



December 10, 2024

MEMORANDUM TO: Matthew J. Alexander, PE
State Geotechnical Engineer
North Carolina Department of Transportation

FROM: Joshua D. Fregosi, PE
Program Manager
Kleinfelder, Inc

STATE PROJECT: 54019.1.1 (U-5728)

COUNTY: Onslow

DESCRIPTION: US 17 Business (Marine Boulevard) at SR 1308 (Bell Fork Road / Gum Branch Road)

SUBJECT: Pavement and Subgrade Investigation Report

Kleinfelder, Inc. has completed the pavement and subgrade investigation for this project and presents the following.

At the project location, US 17 Business (Marine Boulevard) is currently a four-lane road consisting of two travel lanes in the northbound and southbound direction. Most of US 17 Business has a shared center turn lane with various left and right turn lanes. The travel, left turn, right turn, and shared center turn lanes for US 17 Business consist of asphalt. US 17 Business has earthen shoulders along the northbound lanes from the beginning of the project to the intersection with SR 1308 (Bell Fork Road / Gum Branch Road), except for a right turn lane to Jacksonville Station consisting of a concrete curb and gutter. After the intersection with SR 1308, US 17 Business has asphalt paved shoulders along the northbound lanes. US 17 Business has shoulders consisting of concrete curb and gutter along the southbound lanes.

At the project location, SR 1308 is currently a four-lane road consisting of two travel lanes in the westbound and eastbound direction as well as various left and right turn lanes. The travel, left turn, and right turn lanes for SR 1308 consist of asphalt and shoulders consist of concrete curb and gutter.

This project consists of a widening of US 17 Business (-L-) and SR 1308 (-Y1A-, -Y1-) as well as the construction of monolithic concrete islands and sidewalk. For US 17 Business, proposed travel lanes and right turn lanes will be approximately 12 feet wide while proposed left turn lanes will be approximately 11 feet wide. For SR 1308, proposed travel lanes, left turn lanes, and right turn lanes will be approximately 11 feet wide. Asphalt paved shoulders will range from 2 to 4 feet wide while curb and gutter will be 2.5 feet wide.

The length of US 17 Business and SR 1308 is approximately 0.575 miles and 0.20 miles, respectively.



The soils encountered beneath the existing roadway consisted of both roadway embankment and undivided coastal plain deposits. Predominant soil types encountered consisted of silty sands (A-2-4) and sandy clays (A-6).

Anticipated borrow will likely consist of soil types listed above that meet the Coastal Area criteria for Acceptance of Borrow Material, Table 1018-2 of the 2024 Standard Specification.

Pavement Distress

The existing pavement was generally observed to be in good condition on US 17 Business (-L-) and SR 1308 (-Y1A-, -Y1-). Surface pavement distress is primarily characterized by low severity fatigue cracking and low to moderate severity longitudinal and transverse cracking with spalling. Limited rutting was encountered at US 17 Business and SR 1308 measuring approximately 3 mm and 6 to 25 mm, respectively.

Areas of Special Geotechnical Interest

1. Moderately and/or Highly Plastic Soils Encountered Beneath the Existing Roadway

Moderately and/or highly plastic soils ($PI > 15$) were encountered at the following location based on laboratory test results:

LINE	STATION AND OFFSET	PI
-L-	1300_SB_OSL	17
-L-	2200_NB_LTL	17
-L-	3300_NB_OSL	16

2. Groundwater

Groundwater was observed during this investigation at the following locations:

LINE	STATION AND OFFSET	DEPTH (FT)
-Y1A-	1425_WB_ISL	4.0
-Y1A-	1425_WB_LTL(I)	4.0

3. Samples Classified as Wet

The subgrade soils at the following locations were classified as wet based on laboratory test results:

LINE	STATION AND OFFSET	MOISTURE (%)
-L-	1300_SB_OSL	21.0
-L-	2200_NB_LTL	20.0
-L-	2800_SB_ISL	22.0
-L-	3300_NB_OSL	26.0
-L-	3050_RT*	17.2
-Y1A-	1425_WB_LTL(I)	24.3

*Bulk sample location.



Prepared by,
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12/10/2024

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12/11/2024

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Program Manager

Document Not Considered Final Unless All Signatures Are Completed

DHK/JDF:asp

ATTACHMENT: Pavement and Subgrade Investigation

REFERENCE: U-5728

PROJECT: 54019

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

ROADWAY
SUBSURFACE INVESTIGATION

COUNTY ONSLOW
PROJECT DESCRIPTION US 17 BUSINESS (MARINE BOULEVARD) AT SR 1308 (BELL FORK ROAD / GUM BRANCH ROAD)

PAVEMENT AND SUBGRADE INVESTIGATION

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5728	1	

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT, AT (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

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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.

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- THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
 - BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PERSONNEL

D. KUBINSKI

TRIGON EXPLORATION

INVESTIGATED BY KLEINFELDER, INC

DRAWN BY B. FARMER

CHECKED BY D. KUBINSKI

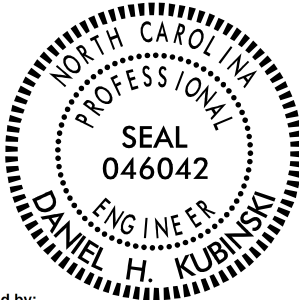
SUBMITTED BY KLEINFLEDER, INC

DATE DECEMBER 2024

Prepared in the Office of:



KLEINFELDER
Bright People. Right Solutions.
422 GALLIMORE DAIRY ROAD, SUITE B
GREENSBORO, NC 27409
NC ENGINEERING FIRM LICENSE NO. F-1312



Signed by: Daniel H. Kubinski 12/10/2024

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SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

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-4, A-5	A-6, A-7		
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		
MATERIAL PASSING #40 LL PI	-		-		40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 11 MN	40 MX 11 MN		
GROUP INDEX	0		0		4 MX		8 MX		12 MX		16 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

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
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME
HIGHLY ORGANIC	> 10%	> 20%	HIGHLY

GROUND WATER

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

MISCELLANEOUS SYMBOLS

ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
 SOIL SYMBOL
 ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
 INFERRED SOIL BOUNDARY
 INFERRED ROCK LINE
 ALLUVIAL SOIL BOUNDARY
 DIP & DIP DIRECTION OF ROCK STRUCTURES
 TEST BORING
 AUGER BORING
 CORE BORING
 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
HL - HIGHLY
MED. - MEDIUM
MICA. - MICACEOUS
MOD. - MODERATELY
NP - NON PLASTIC
ORG. - ORGANIC
PMT - PRESSUREMETER TEST
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
w - MOISTURE CONTENT
V - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
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 (TRUCK)
☐ CME-550
☐ VANE SHEAR TEST
☐ PORTABLE HOIST
☐ _____
☐ _____

ADVANCING TOOLS:

☐ CLAY BITS
☐ 6" CONTINUOUS FLIGHT AUGER
☒ 8" HOLLOW AUGERS
☐ HARD FACED FINGER BITS
☐ TUNG.-CARBIDE INSERTS
☐ CASING ☐ W/ ADVANCER
☐ TRICONE _____ *STEEL TEETH
☐ TRICONE _____ *TUNG.-CARB.
☒ CORE BIT (4 INCH DIAMETER)
☐ _____

HAMMER TYPE:

☐ AUTOMATIC ☐ MANUAL
CORE SIZE:
☐ -B _____ ☐ -H _____
☐ -N _____
HAND TOOLS:
☐ POST HOLE DIGGER
☐ HAND AUGER
☐ SOUNDING ROD
☐ VANE SHEAR TEST
☒ KESSLER DUAL MASS DCP

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 YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.

COASTAL PLAIN SEDIMENTARY ROCK (CP)

COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

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 FINGER NAIL.

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 IN OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: N/A

ELEVATION: N/A FEET

NOTES:
 PAVEMENT CORE WITH KESSLER DUAL MASS DCP TEST
 PAVEMENT CORE WITHOUT KESSLER DUAL MASS DCP TEST
 BULK SAMPLE FOR CBR TESTING

DATE: 8-15-11

ABBREVIATIONS

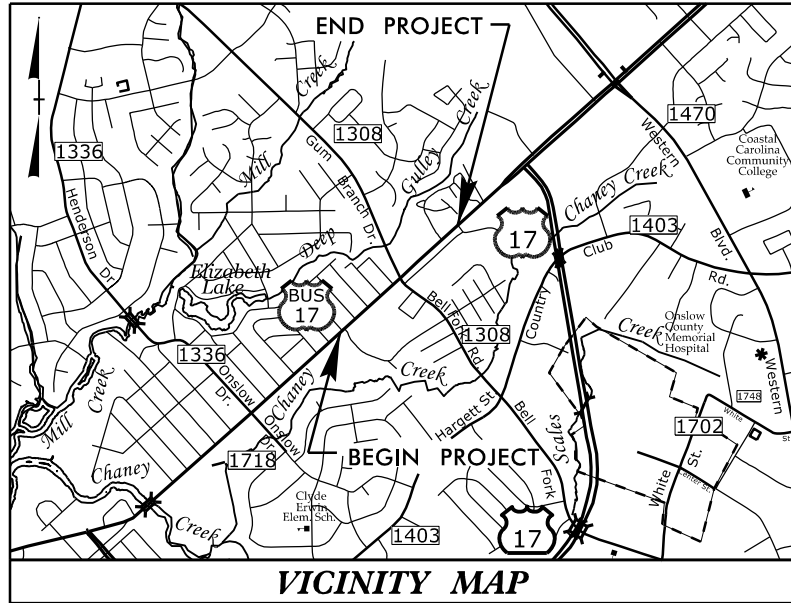
- CG - CURB & GUTTER
- CR - CROWN
- CTL - CENTER TURN LANE
- EB - EASTBOUND
- FISWL - FROM INSIDE WHITE LINE
- FISYL - FROM INSIDE YELLOW LINE
- FOSSWL- FROM OUTSIDE SHOULDER WHITE LINE
- FOSWL - FROM OUTSIDE WHITE LINE
- FOSYL - FROM OUTSIDE YELLOW LINE
- ISL - INSIDE LANE
- LT - LEFT
- LTL - LEFT TURN LANE
- LTL(I) - INSIDE LEFT TURN LANE
- LTL(O) - OUTSIDE LEFT TURN LANE
- NB - NORTHBOUND
- OSL - OUTSIDE LANE
- OSS - OUTSIDE SHOULDER
- PS - PAVED SHOULDER
- RT - RIGHT
- RTL - RIGHT TURN LANE
- SB - SOUTHBOUND
- T/EX SG - TOP OF EXISTING SUBGRADE
- WB - WESTBOUND
- WL - WHITE LINE

09/08/19
03 AUG 2024 13:24
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\$\$\$\$\$SCALE\$\$\$\$\$

TIP PROJECT: U-5728

CONTRACT: D3POC0046

See Sheet 1-B For Conventional Plan Sheet Symbols



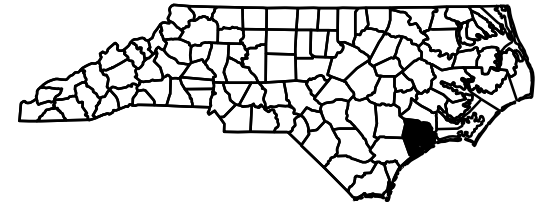
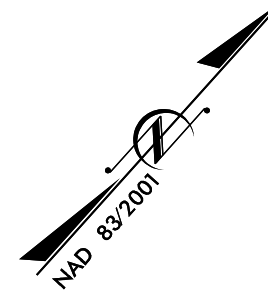
VICINITY MAP

ROW PLANS

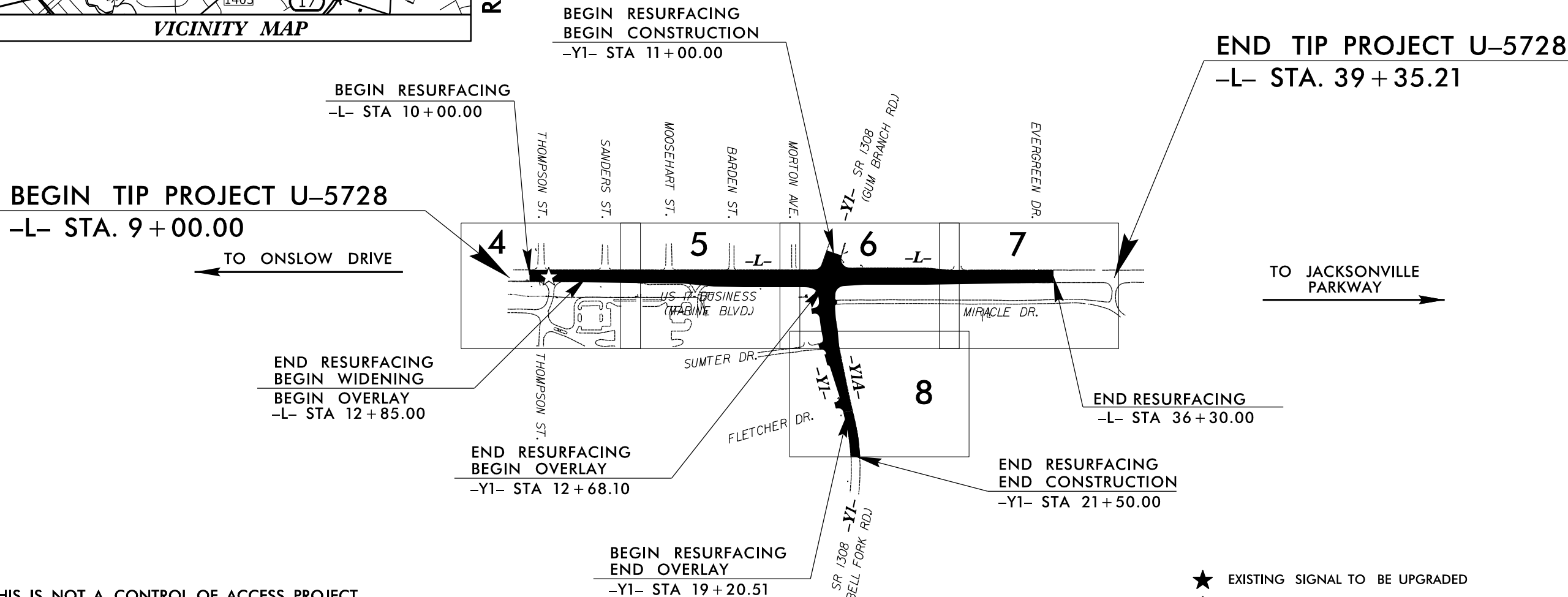
STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS ONSLOW COUNTY

LOCATION: CITY OF JACKSONVILLE -
US 17 BUSINESS (MARINE BOULEVARD) AT
SR 1308 (BELL FORK RD./GUM BRANCH RD.)

TYPE OF WORK: WIDENING, GRADING, DRAINAGE,
PAVING, RESURFACING, AND SIGNALS



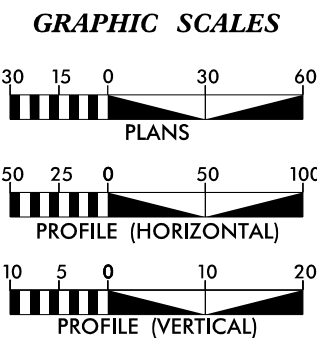
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5728	3	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
54019.1.1	N/A	PE	
54019.2.1	N/A	ROW & UTIL	



THIS IS NOT A CONTROL OF ACCESS PROJECT
THIS PROJECT IS WITHIN THE JACKSONVILLE MUNICIPAL BOUNDARIES.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III (MODIFIED).

- ★ EXISTING SIGNAL TO BE UPGRADED
- ☆ EXISTING SIGNAL TO BE RETAINED

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



DESIGN DATA

ADT 2020 = 21000
ADT 2040 = 25000
DHV = 10 %
D = 60 %
T = 2 % *
V = 50 MPH
* TTST 1% + DUAL 1%
FUNC CLASS =
PRINC. ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-5728 = 0.575 MILES
LENGTH STRUCTURE TIP PROJECT U-5728 = 0.000 MILES
TOTAL LENGTH OF TIP PROJECT U-5728 = 0.575 MILES

Prepared for the North Carolina Department of Transportation in the Office of:
HOME OFFICE
119 BROOKSTOWN AVENUE, SUITE PH1
WINSTON-SALEM, NC 27101
336.744.1636 www.davenportnc.com
NCBELS FIRM LICENSE NO. C-2522

DAVENPORT
2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
MARCH 13, 2018

LETTING DATE:
MAY 7, 2020

NCDOT CONTACT:

DANIEL R. CUMBO, PE
PROJECT ENGINEER

DAVIN B. WALLACE, PE
PROJECT DESIGN ENGINEER

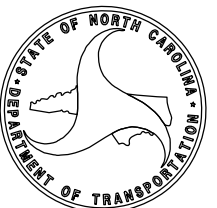
TRACE HOWELL
DIVISION 3 CONTACT

HYDRAULICS ENGINEER

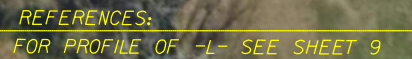
SIGNATURE: P.E.

ROADWAY DESIGN
ENGINEER

SIGNATURE: P.E.



MATCHLINE SEE SHEET 5 -L- STA. 15+00.00



MATCHLINE SEE SHEET 4 -L- STA. 15 + 00.00

REFERENCES:
FOR PROFILE OF -L- SEE SHEET 9

MATCHLINE SEE SHEET 6 -L- STA. 23+00.00

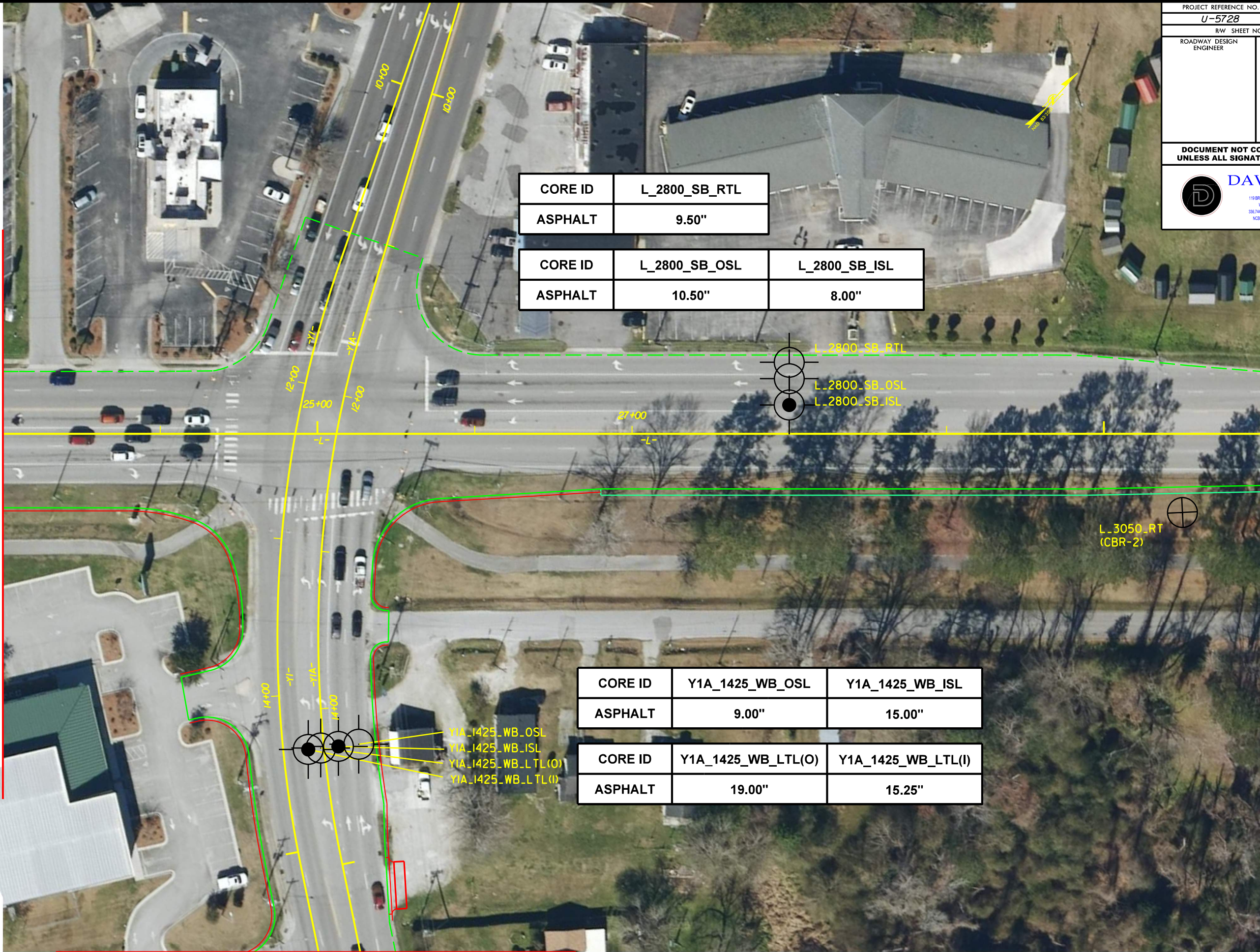
8/17/99

REVISIONS

MATCHLINE SEE SHEET 5 -L- STA. 23+00.00

MATCHLINE SEE SHEET 8 -Y1- STA. 15+65.00

MATCHLINE SEE SHEET 7 -L- STA. 31+00.00



CORE ID	L_2800_SB_RTL
ASPHALT	9.50"

CORE ID	L_2800_SB_OSL	L_2800_SB_ISL
ASPHALT	10.50"	8.00"

CORE ID	Y1A_1425_WB_OSL	Y1A_1425_WB_ISL
ASPHALT	9.00"	15.00"

CORE ID	Y1A_1425_WB_LTL(O)	Y1A_1425_WB_LTL(I)
ASPHALT	19.00"	15.25"

PROJECT REFERENCE NO. U-5728		SHEET NO. 6
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULIC DESIGN ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		
DAVENPORT HOME OFFICE 119 BROOKSTOWN AVENUE, SUITE PH1 WINSTON-SALEM, NC 27101 336.744.1606 www.davenportwi.com NCBELS FIRM LICENSE NO. C-2552		

8/17/99

REVISIONS	

MATCHLINE SEE SHEET 6 -L- STA. 31+00.00



REFERENCES:
FOR PROFILE OF -L- SEE SHEET 9

PROJECT REFERENCE NO. U-5728		SHEET NO. 7
R/W SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULIC DESIGN ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		
DAVENPORT HOME OFFICE 119 BROOKSTOWN AVENUE, SUITE PH1 WINSTON-SALEM, NC 27101 336.744.1606 www.davenportwds.com NCBELS FIRM LICENSE NO. C-3522		

8/17/99
P:\U5728.GEO.PDI\CAOD.GEOTECH\PlanPr of \U5728.GEO.PDI.PSH.08.dgn
\$\$\$\$\$SCALE\$\$\$\$\$
1/8"=1'-0"
DATE: 8/17/99
DRAWN BY: JAVENPORT

REVISIONS

MATCHLINE SEE SHEET 6 -Y1- STA. 15 + 65.00



CORE ID	Y1_1900_EB_ISL	Y1_1900_EB_OSL
ASPHALT	9.00"	11.75"

REFERENCES:
FOR PROFILE OF -Y1- SEE SHEET 10

PROJECT REFERENCE NO. U-5728		SHEET NO. 8
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULIC DESIGN ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		
DAVENPORT HOME OFFICE 119 BROOKSTOWN AVENUE, SUITE PH WINSTON-SALEM, NC 27101 336.744.1606 www.davenportwi.com NCBELS FIRM LICENSE NO. C-3522		

PAVEMENT AND SUBGRADE INVESTIGATION DATA SHEET

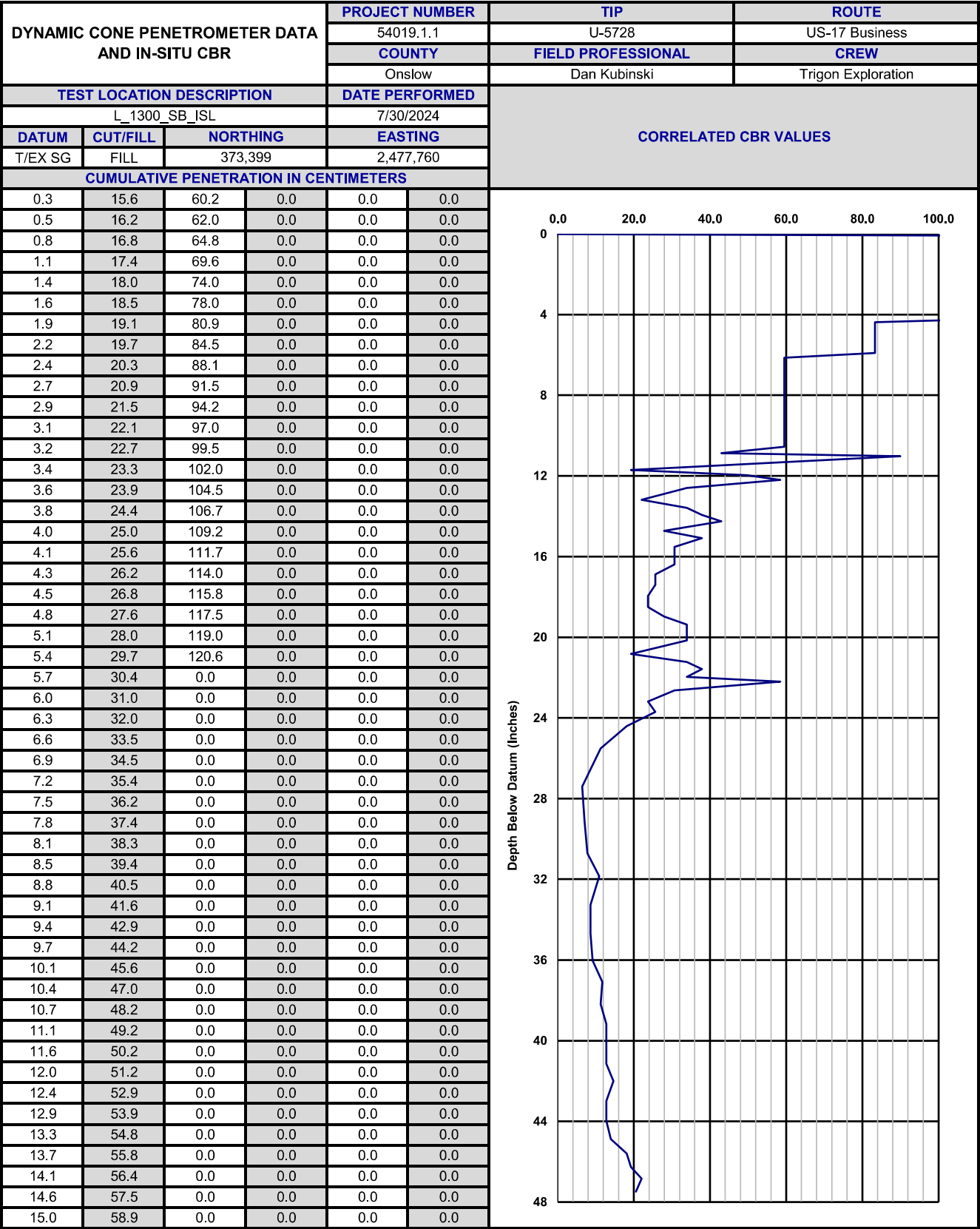
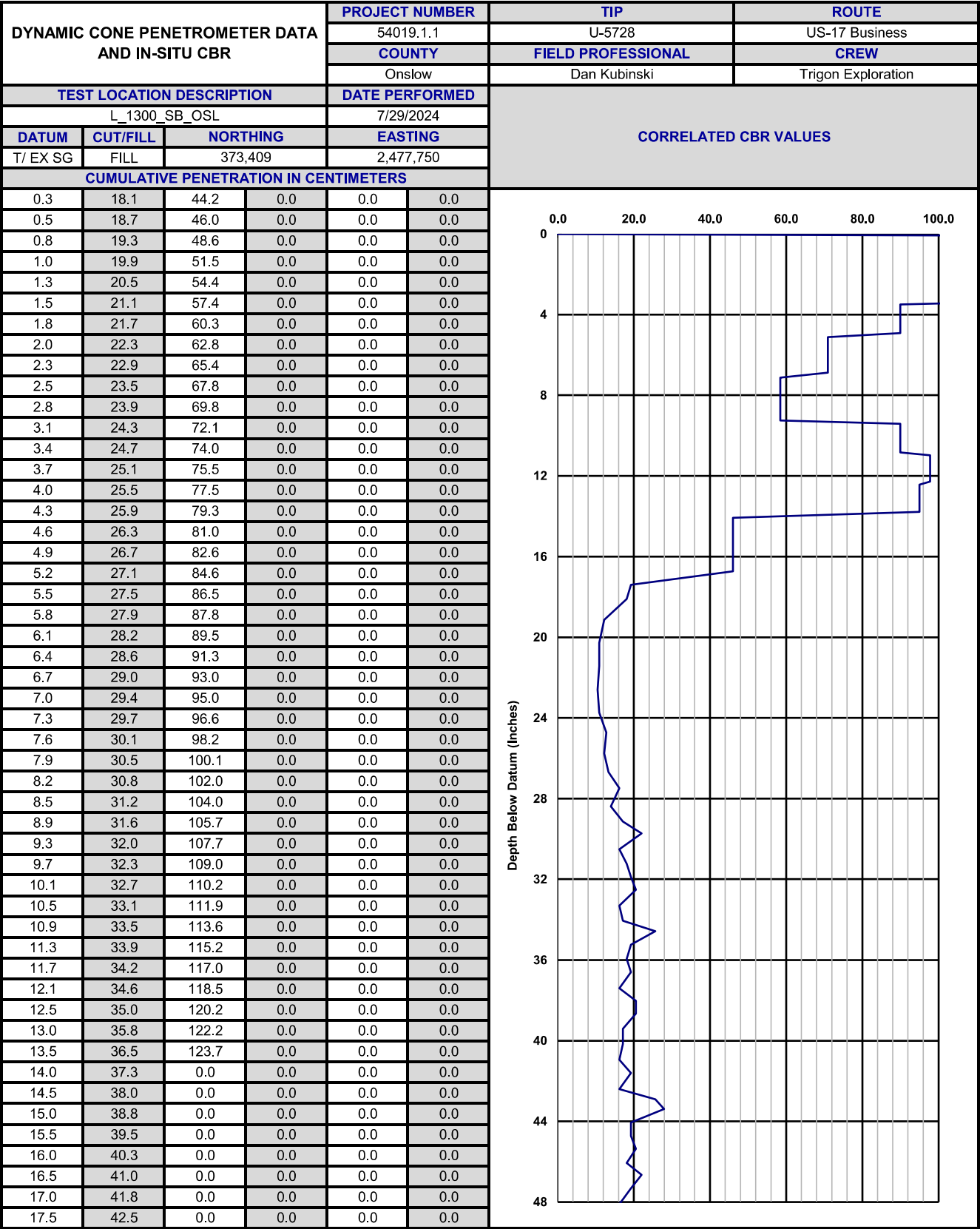
TIP (WBS):	U-5728 (54019.1.1)	Project:	US 17 Business (Marine Boulevard) at SR 1308 (Bell Fork Road / Gum Branch Road)	Date:	July 2024
County:	Onslow	Route:	US 17 Business (Marine Boulevard), SR 1308 (Bell Fork Road)	Notes By:	Dan Kubinski

		Width (ft)		(ft)		Pavement Section Thickness (in)							Subgrade							
Position (Sta.,Lane,Shldr.)	Cut/Fill	Lane(s)	Shoulder	Offset Distance	Crown or Superelevation	Gross to Top of Soil	Asphalt	Concrete	ABC Stone	PADL	Soil Stabilization	Sand	Sample No.	Soil Description	AASHTO Classification	Soil Moisture (%)	Probe Depth (ft)	Pavement Distress Notes, Severity and Cracking Type	Northing	Easting
L_1300_SB_OSL	FILL	11.5	2.5 CG	7.5 LT FISWL	CR	3.75	3.75	0.00	0.00	0.00	0.00	0.00	-- S-1	ROADWAY EMBANKMENT: Moist, Brown, Silty Coarse to Fine SAND (0.3 - 2.5') UNDIVIDED COASTAL PLAIN: Wet, Moderately Plastic, Yellowish Brown, Coarse to Fine Sandy CLAY (2.5 - 5.0')	A-2-4 A-6	-- 21.0	5.0	Fatigue, transverse cracking - Low severity <i>Mechanical damage to asphalt surface layer during coring.</i>	373,409	2,477,750
L_1300_SB_ISL		12.0	--	7.0 RT FOSWL		5.50	5.50	0.00	0.00	0.00	0.00	0.00	S-2 --	ROADWAY EMBANKMENT: Moist, Non Plastic, Brown, Silty Coarse to Fine SAND (0.5 - 2.5') UNDIVIDED COASTAL PLAIN: Wet, Moderately Plastic, Yellowish Brown, Coarse to Fine Sandy CLAY (2.5 - 5.0')	A-2-4 A-6	8.7 --	5.0	Longitudinal, transverse cracking - Low to moderate severity (with spalling)	373,399	2,477,760
L_1650_NB_RTL	FILL	14.0	2.5 CG	10.5 RT FISWL	CR	11.25	11.25	0.00	0.00	0.00	0.00	0.00	--	Kessler DCP and auger probe not performed due to potential underground utility conflicts.	--	--	--	No pavement distress observed	373,603	2,478,047
L_2200_NB_LTL	FILL	12.0	--	6.0 LT FOSWL	CR	14.25	14.25	0.00	0.00	0.00	0.00	0.00	-- S-3	ROADWAY EMBANKMENT: Moist, Brown, Silty Coarse to Fine SAND (1.3 - 2.0') UNDIVIDED COASTAL PLAIN: Wet, Moderately Plastic, Yellowish Brown, Coarse to Fine Sandy CLAY (2.0 - 5.0')	A-2-4 A-6	-- 20.0	5.0	Longitudinal, transverse cracking - Low to moderate severity <i>Pavement core performed on existing crack</i>	373,992	2,478,437
L_2200_NB_ISL		12.0	--	6.0 RT FISWL		16.00	16.00	0.00	0.00	0.00	0.00	0.00	S-4 --	ROADWAY EMBANKMENT: Moist, Non Plastic, Brown, Silty Coarse to Fine SAND (1.3 - 2.0') UNDIVIDED COASTAL PLAIN: Wet, Moderately Plastic, Yellowish Brown, Coarse to Fine Sandy CLAY (2.0 - 5.0')	A-2-4 A-6	12.9 --	5.0	Longitudinal, transverse cracking - Low to moderate severity	373,983	2,478,445
L_2200_NB_OSL		12.0	--	4.5 LT FOSWL		6.00	6.00	0.00	0.00	0.00	0.00	0.00	-- --	ROADWAY EMBANKMENT: Moist, Brown, Silty Coarse to Fine SAND (0.5 - 2.0') UNDIVIDED COASTAL PLAIN: Wet, Moderately Plastic, Yellowish Brown, Coarse to Fine Sandy CLAY (2.0 - 5.0')	A-2-4 A-6	-- --	5.0	Longitudinal, transverse cracking - Low to moderate severity Rutting (3 mm)	373,973	2,478,454
L_2200_NB_RTL		12.0	Earth	4.5 LT FOSSWL		7.75	7.75	0.00	0.00	0.00	0.00	0.00	--	Kessler DCP and auger probe not performed due to potential underground utility conflicts.	--	--	--	Longitudinal, transverse cracking - Low to moderate severity (with spalling) Rutting (3 mm)	373,965	2,478,462
L_2800_SB_RTL	FILL	12.0	2.5 CG	7.0 LT FISWL	CR	9.50	9.50	0.00	0.00	0.00	0.00	0.00	--	Kessler DCP and auger probe not performed due to potential underground utility conflicts.	--	--	--	Longitudinal, transverse cracking - Low severity	374,419	2,478,860
L_2800_SB_OSL		12.0	--	3.5 RT FOSWL		10.50	10.50	0.00	0.00	0.00	0.00	0.00	--	Potential RCP encountered at ~0.9' below existing grade - Kessler DCP testing terminated early. Auger probe not performed	--	--	--	Longitudinal, transverse cracking - Low severity	374,411	2,478,867
L_2800_SB_ISL		12.0	--	3.0 LT FISWL		8.00	8.00	0.00	0.00	0.00	0.00	0.00	-- S-5	ROADWAY EMBANKMENT: Moist, Gray, Silty Coarse to Fine SAND (0.7 - 2.0') UNDIVIDED COASTAL PLAIN: Wet, Slightly Plastic, Yellowish Brown, Coarse to Fine Sandy CLAY (2.0 - 5.0')	A-2-4 A-6	-- 22.0	5.0	Longitudinal, transverse cracking - Low severity	374,399	2,478,878

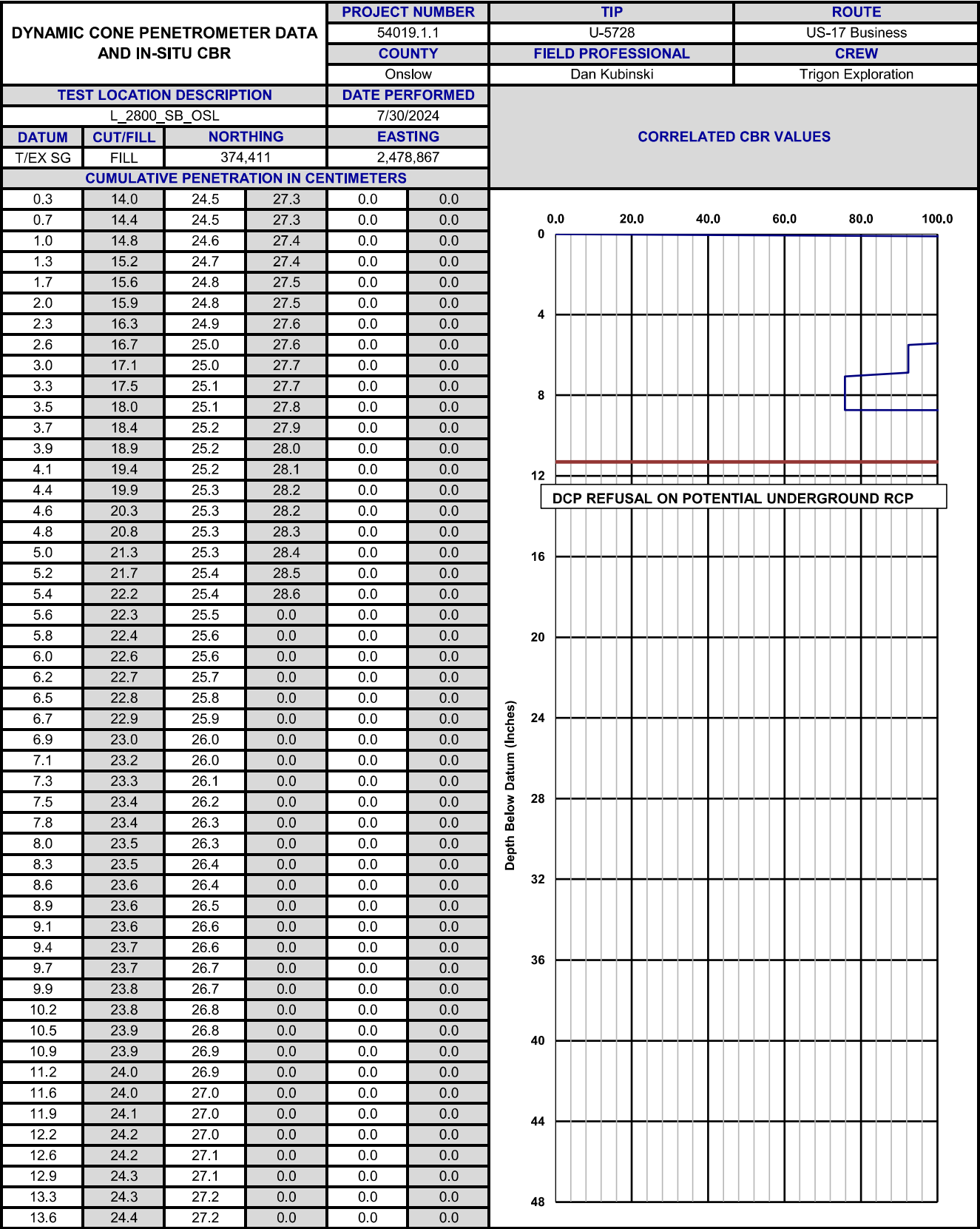
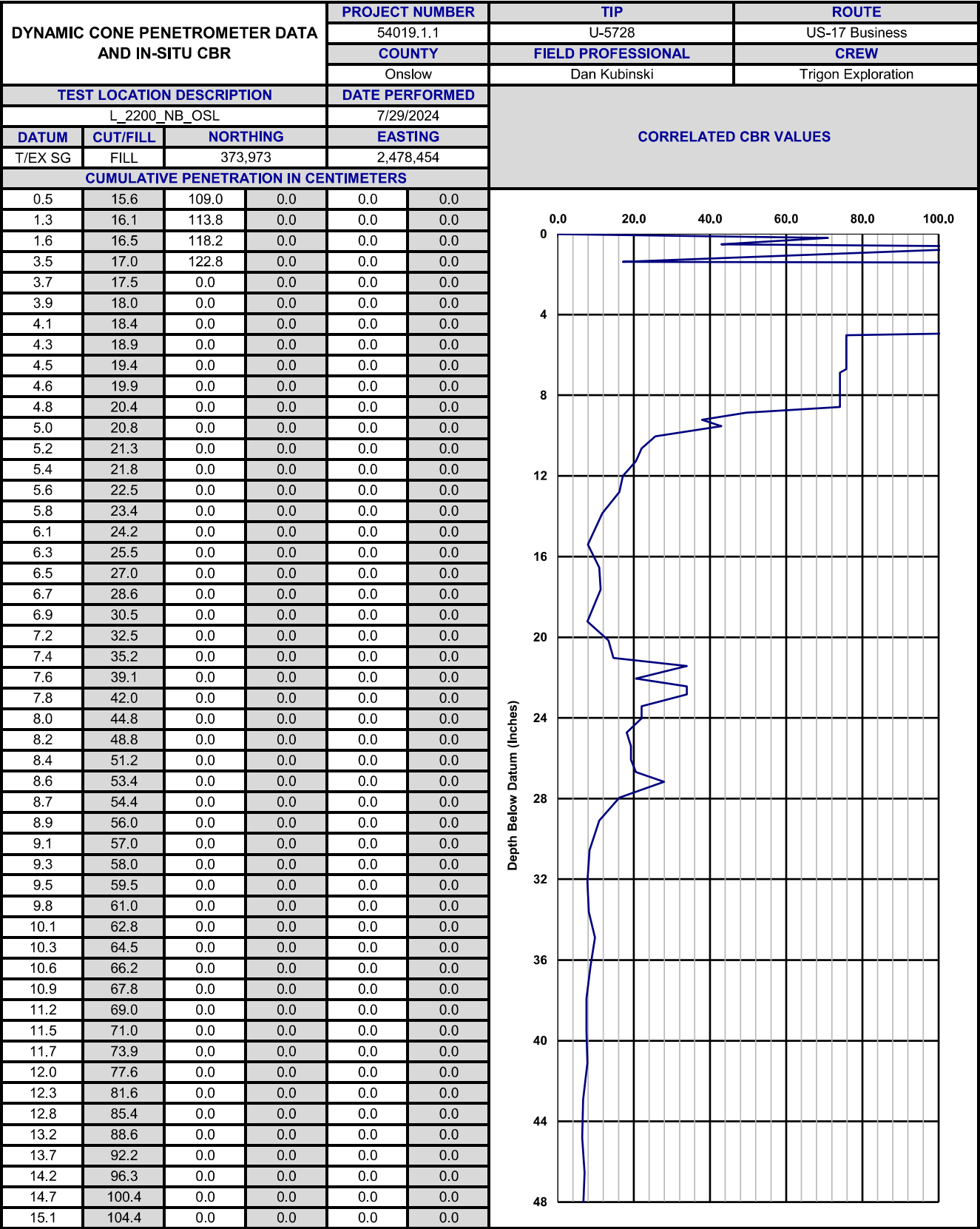
PAVEMENT AND SUBGRADE INVESTIGATION DATA SHEET

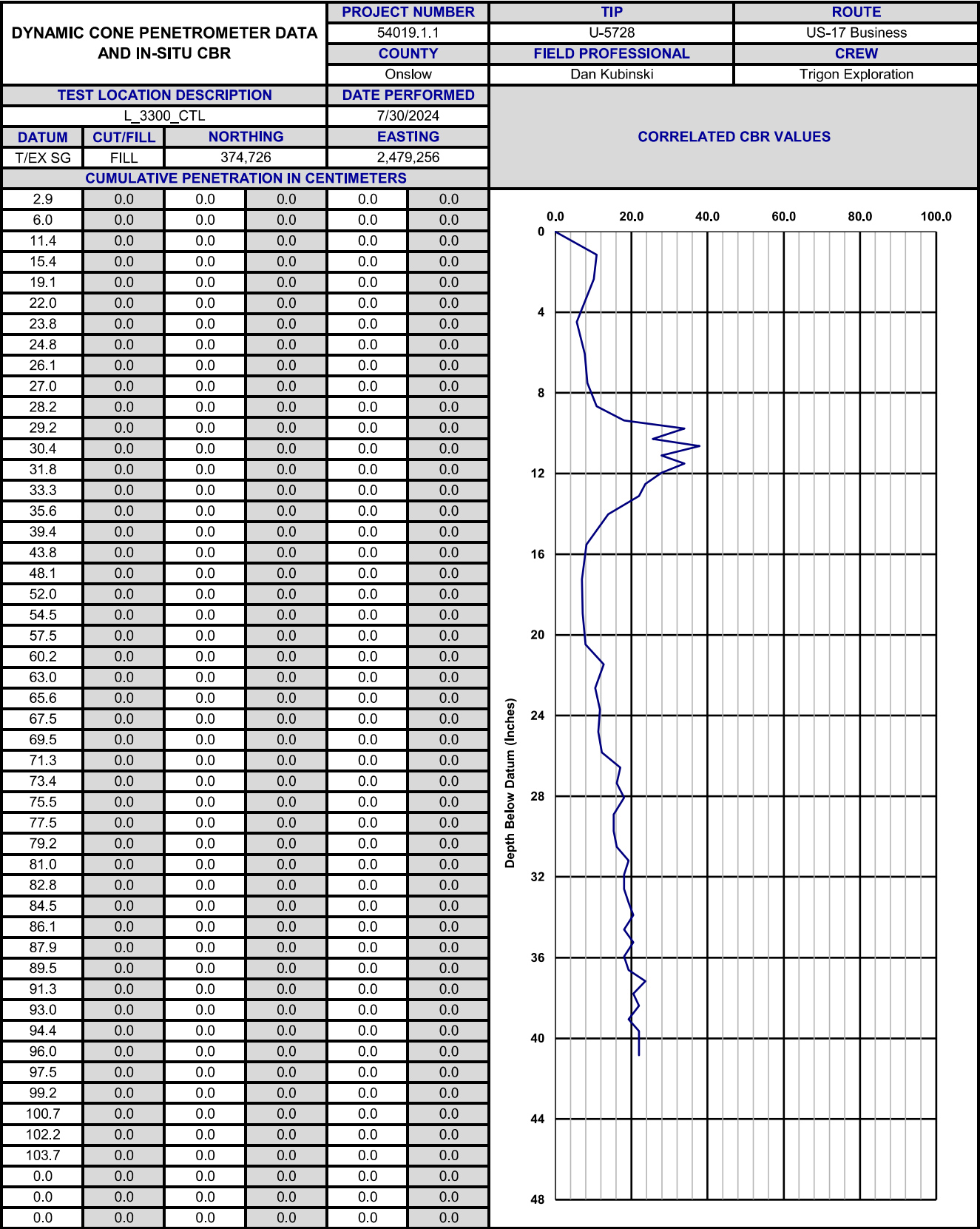
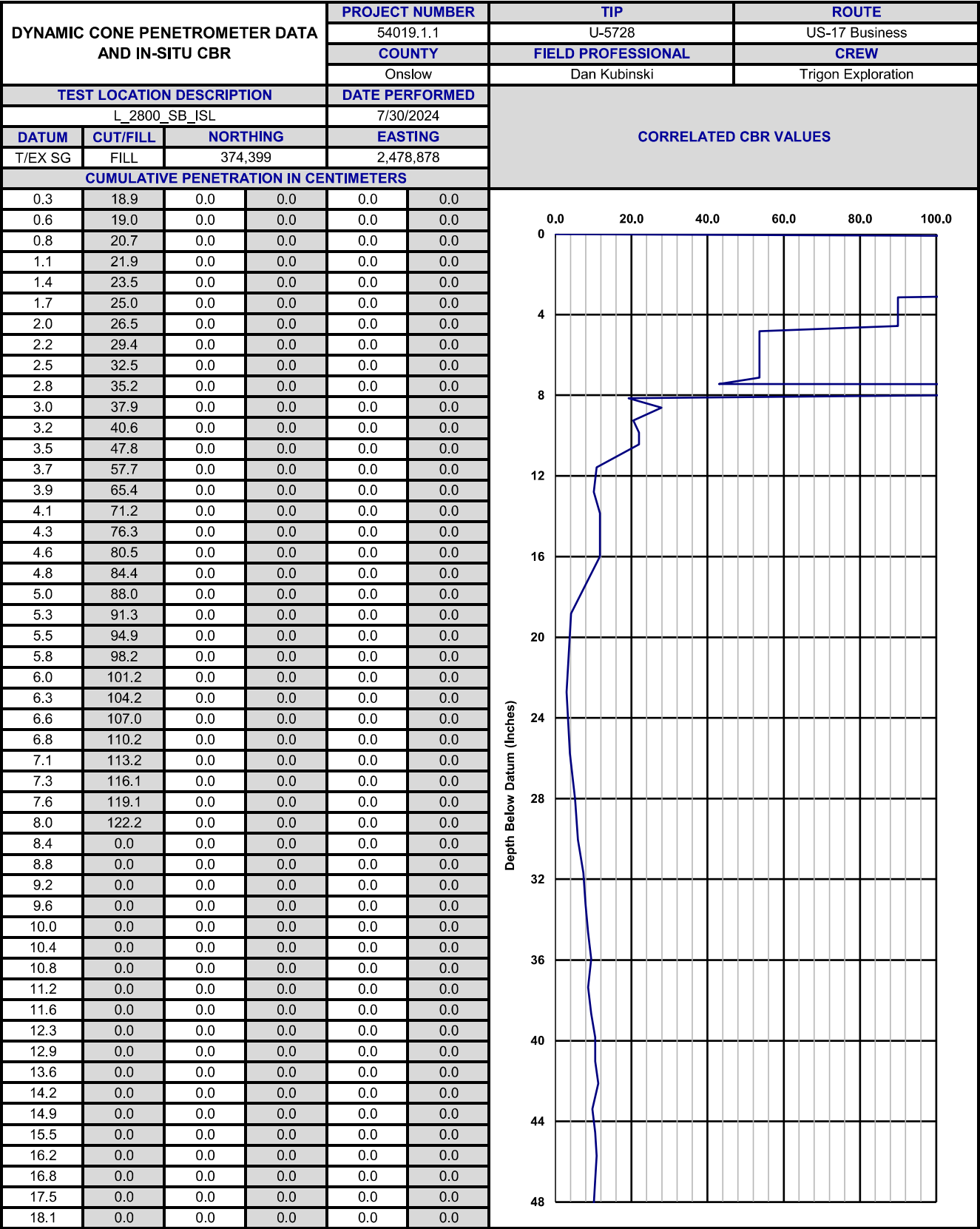
TIP (WBS):	U-5728 (54019.1.1)	Project:	US 17 Business (Marine Boulevard) at SR 1308 (Bell Fork Road / Gum Branch Road)	Date:	July 2024
County:	Onslow	Route:	US 17 Business (Marine Boulevard), SR 1308 (Bell Fork Road)	Notes By:	Dan Kubinski

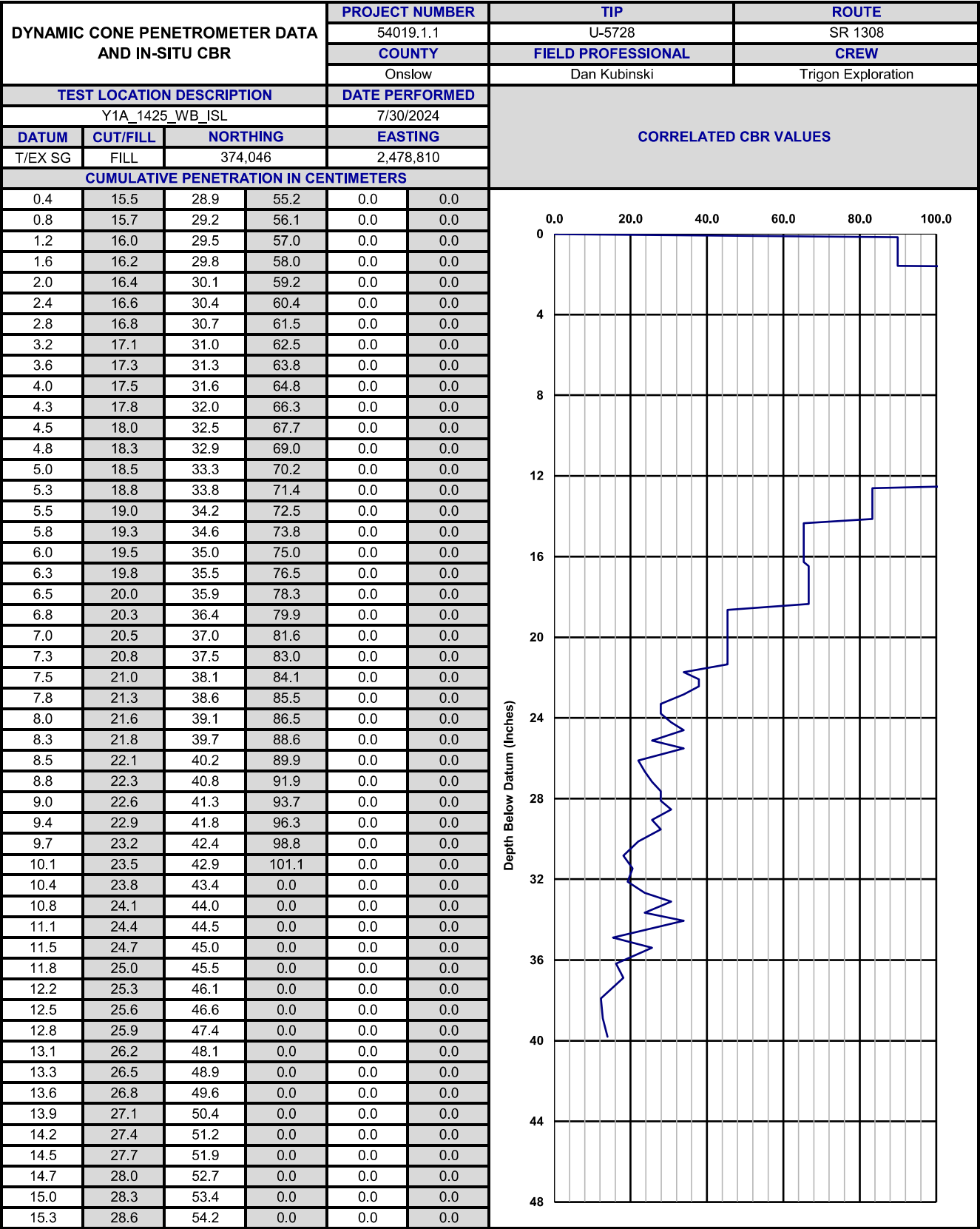
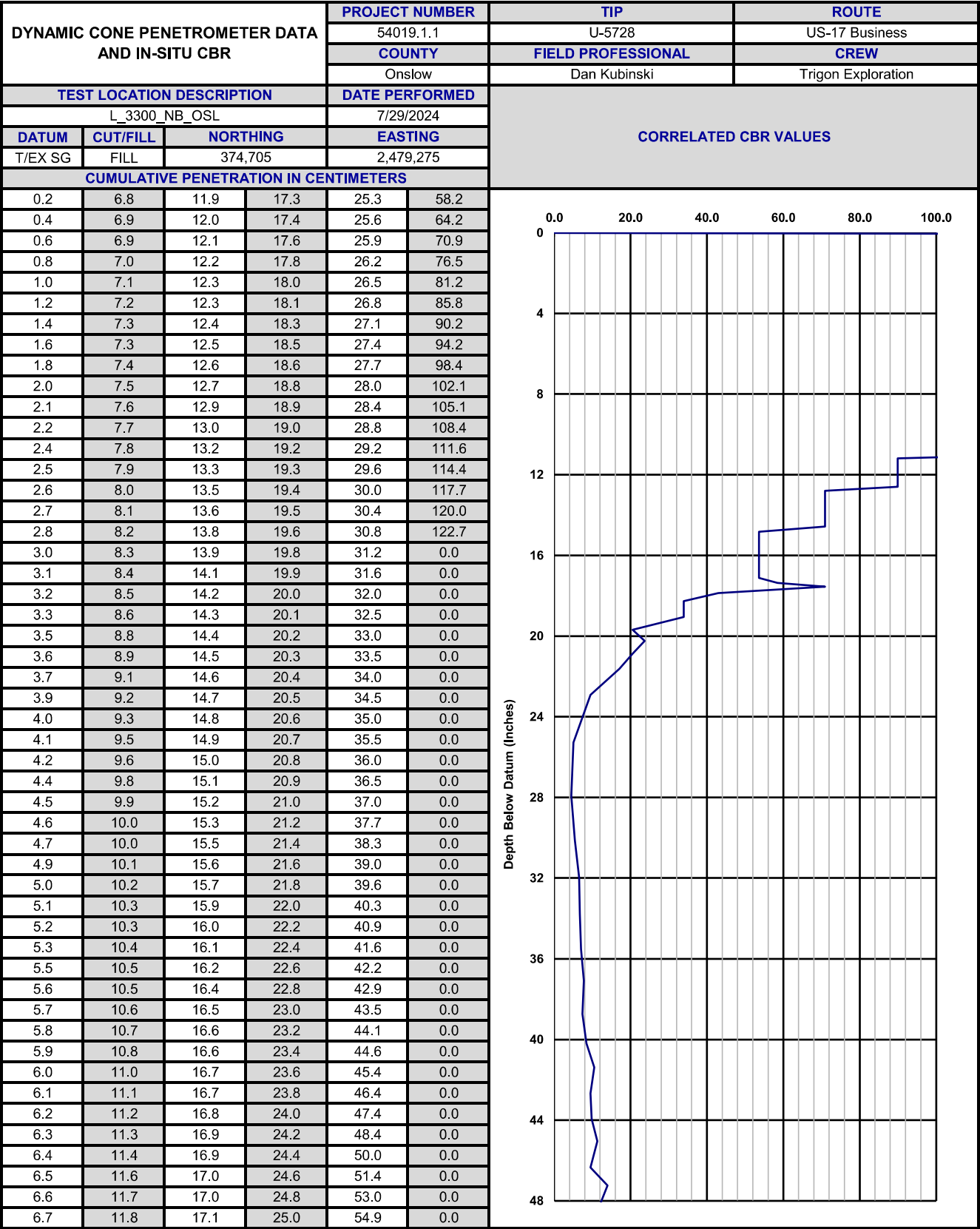
		Width (ft)		(ft)		Pavement Section Thickness (in)							Subgrade							
Position (Sta.,Lane,Shldr.)	Cut/Fill	Lane(s)	Shoulder	Offset Distance	Crown or Superelevation	Gross to Top of Soil	Asphalt	Concrete	ABC Stone	PADL	Soil Stabilization	Sand	Sample No.	Soil Description	AASHTO Classification	Soil Moisture (%)	Probe Depth (ft)	Pavement Distress Notes, Severity and Cracking Type	Northing	Easting
L_3300_CTL	FILL	14.0	--	7.0 LT FOSYL	CR	15.00	15.00	0.00	0.00	0.00	0.00	0.00	-- --	ROADWAY EMBANKMENT: Moist, Brown, Silty Coarse to Fine SAND (1.3 - 2.0') UNDIVIDED COASTAL PLAIN: Wet, Moderately Plastic, Yellowish Brown, Coarse to Fine Sandy CLAY (2.0 - 5.0')	A-2-4 A-6	-- --	5.0	Transverse cracking - Moderate severity <i>Pavement core performed on existing crack</i>	374,726	2,479,256
L_3300_NB_ISL		12.0	--	5.0 RT FISYL		17.00	17.00	0.00	0.00	0.00	0.00	0.00	--	Kessler DCP and auger probe not performed.	--	--	--	Longitudinal, transverse cracking - Low to moderate severity (with spalling) <i>Pavement core performed on existing crack</i>	374,717	2,479,264
L_3300_NB_OSL		12.0	2.0 PS	3.0 LT FOSSWL		7.25	7.25	0.00	0.00	0.00	0.00	0.00	-- S-6	ROADWAY EMBANKMENT: Moist, Grayish Brown, Silty Coarse to Fine SAND (0.6 - 2.0') UNDIVIDED COASTAL PLAIN: Wet, Moderately Plastic, Yellowish Brown, Coarse to Fine Sandy CLAY (2.0 - 5.0')	A-2-4 A-6	-- 26.0	5.0	Longitudinal, transverse cracking - Low to moderate severity (with spalling)	374,705	2,479,275
Y1A_1425_WB_OSL	FILL	11.0	2.5 CG	6.0 LT FISWL	CR	9.00	9.00	0.00	0.00	0.00	0.00	0.00	--	Kessler DCP and auger probe not performed due to potential underground utility conflicts.	--	--	--	Longitudinal cracking - Low to moderate severity	374,056	2,478,818
Y1A_1425_WB_ISL		11.5	--	7.0 RT FOSWL		15.00	15.00	0.00	0.00	0.00	0.00	0.00	S-7	ROADWAY EMBANKMENT: Moist, Non Plastic, Gray, Silty Fine to Coarse SAND, Highly Gravel (1.3 - 5.0')	A-2-4	10.3	5.0	Fatigue cracking - Low severity Longitudinal, transverse cracking - Low to moderate severity Rutting (13 - 25 mm)	374,046	2,478,810
Y1A_1425_WB_LTL(O)		10.0	--	3.0 LT FISWL		19.00	19.00	0.00	0.00	0.00	0.00	0.00	--	Kessler DCP and auger probe not performed.	--	--	--	Fatigue cracking - Low severity Longitudinal, transverse cracking - Low to moderate severity Rutting (13 mm) <i>Pavement core performed on existing crack in asphalt</i>	374,038	2,478,802
Y1A_1425_WB_LTL(I)		10.0	--	5.0 RT FOSWL		15.25	15.25	0.00	0.00	0.00	0.00	0.00	-- S-8	ROADWAY EMBANKMENT: Moist, Gray, Silty Coarse to Fine SAND (1.3 - 2.0') UNDIVIDED COASTAL PLAIN: Wet, Slightly Plastic, Yellowish Brown, Coarse to Fine Sandy CLAY (2.0 - 5.0')	A-2-4 A-6	-- 24.3	5.0	Fatigue cracking - Low severity Longitudinal, transverse cracking - Low to moderate severity Rutting (6 mm) <i>Mechanical damage to asphalt surface layer during coring.</i>	374,032	2,478,797
Y1_1900_EB_ISL	FILL	11.5	--	6.0 LT FOSWL	CR	9.00	9.00	0.00	0.00	0.00	0.00	0.00	S-9 --	ROADWAY EMBANKMENT: Moist, Non Plastic, Gray, Silty Coarse to Fine SAND (0.8 - 2.0') UNDIVIDED COASTAL PLAIN: Wet, Yellowish Brown, Coarse to Fine Sandy CLAY (2.0 - 5.0')	A-2-4 A-6	10.0 --	5.0	Fatigue cracking - Low severity Longitudinal, transverse cracking - Low to moderate severity	373,760	2,479,170
Y1_1900_EB_OSL		11.5	2.5 CG	7.5 RT FISWL		11.75	11.75	0.00	0.00	0.00	0.00	0.00	--	Kessler DCP and auger probe not performed.	--	--	--	Fatigue cracking - Low severity Longitudinal, transverse cracking - Low to moderate severity	373,749	2,479,162

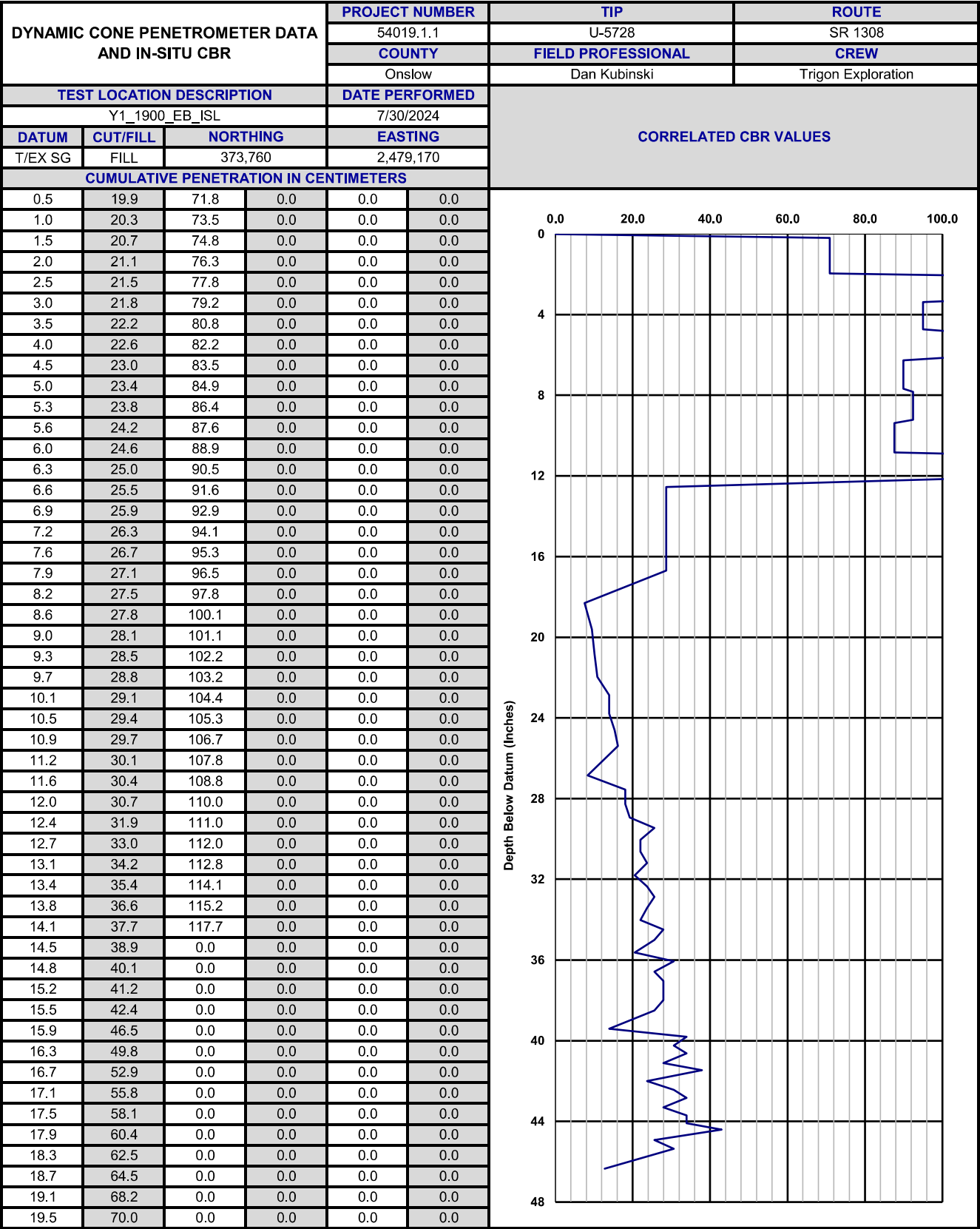
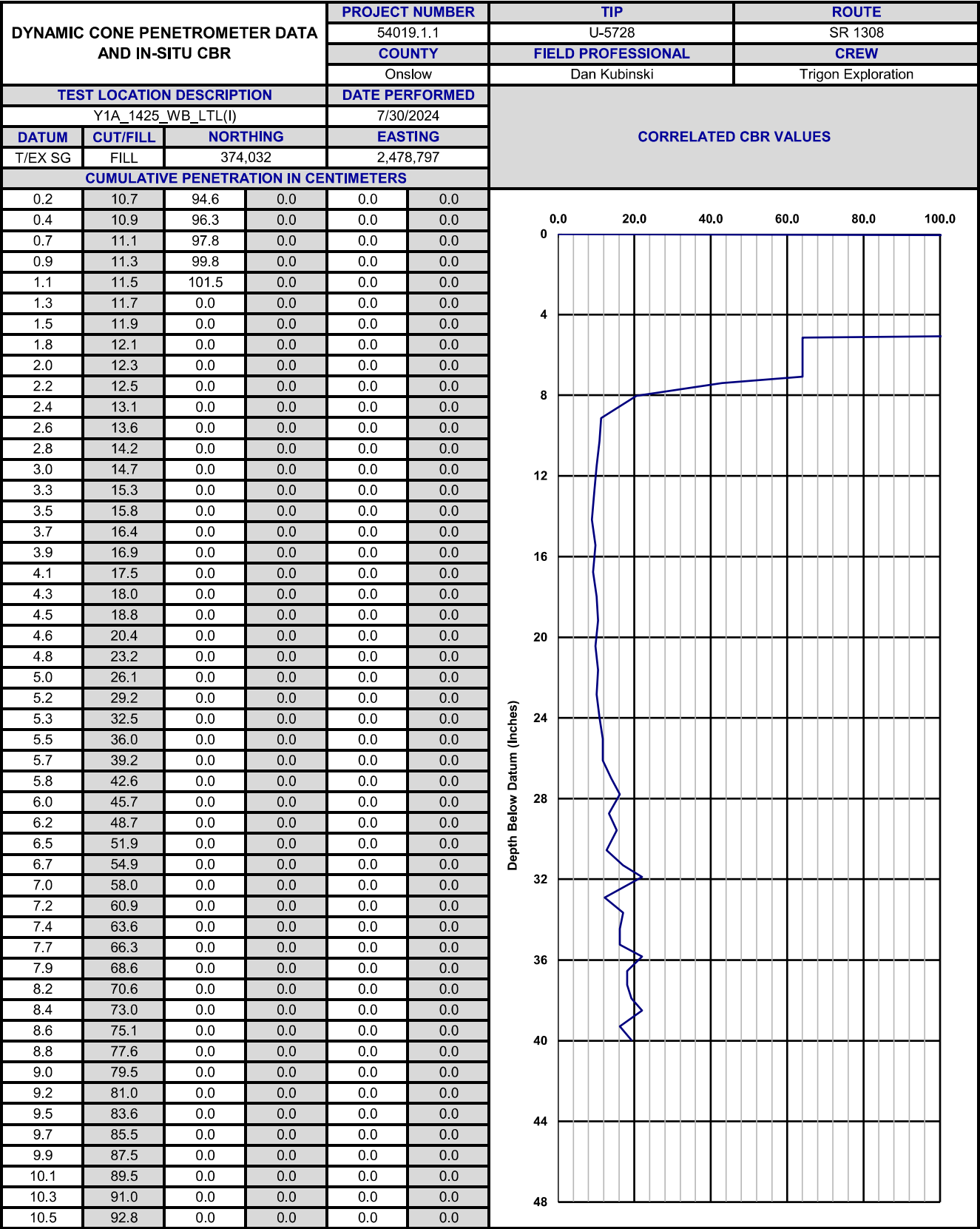


[illegible][illegible]









PAVEMENT CORE PHOTOGRAPHS

U-5728 (54019.1.1)

US 17 Business (Marine Boulevard) at SR 1308 (Bell Fork Road / Gum Branch Road)

BOX 1



BOX 2



BOX 3



BOX 4



PAVEMENT CORE PHOTOGRAPHS

U-5728 (54019.1.1)

US 17 Business (Marine Boulevard) at SR 1308 (Bell Fork Road / Gum Branch Road)

BOX 5

Y1A_1425_WB_LTL(O)



Y1A_1425_WB_LTL(I)



BOX 6

Y1_1900_EB_ISL



Y1_1900_EB_OSL



LABORATORY SUMMARY SHEET FOR SOIL SAMPLES

WBS NO. (TIP NO.): 54019.1.1 (U-5728)
PROJECT ID: 45869
COUNTY: ONSLOW
DESCRIPTION: US 17 BUSINESS (MARINE BOULEVARD) AT SR 1308 (BELL FORK ROAD / GUM BRANCH ROAD)

									Atterberg Limits			Gradation Results							
Sample No.	Boring Number	Alignment	Station	Offset	Sample Depth (ft)	Natural Moisture Content (%)	AASHTO Class. (Group Index)		L.L.	P.L.	P.I.	Retained #4 Sieve (%)	Pass #10 Sieve (%)	Pass #40 Sieve (%)	Pass #200 Sieve (%)	Coarse Sand (%)	Fine Sand (%)	Silt (%)	Clay (%)
S-1	L_1300_SB_OSL	-L-	13+00	36' LT	2.5 - 5.0	21.0	A-6	(4)	30	13	17	0.2	99.6	95.5	45.1	10.3	48.7	12.7	28.3
S-2	L_1300_SB_ISL	-L-	13+00	22' LT	0.5 - 2.5	8.7	A-2-4	(0)	NP	NP	NP	9.3	80.5	80.4	27.8	36.1	38.6	8.2	17.1
S-3	L_2200_NB_LTL	-L-	22+00	10' LT	2.0 - 5.0	20.0	A-6	(7)	31	14	17	0.1	99.8	97.8	61.9	6.0	36.4	25.3	32.3
S-4	L_2200_NB_ISL	-L-	22+00	2' RT	1.3 - 2.0	12.9	A-2-4	(0)	NP	NP	NP	1.0	98.1	87.6	34.9	21.3	48.1	15.6	15.0
S-5	L_2800_SB_ISL	-L-	28+00	18' LT	2.0 - 5.0	22.0	A-6	(3)	26	14	12	0.1	99.8	97.1	54.6	7.2	43.5	20.9	28.4
S-6	L_3300_NB_OSL	-L-	33+00	19' RT	2.0 - 5.0	26.0	A-6	(6)	29	13	16	0.3	99.5	96.3	58.6	7.6	38.9	23.2	30.3
S-7	Y1A_1425_WB_ISL	-Y1A-	14+25	9' LT	1.3 - 5.0	10.3	A-2-4	(0)	NP	NP	NP	23.6	61.6	72.2	30.5	41.1	30.8	12.0	16.1
S-8	Y1A_1425_WB_LTL(I)	-Y1A-	14+25	10' RT	2.0 - 5.0	24.3	A-6	(4)	26	14	12	0.4	99.5	97.4	59.2	6.1	39.3	24.3	30.3
S-9	Y1_1900_EB_ISL	-Y1-	19+00	5' RT	0.8 - 2.0	10.0	A-2-4	(0)	NP	NP	NP	1.0	98.1	92.1	28.2	17.2	60.8	16.0	6.0
CBR-1*	L_1650_RT	-L-	16+50	50' RT	0.5 - 1.5	15.5	A-3	(0)	NP	NP	NP	0.1	99.9	95.9	9.7	12.4	79.1	3.5	5.0
CBR-2*	L_3050_RT	-L-	30+50	50' RT	1.0 - 2.0	17.2	A-6	(3)	26	15	11	0.1	99.3	95.4	57.3	8.5	40.4	22.8	28.3

*Bulk sample location. No Kessler DCP testing or auger probe performed

Digitally signed
by Michelle M.
Stadel
Date: 2024.12.09
09:35:03 -05'00'

Michelle Stadel, P.E.

NCDOT Certification No.: 111-02-1203



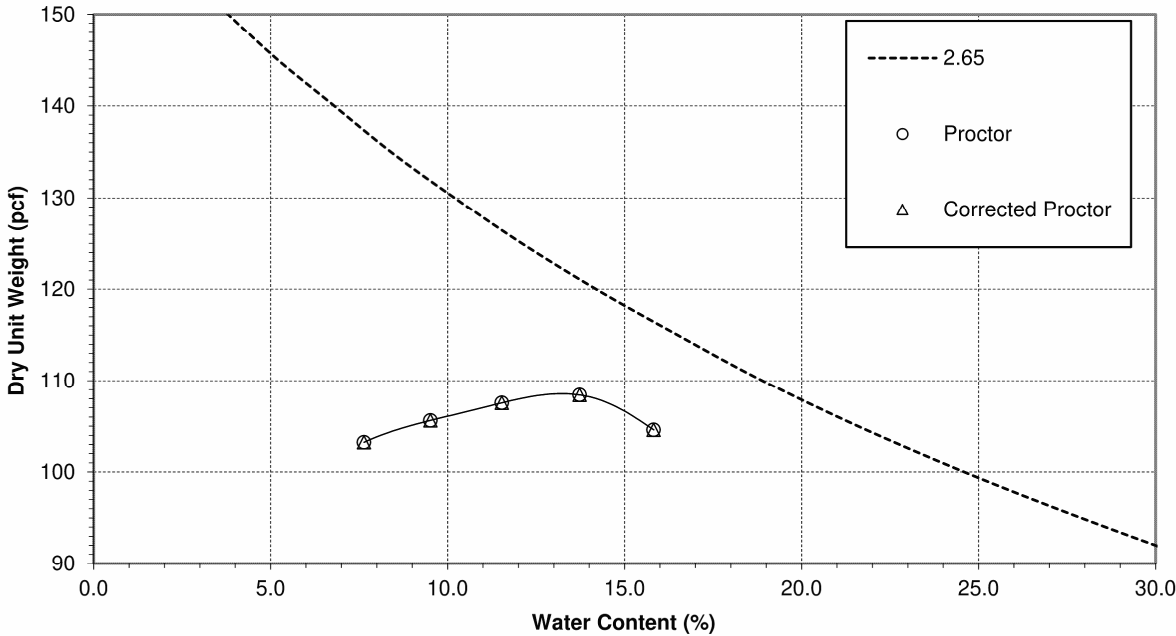
Laboratory Test Report

Client: North Carolina Department of Transportation
Project: 25001311.001A
NCDOT U-5728 PDI (45869)
02-000L - Lab

Report No.: 24-CLT-00727 Rev. 0
Sampled by: Dan Kubinski
Submitted by: Dan Kubinski

Issued: 8/19/2024
Field ID: CBR-1
Date: 7/30/2024
Date: 8/1/2024

Tested on 8/7/2024 by Clifford Blalock
Material Description: A-3
Location: STA. 16+50 -L- , 50' RT



Test Method: AASHTO T99 A	Uncorrected	Corrected
Maximum Dry Unit Weight (pcf)	108.6	na
Optimum Water Content (%)	13.2	na
Oversize Fraction, retained on #4 (%)		0
Bulk Specific Gravity of Oversize Fraction		na

Rammer Type: Manual
Specimen Preparation: Moist

Remarks:
AASHTO T-100, Soil Specific Gravity @ 20°C = 2.723

Reviewed on 8/19/2024 by Michelle Stadel,

Michelle M Stadel

Limitations: Pursuant to applicable building codes, the results presented in this report are for the exclusive use of the client and the registered design professional in responsible charge. The results apply only to the samples tested. If changes to the specifications were made and not communicated to Kleinfelder, Kleinfelder assumes no responsibility for pass/fail statements (meets/did not meet), if provided. This report may not be reproduced, except in full, without written approval of Kleinfelder.



Laboratory Test Report

Client: North Carolina Department of Transportation
Project: 25001311.001A
NCDOT U-5728 PDI (45869)
02-000L - Lab

Report No.: 24-CLT-00727 Rev. 0
Sampled by: Dan Kubinski
Submitted by: Dan Kubinski

Issued: 8/19/2024
Field ID: CBR-1
Date: 7/30/2024
Date: 8/1/2024

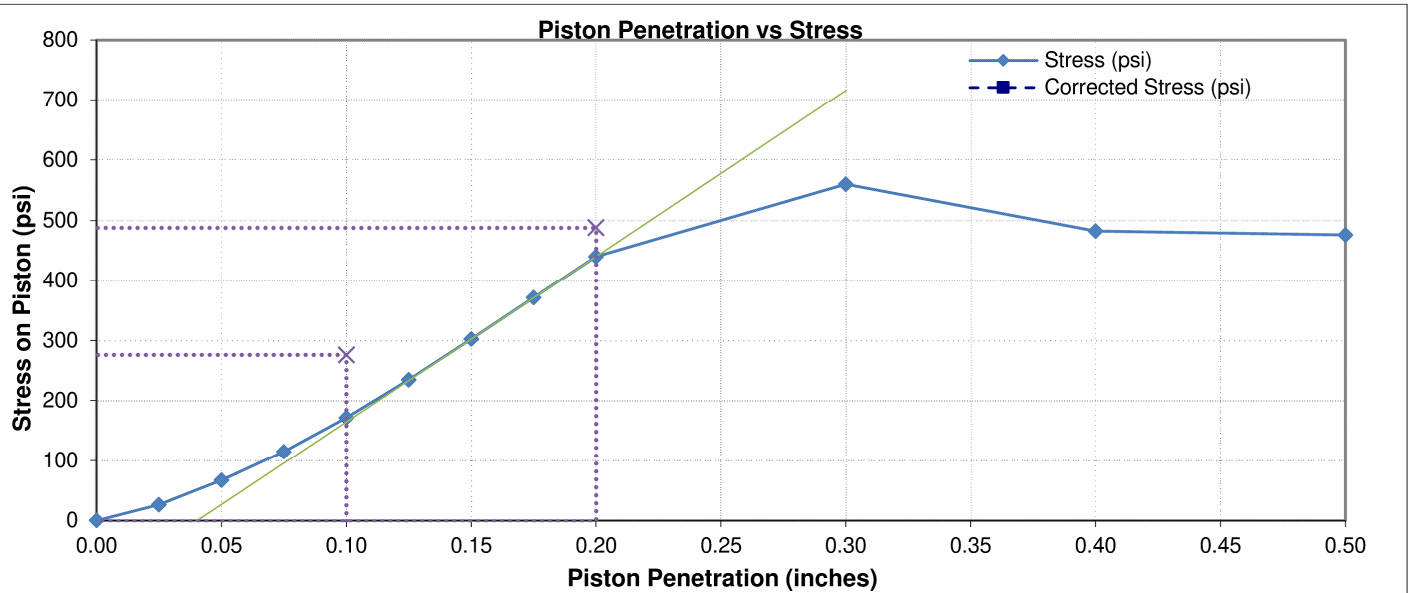
Sample Source: L_1650_RT
Sample ID: CBR-1
Sample Description: A-3
Material Used: Auger Cuttings
Surcharge Weight: 10 lbs

Date Tested: 8/12/24 - 8/16/24
Tested By: Clifford Blalock
Condition of Sample: Soaked
Time Soaked: 96 hrs

AASHTO T-193 - Standard Method of Test for The California Bearing Ratio (CBR)

Dry Unit Wgt Before Soaking (pcf): 106.8
Water Content Before Soaking (%): 13.7
Dry Unit Wgt After Soaking (pcf): 108.9
Water Content After Soak, Top in. (%): 17.0
Swell (%): -0.13
CBR (Corrected CBR) @ 0.1 in. Penetration: 17.2 (27.6)
CBR (Corrected CBR) @ 0.2 in. Penetration: 29.3 (32.5)

Compaction Method: Manual
Max. Dry Unit Weight: 108.6 pcf
Optimum Water Content: 13.2 %



Remarks:

Reviewed on 8/19/2024 by Michelle Stadel,

Michelle M Stadel

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Laboratory Test Report

Client: North Carolina Department of Transportation

Project: 25001311.001A

NCDOT U-5728 PDI (45869)

02-000L - Lab

Report No.: 24-CLT-00730 Rev. 0

Sampled by: Dan Kubinski

Submitted by: Dan Kubinski

Issued: 8/19/2024

Field ID: CBR-2

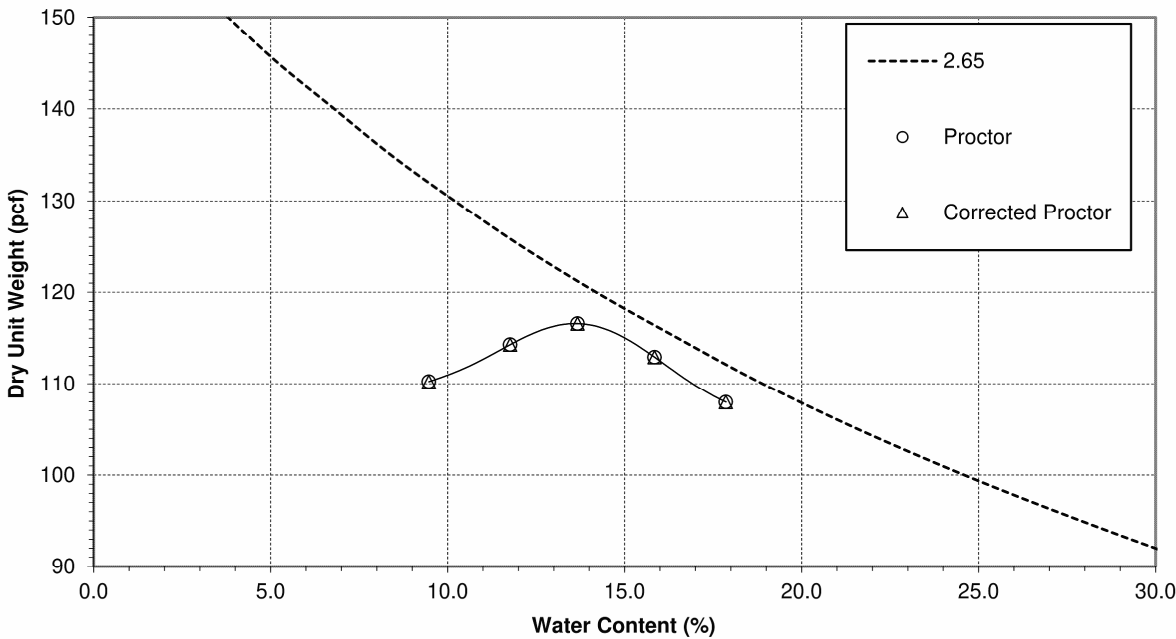
Date: 7/30/2024

Date: 8/1/2024

Tested on 8/9/2024 by Clifford Blalock

Material Description: A-6 (3)

Location: STA. 30+50 -L-, 50' RT



Test Method: AASHTO T99 A	Uncorrected	Corrected
Maximum Dry Unit Weight (pcf)	116.6	na
Optimum Water Content (%)	13.7	na
Oversize Fraction, retained on #4 (%)		0
Bulk Specific Gravity of Oversize Fraction		na

Rammer Type: Manual

Specimen Preparation: Moist

Remarks:

AASHTO T-100, Soil Specific Gravity @ 20°C = 2.765

Reviewed on 8/19/2024 by Michelle Stadel,

Michelle M Stadel

Limitations: Pursuant to applicable building codes, the results presented in this report are for the exclusive use of the client and the registered design professional in responsible charge. The results apply only to the samples tested. If changes to the specifications were made and not communicated to Kleinfelder, Kleinfelder assumes no responsibility for pass/fail statements (meets/did not meet), if provided. This report may not be reproduced, except in full, without written approval of Kleinfelder.



Laboratory Test Report

Client: North Carolina Department of Transportation

Project: 25001311.001A

NCDOT U-5728 PDI (45869)

02-000L - Lab

Report No.: 24-CLT-00730 Rev. 0

Sampled by: Dan Kubinski

Submitted by: Dan Kubinski

Issued: 8/19/2024

Field ID: CBR-2

Date: 7/30/2024

Date: 8/1/2024

Sample Source: L_3050_RT

Sample ID: CBR-2

Sample Description: A-6 (3)

Material Used: Auger Cuttings

Surcharge Weight: 10 lbs

Date Tested: 8/12/24-8/16/24

Tested By: Clifford Blalock

Condition of Sample: Soaked

Time Soaked: 96 hrs

AASHTO T-193 - Standard Method of Test for The California Bearing Ratio (CBR)

Dry Unit Wgt Before Soaking (pcf): 113.1

Water Content Before Soaking (%): 13.9

Dry Unit Wgt After Soaking (pcf): 114.7

Water Content After Soak, Top in. (%): 16.0

Swell (%): 0.28

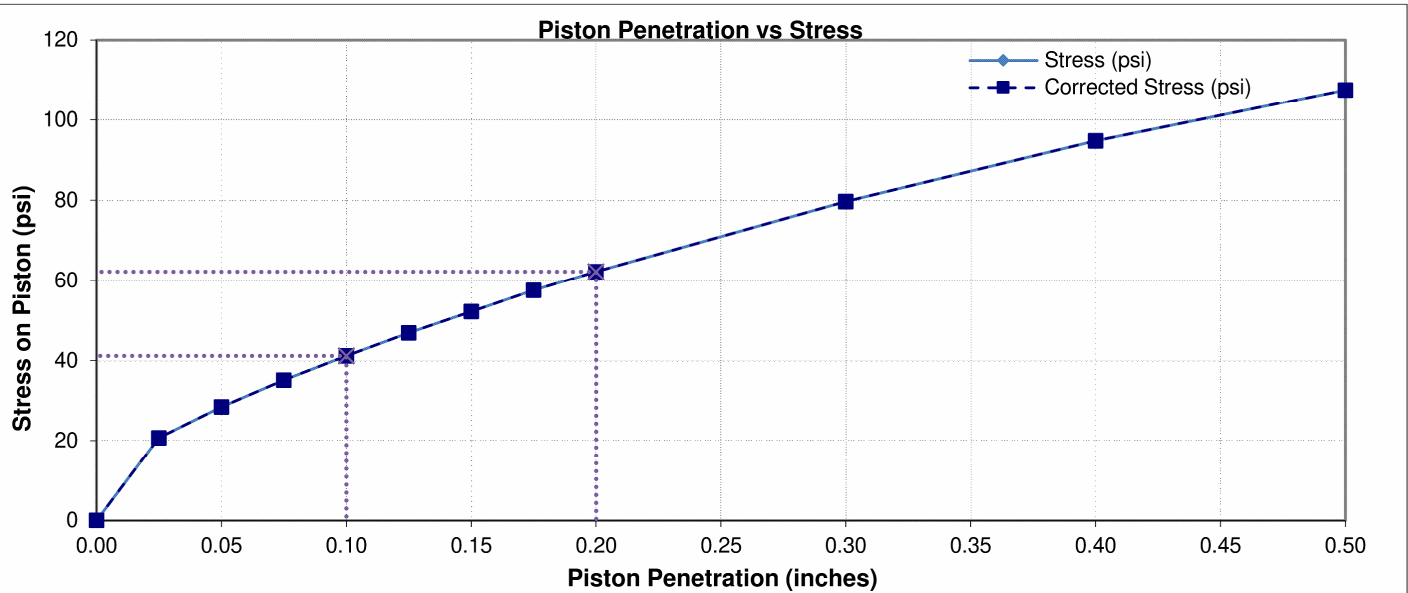
CBR (Corrected CBR) @ 0.1 in. Penetration: 4.1 (4.1)

CBR (Corrected CBR) @ 0.2 in. Penetration: 4.2 (4.2)

Compaction Method: Manual

Max. Dry Unit Weight: 116.6 pcf

Optimum Water Content: 13.7 %



Remarks:

Reviewed on 8/19/2024 by Michelle Stadel,

Michelle M Stadel

Limitations: Pursuant to applicable building codes, the results presented in this report are for the exclusive use of the client and the registered design professional in responsible charge. The results apply only to the samples tested. If changes to the specifications were made and not communicated to Kleinfelder, Kleinfelder assumes no responsibility for pass/fail statements (meets/did not meet), if provided. This report may not be reproduced, except in full, without written approval of Kleinfelder.

PAVEMENT CORE EVALUATION
U-5728 (54019.1.1)

US 17 Business (Marine Boulevard) at SR 1308 (Bell Fork Road / Gum Branch Road)

LINE	STATION	ABC STONE (in)	LAYER THICKNESS (in)	PAVEMENT LAYERS	REMARKS
-L-	1300_SB_OSL 3.75" Asphalt	0.00	3.75	Surface	3 lifts; low oxidation; low stripping
					Mechanical damage to asphalt surface layer during coring
-L-	1300_SB_ISL 5.50" Asphalt	0.00	5.50	Surface	3 lifts; low oxidation
-L-	1650_NB_RTL 11.25" Asphalt	0.00	3.00	Surface	2 lifts; low oxidation
			8.25	Intermediate	2 lifts; low oxidation
-L-	2200_NB_LTL 14.25" Asphalt	0.00	7.75	Surface	4 lift; low oxidation; delamination between lift 2 and 3; full depth crack; Pavement core performed on existing crack in asphalt
			6.50	Surface	2 lifts; sandy asphalt mix; delamination between lift 1 and 2; full depth crack
-L-	2200_NB_ISL 16.00" Asphalt	0.00	6.00	Surface	3 lifts; low oxidation
			2.75	Surface	1 lift; sandy asphalt mix
			2.50	Intermediate	1 lift
			4.75	Surface	2 lifts; sandy asphalt mix; delamination between Surface and overlying Intermediate; delamination between lifts 1 and 2
-L-	2200_NB_OSL 6.00" Asphalt	0.00	6.00	Surface	3 lifts; low oxidation
-L-	2200_NB_RTL 7.75" Asphalt	0.00	1.00	Surface	1 lift; low oxidation
			2.50	Intermediate	1 lift; low oxidation
			4.25	Base	1 lift; low oxidation; low stripping
-L-	2800_SB_RTL 9.50" Asphalt	0.00	3.00	Surface	2 lifts; low oxidation
			2.50	Intermediate	1 lift; low oxidation
			4.00	Base	1 lift; low oxidation; low stripping
-L-	2800_SB_OSL 10.50" Asphalt	0.00	4.00	Surface	2 lifts; low oxidation
			3.00	Intermediate	1 lift; low oxidation
			3.50	Surface	1 lift; sandy asphalt mix
-L-	2800_SB_ISL 8.00" Asphalt	0.00	3.50	Surface	2 lifts; low oxidation
			2.50	Intermediate	1 lift; low oxidation
			2.00	Surface	1 lift; sandy asphalt mix
-L-	3300_CTL 15.00" Asphalt	0.00	8.00	Surface	4 lifts; low oxidation; delamination between lift 2 and 3; full depth crack; Pavement core performed on existing crack in asphalt
			2.00	Surface	1 lift; sandy asphalt mix; severe stripping; full depth crack
			2.50	Intermediate	1 lift; delamination of Intermediate from overlying Surface; severe stripping; full depth crack
			2.50	Surface	1 lift; sandy asphalt mix; severe stripping; full depth crack
-L-	3300_NB_ISL 17.00" Asphalt	0.00	6.50	Surface	3 lifts; low oxidation; full depth crack; Pavement core performed on existing crack in asphalt
			10.50	Surface	3 lifts; sandy asphalt mix; delamination between Surface and overlying Surface; delmaination between lifts; 4" top down crack
					Mechanical damage to bottom lift of sandy asphalt surface layer during coring
-L-	3300_NB_OSL 7.25" Asphalt	0.00	4.75	Surface	3 lifts; low oxidation
			2.50	Intermediate	1 lift; low oxidation

PAVEMENT CORE EVALUATION
U-5728 (54019.1.1)

US 17 Business (Marine Boulevard) at SR 1308 (Bell Fork Road / Gum Branch Road)

LINE	STATION	ABC STONE (in)	LAYER THICKNESS (in)	PAVEMENT LAYERS	REMARKS
-Y1A-	1425_WB_OSL 9.00" Asphalt	0.00	4.00	Surface	2 lifts; low oxidation
			5.00	Intermediate	2 lifts; low oxidation
-Y1A-	1425_WB_ISL 15.00" Asphalt	0.00	4.50	Surface	2 lifts; delamination between lifts
			2.00	Intermediate	1 lift
			8.50	Base	2 lifts; delamination between lifts; moderate stripping
-Y1A-	1425_WB_LTL(O) 19.00" Asphalt	0.00	5.50	Surface	2 lifts; low oxidation; full depth crack; <i>Pavement core performed on existing crack in asphalt</i>
			13.50	Intermediate	3 lifts; low oxidation; delamination between Intermediate and overlying Surface; delamination between lift 1 and 2; severe stripping
-Y1A-	1425_WB_LTL(I) 15.25" Asphalt	0.00	3.50	Surface	2 lifts; <i>Mechanical damage to asphalt surface layer during coring</i>
			8.75	Intermediate	2 lifts; moderate stripping between lifts
			3.00	Surface	1 lift; sandy asphalt mix; delamination of Surface from overlying Intermediate
-Y1-	1900_EB_ISL 9.00" Asphalt	0.00	3.00	Surface	2 lifts; low oxidation
			3.00	Intermediate	1 lift; low oxidation
			3.00	Surface	1 lift; sandy asphalt mix
-Y1-	1900_EB_OSL 11.75" Asphalt	0.00	3.00	Surface	2 lifts; low oxidation
			5.00	Intermediate	2 lifts; low oxidation
			3.75	Base	1 lift; low oxidation; moderate stripping