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REFERENCE: A-0009CB

PROJECT: 32572.1.FS10

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	A-0009CB	1	49

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY *GRAHAM*

PROJECT DESCRIPTION *UPGRADE NC 143 FROM SR 1223 (BEECH CREEK ROAD) TO 0.5 MILES NORTH OF APPALACHIAN TRAIL*

SITE DESCRIPTION *RETAINING WALL #15: SOIL NAIL WALL WITH ARCHITECTURAL FORM LINER FINISH ON -L- FROM 352+29 LT TO 368+35 LT*

CONTENTS

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.

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FALCON ENG.

INVESTIGATED BY *CG2*

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DATE *MAY 2022*

Prepared in the Office of:

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386129C0A4C1462...
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6/7/2022
DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED 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

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5, A-7-6			
SYMBOL														
% PASSING #10 #40 #200	50 MX 30 MX 15 MX	50 MX 25 MX	51 MN 10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
MATERIAL PASSING #40 LL PI	— 6 MX		— NP	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	NO MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

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

CONSISTENCY OR DENSENESS

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

TEXTURE OR GRAIN SIZE

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

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

GRAIN SIZE	MM	305	75	2.0	0.25	0.05	0.005
	IN.	12	3				

SOIL MOISTURE - CORRELATION OF TERMS

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

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NON PLASTIC	0-5	VERY LOW
SLIGHTLY PLASTIC	6-15	SLIGHT
MODERATELY PLASTIC	16-25	MEDIUM
HIGHLY PLASTIC	26 OR MORE	HIGH

COLOR

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

GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
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.

ANGULARITY OF GRAINS

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

MINERALOGICAL COMPOSITION

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

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LL < 31
MODERATELY COMPRESSIBLE	LL = 31 - 50
HIGHLY COMPRESSIBLE	LL > 50

PERCENTAGE OF MATERIAL

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

GROUND WATER

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

MISCELLANEOUS SYMBOLS

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

RECOMMENDATION SYMBOLS

- UNDERCUT
- SHALLOW UNDERCUT
- UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE
- UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK
- UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL

ABBREVIATIONS

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

SAMPLE ABBREVIATIONS

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

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] CME-45C
- [ ] CME-550
- [X] CME-550X
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [X] DIEDRICH D50
- [ ] _____

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

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B _____ [ ] -H _____
- [ ] -N _____

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

ROCK DESCRIPTION

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:

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

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF*
VERY SEVERE (V 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.

ROCK HARDNESS

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

FRACTURE SPACING

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

BEDDING

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

INDURATION

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

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

TERMS AND DEFINITIONS

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

AQUIFER - A WATER BEARING FORMATION OR STRATA.

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

ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, 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 DISLODGED FROM PARENT MATERIAL.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

BENCH MARK: N/A

ELEVATION: FEET

NOTES:

SURVEY AND ROADWAY DESIGN FILES PROVIDED BY TGS ENGINEERS ON 11/15/2021

DATE: 8-15-14

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	3

SITE PLAN

0 100 200

FEET

NC GRID
NAD 83 NA 2011

PROP. RETAINING WALL #15
W/9' WW WILDLIFE
FENCE & CONCRETE DITCH
BEGIN -L- STA. 352+29±
END -L- STA. 368+35±

BEGIN LINE RWAL15.1 15.1
END BEGIN LINE RWAL15.2 15.1 15.2
END BEGIN LINE RWAL15.3 15.2 15.3
END BEGIN LINE RWAL15.4 15.3 15.4
END BEGIN LINE RWAL15.5 15.4 15.5
END 15.5

RWAL15.B-1
RWAL15.B-2
RWAL16.B-1
RWAL16.B-2
RWAL16.B-3

L-35445L
L-35593L
L-35999L
L-36201
L-36501L
L-36707L

-L- PC 354+13.94
-L- PC 358+81.18
-L- PT 363+04.13

ROCK OUTCROP 13
ROCK OUTCROP 14
ROCK OUTCROP 15
ROCK OUTCROP 16
ROCK OUTCROP 17
ROCK OUTCROP 18

BL-53
BL-54
BL-55

SWEETWATER RD
NC 143
24" BST
18" CMP
12" CMP
8" CMP
GRAVEL
MTL
CONC
SIGN
POST
DIRECTION
INV=297.42±
GABION
BARRIER

WOODS

355
360
365

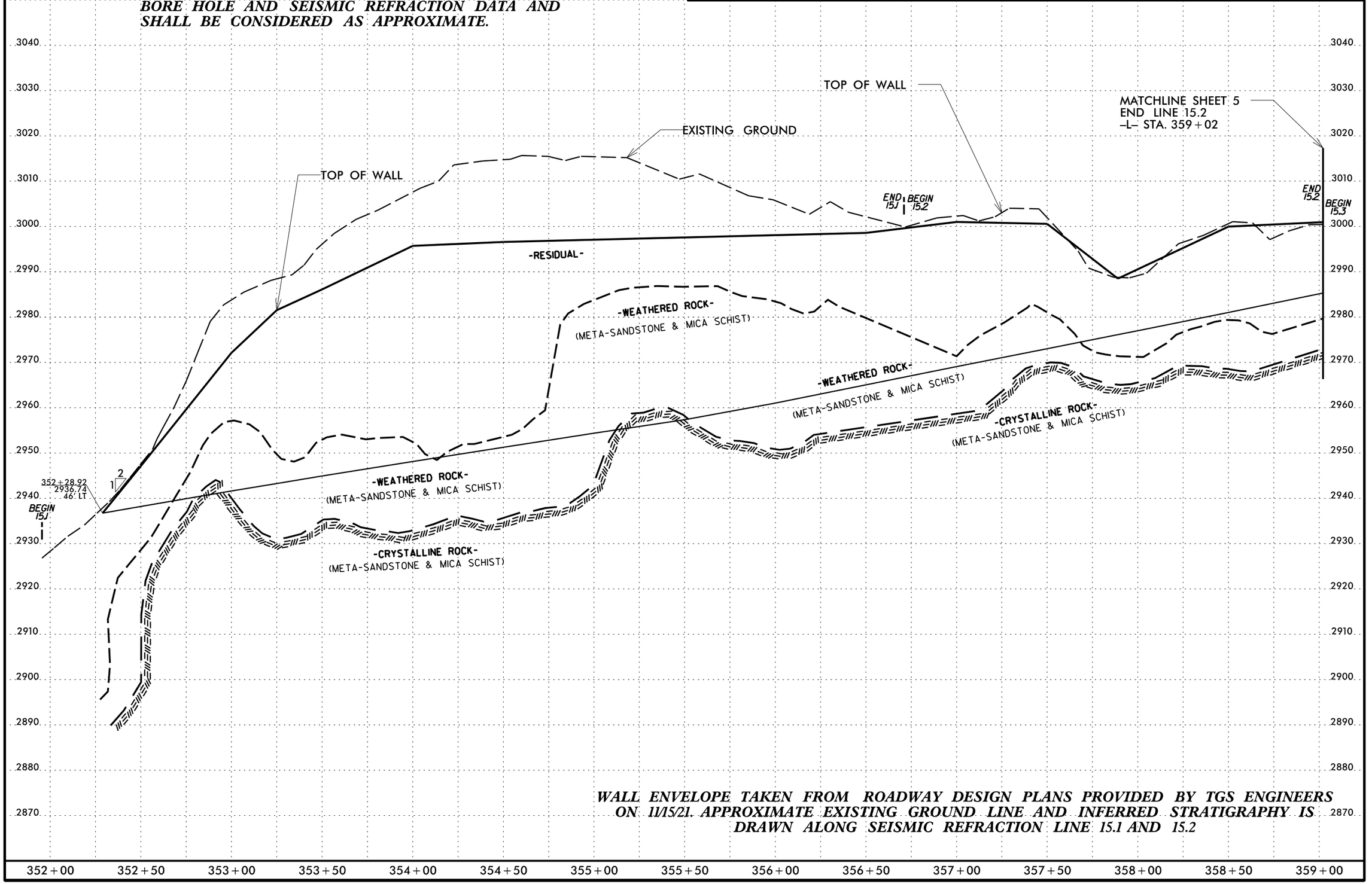
Prepared in the Office of:
CAROLINAS GEOTECHNICAL GROUP

0 50 100
FEET
VE = 2.5:1

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	4

RETAINING WALL #15
SEISMIC REFRACTION LINE 15.1 AND 15.2
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.



WALL ENVELOPE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. APPROXIMATE EXISTING GROUND LINE AND INFERRED STRATIGRAPHY IS DRAWN ALONG SEISMIC REFRACTION LINE 15.1 AND 15.2

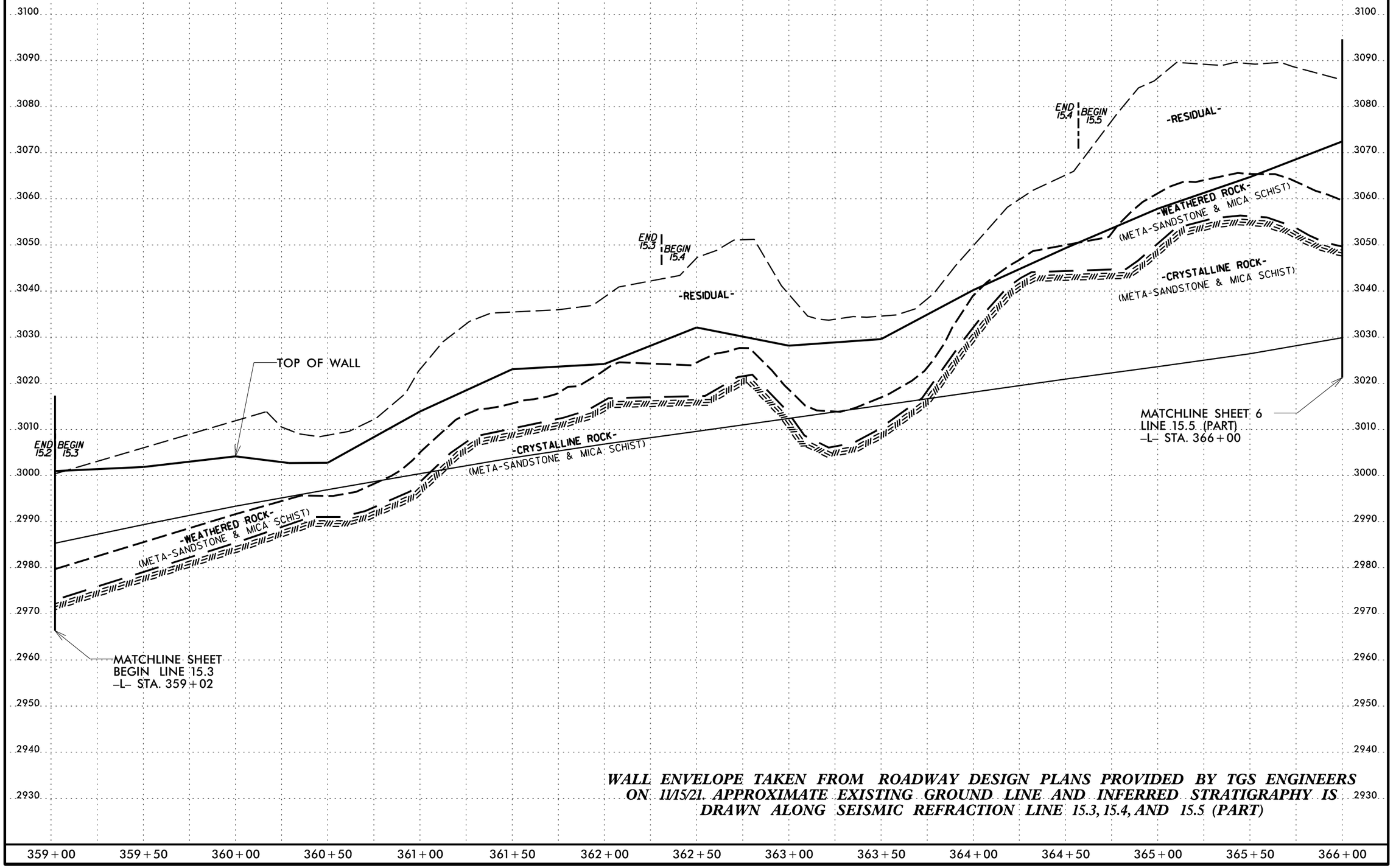
Prepared in the Office of:
CAROLINAS GEOTECHNICAL GROUP

0 50 100
FEET
VE = 2.5:1

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	5

RETAINING WALL #15 SEISMIC REFRACTION LINE 15.3, 15.4, AND 15.5 (PART) 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.



WALL ENVELOPE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. APPROXIMATE EXISTING GROUND LINE AND INFERRED STRATIGRAPHY IS DRAWN ALONG SEISMIC REFRACTION LINE 15.3, 15.4, AND 15.5 (PART)

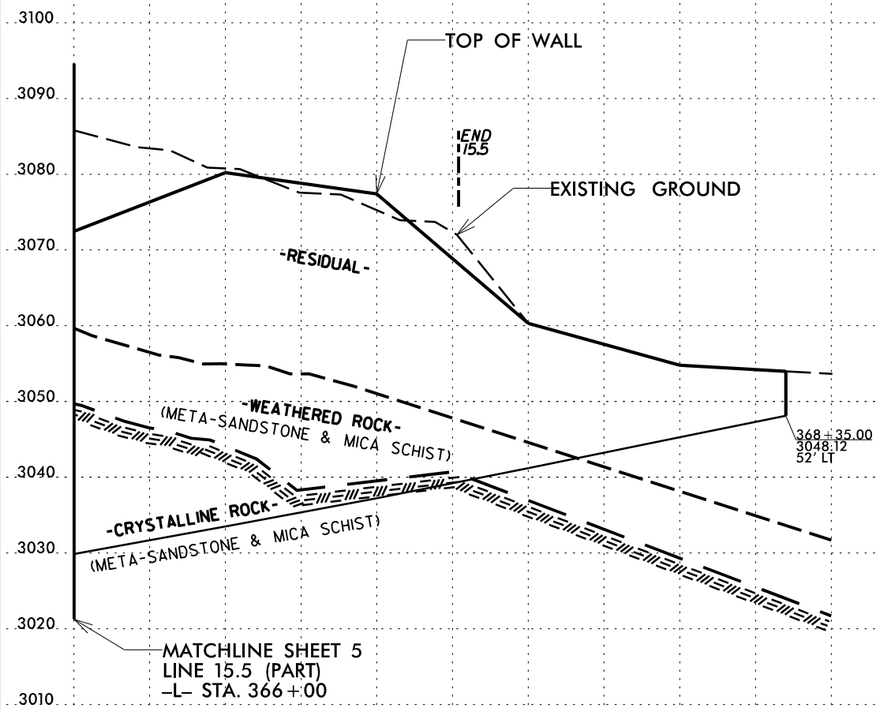
Prepared in the Office of:
CAROLINAS GEOTECHNICAL GROUP

0 50 100
FEET
VE = 2.5:1

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	6

RETAINING WALL #15
SEISMIC REFRACTION LINE 15.5 (PART)
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.



WALL ENVELOPE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. APPROXIMATE EXISTING GROUND LINE AND INFERRED STRATIGRAPHY IS DRAWN ALONG SEISMIC REFRACTION LINE 15.5 (PART) TO STATION 367+27

3100 3090 3080 3070 3060 3050 3040 3030 3020 3010 3000 2990 2980 2970 2960 2950 2940 2930

366+00 366+50 367+00 367+50 368+00 368+50 369+00 369+50 370+00 370+50 371+00

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	7

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.

LINE 15.1

RWAL15_B-1
352+26
26' LT

-RESIDUAL-
STIFF TO HARD, MOIST, TAN, FINE TO COARSE SANDY SILT (A-4), WITH LITTLE GRAVEL-SIZED ROCK FRAGMENTS

4:1

-ROADWAY EMBANKMENT-
MEDIUM DENSE, MOIST, GRAY-TAN, SILTY FINE SAND (A-2-4), WITH LITTLE GRAVEL

EXISTING GROUND

-WEATHERED ROCK-
(META-SANDSTONE)

15
56
60/0.0

BT
DRY
08/21

-CRYSTALLINE ROCK-
(META-SANDSTONE)

352+50.00

℄

—L—

–L– EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING OR SEISMIC REFRACTION LINE 15.1 WITH BOTH PROJECTED ONTO THE CROSS SECTION

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	8

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.

LINE 15.1

1.5:1

-RESIDUAL-
STIFF TO HARD, MOIST, TAN, FINE SANDY SILT (A-4), WITH LITTLE GRAVEL-SIZED ROCK FRAGMENTS

-WEATHERED ROCK-
(META-SANDSTONE)

-CRYSTALLINE ROCK-
(META-SANDSTONE)

EXISTING GROUND

4:1

-ROADWAY EMBANKMENT-
MEDIUM DENSE, MOIST, GRAY-TAN, SILTY FINE SAND (A-2-4), WITH LITTLE GRAVEL

-RESIDUAL-
STIFF TO HARD, MOIST, TAN, FINE SANDY SILT (A-4) WITH LITTLE GRAVEL-SIZED ROCK FRAGMENTS

353+00.00

℄

—L—

–L– EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING OR SEISMIC REFRACTION LINE 15.1 WITH BOTH PROJECTED ONTO THE CROSS SECTION

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.

LINE 15.1

-RESIDUAL-
VERY STIFF TO HARD, TO COARSE SANDY SILT (A-4), SIZED ROCK FRAGMENTS

MOIST, GRAY-TAN-ORANGE, FINE WITH TRACE MICA AND GRAVEL

-WEATHERED ROCK-
(META-SANDSTONE)

-CRYSTALLINE ROCK-
(META-SANDSTONE)

RWAL15_B-2
353+26
1' RT

EXISTING GROUND

4:1

61
23
100/0.9
28
100/0.9
100/0.4
60/0.0
BT
DRY
08/21

-RESIDUAL-
MEDIUM DENSE TO VERY DENSE, MOIST, GRAY-WHITE, SILTY, FINE TO COARSE SANDY GRAVEL (A-1-A)

-WEATHERED ROCK- (META-SANDSTONE)

-RESIDUAL-
MEDIUM TAN, MOIST, MEDIUM DENSE, SILTY FINE SAND (A-2-4)

-WEATHERED ROCK-
(META-SANDSTONE)

-CRYSTALLINE ROCK-
(META-SANDSTONE)

Ⓐ -ROADWAY EMBANKMENT- MEDIUM DENSE, MOIST, GRAY-TAN, SILTY FINE SAND (A-2-4), WITH LITTLE GRAVEL

353+50.00
℄
-L-

-L- EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING OR SEISMIC REFRACTION LINE 15.1 WITH BOTH PROJECTED ONTO THE CROSS SECTION

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	10

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.

LINE 15.1

-RESIDUAL-
VERY STIFF TO HARD, MOIST, GRAY-TAN-ORANGE, FINE TO COARSE SANDY SILT (A-4) WITH TRACE MICA AND GRAVEL-SIZED ROCK FRAGMENTS

EXISTING GROUND

4:1

Ⓐ

-WEATHERED ROCK-
(META-SANDSTONE)

-CRYSTALLINE ROCK-
(META-SANDSTONE)

Ⓐ -ROADWAY EMBANKMENT- MEDIUM DENSE, MOIST, GRAY-TAN, SILTY FINE SAND (A-2-4), WITH LITTLE GRAVEL

354+00.00
℄
—L—

-L- EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING OR SEISMIC REFRACTION LINE 15.1 WITH BOTH PROJECTED ONTO THE CROSS SECTION

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	11

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.

LINE 15.1

-RESIDUAL-
VERY STIFF TO HARD, MOIST, GRAY-TAN-ORANGE, FINE TO COARSE SANDY SILT (A-4), WITH TRACE MICA AND GRAVEL SIZED ROCK FRAGMENTS

L 35445L
354+45
1' LT

EXISTING GROUND

4:1

-WEATHERED ROCK-
(META-SANDSTONE)

22

100/0.8
60/0.1
60/0.0

BT
DRY
08/21

-WEATHERED ROCK-
(META-SANDSTONE)

-CRYSTALLINE ROCK-
(META-SANDSTONE)

-CRYSTALLINE ROCK-
(META-SANDSTONE)

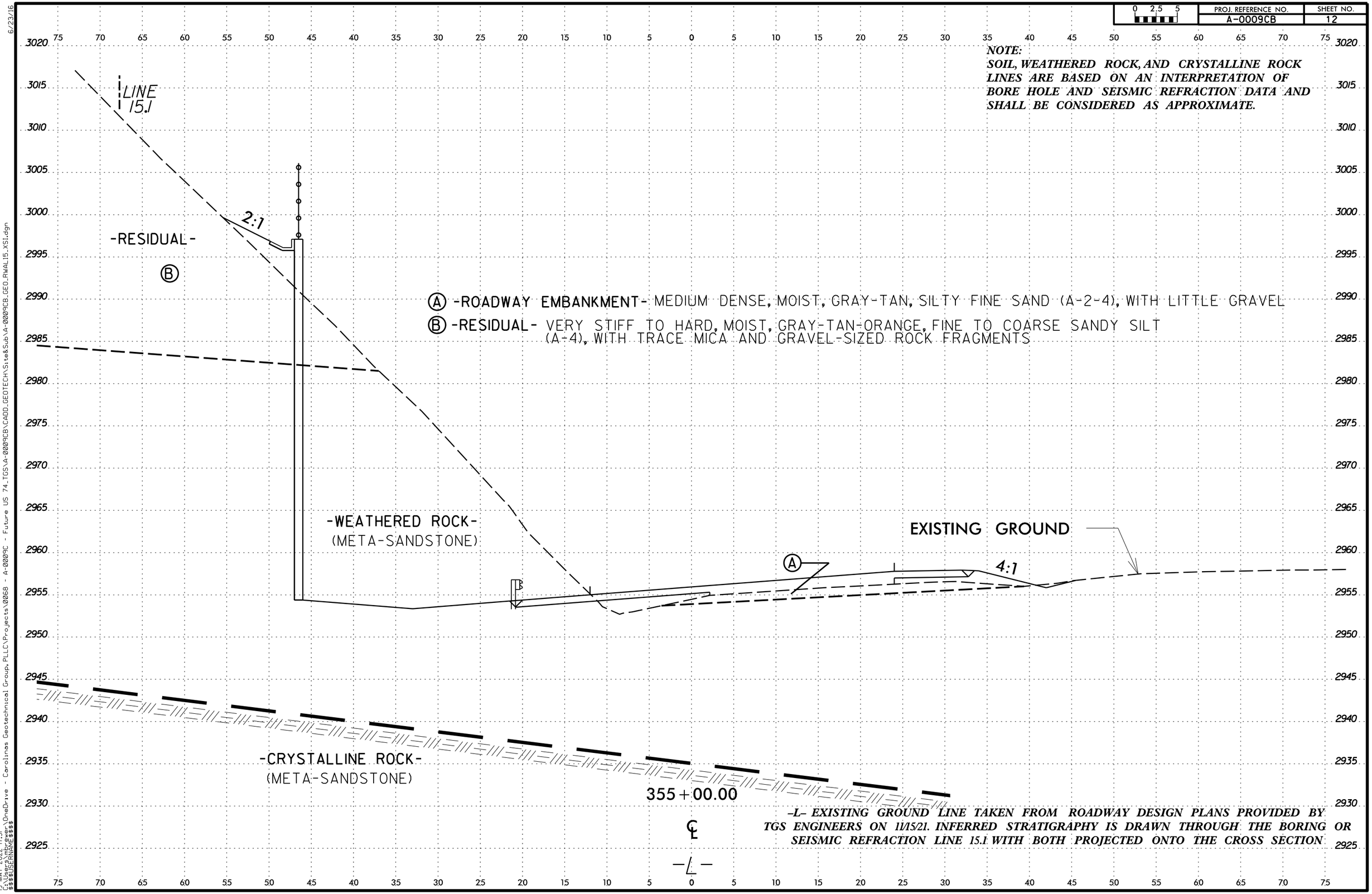
Ⓐ -ROADWAY EMBANKMENT- MEDIUM DENSE, MOIST, GRAY-TAN, SILTY FINE SAND (A-2-4), WITH LITTLE GRAVEL

354+50.00
℄
-L-

-L- EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING OR SEISMIC REFRACTION LINE 15.1 WITH BOTH PROJECTED ONTO THE CROSS SECTION

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	12

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.



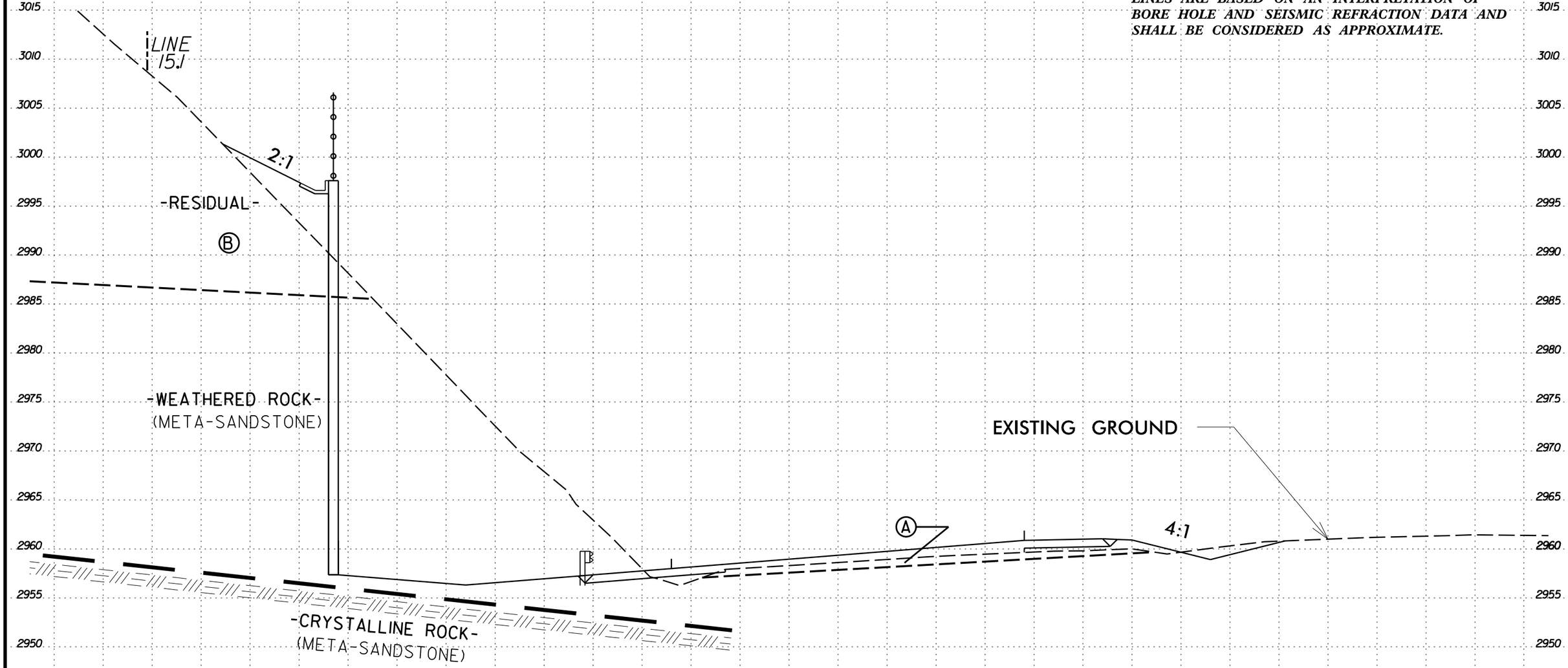
Ⓐ **-ROADWAY EMBANKMENT-** MEDIUM DENSE, MOIST, GRAY-TAN, SILTY FINE SAND (A-2-4), WITH LITTLE GRAVEL

Ⓑ **-RESIDUAL-** VERY STIFF TO HARD, MOIST, GRAY-TAN-ORANGE, FINE TO COARSE SANDY SILT (A-4), WITH TRACE MICA AND GRAVEL-SIZED ROCK FRAGMENTS

–L– EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING OR SEISMIC REFRACTION LINE 15.1 WITH BOTH PROJECTED ONTO THE CROSS SECTION

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	13

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.



Ⓐ **-ROADWAY EMBANKMENT-** MEDIUM DENSE, MOIST, GRAY-TAN, SILTY FINE SAND (A-2-4), WITH LITTLE GRAVEL

Ⓑ **-RESIDUAL-** VERY STIFF TO HARD, MOIST, GRAY-TAN-ORANGE, FINE TO COARSE SANDY SILT (A-4), WITH TRACE MICA AND GRAVEL-SIZED ROCK FRAGMENTS

355+50.00

℄

-L- EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING OR SEISMIC REFRACTION LINE 15.1 WITH BOTH PROJECTED ONTO THE CROSS SECTION

-L-

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	14

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.

LINE 15.1

2:1

-RESIDUAL-

Ⓑ

L_35593L
355+93
6' LT

Ⓐ

4:1

EXISTING GROUND

-WEATHERED ROCK-
(META-SANDSTONE & MICA SCHIST)

-RESIDUAL-
HARD, MOIST, TAN-GRAY, FINE SANDY SILT (A-4), WITH TRACE MANGANESE OXIDE AND GRAVEL-SIZED ROCK FRAGMENTS

-CRYSTALLINE ROCK-
(META-SANDSTONE)

42
90
99
93
100/0.8
100/0.6
100/0.5

BT
DRY
08/21

Ⓐ **-ROADWAY EMBANKMENT-** MEDIUM DENSE, MOIST, GRAY-TAN, SILTY FINE SAND (A-2-4), WITH LITTLE GRAVEL

Ⓑ **-RESIDUAL-** VERY STIFF TO HARD, MOIST, GRAY-TAN-ORANGE, FINE TO COARSE SANDY SILT (A-4), WITH TRACE MICA AND GRAVEL-SIZED ROCK FRAGMENTS

356+00.00

℄

—L—

-L- EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING OR SEISMIC REFRACTION LINE 15.1 WITH BOTH PROJECTED ONTO THE CROSS SECTION

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	15

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.

LINE 15.1

-RESIDUAL-

Ⓑ

EXISTING GROUND

Ⓐ

4:1

-WEATHERED ROCK-
(META-SANDSTONE & MICA SCHIST)

-RESIDUAL-
HARD, MOIST, TAN-GRAY, FINE SANDY SILT (A-4), WITH TRACE MANGANESE OXIDE AND GRAVEL-SIZED ROCK FRAGMENTS

-CRYSTALLINE ROCK-
(META-SANDSTONE)

Ⓐ **-ROADWAY EMBANKMENT-** MEDIUM DENSE, MOIST, GRAY-TAN, SILTY FINE SAND (A-2-4), WITH LITTLE GRAVEL

Ⓑ **-RESIDUAL-** VERY STIFF TO HARD, MOIST, GRAY-TAN-ORANGE, FINE TO COARSE SANDY SILT (A-4), WITH TRACE MICA AND GRAVEL-SIZED ROCK FRAGMENTS

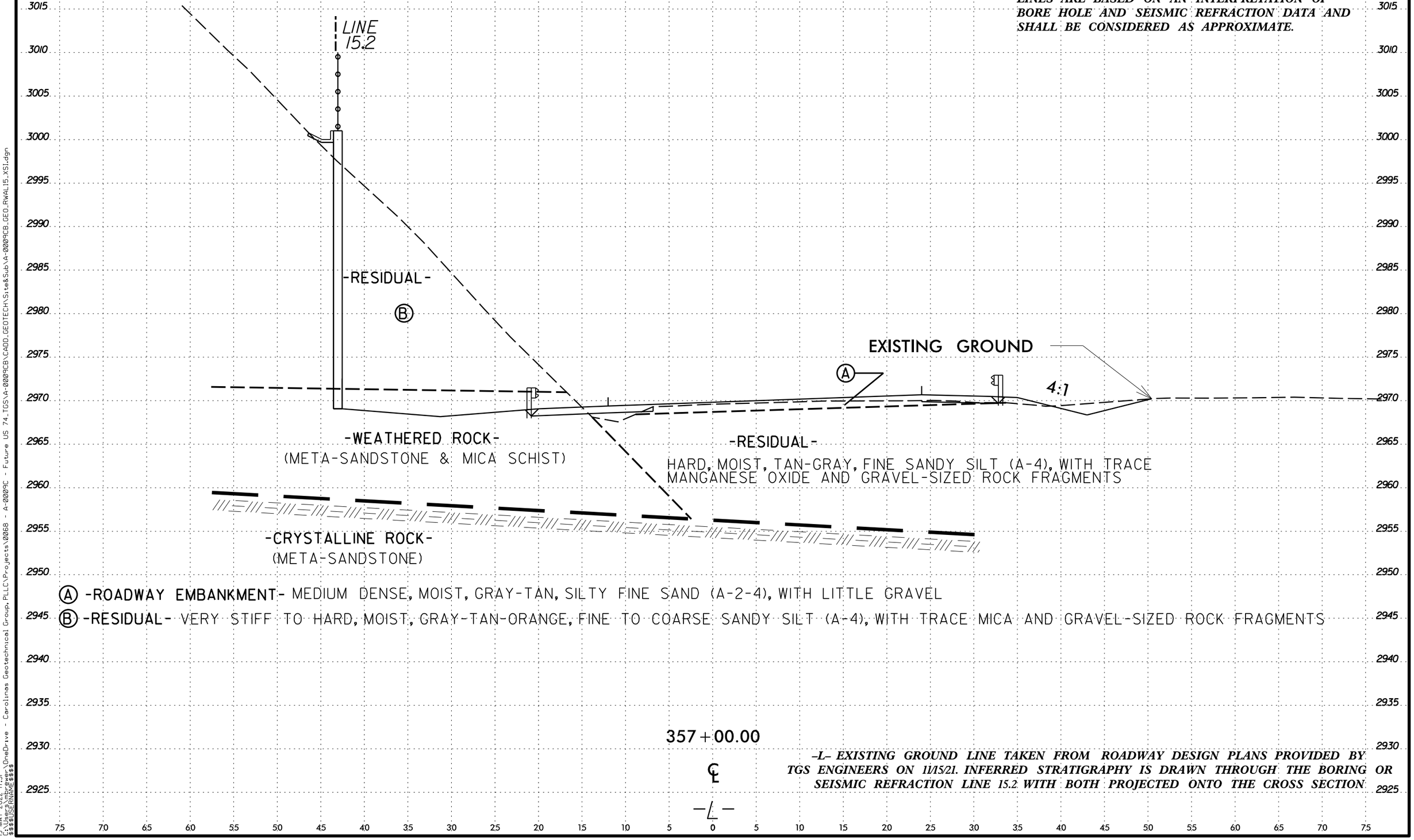
356+50.00

℄

-L- EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING OR SEISMIC REFRACTION LINE 15.1 WITH BOTH PROJECTED ONTO THE CROSS SECTION

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	16

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.



Ⓐ **-ROADWAY EMBANKMENT-** MEDIUM DENSE, MOIST, GRAY-TAN, SILTY FINE SAND (A-2-4), WITH LITTLE GRAVEL

Ⓑ **-RESIDUAL-** VERY STIFF TO HARD, MOIST, GRAY-TAN-ORANGE, FINE TO COARSE SANDY SILT (A-4), WITH TRACE MICA AND GRAVEL-SIZED ROCK FRAGMENTS

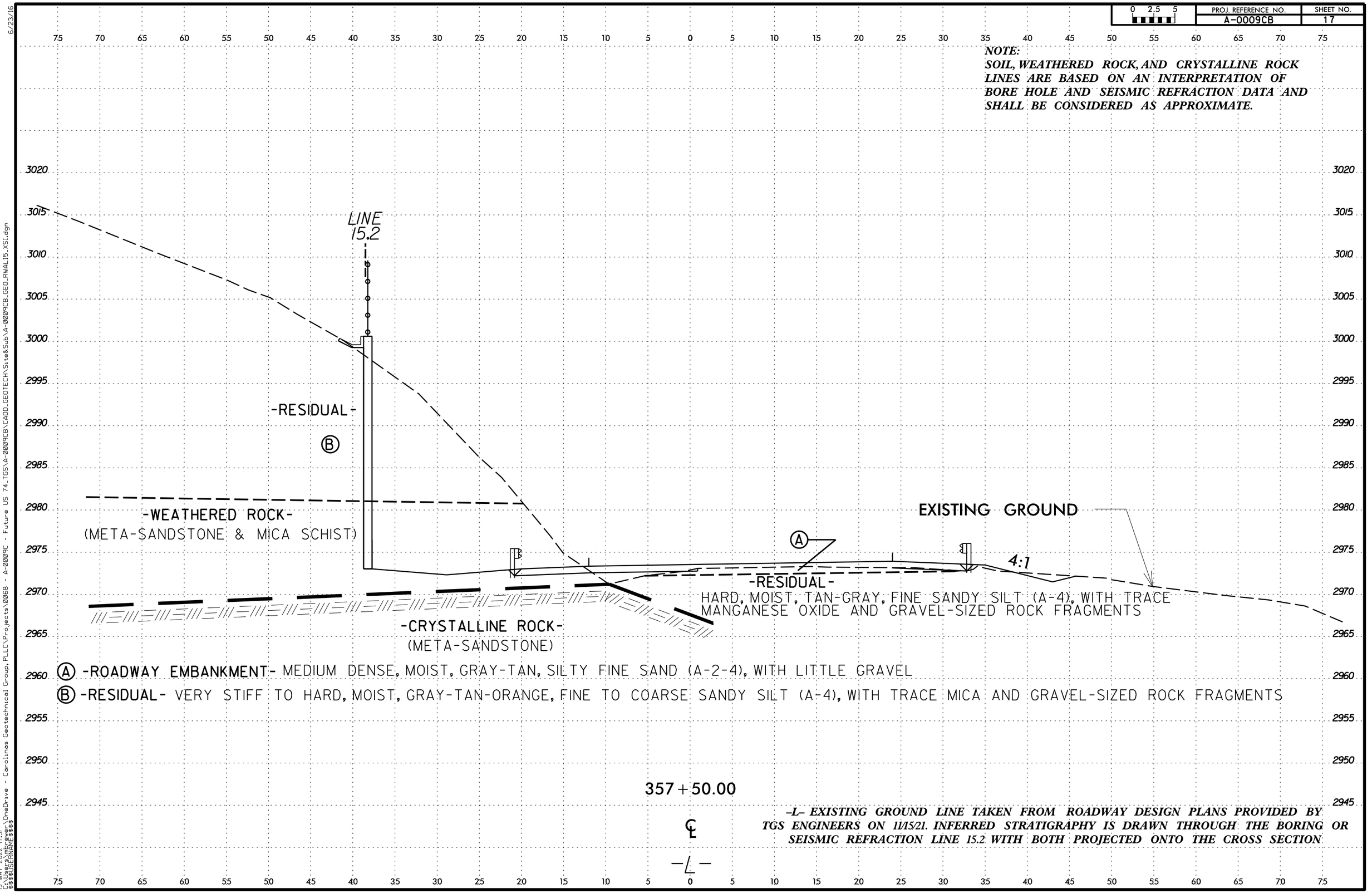
357+00.00

℄

-L- EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING OR SEISMIC REFRACTION LINE 15.2 WITH BOTH PROJECTED ONTO THE CROSS SECTION

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	17

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.



Ⓐ -ROADWAY EMBANKMENT- MEDIUM DENSE, MOIST, GRAY-TAN, SILTY FINE SAND (A-2-4), WITH LITTLE GRAVEL

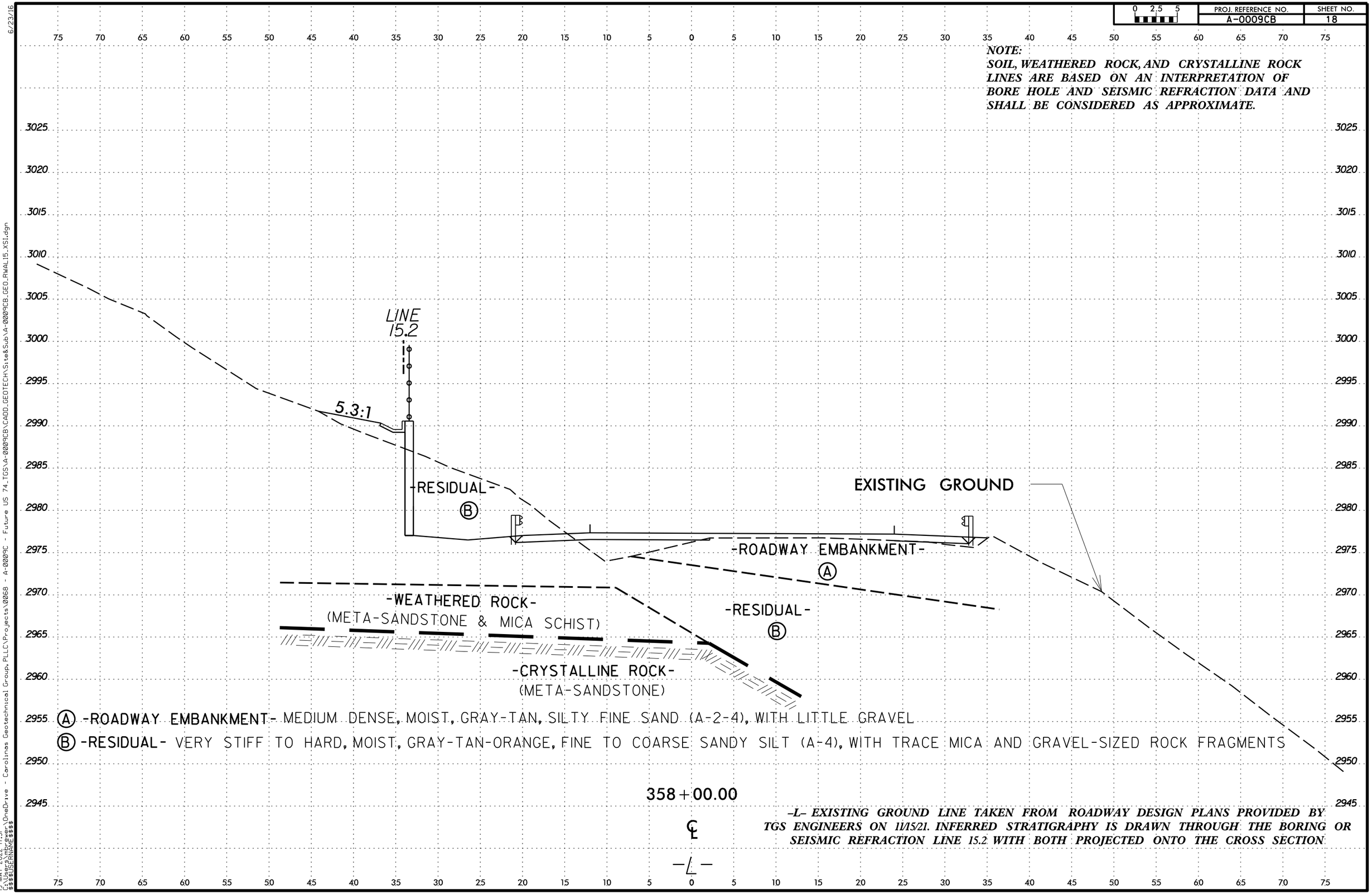
Ⓑ -RESIDUAL- VERY STIFF TO HARD, MOIST, GRAY-TAN-ORANGE, FINE TO COARSE SANDY SILT (A-4), WITH TRACE MICA AND GRAVEL-SIZED ROCK FRAGMENTS

357+50.00

℄

–L– EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING OR SEISMIC REFRACTION LINE 15.2 WITH BOTH PROJECTED ONTO THE CROSS SECTION

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.



(A) -ROADWAY EMBANKMENT- MEDIUM DENSE, MOIST, GRAY-TAN, SILTY FINE SAND (A-2-4), WITH LITTLE GRAVEL

(B) -RESIDUAL- VERY STIFF TO HARD, MOIST, GRAY-TAN-ORANGE, FINE TO COARSE SANDY SILT (A-4), WITH TRACE MICA AND GRAVEL-SIZED ROCK FRAGMENTS

358+00.00

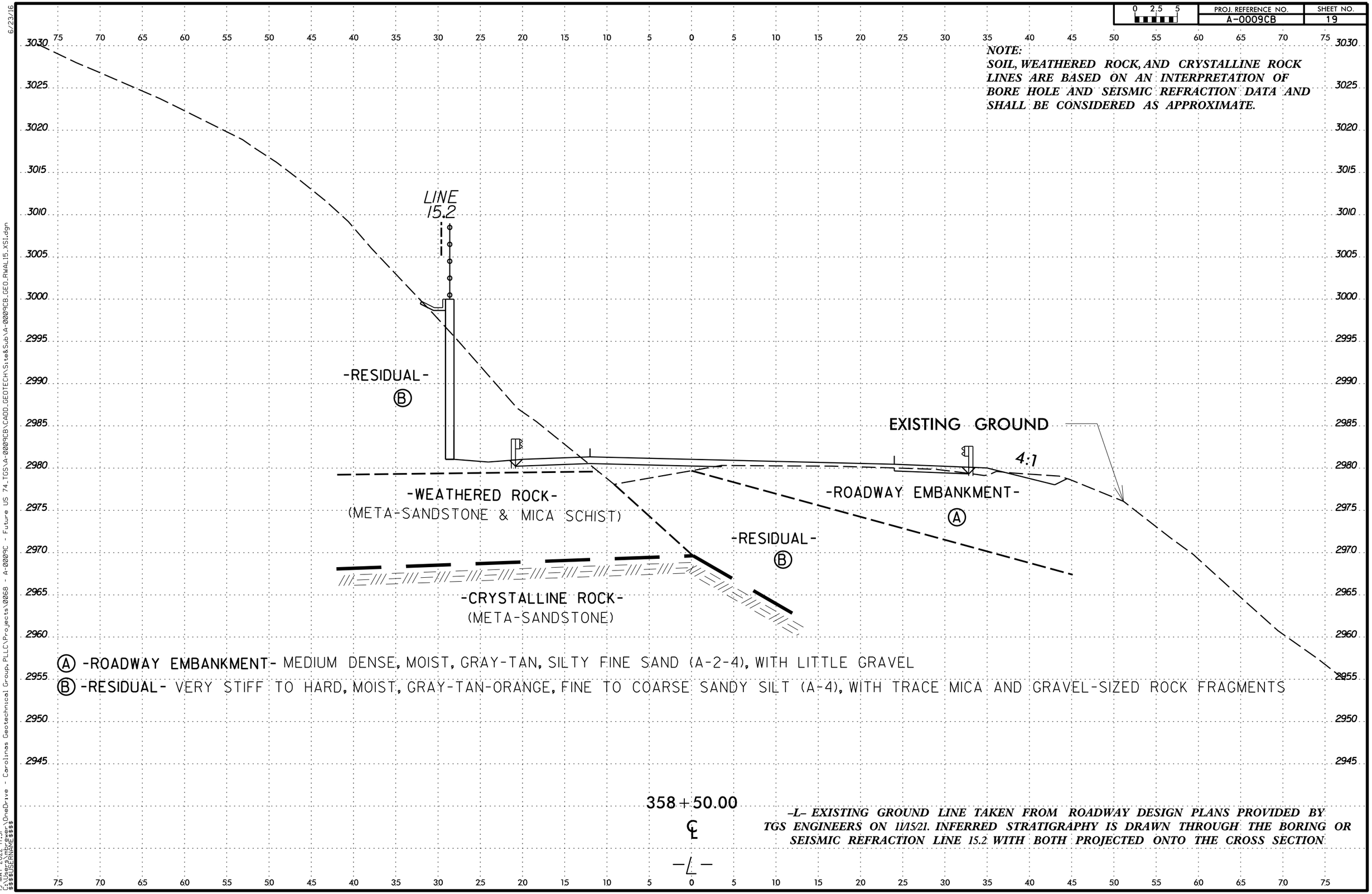
℄

—L—

–L– EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING OR SEISMIC REFRACTION LINE 15.2 WITH BOTH PROJECTED ONTO THE CROSS SECTION

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	19

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.



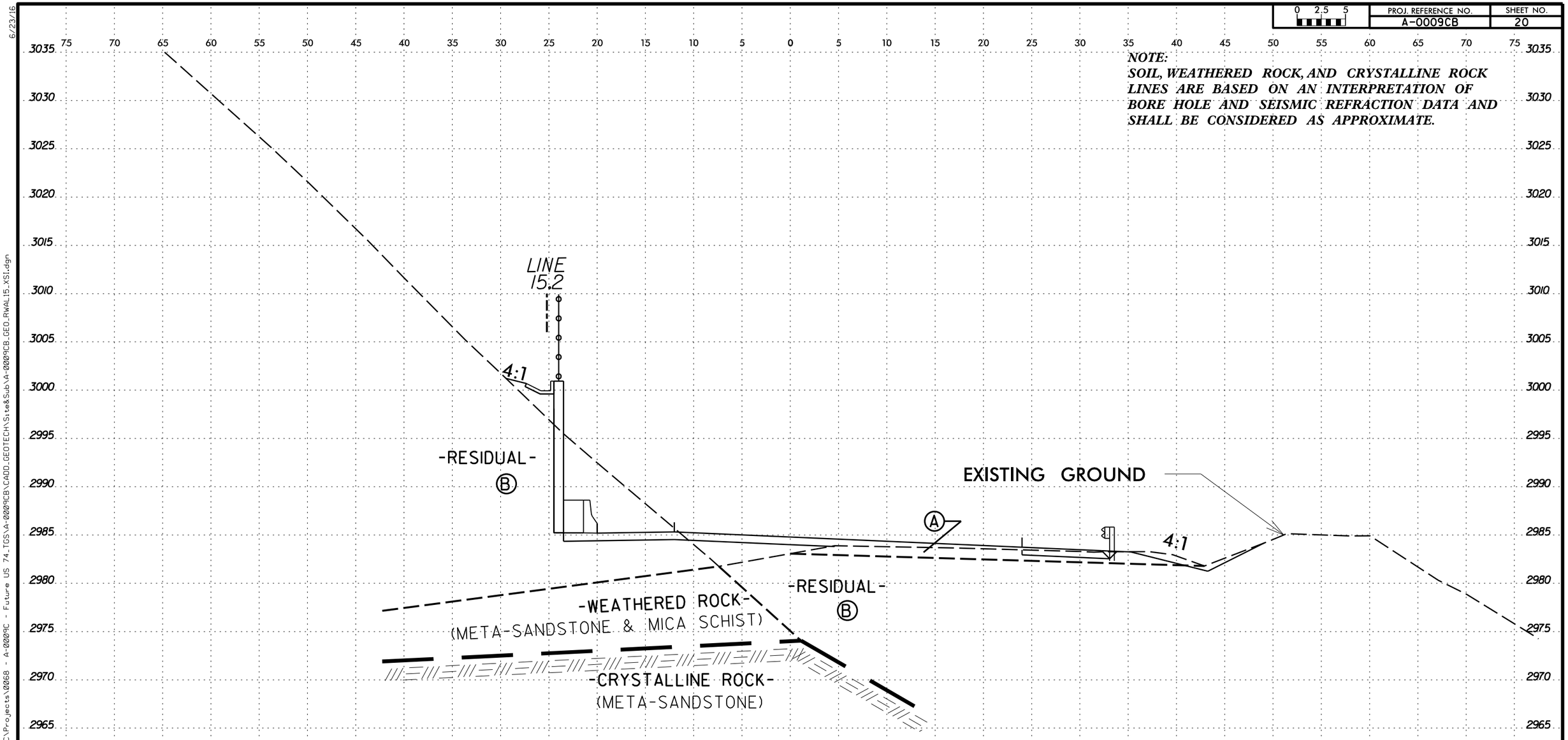
Ⓐ **-ROADWAY EMBANKMENT-** MEDIUM DENSE, MOIST, GRAY-TAN, SILTY FINE SAND (A-2-4), WITH LITTLE GRAVEL

Ⓑ **-RESIDUAL-** VERY STIFF TO HARD, MOIST, GRAY-TAN-ORANGE, FINE TO COARSE SANDY SILT (A-4), WITH TRACE MICA AND GRAVEL-SIZED ROCK FRAGMENTS

–L– EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING OR SEISMIC REFRACTION LINE 15.2 WITH BOTH PROJECTED ONTO THE CROSS SECTION

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	20

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.



Ⓐ **-ROADWAY EMBANKMENT-** MEDIUM DENSE, MOIST, GRAY-TAN, SILTY FINE SAND (A-2-4), WITH LITTLE GRAVEL

Ⓑ **-RESIDUAL-** VERY STIFF TO HARD, MOIST, GRAY-TAN-ORANGE, FINE TO COARSE SANDY SILT (A-4), WITH TRACE MICA AND GRAVEL-SIZED ROCK FRAGMENTS

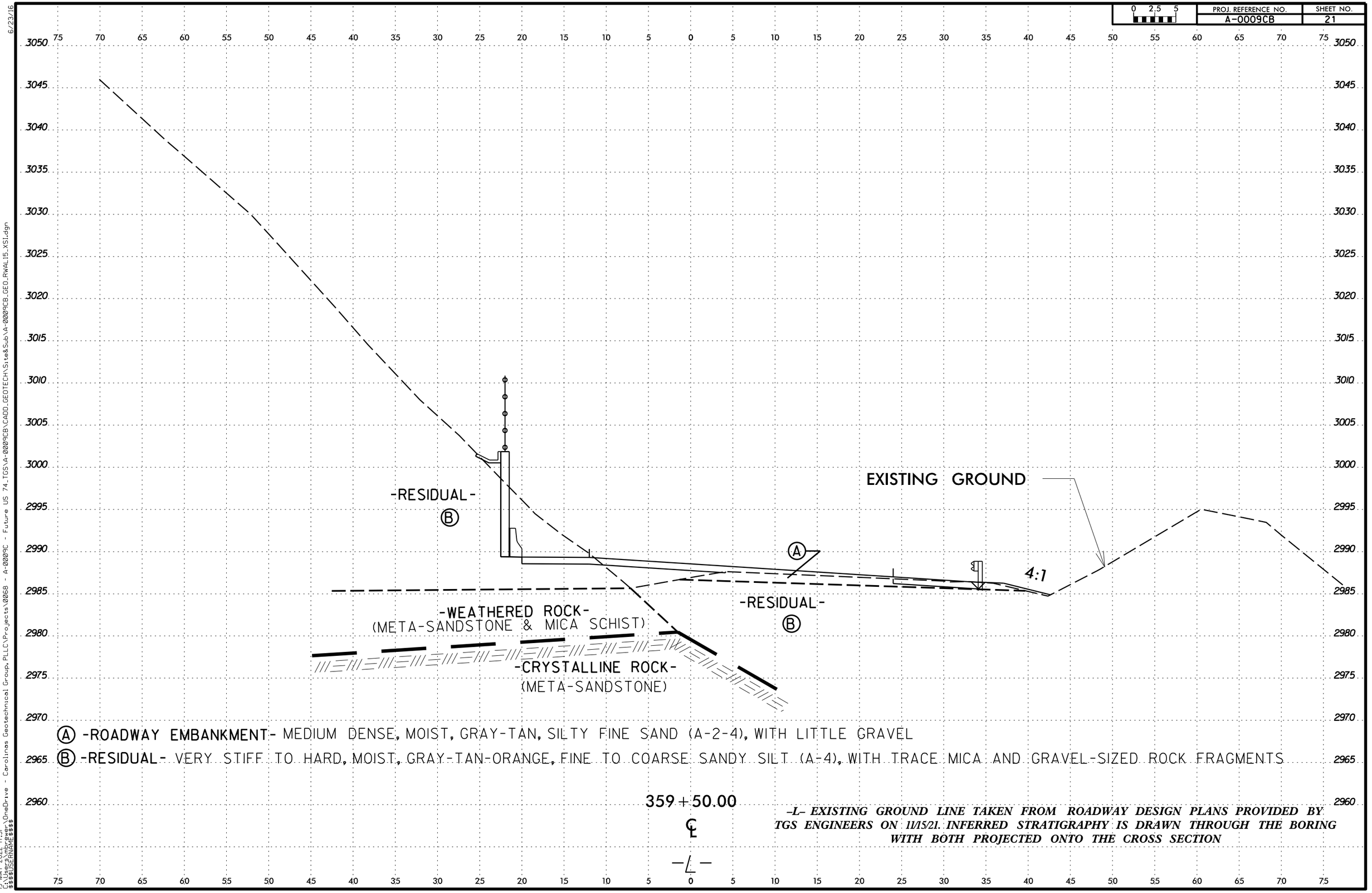
359+00.00

℄

–L–

-L- EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING OR SEISMIC REFRACTION LINE 15.2 WITH BOTH PROJECTED ONTO THE CROSS SECTION

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	21



Ⓐ -ROADWAY EMBANKMENT- MEDIUM DENSE, MOIST, GRAY-TAN, SILTY FINE SAND (A-2-4), WITH LITTLE GRAVEL

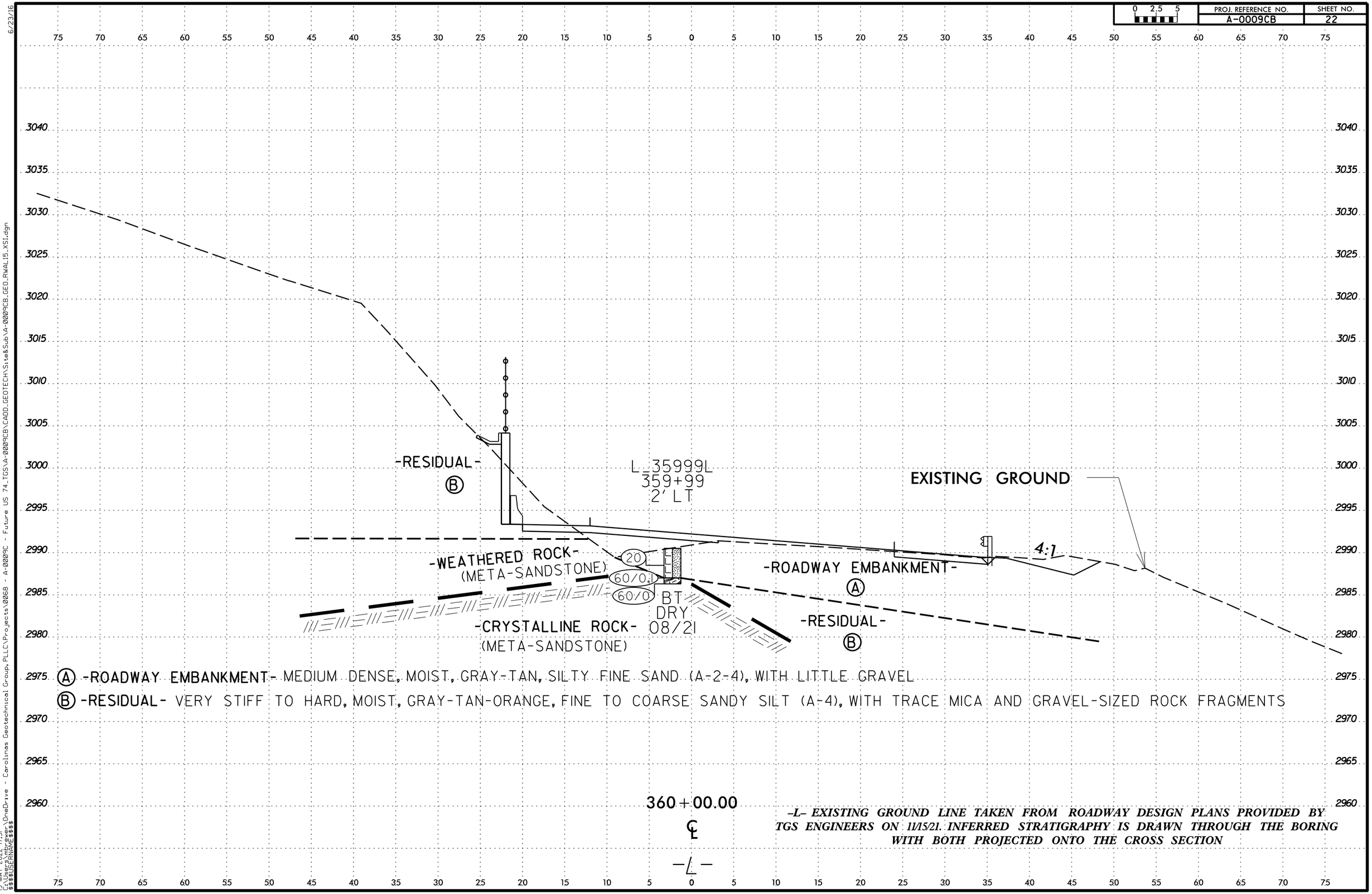
Ⓑ -RESIDUAL- VERY STIFF TO HARD, MOIST, GRAY-TAN-ORANGE, FINE TO COARSE SANDY SILT (A-4), WITH TRACE MICA AND GRAVEL-SIZED ROCK FRAGMENTS

359+50.00

℄

—L—

–L– EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING WITH BOTH PROJECTED ONTO THE CROSS SECTION



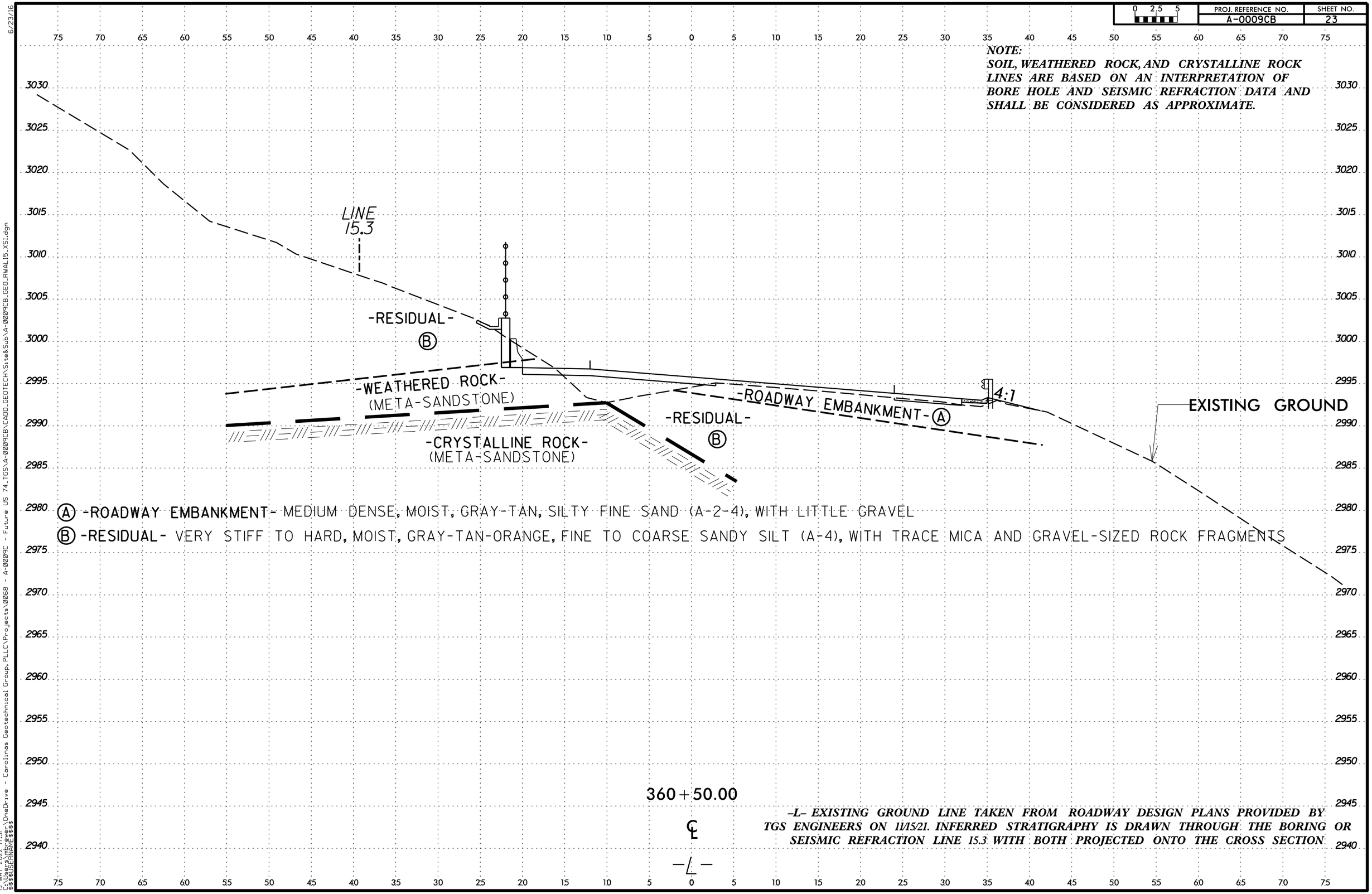
(A) -ROADWAY EMBANKMENT- MEDIUM DENSE, MOIST, GRAY-TAN, SILTY FINE SAND (A-2-4), WITH LITTLE GRAVEL

(B) -RESIDUAL- VERY STIFF TO HARD, MOIST, GRAY-TAN-ORANGE, FINE TO COARSE SANDY SILT (A-4), WITH TRACE MICA AND GRAVEL-SIZED ROCK FRAGMENTS

-L- EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING WITH BOTH PROJECTED ONTO THE CROSS SECTION

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	23

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.



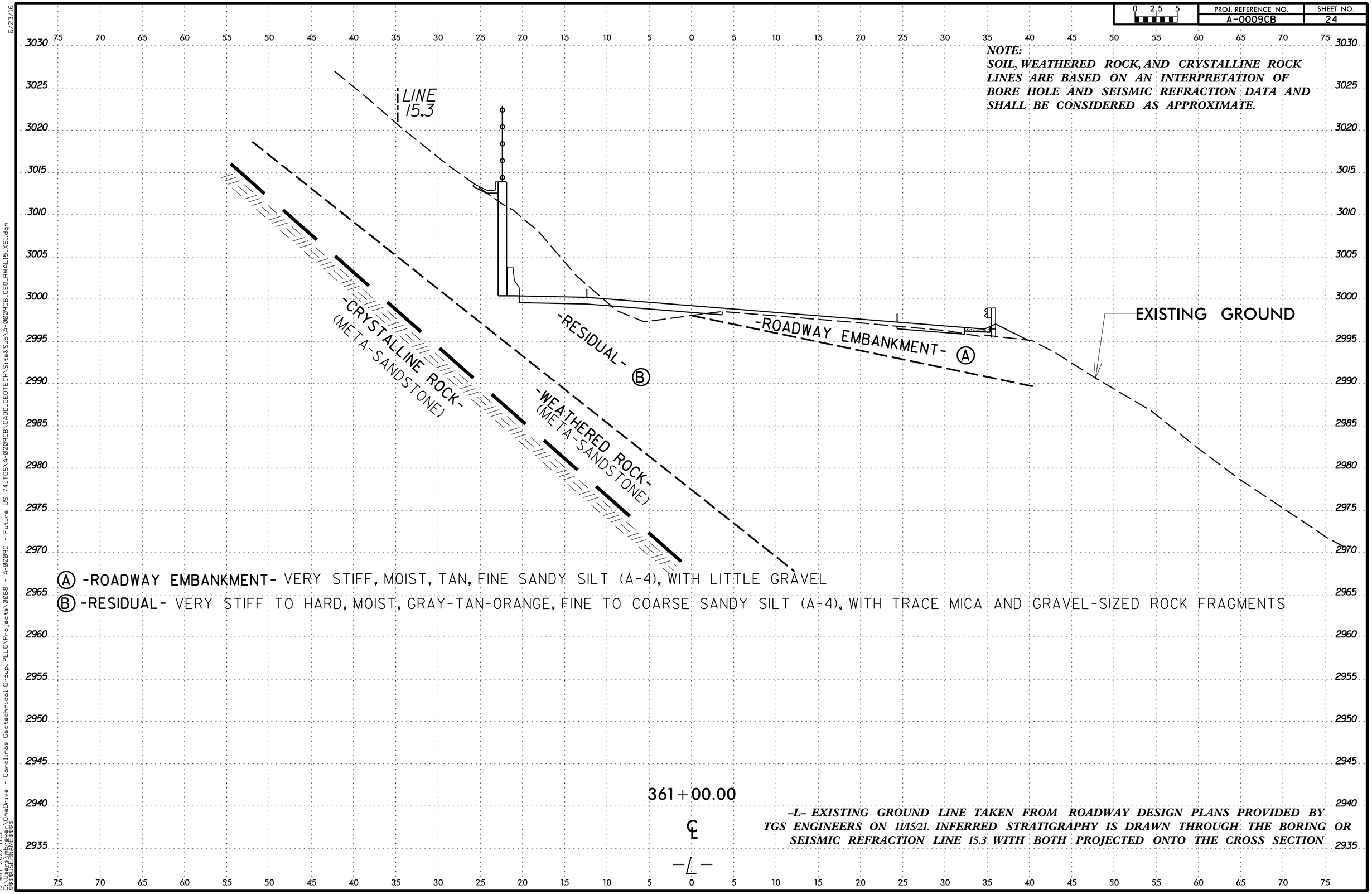
Ⓐ **-ROADWAY EMBANKMENT-** MEDIUM DENSE, MOIST, GRAY-TAN, SILTY FINE SAND (A-2-4), WITH LITTLE GRAVEL

Ⓑ **-RESIDUAL-** VERY STIFF TO HARD, MOIST, GRAY-TAN-ORANGE, FINE TO COARSE SANDY SILT (A-4), WITH TRACE MICA AND GRAVEL-SIZED ROCK FRAGMENTS

-L- EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING OR SEISMIC REFRACTION LINE 15.3 WITH BOTH PROJECTED ONTO THE CROSS SECTION

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	24

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.



Ⓐ **-ROADWAY EMBANKMENT-** VERY STIFF, MOIST, TAN, FINE SANDY SILT (A-4), WITH LITTLE GRAVEL

Ⓑ **-RESIDUAL-** VERY STIFF TO HARD, MOIST, GRAY-TAN-ORANGE, FINE TO COARSE SANDY SILT (A-4), WITH TRACE MICA AND GRAVEL-SIZED ROCK FRAGMENTS

361+00.00

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—L—

–L– EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING OR SEISMIC REFRACTION LINE 15.3 WITH BOTH PROJECTED ONTO THE CROSS SECTION

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.

LINE 15.3

-RESIDUAL-

-CRYSTALLINE ROCK- (META-SANDSTONE)

-WEATHERED ROCK- (META-SANDSTONE)

EXISTING GROUND

Ⓐ -ROADWAY EMBANKMENT- VERY STIFF, MOIST, TAN, FINE SANDY SILT (A-4), WITH LITTLE GRAVEL

Ⓑ -RESIDUAL- VERY STIFF TO HARD, MOIST, GRAY-TAN-ORANGE, FINE TO COARSE SANDY SILT (A-4), WITH TRACE MICA AND GRAVEL-SIZED ROCK FRAGMENTS

361+50.00

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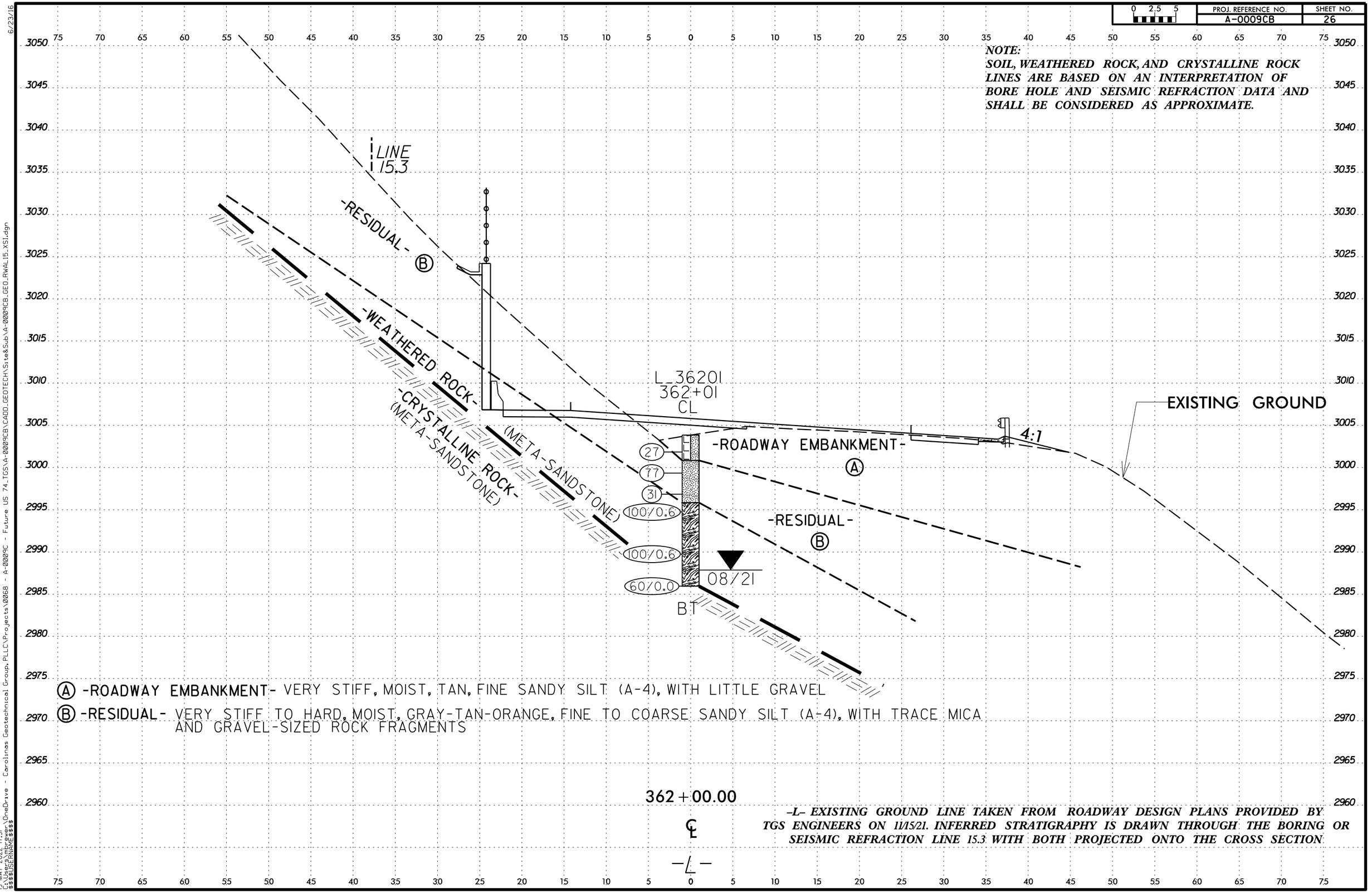
–L–

–L– EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING OR SEISMIC REFRACTION LINE 15.3 WITH BOTH PROJECTED ONTO THE CROSS SECTION

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	26

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.



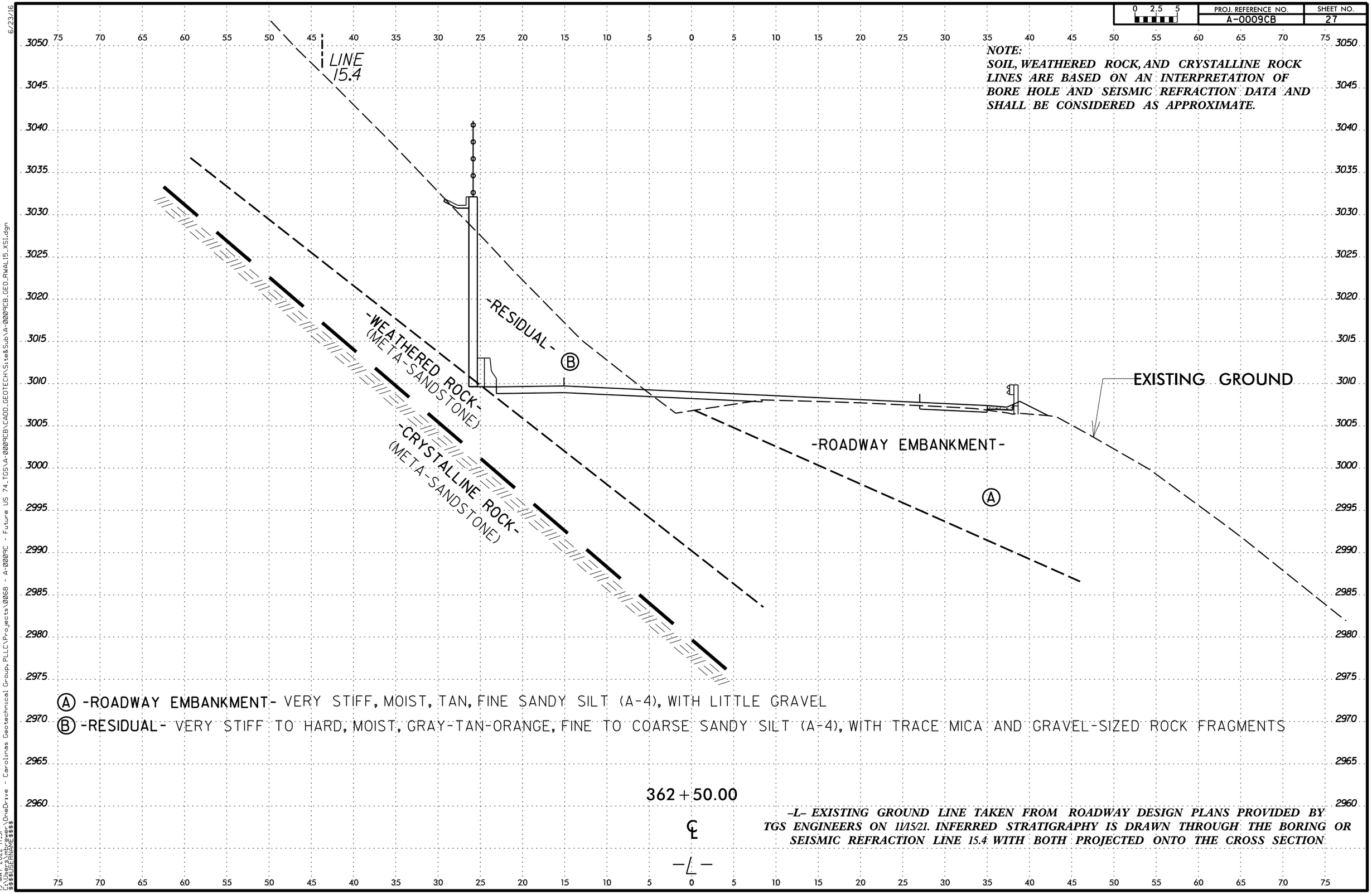
(A) **-ROADWAY EMBANKMENT-** VERY STIFF, MOIST, TAN, FINE SANDY SILT (A-4), WITH LITTLE GRAVEL

(B) **-RESIDUAL-** VERY STIFF TO HARD, MOIST, GRAY-TAN-ORANGE, FINE TO COARSE SANDY SILT (A-4), WITH TRACE MICA AND GRAVEL-SIZED ROCK FRAGMENTS

-L- EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING OR SEISMIC REFRACTION LINE 15.3 WITH BOTH PROJECTED ONTO THE CROSS SECTION

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	27

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.



Ⓐ **-ROADWAY EMBANKMENT-** VERY STIFF, MOIST, TAN, FINE SANDY SILT (A-4), WITH LITTLE GRAVEL

Ⓑ **-RESIDUAL-** VERY STIFF TO HARD, MOIST, GRAY-TAN-ORANGE, FINE TO COARSE SANDY SILT (A-4), WITH TRACE MICA AND GRAVEL-SIZED ROCK FRAGMENTS

362+50.00

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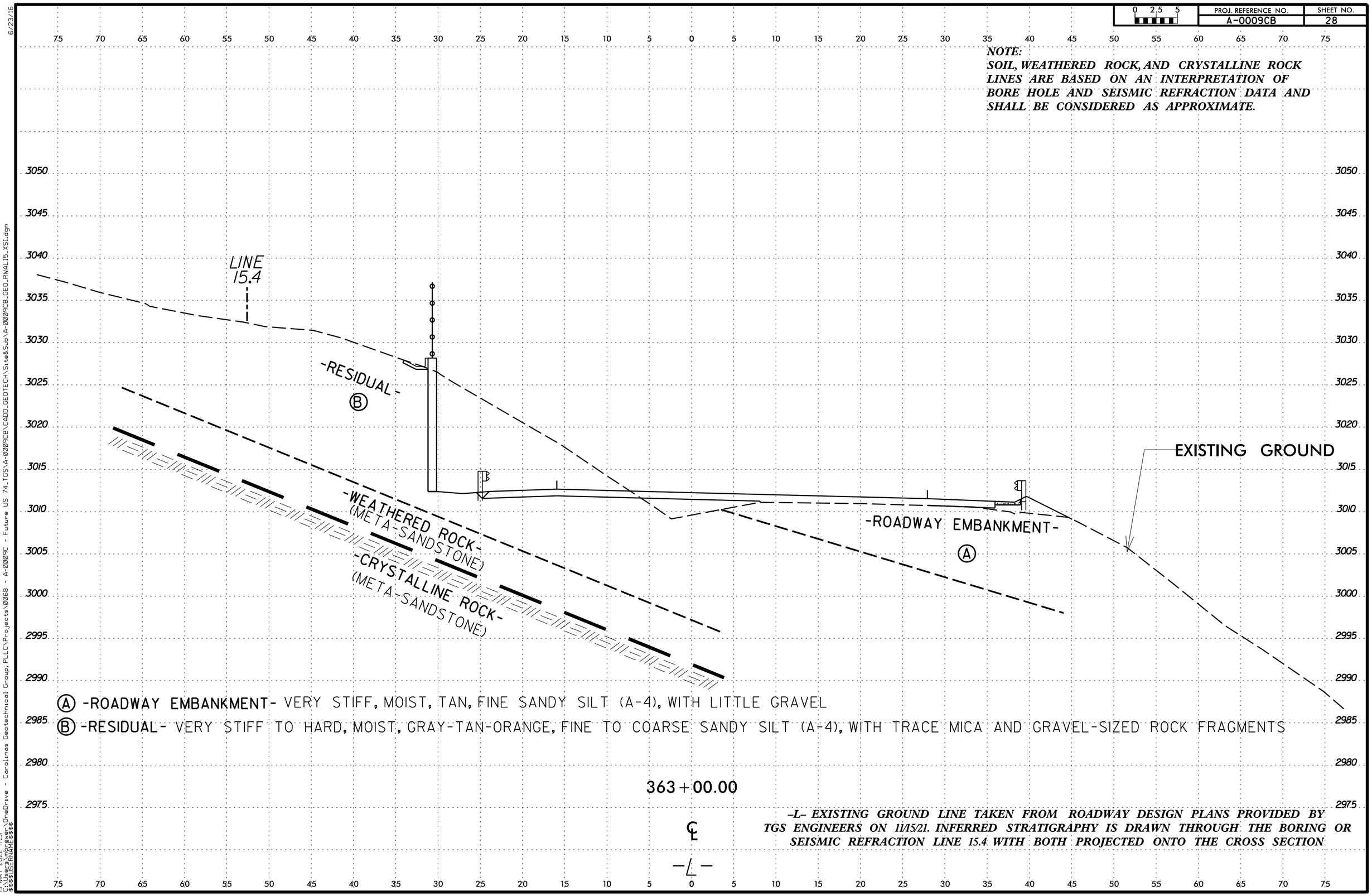
—L—

-L- EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING OR SEISMIC REFRACTION LINE 15.4 WITH BOTH PROJECTED ONTO THE CROSS SECTION

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.



Ⓐ -ROADWAY EMBANKMENT- VERY STIFF, MOIST, TAN, FINE SANDY SILT (A-4), WITH LITTLE GRAVEL

Ⓑ -RESIDUAL- VERY STIFF TO HARD, MOIST, GRAY-TAN-ORANGE, FINE TO COARSE SANDY SILT (A-4), WITH TRACE MICA AND GRAVEL-SIZED ROCK FRAGMENTS

363+00.00

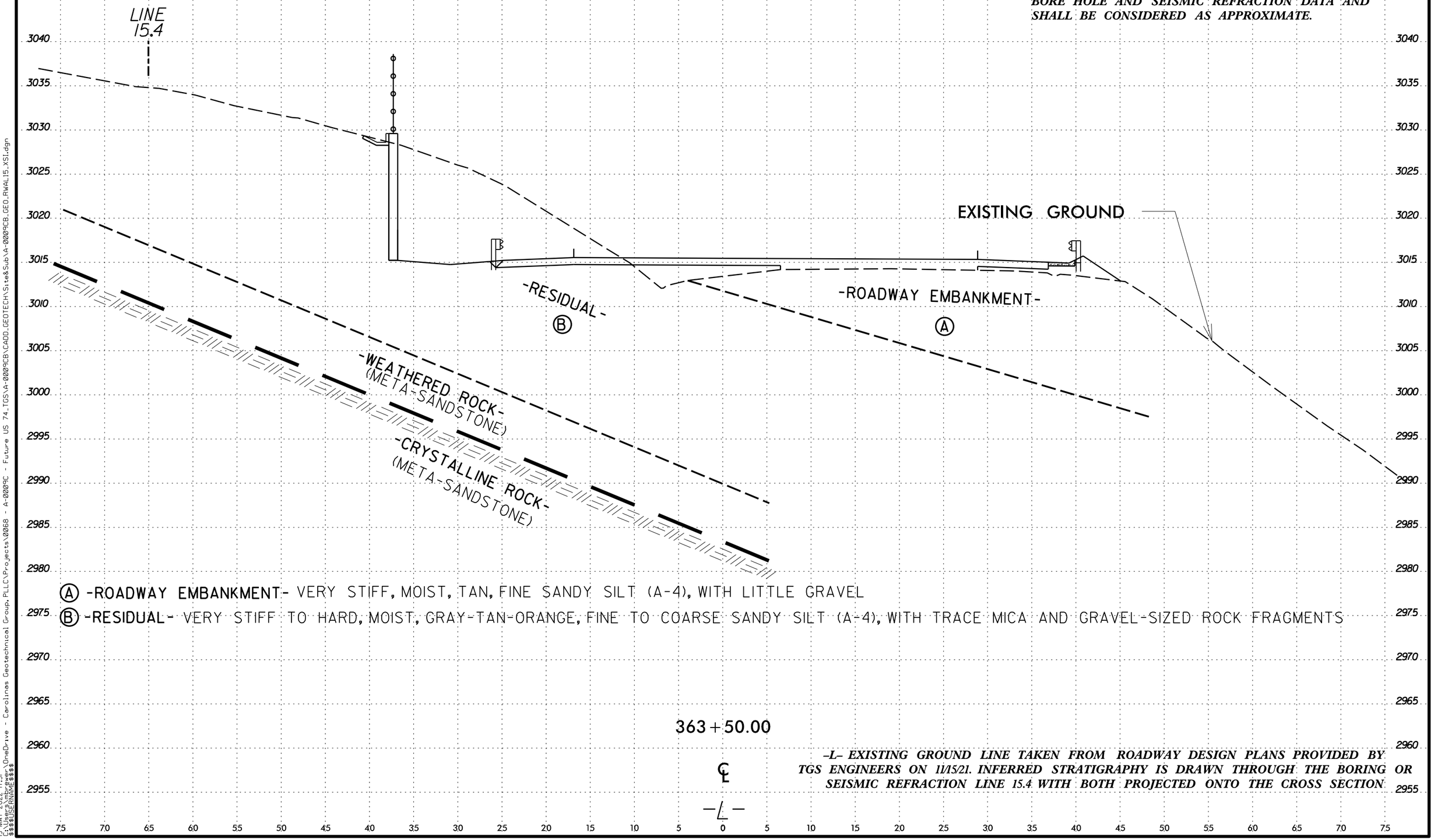
℄

—L—

–L– EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING OR SEISMIC REFRACTION LINE 15.4 WITH BOTH PROJECTED ONTO THE CROSS SECTION

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	29

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.



Ⓐ **-ROADWAY EMBANKMENT-** VERY STIFF, MOIST, TAN, FINE SANDY SILT (A-4), WITH LITTLE GRAVEL

Ⓑ **-RESIDUAL-** VERY STIFF TO HARD, MOIST, GRAY-TAN-ORANGE, FINE TO COARSE SANDY SILT (A-4), WITH TRACE MICA AND GRAVEL-SIZED ROCK FRAGMENTS

363+50.00

℄

–L– EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING OR SEISMIC REFRACTION LINE 15.4 WITH BOTH PROJECTED ONTO THE CROSS SECTION

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	30

LINE 15.4

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.

-RESIDUAL-
Ⓑ

-WEATHERED ROCK-
(MICA SCHIST)

-CRYSTALLINE ROCK-
(MICA SCHIST)

EXISTING GROUND

-ROADWAY EMBANKMENT-
Ⓐ

-CRYSTALLINE ROCK-
(MICA SCHIST)

-RESIDUAL-
STIFF TO HARD, MOIST, TAN, FINE SANDY SILT (A-4)

-CRYSTALLINE ROCK-
(MICA SCHIST)

Ⓐ -ROADWAY EMBANKMENT- VERY STIFF, MOIST, TAN, FINE SANDY SILT (A-4), WITH LITTLE GRAVEL

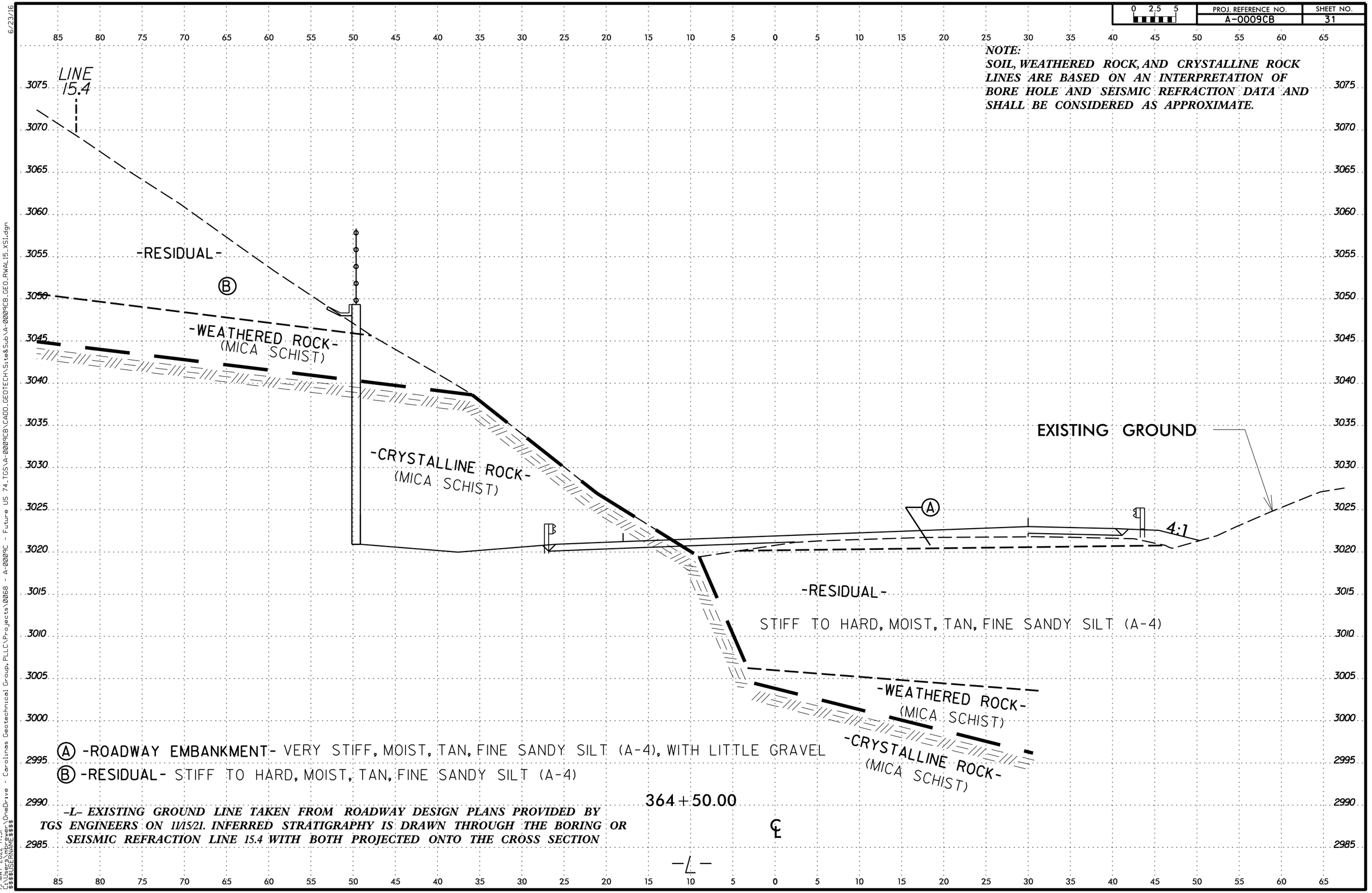
Ⓑ -RESIDUAL- STIFF TO HARD, MOIST, TAN, FINE SANDY SILT (A-4)

364+00.00
℄
—L—

–L– EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING OR SEISMIC REFRACTION LINE 15.4 WITH BOTH PROJECTED ONTO THE CROSS SECTION

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	31

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.



Ⓐ -ROADWAY EMBANKMENT- VERY STIFF, MOIST, TAN, FINE SANDY SILT (A-4), WITH LITTLE GRAVEL

Ⓑ -RESIDUAL- STIFF TO HARD, MOIST, TAN, FINE SANDY SILT (A-4)

-L- EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING OR SEISMIC REFRACTION LINE 15.4 WITH BOTH PROJECTED ONTO THE CROSS SECTION

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	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.

LINE 15.5

-RESIDUAL-

Ⓑ

-WEATHERED ROCK-
(MICA SCHIST)

-CRYSTALLINE ROCK-
(MICA SCHIST)

EXISTING WALL WITH HORIZONTAL DRAINS

L_3650IL
365+01
4' LT

EXISTING GROUND

-ROADWAY EMBANKMENT-
Ⓐ

-RESIDUAL-
STIFF TO HARD, MOIST, TAN, FINE SANDY SILT (A-4)

-WEATHERED ROCK-
(MICA SCHIST)

-CRYSTALLINE ROCK-
(MICA SCHIST)

9	
39	
96	
45	08/21
100/0.3	
100/0.2	
60/0.0	

BT

Ⓐ -ROADWAY EMBANKMENT- VERY STIFF, MOIST, TAN, FINE SANDY SILT (A-4), WITH LITTLE GRAVEL

Ⓑ -RESIDUAL- STIFF TO HARD, MOIST, TAN, FINE SANDY SILT (A-4)

–L– EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING OR SEISMIC REFRACTION LINE 15.5 WITH BOTH PROJECTED ONTO THE CROSS SECTION

365+00.00

℄

–L–

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	33

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.

LINE 15.5

-RESIDUAL-
Ⓑ
-WEATHERED ROCK-
(MICA SCHIST)
-CRYSTALLINE ROCK-
(MICA SCHIST)

EXISTING WALL WITH HORIZONTAL DRAINS

EXISTING GROUND

-ROADWAY EMBANKMENT-
Ⓐ

-RESIDUAL-
STIFF TO HARD, MOIST, TAN, FINE SANDY SILT (A-4)

-WEATHERED ROCK-
(MICA SCHIST)

-CRYSTALLINE ROCK-
(MICA SCHIST)

Ⓐ -ROADWAY EMBANKMENT- VERY STIFF, MOIST, TAN, FINE SANDY SILT (A-4), WITH LITTLE GRAVEL

Ⓑ -RESIDUAL- STIFF TO HARD, MOIST, TAN, FINE SANDY SILT (A-4)

-L- EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING OR SEISMIC REFRACTION LINE 15.5 WITH BOTH PROJECTED ONTO THE CROSS SECTION

365+50.00
℄
-L-

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	34

LINE 15.5

-RESIDUAL-

Ⓑ

-WEATHERED ROCK-
(META-SANDSTONE)

-CRYSTALLINE ROCK-
(META-SANDSTONE)

EXISTING WALL WITH HORIZONTAL DRAINS

EXISTING GROUND

3:1

-ROADWAY EMBANKMENT-

Ⓐ

-RESIDUAL-
STIFF TO HARD, MOIST, TAN, FINE SANDY SILT (A-4)

-WEATHERED ROCK-
(META-SANDSTONE)

-CRYSTALLINE ROCK-
(META-SANDSTONE)

366+00.00

℄

—L—

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.

Ⓐ -ROADWAY EMBANKMENT- VERY STIFF, MOIST, TAN, FINE SANDY SILT (A-4), WITH LITTLE GRAVEL

Ⓑ -RESIDUAL- STIFF TO HARD, MOIST, TAN, FINE SANDY SILT (A-4)

–L– EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING OR SEISMIC REFRACTION LINE 15.5 WITH BOTH PROJECTED ONTO THE CROSS SECTION

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.

LINE 15.5

-RESIDUAL-

Ⓐ

-WEATHERED ROCK-
(META-SANDSTONE)

-CRYSTALLINE ROCK-
(META-SANDSTONE)

EXISTING WALL WITH HORIZONTAL DRAINS

RWAL16_B-1
366+70
29' RT

PAVEMENT

EXISTING GROUND

2:1

-ROADWAY EMBANKMENT-
MEDIUM DENSE TO DENSE, MOIST, GRAY-BROWN-YELLOW-RED, SILTY, GRAVELLY FINE TO COARSE SAND (A-1-B) AND SILTY FINE TO COARSE SAND (A-2-4), WITH TRACE GRAVEL

-WEATHERED ROCK-
(META-SANDSTONE)

-CRYSTALLINE ROCK-
(META-SANDSTONE)

-RESIDUAL-
MEDIUM DENSE TO VERY DENSE, MOIST, BROWN-GRAY, SILTY FINE TO COARSE SAND (A-2-4), WITH TRACE GRAVEL-SIZED ROCK FRAGMENTS

17	
34	
34	
12	
20	
60	
94	
100/0.5	
100/0.3	
60/0.1	

BT
DRY
FIAD
04/21

Ⓐ -RESIDUAL- STIFF TO HARD, MOIST, TAN, FINE SANDY SILT (A-4)

366+50.00

℄

-L-

-L- EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING OR SEISMIC REFRACTION LINE 15.5 WITH BOTH PROJECTED ONTO THE CROSS SECTION

3085 3080 3075 3070 3065 3060 3055 3050 3045 3040 3035 3030 3025 3020 3015 3010 3005 3000 2995

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	36

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.

LINE 15.5

RETAINING WALL #15

-RESIDUAL-
Ⓐ

-WEATHERED ROCK-
(META-SANDSTONE)

EXISTING WALL WITH HORIZONTAL DRAINS

L_36707L
367+07
8' LT

32
14
12
21
100/0.9
60/0.0
BT
DRY
08/21

-ROADWAY EMBANKMENT-
MEDIUM DENSE TO DENSE, MOIST, TAN, SILTY FINE SAND (A-2-4), WITH LITTLE GRAVEL

RETAINING WALL #16

EXISTING GROUND

-RESIDUAL-
MEDIUM DENSE TO VERY DENSE, MOIST, BROWN-GRAY, SILTY FINE TO COARSE SAND (A-2-4), WITH TRACE GRAVEL-SIZED ROCK FRAGMENTS

-WEATHERED ROCK-
(META-SANDSTONE)

-CRYSTALLINE ROCK-
(META-SANDSTONE)

367+00.00

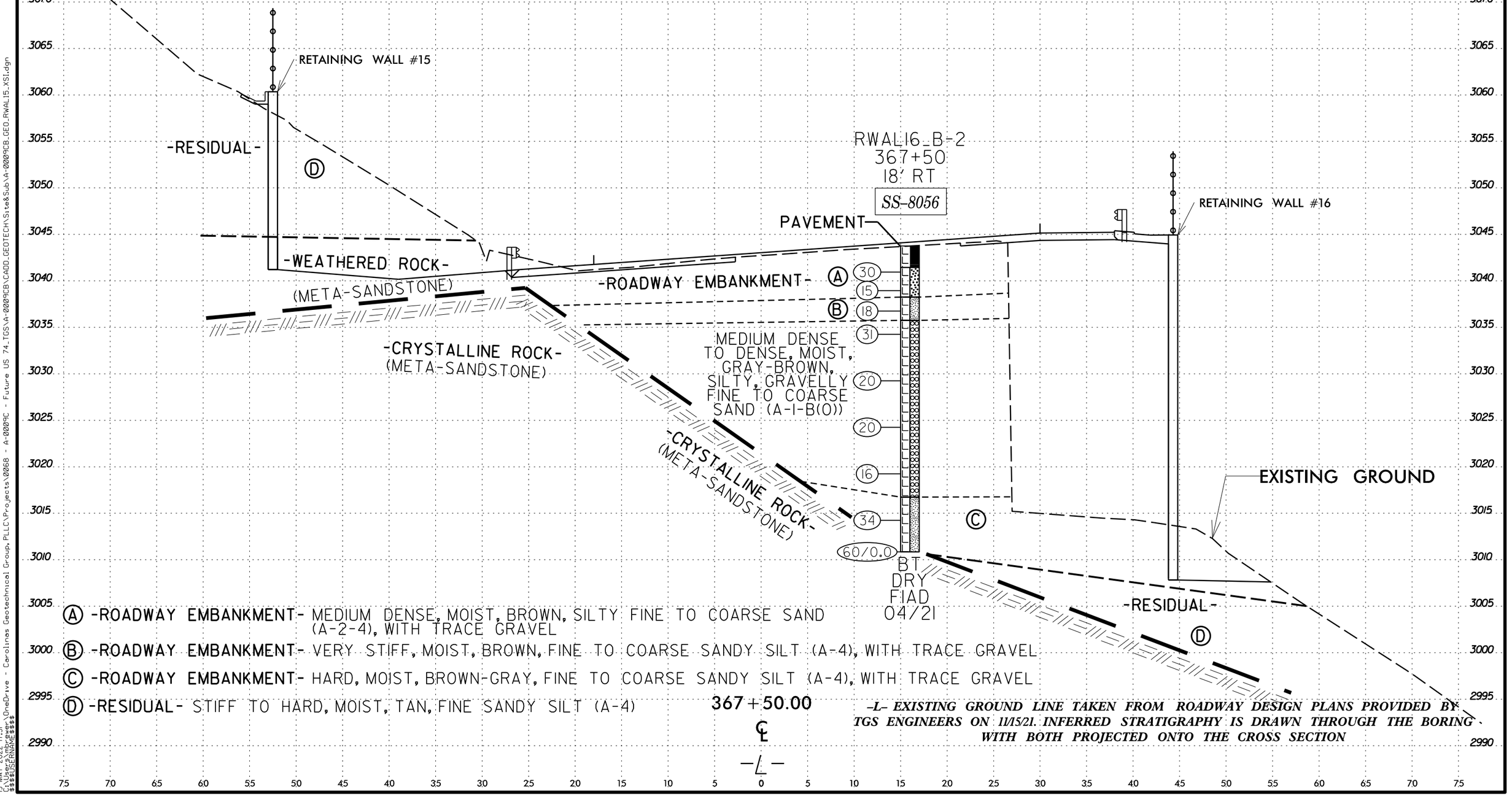
℄

Ⓐ -RESIDUAL- STIFF TO HARD, MOIST, TAN, FINE SANDY SILT (A-4)

-L- EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING OR SEISMIC REFRACTION LINE 15.5 WITH BOTH PROJECTED ONTO THE CROSS SECTION

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-8056	18' RT	367+50 -L-	13.5' – 15.0'	A-1-b(0)	25	NP	26	24	32	17	34	27	20	8	–



Ⓐ -ROADWAY EMBANKMENT- MEDIUM DENSE, MOIST, BROWN, SILTY FINE TO COARSE SAND (A-2-4), WITH TRACE GRAVEL

Ⓑ -ROADWAY EMBANKMENT- VERY STIFF, MOIST, BROWN, FINE TO COARSE SANDY SILT (A-4), WITH TRACE GRAVEL

Ⓒ -ROADWAY EMBANKMENT- HARD, MOIST, BROWN-GRAY, FINE TO COARSE SANDY SILT (A-4), WITH TRACE GRAVEL

Ⓓ -RESIDUAL- STIFF TO HARD, MOIST, TAN, FINE SANDY SILT (A-4)

367+50.00
℄
-L-

-L- EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING WITH BOTH PROJECTED ONTO THE CROSS SECTION

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-4152	18' RT	368+25 -L-	33.5' - 35.0'	A-4(1)	29	4	19	22	31	28	92	80	61	21	-

RWAL16_B-3
368+25
18' RT
SS-4152

RETAINING WALL #15

RETAINING WALL #16

PAVEMENT

1.5:1

-ROADWAY EMBANKMENT-

-RESIDUAL-
VERY DENSE, DRY, GRAY-TAN-BROWN, SILTY, GRAVELLY FINE TO COARSE SAND (A-1-B)

-WEATHERED ROCK-
(META-SANDSTONE)

-CRYSTALLINE ROCK-
(META-SANDSTONE)

MEDIUM DENSE TO VERY DENSE, MOIST, TAN-ORANGE-BROWN, SILTY FINE TO COARSE SAND (A-2-4) AND SILTY, CLAYEY FINE TO COARSE SAND (A-2-6) WITH TRACE TO LITTLE GRAVEL

MEDIUM STIFF, MOIST, TAN-ORANGE-BROWN, FINE TO

49	A
13	
100/0.3	
16	
22	
53	
20	
9	C
5	
62	
60/0.0	
60/0.0	

EXISTING GROUND

COARSE SANDY SILT (A-4(1)), WITH TRACE GRAVEL -COLLUVIAL-

BT
DRY
FIAD
04/21

Ⓐ -ROADWAY EMBANKMENT- DENSE, MOIST, TAN-GRAY-BROWN, SILTY FINE TO COARSE SAND (A-2-4), WITH LITTLE GRAVEL

Ⓑ -ROADWAY EMBANKMENT- STIFF TO HARD, MOIST, TAN-ORANGE-BROWN, FINE TO COARSE SANDY SILT (A-4), WITH LITTLE GRAVEL AND TRACE MICA

Ⓒ -ROADWAY EMBANKMENT- STIFF, MOIST, GRAY-TAN, FINE TO COARSE SANDY SILT (A-4), WITH TRACE TO LITTLE ORGANICS

368+35.00
℄
-L-

-L- EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING WITH BOTH PROJECTED ONTO THE CROSS SECTION

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 32572.1.FS10	**TIP** A-0009CB	**COUNTY** GRAHAM	**GEOLOGIST** D. Goodnight	
SITE DESCRIPTION Upgrade NC 143 from SR 1223 (Beech Creek Road) to 0.5 Miles North of Appalachian Trail				**GROUND WTR (ft)**
BORING NO. RWAL15_B-1	**STATION** 352+26	**OFFSET** 26 ft LT	**ALIGNMENT** L	**0 HR.** Dry
COLLAR ELEV. 2,932.0 ft	**TOTAL DEPTH** 6.1 ft	**NORTHING** 621,176	**EASTING** 593,616	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE FME9553 CME-550X 80% 03/12/2021		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Phillips	**START DATE** 08/11/21	**COMP. DATE** 08/11/21	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
2935										ELEV. (ft) DEPTH (ft)
										2,932.0 GROUND SURFACE 0.0
2930	2,931.0	1.0	5	7	8	15		M		**RESIDUAL** Stiff to Hard, Tan, Fine to Coarse Sandy SILT (A-4), with little gravel-sized rock fragments
	2,928.5	3.5	23	26	30	56		M		2,926.5 5.5
	2,925.9	6.1	60/0.0			60/0.0				2,925.9 6.1 **CRYSTALLINE ROCK** Light Gray, (META-SANDSTONE) Boring Terminated with Standard Penetration Test Refusal at Elevation 2,925.9 ft In Crystalline Rock (META-SANDSTONE)

WBS 32572.1.FS10	**TIP** A-0009CB	**COUNTY** GRAHAM	**GEOLOGIST** C. Piercy	
SITE DESCRIPTION Upgrade NC 143 from SR 1223 (Beech Creek Road) to 0.5 Miles North of Appalachian Trail				**GROUND WTR (ft)**
BORING NO. RWAL16_B-1	**STATION** 366+70	**OFFSET** 29 ft RT	**ALIGNMENT** L	**0 HR.** Dry
COLLAR ELEV. 3,038.6 ft	**TOTAL DEPTH** 38.6 ft	**NORTHING** 619,819	**EASTING** 593,196	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE BRE9533 CME-550X 78% 03/12/2021		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Phillips	**START DATE** 04/27/21	**COMP. DATE** 04/27/21	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
3040										
										3,038.6 GROUND SURFACE 0.0
	3,036.9	1.7	16	9	8	17		M		**ROADWAY EMBANKMENT** Asphalt (1.7') 1.7
3035	3,035.1	3.5	6	13	21	34		M		3,035.1 Medium Dense, Gray-Brown, Silty, Gravelly Fine to Coarse SAND (A-1-b) 3.5
	3,032.6	6.0	38	21	13	34		M		Medium Dense to Dense, Yellow-Red-Brown-Gray, Silty Fine to Coarse SAND (A-2-4), with trace gravel
3030	3,030.1	8.5	6	6	6	12		M		
3025	3,025.1	13.5	8	10	10	20		M		3,026.6 12.0 **RESIDUAL** Medium Dense to Very Dense, Brown-Gray, Silty Fine to Coarse SAND (A-2-4), with trace gravel-sized rock fragments
3020	3,020.1	18.5	22	32	28	60		M		
3015	3,015.1	23.5	8	27	67	94		M		
3010	3,010.1	28.5	100/0.5			100/0.5				3,010.1 28.5 **WEATHERED ROCK** Gray-Brown, (META-SANDSTONE)
3005	3,005.1	33.5	100/0.3			100/0.3				
3000	3,000.1	38.5	60/0.1			60/0.1				3,000.1 38.5 3,000.0 38.6 **CRYSTALLINE ROCK** Gray-Brown, (META-SANDSTONE) Boring Terminated with Standard Penetration Test Refusal at Elevation 3,000.0 ft In Crystalline Rock (META-SANDSTONE)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 32572.1.FS10	**TIP** A-0009CB	**COUNTY** GRAHAM	**GEOLOGIST** D. Goodnight	
SITE DESCRIPTION Upgrade NC 143 from SR 1223 (Beech Creek Road) to 0.5 Miles North of Appalachian Trail				**GROUND WTR (ft)**
BORING NO. L_36707L	**STATION** 367+07	**OFFSET** 8 ft LT	**ALIGNMENT** L	**0 HR.** Dry
COLLAR ELEV. 3,038.7 ft	**TOTAL DEPTH** 16.1 ft	**NORTHING** 619,775	**EASTING** 593,225	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE FME9553 CME-550X 80% 03/12/2021		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Phillips	**START DATE** 08/12/21	**COMP. DATE** 08/12/21	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
3040										
	3,038.7									3,038.7 GROUND SURFACE 0.0
	3,037.7	1.0								**ROADWAY EMBANKMENT**
			15	17	15	32		M		Medium Dense to Dense, Tan, Silty Fine
3035	3,035.2	3.5								SAND (A-2-4), with little gravel
			3	7	7	14		M		
	3,032.7	6.0								
			4	7	5	12		M		
3030	3,030.2	8.5								
			5	10	11	21		M		
3025	3,025.2	13.5								
			9	91/0.4		100/0.9				3,024.7 14.0
	3,022.6	16.1	60/0.0			60/0.0				**WEATHERED ROCK**
										3,022.6 Tan-Gray, (META-SANDSTONE) 16.1
										Boring Terminated with Standard Penetration Test Refusal at Elevation 3,022.6 ft On Crystalline Rock (META-SANDSTONE)

WBS 32572.1.FS10	**TIP** A-0009CB	**COUNTY** GRAHAM	**GEOLOGIST** D. Goodnight	
SITE DESCRIPTION Upgrade NC 143 from SR 1223 (Beech Creek Road) to 0.5 Miles North of Appalachian Trail				**GROUND WTR (ft)**
BORING NO. RWAL15_B-2	**STATION** 353+26	**OFFSET** 1 ft RT	**ALIGNMENT** L	**0 HR.** Dry
COLLAR ELEV. 2,942.2 ft	**TOTAL DEPTH** 19.0 ft	**NORTHING** 621,091	**EASTING** 593,556	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE FME9553 CME-550X 80% 03/12/2021		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Phillips	**START DATE** 08/11/21	**COMP. DATE** 08/11/21	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
2945										
										2,942.2 GROUND SURFACE 0.0
	2,941.2	1.0								**RESIDUAL**
			62	36	25	61		M		Medium Dense to Very Dense, Gray-White,
2940	2,938.7	3.5								Silty, Fine to Coarse Sandy GRAVEL
			11	8	15	23		M		(A-1-a)
	2,936.2	6.0								2,936.3 5.9
			26	74/0.4		100/0.9				**WEATHERED ROCK**
2935	2,933.7	8.5								2,934.2 Gray, (META-SANDSTONE) 8.0
			19	18	10	28		M		**RESIDUAL**
										Medium Dense, Tan, Silty Fine SAND
2930										(A-2-4)
	2,928.7	13.5								2,928.2 14.0
			7	30	70/0.4	100/0.9				**WEATHERED ROCK**
2925										Gray, (META-SANDSTONE)
	2,923.7	18.5								2,923.2 19.0
	2,923.2	19.0	100/0.4			100/0.4				Boring Terminated with Standard
			60/0.0			60/0.0				Penetration Test Refusal at Elevation 2,923.2 ft On Crystalline Rock (META-SANDSTONE)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 32572.1.FS10	**TIP** A-0009CB	**COUNTY** GRAHAM	**GEOLOGIST** D. Goodnight	
SITE DESCRIPTION Upgrade NC 143 from SR 1223 (Beech Creek Road) to 0.5 Miles North of Appalachian Trail				**GROUND WTR (ft)**
BORING NO. L_35445L	**STATION** 354+45	**OFFSET** 1 ft LT	**ALIGNMENT** L	**0 HR.** Dry
COLLAR ELEV. 2,950.3 ft	**TOTAL DEPTH** 6.8 ft	**NORTHING** 620,979	**EASTING** 593,517	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE FME9553 CME-550X 80% 03/12/2021		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Phillips	**START DATE** 08/12/21	**COMP. DATE** 08/12/21	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
2955											
2950										2,950.3 GROUND SURFACE	0.0
	2,949.3	1.0	5	12	10	22		M		**ROADWAY EMBANKMENT** Medium Dense, Gray-Tan, Silty Fine SAND (A-2-4), with little gravel 2,947.7	2.6
	2,946.8	3.5	47	53/0.3		100/0.8				**WEATHERED ROCK** Tan-Gray, (META-SANDSTONE) 2,944.3	6.0
2945	2,944.3	6.0	60/0.1			60/0.0				**CRYSTALLINE ROCK** Gray, (META-SANDSTONE) 2,943.5	6.8
	2,943.5	6.8	60/0.0							Boring Terminated with Standard Penetration Test Refusal at Elevation 2,943.5 ft In Crystalline Rock (META-SANDSTONE)	

WBS 32572.1.FS10	**TIP** A-0009CB	**COUNTY** GRAHAM	**GEOLOGIST** C. Piercy	
SITE DESCRIPTION Upgrade NC 143 from SR 1223 (Beech Creek Road) to 0.5 Miles North of Appalachian Trail				**GROUND WTR (ft)**
BORING NO. RWAL16_B-2	**STATION** 367+50	**OFFSET** 18 ft RT	**ALIGNMENT** L	**0 HR.** Dry
COLLAR ELEV. 3,043.9 ft	**TOTAL DEPTH** 32.9 ft	**NORTHING** 619,735	**EASTING** 593,194	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE BRE9533 CME-550X 78% 03/12/2021		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Phillips	**START DATE** 04/27/21	**COMP. DATE** 04/27/21	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
3045										3,043.9 GROUND SURFACE 0.0
	3,041.6	2.3	27	19	11	30		M		**ROADWAY EMBANKMENT** Asphalt (2.3') 3,041.6 2.3
3040	3,040.1	3.8	6	7	8	15		M		Medium Dense, Brown, Silty Fine to Coarse SAND (A-2-4), with trace gravel 3,038.4 5.5
	3,037.9	6.0	7	10	8	18		M		Very Stiff, Brown, Fine to Coarse Sandy SILT (A-4), with trace gravel 3,035.9 8.0
3035	3,035.4	8.5	15	12	19	31		M		Medium Dense to Dense, Gray-Brown, Silty, Gravelly Fine to Coarse SAND (A-1-b(0))
3030	3,030.4	13.5	11	10	10	20	SS-8056	8%		
3025	3,025.4	18.5	9	9	11	20		M		
3020	3,020.4	23.5	8	7	9	16		M		
3015	3,015.4	28.5	25	23	11	34		M		Hard, Brown-Gray, Fine to Coarse Sandy SILT (A-4), with trace gravel 3,016.9 27.0
	3,011.0	32.9	60/0.0			60/0.0				3,011.0 32.9

Boring Terminated with Standard Penetration Test Refusal at Elevation 3,011.0 ft On Crystalline Rock (META-SANDSTONE)

Notes -

Boulders and/or Hard Drilling encountered infrequently at the following depths: 6.0 to 6.3 ft

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 32572.1.FS10	**TIP** A-0009CB	**COUNTY** GRAHAM	**GEOLOGIST** D. Goodnight	
SITE DESCRIPTION Upgrade NC 143 from SR 1223 (Beech Creek Road) to 0.5 Miles North of Appalachian Trail				**GROUND WTR (ft)**
BORING NO. L_35593L	**STATION** 355+93	**OFFSET** 6 ft LT	**ALIGNMENT** L	**0 HR.** Dry
COLLAR ELEV. 2,961.2 ft	**TOTAL DEPTH** 24.0 ft	**NORTHING** 620,834	**EASTING** 593,490	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE FME9553 CME-550X 80% 03/12/2021		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Phillips	**START DATE** 08/12/21	**COMP. DATE** 08/12/21	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
2965										
2960	2,960.2	1.0	9	9	33	42		M		2,961.2 — 0.0 GROUND SURFACE
	2,957.7	3.5	35	48	42	90		M		**ROADWAY EMBANKMENT** Medium Dense, Tan, Silty Fine SAND (A-2-4), with little gravel — 2,958.2 — 3.0
2955	2,955.2	6.0	23	34	65	99		M		**RESIDUAL** Hard, Tan-Gray, Fine Sandy SILT (A-4), with trace manganese oxide and gravel-sized rock fragments
	2,952.7	8.5	25	47	46	93		M		
2950										2,949.2 — 12.0 **WEATHERED ROCK** Tan, (MICA SCHIST)
	2,947.7	13.5	55	45/0.3		100/0.8				
2945										
	2,942.7	18.5	65	35/0.1		100/0.6				2,940.2 — 21.0 Tan-Gray, (META-SANDSTONE)
2940										
	2,937.7	23.5	100/0.5			100/0.5				2,937.2 — 24.0 Boring Terminated at Elevation 2,937.2 ft In Weathered Rock (META-SANDSTONE)

WBS 32572.1.FS10	**TIP** A-0009CB	**COUNTY** GRAHAM	**GEOLOGIST** N. McLaren	
SITE DESCRIPTION Upgrade NC 143 from SR 1223 (Beech Creek Road) to 0.5 Miles North of Appalachian Trail				**GROUND WTR (ft)**
BORING NO. RWAL16_B-3	**STATION** 368+25	**OFFSET** 18 ft RT	**ALIGNMENT** L	**0 HR.** Dry
COLLAR ELEV. 3,049.2 ft	**TOTAL DEPTH** 43.7 ft	**NORTHING** 619,659	**EASTING** 593,190	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE CG20446 Diedrich D50 83% 06/16/2020		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Estep	**START DATE** 04/27/21	**COMP. DATE** 04/27/21	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
3050										3,049.2 — 0.0 GROUND SURFACE
	3,047.2	2.0	66	28	21	49		M		**ROADWAY EMBANKMENT** Asphalt (1.7') and ABC (0.3') — 3,047.2 — 2.0
3045	3,045.7	3.5	4	6	7	13		M		Dense, Tan-Gray-Brown, Silty Fine to Coarse SAND (A-2-4), with little gravel — 3,045.7 — 3.5
	3,043.2	6.0	100/0.3			100/0.3				Stiff to Hard, Tan-Orange-Brown, Fine to Coarse Sandy SILT (A-4), with little gravel and trace mica — 3,041.2 — 8.0
3040	3,040.7	8.5	11	8	8	16		M		Medium Dense to Very Dense, Tan-Brown, Silty Fine to Coarse SAND (A-2-4), with trace to little gravel
	3,035.7	13.5	23	13	9	22		M		
3035										
	3,030.7	18.5	27	10	43	53		M		
3030										
	3,025.7	23.5	8	10	10	20		M		3,027.2 — 22.0 Medium Dense, Tan-Orange-Brown, Silty, Clayey Fine to Coarse SAND (A-2-6), with trace gravel
3025										
	3,020.7	28.5	5	4	5	9		M		3,022.2 — 27.0 Stiff, Gray-Tan, Fine to Coarse Sandy SILT (A-4), with trace to little organics
3020										
	3,015.7	33.5	2	2	3	5	SS-4152	21%		3,017.2 — 32.0 **COLLUVIAL** Medium Stiff, Tan-Orange-Brown, Fine to Coarse Sandy SILT (A-4(1)), with trace gravel
3015										3,012.2 — 37.0 **RESIDUAL** Very Dense, Gray-Tan-Brown, Silty, Gravelly Fine to Coarse SAND (A-1-b)
	3,010.7	38.5	27	13	49	62		D		
3010										
	3,005.7	43.5	60/0.0			60/0.0				3,005.7 — 43.5 **CRYSTALLINE ROCK** (META-SANDSTONE)
	3,005.5	43.7	60/0.0							3,005.5 — 43.7 Boring Terminated with Standard Penetration Test Refusal at Elevation 3,005.5 ft In Crystalline Rock (META-SANDSTONE)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS	TIP	COUNTY	GEOLOGIST
32572.1.FS10	A-0009CB	GRAHAM	D. Goodnight

SITE DESCRIPTION Upgrade NC 143 from SR 1223 (Beech Creek Road) to 0.5 Miles North of Appalachian Trail — **GROUND WTR (ft)**

BORING NO.	STATION	OFFSET	ALIGNMENT	0 HR.	24 HR.
L_35999L	359+99	2 ft LT	L	Dry	Dry

COLLAR ELEV.	TOTAL DEPTH	NORTHING	EASTING
2,990.5 ft	4.2 ft	620,429	593,477

DRILL RIG/HAMMER EFF./DATE FME9553 CME-550X 80% 03/12/2021 — **DRILL METHOD** H.S. Augers — **HAMMER TYPE** Automatic

DRILLER J. Phillips — **START DATE** 08/12/21 — **COMP. DATE** 08/12/21 — **SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
2995										
2990	2,989.5	1.0	2	7	13	20		M		2,990.5 GROUND SURFACE 0.0
	2,987.0	3.5	60/0.1			60/0.1				**ROADWAY EMBANKMENT** Very Stiff, Brown-Gray, Fine Sandy SILT (A-4), with little gravel
	2,986.3	4.2	60/0			60/0				2,987.0 3.5
										CRYSTALLINE ROCK Gray, (META-SANDSTONE)
										2,986.3 4.2
										Boring Terminated with Standard Penetration Test Refusal at Elevation 2,986.3 ft In Crystalline Rock (META-SANDSTONE)

WBS	TIP	COUNTY	GEOLOGIST
32572.1.FS10	A-0009CB	GRAHAM	D. Goodnight

SITE DESCRIPTION Upgrade NC 143 from SR 1223 (Beech Creek Road) to 0.5 Miles North of Appalachian Trail — **GROUND WTR (ft)**

BORING NO.	STATION	OFFSET	ALIGNMENT	0 HR.	24 HR.
L_36201	362+01	CL	L	Dry	16.0

COLLAR ELEV.	TOTAL DEPTH	NORTHING	EASTING
3,003.9 ft	17.9 ft	620,239	593,414

DRILL RIG/HAMMER EFF./DATE FME9553 CME-550X 80% 03/12/2021 — **DRILL METHOD** H.S. Augers — **HAMMER TYPE** Automatic

DRILLER J. Phillips — **START DATE** 08/12/21 — **COMP. DATE** 08/12/21 — **SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
3005										
	3,002.9	1.0	3	12	15	27		M		3,003.9 GROUND SURFACE 0.0
3000	3,000.4	3.5	15	37	40	77		M		**ROADWAY EMBANKMENT** Very Stiff, Tan, Fine Sandy SILT (A-4), with little gravel
	2,997.9	6.0	25	12	19	31		M		3,000.9 3.0
2995	2,995.4	8.5	85	15/0.1		100/0.6				**RESIDUAL** Hard, Tan, Fine Sandy SILT (A-4), with little gravel-sized rock fragments and trace manganese oxide
	2,990.4	13.5	21	79/0.1		100/0.6				2,995.9 8.0
	2,986.0	17.9	60/0.0			60/0.0				**WEATHERED ROCK** Tan-Gray, (META-SANDSTONE)
										2,986.0 17.9
										Boring Terminated with Standard Penetration Test Refusal at Elevation 2,986.0 ft On Crystalline Rock (META-SANDSTONE)

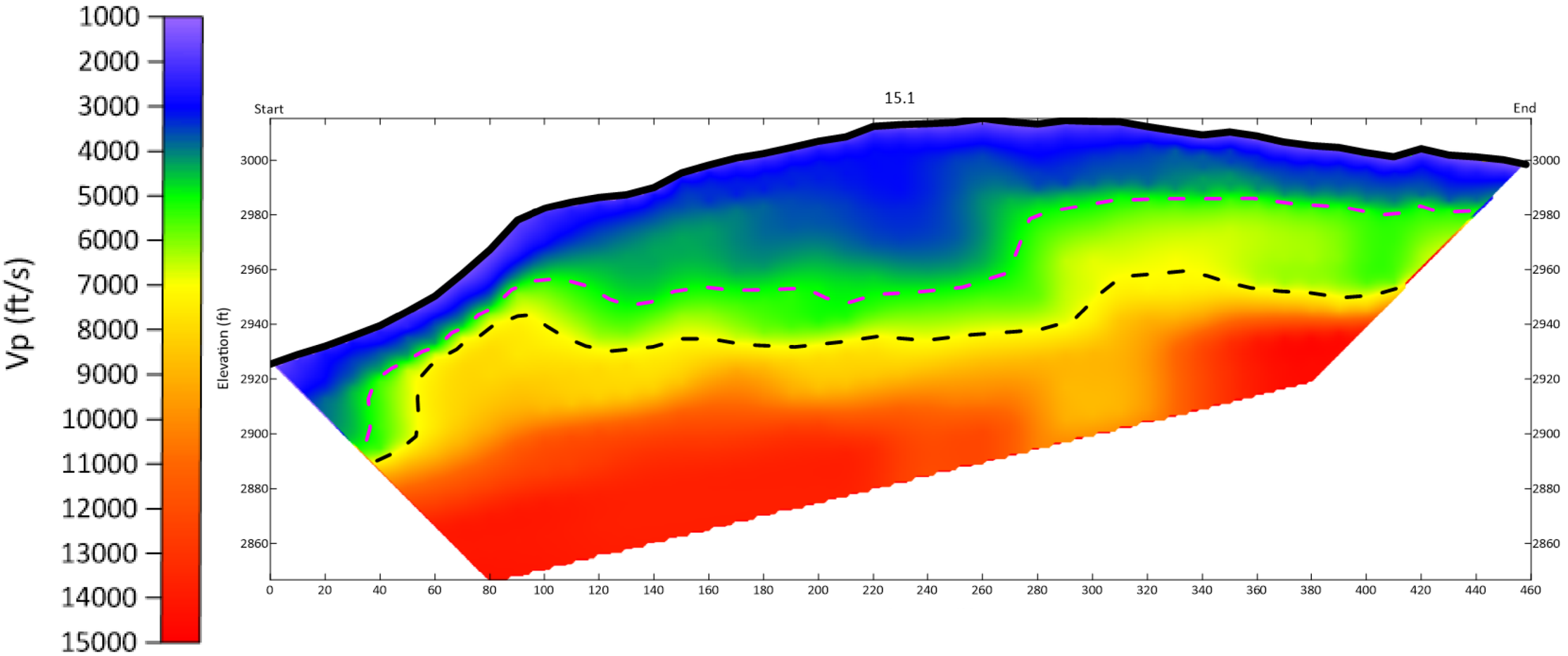
GEOTECHNICAL BORING REPORT
BORE LOG

WBS 32572.1.FS10	**TIP** A-0009CB	**COUNTY** GRAHAM	**GEOLOGIST** D. Goodnight	
SITE DESCRIPTION Upgrade NC 143 from SR 1223 (Beech Creek Road) to 0.5 Miles North of Appalachian Trail				**GROUND WTR (ft)**
BORING NO. L_36501L	**STATION** 365+01	**OFFSET** 4 ft LT	**ALIGNMENT** L	**0 HR.** 20.3
COLLAR ELEV. 3,023.6 ft	**TOTAL DEPTH** 23.5 ft	**NORTHING** 619,971	**EASTING** 593,281	**24 HR.** 2.7
DRILL RIG/HAMMER EFF./DATE FME9553 CME-550X 80% 03/12/2021		**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic
DRILLER J. Phillips	**START DATE** 08/12/21	**COMP. DATE** 08/12/21	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
3025										3,023.6 GROUND SURFACE	0.0
	3,022.6	1.0	3	3	6	9		M		**RESIDUAL** Stiff to Hard, Tan, Fine Sandy SILT (A-4)	
3020	3,020.1	3.5	9	19	20	39		M			
	3,017.6	6.0	19	31	65	96		M			
3015	3,015.1	8.5	17	27	18	45		M			
3010	3,010.1	13.5	17	30	70/0.3	100/0.3				3,009.6	14.0
3005	3,005.1	18.5	100/0.2			100/0.2				**WEATHERED ROCK** Tan, (MICA SCHIST)	
	3,000.1	23.5	60/0.0			60/0.0				3,000.1 Boring Terminated with Standard Penetration Test Refusal at Elevation 3,000.1 ft On Crystalline Rock (MICA SCHIST)	23.5

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	45

GEOPHYSICAL TEST RESULTS – SEISMIC REFRACTION LINE 15.1



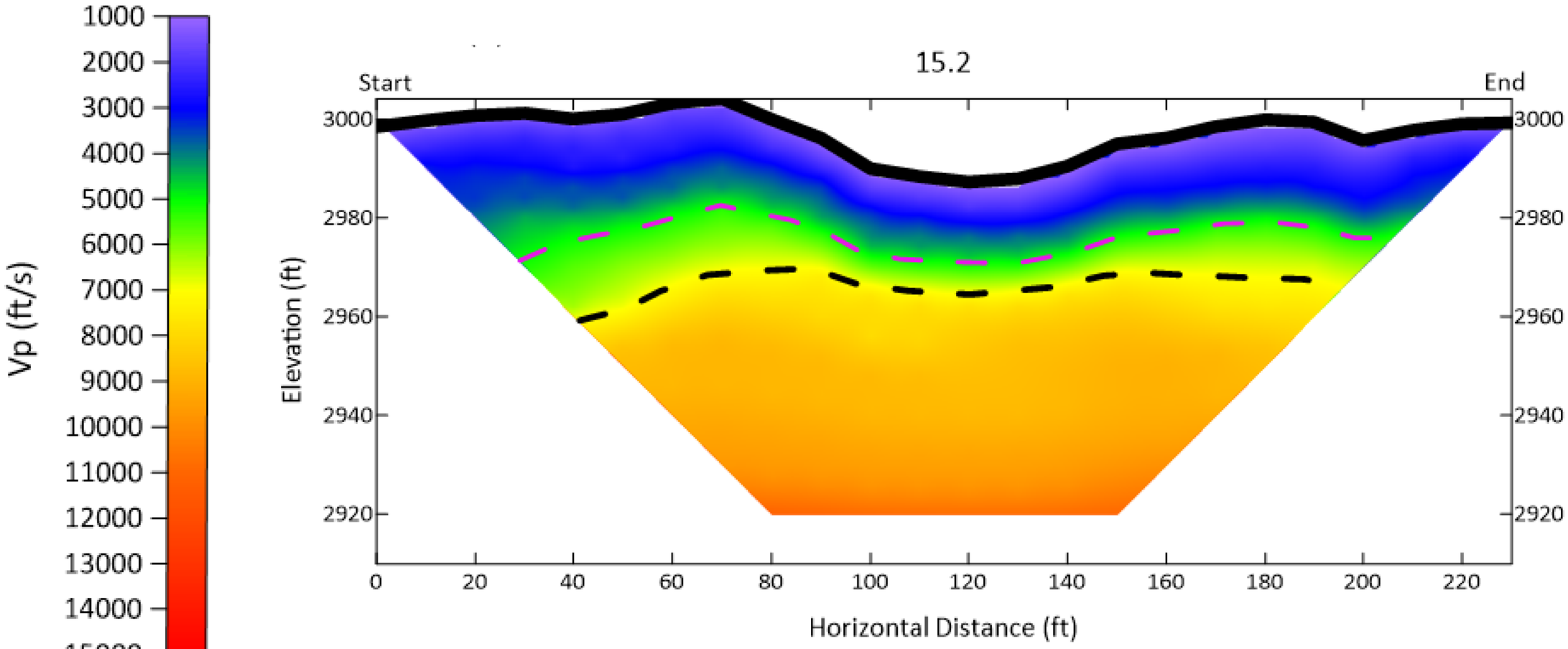
GEOPHYSICAL TESTING PERFORMED BY GEL SOLUTIONS. REFERENCE "SEISMIC REFRACTION SURVEY FOR EVALUATION OF ROCK" DATED 10/01/2021

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

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

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	46

GEOPHYSICAL TEST RESULTS – SEISMIC REFRACTION LINE 15.2



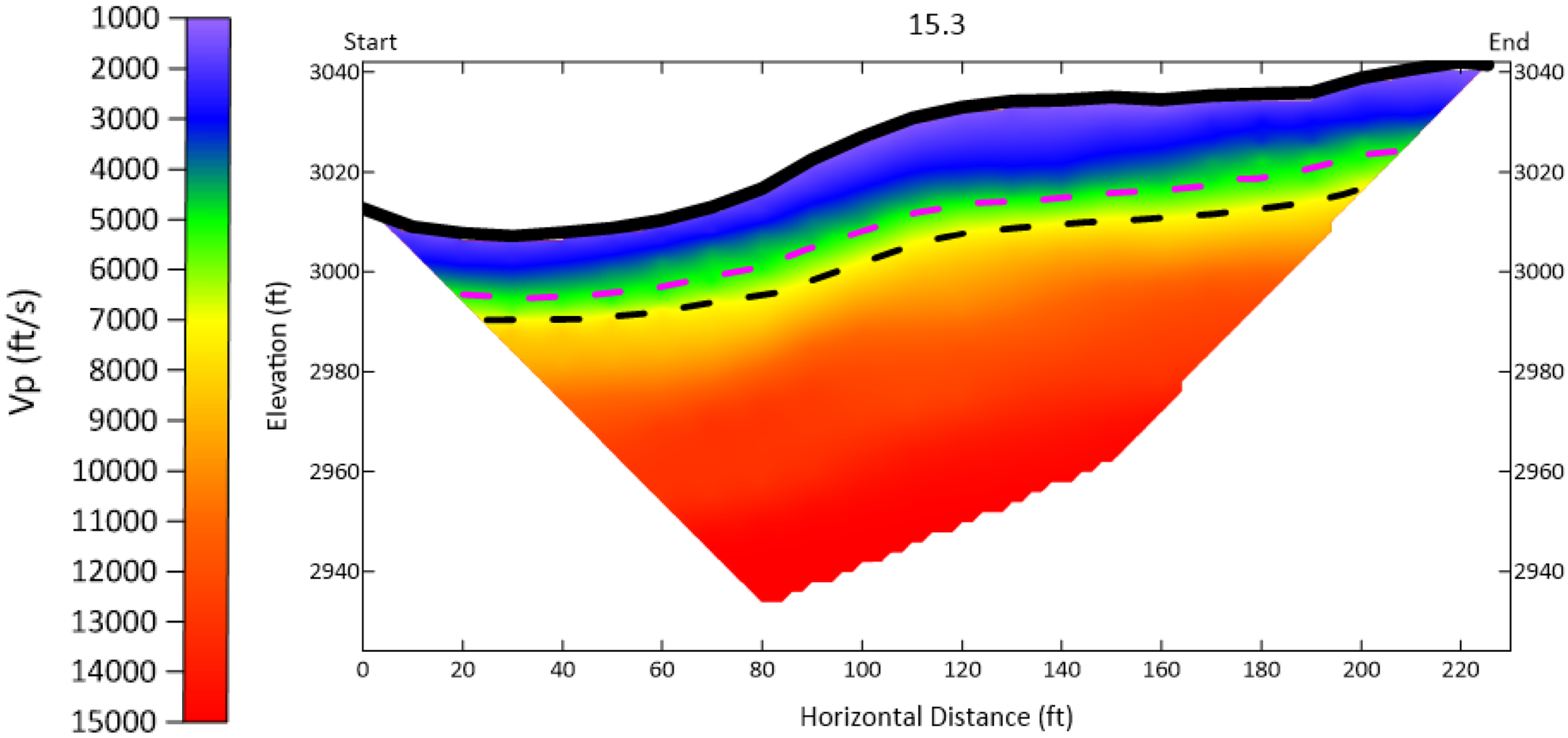
GEOPHYSICAL TESTING PERFORMED BY GEL SOLUTIONS. REFERENCE "SEISMIC REFRACTION SURVEY FOR EVALUATION OF ROCK" DATED 10/01/2021

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

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

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	47

GEOPHYSICAL TEST RESULTS – SEISMIC REFRACTION LINE 15.3



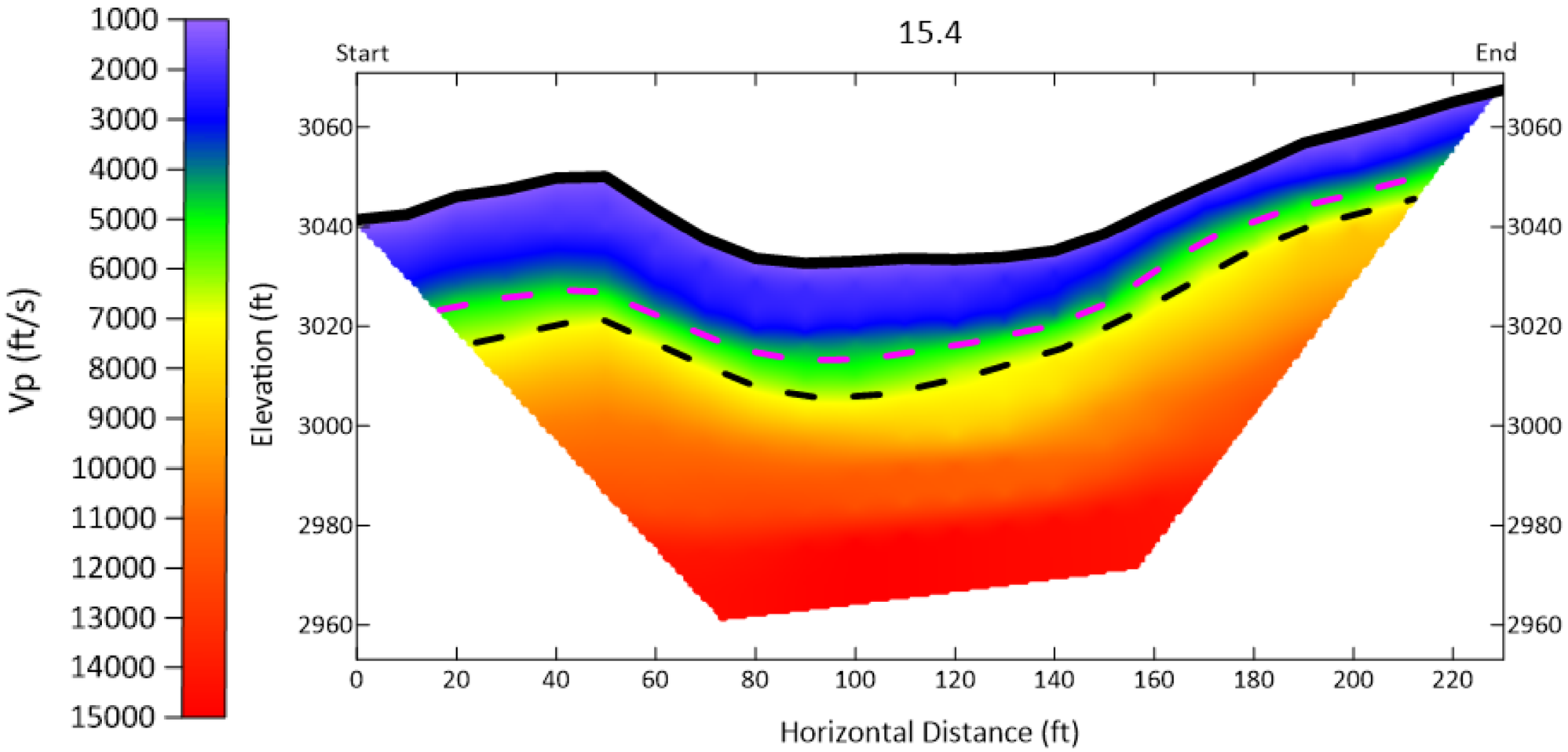
GEOPHYSICAL TESTING PERFORMED BY GEL SOLUTIONS. REFERENCE "SEISMIC REFRACTION SURVEY FOR EVALUATION OF ROCK" DATED 10/01/2021

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

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

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	48

GEOPHYSICAL TEST RESULTS – SEISMIC REFRACTION LINE 15.4



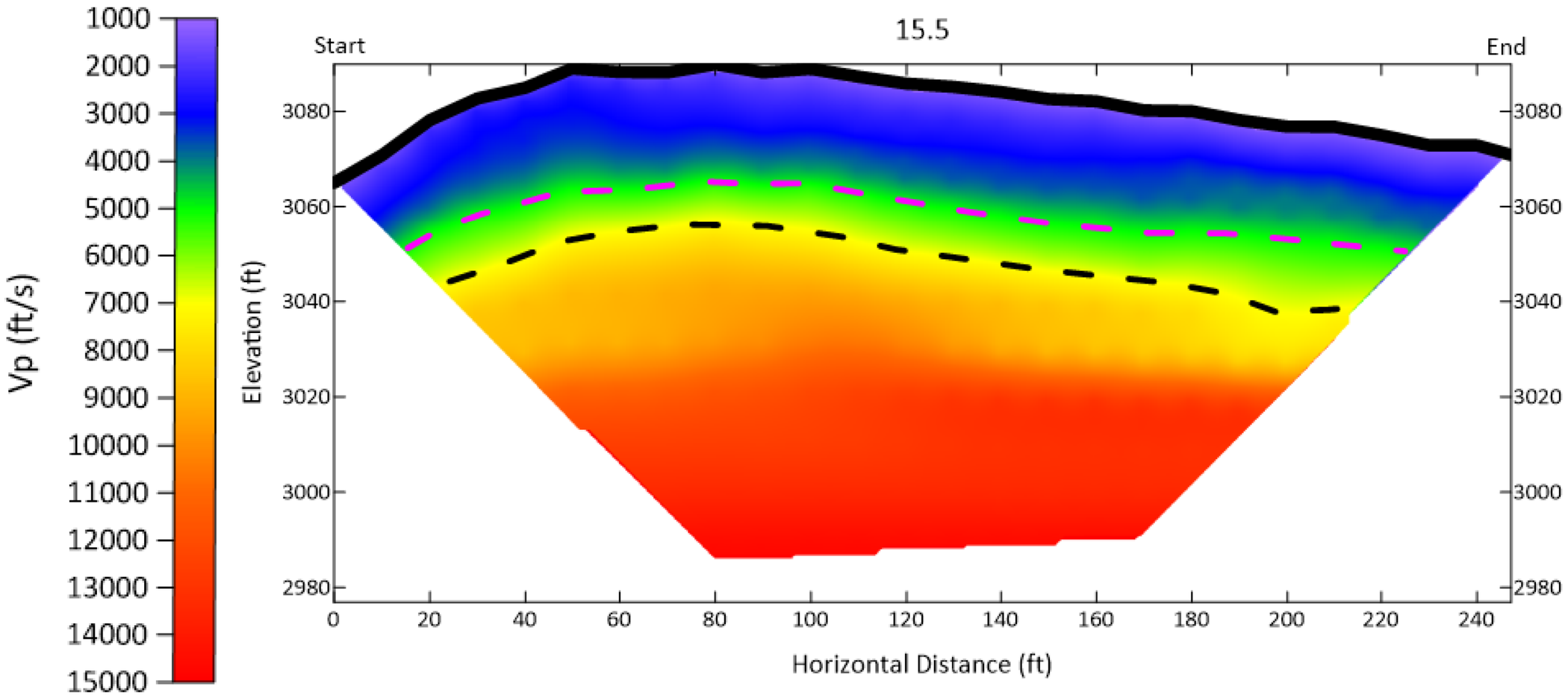
GEOPHYSICAL TESTING PERFORMED BY GEL SOLUTIONS. REFERENCE "SEISMIC REFRACTION SURVEY FOR EVALUATION OF ROCK" DATED 10/01/2021

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

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

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	49

GEOPHYSICAL TEST RESULTS – SEISMIC REFRACTION LINE 15.5



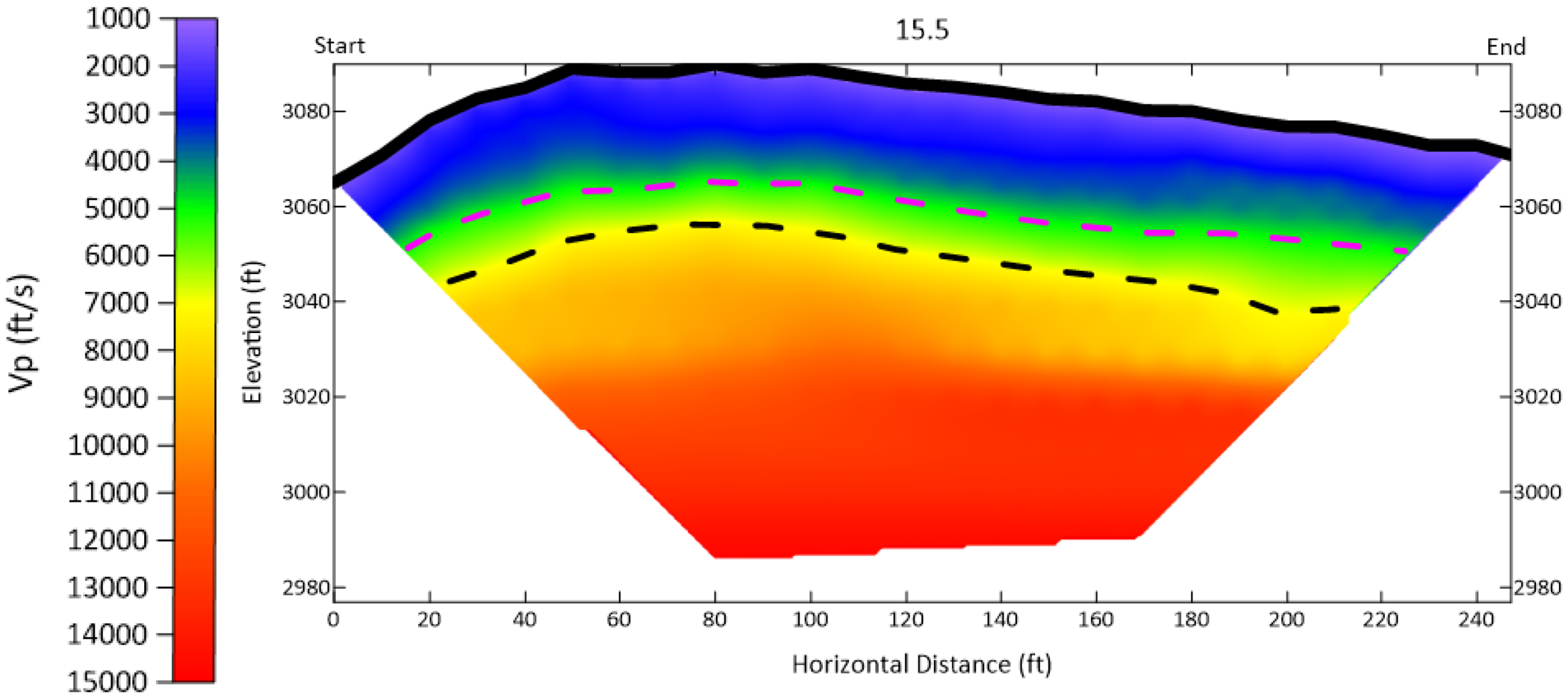
GEOPHYSICAL TESTING PERFORMED BY GEL SOLUTIONS. REFERENCE "SEISMIC REFRACTION SURVEY FOR EVALUATION OF ROCK" DATED 10/01/2021

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

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

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	49

GEOPHYSICAL TEST RESULTS – SEISMIC REFRACTION LINE 15.5



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

REFERENCE: A-0009CB

PROJECT: 32572.1.FS10

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	A-0009CB	1	15

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY *GRAHAM*

PROJECT DESCRIPTION *UPGRADE NC 143 FROM SR 1223 (BEECH CREEK ROAD) TO 0.5 MILES NORTH OF APPALACHIAN TRAIL*

SITE DESCRIPTION *RETAINING WALL #16: SHORED MECHANICALLY STABILIZED EARTH (SMSE) WALL ON -L- FROM 366+70 RT TO 369+72 RT*

CONTENTS

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:
1. 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.
2. 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

CG2 EXPLORATION

BRECCIA

N. MCLAREN

D. GOODNIGHT

C. PIERCY

GEL SOLUTIONS

INVESTIGATED BY *CG2*

DRAWN BY *M. BREWER, P.E.*

CHECKED BY *R. KRAL, P.E.*

SUBMITTED BY *M. BREWER, P.E.*

DATE *MAY 2022*

Prepared in the Office of:

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NORTH CAROLINA PROFESSIONAL SEAL 041986 ENGINEER D. MATTHEW BREWER

DocuSigned by:
D. Matthew Brewer
386129C0A4C1462...
SIGNATURE

6/7/2022
DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED 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

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5, A-7-6			
SYMBOL														
% PASSING #10 #40 #200	50 MX 30 MX 15 MX	50 MX 25 MX	51 MN 10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
MATERIAL PASSING #40 LL PI	— 6 MX		— NP	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	NO MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

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

CONSISTENCY OR DENSENESS

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

TEXTURE OR GRAIN SIZE

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

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

GRAIN SIZE	MM	305	75	2.0	0.25	0.05	0.005
	IN.	12	3				

SOIL MOISTURE - CORRELATION OF TERMS

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

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NON PLASTIC	0-5	VERY LOW
SLIGHTLY PLASTIC	6-15	SLIGHT
MODERATELY PLASTIC	16-25	MEDIUM
HIGHLY PLASTIC	26 OR MORE	HIGH

COLOR

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

GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
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.

ANGULARITY OF GRAINS

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

MINERALOGICAL COMPOSITION

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

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LL < 31
MODERATELY COMPRESSIBLE	LL = 31 - 50
HIGHLY COMPRESSIBLE	LL > 50

PERCENTAGE OF MATERIAL

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

GROUND WATER

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

MISCELLANEOUS SYMBOLS

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

RECOMMENDATION SYMBOLS

- UNDERCUT
- SHALLOW UNDERCUT
- UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE
- UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK
- UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL

ABBREVIATIONS

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

SAMPLE ABBREVIATIONS

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

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] CME-45C
- [ ] CME-550
- [X] CME-550X
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [X] DIEDRICH D50
- [ ] _____

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

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B _____ [ ] -H _____
- [ ] -N _____

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

ROCK DESCRIPTION

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:

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

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF*
VERY SEVERE (V 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.

ROCK HARDNESS

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

FRACTURE SPACING

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

BEDDING

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

INDURATION

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

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

TERMS AND DEFINITIONS

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

AQUIFER - A WATER BEARING FORMATION OR STRATA.

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

ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, 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 DISLODGED FROM PARENT MATERIAL.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

BENCH MARK: N/A

ELEVATION: FEET

NOTES:

SURVEY AND ROADWAY DESIGN FILES PROVIDED BY TGS ENGINEERS ON 11/15/2021

DATE: 8-15-14

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	3

SITE PLAN

0 100 200

FEET

NC GRID
NAD 83 NA 2011

365 370 380

WOODS

-L- PT 368+11.01

-L- PC 375+53.58

USFS BOUNDARY POST

BEGIN LINE RWAL15.5 15.5

END 15.5

BEGIN 17.1

LINE RWAL17.1

END 17.2

70° (FOLIATION)

ROCK OUTCROP 17

ROCK OUTCROP 18

ROCK OUTCROP 19

ROCK OUTCROP 20

NC 143 (SWEETWATER RD)
2# BST

CONC

MTL

18" CMP

GRAVEL

-L-

L_36707L

RWAL16_B-1

RWAL16_B-2

RWAL16_B-3

RWAL16_B-4

RWAL16_B-5

BARRIER WALL

8" HDPE

SIGN

BL-55

BL-56

GRELL TL-3

GRELL TL-2

BST SHOULDER

3+04.13

PROP. RETAINING WALL #16
W/9' WW WILDLIFE FENCE
BEGIN -L- STA. 366+70±
END -L- STA. 369+72±

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.

Prepared in the Office of: CAROLINAS GEOTECHNICAL GROUP

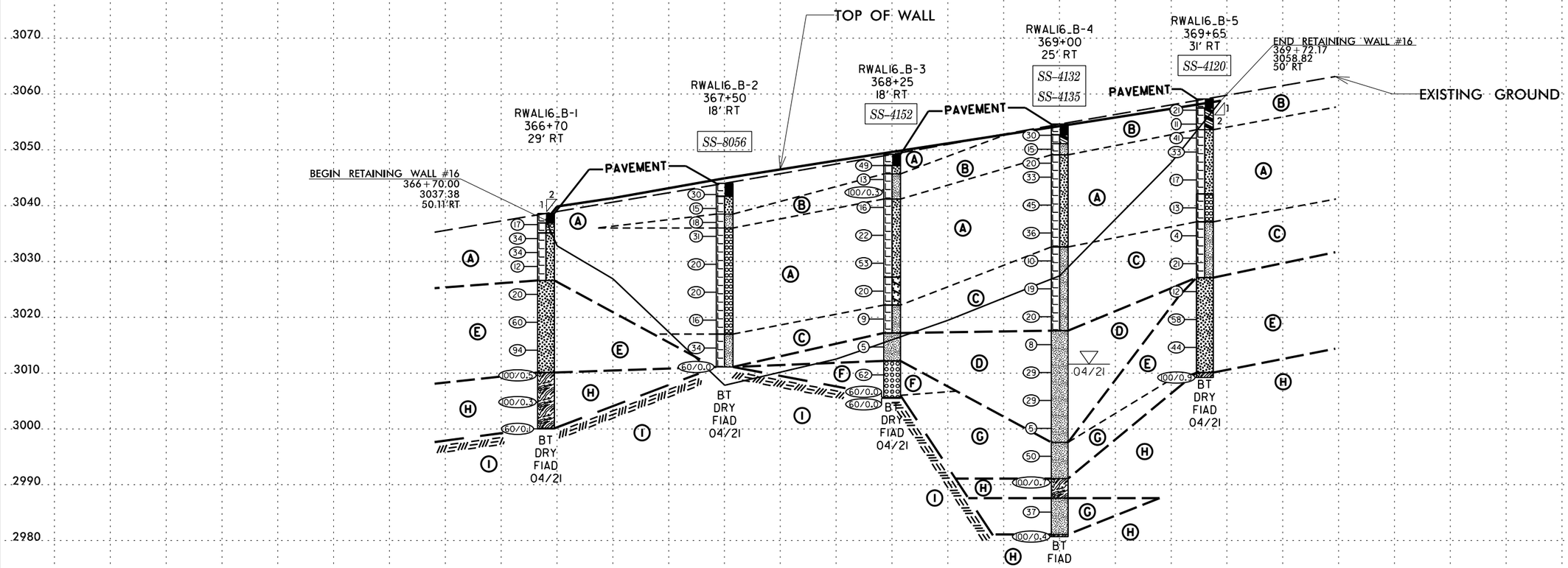
0 50 100
FEET
VE = 2.5:1

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	4

RETAINING WALL #16
PROFILE BORINGS PROJECTED ALONG WALL ENVELOPE

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C. SAND	% BY WEIGHT F. SAND	% BY WEIGHT SILT	% BY WEIGHT CLAY	% PASSING (SIEVES) 10	% PASSING (SIEVES) 40	% PASSING (SIEVES) 200	% MOISTURE	% ORGANIC
SS-8056	18' RT	367+50 -L-	13.5' - 15.0'	A-1-b(0)	25	NP	26	24	32	18	34	27	20	8	-
SS-4152	18' RT	368+25 -L-	33.5' - 35.0'	A-4(1)	29	4	19	22	31	28	92	80	61	21	-
SS-4132	25' RT	369+00 -L-	23.5' - 25.0'	A-4(0)	24	NP	25	27	30	18	100	83	56	5	-
SS-4135	25' RT	369+00 -L-	38.5' - 40.0'	A-4(0)	29	1	15	35	30	20	89	81	53	20	-
SS-4120	31' RT	369+65 -L-	23.5' - 25.0'	A-4(4)	40	7	21	18	34	27	96	81	64	28	-



Ⓐ **-ROADWAY EMBANKMENT-** MEDIUM DENSE TO VERY DENSE, DRY TO MOIST, GRAY-BROWN-YELLOW-RED-TAN-ORANGE, SILTY, GRAVELLY FINE TO COARSE SAND (A-1-B), SILTY FINE TO COARSE SAND (A-2-4), AND CLAYEY FINE TO COARSE SAND (A-2-6), WITH TRACE TO LITTLE GRAVEL

Ⓑ **-ROADWAY EMBANKMENT-** STIFF TO HARD, DRY TO MOIST, TAN-ORANGE-BROWN-GRAY, FINE TO COARSE SANDY SILT (A-4) AND SILTY, FINE TO COARSE SANDY CLAY (A-6), WITH TRACE TO LITTLE GRAVEL AND TRACE MICA

Ⓒ **-ROADWAY EMBANKMENT-** SOFT TO HARD, MOIST, BROWN-GRAY-TAN-ORANGE, FINE TO COARSE SANDY SILT (A-4), WITH TRACE TO LITTLE GRAVEL AND ORGANICS

Ⓓ **-COLLUVIAL-** MEDIUM STIFF TO VERY STIFF, MOIST, TAN-ORANGE-BROWN-GRAY, FINE TO COARSE SANDY SILT (A-4), WITH TRACE MICA AND GRAVEL

Ⓔ **-RESIDUAL-** MEDIUM DENSE TO VERY DENSE, MOIST, BROWN-GRAY-TAN-ORANGE, SILTY FINE TO COARSE SAND (A-2-4), WITH TRACE GRAVEL-SIZED ROCK FRAGMENTS AND MICA

Ⓕ **-RESIDUAL-** VERY DENSE, DRY, GRAY-TAN-BROWN, SILTY, GRAVELLY FINE TO COARSE SAND (A-1-B)

Ⓖ **-RESIDUAL-** HARD, MOIST TO WET, TAN-ORANGE-GRAY, FINE TO COARSE SANDY SILT (A-4), WITH TRACE MICA AND GRAVEL-SIZED ROCK FRAGMENTS

Ⓗ **-WEATHERED ROCK-** (META-SANDSTONE)

Ⓘ **-CRYSTALLINE ROCK-** (META-SANDSTONE)

WALL ENVELOPE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING WITH BOTH PROJECTED ONTO THE PROFILE.

364+50 365+00 365+50 366+00 366+50 367+00 367+50 368+00 368+50 369+00 369+50 370+00 370+50 371+00 371+50

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	5

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.

LINE 15.5

RETAINING WALL #15
(INVENTORY UNDER SEPARATE COVER)

-RESIDUAL-

Ⓐ

-WEATHERED ROCK-
(META-SANDSTONE)

-CRYSTALLINE ROCK-
(META-SANDSTONE)

RWAL16_B-1
366+70
29' RT

PAVEMENT

EXISTING GROUND

2:1

-ROADWAY EMBANKMENT-
MEDIUM DENSE TO DENSE, MOIST, GRAY-BROWN-YELLOW-RED, SILTY, GRAVELLY FINE TO COARSE SAND (A-1-B) AND SILTY FINE TO COARSE SAND (A-2-4), WITH TRACE GRAVEL

-RESIDUAL-
MEDIUM DENSE TO VERY DENSE, MOIST, BROWN-GRAY, SILTY FINE TO COARSE SAND (A-2-4), WITH TRACE GRAVEL-SIZED ROCK FRAGMENTS

17	
34	
34	
12	
20	
60	
94	
100/0.5	
100/0.3	
60/0.1	

BT
DRY
FIAD
04/21

Ⓐ -RESIDUAL- STIFF TO HARD, MOIST, TAN, FINE SANDY SILT (A-4)

366+50.00

℄

-L- EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING OR SEISMIC REFRACTION LINE 15.5 WITH BOTH PROJECTED ONTO THE CROSS SECTION

-L-

3080 3075 3070 3065 3060 3055 3050 3045 3040 3035 3030 3025 3020 3015 3010 3005 3000 2995

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	6

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.

LINE 15.5

RETAINING WALL #15
(INVENTORY UNDER SEPARATE COVER)

-RESIDUAL-
Ⓐ

-WEATHERED ROCK-
(META-SANDSTONE)

L_36707L
367+07
8' LT

32
14
12
21
100/0.9
60/0.0

BT
DRY
08/21

-ROADWAY EMBANKMENT-
MEDIUM DENSE TO DENSE, MOIST, TAN, SILTY FINE SAND (A-2-4), WITH LITTLE GRAVEL

RETAINING WALL #16

EXISTING GROUND

-RESIDUAL-
MEDIUM DENSE TO VERY DENSE, MOIST, BROWN-GRAY, SILTY FINE TO COARSE SAND (A-2-4), WITH TRACE GRAVEL-SIZED ROCK FRAGMENTS

-WEATHERED ROCK-
(META-SANDSTONE)

-CRYSTALLINE ROCK-
(META-SANDSTONE)

367+00.00

℄

Ⓐ -RESIDUAL- STIFF TO HARD, MOIST, TAN, FINE SANDY SILT (A-4)

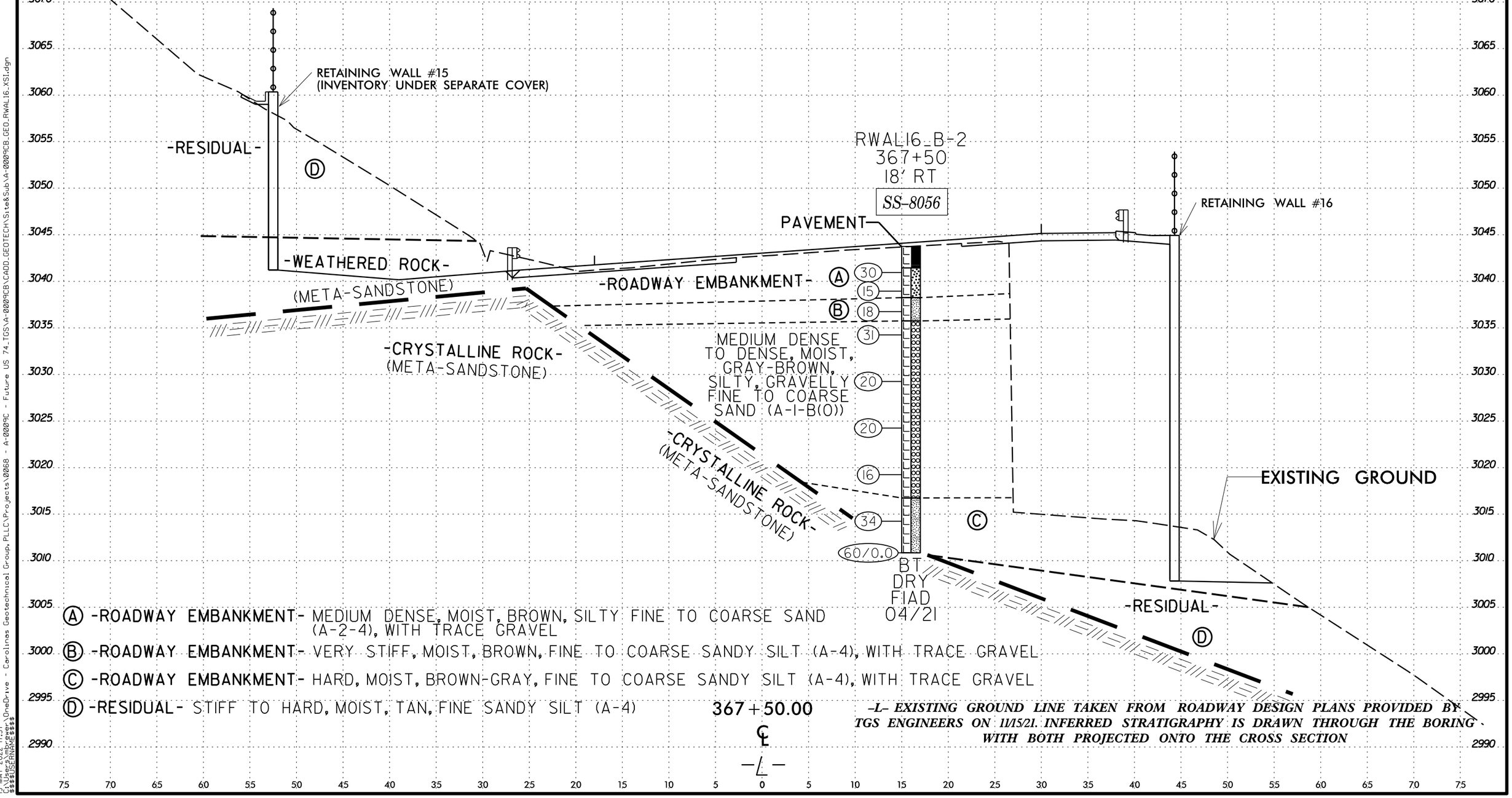
-L- EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING OR SEISMIC REFRACTION LINE 15.5 WITH BOTH PROJECTED ONTO THE CROSS SECTION

3085 3080 3075 3070 3065 3060 3055 3050 3045 3040 3035 3030 3025 3020 3015 3010 3005 3000 2995 2990

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

SOIL TEST RESULTS

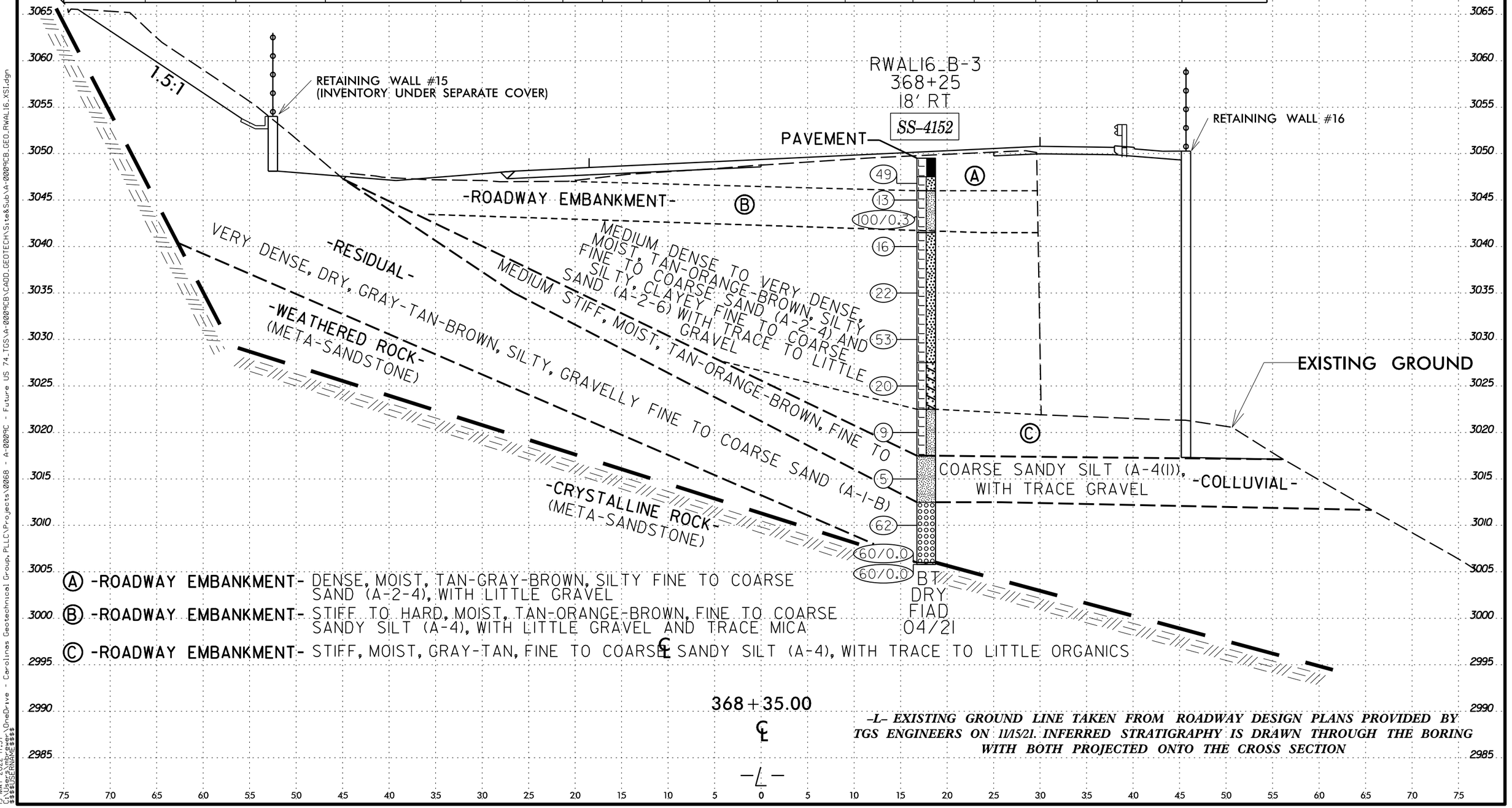
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-8056	18' RT	367+50 -L-	13.5' – 15.0'	A-1-b(0)	25	NP	26	24	32	17	34	27	20	8	–



-L- EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING WITH BOTH PROJECTED ONTO THE CROSS SECTION

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-4152	18' RT	368+25 -L-	33.5' - 35.0'	A-4(1)	29	4	19	22	31	28	92	80	61	21	-



Ⓐ -ROADWAY EMBANKMENT- DENSE, MOIST, TAN-GRAY-BROWN, SILTY FINE TO COARSE SAND (A-2-4), WITH LITTLE GRAVEL

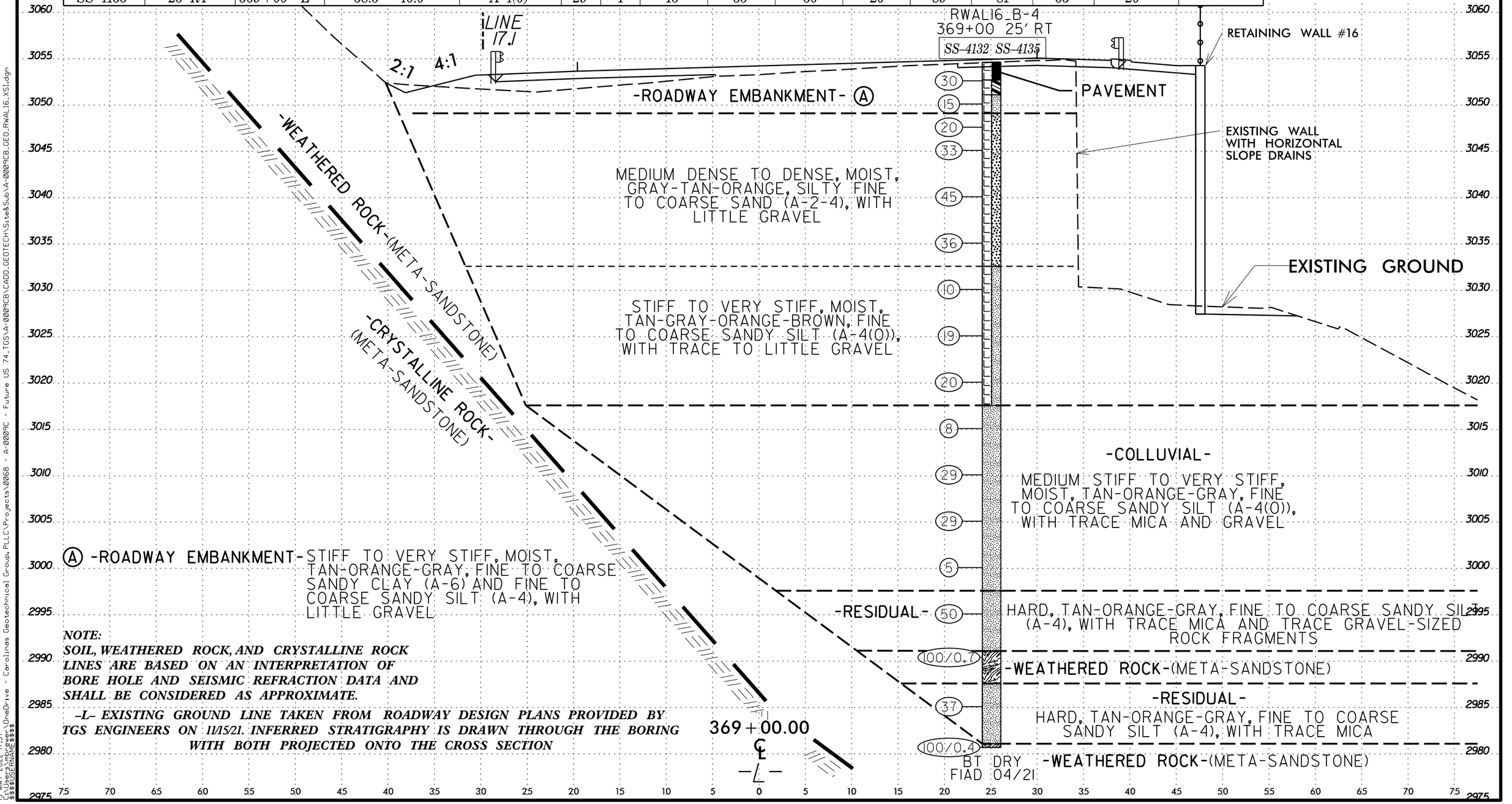
Ⓑ -ROADWAY EMBANKMENT- STIFF TO HARD, MOIST, TAN-ORANGE-BROWN, FINE TO COARSE SANDY SILT (A-4), WITH LITTLE GRAVEL AND TRACE MICA

Ⓒ -ROADWAY EMBANKMENT- STIFF, MOIST, GRAY-TAN, FINE TO COARSE SANDY SILT (A-4), WITH TRACE TO LITTLE ORGANICS

-L- EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING WITH BOTH PROJECTED ONTO THE CROSS SECTION

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-4132	25' RT	369+00 -L-	23.5' - 25.0'	A-4(0)	24	NP	25	27	30	18	100	83	56	5	-
SS-4135	25' RT	369+00 -L-	38.5' - 40.0'	A-4(0)	29	1	15	35	30	20	89	81	53	20	-

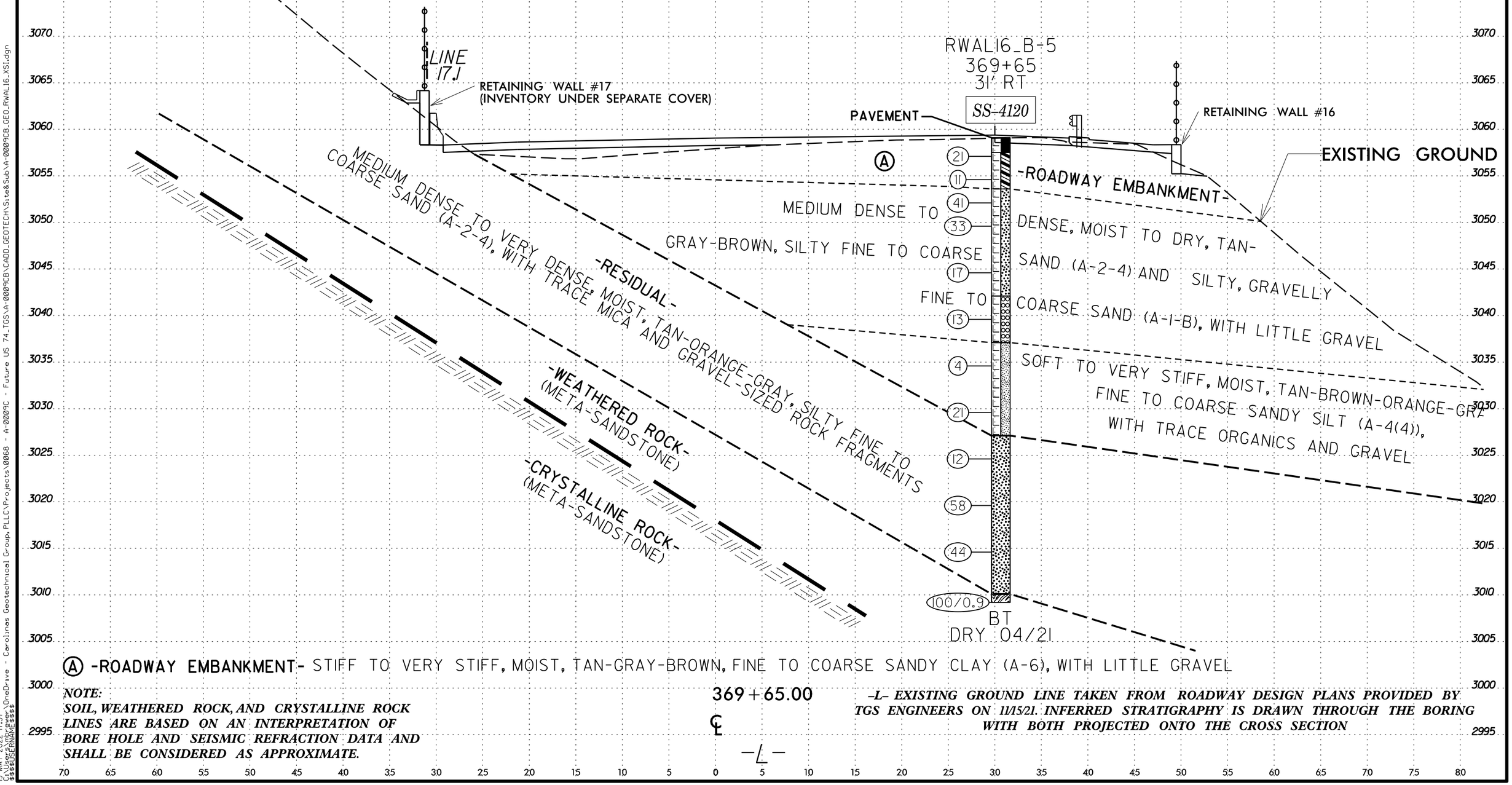


NOTE:
SOIL, WEATHERED ROCK, AND CRYSTALLINE ROCK LINES ARE BASED ON AN INTERPRETATION OF BORE HOLE AND SEISMIC REFRACTION DATA AND SHALL BE CONSIDERED AS APPROXIMATE.

-L- EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING WITH BOTH PROJECTED ONTO THE CROSS SECTION

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-4120	31' RT	369+65 -L-	23.5' - 25.0'	A-4(4)	40	7	21	18	34	27	96	81	64	28	-



Ⓐ **-ROADWAY EMBANKMENT-** STIFF TO VERY STIFF, MOIST, TAN-GRAY-BROWN, FINE TO COARSE SANDY CLAY (A-6), WITH LITTLE GRAVEL

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.

369+65.00
℄
-L-

-L- EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING WITH BOTH PROJECTED ONTO THE CROSS SECTION

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 32572.1.FS10	**TIP** A-0009CB	**COUNTY** GRAHAM	**GEOLOGIST** C. Piercy	
SITE DESCRIPTION Upgrade NC 143 from SR 1223 (Beech Creek Road) to 0.5 Miles North of Appalachian Trail				**GROUND WTR (ft)**
BORING NO. RWAL16_B-1	**STATION** 366+70	**OFFSET** 29 ft RT	**ALIGNMENT** L	**0 HR.** Dry
COLLAR ELEV. 3,038.6 ft	**TOTAL DEPTH** 38.6 ft	**NORTHING** 619,819	**EASTING** 593,196	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE BRE9533 CME-550X 78% 03/12/2021		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Phillips	**START DATE** 04/27/21	**COMP. DATE** 04/27/21	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
3040										3,038.6 GROUND SURFACE	0.0
	3,036.9	1.7						M		**ROADWAY EMBANKMENT** Asphalt (1.7')	1.7
3035	3,035.1	3.5	16	9	8	17		M		3,035.1 Medium Dense, Gray-Brown, Silty, Gravelly Fine to Coarse SAND (A-1-b)	3.5
	3,032.6	6.0	6	13	21	34		M		Medium Dense to Dense, Yellow-Red-Brown-Gray, Silty Fine to Coarse SAND (A-2-4), with trace gravel	
3030	3,030.1	8.5	38	21	13	34		M			
			6	6	6	12		M			
3025	3,025.1	13.5								3,026.6 **RESIDUAL**	12.0
			8	10	10	20		M		Medium Dense to Very Dense, Brown-Gray, Silty Fine to Coarse SAND (A-2-4), with trace gravel-sized rock fragments	
3020	3,020.1	18.5	22	32	28	60		M			
3015	3,015.1	23.5	8	27	67	94		M			
3010	3,010.1	28.5	100/0.5			100/0.5				3,010.1 **WEATHERED ROCK** Gray-Brown, (META-SANDSTONE)	28.5
3005	3,005.1	33.5	100/0.3			100/0.3					
3000	3,000.1	38.5	60/0.1			60/0.1				3,000.1 **CRYSTALLINE ROCK** Gray-Brown, (META-SANDSTONE) 3,000.0 38.6 Boring Terminated with Standard Penetration Test Refusal at Elevation 3,000.0 ft In Crystalline Rock (META-SANDSTONE)	38.5

WBS 32572.1.FS10	**TIP** A-0009CB	**COUNTY** GRAHAM	**GEOLOGIST** D. Goodnight	
SITE DESCRIPTION Upgrade NC 143 from SR 1223 (Beech Creek Road) to 0.5 Miles North of Appalachian Trail				**GROUND WTR (ft)**
BORING NO. L_36707L	**STATION** 367+07	**OFFSET** 8 ft LT	**ALIGNMENT** L	**0 HR.** Dry
COLLAR ELEV. 3,038.7 ft	**TOTAL DEPTH** 16.1 ft	**NORTHING** 619,775	**EASTING** 593,225	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE FME9553 CME-550X 80% 03/12/2021		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Phillips	**START DATE** 08/12/21	**COMP. DATE** 08/12/21	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
3040										3,038.7 GROUND SURFACE 0.0
	3,037.7	1.0						M		**ROADWAY EMBANKMENT** Medium Dense to Dense, Tan, Silty Fine SAND (A-2-4), with little gravel
3035	3,035.2	3.5	15	17	15	32		M		
	3,032.7	6.0	3	7	7	14		M		
3030	3,030.2	8.5	4	7	5	12		M		
			5	10	11	21		M		
3025	3,025.2	13.5								3,024.7 **WEATHERED ROCK** Tan-Gray, (META-SANDSTONE) 14.0
	3,022.6	16.1	9	91/0.4		100/0.9				3,022.6 Boring Terminated with Standard Penetration Test Refusal at Elevation 3,022.6 ft On Crystalline Rock (META-SANDSTONE) 16.1
			60/0.0			60/0.0				

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 32572.1.FS10	**TIP** A-0009CB	**COUNTY** GRAHAM	**GEOLOGIST** C. Piercy	
SITE DESCRIPTION Upgrade NC 143 from SR 1223 (Beech Creek Road) to 0.5 Miles North of Appalachian Trail				**GROUND WTR (ft)**
BORING NO. RWAL16_B-2	**STATION** 367+50	**OFFSET** 18 ft RT	**ALIGNMENT** L	**0 HR.** Dry
COLLAR ELEV. 3,043.9 ft	**TOTAL DEPTH** 32.9 ft	**NORTHING** 619,735	**EASTING** 593,194	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE BRE9533 CME-550X 78% 03/12/2021		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Phillips	**START DATE** 04/27/21	**COMP. DATE** 04/27/21	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
3045										3,043.9 GROUND SURFACE	0.0
	3,041.6	2.3								**ROADWAY EMBANKMENT** Asphalt (2.3')	
			27	19	11	30		M		3,041.6	2.3
3040	3,040.1	3.8	6	7	8	15		M		Medium Dense, Brown, Silty Fine to Coarse SAND (A-2-4), with trace gravel	
	3,037.9	6.0	7	10	8	18		M		3,038.4	5.5
3035	3,035.4	8.5	15	12	19	31		M		Very Stiff, Brown, Fine to Coarse Sandy SILT (A-4), with trace gravel	
										3,035.9	8.0
3030	3,030.4	13.5	11	10	10	20	SS-8056	8%		Medium Dense to Dense, Gray-Brown, Silty, Gravelly Fine to Coarse SAND (A-1-b(0))	
3025	3,025.4	18.5	9	9	11	20		M			
3020	3,020.4	23.5	8	7	9	16		M		3,016.9	27.0
3015	3,015.4	28.5	25	23	11	34		M		Hard, Brown-Gray, Fine to Coarse Sandy SILT (A-4), with trace gravel	
	3,011.0	32.9	60/0.0			60/0.0				3,011.0	32.9
										Boring Terminated with Standard Penetration Test Refusal at Elevation 3,011.0 ft On Crystalline Rock (META-SANDSTONE)	

Notes -

Boulders and/or Hard Drilling encountered infrequently at the following depths: 6.0 to 6.3 ft

WBS 32572.1.FS10	**TIP** A-0009CB	**COUNTY** GRAHAM	**GEOLOGIST** N. McLaren	
SITE DESCRIPTION Upgrade NC 143 from SR 1223 (Beech Creek Road) to 0.5 Miles North of Appalachian Trail				**GROUND WTR (ft)**
BORING NO. RWAL16_B-3	**STATION** 368+25	**OFFSET** 18 ft RT	**ALIGNMENT** L	**0 HR.** Dry
COLLAR ELEV. 3,049.2 ft	**TOTAL DEPTH** 43.7 ft	**NORTHING** 619,659	**EASTING** 593,190	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE CG20446 Diedrich D50 83% 06/16/2020		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Estep	**START DATE** 04/27/21	**COMP. DATE** 04/27/21	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	
3050										3,049.2 GROUND SURFACE	0.0
	3,047.2	2.0								**ROADWAY EMBANKMENT** Asphalt (1.7') and ABC (0.3')	
			66	28	21	49		M		3,047.2	2.0
3045	3,045.7	3.5	4	6	7	13		M		Dense, Tan-Gray-Brown, Silty Fine to Coarse SAND (A-2-4), with little gravel	
	3,043.2	6.0	100/0.3			100/0.3				3,045.7	3.5
3040	3,040.7	8.5	11	8	8	16		M		Stiff to Hard, Tan-Orange-Brown, Fine to Coarse Sandy SILT (A-4), with little gravel and trace mica	
										3,041.2	8.0
3035	3,035.7	13.5	23	13	9	22		M		Medium Dense to Very Dense, Tan-Brown, Silty Fine to Coarse SAND (A-2-4), with trace to little gravel	
3030	3,030.7	18.5	27	10	43	53		M			
3025	3,025.7	23.5	8	10	10	20		M			
3020	3,020.7	28.5	5	4	5	9		M		3,027.2	22.0
3015	3,015.7	33.5	2	2	3	5	SS-4152	21%		Medium Dense, Tan-Orange-Brown, Silty, Clayey Fine to Coarse SAND (A-2-6), with trace gravel	
3010	3,010.7	38.5	27	13	49	62		D		3,022.2	27.0
	3,005.7	43.5	60/0.0			60/0.0				Stiff, Gray-Tan, Fine to Coarse Sandy SILT (A-4), with trace to little organics	
	3,005.5	43.7	60/0.0							3,017.2	32.0
										COLLUVIAL Medium Stiff, Tan-Orange-Brown, Fine to Coarse Sandy SILT (A-4(1)), with trace gravel	
										3,012.2	37.0
										RESIDUAL Very Dense, Gray-Tan-Brown, Silty, Gravelly Fine to Coarse SAND (A-1-b)	
										3,005.7	43.5
										3,005.5 **CRYSTALLINE ROCK** (META-SANDSTONE)	43.7
										Boring Terminated with Standard Penetration Test Refusal at Elevation 3,005.5 ft In Crystalline Rock (META-SANDSTONE)	

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 32572.1.FS10	**TIP** A-0009CB	**COUNTY** GRAHAM	**GEOLOGIST** N. McLaren	
SITE DESCRIPTION Upgrade NC 143 from SR 1223 (Beech Creek Road) to 0.5 Miles North of Appalachian Trail				**GROUND WTR (ft)**
BORING NO. RWAL16_B-4	**STATION** 369+00	**OFFSET** 25 ft RT	**ALIGNMENT** L	**0 HR.** 43.1
COLLAR ELEV. 3,054.6 ft	**TOTAL DEPTH** 73.9 ft	**NORTHING** 619,584	**EASTING** 593,181	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE CG20446 Diedrich D50 83% 06/16/2020		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Estep	**START DATE** 04/27/21	**COMP. DATE** 04/27/21	**SURFACE WATER DEPTH** N/A	

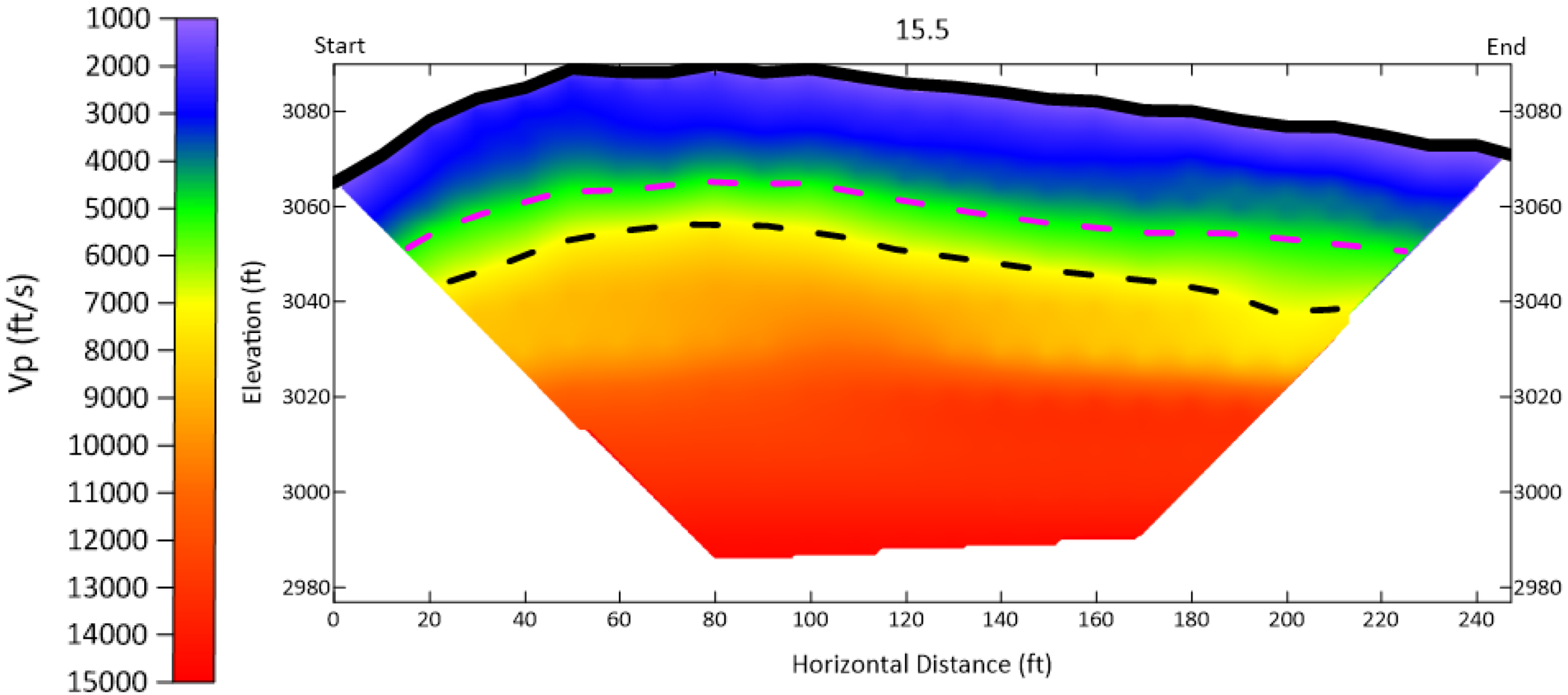
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
3055											
	3,053.6	1.0	63	20	10	30		D		3,054.6 GROUND SURFACE	0.0
	3,051.1	3.5								**ROADWAY EMBANKMENT** Asphalt (1.5') and ABC (0.4')	
3050			15	7	8	15		M		3,052.7	1.9
	3,048.6	6.0				20				Very Stiff, Tan-Orange-Gray, Fine to Coarse Sandy CLAY (A-6), with little gravel	
			39	11	9			M		3,051.1	3.5
	3,046.1	8.5								Stiff, Tan-Orange-Gray, Fine to Coarse Sandy SILT (A-4), with little gravel	
3045			12	12	21	33		M		3,049.1	5.5
										Medium Dense to Dense, Gray-Tan-Orange, Silty Fine to Coarse SAND (A-2-4), with little gravel	
	3,041.1	13.5									
3040			25	31	14	45		M			
	3,036.1	18.5									
3035			3	22	14	36		M			
	3,031.1	23.5								3,032.6	22.0
3030			4	3	7	10	SS-4132	15%		Stiff to Very Stiff, Tan-Gray-Orange-Brown, Fine to Coarse Sandy SILT (A-4(0)), with trace to little gravel	
	3,026.1	28.5									
3025			9	10	9	19		M			
	3,021.1	33.5									
3020			5	9	11	20		M			
	3,016.1	38.5								3,017.6	37.0
3015			4	3	5	8	SS-4135	20%		**COLLUVIAL** Medium Stiff to Very Stiff, Tan-Orange-Gray, Fine to Coarse Sandy SILT (A-4(0)), with trace mica and gravel	
	3,011.1	43.5									
3010			12	17	12	29		M			
	3,006.1	48.5									
3005			12	13	16	29		M			
	3,001.1	53.5									
3000			3	2	3	5		W			
	2,996.1	58.5								2,997.6	57.0
2995			13	24	26	50		M		**RESIDUAL** Hard, Tan-Orange-Gray, Fine to Coarse Sandy SILT (A-4), with trace mica and gravel-sized rock fragments	
	2,991.1	63.5									
2990			55	45/0.2		100/0.7				2,991.1	63.5
										WEATHERED ROCK Tan-Orange-Gray, (META-SANDSTONE)	
	2,986.1	68.5								2,987.6	67.0
2985			12	17	20	37		W		**RESIDUAL** Hard, Tan-Orange-Gray, Fine to Coarse Sandy SILT (A-4), with trace mica	
	2,981.1	73.5	100/0.4			100/0.4				2,981.1	73.5
										2,980.7 **WEATHERED ROCK** Tan-Orange-Gray, (META-SANDSTONE)	73.9
										Boring Terminated at Elevation 2,980.7 ft In Weathered Rock (META-SANDSTONE)	

WBS 32572.1.FS10	**TIP** A-0009CB	**COUNTY** GRAHAM	**GEOLOGIST** N. McLaren	
SITE DESCRIPTION Upgrade NC 143 from SR 1223 (Beech Creek Road) to 0.5 Miles North of Appalachian Trail				**GROUND WTR (ft)**
BORING NO. RWAL16_B-5	**STATION** 369+65	**OFFSET** 31 ft RT	**ALIGNMENT** L	**0 HR.** Dry
COLLAR ELEV. 3,059.1 ft	**TOTAL DEPTH** 49.9 ft	**NORTHING** 619,519	**EASTING** 593,174	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CG20446 Diedrich D50 83% 06/16/2020		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Estep	**START DATE** 04/27/21	**COMP. DATE** 04/27/21	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
3060										
	3,057.5	1.6	22	11	10	21		M		3,059.1 GROUND SURFACE 0.0
3055	3,055.6	3.5	12	5	6	11		M		**ROADWAY EMBANKMENT** Asphalt (1.2') and ABC (0.4') 3,057.5 1.6
	3,053.1	6.0	14	16	25	41		D		Stiff to Very Stiff, Tan-Gray-Brown, Fine to Coarse Sandy CLAY (A-6), with little gravel
3050	3,050.6	8.5	8	17	16	33		D		3,053.6 5.5
										Medium Dense to Dense, Tan-Brown-Gray, Silty Fine to Coarse SAND (A-2-4), with little gravel
3045	3,045.6	13.5	5	8	9	17		M		
3040	3,040.6	18.5	4	7	6	13		M		3,042.1 17.0
										Medium Dense, Tan-Brown-Gray, Silty, Gravelly Fine to Coarse SAND (A-1-b)
3035	3,035.6	23.5	4	1	3	4	SS-4120	28%		3,037.1 22.0
										Soft to Very Stiff, Tan-Brown-Orange-Gray, Fine Sandy SILT (A-4(4)), with trace organics and gravel
3030	3,030.6	28.5	6	10	11	21		M		
3025	3,025.6	33.5	5	5	7	12		M		
3020	3,020.6	38.5	11	22	36	58		M		
3015	3,015.6	43.5	9	10	34	44		M		3,027.1 32.0
										RESIDUAL Medium Dense to Very Dense, Tan-Orange-Gray, Silty Fine to Coarse SAND (A-2-4), with trace mica and gravel-sized rock fragments
3010	3,010.6	48.5	23	53	47/0.4	100/0.9				3,010.1 49.0
										3,009.2 **WEATHERED ROCK** Gray-Tan-Orange, (META-SANDSTONE) 49.9
										Boring Terminated at Elevation 3,009.2 ft In Weathered Rock (META-SANDSTONE)

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	14

GEOPHYSICAL TEST RESULTS – SEISMIC REFRACTION LINE 15.5



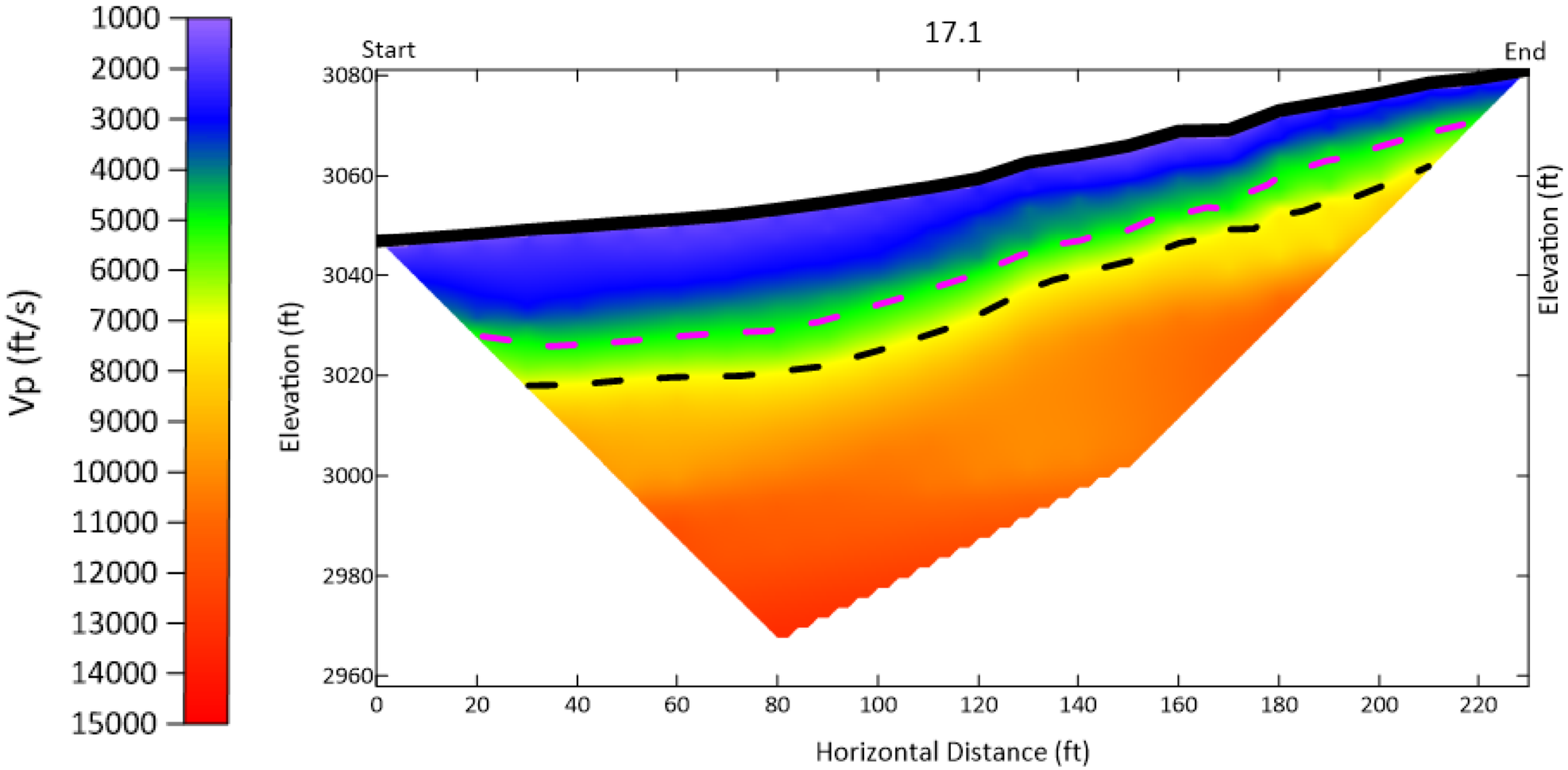
GEOPHYSICAL TESTING PERFORMED BY GEL SOLUTIONS. REFERENCE "SEISMIC REFRACTION SURVEY FOR EVALUATION OF ROCK" DATED 10/01/2021

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

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

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	15

GEOPHYSICAL TEST RESULTS – SEISMIC REFRACTION LINE 17.1



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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	A-0009CB	1	16

REFERENCE: A-0009CB

PROJECT: 32572.1.FS10

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY *GRAHAM*

PROJECT DESCRIPTION *UPGRADE NC 143 FROM SR 1223 (BEECH CREEK ROAD) TO 0.5 MILES NORTH OF APPALACHIAN TRAIL*

SITE DESCRIPTION *RETAINING WALL #17: SOIL NAIL WALL WITH ARCHITECTURAL FORM LINER FINISH ON -L- FROM 369+40 LT TO 375+26 LT*

CONTENTS

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.

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NOTES:
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2. 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

CG2 EXPLORATION

BRECCIA

N. MCLAREN

D. GOODNIGHT

GEL SOLUTIONS

INVESTIGATED BY *CG2*

DRAWN BY *M. BREWER, P.E.*

CHECKED BY *R. KRAL, P.E.*

SUBMITTED BY *M. BREWER, P.E.*

DATE *MAY 2022*

Prepared in the Office of:

CAROLINAS GEOTECHNICAL GROUP

2400 CROWNPOINT EXECUTIVE DRIVE
SUITE 800
CHARLOTTE, NC 28227
(980) 339-8684

NORTH CAROLINA PROFESSIONAL SEAL 041986 ENGINEER D. MATTHEW BREWER

DocuSigned by:
D. Matthew Brewer
386129C0A4C1462...
SIGNATURE

6/7/2022
DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED 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

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5, A-7-6			
SYMBOL														
% PASSING #10 #40 #200	50 MX 30 MX 15 MX	50 MX 25 MX	51 MN 10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
MATERIAL PASSING #40 LL PI	— 6 MX		— NP	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	NO MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

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

CONSISTENCY OR DENSENESS

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

TEXTURE OR GRAIN SIZE

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

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

GRAIN SIZE	MM	305	75	2.0	0.25	0.05	0.005
	IN.	12	3				

SOIL MOISTURE - CORRELATION OF TERMS

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

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NON PLASTIC	0-5	VERY LOW
SLIGHTLY PLASTIC	6-15	SLIGHT
MODERATELY PLASTIC	16-25	MEDIUM
HIGHLY PLASTIC	26 OR MORE	HIGH

COLOR

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

GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
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.

ANGULARITY OF GRAINS

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

MINERALOGICAL COMPOSITION

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

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LL < 31
MODERATELY COMPRESSIBLE	LL = 31 - 50
HIGHLY COMPRESSIBLE	LL > 50

PERCENTAGE OF MATERIAL

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

GROUND WATER

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

MISCELLANEOUS SYMBOLS

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

RECOMMENDATION SYMBOLS

- UNDERCUT
- SHALLOW UNDERCUT
- UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE
- UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK
- UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL

ABBREVIATIONS

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

SAMPLE ABBREVIATIONS

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

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] CME-45C
- [ ] CME-550
- [X] CME-550X
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [X] DIEDRICH D50
- [ ] _____

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

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B _____ [ ] -H _____
- [ ] -N _____

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

ROCK DESCRIPTION

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:

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

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF*
VERY SEVERE (V 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.

ROCK HARDNESS

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

FRACTURE SPACING

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

BEDDING

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

INDURATION

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

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

TERMS AND DEFINITIONS

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

AQUIFER - A WATER BEARING FORMATION OR STRATA.

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

ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, 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 DISLODGED FROM PARENT MATERIAL.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

BENCH MARK: N/A

ELEVATION: FEET

NOTES:

SURVEY AND ROADWAY DESIGN FILES PROVIDED BY TGS ENGINEERS ON 11/15/2021

DATE: 8-15-14

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	3

SITE PLAN

0 60 120
FEET

NC GRID
NAD 83 NA 2011

370

PROP. RETAINING WALL #17
W/9' WIW WILDLIFE FENCE
& CONCRETE DITCH
BEGIN -L- STA. 369+40 ±
END -L- STA. 375+26 ±

-L- PT 368+11.01

-L- PC 375+53.58

USFS BOUNDARY POST

WOODS

USFS BOUNDARY POST

END 17.3

LINE RWALI7.3

BEGIN 17.3

L_37519L

LINE RWALI7.2

70° (FOLIATION)

WOODS

85°

END 17.2

WOODS

LINE RWALI7.1

END 17.1

BEGIN 17.2

ROCK OUTCROP 20

BL CONC

BST SHOULDER

18" CMP

MTL

BEGIN 17.1

ROCK OUTCROP 19

L_37299L

L_37079L

-L-

18" CMP

MTL

GREU TL-3

GREU TL-3

GRAVEL

RWALI6_B-5

BL-56

MTL

CONC. BARRIER WALL

8" HDPE

WOODS

WOODS

WOODS

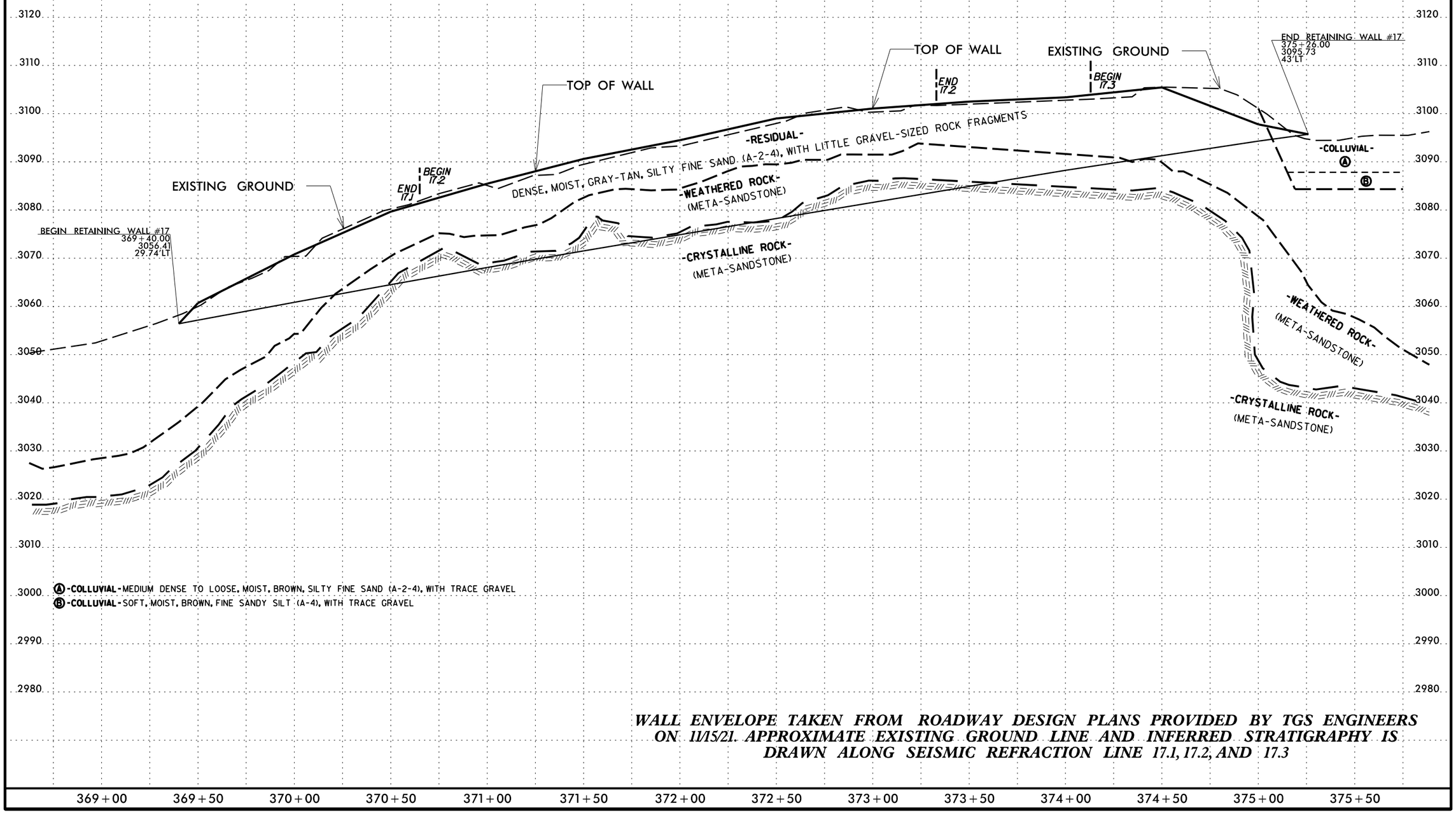
NOTE:
SOIL, WEATHERED ROCK, AND CRYSTALLINE ROCK LINES ARE BASED ON AN INTERPRETATION OF BORE HOLE AND SEISMIC REFRACTION DATA AND SHALL BE CONSIDERED AS APPROXIMATE.

Prepared in the Office of:
CAROLINAS GEOTECHNICAL GROUP

0 50 100
FEET
VE = 2.5:1

PROJECT REFERENCE NO.	*SHEET NO.*
A-0009CB	4

RETAINING WALL #17
SEISMIC REFRACTION LINE 17.1, 17.2, & 17.3 PROJECTED ALONG WALL ENVELOPE

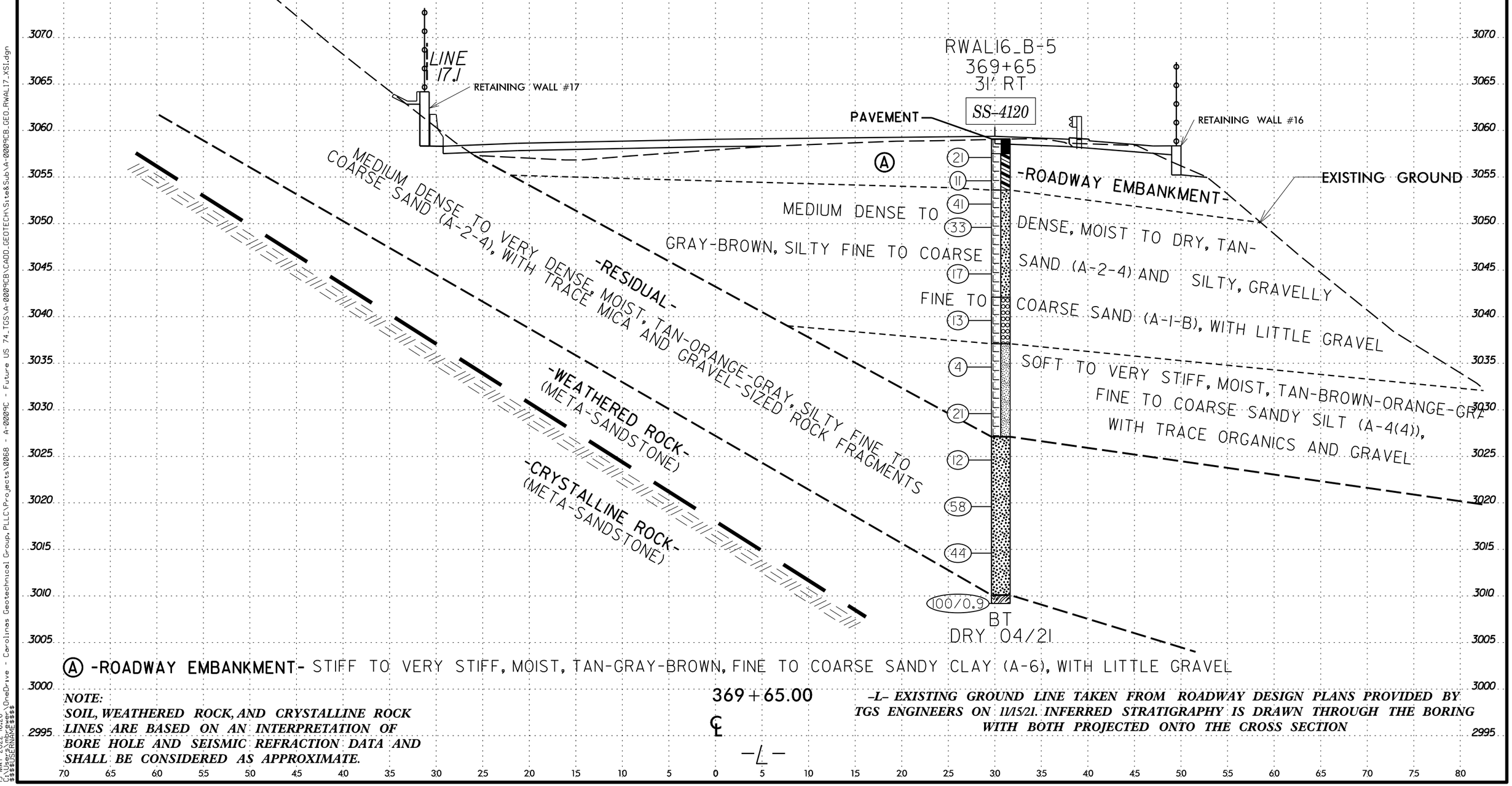


Ⓐ **-COLLUVIAL-** MEDIUM DENSE TO LOOSE, MOIST, BROWN, SILTY FINE SAND (A-2-4), WITH TRACE GRAVEL
Ⓑ **-COLLUVIAL-** SOFT, MOIST, BROWN, FINE SANDY SILT (A-4), WITH TRACE GRAVEL

WALL ENVELOPE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. APPROXIMATE EXISTING GROUND LINE AND INFERRED STRATIGRAPHY IS DRAWN ALONG SEISMIC REFRACTION LINE 17.1, 17.2, AND 17.3

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-4120	31' RT	369+65 -L-	23.5' - 25.0'	A-4(4)	40	7	21	18	34	27	96	81	64	28	-



Ⓐ -ROADWAY EMBANKMENT- STIFF TO VERY STIFF, MOIST, TAN-GRAY-BROWN, FINE TO COARSE SANDY CLAY (A-6), WITH LITTLE GRAVEL

369+65.00
℄
-L-

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 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING WITH BOTH PROJECTED ONTO THE CROSS SECTION

EXISTING GROUND

LINE 17.2

L_37079L
370+79
2' RT

Ⓐ

2:1

4:1

-WEATHERED ROCK-
(META-SANDSTONE)

-CRYSTALLINE ROCK-
(META-SANDSTONE)

-RESIDUAL-
VERY STIFF, MOIST, TAN, FINE SANDY SILT (A-4), WITH TRACE MANGANESE OXIDE

DENSE, MOIST, GRAY-TAN, SILTY FINE SAND (A-2-4), WITH LITTLE GRAVEL-SIZED ROCK FRAGMENTS

-WEATHERED ROCK-
(META-SANDSTONE)

-RESIDUAL-
VERY STIFF, MOIST, TAN, FINE SANDY SILT (A-4)

23	
46	
100/0.8	
100/0.7	
100/0.3	
100/0.4	
30	

BT
DRY
08/21

Ⓐ -ROADWAY EMBANKMENT- STIFF TO VERY STIFF, MOIST, TAN-GRAY-BROWN, FINE TO COARSE SANDY CLAY (A-6), WITH LITTLE GRAVEL

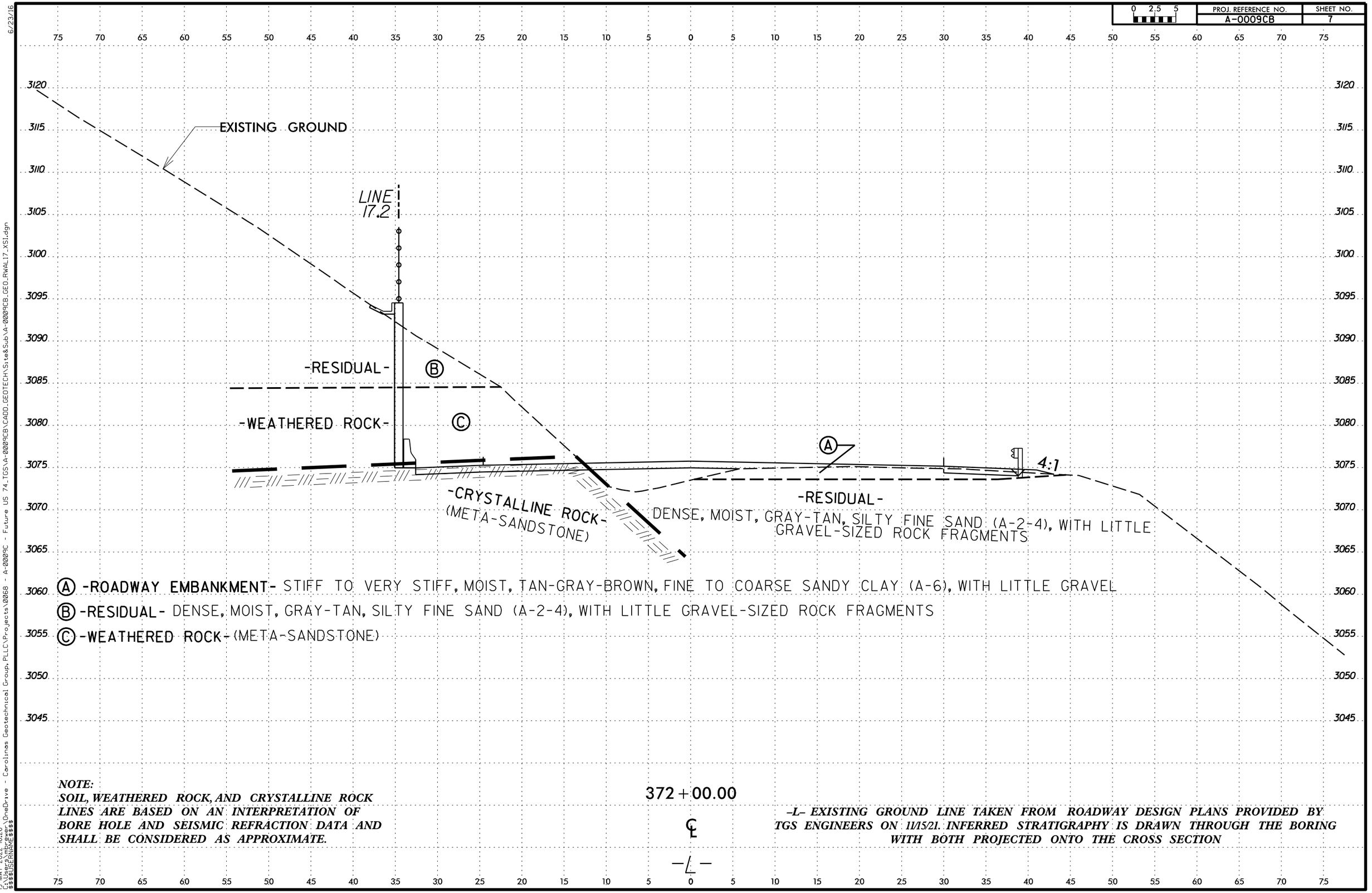
NOTE:
SOIL, WEATHERED ROCK, AND CRYSTALLINE ROCK LINES ARE BASED ON AN INTERPRETATION OF BORE HOLE AND SEISMIC REFRACTION DATA AND SHALL BE CONSIDERED AS APPROXIMATE.

371+00.00
℄
–L–

–L– EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING WITH BOTH PROJECTED ONTO THE CROSS SECTION

3115 3110 3105 3100 3095 3090 3085 3080 3075 3070 3065 3060 3055 3050 3045 3040 3035

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75



Ⓐ **-ROADWAY EMBANKMENT-** STIFF TO VERY STIFF, MOIST, TAN-GRAY-BROWN, FINE TO COARSE SANDY CLAY (A-6), WITH LITTLE GRAVEL

Ⓑ **-RESIDUAL-** DENSE, MOIST, GRAY-TAN, SILTY FINE SAND (A-2-4), WITH LITTLE GRAVEL-SIZED ROCK FRAGMENTS

Ⓒ **-WEATHERED ROCK-** (META-SANDSTONE)

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.

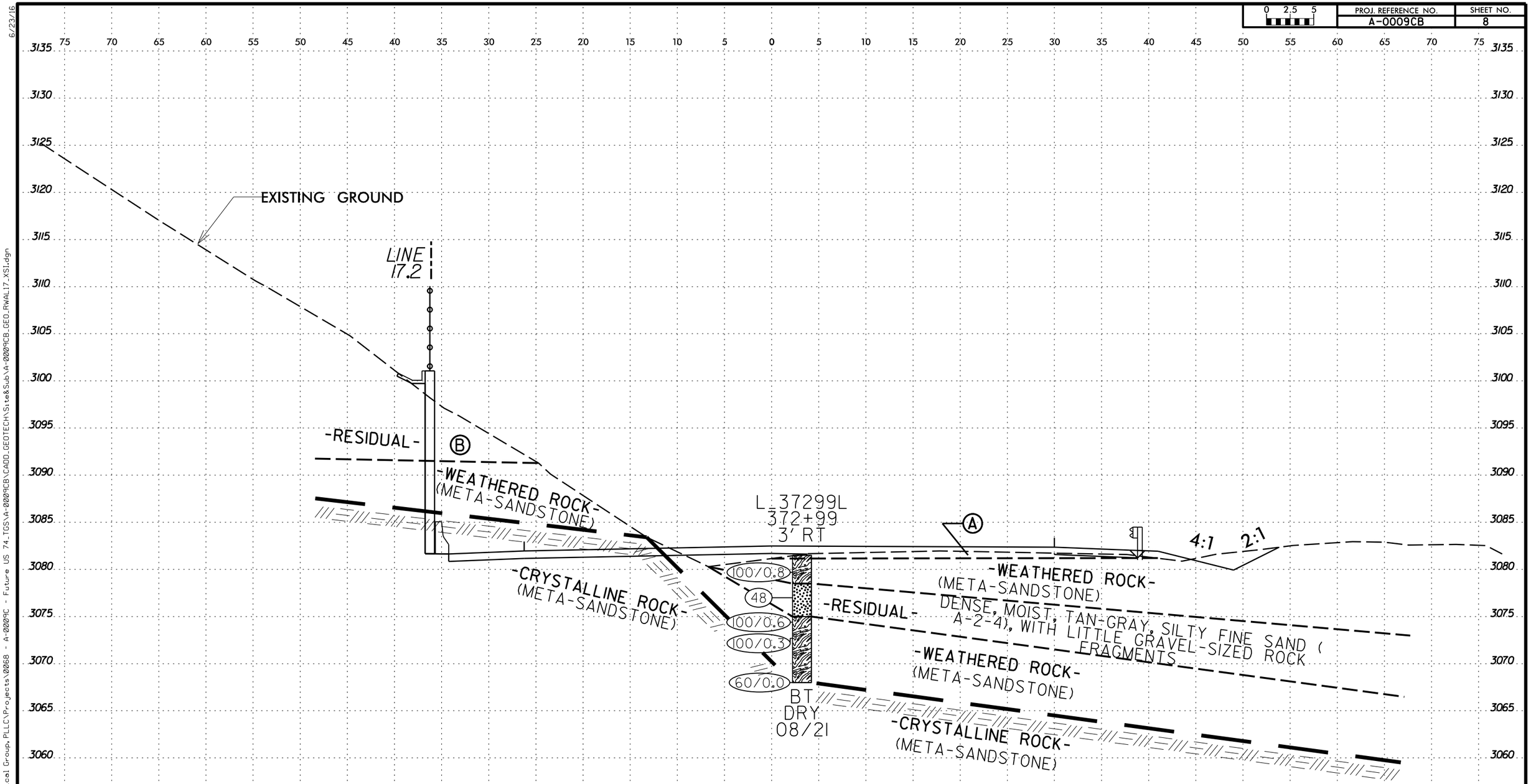
372+00.00

℄

–L–

–L– EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING WITH BOTH PROJECTED ONTO THE CROSS SECTION

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	8



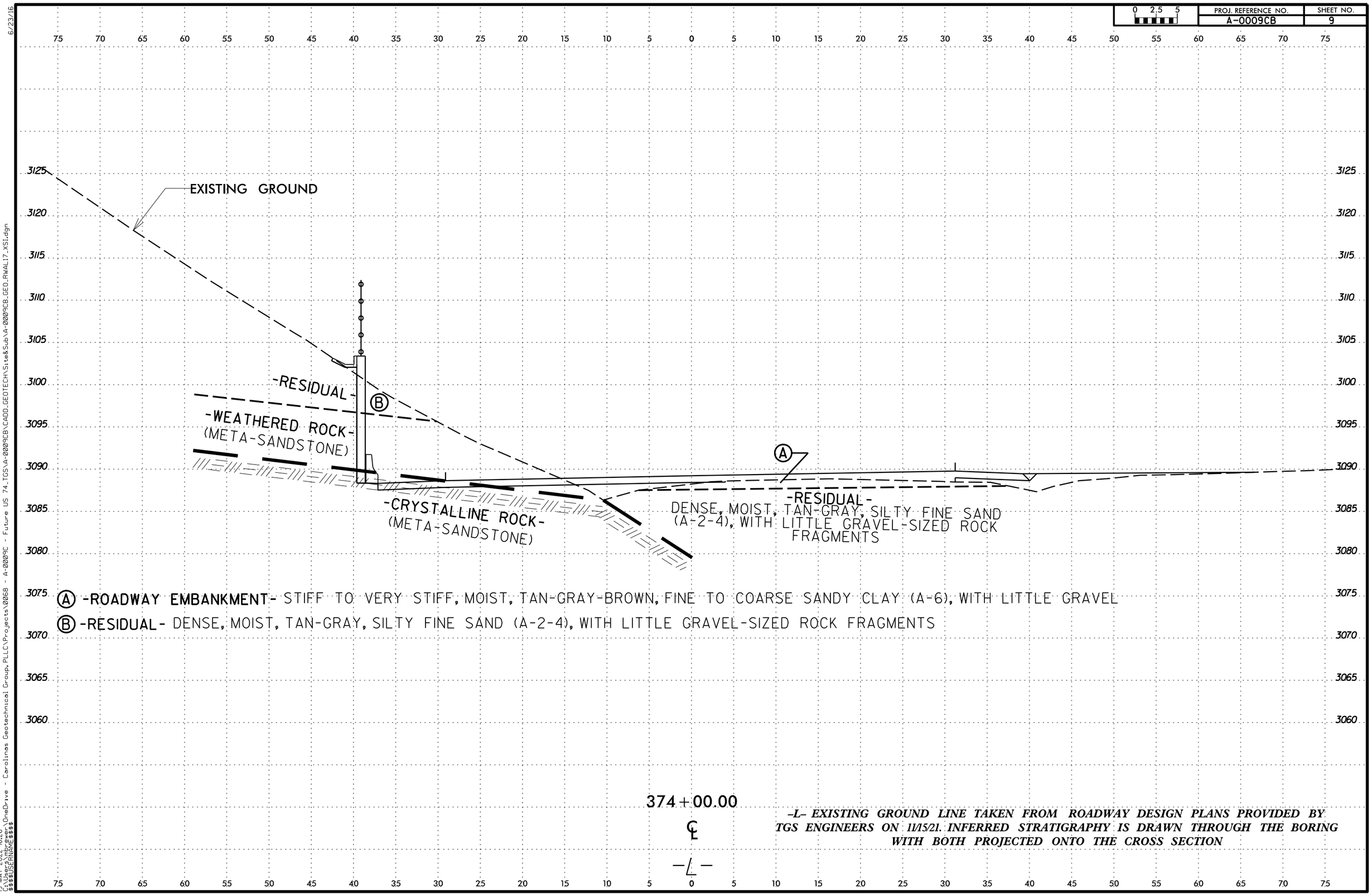
Ⓐ **-ROADWAY EMBANKMENT-** STIFF TO VERY STIFF, TAN-GRAY-BROWN, FINE TO COARSE SANDY CLAY (A-6), WITH LITTLE GRAVEL

Ⓑ **-RESIDUAL-** DENSE, MOIST, TAN-GRAY, SILTY FINE SAND (A-2-4), WITH LITTLE GRAVEL-SIZED ROCK FRAGMENTS

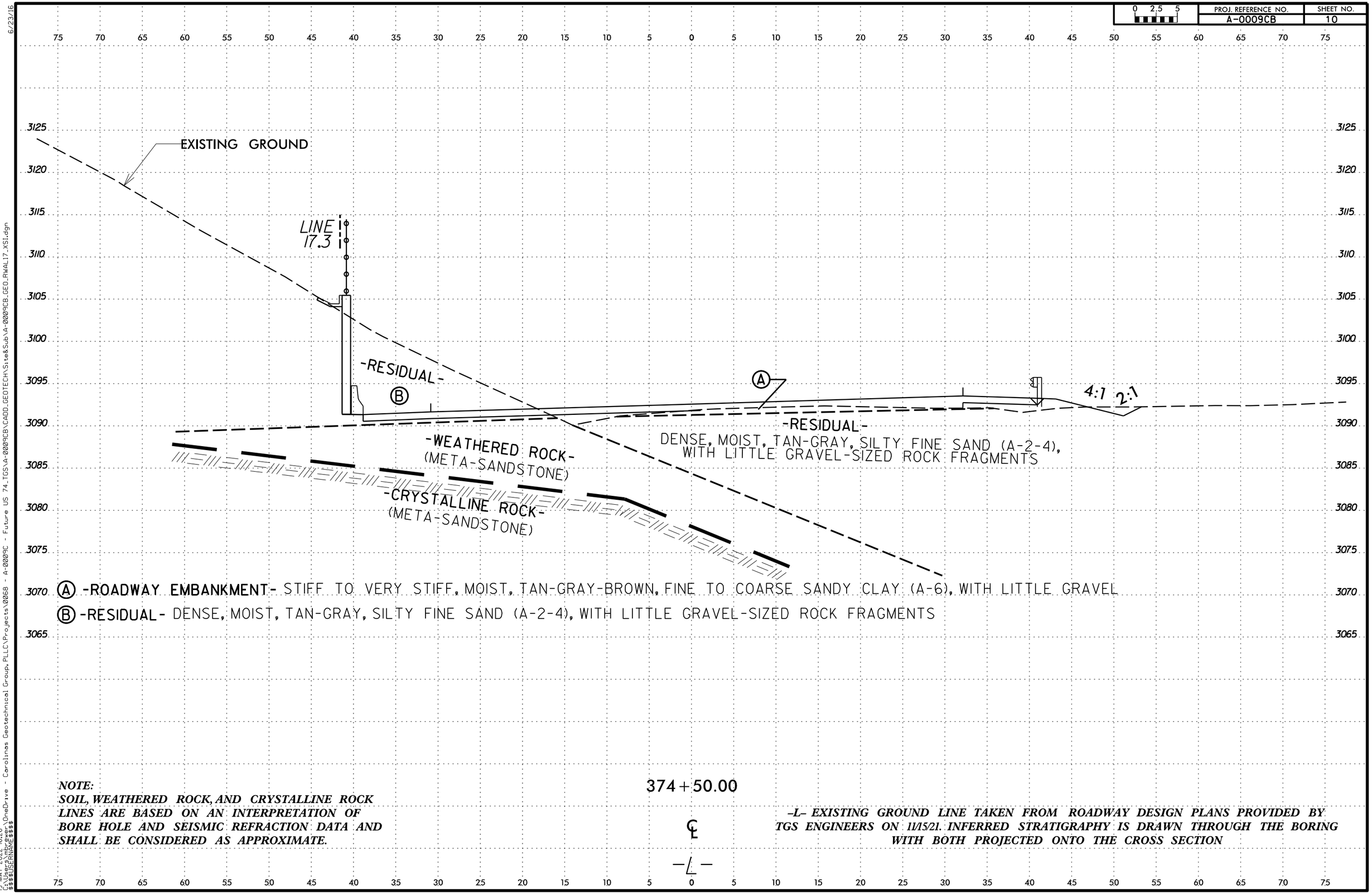
NOTE:
SOIL, WEATHERED ROCK, AND CRYSTALLINE ROCK LINES ARE BASED ON AN INTERPRETATION OF BORE HOLE AND SEISMIC REFRACTION DATA AND SHALL BE CONSIDERED AS APPROXIMATE.

373+00.00
℄
–L–

–L– EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING WITH BOTH PROJECTED ONTO THE CROSS SECTION



0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	10



Ⓐ **-ROADWAY EMBANKMENT-** STIFF TO VERY STIFF, MOIST, TAN-GRAY-BROWN, FINE TO COARSE SANDY CLAY (A-6), WITH LITTLE GRAVEL

Ⓑ **-RESIDUAL-** DENSE, MOIST, TAN-GRAY, SILTY FINE SAND (A-2-4), WITH LITTLE GRAVEL-SIZED ROCK FRAGMENTS

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 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING WITH BOTH PROJECTED ONTO THE CROSS SECTION

EXISTING GROUND

L_37519L
375+19
42' LT

LINE 17.3

12
6
3
12
23

BT
DRY
08/21

-COLLUVIAL-
Ⓐ

-ROADWAY EMBANKMENT-
MEDIUM DENSE, MOIST, BROWN, SILTY FINE TO COARSE SAND (A-2-4)

Ⓑ

-RESIDUAL-
STIFF TO VERY STIFF, TAN-BROWN, SANDY SILT (A-4), WITH TRACE GRAVEL-SIZED ROCK FRAGMENTS

2:1

Ⓐ -COLLUVIAL- MEDIUM DENSE TO LOOSE, MOIST, BROWN, SILTY FINE SAND (A-2-4), WITH TRACE GRAVEL

Ⓑ -COLLUVIAL- SOFT, MOIST, BROWN, FINE SANDY SILT (A-4), WITH TRACE GRAVEL

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.

375+00.00
℄
–L–

–L– EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING WITH BOTH PROJECTED ONTO THE CROSS SECTION

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 32572.1.FS10	**TIP** A-0009CB	**COUNTY** GRAHAM	**GEOLOGIST** D. Goodnight	
SITE DESCRIPTION Upgrade NC 143 from SR 1223 (Beech Creek Road) to 0.5 Miles North of Appalachian Trail				**GROUND WTR (ft)**
BORING NO. L_37079L	**STATION** 370+79	**OFFSET** 2 ft RT	**ALIGNMENT** L	**0 HR.** Dry
COLLAR ELEV. 3,066.1 ft	**TOTAL DEPTH** 25.0 ft	**NORTHING** 619,405	**EASTING** 593,200	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE FME9553 CME-550X 80% 03/12/2021		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Phillips	**START DATE** 08/12/21	**COMP. DATE** 08/12/21	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
3070											
										3,066.1 GROUND SURFACE	0.0
3065	3,065.1	1.0	5	11	12	23 46		M		**RESIDUAL** Very Stiff, Tan, Fine Sandy SILT (A-4), with trace manganese oxide	
	3,062.6	3.5	11	22	24			M		3,063.1 Dense, Gray-Tan, Silty Fine SAND (A-2-4), with little gravel-sized rock fragments	3.0
3060	3,060.1	6.0	45	55/0.3		100/0.8				3,060.1 **WEATHERED ROCK** Tan-Gray, (META-SANDSTONE)	6.0
	3,057.6	8.5	26	66	34/0.2	100/0.7					
3055											
	3,052.6	13.5	100/0.3			100/0.3					
3050											
	3,047.6	18.5	100/0.4			100/0.4					
3045											
	3,042.6	23.5	9	12	18	30		M		3,044.1 **RESIDUAL** Very Stiff, Tan, Fine Sandy SILT (A-4)	22.0
										3,041.1 Boring Terminated at Elevation 3,041.1 ft In Residual Sandy Silt (A-4)	25.0

WBS 32572.1.FS10	**TIP** A-0009CB	**COUNTY** GRAHAM	**GEOLOGIST** N. McLaren	
SITE DESCRIPTION Upgrade NC 143 from SR 1223 (Beech Creek Road) to 0.5 Miles North of Appalachian Trail				**GROUND WTR (ft)**
BORING NO. RWAL16_B-5	**STATION** 369+65	**OFFSET** 31 ft RT	**ALIGNMENT** L	**0 HR.** Dry
COLLAR ELEV. 3,059.1 ft	**TOTAL DEPTH** 49.9 ft	**NORTHING** 619,519	**EASTING** 593,174	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CG20446 Diedrich D50 83% 06/16/2020		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Estep	**START DATE** 04/27/21	**COMP. DATE** 04/27/21	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	
3060											
										3,059.1 GROUND SURFACE	0.0
	3,057.5	1.6								3,057.5 **ROADWAY EMBANKMENT** Asphalt (1.2') and ABC (0.4')	1.6
3055	3,055.6	3.5	22	11	10	21		M		Stiff to Very Stiff, Tan-Gray-Brown, Fine to Coarse Sandy CLAY (A-6), with little gravel	
	3,053.1	6.0	12	5	6	11		M		3,053.6	5.5
3050	3,050.6	8.5	14	16	25	41		D		Medium Dense to Dense, Tan-Brown-Gray, Silty Fine to Coarse SAND (A-2-4), with little gravel	
			8	17	16	33		D			
3045	3,045.6	13.5									
			5	8	9	17		M			
3040	3,040.6	18.5									
			4	7	6	13		M		3,042.1 Medium Dense, Tan-Brown-Gray, Silty, Gravelly Fine to Coarse SAND (A-1-b)	17.0
3035	3,035.6	23.5								3,037.1	22.0
			4	1	3	4	SS-4120	28%		Soft to Very Stiff, Tan-Brown-Orange-Gray, Fine Sandy SILT (A-4(4)), with trace organics and gravel	
3030	3,030.6	28.5									
			6	10	11	21		M			
3025	3,025.6	33.5									
			5	5	7	12		M		3,027.1 **RESIDUAL** Medium Dense to Very Dense, Tan-Orange-Gray, Silty Fine to Coarse SAND (A-2-4), with trace mica and gravel-sized rock fragments	32.0
3020	3,020.6	38.5									
			11	22	36	58		M			
3015	3,015.6	43.5									
			9	10	34	44		M			
3010	3,010.6	48.5								3,010.1	49.0
			23	53	47/0.4	100/0.9				3,009.2 **WEATHERED ROCK** Gray-Tan-Orange, (META-SANDSTONE)	49.9
										Boring Terminated at Elevation 3,009.2 ft In Weathered Rock (META-SANDSTONE)	

GEOTECHNICAL BORING REPORT
BORE LOG

WBS	TIP	COUNTY	GEOLOGIST
32572.1.FS10	A-0009CB	GRAHAM	D. Goodnight

SITE DESCRIPTION Upgrade NC 143 from SR 1223 (Beech Creek Road) to 0.5 Miles North of Appalachian Trail — **GROUND WTR (ft)**

BORING NO.	STATION	OFFSET	ALIGNMENT	0 HR.	24 HR.
L_37299L	372+99	3 ft RT	L	Dry	Dry

COLLAR ELEV.	TOTAL DEPTH	NORTHING	EASTING
3,081.5 ft	13.5 ft	619,185	593,194

DRILL RIG/HAMMER EFF./DATE FME9553 CME-550X 80% 03/12/2021 — **DRILL METHOD** H.S. Augers — **HAMMER TYPE** Automatic

DRILLER J. Phillips — **START DATE** 08/13/21 — **COMP. DATE** 08/13/21 — **SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
3085										
										3,081.5 GROUND SURFACE 0.0
3080	3,080.5	1.0								**WEATHERED ROCK** Tan-Gray, (META-SANDSTONE)
			45	55/0.3		100/0.8		M		
	3,078.0	3.5								3,078.5 3.0
			18	18	30	48		M		**RESIDUAL** Dense, Tan-Gray, Silty Fine SAND (A-2-4), with little gravel-sized rock fragments
3075	3,075.5	6.0								3,075.0 6.5
			8	86	14/0.1	100/0.6		M		**WEATHERED ROCK** Tan-Gray, (META-SANDSTONE)
	3,073.0	8.5	100/0.3			100/0.3		M		
3070										
	3,068.0	13.5	60/0.0			60/0.0		M		3,068.0 13.5
										Boring Terminated with Standard Penetration Test Refusal at Elevation 3,068.0 ft On Crystalline Rock (META-SANDSTONE)

WBS	TIP	COUNTY	GEOLOGIST
32572.1.FS10	A-0009CB	GRAHAM	D. Goodnight

SITE DESCRIPTION Upgrade NC 143 from SR 1223 (Beech Creek Road) to 0.5 Miles North of Appalachian Trail — **GROUND WTR (ft)**

BORING NO.	STATION	OFFSET	ALIGNMENT	0 HR.	24 HR.
L_37519L	375+19	42 ft LT	L	Dry	Dry

COLLAR ELEV.	TOTAL DEPTH	NORTHING	EASTING
3,093.4 ft	15.0 ft	618,964	593,234

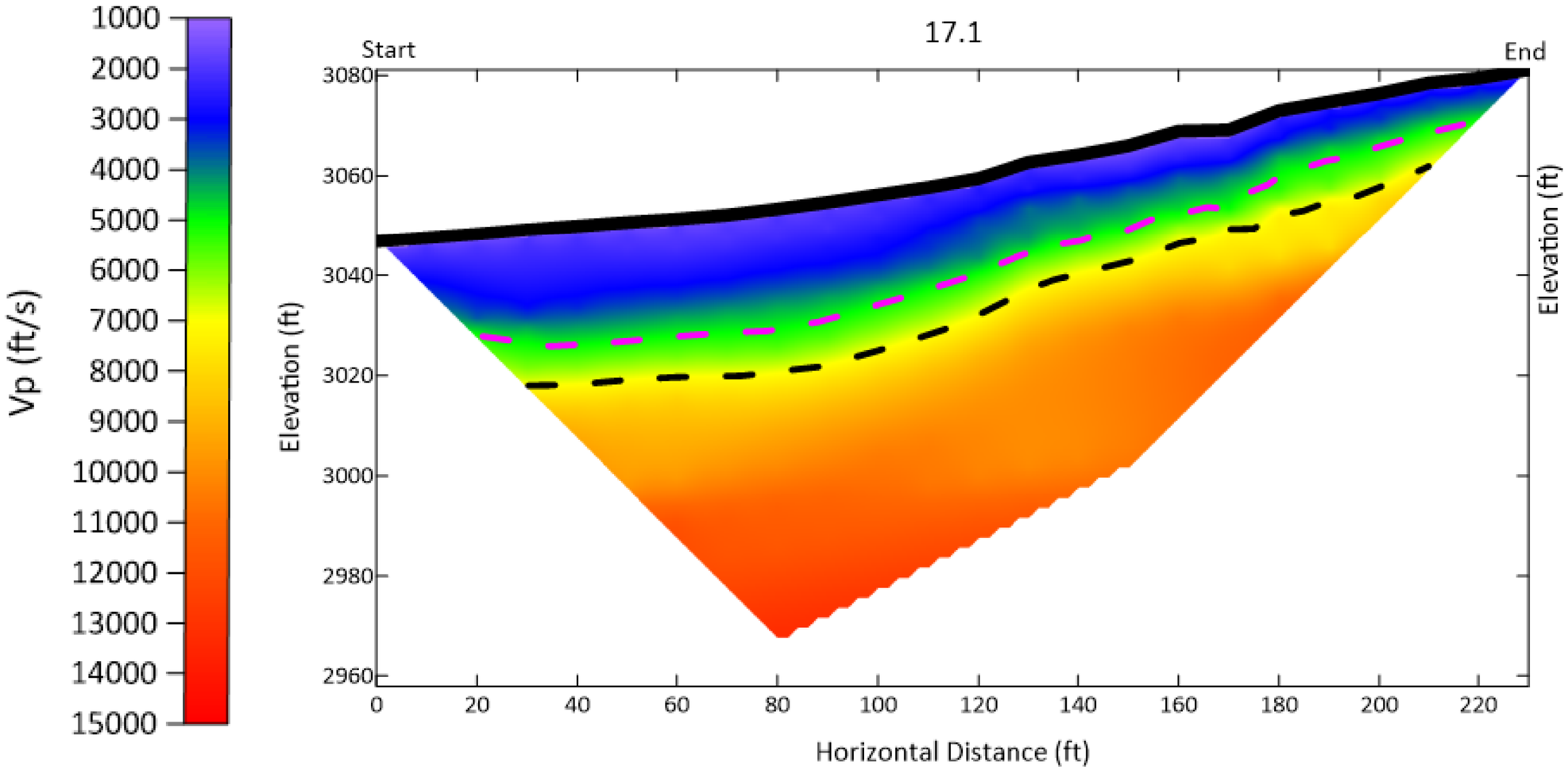
DRILL RIG/HAMMER EFF./DATE FME9553 CME-550X 80% 03/12/2021 — **DRILL METHOD** H.S. Augers — **HAMMER TYPE** Automatic

DRILLER J. Phillips — **START DATE** 08/13/21 — **COMP. DATE** 08/13/21 — **SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
3095										
										3,093.4 GROUND SURFACE 0.0
	3,092.4	1.0								**COLLUVIAL** Medium Dense to Loose, Brown, Silty Fine SAND (A-2-4), with trace gravel
3090			10	7	5	12		M		
	3,089.9	3.5								3,087.9 5.5
			4	3	3	6		M		Soft, Brown, Fine Sandy SILT (A-4), with trace gravel
	3,087.4	6.0								3,084.4 9.0
3085			1	2	1	3		M		**RESIDUAL** Stiff to Very Stiff, Tan-Brown, Fine Sandy SILT (A-4), with trace gravel-sized rock fragments
	3,084.9	8.5								
			1	4	8	12		M		
3080	3,079.9	13.5								3,078.4 15.0
			6	7	16	23		M		Boring Terminated at Elevation 3,078.4 ft In Residual Sandy Silt (A-4)

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	14

GEOPHYSICAL TEST RESULTS – SEISMIC REFRACTION LINE 17.1



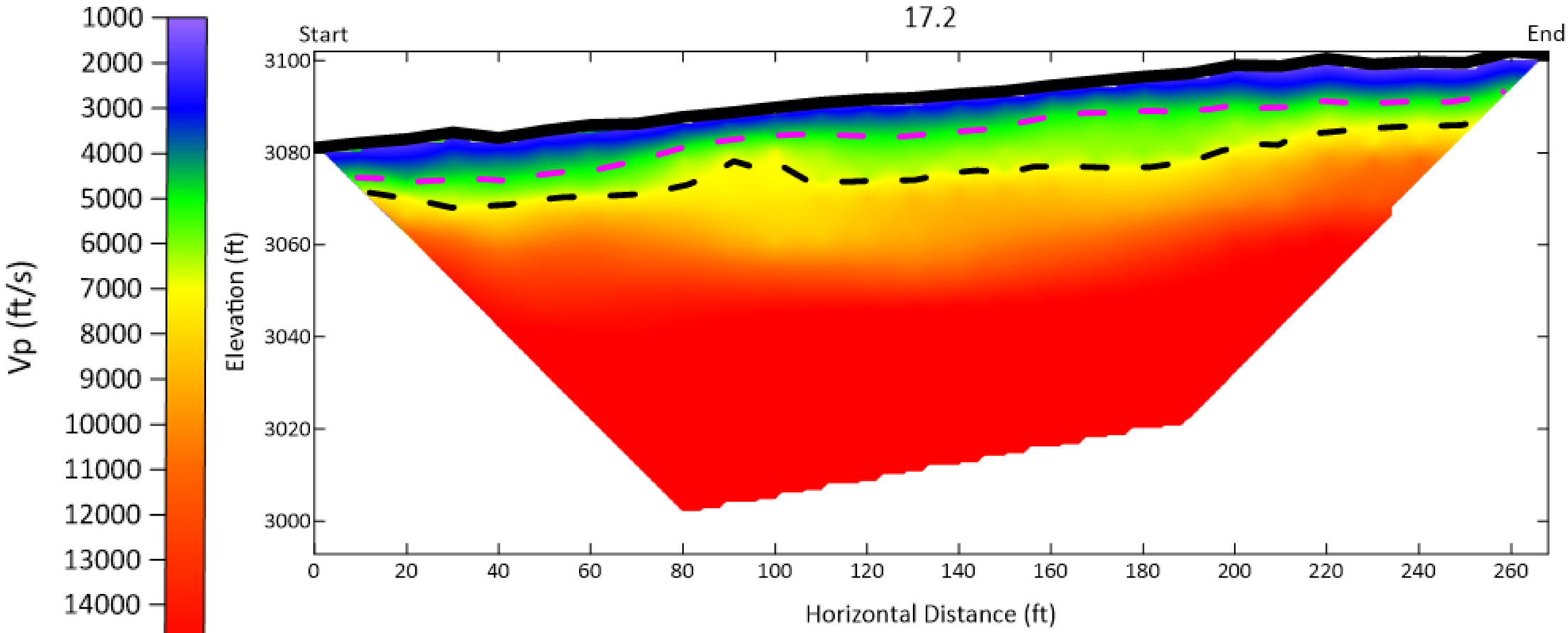
GEOPHYSICAL TESTING PERFORMED BY GEL SOLUTIONS. REFERENCE "SEISMIC REFRACTION SURVEY FOR EVALUATION OF ROCK" DATED 10/01/2021

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

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

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	15

GEOPHYSICAL TEST RESULTS – SEISMIC REFRACTION LINE 17.2



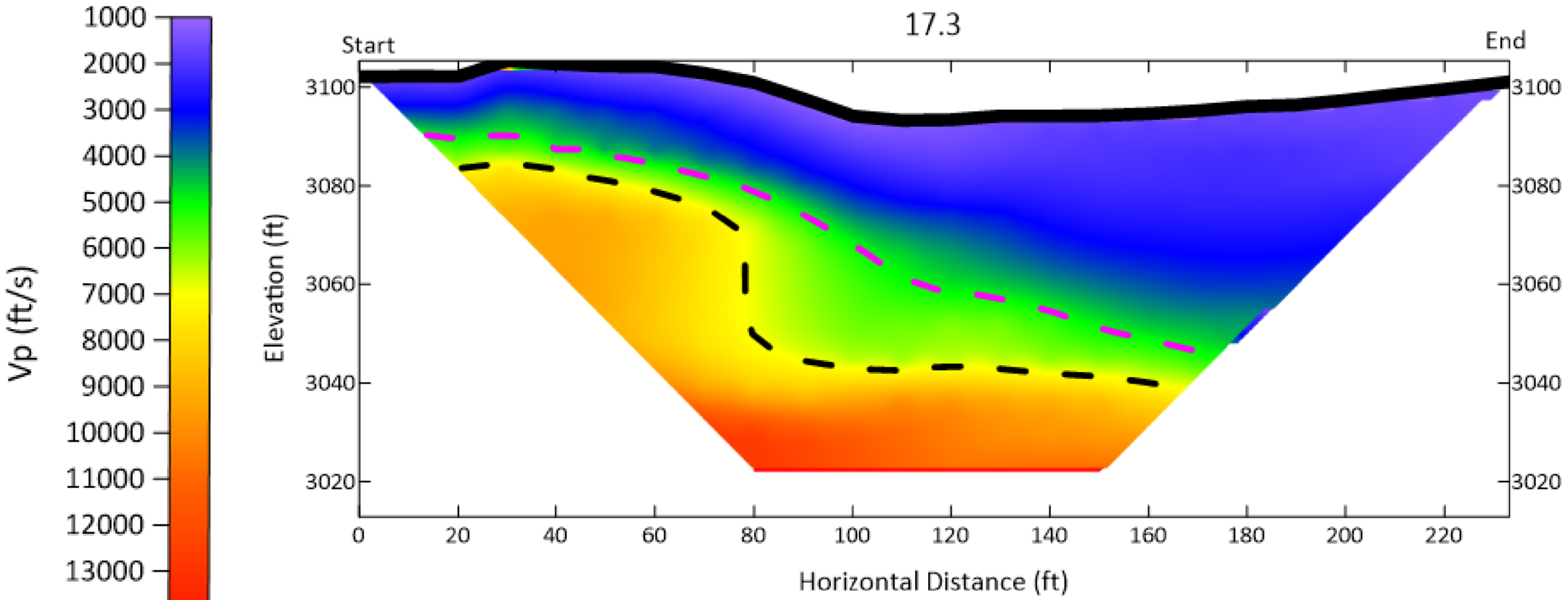
GEOPHYSICAL TESTING PERFORMED BY GEL SOLUTIONS. REFERENCE "SEISMIC REFRACTION SURVEY FOR EVALUATION OF ROCK" DATED 10/01/2021

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

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

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	16

GEOPHYSICAL TEST RESULTS – SEISMIC REFRACTION LINE 17.3



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

REFERENCE: A-0009CB

PROJECT: 32572.1.FS10

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	A-0009CB	1	15

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY *GRAHAM*

PROJECT DESCRIPTION *UPGRADE NC 143 FROM SR 1223 (BEECH CREEK ROAD) TO 0.5 MILES NORTH OF APPALACHIAN TRAIL*

SITE DESCRIPTION *RETAINING WALL #18: SHORED MECHANICALLY STABILIZED EARTH (SMSE) WALL N -L- FROM 375+25 RT TO 378+15 RT*

CONTENTS

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.

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2. 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

CG2 EXPLORATION

BRECCIA

N. MCLAREN

D. GOODNIGHT

C. PIERCY

GEL SOLUTIONS

INVESTIGATED BY *CG2*

DRAWN BY *M. BREWER, P.E.*

CHECKED BY *R. KRAL, P.E.*

SUBMITTED BY *M. BREWER, P.E.*

DATE *MAY 2022*

Prepared in the Office of:

CAROLINAS GEOTECHNICAL GROUP

2400 CROWNPOINT EXECUTIVE DRIVE
SUITE 800
CHARLOTTE, NC 28227
(980) 339-8684

NORTH CAROLINA PROFESSIONAL SEAL 041986 ENGINEER D. MATTHEW BREWER

DocuSigned by:
D. Matthew Brewer
386129C0A4C1462...
SIGNATURE

6/7/2022
DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED 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

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5, A-7-6			
SYMBOL														
% PASSING #10 #40 #200	50 MX 30 MX 15 MX	50 MX 25 MX	51 MN 10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
MATERIAL PASSING #40 LL PI	— 6 MX		— NP	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	NO MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

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

CONSISTENCY OR DENSENESS

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

TEXTURE OR GRAIN SIZE

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

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

GRAIN SIZE	MM	305	75	2.0	0.25	0.05	0.005
	IN.	12	3				

SOIL MOISTURE - CORRELATION OF TERMS

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

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NON PLASTIC	0-5	VERY LOW
SLIGHTLY PLASTIC	6-15	SLIGHT
MODERATELY PLASTIC	16-25	MEDIUM
HIGHLY PLASTIC	26 OR MORE	HIGH

COLOR

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

GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
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.

ANGULARITY OF GRAINS

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

MINERALOGICAL COMPOSITION

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

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LL < 31
MODERATELY COMPRESSIBLE	LL = 31 - 50
HIGHLY COMPRESSIBLE	LL > 50

PERCENTAGE OF MATERIAL

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

GROUND WATER

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

MISCELLANEOUS SYMBOLS

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

RECOMMENDATION SYMBOLS

- UNDERCUT
- SHALLOW UNDERCUT
- UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE
- UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK
- UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL

ABBREVIATIONS

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

SAMPLE ABBREVIATIONS

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

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] CME-45C
- [ ] CME-550
- [X] CME-550X
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [X] DIEDRICH D50
- [ ] _____

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

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B _____ [ ] -H _____
- [ ] -N _____

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

ROCK DESCRIPTION

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:

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

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF*
VERY SEVERE (V 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.

ROCK HARDNESS

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

FRACTURE SPACING

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

BEDDING

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

INDURATION

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

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

TERMS AND DEFINITIONS

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

AQUIFER - A WATER BEARING FORMATION OR STRATA.

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

ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, 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 DISLODGED FROM PARENT MATERIAL.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

BENCH MARK: N/A

ELEVATION: FEET

NOTES:

SURVEY AND ROADWAY DESIGN FILES PROVIDED BY TGS ENGINEERS ON 11/15/2021

DATE: 8-15-14

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	3

SITE PLAN

0 50 100
FEET

NC GRID
NAD 83 NA 2011

-L- PC 37

WOODS

USFS BOUNDARY POST

USFS BOUNDARY POST

83°

BEGIN 17.3

LINE RWAL17.3

END 17.3

LINE RWAL19.1

END 19.1

WOODS

BEGIN 19.1

L-37808L

GREU TL-3

-L-

BST SHOULDER

TL-3

TA-MASH

18" CMP

RWAL18_B-1

RWAL18_B-2

RWAL18_B-3

RWAL18_B-4

RWAL18_B-5

MTL

END 18.2

BEGIN 18.1

LINE RWAL18.1

BEGIN 18.2

LINE RWAL18.2

END 18.1

WOODS

WOODS

WOODS

GPS-15

PROP. RETAINING WALL #18
W/9' WW WILDLIFE FENCE
BEGIN -L- STA. 375+25±
END -L- STA. 378+15±

Prepared in the Office of:
CAROLINAS GEOTECHNICAL GROUP

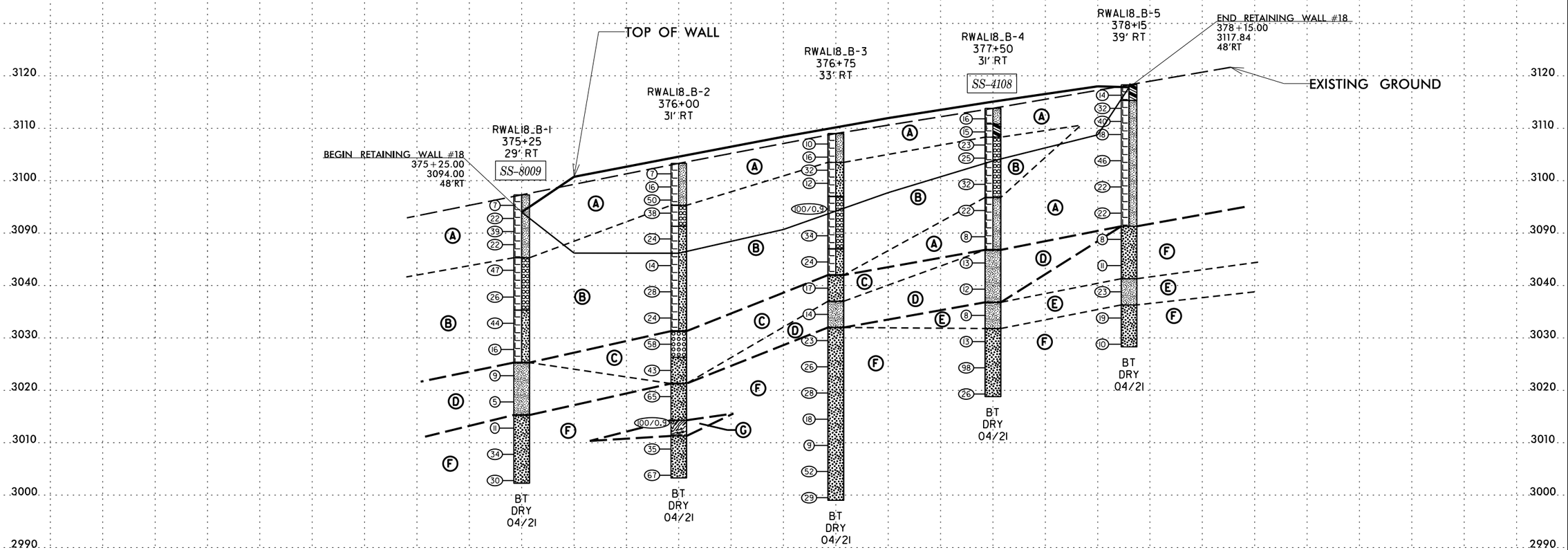
0 50 100
FEET
VE = 2.5:1

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	4

RETAINING WALL #18
PROFILE BORINGS PROJECTED ALONG WALL ENVELOPE

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-8009	29' RT	375+25 -L-	38.5' - 40.0'	A-4(0)	26	NP	16	23	46	15	91	82	62	22	-
SS-4108	31' RT	377+50 -L-	28.5' - 30.0'	A-4(0)	28	2	19	30	34	17	82	71	50	17	-



(A) -ROADWAY EMBANKMENT- MEDIUM STIFF TO HARD, MOIST, BROWN-YELLOW-RED-TAN-ORANGE-GRAY, FINE TO COARSE SANDY SILT (A-4) AND FINE TO COARSE SANDY CLAY (A-6), WITH TRACE TO LITTLE GRAVEL AND TRACE MICA

(B) -ROADWAY EMBANKMENT- MEDIUM DENSE TO VERY DENSE, MOIST, TAN-BROWN-GRAY, SILTY, GRAVELLY FINE TO COARSE SAND (A-1-B) AND SILTY FINE TO COARSE SAND (A-2-4), WITH TRACE GRAVEL AND ASPHALT FRAGMENTS

(C) -COLLUVIAL- MEDIUM DENSE TO VERY DENSE, MOIST, BROWN-GRAY, SILTY, GRAVELLY FINE TO COARSE SAND (A-1-B) AND SILTY FINE TO COARSE SAND (A-2-4), WITH TRACE GRAVEL

(D) -COLLUVIAL- MEDIUM STIFF AND STIFF, MOIST, BROWN-ORANGE-TAN-GRAY, FINE TO COARSE SANDY SILT (A-4), WITH TRACE MANGANESE OXIDE AND GRAVEL

(E) -RESIDUAL- MEDIUM STIFF TO VERY STIFF, MOIST, TAN-BROWN-GRAY-ORANGE, FINE TO COARSE SANDY SILT (A-4), WITH TRACE GRAVEL-SIZED ROCK FRAGMENTS

(F) -RESIDUAL- LOOSE TO VERY DENSE, MOIST, TAN-GRAY-BROWN-ORANGE, SILTY FINE TO COARSE SAND (A-2-4), WITH TO TRACE LITTLE GRAVEL-SIZED ROCK FRAGMENTS

(G) -WEATHERED ROCK- (META-SANDSTONE)

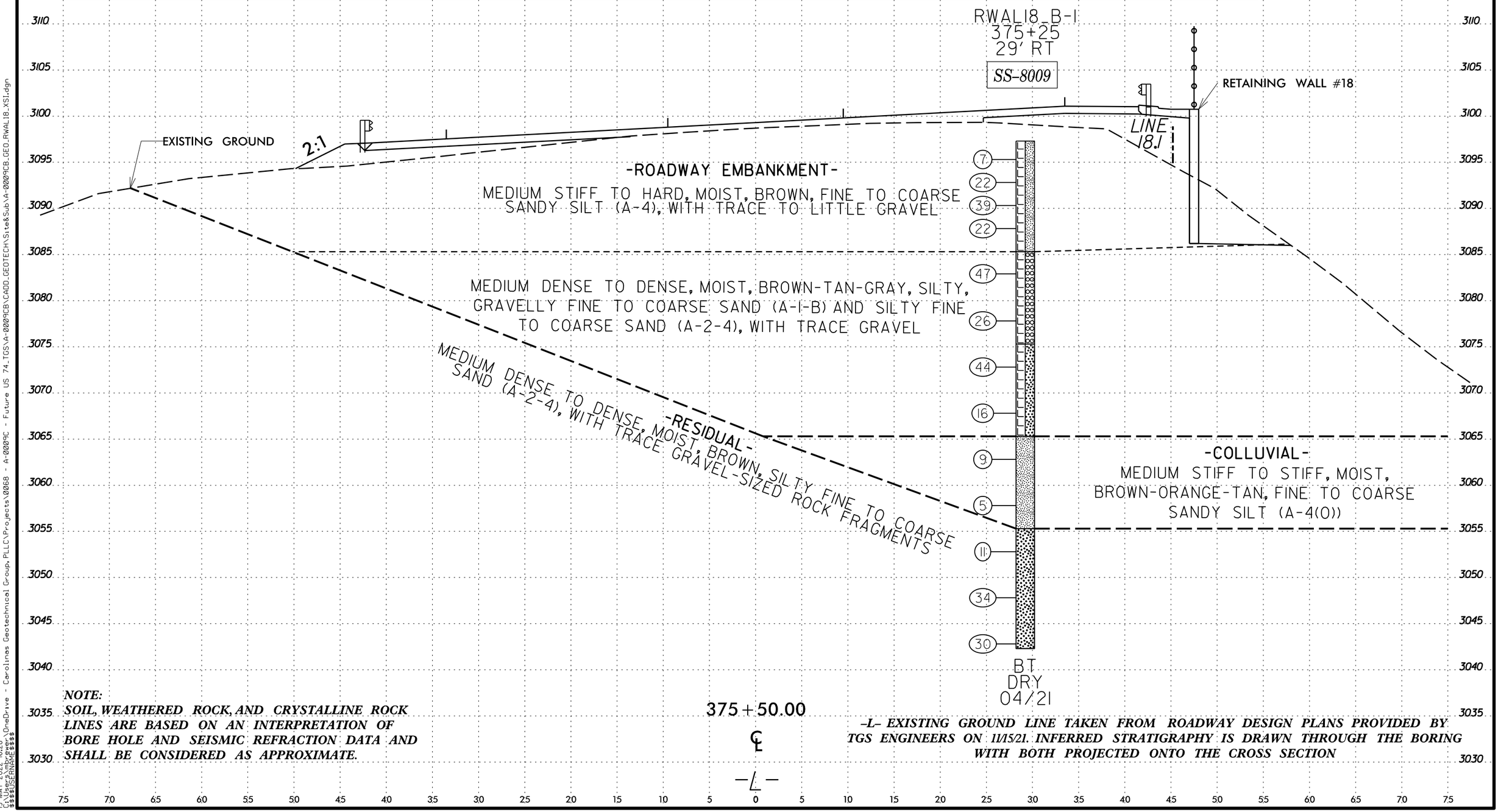
NOTE:
SOIL, WEATHERED ROCK, AND CRYSTALLINE ROCK LINES ARE BASED ON AN INTERPRETATION OF BORE HOLE AND SEISMIC REFRACTION DATA AND SHALL BE CONSIDERED AS APPROXIMATE.

WALL ENVELOPE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING WITH BOTH PROJECTED ONTO THE PROFILE.

373+00 373+50 374+00 374+50 375+00 375+50 376+00 376+50 377+00 377+50 378+00 378+50 379+00 379+50 380+00

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-8009	29' RT	375+25 -L-	38.5' - 40.0'	A-4(0)	26	NP	16	23	46	15	91	82	62	22	-



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.

375+50.00
℄
–L–

–L– EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING WITH BOTH PROJECTED ONTO THE CROSS SECTION

0 2.5 5	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	6

RWAL18_B-2
376+00
31' RT

RETAINING WALL #18

EXISTING GROUND

2:1

-ROADWAY EMBANKMENT-

MEDIUM STIFF TO HARD, MOIST, BROWN, FINE TO COARSE SANDY SILT (A-4), WITH TRACE GRAVEL

MEDIUM DENSE TO DENSE, MOIST, GRAY-BROWN, SILTY, GRAVELLY FINE TO COARSE SAND (A-1-B) AND SILTY FINE TO COARSE SAND (A-2-4), WITH TRACE GRAVEL AND ASPHALT FRAGMENTS

DENSE TO VERY DENSE, MOIST, BROWN-GRAY, SILTY FINE TO COARSE SAND (A-2-4), WITH TRACE GRAVEL-SIZED ROCK FRAGMENTS

-RESIDUAL-

-COLLUVIAL-

DENSE TO VERY DENSE, MOIST, BROWN-GRAY, SILTY GRAVELLY FINE TO COARSE SAND (A-1-B) AND SILTY FINE TO COARSE SAND (A-2-4), WITH TRACE GRAVEL

LINE 18.1

7	
16	
50	
38	
24	
14	
28	
24	
58	
43	
65	
100/0.9	Ⓐ
35	
67	

BT
DRY
04/21

Ⓐ -WEATHERED ROCK- (META-SANDSTONE)

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.

376+00.00
℄
–L–

–L– EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 1/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING WITH BOTH PROJECTED ONTO THE CROSS SECTION

3110 3105 3100 3095 3090 3085 3080 3075 3070 3065 3060 3055 3050 3045 3040 3035 3030

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

EXISTING GROUND

RETAINING WALL #19A
(INVENTORY UNDER SEPARATE COVER)

RWAL18_B-3
376+75
33' RT

LINE
18.2

RETAINING WALL #18

-ROADWAY EMBANKMENT-
STIFF TO VERY STIFF, MOIST, BROWN-YELLOW-RED, FINE TO COARSE SANDY SILT (A-4), WITH TRACE GRAVEL

10
16
32
12

MEDIUM DENSE TO VERY DENSE, MOIST, GRAY-BROWN, SILTY, GRAVELLY FINE TO COARSE SAND (A-1-B) AND SILTY FINE TO COARSE SAND (A-2-4), WITH TRACE GRAVEL

100/0.9
34
24

-RESIDUAL-
LOOSE TO VERY DENSE, MOIST, BROWN-GRAY, SILTY FINE TO COARSE SAND (A-2-4), WITH TRACE GRAVEL

-COLLUVIAL-
MEDIUM DENSE, MOIST, BROWN, SILTY FINE TO COARSE SAND (A-2-4), WITH TRACE GRAVEL

17
14

STIFF, MOIST, BROWN, FINE TO COARSE SANDY SILT (A-4), WITH TRACE MANGANESE OXIDE

23
26
28
18
9
52
29

BT
DRY
04/21

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 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING WITH BOTH PROJECTED ONTO THE CROSS SECTION

377+00.00
℄
-L-

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-4108	31' RT	377+50 -L-	28.5' - 30.0'	A-4(0)	28	2	19	30	34	17	82	71	50	17	-

RETAINING WALL #19A
(INVENTORY UNDER SEPARATE COVER)

LINE 19.1

RWAL18_B-4
377+50
31' RT
SS-4108

LINE 18.2

RETAINING WALL #18

EXISTING GROUND

-ROADWAY EMBANKMENT- Ⓐ

MEDIUM DENSE TO DENSE, DRY TO MOIST, TAN-BROWN, SILTY, GRAVELLY FINE TO COARSE SAND (A-1-B)

-RESIDUAL-
MEDIUM STIFF, MOIST, TAN-BROWN-GRAY-ORANGE, FINE TO MEDIUM DENSE TO VERY DENSE, MOIST, TAN-GRAY-

MEDIUM STIFF TO VERY STIFF, MOIST, TAN-BROWN-ORANGE, FINE TO COARSE SANDY SILT (A-4), WITH TRACE MICA AND LITTLE GRAVEL

-COLLUVIAL-

STIFF, TAN-ORANGE-GRAY, MOIST, FINE SANDY SILT (A-4(0)), WITH TRACE GRAVEL

COARSE SANDY SILT (A-4), WITH TRACE GRAVEL-SIZED ROCK FRAGMENTS

ORANGE, SILTY FINE TO COARSE SAND (A-2-4), WITH LITTLE GRAVEL-SIZED ROCK FRAGMENTS

16 15 23 25 32 22 8 13 12 8 13 98 26

BT
DRY
04/21

Ⓐ -ROADWAY EMBANKMENT- STIFF TO VERY STIFF, MOIST, TAN-ORANGE-BROWN-GRAY, FINE TO COARSE SANDY SILT (A-4) AND FINE TO COARSE SANDY CLAY (A-6), WITH LITTLE GRAVEL

-WEATHERED ROCK- (META-SANDSTONE)

-CRYSTALLINE ROCK-
(META-SANDSTONE)

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 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING WITH BOTH PROJECTED ONTO THE CROSS SECTION

377+50.00
℄
-L-

3135 3130 3125 3120 3115 3110 3105 3100 3095 3090 3085 3080 3075 3070 3065 3060 3055

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

LINE 19.1

1.5:1

EXISTING GROUND

RETAINING WALL #19A
(INVENTORY UNDER SEPARATE COVER)

L_37808L
378+08
7' LT

72
21
12
20
100/0.5
100/0.4
50
BT
DRY
08/21

-ROADWAY EMBANKMENT-
STIFF TO HARD, GRAY-BROWN-TAN-ORANGE, FINE TO COARSE SANDY CLAY (A-6) AND SANDY SILT (A-4), WITH TRACE MICA AND GRAVEL

-RESIDUAL- LOOSE TO VERY DENSE, MOIST, FINE TO COARSE SAND (A-2-4), WITH TRACE MICA AND TRACE TO LITTLE GRAVEL-SIZED ROCK FRAGMENTS

-WEATHERED ROCK- (META-SANDSTONE)

-CRYSTALLINE ROCK-
(META-SANDSTONE)

RWAL18_B-5
378+15
39' RT

LINE 18.2

RETAINING WALL #18

14
32
40
18
46
22
22
8
11
23
19
10
BT
DRY
04/21

Ⓐ -RESIDUAL- VERY STIFF, MOIST, TAN-BROWN-GRAY, FINE TO COARSE SANDY SILT (A-4)

-L- EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING WITH BOTH PROJECTED ONTO THE CROSS SECTION

378+00.00
℄
-L-

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.

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 32572.1.FS10	**TIP** A-0009CB	**COUNTY** GRAHAM	**GEOLOGIST** C. Piercy	
SITE DESCRIPTION Upgrade NC 143 from SR 1223 (Beech Creek Road) to 0.5 Miles North of Appalachian Trail				**GROUND WTR (ft)**
BORING NO. RWAL18_B-1	**STATION** 375+25	**OFFSET** 29 ft RT	**ALIGNMENT** L	**0 HR.** Dry
COLLAR ELEV. 3,097.3 ft	**TOTAL DEPTH** 55.0 ft	**NORTHING** 618,960	**EASTING** 593,163	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE BRE9533 CME-550X 78% 03/12/2021		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Phillips	**START DATE** 04/26/21	**COMP. DATE** 04/26/21	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft) / DEPTH (ft)
3100										
	3,097.3									3,097.3 GROUND SURFACE 0.0
	3,096.3	1.0								**ROADWAY EMBANKMENT** Medium Stiff to Hard, Brown, Fine to Coarse Sandy SILT (A-4), with trace to little gravel
3095			4	3	4	7		M		
	3,093.8	3.5								
	3,091.3	6.0	3	10	12	22		M		
3090			7	18	21	39		M		
	3,088.8	8.5								
			12	13	9	22		M		
3085										
	3,083.8	13.5								3,085.3 12.0
			20	27	20	47		M		Medium Dense to Dense, Brown, Silty, Gravelly Fine to Coarse SAND (A-1-b)
3080										
	3,078.8	18.5								
			21	14	12	26		M		
3075										
	3,073.8	23.5								3,075.3 22.0
			3	16	28	44		M		Medium Dense to Dense, Brown-Tan-Gray, Silty Fine to Coarse SAND (A-2-4), with trace gravel
3070										
	3,068.8	28.5								
			11	9	7	16		M		
3065										
	3,063.8	33.5								3,065.3 32.0
			5	6	3	9		M		**COLLUVIAL** Medium Stiff to Stiff, Brown-Orange-Tan, Fine to Coarse Sandy SILT (A-4(0))
3060										
	3,058.8	38.5								
			2	2	3	5	SS-8009	22%		
3055										
	3,053.8	43.5								3,055.3 42.0
			9	6	5	11		M		**RESIDUAL** Medium Dense to Dense, Brown, Silty Fine to Coarse SAND (A-2-4), with trace gravel-sized rock fragments
3050										
	3,048.8	48.5								
			14	16	18	34		M		
3045										
	3,043.8	53.5								
			11	13	17	30		M		3,042.3 55.0
										Boring Terminated at Elevation 3,042.3 ft In Residual Silty Sand (A-2-4)

WBS 32572.1.FS10	**TIP** A-0009CB	**COUNTY** GRAHAM	**GEOLOGIST** C. Piercy	
SITE DESCRIPTION Upgrade NC 143 from SR 1223 (Beech Creek Road) to 0.5 Miles North of Appalachian Trail				**GROUND WTR (ft)**
BORING NO. RWAL18_B-2	**STATION** 376+00	**OFFSET** 31 ft RT	**ALIGNMENT** L	**0 HR.** Dry
COLLAR ELEV. 3,103.3 ft	**TOTAL DEPTH** 60.0 ft	**NORTHING** 618,880	**EASTING** 593,163	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE BRE9533 CME-550X 78% 03/12/2021		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Phillips	**START DATE** 04/26/21	**COMP. DATE** 04/26/21	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
3105										
	3,103.3									3,103.3 GROUND SURFACE 0.0
	3,102.3	1.0								**ROADWAY EMBANKMENT** Medium Stiff to Hard, Brown, Fine to Coarse Sandy SILT (A-4), with trace gravel
			2	4	3	7		M		
3100	3,099.8	3.5								
			7	9	7	16		M		
	3,097.3	6.0								
			4	20	30	50		M		
3095	3,094.8	8.5								3,095.3 8.0
			20	17	21	38		M		Dense, Gray-Brown, Silty, Gravelly Fine to Coarse SAND (A-1-b)
3090	3,089.8	13.5								3,091.3 12.0
			15	12	12	24		M		Medium Dense, Brown, Silty Fine to Coarse SAND (A-2-4), with trace gravel and asphalt fragments
3085	3,084.8	18.5								
			7	6	8	14		M		
3080	3,079.8	23.5								
			4	15	13	28		M		
3075	3,074.8	28.5								
			10	14	10	24		M		
3070	3,069.8	33.5								3,071.3 32.0
			11	32	26	58		M		**COLLUVIAL** Very Dense, Brown-Gray, Silty, Gravelly Fine to Coarse SAND (A-1-b)
3065	3,064.8	38.5								3,066.3 37.0
			15	26	17	43		M		Dense, Brown, Silty Fine to Coarse SAND (A-2-4), with trace gravel
3060	3,059.8	43.5								3,061.3 42.0
			21	25	40	65		M		**RESIDUAL** Very Dense, Brown-Gray, Silty Fine to Coarse SAND (A-2-4), with trace gravel-sized rock fragments
3055	3,054.8	48.5								3,054.3 49.0
			15	21	79/0.4	100/0.9				**WEATHERED ROCK** Gray, (META-SANDSTONE)
3050	3,049.8	53.5								3,051.3 52.0
			20	19	16	35		M		**RESIDUAL** Dense to Very Dense, Brown-Gray, Silty Fine to Coarse SAND (A-2-4), with trace gravel-sized rock fragments
3045	3,044.8	58.5								
			13	44	23	67		M		3,043.3 60.0
										Boring Terminated at Elevation 3,043.3 ft In Residual Silty Sand (A-2-4)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 32572.1.FS10	**TIP** A-0009CB	**COUNTY** GRAHAM	**GEOLOGIST** C. Piercy	
SITE DESCRIPTION Upgrade NC 143 from SR 1223 (Beech Creek Road) to 0.5 Miles North of Appalachian Trail				**GROUND WTR (ft)**
BORING NO. RWAL18_B-3	**STATION** 376+75	**OFFSET** 33 ft RT	**ALIGNMENT** L	**0 HR.** Dry
COLLAR ELEV. 3,109.0 ft	**TOTAL DEPTH** 70.0 ft	**NORTHING** 618,800	**EASTING** 593,180	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE BRE9533 CME-550X 78% 03/12/2021		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Phillips	**START DATE** 04/27/21	**COMP. DATE** 04/27/21	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
3110										
										3,109.0 / 0.0 — GROUND SURFACE
	3,108.0	1.0	4	4	6	10		M		**ROADWAY EMBANKMENT** Stiff to Very Stiff, Brown-Yellow-Red, Fine to Coarse Sandy SILT (A-4), with trace gravel
3105	3,105.5	3.5	8	8	8	16		M		
	3,103.0	6.0	11	16	16	32		M		3,103.5 / 5.5 — Medium Dense to Dense, Brown, Silty Fine to Coarse SAND (A-2-4), with trace gravel
3100	3,100.5	8.5	9	7	5	12		M		
3095	3,095.5	13.5	13	87/0.4		100/0.9				3,097.0 / 12.0 — Dense to Very Dense, Gray-Brown, Silty, Gravelly Fine to Coarse SAND (A-1-b)
3090	3,090.5	18.5	18	18	16	34		M		
3085	3,085.5	23.5	6	11	13	24		M		3,087.0 / 22.0 — Medium Dense, Brown, Silty Fine to Coarse SAND (A-2-4), with trace gravel
3080	3,080.5	28.5	4	6	11	17		M		3,082.0 / 27.0 — **COLLUVIAL** Medium Dense, Brown, Silty Fine to Coarse SAND (A-2-4), with trace gravel
3075	3,075.5	33.5	5	7	7	14		M		3,077.0 / 32.0 — Stiff, Brown, Fine to Coarse Sandy SILT (A-4), with trace manganese oxide
3070	3,070.5	38.5	13	11	12	23		M		3,072.0 / 37.0 — **RESIDUAL** Loose to Very Dense, Brown-Gray, Silty Fine to Coarse SAND (A-2-4), with trace gravel
3065	3,065.5	43.5	15	13	13	26		M		
3060	3,060.5	48.5	18	14	14	28		M		
3055	3,055.5	53.5	8	8	10	18		M		
3050	3,050.5	58.5	5	4	5	9		M		
3045	3,045.5	63.5	15	23	29	52		M		
3040	3,040.5	68.5	9	12	17	29		M		3,039.0 / 70.0 — Boring Terminated at Elevation 3,039.0 ft In Residual Silty Sand (A-2-4)

WBS 32572.1.FS10	**TIP** A-0009CB	**COUNTY** GRAHAM	**GEOLOGIST** N. McLaren	
SITE DESCRIPTION Upgrade NC 143 from SR 1223 (Beech Creek Road) to 0.5 Miles North of Appalachian Trail				**GROUND WTR (ft)**
BORING NO. RWAL18_B-4	**STATION** 377+50	**OFFSET** 31 ft RT	**ALIGNMENT** L	**0 HR.** Dry
COLLAR ELEV. 3,113.8 ft	**TOTAL DEPTH** 55.0 ft	**NORTHING** 618,727	**EASTING** 593,218	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CG20446 Diedrich D50 83% 06/16/2020		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Estep	**START DATE** 04/26/21	**COMP. DATE** 04/26/21	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
3115										
										3,113.8 — GROUND SURFACE 0.0
	3,112.8	1.0	5	6	10	16		M		**ROADWAY EMBANKMENT** Very Stiff, Tan-Orange-Brown, Fine to
3110	3,110.3	3.5	5	5	10	15		M		3,110.8 — Coarse Sandy SILT (A-4), with little gravel 3.0
	3,107.8	6.0	19	17	6	23		M		Stiff, Tan-Gray-Brown, Fine to Coarse Sandy CLAY (A-6), with little gravel 3,108.3 — 5.5
3105	3,105.3	8.5	13	14	11	25		D		Medium Dense to Dense, Tan-Brown, Silty, Gravelly Fine to Coarse SAND (A-1-b)
3100	3,100.3	13.5	13	14	18	32		M		
3095	3,095.3	18.5	16	11	11	22		M		3,096.8 / 17.0 — Medium Stiff to Very Stiff, Tan-Brown-Orange, Fine to Coarse Sandy SILT (A-4), with trace mica and little gravel
3090	3,090.3	23.5	5	3	5	8		M		
3085	3,085.3	28.5	8	7	6	13	SS-4108	17%		3,086.8 / 27.0 — **COLLUVIAL** Stiff, Tan-Orange-Gray, Fine Sandy SILT (A-4(0)), with trace gravel
3080	3,080.3	33.5	4	5	7	12		M		
3075	3,075.3	38.5	6	4	4	8		M		3,076.8 / 37.0 — **RESIDUAL** Medium Stiff, Tan-Brown-Gray-Orange, Fine to Coarse Sandy SILT (A-4), with trace gravel-sized rock fragments
3070	3,070.3	43.5	2	4	9	13		M		3,071.8 / 42.0 — Medium Dense to Very Dense, Tan-Gray-Orange, Silty Fine to Coarse SAND (A-2-4), with little gravel-sized rock fragments
3065	3,065.3	48.5	23	69	29	98		M		
3060	3,060.3	53.5	6	14	12	26		M		3,058.8 / 55.0 — Boring Terminated at Elevation 3,058.8 ft In Residual Silty Sand (A-2-4)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 32572.1.FS10	**TIP** A-0009CB	**COUNTY** GRAHAM	**GEOLOGIST** D. Goodnight	
SITE DESCRIPTION Upgrade NC 143 from SR 1223 (Beech Creek Road) to 0.5 Miles North of Appalachian Trail				**GROUND WTR (ft)**
BORING NO. L_37808L	**STATION** 378+08	**OFFSET** 7 ft LT	**ALIGNMENT** L	**0 HR.** Dry
COLLAR ELEV. 3,114.0 ft	**TOTAL DEPTH** 25.0 ft	**NORTHING** 618,703	**EASTING** 593,285	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE FME9553 CME-550X 80% 03/12/2021		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Phillips	**START DATE** 08/13/21	**COMP. DATE** 08/13/21	**SURFACE WATER DEPTH** N/A	

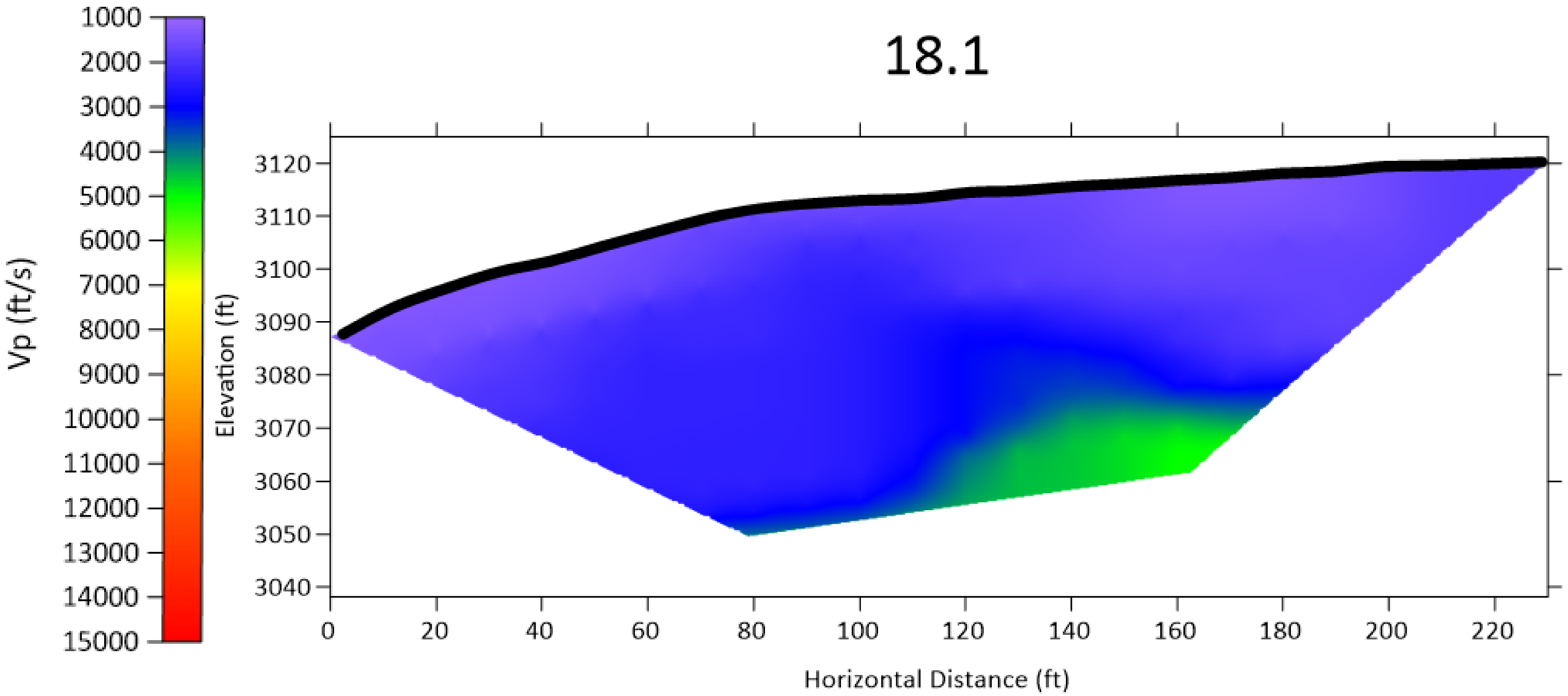
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
3115										3,114.0 GROUND SURFACE	0.0
	3,113.0	1.0	27	30	42	72		M		**RESIDUAL** Very Dense, Gray, Fine to Coarse Sandy GRAVEL (A-1-A)	
3110	3,110.5	3.5	4	8	13	21		M		3,111.0 Medium Dense, Tan, Silty Fine SAND (A-2-4)	3.0
	3,108.0	6.0	4	4	8	12		M			
3105	3,105.5	8.5	3	7	13	20		M			
	3,100.5	13.5	100/0.5			100/0.5				3,102.0 **WEATHERED ROCK** Tan-Gray, (META-SANDSTONE)	12.0
3100											
3095	3,095.5	18.5	100/0.4			100/0.4				3,093.0 **RESIDUAL** Dense, Tan-Gray, Silty Fine SAND (A-2-4), with trace gravel-sized rock fragments	21.0
	3,090.5	23.5	16	20	30	50		M		3,089.0 Boring Terminated at Elevation 3,089.0 ft In Residual Silty Sand (A-2-4)	25.0

WBS 32572.1.FS10	**TIP** A-0009CB	**COUNTY** GRAHAM	**GEOLOGIST** N. McLaren	
SITE DESCRIPTION Upgrade NC 143 from SR 1223 (Beech Creek Road) to 0.5 Miles North of Appalachian Trail				**GROUND WTR (ft)**
BORING NO. RWAL18_B-5	**STATION** 378+15	**OFFSET** 39 ft RT	**ALIGNMENT** L	**0 HR.** Dry
COLLAR ELEV. 3,118.3 ft	**TOTAL DEPTH** 50.0 ft	**NORTHING** 618,666	**EASTING** 593,257	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CG20446 Diedrich D50 83% 06/16/2020		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Estep	**START DATE** 04/26/21	**COMP. DATE** 04/26/21	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
3120										3,118.3 GROUND SURFACE 0.0
	3,117.3	1.0	7	7	7	14		M		**ROADWAY EMBANKMENT** Stiff, Gray-Brown-Tan, Fine to Coarse Sandy CLAY (A-6), with trace gravel and mica
3115	3,114.8	3.5	5	14	18	32		M		3,115.3 3.0
	3,112.3	6.0	24	21	19	40		M		Very Stiff to Hard, Tan-Orange-Gray-Brown, Fine to Coarse Sandy SILT (A-4), with trace mica and gravel
3110	3,109.8	8.5	10	9	9	18		M		
3105	3,104.8	13.5	13	23	23	46		M		
3100	3,099.8	18.5	19	14	8	22		M		
3095	3,094.8	23.5	21	13	9	22		M		
3090	3,089.8	28.5	14	4	4	8		M		3,091.3 **RESIDUAL** Loose to Medium Dense, Tan-Orange-Gray-Brown, Silty Fine to Coarse SAND (A-2-4), with trace mica and gravel-sized rock fragments 27.0
3085	3,084.8	33.5	4	4	7	11		M		
3080	3,079.8	38.5	9	10	13	23		M		3,081.3 Very Stiff, Tan-Brown-Gray, Fine to Coarse Sandy SILT (A-4) 37.0
3075	3,074.8	43.5	5	9	10	19		M		3,076.3 Loose to Medium Dense, Tan-Gray-Brown, Silty Fine to Coarse SAND (A-2-4), with little gravel-sized rock fragments 42.0
3070	3,069.8	48.5	7	5	5	10		M		3,068.3 Boring Terminated at Elevation 3,068.3 ft In Residual Silty Sand (A-2-4) 50.0

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	13

GEOPHYSICAL TEST RESULTS – SEISMIC REFRACTION LINE 18.1



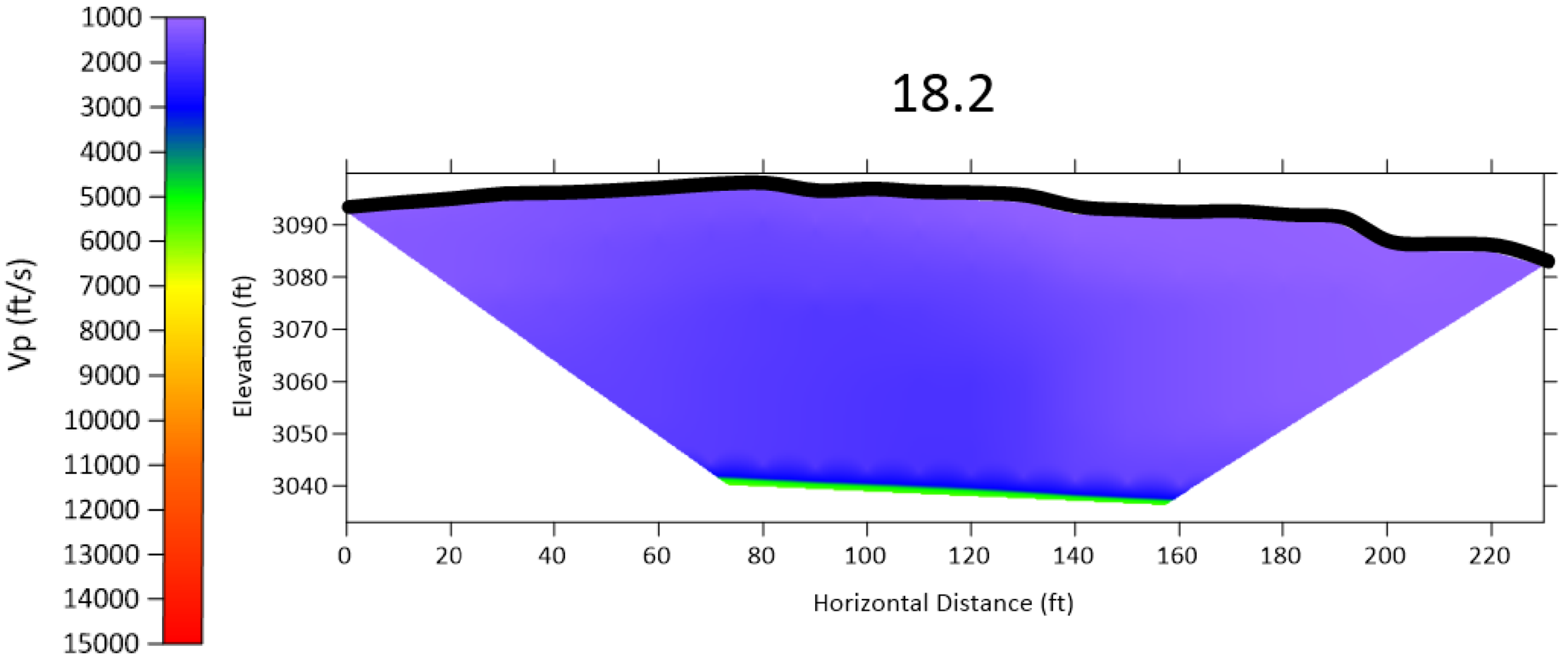
GEOPHYSICAL TESTING PERFORMED BY GEL SOLUTIONS. REFERENCE "SEISMIC REFRACTION SURVEY FOR EVALUATION OF ROCK" DATED 10/01/2021

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

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

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	14

GEOPHYSICAL TEST RESULTS – SEISMIC REFRACTION LINE 18.2



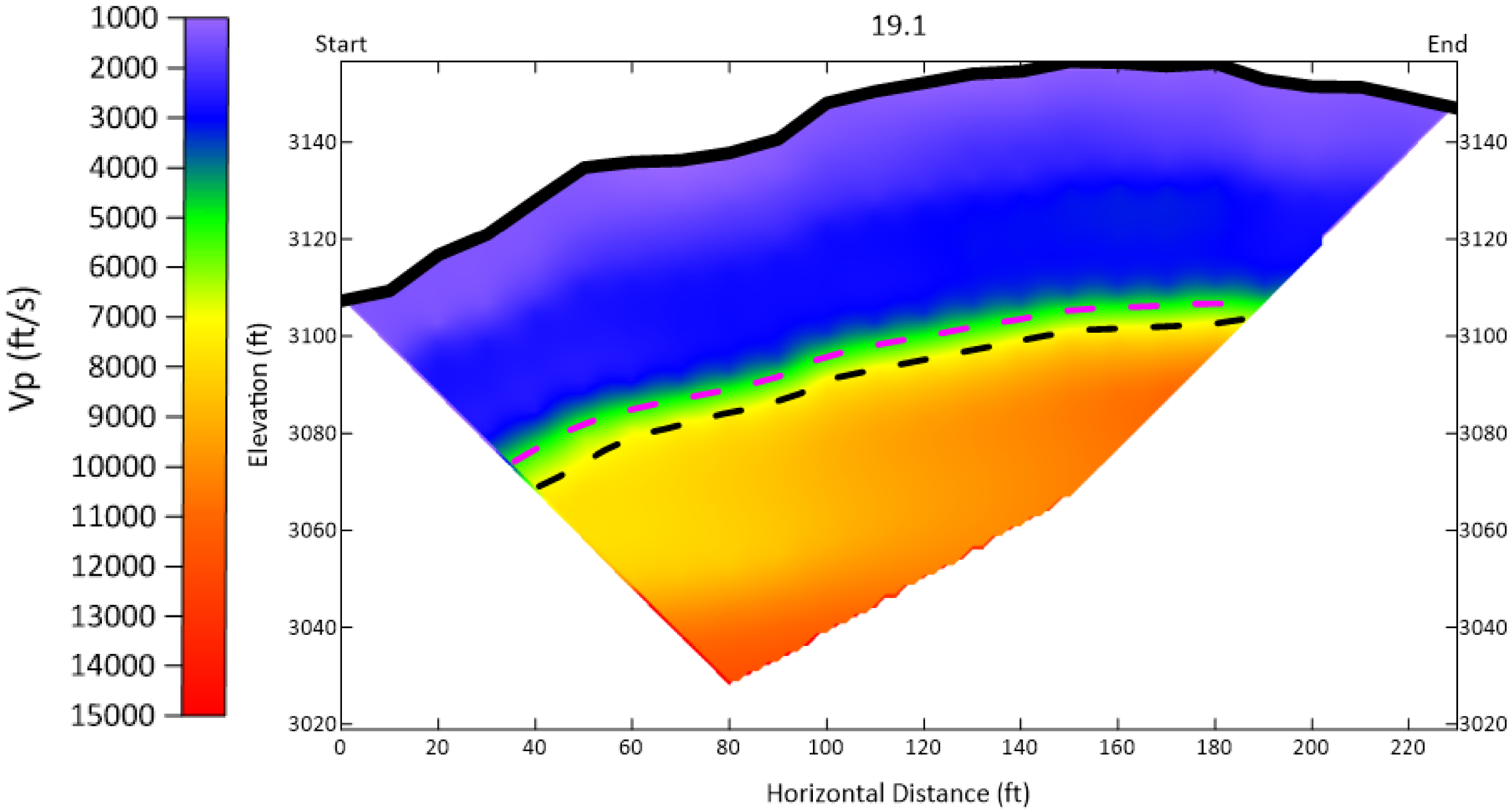
GEOPHYSICAL TESTING PERFORMED BY GEL SOLUTIONS. REFERENCE "SEISMIC REFRACTION SURVEY FOR EVALUATION OF ROCK" DATED 10/01/2021

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

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

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	15

GEOPHYSICAL TEST RESULTS – SEISMIC REFRACTION LINE 19.1



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