STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4194	1	15

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
33541.1.1	BRZ-1129 (9)	P.E.
33541.2.1	BRZ-1129 (9)	R/W & UTILITIES
33541.3.1	BRZ-1129 (9)	CONSTRUCTION

NOTE: SEE SHEET 1A FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

CONTENTS

LINE	STATION	PLAN	PROFILE	XSECT
-L-	10+30 - 25+00	4	5	6-16

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

ROADWAY SUBSURFACE INVESTIGATION

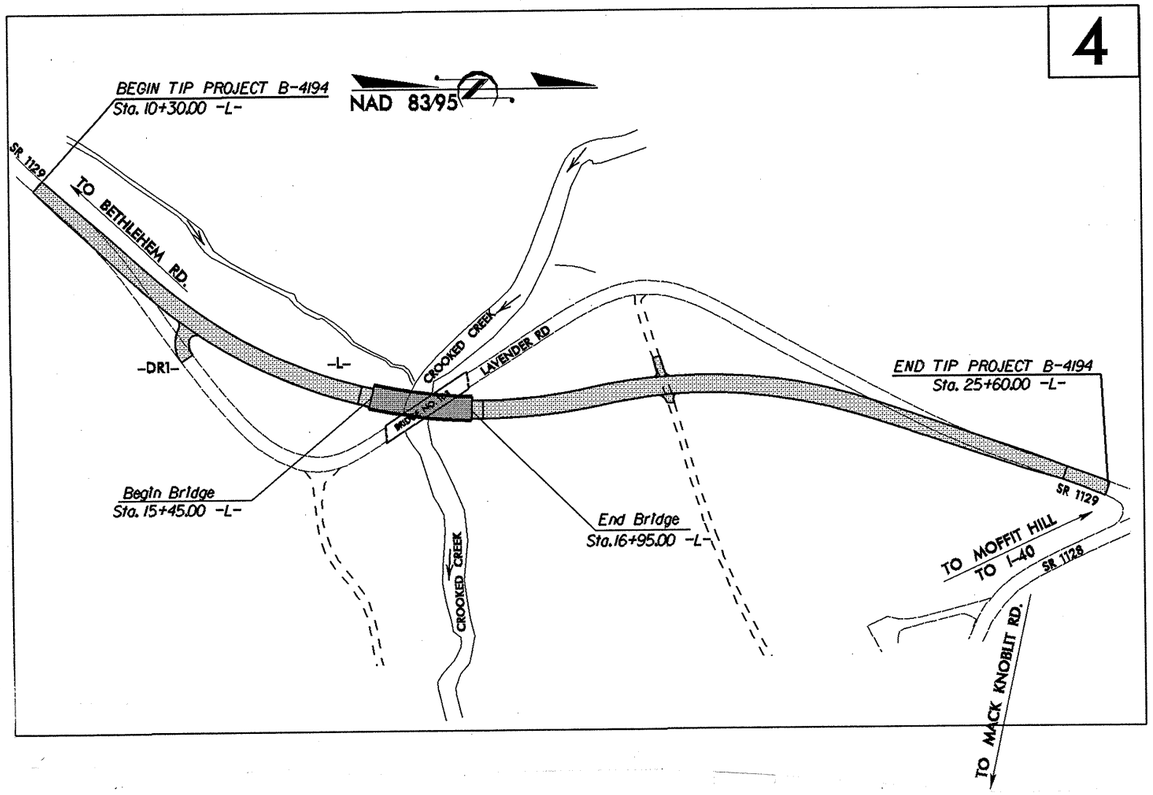
PROJ. REFERENCE NO. 33541.1.1 (B-4194) F.A. PROJ. BRZ-1129 (9)

COUNTY MCDOWELL

PROJECT DESCRIPTION BRIDGE NO. 103 ON SR-1129 OVER CROOKED CREEK.

INVENTORY

4



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.

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 THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

PERSONNEL

M.M. HAGER

P.Q. LOCKAMY

G.K. ROSE

D.O. CHEEK

INVESTIGATED BY M.M. HAGER

CHECKED BY W.D. FRYE, Jr

SUBMITTED BY W.D. FRYE, Jr

DATE APRIL, 2006

NORTH CAROLINA LICENSED SEAL 2040 GEOLOGIST MICHAEL McCLAIN HAGER
Michael M. Hager
05-08-2006

DRAWN BY: M.M. HAGER

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

NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

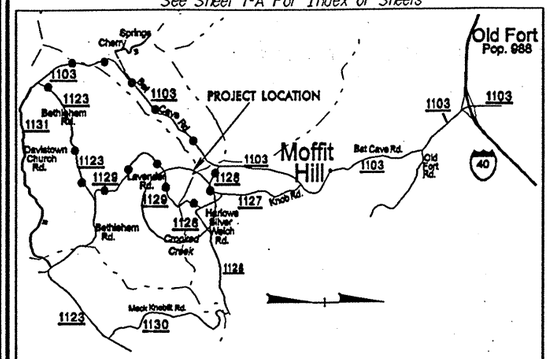
CONTRACT: C201871 ID: B-4194

09/08/99

TIP PROJECT: B-4194

CONTRACT:

See Sheet 1-A For Index of Sheets



VICINITY MAP

OFF SITE DETOUR ROUTE

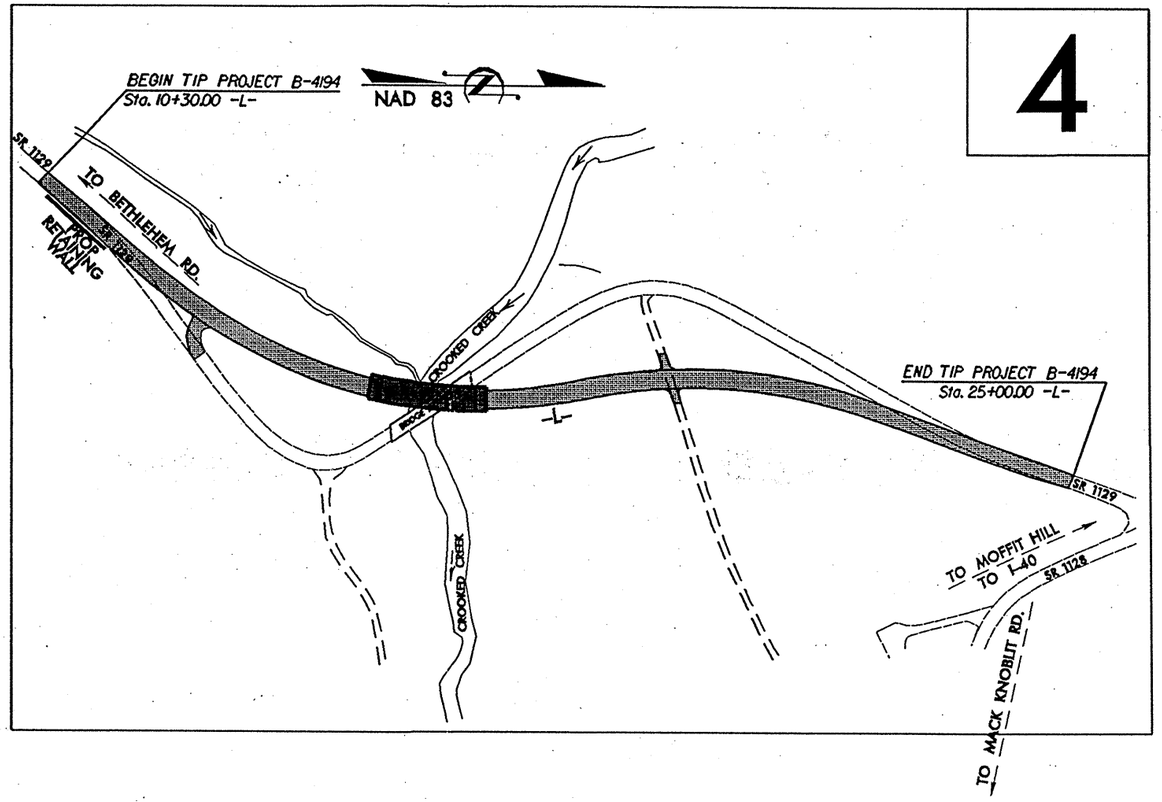
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

McDOWELL COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4194	1A	
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	
33541.1.1	BRZ-1129 (9)	P.E.	

LOCATION: ***BRIDGE NO. 103 OVER CROOKED CREEK ON SR 1129***

TYPE OF WORK: ***GRADING, PAVING, DRAINAGE, BRIDGE, AND GUARDRAIL.***



THIS PROJECT IS NOT IN THE CITY LIMITS OF ANY MUNICIPALITY
**DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED (45mph) and HORIZONTAL STOPPING SIGHT DISTANCE

CLEARING ON THIS PROJECT SHALL BE BY METHOD____

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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 2005 = 585 VPD
ADT 2025 = 1000 VPD
DHV = 12 %
D = 65 %
T = 3 % *
** V = 45 MPH
* TTST 1 % *DUAL 2 %
FUNC CLASS = LOCAL

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4194 = MI.
LENGTH STRUCTURE TIP PROJECT B-4194 = MI.
TOTAL LENGTH TIP PROJECT B-4194 = 0.278 MI.

Prepared In the Office of:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: *February 16, 2007*

LETTING DATE: *February 19, 2008*

JAMES A. SPEER, PE
PROJECT ENGINEER

JOHN C. LANSFORD, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA

P.E.
STATE DESIGN ENGINEER

DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR *DATE*

30-JAN-2006 16:32
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$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
3354.1.1 (B-4194)	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	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/FT²)
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 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
γd - DRY UNIT WEIGHT

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] MOBILE B-___
- [ ] BK-51
- [X] CME-45C
- [ ] CME-550
- [ ] PORTABLE HOIST
- [ ] _____
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [X] 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: NCDOT GPS B4194-2
145.16' LT OF -L- STATION 19+26.29
ELEVATION: 1449.11' FT.

NOTES:
ALL BORING COLLAR ELEVATIONS ASSUMED

REVISED 02/23/06

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

April 2006

STATE PROJECT: 33541.1.1 (B-4194)
FA PROJECT: BRZ-1129 (9)
COUNTY: McDOWELL

DESCRIPTION: Approaches to Bridge No. 103 on SR-1129 over Crooked Creek

SUBJECT: Geotechnical Report- Inventory

PROJECT DESCRIPTION

This project is located in southwest McDowell Co. 3.3 miles southeast of Old Fort, NC. The realignment of bridge approaches to a proposed bridge replacement was investigated. The proposed alignment will detour from the existing alignment at -L- station 10+30, bearing east-northeast toward -L- station 25+00 where it ties back into the existing roadway.

A field investigation of the project was conducted in March of 2006. A CME-45 B track mounted power drill was utilized for the subsurface investigation of 950' linear feet of proposed roadway alignment. Ten borings, mostly spaced on 100' intervals along -L- were advanced with 8" hollow stem augers. Standard Penetration Tests were performed on 5' vertical intervals at each boring location. Twenty-five samples for quality and one moisture sample was collected and submitted to the Materials and Tests Unit for analysis.

Line -L- was investigated from stations 10+30 to 23+00.

PHYSIOGRAPHY AND GEOLOGY

The project falls in the western margin of the Piedmont Geologic Province in the Ashe formation between the Brevard Fault zone and the Tumblebug Creek Fault.

The terrain surrounding the project is moderately flat to precipitous. The specific study area is flat to rolling as it crosses the flood plain of Crooked Creek and a small residual hillside.

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.DOH.DOT.STATE.NC.US

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

No outcropping rocks were encountered in the project study area but residual soils and or saprolite derivative of the Ashe Formation was drilled along the entire length of the roadway. Hard rock was only encountered in one preliminary boring for the proposed bridge at a depth of 45'. No rock is to be expected within construction limits of the project.

Alluvia encountered in the project are derivative of Crooked Creek and its confluence with an unnamed tributary and are comprised of sediments ranging from sandy silt to silt and sand infilled gravels. Crooked Creek drains the upper Catawba River Basin, flowing from its headwaters on Cross Mountain 5.5 miles west of the project area to its confluence with the Catawba River approximately 7 miles northeast of the project.

GROUNDWATER:

In the floodplain area directly bordering Crooked Creek groundwater may be expected at or near the creek surface elevation. Downstation from the creek crossing, the water table surface slopes up, towards the beginning of the project, coming to within 3.0' of the existing ground surface by -L- station 13+50. Upstation of the stream crossing the groundwater table slopes downward distally toward the end of the project.

No groundwater was encountered in the cutslope section of the project through the residual/saprolite hillside.

AREAS OF SPECIAL GEOTECHNICAL INTEREST:

1. Hard Rock: No rock was encountered in outcrop or within construction limits of the project. Material with SPT counts of 60/<0.1 was encountered in Boring-8 at an elevation of 1398'.

2. Alluvia: Shallow, very soft to soft, cohesive, soils were found to occur as a veneer like surface on top of granular, non cohesive soils across the floodplain of Crooked Creek. The following borings were found to have this soft material capping the alluvial sands and gravels:

Boring ID:	-L- Station:	Thickness
B-10	13+50, 0'	0.0'-9.7'
B-9	14+50, 0'	0.0'-8.9'
B-8	15+50, 18.0' LT	0.0'-5.1'
B-7	17+00, 14.5' RT	0.0'-4.3'
B-6	18+00, 0'	0.0'-8.7'
B-5	15+00, 0'	0.0-12.0'

3. Groundwater: Groundwater was encountered within 6' of the existing ground surface in the following borings, 24 hours post drilling:

Boring ID:	-L- Station:	Depth to Groundwater:
B-10	13+50, 0'	-3.0'
B-9	14+50, 0'	-5.0'

* Groundwater was not encountered within 6.0' of proposed grade or within 2.0' of the existing ground surface across the study area. Borings 1 through 4 were all caved-in and dry 24 hours after drilling. Assuming that the cave-in elevation in each of the four borings is equivalent to the static groundwater elevation, the groundwater level in Boring No. 1 may fall within 7.0' of proposed grade 30' right of -L- station 23+00.

GEOTECHNICAL DESCRIPTIVE ANALYSIS:

This project may be subdivided into two distinct areas based on geotechnical and geographical interpretation:

Area-1: -L- stations 12+85 to 19+60

From the existing toe of embankment located at -L- centerline station 12+85, area one extends east-northeast across the floodplain and low lying areas surrounding Crooked Creek to -L- centerline station 19+60. Embankment fill heights, measured above the existing ground surface to the proposed grade, will range from 11.0' to 4.0', generally decreasing with height in the upstation direction.

In the first portion of the project, alluvial sediments were found to fall within three major classifications based on sieve analysis:

1) The most upper division of alluvial sediments (see profile sheet 5, unit B) occurs as a veneer like coating across the studied flood plain area. This unit is comprised of very soft to soft, dark brown to tan to gray, fine sandy silt with intermittent lenses of fine to coarse sand, silt, and the occasional layer of slightly organic material. Thickness of this unit ranges from 3' on the north side of the creek and up to almost 10' on the south side.
2) The middle division of Area-1 alluvial sediments (see profile sheet 5, unit C) occurs distinctly only in Boring No. 7. This unit is comprised of tan-brown to dark gray, loose to medium dense, slightly silty fine to coarse sands.
3) The lowest division of Area-1 alluvial sediments (see profile sheet 5, unit E) is the basal gravel unit found in contact with the underlying saprolite across flood plain. The gravel is composed of gray to tan, loose, sub-rounded to rounded, coarse sand and pebbles infilled with silty fine sand. Unit thickness ranges from almost six feet to less than half a foot.

The previously mentioned suite of alluvial sediments lies in direct contact with underlying saprolitic silts and sands and combinations thereof. The saprolite occurs at a median elevation of 1431.5' ranging only 1.5' up or down through Area-1. Saprolite across Area-1 occurs as orange-brown to tan, loose to medium dense, slightly silty fine to coarse sand with mica. The ratio of silt to sand in the saprolite changes across the project from a sand rich ratio in the south to a silt rich ratio in the north.

A nearly uniformly 8' thick unit of weathered rock lies directly below saprolite in borings 7 and 8 at elevations 1414.7' and 1410.1' respectively. The lower contact of the weathered rock is bordered in both "deep" borings by a rind of saprolite.

Only in Boring No. 8 was the lower contact of the second saprolite unit penetrated at elevation 1398.4'. Hard rock was encountered at this elevation and the boring was terminated after refusal was reached at 1395.6'.

Area-2: -L- stations 19+60 to 25+00

The absence of alluvial soils and the presence of a residual cap on top of the previously mentioned saprolite define the second portion of the study area. From -L- centerline station 19+60 to the end of the drilled study area lies Area-2, all of which falls in a proposed cut area. Roadway slope cuts will be as deep as 20' along the proposed centerline as measured from the existing ground surface line down to the proposed grade line.

Material in Area-2 may be subdivided into two distinct units:

The capping residual soil exists as a thin topping of tan orange to orange, medium stiff to stiff, slightly clayey fine sandy silt and slightly silty fine sand. This unit ranges in thickness from 7' to 4'. Sub-rounded to sub-angular cobbles and boulders can be found intermittently throughout the residual strata.

Below the residual cap lies the previously mentioned saprolite formed from the weathering of Ashe Formation gneiss. Material in this portion of the saprolite is described as orange to gray, medium stiff to very stiff, fine sandy silt with lenses of fine to coarse sand, kaolin, and quartz seams. The saprolite is most likely one conformable across the entire length of the study area.

Respectfully Submitted,

Michael M. Hager
05-08-2006
Michael McClain Hager, LG

EARTHWORK BALANCE SHEET

Volumes in Cubic Yards

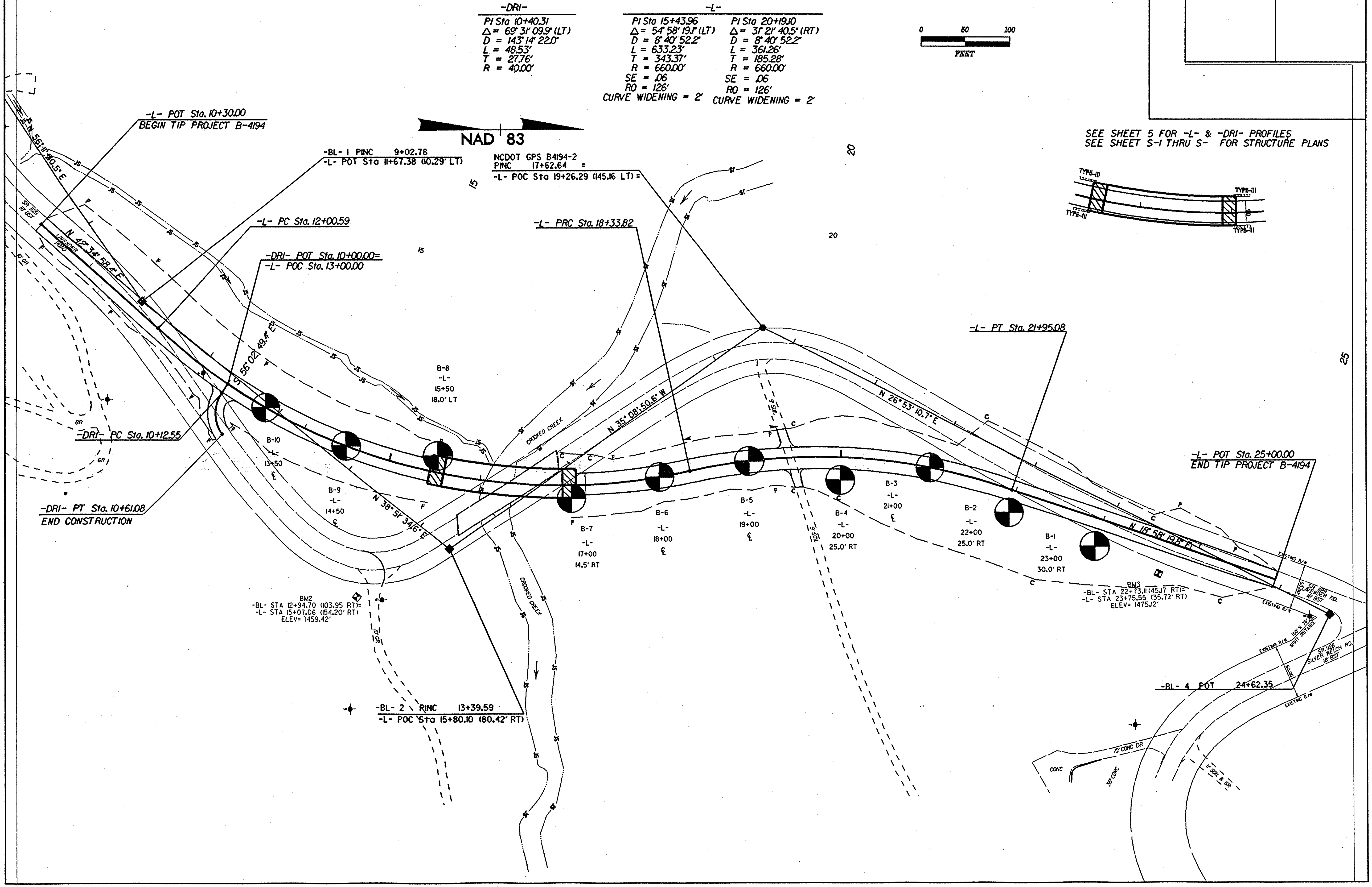
PROJECT B-4194 COUNTY McDowell DATE : 12/11/2007 SHEET 3 OF 15

RD10S01C

LINE	STATION	STATION	TOTAL EXCAV. (UNCL.)	ROCK EXCAV.	UNDERCUT	UNSUIT. EXCAV.	SUITABLE EXCAV.	TOTAL EMB.	ROCK EMB.	EARTH EMB.	EMBANK. +15%	BORROW	SUITABLE WASTE	UNSUIT. WASTE	TOTAL WASTE
-L-	10+30	15+45	150				150	7174		7174	8250	8100			
-DR1-	10+12	10+76.15	1				1	3		3	3	2			
		Subtotal	151				151	7177		7177	8253	8102			
-L-	16+95	25+00	15963				15963	2310		2310	2657		13306		13306
		Subtotal	15963				15963	2310		2310	2657		13306		13306
	Total		16114				16114	9487		9487	10910	8102	13306		13306
	Grading Under Bridge														
	15+50	16+95	706				706						706		706
	Project Total		16820				16820	9487		9487	10910	8102	14012		14012
	Loss for C&G		-750				-750						-750		-750
Waste in Lieu of Borrow												-8102	-8102		-8102
	GRAND	TOTALS	16070				16070	9487		9487	10910		5160		5160
		SAY	16100												
	Additional Undercut				50										
	DDE = 250 CY														
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.															
SHEET TOTALS:															

PROJECT REFERENCE NO.	SHEET NO.
B-4194	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

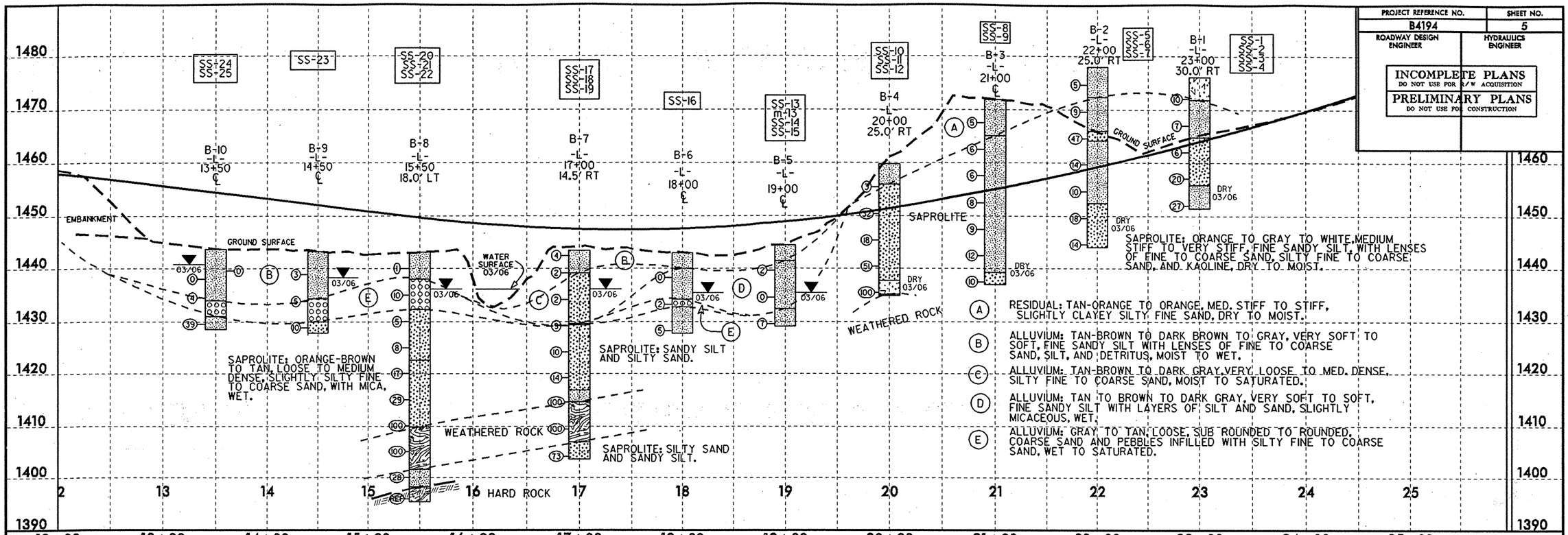
GEOTECHNICAL PLAN VIEW



-DRI-
PI Sta 10+40.31
Δ = 69° 31' 09.9" (LT)
D = 143° 14' 22.0"
L = 48.53'
T = 27.76'
R = 40.00'
-L-
PI Sta 15+43.96
Δ = 54° 58' 19.1" (LT)
D = 8° 40' 52.2"
L = 633.23'
T = 343.37'
R = 660.00'
SE = .06
RO = 126'
CURVE WIDENING = 2'
PI Sta 20+19.10
Δ = 31° 21' 40.5" (RT)
D = 8° 40' 52.2"
L = 361.26'
T = 185.28'
R = 660.00'
SE = .06
RO = 126'
CURVE WIDENING = 2'
0 50 100
FEET
NAD 83
SEE SHEET 5 FOR -L- & -DRI- PROFILES
SEE SHEET S-1 THRU S- FOR STRUCTURE PLANS
TYPE-III
-L- POT Sta. 10+30.00
BEGIN TIP PROJECT B-4194
-BL- 1 PINC 9+02.78
-L- POT Sta 11+67.38 (10.29' LT)
NCDOT GPS B4194-2
PINC 17+62.64 =
-L- POC Sta 19+26.29 (145.16 LT) =
-L- PC Sta. 12+00.59
-L- PRC Sta. 18+33.82
-DRI- POT Sta. 10+00.00=
-L- POC Sta. 13+00.00
-L- PT Sta. 21+95.08
N 42° 34' 58.4" E
S 56° 02' 49.4" E
N 35° 08' 50.6" W
N 26° 53' 10.7" E
N 38° 51' 34.6" E
N 18° 58' 19.8" E
-DRI- PC Sta. 10+12.55
-DRI- PT Sta. 10+61.08
END CONSTRUCTION
-L- POT Sta. 25+00.00
END TIP PROJECT B-4194
CROOKED CREEK
B-8 -L- 15+50 18.0' LT
B-10 -L- 13+50 ℄
B-9 -L- 14+50 ℄
B-7 -L- 17+00 14.5' RT
B-6 -L- 18+00 ℄
B-5 -L- 19+00 ℄
B-4 -L- 20+00 25.0' RT
B-3 -L- 21+00 ℄
B-2 -L- 22+00 25.0' RT
B-1 -L- 23+00 30.0' RT
BM2
-BL- STA 12+94.70 (103.95 RT)=
-L- STA 15+07.06 (154.20' RT)
ELEV= 1459.42'
BM3
-BL- STA 22+73.11 (45.17 RT)=
-L- STA 23+75.55 (35.72' RT)
ELEV= 1475.12'
-BL- 2 RINC 13+39.59
-L- POC Sta 15+80.10 (80.42' RT)
-BL- 4 POT 24+62.35
SR 1108 SILVER WELCH RD. 18' BST
SR 1109 LAVENDER RD. 18' BST
EXISTING R/W
10' CONC DR
CONC

PROJECT REFERENCE NO.	SHEET NO.
B4194	5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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



(A) RESIDUAL: TAN-ORANGE TO ORANGE, MED. STIFF TO STIFF, SLIGHTLY CLAYEY SILTY FINE SAND, DRY TO MOIST.

(B) ALLUVIUM: TAN-BROWN TO DARK BROWN TO GRAY, VERY SOFT TO SOFT, FINE SANDY SILT WITH LENSES OF FINE TO COARSE SAND, SILT, AND DETRITUS, MOIST TO WET.

(C) ALLUVIUM: TAN-BROWN TO DARK GRAY, VERY LOOSE TO MED. DENSE, SILTY FINE TO COARSE SAND, MOIST TO SATURATED.

(D) ALLUVIUM: TAN TO BROWN TO DARK GRAY, VERY SOFT TO SOFT, FINE SANDY SILT WITH LAYERS OF SILT AND SAND, SLIGHTLY MICACEOUS, WET.

(E) ALLUVIUM: GRAY TO TAN, LOOSE, SUB ROUNDED TO ROUNDED, COARSE SAND AND PEBBLES INFILLED WITH SILTY FINE TO COARSE SAND, WET TO SATURATED.

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-1	30' RT	23+00	3.5-4.2	A-5(2)	41	NP	17	44	23	16	93	85	45	-	-
SS-2	30' RT	23+00	8.5-9.5	A-4(2)	34	NP	18	48	28	6	94	86	44	-	-
SS-3	30' RT	23+00	13.5-14.5	A-2-5(0)	47	NP	15	64	17	4	97	91	35	-	-
SS-4	30' RT	23+00	23.8-24.5	A-4(1)	36	NP	12	63	21	4	93	88	38	-	-
SS-5	25' RT	22+00	2.8-3.8	A-4(3)	29	NP	18	42	32	8	99	90	52	-	-
SS-6	25' RT	22+00	17.8-18.8	A-4(2)	32	NP	13	54	29	4	97	92	46	-	-
SS-7	25' RT	22+00	27.8-28.8	A-2-4(0)	28	NP	23	56	19	2	97	87	31	-	-
SS-8	0	21+00	18.8-19.8	A-4(2)	37	NP	17	51	28	4	98	90	47	-	-
SS-9	0	21+00	33.8-34.8	A-2-4(0)	38	NP	33	42	21	4	93	73	32	-	-
SS-10	25' RT	20+00	8.8-9.8	A-2-4(0)	31	NP	30	56	12	2	70	59	16	-	-
SS-11	25' RT	20+00	18.8-19.8	A-2-4(0)	26	NP	27	51	20	2	92	80	32	-	-
SS-12	25' RT	20+00	23.8-24.5	A-5(2)	46	NP	19	53	29	2	95	89	43	-	-
SS-13	0	19+00	4.4-5.4	A-4(8)	34	4	1	29	44	26	100	100	80	23.6	-
SS-14	0	19+00	9.4-10.4	A-4(5)	31	NP	4	53	31	12	100	99	59	-	-
SS-15	0	19+00	14.4-15.4	A-4(2)	34	NP	16	58	24	2	98	93	42	-	-
SS-16	0	18+00	4.2-5.2	A-4(3)	35	NP	4	61	29	6	100	100	48	-	-
SS-17	14.5' RT	17+00	14.1-14.8	A-2-5(0)	48	NP	25	59	14	2	100	87	31	-	-
SS-18	14.5' RT	17+00	28.8-29.4	A-4(2)	26	NP	19	54	25	2	98	88	43	-	-
SS-19	14.5' RT	17+00	38.8-39.8	A-2-4(0)	27	NP	23	56	21	0	94	84	34	-	-
SS-20	18' LT	15+50	13.1-14.1	A-2-5(0)	49	NP	26	52	18	4	100	86	35	-	-
SS-21	18' LT	15+50	28.1-29.1	A-2-4(0)	32	NP	28	47	21	4	92	77	33	-	-
SS-22	18' LT	15+50	43.1-44.1	A-4(1)	38	NP	17	57	24	2	100	95	39	-	-
SS-23	0	14+50	4.4-5.4	A-2-4(0)	36	NP	4	44	36	16	99	97	30	-	-
SS-24	0	13+50	5.5-6.2	A-4(7)	29	NP	1	46	39	14	100	100	67	-	-
SS-25	0	13+50	14.2-15.2	A-2-4(0)	28	NP	25	54	19	2	91	79	31	-	-

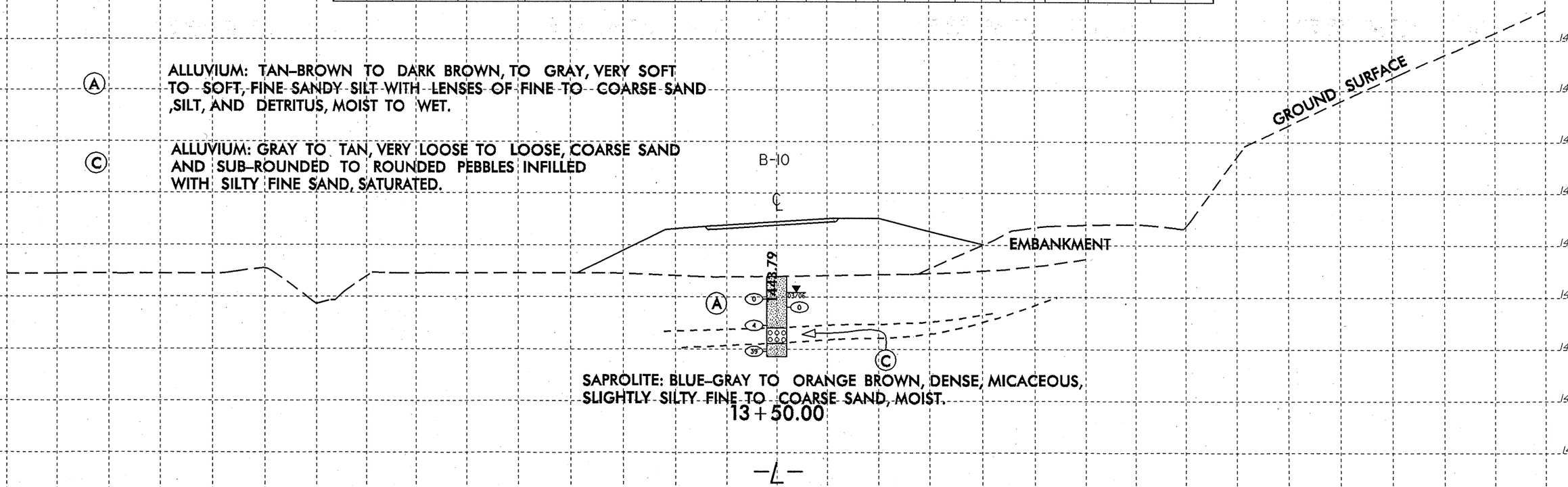
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-4194	6

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	% BY WEIGHT F.SAND	% BY WEIGHT SILT	% BY WEIGHT CLAY	% PASSING (SIEVES) 10	% PASSING (SIEVES) 40	% PASSING (SIEVES) 200	% MOISTURE	% ORGANIC
SS-24	0	13+50	5.5-6.2	A-4(7)	29	NP	1	46	39	14	100	100	67	-	-
SS-25	0	13+50	14.2-15.2	A-2-4(0)	28	NP	25	54	19	2	91	79	31	-	-

Ⓐ ALLUVIUM: TAN-BROWN TO DARK BROWN, TO GRAY, VERY SOFT TO SOFT, FINE SANDY SILT WITH LENSES OF FINE TO COARSE SAND ,SILT, AND DETRITUS, MOIST TO WET.

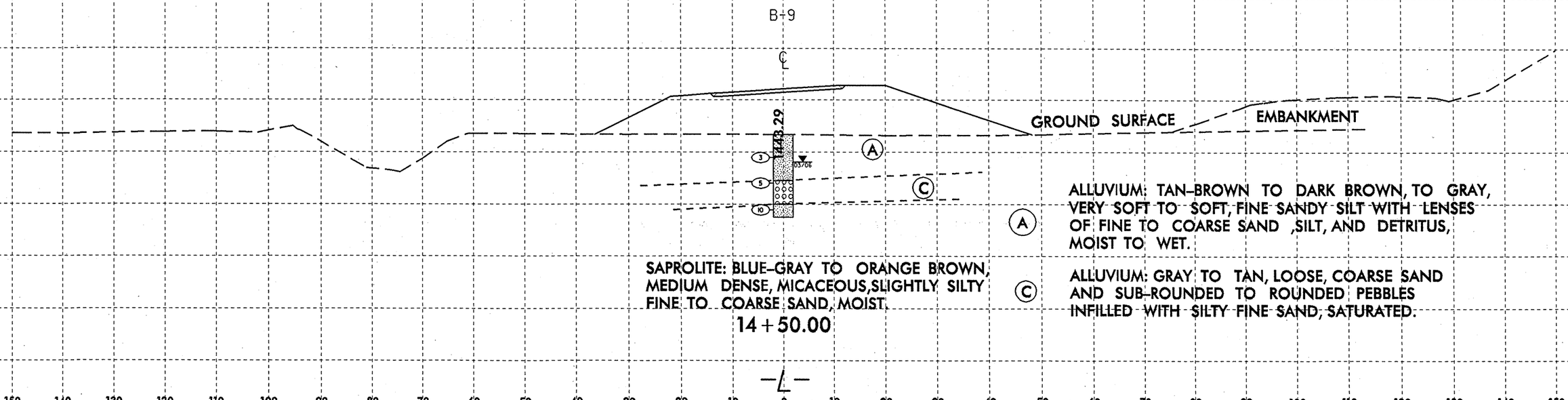
Ⓒ ALLUVIUM: GRAY TO TAN, VERY LOOSE TO LOOSE, COARSE SAND AND SUB-ROUNDED TO ROUNDED PEBBLES INFILLED WITH SILTY FINE SAND, SATURATED.



0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-4194	7

SOIL TEST RESULTS

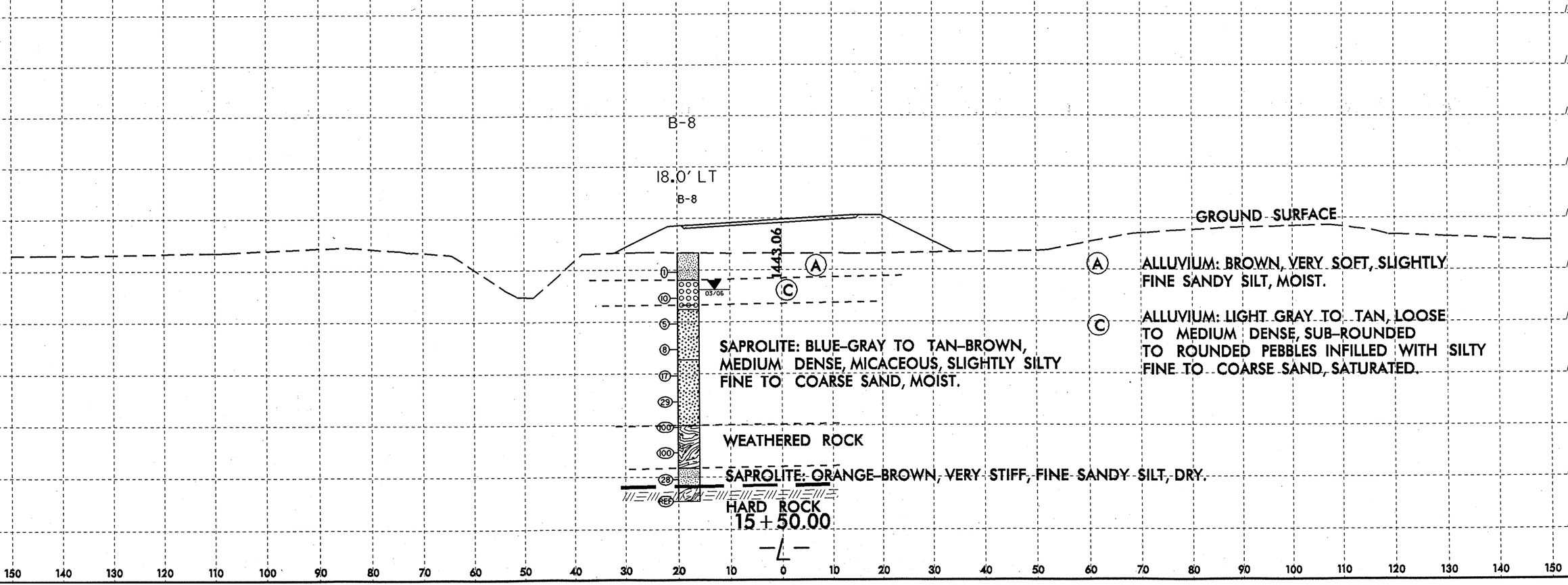
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-23	0	14+50	4.4-5.4	A-2-4(0)	36	NP	4	44	36	16	99	97	30	-	-



0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-4194	8

SOIL TEST RESULTS

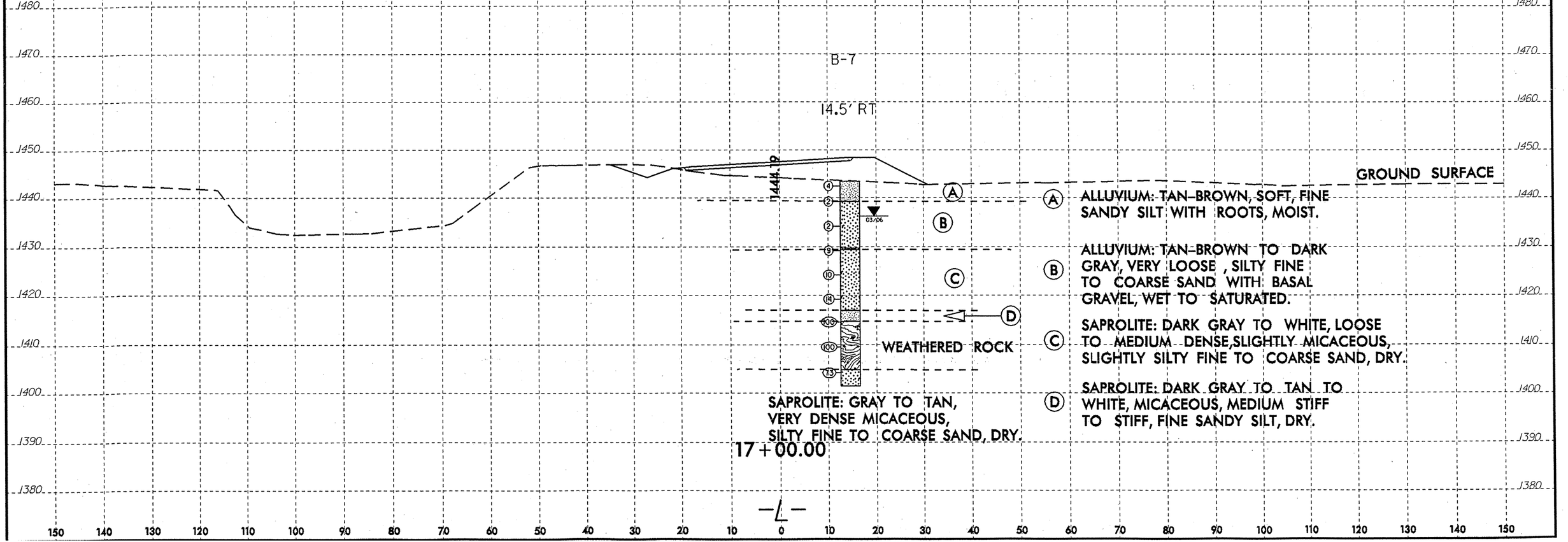
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-20	18' LT	15+50	13.1-14.1	A-2-5(0)	49	NP	26	52	18	4	100	86	35	-	-
SS-21	18' LT	15+50	28.1-29.1	A-2-4(0)	32	NP	28	47	21	4	92	77	33	-	-
SS-22	18' LT	15+50	43.1-44.1	A-4(1)	38	NP	17	57	24	2	100	95	39	-	-



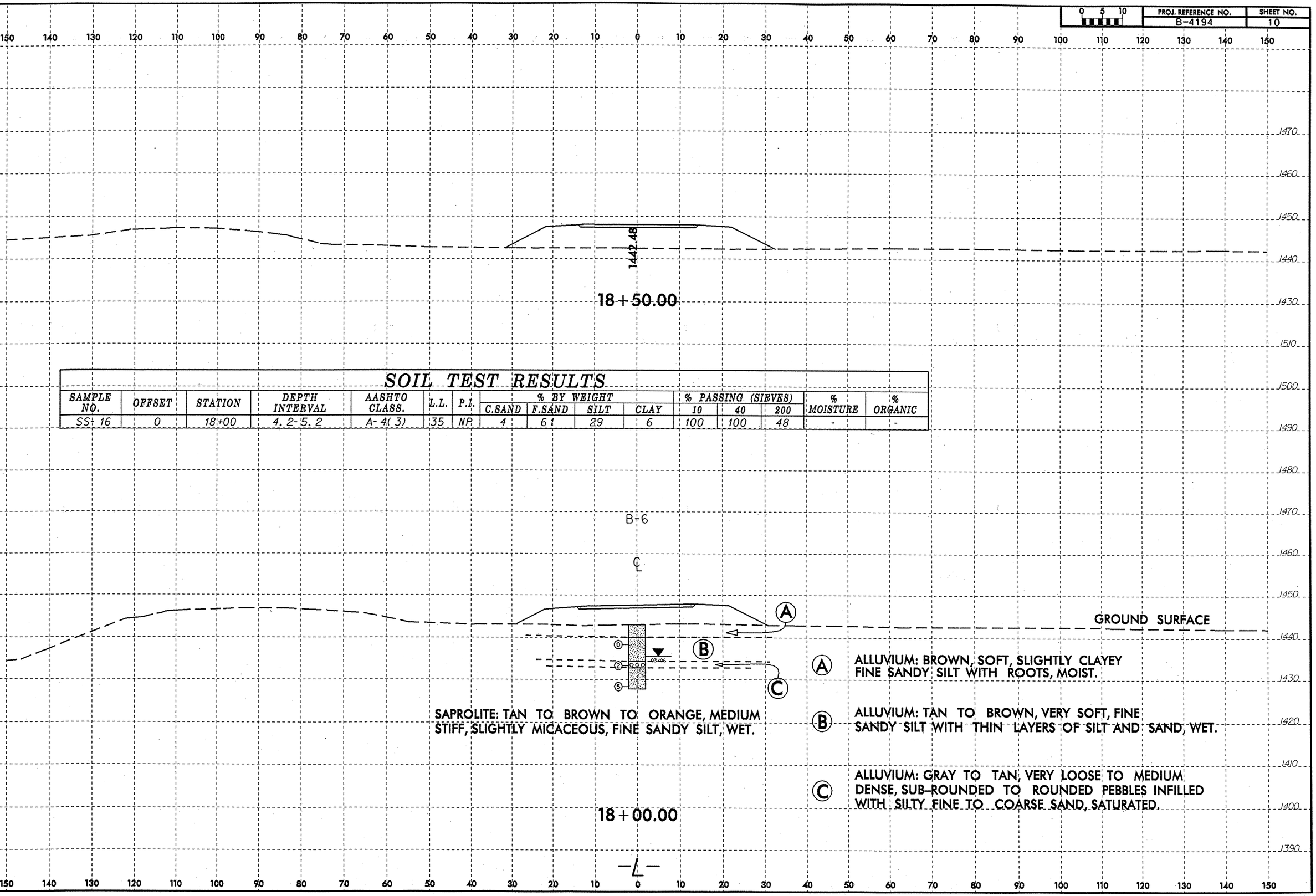
PROJ. REFERENCE NO.	SHEET NO.
B-4194	9

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-17	14.5' RT	17+00	14.1-14.8	A-2-5(0)	48	NP	25	59	14	2	100	87	31	-	-
SS-18	14.5' RT	17+00	28.8-29.4	A-4(2)	26	NP	19	54	25	2	98	88	43	-	-
SS-19	14.5' RT	17+00	38.8-39.8	A-2-4(0)	27	NP	23	56	21	0	94	84	34	-	-



PROJ. REFERENCE NO.	SHEET NO.
B-4194	10



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-16	0	18+00	4.2-5.2	A-4(3)	35	NP	4	61	29	6	100	100	48	-	-

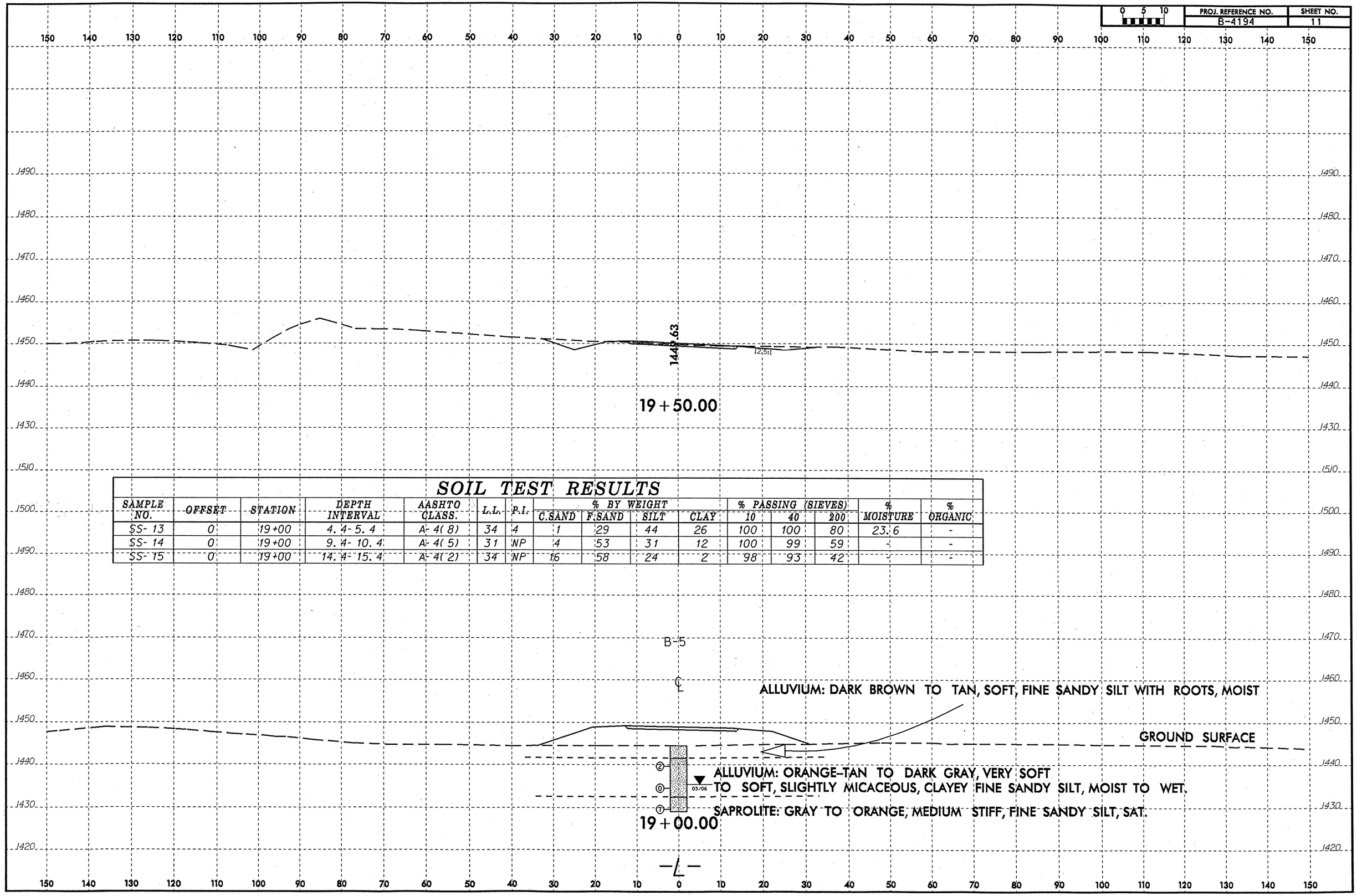
SAPROLITE: TAN TO BROWN TO ORANGE, MEDIUM STIFF, SLIGHTLY MICACEOUS, FINE SANDY SILT, WET.

Ⓐ ALLUVIUM: BROWN, SOFT, SLIGHTLY CLAYEY FINE SANDY SILT WITH ROOTS, MOIST.

Ⓑ ALLUVIUM: TAN TO BROWN, VERY SOFT, FINE SANDY SILT WITH THIN LAYERS OF SILT AND SAND, WET.

Ⓒ ALLUVIUM: GRAY TO TAN, VERY LOOSE TO MEDIUM DENSE, SUB-ROUNDED TO ROUNDED PEBBLES INFILLED WITH SILTY FINE TO COARSE SAND, SATURATED.

PROJ. REFERENCE NO.	SHEET NO.
B-4194	11



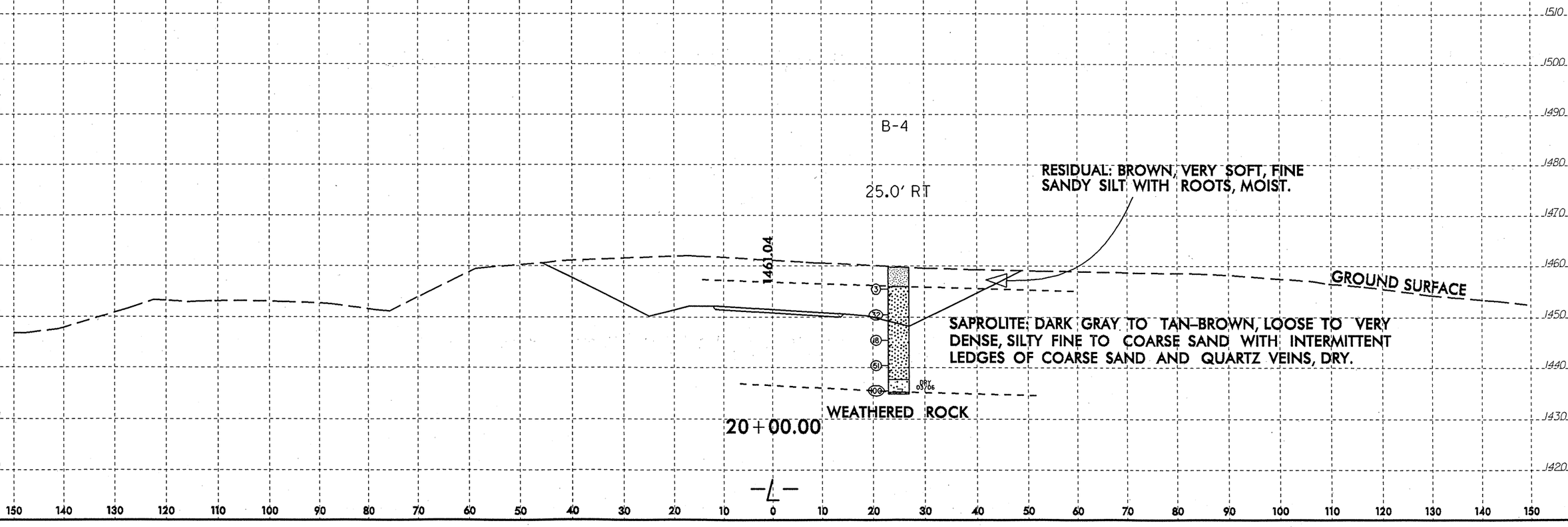
SOIL TEST RESULTS

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-13	0	19+00	4.4-5.4	A-4(8)	34	4	1	29	44	26	100	100	80	23.6	-
SS-14	0	19+00	9.4-10.4	A-4(5)	31	NP	4	53	31	12	100	99	59	-	-
SS-15	0	19+00	14.4-15.4	A-4(2)	34	NP	16	58	24	2	98	93	42	-	-

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-4194	12

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-10	25' RT	20+00	8.8-9.8	A-2-4(0)	31	NP	30	56	12	2	70	59	16	-	-
SS-11	25' RT	20+00	18.8-19.8	A-2-4(0)	26	NP	27	51	20	2	92	80	32	-	-
SS-12	25' RT	20+00	23.8-24.5	A-5(2)	46	NP	19	53	29	2	95	89	43	-	-



PROJ. REFERENCE NO.	SHEET NO.
B-4194	13

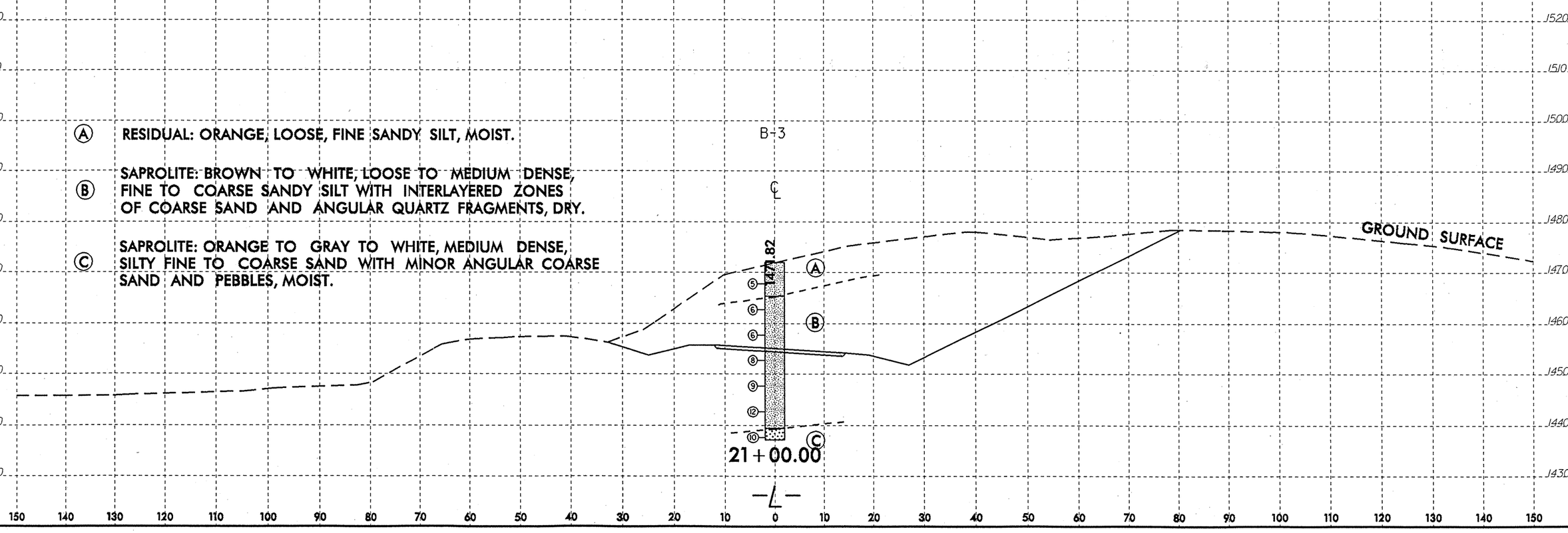
SOIL TEST RESULTS

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		
SS-8	0	21+00	18.8-19.8	A-4(2)	37	NP	17	51	28	4	98	90	47	-	-
SS-9	0	21+00	33.8-34.8	A-2-4(0)	38	NP	33	42	21	4	93	73	32	-	-

Ⓐ RESIDUAL: ORANGE, LOOSE, FINE SANDY SILT, MOIST.

Ⓑ SAPROLITE: BROWN TO WHITE, LOOSE TO MEDIUM DENSE, FINE TO COARSE SANDY SILT WITH INTERLAYERED ZONES OF COARSE SAND AND ANGULAR QUARTZ FRAGMENTS, DRY.

Ⓒ SAPROLITE: ORANGE TO GRAY TO WHITE, MEDIUM DENSE, SILTY FINE TO COARSE SAND WITH MINOR ANGULAR COARSE SAND AND PEBBLES, MOIST.



SOIL TEST RESULTS

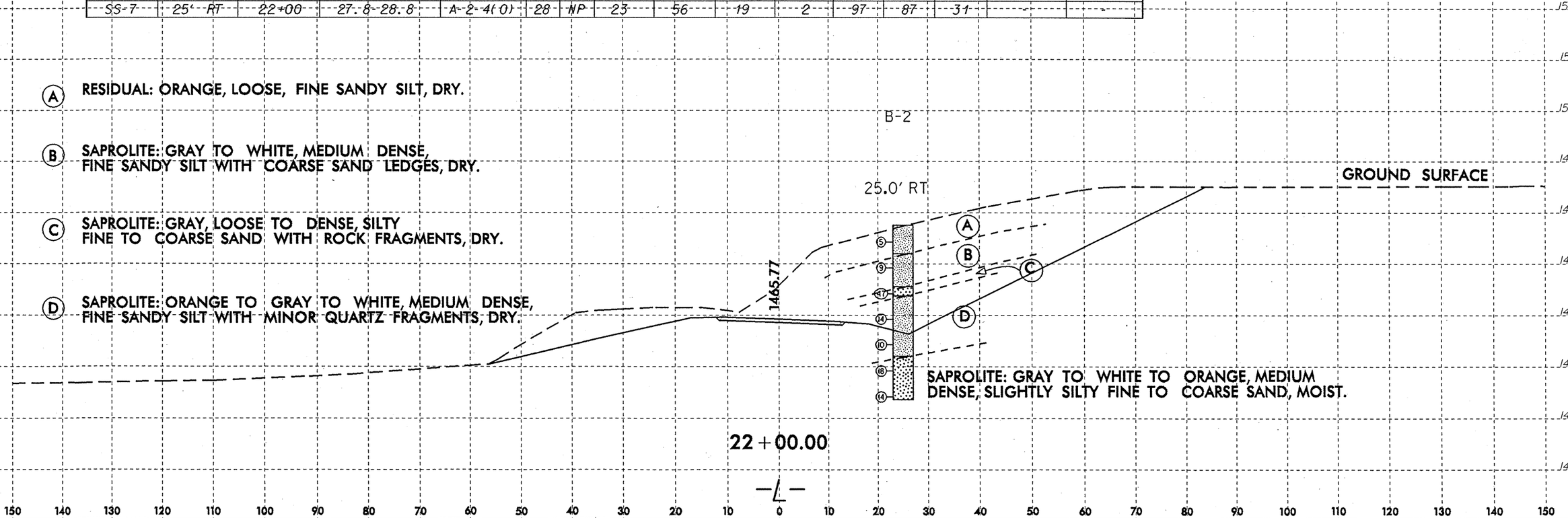
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-5	25' RT	22+00	2.8-3.8	A-4(3)	29	NP	18	42	32	8	99	90	52	-	-
SS-6	25' RT	22+00	17.8-18.8	A-4(2)	32	NP	13	54	29	4	97	92	46	-	-
SS-7	25' RT	22+00	27.8-28.8	A-2-4(0)	28	NP	25	56	19	2	97	87	31	-	-

Ⓐ RESIDUAL: ORANGE, LOOSE, FINE SANDY SILT, DRY.

Ⓑ SAPROLITE: GRAY TO WHITE, MEDIUM DENSE, FINE SANDY SILT WITH COARSE SAND LEDGES, DRY.

Ⓒ SAPROLITE: GRAY, LOOSE TO DENSE, SILTY FINE TO COARSE SAND WITH ROCK FRAGMENTS, DRY.

Ⓓ SAPROLITE: ORANGE TO GRAY TO WHITE, MEDIUM DENSE, FINE SANDY SILT WITH MINOR QUARTZ FRAGMENTS, DRY.



PROJ. REFERENCE NO.	SHEET NO.
B-4194	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		
SS-1	30' RT	23+00	3.5-4.2	A-5(2)	41	NP	17	44	23	16	93	85	45	-	-
SS-2	30' RT	23+00	8.5-9.5	A-4(2)	34	NP	18	48	28	6	94	86	44	-	-
SS-3	30' RT	23+00	13.5-14.5	A-2-5(0)	47	NP	15	64	17	4	97	91	35	-	-
SS-4	30' RT	23+00	23.8-24.5	A-4(1)	36	NP	12	63	21	4	93	88	38	-	-

Ⓐ RESIDUAL: TAN-ORANGE, STIFF, SLIGHTLY CLAYEY FINE SANDY SILT WITH MINOR COARSE SAND INTERMITTENT THROUGHOUT, DRY

Ⓑ SAPROLITE: ORANGE TO GRAY TO WHITE, MEDIUM STIFF, FINE SANDY SILT, DRY.

Ⓒ SAPROLITE: GRAY TO WHITE, LOOSE TO MEDIUM DENSE, SILTY FINE SAND, DRY.

Ⓓ SAPROLITE: ORANGE TO GRAY, VERY STIFF, FINE SANDY SILT WITH INTERMITTENT COARSE SAND THROUGHOUT, DRY.