

REFERENCE: B-5766

PROJECT: 45722

SEE SHEET 3 FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

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

**ROADWAY  
 SUBSURFACE INVESTIGATION**

COUNTY STOKES

PROJECT DESCRIPTION BRIDGE NUMBER 82 OVER  
 DAN RIVER ON SR 1674 (SHEPPARD MILL ROAD)  
 DANBURY, NORTH CAROLINA

**INVENTORY**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5766	1	9

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 1919 T07-6850. 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.

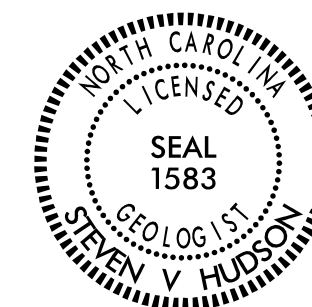
THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT 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

- T. PARK  
C. STRATTON  
T.J. WHITE, CWC  
S. PUGH, CWC

INVESTIGATED BY CATLIN  
 DRAWN BY S.V. HUDSON, PG  
 CHECKED BY J. LEE STONE, PG  
 SUBMITTED BY S.V. HUDSON, PG  
 DATE JANUARY 2024



DocuSigned by:  
Steve V. Hudson 01/12/2024  
 01B23BB746D468 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

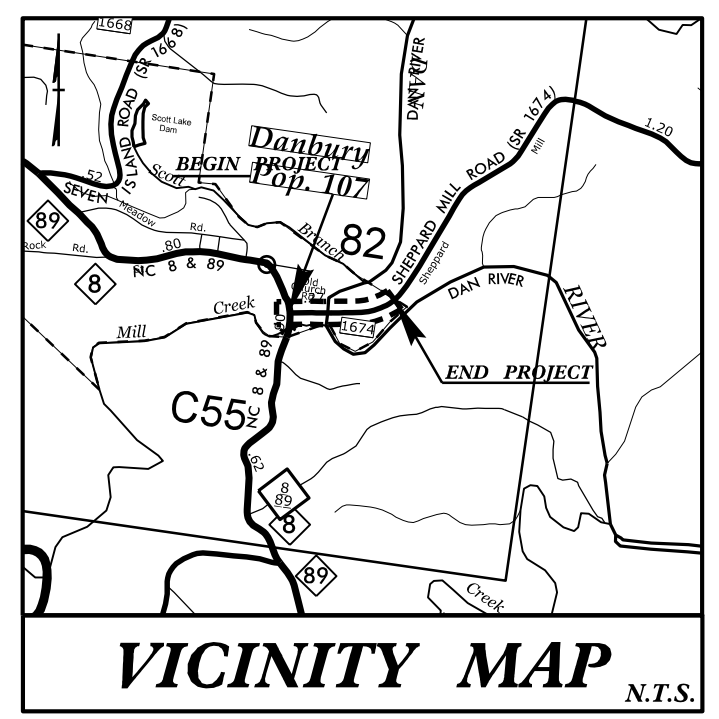
SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS																																																																																																																																																																											
<p>SOIL IS CONSIDERED UNCONSOLIDATED, 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</p>										<p>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.</p>										<p>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:</p>										<p>ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.          AQUIFER - A WATER BEARING FORMATION OR STRATA.          ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.          ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.          ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.          CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.          COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.          CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.          DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.          DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.          DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.          FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.          FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.          FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL.          FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.          FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.          JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.          LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.          LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.          MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.          PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.          RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.          ROCK QUALITY DESIGNATION (ROD) - 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 (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.          TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																																																																																																																											
<p align="center"><b>SOIL LEGEND AND AASHTO CLASSIFICATION</b></p> <table border="1"> <tr> <th>GENERAL CLASS.</th> <th colspan="7">GRANULAR MATERIALS (&lt;= 35% PASSING #200)</th> <th colspan="3">SILT-CLAY MATERIALS (&gt; 35% PASSING #200)</th> <th colspan="3">ORGANIC MATERIALS</th> </tr> <tr> <th>GROUP CLASS.</th> <th>A-1</th> <th>A-3</th> <th>A-2</th> <th>A-2-4</th> <th>A-2-5</th> <th>A-2-6</th> <th>A-2-7</th> <th>A-4</th> <th>A-5</th> <th>A-6</th> <th>A-7</th> <th>A-1, A-2</th> <th>A-3</th> <th>A-4, A-5</th> <th>A-6, A-7</th> </tr> <tr> <th>SYMBOL</th> <td>[Symbol]</td> <td>[Symbol]</td> <td>[Symbol]</td> <td>[Symbol]</td> <td>[Symbol]</td> <td>[Symbol]</td> <td>[Symbol]</td> <td>[Symbol]</td> <td>[Symbol]</td> <td>[Symbol]</td> <td>[Symbol]</td> <td>[Symbol]</td> <td>[Symbol]</td> <td>[Symbol]</td> <td>[Symbol]</td> </tr> <tr> <th>% PASSING #10 #40 #200</th> <td>50 MX 30 MX 15 MX</td> <td>50 MX 25 MX</td> <td>51 MN 35 MX 35 MX</td> <td>40 MX 35 MX</td> <td>41 MN 35 MX</td> <td>41 MN 35 MX</td> <td>41 MN 35 MX</td> <td>40 MX 36 MN</td> <td>41 MN 36 MN</td> <td>40 MX 36 MN</td> <td>41 MN 36 MN</td> <td>GRANULAR SOILS</td> <td>SILT-CLAY SOILS</td> <td>MUCK, PEAT</td> <td></td> </tr> <tr> <th>MATERIAL PASSING #40 LL PI</th> <td>- 6 MX</td> <td>- NP</td> <td>40 MX 41 MN 10 MX 11 MN</td> <td>40 MX 41 MN 11 MN</td> <td>40 MX 41 MN 11 MN</td> <td>40 MX 41 MN 11 MN</td> <td>40 MX 41 MN 11 MN</td> <td>40 MX 41 MN 11 MN</td> <td>40 MX 41 MN 11 MN</td> <td>40 MX 41 MN 11 MN</td> <td>40 MX 41 MN 11 MN</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <th>GROUP INDEX</th> <td>0</td> <td>0</td> <td>0</td> <td>4 MX</td> <td>8 MX</td> <td>12 MX</td> <td>16 MX</td> <td>NO MX</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <th>USUAL TYPES OF MAJOR MATERIALS</th> <td>STONE FRAGS. 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CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.</p> <p>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.</p> <p>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.</p> <p>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 &gt; 100 BPF.</p> <p>VERY SEVERE (IV SEV.): ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. IF TESTED, WOULD YIELD SPT N VALUES &lt; 100 BPF.</p> <p>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.</p>										<p align="center"><b>PERCENTAGE OF MATERIAL</b></p> <table border="1"> <tr> <th>ORGANIC MATERIAL</th> <th>GRANULAR SOILS</th> <th>SILT - CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE 1 - 10%</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE 10 - 20%</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME 20 - 35%</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>&gt; 10%</td> <td>&gt; 20%</td> <td>HIGHLY 35% AND ABOVE</td> </tr> </table>										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
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<p align="center"><b>GROUND WATER</b></p> <p>▽ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING</p> <p>▽ PW STATIC WATER LEVEL AFTER 24 HOURS</p> <p>▽ PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA</p> <p>○ SPRING OR SEEP</p>										<p align="center"><b>MISCELLANEOUS SYMBOLS</b></p> <p>ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION</p> <p>SOIL SYMBOL</p> <p>ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT</p> <p>INFERRED SOIL BOUNDARY</p> <p>INFERRED ROCK LINE</p> <p>ALLUVIAL SOIL BOUNDARY</p> <p>DIP &amp; DIP DIRECTION OF ROCK STRUCTURES</p> <p>SPT DMT TEST BORING</p> <p>AUGER BORING</p> <p>CORE BORING</p> <p>MONITORING WELL</p> <p>PIEZOMETER INSTALLATION</p> <p>SLOPE INDICATOR INSTALLATION</p> <p>CONE PENETROMETER TEST</p> <p>SOUNDING ROD</p> <p>TEST BORING WITH CORE</p> <p>SPT N-VALUE</p>										<p align="center"><b>ROCK HARDNESS</b></p> <p>VERY HARD: CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</p> <p>HARD: CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</p> <p>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.</p> <p>MEDIUM HARD: CAN BE GROUDED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.</p> <p>SOFT: CAN BE GROUDED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.</p> <p>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.</p>																																																																																																																																																																																					
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<p align="center"><b>NOTES:</b></p> <p>INVESTIGATION COMPLETED ON PRELIMINARY DESIGN FILES PROVIDED BY NCDOT ON MAY 26, 2023</p> <p>FIAD = FILLED IMMEDIATELY AFTER DRILLING</p> <p>NEM = NOT ENOUGH MATERIAL FOR FULL ANALYSIS</p>										<p align="center"><b>BENCH MARK: BORING LOCATIONS DETERMINED WITH RTK GPS. ELEVATIONS OF STRUCTURE BORINGS OBTAINED WITH RTK GPS; ROADWAY BORINGS OBTAINED FROM 22105.Ls.tIn.tIn. ELEVATION: NGVD 88 US FT.</b></p>																																																																																																																																																																																															

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PA 2023\223052 NCDOT\_B-5766\_BRIDGE\_82\_OVER\_DAN\_RIVER - GEOTECH\B5766-GEO\_RDWY\CADD\_GEO\TECH\Site&Sub\B5766\_Rdy\_tsh.dgn  
shudson AT ILM-SHUDSON-FZ

**TIP PROJECT: B-5766**

**CONTRACT:**

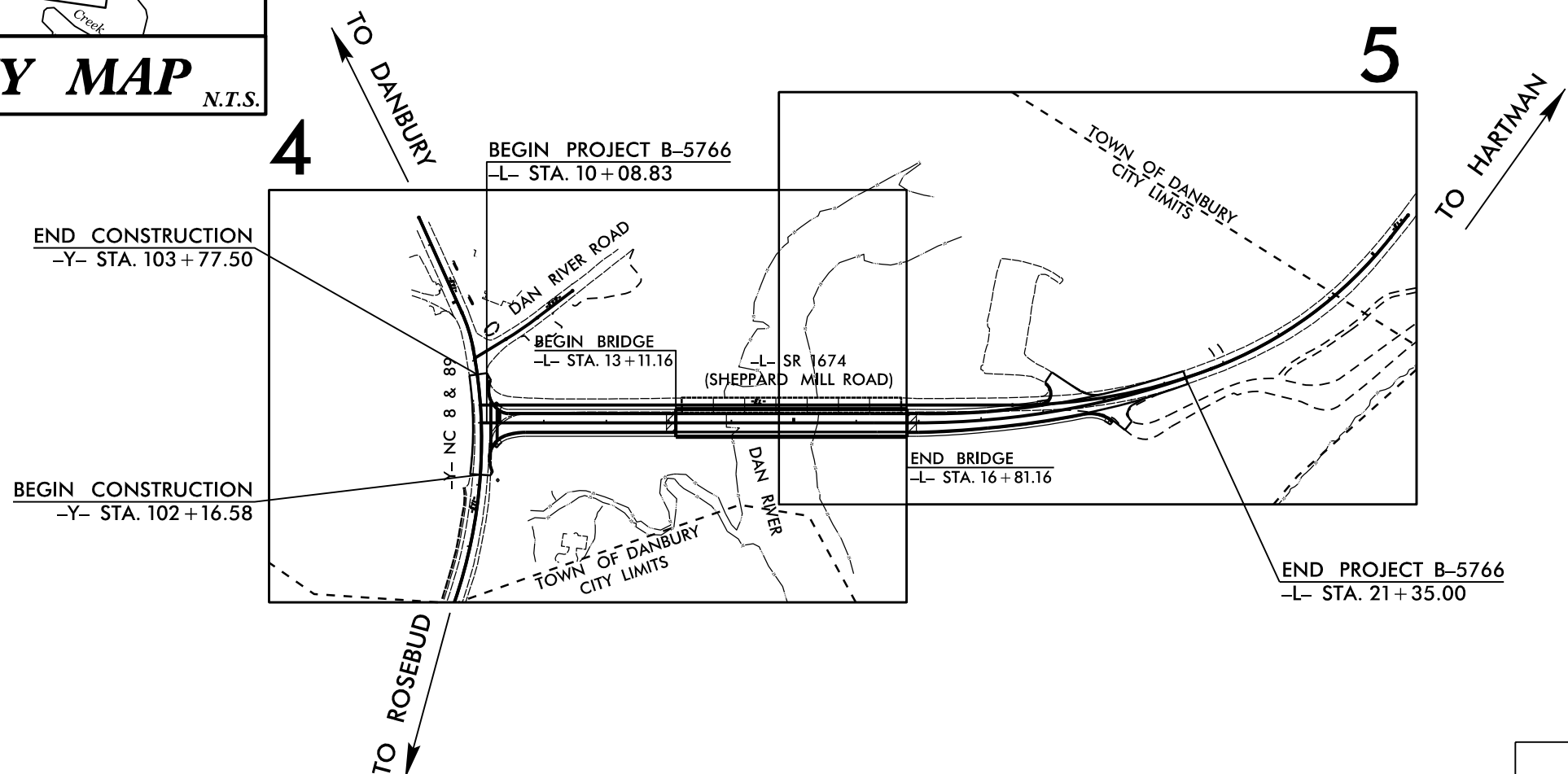


STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS  
**STOKES COUNTY**

**LOCATION:** BRIDGE NO. 82 OVER DAN RIVER ON  
SR 1674 (SHEPPARD MILL ROAD)  
DANBURY, NORTH CAROLINA  
**TYPE OF WORK:** GRADING, PAVING, DRAINAGE, & STRUCTURES

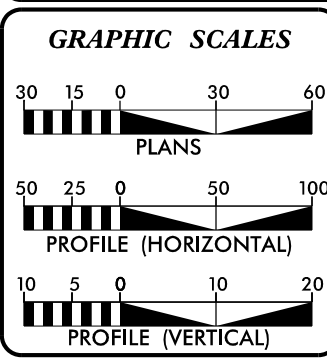
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5766	3	7
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
45722.1.3	N/A	PE	
45722.2.1	N/A	R/W	
45722.2.2	N/A	UTIL	
45722.3.1	N/A	CONST.	

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED



THIS PROJECT IS WITHIN THE MUNICIPAL BUANDARIES OF DANBURY.  
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II

REVISED 25% PLANS  
SUBMITTAL DATE: 05-05-2023



**DESIGN DATA**

ADT 2040 = 1,600
V = 40 MPH
K = 10%
D = 60%
TTST = 1%
DUALS = 2%
FUNC CLASS = MINOR COLLECTOR
SUB-REGIONAL TIER

**PROJECT LENGTH**

LENGTH ROADWAY PROJECT B-5766 = 0.160 MILES
LENGTH STRUCTURE PROJECT B-5766 = 0.070 MILES
LENGTH ROADWAY PROJECT B-5766 = 0.230 MILES

NCDOT CONTACT: RYAN NEWCOMB, PE  
DIVISION PROJECT ENGINEER  
PH: (336) 747-7800

Prepared In the Office of:  
Infrastructure Consulting Services, Inc.

**RKA**  
RAMEY KEMP ASSOCIATES  
5008 Furkington Place Raleigh, North Carolina 27609  
Phone: 919.272.5115 | www.rameykemp.com | NC License No. P-1489

2018 STANDARD SPECIFICATIONS

AUGUST 31, 2023  
RIGHT OF WAY DATE:  
FEBRUARY 18, 2025  
LETTING DATE:

KAYLA M. POULOS, PE  
PROJECT ENGINEER

MIKAYLA M. LINDSEY, EI  
PROJECT DESIGNER

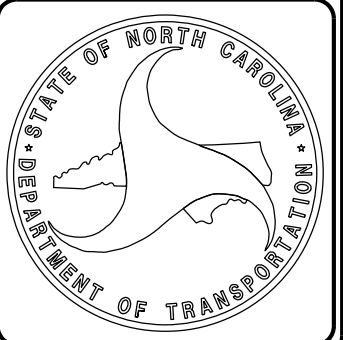
**HYDRAULICS ENGINEER**

**PRELIMINARY PLANS**  
DO NOT USE FOR CONSTRUCTION

SIGNATURE: \_\_\_\_\_  
ROADWAY DESIGN ENGINEER

**INCOMPLETE PLANS**  
DO NOT USE FOR R/W ACQUISITION

SIGNATURE: \_\_\_\_\_



December 2023

WBS Number: 45722.1.1  
 TIP Number: B-5766  
 Project ID: 42290  
 County: STOKES  
 Description: Bridge Number 82 over Dan River on SR 1674 (Sheppard Mill Road)  
 Danbury, North Carolina

CATLIN Number: 223152

SUBJECT: Roadway Subsurface Inventory Report

**Project Description**

This project is located on Sheppard Mill Road immediately east of Danbury in Stokes County, North Carolina. Approximately one-half of the project is located within Moratock Park which was added to the National Register of Historic Places in 1974. The proposed project consists of improvement of SR 1674 (Sheppard Mill Road) along with the replacement of existing bridge Number 82 over the Dan River. This geotechnical investigation was conducted by Richard Catlin and Associates (DBE Catlin Engineers and Scientists – (CATLIN)) and was confined to the areas of proposed construction.

Fieldwork was conducted by CATLIN personnel in October 2023. Standard Penetration Test (SPT) borings were completed along the project corridor with an average distance of approximately 150 linear feet between borings. Additional SPT borings advanced during the associated Structure Inventory were utilized to augment the roadway data. Representative soil samples were collected for visual classification in the field and for laboratory analysis.

The following alignment was investigated. Plan sheets and subsurface profiles are included in this report and were generated from files received from NCDOT on May 26, 2023.

<u>Line</u>	<u>Station (±)</u>
-L-	10+00 to 21+35

**Areas of Special Geotechnical Interest**

1) Seasonal high groundwater was encountered at the following location:

<u>Line</u>	<u>Station (±)</u>
-L-	12+00

2) Cohesive soils that may have the potential to cause embankment/subgrade and or slope stability problems during construction were identified at the following locations:

<u>Line</u>	<u>Station (±)</u>
-L-	11+00 to 13+50
-L-	15+40 to 17+25

**Physiography and Geology**

This project area is located within the North Carolina Inner Piedmont physiographic province. The North Carolina Piedmont is typically characterized by gently rolling, well-rounded hills with a few hundred feet of relief between the hills and valleys. According to the 1985 North Carolina Geologic Map, the area of investigation lies within the Chauga Belt with the predominant rock type being metagraywacke (biotite gneiss) with muscovite-biotite schist interlayered and gradational throughout. Land use along the project area consists primarily of recreational with some residential housing and small business.

**Groundwater**

Groundwater data was collected in October 2023. Ground water was encountered from within 2.1 feet to greater than 36 feet from the ground surface along the area of investigation. The project spans the Dan River which as reported in the Bridge Survey & Hydraulic Design Report (BSR) has a normal water surface elevation (NWSEL) of 677.3 feet. Mill Creek crosses highway 89 terminating in the Dan River approximately 100 feet south of the project site.

**Soils**

Soils encountered along the project site include Roadway Embankment, Artificial Fill, Alluvial, Residual, Weathered Rock, and Crystalline Rock.

- Roadway Embankment soils exist beneath and adjacent to existing -L- (Sheppard Mill Road) and consist of approximately three (3) to 20 feet of material. The embankment soils are comprised of soft to stiff, fine grained sandy clay and sandy silt (A-4, A-6) and very loose to loose, fine grained silty sands (A-2-4).
- Artificial Fill was identified and inferred along the project corridor adjacent to the Dan River and under the Moratock Park access roads. Although not sampled, the materials under the access roads are expected to be comprised of materials similar to those used for Roadway Embankment.
- Alluvial soils were identified across the flood plain to the east of the Dan River and south of Sheppard Mill Road at thickness ranging from six (6) to 12 feet. The soils were predominantly described as very loose to loose, fine grained sands and silty, fine grained sands (A-3, A-2-4) with some well-rounded gravels at the base of the stratum. Medium stiff, clay and fine grained sandy clay (A-6) was encountered along the eastern bank of the Dan River.
- Residual materials consisting of very soft to hard, fine sandy and clayey silt and fine sandy and silty clay (A-6, A-7, A-4) were encountered beneath the Roadway Embankment on the west side of the Dan River at thicknesses of up to approximately 23 feet. A small amount of loose to very dense sand and clayey sand (A-2-4, A-2-6) was identified beneath the fine material adjacent to the Dan River. Residual materials on the east side of the Dan River were comprised primarily of loose to dense, silty, fine and coarse sand (A-2-4, A-3) with some clay and weathered rock fragments at thickness up to 15 feet.
- Weathered Rock (Gneiss) was identified beneath the Residual soils at elevations ranging from 682 feet 673 feet west of the Dan River and from elevations ranging from approximately 665 feet to 685 feet east of the Dan River.
- Crystalline Rock (Gneiss) was identified beneath the Weathered Gneiss at elevations ranging from a high of 682 feet near the west side of the Dan River to a low of 668 feet on the east side of the Dan River. No rock core was collected during the Roadway Investigation.

28-NOV-2023 12:25  
 P:\2023\223152\NCDOT\_B-5766\_BRIDGE\_82\_OVER\_DAN\_RIVER - GEOTECH\B5766.GEO.RDWY.CADD.GEOTECH\Site&Sub\B5766\_Rdy\_psh04.dgn  
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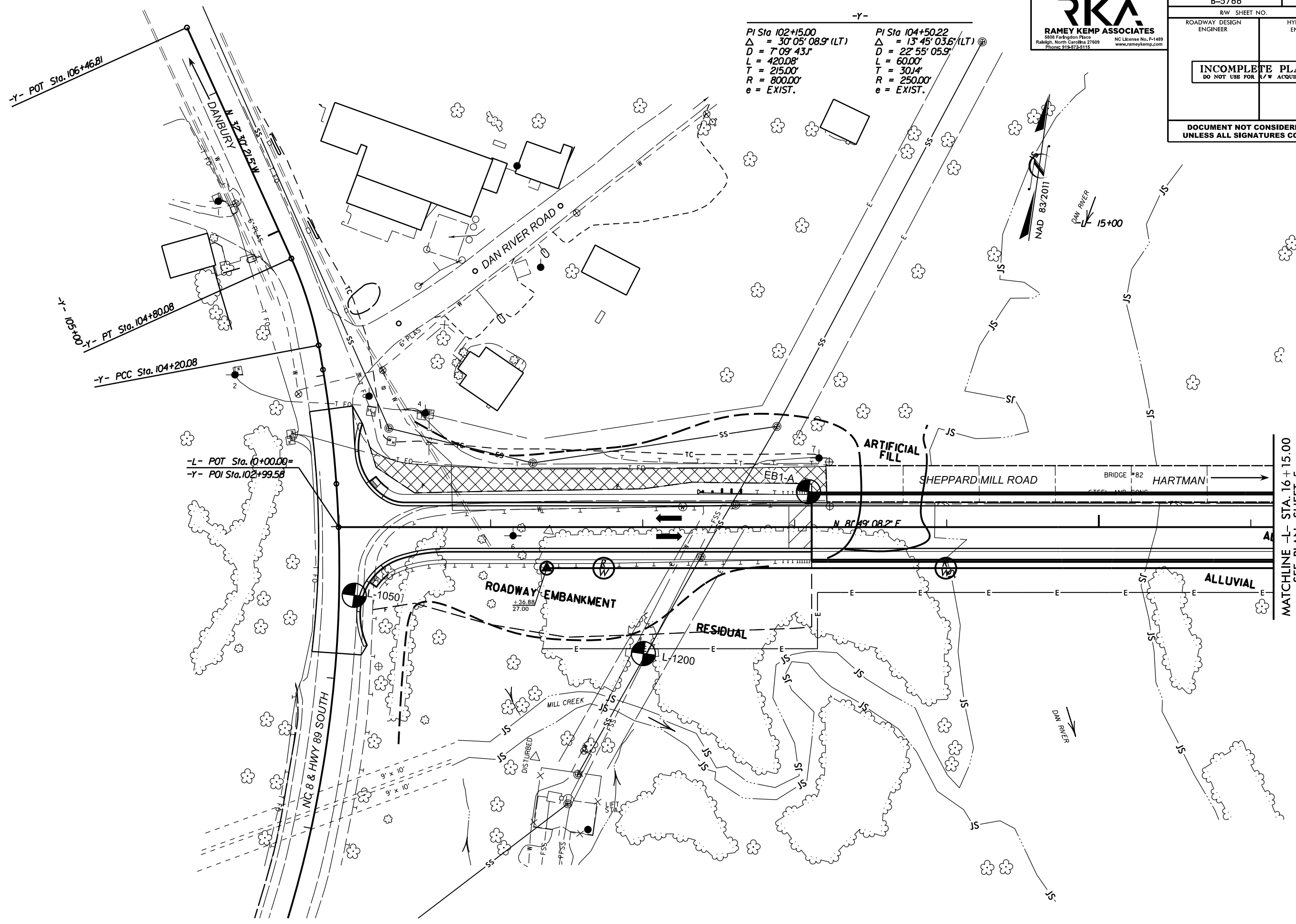
REVISIONS



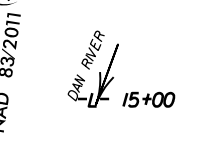
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B-5766	4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION	
<b>DOCUMENT NOT CONSIDERED FINAL</b> UNLESS ALL SIGNATURES COMPLETED	

-Y-

PI Sta 102+15.00	PI Sta 104+50.22
$\Delta = 30^{\circ} 05' 08.9''$ (LT)	$\Delta = 13^{\circ} 45' 03.6''$ (LT)
$D = 7^{\circ} 09' 43.1''$	$D = 22^{\circ} 55' 05.9''$
$L = 420.08'$	$L = 60.00'$
$T = 215.00'$	$T = 30.14'$
$R = 800.00'$	$R = 250.00'$
e = EXIST.	e = EXIST.



MATCHLINE -L- STA. 16+15.00  
 SEE PLAN SHEET 5



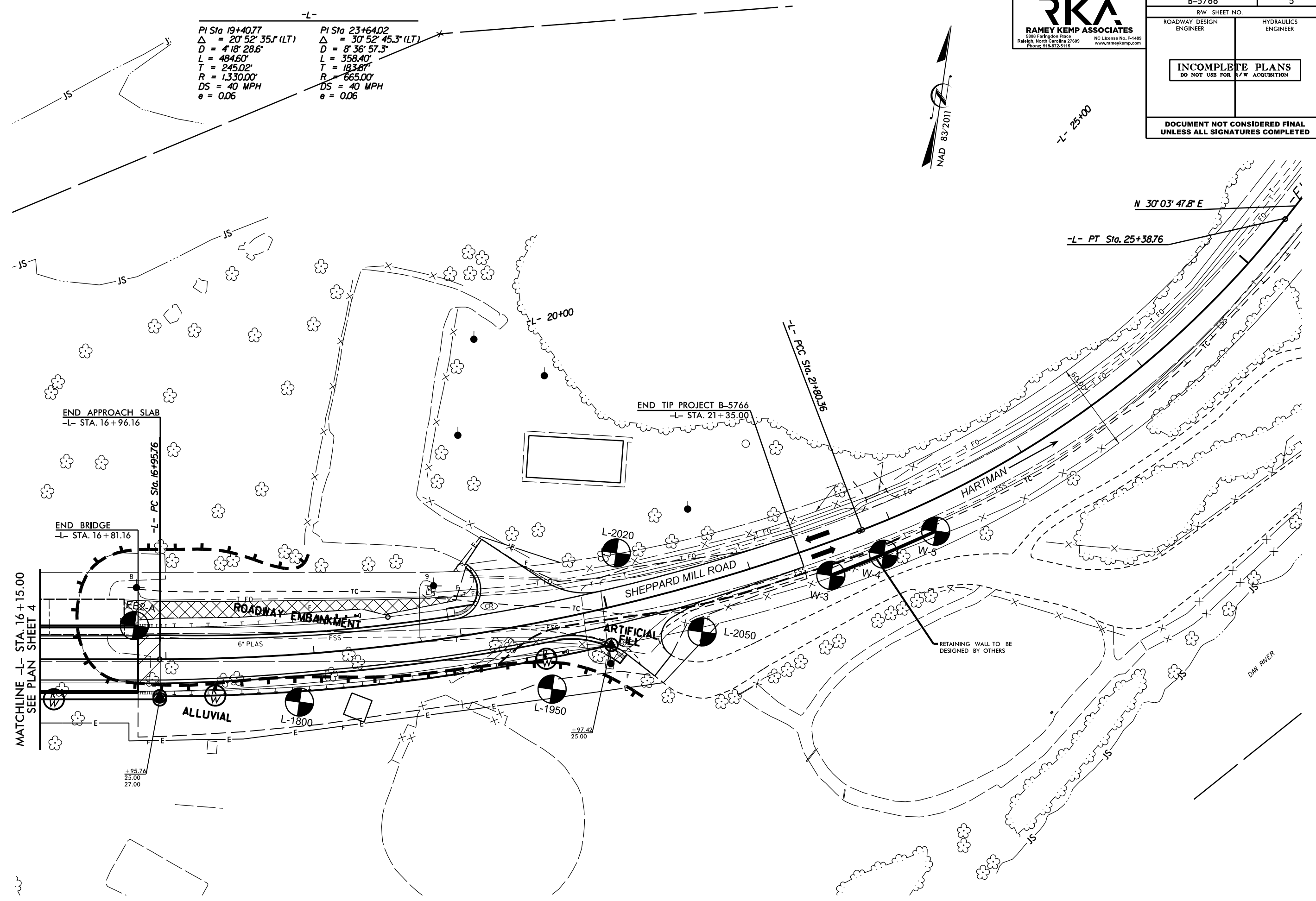
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 P:\2023\223152 NCDOT\_B-5766 BRIDGE 82 OVER DAN RIVER - GEOTECH\B5766.GEO.ROWY\CADD.GEOTECH\Site&Sub\B5766\_Rdy\_psh05.dgn  
 Shudson

REVISIONS

PI Sta 19+40.77 $\Delta = 20^\circ 52' 35.1''$ (LT) $D = 418' 28.6''$ $L = 484.60'$ $T = 245.02'$ $R = 1,330.00'$ $DS = 40$ MPH $e = 0.06$	PI Sta 23+64.02 $\Delta = 30^\circ 52' 45.3''$ (LT) $D = 836' 57.3''$ $L = 358.40'$ $T = 183.87'$ $R = 665.00'$ $DS = 40$ MPH $e = 0.06$
---	---

Infrastructure Consulting Services, Inc.  
**RKA**  
**RAMEY KEMP ASSOCIATES**  
 5808 Farlington Place  
 Raleigh, North Carolina 27608  
 Phone: 919-872-5115  
 NC License No. F-1489  
 www.rameykemp.com

PROJECT REFERENCE NO. B-5766	SHEET NO. 5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION	
<b>DOCUMENT NOT CONSIDERED FINAL</b> UNLESS ALL SIGNATURES COMPLETED	



MATCHLINE -L- STA. 16 + 15.00  
SEE PLAN SHEET 4

END APPROACH SLAB  
-L- STA. 16 + 96.16

END BRIDGE  
-L- STA. 16 + 81.16

END TIP PROJECT B-5766  
-L- STA. 21 + 35.00

-L- PC Sta. 21+08.36

N 30°03'47.8" E  
-L- PT Sta. 25+38.76

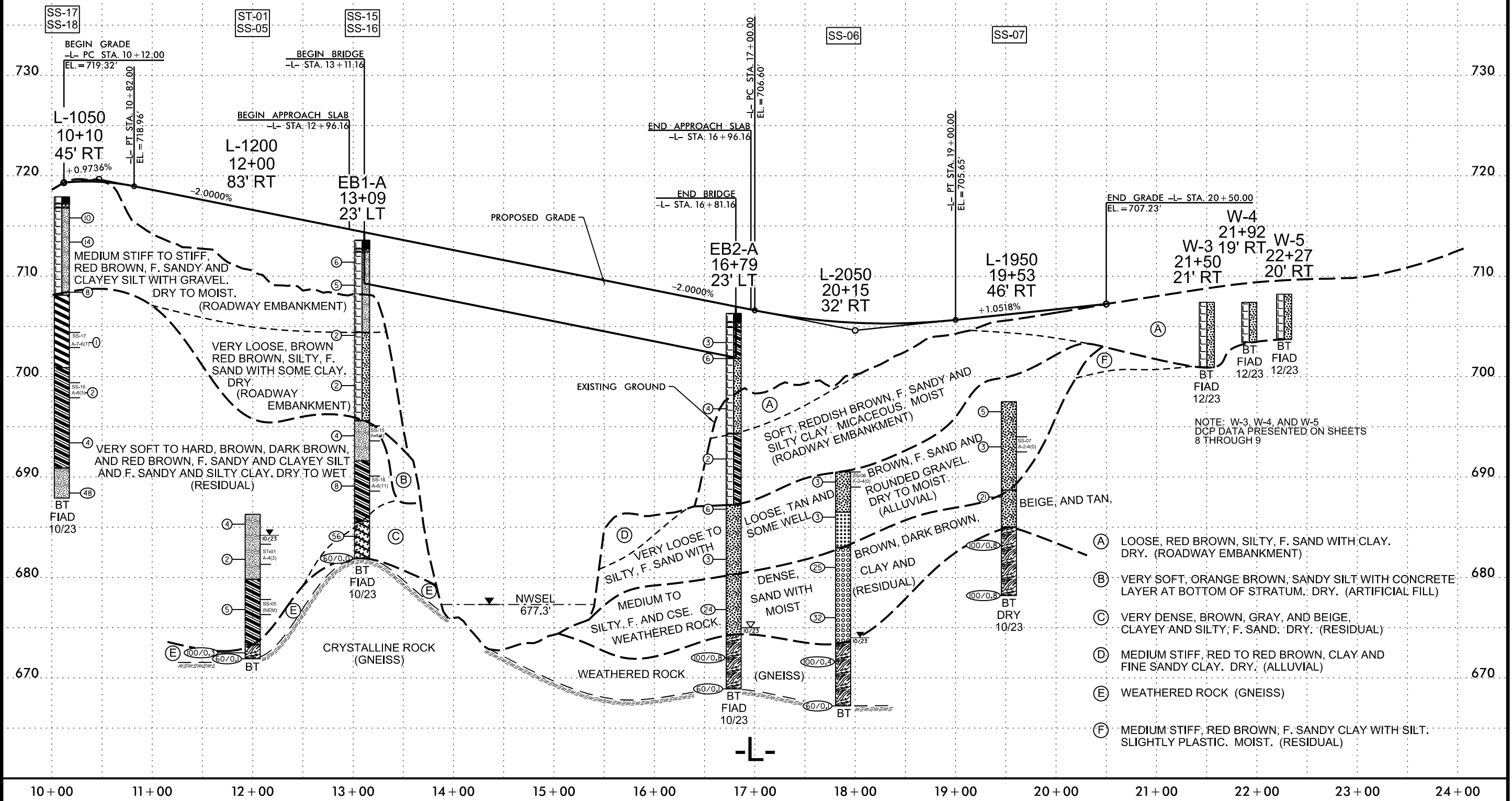
+95.76  
25.00  
27.00

+97.42  
25.00

DAN RIVER

-L- SR 1674 (SHEPPARD MILL ROAD)

SAMPLE NUMBER	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P. I.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-17	45 ft RT	10+10	13.5- 15.0	A-7-6(7)	41	16	15.2	34.1	18.5	32.2	99.3	93	56	26	-
SS-18	45 ft RT	10+10	18.5- 20.0	A-6(5)	35	14	10.2	42.0	18.4	29.4	90.9	88	50	19	-
ST-01	83 ft RT	12+00	3.5- 5.0	A-4(3)	32	7	6.0	41.9	29.5	22.6	100	96	65	16	-
SS-05	83 ft RT	12+00	8.5- 10.0	NEM	32	6	NEM	NEM	NEM	NEM	91.2	NEM	NEM	38	-
SS-15	23 ft LT	13+09	18.5- 20.0	A-4(4)	32	9	3.5	32.9	40.1	23.5	96.3	95	62	25	-
SS-16	23 ft LT	13+09	23.5- 25.0	A-6(11)	39	16	3.9	32.3	25.2	38.6	99.9	99	71	24	-
SS-06	32 ft RT	17+88	0.0- 1.5	A-2-4(0)	NP	NP	35.1	47.5	11.0	6.5	94.6	83	21	16	-
SS-07	46 ft RT	19+53	3.5- 5.0	A-2-4(0)	NP	NP	14.9	54.7	21.6	8.8	99.7	96	33	13	-



- (A) LOOSE, RED BROWN, SILTY, F. SAND WITH CLAY. DRY. (ROADWAY EMBANKMENT)
- (B) VERY SOFT, ORANGE BROWN, SANDY SILT WITH CONCRETE LAYER AT BOTTOM OF STRATUM. DRY. (ARTIFICIAL FILL)
- (C) VERY DENSE, BROWN, GRAY, AND BEIGE, CLAYEY AND SILTY, F. SAND. DRY. (RESIDUAL)
- (D) MEDIUM STIFF, RED TO RED BROWN, CLAY AND FINE SANDY CLAY. DRY. (ALLUVIAL)
- (E) WEATHERED ROCK (GNEISS)
- (F) MEDIUM STIFF, RED BROWN, F. SANDY CLAY WITH SILT. SLIGHTLY PLASTIC. MOIST. (RESIDUAL)

5/14/99  
 10-JAN-2024 13:27  
 P:\2023\223152\NCDOT\_B-5766 BRIDGE 82 OVER DAN RIVER - GEOTECH\B5766.GEO\_RDWY\CADD\GEO\TECH\Plan\Pror\B5766.GEO\_RDWY\_PFL-06.dgn  
 AT 11:55:11 AM

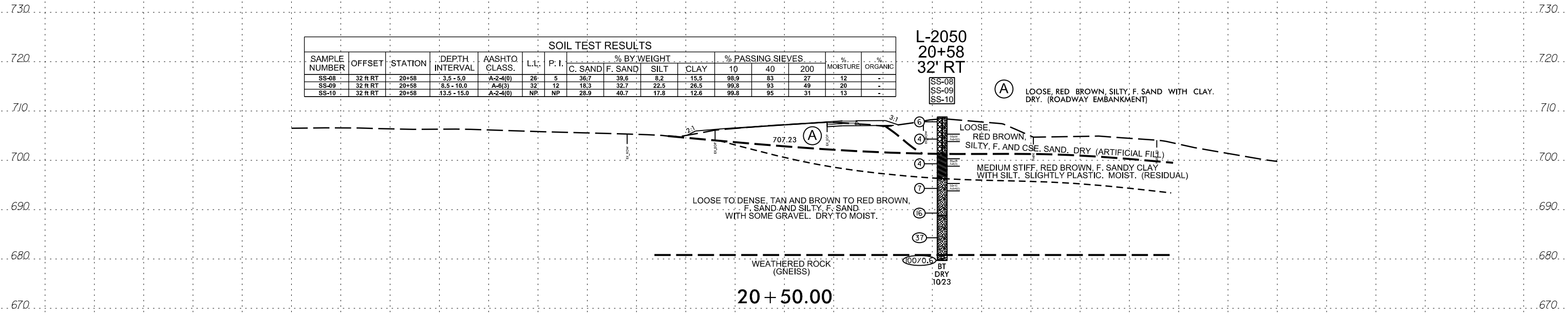
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SAMPLE NUMBER	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P. I.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-08	32 ft RT	20+58	3.5 - 5.0	A-2-4(0)	26	5	36.7	39.6	8.2	15.5	98.9	83	27	12	-
SS-09	32 ft RT	20+58	8.5 - 10.0	A-6(3)	32	12	18.3	32.7	22.5	26.5	99.8	93	49	20	-
SS-10	32 ft RT	20+58	13.5 - 15.0	A-2-4(0)	NP	NP	28.9	40.7	17.8	12.6	99.8	95	31	13	-

L-2050  
20+58  
32' RT

SS-08  
SS-09  
SS-10

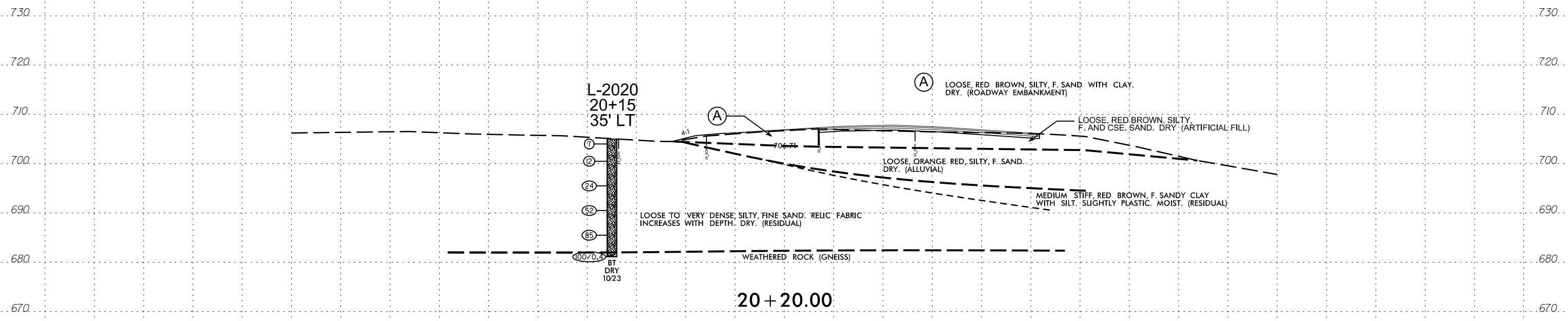
(A) LOOSE, RED BROWN, SILTY, F. SAND WITH CLAY. DRY. (ROADWAY EMBANKMENT)



20 + 50.00

L-2020  
20+15  
35' LT

(A) LOOSE, RED BROWN, SILTY, F. SAND WITH CLAY. DRY. (ROADWAY EMBANKMENT)



20 + 20.00



### GEOTECHNICAL BORING REPORT HAND AUGER AND DCP



WBS: 45722.1.1 TIP: B-5766 COUNTY: STOKES GEOLOGIST: C. Stratton

SITE DESCRIPTION: Bridge Number 82 over Dan River on SR 1674 (Sheppard Mill Road), Danbury, North Carolina

GROUND WTR (ft)

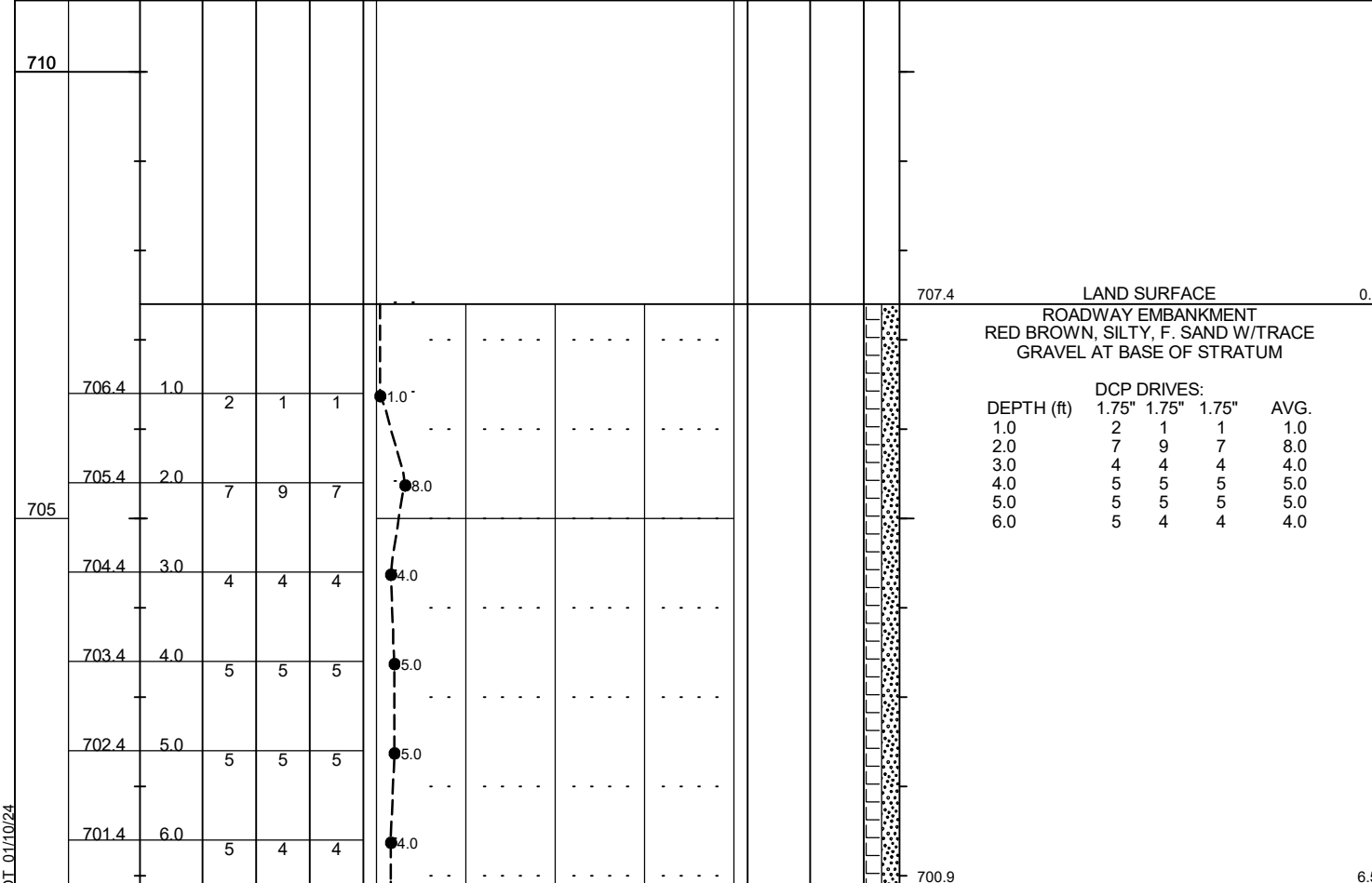
BORING NO.: W-3 STATION: 21+50 OFFSET: 21 ft RT ALIGNMENT: -L- 0 HR. Dry

COLLAR ELEV.: 707.4 ft TOTAL DEPTH: 6.5 ft NORTHING: 969,626 EASTING: 1,647,433 24 HR. FIAD

DRILL RIG/HAMMER EFF./DATE: HAND AUGER DRILL METHOD: HAND AUGER W/DCP HAMMER TYPE: MANUAL

DRILLER: N/A START DATE: 12/07/23 COMP. DATE: 12/07/23 SURFACE WATER DEPTH: N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			AVERAGE DCP VALUES					SAMP. # RESULT	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			1.75in	1.75in	1.75in	0	25	50	75	100				



Boring Terminated WITH HAND AUGER REFUSAL at Elevation 700.9 ft ON WEATHERED ROCK (GNEISS)

WBS: 45722.1.1 TIP: B-5766 COUNTY: STOKES GEOLOGIST: C. Stratton

SITE DESCRIPTION: Bridge Number 82 over Dan River on SR 1674 (Sheppard Mill Road), Danbury, North Carolina

GROUND WTR (ft)

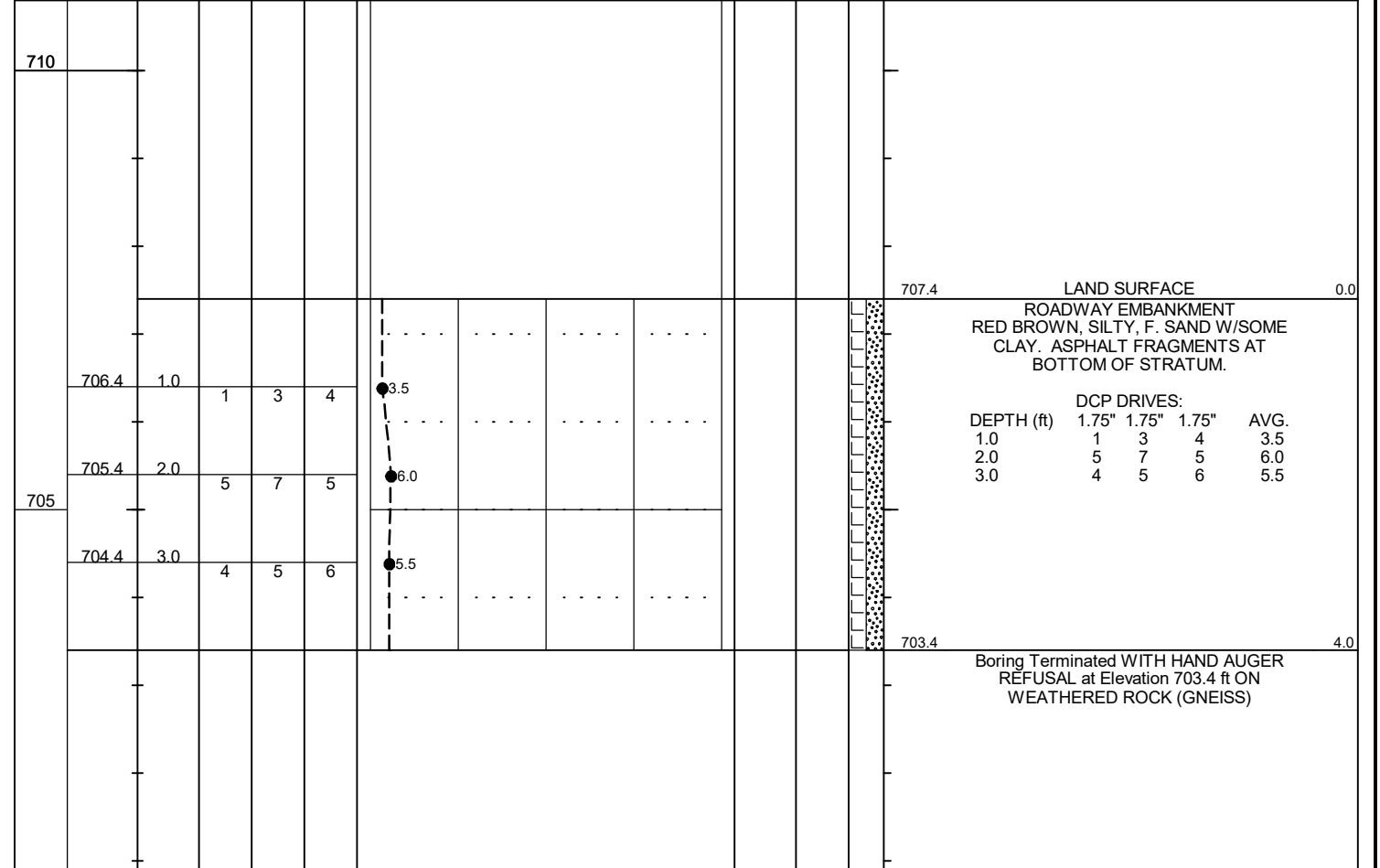
BORING NO.: W-4 STATION: 21+92 OFFSET: 19 ft RT ALIGNMENT: -L- 0 HR. Dry

COLLAR ELEV.: 707.4 ft TOTAL DEPTH: 4.0 ft NORTHING: 969,648 EASTING: 1,647,470 24 HR. FIAD

DRILL RIG/HAMMER EFF./DATE: HAND AUGER DRILL METHOD: HAND AUGER W/DCP HAMMER TYPE: MANUAL

DRILLER: N/A START DATE: 12/07/23 COMP. DATE: 12/07/23 SURFACE WATER DEPTH: N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			AVERAGE DCP VALUES					SAMP. # RESULT	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			1.75in	1.75in	1.75in	0	25	50	75	100				



Boring Terminated WITH HAND AUGER REFUSAL at Elevation 703.4 ft ON WEATHERED ROCK (GNEISS)

# GEOTECHNICAL BORING REPORT HAND AUGER AND DCP

WBS: 45722.1.1	TIP: B-5766	COUNTY: STOKES	GEOLOGIST: C. Stratton	
SITE DESCRIPTION: Bridge Number 82 over Dan River on SR 1674 (Sheppard Mill Road), Danbury, North Carolina				GROUND WTR (ft)
BORING NO.: W-5	STATION: 22+27	OFFSET: 20 ft RT	ALIGNMENT: -L-	0 HR. Dry
COLLAR ELEV.: 708.2 ft	TOTAL DEPTH: 5.0 ft	NORTHING: 969,666	EASTING: 1,647,501	24 HR. FIAD
DRILL RIG/HAMMER EFF./DATE: HAND AUGER		DRILL METHOD: HAND AUGER W/DCP		HAMMER TYPE: MANUAL
DRILLER: N/A	START DATE: 12/07/23	COMP. DATE: 12/07/23	SURFACE WATER DEPTH: N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			AVERAGE DCP VALUES					SAMP. # RESULT	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			1.75in	1.75in	1.75in	0	25	50	75	100					
710															
													708.2	LAND SURFACE	0.0
														ROADWAY EMBANKMENT RED BROWN, SILTY, F. SAND W/SOME CLAY AND ASPHALT FRAGMENTS.	
	707.2	1.0	1	1	2								2.0		
	706.2	2.0	3	2	2								2.0		
705	705.2	3.0	3	2	3								2.5		
	704.2	4.0	8	8	7								7.5		
													703.7	Boring Terminated WITH HAND AUGER REFUSAL at Elevation 703.2 ft ON WEATHERED ROCK (GNEISS)	4.5

NCDOT BORE DOUBLE\_B5766\_GEO\_BRDG&RDWY\_DRILLED.GPJ NCDOT\_CATLIN.GDT 01/10/24