ID: B-5551

CONTRACT: C203311

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

CONTENTS

LINE	STATION	PLAN	PROFILE	XSECT
-L-	10+80.00 TO 29+95.00	4-5	6-7	8-16

BORING RB2(1) SHEET 17

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

ROADWAY SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. *43684.3.1 (B-5551)* F.A. PROJ. *BRSTP-0501(29)*

COUNTY *SCOTLAND*

PROJECT DESCRIPTION *ROADWAY APPROACHES TO BRIDGE NO. 18 OVER LEITH'S CREEK ON US 501 (-L-)*

INVENTORY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	43684.3.1 (B-5551)	1	17

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
8B.108314.1		P.E.
8B.108314.1		R/W & UTIL.
43684.3.1	BRSTP-0501(29)	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) 707-6850. 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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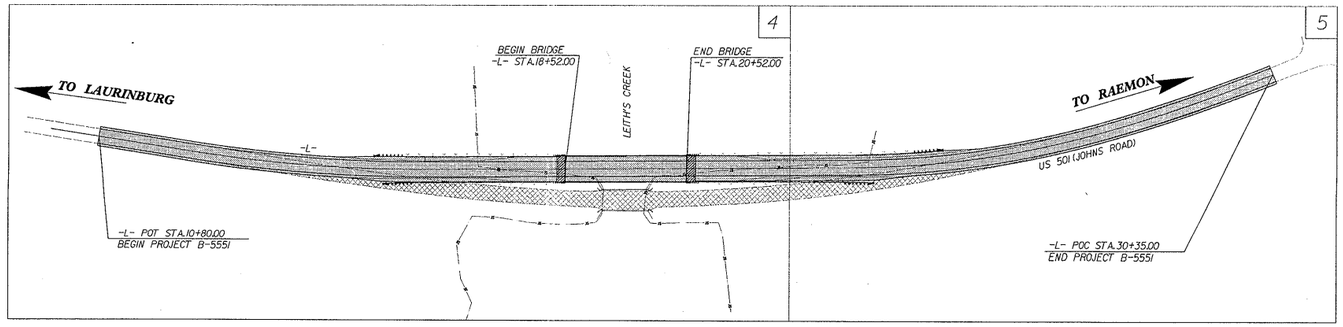
NC GRID NAD 83



PERSONNEL

E. HOWEY

M. BATTEN

B. FOWLER

A. FOWLER

M. SMITH

B. DANIEL

INVESTIGATED BY *HDR, Inc.*

CHECKED BY *E. HOWEY*

SUBMITTED BY *HDR, Inc.*

DATE *4/2013*

NORTH CAROLINA LICENSED SEAL 671 GEOLOGIST ELIZABETH C. HOWEY

4/1/13 Elizabeth C. Howey

DRAWN BY: *M. BATTEN*

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PROJECT REFERENCE NO.	SHEET NO.
43684.3.1 (B-5551)	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 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 PLASTIC INDEX	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 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	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
SL — SHRINKAGE LIMIT		
	- 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 N-VALUE / SPT REFUSAL — TEST BORING (SPT, CPT, DPT, DMT, VST, PMT)
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION

SAMPLE DESIGNATIONS
- S - BULK SAMPLE
- SS - SPLIT SPOON SAMPLE
- ST - SHELBY TUBE SAMPLE
- RS - ROCK SAMPLE
- RT - RECOMPACTED TRIAXIAL SAMPLE
- CBR - 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-550
- [ ] PORTABLE HOIST
- [X] DIEDRICH D-25
- [ ] _____

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

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

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

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [ ] HAND AUGER
- [ ] SOUNDING ROD
- [ ] 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: BM-1- X MARK IN CONCRETE NORTHWEST CORNER OF BRIDGE

ELEVATION: 157.87 FT.

NOTES:
NOTE AUTOMATIC HAMMER ENERGY MEASURED WAS 75% ON 7/16/2012

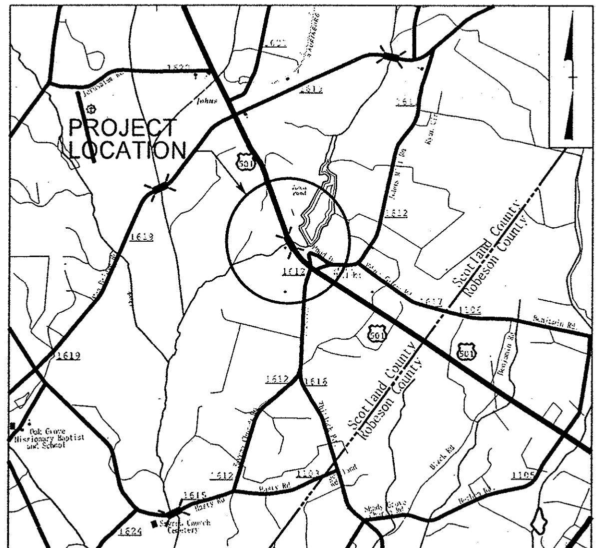
REVISED 02/23/06

09/08/99

PROJECT: B-5551

CONTRACT: DH00102

See Sheet 1-A For Index of Sheets
See Sheet 1-B For Conventional symbols
See Sheet 1-C For Survey Control Sheet



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

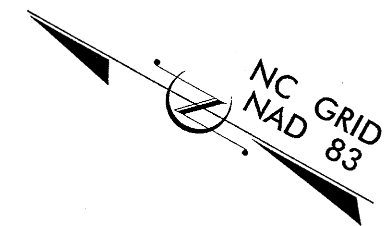
SCOTLAND COUNTY

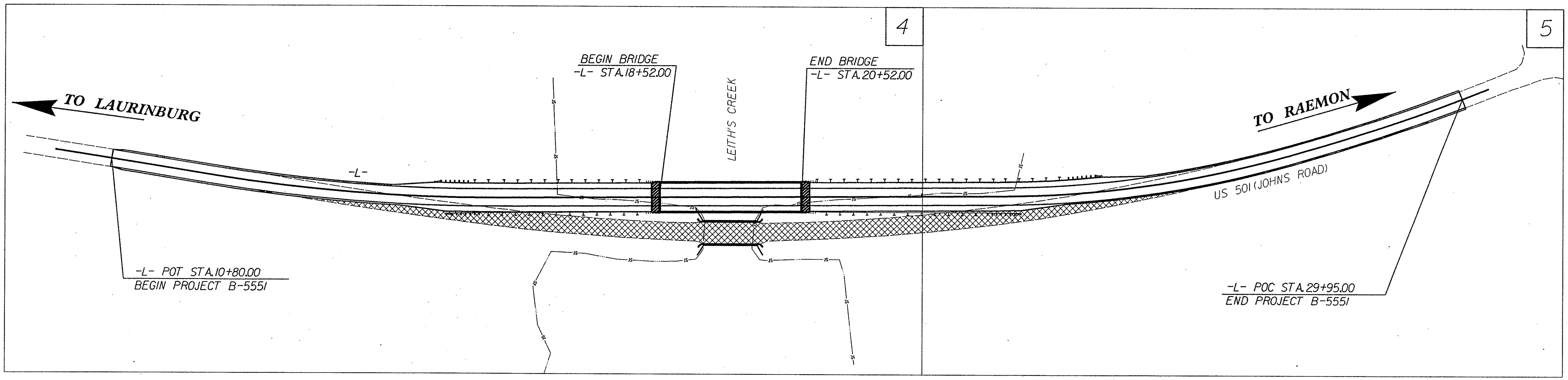
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5551	2A	17

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
8B.108314.1		PE
8B.108314.1		R/W & UTIL.
43684.3.1		CONST.

LOCATION: ***BRIDGE NO. 18 OVER LEITH'S CREEK ON US 501 (JOHNS ROAD)***

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





PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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 2013 = 4810
D = 50 %
T = 8 % *
V = 60 MPH

FUNC CLASS = MINOR ARTERIAL
* TTST 4% DUAL 4%

PROJECT LENGTH

LENGTH OF ROADWAY PROJECT B-5551 = 0.325 MI
LENGTH OF STRUCTURE PROJECT B-5551 = 0.038 MI
TOTAL LENGTH OF PROJECT B-5551 = 0.363 MI

Prepared in the Office of:
SEPI ENGINEERING & CONSTRUCTION
1025 Wade Avenue
Raleigh, NC 27605
Tel:919-789-9977
Fax:919-789-9591
License: C-2197
FOR THE NORTH CAROLINA DEPT. OF TRANSPORATION

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
SEPTEMBER 2012

LETTING DATE:
JUNE 18, 2013

STEVE SCOTT, PE
PROJECT ENGINEER

AGNIESZKA NAU, PE
ROADWAY PROJECT DESIGN ENGINEER

TIM WELCH, PE
NCDOT CONTACT

HYDRAULICS ENGINEER

P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER

P.E.
SIGNATURE:

$$$$$$SYSTIME$$$$$
$$$$$$$$$DGN$$$$$$$$$$$$$$$$$
$$$$$USERNAME$$$$

HDR ONE COMPANY | Many Solutions

February 21, 2013

STATE PROJECT: 43684.3.1 (B-5551)
FEDERAL PROJECT: BRSTP-0501 (29)
COUNTY: Scotland
DESCRIPTION: Bridge No. 18 over Leith's Creek on US 501

SUBJECT: Geotechnical Report – Inventory

Project Description

This project involves the realigned roadway approaches for the replacement of the existing bridge on US 501 over Leith's Creek. The total project length is 0.363 mile with the roadway approaches comprising 0.325 mile of that total. The existing and proposed roadway realignment each contain 2 lanes.

Project Investigation

A geotechnical investigation was performed in January, 2013. A Diedrich D-25 drill was mounted on a large marsh buggy to access the boring locations in the swampy area where the water depth was up to approximately 5 feet at the time of our investigation. The drill was equipped with an automatic hammer with a measured hammer efficiency of 75% (7-16-2012). Casing with 2-7/8" and 3-7/8" drag bits were used to advance the borings. Standard Penetration Tests (SPT) were performed at frequent intervals in the borings advanced along the roadway approaches.

The following alignment was investigated:

Line	Stations
-L-	10+80 to 29+95

Areas of Special Geotechnical Interest

1) Muck: Muck is present at the ground surface from approximately -L- Station 17+00 to 24+00.
2) Very soft alluvial clay: This material is anticipated to be present either at the ground surface or beneath the muck from approximate -L- Station 16+00 to 17+50 and 20+50 to 24+00.
3) Surface/Groundwater: Water is present above the ground surface across much of the site; depths ranged up to approximately 5 feet. All of the borings encountered water at or above the ground surface.
4) Downed trees: Downed trees cover much of the ground surface in the floodplain area.

HDR Engineering, Inc. of the Carolinas
3733 National Drive
Suite 207
Raleigh, NC 27612-4845
Phone: (919) 785-1118
Fax: (919) 785-1187
www.hdrinc.com

Physiography and Geology

The project is located in an area of Cretaceous Age Coastal Plain Deposits. More specifically, the area is mapped as the Middendorf Formation which is described as gray to pale gray with an orange cast sand, sandstone and mudstone. The area around the site is generally rural and the Coastal Plain topography is relatively flat. Existing ground elevations across the site range from nearly 165 feet near the beginning of the project to approximately 143 feet in the floodplain. Leith's Creek is part of a large swampy/wetland area, apparently flooded by beaver activity. The creek flow is to the west.

Soil Properties

Soils encountered at the site were derived from two origins: alluvial deposits from Leith's Creek underlain by the above described Coastal Plain deposits of the Middendorf Formation. Existing roadway embankment is present along current US 501. No borings were advanced through the existing embankment.

The surficial alluvial soils consist of very soft, saturated black muck through much of the floodplain along the proposed alignment. The muck was generally 2 to 3.5 feet thick in borings advanced along the roadway approaches. Other alluvial soil encountered consists of very loose to medium dense silty fine to coarse sand (A-3, A-2-4) or very soft to medium stiff silty fine sandy clay (A-6, A-7-5). Many of the alluvial samples recovered contained organics and wood fragments. The total thickness of the alluvial layer ranged from 8 to 15.5 feet in borings advanced across the site.

The Middendorf Formation was encountered beneath the alluvial deposits to boring terminations and consists of very loose to dense silty sand (A-2-4), stiff fine sandy silt (A-4), and very stiff to hard silty fine sandy clay (A-6, A-7-6).

Nearly all of the recovered samples were wet to saturated.

Groundwater

Water was encountered at or above the ground surface at all of the boring locations at the site. As mentioned above, the proposed alignment crosses a swampy area with water depths ranging from at the surface to 5 feet deep. Per the provided Hydraulics Report, the normal water surface for Leith's Creek is located at elevation 147.5 feet.

Samples

Ten undisturbed Shelby tube samples were attempted in the roadway and bridge end bent borings along the alignment. However, upon opening the recovered samples, many were not favorable for testing due to roots or organics encountered throughout the tube or due to the fact that the sample consisted of sand rather than the clay layer that was targeted to sample. The samples below were the only tubes that recovered the soft clay and were testable:

Sample No.	Location	Depth	Test
ST-2	-L- Sta. 22+87, 7' LT	13.5 – 15.5	Consolidation
ST-3	-L- Sta. 16+50, 14' LT	8.0 – 10.0	CU Triaxial

Respectfully Submitted,

Elizabeth C. Howey

Elizabeth C. Howey, LG, PE
Senior Geotechnical Project Manager

EARTHWORK BALANCE SHEET

Volumes in Cubic Yards

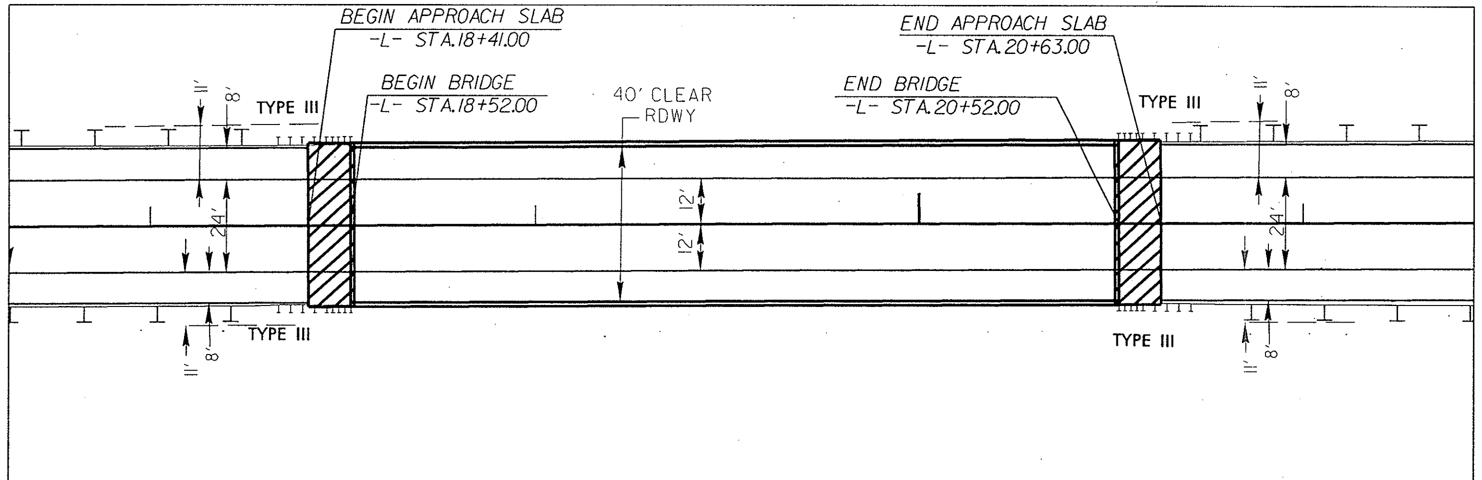
PROJECT: B-5551 COUNTY: Scotland DATE: 6/3/2013 COMPILED BY: SEPI Engineering SHEET _1_ OF _1_ SHEETS

STATION	STATION	EXCAVATION					EMBANKMENT				BORROW	WASTE			
		TOTAL UNCLASS.	ROCK	UNDERCUT	UNSUIT. UNCLASS.	SUITABLE UNCLASS.	TOTAL	ROCK	EARTH	EMBANK. +25%		ROCK	SUITABLE	UNSUIT.	TOTAL
10+80.00	30+35	745		2,217		745	10,877		10,877	13,596	12,851			2,217	2,217
	SUBTOTAL	745		2,217		745	10,877		10,877	13,596	12,851			2,217	2,217
EXISTING ROADBED REMOVAL		9,790				9,790							9,790		9,790
STA. 15+00.00 TO 24+50.00 (AFTER NEW BRIDGE)															
	SUBTOTAL	9,790				9,790							9,790		9,790
	SUBTOTAL														
TOTAL		10,535		2,217		10,535	10,877		10,877	13,596	12,851		9,790	2,217	12,007
LOSS DUE TO CLEARING & GRUBBING															
ADDITIONAL UNDERCUT (GEOTECHNICAL UNIT)				100			100		100	125	125			100	100
SELECT GRANULAR MATERIAL IN LIEU OF BORROW										-6,625	-6,625				
ROCK WASTE TO REPLACE BORROW															
WASTE IN LIEU OF BORROW															
PROJECT TOTAL		10,535		2,317		10,535	10,977		10,977	7,096	6,351		9,790	2,317	12,107
EST. 5% TO REPLACE TOP SOIL ON BORROW PIT															
GRAND TOTAL		10,535		2,317		10,535	10,977		10,977	7,096	6,351		9,790	2,317	12,107
SAY															

NOTE: EARTHWORK QUANTITIES ARE CALCULATED BY SEPI ENGINEERING AND CONSTRUCTION. THESE EARTHWORK QUANTITIES ARE BASED IN PART ON SUBSURFACE DATA PROVIDED BY THE GEOTECHNICAL ENGINEERING UNIT.
PER GEOTECH RECOMMENDATION, ESTIMATED 5,300 CY OF SELECT GRANULAR MATERIAL, CLASS III WILL BE REQUIRED

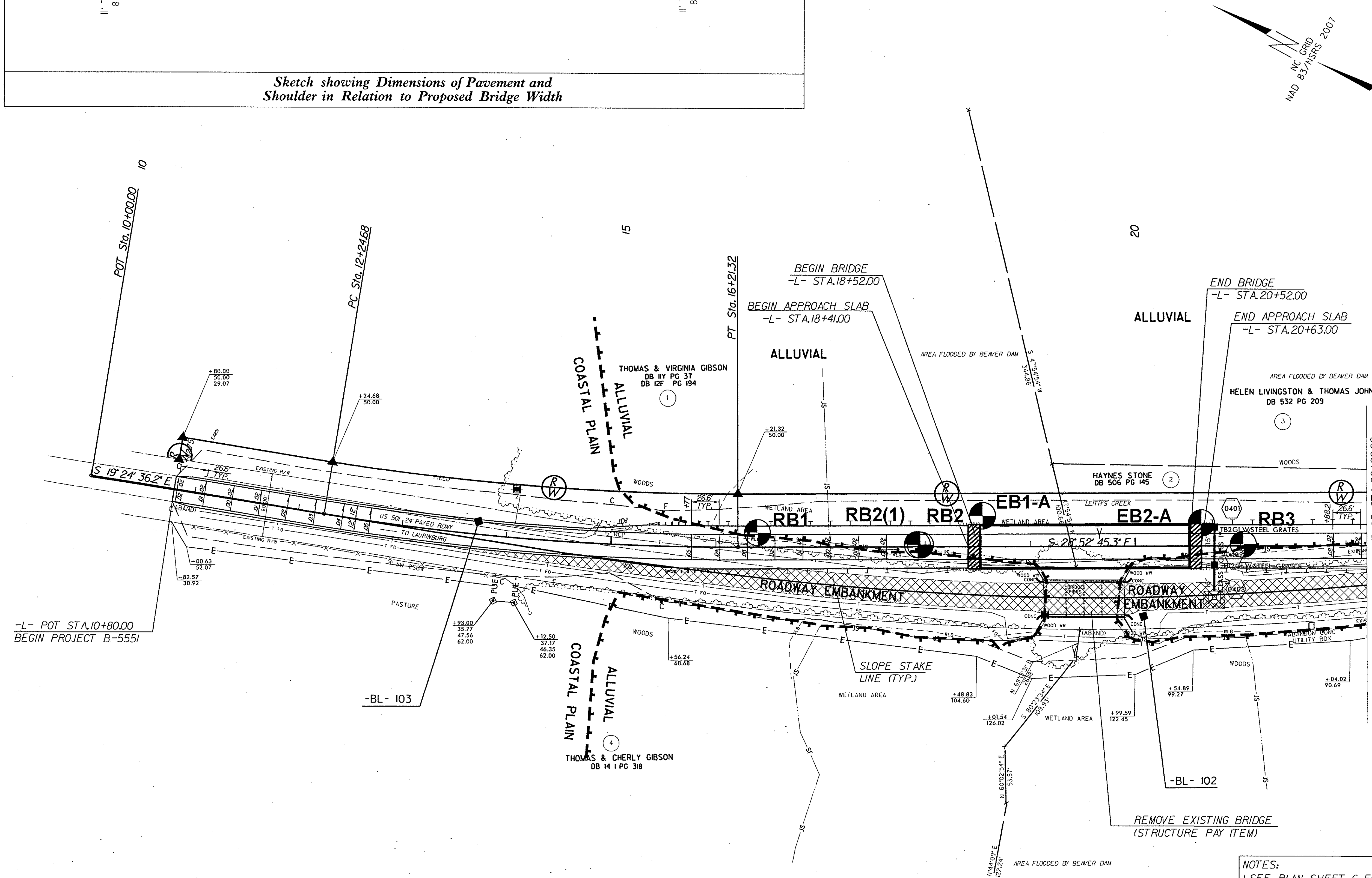
PROJECT REFERENCE NO.	SHEET NO.
B-5551	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



Sketch showing Dimensions of Pavement and Shoulder in Relation to Proposed Bridge Width

-L-
PI Sta 14+23.45
Δ = 9° 28' 09.1" (LT)
D = 2° 23' 14.4"
L = 396.64'
T = 198.77'
R = 2,400.00'



NOTES:
1.SEE PLAN SHEET 6 FOR PROFILE
2.SEE SHEETS S-1THRU S- FOR STRUCTURES PLANS

5/14/99
4/1/2013
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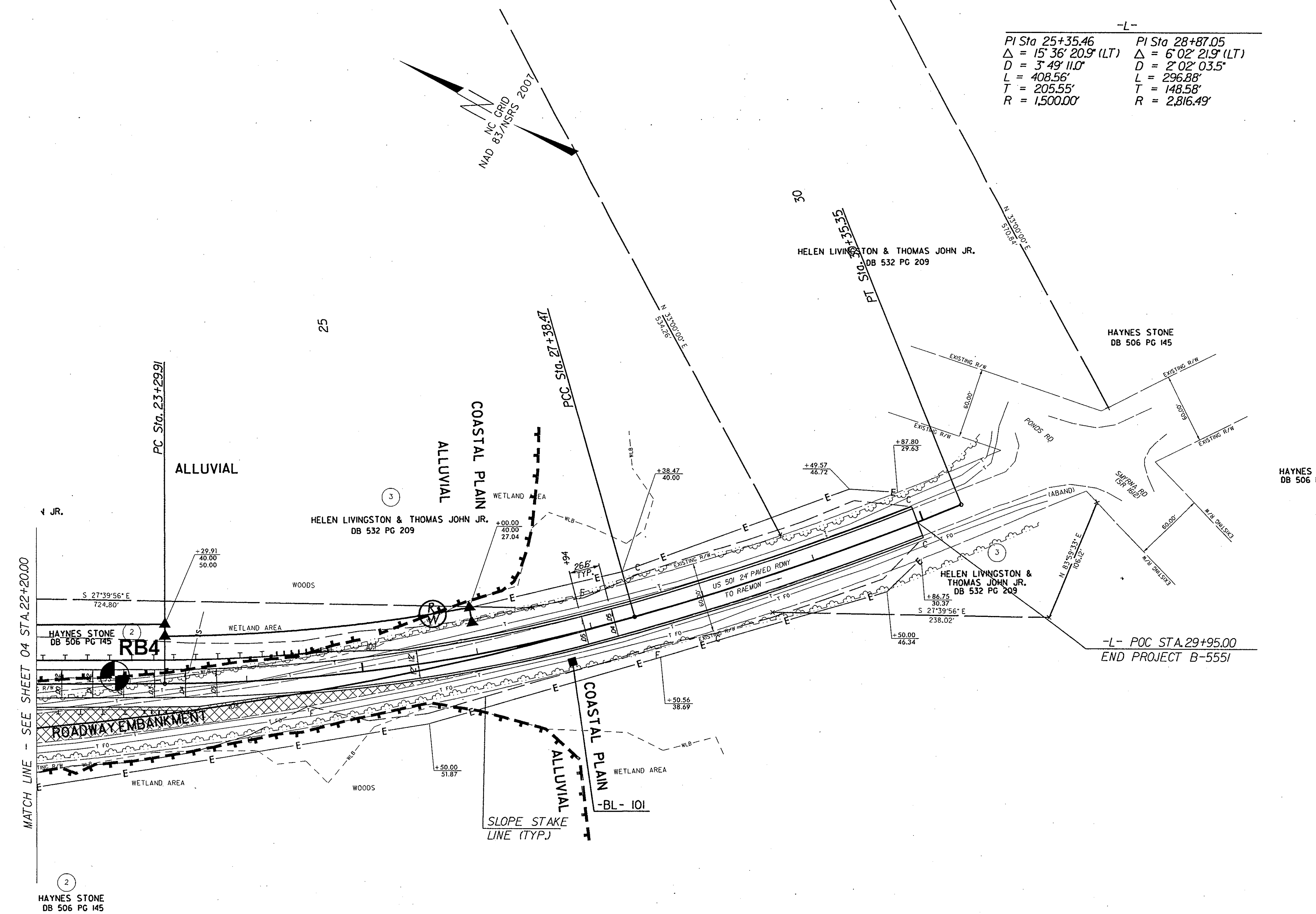
\Inventory Plan Sheet 1

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
B-5551	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



NOTE: SEE PLAN SHEET 6 FOR PROFILE

4/1/2013
\Inventory Plan Sheet 2
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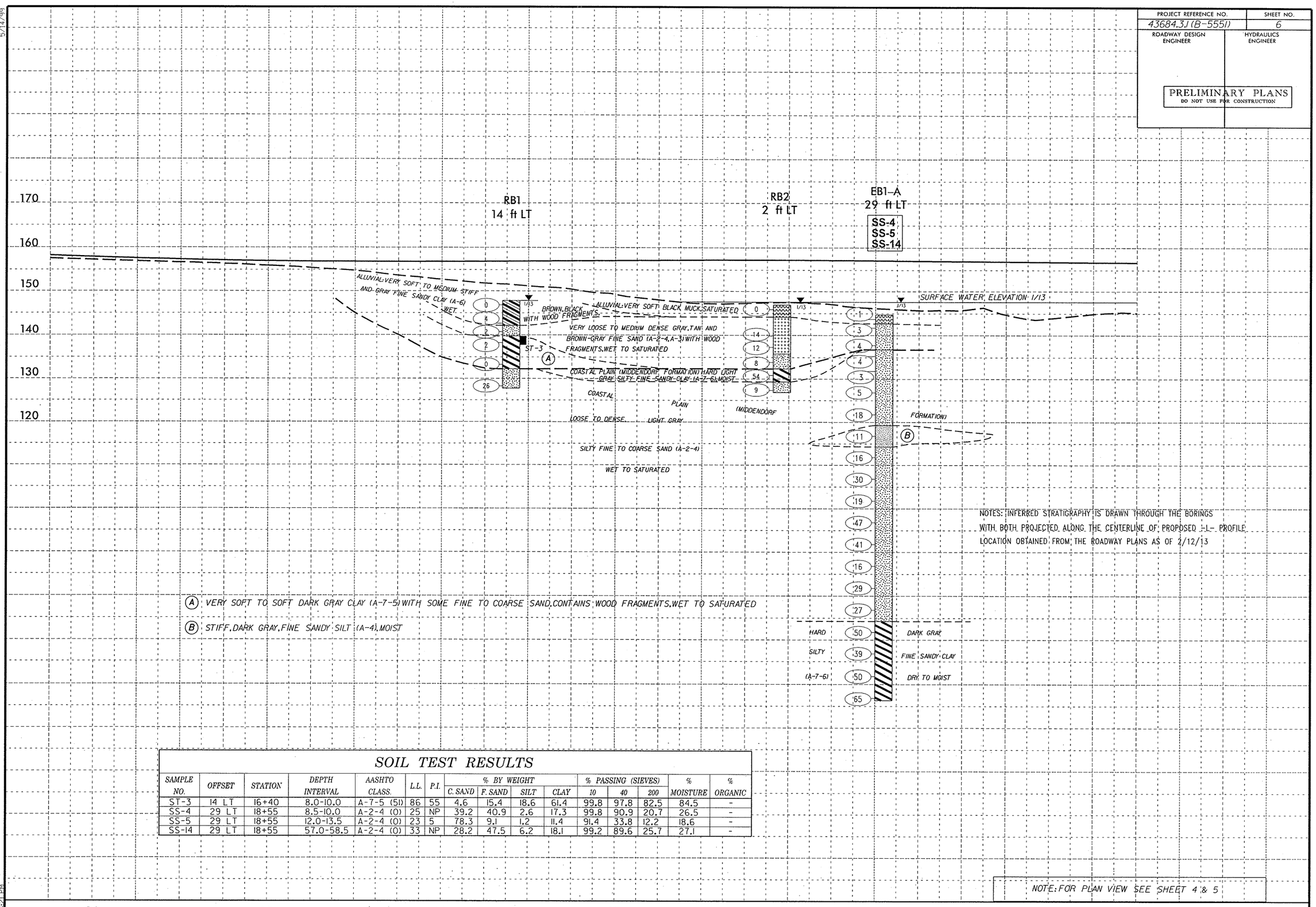
5/14/99

PROJECT REFERENCE NO.	SHEET NO.
43684.3.1 (B-5551)	6
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



NOTES: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ALONG THE CENTERLINE OF PROPOSED -L- PROFILE. LOCATION OBTAINED FROM THE ROADWAY PLANS AS OF 2/12/13

(A) VERY SOFT TO SOFT DARK GRAY CLAY (A-7-5) WITH SOME FINE TO COARSE SAND, CONTAINS WOOD FRAGMENTS, WET TO SATURATED

(B) STIFF, DARK GRAY, FINE SANDY SILT (A-4), MOIST

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		
ST-3	14 LT	16+40	8.0-10.0	A-7-5 (51)	86	55	4.6	15.4	18.6	61.4	99.8	97.8	82.5	84.5	-
SS-4	29 LT	18+55	8.5-10.0	A-2-4 (0)	25	NP	39.2	40.9	2.6	17.3	99.8	90.9	20.7	26.5	-
SS-5	29 LT	18+55	12.0-13.5	A-2-4 (0)	23	5	78.3	9.1	1.2	11.4	91.4	33.8	12.2	18.6	-
SS-14	29 LT	18+55	57.0-58.5	A-2-4 (0)	33	NP	28.2	47.5	6.2	18.1	99.2	89.6	25.7	27.1	-

NOTE: FOR PLAN VIEW SEE SHEET 4 & 5

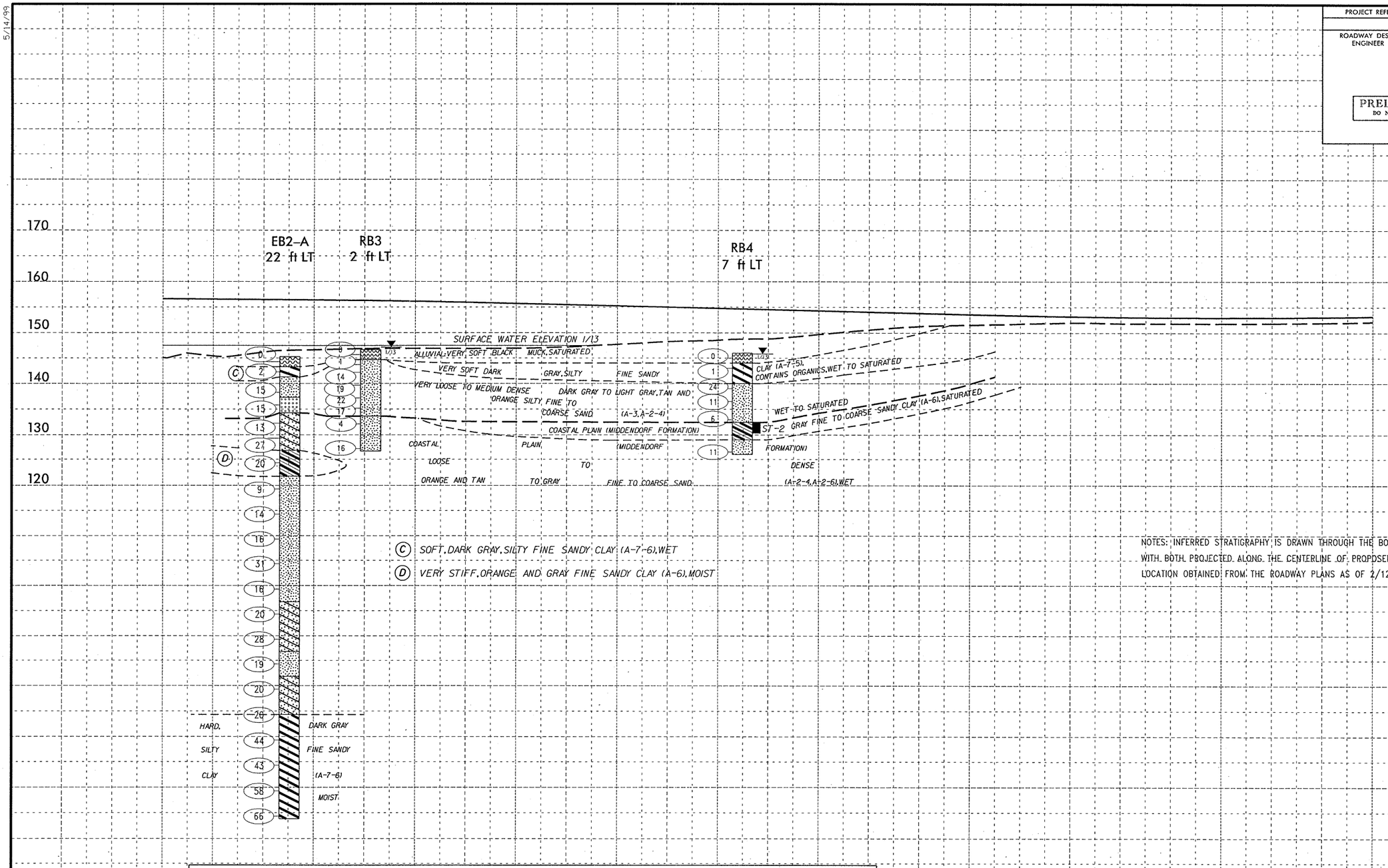
4/1/2013
...\Inventory Profile Sheet 1
1:56:21 PM

14 15 16 17 18 19 20

5/14/99

PROJECT REFERENCE NO.	SHEET NO. 7
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



(C) SOFT,DARK GRAY,SILTY FINE SANDY CLAY (A-7-6),WET

(D) VERY STIFF,ORANGE AND GRAY FINE SANDY CLAY (A-6),MOIST

NOTES: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ALONG THE CENTERLINE OF PROPOSED -L- PROFILE. LOCATION OBTAINED FROM THE ROADWAY PLANS AS OF 2/12/13

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		
ST-2	7 LT	22+87	13.5-15.5	A-6 (3)	38	20	24.4	39.5	7.6	28.5	99.8	83.3	40.2	42.2	-

4/1/2013
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20 21 22 23 24 25 26

8/23/99

PROJ. REFERENCE NO.	SHEET NO.
B-5551	8

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

165
160
155
150
145
140
135
130

2:1

2:1

52.74

ROADWAY EMBANKMENT

ALLUVIAL: VERY SOFT TO MEDIUM STIFF BROWN, BLACK AND GRAY FINE SANDY CLAY (A-6) WITH WOOD FRAGMENTS, WET

VERY LOOSE GRAY FINE SAND (A-2-4) WITH WOOD FRAGMENTS, WET

VERY SOFT DARK GRAY CLAY (A-7-6) WITH SOME FINE TO COARSE SAND, CONTAINS WOOD FRAGMENTS, WET TO SATURATED

ALLUVIAL

COASTAL PLAIN (MIDDENDORF FORMATION)

MEDIUM DENSE

LIGHT GRAY FINE TO COARSE SAND (A-2-4), WET

16+00.00

4/1/2013
8:\Working\tpo\d0430728\B-5551_GEO_xs1_L.dgn
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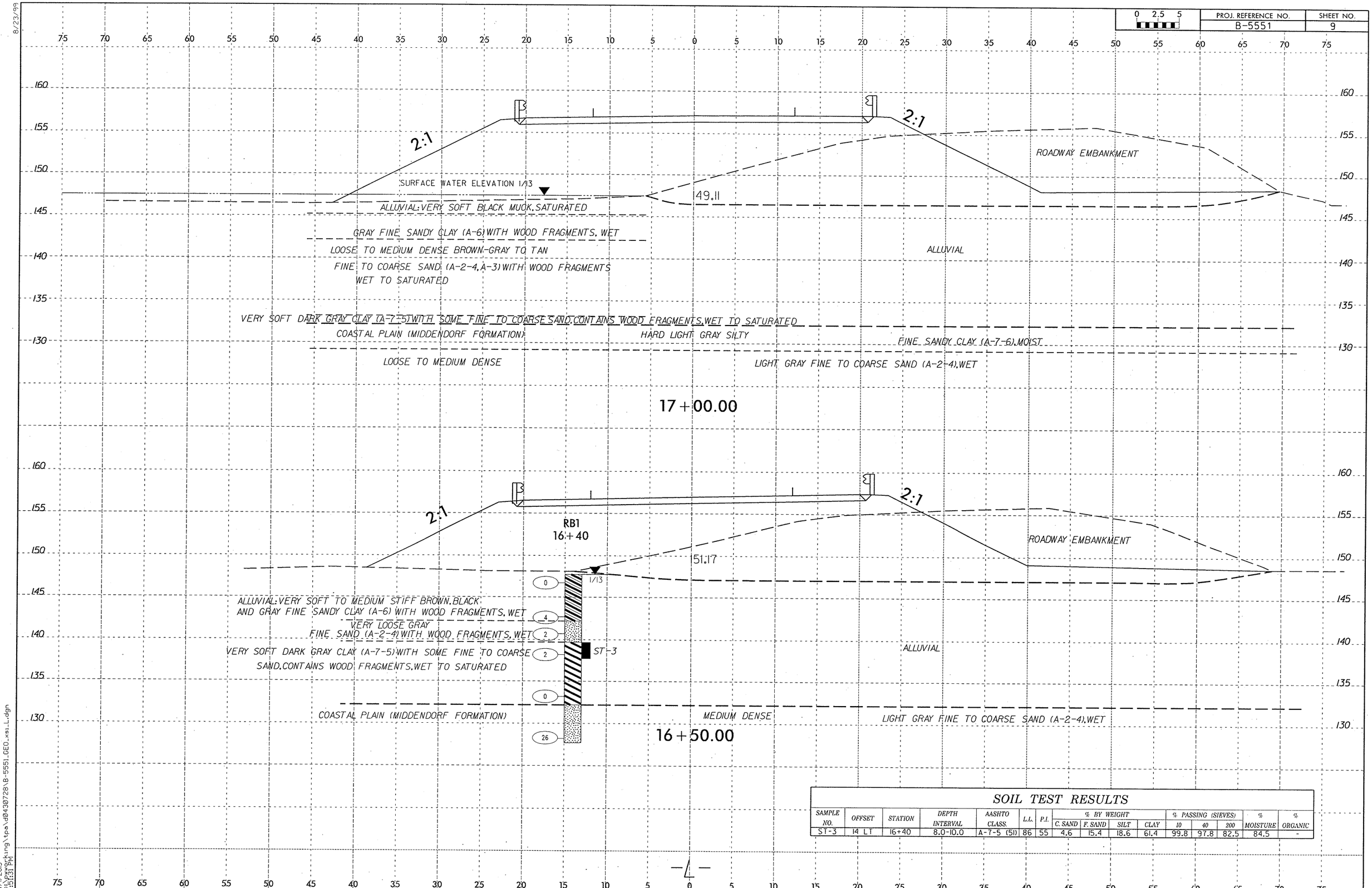
0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-5551	9



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		
ST-3	14 LT	16+40	8.0-10.0	A-7-5 (51)	86	55	4.6	15.4	18.6	61.4	99.8	97.8	82.5	84.5	-

4/1/2013
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8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-5551	10

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

160 155 150 145 140 135 130

2:1

2:1

RB2
17+96

1/13

SURFACE WATER ELEVATION 1/13

147.47

ALLUVIAL: VERY SOFT BLACK MUCK, SATURATED

LOOSE TO MEDIUM DENSE BROWN-GRAY TO TAN
FINE TO COARSE SAND (A-2-4, A-3) WITH WOOD FRAGMENTS
WET TO SATURATED

HARD LIGHT GRAY FINE

LOOSE LIGHT GRAY FINE

0 14 12 8 54 9

ROADWAY EMBANKMENT

ALLUVIAL

SANDY CLAY (A-7-6), MOIST
TO COARSE SAND (A-2-4), WET

18+00.00

2:1

2:1

ROADWAY EMBANKMENT

SURFACE WATER ELEVATION 1/13

147.15

ALLUVIAL: VERY SOFT BLACK MUCK, SATURATED

LOOSE TO MEDIUM DENSE BROWN-GRAY TO TAN
FINE TO COARSE SAND (A-2-4, A-3) WITH WOOD FRAGMENTS
WET TO SATURATED

COASTAL PLAIN (MIDDENDORF FORMATION)

COASTAL PLAIN (MIDDENDORF FORMATION)

ALLUVIAL

HARD LIGHT GRAY FINE SANDY CLAY (A-7-6), MOIST

LOOSE LIGHT GRAY FINE TO COARSE SAND (A-2-4), WET

17+50.00

4/1/2013
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8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-5551	11

BEGIN BRIDGE 18+52.00

2:1

2:1

EB1-A
18+55
SS-4
SS-5
SS-14

SURFACE WATER ELEVATION 1/13

1/13

ROADWAY EMBANKMENT

46.09

ALLUVIAL

ALLUVIAL:

1
3

VERY SOFT BLACK MUCK, SATURATED

VERY LOOSE TO LOOSE

4
4

TAN, TO GRAY, SILTY FINE TO COARSE SAND (A-2-4), WET

COASTAL PLAIN

3

(MIDDENDORF FORMATION)

VERY LOOSE TO MEDIUM DENSE

LIGHT GRAY, FINE TO COARSE SAND (A-2-4), WET TO SATURATED

5

18

STIFF

11

DARK GRAY, FINE SANDY SILT (A-4), WITH MICA, MOIST

16

MEDIUM DENSE TO DENSE

30

LIGHT GRAY, SILTY FINE TO COARSE SAND (A-2-4)

WET TO SATURATED

19

47

41

16

29

27

50

39

50

65

HARD DARK GRAY, SILTY FINE SANDY CLAY (A-7-6) DRY TO MOIST

18+50.00

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-4	29 LT	18+55	8.5-10.0	A-2-4 (0)	25	NP	39.2	40.9	2.6	17.3	99.8	90.9	20.7	26.5	-
SS-5	29 LT	18+55	12.0-13.5	A-2-4 (0)	23	5	78.3	9.1	1.2	11.4	91.4	33.8	12.2	18.6	-
SS-14	29 LT	18+55	57.0-58.5	A-2-4 (0)	33	NP	28.2	47.5	6.2	18.1	99.2	89.6	25.7	27.1	-

4/1/2013
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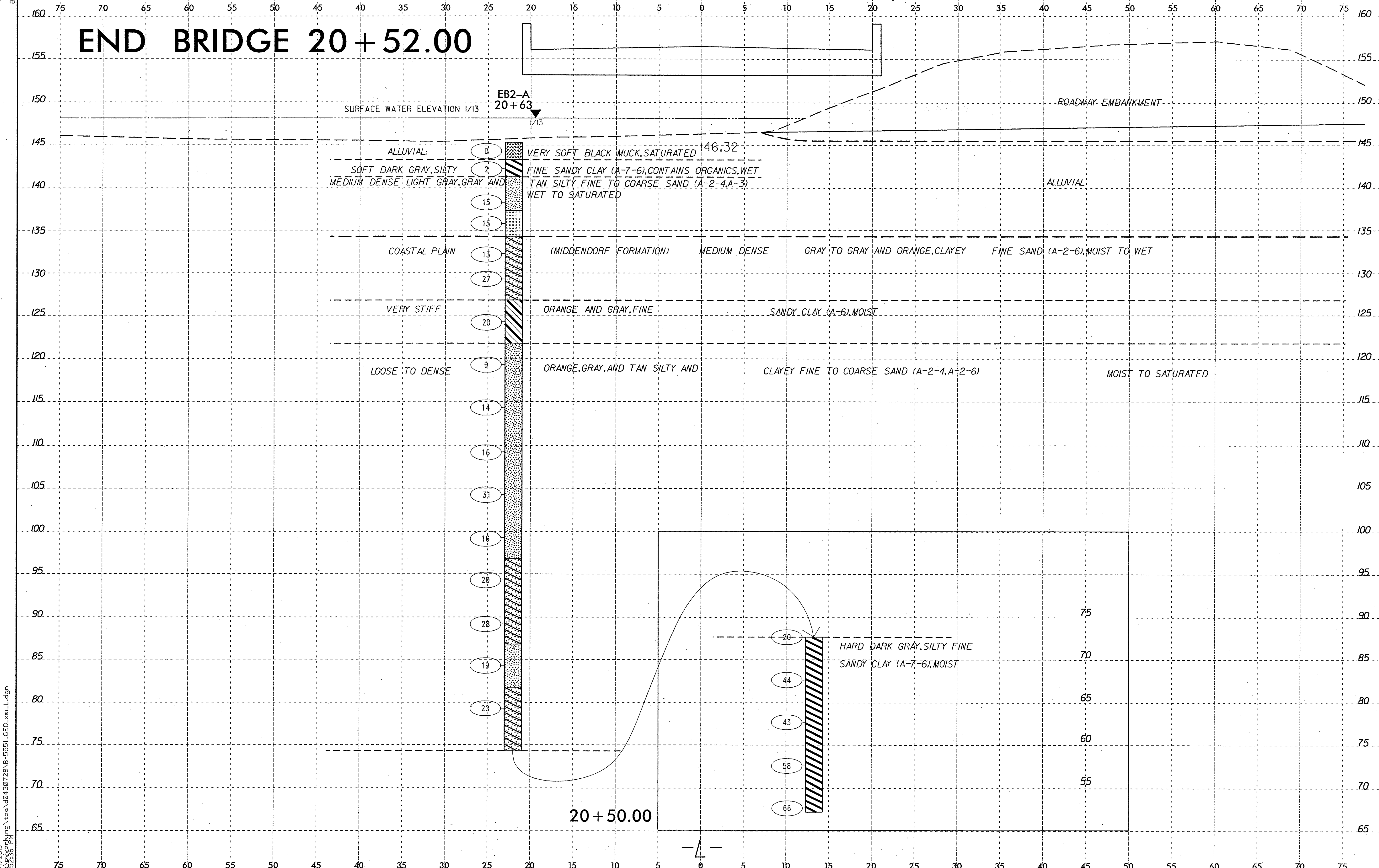
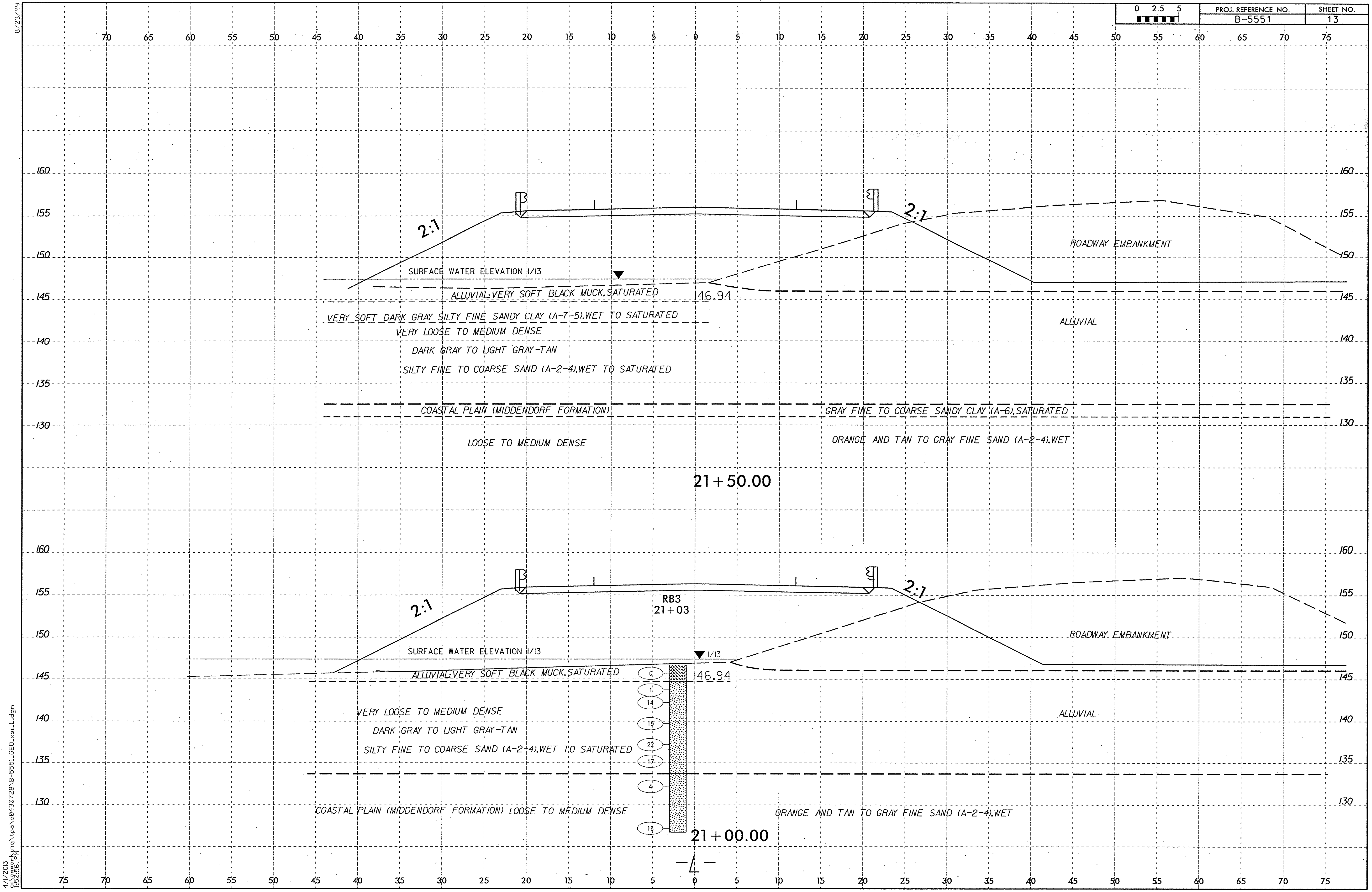
PROJ. REFERENCE NO.	SHEET NO.
B-5551	12

END BRIDGE 20+52.00





8/23/99
PROJ. REFERENCE NO.
B-5551
SHEET NO.
13
0 2.5 5
2:1
2:1
SURFACE WATER ELEVATION 1/13
ALLUVIAL:VERY SOFT BLACK MUCK,SATURATED
146.94
VERY SOFT DARK GRAY SILTY FINE SANDY CLAY (A-7-5),WET TO SATURATED
VERY LOOSE TO MEDIUM DENSE
DARK GRAY TO LIGHT GRAY-TAN
SILTY FINE TO COARSE SAND (A-2-4),WET TO SATURATED
COASTAL PLAIN (MIDDENDORF FORMATION)
GRAY FINE TO COARSE SANDY CLAY (A-6),SATURATED
LOOSE TO MEDIUM DENSE
ORANGE AND TAN TO GRAY FINE SAND (A-2-4),WET
ROADWAY EMBANKMENT
ALLUVIAL
21+50.00
2:1
2:1
RB3
21+03
SURFACE WATER ELEVATION 1/13
1/13
ALLUVIAL:VERY SOFT BLACK MUCK,SATURATED
146.94
VERY LOOSE TO MEDIUM DENSE
DARK GRAY TO LIGHT GRAY-TAN
SILTY FINE TO COARSE SAND (A-2-4),WET TO SATURATED
COASTAL PLAIN (MIDDENDORF FORMATION) LOOSE TO MEDIUM DENSE
ORANGE AND TAN TO GRAY FINE SAND (A-2-4),WET
ROADWAY EMBANKMENT
ALLUVIAL
21+00.00
4/1/2013
1:52:56 PM

8/23/99

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	B-5551	14

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

160 155 150 145 140 135 130

2:1

2:1

ROADWAY EMBANKMENT

SURFACE WATER ELEVATION 1/13

48.34

ALLUVIAL: VERY SOFT BLACK MUCK, SATURATED

VERY SOFT DARK GRAY, FINE SANDY CLAY (A-7-5), CONTAINS ORGANICS, WET TO SATURATED

ALLUVIAL

MEDIUM DENSE LIGHT GRAY-TAN AND ORANGE SILTY FINE TO COARSE SAND (A-2-4), MOIST TO WET

COASTAL PLAIN (MIDDENDORF FORMATION)

GRAY FINE TO COARSE SANDY CLAY (A-6), SATURATED

MEDIUM DENSE ORANGE AND TAN

TO GRAY FINE TO COARSE SAND (A-2-4), WET

22+50.00

160 155 150 145 140 135 130

2:1

2:1

ROADWAY EMBANKMENT

SURFACE WATER ELEVATION 1/13

47.30

ALLUVIAL: VERY SOFT BLACK MUCK, SATURATED

VERY SOFT DARK GRAY, FINE SANDY CLAY (A-7-5), CONTAINS ORGANICS, WET TO SATURATED

ALLUVIAL

MEDIUM DENSE LIGHT GRAY-TAN AND ORANGE SILTY FINE TO COARSE SAND (A-2-4), MOIST TO WET

COASTAL PLAIN (MIDDENDORF FORMATION)

GRAY FINE TO COARSE SANDY CLAY (A-6), SATURATED

MEDIUM DENSE ORANGE AND TAN

22+00.00

TO GRAY FINE TO COARSE SAND (A-2-4), WET

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

4/1/2013
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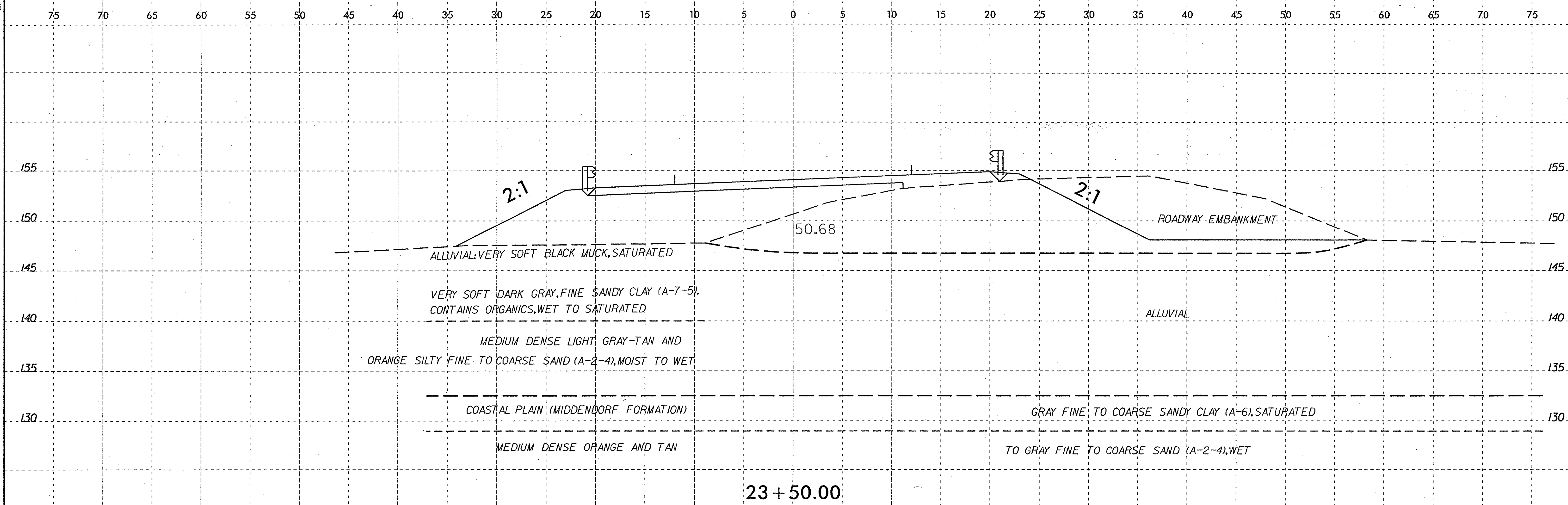
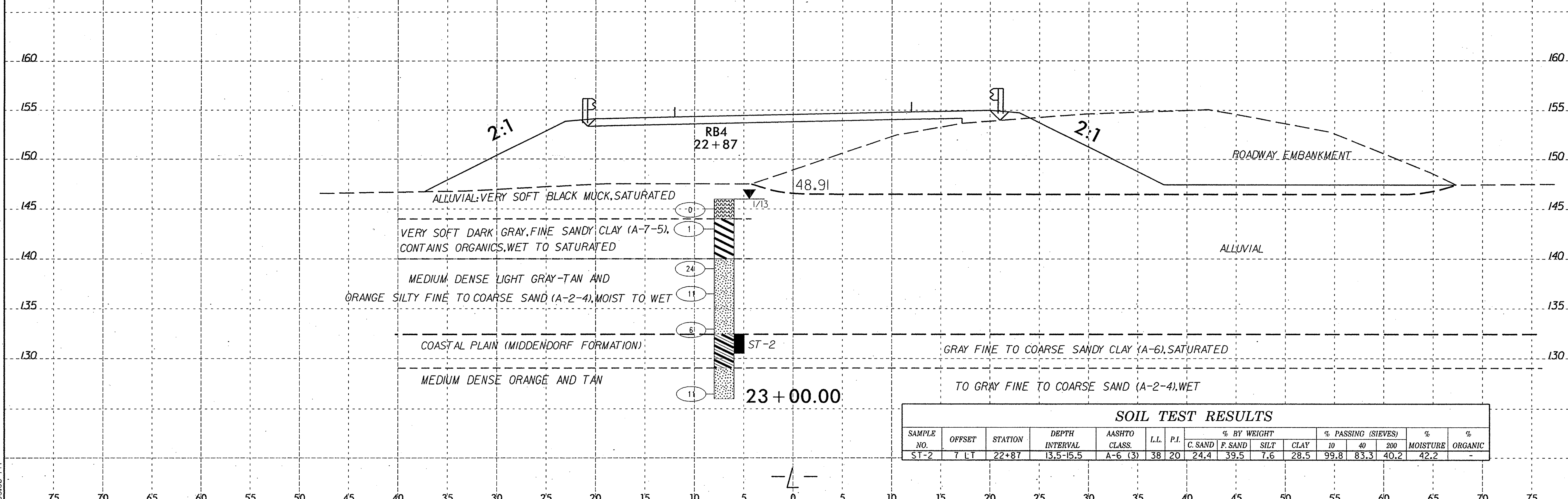
PROJ. REFERENCE NO.	SHEET NO.
B-5551	15





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		
ST-2	7 LT	22+87	13.5-15.5	A-6 (3)	38	20	24.4	39.5	7.6	28.5	99.8	83.3	40.2	42.2	-

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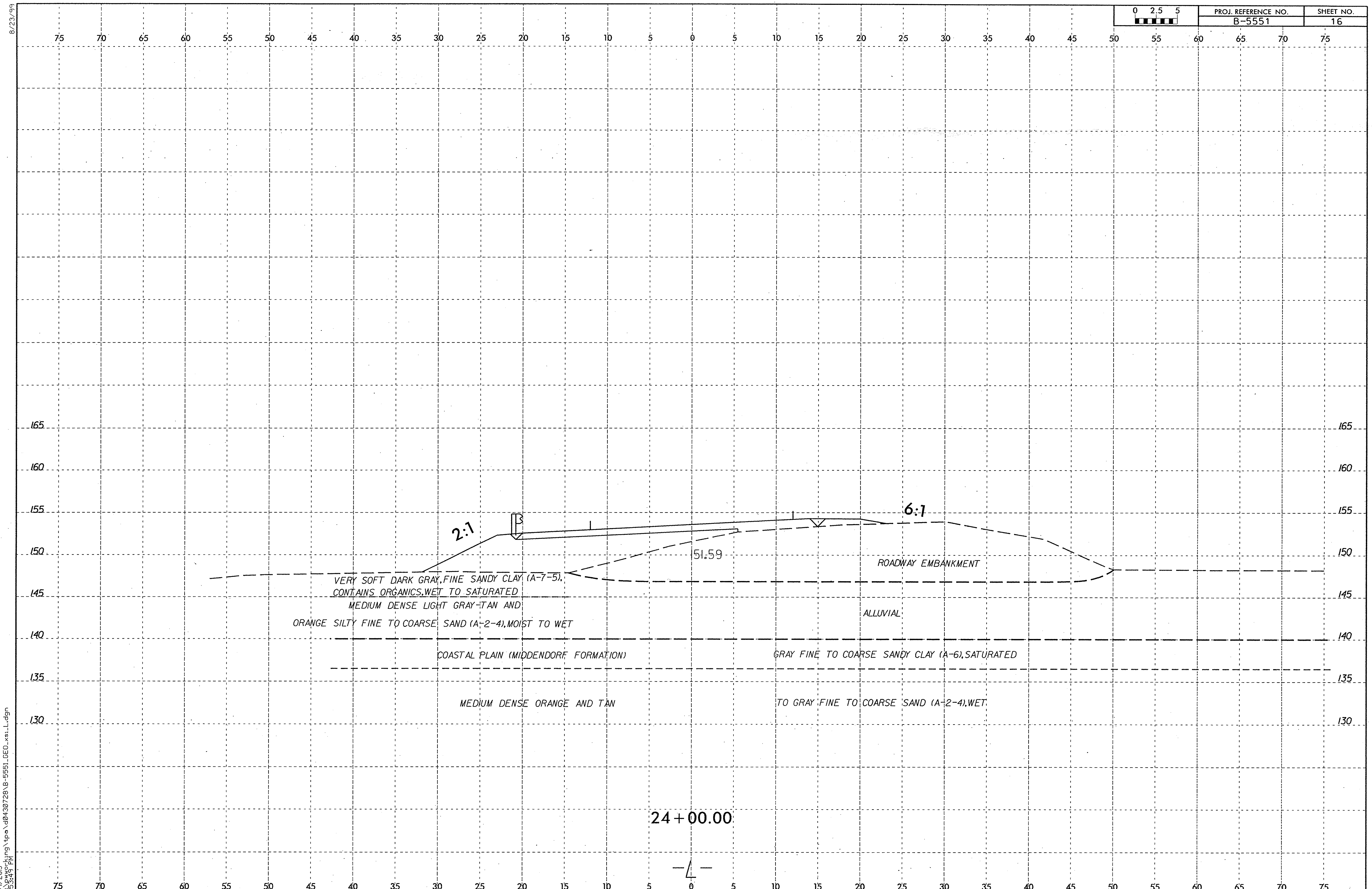

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WBS 43684.3.1	**TIP** B-5551	**COUNTY** SCOTLAND	**GEOLOGIST** Batten, M.
SITE DESCRIPTION Bridge No. 18 over Leith's Creek on US 501			**GROUND WTR (ft)**
BORING NO. RB2(1)	**STATION** 17+93	**OFFSET** 2 ft LT	**ALIGNMENT** -L- **0 HR.** -0.5
COLLAR ELEV. 146.8 ft	**TOTAL DEPTH** 5.0 ft	**NORTHING** 341,506	**EASTING** 1,869,013 **24 HR.** -0.5
DRILL RIG/HAMMER EFF./DATE MAD25152 Diedrich D-25 75% 7/16/2012		**DRILL METHOD** Mud Rotary 3-7/8" Drag Bit	**HAMMER TYPE** Automatic
DRILLER Fowler, B.	**START DATE** 01/23/13	**COMP. DATE** 01/23/13	**SURFACE WATER DEPTH** 0.5ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
150										
										146.8 GROUND SURFACE 0.0
145	144.8	2.0								**ALLUVIAL** Black MUCK
	143.3	3.5	1	WOH	WOH	0 10		W		143.3 3.5
			3	4	6			W		141.8 Light gray-brown, fine SAND (A-3) 5.0
										Boring Terminated at Elevation 141.8 ft in SAND

NOTES:

1) Offset boring taken for RB2-A because SPT's could not be properly performed at 1.5' and 3.5' in depth after Shelby tubes were pushed.

Note water surface at 0.5ft above ground surface