

**REPORT
OF
SUBSURFACE INVESTIGATION
FOR
EMBANKMENTS (STATION 50+23 to 352+00)
PROJECT SCI-823-0.00
PHASE 3 – STAGE I
SCIOTO COUNTY, OHIO**

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**DLZ Job. No. 0121-3070.03
PID No. 77366
Document No. 0096**

November 16, 2007

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1.0 INTRODUCTION

Phase 3 of this project consists of the construction of approximately 5.7 miles of new mainline roadway located in Scioto County, Ohio. The findings and recommendations presented in this document pertain to Phase 3 mainline embankments and soil cuts from Station 50+23 to 352+00 of the SCI-823-0.00 Portsmouth Bypass project only. The findings and recommendations for the rock cut sections and the Phase 1 and Phase 2 embankments for this project will be submitted in separate documents.

The Phase 3 area begins at the U.S. 52 interchange and ends at Station 352+00, approximately feet south of the proposed Shumway Hollow Road interchange. An interchange at S.R. 140 (Webster Street) is also included in Phase 3. The analyses and recommendations pertaining to the interchange areas can be found in the respective interchange reports, which are submitted separately. In addition, the evaluation of the embankments in the Highland Bend area, between approximate Stations 105+75 and 131+54, and the culverts within Phase 3 will be submitted in separate documents. The Highland Bend embankments were analyzed separately because of the high fills and relatively poor soils in that area.

The purpose of this exploration was to 1) determine the subsurface conditions to the depths of the borings, 2) evaluate the engineering characteristics of the subsurface materials, and 3) provide information to assist in designing the roadway embankments and pavements.

The geotechnical engineer has planned and supervised the performance of the geotechnical engineering services, has considered the findings, and has prepared this report in accordance with generally accepted geotechnical engineering practices. No other warranties, either expressed or implied, are made as to the professional advice included in this report.

2.0 GENERAL PROJECT INFORMATION

Approximately 2.7 miles of side hill or embankment fills and 2.7 miles of soil and rock cuts are proposed along the centerline of S.R. 823 in Phase 3. A maximum embankment height of 219.4 feet is anticipated near Station 289+25. The maximum depth of cut is anticipated to be 186.3 feet near Station 148+50.

The analyses and recommendations presented in this report have been made on the basis of the foregoing information. If the proposed roadway location or concept is changed or differs from that assumed, DLZ should be informed of the changes so that recommendations and conclusions presented in this report may be revised as necessary.

3.0 SUBSURFACE INVESTIGATION

The subsurface investigation for the Phase 3 embankments consisted of drilling a total of 90 borings, excluding those drilled in the Highland Bend area. The 90 borings considered for the roadway embankment analyses consist of 20 culvert borings (C-25 through C-119, non-inclusive) and 70 roadway borings (R-24 through R-205 and R-2118 through R-2184, non-inclusive). The borings were drilled primarily between August 26, 2004 and February 22, 2007. Six of the culvert borings, C-114 through C-119, were drilled between June 20 and July 3, 2007. The borings were extended to depths primarily between 7.0 to 55.0 feet and were drilled with both ATV-mounted and truck-mounted drill rigs. One boring, R-143, was drilled to a depth of 100.0 feet. Individual boring logs are included in Appendix A. The locations of the borings are shown on the Boring Location Plan in Appendix A. Information concerning the drilling procedures and the boring log terminology is also presented in Appendix A.

Representatives of Lockwood, Lanier, Mathias and Noland, Inc. (2LMN) generally marked the locations of the roadway borings in the field and representatives of DLZ Ohio, Inc. generally marked the culvert boring locations. Representatives of 2LMN also determined the as-drilled ground surface elevations and locations of most of the boring locations. Boring locations which could not be determined with the survey equipment due to the dense vegetation were estimated from plans. The as-drilled boring locations and ground surface elevations are shown on the individual boring logs in Appendix A.

4.0 FINDINGS

4.1 General Information

The project is located in the Shawnee-Mississippian Plateau of the unglaciated portion of the Appalachian Plateau Physiographic Region. The project area is relatively underdeveloped, and contains limited secondary roadways. The area is characterized by rough, steep, broken, and severely dissected topography. The natural slopes are generally very steep, rising abruptly from the valley bottoms. The maximum existing topographic relief along the Phase 3 project centerline is approximately 397.5 feet and occurs between a high point near Station 281+50 at elevation 890.0 feet, and a low point near Station 135+50, at elevation 492.5 feet. The maximum vertical relief along the proposed finished grade is approximately 324.0 feet, with the lowest point at approximate Station 350+00 (elevation 548.1 feet) and the highest point near Station 253+00 (elevation 872.1 feet).

4.2 Geology of the Site

The genesis of the soils varies across the project location. Residual and colluvial soils are found on the ridge tops and the hillsides across the site. These soils are generally thin to moderately deep, covering moderate to steep slopes. Lacustrine soils, found in the valleys, are commonly known as “Minford Silts” or the Minford Complex. These deposits were formed during the early to middle Pleistocene age when the northward flowing Teays River system was blocked by the southward advance of the Kansan aged ice sheets. As the glaciers advanced, the course of the Teays River was blocked south of Chillicothe and a large lake was formed from the impoundment of the waterways. As a result of the impoundment, vast quantities of sediments were deposited ranging from 10 to 80 feet in thickness, thinning towards the margins. In this area, the Minford Complex is characterized by clays of high plasticity and high compressibility.

Bedrock within the structure area is primarily sandstone of the Logan Formation that is of Mississippian Age. Bedrock of the Pennsylvanian Breathitt Formation can be found at the top of the slopes, roughly above elevation 870.

4.3 Soil Conditions

At the ground surface, the borings encountered 1 to 12 inches of topsoil. Beneath the topsoil, the borings encountered primarily stiff to hard sandy silt (A-4a) and silt and clay (A-6a) with lesser amounts of loose to dense gravel with sand (A-1-b), gravel with sand and silt (A-2-4), sandy silt (A-4a), and silt (A-4b) and very stiff to hard clay (A-7-6) to depths of 2.0 to 36.0 feet below the ground surface to the top of severely weathered bedrock. Soils encountered in each of the Phase 3 fill sections are described below. For more detailed information, refer to the boring logs presented in Appendix A.

Phase 3 Mainline Station 63+00 to 75+00

Borings R-24 to R-27, C-89, and C-90 were evaluated for this fill section and generally encountered stiff to very stiff sandy silt (A-4a), silt (A-4b), and silt and clay (A-6a) to depths ranging from 11.5 to 21.0 feet below the ground surface. Layers of very stiff clay (A-7-6) and loose to medium dense gravel with sand and silt (A-2-4) and sandy silt (A-4a) were also encountered. A 1.0 to 5.0-foot thick layer of severely weathered sandstone was encountered below the soil layers, generally below a depth of 11.0 feet.

Phase 3 Mainline Station 166+50 to 168+50

Borings R-88 to R-92 were evaluated for this fill section and generally encountered a 1.6 to 1.7-foot thick layer of severely weathered sandstone below the topsoil. Boring R-90 encountered a hard sandy silt (A-4a) to a depth of 3.5 feet below the ground surface.

Phase 3 Mainline Station 173+50 to 188+00

Borings R-99 to R-105 and C-114 to C-117 were evaluated for this fill section and generally encountered stiff to hard sandy silt (A-4a), silt (A-4b), and silt and clay (A-6a) to depths ranging from 13.5 to 37.5 feet below the ground surface. The soil layers were 5.0 feet thick or less in Borings R-99, R-101, and R-105. Layers of medium stiff to hard clay (A-7-6) and loose to medium dense sandy silt (A-4a) and silt (A-4b) and very dense gravel (A-1-a) and were also encountered. A 0.5 to 5.3-foot thick layer of severely weathered sandstone was encountered below the soil layers, generally below a depth of 13.5 feet.

Phase 3 Mainline Station 188+00 to 197+50

Borings R-106, R-106A, and R-107 were evaluated for this fill section and generally encountered medium stiff to hard sandy silt (A-4a) and silt and clay (A-6a) to depths ranging from 8.0 to 15.0 feet below the ground surface. Layers of medium dense sandy silt (A-4a) were also encountered. A 2.0-foot thick layer of severely weathered sandstone was encountered below the soil layers in Borings R-106 and R-107.

Phase 3 Mainline Station 207+00 to 212+50

Borings R-115 to R-117, C-96, and C-97 were evaluated for this fill section and generally encountered stiff to hard sandy silt (A-4a) and silt and clay (A-6a) to depths ranging from 5.5 to 19.4 feet below the ground surface. Layers of loose to dense gravel with sand and silt (A-2-4), sandy silt (A-4a), and silt (A-4b) were also encountered. A 1.0 to 3.5-foot thick layer of severely weathered sandstone was encountered below the soil layers.

Phase 3 Mainline Station 227+00 to 257+75

Borings R-126 to R-143, C-118, and C-119 were evaluated for this fill section and generally encountered very stiff to hard sandy silt (A-4a) and silt and clay (A-6a) and loose to medium dense sandy silt (A-4a) to depths ranging from 2.0 to 8.0 feet below the ground surface. Layers of hard silt (A-4b) and medium dense to dense coarse and fine sand (A-3a) and gravel with sand and silt (A-2-4) were also encountered in Boring C-119. A 1.0 to 4.0-foot thick layer of severely weathered sandstone or claystone was encountered below the soil layers. The severely weathered sandstone was 11.5 feet thick in Boring R-143.

Phase 3 Mainline Station 268+00 to 273+00

Borings R-148 and R-149 were evaluated for this fill section and encountered hard silt and clay (A-6a) and clay (A-7-6) to depths ranging from 7.5 to 24.5 feet below the ground surface. A layer of severely weathered sandstone was encountered below a depth of 5.0 feet in Boring R-149.

Phase 3 Mainline Station 289+00 to 306+50

Borings R-157 to R-168, R-2154, R-2157, R-2160, R-2168, and C-25 to C-29 were evaluated for this fill section and generally encountered loose to medium dense

gravel with sand (A-1-b), gravel with sand and silt (A-2-4), and silt (A-4b) to depths ranging from 13.0 to 20.5 feet below the ground surface. However, in Borings R-158, R-161, R-165, R-166, and R-2168, the soils extended only to depths of 6.0 feet or less. A 1.0 to 7.8-foot thick layer of severely weathered sandstone was encountered below the soil layers. The severely weathered sandstone was encountered directly below the topsoil in Borings R-2154 and R-2160.

Phase 3 Mainline Station 308+50 to 324+00

Borings R-171 to R-186, R-2176, R-2183, R-2184, C-30, and C-31 were evaluated for this fill section and generally encountered very stiff to hard sandy silt (A-4a) and silt and clay (A-6a) and loose dense gravel with sand and silt (A-2-4), sandy silt (A-4a), and silt (A-4b) to depths ranging from 2.5 to 14.0 feet below the ground surface. Layers of hard silt (A-4b) and clay (A-7-6) were also encountered. A 1.0 to 6.0-foot thick layer of severely weathered sandstone was encountered below the soil layers. The severely weathered sandstone was encountered directly below the topsoil in Boring R-171.

Phase 3 Mainline Station 328+00 to 330+00

Borings R-192, R-193, C-34, and C-35 were evaluated for this fill section and generally encountered very stiff to hard sandy silt (A-4a) and medium dense sandy silt (A-4a) and silt (A-4b) to depths ranging from 3.0 to 5.0 feet below the ground surface. A 2.0 to 8.5-foot thick layer of severely weathered sandstone was encountered below the soil layers.

Phase 3 Mainline Station 343+50 to 348+00

Borings R-203, R-206, C-98, and C-99 were evaluated for this fill section and generally encountered hard sandy silt (A-4a) and silt and clay (A-6a) and very loose gravel with sand and silt (A-2-4) to depths ranging from 3.0 to 8.1 feet below the ground surface. A 1.0-foot thick layer of severely weathered sandstone was encountered below the soil layers in Boring C-99. The severely weathered sandstone was encountered directly below the topsoil in Boring R-205 to a depth of 4.5 feet.

4.4 Bedrock Conditions

Bedrock was encountered in all of the borings and confirmed by coring a minimum of 5 feet of bedrock. Bedrock encountered in the borings corresponds with the available geologic references. The cores obtained consist primarily of medium hard to hard sandstone or sandstone interbedded with shale or siltstone with occasional layers of siltstone, claystone, and shale. A layer of severely weathered to decomposed bedrock was generally encountered immediately above the higher quality rock encountered in the rock cores. The layer of severely weathered rock generally ranged in thickness from 0.5 to 6.0 feet but was as thick as 14.0 feet and 17.0 feet in Borings R-177 and R-101, respectively. Refer to the boring logs presented in Appendix A for more detailed information.

4.5 Groundwater Conditions

Seepage was observed in 33 of the 90 borings at depths ranging from 1.0 to 26.5 feet below the ground surface. In general, groundwater was not encountered prior to rock coring. Borings C-28, C-31, C-117, R-24, R-25, R-2157, and R-2176 encountered groundwater at depths ranging from 6.0 to 34.3 feet below the ground surface prior to rock coring. Final water levels, which included drilling water, were encountered at depths from 0.0 to 23.3 feet below the ground surface. Refer to the boring logs presented in Appendix A for more detailed information.

It should be noted that groundwater levels may fluctuate with seasonal variations and following periods of heavy or prolonged precipitation, and therefore, the readings indicated on the boring logs may not be representative of the long-term groundwater levels. Long-term monitoring would be needed to obtain a more accurate estimate of the groundwater table elevations.

4.6 Laboratory Testing

In the laboratory, all samples were examined and visually classified. The moisture contents, grain size analyses, and plasticity characteristics of samples considered representative of the subsurface materials were determined. Index test results are included on the borings logs in Appendix A. Due to the generally stiff to hard consistency of the soils encountered in this area, very few undisturbed Shelby tube samples were obtained for laboratory testing. A summary of the strength testing performed for the Phase 3 embankment fills is presented in Appendix B.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 General

At the surface, the borings encountered topsoil ranging in thickness from 1 to 12 inches. All topsoil should be removed prior to placing fill or pavement materials.

Subgrades and embankments should be constructed in accordance with Ohio Department of Transportation Construction and Material Specification (ODOT-CMS) Item 203, "Roadway Excavation and Embankment."

5.2 Pavement Design and Group Index

The results of the subgrade evaluations for Phase 3 of this project were submitted in separate documents. However, the conclusions from the proposed State Route 823 Mainline evaluations are presented below. All subgrade treatments should conform to ODOT CMS Item 206. More information concerning the suitability of soils for use as fill material can be found in section 5.6 of this report.

5.2.1 Subgrades in Soil

Existing laboratory test results performed as of June 6, 2006 were evaluated to estimate a recommended CBR value for Phase 3 mainline roadway pavement design. A total of 252 samples were tested for particle size and plasticity. For both the proposed Phase 3 mainline alignment and the entire project, it was determined that the pavements be designed based on a CBR value of 7. Areas where it is anticipated that the subgrade will be in soil are listed in the table below and are shown on the Boring Locations Plans in Appendix A.

Anticipated Areas of Soil at Subgrade Level

| Beginning Station | Ending Station |
|-------------------|----------------|
| 75+00 | 77+00 |
| 142+50 | 146+00 |
| 257+75 | 259+50 |
| 348+00 | 349+00 |

It is anticipated that soils in the cut sections will be only a few feet thick and not likely to become unstable. In addition, a few feet of soil will likely be encountered at the transition zones from cut section to fill section. The soils at these transitions are also not likely to be unstable. Consequently, the soil cut sections were not evaluated for stability.

5.2.2 Subgrades in Rock

Approximately 2.7 miles of the 9.1-mile long Phase 3 mainline alignment will be constructed in cuts where the subgrade will be in rock. The approximate station limits of these sections are listed in the following table and are shown on the Boring Locations Plans in Appendix A. The station limits are approximate and are based on the materials encountered in the borings drilled near the centerline of construction. Variations in the station limits should be anticipated where the bedrock surface slopes in a transverse direction, such as in sidehill fill/cut areas.

Anticipated Areas of Rock at Subgrade Level

| Begin Station | End Station |
|---------------|-------------|
| 50+23 | 61+00 |
| 77+00 | 105+75 |
| 146+00 | 165+50 |
| 168+50 | 173+50 |
| 197+50 | 207+00 |
| 212+50 | 227+00 |
| 259+50 | 268+00 |
| 273+00 | 289+00 |

Anticipated Areas of Rock at Subgrade Level

| Begin Station | End Station |
|----------------------|--------------------|
| 306+50 | 308+50 |
| 324+00 | 328+00 |
| 330+00 | 343+00 |
| 349+00 | 352+00 |

For the sections of the alignments with subgrades in rock, excavations 2 feet below the proposed pavement materials will be required for the subgrade preparation in accordance with ODOT CMS Item 204.05.

5.3 Culverts

Approximately 13 culverts are presently planned for within the limits of the Phase 3 area. Foundation recommendations and settlement analyses for the culverts are presented for each culvert in a separate report.

5.4 Embankment Evaluations

The following table lists the stations and approximate maximum embankment heights for the embankment sections evaluated for the stability and settlement analyses.

Sidehill Fill / Fill Embankment Sections

| Begin Station | End Station | Approximate Maximum Fill Height (ft.) |
|----------------------|--------------------|--|
| 63+00 | 75+00 | 32.0 |
| 166+50 | 168+50 | 39.7 |
| 173+50 | 188+00 | 86.0 |
| 188+00 | 197+50 | 39.0 |
| 207+00 | 212+50 | 90.1 |
| 227+00 | 257+75 | 195.6 |
| 268+00 | 273+00 | 49.0 |
| 289+00 | 306+50 | 219.4 |
| 308+50 | 315+50 | 158.9 |
| 315+50 | 324+00 | 94.8 |
| 328+00 | 330+00 | 36.5 |
| 343+50 | 348+00 | 91.1 |

Soil parameters used for the stability and settlement analyses were based on laboratory test results (grain-size and plasticity), visual examination of the preserved samples, hand penetrometer readings, and typical values. Due to the generally very stiff to hard consistency of the soils encountered in this area, very few undisturbed Shelby tube samples were obtained for laboratory testing. Global stability analyses and settlement calculations are presented in Appendix C and D, respectively.

5.4.1 Stability Analysis

5.4.1.1 Assumptions and Methodology

In accordance with ODOT guidelines, a unit weight of 120 pcf was assumed for the embankment fill materials. Due to the large quantity of rock cut planned for the project, it is anticipated that the embankment fill will consist primarily of cohesionless material ranging in size from fine granular material to rock but will generally be rock fill from adjacent cuts. The friction angle for the anticipated backfill material will likely range from 28 degrees to over 40 degrees. It is anticipated that more of the rock fill will exhibit friction angles in excess of 40 degrees, but a friction angle of 35 degrees was conservatively selected for the embankment fill with no cohesion.

The stability analyses were performed using UTEXAS3 Version 1.204, a slope stability computer program using variations of the method of slices. UTEXAS3 was developed by Dr. Stephen Wright at the University of Texas for the U.S. Army Corps of Engineers. The Simplified Bishop procedure was used for all of the analyses and only circular failure surfaces were considered. All of the procedures use an iterative approach to investigate many failure surfaces until a critical surface is found.

5.4.1.2 Summary of Results

The Phase 3 mainline roadway is comprised of approximately 11 fill sections and 12 cut sections. All fill sections in Phase 3, except for the interchanges and the Highland Bend area, were considered for stability. The analyses and recommendations for the embankment slopes contained in the interchange areas and Highland Bend are presented in separate reports.

A comprehensive review of subsurface conditions and the results of stability analyses indicate that the Phase 3 embankments may be built using slopes listed in the following table.

Sidehill Fill / Fill Embankment Slopes

| Begin Station | End Station | Recommended Design Slope |
|----------------------|--------------------|---------------------------------|
| 63+00 | 75+00 | 2H:1V |
| 166+50 | 168+50 | 2H:1V |
| 173+50 | 188+00 | 2.5H:1V |
| 188+00 | 197+50 | 2H:1V |
| 207+00 | 212+50 | 2H:1V |
| 227+00 | 257+75 | 2H:1V |

Sidehill Fill / Fill Embankment Slopes

| Begin Station | End Station | Recommended Design Slope |
|----------------------|--------------------|---------------------------------|
| 268+00 | 273+00 | 2H:1V |
| 289+00 | 306+50 | 2H:1V |
| 308+50 | 315+50 | 2H:1V |
| 315+50 | 324+00 | 2H:1V |
| 328+00 | 330+00 | 2H:1V |
| 343+50 | 348+00 | 2H:1V |

The subsurface profile and embankment geometry between Stations 173+50 and 188+00 had the most critical cross section. The maximum embankment height encountered in this section of 86 feet along with the soils encountered resulted in a required 2.5H:1V slope for stability.

All other global stability analyses performed for the mainline embankments in this area have indicated that the drained, seismic and undrained stability of the embankments is adequate based on a 2H:1V slope. Factors of safety of at least 1.3 in the undrained condition and 1.5 for the drained condition were obtained for all the analyses, which are considered acceptable. Based on the results of the stability analyses, it is anticipated that staged construction, wick drains, and other special construction techniques will not be required to construct the Phase 3 embankments analyzed for this report. It should be noted, however, that special construction techniques will be required for the Highland Bend area. The recommendations for the Highland Bend embankments are presented in a separate report.

5.4.2 Settlement Analysis

5.4.2.1 Summary of Results

Settlement has been evaluated for selected locations for the Phase 3 mainline embankments. The following table summarizes the results of the calculations for the consolidation of foundational soils and the anticipated settlement of the associated embankment fill materials.

Summary of Settlement Analyses

| Station | Boring | Approximate Maximum Fill (ft.) | Primary Consolidation (in.) | Anticipated Settlement of Fill Materials (in.) |
|----------------|---------------|---------------------------------------|------------------------------------|---|
| 66+00 | R-25 | 32.0 | 5.1 | 4 |
| 175+40 | R-104 | 86.0 | 16.7 | 10 |
| 189+00 | R-107 | 39.0 | 4.4 | 5 |
| 209+50 | R-115 | 90.1 | negligible | 11 |
| 240+00 | R-132 | 195.6 | 3.5 | 24 |

Summary of Settlement Analyses

| Station | Boring | Approximate Maximum Fill (ft.) | Primary Consolidation (in.) | Anticipated Settlement of Fill Materials (in.) |
|---------|--------|--------------------------------|-----------------------------|--|
| 271+50 | R-148 | 49.0 | 10.0 | 6 |
| 298+25 | R-168 | 219.4 | 12.1 | 26 |
| 312+00 | C-31 | 158.9 | 5.7 | 19 |
| 319+75 | R-2183 | 94.8 | 13.4 | 11 |

The settlement evaluations indicate that embankment settlement is not considered a significant concern for Phase 3 embankments outside of the interchange areas. Based upon a comprehensive review of subsurface conditions, a critical soil profile and embankment height was selected for each fill section for the purposes of performing settlement calculations. In addition, time-rate of settlement calculations were also performed. The analyses and results are briefly discussed in the following sections.

Settlement – Mainline Embankments, Station 66+00

Settlement due to primary consolidation of the foundation soil is expected to be approximately 5.1 inches. In addition, the time needed to reach 90 percent of primary consolidation is expected to take up to approximately 375 days. Due to the relatively small magnitude of settlement, the use of wick drains or other means of accelerating the consolidation were not investigated.

Settlement due to consolidation of the fill material itself was also considered. Consolidation within an embankment will generally range from one to four percent of the embankment height. Assuming one percent consolidation for a well compacted fill, approximately 4 inches of settlement can be expected for a 32-foot high embankment. However, it is anticipated that much of this settlement will occur during construction.

Settlement – Mainline Embankments, Station 175+40

Settlement due to primary consolidation of the foundation soil is expected to be approximately 16.7 inches. In addition, the time needed to reach 90 percent of primary consolidation is expected to take up to approximately 765 days. Due to the relatively small magnitude of settlement, the use of wick drains or other means of accelerating the consolidation were not explored.

Settlement due to consolidation of the fill material itself was also considered. Consolidation within an embankment will generally range from one to four percent of the embankment height. Assuming one percent consolidation for a well compacted fill, approximately 10 inches of settlement can be expected for a 86-foot high embankment. However, it is anticipated that much of this settlement will occur during construction.

Settlement – Mainline Embankments, Station 189+00

Settlement due to primary consolidation of the foundation soil is expected to be approximately 4.4 inches. In addition, the time needed to reach 90 percent of primary consolidation is expected to take up to approximately 144 days. Due to the relatively small magnitude of settlement, the use of wick drains or other means of accelerating the consolidation were not explored.

Settlement due to consolidation of the fill material itself was also considered. Consolidation within an embankment will generally range from one to four percent of the embankment height. Assuming one percent consolidation for a well compacted fill, approximately 5 inches of settlement can be expected for a 39-foot high embankment. However, it is anticipated that much of this settlement will occur during construction.

Settlement – Mainline Embankments, Station 209+50

Settlement due to primary consolidation of the foundation soil is expected to be negligible. Settlement due to consolidation of the fill material itself was also considered. Consolidation within an embankment will generally range from one to four percent of the embankment height. Assuming one percent consolidation for a well compacted fill, approximately 11 inches of settlement can be expected for a 90-foot high embankment. However, it is anticipated that much of this settlement will occur during construction.

Settlement – Mainline Embankments, Station 240+00

Settlement due to primary consolidation of the foundation soil is expected to be approximately 3.4 inches. In addition, the time needed to reach 90 percent of primary consolidation is expected to take up to approximately 26 days. Due to the relatively small magnitude of settlement, the use of wick drains or other means of accelerating the consolidation were not explored.

Settlement due to consolidation of the fill material itself was also considered. Consolidation within an embankment will generally range from one to four percent of the embankment height. Assuming one percent consolidation for a well compacted fill, approximately 24 inches of settlement can be expected for a 196-foot high embankment. However, it is anticipated that much of this settlement will occur during construction.

Settlement – Mainline Embankments, Station 271+50

Settlement due to primary consolidation of the foundation soil is expected to be approximately 10.0 inches. In addition, the time needed to reach 90 percent of primary consolidation is expected to take up to approximately 510 days. Due to the relatively small magnitude of settlement, the use of wick drains or other means of accelerating the consolidation were not explored.

Settlement due to consolidation of the fill material itself was also considered. Consolidation within an embankment will generally range from one to four percent of the embankment height. Assuming one percent consolidation for a well compacted fill, approximately 6 inches of settlement can be expected for a 49-foot high embankment. However, it is anticipated that much of this settlement will occur during construction.

Settlement – Mainline Embankments, Station 298+25

Settlement due to primary consolidation of the foundation soil is expected to be approximately 12.1 inches. In addition, the time needed to reach 90 percent of primary consolidation is expected to take up to approximately 357 days. Due to the relatively small magnitude of settlement, the use of wick drains or other means of accelerating the consolidation were not explored.

Settlement due to consolidation of the fill material itself was also considered. Consolidation within an embankment will generally range from one to four percent of the embankment height. Assuming one percent consolidation for a well compacted fill, approximately 26 inches of settlement can be expected for a 219-foot high embankment. However, it is anticipated that much of this settlement will occur during construction.

Settlement – Mainline Embankments, Station 312+00

Settlement due to primary consolidation of the foundation soil is expected to be approximately 5.7 inches. In addition, the time needed to reach 90 percent of primary consolidation is expected to take up to approximately 144 days. Due to the relatively small magnitude of settlement, the use of wick drains or other means of accelerating the consolidation were not explored.

Settlement due to consolidation of the fill material itself was also considered. Consolidation within an embankment will generally range from one to four percent of the embankment height. Assuming one percent consolidation for a well compacted fill, approximately 19 inches of settlement can be expected for a 159-foot high embankment. However, it is anticipated that much of this settlement will occur during construction.

Settlement – Mainline Embankments, Station 319+75

Settlement due to primary consolidation of the foundation soil is expected to be approximately 13.4 inches. In addition, the time needed to reach 90 percent of primary consolidation is expected to take up to approximately 144 days. Due to the relatively small magnitude of settlement, the use of wick drains or other means of accelerating the consolidation were not explored.

Settlement due to consolidation of the fill material itself was also considered. Consolidation within an embankment will generally range from one to four percent of the embankment height. Assuming one percent consolidation for a well compacted fill, approximately 11 inches of settlement can be expected for a 95-foot high embankment. However, it is anticipated that much of this settlement will occur during construction.

Settlement – Other Fill Sections Evaluated by Inspection

Embankment fill sections from Stations 166+50 to 168+50, 328+00 to 330+00, and 343+00 to 348+00 were also evaluated. Based on the shallow depth to bedrock and properties of the foundation soils, it was determined by inspection that settlement in these sections would be negligible.

5.4.2.2 Additional Settlement Recommendations

It should be emphasized that the time of consolidation estimates are based on the assumption that the initial embankment construction will consist of at least 6 feet of free-draining granular material placed over the entire fill foundation area, as discussed in section 5.6.3. Groundwater seepage, overexcavation, and removal of unsuitable soils should be anticipated within the interchange areas. Consequently, it may be necessary to utilize additional granular material or end-dumped rock in order to establish a dry and stable fill foundation.

Based on the results of calculations described above, excessive settlements are not anticipated for the Phase 3 embankments analyzed for this report. Although settlement is not a significant concern in this area, general recommendations for accelerating or mitigating settlements are presented below.

The most cost effective method for dealing with the potentially excessive settlement would be to surcharge the embankment foundations prior to construction. Monitoring equipment should be installed to measure the rate/amount of settlement and normal fill operations should begin when an acceptable degree of consolidation is achieved. Other options to either reduce the amount of settlement or to accelerate the time of consolidation within the embankment foundation, such as overexcavation and replacement of the existing soft and/or organic soils or wick drains, are not considered viable options for the fill sections evaluated in this report because significant amounts of soft soils were not encountered in the borings and the soils encountered were generally not soft enough to install wick drains.

5.4.3 Potential Areas of Instability

The dominant rock type along the proposed alignment is sandstone of the Mississippian aged Logan Formation. Siltstone and shale are commonly found interbedded with the sandstone. These siltstones and shales generally weather to clay with low shear strength over time. The steeper slopes are prone to gradual movement known as soil creep. The low shear strength of the residual and colluvial soils combined with the steep topography makes some of the hillsides within the proposed limits of construction prone to shallow surficial landslides and soil creep. Generally these conditions are easily corrected by removal of the unstable slope materials. For additional information regarding specific areas of instability encountered along the Phase 3 alignment, refer to the Phase 3 field reconnaissance report, which will be submitted separately.

5.5 Rock Cuts

Currently, approximately 6.1 miles of the Phase 3 mainline alignment is anticipated to be located in cuts. A majority of these cuts will be in rock. In accordance with ODOT's Geotechnical Bulletin Number 3 (GB-3) "Rock Cut Slope & "Catchment Design", Phase 3 rock cuts have been evaluated. For specific information pertaining to the rock cut slopes, please refer to the Phase 3 rock cut slopes report, which was submitted separately.

5.6 Construction Considerations

5.6.1 General

Based on the provided plans, profiles, and cross sections, the new roadway will consist of several cuts as well as embankment fills. All work should be performed in accordance with ODOT CMS, (Current Edition). Special care should be taken to ensure that the requirements of the CMS are met so that stable embankments are constructed.

5.6.2 Subgrade Preparation

Silt (A-4b) was encountered at the existing ground surface at several boring locations in the Phase 3 area. Whenever silt is encountered at the subgrade level, it should be overexcavated to at least three feet below subgrade and replaced with suitable, compacted fill. Additionally, no silt (A-4b) should be placed within three feet of subgrade in embankment fill sections.

5.6.3 New Embankment Construction

ODOT CMS Item 201 "Clearing and Grubbing" should be completed across the entire portion of the embankment foundation. The foundation should be compacted

to at least 95% of the Standard Proctor value as outlined in ODOT CMS section 203.05. Also, it is recommended that the foundation soils be proof rolled (ODOT Item 204.06) prior to placement of any embankment materials. Any soft, yielding areas should be undercut to firm material and replaced with controlled, engineered fill. If seeps are encountered, spring drains should be installed to reduce the potential for the fill to become saturated in the future.

Prior to beginning normal embankment fill operations, it is recommended that the initial embankment construction consist of at least 6 feet of free-draining granular material placed over the entire fill foundation area. This material will allow the drainage of the foundation soils, not inhibit the time-rate of consolidation, and will also provide a stable surface upon which normal fill operations can begin.

Locations of borrow areas are not known at this time. However, if glacial tills are utilized as the fill materials, any large durable cobbles or boulders greater than 8 inches in any dimension that cannot be broken down should be segregated and not be incorporated into the lift. In addition, any soil classified as silt (A-4b) should not be used as fill.

5.6.4 Embankment Drainage

All embankments and side hill fills should have a drainage layer in the lower portion of the fill, at the foundation soil-fill interface. This drainage layer should consist of a minimum of six feet of free-draining, durable, rock fill as defined in ODOT CMS, Item 203.6.C and Item 703.16.C.

If springs or seeps are encountered during construction, the flow should be collected within the embankment drainage layer or directed to the embankment drainage layer with a ditch or a trench drain. A typical trench drain should be a minimum of one foot in width, with a depth and grade suitable for positive drainage. Six inches of concrete sand (ODOT Item 703.02) should be placed in the bottom of the trench, then a six-inch diameter, fabric-wrapped, perforated PVC pipe should be placed on top of the sand layer. The trench should then be backfilled to the surface with concrete sand.

All ponds that lie within the footprint of a planned embankment should be drained, and all "muck" and unsuitable material removed. Ponds may require benching as set forth in ODOT CMS Item 203.05 or placement of a spring or seep drain prior to embankment fill placement. Ponds known to have a spring and requiring a spring drain are indicated as spring-fed ponds on the plans.

5.6.5 Rock Excavation

It is anticipated that rock excavation will be required for the roadway construction.

In addition, sandstone bedrock was encountered at the subgrade elevations between the stations indicated in Section 5.2. Due to the hardness of the rock and the length of the proposed alignment, blasting will likely be needed to excavate the rock. Rock encountered at the subgrade elevation should be undercut and replaced by controlled, engineered fill as outlined by ODOT CMS Item 204.05.

5.6.6 GB-2 Special Benching

The roadway cross-sections were analyzed in accordance with Ohio Department of Transportation's Office of Geotechnical Engineering Geotechnical Bulletin 2 (GB-2), released February 7, 2006. ODOT specifications require that any side hill fill on an existing slope steeper than 8:1 be benched according to the ODOT CMS Item 203.05. The ODOT Office of Geotechnical Engineering recommends special benching on existing slopes 4:1 or steeper. Special benching is used to improve the constructability and stability of the proposed embankment. Special benching is always shown on the cross-sections in the project plans and never on a typical cross-section. Whenever special benching is used, Plan Note G110 from the ODOT Location and Design Manual, Volume 3, needs to be included in the general notes.

Construction along the proposed alignment will consist of side hill fills ranging from less than 2 feet to more than 60 feet. The existing slopes range from nearly flat to steeper than 3H:1V. In some cases, the existing ground surface is steeper than 4H:1V and relatively thin, sliver fills will be placed. The bedrock and overburden interface is a common avenue for water during the wet winter months. In two places along the alignment, relatively thin fills will be placed in areas that will likely experience seepage and ground water infiltration from this interface. These fills are in areas that may be too thin or small to effectively place the free draining durable rock layer. In order to increase the performance of the embankments in these areas, special benching and drainage is recommended at the locations shown in the following table.

Areas requiring special benching

| Beginning Station | End Station |
|--------------------------|--------------------|
| 63+50 | 65+00 |
| 66+50 | 66+50 |
| 67+00 | 67+00 |
| 105+50 | 107+00 |
| 174+00 | 174+00 |
| 182+00 | 183+50 |
| 185+00 | 186+00 |
| 226+50 | 230+50 |
| 237+00 | 238+50 |
| 242+50 | 245+00 |
| 254+50 | 255+50 |
| 259+00 | 260+50 |
| 271+50 | 273+00 |

Areas requiring special benching

| Beginning Station | End Station |
|--------------------------|--------------------|
| 284+50 | 285+50 |
| 288+50 | 289+50 |
| 290+00 | 292+00 |
| 296+00 | 299+00 |
| 301+00 | 306+00 |
| 308+50 | 310+50 |
| 314+50 | 317+00 |
| 322+00 | 324+00 |
| 329+50 | 330+00 |
| 333+50 | 333+50 |

All embankment fill should be placed in accordance with ODOT CMS Items 203.6: Spreading and Compacting and 203.7: Compaction and Moisture Requirements. The majority of the material to be excavated from the benching operation should be acceptable material for embankment fill. However, the material may have excessive moisture contents and may require moisture adjustments prior to compaction.

5.7 Excavation and Groundwater Considerations

Seepage and groundwater conditions are variable across the Phase 3 alignment. The Contractor should be prepared to keep excavations reasonably dry, such as with sumping and pumping. The Contractor should also be prepared to deal with unexpected seepage and precipitation that enters any excavations. Please refer to section 4.3 of this document, and the boring logs in Appendix A, for more information concerning seepage and groundwater levels.

Excavations deeper than 4 feet must be laid back or braced to protect workers entering the excavations. All excavations should be constructed in accordance with applicable local, state, and federal safety regulations including the current OSHA Excavation and Trench Safety Standards (29 CFR Part 1926). Slopes or bracing for excavations 20 feet or more in depth must be designed by a registered professional engineer.

5.8 Geotechnical Design Checklists

The geotechnical design checklist applicable to this report is included in Appendix D.

6.0 CLOSING REMARKS

You are encouraged to discuss with us any questions you may have concerning the findings, conclusions, and recommendations presented in this report. Please do not hesitate to call if we can be of further assistance.

Sincerely,

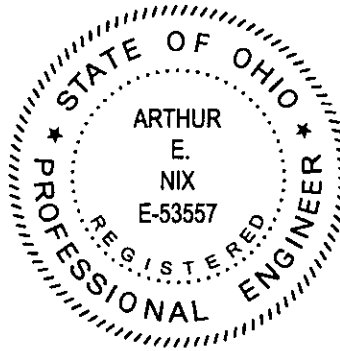
DLZ OHIO, INC.



Dorothy A. Adams, P.E.
Senior Geotechnical Engineer



Pete Nix, P.E.
Geotechnical Division Manager

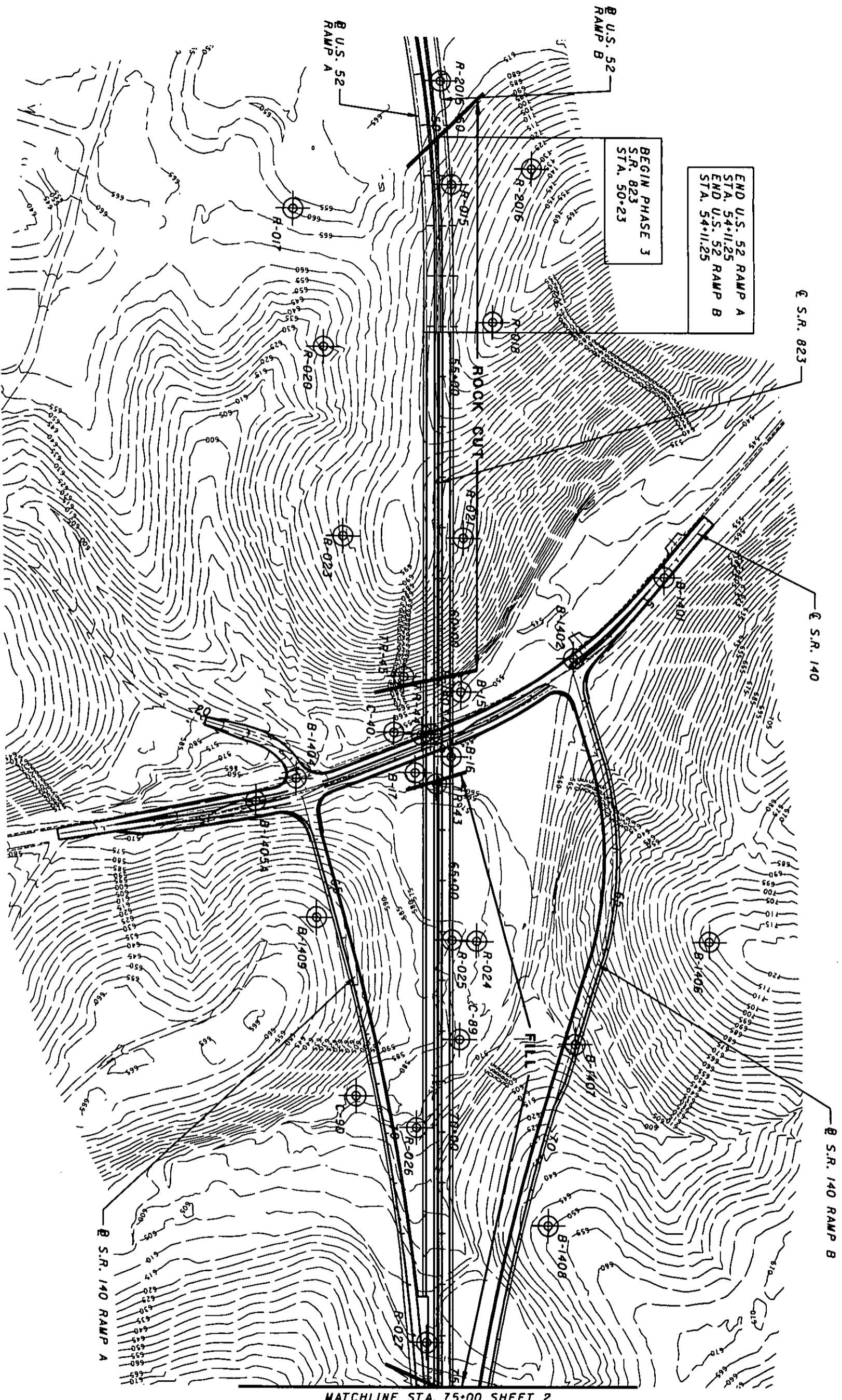


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APPENDIX A

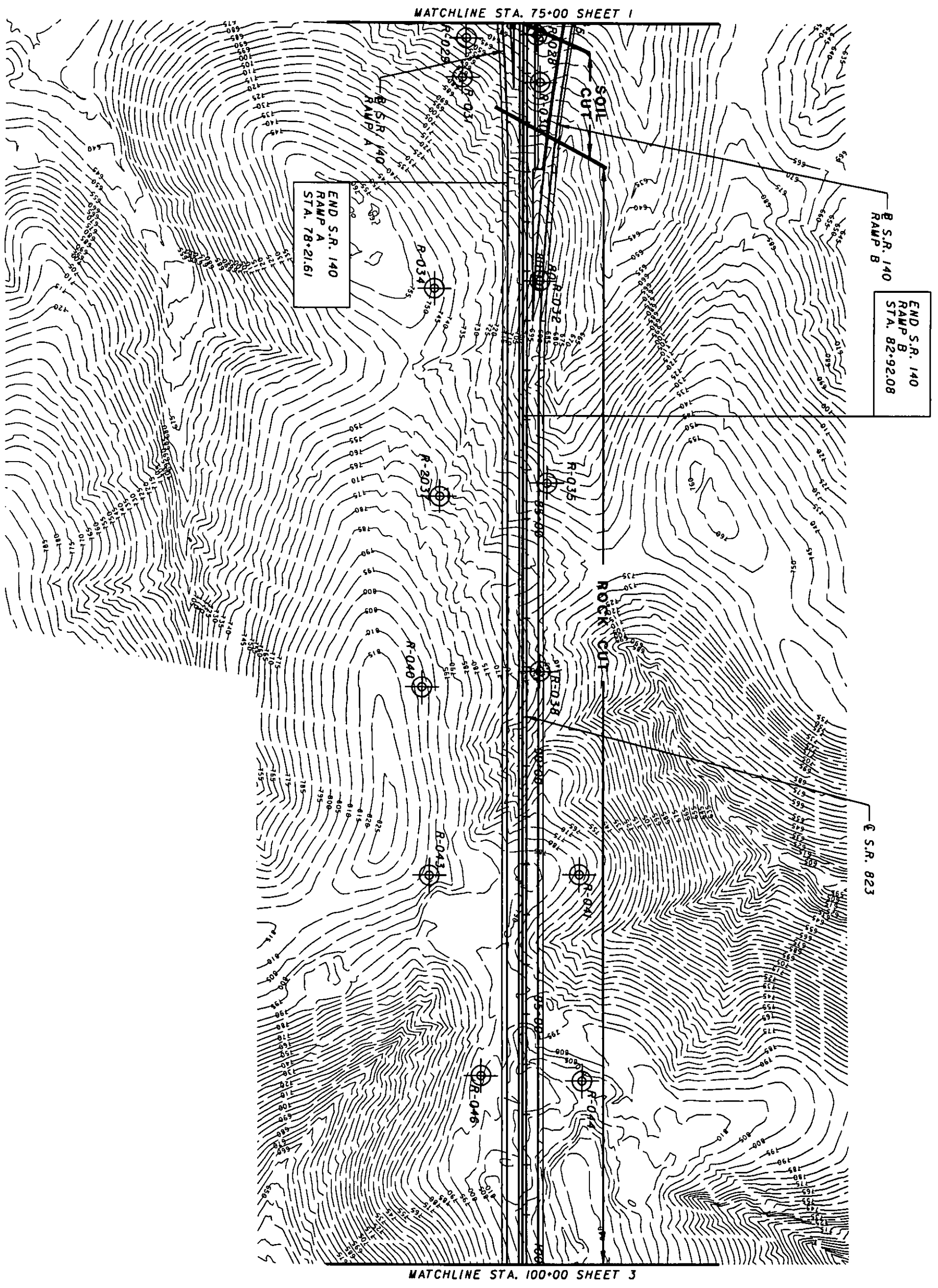
Boring Location Plan
General Information - Drilling Procedures and Logs of Borings
Legend - Boring Log Terminology
Boring Logs – Ninety (90) Borings



BEGIN PHASE 3
 S.R. 823
 STA. 50+23

END U.S. 52 RAMP A
 STA. 54+11.25
 END U.S. 52 RAMP B
 STA. 54+11.25

MATCHLINE STA. 75+00 SHEET 2



MATCHLINE STA. 75+00 SHEET 1

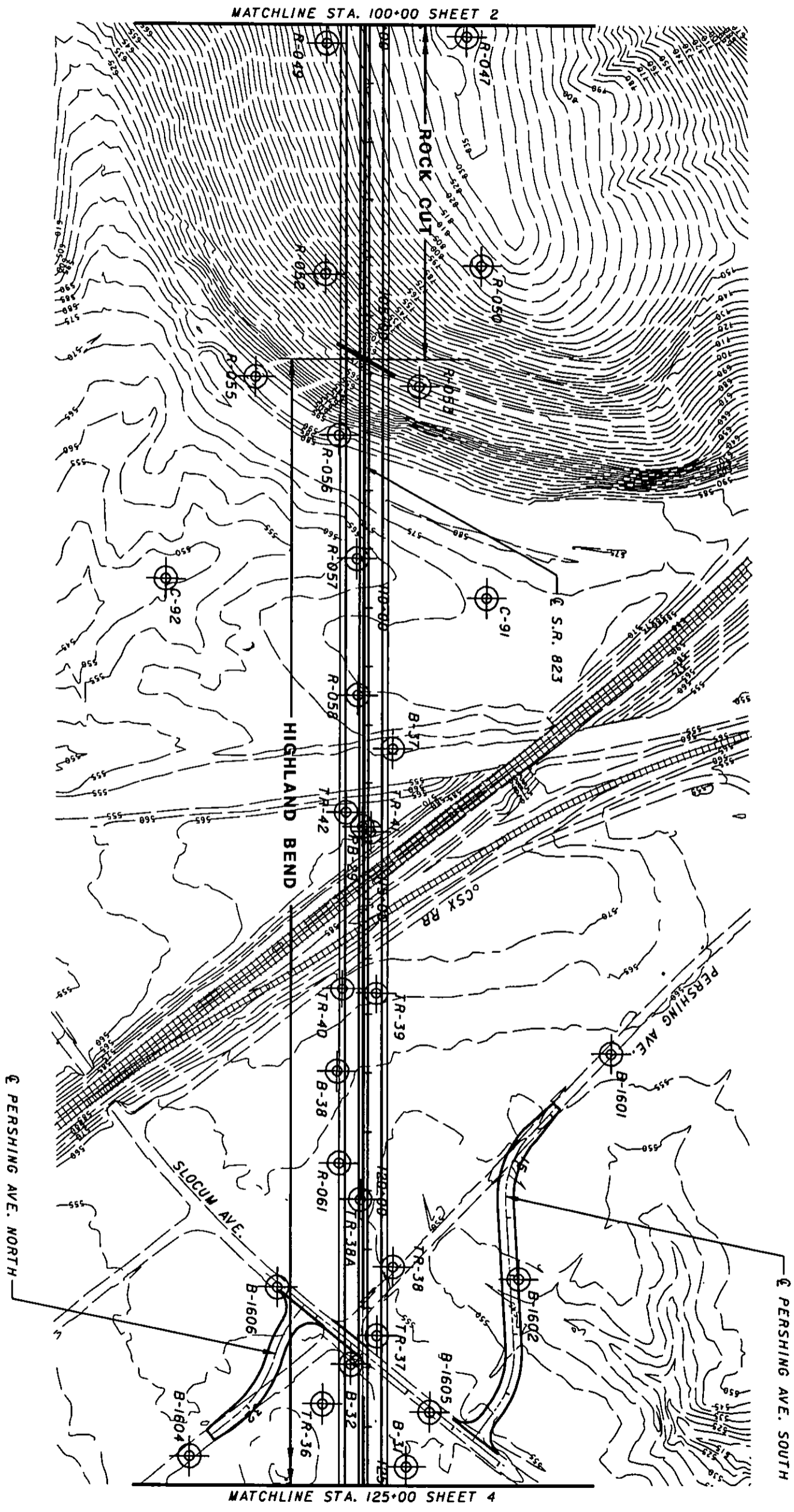
MATCHLINE STA. 100+00 SHEET 3

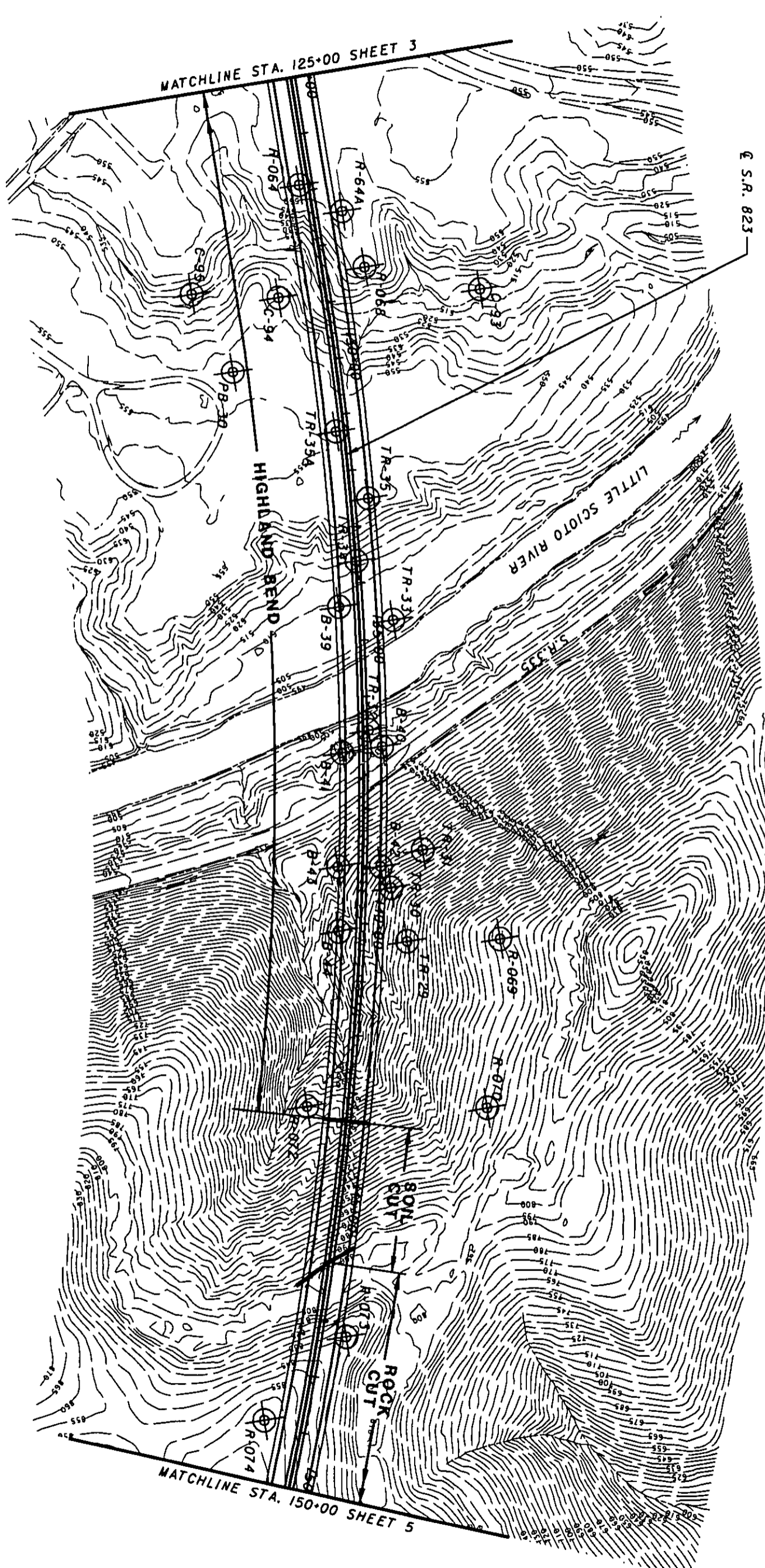


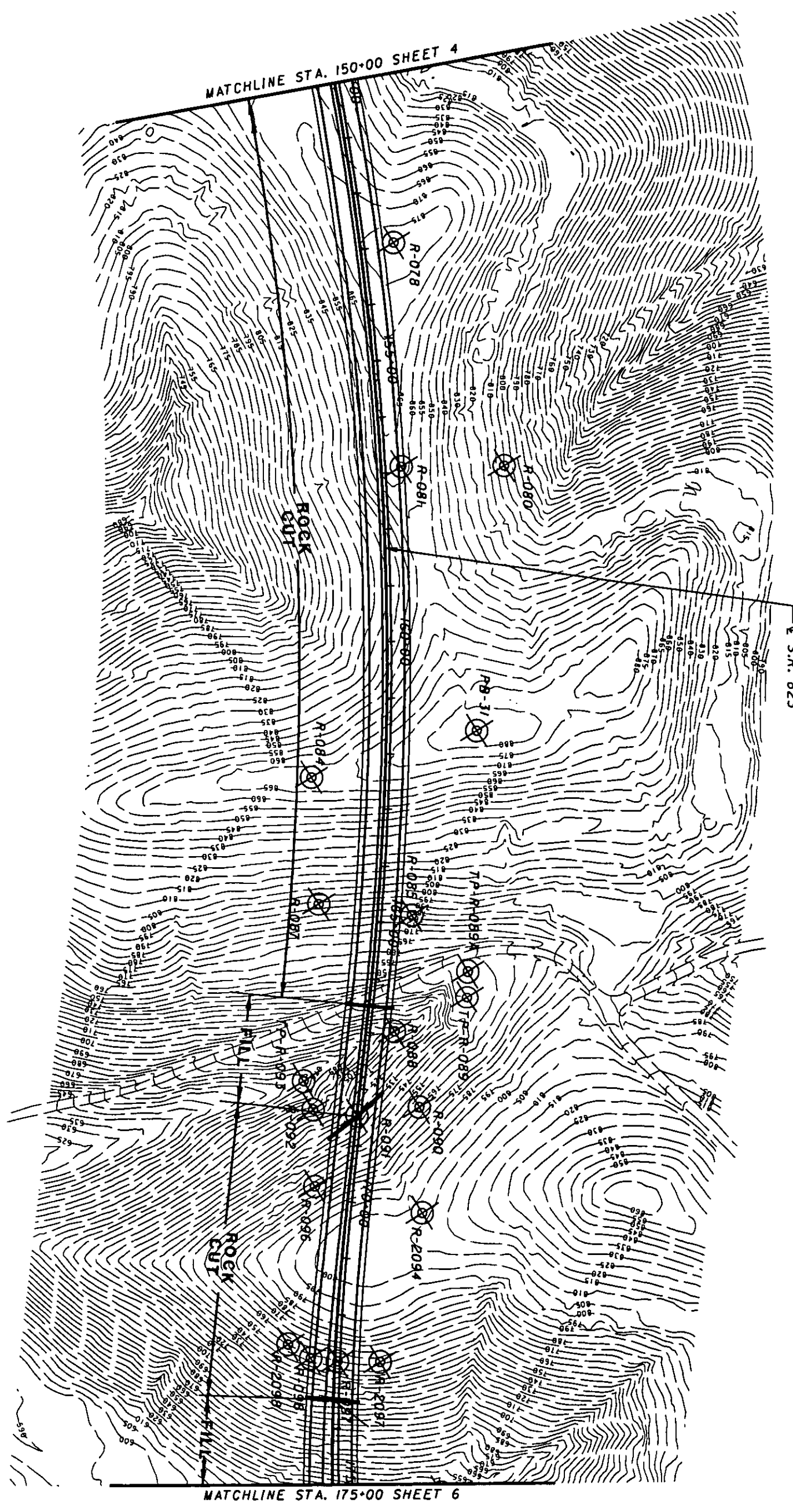
2/13
 SCI-823-0.00

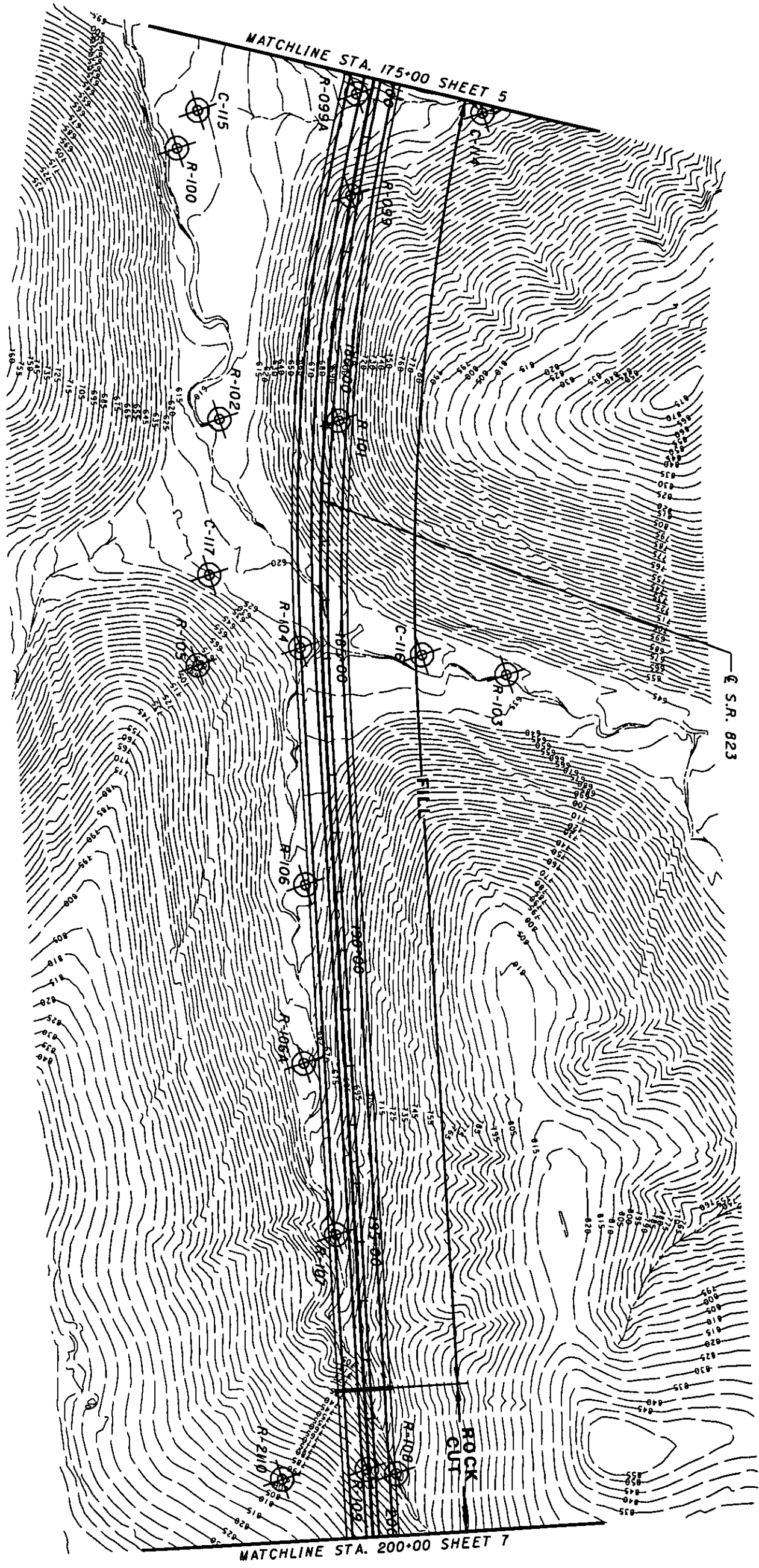
BORING LOCATION PLAN
 S.R. 823 STA. 75+00 TO STA. 100+00

| | | |
|--------------------------------|---|--|
| DRAWN RLS CHECKED AEN | 0 50 100 200 HORIZONTAL SCALE IN FEET | |
|--------------------------------|---|--|







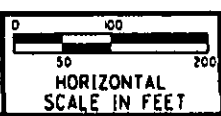


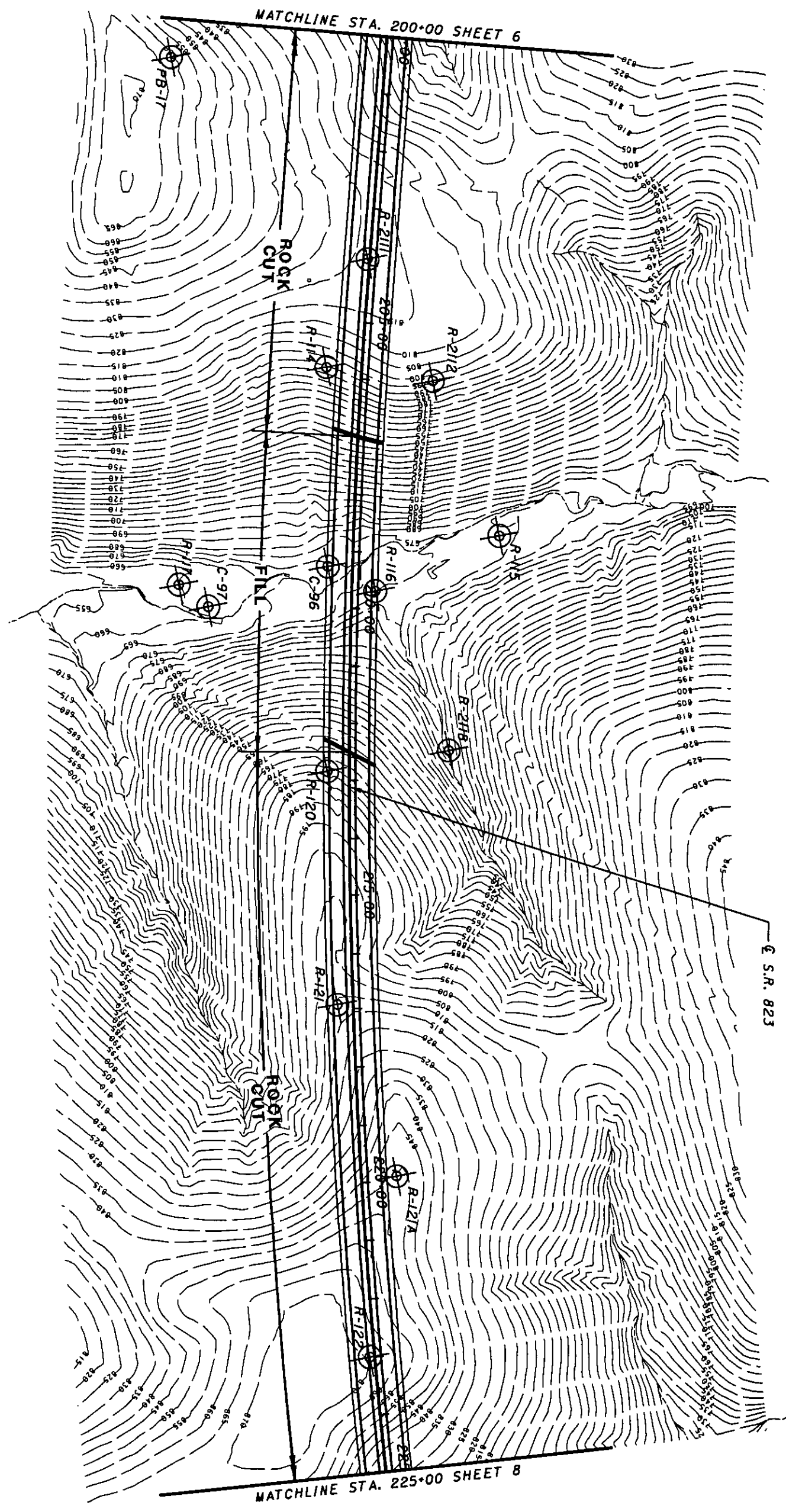
6/13

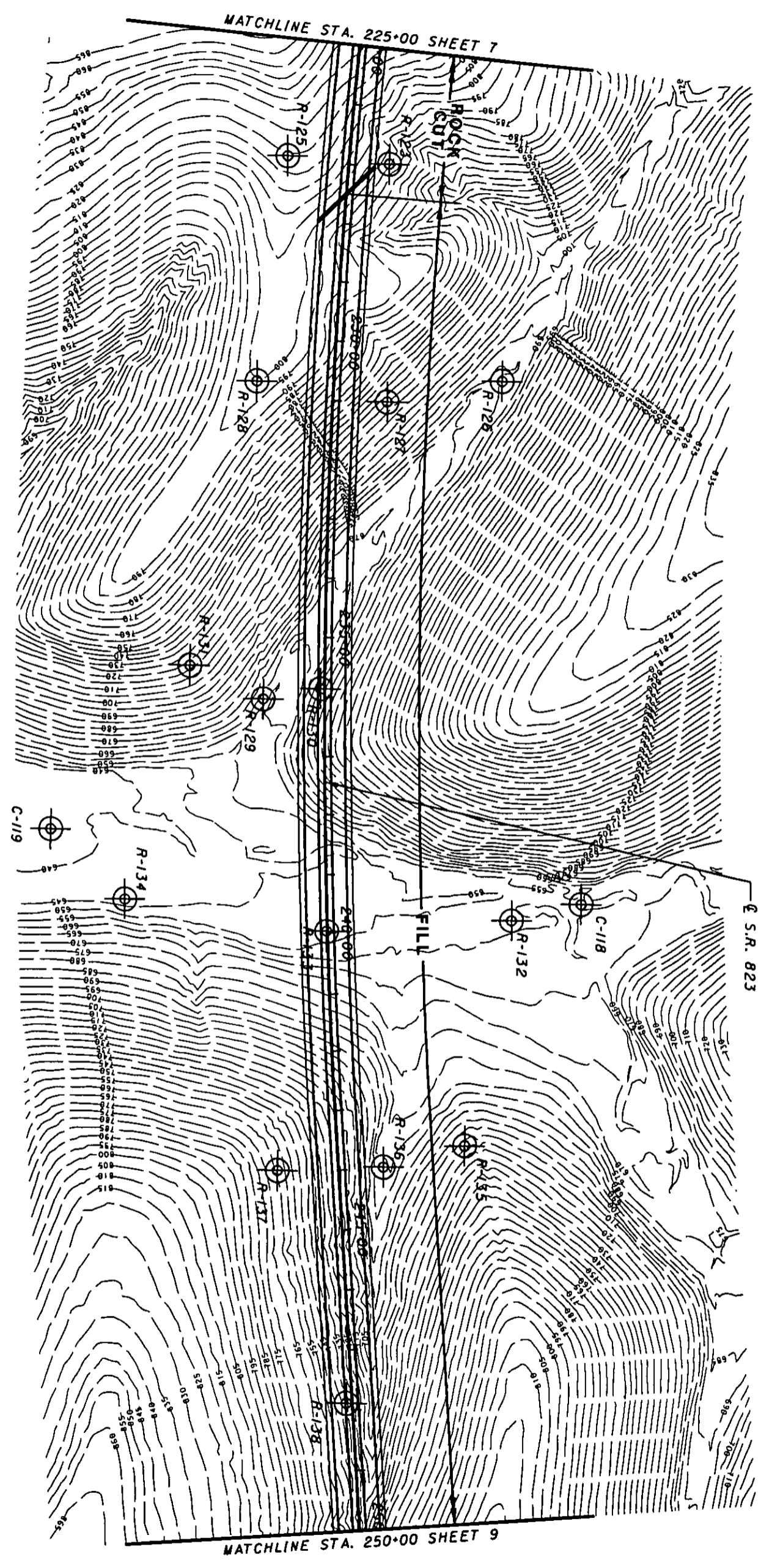
SCI-823-0.00

BORING LOCATION PLAN
S.R. 823 STA. 175+00 TO STA. 200+00

DRAWN
 RLS
 CHECKED
 AEN





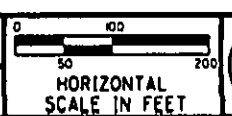


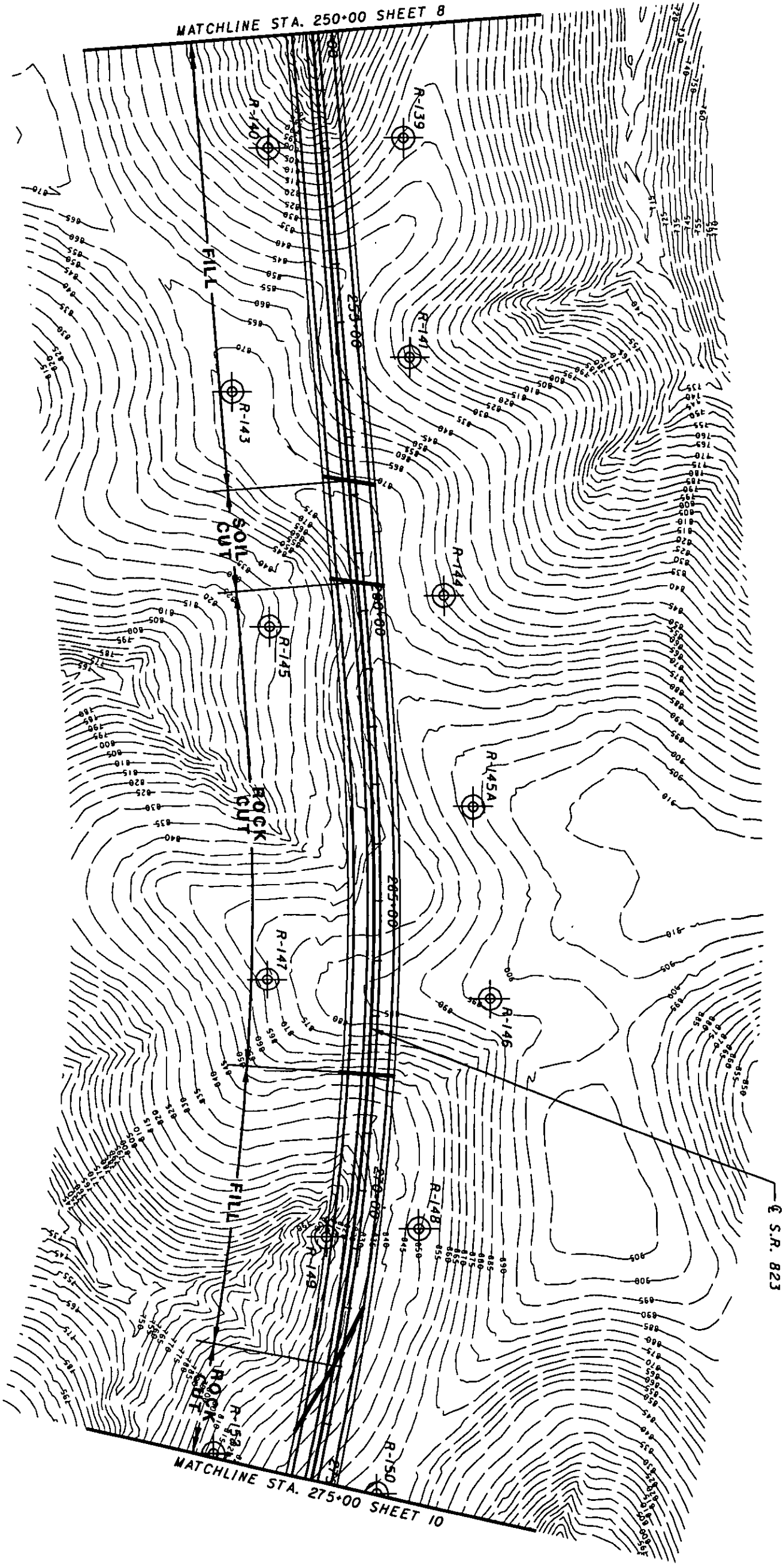
8/13

SCI-823-0.00

BORING LOCATION PLAN
S.R. 823 STA. 225+00 TO STA. 250+00

DRAWN
RLS
CHECKED
AEN



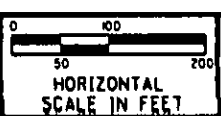


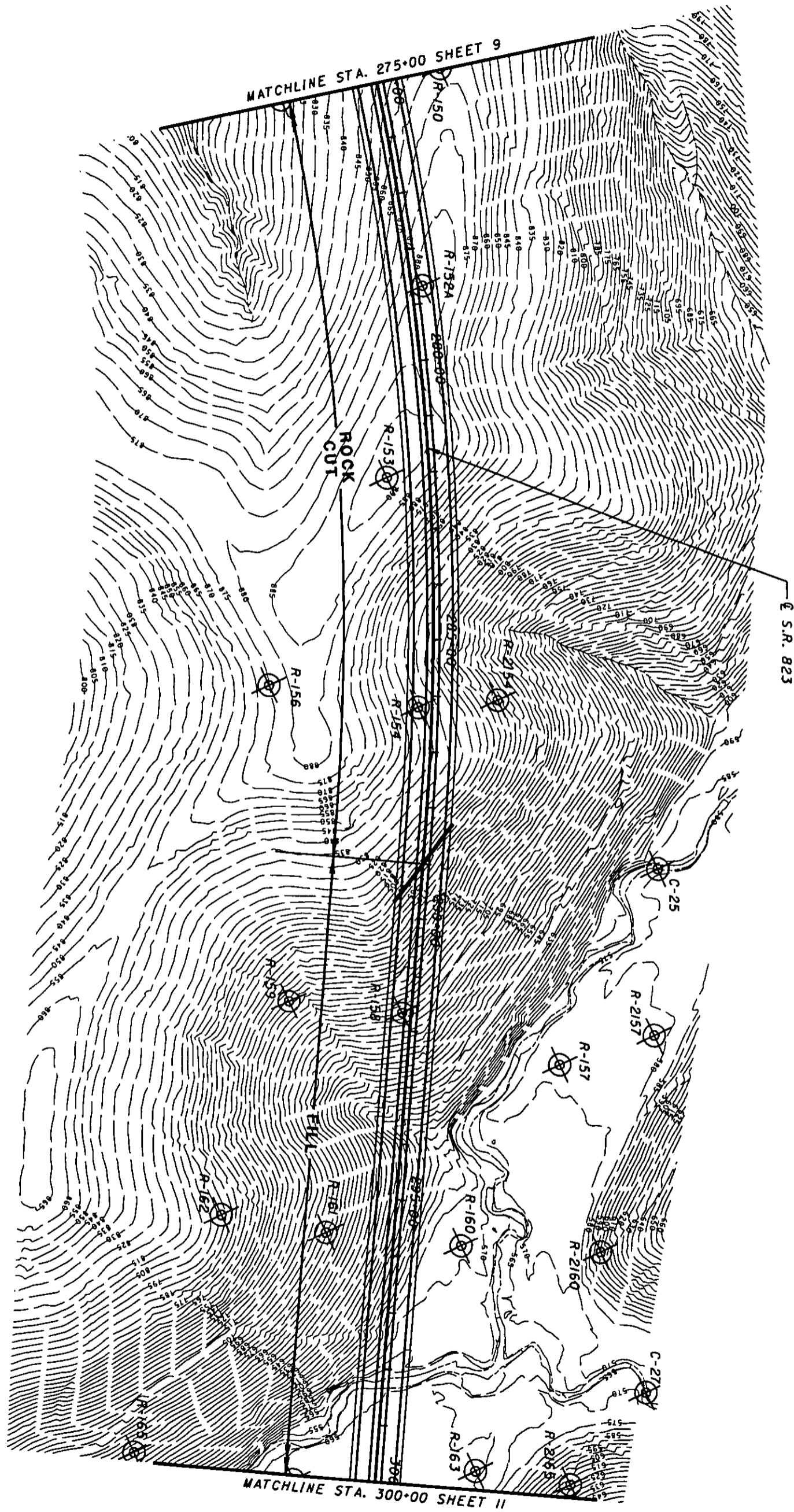
9/13

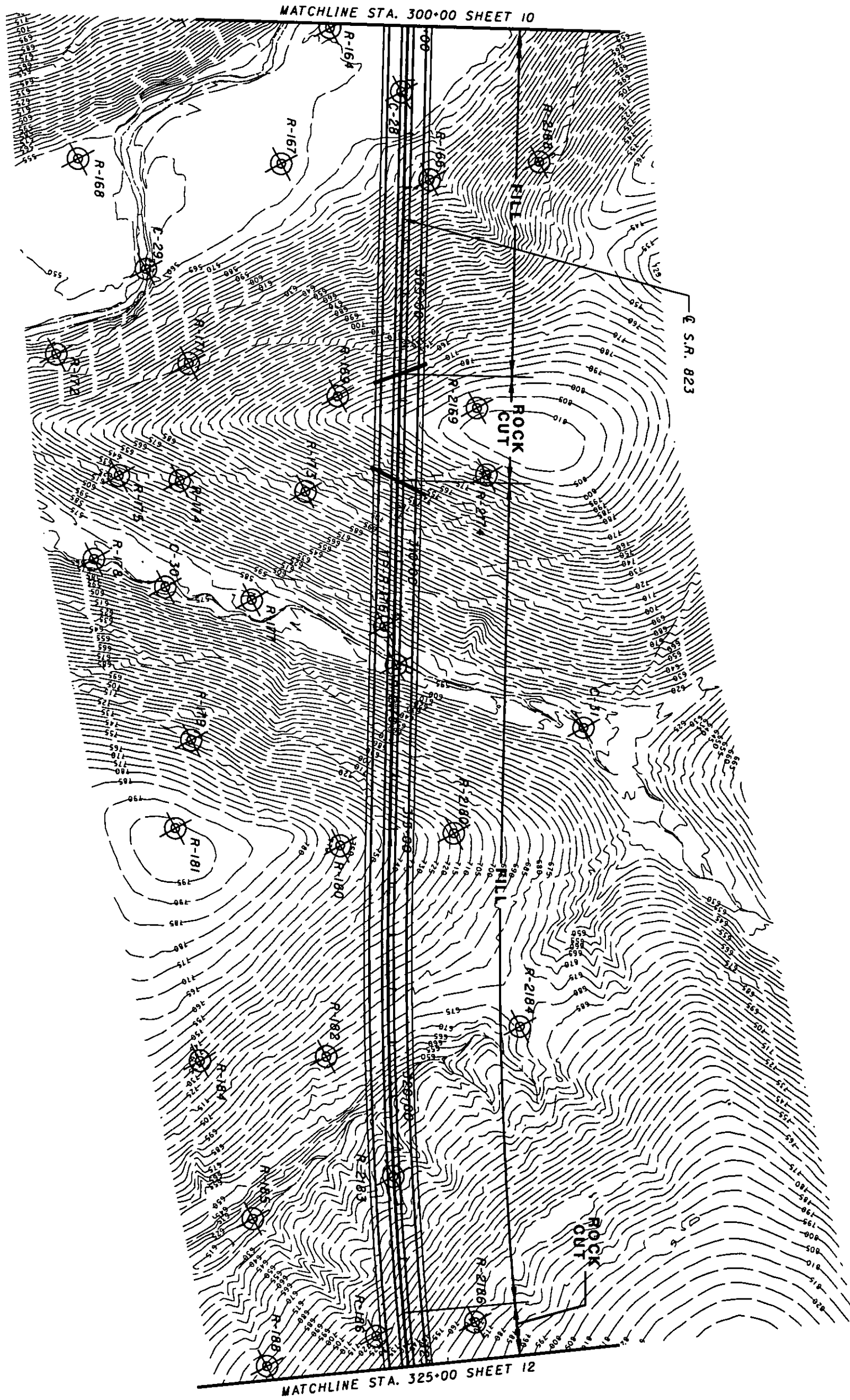
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BORING LOCATION PLAN
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RLS
CHECKED
AEN





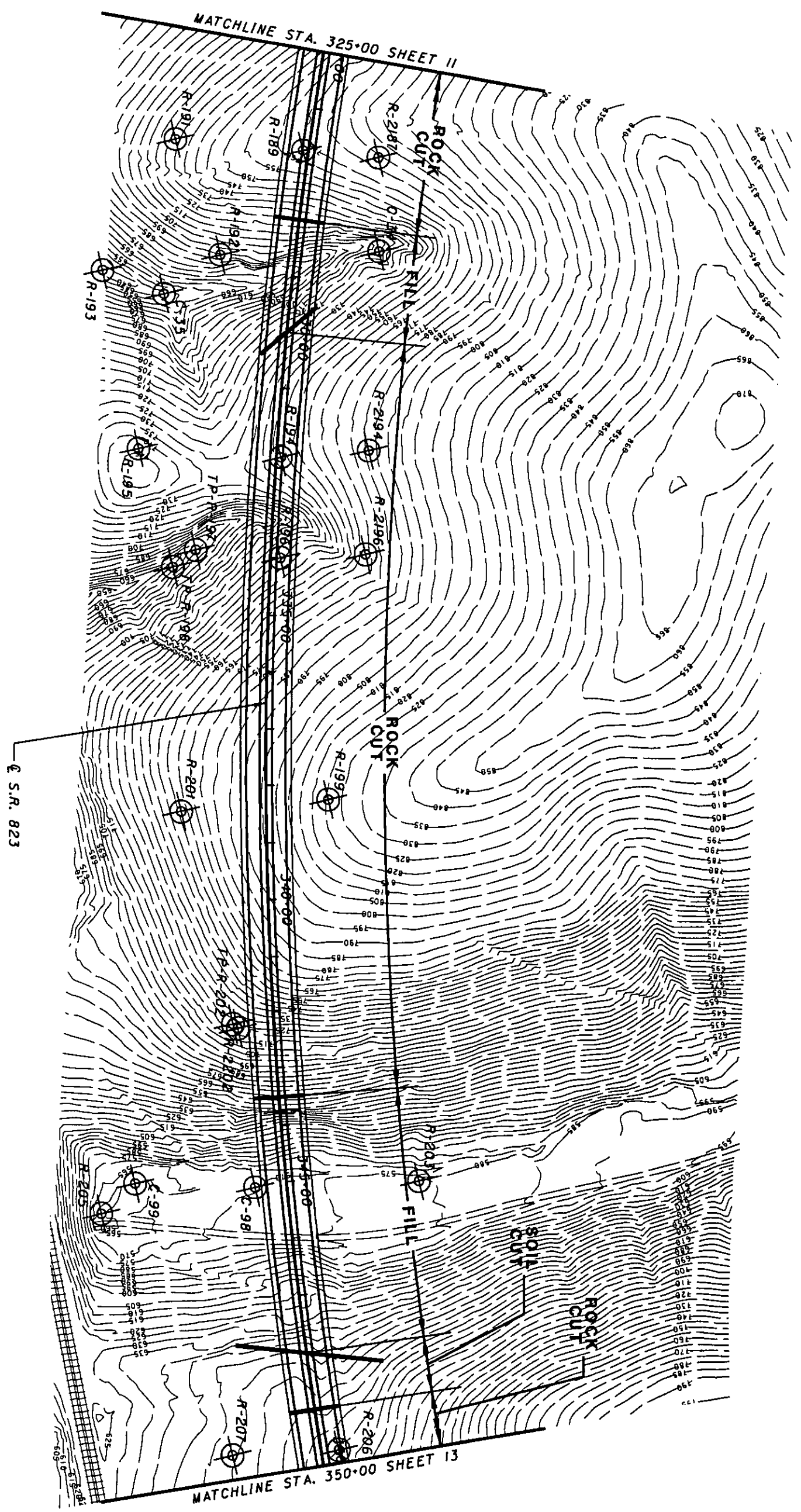


11/13 SCI-823-0.00

BORING LOCATION PLAN
S.R. 823 STA. 300+00 TO STA. 325+00

| | |
|----------------|-----------------------------|
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| CHECKED AEN | HORIZONTAL SCALE IN FEET |



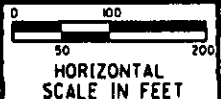


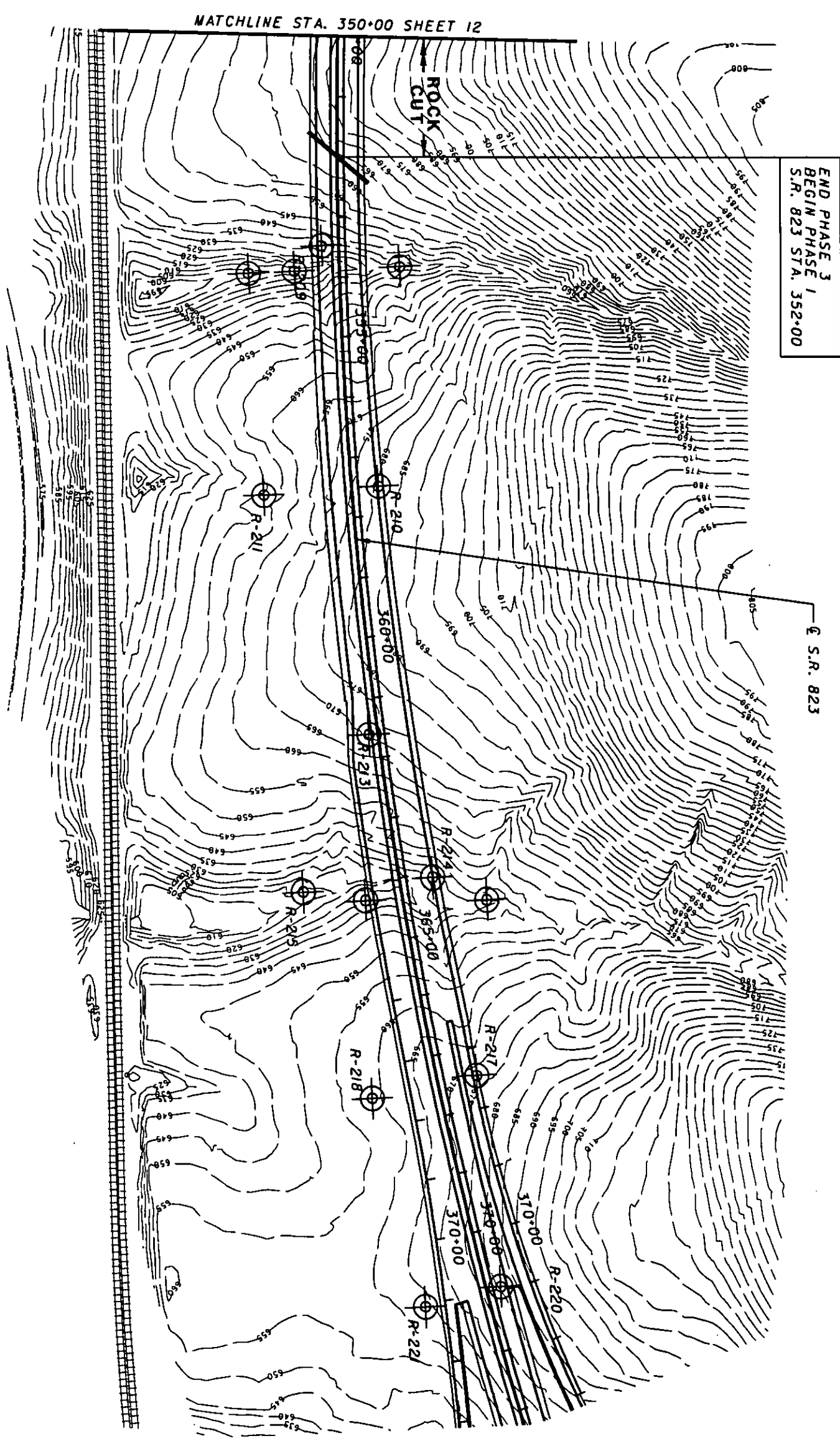
12/13

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BORING LOCATION PLAN
S.R. 823 STA. 325+00 TO STA. 350+00

DRAWN
RLS
CHECKED
AEN



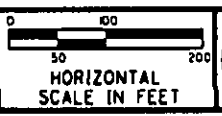


13 / 13

SCI-823-0.00

BORING LOCATION PLAN
S.R. 823 STA. 350+00 TO STA. 352+00

DRAWN
RLS
CHECKED
AEN



GENERAL INFORMATION DRILLING PROCEDURES AND LOGS OF BORINGS

Drilling and sampling were conducted in accordance with procedures generally recognized and accepted as standardized methods of investigation of subsurface conditions concerning geotechnical engineering considerations. Borings were drilled with either a truck-mounted or ATV-mounted drill rig.

Drive split-barrel sampling was performed in 1.5 foot increments at intervals not exceeding 5 feet. In the event the sampler encountered resistance to penetration of 6 inches or less after 50 blows of the drop hammer, the sampling increment was discontinued. Standard penetration data were recorded and one or more representative samples were preserved from each sampling increment.

In borings where rock was cored, NXM or NQ size diamond coring tools were used.

In the laboratory all samples were visually classified by a geotechnical engineer. Moisture contents of representative fine-grained soil samples were determined. A limited number of samples, considered representative of foundation materials present, were selected for performance of grain-size analyses and plasticity characteristics tests. The results of these tests are shown on the boring logs.

The boring logs included in the Appendix have been prepared on the basis of the field record of drilling and sampling, and the results of the laboratory examination and testing of samples. Stratification lines on the boring logs indicating changes in soil stratigraphy represent depths of changes approximated by the driller, by sampling effort and recovery, and by laboratory test results. Actual depths to changes may differ somewhat from the estimated depths, or transitions may occur gradually and not be sharply defined. The boring logs presented in this report therefore contain both factual and interpretative information and are not an exact copy of the field log.

Although it is considered that the borings have disclosed information generally representative of site conditions, it should be expected that between borings conditions may occur which are not precisely represented by any one of the borings. Soil deposition processes and natural geologic forces are such that soil and rock types and conditions may change in short vertical intervals and horizontal distances.

Soil/rock samples will be stored at our laboratory for a period of six months. After this period of time, they will be discarded, unless notified to the contrary by the client.

LEGEND – BORING LOG TERMINOLOGY

Explanation of each column, progressing from left to right

1. Depth (in feet) – refers to distance below the ground surface.
2. Elevation (in feet) – is referenced to mean sea level, unless otherwise noted.
3. Standard Penetration (N) – the number of blows required to drive a 2-inch O.D., 1-3/8 inch I.D., split-barrel sampler, using a 140-pound hammer with a 30-inch free fall. The blows are recorded in 6-inch drive increments. Standard penetration resistance is determined from the total number of blows required for one foot of penetration by summing the second and third 6-inch increments of an 18-inch drive.

50/n – indicates number of blows (50) to drive a split-barrel sampler a certain number of inches (n) other than the normal 6-inch increment.
4. The length of the sampler drive is indicated graphically by horizontal lines across the "Standard Penetration" and "Recovery" columns.
5. Sample recovery from each drive is indicated numerically in the column headed "Recovery".
6. The drive sample location is designated by the heavy vertical bar in the "Sample No., Drive" column.
7. The length of hydraulically pressed "Undisturbed" samples is indicated graphically by horizontal lines across the "Press" column.
8. Sample numbers are designated consecutively, increasing in depth.

9. Soil Description

- a. The following terms are used to describe the relative compactness and consistency of soils:

Granular Soils – Compactness

| <u>Term</u> | <u>Blows/Foot Standard Penetration</u> |
|--------------|--|
| Very Loose | 0 – 4 |
| Loose | 4 – 10 |
| Medium Dense | 10 – 30 |
| Dense | 30 – 50 |
| Very Dense | over 50 |

Cohesive Soils – Consistency

| <u>Term</u> | <u>Unconfined Compression tons/sq.ft.</u> | <u>Blows/Foot Standard Penetration</u> | <u>Hand Manipulation</u> |
|--------------|---|--|--|
| Very Soft | less than 0.25 | below 2 | Easily penetrated by fist |
| Soft | 0.25 – 0.50 | 2 – 4 | Easily penetrated by thumb |
| Medium Stiff | 0.50 – 1.0 | 4 – 8 | Penetrated by thumb with moderate pressure |
| Stiff | 1.0 – 2.0 | 8 – 15 | Readily indented by thumb but not penetrated |
| Very Stiff | 2.0 – 4.0 | 15 – 30 | Readily indented by thumb nail |
| Hard | over 4.0 | over 30 | Indented with difficulty by thumb nail |

- b. Color – If a soil is a uniform color throughout, the term is single, modified by such adjective as light and dark. If the predominant color is shaded by a secondary color, the secondary color precedes the primary color. If two major and distinct colors are swirled throughout the soil, the colors are modified by the term "mottled".
- c. Texture is based on the Ohio Department of Transportation Classification System. Soil particle size definitions are as follows:

| <u>Description</u> | <u>Size</u> | <u>Description</u> | <u>Size</u> |
|--------------------|----------------|--------------------|-----------------------|
| Boulders | Larger than 8" | Sand – Coarse | 2.0 mm to 0.42 mm |
| Cobbles | 8" to 3" | – Fine | 0.42 mm to 0.074 mm |
| Gravel – Coarse | 3" to ¾" | Silt | 0.074 mm to 0.005 mm |
| – Fine | ¾" to 2.0 mm | Clay | smaller than 0.005 mm |

d. The main soil component is listed first. The minor components are listed in order of decreasing percentage of particle size.

e. Modifiers to main soil descriptions are indicated as a percentage by weight of particle sizes.

| | |
|--------|-----------|
| trace | 0 to 10% |
| little | 10 to 20% |
| some | 20 to 35% |
| "and" | 35 to 50% |

f. Moisture content of **cohesionless soils** (sands and gravels) is described as follows:

| <u>Term</u> | <u>Relative Moisture or Appearance</u> |
|-------------|--|
| Dry | No moisture present |
| Damp | Internal moisture, but none to little surface moisture |
| Moist | Free water on surface |
| Wet | Voids filled with free water |

g. The moisture content of **cohesive soils** (silts and clays) is expressed relative to plastic properties.

| <u>Term</u> | <u>Relative Moisture or Appearance</u> |
|-------------|---|
| Dry | Powdery |
| Damp | Moisture content slightly below plastic limit |
| Moist | Moisture content above plastic limit but below liquid limit |
| Wet | Moisture content above liquid limit |

10. Rock Hardness and Rock Quality Designation

a. The following terms are used to describe the relative hardness of the **bedrock**.

| <u>Term</u> | <u>Description</u> |
|-------------|---|
| Very Soft | Permits denting by moderate pressure of the fingers. Resembles hard soil but has rock structure. (Crushes under pressure of fingers and/or thumb) |
| Soft | Resists denting by fingers, but can be abraded and pierced to shallow depth by a pencil point. (Crushes under pressure of pressed hammer) |
| Medium Hard | Resists pencil point, but can be scratched with a knife blade. (Breaks easily under single hammer blow, but with crumbly edges.) |
| Hard | Can be deformed or broken by light to moderate hammer blows. (Breaks under one or two strong hammer blow, but with resistant sharp edges.) |
| Very Hard | Can be broken only by heavy and in some rocks repeated hammer blows. |

b. Rock Quality Designation, RQD – This value is expressed in percent and is an indirect measure of rock soundness. It is obtained by summing the total length of all core pieces which are at least four inches long, and then dividing this sum by the total length of the core run.

11. Gradation – when tests are performed, the percentage of each particle size is listed in the appropriate column (defined in Item 9c).
12. When a test is performed to determine the natural moisture content, liquid limit moisture content, or plastic limit moisture content, the moisture content is indicated graphically.
13. The standard penetration (N) value in blows per foot is indicated graphically.

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring C-25

Location: Sta. 288+76.4, 421.8 ft. LT of SR 823 CL

Date Drilled: 12/13/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 5.5' - 13.0' Water level at completion: 0.0' | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | |
| 0 | 579.2 | | | | | | DESCRIPTION | | | | | | | | | | |
| | | 4 | | | | 2.0 | Topsoil - 0"/drilled in streambed | | | | | | | | | | |
| | | 10 | 12 | | | | Stiff to very stiff brown SANDY SILT (A-4a), trace clay, trace gravel; contains sandstone fragments; damp. | 37 | 13 | - | 13 | 26 | 11 | | | | |
| | | 10 | | | | | | | | | | | | | | | |
| -3.5 | 575.7 | 11 | | | | 3.0 | Very stiff brown SILT (A-4b), some fine to coarse sand, little clay, trace gravel; damp. | 3 | 12 | - | 9 | 61 | 15 | | | | |
| | | 7 | 16 | | | | | | | | | | | | | | |
| | | 4 | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | |
| 5.5 | 573.7 | 3 | | | | | Loose grayish brown GRAVEL WITH SAND (A-1-b), little silt, trace clay; contains sandstone fragments; moist. | | | | | | | | | | |
| | | 5 | 10 | | | | | | | | | | | | | | |
| | | 4 | | | | | | | | | | | | | | | |
| | | 3 | | | | | | | | | | | | | | | |
| | | 3 | 9 | | | | | 62 | 10 | - | 9 | 19 | | | | | |
| 10 | | 3 | | | | | | | | | | | | | | | |
| | | 6 | | | | | | | | | | | | | | | |
| | | 3 | 9 | | | | | | | | | | | | | | |
| | | 5 | | | | | | | | | | | | | | | |
| | | 7 | 11 | | | | | | | | | | | | | | |
| | | 10 | | | | | | | | | | | | | | | |
| -13.0 | 566.2 | 50/4 | 1 | | | | Severely weathered brown SANDSTONE, argillaceous. | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | |
| | | | | | | | @ 16.0', gray. | | | | | | | | | | |
| -16.5 | 562.7 | 50/3 | 1 | | | | Very hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured. | | | | | | | | | | |
| | | | | | | | @ 16.7', 18.2', low angle fractures. | | | | | | | | | | |
| | | | | | | | @ 25.5'-25.6', broken zone. | | | | | | | | | | |
| | | | | | | | @ 25.6'-26.5', lost recovery; possible fracture. | | | | | | | | | | |
| | | | | | | | @ 18.2'-18.3', calcareous. | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | |
| | | Core 120" | Rec 109" | | | | | | | | | | | | | | |
| | | | | RQD 89% | R-1 | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 | 11/12/2007 12:49 PM |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring C-29

Location: Sta. 304+68.4, 482.5 ft. RT of SR 823 CL

Date Drilled: 12/21/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 3.5'-5.0', 8.0'-13.0' Water level at completion: 0.0' | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|-------------|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0 | 544.8 | | | | | | | | | | | | | | | | | | |
| | | 5 7 | 7 | | 1 | | Topsoil - 0"/drilled in streambed | | | | | | | | | | | | |
| | | 6 7 | | | | | Medium dense brown GRAVEL WITH SAND AND SILT (A-2-4), trace clay; contains sandstone fragments; damp to moist. | 32 | 17 | - | 22 | 24 | 5 | | | | | | Non-Plastic |
| | | 5 7 | 13 | | 2 | | | | | | | | | | | | | | |
| 5.5 | 539.3 | | | | | | Stiff brown and gray SILT (A-4b), little to some clay, trace fine to coarse sand, trace gravel; contains sandstone fragments; damp to moist. | 4 | 3 | - | 6 | 67 | 20 | | | | | | |
| | | 4 4 | 14 | | 3 | | | | | | | | | | | | | | |
| 8.0 | 536.8 | | | | | | Medium dense brown and gray SILT (A-4b), little fine sand, trace clay; contains sandstone fragments; damp. | | | | | | | | | | | | |
| | | 3 8 | 7 | | 4 | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | |
| | | 6 50/5 | 6 | | 5 | | | | | | | | | | | | | | |
| 13.0 | 531.8 | | | | | | Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, calcareous, massive, slightly fractured. @ 13.0'-14.8', highly fractured to broken. | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | |
| 20 | | Core 120" | Rec 120" | RQD 85% | R-1 | | | | | | | | | | | | | | |
| 25 | | | | | | | @ 23.4'-23.7', argillaceous zone. | | | | | | | | | | | | |
| | | | | | | | @ 24.3'-24.5', calcareous. | | | | | | | | | | | | |
| 30 | | Core 120" | Rec 120" | RQD 97% | R-2 | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring C-30

Location: Sta. 310+59.3, 433.3 ft. RT of SR 823 CL

Date Drilled: 12/21/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: 9.2' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
| 0 | 573.8 | | | | | | | | | | | | | | | | | | | |
| 0.3 | 573.5 | | | | | | Topsoil - 3" | | | | | | | | | | | | | |
| | | 2 3 | | | | 1 | Loose brown SANDY SILT (A-4a); contains sandstone fragments; damp to moist. @ 0.0'-2.5', contains organics. @ 3.5', very dense. | 16 | 15 | - | 15 | 42 | 12 | | | | | | | |
| | | 2 6 | | | | | | | | | | | | | | | | | | |
| 4.0 | 569.8 | 50/3 | 3 | | | 2 | Very hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, massive, slightly fractured. | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | | |
| 10 | | Core 120" | Rec 120" | | | RQD 98% | @ 9.6'-9.9, high angle fracture. | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | | |
| 20 | | Core 120" | Rec 120" | | | RQD 96% | @ 16.5'-16.7', 17.9'- 18.2', 18.6'-18.7', broken zones with infilling. @ 18.3', 19.9', 20.6', 21.5', low angle fractures. | | | | | | | | | | | | | |
| 24.0 | 549.8 | | | | | | Bottom of Boring - 24.0' | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring C-31

Location: Sta. 313+03.2, 361.3 ft. LT of SR 823 CL

Date Drilled: 12/21/05 to 12/22/05

| Depth (ft) | Elev. (ft) | Blows per 6" | | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 11.0'-12.5' Water level at completion: 6.0' (prior to coring) 8.8' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|------------|---------------|----------|--------------|-------------|---|--|-----------|-----------|-----------|--------|--------|----|---|--|--|--|--|--|--|
| | | Recovery (in) | Drive | Press / Core | % Aggregate | | | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | | |
| 0 | 606.7 | | | | | | | | | | | | | | | | | | | |
| 1.0 | 605.7 | 2 | 3 | 9 | 1 | | Topsoil - 1" | 14 | 8 | - | 19 | 53 | 6 | Non-Plastic | | | | | | |
| 3.0 | 603.7 | | | | | | Loose gray SILT (A-4b), some fine to coarse sand, little gravel; organic; damp. | | | | | | | | | | | | | |
| 5.0 | | 6 | 13 | 24 | 2 | | Medium dense to dense brown SANDY SILT (A-4a), little clay, little gravel; contains sandstone fragments; damp. | | | | | | | | | | | | | |
| | | 5 | 6 | 6 | 3 | | | 16 | 14 | - | 15 | 44 | 11 | Non-Plastic | | | | | | |
| 10.0 | | 2 | 9 | 8 | 4 | | | | | | | | | | | | | | | |
| | | 5 | 7 | 12 | 5 | | | | | | | | | | | | | | | |
| 13.0 | 593.7 | | | | | | | | | | | | | | | | | | | |
| 14.0 | 592.7 | 50/3 | | 2 | 6 | | Severely weathered brownish gray SANDSTONE, argillaceous. | | | | | | | | | | | | | |
| 15.0 | | | | | | | Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, thickly bedded to massive, moderately to highly fractured. | | | | | | | | | | | | | |
| 20.0 | | Core 120" | Rec 89" | RQD 66% | R-1 | | @ 14.7'-15.3', 23.3'-23.5', broken and decomposed zones. @ 15.4'-16.8', 18.3'-19.0', 21.8'-22.2', lost recovery; likely decomposed and argillaceous; possible broken and unfractured zones. | | | | | | | | | | | | | |
| | | | | | | | @ 21.2'-21.4', high angle fracture. | | | | | | | | | | | | | |
| | | | | | | | @ 23.0', low angle fracture. | | | | | | | | | | | | | |
| 25.0 | | | | | | | | | | | | | | | | | | | | |
| | | Core 120" | Rec 120" | RQD 100% | R-2 | | @ 26.8', 27.3', low angle fractures. | | | | | | | | | | | | | |
| 30.0 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring C-31

Location: Sta. 313+03.2, 361.3 ft. LT of SR 823 CL

Date Drilled: 12/21/05 to 12/22/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetro- meter (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 11.0'-12.5' Water level at completion: 6.0' (prior to coring) 8.8' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|--|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | | | |
| 30 | 576.7 | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, thickly bedded to massive, moderately to highly fractured. | | | | | | | | | | | | | | |
| 34.0 | 572.7 | | | | | | Bottom of Boring - 34.0' | | | | | | | | | | | | | | |
| 35 | | | | | | | | | | | | | | | | | | | | | |
| 40 | | | | | | | | | | | | | | | | | | | | | |
| 45 | | | | | | | | | | | | | | | | | | | | | |
| 50 | | | | | | | | | | | | | | | | | | | | | |
| 55 | | | | | | | | | | | | | | | | | | | | | |
| 60 | | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring C-34

Location: Sta. 328+37.0, 148.1 ft. LT of SR 823 CL

Date Drilled: 1/10/06

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: Not reported | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 0 | 713.3 | | | | | | | | | | | | | | | | | | | |
| 0.7 | 712.6 | | | | | | Topsoil - 8"/12" soil removed before drilling | | | | | | | | | | | | | |
| | | 3 | | | | 3.5 | Very stiff to hard brown SANDY SILT (A-4a), little clay; dry. | | | | | | | | | | | | | |
| | | 2 | 8 | | | | | | | | | | | | | | | | | |
| | | 20 | | | | 4.5+ | @ 3.5', contains sandstone fragments. | | | | | | | | | | | | | |
| | | 26 | | | | | | | | | | | | | | | | | | |
| 5.0 | 708.3 | 50/1 | 13 | | | | Severely weathered brown SANDSTONE. | | | | | | | | | | | | | |
| | | | | | | | @ 5.7'-12.5', lost recovery. | | | | | | | | | | | | | |
| 10 | | Core 108" | Rec 30" | RQD 0% | R1 | | | | | | | | | | | | | | | |
| 13.5 | 699.8 | | | | | | Medium hard to hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, thickly bedded, highly fractured to broken. | | | | | | | | | | | | | |
| 15.0 | 698.3 | | | | | | Hard gray SANDSTONE; fine grained, slightly weathered, argillaceous, massive, slightly fractured. | | | | | | | | | | | | | |
| 20 | | Core 120" | Rec 120" | RQD 92% | R2 | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | | |
| 30 | | Core 120" | Rec 120" | RQD 100% | R3 | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring C-34

Location: Sta. 328+37.0, 148.1 ft. LT of SR 823 CL

Date Drilled: 1/10/06

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: Not reported | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|--------------------------|----|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | PL | LL | | | |
| 30 | 683.3 | | | | | | | | | | | | | | | | | |
| | | | | | | | Hard gray SANDSTONE; fine grained, slightly weathered, argillaceous, massive, slightly fractured. @ 31.1'-31.7', few argillaceous laminations. | | | | | | | | | | | |
| 34.0 | 679.3 | | | | | | Bottom of Boring - 34.0' | | | | | | | | | | | |
| 35 | | | | | | | | | | | | | | | | | | |
| 40 | | | | | | | | | | | | | | | | | | |
| 45 | | | | | | | | | | | | | | | | | | |
| 50 | | | | | | | | | | | | | | | | | | |
| 55 | | | | | | | | | | | | | | | | | | |
| 60 | | | | | | | | | | | | | | | | | | |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring C-35

Location: Sta. 329+55.7, 223.5 ft. RT of SR 823 CL

Date Drilled: 1/11/06

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: 6.7' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|--------------|-----------|-----------|-----------|--------|--------|--------------------------|----|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | PL | LL | |
| 0 | 646.2 | | | | | | DESCRIPTION | | | | | | | | | |
| 0.5 | 645.7 | | | | | | | Topsoil - 6" | | | | | | | | |
| | | 2 | | | | 2.5 | Very stiff brown SANDY SILT (A-4a), some gravel, little clay, contains sandstone fragments; damp. | | | | | | | | | |
| | | 5 | | | | | | | | | | | | | | |
| | | 3 | 8 | | 1 | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | 50/5 | 6 | | 2 | 4.0 | | 25 | 19 | - | 9 | 36 | 11 | | | |
| 4.5 | 641.7 | | | | | | Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, pyritic, very thickly bedded, slightly fractured. @ 5.0', 5.1', 7.4'; low angle fractures, iron stained. @ 7.4'-7.5'; decomposed argillaceous zone. | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | |
| | | Core 112" | Rec 112" | RQD 97% | R1 | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | |
| 20 | | Core 120" | Rec 120" | RQD 100% | R2 | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| 24.8 | 621.4 | Core 12" | Rec 12" | RQD 100% | R3 | | | | | | | | | | | |
| | | | | | | | Bottom of Boring - 24.8' | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring C-89

Location: Sta. 68+17.2, 43.6 ft. LT of SR 823 CL

Date Drilled: 2/20/07

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetro- meter (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 2.5' (inside hollowstem augers) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|--|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 0 | 572.2 | | | | | | | | | | | | | | | | | | | |
| 0.7 | 571.5 | 3 | | | 1 | | Topsoil - 8" | | | | | | | | | | | | | |
| | | 3 | 2 | 7 | | | Loose brown GRAVEL WITH SAND AND SILT (A-2-4), trace clay; damp. | | | | | | | | | | | | | |
| 3.0 | 569.2 | 2 | | | 2 | 1.5 | Stiff brownish gray SILT AND CLAY (A-6a), trace fine to coarse sand; moist. | 0 | 1 | -- | 1 | 69 | 29 | | | | | | | |
| 5 | | 3 | 4 | 18 | | | | | | | | | | | | | | | | |
| 5.5 | 566.7 | 3 | | | 3 | 3.0 | Very stiff brown CLAY (A-7-6), some silt, trace fine to coarse sand; moist. | 0 | 1 | -- | 1 | 26 | 72 | | | | | | | |
| 8.0 | 564.2 | 7 | | | 4 | 4.25 | Hard brown SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel; damp. | | | | | | | | | | | | | |
| 10 | | 10 | 16 | 18 | | | | | | | | | | | | | | | | |
| 11.0 | 561.2 | 16 | | | 5 | | Severely weathered gray SANDSTONE, micaceous. | | | | | | | | | | | | | |
| 12.0 | 560.2 | 50/4 | 8 | | | | Soft to medium hard gray SILTSTONE; very fine grained, highly weathered, arenaceous, micaceous, thickly bedded to massive, moderately fractured. | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | | |
| 19.5 | 552.7 | | | | | | @ 18.7'-18.9', broken zone. | | | | | | | | | | | | | |
| 20 | | | | | | | Medium hard gray SANDSTONE interbedded with SILTSTONE; fine grained, slightly weathered, argillaceous, micaceous, medium bedded, slightly to moderately fractured. | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | @ 27.6'-27.7', calcareous. | | | | | | | | | | | | | |
| | | | | | | | @ 28.9'-29.1', vuggy. | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring C-89

Location: Sta. 68+17.2, 43.6 ft. LT of SR 823 CL

Date Drilled: 2/20/07

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 2.5' (inside hollowstem augers) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | |
| 30 | 542.2 | | | | | | MEDIUM HARD GRAY SANDSTONE interbedded with SILTSTONE; fine grained, slightly weathered, argillaceous, micaceous, medium bedded, slightly to moderately fractured. Bottom of Boring - 32.0' | | | | | | | | | | |
| 32.0 | 540.2 | | | | | | | | | | | | | | | | |
| 35 | | | | | | | | | | | | | | | | | |
| 40 | | | | | | | | | | | | | | | | | |
| 45 | | | | | | | | | | | | | | | | | |
| 50 | | | | | | | | | | | | | | | | | |
| 55 | | | | | | | | | | | | | | | | | |
| 60 | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring C-90

Location: Sta. 69+29.2, 163.6 ft. RT of SR 823 CL

Date Drilled: 02/20/07

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: 1.5' | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 0 | 584.1 | | | | | | | | | | | | | | | | | | | |
| 0.8 | 583.3 | 4 | | | 1 | | Topsoil - 10" | | | | | | | | | | | | | |
| | | 5 | | | | | Medium dense brown GRAVEL WITH SAND AND SILT (A-2-4), trace clay; damp. | | | | | | | | | | | | | |
| | | 6 | 14 | | | | | | | | | | | | | | | | | |
| 3.0 | 581.1 | | | | 2 | 4.25 | Very stiff to hard brown and gray SILT (A-4b), little fine to coarse sand, trace clay, trace gravel; damp. | | | | | | | | | | | | | |
| | | 5 | | | | | | | | | | | | | | | | | | |
| | | 13 | | | | | | | | | | | | | | | | | | |
| | | 14 | 15 | | | | | | | | | | | | | | | | | |
| | | 4 | | | 3 | 3.0 | | | | | | | | | | | | | | |
| | | 6 | | | | | | | | | | | | | | | | | | |
| | | 8 | 13 | | | | | | | | | | | | | | | | | |
| 8.0 | 576.1 | | | | 4 | | Medium dense to very dense brown GRAVEL WITH SAND, SILT, AND CLAY (A-2-6); damp. | | | | | | | | | | | | | |
| | | 7 | | | | | | | | | | | | | | | | | | |
| | | 12 | | | | | | | | | | | | | | | | | | |
| | | 11 | 16 | | | | | | | | | | | | | | | | | |
| | | 9 | | | 5 | | | | | | | | | | | | | | | |
| | | 24 | | | | | | | | | | | | | | | | | | |
| | | 50/1 | 12 | | | | | | | | | | | | | | | | | |
| 12.1 | 572.0 | | | | | | Medium hard to hard gray SANDSTONE interbedded with SILTSTONE; fine grained, unweathered to slightly weathered, argillaceous, micaceous, thickly bedded, slightly fractured. @ 12.1'-12.4', iron stained. | | | | | | | | | | | | | |
| | | Core 60" | Rec 60" | | RQD 90% | R1 | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | | |
| 17.1 | 567.0 | | | | | | Bottom of Boring - 17.1' | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring C-96

Location: Sta. 209+28.6, 43.6 ft. RT of SR 823 CL

Date Drilled: 02/21/07

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: 4.7' | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 0 | 669.1 | | | | | | | | | | | | | | | | | | | |
| 0.5 | 668.6 | | | | | | Topsoil - 6" | | | | | | | | | | | | | |
| | | 1 | | | | | Loose to medium dense brown SANDY SILT (A-4a), some gravel, little clay; damp. | | | | | | | | | | | | | |
| | | 2 | | | | | | | | | | | | | | | | | | |
| | | 3 | 10 | | | | | | | | | | | | | | | | | |
| | | 10 | 16 | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | Very stiff to hard brown and gray SILT AND CLAY (A-6a), trace fine to coarse sand; damp. | | | | | | | | | | | | | |
| 5.5 | 663.6 | 8 | | | | | | | | | | | | | | | | | | |
| | | 8 | 10 | 14 | | | | | | | | | | | | | | | | |
| 8.5 | 660.6 | 14 | | | | | Severely weathered brown SANDSTONE, argillaceous. | | | | | | | | | | | | | |
| 9.5 | 659.6 | 50/3 | 7 | | | | Hard brown SANDSTONE; fine grained, moderately to highly weathered, argillaceous, very thinly bedded to thinly bedded, highly fractured, iron staining. @ 10.6'-10.9', 12.7'-12.9', high angle fractures. | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | |
| | | Core 60" | Rec 60" | | RQD 45% | R1 | @ 13.1'-13.2', low angle fracture. | | | | | | | | | | | | | |
| 13.2 | 655.9 | | | | | | Hard gray SANDSTONE interbedded with SILTSTONE; fine grained, slightly weathered, argillaceous, micaceous, very thinly bedded to thinly bedded, slightly fractured, iron staining. Bottom of Boring - 14.5' | | | | | | | | | | | | | |
| 14.5 | 654.6 | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring C-97

Location: Sta. 210+04.6, 252.0 ft. RT of SR 823 CL

Date Drilled: 02/21/07

| Depth (ft) | Elev. (ft) | Blows per 6" | | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: 3.7' | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|--------------|--------------|---------------|-------------|-----------|---|--|-----------|-----------|--------|--------|----|----|---|--|--|--|--|--|
| | | Drive | Press / Core | | % Aggregate | % C. Sand | | | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | | |
| 0 | 661.4 | | | | | | | | | | | | | | | | | | | |
| 0.6 | 660.8 | | | | | | | Topsoil - 7" | | | | | | | | | | | | |
| | | 2 | 3 | 5 | 5 | 1 | | Loose to medium dense brown GRAVEL WITH SAND AND SILT (A-2-4), little clay; damp to moist. | | | | | | | | | | | | |
| | | 6 | 11 | 16 | 14 | 2 | | | 35 | 16 | - | 14 | 24 | 11 | | | | | | |
| 5 | 655.9 | | | | | | | Stiff to very stiff brown and gray SANDY SILT (A-4a), trace clay, trace gravel; contains sandstone fragments; damp. | | | | | | | | | | | | |
| 5.5 | | 4 | 12 | 15 | 12 | 3 | 3.0 | | | | | | | | | | | | | |
| | | 5 | 8 | 11 | 10 | 4 | - | | | | | | | | | | | | | |
| 10 | | 7 | 10 | 11 | 18 | 5 | 1.5 | | | | | | | | | | | | | |
| | | 2 | 5 | 7 | 10 | 6 | 1.5 | | | | | | | | | | | | | |
| 15 | 645.9 | | | | | | | Dense gray SILT (A-4b), little fine to coarse sand, trace gravel, trace clay; damp. | | | | | | | | | | | | |
| 15.5 | | 10 | 17 | 25 | 16 | 7 | | | | | | | | | | | | | | |
| 19.4 | 642.0 | | | | | | | Hard gray SANDSTONE interbedded with SILTSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, very thinly bedded to thinly bedded, slightly fractured, @ 19.4'-19.7', 20.4'-20.6', broken zones. | | | | | | | | | | | | |
| 20 | | Core 60" | Rec 60" | | | RQD 45% | R1 | | | | | | | | | | | | | |
| 24.4 | 637.0 | | | | | | | Bottom of Boring - 24.4' | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-2118

Location: Sta. 212+46.0, 174.8 ft. LT of SR 823 CL

Date Drilled: 1/19/06

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / *Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 15.5' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|--------------|---------------|------------|--------------|--|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0 | 697.8 | | | | | | | | | | | | | | | | | | |
| 0.9 | 696.9 | | | | | | Topsoil - 11" | | | | | | | | | | | | |
| | | 6 8 10 | 17 | | | 4.5+ | Hard brown SILT AND CLAY (A-6a), little fine to coarse sand; contains sandstone fragments; dry. | | | | | | | | | | | | |
| 5.0 | 692.8 | 8 | | | | 4.5+ | Hard brown SANDY SILT (A-4a), some gravel, little clay; contains sandstone fragments; damp. | 29 | 13 | - | 7 | 39 | 12 | | | | | | |
| 5.5 | 692.3 | 50/2 | 7 | | | 2 | @ 5.5'-6.7', weathered. | | | | | | | | | | | | |
| | | | | | | | Hard gray SANDSTONE; fine grained, slightly to moderately weathered, argillaceous, massive, moderately fractured. | | | | | | | | | | | | |
| 10 | | Core 120" | Rec 120" | | | RQD 98% R1 | @ 6.0', 6.3', 6.4', 6.6', 7.2', 7.5', 8.9', 9.2', 9.9', 11.7', 15.2', low angle fractures. | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | |
| 15.5 | 682.3 | | | | | | Bottom of Boring - 15.5' | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring C-98

Location: Sta. 345+04.3, 55.9 ft. RT of SR 823 CL

Date Drilled: 02/22/07

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetro- meter (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 1.0'-2.5' Water level at completion: 1.2' | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|---------------|---------------|--------------|------------------|-------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0 | 585.9 | | | | | | <p>DESCRIPTION</p> <p>Topsoil - 9"</p> <p>Very loose brown GRAVEL WITH SAND AND SILT (A-2-4), trace clay; damp.</p> <p>Hard gray SANDSTONE interbedded with SILTSTONE; fine grained, unweathered, argillaceous, micaceous, calcareous, thickly bedded, slightly fractured. @ 3.5'-3.7', brown.</p> <p>Bottom of Boring - 8.5'</p> | | | | | | | | | | | | |
| 0.8 | 585.1 | 3 1 2 | 6 | 1 | | | | | | | | | | | | | | | |
| 3.5 | 582.4 | | | | | | | | | | | | | | | | | | |
| 5 | | Core 60" | Rec 60" | RQD 100% | R1 | | | | | | | | | | | | | | |
| 8.5 | 577.4 | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring C-99

Location: Sta. 344+78.7, 268.3 ft. RT of SR 823 CL

Date Drilled: 02/22/07

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 1.0'-2.5' Water level at completion: 1.6' | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | |
| 0 | 562.8 | | | | | | Topsoil - 11" Very loose brown and gray GRAVEL WITH SAND AND SILT (A-2-4), trace clay; damp. Severely weathered gray SANDSTONE. Medium hard gray SANDSTONE interbedded with SILTSTONE; fine grained, slightly weathered, argillaceous, micaceous, thinly bedded to medium bedded, slightly fractured, . @ 6.2'-6.3', low angle fracture. @ 6.8', 7.0', clay seams. | | | | | | | |
| 0.9 | 561.9 | 2 | | 1 | | | | | | | | | | |
| | | 1 2 5 | | | | | | | | | | | | |
| 3.0 | 559.8 | | | | | | | | | | | | | |
| 4.0 | 558.8 | 50/5 | 3 | 2 | | | | | | | | | | |
| 5 | | Core 60" | Rec 60" | RQD 95% | R1 | | | | | | | | | |
| 9.0 | 553.8 | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring C-114

Location: Approx. Sta. 175+15.1, 195.2 ft. LT of SR 823 CL

Date Drilled: 07/02/07

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 22.0' Water level at completion: 6.2' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | | | |
|------------|------------|--------------|---------------|------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|--|
| | | | | | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | | |
| 0 | 646.4 | | | | | | | | | | | | | | | | | | | |
| 0.4 | 646.0 | | | | | Topsoil - 5" | | | | | | | | | | | | | | |
| | | 5 | | | 1 | Hard brown SANDY SILT (A-4a), little gravel, little clay; contains rock fragments and rust stains; damp. @ 8.5'-12.5', brown and gray. | | | | | | | | | | | | | | |
| | | 8 | 18 | | 2 | | 4.5+ | | | | | | | | | | | | | |
| 5 | | 7 | 17 | | 3 | | 4.5+ | | | | | | | | | | | | | |
| | | 11 | 13 | | 4 | | 4.5+ | | | | | | | | | | | | | |
| | | 12 | | | 5 | | 4.5+ | | | | | | | | | | | | | |
| | | 8 | 18 | | 6 | Very stiff to hard brown SILT (A-4b), little to some fine to coarse sand, trace to little gravel; contains rock fragments and rust stains; damp to moist. @ 21.0'-22.5', brown and gray. | 23 | 17 | - | 20 | 27 | 13 | | | | | | | | |
| 10 | | 6 | 18 | | 7 | | 4.5 | | | | | | | | | | | | | |
| | | 14 | 18 | | 8 | | 3.25 | | | | | | | | | | | | | |
| | | 16 | | | 9 | | 4.5+ | | | | | | | | | | | | | |
| | | 18 | 18 | | 10 | | 4.5+ | | | | | | | | | | | | | |
| 13.5 | 632.9 | 4 | 18 | | 11 | Severely weathered brown and gray SANDSTONE, argillaceous. | 3 | 7 | - | 8 | 63 | 19 | | | | | | | | |
| 15 | | 7 | | | 12 | | 4.5+ | | | | | | | | | | | | | |
| | | 8 | 18 | | 13 | | 3.25 | | | | | | | | | | | | | |
| | | 13 | 18 | | 14 | | 4.5+ | | | | | | | | | | | | | |
| | | 12 | | | 15 | | 4.5+ | | | | | | | | | | | | | |
| 20 | | 18 | 18 | | 16 | Hard gray SANDSTONE; very fine to fine grained. | | | | | | | | | | | | | | |
| | | 25 | 18 | | 17 | | 4.5+ | | | | | | | | | | | | | |
| | | 18 | 25 | | 18 | | 4.5+ | | | | | | | | | | | | | |
| | | 10 | 18 | | 19 | | 4.5+ | | | | | | | | | | | | | |
| | | 11 | 18 | | 20 | | 4.5+ | | | | | | | | | | | | | |
| 23.5 | 622.9 | 16 | 18 | | 21 | Severely weathered brown and gray SANDSTONE, argillaceous. | | | | | | | | | | | | | | |
| 25 | | 29 | 18 | | 22 | | 4.5+ | | | | | | | | | | | | | |
| | | 49 | | | 23 | | 4.5+ | | | | | | | | | | | | | |
| | | 19 | 16 | | 24 | Severely weathered brown and gray SANDSTONE, argillaceous. | | | | | | | | | | | | | | |
| | | 35 | | | 25 | | 4.5+ | | | | | | | | | | | | | |
| | | 42 | | | 26 | | 4.5+ | | | | | | | | | | | | | |
| 28.8 | 617.6 | 50/3 | 3 | | 27 | Hard gray SANDSTONE; very fine to fine grained. | | | | | | | | | | | | | | |
| 30 | | | | | 28 | | 4.5+ | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 9:37 PM]

Client: TranSystems, Inc. Project: SCI-823-0.00 Job No. 0121-3070.03

LOG OF: Boring C-114 Location: Approx. Sta. 175+15.1, 195.2 ft. LT of SR 823 CL Date Drilled: 07/02/07

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 22.0' Water level at completion: 6.2' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|--------------------------|-----------|-----------|-----------|--------|--------|---|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | |
| 30 | 616.4 | | | RQD 66% | R-1 | | Hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, massive, moderately fractured. @ 28.8'-31.1', broken. | | | | | | | | | | |
| 33.8 | 612.6 | Core 60" | Rec 58" | | | | | Bottom of Boring - 33.8' | | | | | | | | | |
| 35 | | | | | | | | | | | | | | | | | |
| 40 | | | | | | | | | | | | | | | | | |
| 45 | | | | | | | | | | | | | | | | | |
| 50 | | | | | | | | | | | | | | | | | |
| 55 | | | | | | | | | | | | | | | | | |
| 60 | | | | | | | | | | | | | | | | | |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring C-115

Location: Approx. Sta. 176+12.5, 286.9 ft. RT of SR 823 CL

Date Drilled: 07/02/07

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: 4.8' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|------------|-----------------------|---------------|----------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 0 | 603.8 | | | | | | | | | | | | | | | | | | | |
| 0.5 | 603.3 | | | | | | Topsoil - 6" | | | | | | | | | | | | | |
| | | 5 4 7 16 | | 1 | | | Medium dense brown GRAVEL WITH SAND AND SILT (A-2-4), some fine to coarse sand; contains rock fragments; damp. | | | | | | | | | | | | | |
| 3.5 | 600.3 | | | | | | Very stiff to hard brown and gray SANDY SILT (A-4a), trace to little gravel; contains rock fragments; damp to moist. | | | | | | | | | | | | | |
| 5 | | 6 5 4 15 | | 2 | | | | | 6 | 19 | - | 19 | 39 | 17 | | | | | | |
| | | 5 7 14 18 | | 3 | | 3.5 | | | | | | | | | | | | | | |
| | | 3 3 5 17 | | 4 | | 2.25 | | | 0 | 2 | - | 30 | 43 | 25 | | | | | | |
| | | 4 6 6 18 | | 5 | | 2.25 | | | | | | | | | | | | | | |
| 13.5 | 590.3 | | | | | | Severely weathered gray SANDSTONE, argillaceous, wet. | | | | | | | | | | | | | |
| 15 | | 5 9 15 13 | | 6 | | | | | | | | | | | | | | | | |
| 17.5 | 586.3 | | | | | | Hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, massive, moderately fractured. | | | | | | | | | | | | | |
| 20 | | 6 36 50/3 12 | | 7 | | | | | | | | | | | | | | | | |
| | | Core 60" Rec 60" | | RQD 79% R-1 | | | | | | | | | | | | | | | | |
| 22.5 | 581.3 | | | | | | Bottom of Boring - 22.5' | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 9:37 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring C-116

Location: Approx. Sta. 184+99.6, 172.0 ft. LT of SR 823 CL

Date Drilled: 06/20/07 to 06/25/07

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 18.5' - 18.7' Water level at completion: 7.7' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|---|-----------|-----------|-----------|--------|--------|---|--|--|--|--|-----|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 0 | 629.1 | | | | | | | | | | | | | | | | | | | |
| 2 | | 4 | 15 | 1 | | -- | Very stiff to hard brown SANDY SILT (A-4a), trace gravel; damp. @ 1.0'-5.0', contains rock fragments and rust stains. | | | | | | | | | | | | | |
| 4 | | 4 | 16 | 2 | | 3.25 | | | | | | | | | | | | | | |
| 5 | | 8 | 18 | 3 | | 3.0 | | | | | | | | | | | | | | |
| 6 | | 9 | 18 | 4 | | 3.75 | | | | | | | | | | | | | | |
| 10 | | 2 | 16 | 5 | | 2.5 | | @ 11.0'-27.5', gray. | 10 | 13 | -- | 11 | 48 | 18 | | | | | | |
| 15 | | 2 | 18 | 6 | | 1.75 | | @ 13.5'-27.5', contains rock fragments. | | | | | | | | | | | | |
| 17 | | 3 | 18 | 7 | | 4.5+ | | | | | | | | | | | | | | |
| 20 | | 4 | 12 | 8 | | 4.5+ | | | | | | | | | | | | | | |
| 23 | | 3 | 16 | 9 | | -- | | | | | | | | | | | | | | |
| 25 | | 4 | 18 | 10 | | 1.5 | | @ 23.5'-25.0', stiff. | 11 | 12 | -- | 10 | 49 | 19 | | | | | | |
| 28.5 | 600.6 | 6 | 18 | 11 | | 3.25 | | | | | | | | | | | | | | |
| 30 | | 50/6 | 6 | 12 | | | Severely weathered gray SANDSTONE fragments, argillaceous | | | | | | | | | | | | 50+ | |

FILE: 0121-3070-03 [11/12/2007 9:37 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring C-116

Location: Approx. Sta. 184+99.6, 172.0 ft. LT of SR 823 CL

Date Drilled: 06/20/07 to 06/25/07

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 18.5' - 18.7' Water level at completion: 7.7' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---------------------------------|--|--------------------|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● | | Blows per foot - ○ | | | |
| | | | | | | | | | | | | | | | | | | | |
| 30 | 599.1 | | | | | | | | | | | | | | | | | | |
| | | Core 60" | Rec 60" | RQD 71% | R-1 | | DESCRIPTION | | | | | | | | | | | | |
| | | | | | | | Hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, massive, moderately to highly fractured. | | | | | | | | | | | | |
| 34.0 | 595.1 | | | | | | Bottom of Boring - 34.0' | | | | | | | | | | | | |
| 35 | | | | | | | | | | | | | | | | | | | |
| 40 | | | | | | | | | | | | | | | | | | | |
| 45 | | | | | | | | | | | | | | | | | | | |
| 50 | | | | | | | | | | | | | | | | | | | |
| 55 | | | | | | | | | | | | | | | | | | | |
| 60 | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 9:37 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring C-117

Location: Approx. Sta. 183+57.1, 192.0 ft. RT of SR 823 CL

Date Drilled: 07/02/07

| Depth (ft) | Elev. (ft) | Blows per 6" | | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 26.5', 29.5' Water level at completion: 34.3' (prior to coring) 9.8' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|
| | | Drive | Recovery (in) | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | |
| 0 | 626.4 | | | | | | DESCRIPTION Topsoil - 7" Hard brown SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel; contains few rock fragments; damp. @ 11.0'-12.5', brown and gray. Hard brown CLAY (A-7-6), trace fine sand; damp. Very stiff brown SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel; contains rust stains; damp. Medium stiff to stiff gray CLAY (A-7-6), trace fine sand; contains rock fragments; moist. | | | | | | | | | | |
| 0.6 | 625.8 | 3 | 18 | 1 | | 4.0 | | | | | | | | | | | |
| | | 5 | 18 | | | | | | | | | | | | | | |
| | | 7 | 18 | | | | | | | | | | | | | | |
| | | 5 | 14 | 2 | | - | | | | | | | | | | | |
| 5 | | 6 | 14 | | | | | | | | | | | | | | |
| | | 7 | 14 | | | | | | | | | | | | | | |
| | | 8 | 15 | | | | | | | | | | | | | | |
| | | 10 | 15 | | | | | | | | | | | | | | |
| | | 9 | 15 | | | | | | | | | | | | | | |
| | | 6 | 16 | | | 4.0 | | | | | | | | | | | |
| 10 | | 8 | 16 | | | | | | | | | | | | | | |
| | | 6 | 16 | | | | | | | | | | | | | | |
| | | 8 | 16 | | | | | | | | | | | | | | |
| | | 10 | 18 | | | 4.5+ | | | | | | | | | | | |
| | | 9 | 18 | | | | | | | | | | | | | | |
| | | 10 | 18 | | | | | | | | | | | | | | |
| | | 16 | 18 | | | | | | | | | | | | | | |
| 15 | | 6 | 18 | | | 4.0 | | 23 | 13 | - | 9 | 33 | 22 | | | | |
| | | 7 | 18 | | | | | | | | | | | | | | |
| | | 12 | 18 | | | | | | | | | | | | | | |
| | | 4 | 18 | | | 4.5 | | | | | | | | | | | |
| | | 9 | 18 | | | | | | | | | | | | | | |
| | | 11 | 18 | | | | | | | | | | | | | | |
| 18.5 | 607.9 | 3 | 18 | | | 4.5 | | | | | | | | | | | |
| | | 5 | 18 | | | | | | | | | | | | | | |
| | | 9 | 18 | | | | | | | | | | | | | | |
| 20 | | 4 | 16 | | | 2.5 | | | | | | | | | | | |
| | | 5 | 16 | | | | | | | | | | | | | | |
| 21.0 | 605.4 | 4 | 16 | | | | | | | | | | | | | | |
| | | 5 | 16 | | | | | | | | | | | | | | |
| 23.5 | 602.9 | 2 | 18 | | | 0.5 | | | | | | | | | | | |
| | | 3 | 18 | | | | | | | | | | | | | | |
| | | 3 | 18 | | ST1 | | | | | | | | | | | | |
| 25 | | 2 | 18 | | | 1.5 | | 0 | 0 | - | 1 | 25 | 74 | | | | |
| | | 3 | 18 | | | | | | | | | | | | | | |
| | | 4 | 18 | | | | | | | | | | | | | | |
| | | 4 | 18 | | | | | | | | | | | | | | |
| | | 5 | 18 | | | 1.25 | | | | | | | | | | | |
| 30 | | 4 | 18 | | | | | | | | | | | | | | |
| | | 5 | 18 | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 9:37 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring C-117

Location: Approx. Sta. 183+57.1, 192.0 ft. RT of SR 823 CL

Date Drilled: 07/02/07

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 26.5', 29.5' Water level at completion: 34.3' (prior to coring) 9.8' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | |
| 30.0 | 596.4 | | | | | | Very stiff gray SILT AND CLAY (A-6a), little gravel, trace fine sand; contains rock fragments; moist. | | | | | | | | | | |
| 35 | 596.4 | 5 4 7 | 15 | 13 | | 2.5 | | | | | | | | | | | |
| 37.5 | 588.9 | | | | | | Hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, massive, moderately to highly fractured. | | | | | | | | | | |
| 40 | | Core 60" | Rec 60" | RQD 73% | R-1 | | | | | | | | | | | | |
| 42.5 | 583.9 | | | | | | Bottom of Boring - 42.5' | | | | | | | | | | |
| 45 | | | | | | | | | | | | | | | | | |
| 50 | | | | | | | | | | | | | | | | | |
| 55 | | | | | | | | | | | | | | | | | |
| 60 | | | | | | | | | | | | | | | | | |

| | | |
|--|-----------------------|------------------------|
| Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03 |
| LOG OF: Boring C-118 | | Date Drilled: 07/03/07 |
| Location: Approx. Sta. 239+61.2, 433.1 ft. LT of SR 823 CL | | |

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 0.0' Water level at completion: 0.7' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | |
| 0 | 652.6 | | | | | | | | | | | | | | | | | | |
| 1.0 | 651.6 | 30 | | | | | Sand and Gravel - 12" (drilled in creekbed) | | | | | | | | | | | | |
| 2.0 | 650.6 | 50/3 | 7 | | 1 | | Severely weathered brown SANDSTONE, argillaceous, rust-stained. | | | | | | | | | | | | |
| 5 | | Core 60" | Rec 58" | | RQD 95% | R-1 | Hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, massive, moderately fractured. @ 5.3', pyritic, increased very fine grain content. | | | | | | | | | | | | |
| 7.0 | 645.6 | | | | | | Bottom of Boring - 7.0' | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring C-119

Location: Approx. Sta. 238+19.5, 467.4 ft. RT of SR 823 CL

Date Drilled: 07/03/07

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: 4.0' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ← → LL Blows per foot - ○ 10 20 30 40 | | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | | |
| 0 | 638.6 | | | | | | | | | | | | | | | | | | | | |
| 0.3 | 638.3 | | | | | | Topsoil - 4" | | | | | | | | | | | | | | |
| | | 6 | | | | | Medium dense brown GRAVEL WITH SAND AND SILT (A-2-4); contains rock fragments; damp. | | | | | | | | | | | | | | |
| | | 8 | 18 | | | 1 | | | | | | | | | | | | | | | |
| | | 7 | | | | 2 | | | | | | | | | | | | | | | |
| 5 | | 7 | 16 | | | | | | | | | | | | | | | | | | |
| | | 9 | | | | | Hard brown SILT (A-4b), some fine to coarse sand, trace gravel; damp. | | | | | | | | | | | | | | |
| 6.0 | 632.6 | 21 | | | | 3 | | | | | | | | | | | | | | | |
| | | 50/3 | | | | | Hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, massive, highly fractured. | | | | | | | | | | | | | | |
| 7.3 | 631.3 | | 11 | | | | | | | | | | | | | | | | | | |
| 10 | | Core 60" | Rec 60" | RQD 57% | R-1 | | @ 10.7', gray. | | | | | | | | | | | | | | |
| 12.3 | 626.3 | | | | | | Bottom of Boring - 12.3' | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 9:37 PM]

Client: TransSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-24

Location: Sta. 66+18.9, 77.5 ft. LT of SR 823 CL

Date Drilled: 05/17/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: Not Reported Water level at completion: 17.0' (prior to coring) 14.0' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0.0 | 569.8 | | | | | | | | | | | | | | | | | | |
| 0.3 | 569.5 | | | | | | Topsoil - 4" | | | | | | | | | | | | |
| | | 2 | 1 | 12 | 1 | 2.5 | POSSIBLE FILL: Stiff to very stiff dark brown SILT (A-4b), little clay, trace fine to coarse sand; moist. | | | | | | | | | | | | |
| | | 2 | 1 | 15 | 2 | 1.75 | | 0 | 1 | - | 4 | 82 | 13 | | | | | | |
| 5.0 | | | | | | | | | | | | | | | | | | | |
| 6.0 | 563.8 | 1 | 2 | 18 | 3 | 0.75 | Medium stiff to stiff brown SILT AND CLAY (A-6a), trace to little fine to coarse sand, trace gravel; moist. | | | | | | | | | | | | |
| | | 2 | 2 | 18 | 4 | 1.5 | | 0 | 0 | - | 4 | 63 | 33 | | | | | | |
| 10.0 | | 5 | 6 | 18 | 5 | 3.0 | @ 11.0'-12.5', very stiff. | | | | | | | | | | | | |
| 13.5 | 556.3 | 3 | 6 | 14 | 6 | | Medium dense brown SANDY SILT (A-4a), little gravel, trace clay; rust stained; damp. | | | | | | | | | | | | |
| 15.0 | | | | | | | | | | | | | | | | | | | |
| 16.7 | 553.1 | 3 | 3 | 17 | 7 | 1.5 | Stiff gray SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel; rust stained; moist. | | | | | | | | | | | | |
| 18.5 | 551.3 | 14 | 33 | 16 | 8 | | Severely weathered gray SANDSTONE, argillaceous. | | | | | | | | | | | | |
| 20.0 | | 50 | | | | | | | | | | | | | | | | | |
| 21.0 | 548.8 | | | | | | Medium hard gray SANDSTONE; very fine to fine grained, highly weathered, argillaceous, thinly to medium bedded, moderately to highly fractured, contains few argillaceous laminations. | | | | | | | | | | | | |
| 25.0 | | | | | | | @ 24.2'-26.5', thickly bedded. | | | | | | | | | | | | |
| 26.5 | 543.3 | | | | | | Bottom of Boring - 26.5' | | | | | | | | | | | | |
| 30.0 | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-25

Location: Sta. 66+16.7, 28.5 ft. LT of SR 823 CL

Date Drilled: 05/18/05

| Depth (ft) | Elev. (ft) | Blows per 6" | | Sample No. | | Hand Penetro-meter (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 16.0' Water level at completion: 18.0' (prior to coring) 2.0' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|--------------|--------------|------------|--------------|--|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | Drive | Press / Core | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0.2 | 578.7 | | | | | | Topsoil - 2" | | | | | | | | | | | | |
| | 578.5 | 2 | | 1 | | 2.75 | Very stiff brown SILT AND CLAY (A-6a), trace to little fine to coarse sand, trace gravel; damp to moist. | | | | | | | | | | | | |
| | | 3 | 14 | | | | | | | | | | | | | | | | |
| | | 2 | | 2 | | 2.75 | | 0 | 3 | - | 3 | 69 | 25 | | | | | | |
| | | 3 | 16 | | | | | | | | | | | | | | | | |
| 5.5 | 573.2 | 2 | | 3 | | <0.25 | Stiff to very stiff brown and gray SILT (A-4b), some clay, trace fine to coarse sand; moist. @ 6.0'-7.5', very soft. | | | | | | | | | | | | |
| | | 2 | 18 | | | | | | | | | | | | | | | | |
| | | 1 | | 4 | | 1.0 | | | | | | | | | | | | | |
| | | 1 | 18 | | | | | | | | | | | | | | | | |
| | | 1 | | 5 | | 1.75 | | 0 | 1 | - | 2 | 74 | 23 | | | | | | |
| | | 3 | 18 | | | | | | | | | | | | | | | | |
| | | WOH | | 6 | | 1.5 | | | | | | | | | | | | | |
| | | 1 | 18 | | | | | | | | | | | | | | | | |
| | | 5 | | 7 | | 2.5 | | | | | | | | | | | | | |
| | | 4 | 18 | | | | | | | | | | | | | | | | |
| 18.5 | 560.2 | 4 | | 8 | | | Medium dense brown SANDY SILT (A-4a), trace clay, trace gravel; moist. | | | | | | | | | | | | |
| | | 8 | 17 | | | | Severely weathered gray SANDSTONE, argillaceous. | | | | | | | | | | | | |
| 21.0 | 557.7 | 38 | 50/4 | 10 | | | | | | | | | | | | | | | |
| | | | | | | | Medium hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, medium bedded, moderately to highly fractured with clay infilling. | | | | | | | | | | | | |
| 23.5 | 555.2 | | | | | | | | | | | | | | | | | | |
| 25 | | Core 70" | Rec 64" | RQD 83% | R-1 | *122 | | | | | | | | | | | | | |
| 29.3 | 549.4 | | | | | | Bottom of Boring - 29.3' | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-26

Location: Sta. 66+91.6, 42.4 ft. RT of SR 823 CL

Date Drilled: 05/18/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 |
|------------|------------|--------------|---------------|------------|--------------|---|--|--|-----------|-----------|-----------|--------|--------|---|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | |
| 0.0 | 577.1 | | | | | | WATER OBSERVATIONS: Water seepage at: 6.0' Water level at completion: None (prior to coring) 3.5' (includes drilling water) | | | | | | | |
| 0.3 | 576.8 | | | | | | | Topsoil - 3" Loose to medium dense brown SANDY SILT (A-4a), little clay, trace to little gravel; damp to moist. | | | | | | |
| | | 1 2 | 7 | 1 | | | | 10 | 22 | - | 11 | 46 | 11 | |
| | | 2 11 | 6 | 2 | | | | | | | | | | |
| 5.0 | | | 10 | | | | | | | | | | | |
| | | WOH 1 | 6 | 3 | | | | | | | | | | |
| 8.0 | 569.1 | | | | | | | | | | | | | |
| | | 6 9 | 9 | 4 | | 3.25 | 0 | 1 | - | 14 | 63 | 22 | | |
| 10.0 | | | 16 | | | | | | | | | | | |
| | | 3 4 | 7 | 5 | | 3.5 | | | | | | | | |
| | | | 15 | | | | | | | | | | | |
| 13.5 | 563.6 | | | | | | | | | | | | | |
| | | 12 24 | 16 | 6 | | | | | | | | | | |
| 15.0 | | | 18 | | | | | | | | | | | |
| | | 50/5 | 4 | 7 | | | | | | | | | | |
| 17.0 | 560.1 | | | | | | | | | | | | | |
| | | Core 60" | Rec 58" | RQD 77% | R-1 | | Medium hard to hard gray SANDSTONE; very fine grained, highly to moderately weathered, argillaceous, micaceous, thinly bedded to medium bedded, moderately fractured. @ 17.5'-17.9', clay filled fractures. | | | | | | | |
| 20.0 | | | | | | | | | | | | | | |
| 22.0 | 555.1 | | | | | | Bottom of Boring - 22.0' | | | | | | | |
| 25.0 | | | | | | | | | | | | | | |
| 30.0 | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc. Project: SCI-823-0.00 Job No. 0121-3070.03

LOG OF: Boring R-27 Location: Sta. 74+12.9, 22.6 ft. RT of SR 823 CL Date Drilled: 04/11/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 6.6' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | | |
|------------|------------|------------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
| 0 | 609.8 | | | | | | No Topsoil Severely weathered brown SANDSTONE, argillaceous. | | | | | | | | | | | | | |
| | | 25 48 50/3 | 15 | | 1 | | | | | | | | | | | | | | | |
| | | 15 50/4 | 10 | | 2 | | | | | | | | | | | | | | | |
| 5.0 | 604.8 | | | | | | Soft to medium hard brownish gray SANDSTONE interbedded with SILTSTONE; very fine to fine grained, highly weathered to decomposed, argillaceous, micaceous, thinly bedded to thickly bedded, highly fractured, with typical low angle iron stained fractures. @ 7.0'-7.2', broken zone. | | | | | | | | | | | | | |
| | | Core 84" | Rec 84" | RQD 88% | R-1 | *106 | | | | | | | | | | | | | | |
| 11.4 | 598.4 | | | | | | Hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, highly fractured, with typical low angle iron stained fractures. @ 11.4'-17.4', contains few to moderate argillaceous laminations. @ 12.6'-12.9', iron stained broken zone. @ 17.4'-22.0', slightly fractured. | | | | | | | | | | | | | |
| | | Core 120" | Rec 120" | RQD 92% | R-2 | *434 | | | | | | | | | | | | | | |
| 22.0 | 587.8 | | | | | | Bottom of Boring - 22.0' | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-88

Location: Sta. 166+92.7, 51.3 ft. LT of SR 823 CL

Date Drilled: 11/2/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetro- meter (tsf) / *Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 5.6' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|--------------|-----------|-----------|-----------|--------|--------|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● | | | |
| | | | | | | | DESCRIPTION | | | | | | | PL ——— LL Blows per foot - ○ 10 20 30 40 | | | |
| 0 | 699.7 | | | | | | | Topsoil - 3" | | | | | | | | | |
| 0.3 | 699.4 | 50/2 | 2 | 1 | | | Severely weathered brown SANDSTONE, argillaceous. | | | | | | | | | | |
| 2.0 | 697.7 | | | | | | Soft to medium hard gray and brown SANDSTONE; very fine to fine grained, highly weathered to decomposed, argillaceous, thinly bedded to thickly bedded, broken, contains large filled fractures. | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | |
| | | Core 120" | Rec 57" | RQD 0% | R-1 | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | |
| 13.7 | 686.0 | | | | | | Medium hard gray and brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, moderately fractured, with typically low angle fractures, contains few argillaceous laminations. | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | |
| | | Core 120" | Rec 120" | RQD 78% | R-2 | *578 | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | |
| | | Core 36" | Rec 36" | RQD 100% | R-3 | *667 | | | | | | | | | | | |
| 25.0 | 674.7 | | | | | | Bottom of Boring - 25.0' | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-90

Location: Sta. 168+20.2, 110.2 ft. LT of SR 823 CL

Date Drilled: 10/28/04 to 10/29/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (1sf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 7.7' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|---|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 0 | 764.1 | | | | | | | | | | | | | | | | | | | |
| 0.5 | 763.6 | | | | | | Topsoil - 6" | | | | | | | | | | | | | |
| | | 5 | | | | 4.5+ | Hard brown SANDY SILT (A-4a), trace clay; contains sandstone fragments; damp. | | | | | | | | | | | | | |
| | | 6 | 18 | | | | | | | | | | | | | | | | | |
| | | 16 | | | | | | | | | | | | | | | | | | |
| 4.0 | 760.1 | 26 | 18 | | | 2 | Severely weathered SANDSTONE. | | | | | | | | | | | | | |
| 5 | | 40 | | | | | | | | | | | | | | | | | | |
| 5.5 | 758.6 | | | | | | Soft gray and brown SILTSTONE; highly weathered, argillaceous, highly fractured, with typical low angle fractures. | | | | | | | | | | | | | |
| 10 | | Core 90" | Rec 90" | | | RQD 69% | | R-1 | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | | |
| 17.5 | 746.6 | Core 120" | Rec 120" | | | RQD 91% | *549 | R-2 | Medium hard to hard gray and brown SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thickly bedded to massive, moderately to highly fractured with typical low angle clay filled fractures. | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | | |
| 24.6 | 739.5 | Core 120" | Rec 120" | | | RQD 100% | *595 | R-3 | Hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, thickly bedded to massive, slightly fractured. | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc. Project: SCI-823-0.00 Job No. 0121-3070.03

LOG OF: Boring R-91 Location: Sta. 168+47.7, on CL SR 823 Date Drilled: 11/1/04 to 11/1/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 2.6 (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 0 | 728.9 | | | | | | | | | | | | | | | | | | | |
| 0.3 | 728.6 | 50/4 | 3 | 1 | | | Topsoil - 4" | | | | | | | | | | | | | |
| 2.0 | 726.9 | | | | | | Severely weathered SANDSTONE. | | | | | | | | | | | | | |
| 5 | | | | | | | Hard to very hard brown and gray SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, highly fractured with typically low angle clay filled fractures. | | | | | | | | | | | | | |
| 10 | | Core 120" | Rec 120" | RQD 70% | R-1 | *1023 | @ 2.0'-2.4', 2.6'-2.8', 3.0'-3.4', 8.7'-9.0', broken zones. | | | | | | | | | | | | | |
| 13.3 | 715.6 | | | | | | Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly bedded to thickly bedded. | | | | | | | | | | | | | |
| 15 | | Core 120" | Rec 120" | RQD 92% | R-2 | *583 | @ 12.0'-12.1', 13.5'-13.9', high angle rust stained fractures. | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | | |
| 25.0 | 703.9 | Core 36" | Rec 36" | RQD 100% | R-3 | *617 | @ 24.0'-24.3', argillaceous zone. | | | | | | | | | | | | | |
| 25.0 | | | | | | | Bottom of Boring - 25.0' | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/13/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-92

Location: Sta. 168+46.5, 79.3 ft. RT of SR 823 CL

Date Drilled: 11/2/04 to 11/2/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 9.8' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | |
| 0 | 697.2 | | | | | | | | | | | | | | | | | |
| 0.4 | 696.8 | | | | | | Topsoil - 5"/2.5' soil removed before drilling | | | | | | | | | | | |
| 2.0 | 695.2 | 27 50/1 | 7 | 1 | | | Severely weathered brown SANDSTONE, argillaceous. | | | | | | | | | | | |
| 5 | | | | | | | Medium hard gray and brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, moderately fractured, with typical low angle clay filled fractures. | | | | | | | | | | | |
| 8.1 | 689.1 | Core 120" | Rec 120" | RQD 96% | R1 | *311 | Hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, thinly bedded to thickly bedded. | | | | | | | | | | | |
| 15 | | Core 120" | Rec 120" | RQD 100% | R2 | *519 | @ 11.2', low angle rust stained fracture. | | | | | | | | | | | |
| 20 | | | | | | | @ 20.0'-20.1', 20.9'-21.0', arenaceous zones. | | | | | | | | | | | |
| 25 | | | | | | | @ 24.0', 24.7', 25.3', low angle fractures. | | | | | | | | | | | |
| 30.0 | 667.2 | Core 96" | Rec 96" | RQD 100% | R3 | *96 | @ 24.0'-25.3', contains moderate to few argillaceous laminations. | | | | | | | | | | | |
| | | | | | | | Bottom of Boring - 30.0' | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-99

Location: Sta. 177+03.6, 0.9 ft. RT of SR 823 CL

Date Drilled: 10/27/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: 4.9' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 0 | 667.8 | | | | | | | | | | | | | | | | | | | |
| 0.4 | 667.4 | | | | | | Topsoil - 5" | | | | | | | | | | | | | |
| | | 4 | | | 1 | | Medium dense brown SANDY SILT (A-4a), trace clay; contains sandstone fragments; damp to moist. | | | | | | | | | | | | | |
| | | 6 | 18 | | | | | | | | | | | | | | | | | |
| 3.0 | 664.8 | | | | | | Very dense brown GRAVEL (A-1-a), trace to little silt; damp. | | | | | | | | | | | | | |
| | | 50/3 | 0 | | 2 | | | | | | | | | | | | | | | |
| 5.0 | 662.8 | | | | | | Soft brown SHALE; highly weathered to decomposed, moderately fractured with typical low angle clay filled fractures; contains moderate arenaceous laminations. | | | | | | | | | | | | | |
| | | | | | | | @ 6.4'-6.6', 7.4'-7.8', broken zones. | | | | | | | | | | | | | |
| 9.1 | 658.7 | Core 96" | Rec 96" | RQD 63% | R-1 | *238 | Medium hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, highly fractured, with typically low angle clay filled fractures. | | | | | | | | | | | | | |
| 10 | | | | | | | @ 9.9'-10.4', argillaceous laminations. @ 10.6'-11.3', high angle fractures. | | | | | | | | | | | | | |
| 15 | | Core 84" | Rec 84" | RQD 73% | R-2 | *410 | @ 18.3'-18.6', high angle rust stained fracture. | | | | | | | | | | | | | |
| | | | | | | | @ 16.0'-16.1', 18.9'-19.3', broken zones. | | | | | | | | | | | | | |
| 20.0 | 647.8 | | | | | | Bottom of Boring - 20.0' | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-99A

Location: Sta. 175+32.2, 24.4 ft. RT of SR 823 CL

Date Drilled: 10/28/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 2.5' Water level at completion: 7.4' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 0.3 | 628.4 | | | | | | | | | | | | | | | | | | | |
| 0.3 | 628.1 | | | | | | Topsoil - 4" | | | | | | | | | | | | | |
| | | 1 | 18 | 1 | | 1.0 | Stiff dark brown SANDY SILT (A-4a), little clay, little gravel; moist. | 14 | 13 | - | 23 | 36 | 14 | | | | | | | |
| | | 2 | 18 | 2 | | 2.5 | @ 3.5', very stiff, contains sandstone fragments, damp. | | | | | | | | | | | | | |
| | | 3 | 18 | 3 | | 3.0 | | | | | | | | | | | | | | |
| | | 9 | 18 | 4 | | 4.0 | @ 8.5', hard. | | | | | | | | | | | | | |
| | | 9 | 18 | 5 | | 4.5+ | | | | | | | | | | | | | | |
| | | 4 | 18 | 6 | | 4.5+ | | | | | | | | | | | | | | |
| | | 5 | 18 | 7 | | 3.5 | | | | | | | | | | | | | | |
| | | 6 | 18 | 8 | | 4.5+ | | | | | | | | | | | | | | |
| | | 7 | 18 | 9 | | 4.5+ | | | | | | | | | | | | | | |
| 23.0 | 605.4 | | | | | | Severely weathered SANDSTONE, argillaceous, micaceous. | | | | | | | | | | | | | |
| 25.0 | 603.4 | | | | | | Medium hard to hard gray and brown SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, thinly bedded to thickly bedded. | | | | | | | | | | | | | |
| 26.5 | 601.9 | | | | | | @ 26.0'-26.4', high angle clay filled fracture. | | | | | | | | | | | | | |
| | | | | | | | Hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous. | | | | | | | | | | | | | |
| 30 | | Core 120" | Rec 120" | RQD 53% | R-1 | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-99A

Location: Sta. 175+32.2, 24.4 ft. RT of SR 823 CL

Date Drilled: 10/28/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetro- meter (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 2.5' Water level at completion: 7.4' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|--|--|--------------------------|-----------|-----------|-----------|--------|--------|---------------------------------|----|--------------------|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● | | Blows per foot - ○ | | | | |
| | | | | | | | DESCRIPTION | | | | | | PL | LL | | | | | | |
| | | | | | | | | | | | | | 10 | 20 | 30 | 40 | | | | |
| 30 | 598.4 | | | | | *492 | Hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thinly to thickly bedded, moderately to highly fractured, with typical low angle clay filled fractures. | | | | | | | | | | | | | |
| 35.0 | 593.4 | | | | | | | Bottom of Boring - 35.0' | | | | | | | | | | | | |
| 40 | | | | | | | | | | | | | | | | | | | | |
| 45 | | | | | | | | | | | | | | | | | | | | |
| 50 | | | | | | | | | | | | | | | | | | | | |
| 55 | | | | | | | | | | | | | | | | | | | | |
| 60 | | | | | | | | | | | | | | | | | | | | |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-100

Location: Sta. 176+77.5, 310.0 ft. RT of SR 823 CL

Date Drilled: 10/27/04 to 10/28/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 13.5'-20.0' Water level at completion: 4.2' (includes drilling water) | GRADATION | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|---|--------|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | | % Clay | | | | | |
| 0.2 | 601.4 | | | | | | Topsoil - 2" Medium dense to dense dark brown SANDY SILT (A-4a), some gravel, little clay; contains sandstone fragments; damp to moist. | | | | | | | | | | | | |
| | 601.2 | 2 | | | | 1 | | | | | | | | | | | | | |
| | | 3 | 8 | 18 | | | | | | | | | | | | | | | |
| | | 5 | | | | 2 | | | | | | | | | | | | | |
| 5 | | 5 | 6 | 18 | | | | | | | | | | | | | | | |
| | | 8 | 14 | 20 | 18 | 3 | | | | | | | | | | | | | |
| | | 8 | 11 | 11 | 18 | 4 | | | | | | | | | | | | | |
| 10 | | 4 | 9 | 13 | 18 | 5 | | | | | | | | | | | | | |
| | | 3 | 6 | 6 | 18 | 6 | | | | | | | | | | | | | |
| 15 | | 2 | 2 | 2 | 18 | 7 | | | | | | | | | | | | | |
| | | 4 | 9 | 10 | 18 | 8 | | | | | | | | | | | | | |
| 20 | 580.9 | | | | | | | | | | | | | | | | | | |
| 20.5 | | 12 | 17 | 50/3 | 13 | 9 | | | | | | | | | | | | | |
| 22.5 | 578.9 | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | |
| | | Core 120" | Rec 118" | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |

@ 16.0', gray and brown.

Severely weathered SANDSTONE.

Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, slightly fractured.

@ 22.9', 23.4', 23.7', low angle fractures.

FILE: 0121-3070-03 [11/15/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-100

Location: Sta. 176+77.5, 310.0 ft. RT of SR 823 CL

Date Drilled: 10/27/04 to 10/28/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 13.5'-20.0' Water level at completion: 4.2' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---------------------------------|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● | | | | | |
| | | | | | | | DESCRIPTION | | | | | | | PL ————— LL | | | | | |
| | | | | | | | | | | | | | | Blows per foot - ○ | | | | | |
| 30 | 571.4 | | | | | | | | | | | | | | | | | | |
| 32.5 | 568.9 | | | | | | Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, slightly fractured. | | | | | | | | | | | | |
| | | | | | | | Bottom of Boring - 32.5' | | | | | | | | | | | | |
| 35 | | | | | | | | | | | | | | | | | | | |
| 40 | | | | | | | | | | | | | | | | | | | |
| 45 | | | | | | | | | | | | | | | | | | | |
| 50 | | | | | | | | | | | | | | | | | | | |
| 55 | | | | | | | | | | | | | | | | | | | |
| 60 | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-101

Location: Sta. 180+90.9, 23.6 ft. LT of SR 823 CL

Date Drilled: 10/27/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 7.3' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | | | |
|------------|----------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | | |
| 0.2 | 695.6 695.4 | | | | | | | | | | | | | | | | | | | | |
| | | 2 | | | | | Topsoil - 2" | | | | | | | | | | | | | | |
| | | 3 | | | | | Loose brown SANDY SILT (A-4a), trace clay; contains sandstone fragments; damp. | | | | | | | | | | | | | | |
| | | 4 | 18 | | | | | | | | | | | | | | | | | | |
| 3.0 | 692.6 | | | | | | Severely weathered brown SANDSTONE. @ 13.5'-17.5', argillaceous. | | | | | | | | | | | | | | |
| | | 9 | | | | | | | | | | | | | | | | | | | |
| | | 13 | | | | | | | | | | | | | | | | | | | |
| | | 21 | 18 | | | | | | | | | | | | | | | | | | |
| | | 7 | | | | | | | | | | | | | | | | | | | |
| | | 8 | | | | | | | | | | | | | | | | | | | |
| | | 10 | | | | | | | | | | | | | | | | | | | |
| | | 50/4 | 4 | | | | | | | | | | | | | | | | | | |
| | | 9 | | | | | | | | | | | | | | | | | | | |
| | | 11 | | | | | | | | | | | | | | | | | | | |
| | | 16 | 18 | | | | | | | | | | | | | | | | | | |
| | | 27 | | | | | | | | | | | | | | | | | | | |
| | | 37 | | | | | | | | | | | | | | | | | | | |
| | | 48 | 18 | | | | | | | | | | | | | | | | | | |
| | | 27 | | | | | | | | | | | | | | | | | | | |
| | | 9 | | | | | | | | | | | | | | | | | | | |
| | | 22 | 18 | | | | | | | | | | | | | | | | | | |
| | | 50/2 | 2 | | | | | | | | | | | | | | | | | | |
| 20.0 | 675.6 | | | | | | Medium hard to hard gray and brown SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thinly to thickly bedded, highly fractured, with typical high angle rust stained fractures. @ 20.7'-21.5', 22.8'-23.9', 24.1'-25.2', high angle rust stained fractures. @ 25.3'-26.4', high angle fractures. @ 28.8'-29.3', contains carbonaceous laminations with turbidity beds. | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| 25 | | Core 120" | Rec 120" | | RQD 33% | R-1 | *499 | | | | | | | | | | | | | | |
| 30.0 | 665.6 | | | | | | Bottom of Boring - 30.0' | | | | | | | | | | | | | | |

FILE: 0121-3070-03 | 11/12/2007 12:19 PM |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-102

Location: Sta. 181+02.4, 182.6 ft. RT of SR 823 CL

Date Drilled: 10/27/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 8.5'-35.0' Water level at completion: 8.0' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-------------|-----------|-----------|-----------|--------|--------------------------|---------------------------------|--------------------|--|
| | | | | Drive | Press / Core | | | DESCRIPTION | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● | Blows per foot - ○ | |
| 0.2 | 612.8 | | | | | | | | | | | | | | | | |
| | 612.6 | | | | | | Topsoil - 2" | | | | | | | | | | |
| | | 2 | | | | | Loose to medium dense brown SANDY SILT (A-4a), little gravel, trace clay; contains sandstone fragments; damp. | | | | | | | | | | |
| | | 2 | 18 | | | 1 | | | | | | | | | | | |
| | | 4 | | | | | | | | | | | | | | | |
| | | 5 | 18 | | | 2 | | | | | | | | | | | |
| 5 | | 13 | | | | | | | | | | | | | | | |
| | | 16 | 18 | | | 3 | | | | | | | | | | | |
| 8.0 | 604.8 | | | | | | Stiff gray and brown SILT AND CLAY (A-6a), trace fine to coarse sand; damp to moist. - @ 9.0', torvane = 0.7 tsf | | | | | | | | | | |
| | | 3 | | | | | | 1.25 | | | | | | | | | |
| 10 | | | | | | | Medium stiff to stiff gray SILT (A-4b), trace fine sand, some clay; moist to wet. @ 11.0', torvane = 0.2 tsf | | | | | | | | | | |
| 10.5 | 602.3 | | | | | | | 1.0 | | | | | | | | | |
| | | W | | | | | Loose gray and brown SILT (A-4b), some fine to coarse sand, trace gravel; contains sandstone fragments; moist. | | | | | | | | | | |
| | | O | 18 | | | | | P-1 | | | | | | | | | |
| 13.0 | 599.8 | | | | | | | | | | | | | | | | |
| | | 2 | 18 | | | | | 6 | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | |
| | | 2 | 18 | | | | | 7 | | | | | | | | | |
| | | 4 | | | | | | | | | | | | | | | |
| | | 2 | 18 | | | | | 8 | | | | | | | | | |
| 20 | | | | | | | Medium dense gray and light brown FINE SAND (A-3), little silt; contains sandstone fragments; damp. | | | | | | | | | | |
| 20.5 | 592.3 | | | | | | | 9 | | | | | | | | | |
| | | 10 | | | | | Medium dense gray SANDY SILT (A-4a), trace clay; contains sandstone fragments; damp to moist. | | | | | | | | | | |
| | | 9 | 18 | | | | | 10 | | | | | | | | | |
| 23.0 | 589.8 | | | | | | | | | | | | | | | | |
| | | 4 | | | | | | 11 | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | |
| | | 3 | | | | | | 12 | | | | | | | | | |
| | | 8 | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | |
| | | 8 | | | | | | | | | | | | | | | |
| | | 11 | 18 | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-102

Location: Sta. 181+02.4, 182.6 ft. RT of SR 823 CL

Date Drilled: 10/27/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 8.5'-35.0' Water level at completion: 8.0' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|----------------|---------------|------------|--------------|---|--|------------------------------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 30 | 582.8 | | | | | | Medium dense gray SANDY SILT (A-4a), trace clay; contains sandstone fragments; damp to moist. | | | | | | | | | | | | |
| 35 | | 6" 10 13 | 18 | | | 13 | | | | | | | | | | | | | |
| 36.0 | 576.8 | | | | | | | Severely weathered gray SANDSTONE. | | | | | | | | | | | |
| 39.0 | 573.8 | 50/3 | 3 | | | 14 | Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, pyritic, thickly bedded, slightly fractured. | | | | | | | | | | | | |
| 40 | | | | | | | | | | | | | | | | | | | |
| 45 | | Core 120" | Rec 120" | RQD 100% | R-1 | *678 | | | | | | | | | | | | | |
| 49.0 | 563.8 | | | | | | Bottom of Boring - 49.0' | | | | | | | | | | | | |
| 50 | | | | | | | | | | | | | | | | | | | |
| 55 | | | | | | | | | | | | | | | | | | | |
| 60 | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc. Project: SCI-823-0.00 Job No. 0121-3070.03

LOG OF: Boring R-103 Location: Sta. 185+41.0, 317.0 ft. LT of SR 823 CL Date Drilled: 10/26/04 to 10/27/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 2.5', 11.0'-21.0' Water level at completion: 6.1' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 0 | 633.3 | | | | | | | | | | | | | | | | | | | |
| 0.3 | 633.0 | | | | | | Topsail - 4" | | | | | | | | | | | | | |
| | | 5 | | | | 2.5 | Very stiff brown SILT (A-4b), some clay, trace fine to coarse sand, trace gravel; contains sandstone fragments; damp to moist. | | | | | | | | | | | | | |
| | | 6 | 18 | 1 | | | | | | | | | | | | | | | | |
| | | 3 | | | | 3.0 | | | | | | | | | | | | | | |
| 5 | | 5 | 13 | 2 | | | | | | | | | | | | | | | | |
| | | 10 | | | | 2.25 | Very loose to loose brown and gray SILT (A-4b), some fine to coarse sand, little clay, trace gravel; contains sandstone fragments; damp. | | | | | | | | | | | | | |
| | | 11 | 18 | 3 | | | | | | | | | | | | | | | | |
| | | 4 | | | | 3.5 | | | | | | | | | | | | | | |
| 10 | | 4 | 18 | 4 | | | | | | | | | | | | | | | | |
| 10.5 | 622.8 | | | | | | Very loose to loose brown and gray SILT (A-4b), some fine to coarse sand, little clay, trace gravel; contains sandstone fragments; damp. | | | | | | | | | | | | | |
| | | 2 | | | | | | | | | | | | | | | | | | |
| | | 3 | 18 | 5 | | | | | | | | | | | | | | | | |
| | | 4 | | | | | | | | | | | | | | | | | | |
| 15 | | 3 | | | | | @ 18.5', moist. | | | | | | | | | | | | | |
| | | 4 | 18 | 6 | | | | | | | | | | | | | | | | |
| | | 1 | | | | | | | | | | | | | | | | | | |
| | | 1 | 18 | 7 | | | | | | | | | | | | | | | | |
| 20 | | 4 | | | | | Severely weathered grayish brown SANDSTONE. Medium hard gray and brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thinly to thickly bedded, highly fractured, with typical low angle rust stained fractures. Hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, thinly to thickly bedded, moderately fractured, with typical low angle clay filled fractures. | | | | | | | | | | | | | |
| | | 2 | | | | | | | | | | | | | | | | | | |
| | | 3 | 18 | 8 | | | | | | | | | | | | | | | | |
| | | 4 | | | | | | | | | | | | | | | | | | |
| 21.0 | 612.3 | | | | | | Severely weathered grayish brown SANDSTONE. Medium hard gray and brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thinly to thickly bedded, highly fractured, with typical low angle rust stained fractures. Hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, thinly to thickly bedded, moderately fractured, with typical low angle clay filled fractures. | | | | | | | | | | | | | |
| 21.5 | 611.8 | 50 | | | | | | | | | | | | | | | | | | |
| | | 6 | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| 22.9 | 610.4 | | | | | | Severely weathered grayish brown SANDSTONE. Medium hard gray and brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thinly to thickly bedded, highly fractured, with typical low angle rust stained fractures. Hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, thinly to thickly bedded, moderately fractured, with typical low angle clay filled fractures. | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | Severely weathered grayish brown SANDSTONE. Medium hard gray and brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thinly to thickly bedded, highly fractured, with typical low angle rust stained fractures. Hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, thinly to thickly bedded, moderately fractured, with typical low angle clay filled fractures. | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | Severely weathered grayish brown SANDSTONE. Medium hard gray and brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thinly to thickly bedded, highly fractured, with typical low angle rust stained fractures. Hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, thinly to thickly bedded, moderately fractured, with typical low angle clay filled fractures. | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-103

Location: Sta. 185+41.0, 317.0 ft. LT of SR 823 CL

Date Drilled: 10/26/04 to 10/27/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 2.5', 11.0'-21.0' Water level at completion: 6.1' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 30 | 603.3 | | | | | | DESCRIPTION Hard gray SANDSTONE; very fine to fine grained. Bottom of Boring - 31.5' | | | | | | | | | | | | | |
| 31.5 | 601.8 | | | | | | | | | | | | | | | | | | | |
| 35 | | | | | | | | | | | | | | | | | | | | |
| 40 | | | | | | | | | | | | | | | | | | | | |
| 45 | | | | | | | | | | | | | | | | | | | | |
| 50 | | | | | | | | | | | | | | | | | | | | |
| 55 | | | | | | | | | | | | | | | | | | | | |
| 60 | | | | | | | | | | | | | | | | | | | | |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-104

Location: Sta. 184+80.6, 37.3 ft. RT of SR 823 CL

Date Drilled: 10/26/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 5.0', 16.0'-30.0' Water level at completion: 4.8' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|----------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0.3 | 627.5 | | | | | | | | | | | | | | | | | | |
| | 627.2 | | | | | | Topsoil - 3" | | | | | | | | | | | | |
| | | 2 3 6 | 18 | 1 | | 4.0 | Very stiff to hard brown and gray SILT AND CLAY (A-6a), little to some gravel, little fine to coarse sand; damp to moist. | | | | | | | | | | | | |
| | | 2 3 4 | 18 | 2 | | 3.5 | | | | | | | | | | | | | |
| 5 | | 2 5 10 | 18 | 3 | | 3.0 | | | | | | | | | | | | | |
| | | 11 12 13 | 18 | 4 | | 3.25 | | | | | | | | | | | | | |
| | | 4 9 8 | 18 | 5 | | 4.0 | | | | | | | | | | | | | |
| | | 3 3 4 | 18 | 6 | | 3.5 | | | | | | | | | | | | | |
| 15 | | 4 6 8 | 18 | 7 | | 2.5 | | | | | | | | | | | | | |
| 18.0 | 609.5 | 3 3 3 | 18 | 8 | P1 | <0.25 | Very soft gray CLAY (A-7-6), trace to little fine to coarse sand; contains sandstone fragments; moist to wet. | 20 | 5 | - | 11 | 44 | 20 | | | | | | |
| 20 | | 5 6 6 | 18 | 9 | | | Loose to medium dense gray SANDY SILT (A-4a); contains sandstone fragments; dry to damp. | 0 | 2 | - | 9 | 31 | 58 | | | | | | |
| 20.5 | 607.0 | 2 4 6 | 18 | 10 | | | | | | | | | | | | | | | |
| | | 3 4 4 | 18 | 11 | | | | | | | | | | | | | | | |
| 25 | | 3 4 7 | 18 | 12 | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/13/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-104

Location: Sta. 184+80.6, 37.3 ft. RT of SR 823 CL

Date Drilled: 10/26/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 5.0', 16.0'-30.0' Water level at completion: 4.8' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | |
|------------|----------------|--------------|---------------|------------|--------------|---|---|--|-----------|-----------|-----------|--------|--------|---|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | |
| 30.0 | 597.5 597.5 | | | | | | Severely weathered gray SANDSTONE, very fine to fine grained, argillaceous. | | | | | | | | | | | |
| 34.0 | 593.5 | 50 | 5 | 13 | | | | Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly to thickly bedded, slightly to moderately fractured. | | | | | | | | | | |
| 40 | | Core 120" | Rec 120" | RQD 79% | R-1 | *572 | @ 41.5'-43.0', argillaceous zone. | | | | | | | | | | | |
| 44.0 | 583.5 | | | | | | Bottom of Boring - 44.0' | | | | | | | | | | | |
| 45 | | | | | | | | | | | | | | | | | | |
| 50 | | | | | | | | | | | | | | | | | | |
| 55 | | | | | | | | | | | | | | | | | | |
| 60 | | | | | | | | | | | | | | | | | | |

Client: TranSystems, Inc. Project: SCI-823-0.00 Job No. 0121-3070.03

LOG OF: Boring R-105 Location: Sta. 185+04.3, 215.9 ft. RT of SR 823 CL Date Drilled: 10/27/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / *Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: 6.7' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | |
|------------|------------|--------------|---------------|------------|--------------|--|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | |
| 0.3 | 684.2 | | | | | | | | | | | | | | | | | |
| | | 5 9 12 | 18 | 1 | | | Topsail - 3" | | | | | | | | | | | |
| | | | | | | | Medium dense brown SILT (A-4b), some fine to coarse sand, little clay, trace gravel; contains sandstone fragments and roots; damp to moist. | 9 | 16 | — | 10 | 54 | 11 | | | | | |
| 3.5 | 681.0 | 50/2 | 0 | 2 | | | Severely weathered SANDSTONE. | | | | | | | | | | | |
| 5.0 | 679.5 | | | | | | Medium hard gray and brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thinly to thickly bedded, highly fractured, with typical low angle fractures. | | | | | | | | | | | |
| | | Core 96" | Rec 96" | RQD 40% | R-1 | *428 | @ 9.0'-10.8', 12.5'-12.8', rust stained high angle fractures. | | | | | | | | | | | |
| 12.8 | 671.7 | | | | | | Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly to thickly bedded, slightly fractured to unfractured. | | | | | | | | | | | |
| | | Core 84" | Rec 84" | RQD 100% | R-2 | *441 | | | | | | | | | | | | |
| 20.0 | 664.5 | | | | | | Bottom of Boring - 20.0' | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-106

Location: Sta. 188+85.1, 50.5 ft. RT of SR 823 CL

Date Drilled: 10/26/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 9.9' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 0.3 | 647.4 | | | | | | | | | | | | | | | | | | | |
| | 647.1 | | | | | | | | | | | | | | | | | | | |
| | | 4 | | | | | | | | | | | | | | | | | | |
| | | 4 | 6 | 18 | | | | | | | | | | | | | | | | |
| | | 4 | | | | | | | | | | | | | | | | | | |
| | | 6 | 9 | 18 | | | | | | | | | | | | | | | | |
| 5.5 | 641.9 | | | | | | | | | | | | | | | | | | | |
| | | 4 | 6 | 7 | 18 | | 0.25 | | | | | | | | | | | | | |
| | | 12 | 16 | 17 | 18 | | 2.0 | | | | | | | | | | | | | |
| | | 12 | 22 | 29 | 18 | | 4.0 | | | | | | | | | | | | | |
| | | 12 | 15 | 19 | 18 | | 4.5+ | | | | | | | | | | | | | |
| 15.0 | 632.4 | | | | | | | | | | | | | | | | | | | |
| | | 12 | 50/3 | 9 | | | | | | | | | | | | | | | | |
| 17.0 | 630.4 | | | | | | | | | | | | | | | | | | | |
| | | Core 72" | Rec 72" | | RQD 22% | R-1 | *609 | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | | |
| 21.2 | 626.2 | | | | | | | | | | | | | | | | | | | |
| | | Core 84" | Rec 84" | | RQD 100% | R-2 | *615 | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | | |
| 30.0 | 617.4 | | | | | | | | | | | | | | | | | | | |

Bottom of Boring - 30.0'

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-106A

Location: Sta. 191+91.1, 71.3 ft. RT of SR 823 CL

Date Drilled: 10/26/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: 13.4' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|--|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 0.3 | 665.8 | | | | | | Topsoil - 4" Medium dense brown SANDY SILT (A-4a), little gravel, trace clay; contains sandstone fragments; damp. | | | | | | | | | | | | | |
| | 665.5 | 3 | | | | 1 | | | | | | | | | | | | | | |
| | | 4 | 18 | | | | | | | | | | | | | | | | | |
| | | 5 | | | | | | | | | | | | | | | | | | |
| | | 9 | | | | 2 | | | | | | | | | | | | | | |
| | | 12 | 18 | | | | | | | | | | | | | | | | | |
| | | 17 | | | | | | | | | | | | | | | | | | |
| | | 16 | | | | 3 | | | | | | | | | | | | | | |
| | | 22 | 18 | | | | | | | | | | | | | | | | | |
| | | 29 | | | | | | | | | | | | | | | | | | |
| 8.0 | 657.8 | | | | | | Very soft to soft brown SANDSTONE; very fine to fine grained, decomposed, argillaceous, broken; contains gravel and other residual soil like materials. @ 9.1'-11.7', no recovery. | | | | | | | | | | | | | |
| 10 | | Core 60" | Rec 32" | RQD 0% | R-1 | | | | | | | | | | | | | | | |
| 13.0 | 652.8 | | | | | | Medium hard to hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, thinly to thickly bedded, slightly to moderately fractured, with typical low angle fractures. @ 13.0'-13.8', brown highly weathered. | | | | | | | | | | | | | |
| 15 | | Core 120" | Rec 120" | RQD 84% | R-2 | *480 | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | | |
| 25 | | Core 84" | Rec 84" | RQD 100% | R-3 | *503 | | | | | | | | | | | | | | |
| 30.0 | 635.8 | | | | | | Bottom of Boring - 30.0' | | | | | | | | | | | | | |

FILE: 0121-3070-03 1 11/12/2007 12:49 PM

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-107

Location: Sta. 194+85.7, 32.6 ft. RT of SR 823 CL

Date Drilled: 10/26/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 11.1' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0.3 | 685.7 | | | | | | | | | | | | | | | | | | |
| 0.3 | 685.4 | | | | | | Topsoil - 3"/1.1' soil removed before drilling | | | | | | | | | | | | |
| | | 3 | 18 | 1 | | 0.25 | Soft brown SILT AND CLAY (A-6a), some fine to coarse sand, trace to little gravel; contains sandstone fragments; damp to moist. | 4 | 5 | - | 16 | 46 | 29 | | | | | | |
| | | 6 | 18 | | | | | | | | | | | | | | | | |
| 5 | | 8 | 18 | 2 | | 1.0 | | | | | | | | | | | | | |
| | | 11 | 18 | | | | @ 6.0', very stiff to hard. | | | | | | | | | | | | |
| | | 15 | 18 | 3 | | 3.5 | | | | | | | | | | | | | |
| | | 10 | 18 | | | | | | | | | | | | | | | | |
| 10 | | 11 | 18 | | | | | | | | | | | | | | | | |
| | | 12 | 18 | | | | | | | | | | | | | | | | |
| | | 10 | 18 | | | | | | | | | | | | | | | | |
| | | 12 | 18 | | | | | | | | | | | | | | | | |
| | | 14 | 18 | 5 | | 4.5+ | | | | | | | | | | | | | |
| 13.0 | 672.7 | | | | | | Severely weathered brown and gray SANDSTONE. | | | | | | | | | | | | |
| | | 19 | 8 | | | | | | | | | | | | | | | | |
| | | 50/2 | | 6 | | | | | | | | | | | | | | | |
| 15.0 | 670.7 | | | | | | Medium hard to hard gray SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thinly laminated to thickly bedded, slightly to highly fractured, with typically low angle fractures; contains few argillaceous laminations. | | | | | | | | | | | | |
| 20 | | Core 96" | Rec 96" | RQD 76% | R-1 | *477 | | | | | | | | | | | | | |
| | | | | | | | @ 20.6'-22.5', broken with clay filled fractures. | | | | | | | | | | | | |
| 25 | | Core 84" | Rec 84" | RQD 80% | R-2 | *127 | @ 22.5'-26.7', moderate to abundant argillaceous laminations, fissite. | | | | | | | | | | | | |
| 30.0 | 655.7 | | | | | | Bottom of Boring - 30.0' | | | | | | | | | | | | |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-115

Location: Sta. 208+61.9, 255.4 ft. LT of SR 823 CL

Date Drilled: 10/20/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetro- meter (tsf) / *Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 1.0'-2.5' Water level at completion: 3.6' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|---------------|---------------|------------|--------------|--|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0.3 | 678.2 | | | | | | | | | | | | | | | | | | |
| | 677.9 | | | | | | Topsoil - 4" | | | | | | | | | | | | |
| | | 2 4 4 | 18 | | 1 | 3.0 | Very stiff to hard brown, gray, and orange SANDY SILT (A-4a), trace gravel, trace clay; contains sandstone fragments; damp. | | | | | | | | | | | | |
| | | 8 9 17 | 18 | | 2 | 4.25 | | | | | | | | | | | | | |
| 5 | | 9 12 16 | 18 | | 3 | 3.5 | | | | | | | | | | | | | |
| | | 7 13 21 | 18 | | 4 | 4.0 | | | | | | | | | | | | | |
| 10 | 667.7 | | | | | | | | | | | | | | | | | | |
| 10.5 | | 9 15 18 | 18 | | 5 | 4.5+ | Hard gray SILT AND CLAY (A-6a), trace fine to coarse sand; contains sandstone fragments; damp. | | | | | | | | | | | | |
| 13.0 | 665.2 | | | | | | | | | | | | | | | | | | |
| | | 6 13 42 | 16 | | 6 | | Severely weathered gray SANDSTONE. | | | | | | | | | | | | |
| 15.0 | 663.2 | | | | | | | | | | | | | | | | | | |
| | | Core 63" | Rec 63" | | RQD 70% | *33 | Hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, thinly to thickly bedded, moderately fractured, with typical low angle clay filled fractures, turbidity bedded, few argillaceous laminations. | | | | | | | | | | | | |
| 20.3 | 658.0 | | | | | | | | | | | | | | | | | | |
| | | | | | | | Bottom of Boring - 20.3' | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-116

Location: Sta. 209+68.7, 41.2 ft. LT of SR 823 CL

Date Drilled: 10/19/04 to 10/20/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 1.0'-5.0', 8.5'-12.0' Water level at completion: 8.2' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|---|-----------|-----------|-----------|--------|--------|---|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | |
| 0.0 | 675.3 | | | | | | Topsoil - 3" | | | | | | | | | | |
| 0.3 | 675.0 | | | | | | | Loose brown SANDY SILT (A-4a), little clay, trace gravel; contains sandstone fragments; damp. | | | | | | | | | |
| | | 1 | 18 | 1 | | | | | | | | | | | | | |
| | | 4 | 18 | 2 | | | | | | | | | | | | | |
| 5.5 | 669.8 | | | | | | Hard brown and gray SANDY SILT (A-4a), little clay, little gravel; contains sandstone fragments; damp. | | | | | | | | | | |
| | | 8 | 18 | 3 | | | | 4.5+ | | | | | | | | | |
| | | 4 | 18 | 4 | | | | | | | | | | | | | |
| | | 8 | 18 | 5 | | | | | | | | | | | | | |
| 13.0 | 662.3 | | | | | | Severely weathered gray SANDSTONE, very fine grained, argillaceous. | | | | | | | | | | |
| | | 4 | 18 | 6 | | | | 4.5+ | | | | | | | | | |
| 15.5 | 659.8 | | | | | | Medium hard gray and brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, thinly to thickly bedded, moderately fractured, with typical low angle clay filled fractures. @ 15.8'-16.1', few argillaceous laminations. | | | | | | | | | | |
| | | 50/5 | 5 | 7 | | | | 4.5+ | | | | | | | | | |
| | | Core 54" | Rec 47" | RQD 59% | R-1 | *370 | | | | | | | | | | | |
| 20.0 | 655.3 | | | | | | Hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, thinly to thickly bedded, slightly fractured, with typical low angle clay filled fractures; contains few argillaceous laminations. | | | | | | | | | | |
| | | Core 120" | Rec 120" | RQD 75% | R-2 | *516 | | | | | | | | | | | |
| 30.0 | 645.3 | | | | | | Bottom of Boring - 30.0' | | | | | | | | | | |

FILE: 0121-3070-03 | 11/12/2007 12:49 PM

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-117

Location: Sta. 209+68.8, 304.6 ft. RT of SR 823 CL

Date Drilled: 10/19/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 1.0'-2.5' Water level at completion: 2.9' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|---|-----------|-----------|-----------|--------|--------|---|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | |
| 0.3 | 659.3 | | | | | | Topsoil - 4" | | | | | | | | | | |
| 0.3 | 659.0 | 1 | 4 | 18 | 1 | | | Loose to medium dense dark brown SANDY SILT (A-4a), trace clay, trace gravel; contains sandstone fragments; damp. | | | | | | | | | |
| 5 | | 5 | 13 | 15 | 18 | 2 | | | | | | | | | | | |
| 5.5 | 653.8 | | | | | | Severely weathered brown SANDSTONE, fine to medium grained, argillaceous. | | | | | | | | | | |
| 9.0 | 650.3 | | 9 | 13 | 20 | 18 | | | | | | | | | | | |
| 10 | | | 26 | 50/2 | 6 | 4 | | | | | | | | | | | |
| 10 | | | Core 18" | Rec 18" | RQD 61% | R-1 | *289 | Medium hard to hard brown and gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thinly to thickly bedded, highly fractured. @ 9.5'-9.8', high angle rust stained fracture. @ 10.0', 11.9', 12.0', low angle rust stained fractures. | | | | | | | | | |
| 12.1 | 647.2 | | | | | | | Hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, micaceous, pyritic, thinly to thickly bedded, moderately fractured. | | | | | | | | | |
| 15 | | | Core 120" | Rec 120" | RQD 96% | R-2 | *609 | | | | | | | | | | |
| 25 | | | Core 120" | Rec 120" | RQD 98% | R-3 | *676 | @ 15.6', 15.8', 30.2', low angle clay filled fractures. | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-117

Location: Sta. 209+68.8, 304.6 ft. RT of SR 823 CL

Date Drilled: 10/19/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 1.0'-2.5' Water level at completion: 2.9' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 30 | 629.3 | | | | | | | | | | | | | | | | | | | |
| 30.5 | 628.8 | | | | | | @ 30.0'-30.5', contains few argillaceous laminations. Bottom of Boring - 30.5' | | | | | | | | | | | | | |
| 35 | | | | | | | | | | | | | | | | | | | | |
| 40 | | | | | | | | | | | | | | | | | | | | |
| 45 | | | | | | | | | | | | | | | | | | | | |
| 50 | | | | | | | | | | | | | | | | | | | | |
| 55 | | | | | | | | | | | | | | | | | | | | |
| 60 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-126

Location: Sta. 230+51.4, 286.0 ft. LT of SR 823 CL

Date Drilled: 10/13/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 3.4' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|----------------|------------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 0.2 | 684.0 683.8 | | | | | | | | | | | | | | | | | | | |
| | | 5 20 20 | 14 | 1 | | 4.5+ | Topsoil - 2" Hard brown SANDY SILT (A-4a), trace clay; contains sandstone fragments; dry to damp. | | | | | | | | | | | | | |
| | | 10 14 15 | 15 | 2 | | 4.0 | | | | | | | | | | | | | | |
| 5.0 | 679.0 | 11 22 50/5 | 15 | 3 | | | Severely weathered brown SANDSTONE. | | | | | | | | | | | | | |
| 6.5 | 677.5 | | | | RQD 40% | R-1 | Medium hard to hard gray SANDSTONE interbedded with SHALE; very fine to fine grained, highly weathered, micaceous, thinly laminated to thinly bedded, highly fractured, with typical low angle clay filled fractures. | | | | | | | | | | | | | |
| | | Core 42" | Rec 42" | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | |
| 15.0 | 669.0 | Core 120" | Rec 120" | | RQD 74% | R-2 | Hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, pyritic, micaceous, thinly bedded to thickly bedded, moderately to highly fractured. | | | | | | | | | | | | | |
| 20.0 | 664.0 | | | | | | Bottom of Boring - 20.0' | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-127

Location: Sta. 230+97.3, 92.5 ft. LT of SR 823 CL

Date Drilled: 10/13/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: Not Reported | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|---------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0.3 | 725.1 | | | | | | Topsoil - 4"/3.0' soil removed before drilling Medium dense brown SANDY SILT (A-4a), trace clay; contains sandstone fragments; dry to damp. | | | | | | | | | | | | |
| | 724.8 | 5 10 6 | 16 | 1 | | | | | | | | | | | | | | | |
| | | 5 7 9 | 13 | 2 | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | |
| 6.0 | 719.1 | 10 7 33 | 15 | 3 | | | Severely weathered brownish gray SANDSTONE. | | | | | | | | | | | | |
| | | 25 50/2 | 7 | 4 | | | | | | | | | | | | | | | |
| 10.0 | 715.1 | | | | | | Medium hard to hard gray and brown SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, highly fractured, with typical low angle rust stained fractures. Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, moderately fractured, with typical low angle clay filled fractures. @ 12.0'-12.5', broken zone. @ 13.4',13.9',14.3',14.5', 15.4',15.6',16.0',17.0'-17.3', argillaceous zones. @ 15.4',15.5',15.9',17.0', 17.2',17.3',17.7', low angle fractures. | | | | | | | | | | | | |
| 13.1 | 712.0 | | | | | | | | | | | | | | | | | | |
| 15 | | Core 120" | Rec 114" | RQD 70% | R-1 | *467 | | | | | | | | | | | | | |
| 20.0 | 705.1 | | | | | | Bottom of Boring - 20.0' | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 9:37 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-128

Location: Sta. 230+74.1, 130.6 ft. RT of SR 823 CL

Date Drilled: 10/14/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: Not Reported | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|----------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 0.2 | 799.8 799.6 | | | | | | | | | | | | | | | | | | | |
| | | 4 8 15 | 11 | 1 | | | Topsoil - 2" | | | | | | | | | | | | | |
| 3.0 | 796.8 | 50 | 5 | 2 | | | Hard brown SILT AND CLAY (A-6a), trace fine to coarse sand; damp. | | | | | | | | | | | | | |
| | | | | | | | Severely weathered brown and gray CLAYSTONE, arenaceous. | | | | | | | | | | | | | |
| 5.0 | 794.8 | | | | | | Soft to medium hard brown SANDSTONE; very fine to fine grained, highly weathered to decomposed, argillaceous, micaceous, thinly bedded to thickly bedded, broken to highly fractured. | | | | | | | | | | | | | |
| 10 | | Core 120" | Rec 120" | RQD 18% | R-1 | *276 | @ 10.8'-11.2', high angle clay filled fracture. | | | | | | | | | | | | | |
| 14.1 | 785.7 | | | | | | Medium hard gray SANDSTONE; very fine to fine grained, decomposed to highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, highly fractured, with typically low angle clay filled fractures, contains moderate argillaceous laminations. | | | | | | | | | | | | | |
| 15 | | | | | | | @ 15.6'-17.4', 18.0'-19.6', abundant argillaceous laminations. @ 17.2'-17.4', broken zone. | | | | | | | | | | | | | |
| 20.0 | 779.8 | Core 120" | Rec 120" | RQD 63% | R-2 | *288 | Hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, thinly bedded to thickly bedded, moderately fractured. | | | | | | | | | | | | | |
| | | | | | | | @ 19.8'-20.0', broken. @ 20.8', 23.7', 24.9', low angle fractures. | | | | | | | | | | | | | |
| 25.0 | 774.8 | | | | | | Bottom of Boring - 25.0' | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 9:37 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-129

Location: Sta. 236+03.9, 104.6 ft. RT of SR 823 CL

Date Drilled: 10/13/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: 10.0' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|----------------|---------------|------------|--------------|---|--|-------------------------------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0.2 | 656.0 | | | | | | Topsoil - 2" / 3" soil removed before drilling Hard brown SANDY SILT (A-4a), little clay, trace gravel; damp. | | | | | | | | | | | | |
| | 655.8 | 4 6 10 | 15 | 1 | | 4.5+ | | | | | | | | | | | | | |
| 3.0 | 653.0 | 29 25 29 | 14 | 2 | | 4.5+ | | Severely weathered brown SANDSTONE. | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | |
| 7.0 | 649.0 | 45 50/5 | 10 | 3 | | | Medium hard gray and brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, highly fractured, with typical low angle clay filled fractures. @ 10.7'-11.1', high angle rust stained fracture. | | | | | | | | | | | | |
| 10 | | Core 54" | Rec 54" | RQD 57% | R-1 | *200 | | | | | | | | | | | | | |
| 11.2 | 644.8 | | | | | | Medium hard to hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, moderately to highly fractured, with typical low angle clay filled fractures; contains few argillaceous laminations. @ 11.6', low angle rust stained fracture. | | | | | | | | | | | | |
| 15 | | Core 120" | Rec 119" | RQD 87% | R-2 | *597 | | | | | | | | | | | | | |
| 21.5 | 634.5 | | | | | | Bottom of Boring - 21.5' | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc. Project: SCI-823-0.00 Job No. 0121-3070.03

LOG OF: Boring R-130 Location: Sta. 235+85.6, 7.1 ft. RT of SR 823 CL Date Drilled: 10/14/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: 4.4' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - PL LL Blows per foot - | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | |
| 0 | 671.8 | | | | | | Topsoil 4" Severely weathered brown SILTSTONE. | | | | | | | | | | |
| 0.3 | 671.5 | 25 | | 1 | | | | | | | | | | | | | |
| | | 29 35 | 18 | | | | | | | | | | | | | | |
| | | 30 | | 2 | | | Soft to medium hard gray and brown SANDSTONE; very fine to fine grained, highly weathered to decomposed, argillaceous, micaceous, thinly bedded to thickly bedded, highly fractured, with typical low angle rust stained fractures. | | | | | | | | | | |
| | | 50/4 | 10 | | | | | | | | | | | | | | |
| 5.0 | 666.8 | | | | | | | | | | | | | | | | |
| | | Core 96" | Rec 96" | RQD 49% | R-1 | *328 | | | | | | | | | | | |
| 13.2 | 658.6 | | | | | | Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, thinly bedded to thickly bedded, moderately fractured, with typical low angle clay filled fractures. @ 13.6'-15.7', contains few to moderate argillaceous laminations. | | | | | | | | | | |
| 15 | | Core 84" | Rec 84" | RQD 96% | R-2 | *463 | | | | | | | | | | | |
| 20.0 | 651.8 | | | | | | | | | | | | | | | | |
| | | | | | | | Bottom of Boring - 20.0' | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

64
50+

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-131

Location: Sta. 235+49.3, 230.1 ft. RT of SR 823 CL

Date Drilled: 10/14/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: 8.1' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 |
|------------|----------------|------------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | |
| 0.3 | 716.7 716.4 | | | | | | Topsoil - 3"/9" soil removed before drilling Very stiff brown SANDY SILT (A-4a), trace gravel; damp. | | | | | | | |
| | | 11 12 15 | 18 | 1 | | 3.5 | | | | | | | | |
| 3.0 | 713.7 | | | | | | Severely weathered brown SANDSTONE. | | | | | | | |
| | | 27 35 50/4 | 16 | 2 | | | | | | | | | | |
| 5.5 | 711.2 | | | | | | Soft to medium hard brown SANDSTONE; very fine to fine grained, highly weathered to decomposed, argillaceous, thinly bedded to thickly bedded. | | | | | | | |
| 10 | | Core 90" | Rec 76" | RQD 67% | R-1 | *234 | @ 6.5'-7.7', infilled fracture. @ 6.0'-6.5', 8.5'-9.1', broken decomposed zones. @ 14.4'-14.6', high angle rust stained fracture. | | | | | | | |
| 16.5 | 700.2 | Core 84" | Rec 84" | RQD 73% | R-2 | *320 | Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly bedded to thickly bedded. @ 19.8'-20.0', high angle rust stained fracture. | | | | | | | |
| 20.0 | 696.7 | | | | | | Bottom of Boring - 20.0' | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-132

Location: Sta. 239+86.4, 314.0 ft. LT of SR 823 CL

Date Drilled: 10/13/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: 5.3' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | |
| 0.2 | 653.8 | | | | | | DESCRIPTION Topsoil - 2" Loose to medium dense brown SANDY SILT (A-4a), trace clay; (possible decomposed sandstone); dry to damp. | | | | | | | | |
| | 653.6 | 3 | | | | 1 | | | | | | | | | |
| | | 4 | 18 | | | | | | | | | | | | |
| | | 10 | | | | 2 | | | | | | | | | |
| | | 13 | | | | | | | | | | | | | |
| | | 19 | 18 | | | | | | | | | | | | |
| 5 | 648.3 | | | | | | Medium hard to hard gray and brown SANDSTONE; very fine to fine grained, moderately to highly weathered, micaceous, argillaceous, thinly bedded to thickly bedded, highly fractured, with typical low angle clay filled fractures. | | | | | | | | |
| 5.5 | | | | | | RQD 56% R-1 | | *424 | | | | | | | |
| | 645.3 | Core 54" | Rec 54" | | | | | | | | | | | | |
| 8.5 | | | | | | | Hard gray SANDSTONE; very fine to fine grained, slightly weathered, micaceous, pyritic, thinly bedded to thickly bedded, slightly fractured to unfractured. | | | | | | | | |
| 10 | | | | | | | | | | | | | | | |
| | | Core 120" | Rec 120" | | | RQD 98% R-2 | | *654 | | | | | | | |
| 15 | | | | | | | @ 18.7', 18.9', low angle clay filled fractures. | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | Core 120" | Rec 120" | | | RQD 100% R-3 | | *645 | | | | | | | |
| 25 | | | | | | | | | | | | | | | |
| | | Core 120" | Rec 120" | | | | | | | | | | | | |
| 30.0 | 623.8 | | | | | | | | | | | | | | |

Bottom of Boring - 30.0'

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-133

Location: Sta. 239+96.6, 1.5 ft. RT of SR 823 CL

Date Drilled: 10/12/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 2.5' Water level at completion: 5.9' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|--|-----------|-----------|-----------|--------|--------|---|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | |
| 0.2 | 648.4 | | | | | | Topsoil - 2" | | | | | | | | | | | |
| | 648.2 | 2 | | | | 4.5+ | | Medium dense brown SANDY SILT (A-4a), trace clay; contains sandstone fragments; damp to moist. | | | | | | | | | | |
| | | 5 | 6 | 18 | | | | | | | | | | | | | | |
| | | 7 | | | | 4.5+ | Severely weathered brown and gray SANDSTONE. | | | | | | | | | | | |
| | | 11 | 15 | 18 | | | | | | | | | | | | | | |
| 5 | | | | | | | Medium hard to hard gray and brown SANDSTONE; very fine to fine grained, highly weathered, micaceous, argillaceous, thinly bedded to thickly bedded, highly fractured, with typical low angle rust stained fractures. | | | | | | | | | | | |
| 5.5 | 642.9 | 50/4 | 4 | | | | | | | | | | | | | | | |
| 7.0 | 641.4 | | | | | | Hard gray SANDSTONE; very fine to fine grained, slightly weathered, micaceous, argillaceous, pyritic, thickly bedded, slightly fractured to unfractured. | | | | | | | | | | | |
| 8.3 | 640.1 | Core 36" | Rec 33" | RQD 69% | R-1 | *360 | | | | | | | | | | | | |
| 10 | | | | | | | @ 14.5', low angle clay filled fracture. | | | | | | | | | | | |
| 15 | | Core 120" | Rec 120" | RQD 92% | R-2 | *580 | | | | | | | | | | | | |
| 20 | | | | | | | Bottom of Boring - 30.0' | | | | | | | | | | | |
| 25 | | Core 120" | Rec 120" | RQD 100% | R-3 | *630 | | | | | | | | | | | | |
| 30.0 | 618.4 | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-134

Location: Sta. 239+34.2, 343.6 ft. RT of SR 823 CL

Date Drilled: 10/13/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: 4.3' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0 | 643.6 | | | | | | | | | | | | | | | | | | |
| 1.0 | 642.6 | 2 | | | | | Topsoil - 12" | | | | | | | | | | | | |
| | | 2 | 18 | | | | Loose brown SANDY SILT (A-4a), trace clay, trace gravel; contains sandstone fragments; damp to moist. | | | | | | | | | | | | |
| | | 4 | | | | | | | | | | | | | | | | | |
| 5 | | 4 | 18 | | | | Severely weathered brown SANDSTONE. | | | | | | | | | | | | |
| 5.5 | 638.1 | 6 | | | | | | | | | | | | | | | | | |
| 6.5 | 637.1 | 50/1 | 1 | | | | Medium hard to hard gray and brown SANDSTONE; very fine to fine grained, moderately weathered, micaceous, argillaceous, thinly bedded to thickly bedded, moderately to highly fractured, with typical low angle rust stained fractures. @ 8.5'-8.6', clay filled fracture. | | | | | | | | | | | | |
| 8.6 | 635.0 | Core 42" | Rec 42" | RQD 96% | R-1 | *504 | | | | | | | | | | | | | |
| 10 | | | | | | | Hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, micaceous, argillaceous, pyritic, thinly bedded to thickly bedded. | | | | | | | | | | | | |
| 15 | | Core 120" | Rec 115" | RQD 96% | R-2 | *457 | | | | | | | | | | | | | |
| 20 | | | | | | | @ 19.1', 24.1', low angle fractures. | | | | | | | | | | | | |
| 25 | | Core 120" | Rec 120" | RQD 100% | R-3 | *680 | | | | | | | | | | | | | |
| 30.0 | 613.6 | | | | | | Bottom of Boring - 30.0' | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-135

Location: Sta. 243+71.4, 216.6 ft. LT of SR 823 CL

Date Drilled: 10/13/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: 5.5' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - PL ————— LL Blows per foot - ○ | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0.3 | 713.8 | | | | | | Topsoil - 4"/1.2' soil removed before drilling Medium dense brown SANDY SILT (A-4a), trace gravel; contains sandstone fragments; damp. | | | | | | | | | | | | |
| | 713.5 | 5 | 8 | 18 | 1 | | | | | | | | | | | | | | |
| 3.0 | 710.8 | | | | | | Severely weathered brown SANDSTONE. | | | | | | | | | | | | |
| | | 27 | 50/2 | 8 | 2 | | | | | | | | | | | | | | |
| 5.5 | 708.3 | | | | | | Soft to medium hard gray and brown SANDSTONE; very fine to fine grained, highly weathered, micaceous, argillaceous, thinly laminated to thinly bedded, highly fractured, with typical low angle clay filled fractures; contains few to moderate argillaceous laminations, poorly cemented. | | | | | | | | | | | | |
| 10 | | Core 90" | Rec 90" | RQD 63% | R-1 | *178 | | | | | | | | | | | | | |
| 14.7 | 699.1 | | | | | | Medium hard to hard brown SANDSTONE, very fine to fine grained, highly weathered, micaceous, argillaceous, thickly bedded, moderately fractured; contains few argillaceous laminations. | | | | | | | | | | | | |
| | | Core 84" | Rec 84" | RQD 86% | R-2 | *32 | | | | | | | | | | | | | |
| 20.0 | 693.8 | | | | | | Bottom of Boring - 20.0' | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-136

Location: Sta. 243+98.7, 76.5 ft. LT of SR 823 CL

Date Drilled: 10/12/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: 3.5' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---------------------------------|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● | | | | |
| | | | | | | | DESCRIPTION | | | | | | | | | | | |
| 0.0 | 682.6 | | | | | | | | | | | | | | | | | |
| 0.3 | 682.3 | | | | | | Topsoil - 3" | | | | | | | | | | | |
| | | 3 | | | | | Medium dense brown SANDY SILT (A-4a), little to some gravel, trace clay; contains sandstone fragments; damp. | | | | | | | | | | | |
| | | 7 | 18 | 15 | 1 | | | | | | | | | | | | | |
| | | 9 | | | | | Medium hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, thinly bedded to thickly bedded, moderately fractured, with typical low angle clay filled fractures. Hard brown and gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, thinly bedded to thickly bedded, moderately fractured, with typical low angle fractures; contains few argillaceous laminations, turbidity bedded. | | | | | | | | | | | |
| | | 11 | 12 | 15 | 2 | | | | | | | | | | | | | |
| 5.0 | 677.6 | | | | | | Medium hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, thinly bedded to thickly bedded, moderately fractured, with typical low angle clay filled fractures. Hard brown and gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, thinly bedded to thickly bedded, moderately fractured, with typical low angle fractures; contains few argillaceous laminations, turbidity bedded. | | | | | | | | | | | |
| 6.3 | 676.3 | | | | | | | | | | | | | | | | | |
| | | Core 60" | Rec 59" | | RQD 58% | R-1 | *182 | | | | | | | | | | | |
| 10 | | | | | | | Medium hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, thinly bedded to thickly bedded, moderately fractured, with typical low angle fractures; contains few argillaceous laminations, turbidity bedded. | | | | | | | | | | | |
| | | Core 120" | Rec 115" | | RQD 55% | R-2 | | *442 | | | | | | | | | | |
| | | | | | | | @ 10.3'-13.3', moderate to abundant argillaceous laminations, poorly cemented. | | | | | | | | | | | |
| 20.0 | 662.6 | | | | | | Bottom of Boring - 20.0' | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-137

Location: Sta. 243+94.3, 103.9 ft. RT of SR 823 CL

Date Drilled: 10/13/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (1st) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: 3.7' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|------------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0.3 | 759.3 | | | | | | Topsoil - 3"/12" soil removed before drilling Hard brown SILT AND CLAY (A-6a); little fine to coarse sand, trace gravel; damp. | | | | | | | | | | | | |
| | 759.0 | 11 15 19 | 18 | 1 | | 4.5+ | | | | | | | | | | | | | |
| | | 19 27 46 | 18 | 2 | | 4.5+ | Severely weathered brown SANDSTONE, argillaceous. | | | | | | | | | | | | |
| 5.0 | 754.3 | 21 30 50/4 | 16 | 3 | | | | | | | | | | | | | | | |
| 7.5 | 751.8 | | | | | | Soft to medium hard gray and brown SANDSTONE; very fine to fine grained, highly weathered to decomposed, argillaceous, thinly bedded to thickly bedded, moderately fractured, with typical low angle fractures. Medium hard to hard gray and brown SANDSTONE; very fine to fine grained, moderately to highly weathered, micaceous, argillaceous, thinly bedded to thickly bedded, highly fractured, with typical low angle clay filled fractures. @ 9.9'-10.1', 11.5'-11.6', 12.4' -12.6', high angle clay filled fractures. @ 16.1'-16.2', high angle rust stained fracture. | | | | | | | | | | | | |
| 9.0 | 750.3 | Core 66" | Rec 66" | RQD 68% | R-1 | *83 | | | | | | | | | | | | | |
| 15 | | Core 84" | Rec 84" | RQD 90% | R-2 | *442 | Hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, micaceous, pyritic, thinly bedded to thickly bedded, moderately fractured, with typical low angle clay filled fractures. | | | | | | | | | | | | |
| 16.8 | 742.5 | | | | | | | | | | | | | | | | | | |
| 20.0 | 739.3 | | | | | | Bottom of Boring - 20.0' | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 | 11/12/2007 12:49 PM

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-138

Location: Sta. 247+87.7, 10.4 ft. RT of SR 823 CL

Date Drilled: 10/13/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: 6.8' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | | | |
|------------|------------|------------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | | |
| 0 | 741.6 | | | | | | No Topsoil Medium dense brown SANDY SILT (A-4a), trace gravel; damp. Severely weathered brown SANDSTONE, argillaceous. | | | | | | | | | | | | | | |
| 1.0 | | 10 12 50/4 | 16 | 1 | | 4.0 | | | | | | | | | | | | | | | |
| 2.0 | 739.6 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | | 35 37 50/3 | 15 | 2 | | | Soft to medium hard gray and brown SANDSTONE; very fine to fine grained, highly weathered to decomposed, argillaceous, thickly bedded, highly fractured, with typical high angle rust stained fractures. @ 5.8'-6.3', lost recovery. @ 7.0'-7.2', high angle clay filled fracture. | | | | | | | | | | | | | | |
| 5.0 | | | | | | | | | | | | | | | | | | | | | |
| 5.5 | 736.1 | | | | | | | | | | | | | | | | | | | | |
| 10.0 | | Core 90" | Rec 84" | RQD 61% | R-1 | *412 | | | | | | | | | | | | | | | |
| 12.4 | 729.2 | | | | | | Hard gray SANDSTONE; very fine to fine grained, slightly weathered, micaceous, argillaceous, pyritic, thickly bedded, moderately to slightly fractured. @ 13.9',14.5', low angle fractures. | | | | | | | | | | | | | | |
| 15.0 | | Core 84" | Rec 84" | RQD 100% | R-2 | *530 | | | | | | | | | | | | | | | |
| 20.0 | 721.6 | | | | | | Bottom of Boring - 20.0' | | | | | | | | | | | | | | |
| 25.0 | | | | | | | | | | | | | | | | | | | | | |
| 30.0 | | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/13/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-139

Location: Sta. 251+91.9, 143.0 ft. LT of SR 823 CL

Date Drilled: 10/12/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: 2.5' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|----------------|---------------|---------------|------------|--------------|---|--|---|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 0.2 | 825.6 825.4 | | | | | | Topsoil - 2" Medium dense brown SANDY SILT (A-4a), trace clay; dry. | | | | | | | | | | | | | |
| 2.5 | 823.1 | 6 12 12 | 12 | 1 | | | | Severely weathered gray SANDSTONE, very fine grained. | | | | | | | | | | | | |
| 5.0 | 820.6 | 50/4 | 4 | 2 | | | Medium hard gray and brown SANDSTONE; fine grained, highly weathered, argillaceous, micaceous, thinly bedded to massive, highly to moderately fractured, with typical low angle clay filled fractures, contains moderate argillaceous laminations. | | | | | | | | | | | | | |
| 10 | | Core 60" | Rec 60" | RQD 52% | R-1 | *280 | @ 10.6'-11.2', iron stone inclusion. | | | | | | | | | | | | | |
| 15 | | Core 120" | Rec 117" | RQD 53% | R-2 | *38 | @ 12.1'-13.5', 15.7'-16.9', 18.0'-20.6', contains abundant argillaceous laminations, broken. | | | | | | | | | | | | | |
| 21.7 | 803.9 | | | | | | Medium hard to soft SHALE, decomposed to highly weathered, arenaceous, thinly laminated to thinly bedded, moderately fractured. | | | | | | | | | | | | | |
| 23.6 | 802.0 | | | | | | Medium hard gray SANDSTONE, fine grained, highly weathered, argillaceous, micaceous, laminated to thickly bedded, moderately fractured, contains moderate argillaceous laminations. | | | | | | | | | | | | | |
| 25 | | Core 120" | Rec 118" | RQD 55% | R-3 | *350 | Medium hard to hard brown SANDSTONE; very fine to fine grained, slightly to mod. weathered, argillaceous, micaceous, thinly bedded to massive, broken to moderately fractured. | | | | | | | | | | | | | |
| 27.4 | 798.2 | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-139

Location: Sta. 251+91.9, 143.0 ft. LT of SR 823 CL

Date Drilled: 10/12/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: 2.5' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|--|----|----|----|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | 10 | 20 | 30 | 40 |
| 30 | 795.6 | | | | | | MEDIUM HARD TO HARD GRAY SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, thinly bedded to massive. @ 34.3'-35.0', abundant argillaceous laminations. @ 35.2', decomposed clay seam. @ 35.7'-36.9', contains abundant argillaceous laminations, decomposed to highly weathered. @ 37.1'-40.0', moderate argillaceous laminations. @ 41.4', 42.7', low angle rust stained fractures. @ 40.4', 40.5', 43.0', 44.2', 48.0', clay filled low angle fractures. | | | | | | | | | | |
| 35 | | Core 120" | Rec 120" | RQD 91% | R-4 | *394 | | | | | | | | | | | |
| 40 | | | | | | | | | | | | | | | | | |
| 45 | | Core 120" | Rec 119" | RQD 90% | R-5 | *406 | | | | | | | | | | | |
| 50.0 | 775.6 | | | | | | Bottom of Boring - 50.0' | | | | | | | | | | |
| 55 | | | | | | | | | | | | | | | | | |
| 60 | | | | | | | | | | | | | | | | | |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-140

Location: Sta. 251+91.3, 92.5 ft. RT of SR 823 CL

Date Drilled: 10/12/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 8.3' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|----------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0 | 806.3 | | | | | | | | | | | | | | | | | | |
| 0.6 | 805.7 | 12 29 36 | 18 | 1 | | 4.0 | Topsoil - 7"/1.8' soil removed before drilling Hard brown and gray SILT AND CLAY (A-6a); damp. | | | | | | | | | | | | |
| 3.0 | 803.3 | | | | | | Severely weathered brown SANDSTONE, argillaceous. | | | | | | | | | | | | |
| 4.0 | 802.3 | 50/1 | 1 | 2 | | | Soft to medium hard gray and brown SANDSTONE; very fine to fine grained, highly weathered to decomposed, micaceous, argillaceous, thinly bedded to thickly bedded, highly fractured, with typical low angle rust stained fractures. @ 6.9'-7.6', high angle clay filled fracture. | | | | | | | | | | | | |
| 9.6 | 796.7 | Core 108" | Rec 108" | RQD 67% | R-1 | *332 | Soft to medium hard gray SANDSTONE; very fine to fine grained, highly to moderately weathered, micaceous, argillaceous, thinly bedded to thickly bedded, broken to highly fractured, with typical low angle clay filled fractures. @ 7.0'-7.7', clay filled high angle fracture. @ 9.0', gray. @ 13.4'-19.6', contains abundant to moderate argillaceous laminations, decomposed to highly weathered. | | | | | | | | | | | | |
| 19.9 | 786.4 | Core 120" | Rec 120" | RQD 71% | R-2 | *278 | Hard gray SANDSTONE; very fine to fine grained, slightly weathered, micaceous, argillaceous, thinly bedded to thickly bedded. @ 23.0'-23.9' contains moderate argillaceous laminations, broken @ 24.2'-25.4', high angle fracture. | | | | | | | | | | | | |
| 25 | | Core 120" | Rec 120" | RQD 84% | R-3 | *516 | | | | | | | | | | | | | |

65
50+

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-140

Location: Sta. 251+91.3, 92.5 ft. RT of SR 823 CL

Date Drilled: 10/12/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 8.3' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | |
| 30 | 776.3 | | | | | | DESCRIPTION Hard gray SANDSTONE; very fine to fine grained, slightly weathered, micaceous, argillaceous, thinly bedded to thickly bedded, highly to moderately weathered. @ 32.9'-33.4', moderate argillaceous lamination zones. @ 32.7', 34.0', 36.7', low angle clay filled fractures. | | | | | | | | | | |
| 35 | | Core 84" | Rec 84" | RQD 95% | R-4 | *405 | | | | | | | | | | | |
| 40.0 | 766.3 | | | | | | Bottom of Boring - 40.0' | | | | | | | | | | |
| 45 | | | | | | | | | | | | | | | | | |
| 50 | | | | | | | | | | | | | | | | | |
| 55 | | | | | | | | | | | | | | | | | |
| 60 | | | | | | | | | | | | | | | | | |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-141

Location: Sta. 255+69.2, 122.9 ft. LT of SR 823 CL

Date Drilled: 10/11/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 4.7' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|---------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0 | 823.4 | | | | | | | | | | | | | | | | | | |
| | | 8 11 11 | 4 | 1 | | 1.5 | No topsoil Medium stiff brown SANDY SILT (A-4a), trace clay; contains sandstone fragments; damp. | | | | | | | | | | | | |
| | | 5 10 35 | 18 | 2 | | 1.0 | | | | | | | | | | | | | |
| 5.5 | 817.9 | | | | | | Soft to medium brown SANDSTONE; very fine to fine grained, decomposed highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, broken to highly fractured, with typical high angle clay filled fractures. @ 5.7', 6.1', 6.3', low angle clay filled fractures. | | | | | | | | | | | | |
| 10 | | Core 90" | Rec 83" | RQD 42% | R-1 | *450 | | | | | | | | | | | | | |
| 15 | | | | | | | @ 13.0', gray. @ 13.0'-13.4', 14.5'-20.2', 22.0'-23.4', contains abundant to moderate argillaceous laminations, broken. | | | | | | | | | | | | |
| 20 | | Core 120" | Rec 120" | RQD 51% | R-2 | *397 | | | | | | | | | | | | | |
| 24.9 | 798.5 | | | | | | Medium hard to hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, thinly bedded to thickly bedded, moderately fractured, with typical low angle clay filled fractures. @ 24.9', 27.5', 27.7', 28.7', 31.4', 31.6' 36.2', low angle fractures. | | | | | | | | | | | | |
| 30 | | Core 120" | Rec 120" | RQD 86% | R-3 | *455 | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-141

Location: Sta. 255+69.2, 122.9 ft. LT of SR 823 CL

Date Drilled: 10/11/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 4.7' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | |
| 30 | 793.4 | | | | | | Medium hard to hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, thinly bedded to thickly bedded, moderately fractured, with typical low angle clay filled fractures. @ 33.0'-33.5', moderate to few argillaceous laminations, broken. @ 35.9'-36.5', contains moderate argillaceous laminations, broken. @ 36.7', 45.3', 49.1', 49.8', 53.7', low angle fractures. | | | | | | | | | | | |
| 35 | | | | | | | | | | | | | | | | | | |
| | | Core 120" | Rec 120" | RQD 96% | R-4 | *389 | | | | | | | | | | | | |
| 45 | | | | | | | | | | | | | | | | | | |
| | | Core 120" | Rec 120" | RQD 100% | R-5 | *507 | | | | | | | | | | | | |
| 55.0 | 768.4 | Core 24" | Rec 24" | RQD 100% | R-6 | *559 | | | | | | | | | | | | |
| | | | | | | | Bottom of Boring - 55.0' | | | | | | | | | | | |
| 60 | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-143

Location: Sta. 256+05.6, 189.8 ft. RT of SR 823 CL

Date Drilled: 10/11/04 to 10/12/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 6.2' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | |
| 0 | 872.1 | | | | | | | | | | | | | | | | |
| 0.4 | 871.7 | | | | | | Topsoil - 5" | | | | | | | | | | |
| | | 2 | | | 1 | 4.5+ | Hard brown SANDY SILT (A-4a), trace clay; damp. | | | | | | | | | | |
| | | 4 | 18 | | | | | | | | | | | | | | |
| | | 7 | | | 2 | 4.5+ | | | | | | | | | | | |
| 5 | | 10 | 18 | | | | | | | | | | | | | | |
| | | 6 | | | 3 | 4.0 | | | | | | | | | | | |
| | | 14 | 18 | | | | | | | | | | | | | | |
| 8.0 | 864.1 | | | | | | Medium dense to dense brown and gray COARSE AND FINE SAND (A-3a), trace to little clay; dry to damp. (POSSIBLE DECOMPOSED SANDSTONE) | | | | | | | | | | |
| | | 11 | | | 4 | | | | | | | | | | | | |
| | | 15 | | | 5 | | | | | | | | | | | | |
| | | 42 | 11 | | | | | | | | | | | | | | |
| | | 15 | | | 6 | | | | | | | | | | | | |
| 15 | | 45 | 12 | | | | | | | | | | | | | | |
| | | 10 | | | 7 | | | | | | | | | | | | |
| | | 50/3 | 6 | | | | | | | | | | | | | | |
| 19.5 | 852.6 | | | | 8 | | Medium hard brown SANDSTONE; fine grained, moderately to highly weathered, thinly bedded to thickly bedded, highly fractured, with typical low angle clay filled fractures. @ 22.7'-23.9', SDI = 95.5%. @ 20.1'-21.0', 21.4'-21.8' argillaceous interbeds | | | | | | | | | | |
| 20 | | 40 | 6 | | RQD | *357 | | | | | | | | | | | |
| | | 50/2 | 6 | | R-1 | | | | | | | | | | | | |
| | | Core 12" | Rec 12" | | | 33% | | | | | | | | | | | |
| 25 | | | | | R-2 | *200 | | | | | | | | | | | |
| | | Core 120" | Rec 120" | | | 30% | | | | | | | | | | | |
| 28.3 | 843.8 | | | | | | Soft brown SHALE, decomposed. | | | | | | | | | | |
| 28.9 | 843.2 | | | | | | Soft to medium hard gray to black SHALE. | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

| Client: TranSystems, Inc. | | Project: SCI-823-0.00 | | Job No. 0121-3070.03 | | | | | | | | | | | | | | |
|---------------------------|------------|-----------------------|--|----------------------|------------------------------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|
| LOG OF: Boring R-143 | | | Location: Sta. 256+05.6, 189.8 ft. RT of SR 823 CL | | Date Drilled: 10/11/04 to 10/12/04 | | | | | | | | | | | | | |
| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 6.2' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ----- LL Blows per foot - ○ 10 20 30 40 | | | | |
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | |
| 30 | 842.1 | | | | | | Soft to medium hard gray to black SHALE; highly weathered to decomposed, highly to moderately fractured, thinly laminated, carbonaceous. typical low angle fractures, black and gray angle fractures, contains few argillaceous layers. @ 39.7'-40.5', coal blossom. @ 38.4'-39.2', SDI = 19.4%. | | | | | | | | | | | |
| 35 | | Core 120" | Rec 120" | RQD 86% | R-3 | *118 | | | | | | | | | | | | |
| 45 | | Core 120" | Rec 120" | RQD 63% | R-4 | *22 | | | | | | | | | | | | |
| 48.4 | 823.7 | | | | | | Hard gray SANDSTONE; very fine to fine grained, slightly weathered, micaceous, argillaceous, thinly bedded to thickly bedded, moderately fractured. @ 49.5'-49.8', broken zone. @ 52.1',54.5',57.6', low angle clay filled fractures. | | | | | | | | | | | |
| 55 | | Core 120" | Rec 120" | RQD 100% | R-5 | *509 | | | | | | | | | | | | |
| 60 | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-143

Location: Sta. 256+05.6, 189.8 ft. RT of SR 823 CL

Date Drilled: 10/11/04 to 10/12/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / *Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 6.2' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | |
|------------|------------|--------------|---------------|------------|--------------|--|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | |
| 60 | 812.1 | | | | | | Hard gray SANDSTONE; very fine to fine grained, moderately weathered, micaceous, argillaceous, thinly bedded to thickly bedded, contains few argillaceous laminations. @ 63.1', 64.1', 65.0', low angle fractures @ 71.9'-72.1', $q_u = 10,888$ psi. @ 72.6', low angle clay filled fracture. @ 82.2'-82.3', moderate argillaceous zone. | | | | | | | | | |
| 65 | | Core 120" | Rec 120" | RQD 92% | R-6 | *485 | | | | | | | | | | |
| 70 | | | | | | | | | | | | | | | | |
| 75 | | Core 120" | Rec 120" | RQD 100% | R-7 | *250 | | | | | | | | | | |
| 80 | | | | | | | | | | | | | | | | |
| 85 | | Core 120" | Rec 120" | RQD 88% | R-8 | *562 | | | | | | | | | | |
| 90 | | | | | | | | | | | | | | | | |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-143

Location: Sta. 256+05.6, 189.8 ft. RT of SR 823 CL

Date Drilled: 10/11/04 to 10/12/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (1s) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 6.2' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|--|--|---------------------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 90 | 782.1 | | | | | | DESCRIPTION Hard gray SANDSTONE; very fine to fine grained, slightly weathered, micaceous, argillaceous, thinly bedded to thickly bedded. @ 95.4', low angle fracture. | | | | | | | | | | | | | |
| 95 | | Core 114" | Rec 114" | RQD 100% | R-9 | *449 | | | | | | | | | | | | | | |
| 100.0 | 772.1 | | | | | | | Bottom of Boring - 100.0' | | | | | | | | | | | | |
| 105 | | | | | | | | | | | | | | | | | | | | |
| 110 | | | | | | | | | | | | | | | | | | | | |
| 115 | | | | | | | | | | | | | | | | | | | | |
| 120 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:19 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-148

Location: Sta. 270+53.0, 112.3 ft. LT of SR 823 CL

Date Drilled: 10/06/04 to 10/07/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 7.7 (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|---|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | | |
| 0.3 | 849.0 | | | | | | | | | | | | | | | | | | | | |
| 0.3 | 848.7 | | | | | | Topsoil - 3" | | | | | | | | | | | | | | |
| | | 4 | | | | 4.0 | Hard brown SILT AND CLAY (A-6a), trace fine to coarse sand, trace gravel; contains sandstone fragments; dry to damp. | | | | | | | | | | | | | | |
| | | 4 | 18 | 1 | | | | | | | | | | | | | | | | | |
| | | 4 | 18 | 2 | | 4.5+ | | | | | | | | | | | | | | | |
| | | 11 | 18 | 3 | | 4.5+ | | | | | | | | | | | | | | | |
| 8.0 | 841.0 | | | | | | | Hard brown and gray CLAY (A-7-6), trace fine to coarse sand, trace gravel; damp. @ 11.0'-15.0', contains coal fragments. | | | | | | | | | | | | | |
| | | 6 | 18 | 4 | | 4.5+ | | | | | | | | | | | | | | | |
| | | 8 | 18 | 5 | | 4.5+ | | | | | | | | | | | | | | | |
| | | 5 | 18 | 6 | | 4.5+ | | | | | | | | | | | | | | | |
| | | 7 | 18 | 7 | | 4.5+ | | | | | | | | | | | | | | | |
| | | 6 | 18 | 8 | | 4.5+ | | | | | | | | | | | | | | | |
| | | 7 | 18 | 9 | | 4.5+ | | | | | | | | | | | | | | | |
| | | 6 | 18 | 8 | | 4.5+ | | | | | | | | | | | | | | | |
| | | 7 | 18 | 9 | | 4.5+ | | | | | | | | | | | | | | | |
| 24.5 | 824.5 | | | | | | Medium hard to hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, thinly bedded to thickly bedded, moderately fractured, with typical low angle clay filled fractures. @ 26.4'-26.9', argillaceous, broken zone. @ 24.8', 27.5', 27.7', 28.8', low angle fractures. | | | | | | | | | | | | | | |
| 25 | | Core 66" | Rec 66" | RQD 88% | R-1 | *489 | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/13/2007 3:33 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-148

Location: Sta. 270+53.0, 112.3 ft. LT of SR 823 CL

Date Drilled: 10/06/04 to 10/07/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 7.7' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 30.0 | 819.0 | | | | | | <p>Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, thinly bedded to massive, moderately fractured, with typical low angle clay filled fractures.</p> <p>@ 30.6', low angle clay filled fracture.</p> <p>@ 35.6'-36.0', broken zone.</p> <p>@ 35.6'-37.1', gray SHALE highly weathered.</p> <p>@ 32.5', 33.0', 35.3', 37.2', 39.7', low angle fractures.</p> <p>@ 40.4', 41.0', 42.5', 43.4', 45.5', low angle fractures.</p> <p>@ 45.6'-46.3', highly fractured.</p> <p>@ 41.0'-44.4', contains few argillaceous laminations.</p> <p>@ 46.0', slightly fractured.</p> <p>@ 56.5', 56.6', 56.8', low angle fractures.</p> | | | | | | | | | | | | | |
| 35 | | Core 120" | Rec 120" | RQD 88% | R-2 | *699 | | | | | | | | | | | | | | |
| 40 | | | | | | | | | | | | | | | | | | | | |
| 45 | | Core 120" | Rec 120" | RQD 92% | R-3 | *506 | | | | | | | | | | | | | | |
| 50 | | | | | | | | | | | | | | | | | | | | |
| 55 | | Core 120" | Rec 120" | RQD 97% | R-4 | *709 | | | | | | | | | | | | | | |
| 60 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/13/2007 3:33 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-148

Location: Sta. 270+53.0, 112.3 ft. LT of SR 823 CL

Date Drilled: 10/06/04 to 10/07/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / *Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 7.7' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|--|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | | | | | | |
| 60 | 789.0 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Core 60" | Rec 60" | RQD 90% | R-5 | *518 | Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, thinly bedded to massive, slightly fractured. | | | | | | | | | | | | | | | | | | |
| 65.0 | 784.0 | | | | | | Bottom of Boring - 65.0' | | | | | | | | | | | | | | | | | | |
| 70 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 75 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 80 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 85 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 90 | | | | | | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/13/2007 3:33 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-149

Location: Sta. 270+86.6, 45.0 ft. RT of SR 823 CL

Date Drilled: 10/07/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 7.5' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | |
|------------|------------|------------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | |
| 0.2 | 809.5 | | | | | | Topsoil - 2" Hard brown and gray SILT AND CLAY (A-6a), trace fine to coarse sand; contains sandstone fragments; damp. Severely weathered brown and gray SANDSTONE, argillaceous. | | | | | | | | | |
| | 809.3 | 7 9 11 | 18 | 1 | | 4.5+ | | | | | | | | | | |
| | | 16 21 25 | 18 | 2 | | 4.5+ | | | | | | | | | | |
| 5 | | 27 35 50/2 | 14 | 3 | | | | | | | | | | | | |
| 7.5 | 802.0 | | | | | | Soft to medium hard gray and brown SANDSTONE; very fine to fine grained, highly weathered to decomposed, argillaceous, thinly bedded to thickly bedded, highly fractured, with typical low angle clay filled fractures, contains decomposed argillaceous zones. @ 7.8'-8.3', 9.1'-9.3', 10.9'-11.0', high angle rust stained fractures. @ 16.9'-17.1', high angle clay filled fracture. | | | | | | | | | |
| 10 | | Core 66" | Rec 66" | RQD 73% | R-1 | *68 | | | | | | | | | | |
| 15 | | Core 84" | Rec 84" | RQD 83% | R-2 | *514 | | | | | | | | | | |
| 18.2 | 791.3 | | | | | | Hard gray SANDSTONE; very fine to fine grained, moderately weathered, micaceous, argillaceous, thinly bedded to thickly bedded. Bottom of Boring - 20.0' | | | | | | | | | |
| 20.0 | 789.5 | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 (11/12/2007 12:49 PM)

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-158

Location: Sta. 291+67.6, 16.2 ft. RT of SR 823 CL

Date Drilled: 9/27/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 6.4' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | |
|------------|------------|----------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | |
| 0.3 | 704.9 | | | | | | Topsoil - 4"/1.1' soil removed before drilling Hard brown SILT AND CLAY (A-6a), little fine to coarse sand, little gravel; contains sandstone fragments; dry to damp. Severely weathered brown SANDSTONE, argillaceous. | | | | | | | | |
| | 704.6 | 7 10 11 | 18 | 1 | | 4.5+ | | | | | | | | | |
| | | 8 10 11 | 18 | 2 | | 4.5+ | | | | | | | | | |
| 5.5 | 699.4 | 15 20 31 | 18 | 3 | | | | | | | | | | | |
| | | 45 50/3 | 9 | 4 | | | | | | | | | | | |
| 10.0 | 694.9 | | | | | | Medium hard gray and brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, moderately fractured, with typically low angle rust stained fractures. @ 10.0'-10.5', 11.2'-11.7', 12.5'- 12.7', broken zones. @ 12.2'-12.3', 14.0'-14.3', 17.6'- 17.7', high angle rust stained fractures. | | | | | | | | |
| 15 | | Core 120" | Rec 120" | RQD 61% | R-1 | *153 | | | | | | | | | |
| 20.0 | 684.9 | | | | | | Bottom of Boring - 20.0' | | | | | | | | |
| 25 | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-157

Location: Sta. 292+37.8, 273.7 ft. LT of SR 823 CL

Date Drilled: 8/31/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 6.0' Water level at completion: None (prior to coring) 5.2' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0.0 | 576.4 | | | | | | Topsoil - 3" Loose to medium dense brown GRAVEL WITH SAND (A-1-b), little to some silty clay; contains sandstone fragments; damp. | | | | | | | | | | | | |
| 0.3 | 576.1 | 3 | | 1 | | | | | | | | | | | | | | | |
| | | 4 | 18 | | | | | | | | | | | | | | | | |
| | | 7 | | 2 | | | | | | | | | | | | | | | |
| 5 | | 7 | 18 | | | | | | | | | | | | | | | | |
| | | 9 | | 3 | | | | | | | | | | | | | | | |
| | | 8 | 18 | | | | | | | | | | | | | | | | |
| | | 4 | | | | | | | | | | | | | | | | | |
| 10 | | 4 | | 4 | | | | 60 | 7 | 10 | 23 | | | | | | | | |
| 10.5 | 565.9 | 7 | | 5 | | | Loose brown SILT (A-4b); contains sandstone fragments; damp. | | | | | | | | | | | | |
| | | 6 | | | | | | | | | | | | | | | | | |
| | | 3 | 18 | | | | | | | | | | | | | | | | |
| 13.0 | 563.4 | 6 | | 6 | | | Medium dense brown SANDY SILT (A-4a); contains sandstone fragments; damp. | | | | | | | | | | | | |
| | | 8 | | | | | | | | | | | | | | | | | |
| | | 6 | 18 | | | | | | | | | | | | | | | | |
| 15 | | 3 | | 7 | | | Severely weathered brownish gray SANDSTONE. | | | | | | | | | | | | |
| 15.5 | 560.9 | 13 | | | | | | | | | | | | | | | | | |
| | | 50/5 | 13 | | | | | | | | | | | | | | | | |
| 17.5 | 558.9 | | | | | | Medium hard to hard brown and gray SANDSTONE; very fine to fine grained, moderately to highly weathered, micaceous, argillaceous, thinly bedded to thickly bedded, highly fractured, with typical low angle iron stained fractures. | | | | | | | | | | | | |
| 19.0 | 557.4 | | | | | | Hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, micaceous, argillaceous, thinly bedded to thickly bedded. | | | | | | | | | | | | |
| 20 | | Core 60" | Rec 60" | RQD 13% | R-1 | *794 | @ 21.9', low angle clay filled fracture. | | | | | | | | | | | | |
| 22.5 | 553.9 | | | | | | Bottom of Boring - 22.5' | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-160

Location: Sta. 295+71.6, 121.5 ft. LT of SR 823 CL

Date Drilled: 8/30/04 to 8/31/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 10.0' Water level at completion: None (prior to coring) 5.3' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | |
| 0.2 | 570.8 | | | | | | Topsoil - 2" Medium dense to dense brown SANDY SILT (A-4a), little clay, little gravel; contains sandstone fragments; dry to damp. | | | | | | | | | | |
| | 570.6 | 4 | 7 | | | 1 | | | | | | | | | | | |
| | | 7 | 12 | | | 2 | | | | | | | | | | | |
| | | 5 | 17 | | | 3 | | | | | | | | | | | |
| | | 10 | 11 | | | 4 | | | | | | | | | | | |
| | | 6 | 10 | | | 5 | | | | | | | | | | | |
| | | 7 | 7 | | | 6 | | | | | | | | | | | |
| | | 7 | 7 | | | 7 | | | | | | | | | | | |
| 13.0 | 557.8 | | | | | | Loose gray GRAVEL WITH SAND (A-1-b), little silt; moist. | | | | | | | | | | |
| | | 3 | 5 | | | 6 | | | | | | | | | | | |
| | | 5 | 5 | | | 7 | | | | | | | | | | | |
| | | 5 | 5 | | | 8 | | | | | | | | | | | |
| 18.0 | 552.8 | | | | | | Medium dense gray SILT AND CLAY (A-6a), little fine to coarse sand; dry to damp. | | | | | | | | | | |
| | | 5 | 7 | | | | | | | | | | | | | | |
| 20 | | | 13 | | | | Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, slightly fractured. | | | | | | | | | | |
| 20.5 | 550.3 | | | | | | | | | | | | | | | | |
| 25 | | | | | | | @ 20.6', 20.9', 24.8', 27.8', low angle clay filled fractures. | | | | | | | | | | |
| | | Core 114" | Rec 114" | RQD 96% | R-1 | *113 | | | | | | | | | | | |
| 30.0 | 540.8 | | | | | | Bottom of Boring - 30.0' | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-161

Location: Sta. 295+68.4, 122.1 ft. RT of SR 823 CL

Date Drilled: 9/24/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 3.5' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 |
|------------|------------|--------------|---------------|------------|--------------|---|--|---|-----------|-----------|-----------|--------|--------|---|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | |
| 0 | 687.7 | | | | | | Topsoil - 4"/1.5' soil removed before drilling Hard brown and gray SILT AND CLAY (A-6a), some gravel; contains sandstone fragments; damp. | | | | | | | |
| 0.3 | 687.4 | 6 | 7 | 18 | 1 | | | | | | | | | |
| | | 9 | 10 | 21 | 18 | 2 | | | | | | | | |
| 5 | 682.2 | 12 | 27 | 35 | 18 | 3 | | Severely weathered brown SANDSTONE, argillaceous. | | | | | | |
| 5.5 | | 50/4 | | 4 | 4 | | | | | | | | | |
| 10.0 | 677.7 | | | | | | Soft to medium hard gray and brown SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, highly fractured, with typically low angle clay filled fractures. @ 11.4'-11.9', 13.4'-13.6', 14.5', high angle clay filled fractures. | | | | | | | |
| 15.0 | 672.7 | Core 120" | Rec 120" | RQD 68% | R-1 | | | Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly bedded to thickly bedded. @ 18.1', 18.9', low angle clay filled fractures. | | | | | | |
| 20.0 | 667.7 | | | | | | Bottom of Boring - 20.0' | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: **TranSystems, Inc.** Project: **SCI-823-0.00** Job No. **0121-3070.03**
LOG OF: Boring R-163 Location: **Sta. 299+65.8, 177.9 ft. LT of SR 823 CL** Date Drilled: **8/27/04**

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 7.5' Water level at completion: None (prior to coring) 6.8' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | |
| 0.3 | 564.7 | | | | | | TOPSOIL - 4" Loose to medium dense brown and gray SANDY SILT (A-4a), little gravel, trace clay; contains sandstone fragments; dry to damp. @ 6.0', damp to moist. | | | | | | | | | |
| | 564.4 | 4 | 3 | 3 | 18 | 1 | | | | | | | | | | |
| | | 3 | 6 | 5 | 18 | 2 | | | | | | | | | | |
| | | 7 | 12 | 10 | 18 | 3 | | | | | | | | | | |
| | | 6 | 8 | 6 | 18 | 4 | | | | | | | | | | |
| | | 7 | 9 | 8 | 18 | 5 | | | | | | | | | | |
| | | 3 | 5 | 5 | 18 | 6 | | | | | | | | | | |
| | | 4 | 7 | 6 | 18 | 7 | | | | | | | | | | |
| | | 9 | 15 | 50 | 16 | 8 | | | | | | | | | | |
| 18.5 | 546.2 | | | | | | Severely weathered gray SANDSTONE, argillaceous. | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | |
| 20.5 | 544.2 | | | | | | Medium hard to hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, medium bedded to thickly bedded, moderately fractured. @ 20.6'-21.1', 21.7'-21.8', high angle clay filled fractures. @ 23.5'; 23.7', low angle clay filled fractures. | | | | | | | | | |
| 25 | | Core 120" | Rec 120" | RQD 84% | R-1 | *640 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Non-Plastic

65

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-163

Location: Sta. 299+65.8, 177.9 ft. LT of SR 823 CL

Date Drilled: 8/27/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 7.5' Water level at completion: None (prior to coring) 6.8' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | |
| 30 | 534.7 | | | | | | | | | | | | | | | | | | |
| 30.5 | 534.2 | | | | | | @ 30.1'-30.5', very fine, fissile. Bottom of Boring - 30.5' | | | | | | | | | | | | |
| 35 | | | | | | | | | | | | | | | | | | | |
| 40 | | | | | | | | | | | | | | | | | | | |
| 45 | | | | | | | | | | | | | | | | | | | |
| 50 | | | | | | | | | | | | | | | | | | | |
| 55 | | | | | | | | | | | | | | | | | | | |
| 60 | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-164

Location: Sta. 300+08.2, 146.8 ft. RT of SR 823 CL

Date Drilled: 8/30/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 8.5' Water level at completion: None (prior to coring) 12.5' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0 | 561.3 | | | | | | | | | | | | | | | | | | |
| 1.0 | 560.3 | 8 | | | 1 | | Topsoil-12" | | | | | | | | | | | | |
| | | 9 | 18 | | | | Medium dense brown SANDY SILT (A-4a), little gravel, trace to little clay; contains sandstone fragments; dry to damp. | | | | | | | | | | | | |
| | | 6 | | | 2 | | | | | | | | | | | | | | |
| | | 12 | 18 | | | | | | | | | | | | | | | | |
| 5 | | 10 | | | | | | | | | | | | | | | | | |
| | | 6 | | | 3 | | | | | | | | | | | | | | |
| | | 6 | 18 | | | | | | | | | | | | | | | | |
| | | 8 | | | 4 | | | | | | | | | | | | | | |
| | | 10 | 18 | | | | | | | | | | | | | | | | |
| 10.5 | 550.8 | | | | | 1.0 | Medium stiff to stiff gray SILTY CLAY (A-6b), contains sandstone fragments; moist. | | | | | | | | | | | | |
| | | 3 | | | 5 | | | | | | | | | | | | | | |
| | | 2 | 18 | | | | | | | | | | | | | | | | |
| 13.0 | 548.3 | | | | | | Loose to medium dense brown and gray SANDY SILT (A-4a), trace clay, trace gravel; damp. | | | | | | | | | | | | |
| | | 3 | | | 6 | | | 3 | 15 | - | 28 | 45 | 9 | | | | | | |
| | | 2 | 18 | | | | | | | | | | | | | | | | |
| | | 4 | | | 7 | | | | | | | | | | | | | | |
| | | 6 | 12 | | | | | | | | | | | | | | | | |
| | | 4 | | | | | | | | | | | | | | | | | |
| 19.0 | 542.3 | 7 | | | 8 | | Severely weathered brown and gray SANDSTONE, argillaceous. | | | | | | | | | | | | |
| | | 17 | 16 | | | | | | | | | | | | | | | | |
| 20.0 | 541.3 | 27 | | | | | Soft to medium hard brown SANDSTONE; very fine to fine grained, highly weathered to decomposed, argillaceous, thinly bedded to thickly bedded, highly fractured to broken, with typical low angle clay filled fractures. | | | | | | | | | | | | |
| 21.3 | 540.0 | | | | | | Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, highly to moderately fractured; contains few argillaceous laminations. @ 22.2', 26.8', 29.8', low angle clay filled fractures. | | | | | | | | | | | | |
| 25 | | Core 120" | Rec 120" | RQD 84% | R-1 | *657 | | | | | | | | | | | | | |
| 30.0 | 531.3 | | | | | | Bottom of Boring - 30.0' | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-165

Location: Sta. 299+84.7, 435.6 ft. RT of SR 823 CL

Date Drilled: 9/23/04 to 9/24/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 4.8' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|---|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 0.0 | 654.8 | | | | | | <p>DESCRIPTION</p> <p>Topsoil - 4"/2.5' soil removed before drilling</p> <p>Medium dense brown SANDY SILT (A-4a), little gravel; contains sandstone fragments; damp.</p> <p>Severely weathered grayish brown SANDSTONE, argillaceous.</p> | | | | | | | | | | | | | |
| 0.3 | 654.5 | 5 | | | 1 | | | | | | | | | | | | | | | |
| | | 7 | 9 | 18 | | | | | | | | | | | | | | | | |
| 3.0 | 651.8 | 13 | | | 2 | | | | | | | | | | | | | | | |
| 5 | | 15 | 15 | 18 | | | | | | | | | | | | | | | | |
| | | 15 | | | 3 | | | | | | | | | | | | | | | |
| | | 16 | | | | | | | | | | | | | | | | | | |
| | | 50/4 | | 16 | | | | | | | | | | | | | | | | |
| | | 7 | | | 4 | | | | | | | | | | | | | | | |
| 10 | | 9 | 8 | 18 | | | | | | | | | | | | | | | | |
| 11.3 | 643.5 | 50/3 | | 3 | 5 | | <p>Medium hard gray and brown SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, highly fractured, with typical low angle clay filled fractures.</p> <p>@ 15.7'-15.8', 16.1'-16.3', broken zones.</p> | | | | | | | | | | | | | |
| 15 | | Core 104" | Rec 104" | RQD 93% | R-1 | | | | | | | | | | | | | | | |
| 16.6 | 638.2 | | | | | | | Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly bedded to thickly bedded. | | | | | | | | | | | | |
| 20.0 | 634.8 | | | | | | Bottom of Boring - 20.0' | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-166

Location: Sta. 302+85.4, 47.1 ft. LT of SR 823 CL

Date Drilled: 9/23/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 6.6' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|---|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 0 | 604.1 | | | | | | | | | | | | | | | | | | | |
| 0.4 | 603.7 | | | | | | Topsoil - 5"/1.1' soil removed before drilling | | | | | | | | | | | | | |
| | | 3 | | | | 3.5 | Very stiff to hard brown SILT AND CLAY (A-6a), little to some gravel; contains sandstone fragments; damp. | | | | | | | | | | | | | |
| | | 4 | 18 | | 1 | | | | | | | | | | | | | | | |
| | | 5 | | | | 4.0 | | | | | | | | | | | | | | |
| | | 6 | 18 | | 2 | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | | |
| 6.0 | 598.1 | 10 | | | | | | Severely weathered brown SANDSTONE, argillaceous. | | | | | | | | | | | | |
| 7.0 | 597.1 | 50/4 | 10 | | | | Medium hard gray and brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thickly bedded, moderately to highly fractured. | | | | | | | | | | | | | |
| 10 | | Core 72" | Rec 72" | | RQD 85% | *326 | @ 7.7'-7.8', 8.0'-8.1', 9.5'-9.7', high angle clay filled fractures. | | | | | | | | | | | | | |
| 10.7 | 593.4 | | | | | | Hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, thinly bedded to thickly bedded, slightly fractured to unfractured. @ 8.2', 8.9', 9.8', low angle rust stained fractures. | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | | |
| | | Core 120" | Rec 120" | | RQD 100% | *413 | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | | |
| | | Core 84" | Rec 84" | | RQD 100% | *798 | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | | |
| 30.0 | 574.1 | | | | | | | Bottom of Boring - 30.0' | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-167

Location: Sta. 302+63.9, 232.4 ft. RT of SR 823 CL

Date Drilled: 8/26/04 to 8/27/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | DESCRIPTION | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0.0 | 558.4 | | | | | | | | | | | | | | | | | | |
| 0.3 | 558.1 | | | | | | Topsoil - 3" | | | | | | | | | | | | |
| | | 8 | | | | 3.5 | Very stiff brown SANDY SILT (A-4a), trace clay, trace gravel; contains sandstone fragments; damp. | | | | | | | | | | | | |
| | | 8 | 11 | 18 | | | | | | | | | | | | | | | |
| | | 8 | | | | 2.0 | | | | | | | | | | | | | |
| | | 12 | 11 | 18 | | | | | | | | | | | | | | | |
| 5.5 | 552.9 | | | | | 2.0 | Stiff to very stiff brown and gray SILT (A-4b), some clay, trace fine to coarse sand; damp. | 0 | 1 | - | 9 | 71 | 20 | | | | | | |
| | | 3 | 5 | 18 | | | | | | | | | | | | | | | |
| | | 5 | | | | | | | | | | | | | | | | | |
| 8.0 | 550.4 | | | | | | Medium dense brown GRAVEL WITH SAND AND SILT (A-2-4); dry to damp. | | | | | | | | | | | | |
| | | 9 | 12 | 18 | | | | | | | | | | | | | | | |
| | | 12 | | | | | | | | | | | | | | | | | |
| | | 6 | 10 | 18 | | | | | | | | | | | | | | | |
| | | 14 | | | | | | | | | | | | | | | | | |
| 13.0 | 545.4 | | | | | 3.5 | Very stiff gray SILT (A-4b), little fine to coarse sand, little clay, trace gravel; contains sandstone fragments; damp. | 9 | 7 | - | 9 | 61 | 14 | | | | | | |
| | | 1 | 6 | 18 | | | | | | | | | | | | | | | |
| | | 1 | | | | | | | | | | | | | | | | | |
| 15.5 | 542.9 | | | | | | Medium dense brown SANDY SILT (A-4a), little gravel, trace clay; contains sandstone fragments; damp. | | | | | | | | | | | | |
| | | 2 | 8 | 18 | | | | | | | | | | | | | | | |
| | | 8 | 10 | 18 | | | | | | | | | | | | | | | |
| | | 5 | 6 | 18 | | | | | | | | | | | | | | | |
| | | 6 | | | | | | | | | | | | | | | | | |
| | | 9 | | | | | | | | | | | | | | | | | |
| 20.5 | 537.9 | | | | | | Medium hard gray to brown SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, highly fractured, with typical high angle clay filled fractures, contains few argillaceous laminations. | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| 22.6 | 535.8 | | | | | | Hard gray SANDSTONE; very fine to fine grained, moderately to slightly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, moderately fractured. @ 22.0', 22.5', low angle clay filled fractures. @ 24.9', 25.8', 26.3', low angle fractures. | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| 25 | | Core 114" | Rec 114" | | RQD 72% | R-1 | | | | | | | | | | | | | |
| | | | | | | *95 | | | | | | | | | | | | | |
| 30.0 | 528.4 | | | | | | Bottom of Boring - 30.0' | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-168

Location: Sta. 302+66.0, 615.4 ft. RT of SR 823 CL

Date Drilled: 8/26/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetro-meter (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 8.5' Water level at completion: None (prior to coring) 5.5' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ----- LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|--------------|---------------|------------|--------------|--|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0 | 553.4 | | | | | | | | | | | | | | | | | | |
| 0.3 | 553.1 | | | | | | Topsoil - 3" | | | | | | | | | | | | |
| | | 3 | | 6 | 18 | 1 | Loose to medium dense brown GRAVEL WITH SAND (A-1-b); contains sandstone fragments; dry. | | | | | | | | | | | | |
| | | 6 | | | | | | | | | | | | | | | | | |
| | | 3 | | 4 | 18 | 2 | | | | | | | | | | | | | |
| 5 | | | | 2 | 18 | | | | | | | | | | | | | | |
| 5.5 | 547.9 | | | | | | Very stiff brown SANDY SILT (A-4a), little gravel; damp. | | | | | | | | | | | | |
| | | 5 | | 5 | 18 | 3 | | | | | | | | | | | | | |
| | | | | 7 | 18 | | | | | | | | | | | | | | |
| | | 2 | | 4 | 18 | 4 | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | |
| | | 4 | | 5 | 18 | 5 | @ 11.0', sandstone fragments, moist. | | | | | | | | | | | | |
| | | | | 8 | 18 | | | | | | | | | | | | | | |
| 13.0 | 540.4 | | | | | | Very stiff to hard gray SILT (A-4b), little fine sand, trace gravel; contains sandstone fragments; damp. | | | | | | | | | | | | |
| | | 3 | | 4 | 18 | 6 | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | |
| | | 3 | | 4 | 18 | 7 | | | | | | | | | | | | | |
| | | | | 6 | 18 | | | | | | | | | | | | | | |
| | | 4 | | 12 | 18 | 8 | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | |
| 20.5 | 532.9 | | | | | | | | | | | | | | | | | | |
| 21.5 | 531.9 | 50/4 | | 2 | | 9 | Severely weathered gray SANDSTONE. | | | | | | | | | | | | |
| | | | | | | | Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, fossiliferous, micaceous, thickly bedded, slightly to highly fractured, contains few argillaceous laminations. | | | | | | | | | | | | |
| 25 | | | | | | | @ 21.5', 21.9', 22.8', low angle fractures. | | | | | | | | | | | | |
| 30 | | Core 108" | Rec 108" | RQD 97% | R-1 | *612 | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 9:37 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

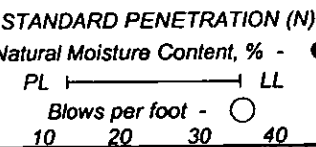
Job No. 0121-3070.03

LOG OF: Boring R-168

Location: Sta. 302+66.0, 615.4 ft. RT of SR 823 CL

Date Drilled: 8/26/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 8.5' Water level at completion: None (prior to coring) 5.5' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---------------------------------|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● | | | | |
| | | | | | | | DESCRIPTION | | | | | | | | | | | |
| 30 | 523.4 | | | | | | | | | | | | | | | | | |
| 30.5 | 522.9 | | | | | | Bottom of Boring - 30.5' | | | | | | | | | | | |
| 35 | | | | | | | | | | | | | | | | | | |
| 40 | | | | | | | | | | | | | | | | | | |
| 45 | | | | | | | | | | | | | | | | | | |
| 50 | | | | | | | | | | | | | | | | | | |
| 55 | | | | | | | | | | | | | | | | | | |
| 60 | | | | | | | | | | | | | | | | | | |



FILE: 0121-3070-03 [11/12/2007 9:37 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-171

Location: Sta. 306+41.8, 398.7 ft. RT of SR 823 CL

Date Drilled: 9/22/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 4.5' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|--|--|--|-----|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Blows per foot - Natural Moisture Content, % - PL ----- LL | | | |
| 0 | 646.1 | | | | | | | | | | | | | | | | |
| 0.3 | 645.8 | 25 50/3 | 9 | 1 | | | Topsoil - 3" Severely weathered brown SANDSTONE. | | | | | | | | | | 5+ |
| | | 50/1 | 1 | 2 | | | | | | | | | | | | | 50+ |
| 5.0 | 641.1 | | | | | | Medium hard to hard brown and gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, moderately fractured, with typical high angle rust stained fractures. | | | | | | | | | | |
| 10 | | Core 96" | Rec 96" | RQD 57% | R-1 | *202 | | | | | | | | | | | |
| 15 | | Core 84" | Rec 84" | RQD 88% | R-2 | | @ 15.2', low angle rust stained fracture. | | | | | | | | | | |
| 18.0 | 628.1 | | | | | | Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, slightly fractured. | | | | | | | | | | |
| 20.0 | 626.1 | | | | | | Bottom of Boring - 20.0' | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-172

Location: Sta. 306+32.2, 647.2 ft. RT of SR 823 CL

Date Drilled: 9/15/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 0.3 | 569.3 | | | | | | | | | | | | | | | | | | | |
| 0.3 | 569.0 | | | | | | Topsoil - 4" | | | | | | | | | | | | | |
| | | 5 | | | | | Very stiff brown SANDY SILT (A-4a), some gravel, little clay; damp. | 26 | 11 | - | 7 | 40 | 16 | | | | | | | |
| | | 7 | 18 | 1 | | | | | | | | | | | | | | | | |
| | | 12 | | | | | Severely weathered brown and gray SANDSTONE, argillaceous. | | | | | | | | | | | | | |
| | | 14 | 18 | 2 | | | | | | | | | | | | | | | | |
| 5 | 563.8 | | | | | | Soft to medium hard brown SANDSTONE; very fine to fine grained, highly weathered to decomposed, argillaceous, micaceous, thinly bedded to thickly bedded, highly fractured, with typical high angle rust stained fractures. | | | | | | | | | | | | | |
| 5.5 | | 30 | 10 | 3 | | | | | | | | | | | | | | | | |
| 7.0 | 562.3 | | | | | | Hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, moderately fractured, contains few argillaceous laminations. @ 13.1', 14.0', 18.7', low angle rust stained fractures. | | | | | | | | | | | | | |
| | | 50/5 | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | Hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, moderately fractured, contains few argillaceous laminations. @ 13.1', 14.0', 18.7', low angle rust stained fractures. | | | | | | | | | | | | | |
| | | Core 72" | Rec 72" | RQD 14% | R-1 | | | | | | | | | | | | | | | |
| 13.0 | 556.3 | | | | | | Hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, moderately fractured, contains few argillaceous laminations. @ 13.1', 14.0', 18.7', low angle rust stained fractures. | | | | | | | | | | | | | |
| 15 | | Core 84" | Rec 84" | RQD 90% | R-2 | | | | | | | | | | | | | | | |
| 20.0 | 549.3 | | | | | | Bottom of Boring - 20.0' | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-177

Location: Sta. 310+79.1, 269.6 ft. RT of SR 823 CL

Date Drilled: 8/31/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 5.0' Water level at completion: None (prior to coring) 5.6' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 0.3 | 581.1 | | | | | | | | | | | | | | | | | | | |
| 0.3 | 580.8 | | | | | | Topsoil - 4" | | | | | | | | | | | | | |
| | | 9 | | | | | Medium dense brown SANDY SILT (A-4a), little gravel; damp. | | | | | | | | | | | | | |
| | | 9 | 18 | | | 1 | | | | | | | | | | | | | | |
| | | 10 | | | | | | | | | | | | | | | | | | |
| | | 9 | | | | | | | | | | | | | | | | | | |
| 5 | | 9 | 18 | | | 2 | | | | | | | | | | | | | | |
| | | 8 | | | | | | | | | | | | | | | | | | |
| | | 12 | 18 | | | | | | | | | | | | | | | | | |
| | | 11 | | | | 3 | | | | | | | | | | | | | | |
| 8.5 | 572.6 | 3 | | | | | Loose to medium dense brown and gray SILT (A-4b), trace fine to coarse sand, trace gravel; damp to moist. | | | | | | | | | | | | | |
| 10 | | 4 | 18 | | | | @ 11.0'-12.5', some fine to coarse sand. | | | | | | | | | | | | | |
| | | 4 | | | | | | | | | | | | | | | | | | |
| | | 9 | | | | | | | | | | | | | | | | | | |
| | | 16 | 18 | | | | | | | | | | | | | | | | | |
| | | 19 | | | | 5 | | | | | | | | | | | | | | |
| 14.0 | 567.1 | 50/0 | 0 | | | | Medium hard gray and brown SANDSTONE; very fine to fine grained, slightly to highly weathered, argillaceous, micaceous, thinly laminated to thickly bedded, moderately to highly fractured. | | | | | | | | | | | | | |
| 15 | | | | | | | @ 13.3'-13.4', 18.2'-18.5', 19.5'- 19.6', broken with typical low angle clay filled fractures. | | | | | | | | | | | | | |
| | | | | | | 6 | | | | | | | | | | | | | | |
| | | Core 72" | Rec 72" | | | | | | | | | | | | | | | | | |
| | | | | | | RQD 54% | | | | | | | | | | | | | | |
| | | | | | | R-1 | *244 | | | | | | | | | | | | | |
| 20.0 | 561.1 | | | | | | Bottom of Boring - 20.0' | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-178

Location: Sta. 310+11.3, 568.7 ft. RT of SR 823 CL

Date Drilled: 8/31/04 to 9/1/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 2.5' Water level at completion: None (prior to coring) 4.0' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0.2 | 566.2 | | | | | | Topsoil - 2" Loose to medium dense brown SANDY SILT (A-4a), little gravel, trace clay; damp to moist. | | | | | | | | | | | | |
| | 566.0 | 2 | | | | | | | | | | | | | | | | | |
| 3.0 | 563.2 | 18 | 9 | | | | Severely weathered brown SANDSTONE. | | | | | | | | | | | | |
| | | 24 | | | | | | | | | | | | | | | | | |
| 5.0 | 561.2 | 50/6 | 10 | | | | Medium hard to hard gray and brown SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, medium to thickly bedded, broken, with typical low angle rust stained fractures. Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly laminated to thickly bedded, slightly fractured. @ 13.4', low angle clay filled fracture. | | | | | | | | | | | | |
| 7.1 | 559.1 | | | | | | | | | | | | | | | | | | |
| 10 | | Core 120" | Rec 120" | RQD 85% | R-1 | | | | | | | | | | | | | | |
| 15 | | Core 60" | Rec 60" | RQD 87% | R-2 | *656 | | | | | | | | | | | | | |
| 20.0 | 546.2 | | | | | | Bottom of Boring - 20.0' | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 | 11/12/2007 12:49 PM |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-182

Location: Sta. 319+23.5, 118.7 ft. RT of SR 823 CL

Date Drilled: 9/28/04 to 9/29/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 4.6' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0 | 683.8 | | | | | | | | | | | | | | | | | | |
| -1.0 | 682.8 | 2 | | | | 1 | Topsoil - 12" | | | | | | | | | | | | |
| | | 4 | | | | | Medium dense to dense brown and gray GRAVEL WITH SAND AND SILT (A-2-4), little clay; contains sandstone fragments; damp. | | | | | | | | | | | | |
| | | 7 | | | | | | | | | | | | | | | | | |
| | | 8 | | | | | | | | | | | | | | | | | |
| | | 16 | | | | 2 | | 63 | 2 | - | 6 | 19 | 10 | | | | | | |
| 5 | | 19 | | | | | | | | | | | | | | | | | |
| | | 3 | | | | 3 | | | | | | | | | | | | | |
| | | 9 | | | | | | | | | | | | | | | | | |
| | | 18 | | | | | | | | | | | | | | | | | |
| -8.0 | 675.8 | | | | | 4 | Severely weathered brown SANDSTONE, argillaceous. | | | | | | | | | | | | |
| | | 4 | | | | | | | | | | | | | | | | | |
| | | 9 | | | | 4 | | | | | | | | | | | | | |
| 10 | | 15 | | | | | | | | | | | | | | | | | |
| | | 4 | | | | 5 | | | | | | | | | | | | | |
| | | 5 | | | | | | | | | | | | | | | | | |
| | | 9 | | | | | | | | | | | | | | | | | |
| -14.0 | 669.8 | 28 | | | | 6 | Soft to medium hard brown and gray SANDSTONE; very fine to fine grained, highly weathered, argillaceous, moderately fractured, contains moderate argillaceous laminations. | | | | | | | | | | | | |
| 15 | | 50/4 | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | Core 60" | Rec 55" | RQD 28% | R-1 | | | | | | | | | | | | | | |
| -20.0 | 663.8 | | | | | | Bottom of Boring - 20.0' | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-184

Location: Sta. 319+26.4, 357.1 ft. RT of SR 823 CL

Date Drilled: 9/29/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 19.3' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|--|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0 | 736.4 | | | | | | Topsoil - 12" | | | | | | | | | | | | |
| 1.0 | 735.4 | 4 | | | | 1 | | Medium dense to dense brown SANDY SILT (A-4a); contains sandstone fragments; damp. | | | | | | | | | | | |
| | | 8 12 | 18 | | | | | | | | | | | | | | | | |
| | | 13 | | | | 2 | | | | | | | | | | | | | |
| | | 31 | 18 | | | | | | | | | | | | | | | | |
| 5 | | 6 | | | | | Severely weathered brown SANDSTONE. | | | | | | | | | | | | |
| 5.5 | 730.9 | 26 | | | | 3 | | | | | | | | | | | | | |
| | | 50/5 | 7 | | | | Medium hard to hard brown SANDSTONE; very fine to fine grained, highly weathered, moderately fractured. @ 7.0'-7.5', broken zone. @ 7.9'-8.3', 8.4'-8.8', 9.6'-9.7', 9.8'-9.9', high angle fractures. @ 12.5'-13.1', high angle fracture. | | | | | | | | | | | | |
| 7.0 | 729.4 | | | | | RQD 53% | | R-1 | *250 | | | | | | | | | | |
| | | Core 36" | Rec 36" | | | | | | | | | | | | | | | | |
| 15 | | | | | | | Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, slightly to moderately fractured; contains few argillaceous laminations. | | | | | | | | | | | | |
| | | Core 120" | Rec 120" | | | RQD 76% | | R-2 | *339 | | | | | | | | | | |
| 18.4 | 718.0 | | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | |
| | | Core 120" | Rec 120" | | | RQD 98% | R-3 | *373 | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 (11/12/2007 12:19 PM)

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-184

Location: Sta. 319+26.4, 357.1 ft. RT of SR 823 CL

Date Drilled: 9/29/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 19.3' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---------------------------------|--|--------------------|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● | | Blows per foot - ○ | |
| 30 | 706.4 | | | | | | DESCRIPTION Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, slightly to moderately fractured; contains few argillaceous laminations. @ 41.2'-41.4', high angle fracture with weathering. Bottom of Boring - 45.0' | | | | | | | | | | |
| 35 | | Core 120" | Rec 120" | RQD 100% | R-4 | *395 | | | | | | | | | | | |
| 40 | | Core 60" | Rec 60" | RQD 100% | R-5 | *376 | | | | | | | | | | | |
| 45.0 | 691.4 | | | | | | | | | | | | | | | | |
| 50 | | | | | | | | | | | | | | | | | |
| 55 | | | | | | | | | | | | | | | | | |
| 60 | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 13:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-185

Location: Sta. 322+09.9, 269.8 ft. RT of SR 823 CL

Date Drilled: 9/2/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None | DESCRIPTION | GRADATION | | | | | STANDARD PENETRATION (N) | | | |
|------------|------------|--------------------------|---------------|------------|--------------|---|--|--|-------------|-----------|-----------|-----------|--------|--------------------------|----|----|--|
| | | | | Drive | Press / Core | | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | PL | LL | |
| 0.0 | 617.8 | | | | | | | | | | | | | | | | |
| 0.3 | 617.5 | | | | | | | Topsoil - 4" | | | | | | | | | |
| | | 1 | 2 | 9 | | 1 | 0.75 | Medium stiff brown SILT AND CLAY (A-6a), little to some fine to coarse sand, little silt; damp. | | | | | | | | | |
| 3.0 | 614.8 | | | | | | | Loose brown SANDY SILT (A-4a), trace gravel, trace clay; damp. | | | | | | | | | |
| 5.0 | | 5 | 1 | 5 | 11 | 2 | | | | | | | | | | | |
| | | | | | | | | @ 6.0', very dense, moist. | | | | | | | | | |
| | | 2 | 50/5 | 3 | | 3 | | | | | | | | | | | |
| 7.5 | 610.3 | | | | | | | Hard gray SANDSTONE ; very fine to fine grained, moderately weathered, argillaceous, micaceous, moderately bedded to thickly bedded. | | | | | | | | | |
| 10.0 | | Core 48" Rec 48" | | RQD 98% | R-1 | | | | | | | | | | | | |
| 15.0 | | Core 102" Rec 102" | | RQD 96% | R-2 | | | | | | | | | | | | |
| 20.0 | 597.8 | Bottom of Boring - 20.0' | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 | 11/12/2007 12:49 PM |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-186

Location: Sta. 324+37.9, 54.6 ft. RT of SR 823 CL

Date Drilled: 8/31/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetro- meter (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 10.0' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | | | |
|------------|----------------|---------------|---------------|------------|--------------|--|--|-------------|-----------|-----------|-----------|--------|--------|--|--|--|--|--|--|--|-----|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | | |
| 0.3 | 717.6 717.3 | | | | | | Topsoil - 3"/2.5' soil removed before drilling Hard light brown SILT AND CLAY (A-6a); contains sandstone fragments; dry. Severely weathered brown SANDSTONE. | | | | | | | | | | | | | | |
| 2.5 | 715.1 | 5 11 36 | 11 | 1 | | | | | | | | | | | | | | | | | |
| | | 50/5 | 4 | 2 | | | | | | | | | | | | | | | | | 50+ |
| 5.0 | 712.6 | Core 60" | Rec 60" | RQD 52% | R-1 | *390 | Soft to medium hard gray and brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, highly to moderately fractured, with typically low angle fractures. | | | | | | | | | | | | | | |
| 10 | | | | | | | @ 10.0'-10.5', 12.0'-12.4', 12.9'-13.3', abundant argillaceous laminations. | | | | | | | | | | | | | | |
| 15 | | Core 120" | Rec 118" | RQD 61% | R-2 | *337 | | | | | | | | | | | | | | | |
| 16.5 | 701.1 | | | | | | Soft to medium hard gray SANDSTONE interbedded with SILTSTONE, very fine grain to fine grain, highly weathered, micaceous, thinly bedded to very thinly bedded, broken. | | | | | | | | | | | | | | |
| 20 | | | | | | | @ 19.0'-19.3', broken zone. @ 26.0'-26.3', 26.9'-27.1', argillaceous interbeds. | | | | | | | | | | | | | | |
| 25 | | Core 120" | Rec 120" | RQD 29% | R-3 | *400 | @ 22.2'-23.7', $q_u = 7,168 \text{ psi}$, $SDI = 97.0\%$. | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | | |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-186

Location: Sta. 324+37.9, 54.6 ft. RT of SR 823 CL

Date Drilled: 8/31/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 10.0' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | | |
|------------|----------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
| 30.0 | 687.6 687.6 | | | | | | <p>DESCRIPTION</p> <p>Soft to medium hard gray and brown SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, highly fractured, with typical low angle fractures. @ 31.4'-31.6', 32.5'-39.1', abundant argillaceous laminations.</p> <p>@ 33.6', 33.9', low angle clay filled fractures.</p> <p>@ 39.0'-39.4', fine to medium grained, poorly cemented.</p> | | | | | | | | | | | | | |
| 35 | | Core 120" | Rec 117" | RQD 36% | R-4 | *478 | | | | | | | | | | | | | | |
| 40.0 | 677.6 | | | | | | Bottom of Boring - 40.0' | | | | | | | | | | | | | |
| 45 | | | | | | | | | | | | | | | | | | | | |
| 50 | | | | | | | | | | | | | | | | | | | | |
| 55 | | | | | | | | | | | | | | | | | | | | |
| 60 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 (11/12/2007 12:49 PM)

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-192

Location: Sta. 328+77.3, 131.7 ft. RT of SR 823 CL

Date Drilled: 9/2/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - PL ———— LL Blows per foot - ○ 10 20 30 40 | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | |
| 0.2 | 694.9 | | | | | | | | | | | | | | | | | |
| | 694.7 | 3 | | | | | Topsoil - 2"/1.5' soil removed before drilling | | | | | | | | | | | |
| | | 13 | 11 | | | 1 | Medium dense brown SILT (A-4b), trace fine to coarse sand; damp. | | | | | | | | | | | |
| | | 12 | | | | | | | | | | | | | | | | |
| 3.0 | 691.9 | | | | | | Severely weathered brown SANDSTONE, argillaceous. | | | | | | | | | | | |
| | | 19 | | | | | | | | | | | | | | | | |
| | | 30 | 14 | | | 2 | | | | | | | | | | | | |
| | | 50/5 | | | | | | | | | | | | | | | | |
| 5.0 | 689.9 | | | | | | Soft to medium hard brown SANDSTONE; very fine to fine grained, highly weathered to decomposed, argillaceous, thinly bedded to thickly bedded, broken with typical low angle rust stained fractures; contains moderate to abundant argillaceous laminations. @ 11.5'-12.3', contains few argillaceous laminations. | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | Core 60" | Rec 42" | | | RQD 0% | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| 12.3 | 682.6 | | | | | | Soft to medium hard gray SANDSTONE interbedded with SHALE, very fine to fine grained, decomposed to highly weathered, highly fractured. | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | Core 120" | Rec 120" | | | RQD 43% | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| 17.7 | 677.2 | | | | | | Medium hard brown and gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, medium bedded to thickly bedded. @ 19.4'-21.3', few to moderate argillaceous laminations. @ 20.4'-20.8', broken with typical low angle rust stained fractures. @ 21.3'-21.8', fine to medium grained, calcareous, poorly cemented. | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| 21.8 | 673.1 | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | Medium hard to hard gray and brown SANDSTONE; very fine to fine grained, moderately to highly weathered, broken, argillaceous, micaceous, thinly bedded to massive; contains few argillaceous laminations. @ 25.2'-25.3', 28.4'-28.8', high angle fractures. | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | Core 120" | Rec 120" | | | RQD 30% | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| 30.0 | 664.9 | | | | | | Bottom of Boring - 30.0' | | | | | | | | | | | |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-193

Location: Sta. 329+27.5, 337.2 ft. RT of SR 823 CL

Date Drilled: 9/2/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / * Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 0.0 | 642.0 | | | | | | | | | | | | | | | | | | | |
| 0.3 | 641.7 | | | | | | Topsoil - 3" | | | | | | | | | | | | | |
| | | 2 5 24 | 12 | 1 | | | Medium dense brown SANDY SILT (A-4a); damp. | | | | | | | | | | | | | |
| 3.0 | 639.0 | | | | | | Severely weathered gray SANDSTONE, argillaceous. | | | | | | | | | | | | | |
| | | 50/4 | 4 | 2 | | | | | | | | | | | | | | | | |
| 5.0 | 637.0 | | | | | | Medium hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, thinly bedded to massive, broken to highly fractured, contains moderate argillaceous laminations. | | | | | | | | | | | | | |
| | | Core 60" | Rec 60" | RQD 62% | R-1 | | @ 5.0'-7.6', highly fractured, with typically low angle clay filled fractures. | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | |
| 15 | | Core 120" | Rec 120" | RQD 88% | R-2 | | @ 17.0', 17.1', 19.7', low angle clay filled fractures. | | | | | | | | | | | | | |
| 20.0 | 622.0 | | | | | | Bottom of Boring - 20.0' | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-203

Location: Sta. 345+21.9, 234.9 ft. LT of SR 823 CL

Date Drilled: 9/7/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: 5.5' (after coring) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | |
|------------|------------|----------------|---------------|------------|--------------|---|---|---|-----------|-----------|-----------|--------|--------|---|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | |
| 0 | 579.8 | | | | | | DESCRIPTION | | | | | | | | | | |
| | | 13 9 8 | 18 | 1 | | 4.0 | | No Topsoil Hard brown SANDY SILT (A-4a); contains sandstone fragments; damp. | | | | | | | | | |
| | | 19 18 18 | 18 | 2 | | 4.5+ | | Hard gray SILT AND CLAY (A-6a); damp. | | | | | | | | | |
| 5 5.5 | 574.3 | 15 29 31 | 18 | 3 | | 4.5+ | | | | | | | | | | | |
| 8.1 | 571.7 | 50/1 | 1 | 4 | | 4.5+ | Medium hard gray and brown SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, moderately to highly fractured, with typical low angle clay filled fractures; contains few argillaceous laminations. @ 8.6'-11.4', fissile. | | | | | | | | | | |
| 10 | | Core 59" | Rec 59" | RQD 93% | R-1 | | | | | | | | | | | | |
| 15 | | Core 120" | Rec 120" | RQD 100% | R-2 | | | | | | | | | | | | |
| 20 | | Core 24" | Rec 24" | RQD 100% | R-3 | | | | | | | | | | | | |
| 25.0 | 554.8 | | | | | | Bottom of Boring - 25.0' | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-205

Location: Sta. 345+24.0, 332.6 ft. RT of SR 823 CL

Date Drilled: 9/2/04 to 9/7/04

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: 2.2' (after coring) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | |
|------------|----------------|--------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | |
| 0.2 | 558.2 558.0 | | | | | | | | | | | | | | | | | |
| | | 50/4 | 3 | | | 1 | Topsoil - 2" | | | | | | | | | | | |
| | | | | | | | Severely weathered brown SANDSTONE. | | | | | | | | | | | |
| | | 50/1 | 1 | | | 2 | @ 3.5', gray. | | | | | | | | | | | |
| 4.5 5 | 553.7 | | | | | | Medium hard to hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, moderately fractured, with typical high angle clay filled fractures. | | | | | | | | | | | |
| | | Core 90" | Rec 90" | | | RQD 72% | @ 6.9'-7.0', 8.1'-8.2', 9.9'- 10.0', 10.4'-10.5', 10.8'-11.0', clay filled fractures. | | | | | | | | | | | |
| | | | | | | R-1 | @ 13.1'-13.2', 14.1'-14.2', clay filled fractures. | | | | | | | | | | | |
| | | Core 84" | Rec 84" | | | RQD 68% | @ 18.5'-21.6', very fine grained, friable. | | | | | | | | | | | |
| | | | | | | R-2 | | | | | | | | | | | | |
| | | Core 72" | Rec 72" | | | RQD 94% | @ 20.2', 21.4', 21.6', low angle clay filled fractures. | | | | | | | | | | | |
| | | | | | | R-3 | | | | | | | | | | | | |
| 25.0 | 533.2 | | | | | | Bottom of Boring - 25.0' | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-2154

Location: Sta. 286+03.1, 117.5 ft. LT of SR 823 CL

Date Drilled: 1/11/06

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / *Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 9.0' Water level at completion: None (prior to coring) 20.7' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | | |
|------------|------------|----------------|---------------|------------|--------------|--|--|-------------|-----------|-----------|-----------|--------|--------|--|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - PL ————— LL Blows per foot - ○ | | | | | | |
| 0 | 787.9 | | | | | | | | | | | | | | | | | | | |
| 0.8 | 787.1 | 20 13 17 | 12 | 1 | | | Topsoil - 9" | | | | | | | | | | | | | |
| | | 50/5 | 5 | 2 | | | Severely weathered brown SANDSTONE, argillaceous. | | | | | | | | | | | | | |
| 5.0 | 782.9 | | | | | | Medium hard to hard grayish brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, massive, moderately to highly fractured. @ 5.0'-6.2', high angle, filled fracture. | | | | | | | | | | | | | |
| 10 | | Core 103" | Rec 103" | RQD 77% | R-1 | *658 | @ 11.3'-11.6', high angle fracture. @ 13.2'-13.4', 14.2'-14.5', 16.1'-16.3', high angle iron stained fractures. @ 13.6'-14.0', broken zone. | | | | | | | | | | | | | |
| 17.5 | 770.4 | Core 120" | Rec 120" | RQD 63% | R-2 | *278 | Soft to medium hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, thinly laminated to thinly bedded, moderately fractured, contains moderate to abundant argillaceous laminations. @ 17.7'-18.1', high angle, iron stained fracture. @ 22.1'-22.9', vertical fracture, iron stained. | | | | | | | | | | | | | |
| 27.1 | 760.8 | Core 120" | Rec 120" | RQD 88% | R-3 | *928 | Medium hard to hard brown and gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, massive, slightly fractured. | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-2154

Location: Sta. 286+03.1, 117.5 ft. LT of SR 823 CL

Date Drilled: 1/11/06

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / *Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 9.0' Water level at completion: .None (prior to coring) 20.7' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | |
|------------|------------|--------------|---------------|------------|--------------|--|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | |
| 30 | 757.9 | | | | | | | | | | | | | | | | | | |
| | | | | | | | Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, massive, unfractured to slightly fractured, iron stained. @ 27.1'-31.0', iron stained. | | | | | | | | | | | | |
| 35 | | | | | | | | | | | | | | | | | | | |
| 40 | | Core 120" | Rec 120" | RQD 100% | R-4 | *1636 | | | | | | | | | | | | | |
| 45.0 | 742.9 | Core 17" | Rec 17" | RQD 100% | R-5 | *1305 | | | | | | | | | | | | | |
| | | | | | | | Bottom of Boring - 45.0' | | | | | | | | | | | | |
| 50 | | | | | | | | | | | | | | | | | | | |
| 55 | | | | | | | | | | | | | | | | | | | |
| 60 | | | | | | | | | | | | | | | | | | | |

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-2157

Location: Sta. 291+72.6, 439.2 ft. LT of SR 823 CL

Date Drilled: 12/14/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|---|-----------|-----------|-----------|--------|--------|---|---|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | |
| 0.1 | 579.6 | | | | | | Water seepage at: 11.0'-17.5' Water level at completion: 17.5' (prior to coring) 0.0' (includes drilling water) | | | | | | | | | | | | |
| | 579.5 | | | | | | | Topsoil - 1" | | | | | | | | | | | |
| | | 5 | | | | 1 | | Medium dense brown GRAVEL WITH SAND AND SILT (A-2-4), trace to little clay, contains sandstone fragments; damp. | | | | | | | | | | | |
| | | 5 | 5 | | | | | | | | | | | | | | | | |
| | | | 3 | | | 2 | | | | | | | | | | | | | |
| | | | 8 | 11 | | | | | | | | | | | | | | | |
| 5 | | | | | | 3 | | | | | | | | | | | | | |
| | | 6 | | | | | | | | 23 | 31 | - | 14 | 23 | 9 | | | | |
| | | | | | | 4 | Loose to medium dense grayish brown SANDY SILT (A-4a), trace to little clay, trace to little gravel; damp to moist. | | | | | | | | | | | | |
| | | | 2 | | | | | | | | | | | | | | | | |
| | | | | | | 5 | | | | | | | | | | | | | |
| | | | 4 | 6 | 11 | | | | 9 | 16 | - | 19 | 45 | 11 | | | | | |
| | | | | | | 6 | Medium dense grayish brown GRAVEL WITH SAND AND SILT (A-2-4), trace clay; contains sandstone fragments; damp. | | | | | | | | | | | | |
| | | | 5 | | | | | | | | | | | | | | | | |
| | | | | | | 7 | | | | | | | | | | | | | |
| | | | 4 | 6 | 9 | | | | | | | | | | | | | | |
| | | | | | | 8 | Severely weathered brownish gray SANDSTONE, argillaceous. | | | | | | | | | | | | |
| | | | 3 | 7 | 14 | | | | | | | | | | | | | | |
| 13.0 | 566.6 | | | | | 8 | Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, moderately to highly fractured. @ 19.0'-19.2', 21.8'-21.9', 22.0'-22.1', broken. @ 19.2'-20.3', core loss. | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | 50/4 | | 2 | | | | 16 | 32 | - | 13 | 31 | 8 | | | | | |
| 18.0 | 561.6 | | | | | | Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, moderately to highly fractured. @ 19.0'-19.2', 21.8'-21.9', 22.0'-22.1', broken. @ 19.2'-20.3', core loss. | | | | | | | | | | | | |
| 19.0 | 560.6 | | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | |
| | | Core 120" | Rec 106" | RQD 83% | R-1 | *586 | | | | | | | | | | | | | |
| 29.0 | 550.6 | | | | | | Bottom of Boring - 29.0' | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-2160

Location: Sta. 295+62.8, 372.4 ft. LT of SR 823 CL

Date Drilled: 12/19/05 to 12/20/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: 3.7' (includes drilling water) | GRADATION | | | | | | STANDARD PENETRATION (N) | | | | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|---|-----------------------------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | Natural Moisture Content, % - PL ———— LL Blows per foot - ○ | | | | | | | | | |
| 0.2 | 597.7 | | | | | | <p>DESCRIPTION</p> <p>Topsoil - 2"/1.6' soil removed before drilling</p> <p>Severely weathered brown SANDSTONE.</p> | | | | | | | | | | | | | | | | |
| | 597.5 | 4 | | 31 | 22 | 12 | | 1 | | | | | | | | | | | | | | | |
| | | 50/3 | | | | 2 | | 2 | | | | | | | | | | | | | | | |
| 5 | | 50/5 | | | | 3 | | 3 | | | | | | | | | | | | | | | |
| 8.0 | 589.7 | | | | | | | | | | | | | | | | | | | | | | |
| 10 | | Core 60" | Rec 60" | RQD 100% | R-1 | *1665 | <p>Very hard gray SANDSTONE; fine grained, moderately weathered, argillaceous, micaceous, massive, moderately to highly fractured, burrows.</p> <p>@ 8.3'-8.7', iron stained.</p> <p>@ 8.3', 8.5', 8.8', 9.4', low angle fractures.</p> | | | | | | | | | | | | | | | | |
| 15 | | Core 84" | Rec 84" | RQD 100% | R-2 | *992 | | <p>@ 18.4'-18.9', calcareous.</p> | | | | | | | | | | | | | | | |
| 20.0 | 577.7 | | | | | | <p>Bottom of Boring - 20.0'</p> | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc. Project: SCI-823-0.00 Job No. 0121-3070.03

LOG OF: Boring R-2176 Location: Sta. 311+92.6, 5.1 ft. LT of SR 823 CL Date Drilled: 12/22/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: 11.0'-11.5' Water level at completion: 13.1' (prior to coring) 7.5' (inside hollowstem augers) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | | | |
|------------|------------|--------------|---------------|------------|--------------|---|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | | | |
| 0.3 | 590.8 | | | | | | | | | | | | | | | | | | | |
| 0.3 | 590.5 | | | | | | Topsoil - 3"/1.1' soil removed before drilling | | | | | | | | | | | | | |
| | | 6 | | | | | Medium dense brown SANDY SILT (A-4a), trace to little clay; contains sandstone fragments; dry. | | | | | | | | | | | | | |
| | | 12 | 7 | | 1 | | | | | | | | | | | | | | | |
| | | 15 | | | | | | | | | | | | | | | | | | |
| 3.5 | 587.3 | 14 | | | | | Hard brown SILT AND CLAY (A-6a), little fine to coarse sand; contains sandstone fragments; dry to damp. | | | | | | | | | | | | | |
| | | 10 | 10 | | 2 | 4.5+ | | | | | | | | | | | | | | |
| | | 7 | | | | | | | | | | | | | | | | | | |
| 6.0 | 584.8 | 3 | | | | | Very stiff to hard brown SILT (A-4b), little clay, trace gravel, some fine to coarse sand; contains sandstone fragments; moist to wet. | | | | | | | | | | | | | |
| | | 4 | 13 | | 3 | 2.5 | | | | | | | | | | | | | | |
| | | 5 | | | | | | | | | | | | | | | | | | |
| | | 8 | | | | | @ 8.5'-10.0', dry | | | | | | | | | | | | | |
| | | 8 | 13 | | 4 | 4.5+ | | | | | | | | | | | | | | |
| | | 12 | | | | | | | | | | | | | | | | | | |
| 11.5 | 579.3 | 8 | | | | | @ 11.0', contains rock fragments. | | | | | | | | | | | | | |
| | | 50/4 | 10 | | 5A | 2.5 | | | | | | | | | | | | | | |
| | | | | | 5B | | Severely weathered gray SANDSTONE. | | | | | | | | | | | | | |
| 14.0 | 576.8 | 50/4 | 4 | | 6 | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | Medium hard to hard gray SANDSTONE; very fine to fine grained, unweathered, argillaceous, calcareous, massive, slightly to moderately fractured. | | | | | | | | | | | | | |
| | | | | | | | @ 14.6', 15.6, 15.8', 15.9', low angle fractures. | | | | | | | | | | | | | |
| | | | | | | | @ 15.1-15.4', lost recovery, fracture or void suspected. | | | | | | | | | | | | | |
| | | | | | | | @ 18.2'-18.9', limestone seam. | | | | | | | | | | | | | |
| 20 | | Core 120" | Rec 116" | | RQD 92% | R1 | *2071 | | | | | | | | | | | | | |
| 24.0 | 566.8 | | | | | | Bottom of Boring - 24.0' | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 [11/12/2007 12:49 PM]

Client: TranSystems, Inc.

Project: SCI-823-0.00

Job No. 0121-3070.03

LOG OF: Boring R-2183

Location: Sta. 321+48.0, 1.1 ft. RT of SR 823 CL

Date Drilled: 12/27/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetrometer (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 4.0' (inside hollowstem augers) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ——— LL Blows per foot - ○ 10 20 30 40 | | | | |
|------------|------------|----------------|---------------|------------|--------------|---|---|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | |
| 0.2 | 672.3 | | | | | | | | | | | | | | | | | |
| | 672.1 | | | | | | Topsoil - 2" | | | | | | | | | | | |
| | | 3 | | | | 4.5+ | Hard brown SANDY SILT (A-4a), little to some clay; contains sandstone fragments; dry to damp. | | | | | | | | | | | |
| | | 6 18 | 17 | | 1 | | | | | | | | | | | | | |
| 3.0 | 669.3 | | | | | 4.5+ | Hard brown SILT AND CLAY (A-6a), some fine to coarse sand; contains sandstone fragments; dry to damp. | 2 | 4 | - | 23 | 39 | 32 | | | | | |
| | | 6 | | | 2 | | | | | | | | | | | | | |
| | | 9 14 | 17 | | | | | | | | | | | | | | | |
| 5 | | | | | | 4.5+ | | | | | | | | | | | | |
| | | 10 12 16 | 18 | | 3 | | | | | | | | | | | | | |
| | | 47 30 24 | 18 | | 4 | 4.5+ | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | |
| | | 8 | | | | 3.0 | Very stiff brown SANDY SILT (A-4a), some clay; contains sandstone fragments; moist. | 2 | 4 | - | 29 | 42 | 23 | | | | | |
| 11.0 | 661.3 | | | | | | Medium hard to hard brown and gray SANDSTONE; fine grained, highly to moderately weathered, argillaceous, micaceous, massive, highly to slightly fractured. @ 12.0'-14.2', 14.9'-15.0', 15.3'-15.5', 15.7'-16.0', 16.7'-17.4', 18.9'-19.2', iron staining. @ 18.5'-19.2', broken. | | | | | | | | | | | |
| 12.0 | 660.3 | 15 50/4 | 18 | | 5 | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | |
| | | Core 120" | Rec 119" | | RQD 79% | R1 | | | | | | | | | | | | |
| | | | | | | *406 | | | | | | | | | | | | |
| 22.0 | 650.3 | | | | | | Bottom of Boring - 22.0' | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | |

FILE: 0121-3070-03 | 11/12/2007 12:49 PM

Client: TranSystems, Inc. Project: SCI-823-0.00 Job No. 0121-3070.03

LOG OF: Boring R-2184 Location: Sta. 318+74.1, 247.4 ft. LT of SR 823 CL Date Drilled: 12/21/05

| Depth (ft) | Elev. (ft) | Blows per 6" | Recovery (in) | Sample No. | | Hand Penetro- meter (tsf) / Point-Load Strength (psi) | WATER OBSERVATIONS: Water seepage at: None Water level at completion: None (prior to coring) 8.1' (inside hollowstem augers) | GRADATION | | | | | | STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ————— LL Blows per foot - ○ 10 20 30 40 | | | | |
|------------|----------------|----------------------|---------------|------------|--------------|--|--|-------------|-----------|-----------|-----------|--------|--------|---|--|--|--|--|
| | | | | Drive | Press / Core | | | % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay | | | | | |
| 0.2 | 677.0 676.8 | | | | | | Topsoil - 2" | | | | | | | | | | | |
| | | 5 7 8 13 | | 1 | | 4.5+ | Hard brown CLAY (A-7-6), trace fine to coarse sand, trace gravel, some silt; moist. | 1 | 1 | - | 6 | 28 | 64 | | | | | |
| 3.5 | 673.5 | 10 19 14 18 | | 2 | | 4.5+ | Hard brown SANDY SILT (A-4a), little clay; contains sandstone fragments; damp. | 7 | 15 | - | 33 | 29 | 16 | | | | | |
| | | 11 19 19 18 | | 3 | | - | | | | | | | | | | | | |
| | | 15 22 50 18 | | 4 | | 4.5+ | | | | | | | | | | | | |
| 10 | | 12 16 49 18 | | 5 | | 4.0 | | | | | | | | | | | | |
| 12.5 | 664.5 | | | | | | Medium hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, massive, highly to slightly, fractured. @ 12.5'-14.4', highly weathered, broken to highly fractured. @ 14.4', 16.5', 17.1', decomposed low angle fractures. @ 15.8'-16.1', contains argillaceous laminations. | | | | | | | | | | | |
| 15 | | Core 120" | Rec 120" | RQD 76% | R1 | *1317 | | | | | | | | | | | | |
| 22.5 | 654.5 | | | | | | Bottom of Boring - 22.5' | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | |

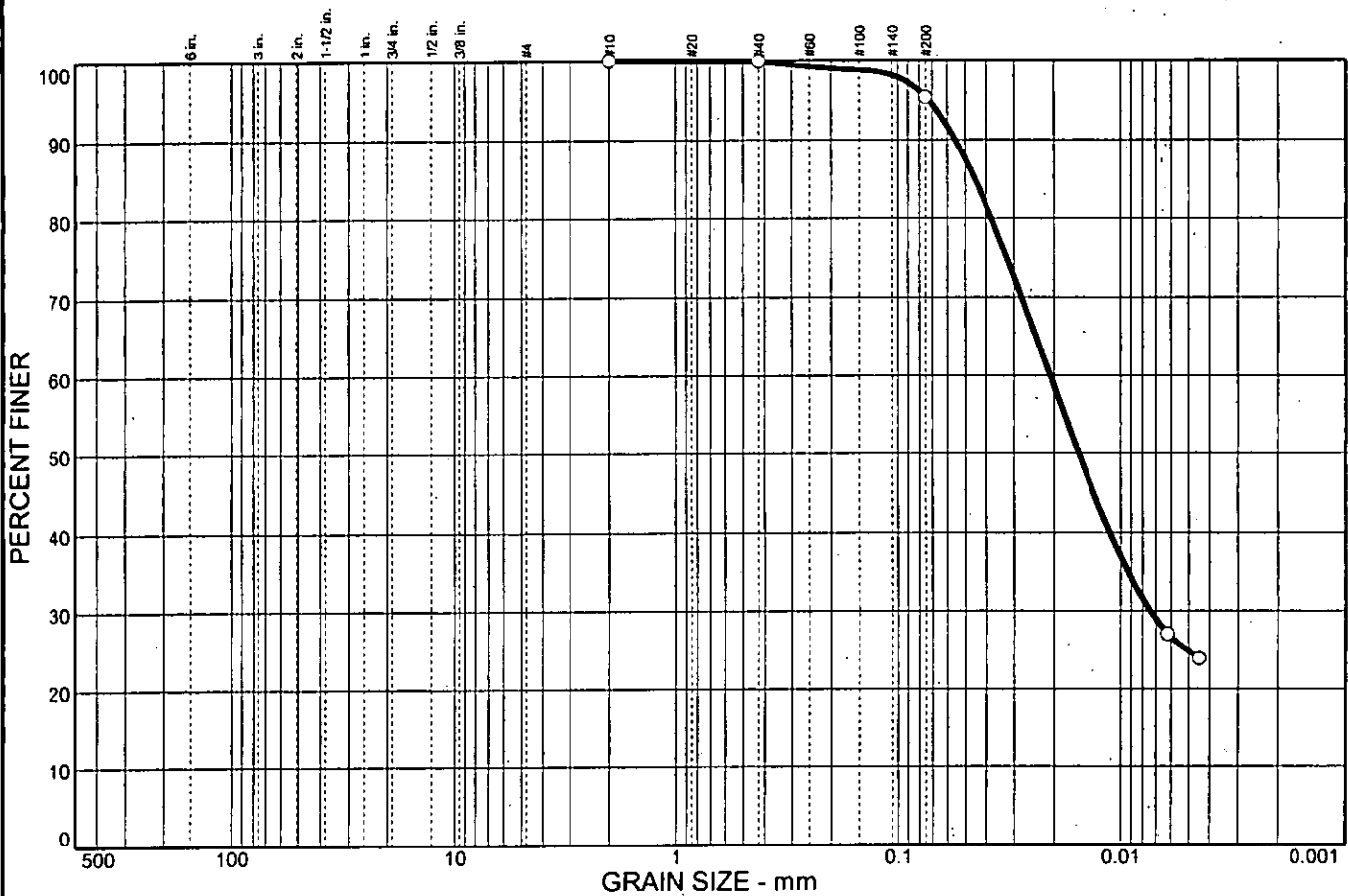
FILE: 0121-3070-03 [11/12/2007 12:49 PM]



APPENDIX B

Laboratory Shear Strength Testing

PARTICLE SIZE DISTRIBUTION TEST REPORT



| % COBBLES | % GRAVEL | | % SAND | | | % FINES | |
|-----------|----------|------|--------|--------|------|---------|------|
| | CRS. | FINE | CRS. | MEDIUM | FINE | SILT | CLAY |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 4.6 | 70.5 | 24.8 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| #10 | 100.0 | | |
| #40 | 99.9 | | |
| #200 | 95.3 | | |

* (no specification provided)

Soil Description
Lean clay

Atterberg Limits
PL= 19 LL= 29 PI= 10

Coefficients
D₈₅= 0.0454 D₆₀= 0.0208 D₅₀= 0.0155
D₃₀= 0.0074 D₁₅= D₁₀=
C_u= C_c=

Classification
USCS= CL AASHTO= A-4(9)

Remarks
Moisture Content= 27.9%
Specific Gravity= 2.66

Sample No.: P-1
Location:

Source of Sample: R-102

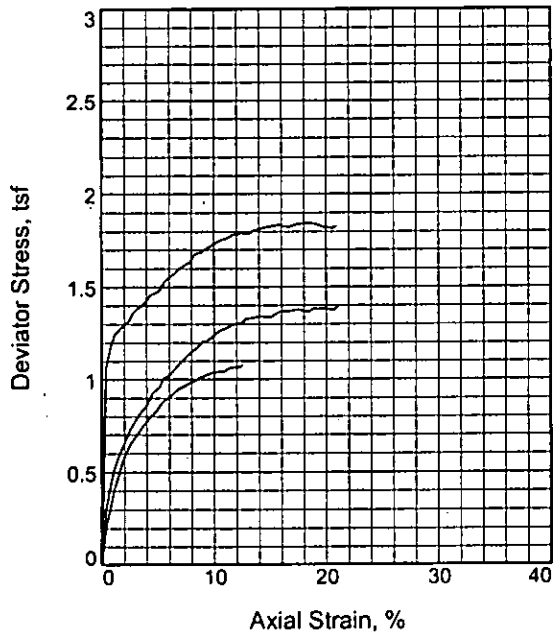
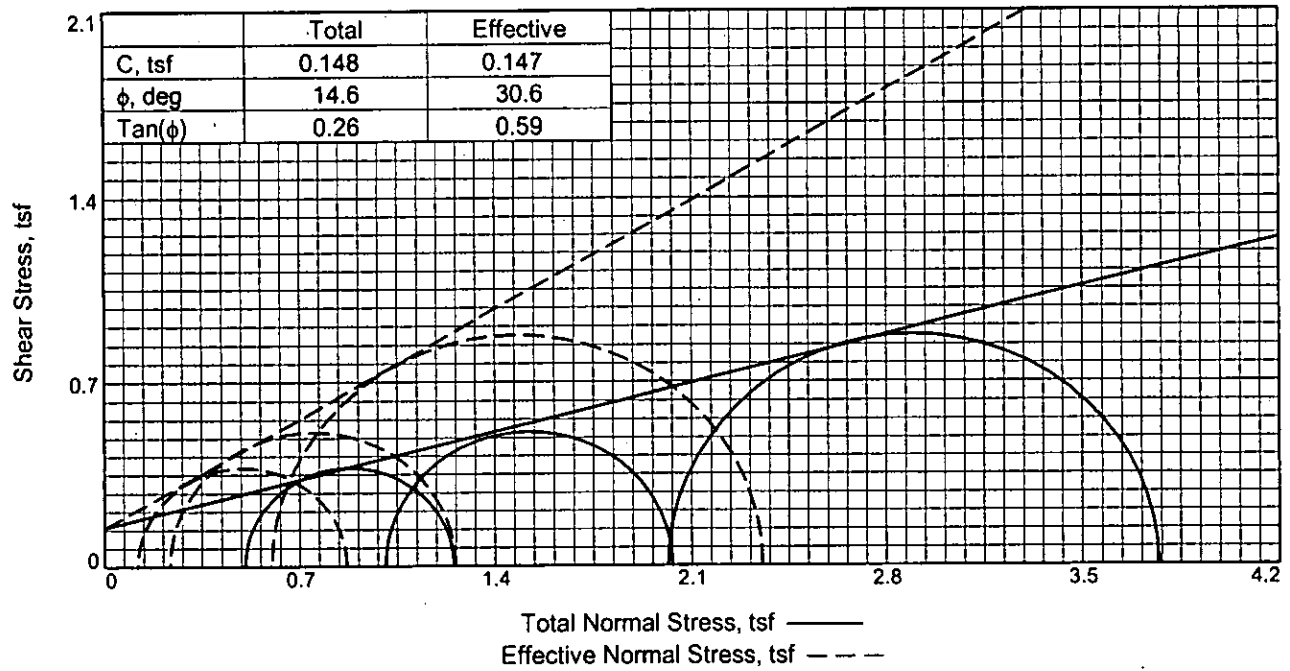
Date: 11/29/05
Elev./Depth: 11



Client: TranSystems, Inc.
Project: SCI-823-0.00

Project No: 0121-3070.03

Figure



| Sample No. | 1 | 2 | 3 | |
|-------------------------------|-------------------------------|--------|--------|--------|
| Initial | Water Content, | 27.9 | 27.9 | 27.9 |
| | Dry Density, pcf | 96.0 | 97.1 | 95.0 |
| | Saturation, | 101.5 | 104.4 | 99.2 |
| | Void Ratio | 0.7305 | 0.7103 | 0.7471 |
| | Diameter, in. | 2.77 | 2.80 | 2.81 |
| | Height, in. | 5.49 | 5.56 | 5.19 |
| At Test | Water Content, | 29.6 | 25.4 | 24.0 |
| | Dry Density, pcf | 92.9 | 99.2 | 101.4 |
| | Saturation, | 100.0 | 100.0 | 100.0 |
| | Void Ratio | 0.7872 | 0.6748 | 0.6383 |
| | Diameter, in. | 2.82 | 2.79 | 2.75 |
| | Height, in. | 5.45 | 5.47 | 5.07 |
| Strain rate, in./min. | 0.06 | 0.06 | 0.06 | |
| Back Pressure, tsf | 4.03 | 4.03 | 4.03 | |
| Cell Pressure, tsf | 4.54 | 5.04 | 6.05 | |
| Fail. Stress, tsf | Total Pore Pr., tsf | 4.42 | 4.80 | 5.45 |
| | Ult. Stress, tsf | 0.75 | 1.02 | 1.75 |
| Total Pore Pr., tsf | Total Pore Pr., tsf | 4.42 | 4.80 | 5.45 |
| | $\bar{\sigma}_1$ Failure, tsf | 0.87 | 1.26 | 2.35 |
| $\bar{\sigma}_3$ Failure, tsf | 0.12 | 0.24 | 0.60 | |

Type of Test:

CU with Pore Pressures

Sample Type: 3" Press Tube

Description: Lean clay

LL= 29 PL= 19 PI= 10

Assumed Specific Gravity= 2.66

Remarks:

Client: TranSystems, Inc.

Project: SCI-823-0.00

Source of Sample: R-102

Depth: 11

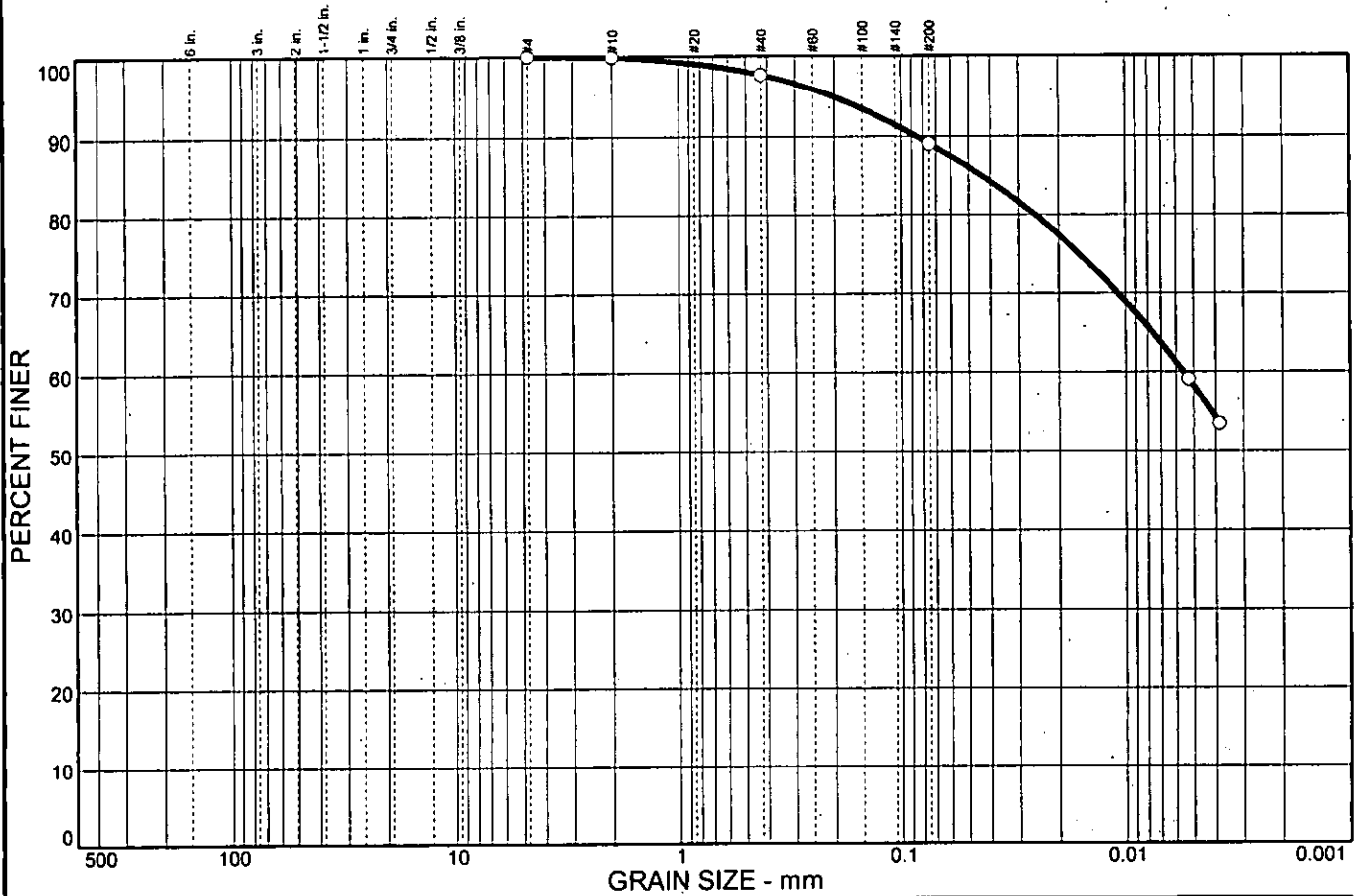
Sample Number: P-1

Proj. No.: 0121-3070.03

Date: 11/29/05



PARTICLE SIZE DISTRIBUTION TEST REPORT



| % COBBLES | % GRAVEL | | % SAND | | | % FINES | |
|-----------|----------|------|--------|--------|------|---------|------|
| | CRS. | FINE | CRS. | MEDIUM | FINE | SILT | CLAY |
| 0.0 | 0.0 | 0.0 | 0.1 | 2.3 | 8.5 | 30.9 | 58.2 |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| #4 | 100.0 | | |
| #10 | 99.9 | | |
| #40 | 97.6 | | |
| #200 | 89.1 | | |

Soil Description
Lean clay Delete Sample S1 - CIU

Atterberg Limits
PL= 22 LL= 48 PI= 26

Coefficients
D₈₅= 0.0439 D₆₀= 0.0056 D₅₀=
D₃₀= D₁₅= D₁₀=
C_u= C_c=

Classification
USCS= CL AASHTO= A-7-6(25)

Remarks
Moisture Content= 26.9%
Specific Gravity= 2.71

* (no specification provided)

Sample No.: P1
Location:

Source of Sample: R-104

Date: 10/7/05
Elev./Depth: 18.0

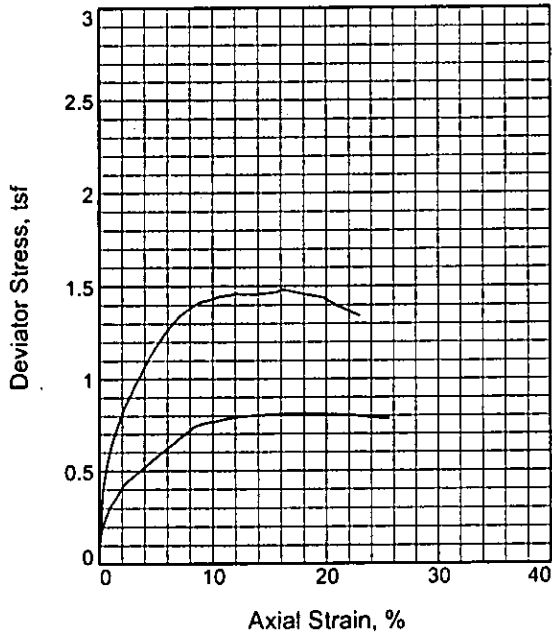
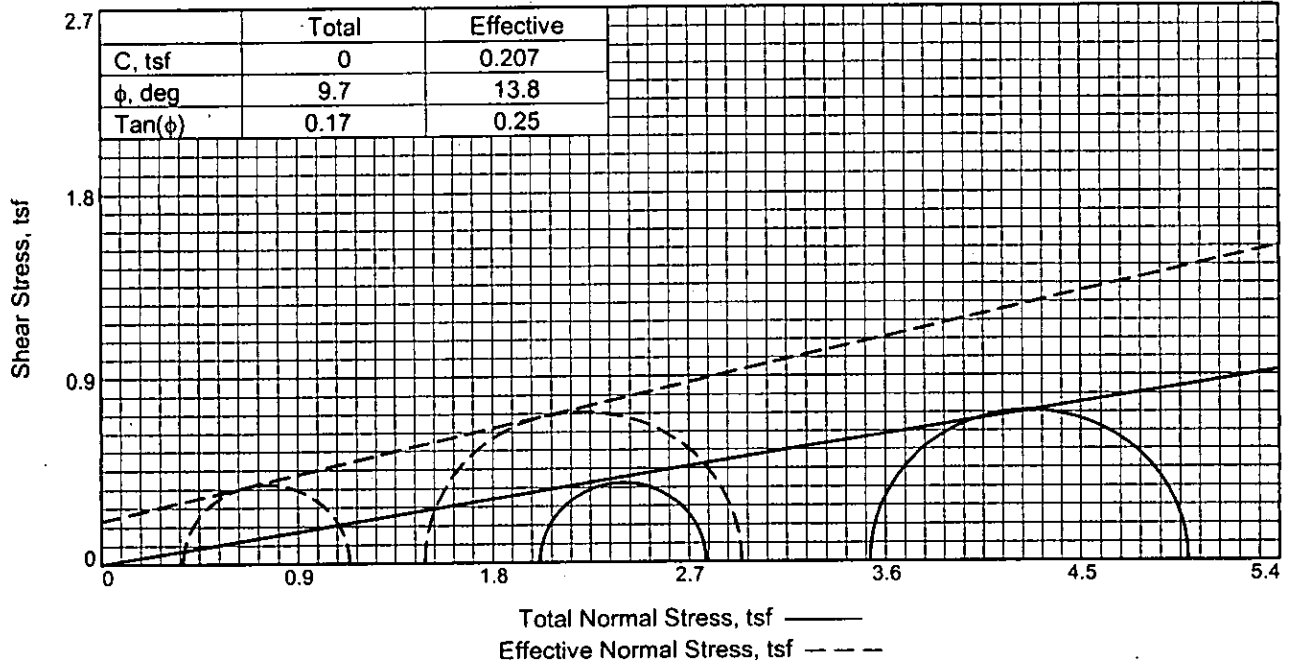


Client: TranSystems, Inc.

Project: SCI-823-0.00

Project No: 0121-3070.03

Figure



| Sample No. | | 1 | 2 |
|-------------------------------|------------------|--------|--------|
| Initial | Water Content, | 26.9 | 26.9 |
| | Dry Density, pcf | 98.0 | 98.0 |
| | Saturation, | 100.2 | 100.4 |
| | Void Ratio | 0.7271 | 0.7259 |
| | Diameter, in. | 2.82 | 2.80 |
| | Height, in. | 5.21 | 5.12 |
| At Test | Water Content, | 28.2 | 26.5 |
| | Dry Density, pcf | 95.9 | 98.5 |
| | Saturation, | 100.0 | 100.0 |
| | Void Ratio | 0.7648 | 0.7183 |
| | Diameter, in. | 2.85 | 2.79 |
| | Height, in. | 5.21 | 5.12 |
| Strain rate, in./min. | | 0.01 | 0.01 |
| Back Pressure, tsf | | 4.03 | 4.03 |
| Cell Pressure, tsf | | 6.05 | 7.56 |
| Fail. Stress, tsf | | 0.76 | 1.46 |
| Total Pore Pr., tsf | | 5.67 | 6.07 |
| Ult. Stress, tsf | | 0.78 | 1.47 |
| Total Pore Pr., tsf | | 5.68 | 6.04 |
| $\bar{\sigma}_1$ Failure, tsf | | 1.14 | 2.94 |
| $\bar{\sigma}_3$ Failure, tsf | | 0.37 | 1.49 |

Type of Test:

CU with Pore Pressures

Sample Type: Press Tube

Description: Lean clay Delete Sample S1 - CIU

LL= 48

PL= 22

PI= 26

Specific Gravity= 2.71

Remarks:

Client: TranSystems, Inc.

Project: SCI-823-0.00

Source of Sample: R-104

Depth: 18.0

Sample Number: P1

Proj. No.: 0121-3070.03

Date: 10/7/05



APPENDIX C

Slope Stability Analyses



CLIENT TransSystems / ODOT Dist 9
 PROJECT SCI - 823 - 0.00
 SUBJECT Mainline Embankment Stability - Phase 3
Stability Analysis - Summary

JOB NUMBER 0121-3070.03
 SHEET NO. 1 OF 13
 COMP. BY JTH DATE 3/28/2007
 CHECKED BY DAA DATE 11/12/07

Evaluate the slope stability for all cross-section.

Phase 3 0+00 to 352+00

A total of 1.

| Fill Section | | X-section Location Analyzed (Station) | Maximum | | Cohesive | Slope | Factor of Safety | | | Comments |
|--------------|--------|--|--------------------------|-----------------------------------|-----------------------------|-------|-------------------|---------|---------|-----------------------------|
| Beginning | Ending | | Fill Height (feet) | Foundation Thickness (feet) | Soil Thickness (feet) | | Undrained | Drained | Seismic | |
| 63+00 | 75+00 | 66+00 | 49.0 | 21.0 | 21.0 | 2.0:1 | 1.95 | 1.80 | 1.67 | |
| 105+00 | 114+34 | 105+00 | 104.0 | --- | --- | 2.5:1 | Analysis Included | | | --- |
| 116+09 | 122+42 | 116+00 | 70.0 | --- | --- | 2.5:1 | in Highland Bend | | | --- |
| 123+09 | 131+54 | 123+50 | 74.0 | --- | --- | 2.5:1 | Report | | | --- |
| 166+50 | 168+50 | --- | 39.7 | <2.0 | <2.0 | 2.0:1 | OK by inspection | | | |
| 173+50 | 188+00 | 175+40 | 86.0 | 36.0 | 7.0 | 2.5:1 | 1.30 | 1.64 | 1.50 | |
| 188+00 | 197+50 | --- | 39.0 | 13.0 | 13.0 | 2.0:1 | OK by inspection | | | |
| 207+00 | 212+50 | 209+50 | 90.1 | 13.0 | 0.0 | 2.0:1 | 1.79 | 1.59 | 1.47 | |
| 227+00 | 257+75 | 240+00 | 195.6 | 5.5 | 5.5 | 2.0:1 | 1.41 | 1.56 | 1.45 | * - infinite slope solution |
| 268+25 | 273+25 | 271+50 | 49.0 | 24.5 | 24.5 | 2.0:1 | 2.16 | 1.40* | 1.30* | |
| 289+00 | 306+50 | 298+25 | 219.4 | 20.5 | 7.5 | 2.0:1 | 1.29 | 1.54 | 1.43 | |
| 308+50 | 315+50 | 312+00 | 158.9 | 13.0 | 0.0 | 2.0:1 | 1.31 | 1.57 | 1.46 | |
| 315+50 | 324+00 | 319+75 | 94.8 | 13.0 | 13.0 | 2.0:1 | 1.75 | 1.59 | 1.47 | |
| 328+00 | 330+00 | --- | 36.5 | 5.0 | 5.0 | 2.0:1 | OK by inspection | | | |
| 343+00 | 348+00 | --- | 91.1 | 8.0 | 8.0 | 2.0:1 | OK by inspection | | | |

Use UTEXAS3 slope stability program by S.G. Wright, Ver 1.204, 10/22/1993.

Analyze for undrained, drained and seismic loading condition.

Use a pseudo-static seismic coefficient of 0.03.

Conservatively, use a ground water table of 5 feet below the ground surface.

The borrow source for the embankments has not been identified.

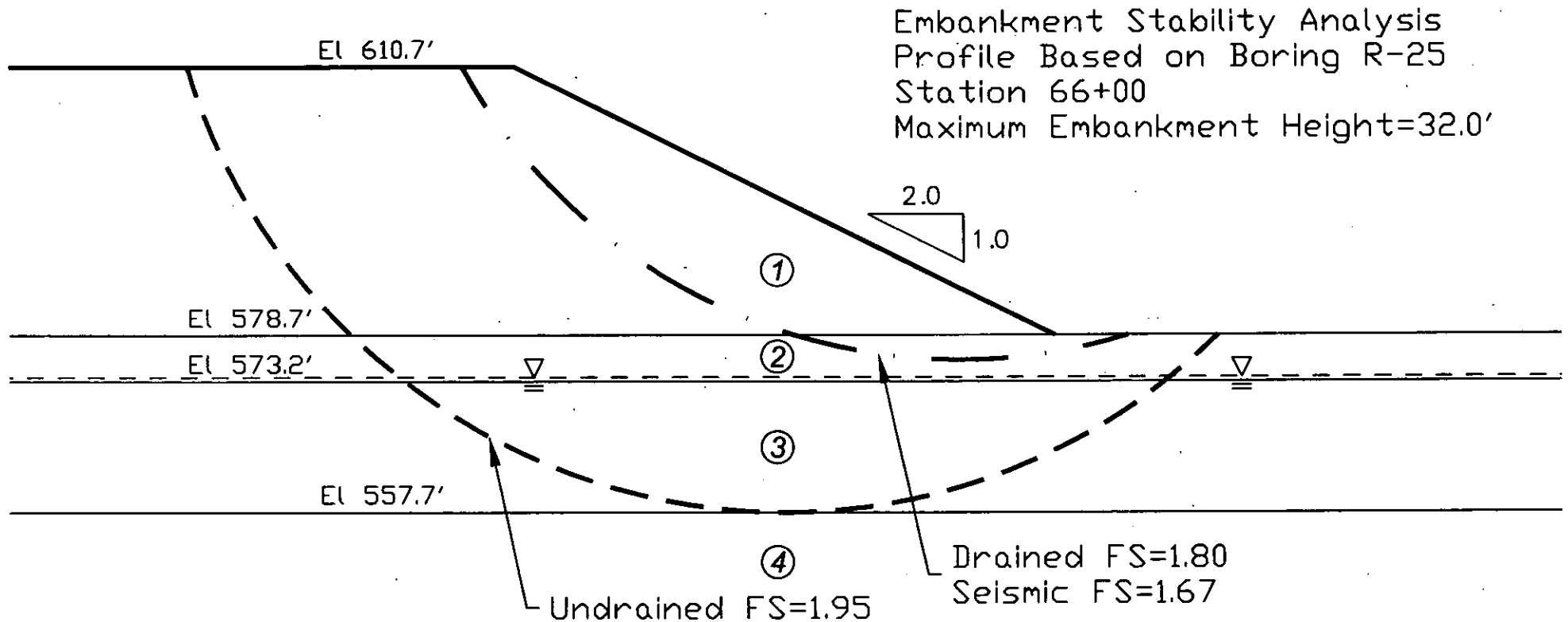
Use the following shear strength parameters for compacted fill for embankments under 40 feet in height.

c = 2,000 psf c' = 300 psf
 ø = 0 degrees ø' = 28 degrees

Use the following shear strength parameters for compacted fill for embankments over 40 feet in height.

c = 0 psf c' = 0 psf
 ø = 35 degrees ø' = 35 degrees

| Material | Consistency | Soil Type | Undrained | | Drained | | γ (pcf) |
|------------|----------------|---------------|-----------|--------------|----------|---------------|----------------|
| | | | C (psf) | ϕ (deg) | C' (psf) | ϕ' (deg) | |
| Material 1 | Compacted | Emb. Fill | 2000 | 0 | 300 | 28 | 120 |
| Material 2 | Stiff/V. Stiff | Silt and Clay | 2000 | 0 | 0 | 30 | 120 |
| Material 3 | Stiff | Silt | 1000 | 0 | 0 | 29 | 120 |
| Material 4 | | Bedrock | 5000 | 45 | 5000 | 45 | 145 |



Sheet 2 of 13

Embankment Global Stability
Station 66+00 Mainline Embankment
Profile Based upon boring R-25

EMBANKMENT STABILITY ANALYSIS

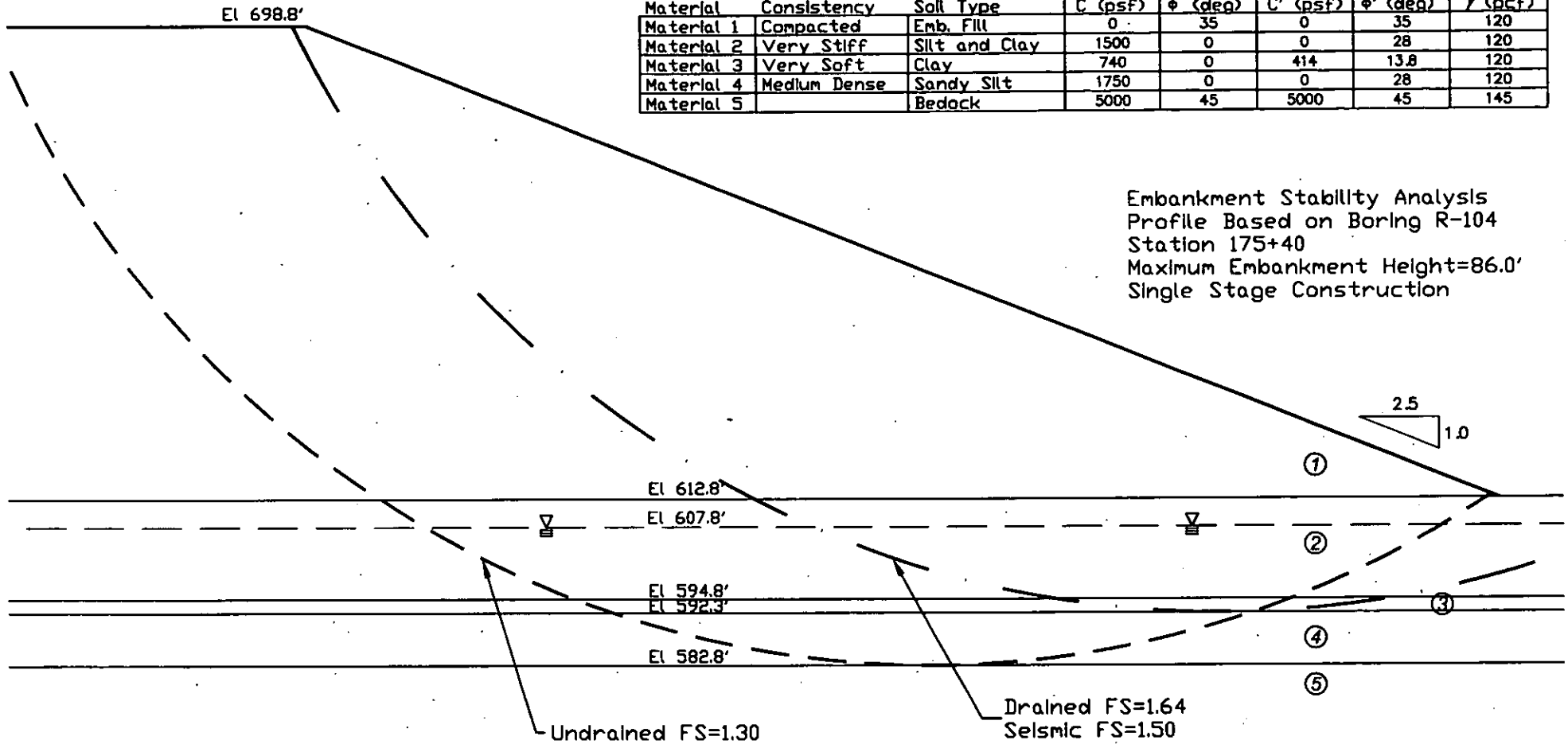
SCI-823-0.00

PROJECT NO. 0121-3070.03

CALC: JTH

DATE 3/28/07

| Material | Consistency | Soil Type | Undrained | | Drained | | γ (pcf) |
|------------|--------------|---------------|-----------|--------------|----------|---------------|----------------|
| | | | C (psf) | ϕ (deg) | C' (psf) | ϕ' (deg) | |
| Material 1 | Compacted | Emb. Fill | 0 | 35 | 0 | 35 | 120 |
| Material 2 | Very Stiff | Silt and Clay | 1500 | 0 | 0 | 28 | 120 |
| Material 3 | Very Soft | Clay | 740 | 0 | 414 | 13.8 | 120 |
| Material 4 | Medium Dense | Sandy Silt | 1750 | 0 | 0 | 28 | 120 |
| Material 5 | | Bedrock | 5000 | 45 | 5000 | 45 | 145 |



Sheet 3 of 13

Embankment Global Stability
 Station 175+40 Mainline Embankment
 Profile Based upon boring R-104

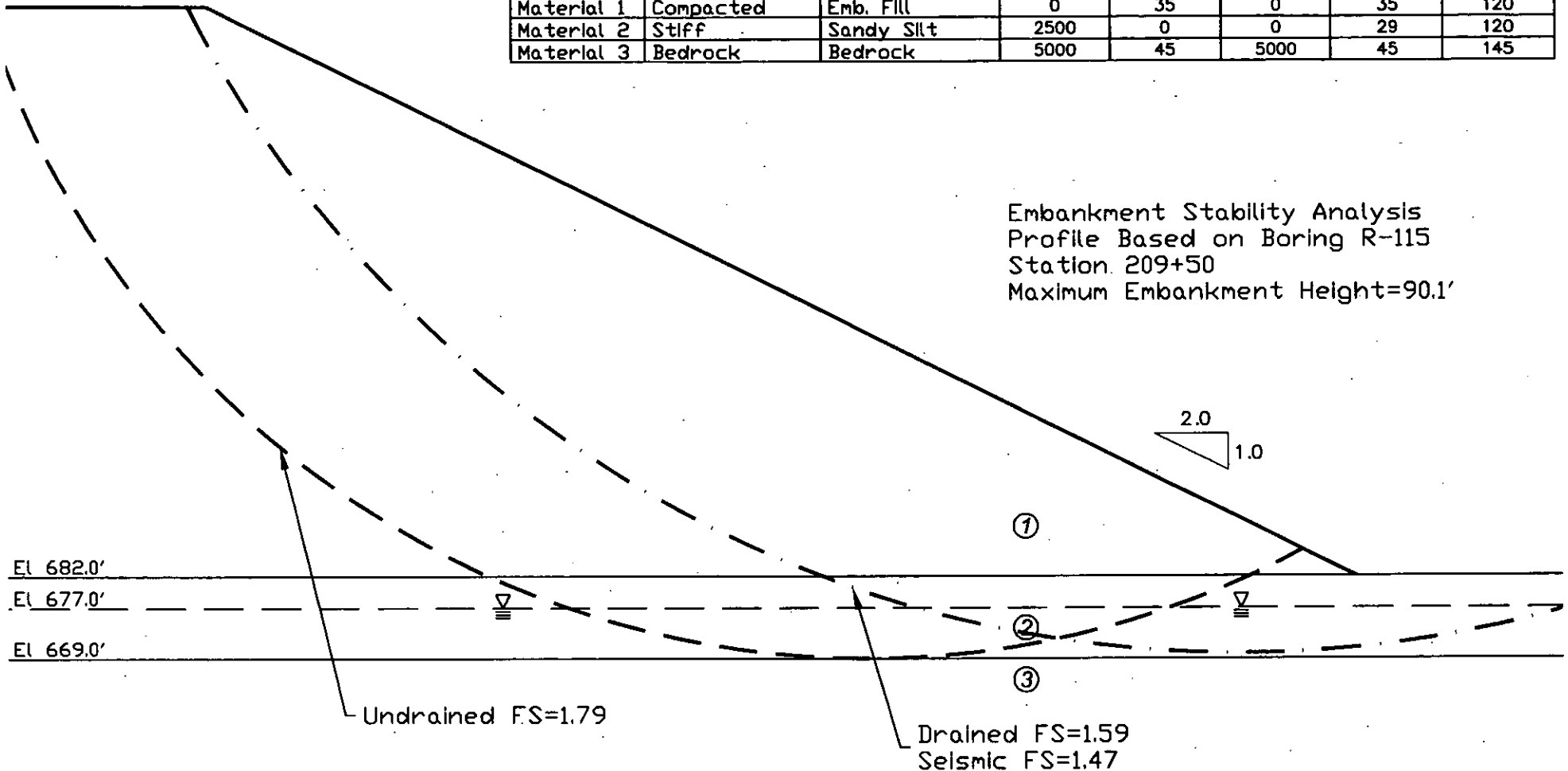
EMBANKMENT STABILITY ANALYSIS
 2.5:1 Slope STAGE 1
 SCI-823-0.00

PROJECT NO. 0121-3070.03 CALC: JTH DATE 3/28/07

El 772.1'

| Material | Consistency | Soil Type | Undrained | | Drained | | γ (pcf) |
|------------|-------------|------------|-----------|--------------|----------|---------------|----------------|
| | | | C (psf) | ϕ (deg) | C' (psf) | ϕ' (deg) | |
| Material 1 | Compacted | Emb. Fill | 0 | 35 | 0 | 35 | 120 |
| Material 2 | Stiff | Sandy Silt | 2500 | 0 | 0 | 29 | 120 |
| Material 3 | Bedrock | Bedrock | 5000 | 45 | 5000 | 45 | 145 |

Embankment Stability Analysis
 Profile Based on Boring R-115
 Station 209+50
 Maximum Embankment Height=90.1'



Sheet 4 of 13

Embankment Global Stability
 Station 209+50 Mainline Embankment
 Profile Based upon boring R-115

EMBANKMENT STABILITY ANALYSIS

SCI-823-0.00

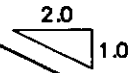
PROJECT NO. 0121-3070.03 CALC: JTH DATE 3/29/07

El 995.6'

El 800.0'
El 795.0'
El 789.5'

| Material | Consistency | Soil Type | Undrained | | Drained | | γ (pcf) |
|------------|-------------|------------|-----------|--------------|----------|---------------|----------------|
| | | | C (psf) | ϕ (deg) | C' (psf) | ϕ' (deg) | |
| Material 1 | Compacted | Emb. Fill | 0 | 35 | 0 | 35 | 120 |
| Material 2 | V. Stiff | Silty Clay | 2000 | 0 | 0 | 29 | 120 |
| Material 3 | | Bedrock | 5000 | 45 | 5000 | 45 | 145 |

Embankment Stability Analysis
 Profile Based on Boring R-123
 Station 240+00
 Maximum Embankment Height=195.6'



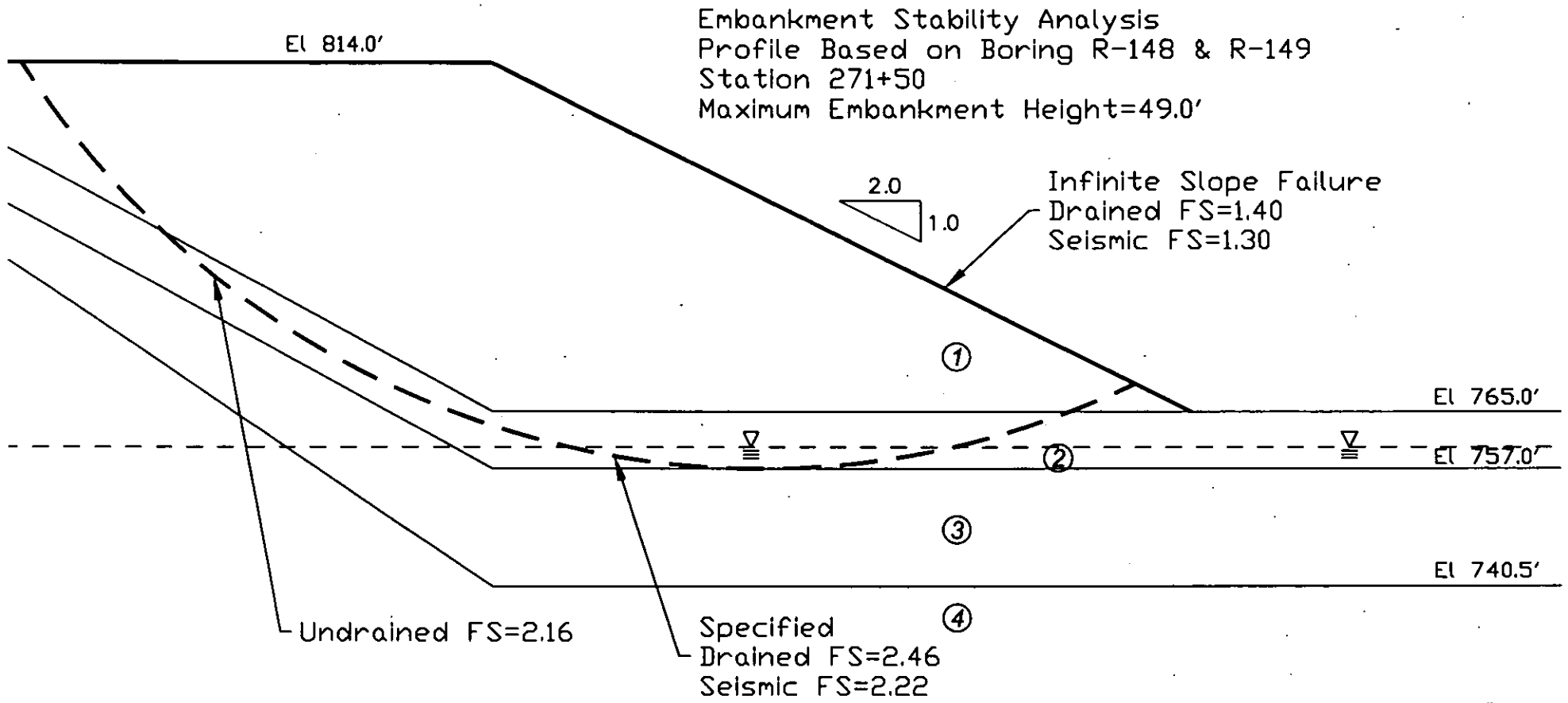
Undrained FS=1.41

Drained FS=1.56
Seismic FS=1.45

Sheet 5 of 13

| | | |
|--|-----------|--------------|
| Embankment Global Stability Station 240+00 Mainline Embankment Profile Based upon boring R-123 | | |
| EMBANKMENT STABILITY ANALYSIS | | |
| SCI-823-0.00 | | |
| PROJECT NO. 0121-3070.03 | CALC: JTH | DATE 3/28/07 |

| Material | Consistency | Soil Type | Undrained | | Drained | | γ (pcf) |
|------------|-------------|---------------|-----------|--------------|----------|---------------|----------------|
| | | | C (psf) | ϕ (deg) | C' (psf) | ϕ' (deg) | |
| Material 1 | Compacted | Emb. Fill | 0 | 35 | 0 | 35 | 120 |
| Material 2 | Hard | Silt and Clay | 2000 | 0 | 0 | 29 | 120 |
| Material 3 | Hard | Clay | 2500 | 0 | 0 | 30 | 120 |
| Material 4 | | Bedrock | 5000 | 45 | 5000 | 45 | 145 |



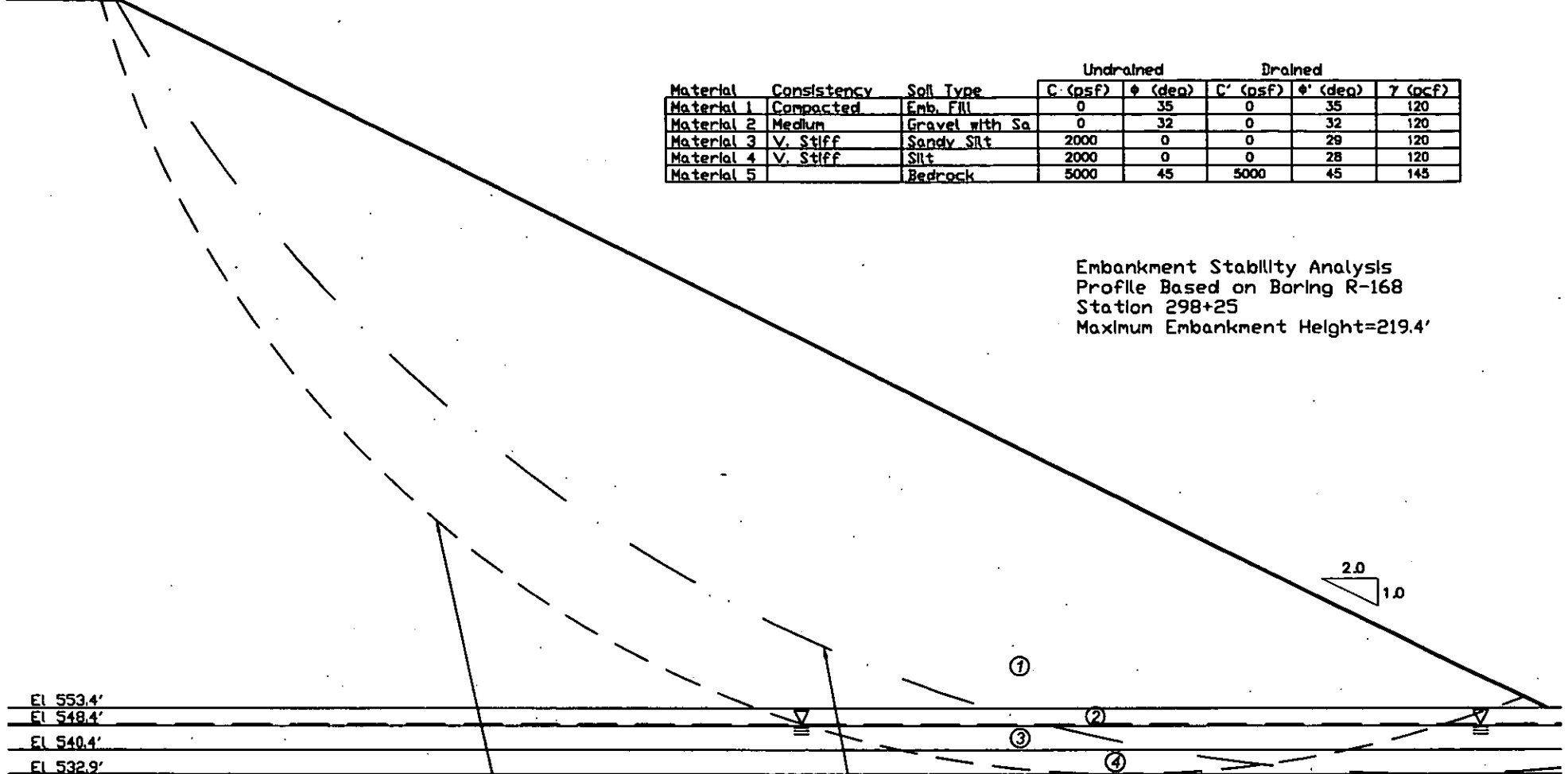
Sheet 6 of 13

| | | |
|--|-----------|--------------|
| Embankment Global Stability Station 271+50 Mainline Embankment Profile Based upon boring R-148 & R-149 | | |
| EMBANKMENT STABILITY ANALYSIS | | |
| SCI-823-0.00 | | |
| PROJECT NO. 0121-3070.03 | CALC. JTH | DATE 3/28/07 |

El 772.8'

| Material | Consistency | Soil Type | Undrained | | Drained | | γ (pcf) |
|------------|-------------|----------------|-----------|---------|----------|----------|---------|
| | | | C' (psf) | φ (deg) | C' (psf) | φ' (deg) | |
| Material 1 | Compacted | Emb. Fill | 0 | 35 | 0 | 35 | 120 |
| Material 2 | Medlum | Gravel with Sa | 0 | 32 | 0 | 32 | 120 |
| Material 3 | V. Stiff | Sandy Silt | 2000 | 0 | 0 | 29 | 120 |
| Material 4 | V. Stiff | Silt | 2000 | 0 | 0 | 28 | 120 |
| Material 5 | | Bedrock | 5000 | 45 | 5000 | 45 | 145 |

Embankment Stability Analysis
 Profile Based on Boring R-168
 Station 298+25
 Maximum Embankment Height=219.4'



Undrained FS=1.29

Drained FS=1.54
 Seismic FS=1.43

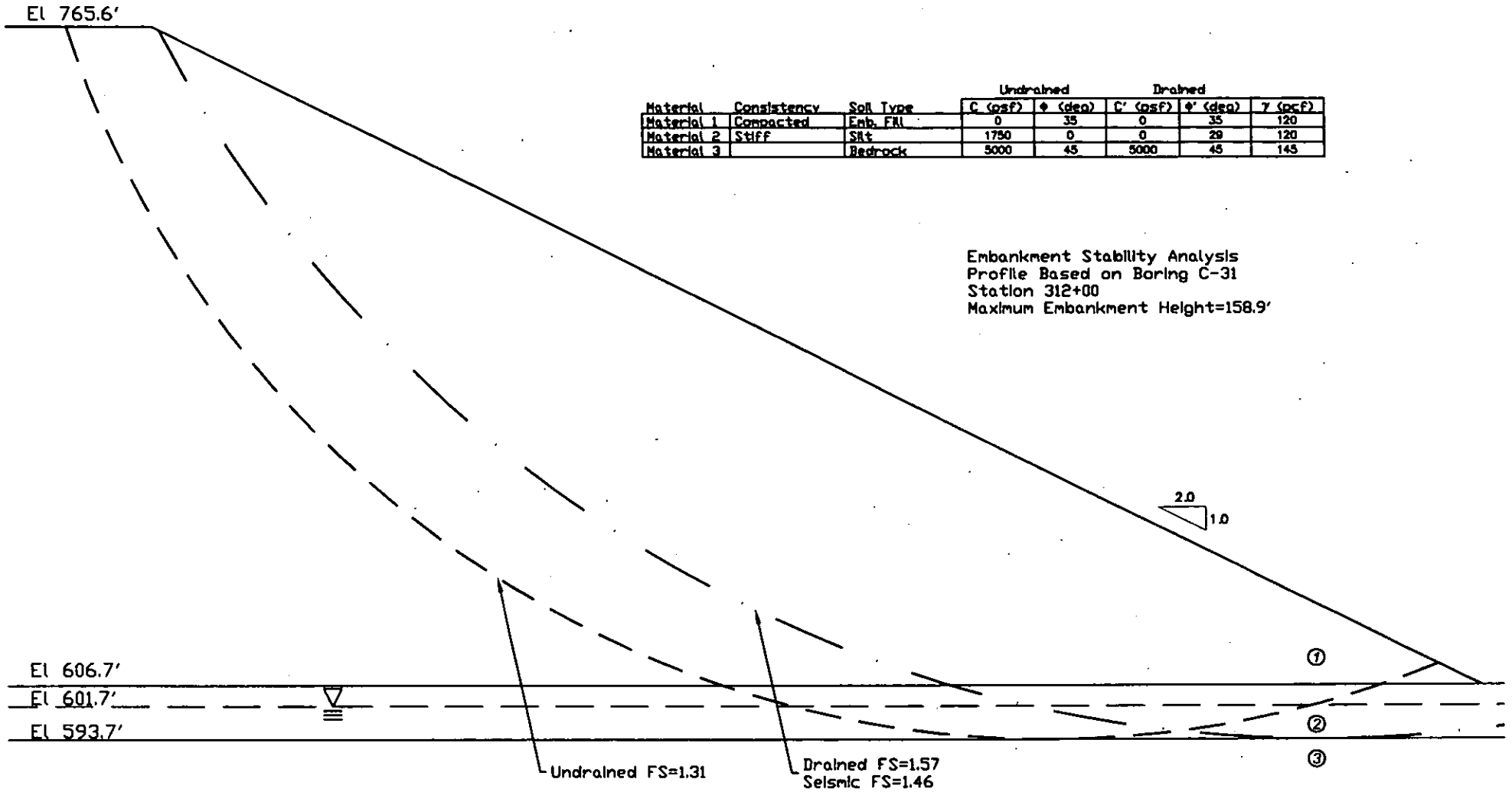
2.0
1.0

Sheet 7 of 13

| | | |
|--|-----------|--------------|
| Embankment Global Stability Station 298+25 Mainline Embankment Profile Based upon boring R-168 | | |
| EMBANKMENT STABILITY ANALYSIS | | |
| SCI-823-0.00 | | |
| PROJECT NO. 0121-3070.03 | CALC. JTH | DATE 3/28/07 |

| Material | Consistency | Soil Type | Undrained | | Drained | | γ (pcf) |
|------------|-------------|-----------|-----------|--------------|----------|---------------|----------------|
| | | | C (psf) | ϕ (deg) | C' (psf) | ϕ' (deg) | |
| Material 1 | Compacted | Emb. FRI | 0 | 35 | 0 | 35 | 120 |
| Material 2 | Stiff | Silt | 1750 | 0 | 0 | 29 | 120 |
| Material 3 | | Bedrock | 5000 | 45 | 5000 | 45 | 145 |

Embankment Stability Analysis
 Profile Based on Boring C-31
 Station 312+00
 Maximum Embankment Height=158.9'



Sheet 8 of 13

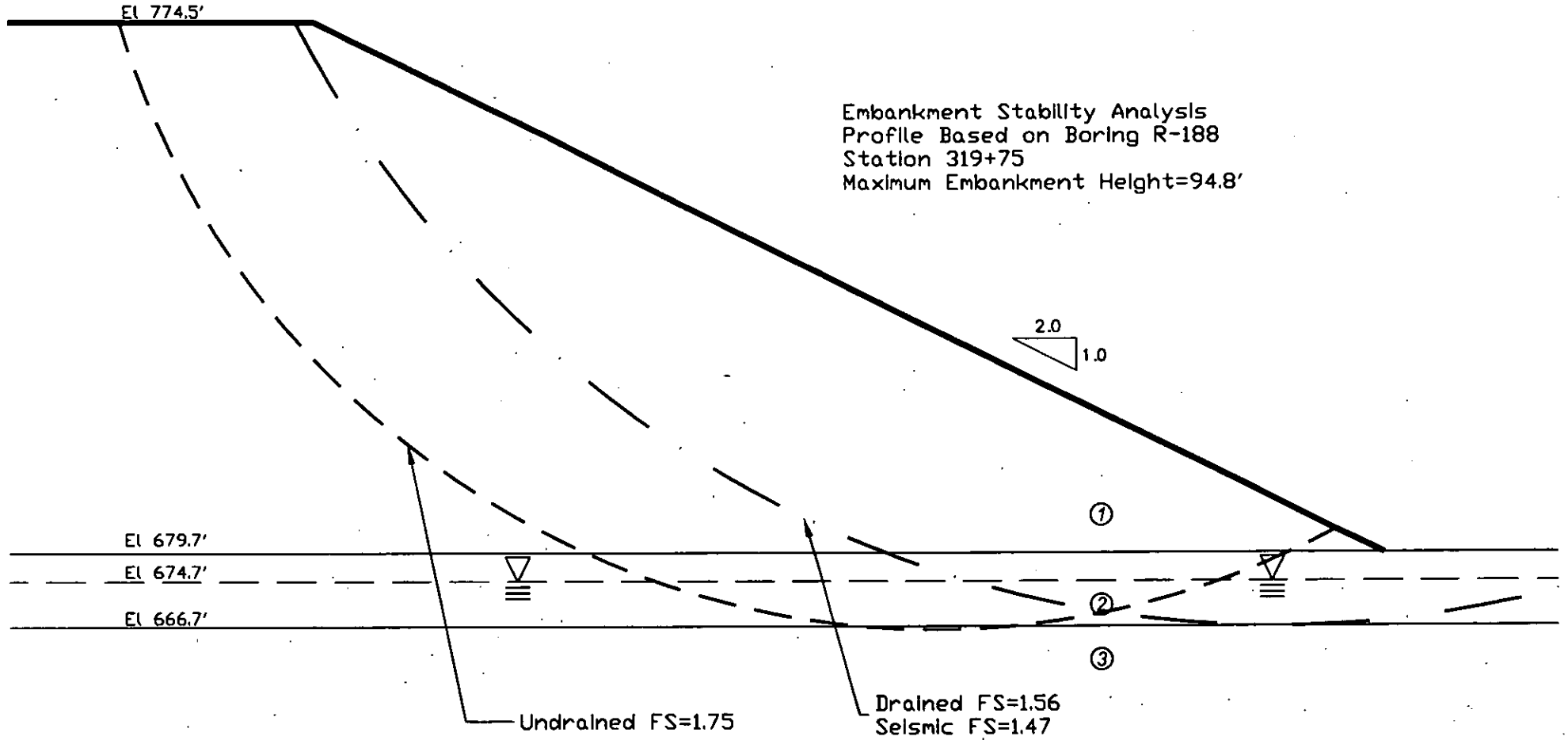
Embankment Global Stability
 Station 312+00 Mainline Embankment
 Profile Based upon boring C-31

EMBANKMENT STABILITY ANALYSIS

SCI-823-0.00

PROJECT NO. 0121-3070.03 CALC: JTH DATE 3/28/07

| Material | Consistency | Soil Type | Undrained | | Drained | | γ (pcf) |
|------------|-------------|-------------|-----------|--------------|----------|---------------|----------------|
| | | | C (psf) | ϕ (deg) | C' (psf) | ϕ' (deg) | |
| Material 1 | Compacted | Emb. Fill | 0 | 35 | 0 | 35 | 120 |
| Material 2 | V. Stiff | Silt & Clay | 2500 | 0 | 0 | 29 | 120 |
| Material 3 | | Bedrock | 5000 | 45 | 5000 | 45 | 145 |



Sheet 9 of 13

| | | |
|--|-----------|--------------|
| Embankment Global Stability Station 319+75 Mainline Embankment Profile Based upon boring R-188 | | |
| EMBANKMENT STABILITY ANALYSIS | | |
| SCI-823-0.00 | | |
| PROJECT NO. 0121-3070.03 | CALC: JTH | DATE 3/28/07 |

CLIENT TRANS SYSTEMS / DOT DIST 9
PROJECT SC1-873-0.00
SUBJECT MAIN LINE EMBANKMENT
STABILITY ANALYSIS

PROJECT NO. 0121-3070.03
SHEET NO. 10 OF 13
COMP. BY JM DATE 3/29/07
CHECKED BY DAA DATE 11/12/07

STA 166+50 TO 168+50
(SOUTH HOLLOW ROAD)

BORINGS R-89, R-89A, R-89 + R-93
ARE CLOSEST TO MAXIMUM SECTION.

R-89, R-89A AND R-93 DID NOT ADVANCE
TO TOP OF ROCK. THEREFORE, ACTUAL SUBSURFACE
CONDITIONS ARE UNKNOWN. THESE BORINGS
ENCOUNTERED FILL OVER SILT AND CLAY + SANDY SILT.
THE BORING TERMINATED IN OVERBURDEN.

R-88 ENCOUNTERED TOP OF ROCK AT 2.0 FT bgs.

EMBANKMENT HEIGHT = 39.7 FT

BASED ON PREVIOUS ANALYSIS, USE A
2:1 SLOPE.



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CLIENT TRANSISTEM / ORO? DST 9
PROJECT SC1-023-0.00
SUBJECT MAINLINE EMBANKMENT
STABILITY ANALYSIS

PROJECT NO. 0121-3070.03
SHEET NO. 11 OF 13
COMP. BY JHA DATE 3/28/07
CHECKED BY DAA DATE 11/12/07

STA 186+50 TO 197+50

BORINGS R-106, R-106A, R-107

R-107 HAS CRITICAL FOUNDATION CONDITION
13 FT SILT AND CLAY $N = 9$ TO 33

MAXIMUM HEIGHT = 39 FT

SIMILAR FOUNDATION CONDITIONS TO STATION
319+75, WHERE 2:1 SLOPES ARE OK.

∴ USE 2H:1V SLOPES



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CLIENT TRANSYSTEM / ODOI DIST 9
PROJECT SC1-826-0.00
SUBJECT DEFININE EMBANKMENT
STABILITY ANALYSIS

PROJECT NO. 0121-2070.03
SHEET NO. 12 OF 13
COMP. BY JH DATE 3/28/07
CHECKED BY DAA DATE 11/12/07

STA 328+00 TO 330+00

BORINGS C-34, C-35 AND R-192 ARE IN SECTION.

BEDROCK IS SHALLOW, TYPICALLY 3 TO 5 FEET

EMBANKMENT HEIGHT \approx 37 FT

BASED ON SHALLOW BEDROCK DEPTH AND
EMBANKMENT HEIGHT OF 37 FT USE
A 2:1 SLOPE.



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CLIENT TRANS SYSTEM / ODOT DIST 9
PROJECT SCI-823-0.00
SUBJECT MAINLINE EMBANKMENT
STABILITY ANALYSIS

PROJECT NO. 021-3070.03
SHEET NO. 13 OF 13
COMP. BY [Signature] DATE 3/28/07
CHECKED BY DNA DATE 11/12/07

STA 343+50 TO 348+00

BORINGS R-203 + R-205 ARE IN SECTION.

BEDROCK IS SHALLOW COMPARED TO EMBANKMENT
HEIGHT.

BASED ON PREVIOUS ANALYSIS USE A 2:1 SLOPE.



APPENDIX D

Settlement Calculations



CLIENT TransSystems / ODOT Dist 9
 PROJECT SCI - 823 - 0.00
 SUBJECT Mainline Embankment
Settlement - Summary

JOB NUMBER 0121-3070.03
 SHEET NO. 1 OF 18
 COMP. BY JTH DATE 3/28/07
 CHECKED BY DAA DATE 11/12/07

Evaluate the quantity of settlement for the fill cross-sections.

| Fill Section Location | | X-section Analyzed (Station) | Maximum Fill Height (feet) | Foundation Thickness (feet) | Cohesive Soil Thickness (feet) | Immediate Settlement (inch) | Total Primary Settlement (inch) |
|-----------------------|--------|------------------------------|----------------------------|-----------------------------|--------------------------------|----------------------------------|---------------------------------|
| Beginning | Ending | | | | | | |
| 63+00 | 75+00 | 66+00 | 32.0 | 21.0 | 21.0 | 0 | 5.1 |
| 105+00 | 114+34 | 105+00 | 104.0 | --- | --- | Analyzed In Highland Bend Report | |
| 116+23 | 122+42 | 116+00 | 70.0 | --- | --- | Analyzed In Highland Bend Report | |
| 123+09 | 131+50 | 123+50 | 74.0 | --- | --- | Analyzed In Highland Bend Report | |
| 166+50 | 168+50 | --- | 39.7 | <2.0 | <2.0 | negligible | negligible |
| 173+50 | 188+00 | 175+40 | 86.0 | 30.0 | 20.5 | 2.4 | 16.7 |
| 188+00 | 197+50 | 189+00 | 39.0 | 13.0 | 13.0 | 0.0 | 4.4 |
| 207+00 | 212+50 | 209+50 | 90.1 | 13.0 | 0.0 | negligible | negligible |
| 227+00 | 257+75 | 240+00 | 195.6 | 5.5 | 5.5 | 3.4 | 3.4 |
| 268+25 | 273+25 | 271+50 | 49.0 | 24.5 | 24.5 | 0.0 | 10.0 |
| 289+00 | 306+50 | 298+25 | 219.4 | 20.5 | 7.5 | 2.3 | 12.1 |
| 308+50 | 315+50 | 312+00 | 158.9 | 13.0 | 0.0 | 0.0 | 5.7 |
| 315+50 | 324+00 | 319+75 | 94.8 | 13.0 | 13.0 | 0.0 | 13.4 |
| 328+00 | 330+00 | --- | 36.5 | 5.0 | 5.0 | negligible | negligible |
| 343+00 | 348+00 | --- | 91.1 | 8.0 | 8.0 | negligible | negligible |



CLIENT TransSystems / ODOT Dist 9
 PROJECT SCI - 823 - 0.00
 SUBJECT Mainline Embankment
 Settlement - Soil Properties

JOB NUMBER 0121-3070.03
 SHEET NO. 2 OF 18
 COMP. BY JTH DATE 3/28/07
 CHECKED BY DAA DATE 11/12/07

Cross-section geomerty and soil properties.

$$e_o = \frac{G_s \times w_c}{100}$$

Assume $G_s = 2.70$ for clayey soils.

Therefore,
$$e_o = \frac{2.70 \times w_c}{100}$$

No consolidation test data available. No known equations or correlation for overconsolidated soils. Use these equations for normally consolidated soils. (Soil Mechanics in Engineering Practice, Terzaghi and Peck, 1967)

$$C_c = 0.009 (LL-10)$$

$$C_r = \frac{C_c}{10}$$

C' (Hough Coef.) is from the chart on page 14 of 18.

| X-section | Fill Height (feet) | Foundation Thickness (feet) |
|-----------|--------------------|-----------------------------|
| 66+00 | 32 | 21.0 |

| Soil Layer | Thickness | Soil Type | WC | LL | PI | e_o | C_c | C_r | N | C' |
|------------|-----------|-------------|------|----|----|-------|-------|-------|-----|------|
| 1 | 5.5 | Silt & Clay | 25.0 | 33 | 13 | 0.675 | 0.207 | 0.021 | --- | --- |
| 2 | 15.5 | Silt | 26.0 | 29 | 8 | 0.702 | 0.171 | 0.017 | --- | --- |

| X-section | Fill Height (feet) | Foundation Thickness (feet) |
|-----------|--------------------|-----------------------------|
| 105+00 | 104 | --- |

| Soil Layer | Thickness | Soil Type | WC | LL | PI | e_o | C_c | C_r | N | C' |
|---|-----------|-----------|----|----|----|-------|-------|-------|---|------|
| Analysis completed as part of the Highland Bend report. | | | | | | | | | | |

| X-section | Fill Height (feet) | Foundation Thickness (feet) |
|-----------|--------------------|-----------------------------|
| 116+00 | 70 | --- |

| Soil Layer | Thickness | Soil Type | WC | LL | PI | e_o | C_c | C_r | N | C' |
|---|-----------|-----------|----|----|----|-------|-------|-------|---|------|
| Analysis completed as part of the Highland Bend report. | | | | | | | | | | |

CLIENT TransSystems / ODOT Dist 9JOB NUMBER 0121-3070.03PROJECT SCI - 823 - 0.00SHEET NO. 3 OF 18SUBJECT Mainline EmbankmentCOMP. BY JTH DATE 3/28/07Settlement - Soil PropertiesCHECKED BY DAA DATE 11/12/07

| X-section | Fill Height (feet) | Foundation Thickness (feet) |
|-----------|--------------------|-----------------------------|
| 123+50 | 74 | --- |

| Soil Layer | Thickness | Soil Type | WC | LL | PI | e _o | C _c | C _r | N | C' |
|---|-----------|-----------|----|----|----|----------------|----------------|----------------|---|----|
| Analysis completed as part of the Highland Bend report. | | | | | | | | | | |

| X-section | Fill Height (feet) | Foundation Thickness (feet) |
|-----------|--------------------|-----------------------------|
| 166+50 | 39.7 | <2.0 |

| Soil Layer | Thickness | Soil Type | WC | LL | PI | e _o | C _c | C _r | N | C' |
|------------|-----------|------------|-------------------------------|----|----|----------------|----------------|----------------|---|----|
| 1 | <2.0 | Sandy Silt | negligible primary settlement | | | | | | | |

| X-section | Fill Height (feet) | Foundation Thickness (feet) |
|-----------|--------------------|-----------------------------|
| 175+40 | 86 | 30.0 |

| Soil Layer | Thickness | Soil Type | WC | LL | PI | e _o | C _c | C _r | N | C' |
|------------|-----------|-------------|--------|--------|--------|----------------|----------------|----------------|-----|-----|
| 1 | 18.0 | Silt & Clay | 21.0 | 33.0 | 12.0 | 0.567 | 0.207 | 0.021 | --- | --- |
| 2 | 2.5 | Clay | 27.0 | 48.0 | 27.0 | 0.729 | 0.342 | 0.034 | --- | --- |
| 3 | 9.5 | Sandy Silt | No Lab | No Lab | No Lab | No Lab | No Lab | No Lab | 12 | 40 |

| X-section | Fill Height (feet) | Foundation Thickness (feet) |
|-----------|--------------------|-----------------------------|
| 189+00 | 39.0 | 13.0 |

| Soil Layer | Thickness | Soil Type | WC | LL | PI | e _o | C _c | C _r | N | C' |
|------------|-----------|-------------|------|------|------|----------------|----------------|----------------|-----|-----|
| 1 | 13.0 | Silt & Clay | 19.0 | 28.0 | 17.5 | 0.513 | 0.162 | 0.016 | --- | --- |

| X-section | Fill Height (feet) | Foundation Thickness (feet) |
|-----------|--------------------|-----------------------------|
| 209+50 | 90.1 | 13.0 |

| Soil Layer | Thickness | Soil Type | WC | LL | PI | e _o | C _c | C _r | N | C' |
|-------------------------------|-----------|-----------|----|----|----|----------------|----------------|----------------|---|----|
| negligible primary settlement | | | | | | | | | | |

CLIENT TransSystems / ODOT Dist 9

JOB NUMBER

0121-3070.03PROJECT SCI - 823 - 0.00

SHEET NO.

4 OF 18SUBJECT Mainline Embankment

COMP. BY

JTH DATE 3/28/07Settlement - Soil Properties

CHECKED BY

DAA DATE 11/12/07

| X-section | Fill Height (feet) | Foundation Thickness (feet) |
|-----------|--------------------|-----------------------------|
| 240+00 | 195.6 | 5.5 |

| Soil Layer | Thickness | Soil Type | WC | LL | PI | e _o | C _c | C _r | N | C' |
|------------|-----------|------------|-----|-----|-----|----------------|----------------|----------------|---|----|
| 1 | 5.5 | Sandy Silt | --- | --- | --- | --- | --- | --- | 8 | 36 |

| X-section | Fill Height (feet) | Foundation Thickness (feet) |
|-----------|--------------------|-----------------------------|
| 271+50 | 49 | 24.5 |

| Soil Layer | Thickness | Soil Type | WC | LL | PI | e _o | C _c | C _r | N | C' |
|------------|-----------|-------------|-----|-----|-----|----------------|----------------|----------------|-----|-----|
| 1 | 8.0 | Silt & Clay | --- | --- | --- | 0.513 | 0.162 | 0.016 | --- | --- |
| 2 | 16.5 | Clay | --- | --- | --- | 0.729 | 0.342 | 0.034 | --- | --- |

| X-section | Fill Height (feet) | Foundation Thickness (feet) |
|-----------|--------------------|-----------------------------|
| 298+25 | 219.4 | 20.5 |

| Soil Layer | Thickness | Soil Type | WC | LL | PI | e _o | C _c | C _r | N | C' |
|------------|-----------|------------|-----|-----|-----|----------------|----------------|----------------|-----|-----|
| 1 | 5.5 | Grvl w/ Sa | --- | --- | --- | --- | --- | --- | 10 | 55 |
| 2 | 7.5 | Sandy Silt | --- | --- | --- | --- | --- | --- | 12 | 40 |
| 3 | 7.5 | Silt | --- | --- | --- | 0.513 | 0.177 | 0.018 | --- | --- |

| X-section | Fill Height (feet) | Foundation Thickness (feet) |
|-----------|--------------------|-----------------------------|
| 312+00 | 158.9 | 13.0 |

| Soil Layer | Thickness | Soil Type | WC | LL | PI | e _o | C _c | C _r | N | C' |
|------------|-----------|------------|----|-----|-----|----------------|----------------|----------------|----|----|
| 1 | 13.0 | Sandy Silt | 16 | --- | --- | --- | --- | --- | 12 | 40 |

| X-section | Fill Height (feet) | Foundation Thickness (feet) |
|-----------|--------------------|-----------------------------|
| 319+75 | 94.8 | 13.0 |

| Soil Layer | Thickness | Soil Type | WC | LL | PI | e _o | C _c | C _r | N | C' |
|------------|-----------|------------|------|------|------|----------------|----------------|----------------|-----|-----|
| 1 | 13.0 | Silty Clay | 18.0 | 33.0 | 15.0 | 0.486 | 0.207 | 0.021 | --- | --- |

CLIENT TransSystems / ODOT Dist 9JOB NUMBER 0121-3070.03PROJECT SCI - 823 - 0.00SHEET NO. 5 OF 18SUBJECT Mainline EmbankmentCOMP. BY JTH DATE 3/28/07Settlement - Soil PropertiesCHECKED BY DAA DATE 11/12/07

| X-section | Fill Height (feet) | Foundation Thickness (feet) |
|-----------|--------------------|-----------------------------|
| 328+00 | 36.5 | 5.0 |

| Soil Layer | Thickness | Soil Type | WC | LL | PI | e _o | C _c | C _r | N | C' |
|-------------------------------|-----------|-----------|----|----|----|----------------|----------------|----------------|---|----|
| negligible primary settlement | | | | | | | | | | |

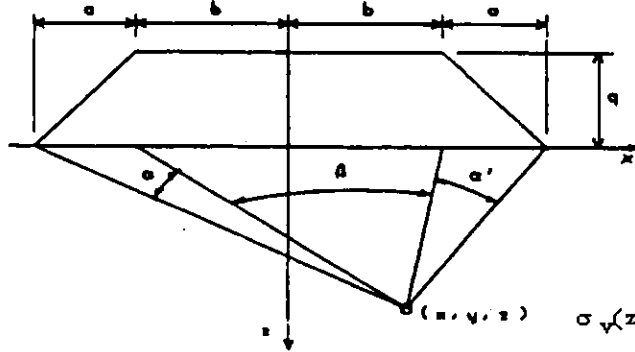
| X-section | Fill Height (feet) | Foundation Thickness (feet) |
|-----------|--------------------|-----------------------------|
| 343+00 | 91.1 | 8.0 |

| Soil Layer | Thickness | Soil Type | WC | LL | PI | e _o | C _c | C _r | N | C' |
|-------------------------------|-----------|-----------|----|----|----|----------------|----------------|----------------|---|----|
| negligible primary settlement | | | | | | | | | | |

SETTLEMENT ANALYSIS - EMBANKMENT

Embankment Informaiton:

Groundwater Table: D= 5.0 ft
 Embankment Height: H= 32 ft
 Fill Unit Weight: $\gamma_{emb} = 120$ pcf $q = 3,840$ psf
 Width of Slope: a = 64
 Top half-width of Emb: b = 45
 Distance from CL: x = 0
 Output Range: z = 0 to 21 ft



*See Data output Attached

$$\sigma_v(z) := \left(\frac{q}{\pi a} \right) \left(a(\alpha(z) + \beta(z) + \alpha'(z)) + b(\alpha(z) + \alpha'(z)) + x(\alpha(z) - \alpha'(z)) \right)$$

$$\beta(z) := \text{atan} \left[\frac{(b-x)}{z} \right] + \text{atan} \left[\frac{(b+x)}{z} \right]$$

$$\alpha'(z) := \text{atan} \left[\frac{(a+b-x)}{z} \right] - \text{atan} \left[\frac{(b-x)}{z} \right]$$

$$\alpha(z) := \text{atan} \left[\frac{(a+b+x)}{z} \right] - \text{atan} \left[\frac{(b+x)}{z} \right]$$

Reference: US Army Corps of Engineers EM 1110-1-1904 "Settlement Analysis", Table C-1

Cohesionless

Soil Properties:

Settlement is calculated at mid-point of layer

| No. | Bot. of Laye | Soil Type | γ_{soil} (pcf) | σ'_c (psf) | σ'_o (psf) | $\Delta\sigma_z$ (psf) | σ'_f (psf) | Soils | | | |
|-----|--------------|-------------|-----------------------|-------------------|-------------------|------------------------|-------------------|-------|-------|-------|-------|
| | | | | | | | | C' | C_r | C_c | e_o |
| 1 | 5.5 ft | Silt & Clay | 120 | 1,650 | 330 | 3,840 | 4,170 | 0.0 | 0.02 | 0.21 | 0.675 |
| 2 | 21.0 ft | Silt | 120 | 6,450 | 1,075 | 3,829 | 4,904 | 0.0 | 0.02 | 0.17 | 0.702 |
| 3 | 0.0 | | 0 | 0 | | | | | | | |
| 4 | 0.0 | | 0 | 0 | | | | | | | |
| 5 | 0.0 | | 0 | 0 | | | | | | | |
| 6 | 0.0 | | 0 | 0 | | | | | | | |
| 7 | 0.0 | | 0 | 0 | | | | | | | |
| 8 | 0.0 | | 0 | 0 | | | | | | | |
| 9 | 0.0 | | 0 | 0 | | | | | | | |
| 10 | 0.0 | | 0 | 0 | | | | | | | |

Reference: Geotechnical Engineering Principles and Practices; Coduto, 1999

Overconsolidated Soils - Case I ($\sigma'_o < \sigma'_c$) Eqn:11.24

$$(\delta_c)_{ult} = \sum \frac{C_r}{1+e_o} H \log \left(\frac{\sigma'_f}{\sigma'_o} \right)$$

Overconsolidated Soils - Case II ($\sigma'_o < \sigma'_c < \sigma'_f$) Eqn:11.25

$$(\delta_c)_{ult} = \sum \left[\frac{C_r}{1+e_o} H \log \left(\frac{\sigma'_c}{\sigma'_o} \right) + \frac{C_c}{1+e_o} H \log \left(\frac{\sigma'_f}{\sigma'_c} \right) \right]$$

Normally Consolidated Soils ($\sigma'_o = \sigma'_c$) Eqn: 11.23

$$(\delta_c)_{ult} = \sum \frac{C_c}{1+e_o} H \log \left(\frac{\sigma'_f}{\sigma'_o} \right)$$

Reference: FHWA NHI-00-045

Cohesionless Soils ($\sigma'_o = \sigma'_c$)

$$(\delta_c)_{ult} = \sum \frac{1}{C'} H \log \left(\frac{\sigma'_f}{\sigma'_o} \right)$$

No. Settlement:

Total Settlement

1 0.322 ft

2 0.102 ft

0.424 ft

3

4

5

5.1 in

6

7

8

9

10



SUBJECT

Client TranSystem / ODOT Dist. 9

JOB NUMBER

0121-3070.03

Project SCI-823-0.00

SHEET NO.

7 OF 18

Item Mainline Embankment - Settlement

COMP. BY

JTH DATE 03/28/07

Station 175+40

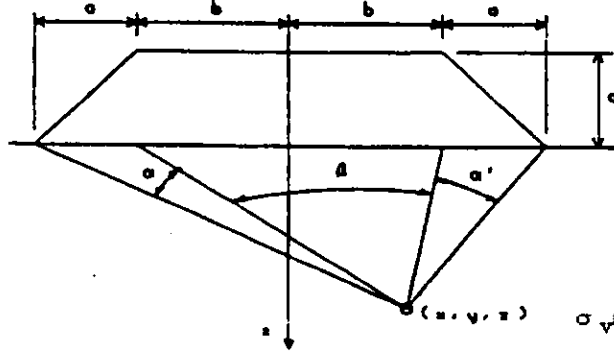
CHECKED BY

DAA DATE 11/12/07

SETTLEMENT ANALYSIS - EMBANKMENT

Embankment Informaiton:

Groundwater Table: D= 5.0 ft
 Embankment Height: H= 86 ft
 Fill Unit Weight: $\gamma_{emb} = 120$ pcf $q = 10,320$ psf
 Width of Slope: a = 215
 Top half-width of Emb: b = 45
 Distance from CL: x = 0
 Output Range: z = 0 to 30 ft



*See Data output Attached

$$\sigma_v(z) := \left(\frac{q}{\pi a} \right) (a \cdot (\alpha(z) + \beta(z) + \alpha'(z)) + b \cdot (\alpha(z) + \alpha'(z)) + x \cdot (\alpha(z) - \alpha'(z)))$$

$$\beta(z) := \text{atan} \left[\frac{(b-x)}{z} \right] + \text{atan} \left[\frac{(b+x)}{z} \right]$$

$$\alpha'(z) := \text{atan} \left[\frac{(a+b-x)}{z} \right] - \text{atan} \left[\frac{(b-x)}{z} \right]$$

$$\alpha(z) := \text{atan} \left[\frac{(a+b+x)}{z} \right] - \text{atan} \left[\frac{(b+x)}{z} \right]$$

Reference: US Army Corps of Engineers EM 1110-1-1904 "Settlement Analysis". Table C-1

Cohesionless

Soil Properties:

Settlement is calculated at mid-point of layer

| No. | Bot. of Laye | Soil Type | γ_{soil} (pcf) | σ'_c (psf) | σ'_o (psf) | $\Delta\sigma_z$ (psf) | σ'_f (psf) | Cohesionless | | | |
|-----|--------------|-------------|-----------------------|-------------------|-------------------|------------------------|-------------------|--------------|----------------------|-------|-------|
| | | | | | | | | Soils C' | Cohesive Soils C_r | C_c | e_o |
| 1 | 18.0 ft | Silt & Clay | 120 | 4,150 | 830 | 10,317 | 11,147 | 0.0 | 0.02 | 0.21 | 0.675 |
| 2 | 20.5 ft | Clay | 120 | 7,105 | 1,421 | 10,289 | 11,710 | 0.0 | 0.02 | 0.17 | 0.567 |
| 3 | 30.0 ft | Sandy Silt | 120 | 8,830 | 1,766 | 10,254 | 12,021 | 40.0 | 0.00 | 0.00 | 0.000 |
| 4 | 0.0 | | 0 | 0 | | | | | | | |
| 5 | 0.0 | | 0 | 0 | | | | | | | |
| 6 | 0.0 | | 0 | 0 | | | | | | | |
| 7 | 0.0 | | 0 | 0 | | | | | | | |
| 8 | 0.0 | | 0 | 0 | | | | | | | |
| 9 | 0.0 | | 0 | 0 | | | | | | | |
| 10 | 0.0 | | 0 | 0 | | | | | | | |

Reference: Geotechnical Engineering Principles and Practices: Coduto, 1999

Overconsolidated Soils - Case I ($\sigma'_o < \sigma'_c$) Eqn:11.24

$$(\delta_c)_{ult} = \sum \frac{C_r}{1+e_o} H \log \left(\frac{\sigma'_f}{\sigma'_o} \right)$$

Overconsolidated Soils - Case II ($\sigma'_o < \sigma'_c < \sigma'_f$) Eqn:11.25

$$(\delta_c)_{ult} = \sum \left[\frac{C_r}{1+e_o} H \log \left(\frac{\sigma'_c}{\sigma'_o} \right) + \frac{C_c}{1+e_o} H \log \left(\frac{\sigma'_f}{\sigma'_c} \right) \right]$$

Normally Consolidated Soils ($\sigma'_o = \sigma'_c$) Eqn: 11.23

$$(\delta_c)_{ult} = \sum \frac{C_c}{1+e_o} H \log \left(\frac{\sigma'_f}{\sigma'_o} \right)$$

Reference: FHWA NHI-00-045

Cohesionless Soils ($\sigma'_o = \sigma'_c$)

$$(\delta_c)_{ult} = \sum \frac{1}{C'} H \log \left(\frac{\sigma'_f}{\sigma'_o} \right)$$

No. Settlement:

Total Settlement

1 1.112 ft

2 0.078 ft

3 0.198 ft

4

5

6

7

8

9

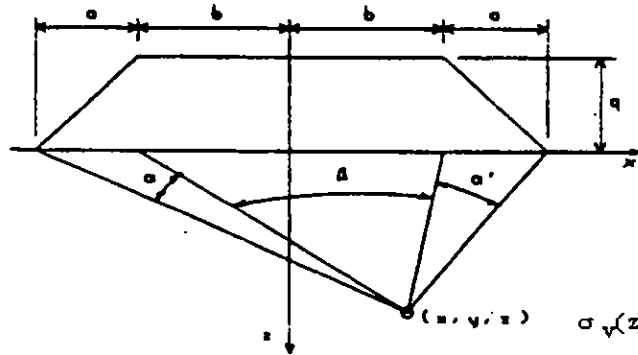
10

1.388 ft

16.7 in

SETTLEMENT ANALYSIS - EMBANKMENT

Embankment Information:



Groundwater Table: D = 5.0 ft
 Embankment Height: H = 39 ft
 Fill Unit Weight: $\gamma_{emb} = 120$ pcf $q = 4,680$ psf
 Width of Slope: a = 78
 Top half-width of Emb: b = 45
 Distance from CL: x = 0
 Output Range: z = 0 to 13 ft

*See Data output Attached

$$\sigma_v(z) := \left(\frac{q}{\pi a_f} \right) (a(\alpha(z) + \beta(z) + \alpha'(z)) + b(\alpha(z) + \alpha'(z)) + x(\alpha(z) - \alpha'(z)))$$

$$\beta(z) := \text{atan} \left[\frac{(b-x)}{z} \right] + \text{atan} \left[\frac{(b+x)}{z} \right]$$

$$\alpha'(z) := \text{atan} \left[\frac{(a+b-x)}{z} \right] - \text{atan} \left[\frac{(b-x)}{z} \right]$$

$$\alpha(z) := \text{atan} \left[\frac{(a+b+x)}{z} \right] - \text{atan} \left[\frac{(b+x)}{z} \right]$$

Reference: US Army Corps of Engineers EM 1110-1-1904 "Settlement Analysis", Table C-1

Cohesionless

Soil Properties:

Settlement is calculated at mid-point of layer

| No. | Bot. of Laye | Soil Type | γ_{soil} (pcf) | σ'_c (psf) | σ'_o (psf) | $\Delta\sigma_z$ (psf) | σ'_f (psf) | Cohesionless | | | |
|-----|--------------|-------------|-----------------------|-------------------|-------------------|------------------------|-------------------|--------------|----------------|-------|-------|
| | | | | | | | | Soils | Cohesive Soils | | |
| | | | | | | | | C_r | C_c | e_o | |
| 1 | 13.0 ft | Silt & Clay | 120 | 3,430 | 686 | 4,679 | 5,365 | 0.0 | 0.02 | 0.16 | 0.513 |
| | 0.0 | | 0 | 0 | | | | | | | |
| 3 | 0.0 | | 0 | 0 | | | | | | | |
| 4 | 0.0 | | 0 | 0 | | | | | | | |
| 5 | 0.0 | | 0 | 0 | | | | | | | |
| 6 | 0.0 | | 0 | 0 | | | | | | | |
| 7 | 0.0 | | 0 | 0 | | | | | | | |
| 8 | 0.0 | | 0 | 0 | | | | | | | |
| 9 | 0.0 | | 0 | 0 | | | | | | | |
| 10 | 0.0 | | 0 | 0 | | | | | | | |

Reference: Geotechnical Engineering Principles and Practices; Coduto, 1999

Overconsolidated Soils - Case I ($\sigma'_o < \sigma'_c$) Eqn:11.24

$$(\delta_c)_{ult} = \sum \frac{C_r}{1+e_o} H \log \left(\frac{\sigma'_f}{\sigma'_o} \right)$$

Overconsolidated Soils - Case II ($\sigma'_o < \sigma'_c < \sigma'_d$) Eqn:11.25

$$(\delta_c)_{ult} = \sum \left[\frac{C_r}{1+e_o} H \log \left(\frac{\sigma'_c}{\sigma'_o} \right) + \frac{C_c}{1+e_o} H \log \left(\frac{\sigma'_f}{\sigma'_c} \right) \right]$$

Normally Consolidated Soils ($\sigma'_o = \sigma'_c$) Eqn: 11.23

$$(\delta_c)_{ult} = \sum \frac{C_c}{1+e_o} H \log \left(\frac{\sigma'_f}{\sigma'_o} \right)$$

Reference: FHWA NHI-00-045

Cohesionless Soils ($\sigma'_o = \sigma'_c$)

$$(\delta_c)_{ult} = \sum \frac{1}{C_r} H \log \left(\frac{\sigma'_f}{\sigma'_o} \right)$$

No. Settlement:

Total Settlement

1 0.366 ft

0.366 ft

2

3

4

5

6

7

8

9

10

4.4 in



SUBJECT

Client TranSystem / ODOT Dist. 9

JOB NUMBER

0121-3070.03

Project SCI-823-0.00

SHEET NO.

9 OF 18

Item Mainline Embankment - Settlement

COMP. BY

JTH DATE 03/28/07

Station 240+00

CHECKED BY

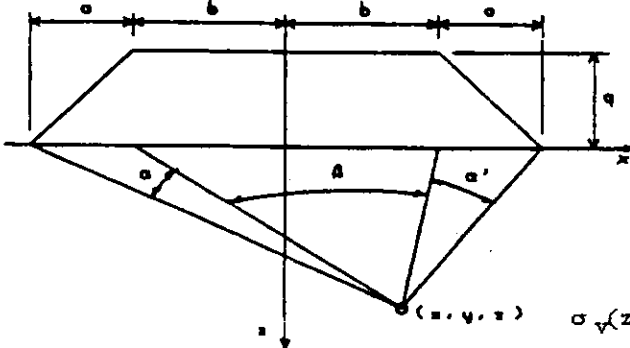
DAA DATE 11/12/07

SETTLEMENT ANALYSIS - EMBANKMENT

Embankment Informaiton:

Groundwater Table: D= 5.0 ft
 Embankment Height: H= 195.6 ft
 Fill Unit Weight: $\gamma_{emb} = 120$ pcf $q = 23,472$ psf
 Width of Slope: a = 391.2
 Top half-width of Emb: b = 45
 Distance from CL: x = 0
 Output Range: z = 0 to 11 ft

*See Data output Attached



$$\sigma_v(z) := \left(\frac{q}{\pi a} \right) (a(\alpha(z) + \beta(z) + \alpha'(z)) + b(\alpha(z) + \alpha'(z)) + x(\alpha(z) - \alpha'(z)))$$

$$\beta(z) := \text{atan} \left[\frac{(b-x)}{z} \right] + \text{atan} \left[\frac{(b+x)}{z} \right]$$

$$\alpha'(z) := \text{atan} \left[\frac{(a+b-x)}{z} \right] - \text{atan} \left[\frac{(b-x)}{z} \right]$$

$$\alpha(z) := \text{atan} \left[\frac{(a+b+x)}{z} \right] - \text{atan} \left[\frac{(b+x)}{z} \right]$$

Reference: US Army Corps of Engineers EM 1110-1-1904 "Settlement Analysis", Table C-1

Cohesionless

Soil Properties:

Settlement is calculated at mid-point of layer

| No. | Bot. of Laye | Soil Type | γ_{soil} (pcf) | σ'_c (psf) | σ'_o (psf) | $\Delta\sigma z$ (psf) | σ'_f (psf) | Cohesionless | | | |
|-----|--------------|------------|-----------------------|-------------------|-------------------|------------------------|-------------------|--------------|-------|-------|-------|
| | | | | | | | | C' | C_r | C_c | e_o |
| 1 | 5.5 ft | Sandy Silt | 120 | 3,070 | 330 | 23,472 | 23,802 | 36.0 | 0.00 | 0.00 | 0.000 |
| | 0.0 | | 0 | 0 | | | | | | | |
| 3 | 0.0 | | 0 | 0 | | | | | | | |
| 4 | 0.0 | | 0 | 0 | | | | | | | |
| 5 | 0.0 | | 0 | 0 | | | | | | | |
| 6 | 0.0 | | 0 | 0 | | | | | | | |
| 7 | 0.0 | | 0 | 0 | | | | | | | |
| 8 | 0.0 | | 0 | 0 | | | | | | | |
| 9 | 0.0 | | 0 | 0 | | | | | | | |
| 10 | 0.0 | | 0 | 0 | | | | | | | |

Reference: Geotechnical Engineering Principles and Practices; Coduto, 1999

Overconsolidated Soils - Case I ($\sigma'_o < \sigma'_c$) Eqn:11.24

$$(\delta_c)_{ult} = \sum \frac{C_r}{1+e_o} H \log \left(\frac{\sigma'_f}{\sigma'_o} \right)$$

Overconsolidated Soils - Case II ($\sigma'_o < \sigma'_c < \sigma_f$) Eqn:11.25

$$(\delta_c)_{ult} = \sum \left[\frac{C_r}{1+e_o} H \log \left(\frac{\sigma'_c}{\sigma'_o} \right) + \frac{C_c}{1+e_o} H \log \left(\frac{\sigma'_f}{\sigma'_c} \right) \right]$$

Normally Consolidated Soils ($\sigma'_o = \sigma'_c$) Eqn: 11.23

$$(\delta_c)_{ult} = \sum \frac{C_c}{1+e_o} H \log \left(\frac{\sigma'_f}{\sigma'_o} \right)$$

Reference: FHWA NHI-00-045

Cohesionless Soils ($\sigma'_o = \sigma'_c$)

$$(\delta_c)_{ult} = \sum \frac{1}{C'} H \log \left(\frac{\sigma'_f}{\sigma'_o} \right)$$

No. Settlement:

Total Settlement

1 0.284 ft

0.284 ft

2

3

4

3.4 in

5

6

7

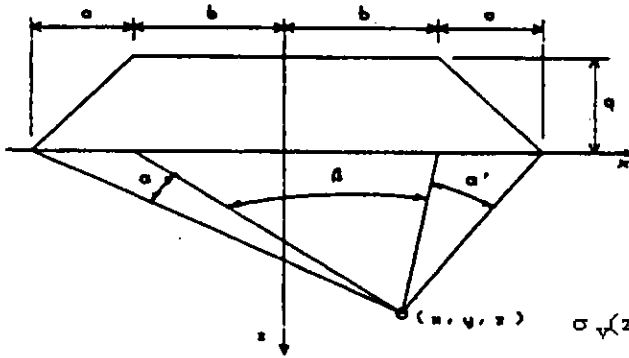
8

9

10

SETTLEMENT ANALYSIS - EMBANKMENT

Embankment Information:



Groundwater Table: D = 5.0 ft
 Embankment Height: H = 49 ft
 Fill Unit Weight: $\gamma_{emb} = 120$ pcf $q = 5,880$ psf
 Width of Slope: a = 98
 Top half-width of Emb: b = 45
 Distance from CL: x = 0
 Output Range: z = 0 to 25 ft

*See Data output Attached

$$\sigma_v(z) := \left(\frac{q}{\pi a}\right) (a(\alpha(z) + \beta(z) + \alpha'(z)) + b(\alpha(z) + \alpha'(z)) + x(\alpha(z) - \alpha'(z)))$$

$$\beta(z) := \text{atan}\left[\frac{(b-x)}{z}\right] + \text{atan}\left[\frac{(b+x)}{z}\right]$$

$$\alpha'(z) := \text{atan}\left[\frac{(a+b-x)}{z}\right] - \text{atan}\left[\frac{(b-x)}{z}\right]$$

$$\alpha(z) := \text{atan}\left[\frac{(a+b+x)}{z}\right] - \text{atan}\left[\frac{(b+x)}{z}\right]$$

Reference: US Army Corps of Engineers EM 1110-1-1904 "Settlement Analysis", Table C-1

Cohesionless

Soil Properties:

Settlement is calculated at mid-point of layer

| No. | Bot. of Laye | Soil Type | γ_{soil} (pcf) | σ'_c (psf) | σ'_o (psf) | $\Delta\sigma_z$ (psf) | σ'_r (psf) | Cohesionless | | | |
|-----|--------------|-------------|-----------------------|-------------------|-------------------|------------------------|-------------------|--------------|----------------|-------|-------|
| | | | | | | | | Soils | Cohesive Soils | | |
| | | | | | | | | C_r | C_c | e_o | |
| 1 | 8.0 ft | Silt & Clay | 120 | 2,400 | 480 | 5,880 | 6,360 | 0.0 | 0.02 | 0.16 | 0.513 |
| 2 | 24.5 ft | Clay | 120 | 6,240 | 1,248 | 5,858 | 7,106 | 0.0 | 0.03 | 0.34 | 0.729 |
| 3 | 0.0 | | 0 | 0 | | | | | | | |
| 4 | 0.0 | | 0 | 0 | | | | | | | |
| 5 | 0.0 | | 0 | 0 | | | | | | | |
| 6 | 0.0 | | 0 | 0 | | | | | | | |
| 7 | 0.0 | | 0 | 0 | | | | | | | |
| 8 | 0.0 | | 0 | 0 | | | | | | | |
| 9 | 0.0 | | 0 | 0 | | | | | | | |
| 10 | 0.0 | | 0 | 0 | | | | | | | |

Reference: Geotechnical Engineering Principles and Practices; Coduto, 1999

Overconsolidated Soils - Case I ($\sigma'_o < \sigma'_c$) Eqn:11.24

$$(\delta_c)_{ult} = \sum \frac{C_r}{1+e_o} H \log\left(\frac{\sigma'_f}{\sigma'_o}\right)$$

Overconsolidated Soils - Case II ($\sigma'_o < \sigma'_c < \sigma'_d$) Eqn:11.25

$$(\delta_c)_{ult} = \sum \left[\frac{C_r}{1+e_o} H \log\left(\frac{\sigma'_c}{\sigma'_o}\right) + \frac{C_c}{1+e_o} H \log\left(\frac{\sigma'_f}{\sigma'_c}\right) \right]$$

Normally Consolidated Soils ($\sigma'_o = \sigma'_c$) Eqn: 11.23

$$(\delta_c)_{ult} = \sum \frac{C_c}{1+e_o} H \log\left(\frac{\sigma'_f}{\sigma'_o}\right)$$

Reference: FHWA NHI-00-045

Cohesionless Soils ($\sigma'_o = \sigma'_c$)

$$(\delta_c)_{ult} = \sum \frac{1}{C_r} H \log\left(\frac{\sigma'_f}{\sigma'_o}\right)$$

No. Settlement: Total Settlement

| | | |
|----|----------|-----------------|
| 1 | 0.422 ft | 0.833 ft |
| 2 | 0.411 ft | |
| 3 | | 10.0 in |
| 4 | | |
| 5 | | |
| 6 | | |
| 7 | | |
| 8 | | |
| 9 | | |
| 10 | | |



SUBJECT

Client TranSystem / ODOT Dist. 9

JOB NUMBER

0121-3070.03

Project SCI-823-0.00

SHEET NO.

11 OF 18

Item Mainline Embankment - Settlement

COMP. BY

JTH DATE 03/28/07

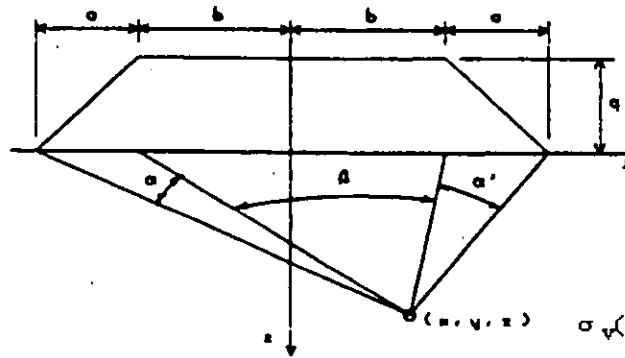
Station 298+25

CHECKED BY

DAA DATE 11/12/07

SETTLEMENT ANALYSIS - EMBANKMENT

Embankment Informaiton:



Groundwater Table: D= 5.0 ft
 Embankment Height: H = 219.4 ft
 Fill Unit Weight: $\gamma_{emb} = 120$ pcf $q = 26,328$ psf
 Width of Slope: a = 438.8
 Top half-width of Emb: b = 45
 Distance from CL: x = 0
 Output Range: z = 0 to 21 ft

*See Data output Attached

$$\sigma_v(z) := \left(\frac{q}{\pi a} \right) (a \cdot (\alpha(z) + \beta(z) + \alpha'(z)) + b \cdot (\alpha(z) + \alpha'(z)) + x \cdot (\alpha(z) - \alpha'(z)))$$

$$\beta(z) := \text{atan} \left[\frac{(b-x)}{z} \right] + \text{atan} \left[\frac{(b+x)}{z} \right]$$

$$\alpha'(z) := \text{atan} \left[\frac{(a+b-x)}{z} \right] - \text{atan} \left[\frac{(b-x)}{z} \right]$$

$$\alpha(z) := \text{atan} \left[\frac{(a+b+x)}{z} \right] - \text{atan} \left[\frac{(b+x)}{z} \right]$$

Reference: US Army Corps of Engineers EM 1110-1-1904 "Settlement Analysis", Table C-1

Cohesionless

Soil Properties:

Settlement is calculated at mid-point of layer

| No. | Bot. of Laye | Soil Type | γ_{soil} (pcf) | σ'_c (psf) | σ'_o (psf) | $\Delta\sigma z$ (psf) | σ'_f (psf) | Soils | | | |
|-----|--------------|--------------|-----------------------|-------------------|-------------------|------------------------|-------------------|-------|-------|-------|-------|
| | | | | | | | | C' | C_r | C_c | e_o |
| 1 | 5.5 ft | Grvl w/ Sand | 120 | 1,650 | 330 | 26,328 | 26,658 | 55.0 | 0.00 | 0.00 | 0.000 |
| 2 | 13.0 ft | Sandy Silt | 120 | 4,225 | 845 | 26,323 | 27,168 | 40.0 | 0.00 | 0.00 | 0.000 |
| 3 | 20.5 ft | Silt | 120 | 8,250 | 1,277 | 26,302 | 27,578 | 0.0 | 0.02 | 0.18 | 0.513 |
| 4 | 0.0 | | 0 | 0 | | | | | | | |
| 5 | 0.0 | | 0 | 0 | | | | | | | |
| 6 | 0.0 | | 0 | 0 | | | | | | | |
| 7 | 0.0 | | 0 | 0 | | | | | | | |
| 8 | 0.0 | | 0 | 0 | | | | | | | |
| 9 | 0.0 | | 0 | 0 | | | | | | | |
| 10 | 0.0 | | 0 | 0 | | | | | | | |

Reference: Geotechnical Engineering Principles and Practices; Coduto, 1999

Overconsolidated Soils - Case I ($\sigma'_o < \sigma'_c$) Eqn:11.24

$$(\delta_c)_{ult} = \sum \frac{C_r}{1+e_o} H \log \left(\frac{\sigma'_f}{\sigma'_o} \right)$$

Overconsolidated Soils - Case II ($\sigma'_o < \sigma'_c < \sigma'_o$) Eqn:11.25

$$(\delta_c)_{ult} = \sum \left[\frac{C_r}{1+e_o} H \log \left(\frac{\sigma'_c}{\sigma'_o} \right) + \frac{C_c}{1+e_o} H \log \left(\frac{\sigma'_f}{\sigma'_c} \right) \right]$$

Normally Consolidated Soils ($\sigma'_o = \sigma'_c$) Eqn: 11.23

$$(\delta_c)_{ult} = \sum \frac{C_c}{1+e_o} H \log \left(\frac{\sigma'_f}{\sigma'_o} \right)$$

Reference: FHWA NHI-00-045

Cohesionless Soils ($\sigma'_o = \sigma'_c$)

$$(\delta_c)_{ult} = \sum \frac{1}{C'} H \log \left(\frac{\sigma'_f}{\sigma'_o} \right)$$

No. Settlement:

Total Settlement

1 0.191 ft

2 0.283 ft

3 0.532 ft

4

5

6

7

8

9

10

1.006 ft

12.1 in



SUBJECT

Client TranSystem / ODOT Dist. 9

JOB NUMBER

0121-3070.03

Project SCI-823-0.00

SHEET NO.

12 OF 18

Item Mainline Embankment - Settlement

COMP. BY

JTH DATE 3828/07

Station 312+00

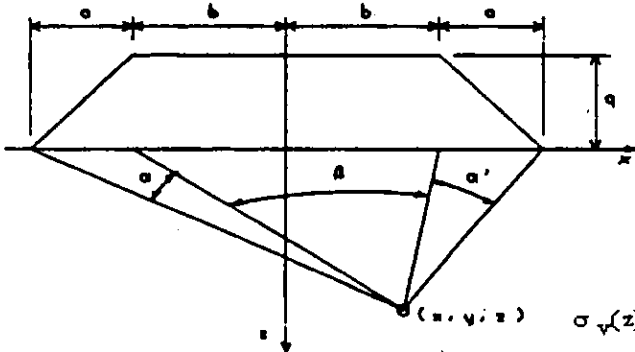
CHECKED BY

DAA DATE 11/12/07

SETTLEMENT ANALYSIS - EMBANKMENT

Embankment Informaiton:

Groundwater Table: D= 5.0 ft
 Embankment Height: H= 158.9 ft
 Fill Unit Weight: $\gamma_{emb} = 120$ pcf $q = 19,068$ psf
 Width of Slope: a = 317.8
 Top half-width of Emb: b = 45
 Distance from CL: x = 0
 Output Range: z = 0 to 13 ft.



*See Data output Attached

$$\sigma_v(z) := \left(\frac{q}{\pi a}\right) (a \cdot (\alpha(z) + \beta(z) + \alpha'(z)) + b \cdot (\alpha(z) + \alpha'(z)) + x \cdot (\alpha(z) - \alpha'(z)))$$

$$\beta(z) := \text{atan}\left[\frac{(b-x)}{z}\right] + \text{atan}\left[\frac{(b+x)}{z}\right]$$

$$\alpha'(z) := \text{atan}\left[\frac{(a+b-x)}{z}\right] - \text{atan}\left[\frac{(b-x)}{z}\right]$$

$$\alpha(z) := \text{atan}\left[\frac{(a+b+x)}{z}\right] - \text{atan}\left[\frac{(b+x)}{z}\right]$$

Reference: US Army Corps of Engineers EM 1110-1-1904 "Settlement Analysis", Table C-1

Cohesionless

Soil Properties:

Settlement is calculated at mid-point of layer

| No. | Bot. of Laye | Soil Type | γ_{soil} (pcf) | σ'_c (psf) | σ'_o (psf) | $\Delta\sigma_z$ (psf) | σ'_r (psf) | Cohesive Soils | | | |
|-----|--------------|-----------|-----------------------|-------------------|-------------------|------------------------|-------------------|----------------|-------|-------|-------|
| | | | | | | | | C' | C_r | C_c | e_o |
| 1 | 13.0 ft | A-4a/A-4b | 120 | 3,430 | 686 | 19,066 | 19,753 | 40.0 | 0.00 | 0.00 | 0.000 |
| | 0.0 | | 0 | 0 | | | | | | | |
| 3 | 0.0 | | 0 | 0 | | | | | | | |
| 4 | 0.0 | | 0 | 0 | | | | | | | |
| 5 | 0.0 | | 0 | 0 | | | | | | | |
| 6 | 0.0 | | 0 | 0 | | | | | | | |
| 7 | 0.0 | | 0 | 0 | | | | | | | |
| 8 | 0.0 | | 0 | 0 | | | | | | | |
| 9 | 0.0 | | 0 | 0 | | | | | | | |
| 10 | 0.0 | | 0 | 0 | | | | | | | |

Reference: Geotechnical Engineering Principles and Practices: Coduto, 1999

Overconsolidated Soils - Case I ($\sigma'_o < \sigma'_c$) Eqn:11.24

$$(\delta_c)_{ult} = \sum \frac{C_r}{1+e_o} H \log\left(\frac{\sigma'_f}{\sigma'_o}\right)$$

Overconsolidated Soils - Case II ($\sigma'_o < \sigma'_c < \sigma'_r$) Eqn:11.25

$$(\delta_c)_{ult} = \sum \left[\frac{C_r}{1+e_o} H \log\left(\frac{\sigma'_c}{\sigma'_o}\right) + \frac{C_c}{1+e_o} H \log\left(\frac{\sigma'_f}{\sigma'_c}\right) \right]$$

Normally Consolidated Soils ($\sigma'_o = \sigma'_c$) Eqn: 11.23

$$(\delta_c)_{ult} = \sum \frac{C_c}{1+e_o} H \log\left(\frac{\sigma'_f}{\sigma'_o}\right)$$

Reference: FHWA NHI-00-045

Cohesionless Soils ($\sigma'_o = \sigma'_c$)

$$(\delta_c)_{ult} = \sum \frac{1}{C'} H \log\left(\frac{\sigma'_f}{\sigma'_o}\right)$$

No. Settlement:

Total Settlement

1 0.474 ft

0.474 ft

2

3

4

5

5.7 in

6

7

8

9

10



SUBJECT

Client TranSystem / ODOT Dist. 9

JOB NUMBER

0121-3070.03

Project SCI-823-0.00

SHEET NO.

13 OF 18

Item Mainline Embankment - Settlement

COMP. BY

JTH DATE 03/28/07

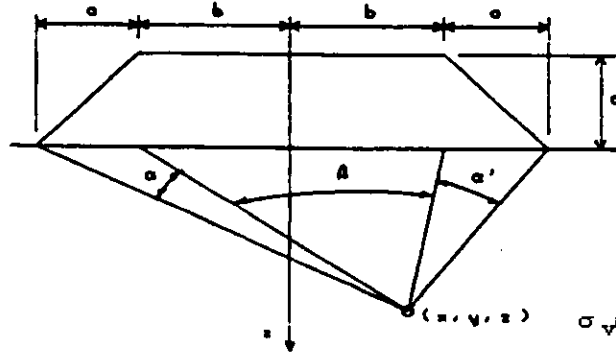
Station 319+75

CHECKED BY

DAA DATE 11/12/07

SETTLEMENT ANALYSIS - EMBANKMENT

Embankment Informaiton:



Groundwater Table: D= 5.0 ft
 Embankment Height: H= 94.8 ft
 Fill Unit Weight: $\gamma_{emb} = 120$ pcf $q = 11,376$ psf
 Width of Slope: a = 189.6
 Top half-width of Emb: b = 45
 Distance from CL: x = 0
 Output Range: z = 0 to 13 ft

*See Data output Attached

$$\sigma_v(z) := \left\{ \frac{q}{\pi a} \right\} (a \cdot (\alpha(z) + \beta(z) + \alpha'(z)) + b \cdot (\alpha(z) + \alpha'(z)) + x \cdot (\alpha(z) - \alpha'(z)))$$

$$\beta(z) := \text{atan} \left[\frac{(b-x)}{z} \right] + \text{atan} \left[\frac{(b+x)}{z} \right]$$

$$\alpha'(z) := \text{atan} \left[\frac{(a+b-x)}{z} \right] - \text{atan} \left[\frac{(b-x)}{z} \right]$$

$$\alpha(z) := \text{atan} \left[\frac{(a+b+x)}{z} \right] - \text{atan} \left[\frac{(b+x)}{z} \right]$$

Reference: US Army Corps of Engineers EM 1110-1-1904 "Settlement Analysis", Table C-1

Cohesionless

Soil Properties:

Settlement is calculated at mid-point of layer

| No. | Bot. of Laye | Soil Type | γ_{soil} (pcf) | σ'_c (psf) | σ'_o (psf) | $\Delta\sigma_z$ (psf) | σ'_r (psf) | Cohesive Soils | | | |
|-----|--------------|-----------|-----------------------|-------------------|-------------------|------------------------|-------------------|----------------|-------|-------|-------|
| | | | | | | | | C' | C_r | C_c | e_o |
| 1 | 13.0 ft | Silt | 120 | 3,430 | 686 | 11,374 | 12,061 | 0.0 | 0.02 | 0.21 | 0.486 |
| | 0.0 | | 0 | 0 | | | | | | | |
| 3 | 0.0 | | 0 | 0 | | | | | | | |
| 4 | 0.0 | | 0 | 0 | | | | | | | |
| 5 | 0.0 | | 0 | 0 | | | | | | | |
| 6 | 0.0 | | 0 | 0 | | | | | | | |
| 7 | 0.0 | | 0 | 0 | | | | | | | |
| 8 | 0.0 | | 0 | 0 | | | | | | | |
| 9 | 0.0 | | 0 | 0 | | | | | | | |
| 10 | 0.0 | | 0 | 0 | | | | | | | |

Reference: Geotechnical Engineering Principles and Practices; Coduto, 1999

Overconsolidated Soils - Case I ($\sigma'_o < \sigma'_c$) Eqn:11.24

$$(\delta_c)_{ult} = \sum \frac{C_r}{1+e_o} H \log \left(\frac{\sigma'_f}{\sigma'_o} \right)$$

Overconsolidated Soils - Case II ($\sigma'_o < \sigma'_c < \sigma'_f$) Eqn:11.25

$$(\delta_c)_{ult} = \sum \left[\frac{C_r}{1+e_o} H \log \left(\frac{\sigma'_c}{\sigma'_o} \right) + \frac{C_c}{1+e_o} H \log \left(\frac{\sigma'_f}{\sigma'_c} \right) \right]$$

Normally Consolidated Soils ($\sigma'_o = \sigma'_c$) Eqn: 11.23

$$(\delta_c)_{ult} = \sum \frac{C_c}{1+e_o} H \log \left(\frac{\sigma'_f}{\sigma'_o} \right)$$

Reference: FHWA NHI-00-045

Cohesionless Soils ($\sigma'_o = \sigma'_c$)

$$(\delta_c)_{ult} = \sum \frac{1}{C'} H \log \left(\frac{\sigma'_f}{\sigma'_o} \right)$$

No. Settlement: Total Settlement

1 1.117 ft

1.117 ft

2

3

4

5

13.4 in

6

7

8

9

10



CLIENT TransSystems / ODOT Dist 9
 PROJECT SCI - 823 - 0.00
 SUBJECT Mainline Embankment
Settlement - Quantity

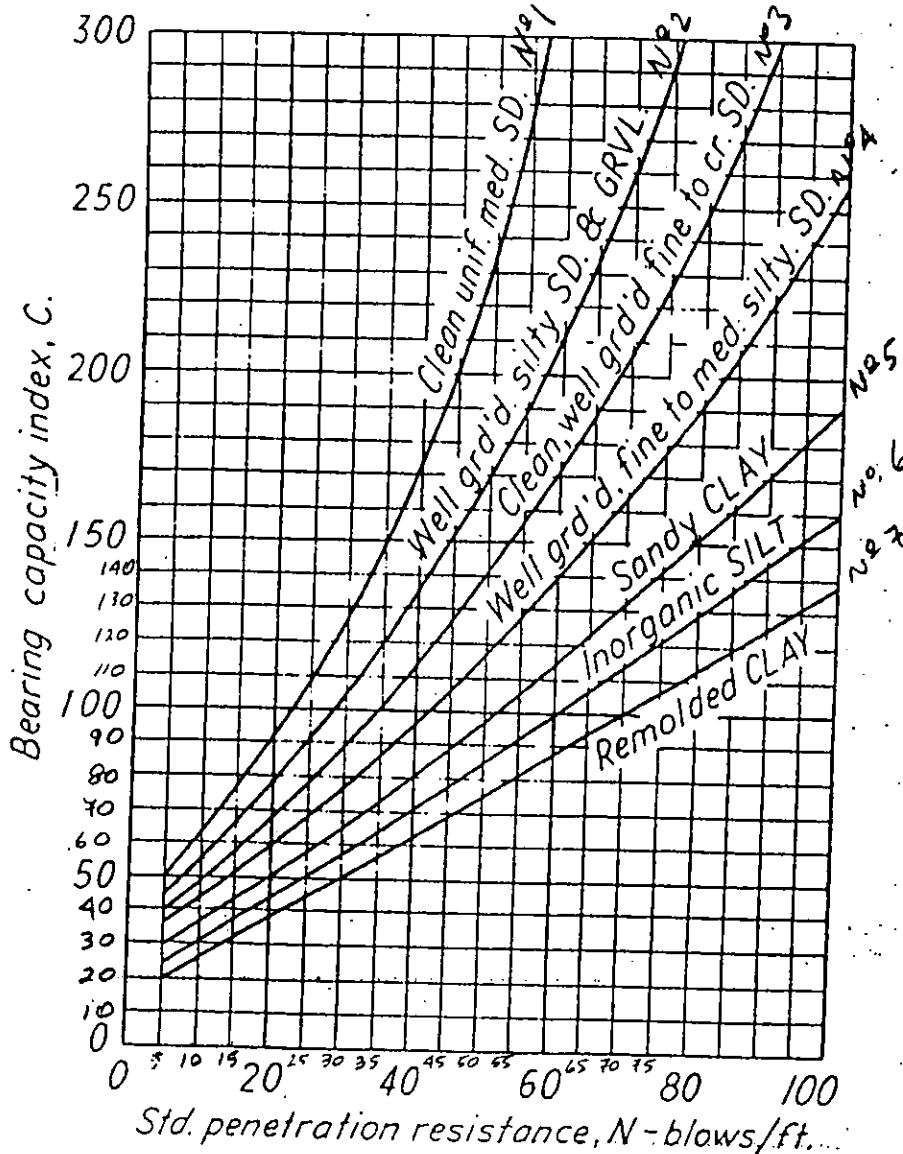
JOB NUMBER 0121-3070.03
 SHEET NO. 14 OF 18
 COMP. BY JTH DATE 3/28/07
 CHECKED BY DAA DATE 11/12/07

COMPRESSIBILITY AS THE BASIS FOR SOIL BEARING VALUE, B.K. HOUGH, AUG 1959.

SM 4

SOIL BEARING

17



BEARING CAPACITY INDEX VALUES

CORRECTED OR UNCORRECTED? FIG. 3



CLIENT TransSystems / ODOT Dist 9
PROJECT SCI - 823 - 0.00
SUBJECT Mainline Embankment
Settlement - Time Rate

JOB NUMBER 0121-3070.03
SHEET NO. 15 OF 18
COMP. BY JTH DATE 3/28/07
CHECKED BY DAA DATE 11/12/07

Evaluate the time rate of settlement for cross-section with greater than 6 inches of consolidation settlement.

The following cross-sections have greater than 6 inches of consolidation settlement.

66+00
175+40
240+00
271+50
298+50
312+00
319+75

Assume single drainage

No consolidation testing available. Assume a C_v of 1 ft²/day. C_v assumed based on references on pages 3 & 4.

Determine time to reach 90 percent consolidation, therefore $T_v = 0.57$.

$$t_{90} = \frac{T_v \times H^2}{C_v}$$

Therefore,
$$t_{90} = \frac{0.85 \times H^2}{1.0}$$

For X-section 66+00, H = 21.0 ft.

$$t_{90} = \frac{0.85 \times 21.0^2}{1.0}$$

$$t_{90} = 375 \text{ days} \quad \text{or} \quad 12.5 \text{ months}$$

For X-section 175+40, H = 30.0 ft.

$$t_{90} = \frac{0.85 \times 30.0^2}{1.0}$$

$$t_{90} = 765 \text{ days} \quad \text{or} \quad 25.5 \text{ months}$$



CLIENT TransSystems / ODOT Dist 9
PROJECT SCI - 823 - 6.81
SUBJECT Mainline Embankment
Settlement - Time Rate

JOB NUMBER 0121-3070.03
SHEET NO. 16 OF 18
COMP. BY JTH DATE 3/28/07
CHECKED BY DATE

For X-section 240+00, H = 5.5 ft.

$$t_{90} = \frac{0.85 \times 5.5^2}{1.0}$$

$$t_{90} = 26 \text{ days} \quad \text{or} \quad 0.9 \text{ months}$$

For X-section 271+50, H = 24.5 ft.

$$t_{90} = \frac{0.85 \times 24.5^2}{1.0}$$

$$t_{90} = 510 \text{ days} \quad \text{or} \quad 17 \text{ months}$$

For X-section 298+25, H = 20.5 ft.

$$t_{90} = \frac{0.85 \times 20.5^2}{1.0}$$

$$t_{90} = 357 \text{ days} \quad \text{or} \quad 11.9 \text{ months}$$

For X-section 312+00, H = 13.0 ft.

$$t_{90} = \frac{0.85 \times 13.0^2}{1.0}$$

$$t_{90} = 144 \text{ days} \quad \text{or} \quad 4.8 \text{ months}$$

For X-section 319+75, H = 13.0 ft.

$$t_{90} = \frac{0.85 \times 13.0^2}{1.0}$$

$$t_{90} = 144 \text{ days} \quad \text{or} \quad 4.8 \text{ months}$$



CLIENT TransSystems / ODOT Dist 9
 PROJECT SCI - 823 - U, CD
 SUBJECT Mainline Embankment
 Settlement - Time Rate

JOB NUMBER 0121-3070.03
 SHEET NO. 17 OF 18
 COMP. BY JTH DATE 2/14/07
 CHECKED BY DAA DATE 11/12/07

TABLE 9-8
TYPICAL VALUES OF COEFFICIENT OF VERTICAL CONSOLIDATION, c_v
 (Compiled by Carter and Bentley, 1991)

| Soil | c_v | |
|--|---|----------------------------|
| | ($\text{cm}^2/\text{s} \times 10^{-6}$) | (m^2/yr) |
| Boston Blue Clay (CL) | 40±20 | 12±6 |
| Organic silt (OH) | 2-10 | 0.6-3 |
| Glacial lake clays (CL) | 6.5-8.7 | 2.0-2.7 |
| Chicago silty clay (CL) | 8.5 | 2.7 |
| Swedish medium sensitive clays (CL-CH) | | |
| 1. laboratory | 0.4-0.7 | 0.1-0.2 |
| 2. field | 0.7-3.0 | 0.2-1.0 |
| San Francisco Bay Mud (CL) | 2-4 | 0.6-1.2 |
| Mexico City clay (MH) | 0.9-1.5 | 0.3-0.5 |

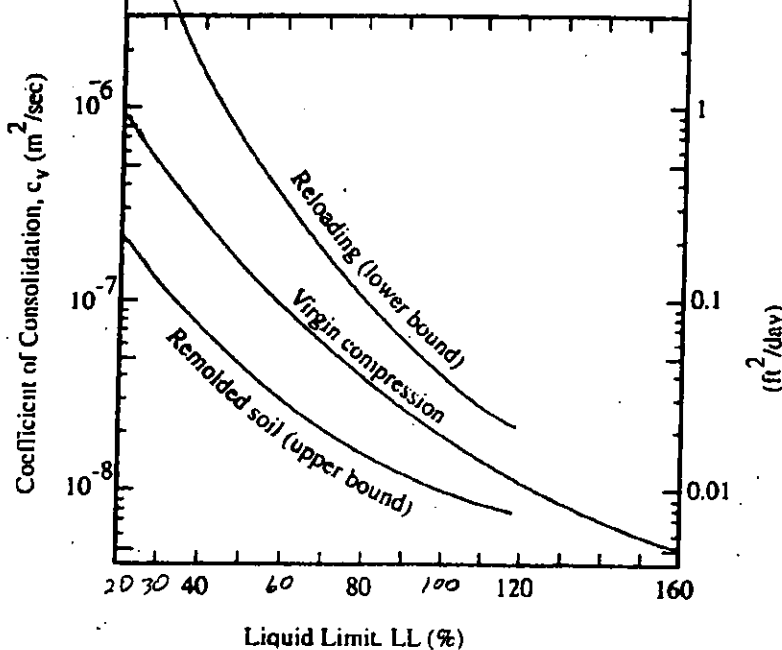


Figure 9-5: Approximate Correlations Between c_v and LL. (NAVFAC, DM-7.1, 1982)



CLIENT TransSystems / ODOT Dist 9
 PROJECT SCI - 823 - C.C.O
 SUBJECT Mainline Embankment
Settlement - Time Rate

JOB NUMBER 0121-3070.03
 SHEET NO. 18 OF 18
 COMP. BY JTH DATE 2/14/07
 CHECKED BY DAA DATE 11/12/07

TABLE 9.-- APPROXIMATE CORRELATION BETWEEN C_v AND LIQUID LIMIT (After Terzaghi and Peck, 1967)

| Liquid Limit (%) | Range of C_v (ft^2/yr) |
|------------------|--|
| 30 | <i>ft²/day</i> <i>0.055</i> 20 to 360 <i>ft²/day</i> <i>0.986</i> |
| 40 | <i>0.033</i> 12 to 230 <i>0.630</i> |
| 50 | <i>0.022</i> 8 to 150 <i>0.411</i> |
| 60 | <i>0.014</i> 5 to 90 <i>0.247</i> |
| 70 | 3 to 58 |
| 80 | 2 to 36 |
| 90 | 1 to 23 |

TYPICAL $LL \approx 30$

USE $C_v = 1.0 \text{ ft}^2/\text{DAY}$ (CONSERVATIVE)



APPENDIX E

Geotechnical Design Checklist

III.B. Embankments Checklist

| | | | |
|-----------------------------|------------|--------------------|----------------|
| C-R-S: SCI-823-0.00 Stage 1 | PID: 77366 | Reviewer: D. Adams | Date: 11-16-07 |
|-----------------------------|------------|--------------------|----------------|

| Settlement | |
|----------------|--|
| <u>Y</u> N X 1 | <p>If soil conditions and project requirements warrant, have settlement issues been addressed?</p> <p>If not applicable (X), go to Question 14</p> |
| <u>Y</u> N X 2 | <p>Have consolidation properties of the foundation soils been determined?</p> <p>Check methods used:</p> <p><input checked="" type="checkbox"/> laboratory consolidation tests</p> <p><input checked="" type="checkbox"/> empirical correlations with moisture content and Atterberg values</p> <p><input type="checkbox"/> other</p> |
| <u>Y</u> N X 3 | <p>Have calculations been performed to estimate the total expected embankment settlement and the time of consolidation?</p> <p>Check method used:</p> <p><input type="checkbox"/> EMBANK or equivalent software</p> <p><input checked="" type="checkbox"/> hand calculations</p> |
| <u>Y</u> N X 4 | <p>If differing foundation soil and/or loading conditions occur throughout the embankment area, have sufficient analyses been completed to evaluate consolidation at locations representative of the most critical conditions?</p> |
| <u>Y</u> N X 5 | <p>Have the total settlement and the time of consolidation analyses indicated acceptable values at all locations for the scope of the embankment work?</p> |
| <u>Y</u> N X 6 | <p>If total settlement or time of consolidation is unacceptable, have the stations and lateral extent of the problem areas been defined?</p> |
| <u>Y</u> N X 7 | <p>Has a method been chosen as a solution to the settlement issues?</p> <p>Check methods used:</p> <p><input checked="" type="checkbox"/> waiting periods with monitoring</p> <p><input type="checkbox"/> drainage blanket and wick drains</p> <p><input type="checkbox"/> surcharge (preloading)</p> <p><input type="checkbox"/> removal and replacement of weak soil</p> <p><input type="checkbox"/> lowering proposed grade / change alignment</p> <p><input type="checkbox"/> lightweight fill</p> |
| | <p>3. Spreadsheet used.</p> |

III.B. Embankments Checklist

| | | <input type="checkbox"/> other | List Other items: | | |
|----------|----------|--------------------------------|-------------------|---|--|
| <u>Y</u> | N | X | 8 | Based on accepted design practices, and where applicable, adhering to published guidelines and design recommendations from FHWA, have calculations been performed to evaluate the effectiveness of the chosen solution(s)? | |
| Y | <u>N</u> | X | 9 | Has an economic analysis been performed to evaluate the cost benefits of the recommended solution compared to others? | |
| Y | N | <u>X</u> | 10 | Have all necessary notes, specifications, and details for the chosen solution been determined? | 10, 11, 12 - Generally not considered for Stage I submittal. |
| Y | N | <u>X</u> | 11 | Have the need, locations, type, plan notes, and reading schedule for settlement platforms been determined? | |
| Y | N | <u>X</u> | 12 | Have the effects of the predicted settlement and the chosen solution been determined and accounted for on the construction schedule? | |
| Y | N | <u>X</u> | 13 | Has the effect of any foundation soil consolidation (including differential settlement) been evaluated with regard to adjacent structures (e.g., bridges, buildings, culverts, utilities) which will also undergo settlement and be subject to stresses induced by the consolidation of the surrounding soil? | |

Notes :

Stage 1:

III.B. Embankments Checklist

| Stability | | | | | |
|-----------|---|----------|----|---|---|
| <u>Y</u> | N | X | 14 | <p>If soil conditions and project requirements warrant, have stability issues been addressed?</p> <p>If not applicable (X), go to Question 27</p> | |
| <u>Y</u> | N | X | 15 | <p>Has the total (short term) and effective (long term) shear strength of the foundation soils been determined?</p> <p>Check method used:</p> <p><input checked="" type="checkbox"/> laboratory shear tests</p> <p><input checked="" type="checkbox"/> estimation from SPT or field tests</p> | |
| <u>Y</u> | N | X | 16 | <p>Have the OGE's recommended values of shear strength for proposed embankment fill material (total: $c = 2000$ psf, $\phi = 0$; effective: $c = 300$ psf, $\phi = 28$) been used in the stability analyses?</p> | 16. Alternate shear strength values assumed due to anticipated rock fill. |
| <u>Y</u> | N | X | 17 | <p>Have calculations been performed to determine the F.S. for stability?</p> <p>Check method used:</p> <p><input checked="" type="checkbox"/> STABL, XSTABL, or equivalent software</p> <p><input type="checkbox"/> hand calculations</p> | |
| | | | 18 | <p>Have the following F.S. been met or exceeded, as determined by the calculations, for the given stability conditions:</p> | |
| <u>Y</u> | N | X | a | 1.30 for short term condition | |
| <u>Y</u> | N | X | b | 1.30 for long term condition | |
| Y | N | <u>X</u> | c | 1.10 for rapid drawdown, flood condition | |
| Y | N | <u>X</u> | d | 1.50 for embankment supporting bridge abutments (not on deep foundations) | |
| <u>Y</u> | N | X | 19 | <p>When differing soil or loading conditions occur throughout the embankment area, have sufficient analyses been completed to evaluate the stability at locations representative of the most critical conditions?</p> | |
| <u>Y</u> | N | X | 20 | <p>If the F.S. was not met or exceeded, have the stations and lateral extent of the problem areas been defined?</p> | |
| <u>Y</u> | N | X | 21 | <p>Has a method been chosen as a solution to the stability issues?</p> <p>Check the method(s) used:</p> <p><input checked="" type="checkbox"/> flattening slopes</p> <p><input type="checkbox"/> counter berm</p> | |

III.B. Embankments Checklist

- lightweight embankment
- reinforced soil slope
- soil nailing
- drainage blanket and wick drains
- removal of soft soil, adding shear key
- reduced grade / change alignment
- stage construction
- controlled rate of fill placement
- drilled shaft slope stabilization
- other List Other items:

| | | | | |
|----------|----------|----------|----|--|
| <u>Y</u> | N | X | 22 | Based on accepted design practices, and where applicable, adhering to published guidelines and design recommendations from FHWA, have calculations been performed to evaluate the effectiveness of the chosen solution(s)? |
| Y | <u>N</u> | X | 23 | Has an economic analysis been performed to evaluate the cost benefits of the recommended solution compared to others? |
| Y | N | <u>X</u> | 24 | Have all necessary notes, specifications, and details for the chosen solution been determined? |
| Y | N | <u>X</u> | 25 | Have the need, location, type, plan notes, and reading schedule for piezometers and inclinometers been determined? |
| Y | N | <u>X</u> | 26 | If piezometers will be used, has the critical pressure value been determined and the appropriate information included in the plans? |
| Y | N | <u>X</u> | 27 | Have the effects of the stability solution been determined and accounted for on the construction schedule? |
| <u>Y</u> | N | X | 28 | Has the effect of the stability solution been evaluated with regard to structures (e.g., bridges, buildings, culverts, utilities) which may be subject to unusual stresses or require special construction considerations? |

24, 25 – Generally not addressed in Stage I submittal.

Notes:

Stage 1:

III.B. Embankments Checklist

| Sidehill Fills | | | | | |
|----------------|---|----------|----|--|--|
| <u>Y</u> | N | X | 29 | If soil conditions and project requirements warrant, have sidehill fill issues been addressed? If not applicable (X), go to Question 34 | |
| <u>Y</u> | N | X | 30 | In accordance with <u>Geotechnical Bulletin 2: Special Benching and Sidehill Embankment Fills (GB 2)</u> , have sidehill fills been evaluated to determine if special benching or shear keys are needed? | |
| | | | 31 | In accordance with GB 2, if special benching or shear keys are required, has | 31a, 31b – Generally not addressed in Stage I submittal. |
| Y | N | <u>X</u> | a | Plan Note G110 from L&D3 been included in the General Notes? | |
| Y | N | <u>X</u> | b | quantities for both excavation and embankment been calculated for the benched areas and added to the plan General Quantities? | |
| <u>Y</u> | N | X | c | the special benching or shear keys been indicated on the appropriate cross sections? | 31c. This information has been provided to the prime consultant (TranSystems). |
| Y | N | <u>X</u> | 32 | Have water bearing zones been identified and their impact addressed? | |
| <u>Y</u> | N | X | 33 | Have subsurface drainage controls been adequately addressed? | |

Notes:

Stage 1:

III.B. Embankments Checklist

| Special | | |
|---|--|---|
| Y N <input checked="" type="checkbox"/> | 34 Have all of the environmental factors, including wetlands, stream mitigation, and landfills, been considered and incorporated prior to design and analysis of embankment settlement and stability, including EPA or other government agencies' involvement, mitigation, or special design or construction considerations? | 34. Outside scope of this report. |
| | 35 If an embankment is to be placed through standing water or over weak, wet soils (with or without a fabric separator), the fill should be placed by the method of end dumping to a given height above the standing water or until compaction is achievable over the soft soil. If end dumping is to be specified, | 35. Specifications not developed for Stage I submittal. |
| Y N <input checked="" type="checkbox"/> | a has the material type for the fill to be end dumped been specified? | |
| Y N <input checked="" type="checkbox"/> | b has the need for a fabric separator or filter layer been determined? | |
| Y N <input checked="" type="checkbox"/> | c has the height of fill to be end dumped been determined? | |
| Y N <input checked="" type="checkbox"/> | d have all notes and specifications for end dumping been developed? | |

Notes:

Stage 1: