



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

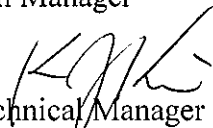
PAT MCCRORY  
GOVERNOR

ANTHONY J. TATA  
SECRETARY

September 25, 2014

MEMORANDUM TO: Karen E. Fussell, P.E.  
Division 3 Engineer

ATTENTION: Amanda T. Glynn, P.E.  
Division Bridge Program Manager

FROM: K. J. Kim, Ph.D., P.E.   
Eastern Regional Geotechnical Manager

STATE PROJECT: 41922.1.1 (R-5023B)  
F.A. PROJECT: STP-0053(8)  
COUNTY: Onslow

DESCRIPTION: NC 53 from 0.18 miles west of SR 1214 (Foy Lockamy Rd.)  
to SR 1116 (Onslow Pines Rd.) , RCBC Culvert over unnamed  
tributary to Blue Creek at -L- Station 87+42.00

SUBJECT: Culvert Foundation Recommendations

The Geotechnical Engineering Unit has completed the subsurface investigation and foundation design calculations for the above referenced reinforced concrete box culvert and presents the attached Culvert Inventory with no special foundation design recommendations.

Please call Majid Khazaei, P.E. or Chris Kreider, P.E. at (919) 662-4710 if there are any questions concerning this memorandum.

KJK/CAK/MK  
Attachment

MAILING ADDRESS:  
NCDOT EASTERN REGIONAL  
GEOTECHNICAL OFFICE  
1570 MAIL SERVICE CENTER  
RALEIGH NC 27699-1570

TELEPHONE: 919-662-4710  
FAX: 919-662-3095

WEBSITE: [WWW.DOH.DOT.STATE.NC.US](http://WWW.DOH.DOT.STATE.NC.US)

LOCATION:  
EASTERN REGIONAL GEOTECHNICAL  
OFFICE  
3301 JONES SAUSAGE RD., SUITE 100  
GARNER, NC 27529-9489

REFERENCE: R-5023B

PROJECT: 41922.1.1

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

| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
|-------|-----------------------------|-----------|--------------|
| N.C.  | R-5023B                     | 1         | 6            |

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| SHEET NO. | DESCRIPTION       |
|-----------|-------------------|
| 1         | TITLE SHEET       |
| 2         | LEGEND            |
| 3         | SITE PLAN         |
| 4         | PROFILE           |
| 5         | BORE LOGS         |
| 6         | SOIL TEST RESULTS |

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

COUNTY ONSLow  
PROJECT DESCRIPTION NC 53 FROM 0.18 MI. WEST OF  
SR 1214 (FOY LOCKAMY RD.) TO SR 1116 (ONSLow  
PINES RD.)  
SITE DESCRIPTION CULVERT ON NC 53 (BURGAw  
HWY.) OVER UT TO BLUE CREEK AT -L- STA.  
87 + 42

CAUTION NOTICE

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

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO 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:
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

- C.M. WRIKE  
J.D. GEMPERLINE  
R.E. SMITH  
D.G. PINTER

INVESTIGATED BY J.L. STONE  
DRAWN BY C.P. TURNER  
CHECKED BY D.N. ARGENBRIGHT  
SUBMITTED BY D.N. ARGENBRIGHT  
DATE SEPTEMBER 2014



Joseph L. Stone 09-21/14  
SIGNATURE DATE

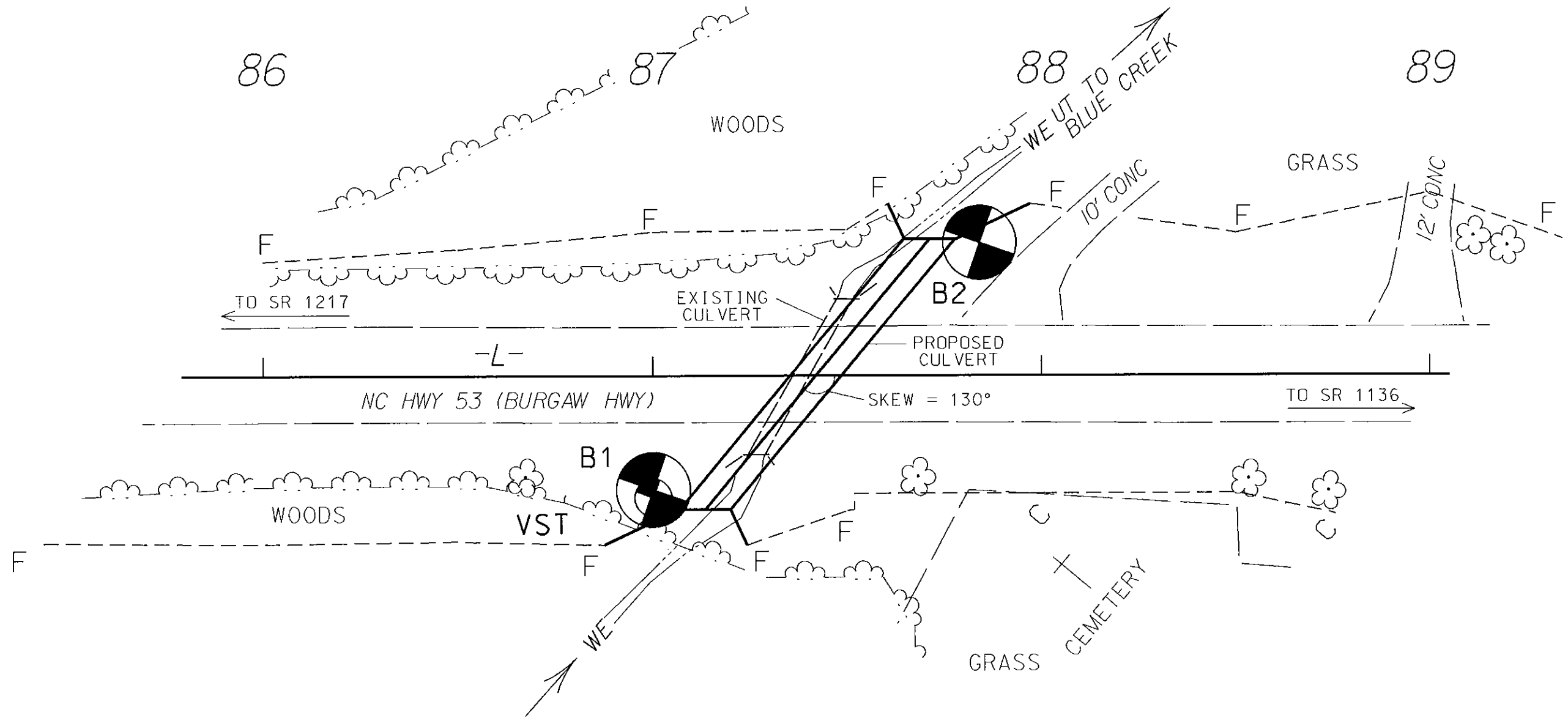
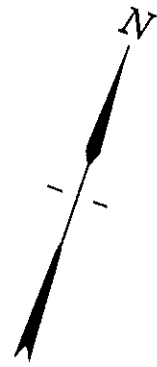
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT SUBSURFACE INVESTIGATION SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

Table containing sections: SOIL DESCRIPTION, GRADATION, ROCK DESCRIPTION, TERMS AND DEFINITIONS, SOIL LEGEND AND AASHTO CLASSIFICATION, MINERALOGICAL COMPOSITION, COMPRESSIBILITY, PERCENTAGE OF MATERIAL, WEATHERING, CONSISTENCY OR DENSENESS, MISCELLANEOUS SYMBOLS, TEXTURE OR GRAIN SIZE, RECOMMENDATION SYMBOLS, ABBREVIATIONS, SOIL MOISTURE - CORRELATION OF TERMS, EQUIPMENT USED ON SUBJECT PROJECT, PLASTICITY, COLOR, FRACTIONAL SPACING, BEDDING, INDURATION.

# SITE PLAN



SKEW = 130°



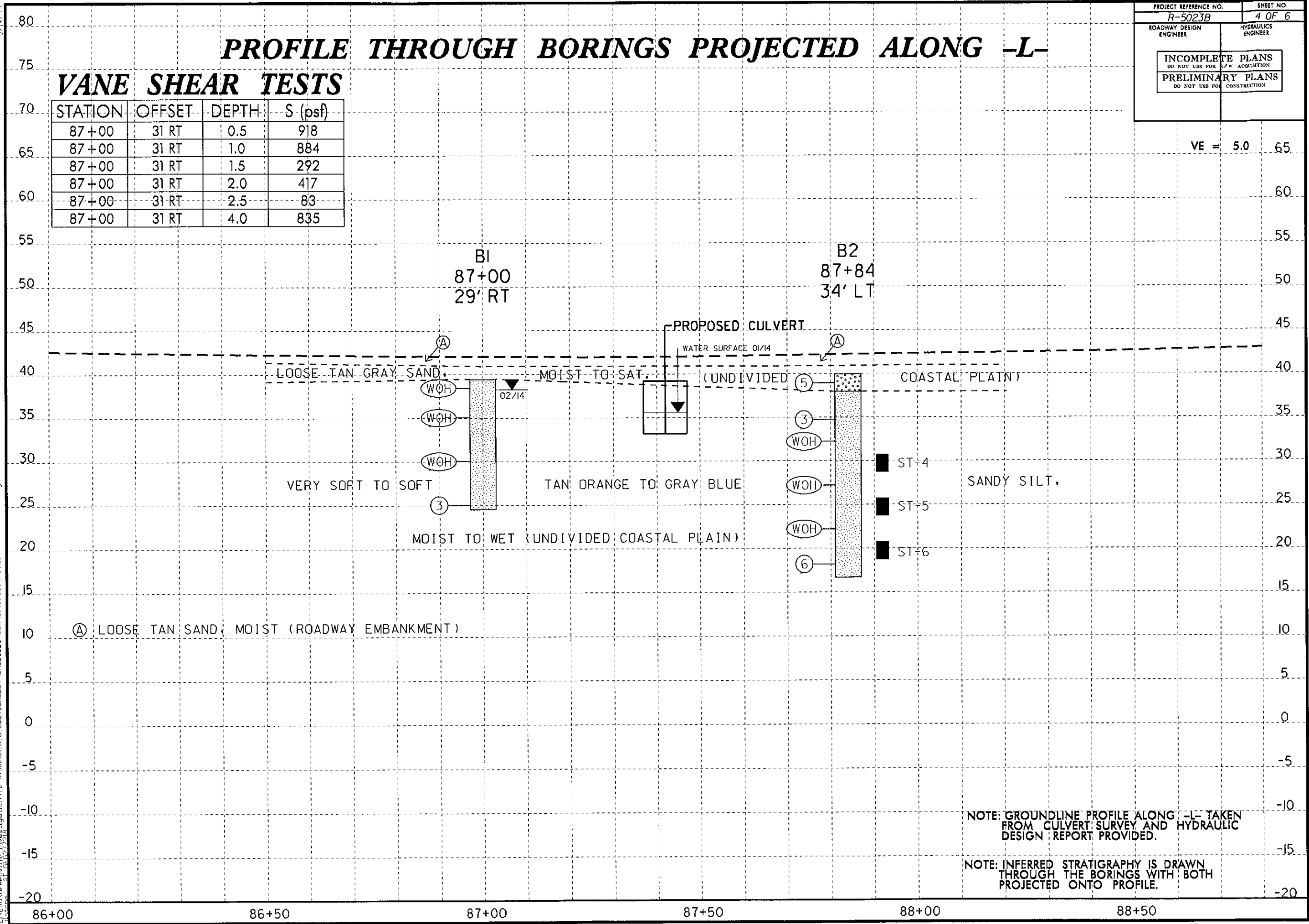
# PROFILE THROUGH BORINGS PROJECTED ALONG -L-

## VANE SHEAR TESTS

| STATION | OFFSET | DEPTH | S (psf) |
|---------|--------|-------|---------|
| 87+00   | 31 RT  | 0.5   | 918     |
| 87+00   | 31 RT  | 1.0   | 884     |
| 87+00   | 31 RT  | 1.5   | 292     |
| 87+00   | 31 RT  | 2.0   | 417     |
| 87+00   | 31 RT  | 2.5   | 83      |
| 87+00   | 31 RT  | 4.0   | 835     |

VE = 5.0 65

5/14/99  
 24-SEP-2014 13:42  
 L:\ERD\erdp\proj\investigation\TIP\IR5023B\_GEO\_CULV\_CMSLOW\CADD\_GEO\TECH\SITE&Sub\IR5023B\_GEO\_CULV\_GTM.dgn



NOTE: GROUNDLINE PROFILE ALONG -L- TAKEN FROM CULVERT SURVEY AND HYDRAULIC DESIGN REPORT PROVIDED.

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO PROFILE.



**NCDOT GEOTECHNICAL ENGINEERING UNIT**  
**BORELOG REPORT**

|   |                     |                         |                         |
|---|---------------------|-------------------------|-------------------------|
| WBS 41922.1.1   | TIP R-5023B         | COUNTY ONSLOW           | GEOLOGIST Wrike, C. M.  |
| SITE DESCRIPTION CULVERT ON -L- (NC 53) OVER UT TO BLUE CREEK |                     |                         | GROUND WTR (ft)         |
| BORING NO. B1   | STATION 87+00       | OFFSET 29 ft RT         | ALIGNMENT -L-           |
| COLLAR ELEV. 39.4 ft  | TOTAL DEPTH 14.9 ft | NORTHING 363,702        | EASTING 2,449,663       |
| DRILL RIG/HAMMER EFF./DATE GFO1042 CME-550X 89% 05/19/2014    |                     | DRILL METHOD Mud Rotary | HAMMER TYPE Automatic   |
| DRILLER Smith, R. E.  | START DATE 02/03/14 | COMP. DATE 02/03/14     | SURFACE WATER DEPTH N/A |

| ELEV (ft) | DRIVE ELEV (ft) | DEPTH (ft) | BLOW COUNT |       |       | BLOWS PER FOOT |    |    |    |     | SAMP. NO. | MOI | LOG | SOIL AND ROCK DESCRIPTION                        | DEPTH (ft) |
|-----------|-----------------|------------|------------|-------|-------|----------------|----|----|----|-----|-----------|-----|-----|--|------------|
|           |                 |            | 0.5ft      | 0.5ft | 0.5ft | 0              | 25 | 50 | 75 | 100 |           |     |     |  |            |
| 40        | 39.4            | 0.0        |            |       |       |                |    |    |    |     |           |     |     | GROUND SURFACE                                   | 0.0        |
|           |                 |            | WOH        | WOH   | WOH   |                |    |    |    |     |           |     |     | UNDIVIDED COASTAL PLAIN                          |            |
|           |                 |            |            |       |       |                |    |    |    |     |           |     |     | TAN ORANGE TO GRAY BLUE SANDY SILT, MOIST TO WET |            |
| 35        | 36.0            | 3.4        | WOH        | WOH   | WOH   |                |    |    |    |     |           |     |     |  |            |
| 30        | 31.0            | 8.4        | WOH        | WOH   | WOH   |                |    |    |    |     |           |     |     |  |            |
| 25        | 26.0            | 13.4       | 1          | 1     | 2     |                |    |    |    |     |           |     |     |  |            |
|           |                 |            |            |       |       |                |    |    |    |     |           |     |     | Boring Terminated at Elevation 24.5 ft IN        | 14.9       |
|           |                 |            |            |       |       |                |    |    |    |     |           |     |     | SOFT SANDY SILT                                  |            |

|   |                     |                         |                              |
|---|---------------------|-------------------------|------------------------------|
| WBS 41922.1.1   | TIP R-5023B         | COUNTY ONSLOW           | GEOLOGIST Contract Geologist |
| SITE DESCRIPTION CULVERT ON -L- (NC 53) OVER UT TO BLUE CREEK |                     |                         | GROUND WTR (ft)              |
| BORING NO. B2   | STATION 87+84       | OFFSET 34 ft LT         | ALIGNMENT -L-                |
| COLLAR ELEV. 39.9 ft  | TOTAL DEPTH 23.2 ft | NORTHING 363,789        | EASTING 2,449,722            |
| DRILL RIG/HAMMER EFF./DATE GFO0057 CME-550X 82% 05/19/2014    |                     | DRILL METHOD Mud Rotary | HAMMER TYPE Automatic        |
| DRILLER Smith, R. E.  | START DATE 06/10/14 | COMP. DATE 06/10/14     | SURFACE WATER DEPTH N/A      |

| ELEV (ft) | DRIVE ELEV (ft) | DEPTH (ft) | BLOW COUNT |       |       | BLOWS PER FOOT |    |    |    |     | SAMP. NO. | MOI | LOG | SOIL AND ROCK DESCRIPTION                        | DEPTH (ft) |
|-----------|-----------------|------------|------------|-------|-------|----------------|----|----|----|-----|-----------|-----|-----|--|------------|
|           |                 |            | 0.5ft      | 0.5ft | 0.5ft | 0              | 25 | 50 | 75 | 100 |           |     |     |  |            |
| 40        | 39.9            | 0.0        | 2          | 3     | 2     |                |    |    |    |     |           |     |     | GROUND SURFACE                                   | 0.0        |
|           |                 |            |            |       |       |                |    |    |    |     |           |     |     | UNDIVIDED COASTAL PLAIN                          |            |
|           |                 |            |            |       |       |                |    |    |    |     |           |     |     | TAN SAND, MOIST                                  | 2.0        |
| 35        | 35.7            | 4.2        | 1          | 2     | 1     |                |    |    |    |     |           |     |     | UNDIVIDED COASTAL PLAIN                          |            |
|           |                 |            |            |       |       |                |    |    |    |     |           |     |     | TAN ORANGE TO GRAY BLUE SANDY SILT, MOIST TO WET |            |
| 30        | 33.2            | 6.7        | WOH        | WOH   | WOH   |                |    |    |    |     |           |     |     |  |            |
| 25        | 28.2            | 11.7       | WOH        | WOH   | WOH   |                |    |    |    |     |           |     |     |  |            |
| 20        | 23.2            | 16.7       | WOH        | WOH   | WOH   |                |    |    |    |     |           |     |     |  |            |
|           | 18.2            | 21.7       | 5          | 3     | 3     |                |    |    |    |     |           |     |     |  |            |
|           |                 |            |            |       |       |                |    |    |    |     |           |     |     | Boring Terminated at Elevation 16.7 ft IN        | 23.2       |
|           |                 |            |            |       |       |                |    |    |    |     |           |     |     | MEDIUM STIFF TO STIFF STIFF SANDY SILT           |            |
|           |                 |            |            |       |       |                |    |    |    |     |           |     |     | Other Samples:                                   |            |
|           |                 |            |            |       |       |                |    |    |    |     |           |     |     | ST-4 (9.2 - 11.2)                                |            |
|           |                 |            |            |       |       |                |    |    |    |     |           |     |     | ST-5 (14.2 - 16.2)                               |            |
|           |                 |            |            |       |       |                |    |    |    |     |           |     |     | ST-6 (19.2 - 21.2)                               |            |

NCDOT BORE DOUBLE SPT BORINGS.GPJ, NC\_DOT\_GDT\_9/24/14

41922.1.1

R-5023B

CULVERT ON NC 53 (BURGAW HWY.) OVER UT TO BLUE CREEK AT -L- STA. 87+42

**B1 SOIL TEST RESULTS**

| SAMPLE NO. | 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-3       | 29 RT  | 87+00   | 0.0-1.5        | A-4(1)        | 25   | 6    | 4.8         | 50.5   | 20.6 | 24.0 | 96                 | 94 | 56  | -          | -         |
| SS-4       | 29 RT  | 87+00   | 8.4-9.9        | A-4(0)        | 23   | 4    | 3.0         | 49.5   | 25.5 | 22.0 | 100                | 99 | 63  | -          | -         |