

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

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4465	1	20
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33714.1.1	BRZ-1208(1)	P.E.	
33714.2.1	BRZ-1208(1)	R.W. & UTILITY	
33714.3.1	BRZ-1208(1)	CONST.	

CONTENTS

LINE	STATION	PLAN	PROFILE
-L-	17+25 TO 30+00	4	5

CROSS SECTION	STATION	SHEET
-L-	17+50 TO 21+80	6-13
-L-	24+20 TO 27+50	14-20

ROADWAY
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 33714.1.1 (B-4465) F.A. PROJ. BRZ-1208(1)
COUNTY CHOWAN
PROJECT DESCRIPTION BRIDGE NO. 5 ON SR 1208 OVER PEMBROKE CREEK

INVENTORY

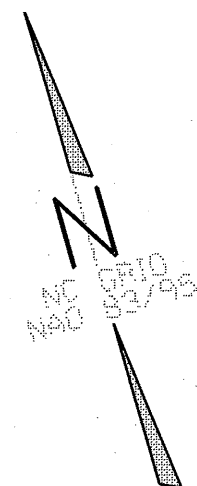
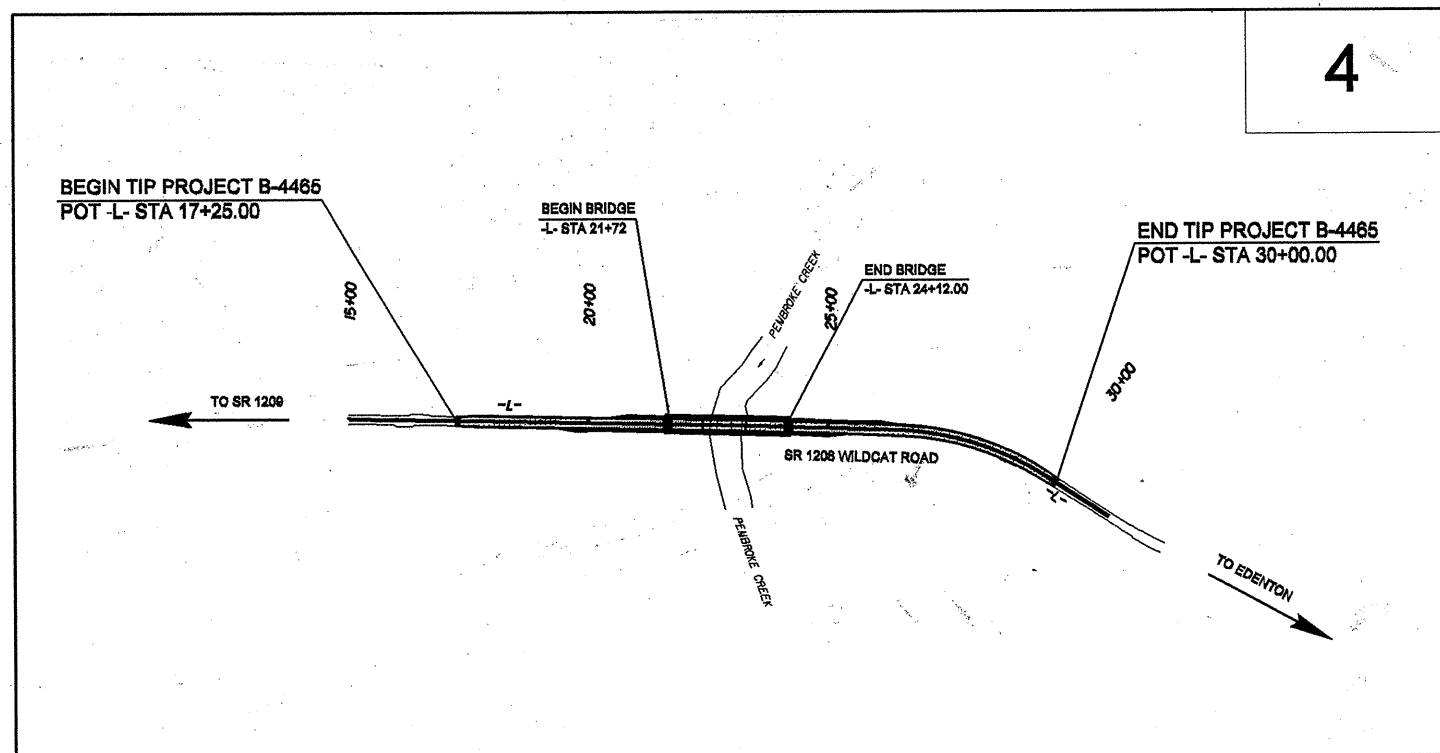
CAUTION NOTICE

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.

CONTRACT: C202270 ID: B-4465



PERSONNEL

R.E. SMITH

J.M. EDMONDSON

J.R. SWARTLEY

S. DILLARD

INVESTIGATED BY D.N. ARGENBRIGHT

CHECKED BY D.N. ARGENBRIGHT

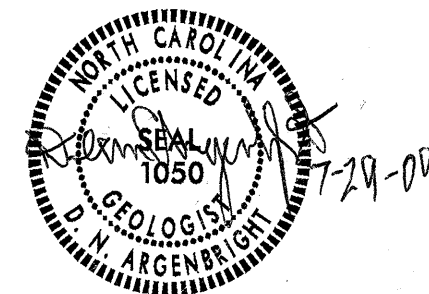
SUBMITTED BY D.N. ARGENBRIGHT

DATE JULY 2009

DRAWN BY: C.P. TURNER

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 DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

PROJECT REFERENCE NO. B-4465	SHEET NO. 2 OF 20
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SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

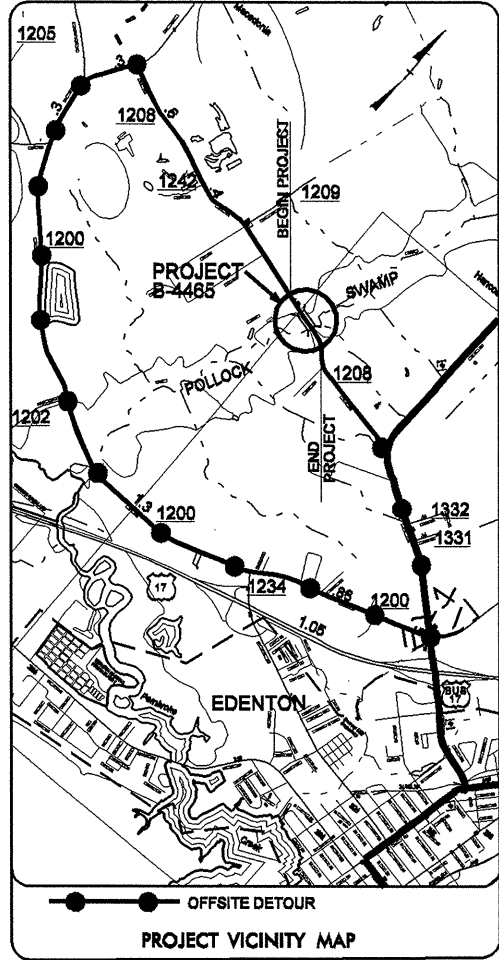
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO 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: <i>VERY STIFF, GRAY-SILT CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGH PLASTIC, A-7-6</i>	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. THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	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 YIELD 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.	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 DISLOGGED 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 (ROD) - 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 (SROD) - 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.
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERALOGICAL COMPOSITION	WEATHERING	
GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	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. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i> 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. <i>IF TESTED, YIELDS SPT N VALUES > 100 BPF</i> 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. <i>IF TESTED, YIELDS SPT N VALUES < 100 BPF</i> 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.	
COMPRESSION	COMPRESSION	PERCENTAGE OF MATERIAL	
SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50		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	MISCELLANEOUS SYMBOLS		
▽ 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	ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP & DIP DIRECTION OF ROCK STRUCTURES SOUNDING ROD	SPT TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION SPT N-VALUE 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
TEXTURE OR GRAIN SIZE	ABBREVIATIONS	ROCK HARDNESS	
U.S. STD. SIEVE SIZE OPENING (MM) 4 10 40 60 200 270 4.76 2.00 0.42 0.25 0.075 0.053	AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST F - FINE FOSS - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS HL - 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 w - UNIT WEIGHT w _d - DRY UNIT WEIGHT	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.	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 (SROD) - 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.
SOIL MOISTURE - CORRELATION OF TERMS	EQUIPMENT USED ON SUBJECT PROJECT	FRACTURE SPACING	BEDDING
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION LL - LIQUID LIMIT - SATURATED - (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE PL - PLASTIC LIMIT - WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE OM - OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE SL - SHRINKAGE LIMIT - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	DRILL UNITS: MOBILE B- BK-51 CME-45C CME-550 PORTABLE HOIST CME-45B ADVANCING TOOLS: CLAY BITS 6" CONTINUOUS FLIGHT AUGER 8" HOLLOW AUGERS HARD FACED FINGER BITS TUNG-CARBIDE INSERTS CASING w/ ADVANCER TRICONE TUNG-CARB. CORE BIT HAMMER TYPE: AUTOMATIC MANUAL CORE SIZE: B N H HAND TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST	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	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
PLASTICITY		INDURATION	
NONPLASTIC PLASTICITY INDEX (PI) DRY STRENGTH LOW PLASTICITY 0-5 VERY LOW MED. PLASTICITY 6-15 SLIGHT HIGH PLASTICITY 16-25 MEDIUM 26 OR MORE HIGH		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.	BENCH MARK: ELEVATION: FT. NOTES: APPROXIMATE LIMITS OF ORGANIC SOILS
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.			

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 AT GE240345
 09/08/99

TIP PROJECT: B-4465

CONTRACT:

See Sheet 1-A For Index of Sheets



25% REVIEW PLANS

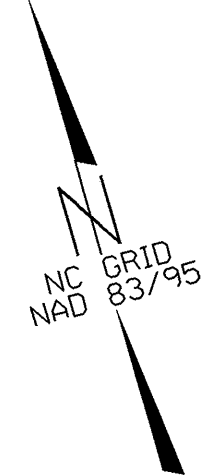
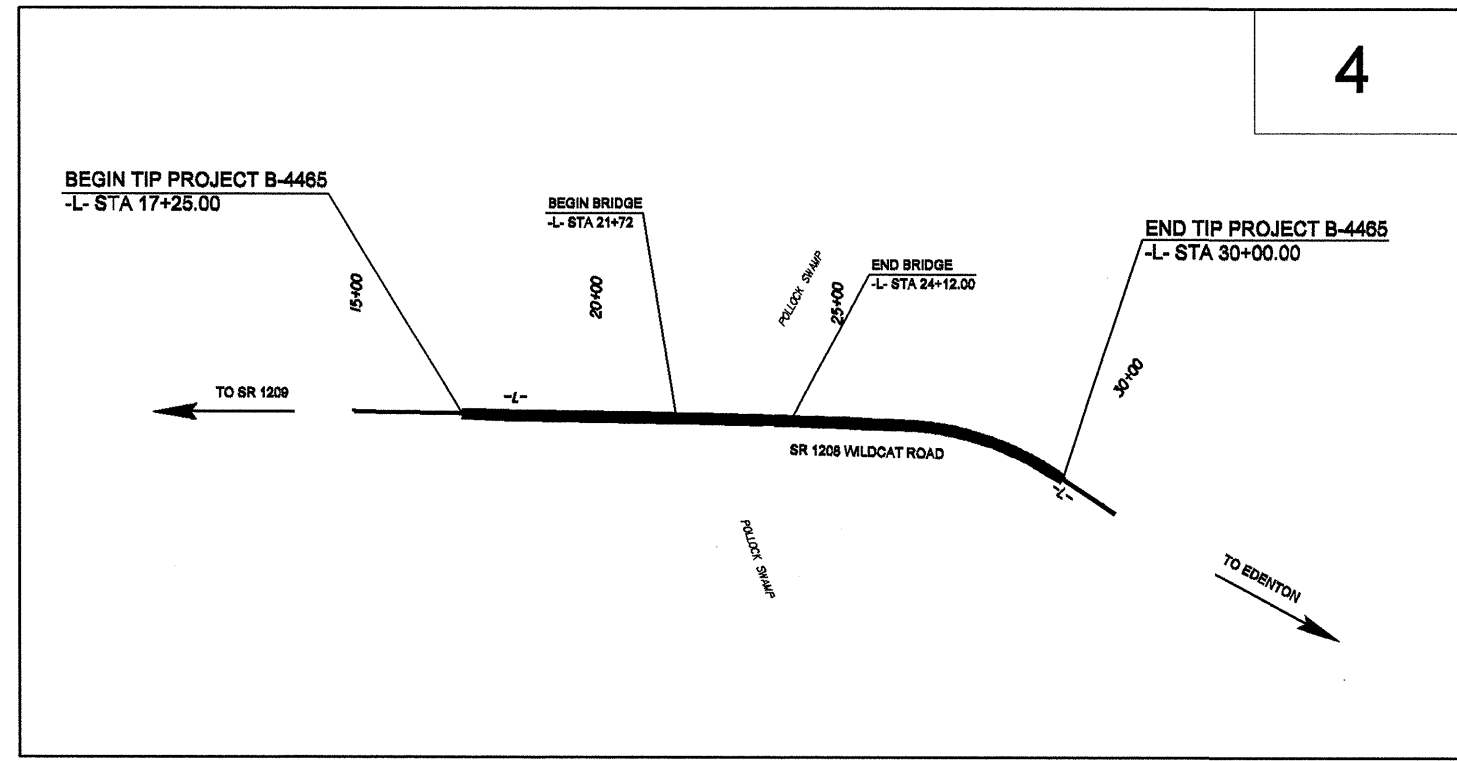
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CHOWAN COUNTY

**LOCATION: BRIDGE NO. 5 ON SR 1208 OVER
POLLOCK SWAMP**

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4465	2A	20
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33714.1.1	BRZ-1208(1)	P.E.	

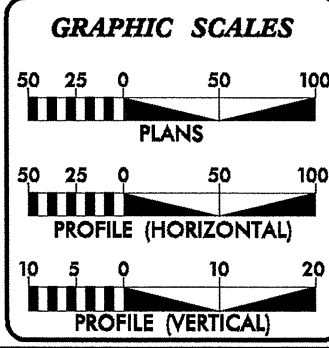


- DESIGN EXCEPTION FOR MINIMUM HORIZONTAL RADIUS
- THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES
- CLEARING ON THIS PROJECT SHALL BE TO THE LIMITS ESTABLISHED BY METHOD _____

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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



DESIGN DATA

ADT 2010 =	1410
ADT 2030 =	2100
DHV =	10 %
D =	60 %
T = 3% (TTST 1%, DUAL 2%)	
V =	50 MPH
FUNC CLASS =	RURAL LOCAL

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4465	=	0.96 MILES
LENGTH STRUCTURE TIP PROJECT B-4465	=	0.045 MILES
TOTAL LENGTH TIP PROJECT B-4465	=	0.241 MILES

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

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JANUARY 16, 2009

LETTING DATE:
JANUARY 19, 2010

Ronald C. Smith, PE
PROJECT ENGINEER

A. Matthew Thigpen, E.I.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: _____

ROADWAY DESIGN ENGINEER

SIGNATURE: _____

P.E.

**DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA**

STATE HIGHWAY DESIGN ENGINEER

P.E.



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PERDUE
GOVERNOR

EUGENE A. CONTI, JR.
SECRETARY

July 29, 2009

STATE PROJECT: 33714.1.1 B-4465
F. A. PROJECT: BRZ-1208 (1)
COUNTY: Chowan
DESCRIPTION: Bridge No. 5 on SR 1208 over Pembroke Creek

SUBJECT: Geotechnical Report – Inventory

Project Description

This project consists of the improvement of the SR 1208 roadway to accommodate the proposed bridge replacement. The total length of the roadway project is 0.241 miles.

The following base lines were investigated for this project:

<u>Line</u>	<u>Station(±)</u>
-L-	17+25 to 30+00

Areas of Special Geotechnical Interest

1) The following sections contain cohesive soils which have the potential to cause embankment stability and/or long term settlement problems:

<u>Line</u>	<u>Station (±)</u>
-L-	18+56 to 26+73

2) The following section contains relatively soft organic soils which have the potential for subgrade problems during construction:

<u>Line</u>	<u>Station(±)</u>
-L-	17+25 to 27+10

Physiography, Geology and Ground Water

The project is located in the Coastal Plain Physiographic Province. Topography at the site is nearly flat to moderately sloping. Elevations along the proposed roadway range from 2± to 12± feet.

The geology of the project consists of Recent age coastal plain sediments overlying marine deposits of Tertiary age. The Pliocene age Yorktown Formation underlies the alluvial soils. The project lies within the Chowan River Drainage system. Drainage along the project is provided by the Pembroke Creek. Surface drainage is generally good in areas with moderate relief and fair to poor in low lying portions of the project.

Ground water data was collected primarily in August 2008 during above average rainfall conditions. Typically, ground water levels were measured at depths of 1± to 3± feet below the surface of the roadway embankment. Ground water in the flood plain was at or near the ground surface.

Soils

Soils encountered during this investigation are separated into three major categories based on origin and occurrence. These categories are roadway embankment, alluvial soils, undivided coastal plain soils and Pliocene age soils of the Yorktown Formation.

Roadway Embankment soil is present in the embankment of the existing roadway. These soils consist of up to 9± feet of loose sand (A-2-4) and soft to medium stiff sandy silt (A-4).

Alluvial soils were encountered beneath the roadway embankment. The alluvial deposits were organic in nature along the project from station 17+25± to 27+10±. Soils within the areas consisted of very soft to stiff muck (A-5, A-7-5), loose sand with moderate amounts of organic matter (A-2-4) and very soft to soft sandy silt with moderate amounts of organic matter (A-5). Organic contents of tested samples ranged from 4.6 to 68.4 percent. Moisture contents of tested organic samples ranged from 44 to 555 percent. Vane Shear tests taken left and right of -L- stations 21+72 and 24+12 indicate shear strengths typically ranging from 0 to 1554 psf in the

MAILING ADDRESS:
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LOCATION:
3301 JONES SAUSAGE RD., SUITE 100
GARNER, NC 27529-9489

organic soils. These soils have poor engineering properties and have the potential to cause subgrade stability problems or embankment stability/settlement problems.

Undivided coastal plain deposits underlie the alluvial soils at elevations ranging from 4.8± to 8.5± feet and at the surface from 27+10 to 30+00. The deposits typically consist of very loose to medium dense sands (A-1-b, A-2-4, A-3). These soils exhibit good to excellent engineering properties.

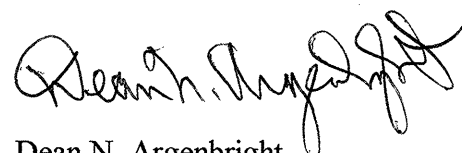
The Pliocene age Yorktown Formation underlies the undivided coastal plain deposits at elevations ranging from -19± to -30± feet. Granular soils within this formation typically consist of beds of very loose to dense sand (A-2-4). These soils exhibit good to excellent engineering properties. Cohesive soils within this formation typically consist of beds of medium stiff to very stiff silty and sandy clay (A-6, A-7-6) and sandy silt (A-4). These soils exhibit fair to poor engineering properties. Shell fragments were noted throughout the formation. Due to its depth of occurrence, the Yorktown Formation should not affect the roadway portion of this project.

Undisturbed Samples

<u>Sample No.</u>	<u>Station</u>	<u>Depth(m)</u>	<u>Test</u>
ST-1	21+12, 7' LT	9.6-11.6	Consolidation
ST-3	19+50, 17' LT	9.5-11.5	Consolidation

* ST-2 was not submitted for testing at this time.

Prepared by:



Dean N. Argenbright
Regional Geological Engineer

38/20

EARTHWORK BALANCE SHEET

Volumes in Cubic Yards

PROJECT TIP # B-4465

COUNTY Chowan

DATE 11/26/2009

SHEET 1 OF 1 SHEETS



LINE	STATION	STATION	TOTAL EXCAV. (UNCL.)	ROCK EXCAV.	UNDERCUT EXCAV.	UNSUIT. EXCAV.	SUITABLE EXCAV.	TOTAL EMB.	ROCK EMB.	UNDERCUT EMB.	EARTH EMB.	EMBANK. 30%	BORROW	SUITABLE WASTE	UNSUIT. WASTE	TOTAL WASTE
L	17+25.00	21+70.94 BEGIN BRIDGE	3				3	1332			1332	1733	1730			
SUBTOTAL			3	0	0	0	3	1332	0	0	1332	1733	1730	0	0	0
L	24+13.06	30+00.00 END BRIDGE	26		250		26	3510		250	3260	4563	4537			
SUBTOTAL			26	0	250	0	26	3510	0	250	3260	4563	4537	0	0	0
PROJECT SUBTOTAL			29	0	250	0	29	4842	0	250	4592	6296	6267	0	0	0
ADDITIONAL UNDERCUT					200											
SHLDER AND FILL SLOPE MAT. (GEOTEC													800			
SURCHARGE EARTH MATERIAL (GEOTEC											1500	1950	1950			
REDUCT. FOR LIGHTWEIGHT AGGREGAT													-4074			
WASTE IN LIEU OF BORROW																
LOSS DUE TO CLEARING & GRUBBING																
PROJECT TOTAL			29	0	450	0	29	4842	0	250	6092	8246	4943	0	0	0
EST 5% TO REPLACE TOP SOIL ON BORROW PIT													247			
SURCHARGE REMOVAL			1500											1500		1500
GRAND TOTAL			1529										5190			
SAY			1550										5200			

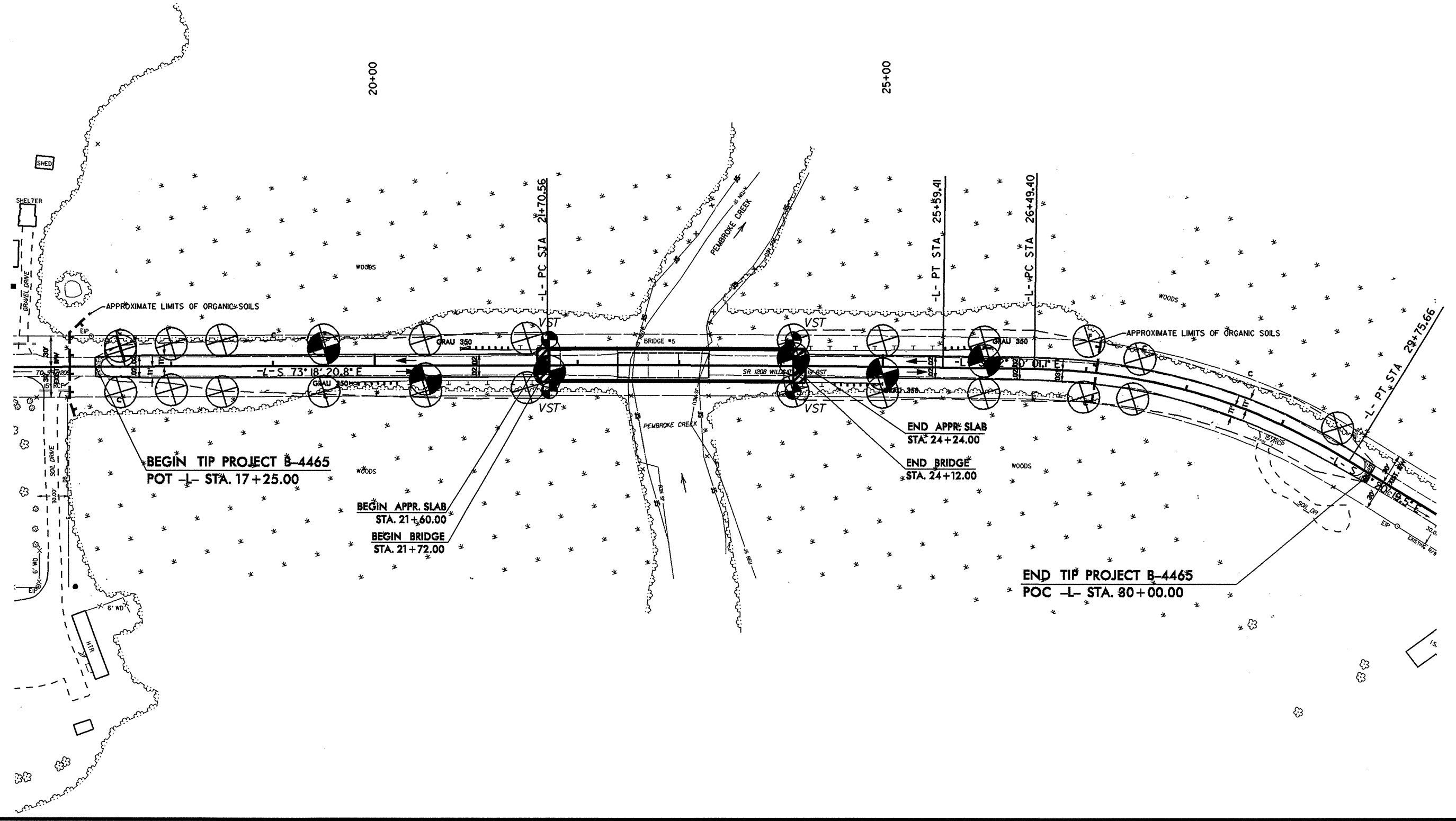
* EARTHWORK QUANTITIES ARE CALCULATED BY THE ROADWAY DESIGN UNIT. THESE EARTHWORK QUANTITIES ARE BASED IN PART ON SUBSURFACE DATA PROVIDED BY THE GEOTECHNICAL ENGINEERING UNIT.

8/17/99

REVISIONS

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PROJECT REFERENCE NO. B-4465		SHEET NO. 4	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			
 DRMP <small>ENGINEER - PLANNING - ARCHITECTURE</small> 7506 EAST INDEPENDENCE BLVD., SUITE 105 CHARLOTTE, NORTH CAROLINA 28227 (704) 332-2283		 MA Engineering <small>CONSULTANTS, INC.</small> 2901 W. GARDNER BLVD., SUITE 137 CHARLOTTE, NC 28211 (704) 332-2283	



BEGIN TIP PROJECT B-4465
POT -L- STA. 17+25.00

BEGIN APPR. SLAB
STA. 21+60.00
BEGIN BRIDGE
STA. 21+72.00

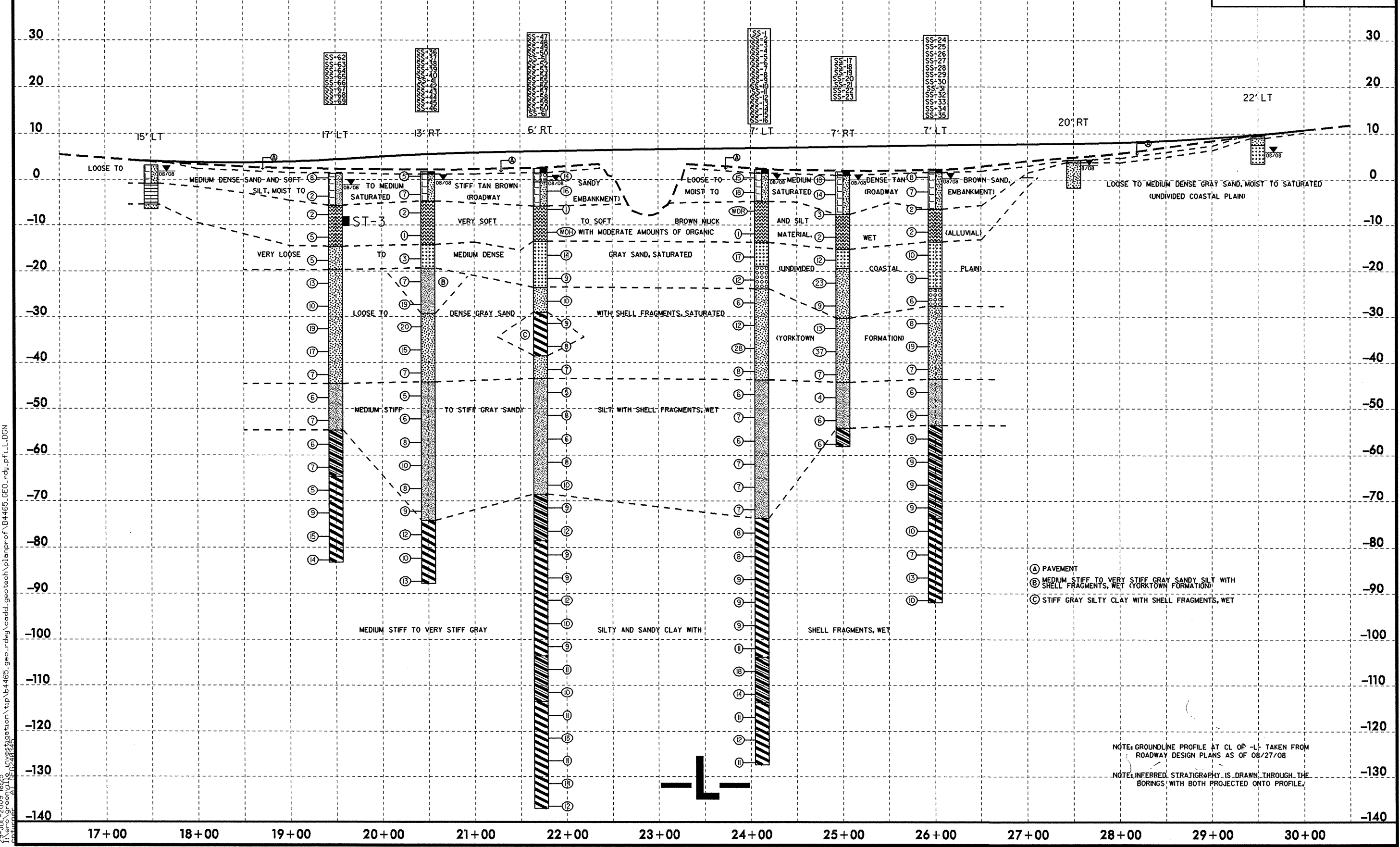
END APPR. SLAB
STA. 24+24.00
END BRIDGE
STA. 24+12.00

END TIP PROJECT B-4465
POC -L- STA. 30+00.00

5/14/99

PROJECT REFERENCE NO. B-4465	SHEET NO. 5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

NOTE:
1.) SEE SHEET 5A FOR SOIL TEST RESULTS
2.) SEE SHEET 5B FOR VANE SHEAR TEST RESULTS



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VANE SHEAR TESTS

STATION	OFFSET	DEPTH	S (psf)
21+72	25 LT	0.5	222
21+72	25 LT	1.0	148
21+72	25 LT	1.5	333
21+72	25 LT	2.0	296
21+72	25 LT	2.5	333
21+72	25 LT	3.0	222
21+72	25 LT	3.5	222
21+72	25 LT	4.0	333
21+72	25 LT	4.5	259
21+72	25 LT	5.0	370
21+72	25 LT	5.5	370
21+72	25 LT	6.0	333
21+72	25 LT	6.5	814
21+72	25 LT	7.0	888
21+72	25 LT	7.5	444
21+72	25 LT	8.0	518
21+72	25 LT	8.5	1073
21+72	25 LT	9.0	1258
21+72	25 LT	9.5	1073
21+72	25 LT	10.0	1554
21+72	25 LT	10.5	1258
21+72	25 LT	11.0	1813
21+72	25 LT	11.5	1258
21+72	25 LT	12.0	1295
21+72	25 LT	12.5	1332
21+72	25 LT	13.0	1295

VANE SHEAR TESTS

STATION	OFFSET	DEPTH	S (psf)
24+12	25 LT	0.5	0
24+12	25 LT	1.0	37
24+12	25 LT	1.5	148
24+12	25 LT	2.0	148
24+12	25 LT	2.5	222
24+12	25 LT	3.0	228
24+12	25 LT	3.5	370
24+12	25 LT	4.0	333
24+12	25 LT	4.5	407
24+12	25 LT	5.0	333
24+12	25 LT	5.5	370
24+12	25 LT	6.0	222
24+12	25 LT	6.5	222
24+12	25 LT	7.0	241
24+12	25 LT	7.5	370
24+12	25 LT	8.0	259
24+12	25 LT	8.5	185
24+12	25 LT	9.0	222
24+12	25 LT	9.5	333
24+12	25 LT	10.0	333
24+12	25 LT	10.5	352
24+12	25 LT	11.0	352
24+12	25 LT	11.5	407
24+12	25 LT	12.0	407
24+12	25 LT	12.5	444
24+12	25 LT	13.0	407

VANE SHEAR TESTS

STATION	OFFSET	DEPTH	S (psf)
21+72	25 RT	0.5	0
21+72	25 RT	1.0	0
21+72	25 RT	1.5	37
21+72	25 RT	2.0	222
21+72	25 RT	2.5	222
21+72	25 RT	3.0	148
21+72	25 RT	3.5	259
21+72	25 RT	4.0	407
21+72	25 RT	4.5	407
21+72	25 RT	5.0	407
21+72	25 RT	5.5	333
21+72	25 RT	6.0	333
21+72	25 RT	6.5	333
21+72	25 RT	7.0	370
21+72	25 RT	7.5	444
21+72	25 RT	8.0	481
21+72	25 RT	8.5	777
21+72	25 RT	9.0	370
21+72	25 RT	9.5	740
21+72	25 RT	10.0	925
21+72	25 RT	10.5	407
21+72	25 RT	11.0	370
21+72	25 RT	11.5	333
21+72	25 RT	12.0	407
21+72	25 RT	12.5	444
21+72	25 RT	13.0	407

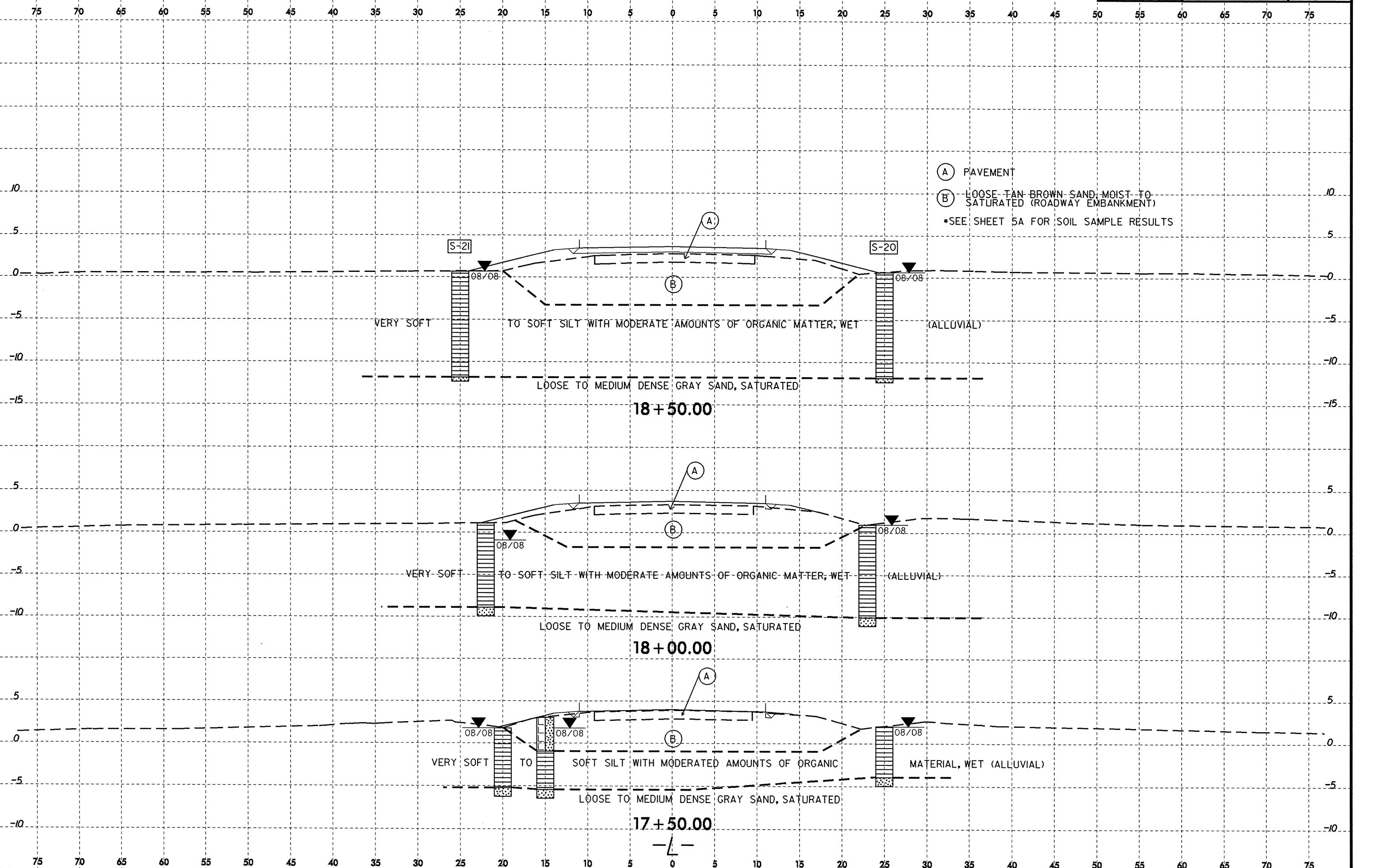
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STATION	OFFSET	DEPTH	S (psf)
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24+12	25 RT	1.0	0
24+12	25 RT	1.5	0
24+12	25 RT	2.0	37
24+12	25 RT	2.5	333
24+12	25 RT	3.0	148
24+12	25 RT	3.5	296
24+12	25 RT	4.0	463
24+12	25 RT	4.5	148
24+12	25 RT	5.0	204
24+12	25 RT	5.5	228
24+12	25 RT	6.0	333
24+12	25 RT	6.5	370
24+12	25 RT	7.0	241
24+12	25 RT	7.5	333
24+12	25 RT	8.0	407
24+12	25 RT	8.5	444
24+12	25 RT	9.0	370
24+12	25 RT	9.5	444
24+12	25 RT	10.0	407
24+12	25 RT	10.5	481
24+12	25 RT	11.0	481
24+12	25 RT	11.5	518
24+12	25 RT	12.0	481
24+12	25 RT	12.5	481
24+12	25 RT	13.0	444

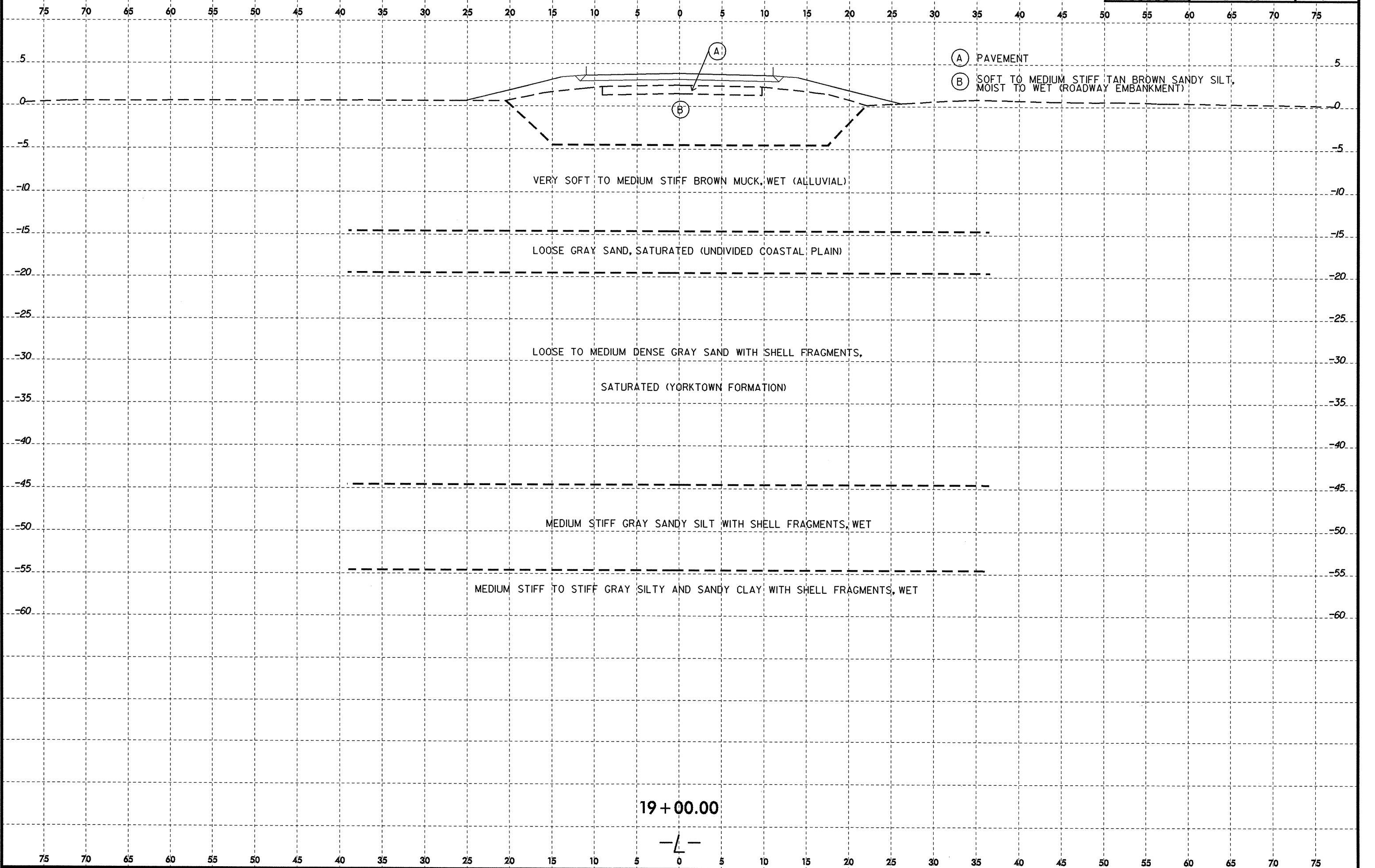
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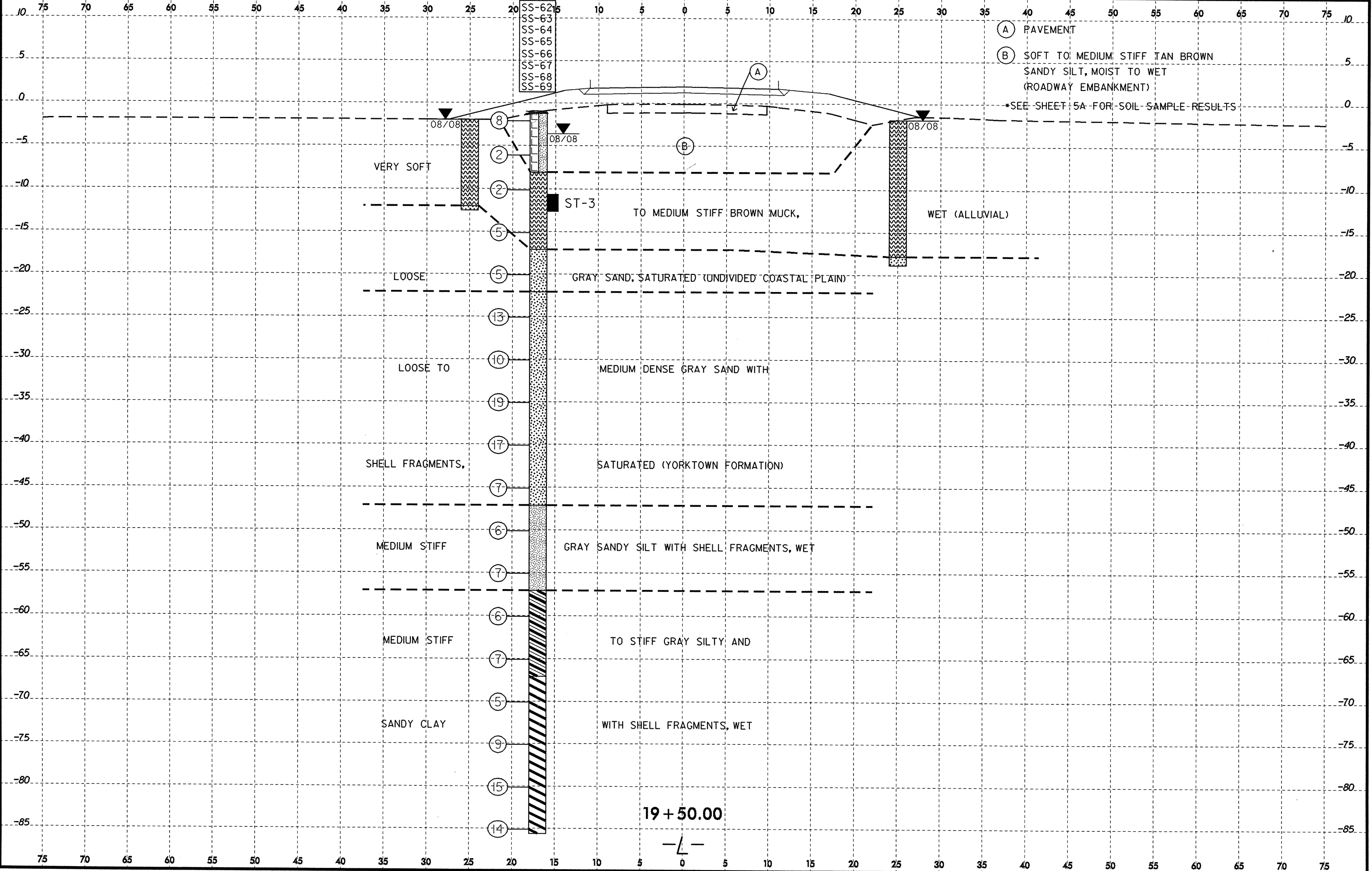


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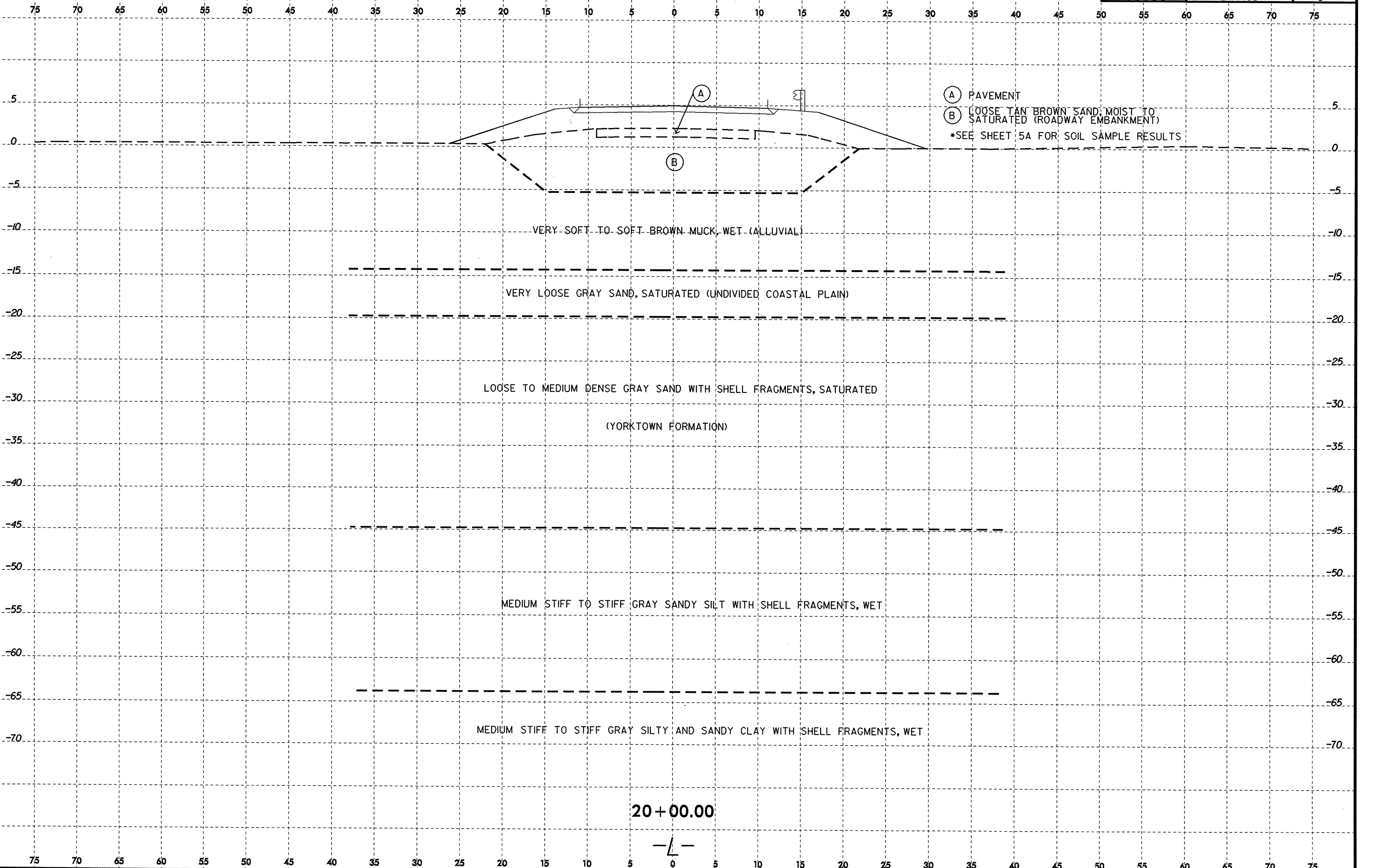
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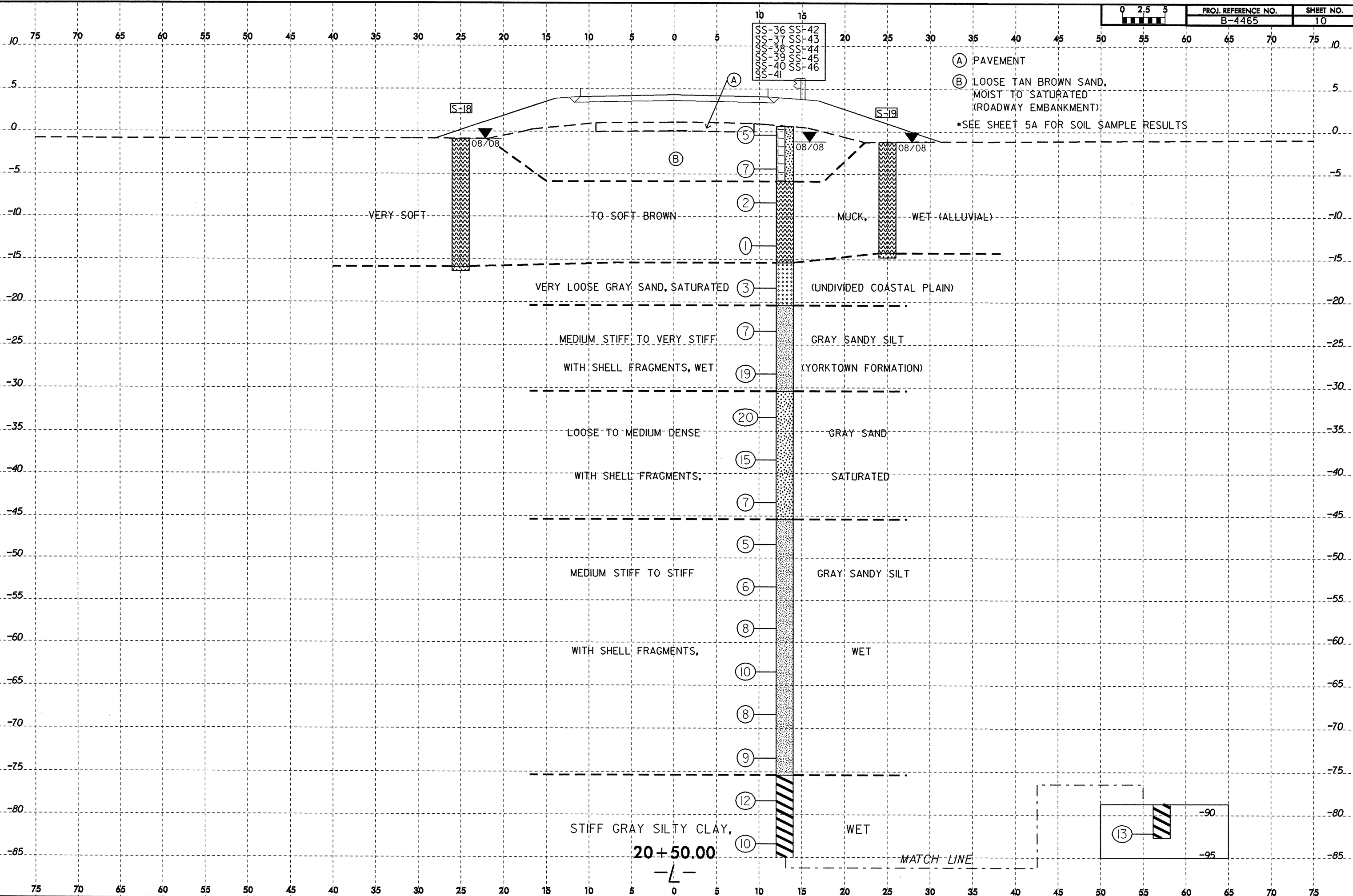
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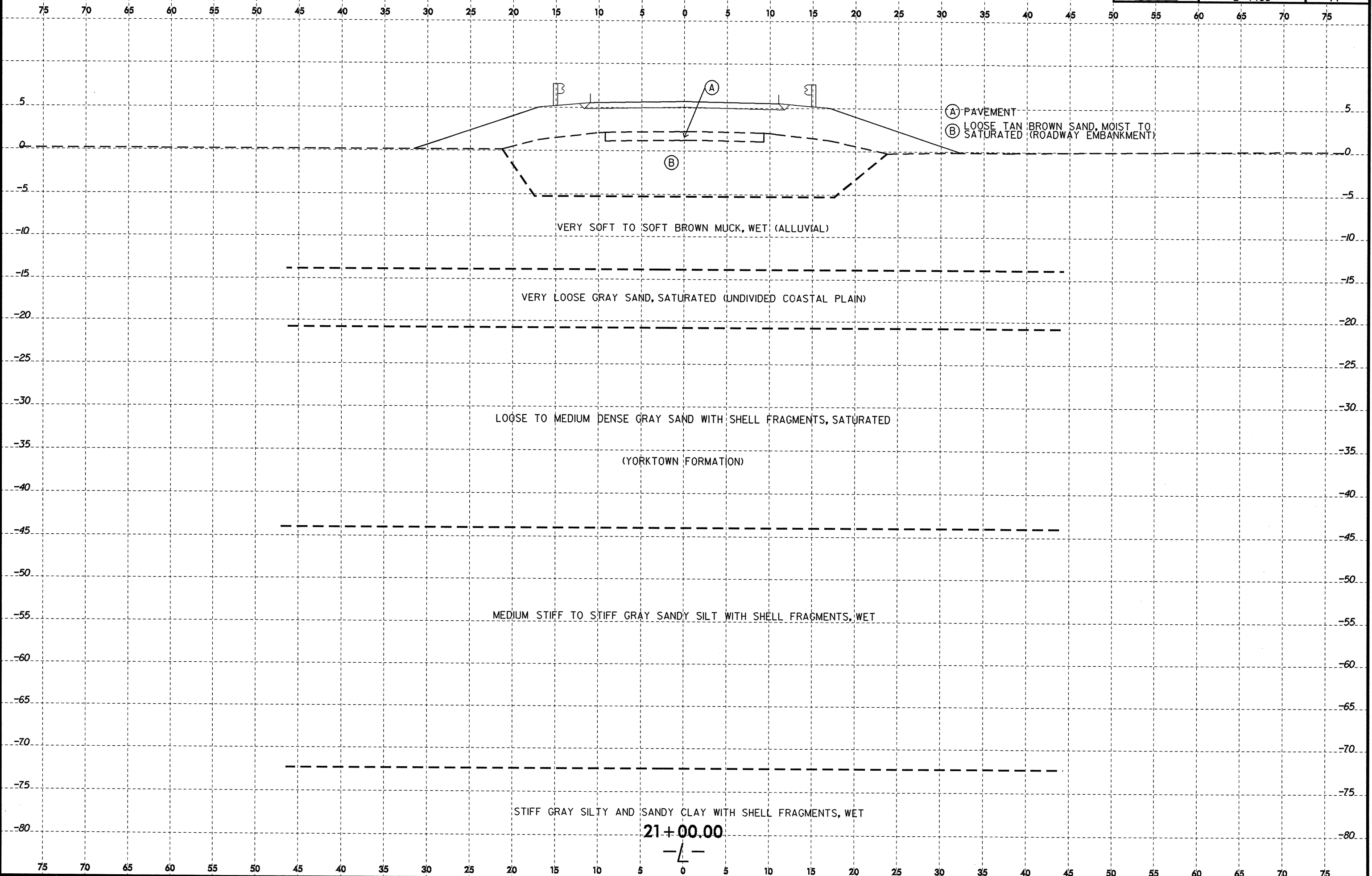
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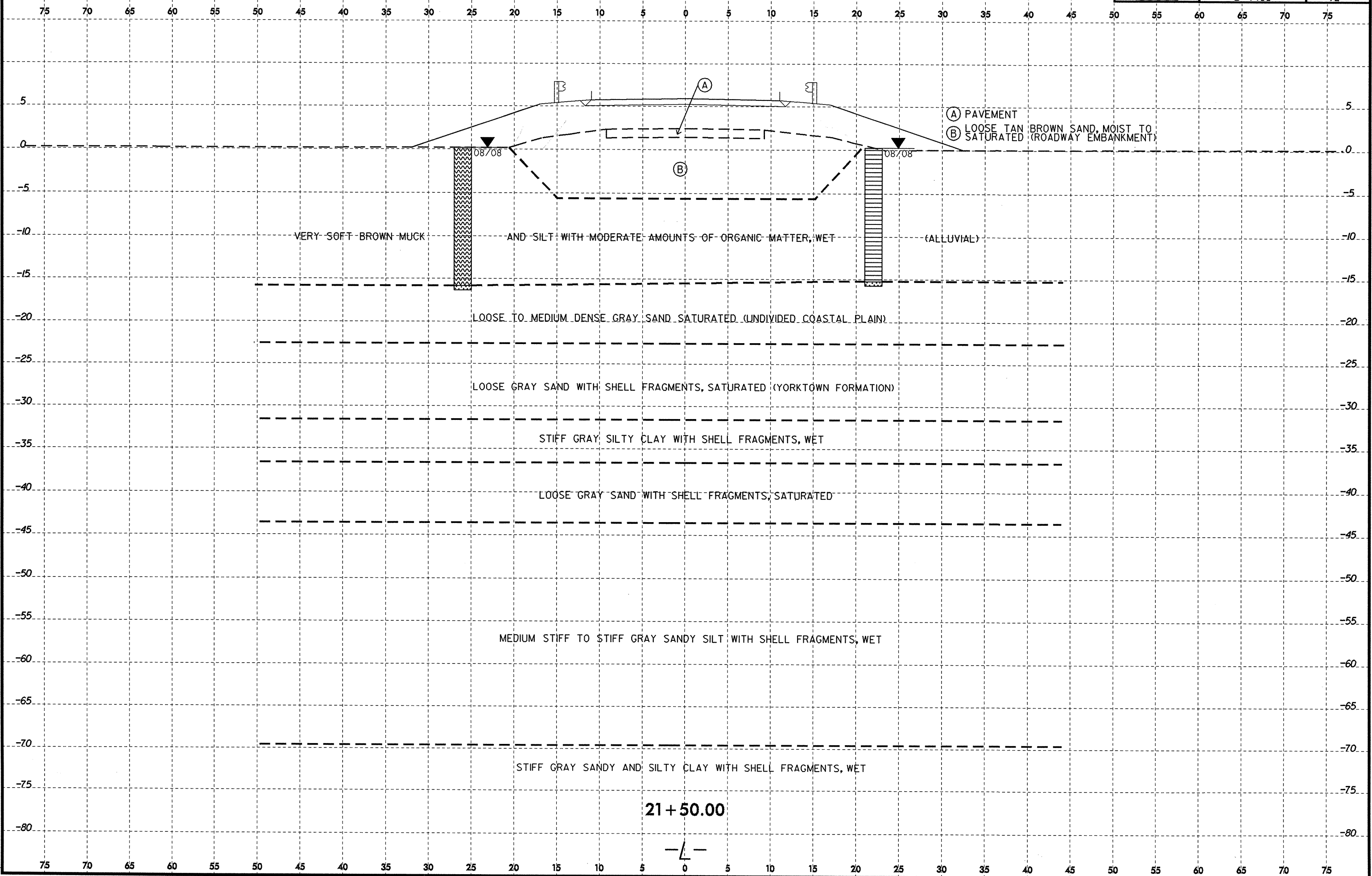
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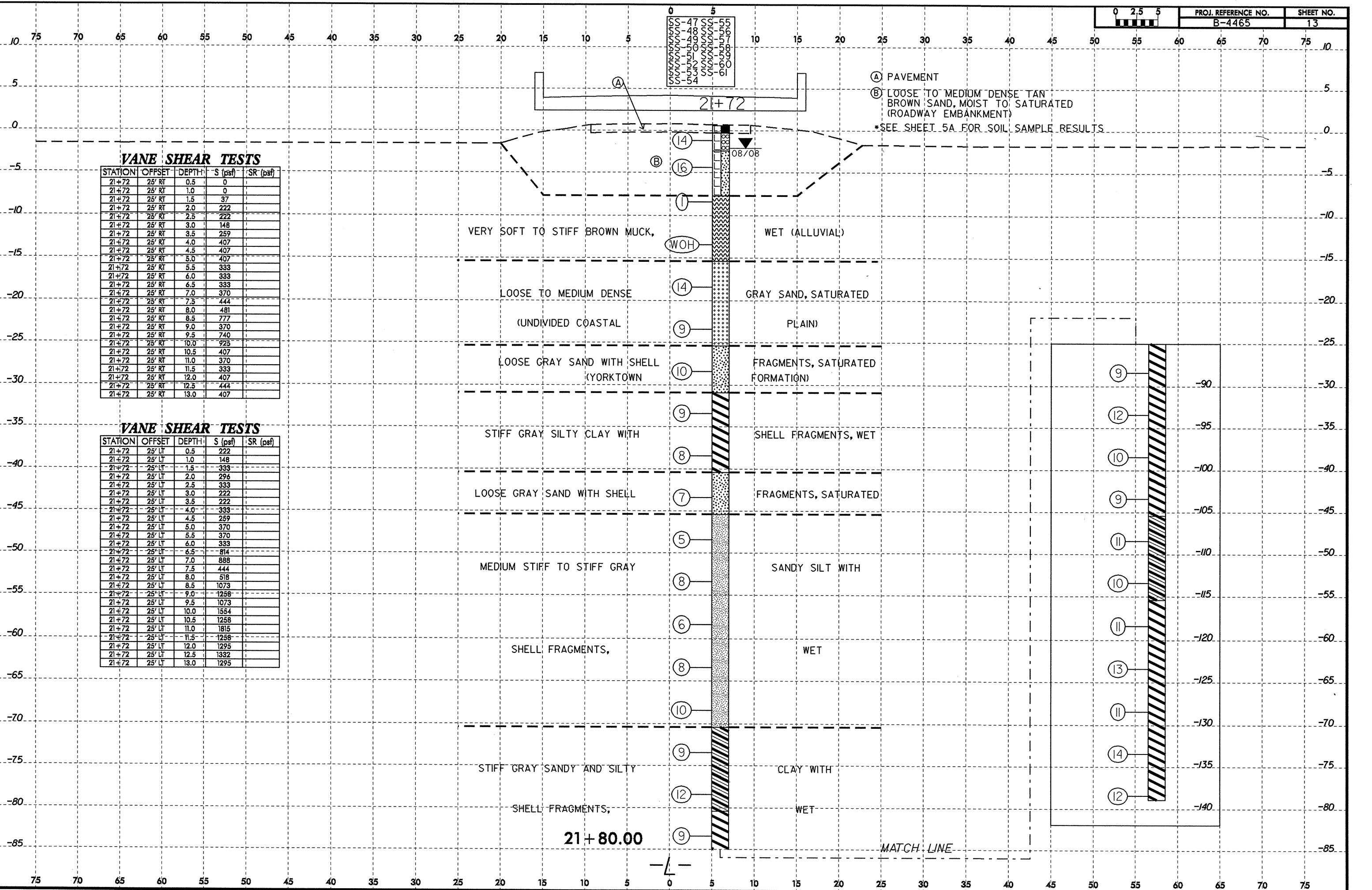
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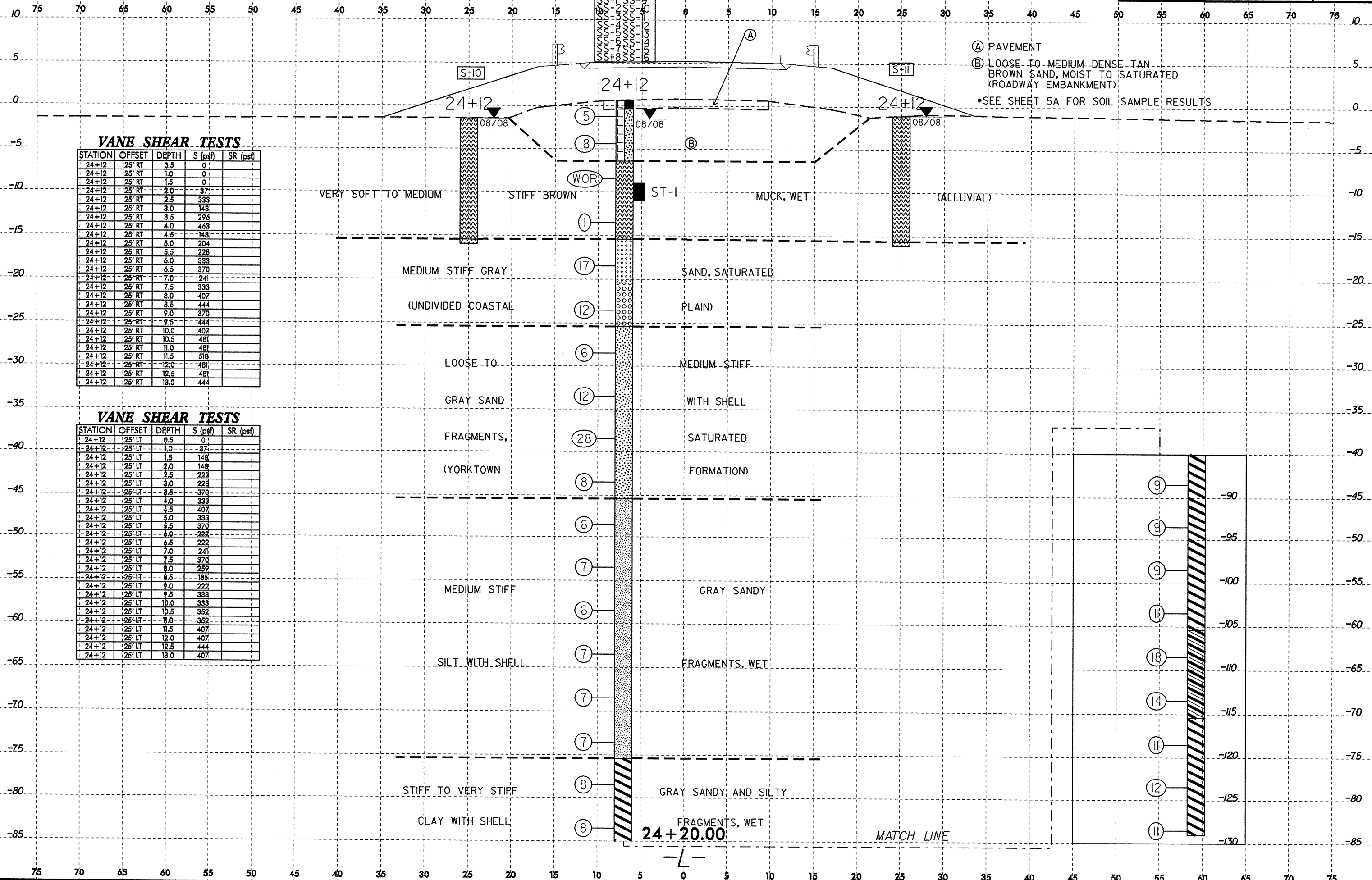
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VANE SHEAR TESTS

STATION	OFFSET	DEPTH	S (psf)	SR (psf)
24+12	'25' RT	0.5	0	
24+12	'25' RT	1.0	0	
24+12	'25' RT	1.5	0	
24+12	'25' RT	2.0	37	
24+12	'25' RT	2.5	333	
24+12	'25' RT	3.0	148	
24+12	'25' RT	3.5	296	
24+12	'25' RT	4.0	463	
24+12	'25' RT	4.5	148	
24+12	'25' RT	5.0	204	
24+12	'25' RT	5.5	228	
24+12	'25' RT	6.0	333	
24+12	'25' RT	6.5	370	
24+12	'25' RT	7.0	241	
24+12	'25' RT	7.5	333	
24+12	'25' RT	8.0	407	
24+12	'25' RT	8.5	444	
24+12	'25' RT	9.0	370	
24+12	'25' RT	9.5	444	
24+12	'25' RT	10.0	407	
24+12	'25' RT	10.5	481	
24+12	'25' RT	11.0	481	
24+12	'25' RT	11.5	519	
24+12	'25' RT	12.0	481	
24+12	'25' RT	12.5	481	
24+12	'25' RT	13.0	444	

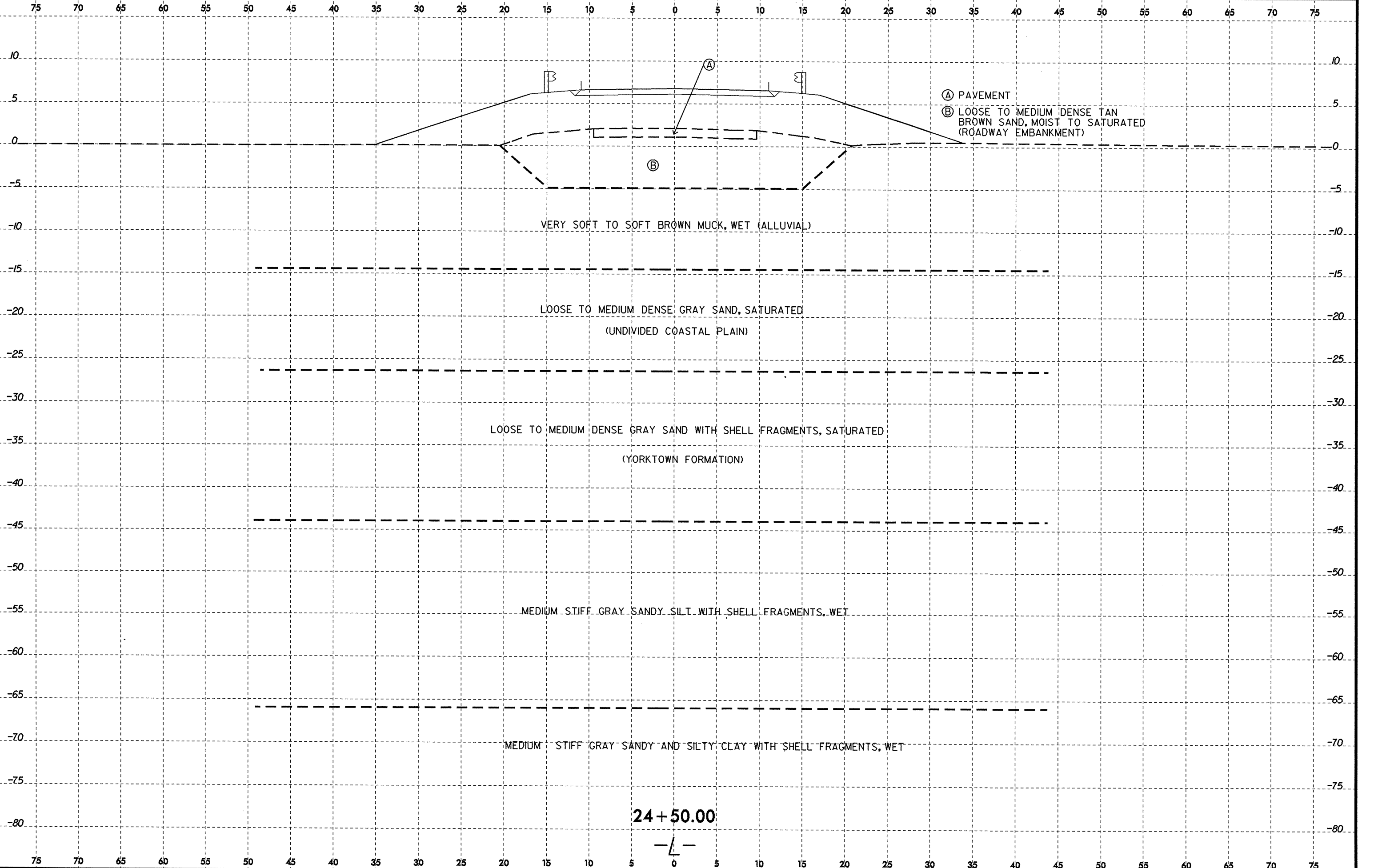
VANE SHEAR TESTS

STATION	OFFSET	DEPTH	S (psf)	SR (psf)
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24+12	'25' LT	1.0	37	
24+12	'25' LT	1.5	148	
24+12	'25' LT	2.0	148	
24+12	'25' LT	2.5	222	
24+12	'25' LT	3.0	228	
24+12	'25' LT	3.5	370	
24+12	'25' LT	4.0	333	
24+12	'25' LT	4.5	407	
24+12	'25' LT	5.0	333	
24+12	'25' LT	5.5	370	
24+12	'25' LT	6.0	222	
24+12	'25' LT	6.5	222	
24+12	'25' LT	7.0	241	
24+12	'25' LT	7.5	370	
24+12	'25' LT	8.0	259	
24+12	'25' LT	8.5	185	
24+12	'25' LT	9.0	222	
24+12	'25' LT	9.5	333	
24+12	'25' LT	10.0	333	
24+12	'25' LT	10.5	352	
24+12	'25' LT	11.0	352	
24+12	'25' LT	11.5	407	
24+12	'25' LT	12.0	407	
24+12	'25' LT	12.5	444	
24+12	'25' LT	13.0	407	

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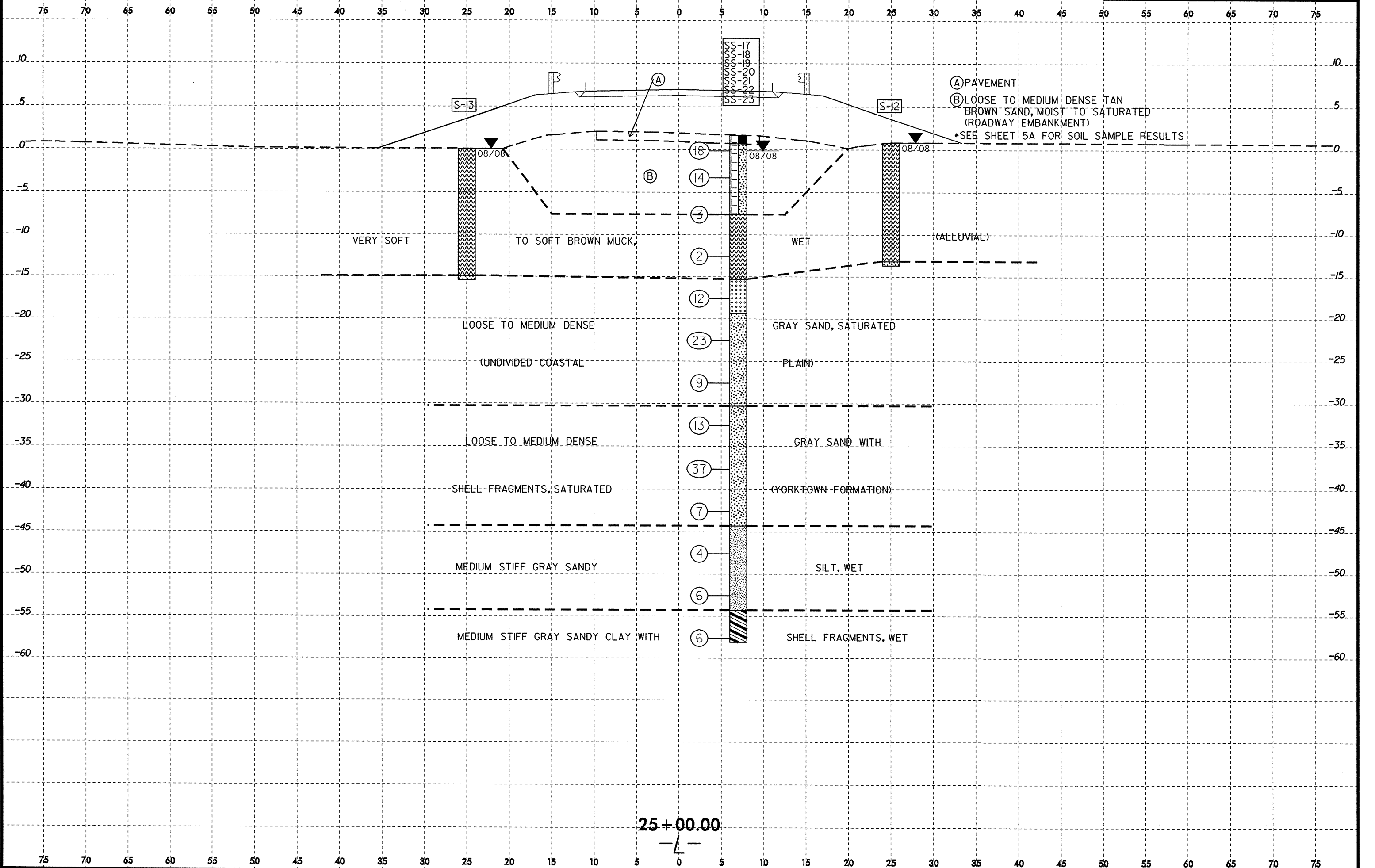
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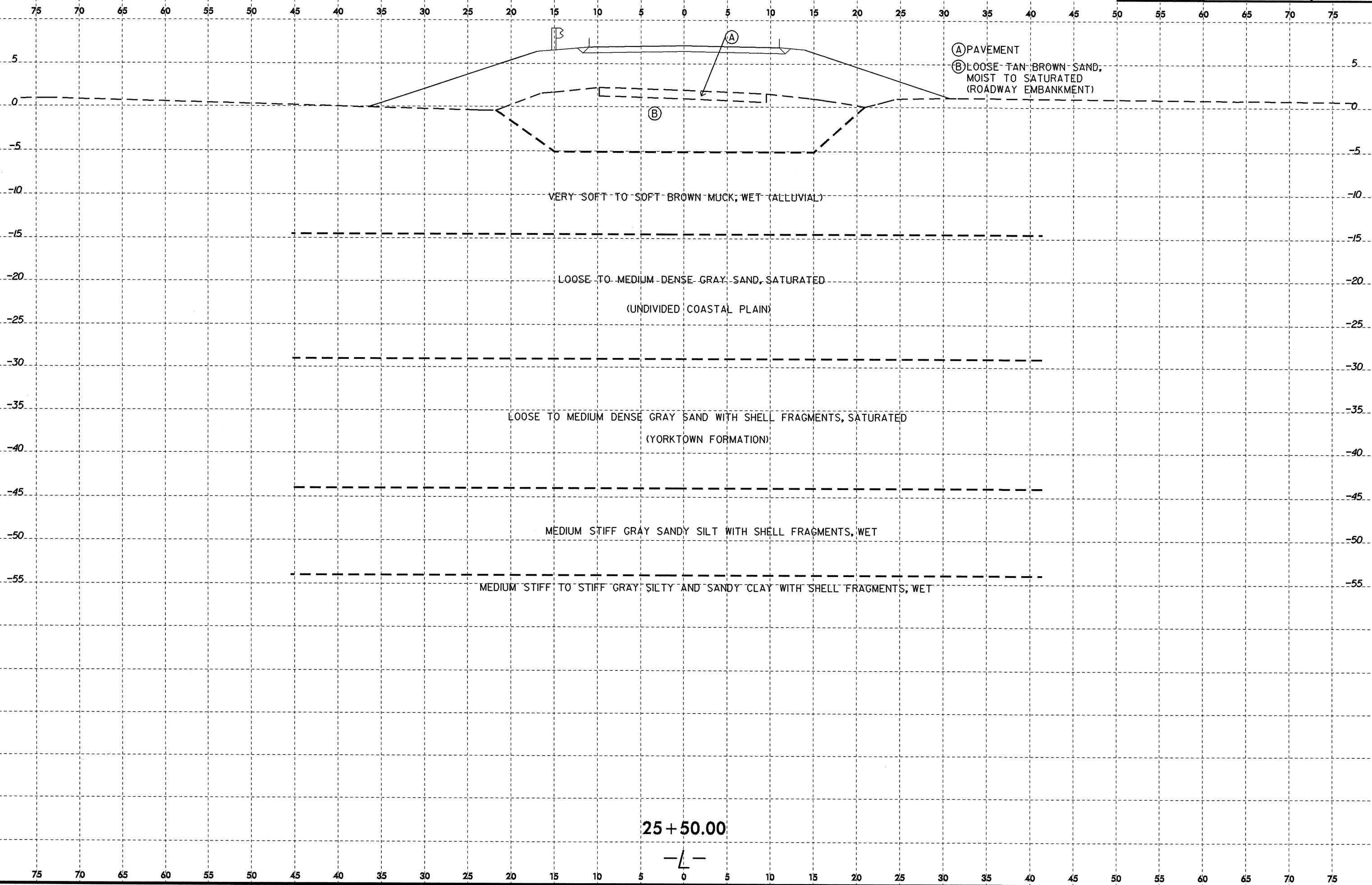
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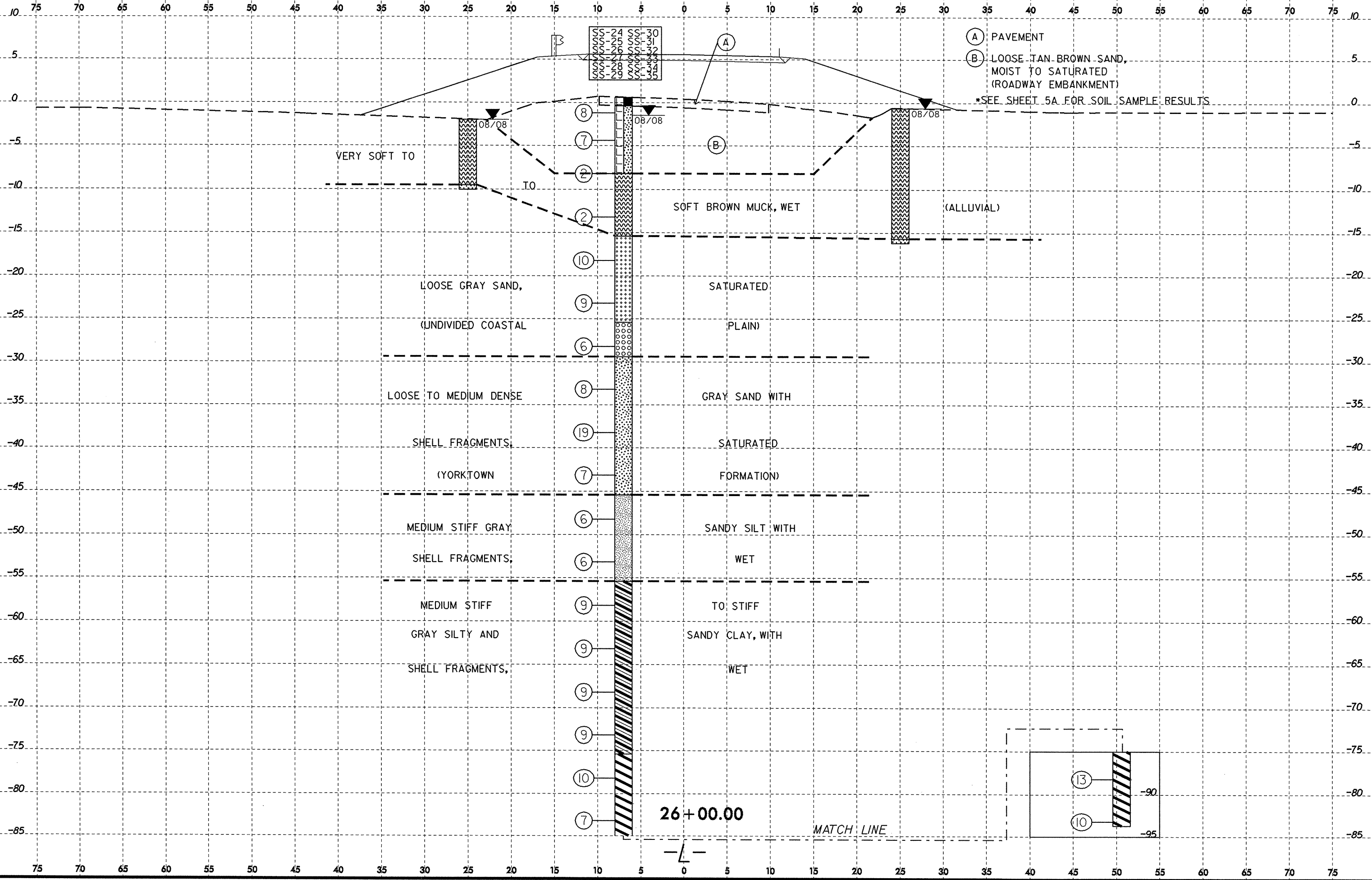
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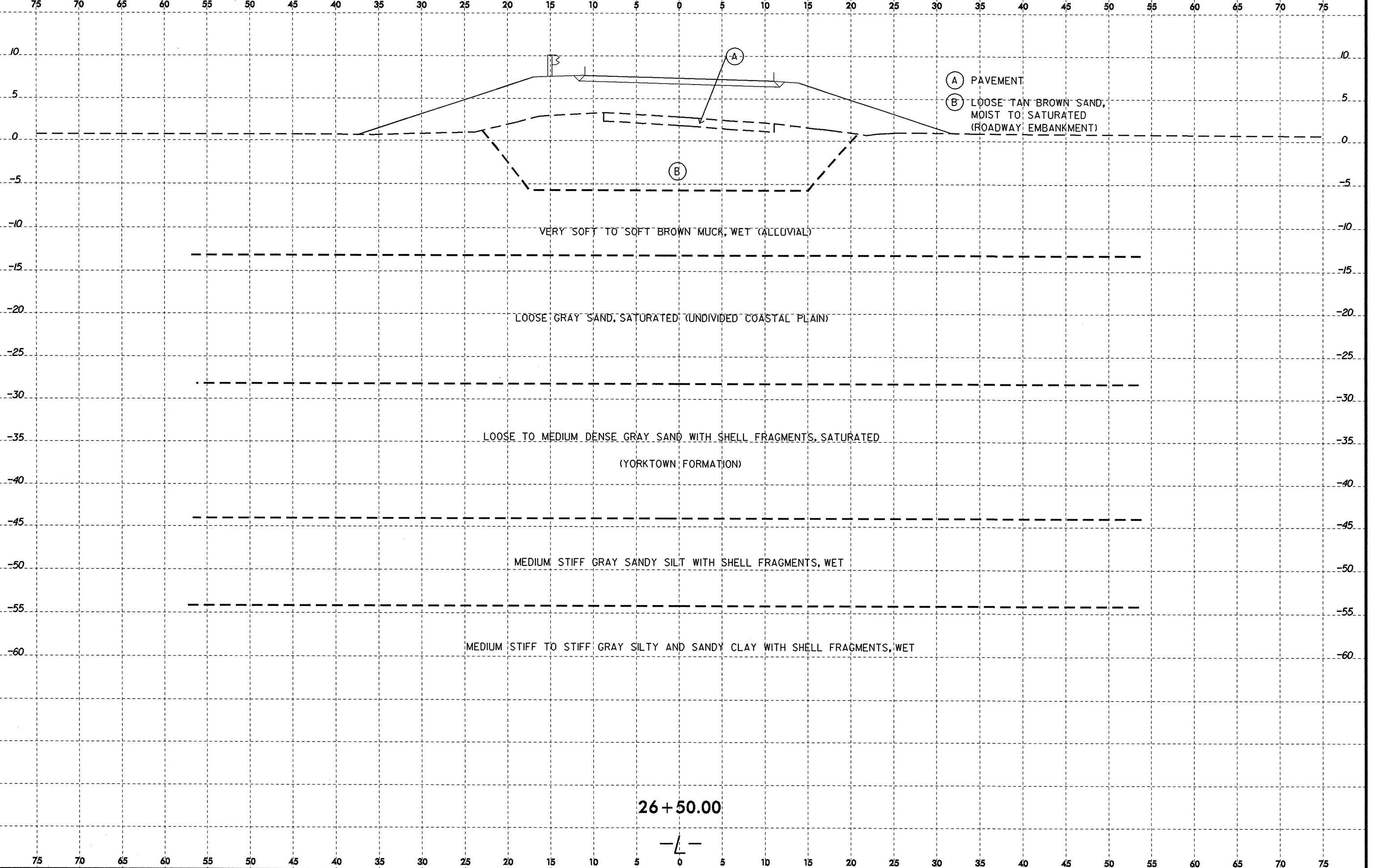
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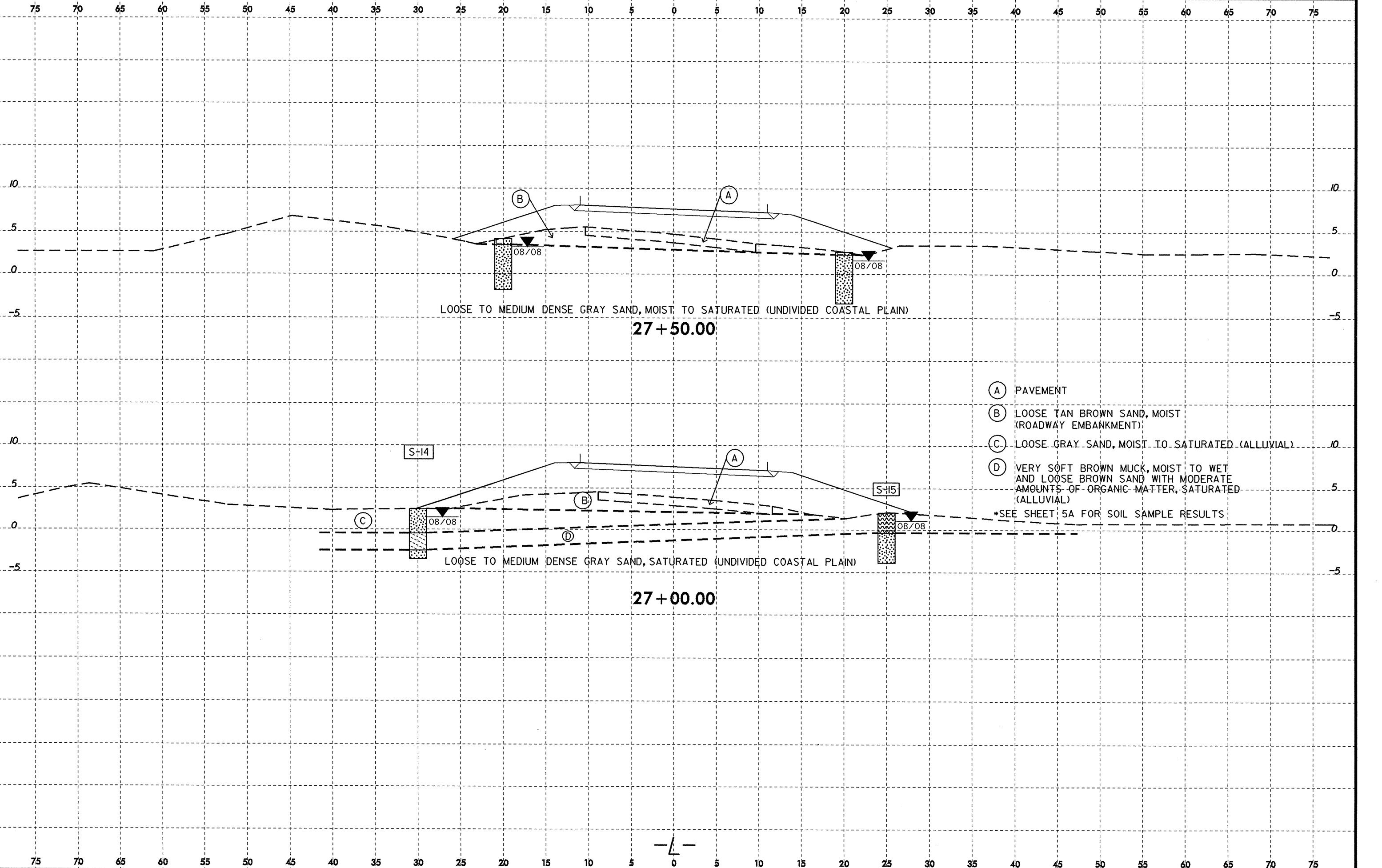
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LOOSE TO MEDIUM DENSE GRAY SAND, MOIST TO SATURATED (UNDIVIDED COASTAL PLAIN)
27 + 50.00

LOOSE TO MEDIUM DENSE GRAY SAND, SATURATED (UNDIVIDED COASTAL PLAIN)
27 + 00.00

- (A) PAVEMENT
 - (B) LOOSE TAN BROWN SAND, MOIST (ROADWAY EMBANKMENT)
 - (C) LOOSE GRAY SAND, MOIST TO SATURATED (ALLUVIAL)
 - (D) VERY SOFT BROWN MUCK, MOIST TO WET AND LOOSE BROWN SAND WITH MODERATE AMOUNTS OF ORGANIC MATTER, SATURATED (ALLUVIAL)
- *SEE SHEET 5A FOR SOIL SAMPLE RESULTS

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