

PROJECT: 32572.1.FS10 REFERENCE: A-0009CC

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY GRAHAM
PROJECT DESCRIPTION UPGRADE NC 143 FROM 0.5
MILES NORTH OF APPALACHIAN TRAIL TO NC 28
AND UPGRADE NC 28 FROM 0.2 MILES WEST OF
NC 143 TO 0.3 MILES EAST OF SR 1235 (GUNTERS
GAP RD)
SITE DESCRIPTION RETAINING WALL #22:
SOIL NAIL WALL WITH ARCHITECTURAL FORM
LINER FINISH ON -L- FROM 438+96 TO 442+59,
LT

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	A-0009CC	1	12

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. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT 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 THE 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.

NOTES:

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

PERSONNEL

BRECCIA

CG2 EXPLORATION

M. BREWER

C. PIERCEY

INVESTIGATED BY CG2

DRAWN BY M. BREWER, P.E.

CHECKED BY R. KRAL, P.E.

SUBMITTED BY M. BREWER, P.E.

DATE JULY 2022

Prepared in the Office of:
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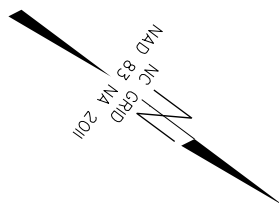
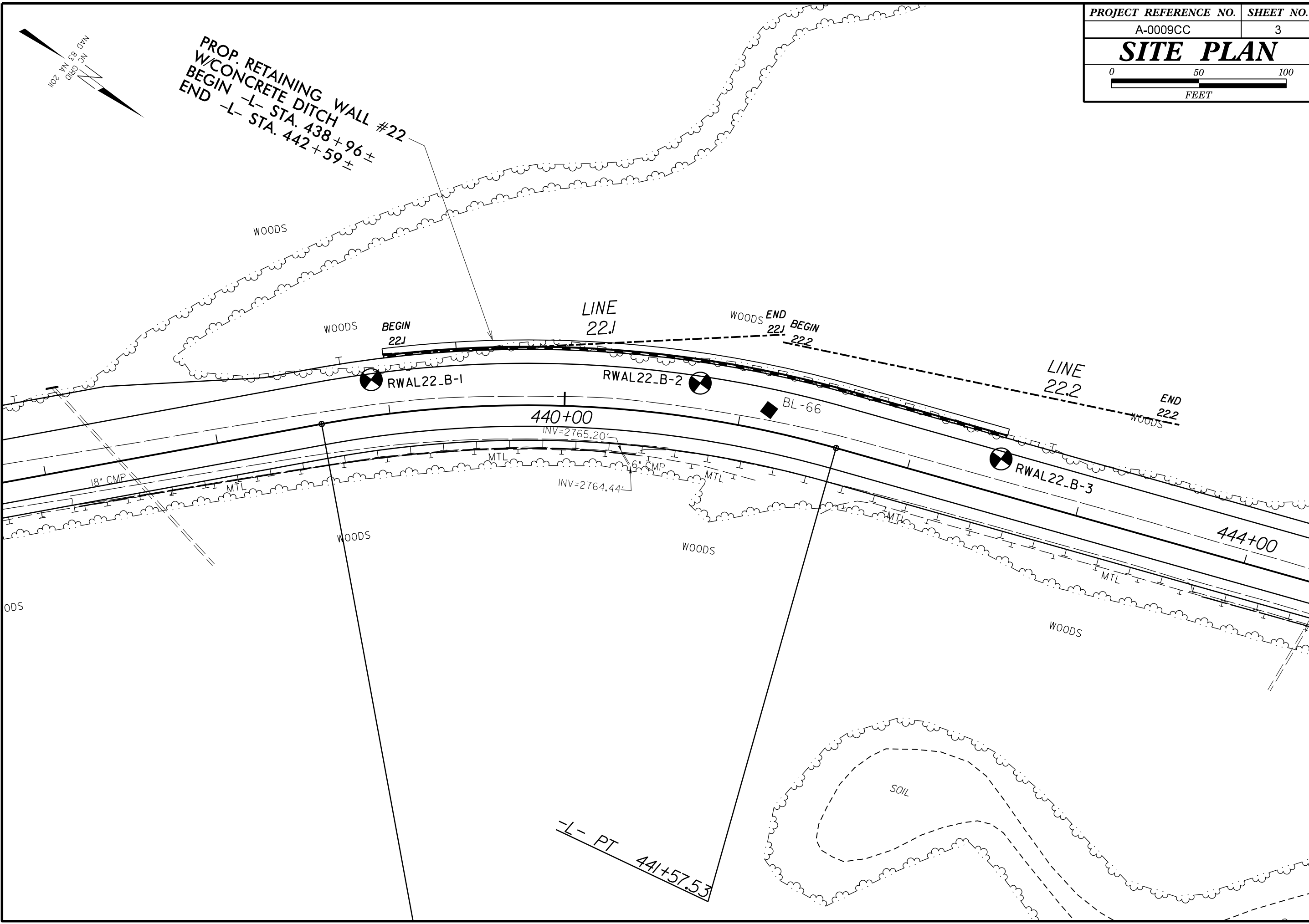
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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION				GRADATION				ROCK DESCRIPTION				TERMS AND DEFINITIONS			
SOIL IS CONSIDERED 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 THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6				WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.				HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED, 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:				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, SUCH 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 (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 (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				ANGULARITY OF GRAINS				WEATHERED ROCK (WR)				NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.			
GENERAL CLASS. GRANULAR MATERIALS (< 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS				THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.				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.			
GROUP CLASS. A-1, A-2, A-3, A-4, A-5, A-6, A-7				MINERALOGICAL COMPOSITION MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.				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			
SYMBOL				COMPRESSIBILITY SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50				FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.				VERY SLIGHT (IV 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.			
% PASSING #10 #40 #200				PERCENTAGE OF MATERIAL				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.			
MATERIAL PASSING #40 LL PI				ORGANIC MATERIAL TRACE OF ORGANIC MATTER 2 - 3% LITTLE ORGANIC MATTER 3 - 5% MODERATELY ORGANIC 5 - 10% HIGHLY ORGANIC > 10%				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, WOULD YIELD SPT N VALUES > 100 BPF			
GROUP INDEX				GROUND WATER				VERY SEVERE (IV SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. IF TESTED, WOULD YIELD 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.			
USUAL TYPES OF MAJOR MATERIALS				WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING				SEVERE (SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF				ROCK HARDNESS			
GEN. RATING AS SUBGRADE				STATIC WATER LEVEL AFTER 24 HOURS				VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.				SOIL MOISTURE - CORRELATION OF TERMS			
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30				PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA				HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.				SOIL MOISTURE SCALE (ATTERBERG LIMITS)			
EXCELLENT TO GOOD				SPRING OR SEEP				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.				FIELD MOISTURE DESCRIPTION			
FAIR TO POOR				MISCELLANEOUS SYMBOLS				MEDIUM HARD 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.				GUIDE FOR FIELD MOISTURE DESCRIPTION			
POOR				ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION				SOFT 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.				PLASTIC RANGE (PI)			
UNSATURABLE				SOIL SYMBOL				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 FINGER NAIL.				OPTIMUM MOISTURE SHRINKAGE LIMIT			
GENERAL CLASS.				ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT				RECOMMENDATION SYMBOLS				SOIL MOISTURE SCALE (ATTERBERG LIMITS)			
GROUP CLASS.				INFERRED SOIL BOUNDARY				UNDERCUT				FIELD MOISTURE DESCRIPTION			
SYMBOL				INFERRED ROCK LINE				SHALLOW UNDERCUT				GUIDE FOR FIELD MOISTURE DESCRIPTION			
% PASSING				ALLUVIAL SOIL BOUNDARY				UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE				FIELD MOISTURE DESCRIPTION			
MATERIAL PASSING #40				ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION				UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK				FIELD MOISTURE DESCRIPTION			
LL				SOIL SYMBOL				UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK				FIELD MOISTURE DESCRIPTION			
PI				ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT				UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK				FIELD MOISTURE DESCRIPTION			
GROUP INDEX				INFERRED SOIL BOUNDARY				UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK				FIELD MOISTURE DESCRIPTION			
USUAL TYPES OF MAJOR MATERIALS				INFERRED ROCK LINE				UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK				FIELD MOISTURE DESCRIPTION			
GEN. RATING AS SUBGRADE				ALLUVIAL SOIL BOUNDARY				UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK				FIELD MOISTURE DESCRIPTION			
EXCELLENT TO GOOD				ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION				UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK				FIELD MOISTURE DESCRIPTION			
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USUAL TYPES OF MAJOR MATERIALS				INFERRED ROCK LINE				UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK				FIELD MOISTURE DESCRIPTION			
GEN. RATING AS SUBGRADE				ALLUVIAL SOIL BOUNDARY				UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK				FIELD MOISTURE DESCRIPTION			
EXCELLENT TO GOOD				ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION				UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK				FIELD MOISTURE DESCRIPTION			
FAIR TO POOR				SOIL SYMBOL				UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK				FIELD MOISTURE DESCRIPTION			
POOR				ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT				UNCLASSIFIED EXCAVATION - ACCEPTABLE							

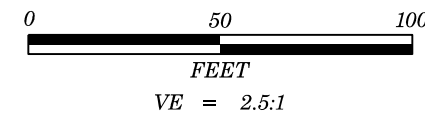




Prepared in the Office of:



CAROLINAS
GEOTECHNICAL
GROUP



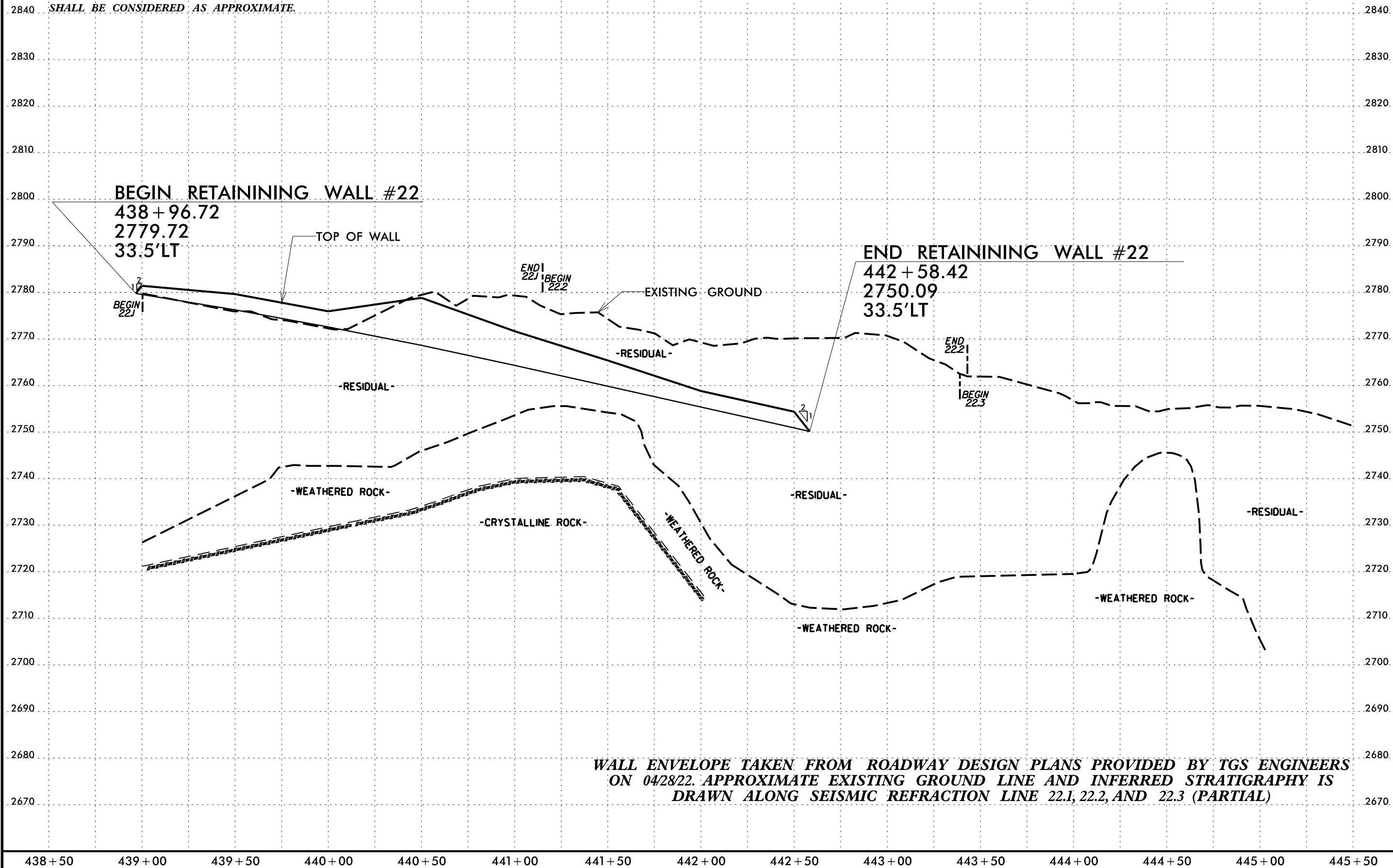
PROJECT REFERENCE NO. SHEET NO.

A-0009CC

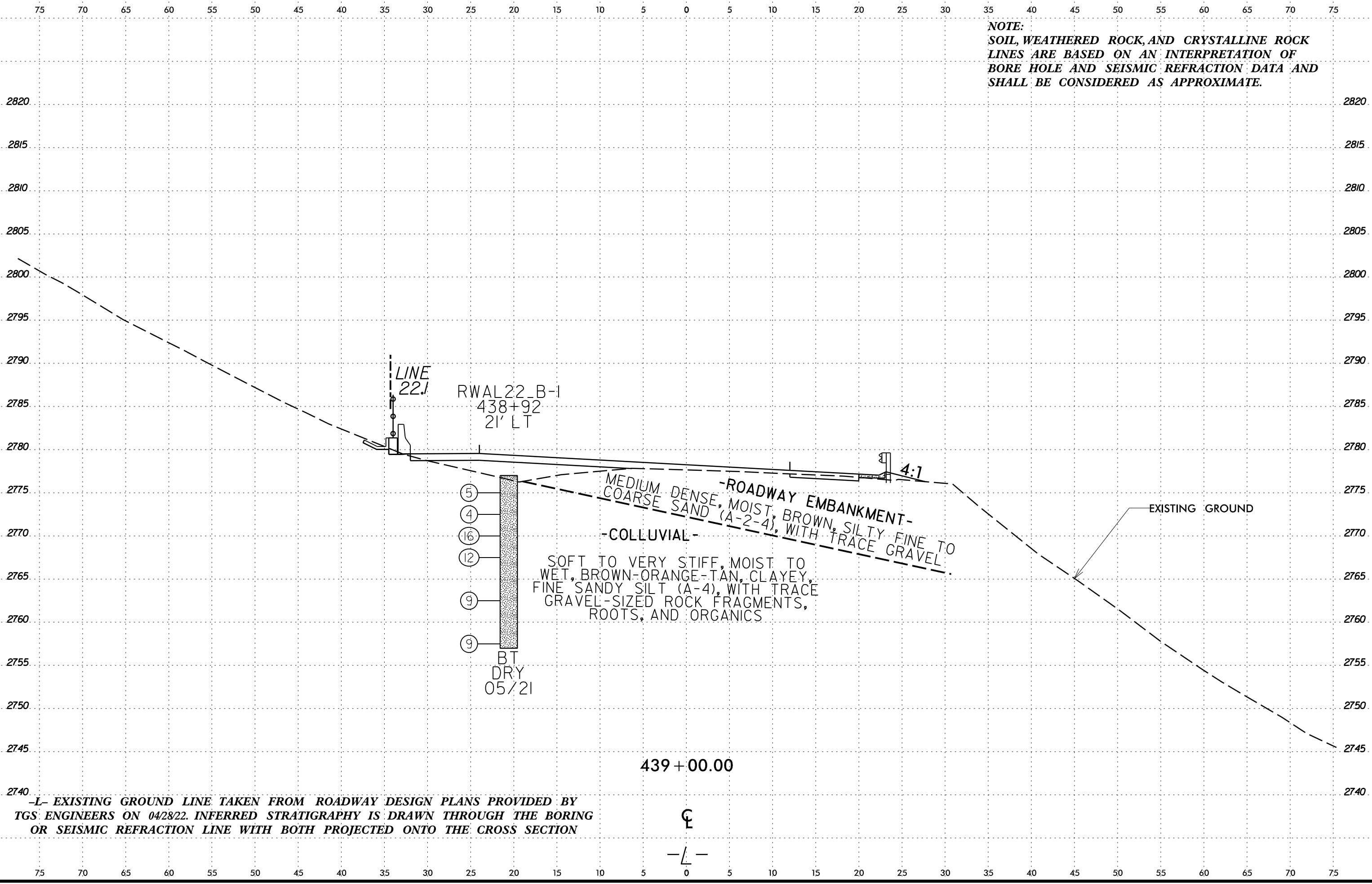
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RETAINING WALL #22:
SEISMIC REFRACTION LINE 22.1, 22.2, & 22.3
PROJECTED ALONG WALL ENVELOPE

NOTE:
SOIL, WEATHERED ROCK, AND CRYSTALLINE ROCK
LINES ARE BASED ON AN INTERPRETATION OF
BORE HOLE AND SEISMIC REFRACTION DATA AND
SHALL BE CONSIDERED AS APPROXIMATE.

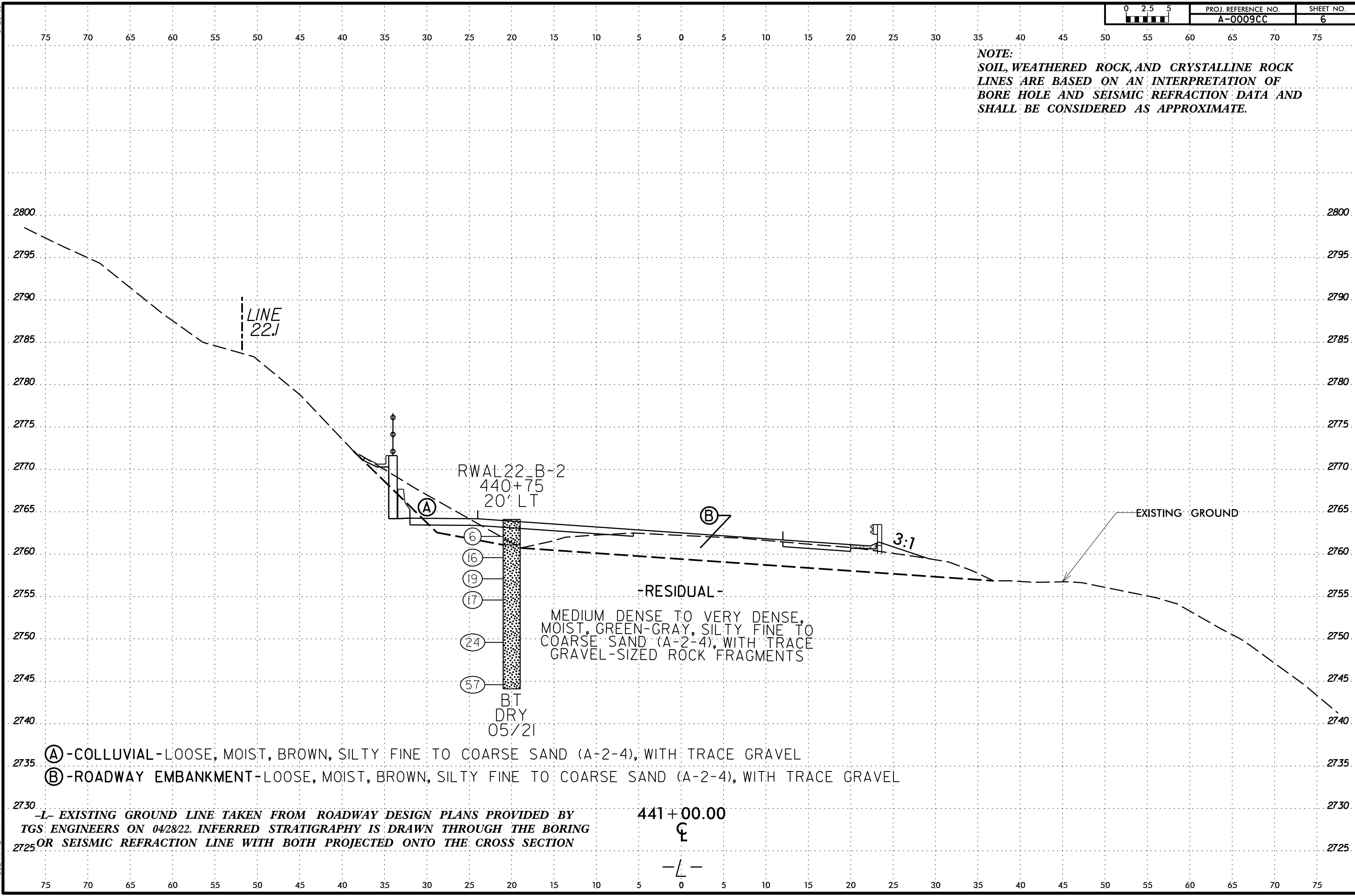


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NOTE:
 SOIL, WEATHERED ROCK, AND CRYSTALLINE ROCK
 LINES ARE BASED ON AN INTERPRETATION OF
 BORE HOLE AND SEISMIC REFRACTION DATA AND
 SHALL BE CONSIDERED AS APPROXIMATE.



- Ⓐ - COLLUVIAL - LOOSE, MOIST, BROWN, SILTY FINE TO COARSE SAND (A-2-4), WITH TRACE GRAVEL
- Ⓑ - ROADWAY EMBANKMENT - LOOSE, MOIST, BROWN, SILTY FINE TO COARSE SAND (A-2-4), WITH TRACE GRAVEL

-L- EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY
 TGS' ENGINEERS ON 04/28/22. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING
 OR SEISMIC REFRACTION LINE WITH BOTH PROJECTED ONTO THE CROSS SECTION

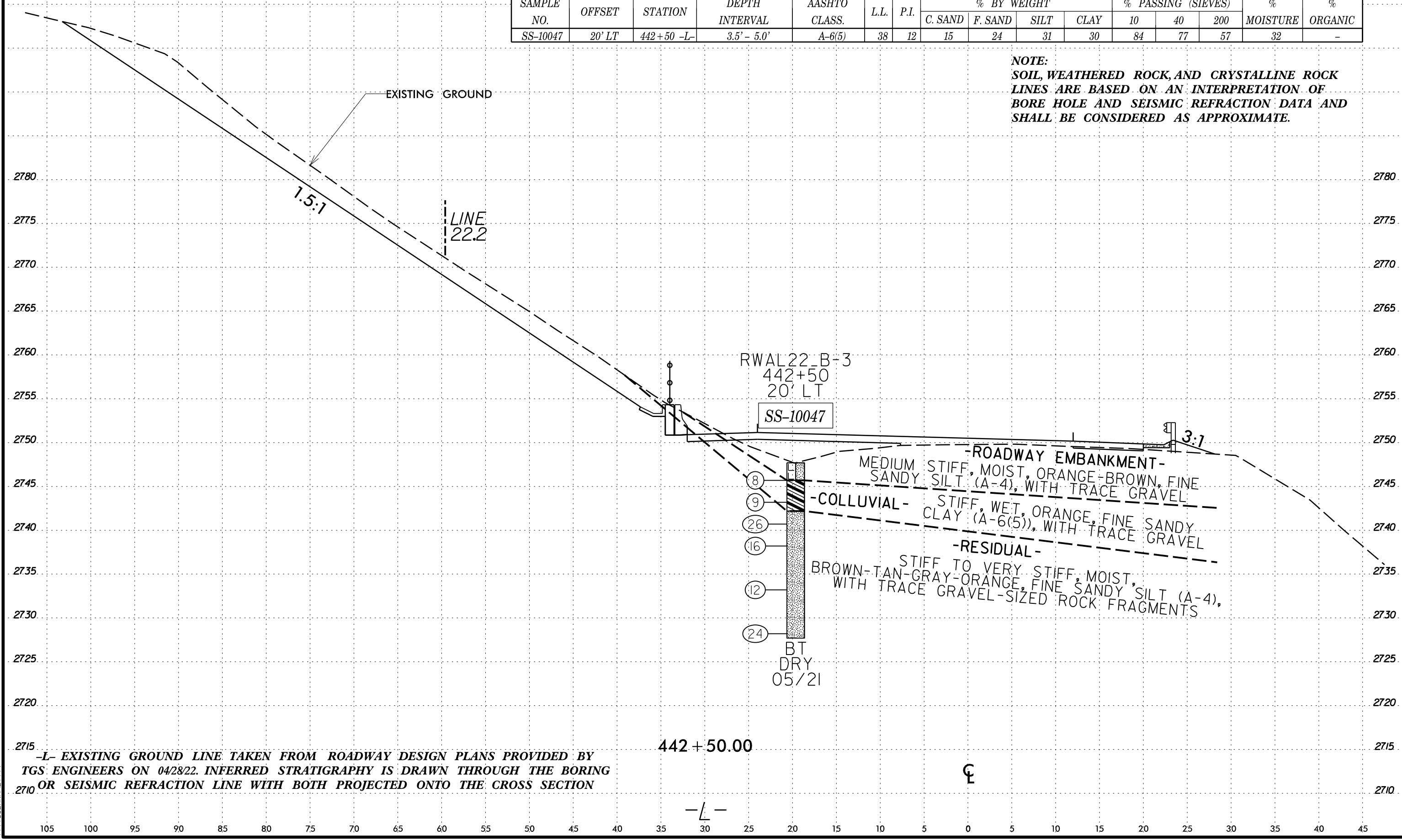
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SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-10047	20' LT	442+50 -L-	3.5' - 5.0'	A-6(5)	38	12	15	24	31	30	84	77	57	32	-

NOTE:
 SOIL, WEATHERED ROCK, AND CRYSTALLINE ROCK LINES ARE BASED ON AN INTERPRETATION OF BORE HOLE AND SEISMIC REFRACTION DATA AND SHALL BE CONSIDERED AS APPROXIMATE.



-L- EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 04/28/22. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING OR SEISMIC REFRACTION LINE WITH BOTH PROJECTED ONTO THE CROSS SECTION

442 + 50.00

-L-

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GEOTECHNICAL BORING REPORT

BORE LOG

WBS 32572.1.FS10		TIP A-0009CC		COUNTY GRAHAM		GEOLOGIST M. Brewer									
SITE DESCRIPTION NC 143 from 0.5 Mi. North of AT to NC 28 & NC 28 from 0.2 Mi. West of NC 143 to 0.3 Mi. East of SR 1235							GROUND WTR (ft)								
BORING NO. RWAL22_B-1		STATION 438+92		OFFSET 21 ft LT		ALIGNMENT L									
COLLAR ELEV. 2,777.0 ft		TOTAL DEPTH 20.0 ft		NORTHING 622,781		EASTING 596,357									
DRILL RIG/HAMMER EFF./DATE CG29473 CME-550 79% 03/12/2021				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic									
DRILLER J. Estep		START DATE 05/11/21		COMP. DATE 05/11/21		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2780															
	2,777.0	1.0												2,777.0	0.0
2775	2,776.0	1.0	2	2	3							M	COLLUVIAL Soft to Very Stiff, Brown-Orange-Tan, Clayey, Fine Sandy SILT (A-4), with trace gravel-sized rock fragments, roots, and organics		
	2,773.5	3.5	2	2	2							M			
2770	2,771.0	6.0	59	10	6							M			
	2,768.5	8.5	5	4	8							W			
2765	2,763.5	13.5	6	5	4							W			
2760	2,758.5	18.5	4	4	5							W			
														2,757.0	20.0
Boring Terminated at Elevation 2,757.0 ft In Colluvial Clayey, Sandy Silt (A-4)															

WBS 32572.1.FS10		TIP A-0009CC		COUNTY GRAHAM		GEOLOGIST C. Piercey									
SITE DESCRIPTION NC 143 from 0.5 Mi. North of AT to NC 28 & NC 28 from 0.2 Mi. West of NC 143 to 0.3 Mi. East of SR 1235							GROUND WTR (ft)								
BORING NO. RWAL22_B-2		STATION 440+75		OFFSET 20 ft LT		ALIGNMENT L									
COLLAR ELEV. 2,764.1 ft		TOTAL DEPTH 20.0 ft		NORTHING 622,933		EASTING 596,246									
DRILL RIG/HAMMER EFF./DATE FVE9553 CME-550X 80% 03/12/2021				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic									
DRILLER J. Phillips		START DATE 05/11/21		COMP. DATE 05/11/21		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2765															
	2,764.1													2,764.1	0.0
	2,763.1	1.0	6	3	3							M	COLLUVIAL Loose, Brown, Silty Fine to Coarse SAND (A-2-4), with trace gravel RESIDUAL Medium Dense to Very Dense, Green-Gray, Silty Fine to Coarse SAND (A-2-4), with trace gravel-sized rock fragments		
2760	2,760.6	3.5	5	6	10							M			
	2,758.1	6.0	10	9	10							M			
2755	2,755.6	8.5	4	7	10							M			
	2,750.6	13.5	8	12	12							M			
2745	2,745.6	18.5	28	24	33							M			
														2,744.1	20.0
Boring Terminated at Elevation 2,744.1 ft In Residual Silty Sand (A-2-4)															

NCDOT BORE DOUBLE A-0009CC_GEO_RDY_GTM.GPJ_NC_DOT.GDT 7/2/22

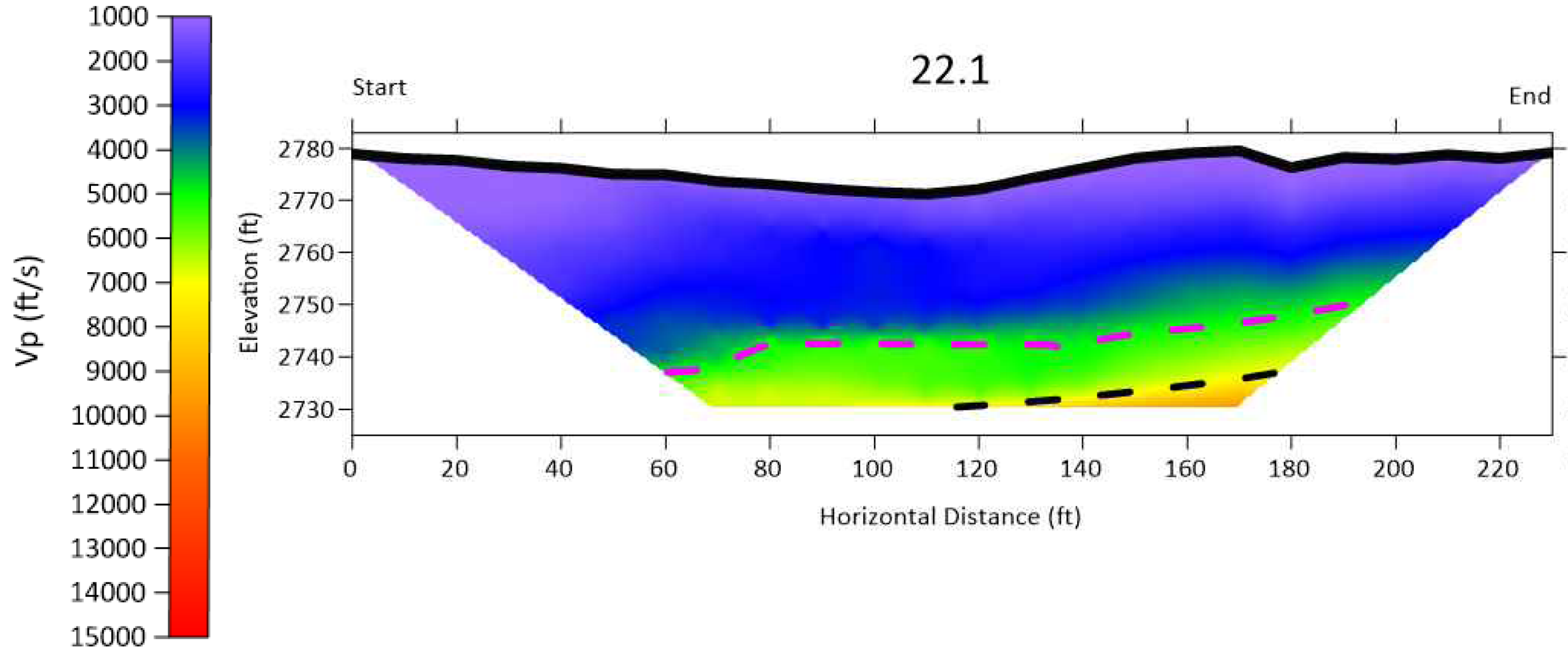
GEOTECHNICAL BORING REPORT

BORE LOG

WBS 32572.1.FS10		TIP A-0009CC		COUNTY GRAHAM		GEOLOGIST M. Brewer									
SITE DESCRIPTION NC 143 from 0.5 Mi. North of AT to NC 28 & NC 28 from 0.2 Mi. West of NC 143 to 0.3 Mi. East of SR 1235							GROUND WTR (ft)								
BORING NO. RWAL22_B-3		STATION 442+50		OFFSET 20 ft LT		ALIGNMENT L									
COLLAR ELEV. 2,747.7 ft		TOTAL DEPTH 20.0 ft		NORTHING 623,096		EASTING 596,178									
DRILL RIGHAMMER EFF./DATE CG29473 CME-550 79% 03/12/2021				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic									
DRILLER J. Estep		START DATE 05/11/21		COMP. DATE 05/11/21		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2750														2,747.7	0.0
	2,746.7	1.0	4	4	4									2,744.7	3.0
2745	2,744.2	3.5	6	5	4									2,742.2	5.5
	2,741.7	6.0	8	13	13										
2740	2,739.2	8.5	9	8	8										
	2,734.2	13.5	5	6	6										
2735	2,729.2	18.5	9	10	14										
2730															
														2,727.7	20.0
Boring Terminated at Elevation 2,727.7 ft In Residual Sandy Silt (A-4)															

NCDOT BORE DOUBLE A-0009CC_GEO_RDY_GTM.GPJ NC_DOT.GDT 7/2/22

GEOPHYSICAL TEST RESULTS – SEISMIC REFRACTION LINE 22.1

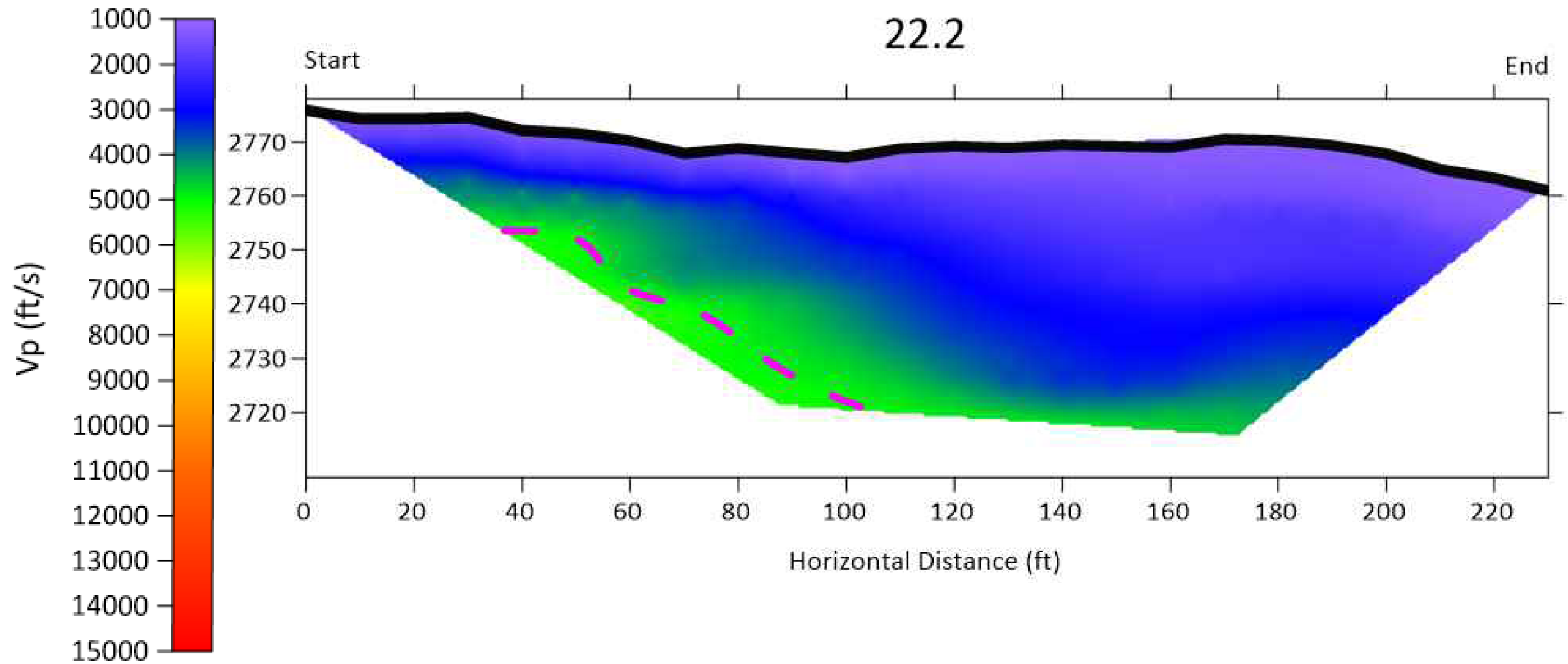


GEOPHYSICAL TESTING PERFORMED BY GEL SOLUTIONS. REFERENCE "SEISMIC REFRACTION SURVEY FOR EVALUATION OF ROCK" DATED 10/01/2021

CG2 ESTIMATED WAVE SPEED FOR WEATHERED ROCK: 4,500 FT/SEC

CG2 ESTIMATED WAVE SPEED FOR CRYSTALLINE ROCK: 7,500 FT/SEC

GEOPHYSICAL TEST RESULTS – SEISMIC REFRACTION LINE 22.2

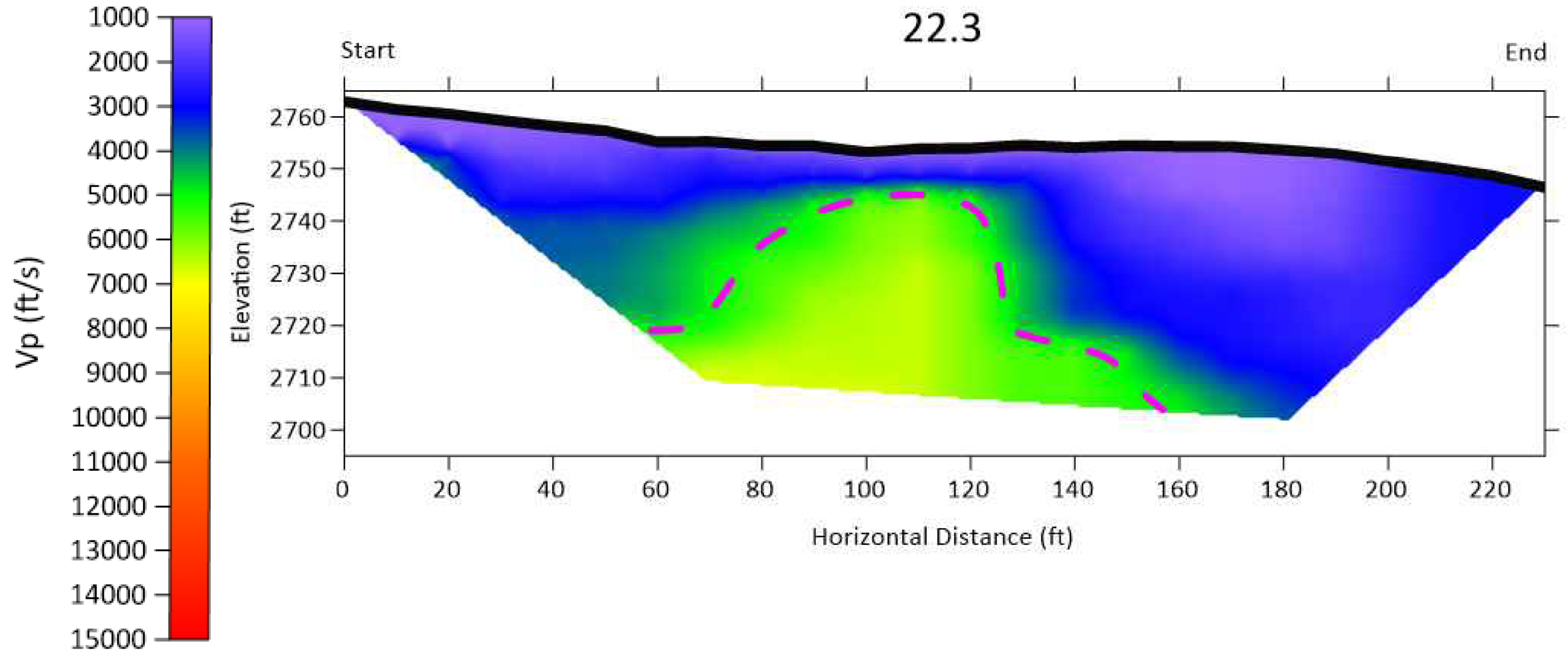


GEOPHYSICAL TESTING PERFORMED BY GEL SOLUTIONS. REFERENCE "SEISMIC REFRACTION SURVEY FOR EVALUATION OF ROCK" DATED 10/01/2021

CG2 ESTIMATED WAVE SPEED FOR WEATHERED ROCK: 4,500 FT/SEC

CG2 ESTIMATED WAVE SPEED FOR CRYSTALLINE ROCK: 7,500 FT/SEC

GEOPHYSICAL TEST RESULTS – SEISMIC REFRACTION LINE 22.3



GEOPHYSICAL TESTING PERFORMED BY GEL SOLUTIONS. REFERENCE "SEISMIC REFRACTION SURVEY FOR EVALUATION OF ROCK" DATED 10/01/2021

CG2 ESTIMATED WAVE SPEED FOR WEATHERED ROCK: 4,500 FT/SEC

CG2 ESTIMATED WAVE SPEED FOR CRYSTALLINE ROCK: 7,500 FT/SEC