STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	41871.1.1 (W-5107)	1	45

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
		P.E.
		R/W & UTIL.

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

ROADWAY SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 41871.1.1 (W-5107) F.A. PROJ. STPHNS-0070(117)

COUNTY JOHNSTON

PROJECT DESCRIPTION US 70 EAST OF I-95 FROM SR 2305 (FIRETOWER RD.) TO EAST OF SR 2310 (DAVIS MILL RD.-STEVENS CHAPEL RD.)

INVENTORY

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

CONTENTS

LINE	STATION	PLAN	PROFILE	XSECT
-L-	12+50 to 26+00	5-6	-	-
	26+00 to 28+50	6	-	21-22
	28+50 to 32+50	6	-	-
	32+50 to 33+50	6	-	23-24
	33+50 to 37+00	6	-	-
	37+00 to 40+50	6	-	25-26
	40+50 to 107+50	6-10	-	-
	107+50 to 114+50	10	-	27-29
	114+50 to 115+50	10	-	-
	115+50 to 116+50	10	-	30
	116+50 to 122+60	10	-	-
-Y1-	13+70 to 16+00	6	13	-
	16+00 to 19+25	6	13	31-32
	19+25 to 31+15	6	13	-
	31+15 to 31+50	6	13	33
	31+50 to 36+70	6	13	-
	36+70 to 42+00	6	13-14	34-37
	42+00 to 42+10	6	14	-
-Y1LPA-	10+00 to 16+00	6	14	-
-Y1RPA-	10+00 to 19+99	6	15	-
-Y1LPC-	10+00 to 14+00	6	15	-
	14+00 to 15+74	6	15	38
	15+74 to 18+86	6	15	-
-Y1RPC-	10+00 to 16+00	5-6	16	-
	16+00 to 21+00	6	16	39-41
	21+00 to 21+66	6	16	-
-Y1RPD-	10+00 to 14+11	6	16	-
	14+11 to 14+60	6	16	42
	14+60 to 22+59	6	16	-
-Y2-	11+50 to 15+39	6	-	-
-Y3-	13+30 to 16+07	6	-	-
-Y6-	12+69 to 34+25	10-11	17	-
-Y6LPB-	10+00 to 21+17	10	18	-
-Y6LPC-	10+00 to 10+78	10	18	-
	10+78 to 14+00	10	18	43-44
	14+00 to 19+20	10	18	-
-Y6LPBA-	10+00 to 12+00	10	18	-
-Y6LPCA-	10+00 to 11+28	10	-	-
	11+28 to 11+60	10	-	45
-SR1-	10+00 to 18+65	6	19	-
-SR2-	10+00 to 27+77	10	19-20	-
-SR3-	10+00 to 14+07	10	-	-
-DW1-	10+00 to 12+64	10	-	-
-DW2-	10+00 to 11+99	10	-	-
-DW3-	10+00 to 10+69	10	-	-
-DW4-	10+00 to 11+28	10	-	-
-DW5-	10+50 to 10+75	10	-	-
-DW6-	10+25 to 11+00	10	-	-

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION OF 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 THE 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

O. B. OTI

J. I. MILKOVITS

H. R. CONLEY

J. R. MATULA

H. L. FROATS

INVESTIGATED BY J. L. PEDRO

CHECKED BY N. T. ROBERSON

SUBMITTED BY N. T. ROBERSON

DATE MARCH 2013

NORTH CAROLINA LICENSED SEAL 2157 GEOLOGIST JAIME LOVE PEDRO

Jaime Love Pedro 3-6-13

ID: W-5107

CONTRACT:

DRAWN BY: J. L. PEDRO, T. T. WALKER

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 NO.
41871.1.1 (W-5107)	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:

VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5 A-7-6			
SYMBOL														
% PASSING # 10	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 MX		NP	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PLASTIC INDEX				10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	No MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT^2)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	<4 4 TO 10 10 TO 30 30 TO 50 >50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	<2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 >30	<0.25 0.25 TO 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 >4

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	2.00	0.42	0.25	0.075	0.053

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)

GRAIN SIZE MM: 305 | 75 | 2.0 | 0.25 | 0.05 | 0.005
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) PL — PLASTIC LIMIT	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
OM — OPTIMUM MOISTURE SL — SHRINKAGE LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

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

COLOR

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

GRADATION

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

ANGULARITY OF GRAINS

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

MINERALOGICAL COMPOSITION

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

COMPRESSIBILITY

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

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	20 - 35%
HIGHLY ORGANIC	>10%	>20%	HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

MISCELLANEOUS SYMBOLS

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

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

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED, FRACTURES
FRAGS. - FRAGMENTS
HI. - HIGHLY
MED. - MEDIUM
MICA. - MICACEOUS
MOD. - MODERATELY
NP - NON PLASTIC
ORG. - ORGANIC
PMT - PRESSUREMETER TEST
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
w - MOISTURE CONTENT
V - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT

EQUIPMENT USED ON SUBJECT PROJECT

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

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

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

CORE SIZE:
- [ ] -B_____
- [X] -N XWL
- [ ] -H_____

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

ROCK DESCRIPTION

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

WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, YIELDS SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, YIELDS SPT N VALUES < 100 BPF*
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FEET
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	> 4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND DEFINITIONS

ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.

AQUIFER - A WATER BEARING FORMATION OR STRATA.

ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.

ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.

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

CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.

COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.

CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.

DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.

DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.

FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.

FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.

FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.

FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.

FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.

JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.

LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.

LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.

MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.

PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.

RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.

SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.

SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.

STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

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

BENCH MARK:

ELEVATION: FT.

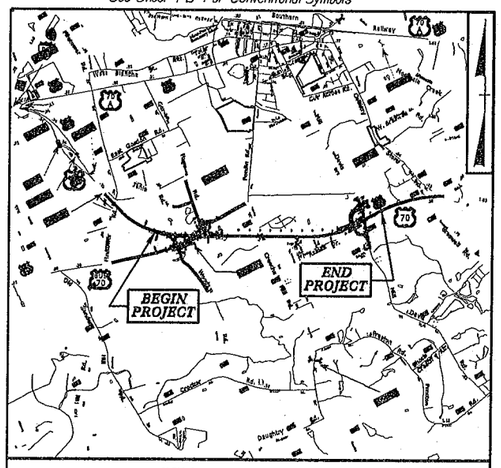
NOTES:

REVISED 02/23/06

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	W-5107	2A	45

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
WBS-41871.1.1	STPNHS-0070(117)	P.E.

See Sheet 1-A For Index of Sheets
See Sheet 1-B For Conventional Symbols



VICINITY MAP

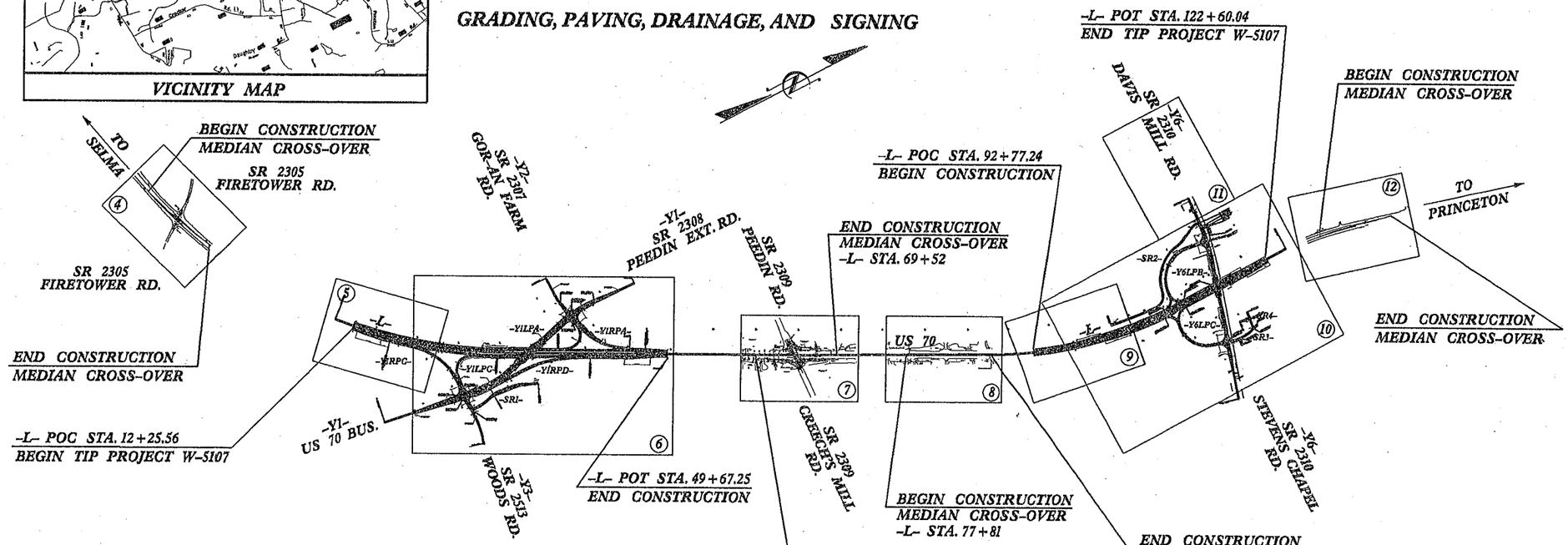
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

JOHNSTON COUNTY

LOCATION: US 70 EAST OF I-95 FROM SR 2305 (FIRETOWER RD.) TO EAST OF SR 2310 (DAVIS MILL RD. - STEVENS CHAPEL RD.)

TYPE OF WORK:

GRADING, PAVING, DRAINAGE, AND SIGNING



THIS IS A FULL CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS SHOWN ON THE PLANS.

THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.

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

TIP PROJECT: W-5107

CONTRACT:

GRAPHIC SCALES

50 25 0 50 100 PLANS

50 25 0 50 100 PROFILE (HORIZONTAL)

10 5 0 10 20 PROFILE (VERTICAL)

DESIGN DATA

ADT 2015 = 29,538
ADT 2035 = 45,000
DHV = 9 %
D = 60 %
T = 10 % *
V = 60 MPH
FUNCTIONAL CLASS = RURAL PRINCIPAL ARTERIAL
STATEWIDE TIER DESIGN
*TTST = 6% DUALS = 4%

PROJECT LENGTH

LENGTH ROADWAY PROJECT = 1.27 MILES
TOTAL LENGTH STATE PROJECT = 1.27 MILES

Prepared In the Office of:
ARCADIS
C.G.&H. of North Carolina, Inc.
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501 Corporate Center Drive, Suite 300
Raleigh, NC 27607-5073
Tel: 919/854-0282 Fax: 919/854-5448 NC License No. C-1869

for the North Carolina Department of Transportation

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:

LETTING DATE:

STEVE SMALLWOOD, P.E.
PROJECT ENGINEER

HYDRAULICS ENGINEER
SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER
SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE HIGHWAY DESIGN ENGINEER P.E.

09/08/99

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAT MCCRORY
GOVERNOR

ANTHONY J. TATA
SECRETARY

March 5, 2013

STATE PROJECT: 41871.1.1 (W-5107)
FEDERAL PROJECT: STPHNS-0070(117)
COUNTY: Johnston

DESCRIPTION: US 70 from SR 2305 (Firetower Rd.) to East of SR 2310 (Davis Mill Rd.-Stevens Chapel Rd.)

SUBJECT: Geotechnical Report – Inventory

The Geotechnical Engineering Unit has completed a subsurface investigation for this project and presents the following inventory.

Project Description

This project consist of upgrading two at-grade intersections to two interchanges with overpasses (-Y1- and -Y6-). The proposed bridge sites are at the intersections of US 70 and US 70 Bus.-Peedin Rd. Ext. and US 70 and Davis Mill Rd.-Stevens Chapel Rd. Other areas along US 70 will have median crossovers constructed to limit access to the two interchange areas. The total length of the project is 1.27 miles.

The geotechnical investigation was conducted from October through December of 2012. An ATV-mounted CME-550 drill machine with an automatic hammer was used during the investigation. Standard Penetration Tests were performed in selected borings and additional borings were advanced using continuous flight augers and hand augers. Representative soil samples were collected for visual classification in the field and for laboratory analysis by the Materials and Tests Unit.

The following alignments, totaling 2.8 miles, were investigated. Subsurface profiles and/or cross sections of these alignments are included in this report.

Line	Stations
-Y1-	13+70 to 42+10
-Y1LPA-	10+00 to16+00
-Y1RPA-	10+00 to 19+99
-Y1LPC-	10+00 to 18+86
-Y1RPC-	10+00 to 21+66

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

TELEPHONE: 919-707-6850
FAX: 919-250-4237
WEBSITE: www.NCDOT.GOV

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

-Y1RPD-	10+00 to 22+59
-SR1-	10+00 to 1865
-Y6-	12+69 to 34+25
-Y6LPB-	10+00 to 21+17
-Y6LPBA-	10+00 to 12+00
-Y6LPC-	10+00 to 19+20
-SR2-	10+00 to 19+20

Areas of Special Geotechnical Interest

1) Highly Plastic Clays: Highly plastic clays (PI > 25) were encountered on the project at the following locations:

Line	Stations	Offsets
-L-	26+00 to 28+50	RT
-L-	37+00 to 40+50	RT
-L-	107+50 to 114+50	RT
-Y1LPC-	14+00 to 18+80	LT and CL
-Y1RPC-	16+00 to 21+60	LT to RT
-Y1-	16+25 to 19+25	LT and RT
-Y1-	36+00 to 42+00	LT and RT
-Y1RPD-	10+00 to 14+60	RT
-Y6LPC-	10+00 to 14+00	CL
-Y6LPCA-	10+00 to 11+60	CL

A discussion of these highly plastic clay soils is located below in the section titled "Soil Properties".

2) Water Wells: Water wells were noted within or in close proximity to the construction limits at the following locations.

Line	Stations	Offsets
-L-	46+09	154' RT
-L-	118+37	126' LT
-Y1-	39+99	51' RT
-Y1RPA-	11+06	131' RT
-Y1RPC-	19+92	28' RT
-Y1RPC-	20+39	28' RT
-DW1-	9+61	19' LT
-DW2-	10+38	75' LT
-DW4-	11+11	10' LT
-SR3-	12+85	82' LT
-Y6-	13+43	190' LT
-Y6-	32+89	73' RT

3) Organic Soils: Several areas of organic alluvial soil were encountered in the vicinity of the Baldy Swamp floodplain. An area of alluvial sandy silt (A-4) with an organic content of 7.0% is present at -Y1- Sta. 25+00, CL. Another area of alluvial sandy clay with an organic content of 6.2% is present at -Y1LPC- Sta. 12+61, 4' LT. A third area of alluvial sandy silt with an organic content of 5.6% is present at -SR1- 13+50, CL.

4) Artificial Fill: Two areas of artificial fill are present along the following alignments:

Line	Station	Offset (ft)
-Y1LPC-	14+30 to 15+20	LT
-Y1-	21+00 to 23+00	LT
-Y1RPD-	10+00 to 22+59	LT to CL
-SR1-	16+90 to 18+64	CL

Physiography and Geology

The project is located south of the town of Pine Level at the boundary of the Piedmont Physiographic Province and the Coastal Plain Province. At the boundary, Terrace deposits and Upland sediments along with clays and sands of the Yorktown formation overlay residual soils derived from underlying felsic metavolcanic rock of the Eastern Slate Belt. The terrain is fairly level, and is sparsely populated. The project corridor includes some wooded areas, large agricultural fields, and some scattered homes and businesses.

Soil Properties

Roadway embankment soils are present along the existing US 70 corridor. These soils consist of loose to dense, silty and clayey sand (A-2-4 and A-2-6) and medium to stiff, sandy clay and silt (A-6 and A-4).

The major area of artificial fill was encountered along the -Y1RPD- alignment. This material consists of orange-brown, loose, moist, silty sand and medium stiff, sandy clay with 1.5 feet of asphalt and ABC (see -Y1RPD- 12+65, 35' LT). This material is present along the proposed -Y1RPD- alignment from Sta. 10+00 LT to 19+00 LT, and is remnant road bed of a previous US 70 alignment. Other small areas of artificial fill at driveways were encountered and consist of tan and brown, loose, moist, silty sand and sand with gravel (A-2-4 and A-3) and medium stiff, sandy silt (A-4).

Alluvial soils are present in two areas on the project. These areas are present in the vicinity of -Y1-, -Y1LPC-, -Y1RPD-, and -SR1- along Baldy Swamp and -Y6-, -Y6LPB-, and -SR2- along Moccasin Swamp. Alluvial soils are primarily tan, gray, and brown very loose to medium dense, wet to saturated, silty, clayey, and coarse sand (A-2-4, A-2-6, and A-1-b) with some quartz gravel and gray-brown, very soft to soft, moist to wet, sandy silt and clay (A-4 and A-6) with trace organics. Alluvial soils range in thickness from 6.0 to 16.0 feet.

Coastal Plain soils consist primarily of sands and clays, and range in thickness from 20 to 30 feet and are underlain by residual soils and/or weathered rock. These Coastal Plain soils are multicolored, with hues of tan, orange, brown, and gray. Clayey soils are generally medium stiff to stiff, dry to moist, and consist of sandy and silty clay and highly plastic, silty clay (A-6, A-7-5, and A-7-6). The plastic indices of these clayey soils range from 26 to 43. Sandy soils are loose to medium dense, moist to saturated, silty, clayey, and coarse sand (A-2-4, A-2-6, and A-1-b). Minor amounts of medium stiff to very stiff, moist, sandy silt (A-4) are also present.

Residual soils were encountered beneath alluvial and Coastal Plain soils in the vicinity of the proposed structure at -Y1- and range in thickness from 3.0 to 10.0 feet. These soils consist of green-gray, stiff to hard, dry to moist, saprolitic, sandy silt (A-4) with trace weathered rock fragments.

Rock Properties

Weathered rock is derived from the underlying felsic metavolcanic rock, and was encountered in the deeper borings at the proposed structure locations. Crystalline rock was also encountered at both structure locations, and ranges in depth at -Y1- from 35.0 to 58.6 feet and at -Y6- from 10.0 to 23.5 feet. Crystalline rock consists or green-gray, slightly weathered to fresh, hard, close to wide fracture spacing, mica schist. The crystalline rock appears to be relatively flat-lying in relation to the ground surface.

Groundwater

Groundwater generally occurs with 2.5 to 13.0 feet of the ground surface in the alluvial and/or Coastal Plain soils. The groundwater level is anticipated to be at elevations similar to Baldy and Moccasin Swamps. Seasonal fluctuations in the water table can be expected.

Prepared by,

Jaime Love Pedro

Jaime Love Pedro, LG
Transportation Engineer II

PROJECT REFERENCE NO.	SHEET NO.
W-5107	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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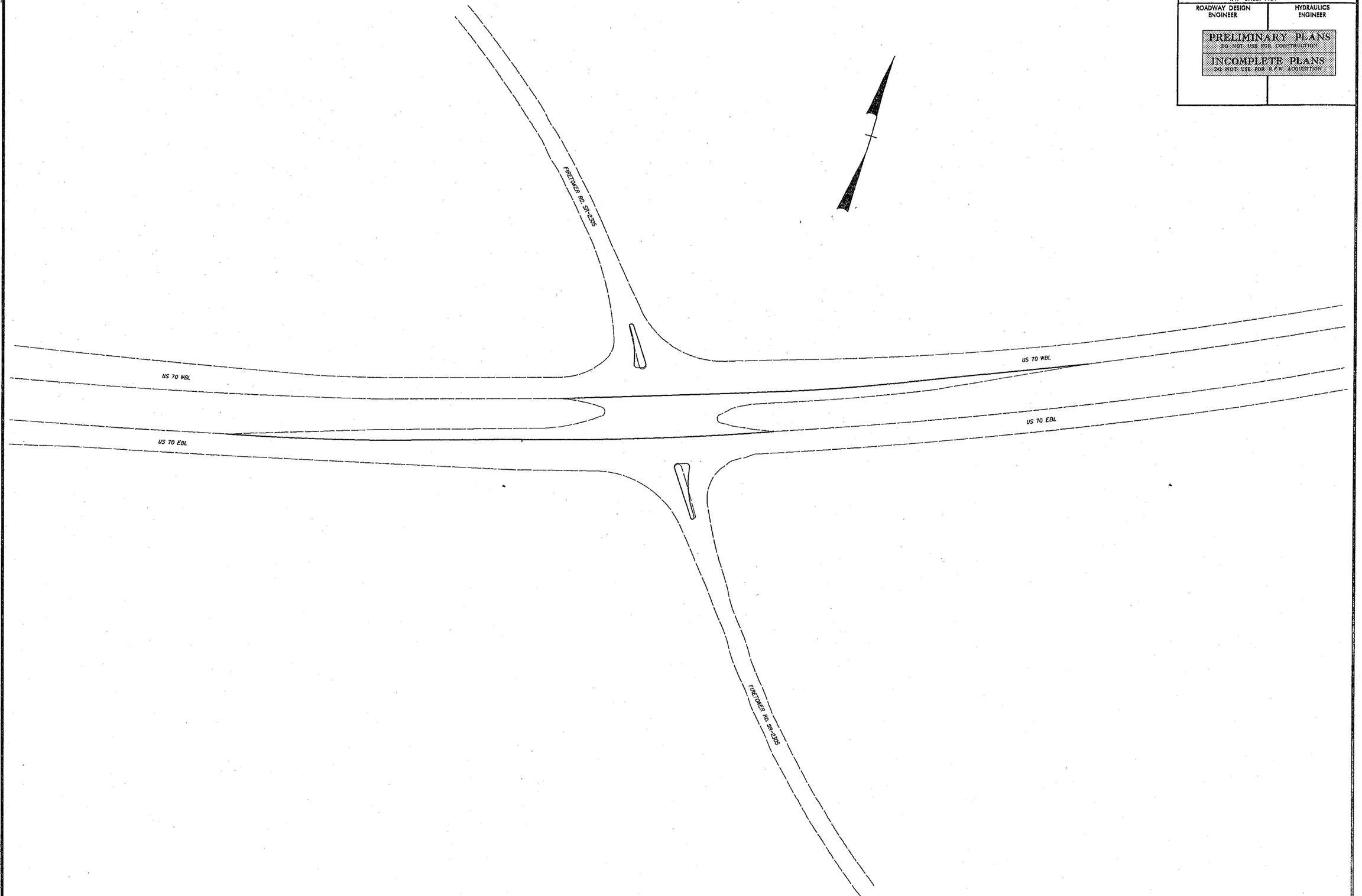
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION



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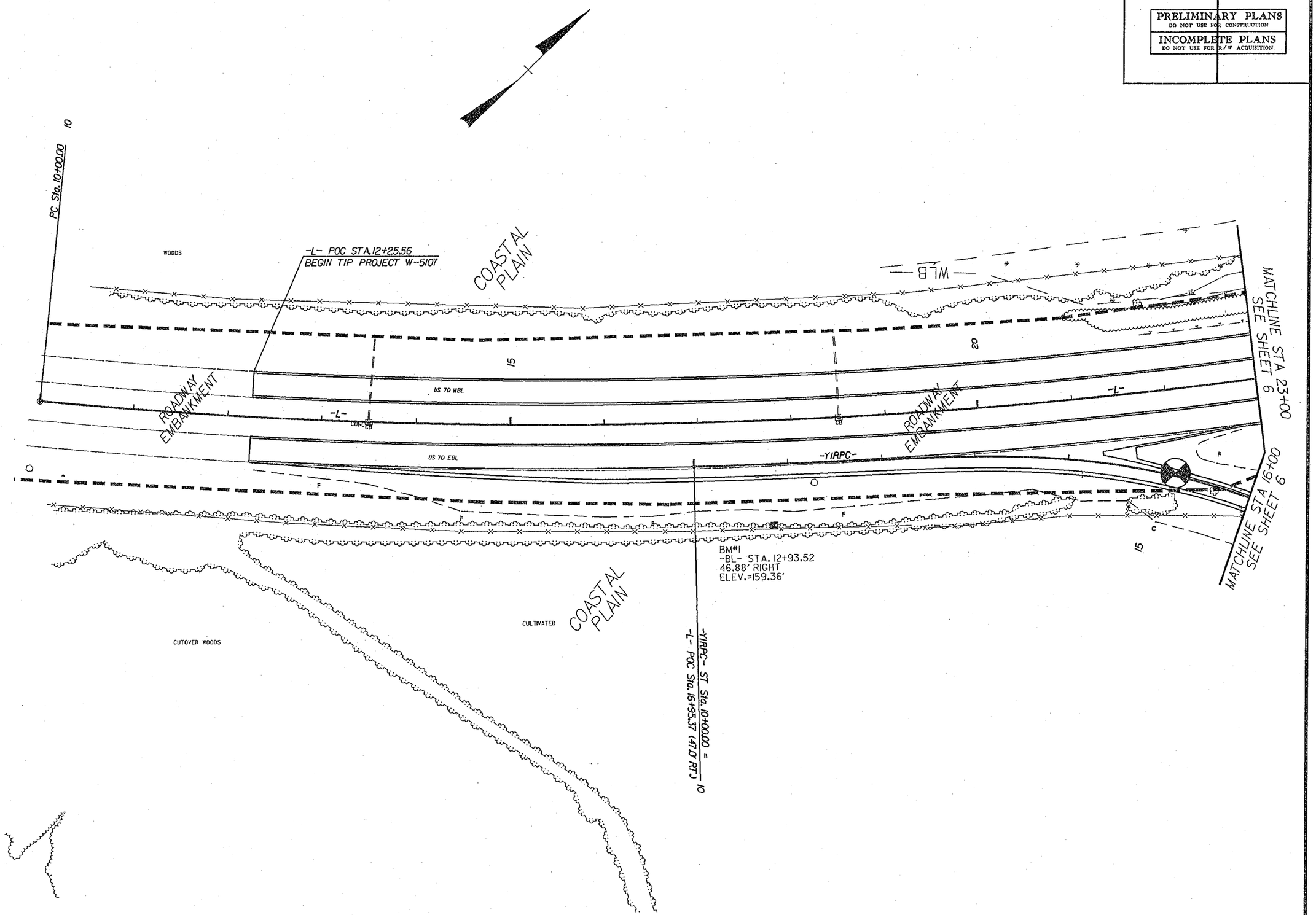

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R/W SHEET NO.	
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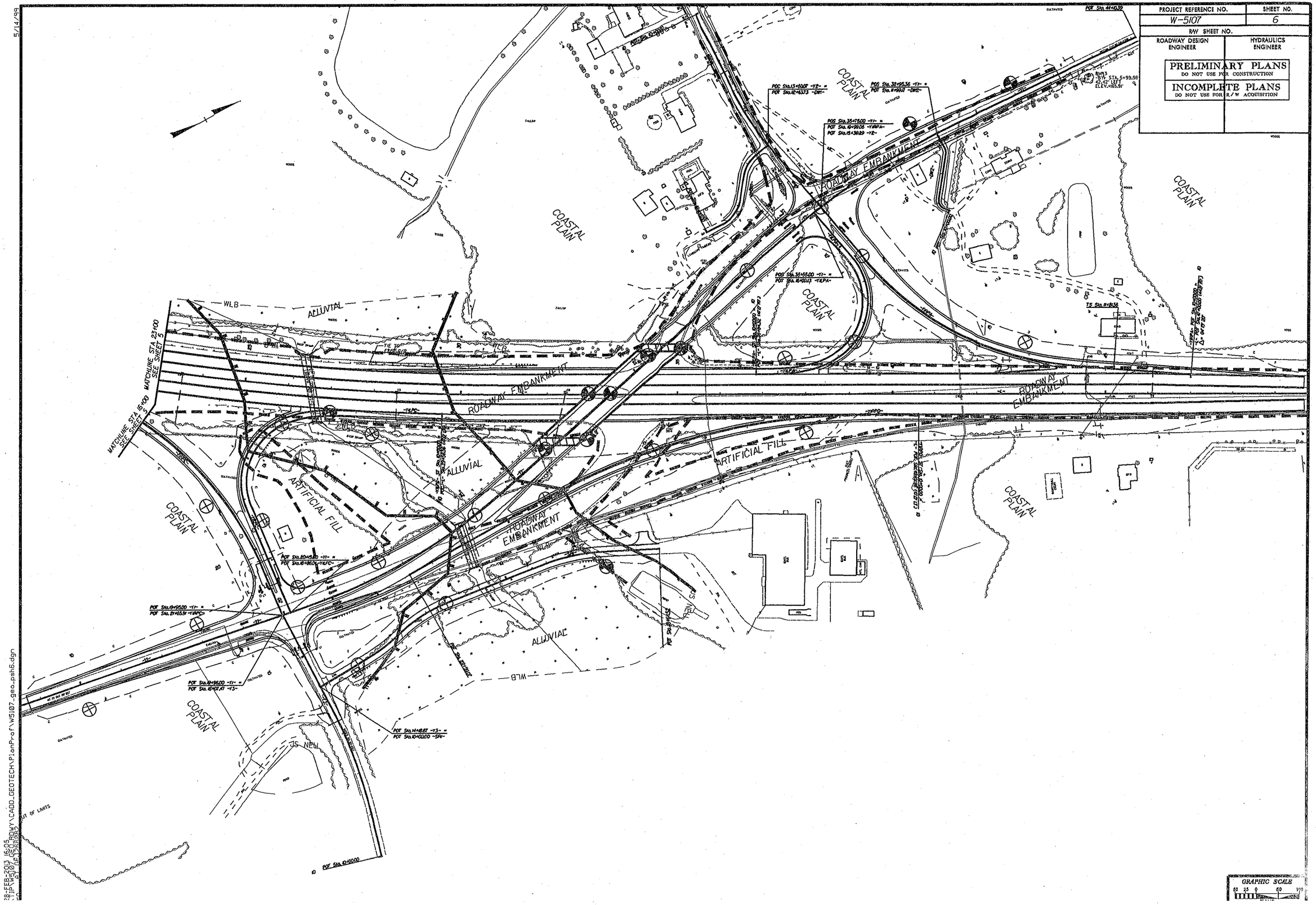

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R/W SHEET NO.	
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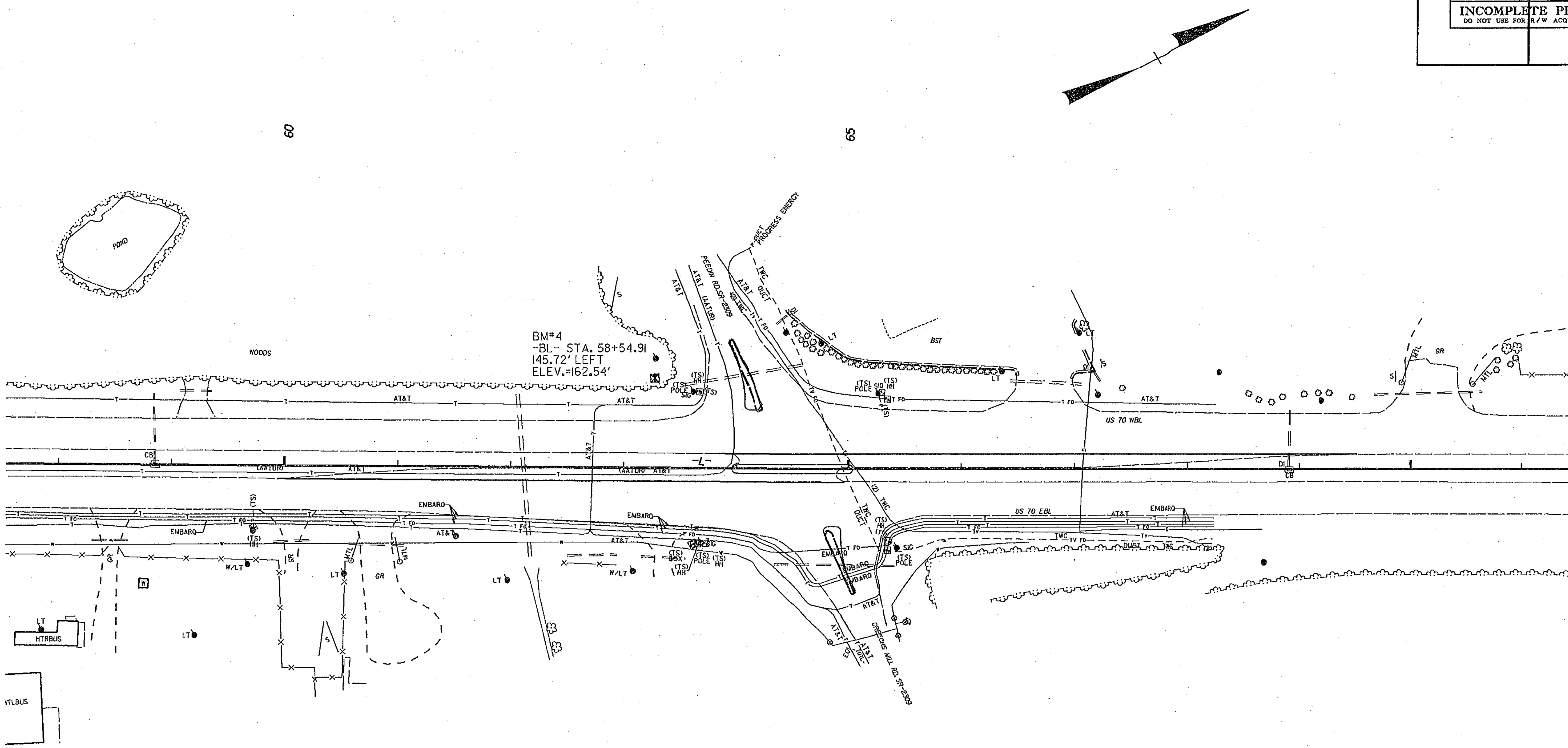

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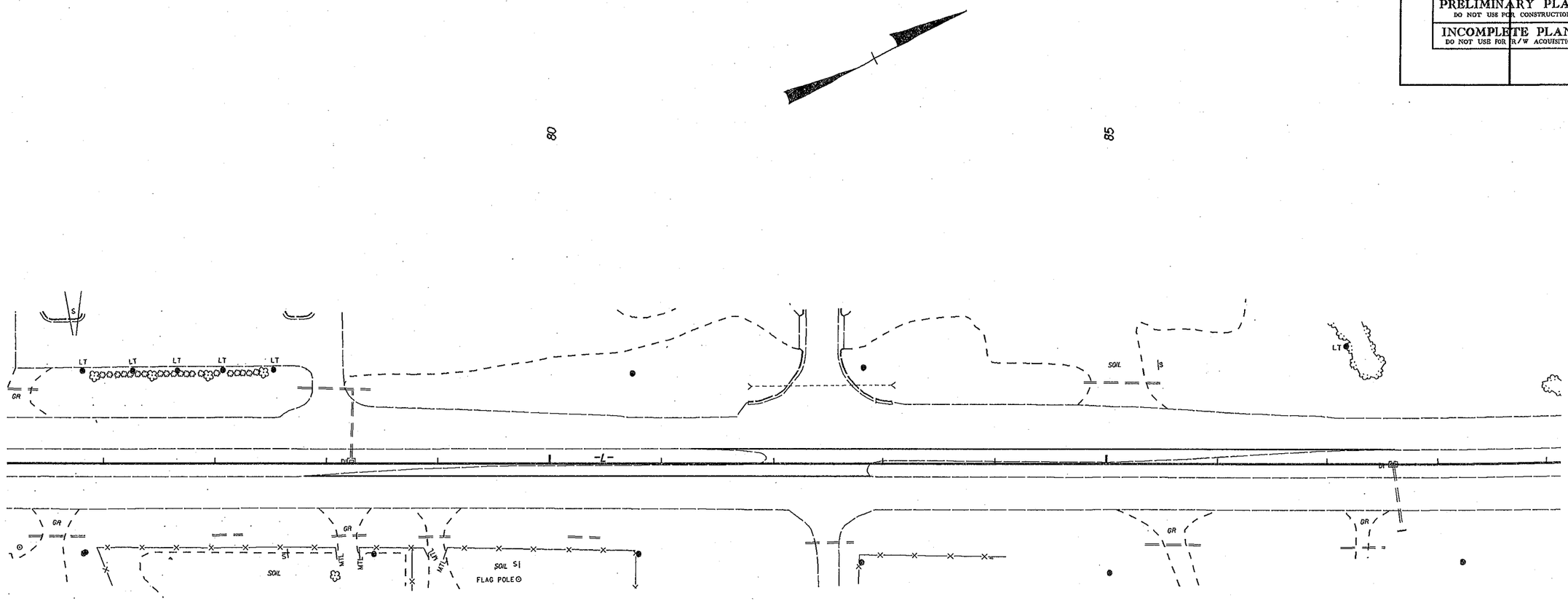

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ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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INCOMPLETE PLANS
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R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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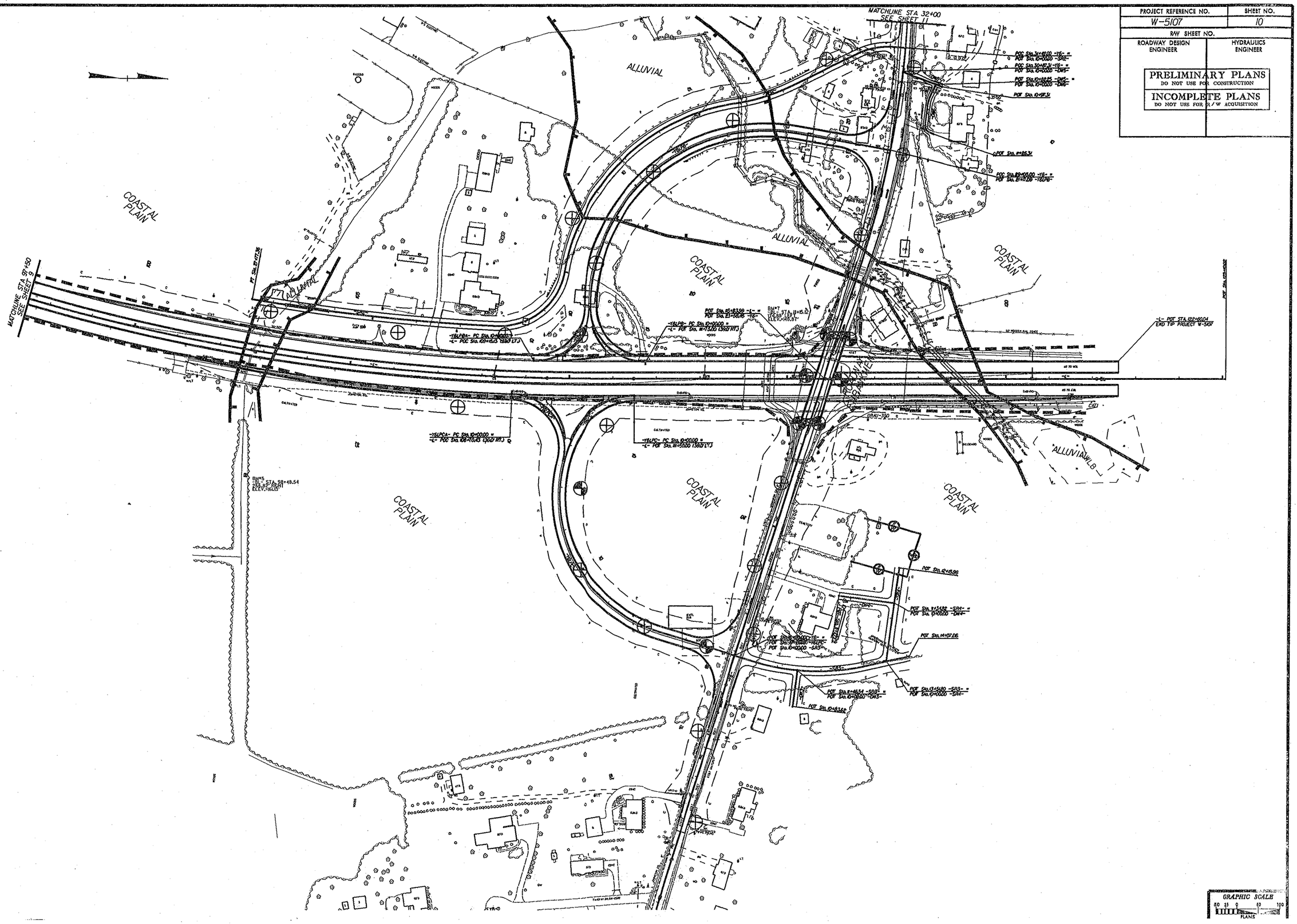
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION



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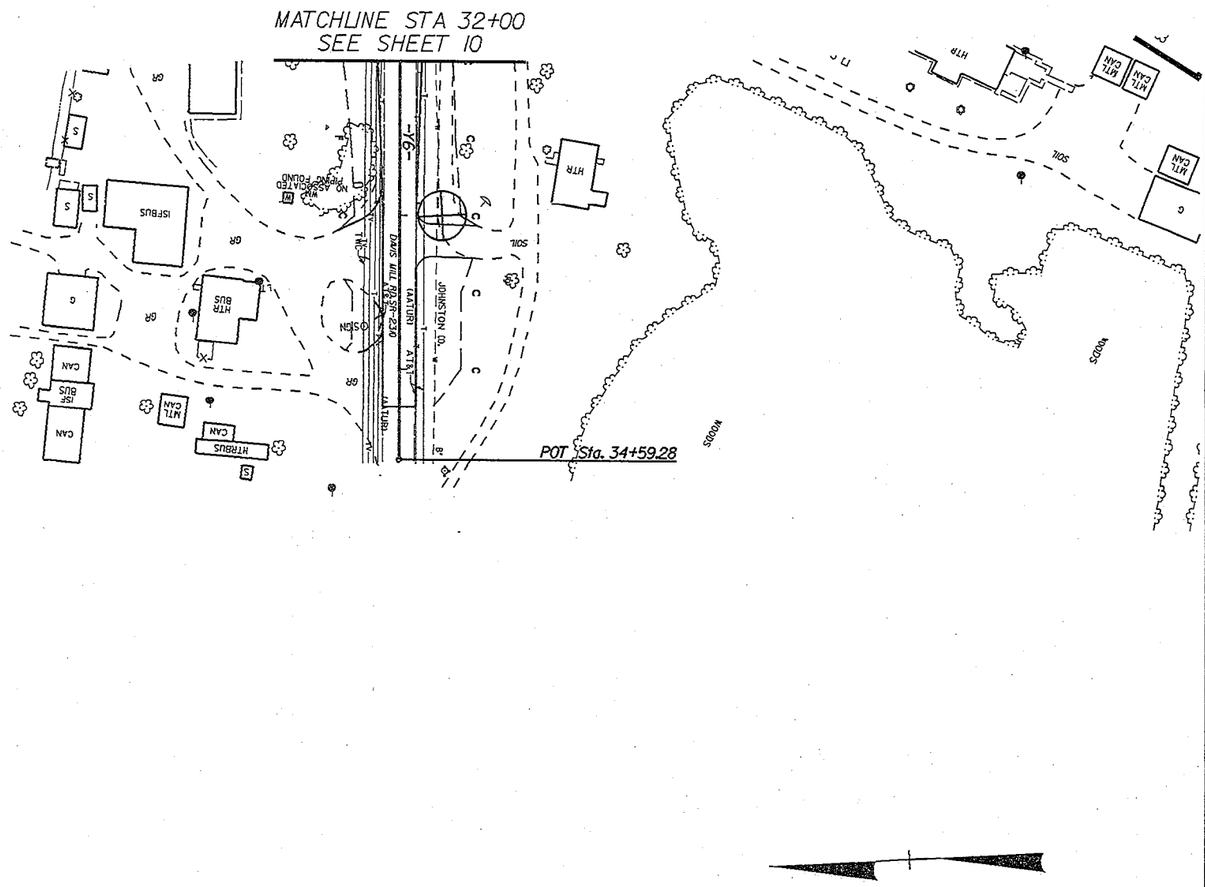

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R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

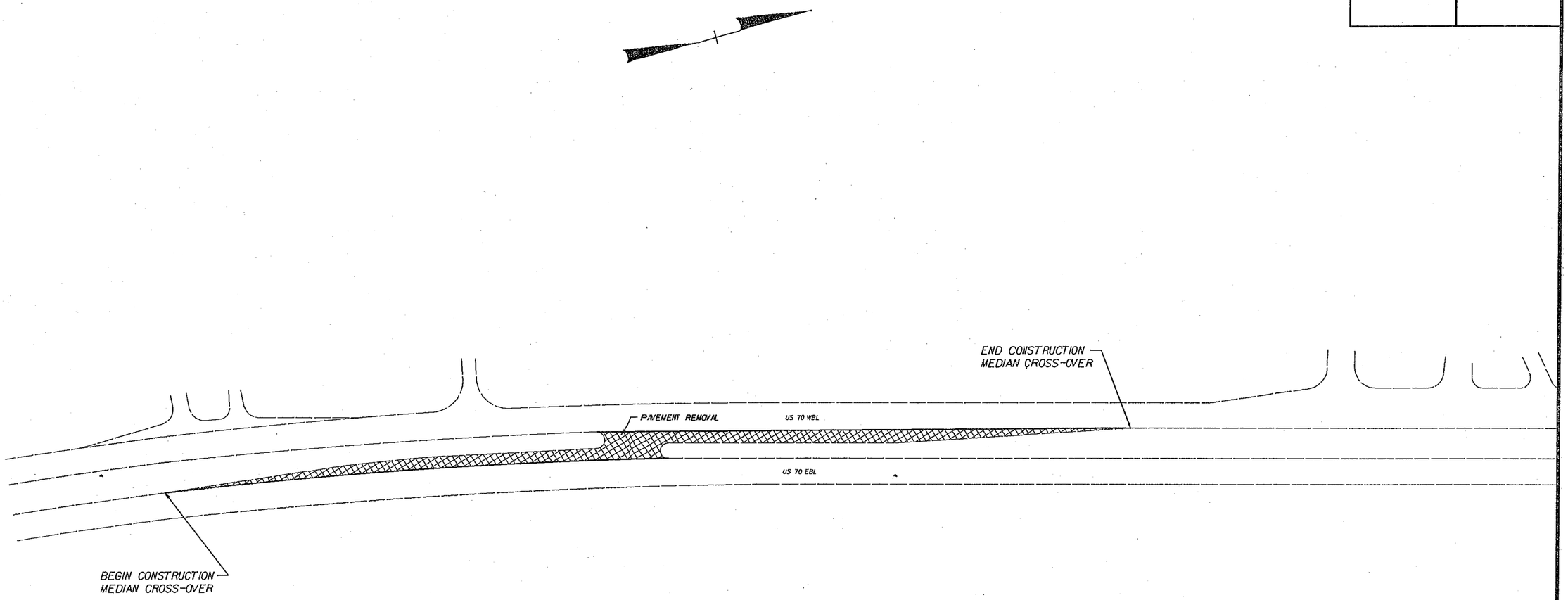
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PROJECT REFERENCE NO.	SHEET NO.
W-5107	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION



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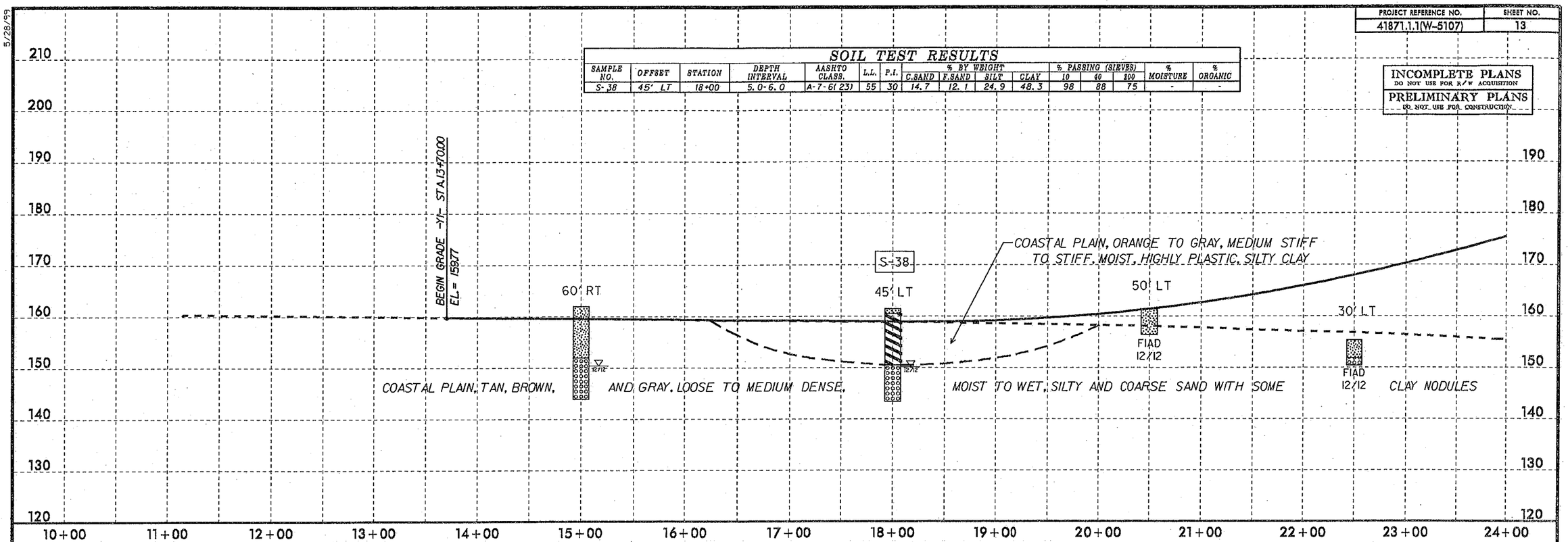
PROJECT REFERENCE NO.	SHEET NO.
41871.1.1(W-5107)	13

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-38	45' LT	18+00	5.0-6.0	A-7-6(23)	55	30	14.7	12.1	24.9	48.3	98	88	75	-	-



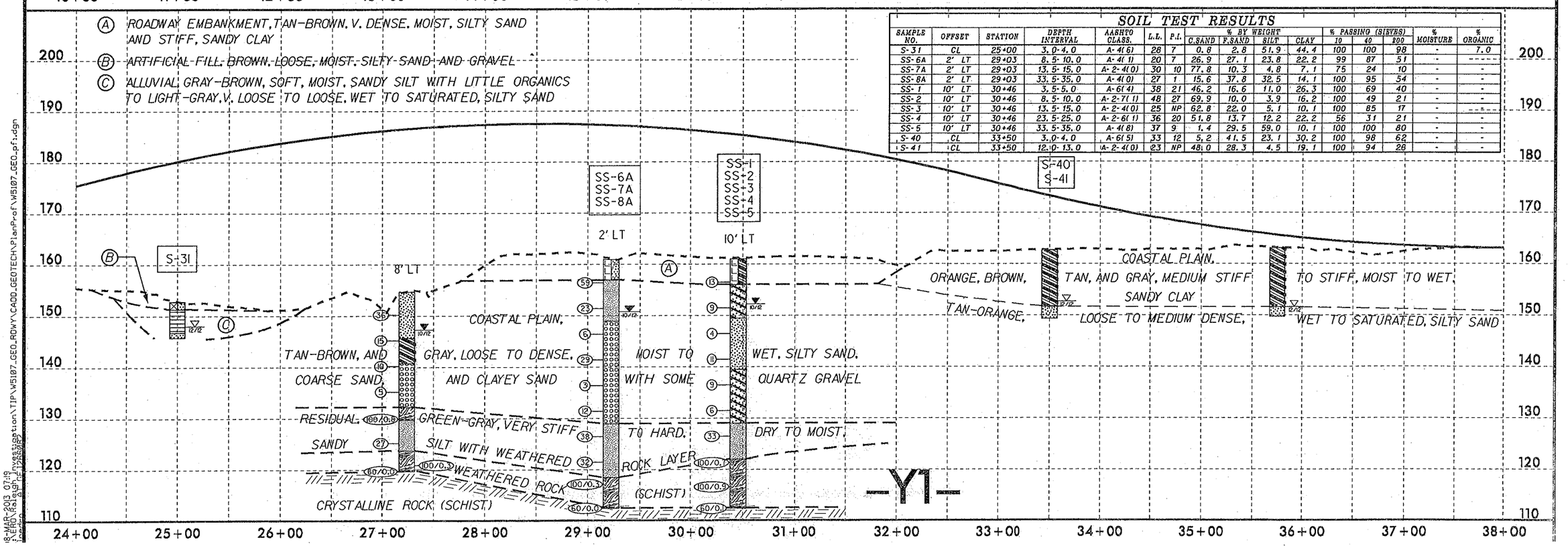
Ⓐ ROADWAY EMBANKMENT, TAN-BROWN, V. DENSE, MOIST, SILTY SAND AND STIFF, SANDY CLAY

Ⓑ ~~ARTIFICIAL FILL, BROWN, LOOSE, MOIST, SILTY SAND AND GRAVEL~~

Ⓒ ALLUVIAL, GRAY-BROWN, SOFT, MOIST, SANDY SILT WITH LITTLE ORGANICS TO LIGHT-GRAY, V. LOOSE TO LOOSE, WET TO SATURATED, SILTY SAND

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-31	CL	25+00	3.0-4.0	A-4(6)	28	7	0.8	2.8	51.9	44.4	100	100	98	-	7.0
SS-6A	2' LT	29+03	8.5-10.0	A-4(1)	20	7	26.9	27.1	23.8	22.2	99	87	51	-	----
SS-7A	2' LT	29+03	13.5-15.0	A-2-4(0)	30	10	77.8	10.3	4.8	7.1	75	24	10	-	-
SS-8A	2' LT	29+03	33.5-35.0	A-4(0)	27	1	15.6	37.8	32.5	14.1	100	95	54	-	-
SS-1	10' LT	30+46	3.5-5.0	A-6(4)	38	21	46.2	16.6	11.0	26.3	100	69	40	-	-
SS-2	10' LT	30+46	8.5-10.0	A-2-7(1)	48	27	69.9	10.0	3.9	16.2	100	49	21	-	-
SS-3	10' LT	30+46	13.5-15.0	A-2-4(0)	25	NP	62.8	22.0	5.1	10.1	100	85	17	-	-
SS-4	10' LT	30+46	23.5-25.0	A-2-6(1)	36	20	51.8	13.7	12.2	22.2	56	31	21	-	-
SS-5	10' LT	30+46	33.5-35.0	A-4(8)	37	9	1.4	29.5	59.0	10.1	100	100	80	-	-
S-40	CL	33+50	3.0-4.0	A-6(5)	33	12	5.2	41.5	23.1	30.2	100	98	62	-	-
S-41	CL	33+50	12.0-13.0	A-2-4(0)	23	NP	48.0	28.3	4.5	19.1	100	94	26	-	-



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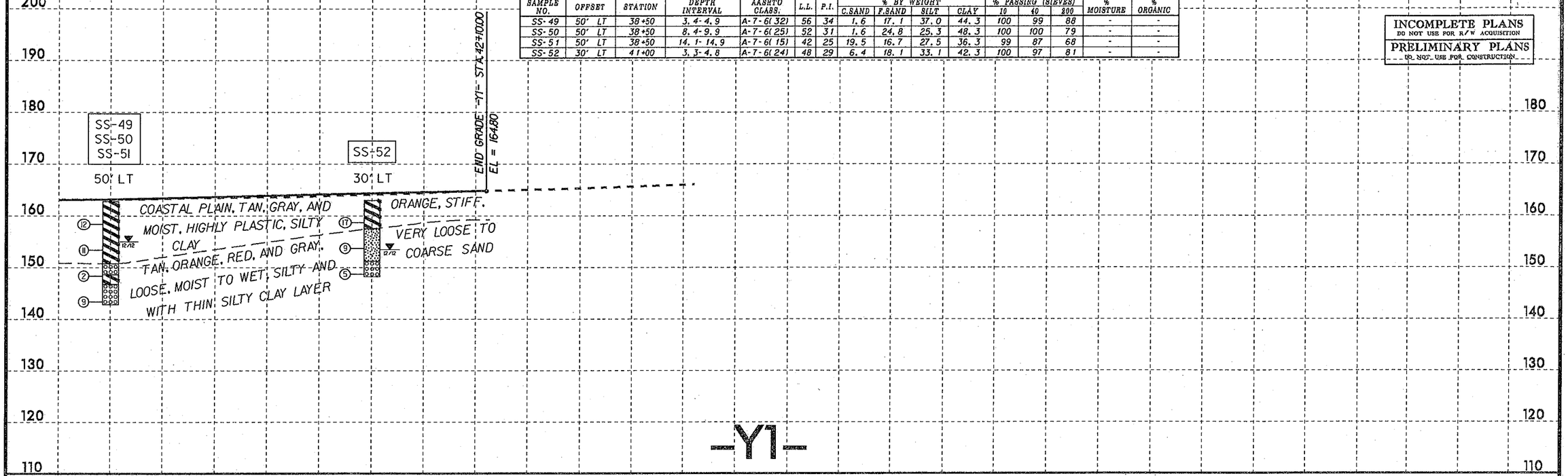
PROJECT REFERENCE NO.	SHEET NO.
41871.1.1(W-5107)	14

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

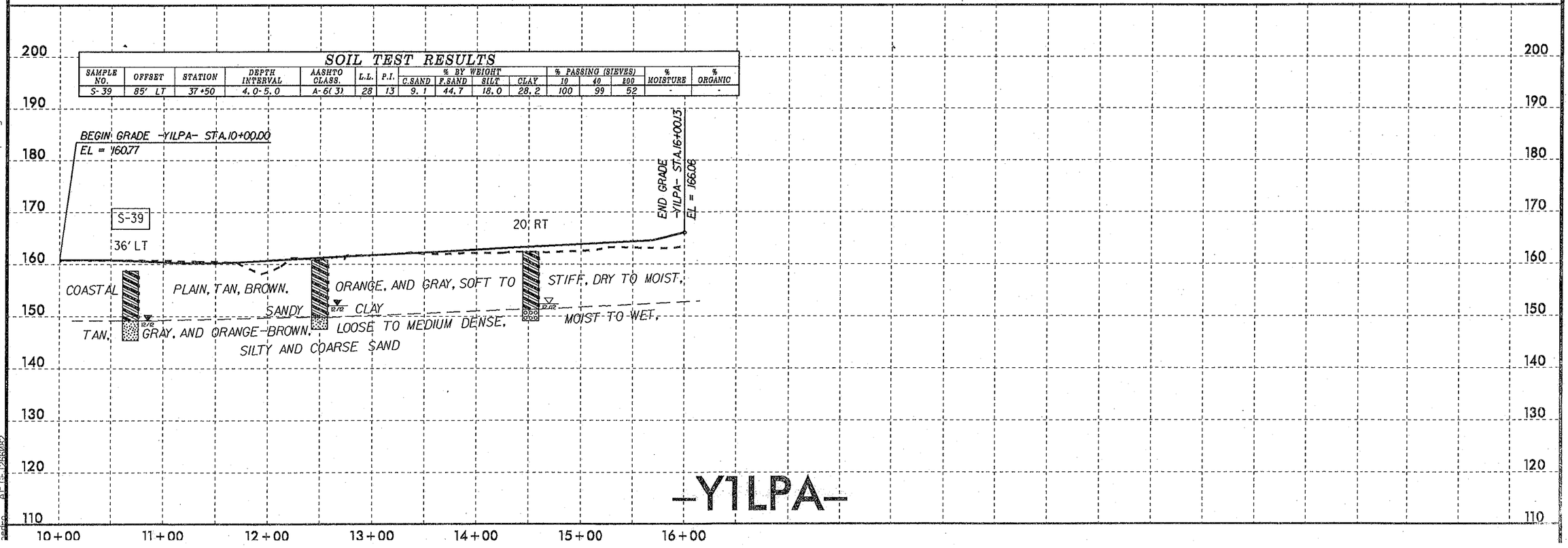
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-49	50' LT	38+50	3.4-4.9	A-7-6(32)	56	34	1.6	17.1	37.0	44.3	100	99	88	-	-
SS-50	50' LT	38+50	8.4-9.9	A-7-6(25)	52	31	1.6	24.8	25.3	48.3	100	100	79	-	-
SS-51	50' LT	38+50	14.1-14.9	A-7-6(15)	42	25	19.5	16.7	27.5	36.3	99	87	68	-	-
SS-52	30' LT	41+00	3.3-4.8	A-7-6(24)	48	29	6.4	18.1	33.1	42.3	100	97	81	-	-



SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-39	85' LT	37+50	4.0-5.0	A-6(3)	28	13	9.1	44.7	18.0	28.2	100	99	52	-	-



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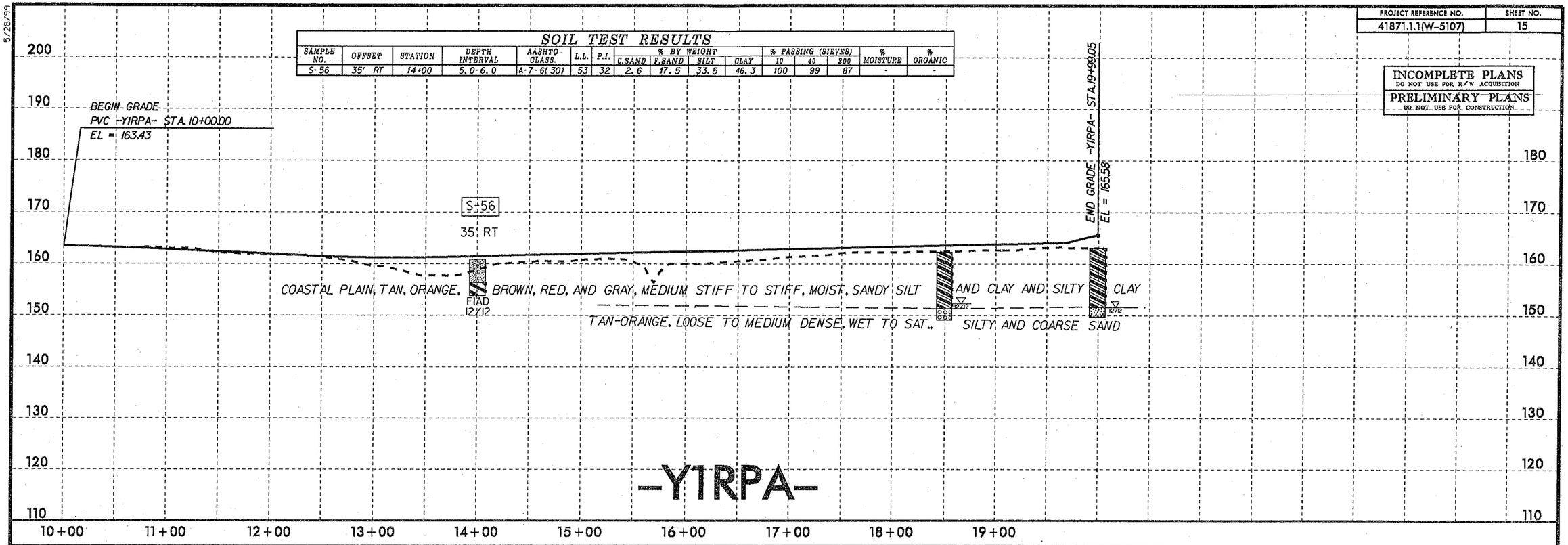
5/28/99

PROJECT REFERENCE NO.	SHEET NO.
41871.1.1(W-5107)	15

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

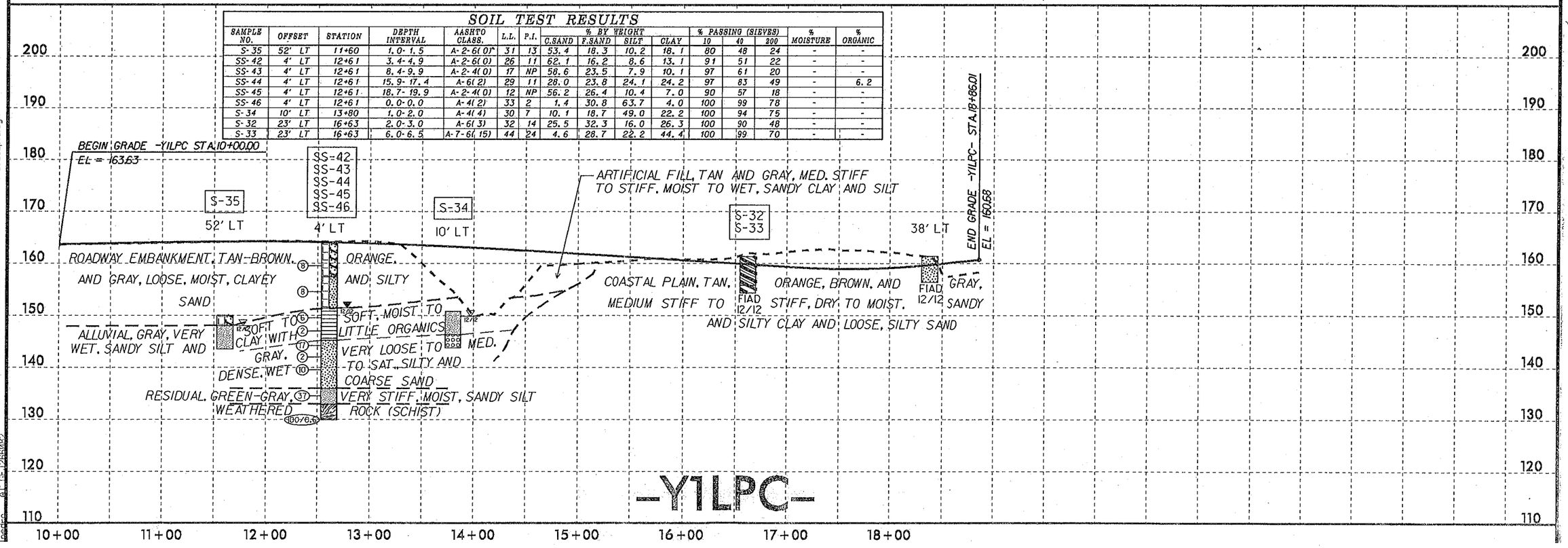
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-56	35' RT	14+00	5.0-6.0	A-7-6(30)	53	32	2.6	17.5	33.5	46.3	100	99	87	-	-



SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-35	52' LT	11+60	1.0-1.5	A-2-6(0)*	31	13	53.4	18.3	10.2	18.1	80	48	24	-	-
SS-42	4' LT	12+61	3.4-4.9	A-2-6(0)	26	11	62.1	16.2	8.6	13.1	91	51	22	-	-
SS-43	4' LT	12+61	8.4-9.9	A-2-4(0)	17	NP	58.6	23.5	7.9	10.1	97	61	20	-	-
SS-44	4' LT	12+61	15.9-17.4	A-6(2)	29	11	28.0	23.8	24.1	24.2	97	83	49	-	6.2
SS-45	4' LT	12+61	18.7-19.9	A-2-4(0)	12	NP	56.2	26.4	10.4	7.0	90	57	18	-	-
SS-46	4' LT	12+61	0.0-0.0	A-4(2)	33	2	1.4	30.8	63.7	4.0	100	99	78	-	-
S-34	10' LT	13+80	1.0-2.0	A-4(4)	30	7	10.1	18.7	49.0	22.2	100	94	75	-	-
S-32	23' LT	16+63	2.0-3.0	A-6(3)	32	14	25.5	32.3	16.0	26.3	100	90	48	-	-
S-33	23' LT	16+63	6.0-6.5	A-7-6(15)	44	24	4.6	28.7	22.2	44.4	100	99	70	-	-



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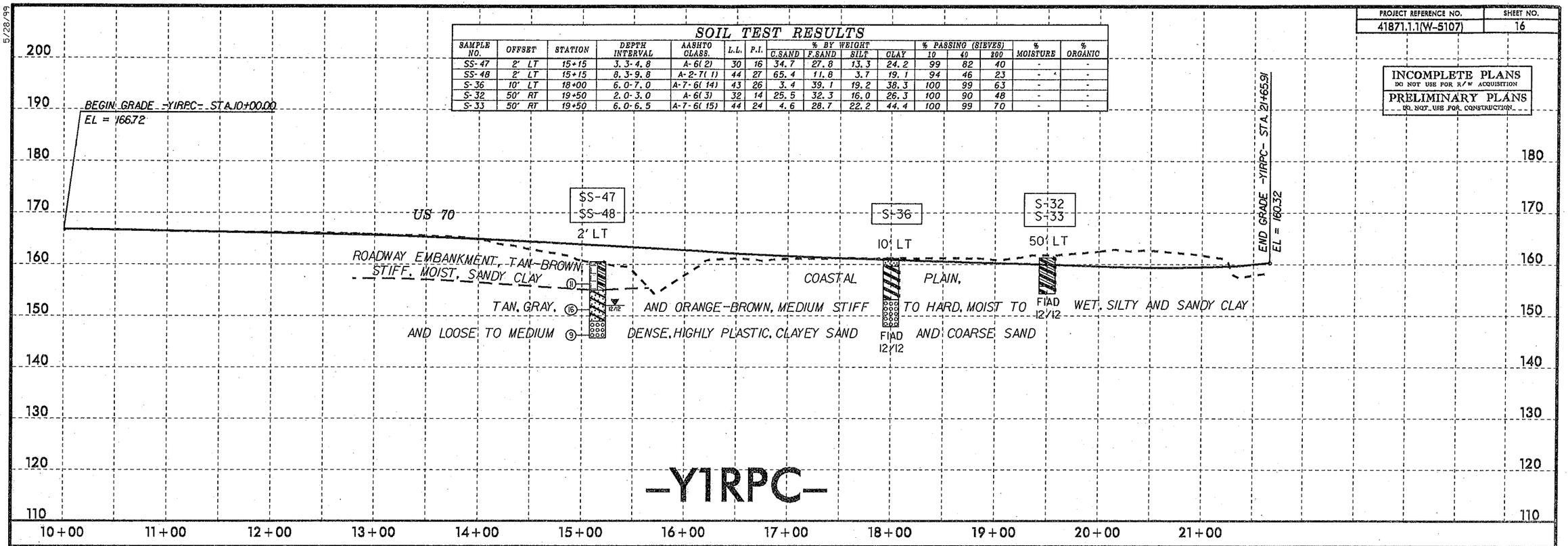
5/28/99

PROJECT REFERENCE NO.	SHEET NO.
41871.1.1(W-5107)	16

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

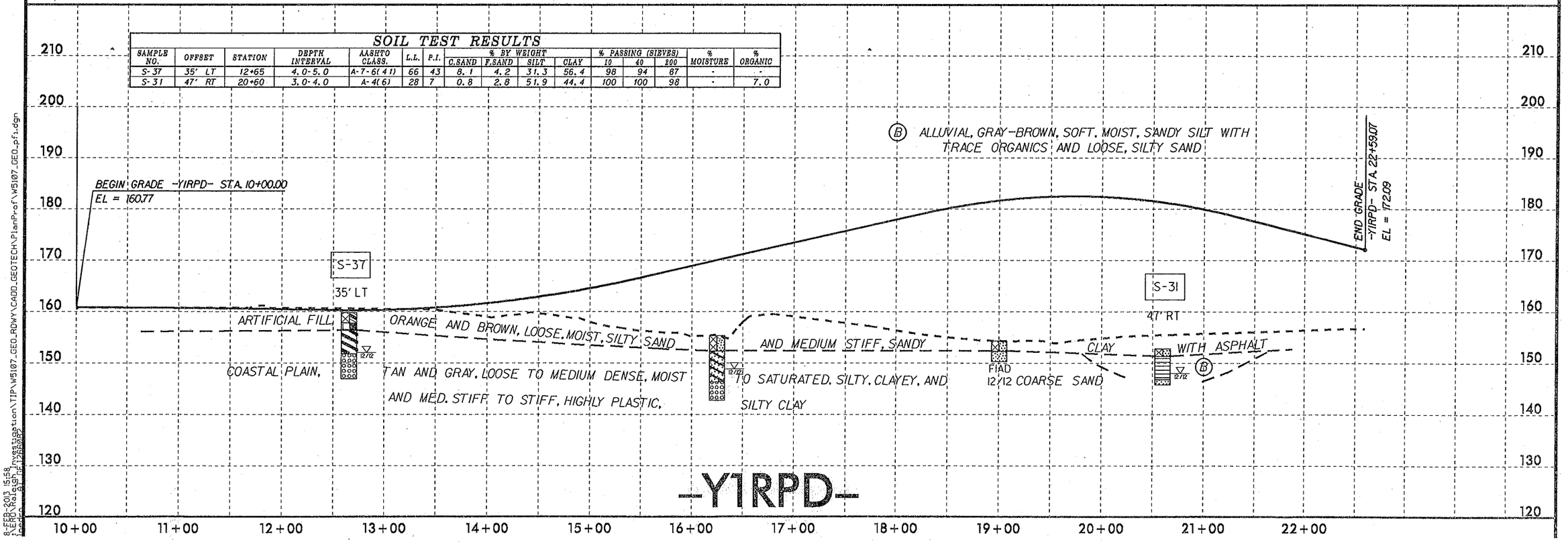
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-47	2' LT	15+15	3.3-4.8	A-6(2)	30	16	34.7	27.8	13.3	24.2	99	82	40	-	-
SS-48	2' LT	15+15	8.3-9.8	A-2-7(1)	44	27	65.4	11.8	3.7	19.1	94	46	23	-	-
S-36	10' LT	18+00	6.0-7.0	A-7-6(14)	43	26	3.4	39.1	19.2	38.3	100	99	63	-	-
S-32	50' RT	19+50	2.0-3.0	A-6(3)	32	14	25.5	32.3	16.0	26.3	100	90	48	-	-
S-33	50' RT	19+50	6.0-6.5	A-7-6(15)	44	24	4.6	28.7	22.2	44.4	100	99	70	-	-



SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-37	35' LT	12+65	4.0-5.0	A-7-6(41)	66	43	8.1	4.2	31.3	56.4	98	94	87	-	-
S-31	47' RT	20+60	3.0-4.0	A-4(6)	28	7	0.8	2.8	51.9	44.4	100	100	98	-	7.0



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5/28/99

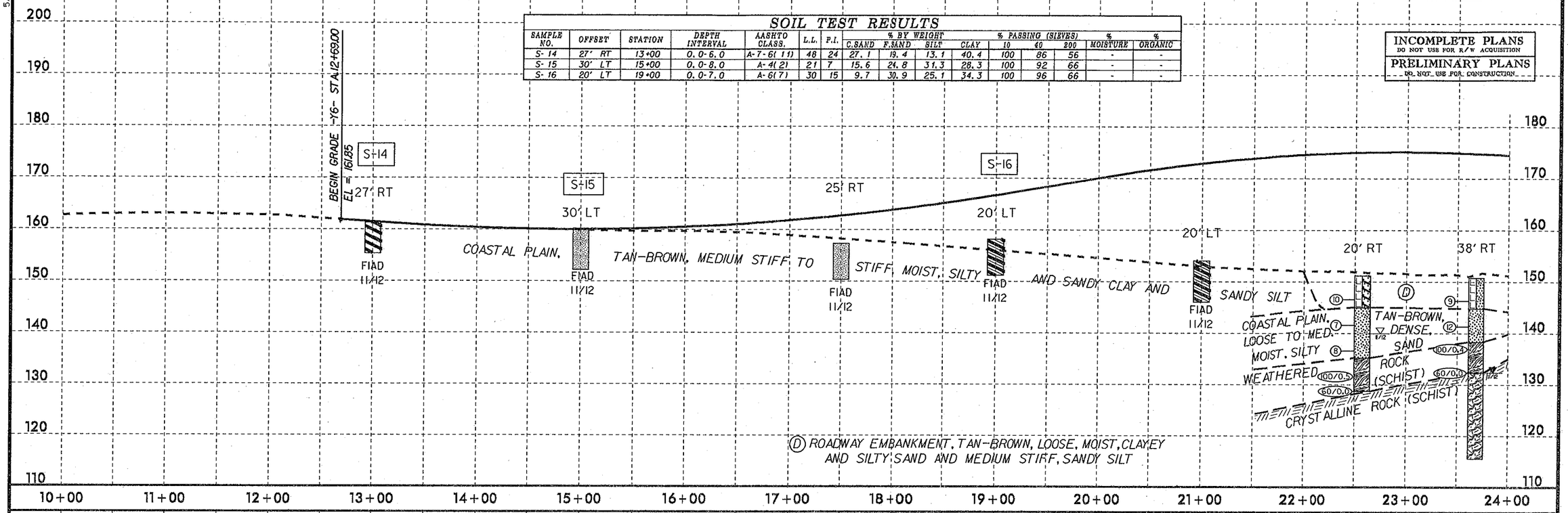
PROJECT REFERENCE NO.	SHEET NO.
41871.1.1(W-5107)	17

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

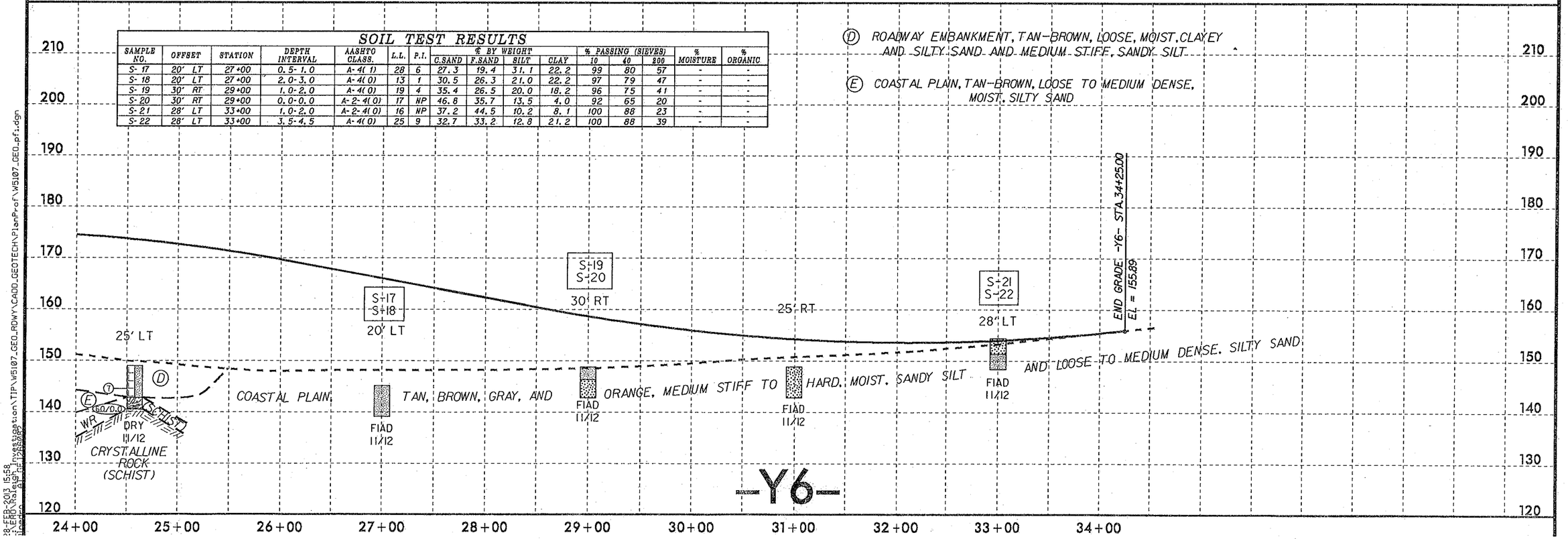
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-14	27' RT	13+00	0.0-6.0	A-7-6(11)	48	24	27.1	19.4	13.1	40.4	100	86	56	-	-
S-15	30' LT	15+00	0.0-8.0	A-4(2)	21	7	15.6	24.8	31.3	28.3	100	92	66	-	-
S-16	20' LT	19+00	0.0-7.0	A-6(7)	30	15	9.7	30.9	25.1	34.3	100	96	66	-	-



SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-17	20' LT	27+00	0.5-1.0	A-4(1)	28	6	27.3	19.4	31.1	22.2	99	80	57	-	-
S-18	20' LT	27+00	2.0-3.0	A-4(0)	13	1	30.5	26.3	21.0	22.2	97	79	47	-	-
S-19	30' RT	29+00	1.0-2.0	A-4(0)	19	4	35.4	26.5	20.0	18.2	96	75	41	-	-
S-20	30' RT	29+00	0.0-0.0	A-2-4(0)	17	NP	46.8	35.7	13.5	4.0	92	65	20	-	-
S-21	28' LT	33+00	1.0-2.0	A-2-4(0)	16	NP	37.2	44.5	10.2	8.1	100	88	23	-	-
S-22	28' LT	33+00	3.5-4.5	A-4(0)	25	9	32.7	33.2	12.8	21.2	100	88	39	-	-



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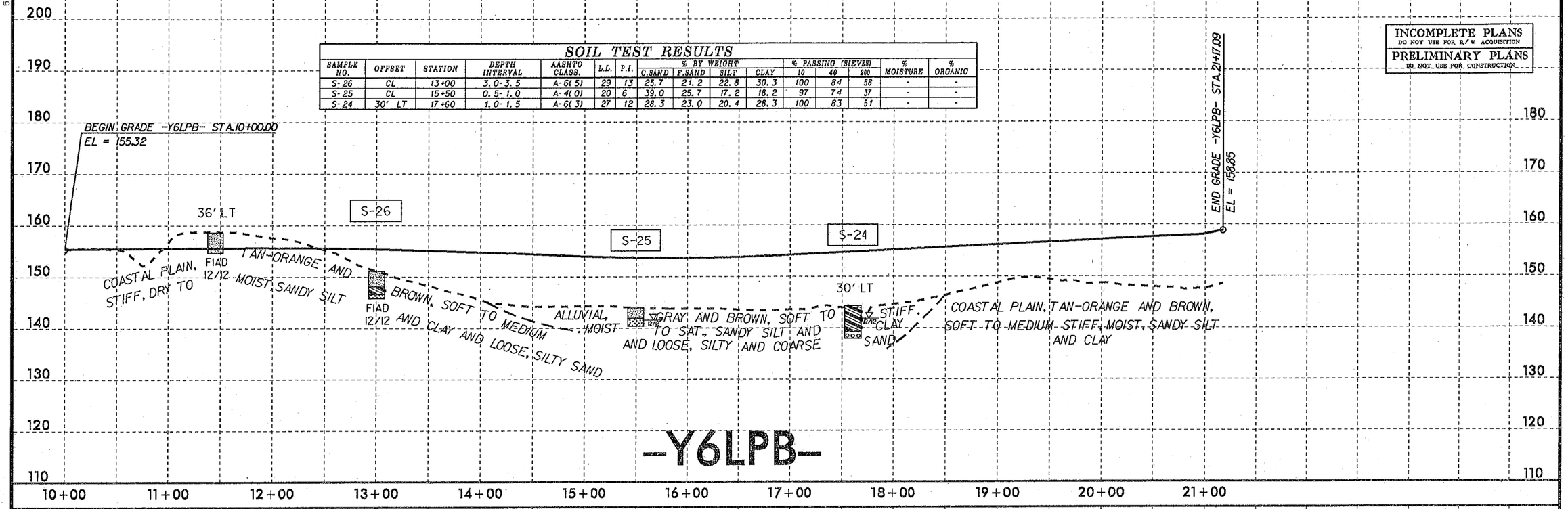
PROJECT REFERENCE NO.	SHEET NO.
41871.1.1(W-5107)	18

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

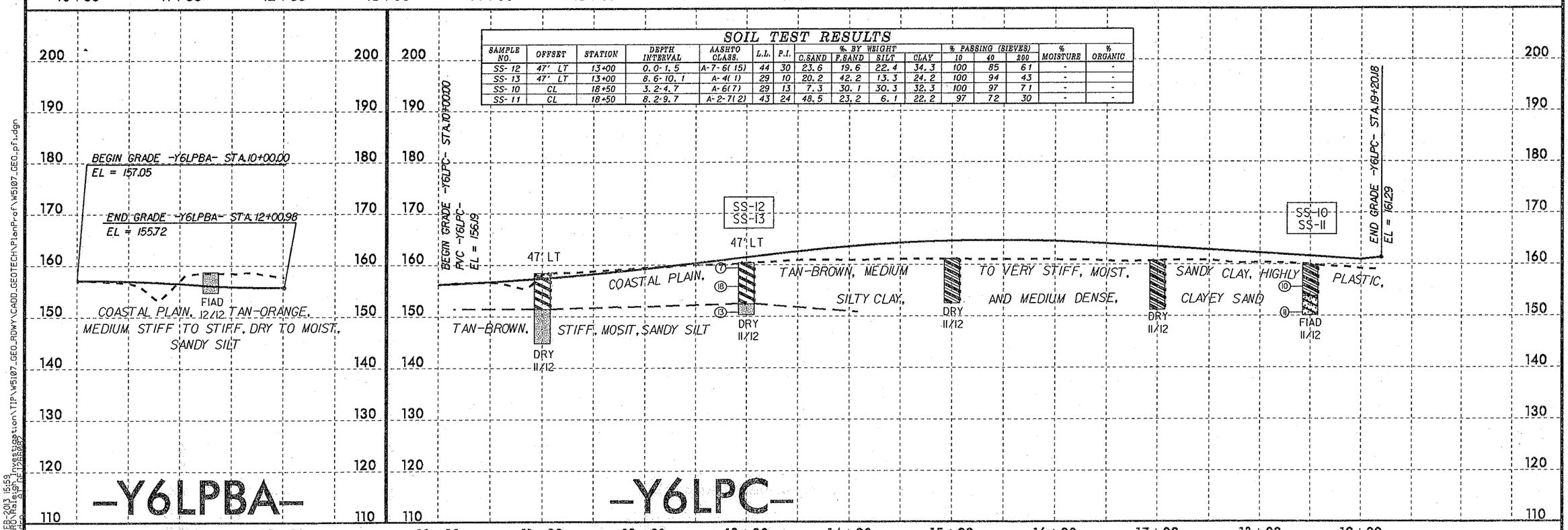
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-26	CL	13+00	3.0-3.5	A-6(5)	29	13	25.7	21.2	22.8	30.3	100	84	58	-	-
S-25	CL	15+50	0.5-1.0	A-4(0)	20	6	39.0	25.7	17.2	18.2	97	74	37	-	-
S-24	30' LT	17+60	1.0-1.5	A-6(3)	27	12	28.3	23.0	20.4	28.3	100	83	51	-	-



SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-12	47' LT	13+00	0.0-1.5	A-7-6(15)	44	30	23.6	19.6	22.4	34.3	100	85	61	-	-
SS-13	47' LT	13+00	8.6-10.1	A-4(1)	29	10	20.2	42.2	13.3	24.2	100	94	43	-	-
SS-10	CL	18+50	3.2-4.7	A-6(7)	29	13	7.3	30.1	30.3	32.3	100	97	71	-	-
SS-11	CL	18+50	8.2-9.7	A-2-7(2)	43	24	48.5	23.2	6.1	22.2	97	72	30	-	-



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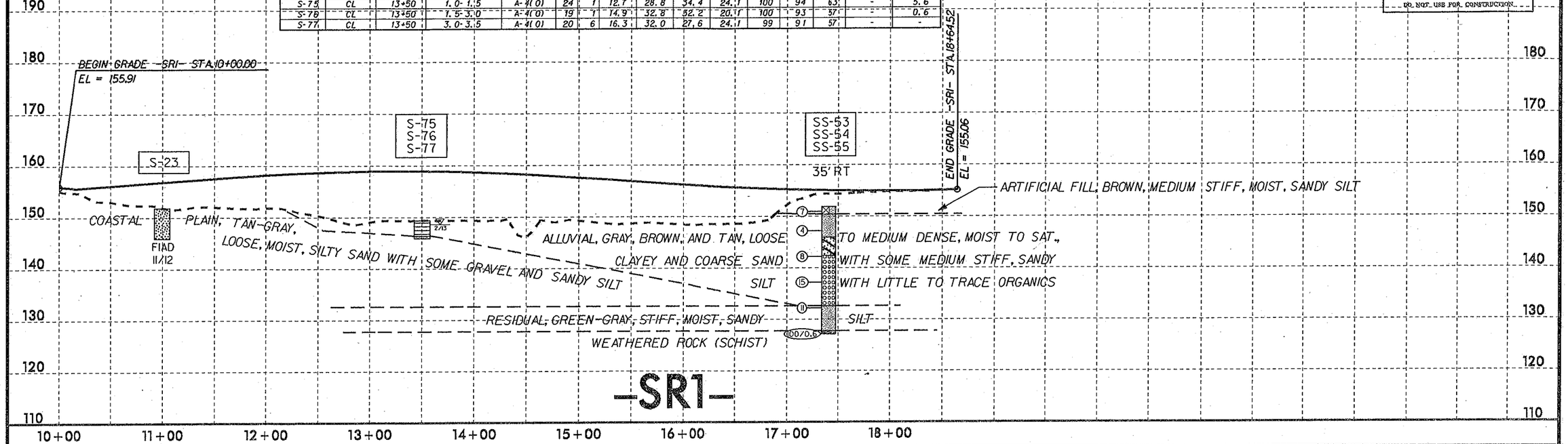
PROJECT REFERENCE NO.	SHEET NO.
41871.1.1(W-5107)	19

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

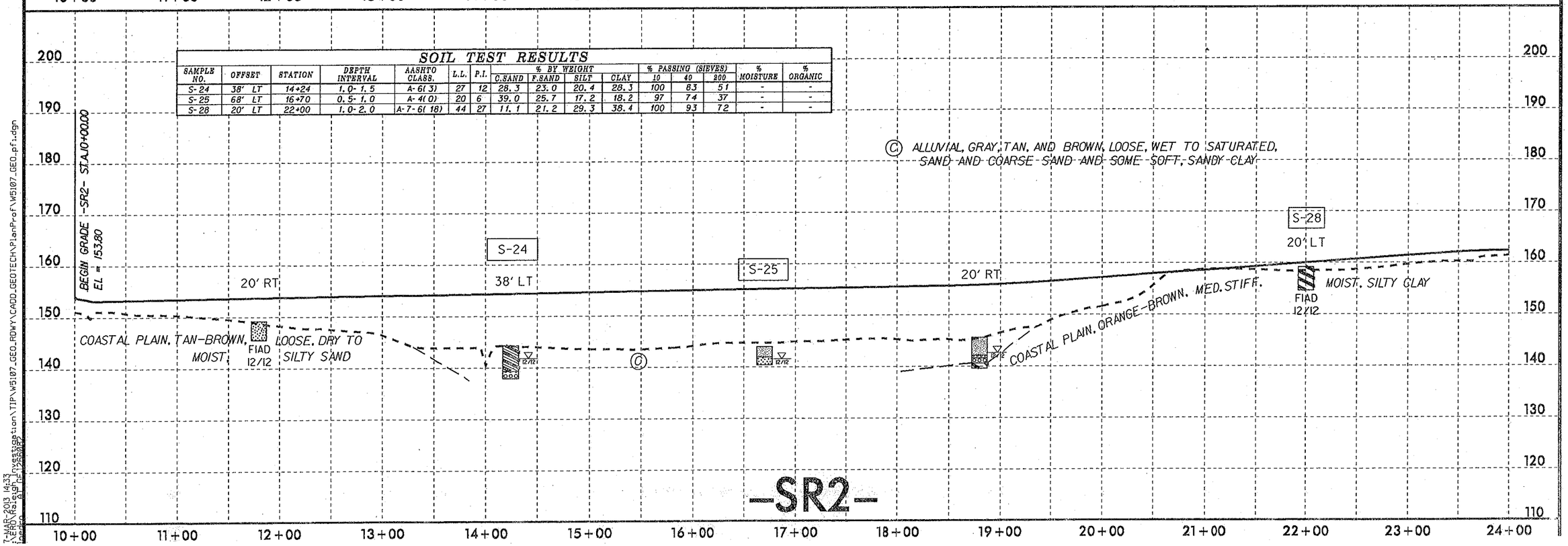
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-23	CL	11+00	0.0-6.0	A-2-4(0)	14	NP	44.6	32.7	14.5	8.1	98	73	27	-	-
SS-53	35' RT	17+40	0.0-1.5	A-4(0)	19	4	23.6	31.4	26.9	18.1	96	83	49	-	-
SS-54	35' RT	17+40	3.7-5.2	A-4(0)	16	3	23.8	31.2	24.9	20.1	96	82	49	-	-
SS-55	35' RT	17+40	8.7-9.5	A-2-6(1)	31	15	50.4	14.3	15.2	20.1	67	41	26	-	-
S-75	CL	13+50	1.0-1.5	A-4(0)	24	1	12.7	28.8	34.4	24.1	100	94	63	-	5.6
S-76	CL	13+50	1.5-3.0	A-4(0)	19	7	14.9	32.8	52.2	20.1	100	93	57	-	0.6
S-77	CL	13+50	3.0-3.5	A-4(0)	20	6	16.3	32.0	27.6	24.1	99	91	57	-	-



SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-24	38' LT	14+24	1.0-1.5	A-6(3)	27	12	28.3	23.0	20.4	28.3	100	83	51	-	-
S-25	68' LT	16+70	0.5-1.0	A-4(0)	20	6	39.0	25.7	17.2	18.2	97	74	37	-	-
S-28	20' LT	22+00	1.0-2.0	A-7-6(18)	44	27	11.1	21.2	29.3	38.4	100	93	72	-	-



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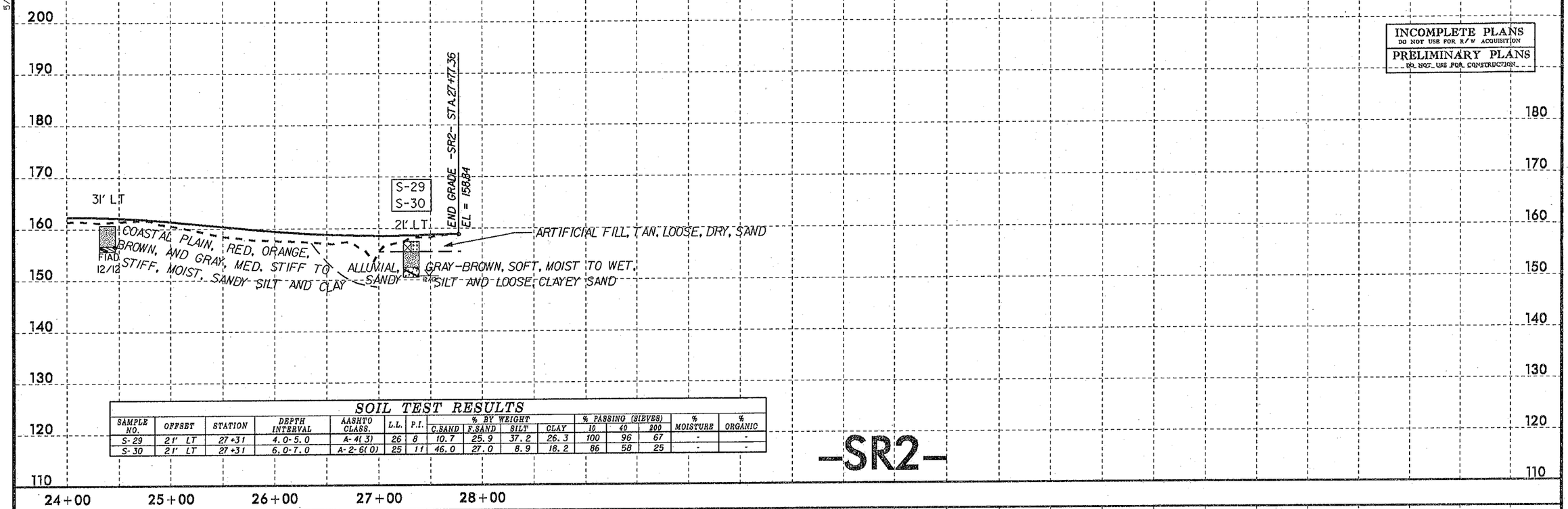
PROJECT REFERENCE NO.	SHEET NO.
41871.1.1(W-5107)	20

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



SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-29	21' LT	27+31	4.0-5.0	A-4(3)	26	8	10.7	25.9	37.2	26.3	100	96	67	-	-
S-30	21' LT	27+31	6.0-7.0	A-2-6(0)	25	11	46.0	27.0	8.9	18.2	86	58	25	-	-

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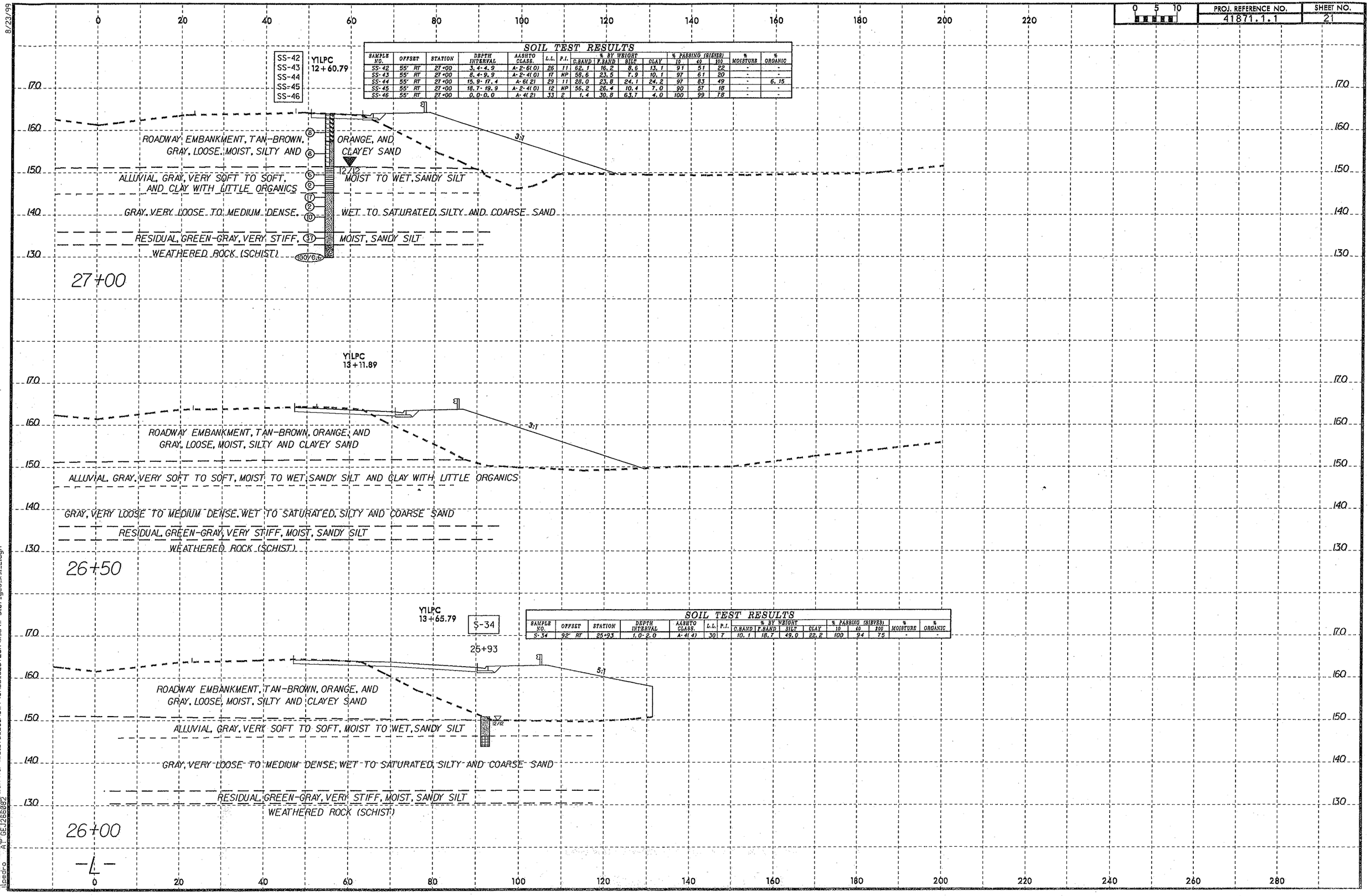

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	100	% MOISTURE	% ORGANIC
SS-42	55' RT	27+00	3.4-4.9	A-2-6(0)	26	11	62.1	16.2	8.6	13.1	91	51	22	-	-
SS-43	55' RT	27+00	6.4-9.9	A-2-4(0)	17	NP	58.6	23.5	7.9	10.1	97	61	20	-	-
SS-44	55' RT	27+00	15.9-17.4	A-6(21)	29	11	28.0	23.8	24.1	24.2	97	83	49	-	6.15
SS-45	55' RT	27+00	18.7-19.9	A-2-4(0)	12	NP	56.2	26.4	10.4	7.0	90	57	18	-	-
SS-46	55' RT	27+00	0.0-0.0	A-4(2)	33	2	1.4	30.8	63.7	4.0	100	99	78	-	-

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	100	% MOISTURE	% ORGANIC
S-34	92' RT	25+93	1.0-2.0	A-4(4)	30	7	10.1	18.7	49.0	22.2	100	94	75	-	-

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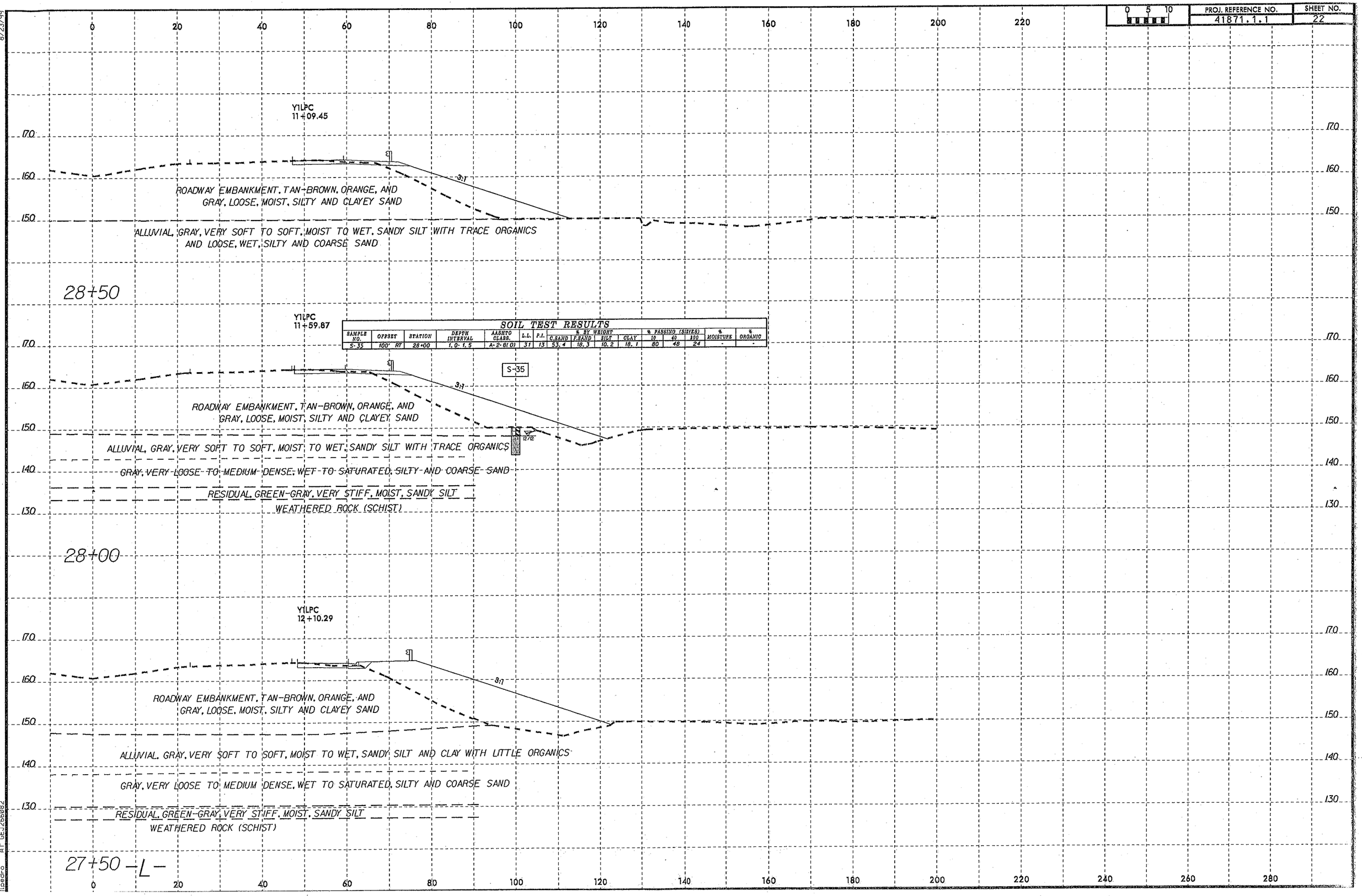
PROJ. REFERENCE NO.	SHEET NO.
41871.1.1	22



SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-35	100' RT	28+00	1.0-1.5	A-2-6(0)	31	13	53.4	18.3	10.2	18.1	80	48	24	-	-

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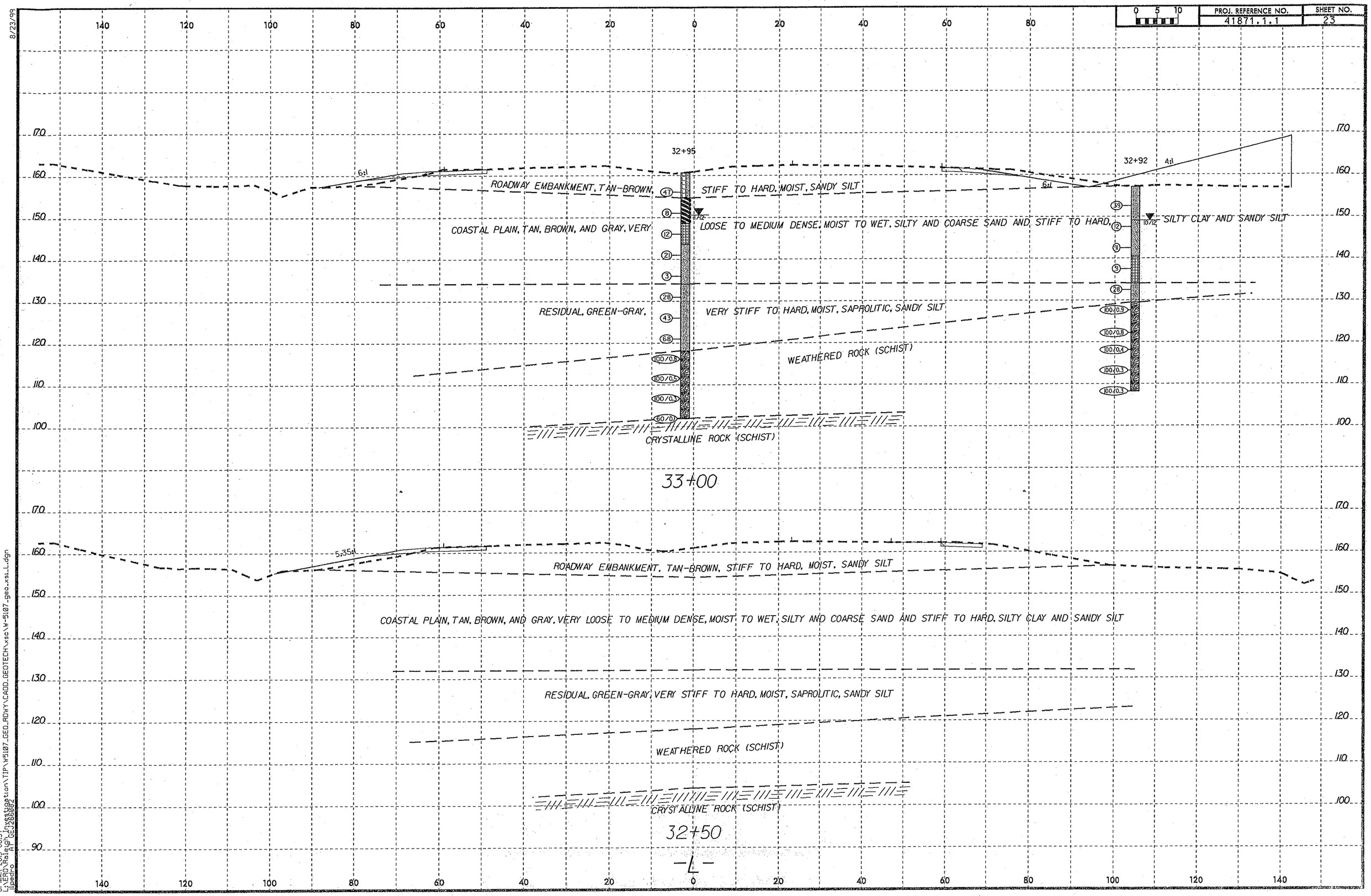

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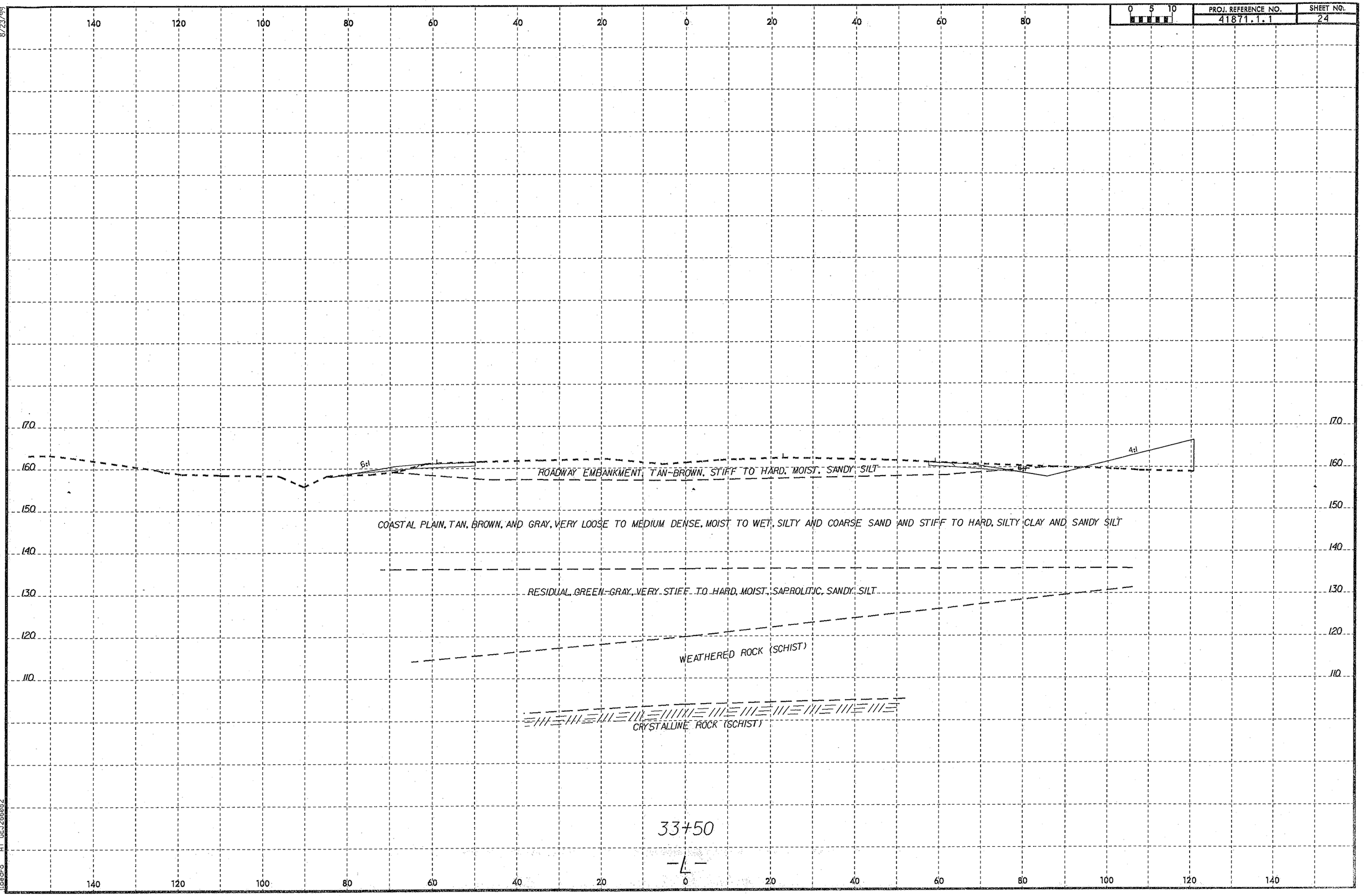
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	41871.1.1	24



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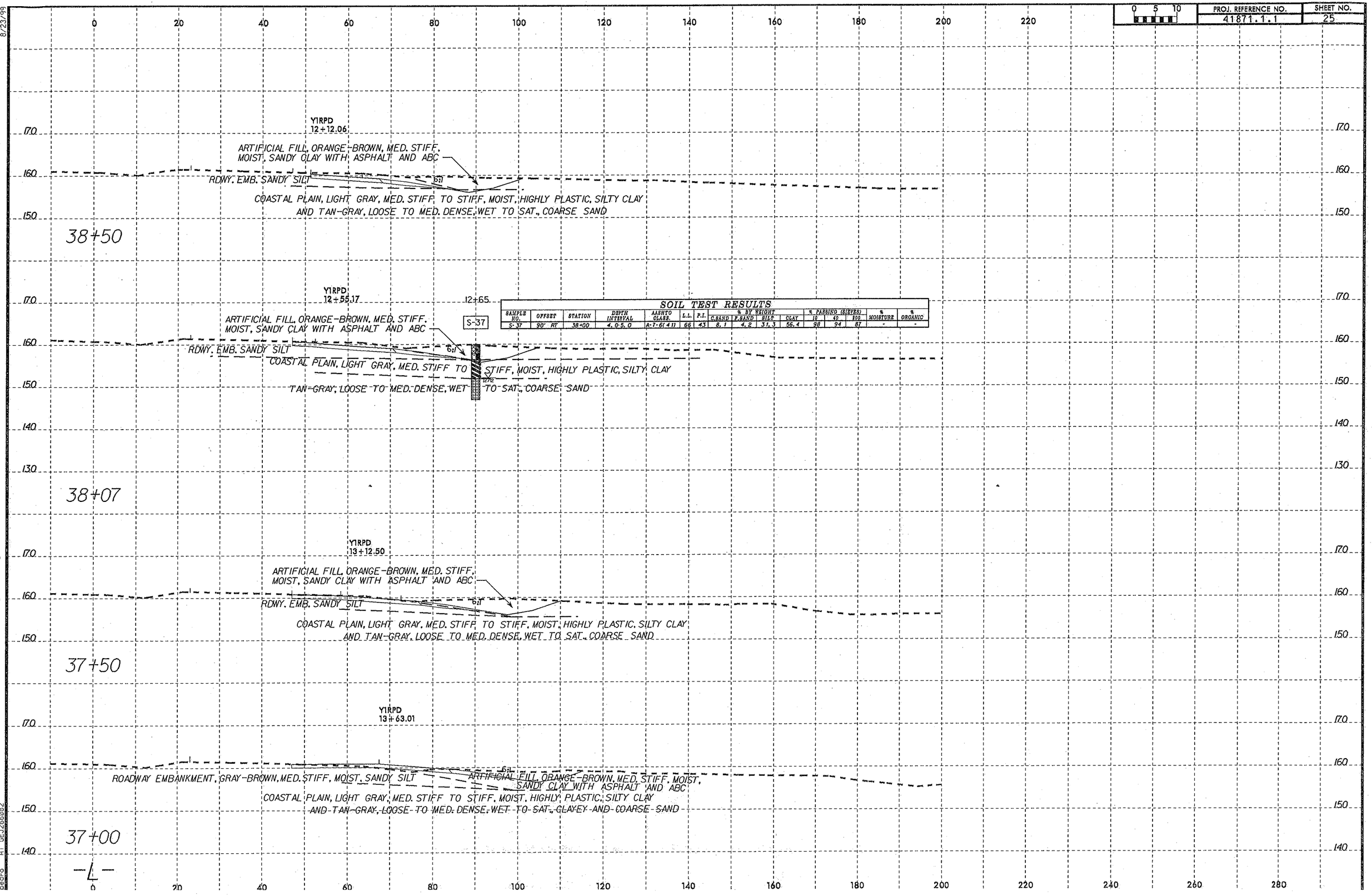
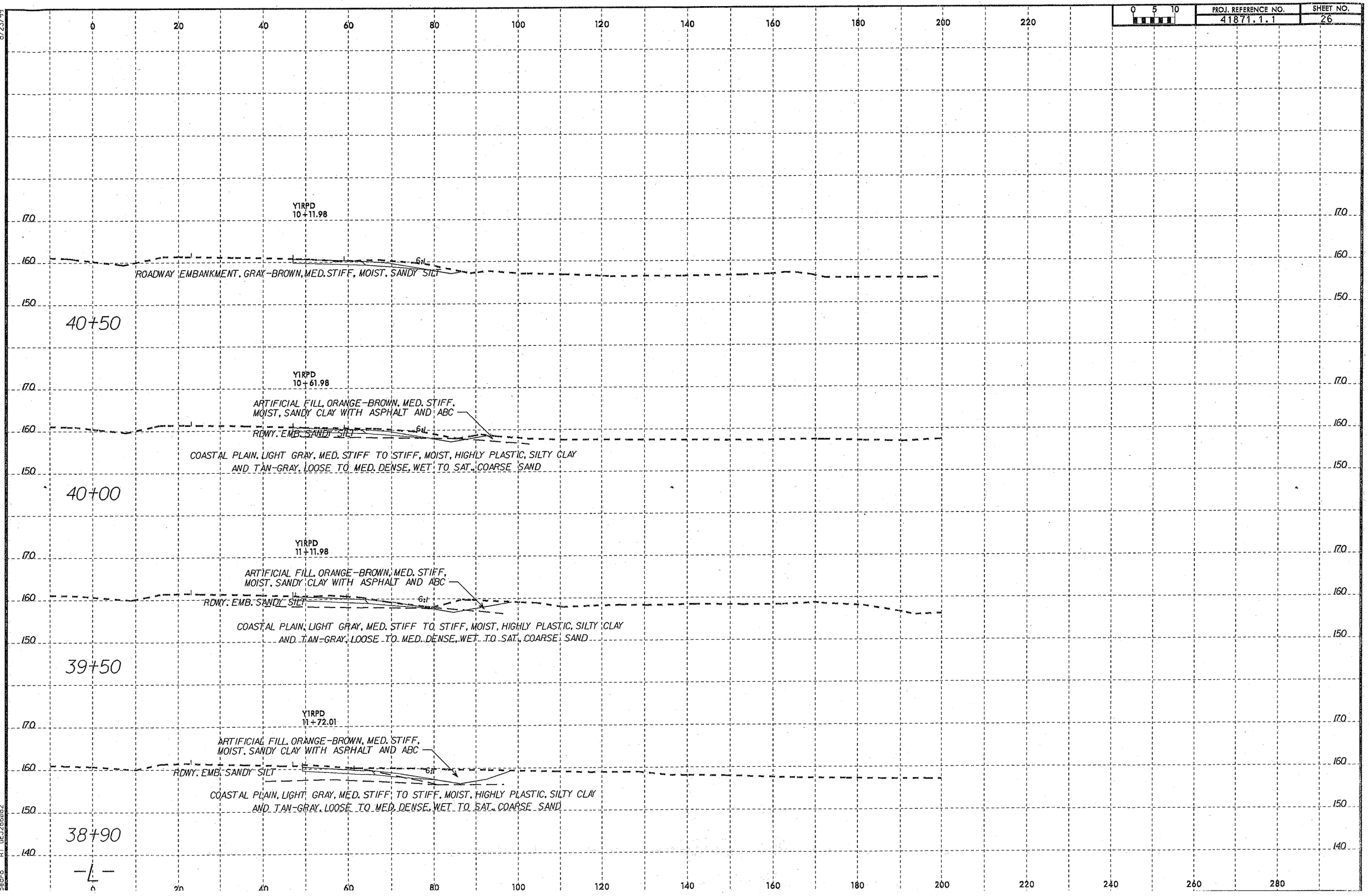


SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-37	90' RT	38+00	4.0-5.0	A-7-6(41)	66	43	8.1	4.2	31.3	56.4	98	94	87	-	-



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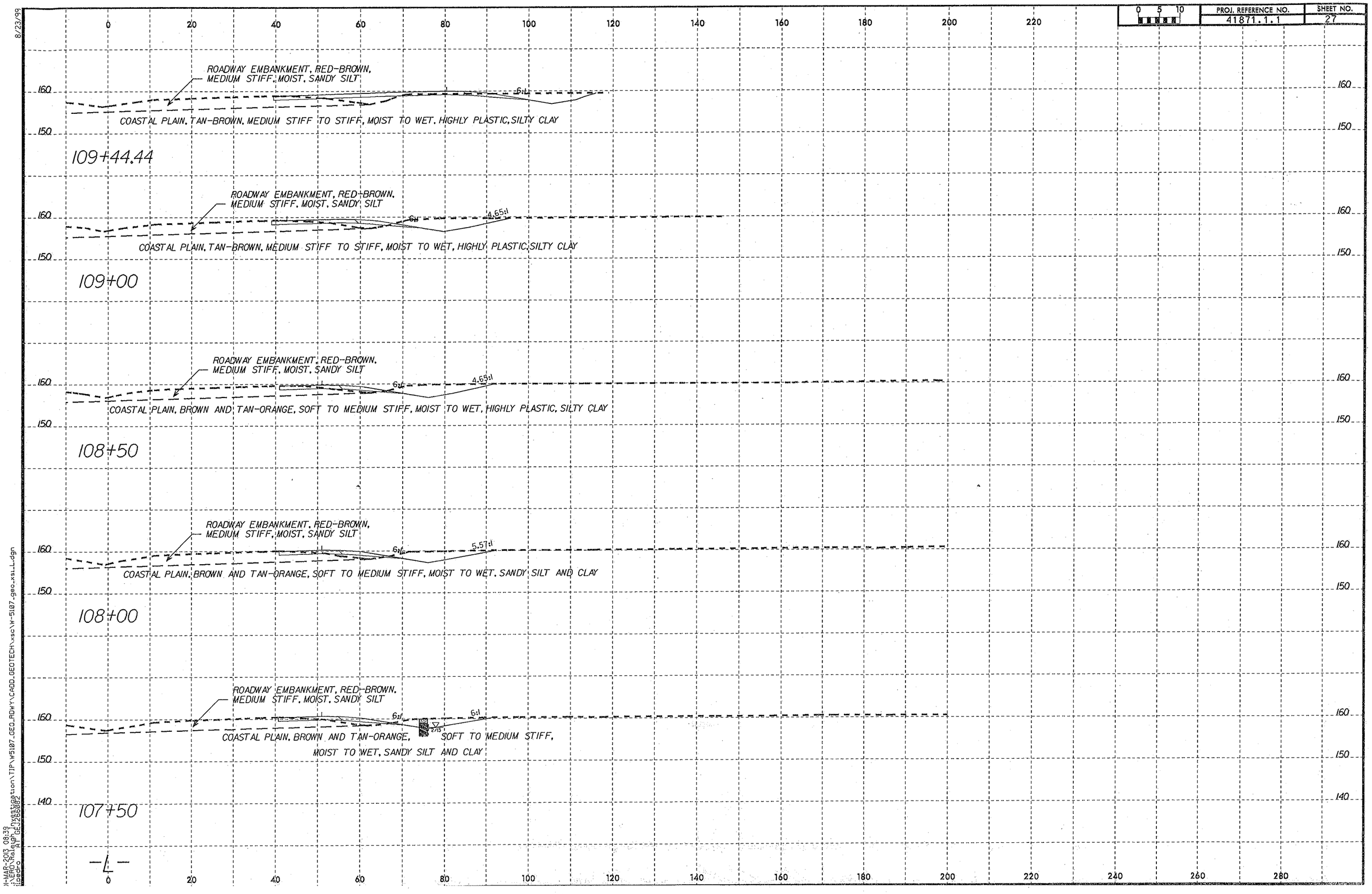

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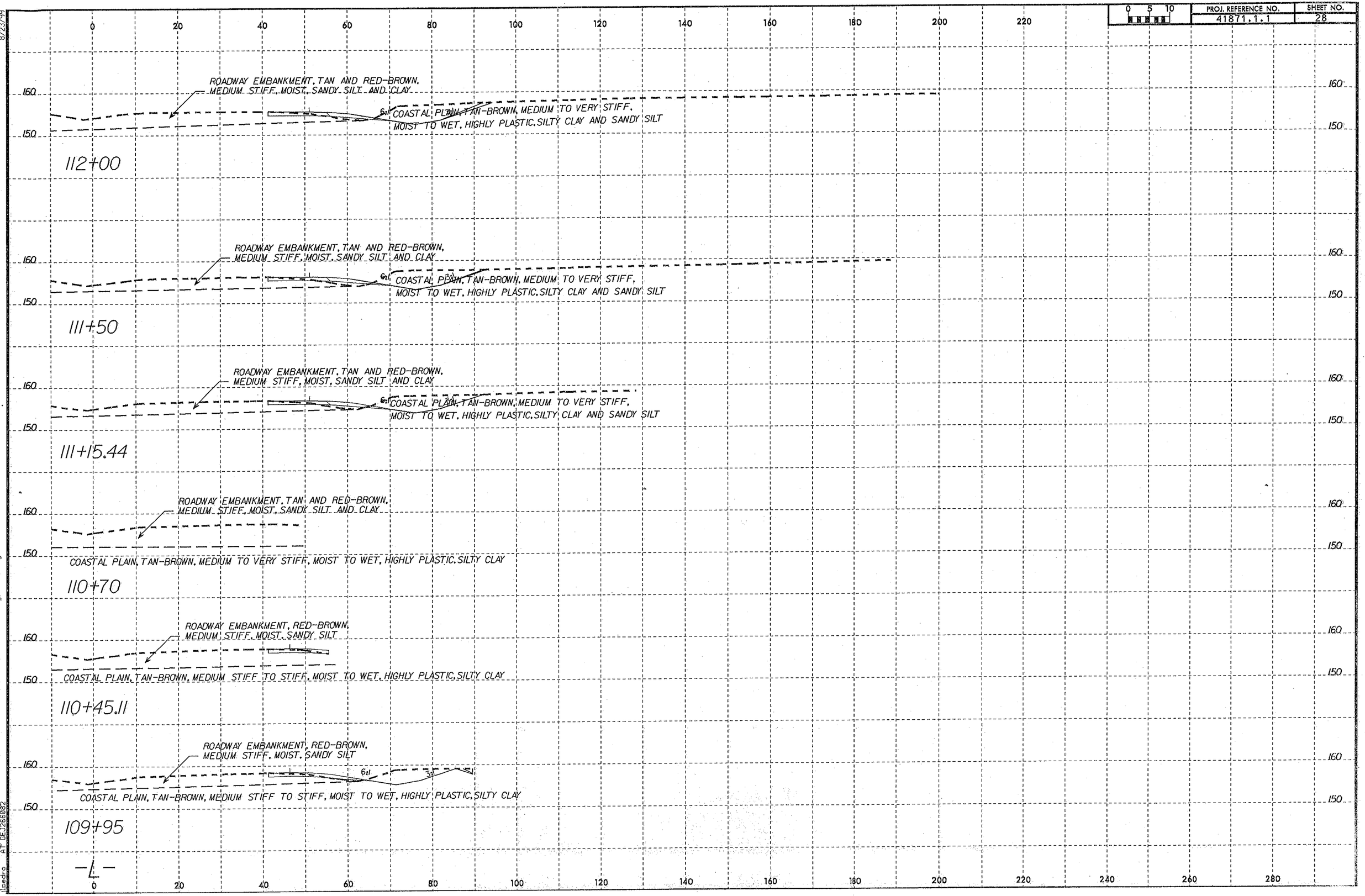

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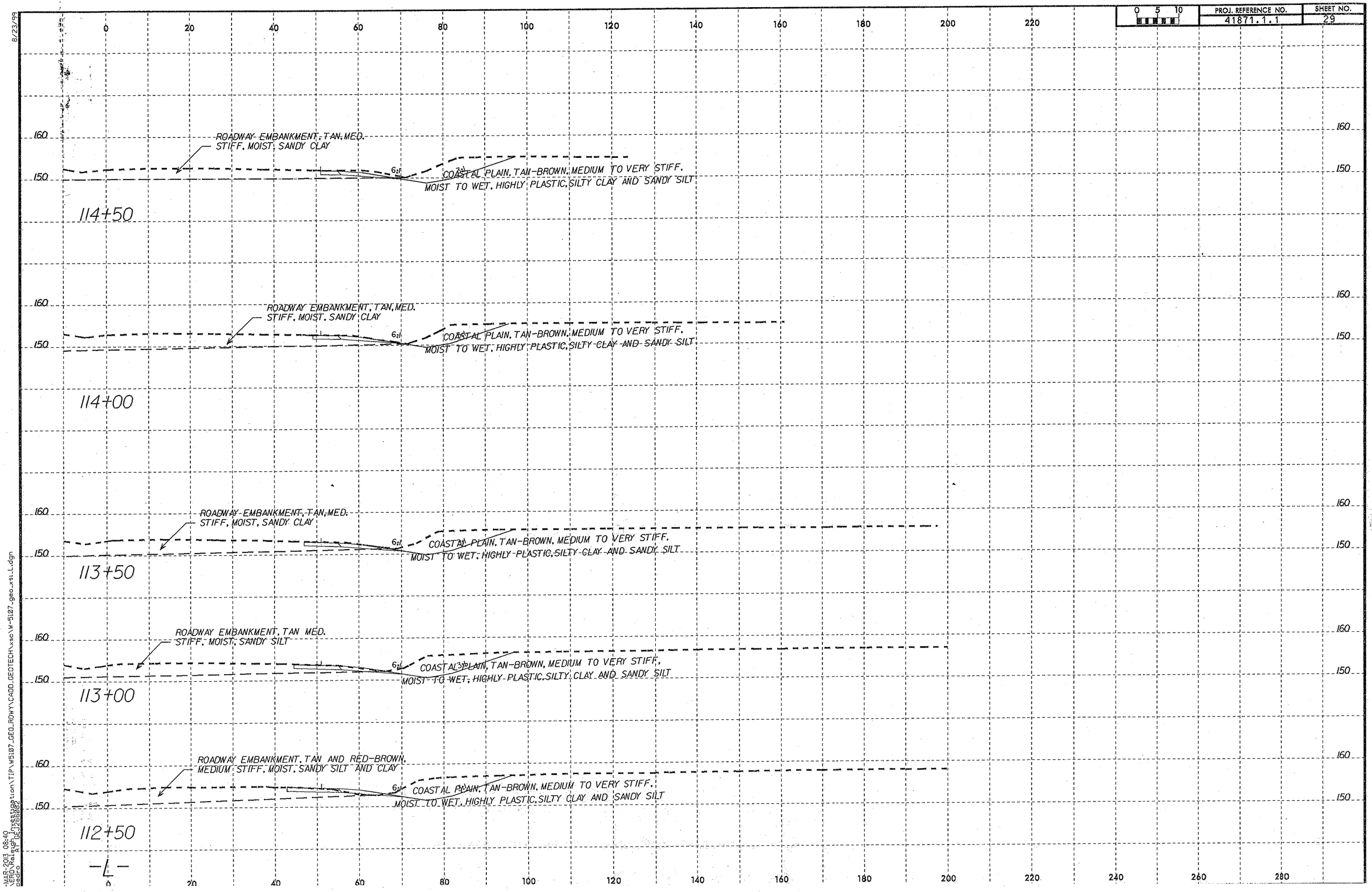

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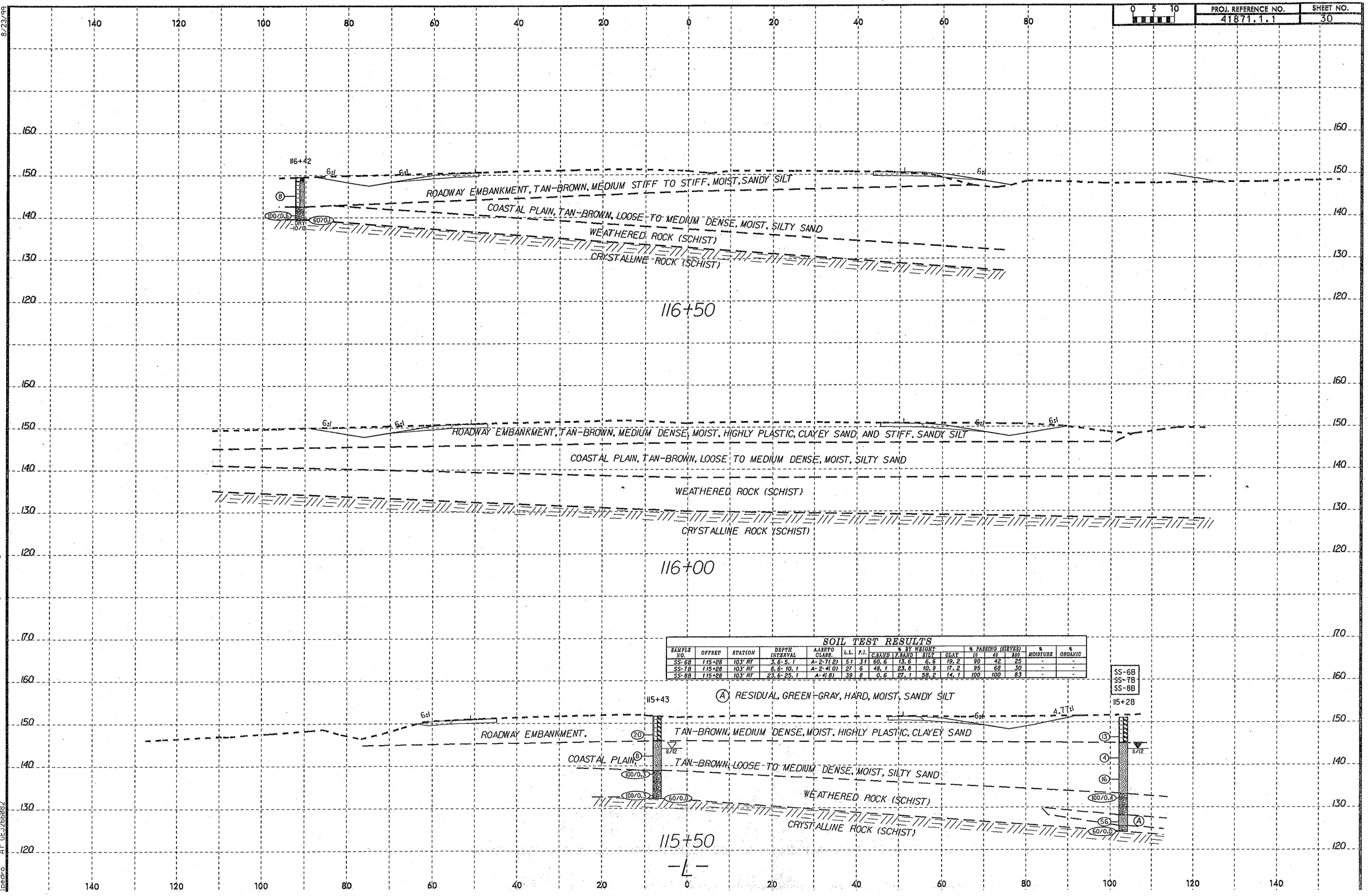

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	100	% MOISTURE	% ORGANIC
SS-6B	115+28	103' RT	3.6-5.1	A-2-7(2)	51	31	60.6	13.6	6.6	19.2	90	42	25	-	-
SS-7B	115+28	103' RT	8.6-10.1	A-2-4(0)	27	6	48.1	23.8	10.9	17.2	95	68	30	-	-
SS-8B	115+28	103' RT	23.6-25.1	A-4(8)	39	8	0.6	27.1	58.2	14.1	100	100	83	-	-

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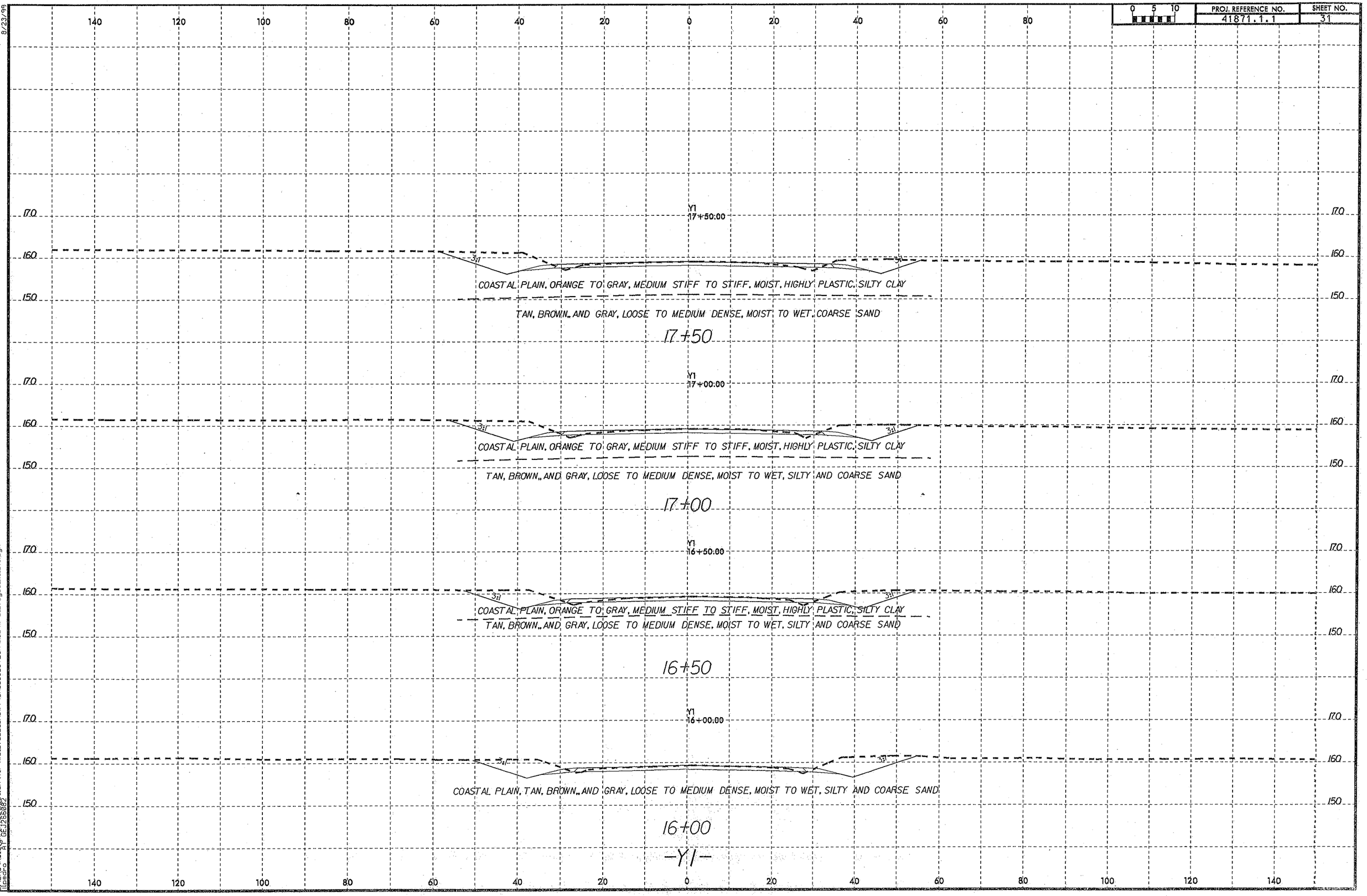

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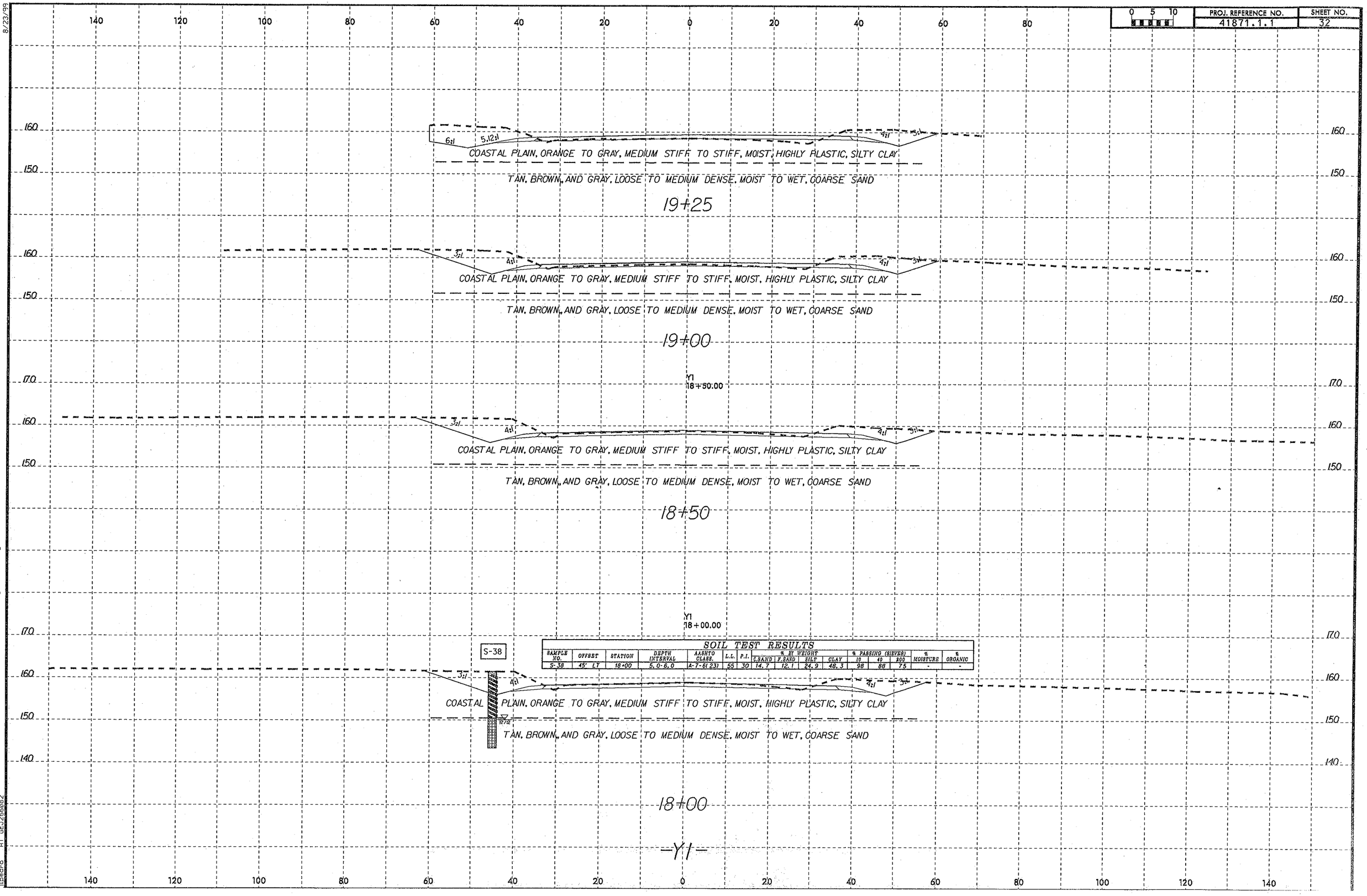

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-38	45' LT	18+00	5.0-6.0	A-7-6(23)	55	30	14.7	12.1	24.9	48.3	98	88	75	-	-

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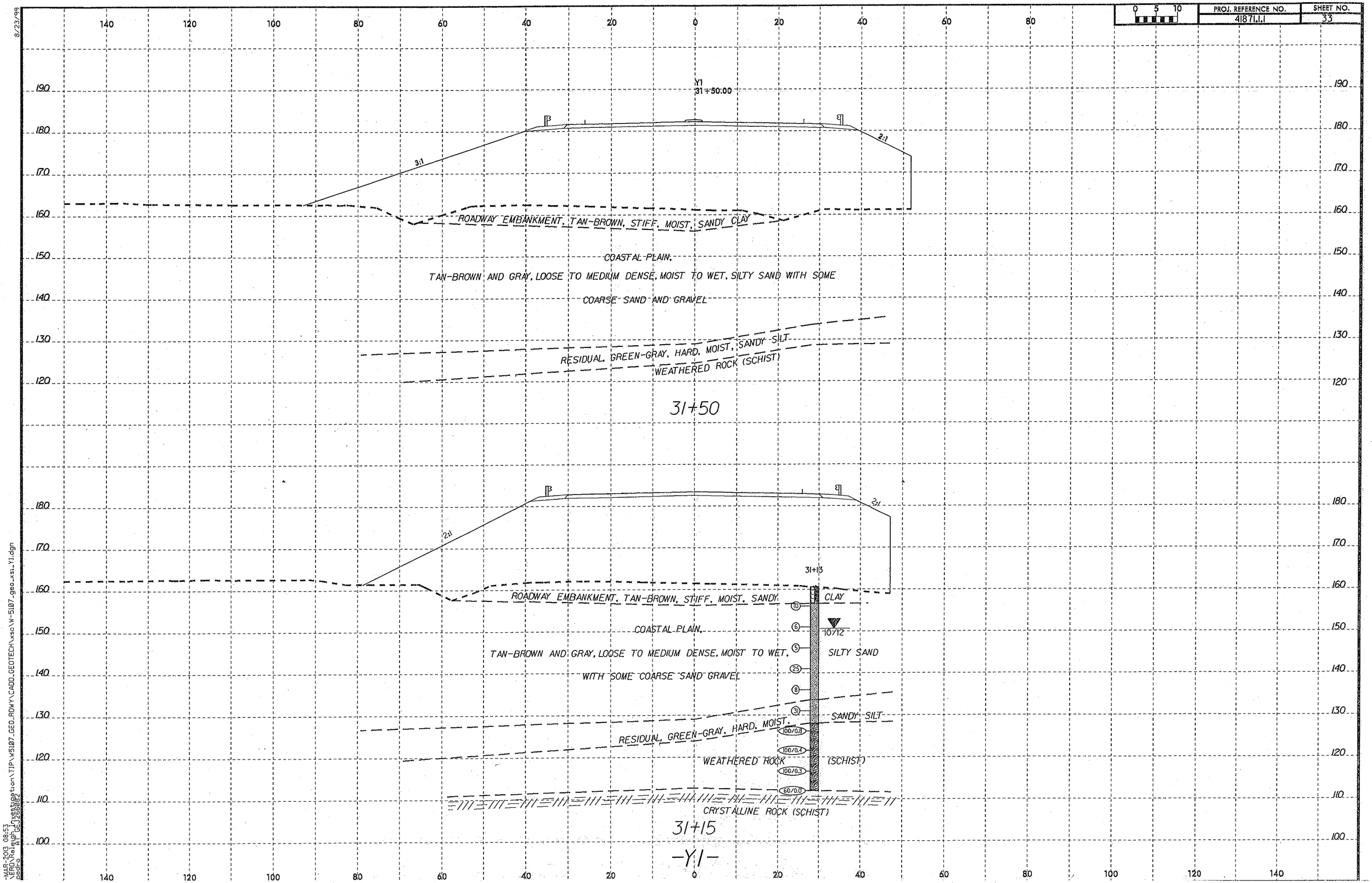

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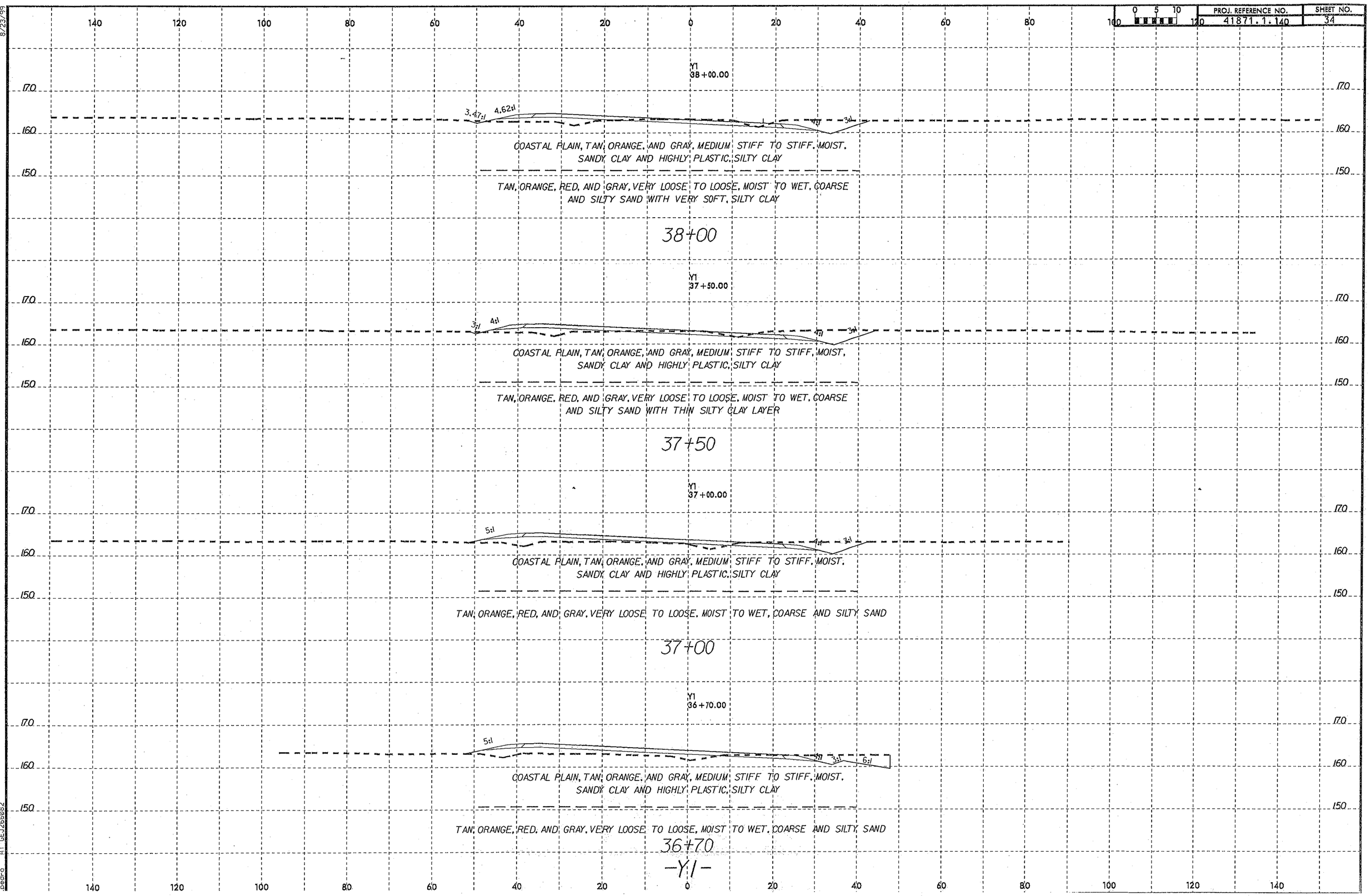

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0 5 10	PROJ. REFERENCE NO.	SHEET NO.
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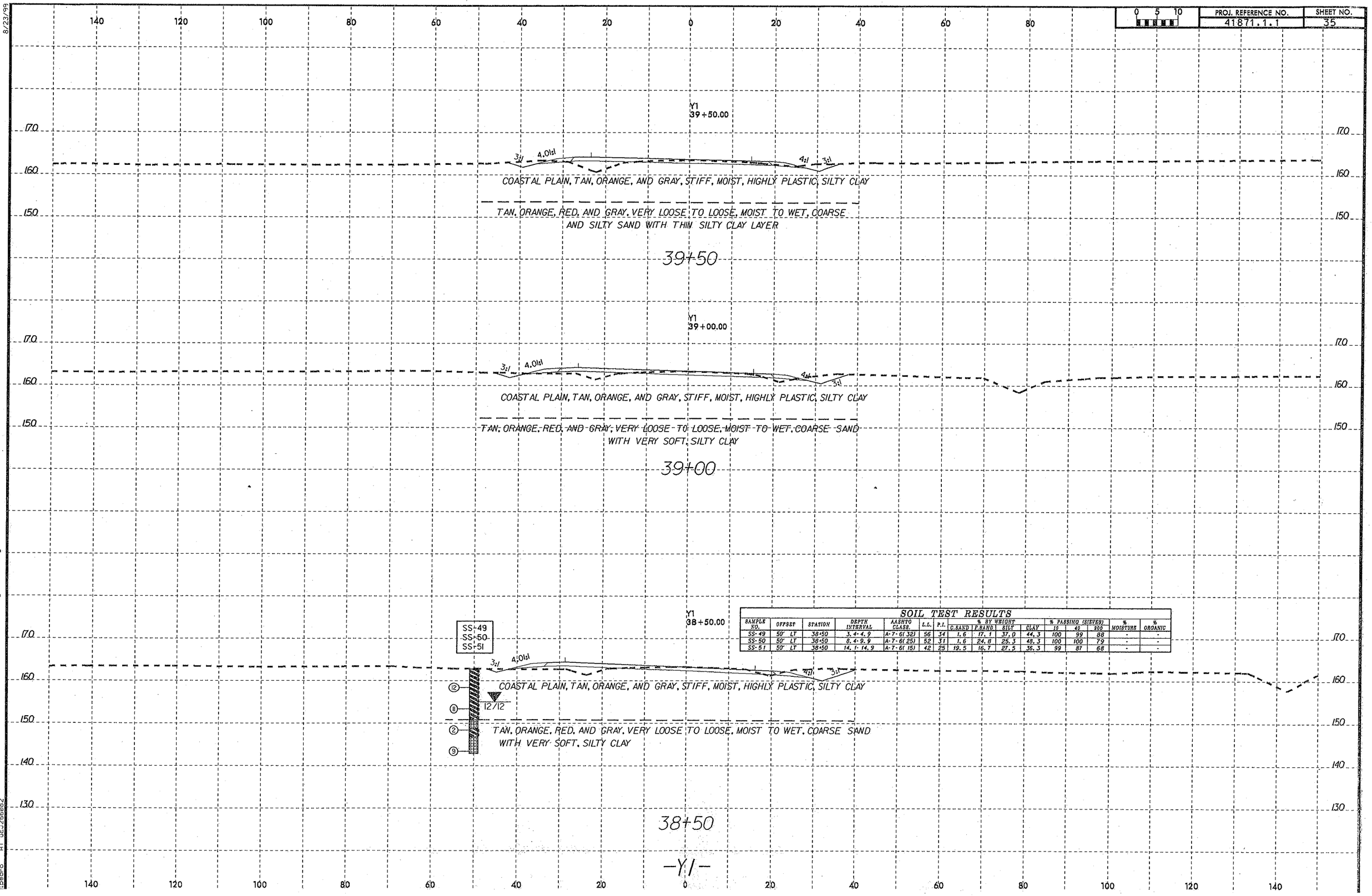

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-49	50' LT	38+50	3.4-4.9	A-7-6(32)	56	34	1.6	17.1	37.0	44.3	100	99	88	-	-
SS-50	50' LT	38+50	8.4-9.9	A-7-6(25)	52	31	1.6	24.8	25.3	48.3	100	100	79	-	-
SS-51	50' LT	38+50	14.1-14.9	A-7-6(15)	42	25	19.5	16.7	27.5	36.3	99	87	68	-	-

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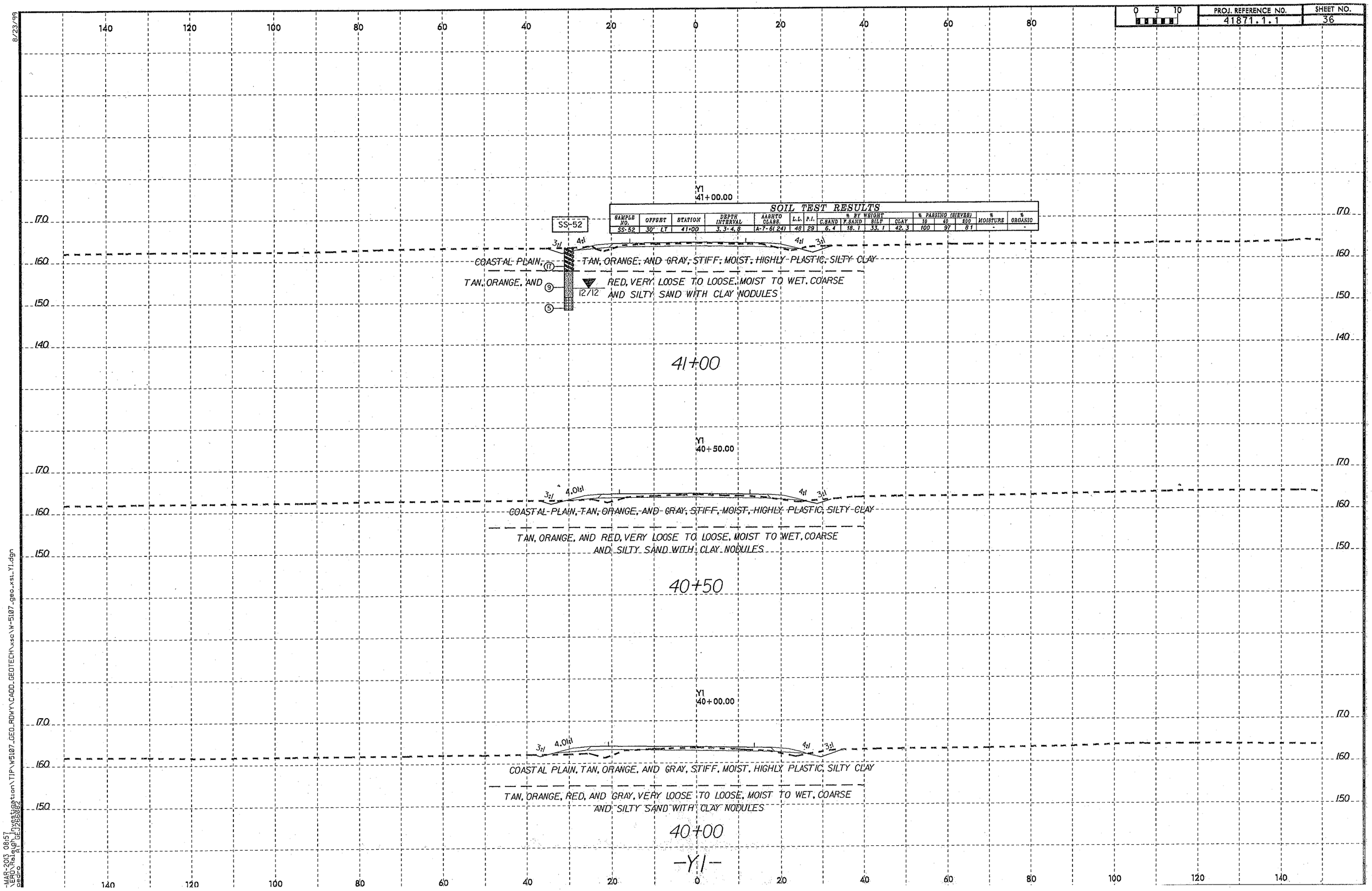

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SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-52	30' LT	41+00	3.3-4.8	A-7-6(24)	48	29	6.4	18.1	33.1	42.3	100	97	91	-	-

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0 5 10	PROJ. REFERENCE NO.	SHEET NO.
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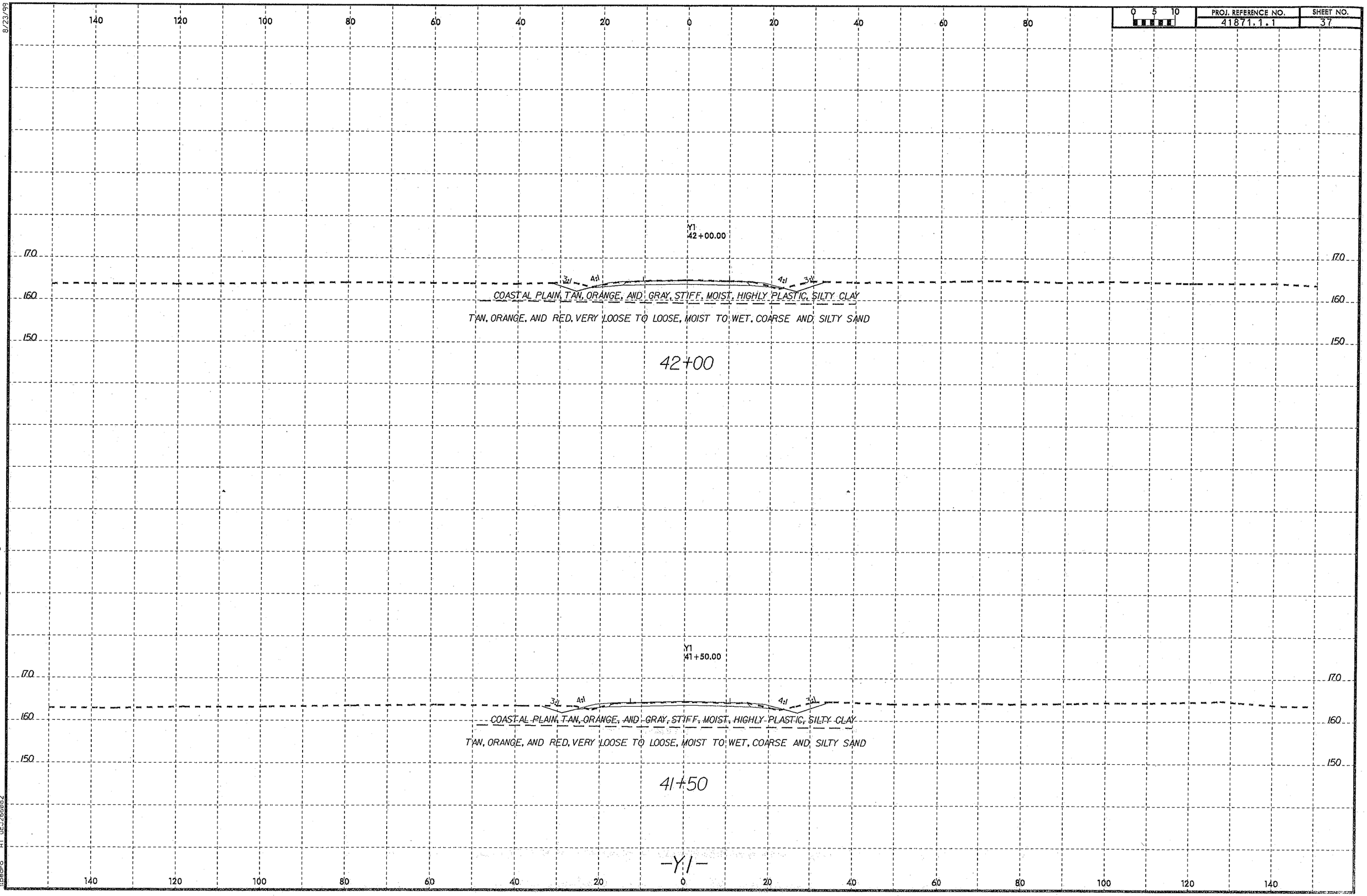

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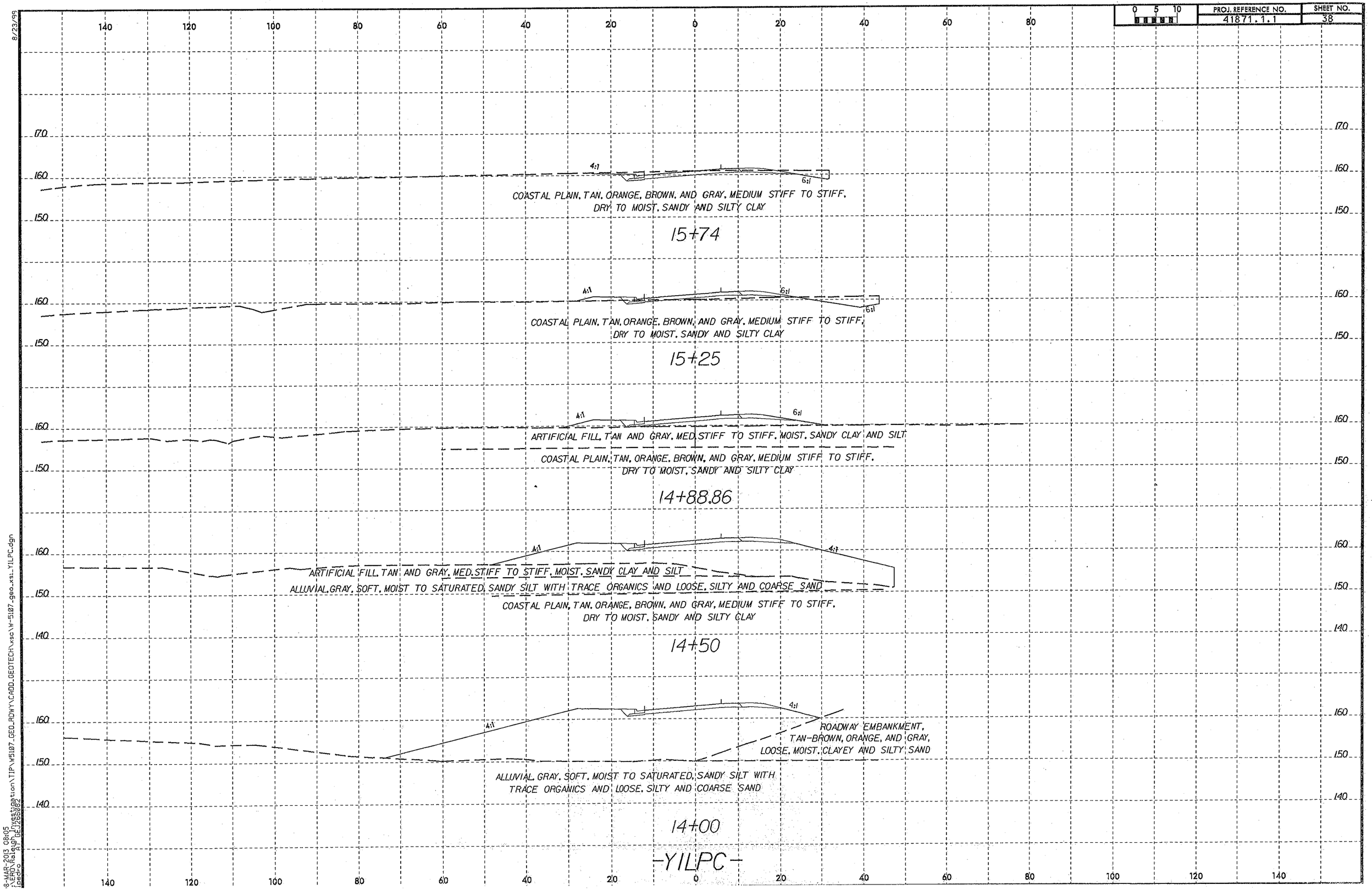

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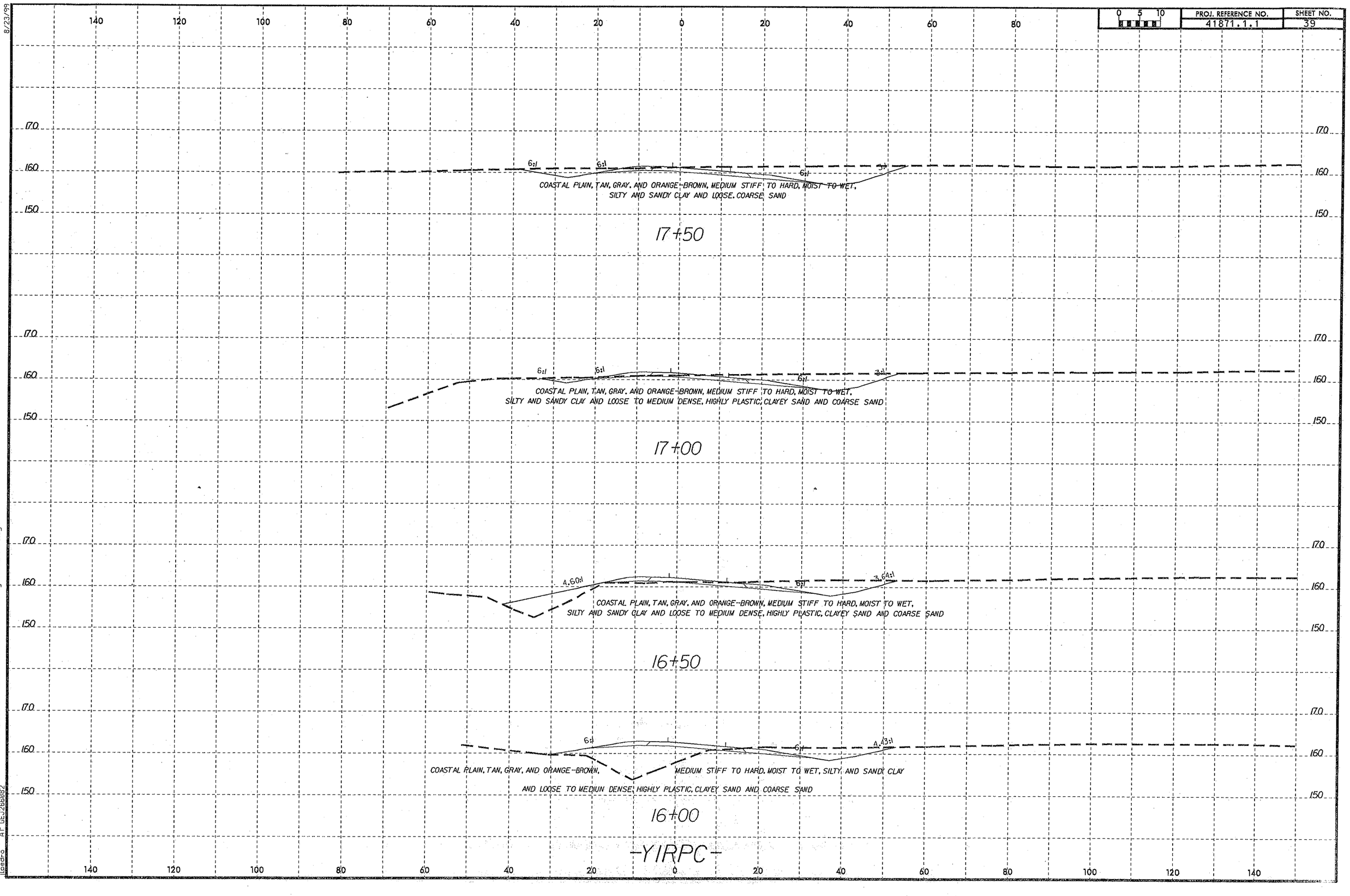

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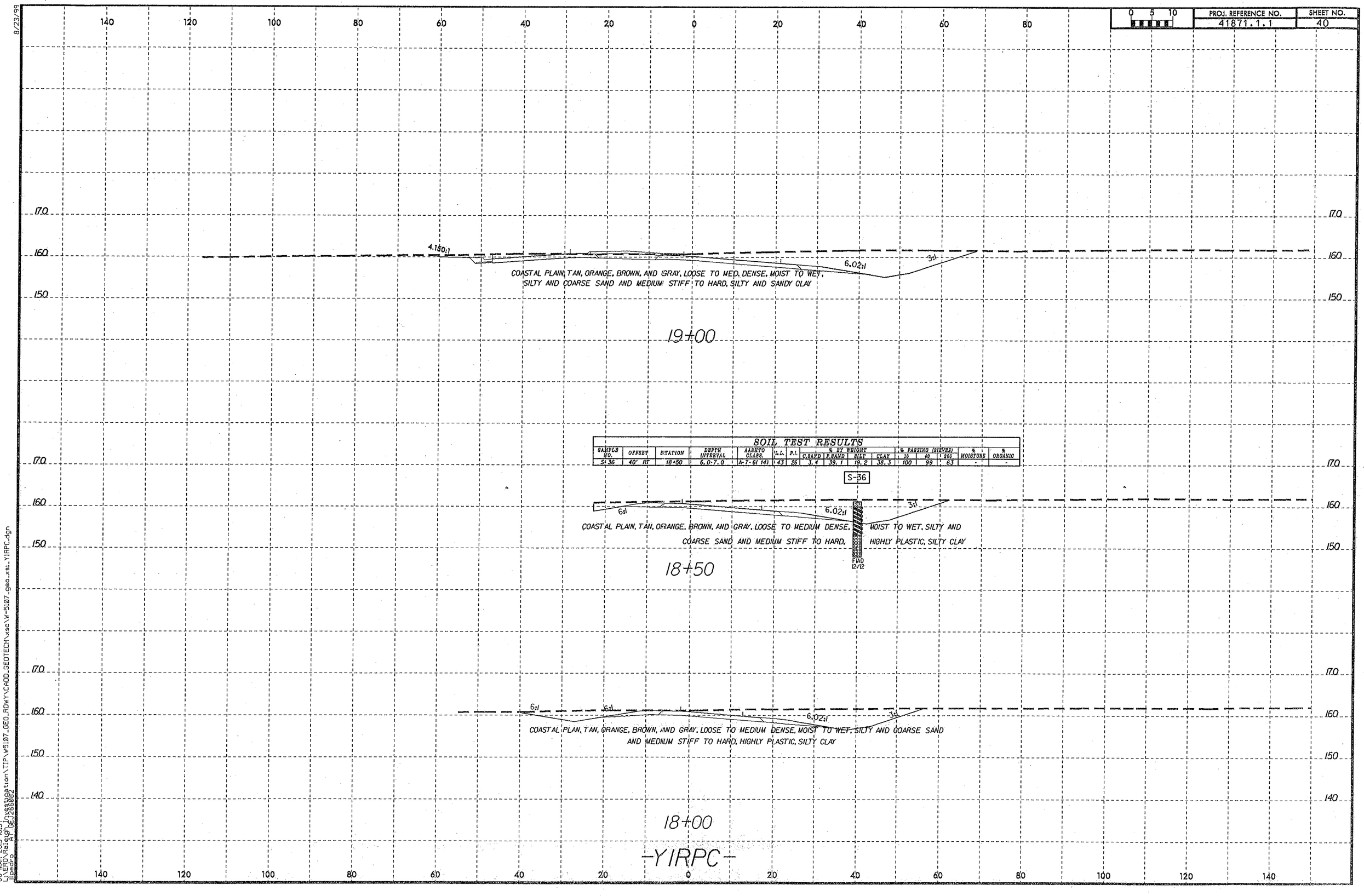

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-36	40' RT	18+50	6.0-7.0	A-7-6(14)	43	26	3.4	39.1	19.2	38.3	100	99	63	-	-

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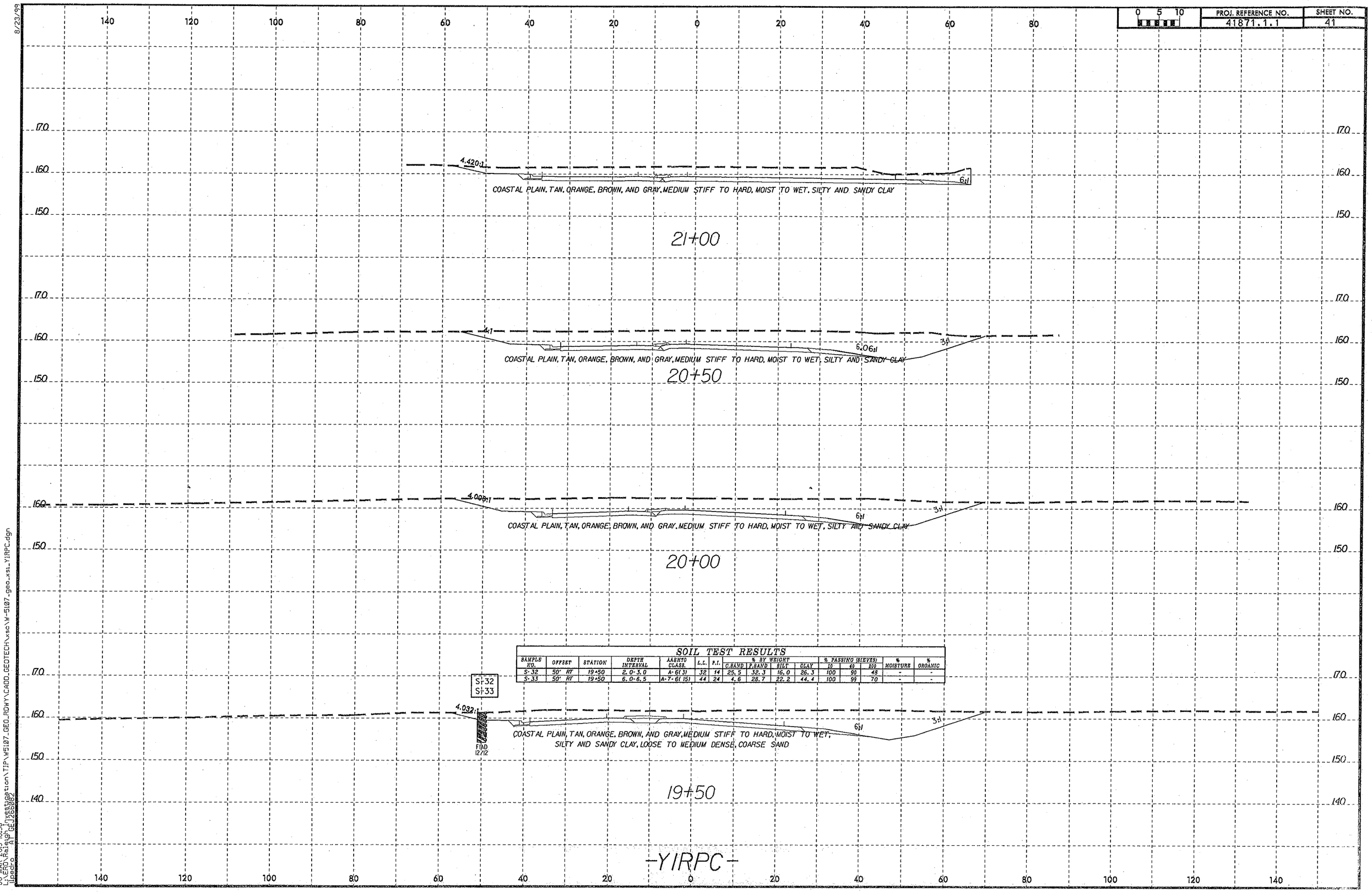

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
S-32	50' RT	19+50	2.0-3.0	A-6(3)	32	14	25.5	32.3	16.0	26.3	100	90	48	-	-
S-33	50' RT	19+50	6.0-6.5	A-7-6(15)	44	24	4.6	28.7	22.2	44.4	100	99	70	-	-

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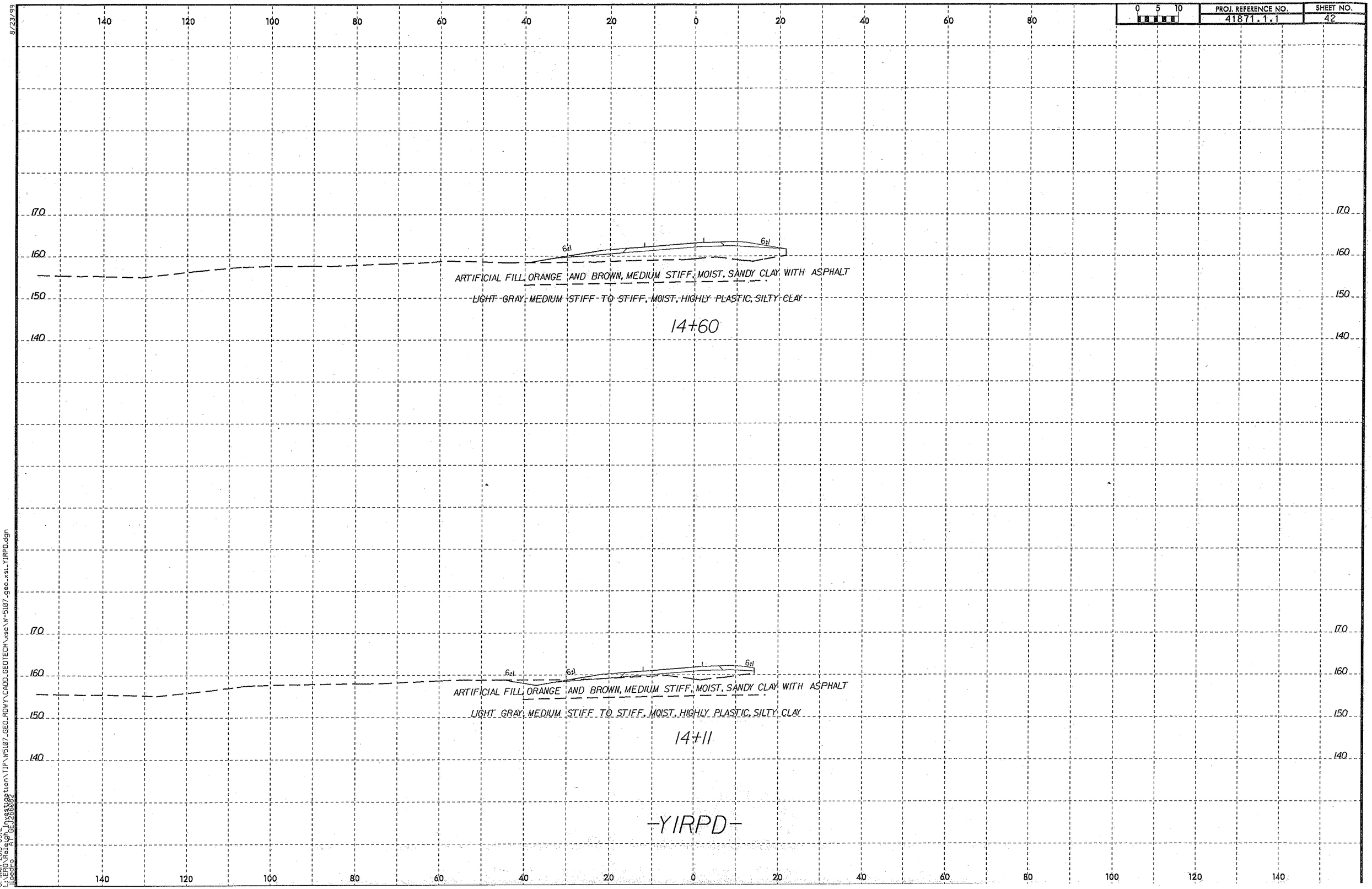

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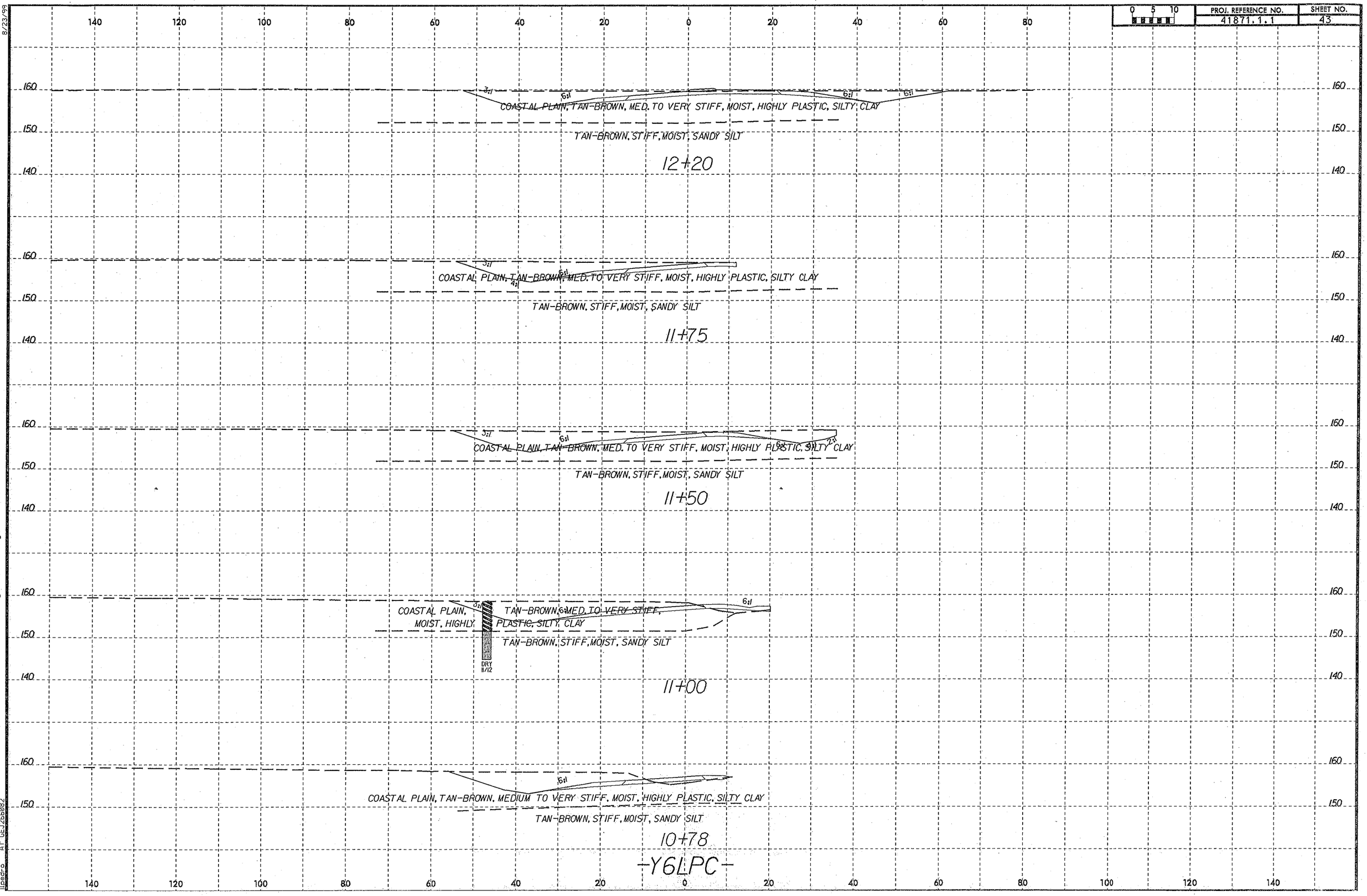

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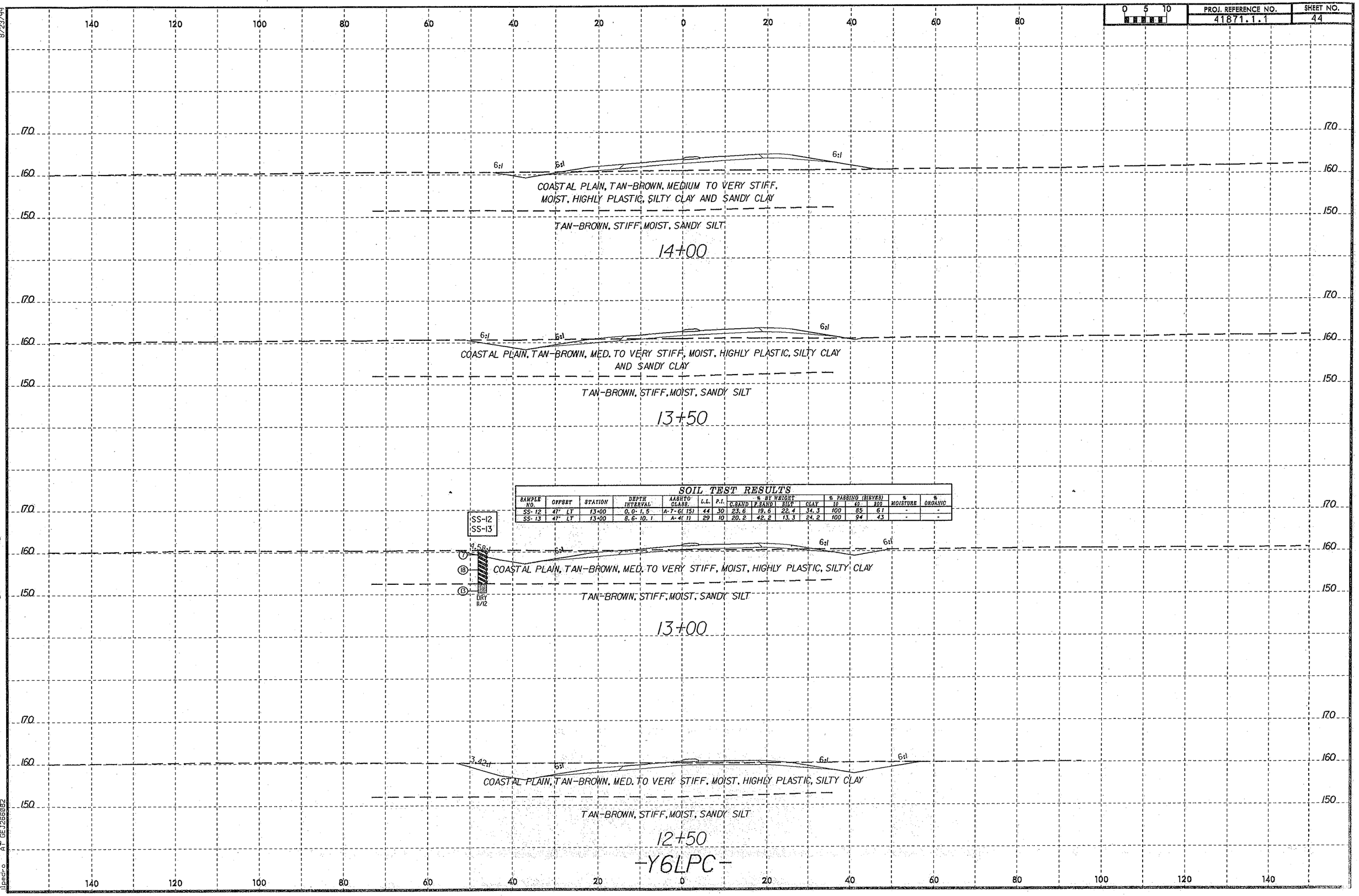

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-12	47' LT	13+00	0.0-1.5	A-7-6(15)	44	30	23.6	19.6	22.4	34.3	100	85	61	-	-
SS-13	47' LT	13+00	8.6-10.1	A-4(1)	29	10	20.2	42.2	13.3	24.2	100	94	43	-	-

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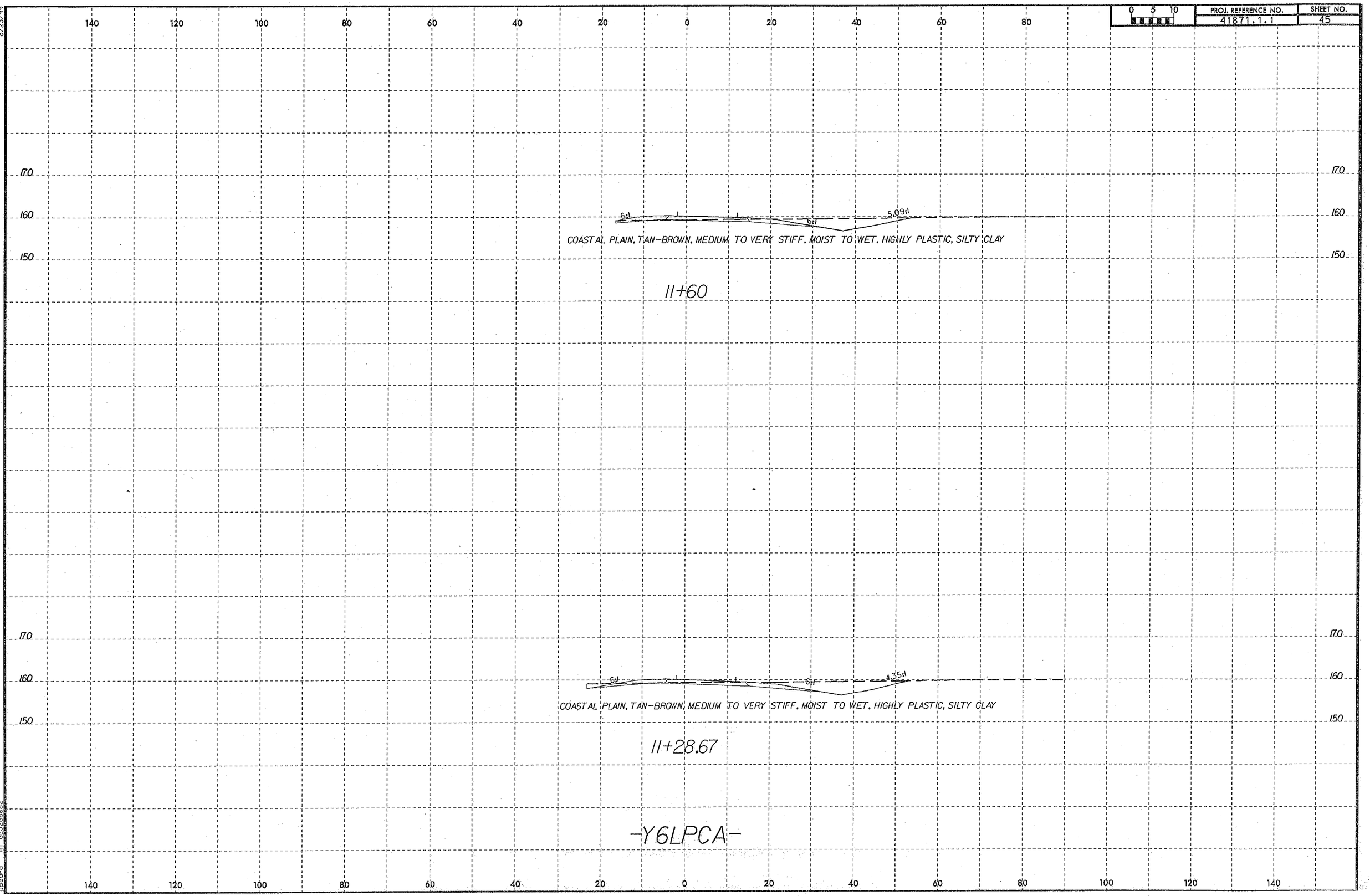

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