REFERENCE: R-5769

PROJECT: N/A

SEE SHEET 2A FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

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LINE	STATION	PLAN	PROFILE
-L-	10+00-43+69.04	4-6	7-9
-LI-	10+00-15+28.38	6	10
-YIREV-	10+00-25+46.29	4	10

CROSS SECTIONS

LINE	STATION	SHEETS
-YIREV-	10+00-25+46.29	11-18

APPENDICES

APPENDIX	TITLE	SHEETS
A	IN-SITU TESTING RESULTS	19-25
B	SOIL LABORATORY RESULTS	26-27

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

ROADWAY SUBSURFACE INVESTIGATION

COUNTY *JOHNSTON*

PROJECT DESCRIPTION *NOVO NORDISK ACCESS FROM SR 1905 (GORDON ROAD) TO PROPOSED NOVO NORDISK SITE*

INVENTORY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5769	1	30

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

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

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

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

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DRAWN BY *FIELDS, W. D.*

CHECKED BY *ALEXANDER, M. J.*

SUBMITTED BY *TERRACON CONSULTANTS*

DATE *JUNE 2016*

DocuSigned by:
Matthew J. Alexander
0FB0[illegible]C

NORTH CAROLINA PROFESSIONAL SEAL 040231 ENGINEER MATTHEW J. ALEXANDER

8/22/2016

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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PROJECT REFERENCE NO.	SHEET NO.
R-5769	2

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 UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

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
MATERIAL PASSING #40 LL PI	— 6 MX		— NP	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 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 SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 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 LOOSE MEDIUM DENSE DENSE VERY DENSE	< 4 4 TO 10 10 TO 30 30 TO 50 > 50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30	< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	2.00	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
NON PLASTIC	0-5	VERY LOW
SLIGHTLY PLASTIC	6-15	SLIGHT
MODERATELY PLASTIC	16-25	MEDIUM
HIGHLY PLASTIC	26 OR MORE	HIGH

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, 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.
UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS 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 WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LL < 31
MODERATELY COMPRESSIBLE	LL = 31 - 50
HIGHLY COMPRESSIBLE	LL > 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 SEEP

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 — DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT, DPT, DMT, VST, PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING WITH CORE
- SPT N-VALUE

RECOMMENDATION SYMBOLS

- UNDERCUT
- SHALLOW UNDERCUT
- UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE
- UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK
- UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL

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, FRACTURES
FRAGS. - FRAGMENTS
HI. - HIGHLY
MED. - MEDIUM
MICA. - MICACEOUS
MOD. - MODERATELY
NP - NON PLASTIC
ORG. - ORGANIC
PMT - PRESSUREMETER TEST
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
w - MOISTURE CONTENT
V - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT

SAMPLE ABBREVIATIONS

S - BULK
SS - SPLIT SPOON
ST - SHELBY TUBE
RS - ROCK
RT - RECOMPACTED TRIAXIAL
CBR - CALIFORNIA BEARING RATIO

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] CME-45C
- [ ] CME-55
- [ ] CME-550
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [X] D50 - (TER346)
- [X] D50 - (TER373)

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

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B ____ [ ] -H ____
- [ ] -N ____

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

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.
ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:

WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
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 ROCK 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, WOULD YIELD SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, WOULD YIELD 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 GEOLOGIST'S 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 GEOLOGIST'S 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 GEOLOGIST'S 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 FOOT
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 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 THAT 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, SUCH AS SHALE, SLATE, ETC.

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

CALCAREOUS (CALC.) - SOILS THAT 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 (FP) - 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 (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (RQD) - 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 THAT 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, THAT 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 BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.

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 (SRQD) - 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 (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: SEE NOTES

ELEVATION: N/A FEET

NOTES:

FIAD - FILLED IN AFTER DRILLING

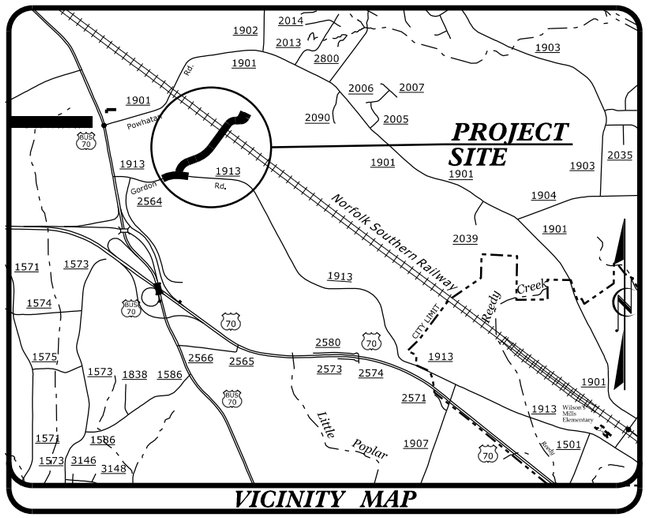
PROJECT WAS DRAFTED USING PROVIDED TIN FILE (FILE: R5769_012616)

DATE: 8-15-14

PROJECT: R-5769

CONTRACT:

See Sheet 1-A For Index of Sheets



VICINITY MAP

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.

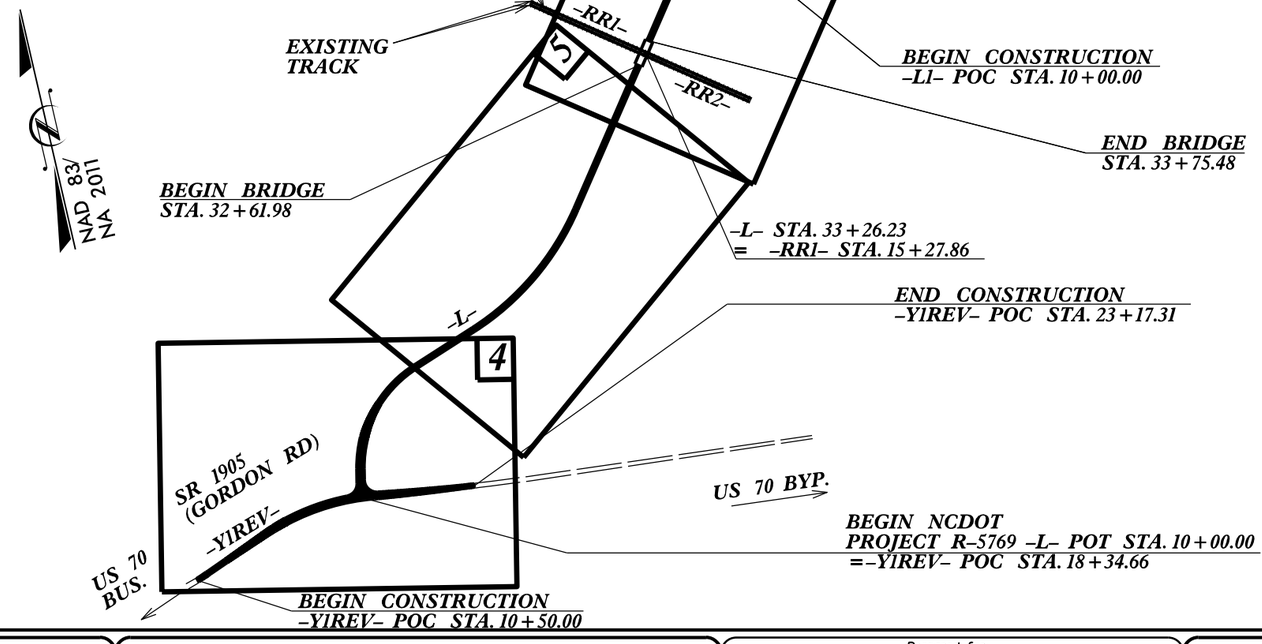
THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

JOHNSTON COUNTY

LOCATION: NOVO NORDISK ACCESS ROAD FROM SR 1905 (GORDON RD.) TO PROPOSED NOVO NORDISK SITE

TYPE OF WORK: GRADING, DRAINAGE, PAVING & STRUCTURE



STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5769	2A	30

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
46448.1.1		PE, UTIL., R/W
		CONST.

WETHERILL ENGINEERING
1223 Jones Franklin Rd
Raleigh, N.C. 27606
License No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

Terracon
Consulting Engineers & Scientists
2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: F-0869

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2040 = 700

T = 4 % *
V = 40 MPH
* (TTST = 2% + DUAL = 2%)
FUNC CLASS =
RURAL LOCAL
SUB REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY PROJECT R-5769 =	0.615 MILES
LENGTH STRUCTURE PROJECT R-5769 =	0.021 MILES
TOTAL LENGTH PROJECT R-5769 =	0.636 MILES

NCDOT CONTACT: JERRY PAGE, PE
DIVISION 4 PROJECT MANAGER

Prepared for:
DIVISION OF HIGHWAYS
DIVISION FOUR
509 Ward Boulevard, Wilson NC, 27895

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:

LETTING DATE:

EDWARD G. WETHERILL, PE
PROJECT ENGINEER

GREG S. PURVIS, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

Date: June 2016
TIP Number: R-5796
County: Johnston
Description: Novo Nordisk Access Road from SR 1905 (Gordon Road) to Proposed Novo Nordisk Site

Subject: Roadway Geotechnical Report - Inventory

Project Description

The project is located between Clayton and Wilsons Mills near the US 70 corridor in Johnston County, North Carolina. The proposed project consists of the construction of 0.6 miles of two-lane roadway on new location and the widening of an 800 feet long section of existing two-lane roadway to accommodate turn lanes. The new construction begins at SR 1905 (Gordon Road) and continues in a northeast direction through cultivated fields, wetlands, and woods before crossing two Norfolk Southern rail lines and ending at the proposed site of the new Novo Nordisk facility. The proposed access road will cross over the Norfolk Southern rail lines on a single span bridge with MSE walls proposed at the abutments. SR 1905 will be widened to the north to accommodate turn lanes to the proposed access road. The widening and new construction will be fill sections ranging from sliver fills on the existing SR 1905 embankments to 30 feet tall embankments at the bridge over the Norfolk Southern rail lines.

The geotechnical subsurface investigation was performed throughout March and April of 2016. Two Diedrich D-50 rotary drills were utilized to advance the soil test borings. Both of the rotary drill rigs utilized on this project were equipped with recently calibrated automatic Standard Penetration Test (SPT) hammers. A Pagani TG73-200 rig was utilized to push cone (CPT) and flat blade dilatometer (DMT) at the proposed bridge approach embankments. Pore water pressure dissipation tests were performed during selected CPT soundings.

The following alignments were investigated by soil testing and visual reconnaissance:

Alignment	Stations
-L-	10+00 to 43+57.04
-L1-	10+00 to 15+07.87
-Y1REV-	10+50 to 23+17.31

Physiography and Geology

The project is located near the western fringe of the Inner Coastal Plain Physiographic Province. The near surface soils consist of undivided upland coastal plain deposits. The coastal plain deposits are underlain by residual soils and weathered and crystalline rock within the depths of several soil test borings performed at the site. Where encountered in the SPT borings, the top of the residual soils and weathered rock is near Elevation 250 feet. SPT refusal on crystalline rock was encountered between Elevations 232 and 242 feet near the Norfolk Southern rail lines. The crystalline rock encountered in the soil test borings was mica schist.

The existing elevations along the corridor range from approximately 279 feet to 295 feet. In general, the topography is rolling with gentle slopes. The existing Norfolk Southern rail lines are located near the highest point on the project. An area delineated as wetlands between -L- Stations 22+00 and 29+50 is believed to be a portion of a Carolina Bay.

Soil Properties

-Y1REV-

Roadway embankment soils were encountered in the hand augers performed along the shoulder of existing SR 1905 (-Y1REV-). The roadway embankment soils begin near -Y1REV- Station 14+75 and continue to Station 22+00. The roadway embankment soils consist of high plasticity silty clay (A-7-6) over silty sand (A-2-4), both containing little quartz gravel. The clay layer was approximately 2 feet thick and the sand extended to approximately 6 feet below existing grades where encountered in the hand augers. In the up station direction along -Y1REV-, the roadway embankment tapers from at grade and gets deeper as existing SR 1905 crosses a small jurisdictional stream channeled through a 30 inch RCP culvert at -Y1REV- Station 20+52. The maximum existing embankment height occurs near the existing RCP culvert and is approximately 6 feet. As the alignment continues up station, the roadway embankment soils taper out and meet undivided coastal plain again at -Y1REV- Station 22+00.

Alluvial soils were encountered beneath the roadway embankment on -Y1REV- between Stations 19+11 and 21+67. The alluvial soils encountered directly beneath the roadway embankment were organic sandy clay (A-6). This layer is approximately 1 foot thick and is underlain by a loose clean sand (A-3) to hand auger termination depths of 6.5 feet. The alluvial soils occur in the low lying area on the -Y1REV- alignment as described above and continue north along the jurisdictional stream floodplain toward the -L- alignment.

-L- and -L1-

Alluvial soils are present on the -L- alignment at the surface near the jurisdictional stream that continues south toward SR 1905 (-Y1REV-). These alluvial soils are present near the surface between -L- Stations 15+97 and 16+79. The alluvial soils consist of loose clean sand (A-3).

The coastal plain deposits along the corridor can be generalized into three layers. There are organic soils present within and surrounding the delineated wetlands. Outside of the wetland areas and beneath the organic soils is a relatively stiff crust. Beneath the stiff crust is a very soft layer that extends to the top of residual and weathered rock.

The organic soil layer was encountered at the surface within the delineated wetlands and near their boundaries between approximately -L- Stations 21+25 to 29+50 and 37+00 to 39+50. This layer consists of organic clayey sand (A-2-6) and organic sandy clay (A-6). These soils contain trace to little organics and extend to depths as deep as 9 feet where encountered.

The second generalized coastal plain layer was encountered outside of the delineated wetlands and beneath the organic soils described previously. This layer is a medium stiff to hard layer that generally consists of silty clay (A-7-6) and sandy clay (A-6), although some samples from this layer also classify as a medium dense to dense clayey sand (A-2-6 or A-2-7) based on laboratory testing. This layer is notably stiffer / denser than the other coastal plain soils encountered along the project. This layer exhibits the highest SPT blow counts and in-situ moduli based on the CPT and DMT near the Norfolk Southern Railroad between approximately -L- Station 30+50 and 35+50, where the depth to groundwater is the deepest along the project. The layer extends from the surface to depths of up to 20 feet below existing site grades.

The third coastal plain layer exhibited very low SPT blow counts and was encountered once the SPT borings were advanced through the stiff crust layer along the project. The soft / loose layer consisted of wet to saturated high plasticity clay (A-7-6) with highly variable amounts of sand and gravel; saturated clayey sand (A-2-6 and A-2-7) with trace to little gravel; and clean, very loose to loose, sand and gravel (A-3 and A-1-a). The sandy and gravelly soils were typically encountered in the top 20 feet of the layer and the high plasticity clay was encountered below to the interface with the residual and weathered rock. Based on the in-situ testing and deeper SPT borings, the soft / loose layer extends to the top of residual and weathered rock which were encountered at depths ranging from 35 to 50 feet below existing site grades. The clay soils near the bottom of the layer also contained trace to little mica.

Residual soils were encountered in several of the deeper SPT borings advanced near the bridge and retaining wall structures at the Norfolk Southern Railroad. The residual soils were sampled as soft to stiff high plasticity clay (A-7-6) and dense to very dense silty sand (A-2-4) both of which contained trace to little mica.

Rock Properties

Weathered rock and crystalline rock along the project appear to be a micaceous schist based on the materials recovered in the split spoon sampler. Rock coring was not performed for the subsurface investigation along the project. The weathered rock and rock were encountered at depths of 40 to 60 feet below existing site grades. The weathered rock and crystalline rock at the site are not anticipated to have an impact on roadway construction.

Groundwater

The corridor generally drains to the delineated wetland areas which in turn drain to unnamed jurisdictional streams that run out of the corridor. The areas delineated as wetlands along the project were observed to retain water for several days following precipitation. In the suspected Carolina Bay, water depths of up to 3 feet were observed during a site visit to lay out boring locations. However, the site was revisited following a period of dry weather to begin the field investigation and the surface water had infiltrated or drained. Surface water depths of up to 1.5 feet were observed in the delineated wetland areas up station from the bridge over the Norfolk Southern Railroad. Similar to the suspected Carolina Bay, surface water was not observed when the site was revisited after a period of dry weather. Although surface water was not observed following dry weather, groundwater was encountered during drilling and sampling in and near the delineated wetlands at depths of 0.5 to 1 foot below existing site grades.

Away from the wetland areas, the depth to groundwater ranged from approximately 3 to 10 feet below existing site grades. From the SR 1905 and access road intersection to approximately -L- Station 21+00, groundwater was encountered between 3 and 7.5 feet below existing site grades which corresponds to an elevation of 278 to 280 feet. Between -L- Stations 29+00 and 37+00 groundwater was encountered between 2 and 10 feet below existing site grades. Along this section of the project, the depths to groundwater correspond to an elevation of 284 to 285 feet.

Areas of Special Geotechnical Interest

1. High Plasticity Clay

High plasticity clay was encountered near proposed subgrade or in fill sections at the following locations:

Alignment	Stations
-Y1REV-	10+50 to 23+17.31

2. Organic Soils

Soils containing little organic matter were encountered at the following locations:

Alignment	Stations
-L-	21+25 to 29+50
-L-	37+00 to 39+50

3. High Groundwater

Groundwater was encountered at the following locations within 6 feet of proposed grades:

Alignment	Stations
-L-	21+25 to 24+00
-L-	41+25 to 43+57.04
-L1-	10+50 to 15+07.87

4. Poor Drainage

The following areas are delineated as wetland and were observed to hold standing surface water for periods during the investigation:

Alignment	Stations
-L-	21+25 to 29+50
-L-	37+56 to 43+57.04
-L1-	10+00 to 15+07.87

Closing

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report, or if we may be of further service, please contact us at your convenience.

Sincerely,
Terracon Consultants, Inc.

Matthew J. Alexander, PE
Project Geotechnical Engineer

Andrew A. Nash, PE
Geotechnical Department Manager

PROJECT REFERENCE NO.	SHEET NO.
R-5769	4

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

WETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
License No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

Terracon
Consulting Engineers & Scientists

NC GRID
NAD 83 NA 2011

MATCHLINE SHEET 5 +/- STA 17+00.00

15+00

20+00

25+00

UNDIVIDED COASTAL PLAIN

ALLUVIAL

ROADWAY EMBANKMENT

NOVO NORDISK PHARMACEUTICAL INDUSTRIES, INC. DB 4706 PG 206

N 02°35'56" E
105.07' R/W TO EP
105.47' EP TO R/W

CP&L OR ASSIGNEES
DB 4514 PG 170
THE POWER LINE FOR WHICH THIS PORTION OF EASEMENT WAS GRANTED HAS BEEN REMOVED. NO RELEASE OF EASEMENT HAS BEEN FOUND.

PIEDMONT NATURAL GAS COMPANY
DB 4044 PG 197-205

NC NATURAL GAS CORPORATION
DB 4004 PG 128

CP&L OR ASSIGNEES
DB 4514 PG 170

WOODS

EXISTING R/W

30" RCP

SR 1905 (GORDON RD) 20' BST

US 70 BYP.

US 70 BUS.

SR 1905
(GORDON RD)
VARIABLE WIDTH BST

TBM "1"
-YIREV- STA. 19+57.34
40.07' RT.

TBM1 ELEVATION = 278.45
N 676965 E 2175790
BL STATION 540.00 168 RIGHT
YIREV- STA. 19+57.34 40.07' RT.
BENCHLITE NAIL IN BASE OF 14" SWEET GUM

PROJECT REFERENCE NO.	SHEET NO.
R-5769	5

PRELIMINARY PLANS
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Terracon
Consulting Engineers & Scientists

NC GRID
NAD 83 NA 2011

WOODS

NOVO NORDISK PHARMACEUTICAL
INDUSTRIES, INC.
DB 4706 PG 206

NOVO NORDISK PHARMACEUTICAL
INDUSTRIES, INC.
DB 1486 PG 1

20+00

25+00

30+00

UNDIVIDED COASTAL PLAIN

MATCHLINE SHEET 4 -L- STA.17+00.00

MATCHLINE SHEET 6 -L- STA.31+00.00

S 87°25'31" E
1884.22'

S 87°25'31" E
200.02' TOTAL

S 88°36'05" E
205.76'

NEW BETHEL CHURCH
NO DEED REFERENCE

WLB

BTM

F

T

I

PROJECT REFERENCE NO.	SHEET NO.
R-5769	6

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

WETHERILL ENGINEERING
1223 Jones Franklin Rd.
Raleigh, N.C. 27606
License No. F-0377
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Fax: 919 851 8107

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

Terracon
Consulting Engineers & Scientists

NC GRID
NAD 83 NA 2011

NOVO NORDISK PHARMACEUTICAL INDUSTRIES, INC. DB 1486 PG 1

35+00

℄ FUTURE TRACK

EXISTING TRACK

CENTERLINE MAIN R/R TRACK

℄ FUTURE TRACK

NOVO NORDISK PHARMACEUTICAL INDUSTRIES, INC. DB 1486 PG 1

TBM3 ELEVATION = 286.33
N 679047 E 2177702
BL STATION 34+86.00 87 RIGHT
-L- STA. 39+23.65 99.24' LT.
BENCHLITE NAIL IN BASE OF 15" SWEET GUM

40+00

UNDIVIDED COASTAL PLAIN

TBM #3
-L- STA. 39+23.65
99.24' LT.

MATCHLINE SHEET 5 -L- STA.31+00.00

18" CMP

AT GRADE CROSSING

NOVO NORDISK PHARMACEUTICAL INDUSTRIES, INC. DB 1486 PG 1

EXISTING RR R/W

WLB

WOODS

NOVO NORDISK PHARMACEUTICAL INDUSTRIES, INC. DB 1486 PG 1

EXISTING RR R/W

WLB

WOODS

END NCDOT PROJECT R-5769
-L- STA. 43+57.04

WOODS

18" CMP

END CONSTRUCTION
-L1- POC STA. 15+07.87

UNDIVIDED COASTAL PLAIN

WLB

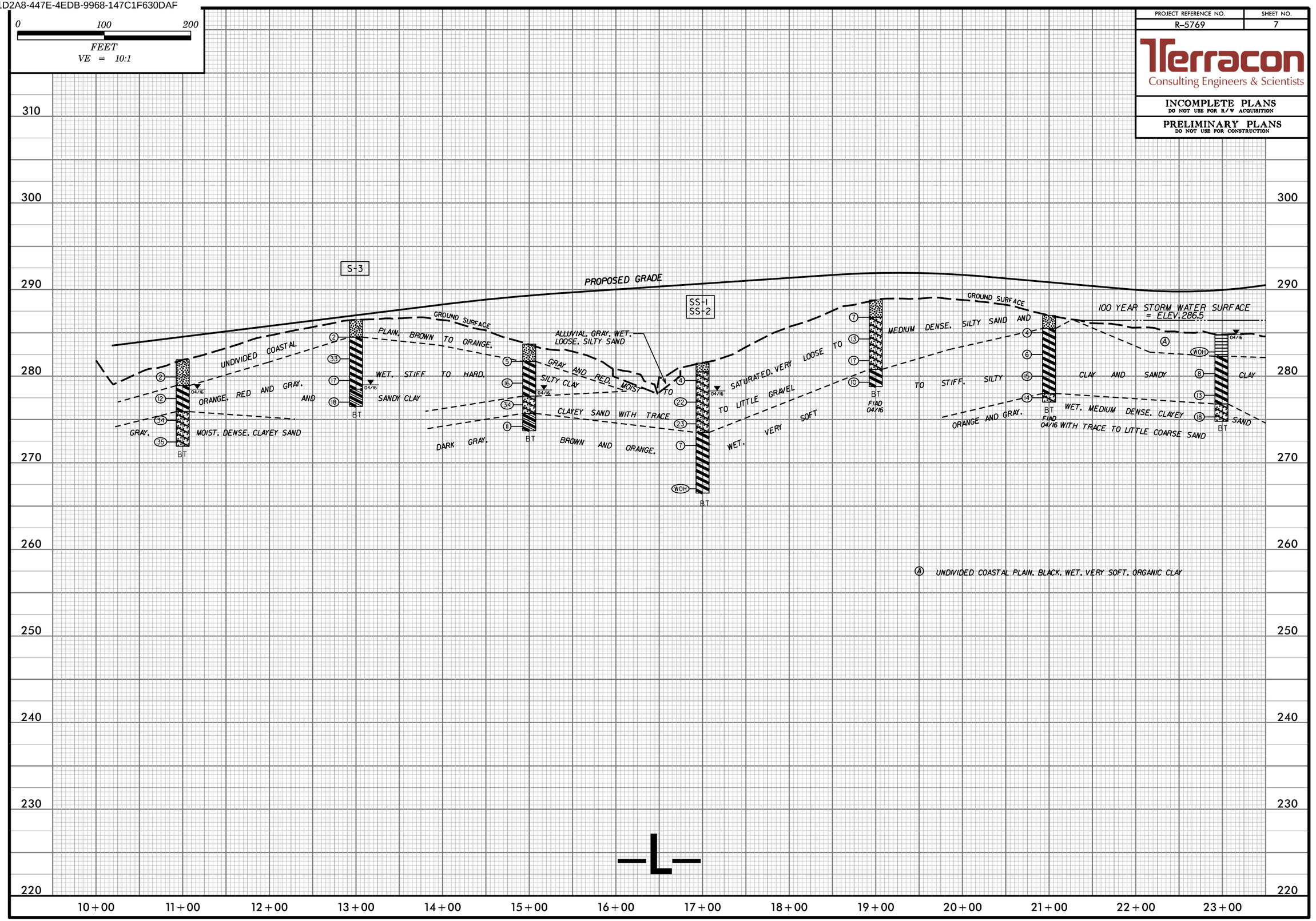
PROJECT REFERENCE NO.	SHEET NO.
R-5769	7

Terracon
Consulting Engineers & Scientists

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

0 100 200
FEET
VE = 10:1



PROJECT REFERENCE NO.	SHEET NO.
R-5769	8

Terracon
Consulting Engineers & Scientists

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

0 100 200
FEET
VE = 10:1

PROPOSED GRADE

80' RT

25' LT

SS-3 SS-4 SS-5

SS-6

SS-7 SS-8

SS-10 SS-11

SS-13 SS-14

SS-15 SS-16

SS-17

RAILROAD EMBANKMENT FILL

100 YEAR STORM WATER SURFACE = ELEV. 286.5

GROUND SURFACE

UNDIVIDED COASTAL PLAIN, BLACK, WET TO SATURATED, VERY SOFT, ORGANIC CLAY AND ORGANIC SAND

UNDIVIDED COASTAL PLAIN, BROWN, RED, ORANGE AND GRAY, SATURATED, VERY LOOSE TO LOOSE, CLAYEY SAND AND SANDY GRAVEL WITH TRACE CLAY

UNDIVIDED COASTAL PLAIN, ORANGE, GRAY AND RED, WET TO SATURATED, VERY STIFF TO MEDIUM, SILTY CLAY WITH TRACE MICA AND SANDY CLAY WITH TRACE MICA AND GRAVEL

RESIDUAL, ORANGE, GRAY, SAPROLITIC, FINE SANDY CLAY WITH LITTLE MICA

BLUE-GRAY AND BLACK, WET, STIFF, TO HARD, SOFT, SILTY CLAY WITH TRACE MICA

BLUE-GRAY, ORANGE AND DARK GRAY, MOIST TO WET, DENSE TO VERY DENSE, SILTY FINE SAND WITH TRACE TO LITTLE MICA

WEATHERED ROCK (SCHIST)

CRYSTALLINE ROCK (SCHIST)

BT

Ⓑ UNDIVIDED COASTAL PLAIN, BROWN AND GRAY-BROWN, MOIST, LOOSE, SILTY SAND
Ⓒ UNDIVIDED COASTAL PLAIN, BLACK, SATURATED, LOOSE, ORGANIC SAND
Ⓓ UNDIVIDED COASTAL PLAIN, ORANGE TO RED, WET, VERY SOFT, SILTY CLAY WITH TRACE MICA
Ⓔ UNDIVIDED COASTAL PLAIN, GRAY AND ORANGE, SATURATED, VERY SOFT, SANDY CLAY
Ⓕ RESIDUAL, BLUE-GRAY, ORANGE AND BLACK, WET, SOFT TO STIFF, FINE SANDY CLAY WITH LITTLE MICA

310 300 290 280 270 260 250 240 230

24+00 25+00 26+00 27+00 28+00 29+00 30+00 31+00 32+00 33+00 34+00 35+00 36+00 37+00

PROJECT REFERENCE NO.	SHEET NO.
R-5769	9

Terracon
Consulting Engineers & Scientists

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

0 100 200
FEET
VE = 10:1

PROPOSED GRADE

SS-18 26' LT
SS-19 26' LT
S-4

100 YEAR STORM WATER SURFACE = ELEV.285.6

GROUND SURFACE

UNDIVIDED COASTAL PLAIN. BROWN TO GRAY. SATURATED. VERY LOOSE. CLAYEY SAND

UNDIVIDED COASTAL PLAIN. ORANGE AND GRAY. SATURATED. SOFT TO VERY SOFT. SILTY CLAY

RESIDUAL. DARK GRAY. WET. MEDIUM STIFF. SILTY CLAY WITH TRACE MICA

WEATHERED ROCK (SCHIST)

ORANGE AND RED. WET. SAND AND TRACE GRAVEL

PLAIN. GRAY. SILTY CLAY AND SANDY CLAY WITH LITTLE GRAVEL WITH TRACE SILT

ORANGE AND GRAY. SATURATED. CLAYEY SAND AND SANDY GRAVEL

SATURATED. VERY LOOSE.

BT
FIAD 04/16

Ⓒ UNDIVIDED COASTAL PLAIN. BLACK. SATURATED. VERY LOOSE. ORGANIC SAND

Ⓖ UNDIVIDED COASTAL PLAIN. RED AND ORANGE. SATURATED. VERY SOFT. SANDY CLAY

310 300 290 280 270 260 250 240 230 220

38+00 39+00 40+00 41+00 42+00 43+00

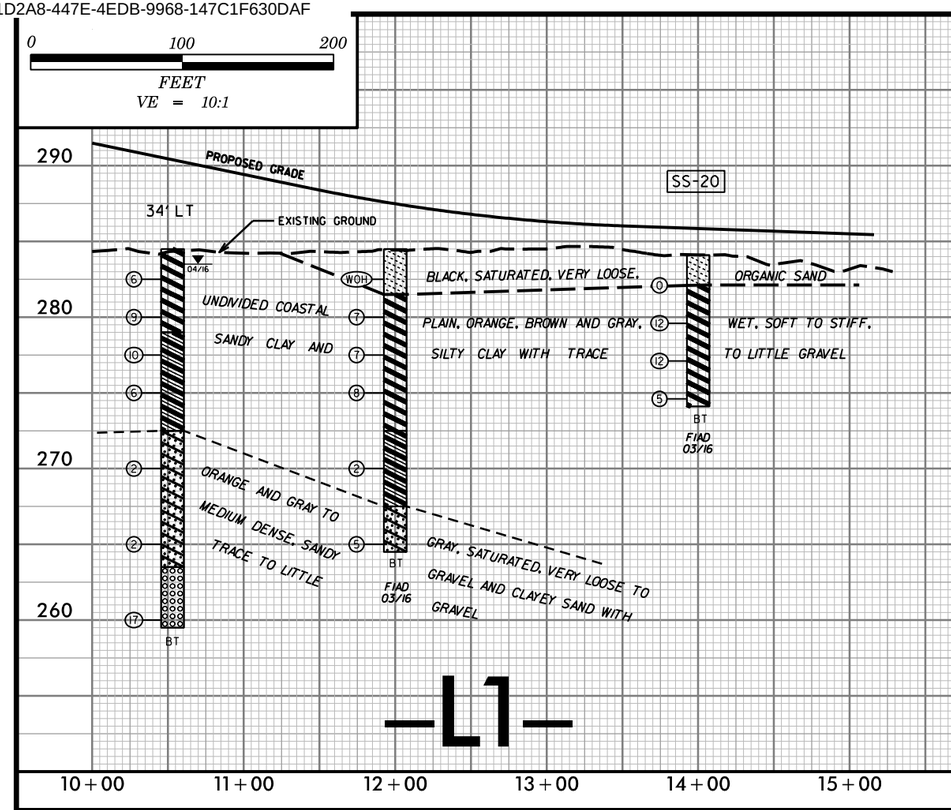
PROJECT REFERENCE NO.	SHEET NO.
R-5769	10

Terracon
Consulting Engineers & Scientists

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

0 100 200
FEET
VE = 10:1



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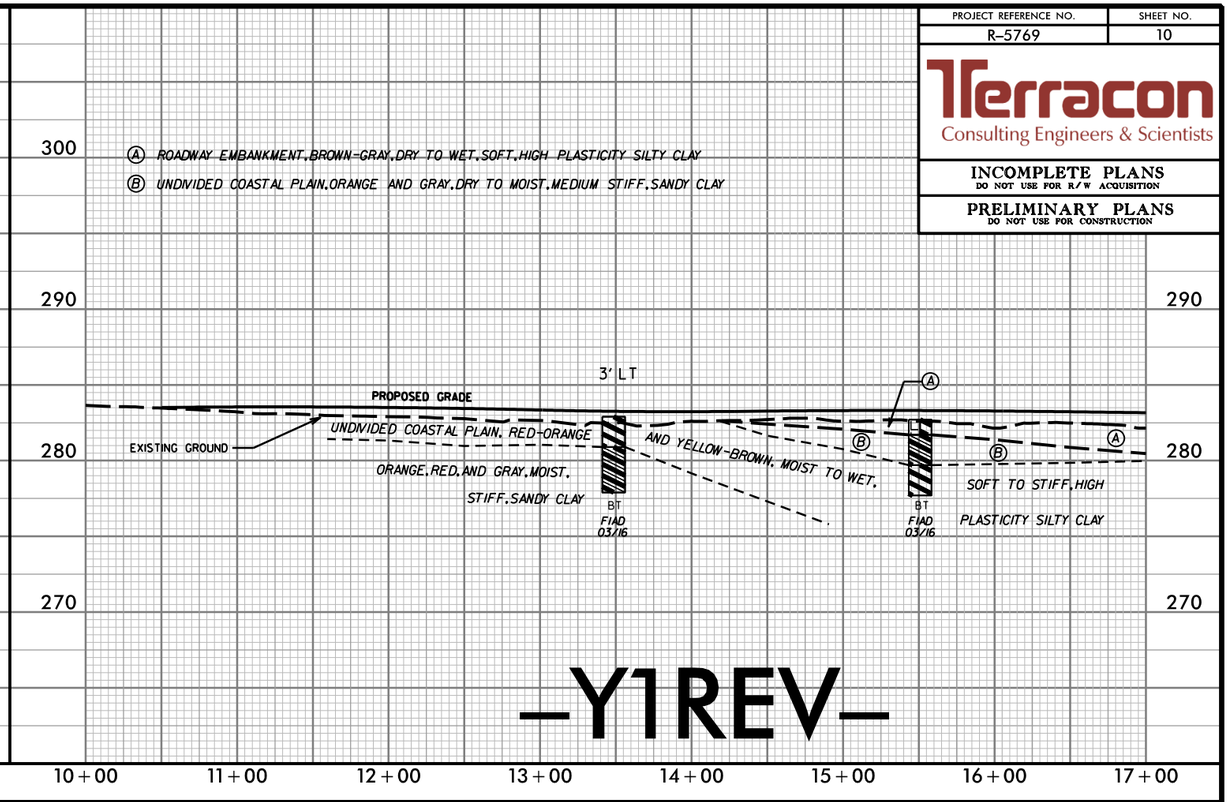

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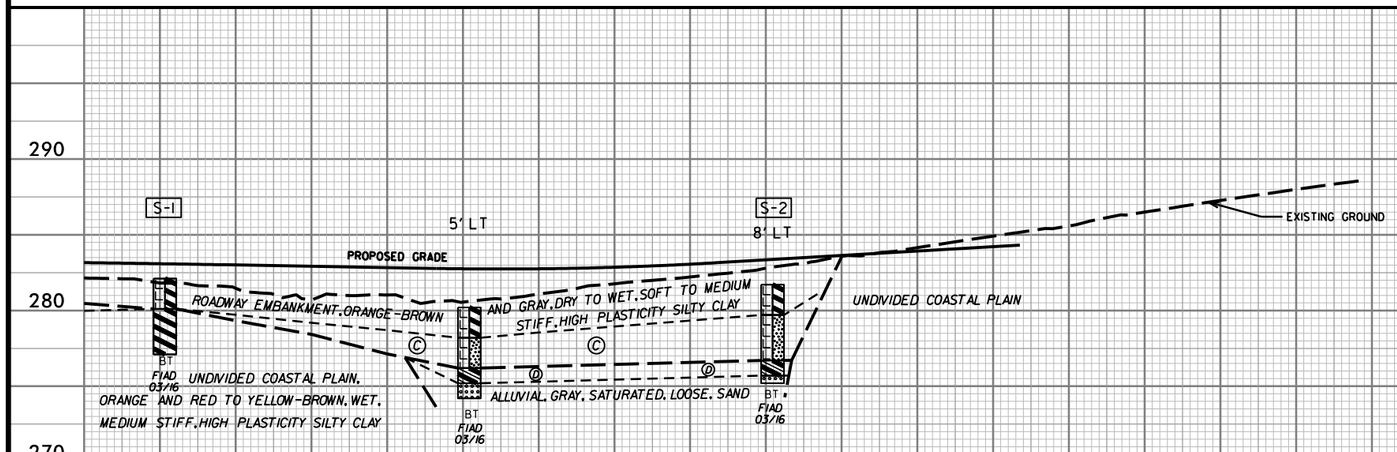

-Y1REV-

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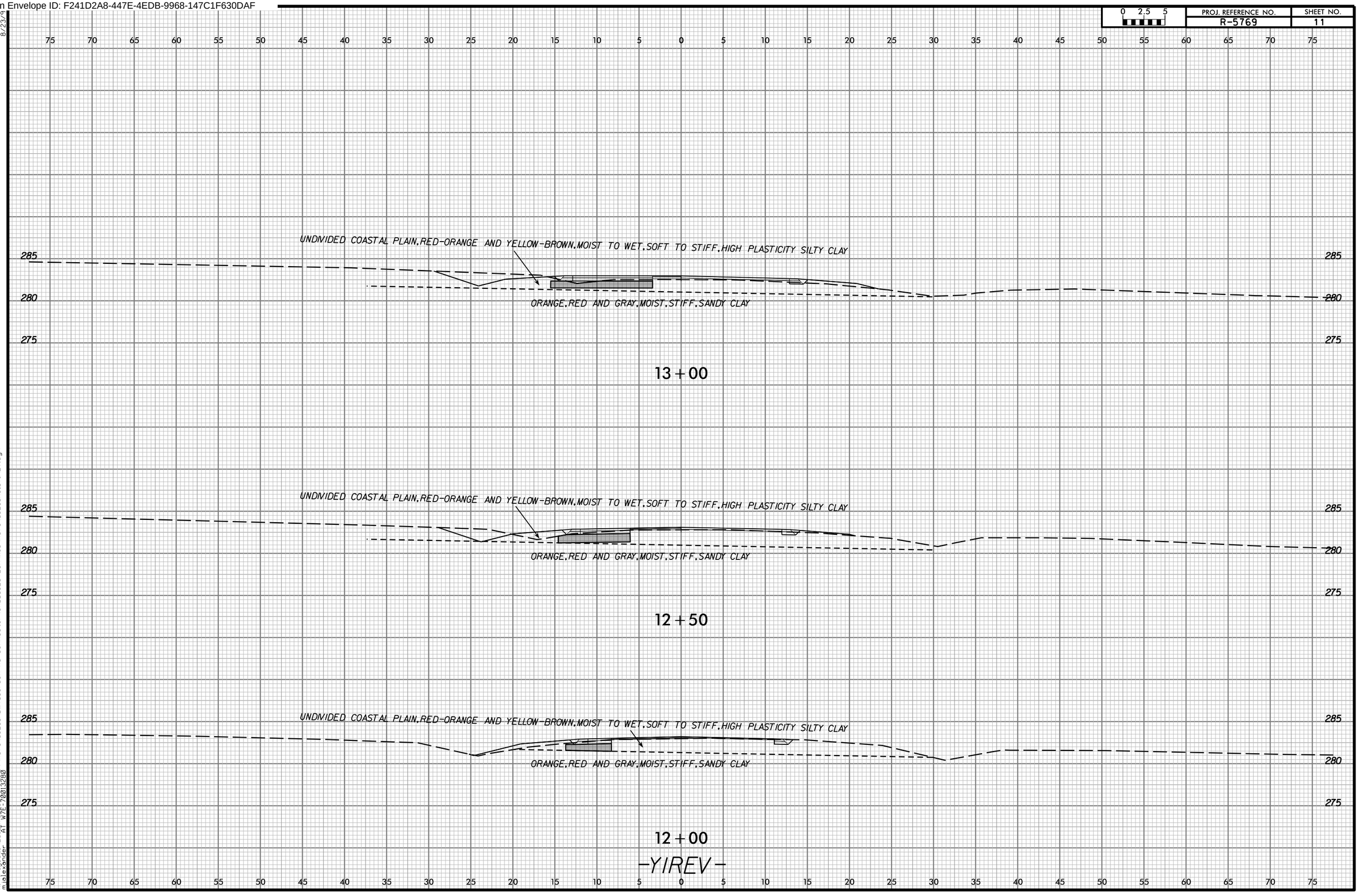

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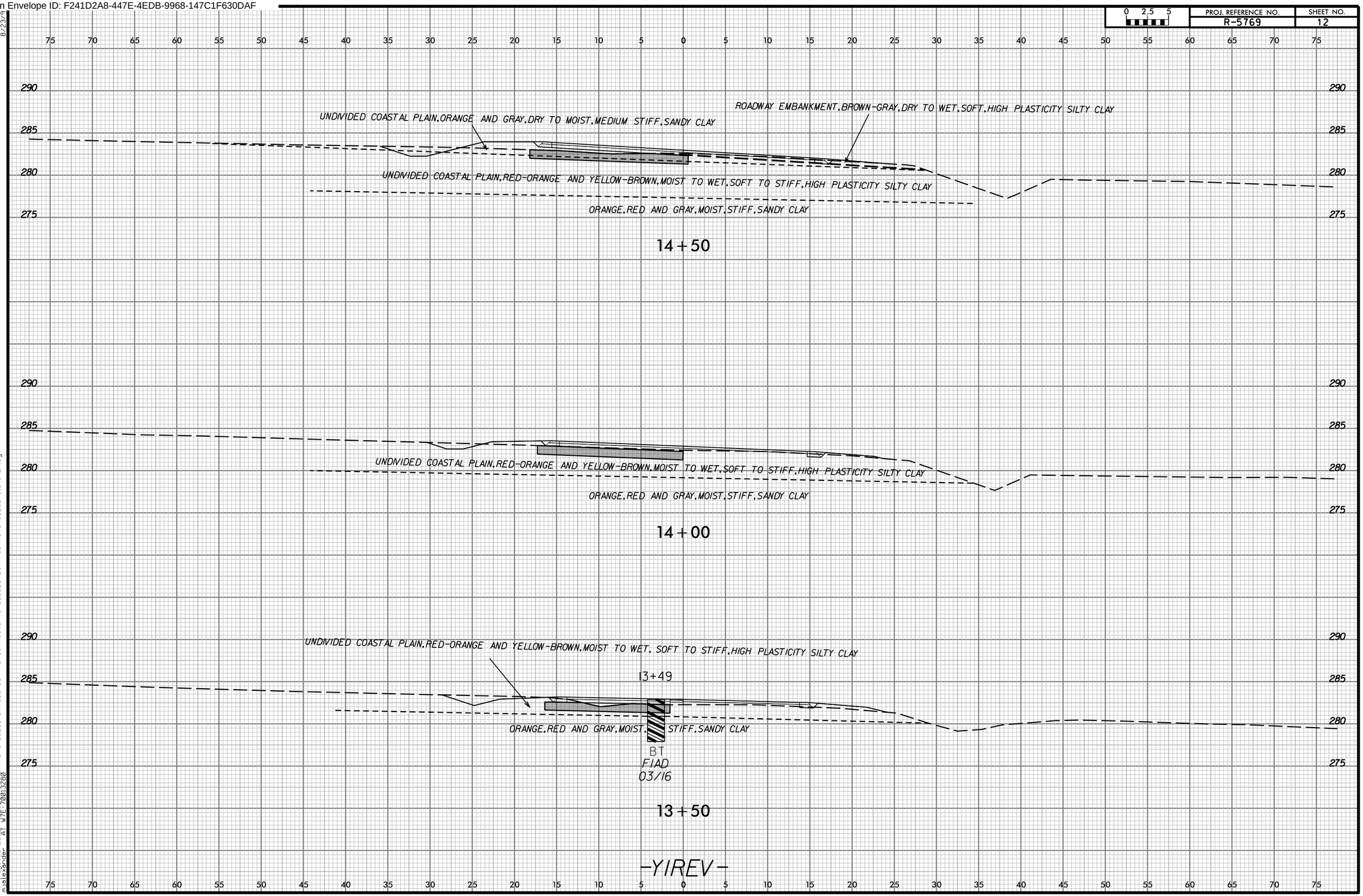
	R-5769	12



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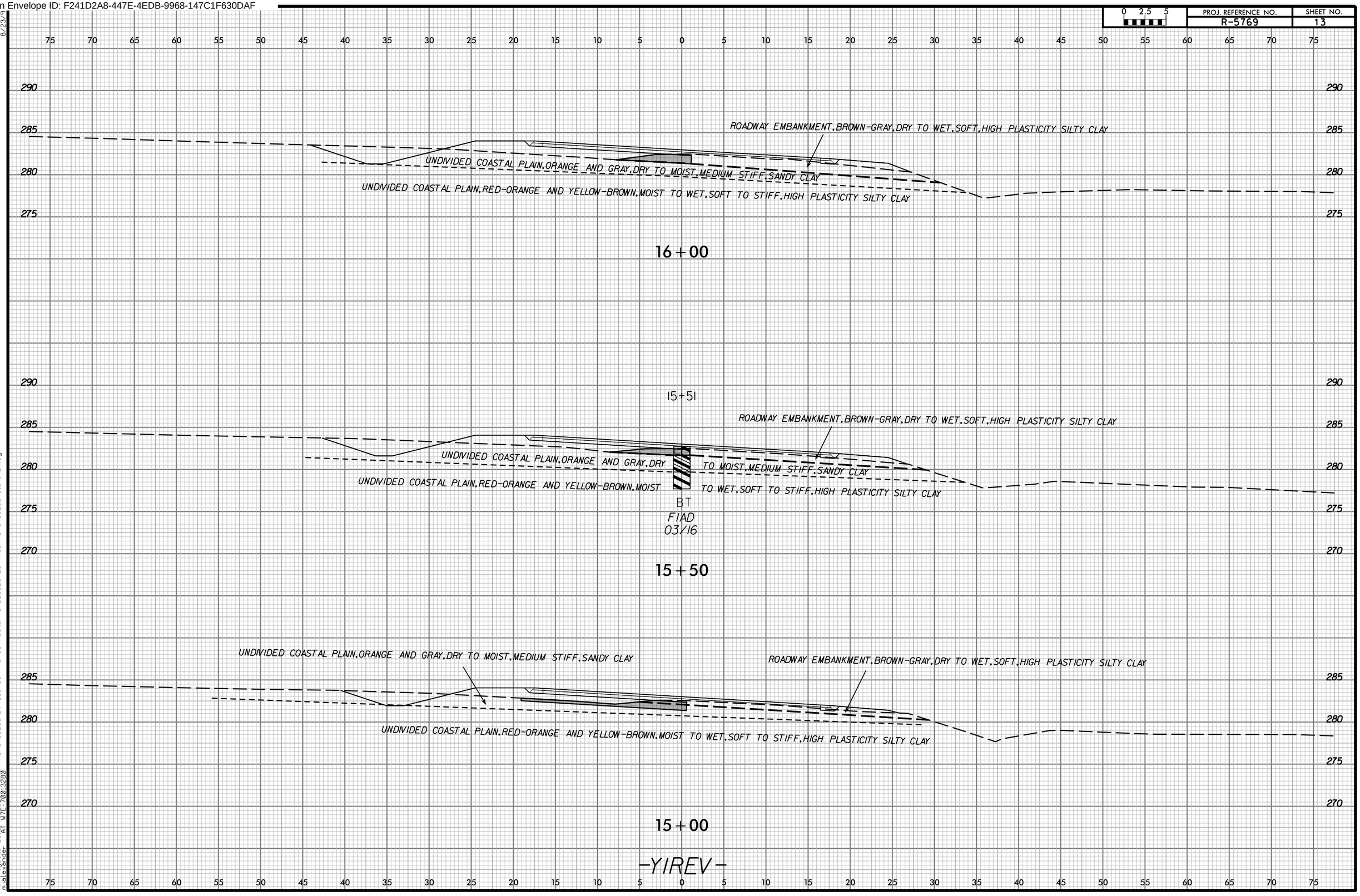
	R-5769	13



-YIREV-

PROJ. REFERENCE NO.	SHEET NO.
R-5769	14

0 2.5 5

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

290
285
280
275

S-1
17+53

ROADWAY EMBANKMENT,ORANGE-BROWN AND GRAY,DRY TO WET,SOFT TO MEDIUM STIFF,HIGH PLASTICITY SILTY CLAY

UNDIVIDED COASTAL PLAIN,ORANGE AND RED TO YELLOW-BROWN, WET,MEDIUM STIFF,HIGH PLASTICITY SILTY CLAY

BT
FIAD
03/16

17+50

UNDIVIDED COASTAL PLAIN,ORANGE AND GRAY,DRY TO MOIST,MEDIUM STIFF,SANDY CLAY

ROADWAY EMBANKMENT,ORANGE-BROWN AND GRAY,DRY TO WET,SOFT TO MEDIUM STIFF,HIGH PLASTICITY SILTY CLAY

UNDIVIDED COASTAL PLAIN, RED-ORANGE TO YELLOW-BROWN, WET, MEDIUM STIFF, HIGH PLASTICITY SILTY CLAY

17+00

UNDIVIDED COASTAL PLAIN,ORANGE AND GRAY,DRY TO MOIST,MEDIUM STIFF,SANDY CLAY

ROADWAY EMBANKMENT,BROWN-GRAY,DRY TO WET,SOFT,HIGH PLASTICITY SILTY CLAY

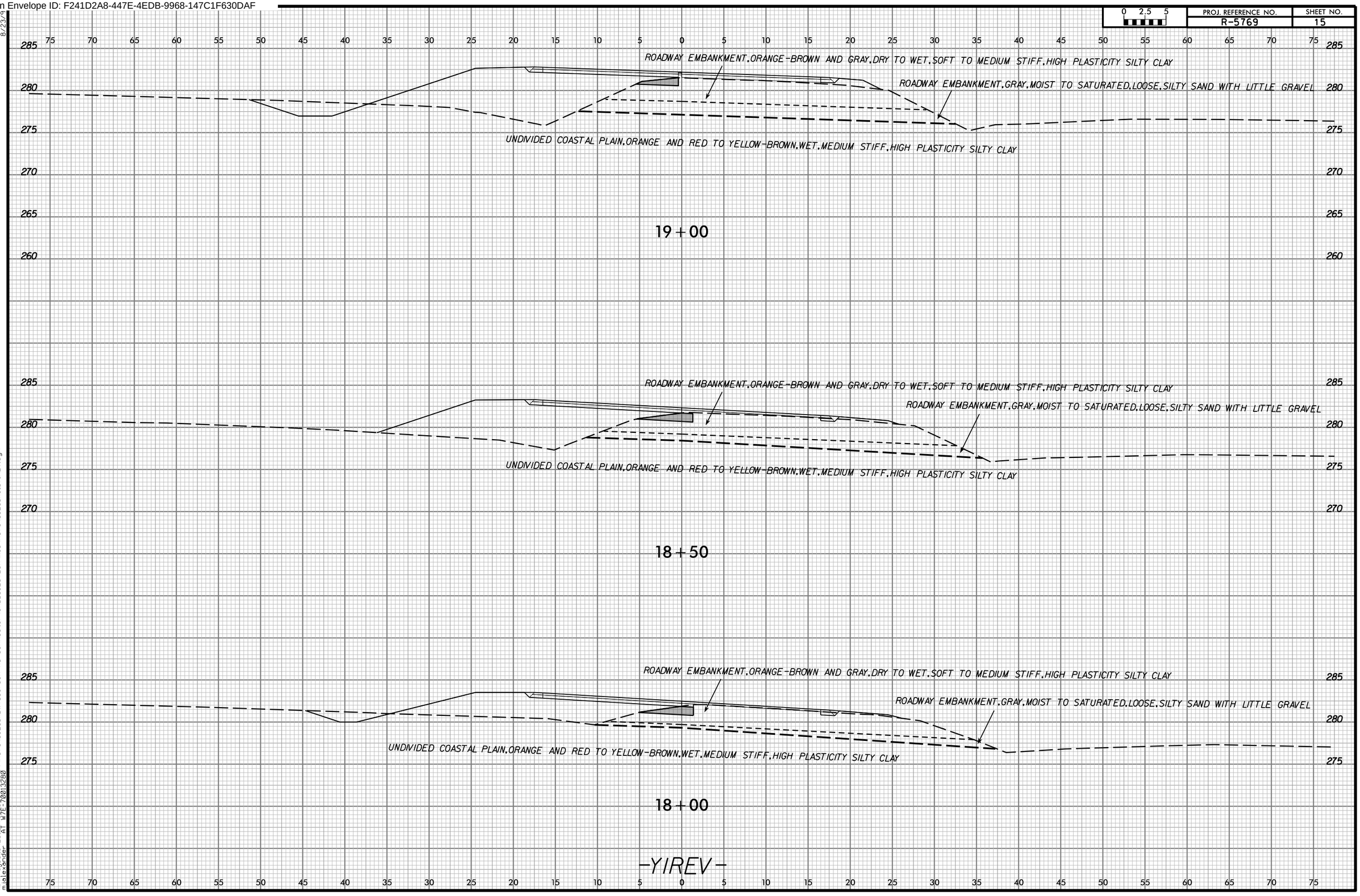
UNDIVIDED COASTAL PLAIN,RED-ORANGE AND YELLOW-BROWN,MOIST TO WET,SOFT TO STIFF,HIGH PLASTICITY SILTY CLAY

16+50

-YIREV-

PROJ. REFERENCE NO.	SHEET NO.
R-5769	15

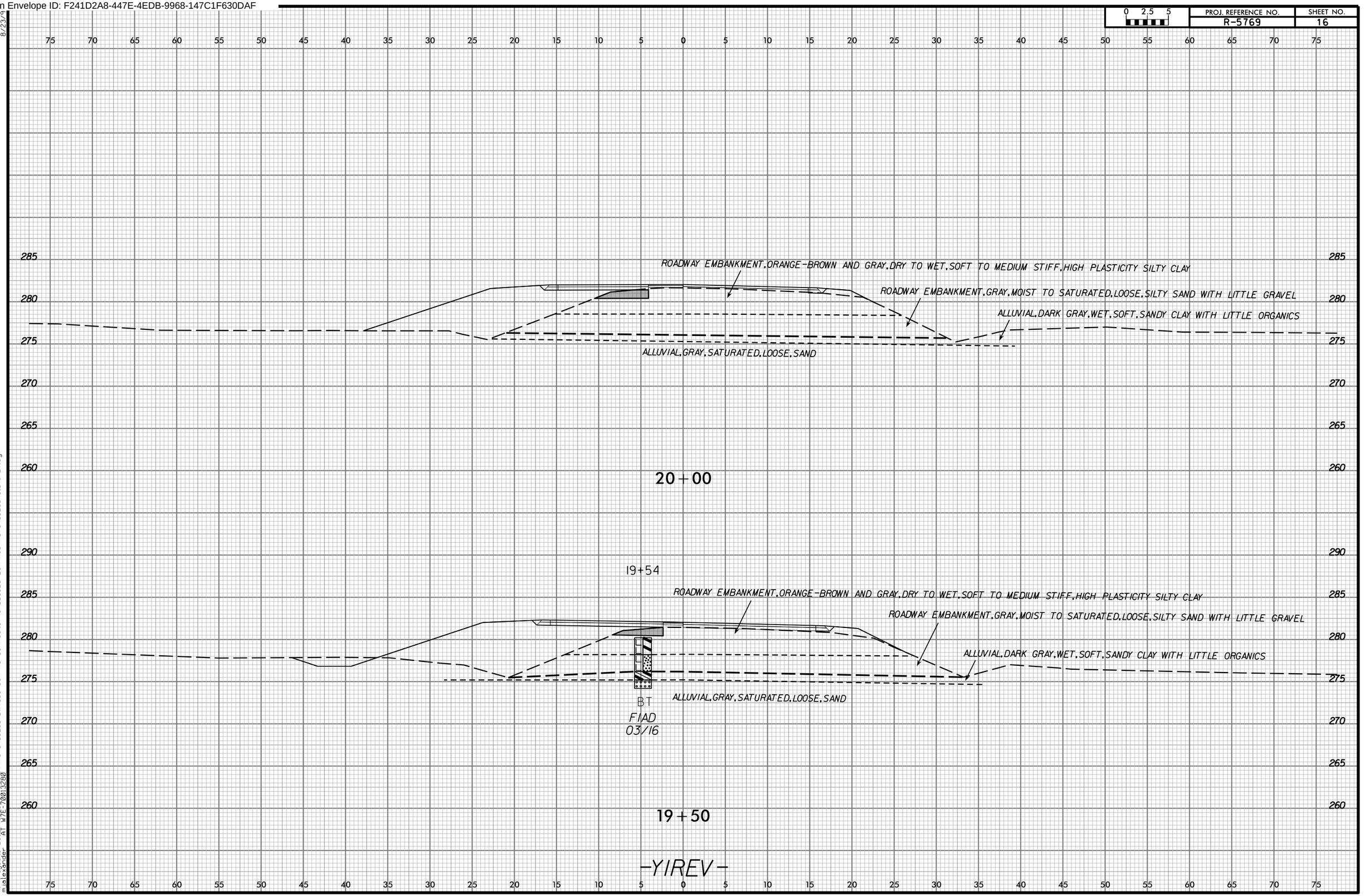
0 2.5 5



8/23/9

22-AUG-2016 13:21
N:\Projects\2016\7016034\R5769\R5769_GEO_RDWY_Gordon Rd Connector\CADD_GEOTECH\xsc\R5769_GEO_XSI_YIREV.dgn
mjolejonder AT WJE-7001.3280

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-5769	16



8/23/9

22-AUG-2016 13:21
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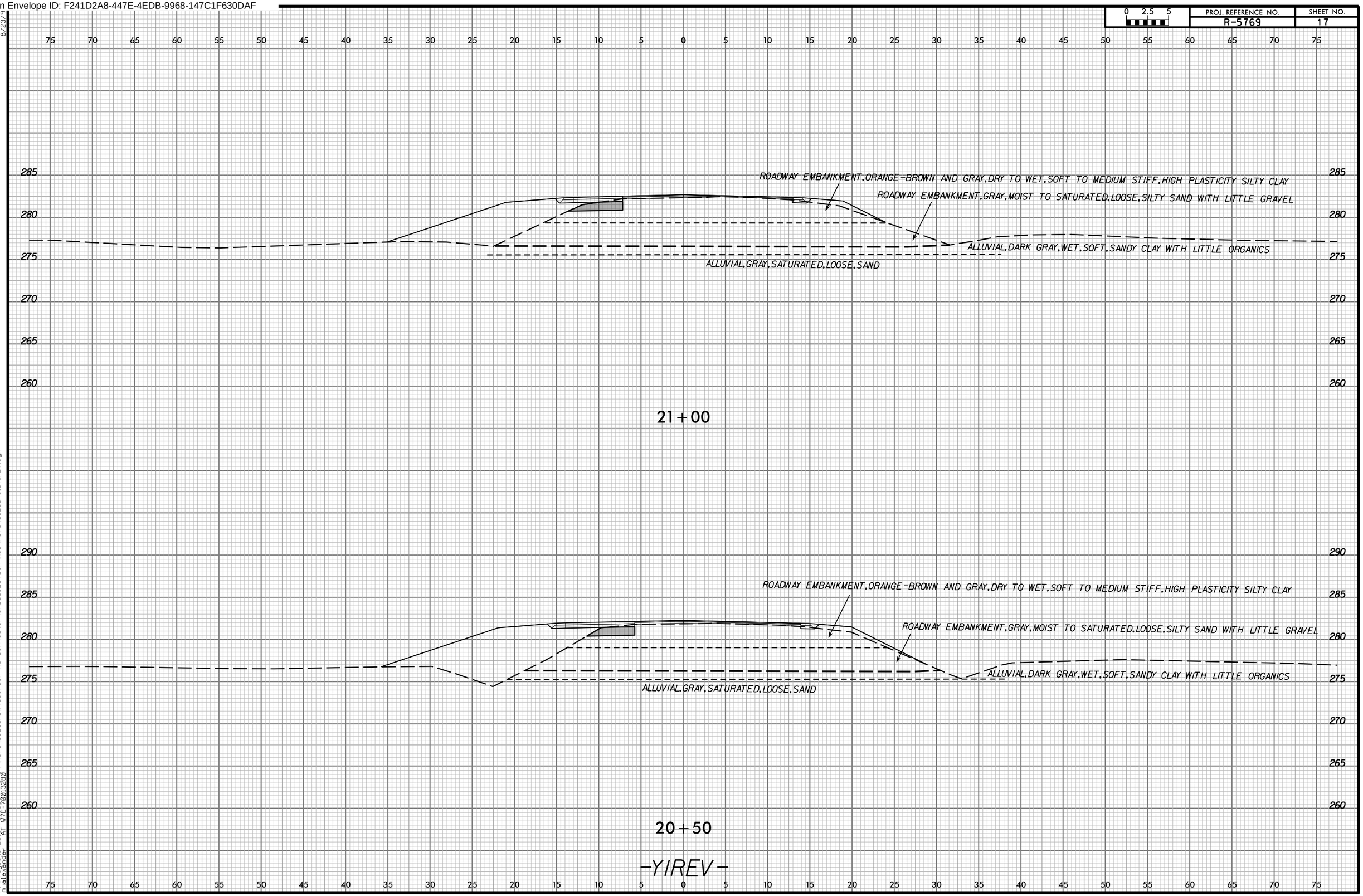
malexander
AT W/E-700013280

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	R-5769	17



8/23/9

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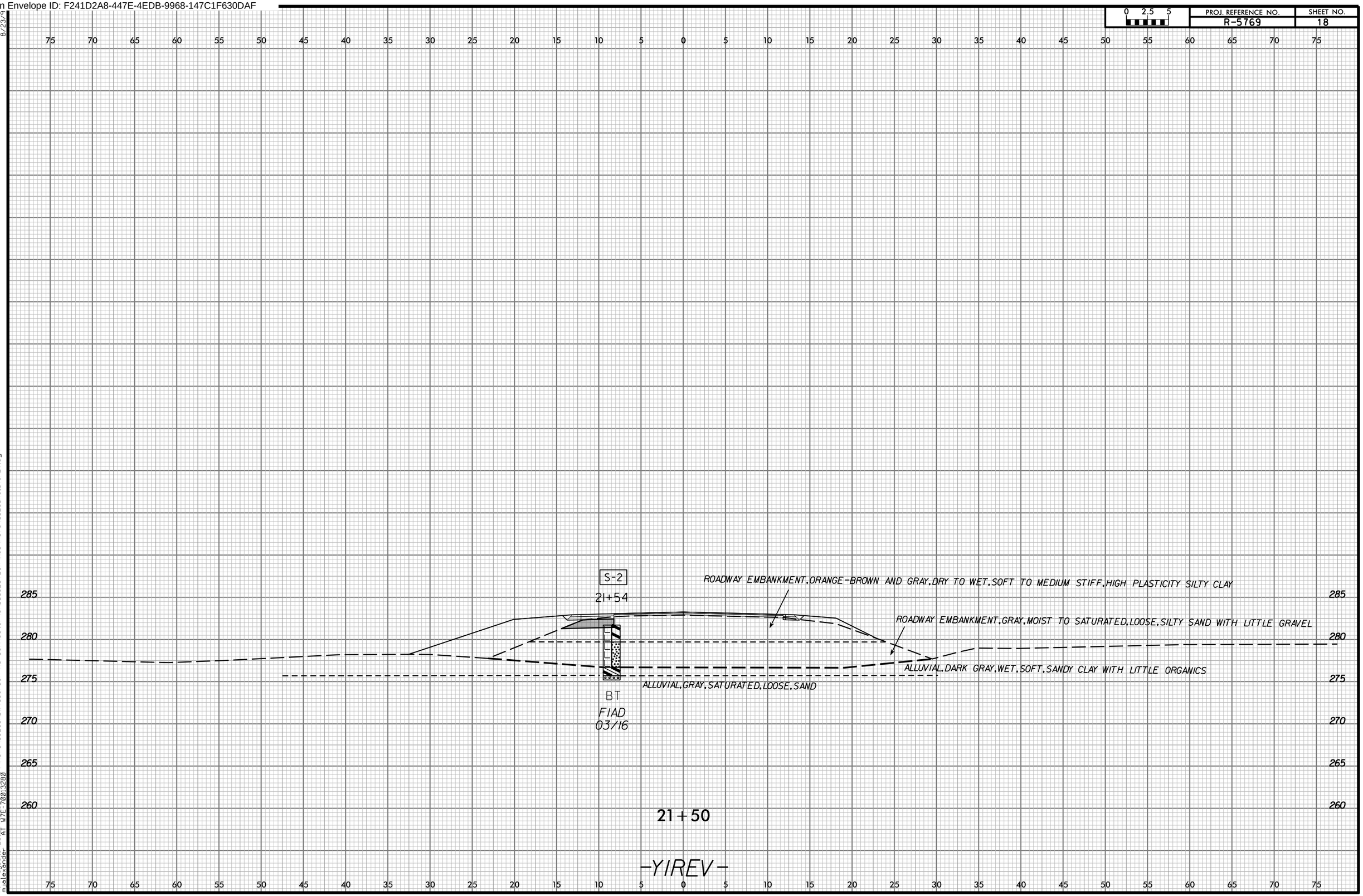
	R-5769	18



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malexander
AT W/E-700013280

PROJECT REFERENCE NO.	SHEET NO.
R–5769	19

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

APPENDIX A
IN–SITU TESTING RESULTS

REFERENCE: R–5769

PROJECT: N/A

Terracon
Consulting Engineers & Scientists
2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873–2211 FAX: (919) 873–9555
NC REGISTERED FIRM: F–0869

INITIALS DATE

CPT LOG NO. C1

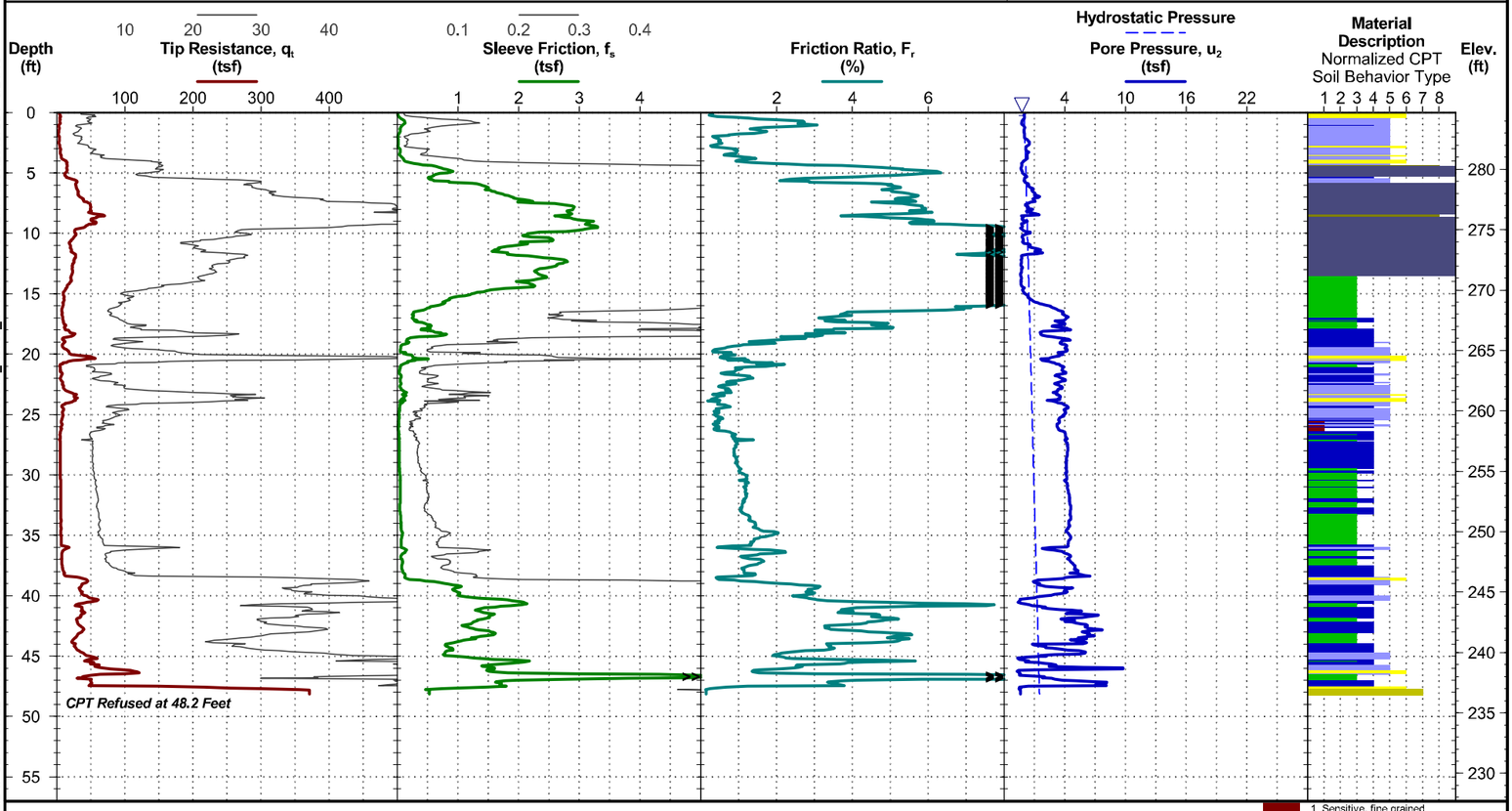
PROJECT: R-5769: NOVO NORDISK ACCESS ROAD

CLIENT: WETHERILL ENGINEERING RALEIGH, NORTH CAROLINA

SITE: BETWEEN SR 1905 (GORDON ROAD) AND PROPOSED NOVO NORDISK FACILITY JOHNSTON COUNTY, NORTH CAROLINA

TEST LOCATION: SEE ROADWAY INVENTORY

Surface Elev.: 284.7 ft
Northing: 677852
Easting: 2176700
Station: 24+00
Offset: CL



See Terracon's CPT General Notes for explanation of symbols and abbreviations.
ELEVATION ESTIMATED FROM PROJECT .TIN FILE.

CPT sensor calibration reports available upon request.

1 Sensitive, fine grained
2 Organic soils - clay
3 Clay - silty clay to clay
4 Silt mixtures - clayey silt to silty clay
5 Sand mixtures - silty sand to sandy silt
6 Sands - clean sand to silty sand
7 Gravelly sand to dense sand
8 Very stiff sand to clayey sand
9 Very stiff fine grained

WATER LEVEL OBSERVATION				
▽ 0 ft measured water depth (used in normalizations and correlations)	Probe no. 4526 with net area ratio of 0.83 U2 pore pressure transducer location Manufactured by Geotech A.B.; calibrated 12/7/2015 Tip and sleeve areas of 10 cm^2 and 150 cm^2 Ring friction reducer with O.D. of 1.875 in	Terracon 2401 Brentwood Rd Ste 107 Raleigh, NC	CPT Started: 4/25/2016 Rig: Pagani TG73-200 Project No.: R-5769	CPT Completed: 4/25/2016 Operator: JB

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT D2165034D_R5769_CPT-DMT.GPJ TERRACON2015.GDT 5/24/16

DMT LOG NO. D1

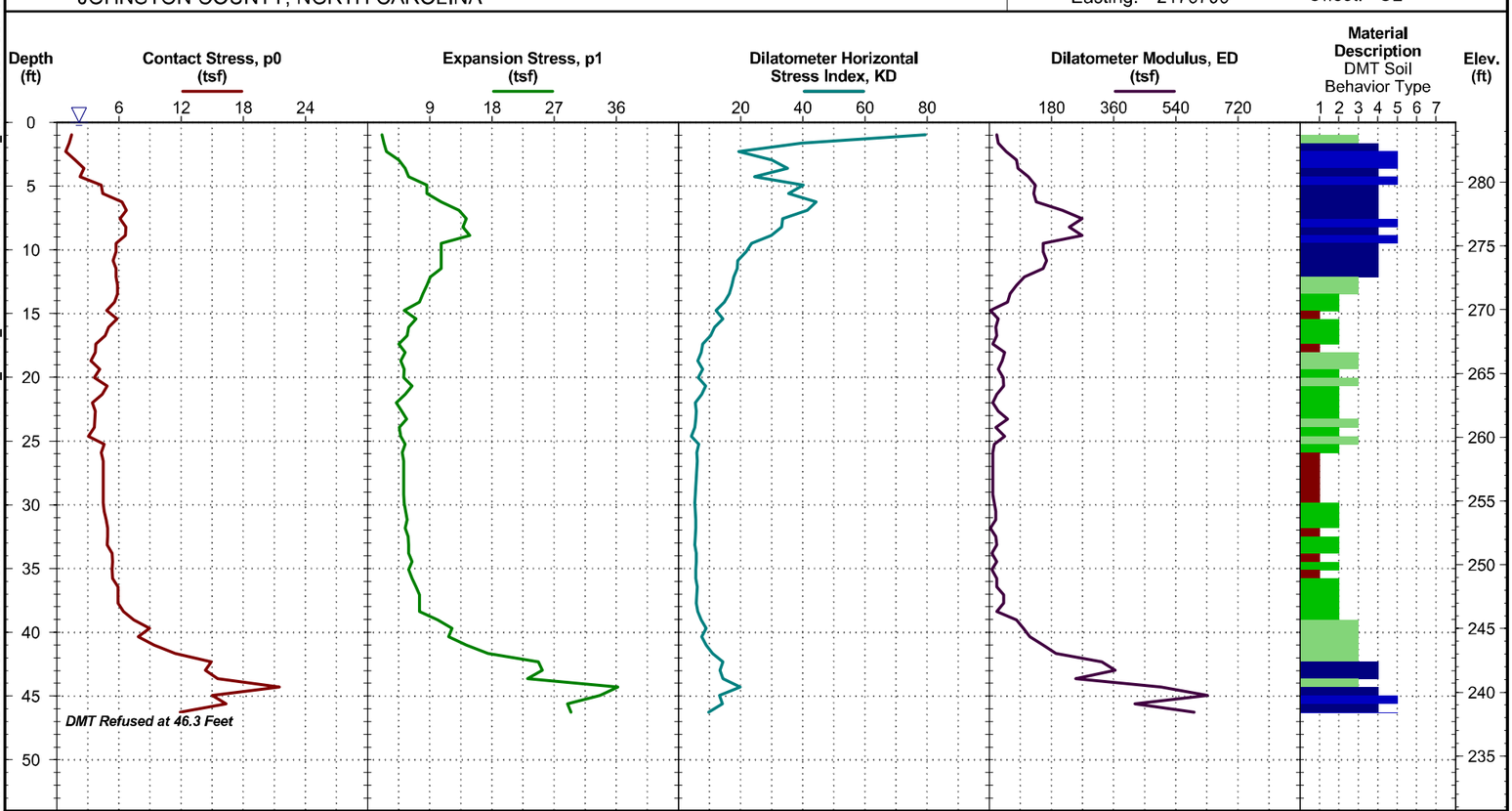
PROJECT: R-5769: NOVO NORDISK ACCESS ROAD

CLIENT: WETHERILL ENGINEERING RALEIGH, NORTH CAROLINA

SITE: BETWEEN SR 1905 (GORDON ROAD) AND PROPOSED NOVO NORDISK FACILITY JOHNSTON COUNTY, NORTH CAROLINA

TEST LOCATION: SEE ROADWAY INVENTORY

Surface Elev.: 284.7 ft
Northing: 677852
Easting: 2176700
Station: 24+00
Offset: CL



See Plan Sheets for explanation of symbols and abbreviations.
ELEVATION ESTIMATED FROM PROJECT .TIN FILE.

DMT specification reports available upon request.

1 Muck / peat
2 Clay
3 Silty clay
4 Clayey silt
5 Silt
6 Sandy silt
7 Silty sand
8 Sand

WATER LEVEL OBSERVATION				
▽ 0 ft measured water depth (used in normalizations and correlations)	Calibrations: ΔA - 0.2 bar; ΔB - 0.4 bar; Zm - 0 bar Blade no. 507	Terracon 2401 Brentwood Rd Ste 107 Raleigh, NC	DMT Started: 4/26/2016 Rig: Pagani TG73-200 Project No.: R-5769	DMT Completed: 4/26/2016 Operator: JB

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. DMT REPORT D2165034D_R5769_CPT-DMT.GPJ TERRACON2012_W INSITU.GDT 5/24/16

CPT LOG NO. C2

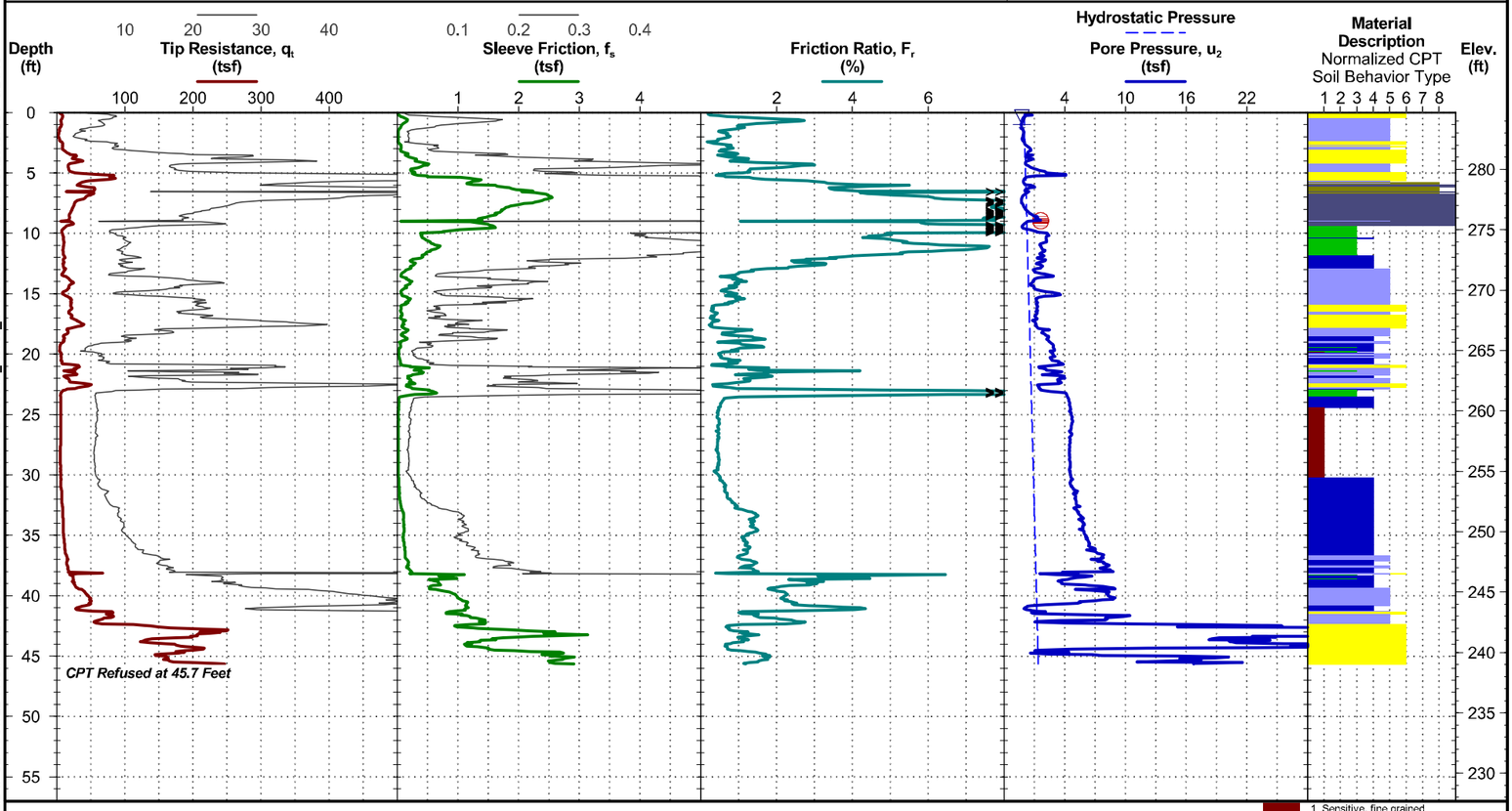
PROJECT: R-5769: NOVO NORDISK ACCESS ROAD

CLIENT: WETHERILL ENGINEERING RALEIGH, NORTH CAROLINA

TEST LOCATION: SEE ROADWAY INVENTORY

SITE: BETWEEN SR 1905 (GORDON ROAD) AND PROPOSED NOVO NORDISK FACILITY JOHNSTON COUNTY, NORTH CAROLINA

Surface Elev.: 284.7 ft
Northing: 678163
Easting: 2176951
Station: 28+00
Offset: CL



See Terracon's CPT General Notes for explanation of symbols and abbreviations.
ELEVATION ESTIMATED FROM PROJECT .TIN FILE.

CPT sensor calibration reports available upon request.

1 Sensitive, fine grained
2 Organic soils - clay
3 Clay - silty clay to clay
4 Silt mixtures - clayey silt to silty clay
5 Sand mixtures - silty sand to sandy silt
6 Sands - clean sand to silty sand
7 Gravelly sand to dense sand
8 Very stiff sand to clayey sand
9 Very stiff fine grained

WATER LEVEL OBSERVATION				
▽ 1 ft measured water depth (used in normalizations and correlations)	Probe no. 4526 with net area ratio of 0.83 U2 pore pressure transducer location Manufactured by Geotech A.B.; calibrated 12/7/2015 Tip and sleeve areas of 10 cm^2 and 150 cm^2 Ring friction reducer with O.D. of 1.875 in	Terracon 2401 Brentwood Rd Ste 107 Raleigh, NC	CPT Started: 4/25/2016 Rig: Pagani TG73-200 Project No.: R-5769	CPT Completed: 4/25/2016 Operator: JB

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT D2165034D_R5769_CPT-DMT.GPJ TERRACON2015.GDT 5/24/16

DMT LOG NO. D2

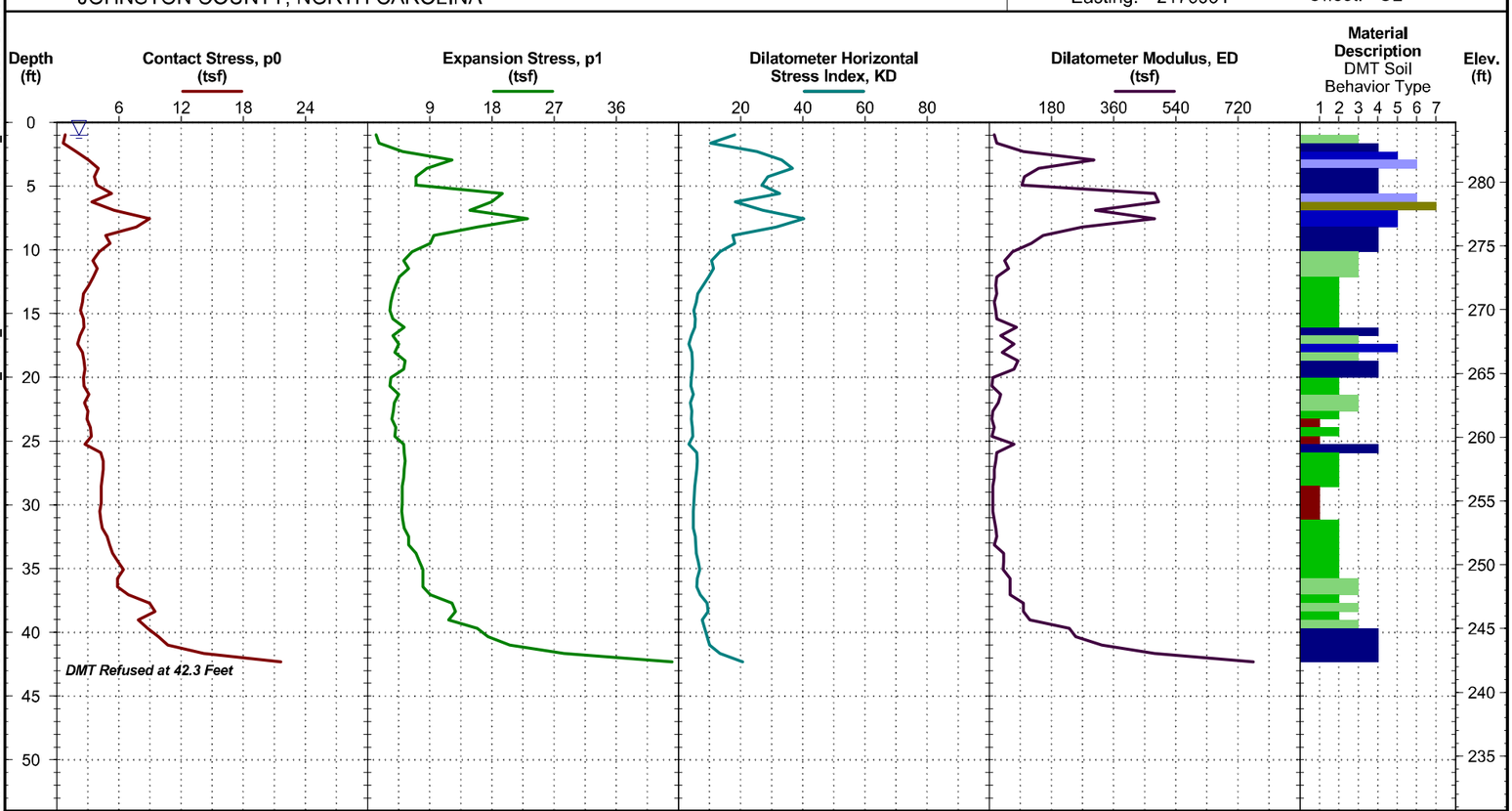
PROJECT: R-5769: NOVO NORDISK ACCESS ROAD

CLIENT: WETHERILL ENGINEERING RALEIGH, NORTH CAROLINA

TEST LOCATION: SEE ROADWAY INVENTORY

SITE: BETWEEN SR 1905 (GORDON ROAD) AND PROPOSED NOVO NORDISK FACILITY JOHNSTON COUNTY, NORTH CAROLINA

Surface Elev.: 284.7 ft
Northing: 678163
Easting: 2176951
Station: 28+00
Offset: CL



See Plan Sheets for explanation of symbols and abbreviations.
ELEVATION ESTIMATED FROM PROJECT .TIN FILE.

DMT specification reports available upon request.

1 Muck / peat
2 Clay
3 Silty clay
4 Clayey silt
5 Silt
6 Sandy silt
7 Silty sand
8 Sand

WATER LEVEL OBSERVATION				
▽ 1 ft measured water depth (used in normalizations and correlations)	Calibrations: ΔA - 0.2 bar; ΔB - 0.4 bar; Zm - 0 bar Blade no. 507	Terracon 2401 Brentwood Rd Ste 107 Raleigh, NC	DMT Started: 4/27/2016 Rig: Pagani TG73-200 Project No.: R-5769	DMT Completed: 4/27/2016 Operator: JB

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. DMT REPORT D2165034D_R5769_CPT-DMT.GPJ TERRACON2012_W INSITU.GDT 5/24/16

CPT LOG NO. C3

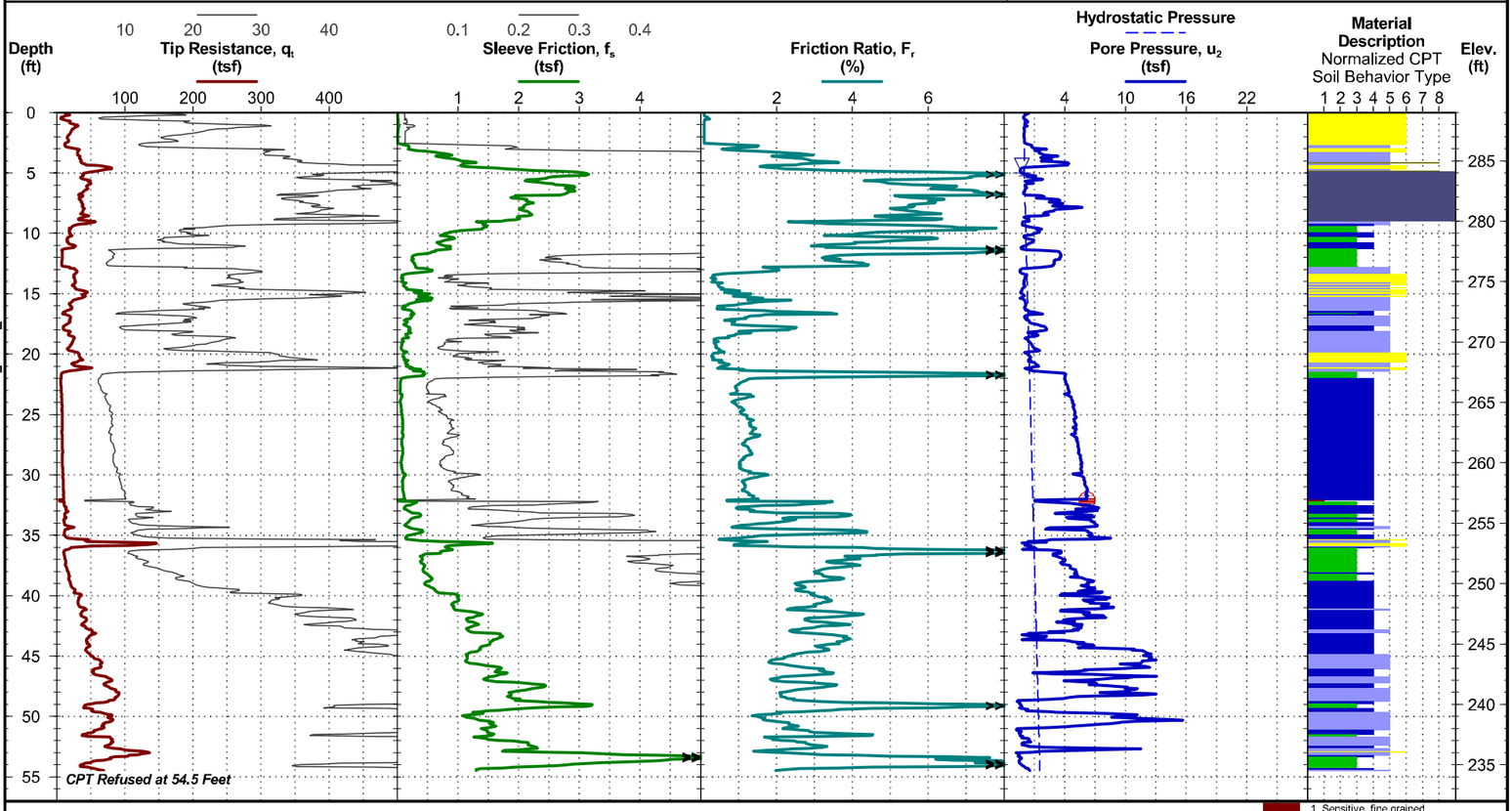
PROJECT: R-5769: NOVO NORDISK ACCESS ROAD

CLIENT: WETHERILL ENGINEERING RALEIGH, NORTH CAROLINA

TEST LOCATION: SEE ROADWAY INVENTORY

SITE: BETWEEN SR 1905 (GORDON ROAD) AND PROPOSED NOVO NORDISK FACILITY JOHNSTON COUNTY, NORTH CAROLINA

Surface Elev.: 289 ft
Northing: 678324
Easting: 2177070
Station: 30+00
Offset: CL



See Terracon's CPT General Notes for explanation of symbols and abbreviations.
ELEVATION ESTIMATED FROM PROJECT .TIN FILE.

CPT sensor calibration reports available upon request.

1 Sensitive, fine grained
2 Organic soils - clay
3 Clay - silty clay to clay
4 Silt mixtures - clayey silt to silty clay
5 Sand mixtures - silty sand to sandy silt
6 Sands - clean sand to silty sand
7 Gravelly sand to dense sand
8 Very stiff sand to clayey sand
9 Very stiff fine grained

WATER LEVEL OBSERVATION
▽ 5 ft measured water depth
(used in normalizations and correlations)

Probe no. 4526 with net area ratio of 0.83
U2 pore pressure transducer location
Manufactured by Geotech A.B.; calibrated 12/7/2015
Tip and sleeve areas of 10 cm^2 and 150 cm^2
Ring friction reducer with O.D. of 1.875 in

Terracon
2401 Brentwood Rd Ste 107
Raleigh, NC

CPT Started: 4/25/2016
CPT Completed: 4/25/2016
Rig: Pagani TG73-200
Operator: JB
Project No.: R-5769

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT D2165034D_R5769_CPT-DMT.GPJ TERRACON2015.GDT 5/24/16

DMT LOG NO. D3

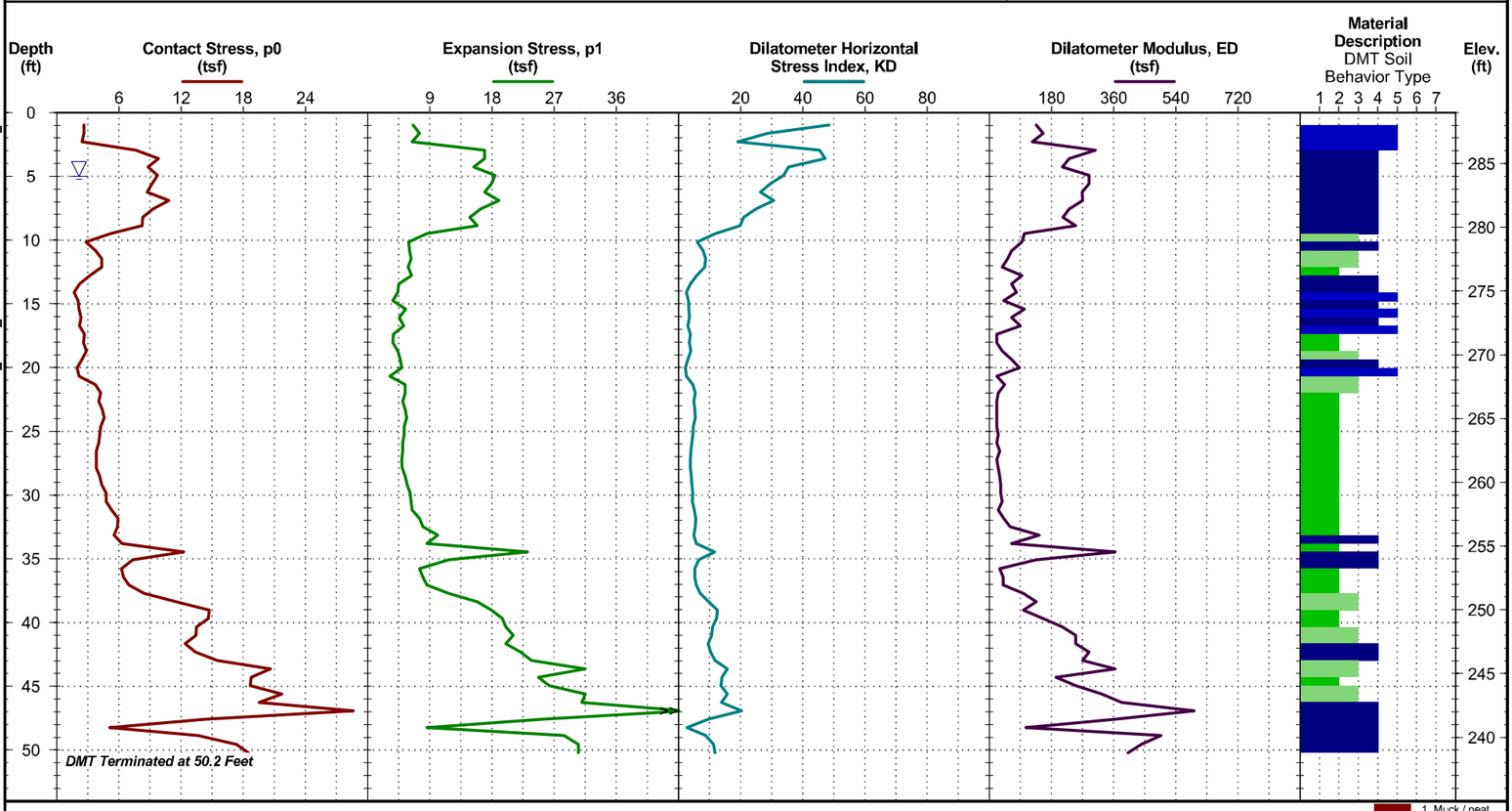
PROJECT: R-5769: NOVO NORDISK ACCESS ROAD

CLIENT: WETHERILL ENGINEERING RALEIGH, NORTH CAROLINA

TEST LOCATION: SEE ROADWAY INVENTORY

SITE: BETWEEN SR 1905 (GORDON ROAD) AND PROPOSED NOVO NORDISK FACILITY JOHNSTON COUNTY, NORTH CAROLINA

Surface Elev.: 289 ft
Northing: 678324
Easting: 2177070
Station: 30+00
Offset: CL



See Plan Sheets for explanation of symbols and abbreviations.
ELEVATION ESTIMATED FROM PROJECT .TIN FILE.

DMT specification reports available upon request.

1 Muck / peat
2 Clay
3 Silty clay
4 Clayey silt
5 Silt
6 Sandy silt
7 Silty sand
8 Sand

WATER LEVEL OBSERVATION
▽ 5 ft measured water depth
(used in normalizations and correlations)

Calibrations: ΔA - 0.2 bar; ΔB - 0.4 bar; Zm - 0 bar
Blade no. 507

Terracon
2401 Brentwood Rd Ste 107
Raleigh, NC

DMT Started: 4/26/2016
DMT Completed: 4/26/2016
Rig: Pagani TG73-200
Operator: JB
Project No.: R-5769

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. DMT REPORT D2165034D_R5769_CPT-DMT.GPJ TERRACON2012_W INSITU.GDT 5/24/16

CPT LOG NO. C4

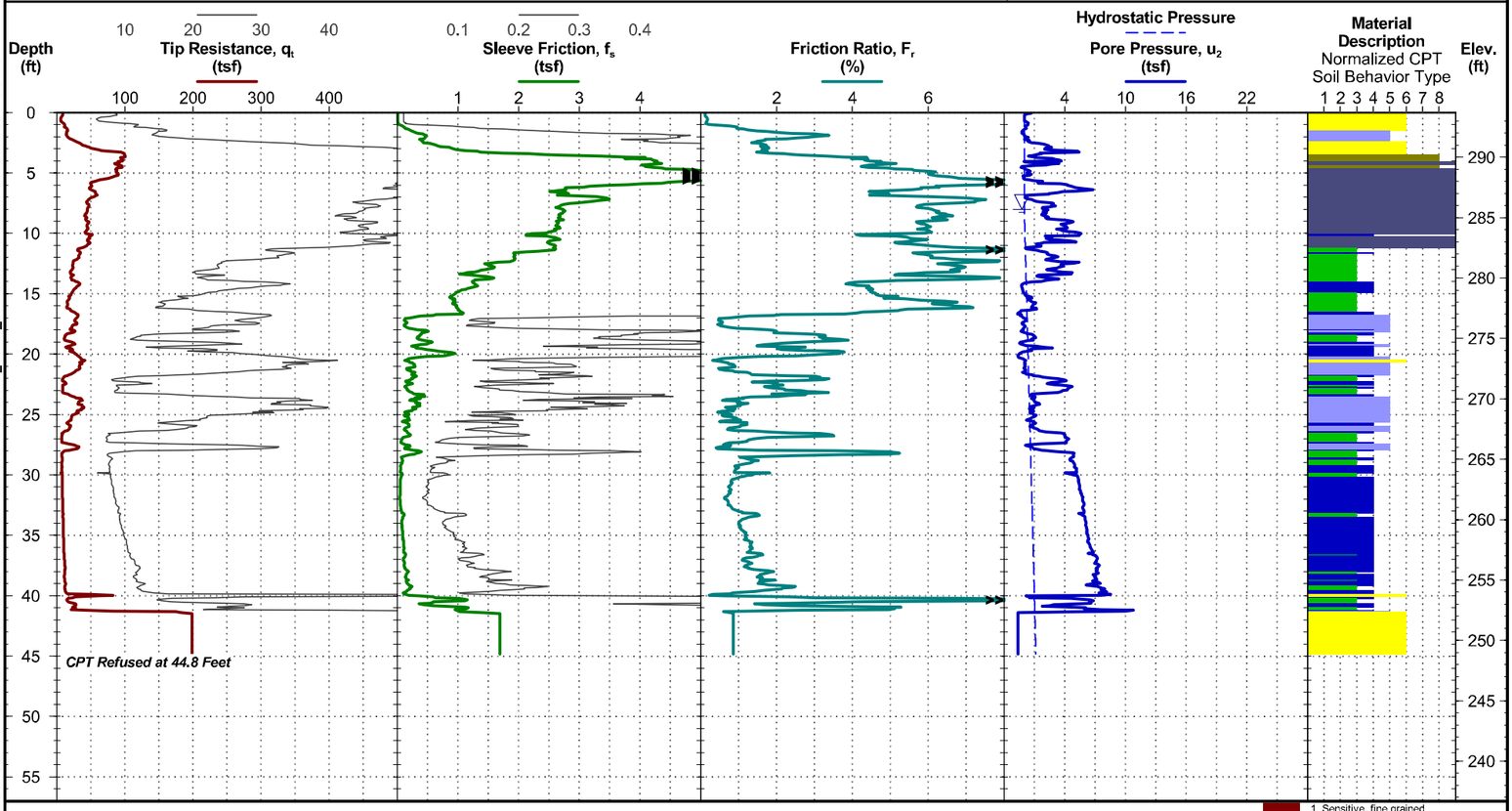
PROJECT: R-5769: NOVO NORDISK ACCESS ROAD

CLIENT: WETHERILL ENGINEERING RALEIGH, NORTH CAROLINA

TEST LOCATION: SEE ROADWAY INVENTORY

SITE: BETWEEN SR 1905 (GORDON ROAD) AND PROPOSED NOVO NORDISK FACILITY JOHNSTON COUNTY, NORTH CAROLINA

Surface Elev.: 293.7 ft
Northing: 678444
Easting: 2177159
Station: 31+50
Offset: CL



See Terracon's CPT General Notes for explanation of symbols and abbreviations.
ELEVATION ESTIMATED FROM PROJECT .TIN FILE.

CPT sensor calibration reports available upon request.

1 Sensitive, fine grained
2 Organic soils - clay
3 Clay - silty clay to clay
4 Silt mixtures - clayey silt to silty clay
5 Sand mixtures - silty sand to sandy silt
6 Sands - clean sand to silty sand
7 Gravelly sand to dense sand
8 Very stiff sand to clayey sand
9 Very stiff fine grained

WATER LEVEL OBSERVATION				
▽ 8 ft measured water depth (used in normalizations and correlations)	Probe no. 4526 with net area ratio of 0.83 U2 pore pressure transducer location Manufactured by Geotech A.B.; calibrated 12/7/2015 Tip and sleeve areas of 10 cm^2 and 150 cm^2 Ring friction reducer with O.D. of 1.875 in	Terracon 2401 Brentwood Rd Ste 107 Raleigh, NC	CPT Started: 4/25/2016 Rig: Pagani TG73-200 Project No.: R-5769	CPT Completed: 4/25/2016 Operator: JB

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT D2165034D_R5769_CPT-DMT.GPJ TERRACON2015.GDT 5/24/16

DMT LOG NO. D4

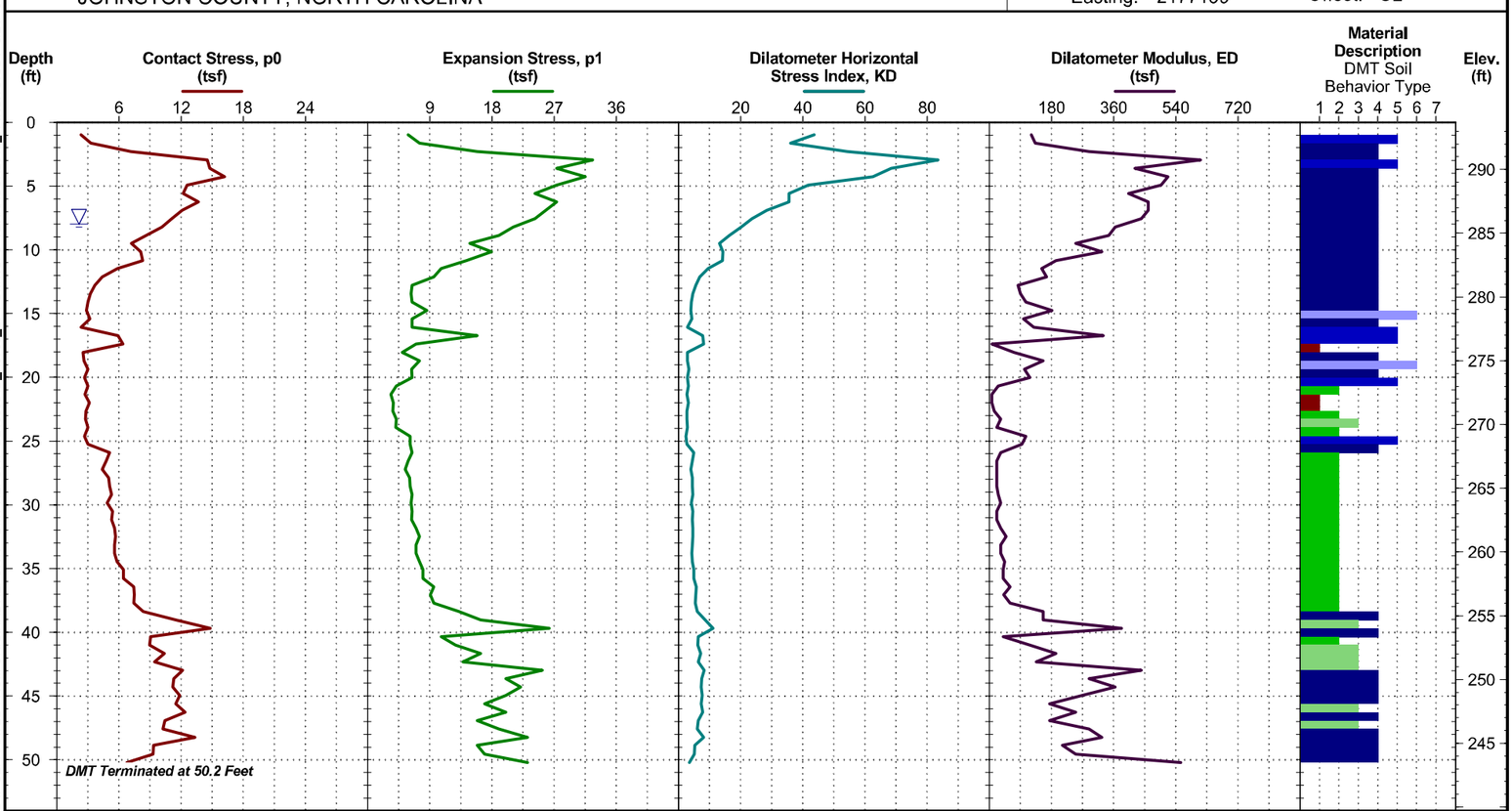
PROJECT: R-5769: NOVO NORDISK ACCESS ROAD

CLIENT: WETHERILL ENGINEERING RALEIGH, NORTH CAROLINA

TEST LOCATION: SEE ROADWAY INVENTORY

SITE: BETWEEN SR 1905 (GORDON ROAD) AND PROPOSED NOVO NORDISK FACILITY JOHNSTON COUNTY, NORTH CAROLINA

Surface Elev.: 293.7 ft
Northing: 678444
Easting: 2177159
Station: 31+50
Offset: CL



See Plan Sheets for explanation of symbols and abbreviations.
ELEVATION ESTIMATED FROM PROJECT .TIN FILE.

DMT specification reports available upon request.

1 Muck / peat
2 Clay
3 Silty clay
4 Clayey silt
5 Silt
6 Sandy silt
7 Silty sand
8 Sand

WATER LEVEL OBSERVATION				
▽ 8 ft measured water depth (used in normalizations and correlations)	Calibrations: ΔA - 0.2 bar; ΔB - 0.4 bar; Zm - 0 bar Blade no. 507	Terracon 2401 Brentwood Rd Ste 107 Raleigh, NC	DMT Started: 4/27/2016 Rig: Pagani TG73-200 Project No.: R-5769	DMT Completed: 4/27/2016 Operator: JB

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. DMT REPORT D2165034D_R5769_CPT-DMT.GPJ TERRACON2012_W INSITU.GDT 5/24/16

CPT LOG NO. C5

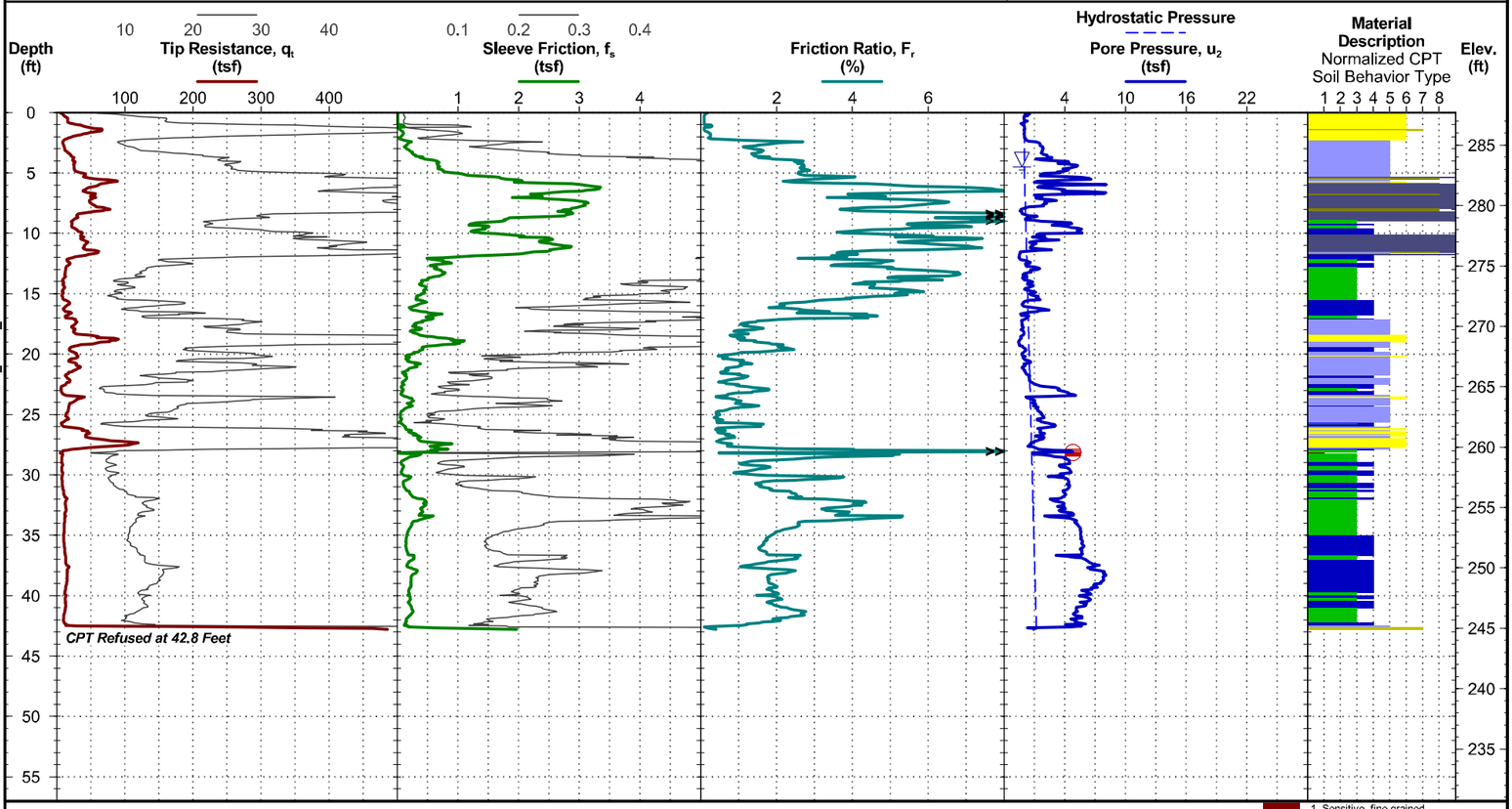
PROJECT: R-5769: NOVO NORDISK ACCESS ROAD

CLIENT: WETHERILL ENGINEERING RALEIGH, NORTH CAROLINA

TEST LOCATION: SEE ROADWAY INVENTORY

SITE: BETWEEN SR 1905 (GORDON ROAD) AND PROPOSED NOVO NORDISK FACILITY JOHNSTON COUNTY, NORTH CAROLINA

Surface Elev.: 287.7 ft
Northing: 678765
Easting: 2177397
Station: 35+50
Offset: CL



See Terracon's CPT General Notes for explanation of symbols and abbreviations.
ELEVATION ESTIMATED FROM PROJECT .TIN FILE.

CPT sensor calibration reports available upon request.

1 Sensitive, fine grained
2 Organic soils - clay
3 Clay - silty clay to clay
4 Silt mixtures - clayey silt to silty clay
5 Sand mixtures - silty sand to sandy silt
6 Sands - clean sand to silty sand
7 Gravelly sand to dense sand
8 Very stiff sand to clayey sand
9 Very stiff fine grained

WATER LEVEL OBSERVATION
▽ 4.5 ft measured water depth
(used in normalizations and correlations)

Probe no. 4526 with net area ratio of 0.83
U2 pore pressure transducer location
Manufactured by Geotech A.B.; calibrated 12/7/2015
Tip and sleeve areas of 10 cm^2 and 150 cm^2
Ring friction reducer with O.D. of 1.875 in

Terracon
2401 Brentwood Rd Ste 107
Raleigh, NC

CPT Started: 4/25/2016
CPT Completed: 4/25/2016
Rig: Pagani TG73-200
Operator: JB
Project No.: R-5769

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT D2165034D_R5769_CPT-DMT.GPJ TERRACON2015.GDT 5/24/16

DMT LOG NO. D5

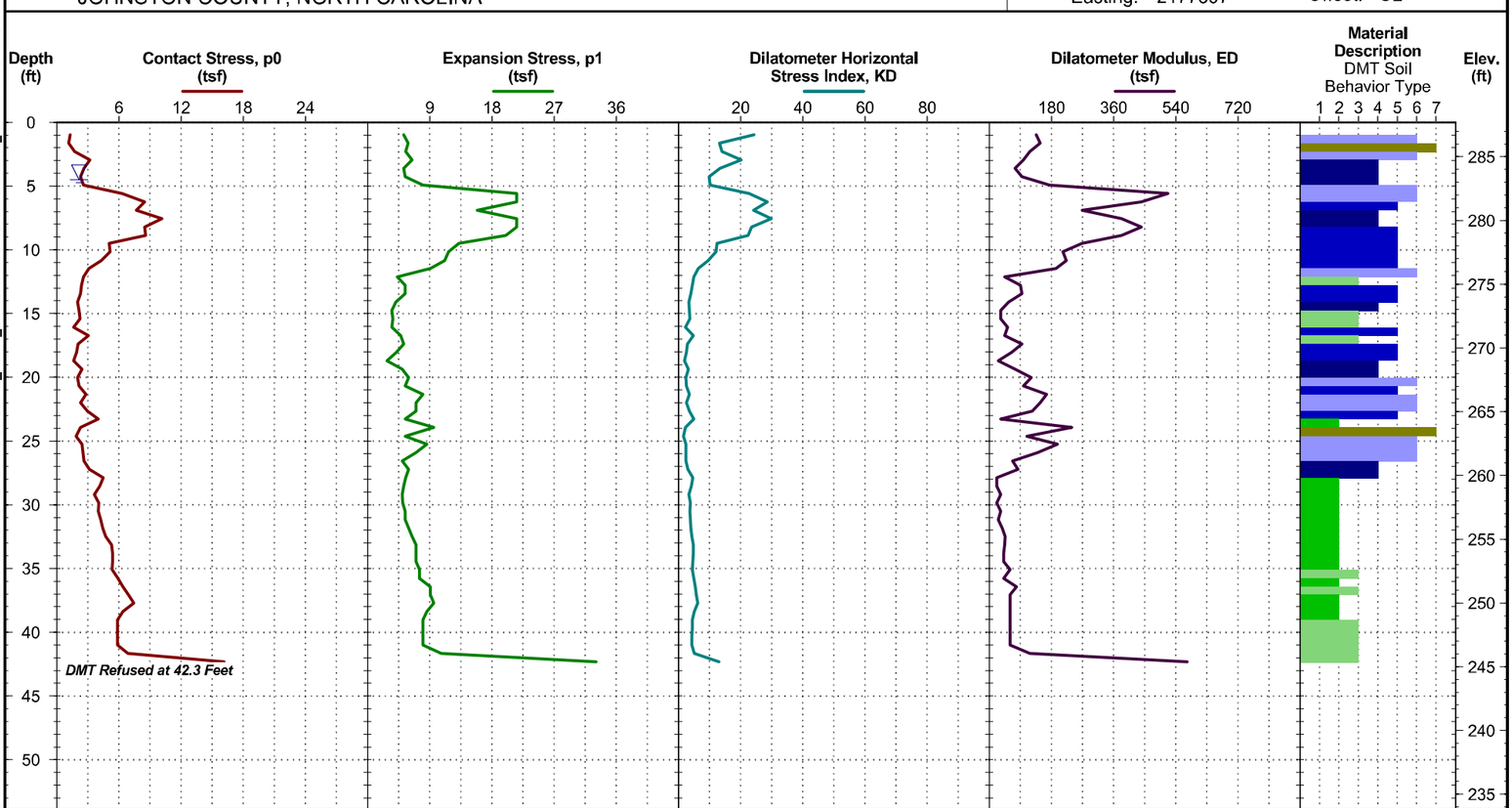
PROJECT: R-5769: NOVO NORDISK ACCESS ROAD

CLIENT: WETHERILL ENGINEERING RALEIGH, NORTH CAROLINA

TEST LOCATION: SEE ROADWAY INVENTORY

SITE: BETWEEN SR 1905 (GORDON ROAD) AND PROPOSED NOVO NORDISK FACILITY JOHNSTON COUNTY, NORTH CAROLINA

Surface Elev.: 287.7 ft
Northing: 678765
Easting: 2177397
Station: 35+50
Offset: CL



See Plan Sheets for explanation of symbols and abbreviations.
ELEVATION ESTIMATED FROM PROJECT .TIN FILE.

DMT specification reports available upon request.

1 Muck / peat
2 Clay
3 Silty clay
4 Clayey silt
5 Silt
6 Sandy silt
7 Silty sand
8 Sand

WATER LEVEL OBSERVATION
▽ 4.5 ft measured water depth
(used in normalizations and correlations)

Calibrations: ΔA - 0.2 bar; ΔB - 0.4 bar; Zm - 0 bar
Blade no. 507

Terracon
2401 Brentwood Rd Ste 107
Raleigh, NC

DMT Started: 4/27/2016
DMT Completed: 4/27/2016
Rig: Pagani TG73-200
Operator: JB
Project No.: R-5769

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. DMT REPORT D2165034D_R5769_CPT-DMT.GPJ TERRACON2012_W INSITU.GDT 5/24/16

CPT LOG NO. C6

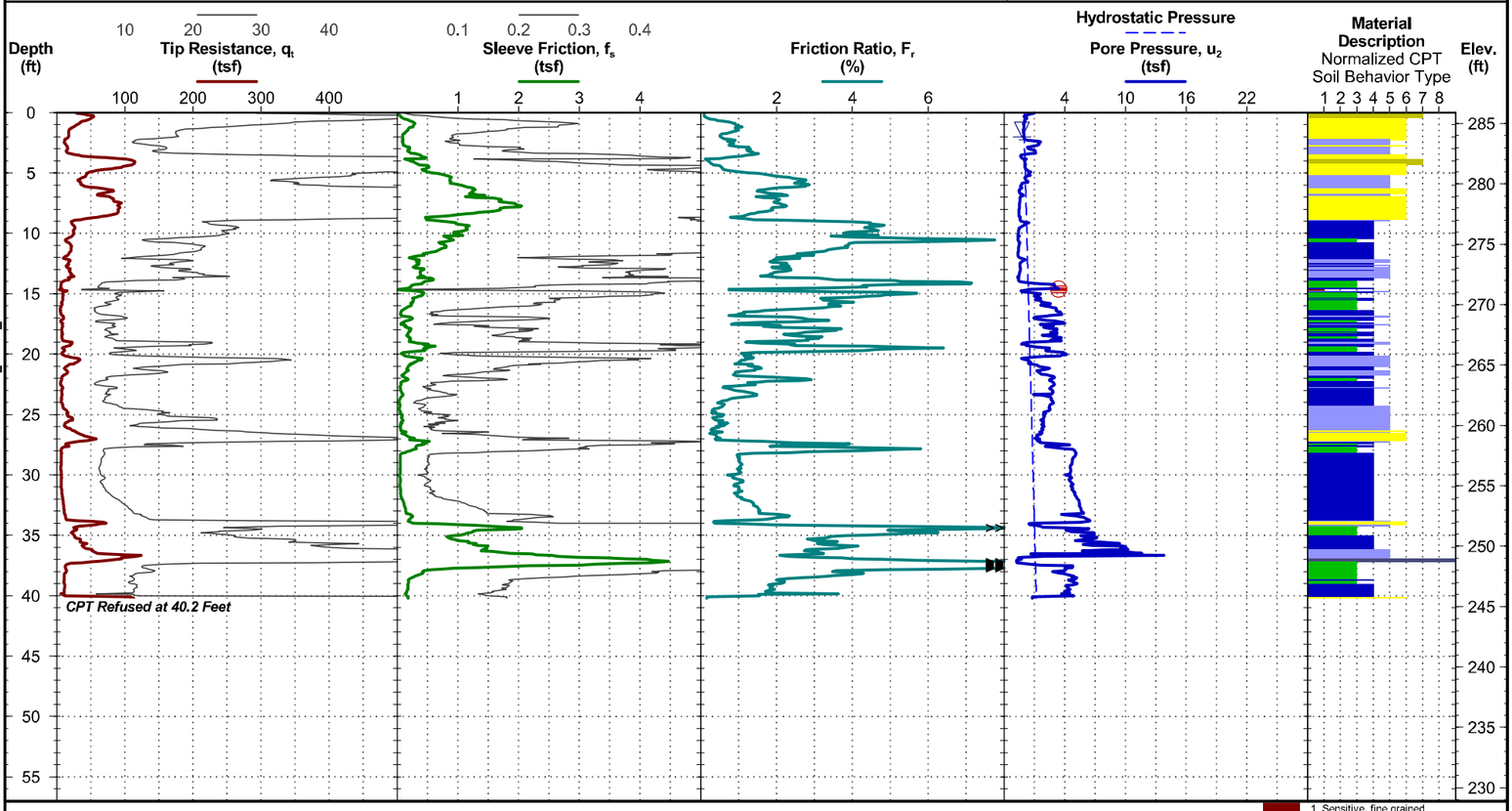
PROJECT: R-5769: NOVO NORDISK ACCESS ROAD

CLIENT: WETHERILL ENGINEERING RALEIGH, NORTH CAROLINA

TEST LOCATION: SEE ROADWAY INVENTORY

SITE: BETWEEN SR 1905 (GORDON ROAD) AND PROPOSED NOVO NORDISK FACILITY JOHNSTON COUNTY, NORTH CAROLINA

Surface Elev.: 285.9 ft
Northing: 678908
Easting: 2177535
Station: 37+50
Offset: CL



See Terracon's CPT General Notes for explanation of symbols and abbreviations.
ELEVATION ESTIMATED FROM PROJECT .TIN FILE.

CPT sensor calibration reports available upon request.

1 Sensitive, fine grained
2 Organic soils - clay
3 Clay - silty clay to clay
4 Silt mixtures - clayey silt to silty clay
5 Sand mixtures - silty sand to sandy silt
6 Sands - clean sand to silty sand
7 Gravelly sand to dense sand
8 Very stiff sand to clayey sand
9 Very stiff fine grained

WATER LEVEL OBSERVATION
▽ 2 ft measured water depth
(used in normalizations and correlations)

Probe no. 4526 with net area ratio of 0.83
U2 pore pressure transducer location
Manufactured by Geotech A.B.; calibrated 12/7/2015
Tip and sleeve areas of 10 cm^2 and 150 cm^2
Ring friction reducer with O.D. of 1.875 in

Terracon
2401 Brentwood Rd Ste 107
Raleigh, NC

CPT Started: 4/25/2016
CPT Completed: 4/25/2016
Rig: Pagani TG73-200
Operator: JB
Project No.: R-5769

DMT LOG NO. D6

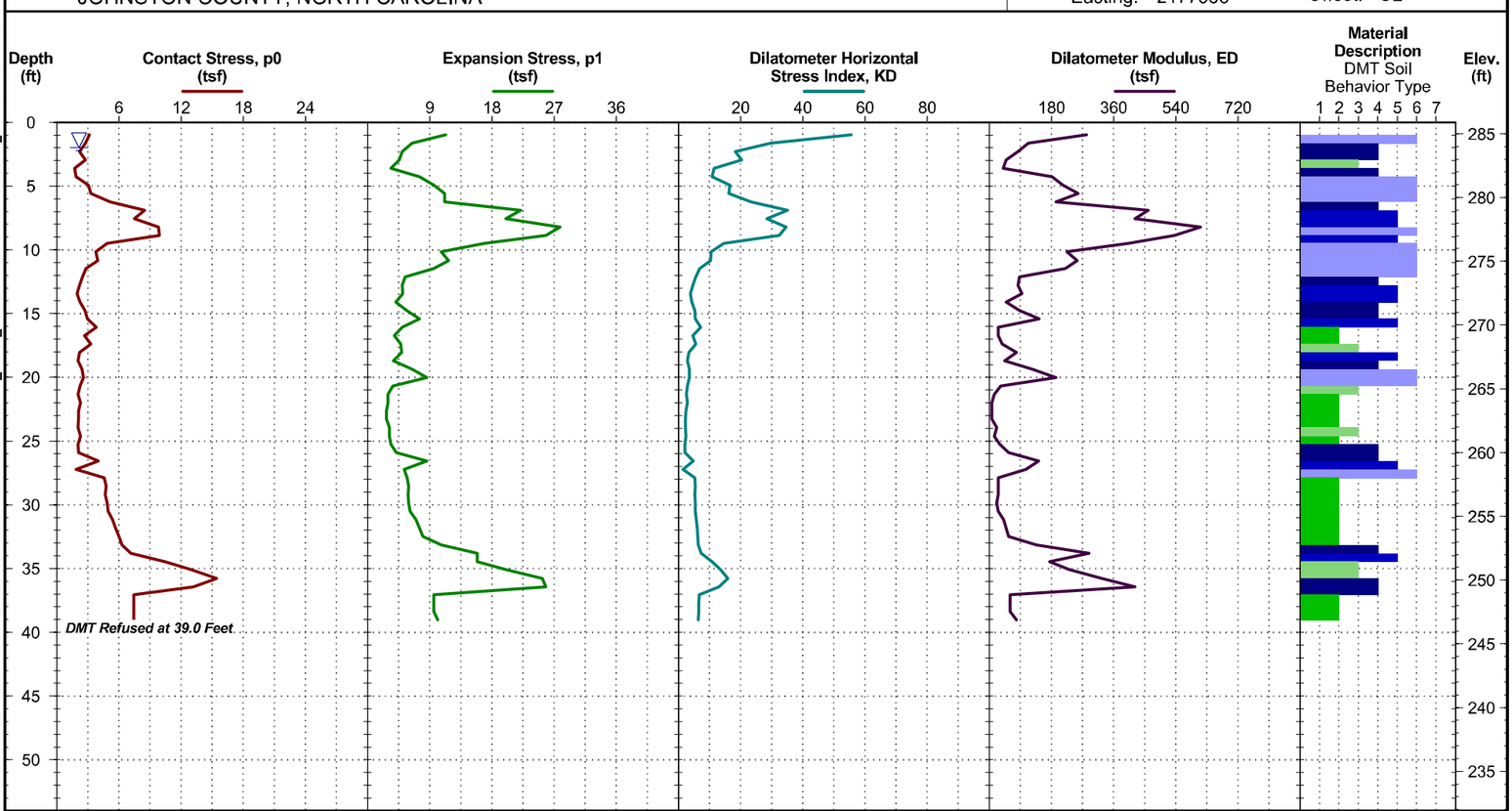
PROJECT: R-5769: NOVO NORDISK ACCESS ROAD

CLIENT: WETHERILL ENGINEERING RALEIGH, NORTH CAROLINA

TEST LOCATION: SEE ROADWAY INVENTORY

SITE: BETWEEN SR 1905 (GORDON ROAD) AND PROPOSED NOVO NORDISK FACILITY JOHNSTON COUNTY, NORTH CAROLINA

Surface Elev.: 285.9 ft
Northing: 678908
Easting: 2177535
Station: 37+50
Offset: CL



See Plan Sheets for explanation of symbols and abbreviations.
ELEVATION ESTIMATED FROM PROJECT .TIN FILE.

DMT specification reports available upon request.

1 Muck / peat
2 Clay
3 Silty clay
4 Clayey silt
5 Silt
6 Sandy silt
7 Silty sand
8 Sand

WATER LEVEL OBSERVATION
▽ 2 ft measured water depth
(used in normalizations and correlations)

Calibrations: ΔA - 0.2 bar; ΔB - 0.4 bar; Zm - 0 bar
Blade no. 507

Terracon
2401 Brentwood Rd Ste 107
Raleigh, NC

DMT Started: 4/27/2016
DMT Completed: 4/27/2016
Rig: Pagani TG73-200
Operator: JB
Project No.: R-5769

PROJECT REFERENCE NO.	SHEET NO.
R–5769	26

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

APPENDIX B
SOIL LABORATORY RESULTS

REFERENCE: R–5769

PROJECT: N/A

Terracon
Consulting Engineers & Scientists
2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873–2211 FAX: (919) 873–9555
NC REGISTERED FIRM: F–0869

INITIALS DATE

SOIL LABORATORY TESTING SUMMARY

PROJECT NUMBER: N/A **ID (TIP):** R-5769 **COUNTY:** JOHNSTON

DESCRIPTION: NOVO NORDISK ACCESS ROAD FROM SR 1905 (GORDON ROAD) TO PROPOSED NOVO NORDISK FACILITY

Boring No.	Sample No.	Alignment	Station	Offset (feet)	Depth Interval (feet)	AASHTO Class.	L.L.	P.I.	% by Weight				% Retained #4 Sieve	% Passing (sieves)			% Moisture	% Organic
									Coarse Sand	Fine Sand	Silt	Clay		#10	#40	#200		
Y1REV_1753	S-1	-Y1REV-	17+53	CL	1.0 - 2.0	A-7-6 (7)	43	28	34.9	22.4	5.8	36.9	1	96	74	44	19.6	-
Y1REV_2154	S-2	-Y1REV-	21+00	9 LT	1.0 - 2.0	A-7-6 (8)	48	26	23.7	26.1	7.7	42.5	10	83	69	46	17.1	-
L_1300	S-3	-L-	13+00	CL	1.0 - 6.0	A-7-6 (7)	47	23	35.1	18.9	4.8	41.2	0	98	76	47	-	-
L_4300	S-4	-L-	43+00	CL	1.0 - 6.0	A-2-6 (1)	34	20	48.7	21.0	2.6	27.7	2	94	65	30	-	-
L_1700	SS-1	-L-	17+00	CL	3.5 - 5.0	A-2-6 (0)	39	23	53.7	15.3	4.6	26.4	15	73	43	24	10.6	-
L_1700	SS-2	-L-	17+00	CL	6.0 - 7.5	A-2-7 (0)	54	36	40.2	19.4	5.2	35.2	35	57	41	24	11.7	-
L_2700	SS-3	-L-	27+00	CL	1.0 - 2.5	A-6 (4)	35	11	21.8	26.7	27.1	24.4	0	99	86	58	34.5	8.0
L_2700	SS-4	-L-	27+00	CL	13.5 - 15.0	A-2-7 (0)	51	33	66.4	7.8	1.6	24.2	10	81	36	22	21.9	-
L_2700	SS-5	-L-	27+00	CL	23.5 - 25.0	A-2-6 (0)	25	14	68.2	13.4	2.0	16.4	43	41	21	8	14.7	-
L_2900	SS-6	-L-	29+00	CL	8.5 - 10.0	A-2-7 (2)	71	50	63.3	8.5	0.9	27.3	1	94	42	27	20.3	-
L_3100	SS-7	-L-	31+00	CL	6.0 - 7.5	A-7-6 (9)	55	36	46.5	12.5	2.5	38.5	0	100	77	42	24.4	-
L_3100	SS-8	-L-	31+00	CL	28.5 - 30.0	A-7-6 (8)	42	19	0.5	58.3	9.8	31.4	0	100	100	55	40.9	-
EB1-A	SS-9	-L-	32+26	17 LT	38.5 - 40.0	A-7-6 (12)	44	18	0.6	47.5	17.6	34.3	0	100	100	68	44.5	-
EB1-B	SS-10	-L-	32+26	17 RT	8.5 - 10.0	A-7-6 (13)	56	38	29.6	24.7	5.0	40.7	0	100	82	49	22.4	-
EB1-B	SS-11	-L-	32+26	17 RT	18.5 - 20.0	A-2-7 (2)	62	45	64.9	8.6	0.3	26.2	1	97	52	27	28.4	-
EB2-A	SS-12	-L-	34+27	17 LT	33.5 - 35.0	A-7-6 (7)	43	21	0.8	61.3	9.8	28.1	0	100	100	49	46.1	-
EB2-B	SS-13	-L-	34+27	17 RT	6.0 - 7.5	A-7-6 (12)	79	54	54.8	5.9	0.5	38.8	1	96	50	39	20.5	-
EB2-B	SS-14	-L-	34+27	17 RT	23.5 - 25.0	A-2-7 (1)	51	38	63.8	8.6	2.0	25.6	2	93	43	27	29.8	-
L_3500	SS-15	-L-	35+00	CL	23.5 - 25.0	A-2-6 (0)	34	22	51.6	22.2	1.0	25.2	13	81	54	23	25.0	-
L_3500	SS-16	-L-	35+00	CL	38.5 - 40.0	A-7-6 (28)	54	38	3.5	34.2	35.2	27.1	2	96	93	76	42.1	-
L_3700	SS-17	-L-	37+00	CL	18.5 - 20.0	A-6 (7)	38	26	25.8	32.8	8.6	32.8	2	97	86	45	30.5	-
L_3900	SS-18	-L-	39+00	CL	13.5 - 15.0	A-2-7 (0)	72	56	77.8	4.2	0.3	17.7	0	99	31	18	30.6	-
L_4100	SS-19	-L-	41+00	CL	1.0 - 2.5	A-6 (3)	33	18	31.6	28.8	6.6	33.0	0	99	87	41	20.4	-
L1_1400	SS-20	-L-	14+00	CL	1.0 - 2.0	A-6 (3)	34	20	41.1	21.9	6.5	30.5	2	95	71	37	25.6	-
EB2-A	ST-1	-L-	34+27	17 LT	33.5 - 36.0	A-7-6 (7)	42	17	0.2	57.2	16.4	26.2	0	100	100	55	-	-

ST-1 TESTED BY GEOTECHNICS

Terracon
Consulting Engineers & Scientists

Stephanie H. Huffman
Certified Lab Technician Signature

114-01-1203
Certification Number