

NOTE: SEE SHEET 3 FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

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



STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	C-4901C	1	22
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
		P.E.	
		RW & UTIL.	

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LINE	STATION	PLAN	PROFILE	XSECT
-L-	16+00 - 32+00	7-8	9-11	12-15

ROADWAY
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. C-4901C F.A. PROJ. _____
COUNTY DAVIDSON
PROJECT DESCRIPTION TURNER ROAD (SR 2005) GRADE SEPARATION OVER NORFOLK SOUTHERN RAILROAD "BOWERS TO LAKE"

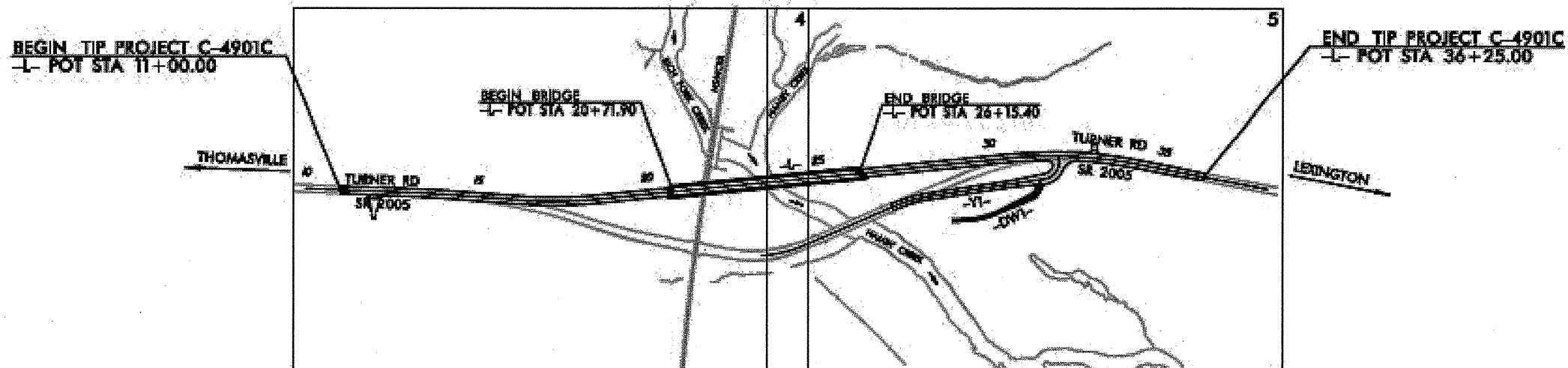
INVENTORY

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) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE 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 (ON-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.

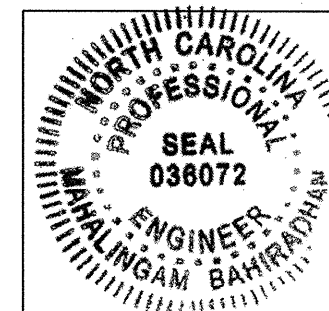
THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT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

CONTRACT: C203142 ID: C-4901C



- PERSONNEL
- C. V. NORVILLE
 - M. BAHIRADHAN
 - J. R. HAMM
 - T. E. EVANS

INVESTIGATED BY T. E. EVANS
CHECKED BY M. BAHIRADHAN
SUBMITTED BY FALCON
DATE APRIL 6, 2012



[Signature]
04/06/2012

DRAWN BY: J. R. HAMM / T. E. EVANS

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - 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.

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 TO BE THE 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 STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:</p> <p align="center"><i>VERY STIFF, GRN, SILTY CLN, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i></p>		<p>WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.</p> <p align="center">ANGULARITY OF GRAINS</p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: <u>ANGULAR</u>, <u>SUBANGULAR</u>, <u>SUBROUNDED</u>, OR <u>ROUNDED</u>.</p>		<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. 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 60 BLOWS PER FOOT 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><u>ALLUVIUM (ALLUV.)</u> - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. <u>AQUIFER</u> - A WATER BEARING FORMATION OR STRATA. <u>ARENACEOUS</u> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. <u>ARGILLACEOUS</u> - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC. <u>ARTESIAN</u> - 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. <u>CALCAREOUS (CALC.)</u> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. <u>COLLUVIUM</u> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. <u>CORE RECOVERY (REC.)</u> - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. <u>DIKE</u> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. <u>DIP</u> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. <u>DIP DIRECTION (DIP AZIMUTH)</u> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. <u>FAULT</u> - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. <u>FISSILE</u> - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. <u>FLOAT</u> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL. <u>FLOOD PLAIN (FP)</u> - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. <u>FORMATION (FM)</u> - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. <u>JOINT</u> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. <u>LEDGE</u> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. <u>LENS</u> - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. <u>MOTTLED (MOT.)</u> - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. <u>PERCHED WATER</u> - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. <u>RESIDUAL (RES.) SOIL</u> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. <u>ROCK QUALITY DESIGNATION (RQD)</u> - 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. <u>SAPROLITE (SAP.)</u> - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. <u>SILL</u> - 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. <u>SLICKENSIDE</u> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. <u>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT)</u> - 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 60 BLOWS PER FOOT. <u>STRATA CORE RECOVERY (SREC.)</u> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. <u>STRATA ROCK QUALITY DESIGNATION (SRQD)</u> - 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. <u>TOPSOIL (TS.)</u> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																																																																																																																																																																														
<p align="center">SOIL LEGEND AND AASHTO CLASSIFICATION</p> <table border="1"> <tr> <th rowspan="2">GENERAL CLASS.</th> <th colspan="7">GRANULAR MATERIALS (<= 35% PASSING #200)</th> <th colspan="7">SILT-CLAY MATERIALS (> 35% PASSING #200)</th> <th colspan="3">ORGANIC MATERIALS</th> </tr> <tr> <th>A-1-a</th> <th>A-1-b</th> <th>A-3</th> <th colspan="2">A-2</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> <th colspan="3"></th> </tr> <tr> <td>GROUP CLASS.</td> <td>A-1-a</td> <td>A-1-b</td> <td>A-3</td> <td>A-2-4</td> <td>A-2-5</td> <td>A-2-6</td> <td>A-2-7</td> <td>A-4</td> <td>A-5</td> <td>A-6</td> <td>A-7</td> <td>A-1, A-2</td> <td>A-3</td> <td>A-4, A-5</td> <td>A-6, A-7</td> <td colspan="3"></td> </tr> <tr> <td>SYMBOL</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td colspan="3"></td> </tr> <tr> <td>% PASSING</td> <td colspan="3">50 MX 30 MX 50 MX 15 MX 25 MX</td> <td colspan="3">51 MN 35 MX 35 MX 10 MX 25 MX</td> <td colspan="2">40 MX 41 MN 10 MX 11 MN 10 MX 11 MN</td> <td colspan="2">36 MN 36 MN 10 MX 10 MX 10 MX 11 MN</td> <td colspan="2">40 MX 41 MN 10 MX 11 MN 10 MX 11 MN</td> <td colspan="2">36 MN 36 MN 10 MX 10 MX 10 MX 11 MN</td> <td colspan="2">40 MX 41 MN 10 MX 11 MN 10 MX 11 MN</td> <td colspan="3"></td> </tr> <tr> <td>LIQUID LIMIT</td> <td colspan="3">6 MX</td> <td colspan="3">NP</td> <td colspan="2">4 MX</td> <td colspan="2">8 MX 12 MX</td> <td colspan="2">16 MX</td> <td colspan="2">No MX</td> <td colspan="3"></td> </tr> <tr> <td>PLASTIC INDEX</td> <td colspan="3">6 MX</td> <td colspan="3">NP</td> <td colspan="2">4 MX</td> <td colspan="2">8 MX 12 MX</td> <td colspan="2">16 MX</td> <td colspan="2">No MX</td> <td colspan="3"></td> </tr> <tr> <td>GROUP INDEX</td> <td colspan="3">0</td> <td colspan="3">0</td> <td colspan="2">4 MX</td> <td colspan="2">8 MX 12 MX</td> <td colspan="2">16 MX</td> <td colspan="2">No MX</td> <td colspan="3"></td> </tr> <tr> <td>USUAL TYPES OF MAJOR MATERIALS</td> <td colspan="2">STONE FRAGS, GRAVEL, AND SAND</td> <td>FINE SAND</td> <td colspan="3">SILTY OR CLAYEY GRAVEL AND SAND</td> <td colspan="2">SILTY SOILS</td> <td colspan="2">CLAYEY SOILS</td> <td colspan="2">GRANULAR SOILS</td> <td colspan="2">SILT-CLAY SOILS</td> <td colspan="3">MUCK, PEAT</td> </tr> <tr> <td>GEN. 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ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.</p>		<p align="center">COMPRESSIBILITY</p> <p>SLIGHTLY COMPRESSIBLE MODERATELY COMPRESSIBLE HIGHLY COMPRESSIBLE</p> <p>LIQUID LIMIT LESS THAN 31 LIQUID LIMIT EQUAL TO 31-50 LIQUID LIMIT GREATER THAN 50</p>		<p align="center">PERCENTAGE OF MATERIAL</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</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>>10%</td> <td>>20%</td> <td>HIGHLY</td> </tr> <tr> <td></td> <td></td> <td></td> <td>35% AND ABOVE</td> </tr> </table>		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				35% AND ABOVE
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STATE OF NORTH CAROLINA
RAIL DIVISION



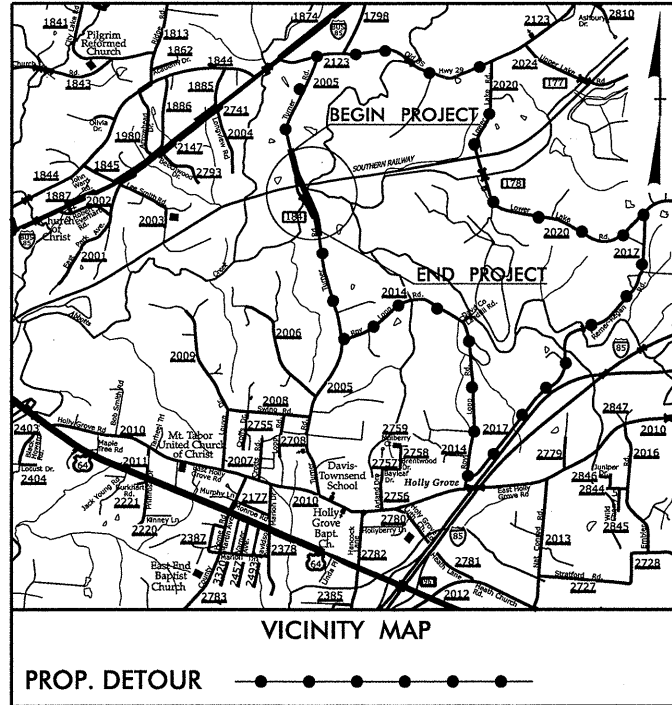
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	C-4901C	3	22
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DAVIDSON COUNTY

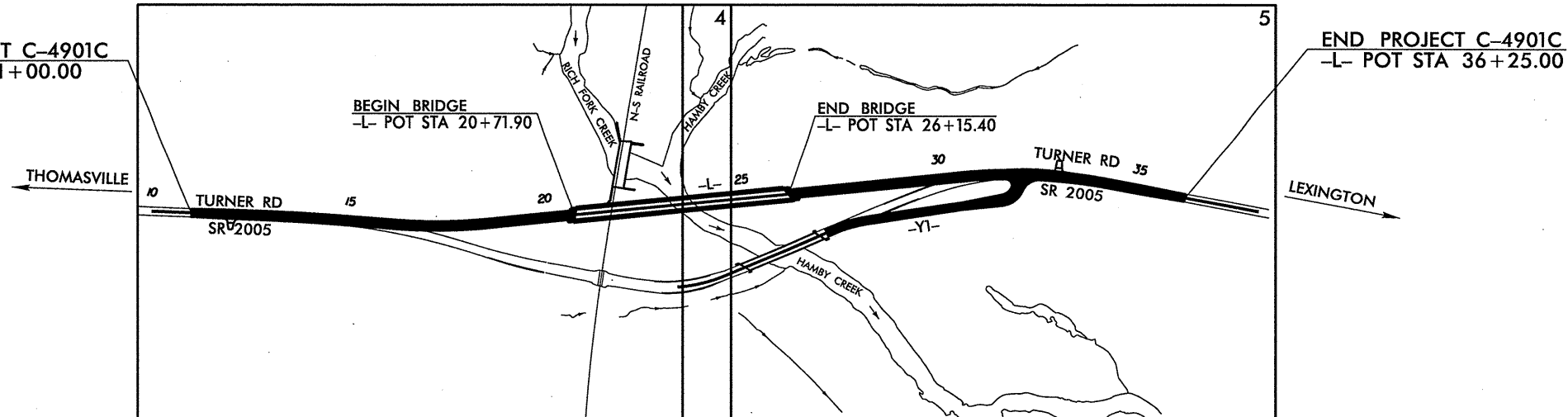
LOCATION: TURNER RD (SR 2005) GRADE SEPARATION OVER
NORFOLK SOUTHERN RAILROAD "BOWERS TO LAKE"

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

TIP PROJECT: C-4901C



BEGIN PROJECT C-4901C
-L- POT STA 11+00.00



END PROJECT C-4901C
-L- POT STA 36+25.00

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III
THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES

SUBMITTAL: STRUCTURE RECOMMENDATIONS
DATE: OCT. 14, 2011

CONTRACT:

<p>GRAPHIC SCALES</p> <p>50 25 0 50 100 PLANS</p> <p>50 25 0 50 100 PROFILE (HORIZONTAL)</p> <p>10 5 0 10 20 PROFILE (VERTICAL)</p>	<p>DESIGN DATA</p> <p>ADT 2013 = 1700 ADT 2033 = 2500 DHV = 9% D = 60% T = 15%* V = 60 MPH * TTST = 2% DUAL 13% FUNC CLASS = LOCAL</p> <p>SUBREGIONAL TIER</p>	<p>PROJECT LENGTH</p> <p>LENGTH ROADWAY STATE PROJECT C-4901C = 0.375 MILES LENGTH STRUCTURES STATE PROJECT C-4901C = 0.103 MILES TOTAL LENGTH STATE PROJECT C-4901C = 0.478 MILES</p> <p>NCDOT CONTACT: SANDRA STEPNEY, PE PROJECT ENGINEER</p>	<p>Prepared in the Office of: AECOM NC FIRM LICENSE No: F-0342 701 Corporate Center Drive, Suite 475 Raleigh, NC 27607 (919) 854-6200 - (919) 854-6259(FAX)</p> <p>FOR THE NORTH CAROLINA DEPT. OF TRANSPORTATION 2012 STANDARD SPECIFICATIONS</p> <p>RIGHT OF WAY DATE: APRIL 13, 2012 LETTING DATE: APRIL 16, 2013</p> <p>LEN HILL, PE PROJECT ENGINEER</p> <p>CLAUDETTE M.K. ROQUE, PE PROJECT DESIGN ENGINEER</p>	<p>HYDRAULICS ENGINEER</p> <p>SIGNATURE: _____ P.E. ROADWAY DESIGN ENGINEER</p> <p>SIGNATURE: _____ P.E.</p>	<p>NC DEPARTMENT OF TRANSPORTATION RAIL DIVISION</p> <p>ENGINEERING AND SAFETY BRANCH CAPITAL YARD 146 MAIL SERVICE CENTER RALEIGH, NC 27699-1466</p>
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\$\$\$\$\$CDGN\$\$\$\$\$
\$\$\$\$\$SERNAME\$\$\$\$\$

Roadway Subsurface Investigation Report

Inventory

Turner Rd (SR 2005) Grade Separation over
Norfolk Southern Railroad "Bowers to Lake"
Davidson County, North Carolina

Prepared for:

AECOM
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607

Submitted by:

Falcon Engineering, Inc.
1210 Trinity Road, Suite 110
Raleigh, North Carolina 27607
(919) 871-0800
www.falconengineers.com

Falcon Project Number | G11019.00

April 6, 2012

PREFACE

This roadway subsurface investigation was conducted between January 19, 2012 and March 9, 2012 in general accordance with our proposal number F2011-051, dated March 25, 2011. The recommendations rendered in this report are based solely on our site reconnaissance, performance of soil test borings, laboratory test results, engineering evaluation of the data gathered, and generally accepted soil and foundation engineering practices and principles.

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.

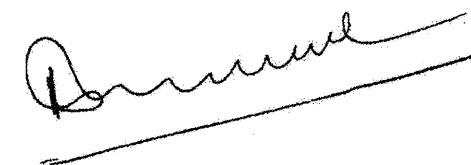
FALCON ENGINEERING, INC.

Report Prepared By:

Report Reviewed By:



Jeremy Hamm, EI
Geotechnical Designer



Mahalingam Bahiradhan, PE
Senior Geotechnical Project Manager



WBS: 49010.1.STR07T1B
TIP: C-4901C
COUNTY: Davidson
DESCRIPTION: Turner Rd (SR 2005) Grade Separation over Norfolk Southern Railroad "Bowers to Lake"
SUBJECT: Roadway Subsurface Investigation – Inventory

PROJECT DESCRIPTION

The project site is located adjacent the existing at-grade crossing between Turner Road (SR 2005) and Norfolk Southern Railroad (NSR) near Lexington, North Carolina. The project involves the realignment of Turner Road to the east and a new bridge structure crossing both Hamby Creek and NSR with six (6) spans. The new tracks will be constructed south of the existing tracks, along with a proposed parallel siding. The existing bridge structure and southern approach will remain in place to provide access to a private property west of Turner Road. The northern approach will be modified, and the existing at-grade crossing will be removed up to the northern intersection with the realigned roadway.

A total of six (6) Standard Penetration Test (SPT) borings were drilled for the new roadway alignment. Additional borings were drilled for the bridge structure and are included in the separate Structure Subsurface Investigation Report. The end bent borings have been utilized in this report since they provide additional pertinent subsurface information relating to approach embankments. All borings were drilled using a CME-55 all-terrain-vehicle (ATV) mounted drill rig, or a CME-850, rubber-tracked vehicle mounted drill rig equipped with 2 ¼-inch inside diameter hollow-stem augers and an automatic hammer. Representative soil samples, collected with a split-barrel sampler, were selected for laboratory testing to verify visual field classifications.

The following alignment, totaling approximately 1,600 feet (.30 miles) was investigated. Subsurface profiles and cross sections of these alignments are included in this report.

<u>Line</u>	<u>Station</u>
Turner Road (-L-)	16+00 – 32+00

AREAS OF SPECIAL GEOTECHNICAL INTEREST

The following areas contained topsoil and/or rootmat exceeding four (4) inches in thickness:

<u>Station</u>	<u>Offset</u>
-L- 19+79	87 ft LT
-L- 20+68	17 ft RT
-L- 20+77	17 ft LT
-L- 27+87	35 ft LT

Large rootballs and thick rootmat exceeding four inches should be expected in other areas throughout the site, particularly areas which are wooded or were minimally disturbed during previous clearing/grading operations. Additionally, stripping and grubbing within the existing floodplain may expose buried organic materials which will need to be removed prior to placement of fills.

The following areas contained soft/loose soils near the ground surface which may not adequately support construction equipment:

<u>Station</u>	<u>Offset</u>
-L- 25+75	15 ft RT
-L- 27+87	35 ft LT

The following areas contained wet soils near the ground surface which may not adequately support construction equipment:

<u>Station</u>	<u>Offset</u>
-L- 20+68	17 ft LT
-L- 25+84	30 ft LT
-L- 19+61	42 ft RT

The following areas contained clayey/silty soils with medium to high plasticity (A-7) near the ground surface. These soils degrade rapidly when exposed to water and may not adequately support construction equipment or fill placement.

<u>Station</u>	<u>Offset</u>
-L- 20+68	17 ft LT
-L- 19+61	42 ft RT



Shallow groundwater (less than 6 feet from existing grades) was encountered at the following locations:

<u>Station</u>	<u>Offset</u>
-L- 25+84	30 ft LT

The new embankments will cross existing water and natural gas easements. Considerations concerning potential damage to the pipes as a result of settlement of the surrounding soils are contained within the Structure Subsurface Investigation Report submitted separately.

PHYSIOGRAPHY AND GEOLOGY

According to the **Geologic Map of North Carolina** (1985), the proposed site is located within the Charlotte Belt region of the western piedmont of North Carolina. Specifically, bedrock at the site is noted to consist of metamorphosed granitic rock (**CZg**), consisting of megacrystic, well foliated rocks which locally contain hornblende.

Topographically, the site contains rolling natural hills representative of the western piedmont. Steep embankments are also present, associated with the existing bridge over Hamby Creek, existing railroad embankment, and the previous roadway embankment south of Hamby Creek. Total elevation change between the Hamby Creek floodplain and surrounding hills approaches 100 feet.

North of NSR, the end bent 1 approach is located partially within a wooded area. An existing overhead power and natural gas easement runs parallel to existing Turner Road and traverses the proposed alignment. The extremities of a previously clear-cut field lie just left of centerline in this area. This area slopes downward away from the alignment and a significant amount of fill will be placed within it. The fill slopes will come within approximately 27 feet of the NSR centerline near the western end of an existing concrete arch railroad bridge.

South of Hamby Creek, new roadway embankments will be constructed predominantly within a naturally rolling cattle field with a previously constructed, grass covered roadway embankment following roughly parallel to the existing Turner Road. This embankment approaches heights of 15 feet. New fills will be placed partially on top of this existing embankment. Underground water and natural gas lines appear to be installed along and/or within this embankment. The northeastern extremity of these fills will be placed within a small wooded area. Two small rock outcrops are located left of centerline, at approximately station 27+00, 135 and 170 feet left. Fills will not be placed within these areas. Surface drainage in the area is provided predominantly by naturally sloping ground and ditches along the existing roadway and railroad.

SOIL PROPERTIES

In general, the subsurface soil conditions encountered across the site were relatively consistent; residual soils underlain by and interlayered with weathered metamorphosed granitic rock. South of Hamby Creek, alluvial soils were encountered overlying residual soils and/or weathered rock. Roadway embankment soils were encountered near ground surface on both sides of the project.

Roadway Embankment soils were encountered in all end bent 2 borings, as well as borings R-2 and R-4, and consisted of medium stiff to hard silts and clays (A-4, A-7-5) and very loose to medium dense silty sand (A-2-4) with gravel and sparse trace organics.

Alluvial soils were encountered in end bent 2 borings only, consisting of loose to medium dense sands with gravel (A-1-b, A-2-4) and soft to stiff, fine sandy silt (A-4).

Residual soils were encountered in most borings near the surface or beneath roadway embankment and alluvial soils, consisting of medium stiff to very hard, clays and silts (A-4, A-7), and medium dense to very dense, silty (A-2-4), with rock fragments, weathered rock layers, and varying amounts of mica. Some residual soils were noted to be saprolitic.

Weathered rock was encountered in most of the borings underlying residual soils or immediately beneath alluvial soils, and extending to boring termination or auger refusal depths. Weathered rock materials consist of metamorphosed granitic rock. Auger refusal, indicating the potential presence of crystalline rock, was encountered in some borings at elevations ranging from approximately 620 to 669 feet, NAVD.

Near surface soils north of Hamby Creek consist of predominantly fine-grained residual soils. South of Hamby Creek, these materials transition to sandy and silty alluvial soils upstation of end bent 2. Existing railway and roadway embankment soils are known to exist nearby within the project site, although they were not investigated within the scope of this report.

GROUNDWATER PROPERTIES

Groundwater levels were measured at the time of boring completion, and in most cases after at least 24 hours. Groundwater was encountered in boring R-3 and in most of the end bent borings, at elevations between 641 and 648 feet, NAVD. Specific groundwater information for each boring can be found in the boring logs in this report.

In general, the site topography allows for reasonable surface drainage, however, depressed areas within the floodplain of Hamby Creek drain poorly and appear to hold water for a significant portion of the year.



EARTHWORK BALANCE SHEET

Volumes in Cubic Yards

PROJECT: C-4901C

COUNTY: DAVIDSON

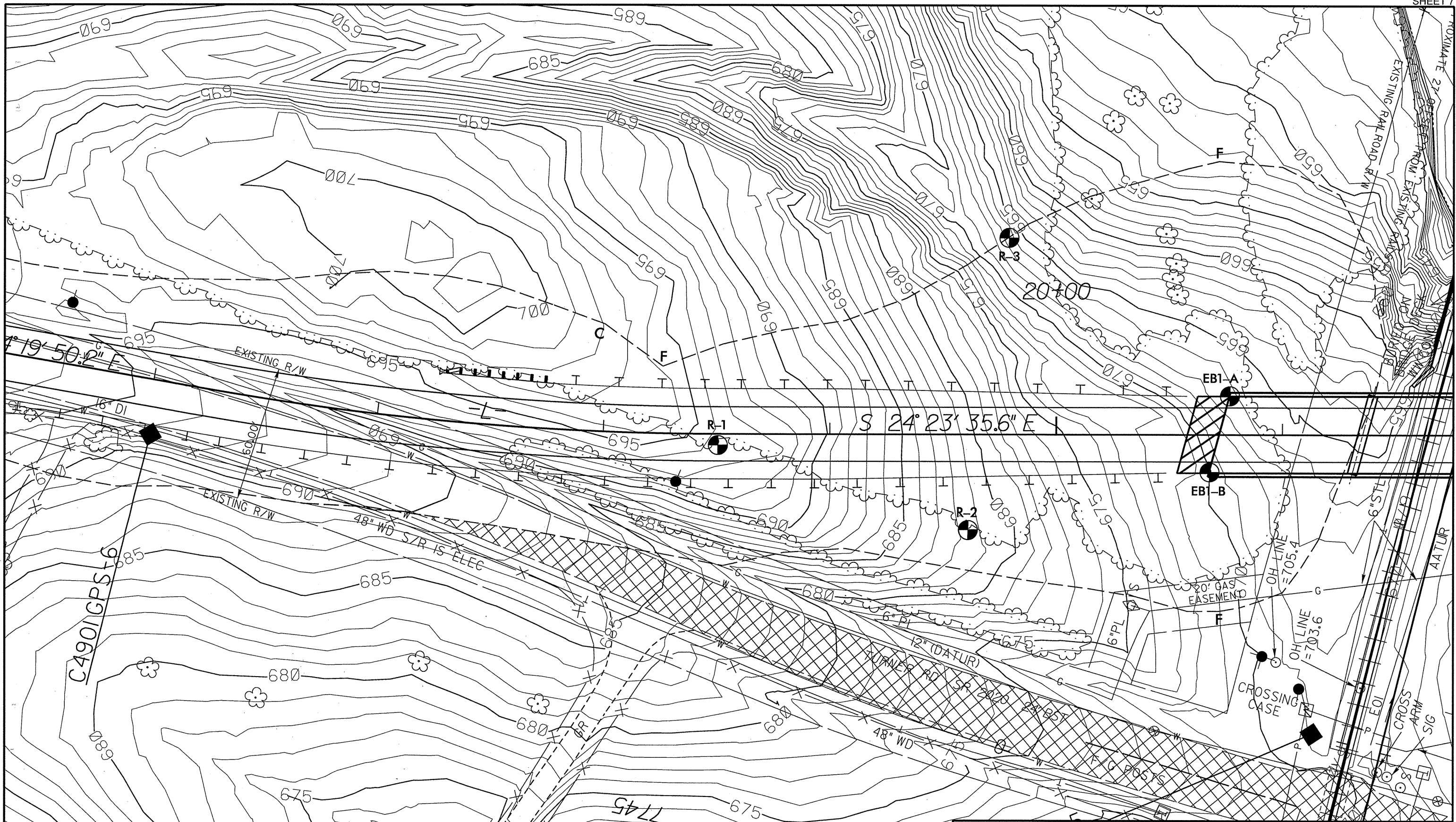
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COMP BY: CMKR

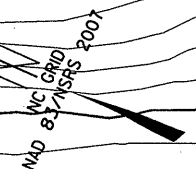
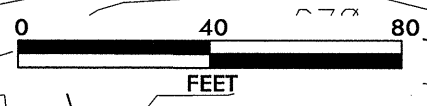
AECOM

SHEET: 6A

LINE	STATION	TO	STATION	EXCAVATION					EMBANKMENT				BORROW	WASTE			
				TOTAL UNCLASSIFIED EXCAVATION	ROCK EXCAVATION	UNDERCUT EXCAVATION	UNSUITABLE UNCLASSIFIED	SUITABLE UNCLASSIFIED	TOTAL EMBANKMENT	ROCK EMBANKMENT (25%)	EARTH EMBANKMENT	EMBANKMENT +20%		ROCK	SUITABLE WASTE	UNSUITABLE WASTE	TOTAL WASTE
L	11+00.00	TO	21+50.00	1681				1681	23392	0	23392	28070	26389	0	0	0	0
SUBTOTAL				1681	0	0	0	1681	23392	0	23392	28070	26389	0	0	0	0
L	25+15.00	TO	36+25.00	457				457	45721	0	45721	54865	54408	0	0	0	0
Y1	27+00.00	TO	31+75.00	62				62	11181	0	11181	13417	13355	0	0	0	0
DW1	28+73.04	TO	31+02.31	3				3	3565	0	3565	4278	4275	0	0	0	0
(Based on -L- Stationing)																	
SUBTOTAL				522	0	0	0	522	60467	0	60467	72560	72038	0	0	0	0
TOTAL				2203	0	0	0	2203	83859	0	83859	100630	98427	0	0	0	0
ADJUSTMENTS DUE TO																	
Est. Loss Due To Clearing And Grubbing				0				0					0				
Shoulder Material									0		0	0	0				
Rock Waste To Replace Borrow																	
Adjust For Rock Swell That Replaces Borrow																	
Eliminate Shrinkage For Mat'l That Is Now Rock																	
Earth Waste to Replace Borrow													0	0	0	0	0
PROJECT TOTAL				2203	0	0	0	2203	83859	0	83859	100630	98427	0	0	0	0
Est. 5% to Replace Topsoil in Borrow Pits													4921				
GRAND TOTAL				2203									103348				
SAY				2300									103500				
Est. Drainage Ditch Excav.						45	CY										
Select Granular Material						500	CY										
Estimate Undercut						2800	CY										



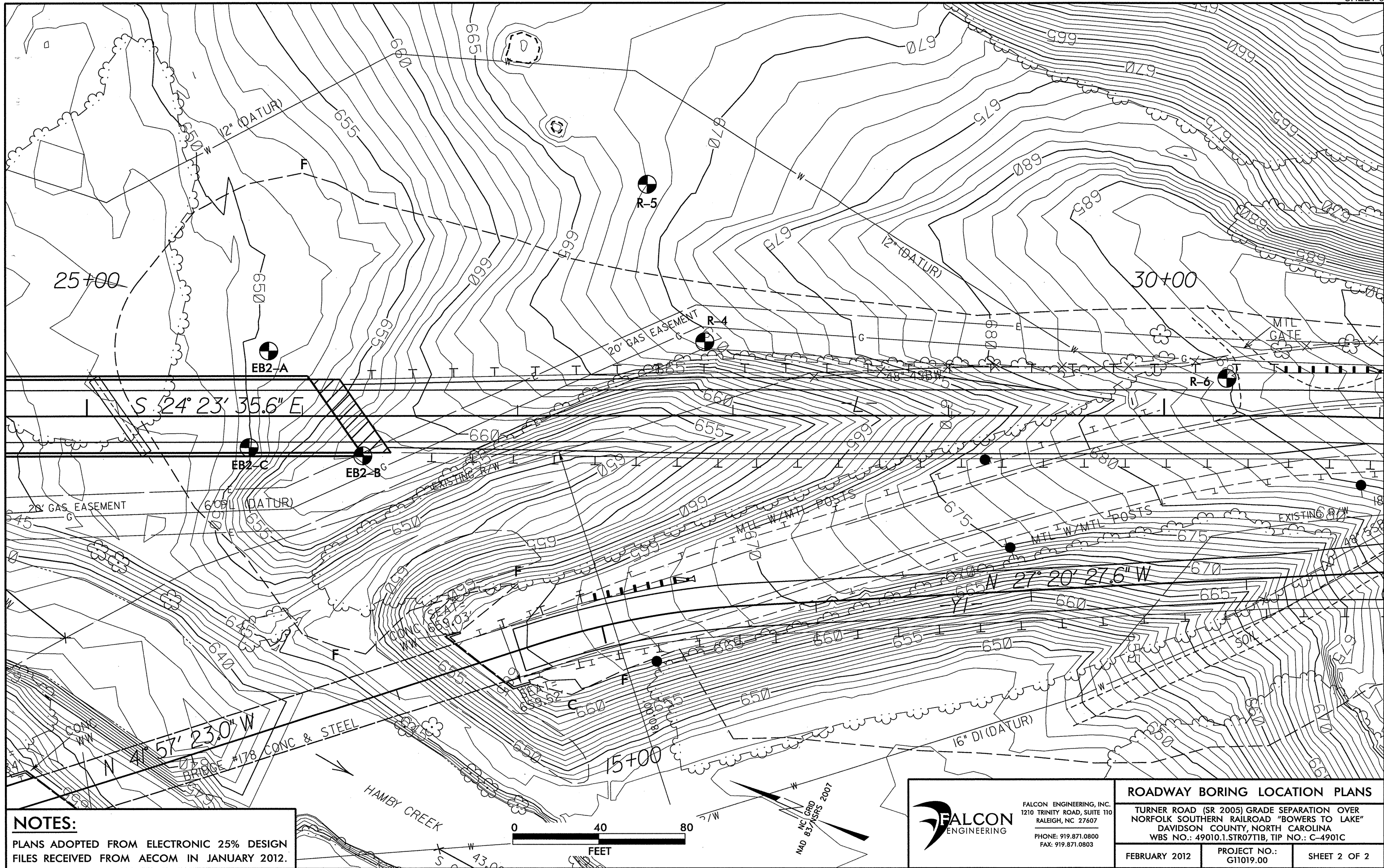
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 PLANS ADOPTED FROM ELECTRONIC 25% DESIGN FILES RECEIVED FROM AECOM IN JANUARY 2012.



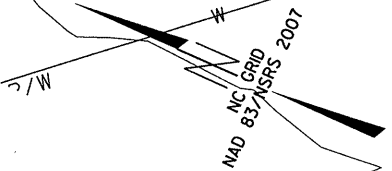
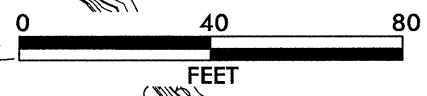
FALCON ENGINEERING
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 PHONE: 919.871.0800
 FAX: 919.871.0803

ROADWAY BORING LOCATION PLANS
 TURNER ROAD (SR 2005) GRADE SEPARATION OVER NORFOLK SOUTHERN RAILROAD "BOWERS TO LAKE"
 DAVIDSON COUNTY, NORTH CAROLINA
 WBS NO.: 49010.1.STR07TIB, TIP NO.: C-4901C

FEBRUARY 2012	PROJECT NO.: G11019.00	SHEET 1 OF 2
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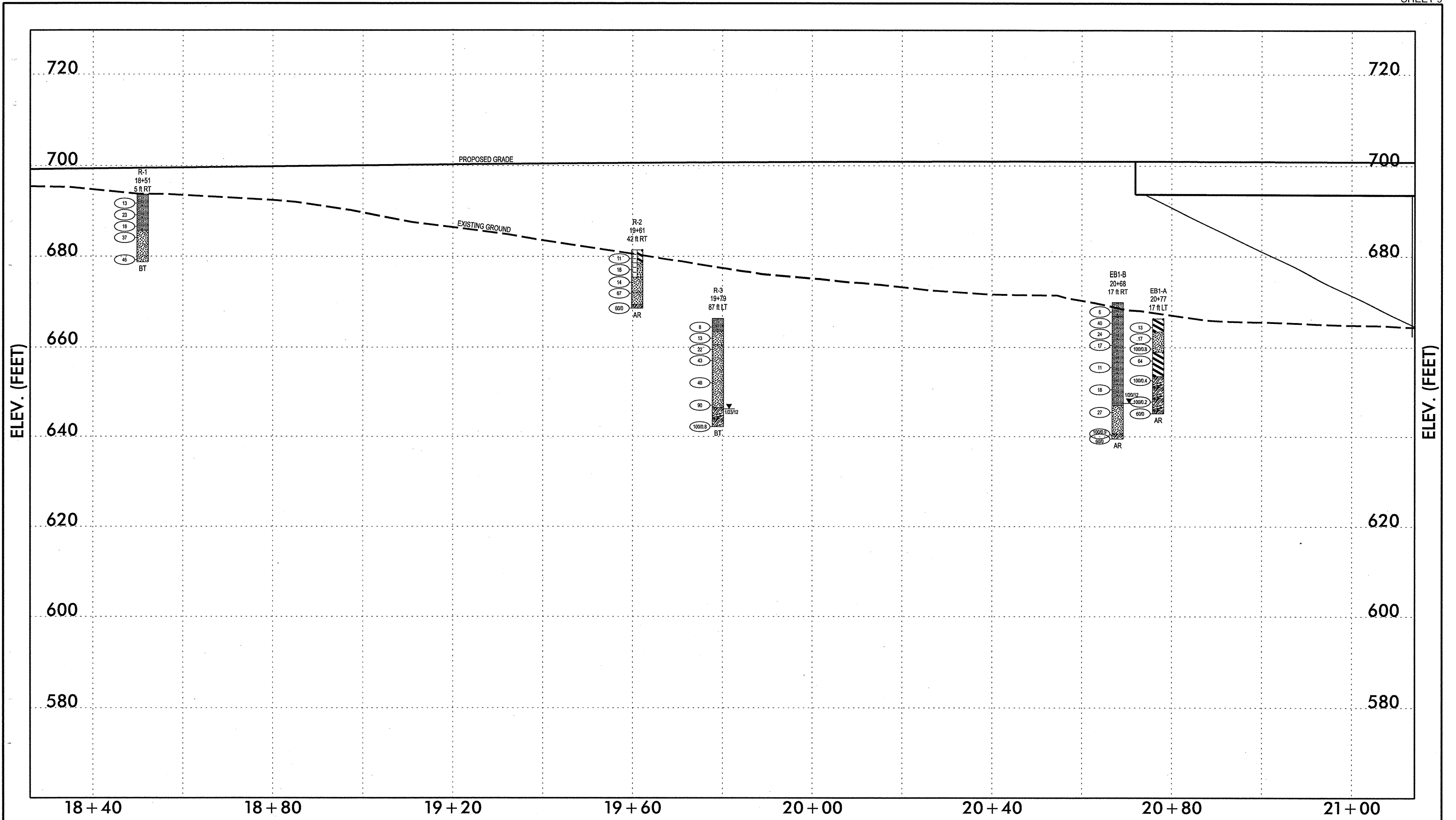


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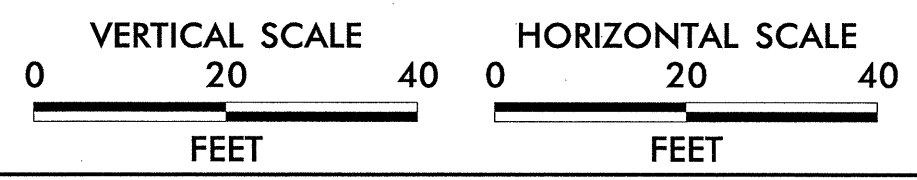
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FEBRUARY 2012	PROJECT NO.: G11019.00	SHEET 2 OF 2



NOTES:

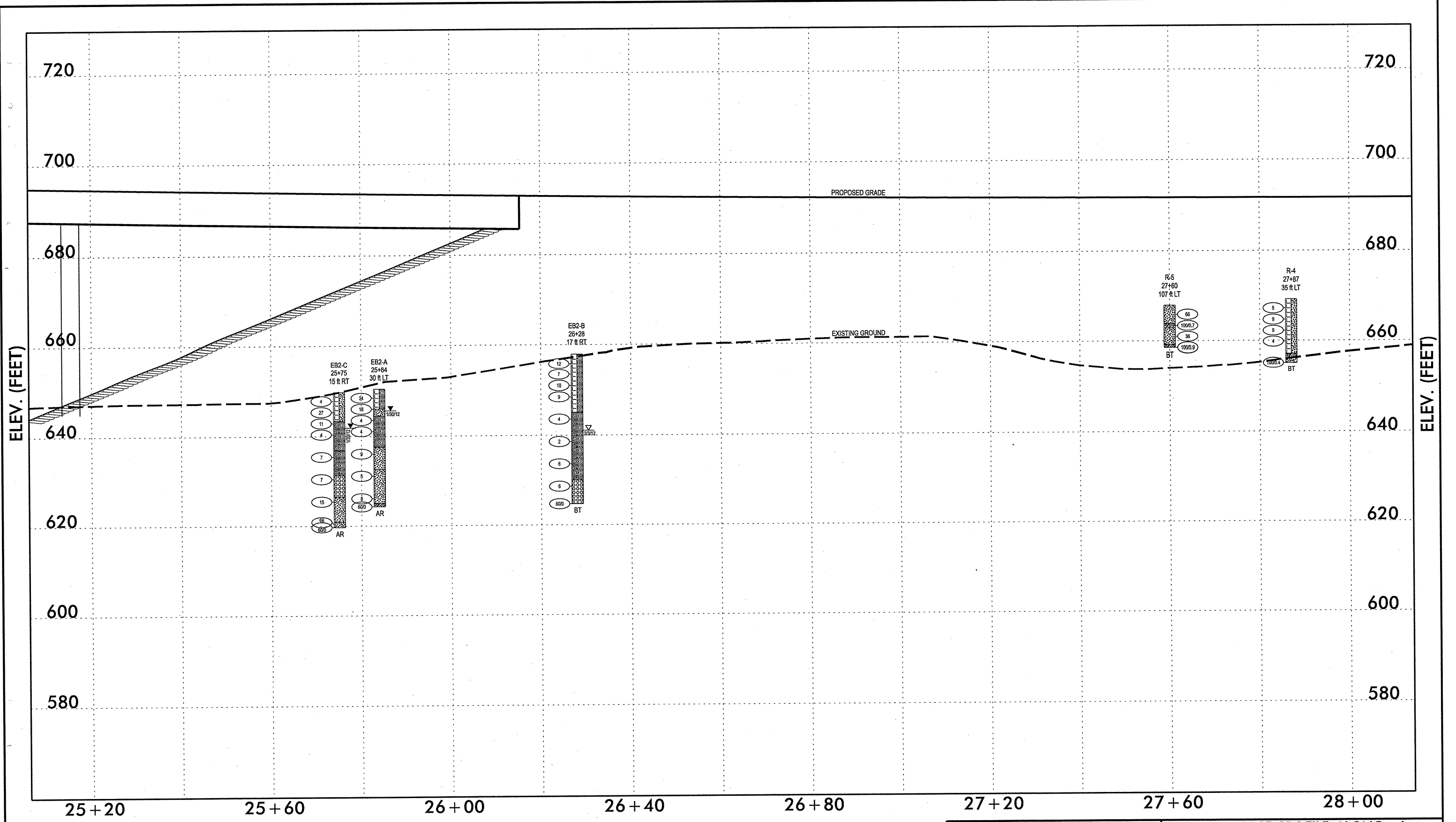
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- BRIDGE SKEW: VARIES



FALCON ENGINEERING

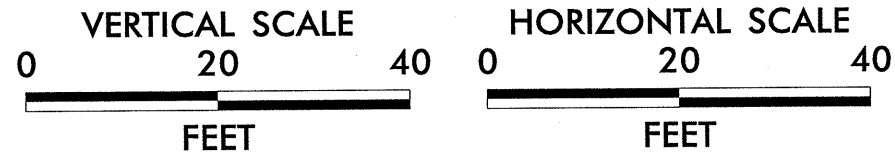
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PHONE: 919.871.0800
FAX: 919.871.0803

SUBSURFACE PROFILE ALONG -L-		
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MARCH 2012	PROJECT NO.: G11019.00	SHEET 1 OF 3

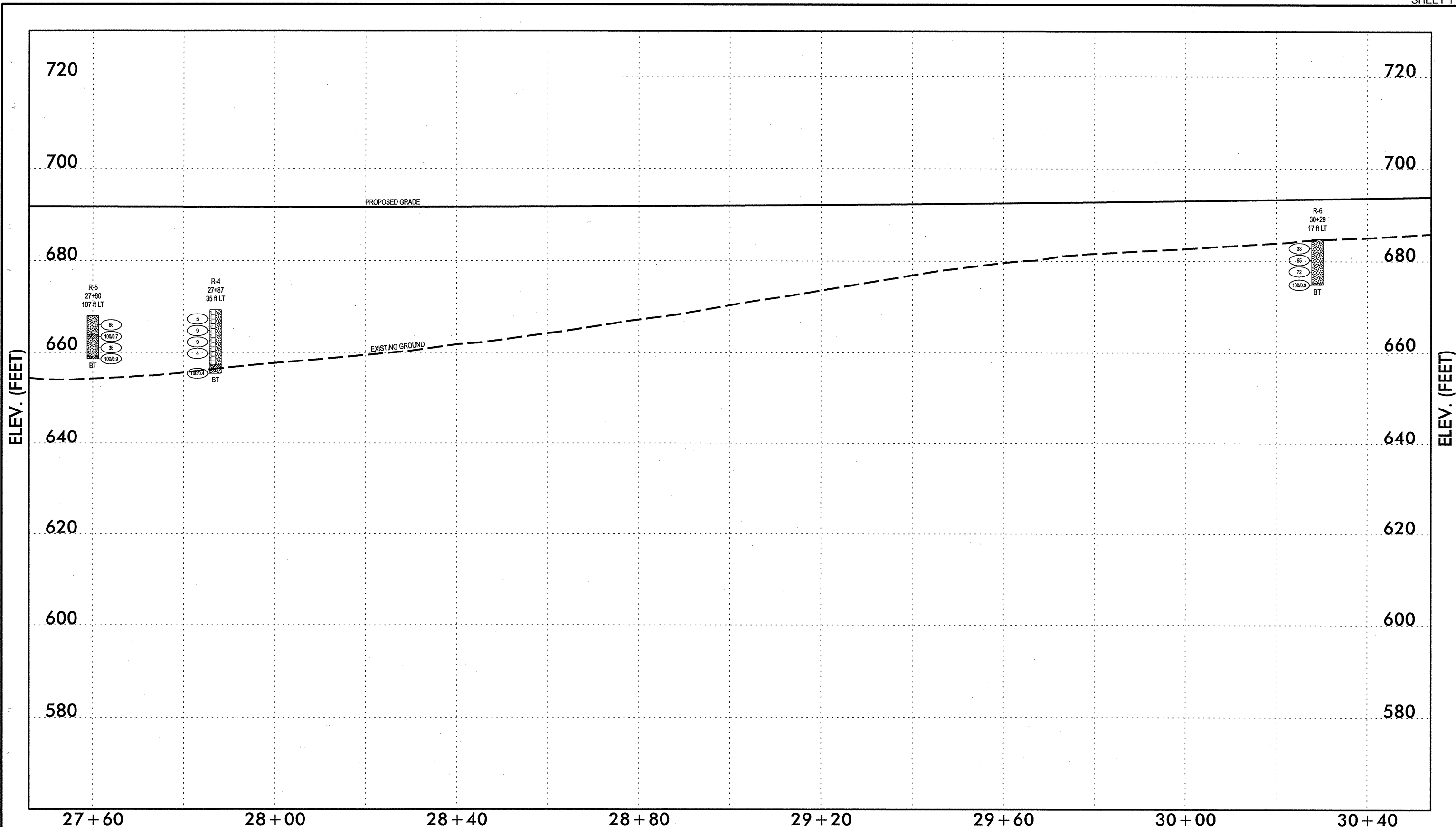


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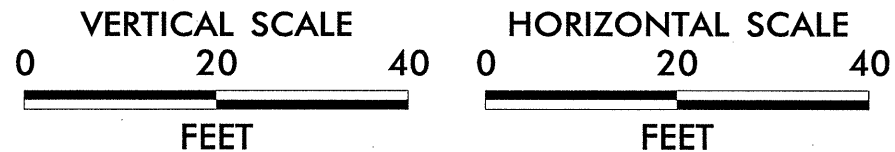


<p>FALCON ENGINEERING, INC. 1210 TRINITY ROAD, SUITE 110 RALEIGH, NC 27607 PHONE: 919.871.0800 FAX: 919.871.0803</p>	SUBSURFACE PROFILE ALONG -L-	
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	MARCH 2012	PROJECT NO.: G11019.00



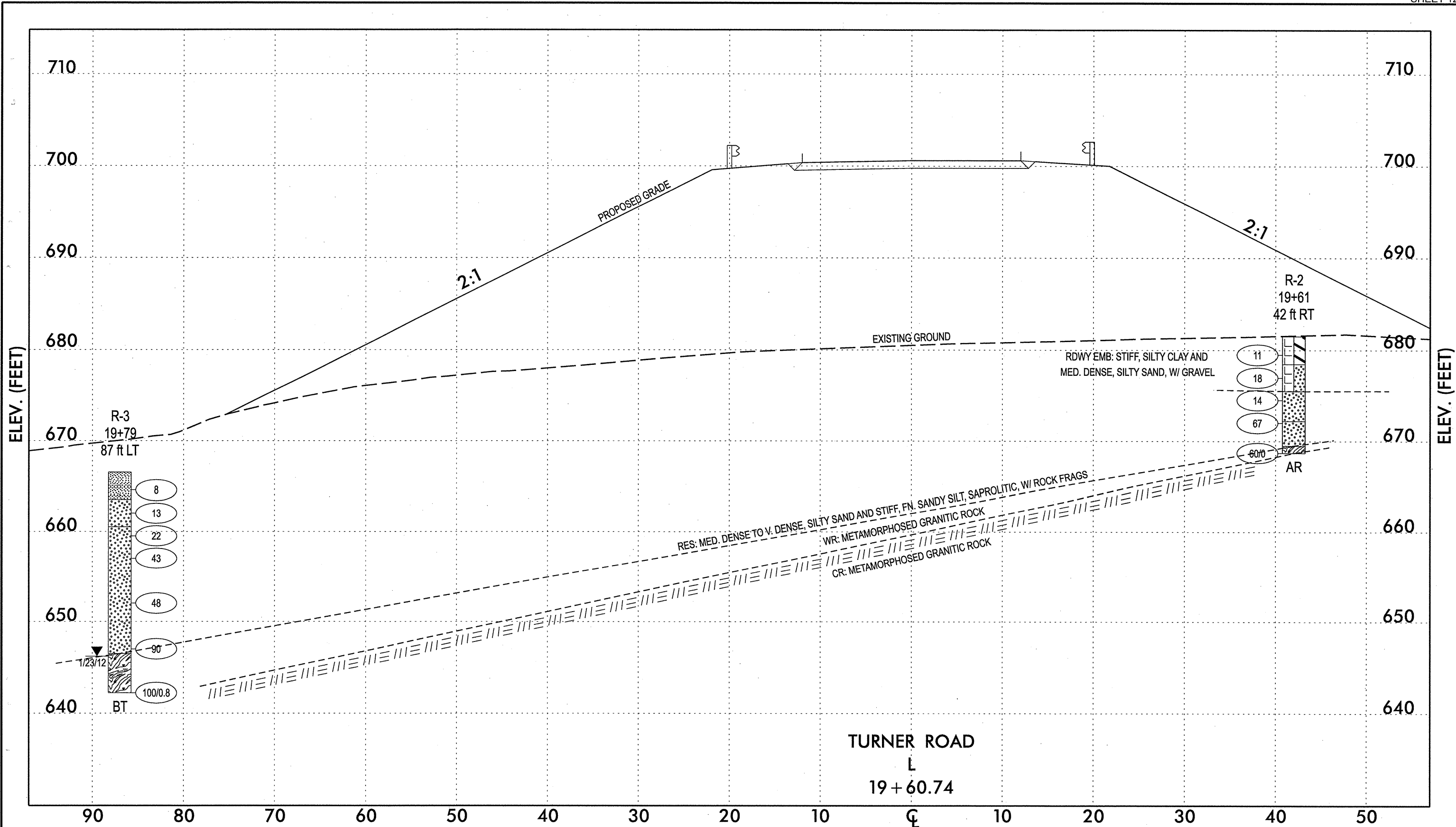
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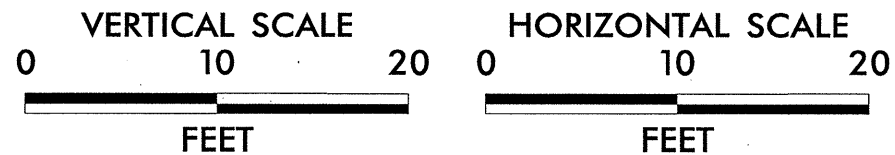


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MARCH 2012	PROJECT NO.: G11019.00	SHEET 3 OF 3

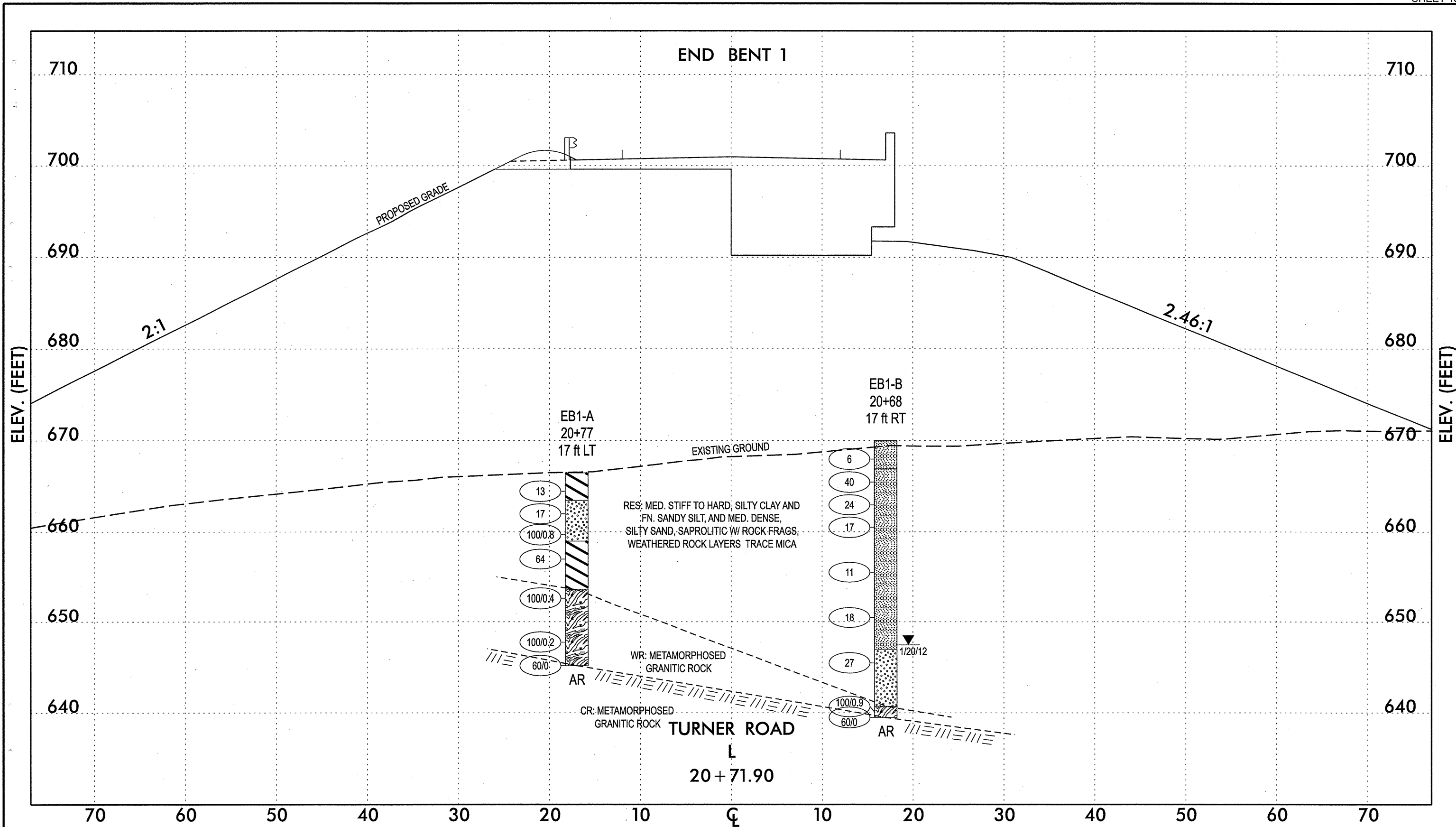


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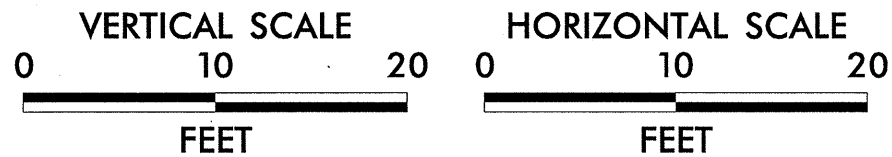


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SUBSURFACE CROSS SECTIONS		
TURNER RD (SR 2005) GRADE SEPARATION OVER NORFOLK SOUTHERN RAILROAD "BOWERS TO LAKE" DAVIDSON COUNTY, NORTH CAROLINA WBS NO.: 49010.1.STR07TIB, TIP NO.: C-4901C		
MARCH 2012	PROJECT NO.: G11019.00	SHEET 1 OF 4

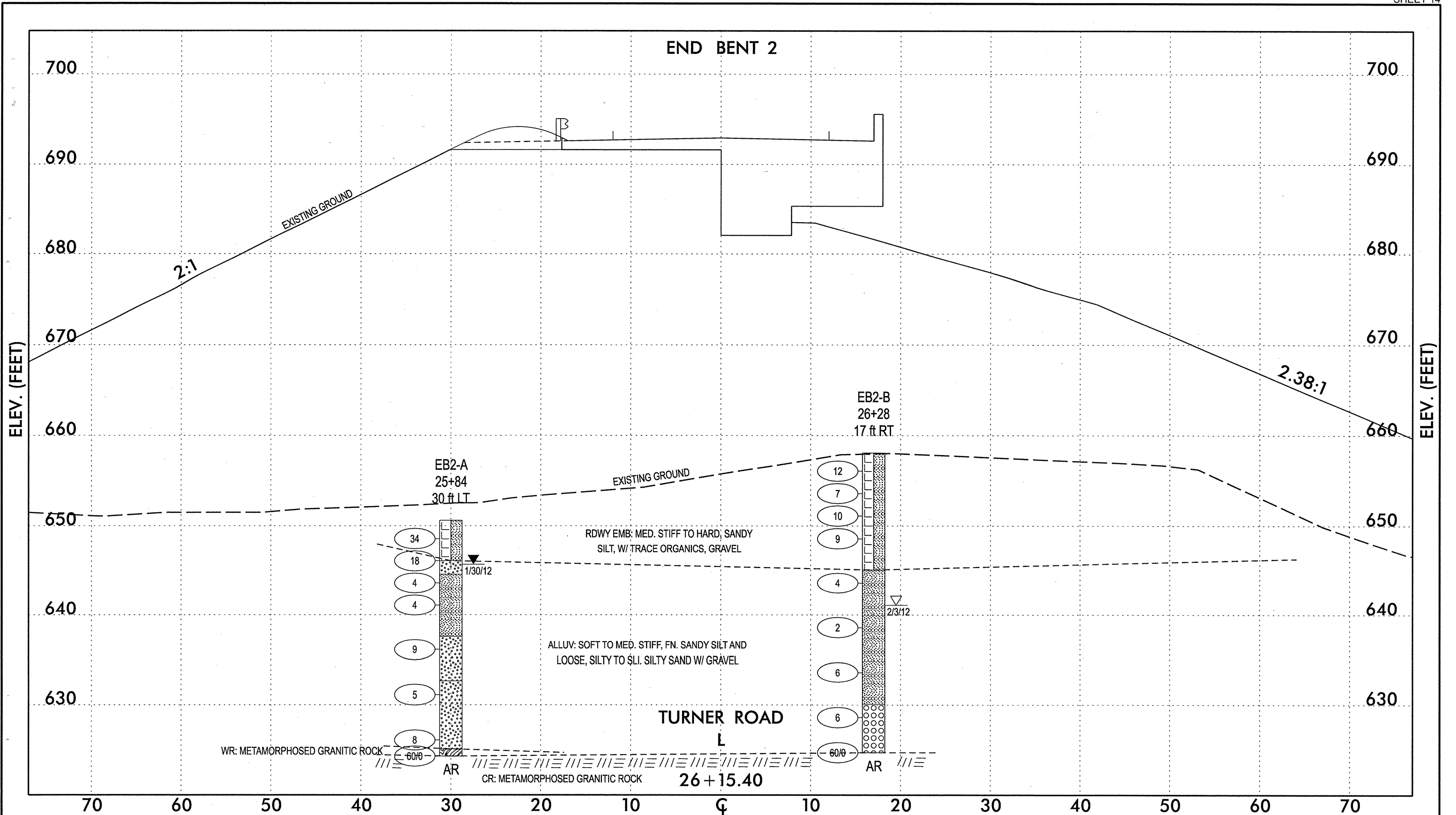


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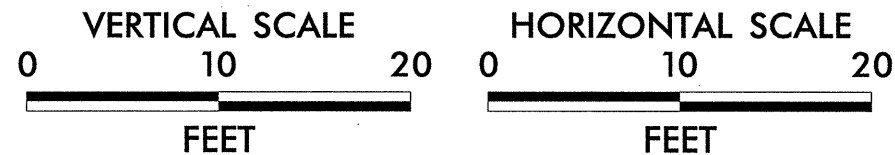


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MARCH 2012	PROJECT NO.: G11019.00	SHEET 2 OF 4

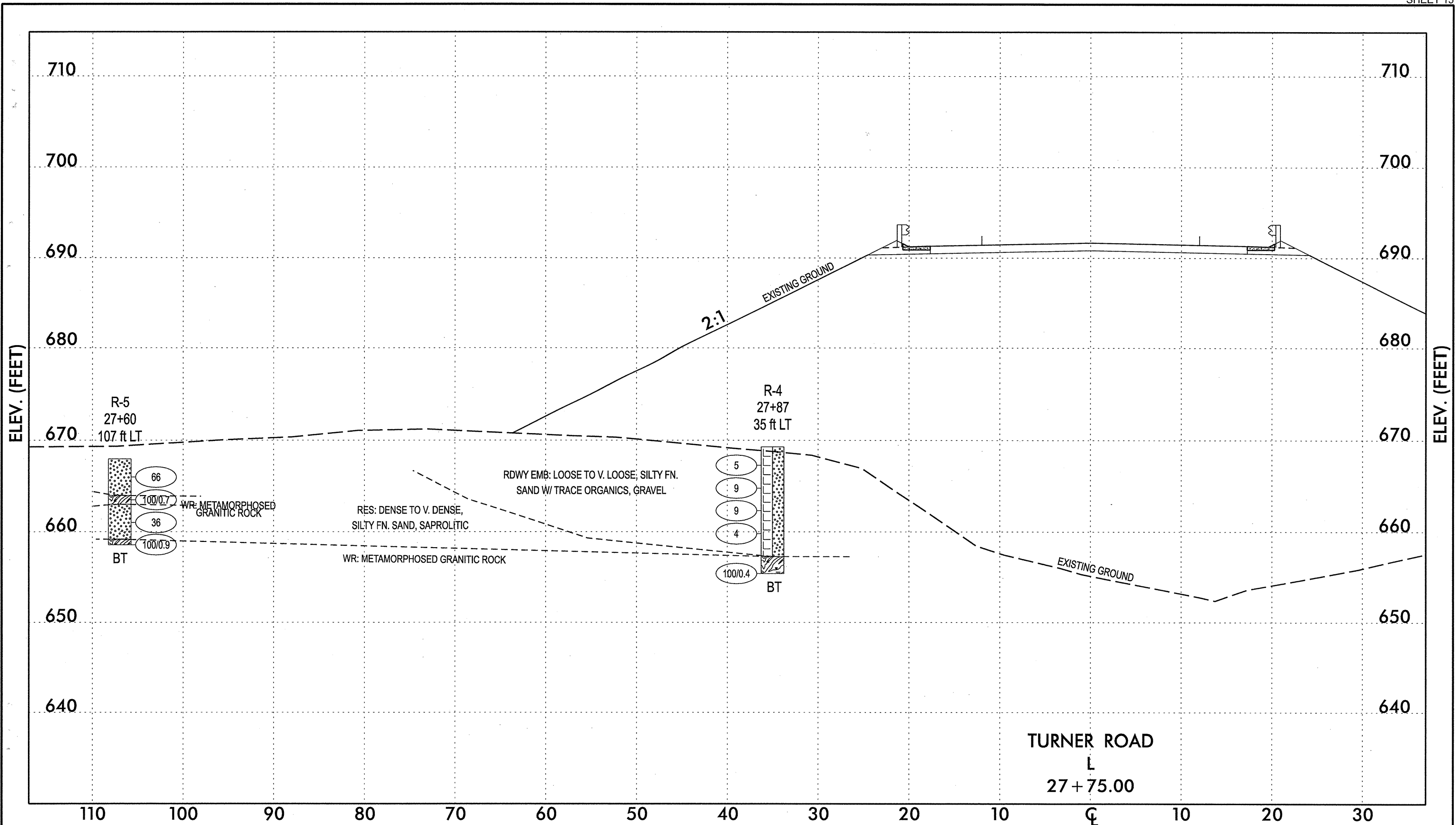


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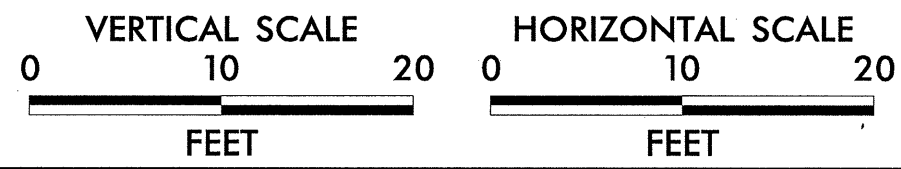
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MARCH 2012	PROJECT NO.: G11019.00	SHEET 3 OF 4



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MARCH 2012	PROJECT NO.: G11019.00	SHEET 4 OF 4



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 49010.1.STR07T1B		TIP C-4901C		COUNTY DAVIDSON		GEOLOGIST T. EVANS											
SITE DESCRIPTION TURNER RD GRADE SEPARATION OVER NORFOLK SOUTHERN RAILROAD "BOWERS TO LAKE"							GROUND WTR (ft)										
BORING NO. R-1		STATION 18+51		OFFSET 5 ft RT		ALIGNMENT -L-											
COLLAR ELEV. 693.7 ft		TOTAL DEPTH 15.0 ft		NORTHING 764,369		EASTING 1,646,228											
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic													
DRILLER R. TOOTHMAN		START DATE 01/20/12		COMP. DATE 01/20/12		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG	SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
695																	
	692.7	1.0	4	6	7										693.7	0.0	GROUND SURFACE
690	690.2	3.5	6	10	13							SS-13	14%				RESIDUAL WHITE AND TAN, V. STIFF, FN. SANDY SILT (A-4) W/ ROCK FRAGS AND CLAY LAYERS, SAPROLITIC
	687.7	6.0	7	7	11												
685	685.2	8.5	12	18	19										685.7	8.0	WHITE AND TAN, DENSE, SILTY FN. SAND (A-2-4) W/ ROCK FRAGS, SAPROLITIC
	680.2	13.5	18	24	22										678.7	15.0	Boring Terminated at Elevation 678.7 ft

WBS 49010.1.STR07T1B		TIP C-4901C		COUNTY DAVIDSON		GEOLOGIST T. EVANS											
SITE DESCRIPTION TURNER RD GRADE SEPARATION OVER NORFOLK SOUTHERN RAILROAD "BOWERS TO LAKE"							GROUND WTR (ft)										
BORING NO. R-2		STATION 19+61		OFFSET 42 ft RT		ALIGNMENT -L-											
COLLAR ELEV. 681.5 ft		TOTAL DEPTH 12.8 ft		NORTHING 764,253		EASTING 1,646,240											
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic													
DRILLER R. TOOTHMAN		START DATE 01/20/12		COMP. DATE 01/20/12		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG	SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
685																	
	680.5	1.0	3	5	6										681.5	0.0	GROUND SURFACE
680	678.0	3.5	4	6	12							SS-14	33%				ROADWAY EMBANKMENT RED AND TAN, STIFF, SILTY CLAY (A-7-5) W/ GRAVEL
	675.5	6.0	3	7	7										678.5	3.0	RED AND TAN, MED. DENSE, SILTY SAND (A-2-4) W/ GRAVEL
675	673.0	8.5	11	25	42										675.5	6.0	RESIDUAL TAN AND RED, MED. DENSE, SILTY SAND (A-2-4) W/ ROCK FRAGS
	668.7	12.8	60/0												672.2	9.3	TAN AND RED-BROWN, V. DENSE, SILTY FN. SAND (A-2-4) SAPROLITIC
670															669.5	12.0	WEATHERED ROCK NO SAMPLE RECOVERED
															668.7	12.8	Boring Terminated by Auger Refusal at Elevation 668.7 ft

NCDOT BORE DOUBLE C-4109C TURNER RD GRADE SEPARATION.GPJ NC_DOT.GDT 3/12/12



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 49010.1.STR07T1B		TIP C-4901C		COUNTY DAVIDSON		GEOLOGIST T. EVANS									
SITE DESCRIPTION TURNER RD GRADE SEPARATION OVER NORFOLK SOUTHERN RAILROAD "BOWERS TO LAKE"							GROUND WTR (ft)								
BORING NO. R-3		STATION 19+79		OFFSET 87 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 666.5 ft		TOTAL DEPTH 24.3 ft		NORTHING 764,290		EASTING 1,646,365									
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic									
DRILLER R. TOOTHMAN		START DATE 01/20/12		COMP. DATE 01/20/12		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					ELEV. (ft)
670															
665	665.5	1.0	2	3	5								M	666.5 6" TOPSOIL/ROOTMAT	0.0
	663.0	3.5	4	5	8								D	RESIDUAL RED-BROWN AND TAN, STIFF, FN. SANDY SILT (A-4)	3.0
660	660.5	6.0	8	8	14								M	TAN RED-BROWN AND GRAY, MED. DENSE, SILTY SAND (A-2-4)	6.0
	658.0	8.5	14	19	24								D	BLUE-GRAY AND WHITE, MED. DENSE TO V. DENSE, SILTY FN. SAND (A-2-4) W/ ROCK FRAGS, SAPROLITIC	
655															
	653.0	13.5	14	21	27								D		
650															
	648.0	18.5	39	43	47										
645															
	643.0	23.5	44	56/0.3										WEATHERED ROCK DK GRAY AND WHITE, METAMORPHOSED GRANITE	20.0
															24.3
															Boring Terminated at Elevation 642.2 ft

NCDOT BORE DOUBLE C-4109C TURNER RD GRADE SEPARATION.GPJ NC_DOT_GDT 3/12/12



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 49010.1.STR07T1B		TIP C-4901C		COUNTY DAVIDSON		GEOLOGIST T. EVANS									
SITE DESCRIPTION TURNER RD GRADE SEPARATION OVER NORFOLK SOUTHERN RAILROAD "BOWERS TO LAKE"							GROUND WTR (ft)								
BORING NO. EB1-A		STATION 20+77		OFFSET 17 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 666.5 ft		TOTAL DEPTH 21.3 ft		NORTHING 764,172		EASTING 1,646,341									
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER W. WHICHARD		START DATE 01/19/12		COMP. DATE 01/19/12		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
670															
665	665.5	1.0	4	5	8							SS-1	24%	6" TOPSOIL/ROOTMAT	0.0
	663.0	3.5	5	7	10									RESIDUAL TAN AND BROWN, STIFF, SILTY CLAY (A-7-6) W/ ROCK FRAGS, WEATHERED ROCK LAYERS	3.0
660	660.5	6.0	28	72/0.3										TAN AND BROWN, MED. DENSE, SILTY SAND (A-2-4) W/ ROCK FRAGS, WEATHERED ROCK LAYERS, TRACE MICA	7.5
	658.0	8.5	9	30	34									TAN, V. HARD, SILTY CLAY (A-7) W/ GRAVEL LAYERS	13.0
655	653.0	13.5	100/0.4											WEATHERED ROCK DARK GRAY AND WHITE, METAMORPHOSED GRANITE	13.0
650	648.0	18.5	100/0.2												
	645.1	21.4	60/0												
															Boring Terminated by Auger Refusal at Elevation 645.2 ft

WBS 49010.1.STR07T1B		TIP C-4901C		COUNTY DAVIDSON		GEOLOGIST T. EVANS									
SITE DESCRIPTION TURNER RD GRADE SEPARATION OVER NORFOLK SOUTHERN RAILROAD "BOWERS TO LAKE"							GROUND WTR (ft)								
BORING NO. EB1-B		STATION 20+68		OFFSET 17 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 670.0 ft		TOTAL DEPTH 30.5 ft		NORTHING 764,166		EASTING 1,646,307									
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER W. WHICHARD		START DATE 01/19/12		COMP. DATE 01/19/12		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
670															
	669.0	1.0	WOH	3	3									8" TOPSOIL/ROOTMAT	0.0
	666.5	3.5	8	15	25									RESIDUAL TAN AND BROWN, MED. STIFF, FN. SANDY SILT (A-4)	3.0
665	664.0	6.0	5	11	13									RED BROWN TAN AND BLACK, STIFF TO HARD, FN. SANDY SILT (A-4) W/ ROCK FRAGS, TRACE MICA, SAPROLITIC	3.0
	661.5	8.5	6	8	9										
660	656.5	13.5	3	4	7										
655	651.5	18.5	6	7	11										
650	646.5	23.5	9	11	16										
645	641.5	28.5	21	42	58/0.4									GRAY TAN AND BLACK, MED. DENSE, SILTY FN. SAND (A-2-4) W/ TRACE MICA, SAPROLITIC	23.0
640	639.5	30.5	60/0											WEATHERED ROCK BROWN GRAY AND TAN, METAMORPHOSED GRANITE	29.3
															Boring Terminated by Auger Refusal at Elevation 639.5 ft

NCDOT BORE DOUBLE C-4109C TURNER RD GRADE SEPARATION.GPJ NC_DOT.GDT 3/12/12



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 49010.1.STR07T1B	TIP C-4901C	COUNTY DAVIDSON	GEOLOGIST T. EVANS
SITE DESCRIPTION TURNER RD GRADE SEPARATION OVER NORFOLK SOUTHERN RAILROAD "BOWERS TO LAKE"			GROUND WTR (ft)
BORING NO. EB2-A	STATION 25+84	OFFSET 30 ft LT	ALIGNMENT -L-
COLLAR ELEV. 650.6 ft	TOTAL DEPTH 26.3 ft	NORTHING 763,715	EASTING 1,646,563
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER W. WHICHARD	START DATE 01/27/12	COMP. DATE 01/27/12	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
655															
650	649.6	1.0	9	11	23									650.6	0.0
	647.1	3.5	19	8	10									646.1	4.5
645	644.6	6.0	2	2	2									644.6	6.0
	642.1	8.5	1	2	2									637.6	13.0
640														632.6	18.0
635	632.1	18.5	WOH	2	3									625.1	25.5
630	627.1	23.5	4	4	4									624.3	26.3
625	624.3	26.3	60/0												

WBS 49010.1.STR07T1B	TIP C-4901C	COUNTY DAVIDSON	GEOLOGIST T. EVANS
SITE DESCRIPTION TURNER RD GRADE SEPARATION OVER NORFOLK SOUTHERN RAILROAD "BOWERS TO LAKE"			GROUND WTR (ft)
BORING NO. EB2-B	STATION 26+28	OFFSET 17 ft RT	ALIGNMENT -L-
COLLAR ELEV. 658.1 ft	TOTAL DEPTH 33.4 ft	NORTHING 763,655	EASTING 1,646,537
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER R. TOOTHMAN	START DATE 02/03/12	COMP. DATE 02/03/12	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
660															
	657.1	1.0	5	6	6									658.1	0.0
655	654.6	3.5	3	3	4										
	652.1	6.0	6	5	5										
650	649.6	8.5	3	4	5										
645	644.6	13.5	1	2	2									645.1	13.0
640	639.6	18.5	WOH	WOH	2										
635	634.6	23.5	2	4	2										
630	629.6	28.5	3	3	3									630.1	28.0
625	624.7	33.4	60/0											624.7	33.4

1109C TURNER RD GRADE SEPARATION.GPJ NC_DOT.GDT 3/12/12



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 49010.1.STR07T1B		TIP C-4901C		COUNTY DAVIDSON		GEOLOGIST T. EVANS										
SITE DESCRIPTION TURNER RD GRADE SEPARATION OVER NORFOLK SOUTHERN RAILROAD "BOWERS TO LAKE"							GROUND WTR (ft)									
BORING NO. EB2-C		STATION 25+75		OFFSET 15 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 649.9 ft		TOTAL DEPTH 30.2 ft		NORTHING 763,705		EASTING 1,646,518										
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic												
DRILLER W. WHICHARD		START DATE 01/27/12		COMP. DATE 01/27/12		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
650														649.9	GROUND SURFACE	0.0
	648.9	1.0	2	3	1										ROADWAY EMBANKMENT	
	646.4	3.5	2	6	21										GRAY BROWN AND TAN, V. LOOSE TO MED. DENSE, SILTY SAND (A-2-4) W/ GRAVEL	
645	643.9	6.0	7	5	6											
	641.4	8.5	1	2	2										ALLUVIAL	
640	636.4	13.5	3	3	4										DK GRAY, STIFF TO SOFT, FN. SANDY SILT (A-4) W/ TRACE ORGANICS, GRAVEL	
	631.4	18.5	3	3	4											
635	626.4	23.5	6	7	8										GRAY, MED. STIFF, FN. SANDY SILT (A-4)	
	621.4	28.5	14	25	41											
630	619.7	30.2	60/0												GRAY, MED. STIFF, FN. SANDY SILT (A-4)	
625															GRAY, LOOSE, SLI. SILTY SAND AND GRAVEL (A-1-b) W/ TRACE ORGANICS	
620															GRAY, MED. DENSE, SILTY SAND (A-2-4) W/ GRAVEL	
															RESIDUAL	
															DK GRAY AND WHITE, V. DENSE, SILTY SAND (A-2-4) W/ ROCK FRAGS, SAPROLITIC	
															Boring Terminated by Auger Refusal at Elevation 619.7 ft	

WBS 49010.1.STR07T1B		TIP C-4901C		COUNTY DAVIDSON		GEOLOGIST T. EVANS										
SITE DESCRIPTION TURNER RD GRADE SEPARATION OVER NORFOLK SOUTHERN RAILROAD "BOWERS TO LAKE"							GROUND WTR (ft)									
BORING NO. R-4		STATION 27+87		OFFSET 35 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 669.3 ft		TOTAL DEPTH 13.9 ft		NORTHING 763,532		EASTING 1,646,651										
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic												
DRILLER R. TOOTHMAN		START DATE 01/26/12		COMP. DATE 01/26/12		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
670														669.3	8" TOPSOIL/ROOTMAT	0.0
	668.3	1.0	2	2	3										ROADWAY EMBANKMENT	
	665.8	3.5	2	4	5										BLUE-GRAY AND TAN, LOOSE TO V. LOOSE, SILTY FN. SAND (A-2-4) W/ TRACE ORGANICS, GRAVEL	
665	663.3	6.0	6	5	4											
	660.8	8.5	2	1	3											
660	655.8	13.5	100/0.4												WEATHERED ROCK	
															BROWN GRAY AND TAN, METAMORPHOSED GRANITE	
															Boring Terminated at Elevation 655.4 ft	

NCDOT BORE DOUBLE C-4109C TURNER RD GRADE SEPARATION.GPJ NC_DOT.GDT 3/12/12



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 49010.1.STR07T1B		TIP C-4901C		COUNTY DAVIDSON		GEOLOGIST T. EVANS							
SITE DESCRIPTION TURNER RD GRADE SEPARATION OVER NORFOLK SOUTHERN RAILROAD "BOWERS TO LAKE"							GROUND WTR (ft)						
BORING NO.	R-5	STATION	27+60	OFFSET	107 ft LT	ALIGNMENT	-L-						
COLLAR ELEV.	668.0 ft	TOTAL DEPTH	9.4 ft	NORTHING	763,587	EASTING	1,646,706						
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011				DRILL METHOD		H.S. Augers	HAMMER TYPE	Automatic					
DRILLER R. TOOTHMAN		START DATE	01/26/12	COMP. DATE	01/26/12	SURFACE WATER DEPTH		N/A					
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT				SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100			
670													
	667.0	1.0											668.0 GROUND SURFACE 0.0
665	664.5	3.5	9	28	38								RESIDUAL GRAY TAN AND BROWN, V. DENSE, SILTY FN. SAND (A-2-4) SAPROLITIC
	662.0	6.0	21	46	54/0.2								664.0 WEATHERED ROCK GRAY BROWN AND TAN, METAMORPHOSED GRANITE 4.0
660	659.5	8.5	14	15	21								663.0 WEATHERED ROCK GRAY TAN AND BROWN, DENSE, SILTY FN. SAND (A-2-4) SAPROLITIC 5.0
	658.6		18	82/0.4									659.2 RESIDUAL GRAY TAN AND BROWN, DENSE, SILTY FN. SAND (A-2-4) SAPROLITIC 8.8
													658.6 WEATHERED ROCK BROWN TAN AND GRAY, METAMORPHOSED GRANITE 9.4 Boring Terminated at Elevation 658.6 ft

WBS 49010.1.STR07T1B		TIP C-4901C		COUNTY DAVIDSON		GEOLOGIST T. EVANS							
SITE DESCRIPTION TURNER RD GRADE SEPARATION OVER NORFOLK SOUTHERN RAILROAD "BOWERS TO LAKE"							GROUND WTR (ft)						
BORING NO.	R-6	STATION	30+29	OFFSET	17 ft LT	ALIGNMENT	-L-						
COLLAR ELEV.	684.8 ft	TOTAL DEPTH	9.9 ft	NORTHING	763,305	EASTING	1,646,735						
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011				DRILL METHOD		H.S. Augers	HAMMER TYPE	Automatic					
DRILLER R. TOOTHMAN		START DATE	01/27/12	COMP. DATE	01/27/12	SURFACE WATER DEPTH		N/A					
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT				SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100			
	683.8	1.0											684.8 GROUND SURFACE 0.0
680	681.3	3.5	6	13	20								RESIDUAL GRAY WHITE AND TAN, DENSE TO V. DENSE, SILTY SAND (A-2-4) SAPROLITIC
	678.8	6.0	35	38	27								680.0 WEATHERED ROCK GRAY BROWN AND TAN, METAMORPHOSED GRANITE 4.0
675	676.3	8.5	12	25	47								678.8 WEATHERED ROCK GRAY TAN AND BROWN, DENSE, SILTY FN. SAND (A-2-4) SAPROLITIC 5.0
			22	39	61/0.4								675.3 RESIDUAL GRAY TAN AND BROWN, DENSE, SILTY FN. SAND (A-2-4) SAPROLITIC 8.8
													674.9 WEATHERED ROCK GRAY WHITE BROWN AND TAN, METAMORPHOSED GRANITE 9.9 Boring Terminated at Elevation 674.9 ft

NCDOT BORE DOUBLE C-4108C TURNER RD GRADE SEPARATION.GPJ NC_DOT.GDT 3/12/12

FALCON

1210 TRINITY ROAD, SUITE 110, RALEIGH, NORTH CAROLINA 27607

AASHTO SOIL CLASSIFICATION AND GRADATION SHEET

TURNER ROAD (SR 2005) GRADE SEPARATION OVER
NORFOLK SOUTHERN RAILROAD "BOWERS TO LAKE"

WBS NO.: 49010.1.STR07T1B, TIP NO.: C-4901C

DAVIDSON COUNTY, NORTH CAROLINA
FALCON ENGINEERING, INC. PROJECT NO: G11019.00

BORING		SAMPLE	TOTAL SAMPLE			Atterberg Limit Test Results			Natural Moisture Content
AASHTO Classification			PERCENT PASSING						
STATION	OFFSET (FEET)	DEPTH (FEET)	#10	#40	#200	LL	PL	PI	%
EB1-A		SS-1							
A-7-6			99	85	63	49	24	25	24.5
20+68	17 ft LT	1.0 - 2.5							
EB1-B		SS-2							
A-4			97	80	53	22	16	6	13.8
20+77	17 ft RT	1.0 - 2.5							
EB1-B		SS-3							
A-4			99	88	58	41	NP	NP	24.6
20+77	17 ft RT	13.5 - 15.0							
EB2-A		SS-4							
A-4			91	68	36	20	NP	NP	8.3
25+84	30 ft LT	1.0 - 2.0							
EB2-A		SS-5							
A-4			100	96	44	19	NP	NP	21.5
25+84	30 ft LT	8.5 - 10.0							
EB2-A		SS-6							
A-2-4			100	97	33	20	NP	NP	22.5
25+84	30 ft LT	13.5 - 15.0							
EB2-B		SS-7							
A-4			95	78	40	25	NP	NP	16.9
26+28	17 ft RT	3.5 - 5.0							
EB2-B		SS-8							
A-4			100	100	92	32	23	9	30.1
26+28	17 ft RT	13.5 - 15.0							
EB2-B		SS-9							
A-4			100	98	48	20	NP	NP	20.5
26+28	17 ft RT	18.5 - 20.0							
EB2-B		SS-10							
A-4			100	99	87	28	21	7	27.2
26+28	17 ft RT	23.5 - 25.0							
EB2-C		SS-11							
A-4			100	99	50	16	NP	NP	21.9
25+75	15 ft RT	8.5 - 10.0							
EB2-C		SS-12							
A-4			100	100	41	20	NP	NP	23.2
25+75	15 ft RT	13.5 - 15.0							
R-1		SS-13							
A-4			99	84	50	35	NP	NP	14.1
18+51	5 ft RT	1.0 - 2.5							
R-2		SS-14							
A-7-5			100	94	85	74	39	35	33.0
19+61	42 ft RT	1.0 - 2.5							
R-4		SS-15							
A-2-4			82	60	34	27	NP	NP	16.4
27+87	35 ft LT	3.5 - 5.0							