91A/91B

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-505	1	91

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34334.1.1	APD-1954 (1)	P.E.
34334.3.1	APD-1954 (1)	R/W, UTILITIES
34334.2.3	APD-0025 (21)	CONST.

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

ROADWAY SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34334.1.1 F.A. PROJ. APD-1954(1)

COUNTY HENDERSON

PROJECT DESCRIPTION NC 225 - US 25/I-26 CONNECTOR FROM US 25 AT ZIRCONIA TO I-26

INVENTORY

CAUTION NOTICE

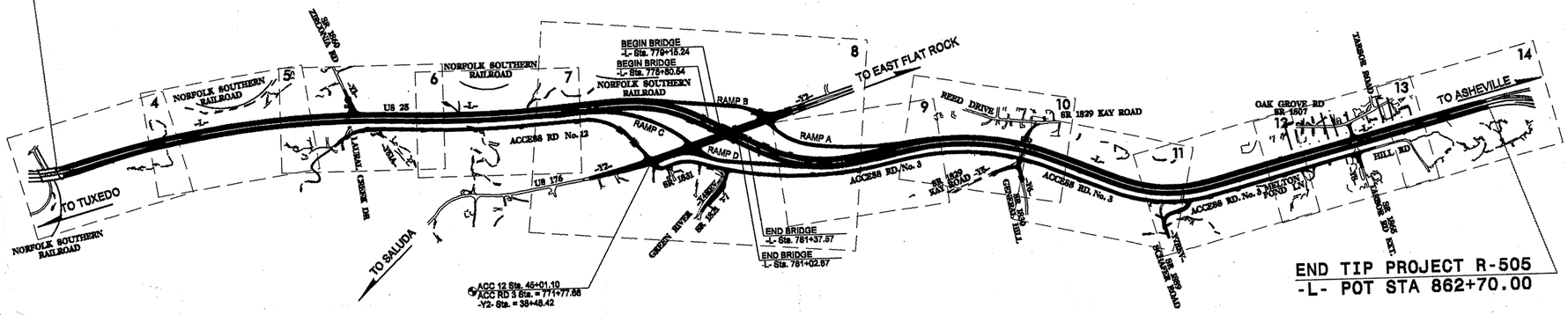
THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING 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.

NAD 83/95

BEGIN TIP PROJECT R-505
-L- POC STA 708+72.00



END TIP PROJECT R-505
-L- POT STA 862+70.00

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DATE February & October, 1990

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.

ID: R-0505

CONTRACT: C202087

N.C. DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL UNIT

STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
R-505	2/91	

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR WEATHERED EARTH MATERIALS WHICH CAN BE PENETRATED WITH A [illegible] FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN 100 B.P.F. ACCORDING TO THE STANDARD PENETRATION TEST (ASTM [illegible]-586). SOIL CLASSIFICATION IS BASED ON THE AASHO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHO 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 CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (35% LESS PASSING NO. 200)							SILT-CLAY MATERIALS (+ 35% PASSING NO. 200)				ORGANIC SOILS		
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	50 MX											GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
# 40	30 MX	50 MX	51 MN											
# 200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN			
LIQUID LIMIT	6 MAX.		N.P.	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	WITH LITTLE OR MODERATE AMOUNT OF ORGANIC MATTER		HIGHLY ORGANIC SOIL
PLASTIC INDEX				10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
GROUP INDEX	0		0	0		4 MAX.		8 MAX.	12 MX	16 MX	20 MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL & SAND			SILTY OR CLAYEY GRAVEL & SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

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

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTANCE	RANGE OF UNCONFINED COMPRESSIVE STRENGTH
COARSE GRAINED SOILS	VERY LOOSE LOOSE MED. DENSE DENSE VERY DENSE	LESS THAN 4 B.P.F. [1] 4 TO 10 10 TO 30 30 TO 50 MORE THAN 50	N/A
FINE GRAINED SOILS	VERY SOFT SOFT MED. STIFF STIFF VERY STIFF HARD	LESS THAN 2 B.P.F. 2 TO 4 4 TO 8 8 TO 15 15 TO 30 MORE THAN 30	LESS THAN .25 TSF 0.25 to 0.5 0.5 TO 1.0 1.0 TO 2.0 2.0 TO 4.0 MORE THAN 4.0

1 SEE STANDARD PENETRATION TEST

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	20	0.42	0.25	.074	.053

BOULDER	COBBLE	GRAVEL	COARSE SAND	MED. SAND	FINE SAND	SILT	CLAY
GRAIN SIZE MM: 305	76	2	0.6	0.25	0.2	.05	.005
GRAIN SIZE IN.: 12"	3"						

SOIL MOISTURE — CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	PHYSICAL STATE	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	LIQUID	SATURATED	VERY WET, USUALLY FROM BELOW GROUND WATER TABLE
LL - LIQUID LIMIT			
PLASTIC RANGE (P.I.)	SEMISOLID	WET (W)	REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL - PLASTIC LIMIT			
	SOLID	MOIST (M)	AT OR NEAR OPTIMUM MOISTURE
OM - OPT. MOISTURE SL - SHRINKAGE LIMIT		DRY (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE
0%			

PLASTICITY

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

COLOR

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

GRADATION

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

ANGULARITY OF GRAINS

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

MINERALOGICAL COMPOSITION

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

COMPRESSIBILITY

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

ROCK DESCRIPTION

IN THE BROADEST MEANING, HARD ROCK IS CONSIDERED TO BE THAT INDURATED EARTH MATERIAL WHICH CANNOT BE SAMPLED BY CONVENTIONAL SOIL SAMPLING TOOLS OR TECHNIQUES. THE BOUNDARY BETWEEN SOIL AND ROCK IS ARBITRARY. TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF "WEATHERED ROCK". FOR THE PURPOSE OF THIS INVESTIGATION, THESE MATERIALS ARE DIVIDED AS FOLLOWS:

TERM	SYMBOL		
WEATHERED ROCK (HWR) (SWR)		SOFT WEATHERED ROCK	MATERIAL THAT CAN BE PENETRATED WITH SOME DIFFICULTY USING POWER AUGER AND YIELDS S.P.T. VALUES >100 B.P.F. BUT < S.P.T. REFUSAL.
		HARD WEATHERED ROCK	MATERIAL THAT CAN BE PENETRATED WITH GREAT DIFFICULTY USING POWER AUGER AND YIELDS S.P.T. REFUSAL.*
HARD ROCK (HR)	CORED ROCK INFERRED ROCK LINE		MATERIAL SUCH THAT IT CANNOT BE PENETRATED BY POWER AUGER, EXCEPT IN THIN LEDGES, AND REQUIRES ROCK CORING TOOLS FOR OBTAINING SAMPLE.

* S.P.T. REFUSAL (ASTM) ≙ 1" OF PENETRATION PER 50 BLOWS.

AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH AUGERS COULD NO LONGER PENETRATE.

WHEN ROCK IS CORED, THE HARD ROCK SYMBOL IS SHOWN TO THE DEPTH CORED. A FULL DESCRIPTION OF ROCK USING APPROPRIATE TERMS (SEE DEFINITION OF TERMS)—INCLUDES PERCENT OF CORE RECOVERY (% REC) AND ROCK QUALITY DESIGNATION (RQD).

GROUND WATER

▽ DATE: WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING

▼ DATE: STATIC WATER LEVEL AFTER 24 HOURS

▽ DATE: PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA

: SPRING

MISCELLANEOUS SYMBOLS AND ABBREVIATIONS

- ROADWAY EMBANKMENT WITH SOIL DESCRIPTION
- SOIL SYMBOL
- AUGER BORING
- SPT DPT VST TEST BORING
- STRIKE AND DIP OF BEDS
- SPT N-COUNT
- ARTIFICAL FILL OTHER THAN ROADWAY EMBANKMENTS
- CORE BORING
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- INFERRED SOIL BOUNDARIES
- APPARENT DIP (NORMAL TO _____)

SAMPLE DESIGNATION:
ST - 3" SHELBY TUBE SAMPLES
S - BULK SAMPLE
SS - SPLIT SPOON SAMPLE
WS - WASH BORING SAMPLE

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
☒ CME - 550 ☐ PORTABLE HOIST
☐ MOBILE B-52 ☒ MOBILE B-56 ☐ CME - 45 ☐ MINUTEMAN

AUGER TOOLS:
☒ 6" CONTINUOUS FLIGHT W/ ☐ HARD FACED FINGER BITS ☐ CLAY BITS ☒ TUNG.-CARBIDE INSERTS
☒ 8" HOLLOW AUGERS

CORE BORING TOOLS: ☐ -AX ☐ -BX ☐ -NX

HAND TOOLS: ☒ POST HOLE DIGGER ☐ HAND AUGER ☐ SOUNDING ROD

TERMS AND DEFINITIONS

ALLUVIUM (alluv.) - Soils which have been transported by flowing water.

APPARENT DIP - The dip of rock strata not perpendicular to strike.

AQUIFER - A water-bearing formation or strata.

AUGER REFUSAL (A.R.) - Point at which power augers will not actually or practically penetrate.

BEDDED - Soil or rock lying in a position essentially parallel.

BEDROCK - Rock of relatively great thickness and extent in its original location.

CALCAREOUS (calc.) - Soils which contain appreciable amounts of calcium carbonate.

COHESIVE SOIL - A soil that when unconfined has considerable dry strength and significant cohesion when submerged.

COLLUVIUM - Rock fragments mixed with soil deposited by gravity on slope or at bottom of slope.

CORE RECOVERY (% Rec.) - Total length of all rock divided by total length of core run expressed as a percentage.

COQUINA - A rock type composed essentially of marine shells cemented by calcium carbonate.

DIKE - Igneous rock intrusive which is narrow compared with its other dimensions.

DIP - The angle between a bedding plane, joint plane or fault plane and the horizontal, measured perpendicular to the strike.

DUMPS - Uncovered deposits of waste materials such as wood, masonry debris or garbage.

FAULT - A break in the continuity of a body of rock, attended by a movement on either or both sides of the break.

FINES - Portion of a soil finer than No. 200 U. S. Standard Sieve.

FISSILITY OR FISSILE - A property of splitting easily along closely spaced parallel planes.

FLOAT - Rock fragments on surface near their original position dislodged from parent material.

FLOODPLAIN - Land bordering a stream, built of sediments deposited by the stream.

FORMATION - A mappable unit that can be recognized and traced in the field.

FRACTURE - A crack large enough to be visible to unaided eye.

FRIABLE - Easy to break or crumble.

GRANULAR SOIL - Soil that when unconfined has little or no dry strength and has little or no cohesion when submerged.

GROUND WATER - (Free Water) (G. W.) - Water that is free to move through soil mass under influence of gravity.

GROUNDWATER LEVEL - Level at which the pressure in water is zero with respect to the atmospheric pressure.

HARDPAN - A general term used to describe a hard cemented soil layer which does not soften when wet.

INDURATED - Earth material hardened by heat, pressure or cementation.

INTERBEDDED - Alternating lenses or layers of soil and/or rock materials.

JOINT - Fracture in rock along which no appreciable movement has occurred.

LAMINATED - Very thin alternating layers less than 1" in thickness.

LAYER - Subject material greater than 1" thick.

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.

MARL - A non-indurated, calcareous deposit of clays, silts and sand, often containing shells.

MICACEOUS SOIL (mic.) - A soil or rock containing an appreciable amount of mica.

MUCK (mk.) - An highly organic soil of very soft consistency, generally found on tidal flats, lakes or stream floodplains.

PEAT (pt) - A fibrous mass of organic matter in various stages of decomposition.

PERCHED WATER - Water maintained above the normal ground water level by the presence of an intervening impervious stratum.

RESIDUAL SOIL - Soil formed in place by weathering of rock.

ROCK - SEE Legend

ROCK QUALITY DESIGNATION (R.Q.D.) - A measure of rock quality described by: total length of rock segments equal to or greater than 4 inches divided by total length of core run expressed as a percentage.

SANITARY LANDFILLS - Compacted and/or covered layers of soil and waste products.

SAPROLITE (sap.) - Residual soil which retain the relic structure or fabric of the parent rock.

SLICKENSIDE - Polished and striated surface that results from friction along a fault, or slip plane.

SILL - An igneous sheet of rock intrusive whose thickness is slight compared to its lateral extent.

SOME - Presence of 5% to 30% of subject material.

STANDARD PENETRATION TEST (Penetration Resistance) (SPT) - Number of blows (N or B.P.F.) of a 140# hammer falling 30" required to produce a penetration of 1 foot into soil with a 2" O.D. split spoon sampler. SPT refusal - penetration resistance of less than 1 inch with 50 blows.

STRIKE - The direction or bearing of a horizontal line in the plane of an inclined stratum, joint, fault or other structural plane.

SUBGRADE - The soil prepared to support a structure or a pavement system.

TOPSOIL - (T.S.) - Surface soils usually containing organic matter.

TRACE - Presence of less than 5% of subject material.

ABBREVIATIONS

Boulder - bldr.	Organic - org.
Clay - cl.	Plastic Limit - P.L.
Cobble - cob.	Plasticity Index - P.I.
Coarse - cse.	Porosity - n
Fine - f.	Sand - sd.
Fossiliferous - foss.	Saturated - sat.
Fractured - frac.	Silt, Silty - si.
Gravel - gr.	Slightly - sli.
Liquid Limit - LL	Specific Gravity - G_s
Medium - med.	Unconfined Compressive Strength - qu
Moisture Content - w	Unit Weight (wet unit weight) - γ
Mottled - mot.	Dry Unit Weight - γd
Optimum Moisture - OM	Saturated Unit Weight - $\gamma sat.$
	Void Ratio - e
	Very - V.
	Estimated - Est.

NOTES:

3/91

EARTHWORK BALANCE SHEET

EARTHWORK TOTALS

	UNCLASSIFIED EXCAVATION (CY)				EMBANKMENT (CY)									
STATION to STATION	TOTAL EXCAV. (UNCL.)	ROCK EXCAV.	UNDERCUT EXCAV.	SUITABLE EARTH	TOTAL	ROCK (25%)	EARTH	REPLACE UNDERCUT	EMBANK 1.15%	BORROW	EARTH SUITABLE WASTE	ROCK SUITABLE WASTE	UNSUIT WASTE	TOTAL WASTE
-L- Sta 708+87.00 to 715+00.00	1460	0	0	1460	28	0	28	0	32	0	1428	0	0	1428
-L- Sta 715+00 to 745+00 RT.	32834	5565	0	27269	26511	5565	19555	0	28053	0	4781	0	0	4781
-L- Sta 715+00 to 745+00 LT.	3577	0	0	3577	364	0	364	0	419	0	3158	0	0	3158
-Y1- 10+15.00 to 11+60.00	68	0	0	68	11	0	11	0	13	0	55	0	0	55
-RY51A- 10+11.00 to 10+95.00	773	0	0	773	0	0	0	0	0	0	773	0	0	773
-ACCESS RD #12- Sta 10+00.00 to 11+50.00	198	0	0	198	683	0	683	0	785	587	0	0	0	0
-ACCESS RD #12- Sta 11+89.17 to 16+91.57	12037	5849	0	6188	15095	5849	7784	0	14800	2763	0	0	0	0
TOTAL Summary No. 1	50947	11414	0	39533	42692	11414	28425	0	44102	3350	10196	0	0	10196
-L- Sta 745+00 to 773+50 RT.	54889	3705	0	51184	9460	3705	4829	0	9258	0	45631	0	0	45631
-L- Sta 745+00 to 773+50 LT.	6306	0	0	6306	504	0	504	0	580	0	5726	0	0	5726
-ACCESS RD #12- Sta16+91.57 to 38+07.66	58237	9225	0	49012	66315	9225	54784	0	72226	13989	0	0	0	0
-ACCESS RD #12- Sta 38+50.00 to 44+64.93	1332	0	0	1332	6615	0	6615	0	7607	6275	0	0	0	0
TOTAL Summary No. 2	120764	12930	0	107834	82894	12930	66732	0	89671	20264	51357	0	0	51357
-L- Sta 773+50 to 778+80.54 RT.	9	0	0	9	3272	0	3272	0	3763	3754	0	0	0	0
-L- Sta 773+50 to 779+15.24 LT.	362	0	0	362	1181	0	1181	0	1358	996	0	0	0	0
-Y2- Sta 23+00.00 to 45+16.22	2353	0	0	2353	4	0	4	0	5	0	2348	0	0	2348
-ACCESS RD #3- Sta 772+50.00 to 784+00.00	26572	0	0	26572	1278	0	1278	0	1470	0	25102	0	0	25102
-Y4 Rev- Sta 10+11.00 to 15+23.83	1213	0	0	1213	935	0	935	0	1075	0	138	0	0	138
TOTAL Summary No. 3	30509	0	0	30509	6670	0	6670	0	7671	4750	27588	0	0	27588
-L- Sta 781+02.87 to 812+00.00 RT	60929	12276	0	48653	9174	7339	0	0	7339	0	48653	4937	0	53590
-L- Sta 781+37.57 to 812+00.00 LT	3966	0	0	3966	1979	0	1979	0	2276	0	1690	0	0	1690
-Y5- Sta 10+12.00 to 12+87.60	186	0	0	186	1741	0	1741	0	2002	1816	0	0	0	0
-Y6- Sta 10+11.00 to 12+45.00	114	0	0	114	44	0	44	0	51	0	63	0	0	63
-ACCESS RD #3- Sta 784+48.97 to 814+20.38	174652	16973	0	157679	11514	9211	0	0	9211	0	157679	7762	0	165441
TOTAL Summary No. 4	239847	29249	0	210598	24452	16550	3764	0	20879	1816	208086	12699	0	220784
-L- Sta 812+00.00 to 842+00.00 RT	29880	0	0	29880	59319	0	59319	0	68217	38337	0	0	0	0
-L- Sta 812+00.00 to 842+00.00 LT	3718	0	0	3718	725	0	725	0	834	0	2884	0	0	2884
-Y7 Rev- Sta 10+16.93 to 15+50.73	434	0	0	434	3366	0	3366	0	3871	3437	0	0	0	0
-ACCESS RD #3- Sta 814+20.38 to 849+41.65	24295	0	0	24295	129835	0	129835	0	149310	125015	0	0	0	0
TOTAL Summary No. 5	58327	0	0	58327	193245	0	193245	0	222232	166789	2884	0	0	2884
-L- Sta 842+00.00 to 861+42.25 RT	6285	0	0	6285	1312	0	1312	0	1509	0	4776	0	0	4776
-L- Sta 842+00.00 to 861+42.25 LT	2925	0	0	2925	240	0	240	0	276	0	2649	0	0	2649
-Y8- Sta 10+11.00 to 11+60.00	100	0	0	100	8	0	8	0	9	0	91	0	0	91
TOTAL Summary No. 6	9310	0	0	9310	1560	0	1560	0	1794	0	7516	0	0	7516
SUBTOTAL R-505	509704	53593	0	456111	351513	40894	300395	0	386349	196969	307627	12699	0	320326

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.

3A/91

STATION to STATION	TOTAL EXCAV. (UNCL.)	ROCK EXCAV.	UNDERCUT EXCAV.		SUITABLE EARTH	TOTAL	ROCK (25%)	EARTH	REPLACE UNDERCUT	EMBANK 1.15%	BORROW	EARTH SUITABLE WASTE	ROCK SUITABLE WASTE	UNSUIT WASTE	TOTAL
Subtotal R-505	509704	53593	0		456111	351513	40894	300395	0	386349	196969	307627	12699	0	320326
Loss to Clearing & Grubbing	-13000	0			-13000					0	0	-13000			-13000
Shoulder Construction	0	0								0	0				0
Temporary Earth Berm	0	0				65		65		75	75				0
Temporary Earth Berm Removal	65	0								0	0	65			65
Rock to Repl Borrow							12699	-12699		0	-12699		-12699		-12699
Adjust for Rock Swell								-3175		-3175	-3175		0		0
Eliminate earth shrinkage factor since this material is now rock										-2381	-2381		0		0
Waste to Repl. Borrow	0	0						0		0	-178789	-178789			-178789
Total R-505	496769	53593	0		443111	351578	53593	284587	0	380868	0	115903	0	0	115903
5% to replace topsoil on borrow pit											0				
Grand Total R-505	496769	53593	0	0	443111	351578	53593	284587	0	380868	0	115903	0	0	115903
SAY	496800									380900	0				116000
EARTHWORK TOTALS FOR ALTERNATE PAVEMENT DESIGN															
Subtotal R-505	509704	53593	0	0	456111	351513	40894	300395	0	386349	196969	307627	12699	0	320326
Adj. For Alt. Pav't Design	-6785	0			-6785	4188				4816	11601	0			0
Loss to Clearing & Grubbing	-13000	0			-13000					0	0	-13000			-13000
Temporary Earth Berm	0	0				65		65		75	75				0
Temporary Earth Berm Removal	65	0								0	0	65			65
Rock to Repl Borrow							12699	-12699		0	-12699		-12699		-12699
Adjust for Rock Swell								-3175		-3175	-3175		0		0
Eliminate earth shrinkage factor since this material is now rock										-2381	-2381		0		0
Waste to Repl. Borrow	0	0								0	-190390	-190390			-190390
TOTAL R-505	489984	53593	0	0	436326	355766	53593	284587	0	385684	0	104302	0	0	104302
5% to replace topsoil on borrow pit											0				
Grand Total R-505	489984	53593	0	0	436326	355766	53593	284587	0	385684	0	104302	0	0	104302
SAY	490000									385700	0				104400

Estimated Undercut = 1600 CY

Note 1: 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.

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.

STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
6.951015 (R-505A)	1	57

4/91

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

SUBSURFACE INVESTIGATION

STATE PROJECT 6.951015 ID. No. (R-505A)

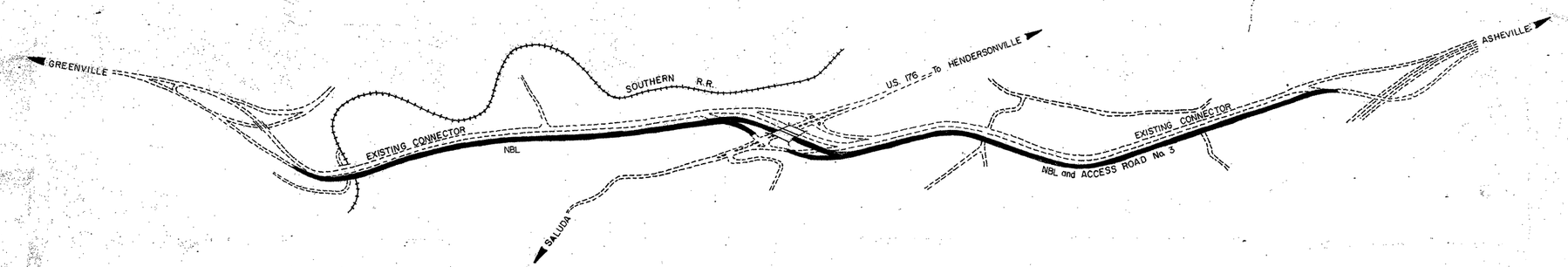
F.A. PROJECT

COUNTY HENDERSON

DESCRIPTION CONNECTOR FROM U.S. 25 AT ZIRCONIA TO I-26

CONTENTS:

-L- STATION 734+00 TO STATION 757+00
-L- STATION 798+00 TO STATION 810+00
ACCESS ROAD NO. 1 STATION 10+00 TO STATION 25+64.98
ACCESS ROAD NO. 2 STATION 9+50 TO STATION 36+37.81
ACCESS ROAD NO. 2 REV. STATION 36+37.81 TO STATION 49+88
ACCESS ROAD NO. 3 STATION 771+77.66 TO STATION 850+50
-Y7- STATION 10+00 TO STATION 16+00
-Y10- STATION 8+50 TO STATION 13+03.96
ODIE GORDON DRIVEWAY STATION 10+00 TO STATION 14+50
-L- IN SEGMENTS AHEAD OF STATION 810+00



INVESTIGATED BY J.L. SHARPE

CHECKED BY F.R. GLASS

SUBMITTED BY F.R. GLASS

DATE FEBRUARY 1990

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DRAWN BY: R.A. SHRANK

PROJECT: 6951015 R-505A

ID. NO. R-505A

N.C. DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL UNIT

STATE PROJECT NO.		SHEET NO.	TOTAL SHEETS
6.951015	R-505A	2	57

5/91

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR WEATHERED EARTH MATERIALS WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN 100 B.P.F. ACCORDING TO THE STANDARD PENETRATION TEST (ASTM-D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHO 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 CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (35% LESS PASSING NO. 200)							SILT-CLAY MATERIALS (+ 35% PASSING NO. 200)				ORGANIC SOILS		
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	50 MX											GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
# 40	30 MX	50 MX	51 MN											
# 200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN			
LIQUID LIMIT	6 MAX.		N.P.	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	WITH LITTLE OR MODERATE AMOUNT OF ORGANIC MATTER		HIGHLY ORGANIC SOIL
PLASTIC INDEX				10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
GROUP INDEX	0		0	0		4 MAX.		8 MAX.	12 MX	16 MX	20 MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL & SAND			SILTY OR CLAYEY GRAVEL & SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

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

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTANCE	RANGE OF UNCONFINED COMPRESSIVE STRENGTH
COARSE GRAINED SOILS	VERY LOOSE LOOSE MED. DENSE DENSE VERY DENSE	LESS THAN 4 B.P.F. [1] 4 TO 10 10 TO 30 30 TO 50 MORE THAN 50	N/A
FINE GRAINED SOILS	VERY SOFT SOFT MED. STIFF STIFF VERY STIFF HARD	LESS THAN 2 B.P.F. 2 TO 4 4 TO 8 8 TO 15 15 TO 30 MORE THAN 30	LESS THAN .25 TSF 0.25 to 0.5 0.5 TO 1.0 1.0 TO 2.0 2.0 TO 4.0 MORE THAN 4.0

1 SEE STANDARD PENETRATION TEST

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	2.0	0.42	0.25	.074	.053

BOULDER	COBBLE	GRAVEL	COARSE SAND	MED. SAND	FINE SAND	SILT	CLAY
GRAIN SIZE MM: 305	76	2	0.6	0.25	0.2	.05	.005
GRAIN SIZE IN.: 12"	3"						

SOIL MOISTURE——CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	PHYSICAL STATE	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	LIQUID	SATURATED	VERY WET, USUALLY FROM BELOW GROUND WATER TABLE
LL — LIQUID LIMIT			
PLASTIC RANGE (P.I.)	SEMISOLID	WET (W)	REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT			
OM — OPT. MOISTURE	SOLID	MOIST (M)	AT OR NEAR OPTIMUM MOISTURE
SL — SHRINKAGE LIMIT		DRY (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE
0%			

PLASTICITY

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

COLOR

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

GRADATION

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

ANGULARITY OF GRAINS

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

MINERALOGICAL COMPOSITION

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

COMPRESSIBILITY

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

ROCK DESCRIPTION

IN THE BROADEST MEANING, HARD ROCK IS CONSIDERED TO BE THAT INDURATED EARTH MATERIAL WHICH CANNOT BE SAMPLED BY CONVENTIONAL SOIL SAMPLING TOOLS OR TECHNIQUES. THE BOUNDARY BETWEEN SOIL AND ROCK IS ARBITRARY. TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF "WEATHERED ROCK". FOR THE PURPOSE OF THIS INVESTIGATION, THESE MATERIALS ARE DIVIDED AS FOLLOWS:

TERM	SYMBOL		
WEATHERED ROCK (HWR) (SWR)		SOFT WEATHERED ROCK	MATERIAL THAT CAN BE PENETRATED WITH SOME DIFFICULTY USING POWER AUGER AND YIELDS S.P.T. VALUES >100 B.P.F. BUT <S.P.T. REFUSAL.
		HARD WEATHERED ROCK	MATERIAL THAT CAN BE PENETRATED WITH GREAT DIFFICULTY USING POWER AUGER AND YIELDS S.P.T. REFUSAL.*
HARD ROCK (HR)	CORED ROCK	INFERRED ROCK LINE	MATERIAL SUCH THAT IT CANNOT BE PENETRATED BY POWER AUGER, EXCEPT IN THIN LEDGES, AND REQUIRES ROCK CORING TOOLS FOR OBTAINING SAMPLE.

* S.P.T. REFUSAL (ASTM) ≙ 1" OF PENETRATION PER 50 BLOWS.

AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH AUGERS COULD NO LONGER PENETRATE.

WHEN ROCK IS CORED, THE HARD ROCK SYMBOL IS SHOWN TO THE DEPTH CORED. A FULL DESCRIPTION OF ROCK USING APPROPRIATE TERMS (SEE DEFINITION OF TERMS)—INCLUDES PERCENT OF CORE RECOVERY (% REC) AND ROCK QUALITY DESIGNATION (RQD).

GROUND WATER

▽ DATE: WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING

▼ DATE: STATIC WATER LEVEL AFTER 24 HOURS

▽ DATE: PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA

: SPRING

MISCELLANEOUS SYMBOLS AND ABBREVIATIONS

- ROADWAY EMBANKMENT WITH SOIL DESCRIPTION
- SOIL SYMBOL
- AUGER BORING
- SPT DPT VST — TEST BORING
- 25° — STRIKE AND DIP OF BEDS
- SPT N-COUNT
- ARTIFICAL FILL OTHER THAN ROADWAY EMBANKMENTS
- CORE BORING
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- INFERRED SOIL BOUNDARIES
- APPARENT DIP (NORMAL TO _____)

SAMPLE DESIGNATION:
ST - 3" SHELBY TUBE SAMPLES
S - BULK SAMPLE
SS - SPLIT SPOON SAMPLE
WS - WASH BORING SAMPLE

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
☐ MOBILE B-52 ☒ MOBILE B-56 ☐ CME - 45 ☐ CME - 550 ☐ PORTABLE HOIST ☐ MINUTEMAN

AUGER TOOLS:
☒ 6" CONTINUOUS FLIGHT W/ ☐ HARD FACED FINGER BITS ☒ TUNG.-CARBIDE INSERTS ☐ CLAY BITS
☒ 8" HOLLOW AUGERS

CORE BORING TOOLS: ☐ -AX ☐ -BX ☐ -NX

HAND TOOLS: ☒ POST HOLE DIGGER ☐ HAND AUGER ☐ SOUNDING ROD

TERMS AND DEFINITIONS

ALLUVIUM (alluv.) - Soils which have been transported by flowing water.

APPARENT DIP - The dip of rock strata not perpendicular to strike.

AQUIFER - A water-bearing formation or strata.

AUGER REFUSAL (A.R.) - Point at which power augers will not actually or practically penetrate.

BEDDED - Soil or rock lying in a position essentially parallel.

BEDROCK - Rock of relatively great thickness and extent in its original location.

CALCAREOUS (calc.) - Soils which contain appreciable amounts of calcium carbonate.

COHESIVE SOIL - A soil that when unconfined has considerable dry strength and significant cohesion when submerged.

COLLUVIUM - Rock fragments mixed with soil deposited by gravity on slope or at bottom of slope.

CORE RECOVERY (% Rec.) - Total length of all rock divided by total length of core run expressed as a percentage.

COQUINA - A rock type composed essentially of marine shells cemented by calcium carbonate.

DIKE - Igneous rock intrusive which is narrow compared with its other dimensions.

DIP - The angle between a bedding plane, joint plane or fault plane and the horizontal, measured perpendicular to the strike.

DUMPS - Uncovered deposits of waste materials such as wood, masonry debris or garbage.

FAULT - A break in the continuity of a body of rock, attended by a movement on either or both sides of the break.

FINES - Portion of a soil finer than No. 200 U. S. Standard Sieve.

FISSILITY OR FISSILE - A property of splitting easily along closely spaced parallel planes.

FLOAT - Rock fragments on surface near their original position dislodged from parent material.

FLOODPLAIN - Land bordering a stream, built of sediments deposited by the stream.

FORMATION - A mappable unit that can be recognized and traced in the field.

FRACTURE - A crack large enough to be visible to unaided eye.

FRIABLE - Easy to break or crumble.

GRANULAR SOIL - Soil that when unconfined has little or no dry strength and has little or no cohesion when submerged.

GROUND WATER - (Free Water) (G. W.) - Water that is free to move through soil mass under influence of gravity.

GROUNDWATER LEVEL - Level at which the pressure in water is zero with respect to the atmospheric pressure.

HARDPAN - A general term used to describe a hard cemented soil layer which does not soften when wet.

INDURATED - Earth material hardened by heat, pressure or cementation.

INTERBEDDED - Alternating lenses or layers of soil and/or rock materials.

JOINT - Fracture in rock along which no appreciable movement has occurred.

LAMINATED - Very thin alternating layers less than 1" in thickness.

LAYER - Subject material greater than 1" thick.

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.

MARL - A non-indurated, calcareous deposit of clays, silts and sand, often containing shells.

MICACEOUS SOIL (mic.) - A soil or rock containing an appreciable amount of mica.

MUCK (mk.) - An highly organic soil of very soft consistency, generally found on tidal flats, lakes or stream floodplains.

PEAT (pt) - A fibrous mass of organic matter in various stages of decomposition.

PERCHED WATER - Water maintained above the normal ground water level by the presence of an intervening impervious stratum.

RESIDUAL SOIL - Soil formed in place by weathering of rock.

ROCK - SEE Legend

ROCK QUALITY DESIGNATION (R.Q.D.) - A measure of rock quality described by: total length of rock segments equal to or greater than 4 inches divided by total length of core run expressed as a percentage.

SANITARY LANDFILLS - Compacted and/or covered layers of soil and waste products.

SAPROLITE (sap.) - Residual soil which retain the relic structure or fabric of the parent rock.

SLICKENSIDE - Polished and striated surface that results from friction along a fault, or slip plane.

SILL - An igneous sheet of rock intrusive whose thickness is slight compared to its lateral extent.

SOME - Presence of 5% to 30% of subject material.

STANDARD PENETRATION TEST (Penetration Resistance) (SPT) - Number of blows (N or B.P.F.) of a 140# hammer falling 30" required to produce a penetration of 1 foot into soil with a 2" O.D. split spoon sampler. SPT refusal - penetration resistance of less than 1 inch with 50 blows.

STRIKE - The direction or bearing of a horizontal line in the plane of an inclined stratum, joint, fault or other structural plane.

SUBGRADE - The soil prepared to support a structure or a pavement system.

TOPSOIL - (T.S.) - Surface soils usually containing organic matter.

TRACE - Presence of less than 5% of subject material.

ABBREVIATIONS

Boulder - bldr.	Organic - org.
Clay - cl.	Plastic Limit - P.L.
Cobble - cob.	Plasticity Index - P.I.
Coarse - cse.	Porosity - n
Fine - f.	Sand - sd.
Fossiliferous - foss.	Saturated - sat.
Fractured - frac.	Silt, Silty - si.
Gravel - gr.	Slightly - sli.
Liquid Limit - LL	Specific Gravity - G_s
Medium - med.	Unconfined Compressive Strength - qu
Moisture Content - w	Unit Weight (wet unit weight) - γ
Mottled - mot.	Dry Unit Weight - γd
Optimum Moisture - OM	Saturated Unit Weight - γsat.
	Void Ratio - e
	Very - V.
	Estimated - Est.

NOTES: SEE CROSS-SECTIONS AND PROFILES FOR DESCRIPTIONS IN DETAIL

Ⓐ ROADWAY EMBANKMENT
Ⓐ MAN-MADE FILL
Ⓑ SANDY SILT, ALLUVIUM
Ⓒ SILTY SAND, ALLUVIUM (OCCASIONALLY WITH SMALL GRAVEL)
Ⓓ SILTY SAND AND SANDY SILT, ORGANIC, ALLUVIUM
Ⓔ SANDY CLAY, COLLUVIUM
Ⓕ SILTY SAND AND CLAYEY SAND, COLLUVIUM
Ⓖ SANDY CLAY, RESIDUAL
Ⓗ CLAYEY SILT, RESIDUAL
Ⓙ SANDY SILT AND CLAYEY SILT, SAPROLITE
Ⓚ SILTY, CLAYEY OR COARSE SAND, SAPROLITE

revised, October 1, 1981

N7770

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
P.O. BOX 25201
RALEIGH 27611-5201

JAMES G. MARTIN
GOVERNOR

THOMAS J. HARRELSON
SECRETARY

DIVISION OF HIGHWAYS

GEORGE E. WELLS, P.E.
STATE HIGHWAY ADMINISTRATOR

March 1990

STATE PROJECT: 6.951015 (R-505A)
COUNTY: Henderson
DESCRIPTION: Connector from US-25 at Zirconia to I-26

SUBJECT: Geotechnical Report - Inventory

PROJECT DESCRIPTION

The existing two-lane connector, approximately three miles in length, trends northerly through southeastern Henderson County from US-25 at Zirconia to I-26 at the eastern town limits of East Flat Rock. Much of the grading required for a four-lane facility was performed on existing right-of-way at the time of construction of the two-lane roadway. The present investigation concerns selected areas requiring additional work for the proposed NBL of the connector, along with three access roads, a driveway and two partially relocated Y-lines.

Rural, forested terrain is dominant from Zirconia to just north of the interchange with US-276. The remainder of the route in the vicinity of East Flat Rock features residential properties, small farms, apple orchards and an apple-packing facility.

The following lines were investigated:

-L- Station 734+00 to Station 757+00, portions of right side only

-L- Station 798+00 to Station 810+00, portions of right side only

An Equal Opportunity / Affirmative Action Employer

-L- Station 810+00 to Station 844+00, selected segments of right side only

Access Road No. 1 Station 10+00 to Station 25+64.98

Access Road No. 2 Station 9+50 to Station 36+37.81
Access Road No. 2 REV. Station 36+37.81 to Station 49+88

Access Road No. 3 Station 771+77.66 to Station 850+50

-Y7- Station 10+00 to Station 16+00

-Y10- Station 8+50 to Station 13+03.96

Odie Gordon Driveway, Station 10+00 to Station 14+50

No investigation was conducted at existing interchange ramps or for Y-lines where no significant revisions are proposed. Subsurface conditions at the short Y-lines are assumed to be similar to conditions along intervals of -L- present in the same vicinity.

Some subsurface investigations were conducted in August-September 1988 utilizing a truck-mounted Mobile B-56 and CME 550 ATV drill. Field investigations were completed in September-October 1989, including investigations of recent revisions to Access Road No. 1 and Access Road No. 2. Soil samples were obtained to determine Atterburg limits, sieve analyses, moisture content and AASHTO classifications; test results are presented on soils profiles accompanying this report. Shelby tube samples were taken to determine shear strength of soils at proposed cut slope locations; and bulk samples were taken to determine recompacted density, shear strength and permeability of potential embankment soils.

AREAS OF SPECIAL GEOTECHNICAL CONSIDERATION

1. Cut Sections Containing Hard Rock

A. Station 739+50 to Station 745+50, -L-
B. Station 755+00 to Station 756+50, -L-
C. Station 799+00 to Station 804+50, -L-
D. Station 14+50 to Station 15+50, Access Road No. 1
E. Station 19+50 to Station 20+50, Access Road No. 1
F. Station 10+50 to Station 13+00, Odie Gordon Driveway
G. Station 12+50 to Station 20+50, Access Road No. 2
H. Station 32+50 to Station 38+50, Access Road No. 2 REV.
I. Station 781+50 to Station 785+00, Access Road No. 3
J. Station 800+00 to Station 804+00 Access Road No. 3

2. Sections Involving High Ground Water

   A. Station 46+50 to Station 49+00, Access Road No. 2 REV.

3. Sections of Very Soft Ground Surface

   A. Station 47+25 to Station 49+00, Access Road No. 2 REV.

GEOLOGY AND PHYSIOGRAPHY

Geologically, the project lies near the eastern edge of the northeasterly trending Blue Ridge Belt. The underlying bedrock consists typically of light gray, weakly foliated to massive, inequigranular granite gneiss of Cambrian age. Depth of weathering throughout the project corridor ranges erratically from zero to approximately 50 feet.

Terrain adjacent to the existing connector from Zirconia to US-176 is typically mountainous to steeply rolling and heavily forested. Natural slopes north of US-176 become more moderate, favoring residential and agricultural development. No important flood plains are present on any portion of this project.

Surface drainage is excellent to good throughout the project. Small branches are widely spaced, but are concentrated along the west side of US-176 near the end of Access Road No. 2 REV.

SOILS PROPERTIES

Residual soils, including considerable weathered rock, are the dominant construction materials throughout the project corridor. Colluvium is present in important quantities in some portions of proposed Access Road No. 2 and Access Road No. 2 REV., but only in negligible quantities in other areas along the project. Thin-bedded alluvial soils associated with small streams are present in relatively insignificant quantities as are existing roadway embankments in portions of the project covered by this investigation. However, at least three waste areas from the previous construction, one south of US-176 and two north of US-176 are present adjacent to the east side of the existing connector and will be involved in construction of the NBL and/or Access Road No. 3.

Unstructured, residual red-brown sandy clay and silty clay possessing low to moderate plasticity and classifying as A-7-6, A-7-5 and A-6 are occasionally present across the uplands and are typically 2 to 8 feet thick. Some sandy clay, saprolite, is also intermittently encountered in small pockets.

Silty to medium and coarsely granular saprolite (A-2-4 and A-2-5) with negligible to moderate amounts of mica and typically containing interbedded weathered rock seams dominates within the limits of proposed construction. Closely related, micaceous sandy silt (A-4 and A-5) is also present in appreciable amounts,

but is definitely subordinate in quantity to the more coarsely granular materials. The saprolite materials are typically well drained, moist to dry and range in color from tan and brown to gray. Soil moistures observed in September-October 1989 were obviously greater than those observed in the same vicinity during August-September 1988 when extended drought conditions had been in effect. Thickness of saprolite ranges from a few feet to as much as 50 feet in rare situations.

Soft and hard weathered rock interbedded with, and underlying saprolite materials is present in most areas of the project. Soft weathered rock ranges in thickness from one foot to greater than 20 feet.

Colluvium migrating downslope from high, rocky ground above Access Road No. 2 is present in significant amounts, which range in thickness from approximately 3 feet to greater than 20 feet. It typically consists of stable, well drained silty sand, clayey sand and sandy silt with rock fragments and small boulders. However, large boulders are concentrated on the surface immediately downslope from extensive hard rock outcrops left of Access Road No. 2 Stations 14+00 to 18+00.

Alluvium associated with small streams near the end of Access Road No. 2 REV. typically ranges in thickness from 3 to 4 feet and consists of interbedded inorganic to slightly organic (3% to 8% in test results) silty sand (A-2-4) and sandy silt (A-4). These soils are underlain by a thin bed of medium dense to loose gravel.

Large waste areas on the right of -L- Stations 748+50 to 752+50 and 823+00 to 829+00, consist dominantly of silty sand with interlayered sandy clay, clayey silt and rock fragments. Boulders are also present, but do not appear to be especially numerous in most portions of these fills. Very dense, large, shot-rock boulders are present in a smaller waste area which lies between Access Road No. 3 Stations 780+00 to 781+50 and Ramp D.

ROCK PROPERTIES

Some hard rock was be encountered in most of the major cuts which were investigated on the project. However, the overburden of saprolite/weathered rock and/or colluvium is the determining factor in cut slope design rather than the occurrences of hard rock. Rock in the proposed cut slope left of Station 12+50 to 18+50, Access Road No. 2 will require blasting.

Crystalline granite gneiss underlying the project corridor is composed of feldspars, quartz and muscovite-biotite mica. The average strike of rock exposures in the vicinity of Station 16+50

to 17+25, Access Road No. 2 was measured as N 10 degrees E with dips ranging from 43 degrees to 60 degrees southeast. Some scattered readings adjacent to the existing connector show closely corresponding strike and dip values; others show strikes in the northwest quadrant with dips both to the northeast and southwest, which suggest possible folding activity.

GROUNDWATER

Groundwater is present at the surface or at shallow depths from approximate Station 46+00, Access Road No. 2 REV. to the existing fill toe of US 176. Elsewhere, groundwater was encountered only in narrow strips in the immediate vicinity of small streams and in a few isolated borings in upland areas. The observed occurrences in the upland are probably "perched" and do not represent the true water table.

Recovery of the water table from the depressed levels of summer 1988 is certain to be occurring at present and should continue if precipitation continues at annual rates comparable to 1989. However, considering the steep natural slopes and excellent drainage characteristics of the soils on this project, a rising regional water table should have little or no impact on construction of the project or performance of the completed facilities.

GEOTECHNICAL DESCRIPTIVE ANALYSIS OF THE PROJECT

LINE -L-

Station 734+00 to Station 757+00

Extensive grading will be required along the NBL of the connector through steep, forested terrain. Construction materials consist dominantly of dry to moist, occasionally micaceous, brown and gray silty sand (A-2-4) and weathered rock. Subordinate quantities of sandy silt/clayey silt (A-4) and sandy clay (A-6, A-7-5) are also present.

Hard rock is present at depths of 2 to 5 feet in the vicinity of the proposed median from Station 739+50 to Station 745+00 and is very near the ground surface on the right between Stations 740+00 and 741+00. Additional hard rock is present erratically within construction limits throughout most of this segment ahead of Station 739+50.

A waste stockpile area, remaining from previous construction, fills a broad, deep ravine right of Station 748+00 to Station 752+75. Thickness of the waste, which consists of micaceous silty sand with interlayered sandy silt, sandy clay, rock fragments and occasional boulders is known to exceed 30 feet in some places; maximum thickness is probably much greater. SPT values ranging from 7 to 41 blows per foot were obtained to a depth of 30 feet in a boring 49 feet right of Station 749+50.

No groundwater was encountered in test borings within this segment of the proposed NBL.

Station 796+50 to Station 811+00

Extensive grading will be required for completion of the NBL and the adjacent Access Road No. 3. The ground surface back of the existing right cut slope is mostly gently sloping. There is some agricultural usage, but the area is dominantly forested. Pockets of red-brown and brown sandy clay/silty clay (A-6, A-7-6, A-7-5) 4 to 10 feet thick are present intermittently across the upland surface of Access Road No. 3, (see page 9 and 10 of this report). Micaceous sandy silt and clayey silt (A-4, A-5) are also occasionally present. These tend to become increasingly granular with depth, grading into silty, medium to coarse sand, which is the dominant construction material. Thin weathered rock seams are typically interlayered with the granular soil, apparently with less frequency ahead of Station 805+00.

Hard rock in the vicinity of the median ranges in depth from 2 to 8 feet from Station 799+00 to Station 805+00. In the adjacent high ground right of these same stations, hard rock is also present in relatively large quantities.

No groundwater was encountered in borings within this segment.

Station 814+50 to Station 818+50

Hard rock which outcrops on the left side of the existing connector apparently does not extend into construction limits required for completion of the NBL. At 40 feet right of Station 816+00, rock was encountered in a boring at a depth greater than 10 feet below proposed grade. Construction materials through this segment should consist of moist to dry, medium dense to dense, silty sand, saprolite with rock fragments and interlayered thin weathered rock seams.

No groundwater was observed in borings within this segment.

Station 823+00 to Station 827+50

A large waste stockpile is present along the right side of the existing connector. Materials contained in the stockpile consist of micaceous silty sand with interlayered sandy silt/clayey silt, sandy clay, rock fragments and boulders.

Station 831+50 to 834+50

The moist to dry, medium dense, micaceous, silty sand (A-2-4) saprolite and interlayered, stiff sandy silt (A-4) are apparently free of weathered rock layers within our borings in this segment.

An SPT boring 30 feet left of Station 832+48 Access Road No. 3 yielded values ranging from 10 to 18 blows per foot.

No groundwater was encountered in borings within this segment.

ACCESS ROAD NO. 1

Station 10+00 to Station 25+52.98

This proposed facility begins in a gravel road approximately 200 feet right of -L- Median Station 739+00. It bends sharply around the rim of a deep, steep-sided ravine and traverses steeply sloping, heavily forested terrain to US-176, which is approximately 110 feet lower than the beginning station.

Moist to dry, tan, brown and gray, silty to gravelly sand (A-2-4), saprolite and weathered rock are the dominant construction materials along the entire survey. Pockets of surficial brown sandy clay (A-6 and A-7-5), 3 to 6 feet thick, occasionally overlie the saprolite.

Weathered rock and hard rock outcrops are numerous along the Odie Gordon driveway left of Station 14+50 to Station 15+50, Access Road No. 1. Hard rock is present erratically at relatively shallow depths throughout an interval from Station 12+00 to Station 15+50 and again from Station 19+25 to Station 20+50. A small outcrop is visible at Station 19+75 on the centerline. Rock also outcrops intermittently in the stream bed at the bottom of the deep, V-shaped ravine adjacent to US-176.

No groundwater was encountered in borings for this facility.

ACCESS ROAD NO. 2

Station 7+97.62 to Station 12+75

This segment is located in existing SR-1930 (Lamplighter Drive) in a residential area. Hard rock is reportedly present at shallow depth in at least two deep wells on the right side of SR-1930.

Station 12+75 to Station 20+50

The proposed alignment passes between two brick houses at the beginning of this segment and traverses a forested mountain slope. An existing single-lane trail is present 25 to 50 feet right of centerline from the beginning of the survey to Station 19+00, where it crosses the alignment.

The edge of a continuous, large, dome-like outcropping of hard granite gneiss is present at 100 to 120 feet left of Stations 14+50 to 17+50. Bare rock typically extends more than 100 feet farther left through this interval. Occasional small bouldery outcrops are present within 75 to 85 feet of the centerline. The

mountain slope between the rock face and the trail is littered with colluvial and residual boulders, some of which are very large. Pockets of granular colluvium containing randomly oriented boulders are visible in the existing slope left of the trail. Although the slope is tree-covered, borings and visual evidence on the slope indicate that hard rock is present within a few feet of the ground surface. Overburden above rock consists of hard and soft weathered rock, boulders and silty, medium to coarse sand (A-2-4) saprolite.

A high potential for blast damage to two or more houses and some valuable water wells exists in this vicinity.

No groundwater was encountered in borings within this segment.

Station 20+50 to Station 23+50

The mountain slopes within this segment are much less steep than those in the preceding segment. Dense to medium dense, silty sand, saprolite and weathered rock are the dominant materials. Hard rock typically is present at depths of 15 to 20 feet within our borings.

No groundwater was encountered in borings within this segment.

Station 23+50 to Station 31+50

This segment traverses a large, roughly fan-shaped deposit of colluvium which consists of stable, loose to medium dense, silty sand and clayey sand (A-2-4) with interlayered, stiff sandy silt (A-4), rock fragments and small boulders. Thickness of the colluvium generally exceeds 20 feet. Clay content in test results ranges from 10 to 20 percent; moisture content in a very dry season (September 1988) ranged from less than 10 percent to approximately 16 percent. SPT values obtained from two borings, each of 20-foot depth, ranged from 7 to 24 blows per foot.

With the exception of one groundwater observation at a depth of 10.5 feet at Station 31+00, no groundwater was encountered in the borings through this segment.

Station 31+50 Access Road No. 2 to Station 38+00
Access Road No. 2 REV.

At the beginning of this segment, the colluvial deposit abuts against a steep-sided ridge. Weathered rock and hard rock are the dominant materials. Overburden of dense silty, medium to coarse sand, micaceous, saprolite (A-2-4) varies from a few feet to approximately 20 feet thick through this segment; within cut sections, saprolite is typically less than 10 feet thick. Quantities of colluvium within this segment are negligible.

No groundwater was encountered in the borings within this segment.

Station 38+00 to Station 47+00, Access Road No. 2 REV.

Within this segment is an at grade crossing with Southern Railway. Natural slopes are not as steep as in the preceding segment. A cover of colluvium is apparently present over practically all of this segment, which is typically 3 to 10 feet thick. Colluvium consists of sandy clay (A-7-6, A-6) and is overlying or interlayered with the dominant, granular (A-2-4, A-2-5) materials. Medium dense to dense, silty sand and stiff sandy silt, saprolite underlie the colluvium.

No groundwater was encountered at depths of 15 to 20 feet back of Station 44+00. In October 1989 groundwater was observed at a depth of 19 feet at Station 44+00 and at increasingly shallow depths ahead to the end of this segment where it is only 2 to 3 feet beneath the surface.

Station 47+00 to Station 49+00

This segment is located in a valley formed by two small branches, and groundwater in October 1989 was virtually at the ground surface over a large area. The ground surface is very soft and marshy to the existing fill toe at US-176. Left of the revised alignment in the vicinity of the original line, there is considerable infiltration drainage where some portions of branch channels are poorly defined.

Alluvium in the branch valley is typically 3 to 4 feet thick and consists of thinly interbedded, loose, inorganic silty sand and very loose, dark brown to black, slightly to moderately organic (3 percent to 8 percent organic material in test results) silty sand (A-2-4) and very soft sandy silt (A-4). A thin bed of medium dense to loose sand and small gravel typically separates alluvium from residual materials.

Saturated, micaceous, silty sand, saprolite (A-2-5 and A-2-4) underlying the alluvium is loose to medium dense with blow counts in the range of 3 to 11 blows per foot obtained from a boring 3 feet right of Station 46+96.

ACCESS ROAD NO. 3

Station 771+77.66 to Station 781+50

This access road begins in unpaved SR-1831 (Green River Road) at the southern end of the interchange of the existing connector with US-176 and trends northerly in towards the proposed NBL to settle in eventually at 120 feet right of -L- Median. Existing roadway embankment has a maximum thickness of approximately 10

feet and consists of loose silty sand (A-2-4) and medium stiff sandy clay (A-7-5). Portions of a waste stockpile on the left near the end of this segment contain very dense, medium to large, shot-rock boulders.

Residual soils through this segment consist of medium dense to dense silty sand and clayey sand (A-2-4), saprolite. Hard rock was encountered at a depth of 12 feet in a boring at Station 779+10.

Groundwater was encountered at Station 779+10 at a depth of 8 feet. One or more springs may be present in the vicinity of Stations 779+25 to 779+60, but none could be located in September 1988.

Station 781+50 to Station 811+00

This segment is located on broad, moderately steeply sloping upland adjacent to the proposed NBL. It is dominantly forested, but partially cleared for agricultural purposes, mainly one fairly level area above the existing cut slope right of Stations 799+00 to 804+00. One small stream interrupts the climb of the upland terrain from approximate centerline elevation 2113 feet to 2247 feet at Station 802+00.

The dominant construction material through this segment is dry to moist, occasionally micaceous, medium dense to very dense, silty sand (A-2-4), saprolite with interlayered weathered rock seams. Subordinate quantities of sandy silt and clayey silt (A-4, A-5) are also present as well as several pockets of red-brown and brown sandy clay (A-7-5, A-6), typically less than 6 feet thick, but occasionally as thick as 10 feet.

Some hard rock is near proposed grade from Station 782+00 to Station 785+00 and in far greater quantities from Station 799+00 to Station 804+50.

Groundwater is present near the ground surface in a narrow strip adjacent to the small stream at Station 792+25. One isolated water measurement at a depth of 32.5 feet (elevation 2212 feet) was obtained from a boring at 30 feet right of Station 803+00.

Station 811+00 to Station 822+00

This segment, which is located on relatively gently sloping terrain, is separated from the existing connector on the left by a narrow wooded strip and a grassy strip maintained by state forces; the right side of proposed construction will extend into an apple orchard in the vicinity of Station 820+00.

Red-brown and brown, residual sandy clay/silty clay and sandy clay, saprolite typically 5 to 12 feet thick apparently is present in locally important quantities through much of this segment. The clay layer is underlain by medium dense to dense

silty sand and very stiff sandy silt, saprolite. In a boring 19 feet right of Station 815+50, SPT values in saprolite ranged from 10 to 38 blows per foot. Weathered rock in this boring was at 23 feet.

No groundwater was encountered in this segment.

Station 822+00 to Station 828+50 (Stations approximate)

This segment traverses brushy woodland and a stretch of unpaved SR-1899 which will be obliterated and relocated. Portions of the segment also abut on the left against the large waste stockpile which lies adjacent to the existing connector. Occasional large boulders are visible in slumps in the lower slopes of this stockpile.

Residual materials through this segment consist of stiff to very stiff sandy silt and medium dense to dense silty sand, saprolite.

No hard rock or groundwater were encountered in this segment.

Station 828+50 to Station 841+00

This segment traverses steeply sloping woodland, thickets and pastureland. Excavation to a maximum depth slightly greater than 30 feet is required from approximate Station 831+00 to 835+00, the final cut of any significance for Access Road No. 3.

Residual materials consist of surficial sandy clay, 4 feet thick in the vicinity of Station 834+00 to 834+50, interlayered, micaceous, stiff to very stiff, sandy silt (A-4) and medium dense silty sand (A-2-4), saprolite. At 30 feet left of Station 832+48 SPT values ranged from 10 to 18 blows per foot through a vertical range of 35 feet. Quantities of weathered rock was minimal and no hard rock was encountered in our borings.

Similar sandy silt and silty sand, residual soils/saprolite were encountered in other portions of this segment where no excavation is required.

No groundwater was encountered in this segment.

Station 841+00 to Station 844+50

This segment is relatively flat-lying, and the alignment follows an existing gravel road which serves residential and farm property. Recent wildflower plantings by the D.O.T. are present on the left between Access Road No. 3 and the existing connector.

A cover of red-brown and brown, stiff, sandy clay, 4 to 5 feet thick, typically overlies moist to dry, stiff, sandy silt and medium dense, silty sand, saprolite.

No groundwater was encountered.

ODIE GORDON DRIVEWAY

Station 10+00 to Station 14+50

The proposed alignment begins at Station 14+20, Access Road No. 1 on embankment placed across a deep ravine and immediately bends sharply to follow the existing driveway through steeply sloping, forested terrain.

Construction materials consist of weathered rock, hard rock and moist to dry, dense to very dense, silty sand, saprolite in roughly equal proportions. Outcrops of bouldery, hard rock and weathered rock are present over a large area left of Station 10+50 to Station 12+50.

LINE -Y7-

Station 10+00 to Station 15+50

This partial relocation of SR-1889 (Shafer Road) begins in a narrow wooded strip in a deep ravine at Station 828+80, Access Road No. 3 and crosses mainly open pasture to near Station 14+00, where it begins to follow the existing, unpaved road.

Dense silty sand and clayey sand, residual/saprolite were observed from Station 13+50 to the end of the survey. Similar materials are likely to be present through the preceding portion of the survey.

No groundwater was encountered.

LINE -Y10-

The proposed alignment follows existing SR-1930 (Lamplighter Drive) in a residential area to approximate Station 10+50, where it begins a slight relocation (maximum of 45 feet) to the south. It ends at Station 12+50, Access Road No. 2.

Construction materials consist of dense, silty, medium to coarse sand, saprolite typically 3 to 12 feet thick and weathered rock. Large masses of hard granite gneiss are present within 150 to 250 feet on the left side, but no hard rock was encountered in our borings in this segment.

Respectfully submitted,

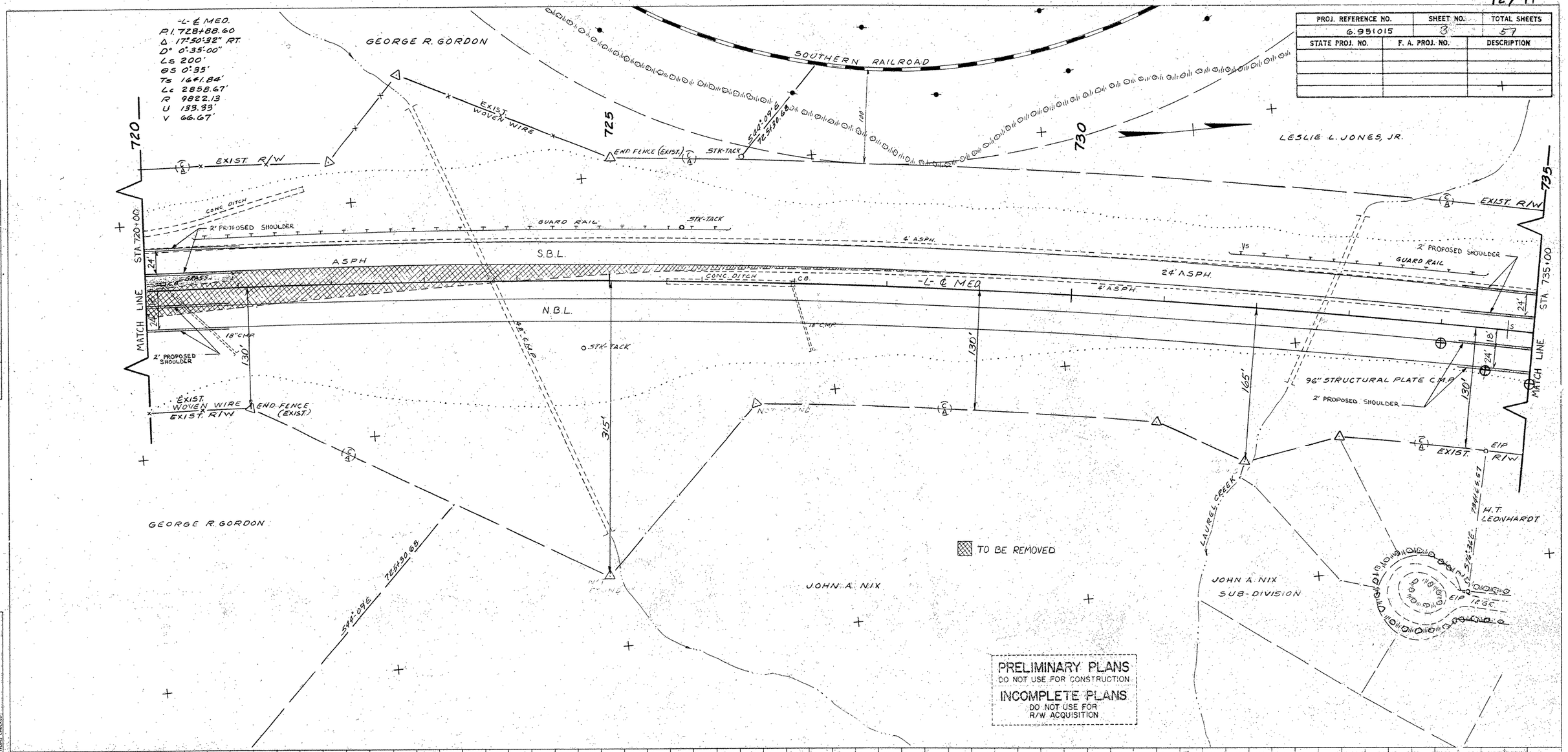
J. L. Sharpe EL.

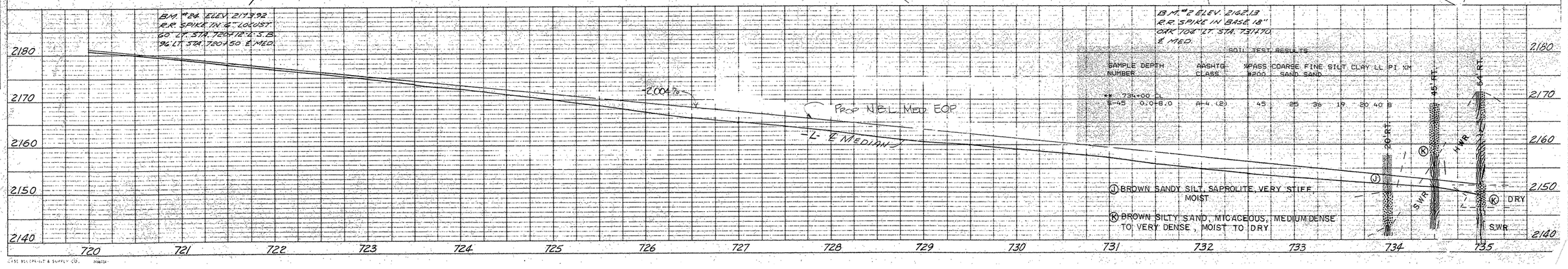
J. L. Sharpe, Project Geologist

JLS:mw

12/91

PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
6.951015	3	57
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION





PLAN — SURVEYED, PLOTTED, ALIGNMENT CHECKED, RT. OF WAY CHECKED — NOTE BOOK No. — BY — DATE

R505

PROFILE — SURVEYED, PLOTTED, GRADES CHECKED, & NOTED, STRUCTURE NOTATIONS CHECKED — NOTE BOOK No. — BY — DATE

13/91

PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
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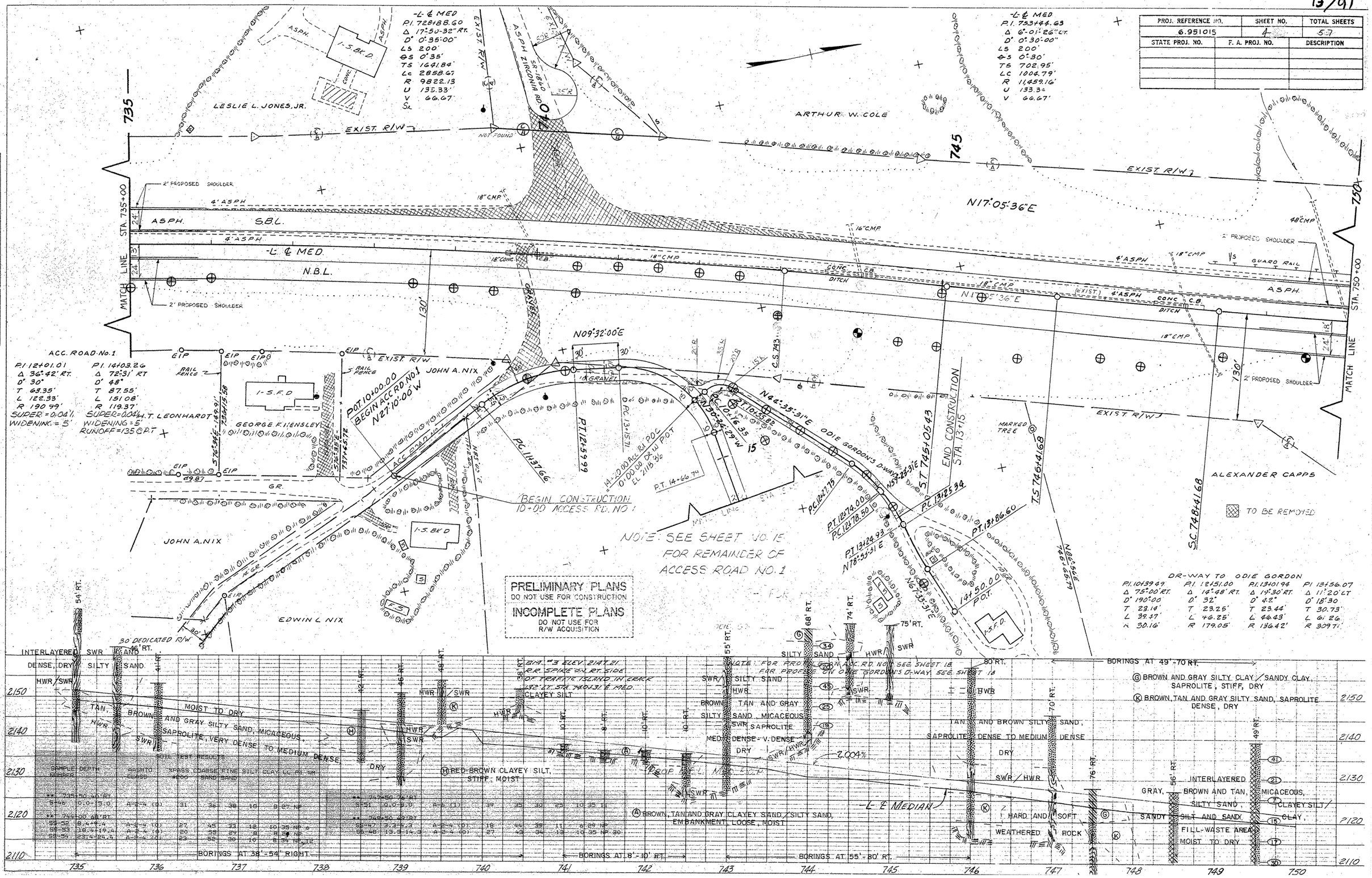
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION



PLAN — SURVEYED, PLOTTED, ALIGNMENT CHECKED, RT. OF WAY CHECKED — NOTE BOOK No. — BY — DATE

PROFILE — SURVEYED, PLOTTED, GRADES CHECKED, R. M.'s NOTED, STRUCTURE NOTATIONS CHECKED — NOTE BOOK No. — BY — DATE

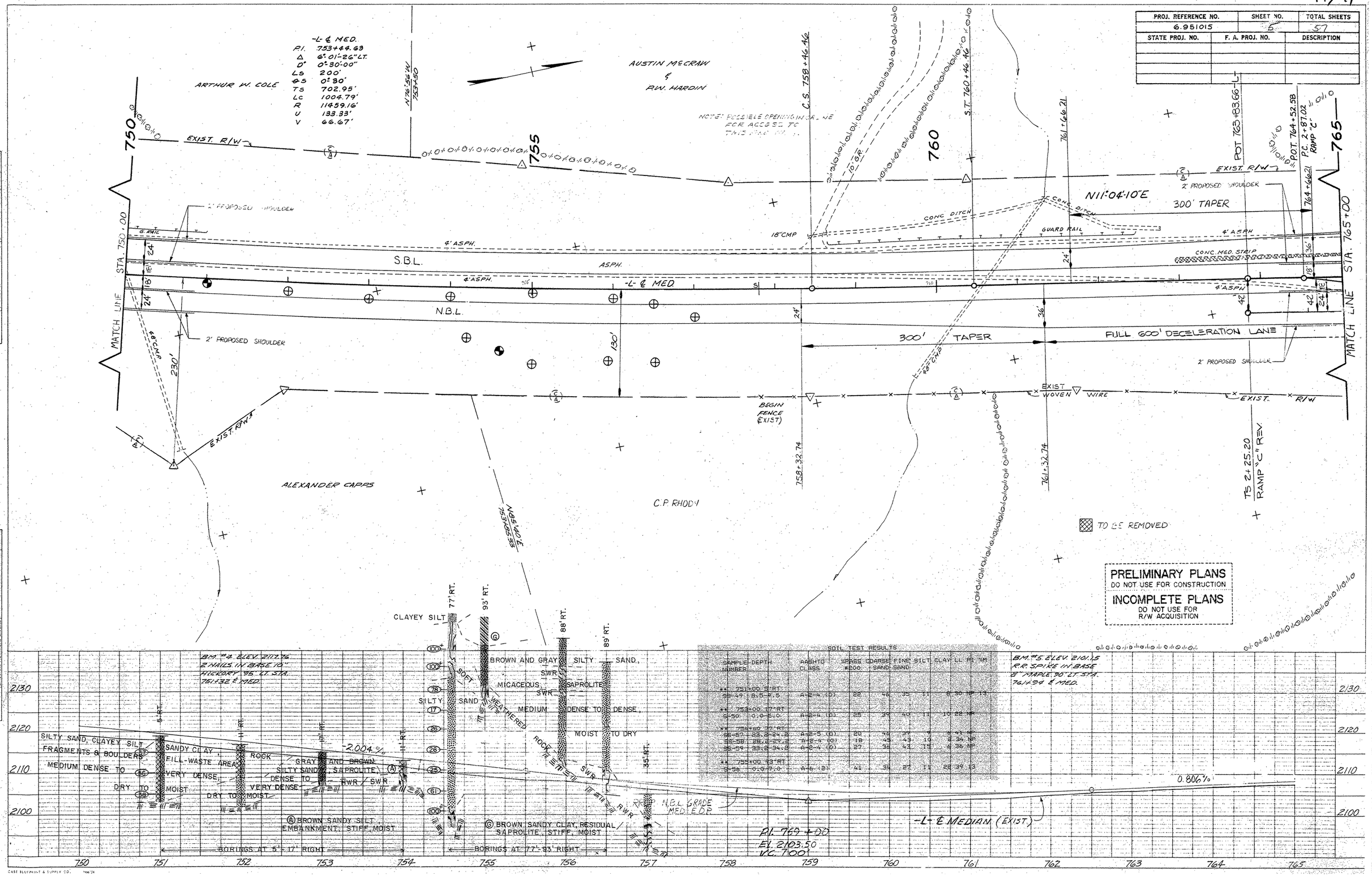
R505

14/91

PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
6.951015	5	57
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION

-L- & MED.

PI.	753+44.63
Δ	6°-01'-26" LT.
D°	0°-30'-00"
Ls	200'
ΘS	0°-30'
TS	702.95'
Lc	1004.79'
R	11459.16'
U	133.33'
V	66.67'



SOIL TEST RESULTS

SAMPLE NUMBER	DEPTH	AASHTO CLASS	%PASS #200	COARSE SAND	FINE SAND	SILT	CLAY	LL	PI	%M
** 751+00 9' RT										
SS-49	1.5-7.5	A-2-4 (0)	22	46	35	11	8	30	NP	13
** 753+00 17' RT										
S-50	0.0-5.0	A-2-4 (0)	25	39	40	11	10	28	NP	
** 754+00 77' RT										
SS-57	33.0-34.2	A-2-5 (0)	20	46	39	9	8	41	NP	
SS-58	28.0-29.2	A-2-4 (0)	18	43	43	10	8	34	NP	
SS-59	33.0-34.2	A-2-4 (0)	27	38	43	15	8	36	NP	
** 755+00 93' RT										
S-56	0.0-7.0	A-6 (2)	41	34	27	11	28	39	13	

PLAN — NOTE BOOK No. — SURVEYED, PLOTTED, ALIGNMENT CHECKED, R/W CHECKED

PROFILE — NOTE BOOK No. — SURVEYED, PLOTTED, GRADES CHECKED, R/W CHECKED, STRUCTURE NOTATIONS CHECKED

R505

CASE BLUEPRINT & SUPPLY CO. 7-66-24

15/91

STATE	PROJECT NO	SHEET NO.	TOTAL SHEETS
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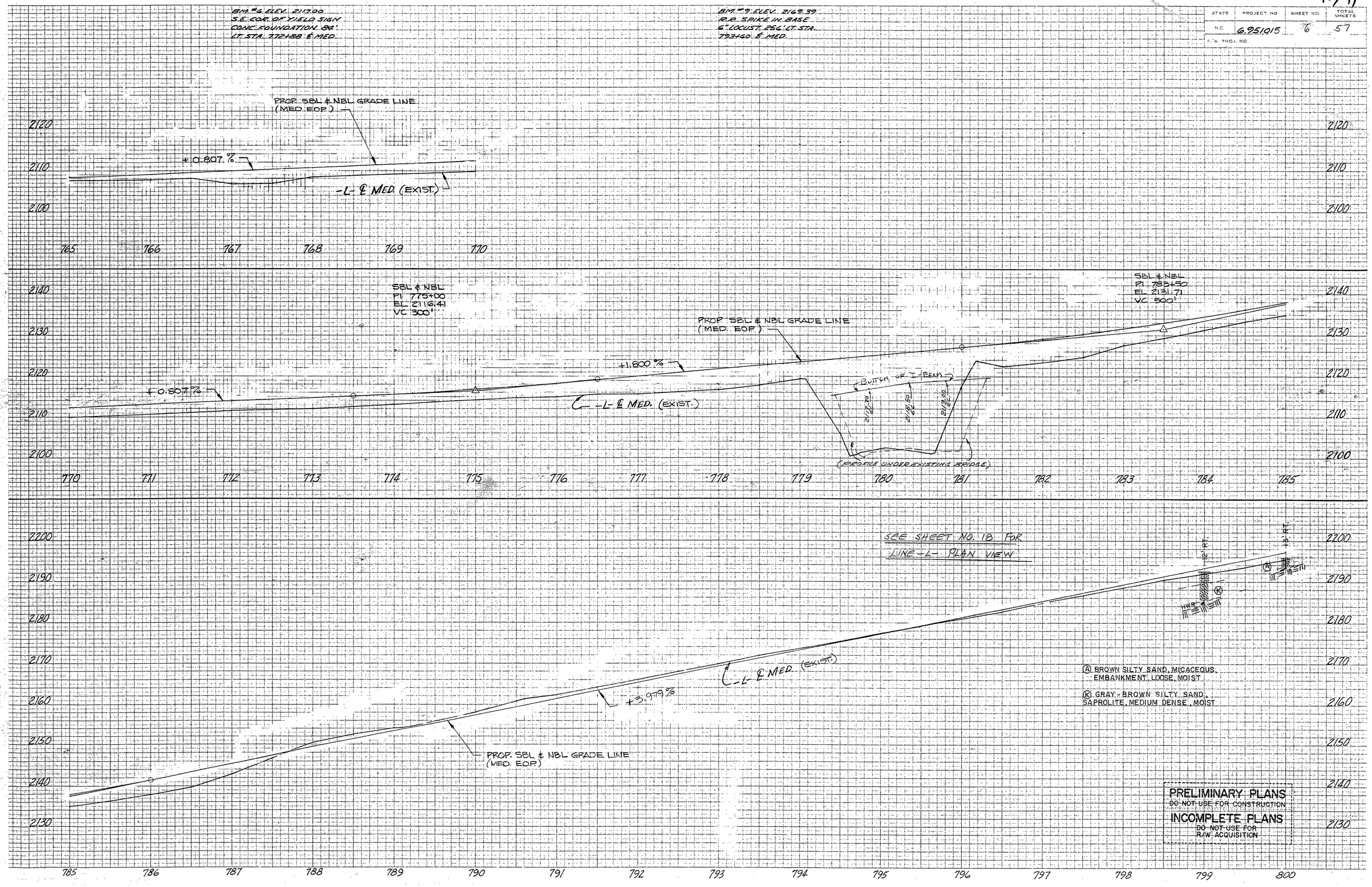
F.A. PROJ. NO.			



16/91

PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
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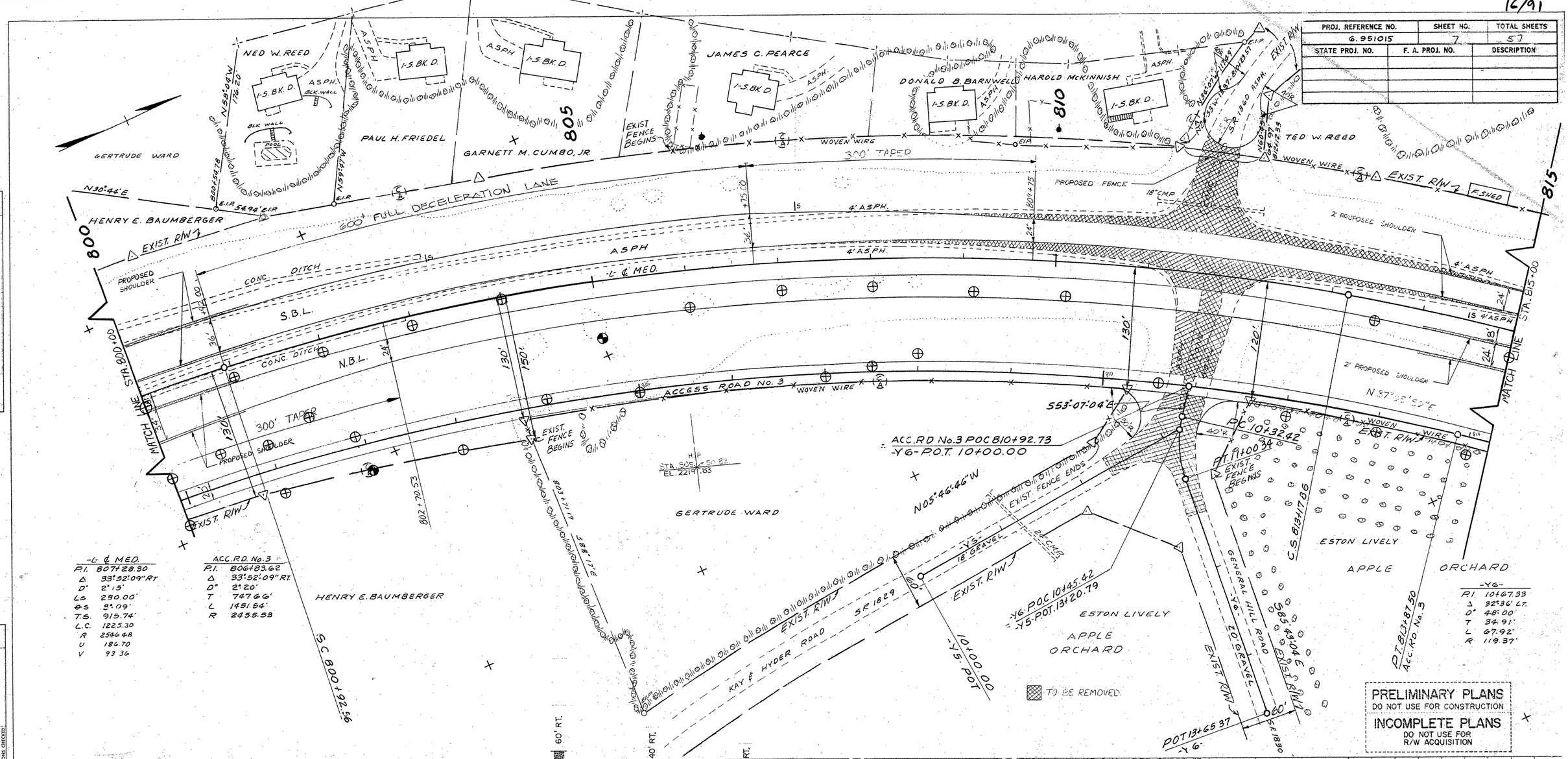
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION



PLAN — SURVEYED / PLOTTED / NOTE BOOK / ALIGNMENT CHECKED / RT. OF WAY CHECKED / No. — DATE / BY

PROFILE — SURVEYED / PLOTTED / NOTE BOOK / GRADES CHECKED / B. M.'S NOTED / No. — STRUCTURE NOTATIONS CHECKED

R505 LY5Y6 **

17/91

PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
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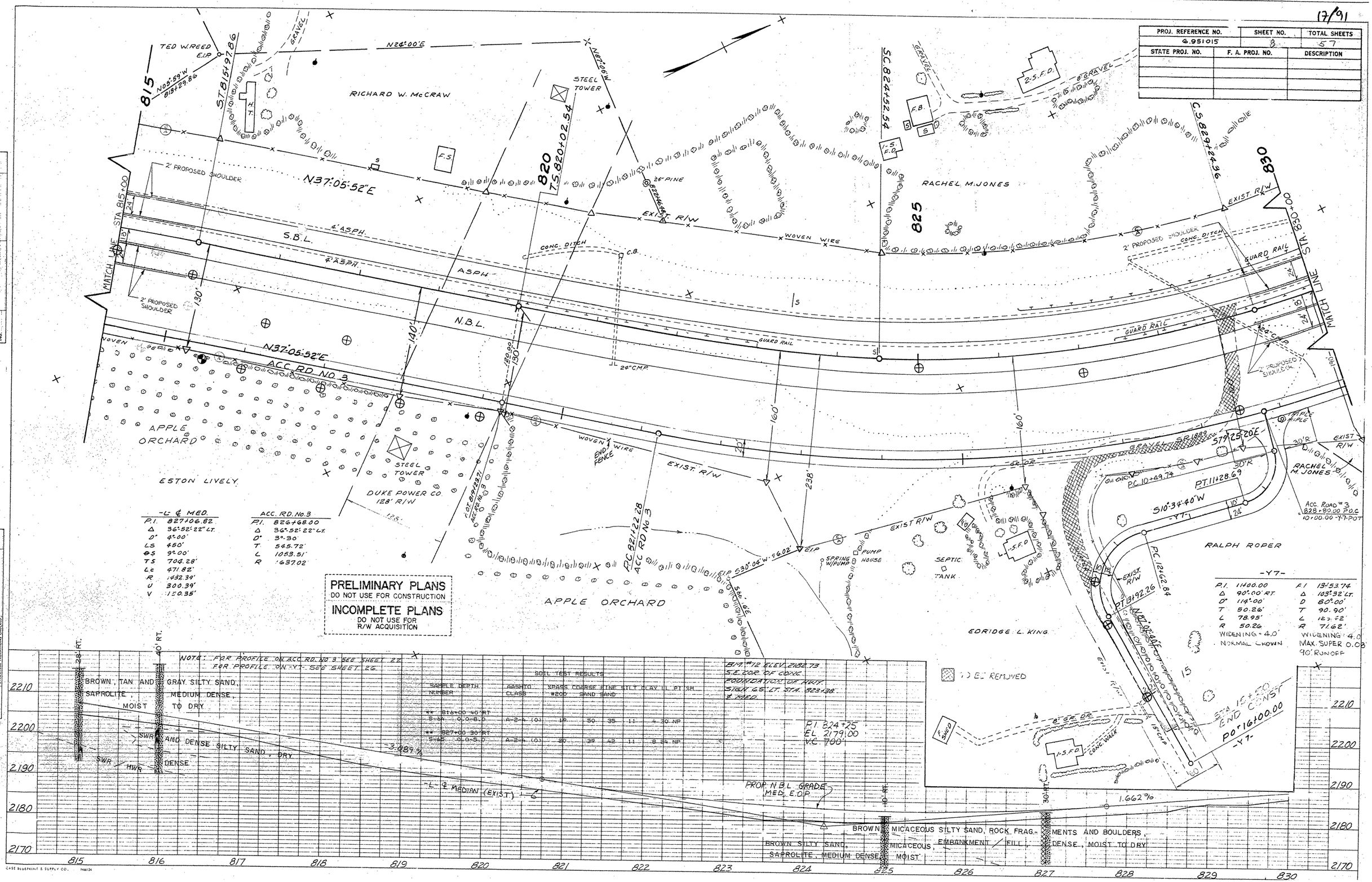
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION



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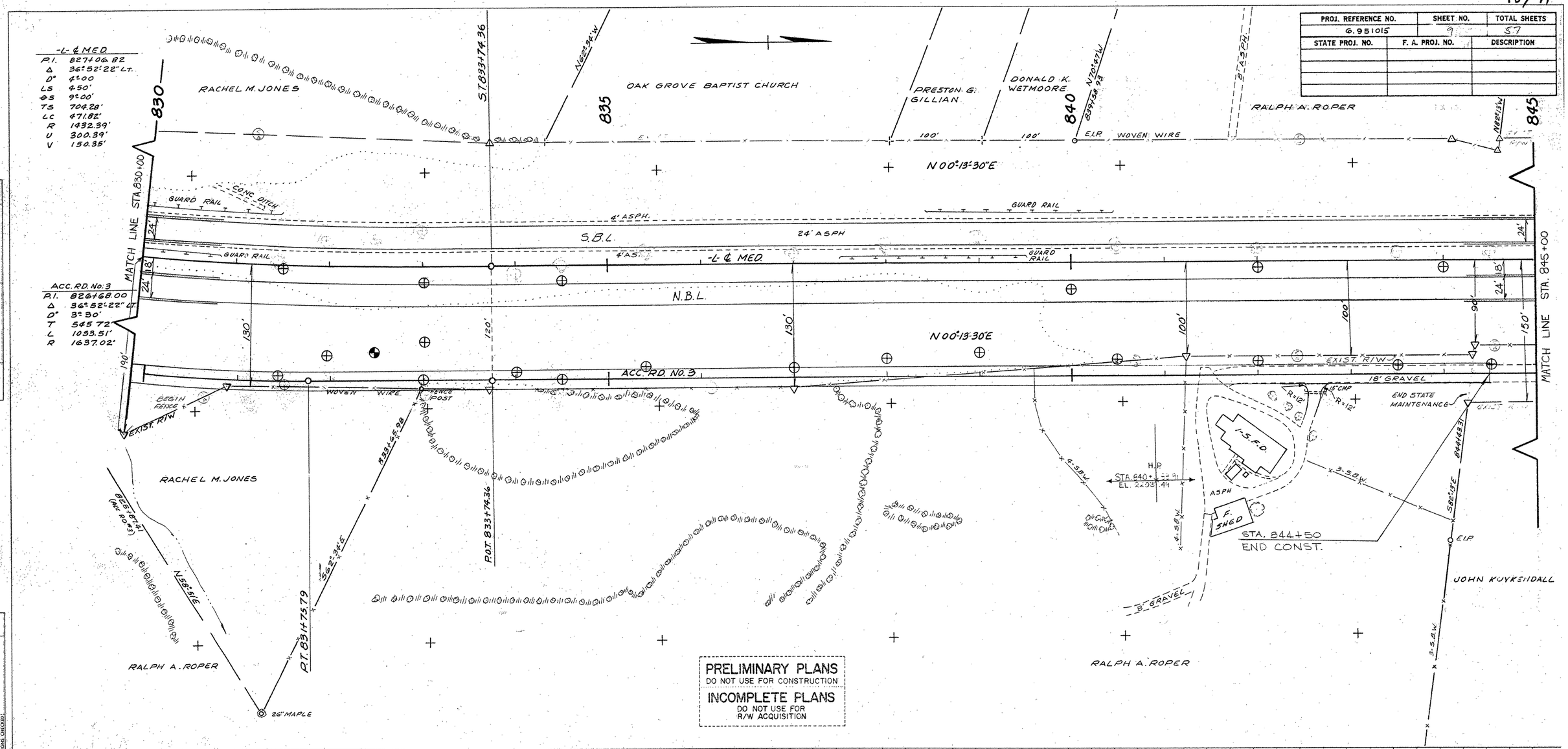
PROFILE NOTE BOOK No. SURVEYED PLOTTED GRADES CHECKED B. M.'s NOTED STRUCTURE NOTATIONS CHECKED BY DATE

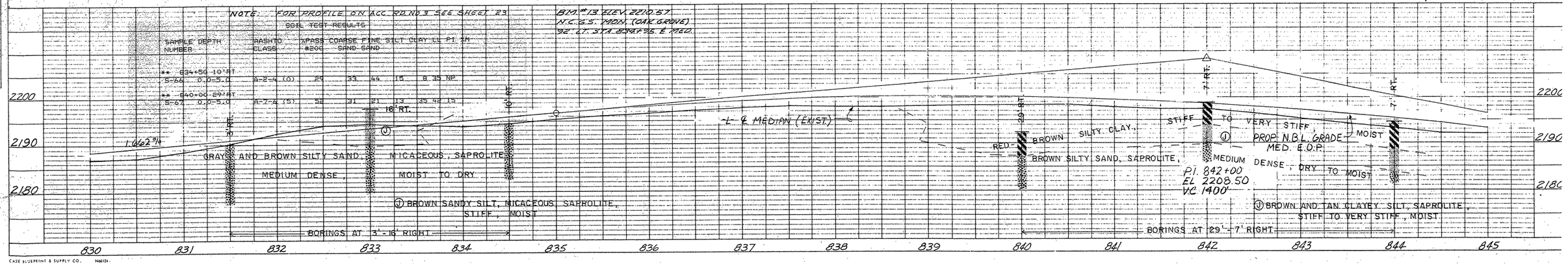
R505 LR#3 **

CASE BLUEPRINT & SUPPLY CO. N66124

18/91

PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
6.951015	9	57
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION





PLAN — NOTE BOOK No. — SURVEYED — PLOTTED — ALIGNMENT CHECKED — BY — DATE

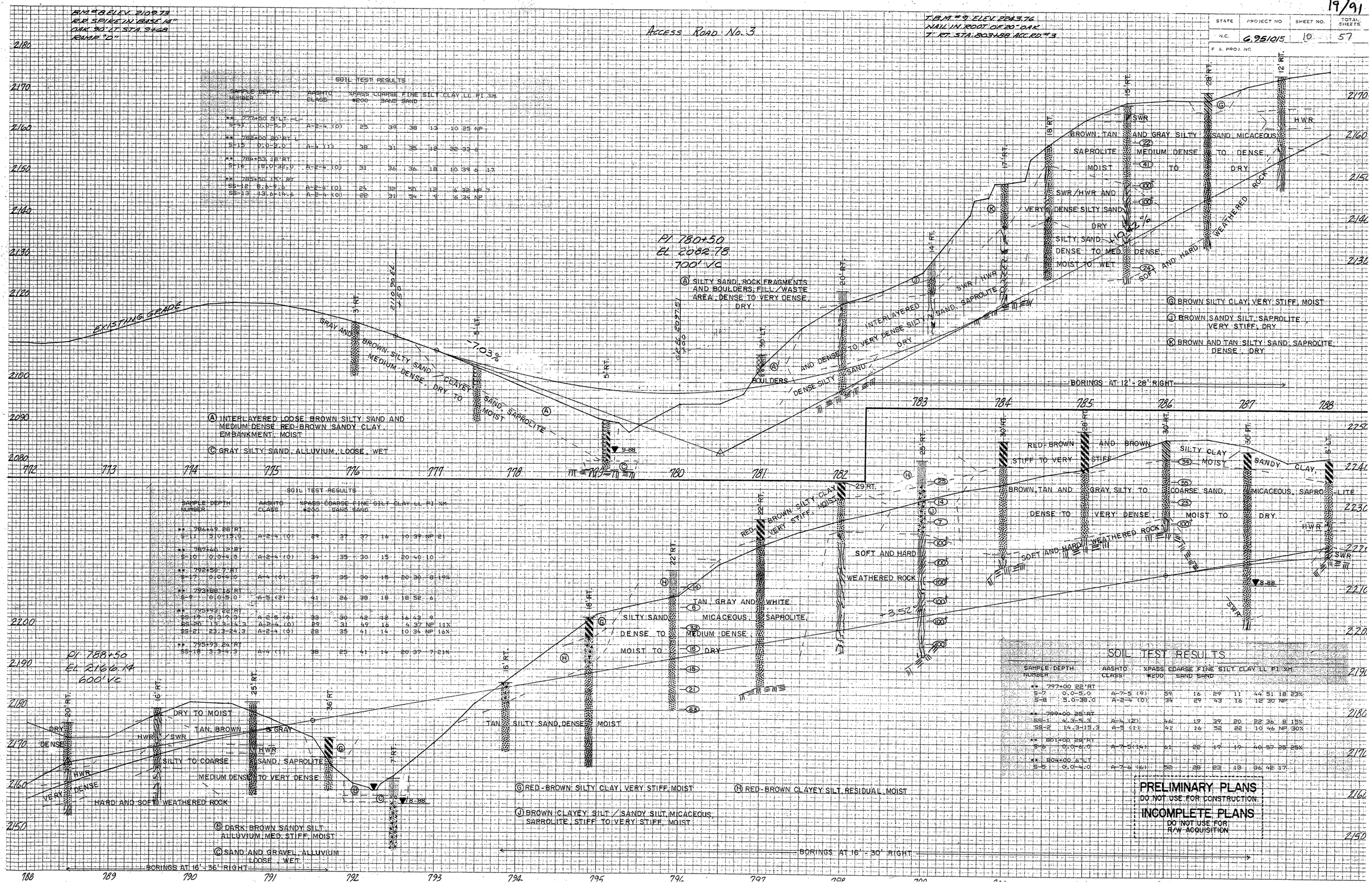
PROFILE — NOTE BOOK No. — SURVEYED — PLOTTED — GRADES CHECKED — B.M.'s NOTED — STRUCTURE NOTATIONS CHECKED — BY — DATE

R505

CASE BLUEPRINT & SUPPLY CO.

STATE	PROJECT NO	SHEET NO.	TOTAL SHEETS
N.C.	6.951015	10	57

F. A. PROJ. NO.



STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	6.951015	11	57

F. A. PROJ. NO.

BM #11 ELEV. 2222.48
R.R. SPIKE IN BASE 18"
OAK 112' LT. STA. 810+95
℄ MED.

ACCESS ROAD NO. 3

BM #13 ELEV. 2210.57
N.C.G.S. MON. (OAKGROVE)
92' LT. STA. 834+95 ℄ MED.

PI 805+00
EL 2224.22
600' VC

BROWN TAN, BROWN AND GRAY SILTY CLAY MEDIUM DENSE TO VERY DENSE
INTERLAYERED SWR AND DENSE TO VERY DENSE SILTY SAND MOIST TO DRY
SILTY SAND, SAPROLITE VERY STIFF, MOIST TO DRY
SOFT WEATHERED ROCK
TAN AND BROWN SANDY SILT / CLAYEY SILT, STIFF TO HARD
GRAY AND TAN SILTY SAND, VERY DENSE, MOIST TO DRY
SAPROLITE MOIST TO DRY
SWR / HWR
BROWN AND GRAY SILTY
RED-BROWN AND SANDY CLAY
BROWN SILTY CLAY STIFF, MOIST
BROWN AND TAN SAPROLITE, VERY SANDY SILT, STIFF, MOIST
SAND, MEDIUM DENSE DRY TO MOIST
-2.5%
-7.02%
Ⓐ GRAY SILTY SAND, EMBANKMENT MEDIUM DENSE, DRY
PI 816+00
EL 2172.72
600' VC
RED-BROWN AND GRAY AND BROWN VERY STIFF TO STIFF SILTY CLAY
SOFT AND HARD WEATHERED ROCK
SILTY SAND, MEDIUM DENSE TO DENSE
SAPROLITE MOIST TO DRY
SANDY CLAY, MOIST
BORINGS AT 17' - 27' RIGHT

SOIL TEST RESULTS

SAMPLE NUMBER	DEPTH	AASHTO CLASS	XPASS #200	COARSE SAND	FINE SAND	SILT	CLAY	LL	PI	XM
** 804+00 6' LT										
S-5	0.0-4.0	A-7-6 (6)	52	28	23	13	36	42	17	
** 805+00 60' RT (L)										
SS-60	4.0-5.0	A-2-4 (0)	29	24	54	14	6	28	NP	
SS-61	19.0-20.0	A-2-4 (0)	29	35	43	16	6	30	NP	
SS-62	24.0-25.0	A-4 (1)	39	28	39	25	8	30	NP	
** 807+30 5' LT										
S-4	0.0-5.0	A-7-6 (5)	54	32	24	12	42	41	13	19
** 808+00 20' LT										
S-3	0.0-5.0	A-4 (1)	38	22	44	14	20	31	NP	

SOIL TEST RESULTS

SAMPLE NUMBER	DEPTH	AASHTO CLASS	XPASS #200	COARSE SAND	FINE SAND	SILT	CLAY	LL	PI	XM
** 810+60 CL										
S-21	2.0-7.0	A-4 (2)	43	22	39	21	18	30	4	
** 812+00 18' RT										
S-68	0.0-5.0	A-6 (3)	47	19	38	13	30	36	12	
** 813+00 17' RT										
S-69	0.0-5.0	A-6 (3)	55	23	26	13	38	37	13	
** 815+50 19' RT										
SS-70	3.8-4.8	A-2-4 (0)	35	39	30	11	20	31	3	
SS-71	9.8-10.8	A-2-4 (0)	19	49	35	10	6	32	NP	
SS-72	19.8-19.8	A-2-4 (0)	21	46	35	11	8	30	NP	
** 817+00 21' RT										
S-73	3.0-12.0	A-7 (13)	43	28	29	11	32	36	11	
** 818+00 23' RT										
S-74	0.0-5.0	A-6 (4)	58	27	29	12	36	36	11	

SOIL TEST RESULTS

SAMPLE NUMBER	DEPTH	AASHTO CLASS	XPASS #200	COARSE SAND	FINE SAND	SILT	CLAY	LL	PI	XM
** 825+00 CL										
S-92	4.0-5.0	A-4 (2)	45	31	28	17	24	38	7	
** 827+00 CL										
S-94	2.0-2.0	A-4 (0)	37	39	28	11	22	34	NP	
** 828+50 10' LT										
S-39	0.0-5.0	A-4 (2)	45	30	29	14	28	32	10	16
** 831+44 5' LT										
S-27	0.0-5.0	A-4 (1)	39	25	42	21	12	34	NP	7
S-28	9.0-23.0	A-4 (0)	36	33	37	18	12	34	NP	
** 832+48 30' LT										
SS-22	4.0-5.0	A-2-5 (0)	24	35	45	12	9	41	NP	12

PI 821+00
EL 2161.62
600' V.C.

BROWN SANDY SILT / SILTY SAND, RESIDUAL
STIFF TO VERY STIFF, MOIST
MEDIUM DENSE
GRAY AND BROWN TO DENSE
SILTY SAND, SAPROLITE MOIST
SWR
+0.89%
LARGE WASTE AREA ON LEFT
Ⓐ BROWN SANDY SILT, MICACEOUS, FILL VERY STIFF TO HARD, MOIST
Ⓓ BROWN CLAYEY SILT / SANDY SILT, SAPROLITE, STIFF TO VERY STIFF, MOIST
GRAY AND BROWN SANDY SILT, MICACEOUS, STIFF TO HARD, MOIST
SAPROLITE TO DRY
TAN BROWN & GRAY SILTY SAND & SANDY SILT, MICACEOUS, SAPROLITE, MEDIUM DENSE TO DENSE MOIST TO DRY
SWR
HWR
PI 831+50
EL 2171.04
400' V.C.
BORINGS 5'-30' LT.
Ⓒ BROWN SANDY CLAY, STIFF, MOIST

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

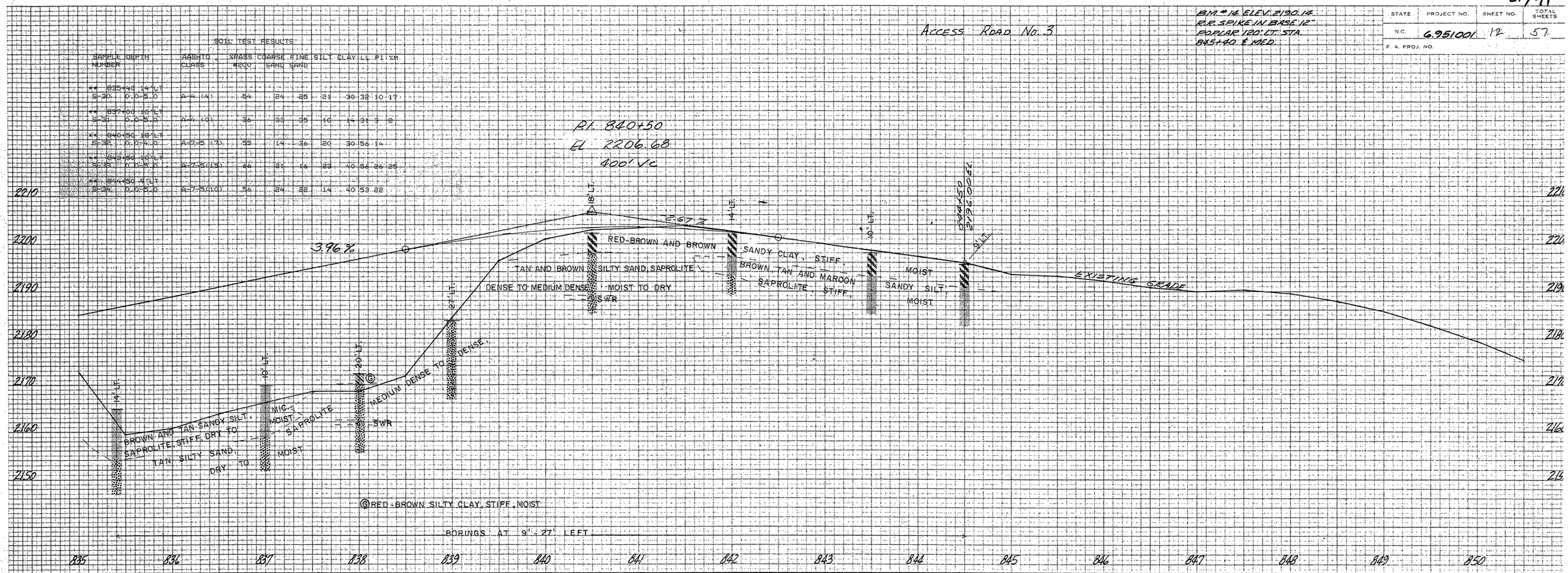
STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	6.951001	12	57
F. A. PROJ. NO.			

ACCESS ROAD NO. 3

BM #14 ELEV. 2190.14
R.R. SPIKE IN BASE 12"
POPLAR 120' LT. STA.
845+40 ℄ MED.

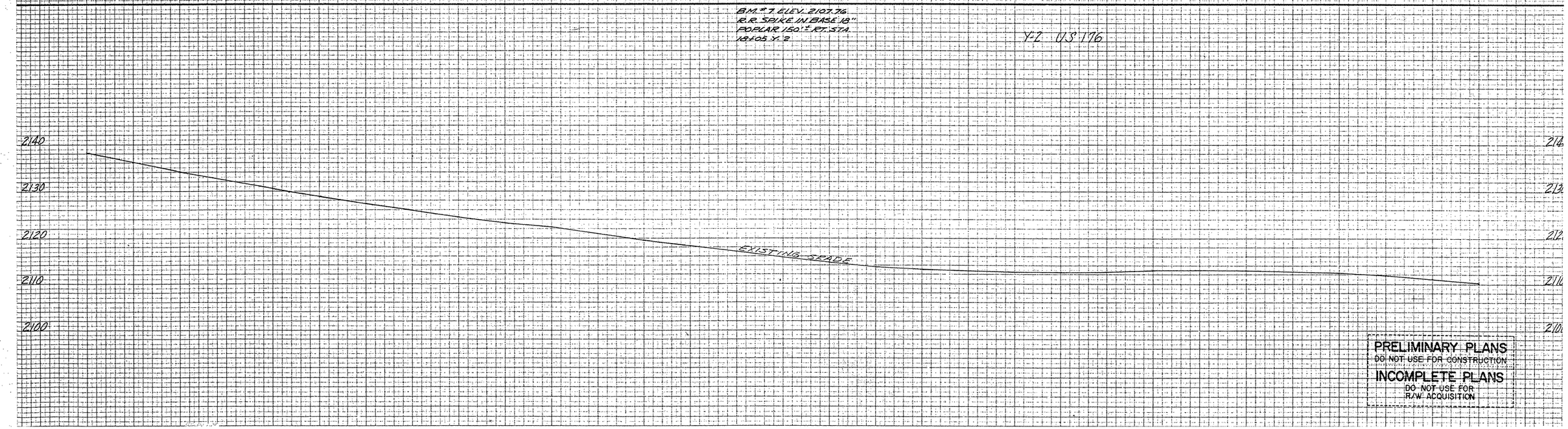
SOIL TEST RESULTS

SAMPLE NUMBER	DEPTH	AASHTO CLASS	%PASS #200	COARSE SAND	FINE SAND	SILT	CLAY	LL	PI	%M
** 835+40 14' LT										
S-30	0.0-5.0	A-4 (4)	54	24	25	21	30	32	10	17
** 837+00 20' LT										
S-31	0.0-5.0	A-4 (0)	36	33	35	16	14	31	3	8
** 840+50 18' LT										
S-32	0.0-4.0	A-7-5 (7)	55	14	36	20	30	56	14	
** 843+50 18' LT										
S-33	0.0-5.0	A-7-5(15)	46	21	14	22	40	54	26	25
** 844+50 5' LT										
S-34	0.0-5.0	A-7-5(10)	56	24	22	14	40	53	22	



BM #7 ELEV. 2107.76
R.R. SPIKE IN BASE 18"
POPLAR 150'± RT. STA.
18+05 Y.2

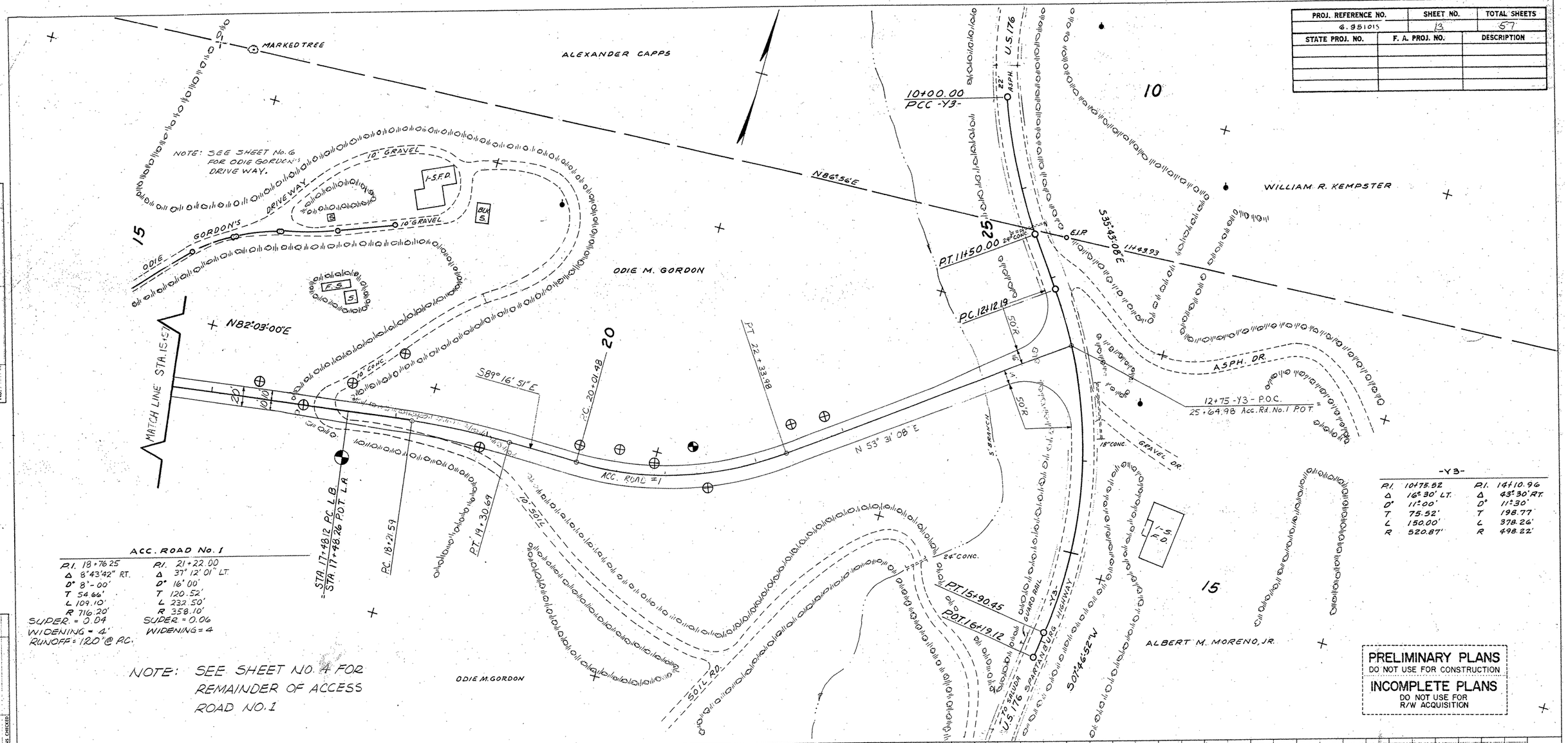
Y-2 US 176



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

ACCESS ROAD #1 22/91

PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
6.951015	13	57
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION



-Y3-			
P.I.	10+75.52	P.I.	14+10.96
Δ	16° 30' LT.	Δ	43° 30' RT.
D°	11° 00'	D°	11° 30'
T	75.52'	T	198.77'
L	150.00'	L	378.26'
R	520.87'	R	498.22'

ACC. ROAD No. 1

P.I. 18+76.25	P.I. 21+22.00
Δ 8°43'42" RT.	Δ 37° 12' 01" LT.
D° 8°-00'	D° 16° 00'
T 54.66'	T 120.52'
L 109.10'	L 232.50'
R 716.20'	R 358.10'
SUPER. = 0.04	SUPER = 0.06
WIDENING = 4'	WIDENING = 4
RUNOFF = 120' @ P.C.	

NOTE: SEE SHEET NO. 4 FOR REMAINDER OF ACCESS ROAD NO. 1

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

NOTE: FOR PROFILE ON ACC. ROAD NO. 1 SEE SHEET 18
FOR PROFILE ON -Y3- SEE SHEET 24

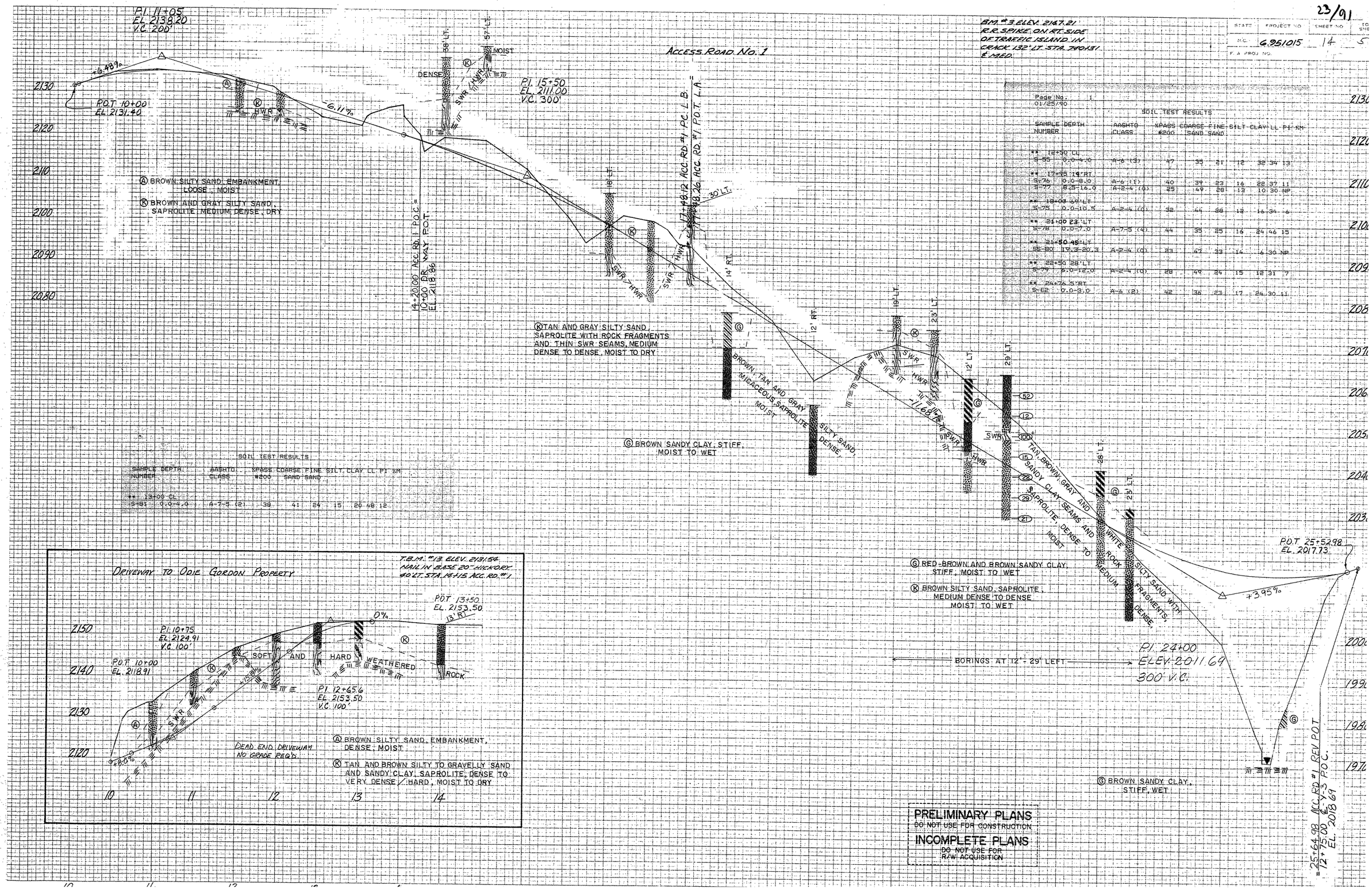
PLAN
NOTE BOOK
No.
SURVEYED
PLOTTED
ALIGNMENT CHECKED
RT. OF WAY CHECKED
BY
DATE

PROFILE
NOTE BOOK
No.
SURVEY CHECKED
G. & A. NOTED
STRUCTURE NOTATIONS CHECKED
BY
DATE

R505 ACRD1 Y3 **

23/91

STATE	PROJECT NO	SHEET NO	TO SHEETS
N.C.	6.951015	14	5
F.A. PROJ. NO.			



Page No. 1
01/25/90

SOIL TEST RESULTS

SAMPLE NUMBER	DEPTH	AASHTO CLASS	%PASS #200	COARSE SAND	FINE SAND	SILT	CLAY	LL	PI	XM
** 12+50 CL										
S-85	0.0-4.0	A-6 (3)	47	33	21	12	32	34	13	
** 17+55 19' RT										
S-76	0.0-8.0	A-6 (1)	40	39	23	16	22	37	11	
S-77	8.5-16.0	A-2-4 (0)	25	49	28	13	10	30	NP	
** 18+00 49' LT										
S-75	0.0-10.5	A-2-4 (0)	32	44	38	12	16	34	6	
** 21+00 23' LT										
S-78	0.0-7.0	A-7-5 (4)	44	35	25	16	24	46	15	
** 21+50 45' LT										
SS-80	17.3-20.3	A-2-4 (0)	23	47	33	14	4	30	NP	
** 22+50 28' LT										
S-79	6.0-12.0	A-2-4 (0)	28	49	24	15	12	31	7	
** 24+76 5' RT										
S-82	0.0-3.0	A-6 (2)	42	34	23	17	24	30	11	

SOIL TEST RESULTS

SAMPLE NUMBER	DEPTH	AASHTO CLASS	%PASS #200	COARSE SAND	FINE SAND	SILT	CLAY	LL	PI	XM
** 13+00 CL										
S-81	0.0-4.0	A-7-5 (2)	38	41	24	15	20	48	12	

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

ACCESS RD. #2 24/91

PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEET
6.951015	15	57

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION

-Y10-

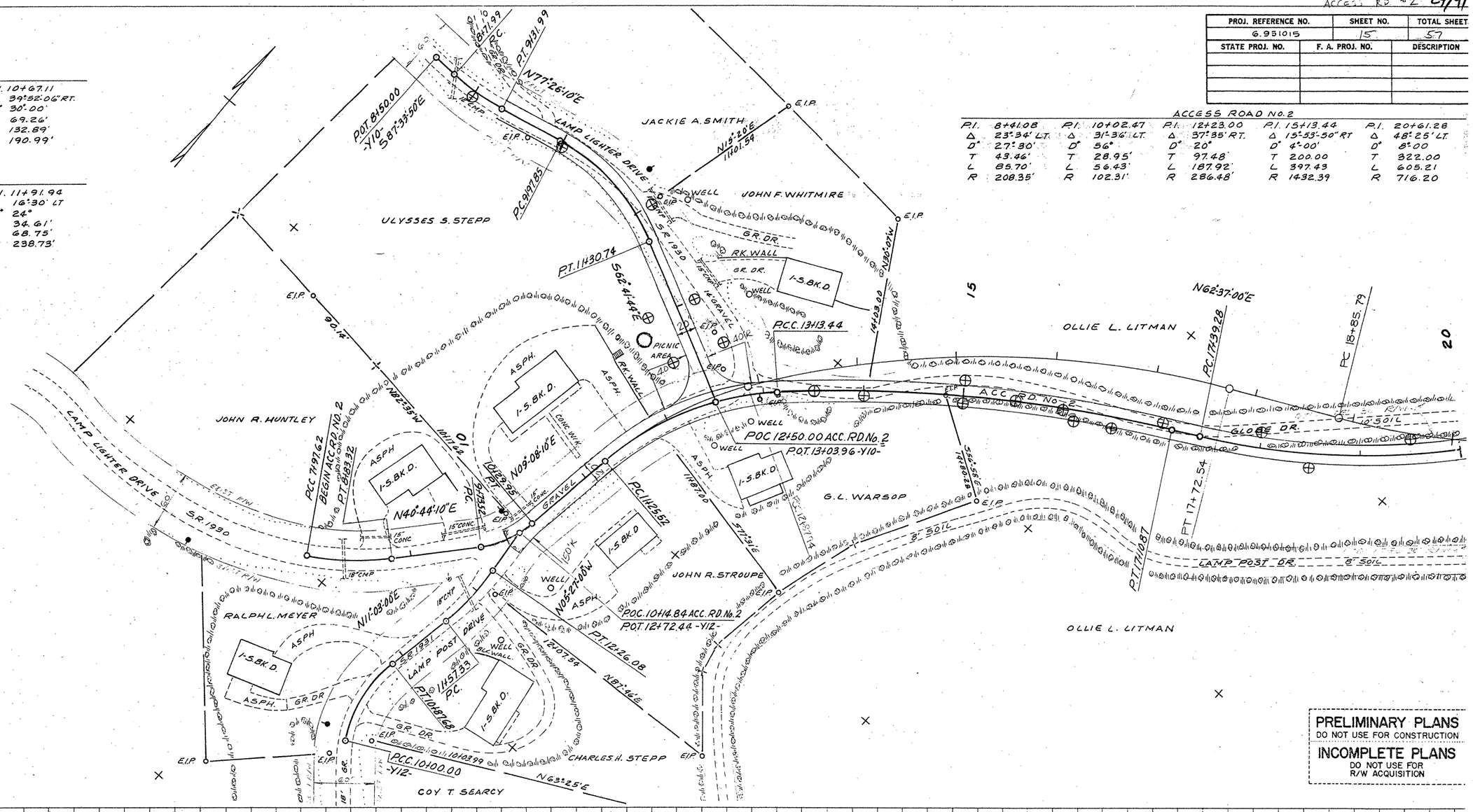
P.I. 9+02.16	P.I. 10+67.11
Δ 15°00' LT	Δ 39°52'06" RT.
D° 25°00'	D° 30°00'
T 30.17'	T 69.26'
L 60.00'	L 132.89'
R 229.18'	R 190.99'

-Y12-

P.I. 10+45.75	P.I. 11+91.94
Δ 40°20' RT.	Δ 16°30' LT
D° 46°	D° 24°
T 45.75'	T 34.61'
L 87.68'	L 68.75'
R 124.56'	R 238.73'

ACCESS ROAD NO. 2

P.I. 8+41.08	P.I. 10+02.47	P.I. 12+23.00	P.I. 15+13.44	P.I. 20+61.28
Δ 23°34' LT.	Δ 31°36' LT.	Δ 37°35' RT.	Δ 15°53'-50" RT	Δ 48°25' LT.
D° 27°30'	D° 56°	D° 20°	D° 4°00'	D° 8°00
T 43.46'	T 28.95'	T 97.48'	T 200.00	T 322.00
L 85.70'	L 56.43'	L 187.92'	L 397.43	L 605.21
R 208.35'	R 102.31'	R 286.48'	R 1432.39	R 716.20



PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

NOTE: FOR PROFILE ON ACC. RD. No. 2 SEE SHEET 19
FOR PROFILE ON -Y12- SEE SHEET 26
FOR PROFILE ON -Y10- SEE SHEET 20

PLAN — NOTE BOOK No. — SURVEYED — PLOTTED — ALIGNMENT CHECKED — RT. OF WAY CHECKED — BY — DATE

R505 ACRD2 Y10 **

PROFILE — NOTE BOOK No. — SURVEYED — PLOTTED — GRADES CHECKED — B. M.'s NOTED — STRUCTURE NOTATIONS CHECKED — BY — DATE

CASE BLUEPRINT & SUPPLY CO. N6124

25/91 ACCESS ROAD

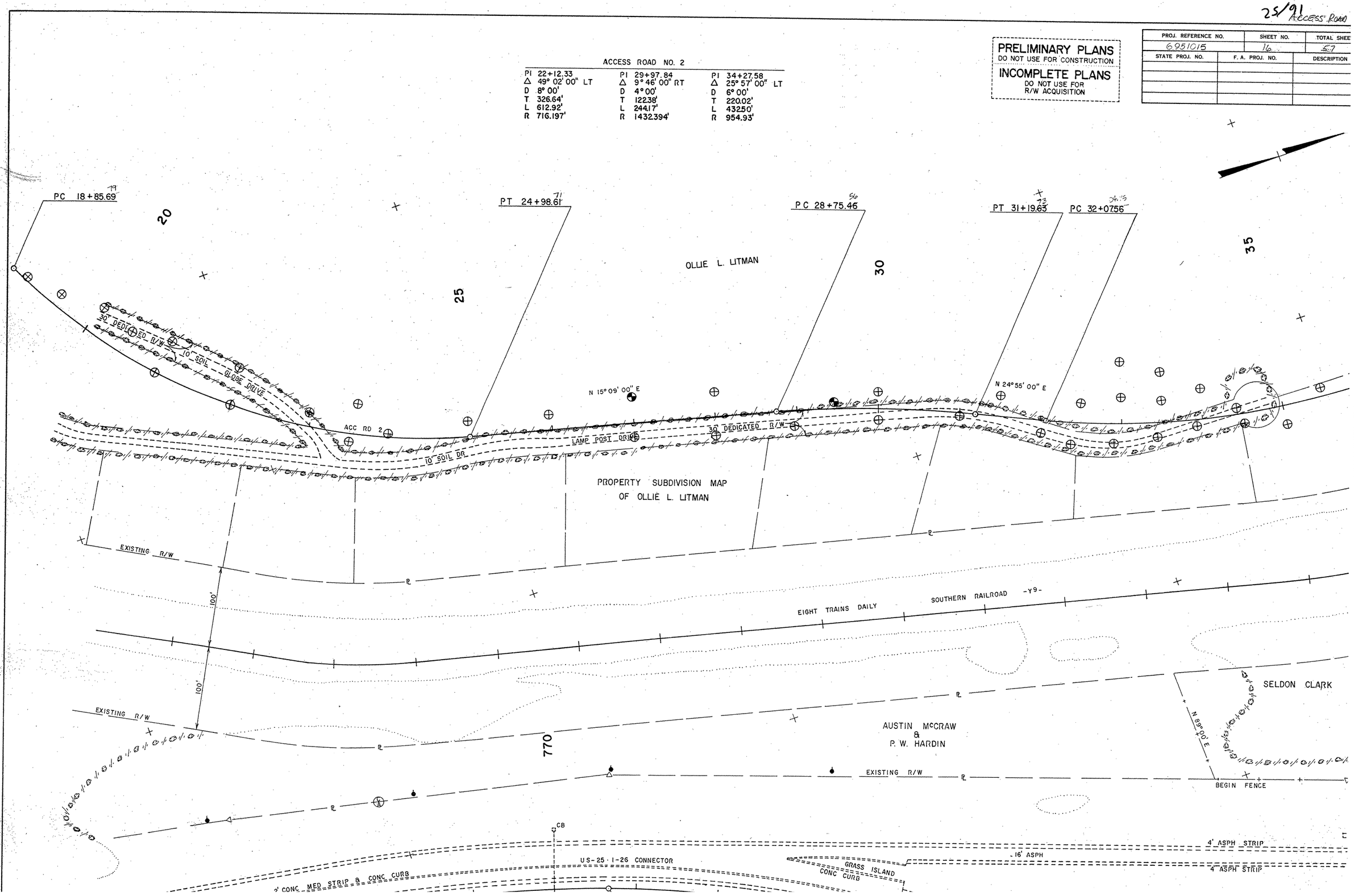
PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEE
6951015	16	57
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION

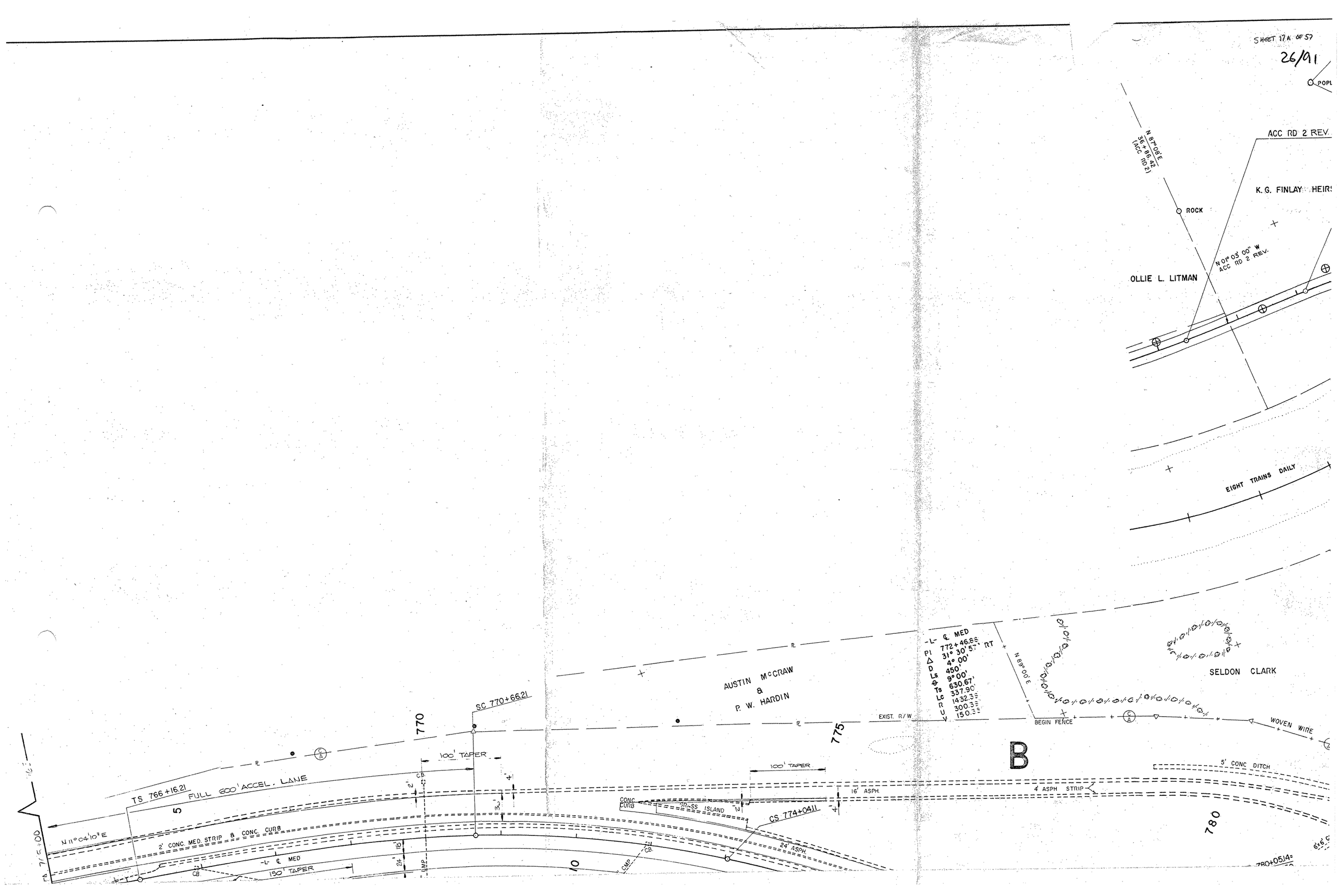
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

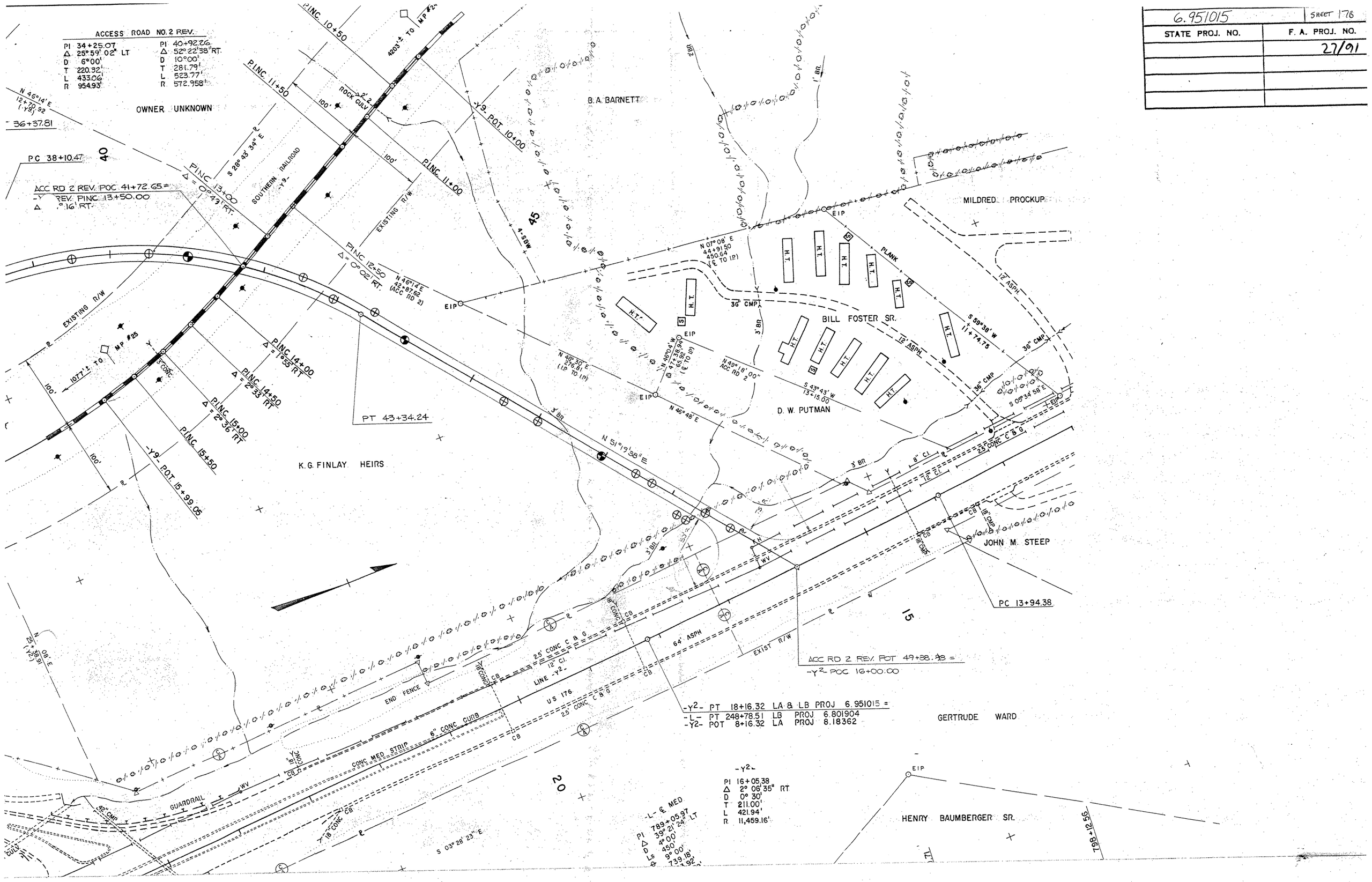
ACCESS ROAD NO. 2

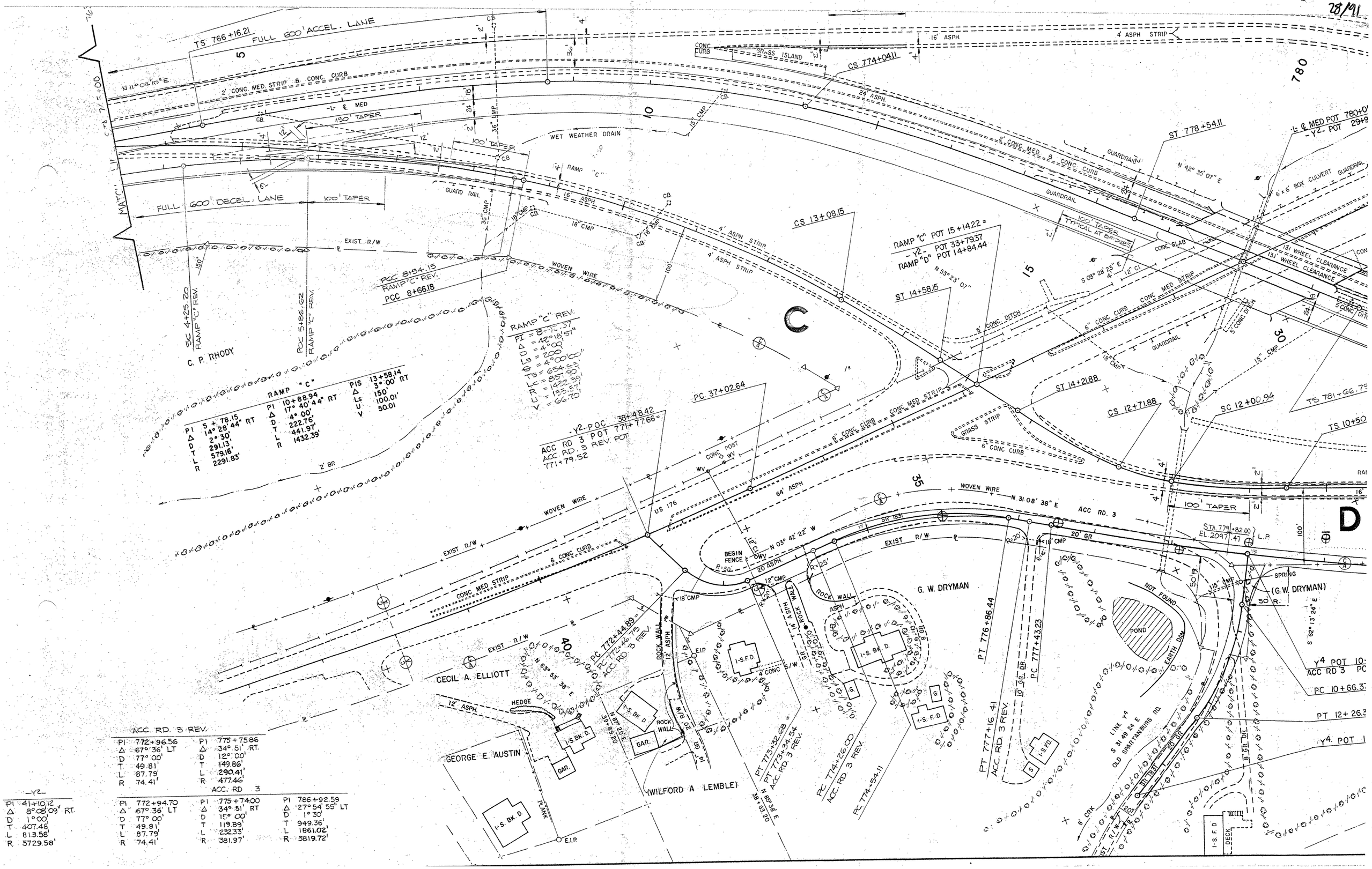
PI 22+12.33	PI 29+97.84	PI 34+27.58
Δ 49° 02' 00" LT	Δ 9° 46' 00" RT	Δ 25° 57' 00" LT
D 8° 00'	D 4° 00'	D 6° 00'
T 326.64'	T 122.38'	T 220.02'
L 612.92'	L 244.17'	L 432.50'
R 716.197'	R 1432.394'	R 954.93'




SHEET 17A OF 57
26/91
POPL
ACC RD 2 REV.
N 87° 08' E
36 + 86.42
(ACC RD 2)
K. G. FINLAY HEIRS
ROCK
N 0° 03' 00" W
ACC RD 2 REV.
OLLIE L. LITMAN
EIGHT TRAINS DAILY
-L- ℄ MED
PI 772+46.65
Δ 31° 30' 57" RT
D 4° 00'
Ls 450'
Θ 9° 00'
Ts 630.67'
Lc 337.90'
R 1432.39'
V 300.39'
U 150.39'
N 89° 00' E
AUSTIN McCRAW
&
P. W. HARDIN
EXIST. R/W
SELDON CLARK
BEGIN FENCE
WOVEN WIRE
B
SC 770+66.21
770
775
780
100' TAPER
100' TAPER
TS 766+16.21
FULL 600' ACCEL. LANE
5
N 11° 04' 10" E
2' CONC. MED. STRIP & CONC. CURB
-L- ℄ MED
150' TAPER
10
CONC CURB
CROSS ISLAND
CS 774+04.11
16' ASPH.
24' ASPH.
4' ASPH STRIP
5' CONC DITCH
CMP
CB
780+05.14

6.951015	SHEET 178
STATE PROJ. NO.	F. A. PROJ. NO.
	27/91





ACC. RD. 3 REV.

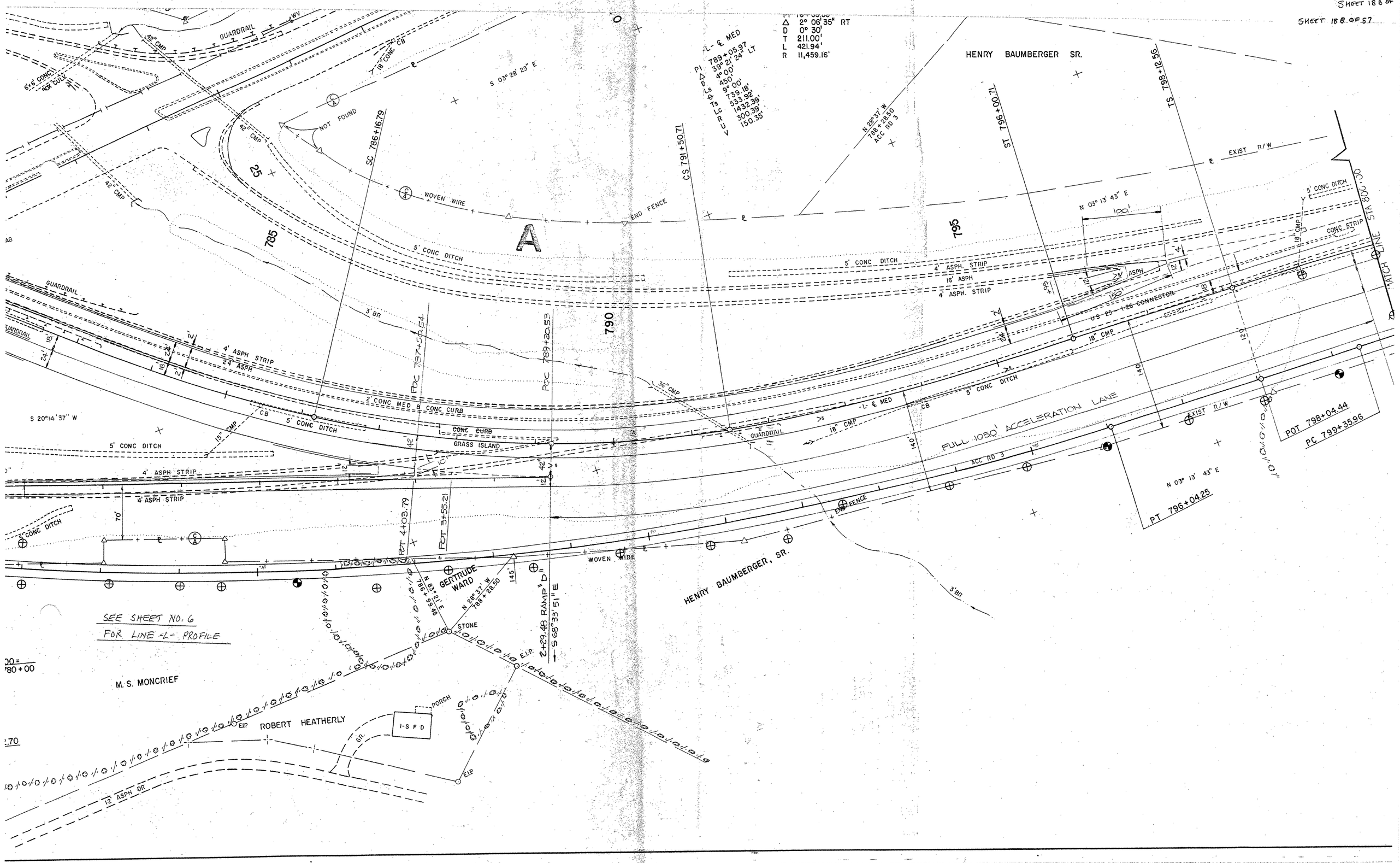
PI	772+96.56	PI	775+75.86
Δ	67° 36' LT	Δ	34° 51' RT.
D	77° 00'	D	12° 00'
T	49.81'	T	149.86'
L	87.79'	L	290.41'
R	74.41'	R	477.46'

ACC. RD 3

PI	772+94.70	PI	775+74.00	PI	786+92.59
Δ	67° 36' LT	Δ	34° 51' RT	Δ	27° 54' 55" LT
D	77° 00'	D	15° 00'	D	1° 30'
T	49.81'	T	119.89'	T	949.36'
L	87.79'	L	232.33'	L	1861.02'
R	74.41'	R	381.97'	R	3819.72'

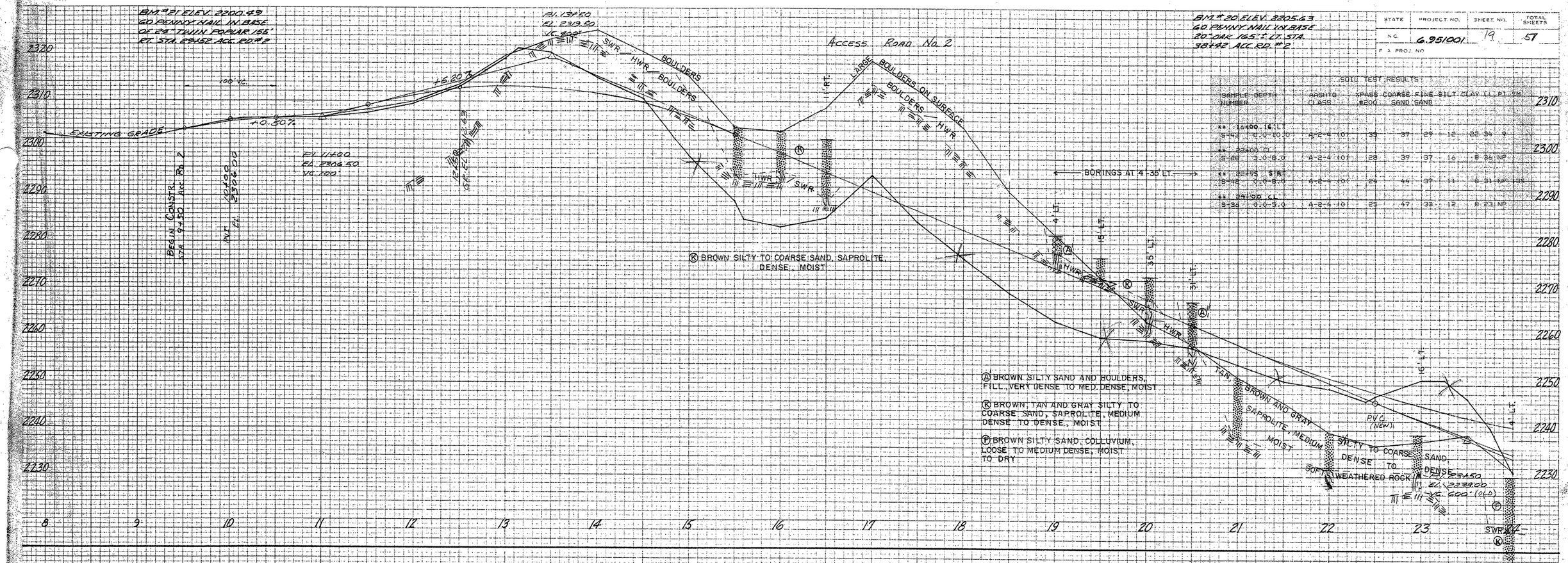
Y2

PI	41+10.12
Δ	8° 08' 09" RT.
D	1° 00'
T	407.48'
L	813.58'
R	5729.58'


HENRY BAUMBERGER SR.
HENRY BAUMBERGER, SR.
GERTRUDE WARD
M. S. MONCRIEF
ROBERT HEATHERLY
FULL 1050' ACCELERATION LANE
US 25 - I-26 CONNECTOR
ACC RD 3
EXIST R/W
GUARDRAIL
WOVEN WIRE
END FENCE
5' CONC DITCH
4' ASPH STRIP
16' ASPH
2' CONC MED & CONC CURB
CONC CURB
GRASS ISLAND
CONC STRIP
MATCH LINE STA 800+00
POT 798+04.44
PC 799+35.96
PT 796+04.25
POT 4+03.79
POT 3+55.21
POC 789+20.53
POC 787+50.54
CS 791+50.71
ST 796+00.71
TS 798+12.56
SC 786+16.79
2+29.48 RAMP "D"
S 68°33'51" E
N 28°37' W
788+28.50
ACC RD 3
N 03° 13' 43" E
S 03° 28' 23" E
S 20°14'37" W
N 83°21' E
786+99.48
N 28°37' W
788+28.50
STONE
E.I.P.
PORCH
I-S F D
GR.
12' ASPH DR
3' BR
36" CMP
18" CMP
15" CMP
42" CMP
18" CONC CB
6'x6' CONC BOX CULV
NOT FOUND
SEE SHEET NO. 6
FOR LINE -L- PROFILE
A
785
790
795
25

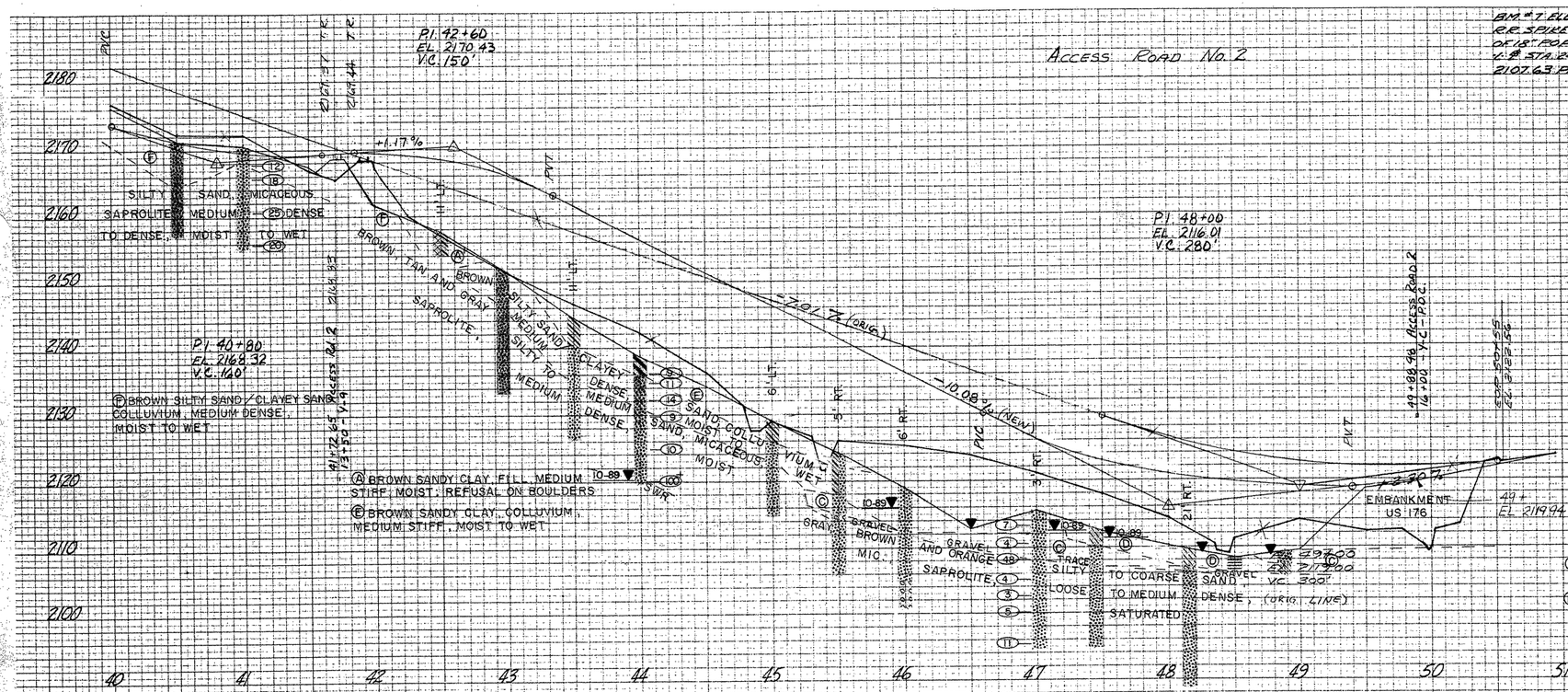
30/91

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	6.951001	19	57
F.A. PROJ. NO.			



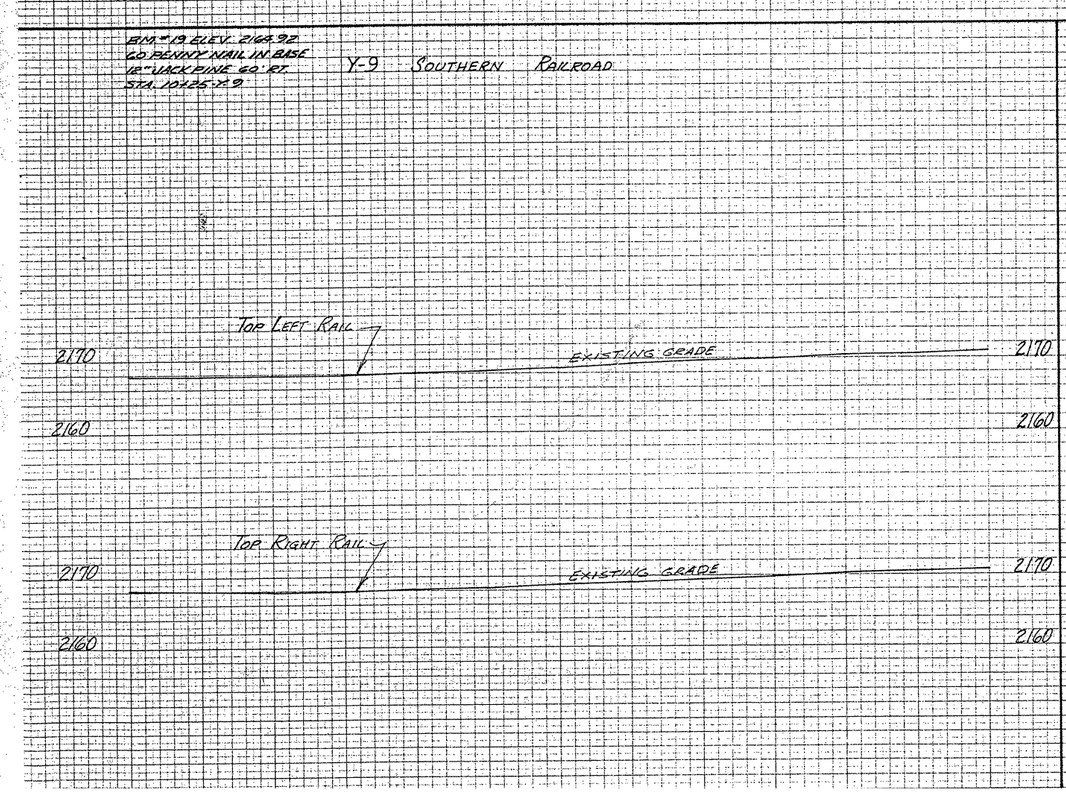
31/91

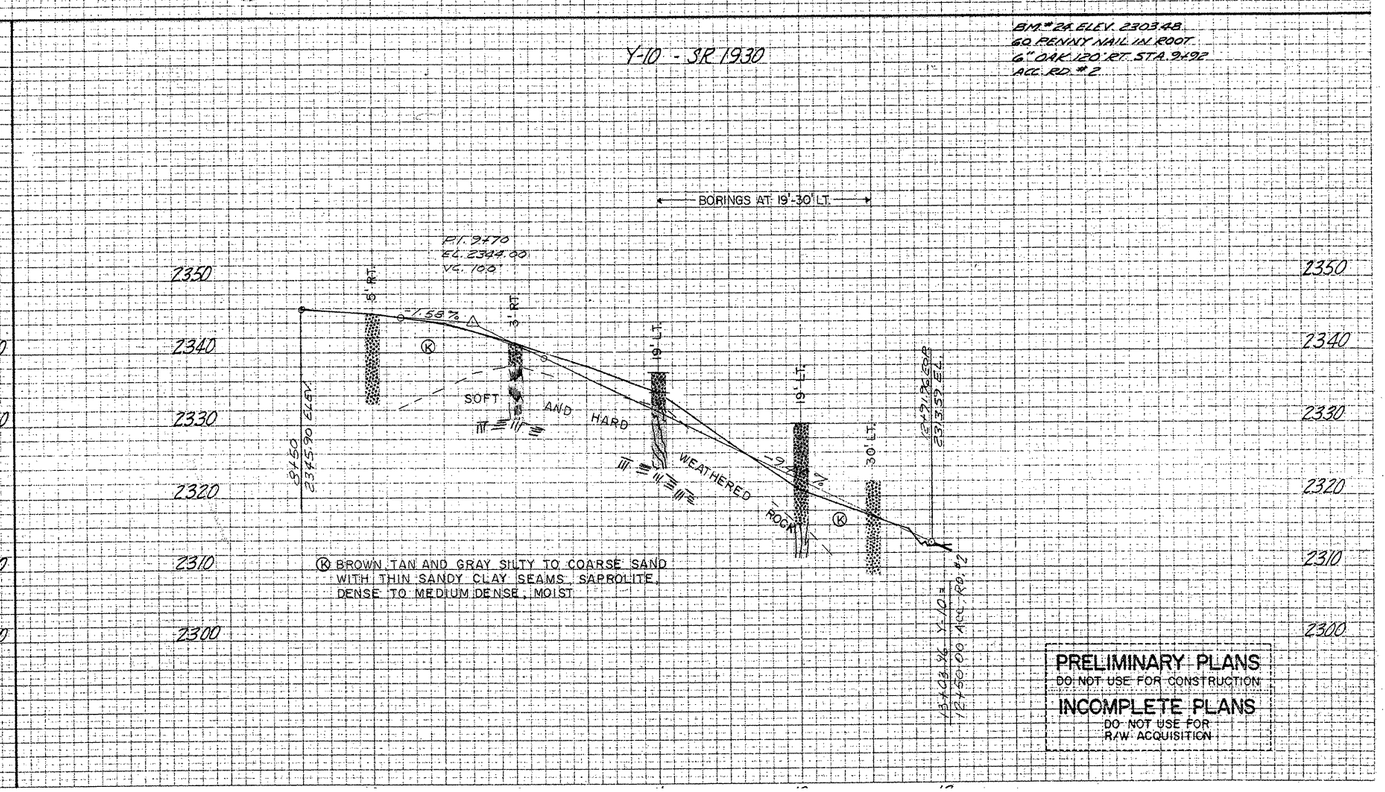
STATE	PROJECT NO	SHEET NO	TOTAL SHEETS
N.C.	6.951001	20	57
F. & PROJ. NO.			



SOIL TEST RESULTS

SAMPLE NUMBER	DEPTH	AASHTO CLASS	%PASS #200	COARSE SAND	FINE SAND	SILT	CLAY	LL	PI	MI
** 41+00 CL										
SS-89	4.2-5.2	A-2-4 (0)	26	45	38	12	10	26	NP	
** 46+00 CL										
SS-90	1.9-2.9	A-7-5 (5)	47	38	17	13	32	45	18	
SS-91	8.4-9.4	A-2-4 (0)	14	48	40	8	4	32	NP	
** 46+76 3' RT										
SS-92	1.8-2.8	A-2-4 (0)	31	46	39	7	13	30	NP	
SS-93	10.0-11.0	A-2-5 (0)	27	47	36	11	6	48	NP	
** 47+45 CL										
S-94	0.0-3.0	A-2-4 (0)	30	48	24	8	20	35	NP	
** 47+70 CL										
S-98	2.5-8.0	A-2-5 (0)	29	43	33	14	10	42	NP	
** 48+16 21' RT										
S-99	3.0-10.0	A-2-5 (0)	30	36	38	18	10	44	NP	
** 48+50 CL										
S-101	1.0-2.2	A-4 (1)	39	11	58	15	16	39	NP	
** 48+88 CL										
S-100	0.0-2.0	A-2-4 (0)	13	36	53	7	4	31	NP	



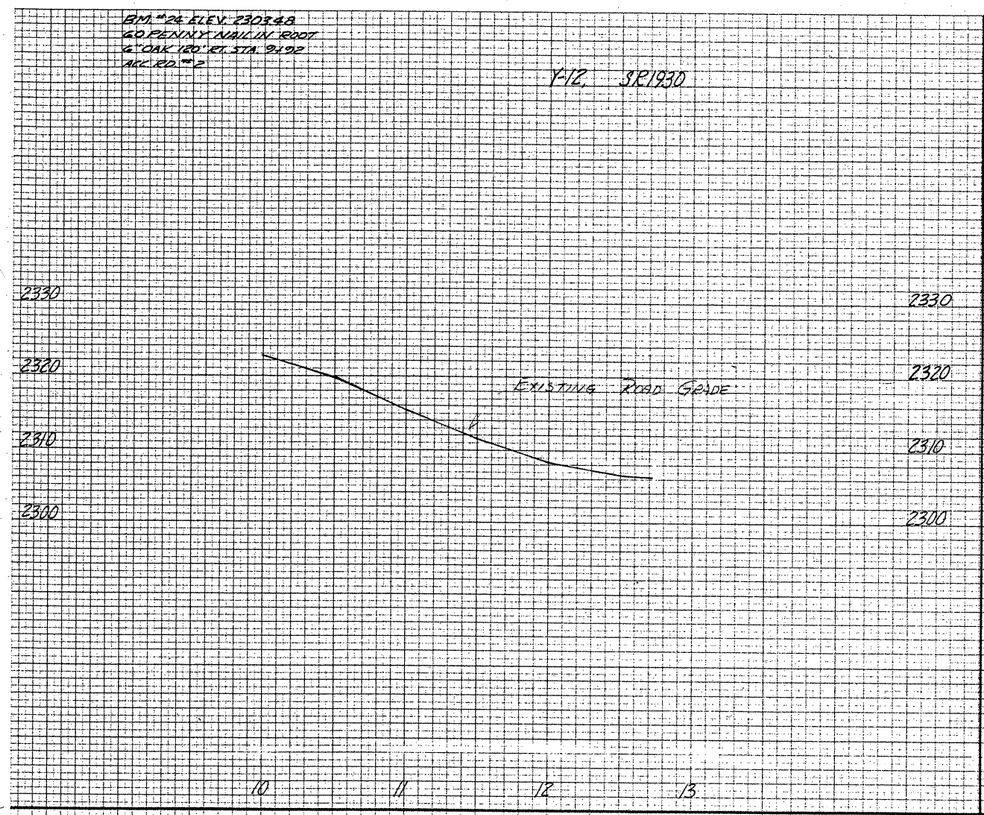


PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

STATE	PROJECT NO	SHEET NO	TOTAL SHEETS
N.C.	G.951001	21	57
F. A. PROJ. NO.			

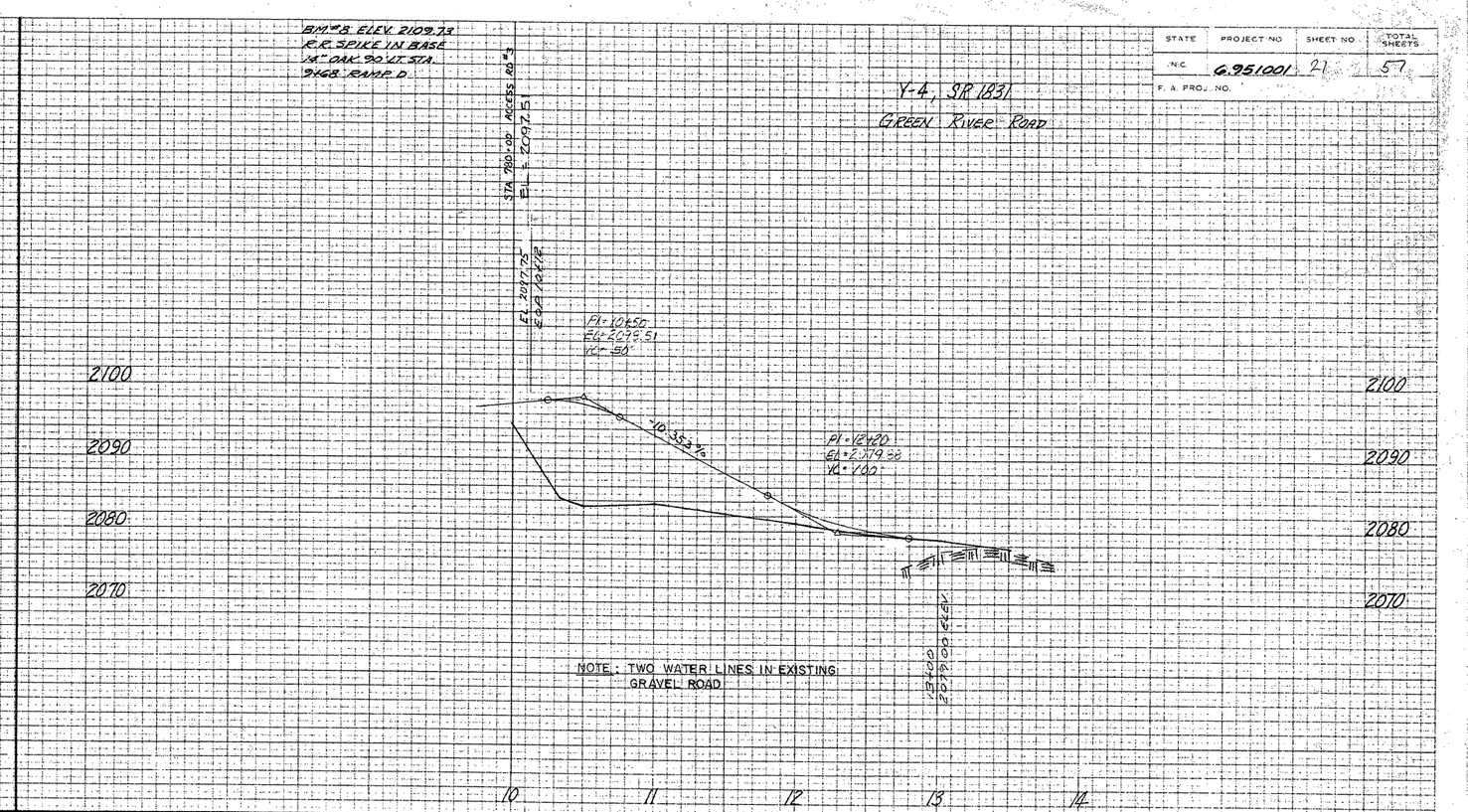
BM #24 ELEV. 2307.48
60 PENNY NAIL IN ROOT
6" OAK 180' RT. STA. 9+92
ACC RD #2

Y-12, SR 1930



BM #8 ELEV. 2109.73
R.R. SPIKE IN BASE
14" OAK 90' LT. STA.
9+68 RAMP D

Y-4, SR 1831
GREEN RIVER ROAD



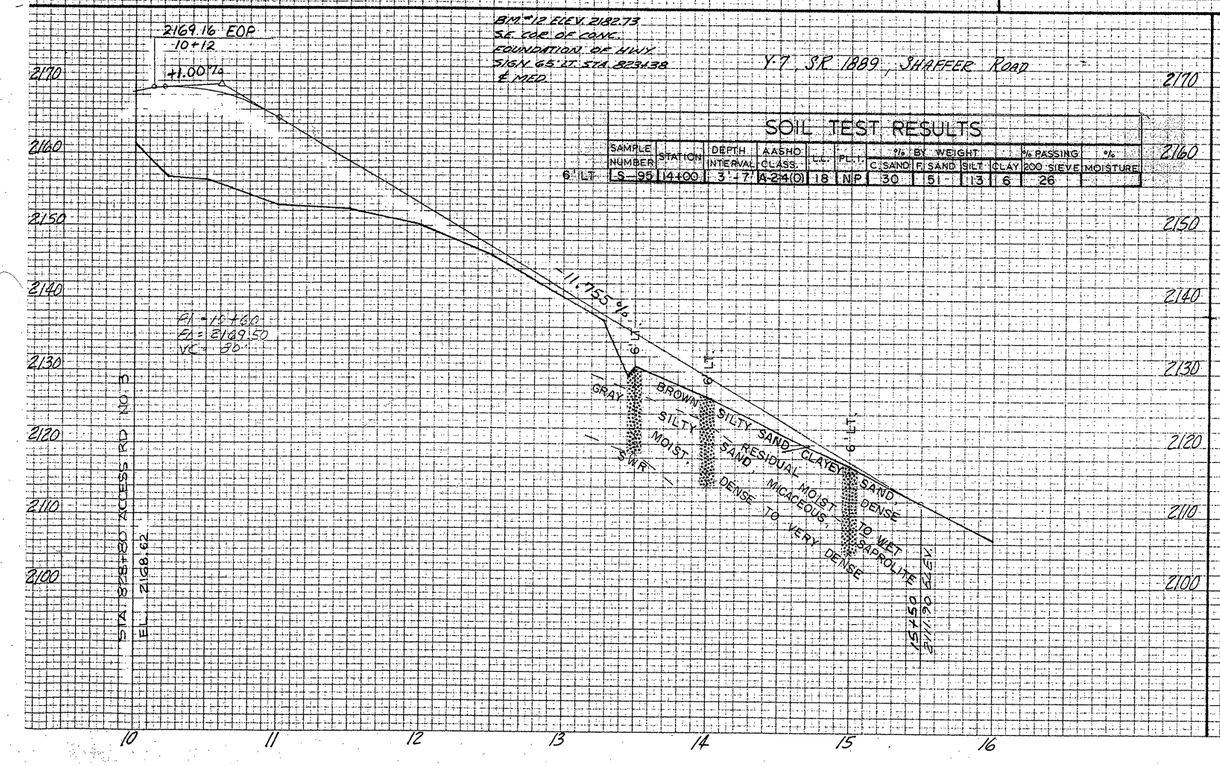
NOTE: TWO WATER LINES IN EXISTING GRAVEL ROAD

BM #12 ELEV. 2182.73
S.E. CAR OF CONC.
FOUNDATION OF HWY.
SIGN. 65' LT. STA. 8+31.38
℄ MED.

Y-7, SR 1889, SHAFFER ROAD

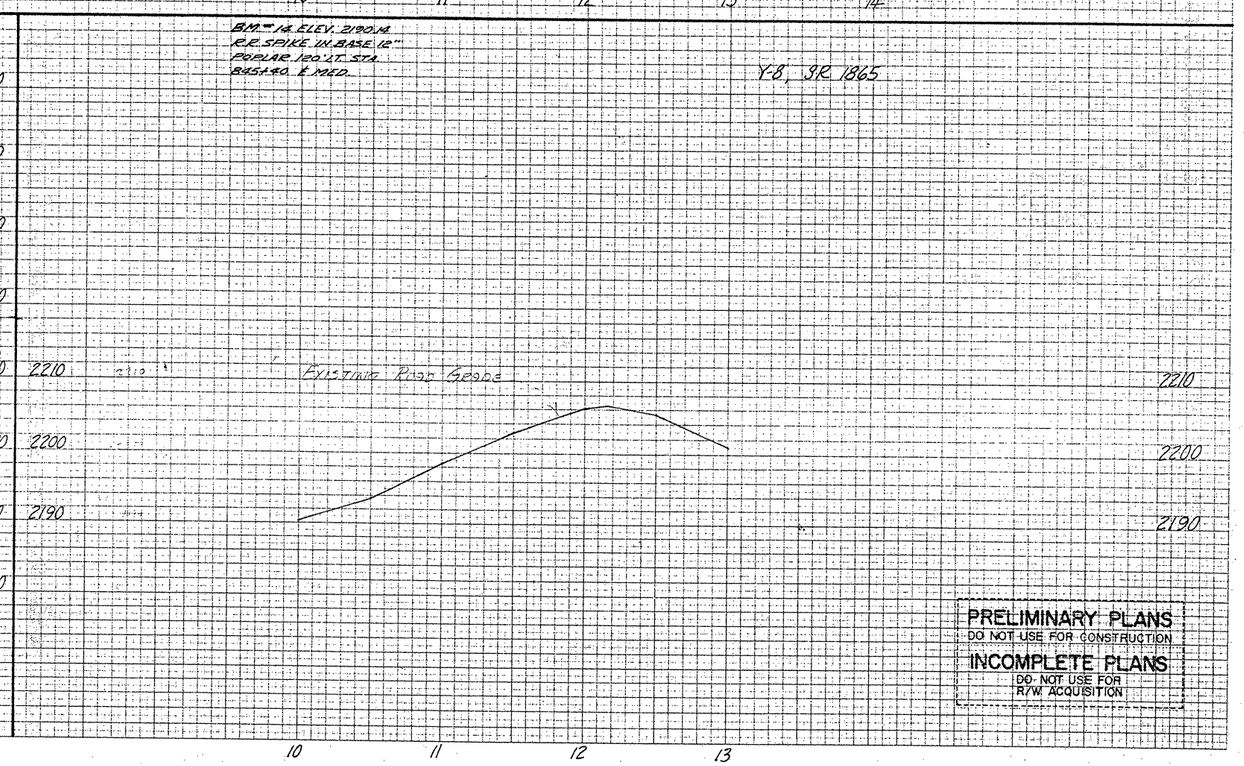
SOIL TEST RESULTS

SAMPLE NUMBER	STATION	DEPTH INTERVAL	AASHO CLASS.	L.L.	P.I.	% BY WEIGHT C. SAND	F. SAND	SILT	CLAY	% PASSING 200 SIEVE	% MOISTURE
6' LT. LS-95	14+00	3'-7'	A-2-4(0)	18	NP	30	51	13	6	26	



BM #14 ELEV. 2190.14
R.R. SPIKE IN BASE 18"
POPLAR 120' LT. STA.
845+40 ℄ MED.

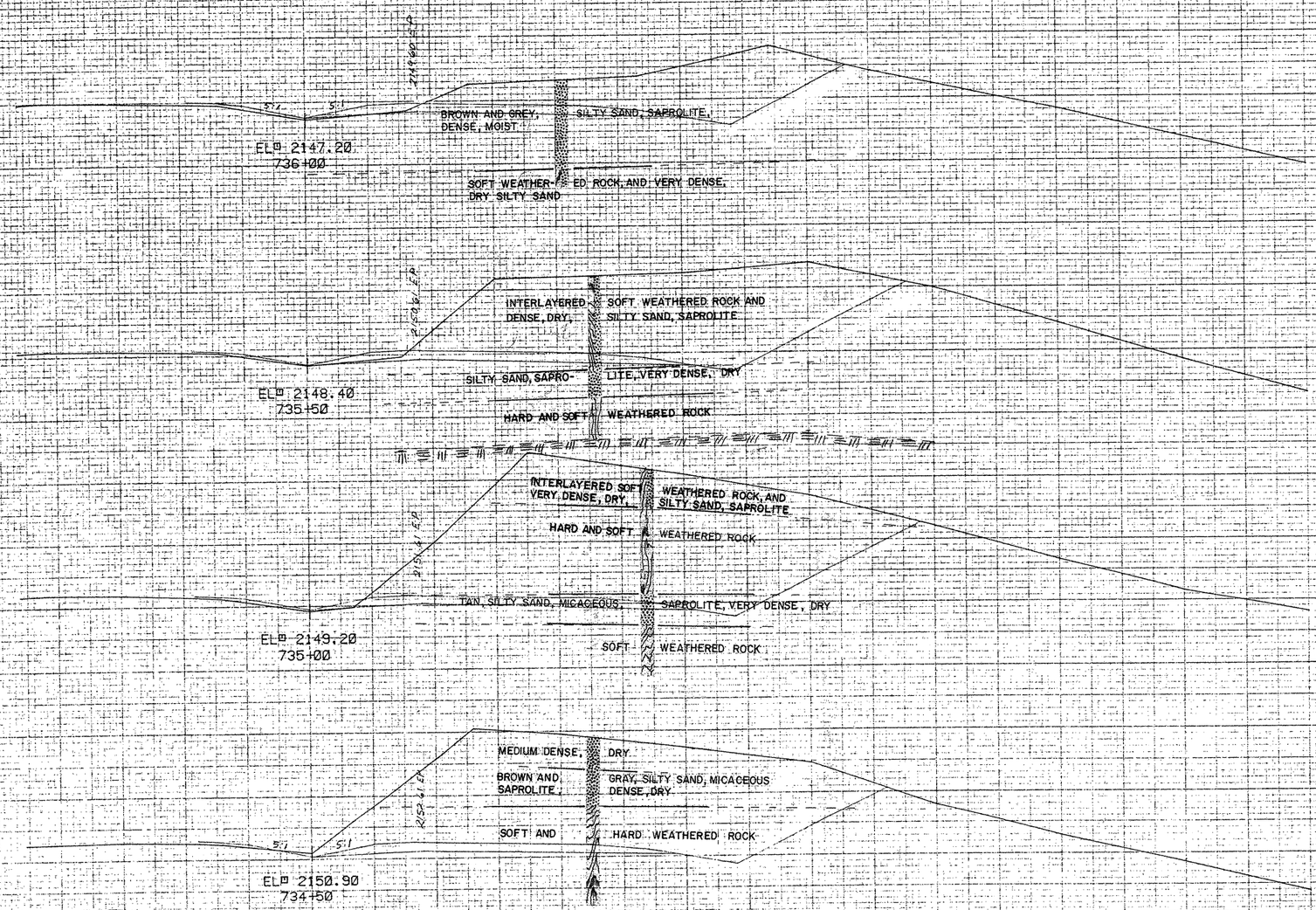
Y-8, SR 1865



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

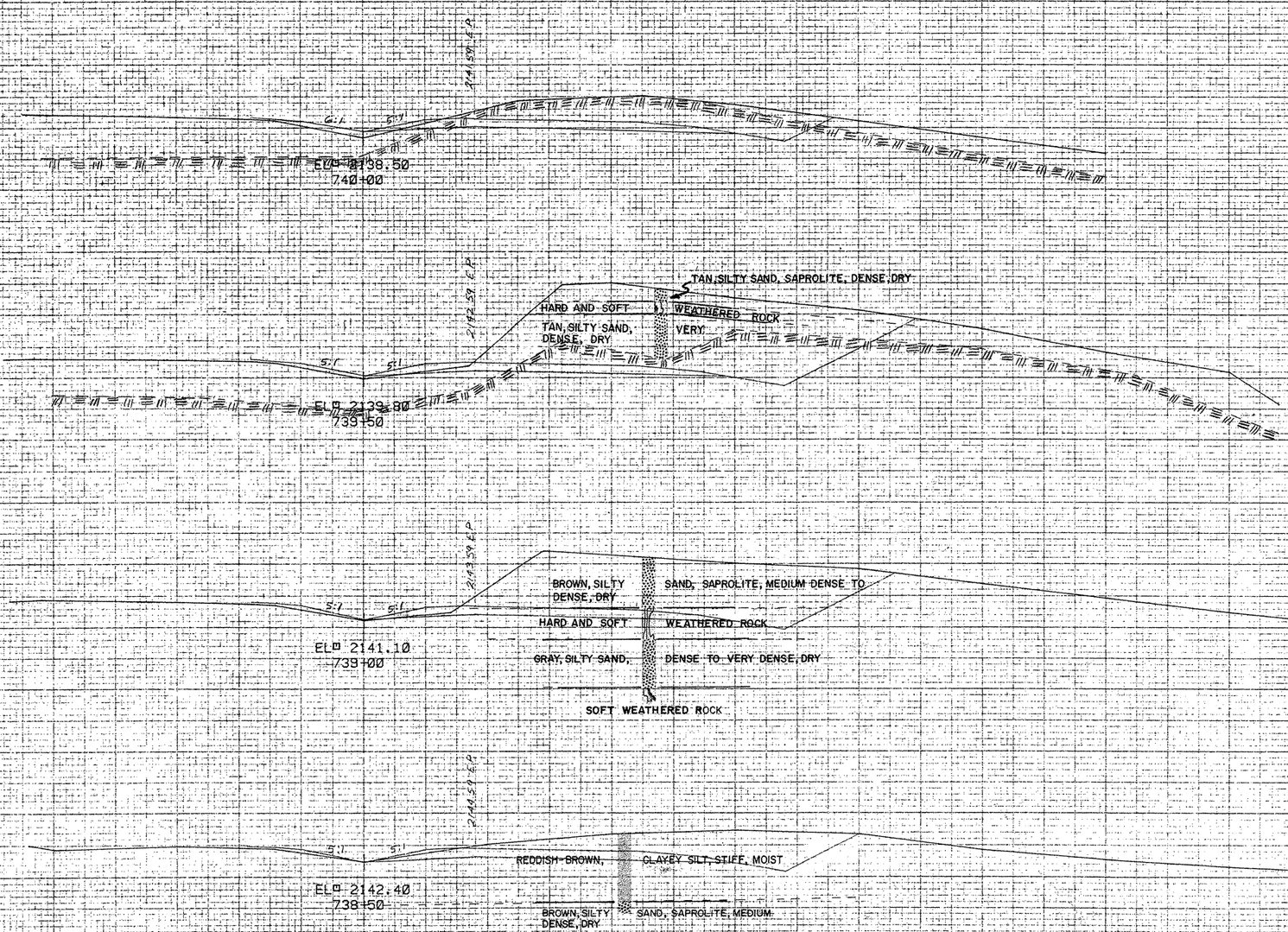
33/91

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	6.981016	22	57
F.A. PROJ. NO.			



0 5 10 15 20
SCALE IN FEET

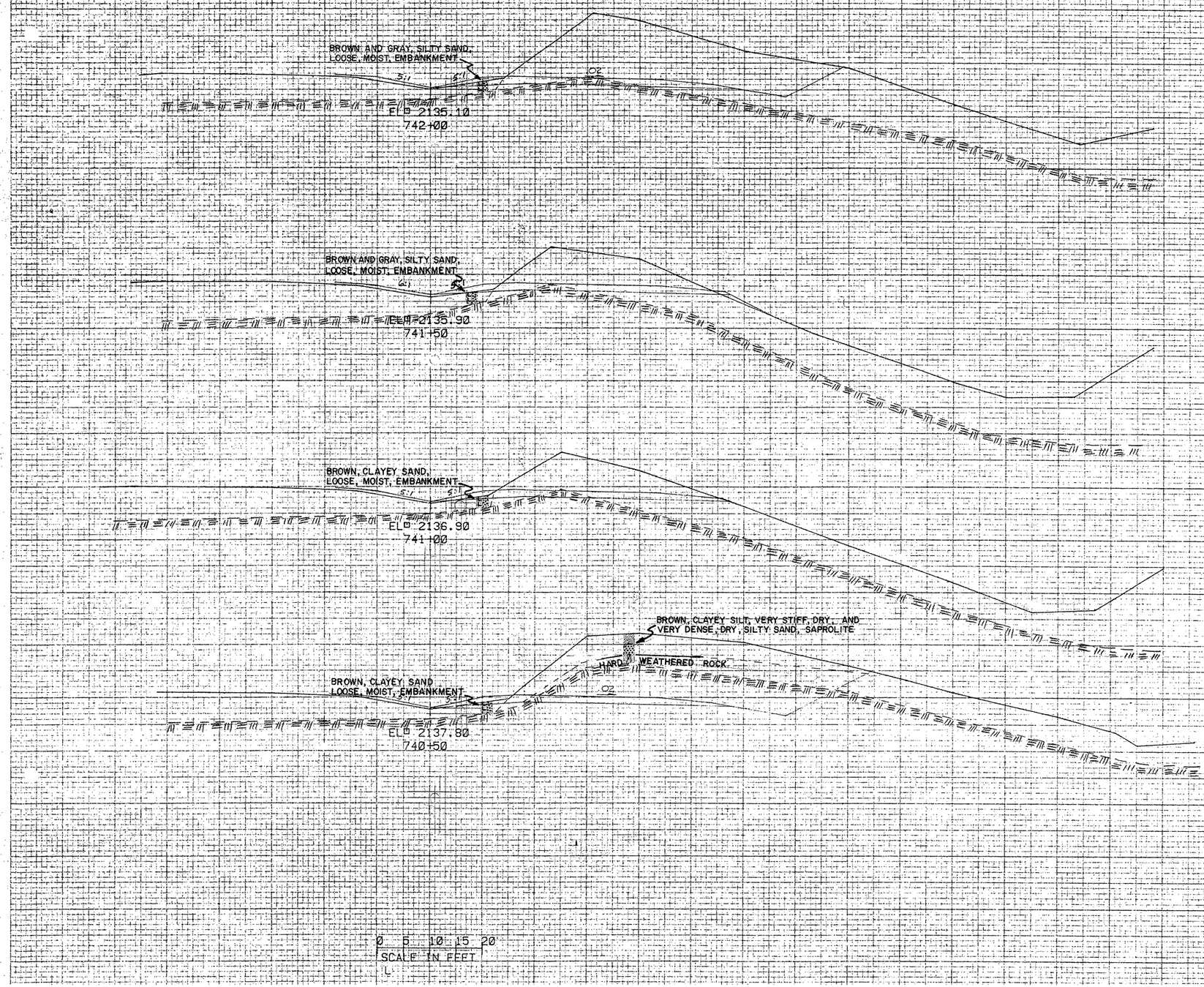
STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	C.93015	23	52
F.A. PROJ. NO.			



0 5 10 15 20
SCALE IN FEET

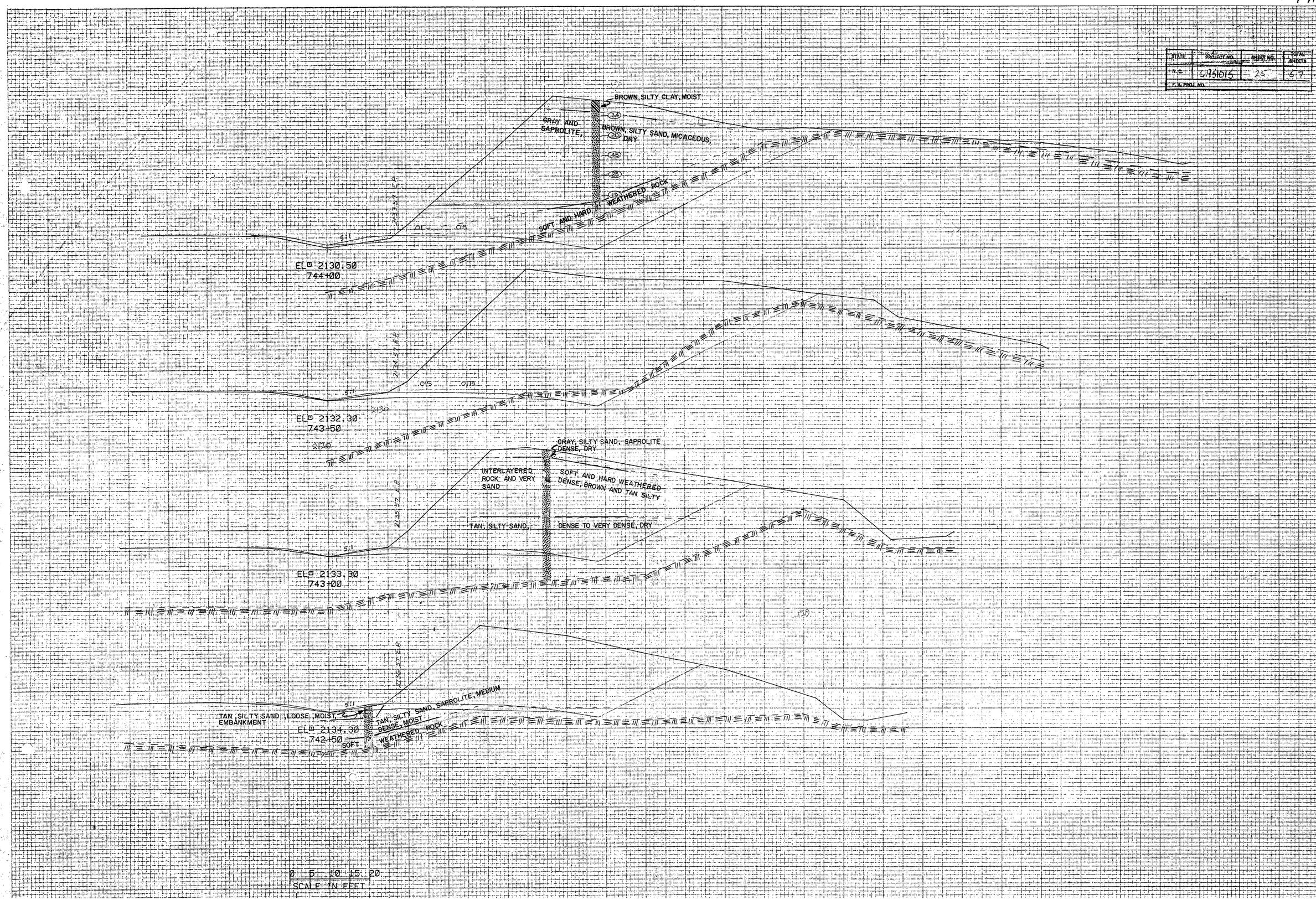
35/91

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	6.94105	24	[illegible]
F.A. PROJ. NO.			



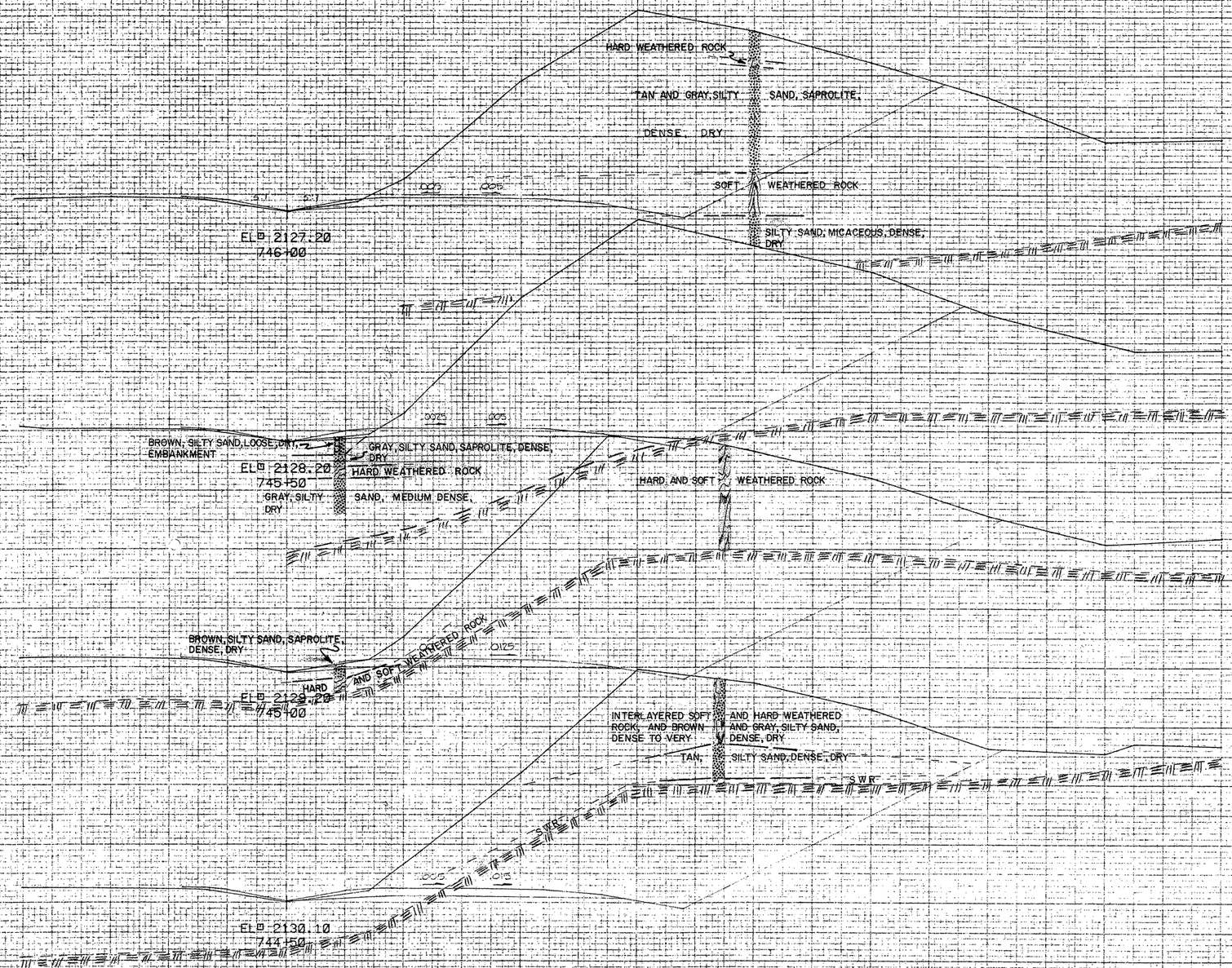
36/91

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	6.951013	25	57
F. A. PROJ. NO.			



32/91

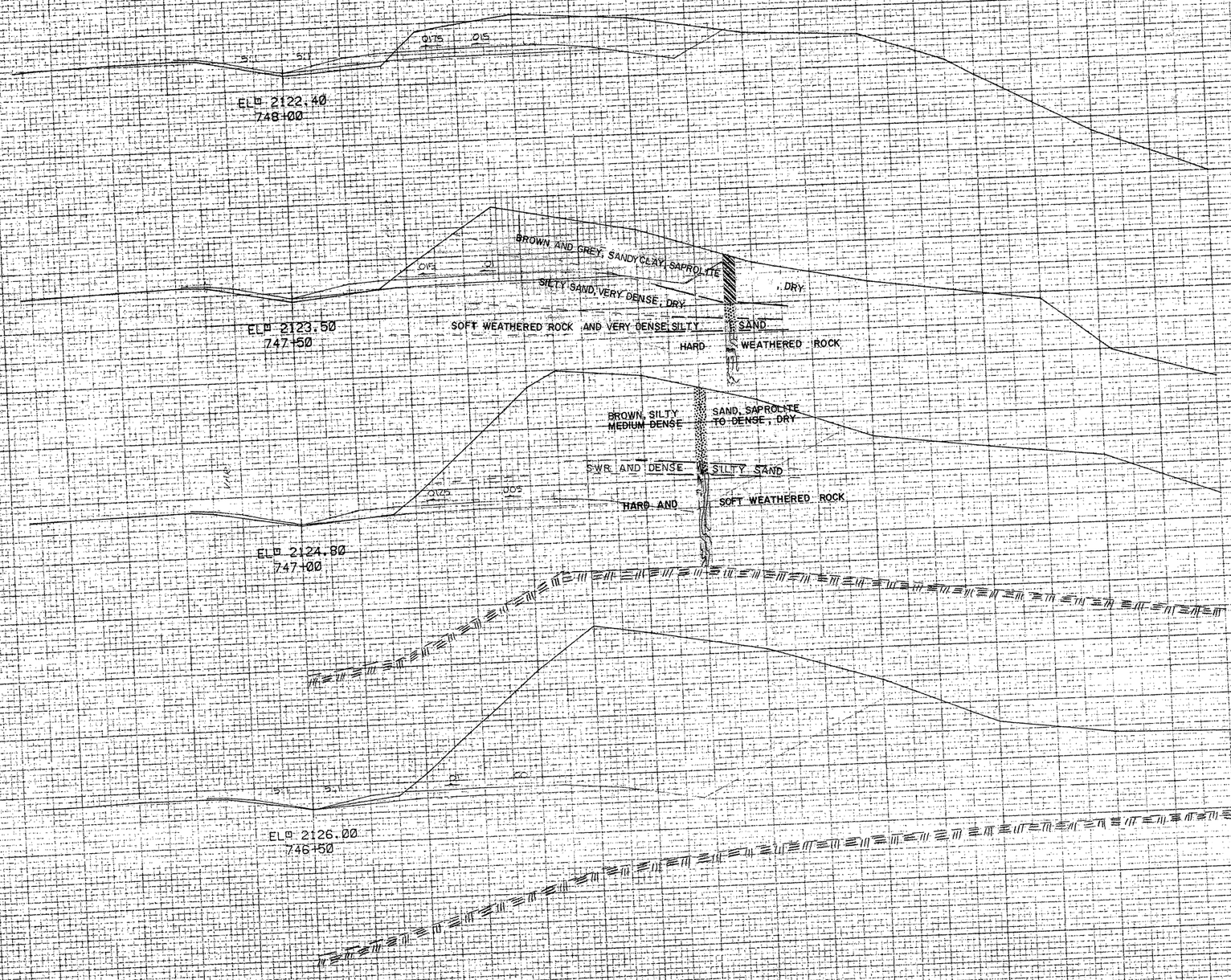
STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	6961015	26	57
F.A. PROJ. NO.			



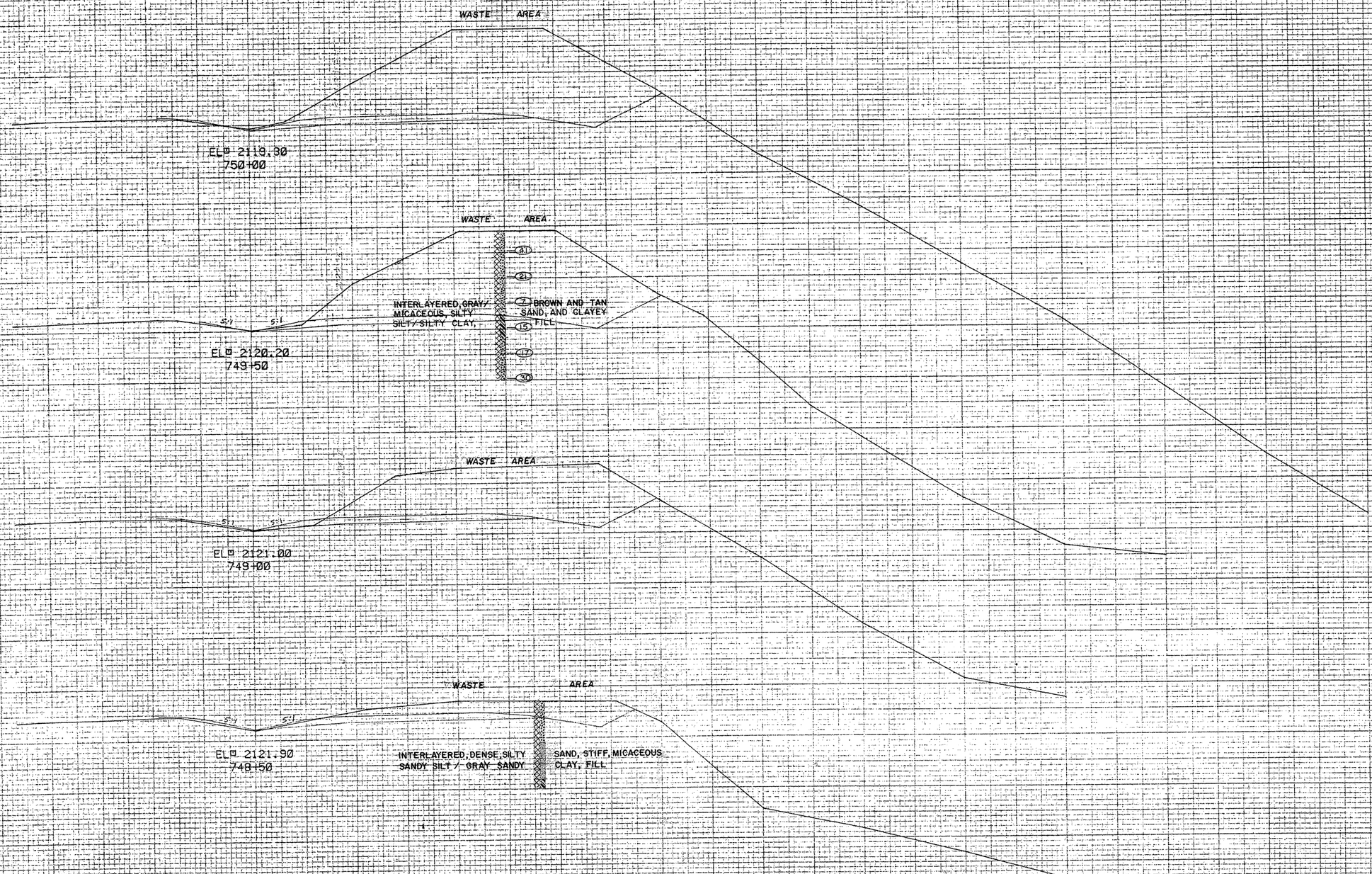
0 5 10 15 20
SCALE IN FEET

38/91

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	6.951015	27	537
T.I.P. PROJ. NO.			

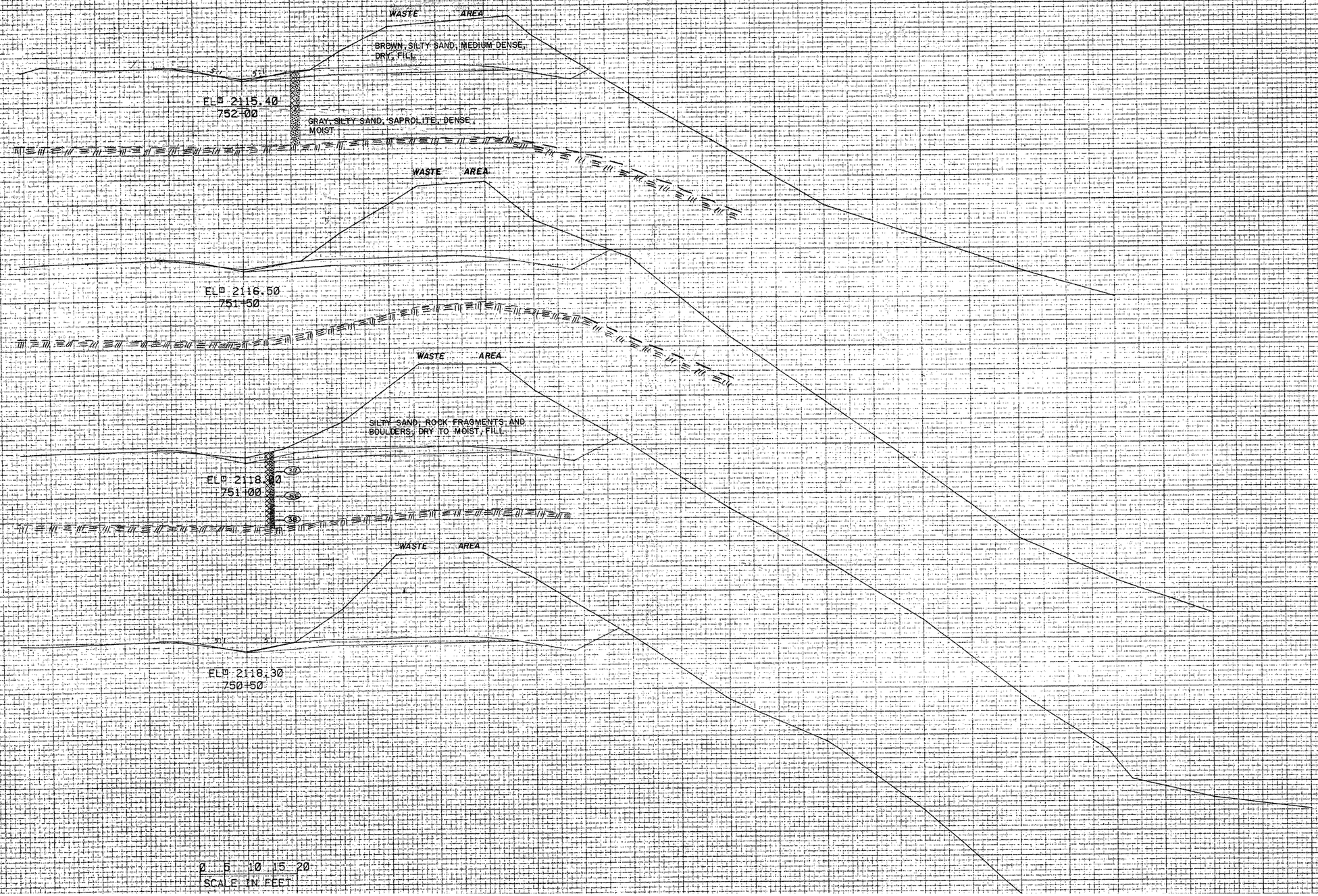


STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	6.960015	28	57
F.A. PROJ. NO.			



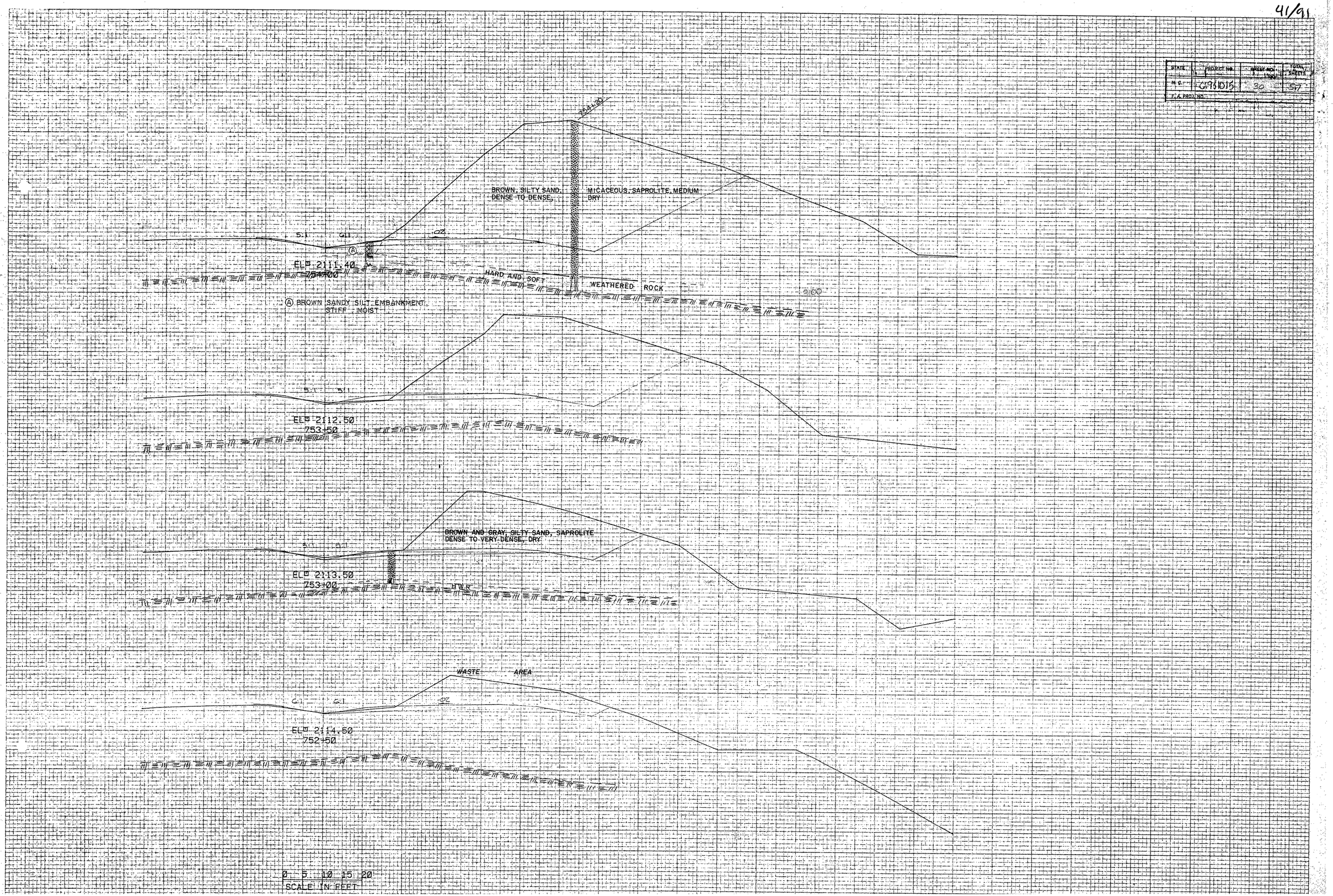
40/91

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	6.951015	29	57
F.A. PROJ. NO.			



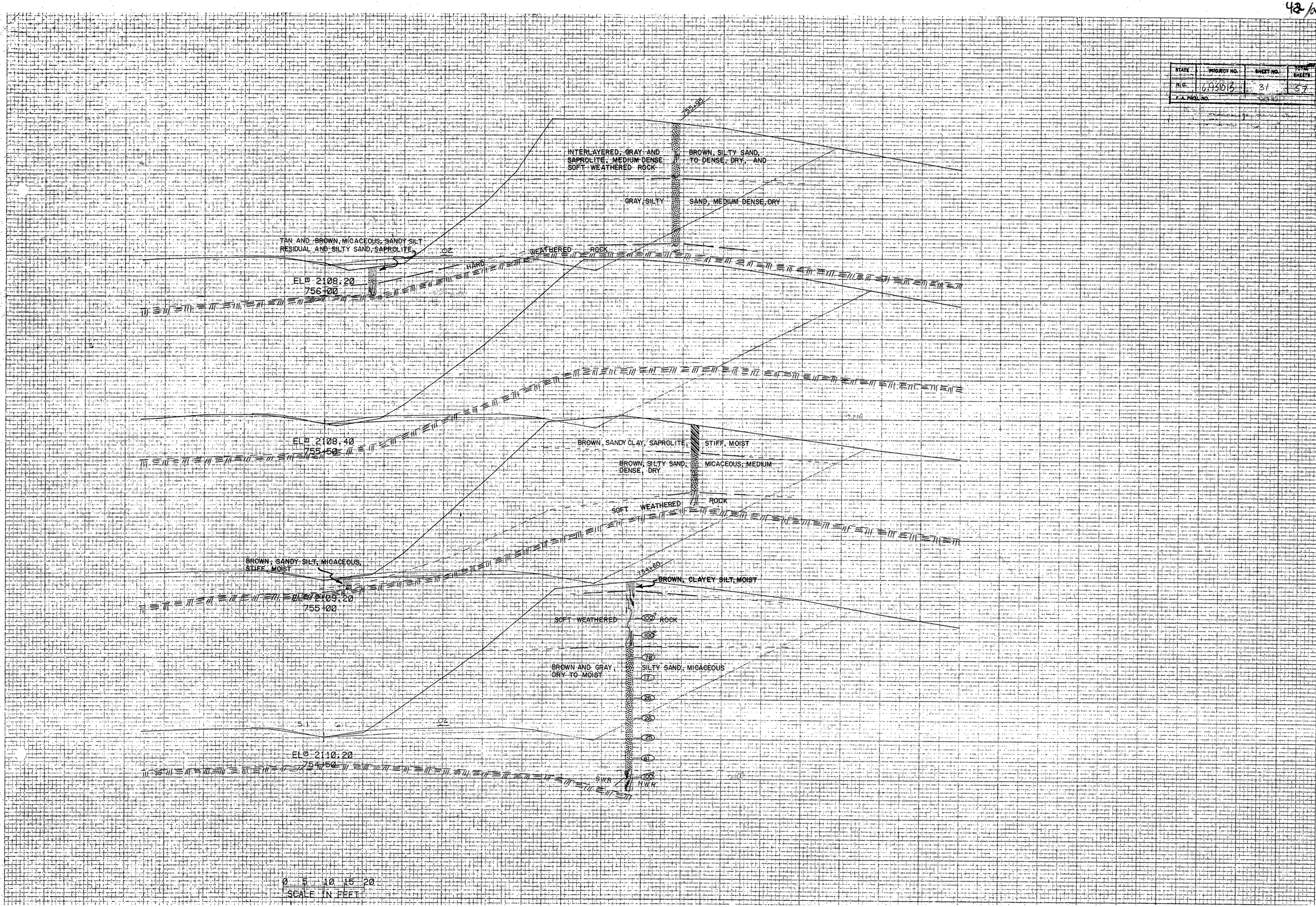
41/91

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	C-3601B	30	57
F.A. PROJ. NO.			



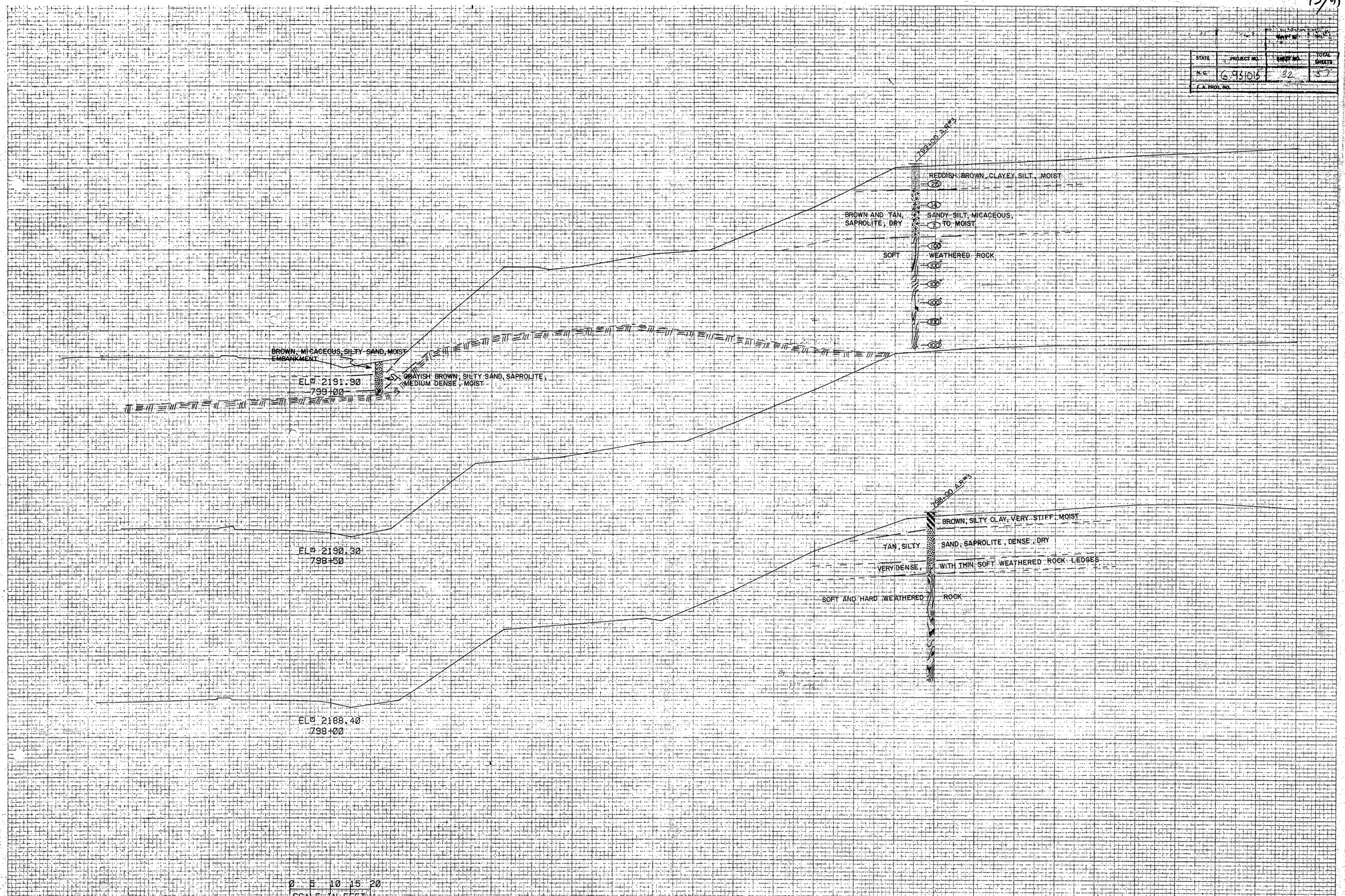
42/91

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	6.935013	31	57
F.A. PROJ. NO.			



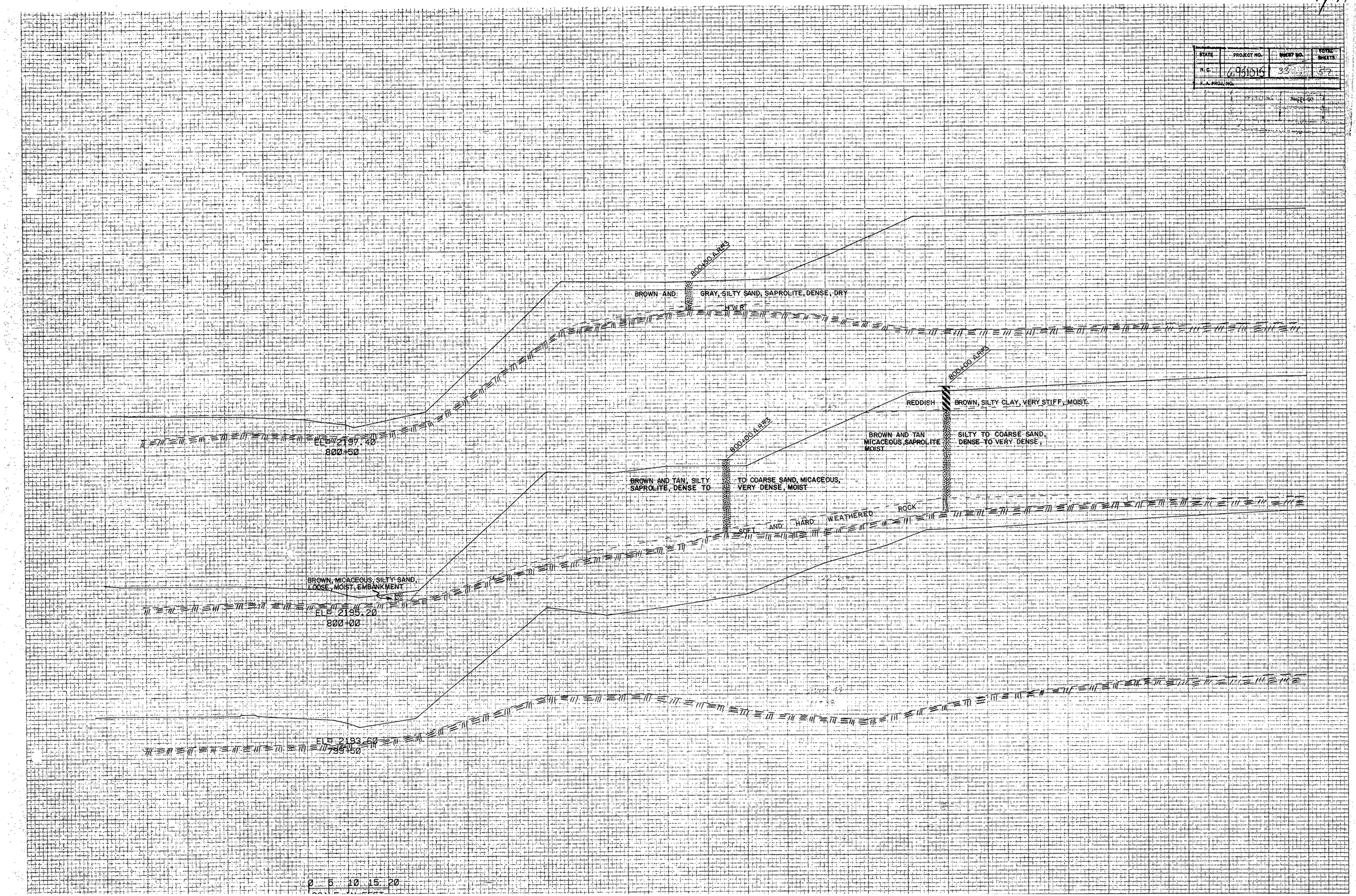
43/91

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	G-93105	32	37
F.A. PROJ. NO.			



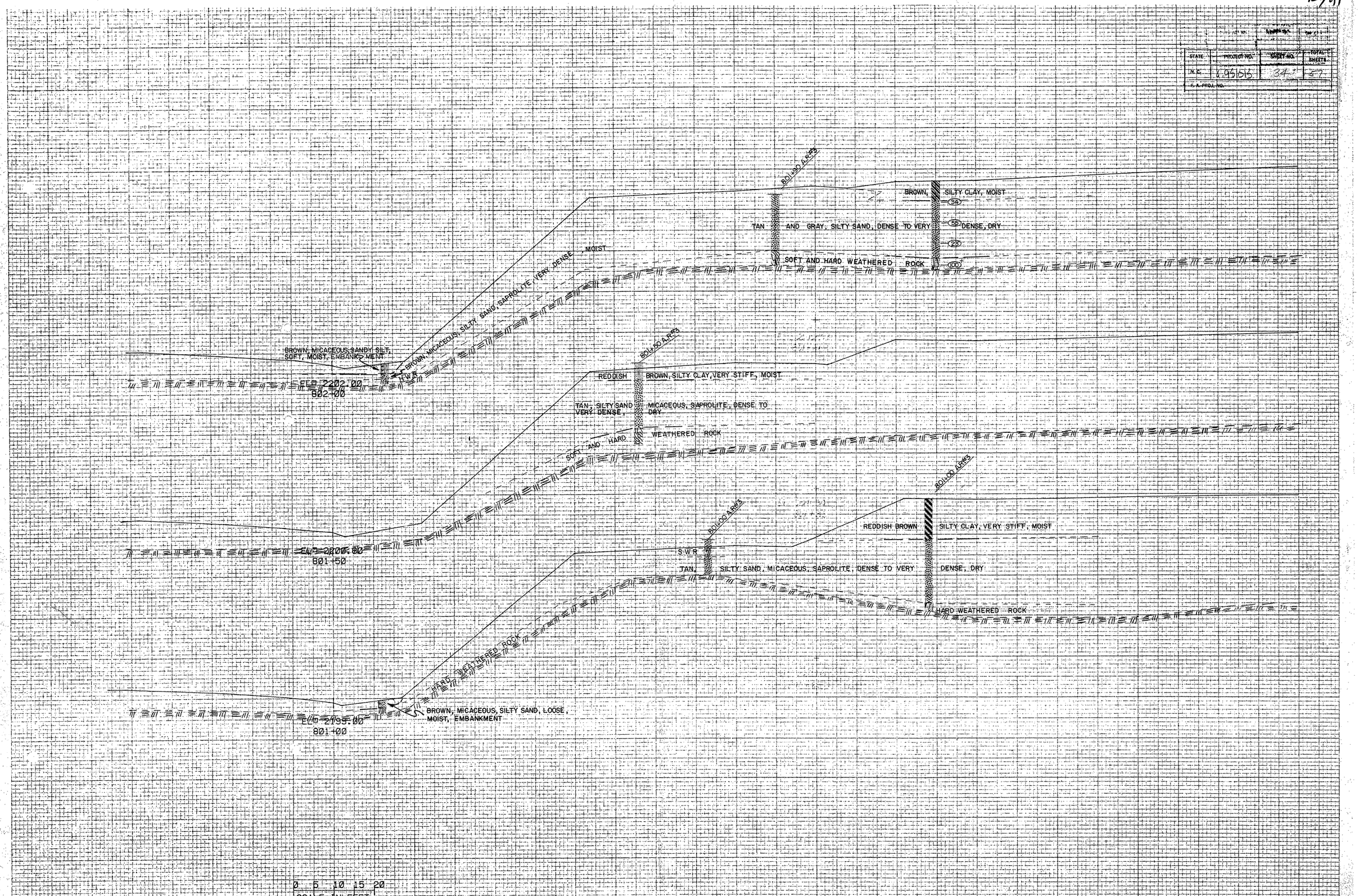
44/91

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	6961015	33	57
F.A. PROJ. NO.			



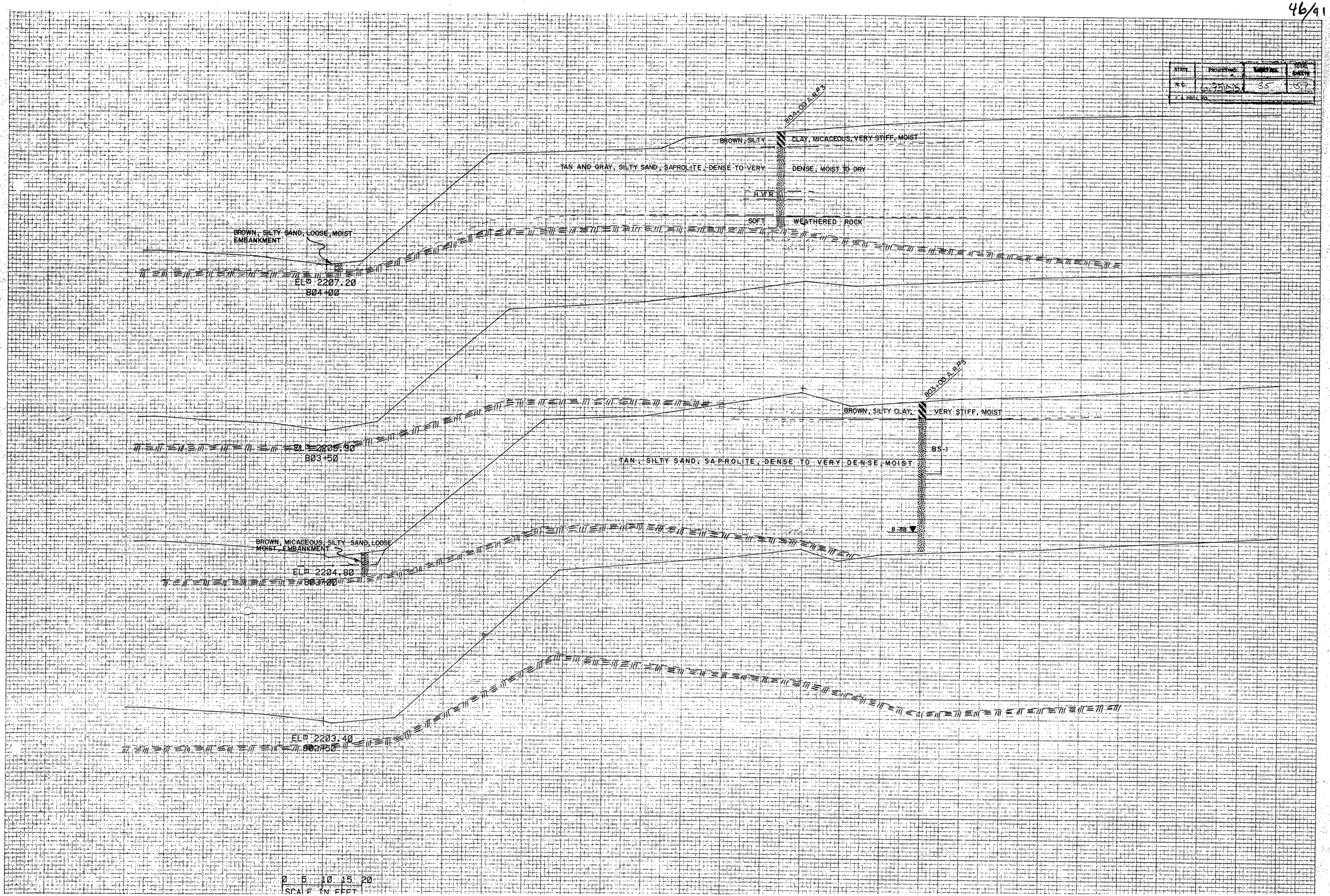
45/91

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	4.95515	34	57
F.A. PROJ. NO.			

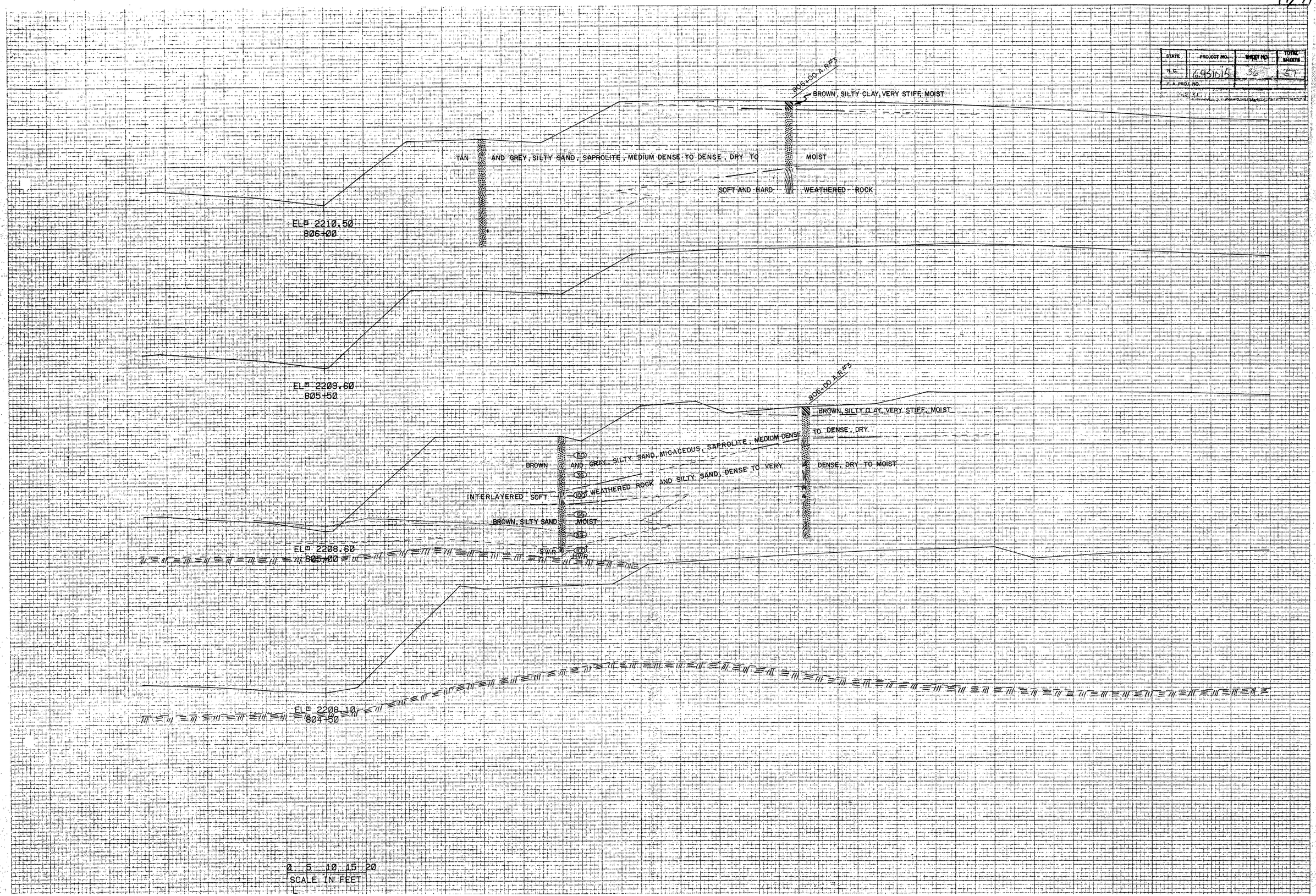


46/91

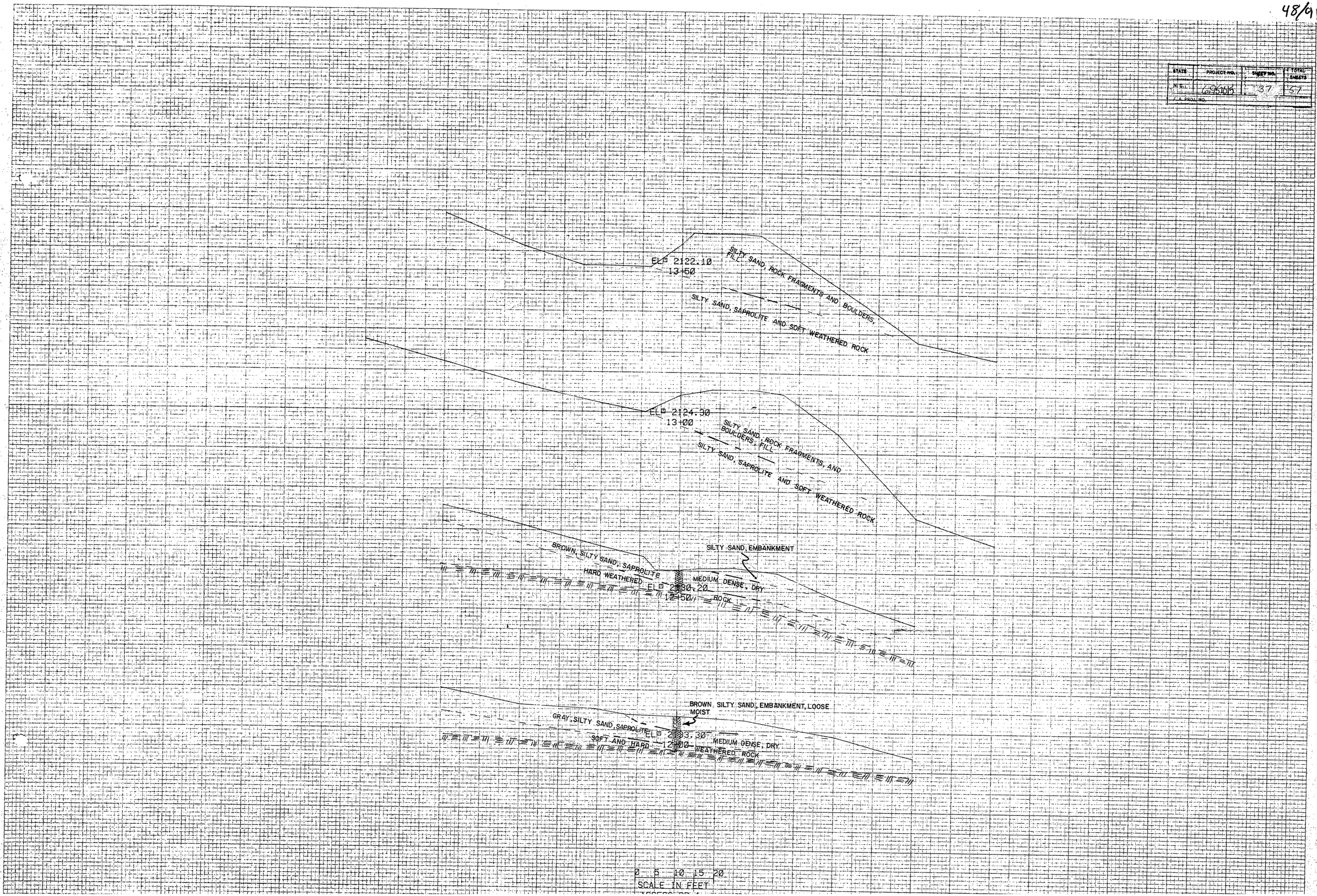
STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	6.251635	35	57
F.A. PROJ. NO.			



STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	6.951016	36	57
F.A. PROJ. NO.			



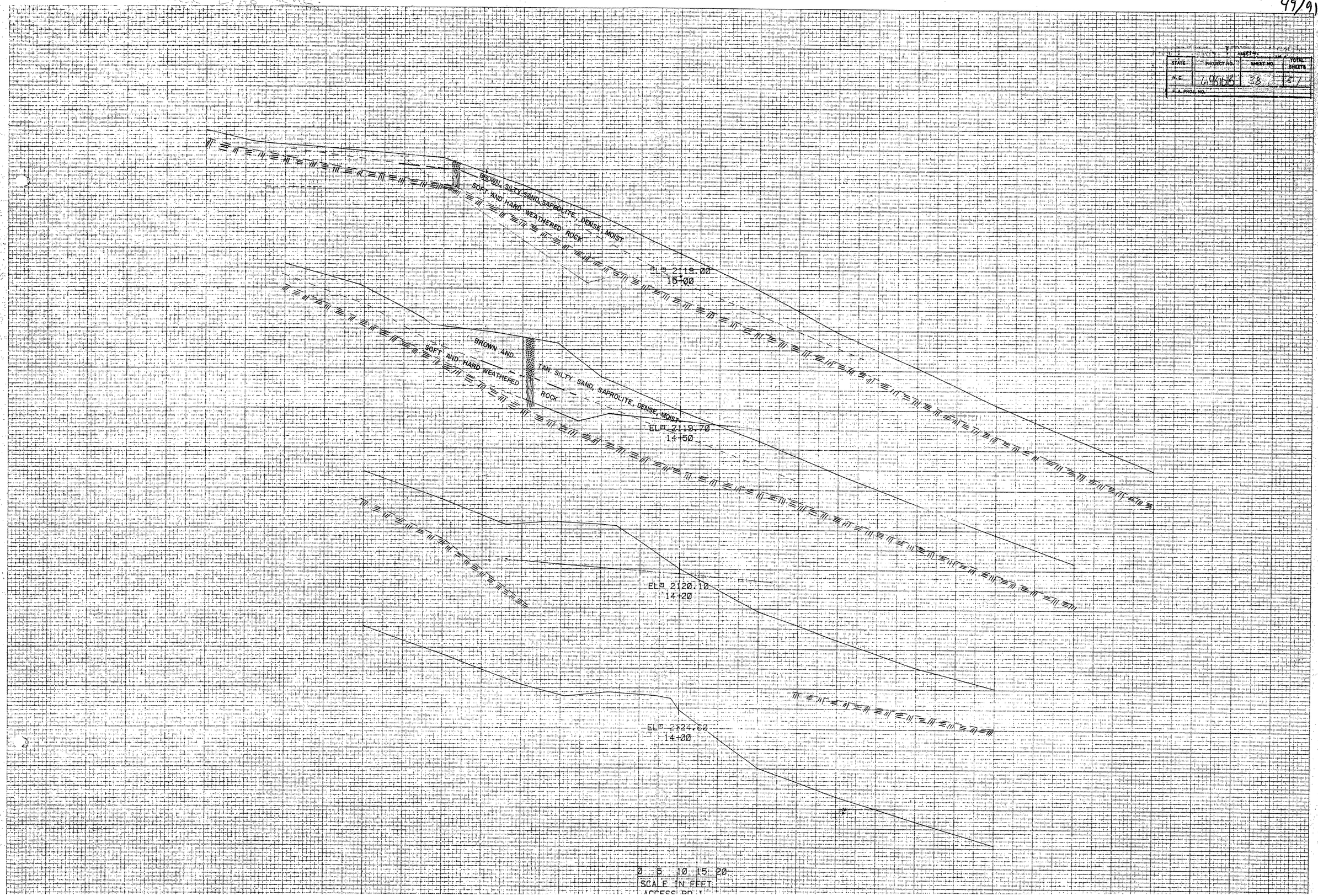
STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	6951015	37	57
F.A. PROJ. NO.			



Rock Lino Inc.

49/91

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	7.9610B	38	127
F.A. PROJ. NO.			



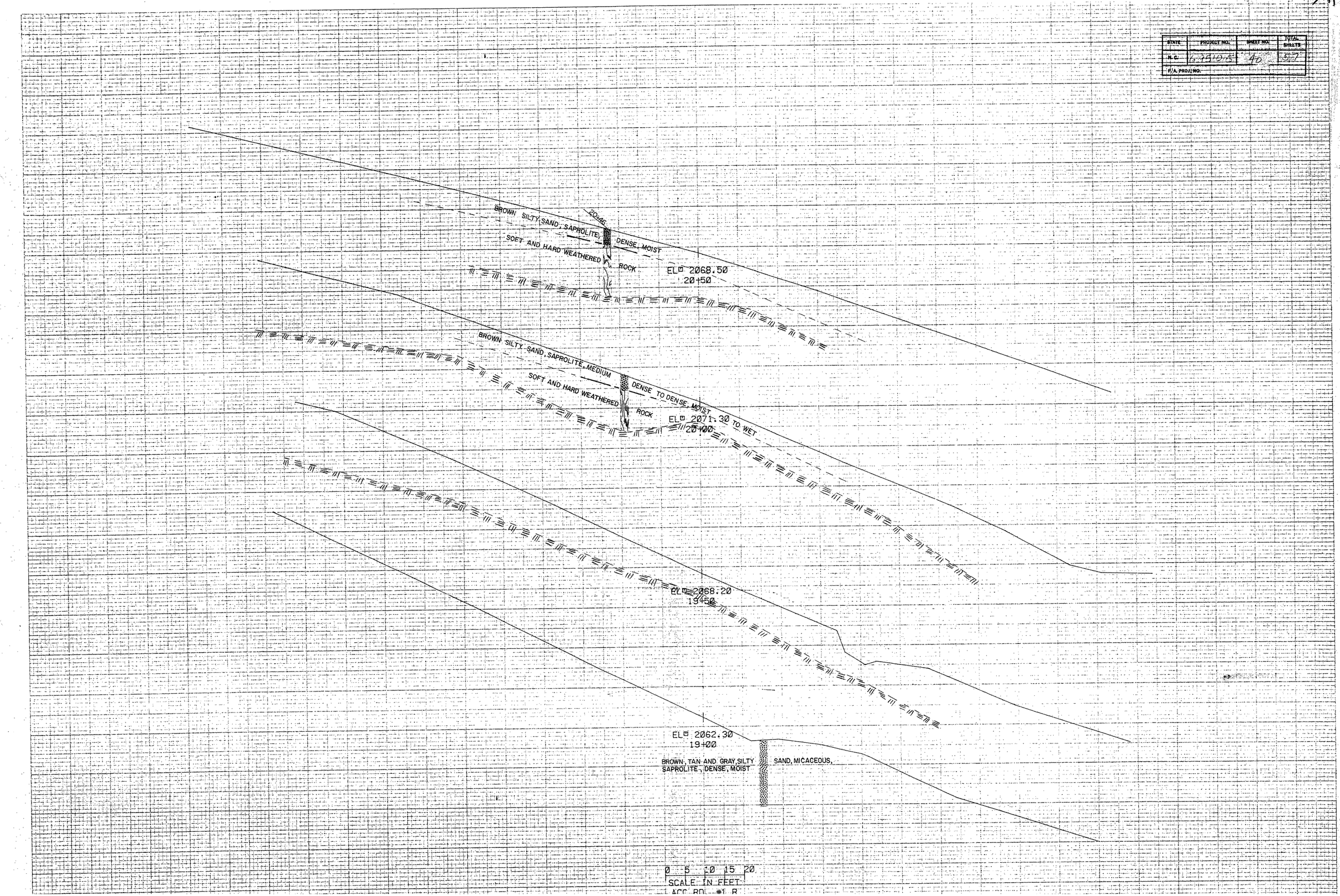
50/91

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	49610B	39	57

F. PROJ. NO.

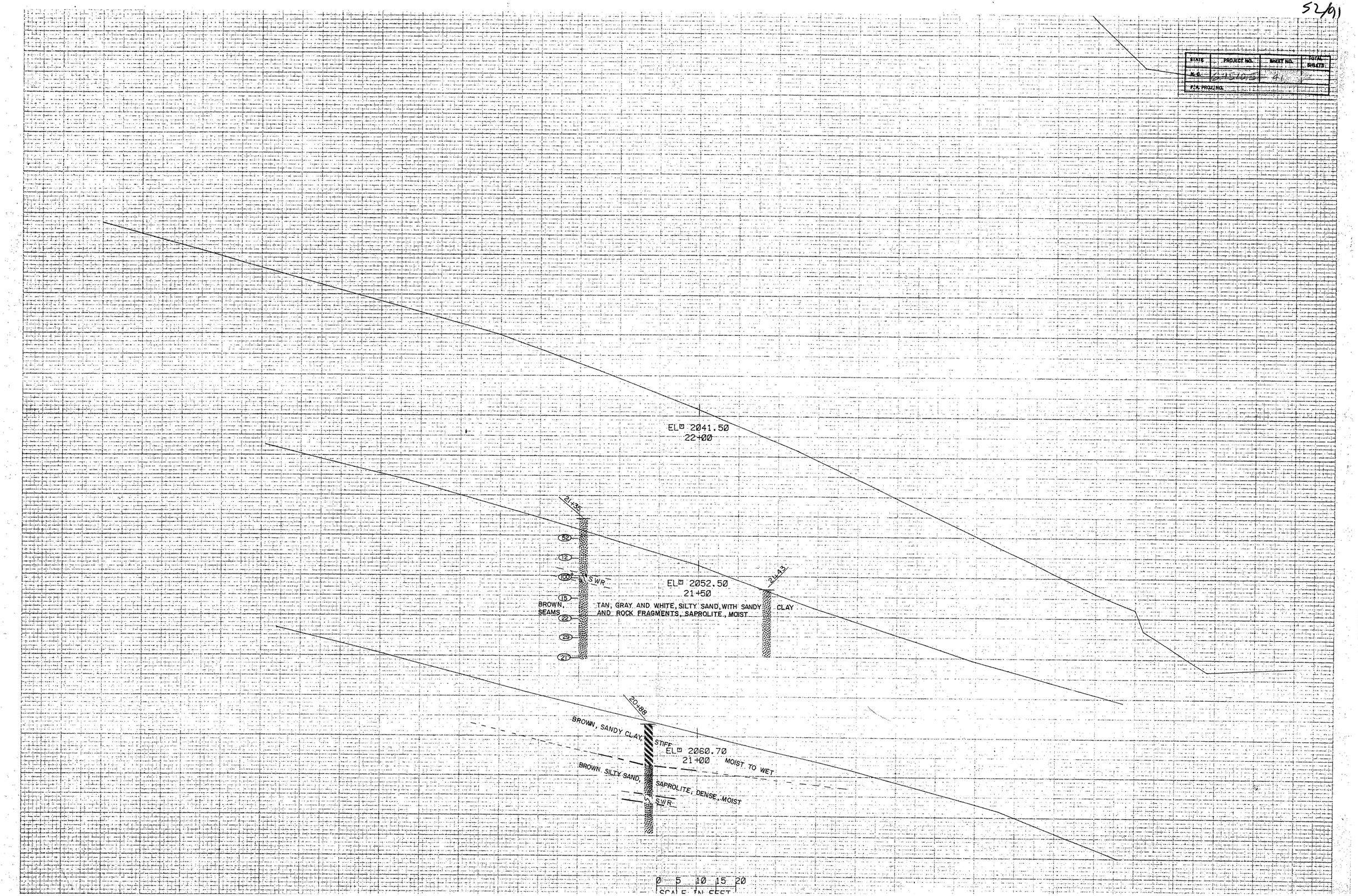
51/91

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	6.1510.5	40	57
F.A. PROJ. NO.			



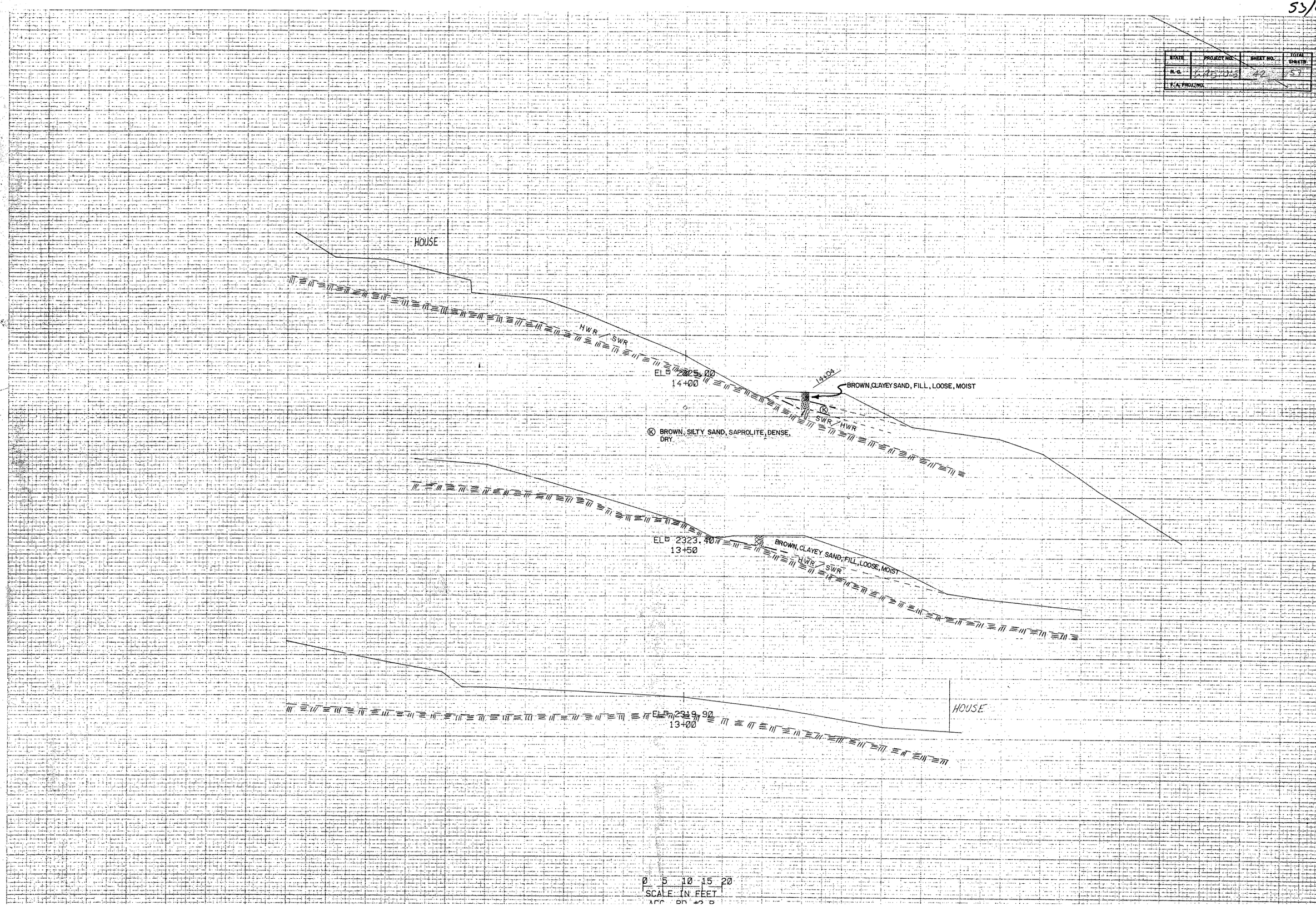
52/91

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	6-5105	41	
F.A. PROJ. NO.			



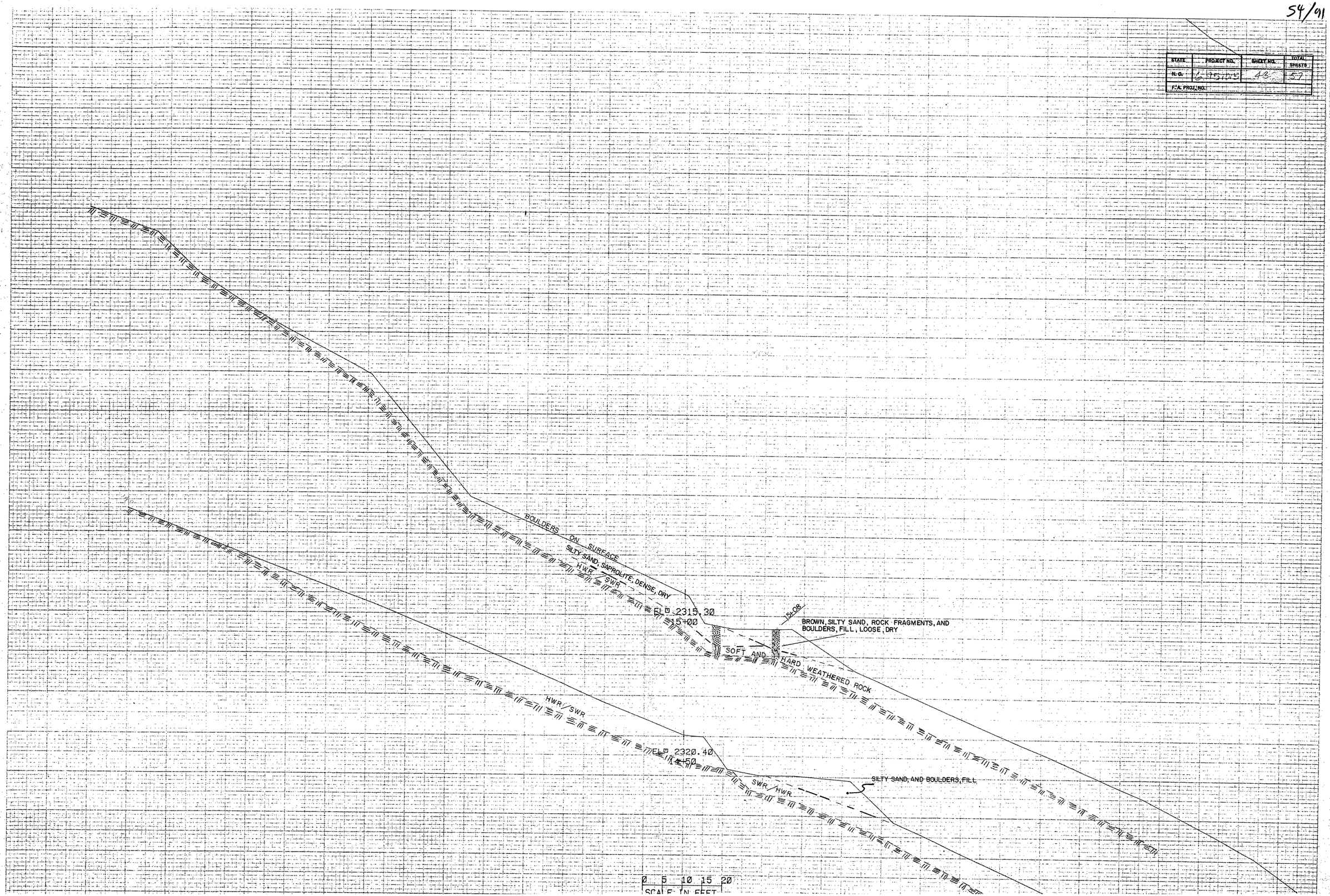
53/91

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	6.95105	42	57
F.A. PROJ. NO.			



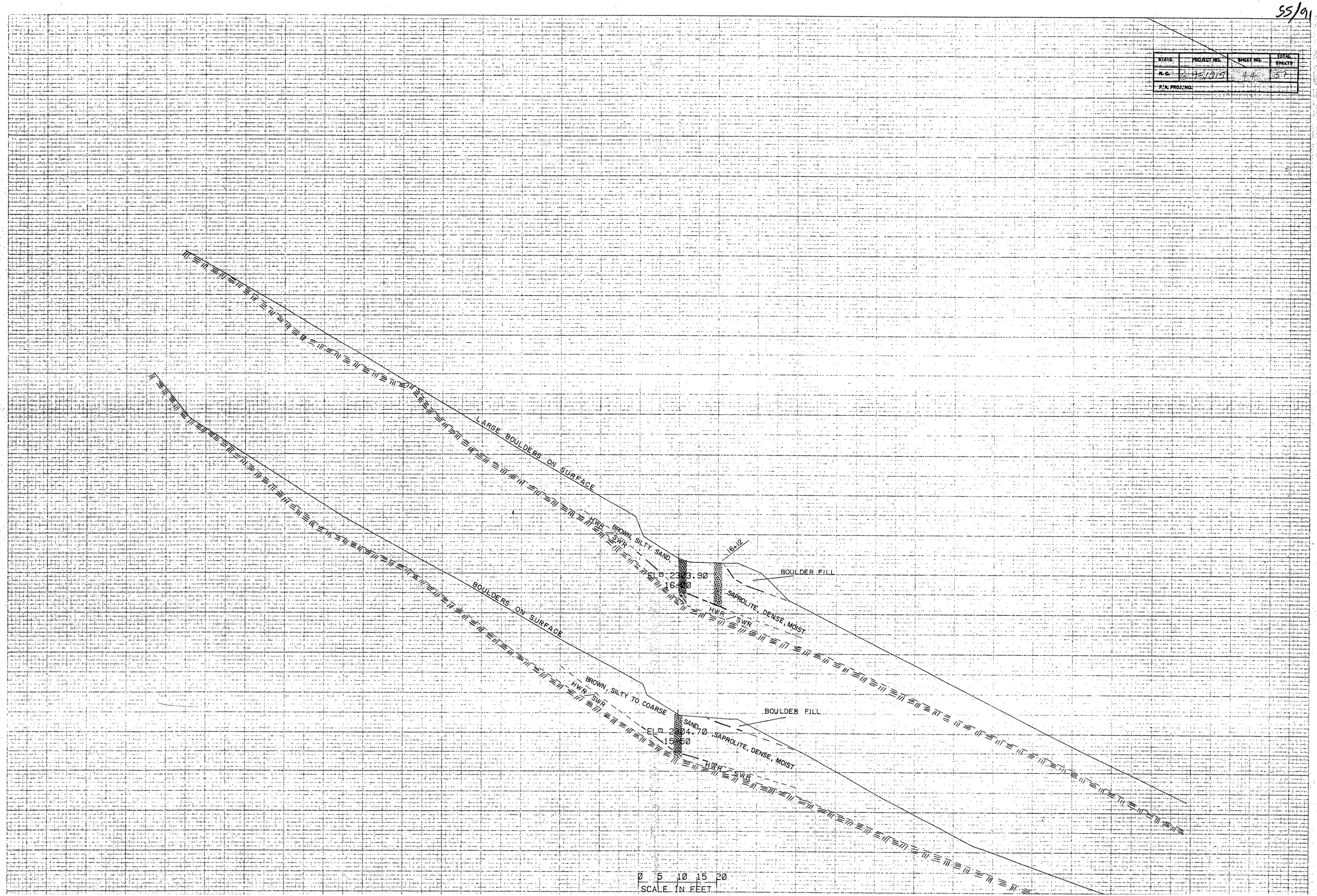
54/91

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N. C.	6-95102	43	57
F.A. PROJ. NO.			



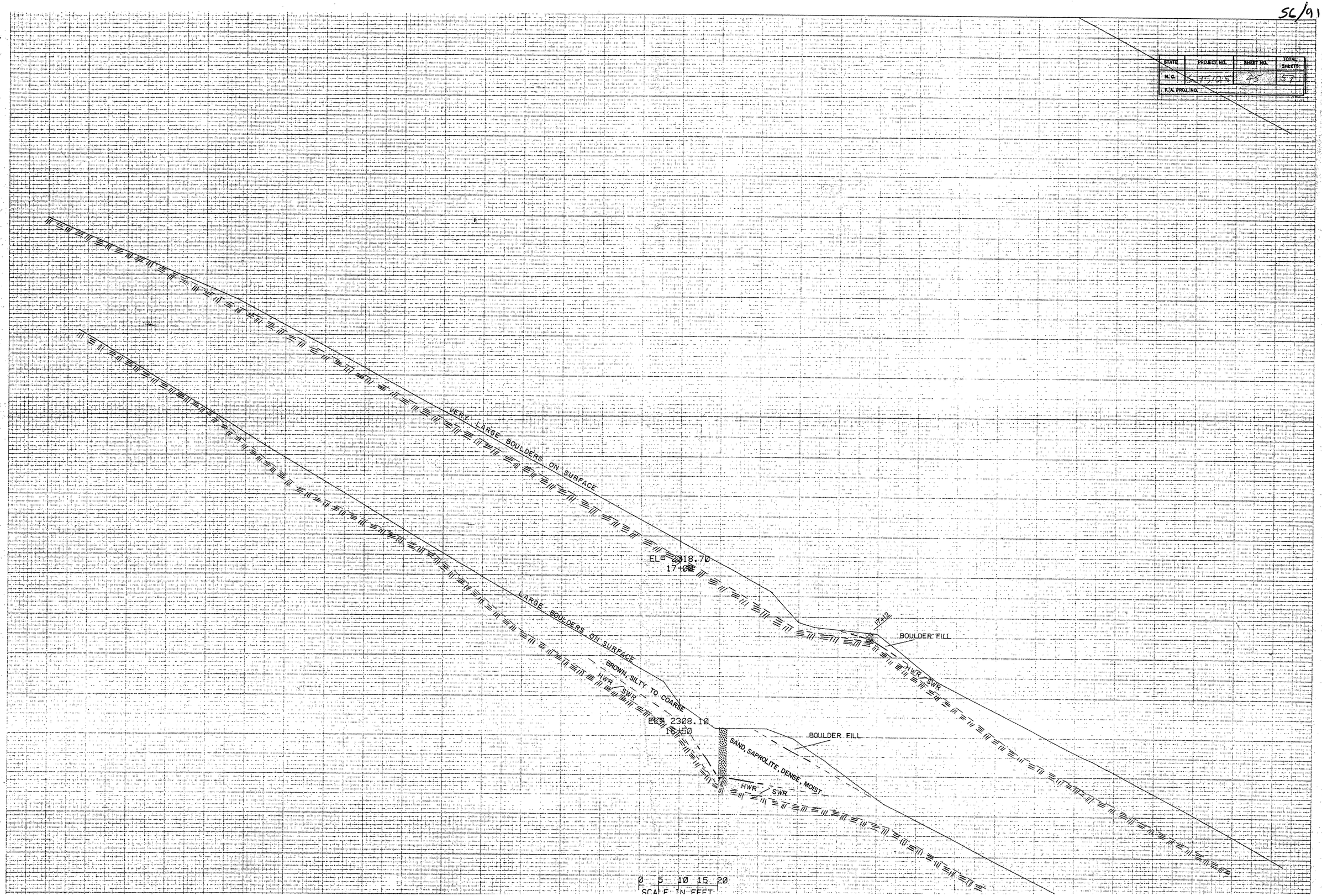
55/91

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N. C.	6.751015	44	57
F.A. PROJ. NO.			



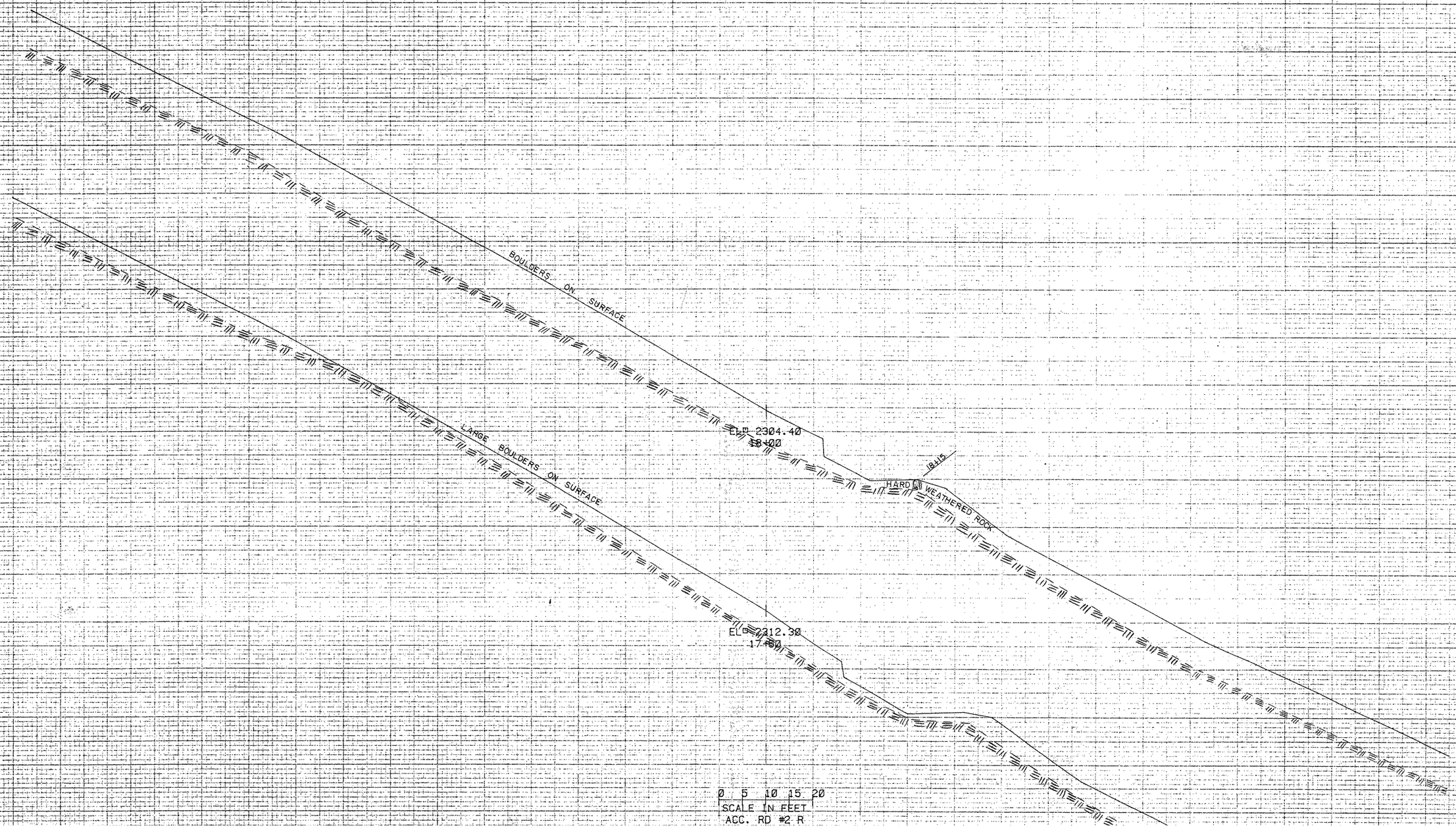
SC/91

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	6.75105	45	57
F.A. PROJ. NO.			



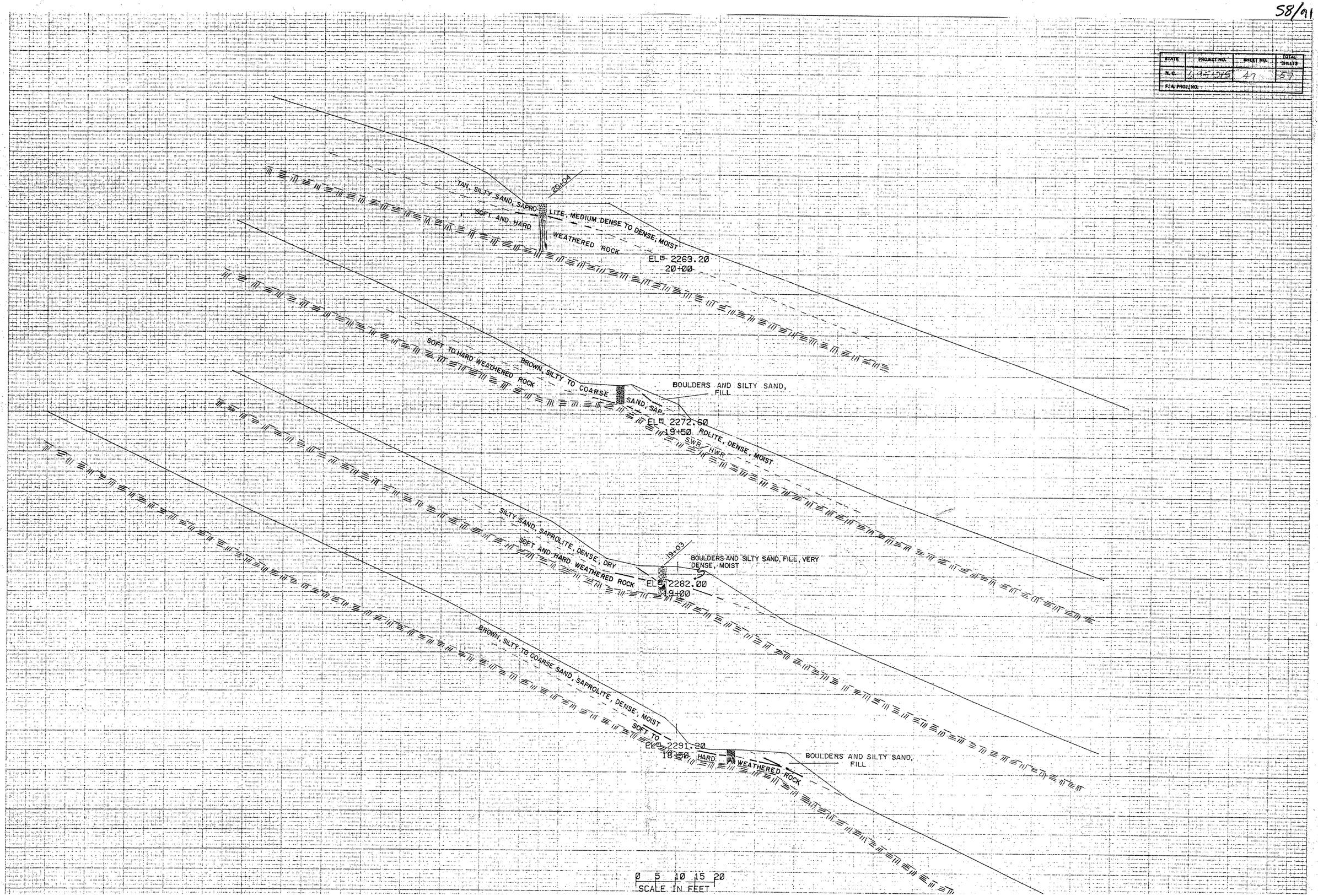
57/91

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	[illegible]	46	57
F.A. PROJ. NO.			



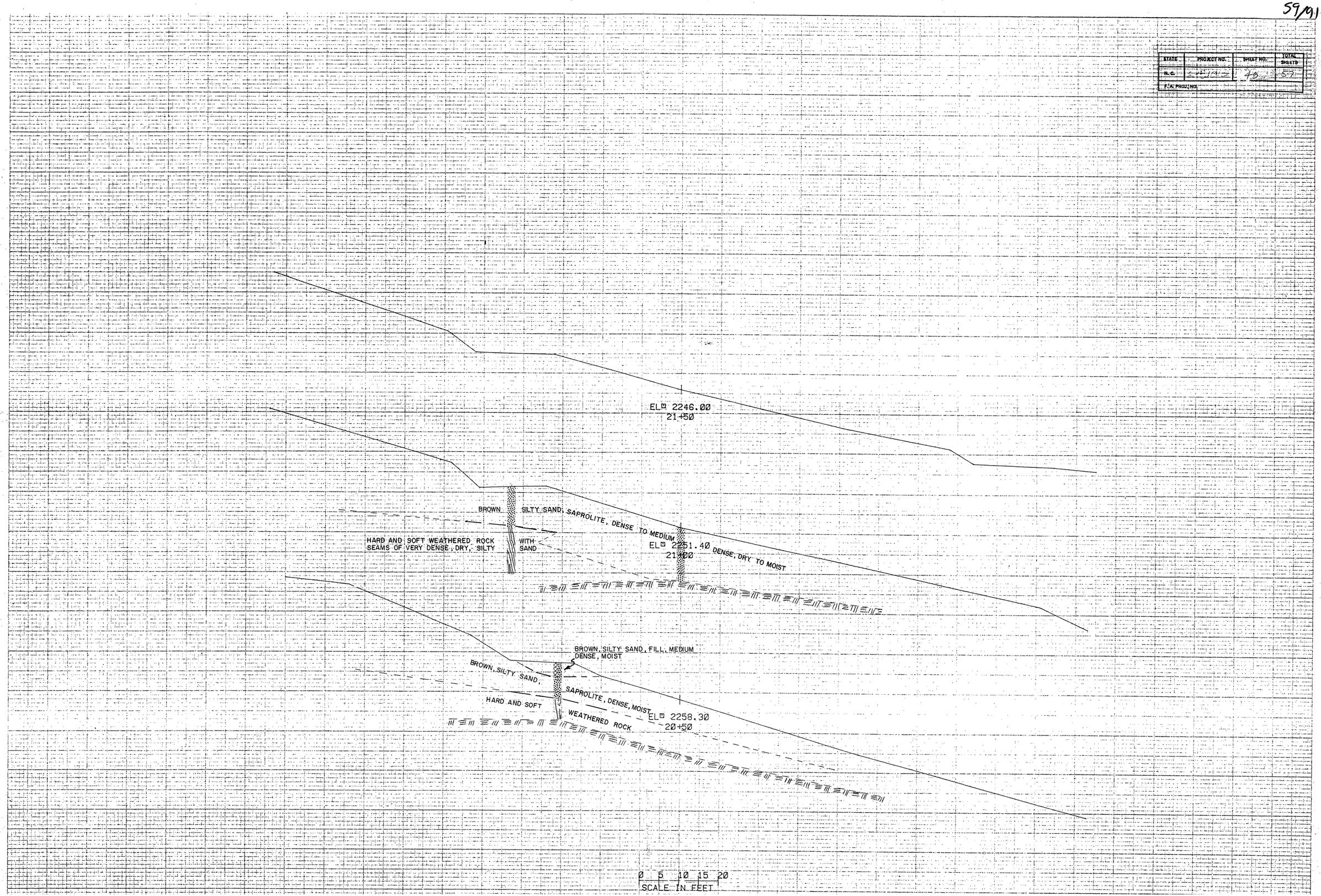
58/91

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N. C.	[illegible]	47	57
F.A. PROJ. NO.			



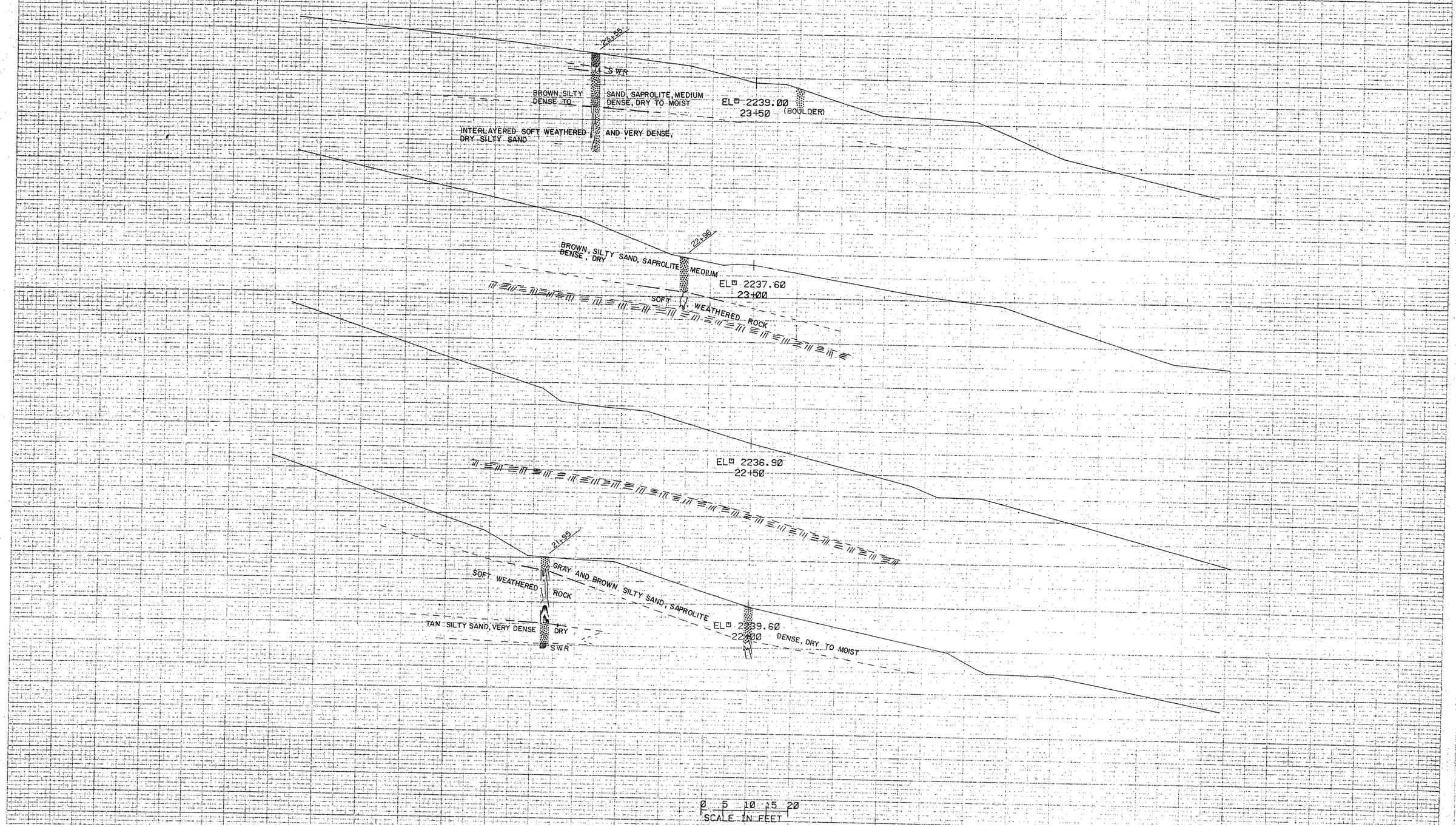
59/91

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	[illegible]	48	57
F.A. PROJ. NO.			



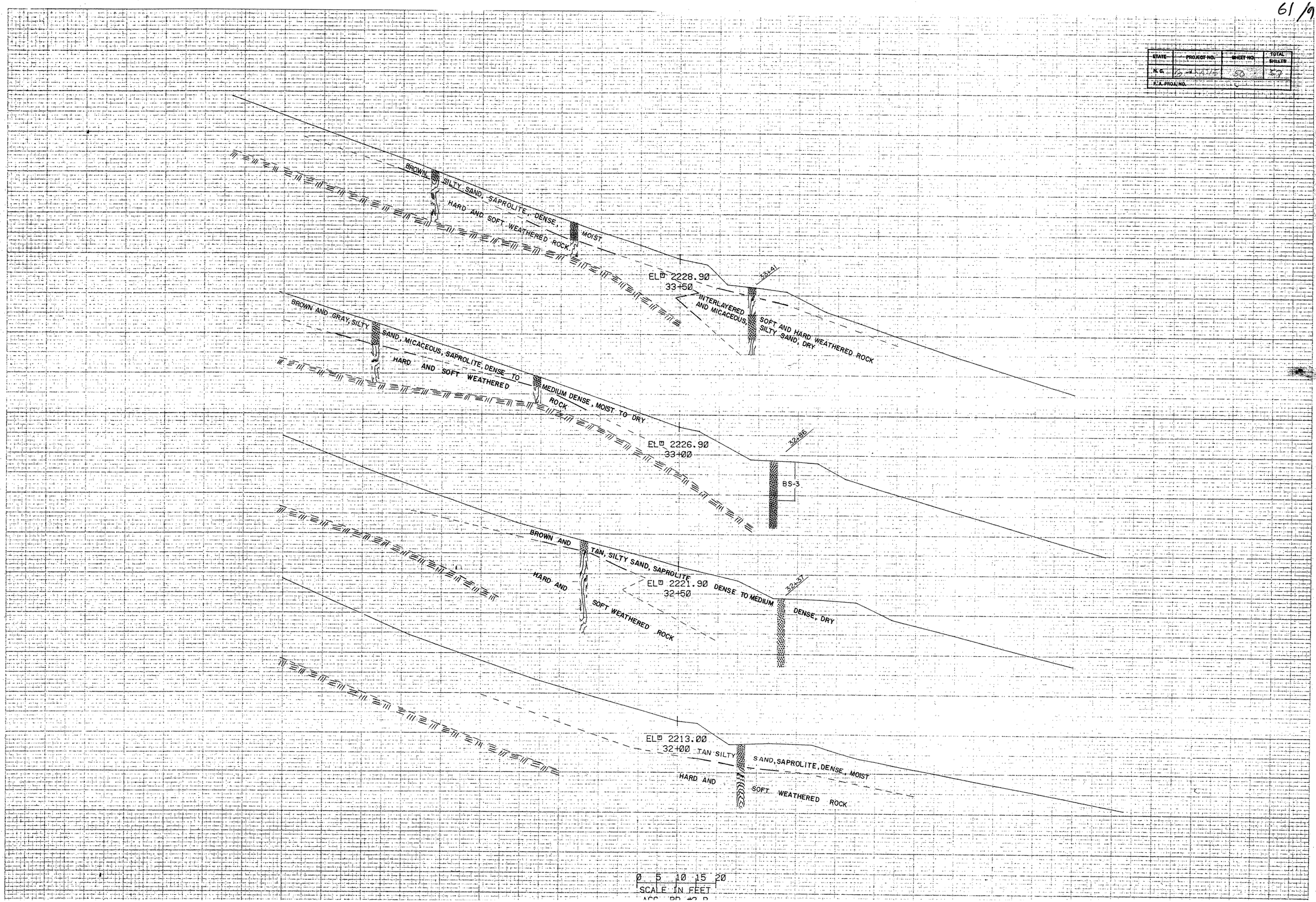
60/91

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	5-15-D-3	49	57
F.A. PROJ. NO.			



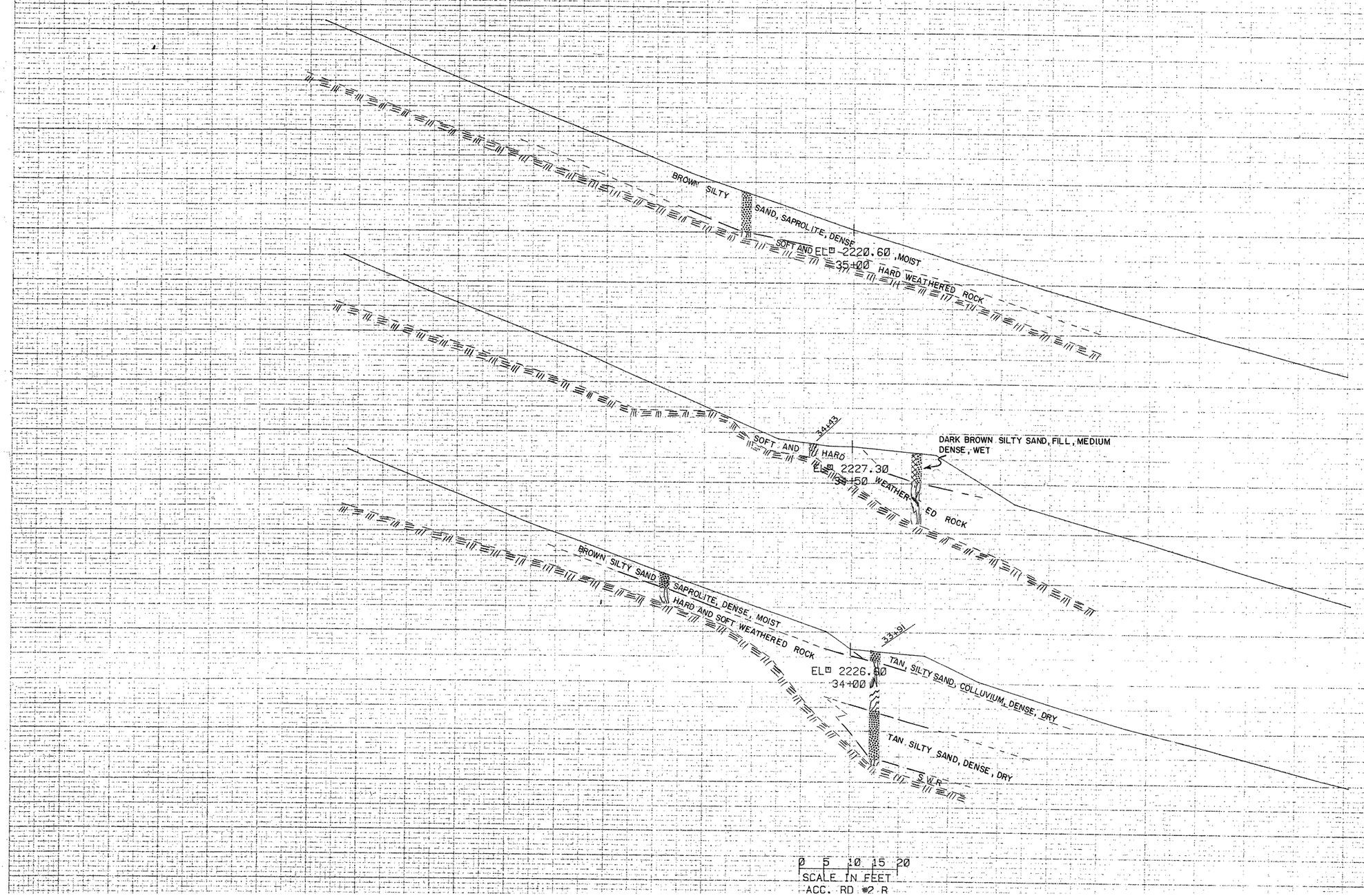
61/91

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N. C.	B-2446	50	59
F.A. PROJ. NO.			



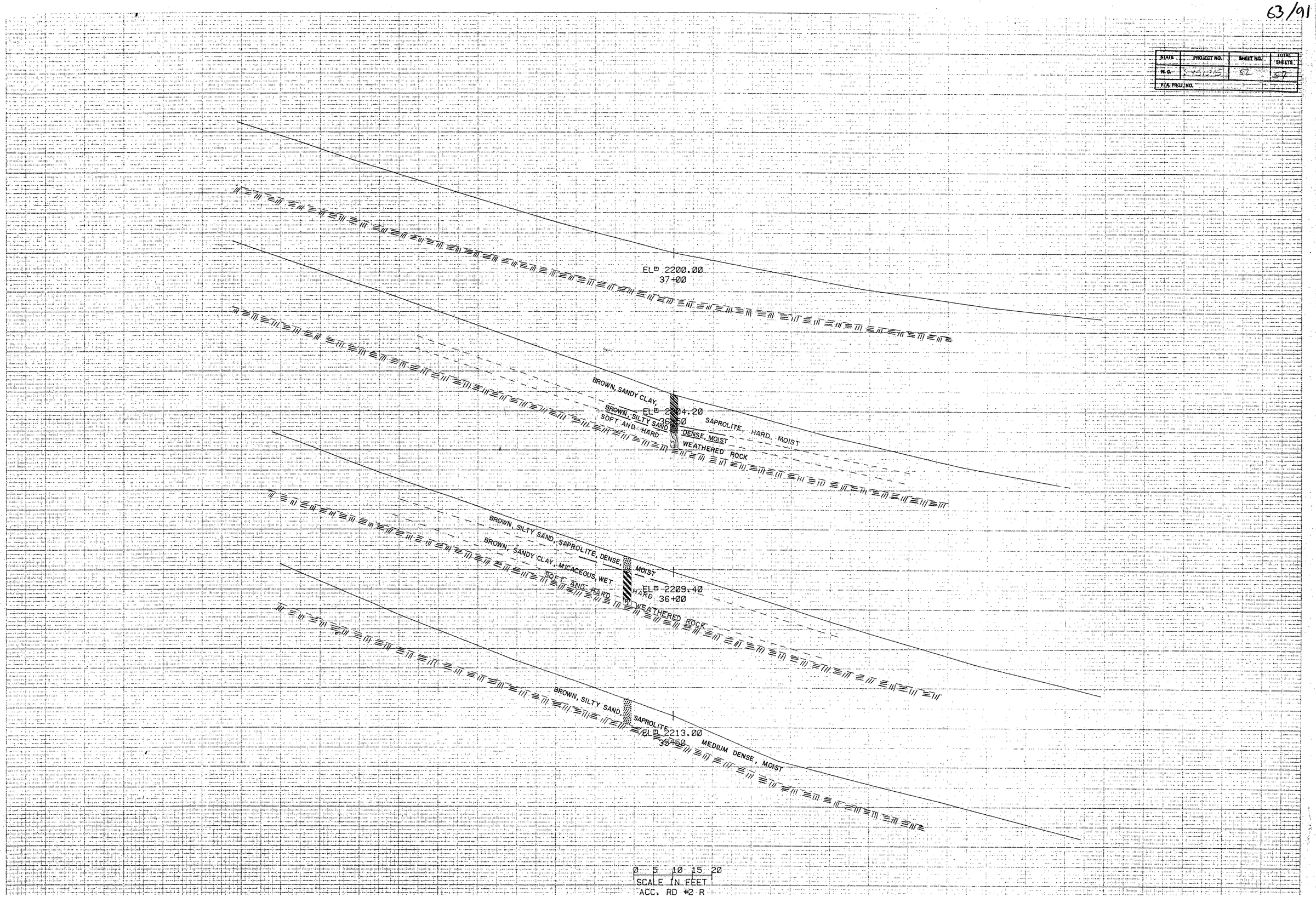
62/91

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	[illegible]	57	57
F.A. PROJ. NO.			



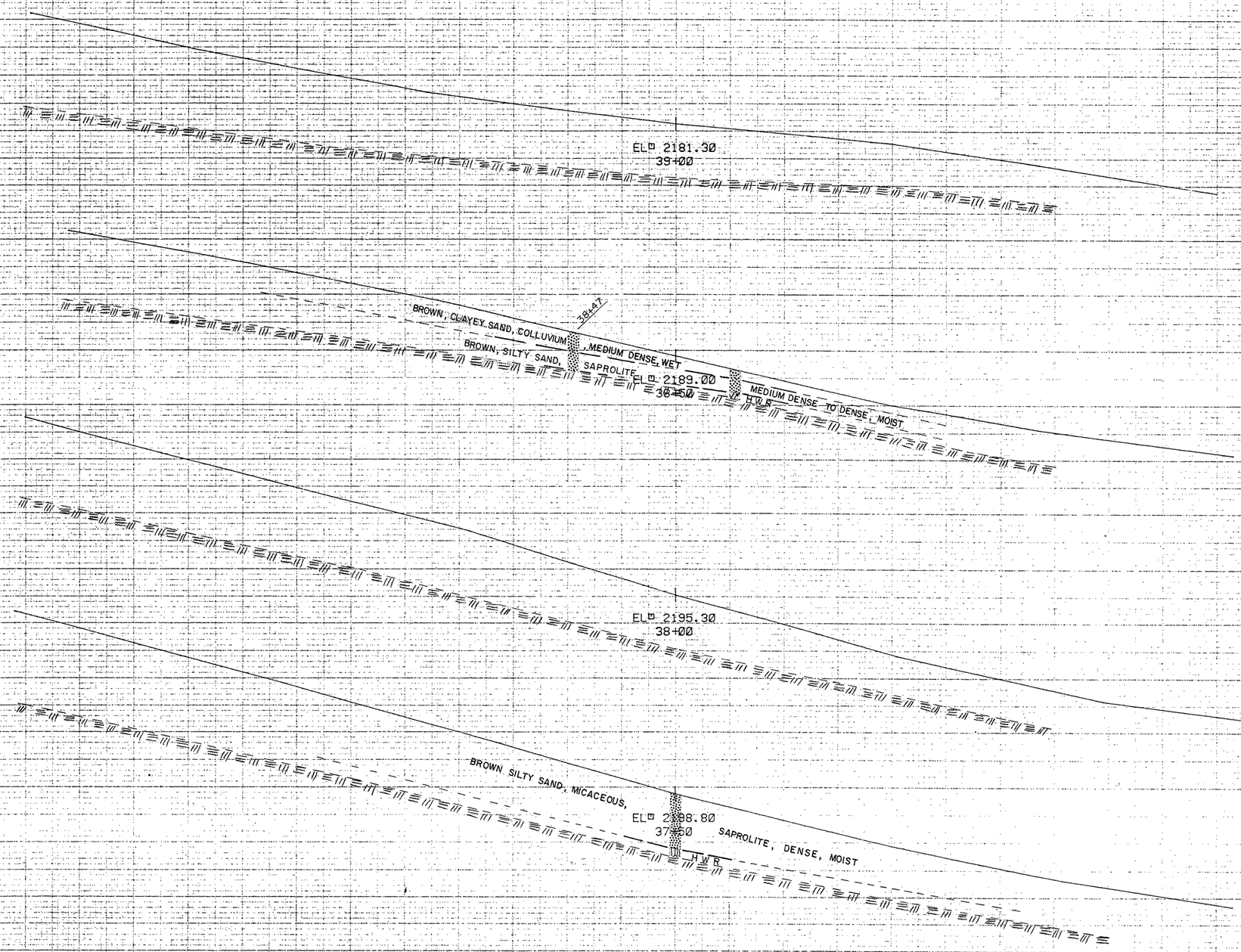
63/91

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N. C.	[illegible]	52	52
F.A. PROJ. NO.			



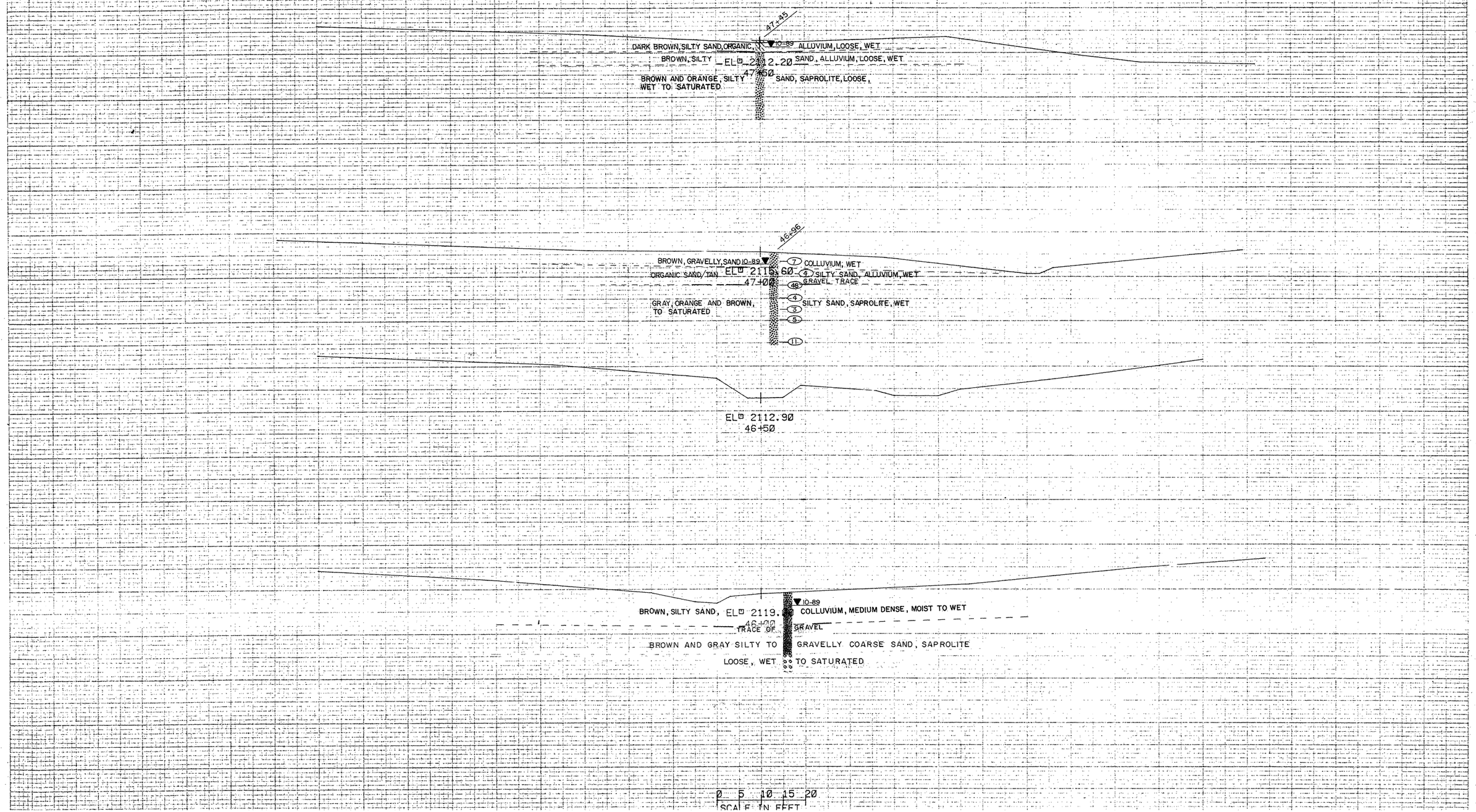
ACC. RD #2 R

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	[illegible]	53	57
F.A. PROJ. NO.			

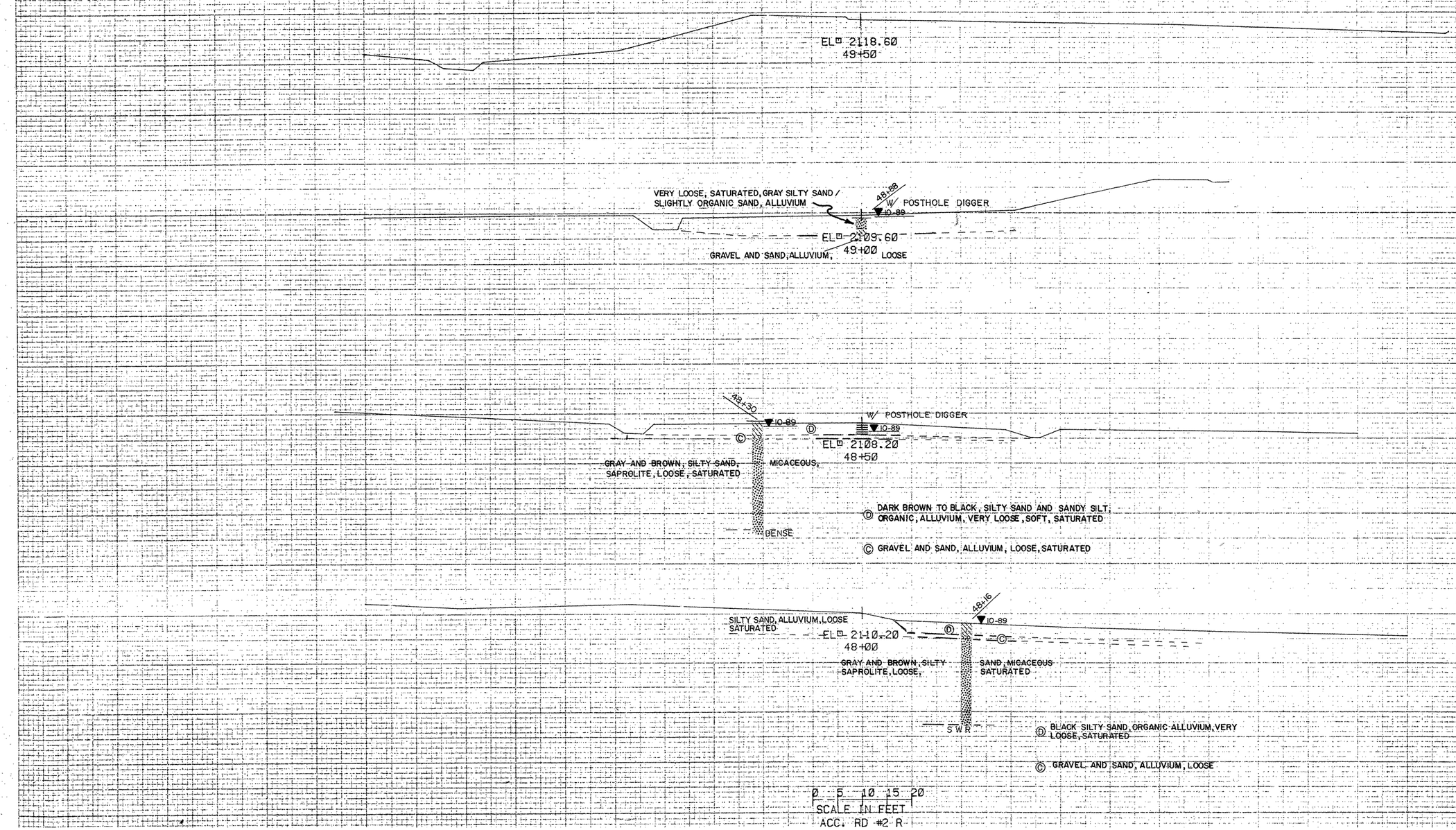


65/91

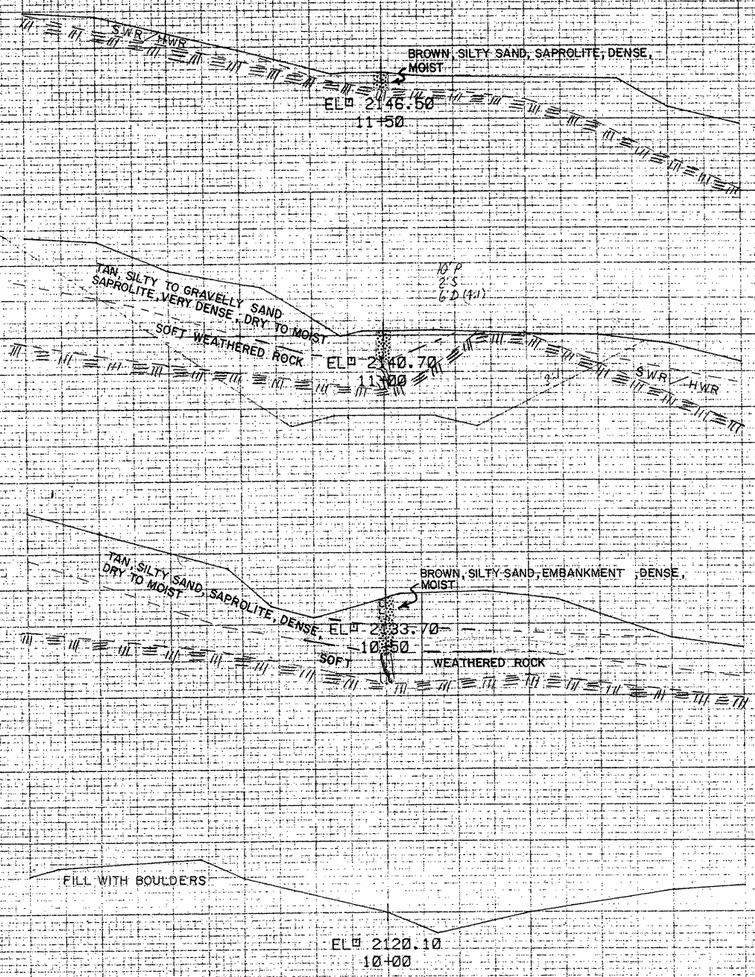
STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	6.95[illegible]	54	57
F.A. PROJ. NO.			



STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	[illegible]	55	57
F.A. PROJ. NO.			



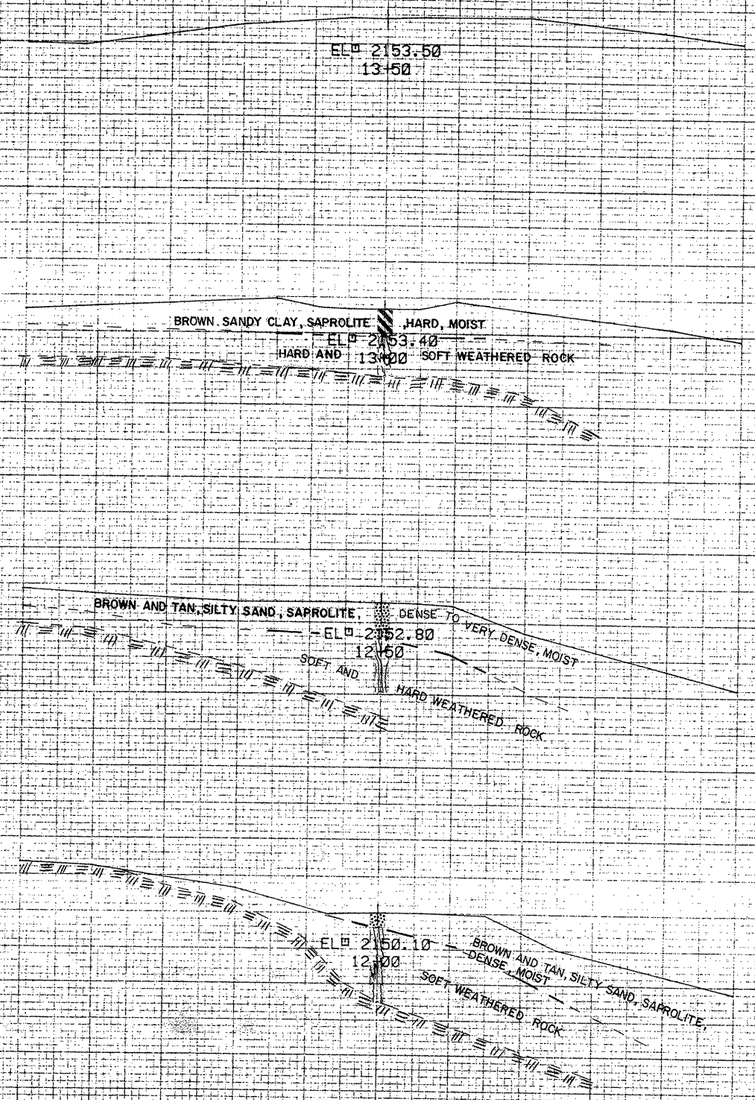
STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	695015	56	57
F.A. PROJ. NO.			



0 5 10 15 20
SCALE IN FEET
ODIE GORDON

68/91

STATE	PROJECT NO.	SHEET NO.
N.C.	6.93013	57
F.A. PROJ. NO.		



ODIE GORDON

69/91

STATE PROJECT NO.		SHEET NO.	TOTAL SHEETS
6.951015	R-505A	1	20

ID. NO. R-505A

PROJECT : 6.951015

CONTENTS :

ACCESS ROAD NO. 12 STATION 10+00 TO STATION 35+44.82

-Y50- STATION 10+00 TO STATION 17+61.33

-Y51- STATION 10+00 TO STATION 11+71.47

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

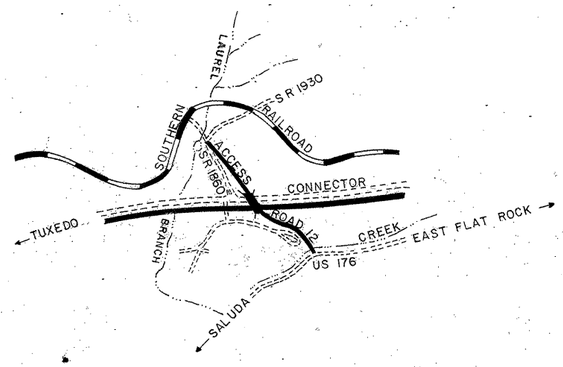
SUBSURFACE INVESTIGATION

STATE PROJECT 6.951015 ID. No. R-505A

F.A. PROJECT

COUNTY HENDERSON

DESCRIPTION CONNECTOR FROM US 25 AT ZIRCONIA TO I-26



INVESTIGATED BY J.L. SHARPE PERSONNEL J.W. MANN

CHECKED BY F.R. GLASS T.E. WILLIAMS

SUBMITTED BY F.R. GLASS D.O. CHEEK

DATE OCTOBER 1990

DRAWN BY: J.L. SHARPE

STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
6.951015 R-2102	2	20

N.C. DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR WEATHERED EARTH MATERIALS WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN 100 B.P.F. ACCORDING TO THE STANDARD PENETRATION TEST (ASTM-D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHO 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 CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (35% LESS PASSING NO. 200)							SILT-CLAY MATERIALS (+ 35% PASSING NO. 200)				ORGANIC SOILS		
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	50 MX											GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
# 40	30 MX	50 MX	51 MN											
# 200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN			
LIQUID LIMIT				40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	WITH LITTLE OR MODERATE AMOUNT OF ORGANIC MATTER		HIGHLY ORGANIC SOIL
PLASTIC INDEX	6 MAX.		N.P.	10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
GROUP INDEX	0		0	0		4 MAX.		8 MAX.	12 MX	16 MX	20 MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL & SAND			SILTY OR CLAYEY GRAVEL & SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

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

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTANCE	RANGE OF UNCONFINED COMPRESSIVE STRENGTH
COARSE GRAINED SOILS	VERY LOOSE LOOSE MED. DENSE DENSE VERY DENSE	LESS THAN 4 B.P.F. [1] 4 TO 10 10 TO 30 30 TO 50 MORE THAN 50	N/A
FINE GRAINED SOILS	VERY SOFT SOFT MED. STIFF STIFF VERY STIFF HARD	LESS THAN 2 B.P.F. 2 TO 4 4 TO 8 8 TO 15 15 TO 30 MORE THAN 30	LESS THAN .25 TSF 0.25 to 0.5 0.5 TO 1.0 1.0 TO 2.0 2.0 TO 4.0 MORE THAN 4.0

1 SEE STANDARD PENETRATION TEST

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	2.0	0.42	0.25	.074	.053

BOULDER | COBBLE | GRAVEL | COARSE SAND | MED. SAND | FINE SAND | SILT | CLAY

GRAIN SIZE MM: 305 | 76 | 2 | 0.6 | 0.25 | 0.2 | .05 | .005

GRAIN SIZE IN.: 12" | 3"

SOIL MOISTURE——CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	PHYSICAL STATE	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	LIQUID	SATURATED	VERY WET, USUALLY FROM BELOW GROUND WATER TABLE
LL — LIQUID LIMIT			
PLASTIC RANGE (P.I.)	SEMISOLID	WET (W)	REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT			
OM — OPT. MOISTURE	SOLID	MOIST (M)	AT OR NEAR OPTIMUM MOISTURE
SL — SHRINKAGE LIMIT	DRY (D)		REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE
0%			

PLASTICITY

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

COLOR

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

GRADATION

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

ANGULARITY OF GRAINS

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

MINERALOGICAL COMPOSITION

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

COMPRESSIBILITY

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

ROCK DESCRIPTION

IN THE BROADEST MEANING, HARD ROCK IS CONSIDERED TO BE THAT INDURATED EARTH MATERIAL WHICH CANNOT BE SAMPLED BY CONVENTIONAL SOIL SAMPLING TOOLS OR TECHNIQUES. THE BOUNDARY BETWEEN SOIL AND ROCK IS ARBITRARY. TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF "WEATHERED ROCK". FOR THE PURPOSE OF THIS INVESTIGATION, THESE MATERIALS ARE DIVIDED AS FOLLOWS:

TERM	SYMBOL		
WEATHERED ROCK (HWR) (SWR)		SOFT WEATHERED ROCK	MATERIAL THAT CAN BE PENETRATED WITH SOME DIFFICULTY USING POWER AUGER AND YIELDS S.P.T. VALUES >100 B.P.F. BUT < S.P.T. REFUSAL.
		HARD WEATHERED ROCK	MATERIAL THAT CAN BE PENETRATED WITH GREAT DIFFICULTY USING POWER AUGER AND YIELDS S.P.T. REFUSAL.*
HARD ROCK (HR)	CORED ROCK	INFERRED ROCK LINE	MATERIAL SUCH THAT IT CANNOT BE PENETRATED BY POWER AUGER, EXCEPT IN THIN LEDGES, AND REQUIRES ROCK CORING TOOLS FOR OBTAINING SAMPLE.

* S.P.T. REFUSAL (ASTM) ≧ 1" OF PENETRATION PER 50 BLOWS.

AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH AUGERS COULD NO LONGER PENETRATE.

WHEN ROCK IS CORED, THE HARD ROCK SYMBOL IS SHOWN TO THE DEPTH CORED. A FULL DESCRIPTION OF ROCK USING APPROPRIATE TERMS (SEE DEFINITION OF TERMS)—INCLUDES PERCENT OF CORE RECOVERY (% REC) AND ROCK QUALITY DESIGNATION (RQD).

GROUND WATER

▽ DATE: WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING

▼ DATE: STATIC WATER LEVEL AFTER 24 HOURS

▽ DATE: PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA

: SPRING

MISCELLANEOUS SYMBOLS AND ABBREVIATIONS

- ROADWAY EMBANKMENT WITH SOIL DESCRIPTION
- SOIL SYMBOL
- AUGER BORING
- SPT DPT VST — TEST BORING
- 25° — STRIKE AND DIP OF BEDS
- SPT N-COUNT
- ARTIFICAL FILL OTHER THAN ROADWAY EMBANKMENTS
- CORE BORING
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- INFERRED SOIL BOUNDARIES
- APPARENT DIP (NORMAL TO _____)

SAMPLE DESIGNATION:
ST - SHELBY TUBE SAMPLES
S - BULK SAMPLE
SS - SPLIT SPOON SAMPLE
WS - WASH BORING SAMPLE

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS: ☒ CME - 550 ☐ PORTABLE HOIST ☐ MOBILE B-52 ☐ MOBILE B-56 ☐ CME - 45 ☐ MINUTEMAN

AUGER TOOLS:
☒ 6" CONTINUOUS FLIGHT W/ ☐ HARD FACED FINGER BITS ☐ CLAY BITS ☒ TUNG.-CARBIDE INSERTS
☒ 8" HOLLOW AUGERS
CORE BORING TOOLS: ☐ -AX ☐ -BX ☐ -NX

HAND TOOLS: ☐ POST HOLE DIGGER ☐ HAND AUGER ☐ SOUNDING ROD

TERMS AND DEFINITIONS

ALLUVIUM (alluv.) - Soils which have been transported by flowing water.

APPARENT DIP - The dip of rock strata not perpendicular to strike.

AQUIFER - A water-bearing formation or strata.

AUGER REFUSAL (A.R.) - Point at which power augers will not actually or practically penetrate.

BEDDED - Soil or rock lying in a position essentially parallel.

BEDROCK - Rock of relatively great thickness and extent in its original location.

CALCAREOUS (calc.) - Soils which contain appreciable amounts of calcium carbonate.

COHESIVE SOIL - A soil that when unconfined has considerable dry strength and significant cohesion when submerged.

COLLUVIUM - Rock fragments mixed with soil deposited by gravity on slope or at bottom of slope.

CORE RECOVERY (% Rec.) - Total length of all rock divided by total length of core run expressed as a percentage.

COQUINA - A rock type composed essentially of marine shells cemented by calcium carbonate.

DIKE - Igneous rock intrusive which is narrow compared with its other dimensions.

DIP - The angle between a bedding plane, joint plane or fault plane and the horizontal, measured perpendicular to the strike.

DUMPS - Uncovered deposits of waste materials such as wood, masonry debris or garbage.

FAULT - A break in the continuity of a body of rock, attended by a movement on either or both sides of the break.

FINES - Portion of a soil finer than No. 200 U. S. Standard Sieve.

FISSILITY OR FISSILE - A property of splitting easily along closely spaced parallel planes.

FLOAT - Rock fragments on surface near their original position dislodged from parent material.

FLOODPLAIN - Land bordering a stream, built of sediments deposited by the stream.

FORMATION - A mappable unit that can be recognized and traced in the field.

FRACTURE - A crack large enough to be visible to unaided eye.

FRIABLE - Easy to break or crumble.

GRANULAR SOIL - Soil that when unconfined has little or no dry strength and has little or no cohesion when submerged.

GROUND WATER - (Free Water) (G. W.) - Water that is free to move through soil mass under influence of gravity.

GROUNDWATER LEVEL - Level at which the pressure in water is zero with respect to the atmospheric pressure.

HARDPAN - A general term used to describe a hard cemented soil layer which does not soften when wet.

INDURATED - Earth material hardened by heat, pressure or cementation.

INTERBEDDED - Alternating lenses or layers of soil and/or rock materials.

JOINT - Fracture in rock along which no appreciable movement has occurred.

LAMINATED - Very thin alternating layers less than 1" in thickness.

LAYER - Subject material greater than 1" thick.

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.

MARL - A non-indurated, calcareous deposit of clays, silts and sand, often containing shells.

MICACEOUS SOIL (mic.) - A soil or rock containing an appreciable amount of mica.

MUCK (mk.) - An highly organic soil of very soft consistency, generally found on tidal flats, lakes or stream floodplains.

PEAT (pt) - A fibrous mass of organic matter in various stages of decomposition.

PERCHED WATER - Water maintained above the normal ground water level by the presence of an intervening impervious stratum.

RESIDUAL SOIL - Soil formed in place by weathering of rock.

ROCK - SEE Legend

ROCK QUALITY DESIGNATION (R.Q.D.) - A measure of rock quality described by: total length of rock segments equal to or greater than 4 inches divided by total length of core run expressed as a percentage.

SANITARY LANDFILLS - Compacted and/or covered layers of soil and waste products.

SAPROLITE (sap.) - Residual soil which retain the relic structure or fabric of the parent rock.

SLICKENSIDE - Polished and striated surface that results from friction along a fault, or slip plane.

SILL - An igneous sheet of rock intrusive whose thickness is slight compared to its lateral extent.

SOME - Presence of 5% to 30% of subject material.

STANDARD PENETRATION TEST (Penetration Resistance) (SPT) - Number of blows (N or B.P.F.) of a 140# hammer falling 30" required to produce a penetration of 1 foot into soil with a 2" O.D. split spoon sampler. SPT refusal - penetration resistance of less than 1 inch with 50 blows.

STRIKE - The direction or bearing of a horizontal line in the plane of an inclined stratum, joint, fault or other structural plane.

SUBGRADE - The soil prepared to support a structure or a pavement system.

TOPSOIL - (T.S.) - Surface soils usually containing organic matter.

TRACE - Presence of less than 5% of subject material.

ABBREVIATIONS

Boulder - bldr.	Organic - org.
Clay - cl.	Plastic Limit - P.L.
Cobble - cob.	Plasticity Index - P.I.
Coarse - cse.	Porosity - n
Fine - f.	Sand - sd.
Fossiliferous - foss.	Saturated - sat.
Fractured - frac.	Silt, Silty - si.
Gravel - gr.	Slightly - sli.
Liquid Limit - LL.	Specific Gravity - G_s
Medium - med.	Unconfined Compressive Strength - qu
Moisture Content - w	Unit Weight (wet unit weight) - γ
Mottled - mot.	Dry Unit Weight - γd
Optimum Moisture - OM	Saturated Unit Weight - $\gamma sat.$
	Void Ratio - e
	Very - V.
	Estimated - Est.

NOTES: (SEE PROFILES AND CROSS-SECTIONS FOR DESCRIPTIONS IN DETAIL)
Ⓐ SILTY SAND, ALLUVIUM
Ⓑ SANDY CLAY, RESIDUAL / SAPROLITE
Ⓒ SILTY SAND, SAPROLITE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

JAMES G. MARTIN
GOVERNOR

JAMES E. HARRINGTON
SECRETARY

DIVISION OF HIGHWAYS

GEORGE E. WELLS, P.E.
STATE HIGHWAY ADMINISTRATOR

November 1990

STATE PROJECT: 6.951015 (R-505A)
COUNTY: Henderson
DESCRIPTION: Revisions to Connector From US-25 at Zirconia to I-26

SUBJECT: Geotechnical Report - Inventory

This report covers revisions to Access Roads and Y-lines proposed since our subsurface report on the US-25/I-26 connector was submitted in March 1990. Access Road No. 12 begins near the intersection of SR-1827, Lamplighter Road, and SR-1860, Zirconia Road. It runs generally east, crossing US-25 connector on a proposed bridge to intersect US-176. The purpose of Access Road No. 12 is to avoid construction of much longer Access Roads 1 and 2 which were originally considered and investigated earlier this year. Lines -Y50- and -Y51- connect surrounding properties with Access Road 12.

ACCESS ROAD NO. 12

Station 10+00 to Station 21+10

The survey begins on embankment in existing Zirconia Road (SR-1860) in a small stream valley and turns onto gently sloping, cattle pasture north of Zirconia Road. An existing cut slope on the connector at the end of this segment is slightly greater than 40 feet in height. Proposed excavation in the pasture reaches a maximum depth of 30 feet left of Station 18+50. No woods are present in this segment with the exception of a few large trees along the top of the existing cut slope on Zirconia Road.

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Soils from Station 15+50 to 18+00 consist of red-brown and brown, sandy clay (A-7-6, A-6), 4 to 10 feet thick, and have low plasticity characteristics. The underlying material is deeply weathered, distinctly granular saprolite, with low cohesive properties. It consists of medium dense to very dense, silty, fine to coarse sand. Thin seams of weathered rock were encountered infrequently in borings, but are present much more frequently in the existing cut slopes at the end of this segment and on the opposite side of the connector. Standard penetration values in a boring 40 feet left of Station 18+50 ranged erratically from 12 to 43 blows per foot in soil zones, to refusal in weathered rock seams.

No hard rock was encountered within this segment, although there are some large, very hard, residual boulders at the surface approximately 130 to 175 feet left of Stations 18+00 to 20+00.

Along the toe of existing embankment between Stations 11+00 and 12+00 (where no additional construction is indicated on preliminary plans), groundwater is occasionally present at the surface in shallow ditches or is at shallow depths beneath the floodplain surface. Groundwater elevations in the floodplain range from 2142 to 2147 feet; in a boring near the left ditchline of the existing connector, water was encountered at elevation 2130 feet. No water was encountered in any borings in the upland.

Station 21+10 to Station 23+90

Proposed bridge site.

Station 23+90 to 24+90.14

This segment is located in brushy woods at the top of the cut slope on the east side of the existing connector. Proposed cuts ahead of the end of the proposed bridge typically are 10 feet or less. The depth of weathering is extremely erratic in this vicinity, ranging from less than 10 feet to greater than 40 feet. Erratic weathering is seen on the right side over into the alignment of -Y50-, where outcrops of weathered rock and hard rock are abundant.

Weathered rock and dense to very dense, sandy saprolite are the dominant materials in this segment. Soil test results indicate that sandy clay (A-7-5, A-6) is also present, although the physical appearance and feel of these soils does not suggest classification as clay. Coarse and fine sands comprise 60 percent of samples taken from this vicinity which classified as A-7-5 and A-6.

In a boring at Station 24+00, weathered rock graded into rock at a depth of about seven feet.

At the time of this investigation, no groundwater was present within proposed construction limits.

Station 24+90 to Station 31+50

This segment traverses a very steep slope from the existing connector down to a narrow branch valley near US-176. The slope is forested with occasional dense undergrowth. Embankment of progressively greater height is proposed through this segment, ranging from a few feet at the beginning to 70 feet in the vicinity of the branch.

Exposed along the centerline of the survey and throughout this area is dry to moist, distinctly granular saprolite with interlayered weathered rock seams. No outcrops of hard rock were observed on the slope, but rock is probably present at shallow depths from the vicinity of Station 31+00 down to the branch.

Since surface drainage from the steep terrain is excellent, no groundwater should be expected at shallow depths within construction limits in this segment.

Station 31+50 to Station 35+44.82

This segment crosses two small branches which flow virtually at the bedrock horizon and join right of Station 32+00. Partially cleared floodplain, approximately 50 feet in width, is present on the east side of the first stream crossing. The remainder of the segment is mostly forested, with some dense rhododendron thickets and some clearings for driveways and trails. The climb in elevation from the second stream crossing to US-176 at the end of the survey is nearly 35 feet.

Wet, medium dense to loose, silty sand, alluvium, ranging in thickness from 3 to 5.5 feet, is present beneath the gently sloping, floodplain surface. Alluvium is underlain directly by weathered rock or hard rock.

Granular saprolite and weathered rock together are typically 6 to 7 feet thick in the area between the branches and are underlain by hard rock. Between the second branch and US-176, the thickness of saprolite and weathered rock ranges from a few feet to approximately 20 feet in the immediate vicinity of US-176.

Hard bedrock is visible in some lengthy intervals of the branch channels within construction limits and is typically at shallow depth erratically through the entire segment.

Although no groundwater was encountered in borings, it is expected to be at or slightly above the flowline elevations of the branches.

LINE -Y50-

Station 10+00 to Station 17+61.33

This facility will provide access for residential properties on the east side of the US-25 connector to Access Road No. 12. It begins in an existing gravel road and runs for much of its length in or adjacent to a private driveway. The survey traverses sparsely wooded areas, an embankment spanning a ravine and barren areas of outcropping weathered rock and hard rock. No streams or wet areas are present.

Materials from Station 10+00 to the ravine at Station 13+00 consist of interlayered, dense to very dense, granular saprolite and weathered rock. Some hard rock and/or large boulders are present within the construction limits.

Dense granular saprolite is estimated to be the dominant material underlying the driveway embankment which spans the ravine from Station 13+00 to 14+50.

From Station 14+50 to the end of the survey, the depth of weathering is extremely erratic. Some borings penetrated several feet beneath proposed grade lines although they were located very close to outcrops of weathered rock and hard rock. The greatest quantities of hard rock are concentrated on the left between Stations 15+00 and 16+25. Less hard rock and weathered rock should be encountered from Station 16+25 through the remainder of the excavation.

No groundwater is present within proposed construction limits on -Y50-.

LINE -Y51-

Station 10+00 to Station 11+71.49

This survey begins near the edge of sparse woods 15 feet left of an existing driveway and immediately connects into the driveway. The maximum depth of proposed excavation is eight feet at the equality with -Y50-.

Dense to medium dense, sandy saprolite is typically present to depths of 10 feet or greater through this interval. A horizon of weathered rock was encountered at a depth of 10 feet at Station 11+00.

No groundwater is present within construction limits on -Y51-.

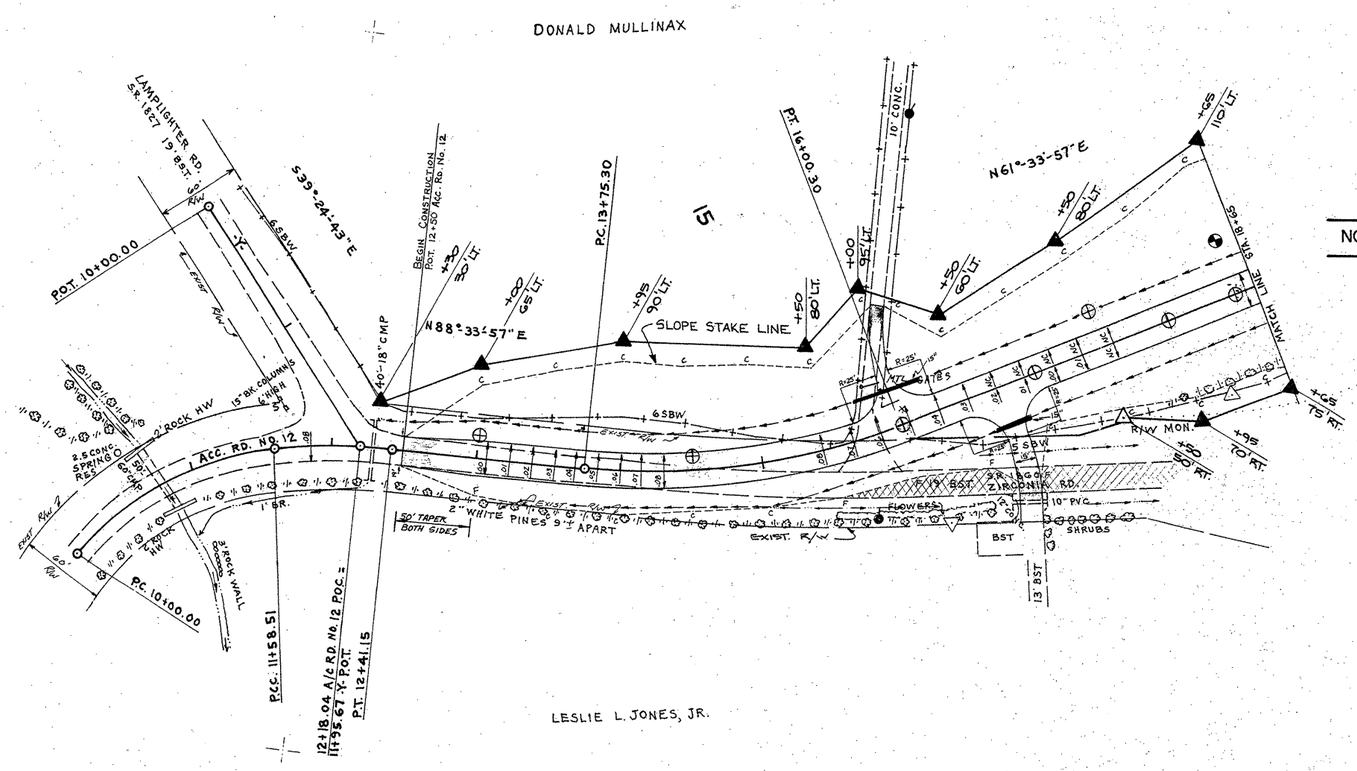
Respectfully submitted,

J. L. Sharpe

J. L. Sharpe
Project Geologist

JLS:mw

PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
G.951015	3	20
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION



NOTE: CREST OF V.C. = 18+64.54

LESLIE L. JONES, JR.

ACC. RD. NO. 12

P.I. 10+83.54	P.I. 11+99.98	P.I. 14+89.93
Δ 44°-42'-00" RT.	Δ 12°-00'-00"	Δ 27°-00'-00" LT.
D 28°-12'	D 14°-31'-17"	D 12°
T 83.54	T 41.47	T 114.63
L 158.51	L 82.64	L 225.00
R 203.1765	R 394.5613	R 477.4648
S .08	S .08	S .08
V < 30 MPH	V ≈ 35 MPH	RUNOFF 170'
		V 40 MPH

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

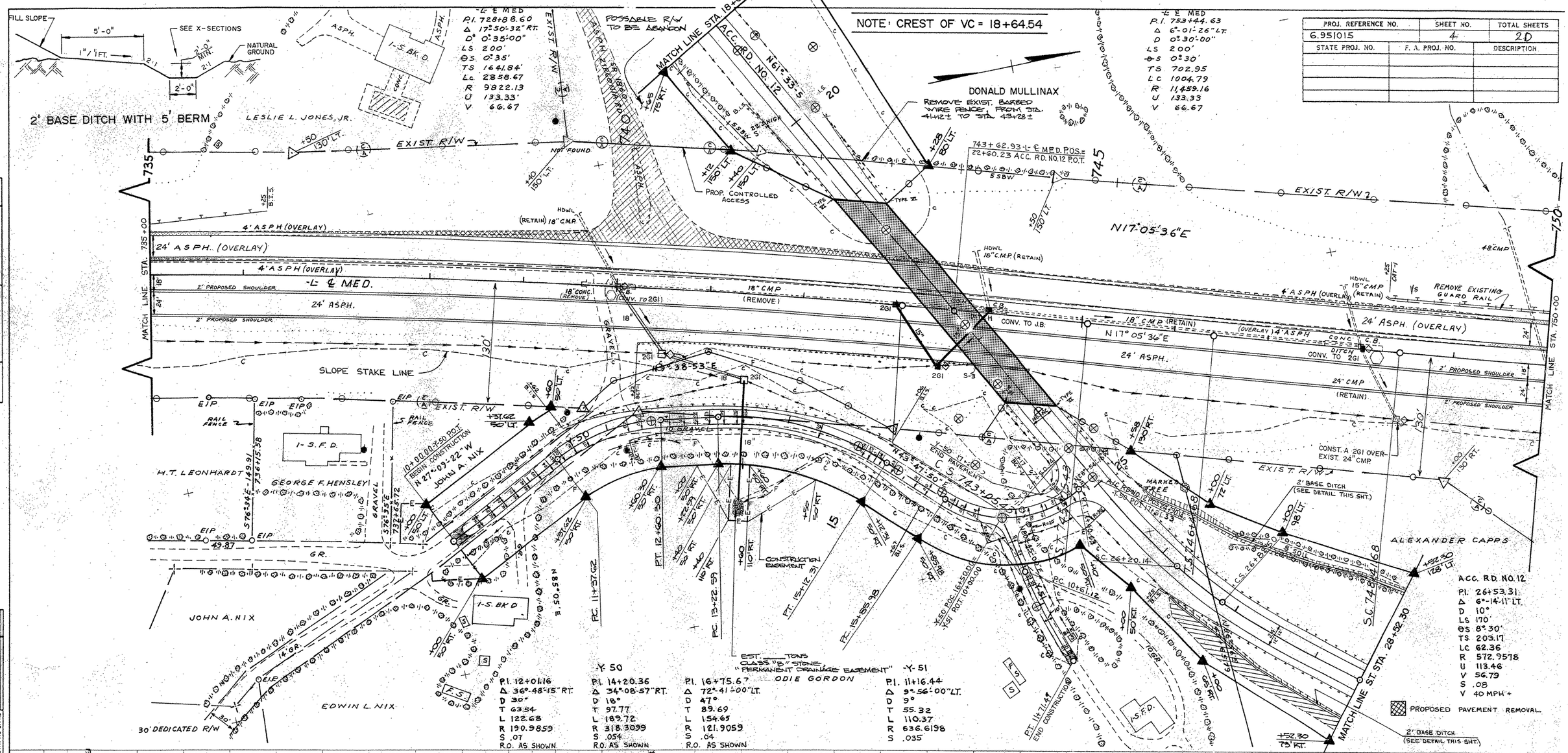
SEE SHEETS 6&7 FOR PROFILE OF ACCESS ROAD NO. 12

PLAN
SURVEYED
PLOTTED
ALIGNMENT CHECKED
RT. OF WAY CHECKED
NOTE BOOK
NO.
BY
DATE

PROFILE
SURVEYED
PLOTTED
GRADES CHECKED
B.M. NOTED
STRUCTURE NOTATNS CHKD
NOTE BOOK
NO.
BY
DATE

BRUNING 44-132 64971

PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
6.951015	4	2D
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION



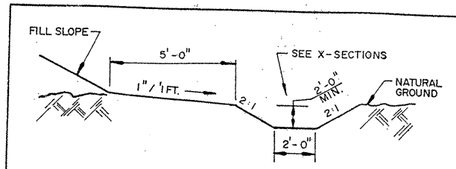
PLAN — SURVEYED / PLOTTED / ALIGNMENT CHECKED / RT. OF WAY CHECKED — NOTE BOOK NO. — BY — DATE

PROFILE — SURVEYED / PLOTTED / GRADES CHECKED / B.M.'s NOTED / STRUCTURE NOTAT'NS CH'KD — NOTE BOOK NO. — BY — DATE

BRUNING 44-132 64971

76/91

PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
6.951015	5	20
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION

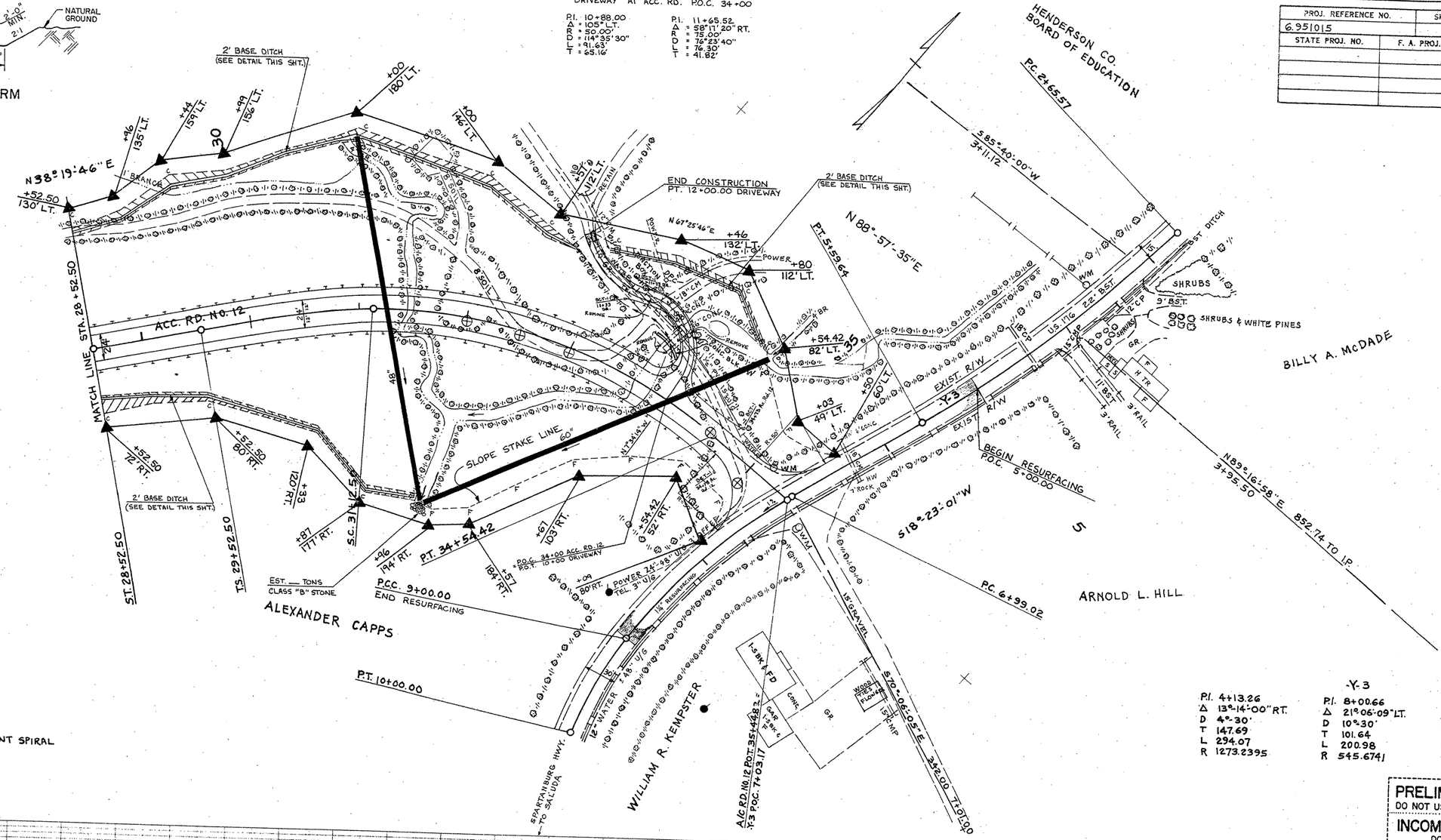


2' BASE DITCH WITH 5' BERM

DRIVEWAY AT ACC. RD. P.O.C. 34+00

P.I. 10+88.00
Δ = 105° LT.
R = 50.00'
D = 114°35'30"
L = 91.63'
T = 65.16'

P.I. 11+65.52
Δ = 58°11'20" RT.
R = 75.00'
D = 76°23'40"
L = 76.30'
T = 41.82'



ACC. RD. NO. 12

P.I.S. 30+59.32
Θ-S 9°-36'
LS 160.00
U 106.82
V 53.48

P.I. 32+91.16
Δ 41°-01'-50" RT.
D 12°
T 178.66
L 341.92
R 477.4648
S .08
RUNOFF 160' @ FRONT SPIRAL

-Y-3

P.I. 4+13.26
Δ 13°-14'-00" RT.
D 4°-30'
T 147.69
L 294.07
R 1273.2395

P.I. 8+00.66
Δ 21°-06'-09" LT.
D 10°-30'
T 101.64
L 200.98
R 545.6741

P.I. 9+50.35
Δ 16°-30'-00" LT.
D 16°-30'
T 50.35
L 100.00
R 347.2471

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PLAN: SURVEYED, PLOTTED, ALIGNMENT CHECKED, RT. OF WAY CHECKED, BY, DATE, NOTE BOOK NO.

PROFILE: SURVEYED, PLOTTED, GRADES CHECKED, B.M.'S SET, STRUCTURE NOTATIONS CHKD., BY, DATE, NOTE BOOK NO.

BRUNING 44-132 64971

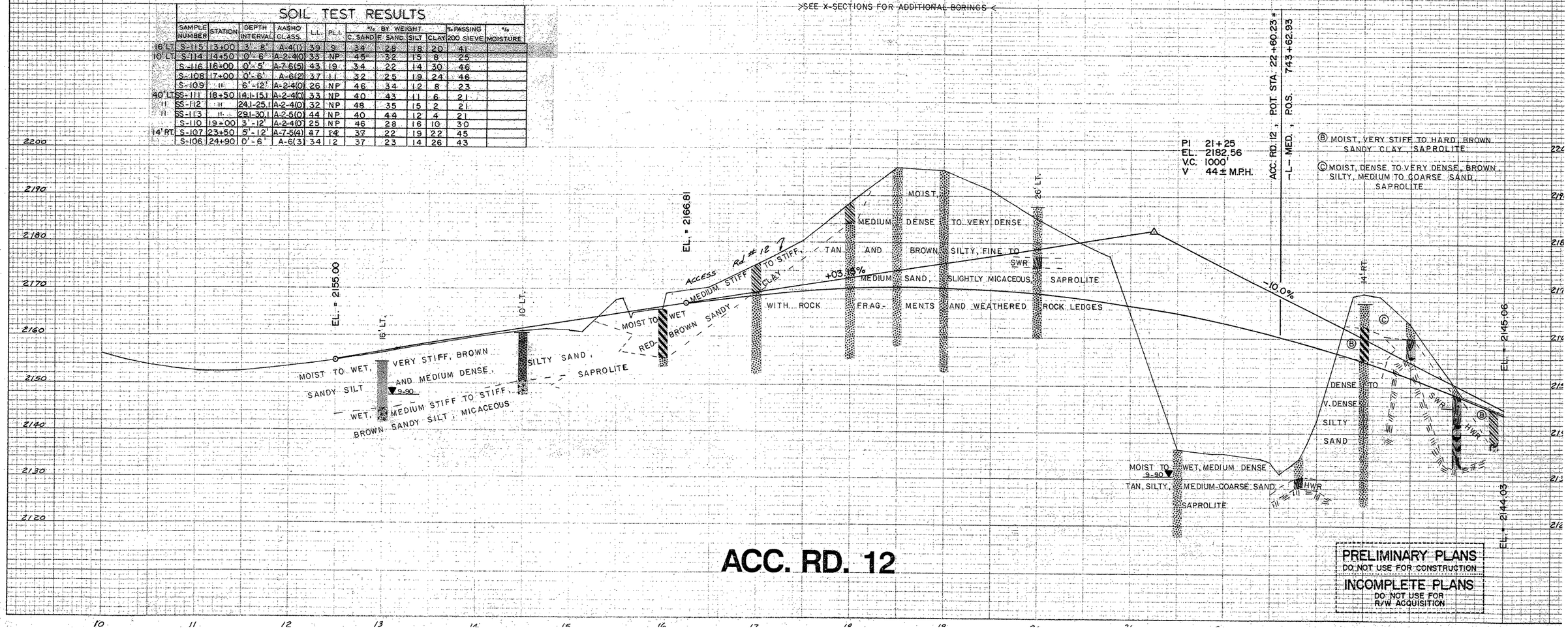
BM #3 ELEV. 2147.21
R.R. SPIKE ON RT. SIDE OF
TRAFFIC ISLAND IN CRACK
132' LT. ℄ MED. STA. 740+31

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	6.951015	6	20
F.A. PROJ. NO.			

SOIL TEST RESULTS

	SAMPLE NUMBER	STATION	DEPTH INTERVAL	AASHO CLASS.	L.L.	P.I.	% BY WEIGHT C. SAND	F. SAND	SILT	CLAY	% PASSING 200 SIEVE	% MOISTURE
16' LT.	S-115	13+00	3'-8'	A-4(1)	39	9	34	28	18	20	41	
10' LT.	S-114	14+50	0'-6'	A-2-4(0)	33	NP	45	32	15	8	25	
	S-116	16+00	0'-5'	A-7-6(5)	43	19	34	22	14	30	46	
	S-108	17+00	0'-6'	A-6(2)	37	11	32	25	19	24	46	
	S-109	"	6'-12'	A-2-4(0)	26	NP	46	34	12	8	23	
40' LT.	SS-111	18+50	14.1-15.1	A-2-4(0)	33	NP	40	43	11	6	21	
	SS-112	"	24.1-25.1	A-2-4(0)	32	NP	48	35	15	2	21	
"	SS-113	"	29.1-30.1	A-2-5(0)	44	NP	40	44	12	4	21	
	S-110	19+00	3'-12'	A-2-4(0)	25	NP	46	28	16	10	30	
14' RT.	S-107	23+50	5'-12'	A-7-5(4)	47	14	37	22	19	22	45	
	S-106	24+90	0'-6'	A-6(3)	34	12	37	23	14	26	43	

>SEE X-SECTIONS FOR ADDITIONAL BORINGS<



ACC. RD. 12

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

78/91

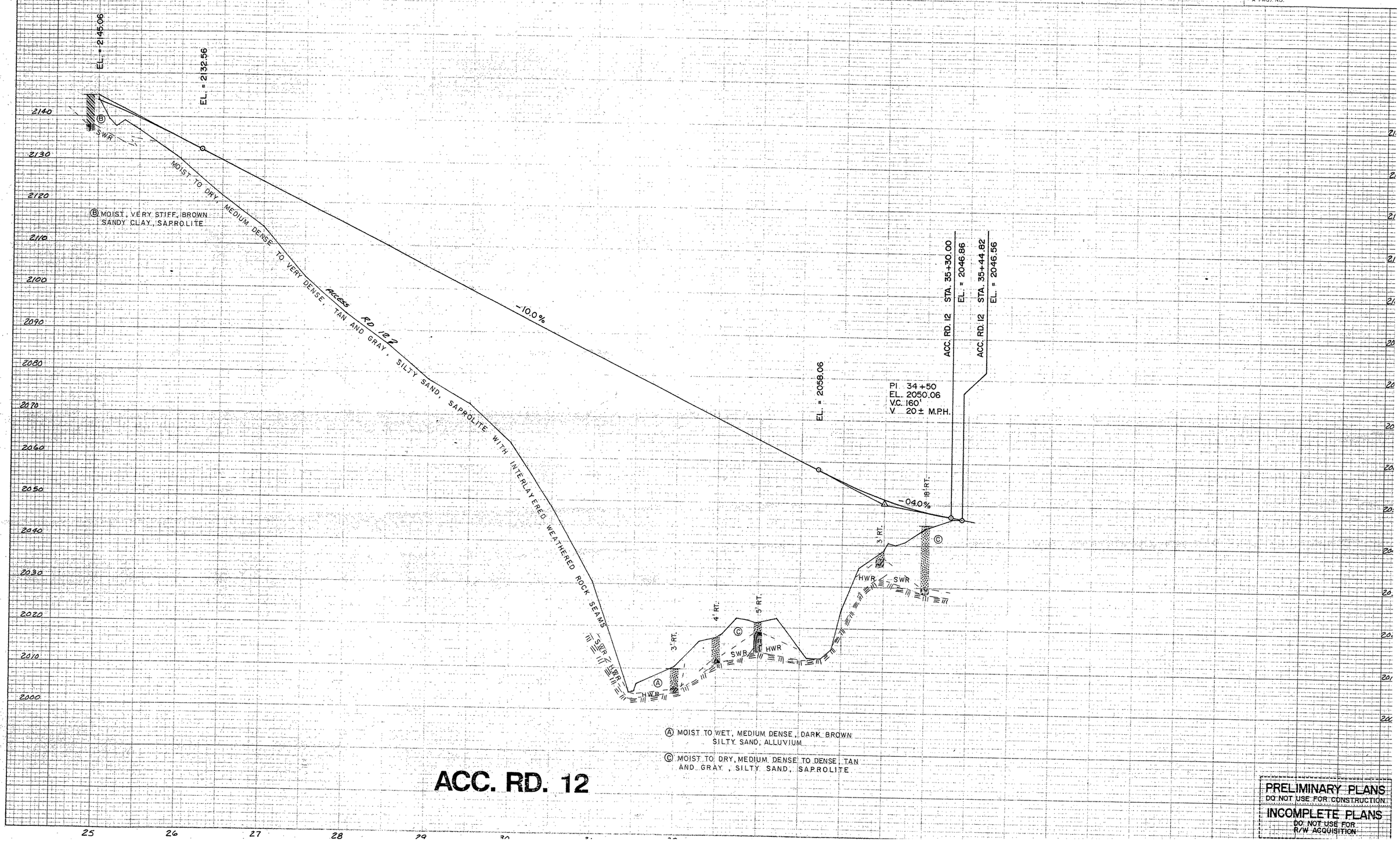
STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N. C.	6.951015	7	20
F.A. PROJ. NO.			

BM # 100 ELEV. 2153.17
NAIL IN BASE OF 8" POPLAR
110' RT. ACCESS RD. 12 STA. 25+45

BM # 101 ELEV. 2071.87
NAIL IN BASE OF 20" WHITE OAK
116' LT. ACCESS RD 12 STA 28+50

BM # 102 ELEV. 2060.30
NAIL IN BASE OF 10" HICKORY
95' RT. ACCESS RD 12 STA. 30+25

BM # 103 ELEV.
NAIL IN BASE OF POWER POLE
RT. -Y3. EXT. STA.

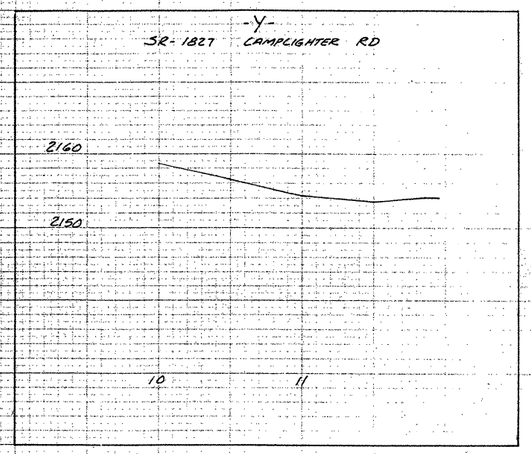


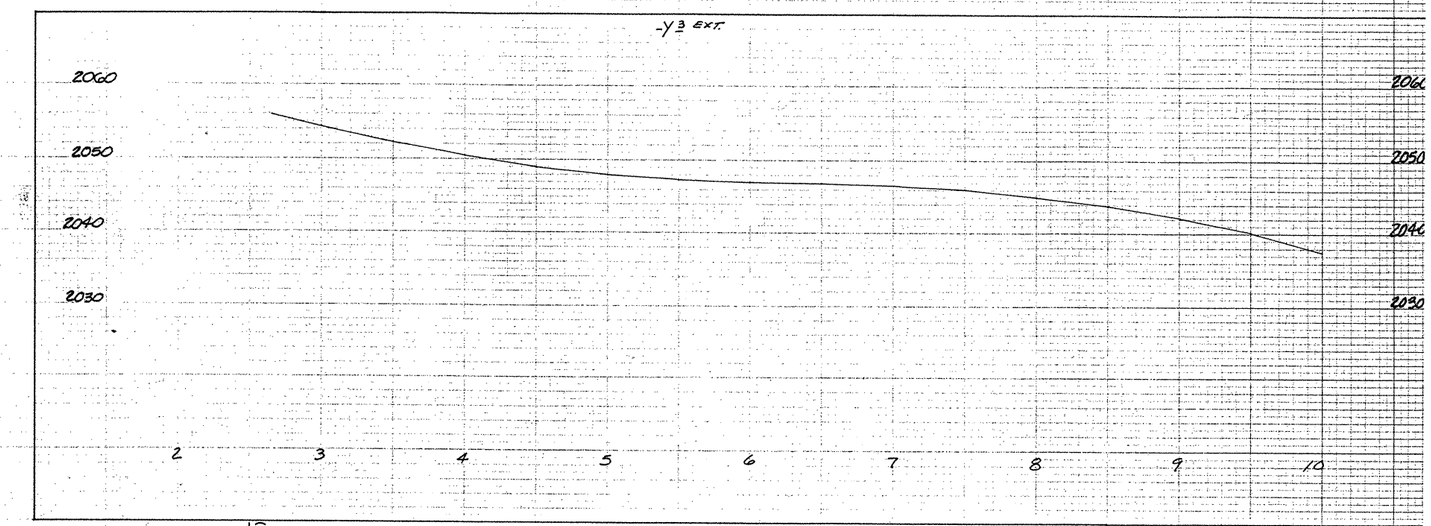
ACC. RD. 12

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

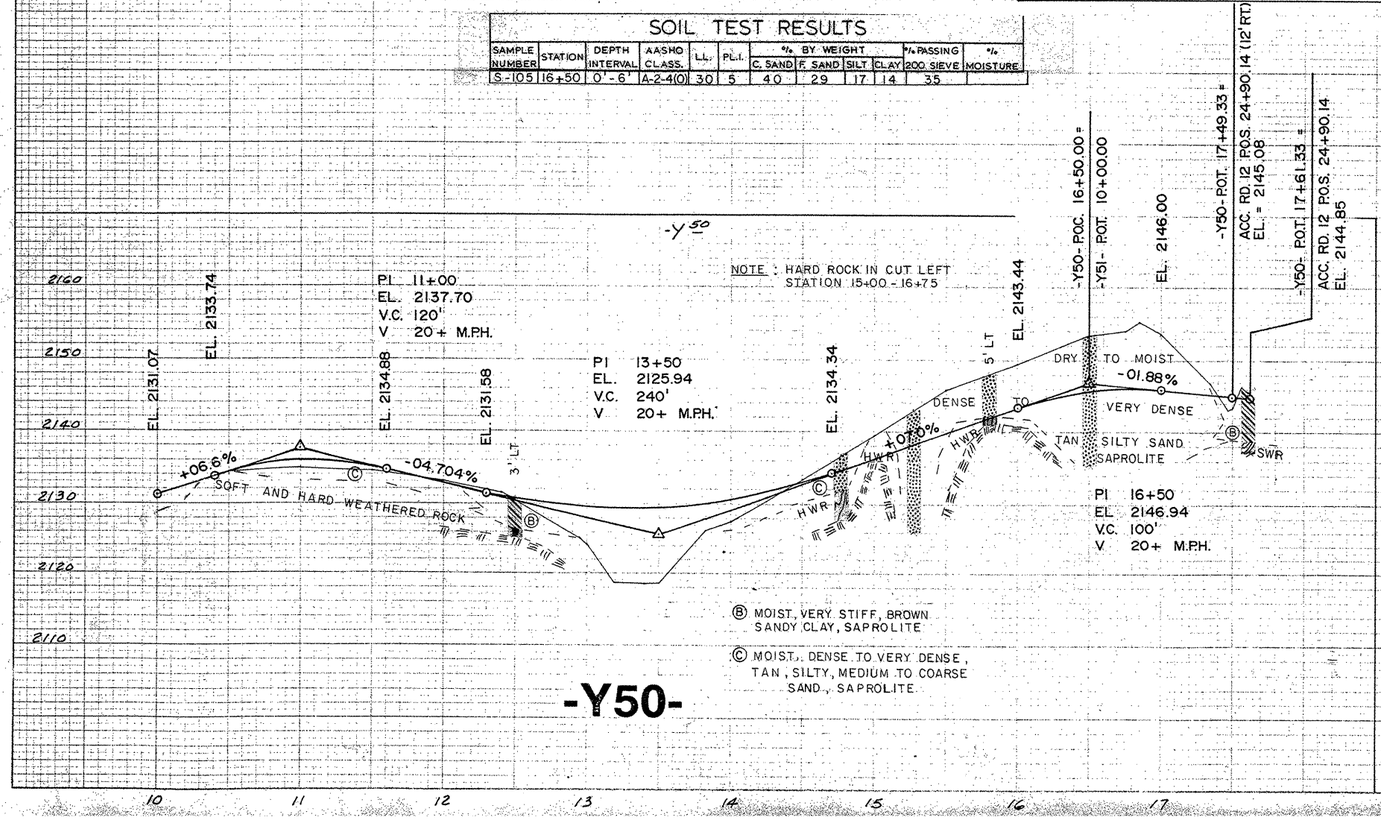
STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N. C.	6.951015	8	20
F.A. PROJ. NO.			





SOIL TEST RESULTS

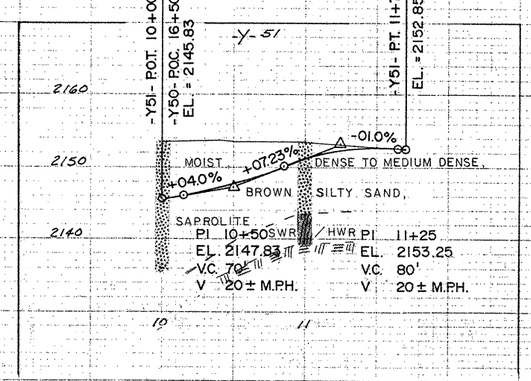
SAMPLE NUMBER	STATION	DEPTH INTERVAL	AASHO CLASS.	LL.	PL.I.	% BY WEIGHT C. SAND	F. SAND	SILT	CLAY	% PASSING 200 SIEVE	% MOISTURE
S-105	16+50	0'-6'	A-2-4(0)	30	5	40	29	17	14	35	



Ⓑ MOIST, VERY STIFF, BROWN SANDY CLAY, SAPROLITE

Ⓒ MOIST, DENSE TO VERY DENSE, TAN, SILTY, MEDIUM TO COARSE SAND, SAPROLITE

-Y50-



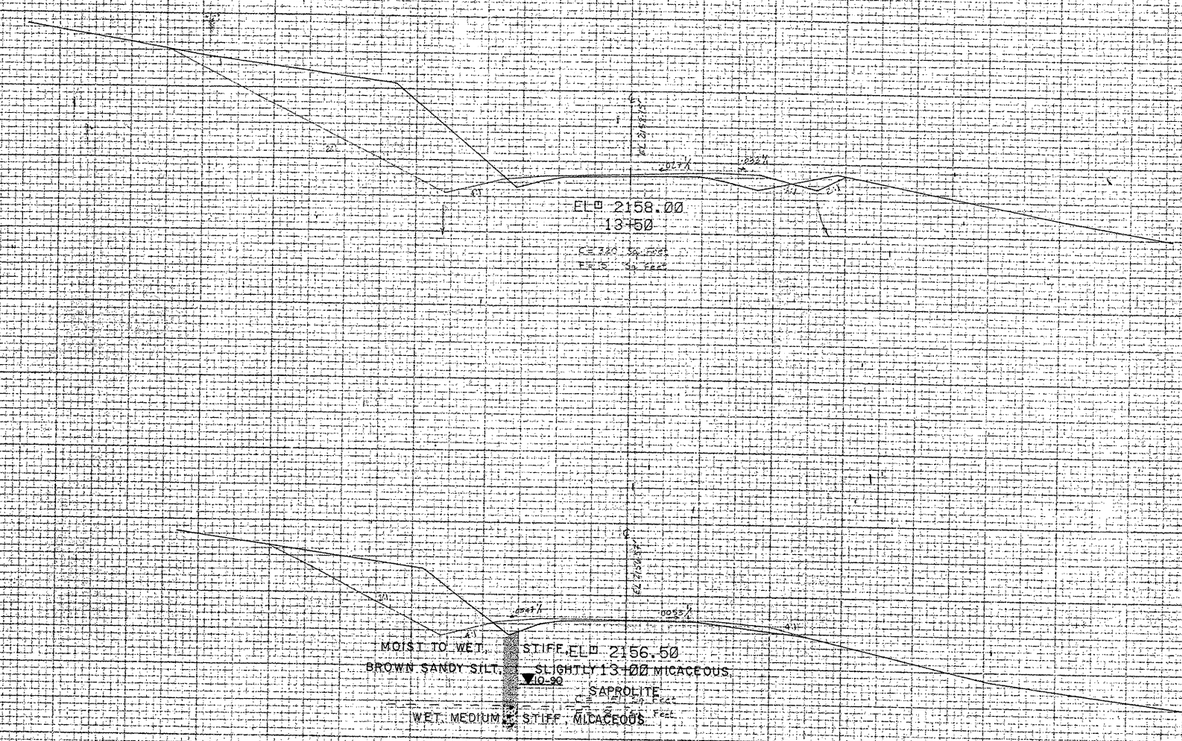
-Y51-

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

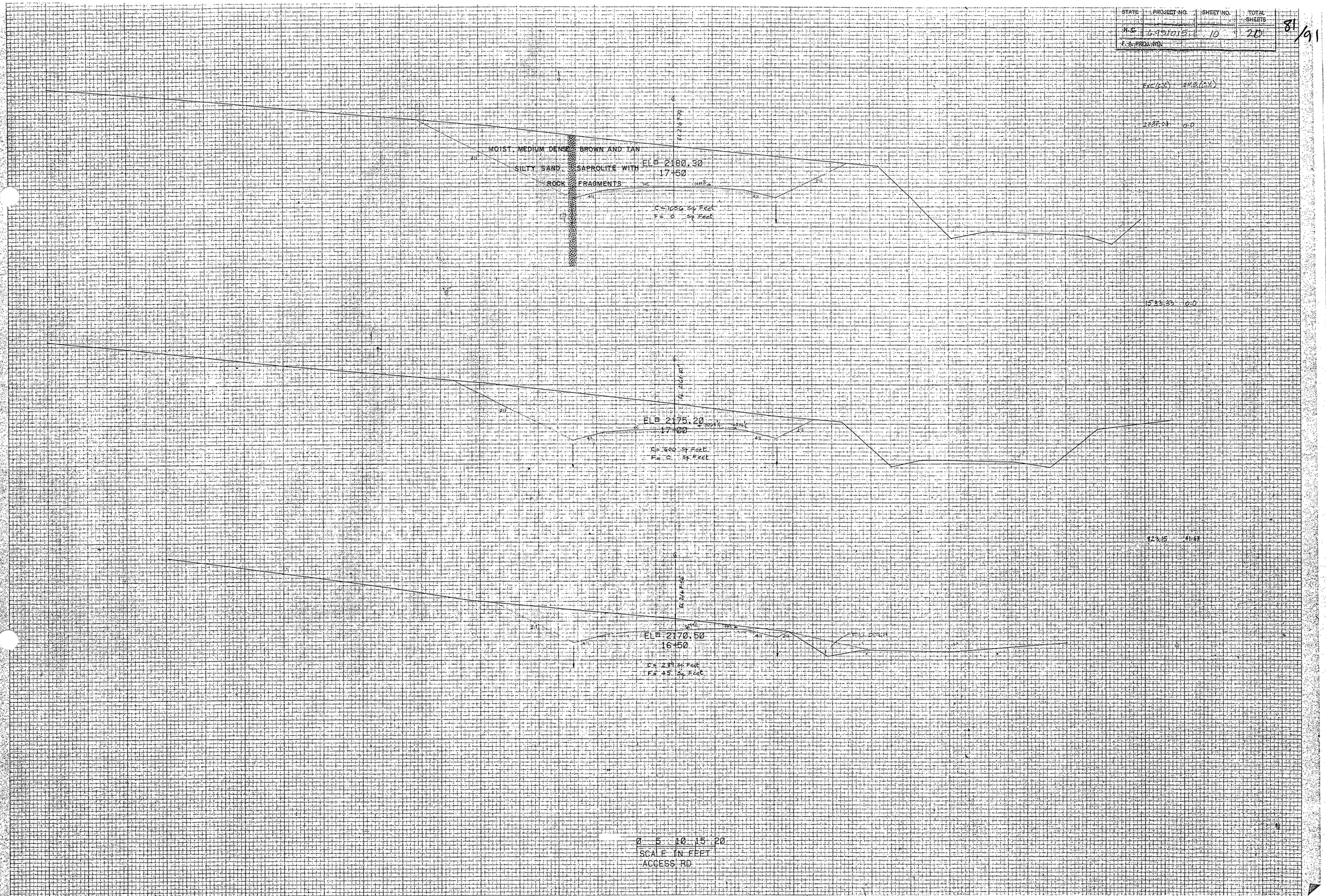
STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	6951013	9	20
F.A. PROJ. NO.			

80/91



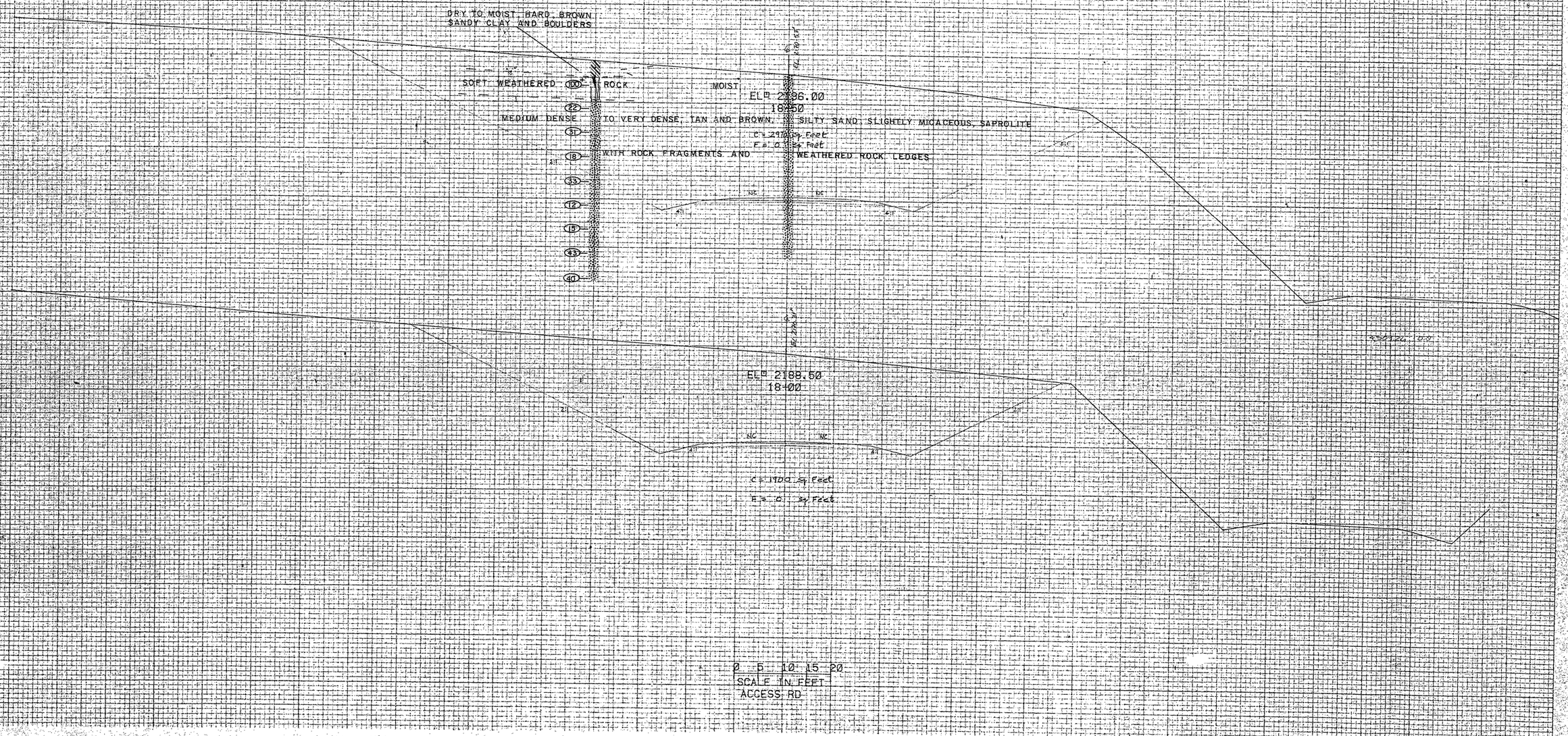
STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	6.451018	10	20
T.I.P. PROJ. NO.			

81/91



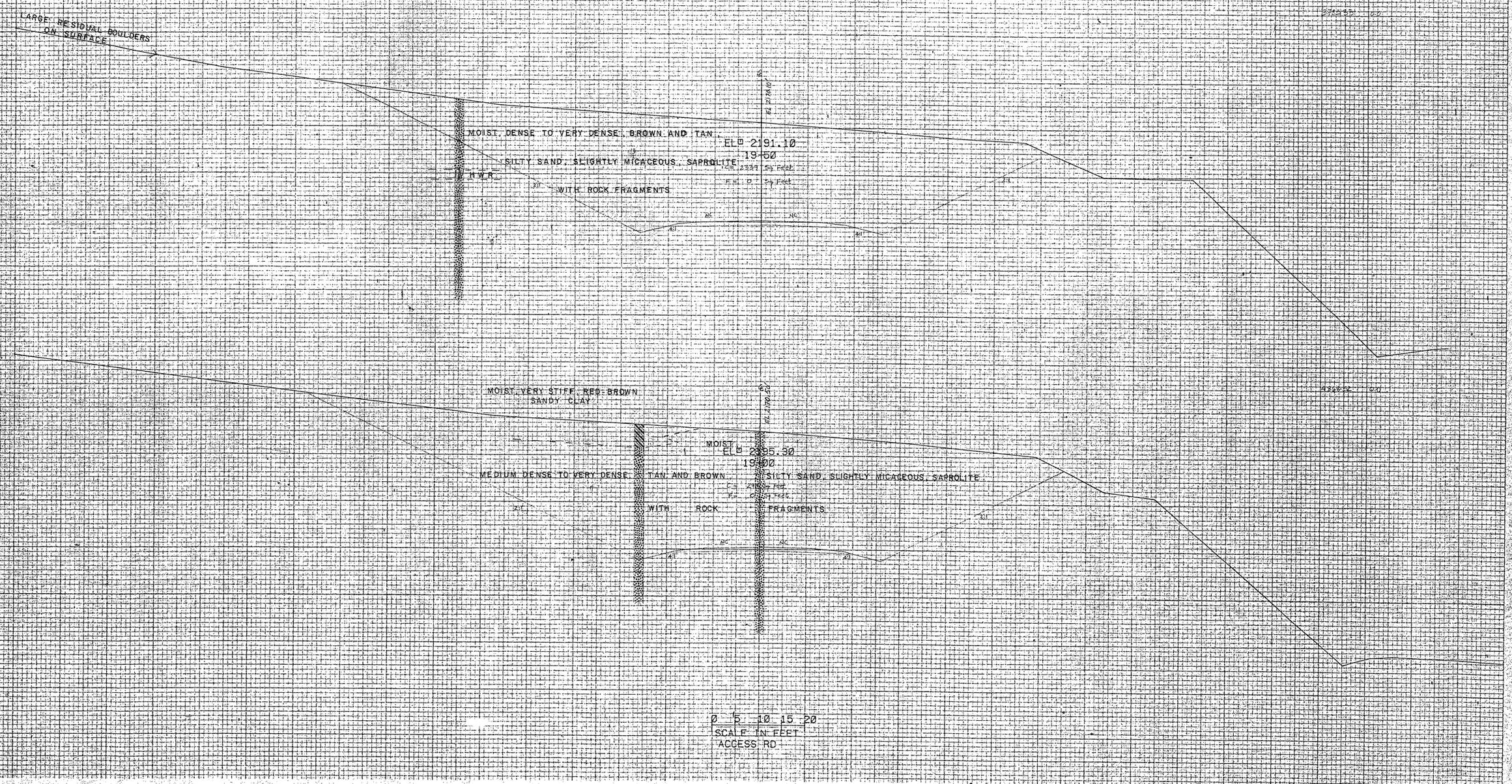
STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	6.451015	11	20
F.A. PROJ. NO.			

82/91



STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	6195015	12	20
F.A. PROJ. NO.			

83/91

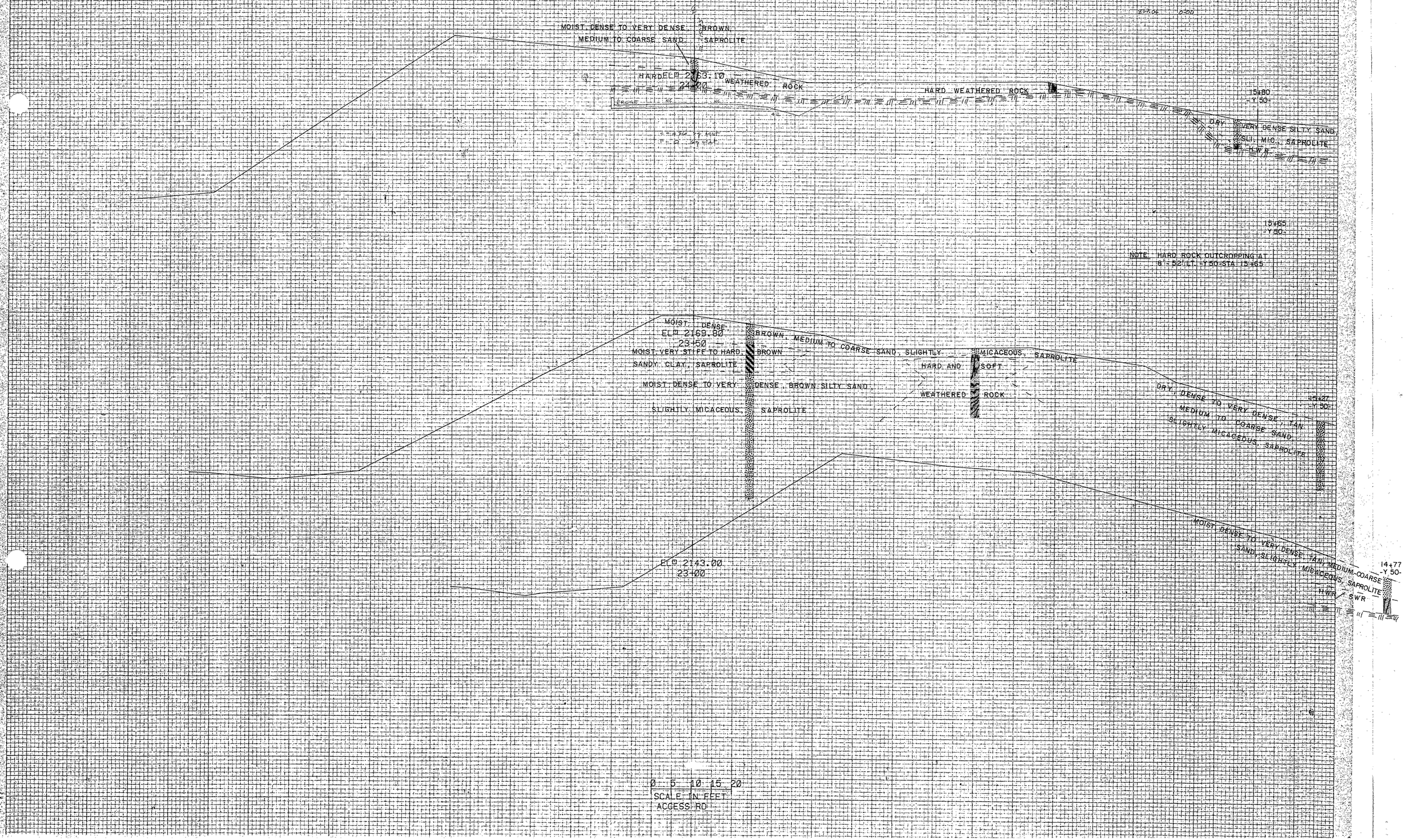


STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	6.951015	13	20
F.A. PROJ. NO.			

84/91

Exc(CY) EMB(CY)

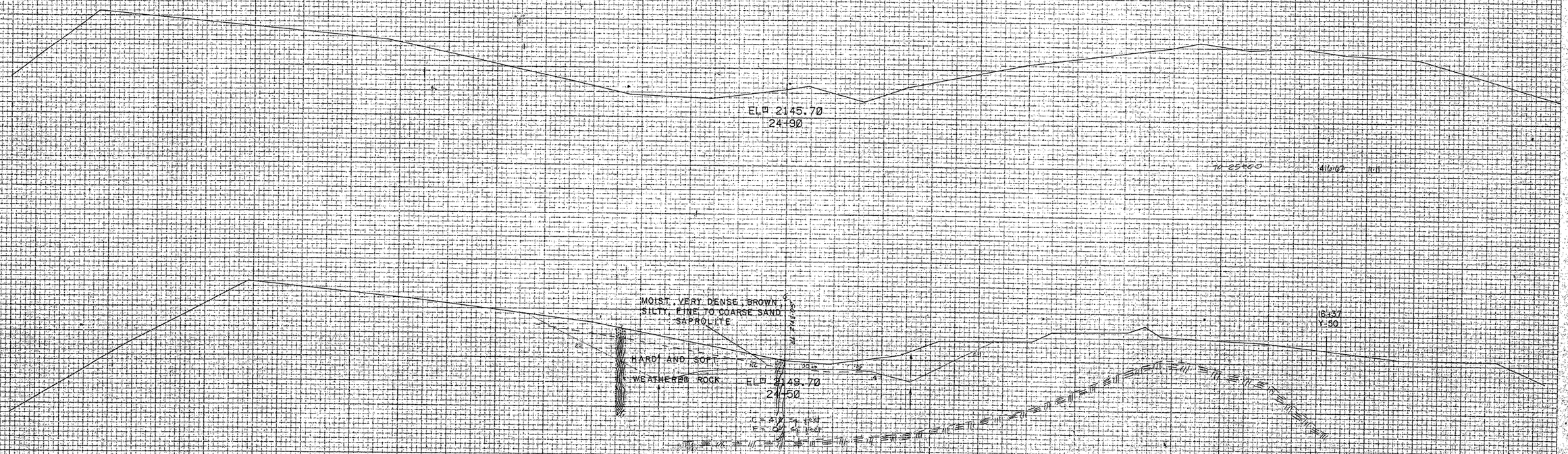
837.04 0.00



STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N. C.	6.951015	14	20
	PROJ. NO.		

85/91

EXC(CY) EMB(CY)



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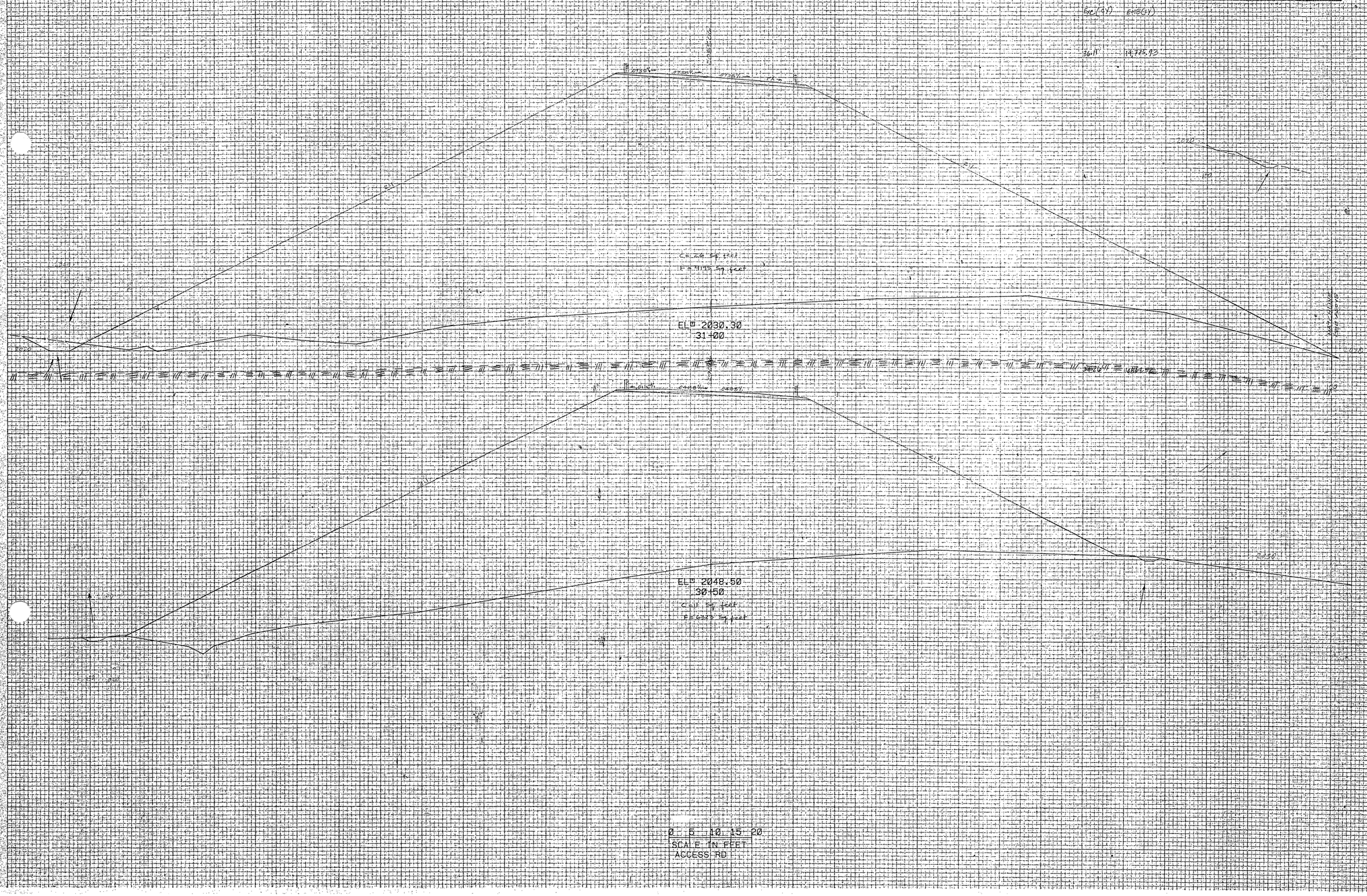
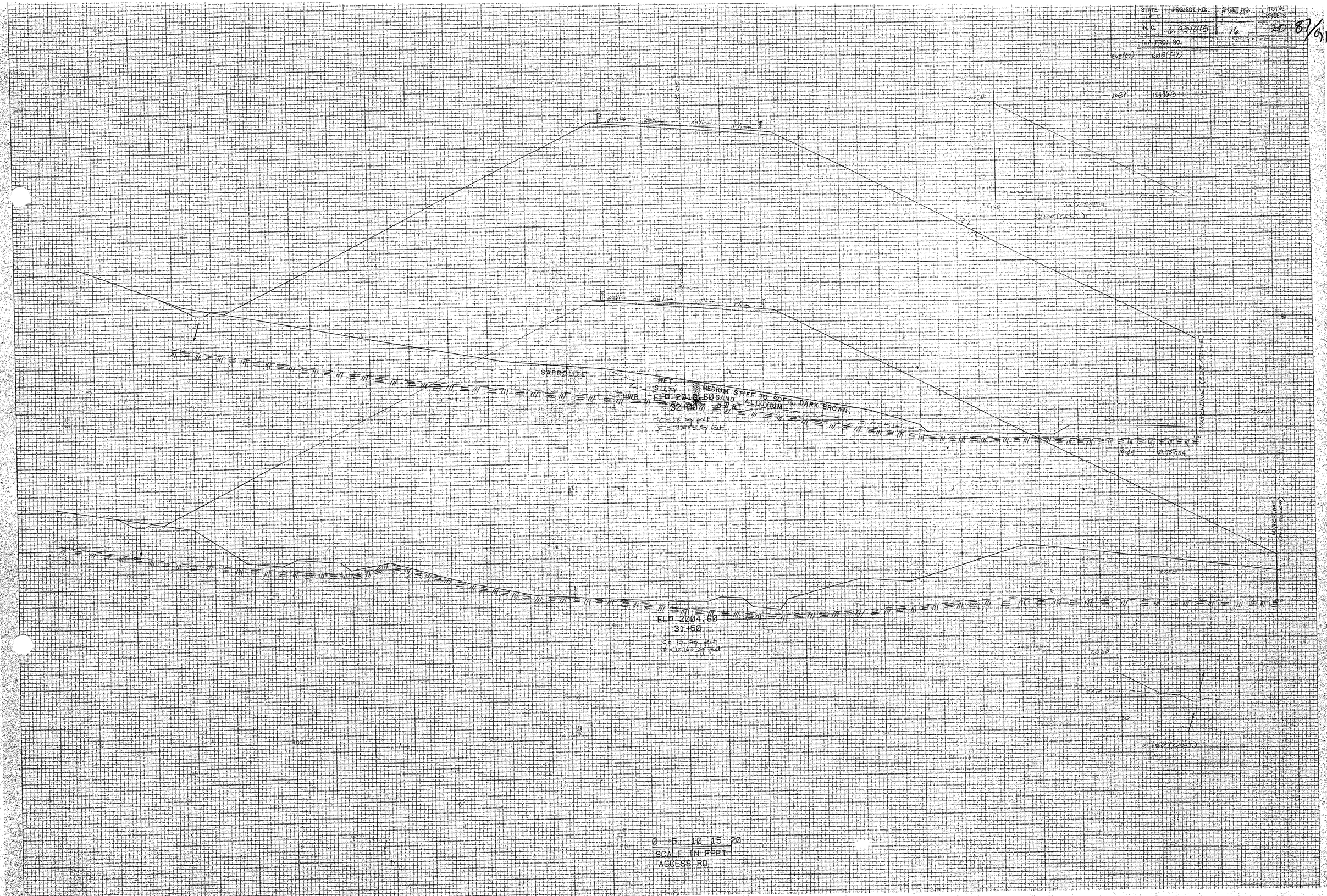
N.C.	6.951015	15	20
E.A. PROJ. NO.			

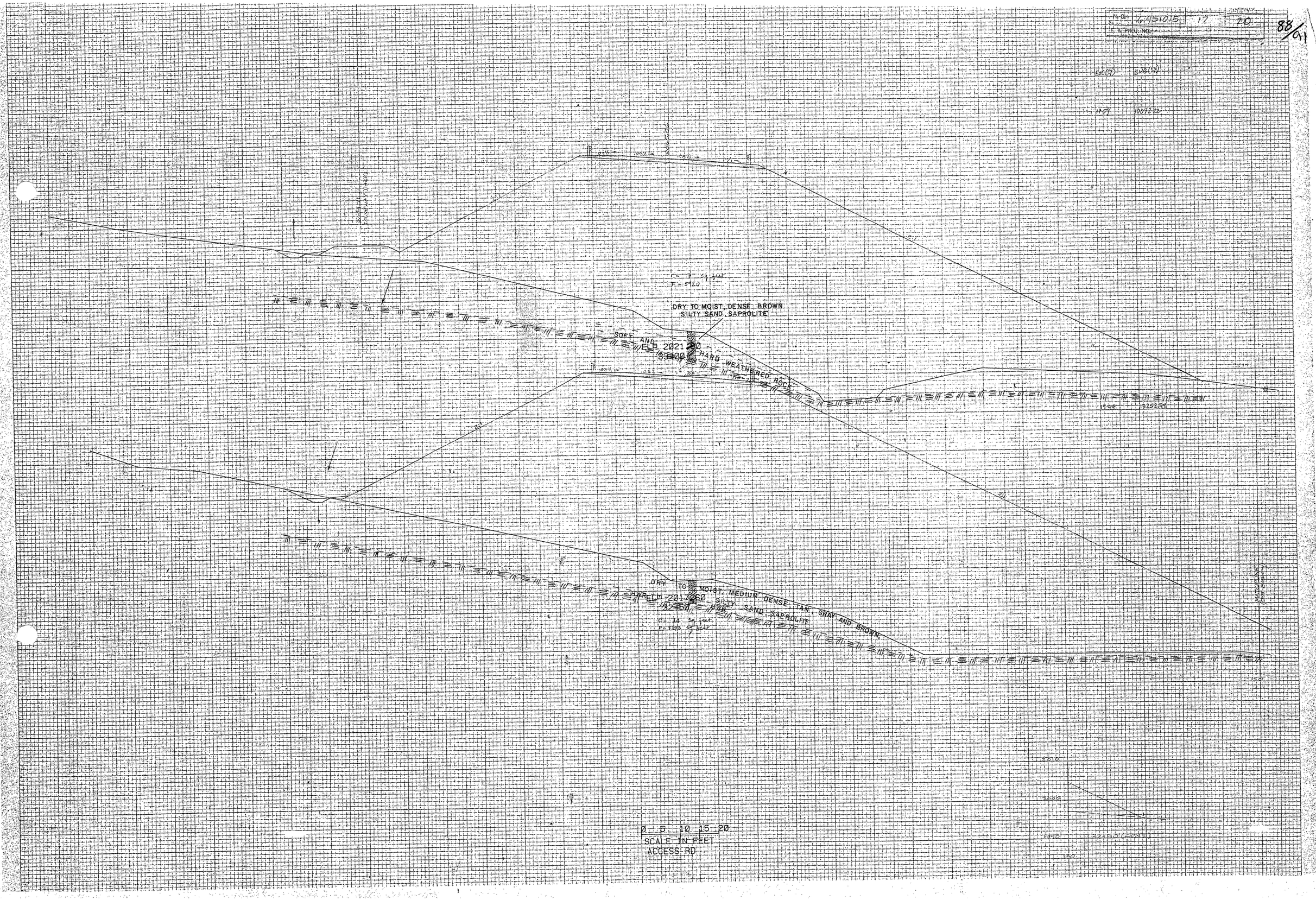
86/91



STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-2517B	16	20
F.A. PROJ. NO.			

87/91

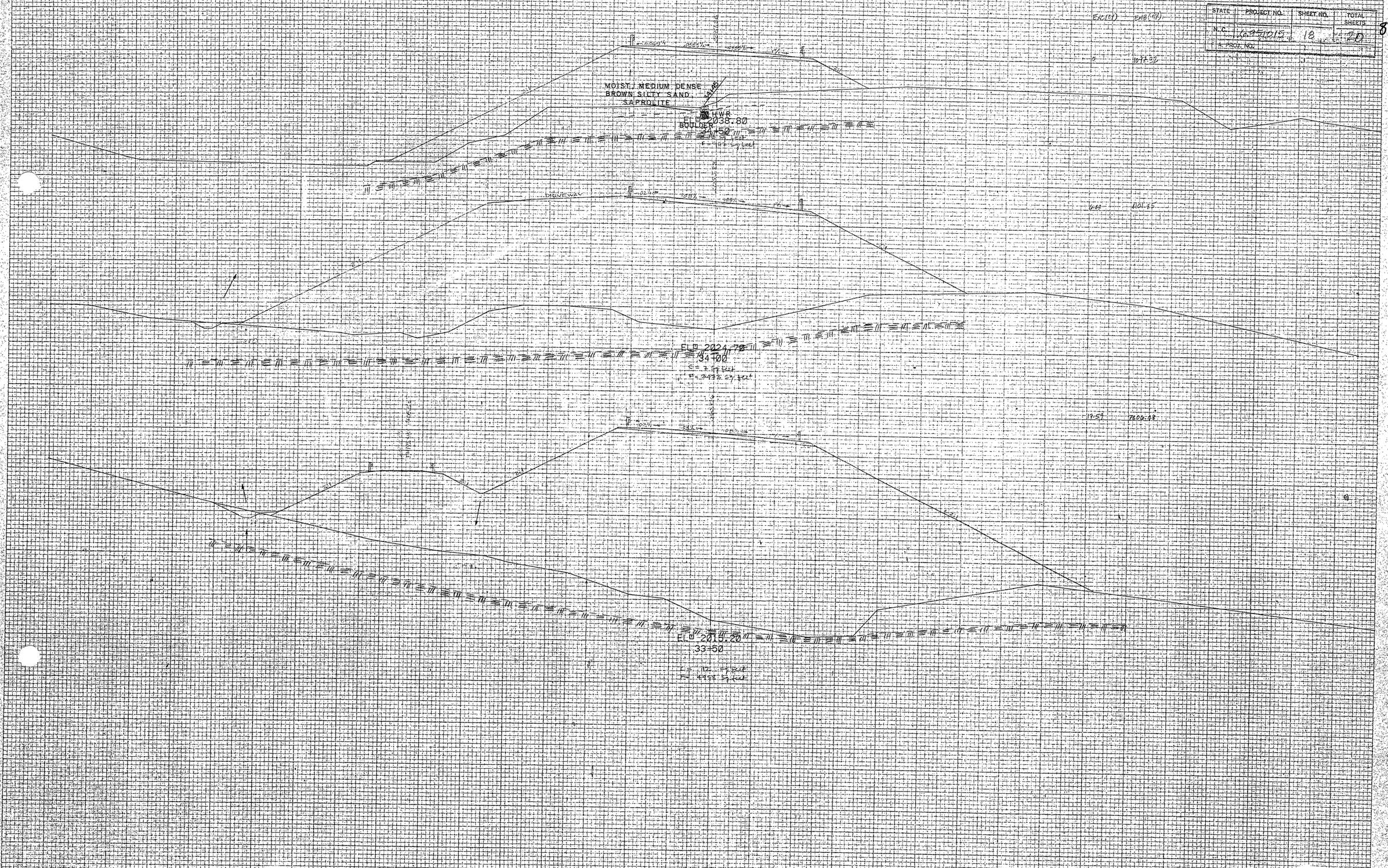




N.C. 6451015 17 20
88/91
DRY TO MOIST, DENSE, BROWN
SILTY SAND, SAPROLITE
SOFT AND HARD WEATHERED ROCK
DRY TO MOIST, MEDIUM DENSE, TAN, GRAY AND BROWN
SILTY SAND, SAPROLITE
0 5 10 15 20
SCALE IN FEET
ACCESS RD

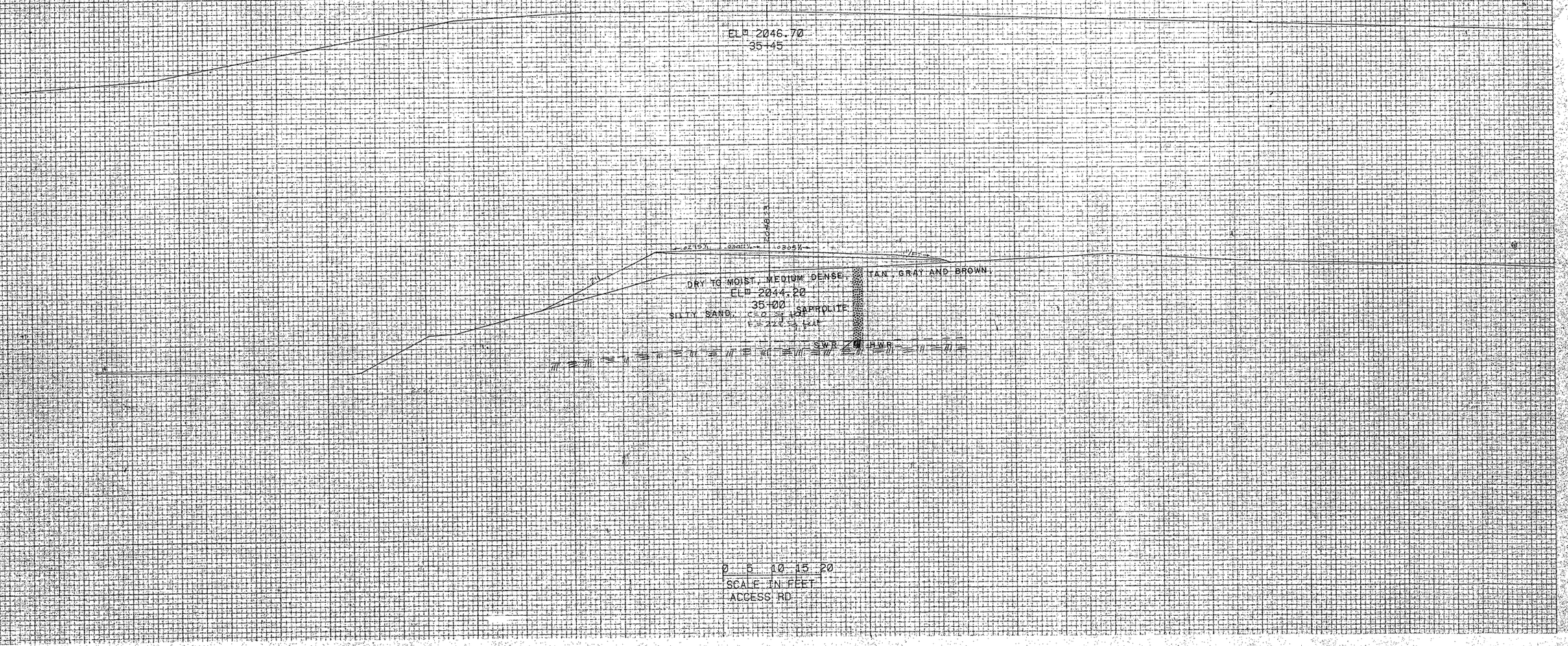
STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	6.951015	18	20
A. PROJ. NO.			

89/91



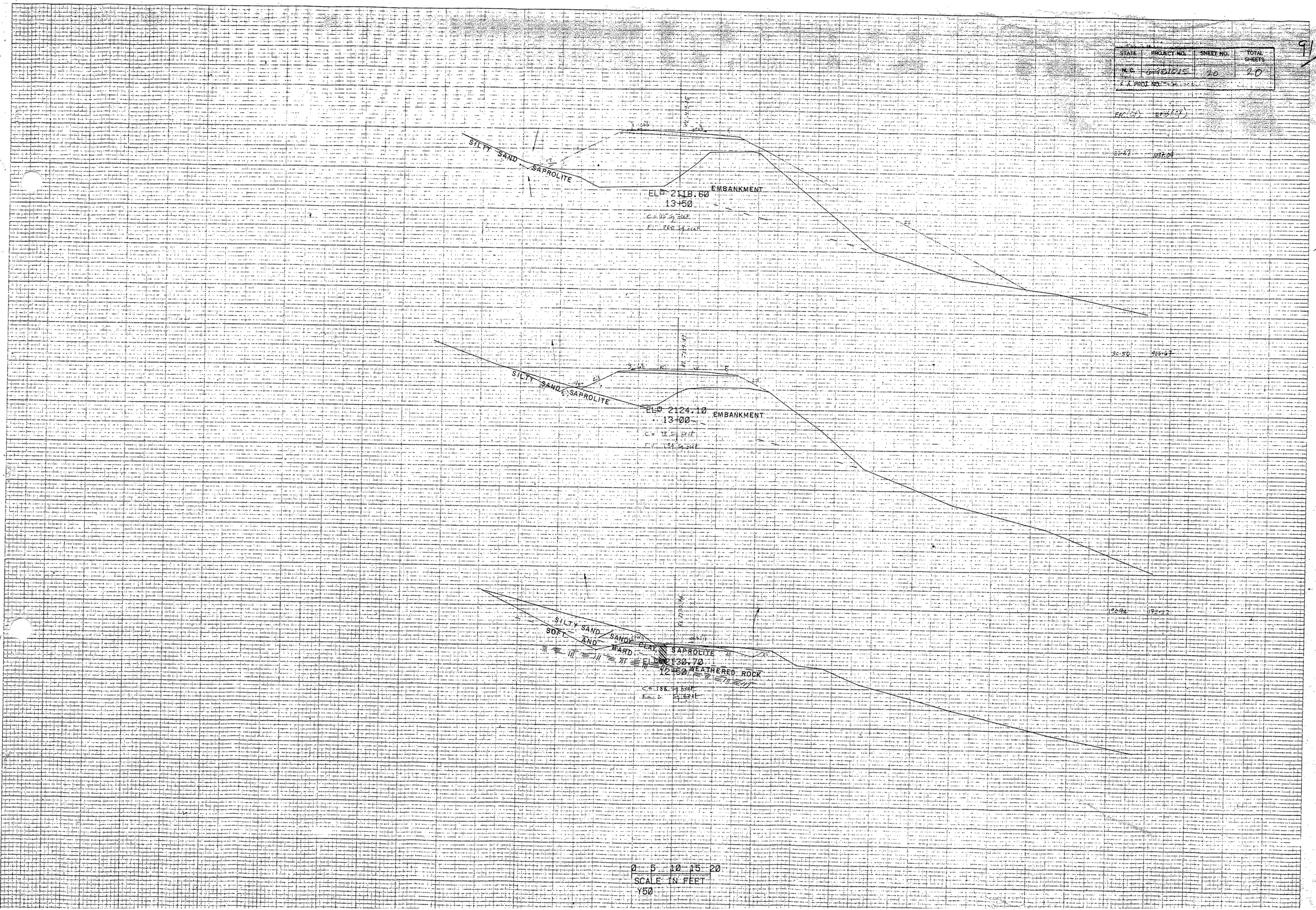
STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	6951015	19	20
T.A. PROJ. NO.			

90/91



STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	6461015	20	20
F.A. PROJ. NO.			

9/91



91-A..

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

September 6, 2006

STATE PROJECT: 34334.1.1 (R-0505)
COUNTY: Henderson
DESCRIPTION: Revisions to Connector from US-25 at Zirconia to I-26

SUBJECT: Geotechnical Report – Inventory Addendum

This document is an addendum to the inventory report submitted in November of 1990. Further revisions to R-0505 include the relocation of Access Road 12 and the construction of two proposed retaining walls. Included in this addendum are additional cross-sections showing the hard rock horizon and its pertinence to Access Road 12. Subsurface information is also included for the retaining walls.

Access Road 12 now sub-parallels the North Bound Lane of the -L- alignment from approximate Stations 738+00 to 772+00 (-L-), connecting -Y51A- to -Y2- (US-176). It replaces the older proposed -Y50- and Access Roads 1 and 2, along with a bridge over -L-. The previously submitted subsurface information can be utilized for the construction of the new access road throughout this station interval.

The retaining walls are to be constructed on -Y1- and -Y4REV- to eliminate extensive rock and soil cut slopes from encroaching on surrounding properties. The enclosed subsurface investigation should be referred to at these sites.

Area of Special Geotechnical Interest

All previously submitted subsurface information that show both soft and hard weathered rock horizons may require blasting or specialized excavation techniques.

Respectfully Submitted,

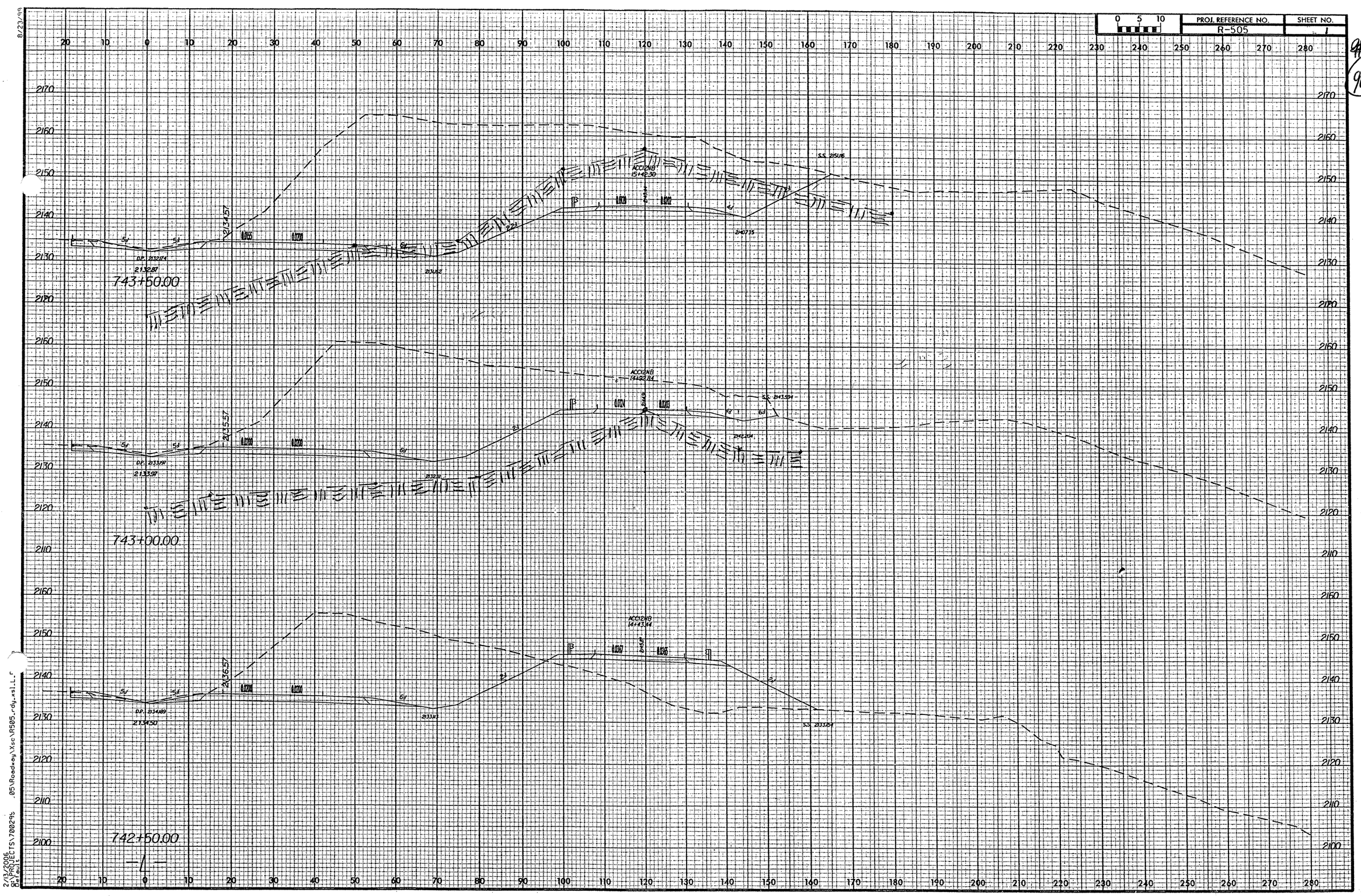
for John W. Mann, LG
Project Geological Engineer

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL 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
BUILDING B
1020 BIRCH RIDGE DRIVE
RALEIGH NC 27610



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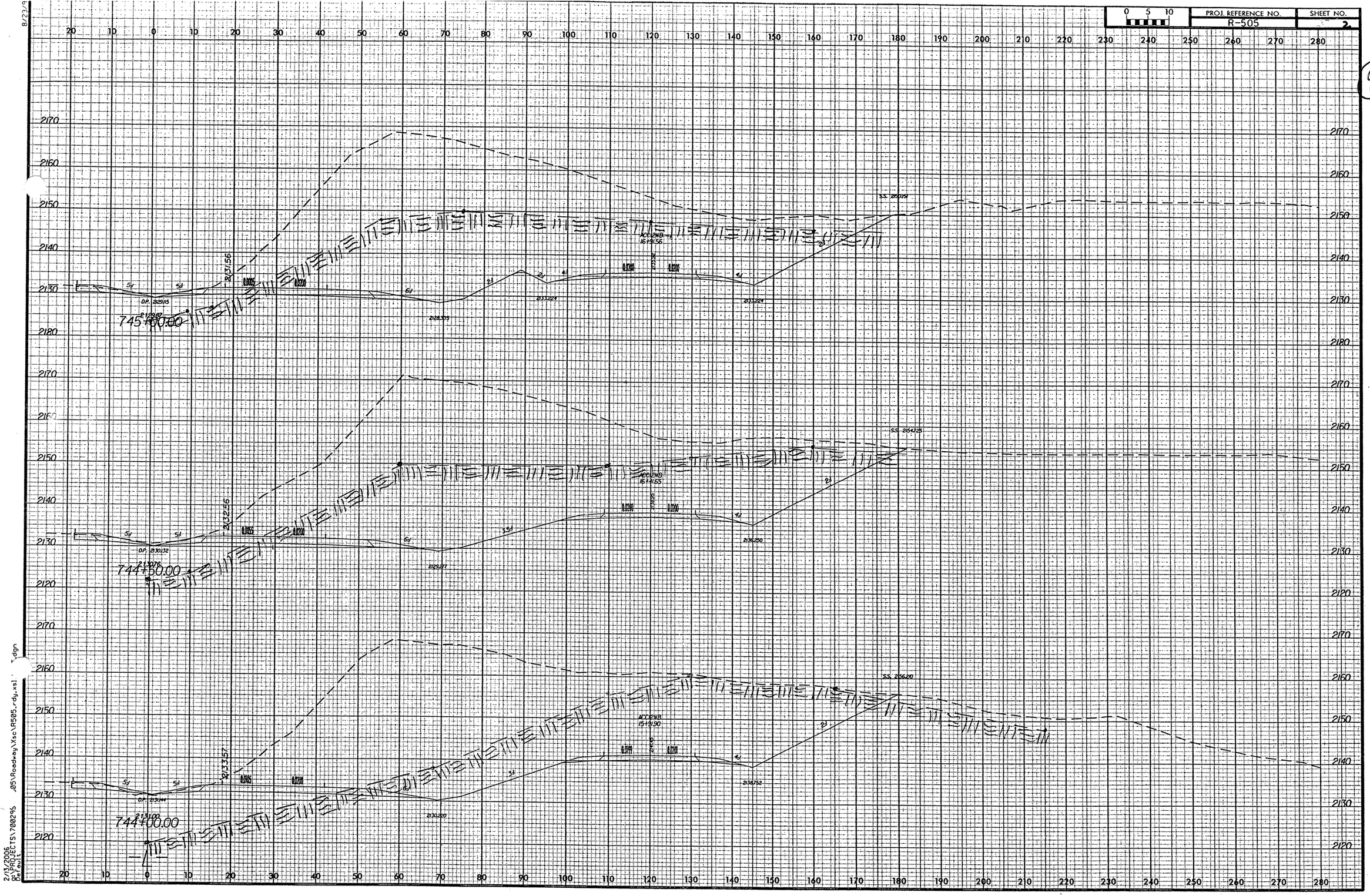

8/23/9

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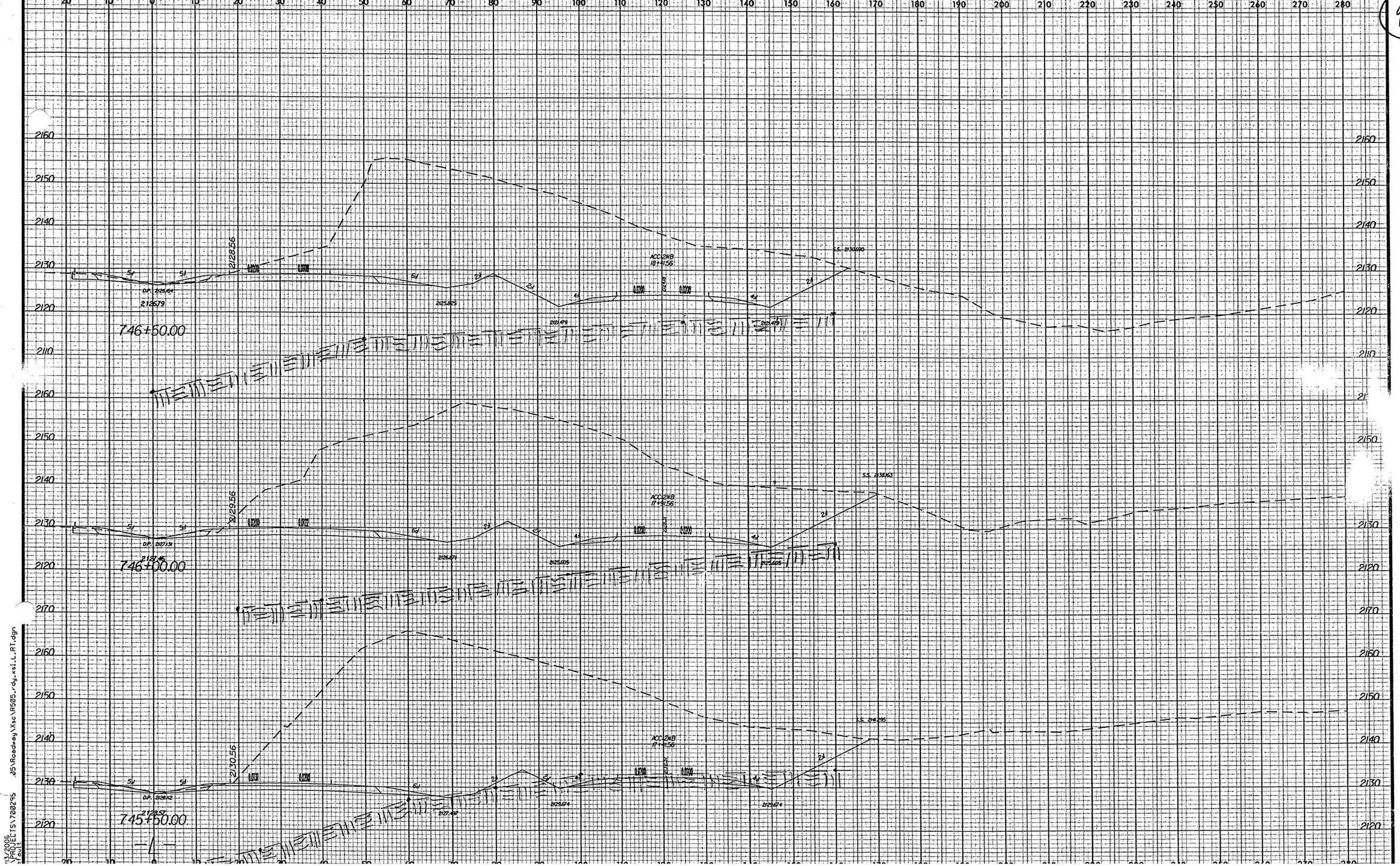
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-505	3

91-A3



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13/2006
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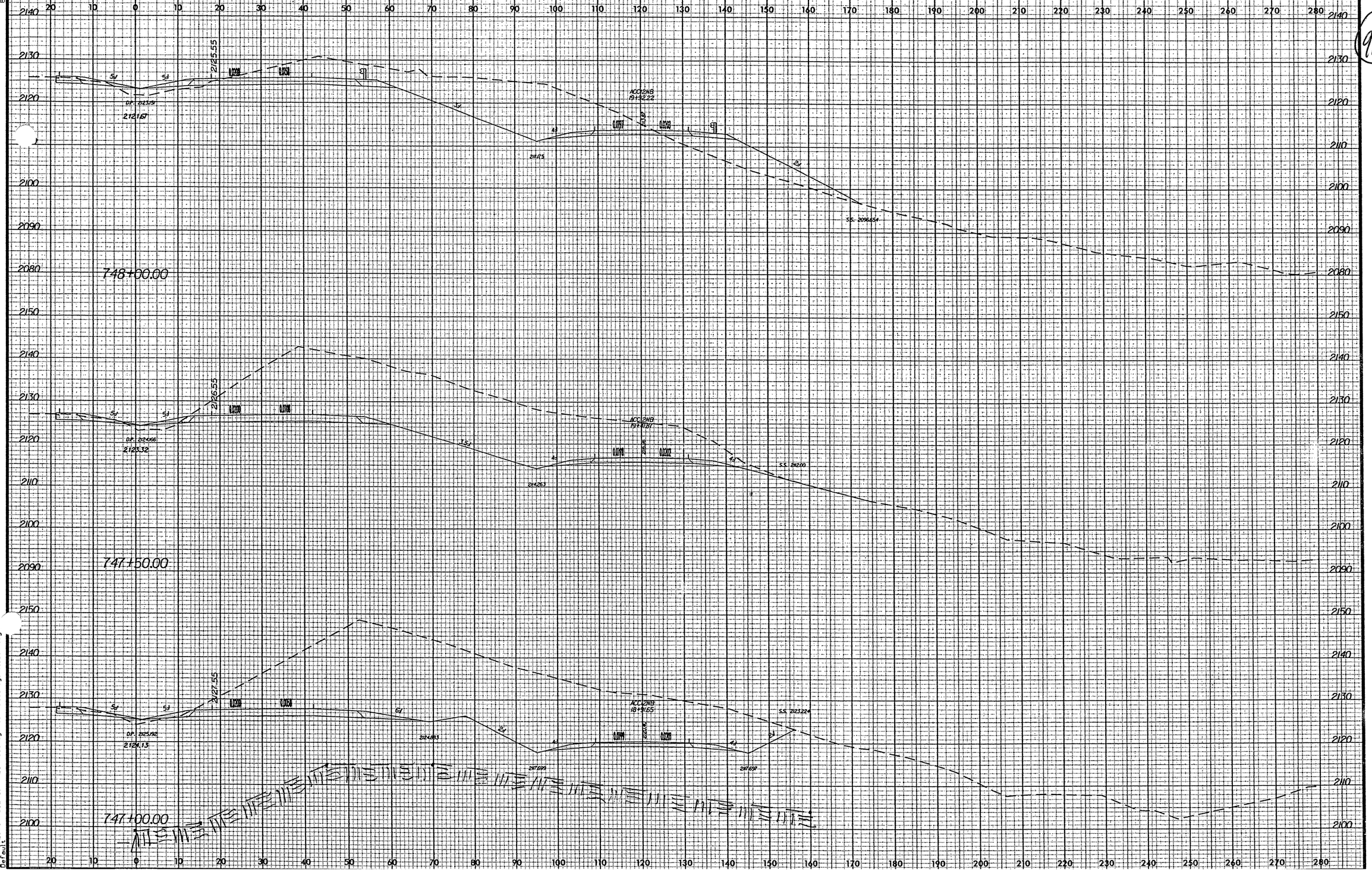

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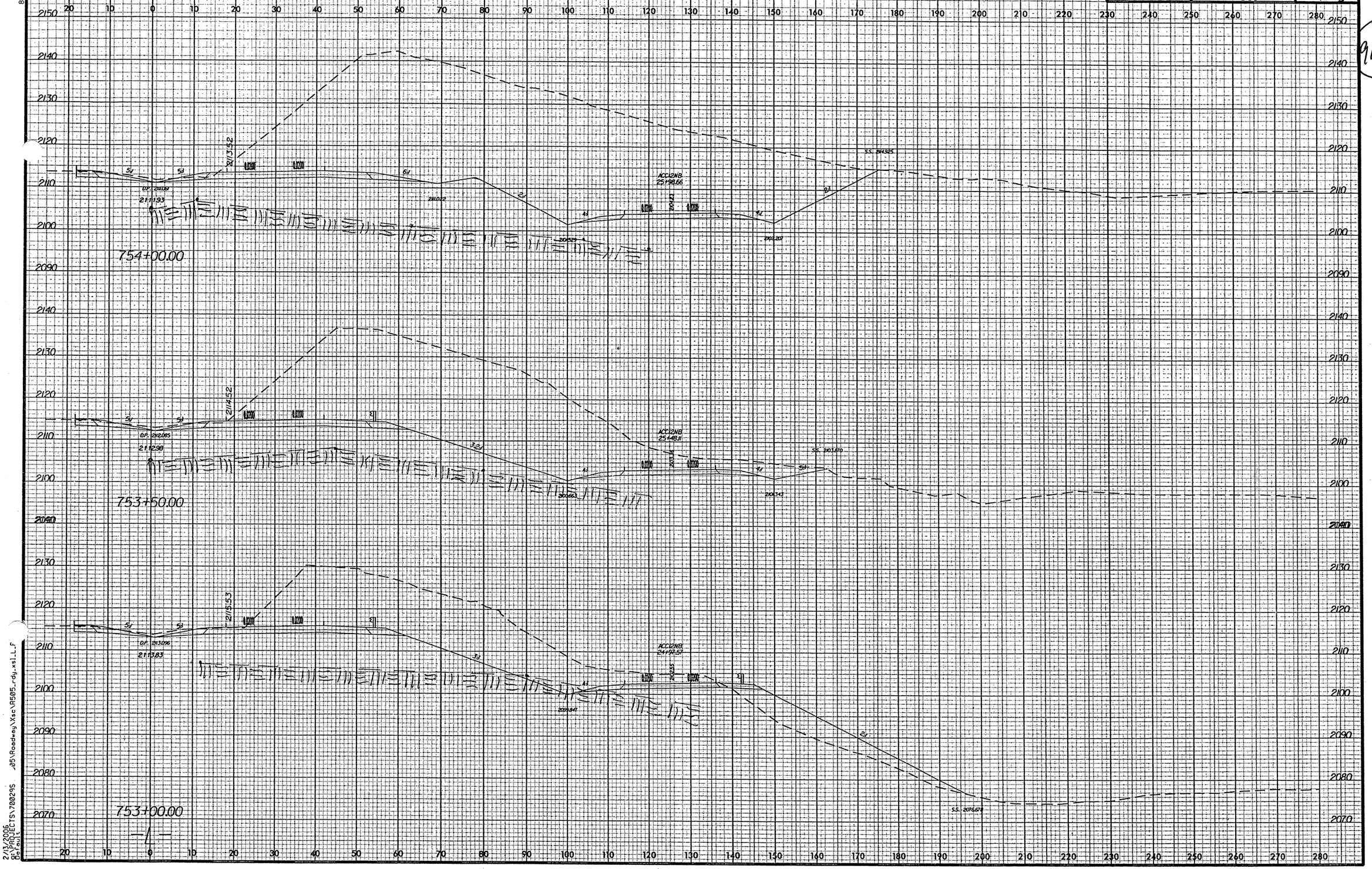

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2/13/2006
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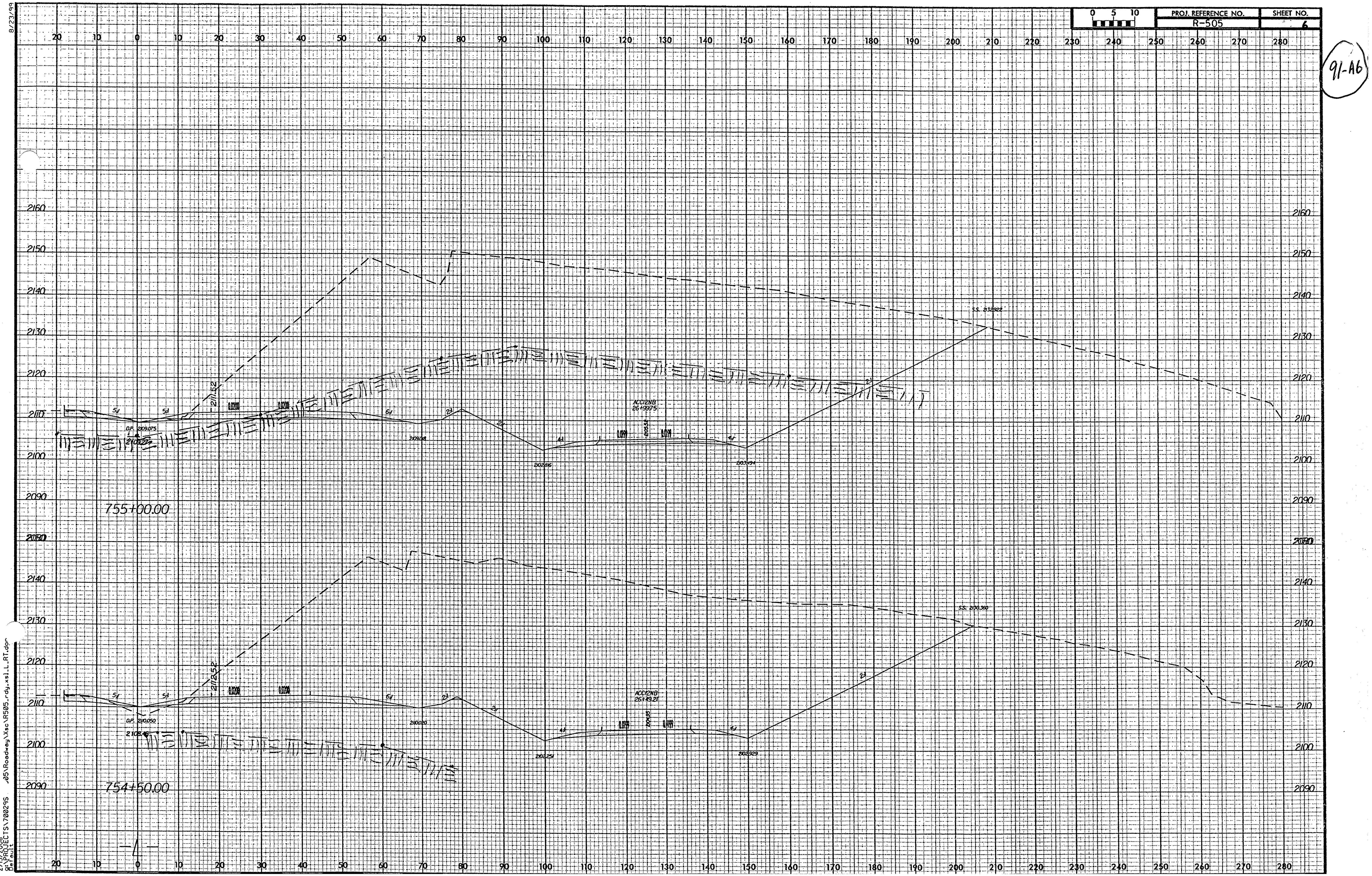

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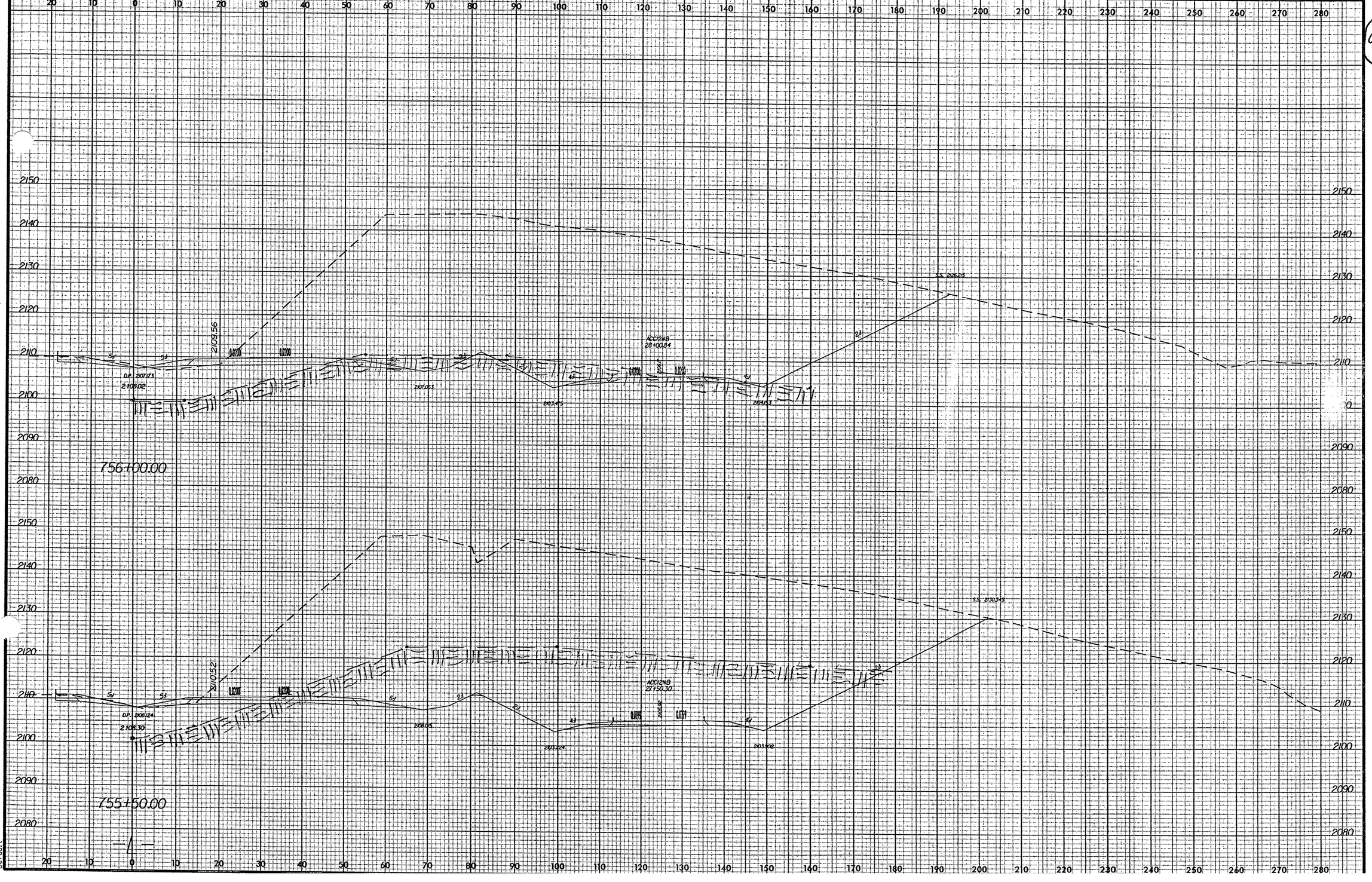

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STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	34334.1.1 (R-0505)	1	6

91-B1

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34334.1.1 F.A. PROJ. APD-1954 (1)

COUNTY HENDERSON

PROJECT DESCRIPTION NC 225-US 25/I-26 CONNECTOR FROM US 25 AT ZIRCINIA TO I-26

SITE DESCRIPTION -Y1- RETAINING WALL

CONTENTS

SHEET	DESCRIPTION
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4	PROFILE
5	BORE LOGS
6	SOIL TEST RESULTS

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
T.B. DANIEL
C.J. COFFEY
G.K. ROSE
R.D. CHILDERS

INVESTIGATED BY J.W. MANN
CHECKED BY W.D. FRYE
SUBMITTED BY W.D. FRYE
DATE 04/17/06

NORTH CAROLINA LICENSED SEAL 1941 GEOLOGIST JOHN W. MANN

PROJECT: 34334.1.1 ID: (R-0505)

DRAWN BY: J.W. MANN

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.

NORTH CAROLINA DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SOIL AND ROCK CLASSIFICATION, LEGEND, AND ABBREVIATIONS

91-B2

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	50 MX											GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
#40	30 MX	50 MX	51 MN											
#200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN			
(PASSING #40) LL				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
PI	6 MX		N.P.	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 & SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				

+ PI OF A-7-5 < (LL-30); PI OF A-7-6 > (LL-30)

TEXTURE OR GRAIN SIZE

BOULDER	COBBLE	GRAVEL	COARSE SAND	FINE SAND	SILT	CLAY

GRAIN SIZE (MM) 305 75 2 0.25 0.05 0.005
GRAIN SIZE (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

ROCK DESCRIPTION

IN THE BROADEST MEANING, HARD ROCK IS CONSIDERED TO BE THAT INDURATED EARTH MATERIAL WHICH CANNOT BE SAMPLED BY CONVENTIONAL SOIL SAMPLING TOOLS OR TECHNIQUES. THE BOUNDARY BETWEEN SOIL AND ROCK IS ARBITRARY. TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF 'WEATHERED ROCK'. FOR THE PURPOSE OF THIS INVESTIGATION, THESE MATERIALS ARE DIVIDED AS FOLLOWS:

TERM	SYMBOLS		DESCRIPTION
HARD ROCK (HR)	CORED ROCK	INFERRED ROCK LINE [2]	MATERIAL THAT CANNOT BE PENETRATED BY POWER AUGERS, EXCEPT IN THIN LEDGES, AND REQUIRES ROCK CORING TOOLS FOR OBTAINING A SAMPLE
WEATHERED ROCK (WR)		HARD WEATHERED ROCK (HWR)	MATERIAL THAT CAN BE PENETRATED WITH GREAT DIFFICULTY USING POWER AUGERS AND YIELDS SPT REFUSAL [1]
		SOFT WEATHERED ROCK (SWR)	MATERIAL THAT CAN BE PENETRATED WITH SOME DIFFICULTY USING POWER AUGERS AND YIELDS SPT VALUES > 100 BPF BUT < SPT REFUSAL

[1] SPT REFUSAL ≤ 1 INCH OF PENETRATION PER 50 BLOWS.
[2] AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH AUGERS COULD NO LONGER PENETRATE. THE HARD ROCK SYMBOL IS SHOWN WHEN ROCK IS CORED AND ONLY TO THAT DEPTH CORED. A DESCRIPTION OF ROCK IS GIVEN, INCLUDING:

CORE RECOVERY (REC.) - TOTAL LENGTH OF ROCK RECOVERED IN THE CORE BARREL DIVIDED BY THE TOTAL LENGTH OF THE CORE RUN TIMES 100%.

ROCK QUALITY DESIGNATION (RQD) - TOTAL LENGTH OF SOUND ROCK SEGMENTS RECOVERED THAT ARE LONGER THAN OR EQUAL TO 4" DIVIDED BY THE TOTAL LENGTH OF THE CORE RUN TIMES 100%.

NORTH CAROLINA LICENSED SEAL 1941 GEOLOGIST JOHN W. MANN

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTANCE (BLOWS PER FOOT)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (q_u) (TONS/FT^2)
GENERALLY GRANULAR MATERIAL	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	< 4 4 TO 10 10 TO 30 30 TO 50 > 50	N/A
GENERALLY SILT-CLAY MATERIAL	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30	< .25 .25 TO .5 .5 TO 1 1 TO 2 2 TO 4 > 4

GROUND WATER

WATER LEVEL IN BORE HOLE { IMMEDIATELY AFTER DRILLING (I.A.D.) / SOON AFTER DRILLING (0 HRS.)
STATIC WATER LEVEL (AFTER 24 HRS.)
PERCHED WATER (PW), SATURATED ZONE, OR WATER BEARING STRATA
SPRING OR SEEPAGE

MISCELLANEOUS SYMBOLS AND ABBREVIATIONS

ROADWAY EMBANKMENT WITH SOIL DESCRIPTION
SOIL SYMBOL
ARTIFICIAL FILL OTHER THAN ROADWAY EMBANKMENTS
INFERRED SOIL BOUNDARIES
25° STRIKE AND DIP OF BEDS
APPARENT DIP (NORMAL TO _____)
ROD SOUNDING
SPT DPT VST TEST BORING
AUGER BORING
CORE BORING
PIEZOMETER INSTALLATION
SLOPE INDICATOR INSTALLATION
SPT N-COUNT

SAMPLE DESIGNATIONS
S-BULK SAMPLE
SS-SPLIT SPOON SAMPLE
ST-SHELBY TUBE SAMPLE
RS-ROCK SAMPLE

ABBREVIATIONS

ALLUV.	ALLUVIUM	MIC.	MICACEOUS
AR	AUGER REFUSAL	MOT.	MOTTLED
BLDR.	BOULDER	NS	NO SAMPLE TAKEN
BPF	BLOWS PER FOOT	ORG.	ORGANIC
CALC.	CALCAREOUS	P.P.	POCKET PENETROMETER
CL.	CLAY	REF.	REFER TO
CLY.	CLAYEY	RES.	RESIDUAL
COB.	COBBLE	S.	SOFT
CSE.	COARSE	SAT.	SATURATED
DPT	DYNAMIC PENETRATION TEST	SD.	SAND
EST.	ESTIMATED	SDY.	SANDY
F.	FINE	SED(S).	SEDIMENT(S)
FIAD	FILLED IMMED. AFTER DRILLING	SL.	SILT, SILTY
FOSS.	FOSSILIFEROUS	SLI.	SLIGHTLY
FRAC.	FRACTURED	SPT	STANDARD PENETRATION TEST
FRAG(S).	FRAGMENT(S)	TS.	TOPSOIL
GR.	GRAVEL	VST	VANE SHEAR TEST
GS	SPECIFIC GRAVITY	V.	VERY
GW	GROUND WATER	W/	WITH
MED.	MEDIUM		

BENCH MARK: 10+85, CENTERLINE -Y1-
ELEVATION ASSUMED
ELEVATION = 2154.0 FEET (ASSUMED)

STATE PROJECT NO. 34334.1.1
T.I.P. NO. R-0505 F.A. NO. APD-1954 (1)
COUNTY HENDERSON ROUTE US-25
SITE DESCRIPTION -Y1- RETAINING WALL

PROJECT GEOLOGIST J.W. MANN SUBMITTED BY W.D. FRYE
PERSONNEL T.B. DANIEL
C.J. COFFEY
R.D. CHILDERS DATE SUBMITTED 04/2006
G.K. ROSE

REV. 8/11/98

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WAS MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT @ (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA IS PART OF THE CONTRACT.

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.

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.

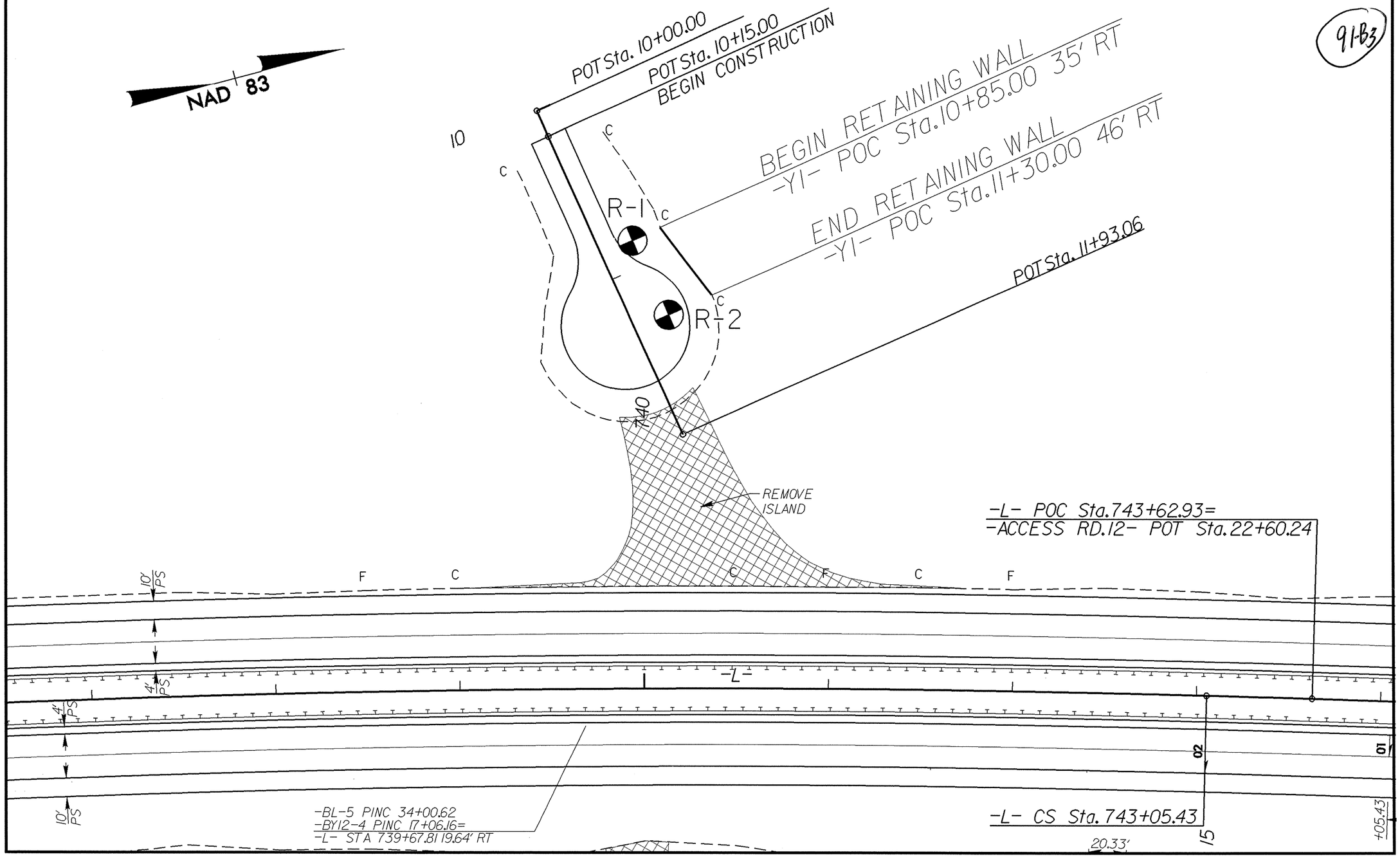
NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PROJECT REFERENCE NO.	SHEET
34334.1.1 (R-0505)	3

SITE PLAN

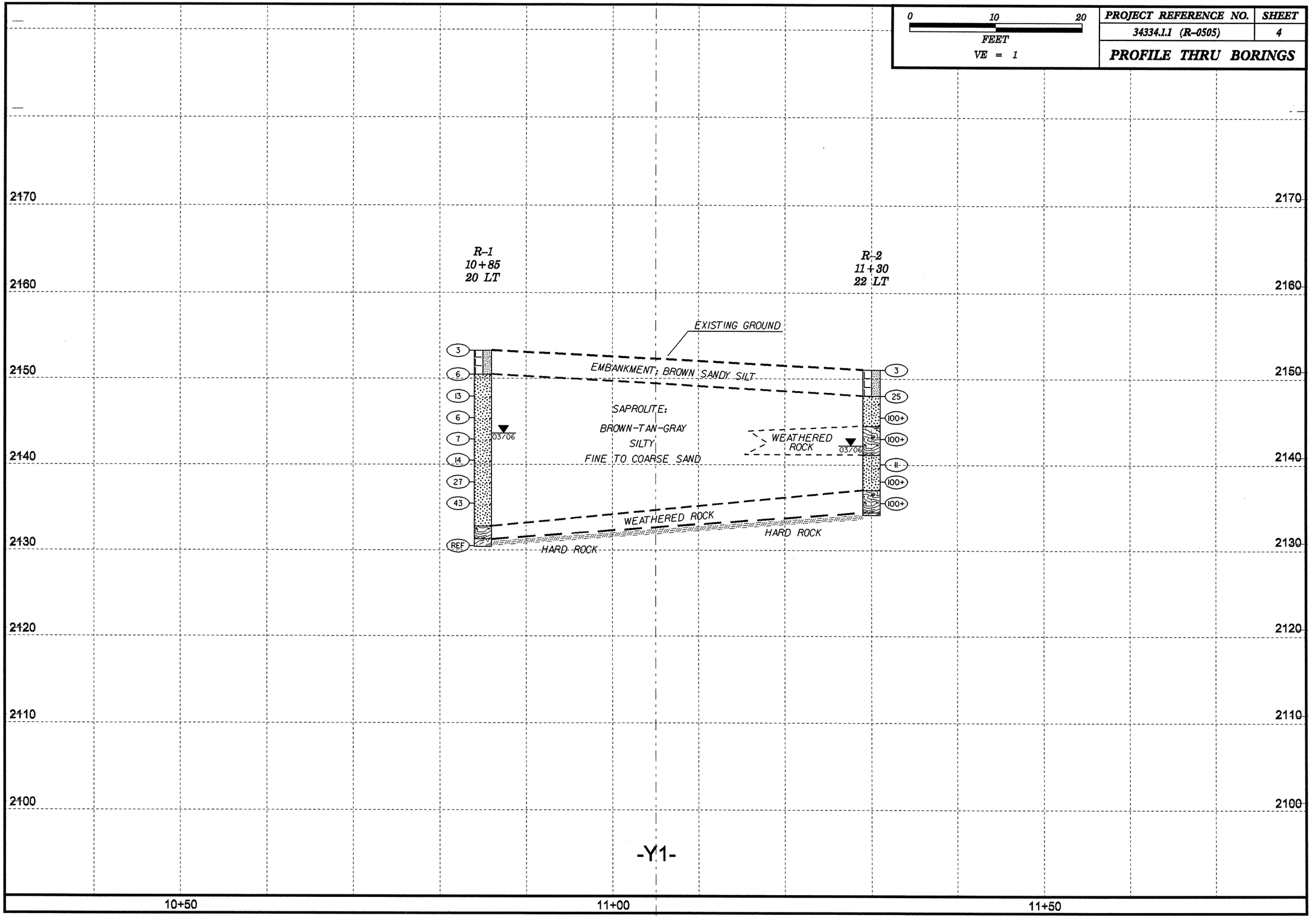
0 50 100
FEET

91-B3



PROJECT REFERENCE NO.	SHEET
34334.1.1 (R-0505)	4

PROFILE THRU BORINGS



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 34334.1.1	ID R-0505	COUNTY HENDERSON	GEOLOGIST T.B. DANIEL
SITE DESCRIPTION -Y1- PROPOSED RETAINING WALL			GND WATER
BORING NO R-1	NORTHING 0.00	EASTING 0.00	0 HR N/A
ALIGNMENT -Y1-	BORING LOCATION 10+85.000	OFFSET 20.00ft LT	24 HR 9.60ft
COLLAR ELEV 2153.28ft	TOTAL DEPTH 22.90ft	START DATE 3/27/06	COMPLETION DATE 03/27/06
DRILL MACHINE CME-550	DRILL METHOD H.S. AUGERS		HAMMER TYPE AUTOMATIC
SURFACE WATER DEPTH	DEPTH TO ROCK 22.00ft		Log R-1, Page 1 of 1

ELEV	DEPTH	BLOW CT 6in	6in	6in	PEN (ft)	BLOWS PER FOOT (0 25 50 75 100)	SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION
2153.28	0.00	0	1	2	1.0	Ground Surface				
2150.00	2.80	2	3	3	1.0	3, 6	SS-5	D		EMBANKMENT: BROWN SANDY SILT
	5.30	2	3	10	1.0	13	SS-6	D		SAPROLITE: BROWN-GRAY-BLACK-WHITE SILTY FINE TO COARSE SAND
	7.80	1	3	3	1.0	6	SS-7	W		
	10.30	2	3	4	1.0	7	SS-8	SAT		
	12.80	3	5	9	1.0	14	SS-9			
2140.00	15.30	6	12	15	1.0	27	SS-10			
	17.80	8	6	27	1.0	33	SS-11			
2130.38	22.80	60			0.1	60				WEATHERED ROCK HARD ROCK: SPT REFUSAL

BORING TERMINATED AT ASSUMED ELEV. 2152.4' IN HARD ROCK

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 34334.1.1	ID R-0505	COUNTY HENDERSON	GEOLOGIST T.B. DANIEL
SITE DESCRIPTION -Y1- PROPOSED RETAINING WALL			GND WATER
BORING NO R-2	NORTHING 0.00	EASTING 0.00	0 HR N/A
ALIGNMENT -Y1-	BORING LOCATION 11+30.000	OFFSET 22.00ft LT	24 HR 8.80ft
COLLAR ELEV 2151.05ft	TOTAL DEPTH 16.90ft	START DATE 3/27/06	COMPLETION DATE 03/27/06
DRILL MACHINE CME-550	DRILL METHOD H.S. AUGERS		HAMMER TYPE AUTOMATIC
SURFACE WATER DEPTH	DEPTH TO ROCK 16.60ft		Log R-2, Page 1 of 1

ELEV	DEPTH	BLOW CT 6in	6in	6in	PEN (ft)	BLOWS PER FOOT (0 25 50 75 100)	SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION
2151.05	0.00	1	1	2	1.0	Ground Surface				
	3.00	3	11	14	1.0	3, 25				EMBANKMENT: BROWN SANDY SILT
	5.50	16	24	88	1.0	100				SAPROLITE: BROWN-GRAY SILTY FINE TO COARSE SAND
	8.00	37	63		0.3	100	SS-12	M		WEATHERED ROCK SEAM
2140.00	11.00	5	5	6	1.0	11				SAPROLITE: TAN-GRAY SILTY FINE TO COARSE SAND
	13.00	4	12	88	0.9	100				
	15.50	17	83		0.3	100				WEATHERED ROCK
2134.15										HARD ROCK

BORING TERMINATED AT ASSUMED ELEV. 2134.2' IN HARD ROCK

M&T 503E

JCS

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT
SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #:	R-0505

REPORT ON SAMPLES OF:	Soils for Classification

PROJECT:	34334.1.1	COUNTY:	Henderson	Owner:	--		
DATE SAMPLED:	3.22.06	DATE RECEIVED:	3.30.06	DATE REPORTED:	4.11.06		
SAMPLED FROM:	Wall	SAMPLED BY:	J. W. Mann				
SUBMITTED BY:	W. D. Frye	2002	STANDARD SPECIFICATION				
LABORATORY:	Asheville						

TEST RESULTS

Project Sample No.	SS-1	SS-2	SS-3	SS-5	SS-6	SS-7	SS-8	SS-9
Lab Sample No. A	152212	152213	152214	152215	152216	152217	152218	152219
HiCAMS Sample #	--	--	--	--	--	--	--	--
Retained #4 Sieve %	--	--	--	--	--	--	--	--
Passing #10 Sieve %	88	83	100	89	99	90	99	98
Passing #40 Sieve %	73	64	84	71	82	72	72	81
Passing #200 Sieve %	39	32	22	35	21	26	28	29

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	32	37	38	35	38	37	43	34
Fine Sand - Ret. #270	27	27	47	30	46	42	34	43
Silt 0.05-0.005 mm %	13	10	11	31	12	17	19	19
Clay < 0.005 mm %	28	26	4	4	4	4	4	4
Passing # 40 Sieve %	--	--	--	--	--	--	--	--
Passing # 200 Sieve %	--	--	--	--	--	--	--	--

Liquid Limit	31	34	41	34	44	36	37	38
Plastic Index	NP	NP	NP	NP	NP	NP	NP	NP
AASHTO Classification	A-4 (1)	A-2-4 (0)	A-2-5 (0)	A-2-4 (0)	A-2-5 (0)	A-2-4 (0)	A-2-4 (0)	A-2-4 (0)
Quantity								
Texture								
Station	13+96	13+96	13+96	10+85	10+85	10+85	10+85	10+85
Hole No.								
Depth (ft) From:	0.0	3.6	11.1	0.0	2.8	5.3	7.8	10.3
To:	1.5	5.1	12.6	1.5	4.3	6.8	9.3	11.8

Remarks:

A-152212 - 152219

CC:

J. W. Mann	
File	

SOILS ENGINEER:	

M&T 503E

JCS

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT
SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #:	R-0505

REPORT ON SAMPLES OF:	Soils for Classification

PROJECT:	34334.1.1	COUNTY:	Henderson	Owner:	--		
DATE SAMPLED:	3.27.06	DATE RECEIVED:	3.30.06	DATE REPORTED:	4.11.06		
SAMPLED FROM:	Wall	SAMPLED BY:	J. W. Mann				
SUBMITTED BY:	W. D. Frye	2002	STANDARD SPECIFICATION				
LABORATORY:	Asheville						

TEST RESULTS

Project Sample No.	SS-10	SS-11	SS-12					
Lab Sample No. A	152220	152221	152222					
HiCAMS Sample #	--	--	--					
Retained #4 Sieve %	--	--	--					
Passing #10 Sieve %	97	99	70					
Passing #40 Sieve %	73	77	57					
Passing #200 Sieve %	23	27	17					

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	43	40	38					
Fine Sand - Ret. #270	40	38	44					
Silt 0.05-0.005 mm %	13	16	14					
Clay < 0.005 mm %	4	6	4					
Passing # 40 Sieve %	--	--	--					
Passing # 200 Sieve %	--	--	--					

Liquid Limit	31	36	26					
Plastic Index	NP	NP	NP					
AASHTO Classification	A-2-4 (0)	A-2-4 (0)	A-2-4 (0)					
Quantity								
Texture								
Station	10+85	10+85	11+30					
Hole No.								
Depth (ft) From:	12.8	15.3	5.5					
To:	14.3	16.8	7.0					

Remarks:

A-152220 - 152222

CC:

J. W. Mann	
File	

SOILS ENGINEER:	

G:/Everyone. . . /M&T Forms/Regional Lab Statesville/Soils Test Report M&T 503E 8-19-2000