

SEE SHEET 3 FOR PLAN SHEET LAYOUT
AT TIME OF INVESTIGATION

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4863	1	12

CONTENTS

LINE	STATION	PLAN	PROFILE
-L-	10+00.00 - 55+05.00	4-7	8-11
-Y-	10+00.00 - 11+30.00	4	12
-DRIVE-	10+00.00 - 11+40.00	4	12

**ROADWAY
SUBSURFACE INVESTIGATION**

COUNTY CARTERET
PROJECT DESCRIPTION BR 73 OVER THE STRAITS AT
HARKERS ISLAND ON SR 1335

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 MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

NOTES:

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

PERSONNEL

PAUL, A. S.

SWARTLEY, J. R.

WHITE, T. J.

INVESTIGATED BY PAUL, A. S.

DRAWN BY HUNSBERGER, W. S.

CHECKED BY HAMM, J. R.

SUBMITTED BY FALCON ENG.

DATE FEBRUARY 2018

REFERENCE: B-4863

PROJECT: 40212



DocuSigned by:

W. Scott Hunsberger 3/5/2018

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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										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 DISLOADED 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 (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																																																																																																																																											
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U.S. STD. SIEVE SIZE OPENING (MM)	4	10	40	60	200	270																																																																																																																																																																																																																			
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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																																																																																																																																																																																																																		
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SOIL MOISTURE - CORRELATION OF TERMS										EQUIPMENT USED ON SUBJECT PROJECT										FRACTURE SPACING										BEDDING																																																																																																																																																																																											
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>SOIL MOISTURE SCALE (ATTERBERG LIMITS)</th> <th>FIELD MOISTURE DESCRIPTION</th> <th>GUIDE FOR FIELD MOISTURE DESCRIPTION</th> </tr> <tr> <td>LL - LIQUID LIMIT</td> <td>- SATURATED - (SAT.)</td> <td>USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE</td> </tr> <tr> <td>PLASTIC RANGE (PI)</td> <td>- WET - (W)</td> <td>SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE</td> </tr> <tr> <td>OM - OPTIMUM MOISTURE SHRINKAGE LIMIT</td> <td>- MOIST - (M)</td> <td>SOLID; AT OR NEAR OPTIMUM MOISTURE</td> </tr> <tr> <td>SL - SHRINKAGE LIMIT</td> <td>- DRY - (D)</td> <td>REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE</td> </tr> </table>										SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION	LL - LIQUID LIMIT	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE	PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE	OM - OPTIMUM MOISTURE SHRINKAGE LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE	SL - SHRINKAGE LIMIT	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	<p>DRILL UNITS: CME-45C CME-55 CME-550 VANE SHEAR TEST PORTABLE HOIST CME-45B DRAG BIT</p> <p>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</p> <p>HAMMER TYPE: AUTOMATIC MANUAL</p> <p>CORE SIZE: -B -H -N</p> <p>HAND TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST</p>										<p>VERY WIDE WIDE MODERATELY CLOSE CLOSE VERY CLOSE</p> <p>MORE THAN 10 FEET 3 TO 10 FEET 1 TO 3 FEET 0.16 TO 1 FOOT LESS THAN 0.16 FEET</p>										<p>VERY THICKLY BEDDED THICKLY BEDDED THINLY BEDDED VERY THINLY BEDDED THICKLY LAMINATED THINLY LAMINATED</p> <p>4 FEET 1.5 - 4 FEET 0.16 - 1.5 FEET 0.03 - 0.16 FEET 0.008 - 0.03 FEET < 0.008 FEET</p>																																																																																																																																																																												
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<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>NON PLASTIC</th> <th colspan="2">PLASTICITY INDEX (PI)</th> <th>DRY STRENGTH</th> </tr> <tr> <td></td> <td>0-5</td> <td>6-15</td> <td>VERY LOW</td> </tr> <tr> <td>SLIGHTLY PLASTIC</td> <td>16-25</td> <td>26 OR MORE</td> <td>SLIGHT</td> </tr> <tr> <td>MODERATELY PLASTIC</td> <td></td> <td></td> <td>MEDIUM</td> </tr> <tr> <td>HIGHLY PLASTIC</td> <td></td> <td></td> <td>HIGH</td> </tr> </table>										NON PLASTIC	PLASTICITY INDEX (PI)		DRY STRENGTH		0-5	6-15	VERY LOW	SLIGHTLY PLASTIC	16-25	26 OR MORE	SLIGHT	MODERATELY PLASTIC			MEDIUM	HIGHLY PLASTIC			HIGH	<p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p> <p>FRIABLE MODERATELY INDURATED INDURATED EXTREMELY INDURATED</p> <p>RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</p>										<p>BENCH MARK: BORING ELEVATIONS TAKEN FROM B4863-Is.tin.tin DATED 08/16 ELEVATION: FEET</p>										<p>FIAD - FILLED IMMEDIATELY AFTER DRILLING</p>																																																																																																																																																																							
NON PLASTIC	PLASTICITY INDEX (PI)		DRY STRENGTH																																																																																																																																																																																																																						
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COLOR										FRACURE SPACING										BEDDING										INDURATION																																																																																																																																																																																											
<p>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.</p>										<p>VERY WIDE WIDE MODERATELY CLOSE CLOSE VERY CLOSE</p> <p>MORE THAN 10 FEET 3 TO 10 FEET 1 TO 3 FEET 0.16 TO 1 FOOT LESS THAN 0.16 FEET</p>										<p>VERY THICKLY BEDDED THICKLY BEDDED THINLY BEDDED VERY THINLY BEDDED THICKLY LAMINATED THINLY LAMINATED</p> <p>4 FEET 1.5 - 4 FEET 0.16 - 1.5 FEET 0.03 - 0.16 FEET 0.008 - 0.03 FEET < 0.008 FEET</p>										<p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p> <p>FRIABLE MODERATELY INDURATED INDURATED EXTREMELY INDURATED</p> <p>RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</p>																																																																																																																																																																																											

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CONTRACT: TIP PROJECT: B-4863

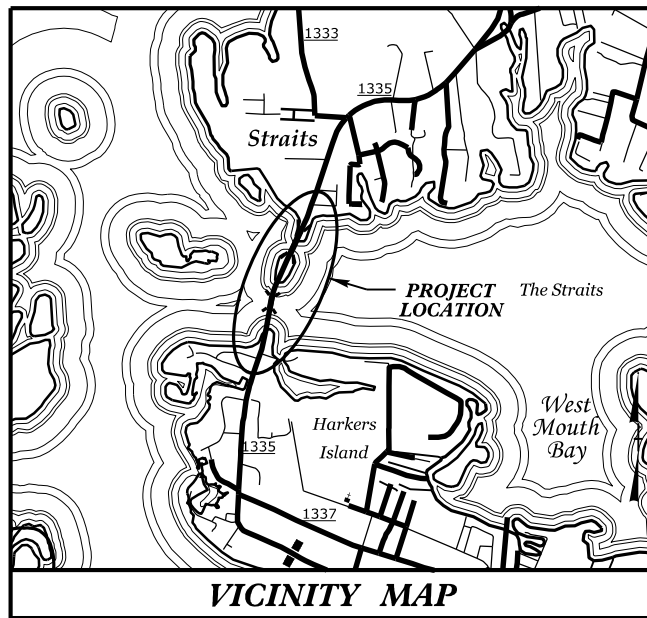
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CARTERET COUNTY

**LOCATION: REPLACEMENT OF BRIDGE NOS. 73 AND 96 CARRYING
SR 1335 (ISLAND RD) OVER THE STRAITS**

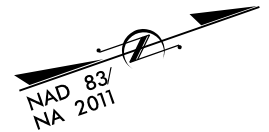
TYPE OF WORK: GRADING, DRAINAGE, PAVING, AND STRUCTURE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4863	3	12
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
40212.1.3	N/A	PE	

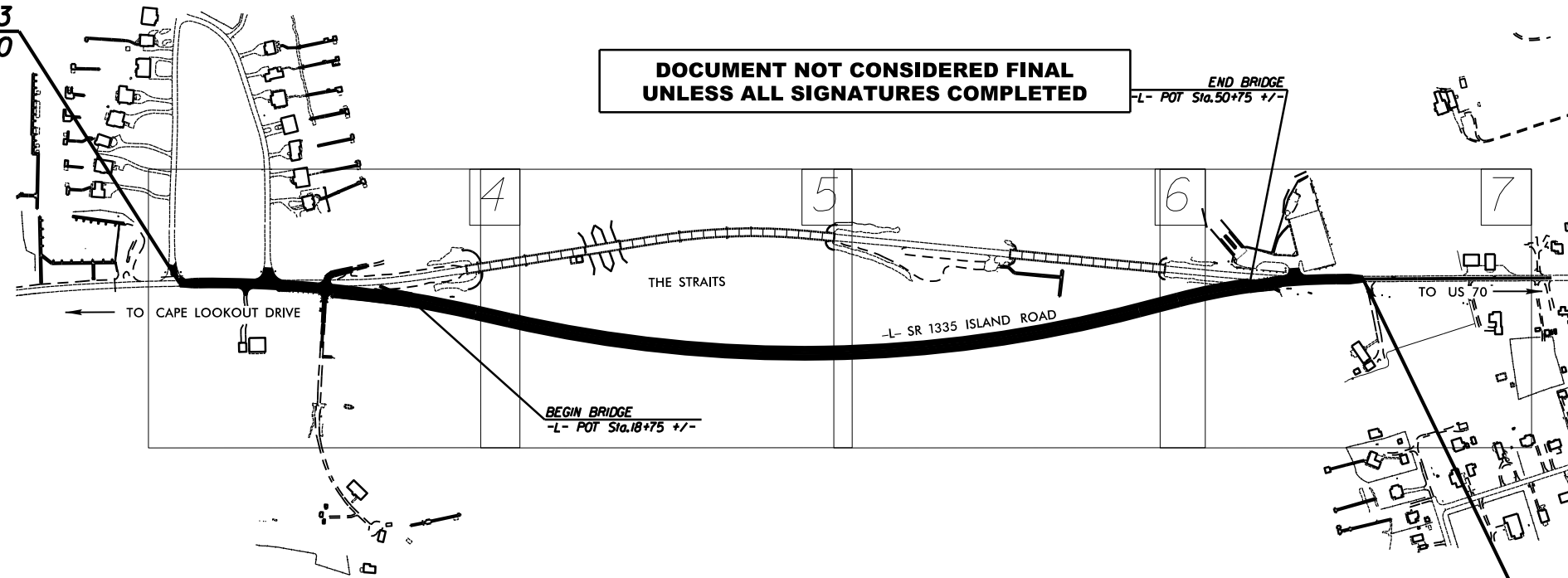


15% LINE & GRADE PLANS

VICINITY MAP



BEGIN TIP PROJECT B-4863
-L- POC Sta.10+00.00



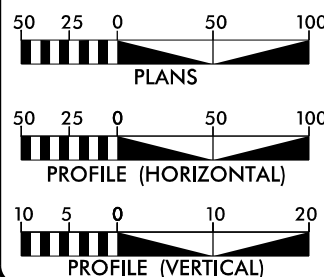
END TIP PROJECT B-4863
-L- POT Sta.55+05.00



THERE IS NO CONTROL OF ACCESS ON THIS PROJECT.
THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES



DESIGN DATA

ADT 2019 = 3,300
ADT 2040 = 4,200
K = 10 %
D = 60 %
T = 4 % *
V = 50 MPH
*(TTST=2% + DUAL=2%)
FUNC CLASS = MAJOR
COLLECTOR

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4863 = 0.247 MILE +/-
LENGTH STRUCTURE TIP PROJECT B-4863 = 0.606 MILE +/-
TOTAL LENGTH TIP PROJECT B-4863 = 0.853 MILE +/-

PLANS PREPARED BY:

1520 SOUTH BLVD, SUITE 200
CHARLOTTE, NC 28203
704-752-0610

FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
MONTH XX, XXXX

LETTING DATE:
MONTH XX, XXXX

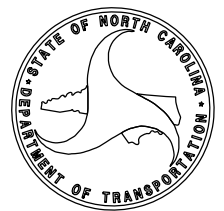
JENNIFER FARINO, PE
PROJECT ENGINEER
DREW MORROW, PE
PROJECT DESIGN ENGINEER
MARIA ROGERSON, PE
NCDOT CONTACT

HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: _____ P.E.





Roadway Subsurface Investigation Report - Inventory

Bridge No. 73 Over the Straits at Harkers Island on SR 1335
Carteret County, North Carolina
WBS: 40212.1.1, TIP: B-4863
Falcon Project No.: G17063.00

Prepared for:
NCDOT Geotechnical Engineering Unit
1020 Birch Ridge Drive
Raleigh, NC 27610

Submitted by:
Falcon Engineering, Inc.
1210 Trinity Road, Suite 110
Cary, North Carolina 27513
(919) 871-0800
www.falconengineers.com

February 28, 2018

TIP: B-4863
WBS: 40212.1.1
Project ID: 30978
COUNTY: Carteret
DESCRIPTION: Bridge No. 73 Over the Straits at Harkers Island on SR 1335
SUBJECT: Roadway Subsurface Investigation – Inventory

PROJECT DESCRIPTION

This project consists of proposed new grading, widening, and realignment related to the construction of a new bridge structure to replace Bridge 73 and 96 on SR 1335 (Harkers Island Rd.) over the Straits at Harkers Island in Carteret County, NC. The total project length is 0.853 miles, although the roadway approach work will occur over a total of 0.247 miles, divided between both approaches.

In addition, approximately 0.106 miles of temporary detour pavement will be constructed at the End Bent 2 approach to accommodate phasing of construction.

The investigation was conducted on November, 2017 in general accordance with our Scope and Fee Estimates for Geotechnical Investigation and Engineering Services. The recommendations provided in this report are based solely on our site reconnaissance, soil test borings and laboratory test data, engineering evaluation of these data, and generally accepted soil and foundation engineering practices and principles.

A total of nine (9) Hand Auger borings were performed for the proposed roadway alignments. Representative soil samples, collected with a hand auger, were selected for laboratory testing to verify visual field classifications.

Additional SPT borings received from S&ME were incorporated into this report.



Portions of the following alignments, totaling approximately 0.865 miles were investigated. Other minor driveways are included on the project but improvements are not anticipated to be significant enough to warrant investigation.

<u>Alignment</u>	<u>Station (ft)</u>
-L- (Harkers Island Road)	10+00.00 - 55+05.00
-Y- (Sparks Road)	10+00.00 - 11+30.00
-DRIVE-	10+00.00 - 11+40.00
-LDET-	10+00.00 - 16+68.48

AREAS OF SPECIAL GEOTECHNICAL INTEREST

- I. The following locations contain shallow groundwater within 6 feet of the ground surface:

<u>Station (ft)</u>	<u>Alignment</u>
10+00 – 14+00	-L-
17+50 – 18+80	-L-
50+75 – 55+00	-L-
10 +00 – 11+30	-Y-
10+00 – 11+40	-DRIVE-

- II. Roadway Embankment soils were encountered at the tie in points of the new alignment associated with prior construction of existing SR 1335.

PHYSIOGRAPHY AND GEOLOGY

The project site is in the Coastal Plain Physiographic Province of North Carolina. According to the *Geologic Map of North Carolina* (1985), the site is underlain by Surficial Deposits of the Quaternary Period in the Coastal Plain Physiographic Province.

Existing site topography is flat in the general project vicinity along the proposed alignments typical of this far eastern extremity of the Coastal Plain. The existing roadway is supported on a shallow embankment which increases in height toward the existing bridge. Roadway embankment varies from several inches to several feet. Shallow drainage ditches or swales parallel the existing roadway and drain toward bottoms, swamps, or The Straits.

SOIL PROPERTIES

A variety of soils were encountered along the project, including existing roadway embankments and undivided coastal plain soils.

Topsoil was encountered in grassy areas ranging in thickness up to 0.5 feet, typically on the order of 0.3 feet and consisting of silty sand (A-2-4).

Roadway Embankment soils were encountered at the ground surface adjacent to existing roadways. These soils consist of up to 6 feet of moist to saturated, silty and clean sand (A-1-a, A-2-4, and A-3).

Undivided Coastal Plain soils were encountered beneath the roadway embankment soils. These soils consist of moist to saturated, silty, clayey, and clean sand (A-2-4, A-2-6, A-3) and sandy and silty clay (A-6, A-7-6).

GROUNDWATER PROPERTIES

Groundwater levels were measured at the time of boring completion, and after a waiting period of at least 24 hours.

Detailed groundwater measurements are included in the attached subsurface profiles, and noted areas of shallow groundwater are included in the Areas of Special Geotechnical Interest earlier in this report.



CLOSING

Falcon appreciates the opportunity to have provided our geotechnical engineering services for the above referenced project. If you have any questions concerning the contents of this report or need additional information, please do not hesitate to contact our office.

FALCON ENGINEERING, INC.

DOCUMENT NOT CONSIDERED FINAL UNTIL ALL SIGNATURES COMPLETED

Report Prepared By:

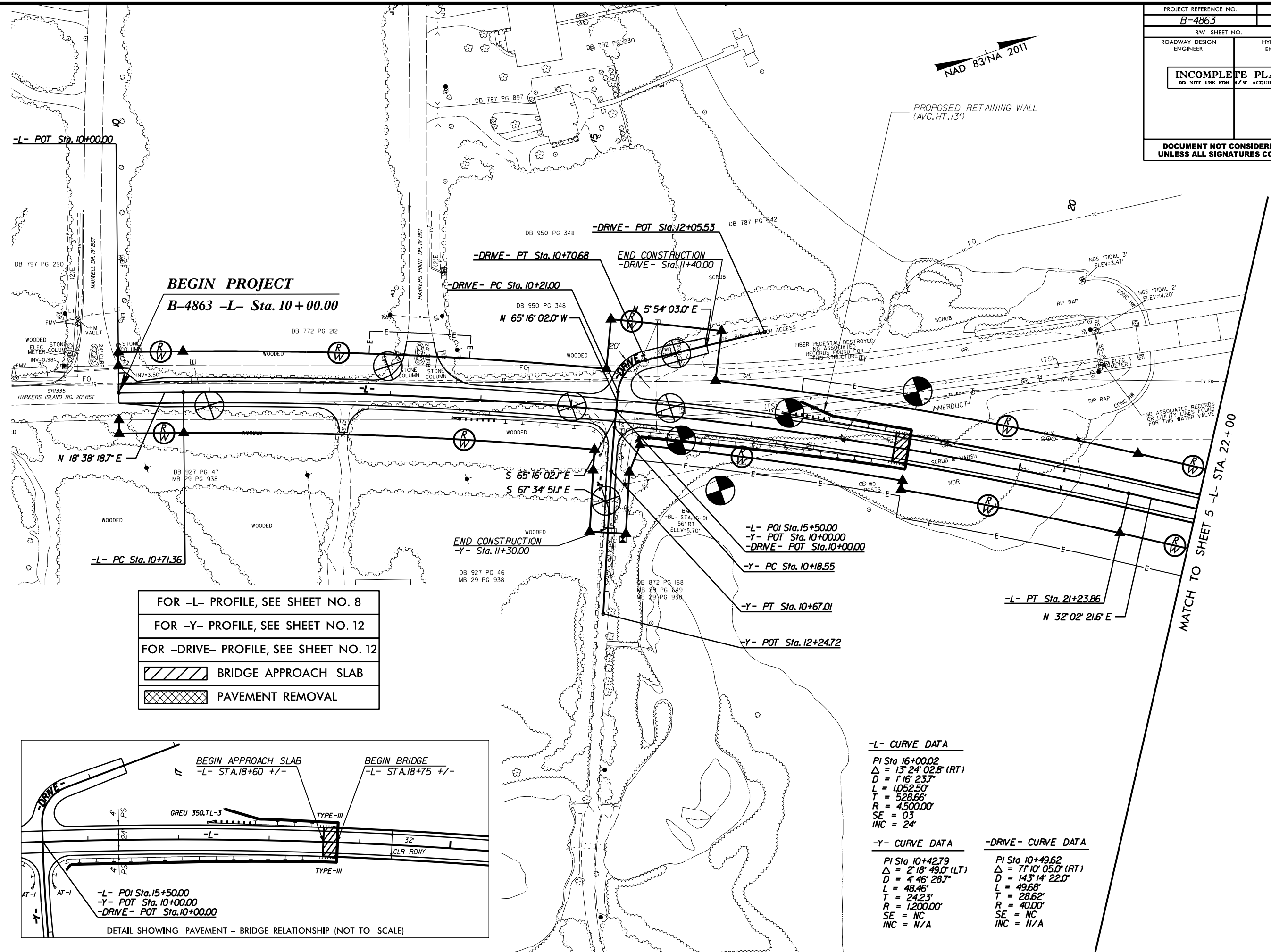
Report Reviewed By:

W. Scott Hunsberger, PE
Geotechnical Engineer

Jeremy R. Hamm, PE
Geotechnical Engineering Manager

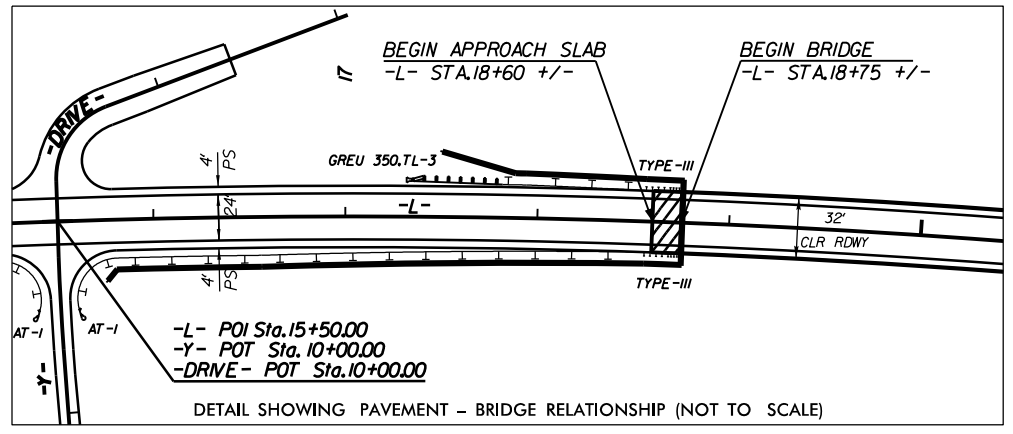


NAD 83/NA 2011



FOR -L- PROFILE, SEE SHEET NO. 8
 FOR -Y- PROFILE, SEE SHEET NO. 12
 FOR -DRIVE- PROFILE, SEE SHEET NO. 12

BRIDGE APPROACH SLAB
 PAVEMENT REMOVAL



-L- CURVE DATA

PI Sta 16+00.02
 $\Delta = 13^\circ 24' 02.8''$ (RT)
 $D = 116' 23.7''$
 $L = 1052.50'$
 $T = 528.66'$
 $R = 4500.00'$
 $SE = 03$
 $INC = 24'$

-Y- CURVE DATA

PI Sta 10+42.79
 $\Delta = 2^\circ 18' 49.0''$ (LT)
 $D = 446' 28.7''$
 $L = 48.46'$
 $T = 24.23'$
 $R = 1200.00'$
 $SE = NC$
 $INC = N/A$

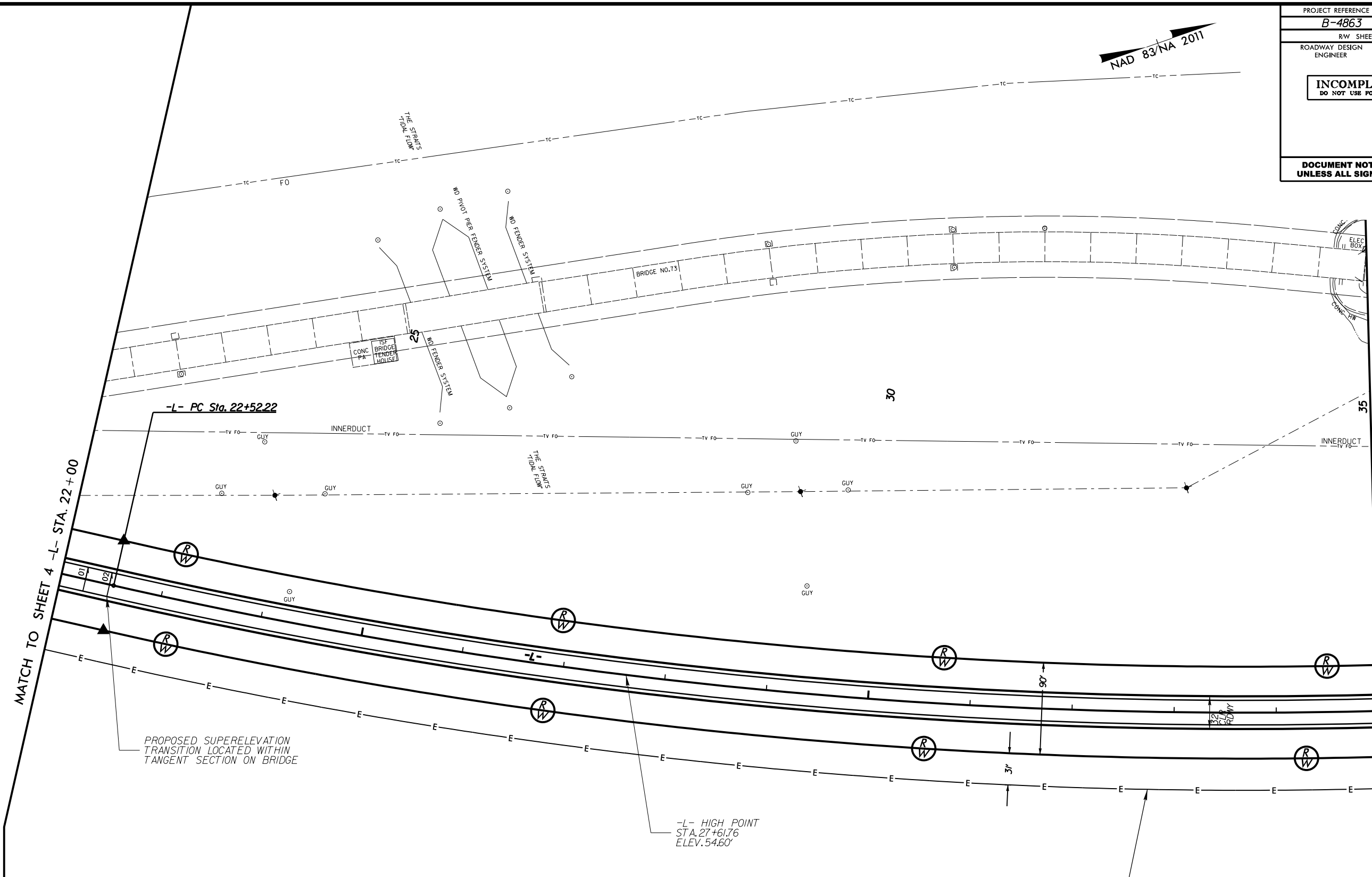
-DRIVE- CURVE DATA

PI Sta 10+49.62
 $\Delta = 71^\circ 10' 05.0''$ (RT)
 $D = 143' 14' 22.0''$
 $L = 49.68'$
 $T = 28.62'$
 $R = 40.00'$
 $SE = NC$
 $INC = N/A$

REVISIONS
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 8/17/19

PROJECT REFERENCE NO. B-4863	SHEET NO. 5
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

NAD 83/NA 2011



-L- PC Sta. 22+52.22

-L- HIGH POINT
STA. 27+61.76
ELEV. 54.60'

PROPOSED SUPERELEVATION
TRANSITION LOCATED WITHIN
TANGENT SECTION ON BRIDGE

TEMPORARY CONSTRUCTION EASEMENT FOR
40' WIDE WORK BRIDGE WITH 10'
CLEARANCE TO PROPOSED BRIDGE

-L- CURVE DATA
 PI Sta 34+74.21
 $\Delta = 27^\circ 28' 03.8''$ (LT)
 $D = 1^\circ 08' 45.3''$
 $L = 2,397.01'$
 $T = 1,222.00'$
 $R = 5,000.00'$
 $SE = RC$
 $INC = 24'$

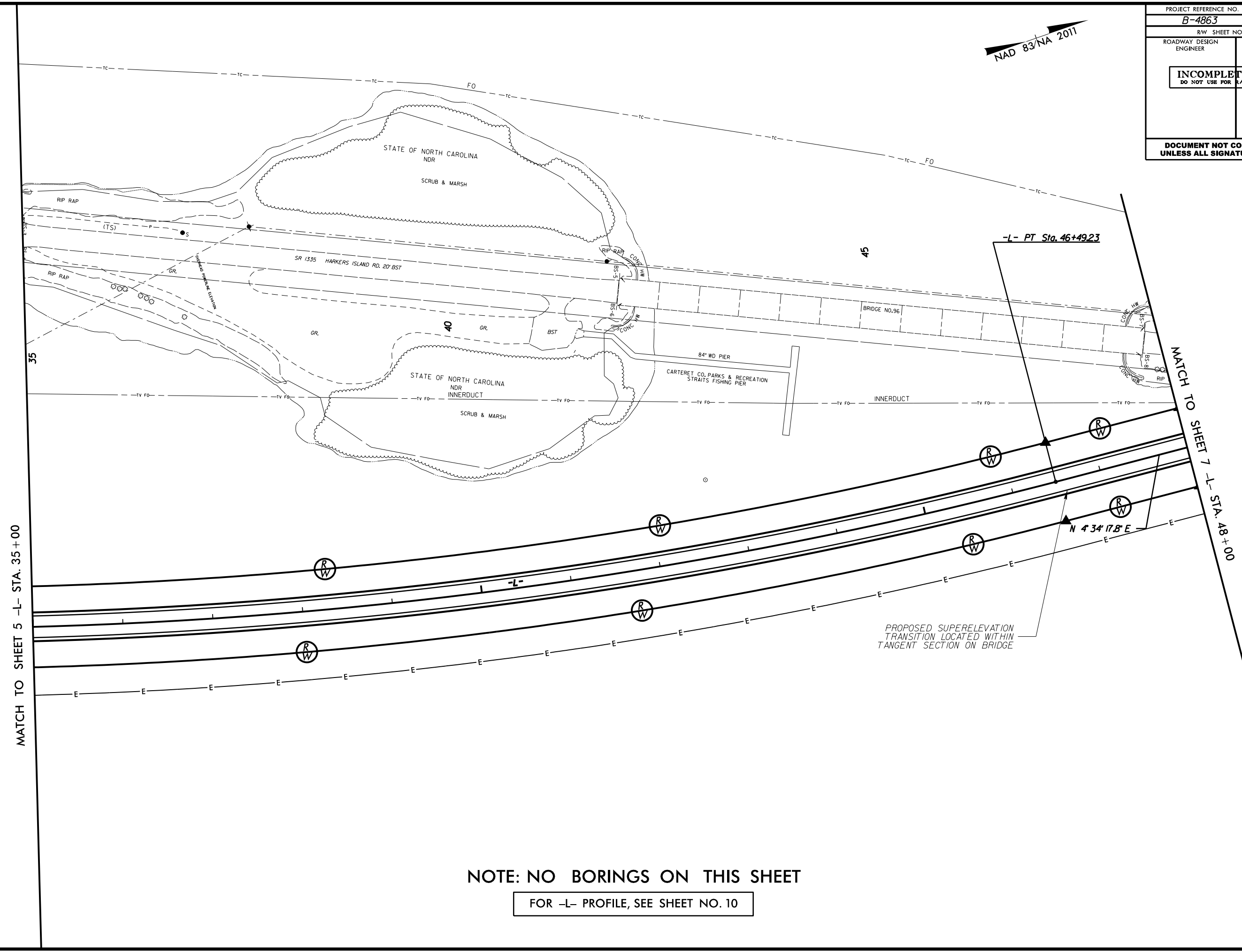
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 FOR -L- PROFILE, SEE SHEET NO. 9

REVISIONS

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PROJECT REFERENCE NO. B-4863	SHEET NO. 6
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

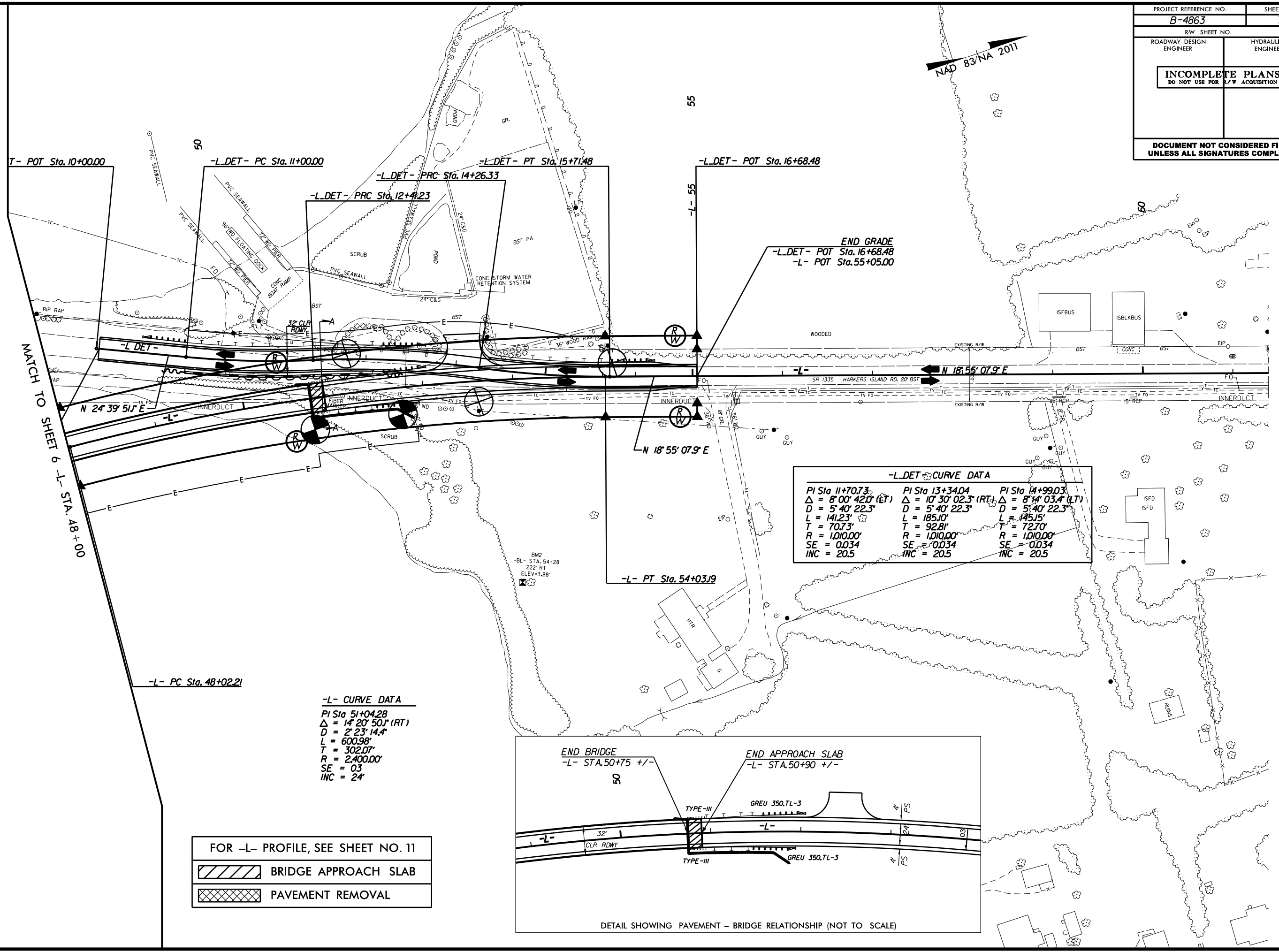
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 8/17/99
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NOTE: NO BORINGS ON THIS SHEET
 FOR -L- PROFILE, SEE SHEET NO. 10

PROJECT REFERENCE NO. B-4863	SHEET NO. 7
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

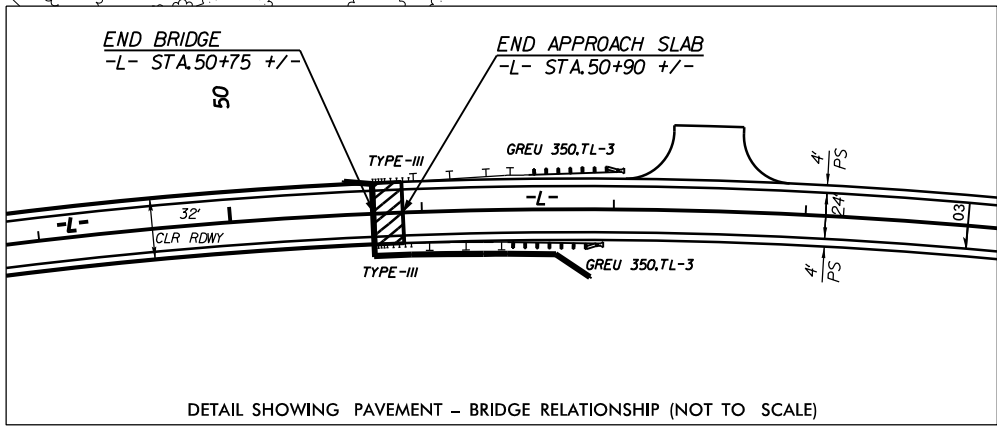


-L- DET CURVE DATA

PI Sta 11+70.73 Δ = 8° 00' 42.0" (RT) D = 5' 40' 22.3" L = 141.23' T = 70.73' R = 1,010.00' SE = 0.034 INC = 20.5	PI Sta 13+34.04 Δ = 10° 30' 02.3" (RT) D = 5' 40' 22.3" L = 185.10' T = 92.81' R = 1,010.00' SE = 0.034 INC = 20.5	PI Sta 14+99.03 Δ = 8° 14' 03.4" (LT) D = 5' 40' 22.3" L = 145.15' T = 72.70' R = 1,010.00' SE = 0.034 INC = 20.5
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-L- CURVE DATA

PI Sta 51+04.28 Δ = 14° 20' 50.1" (RT) D = 2' 23' 14.4" L = 600.98' T = 302.07' R = 2,400.00' SE = 0.3 INC = 24'



FOR -L- PROFILE, SEE SHEET NO. 11	
	BRIDGE APPROACH SLAB
	PAVEMENT REMOVAL

REVISIONS
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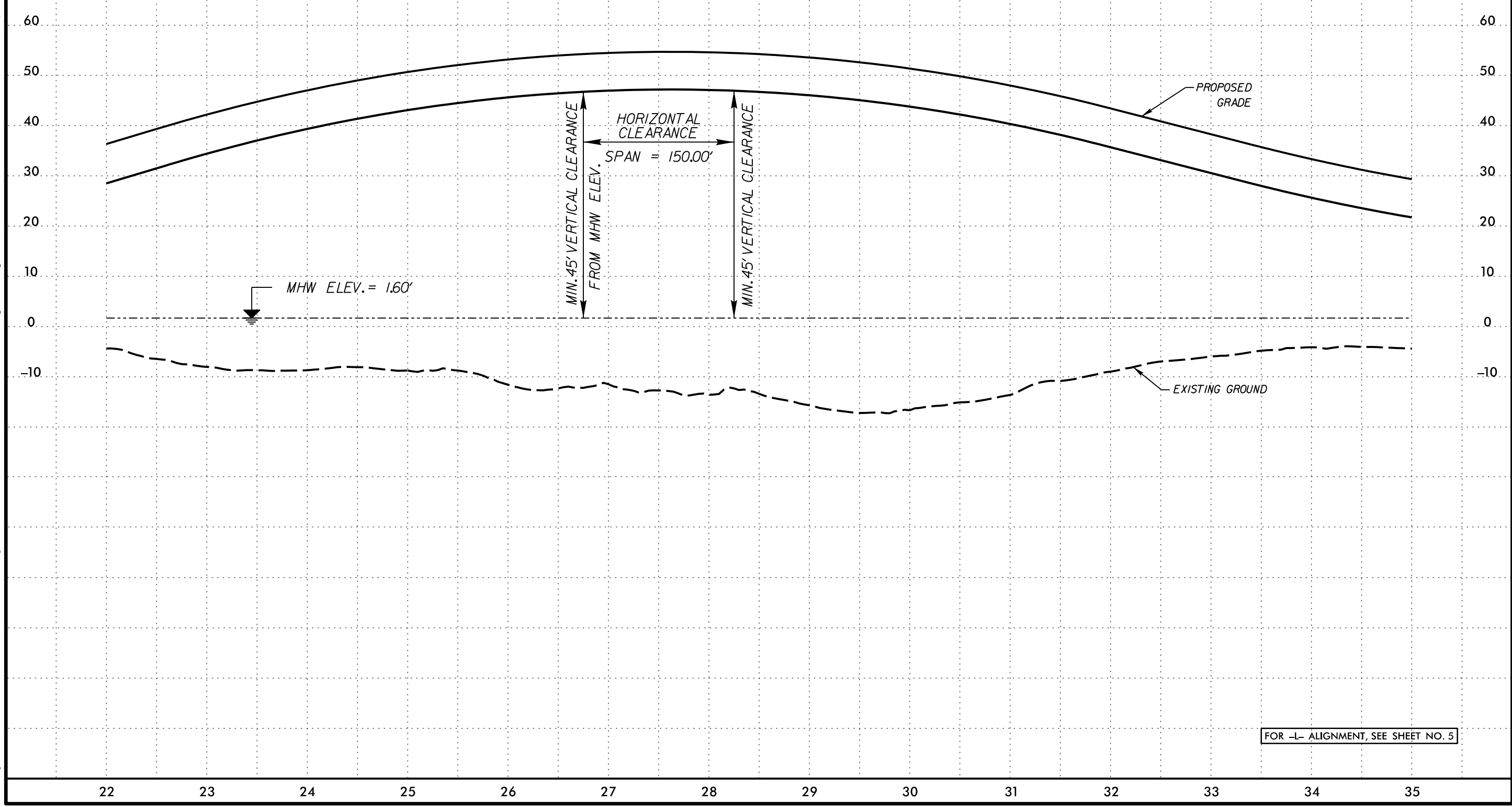
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PROJECT REFERENCE NO. B-4863	SHEET NO. 9
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

-L-

NOTE: NO BORINGS ON THIS SHEET

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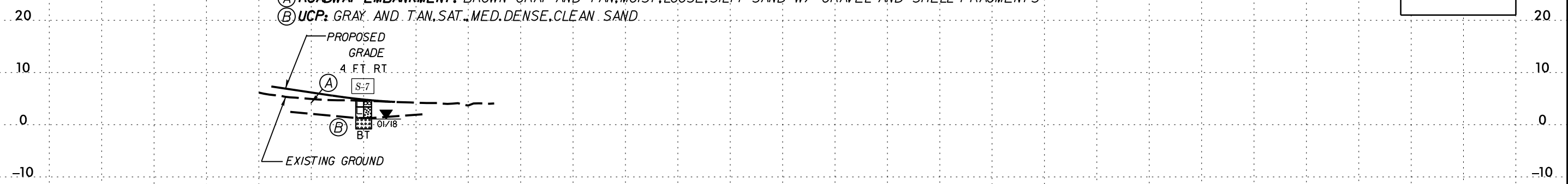
FOR -L- ALIGNMENT, SEE SHEET NO. 5

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 5/14/99

-Y-

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-7	4 FT RT	11+00	1.2'-2.3'	A-2-4	ND	NP	60	33	1	6	100	84	7	8	1.4

- (A) ROADWAY EMBANKMENT: BROWN GRAY AND TAN, MOIST, LOOSE, SILTY SAND W/ GRAVEL AND SHELL FRAGMENTS
- (B) UCP: GRAY AND TAN, SAT., MED. DENSE, CLEAN SAND.



FOR -Y- ALIGNMENT, SEE SHEET NO. 4

10 11 12 13

-DRIVE-

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-3	1 FT RT	11+05	1.3'-2.4'	A-6	33	17	13	43	15	29	100	95	47	20	-

- (A) ROADWAY EMBANKMENT: TAN AND GRAY, DRY, LOOSE, CLEAN SAND W/ GRAVEL AND SHELL FRAGMENTS
- (B) UCP: GRAY, WET TO SAT., MED. DENSE, CLEAN SAND
- (C) UCP: BLACK AND GRAY, WET, SOFT, SANDY CLAY



FOR -DRIVE- ALIGNMENT, SEE SHEET NO. 4

10 11 12 13