

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.	P-5208F	1	18
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
50000.1.STR24T3	N/A	P.E.	
		RW & UTIL.	

CONTENTS

LINE	STATION	PLAN	PROFILE	XSECT
-L-	12+50.00 - 33+75.00	4-5	7-9	11-14
-Y2-	10+00.00 - 15+50.00	5-6	10	-

ROADWAY
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 50000.1.STR24T3 F.A. PROJ. N/A
COUNTY Cabarrus
PROJECT DESCRIPTION Proposed Caldwell Road (SR 1173) Grade Separation over the NS/NCRR Railroad in Harrisburg

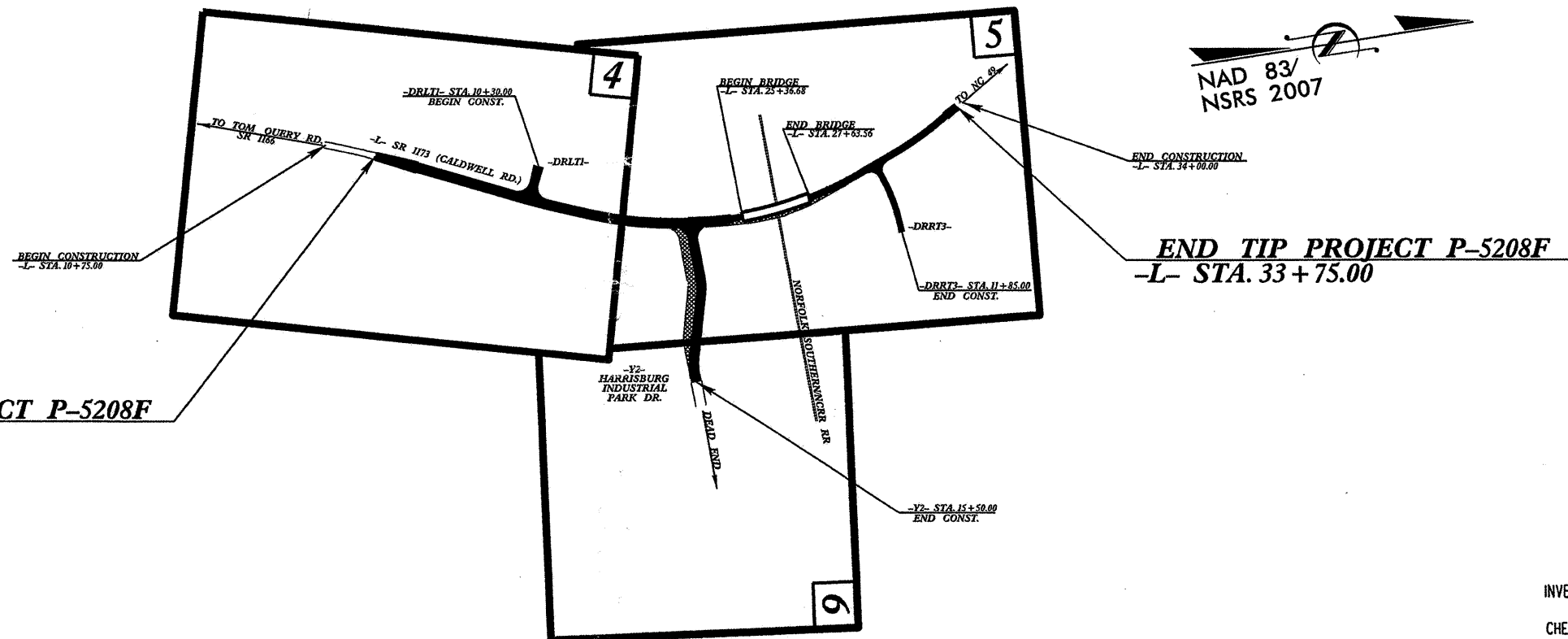
INVENTORY

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) 707-6850. 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 BODDER 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 BODDER 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: C203147 ID: P-5208F



BEGIN TIP PROJECT P-5208F
-L- STA. 12+50.00

END TIP PROJECT P-5208F
-L- STA. 33+75.00

PERSONNEL

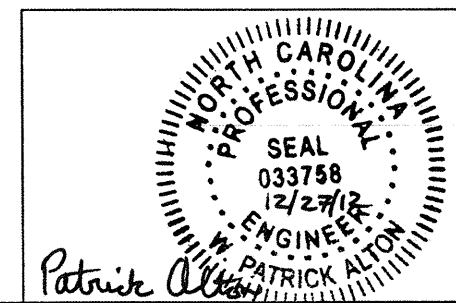
D. Racey
J. Gilchrist
M. Renza
D. Jenks

INVESTIGATED BY F&R, Inc.
CHECKED BY P. Alton, P.E.
SUBMITTED BY F&R, Inc.
DATE April 2012, Revised Dec. 2012

DRAWN BY: D. Racey

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IS IT 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. P-5208F	SHEET NO. 2
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SUBSURFACE INVESTIGATION

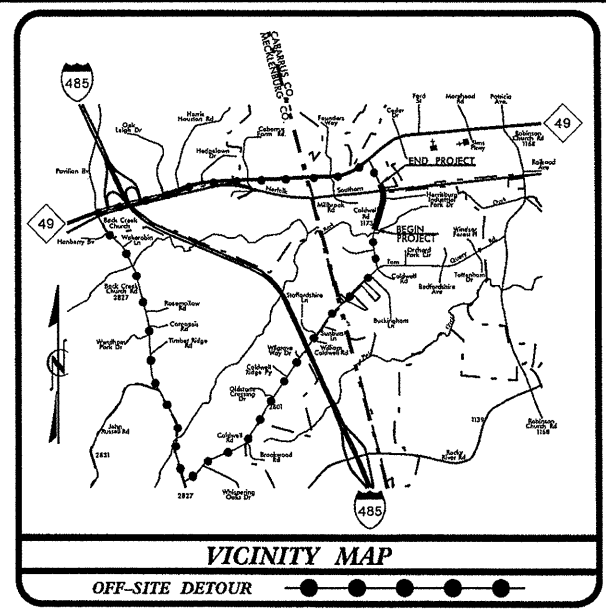
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

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 (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, GRAN. SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGH PLASTIC, A-7-5</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. ANGULARITY OF GRAINS 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) CRYSTALLINE ROCK (CR) NON-CRYSTALLINE ROCK (NCR) COASTAL PLAIN SEDIMENTARY ROCK (CP)	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 IN 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 (SCREC) - 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 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-4, A-5, A-6, A-7 SYMBOL. [Grid of symbols for soil classification] % PASSING: 10, 40, 200 (with sieve sizes 50 MX, 10 MX, 25 MX, 40 MX, 75 MX, 100 MX, 150 MX, 200 MX, 250 MX, 300 MX, 350 MX, 400 MX, 450 MX, 500 MX, 600 MX, 750 MX, 1000 MX) LIQUID LIMIT, PLASTIC INDEX, GROUP INDEX, USUAL TYPES OF MAJOR MATERIALS, GEN. RATING AS A SUBGRADE	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, MODERATELY COMPRESSIBLE, HIGHLY COMPRESSIBLE PERCENTAGE OF MATERIAL ORGANIC MATERIAL, GRANULAR SOILS, SILT-CLAY SOILS, OTHER MATERIAL GROUND WATER WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING, STATIC WATER LEVEL AFTER 24 HOURS, PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA, SPRING OR SEEP	WEATHERING FRESH, VERY SLIGHT (V SL.), SLIGHT (SL.), MODERATE (MOD.), MODERATELY SEVERE (MOD. SEV.), SEVERE (SEV.), VERY SEVERE (V SEV.), COMPLETE ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE. 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. 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. 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> 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> 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> 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.	TERMS AND DEFINITIONS BENCH MARK: SEE BELOW ELEVATION: FT. NOTES: TBM 1: BL-F6 N: 573,185.6688 E: 1,501,467.8690 ELEV. = 636.32 FT. TBM 2: BL-F4 N: 573,131.3088 E: 1,501,471.0561 ELEV. = 639.84 FT. TBM 3: BL-F5 N: 573,874.983 E: 1,500,999.0037 ELEV. = 672.99 FT.
TEXTURE OR GRAIN SIZE U.S. STD. SIEVE SIZE OPENING (MM): 4, 10, 40, 60, 200, 270 COARSE SAND (CS), FINE SAND (FS), SILT (SL), CLAY (CL)	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, DIP & DIP DIRECTION OF ROCK STRUCTURES	ROCK HARDNESS VERY HARD, HARD, MODERATELY HARD, MEDIUM HARD, SOFT, VERY SOFT CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. 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. CAN BE GROUDED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. CAN BE GROUDED 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. 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 FINGER NAIL.	
SOIL MOISTURE - CORRELATION OF TERMS SOIL MOISTURE SCALE (ATTERBERG LIMITS), FIELD MOISTURE DESCRIPTION, GUIDE FOR FIELD MOISTURE DESCRIPTION	ABBREVIATIONS 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, HI - HIGHLY	ROCK HARDNESS VERY HARD, HARD, MODERATELY HARD, MEDIUM HARD, SOFT, VERY SOFT CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. 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. CAN BE GROUDED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. CAN BE GROUDED 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. 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 FINGER NAIL.	
PLASTICITY NONPLASTIC, LOW PLASTICITY, MED. PLASTICITY, HIGH PLASTICITY	EQUIPMENT USED ON SUBJECT PROJECT DRILL UNITS: MOBILE B-51, BK-51, CME-45C, CME-55, PORTABLE HOIST ADVANCING TOOLS: CLAY BITS, 6" CONTINUOUS FLIGHT AUGER, 8" HOLLOW AUGERS, HARD FACED FINGER BITS, TUNG-CARBIDE INSERTS, CASING w/ ADVANCER, TRICONE * STEEL TEETH, TRICONE * TUNG-CARB., CORE BIT	ROCK HARDNESS VERY HARD, HARD, MODERATELY HARD, MEDIUM HARD, SOFT, VERY SOFT CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. 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. CAN BE GROUDED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. CAN BE GROUDED 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. 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 FINGER NAIL.	
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.	INDURATION FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. FRIABLE, MODERATELY INDURATED, INDURATED, EXTREMELY INDURATED	ROCK HARDNESS VERY HARD, HARD, MODERATELY HARD, MEDIUM HARD, SOFT, VERY SOFT CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. 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. CAN BE GROUDED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. CAN BE GROUDED 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. 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 FINGER NAIL.	

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 DRACBY AT 66CAD

TIP PROJECT: P-5208F

CONTRACT: C203147



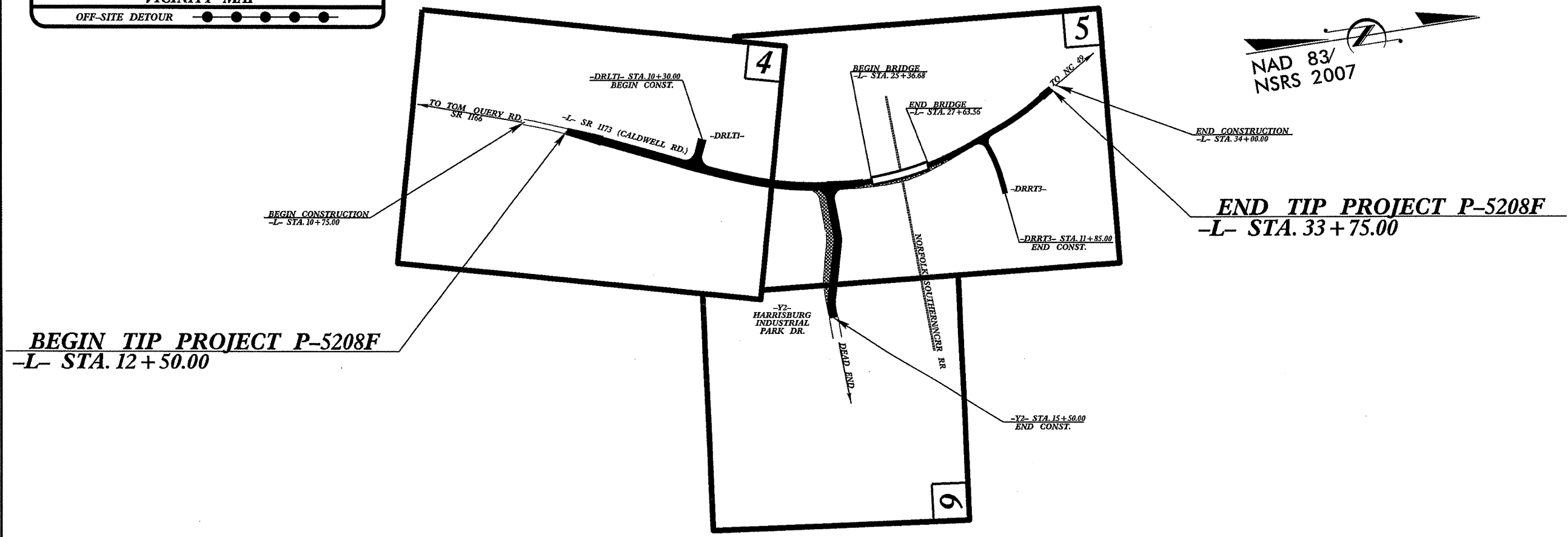
STATE OF NORTH CAROLINA
 NCDOT RAIL DIVISION

CABARRUS COUNTY

LOCATION: PROPOSED CALDWELL ROAD (SR 1173) GRADE SEPARATION OVER THE NSNCRR RAILROAD IN HARRISBURG
TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURE AND CURB & GUTTER

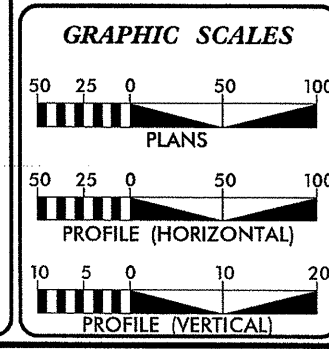


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N.C.	P-5208F	2A	18
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
50000.1.STR22T1B		PE, UTIL PE	
50000.1.STR24T3		PE, UTIL PE	
43219.2.STR09P5208F		RW	
50000.3.STR06T4A		UTIL CONST., CONST.	



BEGIN TIP PROJECT P-5208F
-L- STA. 12 + 50.00

END TIP PROJECT P-5208F
-L- STA. 33 + 75.00



DESIGN DATA

ADT 2013 =	6910
ADT 2035 =	12100
DHV =	9 %
D =	60 %
T =	4 % *
V =	50 MPH
* TTST =	1% DUAL=3%
FUNC CLASS =	COLLECTOR
REGIONAL TIER	

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT P-5208F =	0.359 MI.
LENGTH STRUCTURE TIP PROJECT P-5208F =	0.043 MI.
TOTAL LENGTH TIP PROJECT P-5208F =	0.402 MI.

Prepared for the North Carolina Department of Transportation in the Office of:
 559 JONES FRANKLIN SCMD
 SUITE 164
 Raleigh, N.C. 27604
 License No. F-0377
 POC: 919 851 8077
 Fax: 919 851 8107

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: APRIL 30, 2012

LETTING DATE: APRIL 16, 2013

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 PLANNING & DEVELOPMENT, SENIOR PROJECT ENGINEER

HYDRAULICS ENGINEER

EDWARD G. WETHERILL, PE
 PROJECT ENGINEER

BOB A. MAY, PE
 PROJECT DESIGN ENGINEER

SANDRA A. STEPNEY, PE, CPM
 PLANNING & DEVELOPMENT, SENIOR PROJECT ENGINEER

NC DEPARTMENT OF TRANSPORTATION RAIL DIVISION
 PLANNING AND DEVELOPMENT

CAPITAL YARD
 100 RAIL SERVICE CENTER
 RALEIGH, NC 27604



FROEHLING & ROBERTSON, INC.

Engineering Stability Since 1881

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 Raleigh, North Carolina 27603-2302 | USA
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December 20, 2012

Project No.: 50000.1.STR24T3
 TIP No.: P-5208F
 F.A. Number: N/A
 County: Cabarrus

Description: Proposed Caldwell Road (SR 1173) Grade Separation over the NS/NCRR Railroad in Harrisburg

SUBJECT: **Geotechnical Report – Inventory**

Project Description

The referenced project consists of the construction of approximately 0.4 miles of new roadway, including a 220-foot long bridge for the proposed Caldwell Road (-L-) Grade Separation over NCRR/NSRR in Harrisburg, Cabarrus County, North Carolina. In addition, approximately 400 feet of proposed roadway will be constructed for the realignment of Harrisburg Industrial Park Drive (-Y2-). Several smaller Y-line roads for business driveways (DRRT1, DRLT1, DRRT2 & DRRT3) will have grades raised to meet the proposed Caldwell Road. The proposed roadway begins approximately 1400 feet south of the existing railroad tracks and ends approximately 700 feet north of the tracks.

The initial geotechnical field investigation was performed in February of 2012. During this time period, a total of fifteen (15) standard penetration test (SPT) borings were advanced with an ATV-mounted CME-55 drill rig with an automatic hammer. Seven roadway borings (R-1 through R-7) and eight bridge borings were performed. A supplemental geotechnical field investigation was performed in September of 2012 due to the addition of temporary MSE retaining walls and the realignment of Harrisburg Industrial Park Drive (-Y2-). Initially, borings R-4 and R-5 were performed approximately 45 and 20 feet right, respectively, of the proposed centerline of Harrisburg Industrial Park Drive. The alignment of the road was then shifted back to the existing alignment of Harrisburg Industrial Park Drive, which is located approximately 125 to 150 feet north of its originally proposed location. Therefore, F&R performed two additional borings, S-4 and S-5, along the existing alignment of Harrisburg Industrial Park Drive in order to explore the subsurface conditions with respect to design of the road. During this time period, five additional SPT borings (S-1 through S-5) were performed. The temporary MSE walls will be used for staged construction during fill

placement. Representative soil and rock samples were collected for visual classification in the field and for laboratory analysis by F&R's testing laboratory.

The following alignments were investigated:

<u>Line</u>	<u>Station(±)</u>
-L-	12+50.00 to 33+75.00
-Y2-	10+00.00 to 15+50.00

Areas of Special Geotechnical Interest

- 1) Soft, Loose and Wet Soils: The following areas contain relatively soft or loose and/or wet soils that have the potential for subgrade problems during construction:

<u>Line</u>	<u>Station (±)</u>
-L-	14+95, left
-L-	20+10, left
-L-	27+00 to 28+00
-Y2-	13+92, left

- 2) Cohesive Soils: The following areas contain cohesive soils that have the potential to cause subgrade problems during construction, embankment stability or long-term settlement problems:

<u>Line</u>	<u>Station (±)</u>
-L-	17+45, left
-L-	22+39, right
-L-	25+00 to 26+00
-L-	29+50 to 32+50, left
-Y2-	12+66, right

Physiography and Geology

The project is located in the Charlotte Belt of the Piedmont physiographic province of North Carolina. More specifically, it is located just south of an area referred to as the Concord Plutonic Suite. Rock in this area is mapped as Syenite, Gabbro, Metamorphosed Mafic Rock, Metavolcanic Rock, and Metamorphosed Quartz Diorite. Based on visual observation of the rock core samples obtained from this site, it appears that the rock is predominantly metamorphosed quartz diorite. The virgin soils are the residual product of in-place chemical weathering of rock that was similar to the rock presently underlying the site.

The ground surface along the proposed Caldwell Road alignment generally slopes upward from an elevation of approximately 606 feet at the beginning of the project (Station 12+50) to an elevation of approximately 682 feet at the end of the project (Station 33+75). The proposed grade will require up to approximately 30 feet of fill to be placed at End Bent 1 and up to approximately 29 feet of fill to be placed at End Bent 2. The proposed road ties into the existing Caldwell Road at each end of the project.

The existing ground surface along the proposed Harrisburg Industrial Park Drive alignment generally slopes downward from a maximum elevation of approximately 643 feet at the beginning of the road at Caldwell Road (Station 10+45.25) to an elevation of approximately 637 feet at the end of the road (Station 15+00). The proposed grade will require up to approximately 28 feet of fill to be placed at the beginning of the road where it ties into Caldwell Road. The proposed road then ties into the existing Harrisburg Industrial Park Drive at Station 15+00.

Soils Properties

The subsurface conditions discussed below and those shown on the attached drawings, represent an estimate of the subsurface conditions based on interpretation of the boring data using normally-accepted geotechnical engineering judgments. The transitions between different soil strata are usually less distinct than those shown on the Borelogs. Sometimes the relatively small sample obtained in the field is insufficient to definitively describe the origin of the subsurface material. Although individual soil test borings are representative of the subsurface conditions at the boring locations on the dates shown, they are not necessarily indicative of subsurface conditions at other locations or at other times.

Soils within the area of this project have been divided into three categories: surficial materials (topsoil & asphalt), roadway embankment/artificial fill, and residual soils.

Surficial Materials: Asphalt was encountered at the surface of borings EB1-A, EB1-B and B2-A and the thickness was measured to be approximately 8 to 9 inches at each location.

Topsoil/rootmat was encountered at the surface of all of the remaining borings except R-2 where fill was encountered at the surface. The topsoil ranged in thickness from approximately 0.2 to 0.3 feet, except at boring R-5 where the thickness was approximately 0.7 feet.

Roadway Embankment/Artificial Fill: Roadway Embankment Fill or Artificial Fill was encountered below the asphalt or surficial organic soils at all borings. The fill typically consisted of soft to stiff sandy and silty CLAY (A-6, A-7-5 & A-7-6) and soft to stiff sandy and clayey SILT (A-4 & A-5) and extended to depths ranging from approximately 1 to 13.2 feet below the existing ground surface. The depth of the fill generally increased towards the railroad and increased from the left towards the right side of the road. The SPT N-values in the fill ranged from 2 to 19 blows per foot (bpf), which is indicative of poorly compacted (typically 0 to 4 bpf) to well compacted (typically 8 bpf and higher) soils.

Residual Soil: Residual soil was typically encountered below the Roadway Embankment fill/artificial fill at all borings. The residual soil typically consisted of medium stiff to hard sandy SILT (A-4), dense to very dense silty SAND (A-2-4), and stiff to very stiff clayey SILT (A-5). Borings R-5, R-6, R-7 and S-5 were terminated in residual soil at depths of 25, 15, 10 and 10 feet, respectively.

Rock Properties

Weathered rock (WR) and/or crystalline rock (CR) was encountered below the Roadway Embankment at boring B1-B and below the residual soils at the remaining borings, except at borings R-5, R-6, R-7 and S-5 as noted above. The rock was encountered at depths ranging from 3.5 to 38.5 feet (elevations ranging from ~598.1 to 651.0 feet). Soil was re-encountered below the weathered rock in borings EB2-A and R-3 and was approximately 3.9 and 8.2 feet in thickness with SPT N-values of 98 and 45, respectively. Rock was then re-encountered and extended to boring termination. All of these borings terminated in rock at depths ranging from approximately 8.6 to 30.9 feet (elevations ranging from ~604.1 to 638.2 feet). In accordance with the NCDOT legend, weathered rock is defined as residual material exhibiting an SPT N-value of at least 100 blows per foot and crystalline rock is defined by SPT refusal (*i.e.*, 60/0.1' or 60/0.0').

Rock coring was performed at the interior bent bridge borings (B1-A, B1-B, B2-A & B2-B). The coring extended from 11.9 to 16.2 feet below the level of SPT refusal. The rock consisted of moderately hard to hard, moderately severely weathered to fresh, Metamorphosed Quartz Diorite. Isolated zones of lost core recovery was noted in borings B1-A, B1-B and B2-B, which may be indicative of relatively thin soil seams or weathered rock. The Recovery of each core run and the Rock Quality Designation (RQD) of each core run were measured by F&R staff and are indicated on the Borelogs and Core Boring Reports. The recoveries ranged from 87% to 100% in all of the borings. Typically, lower RQD's were measured in the upper 4 to 6 feet of the cored rock and ranged from 24% to 77%. Higher RQD's were measured below these depths and ranged from 84% to 100% where the borings were terminated.

Groundwater Properties

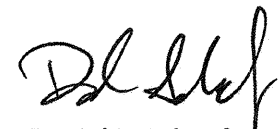
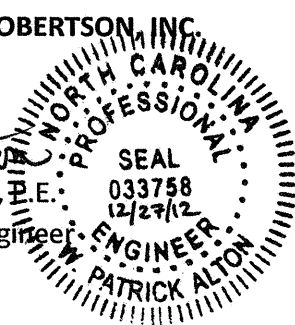
Water levels were measured in the borings immediately after drilling and after a stabilization period of at least 24 hours, except at borings EB1-A and EB1-B where the borings were backfilled immediately after drilling due to their location in the existing road. Groundwater was measured immediately after drilling in the borings at depths ranging from 10.5 to 28.4 feet, and elevations ranging from 603.7 to 644 feet. No groundwater was encountered immediately after drilling in borings R-1, R-3, R-6, R-7, S-1, S-2, S-3, S-5 and EB1-A. Stabilized groundwater was measured in the borings at depths ranging from 3.3 to 14.8 feet, and elevations ranging from 606.9 to 644.5 feet. Stabilized groundwater was not measured in borings S-3, S-5, EB1-A and EB1-B and was not encountered in borings R-6 and R-7. The soil moisture in the recovered soil samples was generally described as moist or wet below the measured groundwater levels. Above the measured groundwater level, the soil moisture was generally described as moist.

Please do not hesitate to contact us if you have any questions regarding this report or if you need additional services.

Sincerely,

FROEHLING & ROBERTSON, INC.

Patrick Alton
W. Patrick Alton, P.E.
Geotechnical Engineer



Daniel K. Schaefer, P.E.
Raleigh Branch Manager

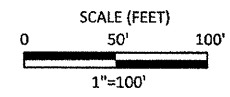
NAD 83/NSRS 2007

SINCE

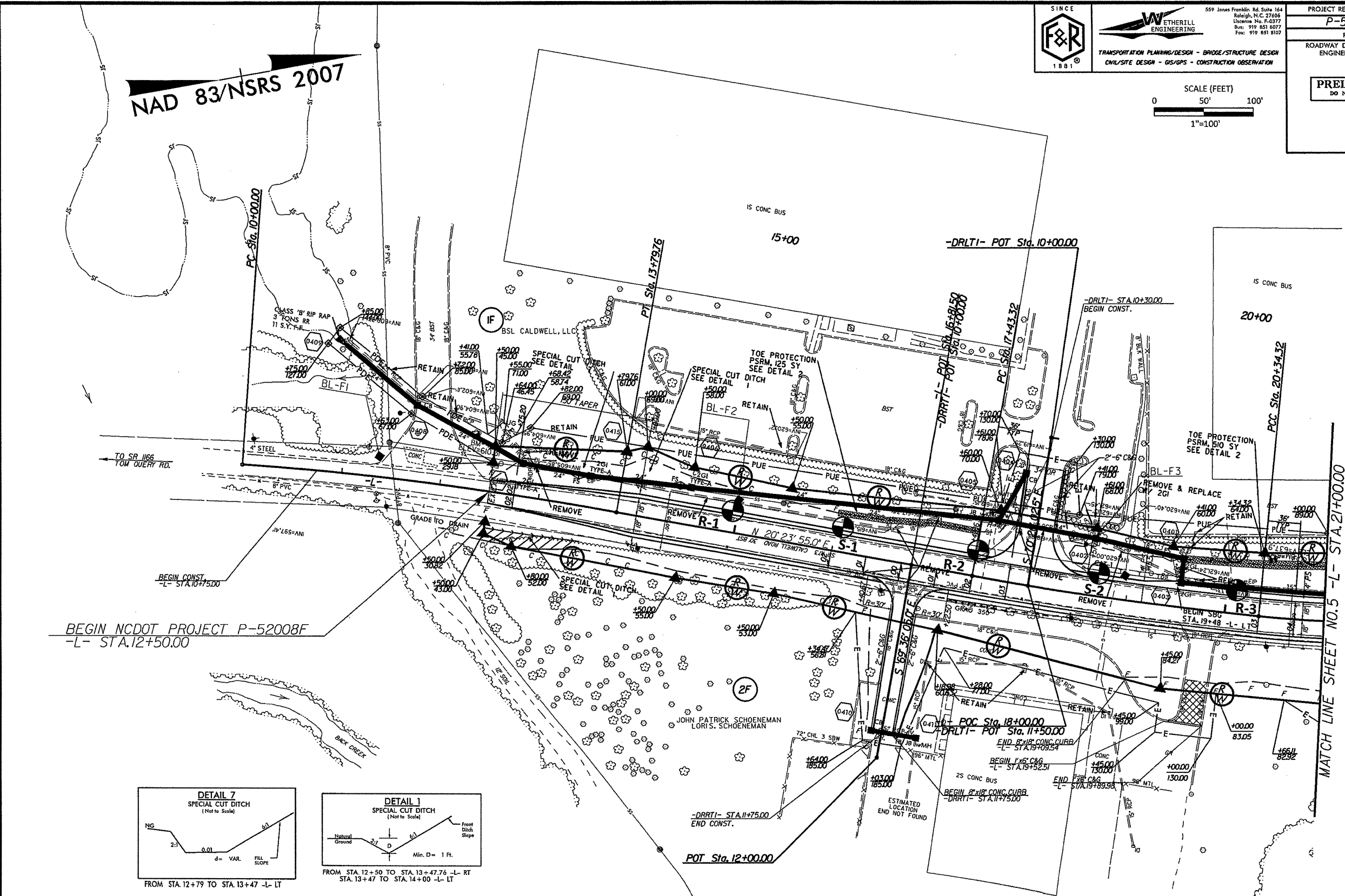
 WETHERILL
 ENGINEERING
 TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
 CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

559 Jones Franklin Rd. Suite 164
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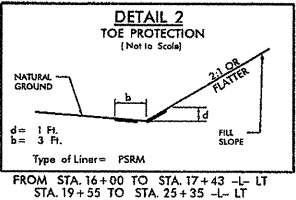
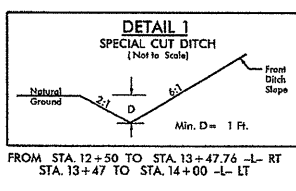
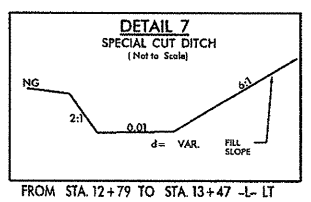
PROJECT REFERENCE NO. P-5208F	SHEET NO. 4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



REVISIONS
 R/W REVISION - 5/23/12 - ELIMINATED PUE ON PARCEL NO.2, PLACED PUE ON PARCEL NO.1, REVISED TCE & PDE.
 R/W REVISION - 7/18/12 - MODIFIED TCE ALONG PARCEL 2F TO ACCOMMODATE EROSION CONTROL MEASURES. BAM
 CADD - GEOTECHNICAL PLAN P-0110 - P-5208F - Rdj_psh041_rev.dgn



BEGIN NCDOT PROJECT P-5208F
 -L- STA.12+50.00

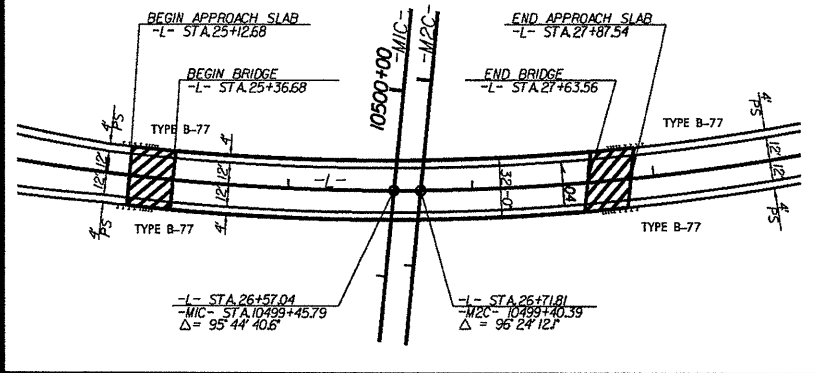


-L-

PI Sta 11+90.07 Δ = 6'13" 00.2' (RT) D = 1'38" 13.3" L = 379.76' T = 190.07' R = 3,500.00' SE = SEE PLANS	PI Sta 18+88.89 Δ = 4'16" 30.5' (LT) D = 1'28" 08.8" L = 291.00' T = 145.57' R = 3,900.00' SE = SEE PLANS
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SEE SHEET 7 FOR -L- PROFILE

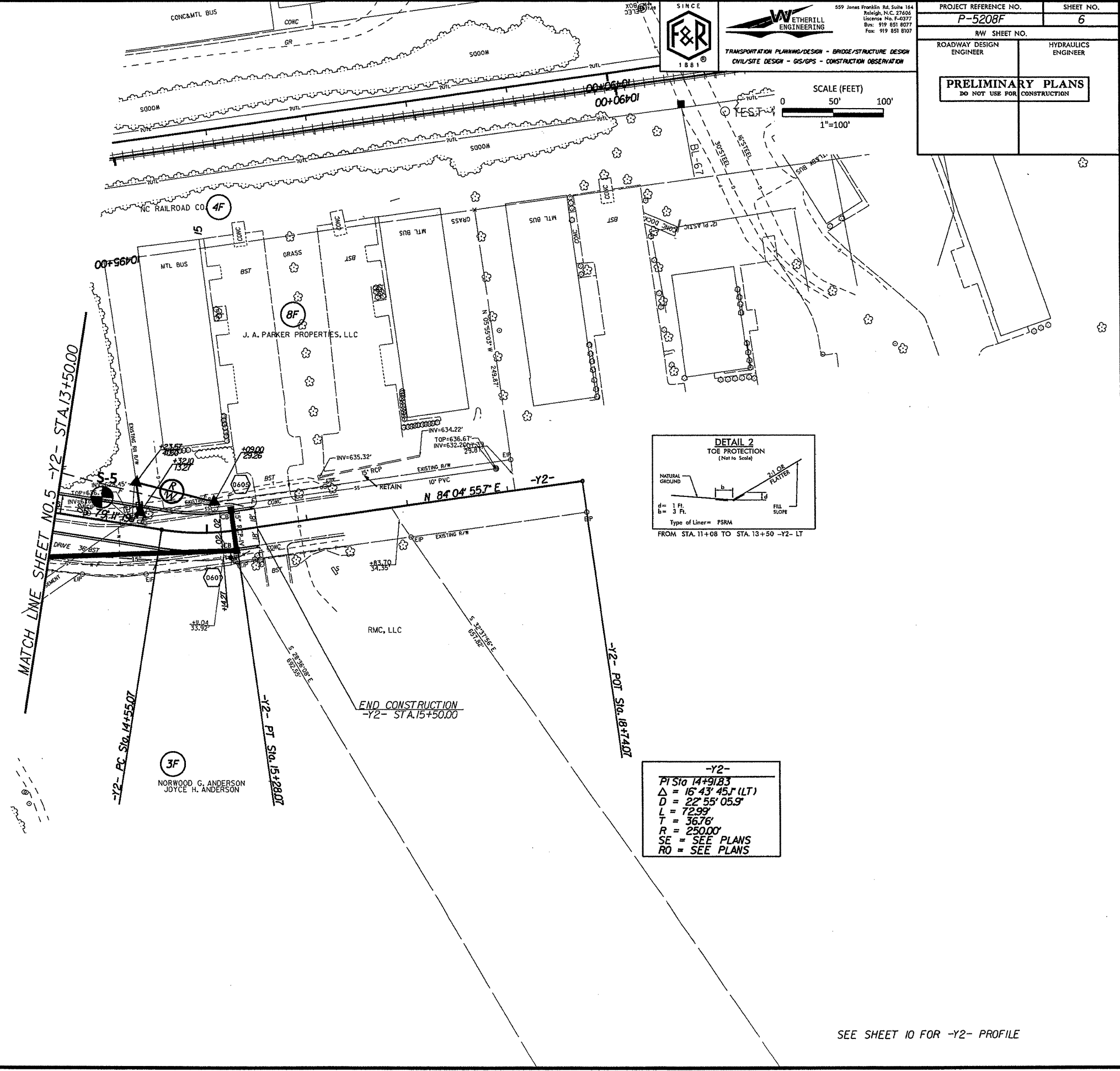
BRIDGE/PAVEMENT RELATIONSHIP SKETCH



REVISIONS
 R/W REVISION - 5/15/12 - ELIMINATED RETAINING ALONG -Y2- (HARRISBURG INDUSTRIAL PARK DR)

20-DEC-2012 14:49
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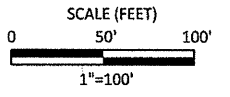
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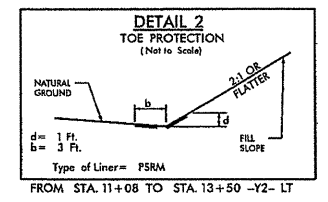
SINCE
F&R
 1881

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TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
 CIVIL/SITE DESIGN - GS/GPS - CONSTRUCTION OBSERVATION



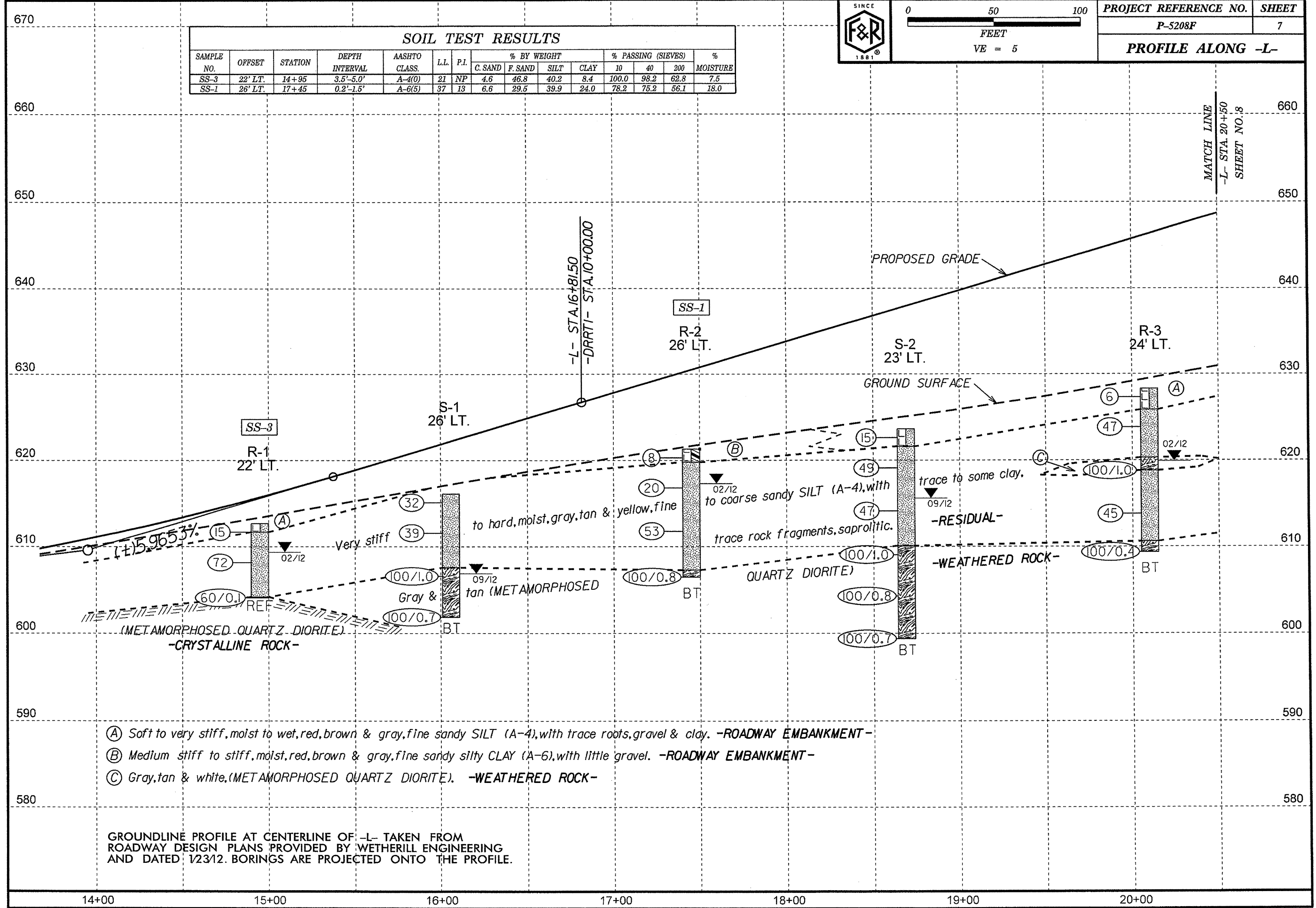
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RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



-Y2-

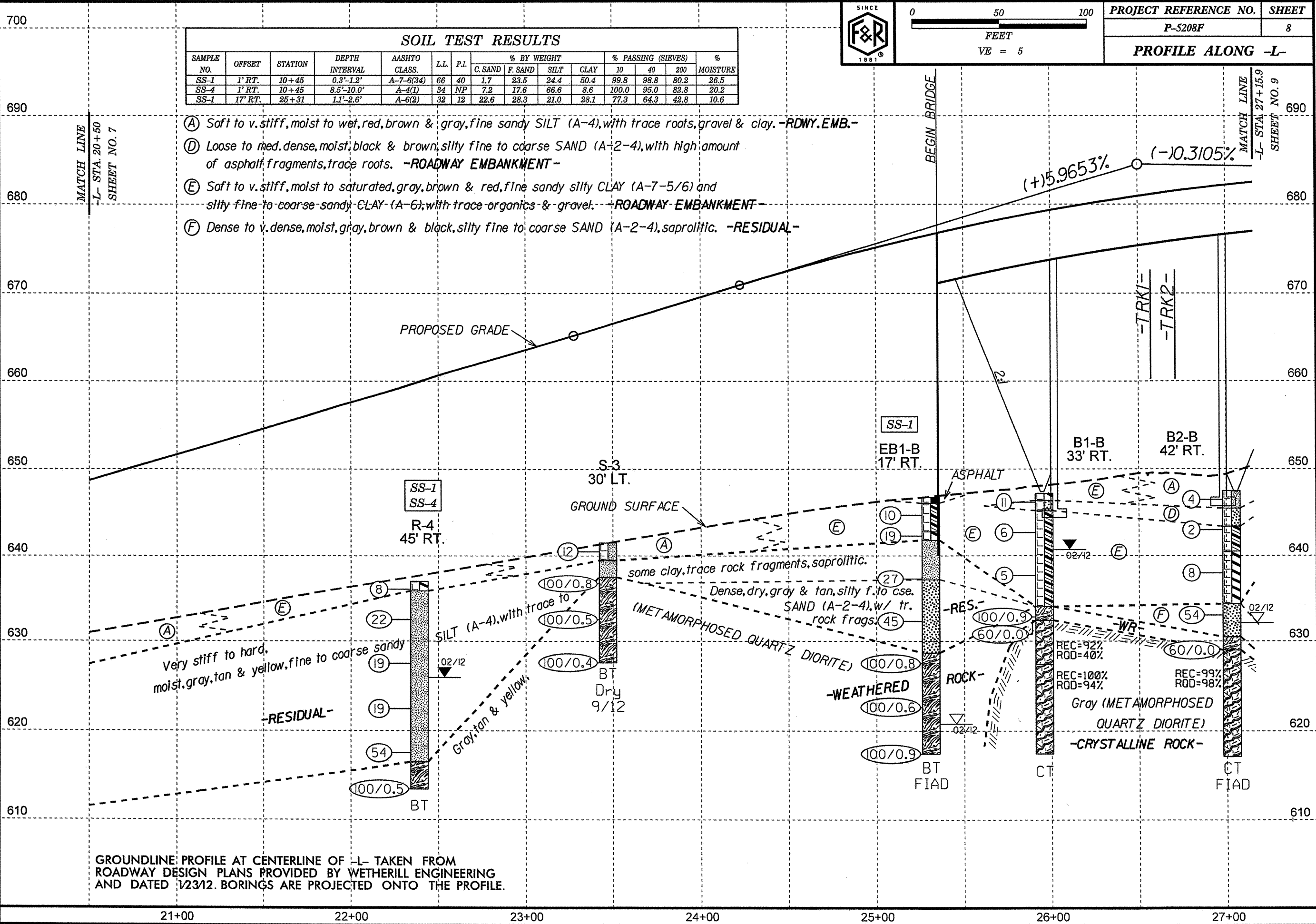
PI Sta 14+91.83
$\Delta = 16' 43' 45.1$ (LT)
D = 22' 55' 05.9"
L = 72.99'
T = 36.76'
R = 250.00'
SE = SEE PLANS
RO = SEE PLANS

SEE SHEET 10 FOR -Y2- PROFILE



- (A) Soft to very stiff, moist to wet, red, brown & gray, fine sandy SILT (A-4), with trace roots, gravel & clay. -ROADWAY EMBANKMENT-
- (B) Medium stiff to stiff, moist, red, brown & gray, fine sandy silty CLAY (A-6), with little gravel. -ROADWAY EMBANKMENT-
- (C) Gray, tan & white, (METAMORPHOSED QUARTZ DIORITE). -WEATHERED ROCK-

GROUNDLINE PROFILE AT CENTERLINE OF -L- TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY WETHERILL ENGINEERING AND DATED 1/23/12. BORINGS ARE PROJECTED ONTO THE PROFILE.



SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE
							C. SAND	F. SAND	SILT	CLAY	10	40	200	
SS-1	1' RT.	10+45	0.3'-1.2'	A-7-6(34)	66	40	1.7	23.5	24.4	50.4	99.8	98.8	80.2	26.5
SS-4	1' RT.	10+45	8.5'-10.0'	A-4(1)	34	NP	7.2	17.6	66.6	8.6	100.0	95.0	82.8	20.2
SS-1	17' RT.	25+31	1.1'-2.6'	A-6(2)	32	12	22.6	28.3	21.0	28.1	77.3	64.3	42.8	10.6

0 50 100
 FEET
 VE = 5

PROJECT REFERENCE NO.	SHEET
P-5208F	8
PROFILE ALONG -L-	

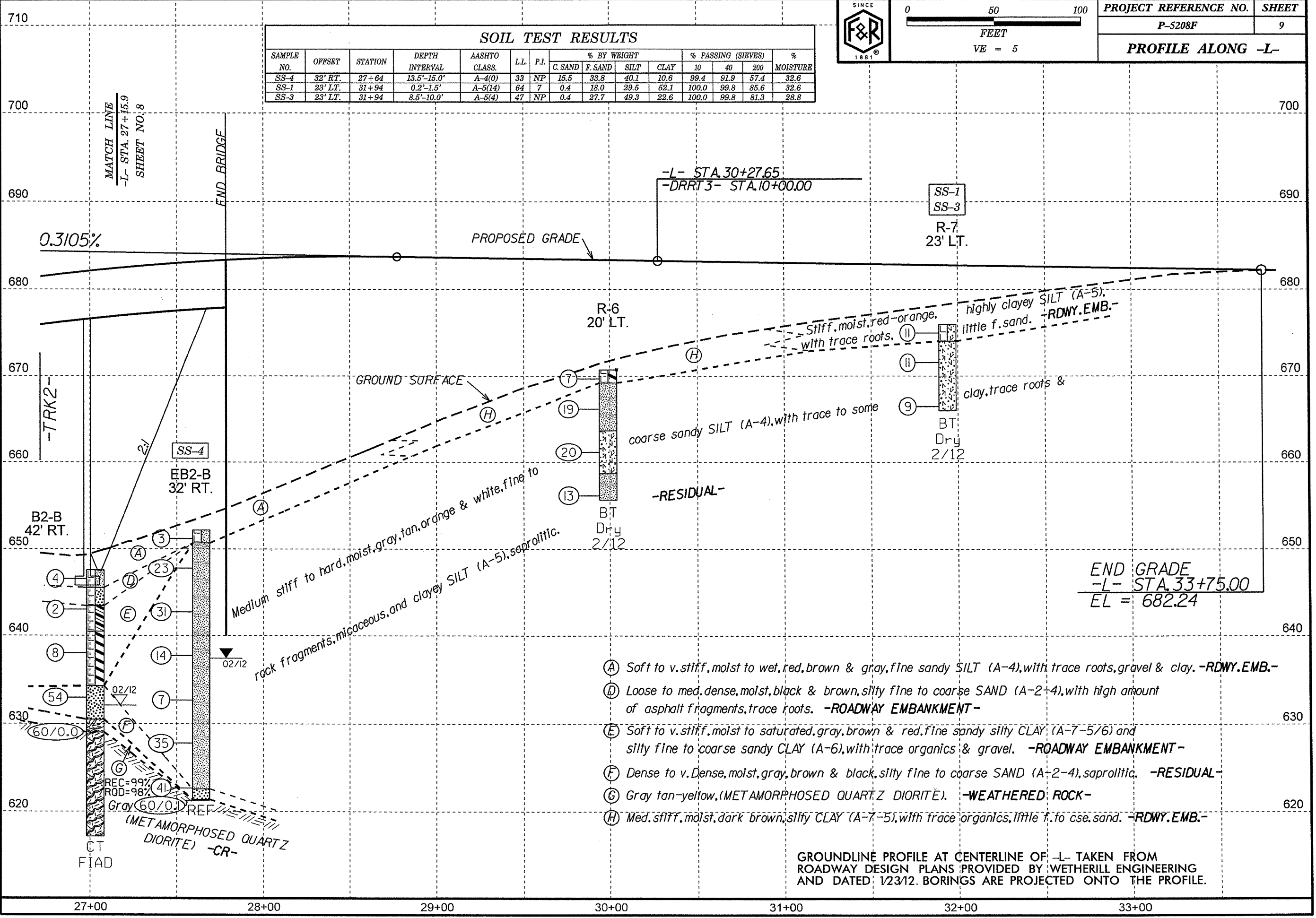
- (A) Soft to v. stiff, moist to wet, red, brown & gray, fine sandy SILT (A-4), with trace roots, gravel & clay. -RDWY. EMB.-
- (D) Loose to med. dense, moist, black & brown, silty fine to coarse SAND (A-2-4), with high amount of asphalt fragments, trace roots. -ROADWAY EMBANKMENT-
- (E) Soft to v. stiff, moist to saturated, gray, brown & red, fine sandy silty CLAY (A-7-5/6) and silty fine to coarse sandy CLAY (A-6), with trace organics & gravel. -ROADWAY EMBANKMENT-
- (F) Dense to v. dense, moist, gray, brown & black, silty fine to coarse SAND (A-2-4), saprolitic. -RESIDUAL-

MATCH LINE
 L- STA. 20+50
 SHEET NO. 7

MATCH LINE
 L- STA. 27+15.9
 SHEET NO. 9

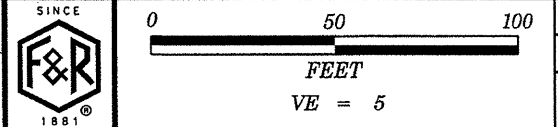
GROUNDLINE PROFILE AT CENTERLINE OF -L- TAKEN FROM
 ROADWAY DESIGN PLANS PROVIDED BY WETHERILL ENGINEERING
 AND DATED 1/23/12. BORINGS ARE PROJECTED ONTO THE PROFILE.

21+00 22+00 23+00 24+00 25+00 26+00 27+00



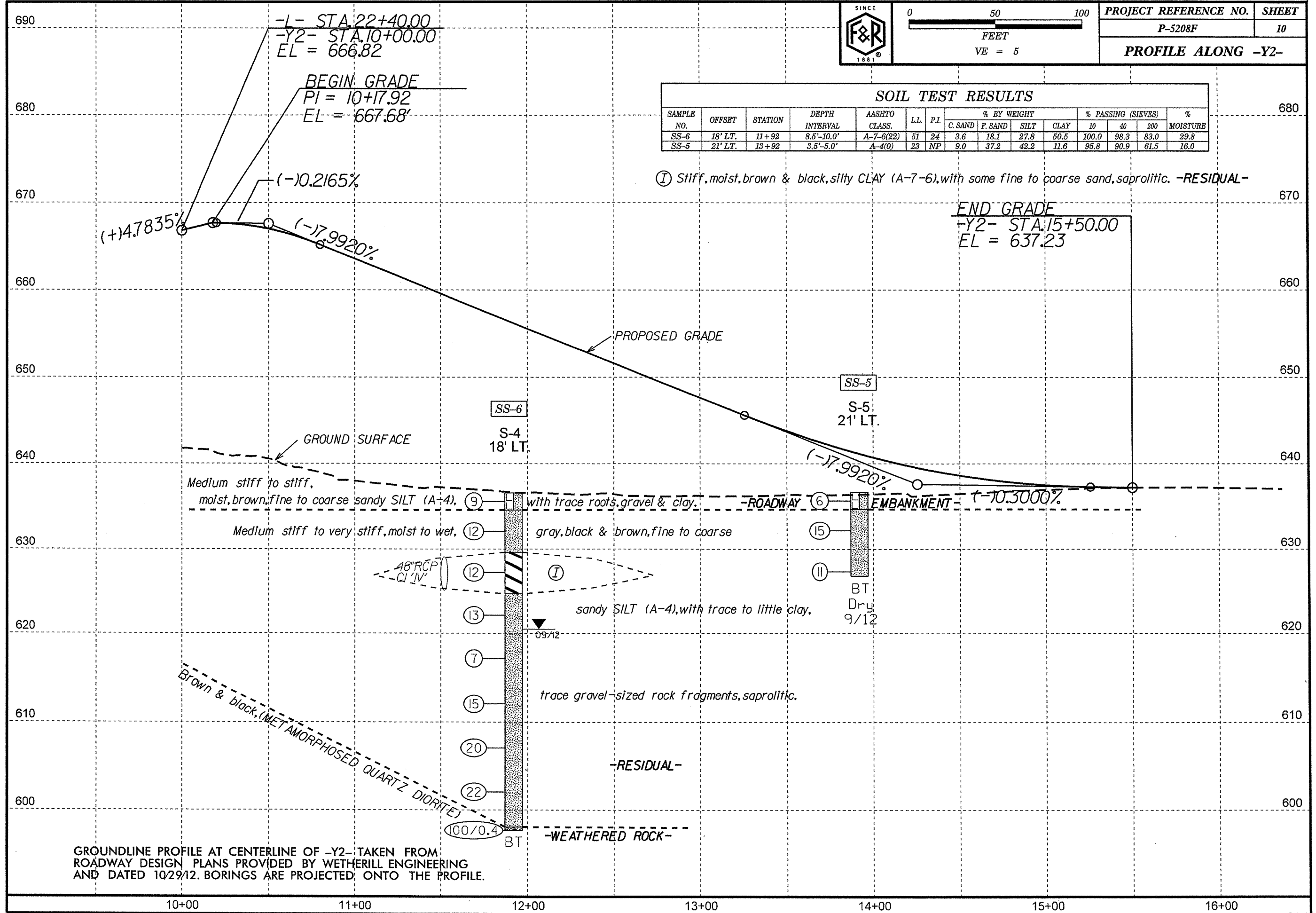
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE
							C. SAND	F. SAND	SILT	CLAY	10	40	200	
SS-4	32' RT.	27+64	13.5'-15.0'	A-4(0)	33	NP	15.5	33.8	40.1	10.6	99.4	91.9	57.4	32.6
SS-1	23' LT.	31+94	0.2'-1.5'	A-6(14)	64	7	0.4	18.0	29.5	52.1	100.0	99.8	85.6	32.6
SS-3	23' LT.	31+94	8.5'-10.0'	A-5(4)	47	NP	0.4	27.7	49.3	22.6	100.0	99.8	81.3	28.8



- (A) Soft to v. stiff, moist to wet, red, brown & gray, fine sandy SILT (A-4), with trace roots, gravel & clay. -RDWY.EMB.-
- (D) Loose to med. dense, moist, black & brown, silty fine to coarse SAND (A-2-4), with high amount of asphalt fragments, trace roots. -ROADWAY EMBANKMENT-
- (E) Soft to v. stiff, moist to saturated, gray, brown & red, fine sandy silty CLAY (A-7-5/6) and silty fine to coarse sandy CLAY (A-6), with trace organics & gravel. -ROADWAY EMBANKMENT-
- (F) Dense to v. Dense, moist, gray, brown & black, silty fine to coarse SAND (A-2-4), saprolitic. -RESIDUAL-
- (G) Gray tan-yellow, (METAMORPHOSED QUARTZ DIORITE). -WEATHERED ROCK-
- (H) Med. stiff, moist, dark brown, silty CLAY (A-7-5), with trace organics, little f. to cse. sand. -RDWY.EMB.-

GROUNDLINE PROFILE AT CENTERLINE OF -L- TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY WETHERILL ENGINEERING AND DATED 1/23/12. BORINGS ARE PROJECTED ONTO THE PROFILE.



-1- STA. 22+40.00
 -Y2- STA. 10+00.00
 EL = 666.82

BEGIN GRADE
 PI = 10+17.92
 EL = 667.68'

END GRADE
 -Y2- STA. 15+50.00
 EL = 637.23

(+)4.7835%
 (-)0.2165%
 (-)17.9920%

PROPOSED GRADE

GROUND SURFACE

SS-6
 S-4
 18' LT.

SS-5
 S-5
 21' LT.

Medium stiff to stiff,
 moist, brown, fine to coarse sandy SILT (A-4),
 Medium stiff to very stiff, moist to wet,

with trace roots, gravel & clay.

gray, black & brown, fine to coarse

sandy SILT (A-4), with trace to little clay.

trace gravel-sized rock fragments, saprolitic.

-RESIDUAL-

-WEATHERED ROCK-

Brown & black, (METAMORPHOSED QUARTZ DIORITE)

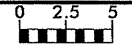
48" RCP
 4' IN

BT
 Dry
 9/12

GROUNDLINE PROFILE AT CENTERLINE OF -Y2- TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY WETHERILL ENGINEERING AND DATED 10/29/12. BORINGS ARE PROJECTED ONTO THE PROFILE.

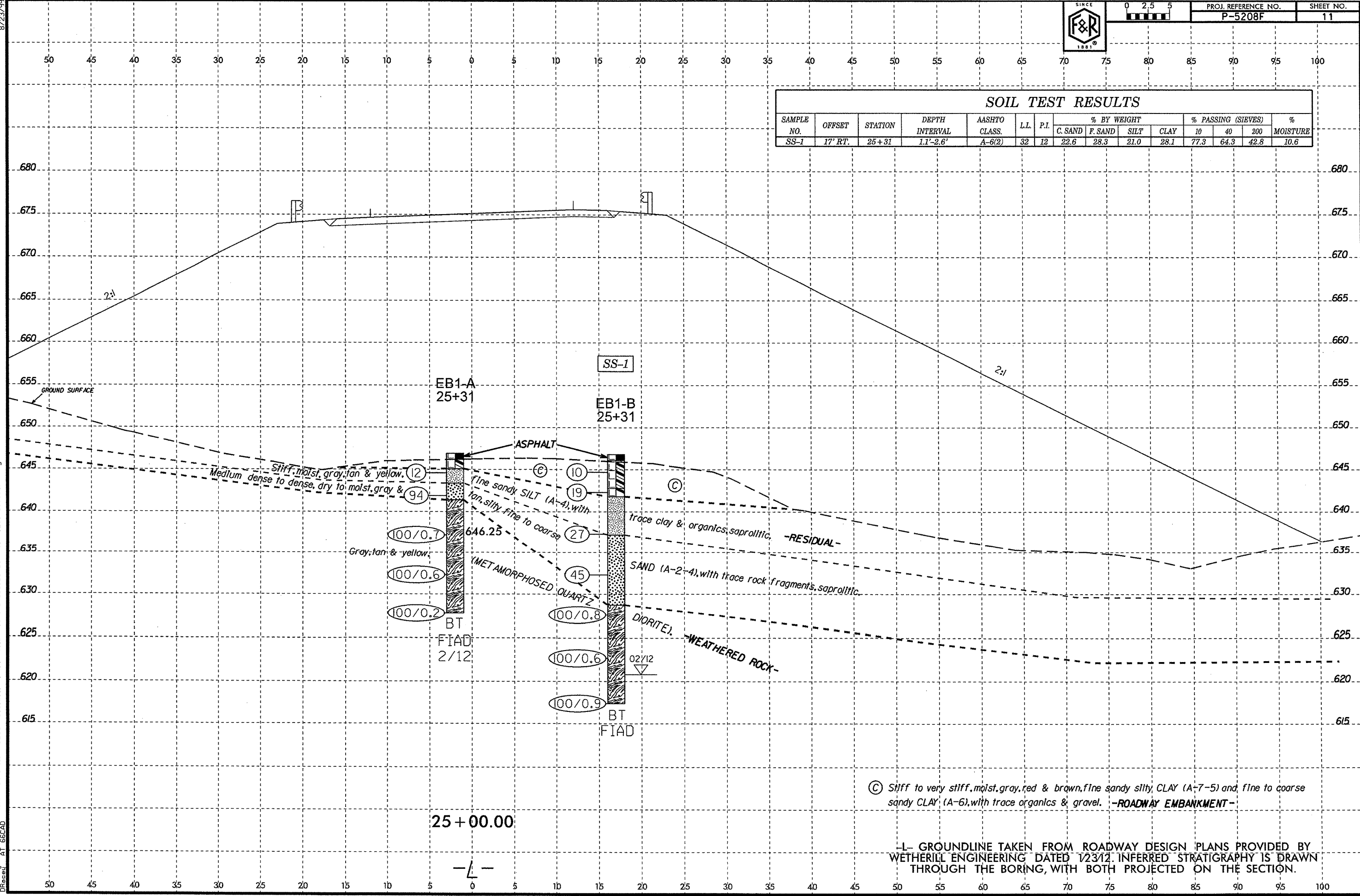
10+00 11+00 12+00 13+00 14+00 15+00 16+00

8/23/99
 20-DEC-2012 15:04
 P:\Projects\66N\66N-0110 Wetherill\1-P-5208F Caldwell\1-Rd\66N-0110 P\ena\CADD\GEOTECH\sec V5208F_Geo.L.xsd.dgn



PROJ. REFERENCE NO. P-5208F
 SHEET NO. 11

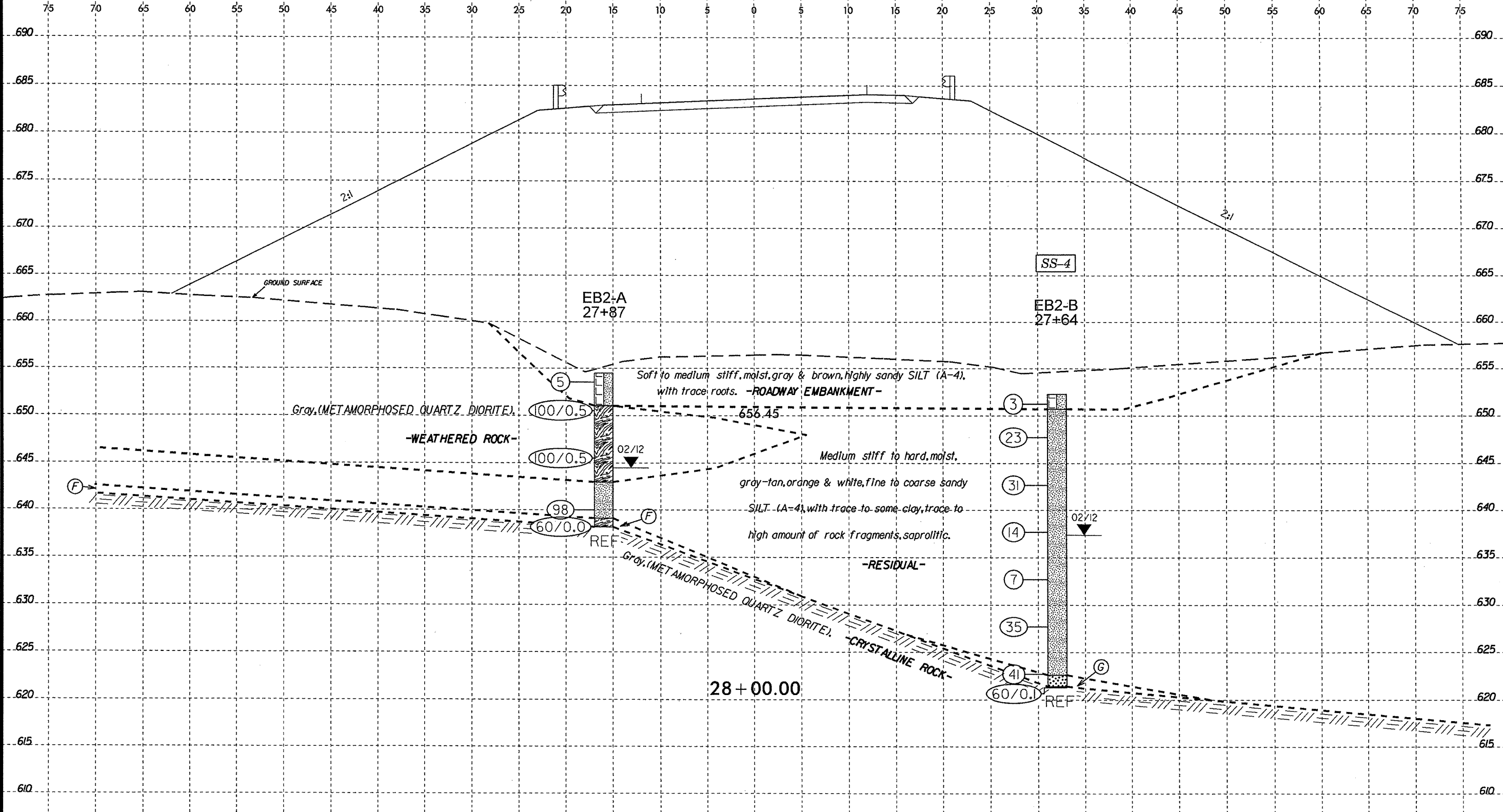
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE
							C. SAND	F. SAND	SILT	CLAY	10	40	200	
SS-1	17' RT.	25+31	1.1'-2.6'	A-6(2)	32	12	22.6	28.3	21.0	28.1	77.3	64.3	42.8	10.6



© Stiff to very stiff, moist, gray, red & brown, fine sandy silty, CLAY (A-7-5) and fine to coarse sandy CLAY (A-6), with trace organics & gravel. -ROADWAY EMBANKMENT-

-L- GROUNDLINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY WETHERILL ENGINEERING DATED 1/23/12. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE SECTION.

20-DEC-2012 15:07
 F:\Projects\66N\66N-0110\CADD\GDTECH\SS-4\SS-4.dgn
 Wetherill-P-5208F-Caldwell Rd\66N-0110-Plans\CADD\GDTECH\SS-4\SS-4.dgn
 8/23/99



SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE
							C. SAND	F. SAND	SILT	CLAY	10	40	200	
SS-4	32' RT.	27+64	13.5'-15.0'	A-4(0)	33	NP	15.5	33.8	40.1	10.6	99.4	91.9	57.4	32.6

F Gray, (METAMORPHOSED QUARTZ DIORITE). -WEATHERED ROCK-
 G Dense, dry, gray, silty fine to coarse SAND (A-2-4), with some rock fragments. -RESIDUAL-
 L- GROUNDLINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY WETHERILL ENGINEERING DATED 1/23/12. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE SECTION.