STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	DF18314.2045181	1	

PROJECT: N/A

REFERENCE: DF18314.2045181

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY *HENDERSON*

PROJECT DESCRIPTION *ROADWAY REPAIRS ON SR 1188 (DAVIS MOUNTAIN RD) FROM SR 1171 (HEBRON RD) TO OLD ORCHARD RD*

SITE DESCRIPTION *CULVERT ON SR 1188 OVER NORTH FORK BIG WILLOW CREEK -L1- STA. 10+86*

CONTENTS

PERSONNEL

M. MALISHER, E.I.T.

CG2 EXPLORATION

INVESTIGATED BY *CG2, PLLC*

DRAWN BY *P. MCKENZIE, E.I.T.*

CHECKED BY *K. DE MONTBRUN, P.E.*

SUBMITTED BY *CG2, PLLC*

DATE *JULY 2025*

Prepared in the Office of:

CAROLINAS GEOTECHNICAL GROUP

1805 SARDIS ROAD NORTH
SUITE 100
CHARLOTTE, NC 28270
(980) 339-8684

NORTH CAROLINA PROFESSIONAL SEAL 045542 ENGINEER KELLY DE MONTBRUN

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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 PERFORM INDEPENDENT SUBSURFACE INVESTIGATIONS AND MAKE INTERPRETATIONS AS NECESSARY TO CONFIRM CONDITIONS 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.

PROJECT REFERENCE NO.	SHEET NO.
DF18314.2045181	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS
(PAGE 1 OF 2)

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) PL — PLASTIC LIMIT	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
OM — OPTIMUM MOISTURE SL — SHRINKAGE LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
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-55
- [X] CME-550X
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [ ] _____
- [ ] _____

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
- [ ] _____

PROJECT REFERENCE NO.	SHEET NO.
DF18314.2045181	2A

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS
(PAGE 2 OF 2)

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 ORIG,NAL POSITION AND DISLODGED FROM PARENT MATERIAL.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

BENCH MARK:

ELEVATION: FEET

NOTES:

HORIZONTAL AND VERTICAL BORING LOCATONS OBTAINED USING CARLSON BRX7 (SURVEY GRADE GPS).

DESIGN FILES PROVIDED BY JMT, MAY 2025.

FIAD = FILLED IN AFTER DRILLING

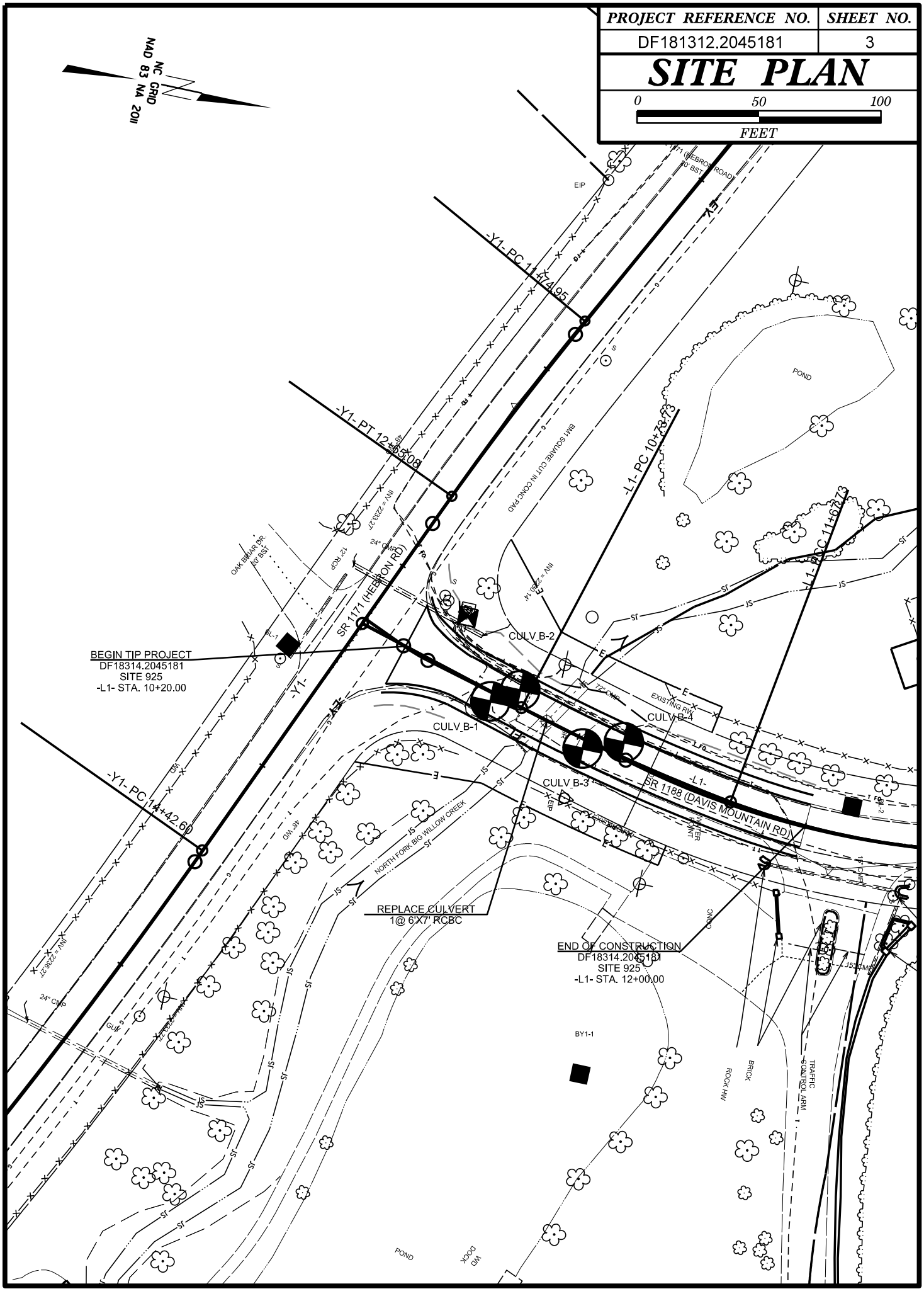
DATE: 8-15-14

PROJECT REFERENCE NO.	SHEET NO.
DF181312.2045181	3

SITE PLAN

0 50 100

FEET



GEOTECHNICAL BORING REPORT
BORE LOG

WBS DF18314.2045181	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** M. Malisher	
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 925				**GROUND WTR (ft)**
BORING NO. CULV_B-1	**STATION** 10+61	**OFFSET** 4 ft RT	**ALIGNMENT** -L1-	**0 HR.** 8.7
COLLAR ELEV. 2,234.2 ft	**TOTAL DEPTH** 28.5 ft	**NORTHING** 585,280	**EASTING** 944,347	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic
DRILLER J. Estep	**START DATE** 04/21/25	**COMP. DATE** 04/21/25	**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)
2235												
										GROUND SURFACE	2,234.2	0.0
	2,233.2	1.0	5	6	4	10		M		**ROADWAY EMBANKMENT** Asphalt (0.2')	2,234.0	0.2
2230	2,230.5	3.7	2	4	6	10		M		Stiff, Red-Brown, Fine to Coarse Sandy CLAY (A-6)	2,231.7	2.5
	2,228.2	6.0	1	1	0	1		Sat.		Stiff, Brown, Fine Sandy SILT (A-4), with trace gravel	2,228.7	5.5
2225	2,225.5	8.7	8	10	10	20		Sat.		**ALLUVIAL** Very Loose, Gray, Silty Fine SAND (A-2-4)	2,226.2	8.0
2220	2,220.5	13.7	3	4	5	9		W		Medium Dense, Brown-Gray, Fine to Coarse Sandy GRAVEL (A-1-a)	2,222.2	12.0
2215	2,215.5	18.7	14	40	60/0.4	100/0.9				**RESIDUAL** Stiff, Brown, Fine to Coarse Sandy SILT (A-4), with trace mica	2,215.0	19.2
2210	2,210.5	23.7	100/0.3			100/0.3				**WEATHERED ROCK** Brown-Gray-White (Granitic Gneiss)		
	2,209.2	25.0	67	33/0.4		100/0.9						
	2,205.7	28.5	60/0.0			60/0.0				Boring Terminated with Standard Penetration Test Refusal at Elevation 2,205.7 ft On Crystalline Rock (Granitic Gneiss)	2,205.7	28.5

GEOTECHNICAL BORING REPORT
BORE LOG

WBS DF18314.2045181	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** M. Malisher	
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 925				**GROUND WTR (ft)**
BORING NO. CULV_B-2	**STATION** 10+70	**OFFSET** 6 ft LT	**ALIGNMENT** -L1-	**0 HR.** 8.5
COLLAR ELEV. 2,234.0 ft	**TOTAL DEPTH** 25.7 ft	**NORTHING** 585,291	**EASTING** 944,340	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic
DRILLER J. Estep	**START DATE** 04/21/25	**COMP. DATE** 04/21/25	**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)
2235										2,234.0 GROUND SURFACE	0.0
	2,233.7	0.3								**ROADWAY EMBANKMENT** Asphalt (0.3')	
	2,233.0	1.0	5	5	6	11	SS-1329	17%		Soft to Stiff, Brown-Red, Moderately Plastic Fine to Coarse Sandy CLAY (A-6(6)), with trace gravel	
2230	2,230.3	3.7	1	2	2	4		M		2,228.5	5.5
	2,228.0	6.0	2	1	1	2		Sat.		**ALLUVIAL** Very Loose, Gray, Silty Fine to Coarse SAND (A-2-4)	
2225	2,225.3	8.7	7	10	9	19		Sat.		2,226.0 Medium Dense, Brown-Gray, Fine to Coarse Sandy GRAVEL (A-1-a)	8.0
										2,222.0	12.0
2220	2,220.3	13.7	5	9	10	19		W		**RESIDUAL** Medium Dense, Brown-Orange, Silty Fine to Coarse SAND (A-2-4), with trace mica	
2215	2,215.3	18.7	100/0.4			100/0.4				2,215.3	18.7
2210										**WEATHERED ROCK** Brown (Granitic Gneiss)	
	2,208.3	25.7	60/0.0			60/0.0				2,208.3	25.7
										Boring Terminated with Standard Penetration Test Refusal at Elevation 2,208.3 ft On Crystalline Rock (Granitic Gneiss)	

GEOTECHNICAL BORING REPORT
BORE LOG

WBS DF18314.2045181	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** M. Malisher
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 925			**GROUND WTR (ft)**
BORING NO. CULV_B-3	**STATION** 11+04	**OFFSET** 4 ft RT	**ALIGNMENT** -L1-	**0 HR.** 7.2
COLLAR ELEV. 2,233.8 ft	**TOTAL DEPTH** 36.4 ft	**NORTHING** 585,321	**EASTING** 944,358	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER J. Estep	**START DATE** 04/21/25	**COMP. DATE** 04/21/25	**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)
2235										2,233.8 GROUND SURFACE	0.0
	2,232.8	1.0	2	3	3	6	SS-1346	25%		**ROADWAY EMBANKMENT** Asphalt (0.2') Soft to Medium Stiff, Red, Moderately Plastic Fine to Coarse Sandy CLAY (A-6(7))	
2230	2,229.8	4.0	2	1	1	2		M		2,228.3	5.5
	2,227.8	6.0	2	1	0	1				2,226.8 **ALLUVIAL** Very Loose, Brown-Gray, Silty Fine to Coarse SAND (A-2-4)	7.0
2225	2,224.8	9.0	5	14	17	31		Sat.		Dense, Gray, Fine to Coarse Sandy GRAVEL (A-1-a)	
2220	2,219.8	14.0	2	3	3	6		W		2,221.8 **RESIDUAL** Medium Stiff to Very Stiff, Gray-White-Orange, Fine to Coarse Sandy SILT (A-4), with trace mica	12.0
2215	2,214.8	19.0	7	9	7	16		W			
2210	2,209.8	24.0	55	45/0.2		100/0.7				2,209.8 **WEATHERED ROCK** Gray-Brown (Granitic Gneiss)	24.0
2205	2,204.8	29.0	40	46	18	64		M		2,206.8 **RESIDUAL** Very Dense, Gray-White-Orange, Silty Fine to Coarse SAND (A-2-4), with trace mica	27.0
2200	2,199.8	34.0	16	84/0.4		100/0.9				2,199.8 **WEATHERED ROCK** Gray-White (Granitic Gneiss)	34.0
	2,197.4	36.4	60/0.0			60/0.0				2,197.4 Boring Terminated with Standard Penetration Test Refusal at Elevation 2,197.4 ft On Crystalline Rock (Granitic Gneiss)	36.4

GEOTECHNICAL BORING REPORT
BORE LOG

WBS DF18314.2045181	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** M. Malisher	
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 925				**GROUND WTR (ft)**
BORING NO. CULV_B-4	**STATION** 11+18	**OFFSET** 6 ft LT	**ALIGNMENT** -L1-	**0 HR.** 8.8
COLLAR ELEV. 2,233.9 ft	**TOTAL DEPTH** 35.4 ft	**NORTHING** 585,337	**EASTING** 944,352	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic
DRILLER J. Estep	**START DATE** 04/21/25	**COMP. DATE** 04/21/25	**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)
2235											
										2,233.9 GROUND SURFACE	0.0
	2,232.9	1.0	3	4	4	8		M		**ROADWAY EMBANKMENT** Asphalt (0.3')	0.3
2230	2,230.1	3.8	8	6	6	12		M		2,230.4 Medium Stiff, Gray-Red, Fine to Coarse Sandy CLAY (A-6), with trace gravel	3.5
	2,227.9	6.0	WOH	WOH	WOH	0		Sat.		2,228.4 Medium Dense, Brown-Gray, Silty Fine to Coarse SAND (A-2-4), with trace gravel	5.5
2225	2,225.1	8.8	10	17	12	29		Sat.		2,225.9 **ALLUVIAL** Very Loose, Gray, Silty Fine to Coarse SAND (A-2-4), with trace gravel	8.0
										Medium Dense, Gray, Fine to Coarse Sandy GRAVEL (A-1-a)	
2220	2,220.1	13.8	2	3	5	8		W		2,221.9 **RESIDUAL** Medium Stiff to Stiff, Brown-Orange, Fine to Coarse Sandy SILT (A-4), with trace mica	12.0
2215	2,215.1	18.8	5	5	6	11		W			
2210	2,210.1	23.8	4	3	2	5		W		2,211.9 Loose Orange-White-Brown, Silty Fine to Coarse SAND (A-2-4), with trace mica	22.0
2205	2,205.1	28.8	100/0.3			100/0.3				2,205.1 **WEATHERED ROCK** Brown-Gray (Granitic Gneiss)	28.8
2200	2,200.1	33.8	100/0.2			100/0.2					
	2,198.5	35.4	60/0.0			60/0.0				2,198.5 Boring Terminated with Standard Penetration Test Refusal at Elevation 2,198.5 ft On Crystalline Rock (Granitic Gneiss)	35.4

PROJECT REFERENCE NO.	SHEET NO.
DF18314.2045181	8

SOIL TEST RESULTS

BORING ID	SAMPLE NO.	OFFSET	STATION	NORTHING	EASTING	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
										C. SAND	F. SAND	SILT	CLAY	10	40	200		
CULV_B-02	SS-1329	6' LT	10+70 -L1-	585291	944340	1.0 - 2.5'	A-6(6)	36	16	20.6	25.2	21.7	32.5	94.5	83.0	55.3	17.0	ND
CULV_B-03	SS-1346	4' RT	11+04 -L1-	585321	944358	1.0 - 2.5'	A-6(7)	38	17	21.6	24.9	21.0	32.5	95.8	83.0	55.4	25.4	ND

Alex M Abernathy

AUTHORIZED SIGNATURE
NCDOT CERT NO. 130-04-0212

Prepared in the Office of:

F&ME CONSULTANTS, INC.
COLUMBIA, SOUTH CAROLINA
NCDOT LAB CERT. NO. 130-0212

REFERENCE: DF18314.2045155

PROJECT: N/A

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	DF18314.2045155	1	

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY *HENDERSON*

PROJECT DESCRIPTION *ROADWAY REPAIRS ON SR 1188 (DAVIS MOUNTAIN ROAD)*

SITE DESCRIPTION

SITE 642: –L3– STA. 10+00.00–17+00.00 (DF18314.2045222)

SITE 644: –L3– STA. 17+00.00–25+00.00 (DF18314.2045223)

SITE 641: –L3– STA. 25+00.00–31+50.00 (DF18314.2045224)

SITE 670: –L3– STA. 31+50.00–38+50.00 (DF18314.2045211)

SITE 643: –L3– STA. 38+50.00–44+30.00 (DF18314.2045220)

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 PERFORM INDEPENDENT SUBSURFACE INVESTIGATIONS AND MAKE INTERPRETATIONS AS NECESSARY TO CONFIRM CONDITIONS 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

M. MALISHER, E.I.T.

CG2 EXPLORATION

INVESTIGATED BY *CG2, PLLC*

DRAWN BY *M. MALISHER, E.I.T.*

CHECKED BY *K. DE MONTBRUN, P.E.*

SUBMITTED BY *CG2, PLLC*

DATE *JULY 2025*

Prepared in the Office of:

CAROLINAS GEOTECHNICAL GROUP

1805 SARDIS ROAD NORTH
SUITE 100
CHARLOTTE, NC 28270
(980) 339-8684

NORTH CAROLINA PROFESSIONAL SEAL 045542 ENGINEER KELLY DE MONTBRUN

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
DF18314.2045155	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-55
- [X] CME-550X
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [ ] _____
- [ ] _____

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:

ELEVATION: FEET

NOTES:

HORIZONTAL AND VERTICAL BORING LOCATIONS OBTAINED USING CARLSON BRX7 SURVEY GRADE GPS.

PREPARED BASED ON PRELIMINARY DESIGN PLANS PROVIDED BY JMT MAY 2025.

FIAD = FILLED IN AFTER DRILLING

DATE: 8-15-14

DF18314.2045155WD3294

3

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
HENDERSON COUNTY

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

JMT
Johnson, Mirmiran, & Thompson Inc.
4700 Falls of Neuse Rd, Suite 100
Raleigh, NC, 27609
License No: C-3097

NAD 83
NA 2011

10

20

-L3- POB 10+00.00

-L3- PC 10+36.36

-L3- PT 11+64.38

-L3- PC 12+06.54

-L3- PT 13+44.60

-L3- PC 14+21.48

-L3- PT 15+29.03

-L3- PC 15+36.35

-L3- PT 16+55.43

-L3- PC 17+26.58

-L3- PCC 18+37.58

-L3- PT 19+37.78

-L3- PC 20+45.78

-L3- PT 21+96.20

-L3- PC 22+26.77

-L3- PT 22+56.46

B-12 B-13 B-14 B-15 B-16 B-17 B-18 B-19 B-20 B-21 B-22 B-23 B-24

N68°47'39.5"E

N89°15'06.8"E

N49°07'38.0"E

N43°45'45.0"E

N89°06'36.0"E

S67°44'44.1"E

N18°37'20.2"E

BEGIN CONSTRUCTION
DF18314.2045222
SITE 642
-L3- POT STA. 10+-00.00

END CONSTRUCTION
DF18314.2045222
SITE 642
BEGIN CONSTRUCION
DF18314.2045223
SITE 644
-L3- POT STA. 17+00.00

MATCH LINE -L3- STA. 24+00. 00 SEE SHEET 4

CUR DATA -L3-
PC 11+01,09
Δc = 20°57'27,4" (RT)
D = 16°22'12.8"
Lc = 128,02
Tc = 64,73
R = 350

CUR DATA -L3-
PC 12+85,98
Δc = 70°37'46,6" (LT)
D = 51°09'25,0"
Lc = 138,06
Tc = 79,34
R = 112

CUR DATA -L3-
PC 14+76,56
Δc = 30°30'17,7" (RT)
D = 28°21'51.3"
Lc = 107,55
Tc = 55,08
R = 202

CUR DATA -L3-
PC 16+28,41
Δc = 05°21'53,0" (LT)
D = 08°38'30,8"
Lc = 62,08
Tc = 31,06
R = 663

CUR DATA -L3-
PC 17+84,11
Δc = 37°11'31,2" (RT)
D = 33°30'22,7"
Lc = 111,00
Tc = 57,53
R = 171

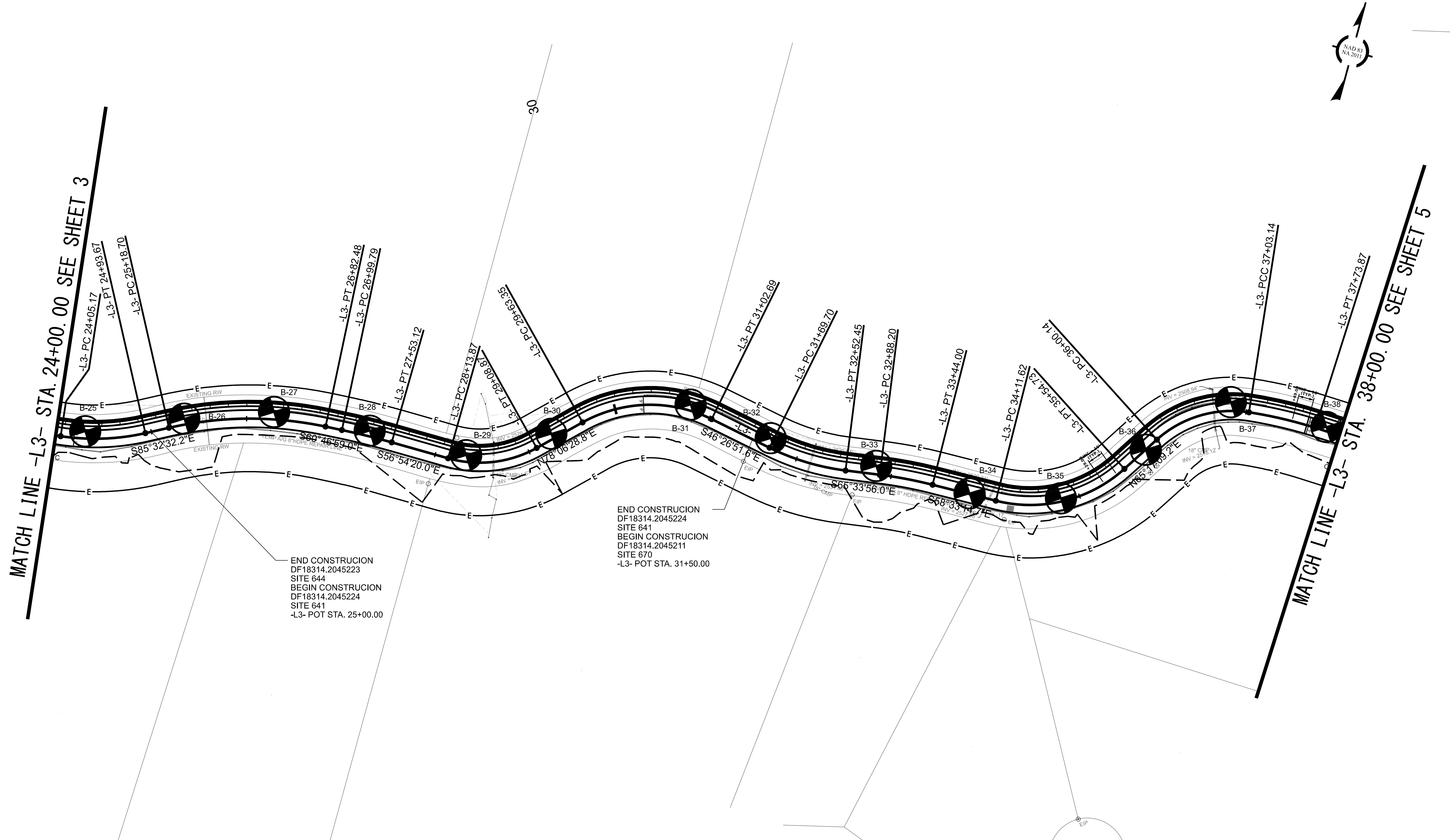
CUR DATA -L3-
PC 18+87,76
Δc = 08°09'17,7" (RT)
D = 08°08'19.0"
Lc = 100,20
Tc = 50,19
R = 704

CUR DATA -L3-
PC 21+22,03
Δc = 23°08'42,0" (RT)
D = 15°23'11.6"
Lc = 150,42
Tc = 76,25
R = 372,38

CUR DATA -L3-
PC 22+41,92
Δc = 03°41'22,1" (RT)
D = 12°25'41.4"
Lc = 29,69
Tc = 14,85
R = 461.02

0 100 200
FEET

AzureAD/KellydeMontbrun/8/18/2025



CUR DATA -L3-	CUR DATA -L3-	CUR DATA -L3-	CUR DATA -L3-	CUR DATA -L3-	CUR DATA -L3-	CUR DATA -L3-	CUR DATA -L3-	CUR DATA -L3-
PI c 24+49.95	PI c 26+01.89	PI c 27+26.47	PI c 28+63.97	PI c 30+39.02	PI c 32+11.46	PI c 33+16.13	PI c 36+55.31	PI c 37+38.57
Δc = 21°29'10.1" (LT)	Δc = 24°45'33.2" (RT)	Δc = 03°52'39.0" (RT)	Δc = 44°59'11.2" (LT)	Δc = 55°26'39.6" (RT)	Δc = 19°07'04.4" (LT)	Δc = 07°00'41.3" (RT)	Δc = 50°52'28.9" (RT)	Δc = 08°38'24.6" (RT)
D = 24°16'40.3"	D = 15°07'03.4"	D = 07°16'15.7"	D = 47°21'06.8"	D = 39°47'19.4"	D = 23°06'11.3"	D = 12°33'53.5"	D = 49°23'34.5"	D = 12°12'59.7"
Lc = 88.50	Lc = 163.78	Lc = 53.33	Lc = 95.00	Lc = 139.35	Lc = 82.75	Lc = 55.80	Lc = 103.00	Lc = 70.72
Tc = 44.78	Tc = 83.19	Tc = 26.67	Tc = 50.10	Tc = 75.67	Tc = 41.76	Tc = 27.94	Tc = 55.17	Tc = 35.43
R = 236	R = 379	R = 788	R = 121	R = 144	R = 248	R = 456	R = 116	R = 469

0 100 200
FEET

DF18314.2045155W03294

4

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
HENDERSON COUNTY

ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

Johnson, Mirmiran, & Thompson Inc.
4700 Falls of Neuse Rd. Suite 100
Raleigh, NC. 27609
License No: C-3097

AzureAD/KellydeMontbrun 7/18/2025

DF18314.2045155WD3294

5

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
HENDERSON COUNTY

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

JMT
Johnson, Mirmiran, & Thompson Inc.
4700 Falls of Neuse Rd, Suite 100
Raleigh, NC, 27609
License No: C-3097

MATCH LINE -L3- STA. 38+00.00 SEE SHEET 4

-L3- POT 38+47.99
-L3- PC 38+89.20
-L3- PT 39+60.07
-L3- PC 39+93.96
-L3- PT 40+37.12
-L3- PC 40+56.31
-L3- PT 41+64.44
-L3- PC 42+46.44
-L3- PT 42+74.20
-L3- PC 43+05.11
-L3- PT 43+81.29
-L3- PC 44+31.93
-L3- PT 45+12.42
-L3- POE 45+95.37

END WALL
-L3- 43+24.00 17.00' LT

B-39 B-41 B-42 B-43

S57°41'08.1"E S67°19'52.2"E S65°42'54.5"E S64°54'55.0"E S51°19'50.6"E S27°44'10.4"E S38°24'44.3"E S55°11'57.3"E

EXISTING RW

END CONSTRUCION
DF18314.2045211
SITE 670
BEGIN CONSTRUCION
DF18314.2045220
SITE 643
-L3- POT STA. 38+50.00

END PROJECT
DF18314.2045220
SITE 643
-L3- POT STA. 44+30.00

CUR DATA -L3-
PI: 39+24.72
Δc = 09°38'44.1" (LT)
D = 13°36'34.0"
Lc = 70.87
Tc = 35.52
R = 421

CUR DATA -L3-
PI: 40+15.54
Δc = 01°36'57.8" (RT)
D = 03°44'41.4"
Lc = 43.15
Tc = 21.58
R = 1,530

CUR DATA -L3-
PI: 41+10.54
Δc = 10°50'59.4" (RT)
D = 10°02'03.4"
Lc = 108.13
Tc = 54.23
R = 571

CUR DATA -L3-
PI: 43+43.74
Δc = 23°35'39.9" (RT)
D = 30°58'14.5"
Lc = 76.18
Tc = 38.64
R = 185

CUR DATA -L3-
PI: 44+72.29
Δc = 10°40'34.2" (LT)
D = 13°15'46.5"
Lc = 80.50
Tc = 40.37
R = 432

0 100 200
FEET

AzureAD/KellydeMontbrun/8/18/2025

GEOTECHNICAL BORING REPORT
BORE LOG

WBS DF18314.2045155	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** M. Malisher	
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 642 {DF18314.2045222}				**GROUND WTR (ft)**
BORING NO. B-12	**STATION** N/A	**OFFSET** N/A	**ALIGNMENT** N/A	**0 HR.** Dry
COLLAR ELEV. 2,603.1 ft	**TOTAL DEPTH** 45.0 ft	**NORTHING** 589,825	**EASTING** 952,030	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Estep	**START DATE** 04/16/25	**COMP. DATE** 04/16/25	**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)
2605											
										2,603.1 GROUND SURFACE	0.0
	2,602.1	1.0								2,602.3 **ROADWAY EMBANKMENT** Asphalt (0.8')	0.8
2600	2,599.6	3.5	7	5	4	9		M		2,600.1 Loose, Brown-Gray, Silty Fine to Coarse SAND (A-2-4)	3.0
	2,597.1	6.0	2	3	3	6 16		M		**COLLUVIAL** Medium Stiff to Very Stiff, Brown, Moderately Plastic Fine to Coarse Sandy CLAY (A-6(5)), with trace gravel	
2595	2,594.6	8.5	12	8	8		SS-1266	22%		2,595.1 **RESIDUAL** Loose to Medium Dense, Brown-Orange-Gray, Silty Fine to Coarse SAND (A-2-4), with trace mica and Manganese Oxide staining	8.0
			7	5	7	12		M			
2590	2,589.6	13.5	6	6	8	14		M			
2585	2,584.6	18.5	6	7	9	16		M			
2580	2,579.6	23.5	6	6	8	14		M			
2575	2,574.6	28.5	5	6	10	16		M			
2570	2,569.6	33.5	9	5	4	9		M			
2565	2,564.6	38.5	7	9	11	20		M			
2560	2,559.6	43.5	6	9	10	19		M		2,558.1 Boring Terminated at Elevation 2,558.1 ft In Residual Silty SAND (A-2-4)	45.0

WBS DF18314.2045155	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** M. Malisher	
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 642 {DF18314.2045222}				**GROUND WTR (ft)**
BORING NO. B-13	**STATION** 11+01	**OFFSET** 4 ft LT	**ALIGNMENT** -L3-	**0 HR.** Dry
COLLAR ELEV. 2,602.9 ft	**TOTAL DEPTH** 49.8 ft	**NORTHING** 589,853	**EASTING** 952,131	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Estep	**START DATE** 04/16/25	**COMP. DATE** 04/16/25	**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
2605										
										2,602.9 GROUND SURFACE 0.0
	2,601.9	1.0								2,602.2 **ROADWAY EMBANKMENT** Asphalt (0.7') 0.7
2600	2,599.4	3.5	16	8	6	14		M		2,599.9 Medium Dense, Gray, Silty Fine to Coarse SAND (A-2-4), with trace gravel 3.0
	2,596.9	6.0	3	2	2	4 10		M		**COLLUVIAL** Soft to Stiff, Brown, Fine to Coarse Sandy CLAY (A-6), with trace gravel and mica
2595	2,594.4	8.5	3	4	6			M		2,594.9 **RESIDUAL** Stiff, Brown-Gray, Fine Sandy SILT (A-4(0)), with trace mica 8.0
			4	5	6	11		M		
2590	2,589.4	13.5	3	6	8	14	SS-1256	41%		
2585	2,584.4	18.5	6	7	7	14		M		2,585.9 Medium Dense, Gray-White, Silty Fine to Coarse SAND (A-2-4), with trace gravel-sized rock fragments 17.0
2580	2,579.4	23.5	44	42	20	62		D		2,580.9 Very Dense, Gray, Fine to Coarse Sandy GRAVEL (A-1-a) 22.0
2575	2,574.4	28.5	9	14	7	21		M		2,575.9 Medium Dense, Brown-Gray-White, Silty Fine to Coarse SAND (A-2-4), with trace mica and Manganese Oxide staining 27.0
2570	2,569.4	33.5	7	7	13	20		M		
2565	2,564.4	38.5	8	9	8	17		M		
2560	2,559.4	43.5	33	10	17	27		M		
2555	2,554.4	48.5	6	67	33/0.3	100/0.8				2,553.9 2,553.1 **WEATHERED ROCK** (Granitic Gneiss) 49.0 49.8 Boring Terminated at Elevation 2,553.1 ft In Weathered Rock (Granitic Gneiss)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS DF18314.2045155	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** M. Malisher	
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 642 {DF18314.2045222}				**GROUND WTR (ft)**
BORING NO. B-14	**STATION** 11+97	**OFFSET** 6 ft LT	**ALIGNMENT** -L3-	**0 HR.** 31.5
COLLAR ELEV. 2,601.9 ft	**TOTAL DEPTH** 39.4 ft	**NORTHING** 589,862	**EASTING** 952,227	**24 HR.** 30.4
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Estep	**START DATE** 04/16/25	**COMP. DATE** 04/16/25	**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)
2605											
										2,601.9 GROUND SURFACE	0.0
										2,601.1 **ROADWAY EMBANKMENT** Asphalt (0.8')	0.8
2600	2,600.9	1.0	2	2	1	3		M		2,598.9 Very Loose, Brown-Gray, Clayey Fine to Coarse SAND (A-2-6), with trace gravel	3.0
	2,598.4	3.5	1	1	1	2		M		2,596.4 **COLLUVIAL** Soft, Brown, Fine to Coarse Sandy CLAY (A-6), with trace organics	5.5
2595	2,595.9	6.0	WOH	WOH	1	1		M		2,593.9 Very Loose, Brown, Clayey Fine to Coarse SAND (A-2-6), with trace gravel	8.0
	2,593.4	8.5	3	8	5	13		M		**RESIDUAL** Medium Dense to Very Dense, Brown-White-Gray, Silty Fine to Coarse SAND (A-2-4), with trace gravel	
2590											
	2,588.4	13.5	29	35	38	73		M			
2585	2,583.4	18.5	22	78/0.4		100/0.9				2,583.4 **WEATHERED ROCK** White-Brown-Gray (Granitic Gneiss)	18.5
2580	2,578.4	23.5	65	35/0.3		100/0.8					
2575	2,573.4	28.5	27	50	50/0.3	100/0.8					
2570	2,568.4	33.5	23	22	12	34				2,569.9 **RESIDUAL** Dense, Brown-Tan, Silty Fine to Coarse SAND (A-2-4), with trace gravel-sized rock fragments	32.0
2565	2,563.4	38.5	10	90/0.4		100/0.9				2,563.4 2,562.5 **WEATHERED ROCK** (Granitic Gneiss) Boring Terminated at Elevation 2,562.5 ft In Weathered Rock (Granitic Gneiss)	38.5 39.4

WBS DF18314.2045155	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** M. Malisher	
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 642 {DF18314.2045222}				**GROUND WTR (ft)**
BORING NO. B-15	**STATION** 12+95	**OFFSET** 5 ft LT	**ALIGNMENT** -L3-	**0 HR.** Dry
COLLAR ELEV. 2,601.5 ft	**TOTAL DEPTH** 33.5 ft	**NORTHING** 589,893	**EASTING** 952,312	**24 HR.** 16.0
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Estep	**START DATE** 04/15/25	**COMP. DATE** 04/15/25	**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
2605										
										2,601.5 GROUND SURFACE 0.0
										2,601.0 **ROADWAY EMBANKMENT** Asphalt (0.5') 0.5
2600	2,600.5	1.0	8	2	1	3		M		2,598.5 Soft, Brown-Gray, Fine Sandy SILT (A-4), with trace mica 3.0
	2,598.0	3.5	15	1	3	4		D		2,596.0 Loose, Gray, Silty Fine to Coarse SAND (A-2-4), with some gravel 5.5
2595	2,596.0	5.5	2	4	10	14		M		2,593.5 Medium Dense, Brown, Clayey Fine to Coarse SAND (A-2-6), with some gravel 8.0
	2,593.0	8.5	30	59	15	74		D		Very Dense Gray, Fine to Coarse Sandy GRAVEL (A-1-a)
2590										2,589.5 12.0
	2,588.0	13.5	7	6	6	12	SS-1237	13%		**COLLUVIAL** Medium Dense, Brown-Gray, Fine to Coarse Gravelly SAND (A-1-b)
2585	2,583.0	18.5	4	5	90	95				2,582.5 19.0
2580	2,578.0	23.5	70	30/0.1		100/0.6		M		**RESIDUAL** Very Dense, Gray-White, Silty Fine to Coarse SAND (A-2-4)
2575	2,573.0	28.5	60/0.1			60/0.1				2,578.0 23.5 **WEATHERED ROCK** Brown-Gray (Granitic Gneiss)
2570	2,568.0	33.5	60/0.0			60/0.0				2,573.0 28.5 **CRYSTALLINE ROCK** Gray (Granitic Gneiss)
										2,568.0 33.5 (Granitic Gneiss) Boring Terminated with Standard Penetration Test Refusal at Elevation 2,568.0 ft In Crystalline Rock (Granitic Gneiss)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS DF18314.2045155	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** M. Malisher	
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 642 {DF18314.2045222}				**GROUND WTR (ft)**
BORING NO. B-16	**STATION** 13+97	**OFFSET** 6 ft LT	**ALIGNMENT** -L3-	**0 HR.** Dry
COLLAR ELEV. 2,600.6 ft	**TOTAL DEPTH** 39.3 ft	**NORTHING** 589,983	**EASTING** 952,352	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Estep	**START DATE** 04/15/25	**COMP. DATE** 04/15/25	**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)
2605											
2600	2,599.6	1.0	5	4	3	7		M		2,600.6 GROUND SURFACE	0.0
	2,597.1	3.5				12				2,600.0 **ROADWAY EMBANKMENT** Asphalt (0.6')	0.6
2595	2,594.6	6.0	1	1	1			M		Very Loose to Loose, Brown, Silty Fine to Coarse SAND (A-2-4), with trace gravel	
	2,592.1	8.5	6	18	30	48		M		2,595.1 **RESIDUAL** Medium Dense to Dense, Gray-White, Silty Fine to Coarse SAND (A-2-4)	5.5
2590			9	8	17	25		M			
	2,587.1	13.5	98	2/0.1		100/0.6				2,587.1 **WEATHERED ROCK** Gray-White (Granitic Gneiss)	13.5
2585	2,582.1	18.5	8	3	17	20		M		2,583.6 **RESIDUAL** Stiff to Very Stiff, Brown-Gray-White, Fine to Coarse Sandy SILT (A-4(0)), with trace mica	17.0
2580	2,577.1	23.5	4	5	7	12	SS-1230	17%			
	2,572.1	28.5	8	14	15	29		M			
2575	2,567.1	33.5	4	7	8	15		M			
2570	2,562.1	38.5	19	81/0.3		100/0.8				2,562.1 **WEATHERED ROCK** Brown-Gray (Granitic Gneiss)	38.5
2565										2,561.3 Boring Terminated at Elevation 2,561.3 ft In Weathered Rock (Granitic Gneiss)	39.3

WBS DF18314.2045155	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** M. Malisher	
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 642 {DF18314.2045222}				**GROUND WTR (ft)**
BORING NO. B-17	**STATION** 15+07	**OFFSET** 4 ft LT	**ALIGNMENT** -L3-	**0 HR.** Dry
COLLAR ELEV. 22,596.9 ft	**TOTAL DEPTH** 39.2 ft	**NORTHING** 590,080	**EASTING** 952,406	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Estep	**START DATE** 04/15/25	**COMP. DATE** 04/15/25	**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
22600										
	22,595.9	1.0	6	5	4	9		M		22,596.9 GROUND SURFACE 0.0
22595	22,593.4	3.5				8				22,596.5 **ROADWAY EMBANKMENT** Asphalt (0.4') 0.4
	22,590.9	6.0	3	3	5			M		22,593.9 Loose, Brown-Gray, Silty Fine to Coarse SAND (A-2-4), with trace gravel 3.0
22590	22,588.4	8.5	7	11	8	19		M		22,591.4 **COLLUVIAL** Loose, Brown-Orange, Silty Fine to Coarse SAND (A-2-4), with trace mica 5.5
			8	6	7	13	SS-1216	32%		22,588.9 Very Stiff, Brown, Slightly Plastic Fine to Coarse Sandy CLAY (A-6(2)), with trace mica 8.0
22585	22,583.4	13.5	18	17	17	34		M		22,584.9 **RESIDUAL** Stiff, Orange-Gray, Fine to Coarse Sandy SILT (A-4) 12.0
22580	22,578.4	18.5	17	5	15	20		M		Medium Dense to Very Dense, Gray-White, Silty Fine to Coarse SAND (A-2-4), with trace gravel-sized rock fragments
22575	22,573.4	23.5	12	28	35	63		M		
22570	22,568.4	28.5	11	16	13	29		M		
22565	22,563.4	33.5	18	18	82/0.3	100/0.8				22,562.9 **WEATHERED ROCK** Gray-Brown (Granitic Gneiss) 34.0
22560	22,558.4	38.5	22	78/0.2		100/0.7				22,557.7 Boring Terminated at Elevation 22,557.7 ft In Weathered Rock (Granitic Gneiss) 39.2

GEOTECHNICAL BORING REPORT
BORE LOG

WBS DF18314.2045155	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** M. Malisher	
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 642 {DF18314.2045222}				**GROUND WTR (ft)**
BORING NO. B-18	**STATION** 15+98	**OFFSET** 4 ft LT	**ALIGNMENT** -L3-	**0 HR.** Dry
COLLAR ELEV. 2,591.1 ft	**TOTAL DEPTH** 38.7 ft	**NORTHING** 590,141	**EASTING** 952,474	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Estep	**START DATE** 04/15/25	**COMP. DATE** 04/15/25	**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)
2595											
2590	2,590.1	1.0	9	5	4	9, 14		M		2,591.1 GROUND SURFACE	0.0
	2,587.6	3.5	4	4	3	7, 11		M		2,590.5 **ROADWAY EMBANKMENT** Asphalt (0.6')	0.6
2585	2,585.1	6.0	5	5	9			M		Loose, Brown-Gray, Silty Fine to Coarse SAND (A-2-4), with trace gravel	
	2,582.6	8.5	5	4	7			M		2,585.6 **RESIDUAL**	5.5
2580										Medium Dense, Brown-Gray-White, Silty Fine to Coarse SAND (A-2-4)	
	2,577.6	13.5	5	10	15	25	SS-1208	15%			
2575	2,572.6	18.5	45	50	50/0.4	100/0.9				2,572.1 **WEATHERED ROCK** Gray-White-Brown (Granitic Gneiss)	19.0
2570	2,567.6	23.5	100/0.4			100/0.4					
2565	2,562.6	28.5	48	52/0.3		100/0.8					
2560	2,557.6	33.5	7	11	50	61		M		2,559.1 **RESIDUAL** Hard, Brown-Gray, Fine to Coarse Sandy SILT (A-4), with trace mica and Managnese Oxide staining	32.0
2555	2,552.6	38.5	100/0.2			100/0.2				2,552.6 **WEATHERED ROCK** Gray (Granitic Gneiss) 2,552.4 Boring Terminated at Elevation 2,552.4 ft In Weathered Rock (Granitic Gneiss)	38.5 38.7

WBS DF18314.2045155	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** M. Malisher	
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 642 {DF18314.2045222}				**GROUND WTR (ft)**
BORING NO. B-19	**STATION** 16+98	**OFFSET** 5 ft LT	**ALIGNMENT** -L3-	**0 HR.** Dry
COLLAR ELEV. 2,584.2 ft	**TOTAL DEPTH** 60.0 ft	**NORTHING** 590,212	**EASTING** 952,544	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Estep	**START DATE** 04/15/25	**COMP. DATE** 04/15/25	**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
2585										
	2,583.2	1.0	5	3	2	5, 10		M		2,584.2 GROUND SURFACE 0.0
2580	2,580.7	3.5	2	4	6	11, 7		M		2,583.6 **ROADWAY EMBANKMENT** Asphalt (0.6') 0.6
	2,578.2	6.0	4	5	6			M		2,581.2 Loose, Brown-Gray, Clayey Fine to Coarse SAND (A-2-6), with trace gravel 3.0
2575	2,575.7	8.5	4	4	3			M		2,578.7 Loose, Brown-Orange, Silty Fine to Coarse SAND (A-2-4) 5.5
										RESIDUAL Loose to Very Dense, Brown-Gray, Silty Fine to Coarse SAND (A-2-4), with trace mica and gravel-sized rock fragments
2570	2,570.7	13.5	17	8	8	16	SS-1194	16%		
2565	2,565.7	18.5	9	32	66	98		M		
2560	2,560.7	23.5	57	43/0.3		100/0.8				2,560.7 **WEATHERED ROCK** Gray-White (Granitic Gneiss) 23.5
2555	2,555.7	28.5	5	7	12	19		M		2,557.2 **RESIDUAL** Very Stiff, Gray-Brown, Fine Sandy SILT (A-4), with trace mica and Manganese Oxide staining 27.0
2550	2,550.7	33.5	22	22	15	37		M		2,552.2 Dense to Very Dense, Brown-Gray-Orange, Silty Fine to Coarse SAND (A-2-4), with trace gravel-sized rock fragments 32.0
2545	2,545.7	38.5	14	16	40	56		M		
2540	2,540.7	43.5	6	10	10	20		M		2,542.2 Very Stiff to Hard, Gray-Brown-Orange, Fine to Coarse Sandy SILT (A-4(0)), with trace mica and Manganese Oxide staining 42.0
2535	2,535.7	48.5	6	10	44	54	SS-1201	23%		
2530	2,530.7	53.5	10	14	30	44		M		
2525	2,525.7	58.5	14	23	25	48		M		2,524.2 Boring Terminated at Elevation 2,524.2 ft In Residual Sandy SILT (A-4) 60.0

GEOTECHNICAL BORING REPORT
BORE LOG

WBS DF18314.2045155	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** M. Malisher	
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 644 {DF18314.2045223}				**GROUND WTR (ft)**
BORING NO. B-20	**STATION** 18+00	**OFFSET** 4 ft LT	**ALIGNMENT** -L3-	**0 HR.** Dry
COLLAR ELEV. 2,578.3 ft	**TOTAL DEPTH** 39.9 ft	**NORTHING** 590,274	**EASTING** 952,627	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Estep	**START DATE** 04/14/25	**COMP. DATE** 04/14/25	**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
2580										ELEV. (ft) DEPTH (ft)
	2,578.3	0.0								2,578.3 0.0 GROUND SURFACE
	2,577.8	0.5								2,577.8 0.5 **ROADWAY EMBANKMENT** Asphalt (0.5')
	2,577.3	1.0	8	4	3	7		M		Loose, Gray, Silty Fine to Coarse SAND (A-2-4), with trace gravel 3.0
2575	2,574.8	3.5	WOH	1	2	3		M		2,575.3 **COLLUVIAL** Very Loose, Brown, Clayey Fine to Coarse SAND (A-2-6) 5.5
	2,572.3	6.0	8	6	7	13		M		2,572.8 **RESIDUAL** Medium Dense, Gray-White-Brown, Silty Fine to Coarse SAND (A-2-4), with trace mica
2570	2,569.8	8.5	8	12	8	20		M		
2565	2,564.8	13.5	4	6	7	13		M		
2560	2,559.8	18.5	5	5	7	12		M		
2555	2,554.8	23.5	3	5	9	14		M		
2550	2,549.8	28.5	12	40	60/0.3	100/0.8		M		2,549.3 29.0 **WEATHERED ROCK** Gray-White (Granitic Gness)
2545	2,544.8	33.5	39	29	71/0.4	100/0.9		M		
2540	2,539.8	38.5	44	35	65/0.4	100/0.9		M		2,538.4 39.9 Boring Terminated at Elevation 2,538.4 ft In Weathered Rock (Granitic Gneiss)

WBS DF18314.2045155	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** M. Malisher	
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 644 {DF18314.2045223}				**GROUND WTR (ft)**
BORING NO. B-21	**STATION** 19+07	**OFFSET** 4 ft LT	**ALIGNMENT** -L3-	**0 HR.** Dry
COLLAR ELEV. 2,573.9 ft	**TOTAL DEPTH** 43.7 ft	**NORTHING** 590,291	**EASTING** 952,733	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Estep	**START DATE** 04/14/25	**COMP. DATE** 04/14/25	**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
2575										
	2,573.9	0.0								2,573.9 GROUND SURFACE 0.0
	2,573.0	0.9								2,573.0 **ROADWAY EMBANKMENT** Asphalt (0.9') 0.9
	2,572.9	1.0	8	7	8	15		M		2,570.9 Medium Dense, Brown-Gray, Silty Fine to Coarse SAND (A-2-4) 3.0
2570	2,570.4	3.5	2	2	3	5	SS-1169	18%		2,568.4 **COLLUVIAL** Medium Stiff, Brown, Slightly Plastic Fine to Coarse Sandy CLAY (A-6(2)), with trace mica 5.5
	2,567.9	6.0	6	5	8	13		M		**RESIDUAL** Loose to Medium Dense, Brown-Gray, Silty Fine to Coarse SAND (A-2-4), with trace mica and gravel-sized rock fragments
2565	2,565.4	8.5	3	3	4	7		M		2,559.9 14.0
2560	2,560.4	13.5	7	72	28/0.2	100/0.7		M		2,557.9 **WEATHERED ROCK** Gray (Granitic Gneiss) 16.0
	2,557.9	16.0	80	19	13	32		M		**RESIDUAL** Medium Dense to Very Dense, Gray-White-Brown-Orange, Silty Fine to Coarse SAND (A-2-4), with trace mica and gravel-sized rock fragments
2555	2,555.4	18.5	9	12	15	27		M		
2550	2,550.4	23.5	10	18	18	36		M		
2545	2,545.4	28.5	16	30	27	57		M		
2540	2,540.4	33.5	24	14	35	49		W		
2535	2,535.4	38.5	25	7	9	16		W		
	2,530.4	43.5	100/0.2			100/0.2				2,530.4 43.5 2,530.2 43.7 **WEATHERED ROCK** (Granitic Gneiss) Boring Terminated at Elevation 2,530.2 ft In Weathered Rock (Granitic Gneiss)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS DF18314.2045155	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** M. Malisher	
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 644 {DF18314.2045223}				**GROUND WTR (ft)**
BORING NO. B-22	**STATION** 20+07	**OFFSET** 7 ft RT	**ALIGNMENT** -L3-	**0 HR.** Dry
COLLAR ELEV. 2,572.0 ft	**TOTAL DEPTH** 39.3 ft	**NORTHING** 590,283	**EASTING** 952,834	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Estep	**START DATE** 04/14/25	**COMP. DATE** 04/14/25	**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)
2575										
	2,572.0	0.0								2,572.0 0.0 GROUND SURFACE
	2,571.4	0.6								2,571.4 0.6 **ROADWAY EMBANKMENT** Asphalt (0.6')
2570	2,571.0	1.0	8	5	4	9		M		
	2,569.0	3.0								2,569.0 3.0 Loose, Brown, Clayey Fine to Coarse SAND (A-2-6), with trace gravel **RESIDUAL** Medium Dense to Very Dense, Gray-White-Tan, Fine to Coarse Gravelly SAND (A-1-b)
	2,568.5	3.5	4	6	6	12		M		
	2,566.0	6.0	7	9	13	22		M		
2565	2,563.5	8.5	11	12	9	21		M		
2560	2,558.5	13.5	59	7	7	14	SS-1162	4% M		
2555	2,553.5	18.5	57	26	42	68		M		
2550	2,548.5	23.5	27	26	35	61		D		
	2,549.0	23.0								Medium Dense to Very Dense, Brown-Tan-Gray-White, Silty Fine to Coarse SAND (A-2-4), with trace mica and gravel-sized rock fragments
2545	2,543.5	28.5	14	14	7	21		D		
2540	2,538.5	33.5	10	27	46	73		D		
2535	2,533.5	38.5	54	46/0.3		100/0.8				2,533.5 38.5 **WEATHERED ROCK** Gray-White (Granitic Gneiss)
	2,532.7	39.3								2,532.7 39.3 Boring Terminated at Elevation 2,532.7 ft In Weathered Rock (Granitic Gneiss)

WBS DF18314.2045155	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** M. Malisher	
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 644 {DF18314.2045223}				**GROUND WTR (ft)**
BORING NO. B-23	**STATION** 20+76	**OFFSET** 3 ft LT	**ALIGNMENT** -L3-	**0 HR.** Dry
COLLAR ELEV. 2,570.8 ft	**TOTAL DEPTH** 49.3 ft	**NORTHING** 590,292	**EASTING** 952,903	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Estep	**START DATE** 04/11/25	**COMP. DATE** 04/11/25	**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
2575										
	2,570.8	0.0								GROUND SURFACE
	2,570.1	0.7								**ROADWAY EMBANKMENT** Asphalt (0.7')
2570	2,569.8	1.0	4	2	2	4	SS-1146	17% M		**COLLUVIAL** Soft, Brown, Fine to Coarse Sandy SILT (A-4(3)), with trace gravel
	2,565.3	5.5								2,565.3 5.5 Loose, Brown-Gray-White, Silty Fine to Coarse SAND (A-2-4), with trace gravel
	2,567.3	3.5	WOH	1	1	2		M		
	2,564.8	6.0	2	3	2	5		M		
	2,562.8	8.0								2,562.8 8.0 **RESIDUAL** Loose to Very Dense, Brown-Gray-White, Silty Fine to Coarse SAND (A-2-4), with trace to some gravel-sized rock fragments
2565	2,562.3	8.5	3	3	4	7		M		
2560	2,557.3	13.5	1	1	3	4		M		
2555	2,552.3	18.5	17	46	54	100		M		
2550	2,547.3	23.5	7	8	8	16		M		
2545	2,542.3	28.5	3	4	2	6		W		
2540	2,537.3	33.5	10	18	16	34		W		
2535	2,532.3	38.5	20	30	58	88		W		
2530	2,527.3	43.5	28	30	29	59		W		
2525	2,522.3	48.5	27	73/0.3		100/0.8				2,522.3 48.5 **WEATHERED ROCK** Gray (Granitic Gneiss)
	2,521.5	49.3								2,521.5 49.3 Boring Terminated at Elevation 2,521.5 ft In Weathered Rock (Grantic Gneiss)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS DF18314.2045155	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** M. Malisher	
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 644 {DF18314.2045223}				**GROUND WTR (ft)**
BORING NO. B-24	**STATION** 23+32	**OFFSET** 3 ft RT	**ALIGNMENT** -L3-	**0 HR.** Dry
COLLAR ELEV. 2,560.4 ft	**TOTAL DEPTH** 33.6 ft	**NORTHING** 590,203	**EASTING** 953,141	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Estep	**START DATE** 04/11/25	**COMP. DATE** 04/11/25	**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)
2565											
2560										2,560.4 GROUND SURFACE	0.0
	2,559.4	1.0	5	4	4	8 4		M		2,559.7 **ROADWAY EMBANKMENT** Asphalt (0.7')	0.7
	2,556.9	3.5								Loose, Brown-Gray, Silty Fine to Coarse SAND (A-2-4), with trace gravel and mica	
2555			1	1	3			M			
	2,554.4	6.0								2,554.9 **RESIDUAL**	5.5
			7	13	21	34		M		Dense, Gray-White, Silty Fine to Coarse SAND (A-2-4)	
	2,551.9	8.5	50	50/0.3		100/0.8				2,551.9 **WEATHERED ROCK** Gray-White (Granitic Gneiss)	8.5
2550											
	2,546.9	13.5	25	17	18	35	SS-1141	9%		2,548.4 **RESIDUAL** Loose to Dense, Gray-White-Brown, Fine to Coarse Gravelly SAND (A-1-b), with trace mica	12.0
2545											
	2,541.9	18.5	4	4	6	10		M			
2540											
	2,536.9	23.5	7	5	4	9		Sat.			
2535											
	2,531.9	28.5	100/0.3			100/0.3				2,531.9 **WEATHERED ROCK** Gray (Granitic Gneiss)	28.5
2530											
	2,526.9	33.5	60/0.1			60/0.1				2,526.9 **CRYSTALLINE ROCK** (Granitic Gneiss)	33.5
										2,526.8 Boring Terminated with Standard Penetration Test Refusal at Elevation 2,526.8 ft In Crystalline Rock (Granitic Gneiss)	33.6

WBS DF18314.2045155	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** M. Malisher	
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 644 {DF18314.2045223}				**GROUND WTR (ft)**
BORING NO. B-25	**STATION** 24+31	**OFFSET** 8 ft LT	**ALIGNMENT** -L3-	**0 HR.** Dry
COLLAR ELEV. 2,555.4 ft	**TOTAL DEPTH** 38.6 ft	**NORTHING** 590,171	**EASTING** 953,234	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Estep	**START DATE** 04/11/25	**COMP. DATE** 04/11/25	**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)
2560											
2555										2,555.4 GROUND SURFACE	0.0
	2,554.4	1.0	9	5	4	9 5		M		2,554.5 **ROADWAY EMBANKMENT** Asphalt (0.9')	0.9
	2,551.9	3.5								2,552.4 Loose, Gray, Silty Fine to Coarse SAND (A-2-4), with some gravel	3.0
2550			WOH	1	4			W		**COLLUVIAL** Very Soft to Medium Stiff, Brown-Gray, Slightly Plastic Fine to Coarse Sandy CLAY (A-6(3)), with trace gravel and wood fragments	
	2,549.4	6.0	WOH	WOH	1	1 5		W			
	2,546.9	8.5	3	2	3		SS-1130	25%			
2545											
	2,541.9	13.5	3	2	1	3		W			
2540											
	2,536.9	18.5	3	2	5	7		M			
2535											
	2,531.9	23.5	2	9	21	30		W		2,531.4 **RESIDUAL** Medium Dense to Very Dense, Gray-White, Silty Fine to Coarse SAND (A-2-4), with trace gravel-sized rock fragments	24.0
2530											
	2,526.9	28.5	16	30	46	76		M			
2525											
	2,521.9	33.5	100/0.4			100/0.4				2,521.9 **WEATHERED ROCK** (Granitic Gneiss)	33.5
2520											
	2,516.9	38.5	60/0.1			60/0.1				2,516.9 **CRYSTALLINE ROCK** (Granitic Gneiss)	38.5
										2,516.8 Boring Terminated with Standard Penetration Test Refusal at Elevation 2,516.8 ft In Crystalline Rock (Granitic Gneiss)	38.6

GEOTECHNICAL BORING REPORT
BORE LOG

WBS DF18314.2045155	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** M. Malisher	
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 641 {DF18314.2045224}				**GROUND WTR (ft)**
BORING NO. B-26	**STATION** 25+36	**OFFSET** 6 ft LT	**ALIGNMENT** -L3-	**0 HR.** Dry
COLLAR ELEV. 2,550.6 ft	**TOTAL DEPTH** 22.9 ft	**NORTHING** 590,153	**EASTING** 953,336	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Estep	**START DATE** 04/10/25	**COMP. DATE** 04/10/25	**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))
2555										
2550	2,549.6	1.0	2	1	2	3		M		2,550.6 / 0.0 GROUND SURFACE 2,550.1 / 0.5 **ROADWAY EMBANKMENT** Asphalt (0.5')
	2,547.1	3.5	4	5	9	14		M		2,547.6 / 3.0 Soft, Gray-Brown, Fine to Coarse Sandy SILT (A-4)
2545	2,544.6	6.0	4	12	12	24		M		**RESIDUAL** Medium Dense to Dense, Gray-White, Silty Fine to Coarse SAND (A-2-4)
	2,542.1	8.5	7	6	5	11		M		
2540	2,537.1	13.5	13	58	11	69		M		
2535	2,532.1	18.5	100/0.2			100/0.2				2,532.1 / 18.5 **WEATHERED ROCK** Gray-White (Granitic Gneiss)
2530	2,527.7	22.9	60/0.0			60/0.0				2,527.7 / 22.9 Boring Terminated with Standard Penetration Test Refusal at Elevation 2,527.7 ft On Crystalline Rock (Granitic Gneiss)

WBS DF18314.2045155	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** M. Malisher	
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 641 {DF18314.2045224}				**GROUND WTR (ft)**
BORING NO. B-27	**STATION** 26+28	**OFFSET** 8 ft LT	**ALIGNMENT** -L3-	**0 HR.** Dry
COLLAR ELEV. 2,544.0 ft	**TOTAL DEPTH** 33.5 ft	**NORTHING** 590,132	**EASTING** 953,427	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Estep	**START DATE** 04/10/25	**COMP. DATE** 04/10/25	**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
2545										
	2,543.0	1.0	9	6	5	11		M		2,544.0 / 0.0 GROUND SURFACE 2,543.4 / 0.6 **ROADWAY EMBANKMENT** Asphalt (0.6')
2540	2,540.5	3.5	4	4	8	12		M		Medium Dense, White-Gray, Silty Fine to Coarse SAND (A-2-4), with trace gravel
	2,538.0	6.0	11	11	13	24		M		2,538.5 / 5.5 **RESIDUAL** Medium Dense to Dense, Gray-White, Silty Fine to Coarse SAND (A-2-4)
2535	2,535.5	8.5	13	21	22	43	SS-1111	12%		
2530	2,530.5	13.5	23	11	18	29		M		
2525	2,525.5	18.5	100/0.3			100/0.3				2,525.5 / 18.5 **WEATHERED ROCK** Gray-White (Granitic Gneiss)
2520	2,520.5	23.5	100/0.2			100/0.2				
2515	2,515.5	28.5	100/0.2			100/0.2				
	2,510.5	33.5	60/0.0			60/0.0				2,510.5 / 33.5 Boring Terminated with Standard Penetration Test Refusal at Elevation 2,510.5 ft On Crystalline Rock (Granitic Gneiss)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS DF18314.2045155	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** M. Malisher	
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 641 {DF18314.2045224}				**GROUND WTR (ft)**
BORING NO. B-28	**STATION** 27+28	**OFFSET** 6 ft LT	**ALIGNMENT** -L3-	**0 HR.** Dry
COLLAR ELEV. 2,538.3 ft	**TOTAL DEPTH** 40.1 ft	**NORTHING** 590,084	**EASTING** 953,516	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Estep	**START DATE** 04/10/25	**COMP. DATE** 04/10/25	**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)
2540										
	2,538.3	0.0								GROUND SURFACE
	2,537.5	0.8						M		**ROADWAY EMBANKMENT** Asphalt (0.8')
2535	2,534.8	3.5	7	5	5	10		D		Loose, Gray, Silty Fine to Coarse SAND (A-2-4), with trace gravel
	2,532.8	5.5	6	2	3	5		M		**COLLUVIAL**
	2,532.3	6.0								Loose, Gray-Brown, Clayey Fine to Coarse SAND (A-2-6), with some gravel
2530	2,530.3	8.0	8	3	2	5				**RESIDUAL**
	2,529.8	8.5	6	15	34	49		D		Dense, Brown-Gray-White, Silty Fine to Coarse SAND (A-2-4), with some gravel-sized rock fragments
2525	2,524.8	13.5	10	16	15	31				
2520	2,519.8	18.5	6	17	26	43		D		
2515	2,514.8	23.5	100/0.4			100/0.4				**WEATHERED ROCK** Brown-Gray (Granitic Gneiss).
2510	2,509.8	28.5	97	3/0.1		100/0.6				
2505	2,504.8	33.5	100/0.3			100/0.3				
2500	2,499.0	39.3	18	82/0.3		100/0.8				
	2,498.2	40.1								Boring Terminated at Elevation 2,498.2 ft In Weathered Rock (Granitic Gneiss)

WBS DF18314.2045155	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** M. Malisher	
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 641 {DF18314.2045224}				**GROUND WTR (ft)**
BORING NO. B-29	**STATION** 28+32	**OFFSET** 7 ft LT	**ALIGNMENT** -L3-	**0 HR.** Dry
COLLAR ELEV. 2,535.3 ft	**TOTAL DEPTH** 28.4 ft	**NORTHING** 590,030	**EASTING** 953,604	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Estep	**START DATE** 04/09/25	**COMP. DATE** 04/10/25	**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
2540										
	2,535.3	0.0								GROUND SURFACE
	2,534.4	0.9						M		**ROADWAY EMBANKMENT** Asphalt (0.9')
2535	2,534.3	1.0	6	6	5	11				
	2,532.3	3.0						M		Medium Dense, Gray-Brown, Silty Fine to Coarse SAND (A-2-4), with trace gravel and mica
	2,531.8	3.5	1	1	2	3				
2530	2,529.3	6.0	5	4	3	7	SS-1092	10%		**COLLUVIAL**
	2,526.8	8.5	6	25	75/0.4	100/0.9				Very Loose to Loose, Brown-Gray, Fine to Coarse Sandy GRAVEL (A-1-a)
2525	2,526.3	9.0								**WEATHERED ROCK** Gray (Granitic Gneiss)
	2,521.8	13.5	100/0.4			100/0.4				
2520	2,516.8	18.5	21	48	52/0.4	100/0.9				
2515	2,511.8	23.5	100/0.2			100/0.2				
2510	2,506.9	28.4	60/0.0			60/0.0				
	2,506.9	28.4								Boring Terminated with Standard Penetration Test Refusal at Elevation 2,506.9 ft On Crystalline Rock (Granitic Gneiss)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS DF18314.2045155	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** M. Malisher	
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 641 {DF18314.2045224}				**GROUND WTR (ft)**
BORING NO. B-30	**STATION** 29+29	**OFFSET** 6 ft LT	**ALIGNMENT** -L3-	**0 HR.** Dry
COLLAR ELEV. 2,534.8 ft	**TOTAL DEPTH** 15.7 ft	**NORTHING** 590,025	**EASTING** 953,695	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Estep	**START DATE** 04/09/25	**COMP. DATE** 04/09/25	**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
2535										ELEV. (ft) DEPTH (ft)
	2,534.8	0.0								GROUND SURFACE 0.0
	2,534.4	0.4								**ROADWAY EMBANKMENT** Asphalt (0.4') 0.4
	2,533.8	1.0	7	10	9	19				
	2,531.8	3.0						M		Medium Dense, Brown-Gray, Silty Fine to Coarse SAND (A-2-4), with trace gravel 3.0
2530	2,531.3	3.5	5	5	4	9	SS-1085	16%		**COLLUVIAL**
	2,528.8	6.0	2	2	2	4		M		Soft to Stiff, Brown, Fine to Coarse Sandy SILT (A-4(0)), with trace gravel
	2,526.8	8.0								8.0
2525	2,526.3	8.5	11	9	13	22		D		**RESIDUAL** Medium Dense, Gray-Brown, Silty Fine to Coarse SAND (A-2-4), with gravel-sized rock fragments
	2,521.3	13.5								13.5
2520	2,519.2	15.6	100/0.3			100/0.3				**WEATHERED ROCK** Gray (Granitic Gneiss) 15.6
	2,519.1	15.7	60/0.1			60/0.1				**CRYSTALLINE ROCK** (Granitic Gneiss) 15.7
										Boring Terminated with Standard Penetration Test Refusal at Elevation 2,519.1 ft In Crystalline Rock (Granitic Gneiss)

WBS DF18314.2045155	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** M. Malisher	
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 641 {DF18314.2045224}				**GROUND WTR (ft)**
BORING NO. B-31	**STATION** 30+77	**OFFSET** 6 ft LT	**ALIGNMENT** -L3-	**0 HR.** Dry
COLLAR ELEV. 2,534.0 ft	**TOTAL DEPTH** 38.7 ft	**NORTHING** 590,011	**EASTING** 953,842	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Estep	**START DATE** 04/09/25	**COMP. DATE** 04/09/25	**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
2535										
	2,534.0	0.0								GROUND SURFACE 0.0
	2,533.1	0.9								**ROADWAY EMBANKMENT** Asphalt (0.9') 0.9
	2,533.0	1.0	5	3	4	7		M		
	2,531.0	3.0								Loose, Gray, Silty Fine to Coarse SAND (A-2-4), with trace gravel and wood 3.0
2530	2,530.5	3.5	2	3	5	8		M		
	2,528.5	5.5								**COLLUVIAL**
	2,528.0	6.0	7	7	9	16		M		Loose, Brown, Clayey Fine to Coarse SAND (A-2-6), with trace gravel 5.5
	2,526.0	8.0								Medium Dense, Brown-Orange, Silty Fine to Coarse SAND (A-2-4), with trace gravel 8.0
2525	2,525.5	8.5	9	5	9	14		M		**RESIDUAL**
	2,520.5	13.5				23		D		Medium Dense to Very Dense, Brown-Gray-White, Silty Fine to Coarse SAND (A-2-4)
2520			11	10	13					
2515	2,515.5	18.5	18	20	23	43	SS-1079	14%		
2510	2,510.5	23.5	26	56	33	89		D		
2505	2,505.5	28.5	100/0.3			100/0.3				2,505.5 28.5
										WEATHERED ROCK Gray (Granitic Gneiss)
	2,502.0	32.0								2,502.0 32.0
2500	2,500.5	33.5	20	41	23	64		D		**RESIDUAL** Very Dense, Gray, Silty Fine to Coarse SAND (A-2-4)
	2,495.5	38.5	100/0.2			100/0.2				2,495.5 38.5
	2,495.3	38.7								**WEATHERED ROCK** Gray (Granitic Gneiss) 38.7
										Boring Terminated at Elevation 2,495.3 ft In Weathered Rock (Granitic Gneiss)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS DF18314.2045155	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** M. Malisher	
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 670 {DF18314.2045211}				**GROUND WTR (ft)**
BORING NO. B-32	**STATION** 31+66	**OFFSET** 9 ft LT	**ALIGNMENT** -L3-	**0 HR.** Dry
COLLAR ELEV. 2,531.9 ft	**TOTAL DEPTH** 20.4 ft	**NORTHING** 589,953	**EASTING** 953,911	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Estep	**START DATE** 04/08/25	**COMP. DATE** 04/08/25	**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)
2535											
										2,531.9 GROUND SURFACE	0.0
	2,530.9	1.0	3	1	1	2		M		2,531.1 **ROADWAY EMBANKMENT** Asphalt (0.7')	0.8
2530	2,528.4	3.5	2	1	2	3		M		2,528.9 Very Loose, Brown-Gray, Clayey Fine to Coarse SAND (A-2-6), with trace gravel	3.0
	2,525.9	6.0	2	4	3	7		M		**COLLUVIAL** Soft to Very Stiff, Brown, Fine to Coarse Sandy SILT (A-4(1)), with trace gravel	
2525	2,523.4	8.5	2	17	11	28	SS-1070	20%			
										2,519.9	12.0
2520	2,518.4	13.5	4	6	15	21		M		Medium Dense, Brown-Gray, Clayey Fine to Coarse SAND (A-2-6), with trace gravel (Cobbles and Boulders from 18.5 to 20.4 ft)	
2515	2,513.4	18.5	60	35	22	57					
	2,511.6	20.3	60/0.1			60/0.1				2,511.5 Boring Terminated at Elevation 2,511.5 ft In Colluvial Boulders	20.4

WBS DF18314.2045155	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** M. Malisher	
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 670 {DF18314.2045211}				**GROUND WTR (ft)**
BORING NO. B-33	**STATION** 32+83	**OFFSET** 9 ft LT	**ALIGNMENT** -L3-	**0 HR.** Dry
COLLAR ELEV. 2,529.5 ft	**TOTAL DEPTH** 29.4 ft	**NORTHING** 589,893	**EASTING** 954,007	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Estep	**START DATE** 04/08/25	**COMP. DATE** 04/08/25	**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	
2530											
	2,528.5	1.0	8	7	6	13		M		2,529.5 GROUND SURFACE	0.0
	2,526.0	3.5	7	3	5	8		M		2,528.7 **ROADWAY EMBANKMENT** Asphalt (0.8')	0.8
2525	2,523.5	6.0	9	10	13	23		M		**RESIDUAL** Loose to Medium, Dense Gray-White-Brown, Silty Fine to Coarse SAND (A-2-4), with trace mica and gravel	
	2,521.0	8.5	13	13	17	30		M			
2520											
	2,516.0	13.5	70	30/0.2		100/0.7				2,516.0 **WEATHERED ROCK** Gray-White (Granitic Gneiss)	13.5
2515											
	2,511.0	18.5	100/0.4			100/0.4					
2510											
	2,506.0	23.5	100/0.4			100/0.4					
2505											
	2,501.0	28.5	36	64/0.4		100/0.9				2,500.1 Boring Terminated at Elevation 2,500.1 ft In Weathered Rock (Granitic Gneiss)	29.4

GEOTECHNICAL BORING REPORT
BORE LOG

WBS DF18314.2045155 | **TIP** N/A | **COUNTY** HENDERSON | **GEOLOGIST** M. Malisher

SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 670 {DF18314.2045211}

BORING NO. B-34 | **STATION** 33+83 | **OFFSET** 1 ft LT | **ALIGNMENT** -L3-

COLLAR ELEV. 2,526.8 ft | **TOTAL DEPTH** 43.5 ft | **NORTHING** 589,837 | **EASTING** 954,091

GROUND WTR (ft) 0 HR. Dry | 24 HR. 28.0

DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024 | **DRILL METHOD** H.S. Augers | **HAMMER TYPE** Automatic

DRILLER J. Estep | **START DATE** 04/08/25 | **COMP. DATE** 04/08/25 | **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))
2530										
										2,526.8 / 0.0 GROUND SURFACE
2525	2,525.8	1.0	4	4	18	22		M		2,526.0 / 0.8 **ROADWAY EMBANKMENT** Asphalt (0.8')
	2,523.3	3.5	12	19	56	75		D		2,523.8 / 3.0 Very Stiff, Brown-Gray, Fine to Coarse Sandy CLAY (A-6), with little gravel
2520	2,520.8	6.0	11	10	7	17		W		2,521.3 / 5.5 **COLLUVIAL** Very Dense, Gray, Fine to Coarse Sandy GRAVEL (A-1-a)
	2,518.3	8.5	5	8	6	14	SS-1051	25%		Medium Stiff to Very Stiff, Brown-Gray, Fine to Coarse Sandy SILT (A-4(0)), with trace to little gravel
2515										
	2,513.3	13.5	4	3	3	6		W		
2510										2,509.8 / 17.0 **RESIDUAL** Loose to Very Dense, Brown-Gray-White, Silty Fine to Coarse SAND (A-2-4), with trace mica and gravel-sized rock fragments
	2,508.3	18.5	2	3	4	7		W		
2505										
	2,503.3	23.5	10	24	42	66		M		
2500										
	2,498.3	28.5	17	25	35	60		M		
2495										
	2,493.3	33.5	100/0.3			100/0.3				2,493.3 / 33.5 **WEATHERED ROCK** Gray (Granitic Gneiss)
2490										2,489.8 / 37.0 **RESIDUAL** Very Dense, Gray, Silty Fine to Coarse SAND (A-2-6), with little gravel-sized rock fragments
	2,488.3	38.5	25	40	34	74		D		
2485										
	2,483.3	43.5	60/0.0			60/0.0				2,483.3 / 43.5 Boring Terminated with Standard Penetration Test Refusal at Elevation 2,483.3 ft On Crystalline Rock (Granitic Gneiss)

WBS DF18314.2045155 | **TIP** N/A | **COUNTY** HENDERSON | **GEOLOGIST** M. Malisher

SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 670 {DF18314.2045211}

BORING NO. B-35 | **STATION** 34+81 | **OFFSET** 3 ft LT | **ALIGNMENT** -L3-

COLLAR ELEV. 2,522.5 ft | **TOTAL DEPTH** 34.3 ft | **NORTHING** 589,804 | **EASTING** 954,180

GROUND WTR (ft) 0 HR. Dry | 24 HR. Dry

DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024 | **DRILL METHOD** H.S. Augers | **HAMMER TYPE** Automatic

DRILLER J. Estep | **START DATE** 04/08/25 | **COMP. DATE** 04/08/25 | **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
2525										
										2,522.5 / 0.0 GROUND SURFACE
	2,521.5	1.0								2,521.8 / 0.7 **ROADWAY EMBANKMENT** Asphalt (0.7')
2520			3	9	7	16		W		Loose to Medium Dense, Gray-Brown-Black, Silty Fine to Coarse SAND (A-2-4), with trace to little gravel
	2,519.0	3.5	8	6	4	10		M		
2515	2,516.5	6.0	2	2	4	6		M		
	2,514.0	8.5	2	2	2	4		M		2,514.5 / 8.0 **COLLUVIAL** Soft to Medium Stiff, Brown, Slightly Plastic Fine to Coarse Sandy CLAY (A-6(1)), with trace gravel
2510										
	2,509.0	13.5	4	3	5	8	SS-1043	9%		
2505										
	2,504.0	18.5	72	28/0.2		100/0.7				2,504.0 / 18.5 **WEATHERED ROCK** Brown-Gray (Granitic Gneiss)
2500										
	2,499.0	23.5	80	20/0.3		100/0.8				
2495										
	2,494.0	28.5	100/0.4			100/0.4				
2490										
	2,488.2	34.3	60/0.0			60/0.0				2,488.2 / 34.3 Boring Terminated with Standard Penetration Test Refusal at Elevation 2,488.2 ft On Crystalline Rock (Granitic Gneiss)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS DF18314.2045155	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** M. Malisher	
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 670 {DF18314.2045211}				**GROUND WTR (ft)**
BORING NO. B-36	**STATION** 35+85	**OFFSET** 0 ft RT	**ALIGNMENT** -L3-	**0 HR.** 29.9
COLLAR ELEV. 2,518.9 ft	**TOTAL DEPTH** 40.0 ft	**NORTHING** 589,826	**EASTING** 954,279	**24 HR.** 29.0
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Estep	**START DATE** 04/08/25	**COMP. DATE** 04/08/25	**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))
2520										
	2,518.9	0.0								2,518.9 GROUND SURFACE 0.0
	2,518.5	0.4								**ROADWAY EMBANKMENT** Asphalt (0.4')
	2,517.9	1.0	34	31	25	56		M		2,515.9 Very Dense, Gray, Silty Fine to Coarse SAND (A-2-4), with some gravel 3.0
2515	2,515.4	3.5	6	14	20	34		M		**RESIDUAL**
	2,512.9	6.0	100/0.3			100/0.3				2,512.9 Dense, Gray-Brown, Silty Fine to Coarse SAND (A-2-4) 6.0
2510	2,510.4	8.5	30	38	34	72		D		2,510.4 **WEATHERED ROCK** Gray (Granitic Gneiss) 8.5
										RESIDUAL
2505	2,505.4	13.5	100/0.3			100/0.3				Very Dense, Gray-White, Silty Fine to Coarse SAND (A-2-4), with trace gravel-sized rock fragments 13.5
										2,505.4 **WEATHERED ROCK** Gray (Granitic Gneiss)
2500	2,500.4	18.5	20	30	45	75		D		2,501.9 17.0 **RESIDUAL** Dense to Very Dense, Gray-White-Brown, Silty Fine to Coarse SAND (A-2-4), with trace gravel-sized rock fragments
2495	2,495.4	23.5	19	19	13	32		M		
2490	2,490.4	28.5	59	41/0.4		100/0.9				2,490.4 28.5 **WEATHERED ROCK** Gray-White-Brown (Granitic Gneiss)
2485	2,485.4	33.5	100/0.3			100/0.3				
2480	2,480.4	38.5	12	16	23	39		M		2,481.9 37.0 **RESIDUAL** Hard, Gray-White-Brown, Fine to Coarse Sandy SILT (A-4), with trace gravel-sized rock fragments, mica and Managnese Oxide Staining 2,478.9 40.0 Boring Terminated at Elevation 2,478.9 ft In Residual Sandy SILT (A-4)

WBS DF18314.2045155	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** M. Malisher	
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 670 {DF18314.2045211}				**GROUND WTR (ft)**
BORING NO. B-37	**STATION** 36+84	**OFFSET** 9 ft LT	**ALIGNMENT** -L3-	**0 HR.** Dry
COLLAR ELEV. 2,517.1 ft	**TOTAL DEPTH** 60.0 ft	**NORTHING** 589,847	**EASTING** 954,378	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Estep	**START DATE** 04/07/25	**COMP. DATE** 04/07/25	**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
2520										
										2,517.1 GROUND SURFACE 0.0
	2,516.1	1.0	4	3	1	4		M		**ROADWAY EMBANKMENT** Loose, Gray-Brown, Silty Fine to Coarse SAND (A-2-4), with little gravel
2515	2,513.6	3.5	1	2	5	7		M		
	2,511.1	6.0	3	2	3	5		W		2,511.6 5.5 **COLLUVIAL**
2510	2,508.6	8.5	2	4	5	9		M		2,509.1 Loose, Brown, Clayey Fine to Coarse SAND (A-2-6), with trace gravel 8.0 **RESIDUAL**
										Loose, Brown-Gray, Silty Fine to Coarse
2505	2,503.6	13.5	3	6	5	11		M		2,505.1 SAND (A-2-4), with trace mica 12.0 Medium Stiff to Very Stiff, Brown-Gray-White, Fine to Coarse Sandy SILT (A-4(0)), with trace mica and gravel-sized rock fragments
2500	2,498.6	18.5	2	3	5	8	SS-1019	17%		
2495	2,493.6	23.5	4	5	6	11		M		
2490	2,488.6	28.5	WOH	8	10	18		M		
2485	2,483.6	33.5	8	8	11	19		M		
2480	2,478.6	38.5	7	11	12	23		M		2,480.1 37.0 Medium Dense to Dense, Brown-Gray-White-Orange, Silty Fine to Coarse SAND (A-2-4), with trace gravel-sized rock fragments, mica, and Manganese Oxide staining
2475	2,473.6	43.5	12	22	24	46	SS-1024	13%		
2470	2,468.6	48.5	9	11	17	28		W		
2465	2,463.6	53.5	6	9	10	19		W		
2460	2,458.6	58.5	7	12	13	25		W		2,457.1 60.0 Boring Terminated at Elevation 2,457.1 ft In Residual Silty SAND (A-2-4)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS DF18314.2045155	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** M. Malisher	
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 670 {DF18314.2045211}				**GROUND WTR (ft)**
BORING NO. B-38	**STATION** 37+85	**OFFSET** 4 ft LT	**ALIGNMENT** -L3-	**0 HR.** Dry
COLLAR ELEV. 2,516.1 ft	**TOTAL DEPTH** 18.6 ft	**NORTHING** 589,793	**EASTING** 954,465	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Estep	**START DATE** 04/07/25	**COMP. DATE** 04/07/25	**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)
2520										
2515	2,515.1	1.0	6	3	2	5		M		2,516.1 — GROUND SURFACE — 0.0 **ROADWAY EMBANKMENT** Loose, Brown, Silty Fine to Coarse SAND (A-2-4), with trace gravel and asphalt fragments
	2,512.6	3.5	1	1	1	2		W		2,513.1 — 3.0 Very Loose, Gray-Brown, Clayey Fine to Coarse SAND (A-2-6), with trace gravel — 5.5
2510	2,510.1	6.0	2	6	9	15		W		**RESIDUAL** Loose to Medium Dense, Gray-Brown, Silty Fine to Coarse SAND (A-2-4)
	2,507.6	8.5	5	3	2	5		W		
2505										
	2,502.6	13.5	60/0.0			60/0.0				2,502.6 — 13.5 **CRYSTALLINE ROCK** Gray, (Granitic Gneiss)
2500	2,497.6	18.5	60/0.1			60/0.1				2,497.5 — 18.6 Boring Terminated with Standard Penetration Test Refusal at Elevation 2,497.5 ft In Crystalline Rock (Granitic Gneiss)

WBS DF18314.2045155	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** R. Welch	
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 643 {DF18314.2045220}				**GROUND WTR (ft)**
BORING NO. B-39	**STATION** 38+85	**OFFSET** 3 ft LT	**ALIGNMENT** -L3-	**0 HR.** Dry
COLLAR ELEV. 2,515.1 ft	**TOTAL DEPTH** 23.6 ft	**NORTHING** 589,736	**EASTING** 954,547	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER L. Ard	**START DATE** 04/04/25	**COMP. DATE** 04/04/25	**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
2520										
2515	2,514.1	1.0	5	3	2	5		M		2,515.1 — GROUND SURFACE — 0.0 2,514.3 — **ROADWAY EMBANKMENT** Asphalt, (0.8') — 0.8
	2,511.6	3.5	5	3	2	5		M		2,512.1 — Medium Stiff, Brown-Tan-Orange, Fine Sandy CLAY (A-6) — 3.0 **COLLUVIAL**
2510	2,509.1	6.0	3	3	4	7		M		2,507.1 — Medium Stiff, Orange-Brown-Tan, Fine to Coarse Sandy SILT (A-4), with trace gravel — 8.0 **RESIDUAL**
	2,506.6	8.5	22	18	7	25		M		Medium Dense, Gray-White-Tan, Silty Fine SAND (A-2-4), with trace gravel-sized rock fragments
2505										2,502.6 — 12.5 Stiff, Gray-Orange-Tan, Fine Sandy SILT (A-4), with trace gravel-sized rock fragments
	2,501.6	13.5	11	8	6	14		M		
2500										2,496.6 — 18.5 **WEATHERED ROCK** Gray-White, (Granitic Gneiss)
2495	2,496.6	18.5	100/0.2			100/0.2				2,491.6 — 23.5 2,491.5 — **CRYSTALLINE ROCK** (Granitic Gneiss) — 23.6
	2,491.6	23.5	60/0.1			60/0.1				Boring Terminated with Standard Penetration Test Refusal at Elevation 2,491.5 ft In Crystalline Rock (Granitic Gneiss)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS DF18314.2045155	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** R. Welch	
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 643 {DF18314.2045220}				**GROUND WTR (ft)**
BORING NO. B-40	**STATION** 39+83	**OFFSET** 6 ft LT	**ALIGNMENT** -L3-	**0 HR.** Dry
COLLAR ELEV. 2,513.3 ft	**TOTAL DEPTH** 38.5 ft	**NORTHING** 589,695	**EASTING** 954,636	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER L. Ard	**START DATE** 04/04/25	**COMP. DATE** 04/04/25	**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)
2515											
	2,513.3	0.0								GROUND SURFACE	0.0
	2,512.5	0.8								**ROADWAY EMBANKMENT** Asphalt, (0.8')	0.8
	2,510.3	3.0	6	3	3	6		M		Loose, Brown-Gray, Fine to Coarse Gravelly SAND (A-1-b)	3.0
2510	2,509.8	3.5	2	2	3	5		M		Medium Stiff, Brown-Gray, Fine to Coarse Sandy SILT (A-4), with trace gravel	
	2,507.3	6.0	12	39	61/0.3	100/0.8					6.5
	2,506.8	6.5								**WEATHERED ROCK** Gray-White, (Granitic Gneiss)	8.0
2505	2,504.8	8.5	18	13	14	27		M		**RESIDUAL** Medium Dense to Dense, Brown-Gray, Silty Fine SAND (A-2-4)	
2500	2,499.8	13.5	8	5	43	48		M			
2495	2,494.8	18.5	12	14	32	46		M			
	2,495.8	17.5								Hard, Brown-Gray-Orange, Fine Sandy SILT (A-4), with trace mica and gravel-sized rock fragments	
2490	2,489.8	23.5	14	18	14	32		M			
2485	2,484.8	28.5	11	9	9	18		M			
	2,485.8	27.5								Medium Dense, Tan-White, Silty Fine SAND (A-2-4), with trace gravel-sized rock fragments and mica	
2480	2,479.8	33.5	83	17/0.1		100/0.6					
	2,479.8	33.5								**WEATHERED ROCK** Gray-White, (Granitic Gneiss)	
2475	2,474.8	38.5	60/0.0			60/0.0					
	2,474.8	38.5								Boring Terminated with Standard Penetration Test Refusal at Elevation 2,474.8 ft On Crystalline Rock (Granitic Gneiss)	

WBS DF18314.2045155	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** R. Welch	
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 643 {DF18314.2045220}				**GROUND WTR (ft)**
BORING NO. B-41	**STATION** N/A	**OFFSET** N/A	**ALIGNMENT** -L3-	**0 HR.** Dry
COLLAR ELEV. 2,510.3 ft	**TOTAL DEPTH** 7.6 ft	**NORTHING** 589,651	**EASTING** 954,720	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER L. Ard	**START DATE** 04/04/25	**COMP. DATE** 04/04/25	**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
2515										
	2,510.3	0.0								GROUND SURFACE
	2,509.8	0.5								**ROADWAY EMBANKMENT** Asphalt (0.5')
	2,509.3	1.0	7	4	3	7				**COLLUVIAL** Loose, Brown-Gray-Tan, Silty Fine to Coarse SAND (A-2-4), with trace gravel
2510	2,506.8	3.5	5	5	4	9				
	2,504.3	6.0	100/0.2			100/0.2				
	2,502.8	7.5	60/0.1			60/0.1				
2505										(Boulder from 6.0 to 7.6 feet)
	2,502.7	7.6								Boring Terminated at Elevation 2,502.7 ft

Notes:

Culluvial Boulder from 6.0' to 7.6'

Boring offset 10' SE due to culluvial boulder. Encountered SPT and auger refusal at 8.7'

Boring offset 10' NW due to culluvial boulder. Encountered SPT and auger refusal at 6.5'

GEOTECHNICAL BORING REPORT
BORE LOG

WBS DF18314.2045155	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** M. Malisher	
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 643 {DF18314.2045220}				**GROUND WTR (ft)**
BORING NO. B-42	**STATION** 41+69	**OFFSET** 2 ft RT	**ALIGNMENT** -L3-	**0 HR.** Dry
COLLAR ELEV. 2,506.8 ft	**TOTAL DEPTH** 25.9 ft	**NORTHING** 589,602	**EASTING** 954,797	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Estep	**START DATE** 04/07/25	**COMP. DATE** 04/07/25	**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)
2510											
										2,506.8	GROUND SURFACE 0.0
2505	2,505.8	1.0	3	1	1	2		D		2,506.1	**ROADWAY EMBANKMENT** 0.7 Asphalt (0.7') Very Loose to Loose, Gray, Silty Fine to Coarse SAND (A-2-4), with trace to some asphalt fragments and trace gravel
	2,503.3	3.5	1	1	0	1		D			
2500	2,500.8	6.0	1	1	4	5		D		2,497.8	9.0
	2,498.3	8.5	12	27	73/0.2	100/0.7					**WEATHERED ROCK** Gray-White, (Granitic Gneiss)
2495	2,493.3	13.5	93	7/0.2		100/0.7				2,491.8	15.0
2490	2,488.3	18.5	50	26	60	86		M			**RESIDUAL** Very Dense, Gray-White, Silty Fine to Coarse SAND (A-2-4), with trace gravel-sized rock fragments
2485	2,483.3	23.5	100/0.3			100/0.3				2,483.3	23.5
	2,480.9	25.9	60/0.0			60/0.0				2,480.9	**WEATHERED ROCK** Gray-White, (Granitic Gneiss) 25.9 Boring Terminated with Standard Penetration Test Refusal at Elevation 2,480.9 ft On Crystalline Rock (Granitic Gneiss)

WBS DF18314.2045155	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** R. Welch	
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 643 {DF18314.2045220}				**GROUND WTR (ft)**
BORING NO. B-43	**STATION** 43+12	**OFFSET** 1 ft LT	**ALIGNMENT** -L3-	**0 HR.** Dry
COLLAR ELEV. 2,504.4 ft	**TOTAL DEPTH** 31.0 ft	**NORTHING** 589,520	**EASTING** 954,913	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER L. Ard	**START DATE** 04/03/25	**COMP. DATE** 04/03/25	**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
2505										
										2,504.4 GROUND SURFACE 0.0
	2,503.4	1.0	4	4	6	10		M		2,503.9 **ROADWAY EMBANKMENT** 0.5 Asphalt (0.5') Loose, Brown-Tan-Gray, Silty Fine to Coarse SAND (A-2-4), with trace gravel
2500	2,500.9	3.5	5	2	5	7		M		
	2,498.4	6.0	4	5	4	9		M		2,498.9 5.5
2495	2,495.9	8.5	8	10	13	23	SS-04	12%		**COLLUVIAL** Loose to Medium Dense, Tan-Orange-Red, Moderately Plastic Clayey Fine to Coarse SAND (A-2-6(1)), with trace gravel (Cobble/Boulder from 14.0 to 15.0 feet)
2490	2,490.9	13.5	14	76	24/0.2	100/0.7		M		
2485	2,485.9	18.5	13	18	25	43		M		2,486.9 17.5 **RESIDUAL** Hard, Gray-White-Black, Fine Sandy SILT (A-4), with trace gravel-sized rock fragments and Manganese Oxide staining
2480	2,480.9	23.5	22	10	35	45		M		
2475	2,475.9	28.5	100/0.4			100/0.4				2,475.9 28.5 **WEATHERED ROCK** Gray-White-Orange, (Granitic Gneiss)
	2,473.4	31.0	60/0.0			60/0.0				2,473.4 31.0 Boring Terminated with Standard Penetration Test Refusal at Elevation 2,473.4 ft On Crystalline Rock (Granitic Gneiss)

PROJECT REFERENCE NO.	SHEET NO.
DF18314.2045155	22

SOIL TEST RESULTS

Boring ID	SAMPLE NO.	OFFSET	STATION	NORTH (FT)	EAST (FT)	DEPTH INTERVAL (ft.)	AASHTO CLASS	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			%	%
										C. SAND	F. SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
B-12	SS-1266	N/A	N/A	589825	952030	6.0 - 7.5	A-6(5)	38	17	20.2%	24.8%	20.4%	34.6%	79.3%	70.3%	47.2%	22.3%	ND
B-13	SS-1256	4' LT	11+01 -L3-	589853	952131	13.5 - 15.0	A-4(0)	NP	NP	6.8%	37.4%	37.2%	18.6%	96.8%	95.1%	60.8%	41.4%	ND
B-15	SS-1237	5' LT	12+95 -L3-	589893	952312	13.5 - 15.0	A-1-b	NP	NP	44.8%	29.6%	15.5%	10.1%	60.4%	41.7%	17.8%	13.3%	ND
B-16	SS-1230	6' LT	13+97 -L3-	589983	952352	23.5 - 25.0	A-4(0)	NP	NP	23.1%	34.4%	36.4%	6.1%	92.1%	80.7%	44.7%	16.7%	ND
B-17	SS-1216	4' LT	15+07 -L3-	590080	952406	6.0 - 7.5	A-6(2)	39	15	17.0%	23.8%	26.5%	32.7%	64.1%	57.7%	40.4%	31.8%	ND
B-18	SS-1208	4' LT	15+98 -L3-	590141	952474	13.5 - 15.0	A-2-4	NP	NP	26.5%	43.9%	21.5%	8.1%	80.1%	68.8%	28.9%	14.9%	ND
B-19	SS-1194	5' LT	16+98 -L3-	590212	952544	13.5 - 15.0	A-2-4	NP	NP	21.1%	41.3%	31.4%	6.2%	61.7%	55.2%	26.9%	16.4%	ND
B-19	SS-1201	5' LT	16+98 -L3-	590212	952544	48.5 - 50.0	A-4(0)	NP	NP	21.1%	31.5%	39.2%	8.2%	91.4%	80.1%	48.9%	23.3%	ND
B-21	SS-1169	4' LT	19+07 -L3-	590291	952733	3.5 - 5.0	A-6(2)	29	11	24.3%	28.0%	19.3%	28.4%	91.4%	78.5%	47.8%	17.8%	ND
B-22	SS-1162	7' RT	20+07 -L3-	590283	952834	13.5 - 15.0	A-1-b	NP	NP	33.7%	38.3%	24.0%	4.0%	41.7%	32.5%	14.3%	3.8%	ND
B-23	SS-1146	3' LT	20+76 -L3-	590292	952903	1.0 - 2.5	A-4(3)	30	10	21.0%	29.1%	21.4%	28.5%	94.8%	84.0%	51.9%	16.6%	ND
B-24	SS-1141	3' RT	23+32 -L3-	590203	953141	13.5 - 15.0	A-1-b	NP	NP	31.0%	44.7%	22.3%	2.0%	57.3%	47.3%	17.8%	9.4%	ND
B-25	SS-1130	8' LT	24+31 -L3-	590171	953234	8.5 - 10.0	A-6(3)	32	13	21.9%	26.2%	23.4%	28.5%	85.2%	74.4%	48.0%	25.3%	ND
B-27	SS-1111	8' LT	26+28 -L3-	590132	953427	8.5 - 10.0	A-2-4	NP	NP	25.0%	45.8%	25.2%	4.0%	89.4%	78.2%	32.3%	11.6%	ND
B-29	SS-1092	7' LT	28+32 -L3-	590030	953604	6.0 - 7.5	A-1-a	NP	NP	36.9%	33.3%	19.7%	10.1%	34.4%	26.1%	12.0%	9.6%	ND
B-30	SS-1085	6' LT	29+29 -L3-	590025	953695	3.5 - 5.0	A-4(0)	25	6	27.9%	30.8%	23.1%	18.2%	79.3%	65.5%	36.5%	15.6%	ND
B-31	SS-1079	6' LT	30+77 -L3-	590011	953842	18.5 - 20.0	A-2-4	NP	NP	34.4%	34.9%	24.6%	6.1%	82.1%	64.4%	29.5%	13.9%	ND
B-32	SS-1070	9' LT	31+66 -L3-	589953	953911	8.5 - 10.0	A-4(1)	30	7	21.8%	29.8%	30.1%	18.3%	90.3%	79.1%	48.0%	20.2%	ND
B-34	SS-1051	1' LT	33+83 -L3-	589837	954091	8.5 - 10.0	A-4(0)	31	9	29.0%	29.0%	21.6%	20.4%	78.9%	65.1%	36.3%	25.2%	ND
B-35	SS-1043	3' LT	34+81 -L3-	589804	954180	13.5 - 15.0	A-6(1)	33	14	18.1%	27.3%	22.0%	32.6%	65.1%	58.3%	38.3%	9.4%	ND
B-37	SS-1019	9' LT	36+84 -L3-	589847	954378	18.5 - 20.0	A-4(0)	NP	NP	26.1%	30.8%	31.0%	12.1%	92.2%	76.9%	44.2%	17.0%	ND
B-37	SS-1024	9' LT	36+84 -L3-	589847	954378	43.5 - 45.0	A-2-4	NP	NP	35.0%	35.6%	25.4%	4.0%	90.1%	69.6%	32.0%	13.2%	ND
B-43	SS-04	1' LT	43+12 -L3-	589520	954913	8.5 - 10.0	A-2-6(1)	35	16	21.8%	17.7%	30.0%	30.5%	47.8%	40.5%	30.4%	11.7%	ND

Alix M Abernathy

Authorized Signature

130-04-0212

NCDOT Cert. No.

06/10/2025

Date

Prepared in the Office of:

F&ME CONSULTANTS, INC.

COLUMBIA, SOUTH CAROLINA.

NCDOT LAB CERT. NO. 130-0212

REFERENCE: DF18314.2045155

PROJECT: N/A

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	DF18314.2045155	1	

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY *HENDERSON*

PROJECT DESCRIPTION *REPAIR SR 1188 (DAVIS MOUNTAIN ROAD)*

SITE DESCRIPTION *SITE 821: –L2– STA. 12+75.00–16+50.00*

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 PERFORM INDEPENDENT SUBSURFACE INVESTIGATIONS AND MAKE INTERPRETATIONS AS NECESSARY TO CONFIRM CONDITIONS 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

M. MALISHER, E.I.T.

CG2 EXPLORATION

INVESTIGATED BY *CG2, PLLC*

DRAWN BY *M. MALISHER, E.I.T.*

CHECKED BY *K. DE MONTBRUN, P.E.*

SUBMITTED BY *CG2, PLLC*

DATE *JULY 2025*

Prepared in the Office of:

CAROLINAS GEOTECHNICAL GROUP

1805 SARDIS ROAD NORTH
SUITE 100
CHARLOTTE, NC 28270
(980) 339-8684

NORTH CAROLINA PROFESSIONAL SEAL 045542 ENGINEER KELLY DE MONTBRUN

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
DF18314.2045155	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-55
- [X] CME-550X
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [ ] _____
- [ ] _____

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:

ELEVATION: FEET

NOTES:

HORIZONTAL AND VERTICAL BORING LOCATIONS OBTAINED USING CARLSON BRX7 SURVEY GRADE GPS.

PREPARED BASED ON PRELIMINARY DESIGN PLANS PROVIDED BY JMT ON MAY 2025.

FIAD = FILLED IN AFTER DRILLING

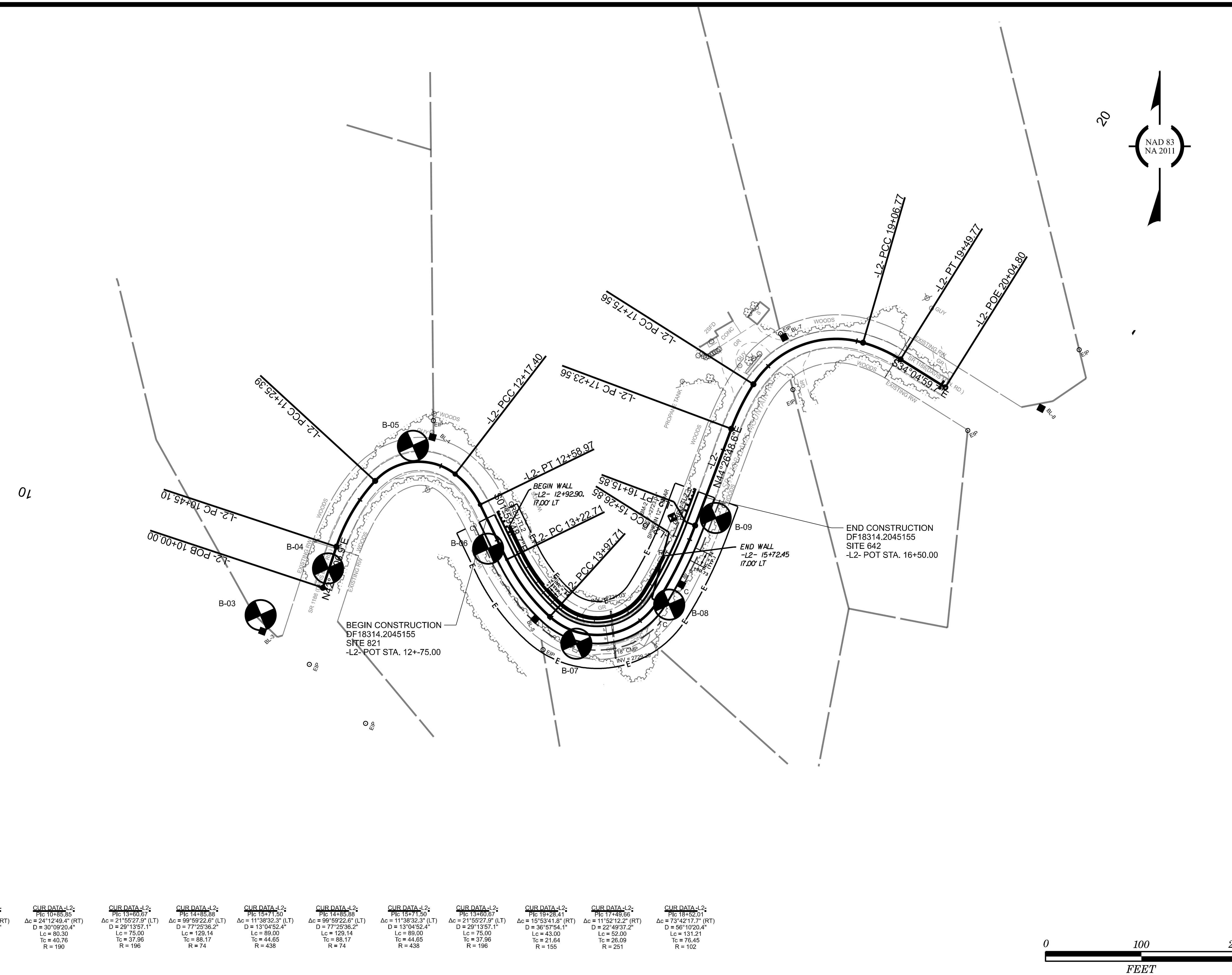
DATE: 8-15-14

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
HENDERSON COUNTY

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

Johnson, Mirmiran, & Thompson Inc.
4700 Falls of Neuse Rd. Suite 100
Raleigh, NC, 27609
License No: C-3097



CUR DATA -L2-	PIc	Δc	D	Lc	Tc	R
1	12+38.56	26°27'46.4" (RT)	63°39'43.1"	41.57	21.16	90
2	11+82.23	85°01'28.6" (RT)	92°24'45.2"	92.01	56.84	62
3	10+85.85	24°12'49.4" (RT)	30°09'20.4"	80.30	40.76	190
4	13+60.67	21°55'27.9" (LT)	29°13'57.1"	75.00	37.96	196
5	14+85.88	99°59'22.6" (LT)	77°25'36.2"	129.14	88.17	74
6	15+71.50	11°38'32.3" (LT)	13°04'52.4"	89.00	44.65	438
7	14+85.88	99°59'22.6" (LT)	77°25'36.2"	129.14	88.17	74
8	15+71.50	11°38'32.3" (LT)	13°04'52.4"	89.00	44.65	438
9	13+60.67	21°55'27.9" (LT)	29°13'57.1"	75.00	37.96	196
10	19+28.41	15°53'41.8" (RT)	36°57'54.1"	43.00	21.64	155
11	17+49.66	11°52'12.2" (RT)	22°49'37.2"	52.00	26.09	251
12	18+52.01	73°42'17.7" (RT)	56°10'20.4"	131.21	76.45	102

GEOTECHNICAL BORING REPORT
BORE LOG

WBS DF18314.2045155	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** M. Malisher	
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 821				**GROUND WTR (ft)**
BORING NO. B-03	**STATION** N/A	**OFFSET** N/A	**ALIGNMENT** N/A	**0 HR.** Dry
COLLAR ELEV. 2,709.0 ft	**TOTAL DEPTH** 11.3 ft	**NORTHING** 588,689	**EASTING** 948,208	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Estep	**START DATE** 04/22/25	**COMP. DATE** 04/22/25	**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)
2710										
	2,709.0	0.0								GROUND SURFACE
	2,708.6	0.4								**ROADWAY EMBANKMENT** Asphalt (0.4')
	2,708.0	1.0	12	20	22	42		M		
2705	2,706.0	3.0								Dense, Gray, Silty Fine to Coarse SAND (A-2-4), with trace gravel
	2,705.5	3.5	4	3	4	7		W		**COLLUVIAL** Very Soft to Medium Stiff, Brown, Slightly Plastic Fine to Coarse Sandy CLAY (A-6(6))
	2,703.0	6.0	1	0	1	1	SS-1371	35%		
2700	2,700.0	9.0								**RESIDUAL** Medium Dense, Gray-White, Silty Fine to Coarse SAND (A-2-4)
	2,700.5	8.5	WOH	3	20	23		M		
	2,697.7	11.3	60/0.0			60/0.0				Boring Terminated with Standard Penetration Test Refusal at Elevation 2,697.7 ft On Crystalline Rock (Granitic Gneiss)

WBS DF18314.2045155	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** M. Malisher	
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 821				**GROUND WTR (ft)**
BORING NO. B-04	**STATION** 10+21	**OFFSET** 1 ft LT	**ALIGNMENT** -L2-	**0 HR.** Dry
COLLAR ELEV. 2,711.4 ft	**TOTAL DEPTH** 14.0 ft	**NORTHING** 588,705	**EASTING** 948,292	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Estep	**START DATE** 04/22/25	**COMP. DATE** 04/22/25	**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
2715										
	2,711.4	0.0								GROUND SURFACE
	2,711.0	0.5								**ROADWAY EMBANKMENT** Asphalt (0.5')
2710	2,710.4	1.0	12	10	7	17		M		
	2,708.4	3.0								Medium Dense, Gray, Silty Fine to Coarse SAND (A-2-4), with trace gravel
	2,707.9	3.5	8	7	3	10		M		**RESIDUAL** Loose to Very Dense, Gray-White, Silty Fine to Coarse SAND (A-2-4), with some gravel-sized rock fragments
2705	2,705.4	6.0	14	13	12	25		M		
	2,702.9	8.5	23	31	37	68		M		
2700	2,697.4	14.0	60/0.0			60/0.0				
										Boring Terminated with Standard Penetration Test Refusal at Elevation 2,697.4 ft On Crystalline Rock (Granitic Gneiss)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS DF18314.2045155	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** M. Malisher	
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 821				**GROUND WTR (ft)**
BORING NO. B-05	**STATION** 11+72	**OFFSET** 17 ft LT	**ALIGNMENT** -L2-	**0 HR.** Dry
COLLAR ELEV. 2,719.7 ft	**TOTAL DEPTH** 39.2 ft	**NORTHING** 588,786	**EASTING** 948,425	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Estep	**START DATE** 04/18/25	**COMP. DATE** 04/18/25	**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)
2720										2,719.7 — 0.0 GROUND SURFACE
	2,718.7	1.0	6	4	4	8		M		**RESIDUAL** Loose, Brown, Silty Fine to Coarse SAND (A-2-4), with trace gravel-sized rock fragments
	2,716.2	3.5								2,716.7 — 3.0
2715			3	4	6	10		M		Loose to Very Dense, White-Brown-Gray, Silty Fine to Coarse SAND (A-2-4), with trace gravel-sized rock fragments
	2,713.7	6.0								
			14	5	7	12		M		
	2,711.2	8.5								
2710			10	10	14	24		M		
	2,706.2	13.5								
2705			14	10	16	26	SS-1321	7%		
	2,701.2	18.5								
2700			5	4	7	11		M		
	2,696.2	23.5								
2695			33	56	24	80		M		
	2,691.2	28.5								
2690			16	23	33	56		M		
	2,686.2	33.5								
2685			17	39	56	95		M		
	2,681.2	38.5	55	45/0.2		100/0.7				2,681.2 — 38.5 2,680.5 — 39.2 **WEATHERED ROCK** Gray-White (Granitic Gneiss)

Boring Terminated at Elevation 2,680.5 ft In Weathered Rock (Granitic Gneiss)

Surficial Organic Laden Soil 0.0'-0.2'

WBS DF18314.2045155	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** M. Malisher	
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 821				**GROUND WTR (ft)**
BORING NO. B-06	**STATION** 13+04	**OFFSET** 13 ft RT	**ALIGNMENT** -L2-	**0 HR.** Dry
COLLAR ELEV. 2,727.6 ft	**TOTAL DEPTH** 2.7 ft	**NORTHING** 588,656	**EASTING** 948,453	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Estep	**START DATE** 04/18/25	**COMP. DATE** 04/18/25	**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
2730										2,727.6 — 0.0 GROUND SURFACE
	2,726.6	1.0								**RESIDUAL** Medium Dense, Gray-White, Silty Fine to Coarse SAND (A-2-4), with trace gravel-sized rock fragments
2725	2,724.9	2.7	11	12	18	30		M		2,724.9 — 2.7
			60/0.0			60/0.0				Boring Terminated with Standard Penetration Test Refusal at Elevation 2,724.9 ft On Crystalline Rock (Granitic Gneiss)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS DF18314.2045155	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** M. Malisher	
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 821				**GROUND WTR (ft)**
BORING NO. B-07	**STATION** 14+33	**OFFSET** 12 ft RT	**ALIGNMENT** -L2-	**0 HR.** 12.7
COLLAR ELEV. 2,731.7 ft	**TOTAL DEPTH** 15.5 ft	**NORTHING** 588,528	**EASTING** 948,497	**24 HR.** 9.1
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Estep	**START DATE** 04/17/25	**COMP. DATE** 04/17/25	**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))
2735										
	2,731.7									2,731.7 GROUND SURFACE 0.0
	2,731.1									**ROADWAY EMBANKMENT** ABC Stone (0.6') 0.6
2730	2,730.7	1.0								
	2,728.2	3.5	WOH	3	3	6		M		2,728.7 **COLLUVIAL** Medium Stiff, Gray-Brown, Fine to Coarse Sandy SILT (A-4), with trace mica 3.0
	2,725.7	6.0	2	4	5	9	SS-1312	18%		2,726.2 Stiff, Gray-Brown, Slightly Plastic Fine to Coarse Sandy CLAY (A-6(2)) 5.5
2725	2,723.2	8.5	4	5	8	13		M		2,722.7 Medium Dense, Gray, Silty Fine SAND (A-2-4) 9.0
			8	4	96/0.3	100/0.8				**WEATHERED ROCK** White-Brown-Gray (Granitic Gneiss)
2720	2,718.2	13.5	50	11	89/0.2	100/0.7				
	2,716.2	15.5	60/0.0			60/0.0				2,716.2 15.5 Boring Terminated with Standard Penetration Test Refusal at Elevation 2,716.2 ft On Crystalline Rock (Granitic Gneiss)

WBS DF18314.2045155	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** M. Malisher	
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 821				**GROUND WTR (ft)**
BORING NO. B-08	**STATION** 15+31	**OFFSET** 12 ft RT	**ALIGNMENT** -L2-	**0 HR.** 5.1
COLLAR ELEV. 2,731.2 ft	**TOTAL DEPTH** 26.8 ft	**NORTHING** 588,526	**EASTING** 948,602	**24 HR.** 9.7
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Estep	**START DATE** 04/17/25	**COMP. DATE** 04/17/25	**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
2735										
										2,731.2 GROUND SURFACE 0.0
2730	2,730.2	1.0								**RESIDUAL** Loose to Medium Dense, Gray-White-Brown, Silty Fine to Coarse SAND (A-2-4)
	2,727.7	3.5	5	4	3	7		M		
	2,725.2	6.0	4	5	6	11		M		2,725.7 5.5 Medium Stiff, Brown-Gray, Fine to Coarse Sandy SILT (A-4), with trace mica and Manganese Oxide staining
2725	2,722.7	8.5	3	3	4	7		M		
			2	3	3	6				
2720	2,717.7	13.5	2	5	6	11		M		2,719.2 12.0 Medium Dense, Gray-White, Silty Fine to Coarse SAND (A-2-4), with trace mica and Manganese Oxide staining
2715	2,712.7	18.5	2	2	4	6		M		2,714.2 17.0 Medium Stiff, Gray- Brown, Fine to Coarse Sandy SILT (A-4), with trace mica
2710	2,707.7	23.5	36	64/0.3		100/0.8				2,707.7 23.5 **WEATHERED ROCK** Gray-White (Granitic Gneiss)
2705	2,704.4	26.8	60./0.0			60/0.0				2,704.4 26.8 Boring Terminated with Standard Penetration Test Refusal at Elevation 2,704.4 ft On Crystalline Rock (Granitic Gneiss)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS DF18314.2045155	**TIP** N/A	**COUNTY** HENDERSON	**GEOLOGIST** M. Malisher	
SITE DESCRIPTION Repair SR 1188 (Davis Mountain Road) Site 821				**GROUND WTR (ft)**
BORING NO. B-09	**STATION** 16+31	**OFFSET** 17 ft RT	**ALIGNMENT** -L2-	**0 HR.** Dry
COLLAR ELEV. 2,725.2 ft	**TOTAL DEPTH** 27.5 ft	**NORTHING** 588,589	**EASTING** 948,683	**24 HR.** 23.0
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 78% 05/06/2024		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER J. Estep	**START DATE** 04/17/25	**COMP. DATE** 04/17/25	**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
2730										
2725										ELEV. (ft) 2,725.2 GROUND SURFACE DEPTH (ft) 0.0
	2,724.2	1.0								**RESIDUAL**
	2,721.7	3.5	3	5	5	10		M		Stiff, Orange-Brown-White-Gray, Fine to Coarse Sandy SILT (A-4(0)), with trace mica and Manganese Oxide staining
2720			4	5	7	12		M		
	2,719.2	6.0	4	4	6	10		M		
	2,716.7	8.5	3	5	7	12	SS-1298	18%		
2715										
	2,711.7	13.5	3	5	7	12		M		
2710										
	2,706.7	18.5	3	7	93/0.2	100/0.7				ELEV. (ft) 2,706.2 DEPTH (ft) 19.0
2705										**WEATHERED ROCK**
	2,701.7	23.5	36	63	37/0.2	100/0.7				Gray-White (Grantic Gneiss)
2700										
	2,697.7	27.5	60/0.0			60/0.0				ELEV. (ft) 2,697.7 DEPTH (ft) 27.5
										Boring Terminated with Standard Penetration Test Refusal at Elevation 2,697.7 ft On Crystalline Rock (Granitic Gneiss)

PROJECT REFERENCE NO.	SHEET NO.
DF18314.2045155	8

SOIL TEST RESULTS

Boring ID	SAMPLE NO.	OFFSET	STATION	NORTH (FT)	EAST (FT)	DEPTH INTERVAL (ft.)	AASHTO CLASS	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			%	%
										C. SAND	F. SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
B-03	SS-1371	N/A	N/A	588689	948208	6.0-7.5	A-6(6)	33	15	19.2%	26.8%	25.5%	28.5%	98.7%	88.7%	58.2%	35.4%	ND
B-05	SS-1321	17' LT	11+72 -L2-	588786	948425	13.5-15.0	A-2-4	NP	NP	30.0%	46.4%	21.6%	2.0%	73.3%	61.5%	22.9%	7.3%	ND
B-07	SS-1312	12' RT	14+33 -L2-	588528	948497	3.5-5.0	A-6(2)	29	11	23.3%	28.5%	19.8%	28.4%	82.9%	71.2%	44.0%	18.4%	ND
B-09	SS-1298	17' RT	16+31 -L2-	588589	948683	8.5-10.0	A-4(0)	NP	NP	22.3%	27.3%	42.3%	8.1%	91.0%	78.6%	50.5%	18.4%	ND

Alix M Abernathy

Authorized Signature

130-04-0212

NCDOT Cert. No.

10/03/24

Date

Prepared in the Office of:

F&ME CONSULTANTS, INC.

COLUMBIA, SOUTH CAROLINA.

NCDOT LAB CERT. NO. 130-0212