8/06	**COMPLETED** 11/8/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 72.8 ft	**NORTHING** 185,422.2	**EASTING** 2,278,089.5		**24 HR.** N/M	**DRILLER:** A. MARTIN	**TECHNICIAN** J. WALKER	



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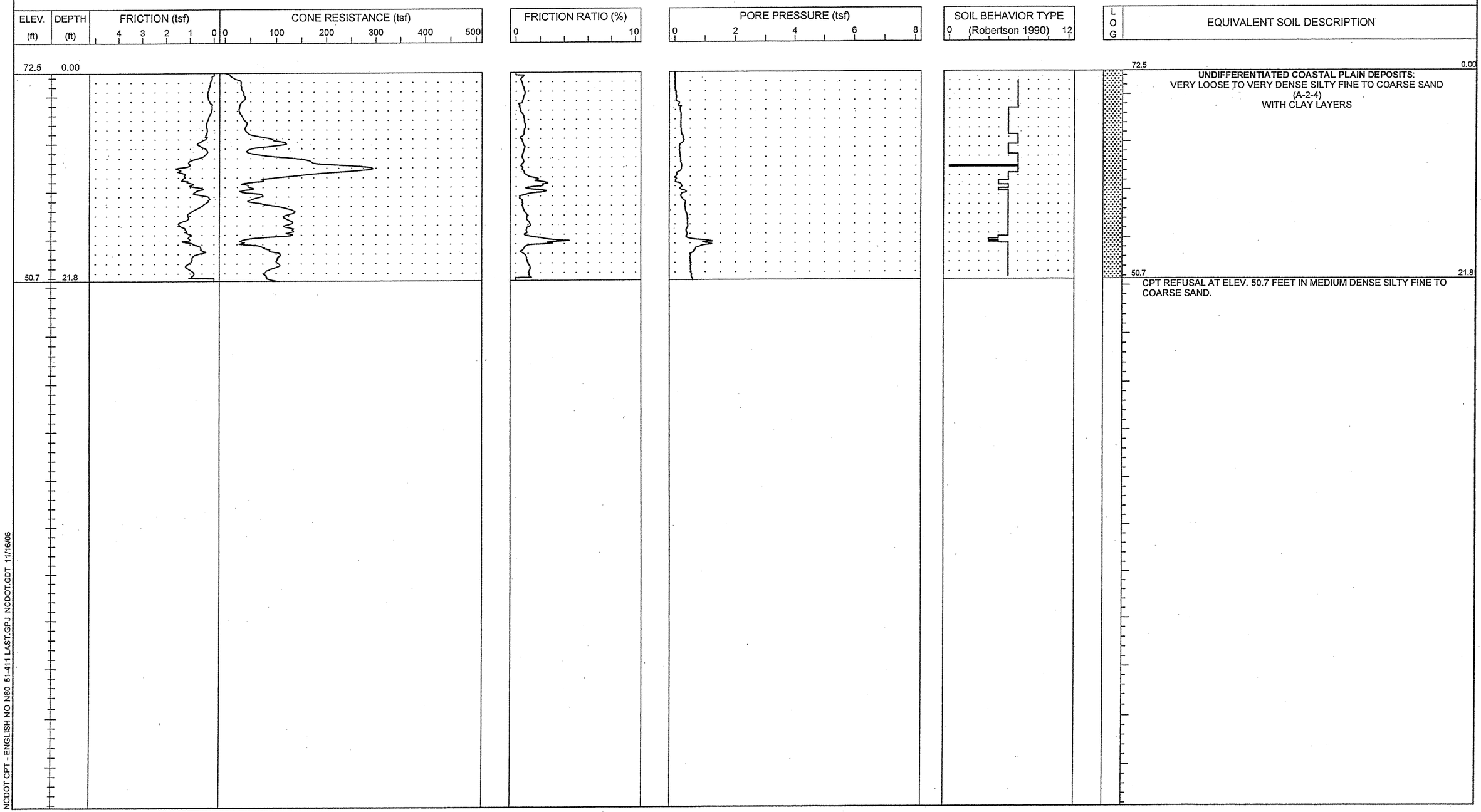
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 21.8 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C- 5	**BORING LOCATION** 32+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** N/M	**DATE STARTED** 11/8/06	**COMPLETED** 11/8/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 72.5 ft	**NORTHING** 185,620.8	**EASTING** 2,278,065.7		**24 HR.** N/M	**DRILLER:** A. MARTIN	**TECHNICIAN** J. WALKER	



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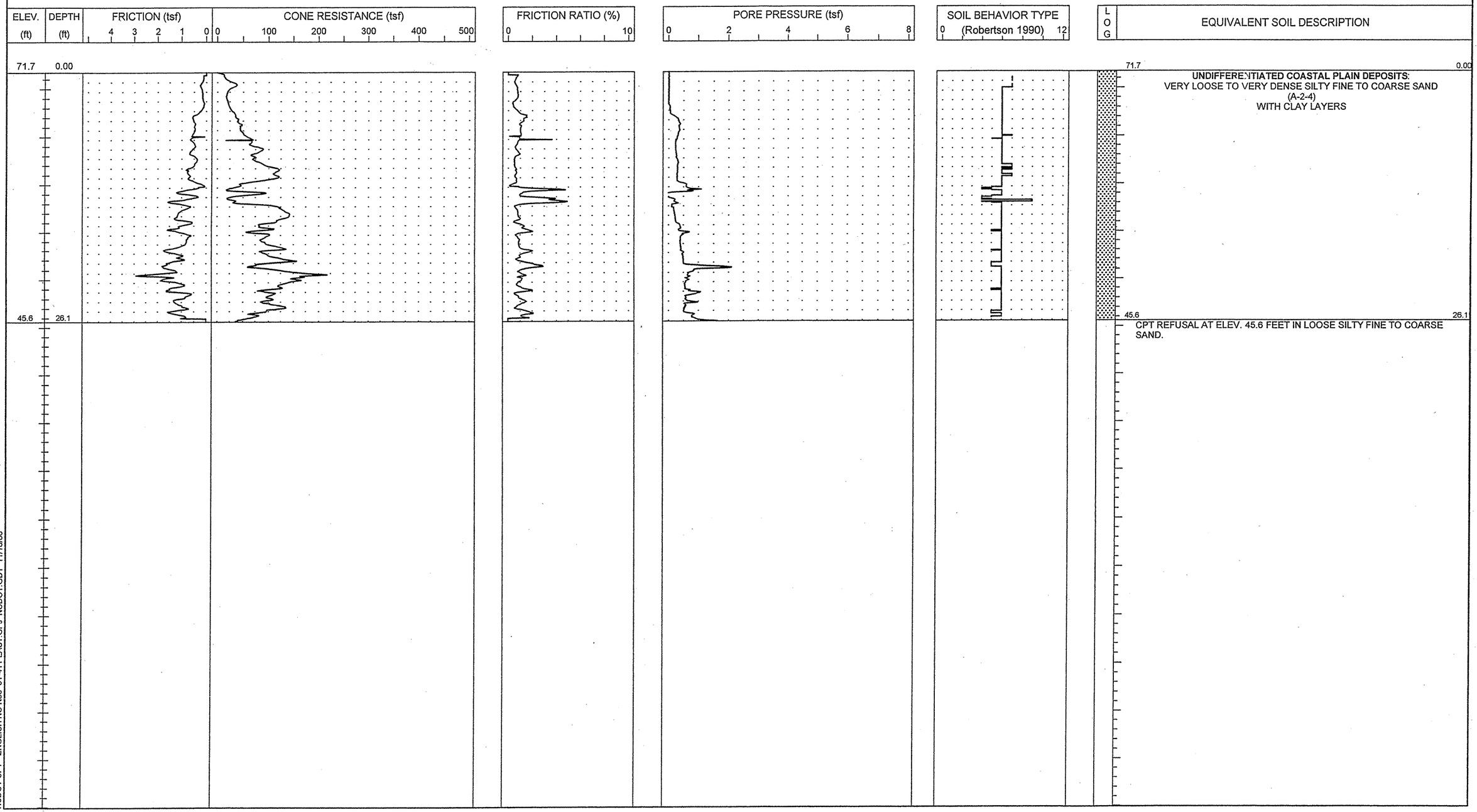
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 26.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C- 6	**BORING LOCATION** 34+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** N/M	**DATE STARTED** 11/8/06	**COMPLETED** 11/8/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 71.7 ft	**NORTHING** 185,819.8	**EASTING** 2,278,045.9		**24 HR.** N/M	**DRILLER:** A. MARTIN	**TECHNICIAN** J. WALKER	



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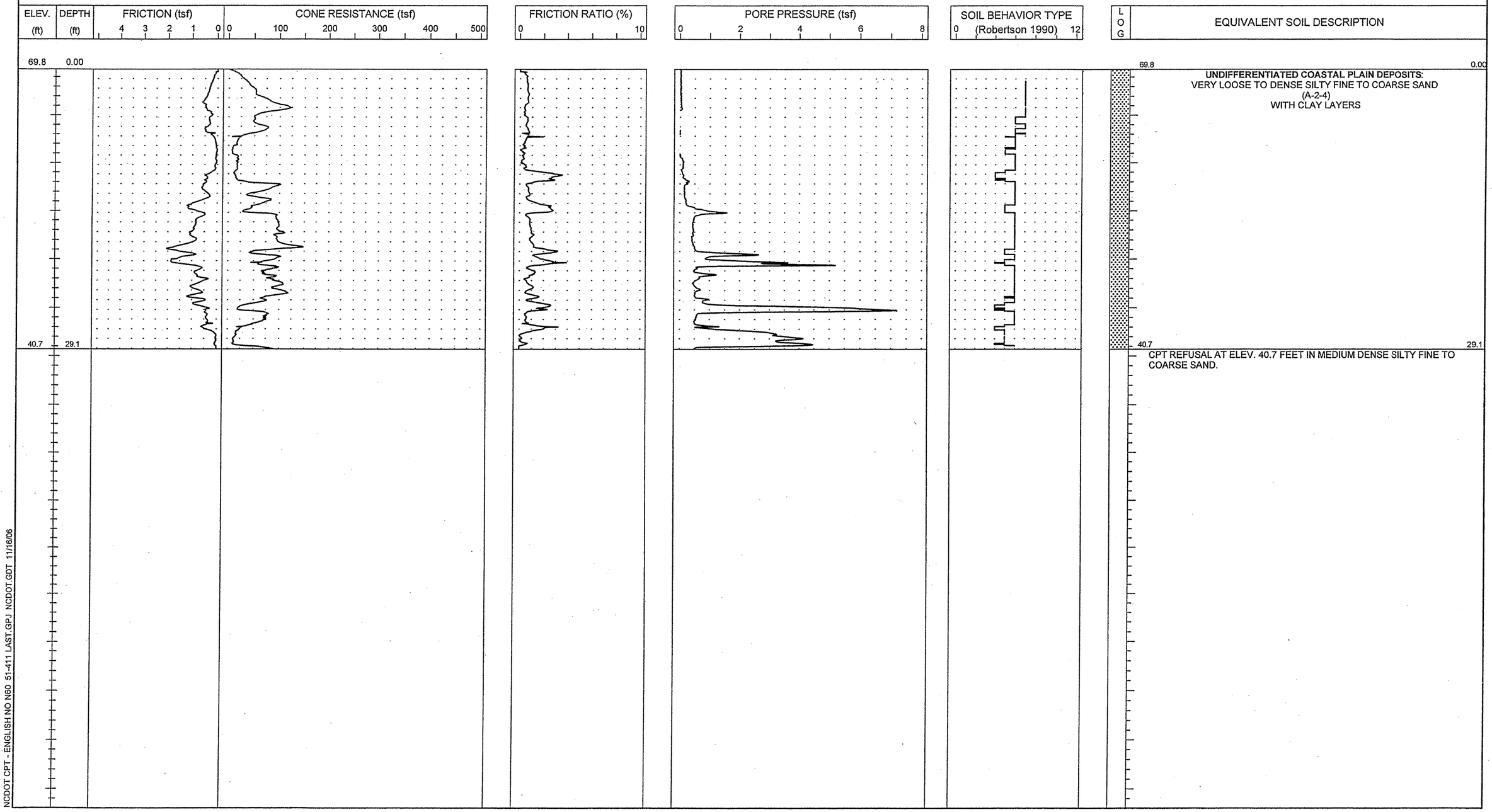
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON		**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf
SITE DESCRIPTION US 17 (Wilmington Bypass)				**GROUND WATER (ft)**	**TOTAL DEPTH** 29.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push / **HAMMER TYPE** N/A
BORING NO. C- 7	**BORING LOCATION** 35+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** N/M	**DATE STARTED** 11/8/06	**COMPLETED** 11/8/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 69.8 ft	**NORTHING** 185,919.5	**EASTING** 2,278,037.6		**24 HR.** N/M	**DRILLER:** A. MARTIN	**TECHNICIAN** J. WALKER	



L O G

EQUIVALENT SOIL DESCRIPTION

69.8 0.00

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS:
VERY LOOSE TO DENSE SILTY FINE TO COARSE SAND
(A-2-4)
WITH CLAY LAYERS

40.7 29.1

CPT REFUSAL AT ELEV. 40.7 FEET IN MEDIUM DENSE SILTY FINE TO COARSE SAND.

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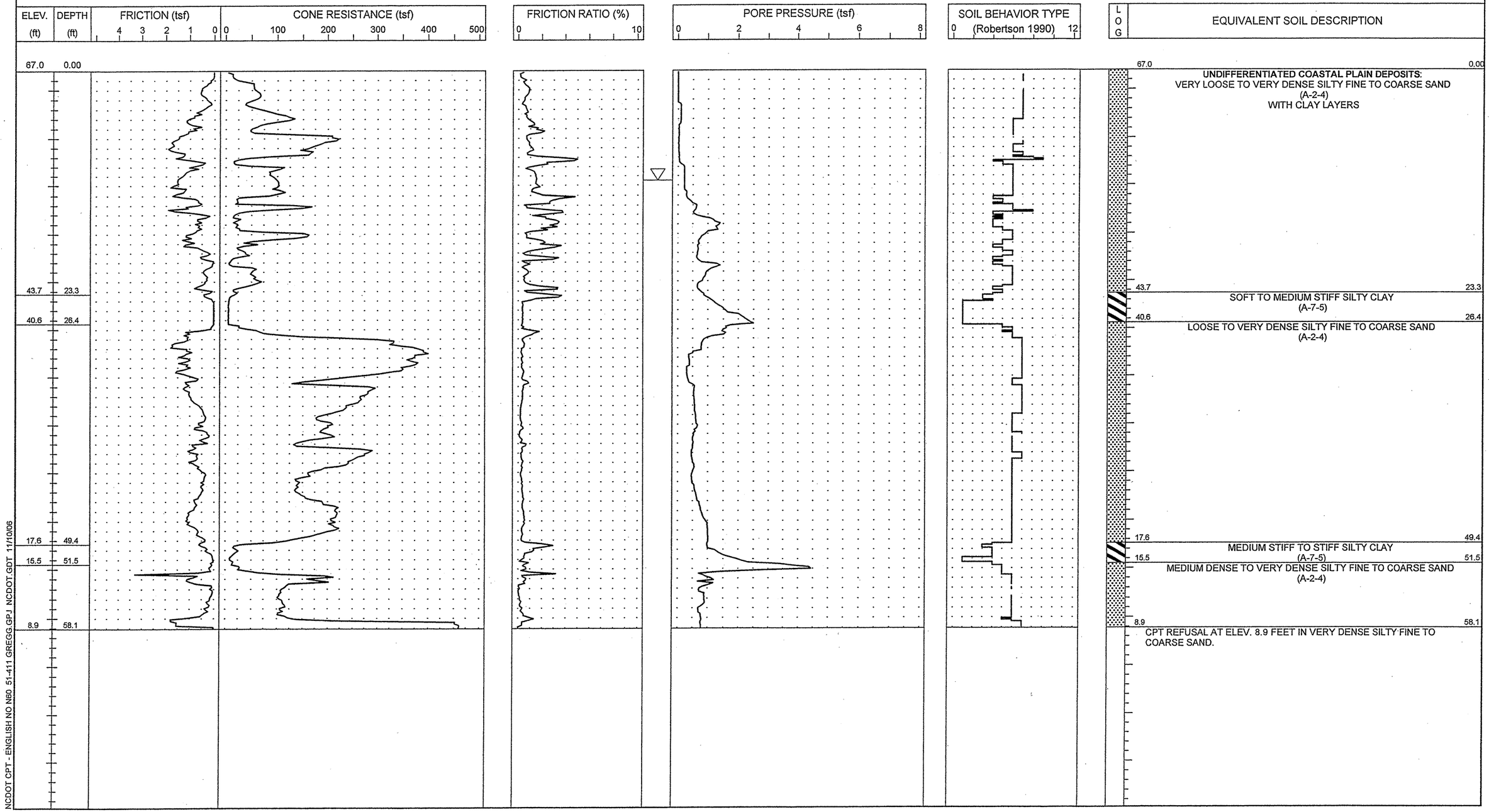
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON		**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf
SITE DESCRIPTION US17 (Wilmington Bypass)				**GROUND WATER (ft)**	**TOTAL DEPTH** 58.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C- 8	**BORING LOCATION** 41+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 11.5	**DATE STARTED** 10/20/06	**COMPLETED** 10/20/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 67.0 ft	**NORTHING** 186,518.7	**EASTING** 2,278,008.7		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SEAN	



NCDOT CPT - ENGLISH NO N60 51-411 GREGG.GPJ NCDOT.GDT 11/10/06

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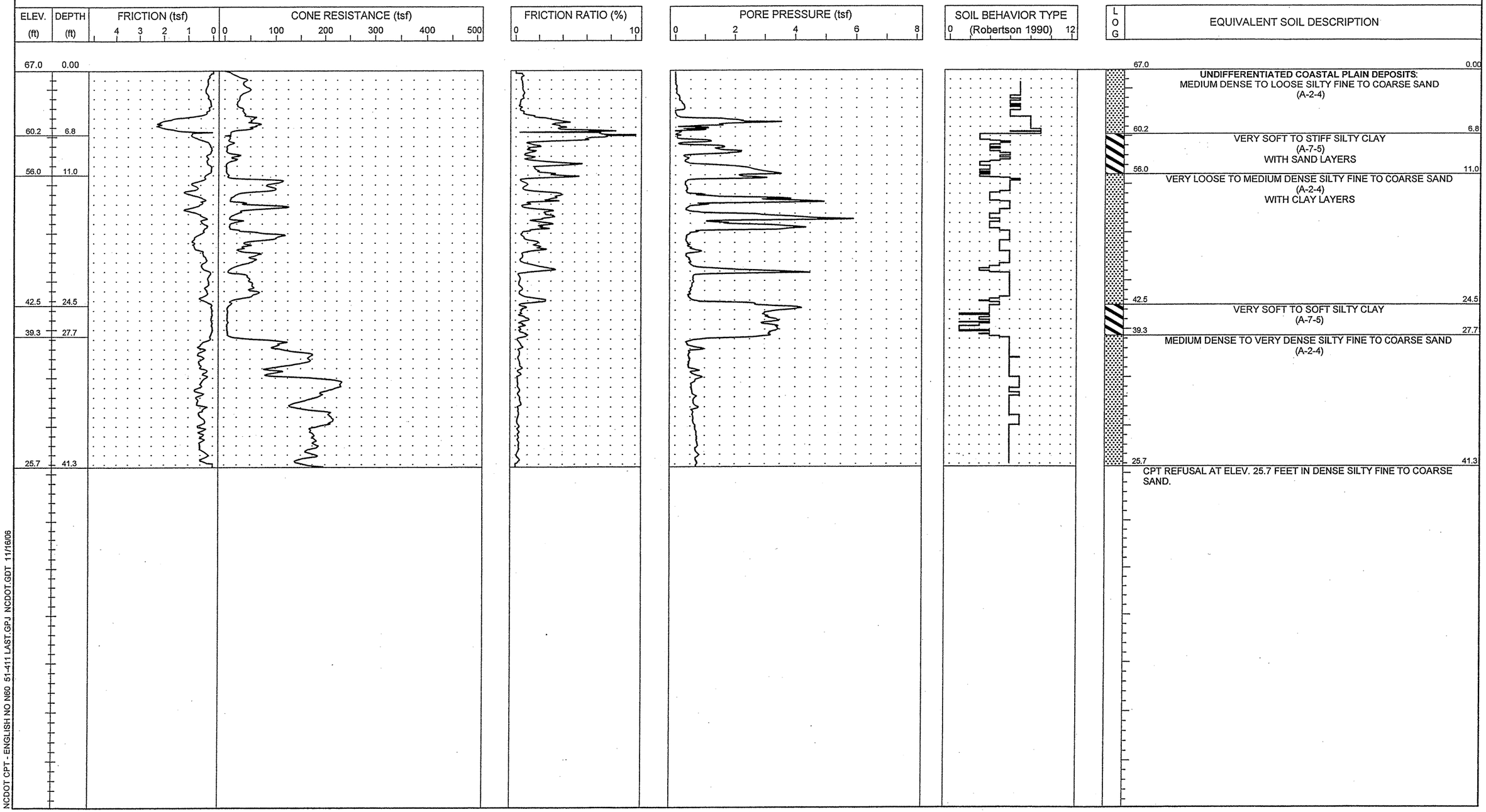
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 41.3 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C- 8A	**BORING LOCATION** 41+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** N/M	**DATE STARTED** 11/8/06	**COMPLETED** 11/8/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 67.0 ft	**NORTHING** 186,518.7	**EASTING** 2,278,008.7		**24 HR.** N/M	**DRILLER:** A. MARTIN	**TECHNICIAN** J. WALKER	



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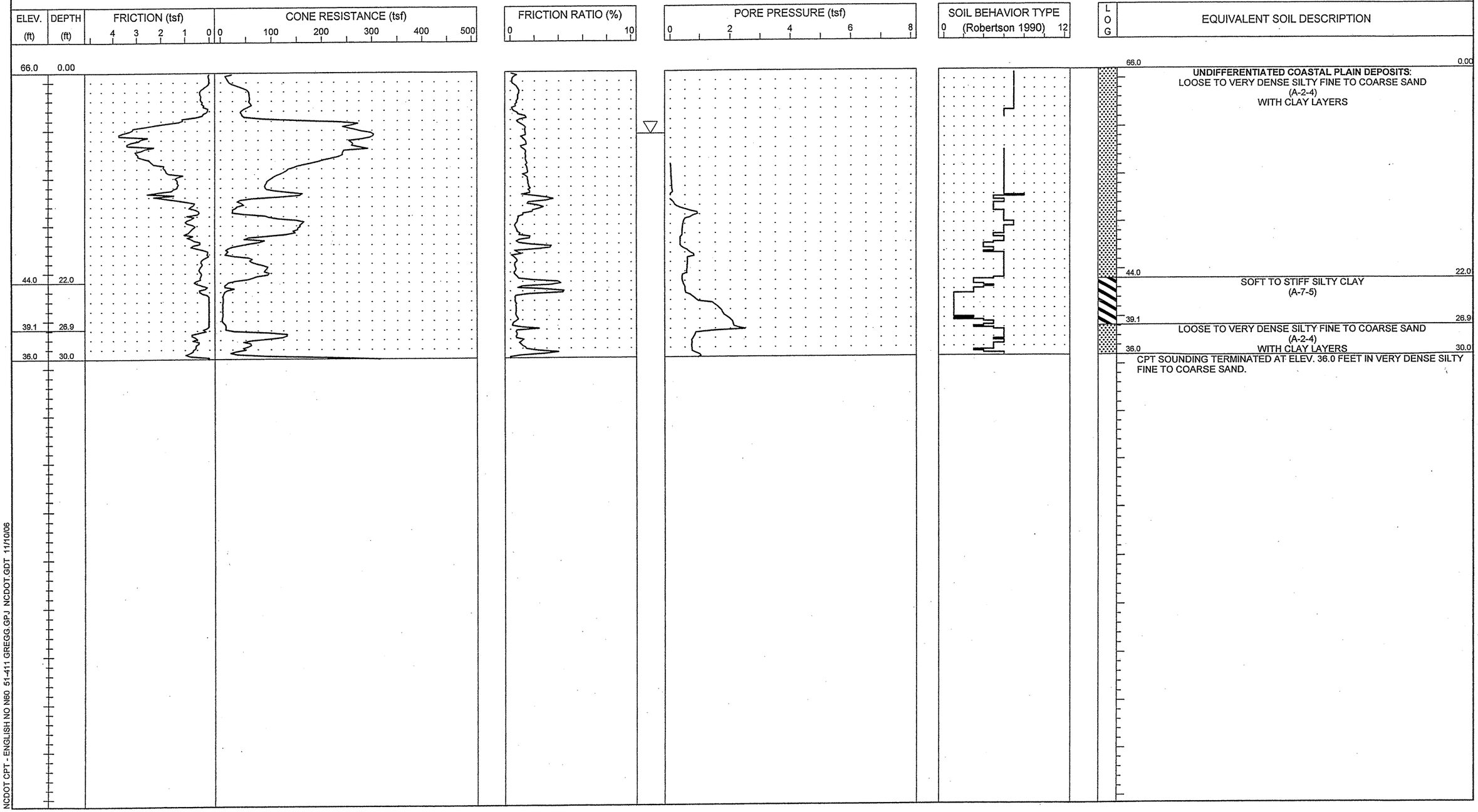
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 30.0 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-10	**BORING LOCATION** 45+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 6.5	**DATE STARTED** 10/20/06	**COMPLETED** 10/20/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 66.0 ft	**NORTHING** 186,918.6	**EASTING** 2,278,009.8		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SEAN	



L O G

EQUIVALENT SOIL DESCRIPTION

66.0 — 0.00

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS:
LOOSE TO VERY DENSE SILTY FINE TO COARSE SAND
(A-2-4)
WITH CLAY LAYERS

44.0 — 22.0

SOFT TO STIFF SILTY CLAY
(A-7-5)

39.1 — 26.9

LOOSE TO VERY DENSE SILTY FINE TO COARSE SAND
(A-2-4)
WITH CLAY LAYERS

36.0 — 30.0

CPT SOUNDING TERMINATED AT ELEV. 36.0 FEET IN VERY DENSE SILTY FINE TO COARSE SAND.

NCDOT CPT - ENGLISH NO N60 51-411 GREGG.GPJ NCDOT.GDT 11/10/06

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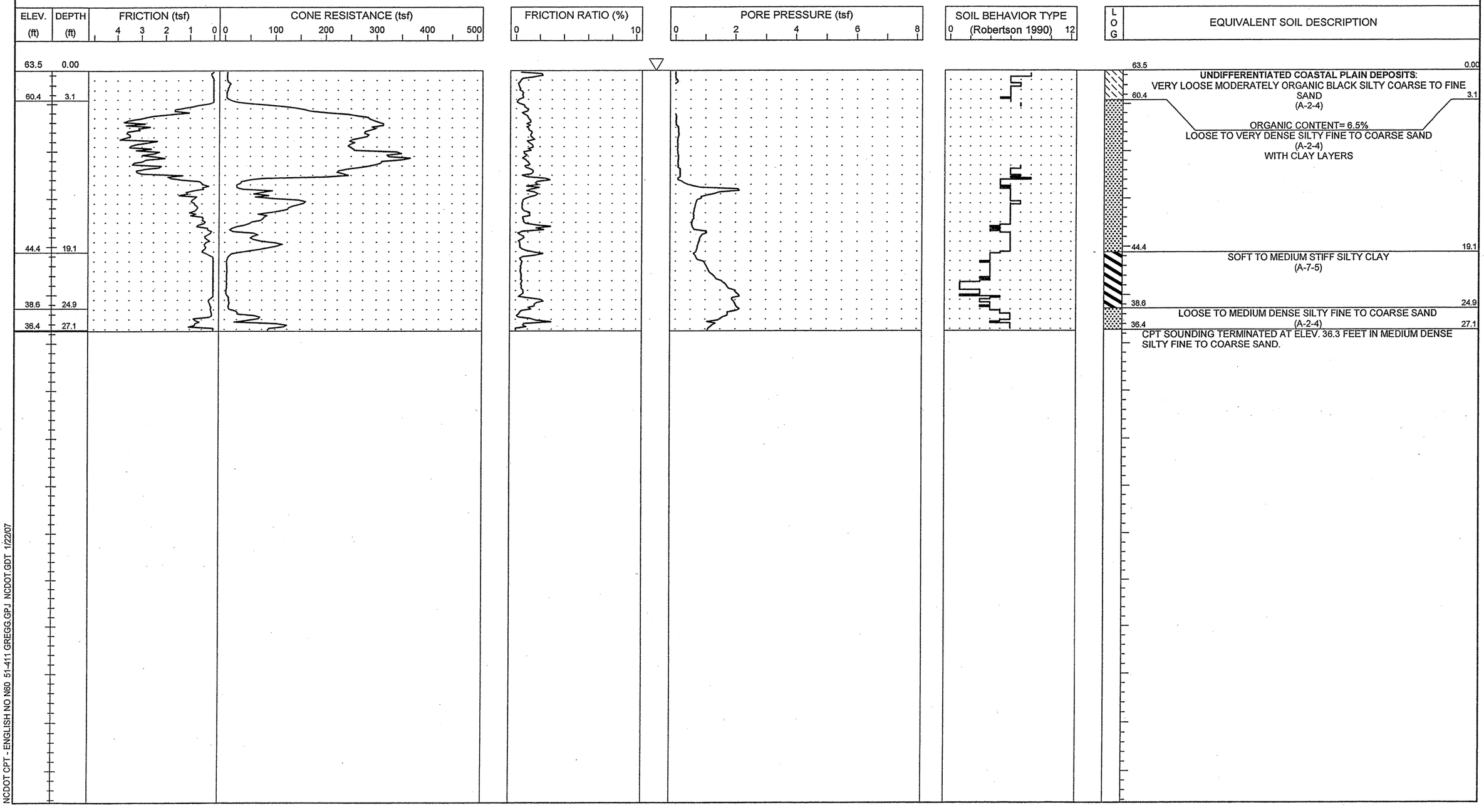
BORING LOG

PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 27.2 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-11	**BORING LOCATION** 47+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 0.0	**DATE STARTED** 10/20/06	**COMPLETED** 10/20/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 63.5 ft	**NORTHING** 187,118.5	**EASTING** 2,278,016.4		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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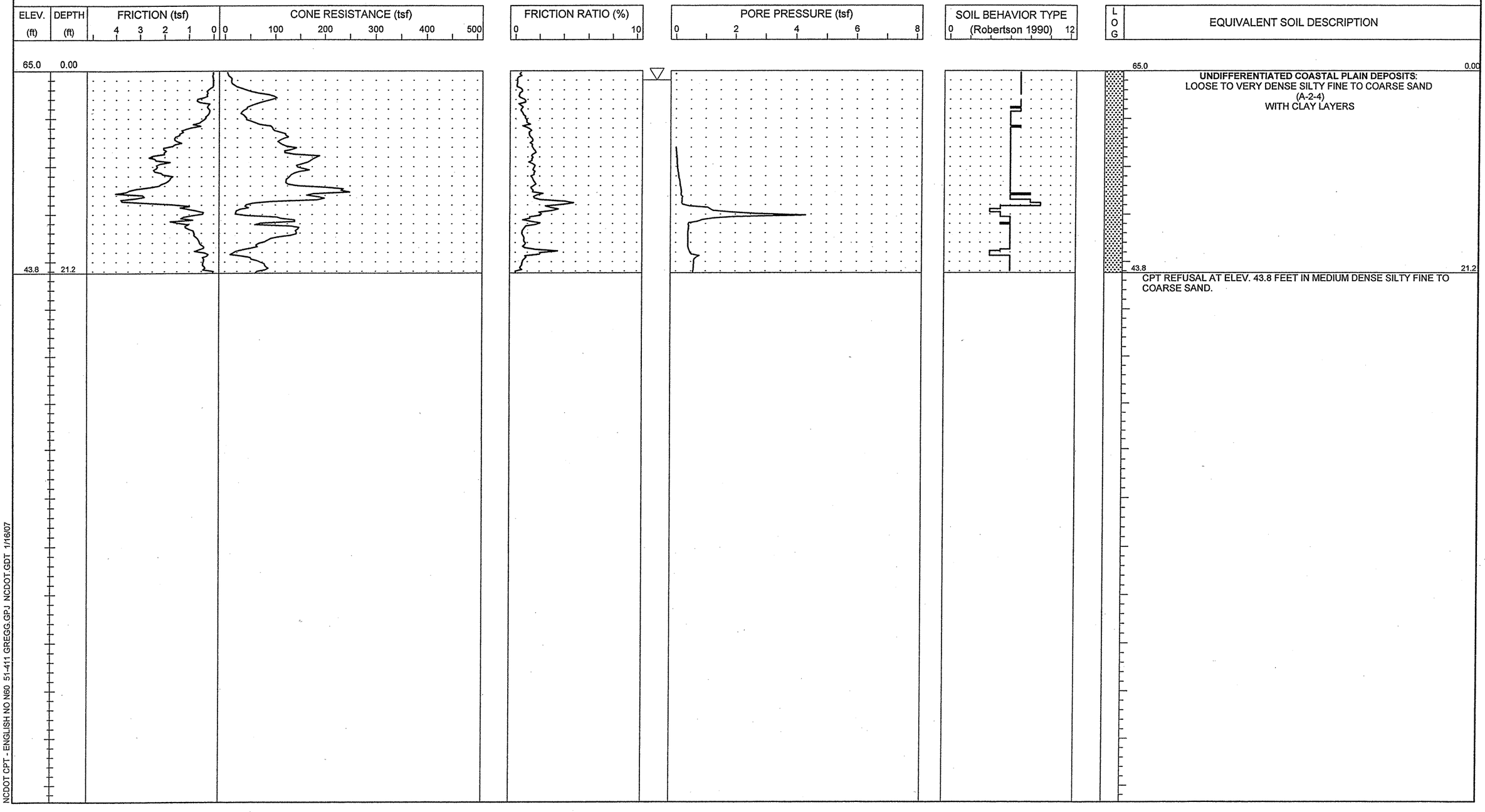
BORING LOG

PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 21.2 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-12	**BORING LOCATION** 49+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 1.0	**DATE STARTED** 10/20/06	**COMPLETED** 10/20/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 65.0 ft	**NORTHING** 187,318.2	**EASTING** 2,278,027.1		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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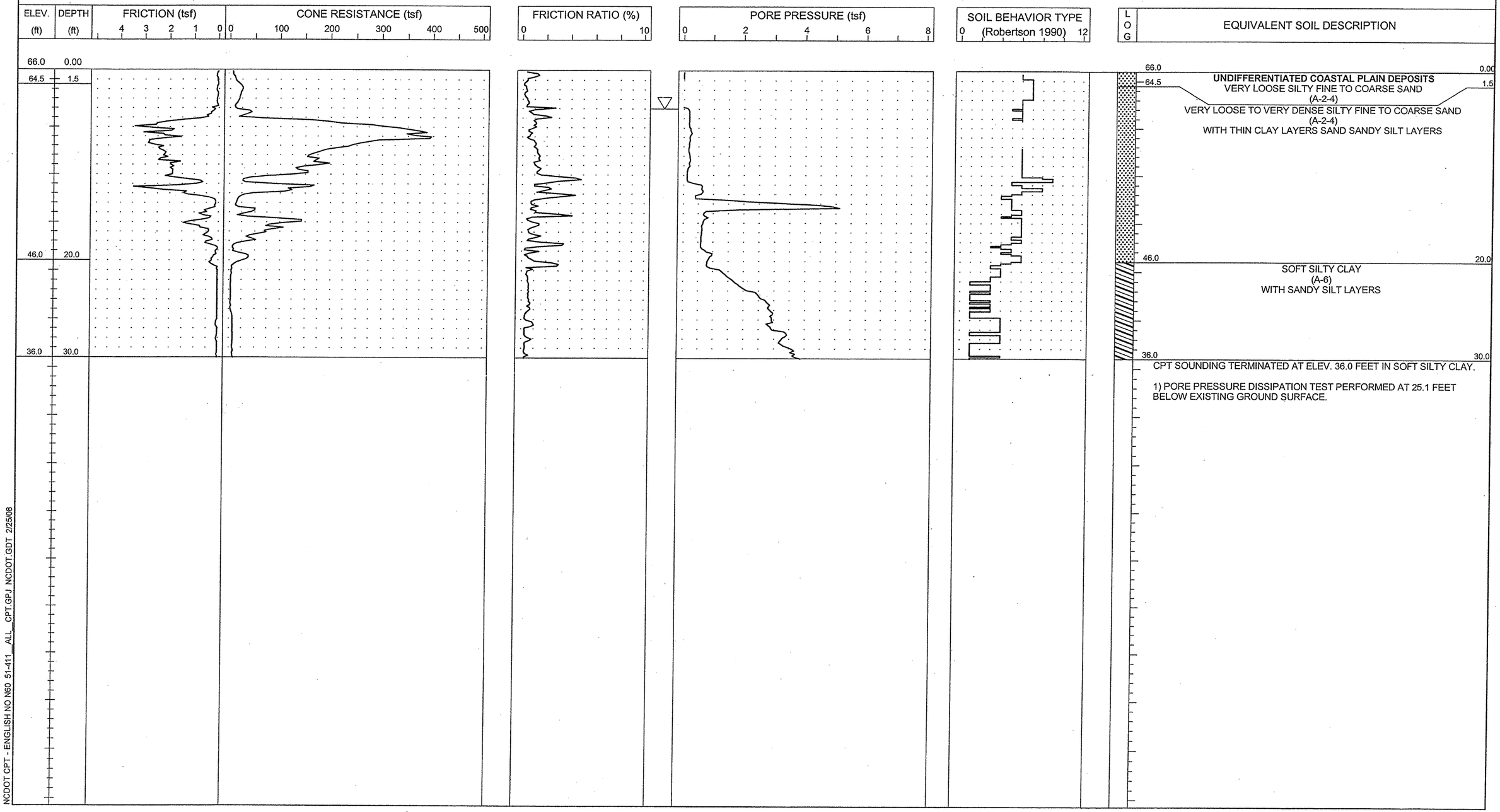
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 30.0 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C- 13	**BORING LOCATION** 51+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 4.0	**DATE STARTED** 10/20/06	**COMPLETED** 10/20/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 66.0 ft	**NORTHING** 187,517.7	**EASTING** 2,278,041.8		**24 HR.** N/M	**DRILLER:** R. Schubert	**TECHNICIAN** K. Canuel	



NCDOT CPT - ENGLISH NO N60 51-411__ALL__CPT.GPJ NCDOT.GDT 2/25/08

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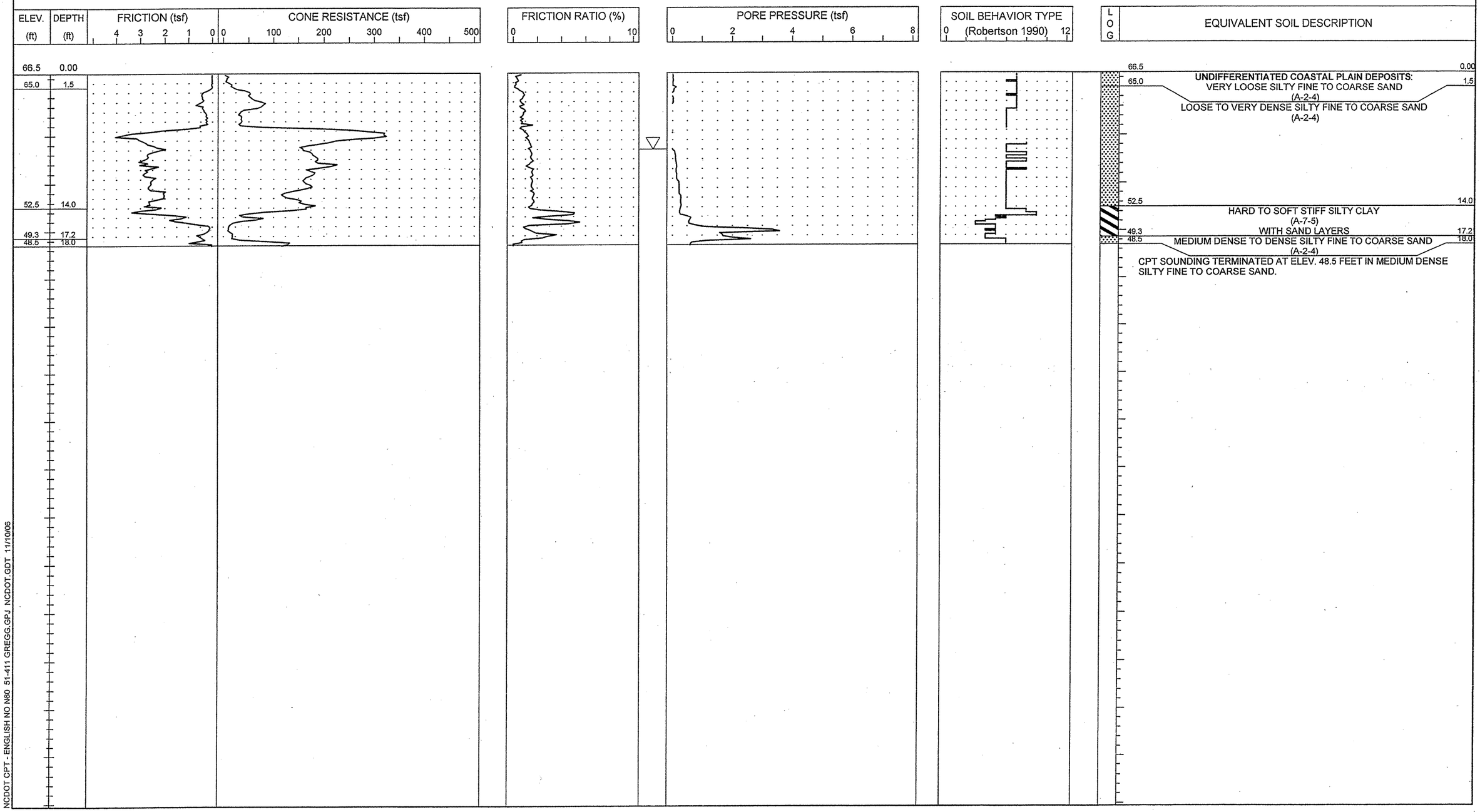
BORING LOG

PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 18.0 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-14	**BORING LOCATION** 53+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 8.0	**DATE STARTED** 10/19/06	**COMPLETED** 10/19/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 66.5 ft	**NORTHING** 187,716.8	**EASTING** 2,278,060.5		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SEAN	



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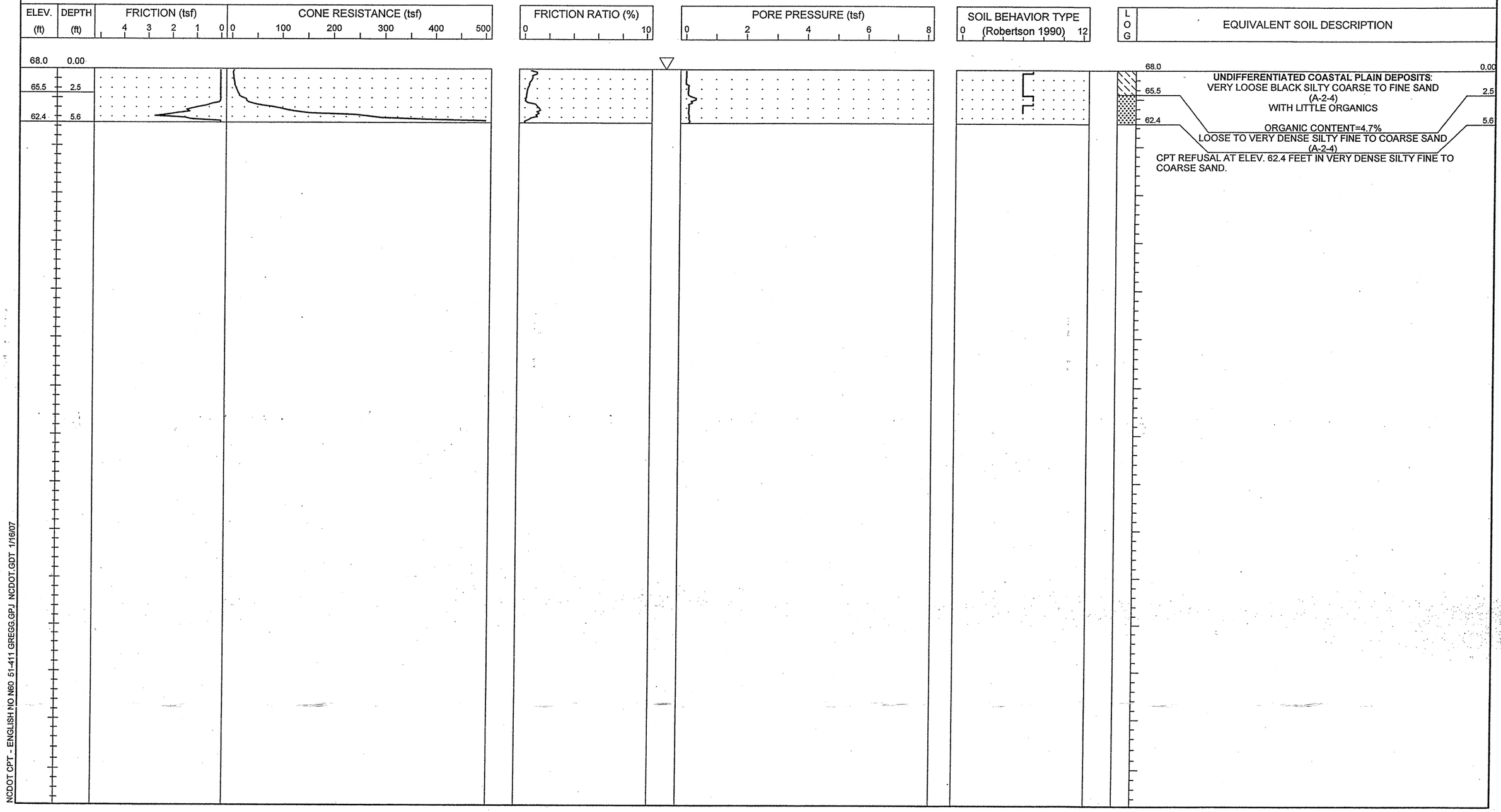
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON		**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US17 (Wilmington Bypass)				**GROUND WATER (ft)**	**TOTAL DEPTH** 5.6 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-15	**BORING LOCATION** 55+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 0.0	**DATE STARTED** 10/19/06	**COMPLETED** 10/19/06	**SURFACE WATER DEPTH** N/A	
COLLAR ELEV. 68.0 ft	**NORTHING** 187,915.5	**EASTING** 2,278,083.4		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN		



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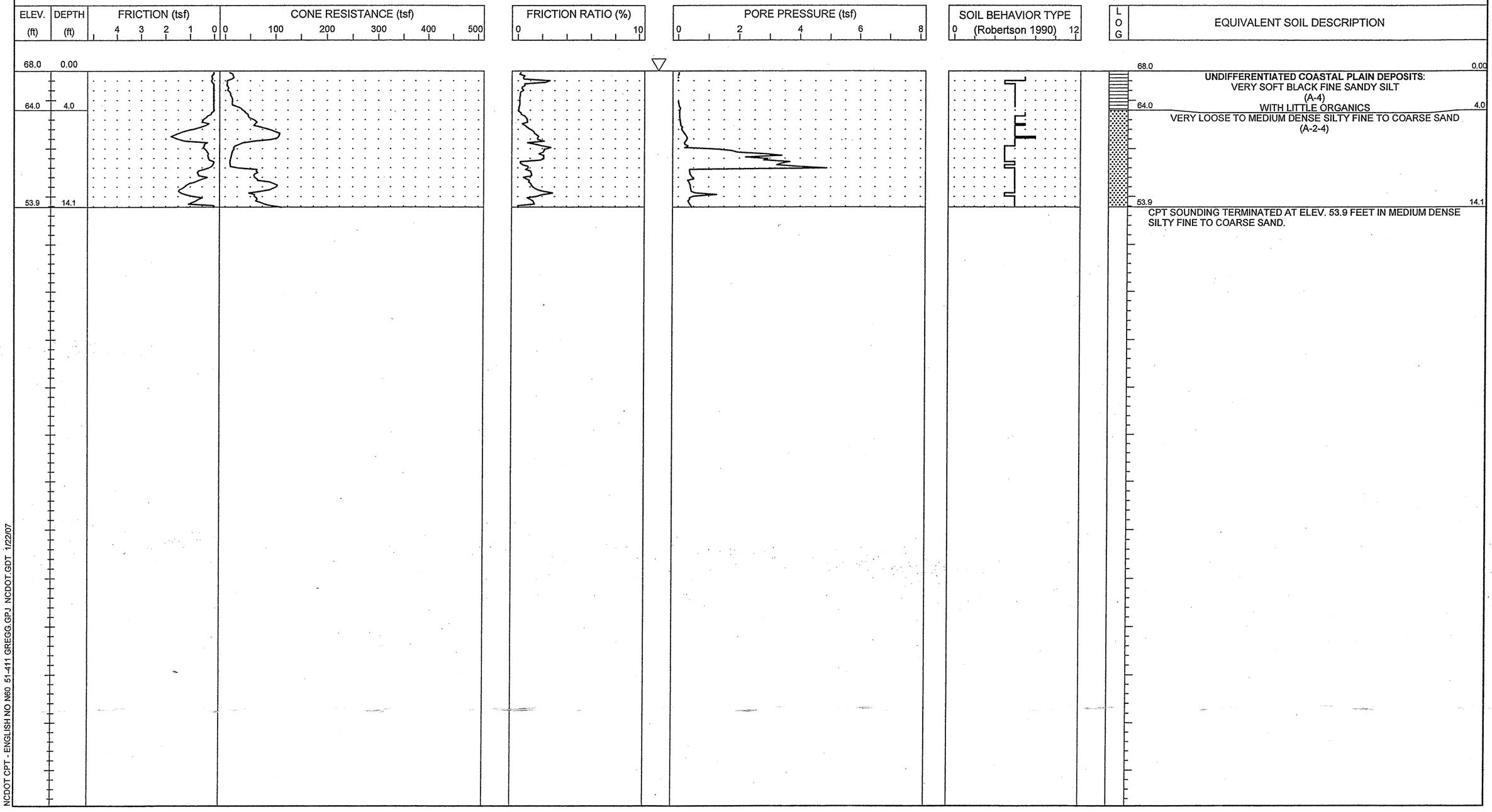
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 14.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-16	**BORING LOCATION** 57+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 0.0	**DATE STARTED** 10/21/06	**COMPLETED** 10/21/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 68.0 ft	**NORTHING** 188,113.7	**EASTING** 2,278,110.2		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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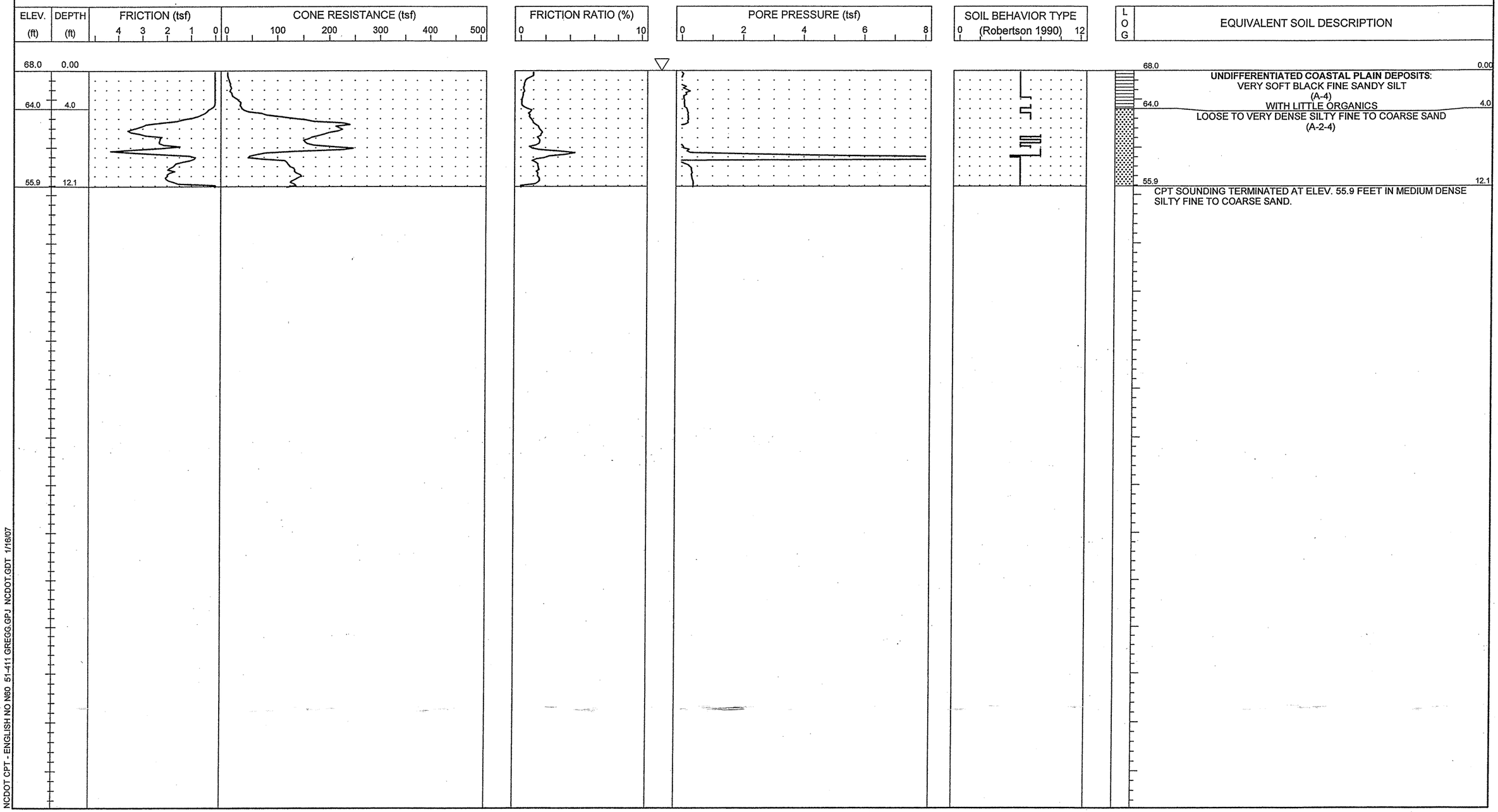
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 12.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-17	**BORING LOCATION** 59+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 0.0	**DATE STARTED** 10/21/06	**COMPLETED** 10/21/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 68.0 ft	**NORTHING** 188,311.3	**EASTING** 2,278,141.1		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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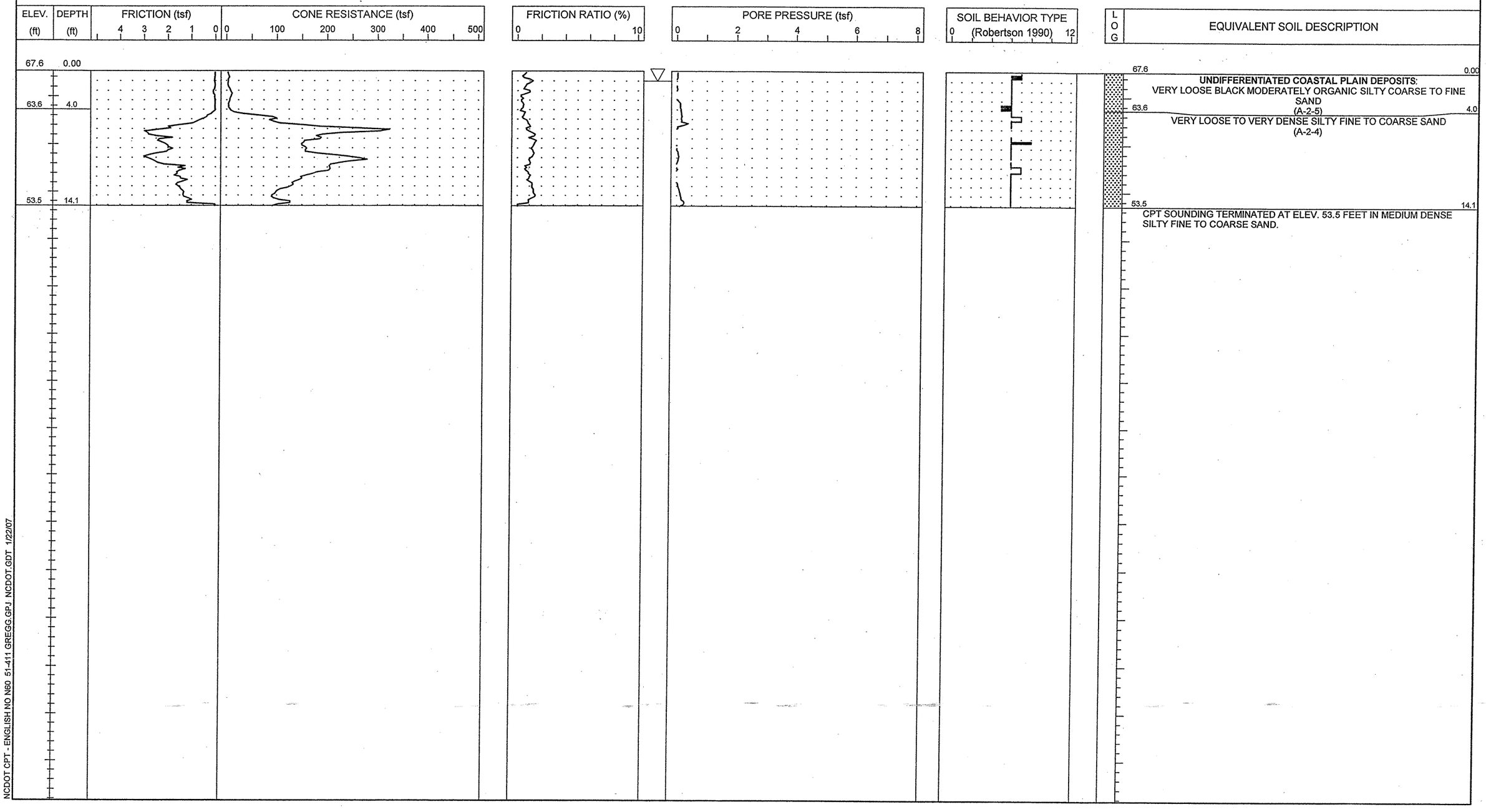
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON		**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US17 (Wilmington Bypass)				**GROUND WATER (ft)**	**TOTAL DEPTH** 14.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-18	**BORING LOCATION** 61+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 1.0	**DATE STARTED** 10/22/06	**COMPLETED** 10/22/06	**SURFACE WATER DEPTH** N/A	
COLLAR ELEV. 67.6 ft	**NORTHING** 188,508.2	**EASTING** 2,278,175.9		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN		



EQUIVALENT SOIL DESCRIPTION

67.6 — 0.00

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS:
VERY LOOSE BLACK MODERATELY ORGANIC SILTY COARSE TO FINE SAND
(A-2-5)

63.6 — 4.0

VERY LOOSE TO VERY DENSE SILTY FINE TO COARSE SAND
(A-2-4)

53.5 — 14.1

CPT SOUNDING TERMINATED AT ELEV. 53.5 FEET IN MEDIUM DENSE SILTY FINE TO COARSE SAND.

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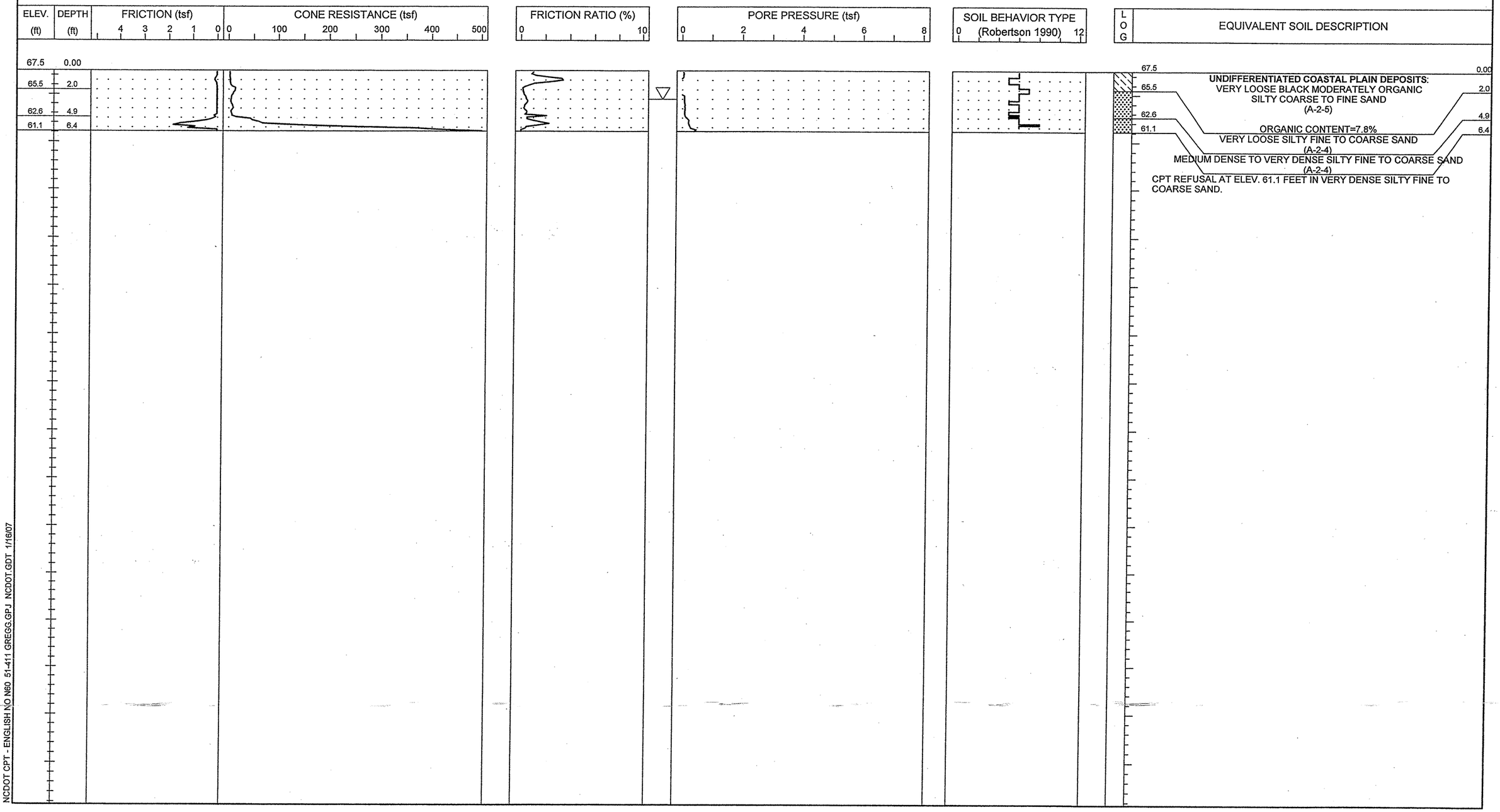
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 6.4 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-19	**BORING LOCATION** 63+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 3.0	**DATE STARTED** 10/22/06	**COMPLETED** 10/22/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 67.5 ft	**NORTHING** 188,704.4	**EASTING** 2,278,214.8		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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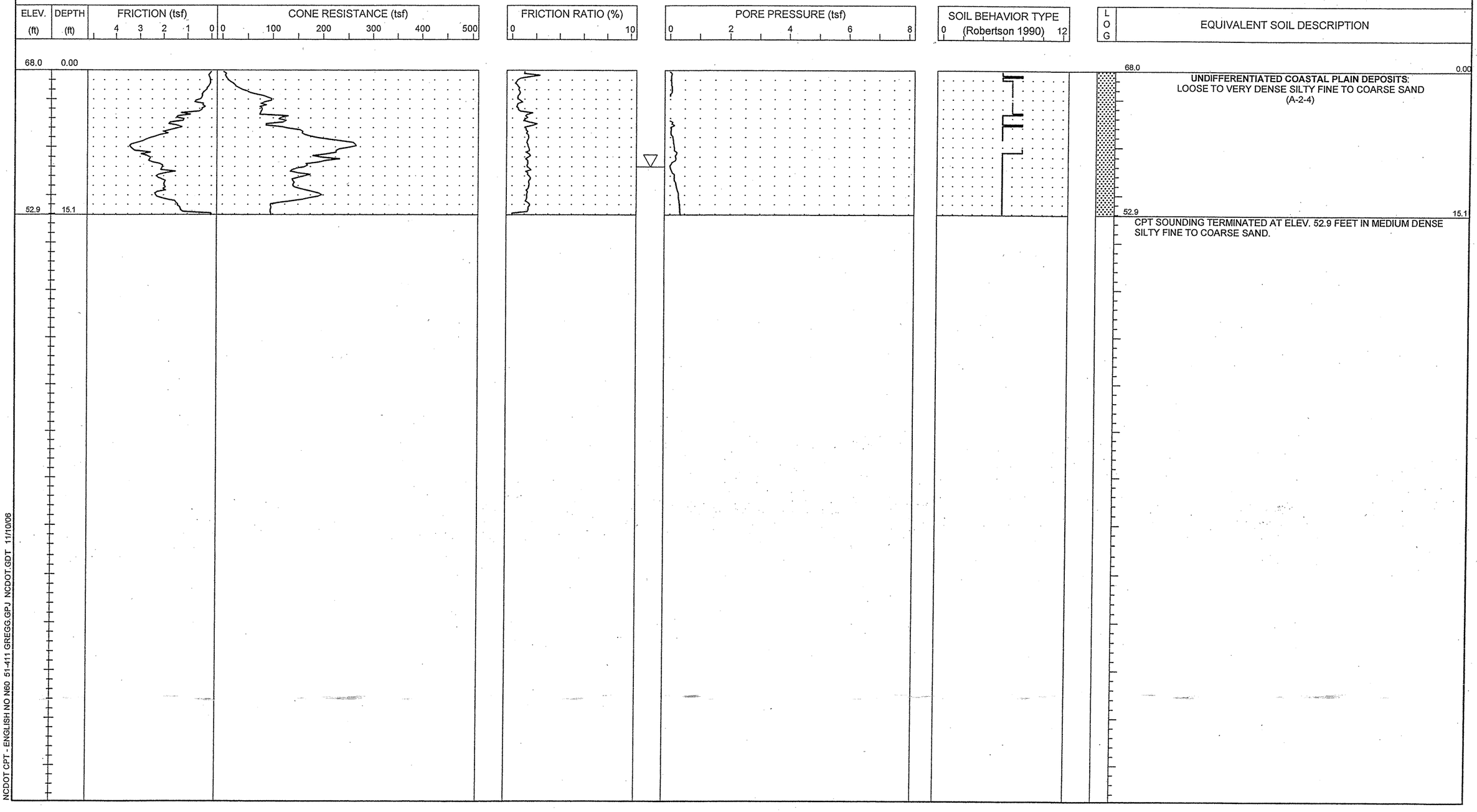
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 15.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-20	**BORING LOCATION** 65+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 10.0	**DATE STARTED** 10/22/06	**COMPLETED** 10/22/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 68.0 ft	**NORTHING** 188,899.8	**EASTING** 2,278,257.6		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SEAN	



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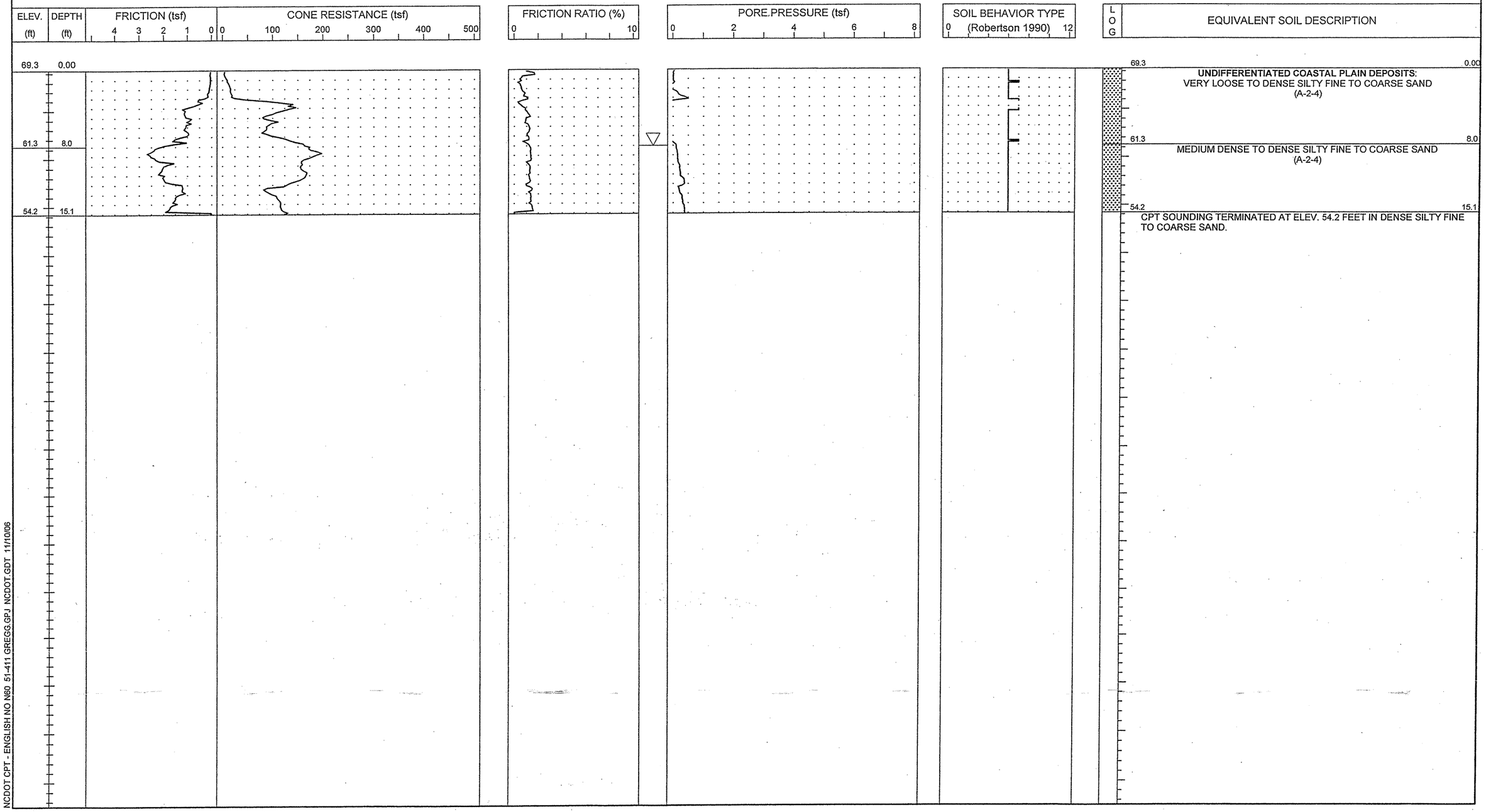
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 15.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-21	**BORING LOCATION** 67+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 8.0	**DATE STARTED** 10/22/06	**COMPLETED** 10/22/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 69.3 ft	**NORTHING** 189,094.2	**EASTING** 2,278,304.4		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SEAN	



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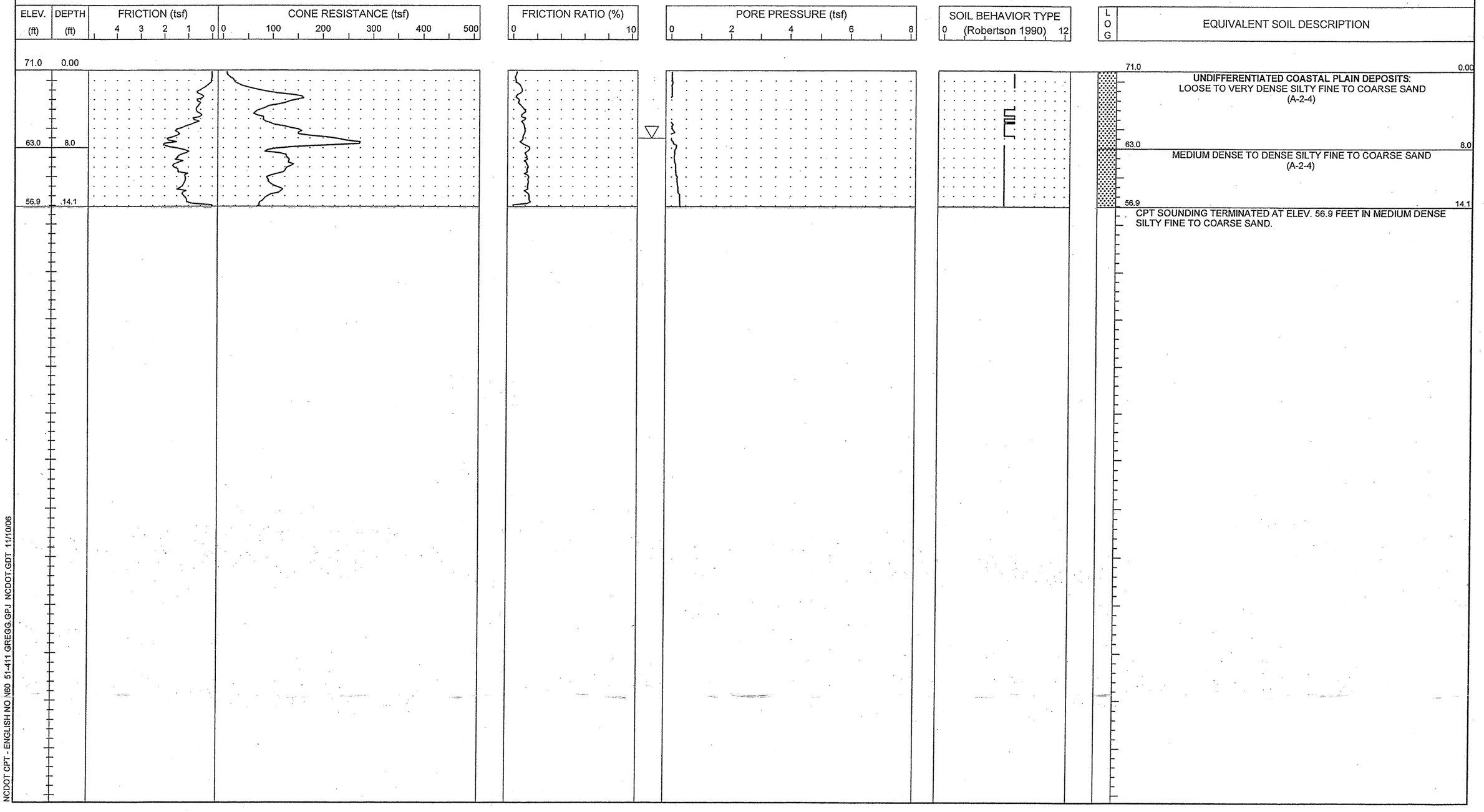
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 14.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-22	**BORING LOCATION** 69+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 7.0	**DATE STARTED** 10/22/06	**COMPLETED** 10/22/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 71.0 ft	**NORTHING** 189,287.7	**EASTING** 2,278,355.1		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SEAN	



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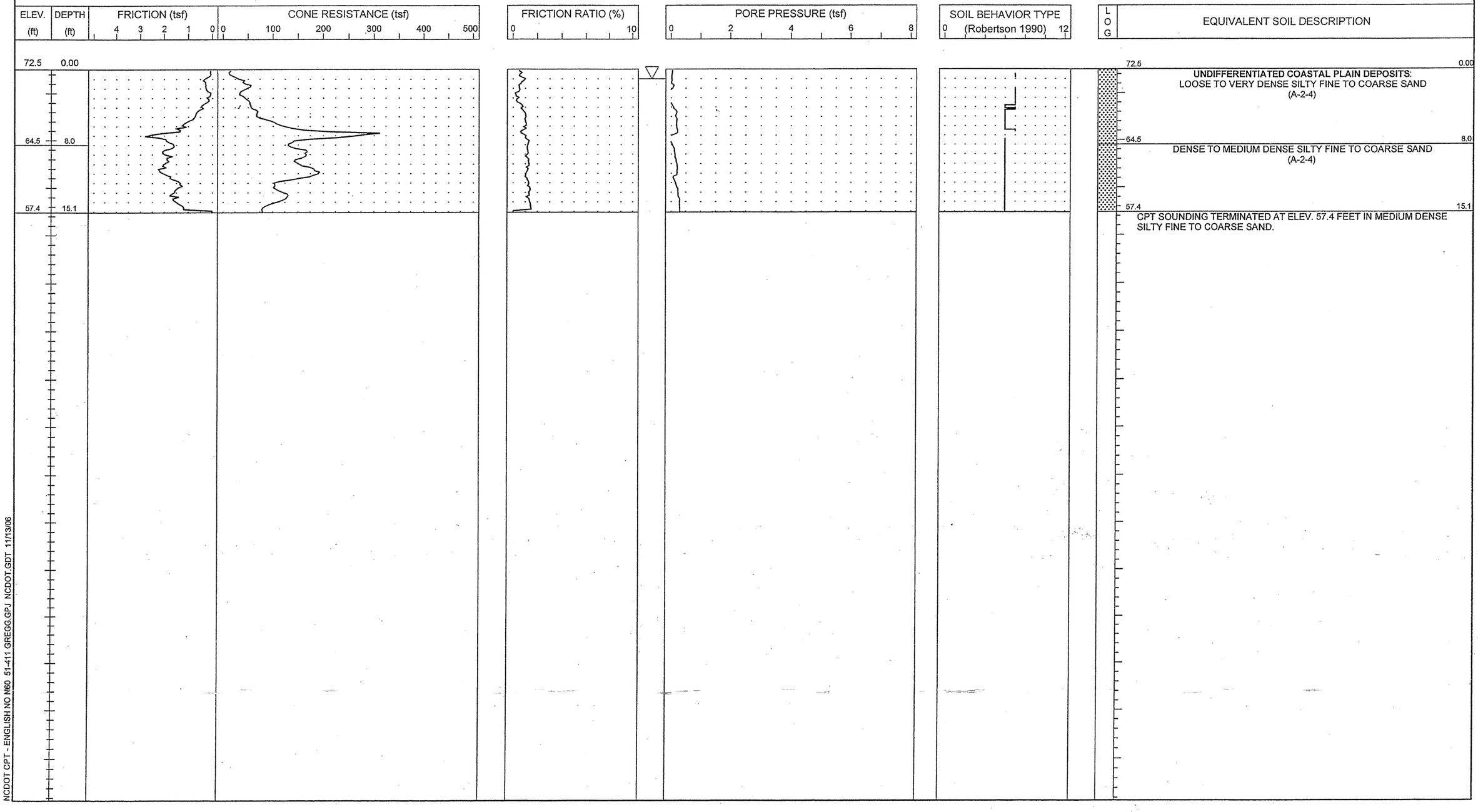
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 15.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-23	**BORING LOCATION** 71+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 1.0	**DATE STARTED** 10/22/06	**COMPLETED** 10/22/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 72.5 ft	**NORTHING** 189,480.1	**EASTING** 2,278,409.7		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SEAN	



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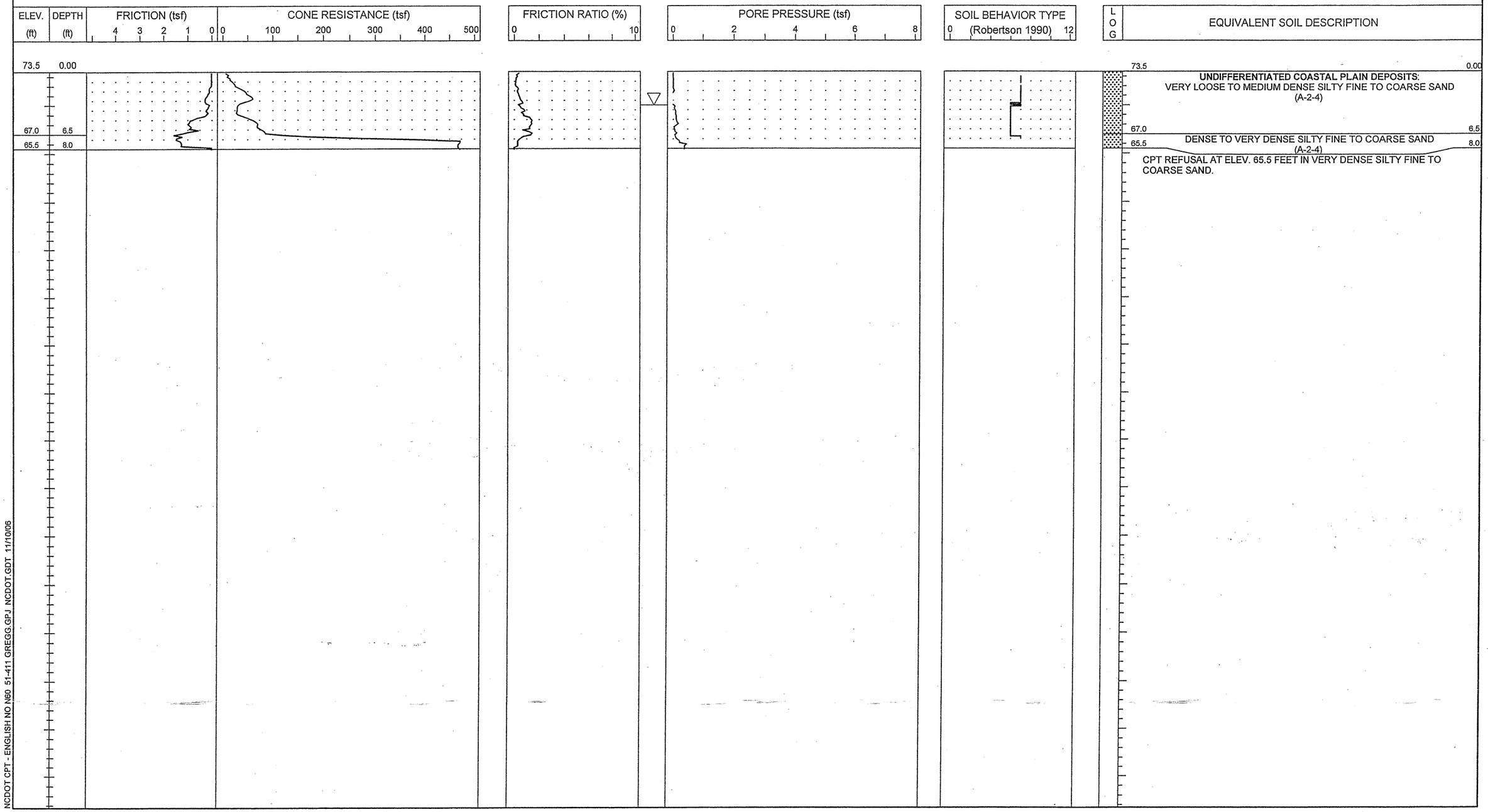
BORING LOG

PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 8.0 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-24	**BORING LOCATION** 73+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 3.5	**DATE STARTED** 10/22/06	**COMPLETED** 10/22/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 73.5 ft	**NORTHING** 189,671.3	**EASTING** 2,278,468.3		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SEAN	



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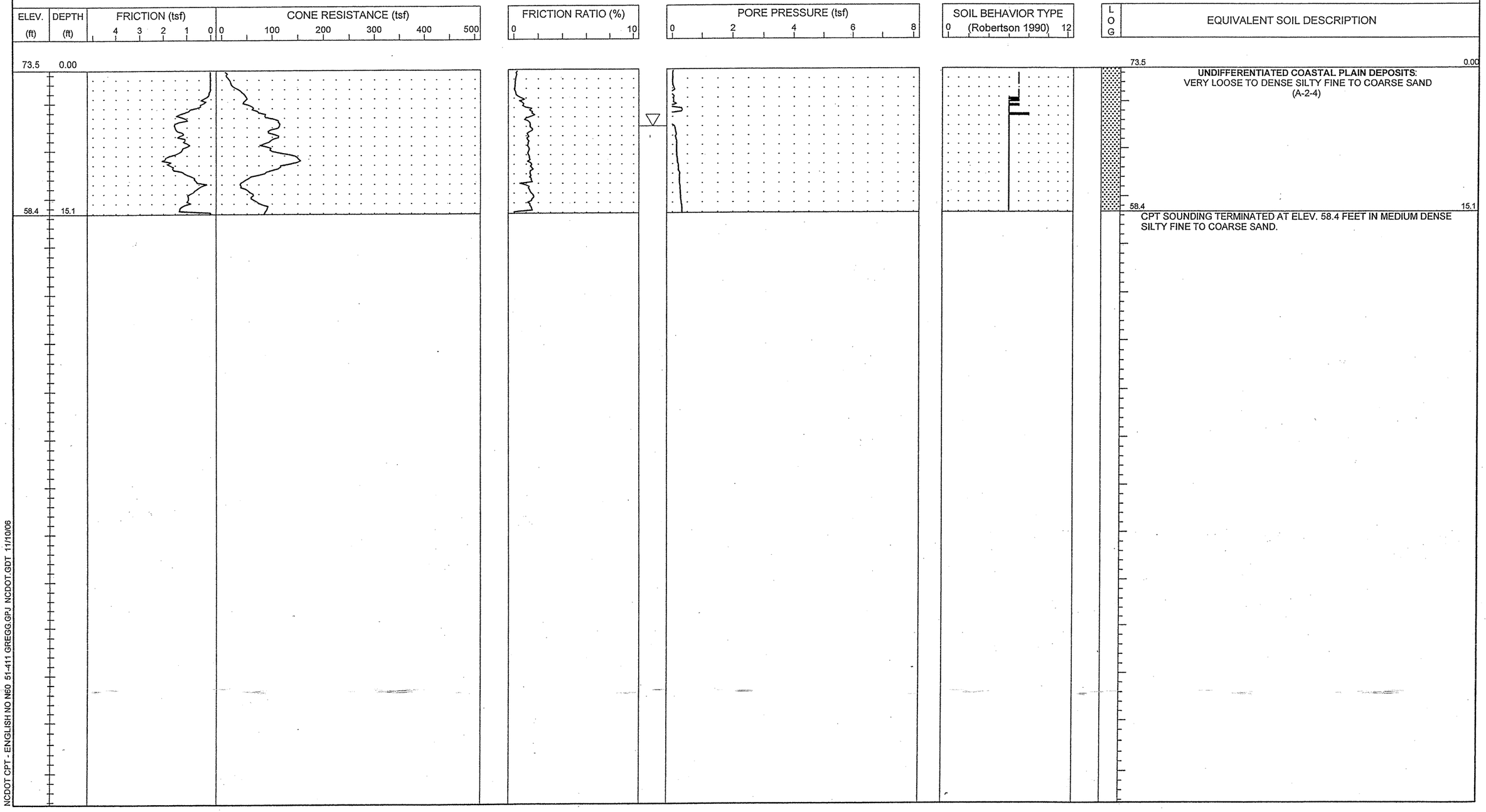
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 15.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-25	**BORING LOCATION** 75+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 6.0	**DATE STARTED** 10/22/06	**COMPLETED** 10/22/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 73.5 ft	**NORTHING** 189,861.3	**EASTING** 2,278,530.7		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SEAN	



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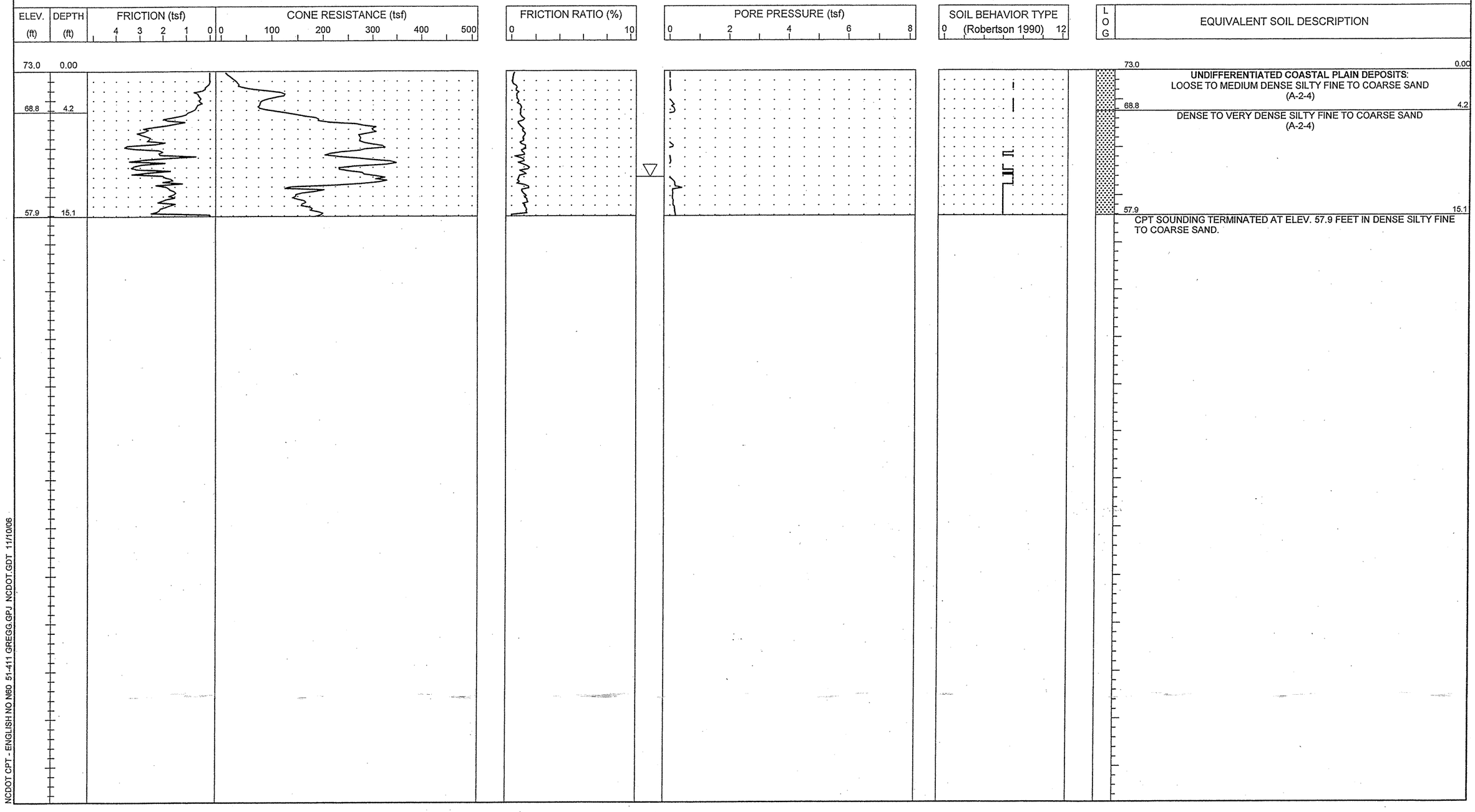
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 15.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-26	**BORING LOCATION** 77+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 11.0	**DATE STARTED** 10/22/06	**COMPLETED** 10/22/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 73.0 ft	**NORTHING** 190,050.0	**EASTING** 2,278,596.9		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SEAN	



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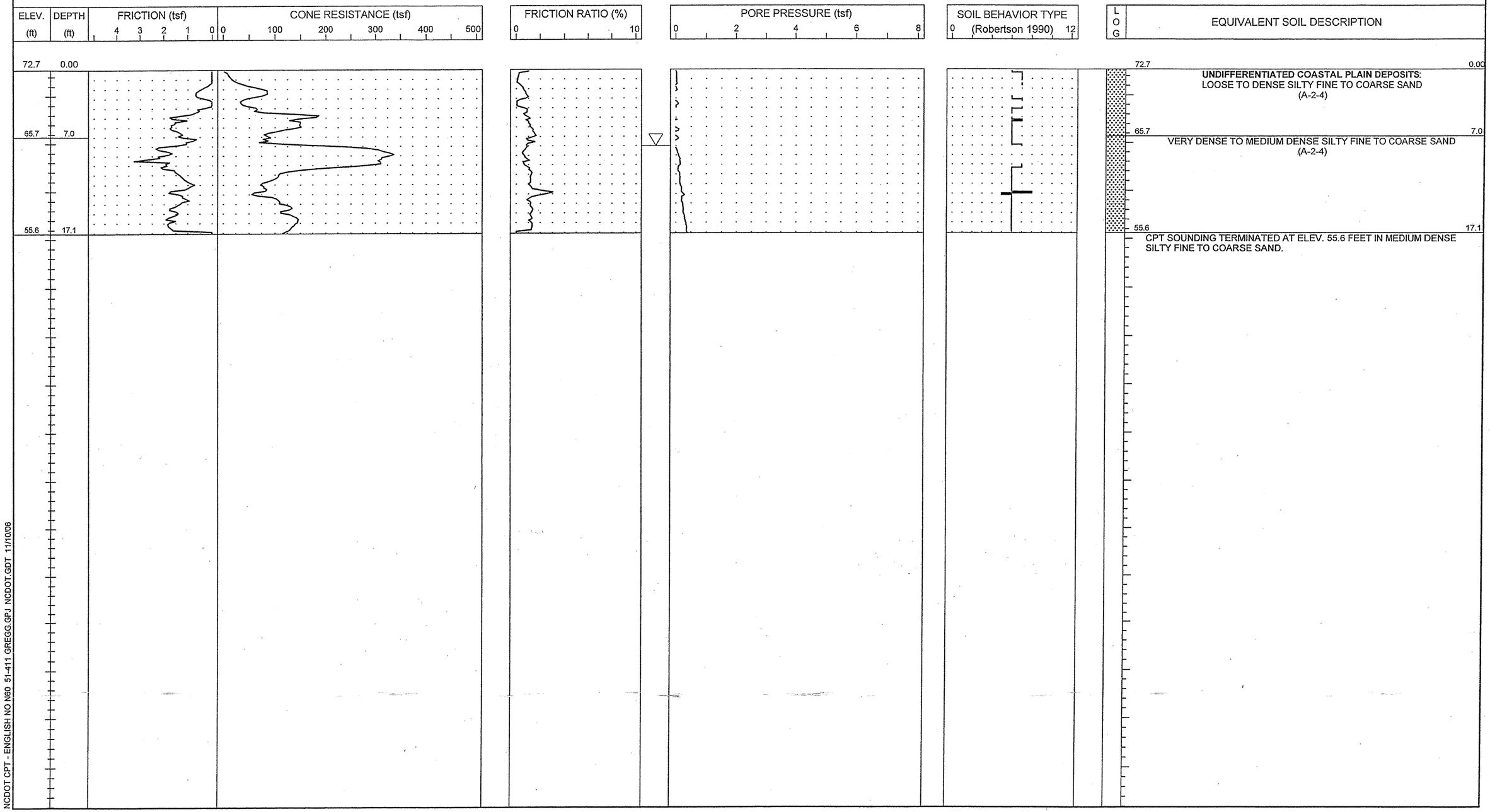
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 17.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-27	**BORING LOCATION** 79+00	**OFFSET** 0.0 ft CL **ALIGNMENT** -L-	**0 HR.** 8.0	**DATE STARTED** 10/22/06	**COMPLETED** 10/22/06	**SURFACE WATER DEPTH** N/A	
COLLAR ELEV. 72.7 ft	**NORTHING** 190,237.3	**EASTING** 2,278,667.0	**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SEAN		



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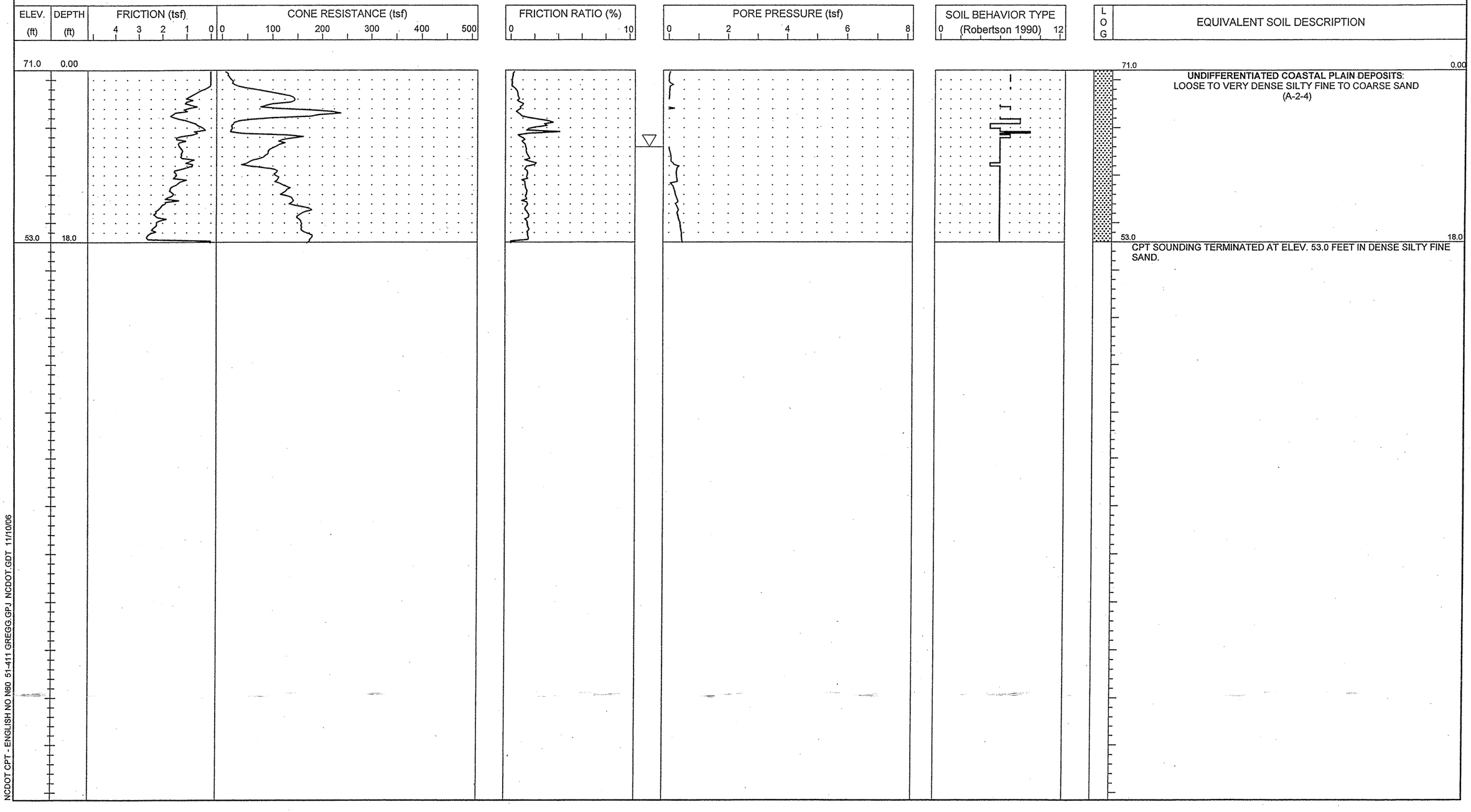
BORING LOG

PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 18.0 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-28	**BORING LOCATION** 81+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 8.0	**DATE STARTED** 10/22/06	**COMPLETED** 10/22/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 71.0 ft	**NORTHING** 190,423.2	**EASTING** 2,278,740.9		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SEAN	



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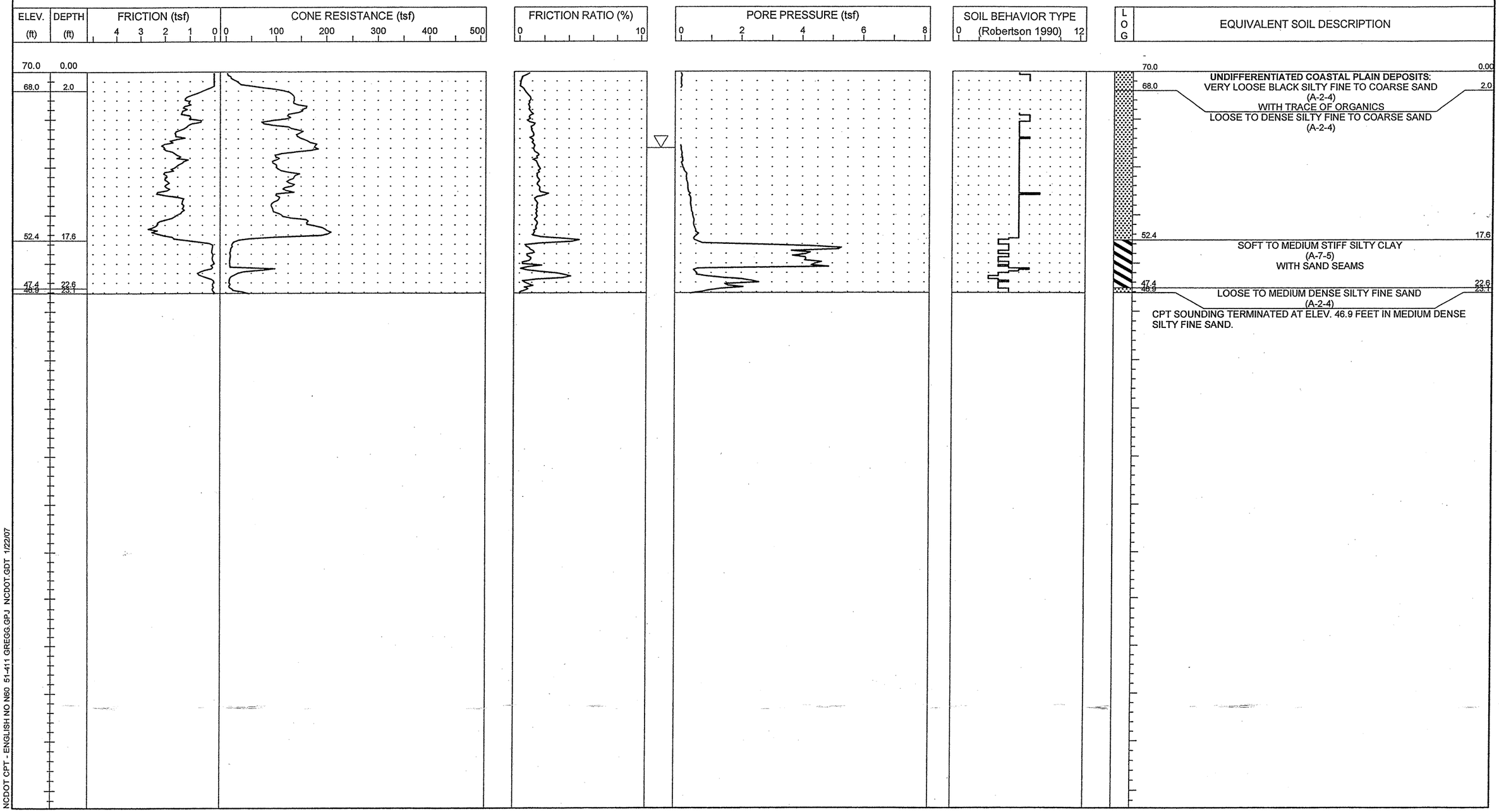
BORING LOG

PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON		**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US17 (Wilmington Bypass)				**GROUND WATER (ft)**	**TOTAL DEPTH** 23.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-29	**BORING LOCATION** 83+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 8.0	**DATE STARTED** 10/22/06	**COMPLETED** 10/22/06	**SURFACE WATER DEPTH** N/A	
COLLAR ELEV. 70.0 ft	**NORTHING** 190,607.5	**EASTING** 2,278,818.5		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN		



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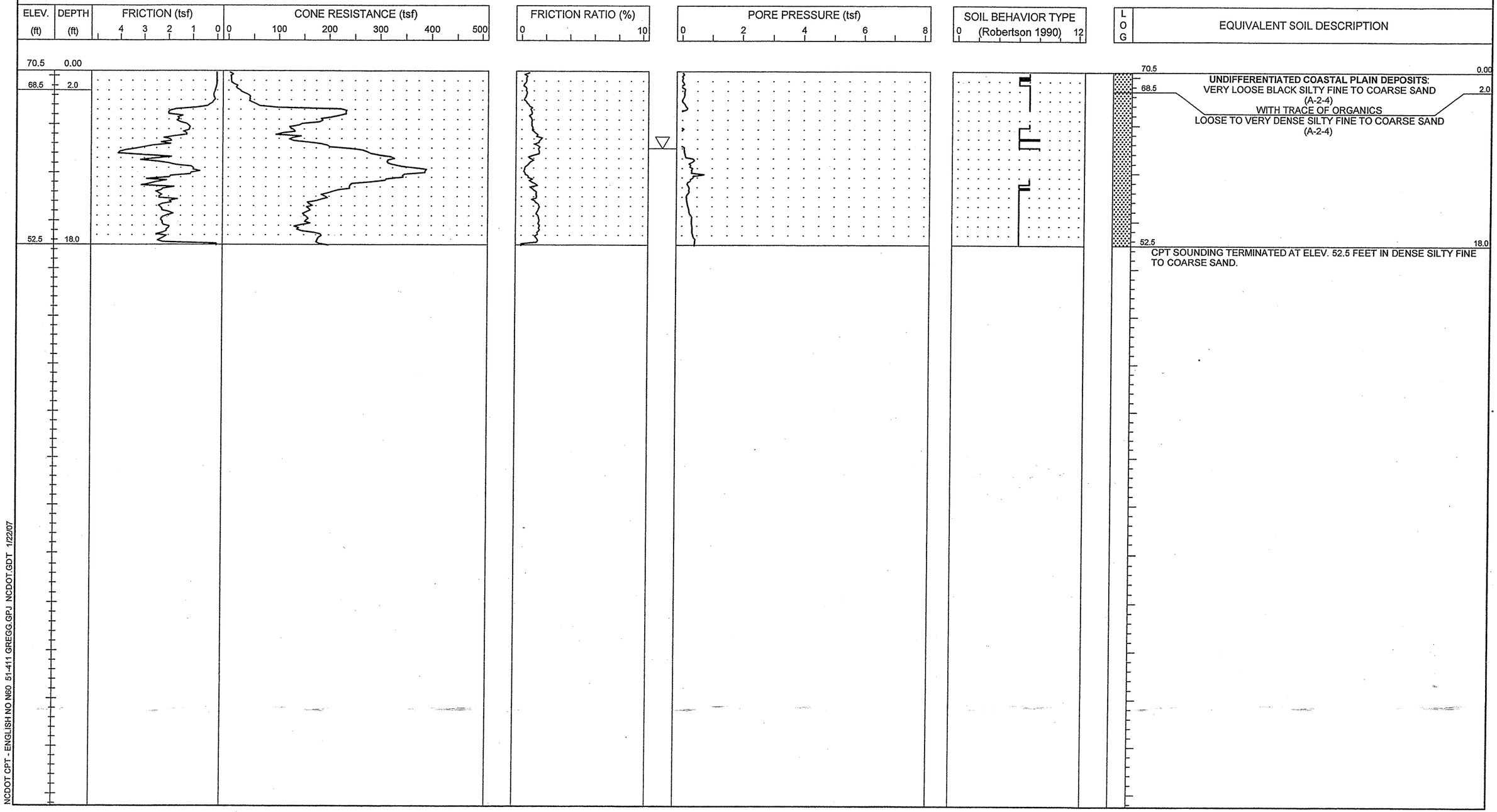
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON		**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US17 (Wilmington Bypass)				**GROUND WATER (ft)**	**TOTAL DEPTH** 18.0 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-30	**BORING LOCATION** 85+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 8.0	**DATE STARTED** 10/22/06	**COMPLETED** 10/22/06	**SURFACE WATER DEPTH** N/A	
COLLAR ELEV. 70.5 ft	**NORTHING** 190,790.2	**EASTING** 2,278,900.0		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN		



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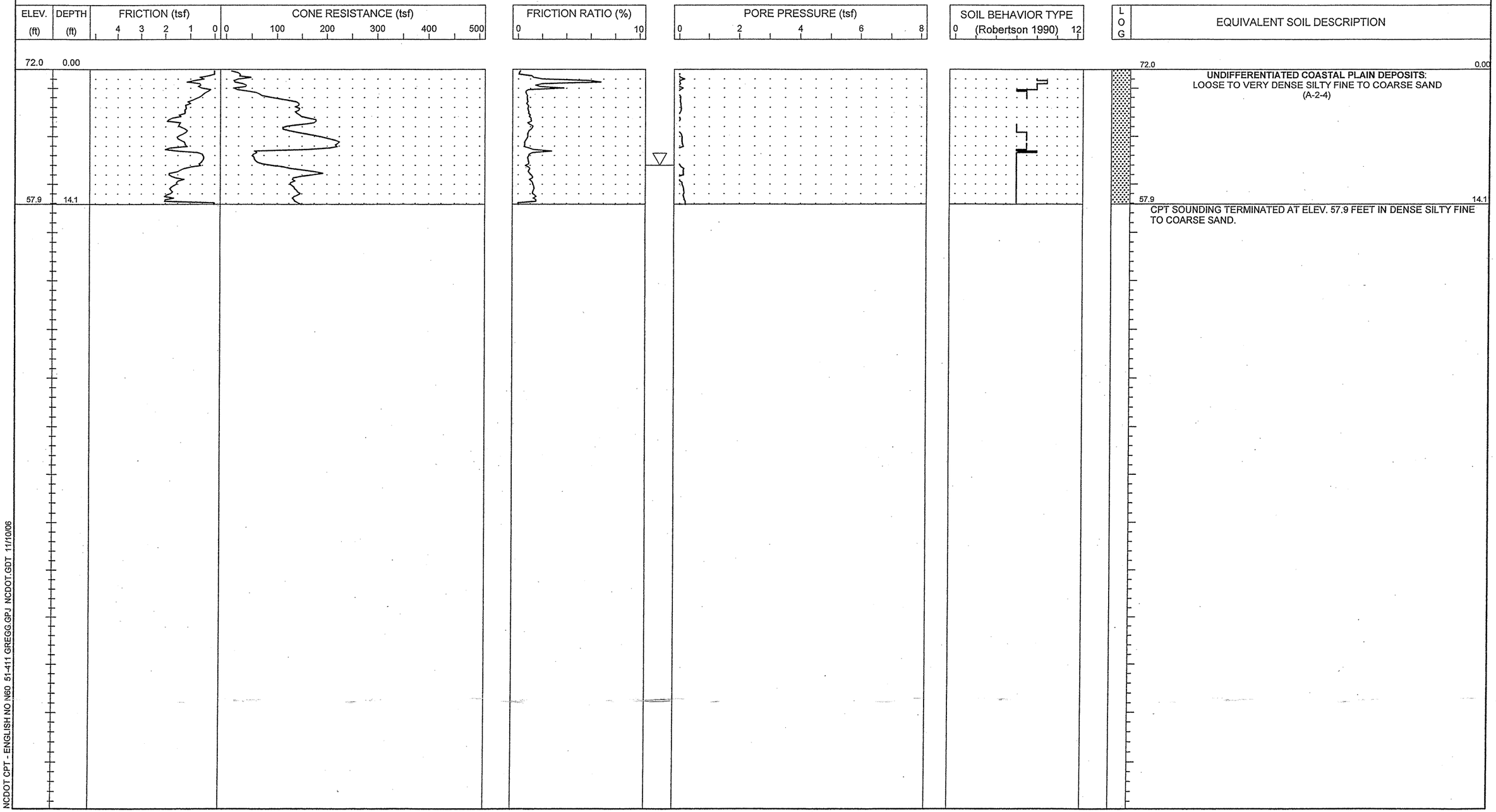
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 14.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-31	**BORING LOCATION** 87+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 10.0	**DATE STARTED** 10/22/06	**COMPLETED** 10/22/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 72.0 ft	**NORTHING** 190,970.4	**EASTING** 2,278,986.6		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SEAN	



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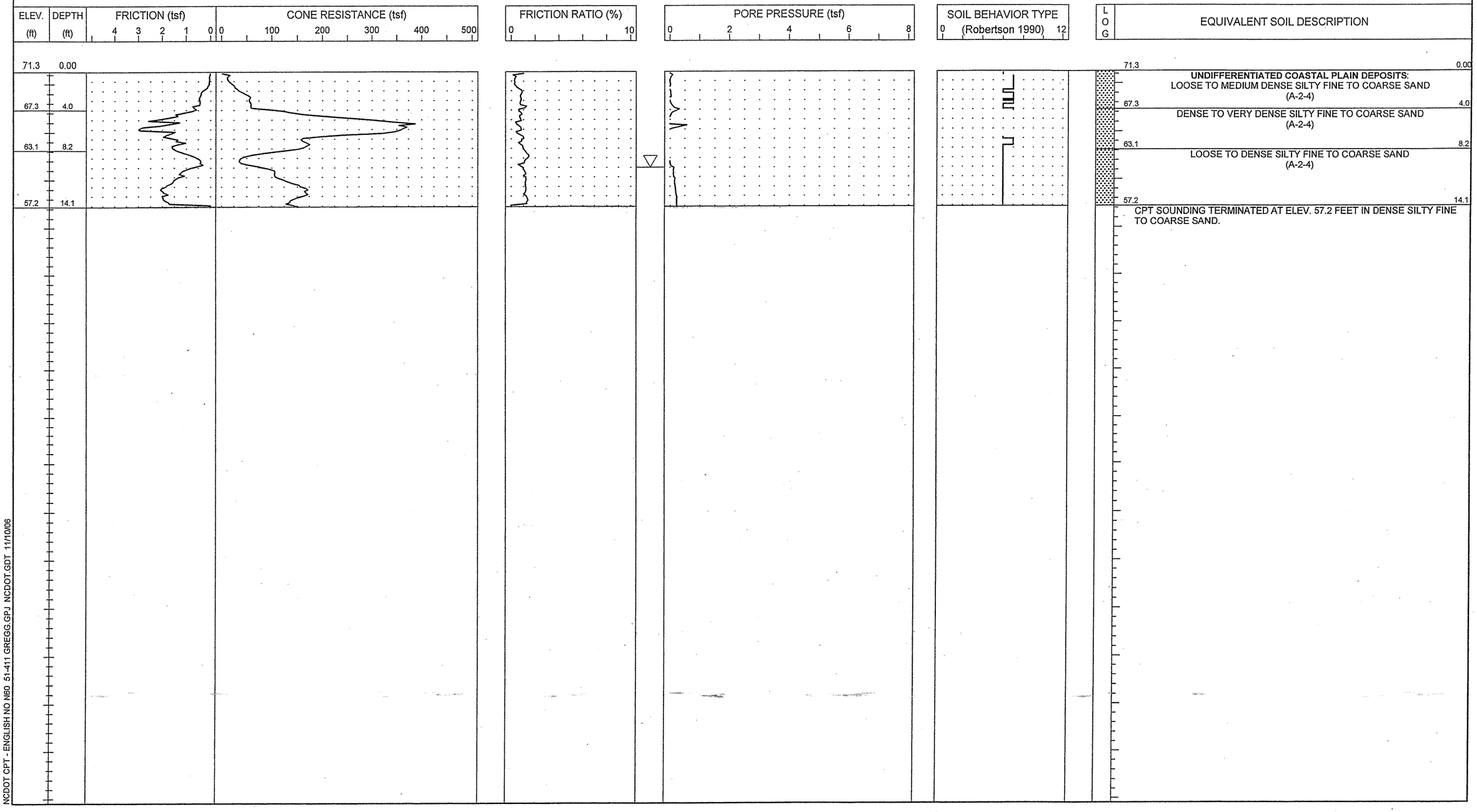
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf		
SITE DESCRIPTION US17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 14.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A	
BORING NO. C-32	**BORING LOCATION** 89+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 10.0	**DATE STARTED** 10/22/06	**COMPLETED** 10/22/06	**SURFACE WATER DEPTH** N/A	
COLLAR ELEV. 71.3 ft	**NORTHING** 191,147.5	**EASTING** 2,279,079.5		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SEAN		



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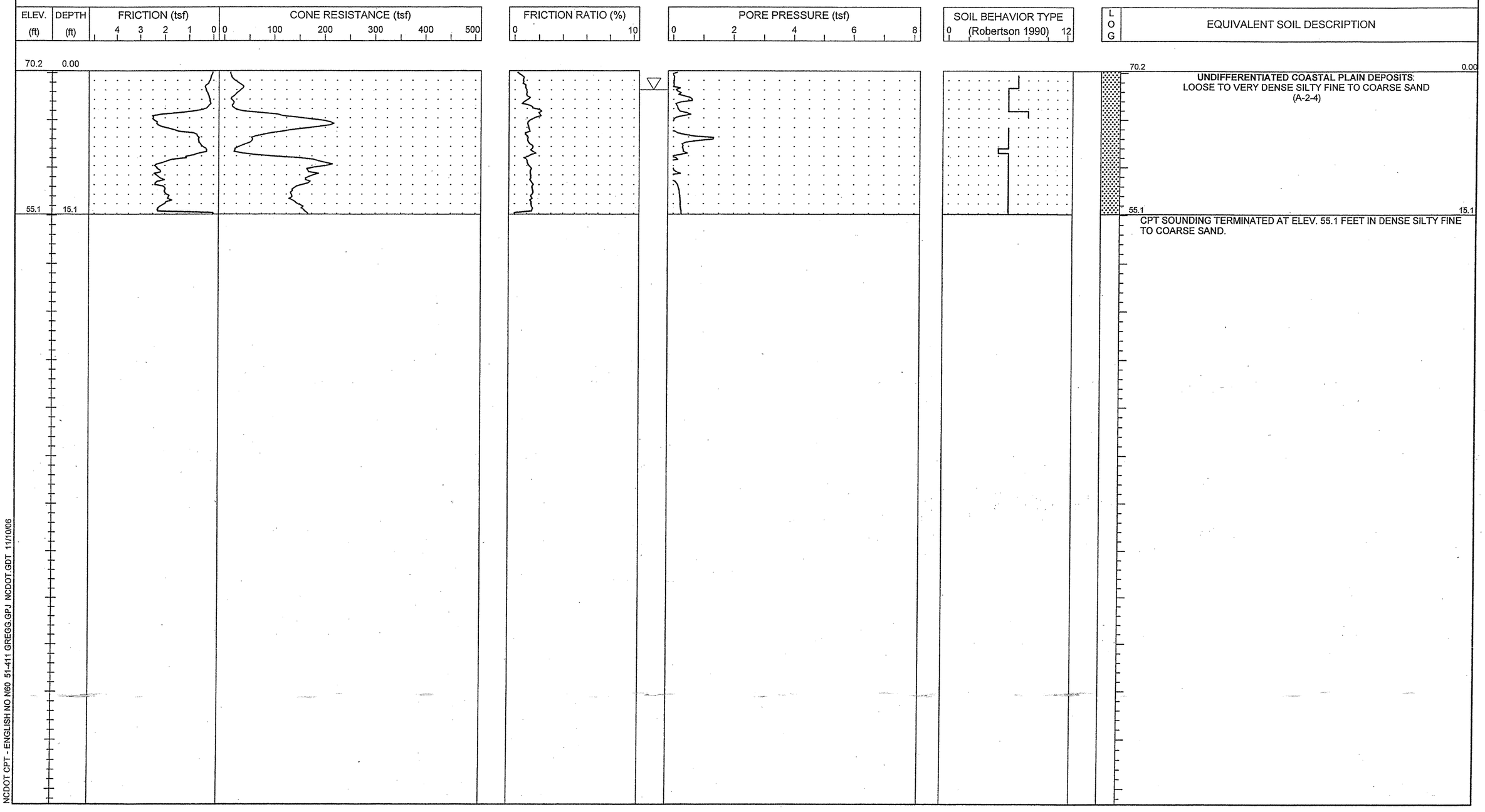
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 15.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-33	**BORING LOCATION** 91+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 2.0	**DATE STARTED** 10/23/06	**COMPLETED** 10/23/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 70.2 ft	**NORTHING** 191,321.3	**EASTING** 2,279,178.4		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SEAN	



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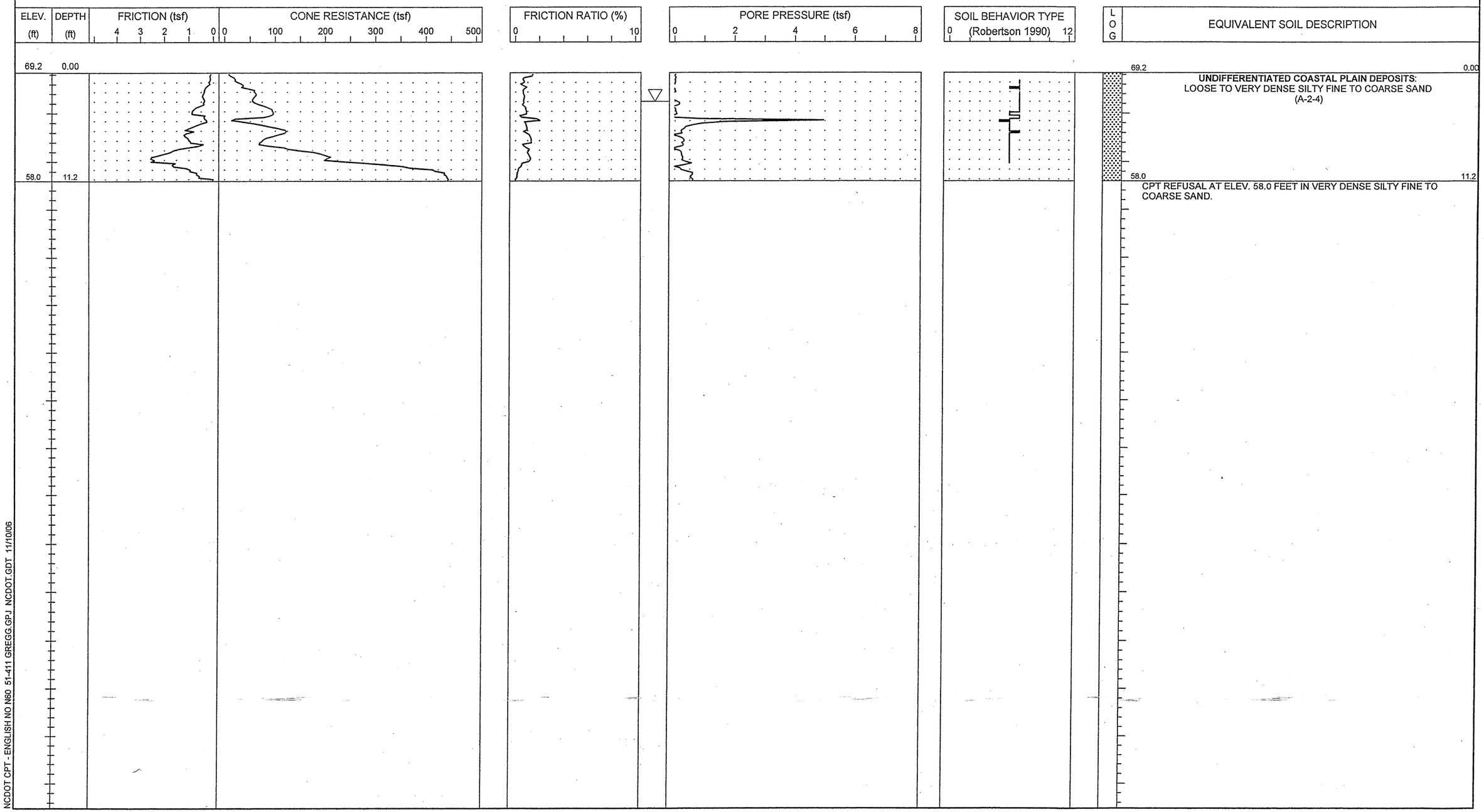
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 11.2 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-34	**BORING LOCATION** 93+00	**OFFSET** 0.0 ft CL **ALIGNMENT** -L-	**0 HR.** 3.0	**DATE STARTED** 10/23/06	**COMPLETED** 10/23/06	**SURFACE WATER DEPTH** N/A	
COLLAR ELEV. 69.2 ft	**NORTHING** 191,491.6	**EASTING** 2,279,283.3	**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SEAN		



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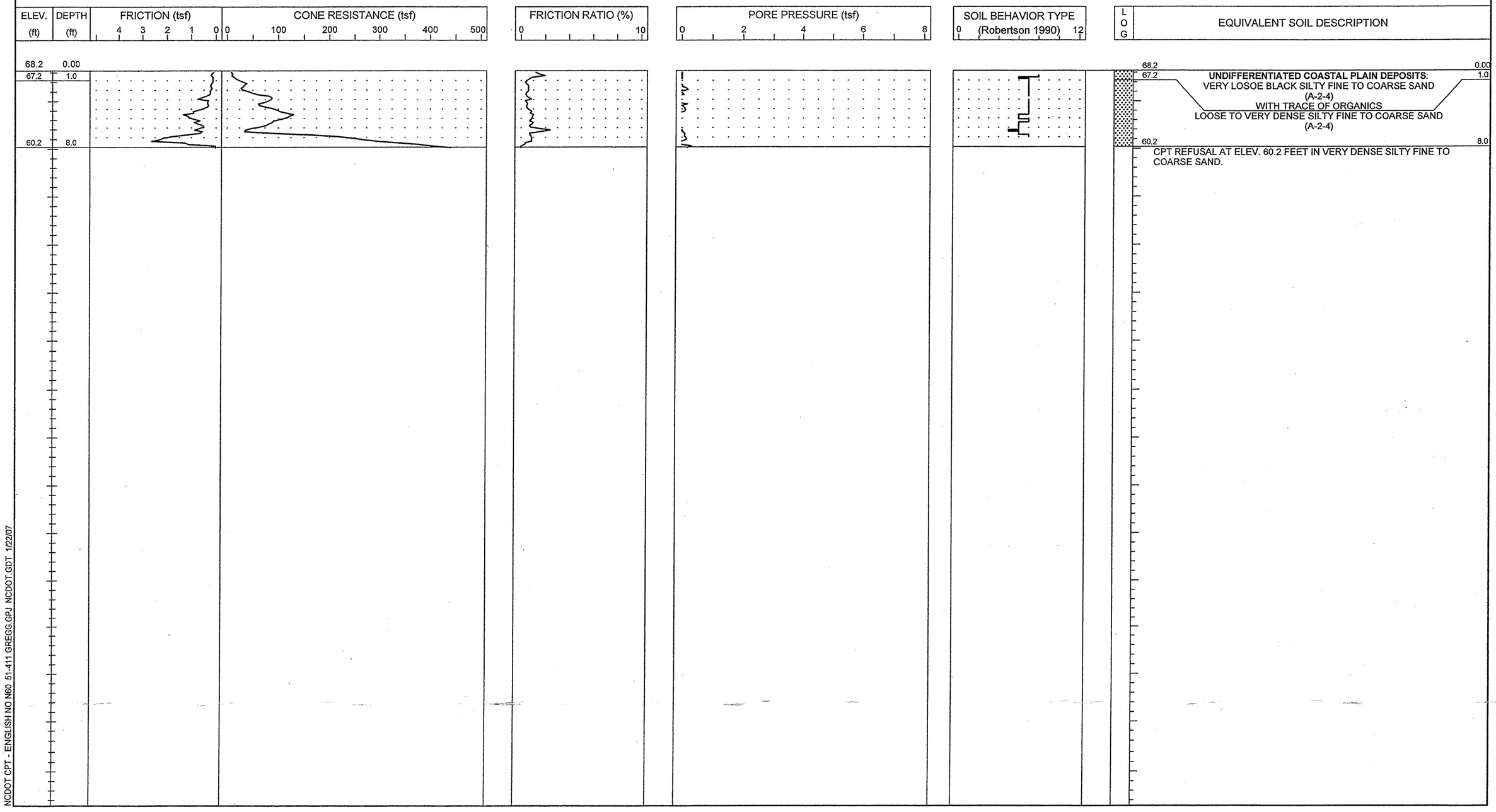
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON		**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf
SITE DESCRIPTION US17 (Wilmington Bypass)				**GROUND WATER (ft)**	**TOTAL DEPTH** 8.0 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-35	**BORING LOCATION** 95+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** N/M	**DATE STARTED** 10/23/06	**COMPLETED** 10/23/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 68.2 ft	**NORTHING** 191,658.1	**EASTING** 2,279,394.1		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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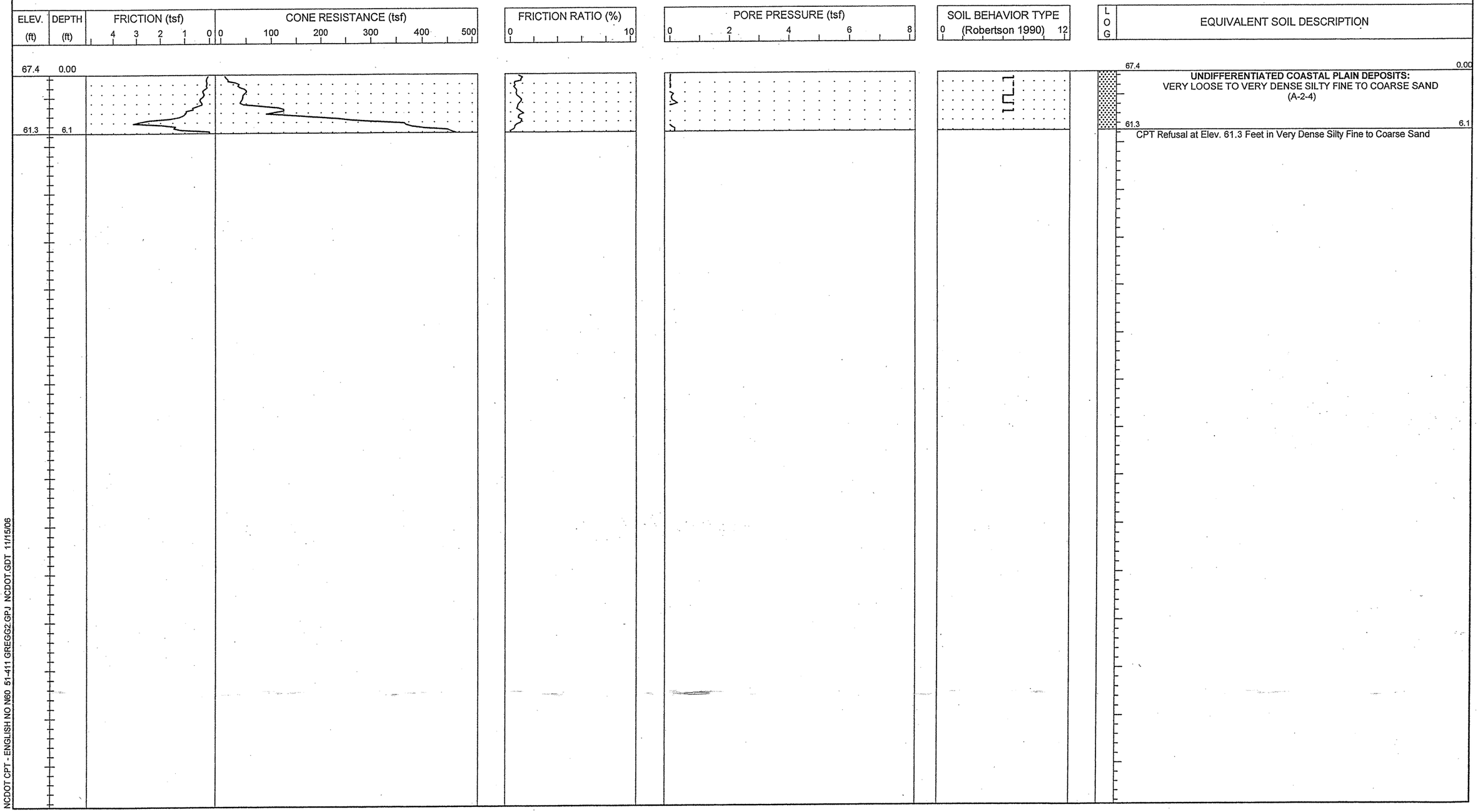
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 6.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-36	**BORING LOCATION** 97+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** N/M	**DATE STARTED** 10/23/06	**COMPLETED** 10/23/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 67.4 ft	**NORTHING** 191,820.7	**EASTING** 2,279,510.6		**24 HR.** N/A	**DRILLER:** A. MARTIN	**TECHNICIAN** J. WALKER	



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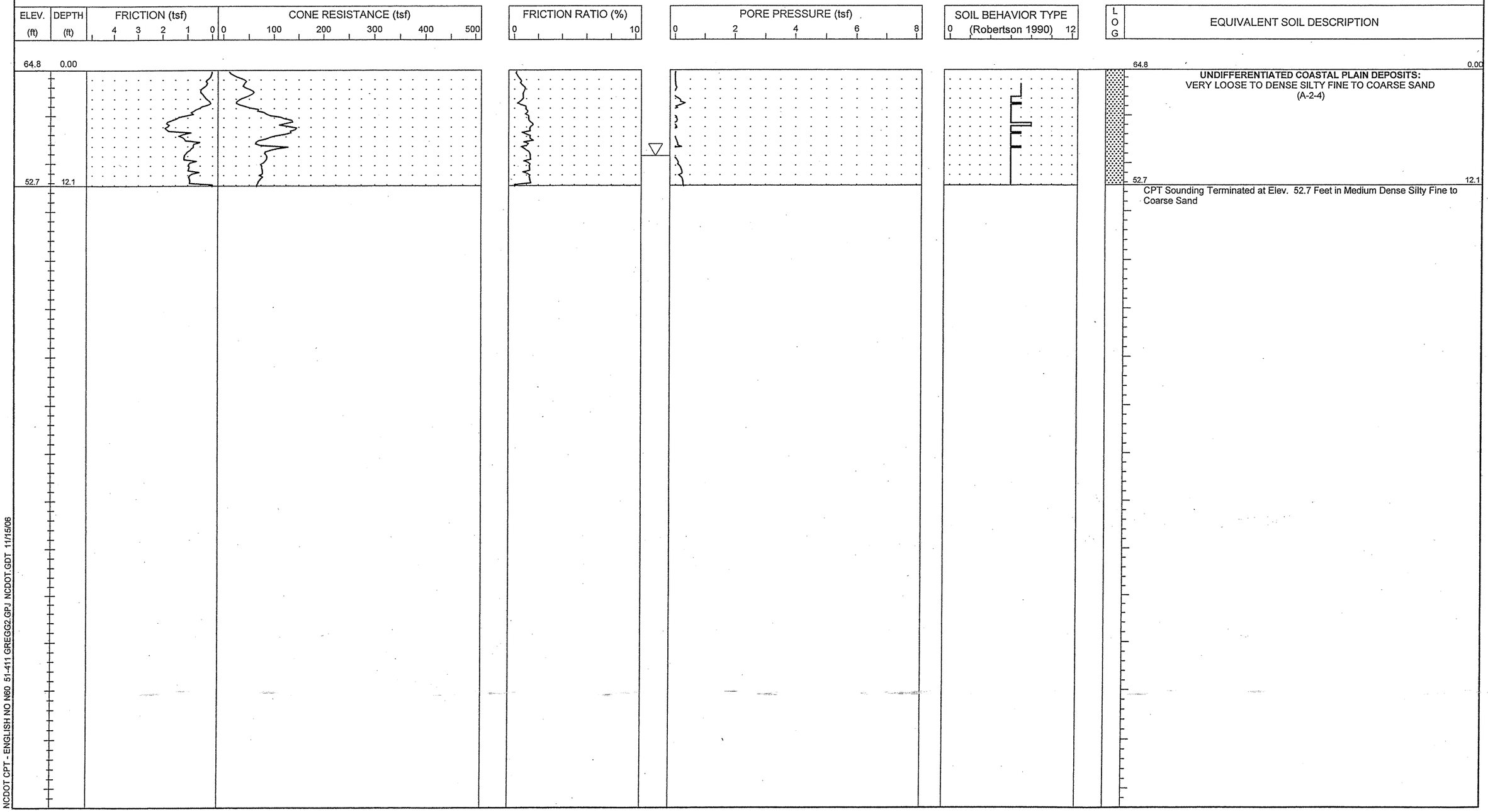
BORING LOG

PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 12.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-37	**BORING LOCATION** 99+00	**OFFSET** 0.0 ft CL **ALIGNMENT** -L-	**0 HR.** 9.0	**DATE STARTED** 10/23/06	**COMPLETED** 10/23/06	**SURFACE WATER DEPTH** N/A	
COLLAR ELEV. 64.8 ft	**NORTHING** 191,979.1	**EASTING** 2,279,632.6	**24 HR.** N/A	**DRILLER:** A. MARTIN	**TECHNICIAN** J. WALKER		



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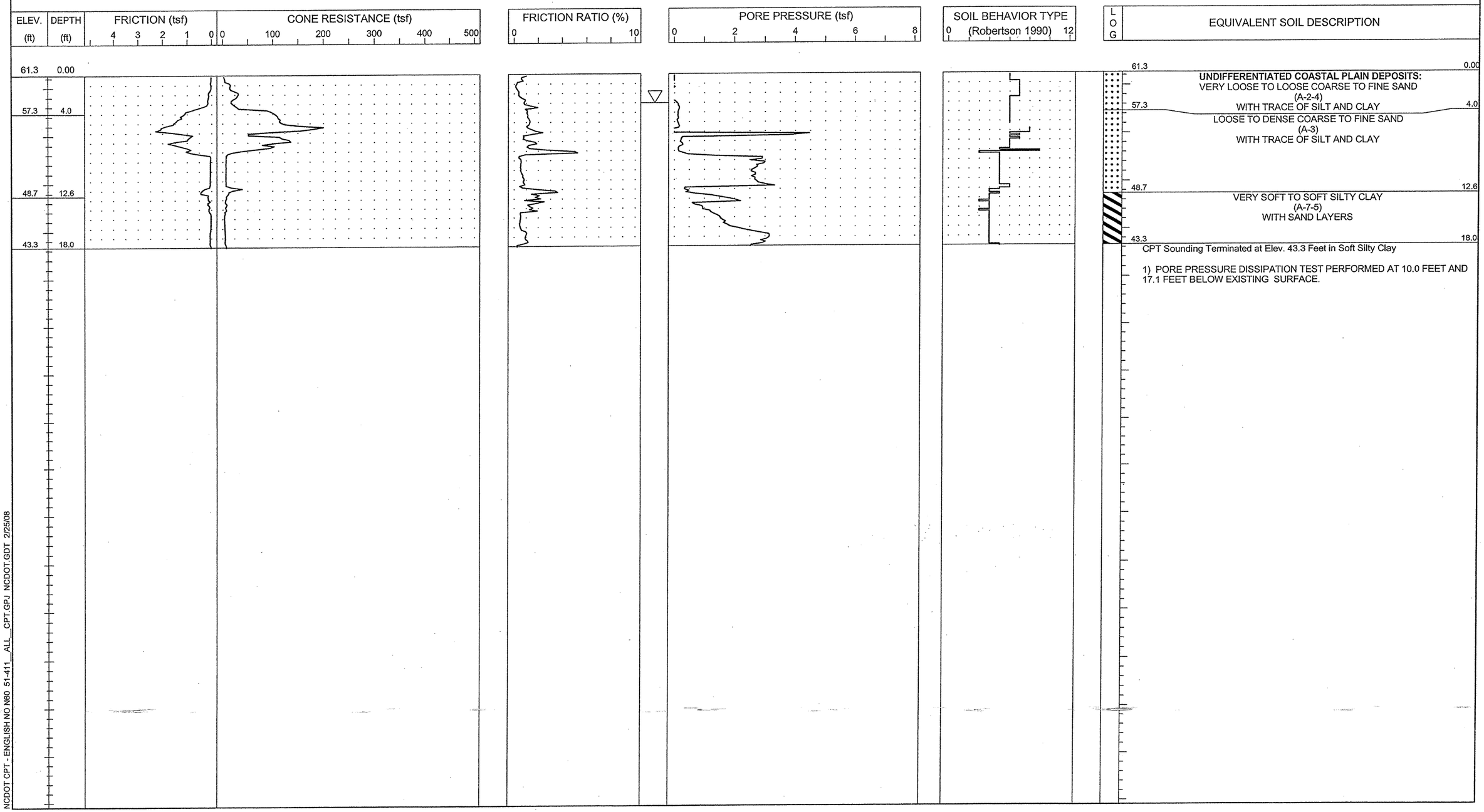
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON		**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf
SITE DESCRIPTION US 17 (Wilmington Bypass)				**GROUND WATER (ft)**	**TOTAL DEPTH** 18.0 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C- 38	**BORING LOCATION** 101+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 3.0	**DATE STARTED** 10/23/06	**COMPLETED** 10/23/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 61.3 ft	**NORTHING** 192,133.2	**EASTING** 2,279,760.2		**24 HR.** N/A	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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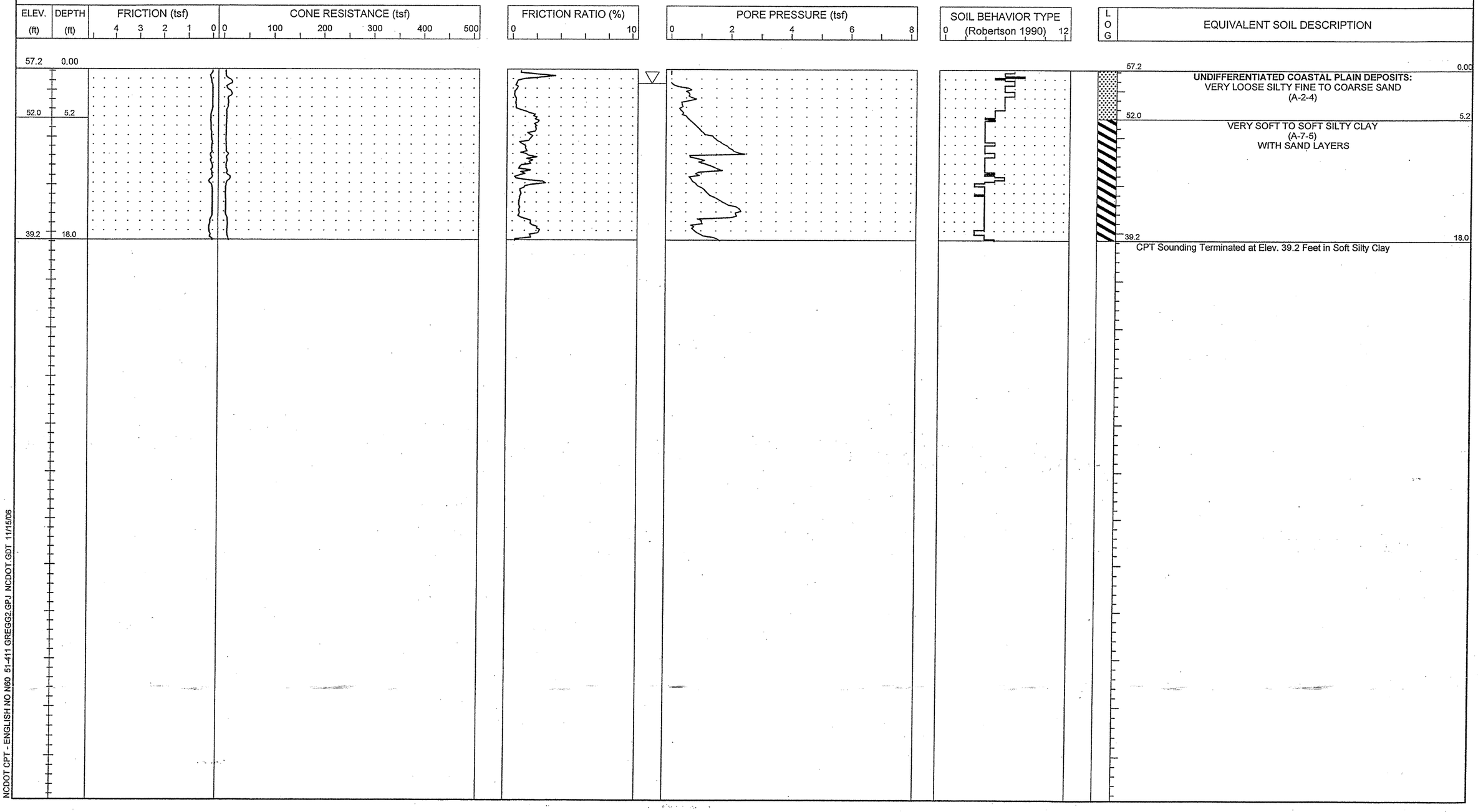
BORING LOG

PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 18.0 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-39	**BORING LOCATION** 103+00	**OFFSET** 0.0 ft CL **ALIGNMENT** -L-	**0 HR.** 1.5	**DATE STARTED** 10/23/06	**COMPLETED** 10/23/06	**SURFACE WATER DEPTH** N/A	
COLLAR ELEV. 57.2 ft	**NORTHING** 192,282.7	**EASTING** 2,279,892.9	**24 HR.** N/A	**DRILLER:** A. MARTIN	**TECHNICIAN** J. WALKER		



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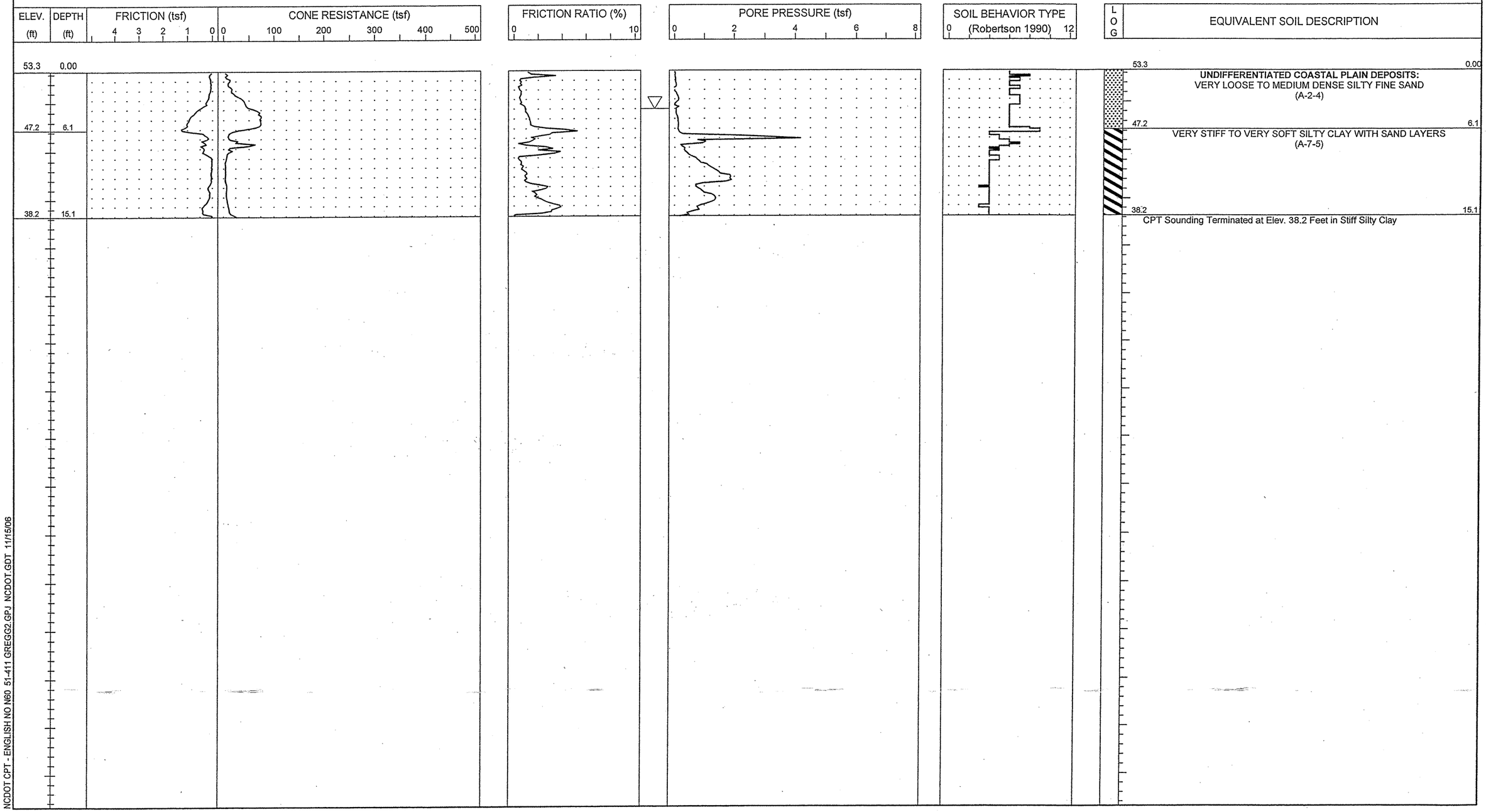
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 15.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-40	**BORING LOCATION** 105+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 4.0	**DATE STARTED** 10/23/06	**COMPLETED** 10/23/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 53.3 ft	**NORTHING** 192,427.5	**EASTING** 2,280,030.9		**24 HR.** N/A	**DRILLER:** A. MARTIN	**TECHNICIAN** J. WALKER	



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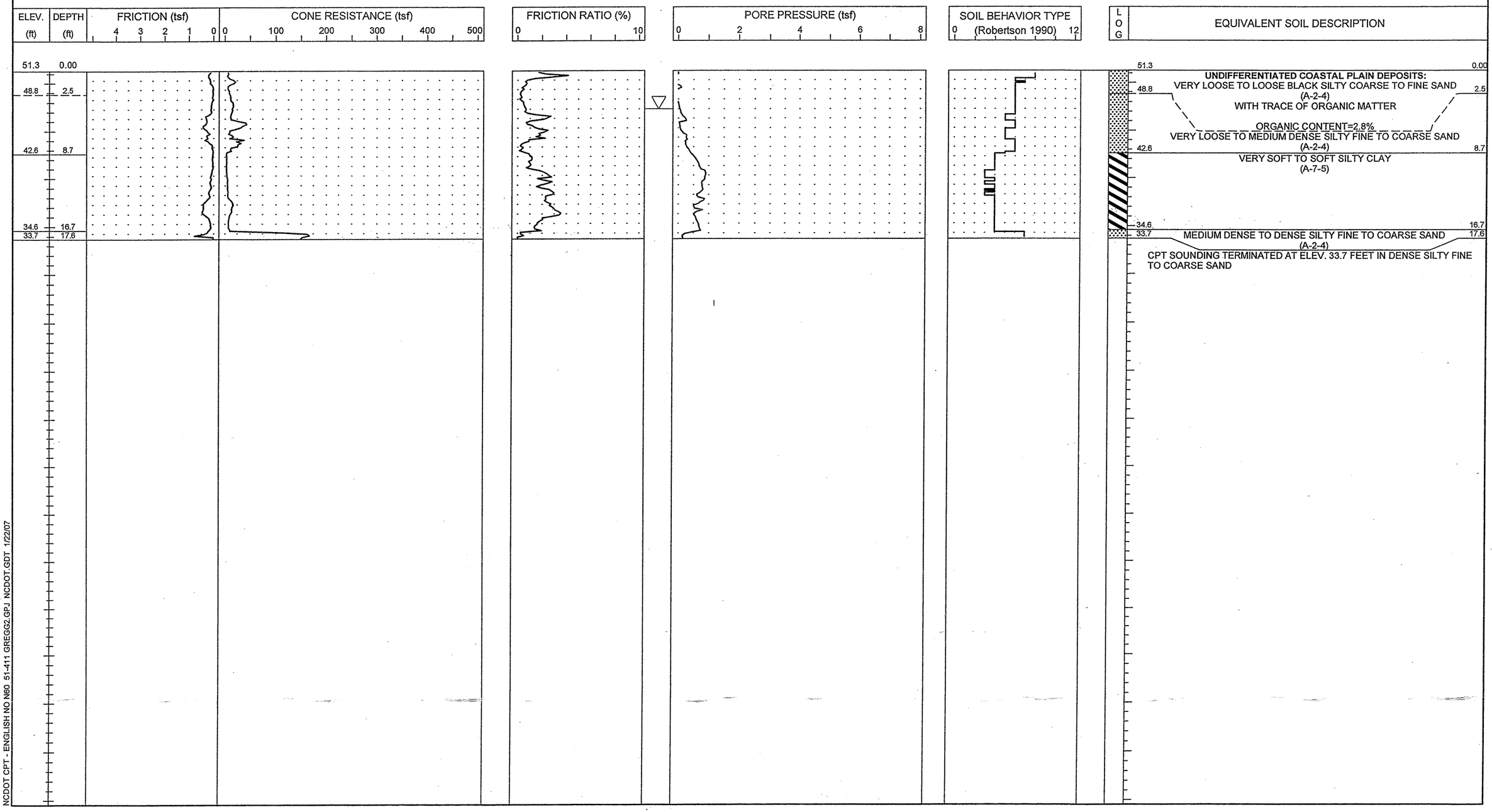
BORING LOG

PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 17.6 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-41	**BORING LOCATION** 106+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 4.0	**DATE STARTED** 10/23/06	**COMPLETED** 10/23/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 51.3 ft	**NORTHING** 192,498.1	**EASTING** 2,280,101.7		**24 HR.** N/A	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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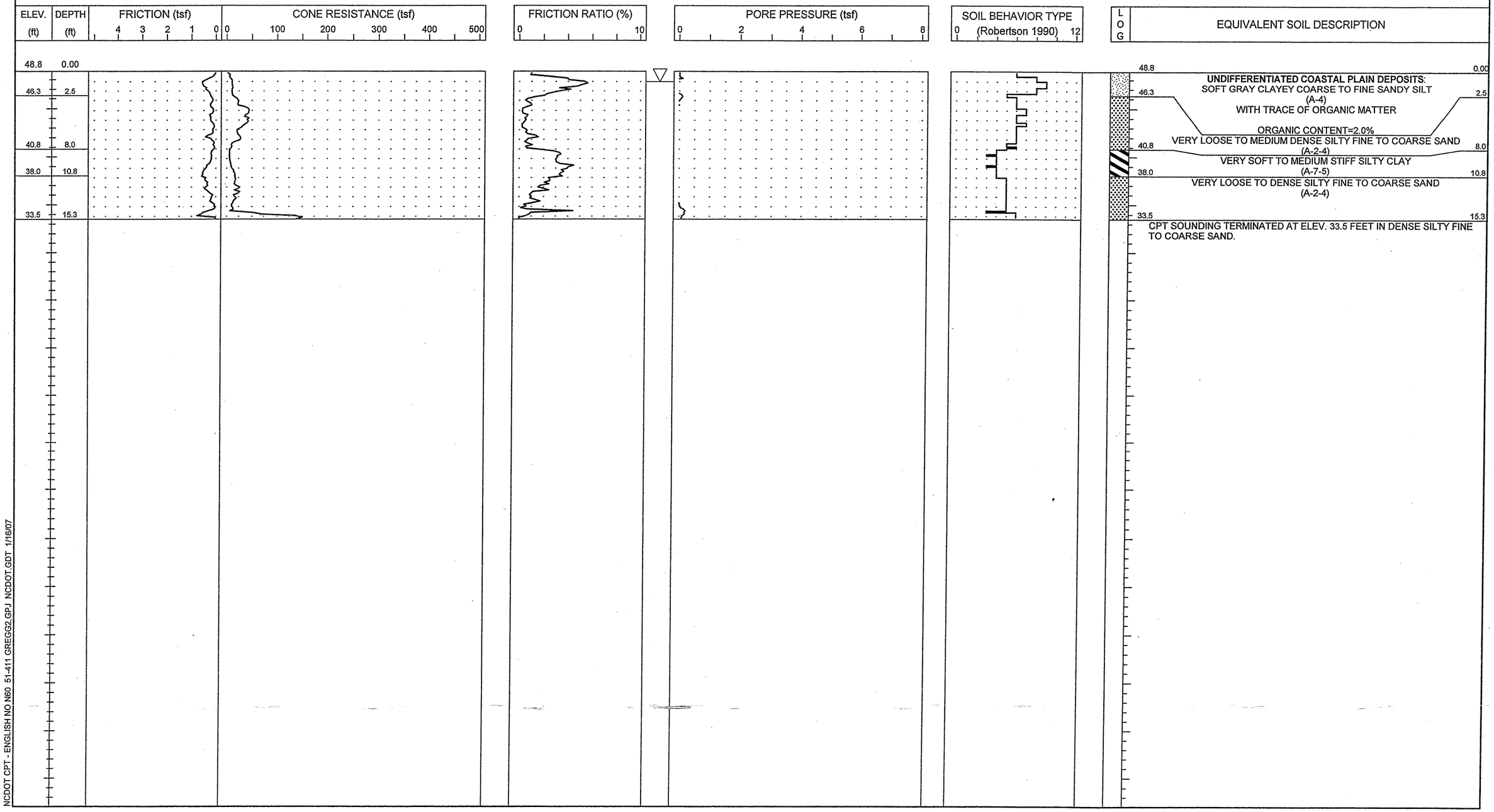
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 15.3 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-42	**BORING LOCATION** 108+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 1.0	**DATE STARTED** 10/23/06	**COMPLETED** 10/23/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 48.8 ft	**NORTHING** 192,635.6	**EASTING** 2,280,247.0		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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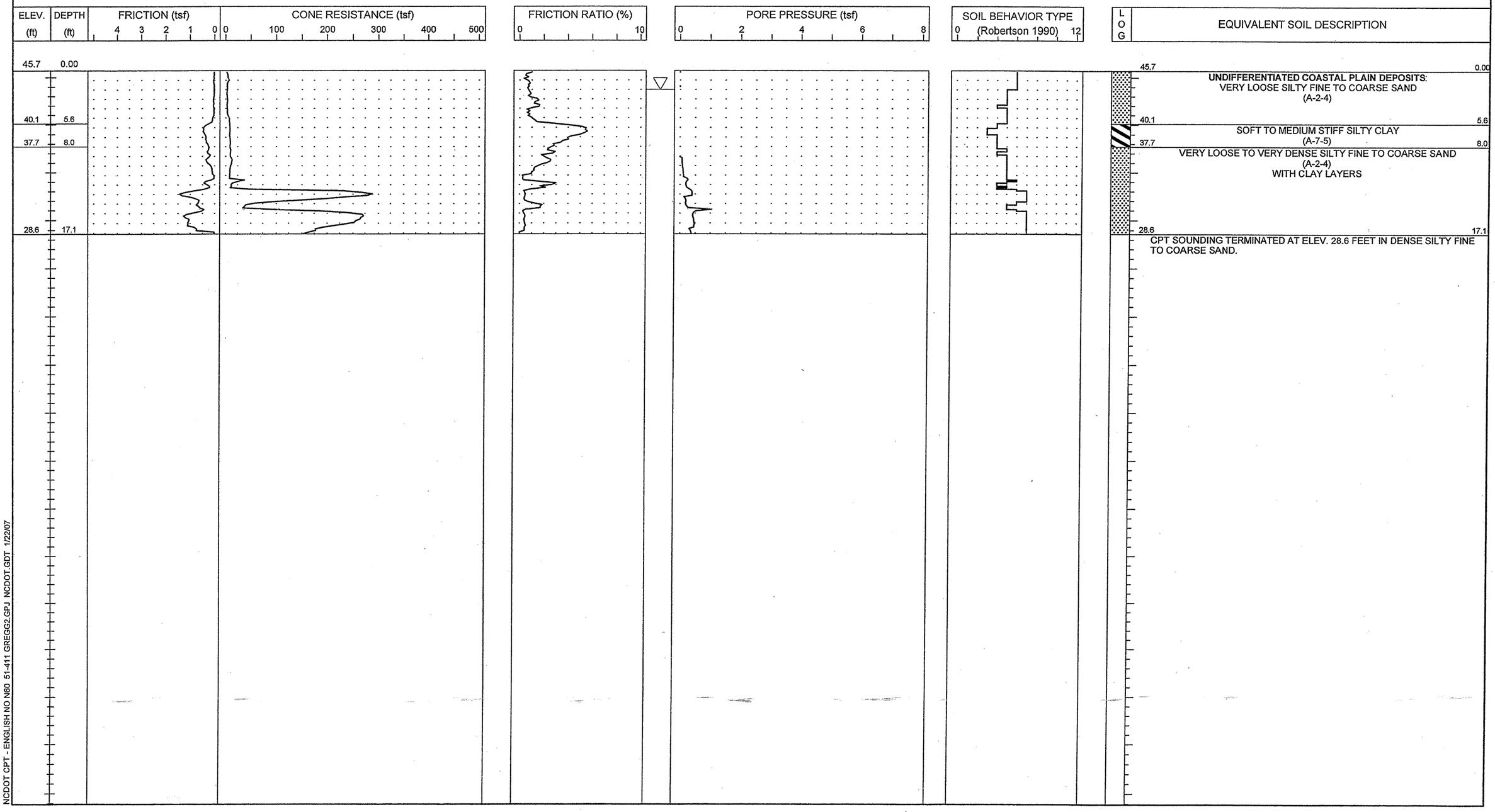
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 17.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-43	**BORING LOCATION** 110+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 2.0	**DATE STARTED** 10/23/06	**COMPLETED** 10/23/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 45.7 ft	**NORTHING** 192,767.9	**EASTING** 2,280,396.9		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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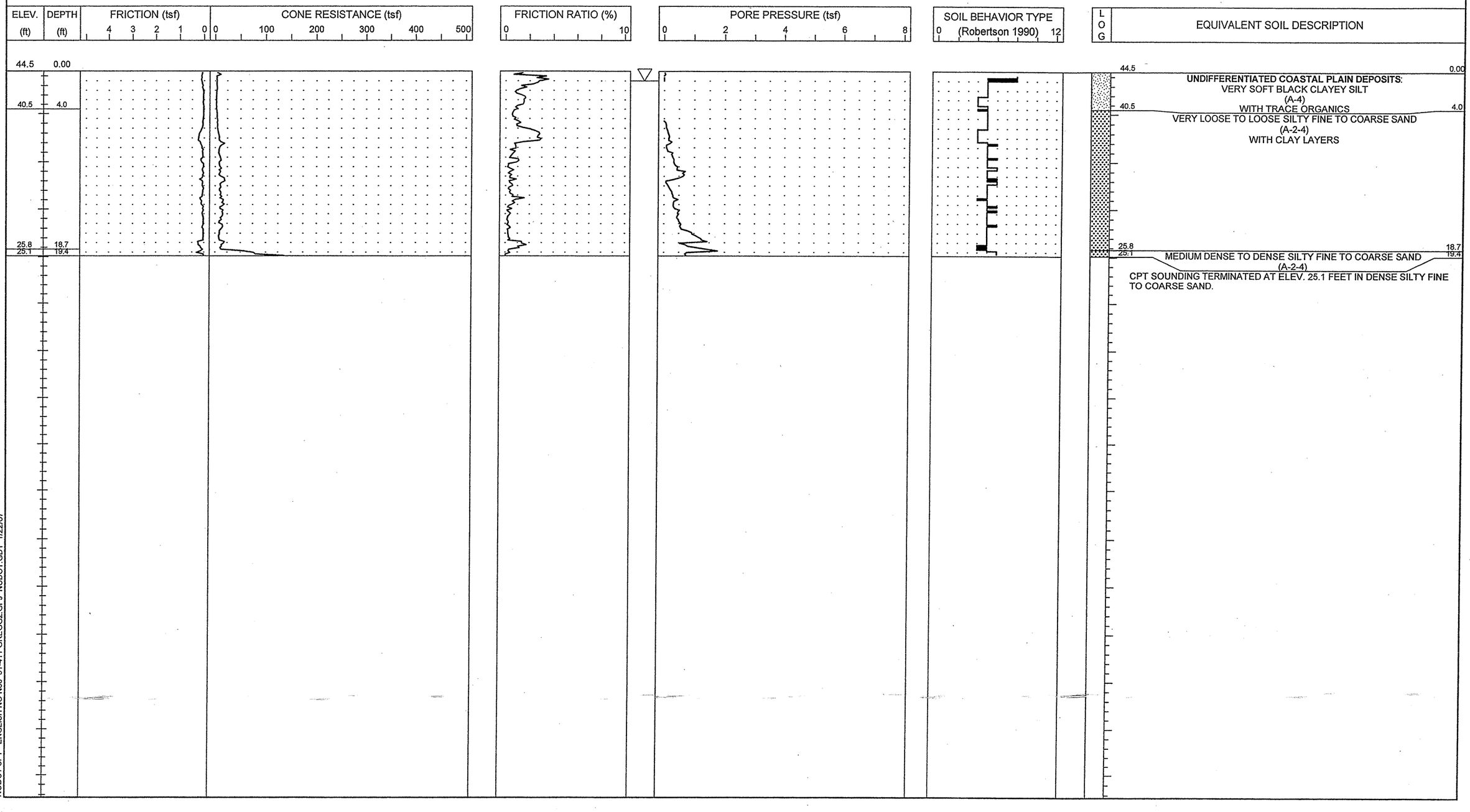
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 19.4 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-44	**BORING LOCATION** 112+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 1.0	**DATE STARTED** 10/23/06	**COMPLETED** 10/23/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 44.5 ft	**NORTHING** 192,894.9	**EASTING** 2,280,551.4		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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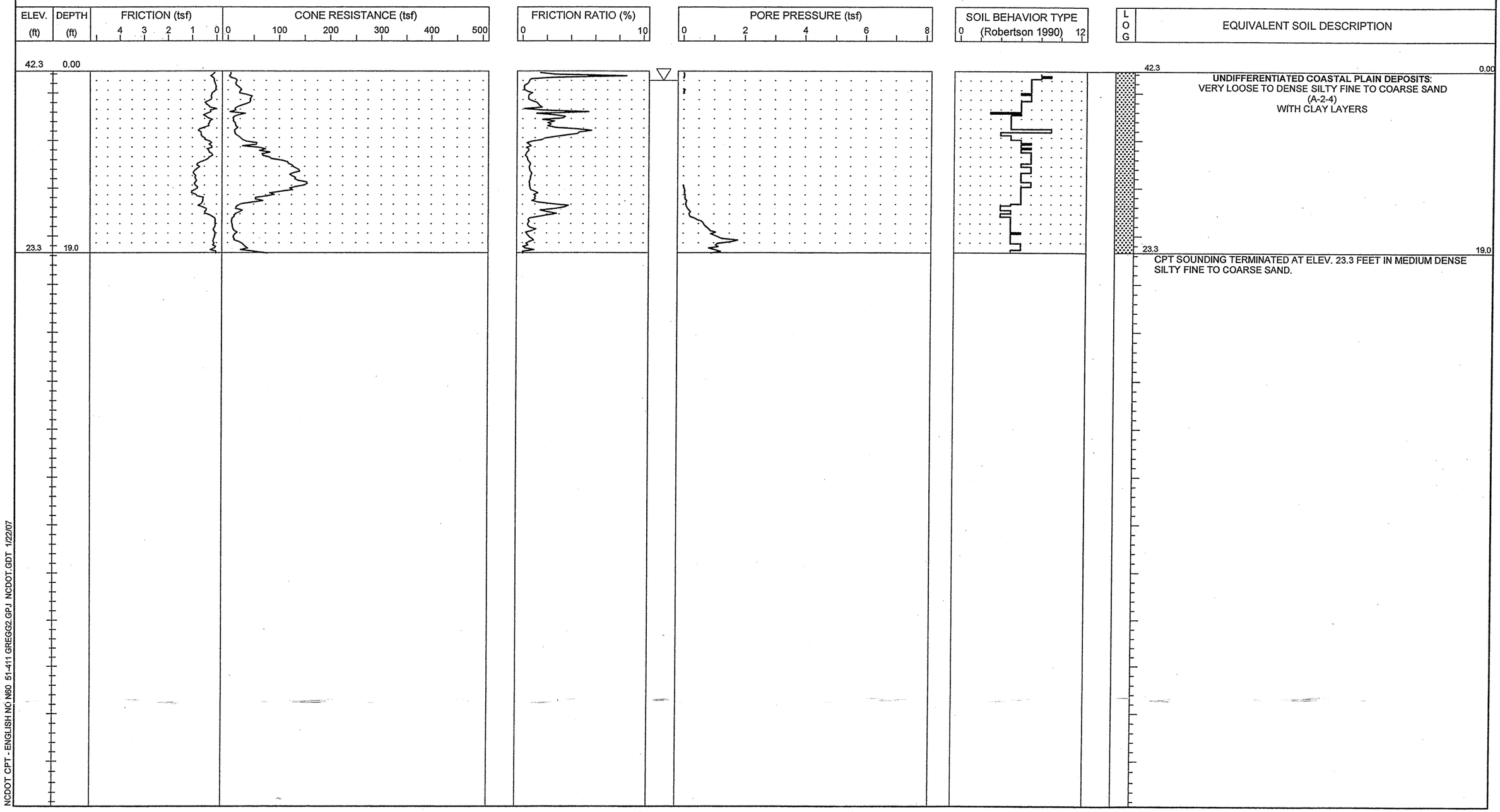
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 19.0 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-45	**BORING LOCATION** 114+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 1.0	**DATE STARTED** 10/23/06	**COMPLETED** 10/23/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 42.3 ft	**NORTHING** 193,016.4	**EASTING** 2,280,710.2		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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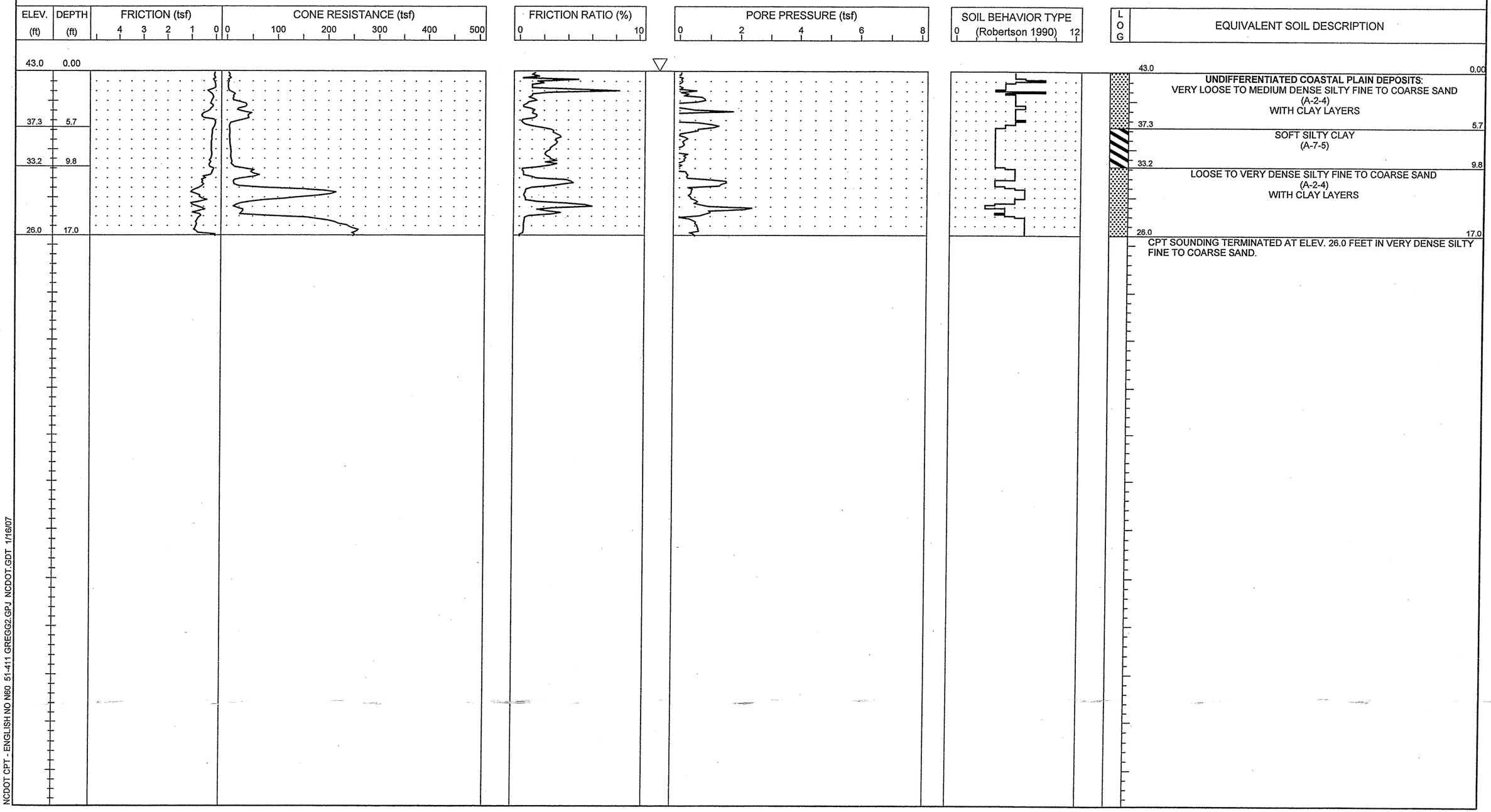
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 17.0 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-46	**BORING LOCATION** 116+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 0.0	**DATE STARTED** 10/23/06	**COMPLETED** 10/23/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 43.0 ft	**NORTHING** 193,132.4	**EASTING** 2,280,873.1		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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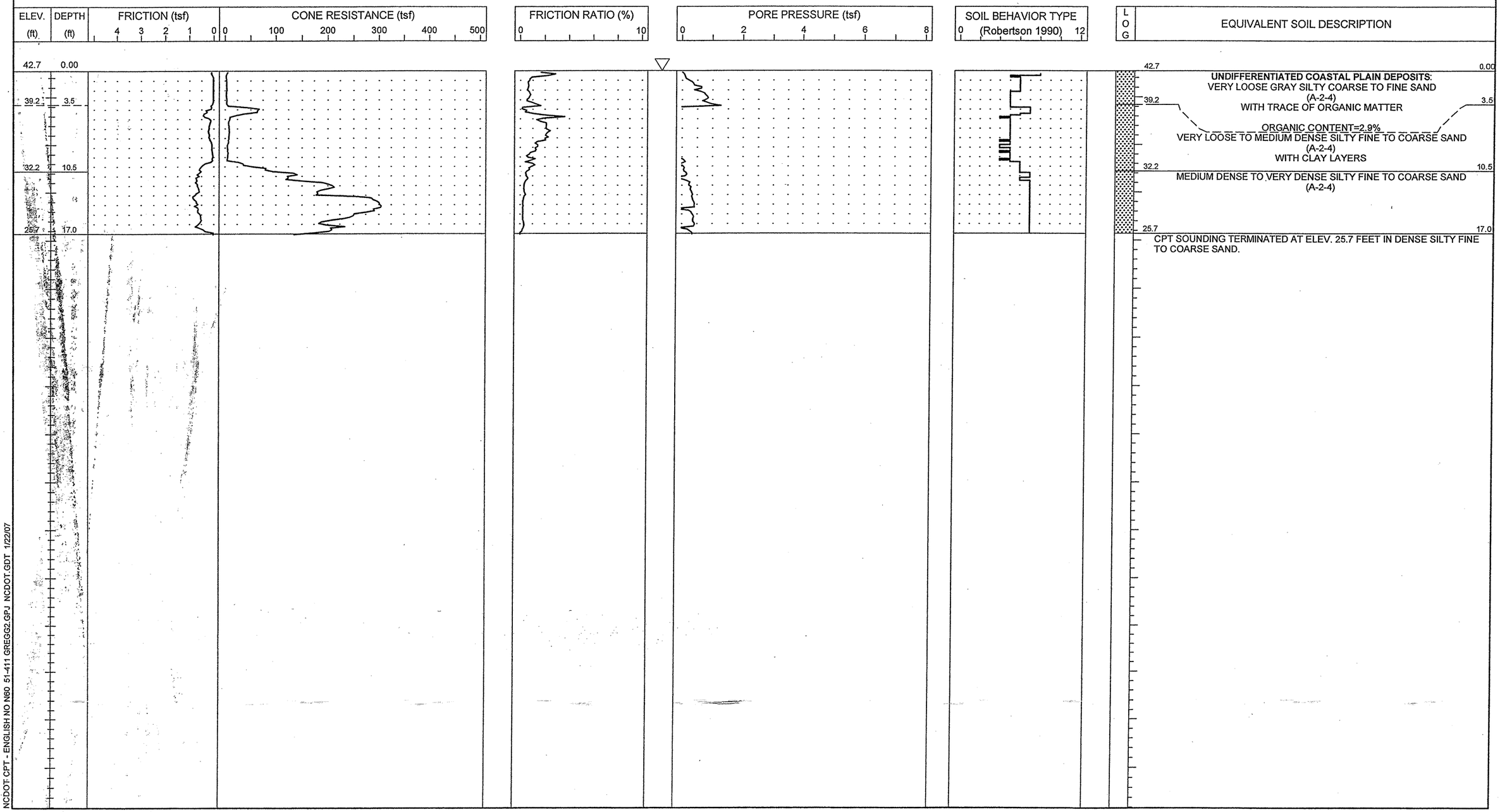
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 17.0 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-47	**BORING LOCATION** 118+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 0.0	**DATE STARTED** 10/23/06	**COMPLETED** 10/23/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 42.7 ft	**NORTHING** 193,242.6	**EASTING** 2,281,040.0		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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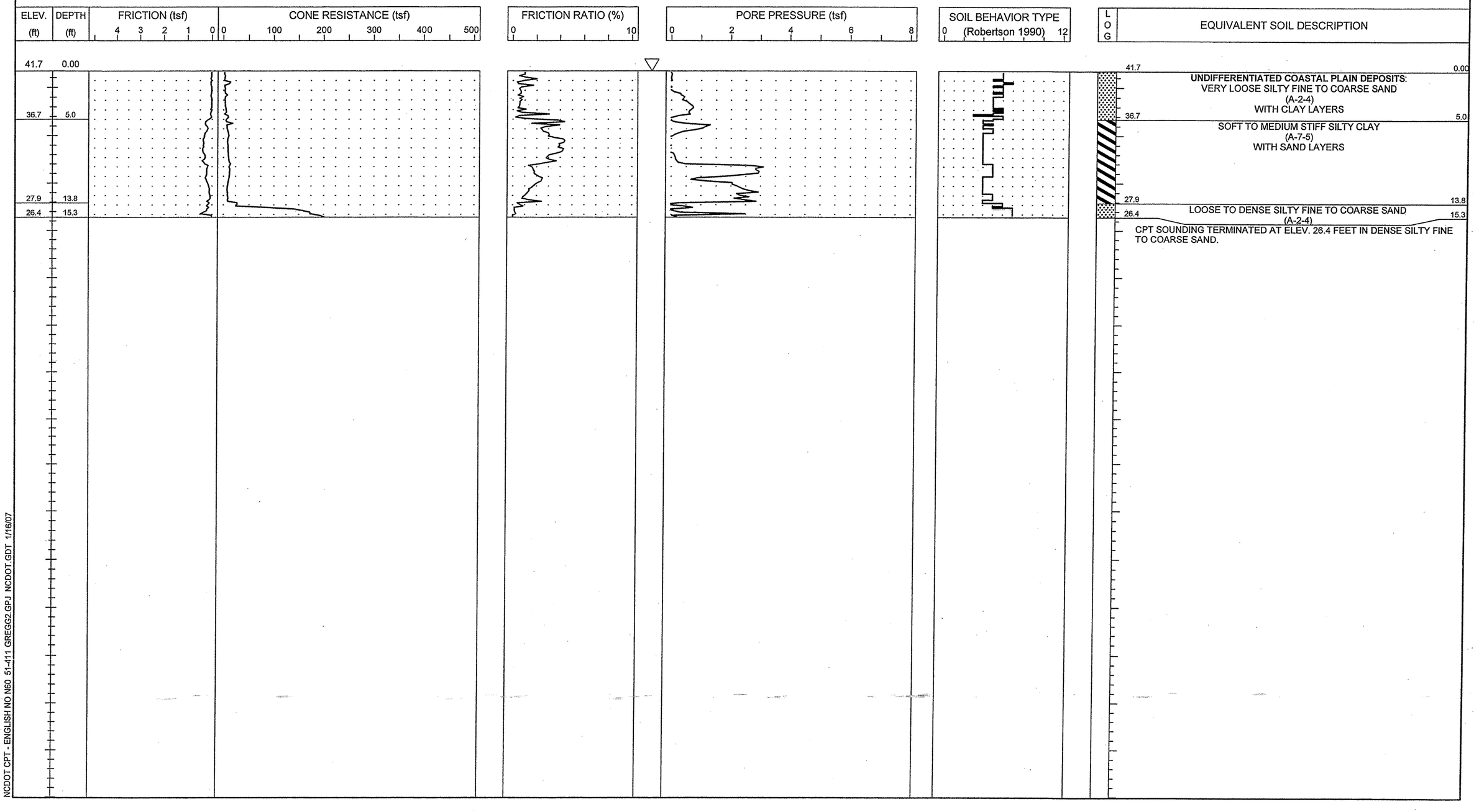
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 15.3 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-48	**BORING LOCATION** 120+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 0.0	**DATE STARTED** 10/23/06	**COMPLETED** 10/23/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 41.7 ft	**NORTHING** 193,347.0	**EASTING** 2,281,210.6		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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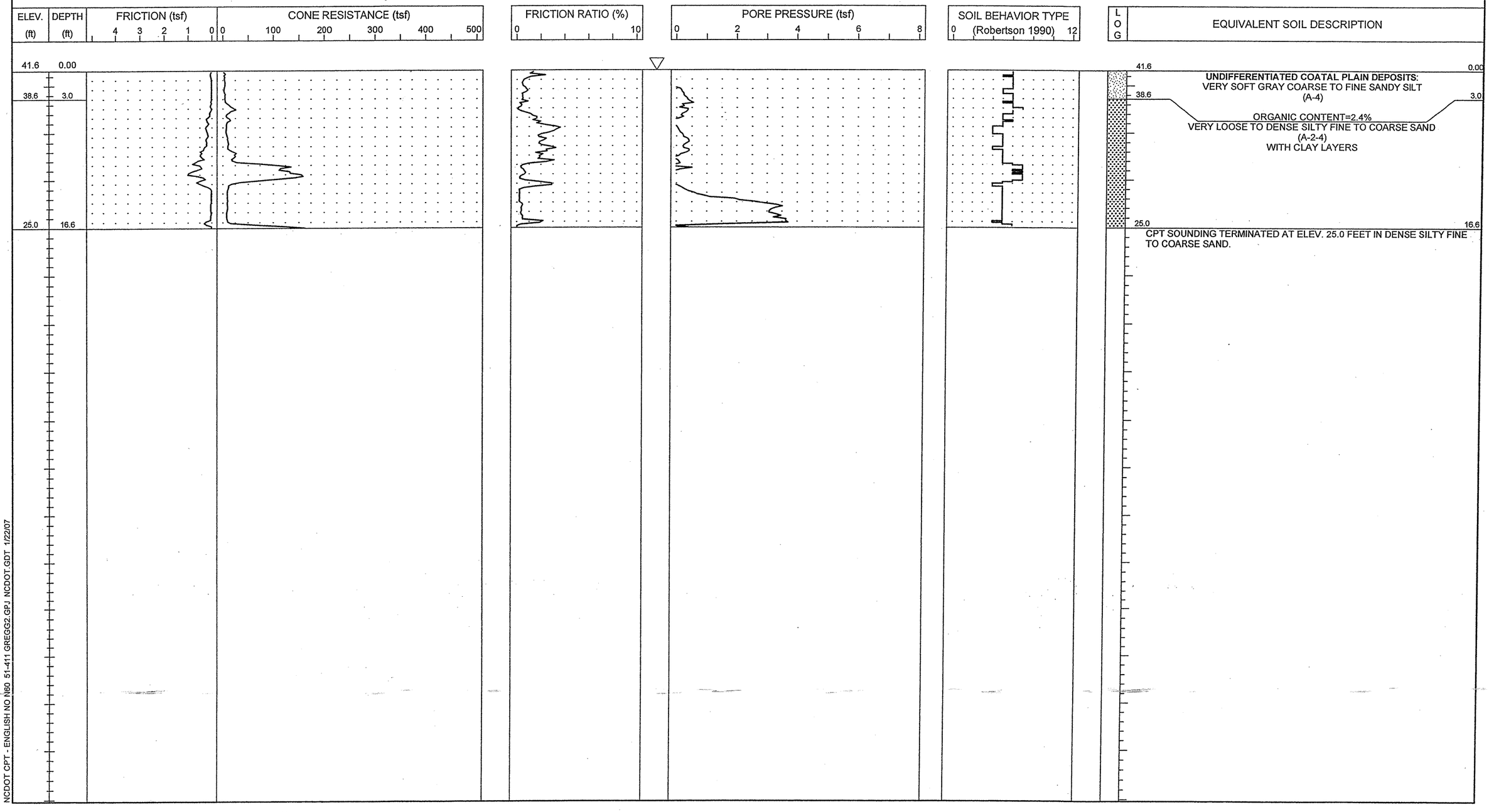
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 16.6 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-49	**BORING LOCATION** 122+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 0.0	**DATE STARTED** 10/23/06	**COMPLETED** 10/23/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 41.6 ft	**NORTHING** 193,445.4	**EASTING** 2,281,384.7		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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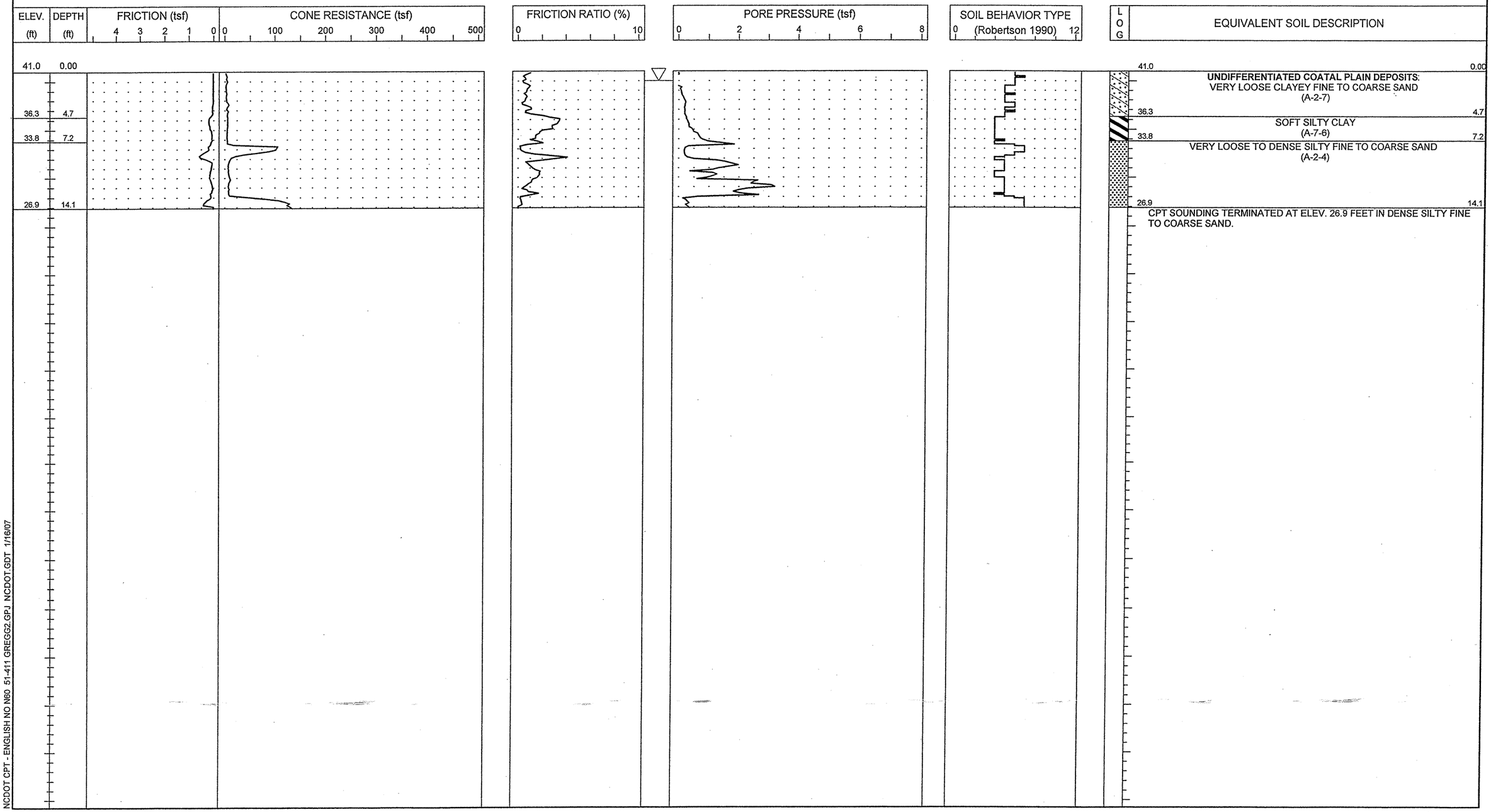
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 14.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-50	**BORING LOCATION** 124+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 1.0	**DATE STARTED** 10/23/06	**COMPLETED** 10/23/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 41.0 ft	**NORTHING** 193,537.6	**EASTING** 2,281,562.2		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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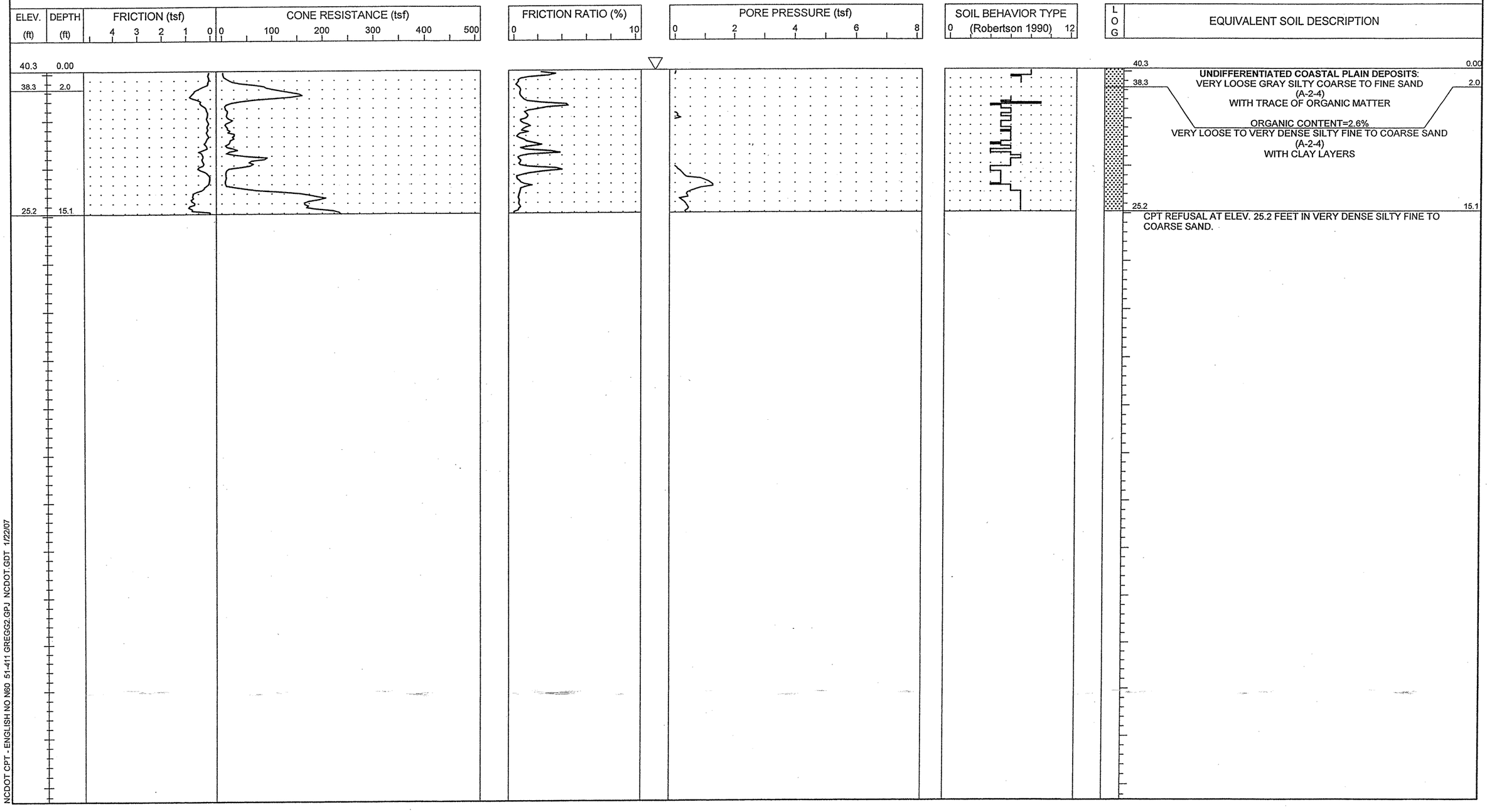
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 15.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-51	**BORING LOCATION** 126+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 0.0	**DATE STARTED** 10/23/06	**COMPLETED** 10/23/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 40.3 ft	**NORTHING** 193,623.6	**EASTING** 2,281,742.7		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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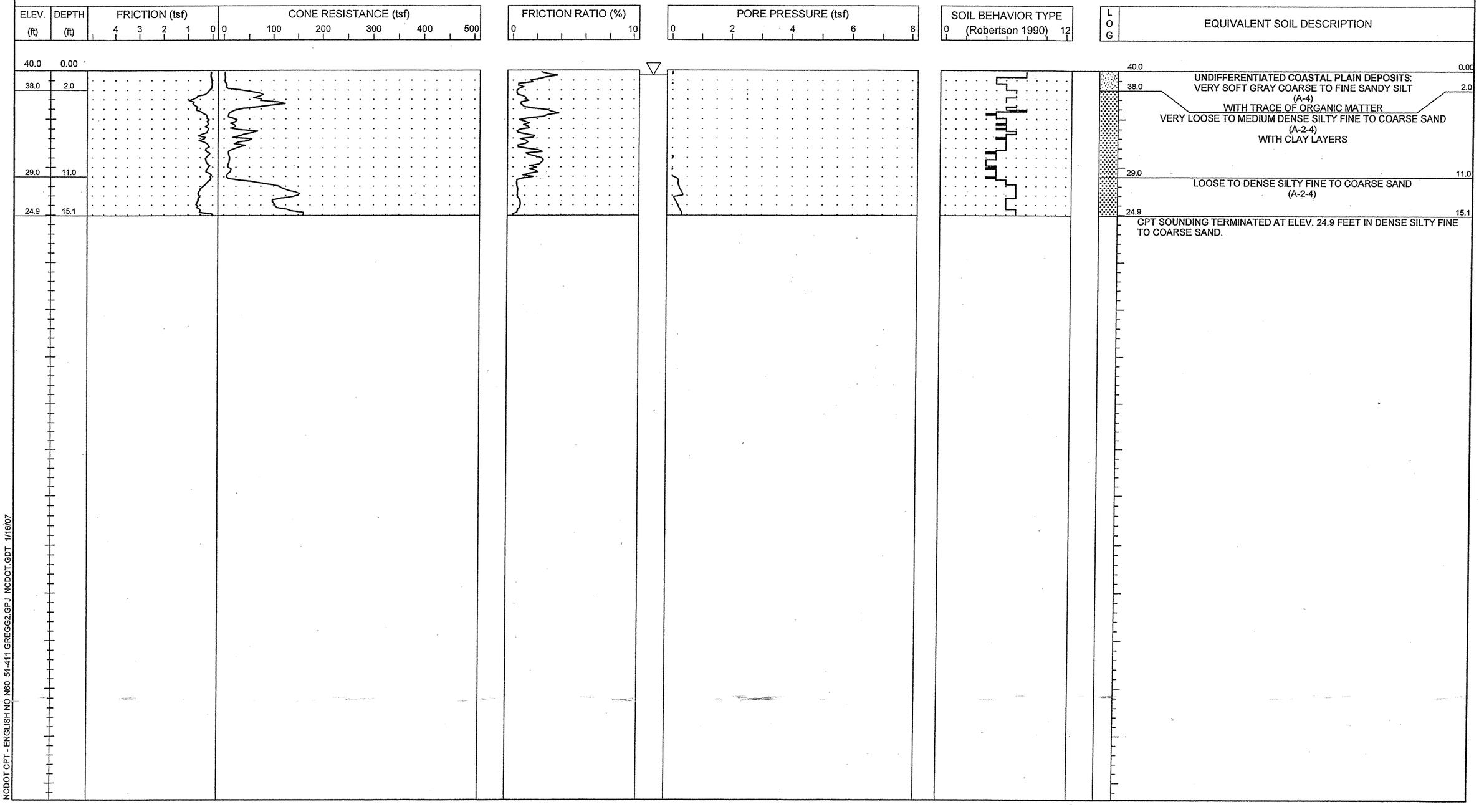
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 15.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-52	**BORING LOCATION** 128+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 0.5	**DATE STARTED** 10/23/06	**COMPLETED** 10/23/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 40.0 ft	**NORTHING** 193,703.3	**EASTING** 2,281,926.2		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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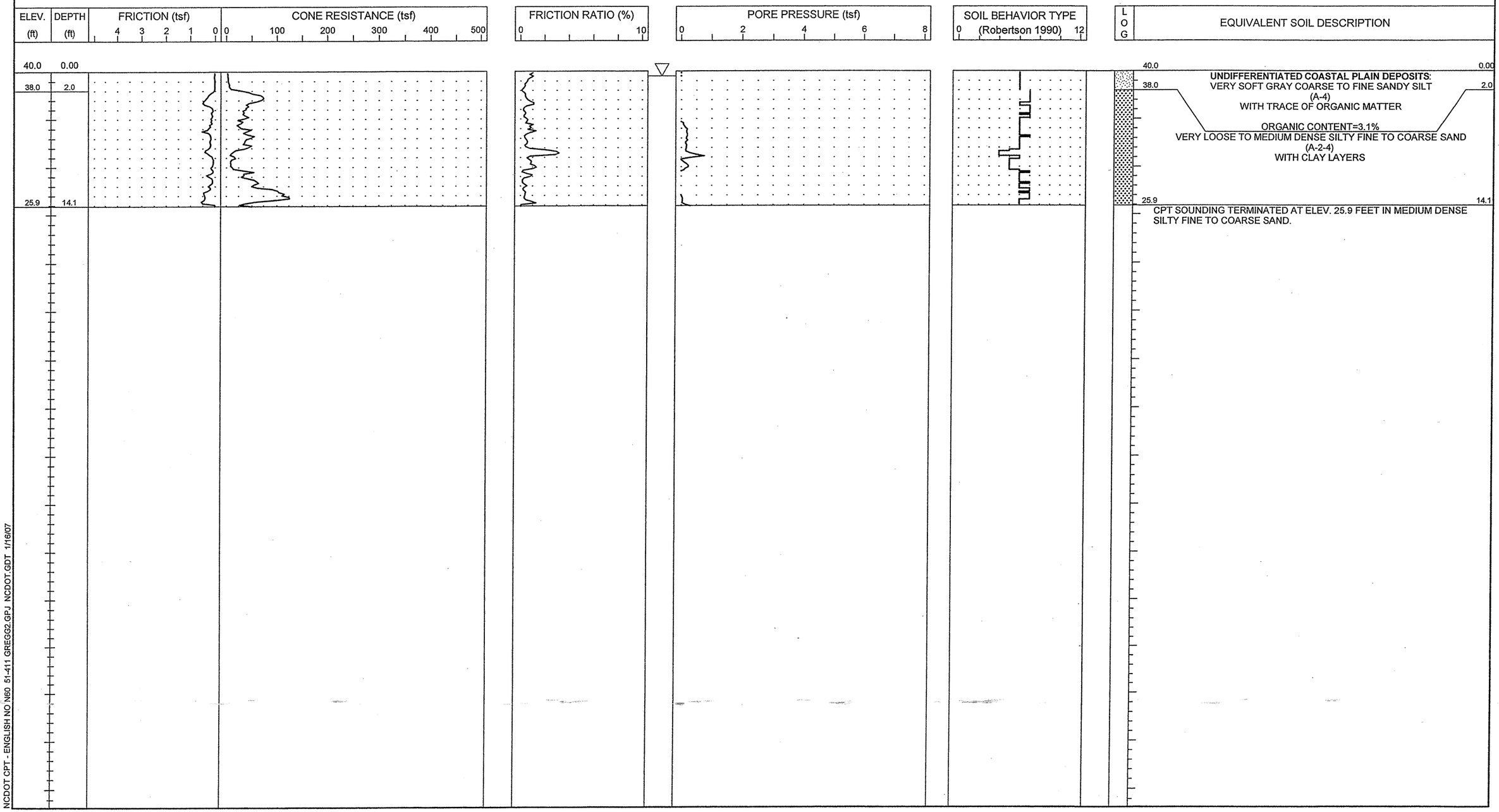
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 14.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-53	**BORING LOCATION** 130+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 0.5	**DATE STARTED** 10/24/06	**COMPLETED** 10/24/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 40.0 ft	**NORTHING** 193,776.6	**EASTING** 2,282,112.2		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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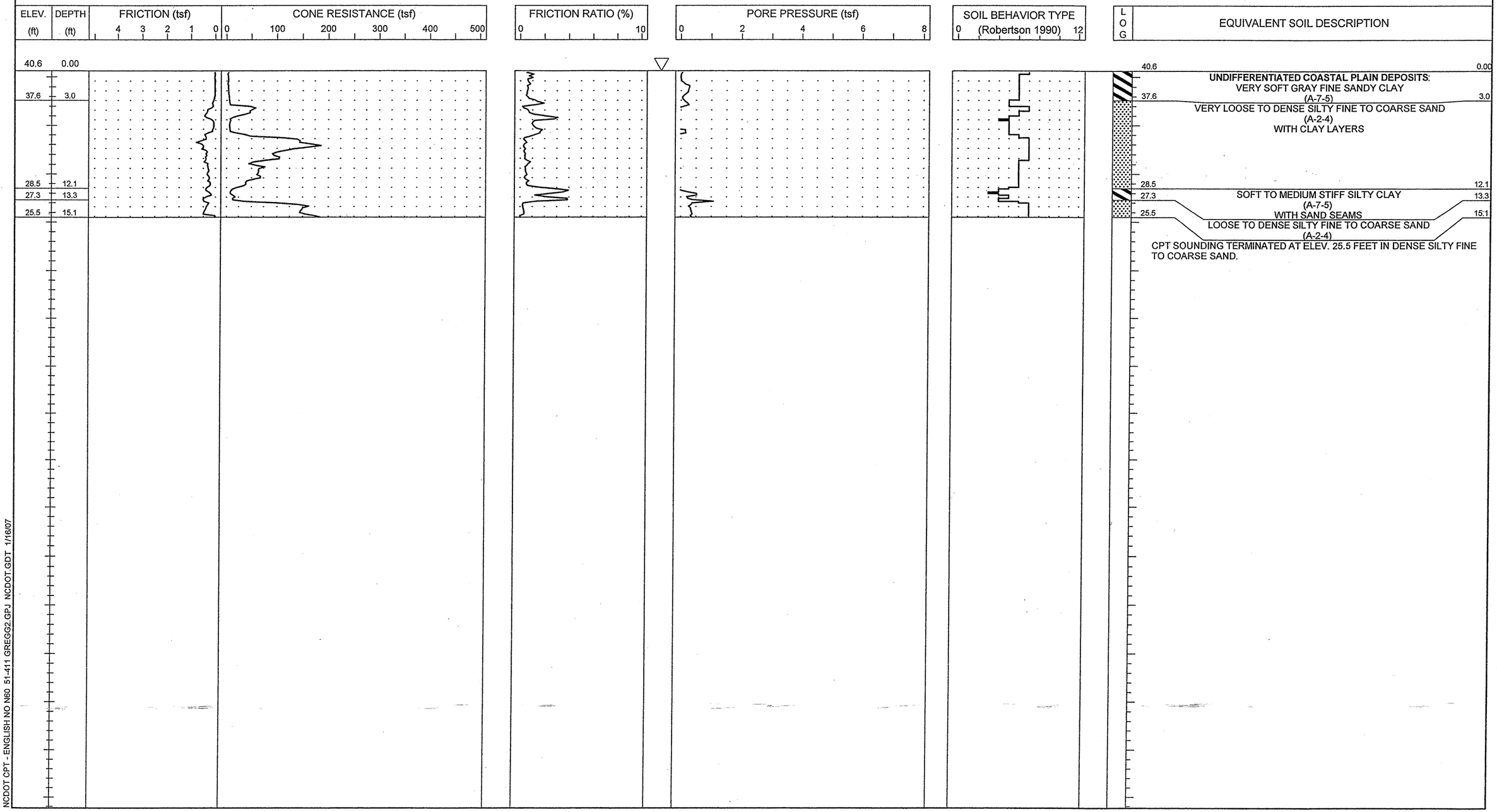
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON		**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf
SITE DESCRIPTION US 17 (Wilmington Bypass)				**GROUND WATER (ft)**	**TOTAL DEPTH** 15.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-54	**BORING LOCATION** 132+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 0.0	**DATE STARTED** 10/24/06	**COMPLETED** 10/24/06	**SURFACE WATER DEPTH** N/A	
COLLAR ELEV. 40.6 ft	**NORTHING** 193,843.3	**EASTING** 2,282,300.8		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN		



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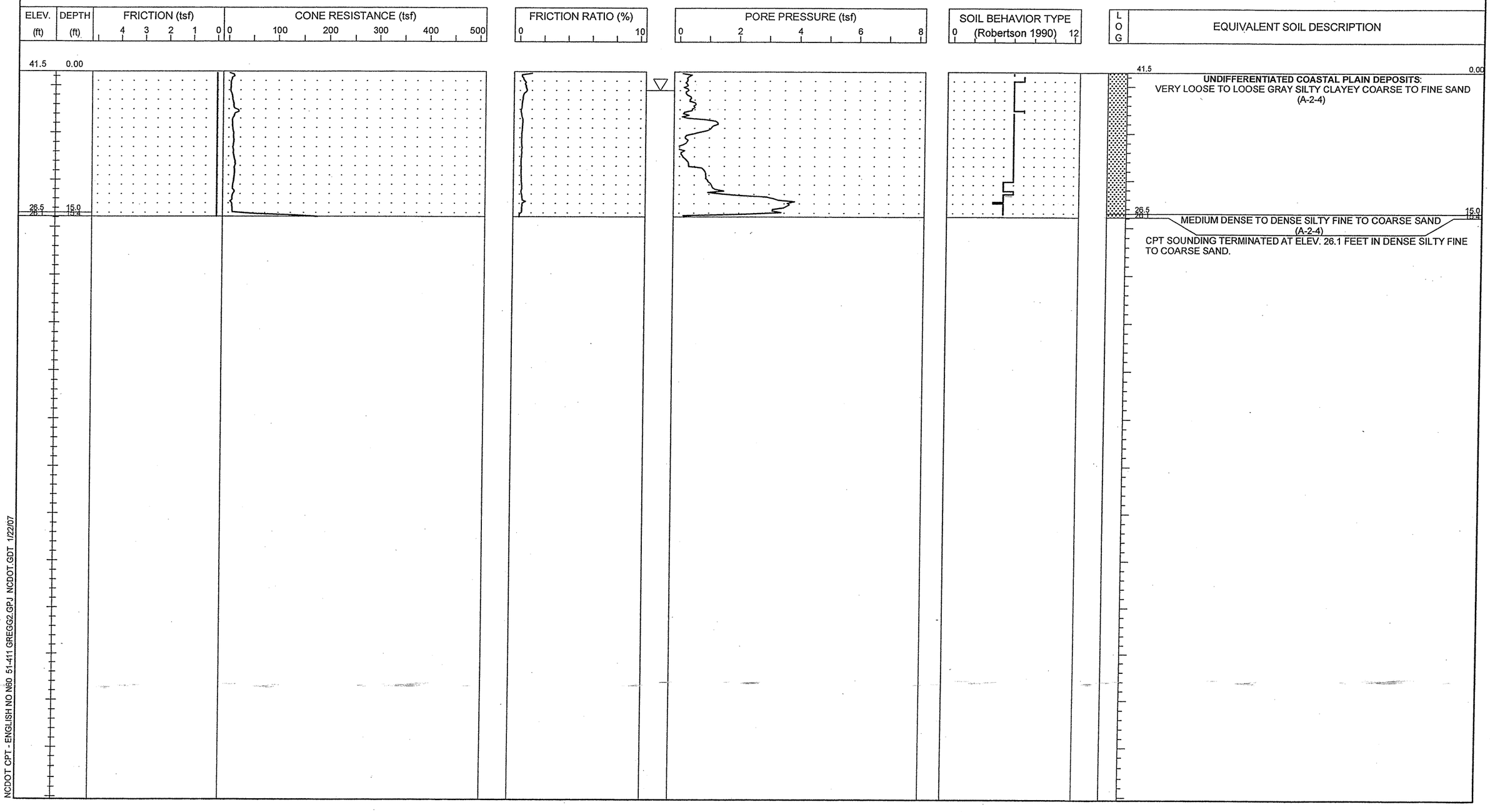
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON		**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)				**GROUND WATER (ft)**	**TOTAL DEPTH** 15.4 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-55	**BORING LOCATION** 134+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 2.0	**DATE STARTED** 10/24/06	**COMPLETED** 10/24/06	**SURFACE WATER DEPTH** N/A	
COLLAR ELEV. 41.5 ft	**NORTHING** 193,903.5	**EASTING** 2,282,491.5		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN		



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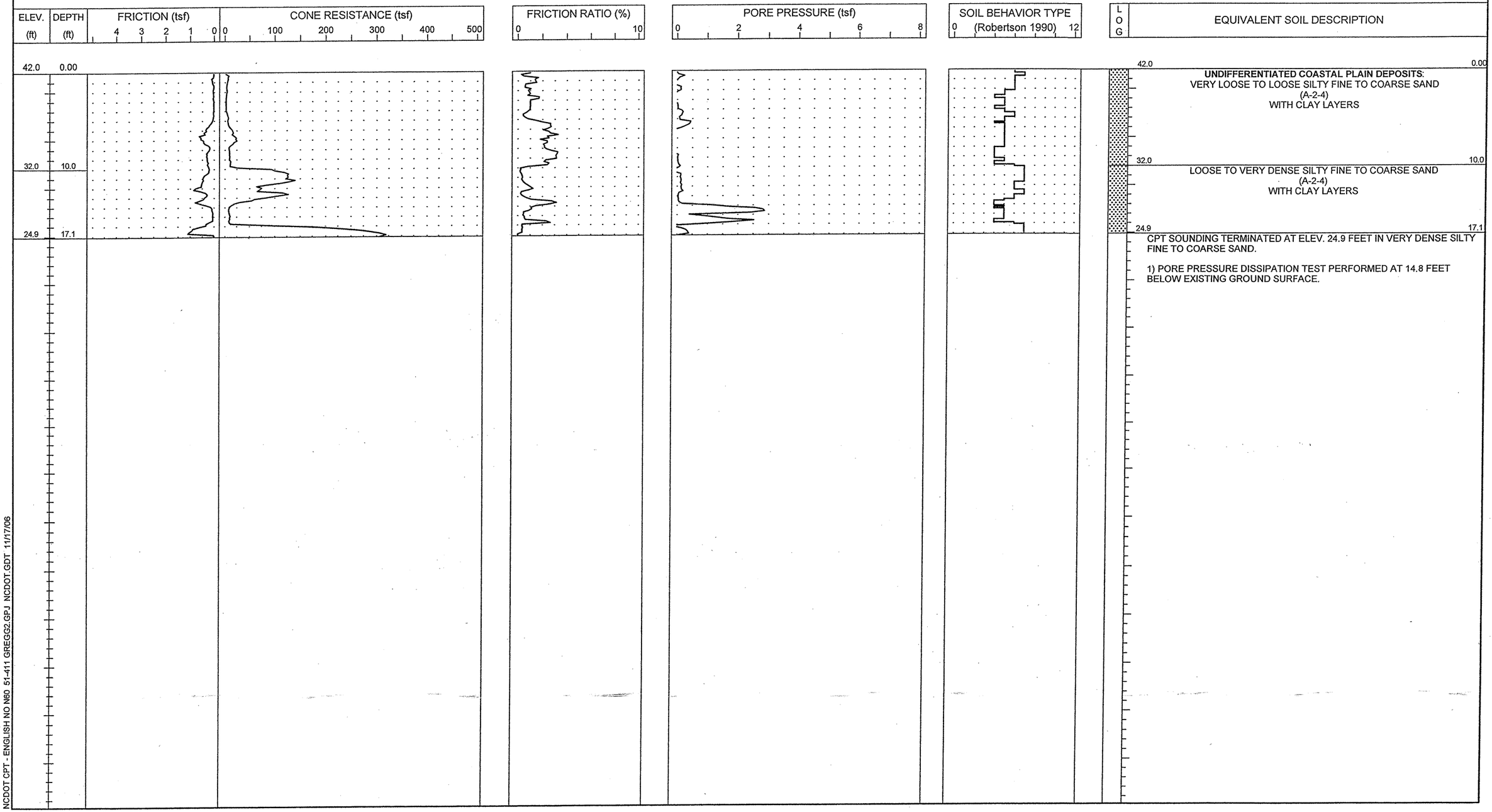
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 17.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-56	**BORING LOCATION** 136+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** N/M	**DATE STARTED** 10/24/06	**COMPLETED** 10/24/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 42.0 ft	**NORTHING** 193,957.0	**EASTING** 2,282,684.2		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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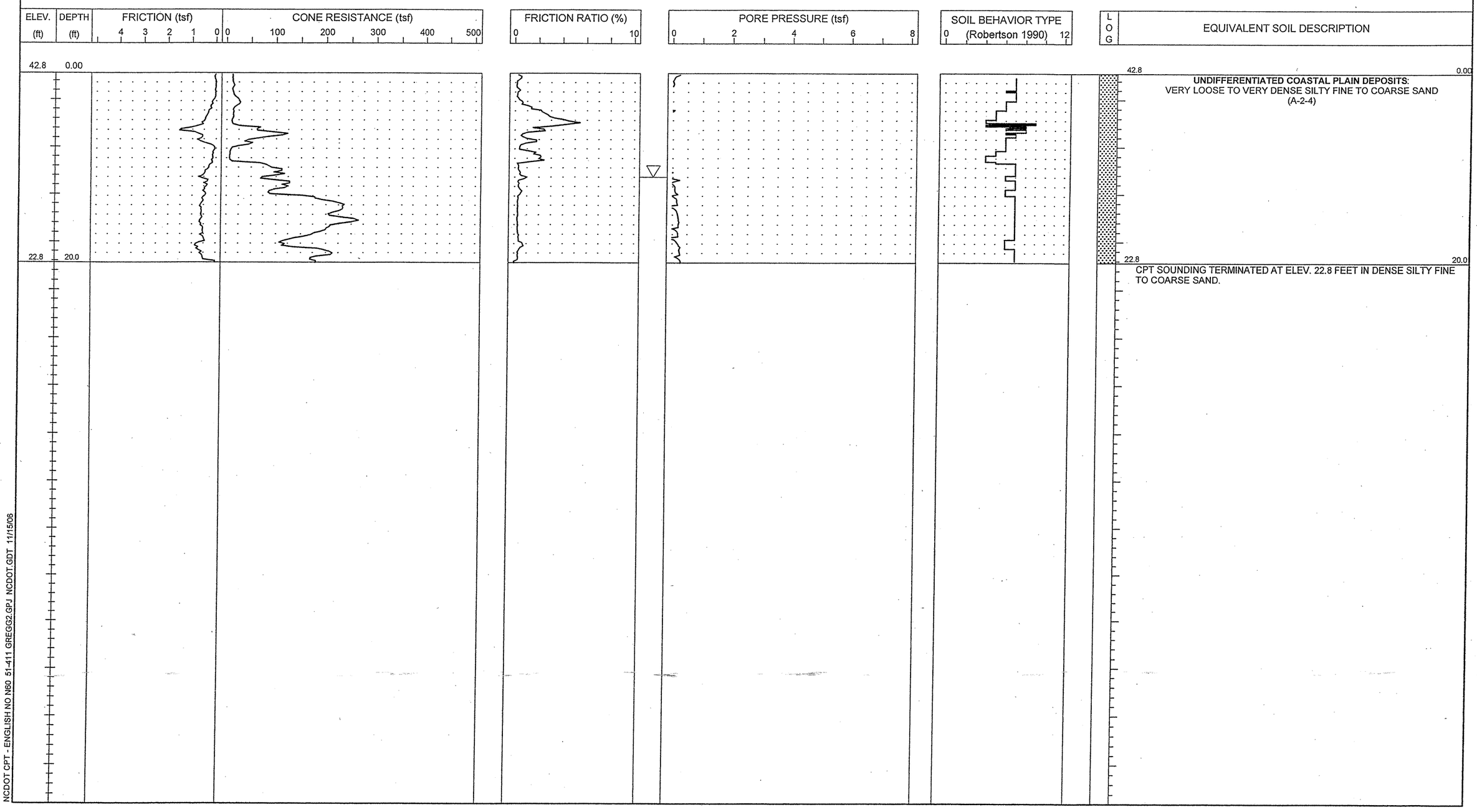
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON		**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)				**GROUND WATER (ft)**	**TOTAL DEPTH** 20.0 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-57	**BORING LOCATION** 138+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 11.0	**DATE STARTED** 10/25/06	**COMPLETED** 10/25/06	**SURFACE WATER DEPTH** N/A	
COLLAR ELEV. 42.8 ft	**NORTHING** 194,003.7	**EASTING** 2,282,878.7		**24 HR.** N/M	**DRILLER:** A. MARTIN	**TECHNICIAN** J. WALKER		



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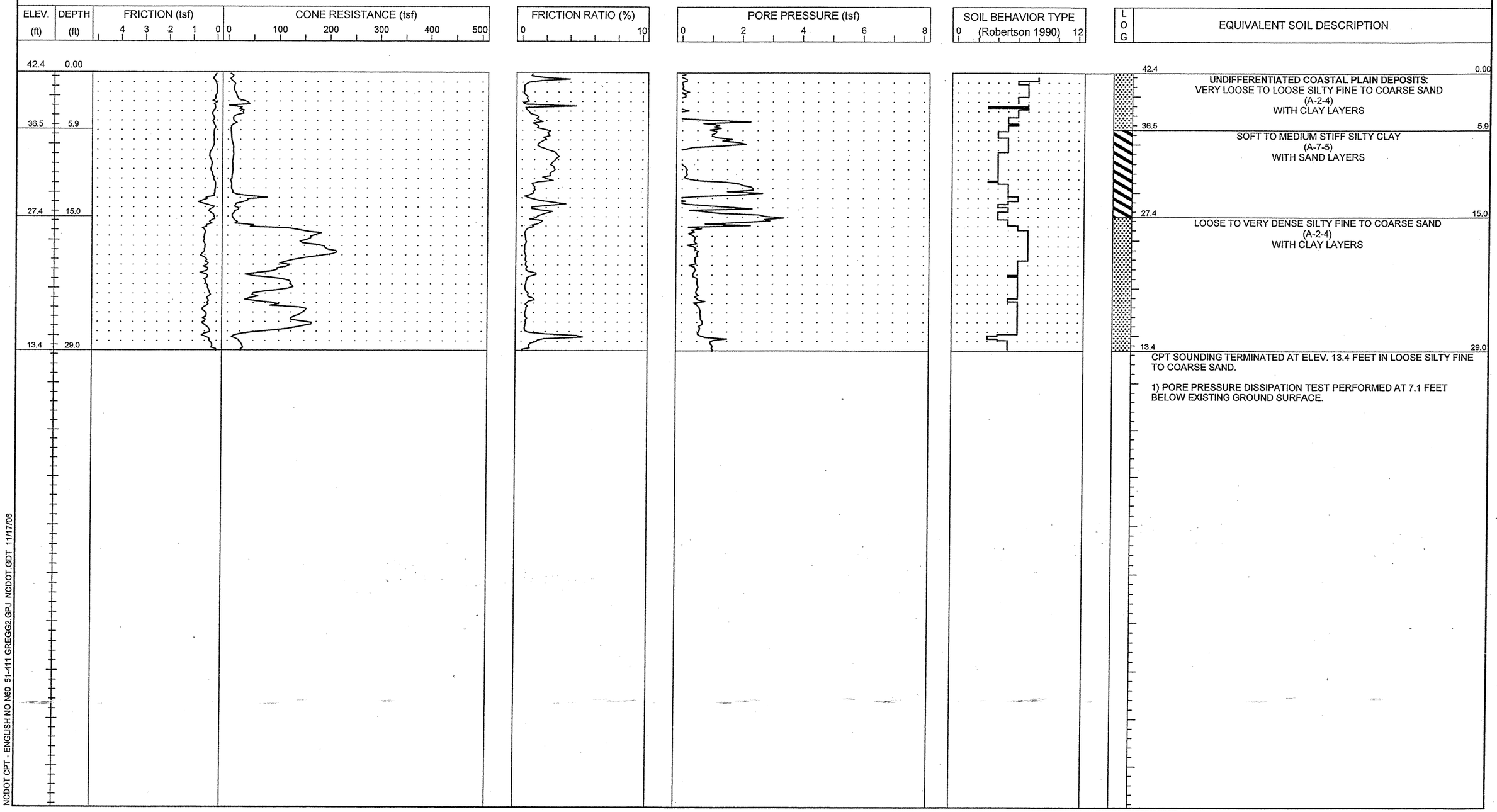
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 29.0 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-58	**BORING LOCATION** 140+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** N/M	**DATE STARTED** 10/25/06	**COMPLETED** 10/25/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 42.4 ft	**NORTHING** 194,043.7	**EASTING** 2,283,074.6		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



LOG

42.4 0.00

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS:
VERY LOOSE TO LOOSE SILTY FINE TO COARSE SAND
(A-2-4)
WITH CLAY LAYERS

36.5 5.9

SOFT TO MEDIUM STIFF SILTY CLAY
(A-7-5)
WITH SAND LAYERS

27.4 15.0

LOOSE TO VERY DENSE SILTY FINE TO COARSE SAND
(A-2-4)
WITH CLAY LAYERS

13.4 29.0

CPT SOUNDING TERMINATED AT ELEV. 13.4 FEET IN LOOSE SILTY FINE TO COARSE SAND.

1) PORE PRESSURE DISSIPATION TEST PERFORMED AT 7.1 FEET BELOW EXISTING GROUND SURFACE.

NCDOT CPT - ENGLISH NO N60 51-411 GREGG2.GPJ NCDOT.GDT 11/17/06

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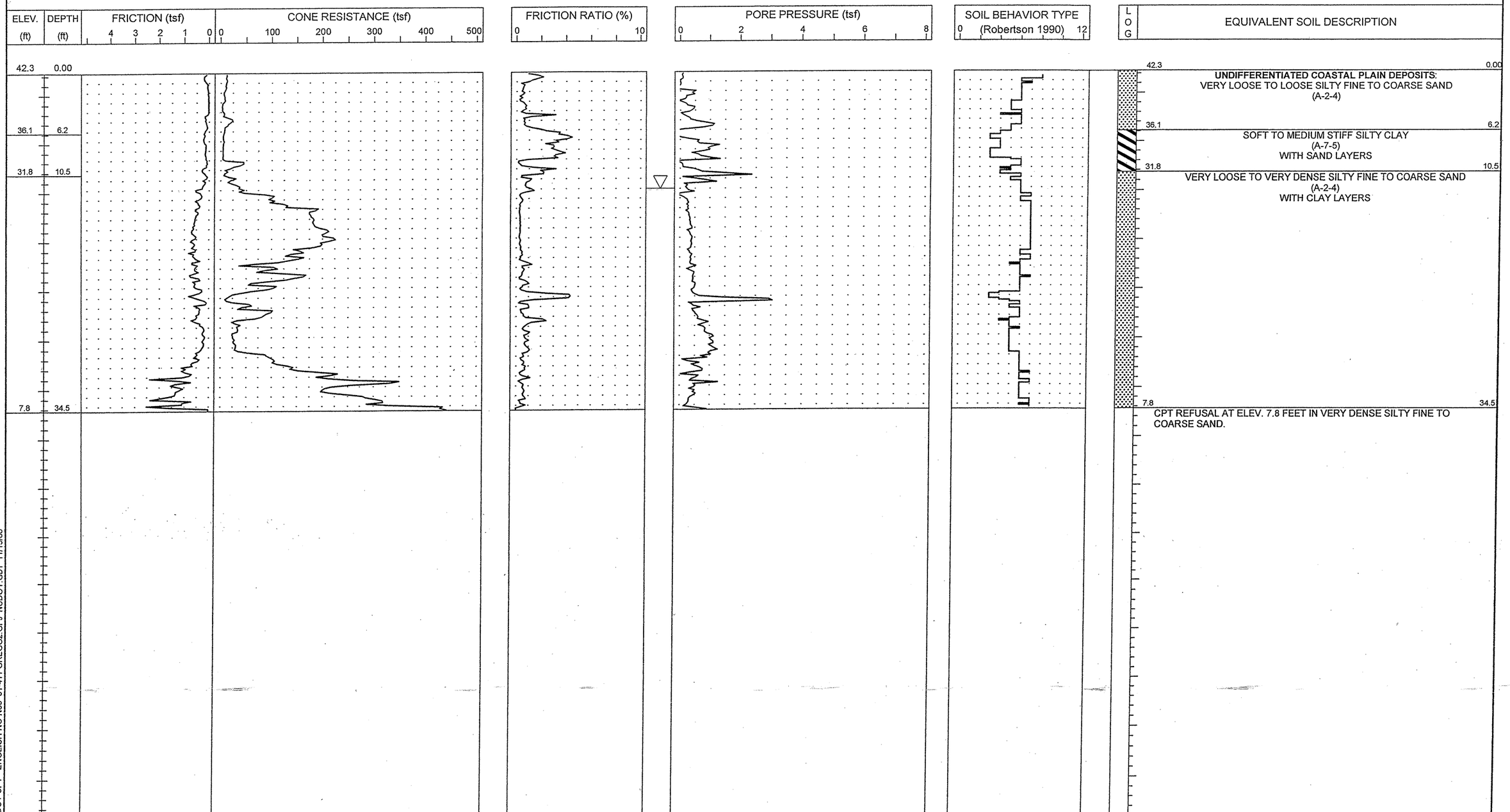
BORING LOG

PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 34.5 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-59	**BORING LOCATION** 142+00	**OFFSET** 0.0 ft CL **ALIGNMENT** -L-	**0 HR.** 12.0	**DATE STARTED** 10/25/06	**COMPLETED** 10/25/06	**SURFACE WATER DEPTH** N/A	
COLLAR ELEV. 42.3 ft	**NORTHING** 194,076.8	**EASTING** 2,283,271.8	**24 HR.** N/M	**DRILLER:** A. MARTIN	**TECHNICIAN** J. WALKER		



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BORING LOG

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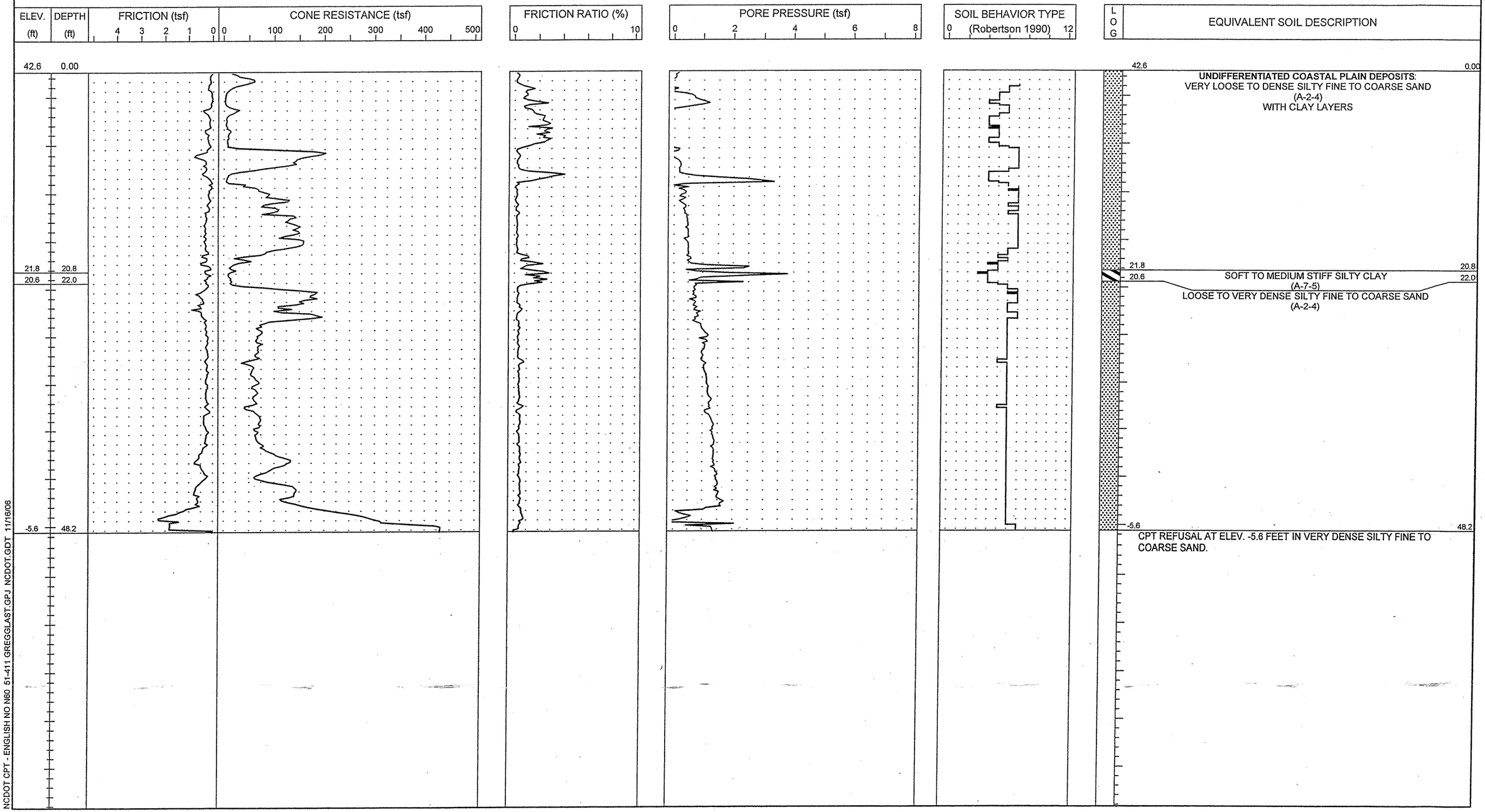
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/ Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 48.2 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C- 60	**BORING LOCATION** 144+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** N/M	**DATE STARTED** 10/31/06	**COMPLETED** 10/31/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 42.6 ft	**NORTHING** 194,103.0	**EASTING** 2,283,470.1		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



NCDOT CPT - ENGLISH NO N60 51-411 GREGGLAST.GPJ NCDOT.GDT 11/16/06

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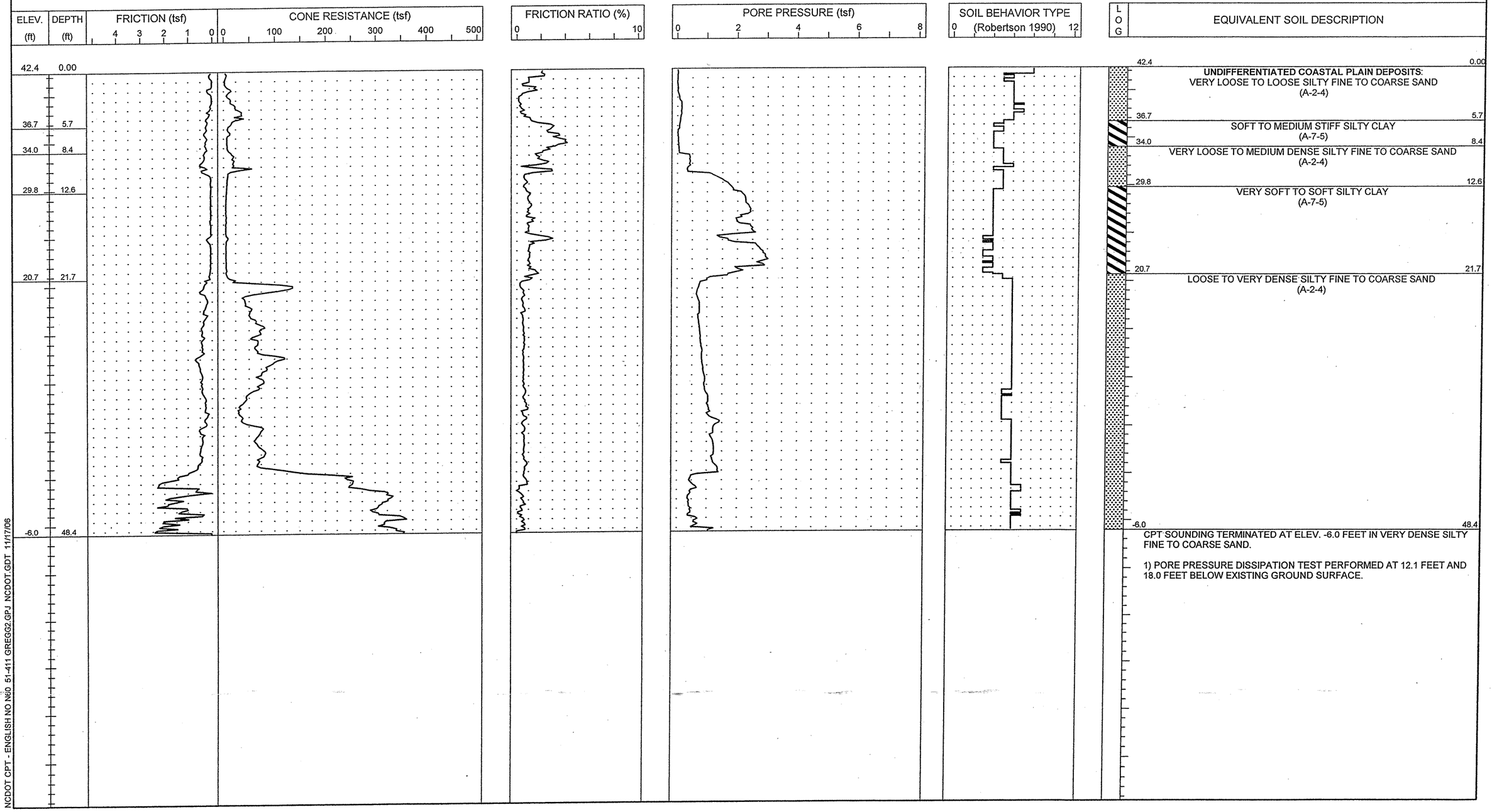
BORING LOG

PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 48.4 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-61	**BORING LOCATION** 150+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** N/M	**DATE STARTED** 10/27/06	**COMPLETED** 10/27/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 42.4 ft	**NORTHING** 194,140.2	**EASTING** 2,284,068.7		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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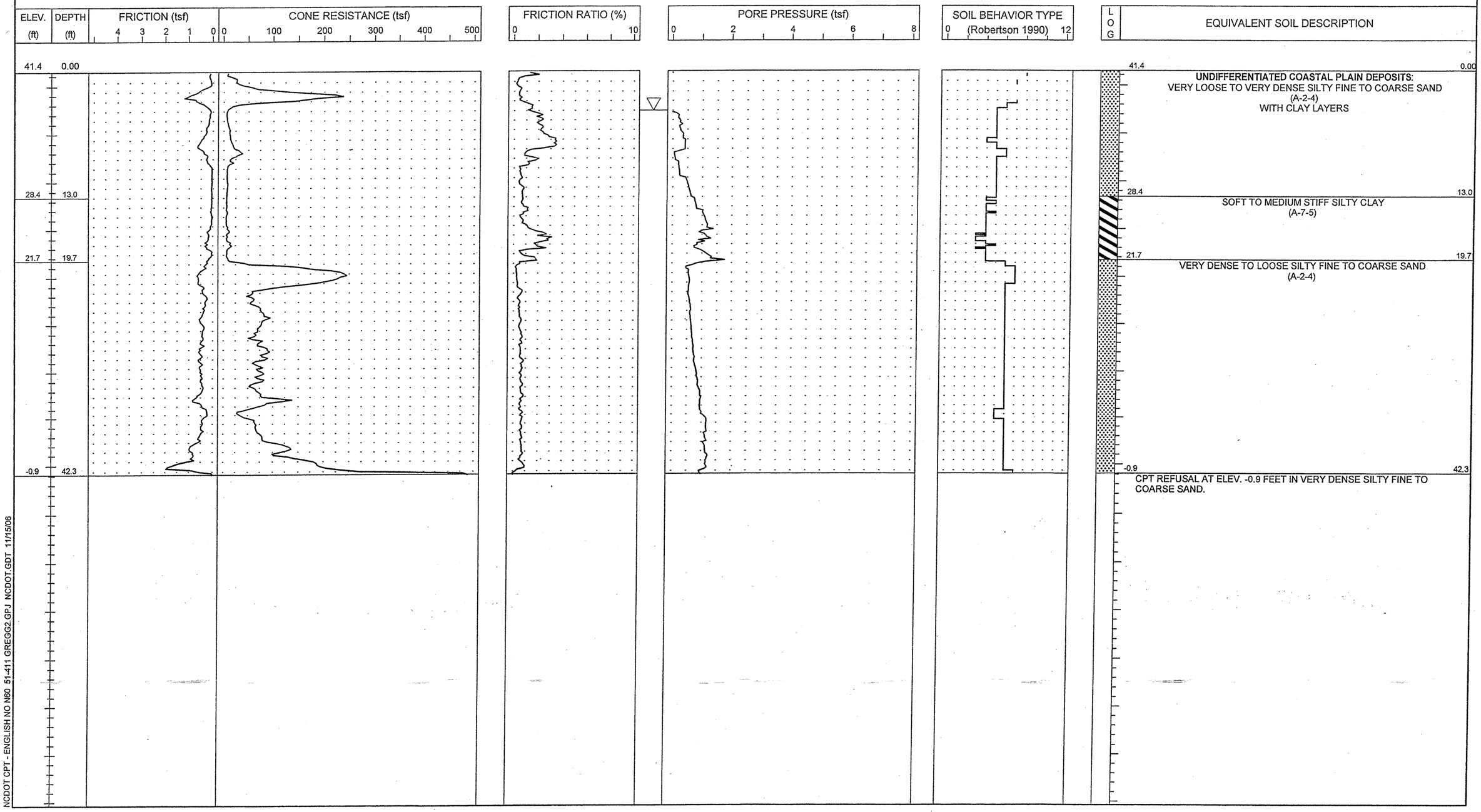
BORING LOG

PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 42.3 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-62	**BORING LOCATION** 152+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 4.0	**DATE STARTED** 10/27/06	**COMPLETED** 10/27/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 41.4 ft	**NORTHING** 194,138.7	**EASTING** 2,284,268.7		**24 HR.** N/M	**DRILLER:** A. MARTIN	**TECHNICIAN** J. WALKER	



EQUIVALENT SOIL DESCRIPTION

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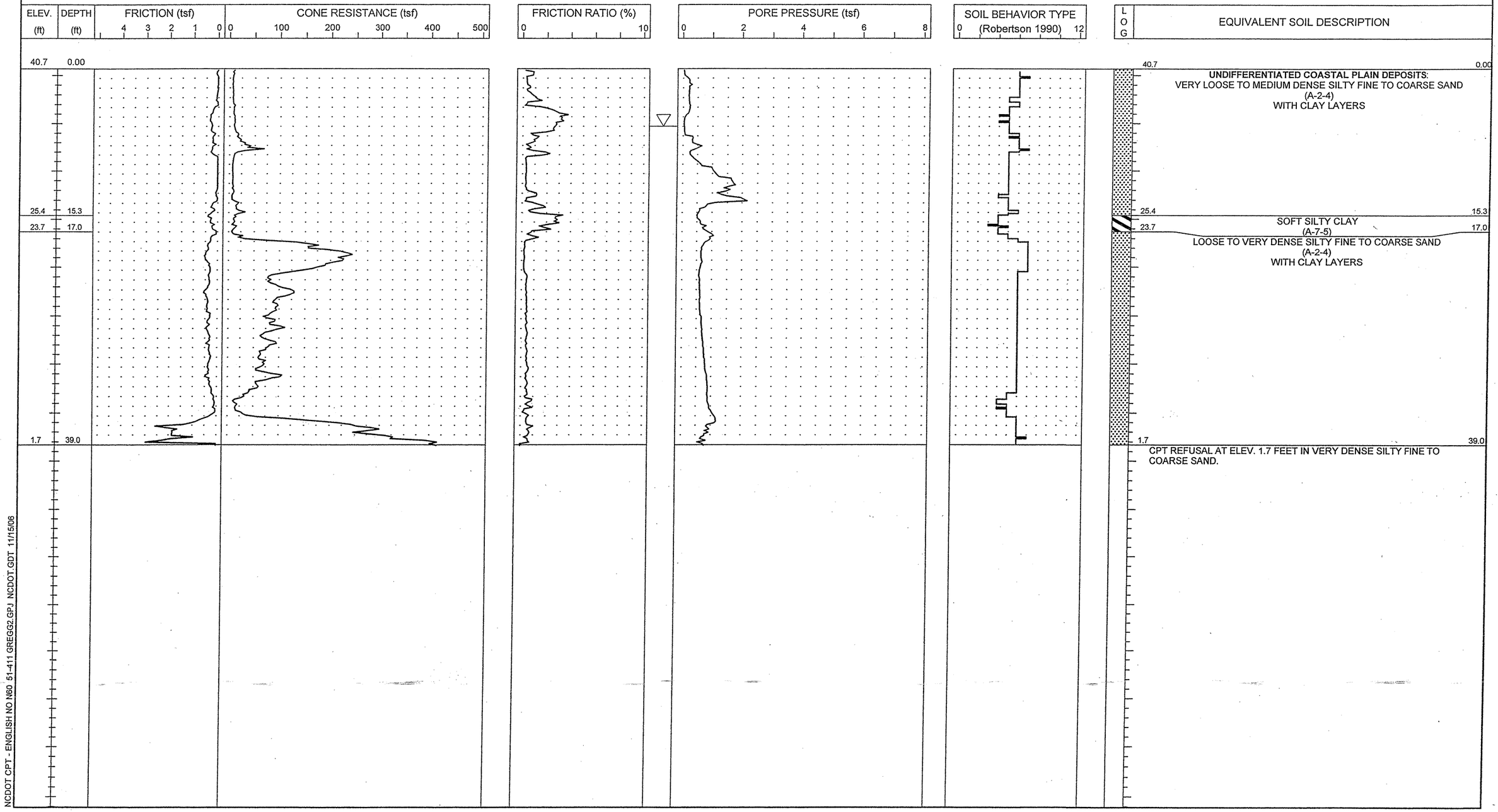
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON		**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf
SITE DESCRIPTION US 17 (Wilmington Bypass)				**GROUND WATER (ft)**	**TOTAL DEPTH** 39.0 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-63	**BORING LOCATION** 154+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 6.0	**DATE STARTED** 10/27/06	**COMPLETED** 10/27/06	**SURFACE WATER DEPTH** N/A	
COLLAR ELEV. 40.7 ft	**NORTHING** 194,130.3	**EASTING** 2,284,468.5		**24 HR.** N/M	**DRILLER:** A. MARTIN	**TECHNICIAN** J. WALKER		



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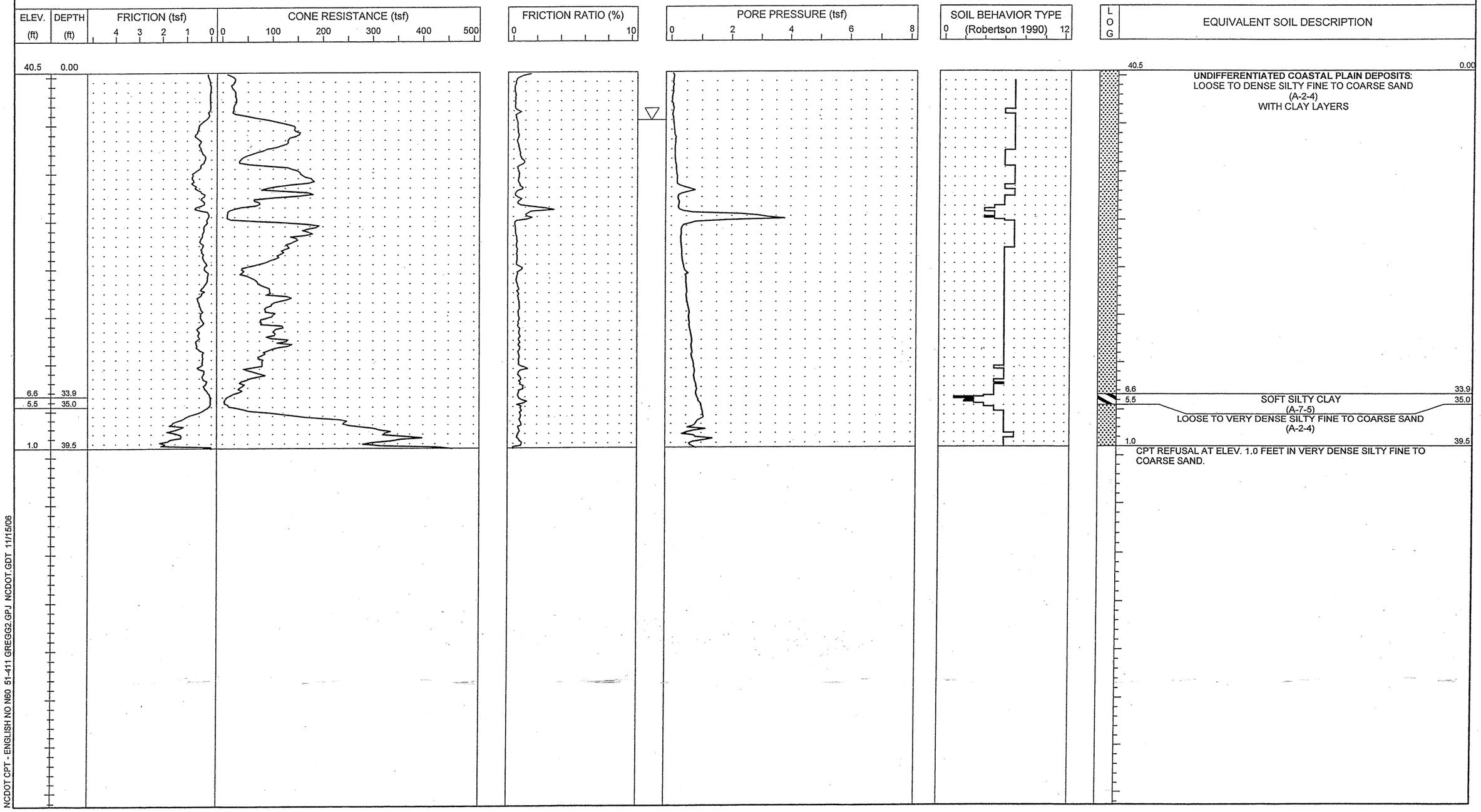
BORING LOG

PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 39.5 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-64	**BORING LOCATION** 156+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 5.0	**DATE STARTED** 10/27/06	**COMPLETED** 10/27/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 40.5 ft	**NORTHING** 194,114.9	**EASTING** 2,284,667.9		**24 HR.** N/M	**DRILLER:** A. MARTIN	**TECHNICIAN** J. WALKER	



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BORING LOG

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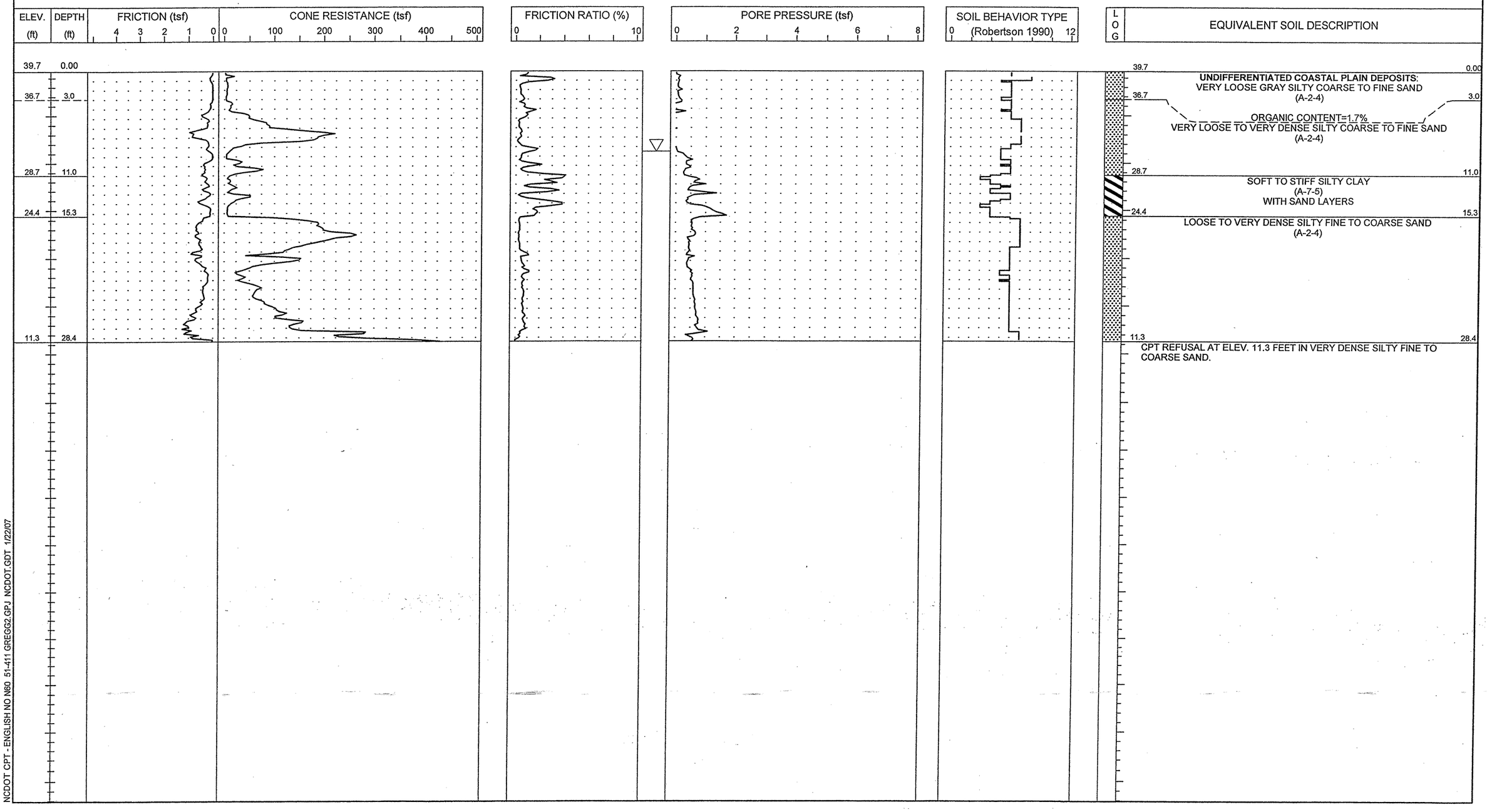
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 28.4 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-65	**BORING LOCATION** 158+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 8.5	**DATE STARTED** 10/26/06	**COMPLETED** 10/26/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 39.7 ft	**NORTHING** 194,092.5	**EASTING** 2,284,866.6		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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BORING LOG

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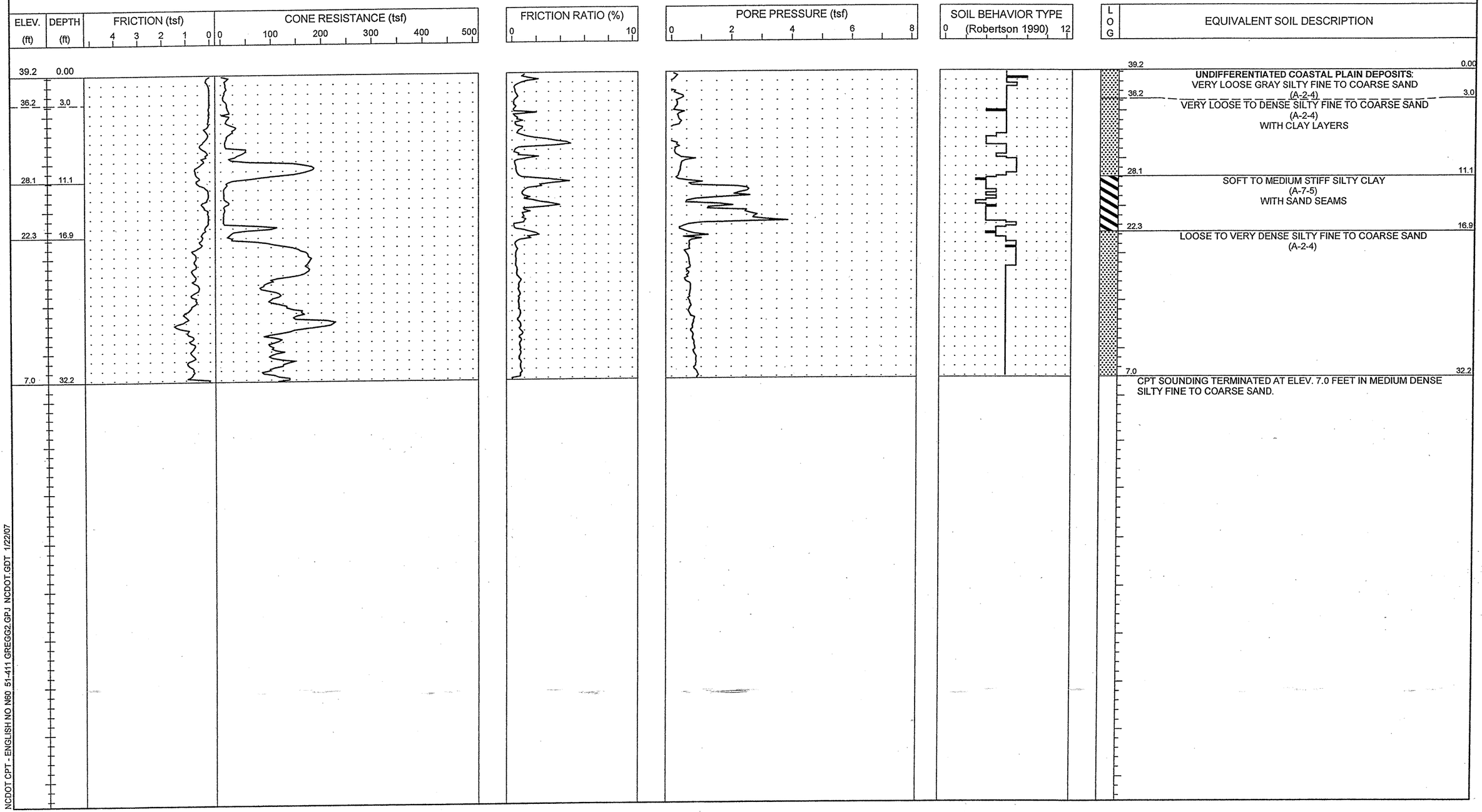
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 32.2 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-66	**BORING LOCATION** 160+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** N/M	**DATE STARTED** 10/26/06	**COMPLETED** 10/26/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 39.2 ft	**NORTHING** 194,063.3	**EASTING** 2,285,064.4		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



LOG

EQUIVALENT SOIL DESCRIPTION

39.2 — 0.00

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS:
VERY LOOSE GRAY SILTY FINE TO COARSE SAND
(A-2-4)

36.2 — 3.0

VERY LOOSE TO DENSE SILTY FINE TO COARSE SAND
(A-2-4)
WITH CLAY LAYERS

28.1 — 11.1

SOFT TO MEDIUM STIFF SILTY CLAY
(A-7-5)
WITH SAND SEAMS

22.3 — 16.9

LOOSE TO VERY DENSE SILTY FINE TO COARSE SAND
(A-2-4)

7.0 — 32.2

CPT SOUNDING TERMINATED AT ELEV. 7.0 FEET IN MEDIUM DENSE SILTY FINE TO COARSE SAND.

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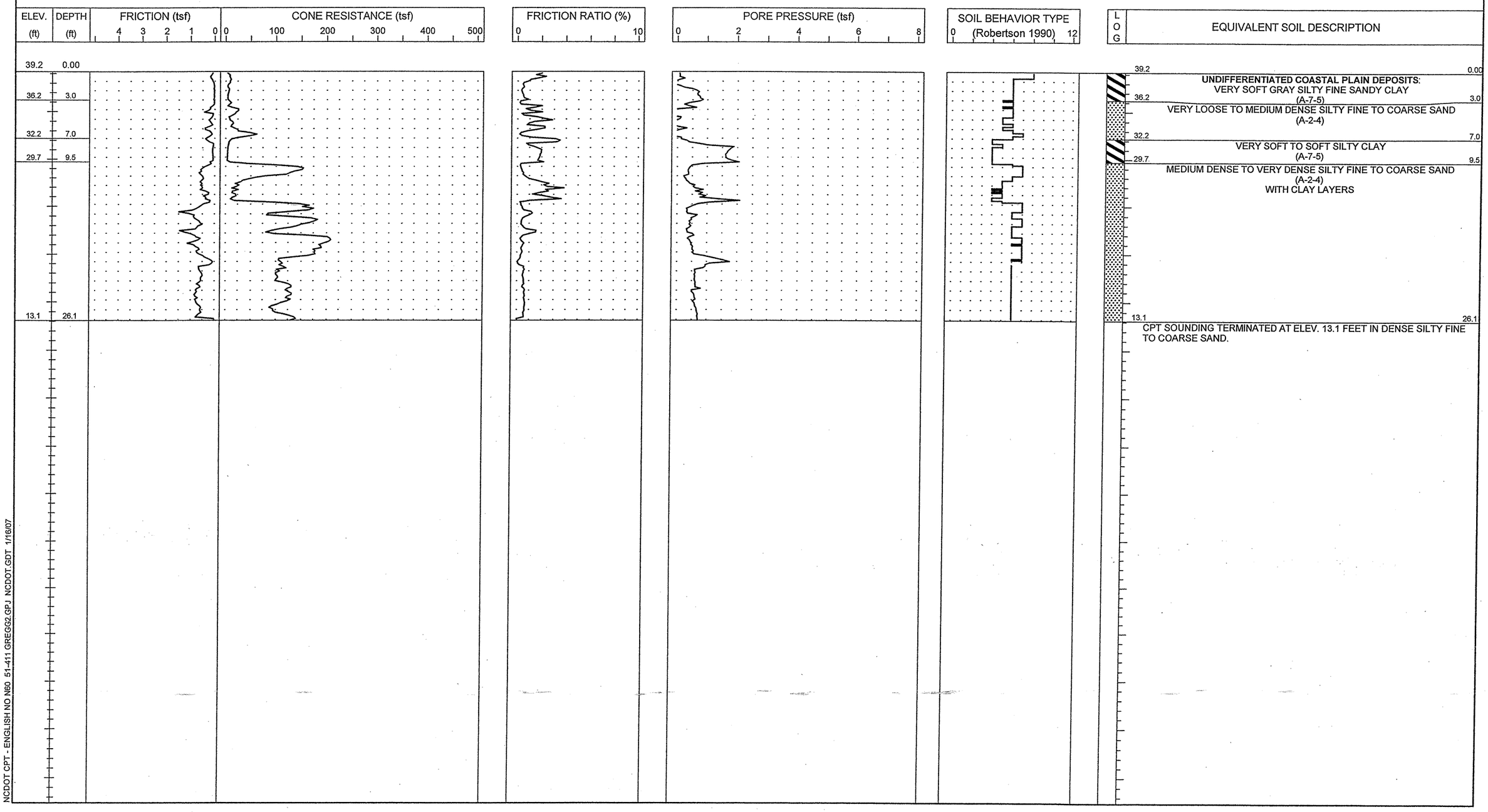
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 26.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-67	**BORING LOCATION** 162+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** N/M	**DATE STARTED** 10/26/06	**COMPLETED** 10/26/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 39.2 ft	**NORTHING** 194,027.2	**EASTING** 2,285,261.2		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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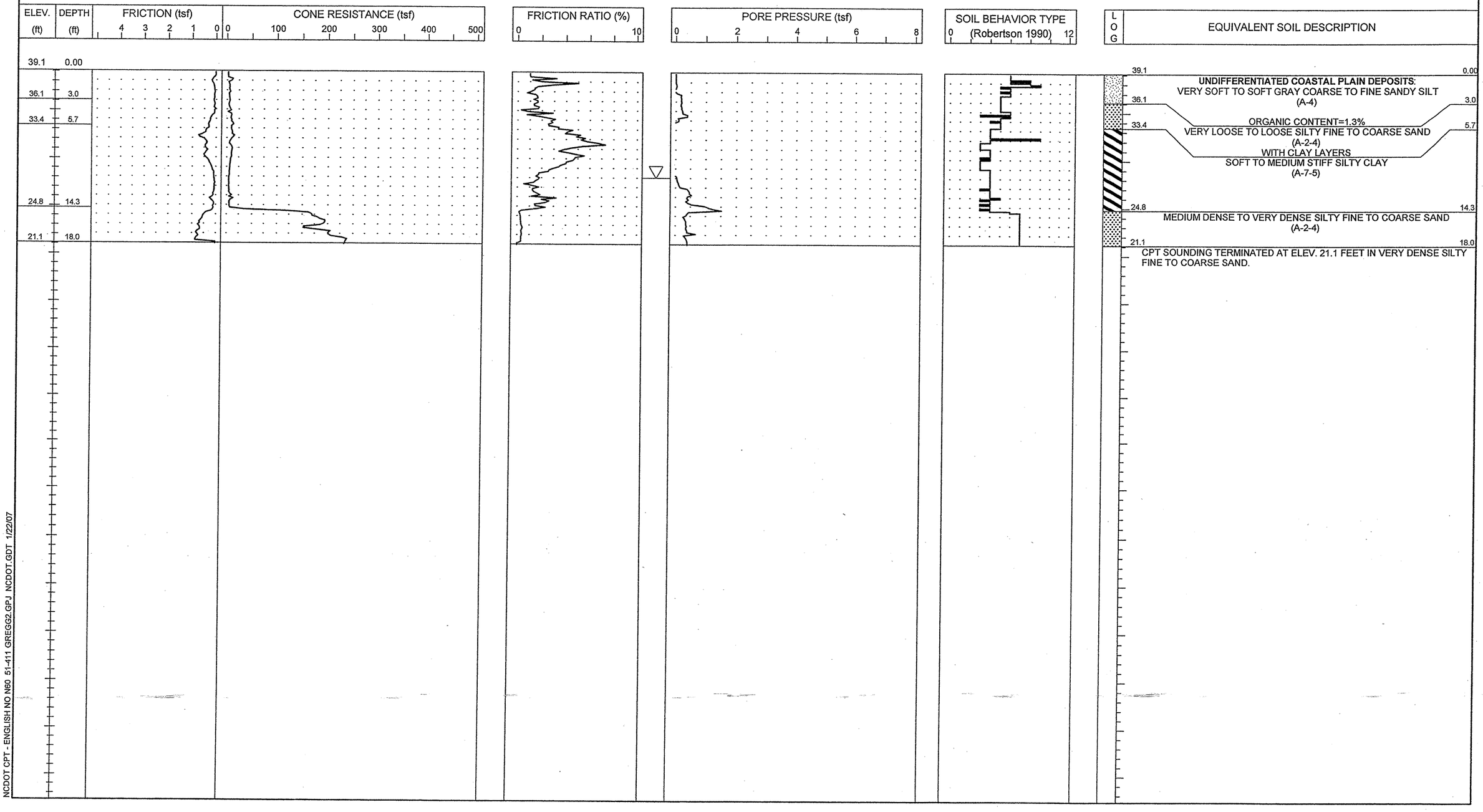
BORING LOG

SHEET 1 OF 1

PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 18.0 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-68	**BORING LOCATION** 164+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 11.0	**DATE STARTED** 10/26/06	**COMPLETED** 10/26/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 39.1 ft	**NORTHING** 193,984.3	**EASTING** 2,285,456.5		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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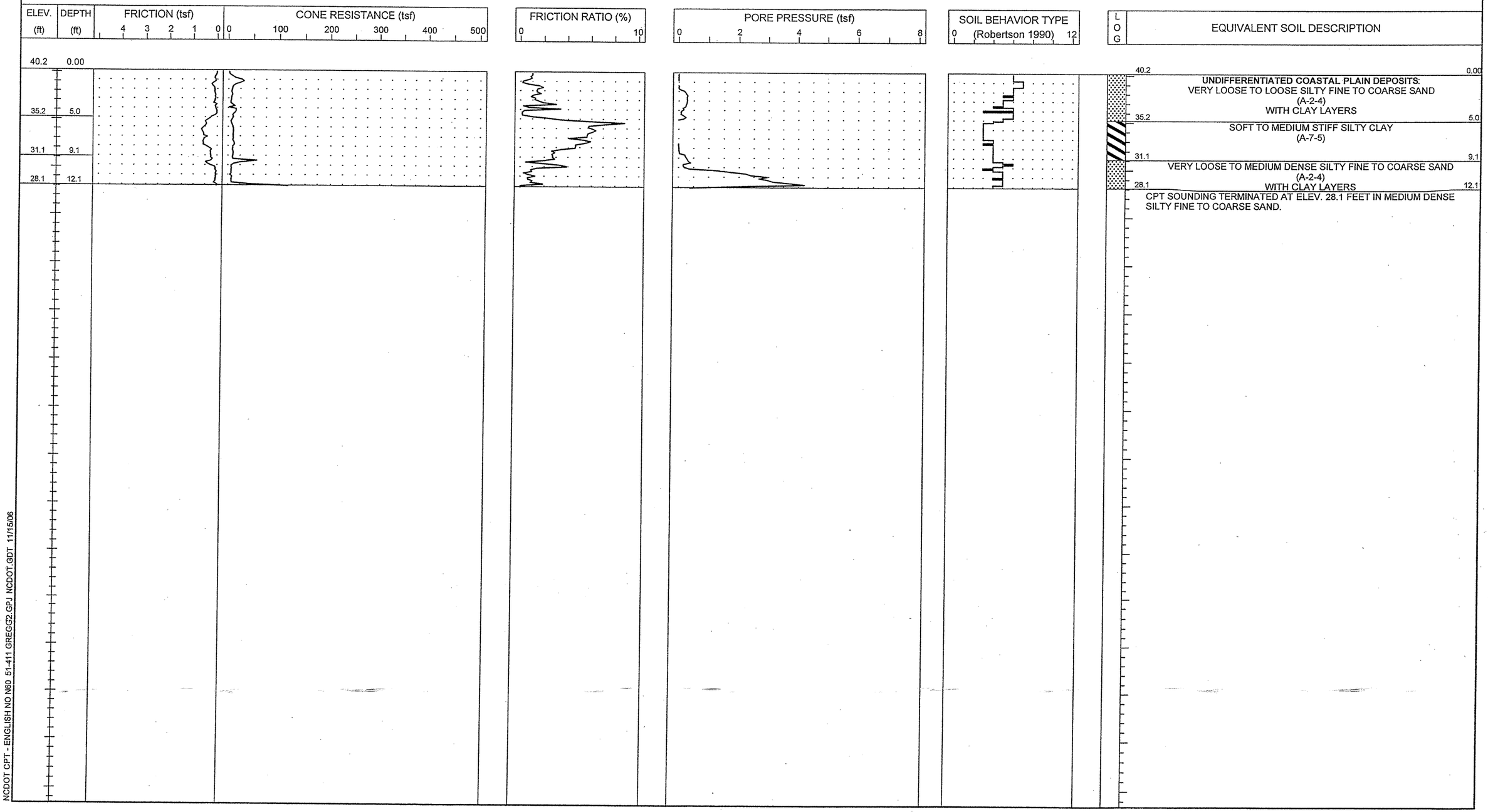
SHEET 1 OF 1

PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 12.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-69	**BORING LOCATION** 166+00	**OFFSET** 0.0 ft CL **ALIGNMENT** -L-	**0 HR.** N/M	**DATE STARTED** 10/26/06	**COMPLETED** 10/26/06	**SURFACE WATER DEPTH** N/A	
COLLAR ELEV. 40.2 ft	**NORTHING** 193,934.6	**EASTING** 2,285,650.2	**24 HR.** N/M	**DRILLER:** A. MARTIN	**TECHNICIAN** J. WALKER		



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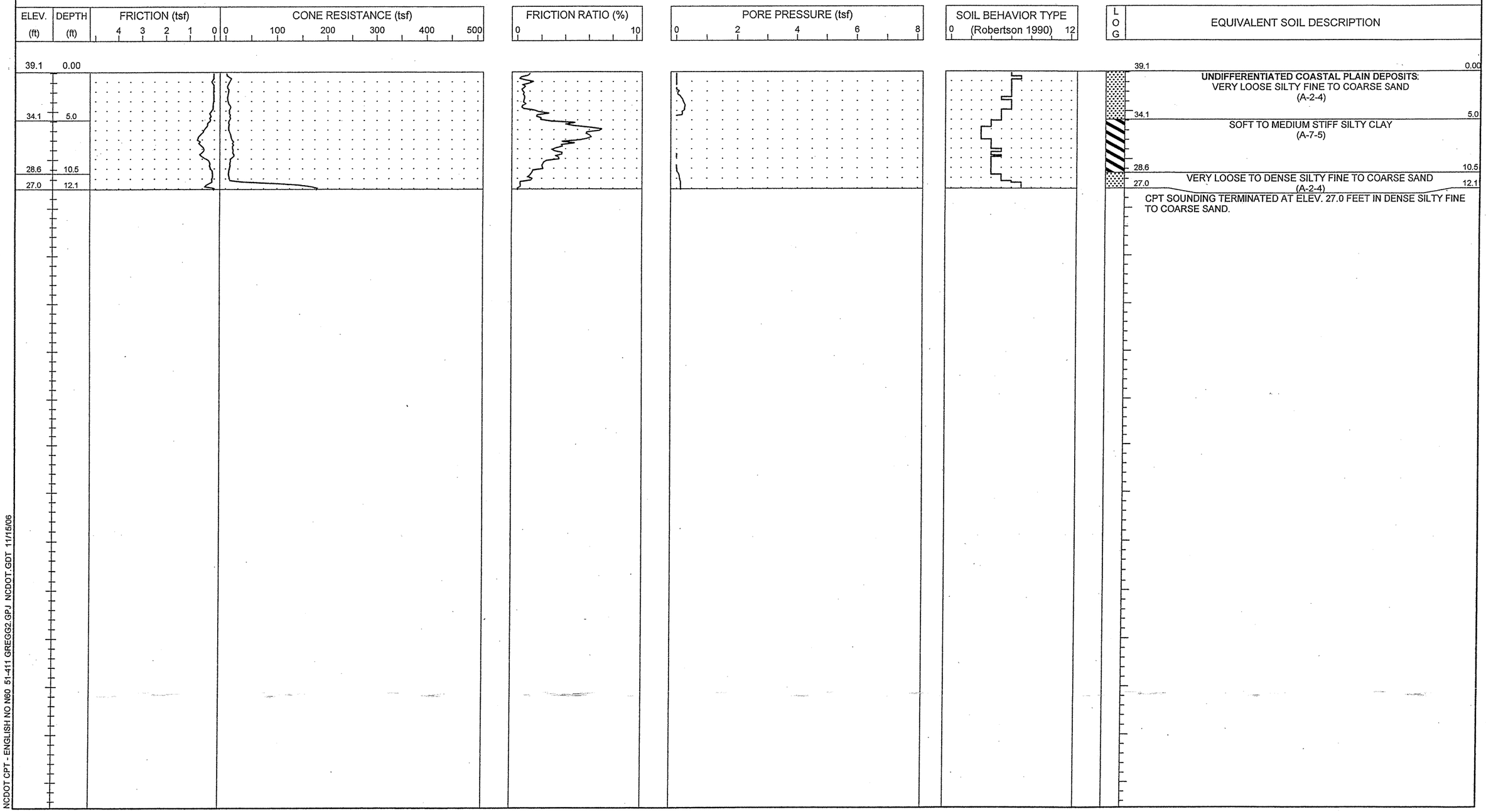
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 12.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-70	**BORING LOCATION** 168+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** N/M	**DATE STARTED** 10/26/06	**COMPLETED** 10/26/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 39.1 ft	**NORTHING** 193,879.4	**EASTING** 2,285,842.4		**24 HR.** N/M	**DRILLER:** A. MARTIN	**TECHNICIAN** J. WALKER	



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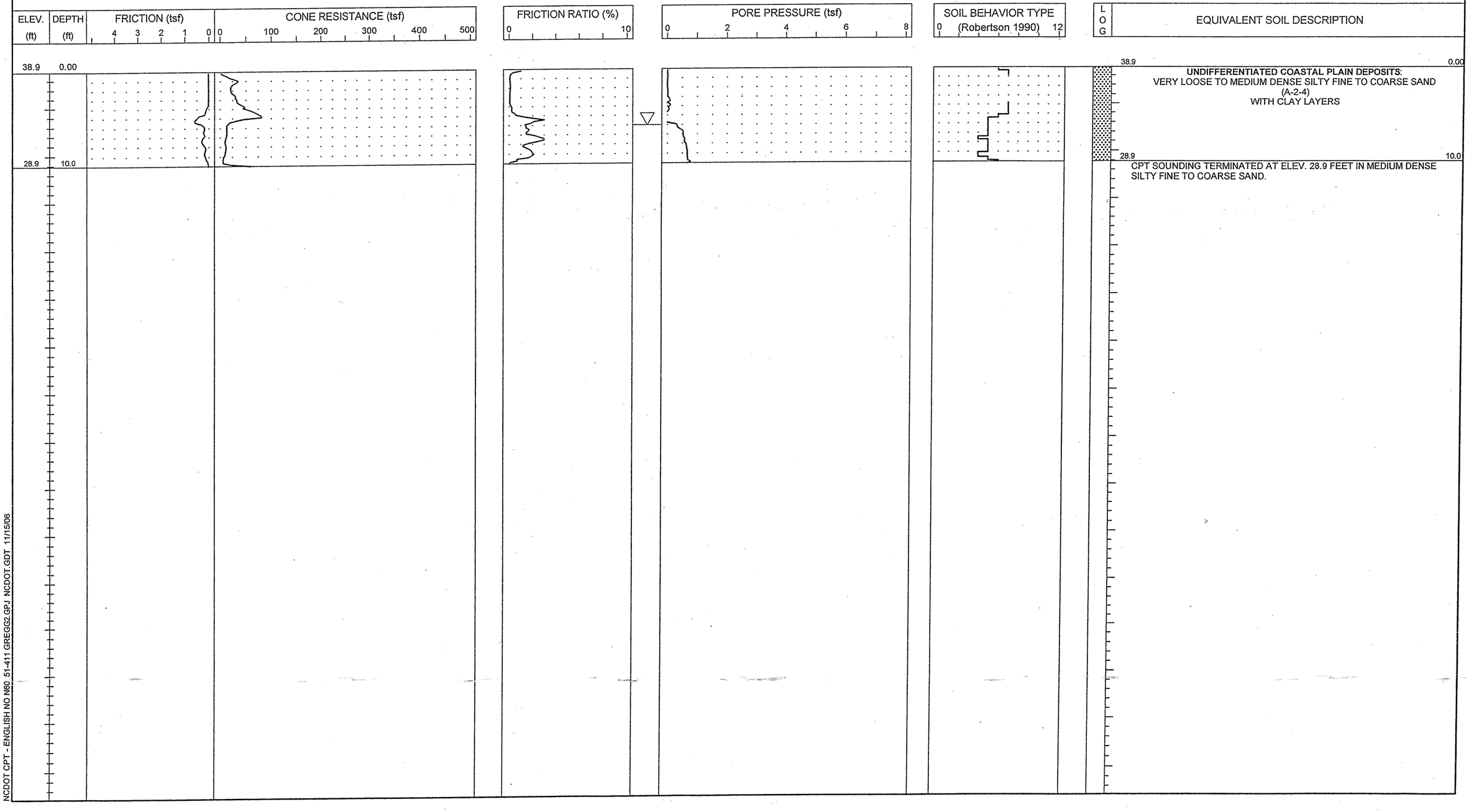
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 10.0 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-72	**BORING LOCATION** 172+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 6.0	**DATE STARTED** 10/26/06	**COMPLETED** 10/26/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 38.9 ft	**NORTHING** 193,766.0	**EASTING** 2,286,226.0		**24 HR.** N/M	**DRILLER:** A. MARTIN	**TECHNICIAN** J. WALKER	



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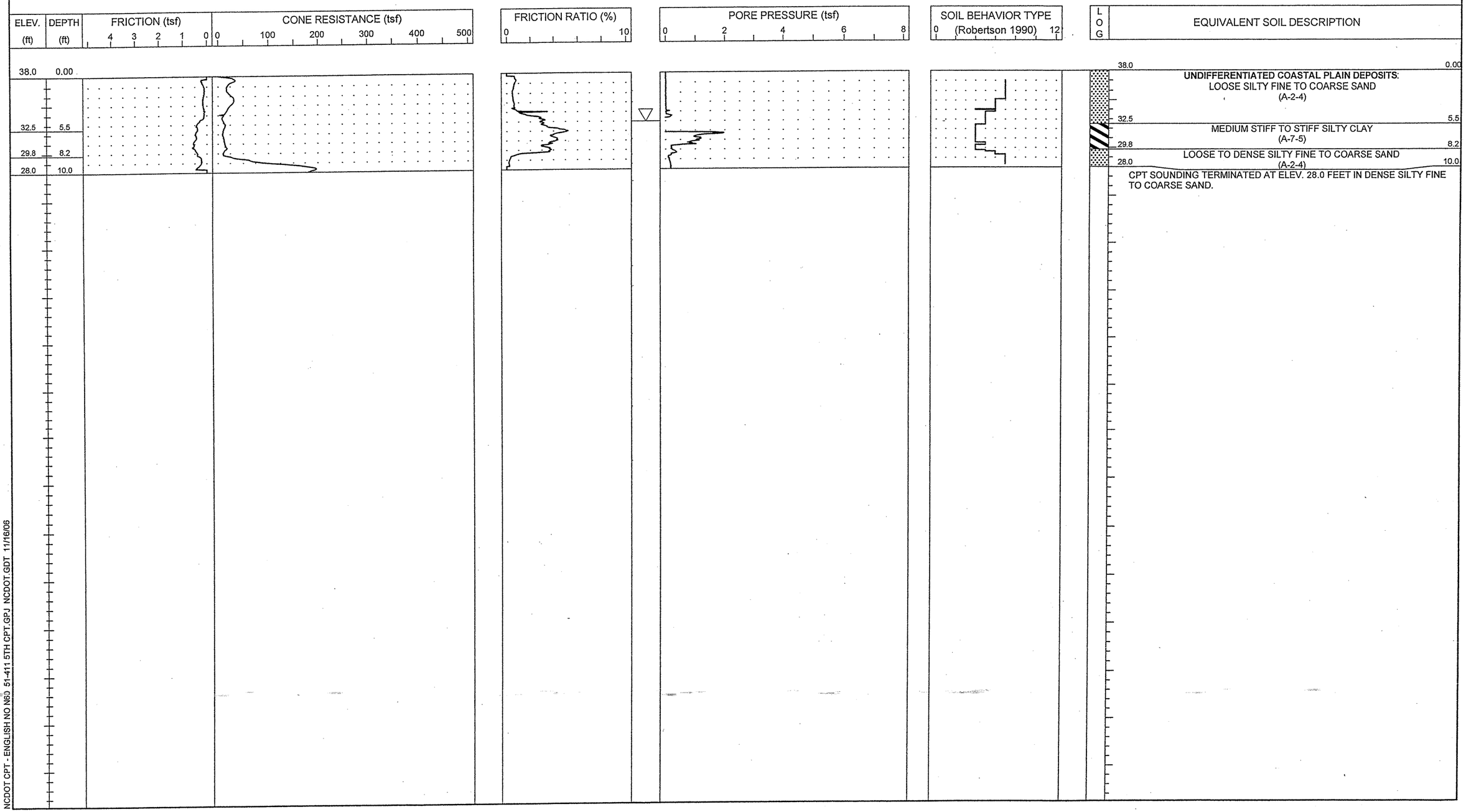
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 10.0 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-73	**BORING LOCATION** 174+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 5.0	**DATE STARTED** 10/30/06	**COMPLETED** 10/30/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 38.0 ft	**NORTHING** 193,709.3	**EASTING** 2,286,417.8		**24 HR.** N/M	**DRILLER:** A. MARTIN	**TECHNICIAN** J. WALKER	



LOG

EQUIVALENT SOIL DESCRIPTION

38.0 — 0.00

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS:
LOOSE SILTY FINE TO COARSE SAND
(A-2-4)

32.5 — 5.5

MEDIUM STIFF TO STIFF SILTY CLAY
(A-7-5)

29.8 — 8.2

LOOSE TO DENSE SILTY FINE TO COARSE SAND
(A-2-4)

28.0 — 10.0

CPT SOUNDING TERMINATED AT ELEV. 28.0 FEET IN DENSE SILTY FINE TO COARSE SAND.

NCDOT CPT - ENGLISH NO N60 51-411 5TH CPT.GPJ NCDOT.GDT 11/16/06

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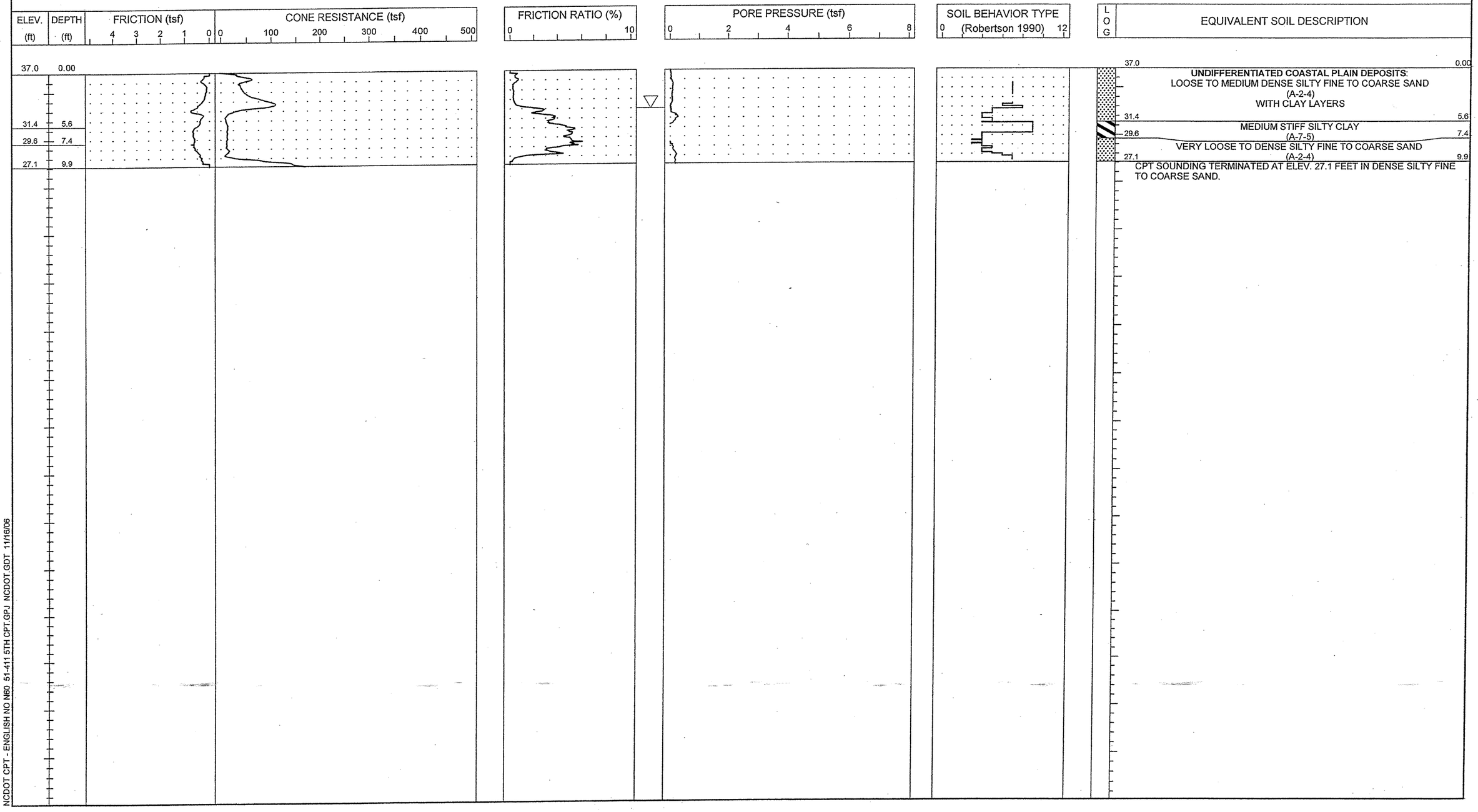
BORING LOG

PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 9.9 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-74	**BORING LOCATION** 176+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 4.0	**DATE STARTED** 10/30/06	**COMPLETED** 10/30/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 37.0 ft	**NORTHING** 193,652.6	**EASTING** 2,286,609.6		**24 HR.** N/M	**DRILLER:** A. MARTIN	**TECHNICIAN** J. WALKER	



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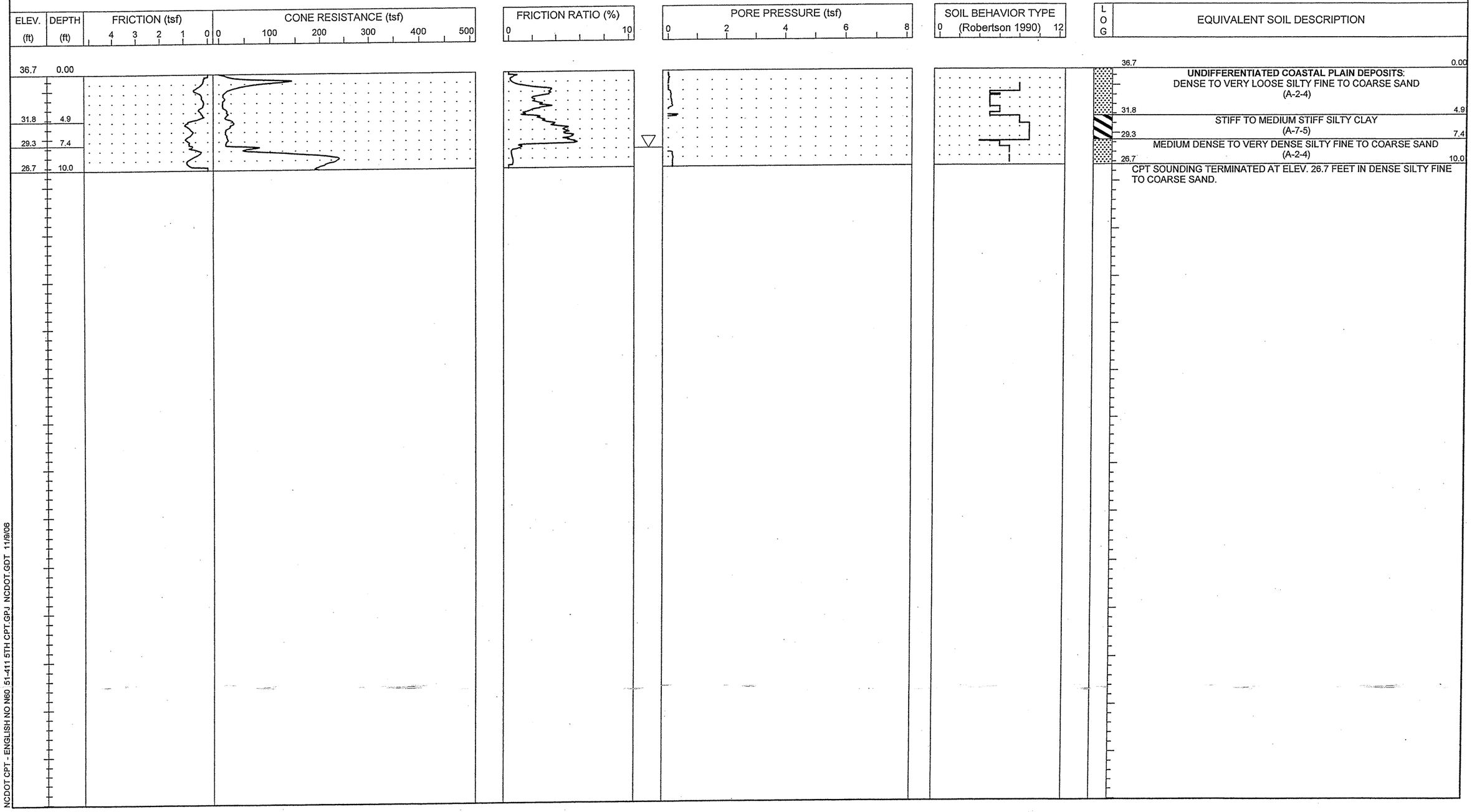
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON		**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf
SITE DESCRIPTION US 17 (Wilmington Bypass)				**GROUND WATER (ft)**	**TOTAL DEPTH** 10.0 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-75	**BORING LOCATION** 178+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 8.0	**DATE STARTED** 10/30/06	**COMPLETED** 10/30/06	**SURFACE WATER DEPTH** N/A	
COLLAR ELEV. 36.7 ft	**NORTHING** 193,595.9	**EASTING** 2,286,801.4		**24 HR.** N/M	**DRILLER:** A. MARTIN	**TECHNICIAN** J. WALKER		



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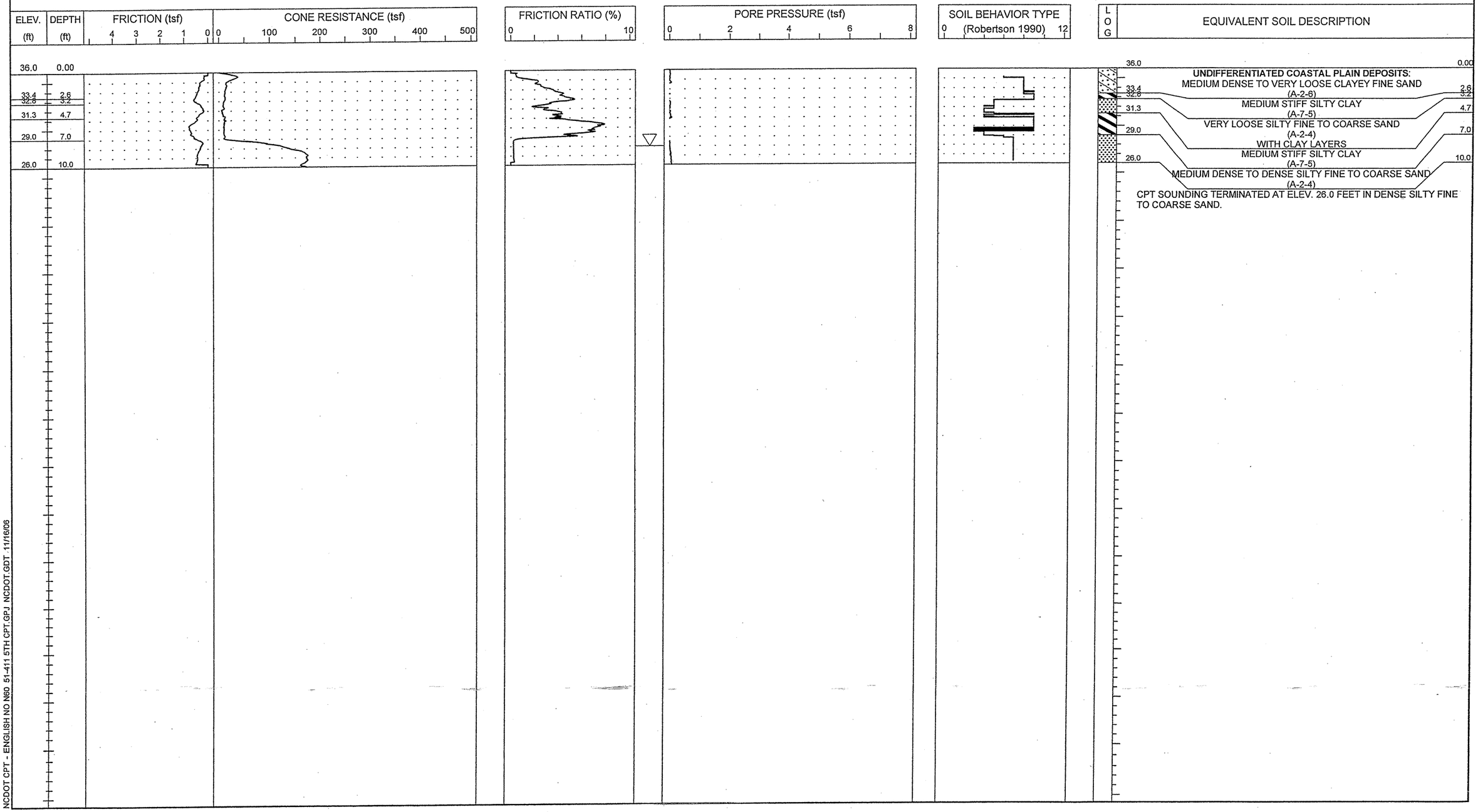
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 10.0 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-76	**BORING LOCATION** 180+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 8.0	**DATE STARTED** 10/30/06	**COMPLETED** 10/30/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 36.0 ft	**NORTHING** 193,539.2	**EASTING** 2,286,993.2		**24 HR.** N/M	**DRILLER:** A. MARTIN	**TECHNICIAN** J. WALKER	



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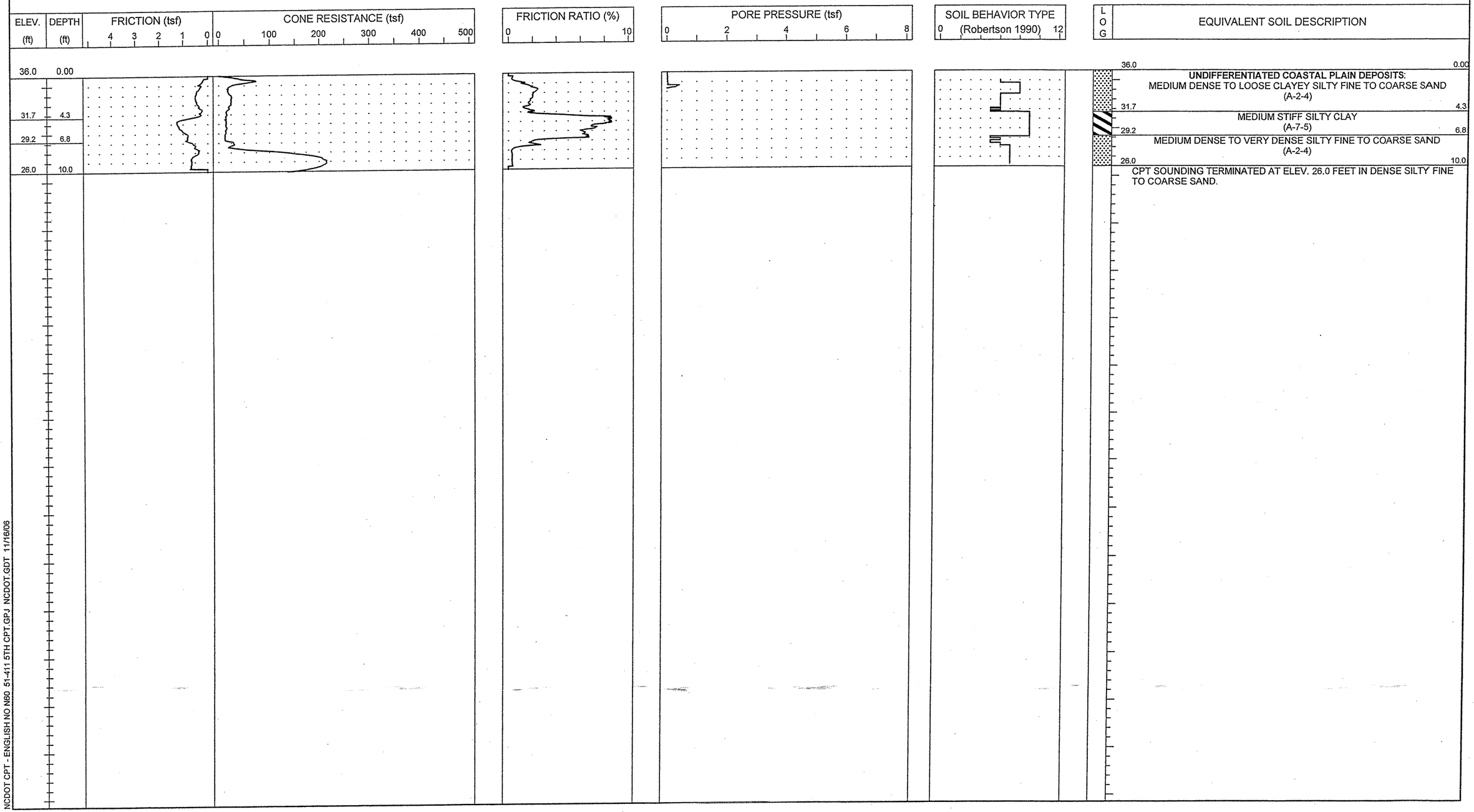
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 10.0 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-77	**BORING LOCATION** 182+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** N/M	**DATE STARTED** 10/30/06	**COMPLETED** 10/30/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 36.0 ft	**NORTHING** 193,482.5	**EASTING** 2,287,185.0		**24 HR.** N/M	**DRILLER:** A. MARTIN	**TECHNICIAN** J. WALKER	



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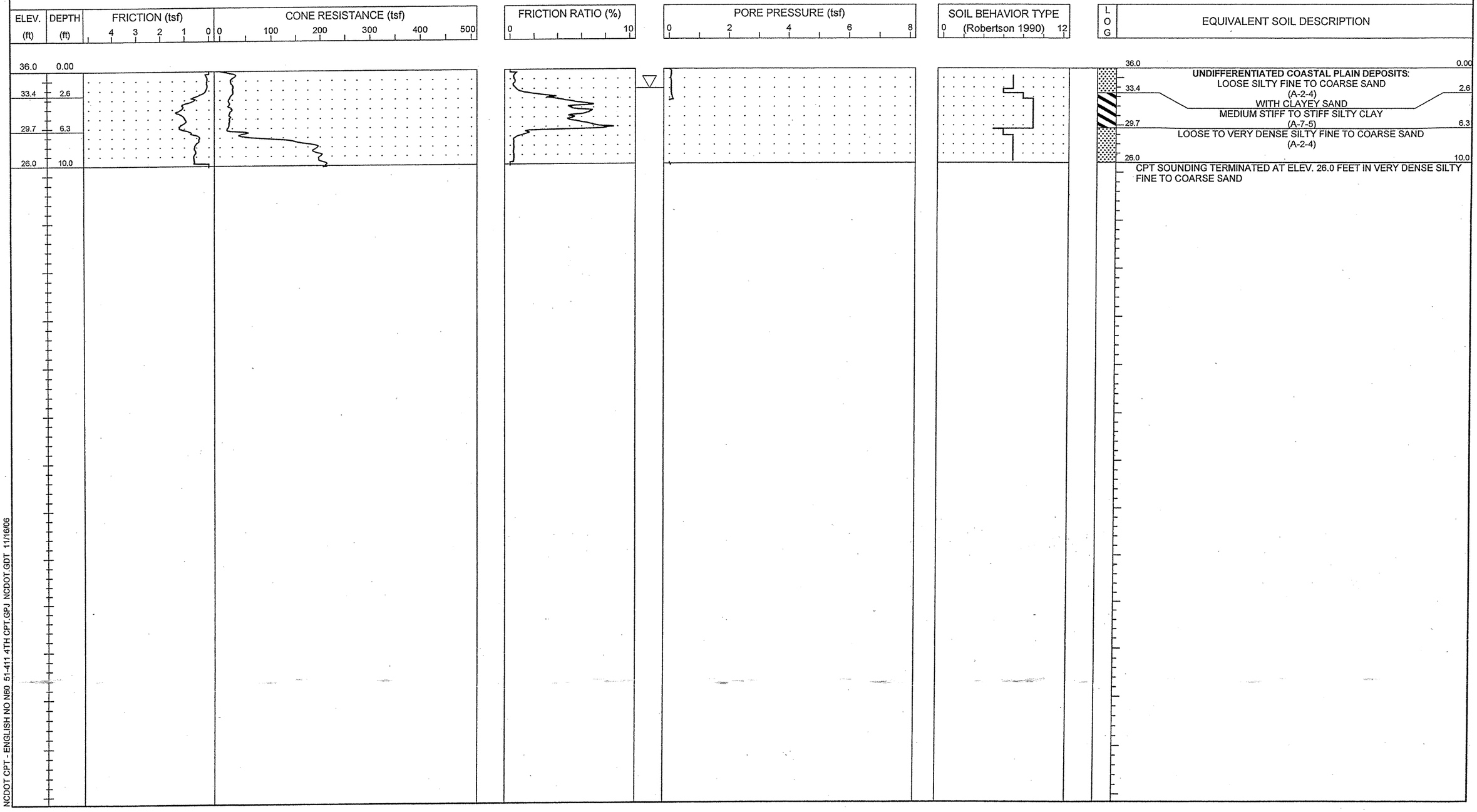
SHEET 1 OF 1

PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON		**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)				**GROUND WATER (ft)**	**TOTAL DEPTH** 10.0 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-78	**BORING LOCATION** 184+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 2.0	**DATE STARTED** 10/26/06	**COMPLETED** 10/26/06	**SURFACE WATER DEPTH** N/A	
COLLAR ELEV. 36.0 ft	**NORTHING** 193,425.8	**EASTING** 2,287,376.8		**24 HR.** N/M	**DRILLER:** A. MARTIN	**TECHNICIAN** J. WALKER		



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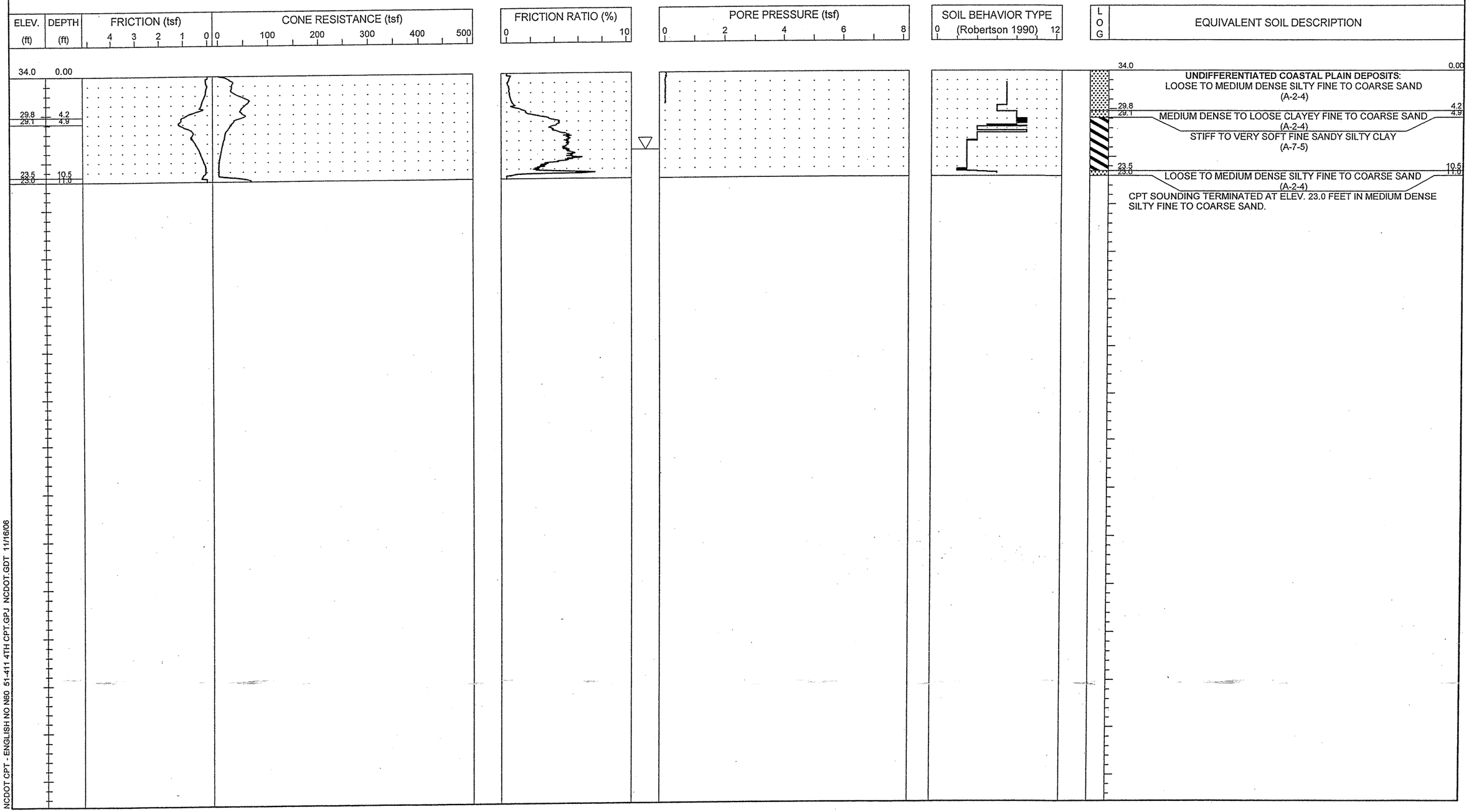
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON		**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)				**GROUND WATER (ft)**	**TOTAL DEPTH** 11.0 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-79	**BORING LOCATION** 186+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 8.0	**DATE STARTED**	**COMPLETED**	**SURFACE WATER DEPTH** N/A	
COLLAR ELEV. 34.0 ft	**NORTHING** 193,369.2	**EASTING** 2,287,568.6		**24 HR.** N/M	**DRILLER:** A. MARTIN	**TECHNICIAN** J. WALKER		



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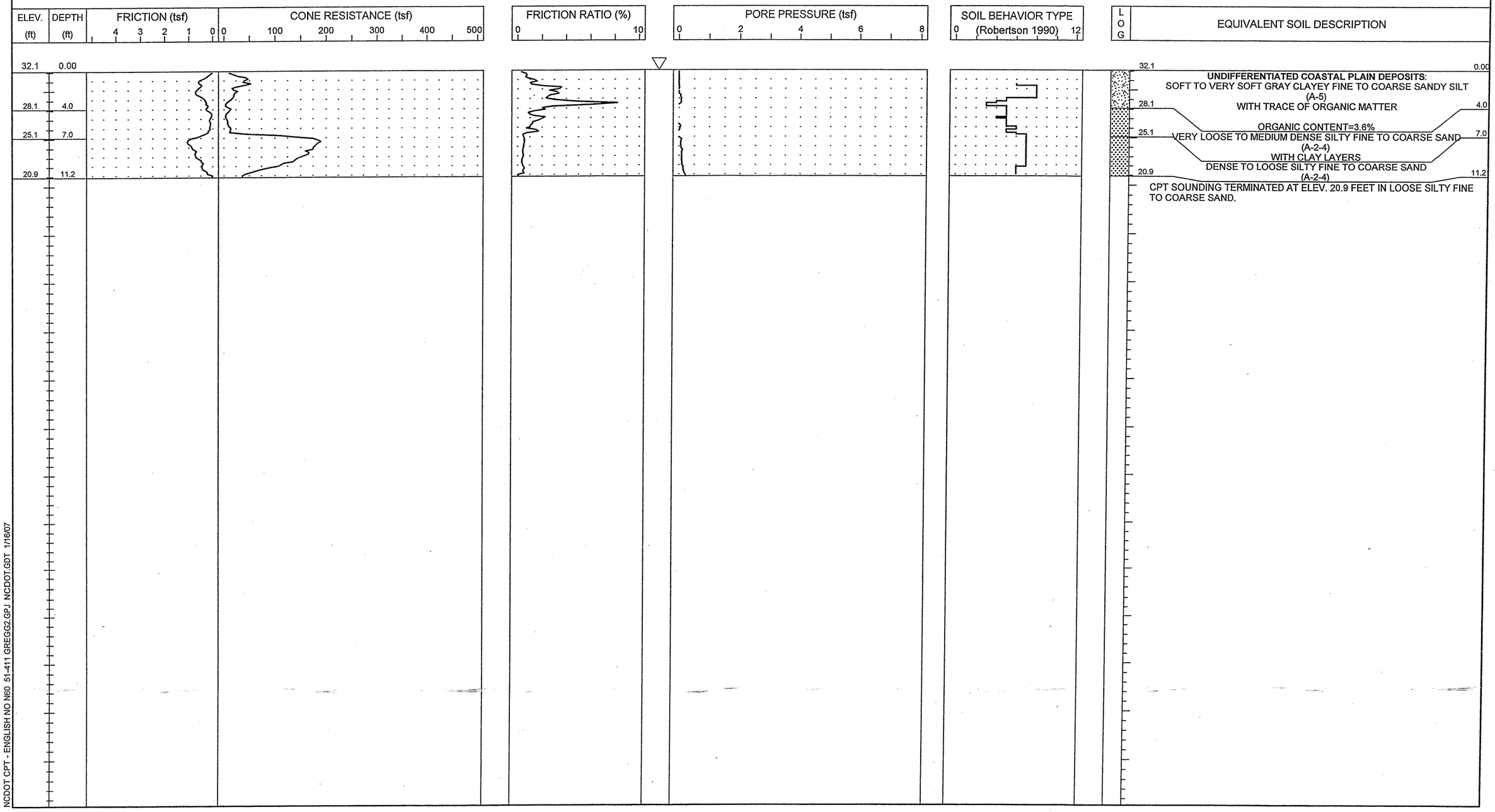
SHEET 1 OF 1

PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 11.2 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-80	**BORING LOCATION** 188+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 0.0	**DATE STARTED** 10/26/06	**COMPLETED** 10/26/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 32.1 ft	**NORTHING** 193,312.5	**EASTING** 2,287,760.4		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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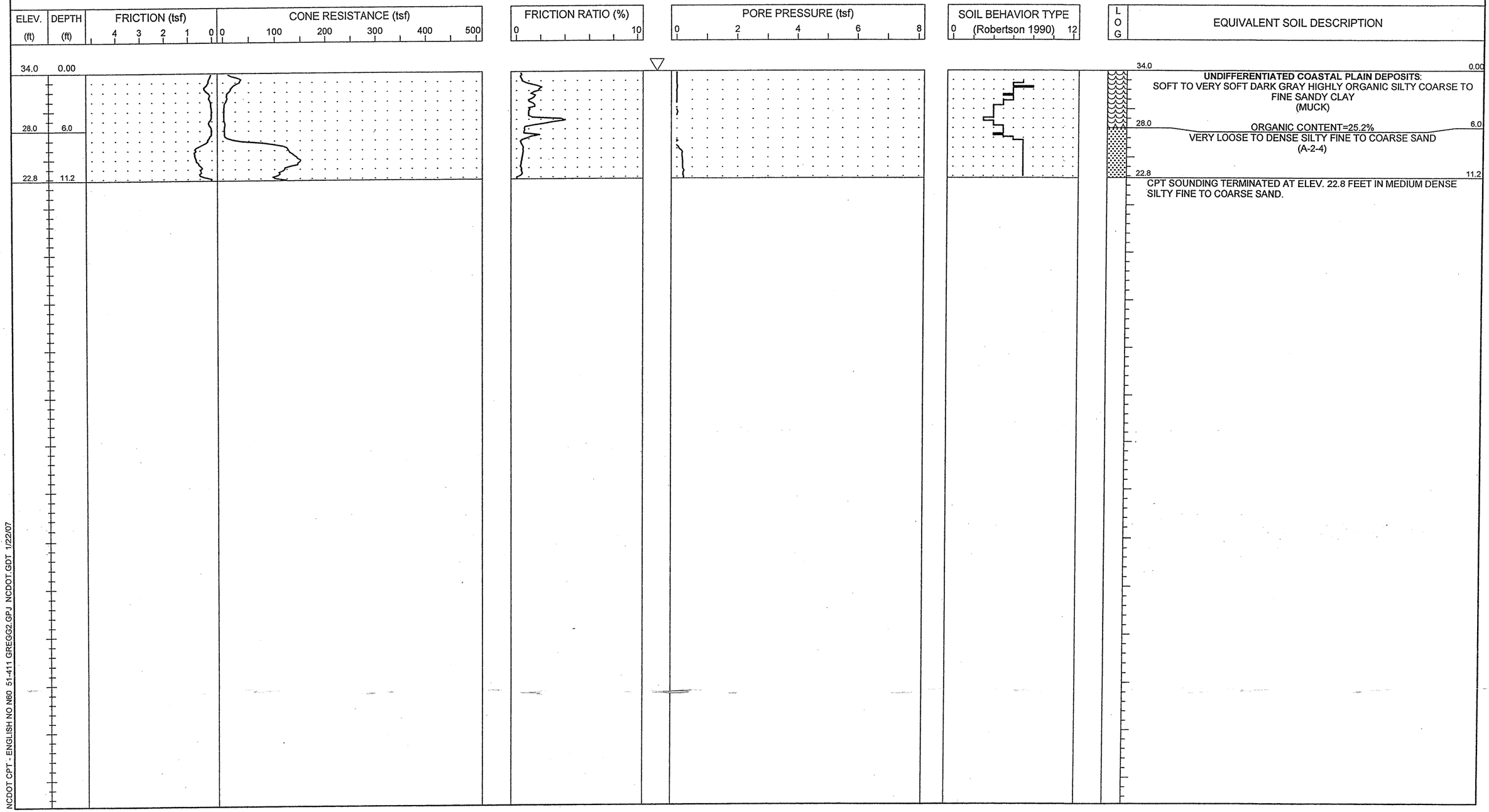
SHEET 1 OF 1

PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 11.2 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-81	**BORING LOCATION** 190+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 0.0	**DATE STARTED** 10/26/06	**COMPLETED** 10/26/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 34.0 ft	**NORTHING** 193,255.8	**EASTING** 2,287,952.2		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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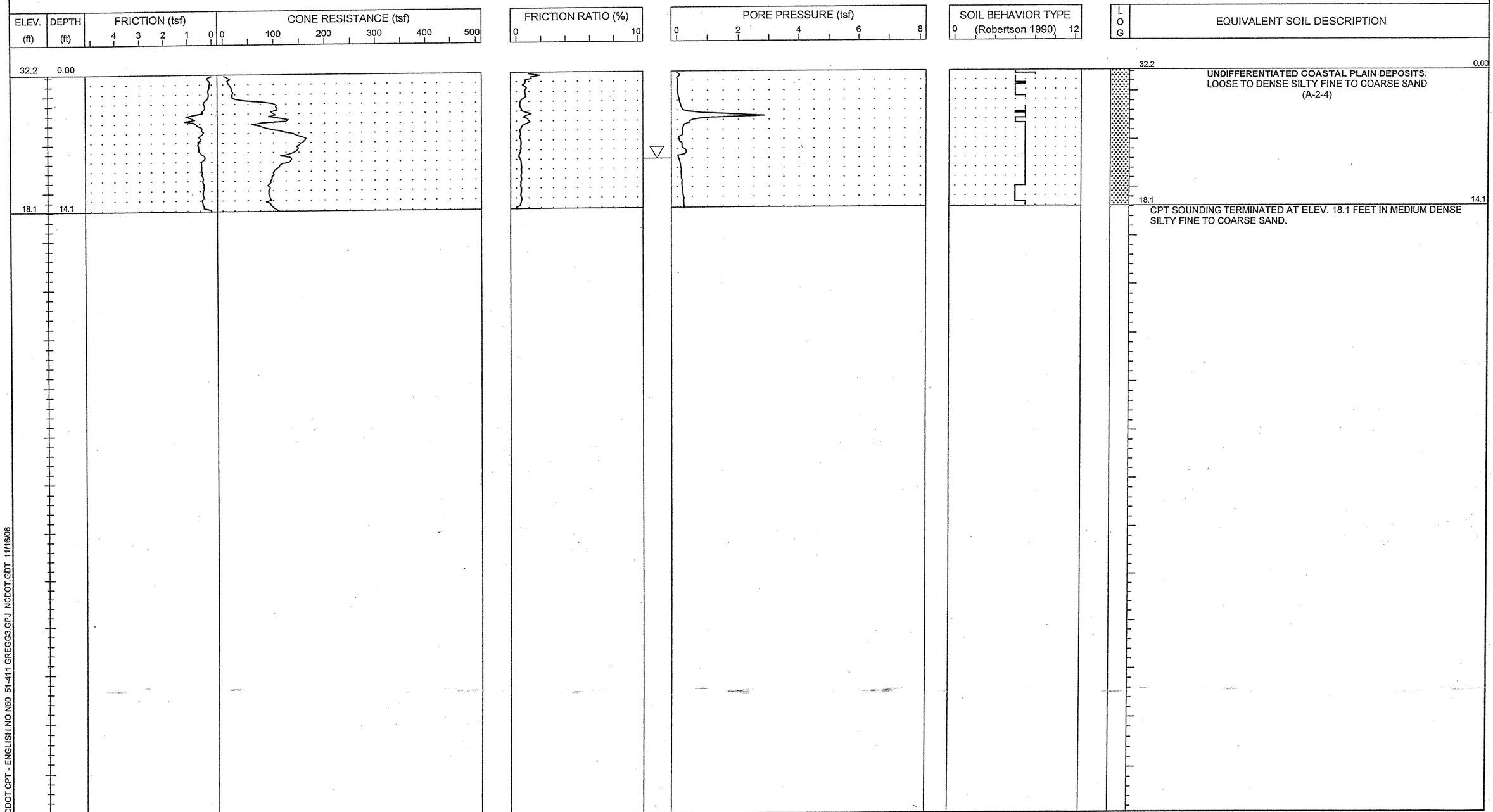
BORING LOG

PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 14.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C- 82	**BORING LOCATION** 192+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 9.0	**DATE STARTED** 10/26/06	**COMPLETED** 10/26/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 32.2 ft	**NORTHING** 193,199.1	**EASTING** 2,288,144.0		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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BORING LOG

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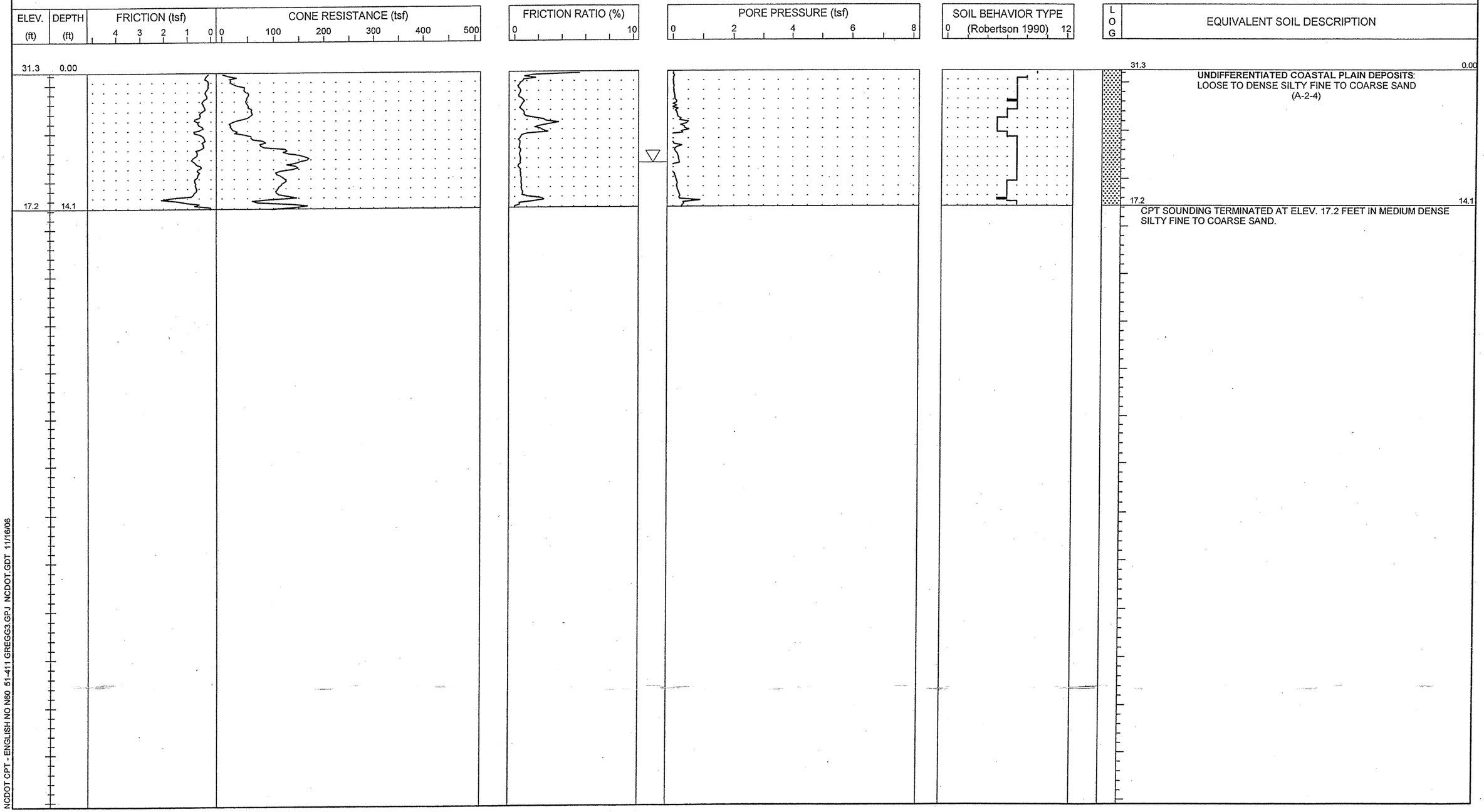
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON		**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)				**GROUND WATER (ft)**	**TOTAL DEPTH** 14.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C- 83	**BORING LOCATION** 194+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 9.5	**DATE STARTED** 10/25/06	**COMPLETED** 10/25/06	**SURFACE WATER DEPTH** N/A	
COLLAR ELEV. 31.3 ft	**NORTHING** 193,142.4	**EASTING** 2,288,335.8		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN		



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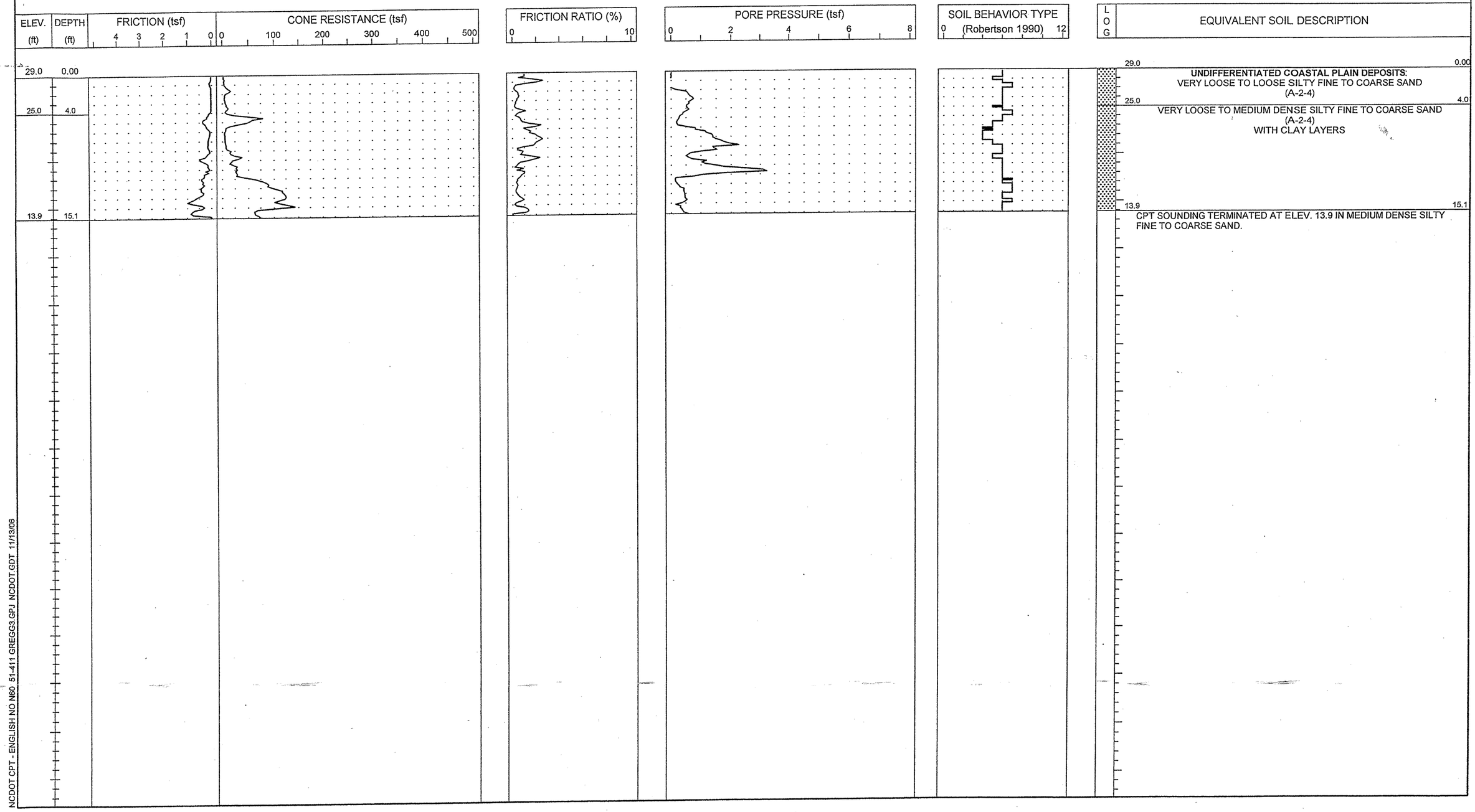
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 15.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-84	**BORING LOCATION** 196+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** N/M	**DATE STARTED** 10/25/06	**COMPLETED** 10/25/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 29.0 ft	**NORTHING** 193,085.7	**EASTING** 2,288,527.6		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



NCDOT CPT - ENGLISH NO N60 51-411 GREGG3.GPJ NCDOT.GDT 11/13/06

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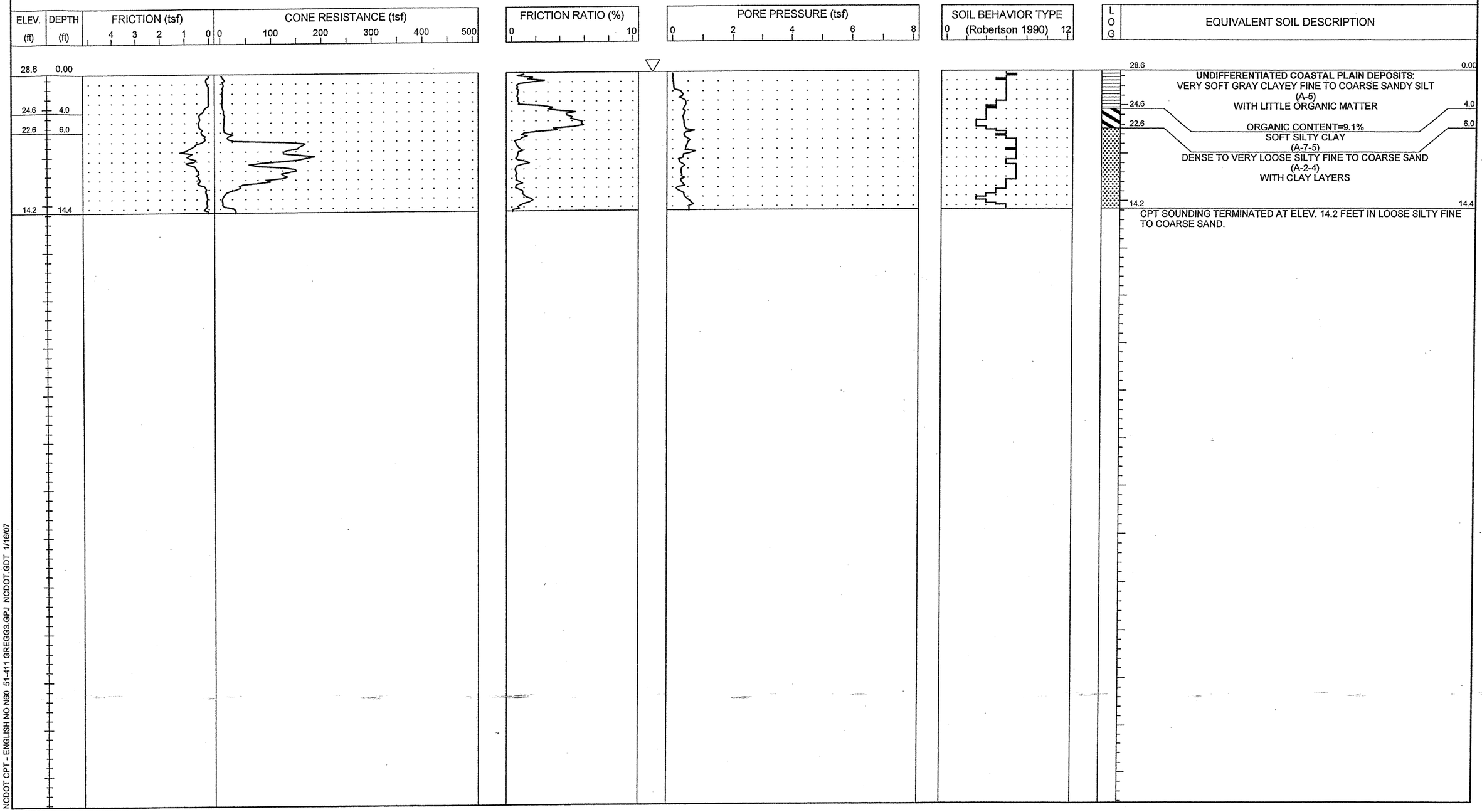
BORING LOG

PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 14.4 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C- 85	**BORING LOCATION** 198+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 0.0	**DATE STARTED** 10/25/06	**COMPLETED** 10/25/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 28.6 ft	**NORTHING** 193,029.0	**EASTING** 2,288,719.4		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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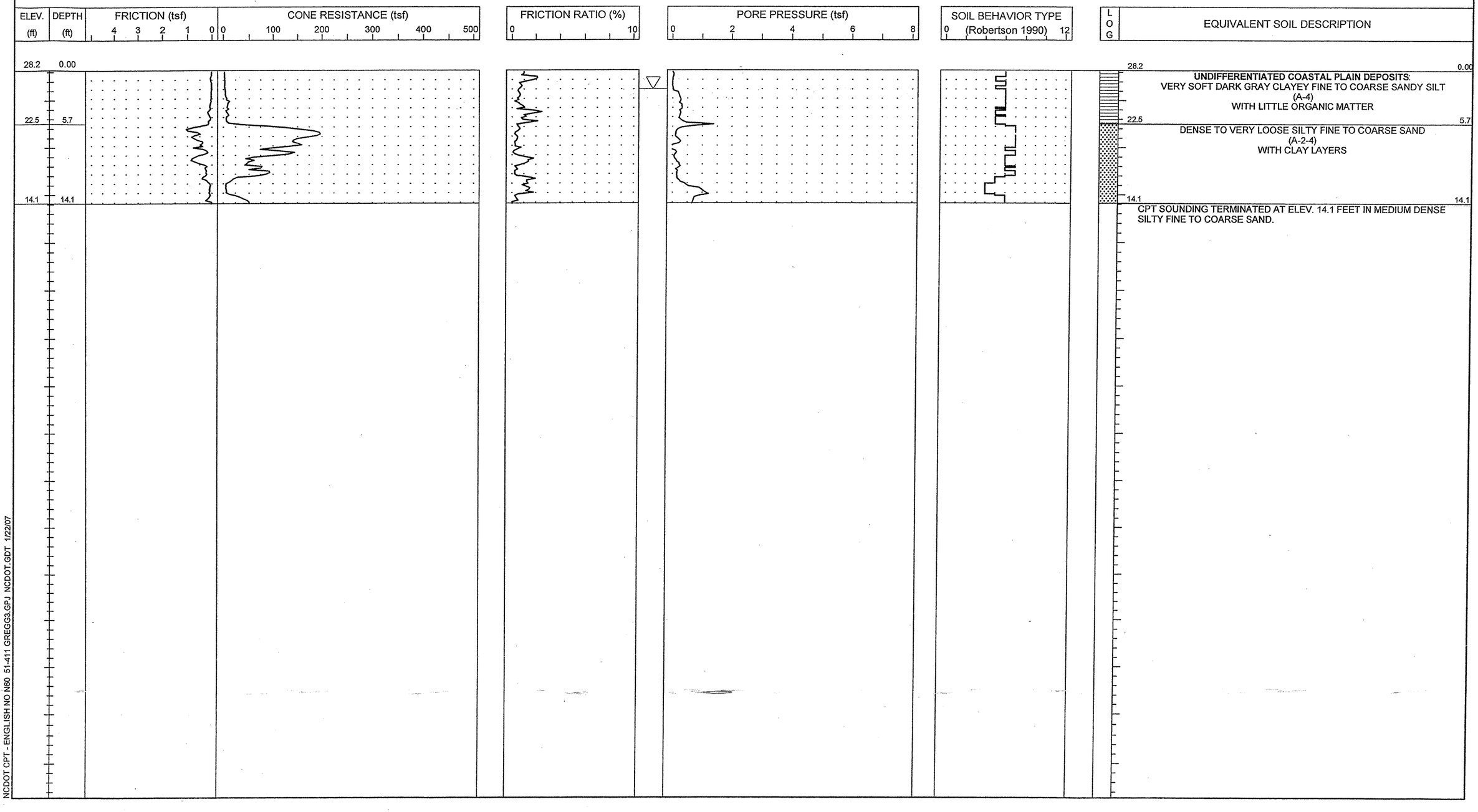
BORING LOG

PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 14.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C- 86	**BORING LOCATION** 200+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 2.0	**DATE STARTED** 10/25/06	**COMPLETED** 10/25/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 28.2 ft	**NORTHING** 192,972.3	**EASTING** 2,288,911.2		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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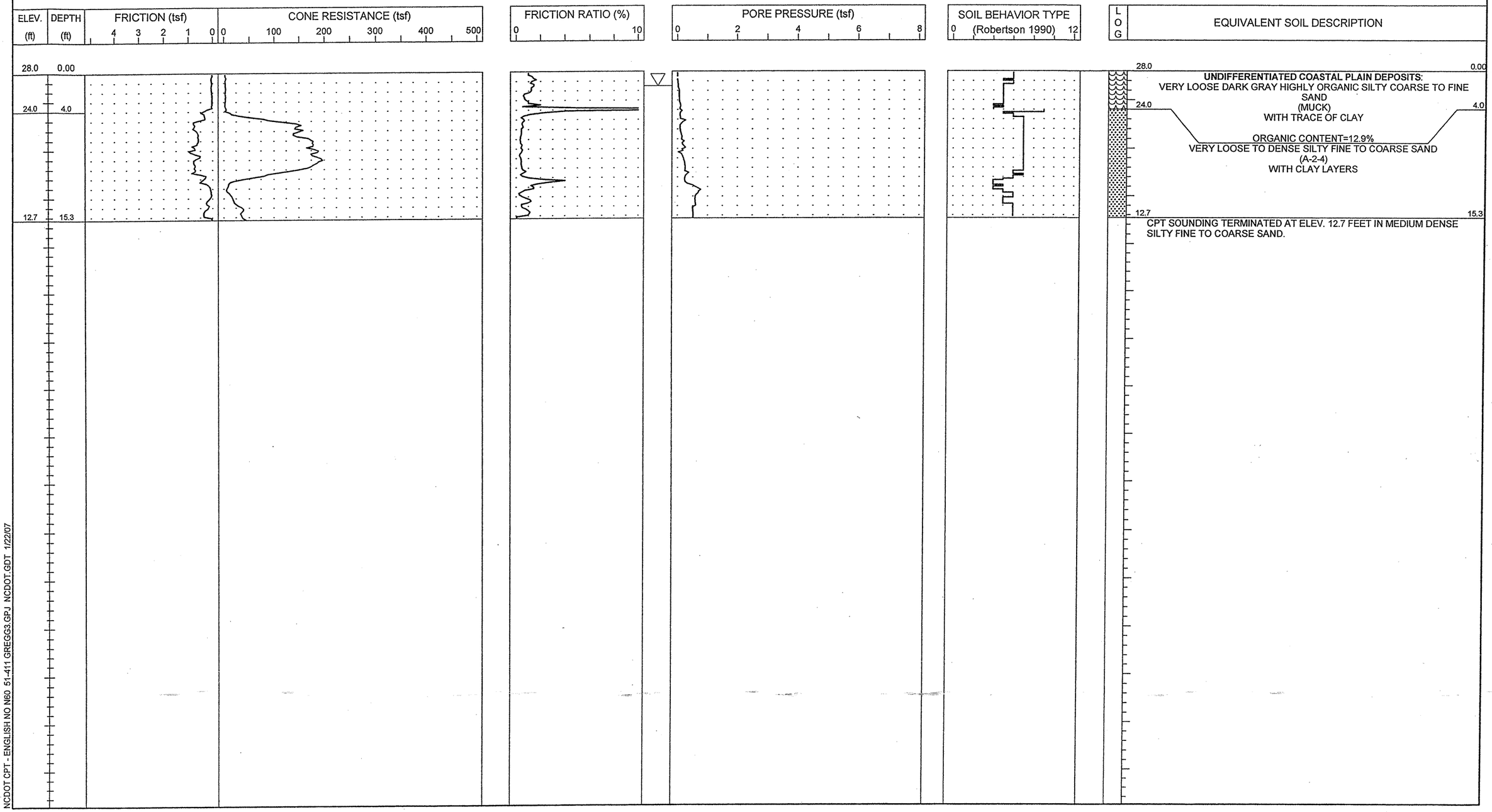
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 15.3 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C- 87	**BORING LOCATION** 202+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 1.5	**DATE STARTED** 10/25/06	**COMPLETED** 10/25/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 28.0 ft	**NORTHING** 192,915.6	**EASTING** 2,289,103.0		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



EQUIVALENT SOIL DESCRIPTION

28.0 — 0.00

UNDIFFERENTIATED COASTAL PLAIN DEPOSITS:
VERY LOOSE DARK GRAY HIGHLY ORGANIC SILTY COARSE TO FINE SAND
(MUCK)
WITH TRACE OF CLAY

24.0 — 4.0

ORGANIC CONTENT=12.9%
VERY LOOSE TO DENSE SILTY FINE TO COARSE SAND
(A-2-4)
WITH CLAY LAYERS

12.7 — 15.3

CPT SOUNDING TERMINATED AT ELEV. 12.7 FEET IN MEDIUM DENSE SILTY FINE TO COARSE SAND.

NCDOT CPT - ENGLISH NO N60 51-411 GREGG3.GPJ NCDOT.GDT 1/22/07

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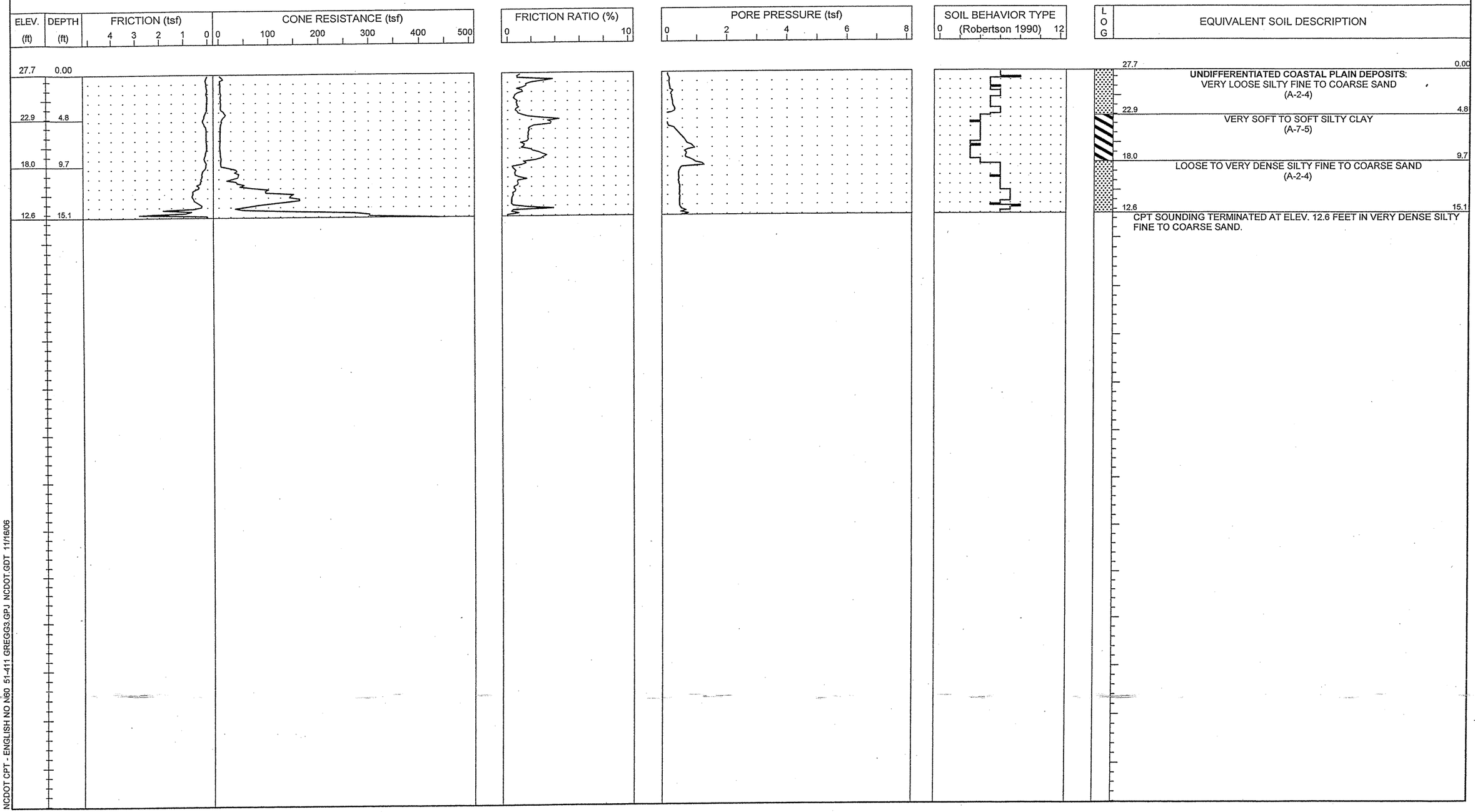
BORING LOG

PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 15.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C- 88	**BORING LOCATION** 204+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** N/M	**DATE STARTED** 10/26/06	**COMPLETED** 10/26/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 27.7 ft	**NORTHING** 192,858.9	**EASTING** 2,289,294.8		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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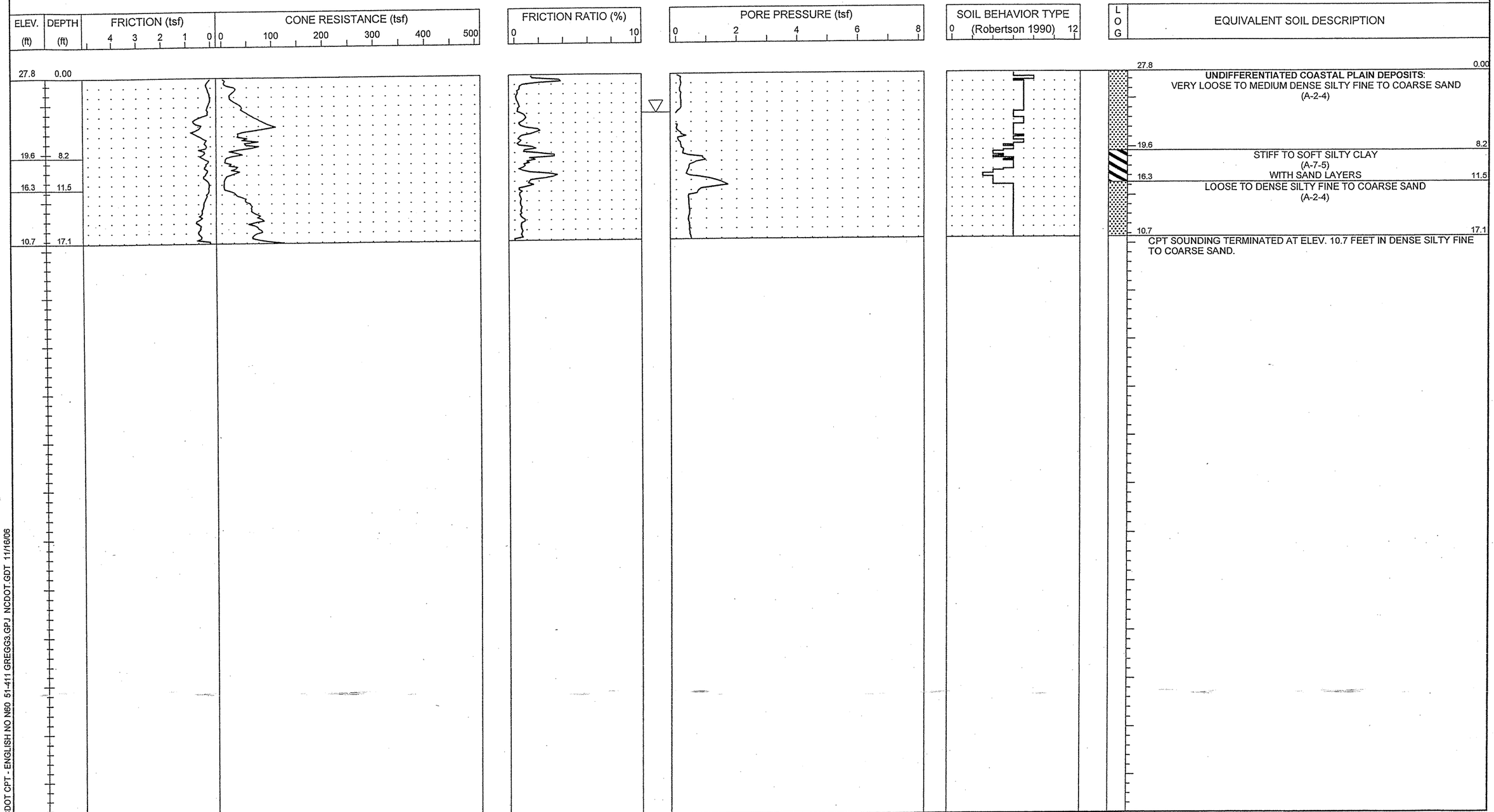
BORING LOG

PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 17.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C- 89	**BORING LOCATION** 206+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 4.0	**DATE STARTED** 10/26/06	**COMPLETED** 10/26/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 27.8 ft	**NORTHING** 192,802.2	**EASTING** 2,289,486.6		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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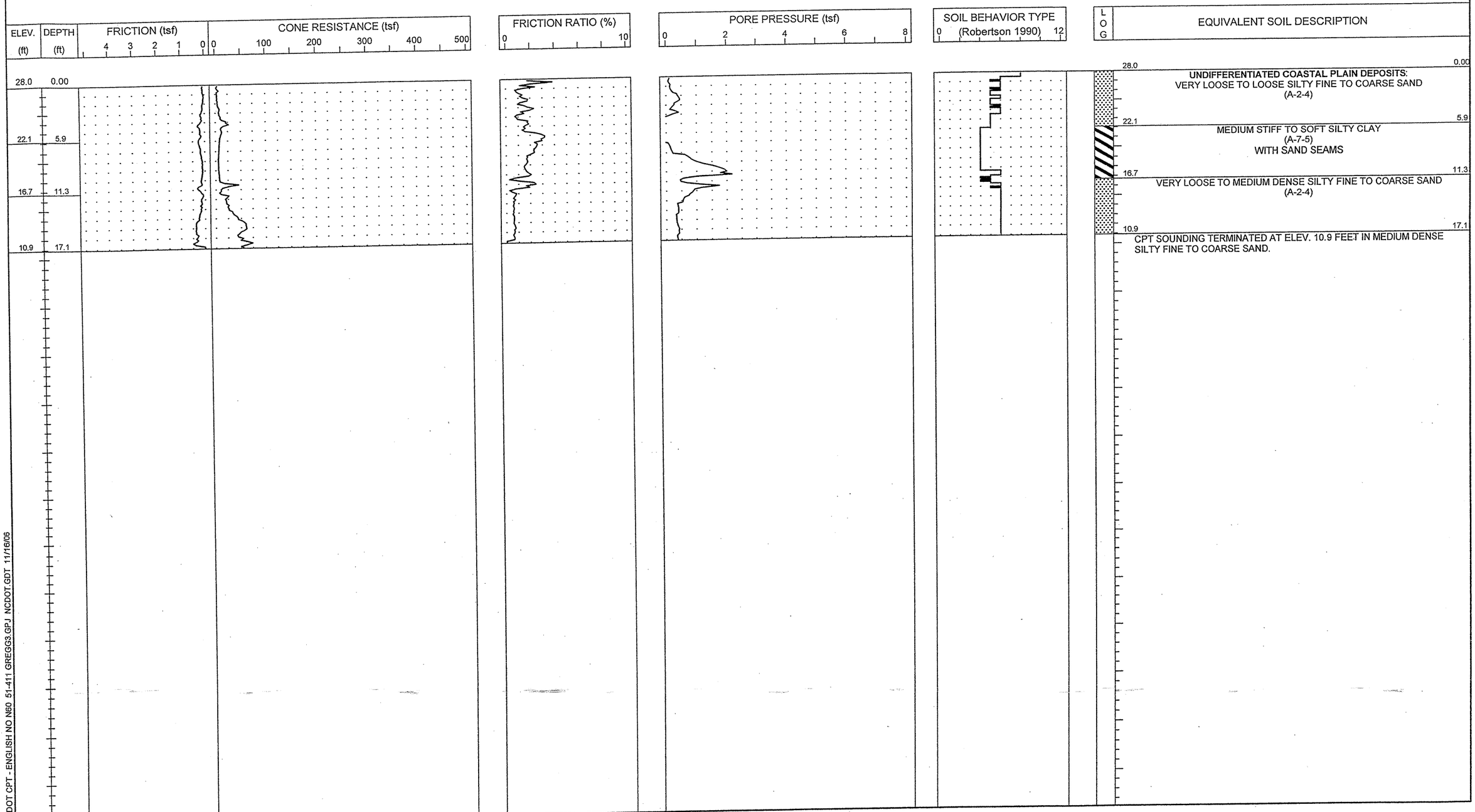
PROJECT NO. 34491.1.2	ID. R-2633B	COUNTY New Hanover/Brunswick	GEOLOGIST S. JOHNSON	TYPE OF CONE 1.75 In. PEIZO CONE	ROD TYPE 1.75 in Dia.	MAXIMUM DOWN PRESSURE Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			GROUND WATER (ft)	TOTAL DEPTH 17.1 ft	DRILL MACHINE CPT-ATV	DRILL METHOD Direct Push	HAMMER TYPE N/A
BORING NO. C- 90	BORING LOCATION 208+00	OFFSET 0.0 ft CL	ALIGNMENT -L-	0 HR. N/M	DATE STARTED 10/26/06	COMPLETED 10/26/06	SURFACE WATER DEPTH N/A
COLLAR ELEV. 28.0 ft	NORTHING 192,745.5	EASTING 2,289,678.4		24 HR. N/M	DRILLER: RUPERTO	TECHNICIAN SHAWN	



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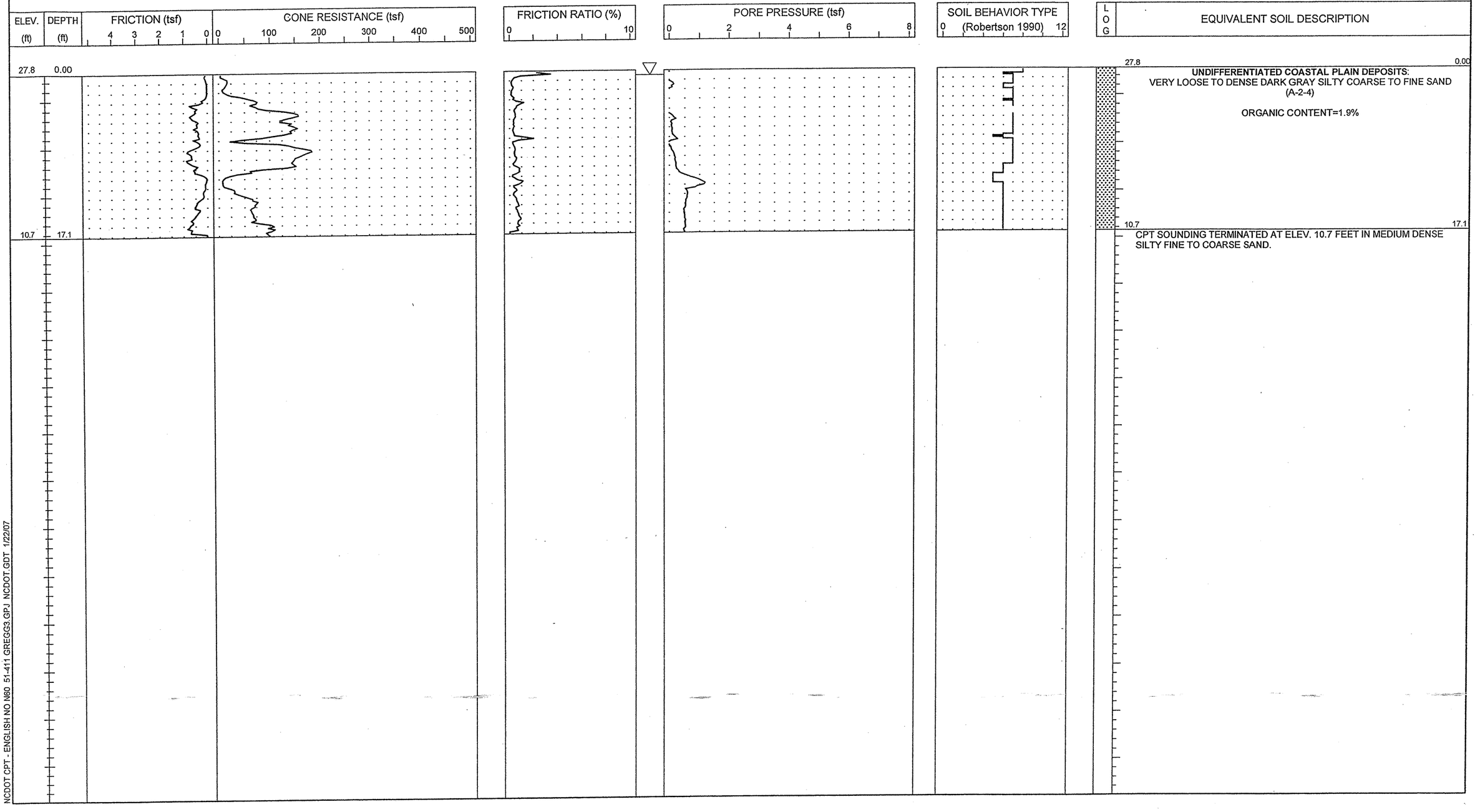
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 17.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C- 91	**BORING LOCATION** 210+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 0.5	**DATE STARTED** 10/25/06	**COMPLETED** 10/25/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 27.8 ft	**NORTHING** 192,688.9	**EASTING** 2,289,870.2		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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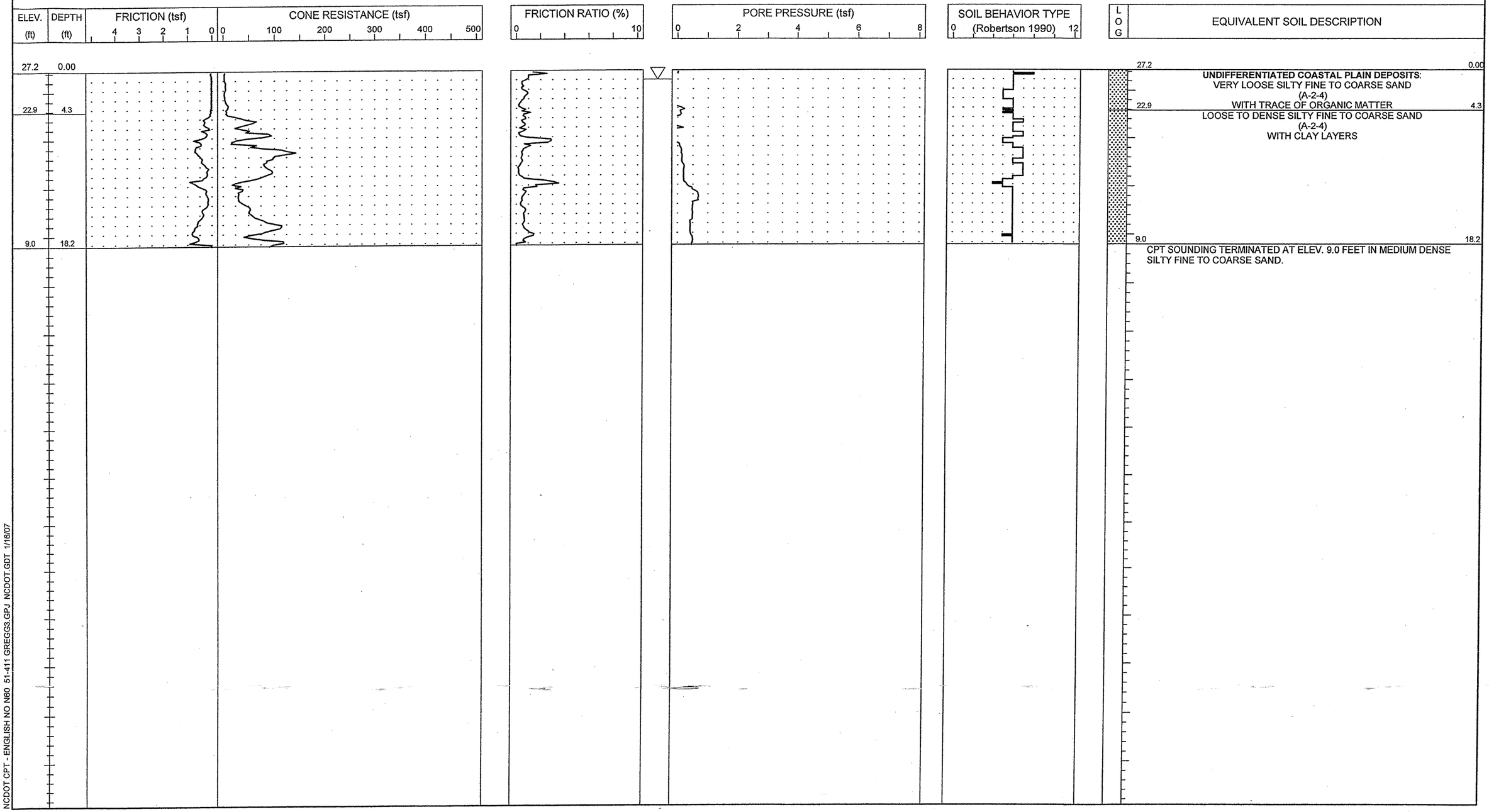
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON		**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)				**GROUND WATER (ft)**	**TOTAL DEPTH** 18.2 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C- 92	**BORING LOCATION** 212+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 1.0	**DATE STARTED** 10/25/06	**COMPLETED** 10/25/06	**SURFACE WATER DEPTH** N/A	
COLLAR ELEV. 27.2 ft	**NORTHING** 192,632.2	**EASTING** 2,290,062.0		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN		



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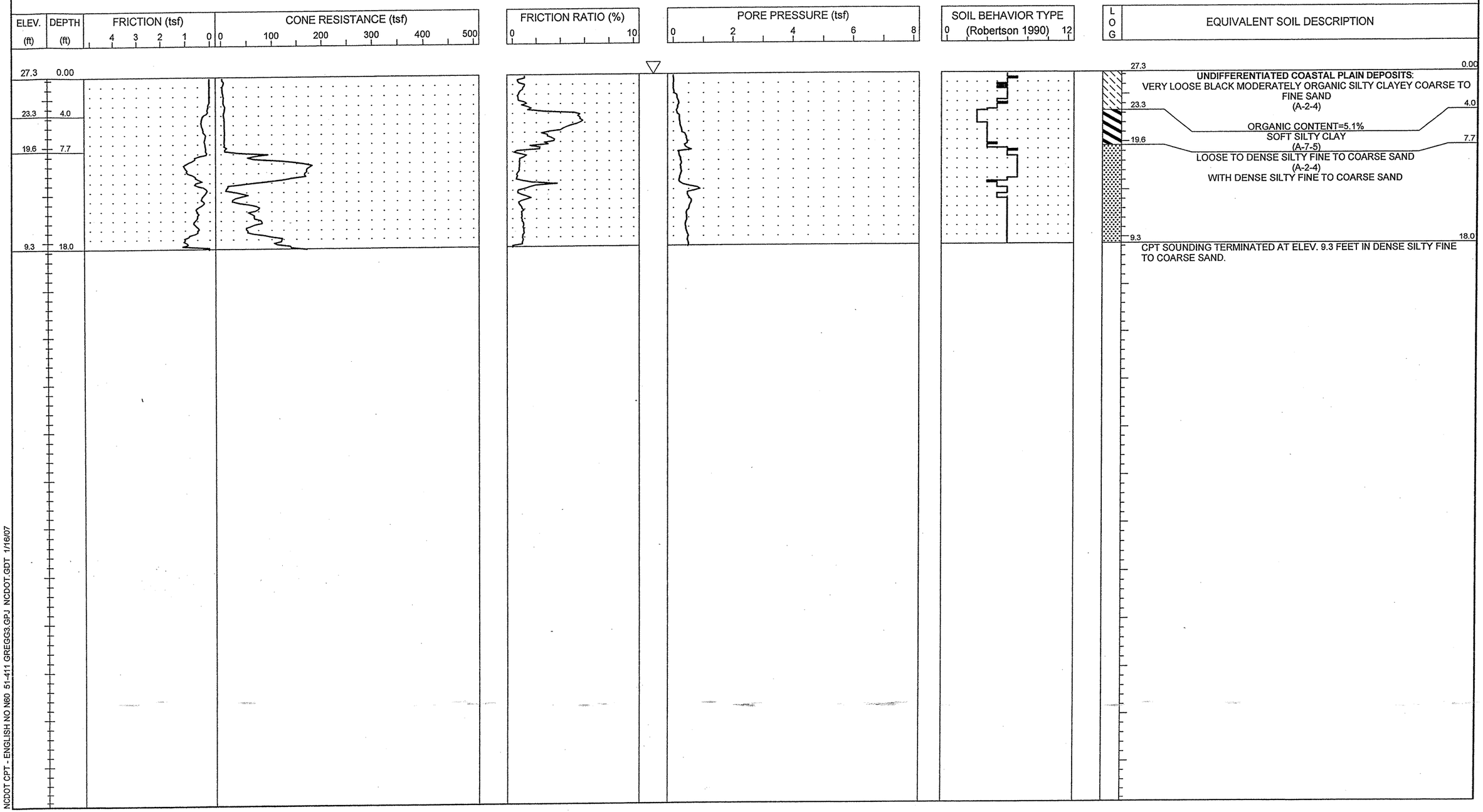
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 18.0 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C- 93	**BORING LOCATION** 214+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 0.0	**DATE STARTED** 10/25/06	**COMPLETED** 10/25/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 27.3 ft	**NORTHING** 192,575.5	**EASTING** 2,290,253.7		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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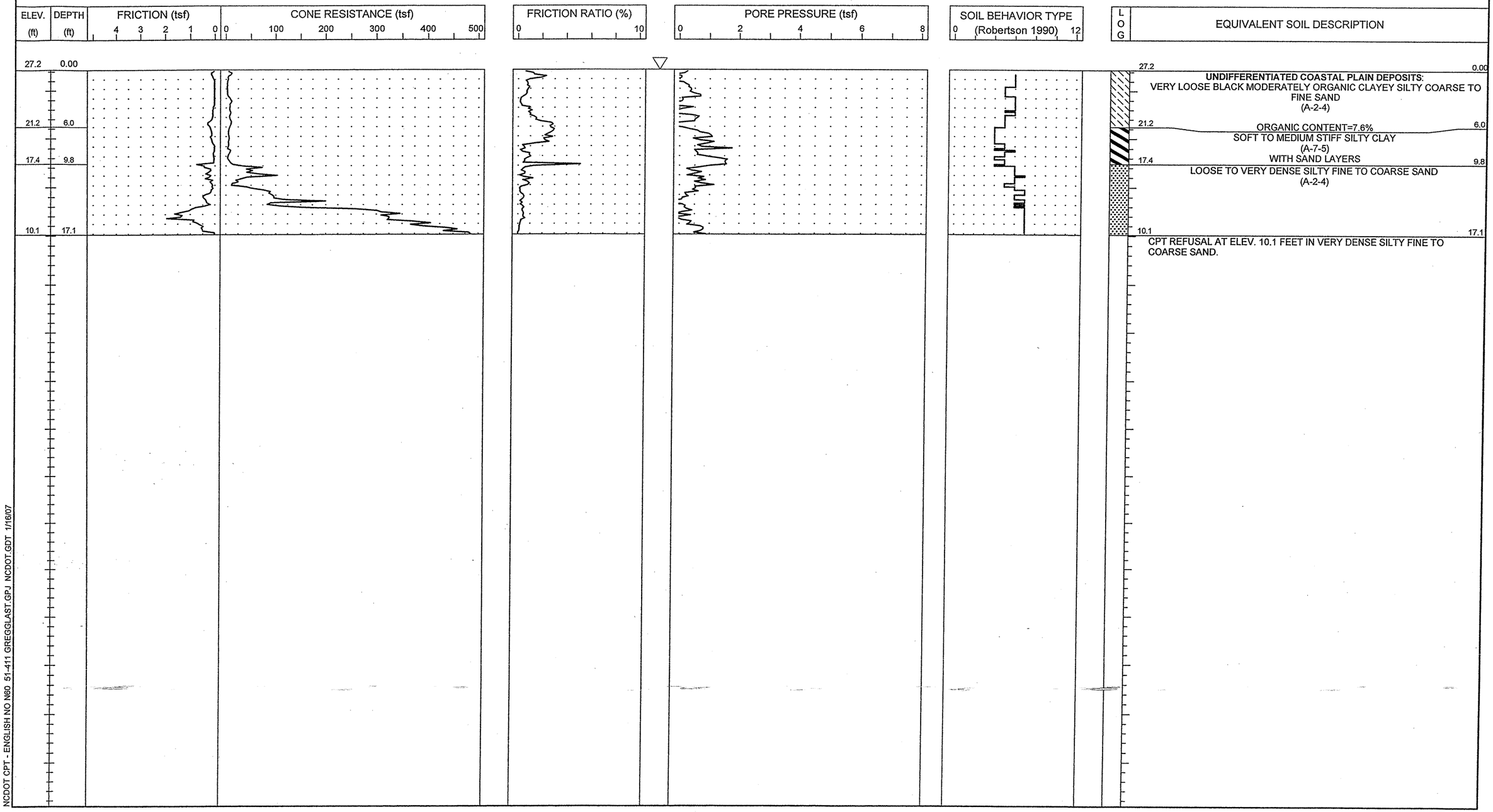
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/ Brunswick	**GEOLOGIST** S. JOHNSON		**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)				**GROUND WATER (ft)**	**TOTAL DEPTH** 17.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C- 94	**BORING LOCATION** 216+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 0.0	**DATE STARTED** 10/31/06	**COMPLETED** 10/31/06	**SURFACE WATER DEPTH** N/A	
COLLAR ELEV. 27.2 ft	**NORTHING** 192,518.8	**EASTING** 2,290,445.5		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN		



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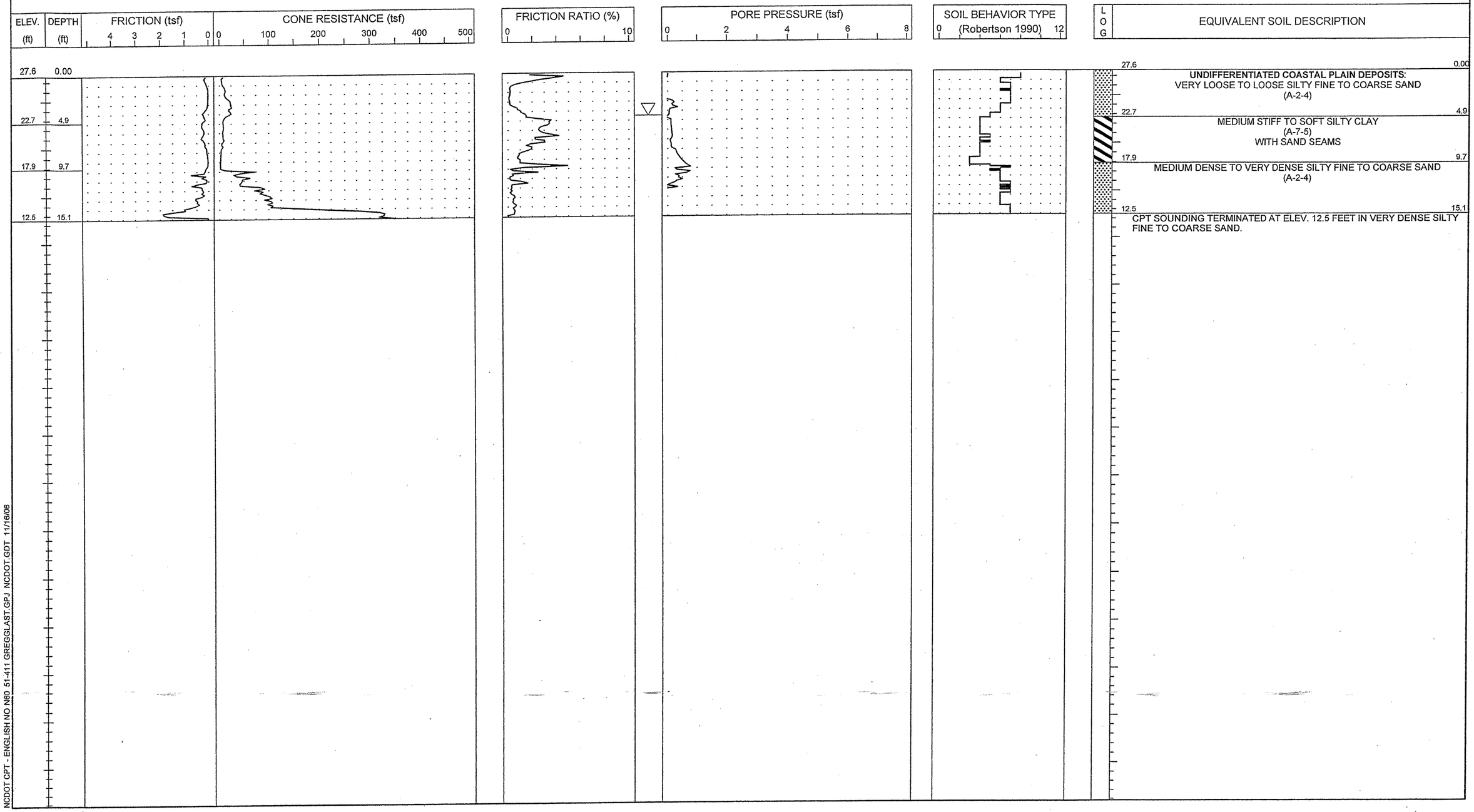
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/ Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 15.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C- 95	**BORING LOCATION** 218+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 4.5	**DATE STARTED** 10/31/06	**COMPLETED** 10/31/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 27.6 ft	**NORTHING** 192,462.1	**EASTING** 2,290,637.3		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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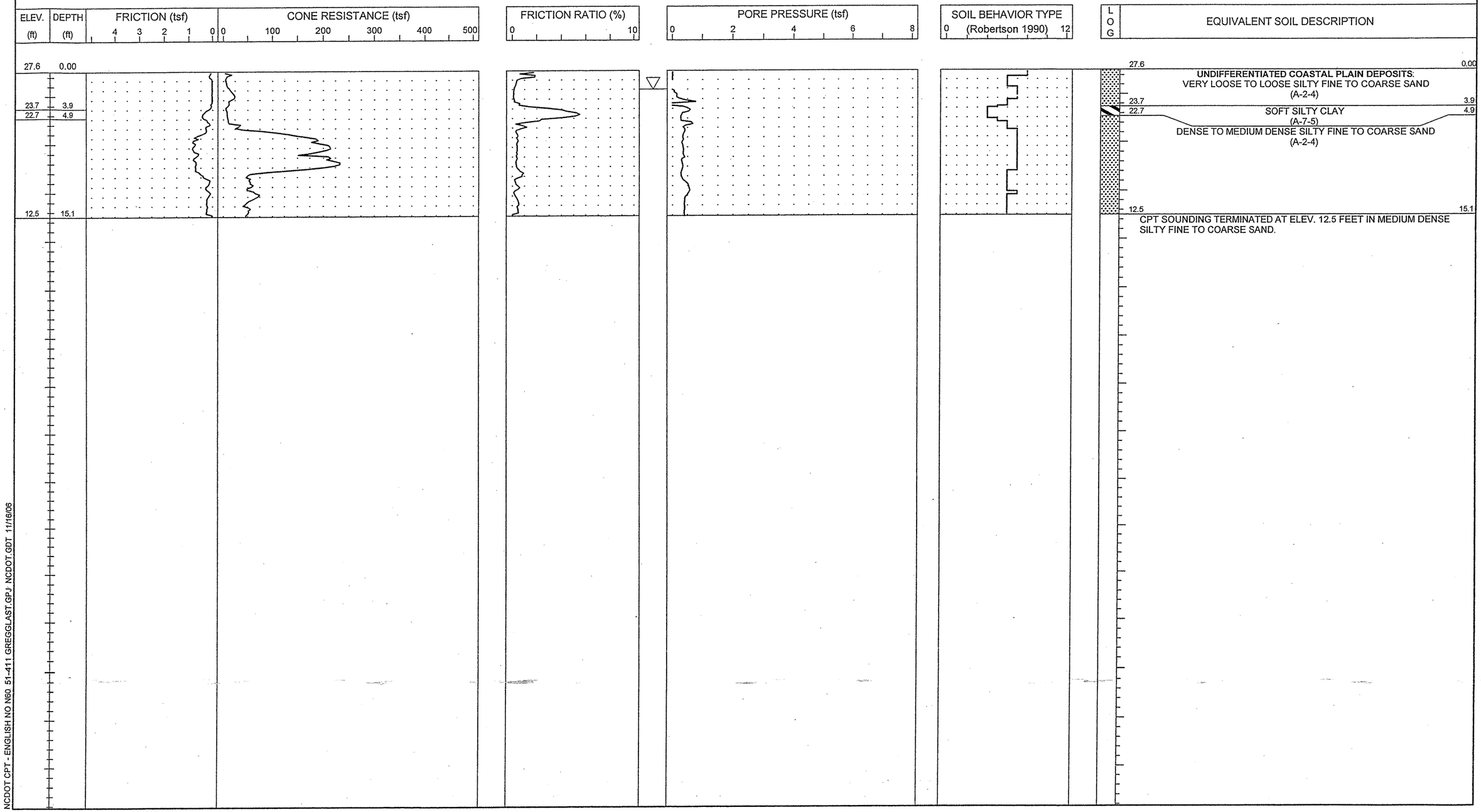
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/ Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 15.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C- 96	**BORING LOCATION** 220+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 2.0	**DATE STARTED** 10/31/06	**COMPLETED** 10/31/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 27.6 ft	**NORTHING** 192,405.4	**EASTING** 2,290,829.1		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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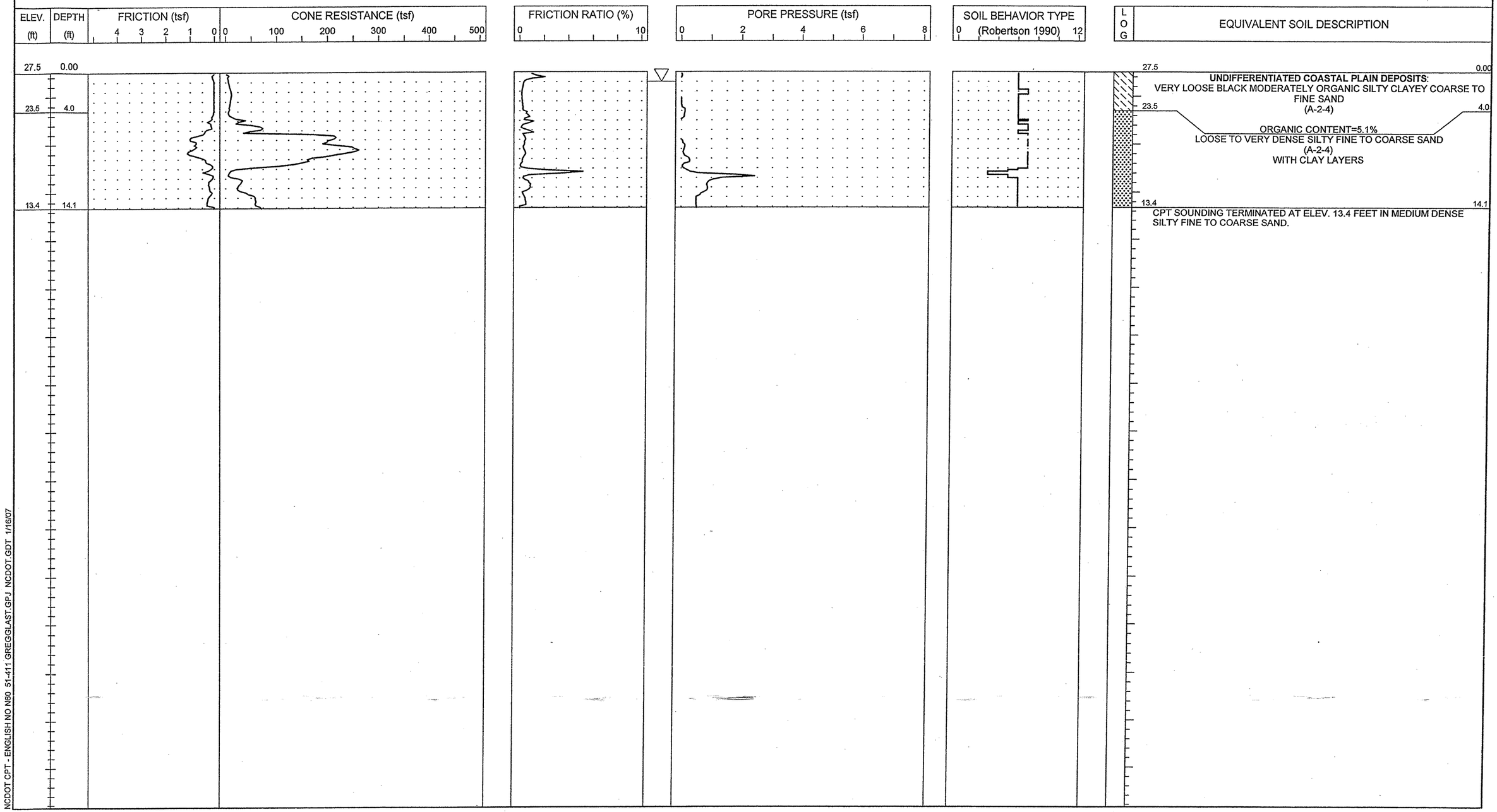
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/ Brunswick	**GEOLOGIST** S. JOHNSON		**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf
SITE DESCRIPTION US 17 (Wilmington Bypass)				**GROUND WATER (ft)**	**TOTAL DEPTH** 14.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C- 97	**BORING LOCATION** 222+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 1.0	**DATE STARTED** 10/31/06	**COMPLETED** 10/31/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 27.5 ft	**NORTHING** 192,348.7	**EASTING** 2,291,020.9		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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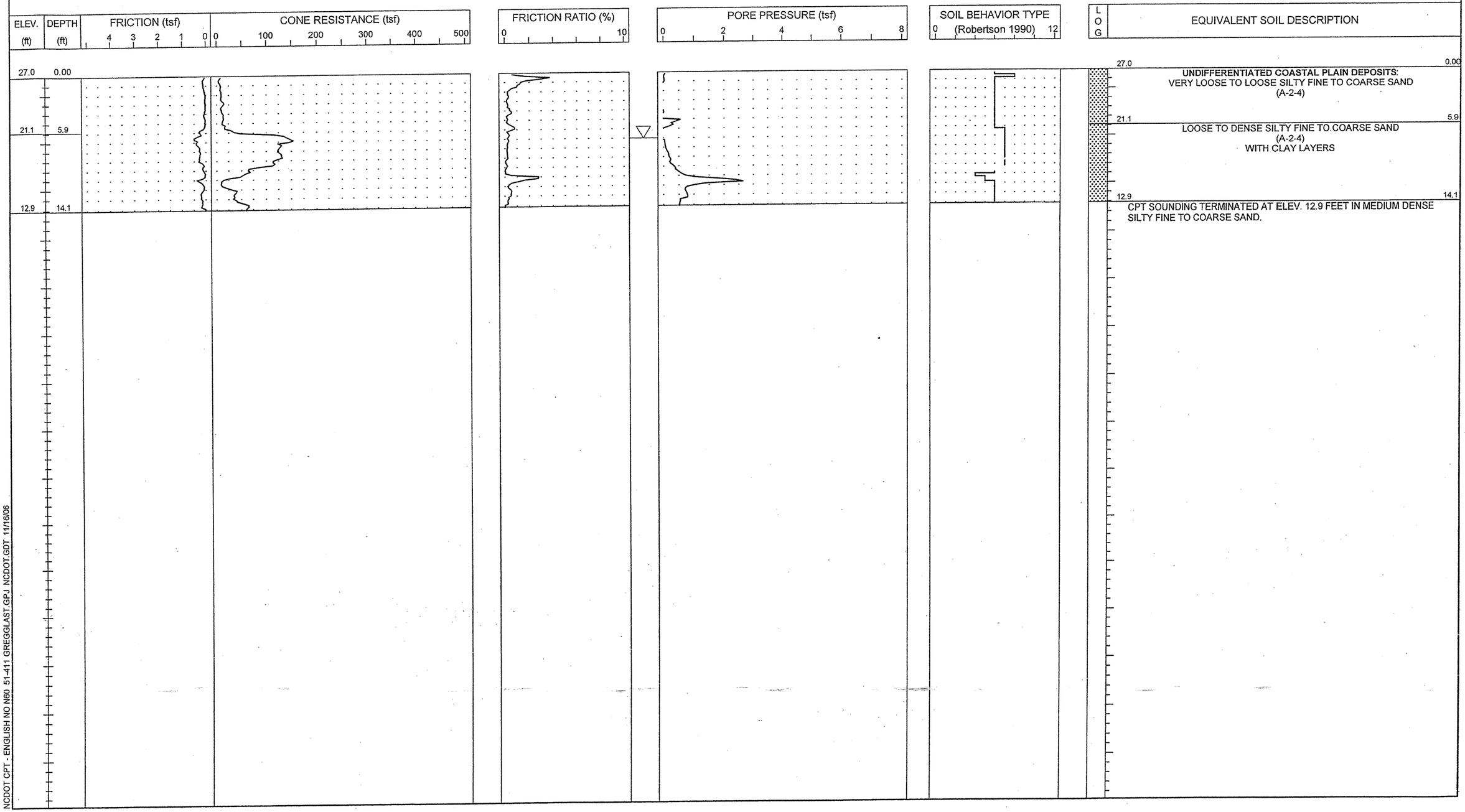
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/ Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 14.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C- 98	**BORING LOCATION** 224+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 7.0	**DATE STARTED** 10/31/06	**COMPLETED** 10/31/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 27.0 ft	**NORTHING** 192,292.0	**EASTING** 2,291,212.7		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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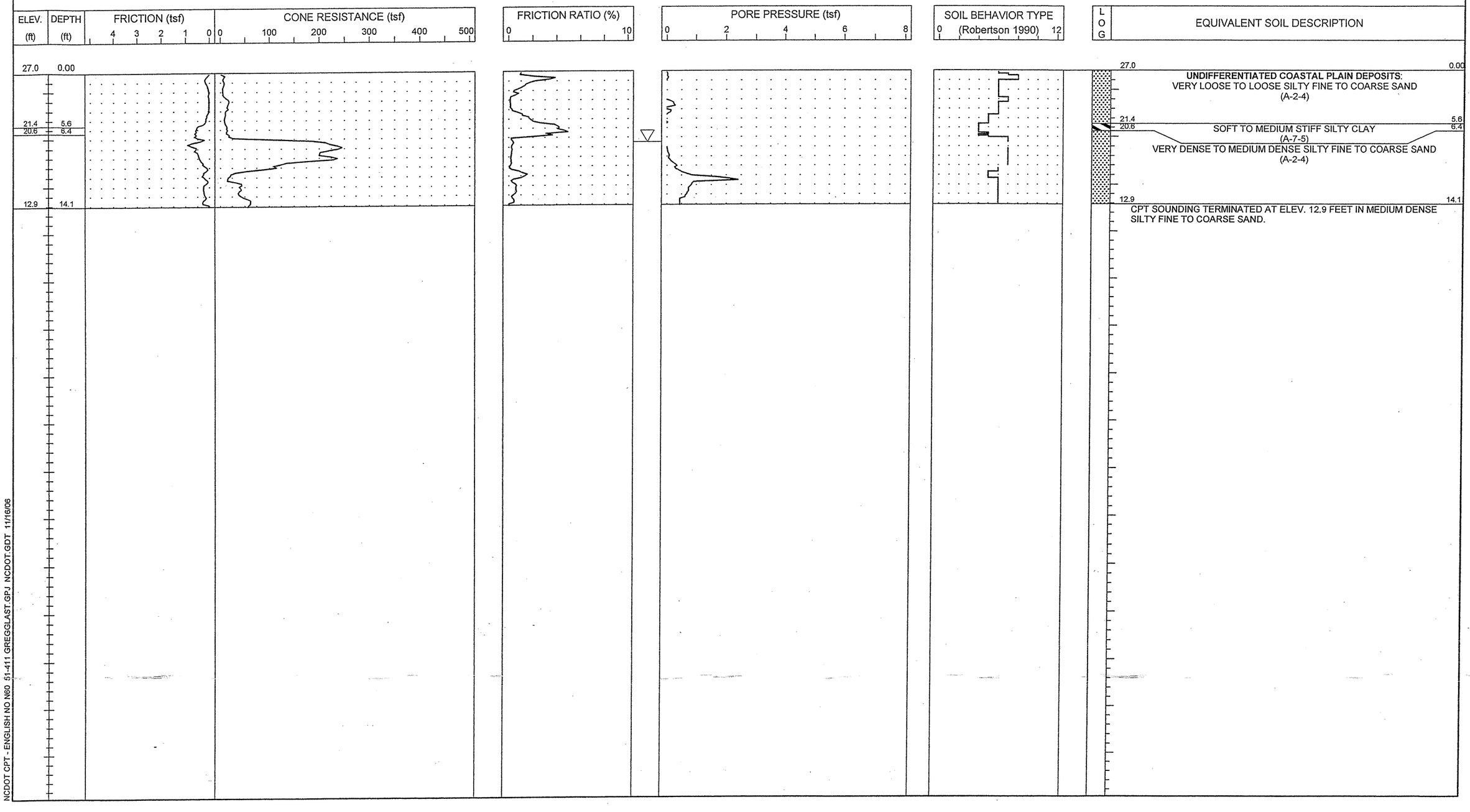
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/ Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 14.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C- 99	**BORING LOCATION** 226+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 7.5	**DATE STARTED** 10/31/06	**COMPLETED** 10/31/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 27.0 ft	**NORTHING** 192,235.4	**EASTING** 2,291,404.6		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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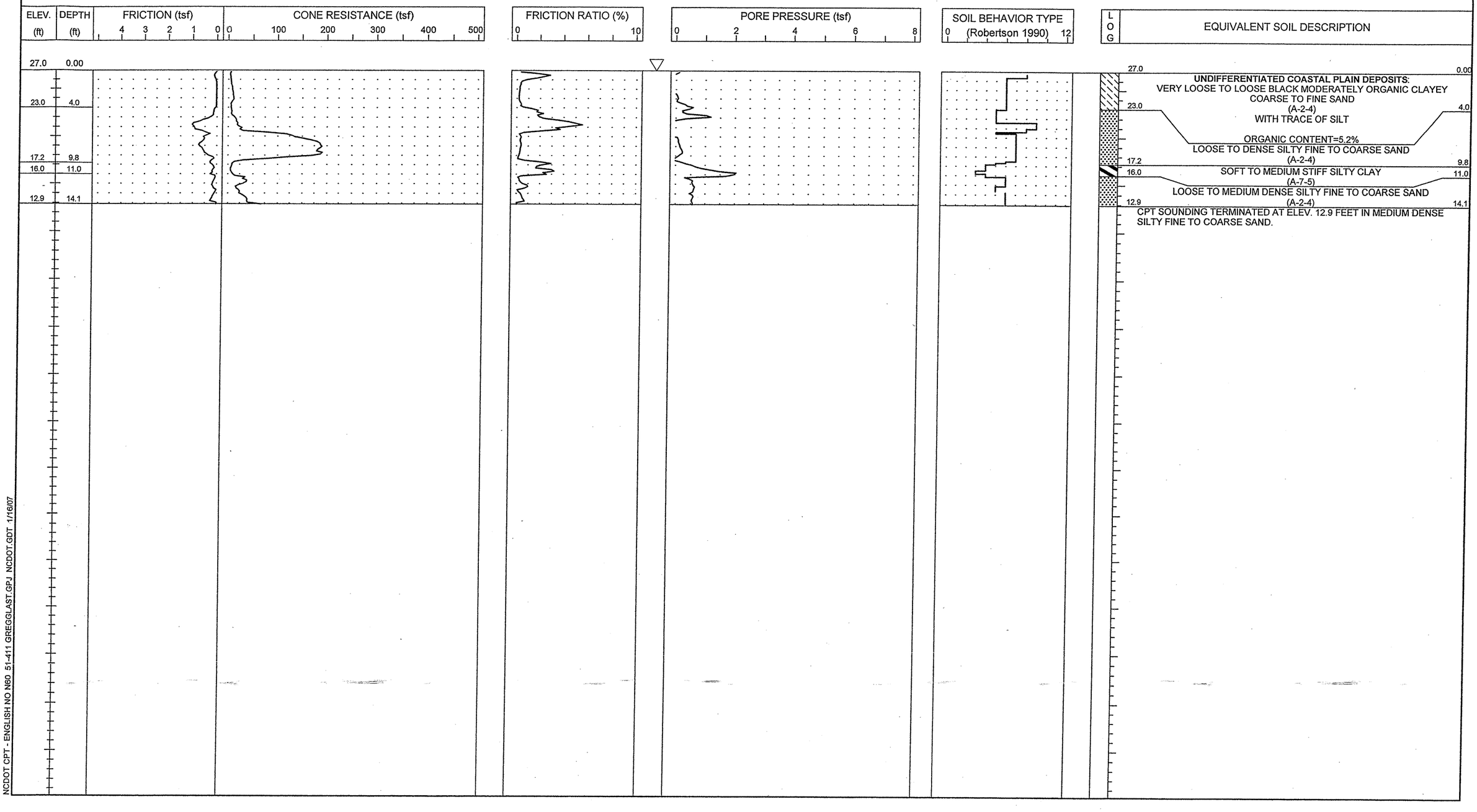
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/ Brunswick	**GEOLOGIST** S. JOHNSON		**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)				**GROUND WATER (ft)**	**TOTAL DEPTH** 14.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-100	**BORING LOCATION** 228+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 0.0	**DATE STARTED** 10/31/06	**COMPLETED** 10/31/06	**SURFACE WATER DEPTH** N/A	
COLLAR ELEV. 27.0 ft	**NORTHING** 192,181.2	**EASTING** 2,291,597.1		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN		



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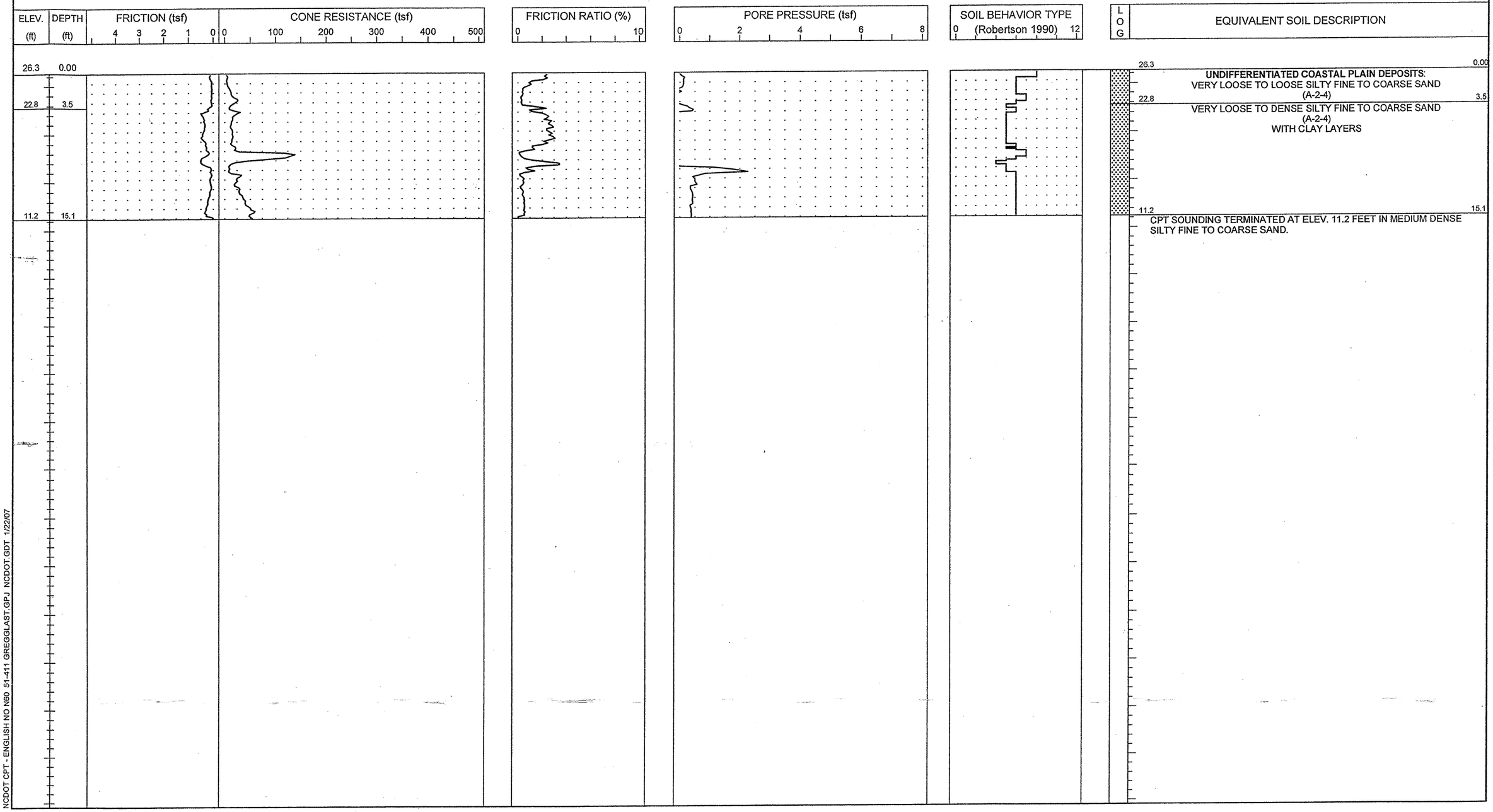
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/ Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 15.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-102	**BORING LOCATION** 232+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** N/M	**DATE STARTED** 10/31/06	**COMPLETED** 10/31/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 26.3 ft	**NORTHING** 192,082.7	**EASTING** 2,291,984.7		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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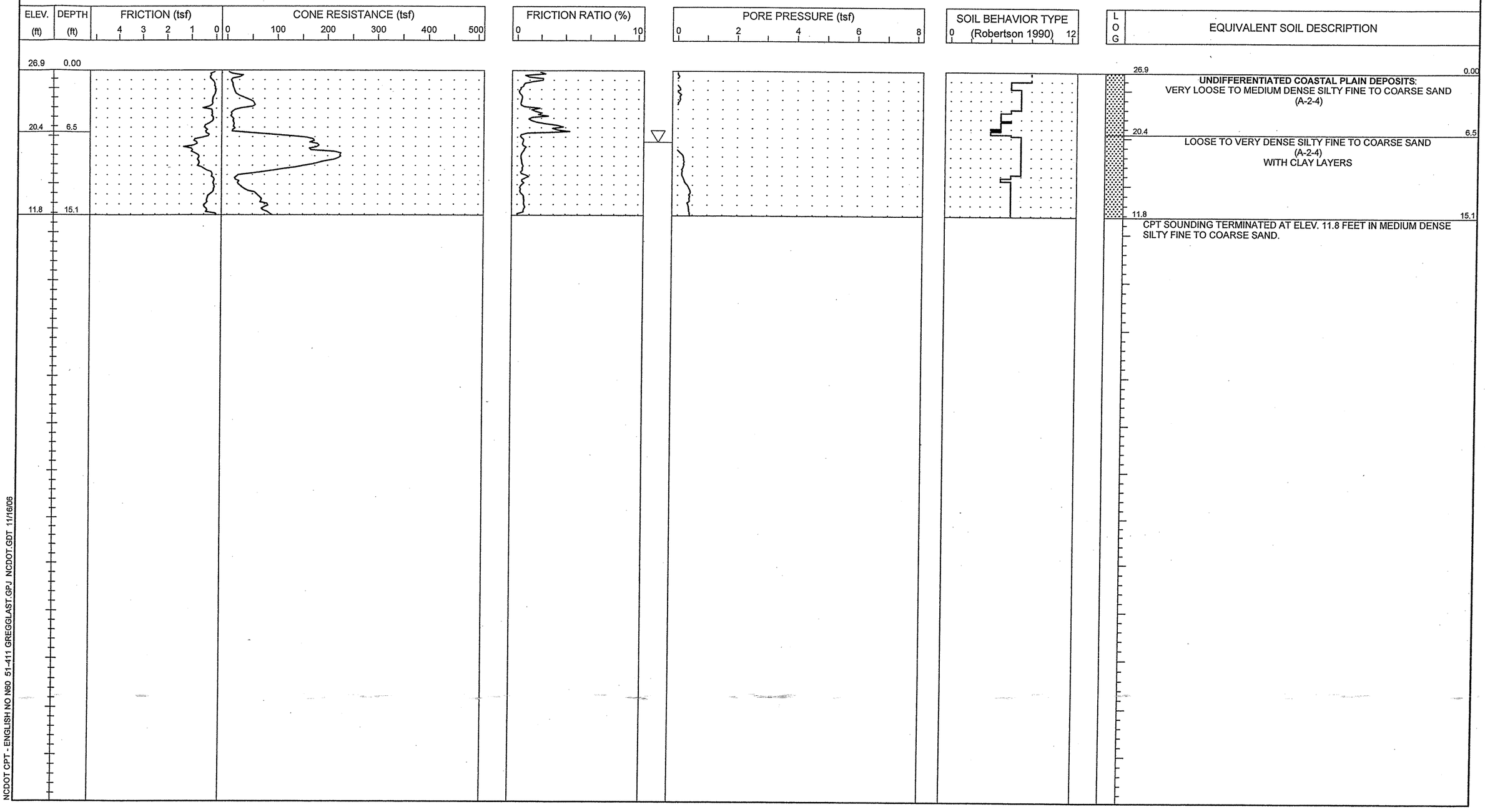
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/ Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 15.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-103	**BORING LOCATION** 234+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 7.5	**DATE STARTED** 10/30/06	**COMPLETED** 10/30/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 26.9 ft	**NORTHING** 192,038.6	**EASTING** 2,292,179.8		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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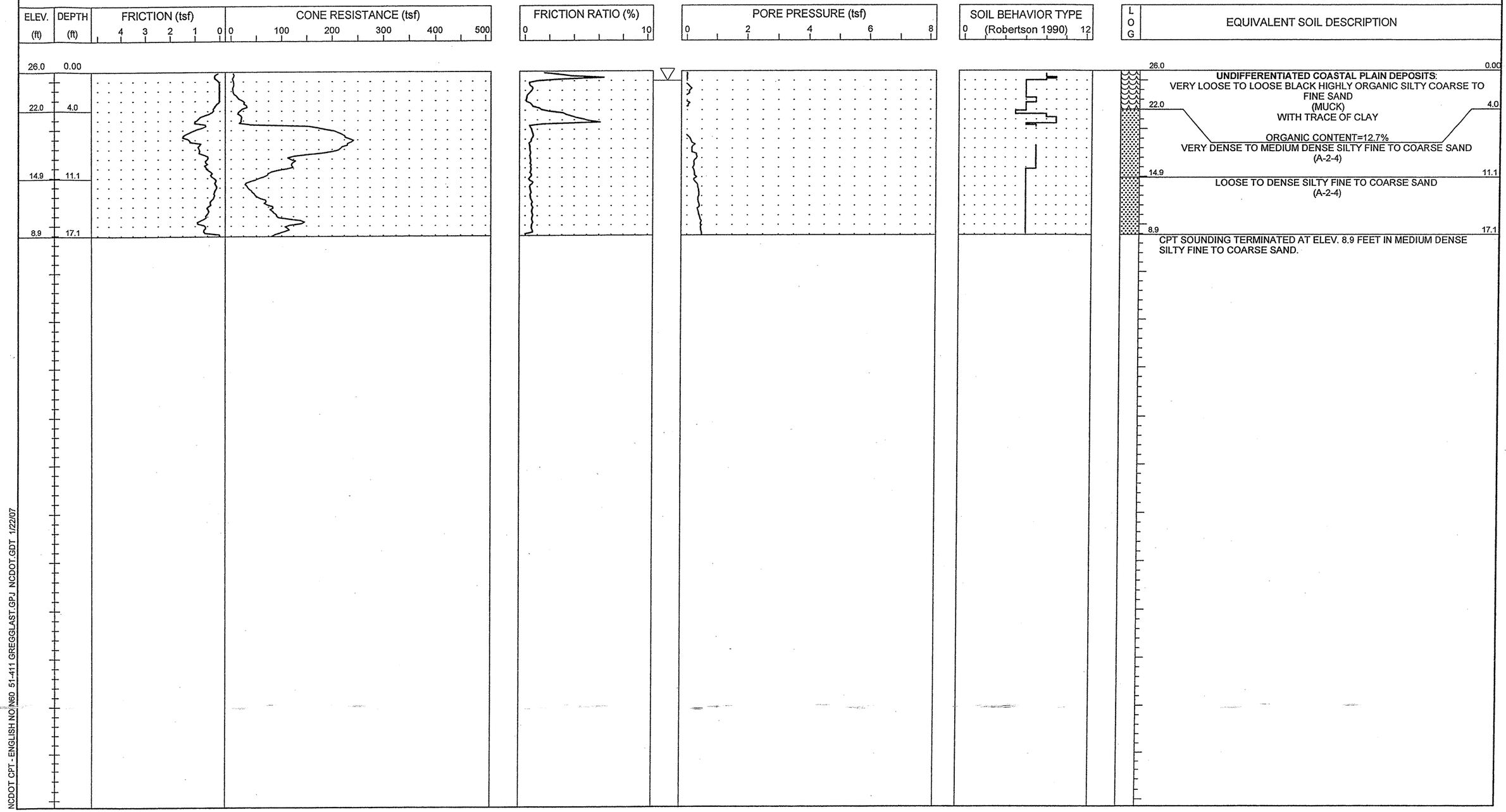
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/ Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 17.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-104	**BORING LOCATION** 236+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 1.0	**DATE STARTED** 10/30/06	**COMPLETED** 10/30/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 26.0 ft	**NORTHING** 191,997.8	**EASTING** 2,292,375.6		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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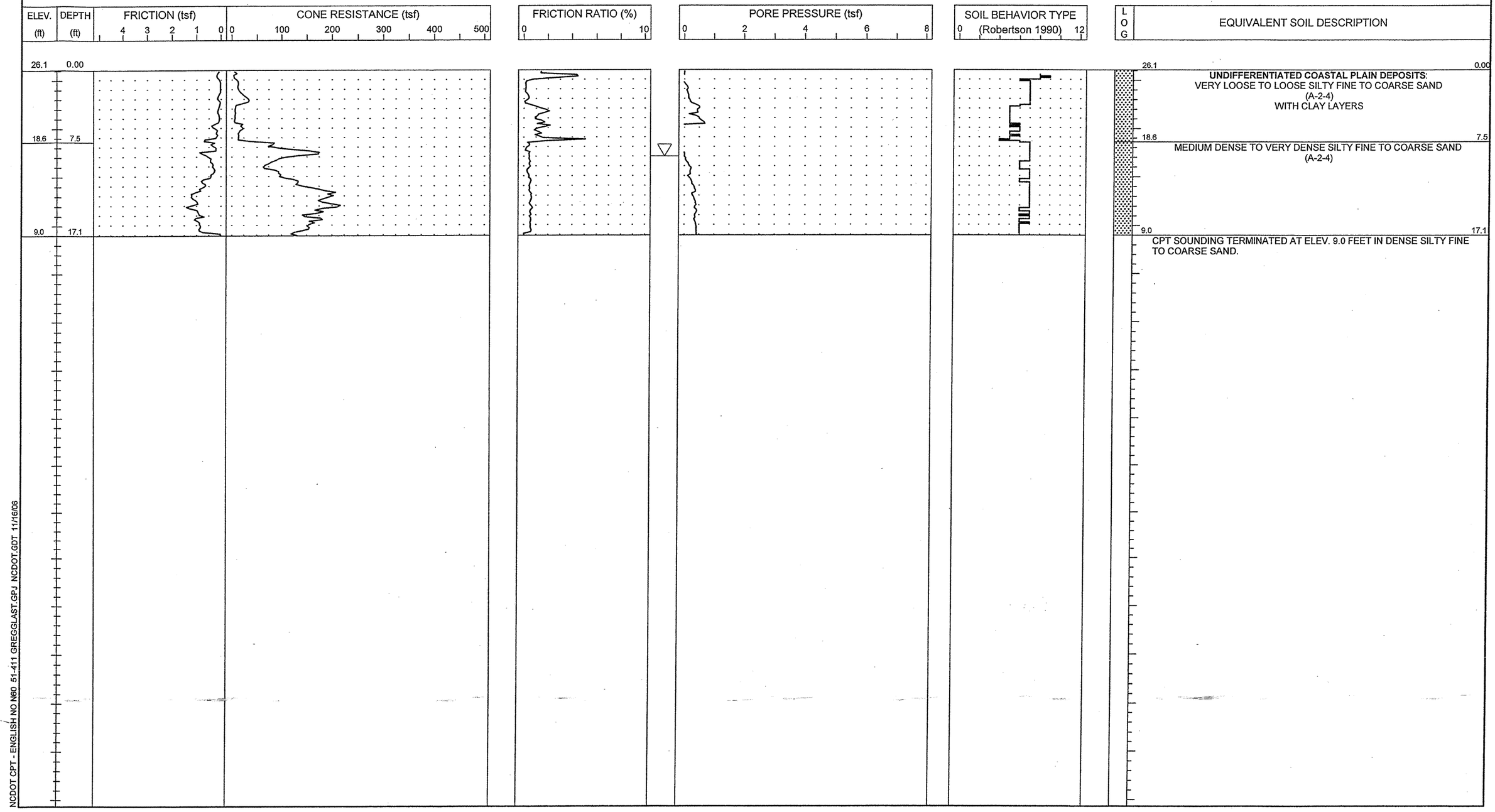
N.C.D.O.T. GEOTECHNICAL UNIT
BORING LOG

PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/ Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 17.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-105	**BORING LOCATION** 238+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 9.0	**DATE STARTED** 10/30/06	**COMPLETED** 10/30/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 26.1 ft	**NORTHING** 191,960.5	**EASTING** 2,292,572.1		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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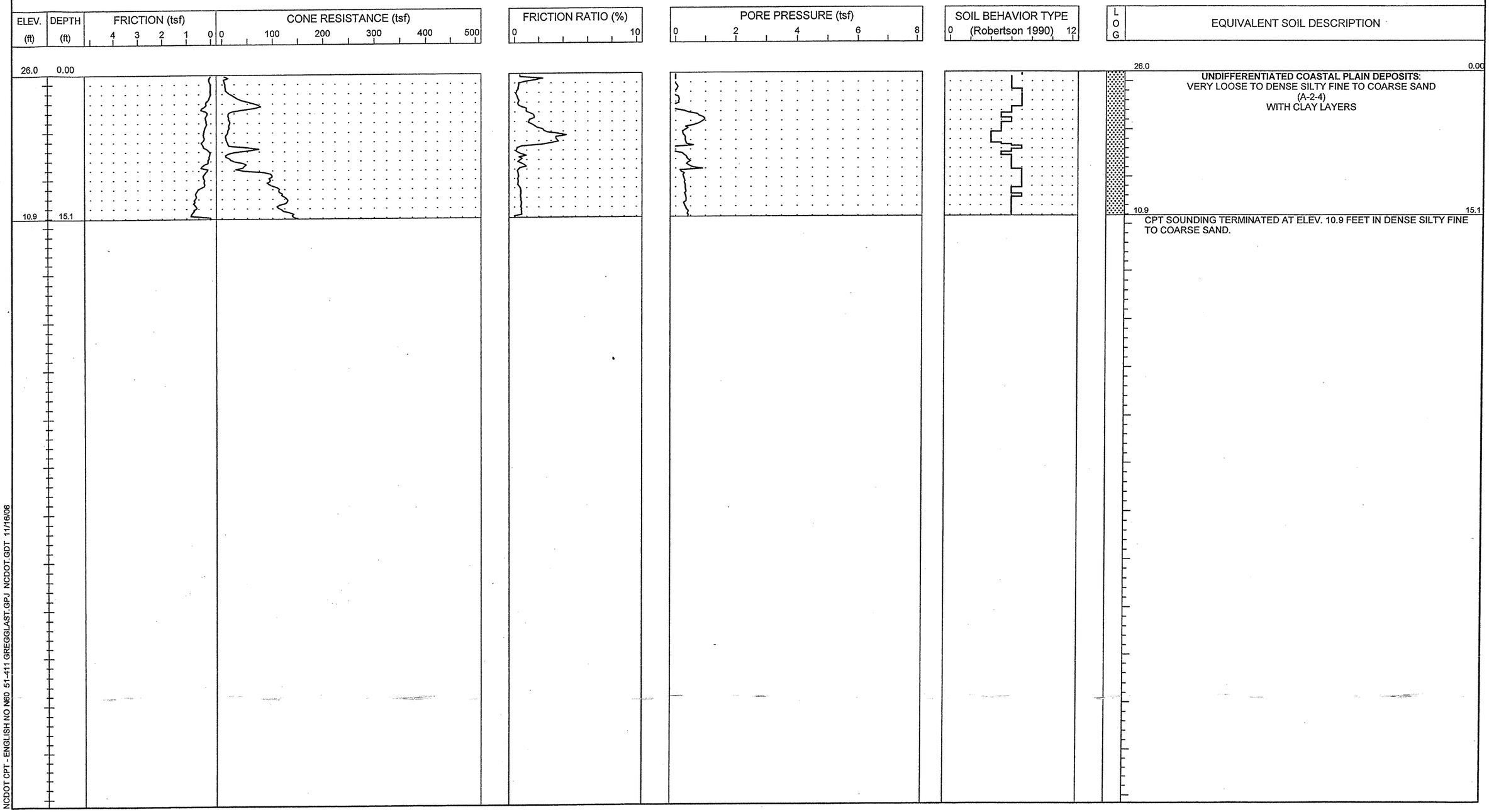
BORING LOG

PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/ Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 15.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-106	**BORING LOCATION** 240+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** N/M	**DATE STARTED** 10/30/06	**COMPLETED** 10/30/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 26.0 ft	**NORTHING** 191,926.6	**EASTING** 2,292,769.2		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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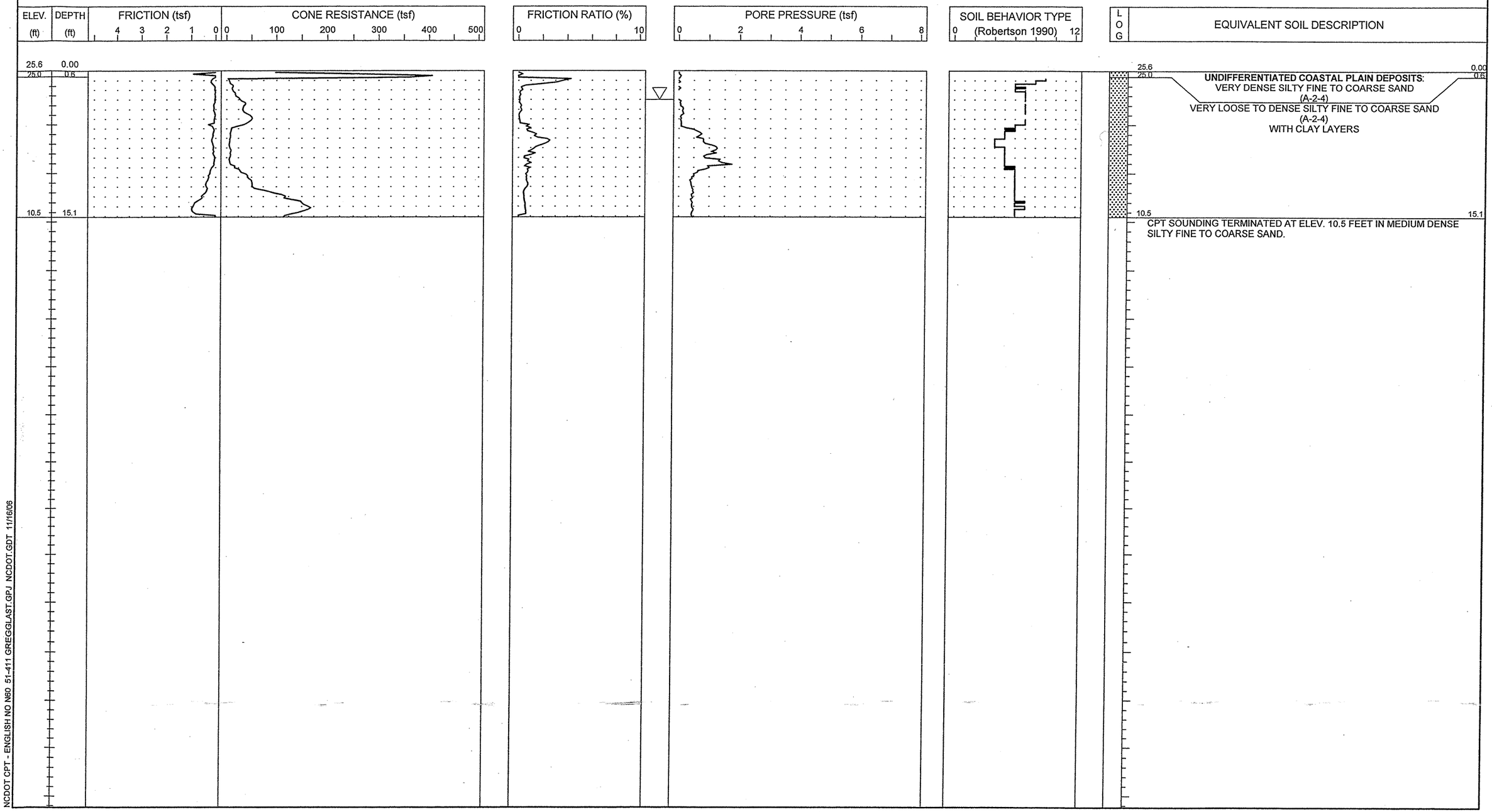
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/ Brunswick	**GEOLOGIST** S. JOHNSON		**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf
SITE DESCRIPTION US 17 (Wilmington Bypass)				**GROUND WATER (ft)**	**TOTAL DEPTH** 15.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-107	**BORING LOCATION** 242+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 3.0	**DATE STARTED** 10/30/06	**COMPLETED** 10/30/06	**SURFACE WATER DEPTH** N/A	
COLLAR ELEV. 25.6 ft	**NORTHING** 191,896.1	**EASTING** 2,292,966.8		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN		



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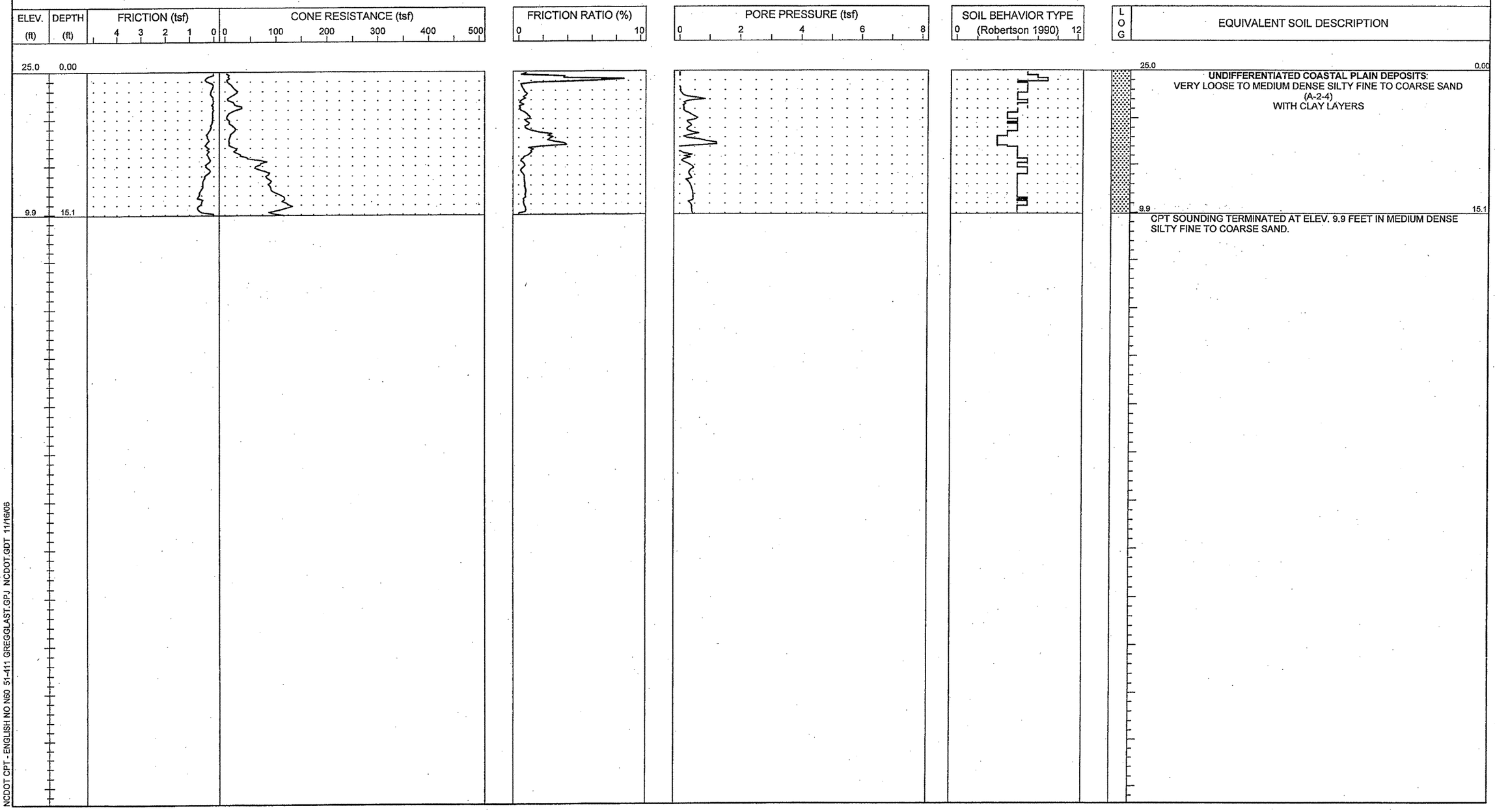
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/ Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 15.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-108	**BORING LOCATION** 244+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** N/M	**DATE STARTED** 10/30/06	**COMPLETED** 10/30/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 25.0 ft	**NORTHING** 191,869.0	**EASTING** 2,293,165.0		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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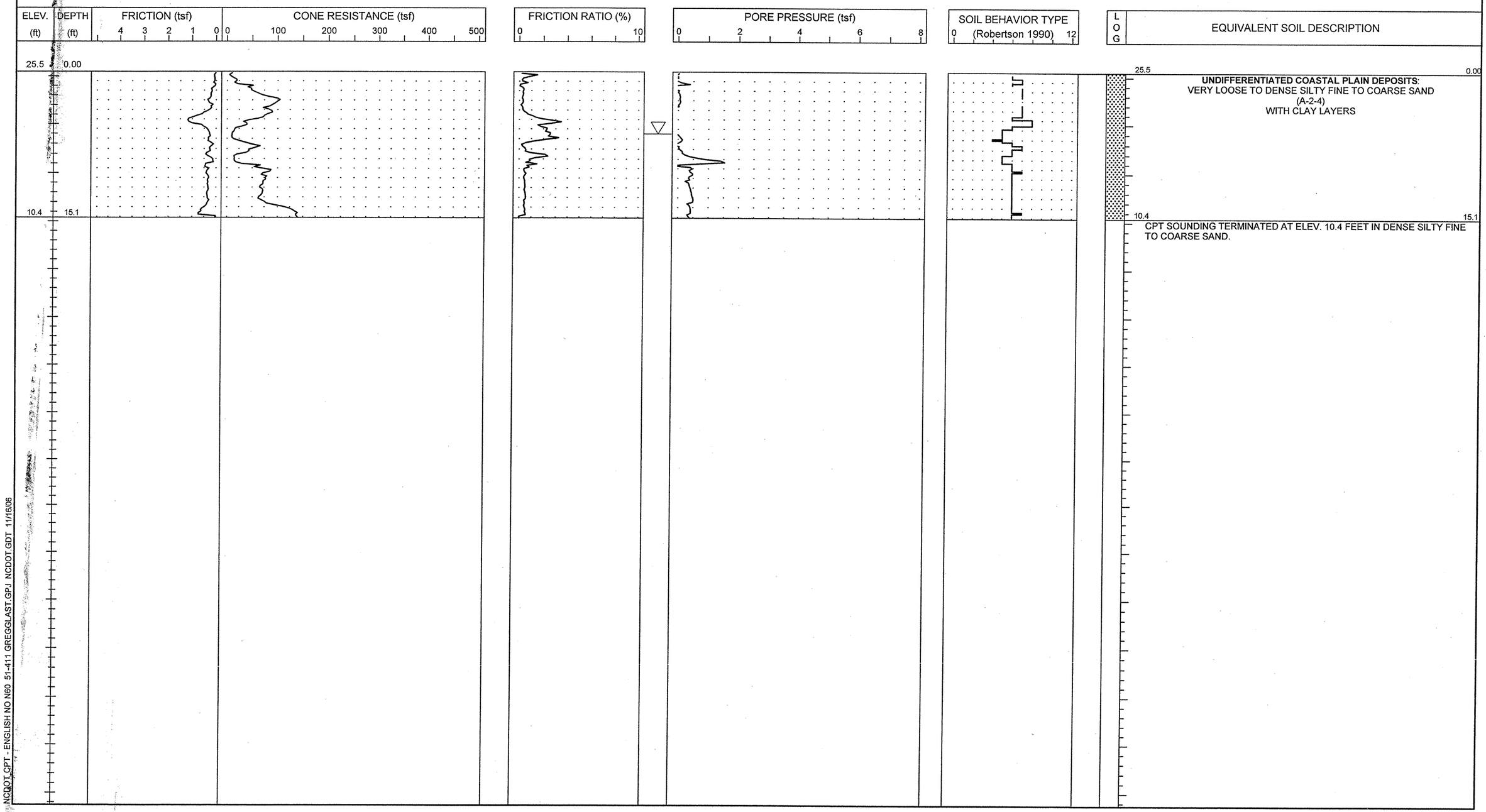
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/ Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 15.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-109	**BORING LOCATION** 246+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 6.5	**DATE STARTED** 10/30/06	**COMPLETED** 10/30/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 25.5 ft	**NORTHING** 191,845.5	**EASTING** 2,293,363.6		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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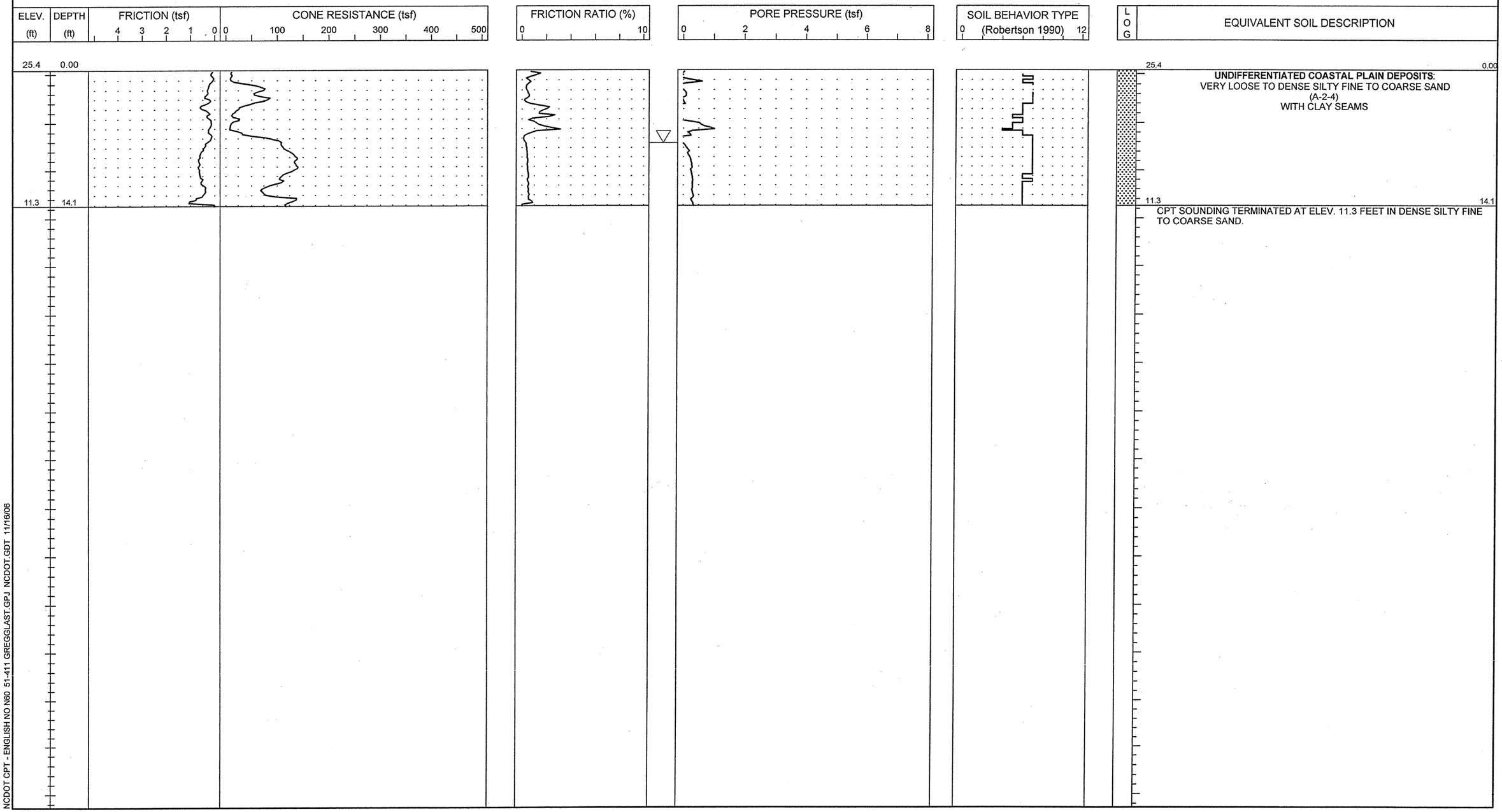
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/ Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 14.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-110	**BORING LOCATION** 248+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 7.5	**DATE STARTED** 10/30/06	**COMPLETED** 10/30/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 25.4 ft	**NORTHING** 191,825.3	**EASTING** 2,293,562.6		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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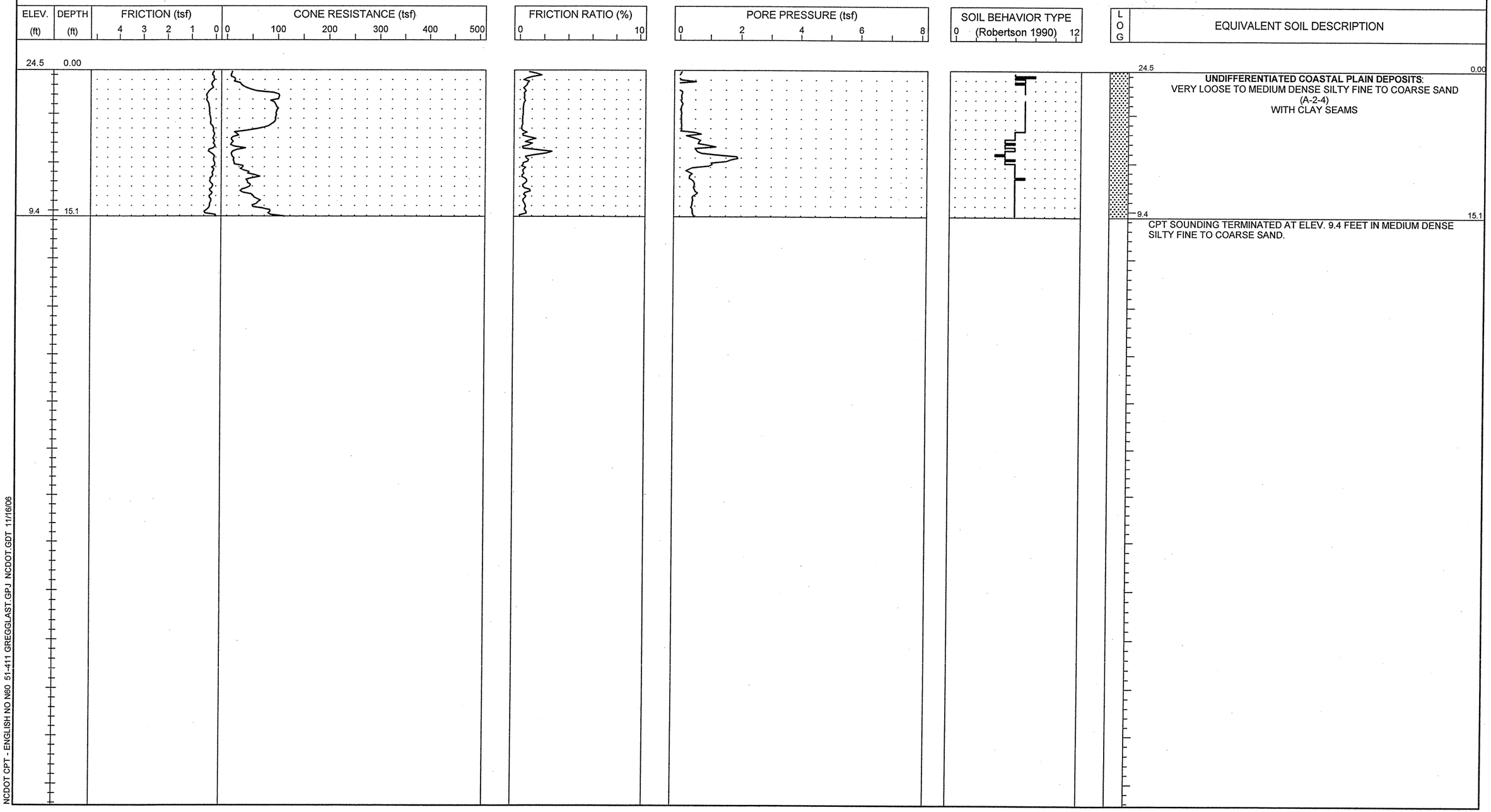
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/ Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 15.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-111	**BORING LOCATION** 250+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** N/M	**DATE STARTED** 10/30/06	**COMPLETED** 10/30/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 24.5 ft	**NORTHING** 191,808.7	**EASTING** 2,293,761.9		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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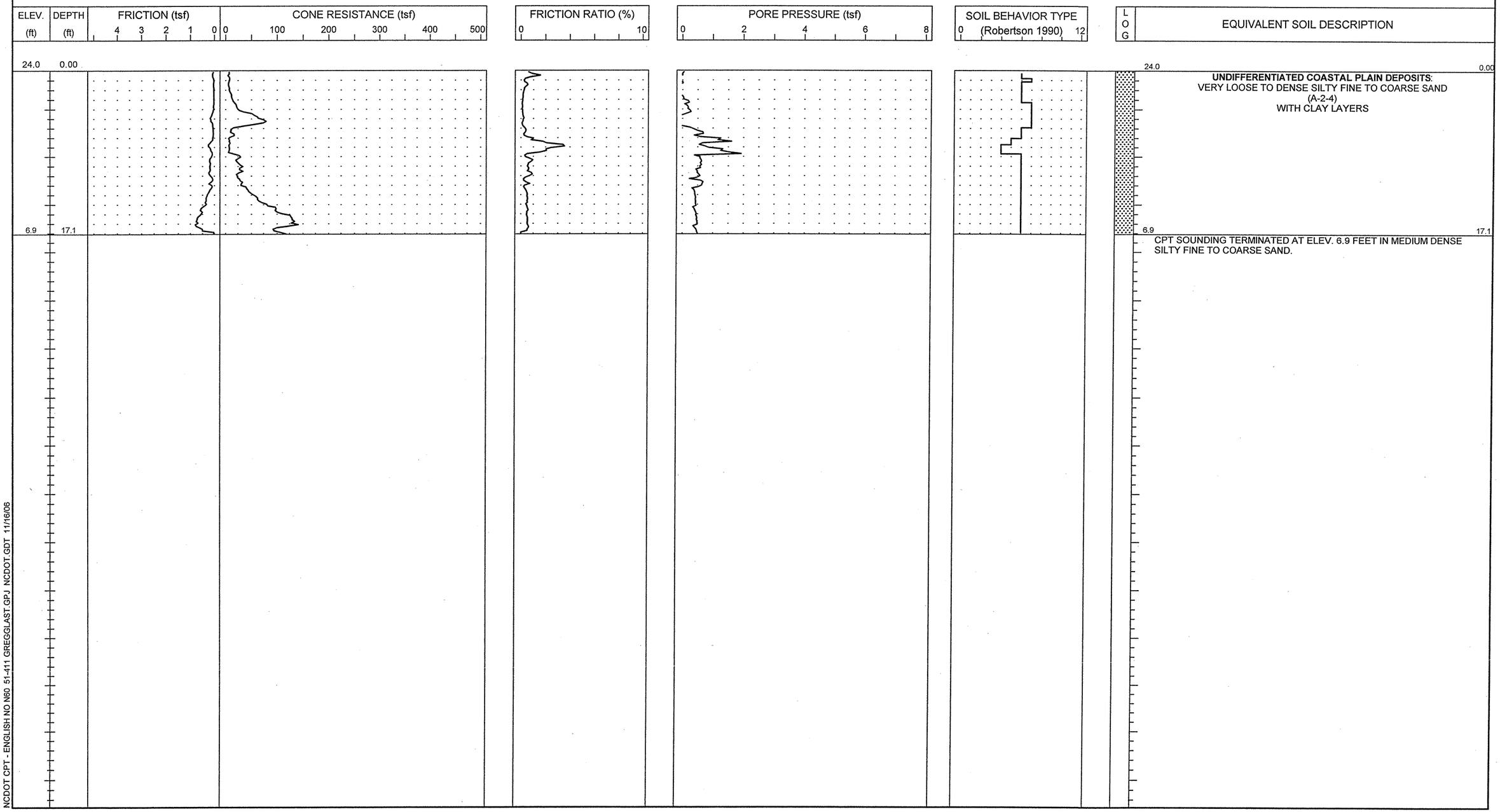
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/ Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 17.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-112	**BORING LOCATION** 252+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** N/M	**DATE STARTED** 10/30/06	**COMPLETED** 10/30/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 24.0 ft	**NORTHING** 191,795.5	**EASTING** 2,293,961.4		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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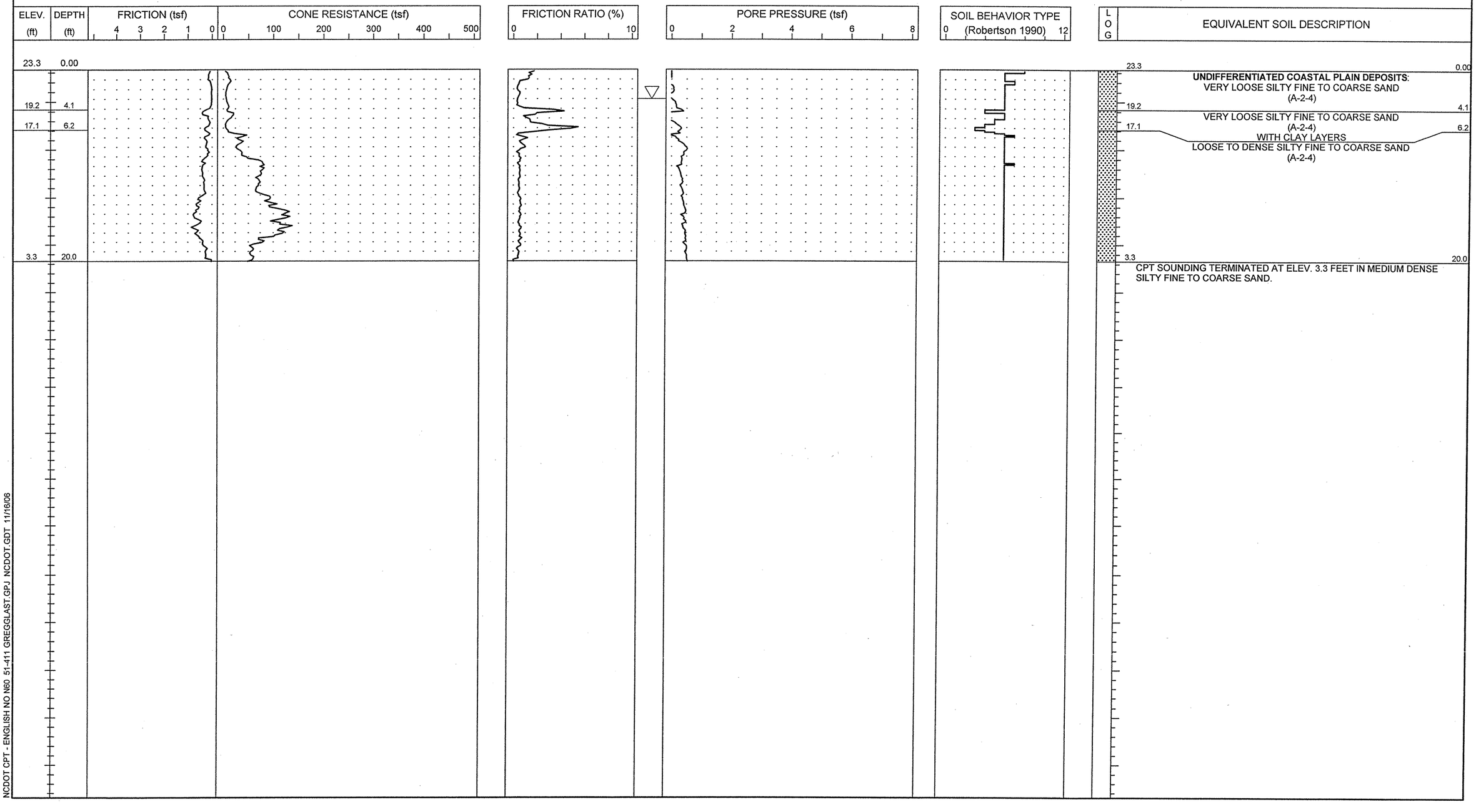
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/ Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 20.0 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-113	**BORING LOCATION** 254+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 3.0	**DATE STARTED** 10/30/06	**COMPLETED** 10/30/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 23.3 ft	**NORTHING** 191,785.7	**EASTING** 2,294,161.2		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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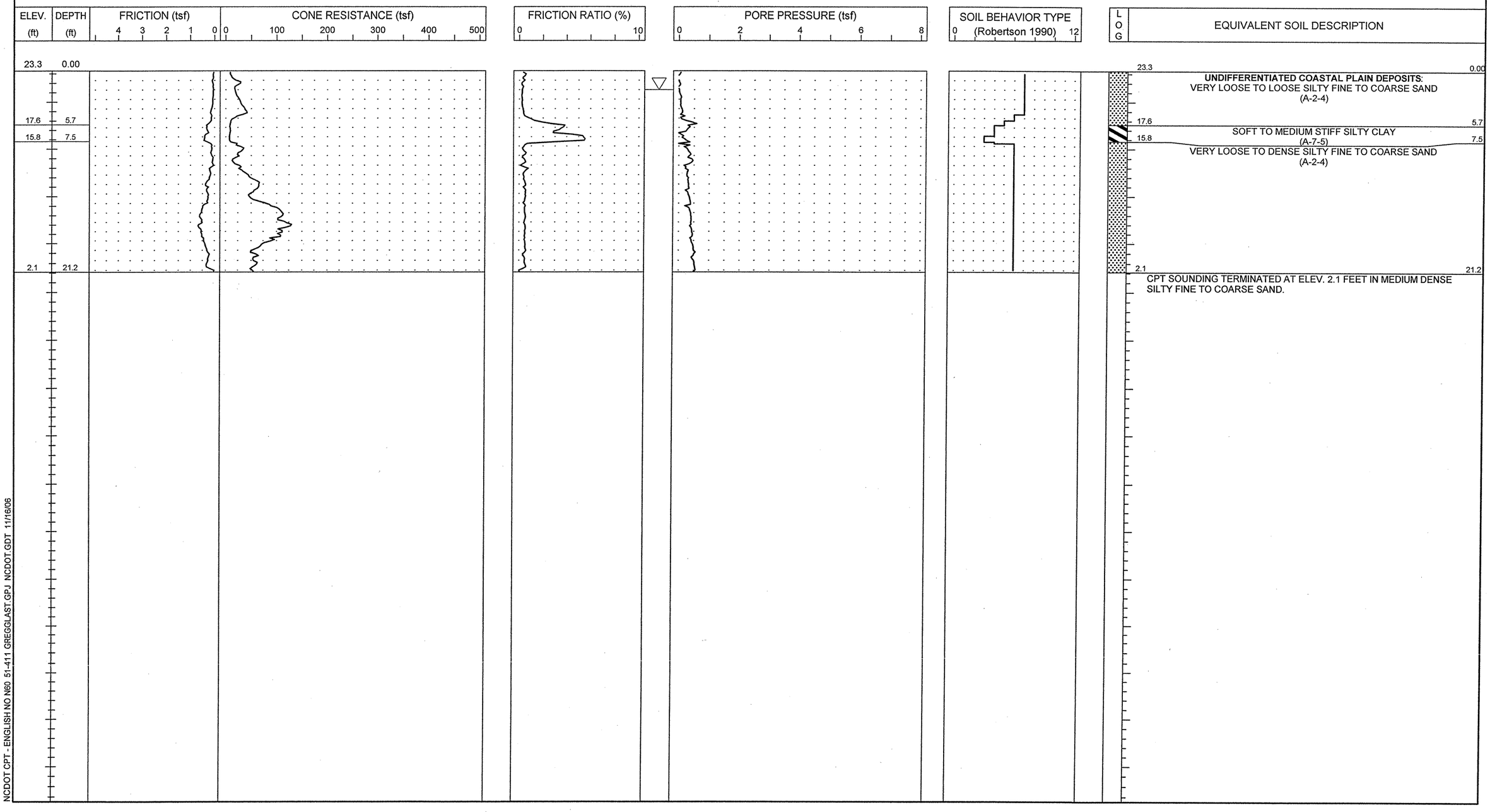
SHEET 1 OF 1

PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/ Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 21.2 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-114	**BORING LOCATION** 256+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 2.0	**DATE STARTED** 10/30/06	**COMPLETED** 10/30/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 23.3 ft	**NORTHING** 191,779.5	**EASTING** 2,294,361.1		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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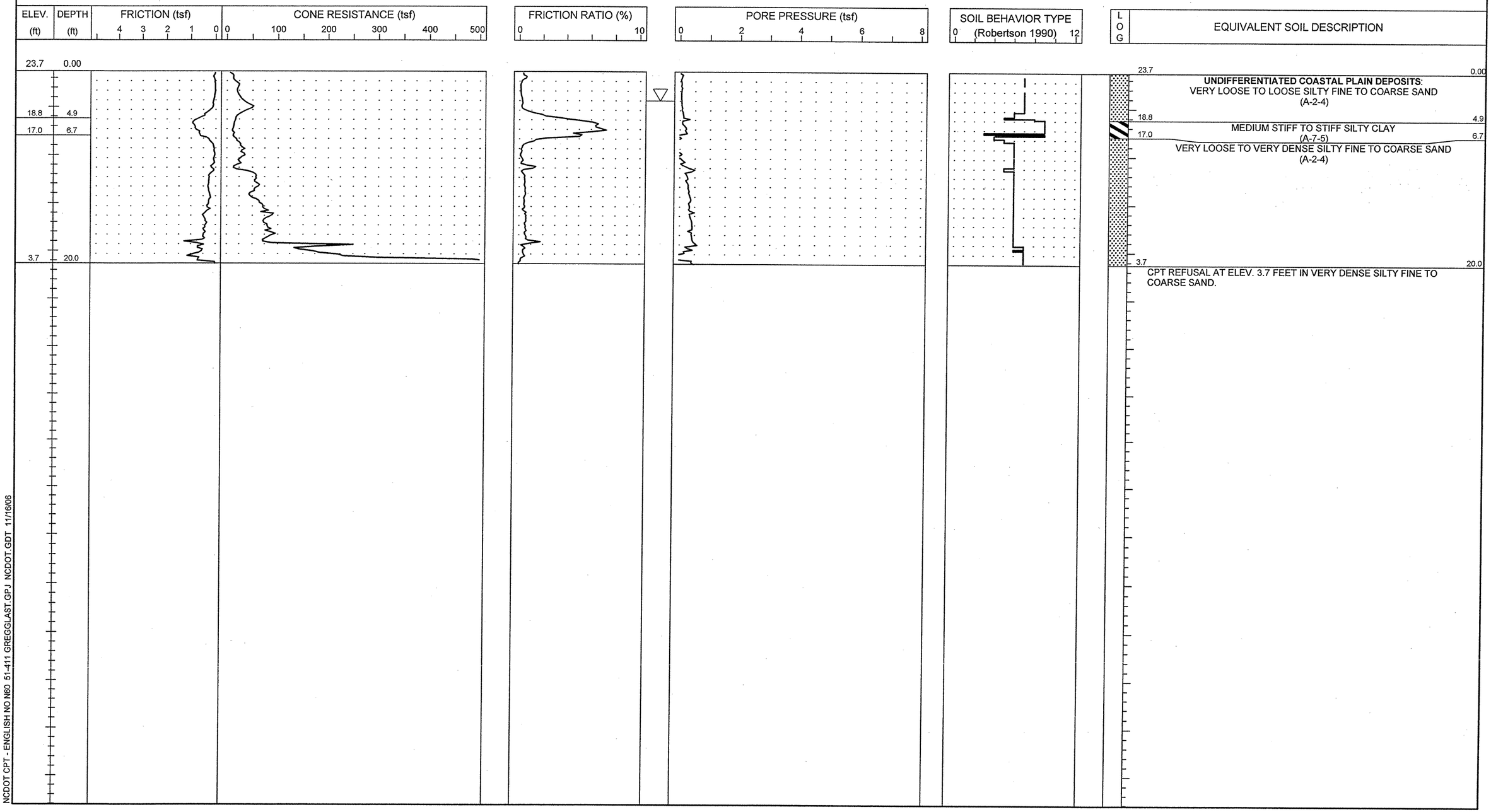
PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/ Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 20.0 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-115	**BORING LOCATION** 258+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 3.0	**DATE STARTED** 10/30/06	**COMPLETED** 10/30/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 23.7 ft	**NORTHING** 191,776.7	**EASTING** 2,294,561.1		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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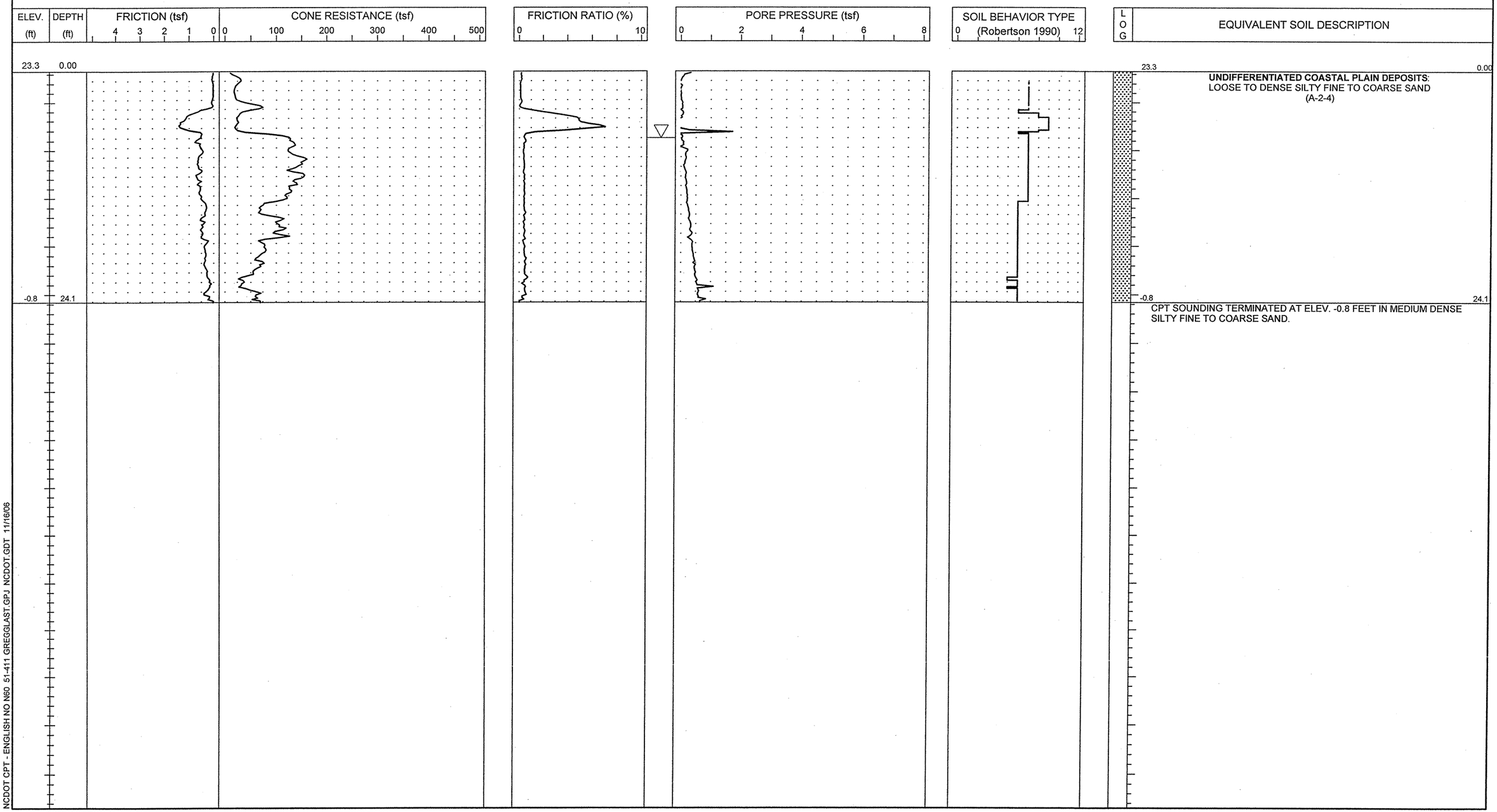
BORING LOG

PROJECT NO. 34491.1.2	**ID.** R-2633B	**COUNTY** New Hanover/ Brunswick	**GEOLOGIST** S. JOHNSON	**TYPE OF CONE** 1.75 In. PEIZO CONE	**ROD TYPE** 1.75 in Dia.	**MAXIMUM DOWN PRESSURE** Approximately 920 tsf	
SITE DESCRIPTION US 17 (Wilmington Bypass)			**GROUND WATER (ft)**	**TOTAL DEPTH** 24.1 ft	**DRILL MACHINE** CPT-ATV	**DRILL METHOD** Direct Push	**HAMMER TYPE** N/A
BORING NO. C-116	**BORING LOCATION** 260+00	**OFFSET** 0.0 ft CL	**ALIGNMENT** -L-	**0 HR.** 7.0	**DATE STARTED** 10/30/06	**COMPLETED** 10/30/06	**SURFACE WATER DEPTH** N/A
COLLAR ELEV. 23.3 ft	**NORTHING** 191,777.4	**EASTING** 2,294,761.1		**24 HR.** N/M	**DRILLER:** RUPERTO	**TECHNICIAN** SHAWN	



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