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RESULTS of GEOTECHNICAL INVESTIGATION
TASK ORDER C071: JOB NO. CA0702
HAMPTON – HWY. 274 (WIDENING)(S)
CALHOUN COUNTY, ARKANSAS

INTRODUCTION

Submitted herein are the final results of the geotechnical investigation performed for Task Order C071, Job CA0702: Hampton – Hwy. 274 (Widening)(S). This study has been performed in general accordance with the scope of services described in that subconsultant agreement. A report of the geotechnical investigation related to the existing pavements on this project alignment was submitted on June 25, 2015. Recommendations for subgrade support were provided in the submittal of June 29, 2015. Recommendations for bridge foundations and embankment configurations were provided in the submittals of August 28, 2015, August 29, 2015, and September 3, 2015.

The project consists of widening 4.5 miles of Highway 167. The existing two-lane roadway of Highway 167 will be widened to five (5) lanes. We understand that the existing roadway will typically be incorporated into the widened section. The project alignment begins at Sta 184+17 (log mile 0.54) and ends at Sta 423+41 (log mile 5.11), just north of Hampton, Arkansas. The project also includes three (3) bridges: Hwy 167 Bridge over Champagnolle Creek (Bridge 1), Hwy 167 Bridge over Champagnolle Creek Relief (Bridge 2), and Hwy 167 Bridge over Champagnolle Creek Relief (Bridge 3).

The purposes of this study were to explore subsurface conditions in the Hwy 167 alignment and to develop recommendations to guide design and construction of foundations, abutment walls,

and earthwork. These purposes have been achieved by a multi-phased study that included the following.

- Coring the existing pavements to obtain pavement cores and measurements of the pavement components.
- Drilling sample borings to evaluate subsurface conditions and obtain samples of the subgrade and foundation soils for laboratory testing.
- Performing laboratory tests to evaluate pertinent engineering properties of the foundation and subgrade strata.
- Analyzing field and laboratory data to develop recommendations for foundation design, abutment walls, embankment configurations, and construction considerations.

The relationship of these factors to design and construction has been considered in developing the recommendations and considerations discussed in the following report sections.

SUBSURFACE EXPLORATION

The subsurface exploration program included coring the existing pavements in 25 locations and drilling 87 sample borings in the roadway alignment and at the bridge locations. The site vicinity is shown on Plate 1 in Attachment 1. The approximate boring locations are shown on the Plans of Borings, Plates 2 through 18 of Attachment 1. The exploration program is summarized on Plates 19 through 21 of Attachment 1. A key to the terms and symbols used on the boring logs is provided on Plate 22. The pavement coring and sample boring phases of this study are discussed in the following paragraphs.

Pavement Cores

The existing asphalt concrete (ACHM) pavements were evaluated by obtaining 6-in.-diameter cores along the existing roadway on a frequency of approximately one (1) core every 1000 feet. A total of 25 cores of the ACHM were obtained in the outer wheel path of the existing roadway. The cores were obtained in alternating northbound and southbound lanes.

Pavement cores were also obtained at the "special" locations indicated in the scope of work. At these locations, 6-in.-diameter cores were obtained at 20-ft intervals in a pattern of inner wheel path (IWP), between wheel paths (BWP), and outer wheel path (OWP). A total of 27 "special" cores were obtained.

As noted, the approximate core locations are shown on the plan drawings included in Attachment 1. The plan core layout, including the typical pavement cores and the "special" core

groups, is provided in Attachment 2. A summary of the core results is also provided in Attachment 2. The summary provides the measured thicknesses of the ACHM cores, including the individual layers where discernible. Detailed core reports, including core location, photographs, and measurements for each core, were provided in the report of June 25, 2015 and are not repeated in this volume.

The cores were advanced through the asphalt concrete to the underlying soil cement or aggregate base. All cores were extracted from the core barrel in the field and measured. Coreholes were patched with cold mix asphalt concrete patch after the cores had been obtained. All cores were returned to our laboratory. In the laboratory, the measurements obtained in the field were verified, photographs were obtained, and a detailed visual description of each core was made. All cores are presently stored in our Little Rock facility.

Sample Borings

The subsurface conditions in the 4.5-mile alignment of the existing roadway were explored by drilling 25 sample borings to approximately 5 ft beneath the existing pavement (Borings C1 through C25). The pavement borings were advanced through the 6-in.-diameter core holes in the outer wheel path to at least 5 ft beneath the existing pavement subgrade. Subsurface conditions in the widened section of the roadway were evaluated by 50 sample borings (Borings R1 through R50). The roadway borings were typically drilled to 10-ft depth. The subsurface conditions at the bridge locations were investigated by drilling 12 borings to 70- to 100-ft depth (Borings 207+56 through 236+69). Logs of the core borings are provided in Attachment 3. Logs of the widened roadway borings are provided in Attachment 4. The bridge boring logs are provided in Attachments 5, 6, and 7 for Bridges 1, 2, and 3, respectively. The approximate boring station location, offset and surface elevation (as provided by Crafton Tull) are noted on the logs.

The pavement borings ("C" borings) and the majority of the roadway borings ("R" borings) were drilled with a truck-mounted SIMCO 2400 rotary-drilling rig using dry auger drilling techniques. Where roadway borings could not be accessed with truck-mounted drilling equipment, the borings were drilled with a buggy-mounted Mobile B-53 rotary-drilling rig using dry auger drilling techniques.

The bridge borings were drilled with truck-mounted Mobile B-53 rotary-drilling rig using a combination of dry-auger and rotary-wash drilling procedures. The bridge borings located over the stream channels were drilled from the bridge decks, coring the deck and setting temporary

casing to the channel bottom. Pavement coreholes were patched after completion of drilling. In one (1) case (see Boring 208+80), rock riprap was encountered in the channel and the boring was abandoned.

Soil samples were typically obtained at approximately 2-ft intervals to 10-ft depth, at 5-ft intervals to 50-ft depth and at 10-ft intervals below 50 feet. Samples were generally recovered using a 2-in.-diameter split-barrel sampler driven into the strata by blows of a 140-lb safety hammer with 30-in. drop in accordance with Standard Penetration Test (SPT) procedures. The number of blows required to drive the standard split-barrel sampler the final 12 in. of an 18-in. total drive, or a portion thereof, is defined as the Standard Penetration Number (N). Recorded N-values are shown on the boring logs in the "Blows Per Ft" column.

All samples were removed from sampling tools in the field, examined, and visually classified. Samples were then placed in appropriate containers to prevent moisture loss and/or change in condition during transfer to our laboratory for further examination and testing.

The borings were advanced using dry-auger drilling procedures to the extent possible to facilitate groundwater observations. Observations regarding groundwater are noted in the lower right portion of each log. All boreholes were backfilled after obtaining final groundwater readings. Where drilled through the existing roadway pavement, the pavement was patched with asphalt concrete cold patch.

Test Pits and Bulk Sampling

To obtain bulk samples for use in evaluation of subgrade support properties in the approximately 4.5-mile project alignment, three (3) test pits were excavated at representative and accessible locations. The approximate test pit locations are shown on the plan drawings included in Attachment 1. The test pit logs are included in Attachment 8. The results of laboratory tests performed on the bulk samples are discussed in subsequent report sections.

LABORATORY TESTING

Pertinent physical and engineering properties of the subgrade and foundation soils were evaluated by performing laboratory tests on representative samples. The laboratory testing program included the following.

- Soil water content (AASHTO T 265)
- Liquid and plastic limits (AASHTO T 89 and T 90)
- Grain size analyses (AASHTO T 88)

- Specific Gravity of Soil Solids by Water Pycnometer (AASHTO T 100)
- Hydrometer Analysis (ASTM D-422)
- Laboratory Compaction Characteristics of Soil Using Standard Effort (AASHTO T 99)
- CBR (California Bearing Ratio) of Laboratory-Compacted Soils (AASHTO T 193)

A total of 481 natural water content determinations were performed to develop a soil water content profile for the cohesive soils in the borings. Water content results are plotted on the boring log forms in accordance with the scale and symbols shown in the legend located in the upper-right corner of the logs.

To verify field classification and to evaluate soil plasticity, 160 liquid and plastic (Atterberg) limit determinations and 177 sieve analyses were performed on selected representative soil samples. The Atterberg limits are plotted on the logs as pluses inter-connected with a dashed line using the water content scale or noted to be "non-plastic". The percent of soil passing the No. 200 sieve is noted in the "- No. 200%" column on the log forms. Classification test results, as well as soil classification by the Unified Soil Classification System (ASTM D-2487) and the AASHTO classification system (AASHTO M 145), are summarized in Attachment 9.

The gradation of the soil fraction finer than the No. 200 sieve was evaluated by hydrometer analyses. Soil specific gravity was also determined for samples on which hydrometer analyses were performed. The results of these tests are also provided in Attachment 9.

Soil compaction characteristics were evaluated by performing AASHTO T 99 moisture-density relationship tests on three (3) representative bulk samples. The compaction test results are presented graphically in Attachment 10.

Pavement subgrade support properties were evaluated by performing three (3) California Bearing Ratio (CBR) tests (AASHTO T-193). One (1) additional CBR test was performed on a bulk sample of the on-site silt mixed with 4 percent Portland cement by dry soil weight (see Test Pit 1). For the CBR tests, the specimens were molded at approximately the optimum water content and 95 percent of the maximum dry density as determined by the corresponding laboratory Proctor tests. The CBR test results are also presented in Attachment 10.

GENERAL SITE and SUBSURFACE CONDITIONS

Site Conditions

The CA0702 project alignment begins at Hwy 167 Sta 184+17 (log mile 0.54) and ends at Sta 423+41 (log mile 5.11), just north of Hampton, in Calhoun County, Arkansas. Hwy 167 is a two lane highway with some alternating three lane sections for passing lanes. The current roadway pavements are primarily asphalt concrete (ACHM). The ACHM pavement surface is weathered with some areas of severe weathering, surface cracks, and potholes. The roadway is predominantly on a short embankment which is higher than the surrounding terrain. Surface water drainage is facilitated by ditches on both sides of the existing road. During periods of heavy rain, water collects in the ditches and approaches the roadway grade. Surface drainage is poor to fair in the roadway, with water pooling in the rutted wheel paths. Surface drainage is very poor in the surrounding terrain. The terrain of the alignment is flat to slightly rolling. Pine trees are often located along the right of way fences for the majority of the project length.

The project includes three (3) bridge replacements. The existing bridges are located near the south end of the project alignment. The Hwy 167 over Champagnolle Creek Bridge (Bridge 1) is located at log mile 1.00. The existing bridge is a two-lane concrete structure with seven (7) spans. The creek at this location has a shallow channel and meanders around the bridge location. The surrounding terrain is flat and swampy.

The Hwy 167 over Champagnolle Creek Relief Bridge (Bridge 2) is located at log mile 1.38. The existing bridge is also a two-lane concrete structure which has five (5) spans. The relief channel is shallow with a width slightly over 100 feet. The surrounding terrain is flat and swampy with very poor surface drainage.

The third bridge is also Hwy 167 over Champagnolle Creek Relief Bridge (Bridge 3). This is a short, two-lane concrete structure with three (3) spans. The relief channel at this location is narrow and shallow. The surrounding terrain is flat and very poorly drained.

Site Geology

The CA0702 project alignment is located in the Gulf Coastal Plain Physiographic Province. The geology of this area is typified by Recent Alluvium and variable Tertiary sediments deposited as the Ouachita Mountains were eroded. The Geologic Map of Arkansas[1] indicates the alignment

[1] Geologic Map of Arkansas; US Geological Survey and Arkansas Geological Commission; 1993

traverses mapped exposures of Quaternary Terrace Deposits with localized areas of Recent Alluvium. The Terrace deposits are comprised of a complex sequence of unconsolidated gravel, sand, silt and clay. Individual Terrace deposits are often lenticular and discontinuous. The Recent Alluvium is localized around the Champagnolle Creek flood plain. The alluvium is comprised of recent stream-deposited alluvial sediments which include gravel, sand, silt, clay and mixtures of all components. The thickness of the Terrace and Alluvial deposits is variable. Bedrock (Paleozoic rock) in this vicinity is reported to be in excess of 4000 ft deep.

Seismic Conditions

The seismic conditions in the project alignment were evaluated based on the results of the borings drilled at each replacement bridge location and the surface geology of the area. Seismic conditions at each bridge location are discussed in the following paragraphs.

Bridge 1. In light of the results of the Hwy 167 over Champagnolle Creek Bridge (Bridge 1) borings and the surface geology, a Seismic Site Class D (stiff soil profile) is considered applicable to the plan bridge alignment with respect to the criteria of the 2011 AASHTO Guide Specifications for LRFD Seismic Bridge Design[2].

Based on the Bridge 1 location and utilizing the General Procedure of the 2011 AASHTO Guide Specifications for LRFD Seismic Bridge Design, the 1.0-sec period spectral acceleration coefficient (S_1) for a Class B is 0.064 g. The site coefficient (F_v) for S_1 adjusted for Site Seismic Class D is 2.4. Accordingly, the calculated design 1.0-sec period spectral acceleration coefficient (S_{D1}) is 0.15 g for the plan bridge site. Table 3.10.6-1 of the 2012 AASHTO LRFD Bridge Design Specifications[3] indicates that a Seismic Performance Zone 1 is fitting for the bridge site. Per Table 3.5-1 of the 2011 AASHTO Guide Specifications for LRFD Seismic Bridge Design, a Seismic Design Category B is considered appropriate at this time.

The general procedure of the 2011 AASHTO LRFD Seismic Bridge Design guide indicates the Peak Ground Acceleration (PGA) having a 7 percent chance of exceedance in 75 years (or mean return period of approximately 1000 years) is predicted to be 0.072 g. For a Seismic Site Class D, the Site Coefficient for the PGA, F_{PGA} is determined to be 1.6. Consequently, a design PGA (A_s) value of 0.12 g is considered appropriate for the Bridge 1 location.

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[2] AASHTO Guide Specifications for LRFD Seismic Bridge Design, 2nd Edition; AASHTO; 2011.
[3] AASHTO LRFD Bridge Design Specifications, AASHTO, 2012.

A liquefaction analysis was performed to evaluate the liquefaction potential of the foundation soils at the Bridge 1 location. The analysis was performed utilizing the methodology and procedures proposed by Idriss and Boulanger[4] in 2008. For the purpose of liquefaction analysis, an earthquake Moment Magnitude (M_w) of 6.2 and a design PGA (A_s) value of 0.12 g were utilized.

The results of the liquefaction analysis for Bridge 1 are presented in Attachment 11 as plots of calculated factors of safety against liquefaction versus depth. The calculated factor of safety against liquefaction has been determined as the ratio of cyclic shear stress required to cause liquefaction (soil strength) to cyclic shear stress induced by an earthquake (earthquake loading). The results of the liquefaction analysis indicate a low liquefaction potential at the bridge location.

Bridge 2. In light of the results of the borings performed at the Bridge 2 location and the surface geology, a Seismic Site Class C (very dense soil and soft rock profile) has been determined for the plan bridge alignment with respect to the criteria of the 2011 AASHTO Guide Specifications for LRFD Seismic Bridge Design[5]. Because of the predominance of dense to very dense granular soils and cohesive soils to at least 100-ft depth, the liquefaction potential is considered to be low at the Bridge 2 location.

Given the bridge location and utilizing the General Procedure of the 2011 AASHTO Guide Specifications for LRFD Seismic Bridge Design, for a Seismic Site Class C the mapped earthquake spectral response acceleration for a short (0.2 sec) period (S_S) is 0.166 g and the 1.0-sec period spectral acceleration coefficient (S_1) is 0.062 g. The design short period spectral acceleration coefficient (S_{Ds}) is reported to be 0.199 g and the 1.0-sec period spectral acceleration coefficient (S_{D1}) is reported to be 0.106 g for a Seismic Site Class C.

Table 3.10.6-1 of the 2012 AASHTO LRFD Bridge Design Specifications[6] indicates that with the S_{D1} value of 0.106 g, Seismic Performance Zone 1 is fitting for the Bridge 2 site. Per Table 3.5-1 of the 2011 AASHTO Guide Specifications for LRFD Seismic Bridge Design, a Seismic Design Category A is considered appropriate with the S_{D1} value of 0.106 g.

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4 "Soil Liquefaction during Earthquakes." Earthquake Engineering Research Institute, MNO-12, Idriss and Boulanger, 2008.

5 AASHTO Guide Specifications for LRFD Seismic Bridge Design, 2nd Edition; AASHTO; 2011.

6 AASHTO LRFD Bridge Design Specifications, AASHTO, 2012.

The general procedure of the 2011 AASHTO LRFD Seismic Bridge Design guide indicates the Peak Ground Acceleration (PGA) having a 7 percent chance of exceedance in 75 years (or mean return period of approximately 1000 years) is predicted to be 0.072 g. For a Seismic Site Class C, the design PGA (A_s) value is reported to be 0.086 g for the Bridge 2 location.

Bridge 3. Based on the results of the borings performed at the Bridge 3 location and the surface geology of the project alignment, a Seismic Site Class C (very dense soil and soft rock profile) is considered applicable to bridge location with respect to the criteria of the 2011 AASHTO Guide Specifications for LRFD Seismic Bridge Design[7]. This determination has been based on an average undrained shear strength (s_u) exceeding 2000 lbs per sq ft within a depth range extending to 100 ft below existing grades. Based on the predominance of dense to very dense granular soils and cohesive soils to at least 100-ft depth, the liquefaction potential is considered to be low at the Bridge 3 location.

Given the bridge location and utilizing the General Procedure of the 2011 AASHTO Guide Specifications for LRFD Seismic Bridge Design, for a Seismic Site Class C the mapped earthquake spectral response acceleration for a short (0.2 sec) period (S_S) is 0.166 g and the 1.0-sec period spectral acceleration coefficient (S_1) is 0.062 g. The design short period spectral acceleration coefficient (S_{Ds}) is reported to be 0.199 g and the 1.0-sec period spectral acceleration coefficient (S_{D1}) is reported to be 0.106 g for a Seismic Site Class C.

Table 3.10.6-1 of the 2012 AASHTO LRFD Bridge Design Specifications[8] indicates that with the S_{D1} value of 0.106 g, Seismic Performance Zone 1 is fitting for the bridge site. Per Table 3.5-1 of the 2011 AASHTO Guide Specifications for LRFD Seismic Bridge Design, a Seismic Design Category A is considered appropriate for the S_{D1} value of 0.106 g.

The general procedure of the 2011 AASHTO LRFD Seismic Bridge Design guide indicates the Peak Ground Acceleration (PGA) having a 7 percent chance of exceedance in 75 years (or mean return period of approximately 1000 years) is predicted to be 0.072 g. For a Seismic Site Class C, the design PGA (A_s) value is reported to be 0.086 g for the Bridge 3 location.

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[7] AASHTO Guide Specifications for LRFD Seismic Bridge Design, 2nd Edition; AASHTO; 2011.
[8] AASHTO LRFD Bridge Design Specifications, AASHTO, 2012.

Subsurface Conditions

The subsurface conditions are shown in detail on the boring logs provided in Attachments 3 through 8. As would be anticipated for the alluvial geologic environment of the alignment, the soil stratigraphy is highly variable.

For the most part, the existing roadway has been constructed on an embankment. The embankment fill is comprised of firm to stiff fine sandy clay with variable amounts of fine to coarse gravel and medium dense to dense clayey fine sand and clayey fine to coarse gravel. The embankment soils also include subordinate amounts of medium dense silty fine to coarse gravel and sandy fine to coarse gravel, and stiff sandy, clayey silt.

The near-surface soils below the embankment fill vary widely and include very soft to stiff silty, fine sandy clay; fine sandy clay; sandy, clayey silt and loose to dense silty fine sand, fine sandy silt, clayey fine sand, and clayey fine to coarse gravel. At depth, the soil stratigraphy trends to dense to very dense silty fine sand and fine sand and very stiff to hard silty clay and clay with interbedded silty fine sand seams and layers.

Groundwater was encountered in the borings at variable depths during the field studies in March to June 2015. Groundwater observations are shown on the boring and test pit logs. Groundwater conditions will vary with seasonal precipitation, surface runoff and infiltration, and surface water levels in the Champagnolle Creek and relief channels. Seasonal seeps or springs may also be present, particularly during wet seasons of the year.

To aid in visualizing subsurface conditions, Generalized Subsurface Profiles at the bridge locations are provided in Attachment 12. It should be recognized that the stratigraphy illustrated by the profiles has been inferred between discrete boring locations. In view of the natural variations in stratigraphy and subsurface conditions, particularly in the area of predominant alluvial geology, variations from the stratigraphy illustrated by the profiles should be anticipated. Additionally, the natural transition between strata is generally gradual, and the stratigraphy will vary with location.

ANALYSES and RECOMMENDATIONS

Foundation Design for Bridges

Foundations for the replacement bridges of the CA0702 project must satisfy two (2) basic and independent design criteria: a) foundations must have an acceptable factor of safety against

factored bearing failure under strength/extreme limit design loads, and b) foundation movement due to consolidation or swelling of the underlying strata should not exceed tolerable limits for the structure. Construction factors, such as installation of foundations, excavation procedures and surface and groundwater conditions, must also be considered.

In light of the results of the borings performed at the bridge locations, the anticipated light to moderate bridge foundation loads, and our understanding of the project, we recommend that foundation loads at the bridge ends and interior bents be supported on piling. Because of the predominant granular foundation soils and shallow groundwater levels of the Bridge 1 and 2 locations, drilled shaft foundations are not recommended. Consideration could be given to using drilled shaft foundation systems for the Bridge 3 location. Recommendations for drilled shafts can be provided upon request. Recommendations for piling are discussed in the following report sections.

Due to the predominance of dense to very dense sand and very stiff to hard silty clay foundation soils, driving displacement piles such as steel shells or concrete piles would potentially be difficult. Consequently, steel piles are recommended. Steel HP12x53 or HP14x73 piles are considered suitable. Other pile sizes or types may be evaluated if desired. Pile foundation recommendations are discussed in the following paragraphs.

Piling Foundations – Bridges 1, 2 and 3

We recommend that the structural loads of the bridge abutments and interior bents be supported on driven steel piles. Piles must extend through the embankment fill and weak zones of the natural soils to bear in the dense to very dense silty fine sand/fine sand or the very stiff to hard silty clay/clay. Piles for Bridge 3 should extend through the lignite unit encountered at the north bridge end at approximately El 152 to El 139 (see Boring 236+69). Steel HP12x53 or HP14x73 piles are considered suitable. Other pile sizes or types may be evaluated if desired.

Nominal pile capacities have been developed using static pile capacity formulae and the results of the borings. Nominal single pile capacity curves for HP12x53 or HP14x73 piles are included in Attachments 13, 14, and 15 for Bridges 1, 2, and 3, respectively.

Based on AASHTO LRFD geotechnical design procedures, an effective resistance factor (φ_{stat}) of 0.35 is recommended for evaluation of factored compression capacity. For evaluation of factored uplift capacities, a resistance factor (φ_{up}) of 0.25 is recommended. These resistance

factors are based on Strength Limit States. For Extreme Events Limit States, resistance factors of 1.0 and 0.8 are recommended for evaluating compression and uplift capacities, respectively.

The calculated allowable capacities are based on single, isolated foundations. Piles spaced closer than three (3) pile widths may develop lower individual capacity due to group effects. Further analysis is recommended for a closely spaced pile layout.

Post-construction settlement of piles driven to the recommended factored capacities should be less than 0.5 inch. Given the relatively minor amount of embankment fill anticipated at the new bridge ends and the anticipated construction sequence with embankment construction completed several months before pile driving, downdrag loads due to long-term embankment settlement are expected to be negligible.

Pre-boring is not expected to be required for pile installation. However, there is existing riprap in some channel bottom and bank areas. Auger refusal on riprap or debris was locally encountered when drilling at bridge locations. In addition, there may be debris in the channel remaining from demolition of prior bridges at these locations. Pre-excavation or removal of riprap or debris on the channel bottoms and bank side slopes could be required for pile installation. Pile tips would facilitate driving where deep penetration into the hard clay is planned.

We recommend at least one (1) test pile at each bridge end and one (1) test pile at an interior bent. As a minimum, safe bearing capacity of production piles should be determined by AHTD Standard Specifications Section 805.09, Method A. Driving records should be available for review by the Engineer during pile installation.

Piles should be installed in compliance with AHTD Standard Specifications Section 805. We recommend that steel piles be driven with a hammer system capable of delivering at least 22,000 ft-lbs per blow. The drivability of the pile-hammer system should be evaluated utilizing wave equation methods when information is available on the design pile capacity for the bridges.

Wingwall and Abutment Wall Lateral Earth Pressures

It is anticipated that wingwalls and abutment walls at the bridge locations will be backfilled with either unclassified borrow or select material. Unclassified borrow is expected to be locally available soils which could be sandy clay, silty clay, or sand. Select material is expected to be SM-1 (AHTD Standard Specifications Section 302).

Recommendations regarding lateral earth pressures for wingwalls and abutment walls are summarized below.

- Total unit weight (γ) for unclassified backfill: 125 lbs per cu ft
- Angle of internal friction (ϕ) for unclassified backfill: 20°
- Equivalent fluid pressure for unclassified backfill:
    - Active condition for walls that are free to rotate, backfilled with unclassified borrow, and fully drained: 62 lbs per sq ft per ft depth.
    - Active condition for walls that are free to rotate, backfilled with unclassified borrow, and with no provision for internal drainage: 93 lbs per sq ft per ft depth.
- Angle of internal friction (ϕ) for SM-1 backfill: 32°
- Total unit weight (γ) for SM-1: 125 lbs per cu ft
- Equivalent fluid pressure for SM-1 backfill:
    - Active condition for walls that are free to rotate, backfilled with SM-1 or clean granular backfill, and fully drained: 40 lbs per sq ft per ft depth.
    - Active condition for walls that are free to rotate, backfilled with SM-1 or clean granular backfill, and with no provision for internal drainage: 85 lbs per sq ft per ft depth.
- Nominal sliding resistance:
    - Interaction friction angle (δ) for concrete on stable bearing stratum: 20°.
    - Interaction friction factor (tan δ) for concrete on stable bearing stratum: 0.36.
    - A resistance factor (φ) of 0.8 is recommended for sliding resistance.

To utilize the lower earth pressure values of the "drained" condition, positive and continuous drainage from behind walls must be provided. This may include a clean, free draining crushed stone, gravel, or granular soil zone or a geosynthetic drainage board approved by the Engineer. Drainage zones should be fully isolated from all soil and shale by a suitable geotextile complying with AHTD Standard Specifications Subsection 625.02, Type 2. Water should be discharged from backfill by a system of regularly-spaced, functioning weep holes or a drain pipe.

Abutment Embankment Slopes

General. It is understood that the fill embankments at the ends of each bridge will utilize simple slopes to transition grades. The new embankments will have 2-horizontal to 1-vertical (2H:1V) end slope configurations and 3-horizontal to 1-vertical (3H:1V) side slope configurations.

Stability analyses have been performed to verify the suitability of the plan bridge end slope configurations. The embankment configurations were modeled based on the available bridge layout information. For the purposes of the stability analyses, uniform surcharge load of 300 to 375 lbs per sq ft were included at the top of the embankments to model the surcharge of vehicle traffic loads.

Stability analyses were performed using the computer program PCSTABL5M and a Modified Bishop (circular) analysis. Three (3) general loading conditions were analyzed with respect to slope stability. In addition, the rapid drawdown condition was evaluated from the assumed high water elevation to the channel bottom. The seismic analyses utilized a horizontal acceleration coefficient (k_h) value of one-half of the peak ground acceleration value ($0.5A_S/g$) as recommended by Kramer[9].

The results of the stability analyses for each bridge are summarized in the following tables below. Graphical results of stability analyses are provided in Attachments 16 through 18.

Table 1: Stability Analysis Results – Bridge 1 Bent 1 / South Bridge End Embankments

Slope Configuration	Design Condition	Calculated Minimum Factor of Safety
2H:1V End Slope	End of Construction	3.3
	Long Term	1.7
	Seismic ($A_S/2 = 0.06$)	1.5
	Rapid Drawdown – from El 164 to El 155	1.2
3H:1V Side Slope	End of Construction	4.8
	Long Term	2.6
	Seismic ($A_S/2 = 0.06$)	2.1
	Rapid Drawdown – from El 164 to El 158	2.0

[9] Geotechnical Earthquake Engineering, Prentice-Hall, Upper Saddle River, New Jersey, Steven L. Kramer, Page 436-437.

Table 2: Stability Analysis Results – Bridge 1 Bent 5 / North Bridge End Embankments

Slope Configuration	Design Condition	Calculated Minimum Factor of Safety
2H:1V End Slope	End of Construction	3.2
	Long Term	1.6
	Seismic ($A_S/2 = 0.06$)	1.4
	Rapid Drawdown – from El 164 to El 156	1.2
3H:1V Side Slope	End of Construction	3.8
	Long Term	2.5
	Seismic ($A_S/2 = 0.06$)	2.0
	Rapid Drawdown – from El 164 to El 158	1.9

Table 3: Stability Analysis Results – Bridge 2 Bent 1 / South Bridge End Embankments

Slope Configuration	Design Condition	Calculated Minimum Factor of Safety
2H:1V End Slope	End of Construction	4.4
	Long Term	1.6
	Seismic ($A_S/2 = 0.043$)	1.5
	Rapid Drawdown – from El 166 to El 154	1.2
3H:1V Side Slope	End of Construction	6.2
	Long Term	2.7
	Seismic ($A_S/2 = 0.043$)	2.4
	Rapid Drawdown – from El 166 to El 160	1.9

Table 4: Stability Analysis Results – Bridge 2 Bent 5 / North Bridge End Embankments

Slope Configuration	Design Condition	Calculated Minimum Factor of Safety
2H:1V End Slope	End of Construction	2.4
	Long Term	1.9
	Seismic ($A_S/2 = 0.043$)	1.8
	Rapid Drawdown – from El 166 to El 154	1.4
3H:1V Side Slope	End of Construction	4.4
	Long Term	3.0
	Seismic ($A_S/2 = 0.043$)	2.6
	Rapid Drawdown – from El 166 to El 158	2.1

Table 5: Stability Analysis Results – Bridge 3 Bent 1 / South Bridge End Embankments

Slope Configuration	Design Condition	Calculated Minimum Factor of Safety
2H:1V End Slope	End of Construction	2.3
	Long Term	2.1
	Seismic ($A_S/2 = 0.040$)	1.9
	Rapid Drawdown – from El 165 to El 155	1.5
3H:1V Side Slope	End of Construction	15.7
	Long Term	5.0
	Seismic ($A_S/2 = 0.040$)	4.2
	Rapid Drawdown – from El 165 to El 162	4.1

Table 6: Stability Analysis Results – Bridge 3 Bent 2 / North Bridge End Embankments

Slope Configuration	Design Condition	Calculated Minimum Factor of Safety
2H:1V End Slope	End of Construction	2.7
	Long Term – shallow failure	1.8
	Long Term – deep-seated failure	2.4
	Seismic ($A_S/2 = 0.04$) – shallow failure	1.7
	Rapid Drawdown – from El 165 to El 155	1.3
3H:1V Side Slope	End of Construction	9.2
	Long Term	2.8
	Seismic ($A_S/2 = 0.06$)	2.5
	Rapid Drawdown – from El 165 to El 158	2.2

The results of the stability analyses indicate that the calculated minimum factors of safety are within acceptable ranges for each of the planned embankments. Consequently, it is our conclusion that the plan embankment slope configurations are suitable with respect to slope stability.

Pavement Design Subgrade Support Parameters

The results of the borings and laboratory test results indicate that the subgrade soils in the CA0702 alignment vary widely from clayey sand and clayey gravel (AASHTO A-2-4) to silt, sandy silt, silty clay and sandy clay (AASHTO A-4 to A-6). It is expected that locally available borrow for use as unclassified embankment fill will be comprised of similar soils.

In light of the results developed during the course of this study, the following are recommended for subgrade support parameters.

- Subgrade Resilient Modulus (M_R): 3500 lbs per sq inch
- R value: 5
- Modulus of subgrade reaction (k): 145 lbs per sq in. per inch

Areas of unsuitable subgrade should be improved by undercut and replacement. Alternatively, improvement by addition of lime, Portland cement or an approved alternative additive may be considered. Laboratory testing must be performed to confirm the suitability of lime, cement or other additive to improve weak and unstable subgrade areas and improve

subgrade support. We recommend a minimum treatment depth of 8 in. where lime- or cement-modified subgrade is utilized. The addition of lime, cement, or other alternative modification additives must be approved by the Engineer.

Site Grading and Subgrade Preparation

Site grading/site preparation in the structure and roadway areas should include necessary clearing and grubbing of trees and underbrush and stripping the organic-containing surface soils in work areas. Where fill depths in excess of 3 ft are planned, stumps may be left after close cutting trees to grade, as per AHTD criteria. Otherwise, tree stumps must be completely excavated and properly backfilled.

The depth of stripping will be variable, with deeper stripping depths in the low-lying, poorly drained, and/or wooded areas, and less stripping required in the areas of higher terrain. In general, the stripping depth is estimated to be about 6 to 12 in. in cleared areas, but may be 18 to 24 in. or more in the localized wooded areas and areas with thick underbrush. The zone of organic surface soils should be completely stripped in the embankment footprint areas.

Where pavements are to be demolished, consideration may be given to utilizing the processed asphalt concrete and aggregate base for embankment fill. In this case, the demolished materials should be thoroughly blended and processed as per AHTD Standard Specifications Section 212 to a reasonably well-graded mixture with a maximum particle size of 2 inches. If abandoned, existing pavements are within 3 ft of the plan subgrade elevation, the existing pavement surface should be scarified to a minimum depth of 6 inches. The scarified material should be recompacted to a stable condition.

Following required pavement demolition, stripping and grubbing, and prior to fill placement or otherwise continuing with subgrade preparation, the extent of weak and unsuitable soils should be determined. Thorough proof-rolling should be performed to verify subgrade stability. Proof-rolling should be performed with a loaded tandem-wheel dump truck or similar equipment. Unstable soils exhibiting a tendency to rut and/or pump should be undercut and replaced with suitable fill. Care should be taken that undercuts, stump holes, and other excavations or low areas resulting from subgrade preparation are properly backfilled with compacted fill.

Based on the results of the borings and layout of the project alignments, some undercutting or subgrade stabilization is expected to be required to develop subgrade stability

and develop adequate foundation support for embankments. In addition, some subgrade improvement may be required in the improved roadway alignment. Estimated improvement depths are summarized in Table 7 below.

Table 7: Estimated Subgrade Improvement Depths

Project Feature	Approximate location, station	Estimated improvement depth below existing grade, ft
Roadway	196+60 to 219+50	3
Roadway	219+50 to 226+90	2
Roadway	226+90 to 237+00	3
Roadway	257+00 to 277+00	3
Roadway	289+50 to 307+20	3
Roadway	317+00 to 329+70	2
Roadway	339+25 to 369+35	2
Roadway	386+80 to 389+40	2
Roadway	399+25 to 409+50	2
Roadway	419+30 to 423+10	2

The undercut/improvement depths summarized in the table above are provided for estimation purposes only. The depths summarized above have been based on the results of the borings drilled during the period of March to June 2015. The required depth of improvement will vary with seasonal site conditions and final grading plans. As-built undercut requirements must be field verified by the Engineer or Department.

In lieu of undercutting and replacing unsuitable soils in roadway areas, consideration may be given to using additives to improve soil workability and to stabilize weak areas. Hydrated lime, quick lime, Portland cement, fly ash, or suitable alternate materials may be used as verified by appropriate testing and approved by the Engineer. Additives can be effective where the depth of unstable soils is relatively shallow. Treatment will be less effective in areas where the zone of unstable soils is deep. The optimum application rate of stabilization additive must be determined by specific laboratory tests performed on the alignment subgrade soils. We recommend a minimum treatment depth of 8 inches.

Undercuts for embankments may be backfilled with suitable embankment fill. Should excavations or deeper undercuts encounter shallow water or seepage, or if areas of seepage or seasonal springs are encountered during the work, backfill should consist of clean sand (AHTD Standard Specifications Section 302, SM-1 with less than 10 percent passing the No. 200 sieve), stone backfill (AHTD Standard Specifications Section 207), or clean aggregate (AHTD Standard

Specifications Subsections 403.01 and 403.02, Class 3 mineral aggregate) extending up to an elevation above the inflow of seepage. In areas of seepage infiltration, the granular fill should be fully encapsulated with a filter fabric complying with AHTD Standard Specifications Subsection 625.02, Type 2.

In areas of deep fills, the potential exists for use of thick initial lifts ("bridging"), as per AHTD criteria. Bridge lifts will be subject to some consolidation. Settlement of a primarily granular fill suitable for use in bridging would be expected to be relatively rapid and long-term post-construction settlement would not be expected to be a significant concern. Where clayey soils are placed in thick lifts, long term settlement will be more significant. We recommend that the use of "bridging" techniques be limited to granular borrow soils, i.e., sand or gravel. Where fill amounts are limited to less than about 3 ft, bridging will be less effective and the potential for undercut or stabilization will increase. Use of bridging techniques and fill lift thickness must be specifically approved by the Engineer or Department.

Subgrade preparation and mass undercuts should extend at least 10 ft beyond the embankment toes to the extent possible. Subgrade preparation in roadway areas should extend at least 3 ft outside pavement shoulder edges to the extent possible. The existing drainage features should be completely mucked out and all loose and/or organic soils removed prior to fill placement.

Fill and backfill may consist of unclassified borrow free of organics and other deleterious materials as per AHTD Standard Specifications Subsection 210.06. Granular soils must be protected from erosion with a minimum 18-in.-thick armor of clayey soil. The on-site silty clay and sandy clay are typically suitable for this use.

Subgrade preparation should comply with AHTD Standard Specifications Section 212. Embankments should be constructed in accordance with AHTD criteria (AHTD Standard Specifications Section 210). Fill and backfill should be placed in nominal 6- to 10-in.-thick loose lifts. All fill and backfill must be placed in horizontal lifts. Where fill is placed against existing slopes, short vertical cuts should be "notched" in the existing slope face to facilitate bonding of horizontal fill lifts. The in-place density and water content should be determined for each lift and should be tested to verify compliance with the specified density and water content prior to placement of subsequent lifts.

CONSTRUCTION CONSIDERATIONS

Groundwater and Seepage Control

Positive surface drainage should be established at the start of the work, be maintained during construction and following completion of the work to prevent surface water ponding and subsequent saturation of subgrade soils. Density and water content of all earthwork should be maintained until the retaining wall, embankments, and bridge work is completed.

Subgrade soils that become saturated by ponding water or runoff should be excavated to undisturbed soils. The embankment subgrade and the retaining wall foundations should be evaluated by the Engineer during subgrade preparation.

Shallow perched groundwater may be encountered in the near-surface soils. The volume of groundwater produced can be highly variable depending on the condition of the soils in the immediate vicinity of the excavation. In addition, seasonal surface seeps or springs could develop.

Seepage into excavations and cuts can typically be controlled by ditching or sump-and-pump methods. If seepage into excavations becomes a problem, backfill should consist of clean sand (AHTD Standard Specifications Section 302, SM-1 with less than 10 percent passing the No. 200 sieve), stone backfill (AHTD Standard Specifications Section 207), or clean aggregate (AHTD Standard Specifications Subsections 403.01 and 403.02 Class 3 mineral aggregate) to an elevation above the inflow of seepage. In areas of seepage infiltration, the granular fill should be encapsulated with a filter fabric complying with AHTD Standard Specifications Subsection 625.02, Type 2 and vented to positive discharge. Where surface seeps or springs are encountered during site grading, we recommend the seepage be directed via French drains or blanket drains to positive discharge at daylight or to storm drainage lines.

Piling

Piles should be installed in compliance with AHTD Standard Specifications, Section 805. Piles should be carefully examined prior to driving and piles with structural defects should be rejected. Any splices in steel piles should develop the full cross-sectional capacity of un-spliced piles.

Pile installation should be monitored by qualified personnel to maintain specific and complete driving records and observe pile installation procedures. Safe bearing capacity of production piles should be determined by AHTD Standard Specifications Section 805.09, Method A. Driving records should be available for review by the Engineer during pile

installation. For driving steel piles on this project, we recommend minimum hammer energy of 22,000 ft-lbs per blow. Blow counts on steel piles should be limited to about 20 blows per inch.

CLOSURE

The Engineer or Department or a designated representative thereof should monitor site preparation, grading work and foundation and pavement construction. Subsurface conditions significantly at variance with those encountered in the borings should be brought to the attention of the Geotechnical Engineer. The conclusions and recommendations of this report should then be reviewed in light of the new information.

The following illustrations are attached and complete this submittal.

Attachment 1	Site Vicinity Map
	Plan of Borings, Test Pits, and Pavement Cores
	Subsurface Exploration Summary
	Key to Terms and Symbols
Attachment 2	Core Sampling Layout
	Summary of Core Results
Attachment 3	Pavement Boring Logs
Attachment 4	Roadway Boring Logs
Attachment 5	Bridge 1 Boring Logs
Attachment 6	Bridge 2 Boring Logs
Attachment 7	Bridge 3 Boring Logs
Attachment 8	Test Pit Logs
Attachment 9	Classification Test Results
Attachment 10	Subgrade Test Results
Attachment 11	Liquefaction Analysis – Bridge 1
Attachment 12	Generalized Subsurface Profiles
Attachment 13	Nominal Pile Capacity – Bridge 1
Attachment 14	Nominal Pile Capacity – Bridge 2
Attachment 15	Nominal Pile Capacity – Bridge 3
Attachment 16	Bridge 1 Stability Analysis Results
Attachment 17	Bridge 2 Stability Analysis Results
Attachment 18	Bridge 3 Stability Analysis Results

* * * *

We appreciate the opportunity to be of service to you on this project. Should you have any questions regarding this report, or if we may be of additional assistance, please call on us.

Sincerely,

GRUBBS, HOSKYN,
BARTON &WYATT, INC.

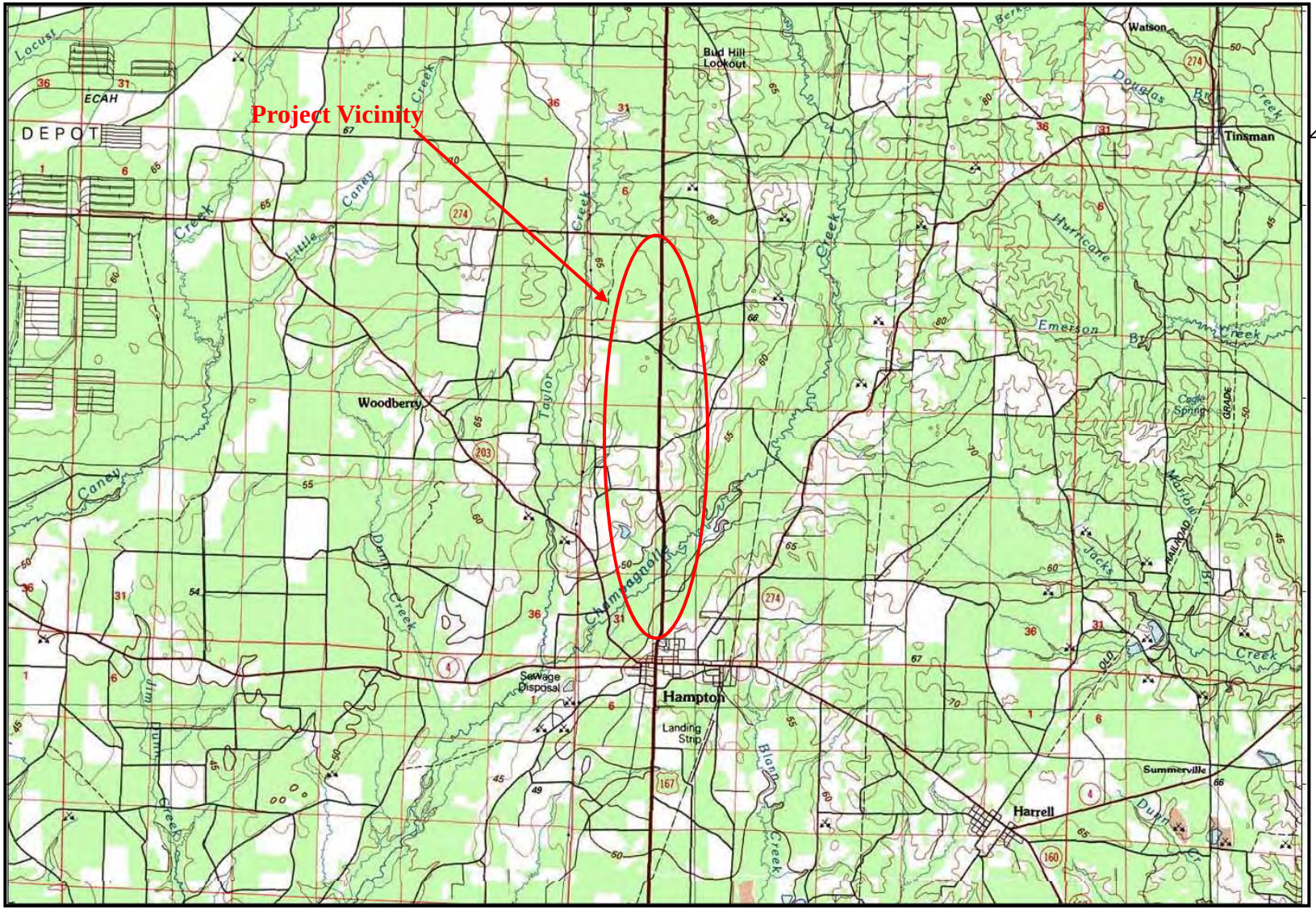
Matthew R. Satterfield, P.E.
Senior Project Engineer

Mark E. Wyatt, P.E.
President

MRS/MEW:jw

Copies Submitted: Crafton Tull & Associates, Inc.
Attn: Mr. Mike Burns, P.E. (1+electronic)

ATTACHMENT 1



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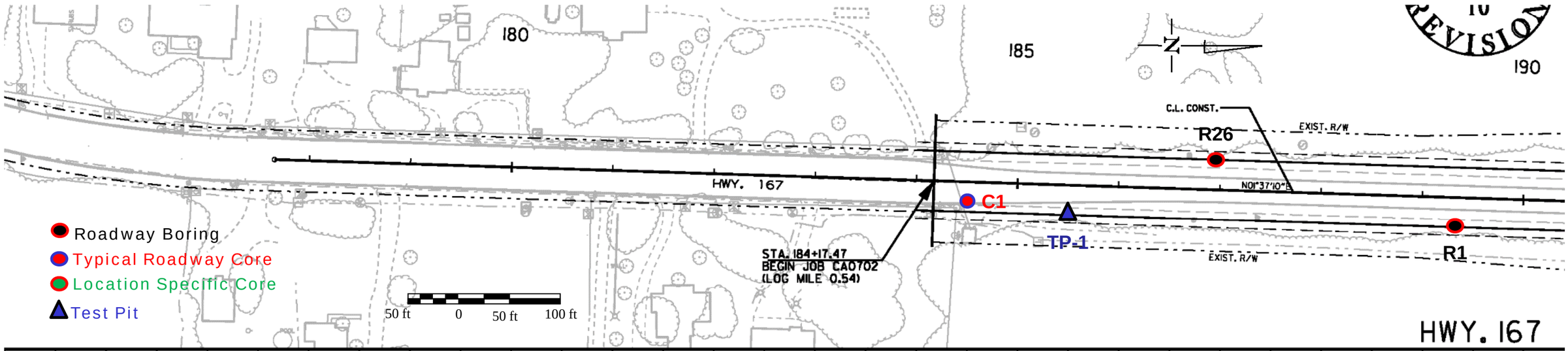
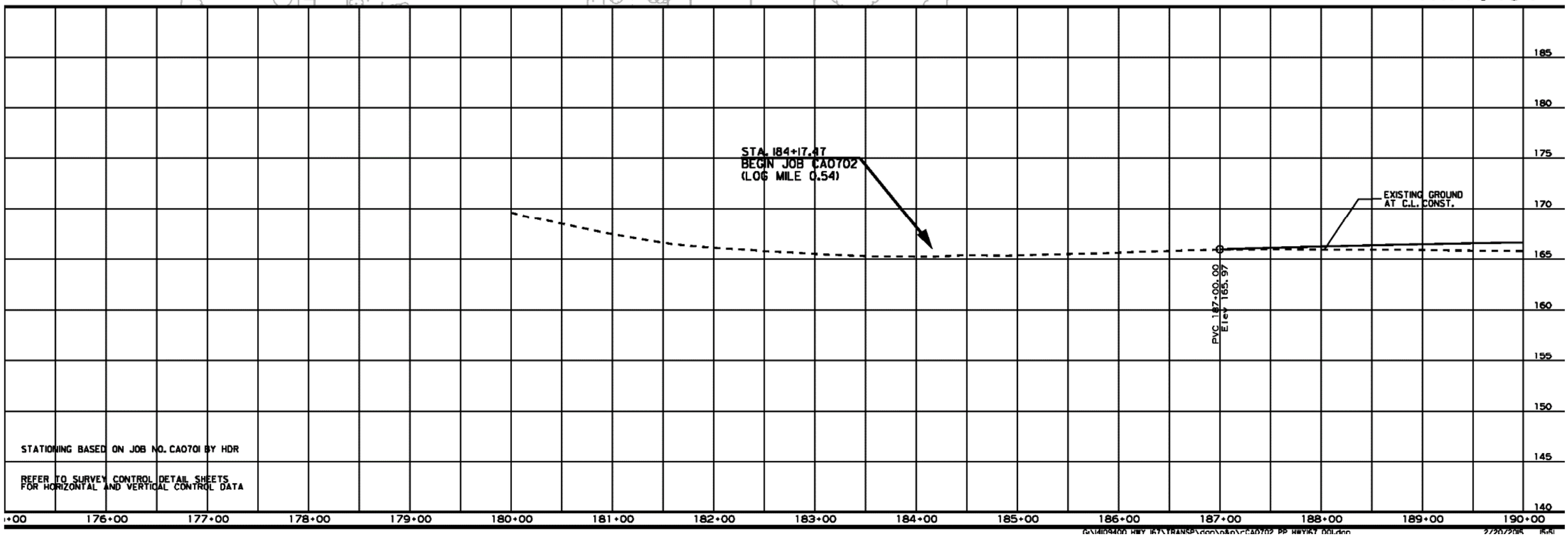
CONSULTING ENGINEERS

Site Vicinity Map
CA0702: Hwy 167 Widening
Calhoun County, Arkansas

Job No. 14-198

Plate 1





Grubbs, Hoskyn, Barton & Wyatt, INC. CONSULTING ENGINEERS	**PLAN OF BORINGS, TEST PITS AND PAVEMENT CORES** **Job No. CA0702 – Hampton – Hwy 274 (Widening)(S)** **HWY 167 – Calhoun County, Arkansas**	**Scale: As Shown**	**Job No. 14-198**	**PLATE 2**

PRELIMINARY SUBJECT TO REVISION

Roadway Boring
Typical Roadway Core
Location Specific Core
Test Pit

STA. 198+26 - IN PLACE
6'X5.5'X97' R.C. BOX CULV'T.
(3.5° RT. FWD. SKEW)
Q50 = XXXX C.F.S. D.A. = X.XXX ACRES

HWY. 167
PI = 199+00.29
Δ = 02°48'02"
D = 00°30'00"
T = 280.13'
L = 560.14'
PC = 196+20.17
PRC = 201+80.30
e = N.C.

HWY. 167
PI = 204+60.43
Δ = 02°48'03"
D = 00°30'00"
T = 280.13'
L = 560.14'
PRC = 201+80.30
PT = 207+40.44
e = N.C.

190 195 200 205

EXIST. R/W
P.C. 196+20.17
C.L. CONST.
R27
CS-1
P.I. 199+00.29
P.R.C. 201+80.30
C3
C2
HWY. 167
N04°25'13"E
R2
EXIST. R/W
P.I. 204+60.43

50 ft 0 50 ft 100 ft

HWY. 167

185 180 175 170 165 160 155 150

P.I. 193+00.00
Elev. 167.77
1200' V. C.
K = 2000
SSD = 2399'

EXISTING GROUND AT C.L. CONST. +26 (EXIST.)
F.L. ELEV. IN = 157.28 RT.
F.L. ELEV. OUT = 156.76 LT.

PVRC 199+00.00
Elev 165.97

300' V. C.
K = 429
-0.36%
0.40%

PVI 200+50.00
ELEV. 165.52
PG ELEV. 165.78

PVT 202+00.00
Elev 166.12

0.40%

PVC 204+50.00
Elev 167.14

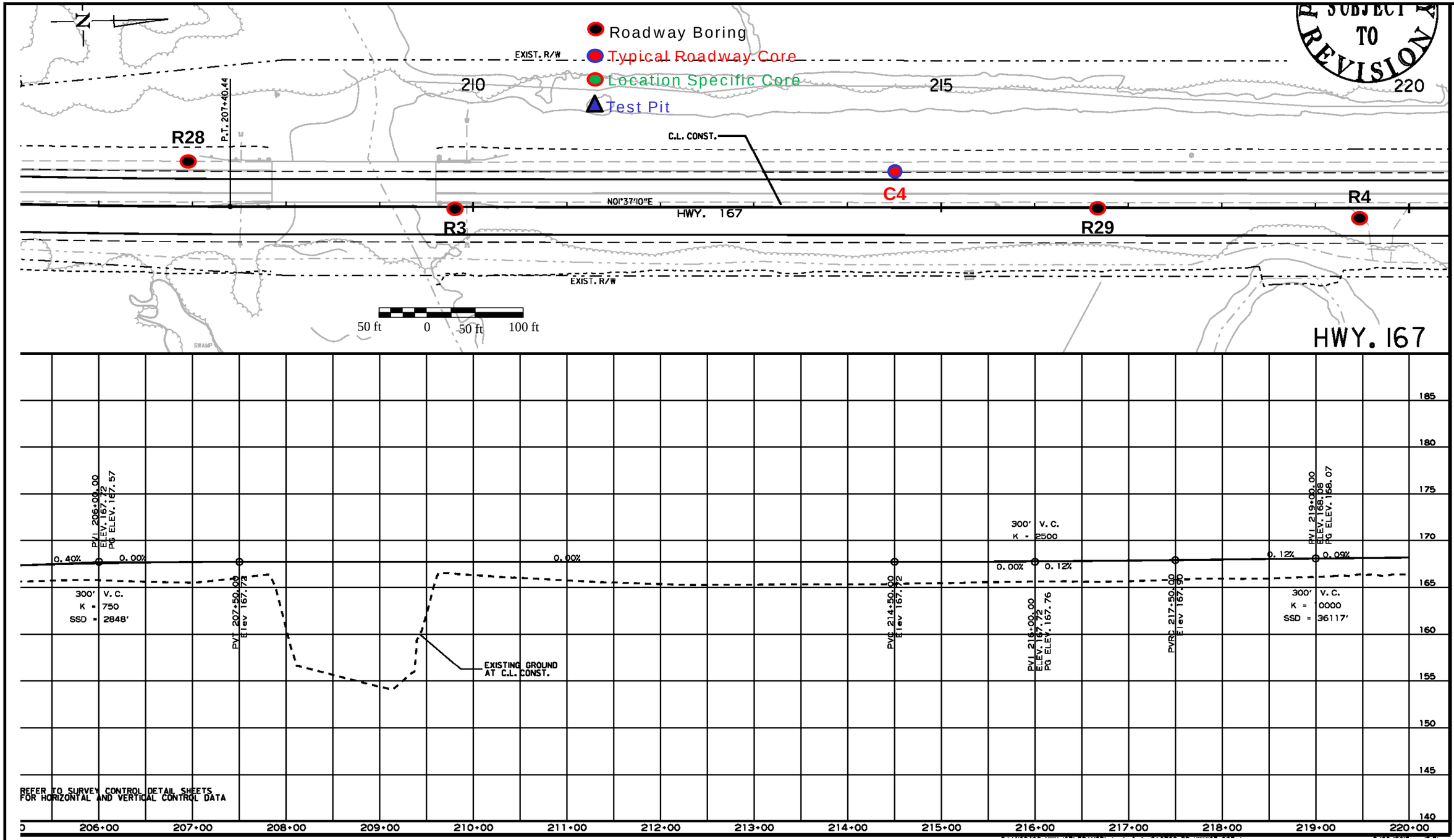
Grubbs, Hoskyn, Barton & Wyatt, INC.
CONSULTING ENGINEERS

PLAN OF BORINGS, TEST PITS AND PAVEMENT CORES
Job No. CA0702 – Hampton – Hwy 274 (Widening)(S)
HWY 167 – Calhoun County, Arkansas

Scale: As Shown

Job No. 14-198

PLATE 3



REFER TO SURVEY CONTROL DETAIL SHEETS FOR HORIZONTAL AND VERTICAL CONTROL DATA

SUBJECT TO REVISION

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PLAN OF BORINGS, TEST PITS AND PAVEMENT CORES
Job No. CA0702 – Hampton – Hwy 274 (Widening)(S)
HWY 167 – Calhoun County, Arkansas

Scale: As Shown

Job No. 14-198

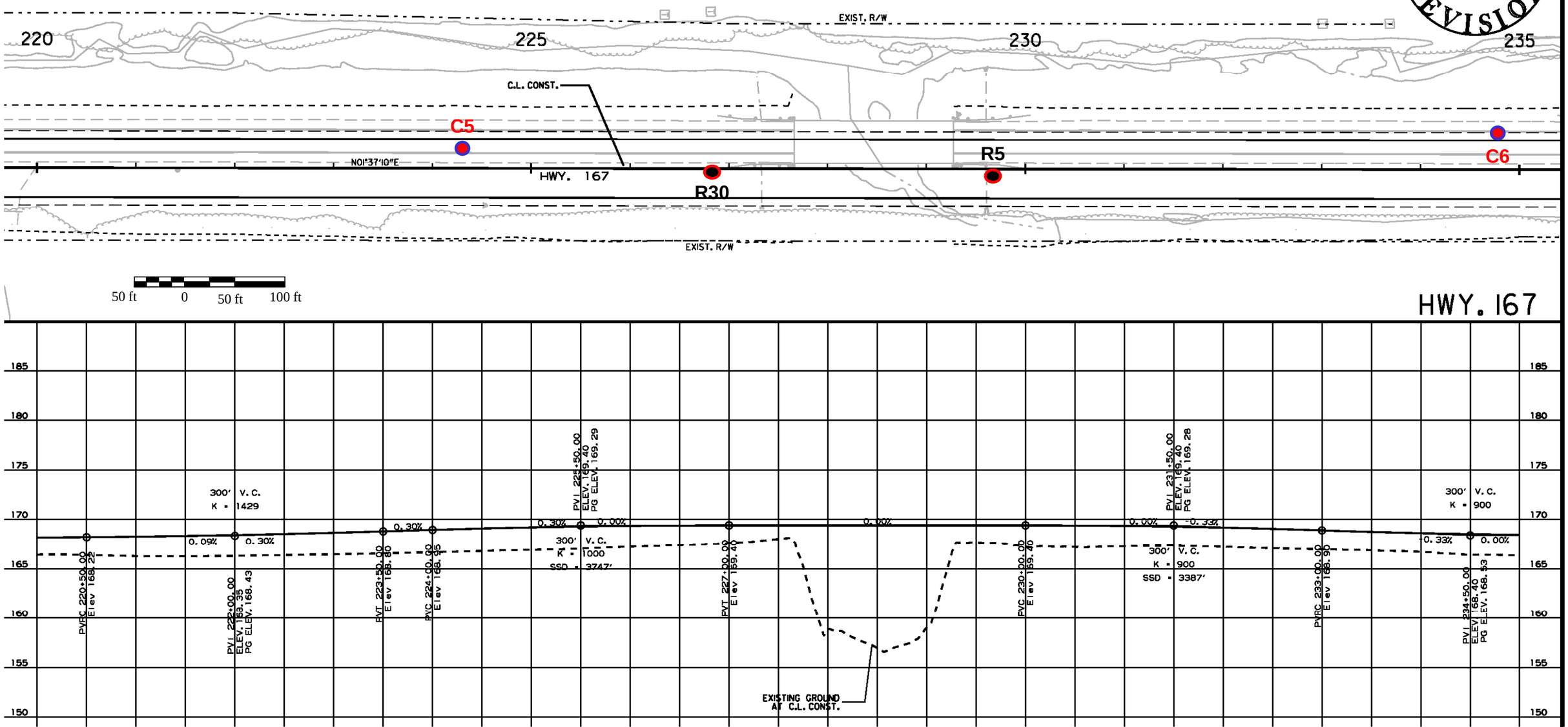
PLATE 4

JOB NO. CA0702 | 7 | 26

PLAN AND PROFILE SHEETS

Roadway Boring
Typical Roadway Core
Location Specific Core
Test Pit

PRELIMINARY SUBJECT TO REVISION



Grubbs, Hoskyn, Barton & Wyatt, INC. CONSULTING ENGINEERS	**PLAN OF BORINGS, TEST PITS AND PAVEMENT CORES** **Job No. CA0702 – Hampton – Hwy 274 (Widening)(S)** **HWY 167 – Calhoun County, Arkansas**	**Scale: As Shown**	**Job No. 14-198**	**PLATE 5**

Roadway Boring
Typical Roadway Core
Location Specific Core
Test Pit

N

EXIST. R/W
CO. RD. 232
EXIST. R/W
EXIST. R/W
EXIST. R/W
EXIST. R/W

235
240
245
250

P.C. 239+03.04
N01°37'10"E

R31
R6
C7
R32
R7

C.L. CONST.
HWY. 167

STA. 246+44 - IN PLACE
24"X96' R.C. PIPE CULV'T.
(2° RT. FWD. SKEW)
WITH HEADWALL LT. & RT.
050 = XXXX C.F.S. D.A. = X.XXX ACRES

HWY. 167
PI = 246+21.05
Δ = 18°12'20"
D = 01°00'00"
T = 918.01'
L = 1820.56'
PC = 239+03.04
PT = 257+23.59
e = 0.030 /'/
Ls = 540'

PRELIMINARY
SUBJECT
TO
REVISION

PLAN AND PROFILE SHEETS

50 ft 0 50 ft 100 ft

HWY. 167

STA. 237+30.00 BEGIN SUPERELEVATION
STA. 242+70.00 MAX. SUPERELEVATION (0.030'/')
STA. 253+78.67 MAX. SUPERELEVATION (0.030'/')
STA. 259+18.67 END SUPERELEVATION

190
185
180
175
170
165
160
155

PVT 236+00.00
Elev 168.40

0.00%

PVC 237+50.00
Elev 168.40

300' V.C.
K = 260

PVI 239+00.00
ELEV. 168.40
PG ELEV. 168.83

0.00%
1.16%

PVT 240+50.00
Elev 170.13

EXISTING GROUND
AT C.L. CONST.

241+50.00
Elev 171.29

1.16%

PVI 243+00.00
ELEV. 173.02
PG ELEV. 172.92

0.88%

300' V.C.
K = 1107
SSD = 4133'

1.16%

PVT 244+50.00
Elev 174.35

0.88%

PVC 245+85.00
Elev 175.54

+44
(EXIST.)
F.L. ELEV. IN = 168.77 LT.
F.L. ELEV. OUT = 167.61RT.

0.88%

500' V.C.
K = 242

2.95%

PVI 248+35.00
ELEV. 177.75
PG ELEV. 179.04

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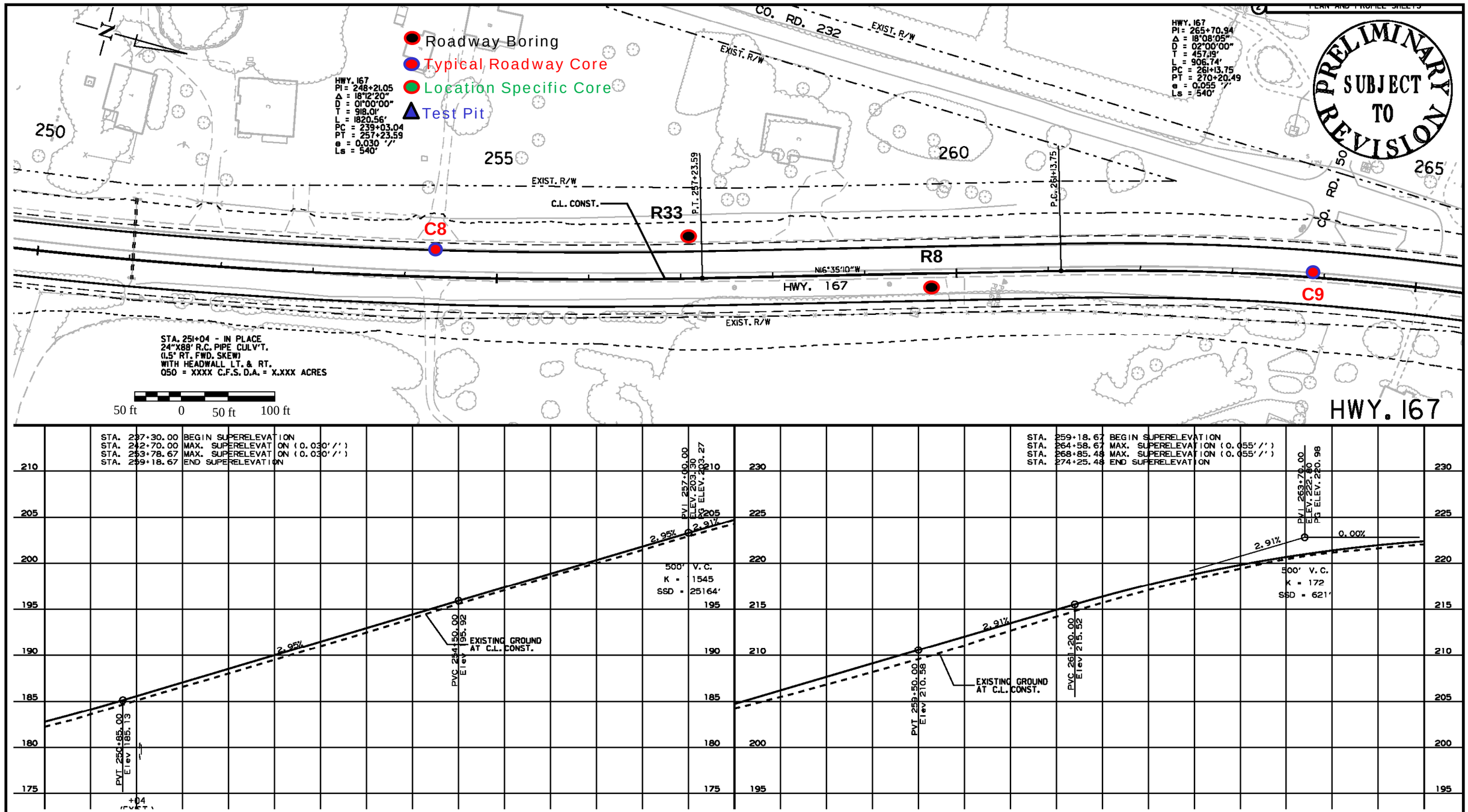
CONSULTING ENGINEERS

PLAN OF BORINGS, TEST PITS AND PAVEMENT CORES
Job No. CA0702 – Hampton – Hwy 274 (Widening)(S)
HWY 167 – Calhoun County, Arkansas

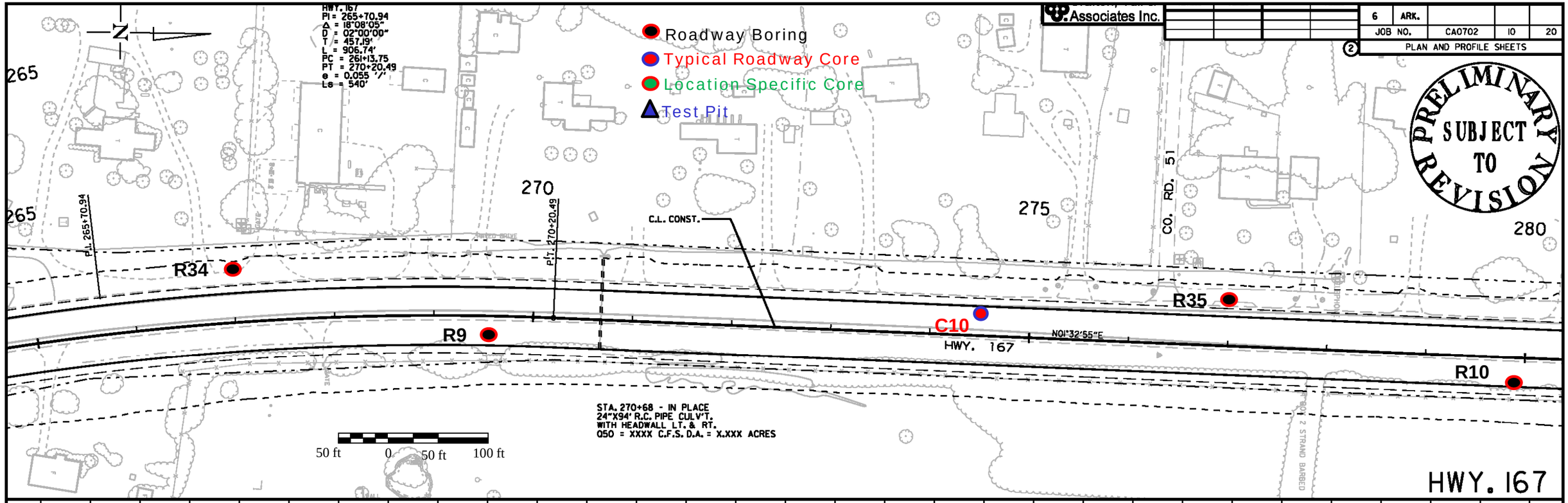
Scale: As Shown

Job No. 14-198

PLATE 6



Grubbs, Hoskyn, Barton & Wyatt, INC. CONSULTING ENGINEERS	**PLAN OF BORINGS, TEST PITS AND PAVEMENT CORES** **Job No. CA0702 – Hampton – Hwy 274 (Widening)(S)** **HWY 167 – Calhoun County, Arkansas**	**Scale: As Shown**	**Job No. 14-198**	**PLATE 7**



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PLAN OF BORINGS, TEST PITS AND PAVEMENT CORES
Job No. CA0702 – Hampton – Hwy 274 (Widening)(S)
HWY 167 – Calhoun County, Arkansas

Scale: As Shown

Job No. 14-198

PLATE 8

Associates Inc.

				6	ARK.
				JOB NO.	CA0702	II	20
				2	PLAN AND PROFILE SHEETS

Roadway Boring
Typical Roadway Core
Location Specific Core
Test Pit

HWY. 167
PI = 287+95.65
Δ = 01°50'00"
D = 00°30'00"
T = 183.35'
L = 366.67'
PC = 286+12.30
PT = 289+78.97
℄ = N.C.

PRELIMINARY SUBJECT TO REVISION

280 285 290 295

CO. RD. 53

C.L. CONST.

EXIST. R/W

R36

C11

C12

R11

N01°32'55"E

N00°17'05"W

HWY. 167

EXIST. R/W

50 ft 0 50 ft 100 ft

STA. 284+69 - IN PLACE
24"X94' R.C. PIPE CULV'T.
WITH HEADWALL LT. & RT.
Q50 = XXXX C.F.S. D.A. = X.XXX ACRES

HWY. 167

245 240 235 230 225 220 215

PVI 281+75.00
ELEV. 229.95
PG ELEV. 229.61

0.90%

0.13%

350' V. C.
K = 452
SSD = 1569'

Elev 228.38

PVCC 283+50.00
Elev 230.17

EXISTING GROUND AT C.L. CONST.

+69
(EXIST.)
F.L. ELEV. IN = 225.74 RT.
F.L. ELEV. OUT = 225.45 LT.

PVI 285+00.00
ELEV. 230.36
PG ELEV. 230.48

0.13%

0.44%

300' V. C.
K = 966

PVRC 286+50.00
Elev 231.01

PVI 288+00.00
ELEV. 231.67
PG ELEV. 230.96

0.44%

-1.46%

300' V. C.
K = 158
SSD = 720'

FVCC 289+50.00
Elev 229.89

PVI 291+00.00
ELEV. 227.30
PG ELEV. 227.30

-1.46%

-1.46%

300' V. C.
K = 180000
SSD = 647550'

PVT 292+50.00
Elev 225.11

-1.46%

Grubbs, Hoskyn, Barton & Wyatt, INC.
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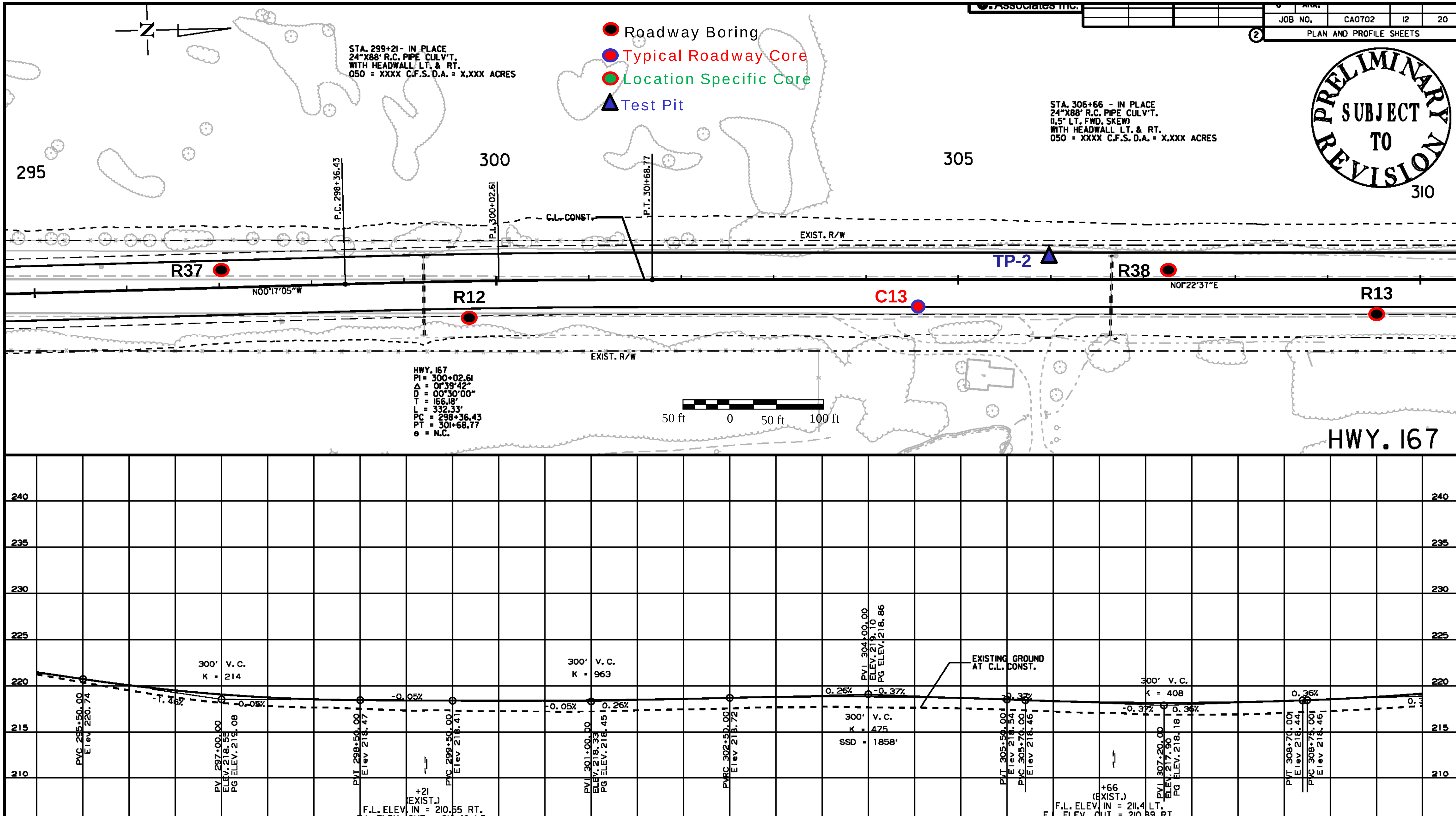
PLAN OF BORINGS, TEST PITS AND PAVEMENT CORES
Job No. CA0702 – Hampton – Hwy 274 (Widening)(S)
HWY 167 – Calhoun County, Arkansas

Scale: As Shown

Job No. 14-198

PLATE 9



Roadway Boring
Typical Roadway Core
Location Specific Core
Test Pit
JOB NO. CA0702 12 20
PLAN AND PROFILE SHEETS
PRELIMINARY SUBJECT TO REVISION
STA. 299+21 - IN PLACE
24"X88' R.C. PIPE CULV'T.
WITH HEADWALL LT. & RT.
050 = XXXX C.F.S. D.A. = X.XXX ACRES
STA. 306+66 - IN PLACE
24"X88' R.C. PIPE CULV'T.
(1.5" LT. FWD. SKEW)
WITH HEADWALL LT. & RT.
050 = XXXX C.F.S. D.A. = X.XXX ACRES
295
300
305
310
R37
R12
C13
TP-2
R38
R13
EXIST. R/W
C.L. CONST.
HWY. 167
PI = 300+02.61
Δ = 01°39'42"
D = 00°30'00"
T = 166.18'
L = 332.33'
PC = 298+36.43
PT = 301+68.77
e = N.C.
50 ft 0 50 ft 100 ft
HWY. 167
EXISTING GROUND AT C.L. CONST.
300' V.C. K = 214
300' V.C. K = 963
300' V.C. K = 475 SSD = 1858'
300' V.C. K = 408

PLAN OF BORINGS, TEST PITS AND PAVEMENT CORES

Job No. CA0702 – Hampton – Hwy 274 (Widening)(S)

HWY 167 – Calhoun County, Arkansas

Grubbs, Hoskyn, Barton & Wyatt, INC. CONSULTING ENGINEERS

Scale: As Shown

Job No. 14-198

PLATE 10

JOB NO.	CA0702	13	20
(2) PLAN AND PROFILE SHEETS			

PRELIMINARY SUBJECT TO REVISION

Roadway Boring
Typical Roadway Core
Location Specific Core
Test Pit

310 315 320 325

P.I. 318+19.99
Δ = 00°10'09" RT.

C.L. CONST.
EXIST. R/W
R39
C14
CS-2
N01°22'37"E
N01°32'46"E
C15
R14
EXIST. R/W

50 ft 0 50 ft 100 ft

HWY. 167

240 235 230 225 220 215 210 205

300' V.C.
K = 302
-1.5%
+1.35%
PVI 310+25.00
ELEV. 219.00
PG ELEV. 219.371
PVRC 311+75.00
Elev 221.03
PVI 318+50.00
ELEV. 224.75
PG ELEV. 223.76
+1.35%
-0.08%
550' V.C.
K = 383
SSD = 1026'
PVI 317+25.00
Elev 224.52
EXISTING GROUND AT C.L. CONST.
-0.08%
PVC 324+50.00
Elev 223.92

Grubbs, Hoskyn, Barton & Wyatt, INC.
CONSULTING ENGINEERS

PLAN OF BORINGS, TEST PITS AND PAVEMENT CORES
Job No. CA0702 – Hampton – Hwy 274 (Widening)(S)
HWY 167 – Calhoun County, Arkansas

Scale: As Shown

Job No. 14-198

PLATE 11

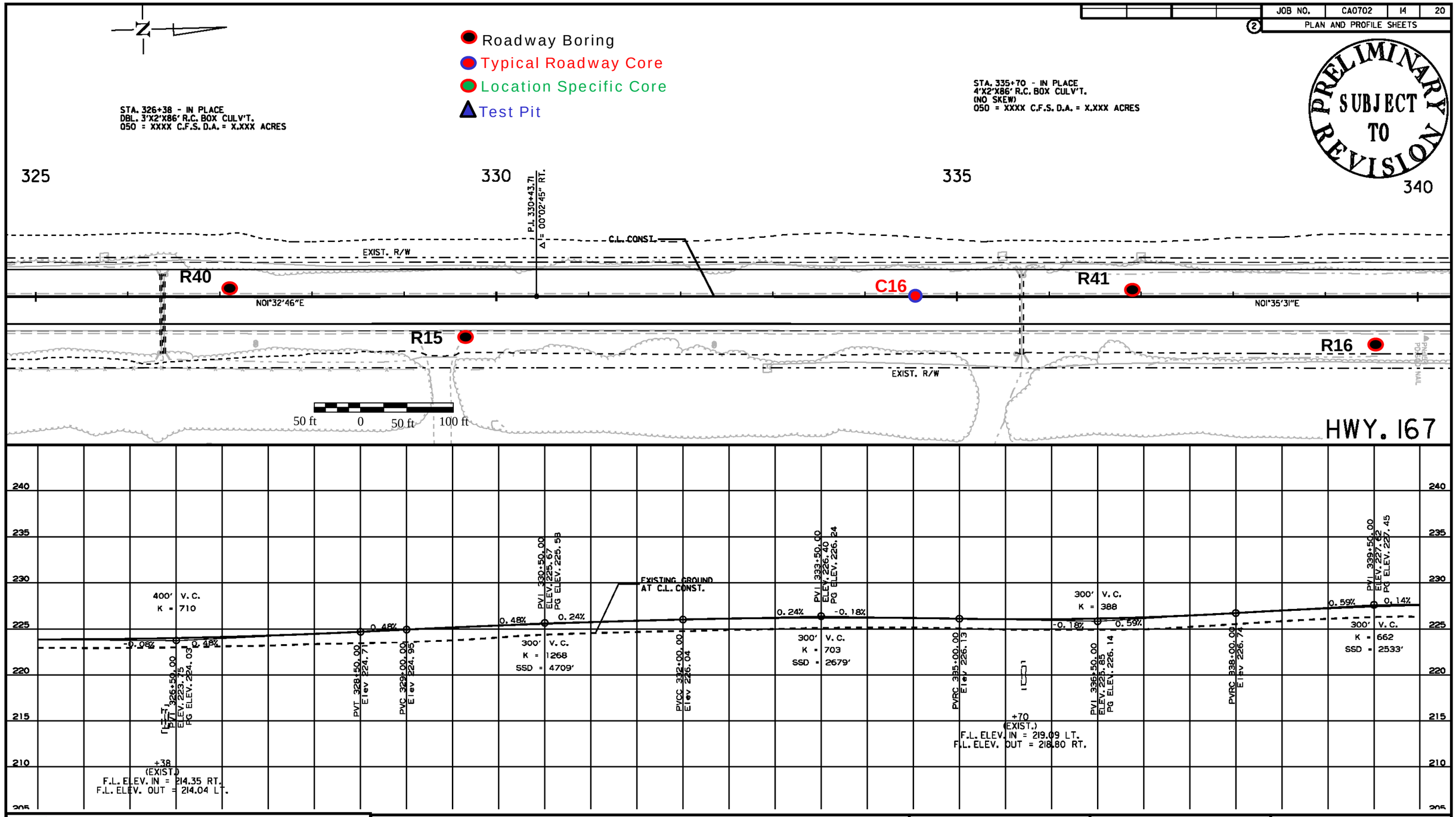
JOB NO.	CA0702	14	20
(2) PLAN AND PROFILE SHEETS			

Roadway Boring
Typical Roadway Core
Location Specific Core
Test Pit

PRELIMINARY SUBJECT TO REVISION

STA. 326+38 - IN PLACE
DBL. 3'X2'X86' R.C. BOX CULV'T.
050 = XXXX C.F.S. D.A. = X.XXX ACRES

STA. 335+70 - IN PLACE
4'X2'X86' R.C. BOX CULV'T.
(NO SKEW)
050 = XXXX C.F.S. D.A. = X.XXX ACRES



Grubbs, Hoskyn, Barton & Wyatt, INC.
CONSULTING ENGINEERS

PLAN OF BORINGS, TEST PITS AND PAVEMENT CORES
Job No. CA0702 – Hampton – Hwy 274 (Widening)(S)
HWY 167 – Calhoun County, Arkansas

Scale: As Shown

Job No. 14-198

PLATE 12

Roadway Boring
Typical Roadway Core
Location Specific Core
Test Pit

PLAN AND PROFILE SHEETS

PRELIMINARY SUBJECT TO REVISION

HWY. 167
PI = 355+02.69
Δ = 02°00'35"
D = 00°30'00"
T = 200.99'
L = 401.94'
PC = 353+01.70
PT = 357+03.64
e = N.C.

340 345 350 355

EXIST. R/W
C.L. CONST.
N01°35'31"E
HWY. 167
CO. RD. 54
P.C. 353+01.70
P.I. 355+02.69
R42
C18
C17
R17
EXIST. R/W

50 ft 0 50 ft 100 ft

HWY. 167

250 245 240 235 230 225 220 215

PVI 341+00.00 Elev 227.83
PVC 341+50.00 Elev 227.89
PVI 343+00.00 ELEV. 228.10 PG ELEV. 228.25
PVRC 344+50.00 Elev 228.93
PVI 345+00.00 ELEV. 229.75 PG ELEV. 229.71
PVT 347+50.00 Elev 230.42
PVC 348+50.00 Elev 230.87
PVI 350+50.00 ELEV. 231.77 PG ELEV. 231.23
PVT 352+50.00 Elev 230.50
PVC 353+50.00 Elev 229.87

0.14% 0.14% 0.55% 0.55% 0.45% 0.45% 0.45% -0.63% -0.63%

300' V. C.
K = 727

300' V. C.
K = 2967
SSD = 10821'

400' V. C.
K = 369
SSD = 1196'

EXISTING GROUND AT C.L. CONST.

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PLAN OF BORINGS, TEST PITS AND PAVEMENT CORES
Job No. CA0702 – Hampton – Hwy 274 (Widening)(S)
HWY 167 – Calhoun County, Arkansas

Scale: As Shown

Job No. 14-198

PLATE 13

Roadway Boring
Typical Roadway Core
Location Specific Core
Test Pit

CO. RD. 89 (WOODBERRY RD.)

STA. 364+45 - IN PLACE
24"X88' R.C. PIPE CULV'T.
(2° RT. FWD. SKEW)
WITH HEADWALL LT. & RT.
050 = XXXX C.F.S. D.A. = X.XXX ACRES

HWY. 167
PI = 365+03.24
Δ = 02°00'30"
D = 00°30'00"
T = 200.85'
L = 401.67'
PC = 363+02.39
PT = 367+04.05
e = N.C.

STA. 369+58 - IN PLACE
24"X92' R.C. PIPE CULV'T.
(2° RT. FWD. SKEW)
WITH HEADWALL LT. & RT.
050 = XXXX C.F.S. D.A. = X.XXX ACRES

PRELIMINARY SUBJECT TO REVISION

JOB NO.	CA0702	16	20
PLAN AND PROFILE SHEETS			

355 360 365 370

P.I. 355+02.69
P.T. 357+03.64
P.C. 363+02.39
P.T. 367+04.05

C.L. CONST.
EXIST. R/W
R43
R18
R44
R19
C19
N03°36'06"E
N01°35'36"E
HWY. 167

50 ft 0 50 ft 100 ft

HWY. 167

245 240 235 230 225 220 215

400' V.C.
K = 1460
-0.63%
-0.36%
PVI 355+50.00
ELEV. 228.60
PG ELEV. 228.74
PVT 357+50.00
Elev 227.88
-0.36%
PVC 359+00.00
Elev 227.34
300' V.C.
K = 732
-0.36%
0.05%
PVI 360+50.00
ELEV. 226.80
PG ELEV. 226.95
PVT 362+00.00
Elev 226.88
0.05%
EXISTING GROUND AT C.L. CONST.
PVC 363+00.00
Elev 226.93
300' V.C.
K = 1125
-0.05%
0.32%
PVI 364+50.00
ELEV. 227.00
PG ELEV. 227.10
+45
(EXIST.)
F.L. ELEV. IN = 221.74 RT.
PVRC 366+00.00
Elev 227.47
0.32%
-0.13%
PVI 367+50.00
ELEV. 227.85
PG ELEV. 227.78
300' V.C.
K = 667
SSD = 2548'
PVT 369+00.00
Elev 227.75
+58
(EXIST.)
F.L. ELEV. IN = 221.94
F.L. ELEV. OUT = 221.4

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CONSULTING ENGINEERS

PLAN OF BORINGS, TEST PITS AND PAVEMENT CORES
Job No. CA0702 – Hampton – Hwy 274 (Widening)(S)
HWY 167 – Calhoun County, Arkansas

Scale: As Shown

Job No. 14-198

PLATE 14

JOB NO.	CA0702	17	20
2	PLAN AND PROFILE SHEETS		

PRELIMINARY SUBJECT TO REVISION

Roadway Boring
Typical Roadway Core
Location Specific Core
Test Pit

STA. 380+42 - IN PLACE
24"X87' R.C. PIPE CULV'T.
WITH HEADWALL LT. & RT.
Q50 = XXXX C.F.S. D.A. = X.XXX ACRES

370 375 380 385

EXIST. R/W
C.L. CONST.
R45
C20
CS-3
C21
N01°35'36"E
R20
EXIST. R/W

50 ft 0 50 ft 100 ft

HWY. 167

245 240 235 230 225 220 215

-0.13%
-0.13%
-0.45%
300' V. C.
K = 947
SSD = 3557'
PVI 373+50.00
ELEV. 227.15
PG ELEV. 227.03
300' V. C.
K = 734
-0.45%
-0.04%
-0.04%

PVC 372+00.00
Elev 227.35
PVRC 375+00.00
Elev 226.48
PVI 376+50.00
ELEV. 225.80
PG ELEV. 225.95
PVT 378+00.00
Elev 225.74
PVC 384+00.00
Elev 225.49

EXISTING GROUND AT C.L. CONST.

RT. 7 LT.

+42
(EXIST.)
F.L. ELEV. IN = 220.25 RT.
F.L. ELEV. OUT = 219.66 LT.

Grubbs, Hoskyn, Barton & Wyatt, INC.
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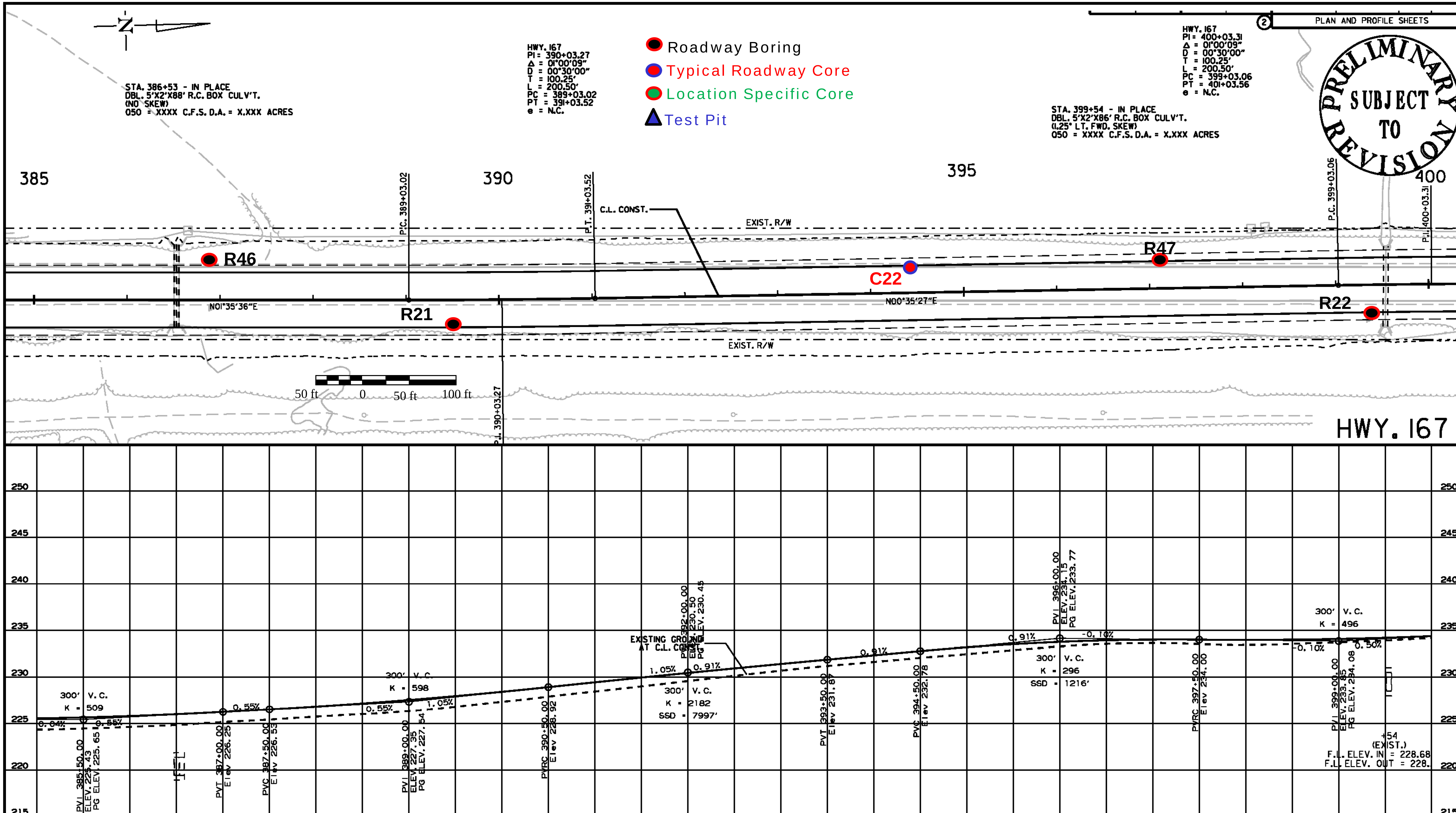
PLAN OF BORINGS, TEST PITS AND PAVEMENT CORES
Job No. CA0702 – Hampton – Hwy 274 (Widening)(S)
HWY 167 – Calhoun County, Arkansas

Scale: As Shown

Job No. 14-198

PLATE 15



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CONSULTING ENGINEERS

PLAN OF BORINGS, TEST PITS AND PAVEMENT CORES
Job No. CA0702 – Hampton – Hwy 274 (Widening)(S)
HWY 167 – Calhoun County, Arkansas

Scale: As Shown	**Job No. 14-198**	**PLATE 16**

JOB NO. | CA0702 | 19 | 20

2 PLAN AND PROFILE SHEETS

PRELIMINARY SUBJECT TO REVISION

Roadway Boring
Typical Roadway Core
Location Specific Core
Test Pit

HWY. 167
PI = 400+03.31
Δ = 01°00'09"
D = 00°30'00"
T = 100.25'
L = 200.50'
PC = 399+03.06
PT = 401+03.56
e = N.C.

400 405 410 415

P.I. 400+03.31
P.T. 401+03.56
C.L. CONST.
EXIST. R/W
R48
C23
C24
R23
N01°35'36"E
N01°3
EXIST. R/W

50 ft 0 50 ft 100 ft

HWY. 167

260 255 250 245 240 235 230 225

EXISTING GROUND AT C.L. CONST.

PVT 400+50.00 Elev 234.61
0.50%
PVC 402+75.00 Elev 235.74
300' V.C. K = 496
PVI 404+25.00 ELEV. 236.50 PG ELEV. 236.73
0.50%
1%
PVT 405+75.00 Elev 238.16
1.11%
PVC 406+35.00 Elev 239.39
300' V.C. K = 233
PVI 406+35.00 ELEV. 241.05 PG ELEV. 241.52
1.11%
2.40%
PVT 409+85.00 Elev 244.65
PVC 410+00.00 Elev 245.01
2.40%
350' V.C. K = 157 SSD = 658'
PVI 411+75.00 ELEV. 249.20 PG ELEV 248.22
2.40%
0.16%
0.16%
PVT 413+50.00 Elev 249.49
PVC 413+65.00 Elev 249.51

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CONSULTING ENGINEERS

PLAN OF BORINGS, TEST PITS AND PAVEMENT CORES
Job No. CA0702 – Hampton – Hwy 274 (Widening)(S)
HWY 167 – Calhoun County, Arkansas

Scale: As Shown

Job No. 14-198

PLATE 17

PLAN AND PROFILE SHEETS

PRELIMINARY SUBJECT TO REVISION

Roadway Boring
Typical Roadway Core
Location Specific Core
Test Pit

415 420 425

HWY. 167

EXIST. R/W

P.I. 418+44.37
Δ = 00°00'32" LT.

C.L. CONST.

R49 R50 C25 R25 R24 TP-3

N01°35'36"E

N01°35'04"E

50 ft 0 50 ft 100 ft

STA. 423+41.07
END JOB CA0702
(LOG MILE 5.11)

HWY. 167

280 275 270 265 260 255 250 245

350' V. C.
K = 145

5+40.00
Elev 250.85

PVT 417+15.00
Elev 254.30

PVC 419+25.00
Elev 259.71

PVI 421+00.00
ELEV. 264.21
PG ELEV. 263.83

350' V. C.
K = 400
SSD = 1407'

PVT 422+75.00
Elev 267.18

PVC 423+00.00
Elev 267.50

424+50.00
Elev. 270.15

300' V. C.
K = 677

ELEV. 270.32

EXISTING GROUND
AT C.L. CONST.

PVT 426+00.00
Elev 273.36

PVI 427+00.00
ELEV. 275.50

2.57% 1.70% 2.14%

Grubbs, Hoskyn, Barton & Wyatt, INC.
CONSULTING ENGINEERS

PLAN OF BORINGS, TEST PITS AND PAVEMENT CORES
Job No. CA0702 – Hampton – Hwy 274 (Widening)(S)
HWY 167 – Calhoun County, Arkansas

Scale: As Shown

Job No. 14-198

PLATE 18

SUMMARY of SUBSURFACE EXPLORATION

PROJECT: Job No. CA0702 - Hampton - HWY-274 (Widening)(S)
LOCATION: HWY 167 - Calhoun Co., Arkansas
GHBW JOB No.: 14-198

Boring No.	Station	Construction CL Offsett, ft		Completion Depth, ft	Approximate Surf El, ft	Boring location
R1	189+32	31	R	9.7	164.1	widened road
R2	199+15	32	R	9.7	164.0	widened road
R3	209+78	3	R	10	166.3	widened road
R4	219+45	11	R	10	165.1	widened road
R5	229+67	8	R	10	166.0	widened road
R6	239+86	9	R	10	167.3	widened road
R7	249+72	14	R	10	179.2	widened road
R8	259+64	17	R	10	207.9	widened road
R9	269+50	22	R	10	221.1	widened road
R10	279+88	26	R	10	224.8	widened road
R11	289+52	29	R	7.5	226.4	widened road
R12	299+68	41	R	10	216.0	widened road
R13	309+50	40	R	10	216±	widened road
R14	319+61	46	R	10	221.1	widened road
R15	329+65	46	R	10	223.1	widened road
R16	339+49	51	R	10	224.3	widened road
R17	349+64	40	R	10	229.4	widened road
R18	359+49	28	R	10	225.9	widened road
R19	369+35	24	R	10	225.0	widened road
R20	379+58	30	R	10	221.9	widened road
R21	389+41	28	R	10	224.4	widened road
R22	399+38	33	R	9.2	232.5	widened road
R23	409+51	32	R	10	241.8	widened road
R24	419+37	38	R	10	256.9	widened road
R25	423+03	32	R	10	264.5	widened road
R26	186+95	28	L	10	164.8	widened road
R27	196+63	40	L	10	163.0	widened road
R28	206+97	53	L	10	165.7	widened road
R29	216+66	3	R	10	165.2	widened road
R30	226+83	4	R	10	167.2	widened road
R31	237+01	2	R	10	167.3	widened road
R32	247+12	47	L	10	174.7	widened road
R33	257+10	47	L	10	201.4	widened road
R34	266+93	54	L	9.3	222.4	widened road
R35	277+02	42	L	10	224.1	widened road

SUMMARY of SUBSURFACE EXPLORATION

PROJECT: Job No. CA0702 - Hampton - HWY-274 (Widening)(S)
LOCATION: HWY 167 - Calhoun Co., Arkansas
GHBW JOB No.: 14-198

Boring No.	Station	Construction CL Offsett, ft		Completion Depth, ft	Approximate Surf El, ft	Boring location
R36	287+17	40	L	10	229.1	widened road
R37	296+97	19	L	9	217.2	widened road
R38	307+25	11	L	10	216.4	widened road
R39	317+06	36	L	10	221.4	widened road
R40	327+09	12	L	10	222.3	widened road
R41	336+91	10	L	10	224.3	widened road
R42	347+02	13	L	10	228.3	widened road
R43	357+16	17	L	10	226.5	widened road
R44	367+11	38	L	10	226.0	widened road
R45	377+00	39	L	10	223.9	widened road
R46	386+80	39	L	10	224.6	widened road
R47	397+11	28	L	10	232.4	widened road
R48	406+61	24	L	10	238.0	widened road
R49	416+40	24	L	10	251.3	widened road
R50	421+80	20	L	10	265±	widened road
C1	184+57	19	RT	6.5	164.8	pavt core
C2	194+50	10	LT	6.5	165.6	pavt core
C3	204+46	13	LT	7.5	166.2	pavt core
C4	214+50	37	LT	6.5	166.5	pavt core
C5	224+37	19	LT	6.5	167.7	pavt core
C6	234+80	38	LT	10	167.4	pavt core
C7	244+70	14	LT	6.5	173.4	pavt core
C8	254+27	30	LT	6.5	194.2	pavt core
C9	264+81	6	LT	6.5	222.0	pavt core
C10	274+44	24	LT	6.5	223.0	pavt core
C11	284+65	2	RT	6.5	229.3	pavt core
C12	294+80	16	LT	5.5	221.1	pavt core
C13	304+59	31	RT	6.5	217.5	pavt core
C14	314+57	5	LT	5.5	222.1	pavt core
C15	324+91	29	RT	5.5	222.7	pavt core
C16	334+58	3	LT	5.5	225.3	pavt core
C17	344+81	31	RT	5.5	228.0	pavt core
C18	354+91	5	LT	5.5	227.9	pavt core
C19	364+38	5	RT	5.5	226.1	pavt core

SUMMARY of SUBSURFACE EXPLORATION

PROJECT: Job No. CA0702 - Hampton - HWY-274 (Widening)(S)
LOCATION: HWY 167 - Calhoun Co., Arkansas
GHBW JOB No.: 14-198

Boring No.	Station	Construction CL Offsett, ft		Completion Depth, ft	Approximate Surf El, ft	Boring location
C20	374+59	29	LT	5.5	225.6	pavt core
C21	384+56	3	RT	6.5	224.4	pavt core
C22	394+39	25	LT	5.5	231.5	pavt core
C23	404+41	17	RT	5.5	236.1	pavt core
C24	412+99	15	LT	5.5	248.4	pavt core
C25	423+48	10	RT	5.5	268.0	pavt core
207+56	207+56	4	RT	100	165.9	Bridge 1
208+25	208+25	20	LT	70	164.0	Bridge 1
208+80	208+80	20	LT	1	156.0	Bridge 1
209+30	209+30	32	LT	70	158±	Bridge 1
209+75	209+75	18	LT	70	166±	Bridge 1
227+60	227+60	55	LT	80	167±	Bridge 2
227+94	227+94	16	LT	80	158±	Bridge 2
228+55	228+55	16	LT	80	154±	Bridge 2
229+35	229+35	15	RT	80	164±	Bridge 2
229+68	229+68	57	LT	100	166.9	Bridge 2
235+84	235+84	3	RT	100	166.7	Bridge 3
236+69	236+69	38	LT	70	166.0	Bridge 3
TP-1	185+50	30	RT	6.5	163.9	road test pit
TP-2	306+00	20	LT	6	216±	road test pit
TP-3	423+40	20	RT	6	264±	road test pit

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

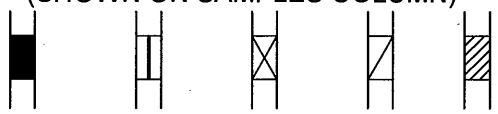
SYMBOLS AND TERMS USED ON BORING LOGS

SOIL TYPES
(SHOWN IN SYMBOLS COLUMN)

Gravel Sand Silt Clay

Predominant type shown heavy

SAMPLER TYPES
(SHOWN ON SAMPLES COLUMN)



Shelby Tube | Rock Core | Split Spoon | No Recovery | Cutting

TERMS DESCRIBING CONSISTENCY OR CONDITION

COARSE GRAINED SOILS (major portion retained on No. 200 sieve): Includes (I) Clean gravels and sands, and (2) silty or clayey gravels and sands. Condition is rated according to relative density, as determined by laboratory tests.

DESCRIPTIVE TERM	N-VALUE	RELATIVE DENSITY
VERY LOOSE	0-4	0-15%
LOOSE	4-10	15-35%
MEDIUM DENSE	10-30	35-65%
DENSE	30-50	65-85%
VERY DENSE	50 and above	85-100%

FINE GRAINED SOILS (major portion passing No. 200 sieve): Includes (1) Inorganic and organic silts and clays, (2) gravelly, sandy, or silty clays, and (3) clayey silts. Consistency is rated according to shearing strength, as indicated by penetrometer readings or by unconfined compression tests.

DESCRIPTIVE TERM	UNCONFINED COMPRESSIVE STRENGTH TON/SQ. FT.
VERY SOFT	Less than 0.25
SOFT	0.25-0.50
FIRM	0.50-1.00
STIFF	1.00-2.00
VERY STIFF	2.00-4.00
HARD	4.00 and higher

NOTE: Slickensided and fissured clays may have lower unconfined compressive strengths than shown above, because of planes of weakness or cracks in the soil. The consistency ratings of such soils are based on penetrometer readings.

TERMS CHARACTERIZING SOIL STRUCTURE

SLICKENSIDED - having inclined planes of weakness that are slick and glossy in appearance.
FISSURED - containing shrinkage cracks, frequently filled with fine sand or silt; usually more or less vertical.
LAMINATED - composed of thin layers of varying color and texture.
INTERBEDDED - composed of alternate layers of different soil types.
CALCAREOUS - containing appreciable quantities of calcium carbonate.
WELL GRADED - having a wide range in grain sizes and substantial amounts of all intermediate particle sizes.
POORLY GRADED - predominantly of one grain size, or having a range of sizes with some intermediate sizes missing.

Terms used on this report for describing soils according to their texture or grain size distribution are in accordance with the UNIFIED SOIL CLASSIFICATION SYSTEM, as described in Technical Memorandum No.3-357, Waterways Experiment Station, March 1953

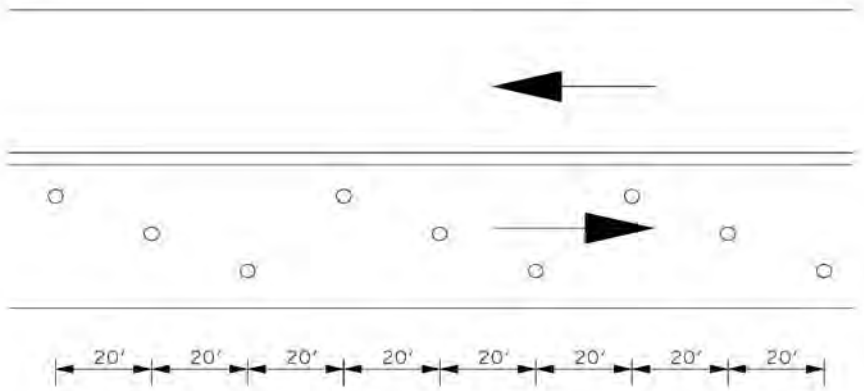
KEY 7-28-11

ATTACHMENT 2

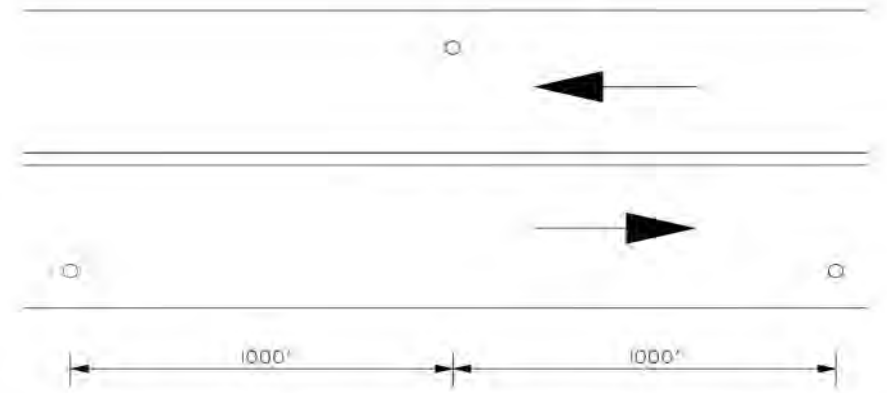
JOB CA0702

Location Specific Cores				
Severity Level	Route	Section	Log Mile	Lane
Good	Hwy. 167	4	4.30	East Bound
Fair	Hwy. 167	4	3.00	East Bound
Poor	Hwy. 167	4	0.80	East Bound
Depth of Corings		To bottom of Pavement		
Coring Size		6"		
Coring Size tolerance		± 0"		
Core Spacing		See Diagram below		

Location Specific Cores for the (3) different severity levels, with 3 cores on the outside wheel path, 3 on the inside wheel path, and 3 between the wheel paths.



Typical Cores	
Location	1000' Intervals alternating between lanes on the outside wheel path
Depth of Corings	To Bottom of Pavement
Coring Size	4" or 6"
Coring Size tolerance	± 0"
Core Spacing	See Diagram below



SUMMARY of CORE RESULTS

PROJECT: Task Order C071: Job No. CA0702 - Hampton - Hwy 274 (Widening) (S)
LOCATION: HWY 167 - Calhoun Co., Arkansas
GHBW JOB No.: 14-198

Project Length: 4.57 miles +/-

Core No.	Approx Sta	Approx Offset, ft	Directional lane		Total Core length, in.	AC Layer #1, in.	AC Layer #2, in.	AC Layer #3, in.	AC Layer #4, in.	AC Layer #5, in.	AC Layer #6, in.
C1	184+57	19	NB	OWP	2.75	2.75	---	---	---	---	---
C2	194+50	-10	SB	OWP	14.5	2	3	6	3.5	---	---
CS-1 IWP 1	198+03		NB	IWP	15	1	3.5	3	5	2.5	---
CS-1 BWP 1	198+23		NB	BWP	13.25	1	3.5	2.75	4	2	---
CS-1 OWP 1	198+43		NB	OWP	14.5	1.75	2.5	2.25	6	2	---
CS-1 IWP 2	198+63		NB	IWP	16	1	2	3	5.5	4.5	---
CS-1 BWP 2	198+83		NB	BWP	13.5	1.5	3.5	3.5	3	2	---
CS-1 OWP 2	199+03		NB	OWP	12.5	1.75	2.5	3.25	2.5	2.5	---
CS-1 IWP 3	199+23		NB	IWP	13	1	3.5	2	2.5	4	---
CS-1 BWP 3	199+43		NB	BWP	13.5	1.5	3.5	3.5	3	2	---
CS-1 OWP 3	199+63		NB	OWP	12	1.25	1	2.25	3	2.25	---
C3	204+46	-13	NB	OWP	16	3	2	2	2.25	2.25	3.5
C4	214+50	-37	SB	OWP	15	2.5	3.5	5.75	3.25	---	---
C5	224+37	-19	NB	OWP	15.5	3	2	2	2.25	2	3.25
C6	234+80	-38	SB	OWP	16.25	3.25	3.25	3	4.5	2	---
C7	244+70	-14	NB	OWP	9.5	2.75	2.5	2	2.5	---	---
C8	254+27	-30	SB	OWP	11.75	3.25	1.75	1.75	2	2.25	2.75
C9	264+81	-6	NB	OWP	10	3	1.75	2	3.25	---	---
C10	274+44	-24	SB	OWP	11.75	3.25	2	2	1.5	---	---
C11	284+65	2	NB	OWP	5.25	2	3.25	---	---	---	---
C12	294+80	-16	SB	OWP	5	1.5	1	2.5	---	---	---
C13	304+59	31	NB	OWP	6.5	2.5	3.25	---	---	---	---
CS-2 IWP 1	314+36		NB	IWP	15.75	2	2	3.75	2.75	6	---
CS-2 BWP 1	314+56		NB	BWP	16	2.75	2	2.25	2.75	6.25	---
CS-2 OWP 1	314+76		NB	OWP	5.75	2	2	1.75	---	---	---
CS-2 IWP 2	314+96		NB	IWP	13.75	2	2	3.5	3	3.25	---

SUMMARY of CORE RESULTS

PROJECT: Task Order C071: Job No. CA0702 - Hampton - Hwy 274 (Widening) (S)
LOCATION: HWY 167 - Calhoun Co., Arkansas
GHBW JOB No.: 14-198

Project Length: 4.57 miles +/-

Core No.	Approx Sta	Approx Offset, ft	Directional lane		Total Core length, in.	AC Layer #1, in.	AC Layer #2, in.	AC Layer #3, in.	AC Layer #4, in.	AC Layer #5, in.	AC Layer #6, in.
CS-2 BWP 2	315+16		NB	BWP	5	2.5	2.5	---	---	---	---
CS-2 OWP 2	315+36		NB	OWP	5.5	2.5	3	---	---	---	---
CS-2 IWP 3	315+56		NB	IWP	12.5	2	2	3.5	3	2	---
CS-2 BWP 3	315+76		NB	BWP	5	2	3	---	---	---	---
CS-2 OWP 3	315+96		NB	OWP	5	2	3	---	---	---	---
C14	314+57	-5	SB	OWP	5.25	2.75	2.5	---	---	---	---
C15	324+91	29	NB	OWP	4	2	2	---	---	---	---
C16	334+58	-3	SB	OWP	5.25	2.5	2.75	---	---	---	---
C17	344+81	31	NB	OWP	6	3	3	---	---	---	---
C18	354+91	-5	SB	OWP	4.5	2.25	2.25	---	---	---	---
C19	364+38	5	NB	OWP	7.5	1.5	1.5	4.5	---	---	---
C20	374+59	-29	SB	OWP	4.5	2	2.5	---	---	---	---
CS-3 IWP 1	382+92		NB	IWP	12	1	3	5.5	2.5	---	---
CS-3 BWP 1	383+12		NB	BWP	4.5	1	3.5	---	---	---	---
CS-3 OWP 1	383+32		NB	OWP	7	1	2	4	---	---	---
CS-3 IWP 2	383+52		NB	IWP	12.5	1	3	5.5	3	---	---
CS-3 BWP 2	383+72		NB	BWP	5.5	1.5	2.5	2	---	---	---
CS-3 OWP 2	383+92		NB	OWP	5	1	2	2	---	---	---
CS-3 IWP 3	384+12		NB	IWP	12.5	1	3	5.5	3	---	---
CS-3 BWP 3	384+32		NB	BWP	4	1	3	---	---	---	---
CS-3 OWP 3	384+52		NB	OWP	5.5	0.75	2.75	2	---	---	---
C21	384+56	3	NB	OWP	4.75	0.75	1.5	2.5	---	---	---
C22	394+39	-25	SB	OWP	5	2	3	---	---	---	---
C23	404+41	17	NB	OWP	5	2	3	---	---	---	---
C24	414+50	-12	SB	OWP	4.25	2	2.25	---	---	---	---
C25	423+48	10	NB	OWP	7	1.5	2	3.5	---	---	---

ATTACHMENT 3

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. C1

AHTD CA0702: Highway 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 184+57, 19 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 164.8				
			3 inches: Asphalt Concrete				
			Medium dense tan and reddish tan silty fine to coarse sand w/some fine gravel (fill)	17		-NON-PLASTIC-	19
			Medium dense gray fine sandy silt	27		-NON-PLASTIC	74
5			Stiff to very stiff tan and gray fine sandy clay w/trace fine sand pockets	24			
10							
15							

COMPLETION DEPTH: 6.5 ft
DATE: 4-20-15

DEPTH TO WATER IN BORING: Dry

DATE: 4/20/2015

LGBNEW 14-198_C_LOGS.GPJ 6-25-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. C2

AHTD CA0702: Highway 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 194+50, 10 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 165.6				
			15 inches: Asphalt Concrete				
			Medium dense gray sandy silt, slightly clayey (fill) - medium dense dark brown clayey fine to coarse gravel layer at 2 ft -with sand, clayey silt layers below 2.5 - perched water at 3 ft	25 15			69
5			Soft dark gray clayey silt w/sand seams				
			Soft tan and gray fine sandy clay w/occasional ferrous nodules and stains	5			
10							
15							

COMPLETION DEPTH: 6.5 ft
DATE: 4-30-15

DEPTH TO WATER IN BORING: Dry

DATE: 4/1/320

LGBNEW 14-198_C_LOGS.GPJ 6-25-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. C3

AHTD CA0702: Highway 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 204+46, 13 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 166.2				
			16 inches: Asphalt Concrete				
			Medium dense tan and reddish tan clayey fine to coarse gravel w/silt (fill)	19		●	
5			Loose gray fine sandy silt	4		● -NON-PLASTIC-	56
			- perched water at 5.5 ft	6		●	
10							
15							

COMPLETION DEPTH: 7.5 ft
DATE: 4-20-15

DEPTH TO WATER IN BORING: 7.5 ft

DATE: 4/20/2015

LGBNEW 14-198_C_LOGS.GPJ 6-25-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. C4

AHTD CA0702: Highway 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 214+50, 37 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 166.5				
			15 inches: Asphalt Concrete				
			Medium dense gray clayey fine sand, silty (fill) - with fine to coarse gravel below 1.5 ft	13			19
			Very soft gray clayey silt, sandy				
			Very soft dark gray silty clay, sandy, wet	2			
5				4			
10							
15							

COMPLETION DEPTH: 6.5 ft
DATE: 4-30-15

DEPTH TO WATER IN BORING: 3.5 ft

DATE: 4/30/2015

LGBNEW 14-198_C_LOGS.GPJ 6-25-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. C5

AHTD CA0702: Highway 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 224+37, 19 ft Lt

SURF. EL: 167.7

DEPTH, FT	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	- No. 200 %
	15.5 inches: Asphalt Concrete			
	Firm tan and reddish tan fine sandy clay, silty fine to coarse gravel (fill)	7		59
	Firm gray fine sandy clay w/a litle silt and fine to coarse gravel (fill)	10		
5	- perched water at 6 ft	9		
	Firm gray silty clay w/decaying organics			
10				
15				

COHESION, TON/SQ FT
0.2 0.4 0.6 0.8 1.0 1.2 1.4

PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT
10 20 30 40 50 60 70

COMPLETION DEPTH: 6.5 ft
DATE: 4-22-15

DEPTH TO WATER IN BORING: 6 ft
DATE: 4/22/2015

LGBNEW 14-198_C_LOGS.GPJ 6-25-15

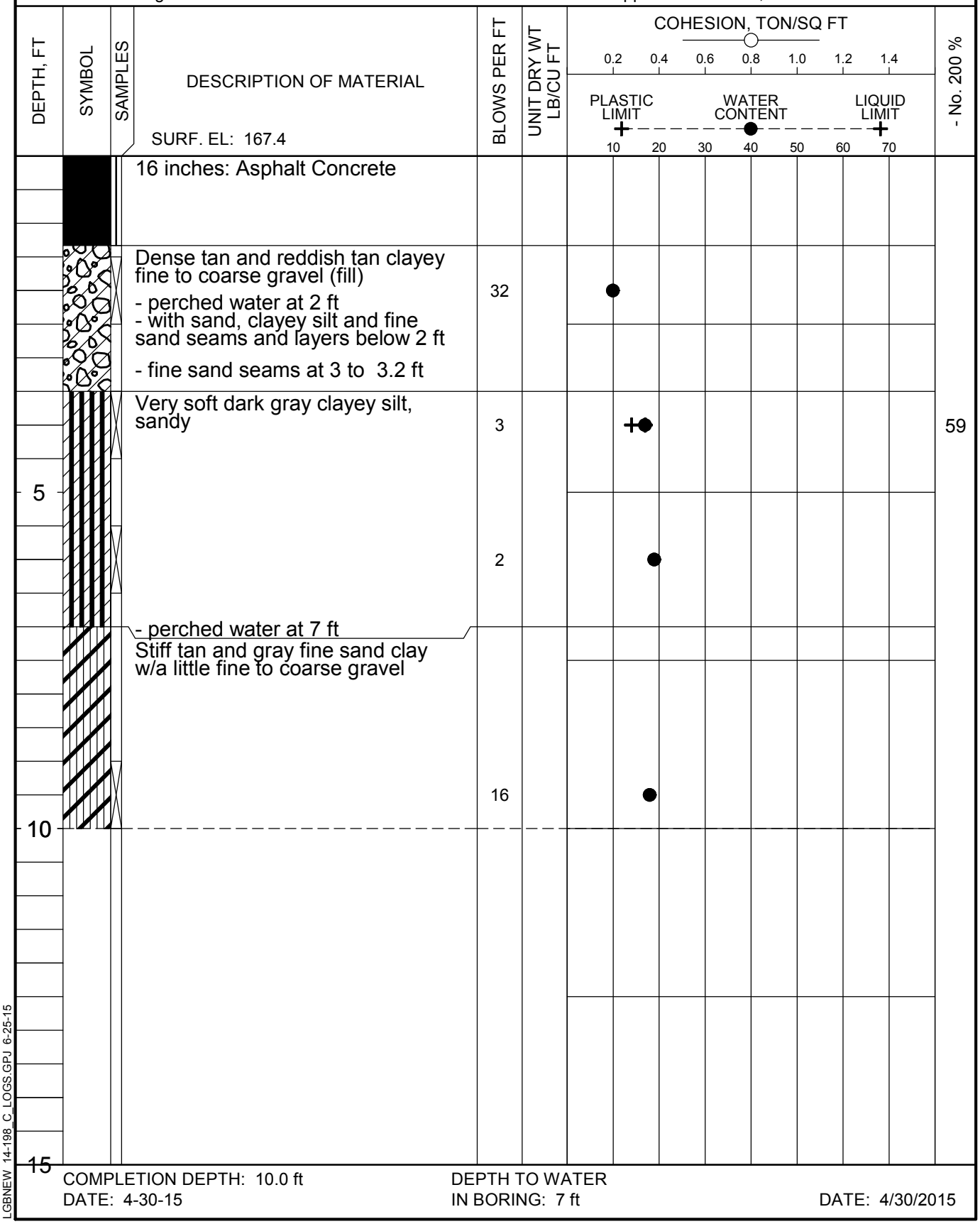
Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. C6

AHTD CA0702: Highway 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 234+80, 38 ft Lt



COMPLETION DEPTH: 10.0 ft
DATE: 4-30-15

DEPTH TO WATER IN BORING: 7 ft

DATE: 4/30/2015

LGBNEW 14-198_C_LOGS.GPJ 6-25-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. C7

AHTD CA0702: Highway 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 244+70, 14 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 173.4				
			9.5 inches: Asphalt Concrete				
			Medium dense tan and reddish tan clayey fine to coarse gravel w/ silt (fill)	19			19
			Stiff gray clayey silt, sandy	22			63
5			- firm below 5 ft				
			- with occasional organic inclusions below 6 ft	9			
10							
15							

COMPLETION DEPTH: 6.5 ft
DATE: 4-22-15

DEPTH TO WATER IN BORING: Dry

DATE: 4/22/2015

LGBNEW 14-198_C_LOGS.GPJ 6-25-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. C8

AHTD CA0702: Highway 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 254+27, 30 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 194.2				
			11.5 inches: Asphalt Concrete				
			Medium dense tan and reddish tan clayey fine to coarse gravel (fill)				
			- dark brown below 2 ft	18		● + +	19
			- perched water at 3.5 ft - very loose below 3.5 ft	2		●	
5			Dense gray and reddish tan clayey fine to coarse gravel, silty (possible fill)	50/10"		●	
10							
15							

COMPLETION DEPTH: 6.5 ft
DATE: 4-30-15

DEPTH TO WATER IN BORING: 3.5 ft

DATE: 4/30/2015

LGBNEW 14-198_C_LOGS.GPJ 6-25-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. C9

AHTD CA0702: Highway 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 264+81, 6 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 222.0				
			10 inches: Asphalt Concrete				
			Firm reddish tan fine sandy clay w/some fine to coarse gravel (fill)	7			53
			Stiff gray, tan and red fine sandy clay w/occasional ferrous nodules and stains	18			
5			Medium dense gray and reddish tan clayey fine sand w/occasional ferrous nodules	27			
10							
15							

COMPLETION DEPTH: 6.5 ft
DATE: 4-22-15

DEPTH TO WATER IN BORING: Dry

DATE: 4/22/2015

LGBNEW 14-198_C_LOGS.GPJ 6-25-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. C10

AHTD CA0702: Highway 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 274+45, 24 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 223.0				
			9 inches: Asphalt Concrete				
			Dense crushed stone and gravel w/asphalt concrete debris (fill)				
			Medium dense gray clayey fine sand w/fine to coarse gravel (fill) - gray and dark brown with fine to coarse gravel below 2 ft	11			30
			Loose gray silty fine sand	5			48
			- perched water at 4 ft				
5			- very loose below 5 ft	1			
			Stiff gray, tan and reddish tan fine sandy clay w/occasional ferrous nodules and stains				
10							
15							

COMPLETION DEPTH: 6.5 ft
DATE: 4-30-15

DEPTH TO WATER IN BORING: 4 ft

DATE: 4/30/2015

LGBNEW 14-198_C_LOGS.GPJ 6-25-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. C11

AHTD CA0702: Highway 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 284+65, 2 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 229.3				
			5.75 inches: Asphalt Concrete				
			Dense tan and reddish tan clayey fine to coarse gravel w/silt and a little fine to coarse sand (fill)	31			13
			- medium dense gray fine sandy silt below 3 ft	15			
5			Stiff tan and gray fine sandy clay - perched water at 5 ft				
			- gray, tan and red below 6 ft	11			
10							
15							

COMPLETION DEPTH: 6.5 ft
DATE: 4-22-15

DEPTH TO WATER IN BORING: 5 ft
DATE: 4/22/2015

LGBNEW 14-198_C_LOGS.GPJ 6-25-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. C12

AHTD CA0702: Highway 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 294+80, 16 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 221.1				
			5 inches: Asphalt Concrete				
			1 inch: Aggregate Base				
			Dense tan and reddish tan clayey fine to coarse gravel (fill)	45			
			Dense dark gray and brown silty fine sand w/fine to coarse gravel (fill)	20			49
			Stiff dark gray clayey silt, sandy w/occasional decayed organics - perched water at 4 ft				
5			Stiff tan, gray and reddish tan fine sandy clay w/fine sand pockets, and ferrous nodules and stains	28			
10							
15							

COMPLETION DEPTH: 5.5 ft
DATE: 4-30-15

DEPTH TO WATER IN BORING: 4 ft
DATE: 4/30/2015

LGBNEW 14-198_C_LOGS.GPJ 6-25-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. C13

AHTD CA0702: Highway 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 304+59, 31 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 217.5				
			6.5 inches: Asphalt Concrete				
			Dense tan and reddish tan clayey fine to coarse gravel w/silt (fill)	30			16
			- loose tan and reddish tan clayey fine sand with a little fine to coarse gravel below 3 ft	8			
5			Medium dense tan and gray clayey fine sand, damp				
			Stiff gray, tan and reddish tan fine sandy clay w/some fine to coarse gravel	22			
10							
15							

COMPLETION DEPTH: 6.5 ft
DATE: 4-22-15

DEPTH TO WATER IN BORING: Dry

DATE: 4/22/2015

LGBNEW 14-198_C_LOGS.GPJ 6-25-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. C14

AHTD CA0702: Highway 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 314+57, 5 ft Lt

SURF. EL: 222.1

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			5.5 inches: Asphalt Concrete				
			Dense tan and reddish tan silty fine to coarse gravel w/clayey silt pockets (fill)	36			30
			Medium dense dark gray fine sandy silt - tan and gray with more sand and ferrous stains below 3 ft	13		-NON-PLASTIC-	62
5			Firm tan and gray fine sandy clay w/ferrous stains	7			
10							
15							

COMPLETION DEPTH: 5.5 ft
DATE: 4-30-15

DEPTH TO WATER IN BORING: Dry

DATE: 4/30/2015

LGBNEW 14-198_C_LOGS.GPJ 6-25-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. C15

AHTD CA0702: Highway 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 324+91, 29 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 222.7				
			4 inches: Asphalt Concrete				
			Medium dense reddish tan and tan clayey fine to coarse gravel (fill)	28			20
			- medium dense gray silty fine sand with fine gravel and organics below 2.5 ft	15			
			- with brown clayey sand seams below 4 ft				
5			Stiff gray, tan and red fine sandy clay w/trace fine to coarse gravel	10			
			- perched water at 5 ft				
10							
15							

COMPLETION DEPTH: 5.5 ft
DATE: 4-22-15

DEPTH TO WATER IN BORING: 5 ft
DATE: 4/22/2015

LGBNEW 14-198_C_LOGS.GPJ 6-25-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. C16

AHTD CA0702: Highway 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 334+58, 3 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 225.3				
			5.5 inches: Asphalt Concrete				
			Dense reddish tan and tan silty fine to coarse gravel w/clayey silt pockets (fill)	35			19
			Medium dense gray and dark brown silty fine sand w/fine to coarse gravel (fill) -asphalt concrete debris at 3 ft (2-3 in. layer)	16			
5			Stiff tan fine sandy clay, damp - gray tan and reddish tan with fine sand pockets and ferrous nodules and stains below 5 ft	13			
10							
15							

COMPLETION DEPTH: 5.5 ft
DATE: 4-30-15

DEPTH TO WATER IN BORING: Dry

DATE: 4/30/2015

LGBNEW 14-198_C_LOGS.GPJ 6-25-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. C17

AHTD CA0702: Highway 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 344+81, 31 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 228.0				
			6 inches: Asphalt Concrete				
			Medium dense reddish tan clayey fine to coarse gravel (fill)				
			Medium dense gray silty fine sand (probable fill)	35		-NON-PLASTIC-	18
			- loose to medium dense below 2.5 ft	10			
			- perched water at 3.5 ft				
			Medium dense gray silty fine sand				
5				19			
10							
15							

COMPLETION DEPTH: 5.5 ft
DATE: 4-22-15

DEPTH TO WATER IN BORING: Dry

DATE: 4/22/2015

LGBNEW 14-198_C_LOGS.GPJ 6-25-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. C18

AHTD CA0702: Highway 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 354+91, 5 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 227.9				
			5.5 inches: Asphalt Concrete				
			Dense tan silty fine to coarse gravel w/silt(fill)	39		-NON-PLASTIC-	8
			- perched water at 2 ft Medium dense dark gray fine sandy silt w/fine to coarse gravel (possible fill)	26			
5			Medium dense gray silty fine sand	14			
10							
15							

COMPLETION DEPTH: 5.5 ft
DATE: 4-29-15

DEPTH TO WATER IN BORING: 2 ft
DATE: 4/29/2015

LGBNEW 14-198_C_LOGS.GPJ 6-25-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. C19

AHTD CA0702: Highway 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 364+38, 5 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 226.1				
			7.5 inches: Asphalt Concrete				
			Medium dense reddish tan and tan silty fine to coarse gravel (fill) - perched water at 1 ft	25		● +	17
			- silty fine sand layer at 2 ft				
			Medium dense gray silty fine sand w/a little fine to coarse gravel	15		●	
5				24		●	
10							
15							

COMPLETION DEPTH: 5.5 ft
DATE: 4-29-15

DEPTH TO WATER IN BORING: Dry

DATE: 4/29/2015

LGBNEW 14-198_C_LOGS.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. C20

AHTD CA0702: Highway 167 Widening
Calhoun County, Arkansas

TYPE: Auger LOCATION: Approx Sta 374+59, 29 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 225.6				
			5 inches: Asphalt Concrete				
			Dense tan and reddish tan sandy fine to coarse gravel (fill)	39		-NON-PLASTIC-	16
			Medium dense dark gray silty fine sand w/some fine to coarse gravel				
			- dark brown below 3 ft	23		-NON-PLASTIC-	36
			- perched water at 4.5 ft				
5			Very loose to loose tan and gray clayey fine sand w/ferrous nodules, damp	4			
10							
15							

COMPLETION DEPTH: 5.5 ft
DATE: 4-29-15

DEPTH TO WATER IN BORING: 4.5 ft
DATE: 4/29/2015

LGBNEW 14-198_C_LOGS.GPJ 6-25-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. C21

AHTD CA0702: Highway 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 384+56, 3 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 224.4				
			5.5 inches: Asphalt Concrete				
			Medium dense tan and reddish tan clayey fine to coarse gravel (fill)				
			Stiff dark brown clayey silt, sandy w/a little fine to coarse gravel (probable fill)	17			55
				21			
5			Stiff tan and gray fine sandy clay, silty w/trace fine to coarse gravel				
				13			67
10							
15							

COMPLETION DEPTH: 6.5 ft
DATE: 4-29-15

DEPTH TO WATER IN BORING: Dry

DATE: 4/29/2015

LGBNEW 14-198_C_LOGS.GPJ 6-25-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. C22

AHTD CA0702: Highway 167 Widening
Calhoun County, Arkansas

TYPE: Auger LOCATION: Approx Sta 394+39, 25 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 231.5				
			4.5 Inches: Asphalt Concrete				
			Medium dense tan and reddish tan clayey fine gravel, silty w/some fine to coarse sand (fill)	24			20
			- clayey silt layer at 1.8 ft				
			Medium dense gray fine sandy silt	12			
			- sandy, clayey silt layer at4 ft				
5			Medium dense tan and gray silty fine sand	11			
10							
15							

COMPLETION DEPTH: 5.5 ft
DATE: 4-29-15

DEPTH TO WATER IN BORING: Dry

DATE: 4/29/2015

LGBNEW 14-198_C_LOGS.GPJ 6-25-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. C23

AHTD CA0702: Highway 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 404+41, 17 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 236.1				
			5 Inches: Asphalt Concrete				
			Tan and reddish tan silty fine to coarse gravel (fill)				10
			Dense gray clayey silt, sandy with some fine to coarse gravel (fill)	31			
			- silty fine sand seam at 2 ft				
			- medium dense below 2.5 ft	15			
			Stiff tan and gray fine sandy clay, silty w/occasional ferrous nodules and stains				
5			- perched water at 4 ft	15			
10							
15							

COMPLETION DEPTH: 5.5 ft
DATE: 4-29-15

DEPTH TO WATER IN BORING: 4 ft
DATE: 4/29/2015

LGBNEW 14-198_C_LOGS.GPJ 6-25-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. C24

AHTD CA0702: Highway 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 414+50, 12 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 250±				
			4 Inches: Asphalt Concrete				
			Medium dense gray sandy fine to coarse gravel w/silt (fill)			-NON-PLASTIC-	10
			Medium dense brown clayey fine sand, silty w/fine to coarse gravel (fill)	16			49
			- loose below 2.5 ft	8			
			- with asphalt concrete debris below 3 ft				
			Firm tan and dark gray clayey silt, sandy w/ferrous nodules and some fine to coarse gravel				
			- perched water at 4.5 ft	7			
5							
10							
15							

COMPLETION DEPTH: 5.5 ft
DATE: 4-29-15

DEPTH TO WATER IN BORING: 4.5 ft

DATE: 4/29/2015

LGBNEW 14-198_C_LOGS.GPJ 6-25-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. C25

AHTD CA0702: Highway 167 Widening
Calhoun County, Arkansas

TYPE: Auger LOCATION: Approx Sta 423+48, 10 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 268.0				
			7 Inches: Asphalt Concrete				
			Dense tan and reddish tan silty fine to coarse gravel (fill)	50/7"		-NON-PLASTIC-	6
			- medium dense below 2.5 ft - with some asphalt concrete debris below 3 ft - silty clay layer at 4 ft	25			
5			Medium dense dark gray clayey silt w/trace fine to coarse gravel and occasional decayed organic inclusions	13			
10							
15							

COMPLETION DEPTH: 5.5 ft
DATE: 4-29-15

DEPTH TO WATER IN BORING: 5.5 ft
DATE: 4/29/2015

LGBNEW 14-198_C_LOGS.GPJ 6-25-15

ATTACHMENT 4

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R1

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 189+32, 31 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70)	
			SURF. EL: 164.1				
			Medium dense reddish tan clayey fine to coarse gravel (fill)				
			Stiff gray clayey silt, sandy	15			62
			- tan and reddish tan clayey fine sand with fine to coarse gravel below 2 ft	14			
5			Medium dense gray fine sandy silt	16		-NON-PLASTIC-	59
			Medium dense gray and tan clayey fine sand w/ferrous stains below 7.3	18			
10			Dense to very dense tan and gray clayey fine to coarse gravel	50/8"			
15							

COMPLETION DEPTH: 10.0 ft
DATE: 4-6-15

DEPTH TO WATER IN BORING: 4.8 ft

DATE: 4/6/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R2

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger LOCATION: Approx Sta 199+15, 32 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 164±				
			Medium dense brown clayey fine sand w/a little fine to coarse gravel (fill)	12			32
			Medium dense gray clayey fine sand w/occasional fine gravel	12			
			- with more gravel below 4 ft				
5			Stiff gray silty clay	14			
			- perched water at 6 ft - firm to stiff below 6 ft	10			
			Dense to very dense tan and gray clayey fine to coarse gravel	50/8"			
10							
15							

COMPLETION DEPTH: 10.0 ft
DATE: 4-6-15

DEPTH TO WATER IN BORING: 6 ft

DATE: 4/6/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R3

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Aprrox Sta 209+78, 3 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 166.3				
			Loose brown clayey fine to coarse gravel w/occasional asphalt debris (fill)	10			36
			- medium dense at 2 to 4 ft	14			
			- loose reddish tan and tan below 4 ft	6			
5							
			Loose tan and gray fine sandy clay w/trace fine to coarse gravel, damp	5			44
			Very loose gray clayey fine sand w/trace fine gravel	2			
10							
15							

COMPLETION DEPTH: 10.0 ft
DATE: 4-7-15

DEPTH TO WATER IN BORING: Dry

DATE: 4/7/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R4

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 219+45, 11 ft Rt

SURF. EL: 165.1

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			Medium dense gray, tan and reddish tan clayey fine sand w/fine to coarse gravel (fill)	16			32
			- loose at 2 to 4 ft	9			
5			- medium dense, tan and gray silty clay below 4 ft	18			
			Very soft gray silty clay w/decayed organics	3			
			- stiff below 8.5 ft				
10			Stiff gray clayey silt, sandy	23			
15							

COMPLETION DEPTH: 10.0 ft
DATE: 4-7-15

DEPTH TO WATER IN BORING: Dry

DATE: 4/7/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

PLATE 4

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R5

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 229+67, 8 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 166.0				
			Stiff tan and gray fine sandy clay, silty w/occasional ferrous nodules and stains	16			63
				16			
5				12			
			- water at 6 ft	16			
			- firm to stiff below 8 ft				
				10			
10							
15							

COMPLETION DEPTH: 10.0 ft
DATE: 5-5-15

DEPTH TO WATER IN BORING: 6 ft

DATE: 5/5/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R6

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger LOCATION: Approx Sta 239+86, 9 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 167.3				
			Medium dense tan and brown clayey fine sand w/fine to coarse gravel (fill)	16			24
			Stiff tan and gray silty clay w/fine sand seams	18			
5			Medium dense reddish tan and tan clayey fine sand w/fine to coarse gravel and ferrous stains	25			
			- water at 6.5 ft Dense tan sandy fine to coarse gravel, slightly clayey	42			
			- dense to very dense below 8.5 ft	50/10"			
10							
15							

COMPLETION DEPTH: 10.0 ft
DATE: 5-5-15

DEPTH TO WATER IN BORING: 6.5 ft

DATE: 5/5/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R7

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 249+72, 14 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 179.2				
			Medium dense brown sandy fine to coarse gravel and clayey silt (fill)	26			
			- tan silty fine sand below 2 ft - dense below 2 ft	30		-NON-PLASTIC-	42
			- water at 4 ft - gray below 4.5 ft	32			
5			Stiff gray clayey silt, sandy w/trace of fine to coarse gravel	12			
			Stiff tan and gray silty clay	16			
10							
15							

COMPLETION DEPTH: 10.0 ft
DATE: 5-5-15

DEPTH TO WATER IN BORING: 4 ft

DATE: 5/5/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R8

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 259+64, 17 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 207.9				
			Stiff tan and gray fine sandy clay, silty	16			57
			Dense reddish tan clayey fine to coarse gravel	32			
5				36			
			- medium dense at 6 to 8 ft	28			
			- dense below 8 ft	37			
10							
15							

COMPLETION DEPTH: 10.0 ft
DATE: 5-5-15

DEPTH TO WATER IN BORING: Dry

DATE: 5/5/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R9

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 269+50, 22 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 221.1				
			Loose gray and tan silty fine sand, slightly clayey w/trace fine to coarse gravel (fill)	7			46
			- loose to medium dense tan and gray clayey fine sand below 2 ft	10			
5			Stiff reddish tan and tan fine sandy clay	14			61
			- very stiff, gray and yellowish tan below 6 ft	46			
				35			
10							
15							

COMPLETION DEPTH: 10.0 ft
DATE: 4-7-15

DEPTH TO WATER IN BORING: Dry

DATE: 4/7/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R10

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 279+88, 26 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 224.8				
			Medium dense tan silty fine sand/fine sandy silt w/occasional organics	12		-NON-PLASTIC-	49
			- gray and tan with less organics below 2 ft	16			
5			Very stiff gray, reddish tan and tan fine sandy clay w/some fine to coarse gravel and ferrous stains.	44			60
				50/9"			
10			- tan and reddish brown with less sand below 9 ft	50/9"			
15							

COMPLETION DEPTH: 10.0 ft
DATE: 5-5-15

DEPTH TO WATER IN BORING: Dry

DATE: 5/5/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R11

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 289+52, 29 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 226.4				
			Loose to medium dense brown silty fine sand/fine sandy silt w/some fine gravel (fill)	10		-NON-PLASTIC-	47
			Very soft gray and tan fine sandy clay, silty	3			58
5			- stiff, gray and yellowish tan below 4 ft	22			
			Medium dense tan and reddish tan clayey fine sand	25			
10							
15							

COMPLETION DEPTH: 7.5 ft
DATE: 4-7-15

DEPTH TO WATER IN BORING: Dry

DATE: 4/7/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R12

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger LOCATION: Approx Sta 299+68, 41 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 216.0				
			4 inches: Loose brown silt w/crushed stone (fill)				
			Loose to medium dense red clayey fine sand (fill)	10			31
			- loose below 2 ft	9			
			- perched water at 4 ft Loose tan silty fine sand, wet	8			37
5							
			Stiff gray and tan fine sandy clay	12			
			Medium dense gray and reddish tan clayey fine sand	26			
10							
15							

COMPLETION DEPTH: 10.0 ft
DATE: 4-8-15

DEPTH TO WATER IN BORING: 5.3 ft

DATE: 4/8/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

PLATE 12

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R13

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 309+50, 40 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
	PH		SURF. EL: 216± 3 inches: Dark brown silt w/crushed gravel fragments and some organics				
			7 inches: Medium dense reddish brown clayey fine sand w/trace fine gravel (fill) Stiff reddish tan fine sandy clay	20			
				14			42
5			Medium dense gray fine sandy silt w/silty clay pockets, moist	11			
			Very stiff tan, gray and reddish brown fine sandy clay w/occasional clay pockets	35			
			- with clayey fine sand seams and layers below 8 ft	48			
10							
15							

COMPLETION DEPTH: 10.0 ft
DATE: 6-5-15

DEPTH TO WATER IN BORING: Dry

DATE: 6/15/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R14

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger LOCATION: Approx Sta 319+61, 46 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 221.1				
			3 inches: Loose brown crushed stone (fill)				
			Medium dense tan sandy fine gravel w/clayey fine sand pockets (fill)	11			
			- perched water at 2 ft				
			Loose tan silty fine sand, slightly clayey	6			44
			- medium dense below 4 ft				
5				11			
			Very stiff tan fine sandy clay	26			
			Medium dense to dense gray and tan clayey fine sand	30			
10							
15							

COMPLETION DEPTH: 10.0 ft
DATE: 4-8-15

DEPTH TO WATER IN BORING: 3 ft

DATE: 4/8/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R15

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger LOCATION: Approx Sta 329+65, 46 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 223.1				
			Loose dark brown sandy silt w/fine gravel (fill)				
			Medium dense light brown silty fine sand w/trace fine to coarse gravel (fill)	12		-NON-PLASTIC-	40
			- loose below 2 ft	8			
5			Loose tan and reddish tan clayey fine sand	5			48
			- medium dense at 6 to 8 ft	20			
			- dense below 8 ft	36			
10							
15							

COMPLETION DEPTH: 10.0 ft
DATE: 4-8-15

DEPTH TO WATER IN BORING: 5.3 ft

DATE: 4/8/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R16

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger LOCATION: Approx Sta 339+49, 51 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 224.3				
			Loose tan fine sandy silt w/trace fine gravel (fill)	8		-NON-PLASTIC-	48
			Loose gray and tan clayey fine sand	8			
5			Stiff gray and tan fine sandy clay	20			
			- very stiff below 6 ft	50			
			Dense tan and gray clayey fine sand	44			
10							
15							

COMPLETION DEPTH: 10.0 ft
DATE: 4-8-15

DEPTH TO WATER IN BORING: 10 ft

DATE: 4/8/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R17

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 349+64, 40 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 229.4				
			4 inches: Asphalt Concrete				
			Loose light brown silty fine sand w/fine to coarse gravel (fill)	8		-NON-PLASTIC-	32
			Loose gray and tan silty fine sand	7			46
5				9			
			Very stiff reddish tan and tan fine sandy clay w/trace fine gravel	26			66
			- tan and gray below 9 ft	35			
10							
15							

COMPLETION DEPTH: 10.0 ft
DATE: 4-8-15

DEPTH TO WATER IN BORING: Dry

DATE: 4/8/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R18

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger LOCATION: Approx Sta 359+49, 28 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 225.9				
			Medium dense gray and tan silty fine sand w/fine to coarse gravel (fill)	11			43
			- loose below 2 ft	8		-NON-PLASTIC-	42
5			Very loose gray and tan silty fine sand	3			46
			Medium dense gray and tan clayey fine sand w/a little fine to coarse gravel	26			
10				18			
15							

COMPLETION DEPTH: 10.0 ft
DATE: 4-8-15

DEPTH TO WATER IN BORING: Dry

DATE: 4/8/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R19

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 369+35, 24 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 225.0				
			Loose gray and tan clayey fine sand w/silt and trace fine to coarse gravel (fill)	8			41
			Medium dense gray fine sandy silt/silty fine sand - perched water at 2.5	20		-NON-PLASTIC-	50
5				14			
			Firm gray and tan fine sandy clay	9			
			- firm to stiff, gray below 8 ft	10			
10							
15							

COMPLETION DEPTH: 10.0 ft
DATE: 4-8-15

DEPTH TO WATER IN BORING: Dry

DATE: 4/8/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

PLATE 19

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R20

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger LOCATION: Approx Sta 379+58, 30 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 221.9				
			Medium dense tan and gray clayey fine sand, silty	13			44
			Medium dense tan and gray fine sandy silt - water at 3 ft	19			
5			Stiff tan and gray fine sandy clay w/trace fine to coarse gravel	19 30			
10			Dense tan and gray clayey fine sand	50/10"			
15							

COMPLETION DEPTH: 10.0 ft
DATE: 5-5-15

DEPTH TO WATER IN BORING: 3 ft

DATE: 5/5/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R21

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger LOCATION: Approx Sta 389+41, 28 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 224.4				
			Medium dense gray and tan silty fine sand/fine sandy silt	11		-NON-PLASTIC-	49
			Stiff tan and gray clayey silt, sandy w/ferrous stains	17			58
5			Stiff tan and gray silty clay w/occasional ferrous nodules and stains	20			
			- with fine sand pockets below 6 ft	22			
			Medium dense to dense light gray clayey fine sand	30			
10							
15							

COMPLETION DEPTH: 10.0 ft
DATE: 5-5-15

DEPTH TO WATER IN BORING: Dry

DATE: 5/5/2015

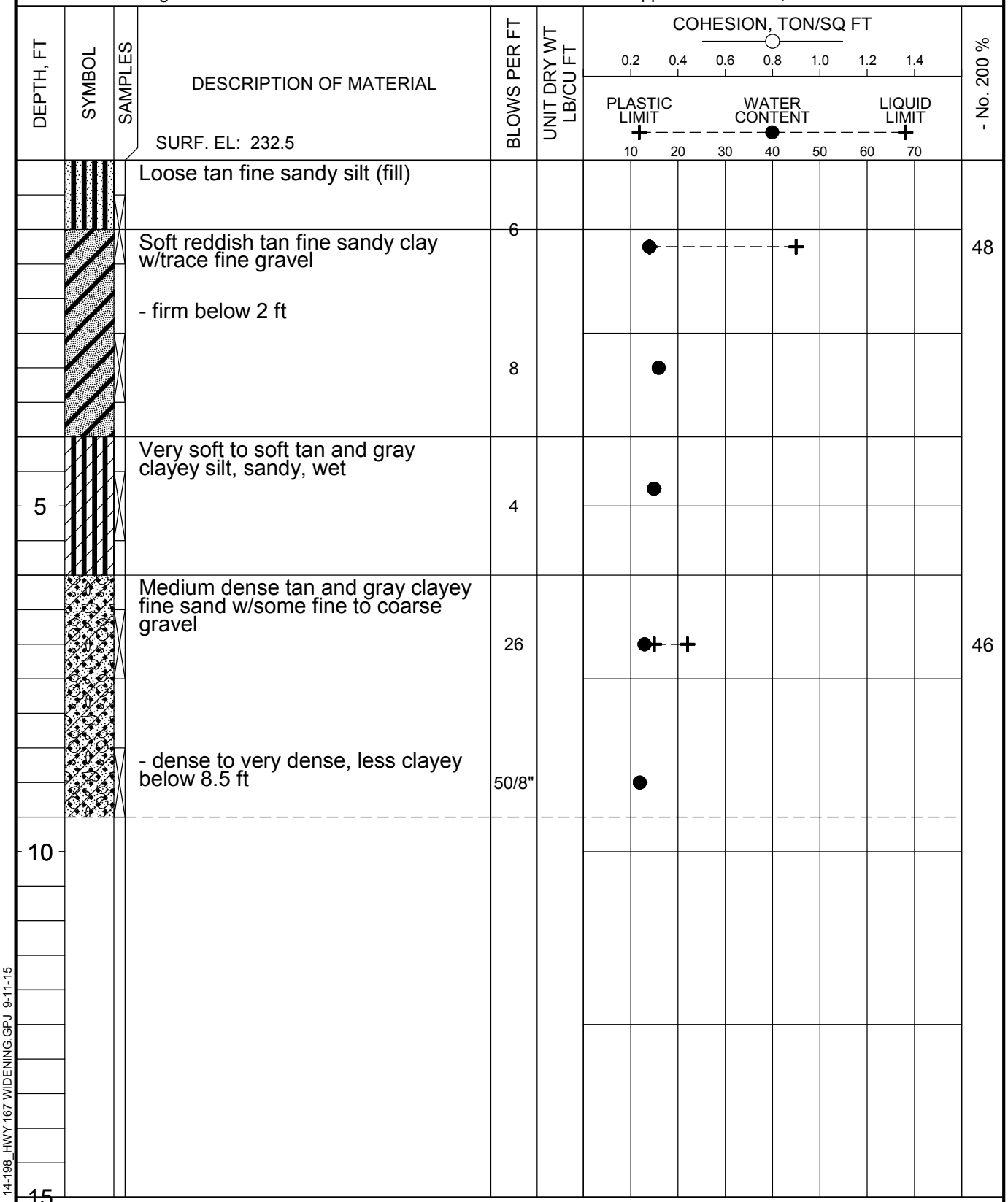
LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R22

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger LOCATION: Approx Sta 399+38, 33 ft Rt



COMPLETION DEPTH: 9.5 ft
DATE: 4-8-15

DEPTH TO WATER IN BORING: Dry

DATE: 4/8/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

PLATE 22

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R23

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger LOCATION: Approx Sta 409+51, 32 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 241.8				
			Loose reddish tan clayey fine sand w/trace fine gravel (fill)	6			42
			Loose reddish tan and gray clayey fine sand w/some fine to coarse gravel	7			
5			Dense tan and reddish tan clayey fine to coarse gravel	31			16
			- dense to very dense below 6 ft	50/6"			
			Dense gray and reddish tan clayey fine sand w/occasional fine gravel	40			
10							
15							

COMPLETION DEPTH: 10.0 ft
DATE: 4-8-15

DEPTH TO WATER IN BORING: Dry

DATE: 4/8/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

PLATE 23

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R24

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger LOCATION: Approx Sta 419+37, 38 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 256.9				
			Loose brown fine sandy silt and crushed stone (fill)				
			Firm tan and gray fine sandy clay	9			
			- water at 2 ft - stiff with some fine to coarse gravel below 2 ft	16			57
5			Very stiff reddish brown and gray clay, slightly sandy w/ferrous stains	25			
				30			
			- light tan slightly blocky below 9 ft	28		82	99
10							
15							

COMPLETION DEPTH: 10.0 ft
DATE: 5-5-15

DEPTH TO WATER IN BORING: 2 ft

DATE: 5/5/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R25

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger LOCATION: Approx Sta 423+03, 32 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 264.5				
			Loose dark brown silty fine sand w/crushed stone (fill)				
			Loose to medium dense tan and gray clayey fine sand, silty w/a little fine to coarse gravel and ferrous stains - water at 2 ft	10		●	
				14		●+ +	44
5				14		●	
			Medium dense reddish tan and tan clayey fine sand	19		● + – – – +	48
			- light tan, slightly blocky below 9 ft	22		●	
10							
15							

COMPLETION DEPTH: 10.0 ft
DATE: 5-5-15

DEPTH TO WATER IN BORING: 2 ft

DATE: 5/5/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R26

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger LOCATION: Approx Sta 186+95, 28 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 164.8				
			Stiff red and tan clayey silt, sandy w/fine to coarse gravel (fill)	14			57
			Stiff gray and tan fine sandy clay w/some fine to coarse gravel	20			
5				21			
			Stiff gray fine sandy clay w/ferrous stains	17			
				12			
10							
15							

COMPLETION DEPTH: 10.0 ft
DATE: 4-20-15

DEPTH TO WATER IN BORING: Dry

DATE: 4/20/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

PLATE 26

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R27

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 196+63, 40 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 163.0				
			Stiff brown fine sandy clay and fine to coarse gravel (fill)	20			51
			Stiff gray and tan silty clay w/silt pockets and ferrous stains	20			
5			Medium dense brown fine sandy silt	16			
			Very stiff tan and gray fine sandy clay w/ferrous stains	33			67
				50			
10			Dense gray clayey sand w/trace fine gravel and ferrous stains				
15							

COMPLETION DEPTH: 10.0 ft
DATE: 5-1-15

DEPTH TO WATER IN BORING: Dry

DATE: 5/1/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R28

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger LOCATION: Approx Sta 206+97, 53 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 165.7				
			Firm tan fine sandy clay w/fine to coarse gravel (fill)	9			56
			- medium dense brown fine sandy silt with fine sand seams below 2 ft	23			67
5			- stiff tan and light tan fine sandy clay with a little fine gravel below 4.5 ft	15			
			Soft gray fine sandy clay w/trace fine gravel - perched water at 6 ft	5			
				4			
10							
15							

COMPLETION DEPTH: 10.0 ft
DATE: 5-1-15

DEPTH TO WATER IN BORING: Dry

DATE: 5/1/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R29

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 216+66, 3 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 165.2				
			Medium dense tan and reddish tan sandy fine to coarse gravel (fill)	12		-NON-PLASTIC-	10
			- loose, reddish tan silty fine to medium sand with trace fine to coarse gravel below 2 ft	8		-NON-PLASTIC-	13
			- firm, tan and gray silty clay below 3.5 ft - stiff below 4 ft				
5				11			
			Firm gray fine sandy clay w/some fine to coarse gravel	7			
			- with some decayed organics below 9 ft	7			
10			Loose sandy fine to coarse gravel, clayey				
15							

COMPLETION DEPTH: 10.0 ft
DATE: 5-1-15

DEPTH TO WATER IN BORING: Dry

DATE: 5/1/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R30

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 226+83, 4 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 167.2				
			Soft tan and gray fine sandy clay, silty w/a little fine to coarse gravel	6			58
			- stiff at 2 to 4 ft	11			
			- firm at 4 to 8 ft	9			62
5			- stiff at 6 to 8 ft	16			
			- soft, wet below 8 ft	6			
10							
15							

COMPLETION DEPTH: 10.0 ft
DATE: 4-7-15

DEPTH TO WATER IN BORING: Dry

DATE: 4/7/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R31

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger LOCATION: Approx Sta 237+01, 2 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 167.3				
			Medium dense brown clayey fine to coarse gravel w/silt (fill)	16			21
				16			
5			Loose tan and gray clayey fine sand w/a little fine to coarse gravel, damp	4			48
				8			
			- medium dense with more gravel below 8 ft	13			
10							
15							

COMPLETION DEPTH: 10.0 ft
DATE: 4-7-15

DEPTH TO WATER IN BORING: Dry

DATE: 4/7/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R32

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger LOCATION: Approx Sta 247+12, 47 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 174.7				
			Medium dense tan and reddish tan clayey fine to coarse gravel (fill)				
			- stiff, gray silty clay with fine to coarse gravel below 1 ft	14			23
			- stiff gray clay with silt pockets below 2 ft	14			
5			- stiff to very stiff tan fine sandy silt, slightly clayey below 4.5 ft	35			
			- soft fine sandy clay with fine to coarse gravel below 6 ft	5			54
			- stiff with more gravel below 8.5 ft	19			
10							
15							

COMPLETION DEPTH: 10.0 ft
DATE: 5-1-15

DEPTH TO WATER IN BORING: 7 ft

DATE: 5/1/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R33

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 257+10, 47 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 201.4				
			Loose tan and reddish tan clayey fine to coarse gravel (fill)	8			38
			- very loose with more clay at 2 - 4 ft	3			
			- medium dense below 4 ft	16			
5							
			Dense reddish tan silty fine to coarse sand w/little fine to coarse gravel	36		-NON-PLASTIC-	12
			- medium dense below 8.5 ft	28			
10							
15							

COMPLETION DEPTH: 10.0 ft
DATE: 5-1-15

DEPTH TO WATER IN BORING: Dry

DATE: 5/1/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R34

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger LOCATION: Approx Sta 266+93, 54 ft Lt

SURF. EL: 222.4

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			Loose tan and reddish tan sandy fine to coarse gravel, silty (fill)	8			17
			Loose tan silty fine sand w/ferrous stains and nodules - tan and gray below 2.5 ft	5		-NON-PLASTIC-	44
5			Medium dense tan, gray and reddish tan clayey fine sand w/some ferrous stains and nodules and a little fine to coarse gravel	17 20			
			Dense to very dense tan and gray silty fine sand	50/9"			
10							
15							

COMPLETION DEPTH: 9.5 ft
DATE: 4-22-15

DEPTH TO WATER IN BORING: Dry
DATE: 4/22/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R35

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger LOCATION: Approx Sta 277+02, 42 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 224.1				
			Medium dense tan and reddish tan silty fine sand w/fine to coarse gravel (fill)	16		-NON-PLASTIC-	29
			- medium dense, tan and gray clayey fine sand below 1 ft				
			- with fine to coarse gravel below 2.5 ft	16			
5			Firm gray and tan fine sandy clay w/ferrous stains and nodules	7			
			- stiff to very stiff below 6 ft	24			
			Dense tan silty fine sand	39			
10							
15							

COMPLETION DEPTH: 10.0 ft
DATE: 4-20-15

DEPTH TO WATER IN BORING: Dry

DATE: 4/20/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R36

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger LOCATION: Approx Sta 287+17, 40 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 229.1				
			Medium dense dark brown sandy fine to coarse gravel w/silt (fill)	13		-NON-PLASTIC-	12
			Stiff dense gray and reddish tan fine sandy clay, silty	11			54
			- perched water at 4 ft				
5			Stiff gray, tan and reddish tan fine sandy clay w/trace fine to coarse gravel	19			
			- water at 6 ft	23			
			Dense tan and reddish tan clayey fine sand	34			
10			NOTE: Water at 6 ft at completion.				
15							

COMPLETION DEPTH: 10.0 ft
DATE: 4-21-15

DEPTH TO WATER IN BORING: 4 ft

DATE: 4/21/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R37

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger LOCATION: Approx Sta 296+97, 19 ft Lt

SURF. EL: 217.2

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			4 inches: Loose dark brown fine sandy silt w/gravel (fill)				
			Firm to stiff tan, reddish tan and gray fine sandy clay (fill)	10			45
			- stiff brown clayey silt, sandy with fine to coarse gravel at 2 to 4 ft	16			
			- medium dense gray and tan clayey fine sand below 4 ft	11			43
5							
			Very stiff tan and gray fine sandy clay	41			
			- very stiff to hard below 8 ft	50/7"			
10							
15							

COMPLETION DEPTH: 9.0 ft
DATE: 4-9-15

DEPTH TO WATER IN BORING: Dry

DATE: 4/9/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R38

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger LOCATION: Approx Sta 307+25, 11 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 216.4				
			Medium dense tan and reddish tan clayey fine sand w/fine to coarse gravel (fill)	22			
			- reddish tan below 2 ft				
			- stiff gray and tan fine sandy clay with some fine gravel below 3 ft	19			46
5			Firm tan and gray silty clay w/decayed organics, damp	9			
			- slightly sandy below 6 ft	10			
			Very stiff tan fine sandy clay w/fine to coarse gravel	47			
10							
15							

COMPLETION DEPTH: 10.0 ft
DATE: 4-9-15

DEPTH TO WATER IN BORING: 6 ft

DATE: 4/9/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R39

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger LOCATION: Approx Sta 317+06, 36 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 221.4				
			Medium dense tan and brown sandy fine to coarse gravel w/silt (fill)	27			
			- with tan and gray fine sand below 3 ft	13		-NON-PLASTIC-	38
5			Loose gray and tan clayey fine sand, damp	7			
			- medium dense below 6 ft	11			
			Very stiff reddish tan and light tan silty clay	45			
10							
15							

COMPLETION DEPTH: 10.0 ft
DATE: 4-9-15

DEPTH TO WATER IN BORING: Dry

DATE: 4/9/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R40

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 327+09, 12 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 222.3				
			Loose dark brown silty fine to coarse sand w/a little fine to coarse gravel (fill)				
			Medium dense reddish tan and tan clayey fine sand	11			28
			- gray and tan below 2 ft	17			
5			Stiff gray fine sandy clay	12			
			Soft tan and gray clayey silt, sandy w/decayed organics	6			
			Firm gray and tan fine sandy clay	8			
10							
15							

COMPLETION DEPTH: 10.0 ft
DATE: 4-9-15

DEPTH TO WATER IN BORING: Dry

DATE: 4/9/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R41

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger LOCATION: Approx Sta 336+91, 10 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 224.3				
			Medium dense dark brown and tan sandy fine to coarse gravel, slightly clayey (fill)	26			26
			- with gray and tan fine sandy silt and fine sandy clay pockets and seams below 2 ft	26			
5			Dense gray silty fine sand	34			
			Stiff gray and tan clayey silt, sandy, damp	15			
			Dense gray and tan clayey fine sand w/fine sand seams	40			
10							
15							

COMPLETION DEPTH: 10.0 ft
DATE: 4-9-15

DEPTH TO WATER IN BORING: 6.5 ft

DATE: 4/9/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R42

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger LOCATION: Approx Sta 347+02, 13 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 228.3				
			3 inches: Loose brown fine sandy silt w/crushed stone (fill)				
			Medium dense tan clayey fine sand w/some fine to coarse gravel (fill)	13			45
			Medium dense gray silty fine sand	13		-NON-PLASTIC-	40
			Stiff reddish tan, gray and tan fine sandy clay	11			
5				20			
			- very stiff below 8.5 ft	32			
10							
15							

COMPLETION DEPTH: 10.0 ft
DATE: 4-9-15

DEPTH TO WATER IN BORING: Dry

DATE: 4/9/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R43

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger LOCATION: Approx Sta 357+16, 17 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 226.5				
			Medium dense dark brown and tan sandy fine to coarse gravel w/silt (fill)	25		-NON-PLASTIC-	33
			- gray and tan silty fine sand below 2 ft	21			
5			- with tan fine to coarse gravel below 4 ft	20			
			Medium dense tan and gray clayey fine sand	14			
			Very stiff tan and gray fine sandy clay w/some ferrous nodules and stains	28			
10							
15							

COMPLETION DEPTH: 10.0 ft
DATE: 4-9-15

DEPTH TO WATER IN BORING: Dry

DATE: 4/9/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R44

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 367+11, 38 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 226.0				
			Medium dense dark brown sandy fine to coarse gravel w/silt (fill)	20			
			Stiff tan and gray fine sandy clay, silty	22			65
5			Medium dense tan and gray silty fine sand	14			
			Very stiff gray, reddish tan and tan fine sandy clay w/ferrous nodules and stains	32			
			- tan and gray below 8 ft	42			
10							
15							

COMPLETION DEPTH: 10.0 ft
DATE: 4-9-15

DEPTH TO WATER IN BORING: Dry

DATE: 4/9/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

PLATE 44

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R45

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 377+00, 39 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 223.9				
			Loose to medium dense dark brown sandy silt w/crushed stone fragments and some organics (fill)				
			Medium dense brown clayey fine sand, silty w/fine to coarse gravel (fill)	12		● + +	41
				10		●	
			Medium dense gray and tan fine sandy silt w/trace fine gravel				
5				19		● -NON-PLASTIC-	60
			Stiff tan and gray fine sandy clay, silty	11		●	
				11		●	
10							
15							

COMPLETION DEPTH: 10.0 ft
DATE: 4-9-15

DEPTH TO WATER IN BORING: Dry

DATE: 4/9/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R46

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 386+80, 39 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 224.6				
			Medium dense dark brown sandy fine to coarse gravel w/silt (fill)	29			27
			- medium dense tan and gray silty fine sand below 1 ft	23			
5			Soft tan and gray clayey silt, sandy, damp - perched water at 4.5 ft	4			
			Soft tan and gray fine sandy clay w/occasional fine to coarse gravel	6			
			- very stiff below 8 ft	32			
10							
15							

COMPLETION DEPTH: 10.0 ft
DATE: 4-9-15

DEPTH TO WATER IN BORING: 4 ft

DATE: 4/9/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

PLATE 46

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R47

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 397+11, 28 ft Lt

SURF. EL: 232.4

DEPTH, FT	DESCRIPTION OF MATERIAL	BLOWS PER FT	- No. 200 %
	3 inches: Loose brown fine sandy silt w/crushed stone, fine to coarse sand and coarse gravel (fill)		
	Stiff tan and gray fine sandy clay w/a little fine to coarse gravel	13	53
		15	
	- firm below 4 ft		
5		8	
	Very stiff reddish tan and gray fine sandy clay w/trace fine to coarse gravel	25	60
	- stiff below 8 ft		
		22	
10			
15			

UNIT DRY WT LB/CU FT

COHESION, TON/SQ FT
0.2 0.4 0.6 0.8 1.0 1.2 1.4

PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT
10 20 30 40 50 60 70

COMPLETION DEPTH: 10.0 ft
DATE: 4-9-15

DEPTH TO WATER IN BORING: Dry

DATE: 4/9/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R48

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger LOCATION: Approx Sta 406+61, 24 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 238.0				
			Dense dark brown and tan sandy fine to coarse gravel (fill)	35		-NON-PLASTIC-	12
			- medium dense tan clayey fine sand below 2 ft	15			
5			Stiff tan and gray clayey silt, sandy, damp - perched water at 4.5 ft	12			
			Stiff tan and gray fine sandy clay w/ferrous nodules and stains	16			66
			- very stiff below 8 ft	37			
10							
15							

COMPLETION DEPTH: 10.0 ft
DATE: 4-9-15

DEPTH TO WATER IN BORING: 6 ft

DATE: 4/9/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R49

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger

LOCATION: Approx Sta 416+40, 24 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 251.3				
			Medium dense brown silty fine sand w/fine to coarse gravel (fill)	23			35
			- with clayey fine sand seams and layers below 1 ft	27			
5			Stiff tan and gray clayey silt, sandy	12			
			Stiff tan fine sandy clay w/some fine to coarse gravel	19			
			Very stiff to hard light tan clay	50/8"			
10							
15							

COMPLETION DEPTH: 10.0 ft
DATE: 4-9-15

DEPTH TO WATER IN BORING: Dry

DATE: 4/9/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. R50

AHTD CA0702: Hwy 167 Widening
Calhoun County, Arkansas

TYPE: Auger LOCATION: Approx Sta 421+80, 20 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 265±				
			Medium dense dark brown and tan crushed stone w/some clayey sand seams and layers (fill)	21			
			- with gray clayey fine to coarse gravel seams at 2 ft - stiff tan fine sandy clay w/some fine gravel below 2.5 ft	15			44
5			Firm reddish tan and tan fine sandy clay w/some fine to coarse gravel and ferrous nodules and stains	8			
			Stiff reddish brown and light gray clay w/ferrous nodules and stains	20			96
10			Stiff reddish brown and gray fine sandy clay w/ferrous stains and some fine to coarse gravel	21			
15							

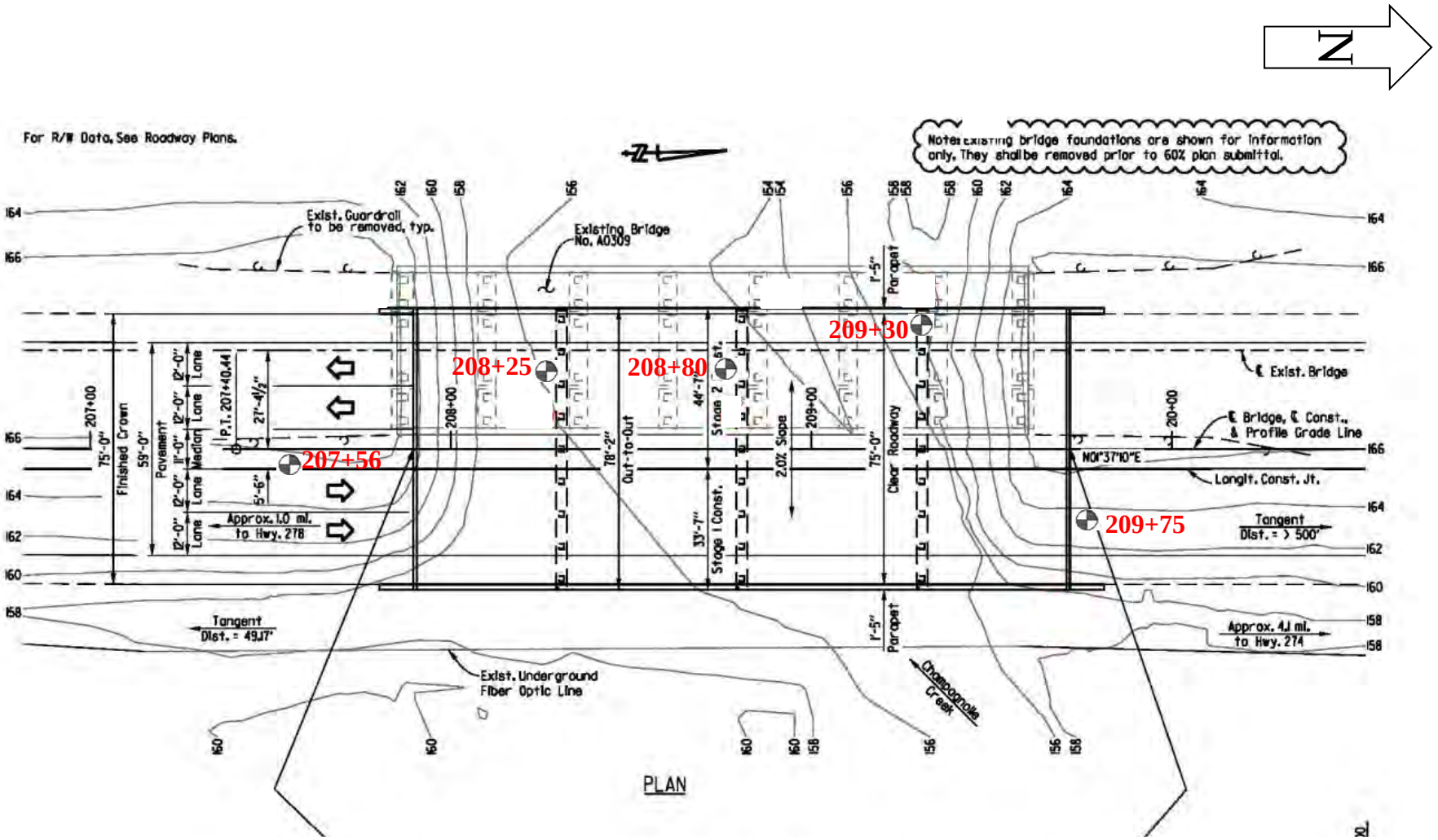
COMPLETION DEPTH: 10.0 ft
DATE: 5-22-15

DEPTH TO WATER IN BORING: Dry

DATE: 5/22/2015

LGBNEW 14-198_HWY 167 WIDENING.GPJ 9-11-15

ATTACHMENT 5



Grubbs, Hoskyn, Barton & Wyatt, INC. CONSULTING ENGINEERS	**PLAN of BORINGS** **Bridge 1 - Hwy 167 over Champagnolle Creek** **Calhoun County, Arkansas**	**Scale: As Shown** **Job No. 14-198** **Plate 1**

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. 207+56

CA0702: Hwy 167 over Champagnolle Creek Relief
Calhoun County, Arkansas

TYPE: Auger to 15 ft /Wash

LOCATION: Bridge 1, Approx Sta 207+56, 4 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 165.9				
			Stiff grayish brown, tan and brown fine sandy clay, silty w/trace fine to coarse gravel (fill)	18			
				12			
5			- firm below 4 ft	7		G_s = 2.65	60
			Soft gray and tan fine sandy clay, silty w/trace fine gravel, wet	3			
			- firm below 8 ft	7		G_s = 2.67	69
10							
			Dense tan and gray sandy fine gravel, slightly silty	45			11
15							
			- dense to very dense below 18 ft	50/11"			
20							
			Dense to very dense brownish gray silty fine sand w/interbedded silty clay seams and layers and a little fine gravel	50/9"			19
25							
				50/10"			
30							
				50/10"			
35							
				50/10"			
40							
			Dense to very dense brownish gray fine sand, slightly silty w/a little fine to coarse gravel	50/6"			10
45							
				50/6"			
50							
			Dense to very dense brown silty fine sand w/interbedded silty clay seams and layers				
55							
				50/5"			

COMPLETION DEPTH: 100.0 ft
DATE: 4-7-15

DEPTH TO WATER IN BORING: 13 ft

DATE: 4/8/2015

LGBNEW 14-198_CHAMPAGNOLLE CREEK RELIEF #2 (2,5,7,8,12).GPJ 8-28-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. 207+56

CA0702: Hwy 167 over Champagnolle Creek Relief
Calhoun County, Arkansas

TYPE: Auger to 15 ft /Wash

LOCATION: Bridge 1, Approx Sta 207+56, 4 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
65			(continued)				
70			Dense to very dense grayish brown fine sand, slightly silty w/occasional organic inclusions	50/5"			
75							
80				50/5"		WATER CONTENT	11
85			- with interbedded silty clay seams below 86 ft				
90				50/5"			
95			- with trace fine to coarse gravel and organic inclusions below 95 ft				
100				50/5"			
105							
110							
115							

COMPLETION DEPTH: 100.0 ft
DATE: 4-7-15

DEPTH TO WATER IN BORING: 13 ft

DATE: 4/8/2015

LGBNEW 14-198_CHAMPAGNOLLE CREEK RELIEF #2 (2,5,7,8,12).GPJ 8-28-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. 208+25

CA0702: Hwy 167 over Champagnolle Creek Relief
Calhoun County, Arkansas

TYPE: Wash

LOCATION: Bridge 1, Approx Sta 208+25, 20 ft Lt

SURF. EL: 155±

DEPTH, FT	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
	Soft brown clay, slightly silty w/some fine to coarse gravel, moist (fill)	5			
	Dense to very dense tan sandy fine to coarse gravel	50/9"			
5		50/7"		●	6
		50/8"			
	Dense gray silty fine sand w/occasional clayey fine sand pockets and occasional organic inclusions	48		●-NON-PLASTIC-	16
10					
15		53			
	Dense to very dense grayish brown silty fine sand w/occasional clay pockets	50/9"		●	18
20					
	- with occasional organic inclusions below 23 ft	50/8"			
25					
30		50/10"			
	Very stiff to hard brown silty clay w/interbedded silty fine sand seams and layers	50/8"		●-NON-PLASTIC-	36
35					
		50/8"			

COMPLETION DEPTH: 70.0 ft
DATE: 6-10-15

DEPTH TO WATER IN BORING: NA

DATE: 6/10/2015

LGBNEW 14-198_CHAMPAGNOLLE CREEK RELIEF #2 (2,5,7,8,12).GPJ 8-28-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. 208+25

CA0702: Hwy 167 over Champagnolle Creek Relief
Calhoun County, Arkansas

TYPE: Wash

LOCATION: Bridge 1, Approx Sta 208+25, 20 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL (continued)	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
45			Dense to very dense gray silty fine sand w/interbedded clay seams	50/7"			18
50			Very stiff to hard dark brown silty clay w/interbedded silty fine sand pockets and seams	50/10"			77
55			Dense to very dense brownish gray fine sand, slightly silty	50/8"			10
60			- with occasional organic inclusions below 58 ft	50/7"			
65							
70			- with interbedded silty clay seams below 68 ft	50/7"			9
75			NOTE 1: Deck 11 ft above channel bottom. NOTE 2: Water depth 3 ft. NOTE 3: Set 13 ft casing.				

COMPLETION DEPTH: 70.0 ft
DATE: 6-10-15

DEPTH TO WATER IN BORING: NA

DATE: 6/10/2015

LGBNEW 14-198_CHAMPAGNOLLE CREEK RELIEF #2 (2,5,7,8,12).GPJ 8-28-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. 208+80

CA0702: Hwy 167 over Champagnolle Creek Relief
Calhoun County, Arkansas

TYPE: Wash

LOCATION: Bridge 1, Approx Sta 208+80, 20 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 156±				
			Sandstone boulders and cobbles (riprap)	1/50-5"			
1			- refusal at 1 ft, boring abandoned				
2			NOTE 1: 11.3 ft from deck to channel bottom.				
			NOTE 2: Water depth 1 ft.				
3							
4							
5							
6							
7							
8							
9							

COMPLETION DEPTH: 1.0 ft
DATE: 6-10-15

DEPTH TO WATER IN BORING: NA

DATE: 6/10/2015

LGBNEW 14-198_CHAMPAGNOLLE CREEK RELIEF #2 (2.5.7.8.12).GPJ 8-28-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. 209+30

CA0702: Hwy 167 over Champagnolle Creek Relief
Calhoun County, Arkansas

TYPE: Auger to 15 ft /Wash

LOCATION: Bridge 1, Approx Sta 209+30, 32 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 156±				
			Very soft tan and gray fine sandy clay w/trace fine gravel and clay seams, moist	2			
			- with occasional organic inclusions below 2 ft	3			
5				2			73
			Very soft gray and tan fine sandy clay w/trace fine gravel, moist	3			
			- with some coarse gravel below 8 ft				
10				26			60
			Medium dense brownish gray fine sandy silt, slightly clayey w/fine to coarse gravel and some organic inclusions	24			
15			- with some clayey fine sand seams and trace fine gravel below 15 ft				
20				22			51
			Dense to very dense gray silty fine sand, slightly clayey w/occasional organic inclusions	50/8"		NON-PLASTIC-	19
25							
			- tan and gray below 27 ft	50/8"			13
30							
			Very stiff to hard brown silty clay w/occasional silty fine sand partings	50/8"			64
35							
			- with silty fine sand seams and layers below 38 ft	50/9"			

COMPLETION DEPTH: 70.0 ft
DATE: 6-11-15

DEPTH TO WATER IN BORING: 8 ft

DATE: 6/11/2015

LGBNEW 14-198_CHAMPAGNOLLE CREEK RELIEF #2 (2,5,7,8,12).GPJ 8-28-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. 209+30

CA0702: Hwy 167 over Champagnolle Creek Relief
Calhoun County, Arkansas

TYPE: Auger to 15 ft /Wash

LOCATION: Bridge 1, Approx Sta 209+30, 32 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			(continued)				
45			- interbedded clay and silty fine sand with trace gravel below 43 ft	50/8"		-NON-PLASTIC-	38
50				50/8"			
55			- with less silty fine sand seams below 57 ft				
60				50/8"			61
65			- with occasional silty fine sand pockets and seams below 68 ft				
70				50/8"			
75			NOTE 1: 10 ft to channel bottom. NOTE 2: Set 16 ft casing.				

COMPLETION DEPTH: 70.0 ft
DATE: 6-11-15

DEPTH TO WATER IN BORING: 8 ft

DATE: 6/11/2015

LGBNEW 14-198_CHAMPAGNOLLE CREEK RELIEF #2 (2.5.7.8.12).GPJ 8-28-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. 209+75

CA0702: Hwy 167 over Champagnolle Creek Relief
Calhoun County, Arkansas

TYPE: Auger to 35 ft /Wash

LOCATION: Bridge 1, Approx Sta 209+75, 18 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 164±				
			Stiff brown, tan to gray silty clay, slightly sandy w/some fine to coarse gravel and clay pockets (fill)	18			
			Firm brownish gray fine sandy clay w/some clay pockets and silt pockets and trace silty fine sand partings and fine gravel and ferrous stains and nodules	9			75
5			- soft reddish brown and brownish gray with a little fine gravel and fine sand pockets below 4 ft	5			
			- less silt below 6 ft	4			
			Firm tan, brown and gray fine sandy clay w/occasional fine sand pockets and organic inclusions and some fine gravel, moist	7			51
10			- water at 9 ft				
			Dense brownish gray fine sandy silt, slightly clayey w/occasional organic inclusions	44			47
15							
			Dense to very dense gray clayey fine sand, silty w/occasional micaceous inclusions	50/11"			
20							
			Dense gray silty fine sand w/silty clay seams and layers	50			
25							
				50			20
30							
			- dense to very dense, with more frequent silty clay seams and layers below 33 ft	50/9"			
35							
			Dense to very dense brown and gray silty fine sand w/occasional organic inclusions	50/8"			

COMPLETION DEPTH: 70.0 ft
DATE: 6-11-15

DEPTH TO WATER IN BORING: 9 ft
DATE: 6/11/2015

LGBNEW 14-198_CHAMPAGNOLLE CREEK RELIEF #2 (2,5,7,8,12).GPJ 8-28-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. 209+75

CA0702: Hwy 167 over Champagnolle Creek Relief
Calhoun County, Arkansas

TYPE: Auger to 35 ft /Wash

LOCATION: Bridge 1, Approx Sta 209+75, 18 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			(continued)				
45			Very stiff to hard dark brown silty clay w/interbedded silty fine sand seams and layers and micaceous inclusions	50/5"			
50				50/5"		-NON-PLASTIC-	47
55				50/6"			
60				50/6"			
65				50/6"			
70			- slightly blocky and slickensided	50/9"			
75							

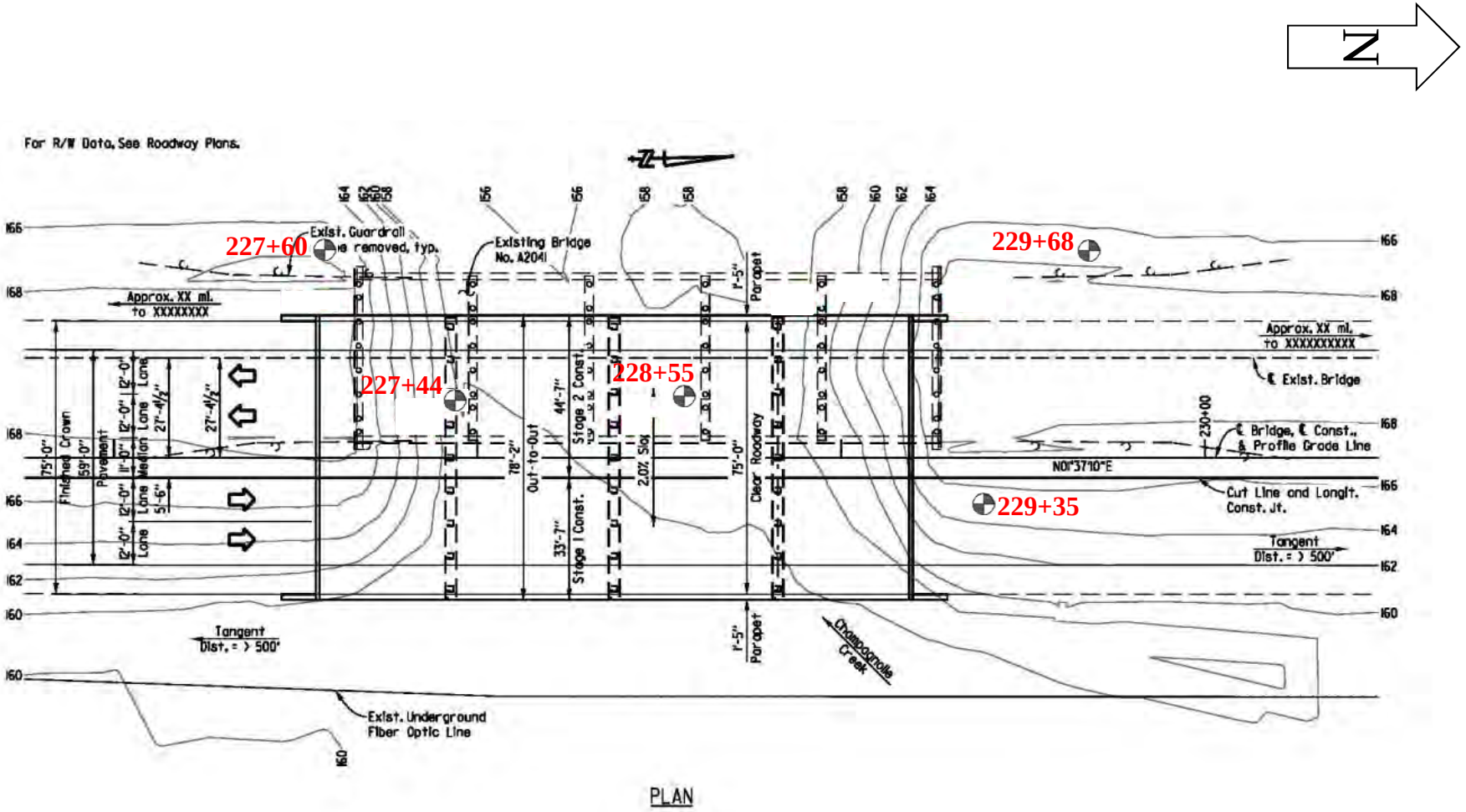
COMPLETION DEPTH: 70.0 ft
DATE: 6-11-15

DEPTH TO WATER IN BORING: 9 ft

DATE: 6/11/2015

LGBNEW 14-198_CHAMPAGNOLLE CREEK RELIEF #2 (2,5,7,8,12).GPJ 8-28-15

ATTACHMENT 6



PLAN

Grubbs, Hoskyn, Barton & Wyatt, INC. CONSULTING ENGINEERS	**PLAN of BORINGS** **Hwy 167 over Champagnolle Creek Relief** **(Bridge 2)** **Calhoun County, Arkansas**	**Scale: As Shown** **Job No. 14-198** **Plate 1**

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. 227+60

CA0702: Hwy 167 over Champagnolle Creek Relief
Calhoun County, Arkansas

TYPE: Auger to 10 ft /Wash

LOCATION: Bridge 2, Approx Sta 227+60, 55 ft Lt

SURF. EL: 167±

DEPTH, FT	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
	Soft brown fine sandy clay w/a little gravel (fill)	20			
	Medium dense gray fine sandy silt w/trace fine to coarse gravel (fill)	7			46
5	Firm gray fine sandy clay w/some medium to coarse sand and fine to coarse gravel (fill)	2			
	- very soft with some silt pockets and seams below 4 ft	10			
10	Firm to stiff gray fine sandy clay w/occasional fine sand pockets and trace fine gravel	26			73
	- very stiff with some clay pockets and seams below 8 ft				
15	Very loose gray sandy fine to coarse gravel, wet	2			
20	Dense to very dense gray silty fine sand w/interbedded silty clay seams and layers and occasional organic inclusions	50/10"			
25		50/8"			54
	- with interbedded clayey silt seams and layers below 23 ft	50/9"			
30					
35		50/9"		-NON-PLASTIC-	23
40		50/9"			
45		50/8"		-NON-PLASTIC-	29
	- with some silty clay pockets below 48 ft	50/8"			

COMPLETION DEPTH: 80.0 ft
DATE: 6-4-15

DEPTH TO WATER IN BORING: Dry to 10 ft

DATE: 6/5/2015

LGBNEW 14-198_CHAMPAGNOLLE CREEK RELIEF #2 (2,5,7,8,12).GPJ 8-31-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. 227+60

CA0702: Hwy 167 over Champagnolle Creek Relief
Calhoun County, Arkansas

TYPE: Auger to 10 ft /Wash

LOCATION: Bridge 2, Approx Sta 227+60, 55 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			(continued)				
55			Dense to very dense gray silty fine sand w/interbedded silty clay seams	50/7"			
				50/9"		-NON-PLASTIC-	13
60							
			Dense to very dense brownish gray silty fine sand w/some silty clay pockets and seams	50/9"			23
65							
				50/11"			
70							
			- with trace fine gravel below 73 ft	50/6"			
75							
			Dense to very dense gray sandy fine to coarse gravel	50/8"			
80							
85							
90							
95							

COMPLETION DEPTH: 80.0 ft
DATE: 6-4-15

DEPTH TO WATER
IN BORING: Dry to 10 ft

DATE: 6/5/2015

LGBNEW 14-198_CHAMPAGNOLLE CREEK RELIEF #2 (2,5,7,8,12).GPJ 8-31-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. 227+94

CA0702: Hwy 167 over Champagnolle Creek Relief
Calhoun County, Arkansas

TYPE: Wash

LOCATION: Bridge 2, Approx Sta 227+94, 16 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 158±				
			Very stiff tan and gray fine sandy clay, silty w/some silty fine sand seams and ferrous stains and nodules	38			43
5			Medium dense gray sandy fine to coarse gravel, slightly silty	29		-NON-PLASTIC-	10
				11			0
10			Very stiff brownish gray fine sandy clay, silty	27			
			- very stiff to hard with some silt seams and layers below 10 ft	39			70
15				50/10"			
20			Dense to very dense brownish gray silty fine sand w/interbedded clayey silt seams and layers and organic inclusions	50/9"			
25				50/9"		-NON-PLASTIC-	32
30				50/11"			
			- more sandy below 33 ft	50			
35				50/10"			
40				50/10"			22

COMPLETION DEPTH: 80.0 ft
DATE: 6-9-15

DEPTH TO WATER IN BORING: NA

DATE: 6/9/2015

LGBNEW 14-198_CHAMPAGNOLLE CREEK RELIEF #2 (2.5.7.8.12).GPJ 8-31-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. 227+94

CA0702: Hwy 167 over Champagnolle Creek Relief
Calhoun County, Arkansas

TYPE: Wash

LOCATION: Bridge 2, Approx Sta 227+94, 16 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			(continued)				
50				50/7"			
55			Very stiff to hard dark brown silty clay w/interbedded silty fine sand seams and layers	50/5"			
60							
65				50/10"			51
70			Dense to very dense gray and brown silty fine sand w/interbedded silty clay seams and layers, moist				
75				50/9"			97
80				50/7"			
85			NOTE 1: Deck 10 ft above channel bottom. NOTE 2: Set 20 ft casing. NOTE 3: Boring above stream water level.				

COMPLETION DEPTH: 80.0 ft
DATE: 6-9-15

DEPTH TO WATER IN BORING: NA

DATE: 6/9/2015

LGBNEW 14-198_CHAMPAGNOLLE CREEK RELIEF #2 (2,5,7,8,12).GPJ 8-31-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. 228+55

CA0702: Hwy 167 over Champagnolle Creek Relief
Calhoun County, Arkansas

TYPE: Wash

LOCATION: Bridge 2, Approx Sta 228+55, 16 ft Lt

SURF. EL: 154±

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			Medium dense brown sandy fine to coarse gravel w/occasional silty clay pockets	25			
				20			5
5				50/9"			
				50/9"			
			Stiff to very stiff gray and tan silty clay w/occasional organic inclusions	24			
10							
			- very stiff below 13 ft	50			92
15							
				47			
20							
			- with some silty fine sand seams below 23 ft	51			
25							
			Dense to very dense gray and brown silty fine sand w/interbedded silty clay seams and layers	50/10"			
30							
				50/8"			28
35							
				50/7"			
40							
			- decreasing silty clay seams with trace fine gravel below 43 ft	50/8"			13

COMPLETION DEPTH: 80.0 ft
DATE: 6-9-15

DEPTH TO WATER IN BORING: NA

DATE: 6/9/2015

LGBNEW 14-198_CHAMPAGNOLLE CREEK RELIEF #2 (2,5,7,8,12).GPJ 8-31-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. 228+55

CA0702: Hwy 167 over Champagnolle Creek Relief
Calhoun County, Arkansas

TYPE: Wash

LOCATION: Bridge 2, Approx Sta 228+55, 16 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			(continued)				
50				50/5"			
				50/5"			
55							
				50/6"		++●	32
60							
65							
70				50/8"			
75			Very stiff to hard brown silty clay w/interbedded silty fine sand seams				
				50/7"			
80			NOTE 1: Deck 14.3 ft above channel bottom. NOTE 2: Water depth 1 ft. NOTE 3: Set 16 ft casing.				
85							

COMPLETION DEPTH: 80.0 ft
DATE: 6-9-15

DEPTH TO WATER IN BORING: NA

DATE: 6/9/2015

LGBNEW 14-198_CHAMPAGNOLLE CREEK RELIEF #2 (2.5.7.8.12).GPJ 8-31-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. 229+35

CA0702: Hwy 167 over Champagnolle Creek Relief
Calhoun County, Arkansas

TYPE: Auger to 20 ft /Wash

LOCATION: Bridge 2, Approx Sta 229+35, 15 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 164±				
			Medium dense brown and brownish gray clayey fine sand w/fine to coarse gravel	15			
			Stiff reddish tan and brownish gray fine sandy clay w/a little fine to coarse gravel, some silty clay pockets and organic stains	12			
5				8			74
			- firm with some organic inclusions below 4 ft	3			
			Very soft tan and gray fine sandy clay w/trace fine gravel and occasional fine sandy silt partings				
10				26			
			- very stiff with fine sand seams and layers and occasional clay pockets and trace fine gravel below 8 ft				
			- water at 10 ft				
15			Medium dense brown clayey fine to coarse gravel, sandy	28			
			Very stiff light gray clay, slightly blocky and slickensided w/occasional organic inclusions				
20				38			99
			Dense to very dense brownish gray silty fine sand w/interbedded silty clay seams and layers and occasional organic inclusions	45			
25							
				50/9"			
30							
				50/9"			62
35							
				50/8"			
40							
				50/6"			

COMPLETION DEPTH: 80.0 ft
DATE: 6-12-15

DEPTH TO WATER IN BORING: 10 ft

DATE: 6/12/2015

LGBNEW 14-198_CHAMPAGNOLLE CREEK RELIEF #2 (2,5,7,8,12).GPJ 8-31-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. 229+35

CA0702: Hwy 167 over Champagnolle Creek Relief
Calhoun County, Arkansas

TYPE: Auger to 20 ft /Wash

LOCATION: Bridge 2, Approx Sta 229+35, 15 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
50			(continued)	50/7"			20
55							
60			Very stiff to hard brown silty clay w/interbedded silty fine sand partings and seams	50/10"			
65							
70			- with more frequent silty fine sand seams below 68 ft	50/8"			60
75			- alternating silty clay and silty fine sand seams and layers below 75 ft				
80				50/6"			
85							

COMPLETION DEPTH: 80.0 ft
DATE: 6-12-15

DEPTH TO WATER IN BORING: 10 ft

DATE: 6/12/2015

LGBNEW 14-198_CHAMPAGNOLLE CREEK RELIEF #2 (2,5,7,8,12).GPJ 8-31-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. 229+68

CA0702: Hwy 167 over Champagnolle Creek Relief
Calhoun County, Arkansas

TYPE: Auger to 10 ft /Wash

LOCATION: Bridge 2, Approx Sta 229+68, 57 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 166.9				
			Stiff brown, tan and red fine sandy clay w/a little fine to coarse gravel (fill)	16			
				20			
5			Stiff tan and gray fine sandy clay, silty, wet - soft at 4 to 8 ft	6			
				4		G_s = 2.67	62
			- stiff below 8 ft				
10				12			
15			Medium dense tan and gray silty fine sand	23		-NON-PLASTIC- G_s = 2.67	28
20			Stiff grayish brown clay w/organic inclusions	14		G_s = 2.68	95
25			Stiff brown silty clay	24		G_s = 2.65	94
30			Dense to very dense grayish brown silty fine sand w/interbedded silty clay seams and layers	50/8"		-NON-PLASTIC-	66
35				50/10"			
40				50/8"			
45			- gray below 43 ft	70/8"			
50				70/8"		-NON-PLASTIC-	33

COMPLETION DEPTH: 100.0 ft
DATE: 4-8-15

DEPTH TO WATER IN BORING: 8 ft

DATE: 4/8/2015

LGBNEW 14-198_CHAMPAGNOLLE CREEK RELIEF #2 (2,5,7,8,12).GPJ 8-31-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. 229+68

CA0702: Hwy 167 over Champagnolle Creek Relief
Calhoun County, Arkansas

TYPE: Auger to 10 ft /Wash

LOCATION: Bridge 2, Approx Sta 229+68, 57 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			(continued)				
60			- clay layer at 59 to 59.5 ft	70/6"			
65							
70				70/6"			
75			Very stiff to hard dark brown silty clay w/interbedded silty fine sand partings, seams and layers and organic stains				
80				70/6"			85
85							
90			- with pyrite crystals below 88.5 ft	70/6"			
95							
100				70/5"			
105							

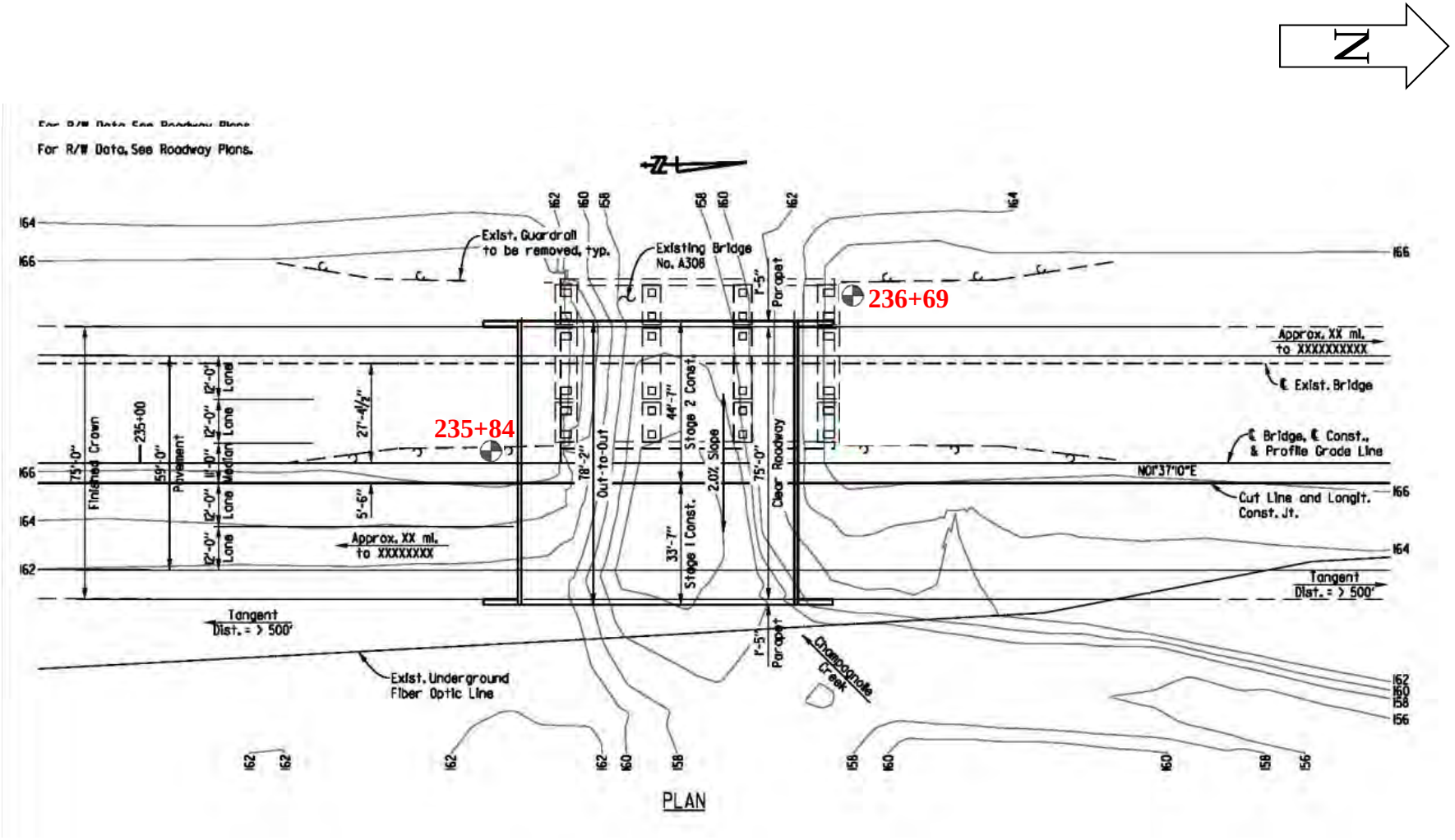
COMPLETION DEPTH: 100.0 ft
DATE: 4-8-15

DEPTH TO WATER IN BORING: 8 ft

DATE: 4/8/2015

LGBNEW 14-198_CHAMPAGNOLLE CREEK RELIEF #2 (2,5,7,8,12).GPJ 8-31-15

ATTACHMENT 7



Grubbs, Hoskyn, Barton & Wyatt, INC.
CONSULTING ENGINEERS

PLAN of BORINGS

Bridge 3 - Hwy 167 over Champagnolle Creek Relief
Calhoun County, Arkansas

Scale: As Shown

Job No. 14-198

Plate 1

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. 235+84

CA0702: Hwy 167 over Champagnolle Creek Relief
Calhoun County, Arkansas

TYPE: Auger to 10 ft /Wash

LOCATION: Bridge 3, Approx Sta 235+84, 3 ft Rt

SURF. EL: 166.7

DEPTH, FT	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	- No. 200 %
	Stiff reddish brown and tan fine sandy clay, silty (fill)	21		
	Stiff tan and brownish gray fine sandy clay, silty	19		
5	- with trace fine gravel below 4 ft	11		53
	- soft below 6 ft	4		
10	Stiff grayish brown fine sandy clay, silty w/silt pockets	24		72
15	Dense to very dense dark brown fine to medium sand, slightly silty w/organics and lignite inclusions and a little fine to coarse gravel	50/7"		7
20		25/0"		
25	Dense brown and grayish brown silty fine sand w/interbedded silty clay seams and layers	48		48
30	Very stiff dark grayish brown clay, varved w/occasional organic inclusions and organic stains	58		
35		40		99
40		41		
45	- very stiff to hard below 43 ft	50/10"		
50	Very stiff to hard dark brown silty clay w/interbedded silty fine sand partings and seams	50/10"		93
55	Very stiff to hard dark grayish brown clay	70/9"		98

COHESION, TON/SQ FT: 0.2 0.4 0.6 0.8 1.0 1.2 1.4

PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT: 10 20 30 40 50 60 70

G_s = 2.60

G_s = 2.61

G_s = 2.58

80

COMPLETION DEPTH: 100.0 ft
DATE: 4-8-15

DEPTH TO WATER IN BORING: 10 ft

DATE: 4/8/2015

LGBNEW 14-198_CHAMPAGNOLLE CREEK RELIEF #2 (2,5,7,8,12).GPJ 8-31-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. 235+84

CA0702: Hwy 167 over Champagnolle Creek Relief
Calhoun County, Arkansas

TYPE: Auger to 10 ft /Wash

LOCATION: Bridge 3, Approx Sta 235+84, 3 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			(continued)				
65							
70				70/8"			
75							
80				70/7"			
85							
90			- with silty fine sand partings and lignite inclusions below 88 ft	70/7"			
95							
100				70/6"			
105							
110							
115							

COMPLETION DEPTH: 100.0 ft
DATE: 4-8-15

DEPTH TO WATER IN BORING: 10 ft

DATE: 4/8/2015

LGBNEW 14-198_CHAMPAGNOLLE CREEK RELIEF #2 (2,5,7,8,12).GPJ 8-31-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. 236+69

CA0702: Hwy 167 over Champagnolle Creek Relief
Calhoun County, Arkansas

TYPE: Auger to 10 ft /Wash

LOCATION: Bridge 3, Approx Sta 236+69, 38 ft Lt

SURF. EL: 166

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			Loose brown and tan silt w/fine to coarse gravel (fill)	13			
			Stiff brown fine sandy clay w/medium to coarse sand and fine gravel (fill)	10			
5			Firm to stiff brown fine sandy clay w/some fine gravel - very soft below 4 ft - with occasional fine sand pockets below 6 ft	3 3			42
10			Very stiff tan, brown and gray fine sandy clay w/some fine gravel and interbedded silty fine sand seams and layers - water at 9 ft - dark brown with less sand and gravel below 12 ft	41 23			39
15			Dense gray lignite w/interbedded clay seams and layers				
20				50/8"		83	
25				50/4"			
30			Very stiff to hard tan, grayish brown and dark brown clay w/occasional lignite seams and layers	50			83
35				50			
40			- brownish gray below 38 ft - with some silt partings and seams below 38 ft	50/9"			
				50/8"			97

COMPLETION DEPTH: 70.0 ft
DATE: 6-8-15

DEPTH TO WATER IN BORING: 9 ft

DATE: 6/8/2015

LGBNEW 14-198_CHAMPAGNOLLE CREEK RELIEF #2 (2,5,7,8,12).GPJ 9-9-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF BORING NO. 236+69

CA0702: Hwy 167 over Champagnolle Creek Relief
Calhoun County, Arkansas

TYPE: Auger to 10 ft /Wash

LOCATION: Bridge 3, Approx Sta 236+69, 38 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT / WATER CONTENT / LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			(continued)				
50				50/8"			
55							
60				50			
65							
70				50			
75							
80							
85							

COMPLETION DEPTH: 70.0 ft
DATE: 6-8-15

DEPTH TO WATER IN BORING: 9 ft

DATE: 6/8/2015

LGBNEW 14-198_CHAMPAGNOLLE CREEK RELIEF #2 (2.5.7.8.12).GPJ 9-9-15

ATTACHMENT 8

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF TEST PIT NO. 1

CA0702: Hampton - Hwy 274 (Widening) (S)
Hwy 167 - Calhoun County, Arkansas

TYPE: Backhoe

LOCATION: Approx Sta 185+50, 30 ft Rt

SURF. EL: 163.9

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			2 inches: Dark brown silt w/organics				
1			Medium dense to dense reddish tan, tan and gray clayey fine sand w/silt pockets (fill)				49
2			Dense reddish tan silty fine to medium sand w/fine to coarse gravel, wet (fill)			-NON-PLASTIC-	23
3			Medium dense gray fine sandy silt - some seepage and piping at 3 - 4 ft - dense with a little fine to coarse gravel below 3.5 ft			-NON-PLASTIC-	78
4							
5							
6							
7							
8							
9							

COMPLETION DEPTH: 6.5 ft
DATE: 3-2-15

DEPTH TO WATER IN TEST PIT: Dry

DATE: 3/2/2015

LTPNEW 14-198_TEST PITS.GPJ 9-9-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF TEST PIT NO. 2

CA0702: Hampton - Hwy 274 (Widening) (S)
Hwy 167 - Calhoun County, Arkansas

TYPE: Backhoe

LOCATION: Approx Sta 306+00, 20 ft Lt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 216±				
			Loose brown clayey fine to coarse gravel and organics (fill)				
1			Medium dense tan and gray clayey fine sand and reddish tan clayey fine to coarse gravel (fill)				41
2							
3			Stiff gray clayey silt, sandy w/trace decayed organics - tan and gray below 3 ft - perched water at 3.5 ft				54
4							
5			Stiff gray and tan fine sandy clay, silty w/occasional fine to coarse gravel and ferrous stains				58
6							
7							
8							
9							

COMPLETION DEPTH: 6.0 ft
DATE: 3-2-15

DEPTH TO WATER IN TEST PIT: Dry

DATE: 3/2/2015

LTPNEW 14-198_TEST PITS.GPJ 9-9-15

Grubbs, Hoskyn, Barton & Wyatt, Inc.
Consulting Engineers

LOG OF TEST PIT NO. 3

CA0702: Hampton - Hwy 274 (Widening) (S)
Hwy 167 - Calhoun County, Arkansas

TYPE: Backhoe

LOCATION: Approx Sta 423+40, 20 ft Rt

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WT LB/CU FT	COHESION, TON/SQ FT (0.2 0.4 0.6 0.8 1.0 1.2 1.4) / PLASTIC LIMIT — WATER CONTENT — LIQUID LIMIT (10 20 30 40 50 60 70)	- No. 200 %
			SURF. EL: 264±				
			Loose brown sandy fine to coarse gravel and organics (fill)				
1			Medium dense tan, reddish tan and gray sandy fine gravel, silty (fill)			-NON-PLASTIC-	30
2							
3			Medium dense gray silty fine sand w/a little fine to coarse gravel and decayed organics - tan and gray below 3 ft				40
			- minor seepage at 3.5 ft				
4			Medium dense to dense tan and gray clayey fine sand w/some ferrous nodules and stains				31
5			- gray and tan with more fine to coarse gravel below 4.5 ft				
6							
7							
8							
9							

COMPLETION DEPTH: 6.0 ft
DATE: 3-2-15

DEPTH TO WATER IN TEST PIT: Dry

DATE: 3/2/2015

LTPNEW 14-198_TEST PITS.GPJ 9-9-15

ATTACHMENT 9

SUMMARY of CLASSIFICATION TEST RESULTS - ROADWAY BORINGS

PROJECT: Job No. CA0702 Hwy 167 (Widening) (S)
LOCATION: Calhoun County, Arkansas
GHBW JOB NUMBER: 14-198

BORING NO.	SAMPLE DEPTH (ft)	WATER CONTENT (%)	ATTERBERG LIMITS			SIEVE ANALYSIS PERCENT PASSING							UNIFIED CLASS.	AASHTO CLASS.
			LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	1 in.	3/4 in.	3/8 in.	#4	#10	#40	#200		
R1	0.5-1.5	14	20	15	5	---	---	---	---	---	---	62	CL-ML	A-4
R1	4.5-5.5	13	---	---	---	---	---	---	---	---	---	59	ML	A-4
R2	0.5-1.5	10	23	13	10	100	100	86	69	62	57	32	GC	A-2-4
R3	0.5-1.5	8	21	15	6	100	100	89	74	66	59	36	GC-GM	A-4
R3	6.5-7.5	16	21	15	6	---	---	---	---	---	---	44	SC-SM	A-4
R4	0.5-1.5	9	25	14	11	---	---	---	---	---	---	32	SC	A-2-6
R5	0.5-1.5	14	28	15	13	---	---	---	---	---	---	63	CL	A-6
R6	0.5-1.5	6	21	14	7	---	---	---	---	---	---	24	SC-SM	A-2-4
R7	2.5-3.5	13	---Non Plastic---			---	---	---	---	---	---	42	SM	A-4
R8	0.5-1.5	16	25	15	10	---	---	---	---	---	---	57	CL	A-4
R9	0.5-1.5	17	16	14	2	---	---	---	---	---	---	46	SM	A-4
R9	4.5-5.5	21	41	16	25	---	---	---	---	---	---	61	CL	A-7-6
R10	0.5-1.5	14	---Non Plastic---			---	---	---	---	---	---	49	SM	A-4
R10	4.5-5.5	19	38	19	19	---	---	---	---	---	---	60	CL	A-6

SUMMARY of CLASSIFICATION TEST RESULTS - ROADWAY BORINGS

PROJECT: Job No. CA0702 Hwy 167 (Widening) (S)
LOCATION: Calhoun County, Arkansas
GHBW JOB NUMBER: 14-198

BORING NO.	SAMPLE DEPTH (ft)	WATER CONTENT (%)	ATTERBERG LIMITS			SIEVE ANALYSIS PERCENT PASSING							UNIFIED CLASS.	AASHTO CLASS.
			LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	1 in.	3/4 in.	3/8 in.	#4	#10	#40	#200		
R11	0.5-1.5	14	---Non Plastic---			---	---	---	---	---	---	47	SM	A-4
R11	2.5-3.5	20	25	16	9	---	---	---	---	---	---	58	CL	A-4
R12	0.5-1.5	16	29	17	12	---	---	---	---	---	---	31	SC	A-2-6
R12	4.5-5.5	14	---	---	---	---	---	---	---	---	---	37	SM	A-4
R13	2.5-3.5	17	33	20	13	---	---	---	---	---	---	42	SC	A-6
R14	2.5-3.5	18	---	---	---	---	---	---	---	---	---	44	SM	A-4
R15	0.5-1.5	13	---Non Plastic---			---	---	---	---	---	---	40	SM	A-4
R15	4.5-5.5	20	27	16	11	---	---	---	---	---	---	48	SC	A-6
R16	0.5-1.5	14	---Non Plastic---			100	100	100	100	99	98	48	SM	A-4
R17	0.5-1.5	10	---Non Plastic---			---	---	---	---	---	---	32	SM	A-2-4
R17	2.5-3.5	14	---	---	---	---	---	---	---	---	---	46	SM	A-4
R17	6.5-7.5	20	35	15	20	---	---	---	---	---	---	66	CL	A-6
R18	0.5-1.5	11	16	14	2	---	---	---	---	---	---	43	SM	A-4
R18	2.5-3.5	15	---Non Plastic---			---	---	---	---	---	---	42	SM	A-4

SUMMARY of CLASSIFICATION TEST RESULTS - ROADWAY BORINGS

PROJECT: Job No. CA0702 Hwy 167 (Widening) (S)
LOCATION: Calhoun County, Arkansas
GHBW JOB NUMBER: 14-198

BORING NO.	SAMPLE DEPTH (ft)	WATER CONTENT (%)	ATTERBERG LIMITS			SIEVE ANALYSIS PERCENT PASSING							UNIFIED CLASS.	AASHTO CLASS.
			LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	1 in.	3/4 in.	3/8 in.	#4	#10	#40	#200		
R18	4.5-5.5	16	---	---	---	---	---	---	---	---	---	46	SM	A-4
R19	0.5-1.5	9	21	15	6	---	---	---	---	---	---	41	SC-SM	A-4
R19	2.5-3.5	18	---Non Plastic---			---	---	---	---	---	---	50	ML	A-4
R20	0.5-1.5	13	18	14	4	---	---	---	---	---	---	44	SC-SM	A-4
R21	0.5-1.5	14	---Non Plastic---			---	---	---	---	---	---	49	SM	A-4
R21	2.5-3.5	19	17	14	3	---	---	---	---	---	---	58	ML	A-4
R22	0.5-1.5	14	45	14	31	---	---	---	---	---	---	48	SC	A-7-6
R22	6.5-7.5	13	22	15	7	---	---	---	---	---	---	46	SC-SM	A-4
R23	0.5-1.5	17	27	15	12	---	---	---	---	---	---	42	SC	A-6
R23	4.5-5.5	16	35	18	17	---	---	---	---	---	---	16	GC	A-2-6
R24	2.5-3.5	17	33	16	17	---	---	---	---	---	---	57	CL	A-6
R24	9-10	32	82	24	58	---	---	---	---	---	---	99	CH	A-7-6
R25	2.5-3.5	14	22	17	5	---	---	---	---	---	---	44	SC-SM	A-4
R25	6.5-7.5	14	38	19	19	---	---	---	---	---	---	48	SC	A-6

SUMMARY of CLASSIFICATION TEST RESULTS - ROADWAY BORINGS

PROJECT: Job No. CA0702 Hwy 167 (Widening) (S)
LOCATION: Calhoun County, Arkansas
GHBW JOB NUMBER: 14-198

BORING NO.	SAMPLE DEPTH (ft)	WATER CONTENT (%)	ATTERBERG LIMITS			SIEVE ANALYSIS PERCENT PASSING							UNIFIED CLASS.	AASHTO CLASS.
			LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	1 in.	3/4 in.	3/8 in.	#4	#10	#40	#200		
R26	0.5-1.5	12	21	15	6	100	100	100	95	93	89	57	CL-ML	A-4
R27	0.5-1.5	9	20	14	6	100	100	95	85	80	76	51	CL-ML	A-4
R27	6.5-7.5	17	28	13	15	---	---	---	---	---	---	67	CL	A-6
R28	0.5-1.5	13	23	14	9	---	---	---	---	---	---	56	CL	A-4
R28	2.5-3.5	13	17	14	3	---	---	---	---	---	---	67	ML	A-4
R29	0.5-1.5	7	---Non Plastic---			100	92	81	59	45	35	10	GM-GP	A-1-b
R29	2.5-3.5	13	---Non Plastic---			---	---	---	---	---	---	13	GM	A-1-b
R30	0.5-1.5	15	20	14	6	100	100	95	93	90	86	58	CL-ML	A-4
R30	4.5-5.5	14	21	15	6	---	---	---	---	---	---	62	CL-ML	A-4
R31	0.5-1.5	6	21	16	5	100	100	68	54	46	39	21	GC-GM	A-1-b
R31	4.5-5.5	14	23	13	10	---	---	---	---	---	---	48	SC	A-4
R32	0.5-1.5	7	21	13	8	---	---	---	---	---	---	23	GC	A-2-4
R32	6.5-7.5	15	21	13	8	---	---	---	---	---	---	54	CL	A-4
R33	0.5-1.5	12	25	14	11	---	---	---	---	---	---	38	GC	A-6
R33	6.5-7.5	13	---Non Plastic---			100	100	99	96	92	74	12	SM-SP	A-2-4

SUMMARY of CLASSIFICATION TEST RESULTS - ROADWAY BORINGS

PROJECT: Job No. CA0702 Hwy 167 (Widening) (S)
LOCATION: Calhoun County, Arkansas
GHBW JOB NUMBER: 14-198

BORING NO.	SAMPLE DEPTH (ft)	WATER CONTENT (%)	ATTERBERG LIMITS			SIEVE ANALYSIS PERCENT PASSING							UNIFIED CLASS.	AASHTO CLASS.
			LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	1 in.	3/4 in.	3/8 in.	#4	#10	#40	#200		
R34	0.5-1.5	7	20	18	2	---	---	---	---	---	---	17	GM	A-1-b
R34	2.5-3.5	14	---Non Plastic---			---	---	---	---	---	---	44	SM	A-4
R35	0-1.5	9	---Non Plastic---			100	100	82	73	68	63	29	SM	A-2-4
R36	0.5-1.5	5	---Non Plastic---			100	100	80	53	39	30	12	GM-GP	A-1-a
R36	2.5-3.5	14	21	16	5	---	---	---	---	---	---	54	CL-ML	A-4
R37	0.5-1.5	13	21	15	6	---	---	---	---	---	---	45	SC-SM	A-4
R37	4.5-5.5	15	27	15	12	---	---	---	---	---	---	43	SC	A-6
R38	2.5-3.5	15	22	14	8	---	---	---	---	---	---	46	GC	A-4
R39	2.5-3.5	15	---Non Plastic---			---	---	---	---	---	---	38	GC	A-4
R39	9-10	19	47	17	30	---	---	---	---	---	---	---	CL	A-7-6
R40	0.5-1.5	13	27	17	10	---	---	---	---	---	---	28	SC	A-4
R41	0.5-1.5	8	17	14	3	100	94	87	77	66	59	26	GM	A-2-4
R42	0.5-1.5	13	20	15	5	---	---	---	---	---	---	45	SC-SM	A-4

SUMMARY of CLASSIFICATION TEST RESULTS - ROADWAY BORINGS

PROJECT: Job No. CA0702 Hwy 167 (Widening) (S)
LOCATION: Calhoun County, Arkansas
GHBW JOB NUMBER: 14-198

BORING NO.	SAMPLE DEPTH (ft)	WATER CONTENT (%)	ATTERBERG LIMITS			SIEVE ANALYSIS PERCENT PASSING							UNIFIED CLASS.	AASHTO CLASS.
			LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	1 in.	3/4 in.	3/8 in.	#4	#10	#40	#200		
R42	2.5-3.5	13	---Non Plastic---			---	---	---	---	---	---	40	SM	A-4
R43	0.5-1.5	9	---Non Plastic---			100	100	93	85	78	72	33	SM	A-2-4
R44	2.5-3.5	13	22	14	8	---	---	---	---	---	---	65	CL	A-4
R45	0.5-1.5	9	18	14	4	100	100	87	77	72	68	41	SC-SM	A-4
R45	4.5-5.5	13	---Non Plastic---			---	---	---	---	---	---	60	ML	A-4
R46	0.5-1.5	7	---	---	---	100	90	81	69	60	53	27	GM	A-2-4
R47	0.5-1.5	10	19	10	9	100	100	100	98	94	92	53	CL	A-4
R47	6.5-7.5	17	30	18	12	---	---	---	---	---	---	60	CL	A-6
R48	0.5-1.5	6	---Non Plastic---			100	100	76	50	34	26	12	GM-GP	A-1-a
R48	6.5-7.5	21	37	16	21	---	---	---	---	---	---	66	CL	A-6
R49	0.5-1.5	8	---	---	---	100	95	84	74	64	57	35	GM	A-2-4
R50	2.5-3.5	13	28	16	12	---	---	---	---	---	---	44	GC	A-6
R50	6.5-7.5	24	55	21	34	---	---	---	---	---	---	96	CH	A-7-6

SUMMARY of CLASSIFICATION TEST RESULTS - PAVEMENT BORINGS

PROJECT: Job No. CA0702 Hwy 167 (Widening) (S)
LOCATION: Calhoun County, Arkansas
GHBW JOB NUMBER: 14-198

BORING/ TEST PIT NO.	SAMPLE DEPTH (ft)	WATER CONTENT (%)	ATTERBERG LIMITS			SIEVE ANALYSIS PERCENT PASSING							UNIFIED CLASS.
			LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	1 in.	3/4 in.	3/8 in.	#4	#10	#40	#200	
C1	1.2-2.2	6	---Non Plastic---			100	100	76	62	50	41	19	SM
C1	3.5-4.5	15	---Non Plastic---									74	ML
C2	1.8-2.8	15	19	15	4							69	CL-ML
C3	4.5-5.5	17	---Non Plastic---			100	100	100	98	96	91	56	ML
C4	1.8-2.8	7	19	13	6							19	SC-SM
C5	2-3	13	19	13	6							59	CL-ML
C6	3.5-4.5	17	17	14	3							59	ML
C7	1.5-2.5	9	24	14	10							19	GC
C7	3.5-4.5	15	21	16	5							63	CL-ML
C8	1.5-2.5	9	19	14	5							19	GC-GM
C9	1.5-2.5	16	30	15	15							53	CL
C10	1.2-2.5	9	22	12	10	100	94	84	72	66	62	30	SC
C10	3.5-4.5	15	15	14	1							48	SM

SUMMARY of CLASSIFICATION TEST RESULTS - PAVEMENT BORINGS

PROJECT: Job No. CA0702 Hwy 167 (Widening) (S)
LOCATION: Calhoun County, Arkansas
GHBW JOB NUMBER: 14-198

BORING/ TEST PIT NO.	SAMPLE DEPTH (ft)	WATER CONTENT (%)	ATTERBERG LIMITS			SIEVE ANALYSIS PERCENT PASSING							UNIFIED CLASS.
			LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	1 in.	3/4 in.	3/8 in.	#4	#10	#40	#200	
C11	0.9-2.4	6	23	12	11	100	66	48	31	26	23	13	GC
C12	2.5-3.5	12	15	14	1							49	SM
C13	1-2	7	22	15	7							16	GC-GM
C14	1-2	8	18	15	3							30	GM
C14	2.5-3.5	14	---Non Plastic---									62	ML
C15	1-2	8	18	14	4							20	GC-GM
C16	1-2	11	19	16	3							19	GM
C17	1-2	7	---Non Plastic---									18	SM
C18	1-2	7	---Non Plastic---									8	GM-GP
C19	1.1-2.1	6	18	15	3							17	GM
C20	1-2	6	---Non Plastic---									16	GM
C20	2.5-3.5	9	---Non Plastic---									36	SM
C21	1.1-2.1	10	19	14	5							55	CL-ML

SUMMARY of CLASSIFICATION TEST RESULTS - PAVEMENT BORINGS

PROJECT: Job No. CA0702 Hwy 167 (Widening) (S)
LOCATION: Calhoun County, Arkansas
GHBW JOB NUMBER: 14-198

BORING/ TEST PIT NO.	SAMPLE DEPTH (ft)	WATER CONTENT (%)	ATTERBERG LIMITS			SIEVE ANALYSIS PERCENT PASSING							UNIFIED CLASS.
			LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	1 in.	3/4 in.	3/8 in.	#4	#10	#40	#200	
C21	5.5-6.5	18	31	13	18							67	CL
C22	1-2	7	19	14	5	100	100	76	60	50	41	20	GC-GM
C23	0.5-1	8	18	16	2							10	GM-GP
C24	0.5-1	7	---Non Plastic---									10	GM-GP
C24	1-2	11	20	14	6							49	SC-SM
C25	0.6-1	6	---Non Plastic---									6	GM-GP

SUMMARY of CLASSIFICATION TEST RESULTS - BRIDGE BORINGS

PROJECT: Job No. CA0702 Hwy 167 (Widening) (S)
LOCATION: Calhoun County, Arkansas
GHBW JOB NUMBER: 14-198

BORING/ TEST PIT NO.	SAMPLE DEPTH (ft)	WATER CONTENT (%)	ATTERBERG LIMITS			SIEVE ANALYSIS PERCENT PASSING								UNIFIED CLASS.	AASHTO CLASS.
			LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	2 in.	1 in.	3/4 in.	3/8 in.	#4	#10	#40	#200		
207+56	4.5-5.5	16	23	14	9	100	94	94	94	90	88	84	60	CL	A-4
207+56	9-10	19	25	14	11	100	100	100	98	94	90	86	69	CL	A-6
207+56	14-15	11	---	---	---	100	100	95	76	55	38	22	11	GM-GW	A-1-a
207+56	23.5-24.5	24	---	---	---	100	100	86	85	84	83	82	19	SM	A-2-4
207+56	43.5-44.5	26	---	---	---	100	100	94	86	84	83	80	10	SM-SP	A-3
208+25	4-5	7	---	---	---	100	100	100	59	23	12	9	6	GM-GP	A-1-a
208+25	9-10	29	---Non Plastic---			---	---	---	---	---	---	---	16	SM	A-1-b
208+25	18.5-19.5	27	---	---	---	100	100	100	100	100	100	97	18	SM	A-2-4
208+25	33.5-34.5	28	---Non Plastic---			---	---	---	---	---	---	---	36	SM	A-4
208+25	43.5-44.5	27	---	---	---	---	---	---	---	---	---	---	18	SM	A-2-4
208+25	48.5-49.5	32	36	17	19	---	---	---	---	---	---	---	77	CL	A-6
208+25	53.5-54.5	30	---	---	---	---	---	---	---	---	---	---	10	SM-SP	A-3
208+25	68.5-69.5	35	---	---	---	100	100	100	100	100	100	98	9	SM-SP	A-3
209+30	4.5-5.5	25	25	15	10	---	---	---	---	---	---	---	73	CL	A-4
209+30	9-10	22	25	15	10	100	100	100	92	86	83	79	60	CL	A-4
209+30	19-20	25	25	22	3	---	---	---	---	---	---	---	51	ML	A-4
209+30	23.5-24.5	30	---Non Plastic---			---	---	---	---	---	---	---	19	SM	A-2-4
209+30	28.5-29.5	29	---Non Plastic---			---	---	---	---	---	---	---	13	SM	A-2-4
209+30	34-35	30	40	19	21	---	---	---	---	---	---	---	64	CL	A-6
209+30	43.5-44.5	28	---Non Plastic---			---	---	---	---	---	---	---	38	SM	A-4
209+30	58.5-59.5	30	45	22	23	---	---	---	---	---	---	---	61	CL	A-7-6

SUMMARY of CLASSIFICATION TEST RESULTS - BRIDGE BORINGS

PROJECT: Job No. CA0702 Hwy 167 (Widening) (S)
LOCATION: Calhoun County, Arkansas
GHBW JOB NUMBER: 14-198

BORING/ TEST PIT NO.	SAMPLE DEPTH (ft)	WATER CONTENT (%)	ATTERBERG LIMITS			SIEVE ANALYSIS PERCENT PASSING								UNIFIED CLASS.	AASHTO CLASS.
			LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	2 in.	1 in.	3/4 in.	3/8 in.	#4	#10	#40	#200		
209+75	2.5-3.5	20	31	15	16	---	---	---	---	---	---	---	75	CL	A-6
209+75	9-10	20	25	15	10	---	---	---	---	---	---	---	51	CL	A-4
209+75	14-15	25	26	23	3	---	---	---	---	---	---	---	47	SC-SM	A-4
209+75	28.5-29.5	23	---	---	---	---	---	---	---	---	---	---	20	SM	A-2-4
209+75	49-49.5	29	---Non Plastic---			---	---	---	---	---	---	---	47	SM	A-4
209+75	58.5-59	37	21	18	3	---	---	---	---	---	---	---	---	ML	A-4
227+60	2.5-5.5	14	22	12	10	100	100	100	89	83	78	72	46	SC	A-4
227+60	9-10	18	31	13	18	---	---	---	---	---	---	---	73	CL	A-6
227+60	24-24.7	28	33	27	6	---	---	---	---	---	---	---	54	CL-ML	A-4
227+60	34-35	29	---Non Plastic---			---	---	---	---	---	---	---	23	SM	A-2-4
227+60	43.5-44.5	27	---Non Plastic---			---	---	---	---	---	---	---	29	SM	A-2-4
227+60	58.59.3	28	---Non Plastic---			---	---	---	---	---	---	---	13	SM	A-2-4
227+60	63.5-64.3	29	---	---	---	100	100	100	100	100	99	97	23	SM	A-2-4
227+94	0.5-1.5	16	18	14	4	---	---	---	---	---	---	---	43	SM	A-4
227+94	4-5	10	---Non Plastic---			100	100	100	83	57	42	26	10	SM-SP	A-1-a
227+94	6.5-7.5	16	---	---	---	100	100	90	60	32	14	3	0.1	GW	A-1-a
227+94	11.5-12.5	26	26	23	3	---	---	---	---	---	---	---	70	ML	A-4
227+94	26-26.8	28	---Non Plastic---			---	---	---	---	---	---	---	32	SM	A-2-4
227+94	43.5-44.3	29	---	---	---	---	---	---	---	---	---	---	29	SM	A-2-4
227+94	63.5-64.3	30	28	23	5	---	---	---	---	---	---	---	51	CL-ML	A-4

SUMMARY of CLASSIFICATION TEST RESULTS - BRIDGE BORINGS

PROJECT: Job No. CA0702 Hwy 167 (Widening) (S)
LOCATION: Calhoun County, Arkansas
GHBW JOB NUMBER: 14-198

BORING/ TEST PIT NO.	SAMPLE DEPTH (ft)	WATER CONTENT (%)	ATTERBERG LIMITS			SIEVE ANALYSIS PERCENT PASSING								UNIFIED CLASS.	AASHTO CLASS.
			LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	2 in.	1 in.	3/4 in.	3/8 in.	#4	#10	#40	#200		
227+94	73.5-74.3	33	---	---	---	---	---	---	---	---	---	---	27	SM	A-2-4
228+55	2.5-3.5	18	---	---	---	100	100	87	60	38	22	11	5	GP-GM	A-1-a
228+55	13.5-14.5	19	32	19	13	---	---	---	---	---	---	---	92	CL	A-6
228+55	33.5-34.5	28	---	---	---	---	---	---	---	---	---	---	28	SM	A-2-4
228+55	43.5-44.5	29	---	---	---	100	100	100	100	100	100	99	13	SM	A-2-4
228+55	58.5-59	32	28	25	3	100	100	100	100	100	100	99	32	SM	A-2-4
229+35	4.5-5.5	19	23	16	7	---	---	---	---	---	---	---	74	CL-ML	A-4
229+35	19-20	29	66	25	41	---	---	---	---	---	---	---	99	CH	A-7-6
229+35	33.5-34.5	25	30	20	10	---	---	---	---	---	---	---	61	CL	A-4
229+35	48.5-49.5	29	---	---	---	100	100	100	100	100	100	99	20	SM	A-2-4
229+35	68.5-69.5	33	25	22	3	---	---	---	---	---	---	---	60	ML	A-4
229+68	6.5-7.5	18	17	13	4	100	100	100	100	98	97	95	62	SC-SM	A-4
229+68	14-15	19	---Non Plastic---			100	100	100	100	100	99	89	28	SM	A-2-4
229+68	19-20	33	66	24	42	100	100	100	98	98	98	97	95	CH	A-7-6
229+68	24-25	27	27	22	5	100	100	100	100	100	100	100	94	CL-ML	A-4
229+68	29-30	25	---Non Plastic---			---	---	---	---	---	---	---	66	ML	A-4
229+68	49-50	25	---Non Plastic---			---	---	---	---	---	---	---	33	SM	A-2-4
229+68	78.5-79	19	47	19	28	---	---	---	---	---	---	---	85	CL	A-7-6
235+69	4.5-5.5	16	24	15	9	---	---	---	---	---	---	---	42	SC	A-4

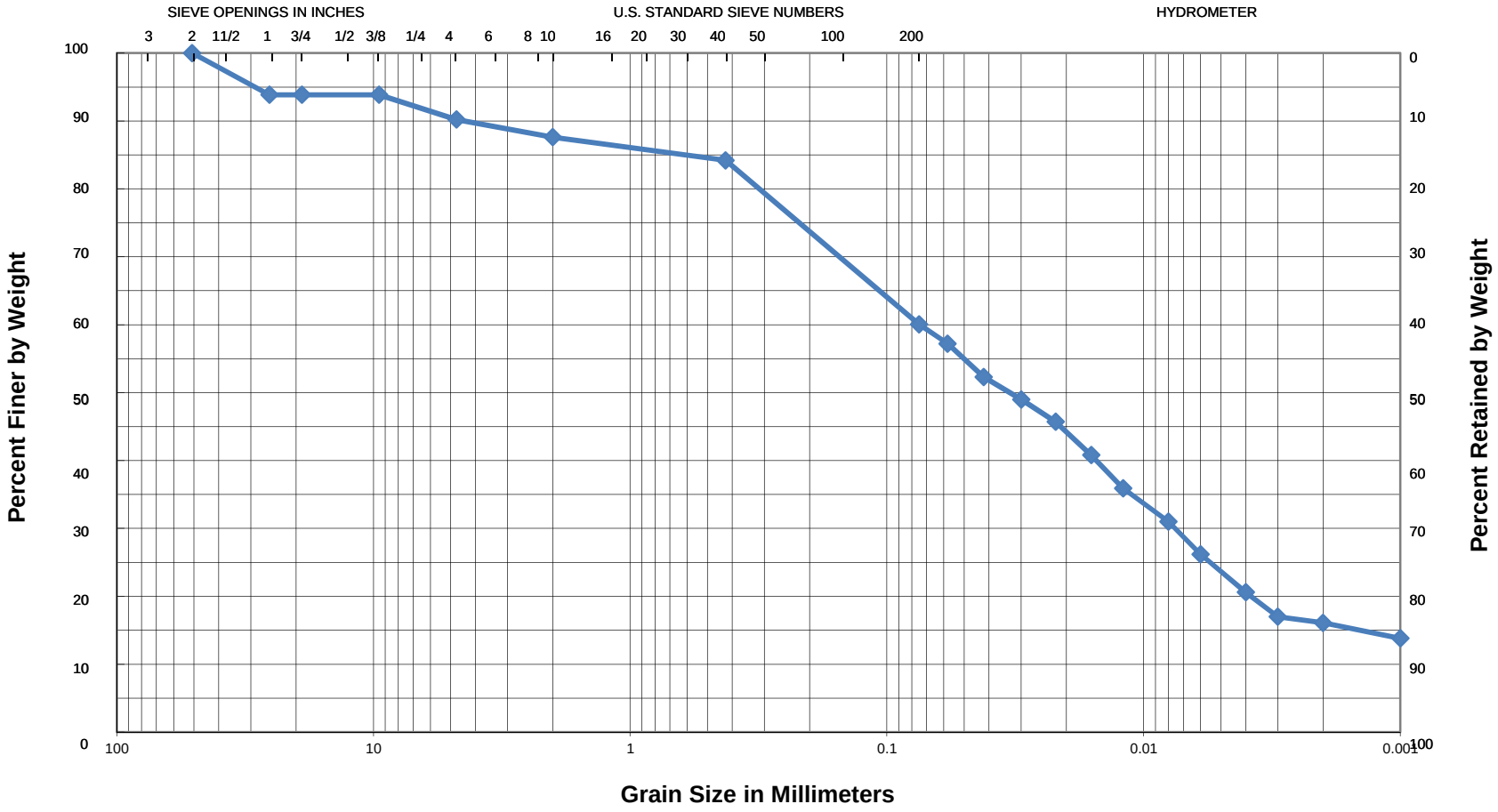
SUMMARY of CLASSIFICATION TEST RESULTS - BRIDGE BORINGS

PROJECT: Job No. CA0702 Hwy 167 (Widening) (S)
LOCATION: Calhoun County, Arkansas
GHBW JOB NUMBER: 14-198

BORING/ TEST PIT NO.	SAMPLE DEPTH (ft)	WATER CONTENT (%)	ATTERBERG LIMITS			SIEVE ANALYSIS PERCENT PASSING								UNIFIED CLASS.	AASHTO CLASS.
			LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	2 in.	1 in.	3/4 in.	3/8 in.	#4	#10	#40	#200		
235+69	9-10	13	23	12	11	---	---	---	---	---	---	---	39	SC	A-6
235+69	29-30	22	53	19	34	---	---	---	---	---	---	---	83	CH	A-7-6
235+69	44-44.7	21	52	17	35	---	---	---	---	---	---	---	97	CH	A-7-6
235+84	4.5-5.5	16	19	14	5	100	100	100	98	96	94	89	53	CL-ML	A-4
235+84	9-10	19	36	15	21	100	100	100	99	99	97	94	72	CL	A-6
235+84	14-15	29	---	---	---	100	54	53	44	41	28	13	7	GM-GW	A-1-b
235+84	24-25	25	35	18	17	100	100	100	100	100	100	99	48	SC	A-6
235+84	34-35	33	80	26	54	---	---	---	---	---	---	---	99	CH	A-7-6
235+84	49-50	19	36	18	18	---	---	---	---	---	---	---	93	CL	A-6
235+84	58.5-59	24	62	20	42	---	---	---	---	---	---	---	98	CH	A-7-6

14-198

GRAIN SIZE CURVE



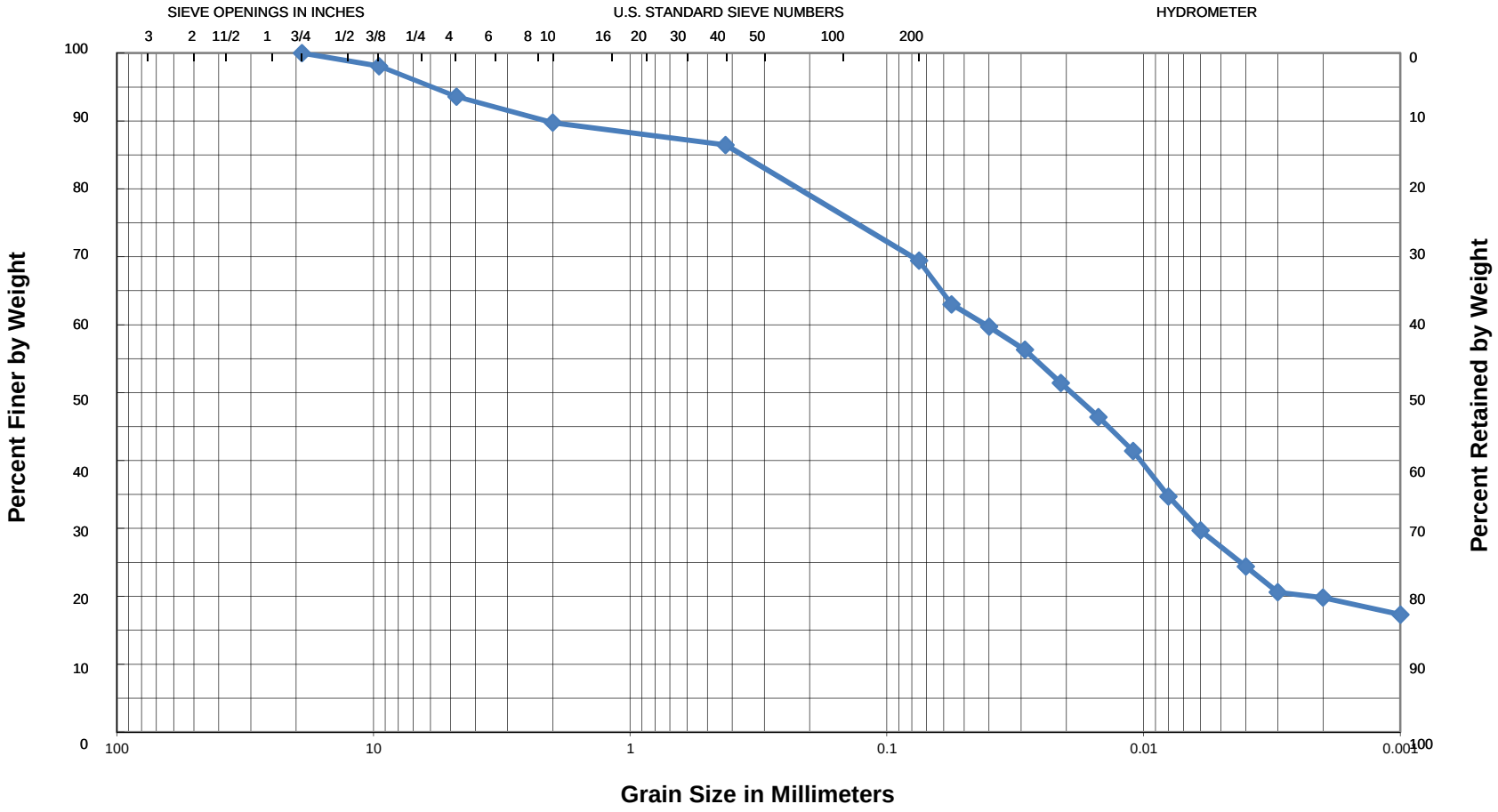
GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

Sample: Boring 207+56, 4.5-5.5 ft
Description: Grayish brown, tan and brown fine sandy clay with trace fine gravel
Properties: G_s = 2.65; LL = 23, PL = 14, PI = 9; Classification: **USCS = CL; AASHTO = A-6**

PLATE 14

14-198

GRAIN SIZE CURVE



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

Sample: Boring 207+56, 9-10 ft Description: Gray and tan fine sandy clay

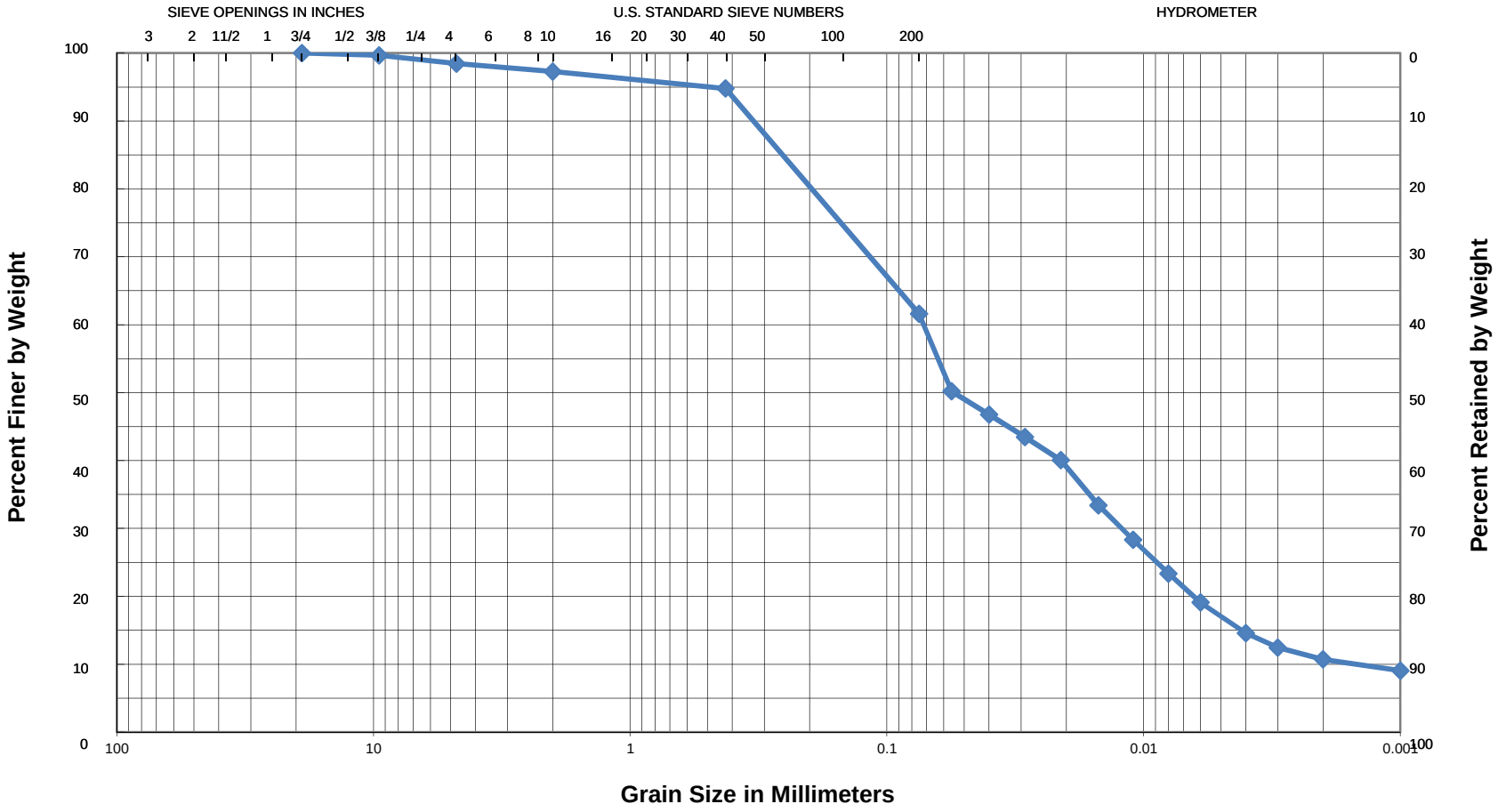
Properties: G_s = 2.67; LL = 25, PL = 14, PI = 11;

Classification: **USCS = CL; AASHTO = A-6**

PLATE 15

14-198

GRAIN SIZE CURVE



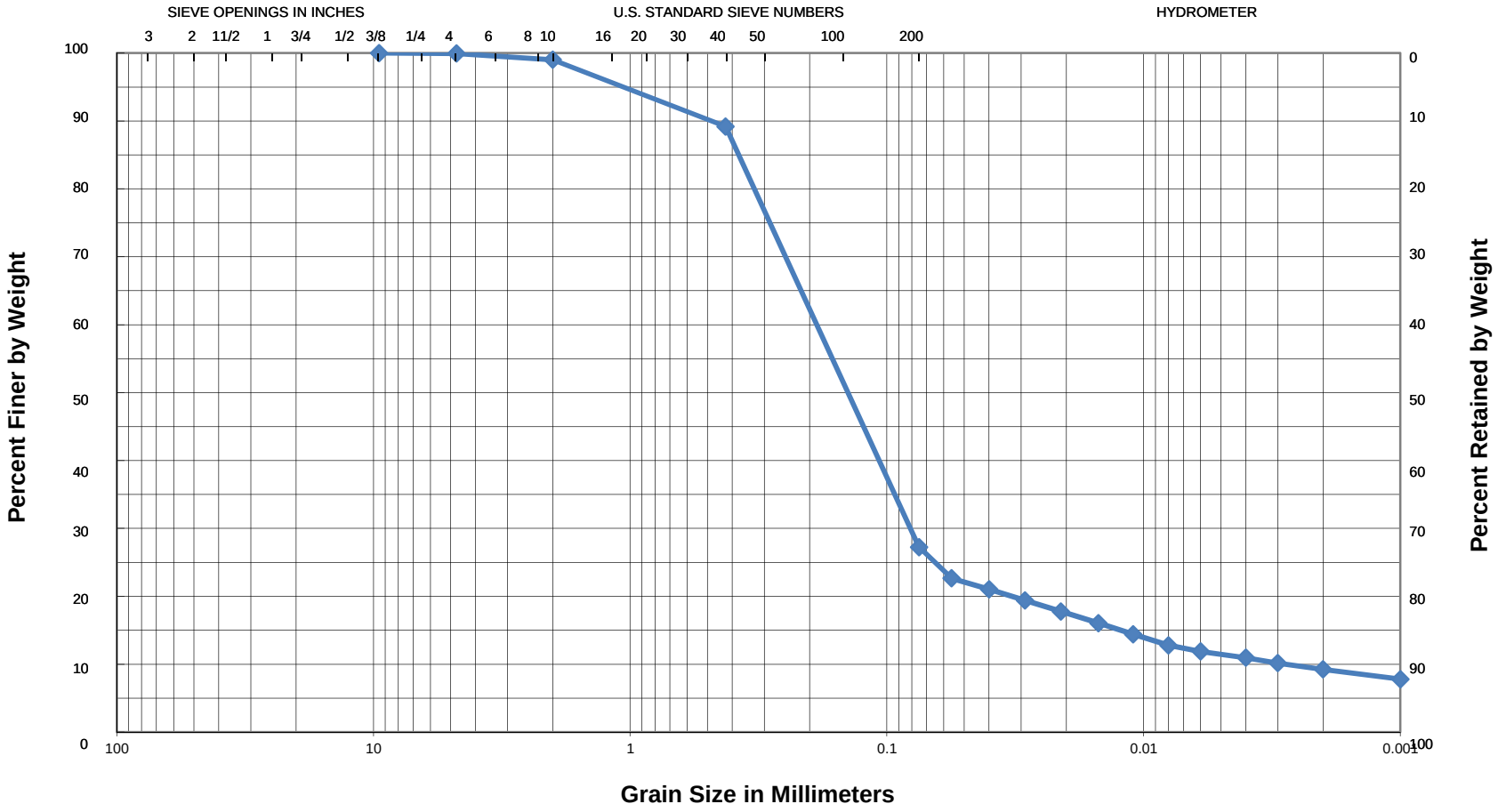
GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

Sample: Boring 229+68, 6.5-7.5 ft
Properties: G_s = 2.67; LL = 17, PL = 13, PI = 4;
Classification: **USCS = CL; AASHTO = A-4**

Description: Tan and gray fine sandy clay

14-198

GRAIN SIZE CURVE



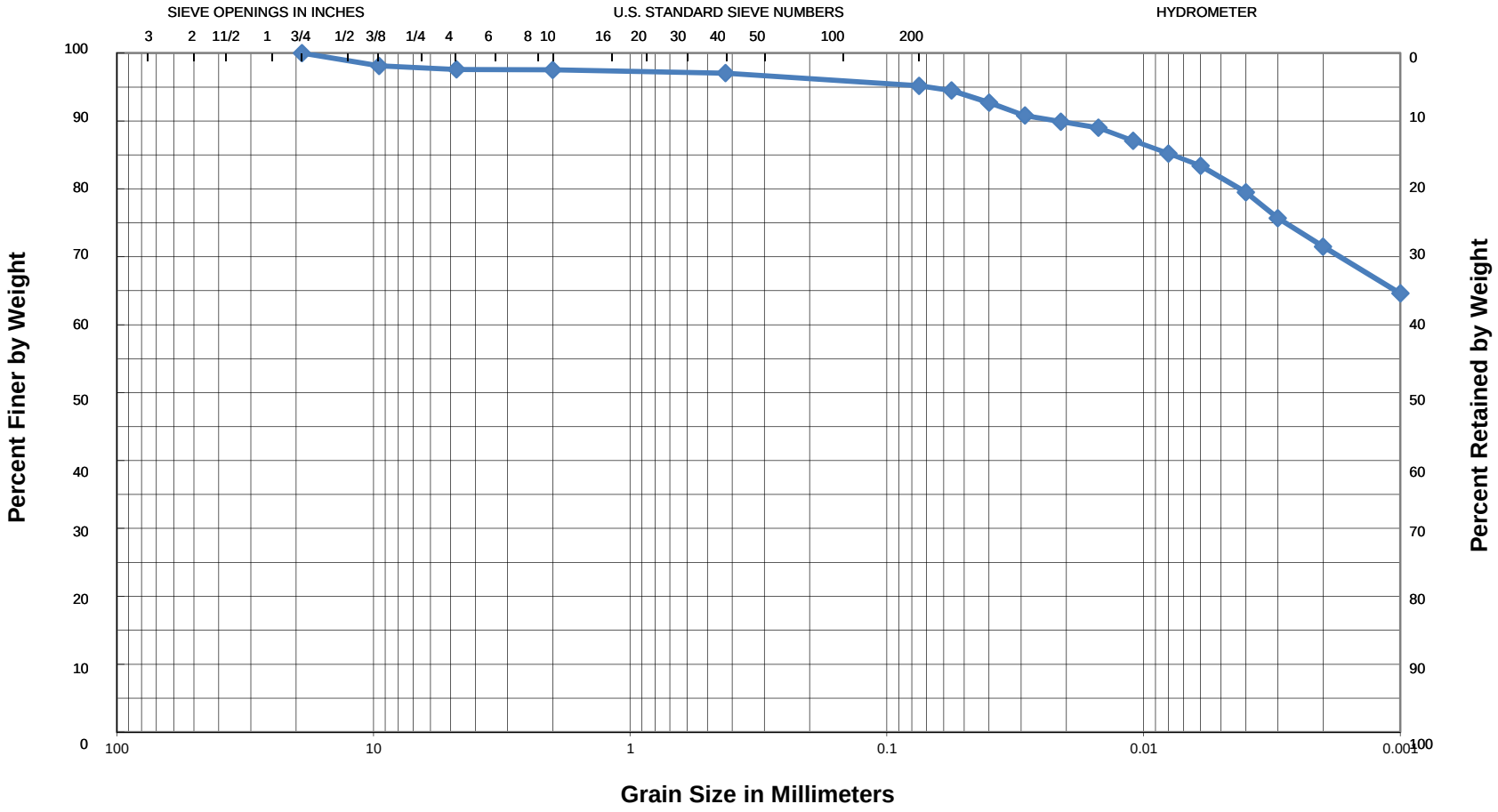
GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

Sample: Boring 229+68, 14-15 ft
Properties: G_s = 2.675; Non Plastic;
Classification: **USCS = SM; AASHTO = A-2-4**

Description: Tan and gray silty fine sand

14-198

GRAIN SIZE CURVE



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

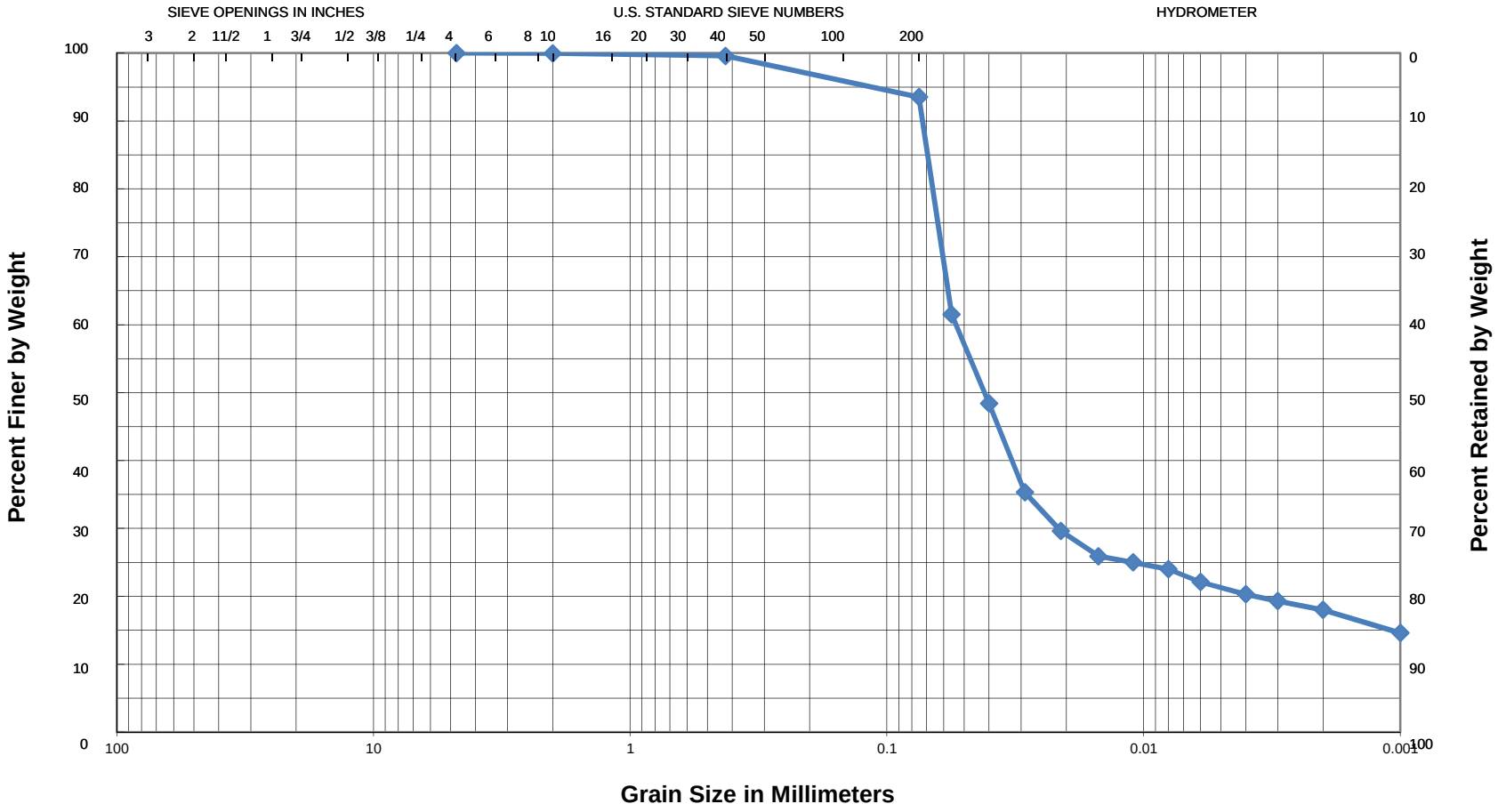
Sample: Boring 229+68, 19-20 ft
Properties: G_s = 2.68; LL = 66, PL = 24, PI = 42;
Classification: **USCS = CH; AASHTO = A-7-6**

Description: Grayish brown clay

PLATE 18

14-198

GRAIN SIZE CURVE



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

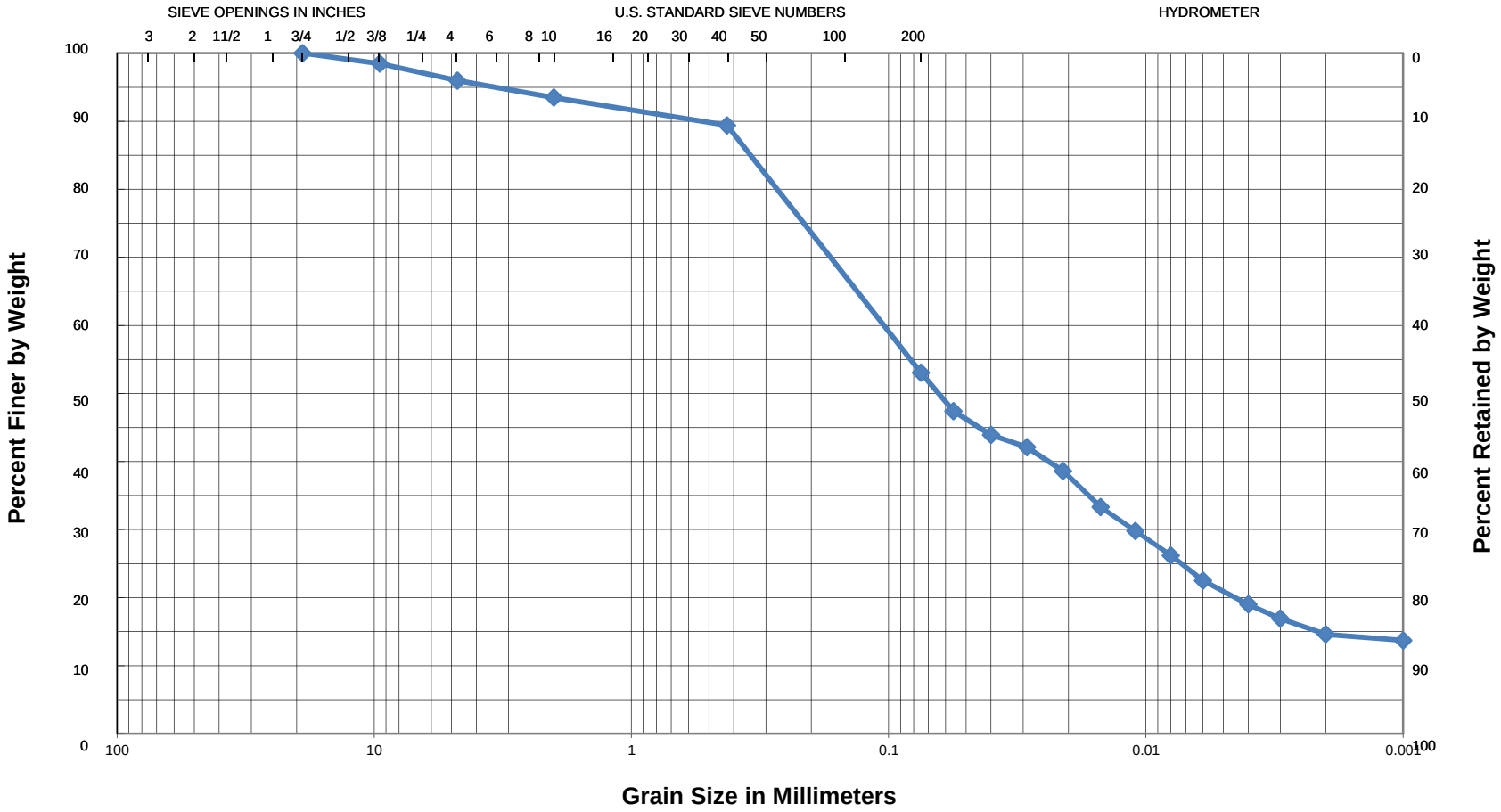
Sample: Boring 229+68, 24-25 ft
Properties: G_s = 2.65; LL = 27, PL = 22, PI = 5;
Classification: **USCS = CL-ML; AASHTO = A-4**

Description: Brown silty clay

PLATE 19

14-198

GRAIN SIZE CURVE



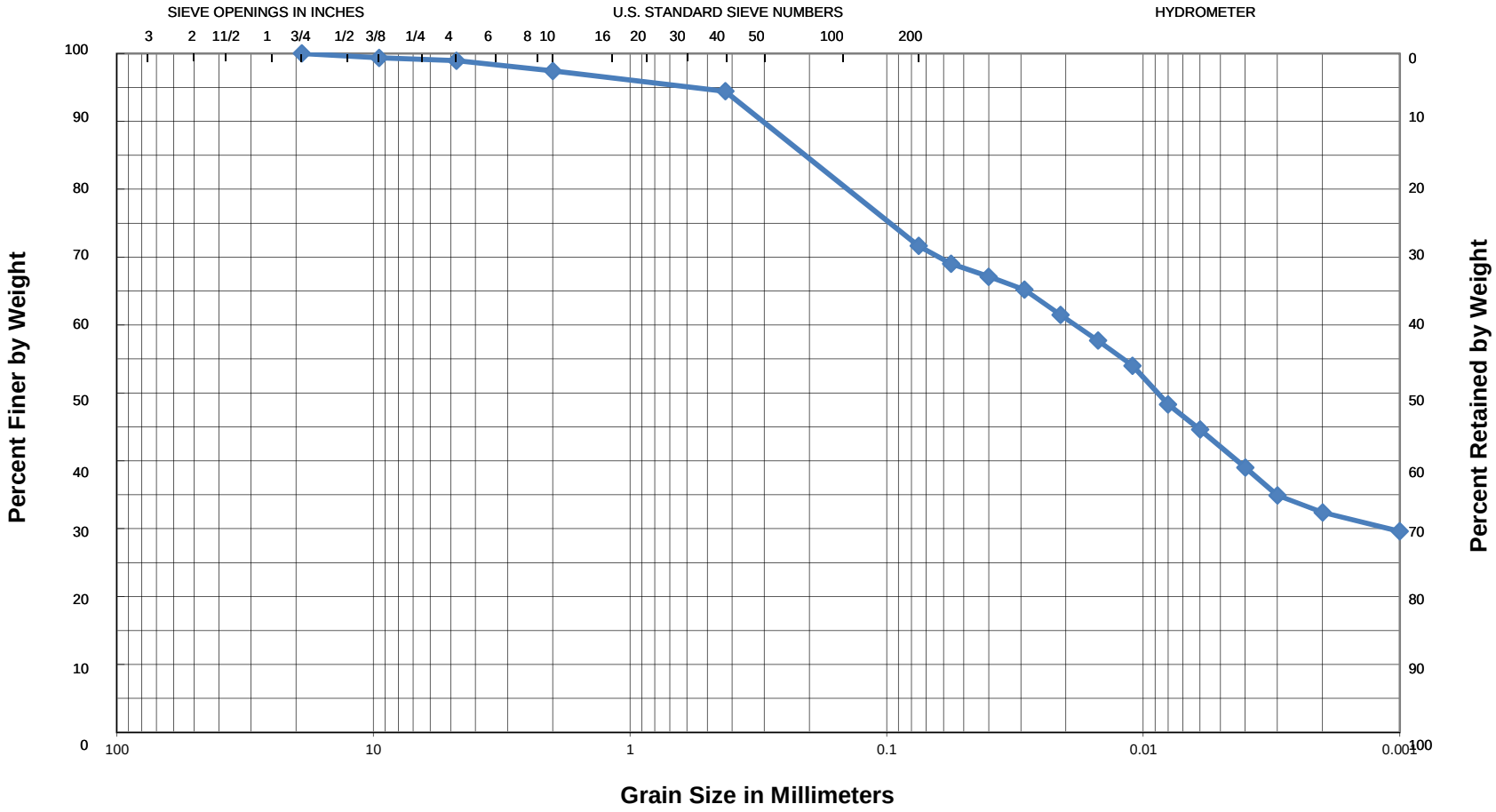
GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

Sample: Boring 235+84, 4.5-5.5 ft
Properties: G_s = 2.60; LL = 19, PL = 14, PI = 5;
Classification: **USCS = CL-ML; AASHTO = A-4**

Description: Grayish brown fine sandy clay with trace fine gravel

14-198

GRAIN SIZE CURVE



GRAVEL		SAND			SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

Sample: Boring 235+84, 9-10 ft
Properties: G_s = 2.61; LL = 36, PL = 15, PI = 21;
Classification: **USCS = CL; AASHTO = A-6**

Description: Grayish brown fine sandy clay w/ silt pockets

PLATE 21

ATTACHMENT 10

SUMMARY of ROADWAY SUBGRADE SUPPORT TEST RESULTS

PROJECT: Job No. CA0702 Hwy 167 (Widening) (S)
LOCATION: Calhoun County, Arkansas
GHBW JOB NUMBER: 14-198

TEST PIT NO.	DEPTH, FT	WATER CONT, %	ATTERBERG LIMITS			SIEVE ANALYSIS PERCENT PASSING								Soil Description	UNIFIED CLASS.	AASHTO CLASS.	PROCTOR TEST RESULTS (AASHTO T 99)		CBR TEST RESULTS (AASHTO T 193)			
			LIQUID LIMIT	PLASTIC LIMIT	PI	2 in.	1 in.	3/4 in.	3/8 in.	#4	#10	#40	#200				MAX DRY UNIT WT, pcf	OPTIMUM MOISTURE, %	MOLDED DRY UNIT WT, pcf	MOLDED WATER CONTENT, %	CBR VALUE TOP	CBR VALUE BOTTOM
1	0.5-2.5	17.8	19	17	2	100	100	100	97	96	94	91	70	Reddish tan, tan and gray fine sandy SILT, slightly clayey w/ trace fine gravel	ML	A-4	114.9	13.3	109.5	13.5	8.5	5.0
1	0.5-2.5	17.8	----	----	----	----	----	----	----	----	----	----	----	Test Pit 1 bulk sample w/ 4% Portland cement by dry weight	----	----	----	----	110.6	13.5	149.8	----
2	0.5-3	15.8	23	15	8	100	100	98	90	86	82	79	41	Tan and gray clayey fine SAND and reddish tan clayey fine to coarse GRAVEL	SC	A-4	122.2	10.9	116.3	10.7	13.3	11.4
3	0.5-3	11.9	19	15	4	100	99	96	87	72	63	58	37	Tan, reddish tan, and gray sandy fine to coarse GRAVEL and some clayey SILT	GC-GM	A-4	129.1	8.5	123.7	8.2	14.6	10.4

Grubbs, Hoskyn,
Barton & Wyatt, Inc.
CONSULTING ENGINEERS

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#1 Trigon Place 72209
(501) 455-2536
FAX (501) 455-4137

REPORT of SOIL COMPACTION CHARACTERISTICS

(AASHTO T-99 METHOD A)

Project: CA0702: Hampton - Hwy 274 (Widening) (S) Job No: 14-198

Material Description: Reddish tan, tan and gray fine sandy SILT, slightly clayey with trace fine gravel

Location Sampled/Source: Test Pit 1

Sample Depth, ft: 0.5-2.5

Date Sampled: 3/2/2015

Date Tested: 3/20/2015

Tested By: RSL

Report Date: 4/8/2015

LAB COMPACTION PROCEDURE: AASHTO T-99 Method: A	
Maximum Unit Dry Wt. (pcf):	114.9
Optimum Water Content (%):	13.3

As Processed Water Content: 17.8 %

ATTERBERG LIMITS AASHTO T-89 & T-90
Liquid Limit: 19
Plastic Limit: 17
Plasticity Index: 2

AASHTO Classification:
ML

USCS Classification:
A-4

GRADATION AASHTO T-88	
Sieve Number	Percent Passing
3 in.	100
2 in.	100
1 in.	100
3/4 in.	100
3/8 in.	97
#4	96
#10	94
#40	91
#200	70

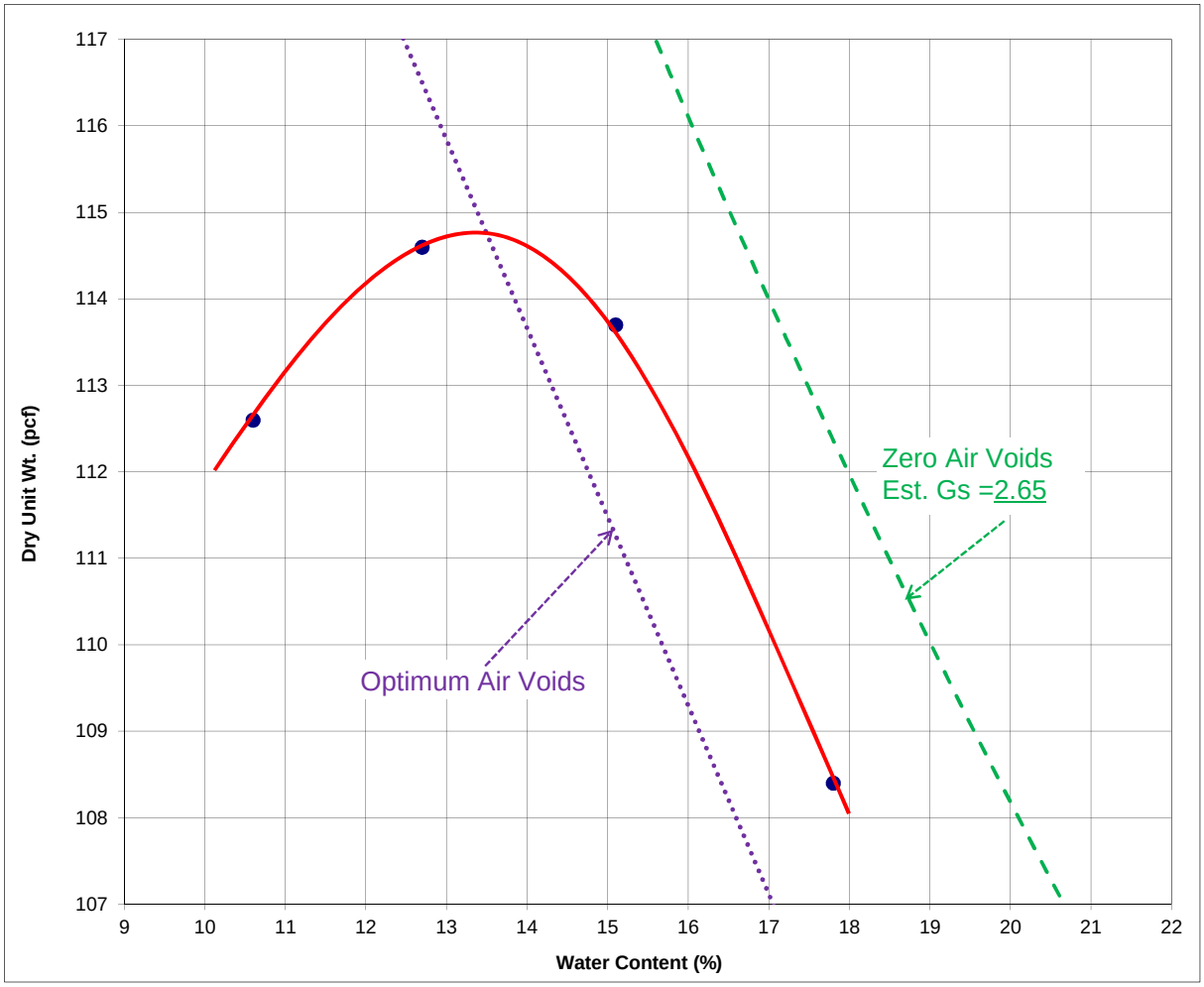
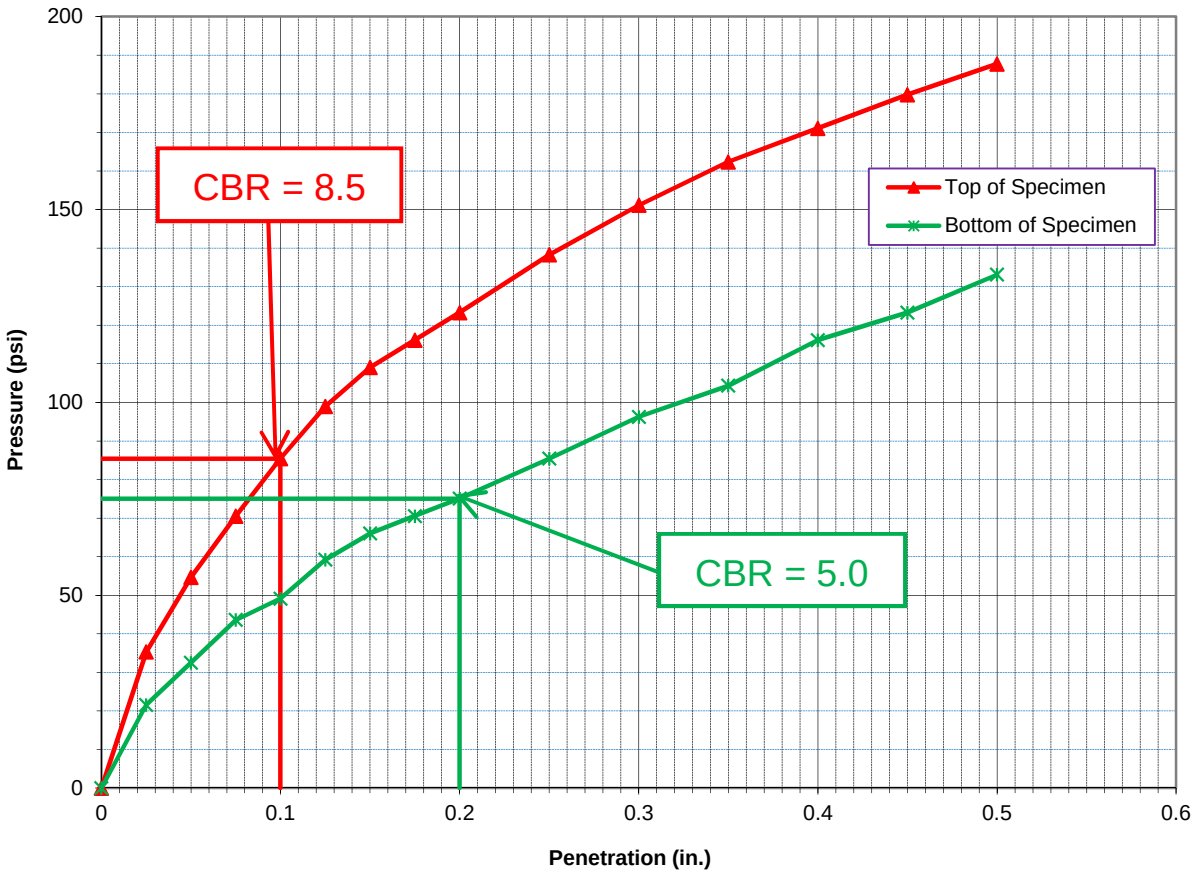


PLATE 2

Laboratory CBR Test Report
(AASHTO T 193)

RE



Test Pit/Depth, ft	Classification		Natural Moisture Content, %	Assumed Specific Gravity	Liquid Limit, %	Plastic Limit, %	% Retained on No.4	% Passing No.200
	USCS	AASHTO						
TP-1/0.5-2.5	ML	A-4	17.8	2.65	19	17	4	70

PROCTOR TEST RESULTS (AASHTO T-99 A)	MATERIAL DESCRIPTION
Optimum Moisture Content = 13.3% Maximum Dry Density = 114.9 pcf	Reddish tan, tan and gray fine sandy SILT, slightly clayey with trace fine gravel

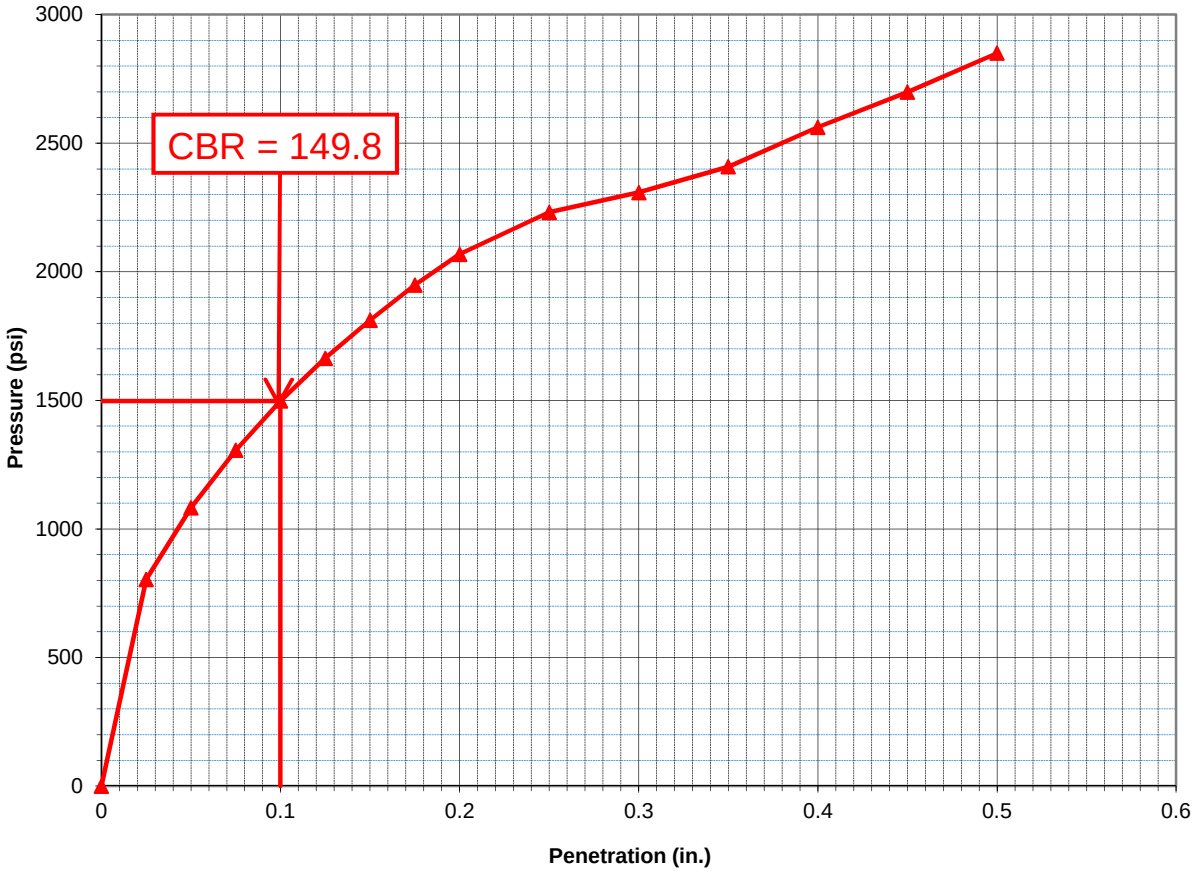
Remarks:

As molded: Dry Unit Weight, γ_d = 109.5 pcf; Moisture Content, w = 13.5%

Grubbs, Hoskyn, Barton & Wyatt, INC.
CONSULTING ENGINEERS

Project: CA0702: Hampton - Hwy 274 (Widening)
GHBW Project No.: 14-198
Location:Hwy 167 - Calhoun Co., Arkansas
Sample Date: 3-2-15
Test Date: 3-26-15

Laboratory CBR Test Report
(AASHTO T 193)



Test Pit/Depth, ft	Classification		Natural Moisture Content, %	Assumed Specific Gravity	Liquid Limit, %	Plastic Limit, %	% Retained on No.4	% Passing No.200
	USCS	AASHTO						
TP-1/0.5-2.5	ML	A-4	17.8	2.65	---	---	---	---

PROCTOR TEST RESULTS (AASHTO T-99 A)	MATERIAL DESCRIPTION
Optimum Moisture Content = 13.3% Maximum Dry Density = 114.9 pcf	Reddish tan, tan and gray fine sandy SILT, slightly clayey with trace fine gravel with 4% Portland cement added by dry weight

Remarks: TP-1 with 4% Portland Cement

As molded: Dry Unit Weight, γ_d = 110.6 pcf; Moisture Content, w = 13.5%

Grubbs, Hoskyn, Barton & Wyatt, INC.
CONSULTING ENGINEERS

Project: CA0702: Hampton - Hwy 274 (Widening)
GHBW Project No.: 14-198
Location:Hwy 167 - Calhoun Co., Arkansas
Sample Date: 3-2-15
Test Date: 6-19-15

Grubbs, Hoskyn, Barton & Wyatt, INC.
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REPORT of SOIL COMPACTION CHARACTERISTICS

(AASHTO T-99 METHOD C)

Project: CA0702: Hampton - Hwy 274 (Widening) (S) Job No: 14-198

Material Description: Tan and gray clayey SAND and reddish tan clayey fine to coarse GRAVEL

Location Sampled/Source: Test Pit 2

Sample Depth, ft: 0.5-3

Date Sampled: 3/2/2015

Date Tested: 3/19/2015

Tested By: RSL

Report Date: 4/8/2015

LAB COMPACTION PROCEDURE: AASHTO T-99 Method: C	
Maximum Unit Dry Wt. (pcf):	122.2
Optimum Water Content (%):	10.9

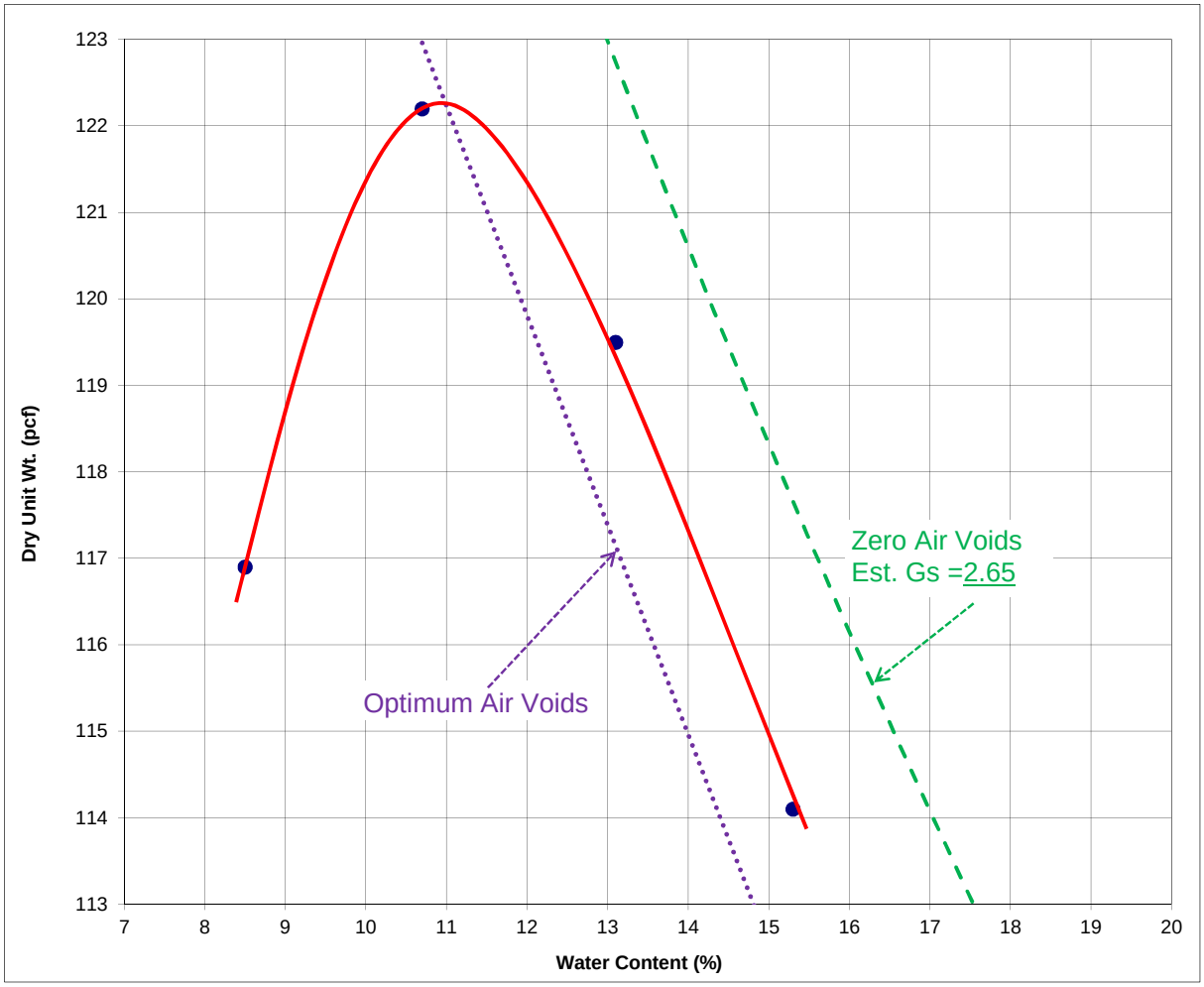
As Processed Water Content: 15.8 %

ATTERBERG LIMITS AASHTO T-89 & T-90
Liquid Limit: 23
Plastic Limit: 15
Plasticity Index: 8

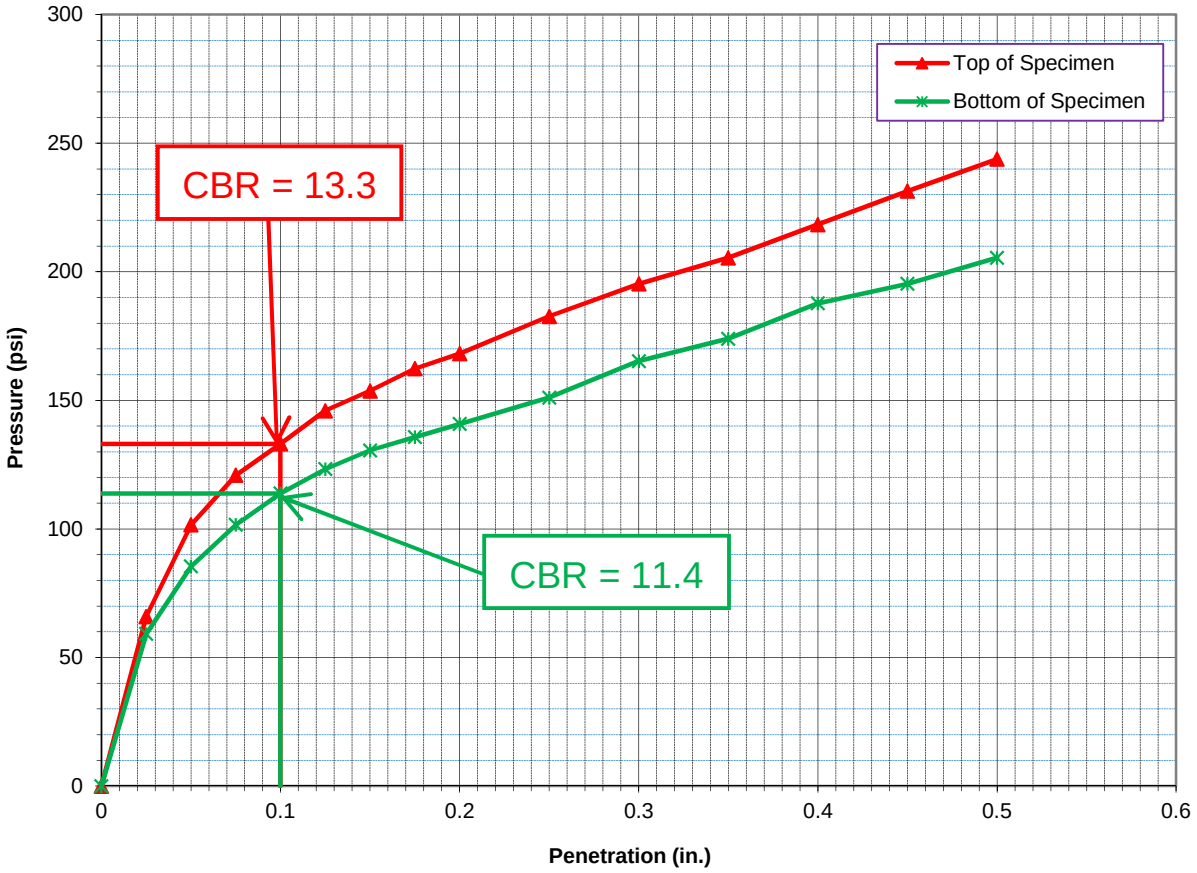
AASHTO Classification:
SC

USCS Classification:
A-4

GRADATION AASHTO T-88	
Sieve Number	Percent Passing
3 in.	100
2 in.	100
1 in.	100
3/4 in.	98
3/8 in.	90
#4	86
#10	82
#40	79
#200	41



Laboratory CBR Test Report
(AASHTO T 193)



Test Pit/Depth, ft	Classification		Natural Moisture Content, %	Assumed Specific Gravity	Liquid Limit, %	Plastic Limit, %	% Retained on No.4	% Passing No.200
	USCS	AASHTO						
TP-2/0.5-3	SC	A-4	15.8	2.65	23	15	14	41

PROCTOR TEST RESULTS (AASHTO T-99 C)	MATERIAL DESCRIPTION
Optimum Moisture Content = 10.9% Maximum Dry Density = 122.2 pcf	Tan and gray clayey SAND and reddish tan clayey fine to coarse GRAVEL

Remarks:

As molded: Dry Unit Weight, γ_d = 116.3 pcf; Moisture Content, w = 10.7%

Grubbs, Hoskyn, Barton & Wyatt, INC.
CONSULTING ENGINEERS

Project: CA0702: Hampton - Hwy 274 (Widening)
GHBW Project No.: 14-198
Location:Hwy 167 - Calhoun Co., Arkansas
Sample Date: 3-2-15
Test Date: 3-26-15

Grubbs, Hoskyn, Barton & Wyatt, INC.
CONSULTING ENGINEERS

P.O. Box 30970
Little Rock, Arkansas 72260-0970
#1 Trigon Place 72209
(501) 455-2536
FAX (501) 455-4137

REPORT of SOIL COMPACTION CHARACTERISTICS

(AASHTO T-99 METHOD C)

Project: CA0702: Hampton - Hwy 274 (Widening) (S) Job No: 14-198

Material Description: Tan reddish tan and gray sandy fine to coarse GRAVEL and some clayey silt

Location Sampled/Source: Test Pit 3
Sample Depth, ft: 0.5-3
Date Sampled: 3/2/2015
Date Tested: 3/20/2015
Tested By: RSL
Report Date: 4/8/2015

LAB COMPACTION PROCEDURE: AASHTO T-99 Method: C	
Maximum Unit Dry Wt. (pcf):	129.1
Optimum Water Content (%):	8.5

As Processed Water Content: 11.9 %

ATTERBERG LIMITS AASHTO T-89 & T-90
Liquid Limit: 19
Plastic Limit: 15
Plasticity Index: 4

AASHTO Classification:
GC-GM

USCS Classification:
A-4

GRADATION AASHTO T-88	
Sieve Number	Percent Passing
3 in.	100
2 in.	100
1 in.	99
3/4 in.	96
3/8 in.	87
#4	72
#10	63
#40	58
#200	37

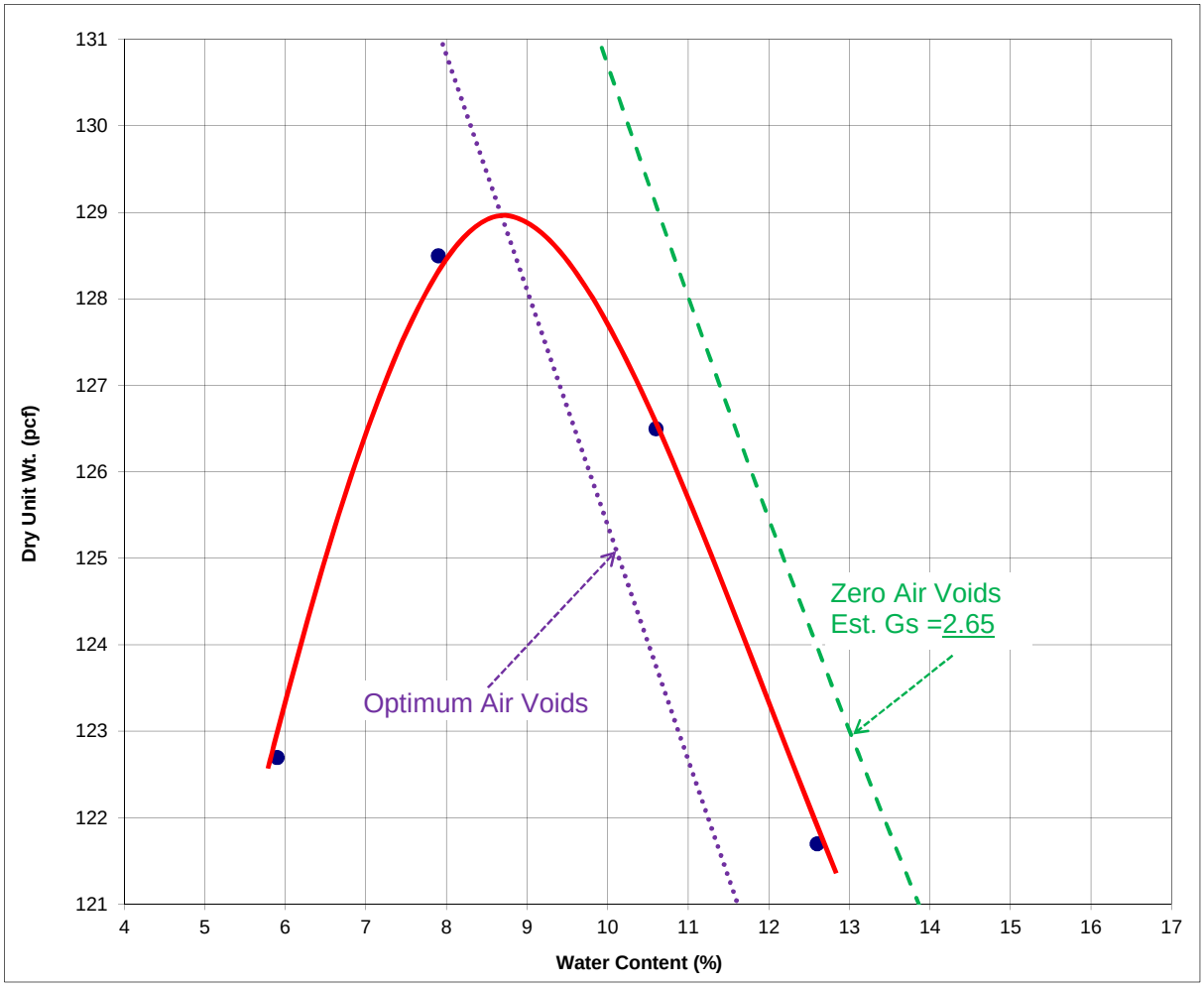
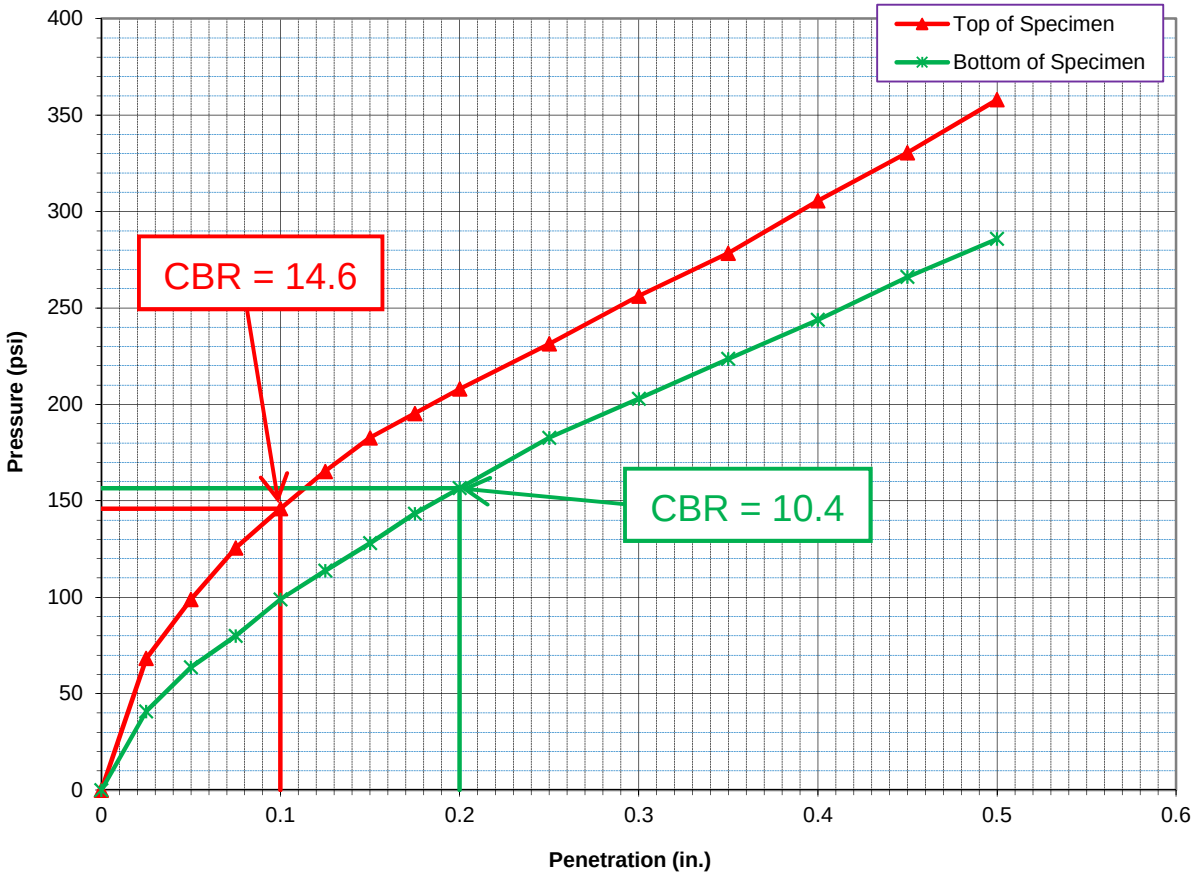


PLATE 7

Laboratory CBR Test Report
(AASHTO T 193)



Test Pit/Depth, ft	Classification		Natural Moisture Content, %	Assumed Specific Gravity	Liquid Limit, %	Plastic Limit, %	% Retained on No.4	% Passing No.200
	USCS	AASHTO						
TP-3/0.5-3	GC-GM	A-4	11.9	2.65	19	15	28	37

PROCTOR TEST RESULTS (AASHTO T-99 C)	MATERIAL DESCRIPTION
Optimum Moisture Content = 8.5% Maximum Dry Density = 129.1 pcf	Tan reddish tan and gray sandy fine to coarse GRAVEL and some clayey silt

Remarks:

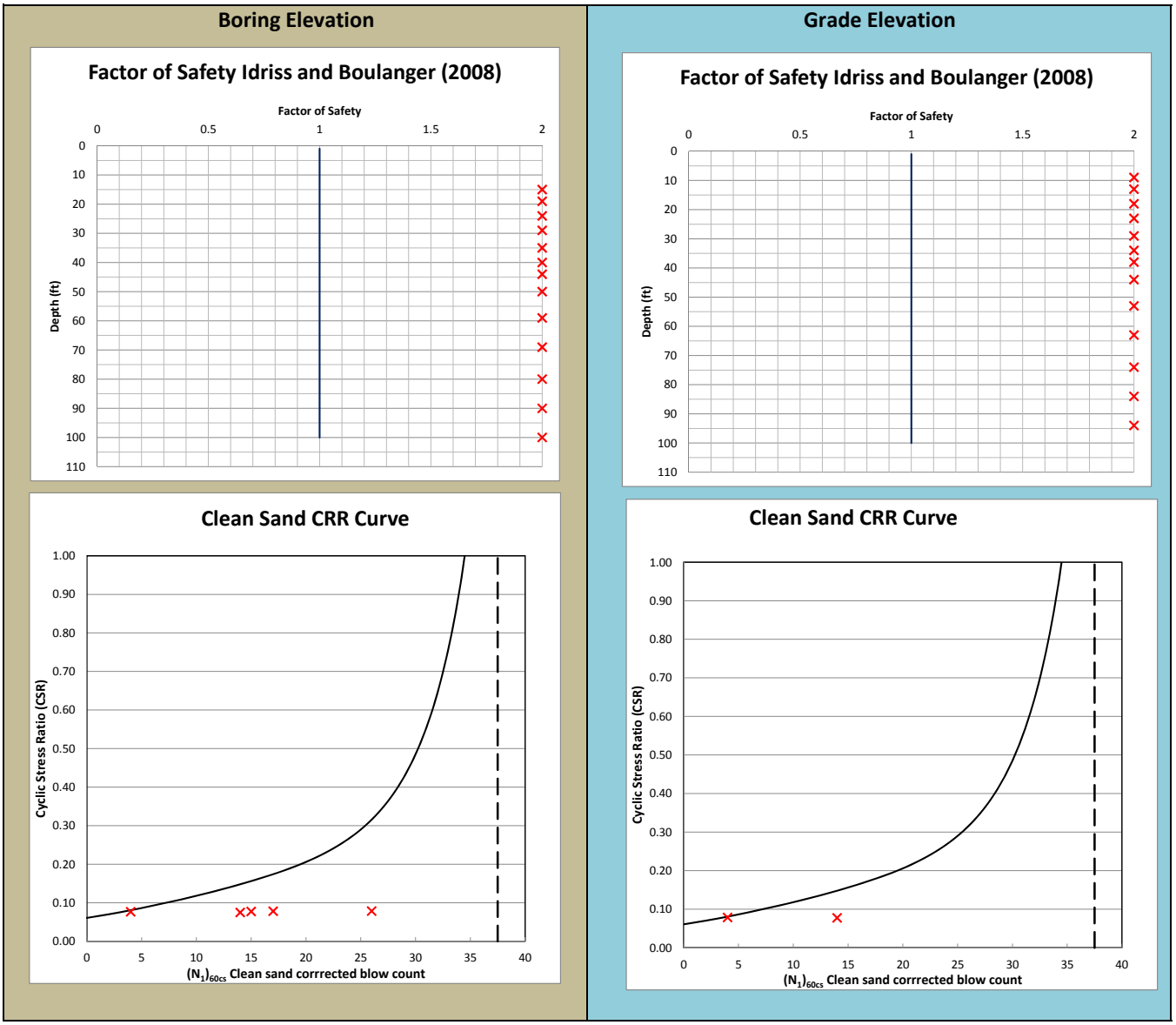
As molded: Dry Unit Weight, γ_d = 123.7 pcf; Moisture Content, w = 8.2%

Grubbs, Hoskyn, Barton & Wyatt, INC.
CONSULTING ENGINEERS

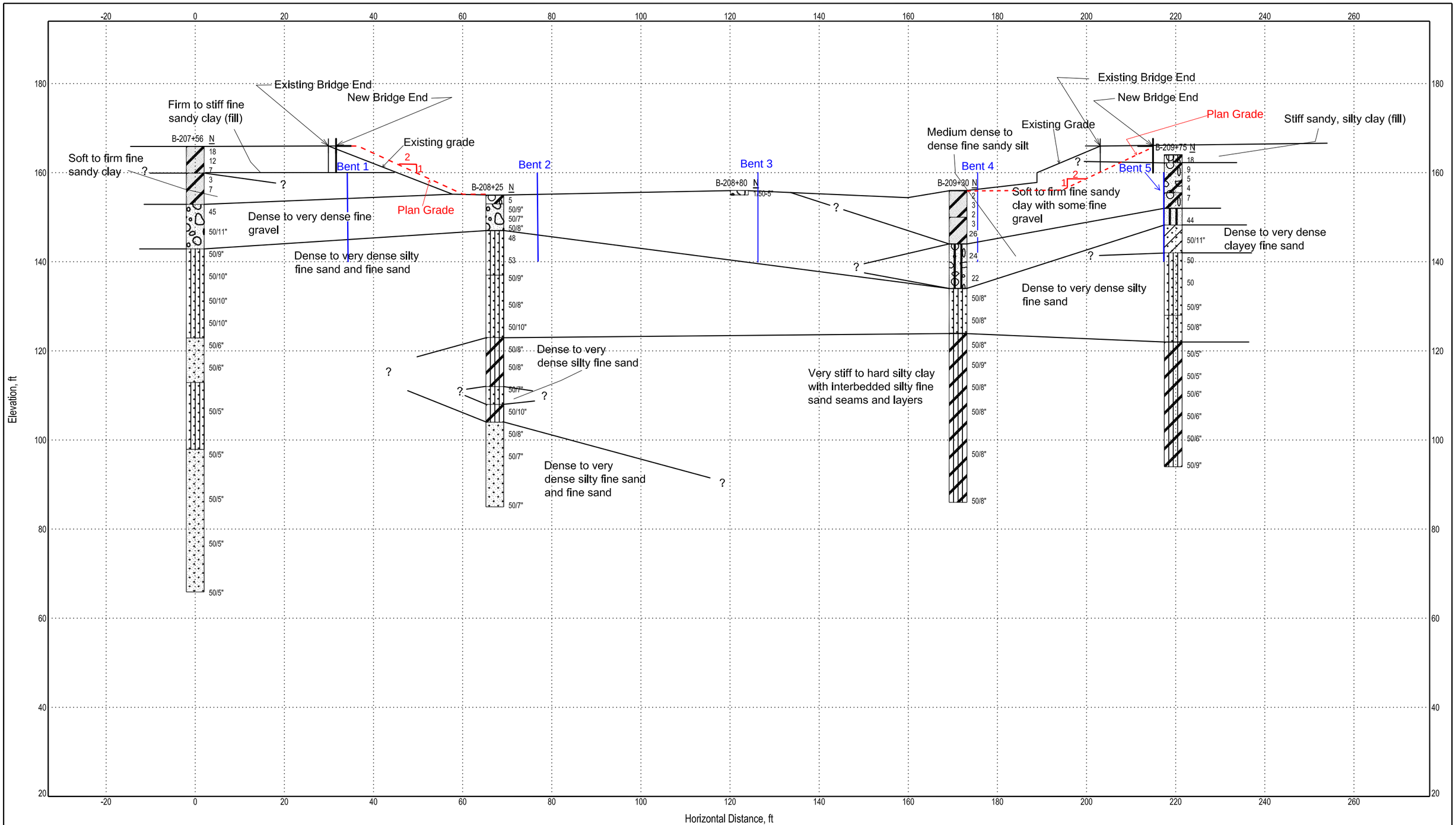
Project: CA0702: Hampton - Hwy 274 (Widening)
GHBW Project No.: 14-198
Location:Hwy 167 - Calhoun Co., Arkansas
Sample Date: 3-2-15
Test Date: 3-26-15

ATTACHMENT 11

Results of Liquefaction Analyses
CA0702 - Hwy 167 over Campagnolle Creek bridge (Bridge 1)



ATTACHMENT 12



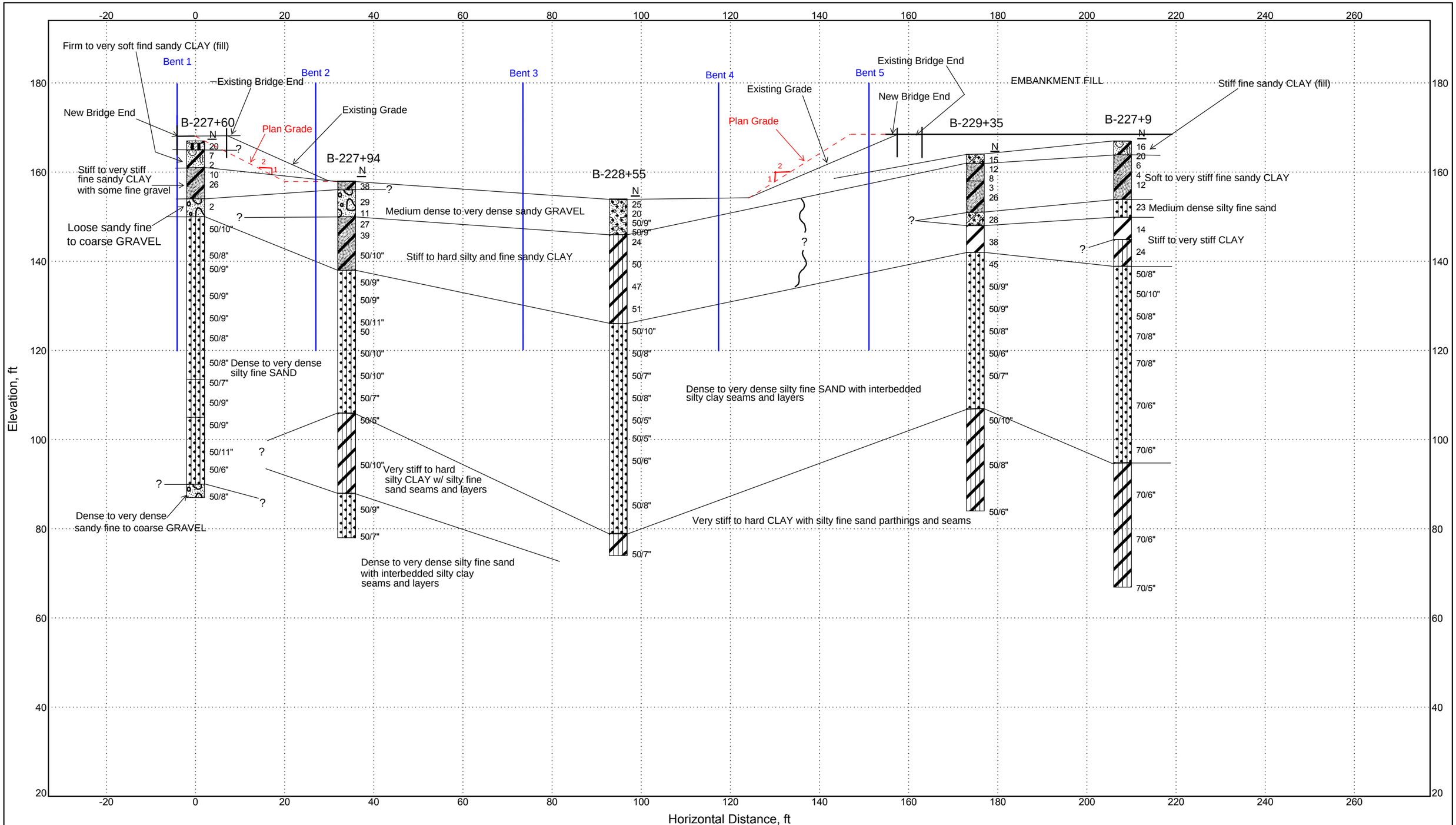
Grubbs, Hoskyn, Barton & Wyatt, Inc.

NOTES:
1. Subsurface conditions have been inferred between discrete boring locations. Actual conditions may vary.
2. Ground surface approximate.

SCALE:
1" = 20' Horizontal
1" = 20' Vertical

Generalized Subsurface Profile
CA0702: Hwy 167 over Champagnolle Creek (Bridge 1)
Calhoun County, Arkansas

Project Number: 14-198

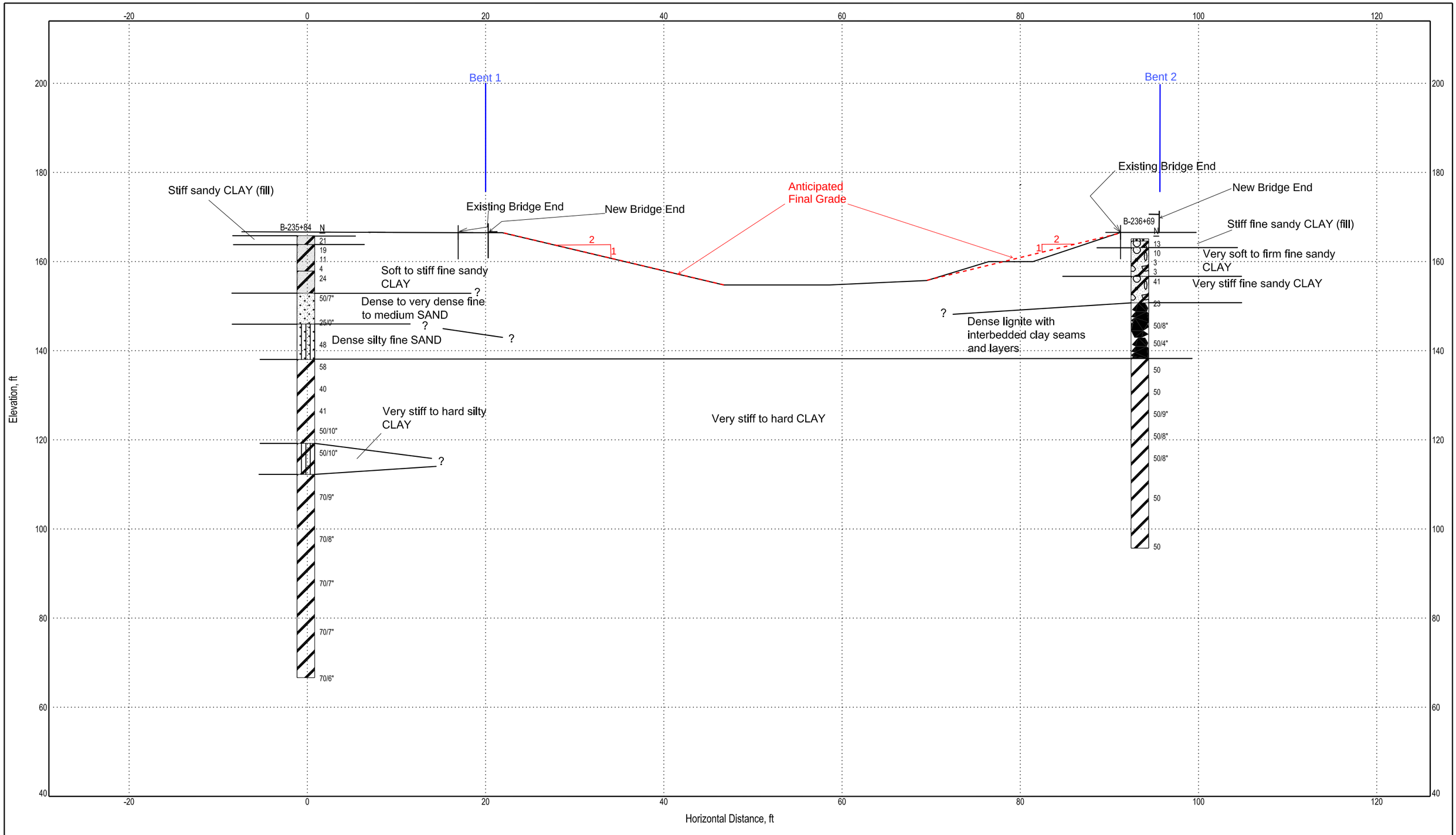


Grubbs, Hoskyn, Barton & Wyatt, Inc.

NOTES:
1. Subsurface conditions have been inferred between discrete boring locations. Actual conditions may vary.
2. Ground surface approximate.

SCALE:
1" = 20' Horizontal
1" = 20' Vertical

Generalized Subsurface Profile
CA0702: Hwy 167 over Champagnolle Creek Relief (Bridge 2)
Calhoun County, Arkansas
Project Number: 14-198



Grubbs, Hoskyn,
Barton & Wyatt, Inc.

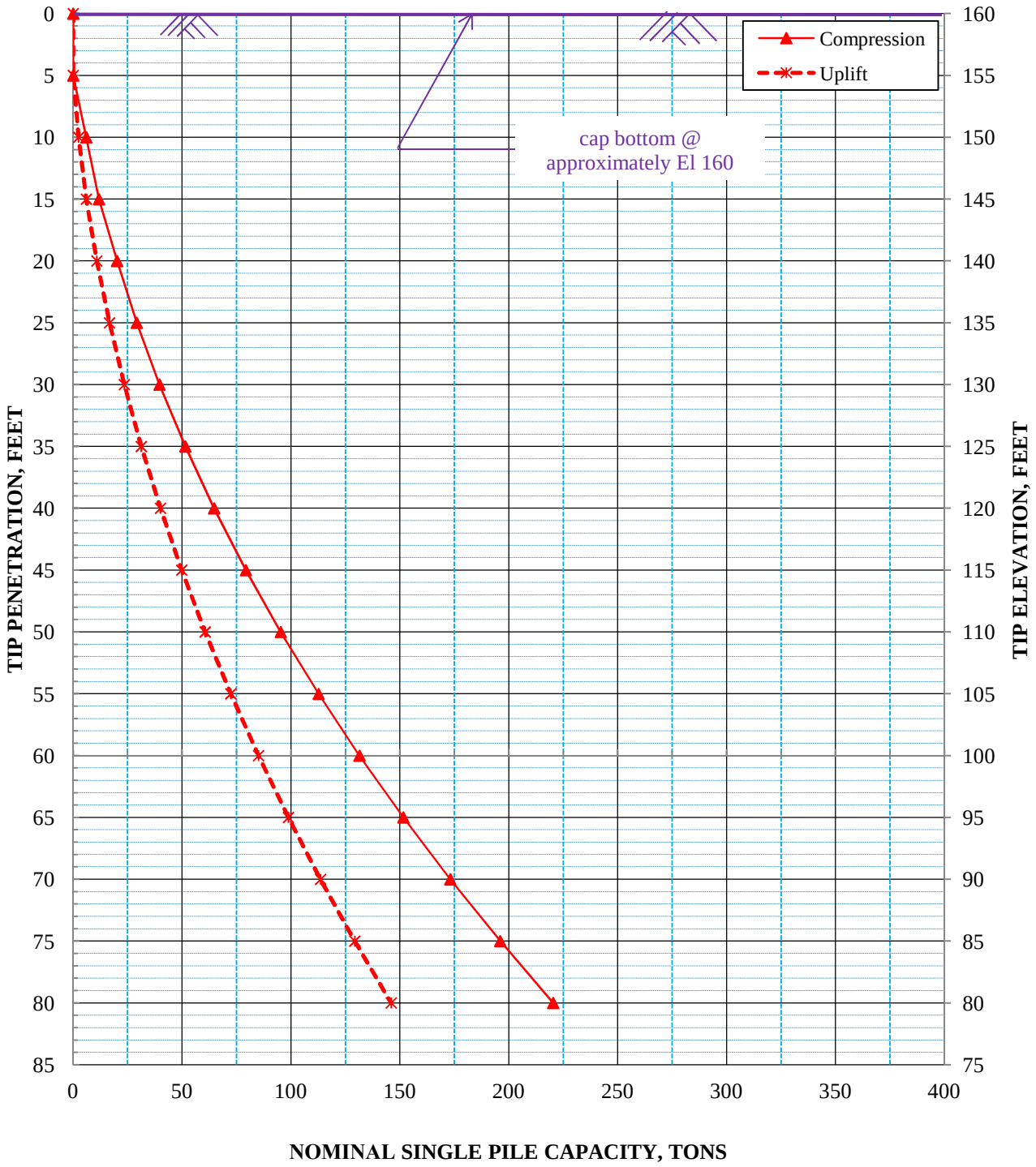
NOTES:
1. Subsurface conditions have been inferred between discrete boring locations. Actual conditions may vary.
2. Ground surface approximate.

SCALE:
1" = 10' Horizontal
1" = 20' Vertical

Generalized Subsurface Profile
CA0702: Hwy 167 over Champagnolle Creek Relief (Bridge 3)
Calhoun County, Arkansas

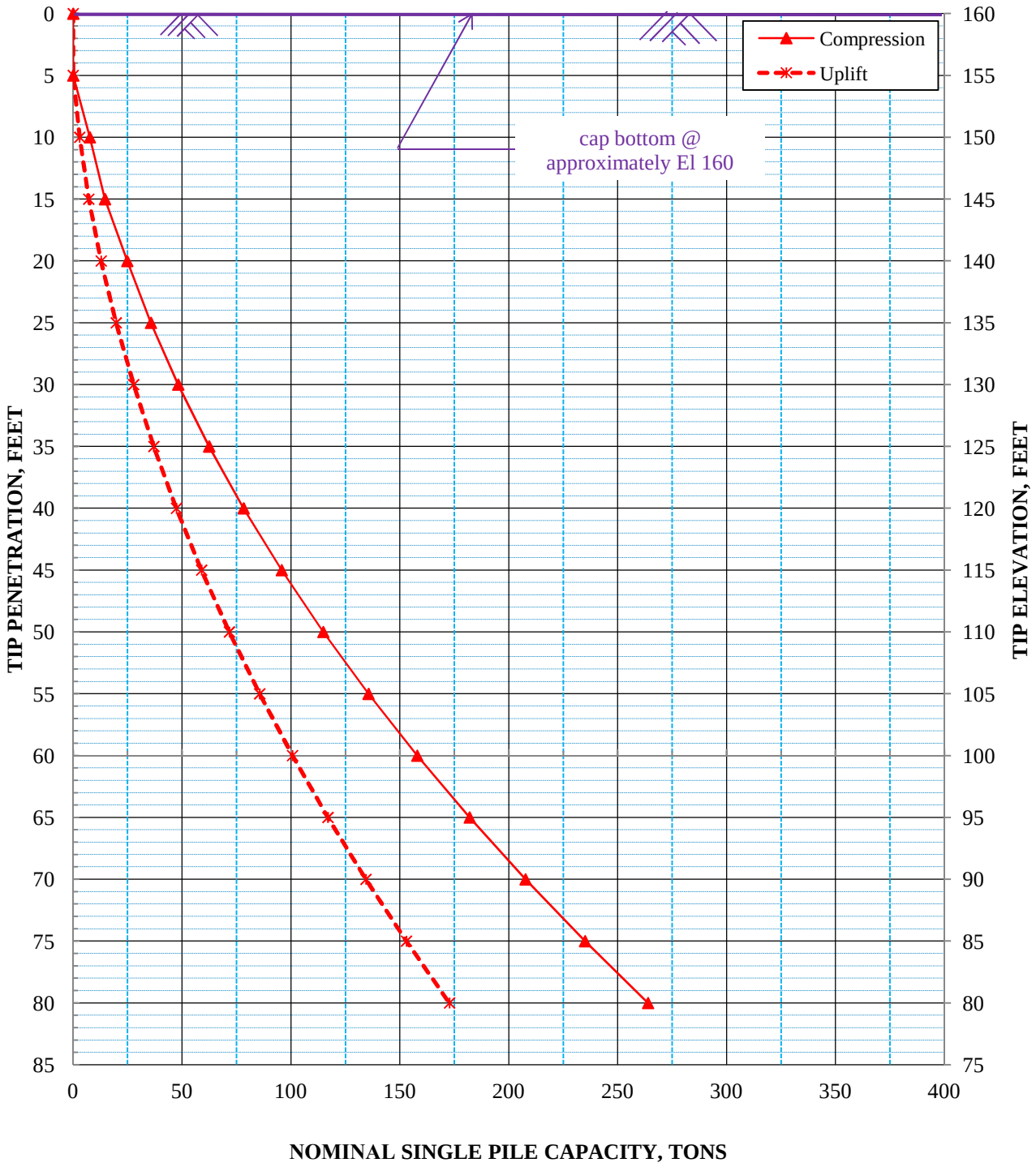
Project Number: 14-198

ATTACHMENT 13



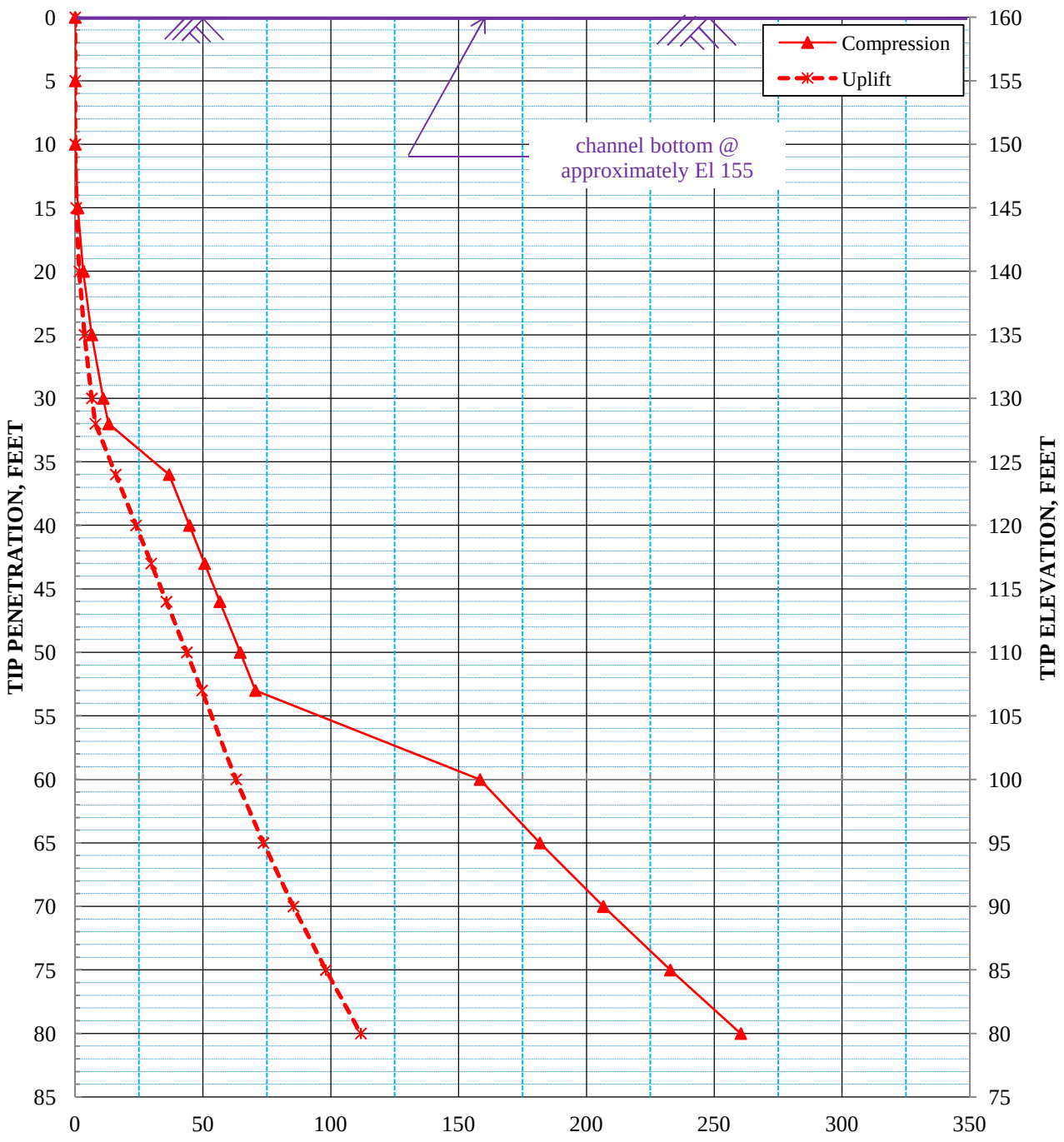
HP12x53 Steel Piles - Bent 1
CA0702: Hwy 167 over Champagnolle Creek, Bridge 1
Calhoun County, Arkansas

Note: Plan cap bottom at El 160



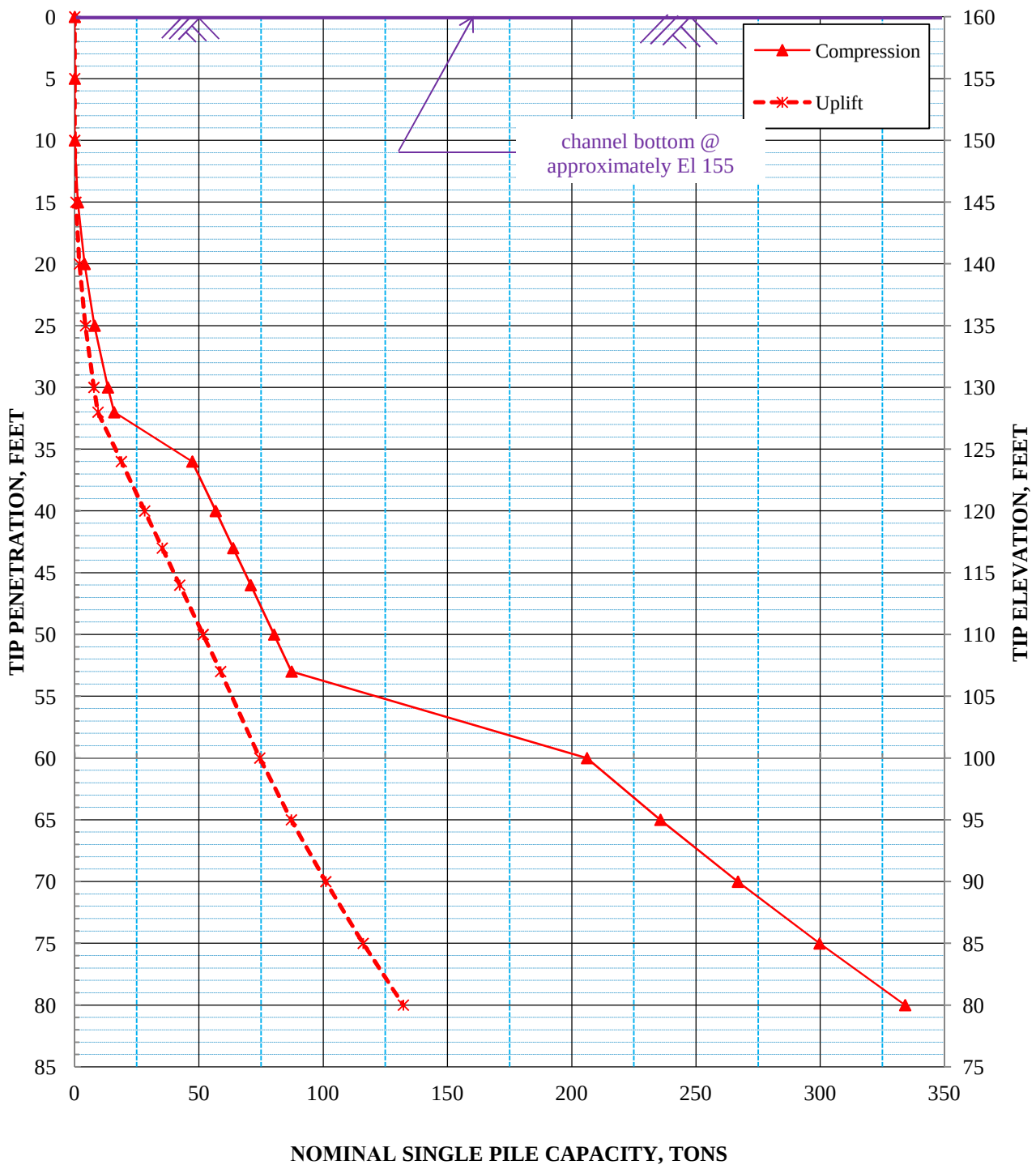
HP14x73 Steel Piles - Bent 1
CA0702: Hwy 167 over Champagnolle Creek, Bridge 1
Calhoun County, Arkansas

Note: Plan cap bottom at El 160



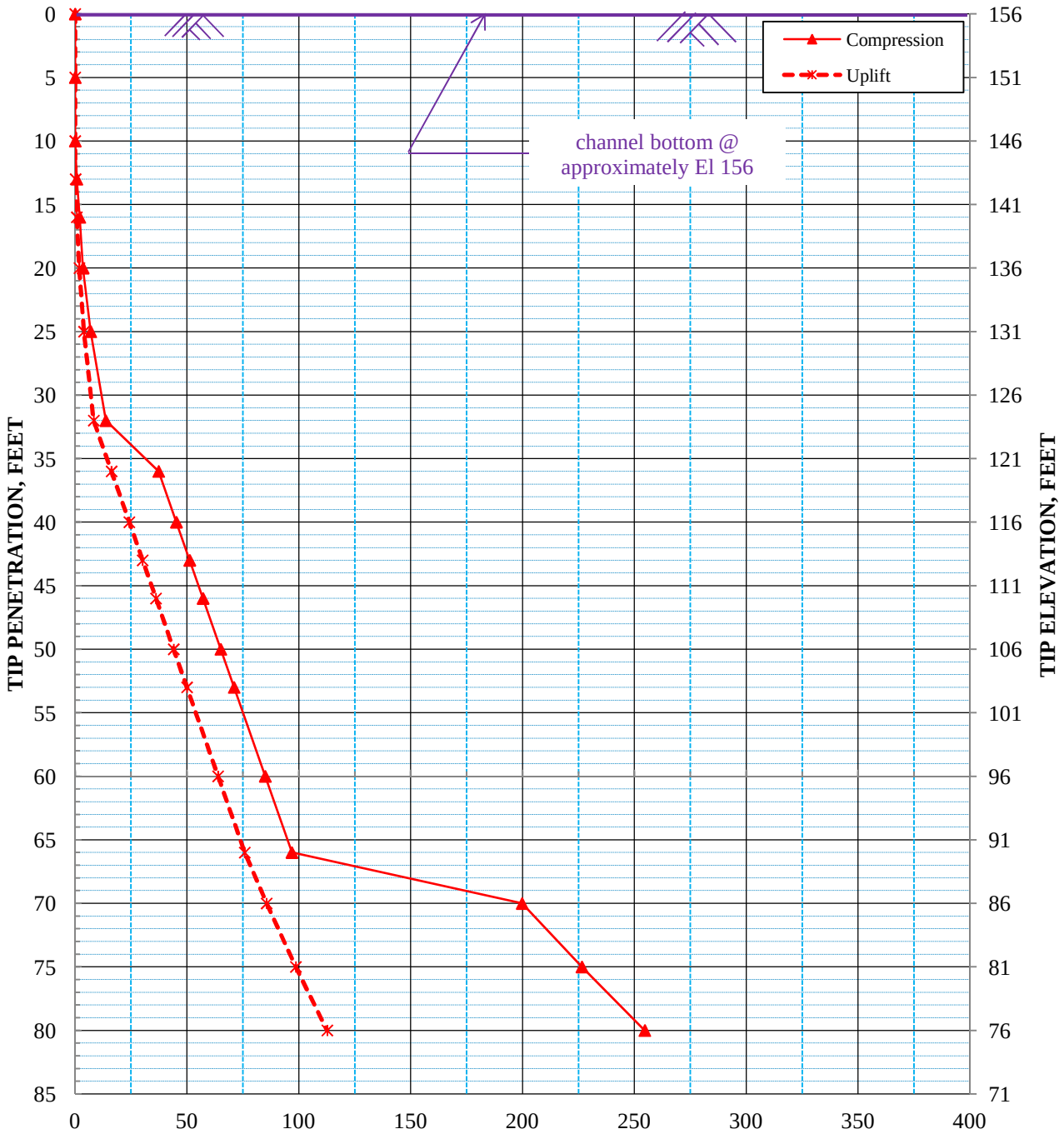
HP12x53 Steel Piles - Bent 2
CA0702: Hwy 167 over Champagnolle Creek, Bridge 1
Calhoun County, Arkansas

Note: Channel bottom at El 155, 10 ft scour assumed



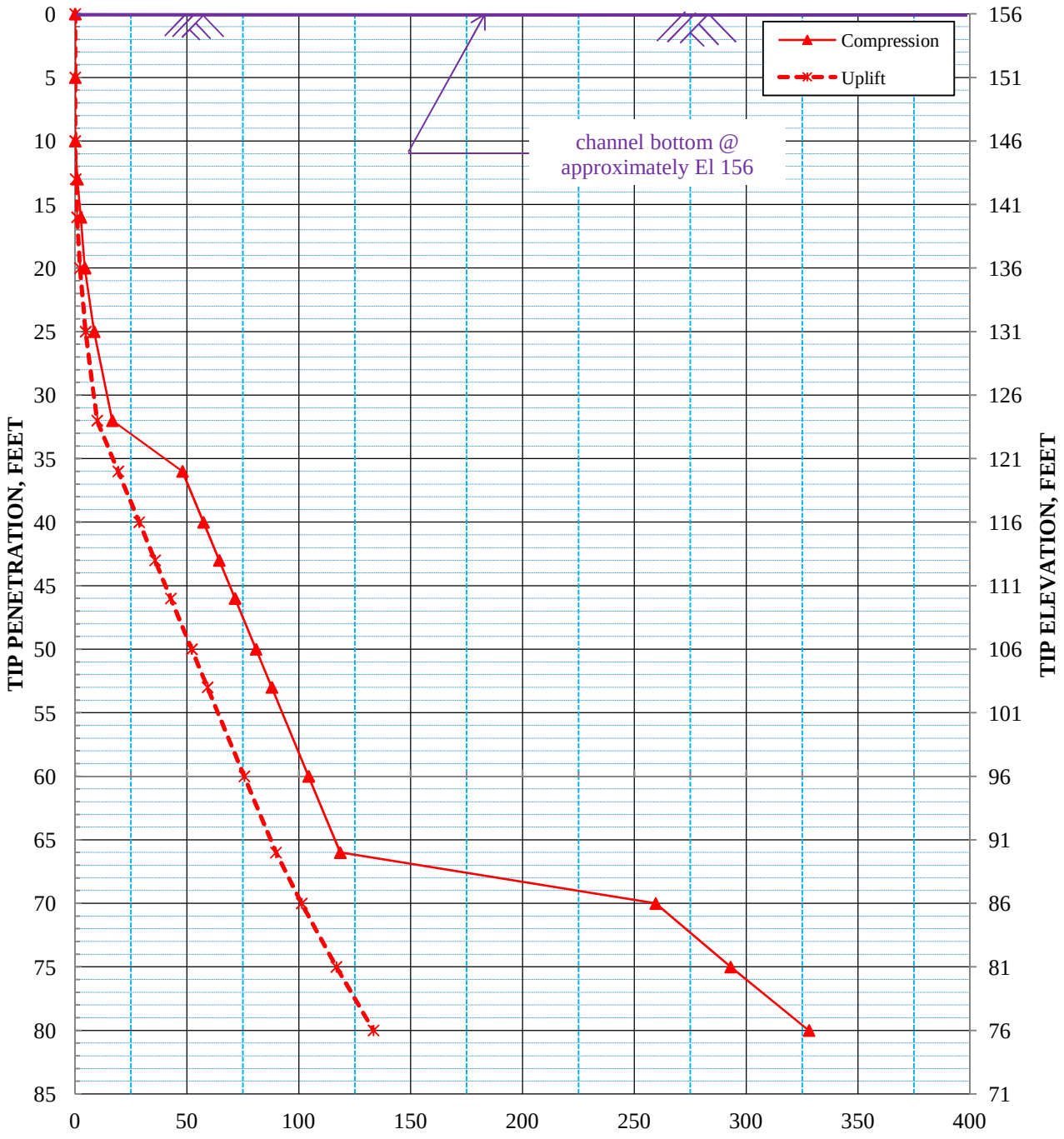
HP14x73 Steel Piles - Bent 2
CA0702: Hwy 167 over Champagnolle Creek, Bridge 1
Calhoun County, Arkansas

Note: Channel bottom at El 155, 10 ft scour assumed



HP12x53 Steel Piles - Bent 3
CA0702: Hwy 167 over Champagnolle Creek, Bridge 1
Calhoun County, Arkansas

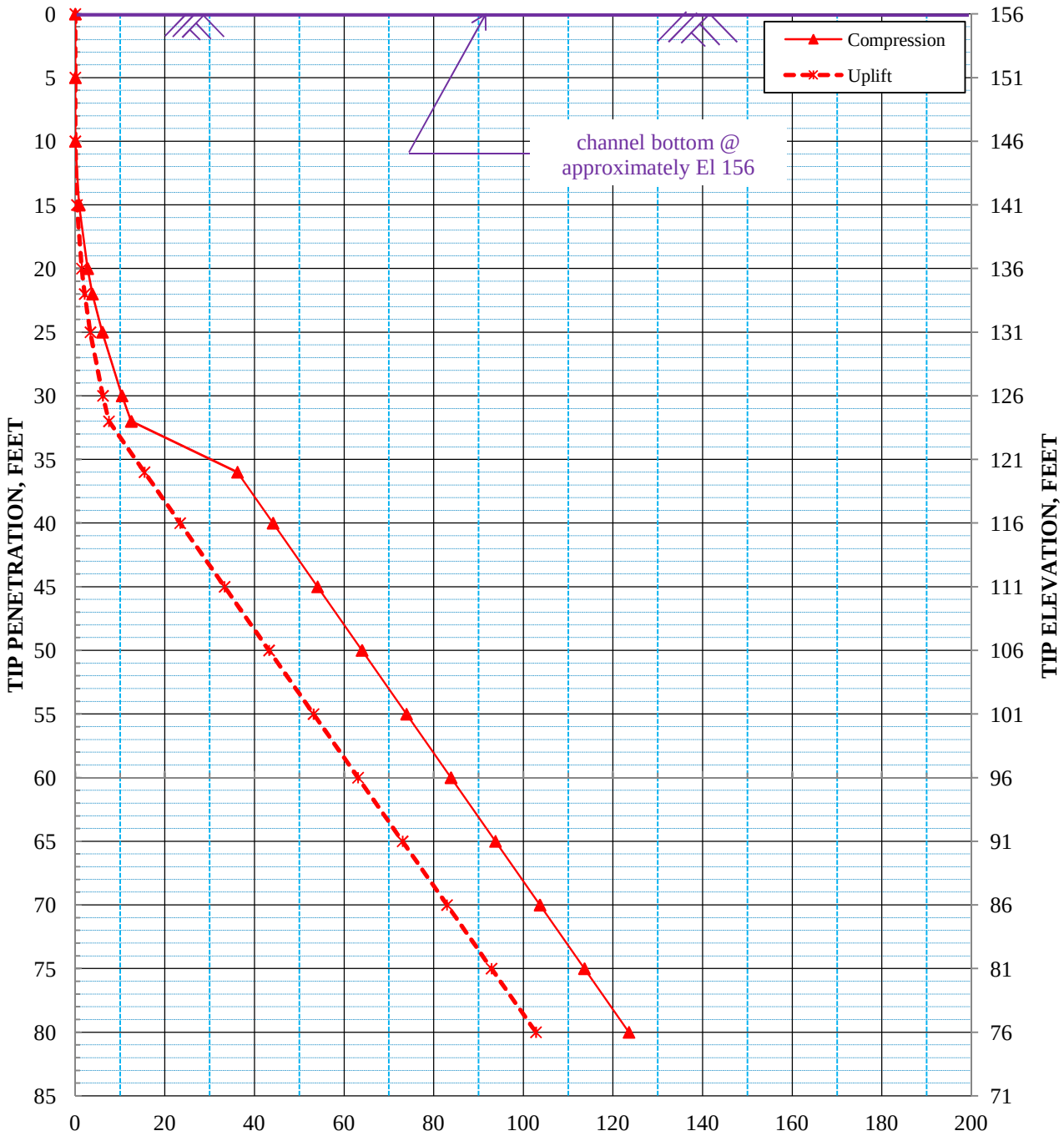
Note: Channel bottom at El 156, 10 ft scour assumed



HP14x73 Steel Piles - Bent 3
CA0702: Hwy 167 over Champagnolle Creek, Bridge 1
Calhoun County, Arkansas

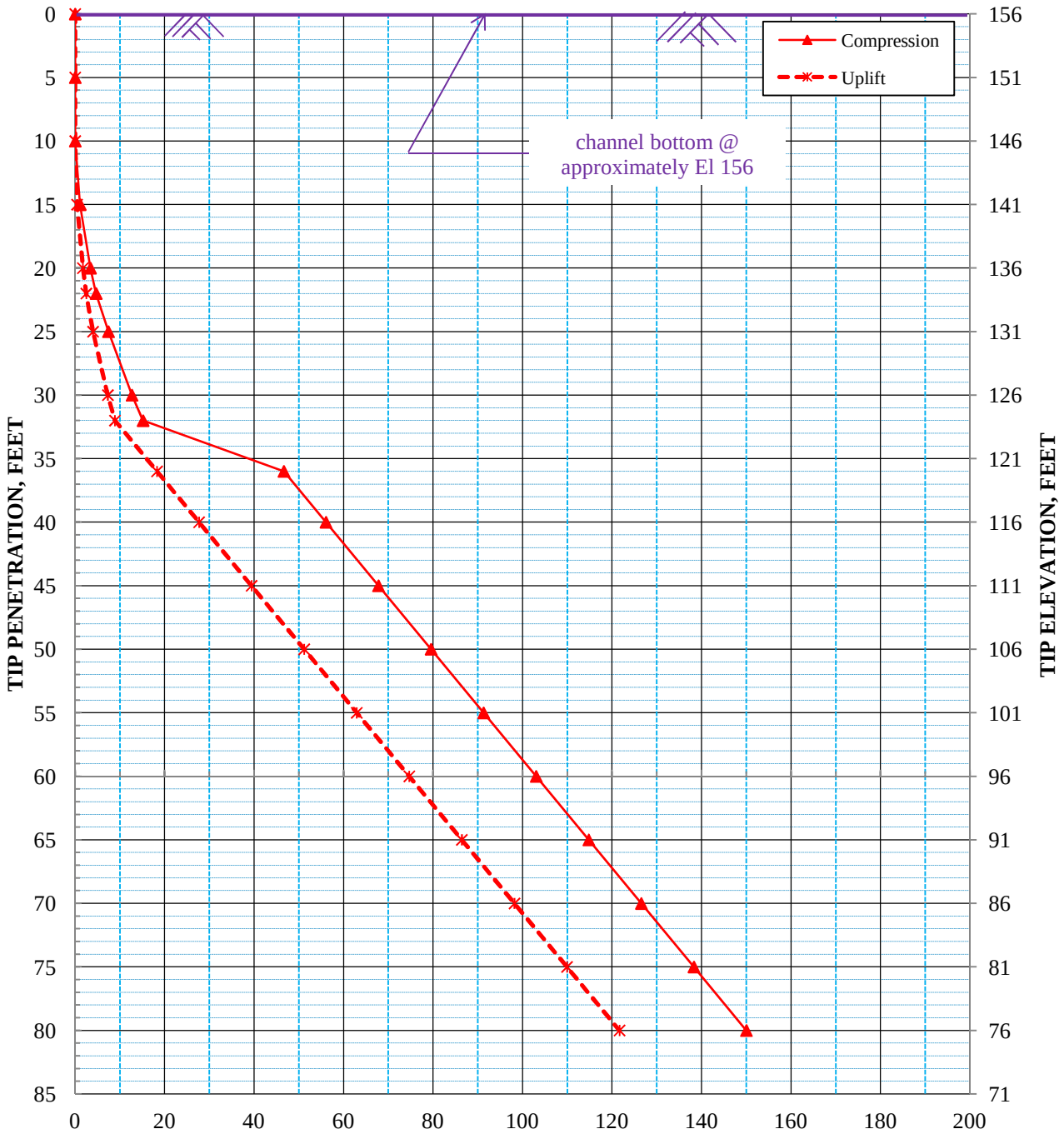
Note: Channel bottom at El 156, 10 ft scour assumed

NOMINAL SINGLE PILE CAPACITY, TONS



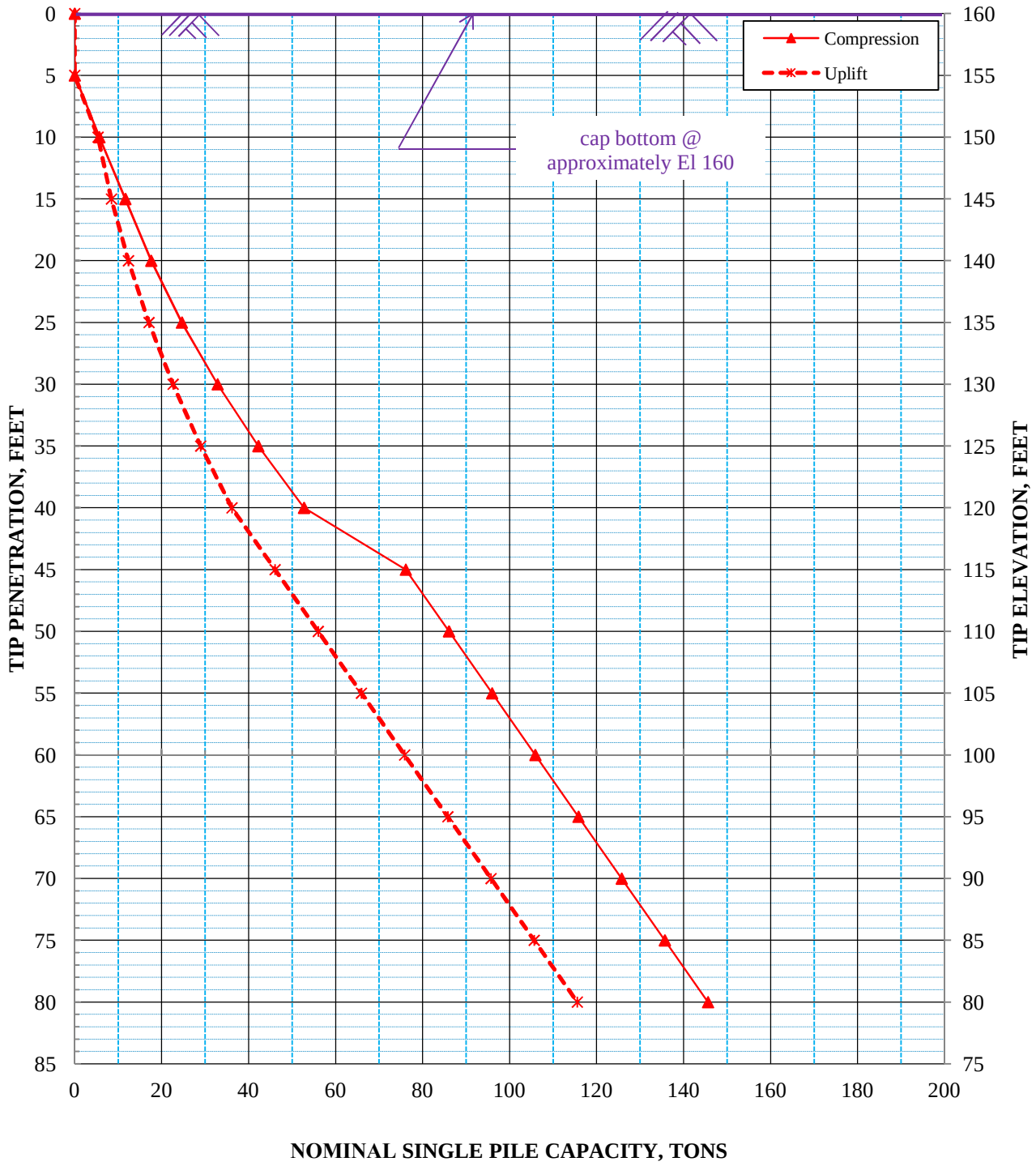
HP12x53 Steel Piles - Bent 4
CA0702: Hwy 167 over Champagnolle Creek, Bridge 1
Calhoun County, Arkansas

Note: Channel bottom at El 156, 10 ft scour assumed



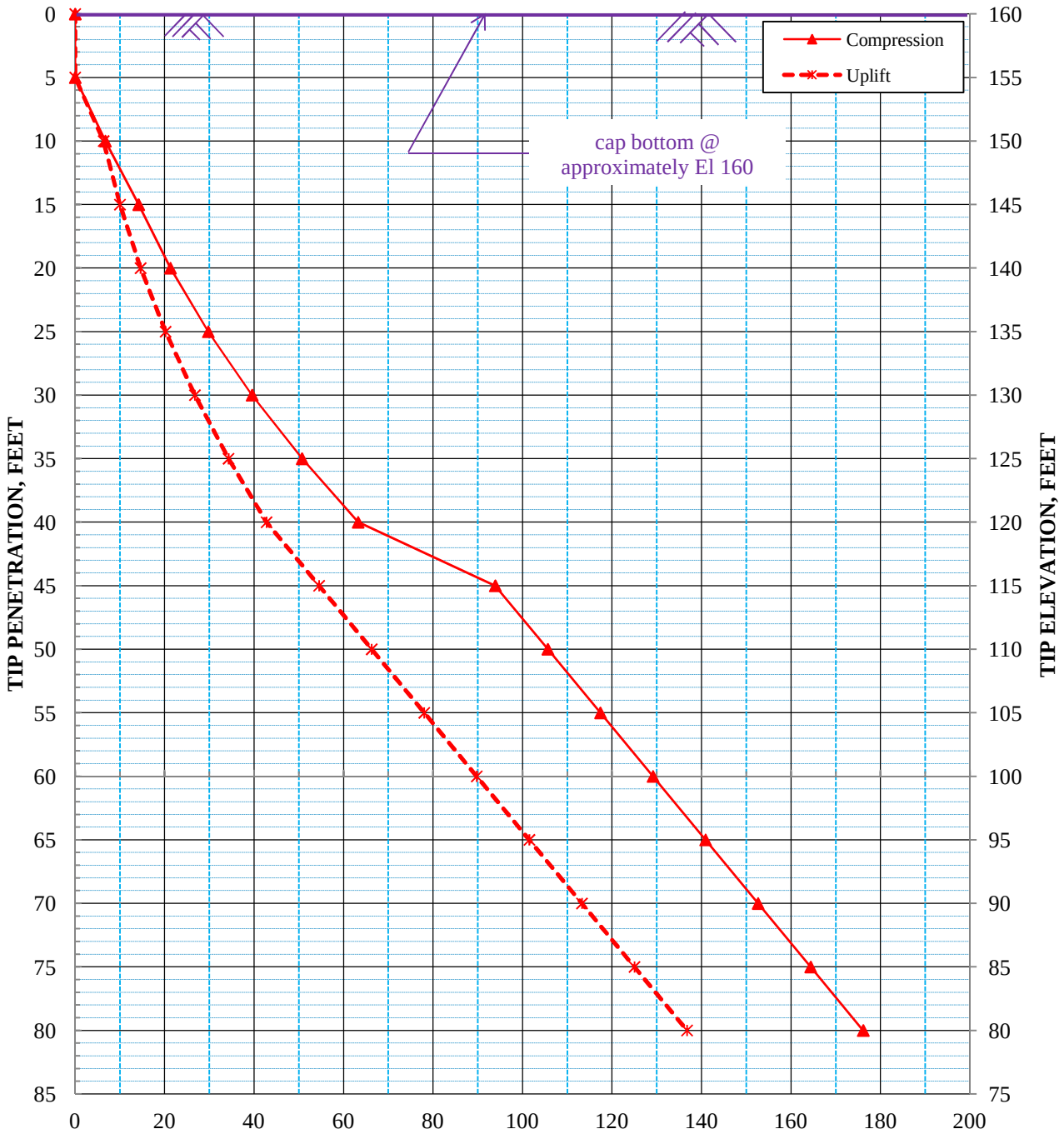
HP14x73 Steel Piles - Bent 4
CA0702: Hwy 167 over Champagnolle Creek, Bridge 1
Calhoun County, Arkansas

Note: Channel bottom at El 156, 10 ft scour assumed



HP12x53 Steel Piles - Bent 5
CA0702: Hwy 167 over Champagnolle Creek, Bridge 1
Calhoun County, Arkansas

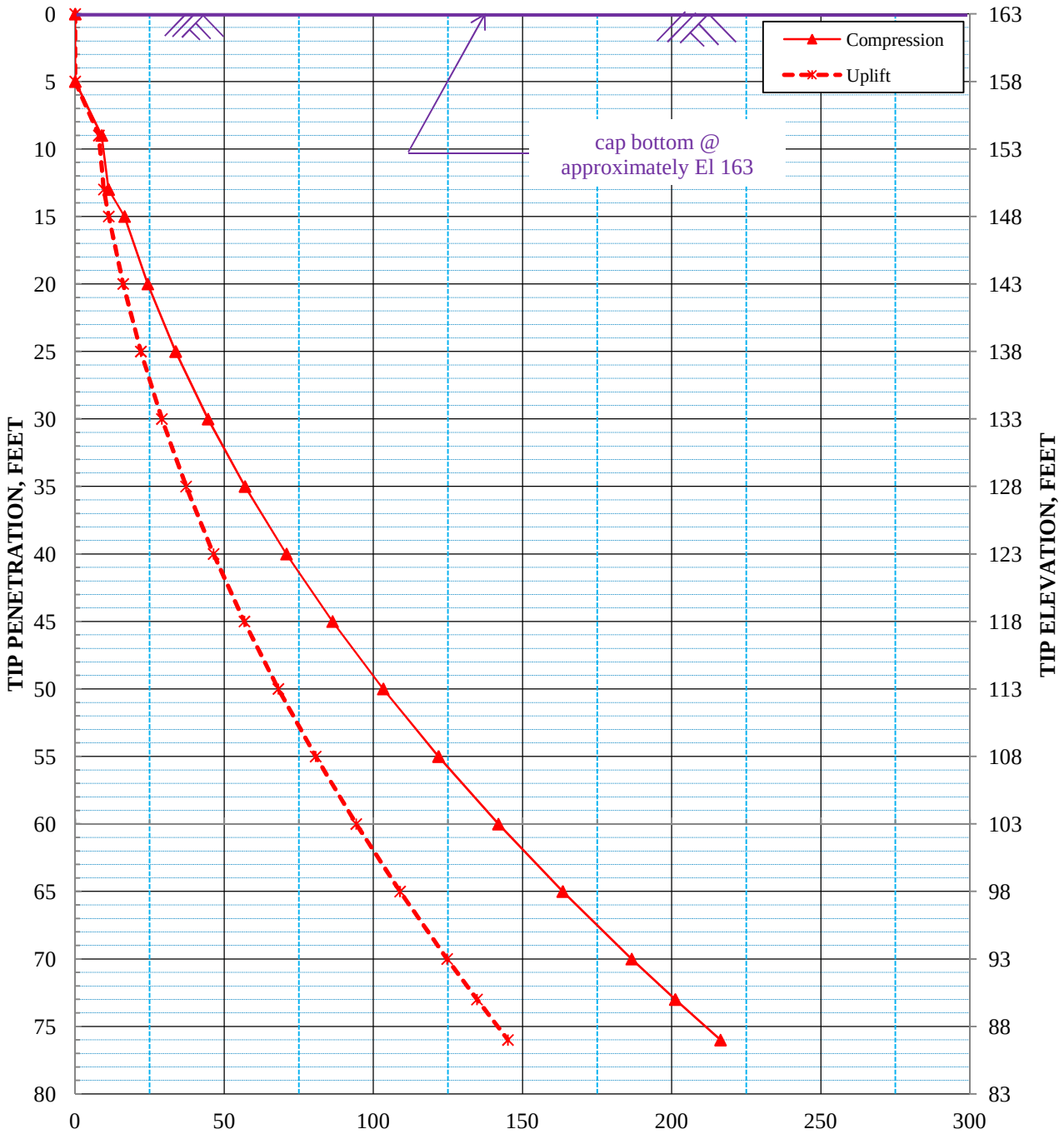
Note: Plan cap bottom at El 160



HP14x73 Steel Piles - Bent 5
CA0702: Hwy 167 over Champagnolle Creek, Bridge 1
Calhoun County, Arkansas

Note: Plan cap bottom at El 160

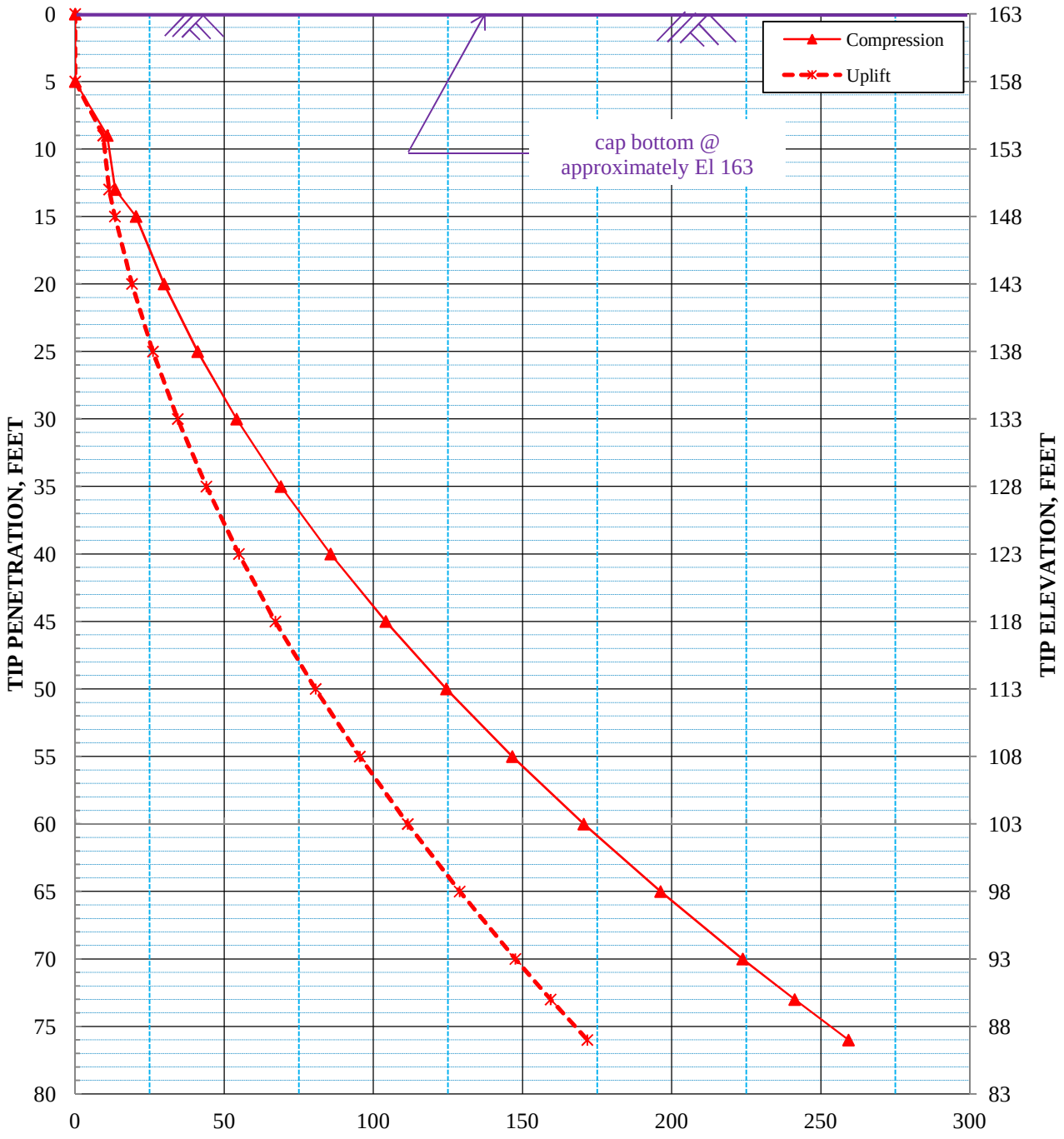
ATTACHMENT 14



HP12x53 Steel Piles - Bent 1
CA0702: Hwy 167 over Champagnolle Creek Relief (Bridge 2)
Calhoun County, Arkansas

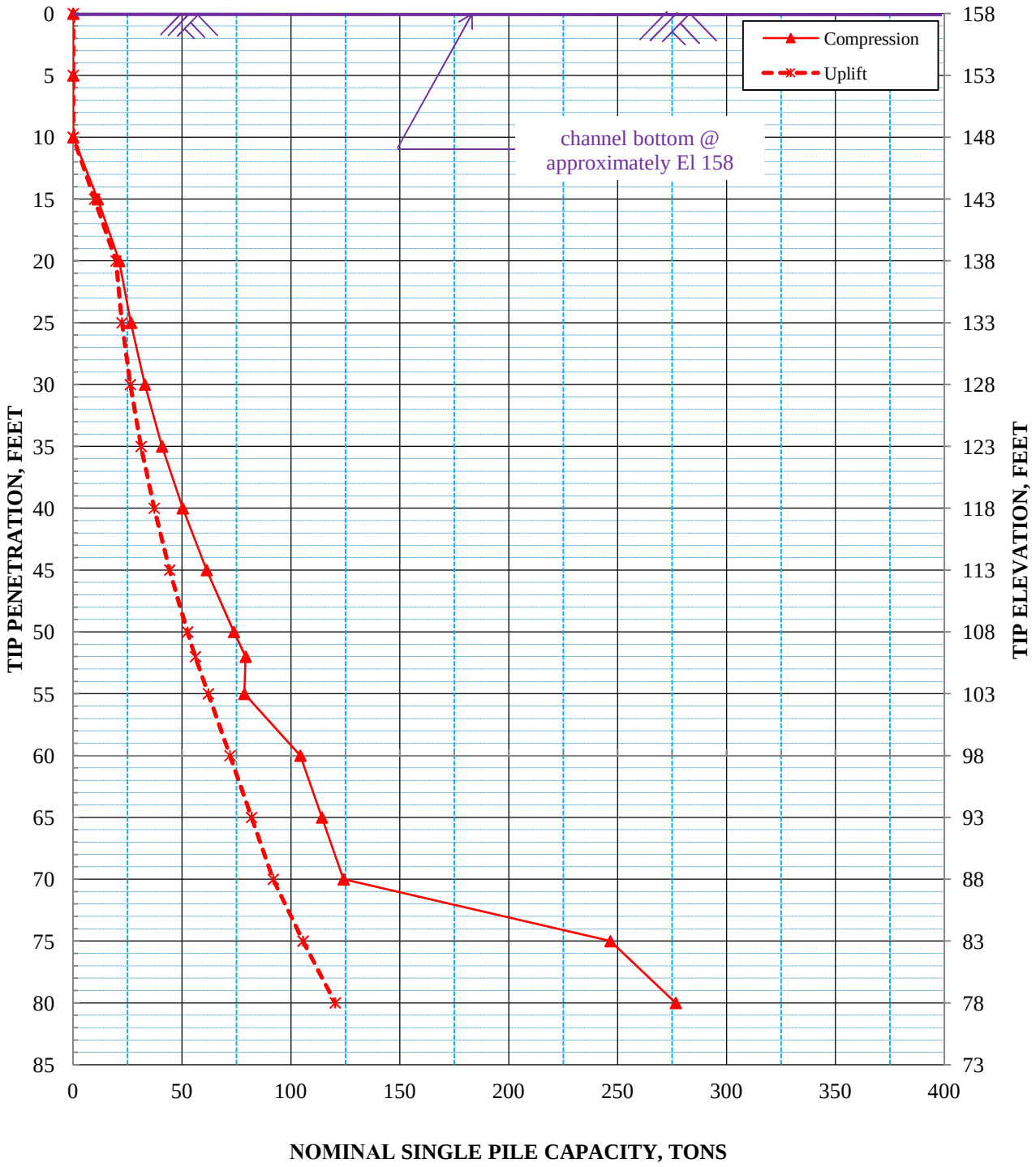
Note: Assumed cap bottom at El 163

NOMINAL SINGLE PILE CAPACITY, TONS



HP14x73 Steel Piles - Bent 1
CA0702: Hwy 167 over Champagnolle Creek Relief (Bridge 2)
Calhoun County, Arkansas

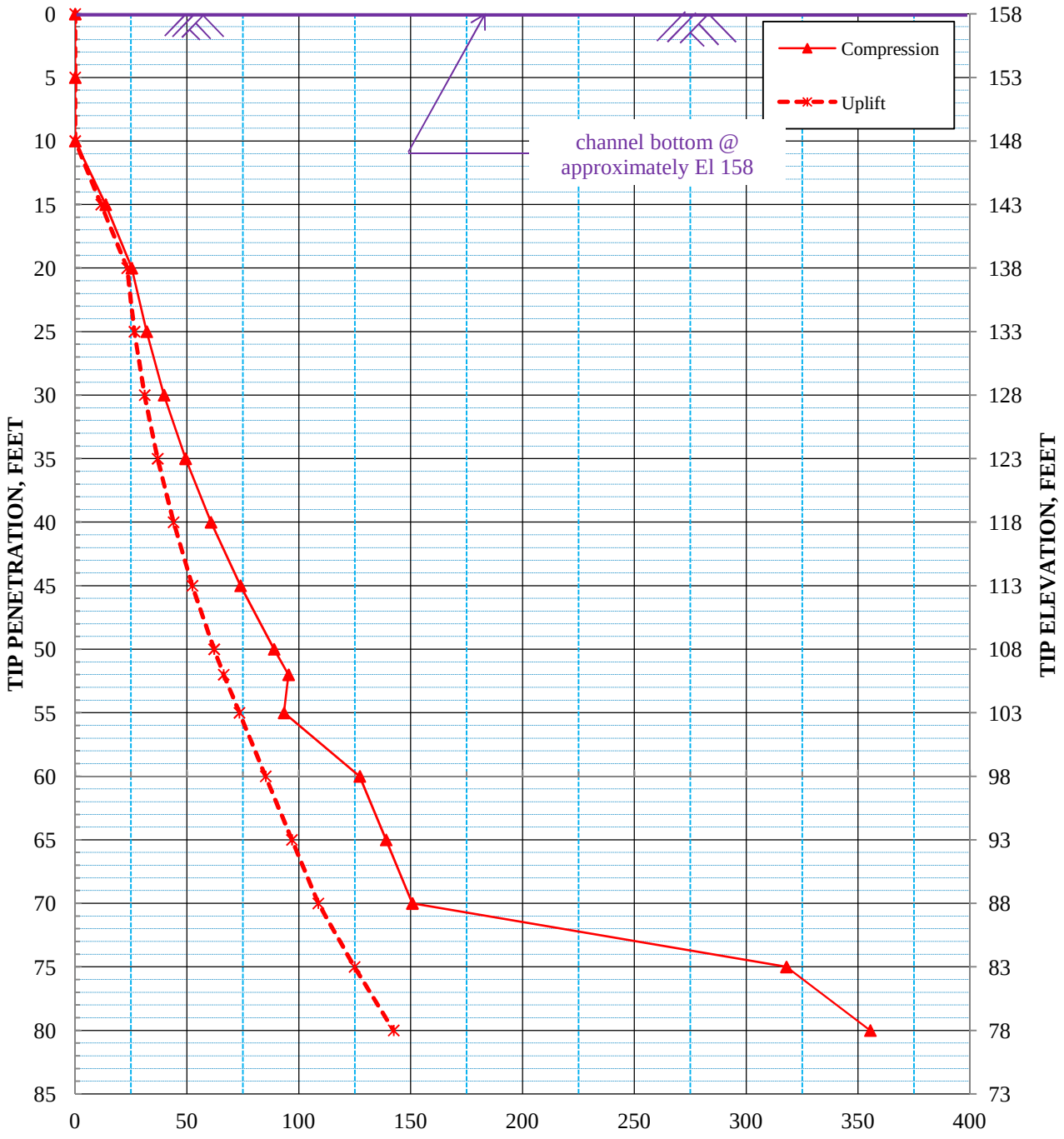
Note: Assumed cap bottom at El 163



HP12x53 Steel Piles - Bent 2
CA0702: Hwy 167 over Champagnolle Creek Relief (Bridge 2)
Calhoun County, Arkansas

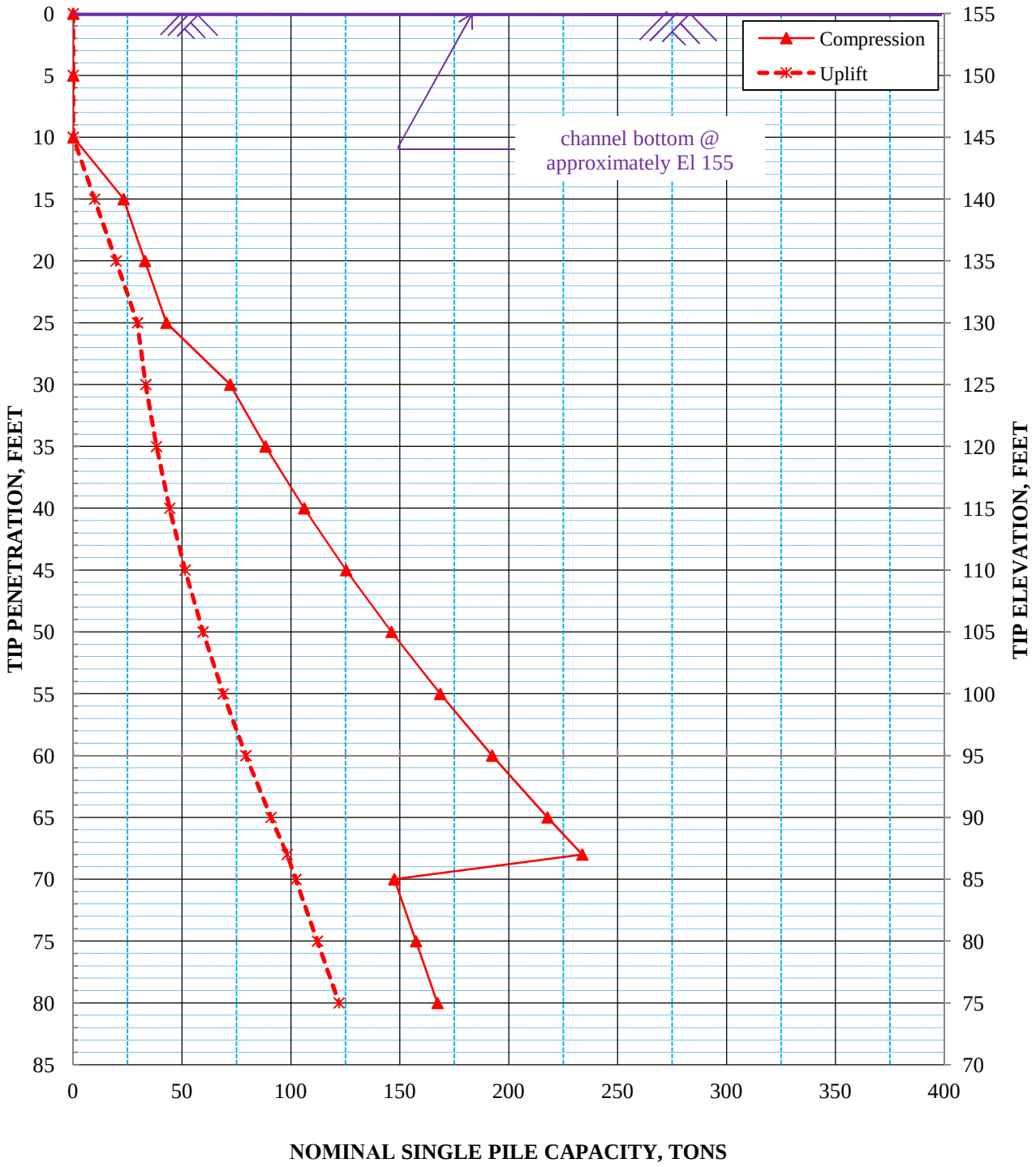
Note: Channel bottom at El 158, 10 ft scour assumed

NOMINAL SINGLE PILE CAPACITY, TONS



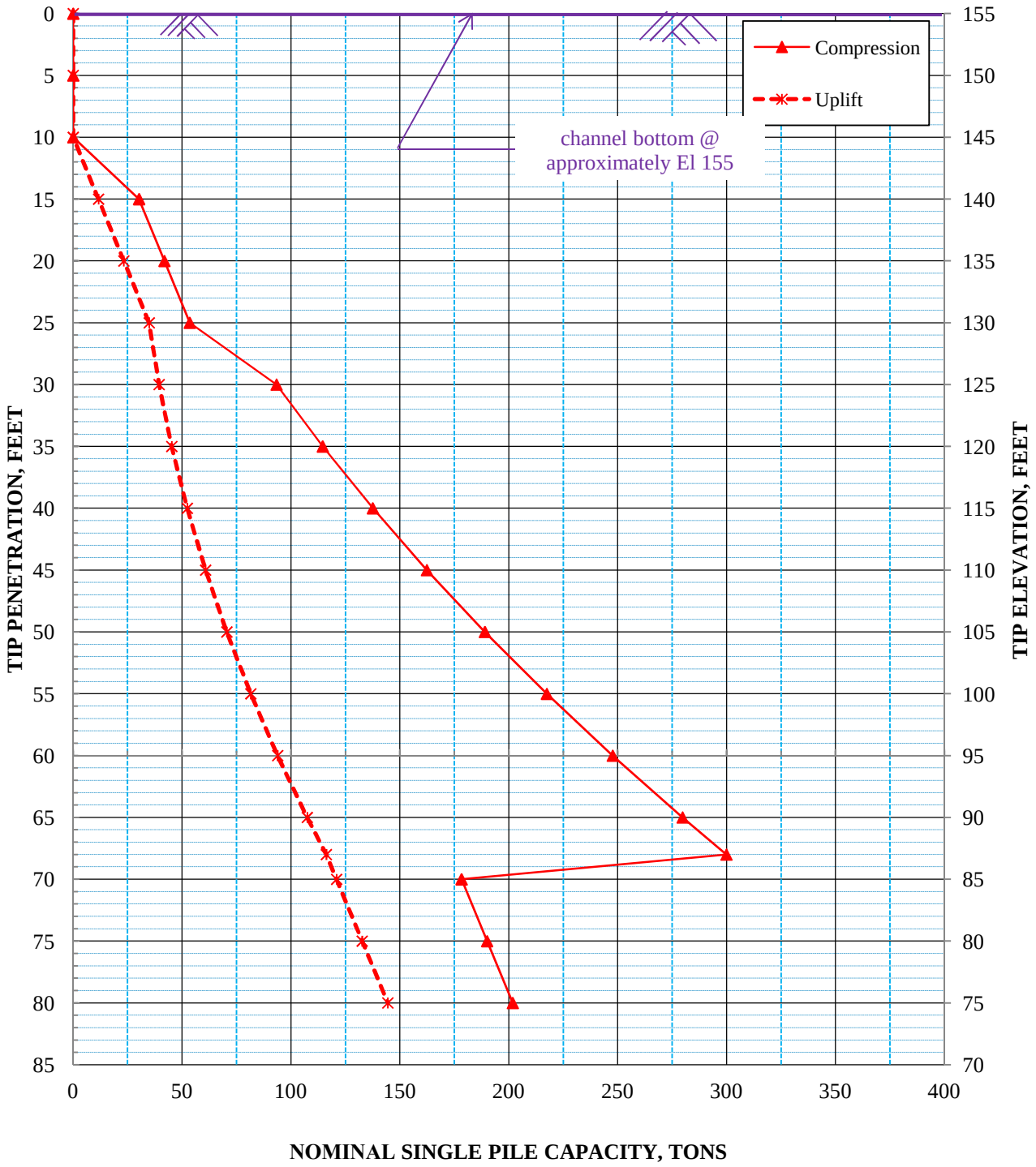
HP14x73 Steel Piles - Bent 2
CA0702: Hwy 167 over Champagnolle Creek Relief (Bridge 2)
Calhoun County, Arkansas

Note: Channel bottom at El 158, 10 ft scour assumed



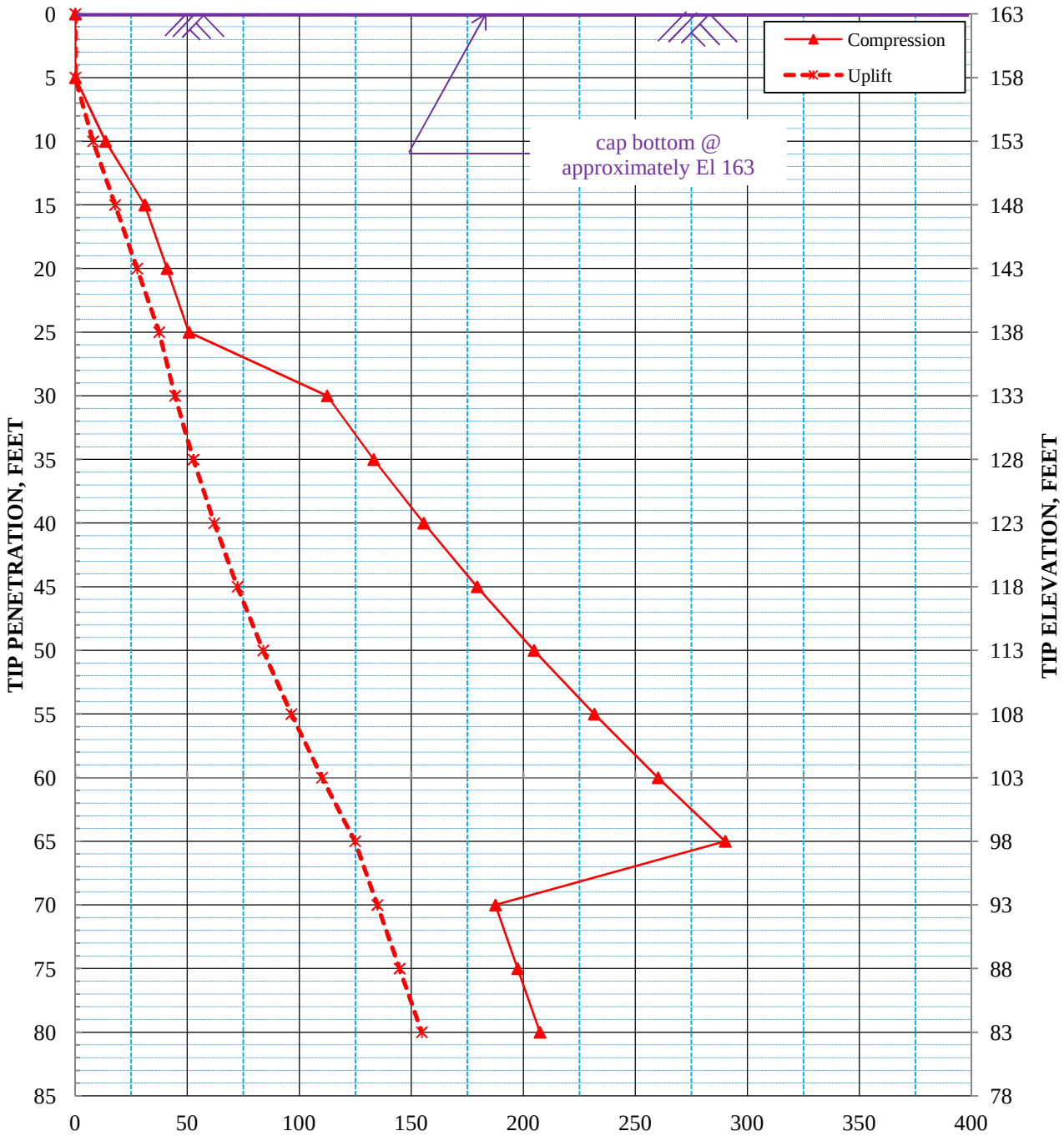
HP12x53 Steel Piles - Bents 3 and 4
CA0702: Hwy 167 over Champagnolle Creek Relief (Bridge 2)
Calhoun County, Arkansas

Note: Channel bottom at El 155, 10 ft scour assumed



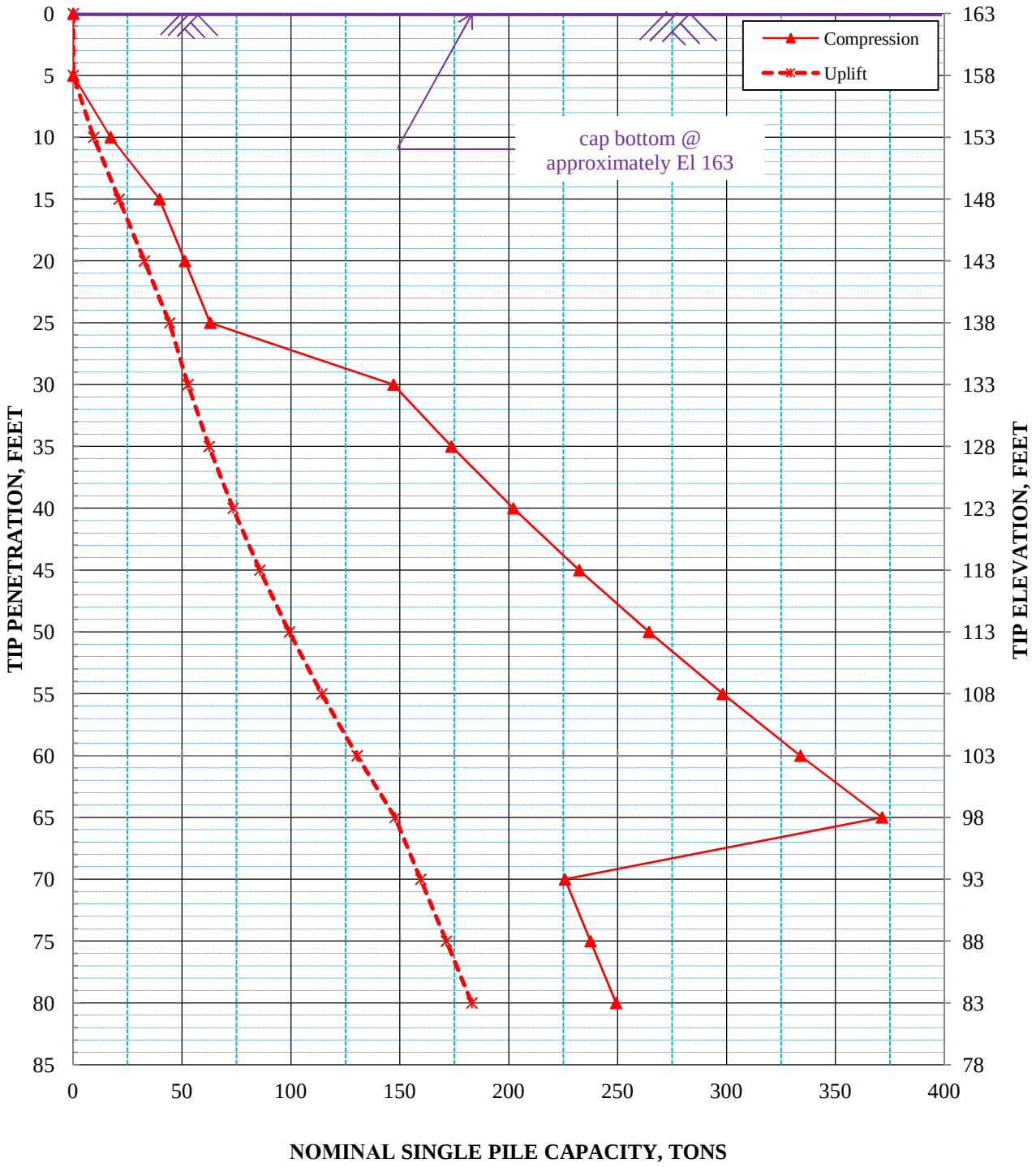
HP14x73 Steel Piles - Bents 3 and 4
CA0702: Hwy 167 over Champagnolle Creek Relief (Bridge 2)
Calhoun County, Arkansas

Note: Channel bottom at El 155, 10 ft scour assumed



HP12x53 Steel Piles - Bent 5
CA0702: Hwy 167 over Champagnolle Creek Relief (Bridge 2)
Calhoun County, Arkansas

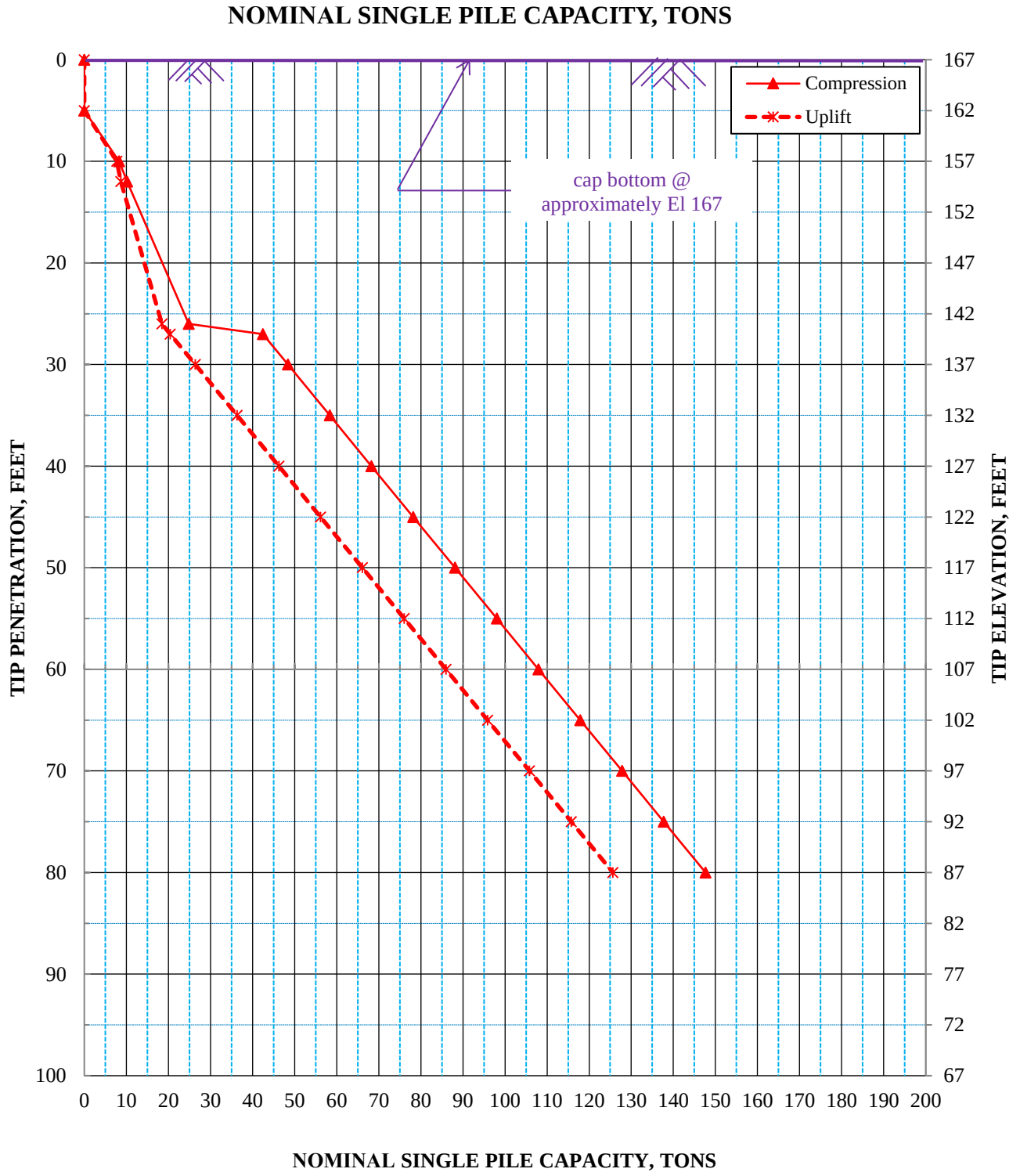
Note: Assumed cap bottom at El 163



HP14x73 Steel Piles - Bent 5
CA0702: Hwy 167 over Champagnolle Creek Relief (Bridge 2)
Calhoun County, Arkansas

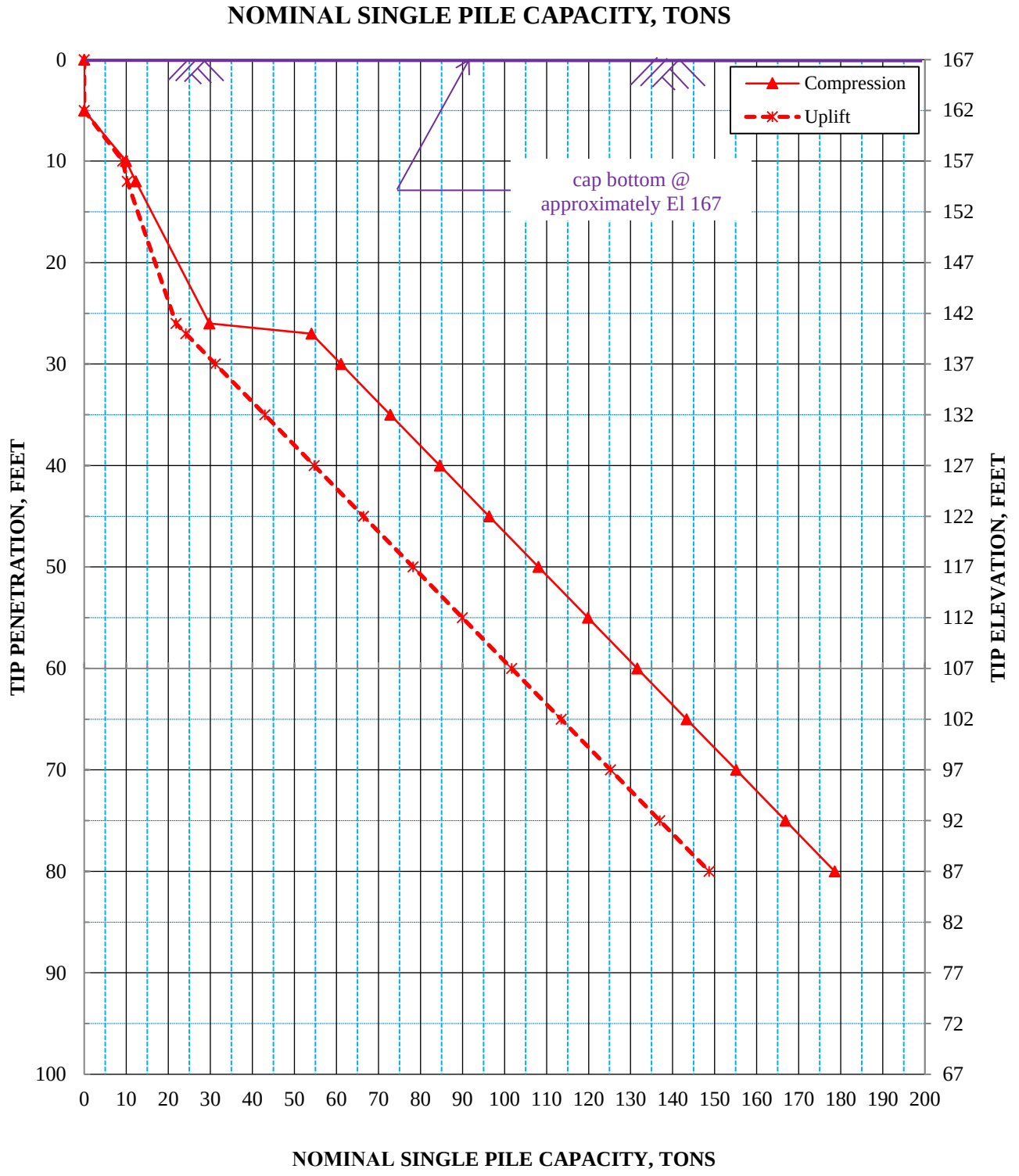
Note: Assumed cap bottom at El 163

ATTACHMENT 15



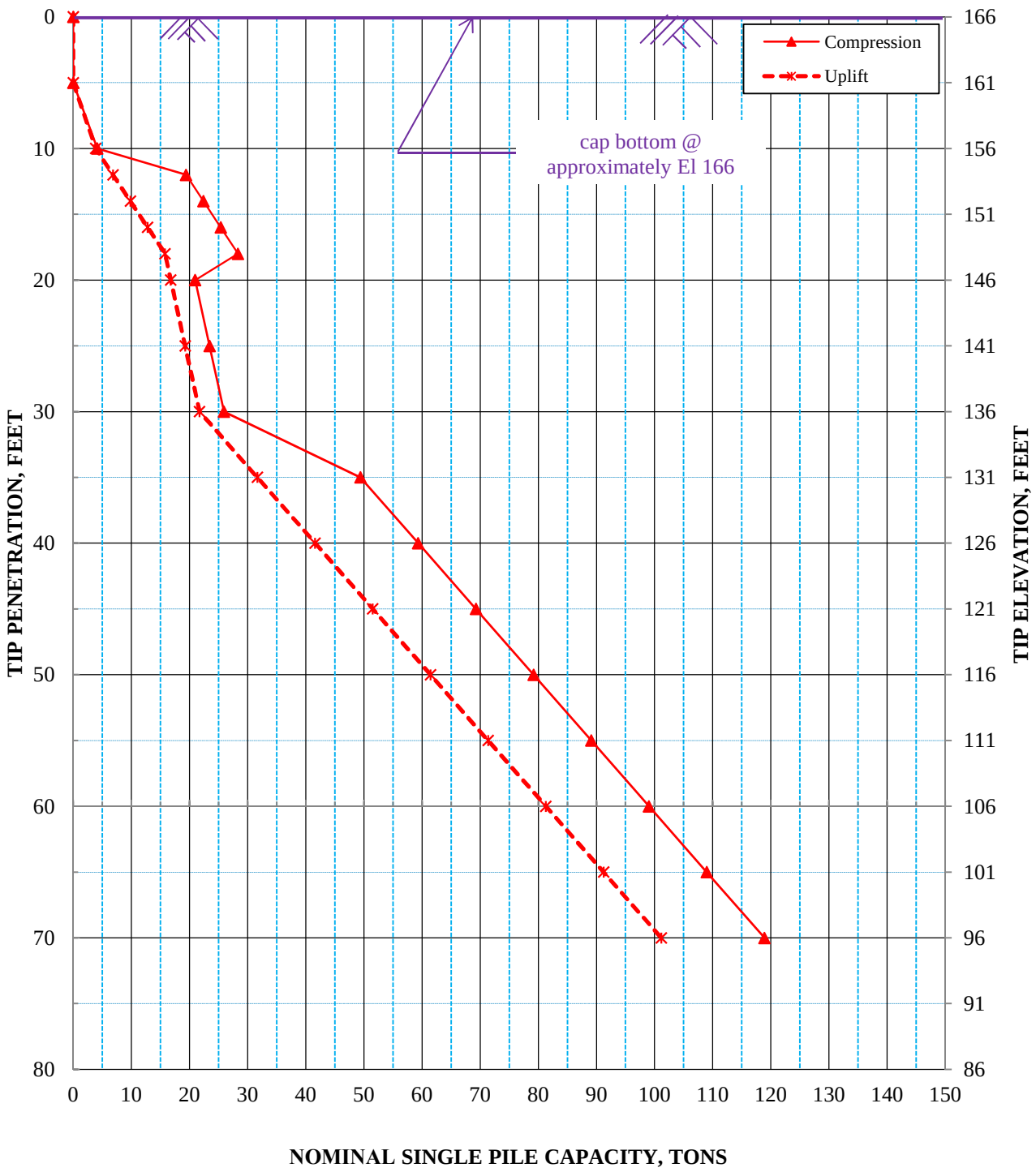
HP12x53 Steel Piles - Bent 1
CA0702: Hwy 167 over Champagnolle Creek Relief - Bridge 3
Calhoun County, Arkansas

Note: Plan pile cap bottom assumed at El 167



HP14x73 Steel Piles - Bent 1
CA0702: Hwy 167 over Champagnolle Creek Relief - Bridge 3
Calhoun County, Arkansas

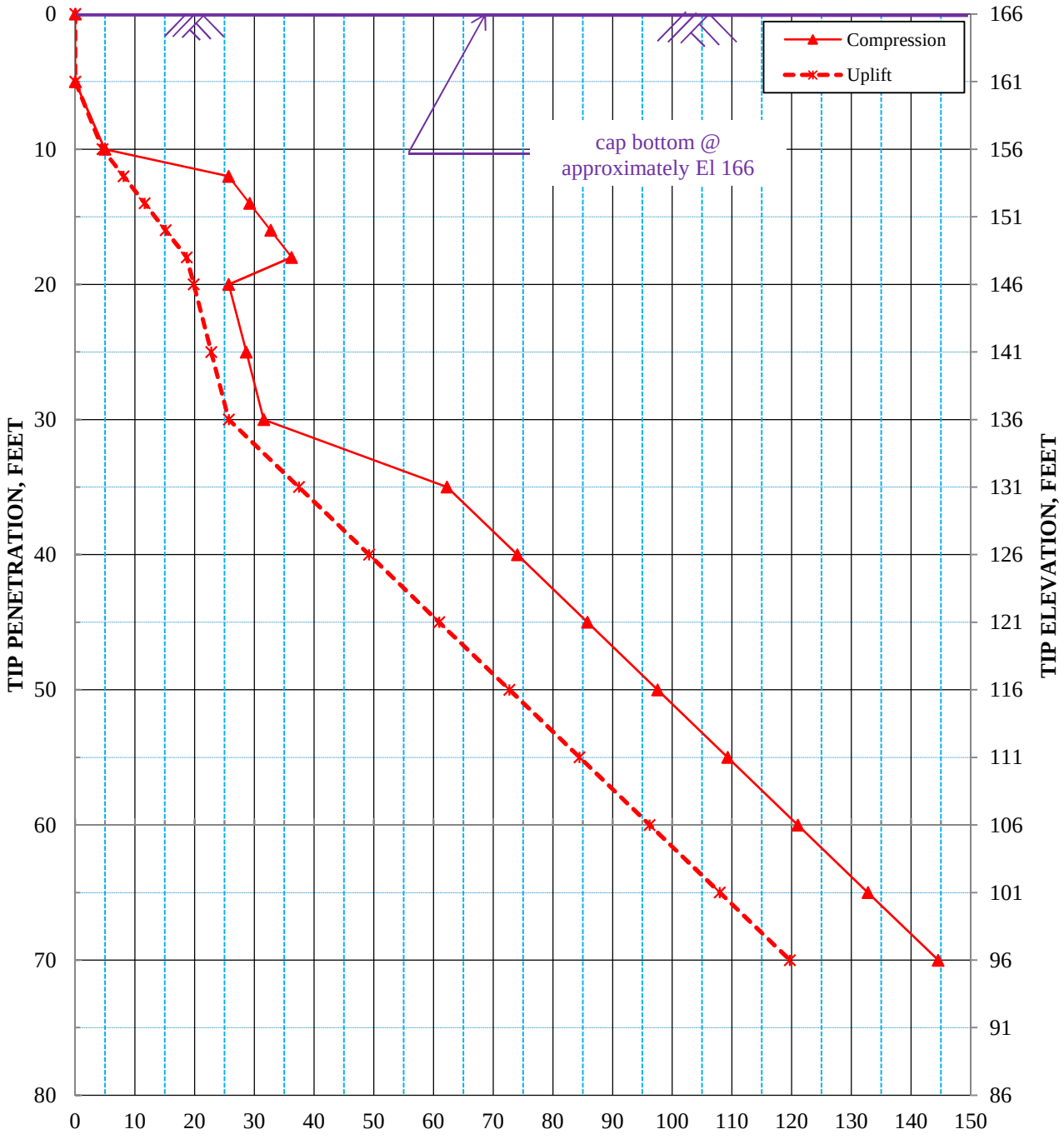
Note: Plan pile cap bottom assumed at El 167



HP12x53 Steel Piles - Bent 2
CA0702: Hwy 167 over Champagnolle Creek Relief - Bridge 3
Calhoun County, Arkansas

Note: Plan pile cap bottom assumed at El 166

NOMINAL SINGLE PILE CAPACITY, TONS



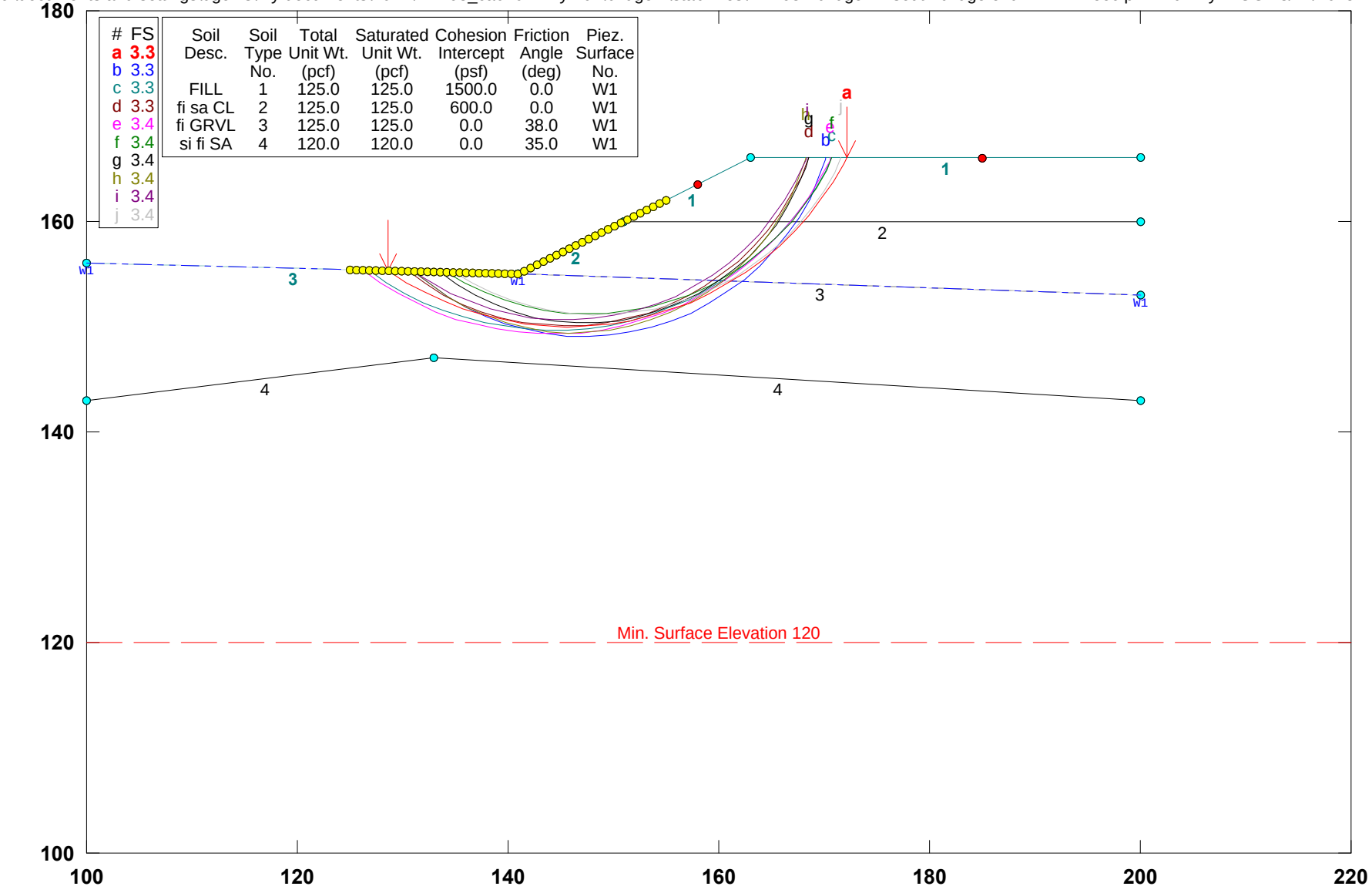
HP14x73 Steel Piles - Bent 2
CA0702: Hwy 167 over Champagnolle Creek Relief - Bridge 3
Calhoun County, Arkansas

Note: Plan pile cap bottom assumed at El 166

ATTACHMENT 16

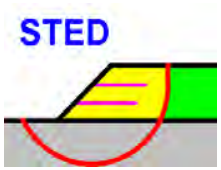
14-198 - CA0702: Bridge 1 Bent 1 - 2H:1V - End of Construction Cond.

c:\documents and settings\dgoins\my documents\2014\14-198_ca0702 hwy 167\bridge 1\stabl files\14-198 - bridge 1 - south bridge end - 2h-1v - eoc.pl2 Run By: DGG 8/24/2015 11:08AM



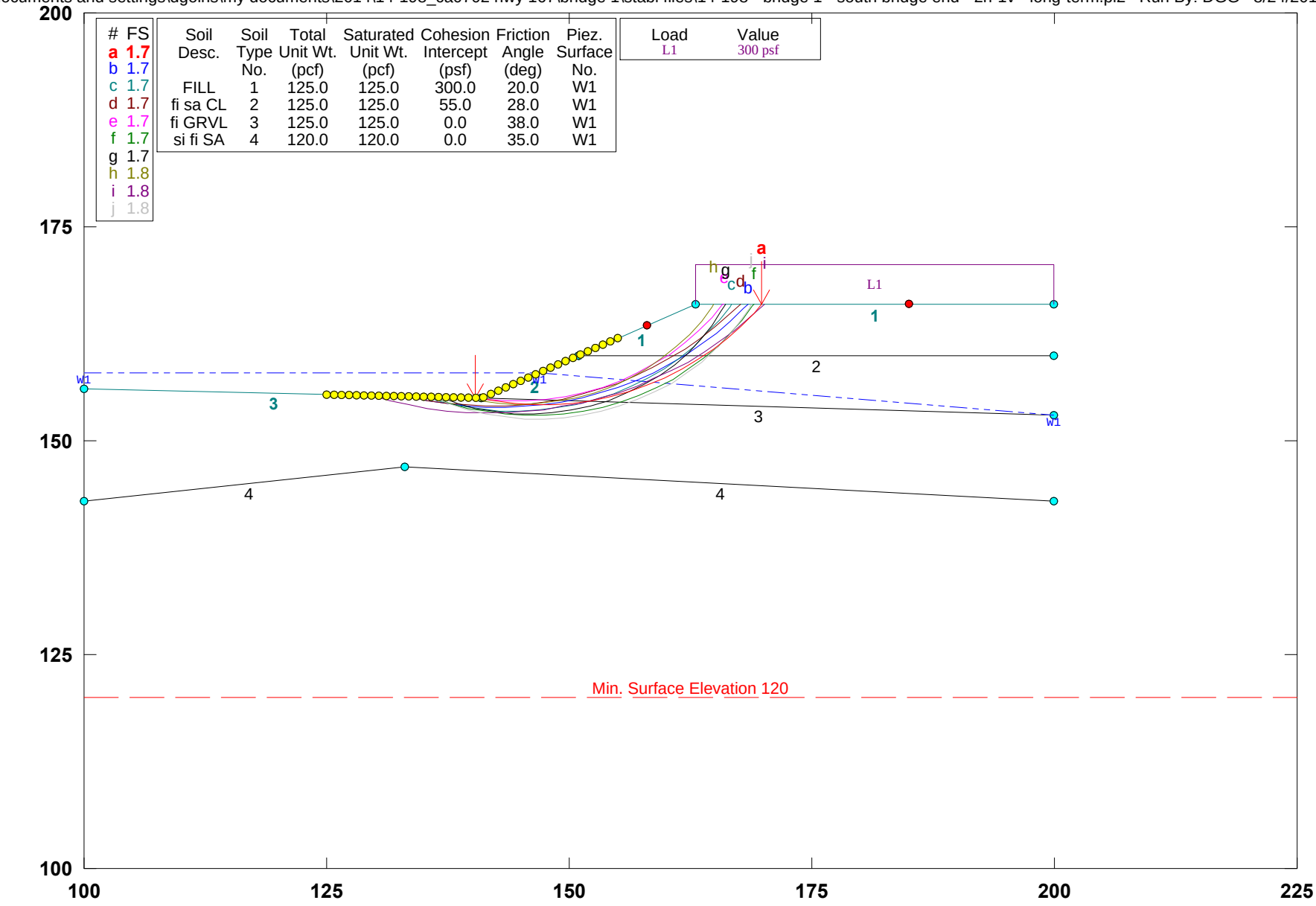
PCSTABL5M/si FSmin=3.3

Safety Factors Are Calculated By The Modified Bishop Method



14-198 - CA0702: Bridge 1 Bent 1 - 2H:1V - Long Term Cond.

c:\documents and settings\dgoins\my documents\2014\14-198_ca0702 hwy 167\bridge 1\stabl files\14-198 - bridge 1 - south bridge end - 2h-1v - long-term.pl2 Run By: DGG 8/24/2015 11:12AM



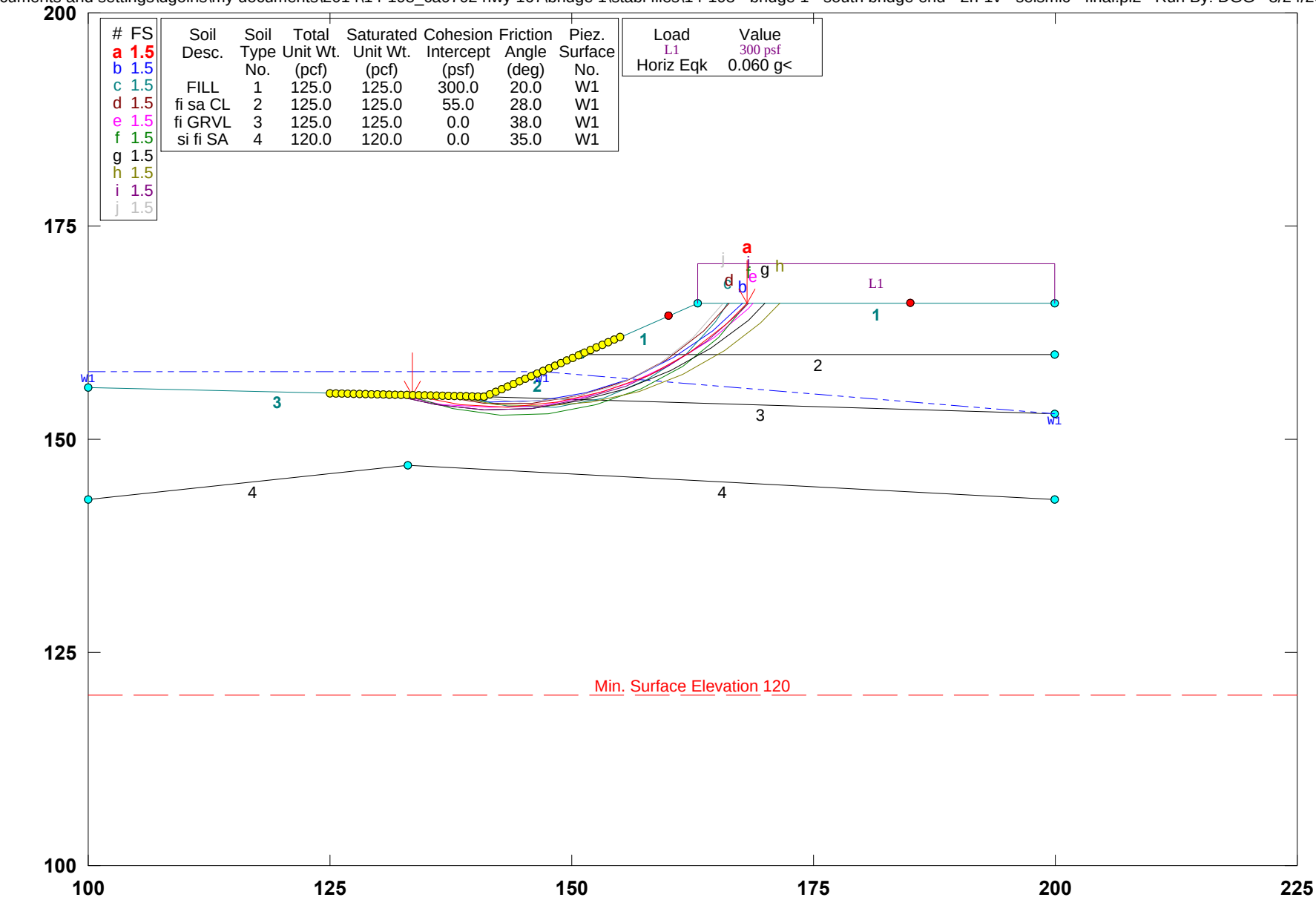
PCSTABL5M/si FSmin=1.7

Safety Factors Are Calculated By The Modified Bishop Method

STED

14-198 - CA0702: Bridge 1 Bent 1 - 2H:1V - Seismic Cond.

c:\documents and settings\dgoins\my documents\2014\14-198_ca0702 hwy 167\bridge 1\stabl files\14-198 - bridge 1 - south bridge end - 2h-1v - seismic - final.pl2 Run By: DGG 8/24/2015 11:13AM



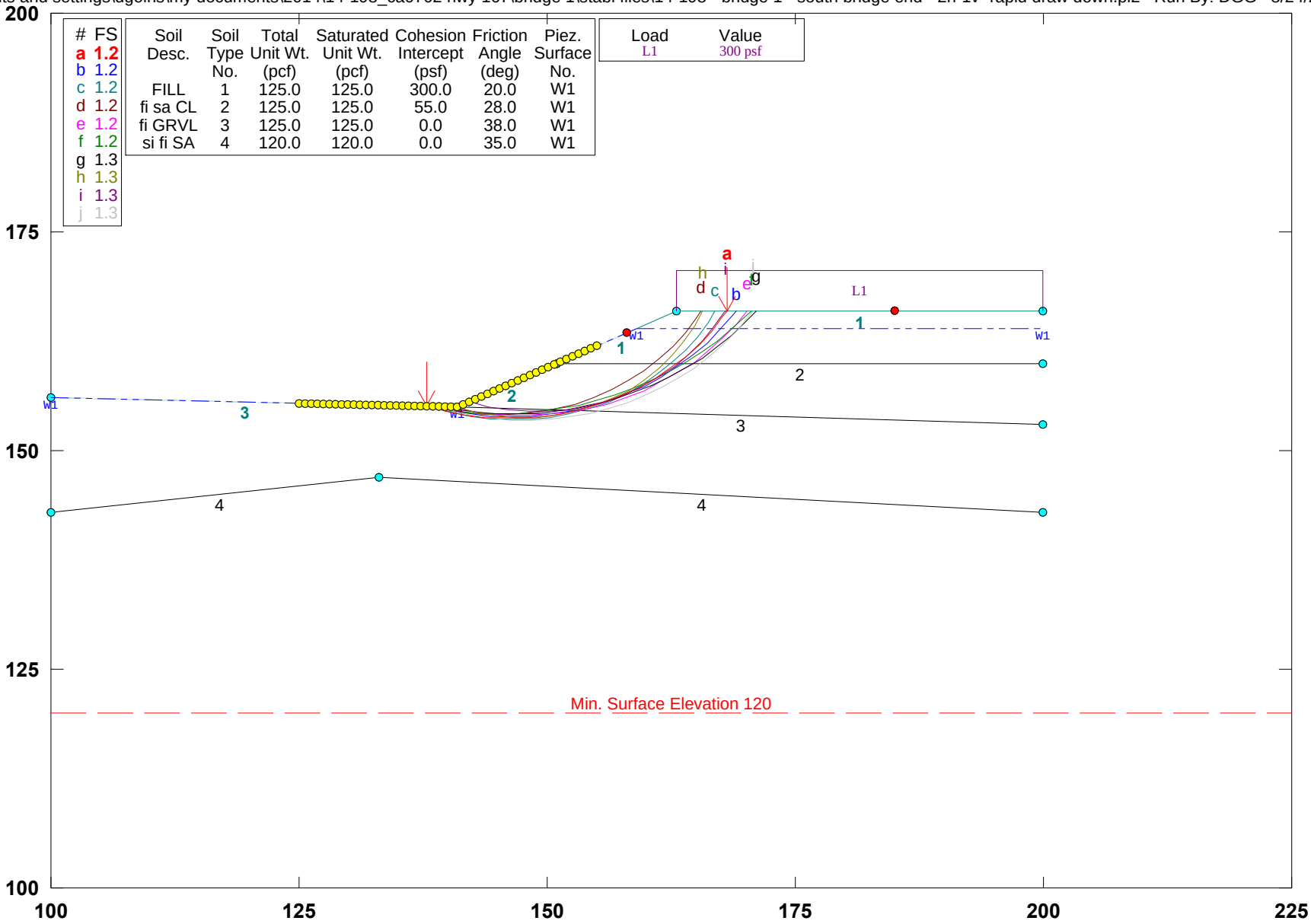
PCSTABL5M/si FSmin=1.5

Safety Factors Are Calculated By The Modified Bishop Method

STED

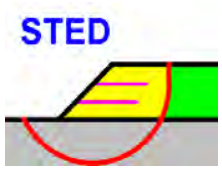
14-198 - CA0702: Bridge 1 Bent 1 - 2H:1V - Rapid Draw Down Cond.

c:\documents and settings\dgoins\my documents\2014\14-198_ca0702 hwy 167\bridge 1\stabl files\14-198 - bridge 1 - south bridge end - 2h-1v -rapid draw down.pl2 Run By: DGG 8/24/2015 11:10A



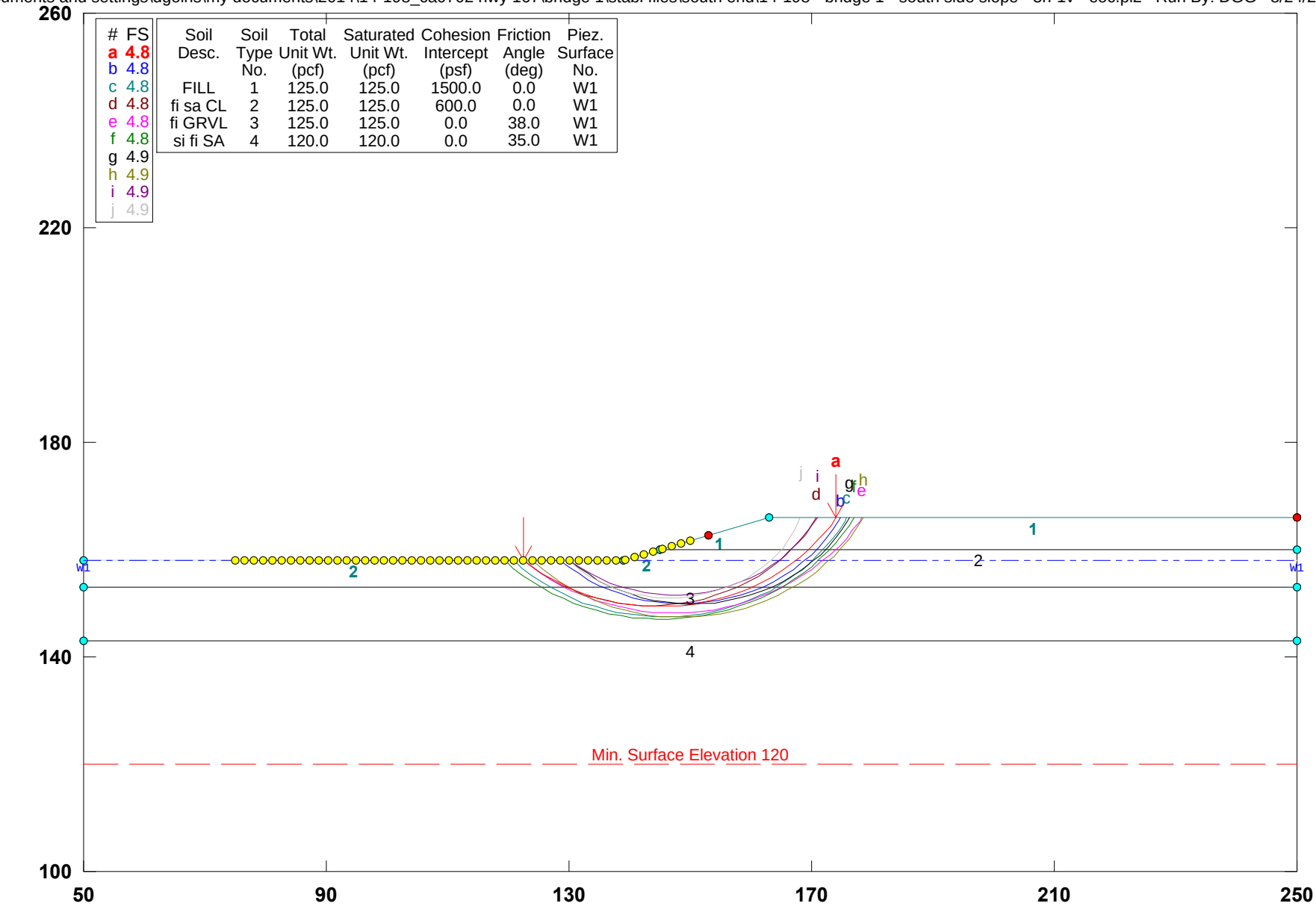
PCSTABL5M/si FSmin=1.2

Safety Factors Are Calculated By The Modified Bishop Method



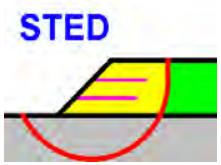
14-198 - CA0702: Bridge 1 South End Side Slope - 3H:1V - End of Construction Cond.

c:\documents and settings\dgoins\my documents\2014\14-198_ca0702 hwy 167\bridge 1\stabl files\south end\14-198 - bridge 1 - south side slope - 3h-1v - eoc.pl2 Run By: DGG 8/24/2015 04:45PM



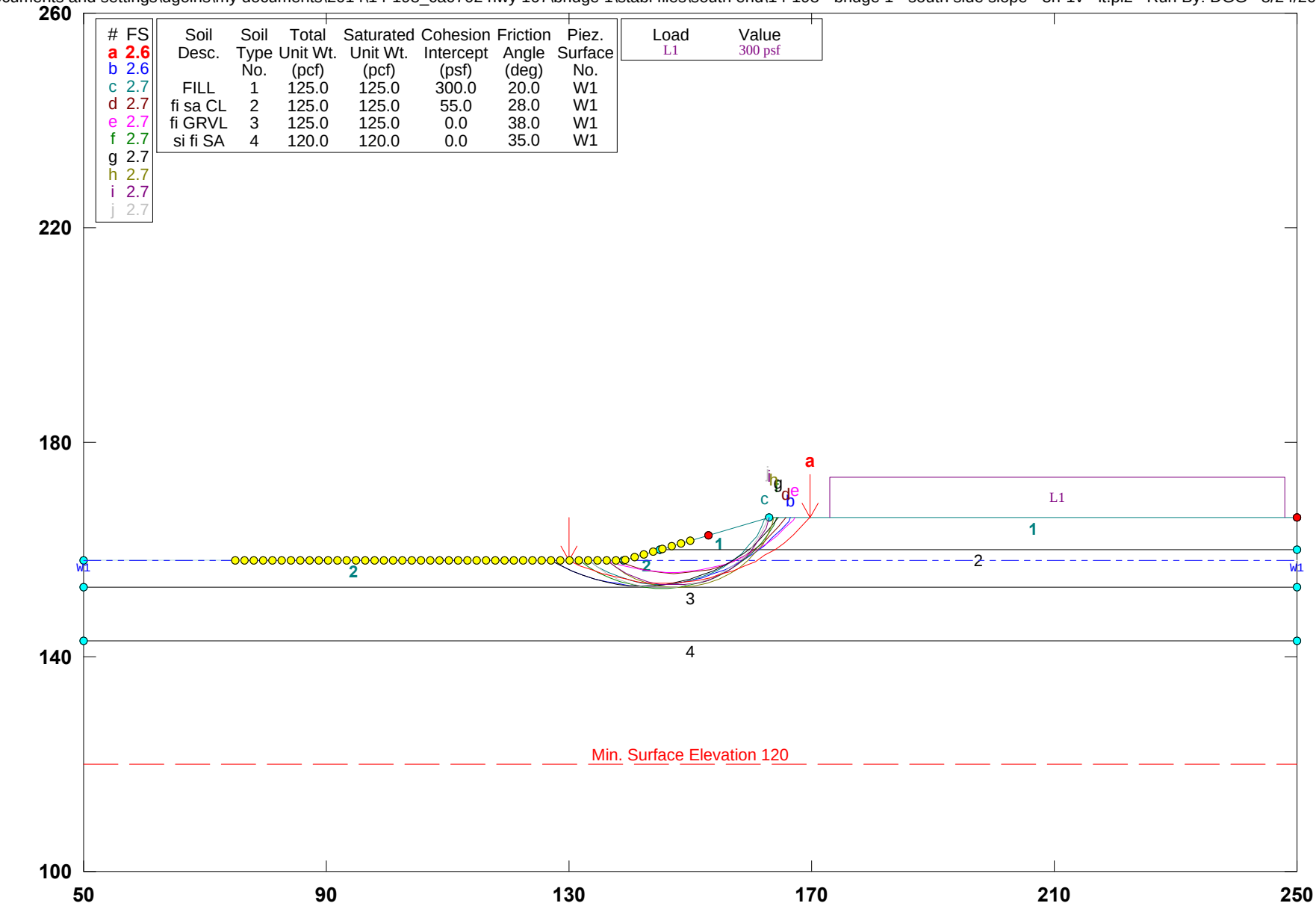
PCSTABL5M/si FSmin=4.8

Safety Factors Are Calculated By The Modified Bishop Method



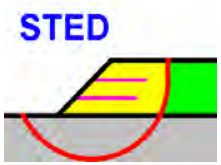
14-198 - CA0702: Bridge 1 South End Side Slope - 3H:1V - Long Term Cond.

c:\documents and settings\dgoins\my documents\2014\14-198_ca0702 hwy 167\bridge 1\stabl files\south end\14-198 - bridge 1 - south side slope - 3h-1v - lt.pl2 Run By: DGG 8/24/2015 04:54PM



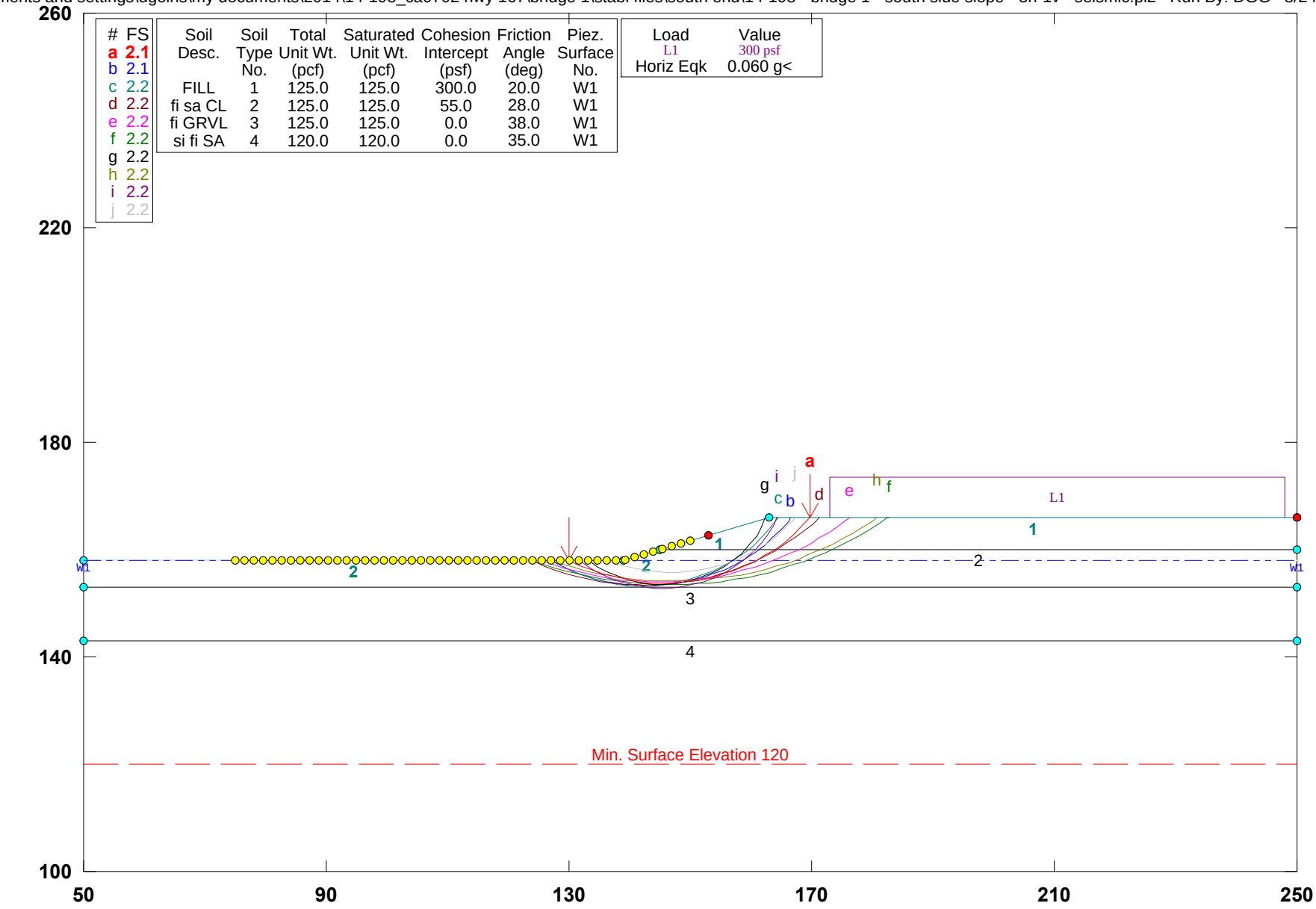
PCSTABL5M/si FSmin=2.6

Safety Factors Are Calculated By The Modified Bishop Method



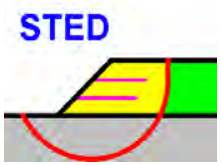
14-198 - CA0702: Bridge 1 South End Side Slope - 3H:1V - Seismic Cond.

c:\documents and settings\dgoins\my documents\2014\14-198_ca0702 hwy 167\bridge 1\stabl files\south end\14-198 - bridge 1 - south side slope - 3h-1v - seismic.pl2 Run By: DGG 8/24/2015 04:51P



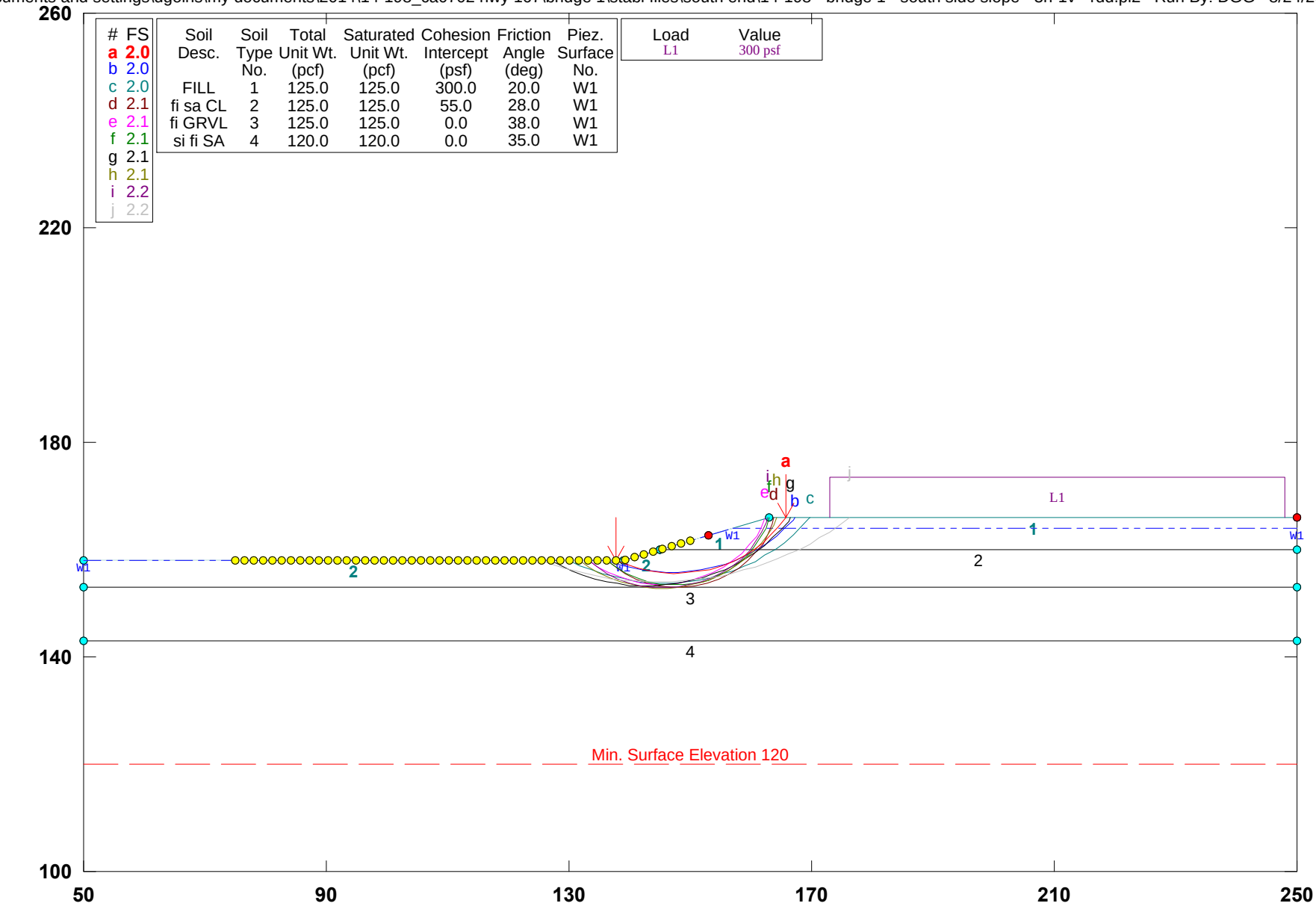
PCSTABL5M/si FSmin=2.1

Safety Factors Are Calculated By The Modified Bishop Method



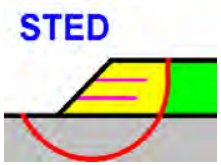
14-198 - CA0702: Bridge 1 South End Side Slope - 3H:1V - Rapid Draw Down Cond.

c:\documents and settings\dgoins\my documents\2014\14-198_ca0702 hwy 167\bridge 1\stabl files\south end\14-198 - bridge 1 - south side slope - 3h-1v - rdd.pl2 Run By: DGG 8/24/2015 04:58PM



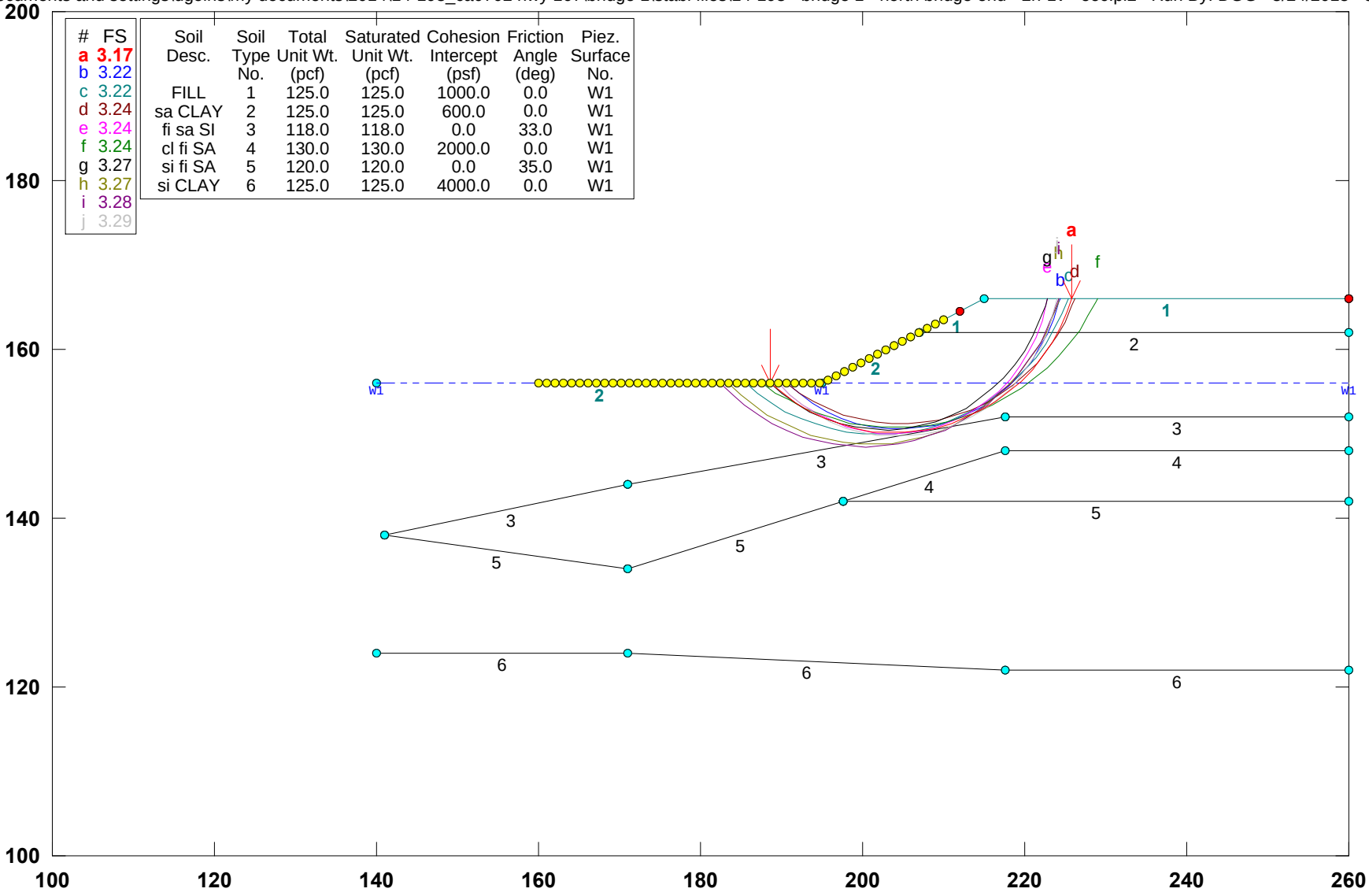
PCSTABL5M/si FSmin=2.0

Safety Factors Are Calculated By The Modified Bishop Method



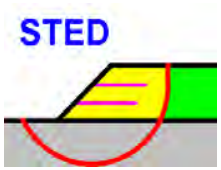
14-198 - CA0702: Bridge 1 Bent 5 - 2H:1V - End of Construction Cond.

c:\documents and settings\dgoins\my documents\2014\14-198_ca0702 hwy 167\bridge 1\stabl files\14-198 - bridge 1 - north bridge end - 2h-1v - eoc.pl2 Run By: DGG 8/24/2015 02:57PM



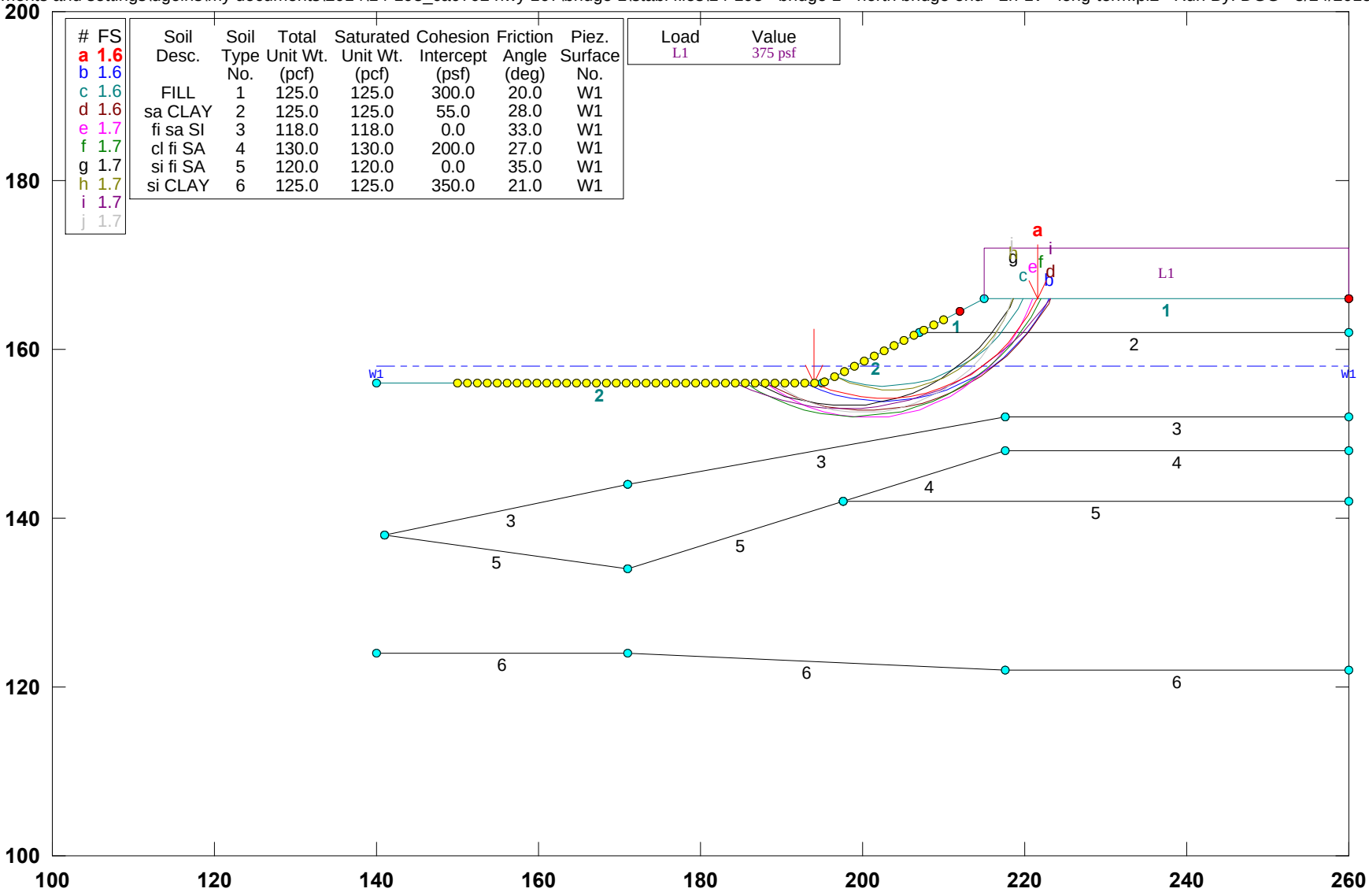
PCSTABL5M/si FSmin=3.17

Safety Factors Are Calculated By The Modified Bishop Method



14-198 - CA0702: Bridge 1 Bent 5 - 2H:1V - Long Term Cond.

c:\documents and settings\dgoins\my documents\2014\14-198_ca0702 hwy 167\bridge 1\stabl files\14-198 - bridge 1 - north bridge end - 2h-1v - long-term.pl2 Run By: DGG 8/24/2015 03:56PM



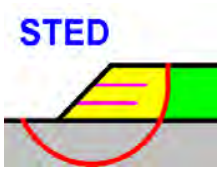
#	FS
a	1.6
b	1.6
c	1.6
d	1.6
e	1.7
f	1.7
g	1.7
h	1.7
i	1.7
j	1.7

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
FILL	1	125.0	125.0	300.0	20.0	W1
sa CLAY	2	125.0	125.0	55.0	28.0	W1
fi sa SI	3	118.0	118.0	0.0	33.0	W1
cl fi SA	4	130.0	130.0	200.0	27.0	W1
si fi SA	5	120.0	120.0	0.0	35.0	W1
si CLAY	6	125.0	125.0	350.0	21.0	W1

Load	Value
L1	375 psf

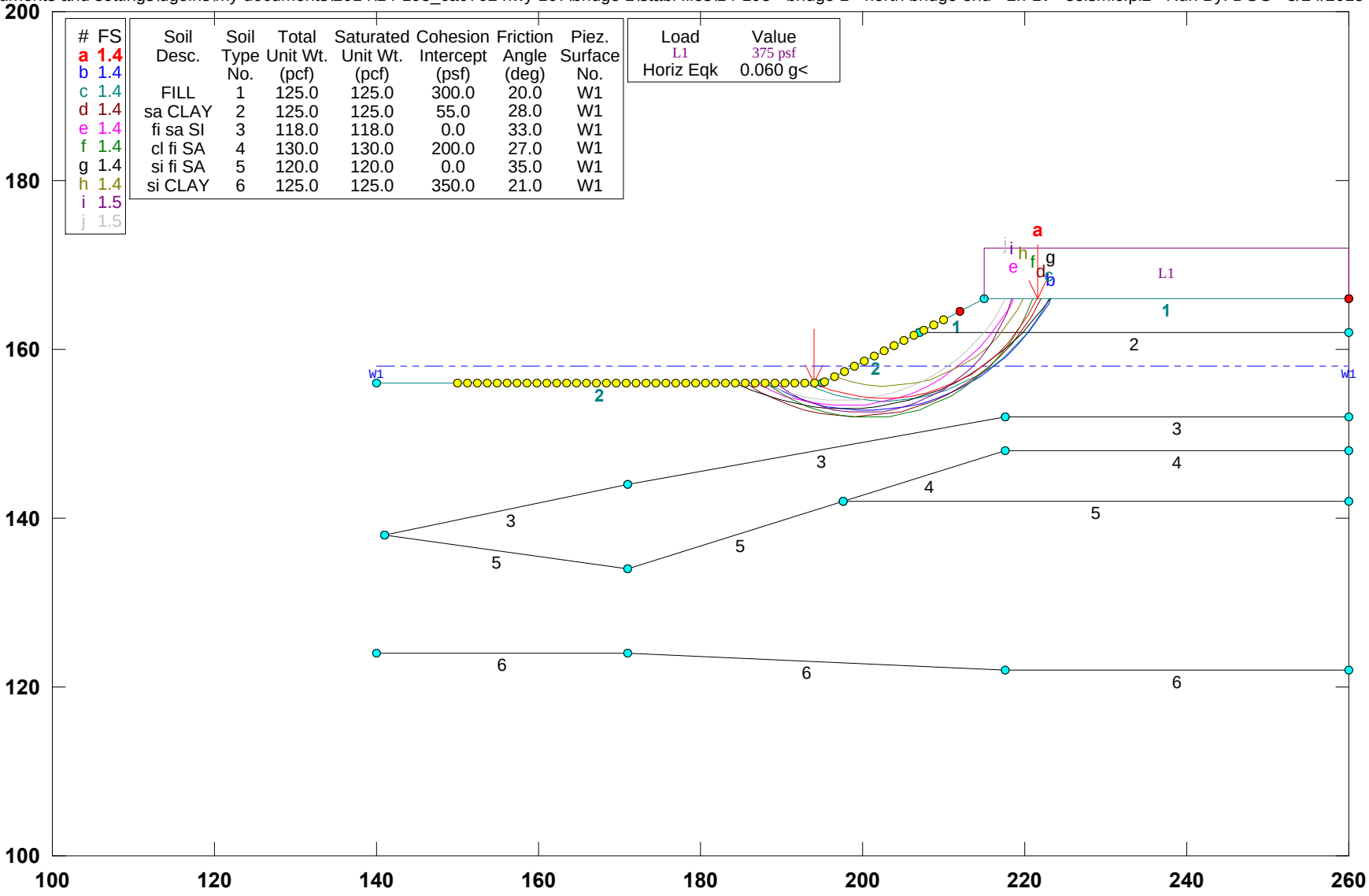
PCSTABL5M/si FSmin=1.6

Safety Factors Are Calculated By The Modified Bishop Method



14-198 - CA0702: Bridge 1 Bent 5 - 2H:1V - Seismic Cond.

c:\documents and settings\dgoins\my documents\2014\14-198_ca0702 hwy 167\bridge 1\stabl files\14-198 - bridge 1 - north bridge end - 2h-1v - seismic.pl2 Run By: DGG 8/24/2015 03:55PM



#	FS
a	1.4
b	1.4
c	1.4
d	1.4
e	1.4
f	1.4
g	1.4
h	1.4
i	1.5
j	1.5

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
FILL	1	125.0	125.0	300.0	20.0	W1
sa CLAY	2	125.0	125.0	55.0	28.0	W1
fi sa SI	3	118.0	118.0	0.0	33.0	W1
cl fi SA	4	130.0	130.0	200.0	27.0	W1
si fi SA	5	120.0	120.0	0.0	35.0	W1
si CLAY	6	125.0	125.0	350.0	21.0	W1

Load	Value
L1	375 psf
Horiz Eqk	0.060 g<

PCSTABL5M/si FSmin=1.4

Safety Factors Are Calculated By The Modified Bishop Method

STED

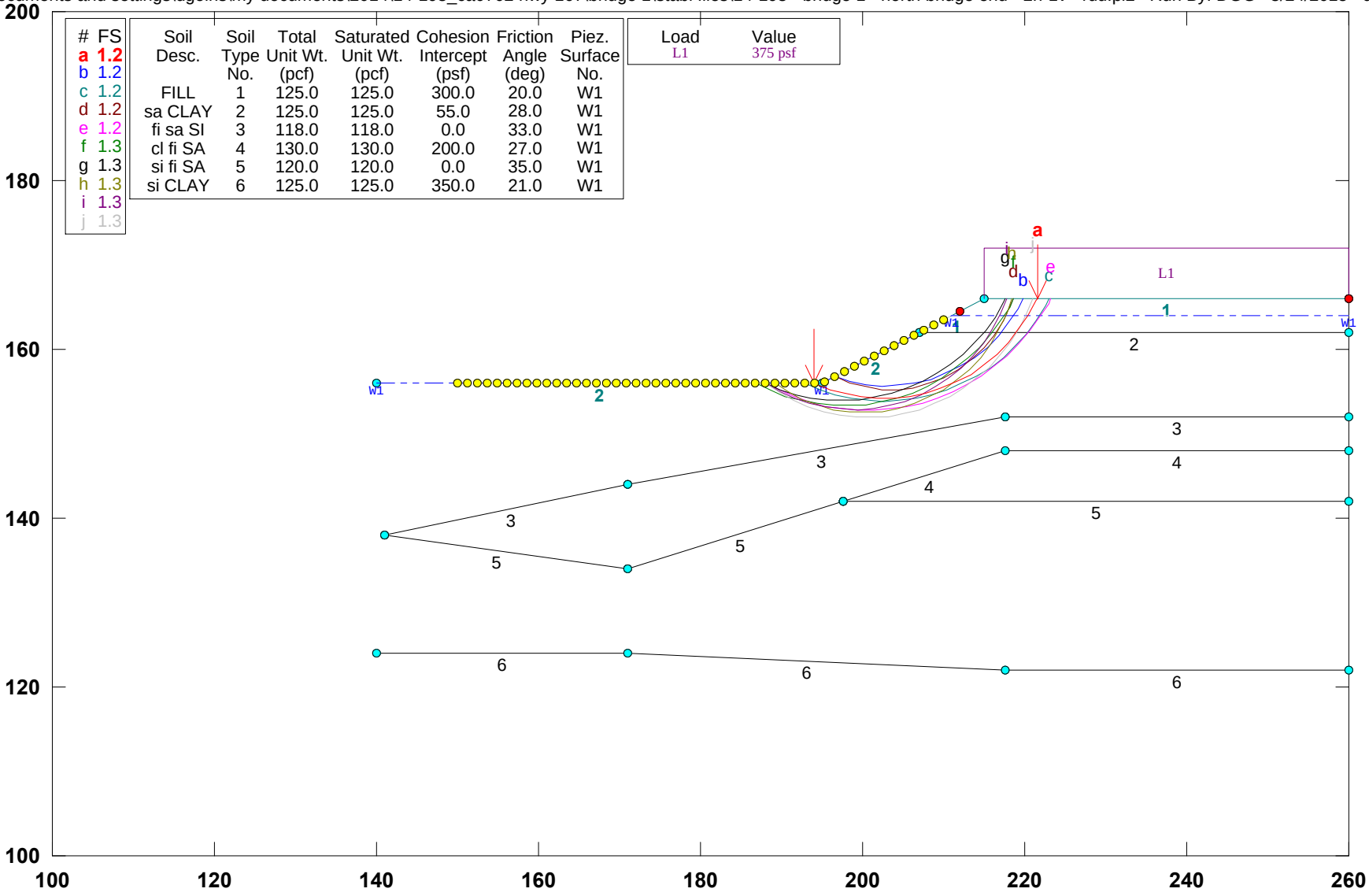
14-198 - CA0702: Bridge 1 Bent 5 - 2H:1V - Rapid Draw Down Cond.

c:\documents and settings\dgoins\my documents\2014\14-198_ca0702 hwy 167\bridge 1\stabl files\14-198 - bridge 1 - north bridge end - 2h-1v - rdd.pl2 Run By: DGG 8/24/2015 03:52PM

#	FS
a	1.2
b	1.2
c	1.2
d	1.2
e	1.2
f	1.3
g	1.3
h	1.3
i	1.3
j	1.3

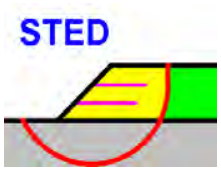
Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
FILL	1	125.0	125.0	300.0	20.0	W1
sa CLAY	2	125.0	125.0	55.0	28.0	W1
fi sa SI	3	118.0	118.0	0.0	33.0	W1
cl fi SA	4	130.0	130.0	200.0	27.0	W1
si fi SA	5	120.0	120.0	0.0	35.0	W1
si CLAY	6	125.0	125.0	350.0	21.0	W1

Load	Value
L1	375 psf



PCSTABL5M/si FSmin=1.2

Safety Factors Are Calculated By The Modified Bishop Method

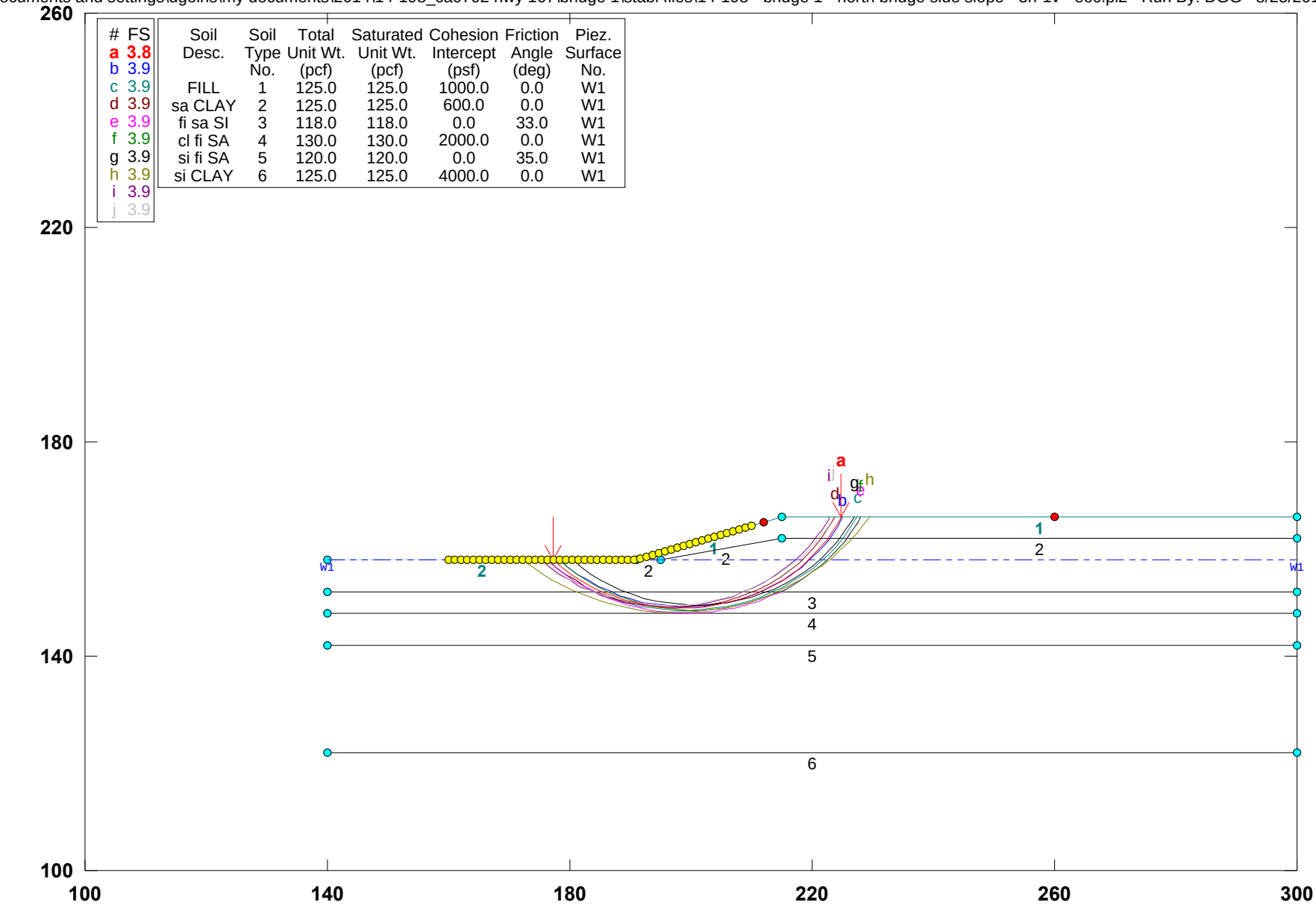


14-198 - CA0702: Bridge 1 North End Side Slope - 3H:1V - End of Construction Cond.

c:\documents and settings\dgoins\my documents\2014\14-198_ca0702 hwy 167\bridge 1\stabl files\14-198 - bridge 1 - north bridge side slope - 3h-1v - eoc.pl2 Run By: DGG 8/25/2015 08:27AM

#	FS
a	3.8
b	3.9
c	3.9
d	3.9
e	3.9
f	3.9
g	3.9
h	3.9
i	3.9
j	3.9

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
FILL	1	125.0	125.0	1000.0	0.0	W1
sa CLAY	2	125.0	125.0	600.0	0.0	W1
fi sa SI	3	118.0	118.0	0.0	33.0	W1
cl fi SA	4	130.0	130.0	2000.0	0.0	W1
si fi SA	5	120.0	120.0	0.0	35.0	W1
si CLAY	6	125.0	125.0	4000.0	0.0	W1



PCSTABL5M/si FSmin=3.8

Safety Factors Are Calculated By The Modified Bishop Method

STED

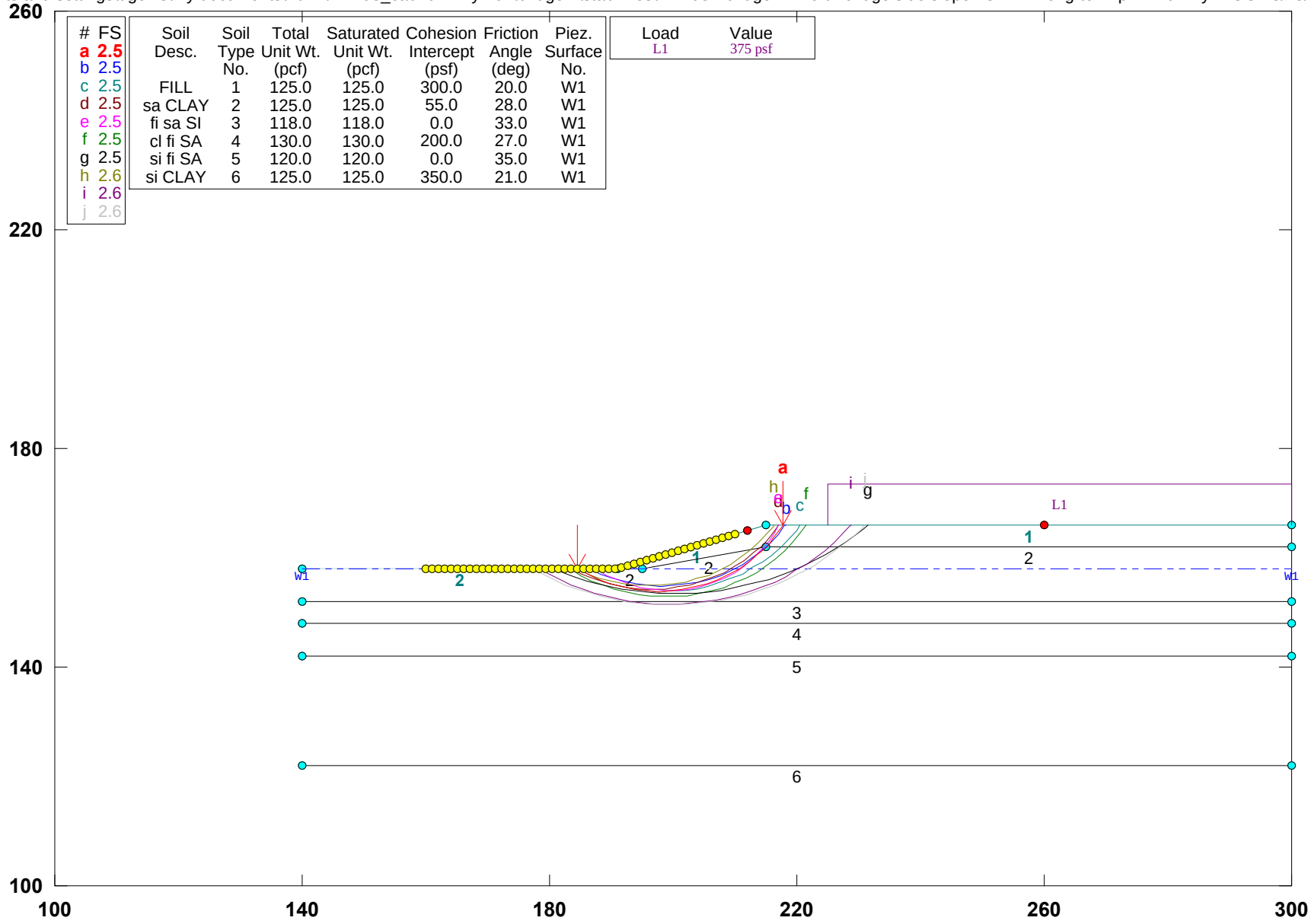
14-198 - CA0702: Bridge 1 North End Side Slope - 3H:1V - Long Term Cond.

c:\documents and settings\dgoins\my documents\2014\14-198_ca0702 hwy 167\bridge 1\stabl files\14-198 - bridge 1 - north bridge side slope - 3h-1v - long-term.pl2 Run By: DGG 8/25/2015 08:21A

#	FS
a	2.5
b	2.5
c	2.5
d	2.5
e	2.5
f	2.5
g	2.5
h	2.6
i	2.6
j	2.6

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
FILL	1	125.0	125.0	300.0	20.0	W1
sa CLAY	2	125.0	125.0	55.0	28.0	W1
fi sa SI	3	118.0	118.0	0.0	33.0	W1
cl fi SA	4	130.0	130.0	200.0	27.0	W1
si fi SA	5	120.0	120.0	0.0	35.0	W1
si CLAY	6	125.0	125.0	350.0	21.0	W1

Load	Value
L1	375 psf



PCSTABL5M/si FSmin=2.5

Safety Factors Are Calculated By The Modified Bishop Method

STED

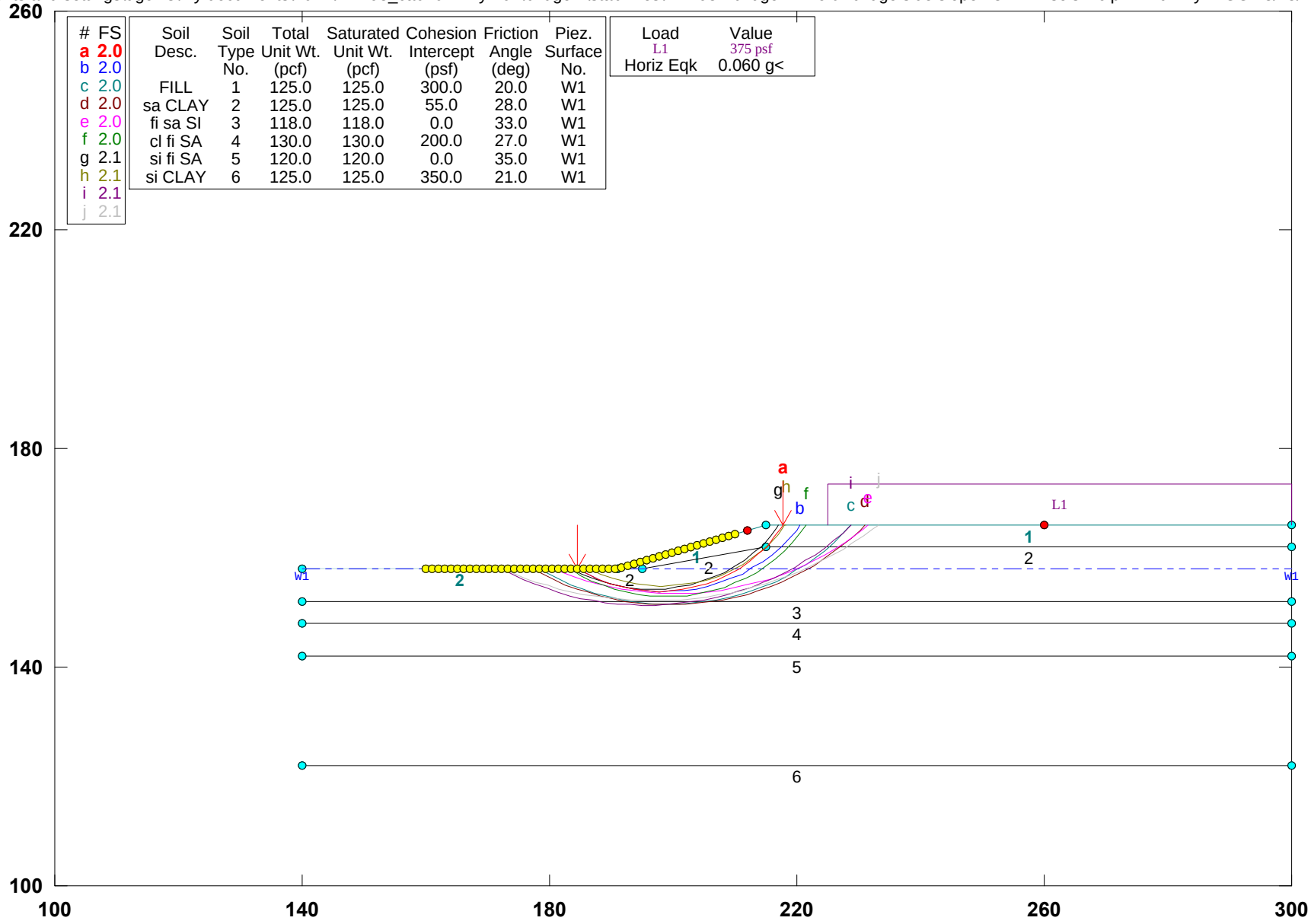
14-198 - CA0702: Bridge 1 North End Side Slope - 3H:1V - Seismic Cond.

c:\documents and settings\dgoins\my documents\2014\14-198_ca0702 hwy 167\bridge 1\stabl files\14-198 - bridge 1 - north bridge side slope - 3h-1v - seismic.pl2 Run By: DGG 8/25/2015 08:28AM

#	FS
a	2.0
b	2.0
c	2.0
d	2.0
e	2.0
f	2.0
g	2.1
h	2.1
i	2.1
j	2.1

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
FILL	1	125.0	125.0	300.0	20.0	W1
sa CLAY	2	125.0	125.0	55.0	28.0	W1
fi sa SI	3	118.0	118.0	0.0	33.0	W1
cl fi SA	4	130.0	130.0	200.0	27.0	W1
si fi SA	5	120.0	120.0	0.0	35.0	W1
si CLAY	6	125.0	125.0	350.0	21.0	W1

Load	Value
L1	375 psf
Horiz Eqk	0.060 g<



PCSTABL5M/si FSmin=2.0

Safety Factors Are Calculated By The Modified Bishop Method

STED

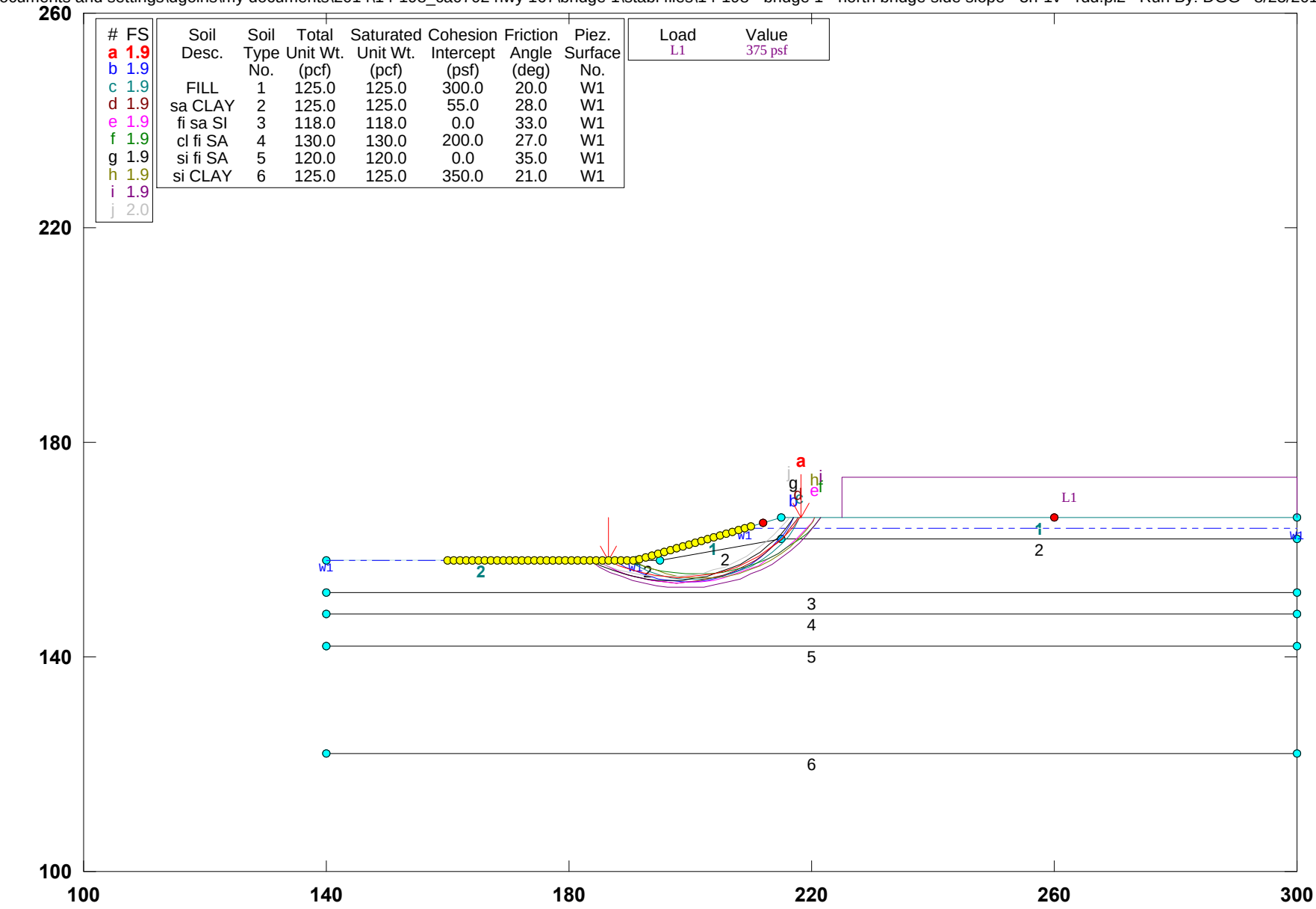
14-198 - CA0702: Bridge 1 North End Side Slope - 3H:1V - Rapid Draw Down Cond.

c:\documents and settings\dgoins\my documents\2014\14-198_ca0702 hwy 167\bridge 1\stabl files\14-198 - bridge 1 - north bridge side slope - 3h-1v - rdd.pl2 Run By: DGG 8/25/2015 08:23AM

#	FS
a	1.9
b	1.9
c	1.9
d	1.9
e	1.9
f	1.9
g	1.9
h	1.9
i	1.9
j	2.0

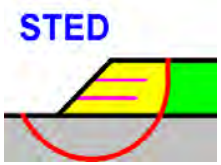
Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
FILL	1	125.0	125.0	300.0	20.0	W1
sa CLAY	2	125.0	125.0	55.0	28.0	W1
fi sa SI	3	118.0	118.0	0.0	33.0	W1
cl fi SA	4	130.0	130.0	200.0	27.0	W1
si fi SA	5	120.0	120.0	0.0	35.0	W1
si CLAY	6	125.0	125.0	350.0	21.0	W1

Load	Value
L1	375 psf



PCSTABL5M/si FSmin=1.9

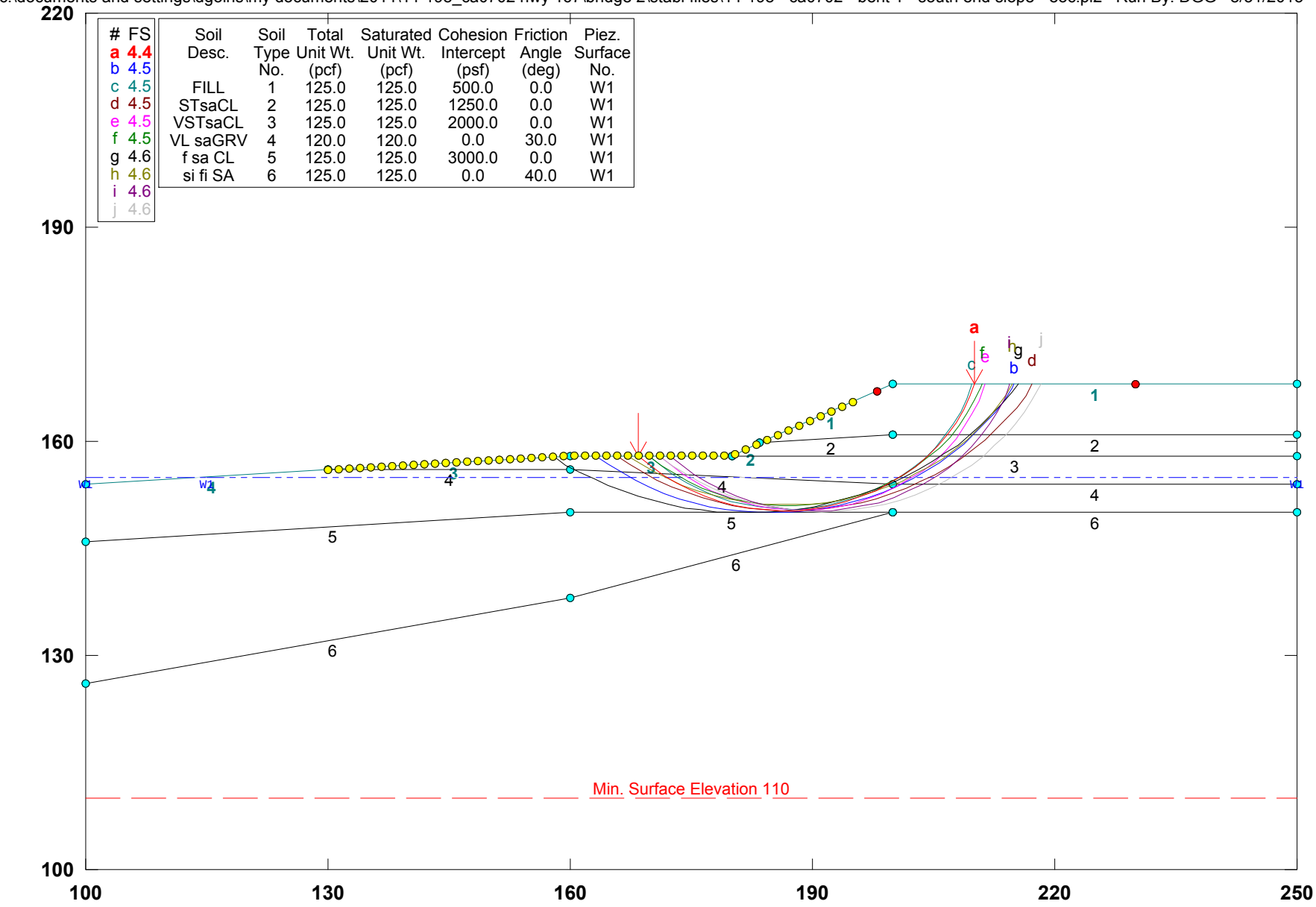
Safety Factors Are Calculated By The Modified Bishop Method



ATTACHMENT 17

14-198 - CA0702: Bridge 2 Bent 1 - 2H:1V- End of Construction Cond.

c:\documents and settings\dgoins\my documents\2014\14-198_ca0702 hwy 167\bridge 2\stabl files\14-198 - ca0702 - bent 1 - south end slope - eoc.pl2 Run By: DGG 8/31/2015 02:01PM



Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
FILL	1	125.0	125.0	500.0	0.0	W1
STsaCL	2	125.0	125.0	1250.0	0.0	W1
VSTsaCL	3	125.0	125.0	2000.0	0.0	W1
VL saGRV	4	120.0	120.0	0.0	30.0	W1
f sa CL	5	125.0	125.0	3000.0	0.0	W1
si fi SA	6	125.0	125.0	0.0	40.0	W1

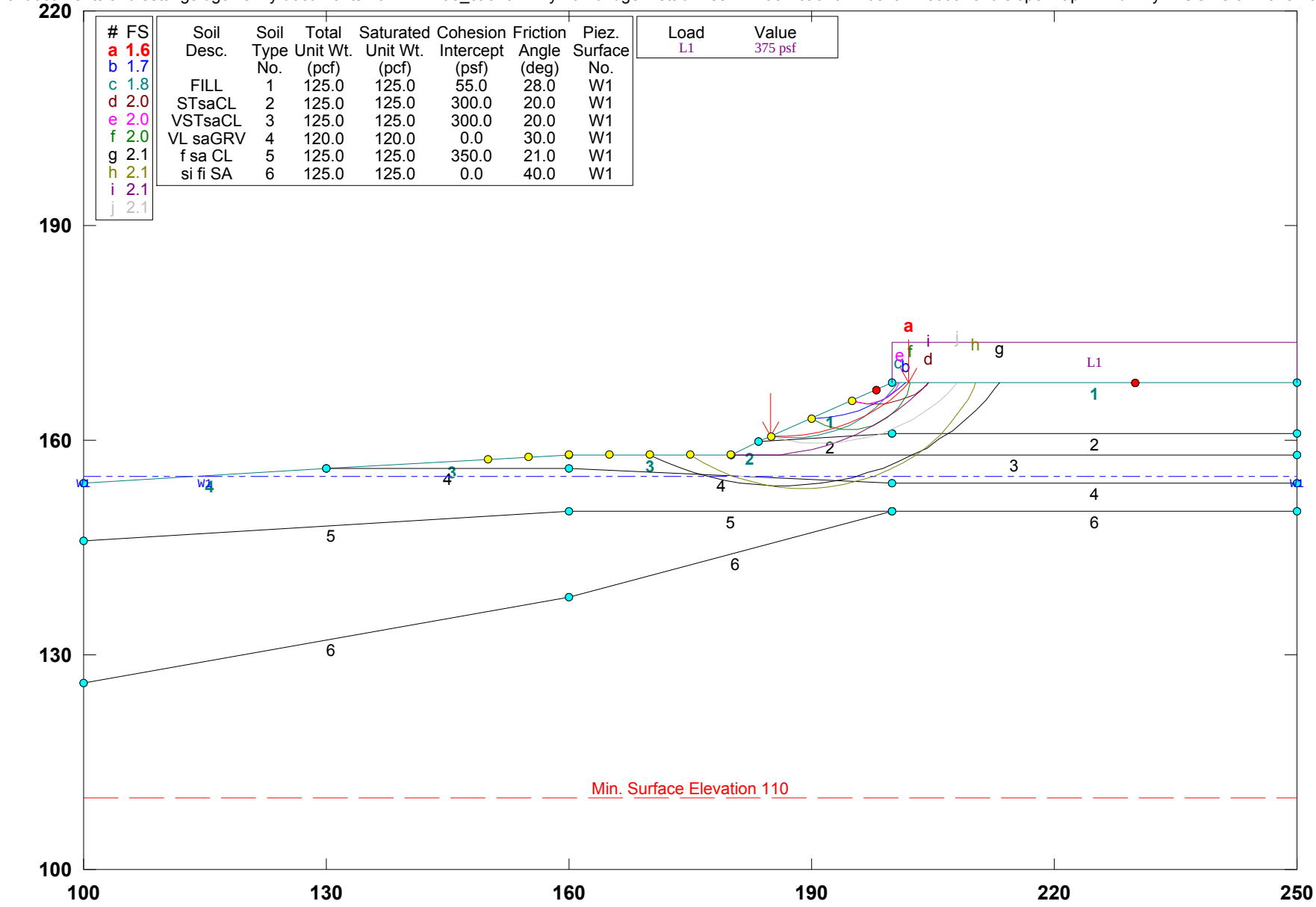
PCSTABL5M/si FSmin=4.4

Safety Factors Are Calculated By The Modified Bishop Method

STED

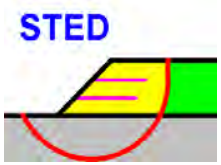
14-198 - CA0702: Bridge 2 Bent 1 - 2H:1V- Long Term Cond.

c:\documents and settings\dgoins\my documents\2014\14-198_ca0702 hwy 167\bridge 2\stabl files\14-198 - ca0702 - bent 1 - south end slope - lt.pl2 Run By: DGG 8/31/2015 01:56PM



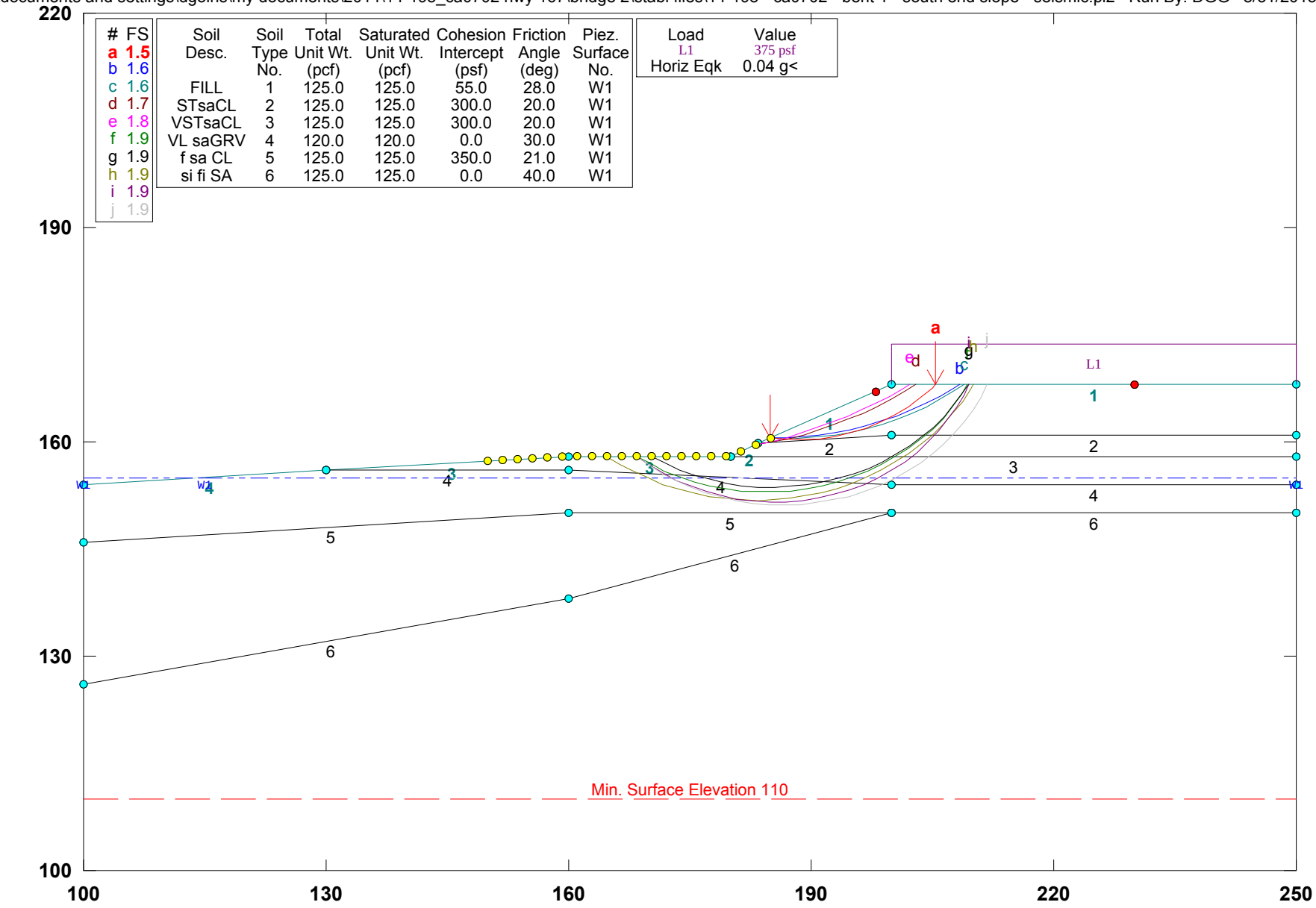
PCSTABL5M/si FSmin=1.6

Safety Factors Are Calculated By The Modified Bishop Method



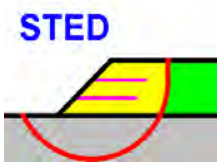
14-198 - CA0702: Bridge 2 Bent 1 - 2H:1V- Seismic Cond.

c:\documents and settings\dgoins\my documents\2014\14-198_ca0702 hwy 167\bridge 2\stabl files\14-198 - ca0702 - bent 1 - south end slope - seismic.pl2 Run By: DGG 8/31/2015 04:27PM



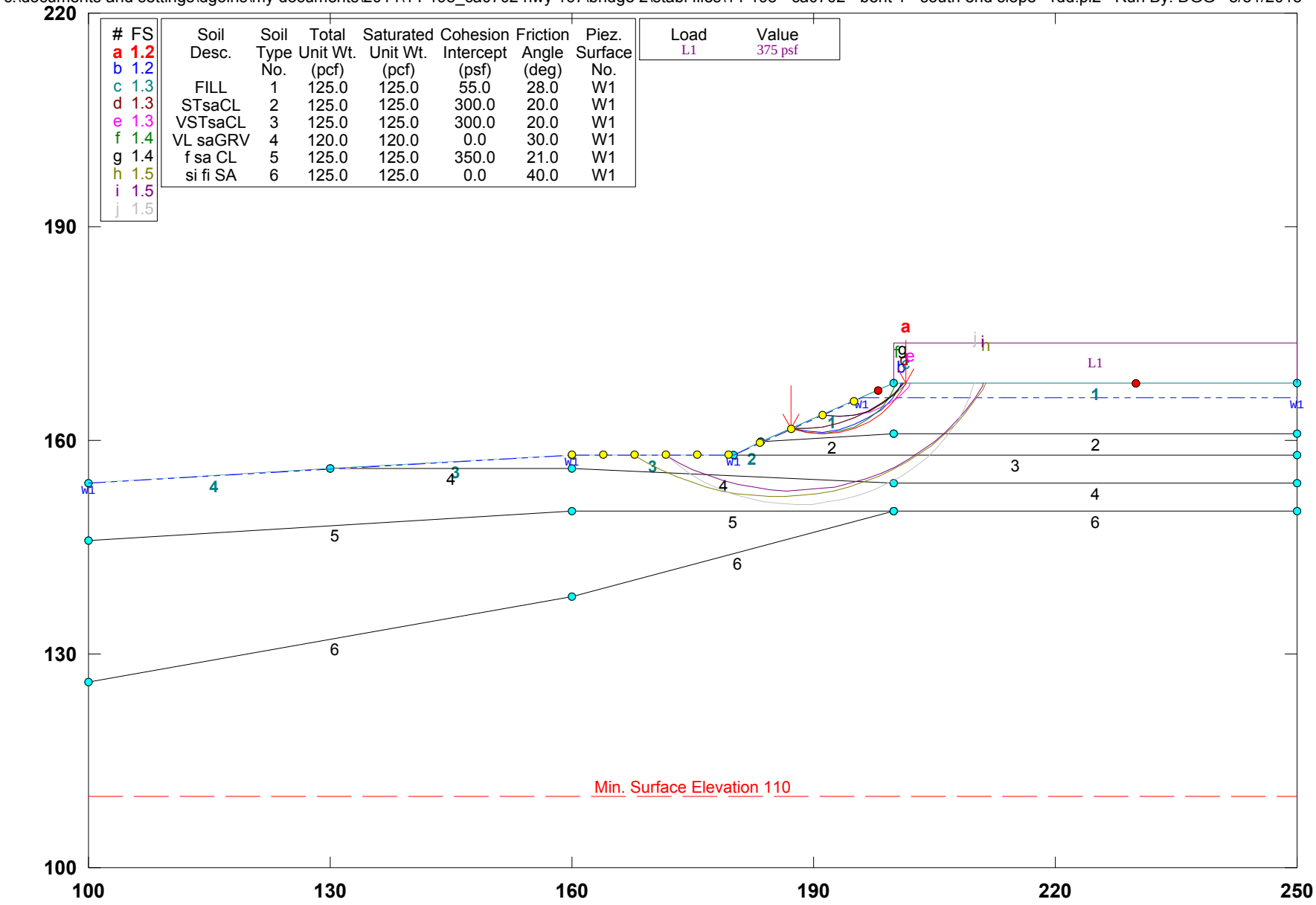
PCSTABL5M/si FSmin=1.5

Safety Factors Are Calculated By The Modified Bishop Method



14-198 - CA0702: Bridge 2 Bent 1 - 2H:1V- Rapid Drawdown Cond.

c:\documents and settings\dgoins\my documents\2014\14-198_ca0702 hwy 167\bridge 2\stabl files\14-198 - ca0702 - bent 1 - south end slope - rdd.pl2 Run By: DGG 8/31/2015 01:58PM



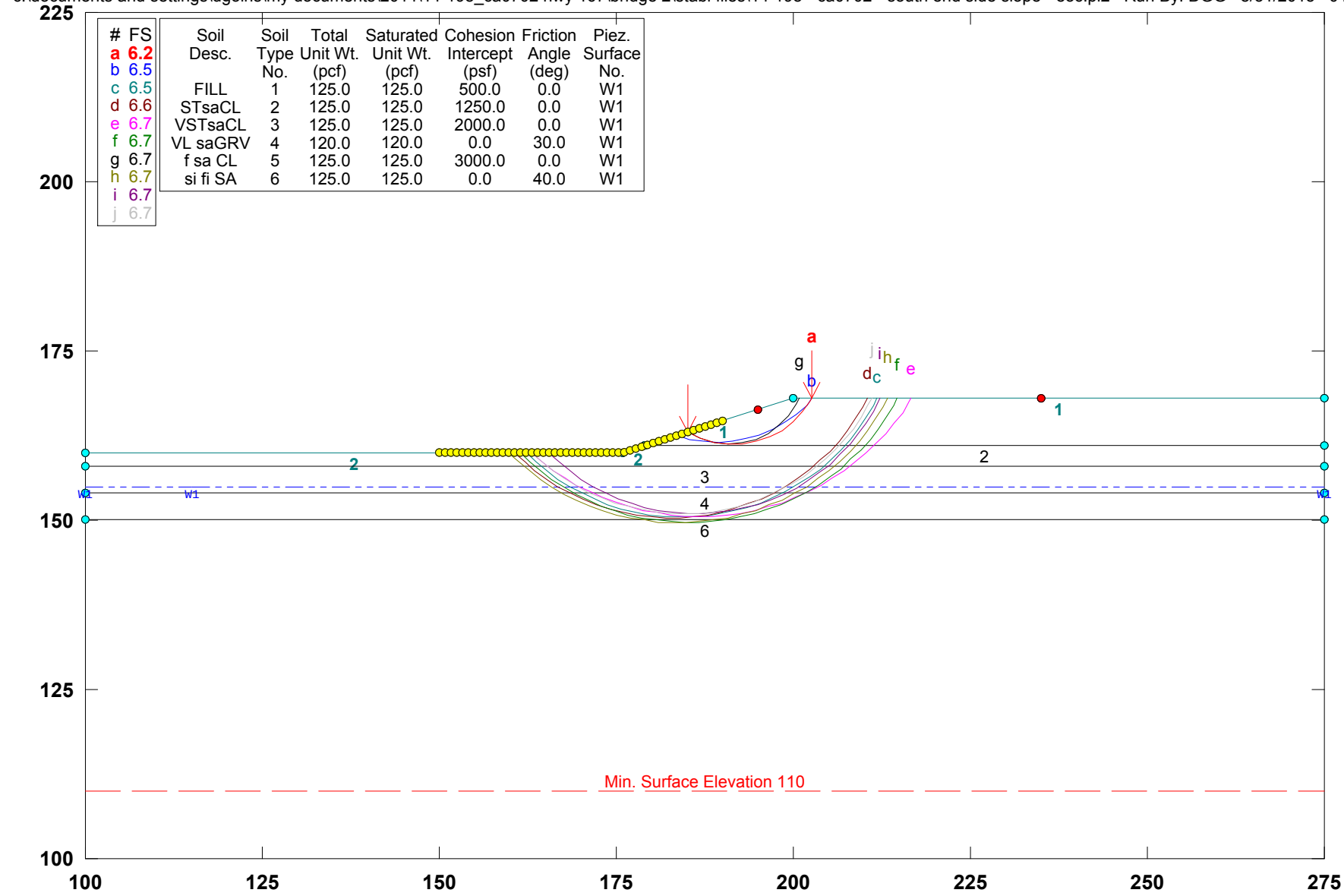
PCSTABL5M/si FSmin=1.2

Safety Factors Are Calculated By The Modified Bishop Method

STED

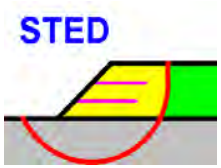
14-198 - CA0702: Bridge 2 South End Side Slope - 3H:1V -End of Construction Cond.

c:\documents and settings\dgoins\my documents\2014\14-198_ca0702 hwy 167\bridge 2\stabl files\14-198 - ca0702 - south end side slope - eoc.pl2 Run By: DGG 8/31/2015 04:19PM



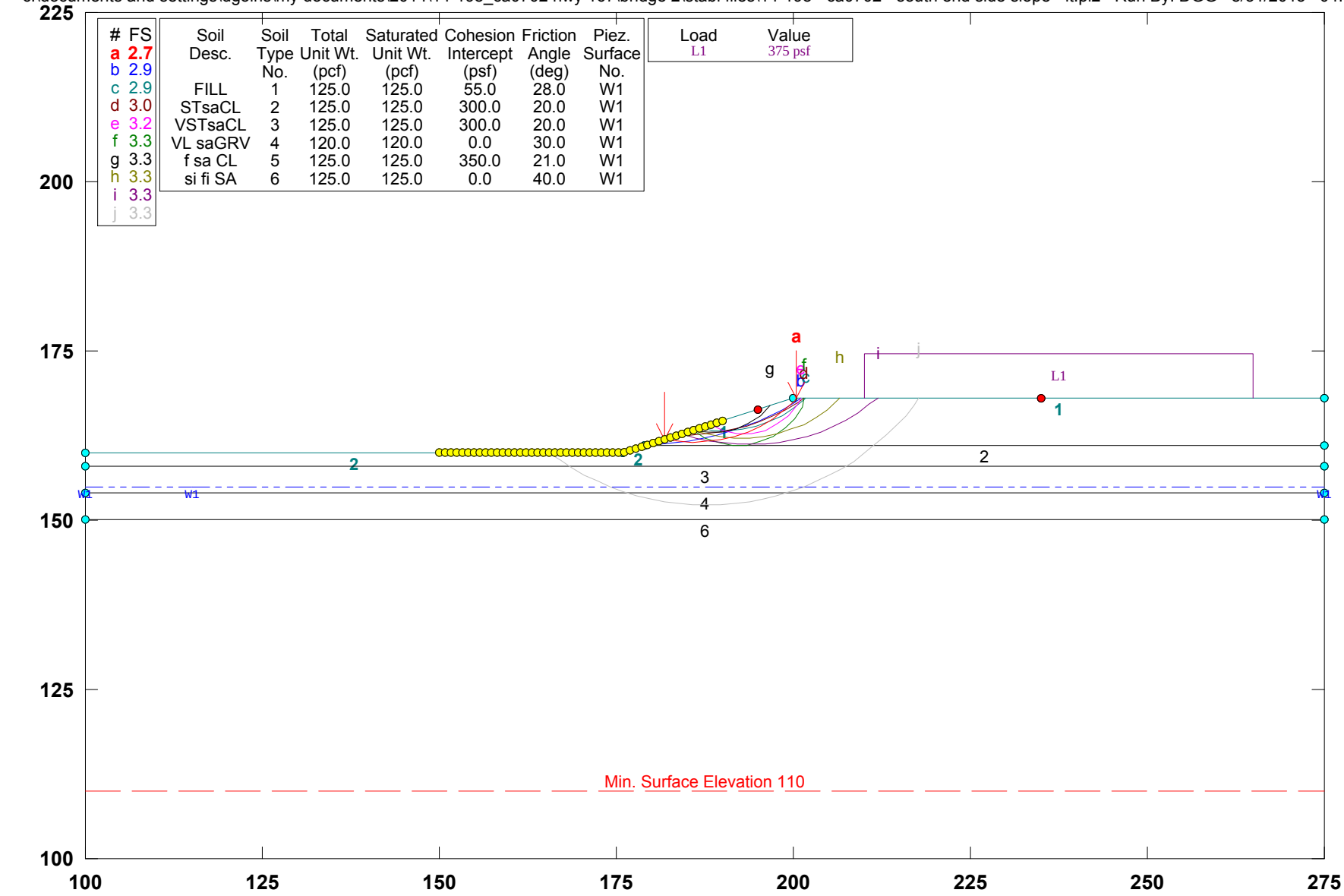
PCSTABL5M/si FSmin=6.2

Safety Factors Are Calculated By The Modified Bishop Method



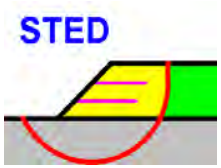
14-198 - CA0702: Bridge 2 South End Side Slope - 3H:1V - Long Term Cond.

c:\documents and settings\dgoins\my documents\2014\14-198_ca0702 hwy 167\bridge 2\stabl files\14-198 - ca0702 - south end side slope - lt.pl2 Run By: DGG 8/31/2015 04:06PM



PCSTABL5M/si FSmin=2.7

Safety Factors Are Calculated By The Modified Bishop Method



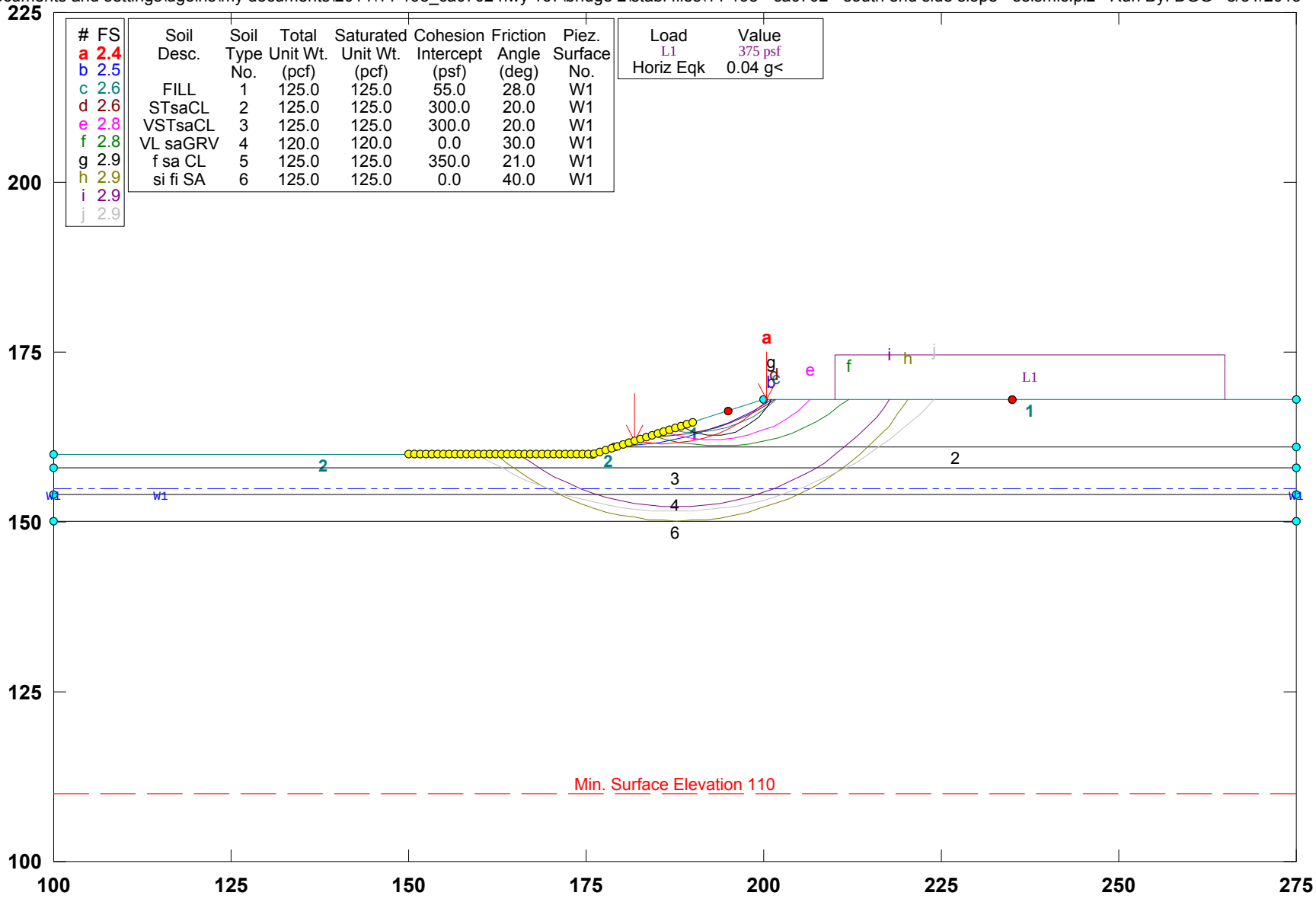
14-198 - CA0702: Bridge 2 South End Side Slope - 3H:1V - Seismic Cond.

c:\documents and settings\dgoins\my documents\2014\14-198_ca0702 hwy 167\bridge 2\stabl files\14-198 - ca0702 - south end side slope - seismic.pl2 Run By: DGG 8/31/2015 04:09PM

#	FS
a	2.4
b	2.5
c	2.6
d	2.6
e	2.8
f	2.8
g	2.9
h	2.9
i	2.9
j	2.9

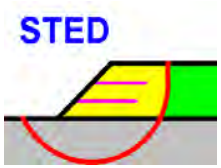
Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
FILL	1	125.0	125.0	55.0	28.0	W1
STsaCL	2	125.0	125.0	300.0	20.0	W1
VSTsaCL	3	125.0	125.0	300.0	20.0	W1
VL saGRV	4	120.0	120.0	0.0	30.0	W1
f sa CL	5	125.0	125.0	350.0	21.0	W1
si fi SA	6	125.0	125.0	0.0	40.0	W1

Load	Value
L1	375 psf
Horiz Eqk	0.04 g<



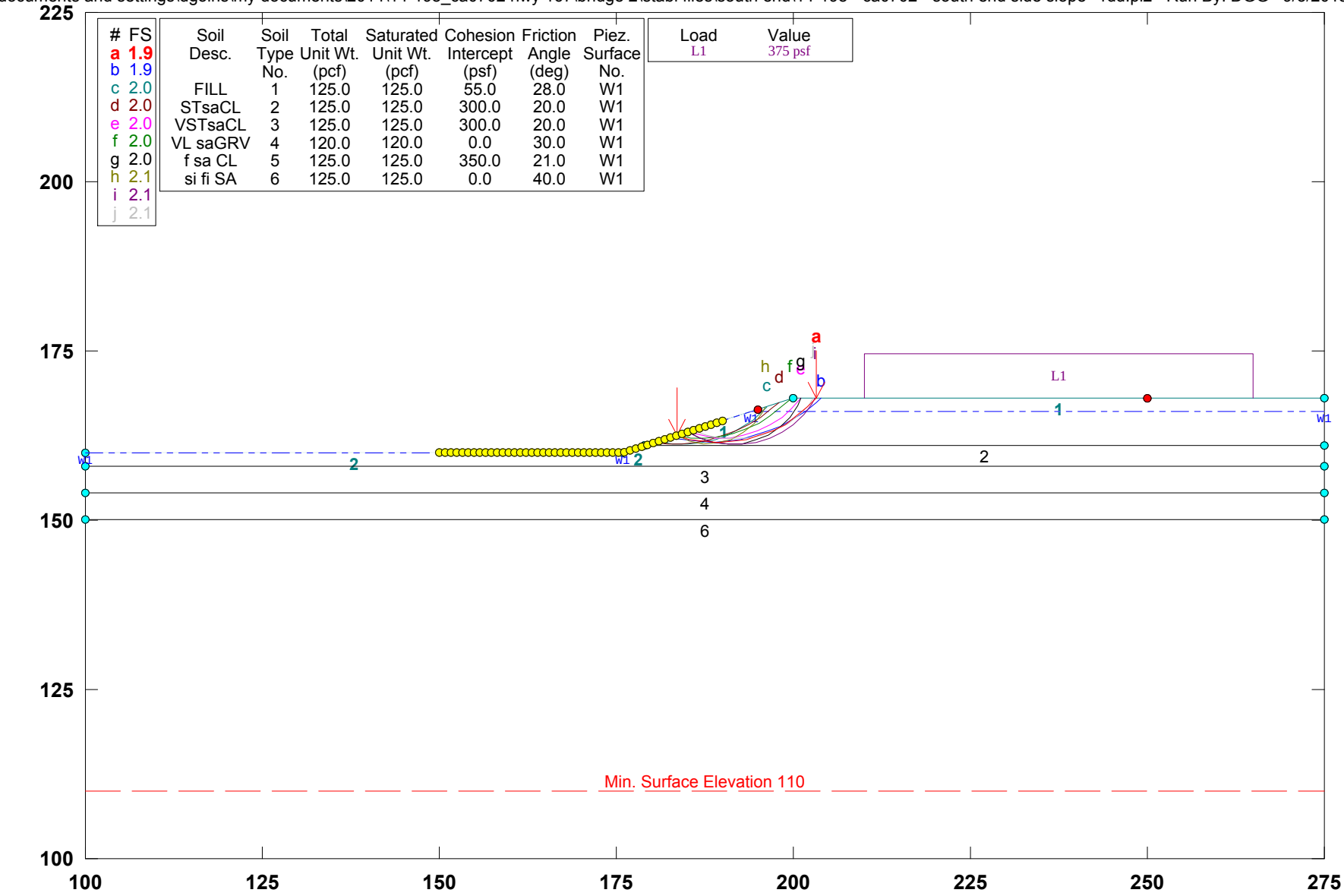
PCSTABL5M/si FSmin=2.4

Safety Factors Are Calculated By The Modified Bishop Method



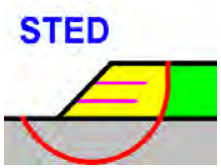
14-198 - CA0702: Bridge 2 South End Side Slope - 3H:1V - Rapid Drawdown Cond.

c:\documents and settings\dgoins\my documents\2014\14-198_ca0702 hwy 167\bridge 2\stabl files\south end\14-198 - ca0702 - south end side slope - rdd.pl2 Run By: DGG 9/3/2015 09:49AM



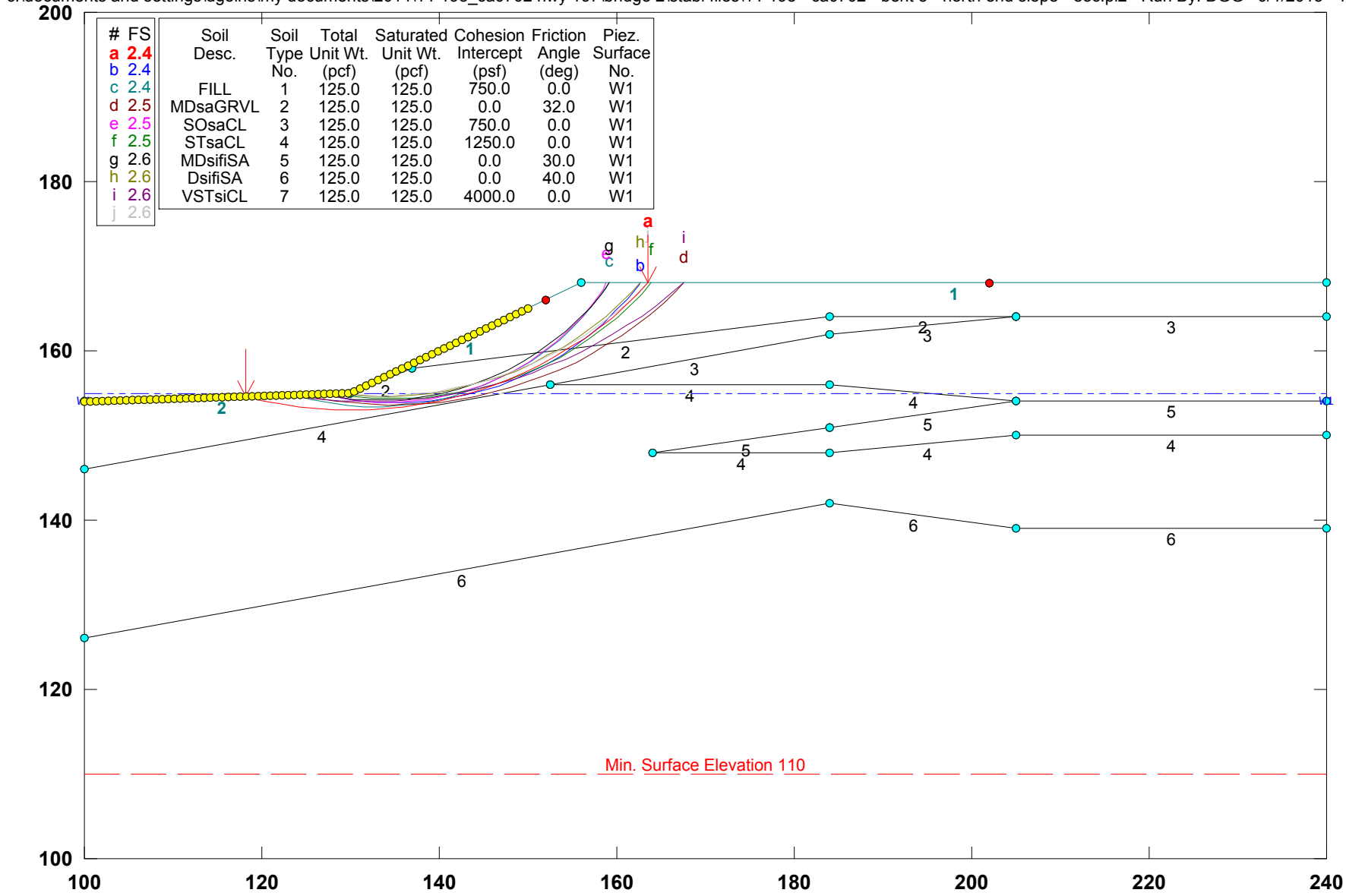
PCSTABL5M/si FSmin=1.9

Safety Factors Are Calculated By The Modified Bishop Method



14-198 - CA0702: Bridge 2 Bent 5 - 2H:1V- End of Construction Cond.

c:\documents and settings\dgoins\my documents\2014\14-198_ca0702 hwy 167\bridge 2\stabl files\14-198 - ca0702 - bent 5 - north end slope - eoc.pl2 Run By: DGG 9/1/2015 11:07AM



#	FS
a	2.4
b	2.4
c	2.4
d	2.5
e	2.5
f	2.5
g	2.6
h	2.6
i	2.6
j	2.6

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
FILL	1	125.0	125.0	750.0	0.0	W1
MDsaGRVL	2	125.0	125.0	0.0	32.0	W1
SOsaCL	3	125.0	125.0	750.0	0.0	W1
STsaCL	4	125.0	125.0	1250.0	0.0	W1
MDsifiSA	5	125.0	125.0	0.0	30.0	W1
DsifiSA	6	125.0	125.0	0.0	40.0	W1
VSTsiCL	7	125.0	125.0	4000.0	0.0	W1

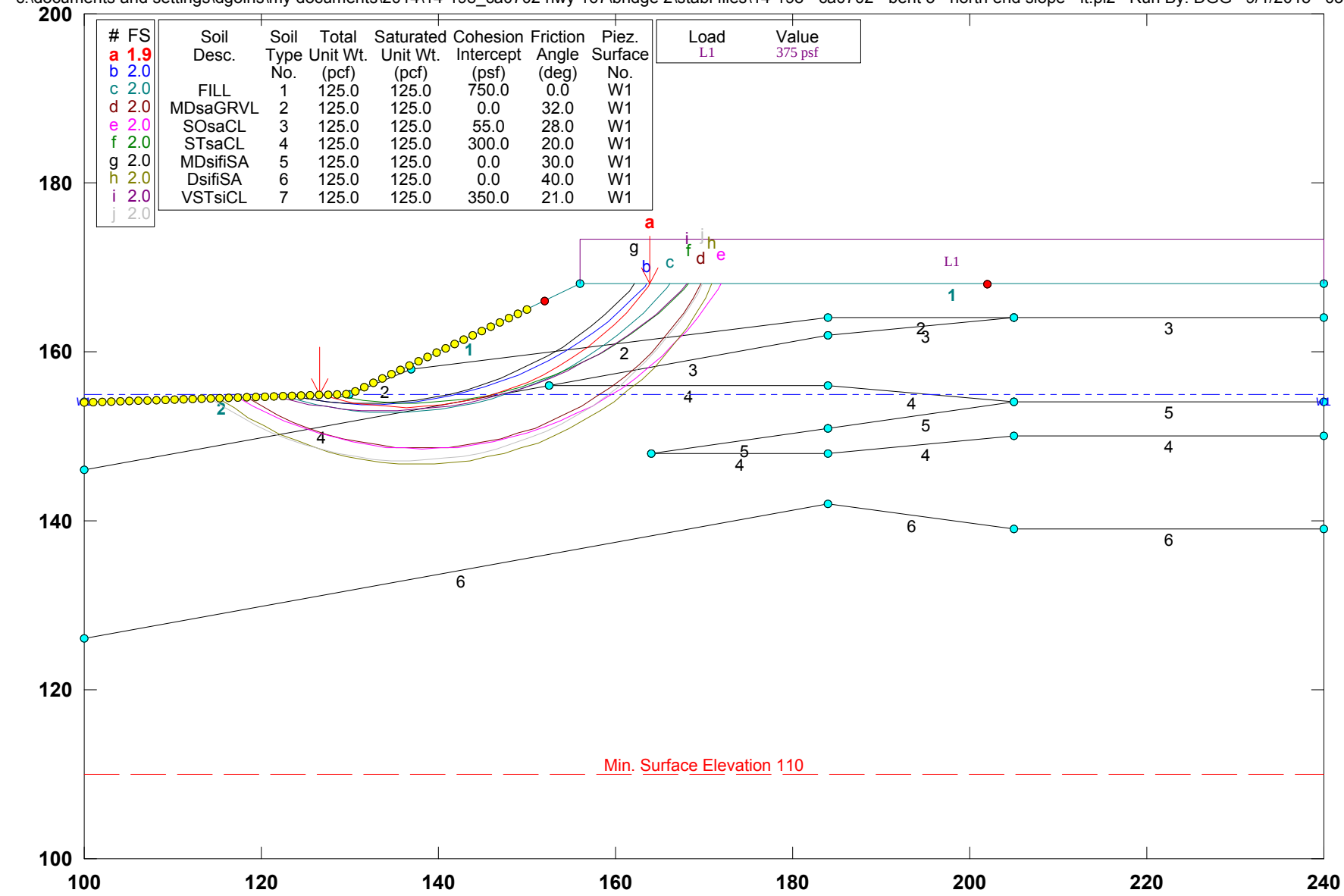
PCSTABL5M/si FSmin=2.4

Safety Factors Are Calculated By The Modified Bishop Method

STED

14-198 - CA0702: Bridge 2 Bent 5 - 2H:1V- Long Term Cond.

c:\documents and settings\dgoins\my documents\2014\14-198_ca0702 hwy 167\bridge 2\stabl files\14-198 - ca0702 - bent 5 - north end slope - lt.pl2 Run By: DGG 9/1/2015 03:00PM



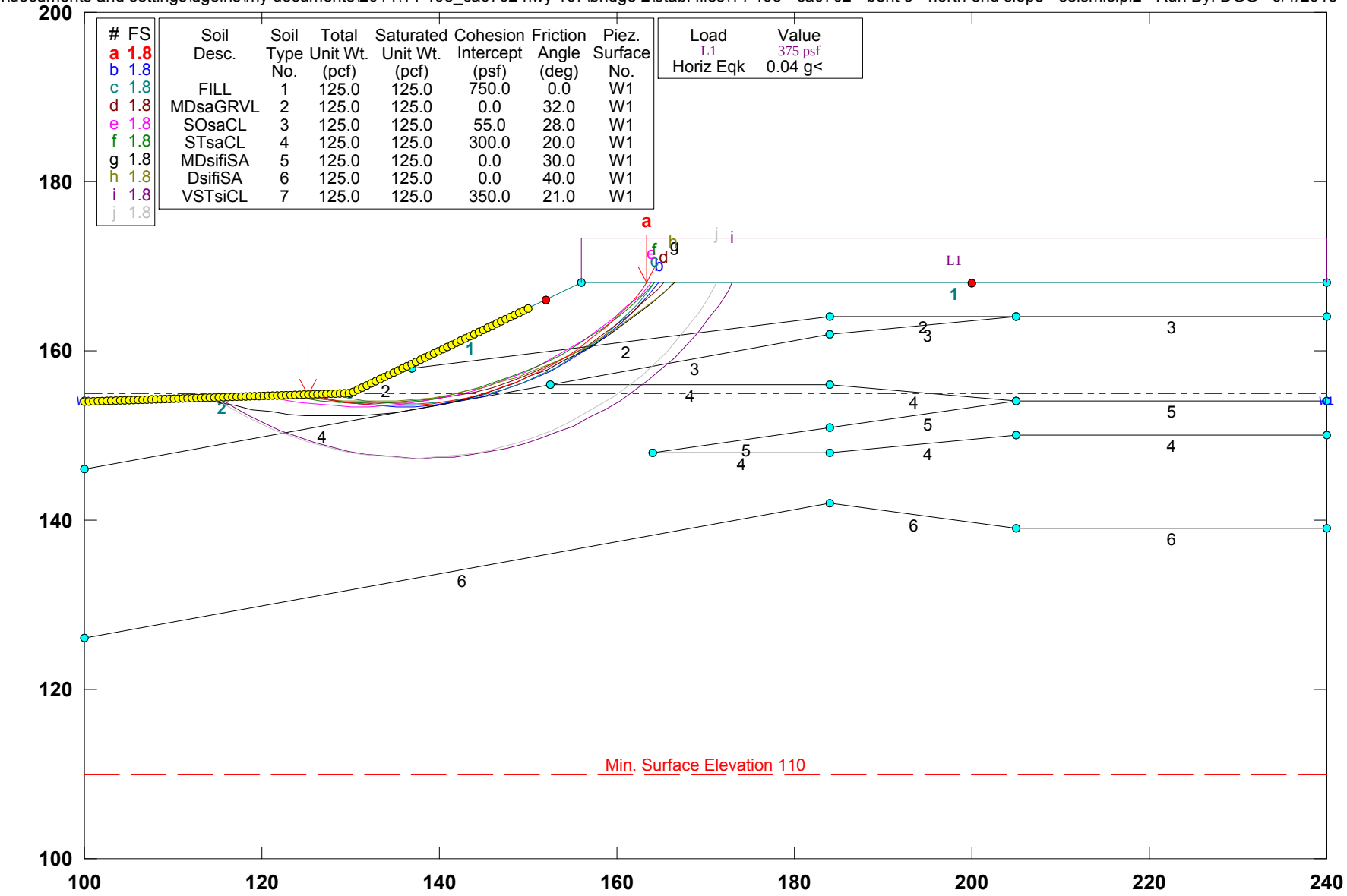
PCSTABL5M/si FSmin=1.9

Safety Factors Are Calculated By The Modified Bishop Method

STED

14-198 - CA0702: Bridge 2 Bent 5 - 2H:1V- Seismic Cond.

c:\documents and settings\dgoins\my documents\2014\14-198_ca0702 hwy 167\bridge 2\stabl files\14-198 - ca0702 - bent 5 - north end slope - seismic.pl2 Run By: DGG 9/1/2015 03:03PM



#	FS
a	1.8
b	1.8
c	1.8
d	1.8
e	1.8
f	1.8
g	1.8
h	1.8
i	1.8
j	1.8

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
FILL	1	125.0	125.0	750.0	0.0	W1
MDsaGRVL	2	125.0	125.0	0.0	32.0	W1
SOsaCL	3	125.0	125.0	55.0	28.0	W1
STsaCL	4	125.0	125.0	300.0	20.0	W1
MDsifiSA	5	125.0	125.0	0.0	30.0	W1
DsifiSA	6	125.0	125.0	0.0	40.0	W1
VSTsiCL	7	125.0	125.0	350.0	21.0	W1

Load	Value
L1	375 psf
Horiz Eqk	0.04 g<

PCSTABL5M/si FSmin=1.8

Safety Factors Are Calculated By The Modified Bishop Method

STED

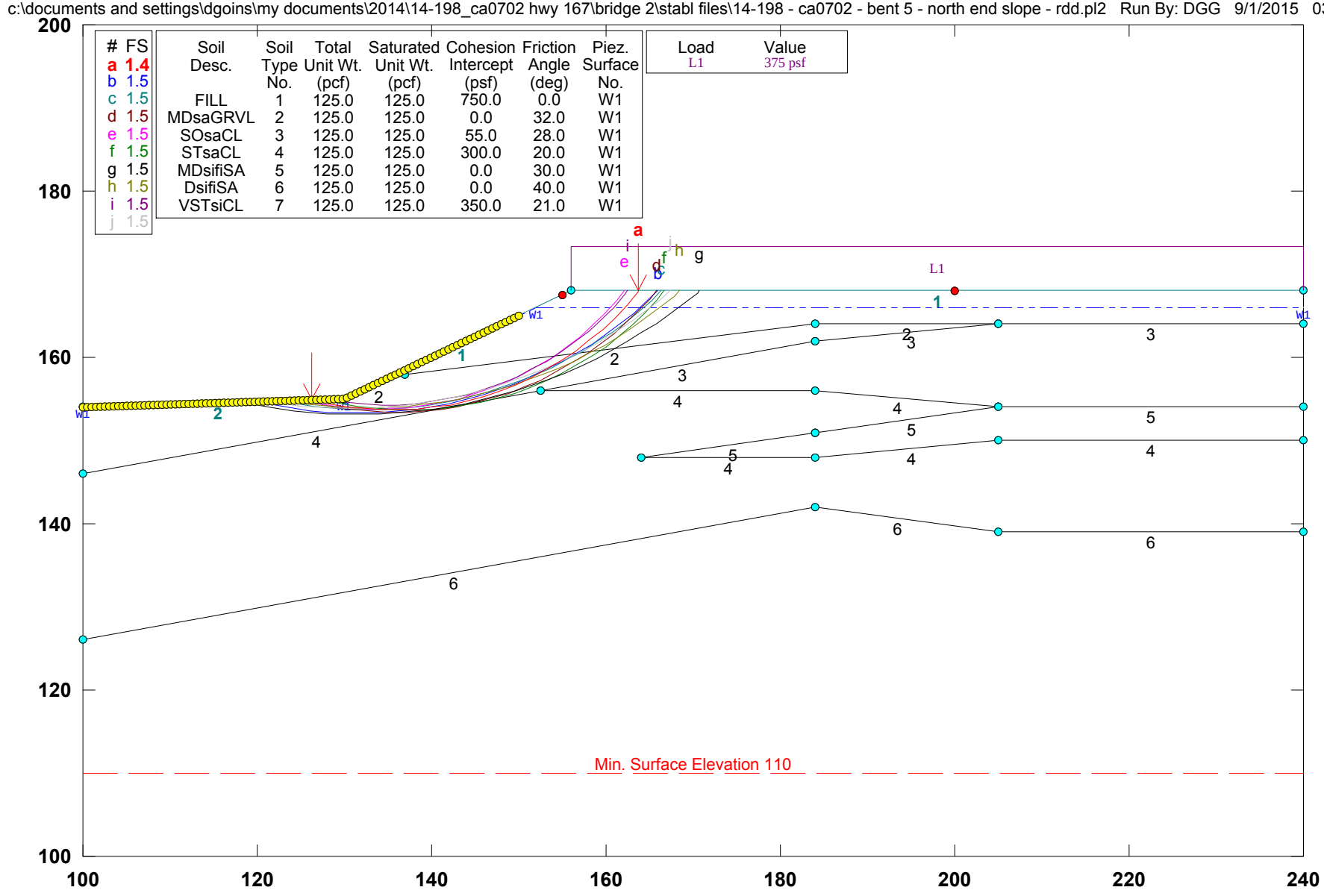
14-198 - CA0702: Bridge 2 Bent 5 - 2H:1V- Rapid Drawdown Cond.

c:\documents and settings\dgoins\my documents\2014\14-198_ca0702 hwy 167\bridge 2\stabl files\14-198 - ca0702 - bent 5 - north end slope - rdd.pl2 Run By: DGG 9/1/2015 03:06PM

#	FS
a	1.4
b	1.5
c	1.5
d	1.5
e	1.5
f	1.5
g	1.5
h	1.5
i	1.5
j	1.5

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
FILL	1	125.0	125.0	750.0	0.0	W1
MDsaGRVL	2	125.0	125.0	0.0	32.0	W1
SOsaCL	3	125.0	125.0	55.0	28.0	W1
STsaCL	4	125.0	125.0	300.0	20.0	W1
MDsifiSA	5	125.0	125.0	0.0	30.0	W1
DsifiSA	6	125.0	125.0	0.0	40.0	W1
VSTsiCL	7	125.0	125.0	350.0	21.0	W1

Load	Value
L1	375 psf



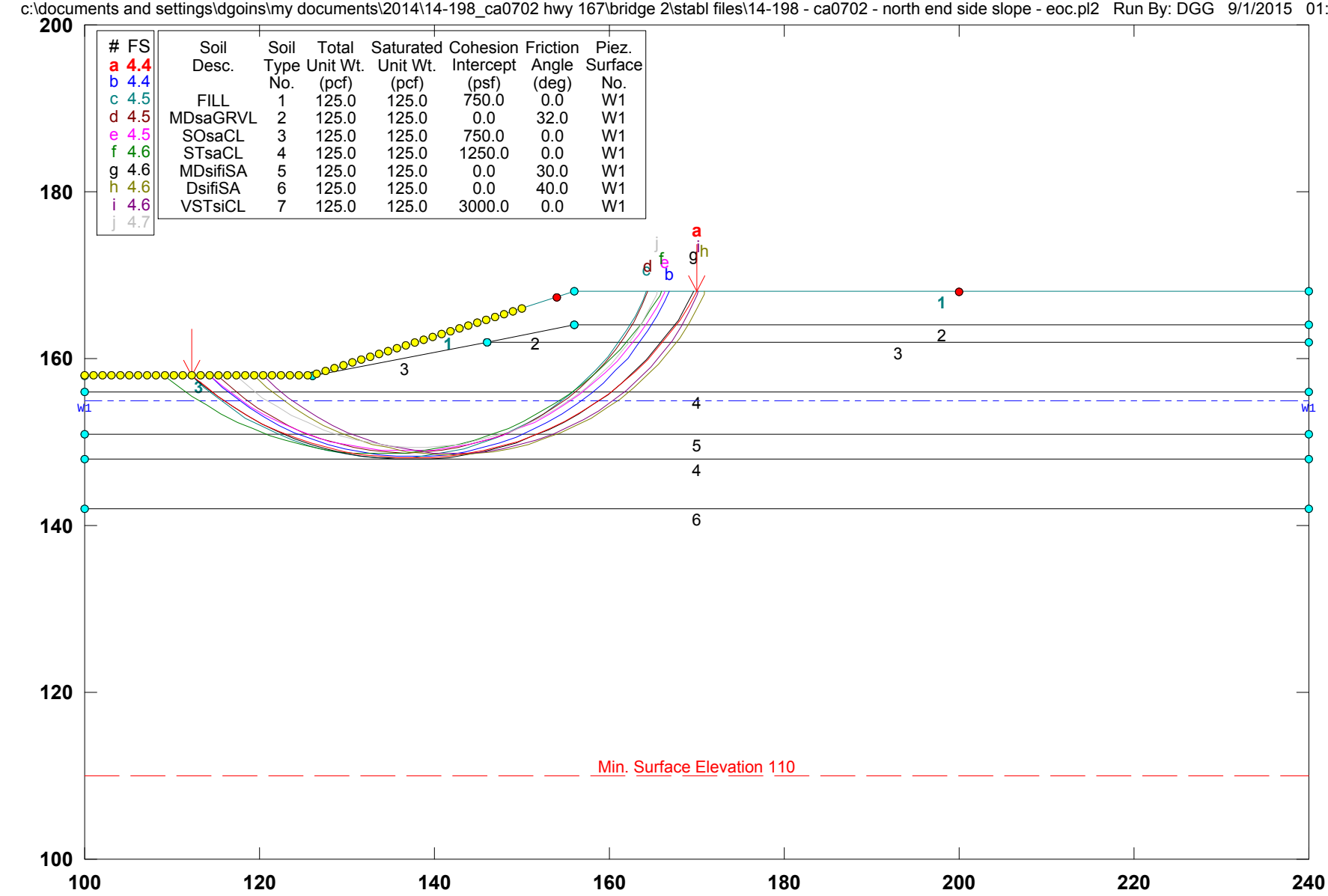
PCSTABL5M/si FSmin=1.4

Safety Factors Are Calculated By The Modified Bishop Method

STED

14-198 - CA0702: Bridge 2 North End Side Slope- 3H:1V - End of Construction Cond.

c:\documents and settings\dgoins\my documents\2014\14-198_ca0702 hwy 167\bridge 2\stabl files\14-198 - ca0702 - north end side slope - eoc.pl2 Run By: DGG 9/1/2015 01:58PM



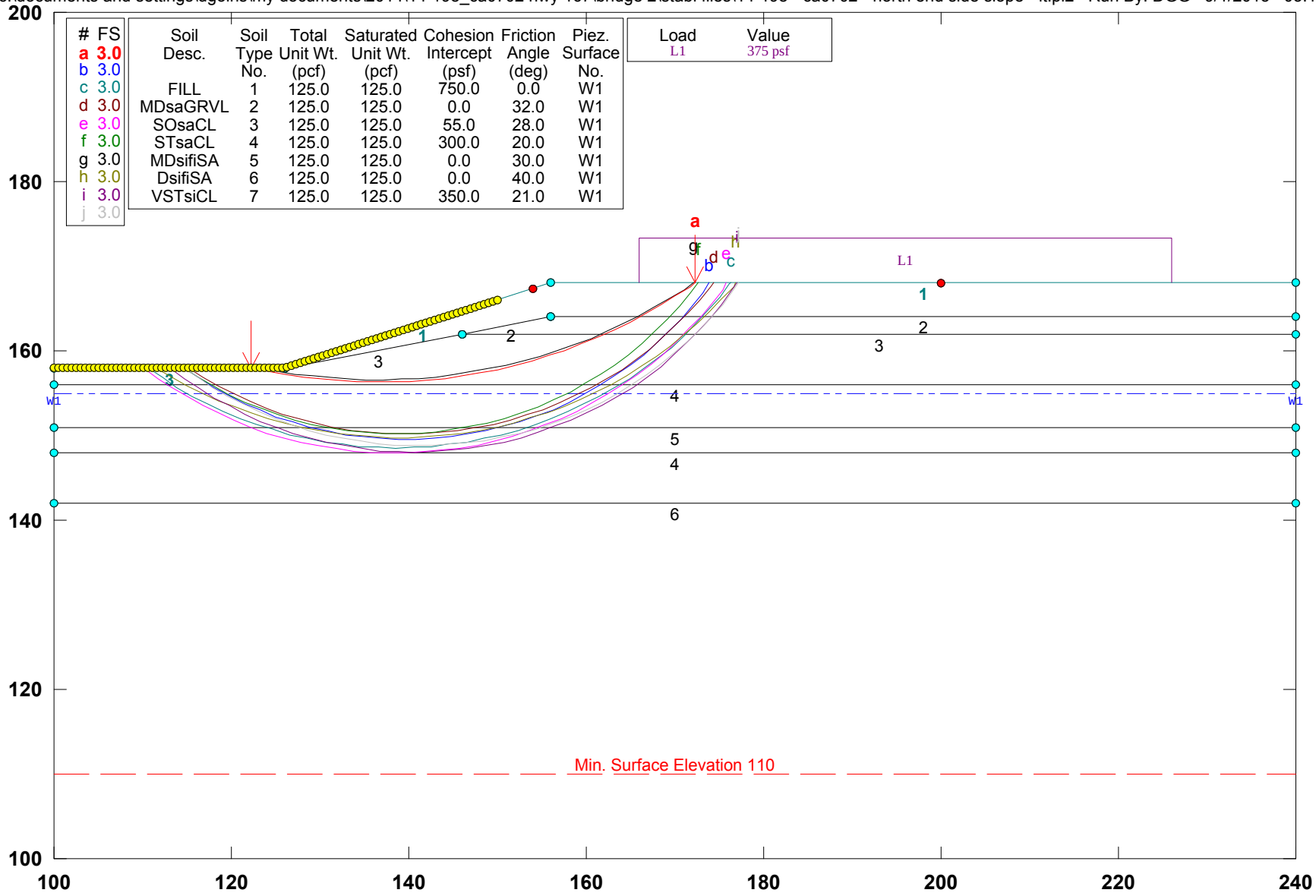
PCSTABL5M/si FSmin=4.4

Safety Factors Are Calculated By The Modified Bishop Method

STED

14-198 - CA0702: Bridge 2 North End Side Slope - 3H:1V - Long Term Cond.

c:\documents and settings\dgoins\my documents\2014\14-198_ca0702 hwy 167\bridge 2\stabl files\14-198 - ca0702 - north end side slope - lt.pl2 Run By: DGG 9/1/2015 03:11PM



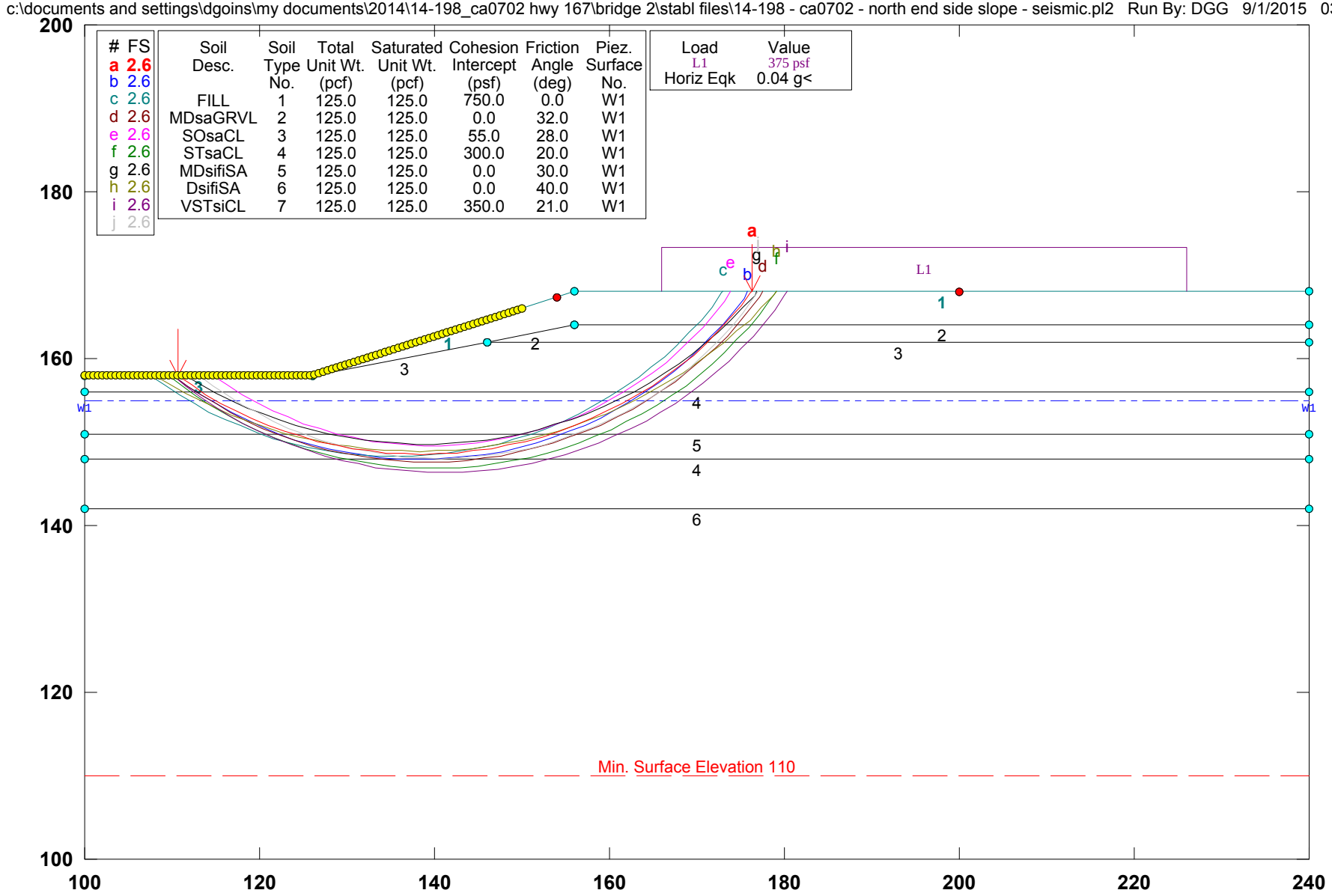
PCSTABL5M/si FSmin=3.0

Safety Factors Are Calculated By The Modified Bishop Method

STED

14-198 - CA0702: Bridge 2 North End Side Slope - 3H:1V - Seismic Cond.

c:\documents and settings\dgoins\my documents\2014\14-198_ca0702 hwy 167\bridge 2\stabl files\14-198 - ca0702 - north end side slope - seismic.pl2 Run By: DGG 9/1/2015 03:16PM



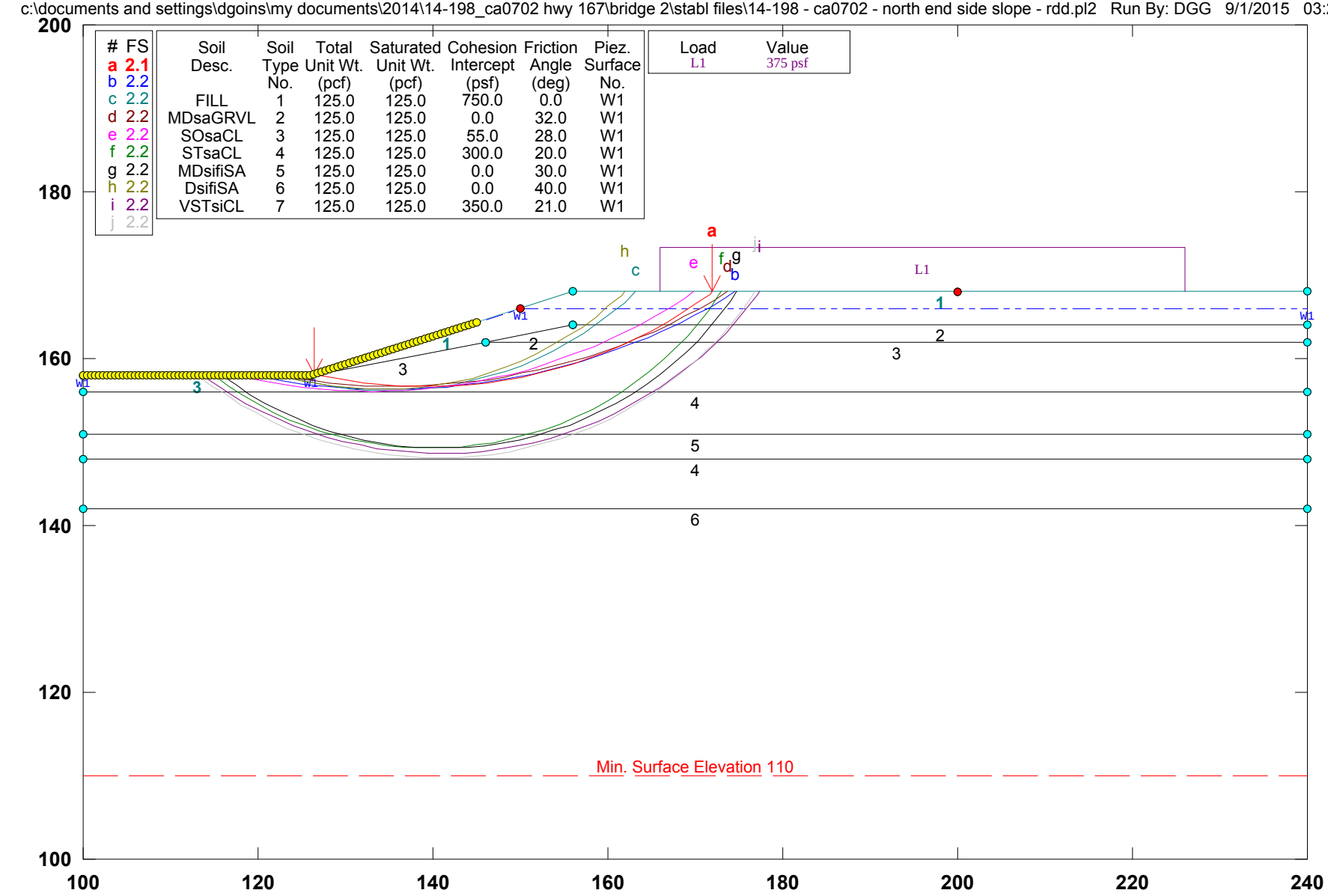
PCSTABL5M/si FSmin=2.6

Safety Factors Are Calculated By The Modified Bishop Method

STED

14-198 - CA0702: Bridge 2 North End Side Slope - 3H:1V - Rapid Drawdown Cond.

c:\documents and settings\dgoins\my documents\2014\14-198_ca0702 hwy 167\bridge 2\stabl files\14-198 - ca0702 - north end side slope - rdd.pl2 Run By: DGG 9/1/2015 03:21PM



PCSTABL5M/si FSmin=2.1

Safety Factors Are Calculated By The Modified Bishop Method

STED

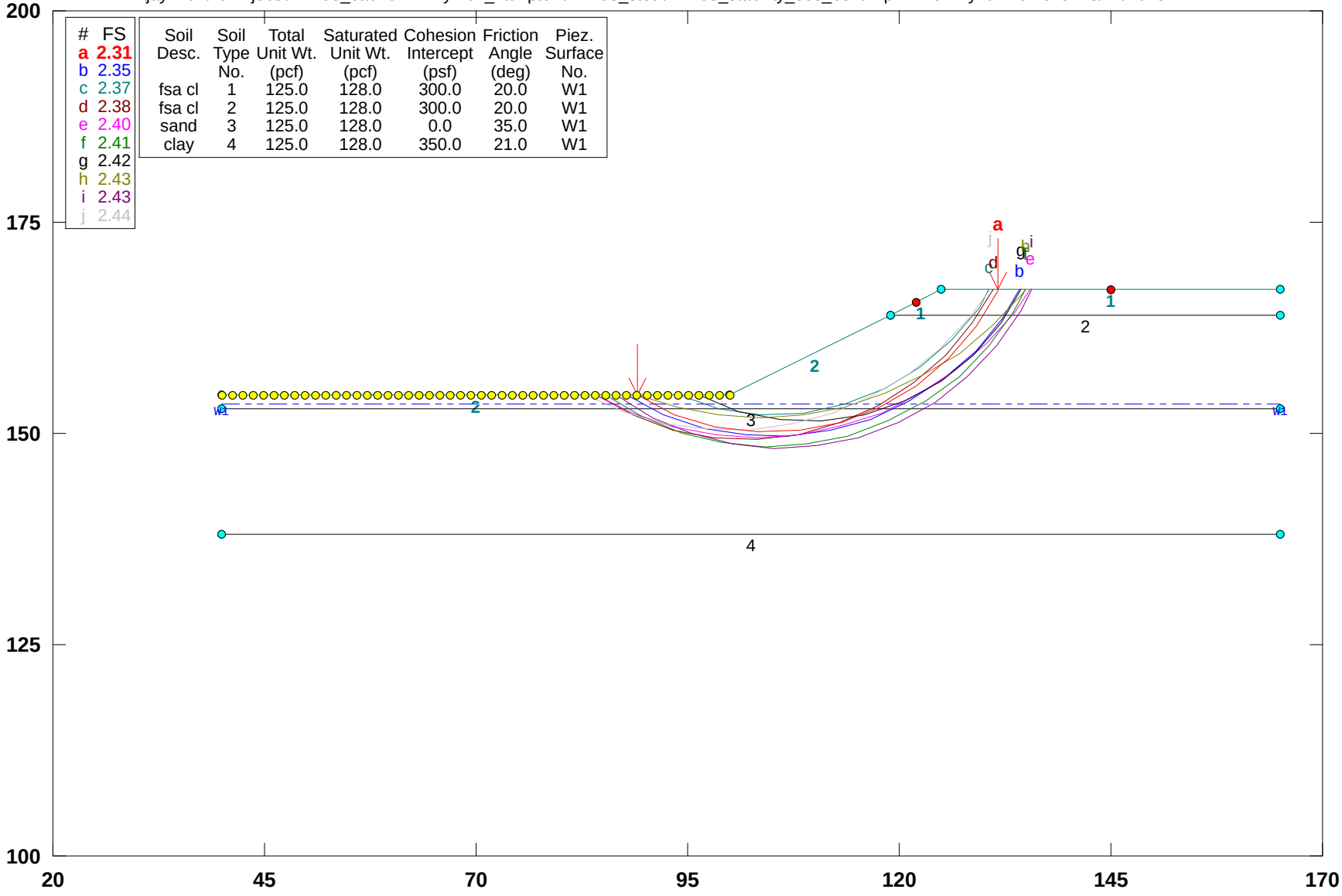
ATTACHMENT 18

Hwy 167 - Bridge 3 - Bent 1 - End of Construction

z:\jay mck\2014 jobs\14-198_ca0702 - hwy 167_hampton\14-198_sted\14-198_stability_eoc_bent 1.pl2 Run By: J. McKiever 8/24/2015 11:24AM

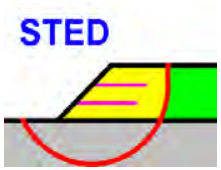
#	FS
a	2.31
b	2.35
c	2.37
d	2.38
e	2.40
f	2.41
g	2.42
h	2.43
i	2.43
j	2.44

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
fsa cl	1	125.0	128.0	300.0	20.0	W1
fsa cl	2	125.0	128.0	300.0	20.0	W1
sand	3	125.0	128.0	0.0	35.0	W1
clay	4	125.0	128.0	350.0	21.0	W1



PCSTABL5M/si FSmin=2.31

Safety Factors Are Calculated By The Modified Bishop Method



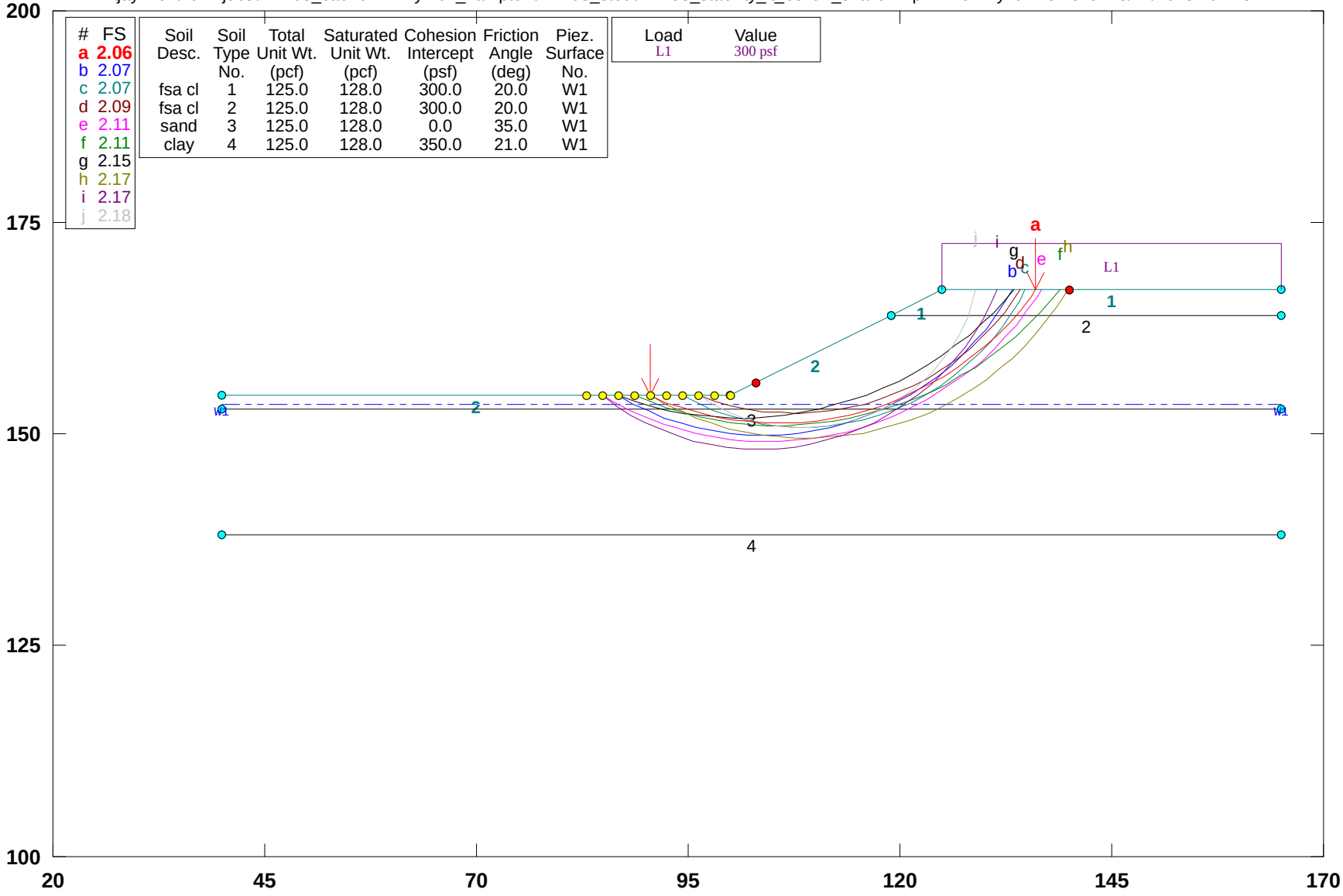
Hwy 167 - Bridge 3 - Bent 1 - Long Term

z:\jay mck\2014 jobs\14-198_ca0702 - hwy 167_hampton\14-198_sted\14-198_stability_lt_bent 1_shallow1.pl2 Run By: J. McKiever 8/24/2015 04:28PM

#	FS
a	2.06
b	2.07
c	2.07
d	2.09
e	2.11
f	2.11
g	2.15
h	2.17
i	2.17
j	2.18

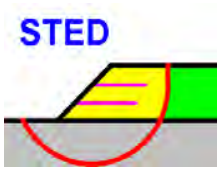
Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
fsa cl	1	125.0	128.0	300.0	20.0	W1
fsa cl	2	125.0	128.0	300.0	20.0	W1
sand	3	125.0	128.0	0.0	35.0	W1
clay	4	125.0	128.0	350.0	21.0	W1

Load	Value
L1	300 psf



PCSTABL5M/si FSmin=2.06

Safety Factors Are Calculated By The Modified Bishop Method



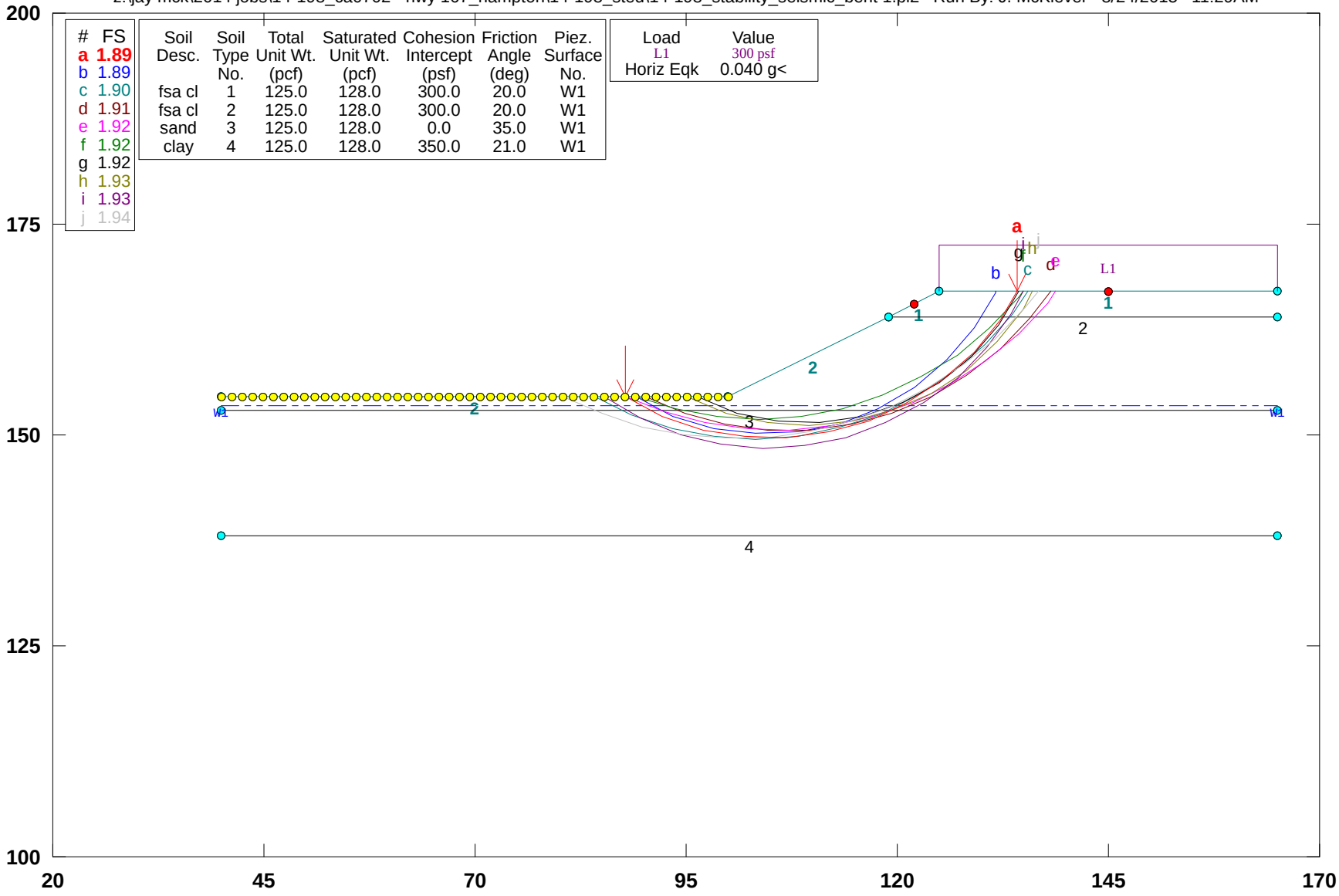
Hwy 167 - Bridge 3 - Bent 1 - Seismic

z:\jay mck\2014 jobs\14-198_ca0702 - hwy 167_hampton\14-198_sted\14-198_stability_seismic_bent 1.pl2 Run By: J. McKiever 8/24/2015 11:29AM

#	FS
a	1.89
b	1.89
c	1.90
d	1.91
e	1.92
f	1.92
g	1.92
h	1.93
i	1.93
j	1.94

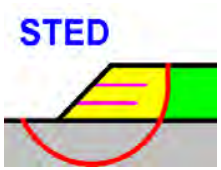
Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
fsa cl	1	125.0	128.0	300.0	20.0	W1
fsa cl	2	125.0	128.0	300.0	20.0	W1
sand	3	125.0	128.0	0.0	35.0	W1
clay	4	125.0	128.0	350.0	21.0	W1

Load	Value
L1	300 psf
Horiz Eqk	0.040 g<



PCSTABL5M/si FSmin=1.89

Safety Factors Are Calculated By The Modified Bishop Method



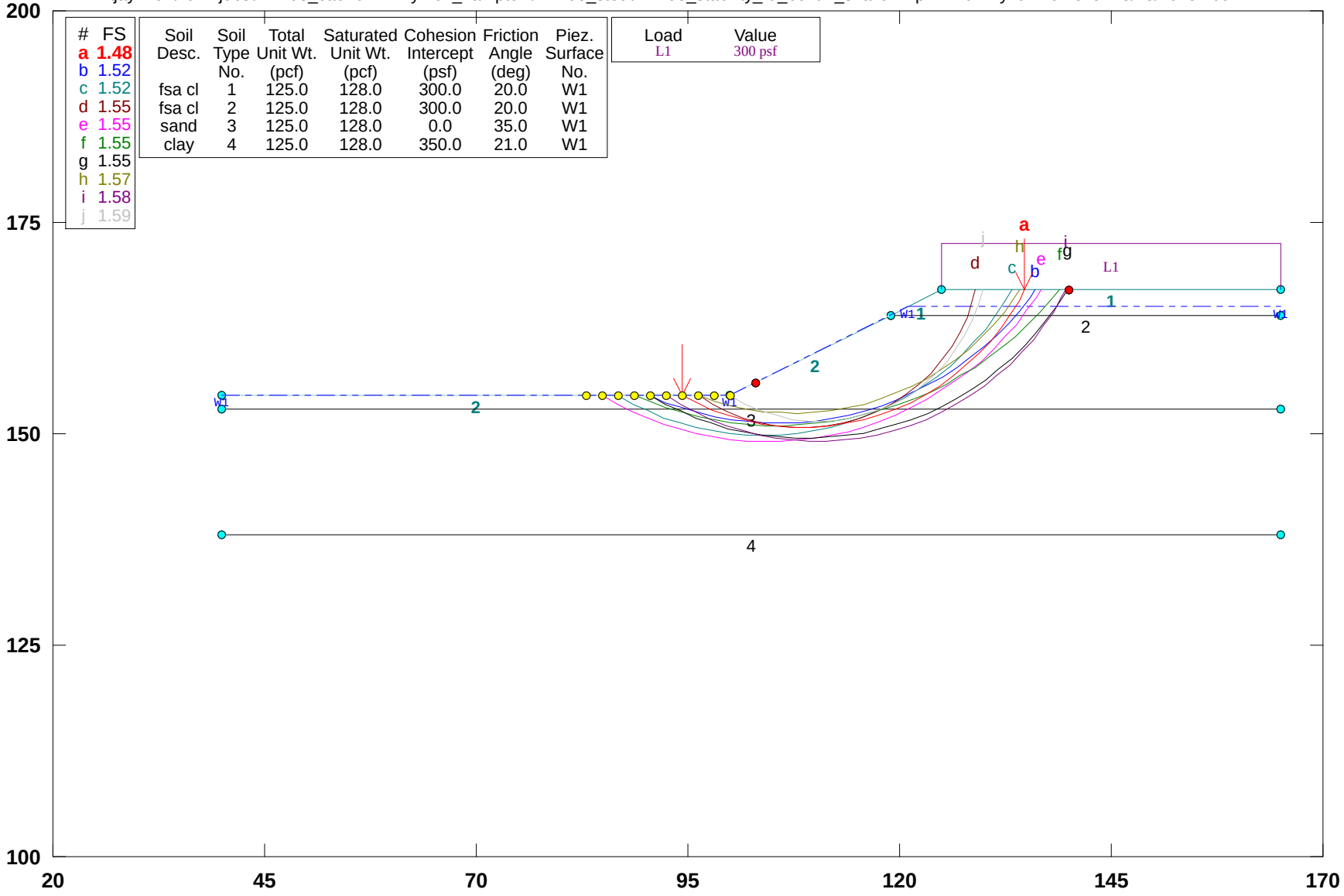
Hwy 167 - Bridge 3 - Bent 1 - Rapid Drawdown

z:\jay mck\2014 jobs\14-198_ca0702 - hwy 167_hampton\14-198_sted\14-198_stability_rd_bent 1_shallow2.pl2 Run By: J. McKiever 8/25/2015 09:14AM

#	FS
a	1.48
b	1.52
c	1.52
d	1.55
e	1.55
f	1.55
g	1.55
h	1.57
i	1.58
j	1.59

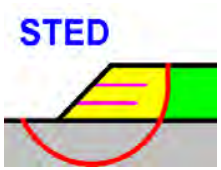
Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
fsa cl	1	125.0	128.0	300.0	20.0	W1
fsa cl	2	125.0	128.0	300.0	20.0	W1
sand	3	125.0	128.0	0.0	35.0	W1
clay	4	125.0	128.0	350.0	21.0	W1

Load	Value
L1	300 psf



PCSTABL5M/si FSmin=1.48

Safety Factors Are Calculated By The Modified Bishop Method

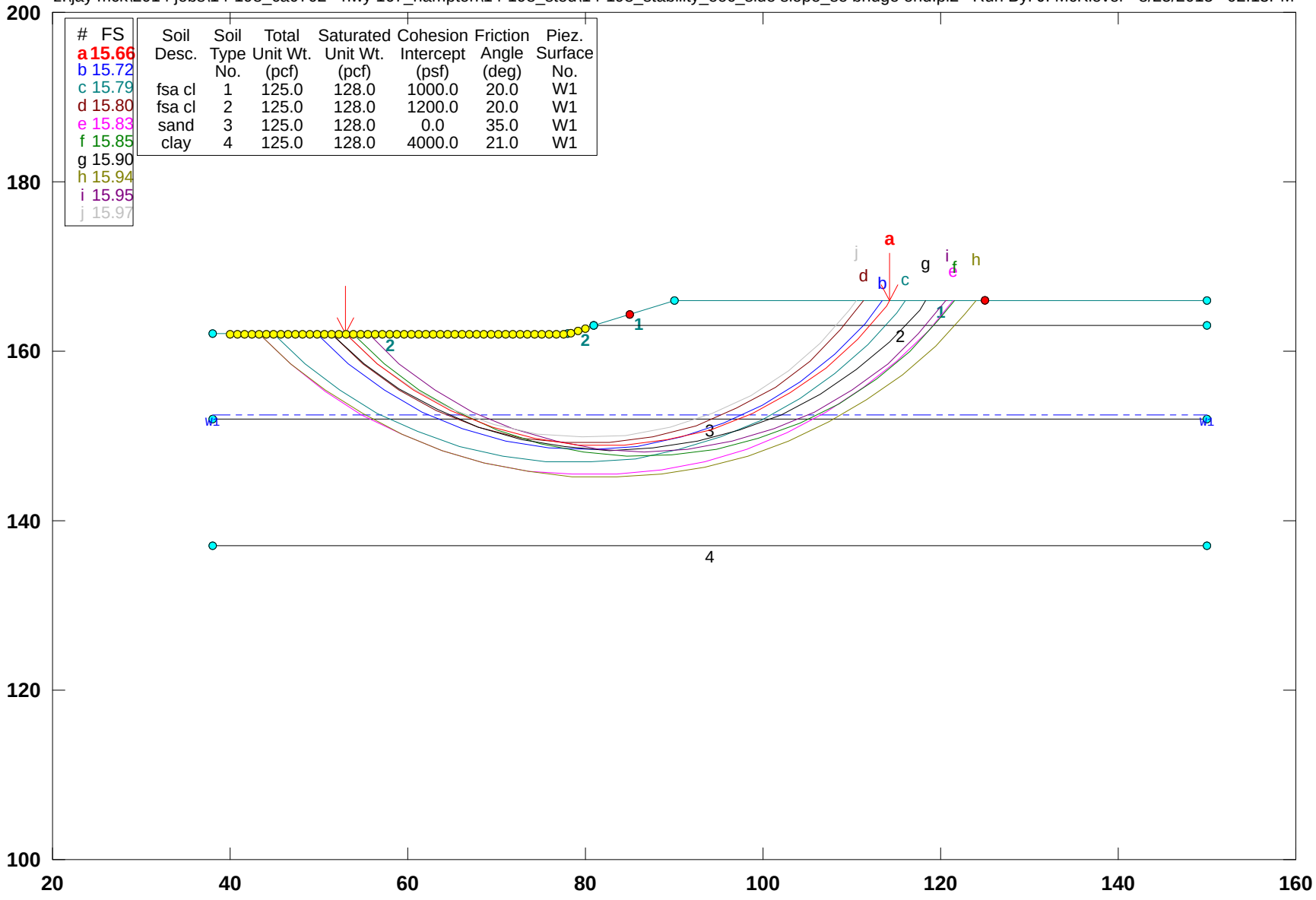


Hwy 167 - Bridge 3 - South side slope - End of Construction

z:\jay mck\2014 jobs\14-198_ca0702 - hwy 167_hampton\14-198_sted\14-198_stability_eoc_side slope_se bridge end.pl2 Run By: J. McKiever 8/25/2015 02:13PM

#	FS
a	15.66
b	15.72
c	15.79
d	15.80
e	15.83
f	15.85
g	15.90
h	15.94
i	15.95
j	15.97

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
fsa cl	1	125.0	128.0	1000.0	20.0	W1
fsa cl	2	125.0	128.0	1200.0	20.0	W1
sand	3	125.0	128.0	0.0	35.0	W1
clay	4	125.0	128.0	4000.0	21.0	W1



PCSTABL5M/si FSmin=15.66

Safety Factors Are Calculated By The Modified Bishop Method

STED

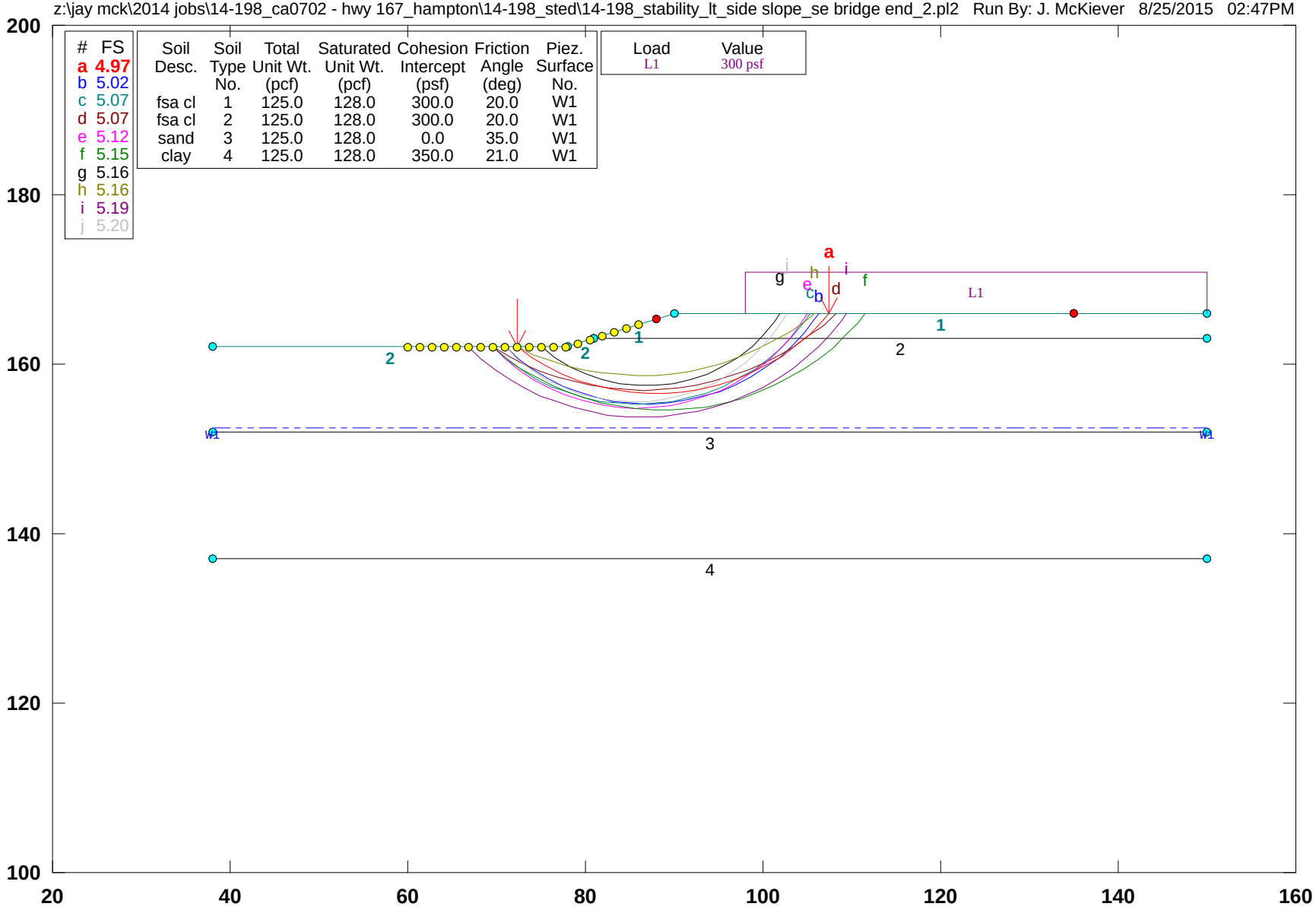
Hwy 167 - Bridge 3 - South side slope - Long Term

z:\jay mck\2014 jobs\14-198_ca0702 - hwy 167_hampton\14-198_sted\14-198_stability_lt_side slope_se bridge end_2.pl2 Run By: J. McKiever 8/25/2015 02:47PM

#	FS
a	4.97
b	5.02
c	5.07
d	5.07
e	5.12
f	5.15
g	5.16
h	5.16
i	5.19
j	5.20

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
fsa cl	1	125.0	128.0	300.0	20.0	W1
fsa cl	2	125.0	128.0	300.0	20.0	W1
sand	3	125.0	128.0	0.0	35.0	W1
clay	4	125.0	128.0	350.0	21.0	W1

Load	Value
L1	300 psf



PCSTABL5M/si FSmin=4.97

Safety Factors Are Calculated By The Modified Bishop Method

STED

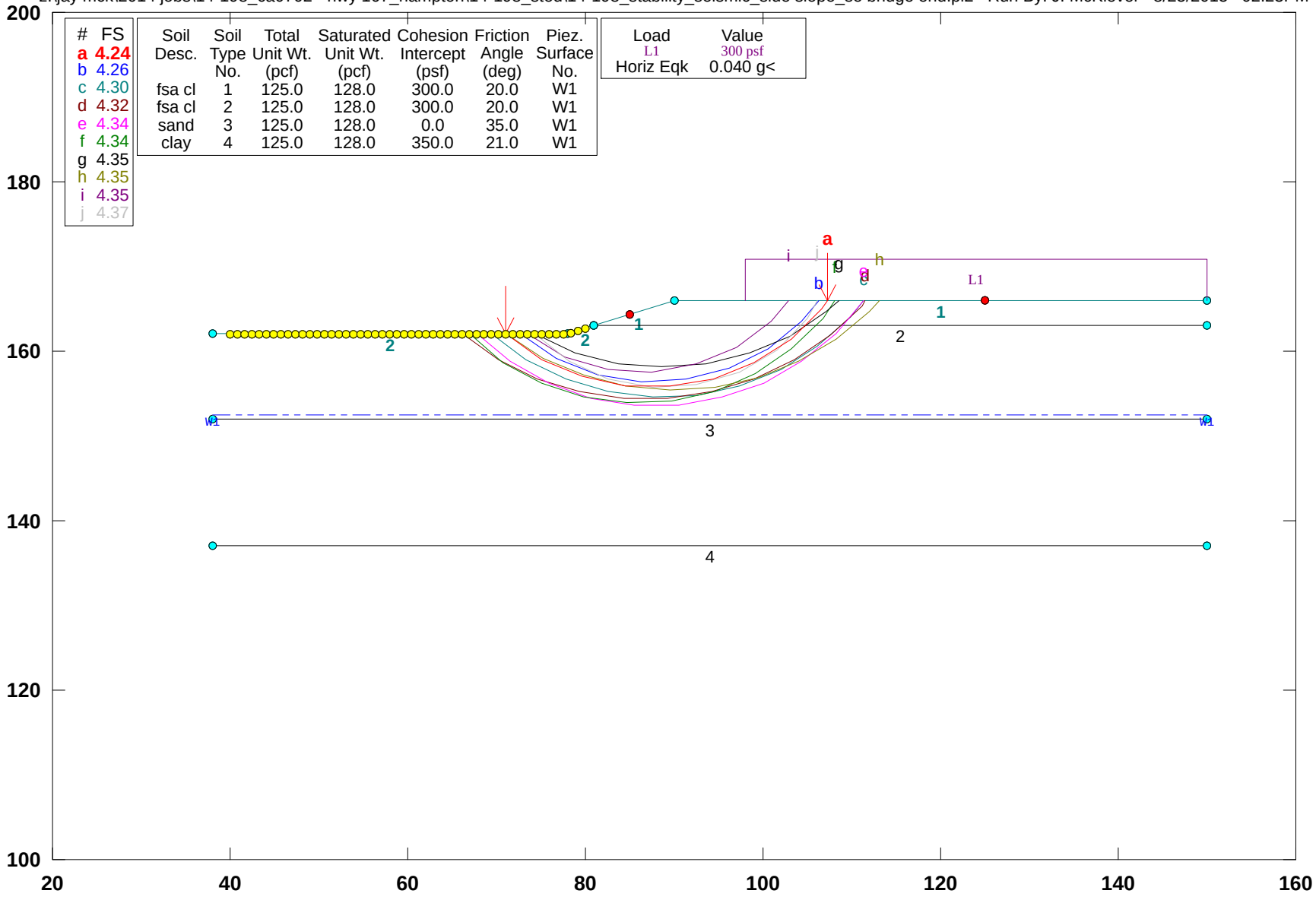
Hwy 167 - Bridge 3 - South side slope - Seismic

z:\jay mck\2014 jobs\14-198_ca0702 - hwy 167_hampton\14-198_sted\14-198_stability_seismic_side slope_se bridge end.pl2 Run By: J. McKiever 8/25/2015 02:23PM

#	FS
a	4.24
b	4.26
c	4.30
d	4.32
e	4.34
f	4.34
g	4.35
h	4.35
i	4.35
j	4.37

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
fsa cl	1	125.0	128.0	300.0	20.0	W1
fsa cl	2	125.0	128.0	300.0	20.0	W1
sand	3	125.0	128.0	0.0	35.0	W1
clay	4	125.0	128.0	350.0	21.0	W1

Load	Value
L1	300 psf
Horiz Eqk	0.040 g<



PCSTABL5M/si FSmin=4.24

Safety Factors Are Calculated By The Modified Bishop Method

STED

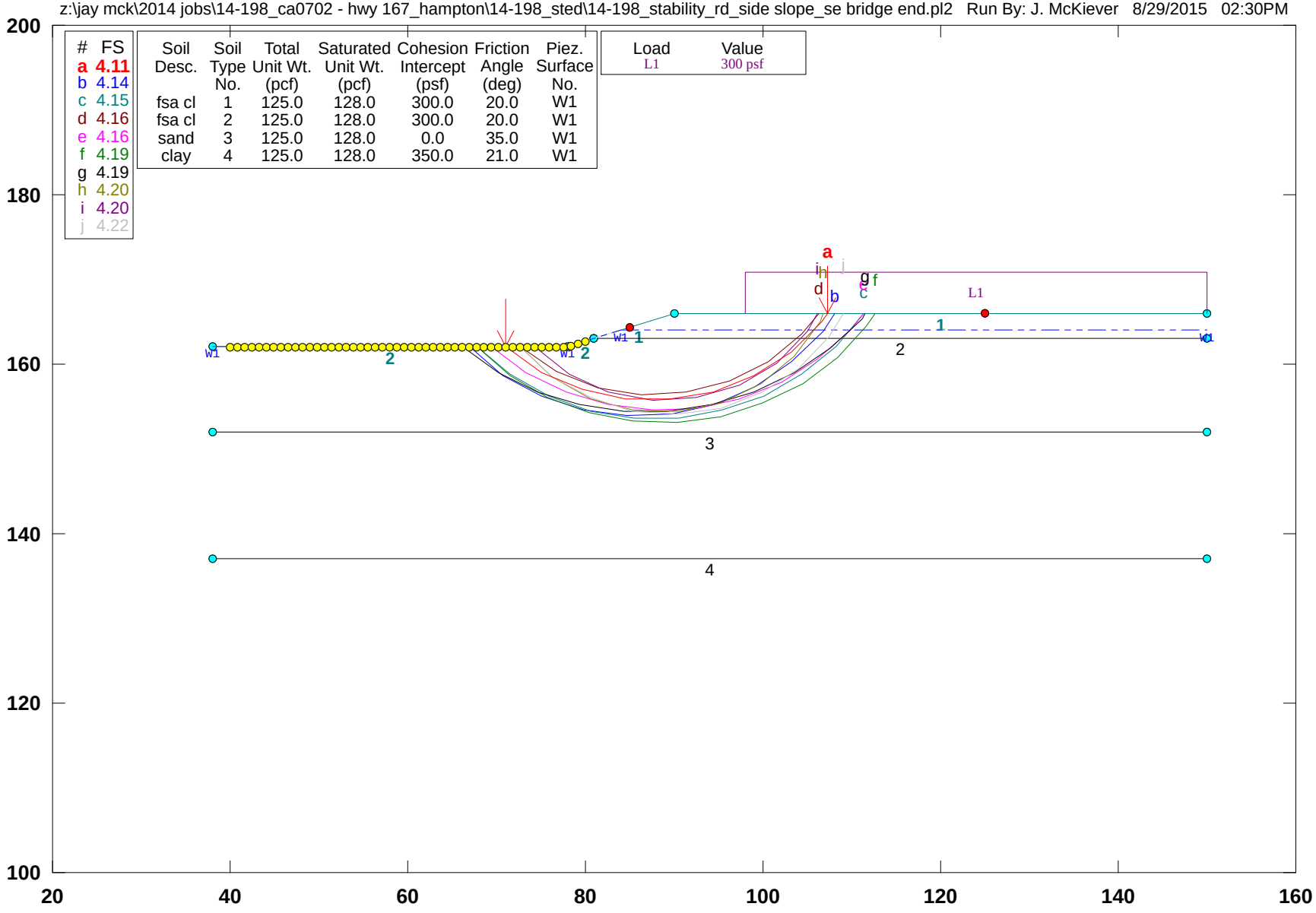
Hwy 167 - Bridge 3 - South side slope - Rapid Drawdown

z:\jay mck\2014 jobs\14-198_ca0702 - hwy 167_hampton\14-198_sted\14-198_stability_rd_side slope_se bridge end.pl2 Run By: J. McKiever 8/29/2015 02:30PM

#	FS
a	4.11
b	4.14
c	4.15
d	4.16
e	4.16
f	4.19
g	4.19
h	4.20
i	4.20
j	4.22

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
fsa cl	1	125.0	128.0	300.0	20.0	W1
fsa cl	2	125.0	128.0	300.0	20.0	W1
sand	3	125.0	128.0	0.0	35.0	W1
clay	4	125.0	128.0	350.0	21.0	W1

Load	Value
L1	300 psf



PCSTABL5M/si FSmin=4.11

Safety Factors Are Calculated By The Modified Bishop Method

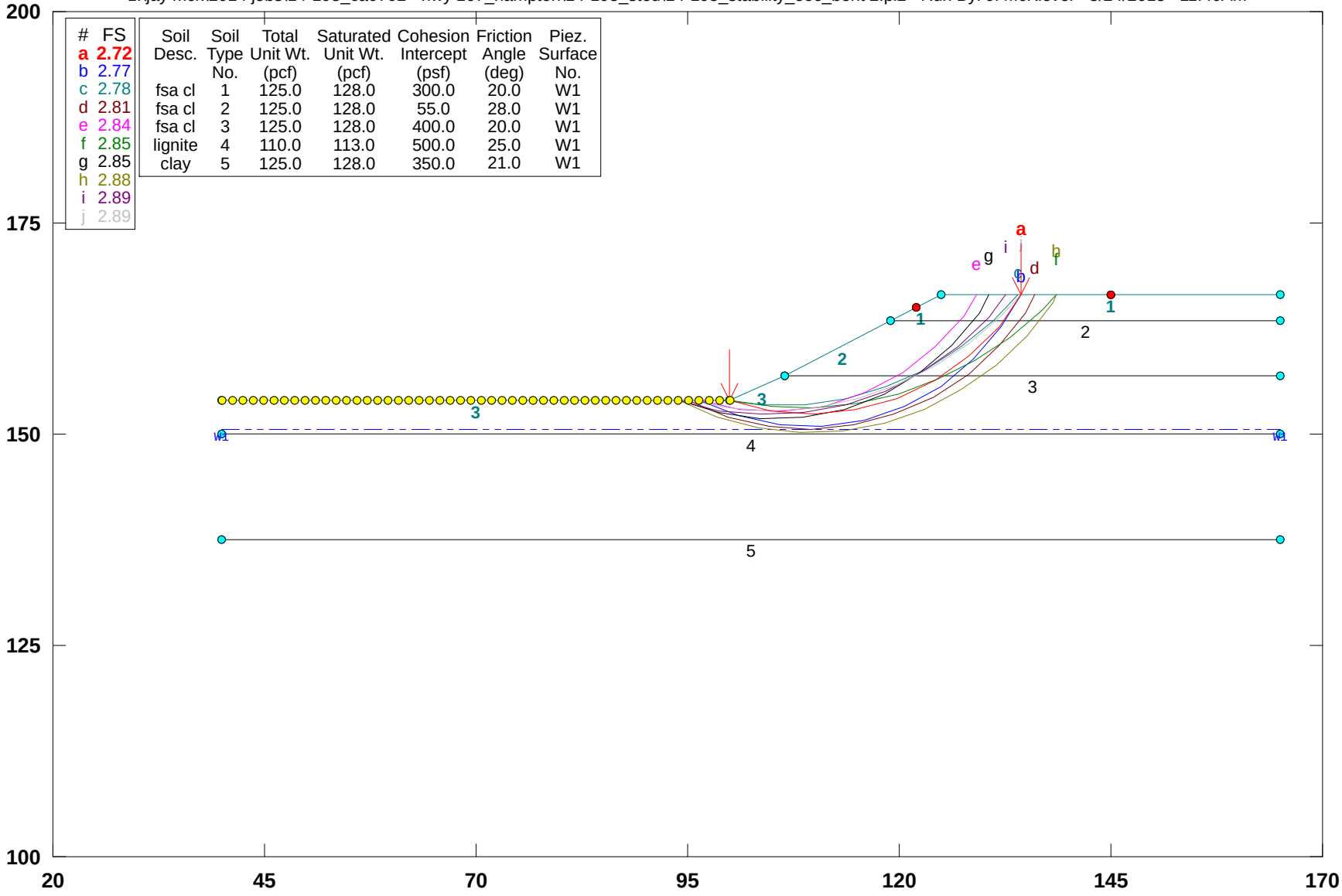
STED

Hwy 167 - Bridge 3 - Bent 2 - End of Construction

z:\jay mck\2014 jobs\14-198_ca0702 - hwy 167_hampton\14-198_sted\14-198_stability_eoc_bent 2.pl2 Run By: J. McKiever 8/24/2015 11:40AM

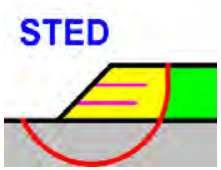
#	FS
a	2.72
b	2.77
c	2.78
d	2.81
e	2.84
f	2.85
g	2.85
h	2.88
i	2.89
j	2.89

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
fsa cl	1	125.0	128.0	300.0	20.0	W1
fsa cl	2	125.0	128.0	55.0	28.0	W1
fsa cl	3	125.0	128.0	400.0	20.0	W1
lignite	4	110.0	113.0	500.0	25.0	W1
clay	5	125.0	128.0	350.0	21.0	W1



PCSTABL5M/si FSmin=2.72

Safety Factors Are Calculated By The Modified Bishop Method



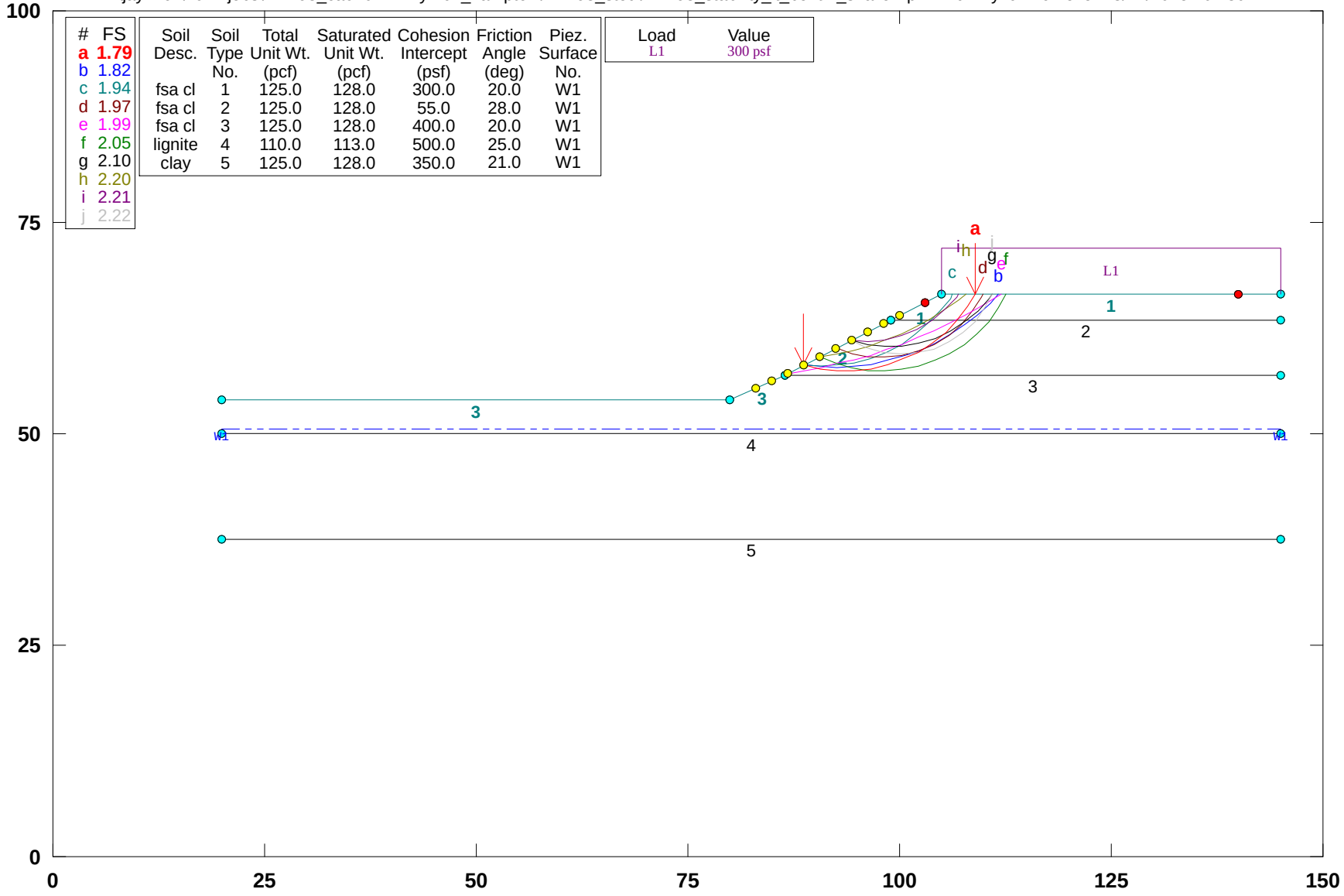
Hwy 167 - Bridge 3 - Bent 2 - Long Term

z:\jay mck\2014 jobs\14-198_ca0702 - hwy 167_hampton\14-198_sted\14-198_stability_lt_bent 2_shallow.pl2 Run By: J. McKiever 8/24/2015 04:30PM

#	FS
a	1.79
b	1.82
c	1.94
d	1.97
e	1.99
f	2.05
g	2.10
h	2.20
i	2.21
j	2.22

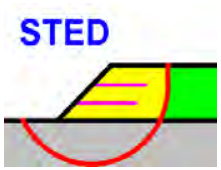
Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
fsa cl	1	125.0	128.0	300.0	20.0	W1
fsa cl	2	125.0	128.0	55.0	28.0	W1
fsa cl	3	125.0	128.0	400.0	20.0	W1
lignite	4	110.0	113.0	500.0	25.0	W1
clay	5	125.0	128.0	350.0	21.0	W1

Load	Value
L1	300 psf



PCSTABL5M/si FSmin=1.79

Safety Factors Are Calculated By The Modified Bishop Method



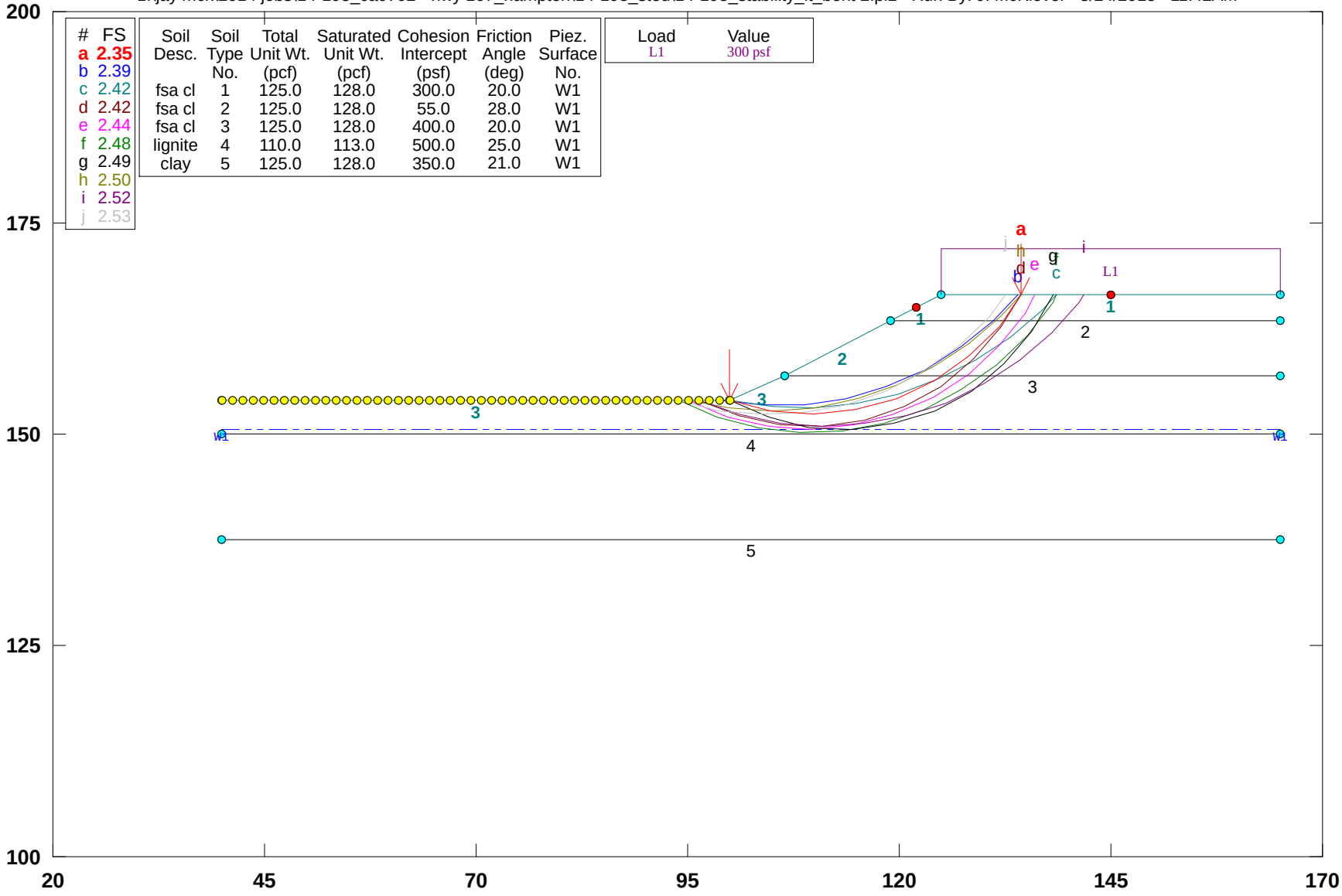
Hwy 167 - Bridge 3 - Bent 2 - Long Term

z:\jay mck\2014 jobs\14-198_ca0702 - hwy 167_hampton\14-198_sted\14-198_stability_lt_bent 2.pl2 Run By: J. McKiever 8/24/2015 11:42AM

#	FS
a	2.35
b	2.39
c	2.42
d	2.42
e	2.44
f	2.48
g	2.49
h	2.50
i	2.52
j	2.53

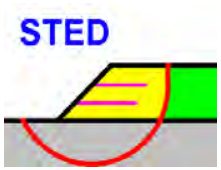
Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
fsa cl	1	125.0	128.0	300.0	20.0	W1
fsa cl	2	125.0	128.0	55.0	28.0	W1
fsa cl	3	125.0	128.0	400.0	20.0	W1
lignite	4	110.0	113.0	500.0	25.0	W1
clay	5	125.0	128.0	350.0	21.0	W1

Load	Value
L1	300 psf



PCSTABL5M/si FSmin=2.35

Safety Factors Are Calculated By The Modified Bishop Method



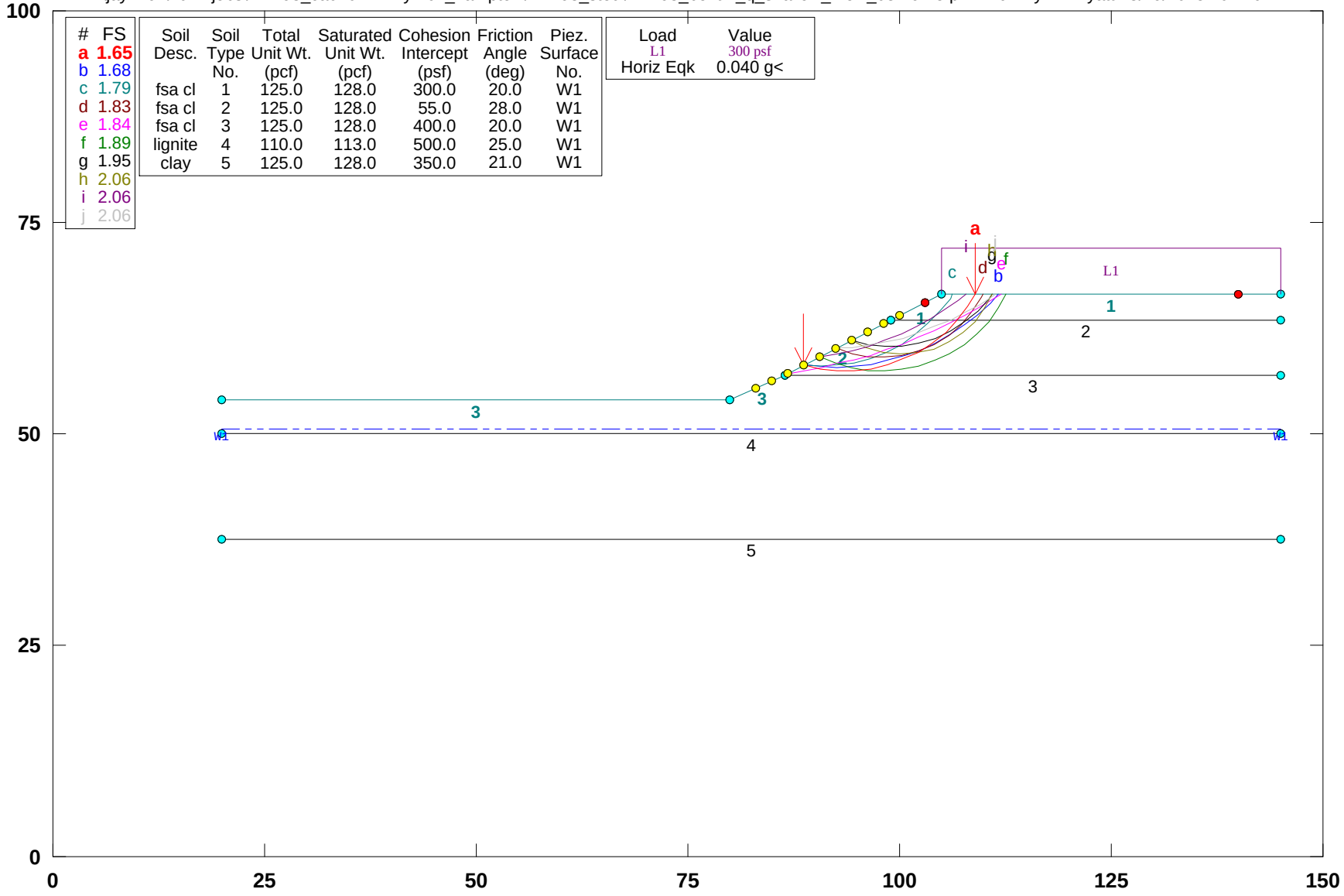
Hwy 167 - Bridge 3 @ 2H:1V - Bent 2 - Seismic

z:\jay mck\2014 jobs\14-198_ca0702 - hwy 167_hampton\14-198_sted\14-198_bent 2_q_shallow_mew_08-29-15.pl2 Run By: M.Wyatt 8/29/2015 02:46PM

#	FS
a	1.65
b	1.68
c	1.79
d	1.83
e	1.84
f	1.89
g	1.95
h	2.06
i	2.06
j	2.06

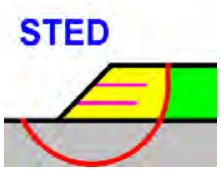
Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
fsa cl	1	125.0	128.0	300.0	20.0	W1
fsa cl	2	125.0	128.0	55.0	28.0	W1
fsa cl	3	125.0	128.0	400.0	20.0	W1
lignite	4	110.0	113.0	500.0	25.0	W1
clay	5	125.0	128.0	350.0	21.0	W1

Load	Value
L1	300 psf
Horiz Eqk	0.040 g<



PCSTABL5M/si FSmin=1.65

Safety Factors Are Calculated By The Modified Bishop Method



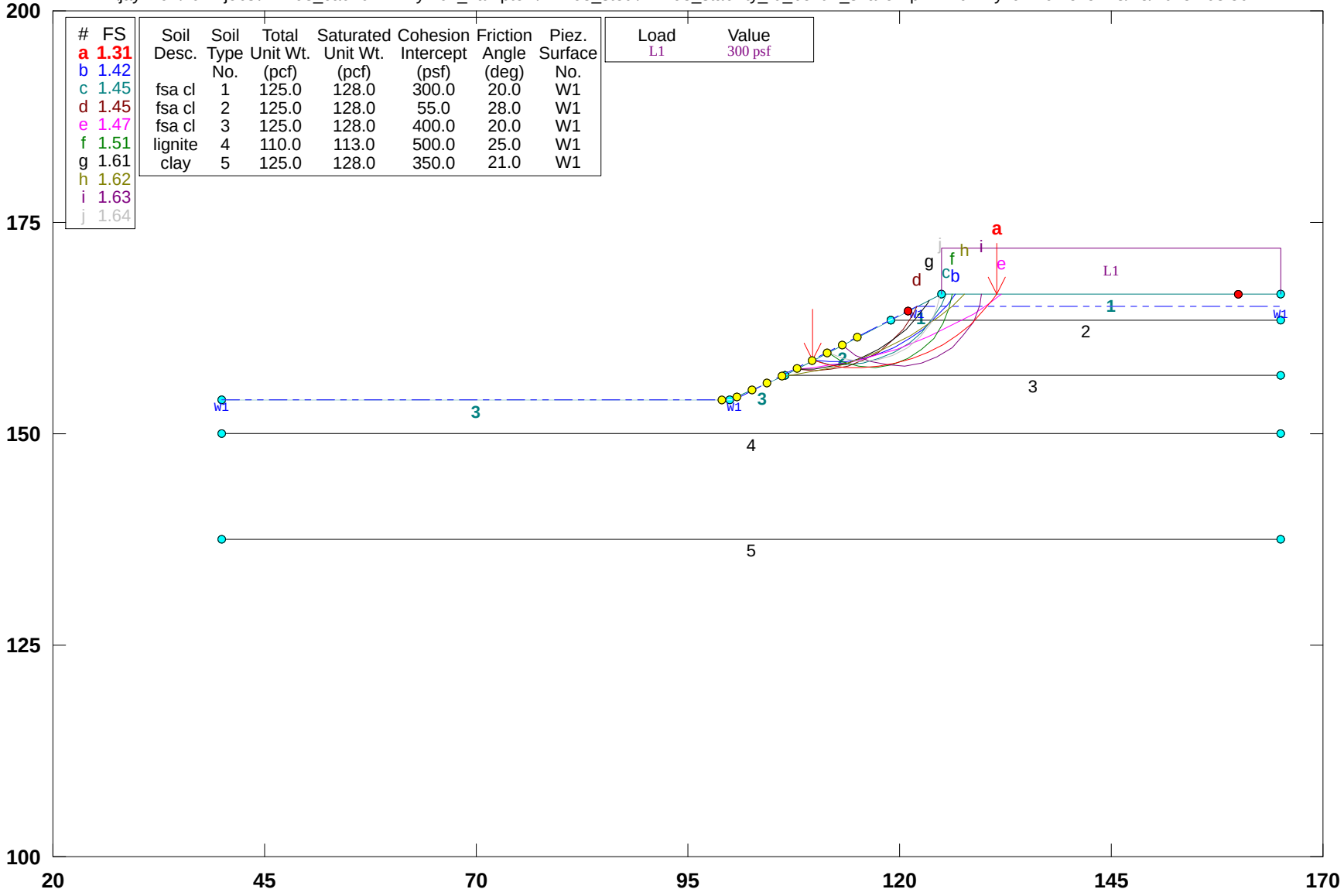
Hwy 167 - Bridge 3 - Bent 2 - Rapid Drawdown

z:\jay mck\2014 jobs\14-198_ca0702 - hwy 167_hampton\14-198_sted\14-198_stability_rd_bent 2_shallow.pl2 Run By: J. McKiever 8/25/2015 08:50AM

#	FS
a	1.31
b	1.42
c	1.45
d	1.45
e	1.47
f	1.51
g	1.61
h	1.62
i	1.63
j	1.64

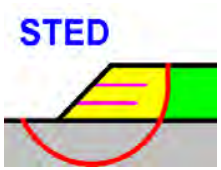
Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
fsa cl	1	125.0	128.0	300.0	20.0	W1
fsa cl	2	125.0	128.0	55.0	28.0	W1
fsa cl	3	125.0	128.0	400.0	20.0	W1
lignite	4	110.0	113.0	500.0	25.0	W1
clay	5	125.0	128.0	350.0	21.0	W1

Load	Value
L1	300 psf



PCSTABL5M/si FSmin=1.31

Safety Factors Are Calculated By The Modified Bishop Method

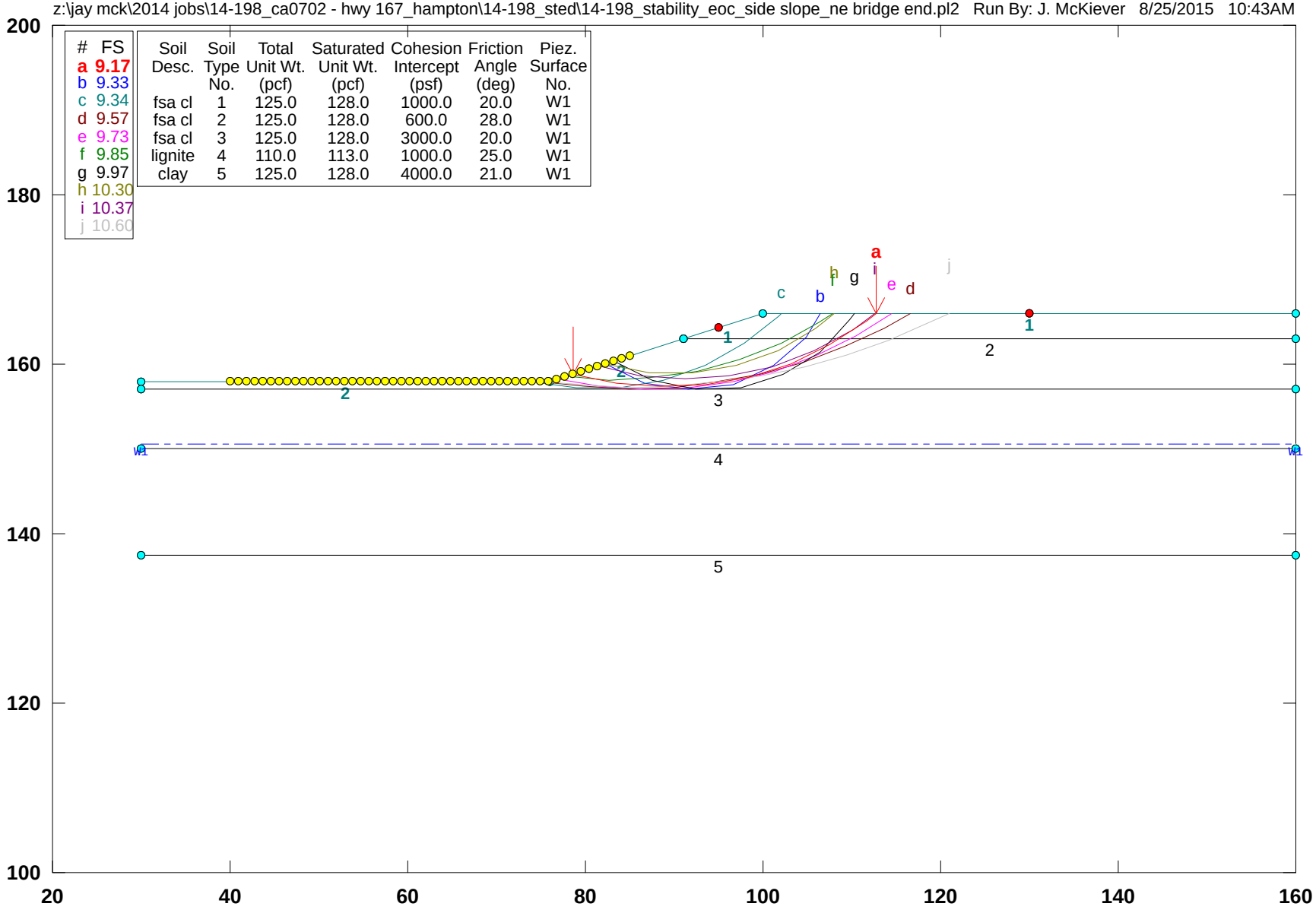


Hwy 167 - Bridge 3 - North side slope - End of Construction

z:\jay mck\2014 jobs\14-198_ca0702 - hwy 167_hampton\14-198_sted\14-198_stability_eoc_side slope_ne bridge end.pl2 Run By: J. McKiever 8/25/2015 10:43AM

#	FS
a	9.17
b	9.33
c	9.34
d	9.57
e	9.73
f	9.85
g	9.97
h	10.30
i	10.37
j	10.60

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
fsa cl	1	125.0	128.0	1000.0	20.0	W1
fsa cl	2	125.0	128.0	600.0	28.0	W1
fsa cl	3	125.0	128.0	3000.0	20.0	W1
lignite	4	110.0	113.0	1000.0	25.0	W1
clay	5	125.0	128.0	4000.0	21.0	W1



PCSTABL5M/si FSmin=9.17

Safety Factors Are Calculated By The Modified Bishop Method

STED

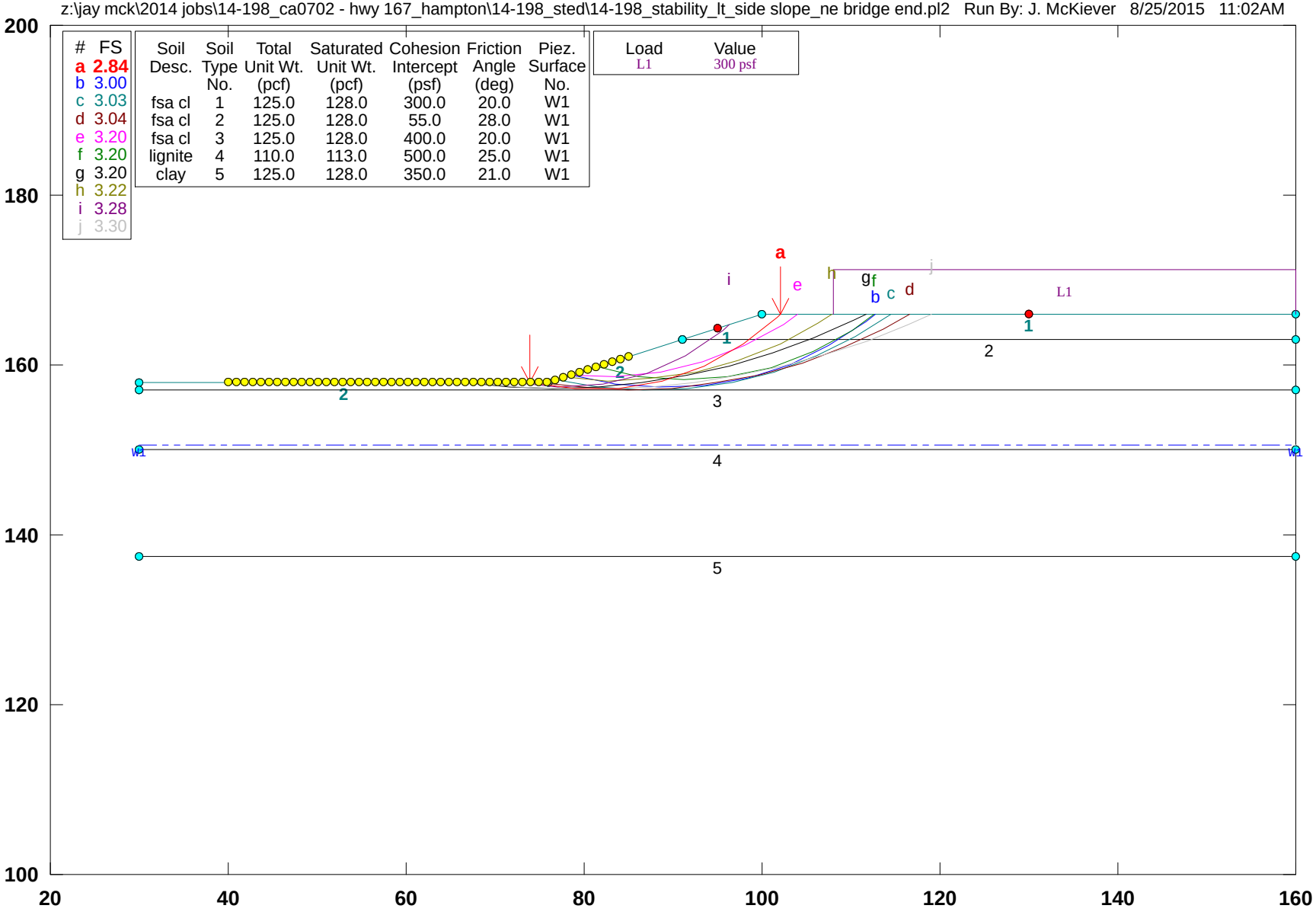
Hwy 167 - Bridge 3 - North side slope - Long Term

z:\jay mck\2014 jobs\14-198_ca0702 - hwy 167_hampton\14-198_sted\14-198_stability_lt_side slope_ne bridge end.pl2 Run By: J. McKiever 8/25/2015 11:02AM

#	FS
a	2.84
b	3.00
c	3.03
d	3.04
e	3.20
f	3.20
g	3.20
h	3.22
i	3.28
j	3.30

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
fsa cl	1	125.0	128.0	300.0	20.0	W1
fsa cl	2	125.0	128.0	55.0	28.0	W1
fsa cl	3	125.0	128.0	400.0	20.0	W1
lignite	4	110.0	113.0	500.0	25.0	W1
clay	5	125.0	128.0	350.0	21.0	W1

Load	Value
L1	300 psf



PCSTABL5M/si FSmin=2.84

Safety Factors Are Calculated By The Modified Bishop Method

STED

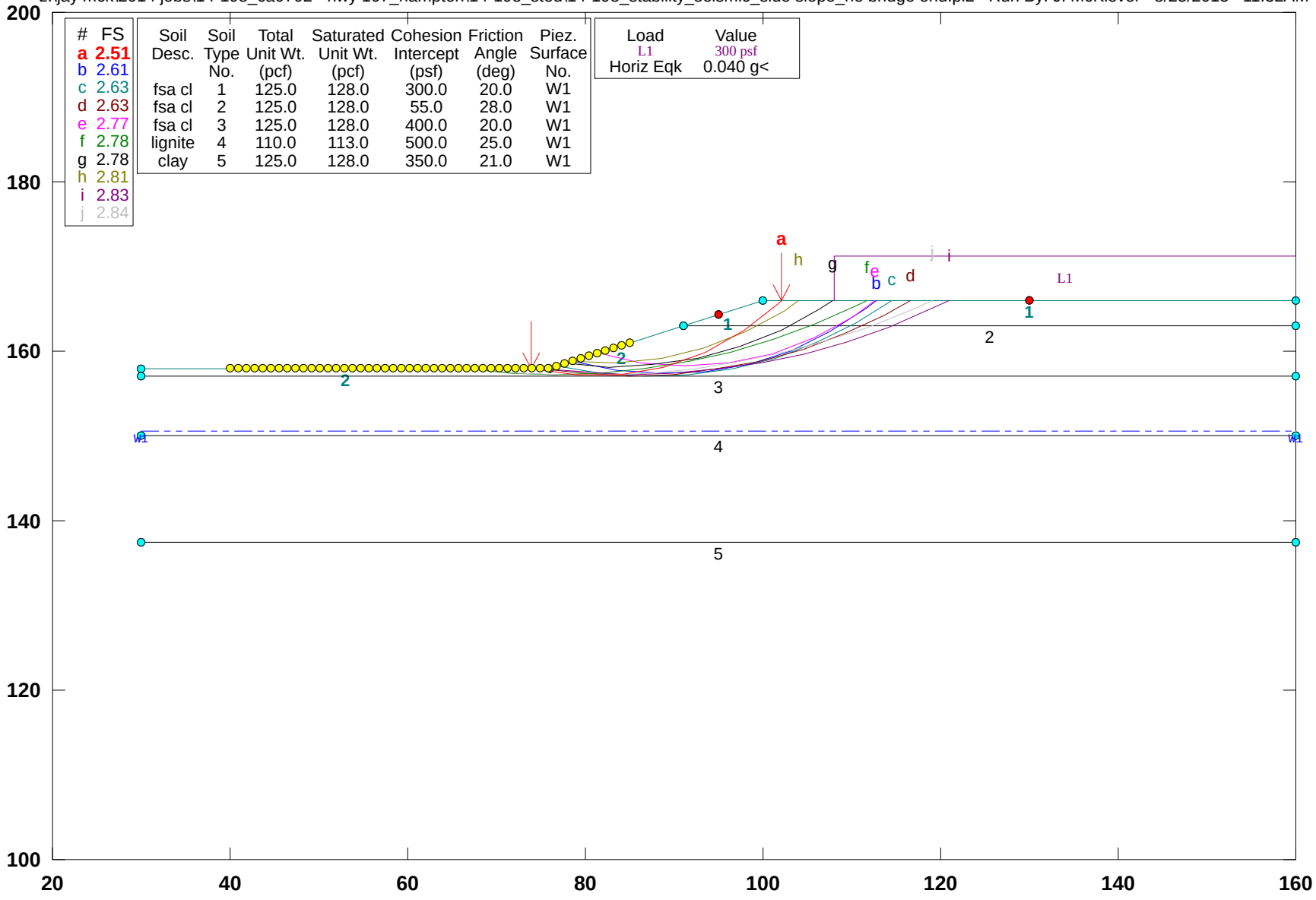
Hwy 167 - Bridge 3 - North side slope - Seismic

z:\jay mck\2014 jobs\14-198_ca0702 - hwy 167_hampton\14-198_sted\14-198_stability_seismic_side slope_ne bridge end.pl2 Run By: J. McKiever 8/25/2015 11:32AM

#	FS
a	2.51
b	2.61
c	2.63
d	2.63
e	2.77
f	2.78
g	2.78
h	2.81
i	2.83
j	2.84

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
fsa cl	1	125.0	128.0	300.0	20.0	W1
fsa cl	2	125.0	128.0	55.0	28.0	W1
fsa cl	3	125.0	128.0	400.0	20.0	W1
lignite	4	110.0	113.0	500.0	25.0	W1
clay	5	125.0	128.0	350.0	21.0	W1

Load	Value
L1	300 psf
Horiz Eqk	0.040 g<



PCSTABL5M/si FSmin=2.51

Safety Factors Are Calculated By The Modified Bishop Method

STED

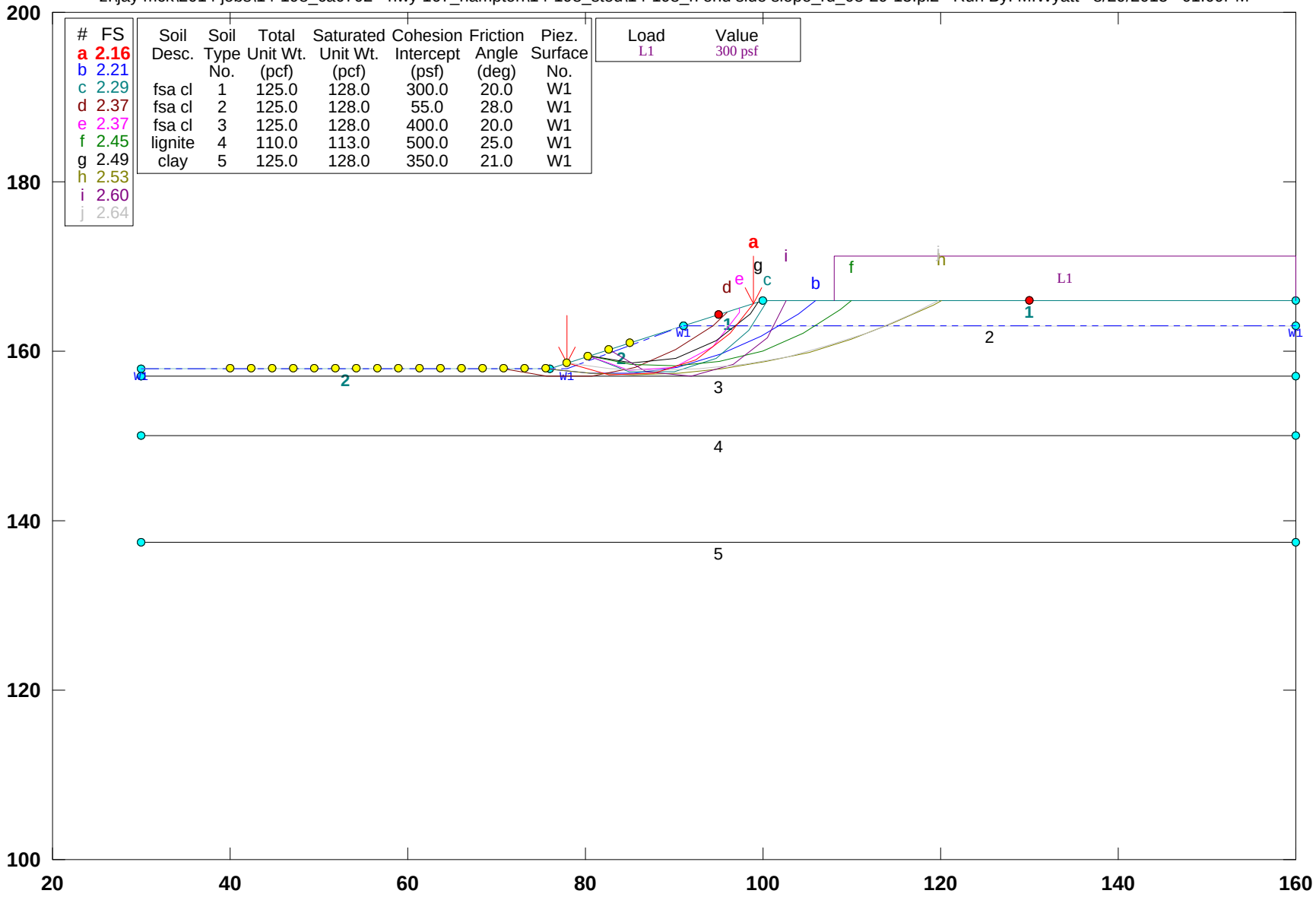
Hwy 167 - Bridge 3 - North side slope - Rapid Drawdown

z:\jay mck\2014 jobs\14-198_ca0702 - hwy 167_hampton\14-198_sted\14-198_n end side slope_rd_08-29-15.pl2 Run By: M.Wyatt 8/29/2015 01:09PM

#	FS
a	2.16
b	2.21
c	2.29
d	2.37
e	2.37
f	2.45
g	2.49
h	2.53
i	2.60
j	2.64

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
fsa cl	1	125.0	128.0	300.0	20.0	W1
fsa cl	2	125.0	128.0	55.0	28.0	W1
fsa cl	3	125.0	128.0	400.0	20.0	W1
lignite	4	110.0	113.0	500.0	25.0	W1
clay	5	125.0	128.0	350.0	21.0	W1

Load	Value
L1	300 psf



PCSTABL5M/si FSmin=2.16

Safety Factors Are Calculated By The Modified Bishop Method

STED