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

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

ROADWAY SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 33713.1.2 (B-4463) F.A. PROJ. STP-0032(8)

COUNTY CHOWAN

PROJECT DESCRIPTION BRIDGE NO. 12 ON -L- (NC 32) OVER QUEEN ANNE CREEK

INVENTORY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4463	1	18

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33713.1.2	STP-0032(8)	P.E.
33713.2.1	STP-0032(8)	R.W. & UTILITY
33713.3.1	BRSTP-0032(8)	CONST.

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) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

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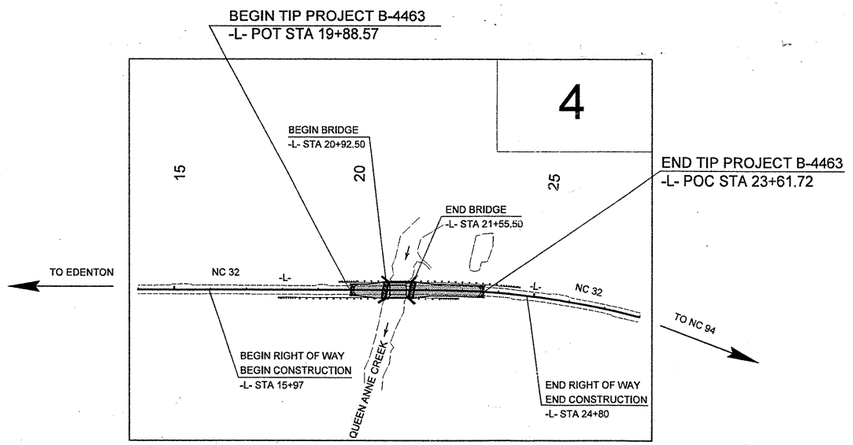


PERSONNEL

CMW

SCD

JRS

RES

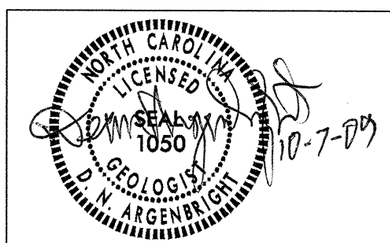
JME

INVESTIGATED BY C.M. WRIKE

CHECKED BY D.N. ARGENBRIGHT

SUBMITTED BY D.N. ARGENBRIGHT

DATE OCTOBER 2009



DRAWN BY: C.R. SUMNER, C.M. WRIKE

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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.

ID: B-4463

CONTRACT: C202659

PROJECT REFERENCE NO.	SHEET NO.
B-4463	2 OF 18

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 THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. 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	6 MX		NP		40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PLASTIC INDEX					10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
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

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	<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 0.50
	MEDIUM STIFF	4 TO 8	0.5 TO 1.0
	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	2.00	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
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, 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.
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 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 WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

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

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%
MODERATELY ORGANIC	5 - 10%	12 - 20%
HIGHLY ORGANIC	>10%	>20%

OTHER MATERIAL	
TRACE	1 - 10%
LITTLE	10 - 20%
SOME	20 - 35%
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
- SOUNDING ROD
- SPT CPT DPT DMT VST PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- SPT N-VALUE
- REF — SPT REFUSAL

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

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

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] MOBILE B-__
- [ ] BK-51
- [ ] CME-45C
- [ ] CME-750
- [ ] PORTABLE HOIST
- [X] CME-45B
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [ ] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [X] W/ ADVANCER
- [X] TRICONE 2 15/16 " STEEL TEETH
- [ ] TRICONE ____ " TUNG.-CARB.
- [ ] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

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

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

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF 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 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, 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 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 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 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, 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: _

_ ELEVATION: _ FT.

NOTES:
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APPROXIMATE LIMITS OF SURFICIAL ORGANIC DEPOSITS

REVISED 02/23/06

See Sheet 1-A For Index of Sheets

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4463	2A	18

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33713.1.2	STP-0032(8)	P.E.

TIP PROJECT: B-4463

25% REVIEW PLANS

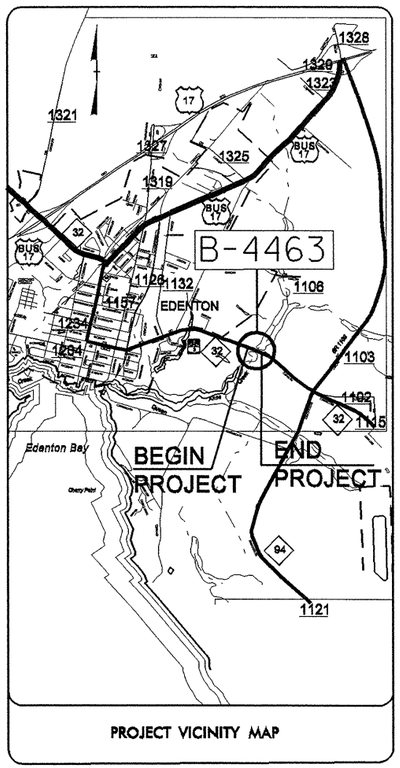
CONTRACT:

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

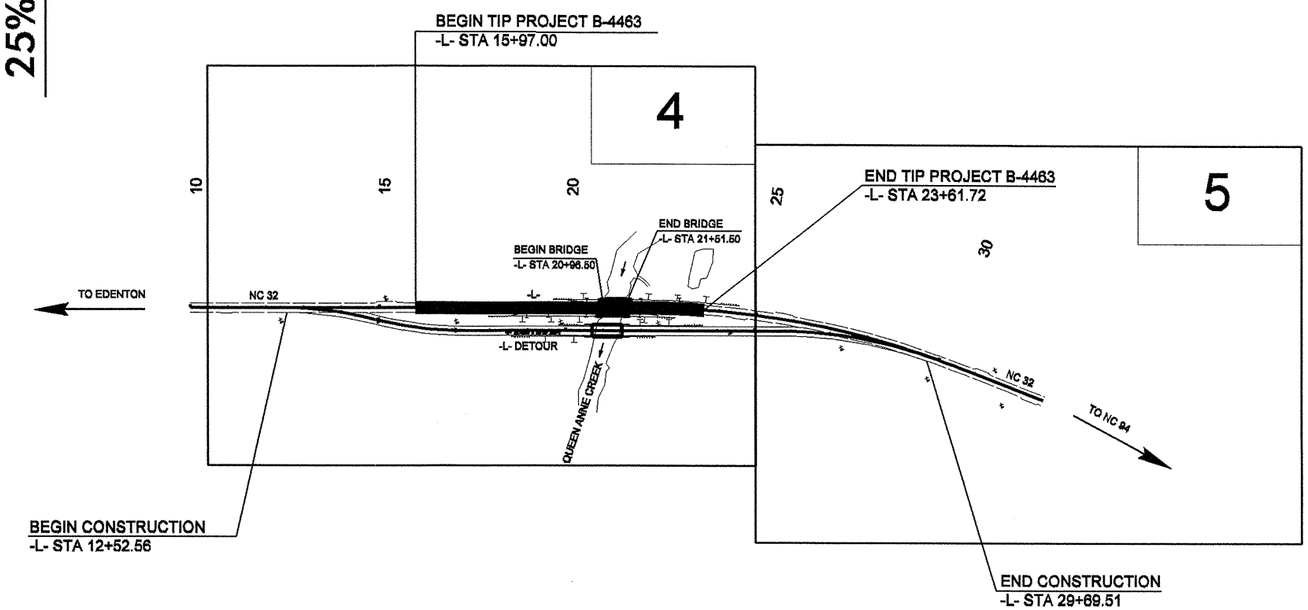
CHOWAN COUNTY

LOCATION: BRIDGE NO. 12 ON NC 32. OVER QUEEN ANNE CREEK

TYPE OF WORK: GRADING, PAVING, DRAINAGE, AND STRUCTURE



PROJECT VICINITY MAP



NC GRID
NAD 83/95

-THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES

-CLEARING ON THIS PROJECT SHALL BE TO THE LIMITS ESTABLISHED BY METHOD____

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

NCDOT Contact: Cathy S. Houser, PE
Roadway Design–Engineering Coordination

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 2011 = 6280
ADT 2030 = 9200
DHV = 10 %
D = 60 %
T = 5% (TTST 2%, DUAL 3%)
V = 60 MPH

FUNC CLASS = MAJOR COLLECTOR

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4463	=	0.135 MILE
LENGTH STRUCTURE TIP PROJECT B-4463	=	0.010 MILE
TOTAL LENGTH TIP PROJECT B-4463	=	0.145 MILE

Prepared In the Office of
DYER, RIDDLE, MILLS & PRECOURT, INC. (DRMP)
7506 EAST INDEPENDENCE BLVD., SUITE 105
CHARLOTTE, NORTH CAROLINA 28227
(704) 332-2289

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: JANUARY 15, 2010

LETTING DATE: JANUARY 18, 2011

Ronald C. Smith, PE
PROJECT ENGINEER

A. Matthew Thigpen, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE:

ROADWAY DESIGN ENGINEER

P.E.
SIGNATURE:

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA

P.E.
STATE HIGHWAY DESIGN ENGINEER

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PERDUE
GOVERNOR

EUGENE A. CONTI, JR.
SECRETARY

October 7, 2009

STATE PROJECT: 33713.1.2 (B-4463)
F.A. PROJECT: STP-0032 (4)
COUNTY: Chowan
DESCRIPTION: Bridge No. 12 on NC 32 over Queen Anne Creek

SUBJECT: Geotechnical Report – Inventory

Project Description

The proposed project is located in Chowan County along NC 32 at the existing Queen Anne Creek crossing approximately 2 miles east of Edenton. Based on the current plans, proposed construction consists of minor widening of NC 32 and construction of an on-site detour to the south to accommodate bridge replacement.

Standard penetration test (SPT) and hand auger borings were performed at various offset locations from -L- and –L-DETOUR- alignments. SPT borings were completed with an ATV mounted CME-45B drill machine and advanced by rotary drill methods using bentonite drilling fluid. Representative samples were collected for visual classification in the field and submitted for laboratory analysis by the Materials and Tests Unit. Vane sheer tests were performed in soft organic deposits. Also, Shelby tubes were collected in the soft organic deposits.

The investigation of subsurface conditions was confined to areas of proposed construction and included the following alignments. Profiles and selected cross sections will be submitted with this project.

Alignment	Station
-L-	12+52 to 29+69
-L-DETOUR-	12+52 to 29+67

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT
1589 MAIL SERVICE CENTER
RALEIGH NC 27699-1589

TELEPHONE: 919-250-4088
FAX: 919-250-4237

WEBSITE: WWW.NCDOT.GOV/DOH

LOCATION:
CENTURY CENTER COMPLEX
ENTRANCE B-2
1020 BIRCH RIDGE DRIVE
RALEIGH NC

Physiography and Geology

The project is located in Chowan County within the Coastal Plain Physiographic Province. This area is underlain by roadway embankment, alluvial sediments, undivided coastal plain soils, and the Yorktown Formation. Topography along the project is flat to gradually sloping. Ground elevations range from -6± feet below sea level along the channel bed of Queen Anne Creek to 13± feet above sea level along the existing NC 32 roadway embankment. Surface water along the project flows directly into Queen Anne Creek.

Ground Water

Ground water data was collected during February and March 2009, during which period the area experienced normal precipitation conditions. Ground water elevations were found to be from at mean sea level to 3± feet above mean sea level. The project area is subject to wind-driven tidal fluctuations.

Soils

Soils encountered during this investigation are separated into 4 categories: roadway embankment, undivided coastal plain soils, alluvial soils, and the Yorktown Formation soils.

Roadway embankment soils are made up of 1.5± feet to 6.5± feet of loose tan gray silty sand (A-2-4).

Undivided coastal plain soils consist of 2.5± feet to 6.6± feet of medium stiff to stiff tan sandy silt (A-4), underlain by loose gray silty sand (A-2-4).

Alluvial soils in the flood plain consist of 2.0± feet to 15.0± feet of soft brown muck (A-5), 8.0± feet to 15.0± feet of soft brown moderately organic sandy silt (A-4), and 1.5± feet of loose dark brown moderately organic silty sand (A-2-4). These deposits are underlain by loose to dense gray sand (A-2-4, A-3). Laboratory analysis of representative samples collected within the organic deposits returned a natural moisture content of 24.0 percent to 42.0 percent. The representative samples returned an organic content of 9.0 percent to 24.0 percent. The Vane Shear tests range from 0 to 1378 psf.

The Yorktown Formation soils are made up of silty sand (A-2-4), sandy silt (A-4), and sandy silty clay (A-6, A-7-6). Shell fragments are typically found in this formation. The Yorktown Formation is encountered at -30± feet to -35± feet below sea level.

Undisturbed Samples

Undisturbed thin wall Shelby tube samples were collected at the following locations and submitted for testing.

Sample No.	Station	Depth	Test
ST-1	-L- Sta. 19+50 45' RT	0.0'-2.0'	Consolidation, Triaxial
ST-2	-L- Sta. 22+75 58' RT	0.0'-2.0'	Consolidation, Triaxial

Prepared by,

Cynthea Wrike

Cynthea Wrike
Engineering Geologist

EARTHWORK BALANCE SHEET

Volumes in Cubic Yards

38 of 18

PROJECT B-4463 COUNTY Chowan DATE 2-Apr-10 COMPILED BY: Garrett McCaffety SHEET 1 OF 1 SHEETS

STATION	STATION	EXCAVATION					EMBANKMENT				BORROW	WASTE			
		TOTAL UNCLASS.	ROCK	UNDERCUT	UNSUIT. UNCLASS.	SUITABLE UNCLASS.	TOTAL	ROCK	EARTH	EMBANK. +30%		ROCK	SUITABLE	UNSUIT.	TOTAL
-L- 17+71.27	20+92.50 (BEG. BRIDGE)	15				15	219		219	286	271				
	SUBTOTAL	15				15	219		219	286	271				
-L- 21+55.50 (END BRIDGE)	23+61.72	18				18	186		186	241	223				
	SUBTOTAL	18				18	186		186	241	223				
	SUBTOTAL														
	SUBTOTAL														
	SUBTOTAL														
TOTAL		33				33	405		405	527	494				
MATERIAL FOR SHOULDER CONSTRUCTION															
LOSS DUE TO CLEARING & GRUBBING															
ADDITIONAL UNDERCUT															
ROCK WASTE TO REPLACE BORROW															
ADJUST FOR ROCK WASTE															
WASTE IN LIEU OF BORROW															
PROJECT TOTAL		33				33	405		405	527	494				
EST. 5% TO REPLACE TOP SOIL ON BORROW PIT											25				
GRAND TOTAL		33				33	405		405	527	519				
SAY		40				40					520				
Per Geotech Recommendation				400											

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.

8/17/99

REVISIONS

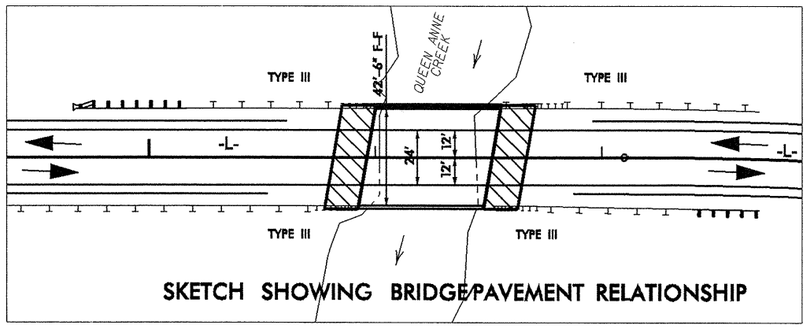
PROJECT REFERENCE NO.	SHEET NO.
B-4463	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

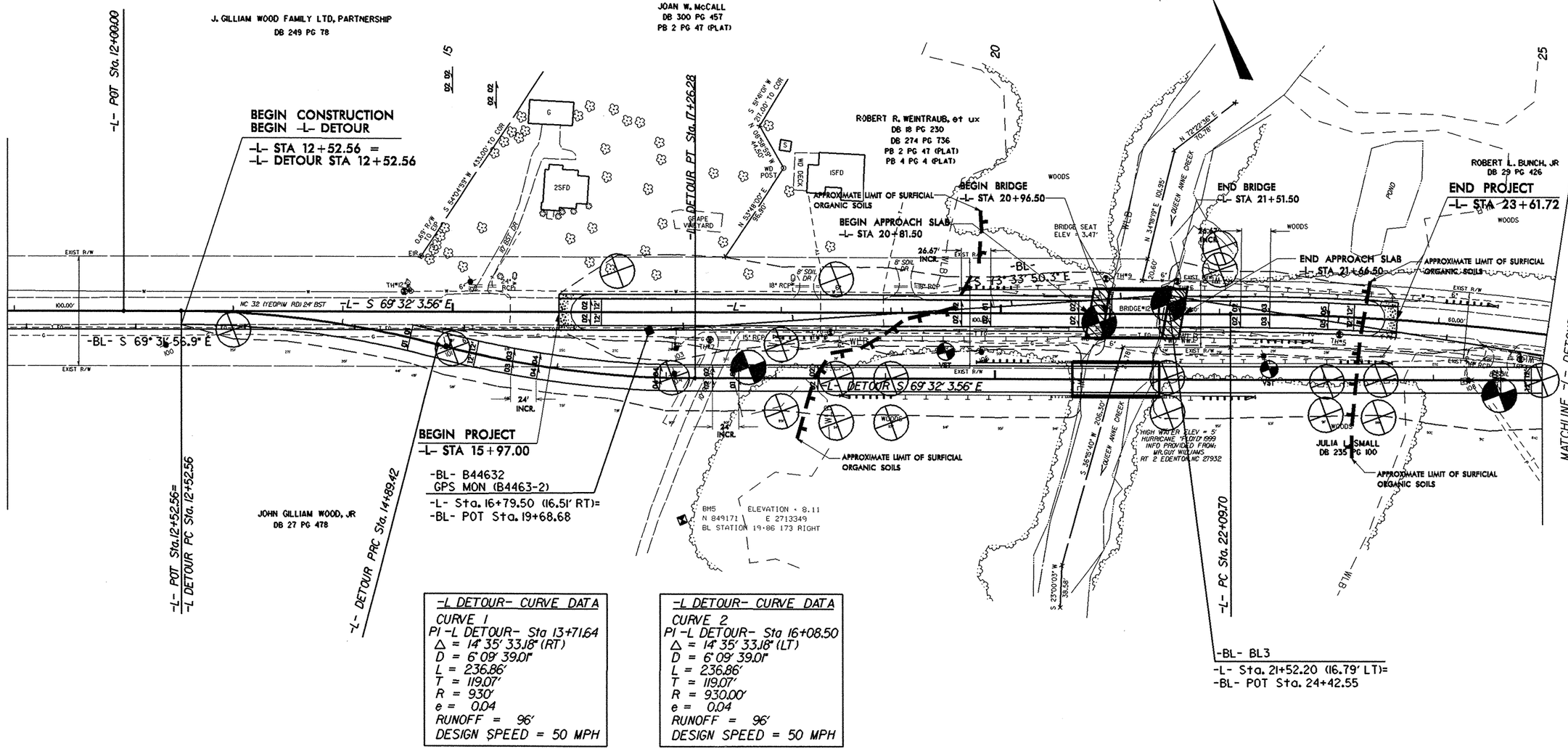
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DRMP ENGINEERS • PLANNERS • SCIENTISTS
DYER, RIDDLE, MILLS & PRECOURT, INC.
7506 EAST INDEPENDENCE BLVD., SUITE 105
CHARLOTTE, NORTH CAROLINA 28227
(704) 332-2289

MA Engineering CONSULTANTS, INC.



SKETCH SHOWING BRIDGE/PAVEMENT RELATIONSHIP



-L DETOUR- CURVE DATA
CURVE 1
PI -L DETOUR- Sta 13+71.64
Δ = 14° 35' 33.18" (RT)
D = 6° 09' 39.01"
L = 236.86'
T = 119.07'
R = 930'
e = 0.04
RUNOFF = 96'
DESIGN SPEED = 50 MPH

-L DETOUR- CURVE DATA
CURVE 2
PI -L DETOUR- Sta 16+08.50
Δ = 14° 35' 33.18" (LT)
D = 6° 09' 39.01"
L = 236.86'
T = 119.07'
R = 930.00'
e = 0.04
RUNOFF = 96'
DESIGN SPEED = 50 MPH

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PROJECT REFERENCE NO.	SHEET NO.
B-4463	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DRMP ENGINEERS • PLANNERS • SCIENTISTS
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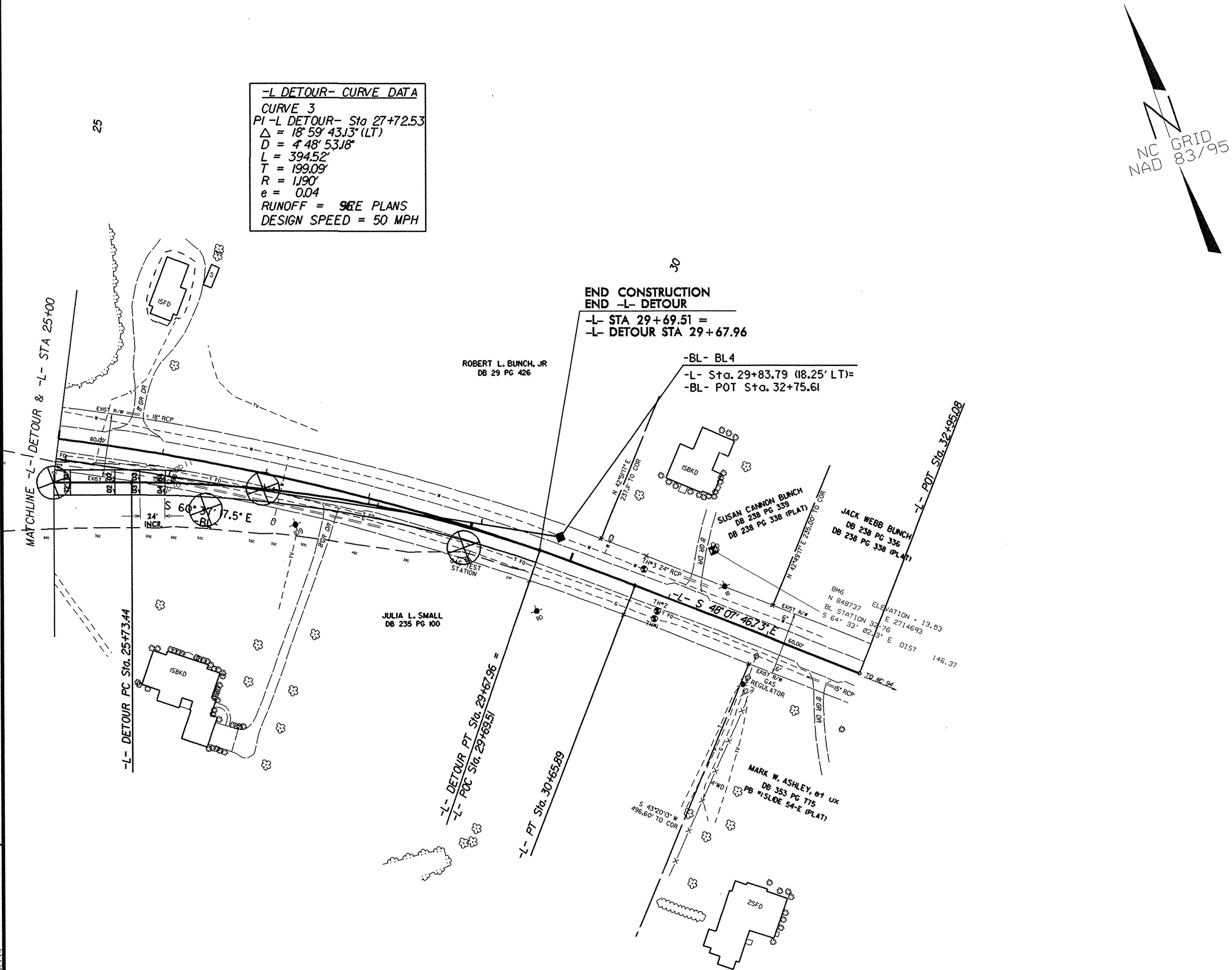
7506 EAST INDEPENDENCE BLVD., SUITE 105
CHARLOTTE, NORTH CAROLINA 28227
(704) 332-2289

MA Engineering CONSULTANTS, INC.



-L DETOUR- CURVE DATA
CURVE 3
PI -L DETOUR- Sta 27+72.53
Δ = 18° 59' 43.13" (LT)
D = 4° 48' 53.18"
L = 394.52'
T = 199.09'
R = 1190'
e = 0.04
RUNOFF = SEE PLANS
DESIGN SPEED = 50 MPH
NC GRID
NAD 83/95
25
30
END CONSTRUCTION
END -L- DETOUR
-L- STA 29+69.51 =
-L- DETOUR STA 29+67.96
-BL- BL4
-L- Sta. 29+83.79 (18.25' LT)=
-BL- POT Sta. 32+75.61
ROBERT L. BUNCH, JR
DB 29 PG 426
MATCHLINE -L- DETOUR & -L- STA 25+00
S 60° 37' 7.5" E
24' INCR.
JULIA L. SMALL
DB 235 PG 100
SUSAN CANNON BUNCH
DB 238 PG 339
DB 238 PG 338 (PLAT)
JACK WEBB BUNCH
DB 238 PG 336
DB 238 PG 338 (PLAT)
-L- POT Sta. 32+95.08
-L- S 46° 07' 46.73" E
BM6
N 848737 E 2714693
ELEVATION = 13.53
BL STATION 33+76
S 64° 33' 02.13" E DIST 146.37
TO NC 94
GAS REGULATOR
GAS TEST STATION
MARK W. ASHLEY, et ux
DB 353 PG 775
PB #SLIDE 54-E (PLAT)
S 43°20'13" W
496.60' TO COR
-L- DETOUR PC Sta. 25+73.44
-L- DETOUR PT Sta. 29+67.96 =
-L- POC Sta. 29+69.51
-L- PT Sta. 30+65.89
1SFD
1SBKD
2SFD

REVISIONS

8/17/99

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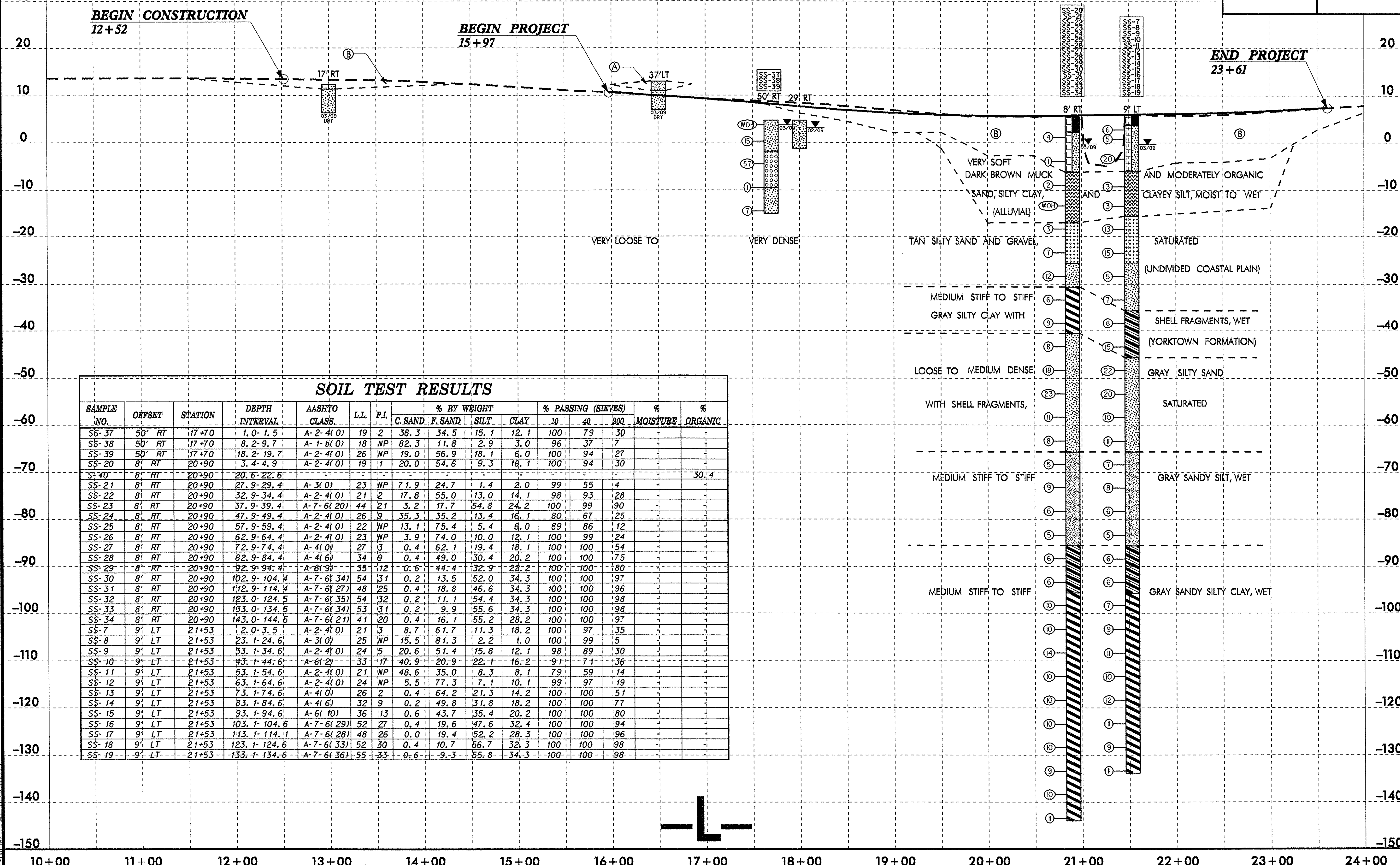
PROJECT REFERENCE NO.	SHEET NO.
B-4463	6
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Ⓐ STIFF TAN SANDY SILT, MOIST (UNDIVIDED COASTAL PLAIN)
Ⓑ LOOSE TAN SILTY SAND, MOIST TO SATURATED (ROADWAY EMBANKMENT)



SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-37	50' RT	17+70	1.0-1.5	A-2-4(0)	19	2	38.3	34.5	15.1	12.1	100	79	30	-	-
SS-38	50' RT	17+70	8.2-9.7	A-1-b(0)	18	NP	82.3	11.8	2.9	3.0	96	37	7	-	-
SS-39	50' RT	17+70	18.2-19.7	A-2-4(0)	26	NP	19.0	56.9	18.1	6.0	100	94	27	-	-
SS-20	8' RT	20+90	3.4-4.9	A-2-4(0)	19	1	20.0	54.6	9.3	16.1	100	94	30	-	-
S-40	8' RT	20+90	20.6-22.6	-	-	-	-	-	-	-	-	-	-	-	30.4
SS-21	8' RT	20+90	27.9-29.4	A-3(0)	23	NP	71.9	24.7	1.4	2.0	99	55	4	-	-
SS-22	8' RT	20+90	32.9-34.4	A-2-4(0)	21	2	17.8	55.0	13.0	14.1	98	93	28	-	-
SS-23	8' RT	20+90	37.9-39.4	A-7-6(20)	44	21	3.2	17.7	54.8	24.2	100	99	90	-	-
SS-24	8' RT	20+90	47.9-49.4	A-2-4(0)	26	9	35.3	35.2	13.4	16.1	80	67	25	-	-
SS-25	8' RT	20+90	57.9-59.4	A-2-4(0)	22	NP	13.1	75.4	5.4	6.0	89	86	12	-	-
SS-26	8' RT	20+90	62.9-64.4	A-2-4(0)	23	NP	3.9	74.0	10.0	12.1	100	99	24	-	-
SS-27	8' RT	20+90	72.9-74.4	A-4(0)	27	3	0.4	62.1	19.4	18.1	100	100	54	-	-
SS-28	8' RT	20+90	82.9-84.4	A-4(6)	34	9	0.4	49.0	30.4	20.2	100	100	75	-	-
SS-29	8' RT	20+90	92.9-94.4	A-6(9)	35	12	0.6	44.4	32.9	22.2	100	100	80	-	-
SS-30	8' RT	20+90	102.9-104.4	A-7-6(34)	54	31	0.2	13.5	52.0	34.3	100	100	97	-	-
SS-31	8' RT	20+90	112.9-114.4	A-7-6(27)	48	25	0.4	18.8	46.6	34.3	100	100	96	-	-
SS-32	8' RT	20+90	123.0-124.5	A-7-6(35)	54	32	0.2	11.1	54.4	34.3	100	100	98	-	-
SS-33	8' RT	20+90	133.0-134.5	A-7-6(34)	53	31	0.2	9.9	55.6	34.3	100	100	98	-	-
SS-34	8' RT	20+90	143.0-144.5	A-7-6(21)	41	20	0.4	16.1	55.2	28.2	100	100	97	-	-
SS-7	9' LT	21+53	2.0-3.5	A-2-4(0)	21	3	8.7	61.7	11.3	18.2	100	97	35	-	-
SS-8	9' LT	21+53	23.1-24.6	A-3(0)	25	NP	15.5	81.3	2.2	1.0	100	99	5	-	-
SS-9	9' LT	21+53	33.1-34.6	A-2-4(0)	24	5	20.6	51.4	15.8	12.1	98	89	30	-	-
SS-10	9' LT	21+53	43.1-44.6	A-6(2)	33	17	40.9	20.9	22.1	16.2	91	71	36	-	-
SS-11	9' LT	21+53	53.1-54.6	A-2-4(0)	21	NP	48.6	35.0	8.3	8.1	79	59	14	-	-
SS-12	9' LT	21+53	63.1-64.6	A-2-4(0)	24	NP	5.5	77.3	7.1	10.1	99	97	19	-	-
SS-13	9' LT	21+53	73.1-74.6	A-4(0)	26	2	0.4	64.2	21.3	14.2	100	100	51	-	-
SS-14	9' LT	21+53	83.1-84.6	A-4(6)	32	9	0.2	49.8	31.8	18.2	100	100	77	-	-
SS-15	9' LT	21+53	93.1-94.6	A-6(10)	36	13	0.6	43.7	35.4	20.2	100	100	80	-	-
SS-16	9' LT	21+53	103.1-104.6	A-7-6(29)	52	27	0.4	19.6	47.6	32.4	100	100	94	-	-
SS-17	9' LT	21+53	113.1-114.1	A-7-6(28)	48	26	0.0	19.4	52.2	28.3	100	100	96	-	-
SS-18	9' LT	21+53	123.1-124.6	A-7-6(33)	52	30	0.4	10.7	56.7	32.3	100	100	98	-	-
SS-19	9' LT	21+53	133.1-134.6	A-7-6(36)	55	33	0.6	9.3	55.8	34.3	100	100	98	-	-

5/14/99
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5/14/99

PROJECT REFERENCE NO.	SHEET NO.
B-4463	7
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

Ⓐ LOOSE TAN SILTY SAND, MOIST TO SATURATED (ROADWAY EMBANKMENT)

40
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150

END CONSTRUCTION
29+67

Ⓐ

42' RT
03709
DRT

15' RT
03709
DRT

20' RT
03709
DRT

LOOSE TAN SAND, MOIST TO SATURATED (UNDIVIDED COASTAL PLAIN)

24+00 25+00 26+00 27+00 28+00 29+00 30+00 31+00 32+00

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5/14/99

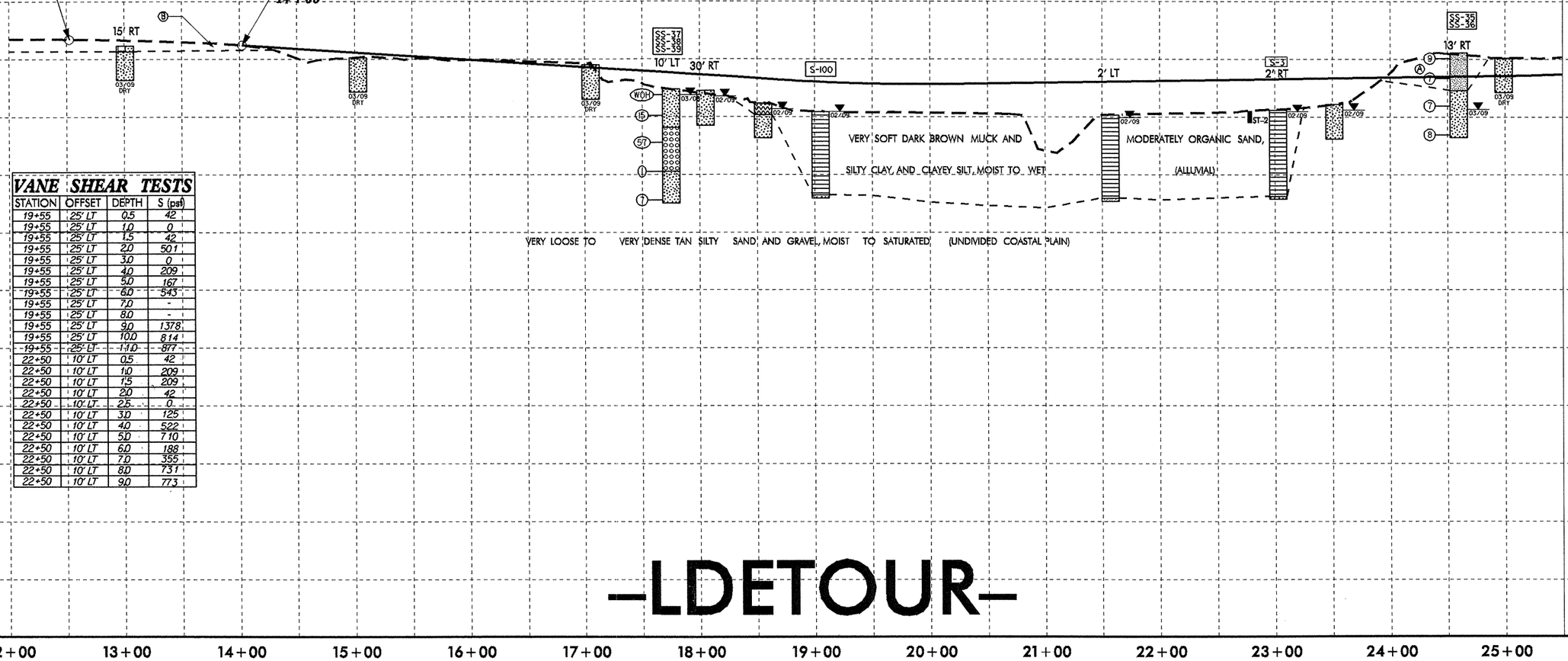
PROJECT REFERENCE NO.	SHEET NO.
B-4463	8
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-37	10' LT	17+75	1.0-1.5	A-2-4(0)	19	2	38.3	34.5	15.1	12.1	100	79	30	-	-
SS-38	10' LT	17+75	8.2-9.7	A-1-b(0)	18	NP	82.3	11.8	2.9	3.0	96	37	7	-	-
SS-39	10' LT	17+75	18.2-19.7	A-2-4(0)	26	NP	19.0	56.9	18.1	6.0	100	94	27	-	-
S-100	CL	19+05	1.0-14.5	A-7-5(8)	48	13	13.2	27.0	25.4	34.4	100	95	64	-	13.7
S-3	2' RT	23+00	1.0-15.0	A-4(0)	28	5	21.1	36.3	17.7	24.9	100	88	47	27.9	17.2
SS-35	13' RT	24+62	1.0-1.5	A-4(0)	17	1	10.3	54.4	21.2	14.1	100	96	42	-	-
SS-36	13' RT	24+62	8.2-9.7	A-2-4(0)	19	NP	47.4	41.2	3.3	8.1	96	69	12	-	-

(A) MEDIUM STIFF TO STIFF SANDY SILT, MOIST (UNDIVIDED COASTAL PLAIN)
(B) LOOSE TAN SILTY SAND, MOIST TO SATURATED (ROADWAY EMBANKMENT)



VANE SHEAR TESTS

STATION	OFFSET	DEPTH	S (psf)
19+55	25' LT	0.5	42
19+55	25' LT	1.0	0
19+55	25' LT	1.5	42
19+55	25' LT	2.0	501
19+55	25' LT	3.0	0
19+55	25' LT	4.0	209
19+55	25' LT	5.0	167
19+55	25' LT	6.0	543
19+55	25' LT	7.0	-
19+55	25' LT	8.0	-
19+55	25' LT	9.0	1378
19+55	25' LT	10.0	814
19+55	25' LT	11.0	877
22+50	10' LT	0.5	42
22+50	10' LT	1.0	209
22+50	10' LT	1.5	209
22+50	10' LT	2.0	42
22+50	10' LT	2.5	0
22+50	10' LT	3.0	125
22+50	10' LT	4.0	522
22+50	10' LT	5.0	710
22+50	10' LT	6.0	188
22+50	10' LT	7.0	355
22+50	10' LT	8.0	731
22+50	10' LT	9.0	773

-LDETOUR-

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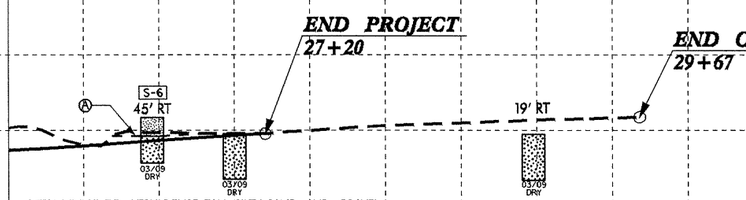
PROJECT REFERENCE NO.	SHEET NO.
B-4463	9
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-6	24 RT	26+50	1.0-3.0	A-4(1)	33	3	4.4	45.4	13.0	37.3	100	98	58	-	-

Ⓐ - MEDIUM STIFF TO STIFF SANDY SILT, MOIST (UNDIVIDED COASTAL PLAIN)



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26+00 27+00 28+00 29+00

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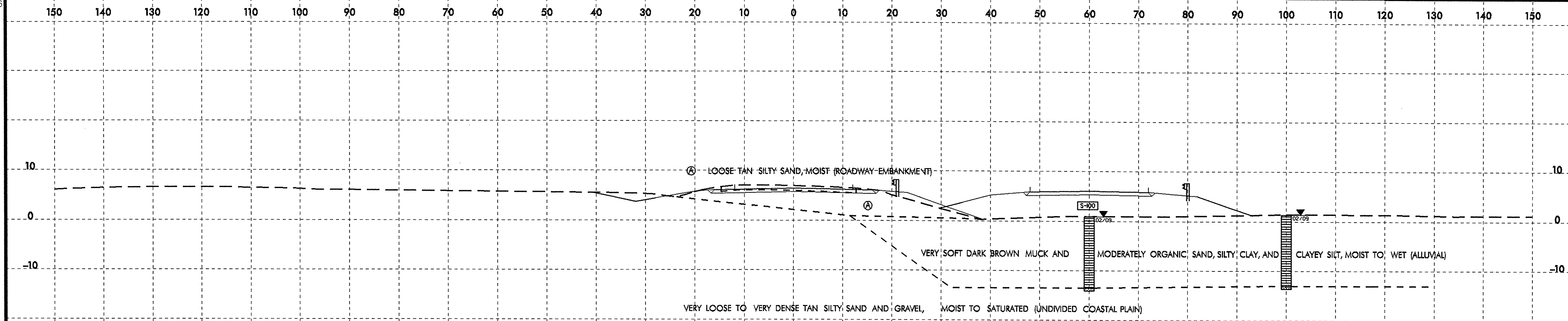
PROJ. REFERENCE NO.	SHEET NO.
B-4463	10



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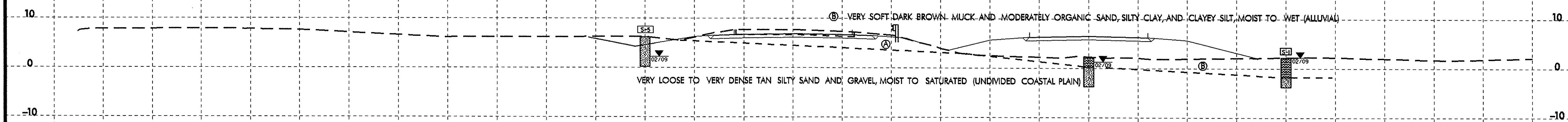
SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-5	30' LT	18+50	1.0-3.0	A-2-4(0)	17	NP	25.3	58.0	8.4	8.3	100	88	22	-	-
S-1	90' RT	18+50	1.0-4.0	A-5(6)	41	9	32.5	2.3	38.2	26.9	100	68	66	31.4	24.0
S-100	60' RT	19+00	1.0-14.5	A-7-5(8)	48	13	13.2	27.0	25.4	34.4	100	95	64	-	13.7



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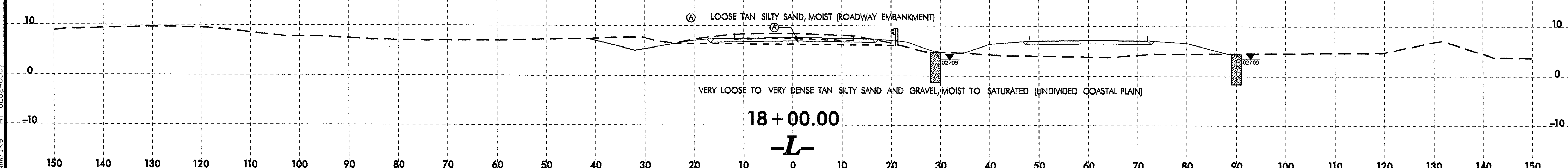

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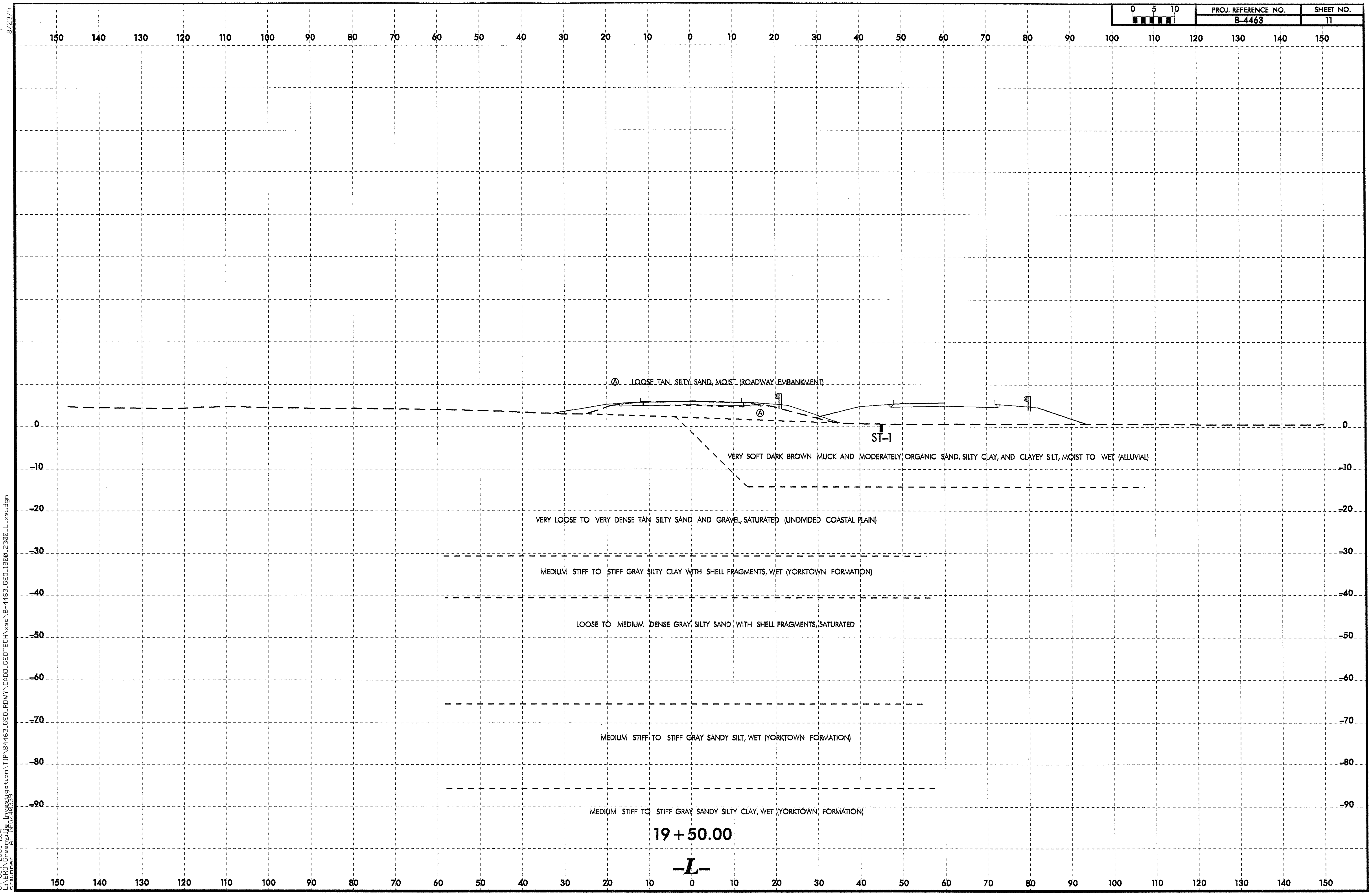
PROJ. REFERENCE NO.	SHEET NO.
B-4463	11



0 5 10
Ⓐ LOOSE TAN SILTY SAND, MOIST (ROADWAY EMBANKMENT)
Ⓐ
ST-1
VERY SOFT DARK BROWN MUCK AND MODERATELY ORGANIC SAND, SILTY CLAY, AND CLAYEY SILT, MOIST TO WET (ALLUVIAL)
VERY LOOSE TO VERY DENSE TAN SILTY SAND AND GRAVEL, SATURATED (UNDIVIDED COASTAL PLAIN)
MEDIUM STIFF TO STIFF GRAY SILTY CLAY WITH SHELL FRAGMENTS, WET (YORKTOWN FORMATION)
LOOSE TO MEDIUM DENSE GRAY SILTY SAND WITH SHELL FRAGMENTS, SATURATED
MEDIUM STIFF TO STIFF GRAY SANDY SILT, WET (YORKTOWN FORMATION)
MEDIUM STIFF TO STIFF GRAY SANDY SILTY CLAY, WET (YORKTOWN FORMATION)
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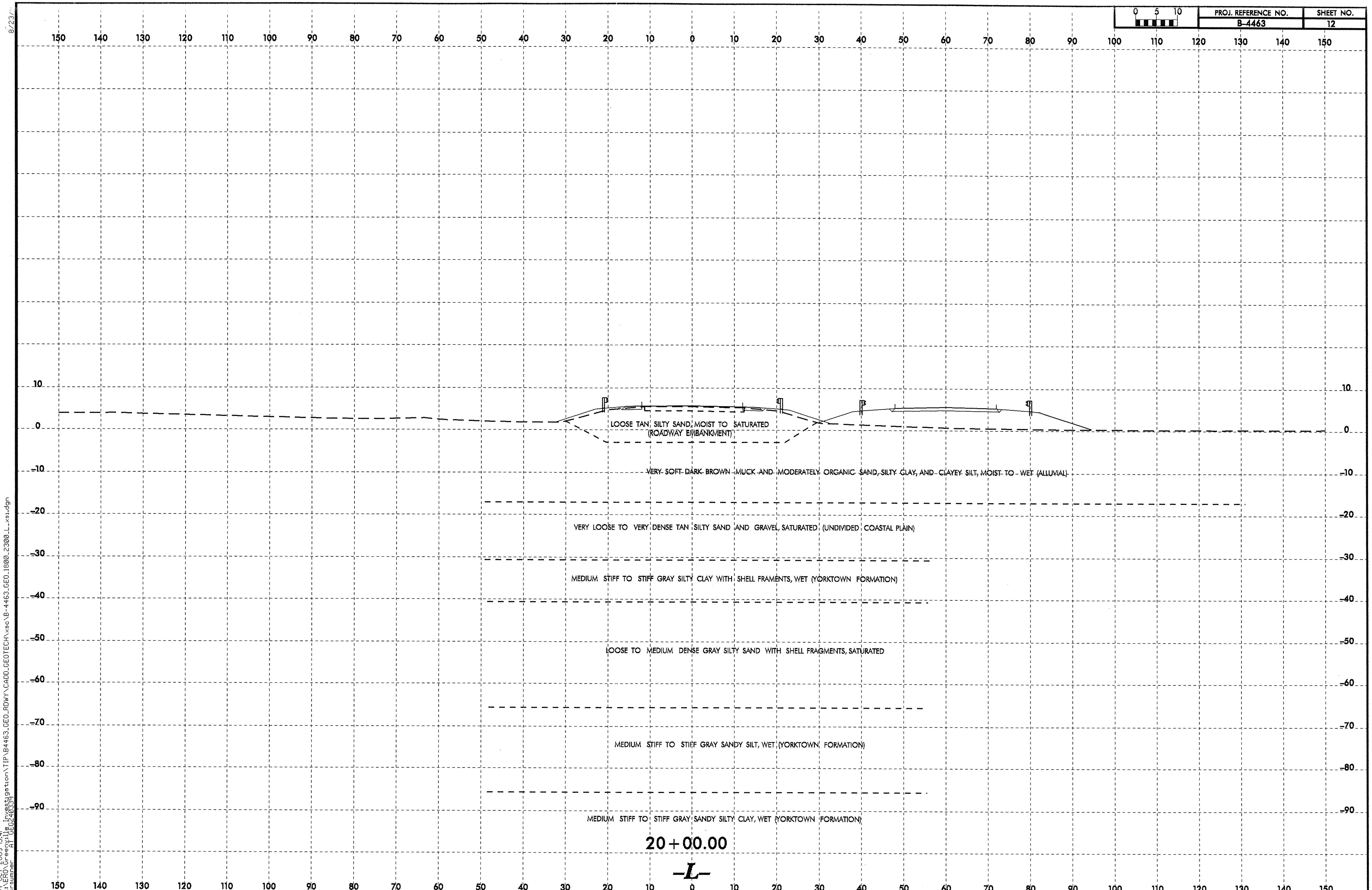
PROJ. REFERENCE NO.
B-4463
SHEET NO.
12
0 5 10
LOOSE TAN SILTY SAND, MOIST TO SATURATED (ROADWAY EMBANKMENT)
VERY SOFT DARK BROWN MUCK AND MODERATELY ORGANIC SAND, SILTY CLAY, AND CLAYEY SILT, MOIST TO WET (ALLUVIAL)
VERY LOOSE TO VERY DENSE TAN SILTY SAND AND GRAVEL, SATURATED (UNDIVIDED COASTAL PLAIN)
MEDIUM STIFF TO STIFF GRAY SILTY CLAY WITH SHELL FRAMENTS, WET (YORKTOWN FORMATION)
LOOSE TO MEDIUM DENSE GRAY SILTY SAND WITH SHELL FRAGMENTS, SATURATED
MEDIUM STIFF TO STIFF GRAY SANDY SILT, WET (YORKTOWN FORMATION)
MEDIUM STIFF TO STIFF GRAY SANDY SILTY CLAY, WET (YORKTOWN FORMATION)
20+00.00
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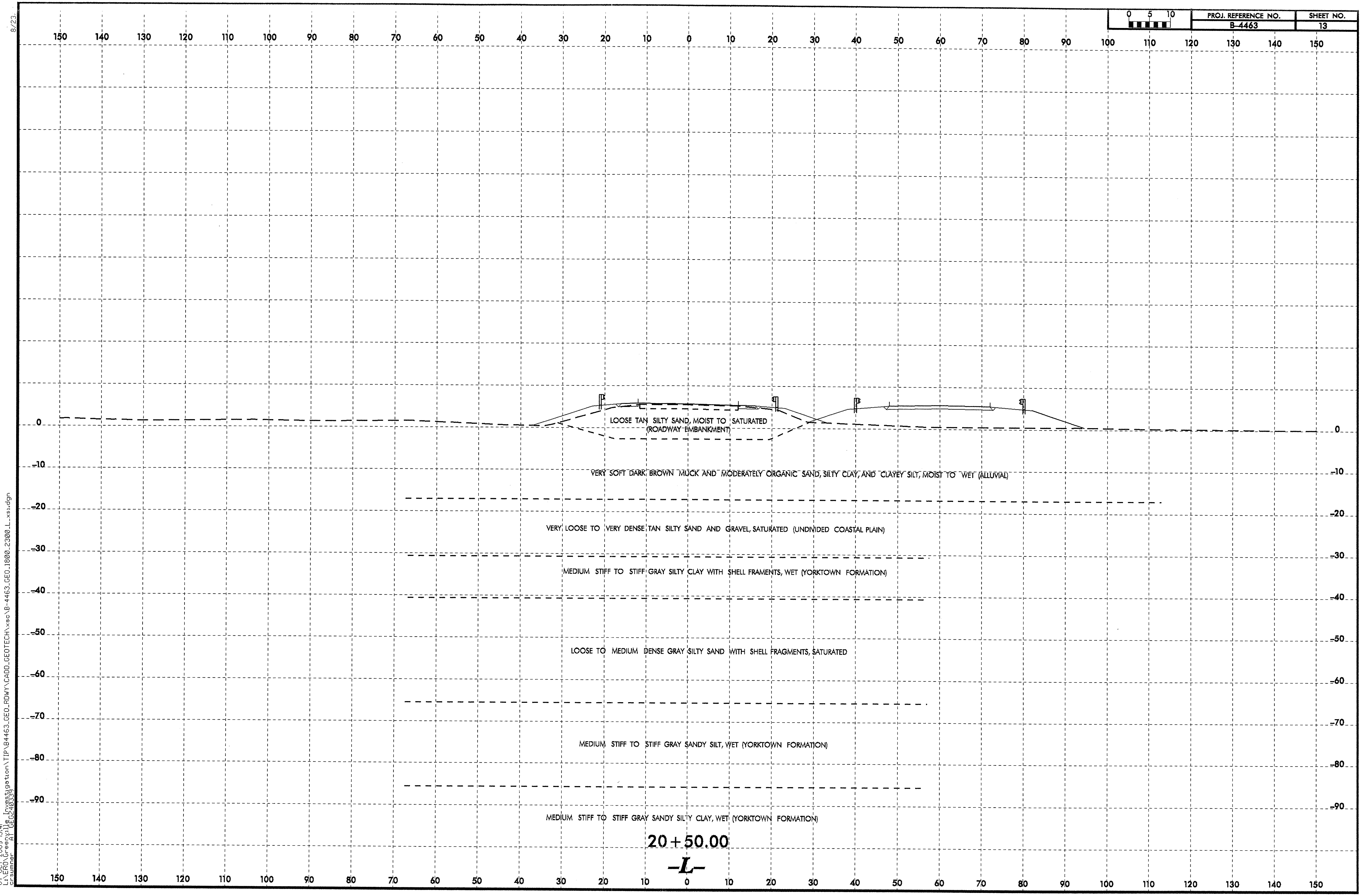
PROJ. REFERENCE NO.	SHEET NO.
B-4463	13



0 5 10
LOOSE TAN SILTY SAND, MOIST TO SATURATED
(ROADWAY EMBANKMENT)
VERY SOFT DARK BROWN MUCK AND MODERATELY ORGANIC SAND, SILTY CLAY, AND CLAYEY SILT, MOIST TO WET (ALLUVIAL)
VERY LOOSE TO VERY DENSE TAN SILTY SAND AND GRAVEL, SATURATED (UNDIVIDED COASTAL PLAIN)
MEDIUM STIFF TO STIFF GRAY SILTY CLAY WITH SHELL FRAMENTS, WET (YORKTOWN FORMATION)
LOOSE TO MEDIUM DENSE GRAY SILTY SAND WITH SHELL FRAGMENTS, SATURATED
MEDIUM STIFF TO STIFF GRAY SANDY SILT, WET (YORKTOWN FORMATION)
MEDIUM STIFF TO STIFF GRAY SANDY SILTY CLAY, WET (YORKTOWN FORMATION)
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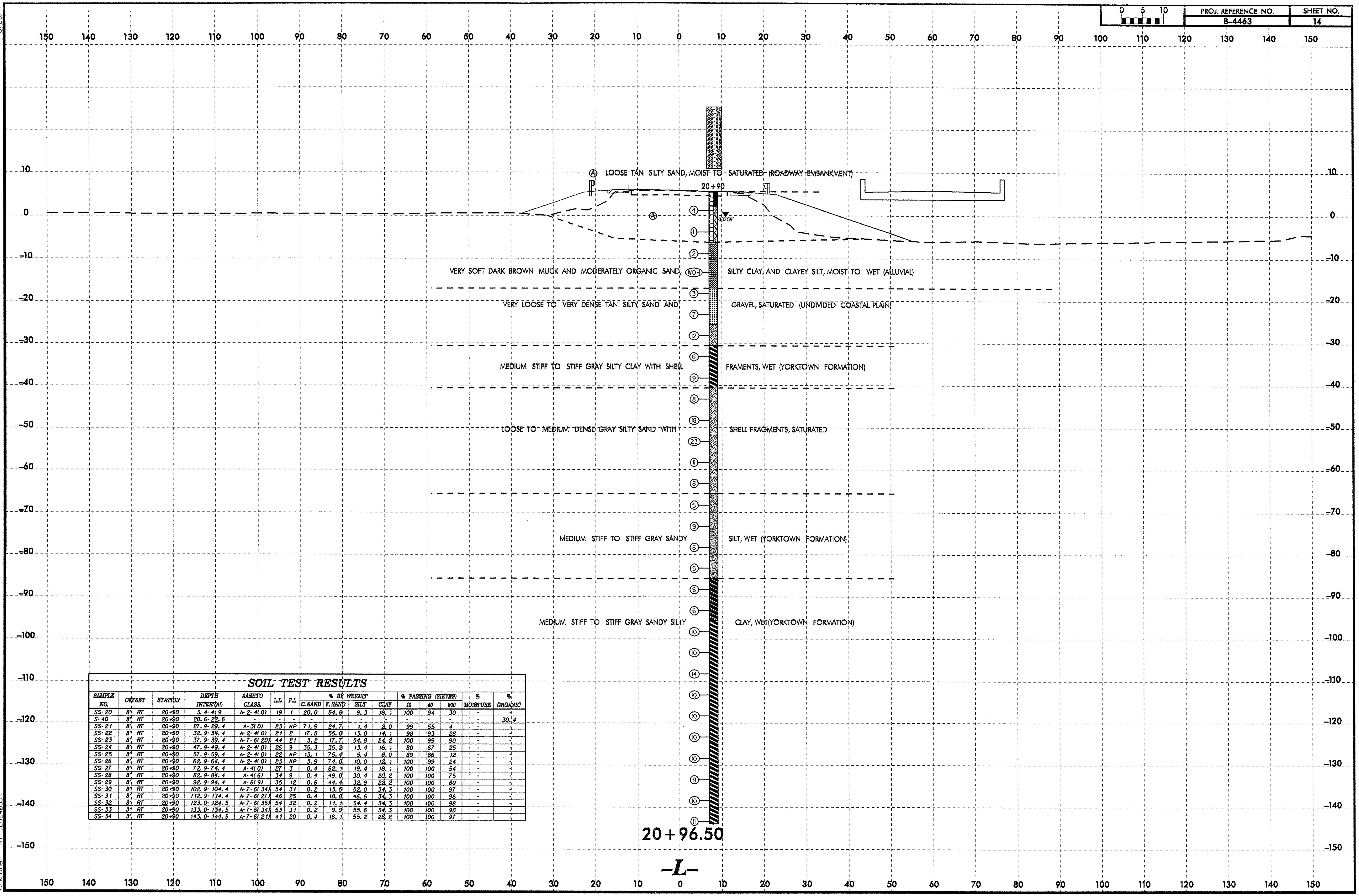
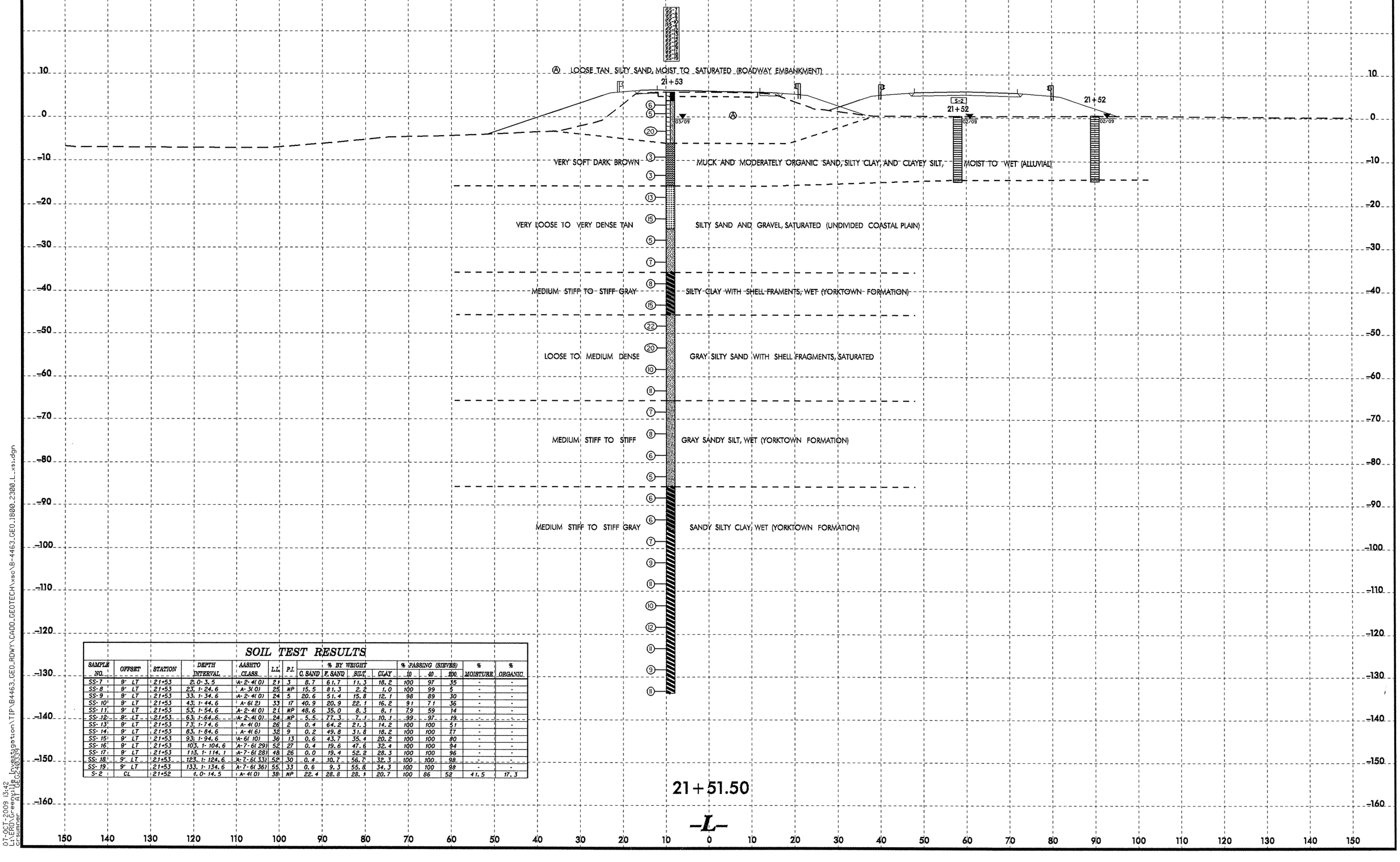
PROJ. REFERENCE NO.	SHEET NO.
B-4463	14



SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-20	8' RT	20+90	3.4-4.9	A-2-4(0)	19	1	20.0	54.6	9.3	16.1	100	94	30	-	-
S-40	8' RT	20+90	20.6-22.6	-	-	-	-	-	-	-	-	-	-	-	30.4
SS-21	8' RT	20+90	27.9-29.4	A-3(0)	23	NP	71.9	24.7	1.4	2.0	99	55	4	-	-
SS-22	8' RT	20+90	32.9-34.4	A-2-4(0)	21	2	17.8	55.0	13.0	14.1	98	93	28	-	-
SS-23	8' RT	20+90	37.9-39.4	A-7-6(20)	44	21	3.2	17.7	54.8	24.2	100	99	90	-	-
SS-24	8' RT	20+90	47.9-49.4	A-2-4(0)	26	9	35.3	35.2	13.4	16.1	80	67	25	-	-
SS-25	8' RT	20+90	57.9-59.4	A-2-4(0)	22	NP	13.1	75.4	5.4	6.0	89	86	12	-	-
SS-26	8' RT	20+90	62.9-64.4	A-2-4(0)	23	NP	3.9	74.0	10.0	12.1	100	99	24	-	-
SS-27	8' RT	20+90	72.9-74.4	A-4(0)	27	3	0.4	62.1	19.4	18.1	100	100	54	-	-
SS-28	8' RT	20+90	82.9-84.4	A-4(6)	34	9	0.4	49.0	30.4	20.2	100	100	75	-	-
SS-29	8' RT	20+90	92.9-94.4	A-6(9)	35	12	0.6	44.4	32.9	22.2	100	100	80	-	-
SS-30	8' RT	20+90	102.9-104.4	A-7-6(34)	54	31	0.2	13.5	52.0	34.3	100	100	97	-	-
SS-31	8' RT	20+90	112.9-114.4	A-7-6(27)	48	25	0.4	18.8	46.6	34.3	100	100	96	-	-
SS-32	8' RT	20+90	123.0-124.5	A-7-6(35)	54	32	0.2	11.1	54.4	34.3	100	100	98	-	-
SS-33	8' RT	20+90	133.0-134.5	A-7-6(34)	53	31	0.2	9.9	55.6	34.3	100	100	98	-	-
SS-34	8' RT	20+90	143.0-144.5	A-7-6(21)	41	20	0.4	16.1	55.2	28.2	100	100	97	-	-

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-4463	15



SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-7	9' LT	21+53	2.0- 3.5	A-2-4(0)	21	3	8.7	61.7	11.3	18.2	100	97	35	-	-
SS-8	9' LT	21+53	23.1- 24.6	A-3(0)	25	NP	15.5	81.3	2.2	1.0	100	99	5	-	-
SS-9	9' LT	21+53	33.1- 34.6	A-2-4(0)	24	5	20.6	51.4	15.8	12.1	98	89	30	-	-
SS-10	9' LT	21+53	43.1- 44.6	A-6(21)	33	17	40.9	20.9	22.1	16.2	91	71	36	-	-
SS-11	9' LT	21+53	53.1- 54.6	A-2-4(0)	21	NP	48.6	35.0	8.3	8.1	79	59	14	-	-
SS-12	9' LT	21+53	63.1-64.6	A-2-4(0)	24	NP	5.5	77.3	7.1	10.1	99	97	19	-	-
SS-13	9' LT	21+53	73.1-74.6	A-4(0)	26	2	0.4	64.2	21.3	14.2	100	100	51	-	-
SS-14	9' LT	21+53	83.1-84.6	A-4(6)	32	9	0.2	49.8	31.8	18.2	100	100	77	-	-
SS-15	9' LT	21+53	93.1-94.6	A-6(10)	36	13	0.6	43.7	35.4	20.2	100	100	80	-	-
SS-16	9' LT	21+53	103.1-104.6	A-7-6(29)	52	27	0.4	19.6	47.6	32.4	100	100	94	-	-
SS-17	9' LT	21+53	113.1-114.1	A-7-6(28)	48	26	0.0	19.4	52.2	28.3	100	100	96	-	-
SS-18	9' LT	21+53	123.1-124.6	A-7-6(33)	52	30	0.4	10.7	56.7	32.3	100	100	98	-	-
SS-19	9' LT	21+53	133.1-134.6	A-7-6(36)	55	33	0.6	9.3	55.8	34.3	100	100	98	-	-
S-2	CL	21+52	6.0- 14.5	A-4(0)	38	NP	22.4	28.8	28.1	20.7	100	86	52	41.5	17.3

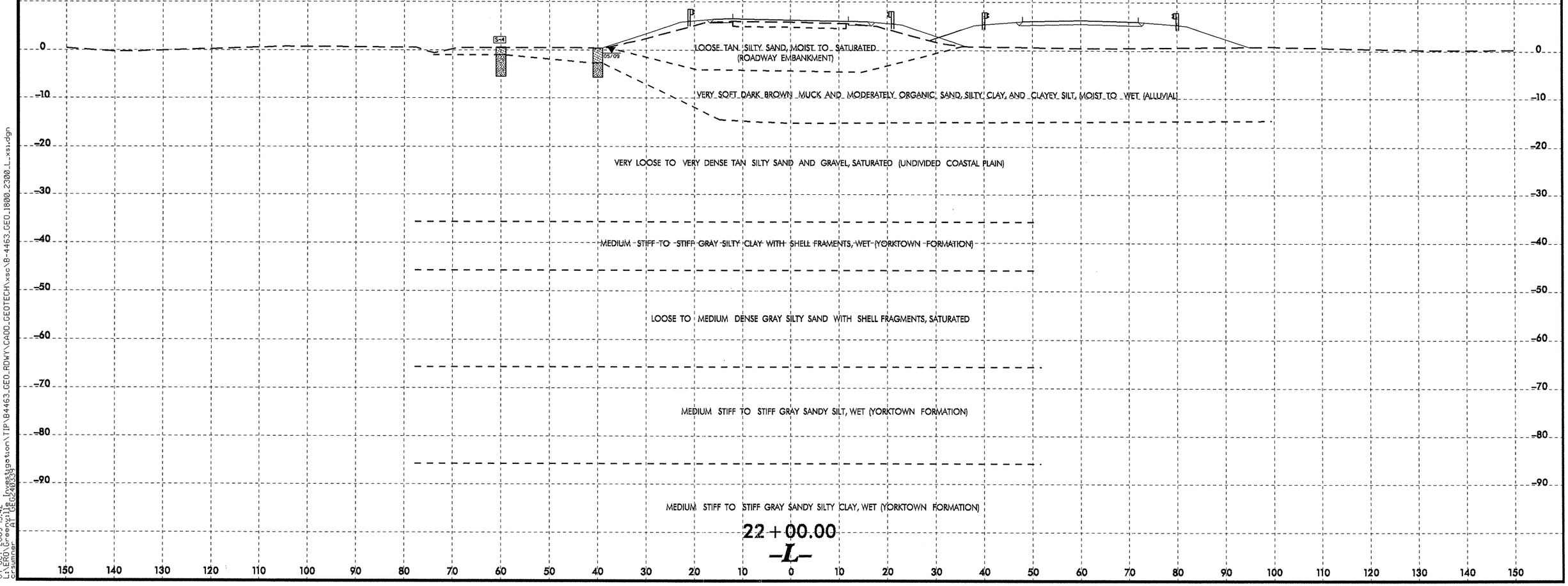
PROJ. REFERENCE NO.	SHEET NO.
B-4463	16

0 5 10

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-4	60' LT	22+00	1.0-1.5	A-2-4(0)	36	NP	26.7	42.3	6.1	24.9	98	84	32	23.6	9



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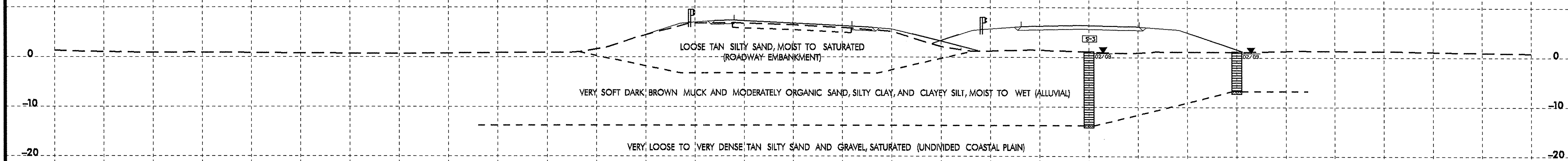
PROJ. REFERENCE NO.	SHEET NO.
B-4463	17

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT: C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES): 10	40	200	% MOISTURE	% ORGANIC
S-3	58' RT	23+00	1.0-15.0	A-4(0)	28	5	21.1	36.3	17.7	24.9	100	88	47	27.9	17.2



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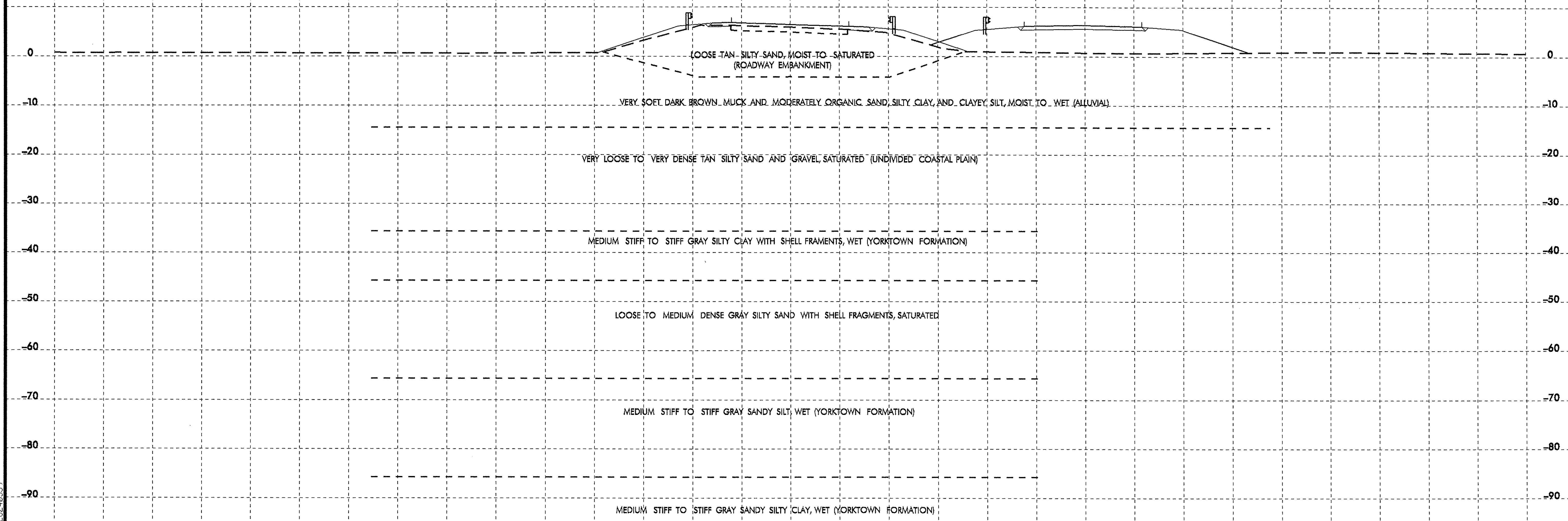

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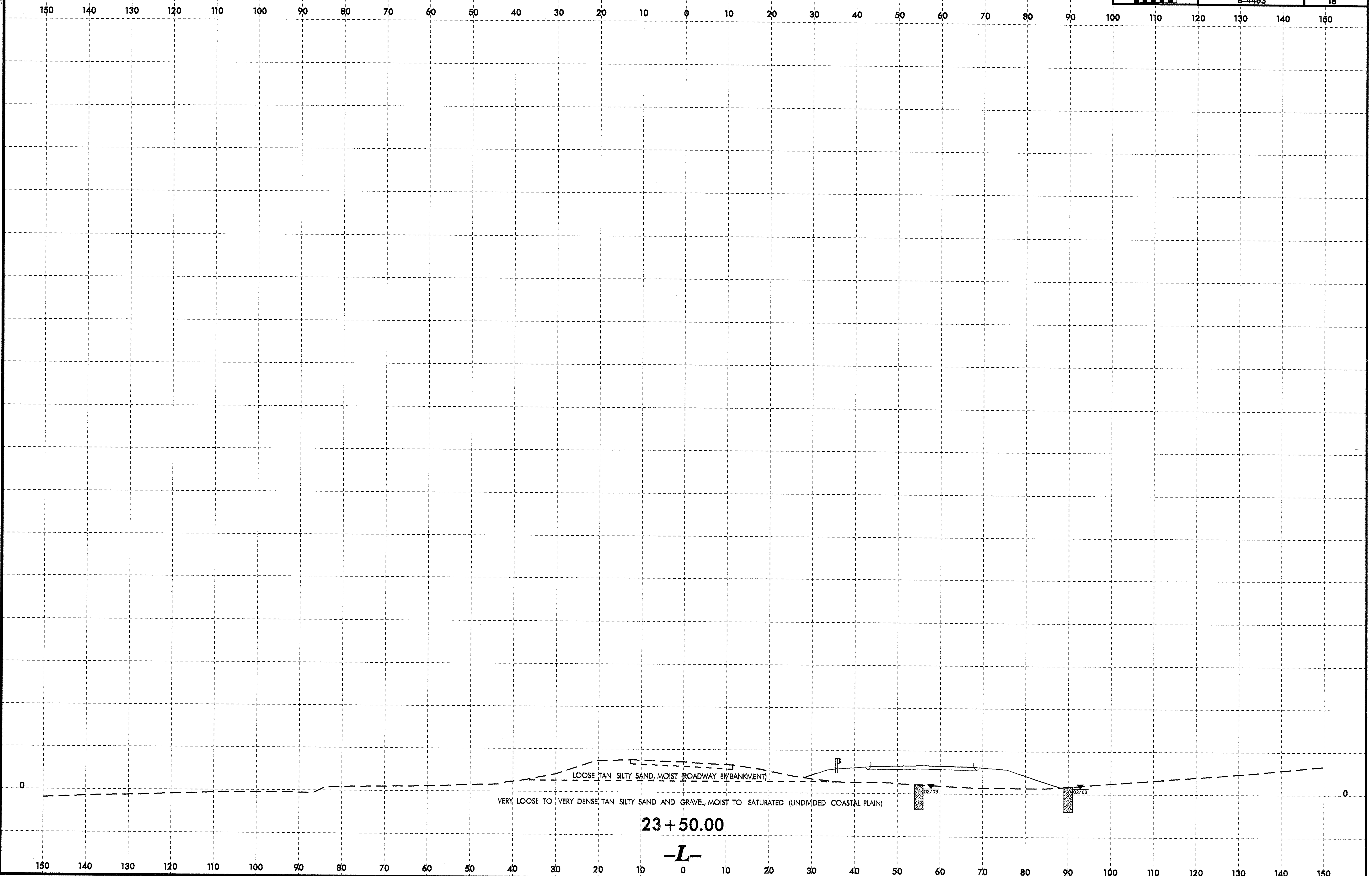
PROJ. REFERENCE NO.	SHEET NO.
B-4463	18



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