

**GEOTECHNICAL INVESTIGATION REPORT
SH 71 – FROM EAST RIVERSIDE TO SH 130
AUSTIN, TEXAS
CSJ NO. 0265-01-110**

**SUBMITTED TO
HNTB CORPORATION
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AUSTIN, TEXAS 78701**

**BY
HVJ ASSOCIATES, INC.
OCTOBER 31, 2013**

HVJ REPORT NO. AG 12 15282



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October 31, 2013

Mr. Glenn Gregory Jr., PE
HNTB
301 Congress Ave, Suite 600
Austin, Texas 78701

Re: Geotechnical Data Report
SH 71 – From East Riverside to SH 130
Owner: TXDOT
HVJ Project No. AG1215282

Dear Mr. Gregory:

Submitted herein is the final geotechnical data report of our geotechnical investigation for the above referenced project. The study was performed in accordance with HVJ proposal number AG 12 15282 and Work Authorization No. 8.

It has been a pleasure to work for you on this project and we appreciate the opportunity to be of service. Please notify us if there are questions or if we may be of further assistance.

Sincerely,

HVJ ASSOCIATES, INC.
Texas Firm Registration No. F-000646

A handwritten signature in blue ink that reads 'Jason Schwarz'.



A handwritten signature in blue ink that reads 'Zach Lootens'.

Date: 10/31/2013

Jason Schwarz, P.E.
Project Manager

Zach Lootens, EIT
Staff Engineer

The seals appearing on this document were authorized by Jason Schwarz, P.E. 99343 on October 31, 2013. Alteration of a sealed document without proper notification to the responsible engineer is an offense under the Texas Engineering Practice Act.

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I. EXECUTIVE SUMMARY

HVJ Associates, Inc. (HVJ) was retained by HNTB to perform a geotechnical investigation for the SH 71 Improvement Project from East Riverside to SH 130. The proposed project, CSJ number 0265-01-110, is located on SH 71 east of US 183 and east of SH 130. The purpose of this project is to improve mobility and safety on this stretch of roadway. The improvements consist of main lane widening, frontage roads, ramps, and construction of an overpass at FM 973 as well as an elevated grade separation at SH 130. A brief summary of the investigational findings and pertinent recommendations is as follows:

1. Twenty-five (25) of the project borings, P-1 through P-27 (P-11 and P-20 not drilled), were drilled through the pavement to termination depths of approximately fifteen (15) feet below grade. Information from pavement borings was used to assess current pavement thicknesses and to characterize shrink/swell potential of subsurface soils within the seasonal moisture change influence zone.
2. Eleven (11) of the project borings, BR-1 through BR-13 (BR-1 and BR-3 not drilled), were drilled to depths of eighty (80) feet at and around FM 973 and SH 130 to characterize the subsurface conditions and to estimate engineering properties of the soil/rock to aide in bridge design.
3. Eleven (11) retaining wall borings were drilled to a depth of thirty (30) feet near SH 130 for retaining wall analysis at the location of the elevated grade separation between SH 71 and SH 130. These borings were denoted RW-1 through RW-12 (RW-1 not drilled).
4. Groundwater was encountered in seven (7) of the bridge borings during drilling operations. The table below summarizes the groundwater depths measured.

<u>Boring</u>	<u>Groundwater Depth</u> <u>(ft)</u>
BR-2	43
BR-6	34
BR-7	34
BR-8	43
BR-9	35
BR-10	33
BR-12	49.5

5. WinCore shaft end bearing, skin friction, and soil strength are provided in Appendix H for use in drilled shaft design.
6. Basic laboratory testing results including Atterberg Limits, Moisture Content, Percent Passing the #200 Sieve, and Unconfined Compressive Strength tests are tabulated in Appendix B. Advanced laboratory testing including Texas Triaxial, Consolidated Undrained Triaxial, Sulfate Content, pH and Lime Series, and Swell Tests are provided in Appendices C-G.

Please note that this executive summary does not fully relate our findings and opinions. These findings and opinions are only presented through the full report.

1 INTRODUCTION

1.1 General

HVJ Associates, Inc. (HVJ) was retained by HNTB to perform a geotechnical investigation for the SH 71 Improvement Project from East Riverside to SH 130. The proposed project, CSJ number 0265-01-110, is located on SH 71 east of US 183 and east of SH 130. The purpose of this project is to improve mobility and safety on this stretch of roadway. The improvements consist of main lane widening, frontage roads, ramps, and construction of an overpass at FM 973 as well as an elevated grade separation at SH 130. A map of the site vicinity is provided on Plate 1.

1.2 Scope of Work

HVJ's scope of work is to provide information on subsurface conditions along the alignment of the proposed road improvements, determine existing pavement thickness, and characterize the subsurface to aid in design recommendations for the proposed bridges and retaining walls.

The primary objective of this study was accomplished by:

1. Drilling a total of forty-seven (47) borings for a total of one thousand five hundred and ninety-five (1595) linear feet. These borings included twenty-five (25) 15-foot deep pavement borings, eleven (11) 30-foot deep retaining wall borings, and eleven (11) 80-foot deep bridge borings.
2. Performing laboratory tests to determine physical and engineering characteristics of the soils and bedrock material encountered.
3. Determining drill shaft foundation capacities using WinCore with TCP inputs.

Subsequent sections of this report contain descriptions of the field exploration, laboratory testing program, the general site and subsurface conditions and limitations.

2 FIELD EXPLORATION

2.1 General

The field exploration program undertaken for the project was conducted between July 29th, 2013 and August 20th, 2013. The borings were based off of an aerial photo of the project depicting the preliminary schematic. Originally, twenty-seven (27) borings for pavement, twelve (12) borings for retaining walls, and thirteen (13) borings for bridges were planned to investigate subsurface conditions. However, five project borings (P-11; P-20; RW-1; BR-1; BR-3) were cancelled due to right-of-entry issues. The pavement borings, P-1 through P-27, were cored through the pavement and sampled to termination depths of approximately fifteen (15) feet below grade. Retaining Wall borings, denoted RW-1 through RW-12, were drilled to thirty (30) feet. The bridge borings, aside from BR-12, were drilled to a termination depth of approximately eighty (80) feet. The termination depth of BR-12 was extended to ninety (90) feet due to low Texas Cone Penetration test (TCP) counts within the first eighty (80) feet. For the bridge and retaining wall borings, TCP Tests were conducted at five (5) feet intervals beginning at a depth of five (5) feet. Approximate boring

locations are provided in the Plan of Borings, Plate 3A through 3D. The following table depicts the general details of each boring.

Table 1: Boring Details

Bore	Northing	Easting	Station	Offset	Highway	Elev (ft)	Depth (ft)
P-1	10054666.9	3138054.1	11034+06.19	67.60 L	SH 71 WB Main Lane	494.9	15
P-2	10052707.9	3141125.2	11070+45.98	29.90 R	SH 71 EB Main Lane	507.9	15
P-3	10052528.1	3141549.5	11075+03.44	22.83 L	SH 71 WB Main Lane	515.5	15
P-4	10051928.6	3142535.5	11086+54.89	41.56 R	SH 71 EB Main Lane	491.6	15
P-5	10051364.3	3143784.6	11100+23.01	61.68 L	SH 71 WB Main Lane	484.0	15
P-6	10051115.1	3143995.5	11103+28.33	53.92 R	SH 71 EB Main Lane	484.4	15
P-7	10050751.5	3144882.9	11112+80.70	58.71 L	SH 71 WB Main Lane	476.7	15
P-8	10050176.8	3145679.9	11122+56.44	57.12 R	SH 71 EB Main Lane	463.3	15
P-9	10050022.8	3146198.5	11127+83.44	61.93 L	SH 71 WB Main Lane	467.8	15
P-10	10049701.7	3146778.0	11134+40.54	94.98 L	SH 71 WB Main Lane	471.7	15
P-11	*	*	*	*	Prop. SH 71 EB Frontage Rd	*	15
P-12	10049395.8	3147330.6	11140+75.26	139.78 L	SH 71 WB Main Lane	468.6	15
P-13	10050096.6	3148073.1	11143+72.66	1121.62 L	FM 973 NB Lane	428.1	15
P-14	10049255.0	3147921.1	11146+66.08	313.24 L	FM 973 NB Lane	459.8	15
P-15	10047532.4	3147290.4	11149+50.38	1499.03 R	FM 973 SB Lane	464.9	15
P-16	10046725.7	3146546.1	11146+90.95	2565.54 R	FM 973 SB Lane	467.4	15
P-17	10046178.8	3146041.6	11145+22.99	3288.57 R	FM 973 SB Lane	468.2	15
P-18	10048530.4	3148207.8	11152+68.34	181.25 R	FM 973 SB Lane	456.8	15
P-19	10048820.8	3148369.1	11152+68.49	150.94 L	SH 71 WB Main Lane	456.0	15
P-20	*	*	*	*	Prop. SH 71 EB Frontage Rd	*	15
P-21	10048459.3	3149019.8	11160+12.86	150.55 L	SH 71 WB Main Lane	453.0	15
P-22	10048102.3	3149430.3	11165+45.02	37.55 L	Prop. SH 71 EB Main Lane	453.8	15
P-23	10047960.7	3149458.7	11166+38.55	72.49 R	SH 71 EB Main Lane	456.7	15
P-24	10048107.0	3149718.7	11167+94.92	181.59 L	SH 71 WB Main Lane	454.6	15
P-25	10047823.8	3149953.4	11171+37.55	47.83 L	Prop. SH 71 EB Main Lane	452.9	15
P-26	10047422.0	3150190.5	11175+33.03	194.84 R	SH 71 EB Main Lane	455.9	15
P-27	10047661.3	3150759.7	11179+39.32	269.29 L	SH 71 WB Main Lane	449.9	15
RW-1	*	*	*	*	SH 71	*	30
RW-2	10049325.6	3147341.3	11141+21.42	85.41 L	SH 71	468.1	30
RW-3	10048662.6	3148192.9	11151+91.17	72.89 R	SH 71	455.5	30
RW-4	10048829.0	3148235.1	11151+47.34	93.09 L	SH 71	455.4	30
RW-5	10048455.3	3148475.0	11155+38.42	117.28 R	SH 71	453.6	30
RW-6	10048638.9	3148577.1	11155+38.62	92.80 L	SH 71	451.5	30
RW-7	10048219.2	3148952.1	11160+70.16	92.25 R	SH 71	452.0	30
RW-8	10048437.4	3148935.9	11159+50.12	90.69 L	SH 71	449.4	30
RW-9	10047486.2	3150507.2	11177+86.15	3.18 L	SH 71	450.5	30
RW-10	10047491.9	3150674.2	11179+34.66	79.59 L	SH 71	449.6	30

Bore	Northing	Easting	Station	Offset	Highway	Elev (ft)	Depth (ft)
RW-11	10047347.8	3150756.6	11180+70.81	15.32R	SH 71	447.8	30
RW-12	10047361.9	3150914.6	11182+06.19	66.30 L	SH 71	445.7	30
BR-1	*	*	*	*	SH 71	*	80
BR-2	10049132.5	3147678.4	11145+13.01	88.31L	SH 71	462.9	80
BR-3	*	*	*	*	SH 71	*	80
BR-4	10048941.5	3148027.6	11149+11.31	90.79L	SH 71	458.9	80
BR-5	10047223.1	3151035.0	11183+75.99	1.57 R	SH 71	444.4	80
BR-6	10046941.7	3151504.9	11189+24.03	0.75 R	SH 71	438.9	80
BR-7	10046484.5	3152051.1	11196+38.18	32.83 R	SH 71	437.4	80
BR-8	10046321.4	3152390.0	11199+98.24	75.87 L	SH 71	438.9	80
BR-9	10046063.2	3152667.6	11203+77.35	77.59 L	SH 71	437.4	80
BR-10	10045562.6	3153048.9	11209+97.97	26.47 R	SH 71	436.3	80
BR-11	10045175.2	3153502.9	11215+94.12	0.32 R	SH 71	440.0	80
BR-12	10044590.1	3154131.3	11224+52.82	0.60 R	SH 71	449.6	90
BR-13	10044014.5	3154704.7	**	**	SH 71	450.8	80

Note: Northing and Easting based on the Texas State Plane Coordinate System, South Central Zone, NAD 83(93). Vertical Datum is NAVD 88 from GPS observations using GEOID 20012A. All coordinates are adjusted to surface by multiplying by a combined adjustment factor of 1.00017. Units: US Survey Feet.

* Not drilled – right of entry issues

** Off-Chain – not provided by SAM, Inc.

The final boring logs are presented in Appendix A, with a key to terms and symbols used provided on Plates 4A-4B.

2.2 Sampling Methods and Field Testing

The TxDOT Texas Cone Penetration test was performed at approximately 5-foot intervals starting at a depth of five (5) feet below existing grade, in accordance with Test Method TEX-132-E. The TCP test is used to determine the relative density or consistency of a subsurface material, and to develop bearing and skin friction resistance of the subsurface for the foundations. The test consists of driving a 3-inch diameter cone with a 170-pound hammer, which is dropped for a distance of 2 feet. Following seating, the cone is driven for two consecutive 6-inch increments, and the blow counts for each increment are noted. The number of blows for each 6-inch increment and/or the amount of penetration for 50 blows was documented in the field. All rigs used on the project had an automatic hammer to minimize operator error while running the test.

Fine grained, cohesive soils encountered were sampled using a 3-inch outer diameter thin-walled tube, which was pushed into the soil in general accordance with ASTM standard D 1587- *Thin Walled Tube Sampling of Soils*. The samples were extruded in the field and a calibrated pocket penetrometer was used to obtain an estimate of the unconfined compressive strength of the sample.

Standard Penetration Tests (SPTs) were conducted in non-cohesive soils within the soil strata. The requirement that TCP be conducted every five feet caused the SPTs to be performed with a slight deviation from ASTM D 1586 – *Penetration Test and Split-Barrel Sampling of Soils*. The procedure performed in the field consisted of driving a standardized 1.50 ± 0.005 inch inner diameter split-spoon sampler into undisturbed soil with a 170-pound (as opposed to the standard 140-pound)

hammer falling 24 inches (as opposed to the standard 30 inches). The split-spoon sampler was first seated 6 inches to penetrate any loose cuttings and was then driven an additional 12 inches with blows from the hammer. The number of hammer blows required to drive the sampler each 6-inch increment was recorded. The penetration resistance, or “N-value”, is defined as the number of hammer blows required to drive the sampler the final 12 inches and was used in the field to estimate the density of granular soils or the consistency of cohesive soils. In very dense material the SPT test was typically stopped after 50 blows from the hammer and the measurement was recorded as 50 blows per distance penetrated (e.g. 50 over 3 inches). The primary purpose of the split spoon sample method was to obtain a sample of soil.

Continuous rock core samples were collected within rock materials. The coring method employed consisted of a wire-lined NX core barrel with an inside diameter of 2 inches and length of 5 feet. Water was used as the drilling fluid to promote coring. Percent recovery (REC) and the Rock Quality Designation (RQD) were recorded for each run. The REC value was obtained by dividing the total length of core recovered by the total length of the core run. The RQD value was obtained by dividing the total length of sound core pieces with a minimum length of 4 inches by the total length of the core run. The core samples were visually identified for rock type and features and properly documented on field logs, including REC and RQD values. The samples were then secured in boxes and transported to our laboratory for further examination and testing.

Classification and field test results for both the thin-walled tube and split-spoon samples were recorded onto field logs, which included a visual description in accordance with ASTM D 2488 – *Visual Description and Identification of Soils*. After field documentation and logging was complete, the individual soil samples were either wrapped in plastic or placed in sealed containers to prevent loss of moisture and were transported to our laboratory for further examination and testing.

2.3 Groundwater Conditions

Groundwater was encountered in seven (7) of the project bridge borings during drilling operations. Table 2, below, shows the borings and depth where groundwater was observed. As can be seen from the table, the groundwater level ranged from 33-49.5 feet below grade. It should be mentioned that once the coring process or wet rotary drilling is commenced, the groundwater level cannot be located/measured due to the introduction of drilling fluids.

It should be noted that groundwater levels may fluctuate seasonally, in response to climatic conditions. Perched groundwater conditions may also exist at the interface between soil and rock surface.

Table 2: Groundwater Conditions

<u>Boring</u>	<u>Groundwater Depth (ft)</u>
BR-2	43
BR-6	34
BR-7	34
BR-8	43
BR-9	35
BR-10	33
BR-12	49.5

2.4 Borehole Completion

All project borings were backfilled with soil cuttings and bentonite chips, as required. The borings were topped with a single lift of cold mix asphalt patch to match the existing pavement surface upon completion of drilling where applicable.

3 **LABORATORY TESTING**

3.1 General

Soil samples transported to our laboratory were further examined and described and a preliminary soil classification was assigned to each soil sample based on ASTM D 2487 – *Classification of Soil for Engineering Purposes*.

Classification testing, which included moisture contents, Atterberg limits, and percent passing the No. 200 sieve, was subsequently conducted on select samples. Advanced testing including unconfined compressive strength tests with wet and dry unit weight determinations, sieve and hydrometer analysis, consolidated-undrained triaxial test, and swell test were performed on select samples from the borings. Sulfate content along with pH and Lime Series tests were also conducted for pavement borings. All testing was performed in accordance with the relevant ASTM and TxDOT Standards as required. The results of these tests were used to confirm or modify the preliminary soil classifications.

The sampling information obtained in the field was used in conjunction with the laboratory examination and testing to generate final boring logs, provided in Appendix A. A Key of Terms and Symbols for the boring logs is provided on Plates 4A and 4B. The laboratory test results are provided on the final borings logs, as well as tabulated in Appendix B.

3.2 Atterberg Limits

Select samples were tested to determine the Atterberg Limits in accordance with ASTM D4318-10 (Tex 104E, and 105E). The Atterberg Limit test is used to classify the soil using the Unified Soil Classification System (USCS). The Atterberg Limit test consists of two parts: a liquid limit test and a plastic limit test. The liquid limit equipment setup consists of a brass cup partially filled with soil which is grooved with a specialized grooving tool, and then dropped freely from a specified height to the rubber base below at a constant rate of 2 drops per second. The liquid limit test is performed on soil that has been sieved through the No. 40 sieve and brought to a moisture content that would close the 1/2-inch groove within 20 to 30 blows for two consecutive tests. The moisture content of the soil is then measured and recorded as the liquid limit. The second part of the tests consists of rolling a remolded sample between the tips of the fingers and a glass plate until transverse cracks appear at a rolled diameter of 1/8-inch. The moisture content of the rolled sample is taken and recorded as the plastic limit.

3.3 Percent Passing the No. 200 Sieve

Select soil samples were tested in accordance with ASTM D1140-00 (Tex 111E) to determine the amount of material finer than the No. 200 sieve for use in classification. An oven dried sample of material is weighed then washed over a 75-µm (No. 200) sieve, allowing clay and other particles to

be dispersed and removed from the soil. The retained material is oven dried then reweighed. The loss in mass resulting from the washing is calculated as mass percent of the original sample and is reported as the percentage of material finer than a No. 200 sieve.

3.4 Moisture Content

Moisture content testing was performed on select soil samples to determine the in situ state of moisture of the soil. A fresh sample was weighed before being placed in an oven with a controlled temperature of 230°F and dried back to a constant mass. Upon the drying and reweighing of the sample, the total mass of water lost was recorded. The ratio of the water loss to the dried mass is recorded as the moisture content. This test was performed in accordance with ASTM D2216-10 (Tex 103E).

3.5 Unconfined Compressive Strength Testing

Select cohesive soil samples were tested for unconfined compressive strength in accordance with ASTM D2166-06. The intact specimen is placed in a loading device and is subjected to a load producing an axial strain at a rate between ½% and 2% per minute. The load is applied until failure occurs at the maximum rate of strain. The maximum axial strain is then used to calculate the soil's unconfined compressive strength.

Select intact rock core samples were tested following procedure from ASTM D7012-10 to determine unconfined compressive strength. The sample is loaded until failure at a strain rate as constant as feasible. The unconfined compressive strength is taken as the compressive stress in the sample at failure.

3.6 Sieve and Hydrometer Analysis

Sieve and hydrometer analyses were performed on select non-cohesive soil samples to determine the particle size distribution of the soil for use of the Unified Soil Classification System. Oven dried material was weighed and then mechanically shaken through a full set of sieves, ranging in size from 75 mm through 75-µm with the weights retained on each sieve recorded. The distribution of particle size smaller than 75- µm was determined by a sedimentation process using a hydrometer. This test was performed in accordance with ASTM D422. Results for this test are shown in Appendix I.

3.7 Sulfate Content

Sulfate content was determined in accordance with TEX-620-J. The results for this test can be found in Appendix C.

3.8 Texas Triaxial Test

The Texas Triaxial test (Tex 117E) is a modified version of the general triaxial test in which six samples are remolded by compacting the soil at optimum moisture content following procedure from Tex 113E or Tex 114E. Once molded, the specimens go through a drying phase followed by a saturation phase. After samples have been saturated by capillary wetting, they are loaded until failure or up to a deformation of 0.6 inch at lateral confining pressures of 0, 3, 5, 10, and 15 psi. The data from the compression test is then used to determine shear strength parameters of the soil based on

the Mohr-Coulomb failure criteria. Results for the TXDOT triaxial test are displayed in Appendix D.

3.9 Consolidated Undrained Triaxial Test

Select cohesive soil samples were tested for total and effective stresses in accordance with ASTM D4767-11 (Tex 131E). A cylindrical saturated soil specimen (either undisturbed or remolded) is isotropically consolidated and then sheared in compression without drainage at a constant rate of axial deformation. Three samples are run at 5, 10, and 15 psi confining pressure with pore pressure measurements to provide total and effective stresses. The test reports are provided in Appendix E.

3.10 pH and Lime Series Testing

The pH test is performed on the soil binder, minus 425 μm (No. 40) material prepared according to TX-101-E, Part I. The test itself is performed in accordance with TX-128-E with the help of a pH meter. Lime series test determines the minimum percent of lime needed for a soil-lime mixture to attain a pH of 12.4. Cation exchange occurs at this pH, resulting in modification of the soil particle structure to achieve improved workability and decrease swell and plasticity. The test is conducted in accordance with TX-128-E, Part III. Tests results for this test are shown in Appendix F.

3.11 Swell test

The swell tests were performed in accordance with ASTM D4546 Method C. The swell test results can be interpreted to estimate one dimensional heave or settlement or stress-induced settlement following wetting-induced swelling. Estimates for the necessary pressure to prevent swelling can also be derived from this test. The test procedure involves placing an undisturbed sample in a consolidometer ring and placing a load on the sample, either 20 psf for free swell conditions or an overburden pressure to simulate field conditions. Once the initial load is applied, the sample is inundated and allowed to collapse or swell and deflections are measured. After the process of primary swell is completed, subsequent loads are applied to the sample while recording deflection during consolidation of the sample. The swell pressure is then defined as the load pressure that brings the sample back to zero strain. Results from the swell test can be found in Appendix G.

4 SITE CHARACTERIZATION

4.1 General Geology

According to the Geologic Atlas of Texas, San Antonio Sheet (University of Texas Bureau of Economic Geology, 1974), the proposed project is located within an area characterized by the Tributary Terrace Deposits (Qtt), Lower Colorado River Terrace Deposits (Qlcr), Navarro Group (Kna), and Taylor Group (Kta).

Tributary Terrace Deposits (Qtt) includes terraces along streams and Onion Creek Marl. It consists of gravel, sand, silt, and clay in various proportions with gravel more prominent in older, higher terraces.

The Lower Colorado River Terrace Deposits generally consist of yellow to orange brown sand, silt, clay, and/or gravel. The gravel of the terrace deposits are generally reworked limestone and chert fragments. The average thickness is 30 feet; however, it can range up to as much as 60 feet.

The Navarro Group consists of silty, dark gray to brown, highly overconsolidated, montmorillonitic clay, marly clay, and clay shale, with calcareous concretions, and locally inter-bedded sandy layers. These clays are highly plastic with high swelling potential, and are therefore very unstable. When left exposed to the air, soil of this nature has a tendency to slake. This unit has a maximum thickness of about 120 feet.

The Taylor Group has been divided into three formations, based on Keith Young (1965), from bottom to top: Sprinkle, Pecan Gap, and Bergstrom. The formations consist of calcareous, montmorillonitic, highly over-consolidated clay, marly clay, and clay shale varying in color and calcium carbonate content. It is highly plastic, with high swelling potential, and very unstable. When left exposed to the air, it will slake. Thickness of the Taylor Group ranges from approximately 50 feet thick in the area of southeast Austin to approximately 300 feet thick in the area of Walnut Creek.

According to available geologic data, there are no mapped faults within the local vicinity of the construction limits.

4.2 Subsurface Stratigraphy

4.2.1 Pavement

The borings that went through pavement encountered 4-10 inches of asphaltic concrete underlain by 13-22 inches of flex base. Table 3, below, summarizes the approximate pavement and base thicknesses.

Table 3: Pavement/Base Thickness (inches)

Boring	Station (feet)	Offset (feet)	HMAC	Base
P-1	11034+06.19	67.60 L	8	17
P-2	11070+45.98	29.9 R	10	18
P-3	11075+03.44	22.83 L	7	17
P-4	11086+54.89	45.56 R	9	15
P-5	11100+23.01	61.68 L	8	15
P-6	11103+28.33	53.92 R	7	17
P-7	11112+80.70	58.71 L	9	15
P-8	11122+56.44	57.12 R	7	17
P-9	11127+83.44	61.93 L	8	22
P-10	11134+40.54	94.98 L	8	16
P-11	*	*	*	*
P-12	11140+75.26	139.78 L	9	15
P-13	11143+72.66	1121.62 L	5	15
P-14	11146+66.08	313.24 L	8	13
P-15	11149+50.38	1499.03 R	8	14
P-16	11146+90.95	2565.54 R	7	14
P-17	11145+22.99	3288.57 R	4	16

Boring	Station (feet)	Offset (feet)	HMAC	Base
P-18	11152+68.34	181.25 R	4	14
P-19	11152+68.49	150.94 L	9	15
P-20	*	*	*	*
P-21	11160+12.86	150.55L	9	15
P-22	11165+45.02	37.55 L	0	0
P-23	11166+38.55	72.49 R	8	16
P-24	11167+94.92	181.59 L	7	16
P-25	11171+37.55	47.83 L	0	0
P-26	11175+33.03	194.84 R	8	16
P-27	11179+39.32	269.29 L	9	15

*Not drilled – right of entry issues

4.2.2 Soil and Rock

Soil and groundwater conditions along the project alignment described herein are based on information obtained at the boring locations only. Significant variations at areas not explored by the project borings may require re-evaluation of our findings and conclusions. Subsurface soils as encountered along the project alignment are discussed below and summarized in Table 5.

The general subsurface conditions at the site consisted of a fill layer overlying a layer of Lower Colorado River Deposits (Qlcr), which was underlain by Taylor Group (Kta) Clay and Clay Shale. The subsurface profile of BR-13 was an exception to this generalized subsurface, which was comprised of 2 feet of fill, overlying 21 feet of Navarro Group (Kna) Fat Clay (CH), underlain by Taylor Group (Kta) Clay Shale.

The fill layer ranged from 0 to greater than 15 feet for pavement boring locations, having thicker fill depths on overpass embankments. Thicknesses of fill at Retaining Wall and Bridge borings were typically 0-13 feet with the exception of 20 feet at BR-12, which is located on a bridge approach embankment. The fill materials encountered include: Lean Clay (CL), Sandy Lean Clay (CL), Gravelly Lean Clay (CL), Fat Clay (CH), Sandy Fat Clay (CH), Silty Sand (SM), Clayey Sand (SC), and Clayey Gravel (GC).

Soils from the Qlcr layer ranged from 30 to 50 feet in most locations. In one local area, containing borings RW-9, RW-10, RW-11, RW-12, and BR-5, the Qlcr layer was not observed. Instead, a layer of Kta was identified near the surface below a thin fill layer. The Qlcr layer was composed of the following soils: Lean Clay (CL), Sandy Lean Clay (CL), Fat Clay (CH), Sandy Fat Clay (CH), Gravelly Fat Clay (CH), Clayey Sand (SC), Silty Sandy (SM), Poorly-graded Sand with Clay (SP-SC), Clayey Gravel (GC), and Well-graded Gravel with Clay (GW-GC).

The Kta layer was generally encountered at depths between 22-54 feet below ground surface. This layer was composed of soft, highly weathered, fissile, Clay Shale. A layer of Fat Clay (CH), ranging from around 5-30+ feet thick, was observed overlying the Clay Shale in the aforementioned local area (RW-7, RW-9, RW-10, RW-11, RW-12, BR-5, BR-8, and BR-9) where this Kta layer was found

in place of or below the Qlcr layer. This Fat Clay Layer thinned out towards the east, with thickness decreasing from 20-30+ feet to only 5 and 14 feet in BR-8 and BR-9 respectively.

Detailed descriptions of the materials encountered in the borings are displayed on the final boring logs presented in Appendix A. A full laboratory testing summary can be seen in Appendix B. A summary of the laboratory test statistics for each previously described layer is summarized below in Table 4.

Table 4: Subsurface Characterization (Bridge and Retaining Wall Borings)

<u>Top of Layer/Thickness (ft)</u>	<u>Formation</u>	<u>Soil/Rock Type</u>
0/(0-13)*	Fill	Lean Clay (CL); Sandy Lean Clay (CL); Gravelly Lean Clay (CL); Fat Clay (CH); Sandy Fat Clay (CH); Silty Sand (SM); Clayey Sand (SC); Clayey Gravel (GC)
2-13/(30-50)**	Qlcr	Lean Clay (CL); Sandy Lean Clay (CL); Fat Clay (CH); Sandy Fat Clay (CH); Gravelly Fat Clay (CH); Clayey Sand (SC); Silty Sandy (SM); Poorly-graded Sand with Clay (SP-SC); Clayey Gravel (GC); Well-graded Gravel with Clay (GW-GC)
2-32/(5-30+)***	Kta (Clay)****	Fat Clay (CH)
22-54/(>>)***	Kta (Clay Shale)	Soft, highly weathered, fissile, Clay Shale

Note: Table does not include profile of BR-13

*Excludes BR-12

**Layer absent in RW-9, RW-10; RW-11; RW-12, and BR-5

***Maximum layer thickness not determined, layer extended past boring termination depth

****Only encountered in RW-7, RW-9, RW-10, RW-11, RW-12, BR-5, BR-8, and BR-9

Table 5: Soil Laboratory Summary

Laboratory Test	Average	Maximum	Minimum	Standard Deviation	No. Tested
	Fill				
Moisture Content (%)	19	32	9	5.6	43
Liquid Limit (%)	56	89	23	16.9	42
Plasticity Index (%)	35	64	10	13.4	42
% Passing No. 200 Sieve	74	96	30	16.7	42
Unconfined Compressive Strength (psi)	206	-	-	-	1
Wet Unit Weight (pcf)	129	-	-	-	1

Laboratory Test	Average	Maximum	Minimum	Standard Deviation	No. Tested
	Qlcr				
Moisture Content (%)	16	32	3	5.6	110
Liquid Limit (%)	41	93	18	14.8	79
Plasticity Index (%)	24	58	6	10.5	79
% Passing No. 200 Sieve	63	96	8	25.1	79
Unconfined Compressive Strength (psi)	60	174	16	37.1	31
Wet Unit Weight (pcf)	128	138	105	6.6	31
	Kta (CH)				
Moisture Content (%)	25	39	17	5.3	23
Liquid Limit (%)	68	86	50	14.4	9
Plasticity Index (%)	45	64	25	14.0	9
% Passing No. 200 Sieve	90	97	64	10.3	9
Unconfined Compressive Strength (psi)	61	150	28	34.4	14
Wet Unit Weight (pcf)	125	134	118	5.3	14
	Kna				
Moisture Content (%)	19.1	21.6	16.5	-	2
Liquid Limit (%)	66	-	-	-	1
Plasticity Index (%)	32	-	-	-	1
% Passing No. 200 Sieve	86	-	-	-	1
Unconfined Compressive Strength (psi)	71	-	-	-	1
Wet Unit Weight (pcf)	118	-	-	-	1
	Kta (Clay Shale)				
Moisture Content (%)	26	35	16	4.9	44
Liquid Limit (%)	77	92	64	11.4	6
Plasticity Index (%)	41	60	29	11.7	6
% Passing No. 200 Sieve	97	98	87	4.7	6
Unconfined Compressive Strength (psi)	104	516	8	98.1	38
Wet Unit Weight (pcf)	122	134	110	5.7	38

4.3 Sulfate Content

The results of Sulfate (TEX-620-J) content determination tests are provided in Table 6 and Appendix C. The sulfate concentrations were fairly uniform among the samples tested which all showed low amounts of sulfate (max value of 148 ppm).

Table 6: Soluble Sulfate Content

Boring No.	Station (Approx.)	Offset (Approx.)	Depth (ft.)	Sulfate (ppm-dry)
P-1	11034+06.19	67.60 L	2-4	37.7
P-3	11075+03.44	22.83 L	2-4	138.0
P-5	11100+23.01	61.68 L	4-6	40.4
P-7	11112+80.70	58.71 L	2-4	78.0
P-9	11127+83.44	61.93 L	4-6	46.6
P-19	11152+68.49	150.94L	2-4	148.0
P-22	11165+45.02	37.55 L	2-4	56.1
P-24	11167+94.92	181.59 L	4-6	47.3
P-26	11175+33.03	194.84 R	4-6	41.1

4.4 Texas Triaxial Test

Four Texas Triaxial Tests (Tex 117E) were performed on soil samples at locations 130 WAB, #1, and #2 (See Plates 3C and 3D). The results of these tests are provided in Table 7 below.

Table 7 – Texas Triaxial Test Results

Location	Friction Angle ϕ (deg)	Cohesion c (psi)
130 WAB	28.2	2.3
#1	16.1	1.1
#2	22.3	3.6

4.5 CU Triaxial Test

A CU Triaxial test was performed on two samples from RW-2 and RW-12. The sample from RW-2 was classified as Clayey Sand (SC) while the sample from RW-12 was Fat Clay (CH). The total and effective stress parameters are shown below in Table 8.

Table 8 – CU Triaxial Test Results

Location	Total Stress		Effective Stress	
	Friction Angle ϕ (deg)	Cohesion c (psi)	Friction Angle ϕ (deg)	Cohesion c (psi)
RW-2 (8-10)'	28.1	6.4	31.1	2.3
RW-12 (8-10)'	15.5	4.4	19.5	3.4

4.6 pH and Lime Series

Lime series (TEX-121-E) and pH (TEX-128-E) tests were conducted on soil samples obtained from two locations along the proposed alignment, Location 71E and Location #2. These locations are shown in the Plan of Borings, on Plate 3C and Plate 3D. The results of these tests are provided in Table 9 below as well as in Appendix F.

Table 9 – Lime Series Test Results

Percent Lime		0	2	4	6	8	10
Location 71E	pH	8.94	12.17	12.29	12.31	12.32	12.34
Location #2	pH	8.79	11.62	12.23	12.23	12.27	12.30

4.7 Swell Test

Samples from RW-7, RW-9, and P-6 were selected for swell tests. These samples were all classified as Fat Clay (CH). See Table 10 below for the swell test results.

Table 10 – Swell Test Results

Location	Swell Pressure (tsf)	% Swell
RW-7 (2-4)'	2.5	5.13
RW-9 (2-4)'	2.0	4.75
P-6 (6-8)'	1.4	5.81

5 WINCORE DRILLED SHAFT DESIGN DATA

5.1 General

The WinCore computer program that incorporates TxDOT standard procedures was used to compute the allowable unit and accumulative skin friction and the end bearing capacity for straight-sided drilled shafts for the project structures. A soil reduction factor of 0.7 was used to obtain the skin friction curves for the drilled shafts. The shaft capacity curves were developed for each bridge boring location. The allowable values shown include a factor of safety of 2 according to the TxDOT Geotechnical Manual. The WinCore drilled shaft design data can be found in Appendix H.

Allowable compressive capacity due to skin friction may be calculated from the curves by reading the accumulative skin friction value corresponding to the tip penetration of the shaft and multiplying the value by the shaft perimeter. For drilled shaft foundations the allowable skin friction capacity for the upper 10 feet should be disregarded. The section of the bottom of the shaft for a length equivalent to the shaft diameter has been shown to form a tension zone. The skin friction along this section should also be disregarded.

For drilled shafts, an allowable end bearing capacity should be calculated by multiplying the shaft end area by the allowable unit end bearing pressure. End bearing capacity for drilled shafts with diameter 24 inches or less should be neglected. The allowable end bearing capacity should be added to the allowable skin friction capacity (adjusted to remove the appropriate disregard depth) to determine the total allowable drilled shaft compressive capacity. The maximum allowable drilled shaft service load should be determined in accordance with Chapter 5, Section 3 of the TxDOT Geotechnical Manual.

The Wincore outputs (capacities, skin friction, and end bearing) are only valid at the locations drilled, and are for information only. The designers should use their own experience, the data in this report, and any supplemental data necessary to provide recommendations for the project. Project plans and schematics were not evaluated during the course of this project, and engineering experience/judgment should be used to determine recommendations for the project by the design team. Supplemental data may be necessary i.e. additional borings/lab testing upon review of the schematics as deemed necessary by the design team.

6 LIMITATIONS

This geotechnical data report has been issued for the exclusive use of HNTB and TxDOT for the SH 71 Improvement Project between East Riverside and SH 130.

In performing our geotechnical investigation, HVJ Associates, Inc. has endeavored to comply with generally accepted geotechnical engineering practice common in the local area. HVJ Associates, Inc. makes no warranty, express or implied. The information contained in this report is based on data obtained from subsurface exploration and laboratory testing, as well as preliminary project design information that has been provided to us.

The exploration methods used indicate subsurface conditions only at the specific location where samples were obtained, only at the time they were obtained, and only to the depths penetrated. Samples cannot be relied on to accurately reflect the strata variations that usually exist between sampling locations or areas where borings were not performed. Should any subsurface conditions other than those described in our test boring be encountered, HVJ Associates should be immediately notified so that further investigation and supplemental recommendations can be provided.

ILLUSTRATIONS

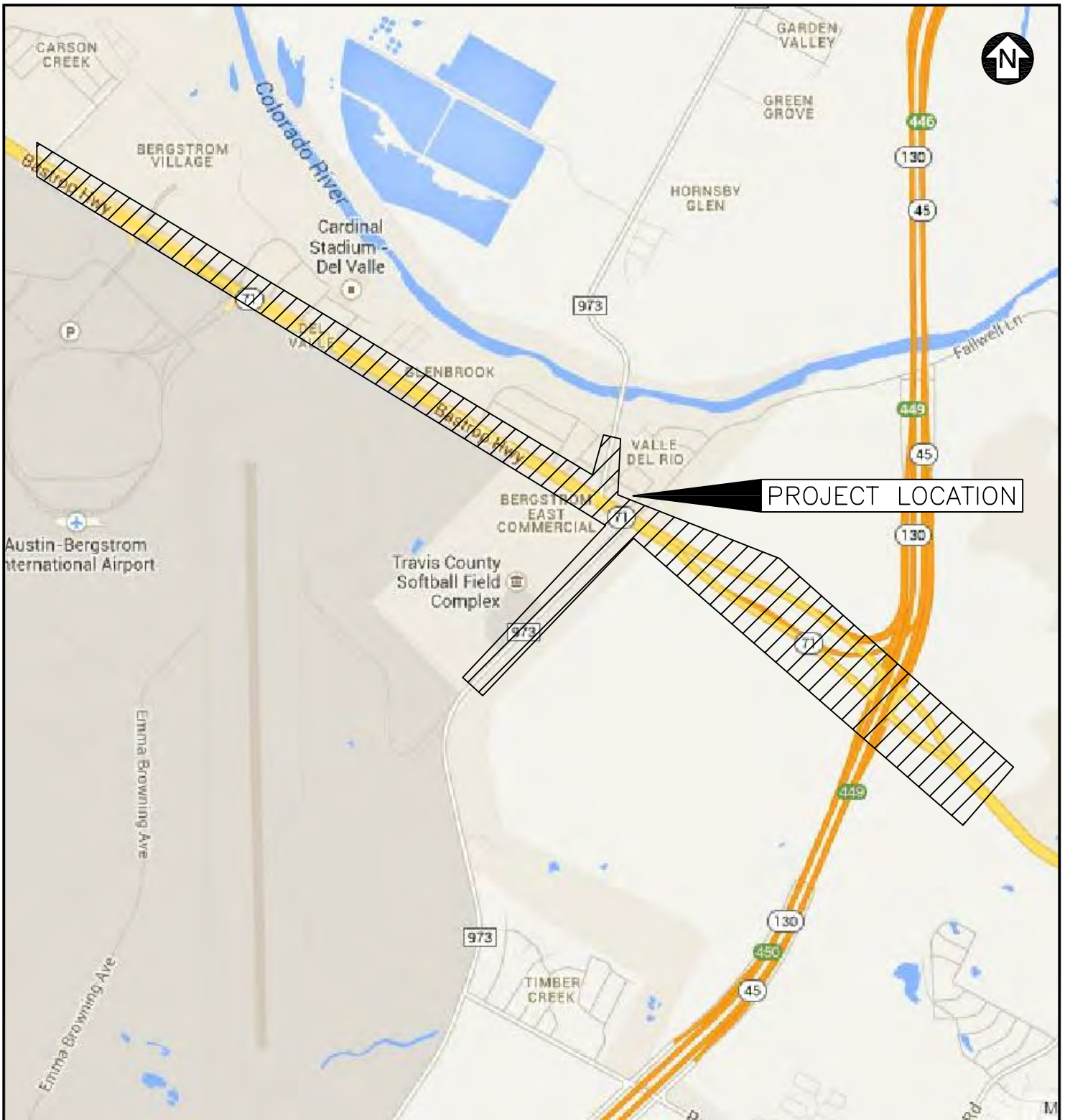


IMAGE SOURCE: GOOGLE



MAP LOCATION



SCALE: N.T.S

DATE: 10/10/2013

DRAWN BY:	PROJ. CHK:	APPRV. BY:
ZL	JS	JS

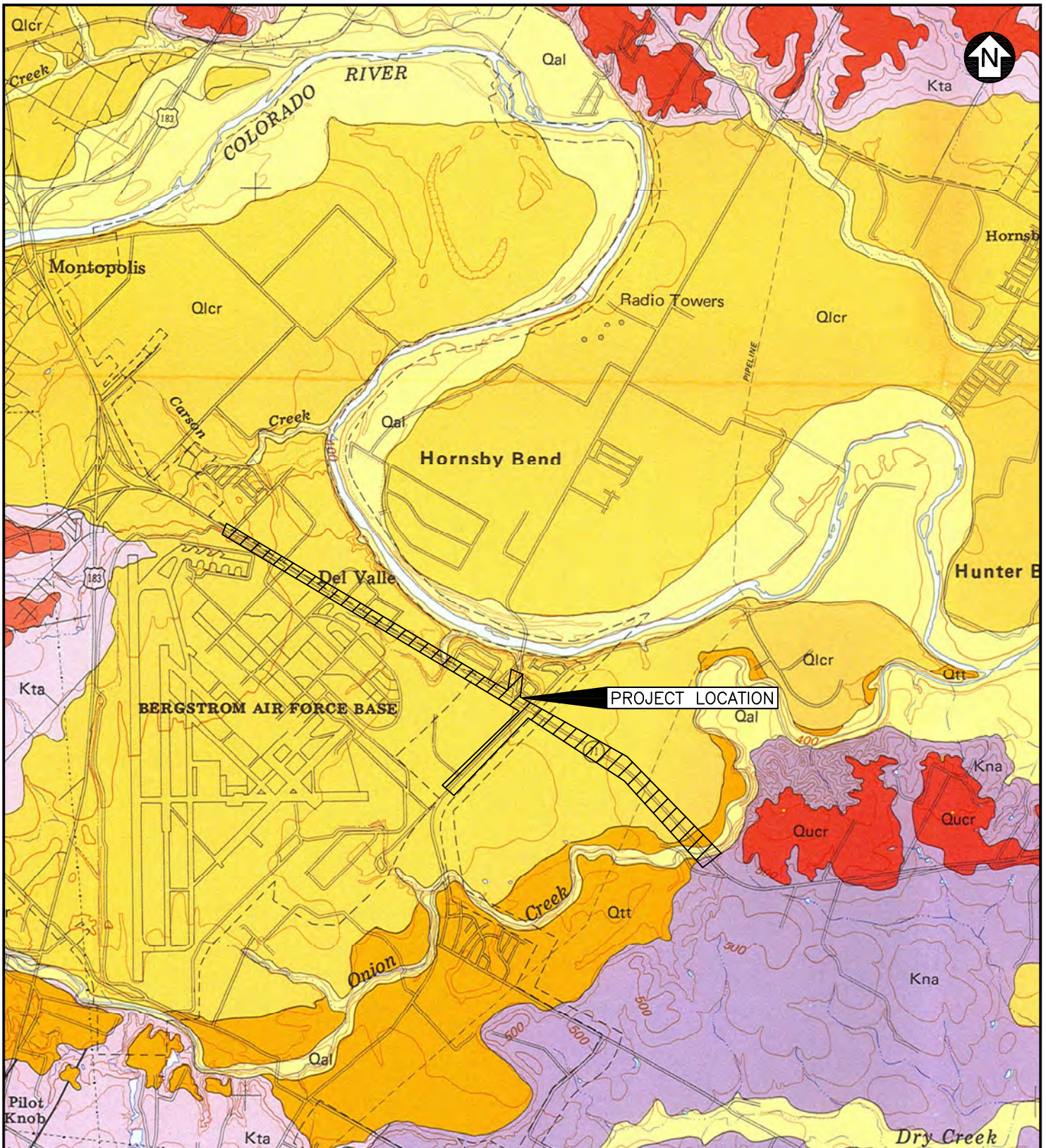
SITE VICINITY MAP
SH 71 - FROM EAST RIVERSIDE TO SH 130
AUSTIN, TEXAS
CSJ NO. 0265-01-110

PROJECT NO.:
AG 12 15282

FILENAME:
VIC

PLATE 1

DATE:
FILE:



LEGEND

Qal Alluvium
 Kta Taylor Group
 Qlcr Lower Colorado River Deposits
 Qucr Upper Colorado River Deposits
 Qtt Tributary Terrace Deposits
 Kna Navarro Group



MAP LOCATION



SCALE: N.T.S

DATE: 10/10/2013

DRAWN BY:	PROJ. CHK:	APPRV. BY:
ZL	JS	JS

GEOLOGY MAP
 SH 71 - FROM EAST RIVERSIDE TO SH 130
 AUSTIN, TEXAS
 CSJ NO. 0265-01-110

PROJECT NO.:
 AG 12 15282

FILENAME:
 GEO

PLATE 2

DATE:
 FILE:



IMAGE SOURCE:

Base Map Source: Google Maps

 Boring Location: Boring ID/Elevation (feet)



MAP LOCATION



SCALE: 1" = 600'

DATE: 10/10/2013

DRAWN BY:	PROJ. CHK:	APPRV. BY:
ZL	JS	JS

PLAN OF BORINGS
SH 71 - FROM EAST RIVERSIDE TO SH 130
AUSTIN, TEXAS
CSJ NO. 0265-01-110

PROJECT NO.:
AG 12 15282

FILENAME:
POB

PLATE 3A

DATE:
FILE:



IMAGE SOURCE:

Base Map Source: Google Maps

 Boring Location: Boring ID/Elevation (feet)



MAP LOCATION



SCALE: 1" = 600'

DATE: 10/10/2013

DRAWN BY:	PROJ. CHK:	APPRV. BY:
ZL	JS	JS

PLAN OF BORINGS
SH 71 - FROM EAST RIVERSIDE TO SH 130
AUSTIN, TEXAS
CSJ NO. 0265-01-110

PROJECT NO.:
AG 12 15282

FILENAME:
POB

PLATE 3B

DATE:
FILE:



Base Map Source: Google Maps

- Boring Location: Boring ID/Elevation (feet)
- Bore Location (not drilled)
- × Sample Location



SCALE: 1" = 600'

DATE: 10/10/2013

DRAWN BY:	PROJ. CHK:	APPRV. BY:
ZL	JS	JS

PLAN OF BORINGS
SH 71 - FROM EAST RIVERSIDE TO SH 130
AUSTIN, TEXAS
CSJ NO. 0265-01-110

PROJECT NO.:
AG 12 15282

FILENAME:
POB

PLATE 3C

DATE:
FILE:



IMAGE SOURCE:

Base Map Source: Google Maps

Boring Location: Boring ID/Elevation (feet)
 Sample Location



MAP LOCATION



SCALE: 1" = 600'

DATE: 10/10/2013

DRAWN BY:	PROJ. CHK:	APPRV. BY:
ZL	JS	JS

PLAN OF BORINGS
 SH 71 - FROM EAST RIVERSIDE TO SH 130
 AUSTIN, TEXAS
 CSJ NO. 0265-01-110

PROJECT NO.:
 AG 12 15282

FILENAME:
 POB

PLATE 3D

DATE:
 FILE:

SOIL SYMBOLS

Soil Types



Fat Clay



Lean Clay



Sand



Gravel



Silt

Other Materials



Pavement/Base



Water

SOIL GRAIN SIZE

Classification

Clay
Silt
Sand
Gravel
Cobble
Boulder

Particle Size

< 0.002 mm
0.002 - 0.075 mm
0.075 - 4.75 mm
4.75 - 75 mm
75 - 200 mm
> 200 mm

Particle Size or Sieve No. (U.S. Standard)

< 0.002 mm
0.002 mm - #200 sieve
#200 sieve - #4 sieve
#4 sieve - 3 in.
3 in. - 8 in.
> 8 in.

DENSITY OF COHESIONLESS SOILS

<u>Consistency</u>	<u>TCP Blows/Foot</u>
Very Loose	0 to 8
Loose	8 to 20
Slightly Compact	20 to 40
Compact	40 to 80
Dense	80 to 5 in./100
Very Dense	0 in to 5 in./100

CONSISTENCY OF COHESIVE SOILS

<u>Consistency</u>	<u>TCP Blows/Foot</u>
Very Soft	0 to 8
Soft	8 to 20
Stiff	20 to 40
Very Stiff	40 to 80
Hard	80 to 5 in./100
Very Hard	0 in to 5 in./100

PENETRATION RESISTANCE

3/6	Blows required to penetrate each of three consecutive 6-inch increments per ASTM D-1586 *
50/4"	If more than 50 blows are required, driving is discontinued and penetration at 50 blows is noted
0/18"	Sampler penetrated full depth under weight of drill rods and hammer

* The N value is taken as the blows required to penetrate the final 12 inches

TERMS DESCRIBING SOIL STRUCTURE

<i>Slickensided</i>	Fracture planes appear polished or glossy, sometimes striated
<i>Fissured</i>	Breaks along definite planes of fracture with little resistance to fracturing
<i>Inclusion</i>	Small pockets of different soils, such as small lenses of sand scattered through a mass of clay
<i>Parting</i>	Inclusion less than 1/4 inch thick extending through the sample
<i>Seam</i>	Inclusion 1/4 inch to 3 inches thick extending through the sample
<i>Layer</i>	Inclusion greater than 3 inches thick extending through the sample
<i>Laminated</i>	Soil sample composed of alternating partings of different soil type
<i>Stratified</i>	Soil sample composed of alternating seams or layers of different soil type
<i>Marl</i>	Calcium carbonate-rich material containing variable amounts of clay and silt

<i>Intermixed</i>	Soil sample composed of pockets of different soil type and laminated or stratified structure is not evident
<i>Calcareous</i>	Having appreciable quantities of calcium carbonate
<i>Ferrous</i>	Having appreciable quantities of iron
<i>Nodule</i>	A small mass of irregular shape
<i>Speckled</i>	Dotted or covered with small spots of contrasting color

CSJ NO.: 0265-01-110



PROJECT NO.:
AG 12 15282

DRAWING NO.:
PLATE 4A

KEY TO TERMS AND SYMBOLS
USED ON BORING LOGS FOR SOIL

ROCK TYPES



Limestone



Shale



Sandstone



Conglomerate



Gypsum



Redbed



Lignite
Muck



Granite
Basalt
Schist
Gneiss

SOLUTION AND VOID CONDITIONS

Void	Interstice; a general term for pore space or other openings in rock.
Cavities	Small solutional concavities.
Vuggy	Containing small cavities, usually lined with a mineral of different composition from that of the surrounding rock.
Vesicular	Containing numerous small, unlined cavities, formed by expansion of gas bubbles or steam during solidification of the rock.
Porous	Containing pores, interstices, or other openings which may or may not interconnect.
Cavernous	Containing cavities or caverns, sometimes quite large. Most frequent in limestones and dolomites.

HARDNESS

Soft	Rock can be scratched with fingernail
Hard	Rock can be scratched with knife blade
Very Hard	Rock will scratch knife

WEATHERING GRADES OF ROCKMASS ⁽¹⁾

Slightly	Discoloration indicates weathering of rock material and discontinuity surfaces.
Moderately	Less than half of the rock material is decomposed or disintegrated to a soil.
Highly	More than half of the rock material is decomposed or disintegrated to a soil.
Completely	All rock material is decomposed and/or disintegrated into soil. The original mass structure is still largely intact.
Residual Soil	All rock material is converted to soil. The mass structure and material fabric are destroyed.

JOINT DESCRIPTION

SPACING		INCLINATION		SURFACES	
Very Close	<2"	Horizontal	0-5	Slickensided	Polished, grooved
Close	2"-12"	Shallow	5-35	Smooth	Planar
Medium Close	12"-3'	Moderate	35-65	Irregular	Undulating or granular
Wide	>3'	Steep	65-85	Rough	Jagged or pitted
		Vertical	85-90		

REFERENCES:

- (1) British Standard (1981) Code of Practice for Site Investigation, BS 5930.
- (2) The Bridge Div., Tx. Highway Dept. Foundation Exploration & Design Manual, 2nd Division, revised December, 2012.

BEDDING THICKNESS ⁽²⁾

Very Thick	>4'
Thick	2'-4'
Thin	2"-2'
Very Thin	1/2"-2"
Laminated	0.08"-1/2"
Thinly Laminated	<0.08"

Information on each boring log is a compilation of subsurface conditions and soil and rock classifications obtained from the field as well as from laboratory testing of samples. Strata have been interpreted by commonly accepted procedures. The stratum lines on the logs may be transitional and approximate in nature. Water level measurements refer only to those observed at the times and places indicated, and may vary with time, geologic condition or construction activity.

CSJ NO.: 0265-01-110



PROJECT NO.:
AG 12 15282

DRAWING NO.:
PLATE 4B

KEY TO TERMS AND SYMBOLS
USED ON BORING LOGS FOR ROCK

APPENDIX A
WINCORE BORE LOGS

PAVEMENT BORING LOGS



DRILLING LOG

1 of 1

WinCore
Version 3.1

County Travis
Highway SH-71
CSJ 0265-01-110

Hole P-1
Structure Pavements
Station 11034+06.19
Offset 67.60L

District Austin
Date 08/13/2013
Grnd. Elev. 494.90 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
493.2			PAVEMENT/BASE, 8" asphaltic concrete pavement, 12" tan clayey sand with gravel base.							
			CLAY, very stiff, dry, dark brown, sandy, lean. [Fill] (CL)			8.6	36	20		PP=4.5+ tsf % Passing NO. 200 Sieve: 56
5										PP=4.5+ tsf
488.9			CLAY, very stiff, moist, brown, lean, with calcareous inclusions. [Lower Colorado] (CL)			13.3	39	16		PP=4.5+ tsf % Passing No. 200 Sieve: 82
										PP=4.5+ tsf
10										PP=4.5+ tsf
						10.9	36	11		% Passing No. 200 Sieve: 80
479.9 15										

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 15.0 ft, and groundwater was not encountered to that depth. (N, E) = (10054666.85, 3138054.10)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: PW

Organization: HVJ Associates



DRILLING LOG

1 of 1

WinCore
Version 3.1

County Travis
Highway SH-71
CSJ 0265-01-110

Hole P-2
Structure Pavements
Station 11070+45.98
Offset 29.90R

District Austin
Date 08/13/2013
Grnd. Elev. 507.90 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
505.5			PAVEMENT/BASE, 10" asphaltic concrete pavement, 18" tan clayey sand with gravel base.							SPT:10-10-10
			CLAY, soft, moist, tan and light brown, lean, with sand. [Fill] (CL)			13.2	23	10		% Passing No. 200 Sieve: 85
										PP=2.0 tsf
										% Passing No. 200 Sieve: 75
5										PP=2.5 tsf
						14.8	37	23		% Passing No. 200 Sieve: 84
										PP=3.0 tsf
						15.7	30	17		% Passing No. 200 Sieve: 79
10										
496.9			CLAY, stiff, moist, dark brown, lean. [Fill] (CL)							PP=3.0 tsf
492.9										

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 15.0 ft, and groundwater was not encountered to that depth. (N, E) = (10052707.91, 3141125.20)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: PW

Organization: HVJ Associates



DRILLING LOG

1 of 1

WinCore
Version 3.1

County Travis
Highway SH-71
CSJ 0265-01-110

Hole P-3
Structure Pavements
Station 11075+03.44
Offset 22.83L

District Austin
Date 08/13/2013
Grnd. Elev. 515.50 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
513.5			PAVEMENT/BASE, 7" asphaltic concrete pavement, 17" tan clayey sand with gravel base.							PP=1.5 tsf
			SAND, loose, moist, tan, uncemented, silty. [Fill] (SM)							PP=0.5 tsf
5						10.4				% Passing No. 200 Sieve: 33
509.5			CLAY, stiff, moist, tan, sandy, lean. [Fill] (CL)							non-plastic PP=3.5 tsf
										PP=3.5 tsf
10						14.9	28	15		% Passing No. 200 Sieve: 67
504.5			SAND, compact, moist, tan, uncemented, clayey. [Fill] (SC)							PP=4.5+ tsf
						11.4	26	14		% Passing No. 200 Sieve: 49
500.5										

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 15.0 ft, and groundwater was not encountered to that depth. (N, E) = (10052528.07, 3141549.51)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: PW

Organization: HVJ Associates



DRILLING LOG

1 of 1

WinCore
Version 3.1

County Travis
Highway SH-71
CSJ 0265-01-110

Hole P-4
Structure Pavements
Station 11086+54.89
Offset 41.56R

District Austin
Date 08/11/2013
Grnd. Elev. 491.60 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
489.6			PAVEMENT/BASE, 9" asphaltic concrete pavement, 15" tan clayey sand with gravel base.							SPT:5-8-9
			CLAY, stiff, moist, dark brown, fat, with sand. [Fill] (CH)							
5						17.5	52	24		PP=3.5 tsf % Passing No. 200 Sieve: 77
										PP=3.5 tsf % Passing No. 200 Sieve: 81
						17.5	50	26		PP=3.5 tsf % Passing No. 200 Sieve: 76
10										
479.6			CLAY, stiff, moist, brown, fat, with calcareous inclusions. [Lower Colorado] (CH)							
						22.3	53	39		% Passing No. 200 Sieve: 91
476.6										

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 15.0 ft, and groundwater was not encountered to that depth. (N, E) = (10051928.6, 3142535.5)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: PW

Organization: HVJ Associates



DRILLING LOG

1 of 1

WinCore
Version 3.1

County Travis
Highway SH-71
CSJ 0265-01-110

Hole P-6
Structure Pavements
Station 11103+28.33
Offset 53.92R

District Austin
Date 08/13/2013
Grnd. Elev. 484.40 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
482.4			PAVEMENT/BASE, 7" asphaltic concrete pavement, 17" tan clayey sand with gravel base.							PP=4.0 tsf
			CLAY, stiff to very stiff, moist, dark brown, fat, trace of sand. [Fill] (CH)							PP=4.0 tsf
5						16.9	72	46		% Passing No. 200 Sieve: 86
478.4			CLAY, stiff to very stiff, moist, dark brown, fat, with sand. [Fill] (CH)							PP=4.5 tsf
476.4			CLAY, stiff to very stiff, moist, dark brown, fat, trace of sand. [Fill] (CH)							PP=4.5 tsf
						20.9	75	57		% Passing No. 200 Sieve: 89
10										
473.4			CLAY, very stiff, moist, brown, lean, with calcareous inclusions. [Lower Colorado] (CL)							
						15.8	45	31		% Passing No. 200 Sieve: 45
469.4										

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 15.0 ft, and groundwater was not encountered to that depth. (N, E) = (10051115.05, 3143995.48)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: PW

Organization: HVJ Associates



DRILLING LOG

1 of 1

WinCore
Version 3.1

County Travis
Highway SH-71
CSJ 0265-01-110

Hole P-7
Structure Pavements
Station 11112+80.70
Offset 58.71L

District Austin
Date 08/13/2013
Grnd. Elev. 476.70 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
474.7			PAVEMENT/BASE, 9" asphaltic concrete pavement, 15" tan clayey sand with gravel base.							PP=4.5+ tsf
			SAND, slightly compact, moist, tan, uncemented, silty. [Lower Colorado] (SM)							PP=4.5+ tsf
5						8.0				% Passing No. 200 Sieve: 43 non-plastic PP=4.5+ tsf
										PP=4.5+ tsf
10						10.1				% Passing No. 200 Sieve: 49 non-plastic
										SPT:18-13-15
15						6.0				% Passing No. 200 Sieve: 22 non-plastic

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 15.0 ft, and groundwater was not encountered to that depth. (N, E) = (10050751.46, 3144882.92)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: PW

Organization: HVJ Associates



DRILLING LOG

1 of 1

WinCore
Version 3.1

County Travis
Highway SH-71
CSJ 0265-01-110

Hole P-8
Structure Pavements
Station 11122+56.44
Offset 57.12R

District Austin
Date 08/13/2013
Grnd. Elev. 463.30 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
461.3			PAVEMENT/BASE, 7" asphaltic concrete pavement, 17" tan clayey sand with gravel base.							PP=2.0 tsf
			CLAY, soft, moist, brown and tan, sandy, lean. [Fill] (CL)			15.2	38	25		% Passing No. 200 Sieve: 61
459.3			CLAY, soft, moist, brown and tan, lean, with sand. [Fill] (CL)							PP=2.5 tsf
5										% Passing No. 200 Sieve: 85
457.3			CLAY, soft, moist, brown and tan, sandy, lean. [Fill] (CL)			14.4	40	28		PP=2.0 tsf
										% Passing No. 200 Sieve: 60
455.3			CLAY, soft, moist, brown, lean, with sand. [Lower Colorado] (CL)			20.5	49	33		PP=1.0 tsf
										% Passing No. 200 Sieve: 78
10										PP=1.0 tsf
448.3	15									

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 15.0 ft, and groundwater was not encountered to that depth. (N, E) = (10050176.8, 3145679.9)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: PW

Organization: HVJ Associates



DRILLING LOG

1 of 1

WinCore
Version 3.1

County Travis
Highway SH-71
CSJ 0265-01-110

Hole P-9
Structure Pavements
Station 11127+83.44
Offset 61.93L

District Austin
Date 08/13/2013
Grnd. Elev. 467.80 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
465.3			PAVEMENT/BASE, 8" asphaltic concrete pavement, 22" tan clayey sand with gravel base.							
			CLAY, very stiff, dry, tan and brown, lean, with sand and gravel. [Lower Colorado] (CL)			7.9	27	13		SPT:14-15-14 % Passing No. 200 Sieve: 71 PP=4.5+ tsf PP=4.5+ tsf PP=4.5+ tsf % Passing No. 200 Sieve: 80
5										
						9.3	30	18		
10										
456.8			CLAY, very stiff, moist, brown, lean. [Lower Colorado] (CL)							
						13.5	42	22		% Passing No. 200 Sieve: 93
15										
452.8										

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 15.0 ft, and groundwater was not encountered to that depth. (N, E) = (10050022.79, 3146198.48)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: PW

Organization: HVJ Associates



DRILLING LOG

1 of 1

WinCore
Version 3.1

County Travis
Highway SH-71
CSJ 0265-01-110

Hole P-10
Structure Pavements
Station 11134+40.54
Offset 94.98L

District Austin
Date 08/13/2013
Grnd. Elev. 471.70 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
469.7			PAVEMENT/BASE, 8" asphaltic concrete pavement, 16" tan clayey sand with gravel base.							PP=2.5 tsf
			CLAY, stiff, moist, dark brown, fat, with sand. [Fill] (CH)							PP=4.0 tsf
5						18.9	54	29		% Passing No. 200 Sieve: 82
465.7			CLAY, stiff, moist, brown, sandy, lean. [Lower Colorado] (CL)							PP=4.0 tsf
						15.7	49	34		% Passing No. 200 Sieve: 68
										PP=4.5+ tsf
										% Passing No. 200 Sieve: 64
461.7	10		CLAY, stiff, moist, brown, lean, with calcareous inclusions. [Lower Colorado] (CL)							PP=3.0 tsf
						14.3	39	24		% Passing No. 200 Sieve: 92
456.7	15									

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 15.0 ft, and groundwater was not encountered to that depth. (N, E) = (10049701.68, 3146778.01)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: PW

Organization: HVJ Associates



DRILLING LOG

1 of 1

WinCore
Version 3.1

County Travis
Highway SH-71
CSJ 0265-01-110

Hole P-12
Structure Pavements
Station 11140+75.26
Offset 139.78L

District Austin
Date 08/13/2013
Grnd. Elev. 468.60 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
466.6			PAVEMENT/BASE, 9" asphaltic concrete pavement, 15" tan clayey sand with gravel base.							PP=2.0 tsf
			CLAY, soft to stiff, moist, brown, fat, with sand and gravel. [Fill] (CH)			15.3	55	32		% Passing No. 200 Sieve: 73
463.6 5										PP=4.5+ tsf
						18.5	55	38		% Passing No. 200 Sieve: 73
			CLAY, soft to stiff, moist, brown, sandy, fat. [Fill] (CH)							PP=4.5+ tsf
460.6										% Passing No. 200 Sieve: 65
			SAND, compact, moist, tan, uncemented, clayey. [Lower Colorado] (SC)							PP=4.5+ tsf
						9.1	24	11		% Passing No. 200 Sieve: 47
10										PP=4.5+ tsf
453.6 15										

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 15.0 ft, and groundwater was not encountered to that depth. (N, E) = (10049395.77, 3147330.56)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: PW

Organization: HVJ Associates



DRILLING LOG

1 of 1

WinCore
Version 3.1

County Travis
Highway SH-71
CSJ 0265-01-110

Hole P-13
Structure Pavements
Station 11143+72.66
Offset 1121.62L

District Austin
Date 08/15/2013
Grnd. Elev. 428.10 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
426.4			PAVEMENT/BASE, 5" asphaltic concrete pavement, 15" tan clayey sand with gravel base.							
			CLAY, soft, moist, dark brown, fat, with sand and gravel. [Fill] (CH)							PP=2.5 tsf
424.1			CLAY, soft to stiff, moist, tan, sandy, lean. [Lower Colorado] (CL)							PP=2.5 tsf
5						21.4	29	14		% Passing No. 200 Sieve: 70
										PP=3.5 tsf
										PP=2.0 tsf
						18.7	36	25		% Passing No. 200 Sieve: 66
10										
416.1			SAND, slightly compact, moist, reddish brown, uncemented, clayey. [Lower Colorado] (SC)							
						23.0	40	29		% Passing No. 200 Sieve: 20
413.1										
15										

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 15.0 ft, and groundwater was not encountered to that depth. (N, E) = (10049255.03, 3147921.07)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: PW

Organization: HVJ Associates



DRILLING LOG

1 of 1

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole P-14
Structure Pavement
Station 11146+66.08
Offset 313.24L

District Austin
Date 05/15/2013
Grnd. Elev. 459.80 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
458.1			PAVEMENT/BASE, 8" asphaltic concrete pavement, 13" tan clayey sand with gravel base.							
			CLAY, soft to stiff, moist, light brown, sandy, lean, with calcareous inclusions. [Lower Colorado] (CL)			14.0	34	23		PP=4.0 tsf % Passing No. 200 Sieve: 63
5						13.0	30	18		PP=2.5 tsf % Passing No. 200 Sieve: 64
451.8			SAND, slightly compact, dry, light brown, uncemented, clayey. [Lower Colorado] (SC)			4.8	24	13		PP=3.5 tsf SPT:17-8-15 % Passing No. 200 Sieve: 17
10										
444.8										
15										

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 15.0 ft, and groundwater was not encountered to that depth. (N, E) = (10049255.03, 3147921.07)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: PW

Organization: HVJ Associates



DRILLING LOG

1 of 1

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole P-15
Structure Pavement
Station 11149+50.38
Offset 1499.03R

District Austin
Date 08/15/203
Grnd. Elev. 464.90 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
463.1			PAVEMENT/BASE, 8" asphaltic concrete pavement, 14" tan clayey sand with gravel base.							
			CLAY, very stiff, moist, dark brown, fat, with sand. [Fill] (CH)			24.6	53	38		PP=4.0 tsf % Passing No. 200 Sieve: 85
460.9			CLAY, stiff to very stiff, moist, light brown, lean, with sand. [Lower Colorado] (CL)							PP=4.5+ tsf
5						15.0	38	19		PP=4.5+ tsf % Passing No. 200 Sieve: 71
										PP=3.0 tsf
453.9			SAND, slightly compact, moist, tan, uncemented, clayey. [Lower Colorado] (SC)			10.5	24	14		PP=2.0 tsf % Passing No. 200 Sieve: 45
449.9	15									

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 15.0 ft, and groundwater was not encountered to that depth. (N, E) = (10047532.4, 3147290.4)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: PW

Organization: HVJ Associates



DRILLING LOG

1 of 1

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole P-16
Structure Pavement
Station 11146+90.95
Offset 2565.54R

District Austin
Date 08/14/2013
Grnd. Elev. 467.54 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
465.8			PAVEMENT/BASE, 7" asphaltic concrete pavement, 14" tan clayey sand with gravel base.							
			CLAY, soft to stiff, moist, dark brown, sandy, fat. [Fill] (CH)							PP=4.0 tsf
										PP=1.5 tsf
5						25.9	89	59		% Passing No. 200 Sieve: 65
										PP=2.5 tsf
461.			SAND, slightly compact, moist, light brown, uncemented, clayey. [Lower Colorado] (SC)			23.2	67	51		% Passing No. 200 Sieve: 14
										PP=3.0 tsf
10										
456.5			SAND, slightly compact, moist, light brown, uncemented, poorly graded, with clay. [Lower Colorado] (SP-SC)							PP=4.0 tsf
						17.6	40	28		% Passing No. 200 Sieve: 8
452.5										

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 15.0 ft, and groundwater was not encountered to that depth. (N, E) = (10046725.7, 3146546.1)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: PW

Organization: HVJ Associates



DRILLING LOG

1 of 1

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole P-17
Structure Pavement
Station 11145+22.99
Offset 3288.57R

District Austin
Date 08/14/2013
Grnd. Elev. 468.20 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
466.5			PAVEMENT/BASE, 4" asphaltic concrete pavement, 16" tan clayey sand with gravel base.							
			SAND, compact, moist, dark brown, uncemented, clayey, with crushed limestone. [Fill] (SC)			10.5	48	34		PP=3.5 tsf % Passing No. 200 Sieve: 30
463.7			CLAY, very stiff, moist, dark brown, sandy, fat. [Fill] (CH)							SPT:17-7-7 PP=4.5 tsf % Passing No. 200 Sieve: 53
460.2			SAND, slightly compact, moist, light brown, uncemented, clayey. [Lower Colorado] (SC)			16.1	58	38		PP=4.0 tsf PP=3.0 tsf % Passing No. 200 Sieve: 37
453.2						10.5	27	16		

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 15.0 ft, and groundwater was not encountered to that depth. (N, E) = (10046178.8, 3146041.6)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: PW

Organization: HVJ Associates



DRILLING LOG

1 of 1

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole P-18
Structure Pavement
Station 11152+68.34
Offset 181.25R

District Austin
Date 08/15/2013
Grnd. Elev. 456.80 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
455.3			PAVEMENT/BASE, 4" asphaltic concrete pavement, 14" tan clayey sand with gravel base.							
			CLAY, soft to stiff, moist, dark brown, fat, with sand seams. [Fill] (CH)							PP=1.5 tsf
										PP=2.0 tsf
5						31.4	69	42		% Passing No. 200 Sieve: 87
										PP=3.0 tsf
										PP=2.5 tsf
448.3			CLAY, soft, moist, light brown, fat. [Lower Colorado] (CH)			26.7	71	44		% Passing No. 200 Sieve: 91
10										
444.8			SAND, compact, moist, tan, uncemented, clayey. [Lower Colorado] (SC)							PP=4.5+ tsf
						10.7	49	31		% Passing No. 200 Sieve: 47
441.8										
15										

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 15.0 ft, and groundwater was not encountered to that depth. (N, E) = (10048530.4, 3148207.8)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: PW

Organization: HVJ Associates



DRILLING LOG

1 of 1

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole P-19
Structure Pavement
Station 11152+68.49
Offset 150.94L

District Austin
Date 08/12/2013
Grnd. Elev. 456.00 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
454.			PAVEMENT/BASE, 9" asphaltic concrete pavement, 15" tan clayey sand with gravel base.							PP=3.0 tsf
			CLAY, stiff, moist, dark brown, fat, with sand. [Fill] (CH)							PP=2.5 tsf
452.			CLAY, stiff to very stiff, moist, brown, sandy, lean, with gravel and sand seams. (CL)			14.7	34	23		% Passing No. 200 Sieve: 65
5										PP=4.5+ tsf
										PP=3.5 tsf
						11.7	25	15		% Passing No. 200 Sieve: 43
10										
						15.2	31	16		% Passing No. 200 Sieve: 68
15										

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 15.0 ft, and groundwater was not encountered to that depth. (N, E) = (10048820.81, 3148369.08)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: PW

Organization: HVJ Associates



DRILLING LOG

1 of 1

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole P-21
Structure Pavement
Station 11160+12.86
Offset 150.55L

District Austin
Date 08/12/2013
Grnd. Elev. 453.00 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
451.			PAVEMENT/BASE, 9" asphaltic concrete pavement, 15" tan clayey sand with gravel base.							PP=2.0 tsf
			CLAY, soft, moist, dark brown, fat, with sand lenses. [Fill] (CH)			32.0	69	36		% Passing No. 200 Sieve: 88
5										PP=3.5 tsf
										% Passing No. 200 Sieve: 93
447.			CLAY, stiff, moist, brown to dark brown, fat, with sand. [Fill] (CH)			18.9	60	43		PP=3.0 tsf
										% Passing No. 200 Sieve: 73
445.			CLAY, stiff to very stiff, moist, light brown, lean, with sand. [Lower Colorado] (CL)							Pp=4.5+ tsf
10										PP=2.5 tsf
						18.7	37	19		% Passing No. 200 Sieve: 85
438.										

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 15.0 ft, and groundwater was not encountered to that depth. (N, E) = (10048459.3, 3149019.8)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: PW

Organization: HVJ Associates



DRILLING LOG

1 of 1

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole P-22
Structure Pavement
Station 11165+45.02
Offset 37.55L

District Austin
Date 08/14/2013
Grnd. Elev. 453.80 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
448.3			CLAY, soft, moist, dark brown, fat, with sand lenses. [Fill] (CH)							SPT:48-33-11
										PP=2.0 tsf
										PP=2.5 tsf
						21.1	54	31		% Passing No. 200 Sieve: 86
442.3			CLAY, soft, moist, light brown, lean, with trace of sand. [Lower Colorado] (CL)							PP=2.5 tsf
										PP=1.5 tsf
						18.6	37	23		% Passing No. 200 Sieve: 88
438.8			CLAY, soft, moist, tan, lean, with sand. [Lower Colorado] (CL)							PP=2.5 tsf
						16.7	33	20		% Passing No. 200 Sieve: 71
438.8										

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 15.0 ft, and groundwater was not encountered to that depth. (N, E) = (10048102.29, 3149430.32)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: PW

Organization: HVJ Associates



DRILLING LOG

1 of 1

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole P-23
Structure Pavement
Station 11166+38.55
Offset 72.49

District Austin
Date 08/12/2013
Grnd. Elev. 456.70 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
454.7			PAVEMENT/BASE, 8" asphaltic concrete pavement, 16" tan clayey sand with gravel base.							PP=2.5 tsf
			GRAVEL, slightly compact, moist, light brown, uncemented, clayey. [Fill] (GC)			18.0	55	28		% Passing No. 200 Sieve: 49
451.7 5			CLAY, stiff, moist, light brown, lean, with sand. [Lower Colorado] (CL)							PP=1.5 tsf % Passing No. 200 Sieve: 81
						16.7	48	33		PP=3.5 tsf % Passing No. 200 Sieve: 82
10										PP=4.0 tsf
445.7			CLAY, soft, moist, tan, lean. [Lower Colorado] (CL)							PP=2.5 tsf
						18.8	39	21		% Passing No. 200 Sieve: 92
441.7 15										

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 15.0 ft, and groundwater was not encountered to that depth. (N, E) = (10047960.70, 3149458.68)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: PW

Organization: HVJ Associates



DRILLING LOG

1 of 1

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole P-24
Structure Pavement
Station 11167+94.92
Offset 181.59L

District Austin
Date 08/12/2013
Grnd. Elev. 454.60 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
452.7			PAVEMENT/BASE, 7" asphaltic concrete pavement, 16" tan clayey sand with gravel base.							PP=2.5 tsf
			CLAY, soft to stiff, moist, brown to dark brown, gravelly, lean. [Fill] (CL)							
5						15.8	42	24		PP=1.5 tsf
										% Passing No. 200 Sieve: 54
447.6			CLAY, stiff, moist, light brown, sandy, lean. [Lower Colorado] (CL)							PP=3.0 tsf
						14.8	32	21		% Passing No. 200 Sieve: 65
10										
441.6			CLAY, stiff, moist, tan, sandy, lean, with calcareous inclusions. [Lower Colorado] (CL)							PP=3.0 tsf
						13.3	30	14		% Passing No. 200 Sieve: 51
439.6										
15										

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 15.0 ft, and groundwater was not encountered to that depth. (N, E) = (10048107.03, 3149718.70)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: PW

Organization: HVJ Associates



DRILLING LOG

1 of 1

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole P-25
Structure Pavement
Station 11171+37.55
Offset 47.83L

District Austin
Date 08/14/203
Grnd. Elev. 452.90 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
5			CLAY, soft, moist, dark brown, sandy, fat. [Fill] (CH)			23.1	67	38		PP=4.5+ tsf
										PP=1.5 tsf
										PP=1.5 tsf
										% Passing No. 200 Sieve: 59
10						24.3	76	50		% Passing No. 200 Sieve: 70
										% Passing No. 200 Sieve: 67
										% Passing No. 200 Sieve: 71
439.9			CLAY, stiff, moist, brown, sandy, lean. [Lower Colorado] (CL)			21.6	48	35		% Passing No. 200 Sieve: 71
437.9	15									

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 15.0 ft, and groundwater was not encountered to that depth. (N, E) = (10047823.77, 3149953.40)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: PW

Organization: HVJ Associates



DRILLING LOG

1 of 1

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole P-26
Structure Pavement
Station 11175+33.03
Offset 194.84R

District Austin
Date 08/12/2013
Grnd. Elev. 455.90 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
453.9			PAVEMENT/BASE, 8" asphaltic concrete pavement, 16" tan clayey sand with gravel base							PP=3.0 tsf
			CLAY, stiff, moist, tan, fat, with gravel seams. [Fill] (CH)			21.3	61	38		% Passing No. 200 Sieve: 89
450.9 5			CLAY, stiff, moist, tan, lean, with sand. [Lower Colorado] (CL)							PP=4.0 tsf
										PP=4.0 tsf
						15.3	43	31		% Passing No. 200 Sieve: 83
										PP=3.0 tsf
						16.3	34	16		% Passing No. 200 Sieve: 79
10										PP=3.0 tsf
440.9 15										

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 15.0 ft, and groundwater was not encountered to that depth. (N, E) = (10047422.04, 3150190.52)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: PW

Organization: HVJ Associates



DRILLING LOG

1 of 1

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole P-27
Structure Pavement
Station 11179+39.32
Offset 269.29L

District Austin
Date 08/12/2013
Grnd. Elev. 449.90 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
447.9			PAVEMENT/BASE, 9" asphaltic concrete pavement, 15" tan clayey sand with gravel base.							PP=2.0 tsf
			CLAY, soft, moist, tan, fat, with sand. [Fill] (CH)			17.4	52	35		% Passing No. 200 Sieve: 74
445.9			CLAY, soft, moist, dark brown, fat, trace of sand. [Fill] (CH)							PP=3.0 tsf
5										% Passing No. 200 Sieve: 89
443.9			CLAY, stiff, moist, tan, fat, with gravel. [Lower Colorado] (CH)			18.3	52	30		PP=3.0 tsf
										% Passing No. 200 Sieve: 80
441.9			CLAY, stiff, moist, tan, lean, with gravel. [Lower Colorado] (CL)			16.9	47	32		PP=4.0 tsf
										% Passing No. 200 Sieve: 85
10										PP=4.5+ tsf
434.9 15										

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 15.0 ft, and groundwater was not encountered to that depth. (N, E) = (10047661.26, 3150759.70)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: PW

Organization: HVJ Associates

RETAINING WALL BORING LOGS



DRILLING LOG

1 of 1

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole RW-2
Structure Retaining Wall
Station 11141+21.42
Offset 85.41L

District Austin
Date 08/14/2013
Grnd. Elev. 468.10 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
466.1			CLAY, stiff, moist, dark brown, fat, with sand. [Fill] (CL)	0	59	11.2			133	SPT:13-6-5 PP=3.5 tsf
			CLAY, stiff, moist, light brown, sandy, lean, with gravel. [Lower Colorado] (CL)							
5		12 (6) 10 (6)								
462.6			SAND, compact to dense, moist, tan, uncemented, clayey. [Lower Colorado] (SC)							PP=3.0 tsf PP=3.0 tsf
10		11 (6) 10 (6)								PP=2.0 tsf
						11.0	35	22		% Passing No. 200 Sieve: 48
15		22 (6) 21 (6)								PP=1.5 tsf
						11.2	24	12		% Passing No. 200 Sieve: 43
20		50 (4.5) 50 (3)								
		50 (5.75) 50 (3.25)								
444.1			SAND, compact to dense, dry, tan, uncemented, clayey. [Lower Colorado] (SC)			4.0	20	8		SPT:37-22-24 % Passing No. 200 Sieve: 19
25										
		18 (6) 31 (6)								SPT:34-38-25
438.1										
30										

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 30.0 ft, and groundwater was not encountered to that depth. (N, E) = (10049325.6, 3147341.3)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: PW

Organization: HVJ Associates



DRILLING LOG

1 of 1

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole RW-3
Structure Retaining Wall
Station 11151+91.17
Offset 72.89R

District Austin
Date 08/20/2013
Grnd. Elev. 455.50 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
5		15 (6) 19 (6)	CLAY, very stiff, dry, dark brown, sandy, fat, with gravel. [Fill] (CH)							PP=4.5+ tsf
										PP=4.5+ tsf
										PP=4.5+ tsf
						18.8	81	64		% Passing No. 200 Sieve: 69
10		17 (6) 15 (6)	CLAY, very stiff, dry, dark brown, sandy, fat, with gravel. [Fill] (CH)	0	206	18.8			129	PP=4.5+ tsf
15		13 (6) 14 (6)	CLAY, stiff, moist, tan, lean, with sand seams. [Lower Colorado] (CL)			18.4	35	19		PP=4.0 tsf
										% Passing No. 200 Sieve: 91
20		9 (6) 10 (6)	SAND, slightly compact to compact, moist, tan, uncemented, clayey. [Lower Colorado] (SC)	0	42	19.0			126	PP=3.5 tsf
										PP=3.5 tsf
25		8 (6) 11 (6)	SAND, slightly compact to compact, moist, tan, uncemented, clayey. [Lower Colorado] (SC)							
30		11 (6) 10 (6)	SAND, slightly compact to compact, moist, tan, uncemented, clayey. [Lower Colorado] (SC)							PP=3.0 tsf

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 30.0 ft, and groundwater was not encountered to that depth. (N, E) = (10048662.6, 3148192.9)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: Rudy Ruiz Jr

Organization: HVJ Associates



DRILLING LOG

1 of 1

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole RW-4
Structure Retaining Wall
Station 11151+47.34
Offset 93.09L

District Austin
Date 08/19/2013
Grnd. Elev. 455.40 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
453.4			CLAY, very stiff, moist, dark brown, sandy, fat with gravel. [Fill] (CH)							PP=4.5+ tsf
			CLAY, soft to stiff, moist, tan, sandy, lean, with gravel and calcareous inclusions. [Lower Colorado] (CL)			13.6	34	20		PP=2.5 tsf % Passing No. 200 Sieve: 57
5		5 (6) 6 (6)								PP=3.0 tsf
				0	57	14.1			135	PP=3.5 tsf
10		14 (6) 17 (6)								
442.4			CLAY, very stiff, moist, tan, sandy, lean. [Lower Colorado] (CL)			17.9	25	12		PP=2.0 tsf % Passing No. 200 Sieve: 61
15		20 (6) 24 (6)								
438.4			GRAVEL, dense, dry, tan, uncemented, well-graded, with silty clay and sand. [Lower Colorado] (GW-GC)							SPT:16-7-11
20		50 (4) 50 (3)								SPT:30-33-29
						3.1	18	6		% Passing No. 200 Sieve: 11
25		31 (6) 50 (5)								SPT:38-26-24
425.4 30		39 (6) 50 (5.5)								

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 30.0 ft, and groundwater was not encountered to that depth. (N, E) = (10048829.0, 3148235.1)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: Rudy Ruiz Jr.

Organization: HVJ Associates



DRILLING LOG

1 of 1

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole RW-5
Structure Retaining Wall
Station 11155+38.42
Offset 117.28R

District Austin
Date 08/16/2013
Grnd. Elev. 444.30 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
5		6 (6) 8 (6)	CLAY, very stiff, moist, dark brown, fat, with sand lenses. [Fill] (CH)			23.7	70	48		PP=4.5+ tsf
										PP=4.5 tsf
										% Passing No. 200 Sieve: 92
										PP=4.5+ tsf
436.3				0	69	18.0			129	PP=4.5+ tsf
10		11 (6) 18 (6)	CLAY, stiff, moist, tan, lean, with sand and calcareous inclusions. [Lower Colorado] (CL)			15.6	37	20		PP=4.5+ tsf
										% Passing No. 200 Sieve: 80
										PP=4.5+ tsf
										PP=4.5+ tsf
15		10 (6) 16 (6)				18.6			130	PP=4.5+ tsf
										PP=4.5+ tsf
										PP=4.5+ tsf
										PP=4.5+ tsf
20		9 (6) 10 (6)	CLAY, soft, moist, tan and light gray, sandy, lean, with sand/gravel seams. [Lower Colorado] (CL)							PP=4.0 tsf
										PP=4.0 tsf
										PP=4.0 tsf
										PP=4.0 tsf
25		8 (6) 11 (6)								PP=3.5 tsf
										PP=3.5 tsf
										PP=3.5 tsf
										PP=3.5 tsf
30		7 (6) 9 (6)								PP=3.5 tsf
										PP=3.5 tsf
										PP=3.5 tsf
										PP=3.5 tsf

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 30.0 ft, and groundwater was not encountered to that depth. (N, E) = (10048455.28, 3148475.03)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: Rudy Ruiz Jr.

Organization: HVJ Associates



DRILLING LOG

1 of 1

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole RW-6
Structure Retaining Wall
Station 11155+38.62
Offset 92.80L

District Austin
Date 08/19/2013
Grnd. Elev. 451.50 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
447.5			CLAY, very stiff, dry, dark brown, sandy, fat, with gravel. [Fill] (CH)							PP=4.0 tsf
5		5 (6) 6 (6)	CLAY, soft, moist, dark brown, fat. [Fill] (CH)							PP=4.0 tsf
						25.5	81	56		PP=3.5 tsf
										% Passing No. 200 Sieve: 94
443.5				0	174	17.7			128	PP=4.5+ tsf
		17 (6) 20 (6)	CLAY, stiff, moist, tan-brown, lean, with sand seams and calcareous inclusions. [Lower Colorado] (CL)							
										PP=4.5+ tsf
		14 (6) 18 (6)								
				0	50	20.1			128	PP=3.5 tsf
433.5		9 (6) 12 (6)	CLAY, stiff, moist, tan, lean. [Lower Colorado] (CL)							
										PP=3.0 tsf
						20.5	37	18		% Passing No. 200 Sieve: 86
		12 (6) 16 (6)								
										PP=3.0 tsf
421.5		15 (6) 18 (6)								

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 30.0 ft, and groundwater was not encountered to that depth. (N, E) = (10048638.93, 3148577.10)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: Rudy Ruiz Jr

Organization: HVJ Associates



DRILLING LOG

1 of 1

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole RW-7
Structure Retaining Wall
Station 11160+70.17
Offset 92.25R

District Austin
Date 08/20/2013
Grnd. Elev. 452.00 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
445.	5	7 (6) 10 (6)	CLAY, hard, dry, brown to dark brown, fat, sandy. [Fill] (CH)							PP=4.5+ tsf
										PP=4.5+ tsf
						12.1	54	33		PP=4.5+ tsf
437.	10	11 (6) 13 (6)	CLAY, stiff, moist, tan, sandy, lean, with gravel seams. [Lower Colorado] (CL)							% Passing No. 200 Sieve: 59
										PP=4.5+ tsf
				0	72	14.8			135	PP=4.5+ tsf
430.	15	12 (6) 12 (6)	CLAY, soft to stiff, moist, tan, sandy, fat, stratified with sand/gravel layers. [Lower Colorado] (CH)							PP=4.5+ tsf
						29.1	84	58		% Passing No. 200 Sieve: 63
										PP=2.5 tsf
425.	20	6 (6) 8 (6)	SAND, slightly compact, moist, tan, uncemented, clayey, with gravel. [Lower Colorado] (SC)							PP=4.5+ tsf
422.	25	10 (6) 11 (6)	CLAY, very stiff, moist, tan and light gray, fat. [Taylor Group] (CH)	0	71	22.5			131	PP=4.5+ tsf
422.	30	21 (6) 23 (6)								

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 30.0 ft, and groundwater was not encountered to that depth. (N, E) = (10048219.18, 3148952.10)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: Rudy Ruiz Jr

Organization: HVJ Associates



DRILLING LOG

1 of 1

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole RW-8
Structure Retaining Wall
Station 11159+50.12
Offset 90.69L

District Austin
Date 08/19/2013
Grnd. Elev. 449.40 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
444.4	5	13 (6) 11 (6)	CLAY, very stiff, moist, dark brown, fat, with sand/gravel lenses. [Fill] (CH)			23.9	78	50		PP=4.25 tsf PP=4.25 tsf % Passing No. 200 Sieve: 92
			CLAY, stiff, moist, tan, lean, with trace of sand. [Lower Colorado] (CL)	0	83	15.7			132	PP=4.5+ tsf PP=4.25 tsf
10		9 (6) 12 (6)								PP=4.0 tsf
						18.5	38	22		% Passing No. 200 Sieve: 90
15		11 (6) 14 (6)								
				0	39	18.5			130	PP=3.0 tsf
20		10 (6) 15 (6)								
			GRAVEL, dense, moist, tan and gray, uncemented, clayey, with sand seams. [Lower Colorado] (GC)							PP=4.0 tsf
25		23 (6) 50 (5)								
			GRAVEL, dense, moist, tan, uncemented, well graded, with clay. [Lower Colorado] (GW-GC)							SPT:15-19-26
422.4										
419.4	30	41 (6) 38 (6)								

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 30.0 ft, and groundwater was not encountered to that depth. (N, E) = (10048437.40, 3148935.91)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: Rudy Ruiz Jr

Organization: HVJ Associates



DRILLING LOG

1 of 1

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole RW-9
Structure Retaining Wall
Station 11177+86.15
Offset 3.18L

District Austin
Date 08/16/2013
Grnd. Elev. 450.50 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
448.5			CLAY, soft, moist, brown, sandy, fat, with gravel. [Fill] (CH)							PP=0.5 tsf
			CLAY, soft to very stiff, moist, olive green, with calcite nodules. [Taylor Group] (CH)							PP=3.0 tsf
5		6 (6) 8 (6)								PP=4.25 tsf
						32.0	86	64		% Passing No. 200 Sieve: 97
				0	43	26.6			118	PP=3.5 tsf
10		5 (6) 10 (6)								
										PP=4.5+ tsf
15		28 (6) 27 (6)								
				0	112	23.4			128	PP=4.5+ tsf
20		30 (6) 42 (6)								
428.5			SHALE, soft, dark gray, clay shale, highly weathered, fissured. [Taylor Group]			20.9	67	42		PP=4.5+ tsf
										% Passing No. 200 Sieve: 93
25		50 (2) 50 (1)								PP=4.5+ tsf
420.5 30		50 (2) 50 (1)								

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 30.0 ft, and groundwater was not encountered to that depth. (N, E) = (10047486.17, 3150507.16)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: Rudy Ruiz Jr

Organization: HVJ Associates



DRILLING LOG

1 of 1

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole RW-10
Structure Retaining Wall
Station 11179+34.66
Offset 79.59L

District Austin
Date 08/09/2013
Grnd. Elev. 449.60 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
447.6			CLAY, stiff, dry, brown, sandy, fat, with gravel. [Fill] (CH)							PP=2.25 tsf
			CLAY, stiff to very stiff, moist, tan and gray, fat, with calcareous inclusions. [Taylor Group] (CH)			28.0	77	51		PP=2.75 tsf % Passing No. 200 Sieve: 94
5		8 (6) 10 (6)								
				0	42	33.9			118	PP=2.75 tsf
										PP=3.5 tsf
10		9 (6) 15 (6)								
						25.3	67	44		PP=4.5+ tsf % Passing No. 200 Sieve: 87
15		26 (6) 28 (6)								
				0	58	25.1			125	PP=4.5+ tsf
20		50 (4) 50 (3.5)								
				0	150	21.4			128	PP=4.5+ tsf
25		50 (2) 50 (2.25)								
421.6			SHALE, soft, dark gray, clay shale, highly weathered, fissured. [Taylor Group]							PP=4.5+ tsf
419.6 30		50 (2.25) 50 (1.5)								

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 30.0 ft, and groundwater was not encountered to that depth. (N, E) = (10047491.89, 3150674.23)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: Rudy Ruiz Jr

Organization: HVJ Associates



DRILLING LOG

1 of 1

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole RW-11
Structure Retaining Wall
Station 11180+70.81
Offset 15.32R

District Austin
Date 08/09/2013
Grnd. Elev. 447.80 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
446.8			CLAY, very stiff, moist, dark brown, sandy, fat. [Fill] (CH)							PP=4.5+ tsf
445.8			SAND, compact, dry, tan, uncemented, clayey, with gravel. [Fill] (SC)	0	51	23.1			125	PP=3.75 tsf
443.8			CLAY, soft, moist, olive-green, fat, with sand. [Taylor Group] (CH)							
5		7 (6) 8 (6)	CLAY, soft to stiff, moist, tan and light gray, fat, with sand lenses. [Taylor Group] (CH)							PP=2.5 tsf
						24.9	50	25		% Passing No. 200 Sieve: 87
				0	36	26.4			118	PP=2.25 tsf
10		4 (6) 8 (6)								
										PP=4.5+ tsf
15		15 (6) 20 (6)	CLAY, stiff to very stiff, moist, tan and light gray, fat. [Taylor] (CH)							
				0	94	22.5			129	PP=4.5+ tsf
20		21 (6) 19 (6)								
						24.8	70	48		PP=4.5+ tsf % Passing No. 200 Sieve: 97
25		18 (6) 24 (6)								
				0	62	27.2			124	PP=4.5+ tsf
30		33 (6) 27 (6)								

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 30.0 ft, and groundwater was not encountered to that depth. (N, E) = (10047347.84, 3150756.64)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: Rudy Ruiz Jr

Organization: HVJ Associates



DRILLING LOG

1 of 1

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole RW-12
Structure Retaining Wall
Station 11182+06.19
Offset 66.30L

District Austin
Date 08/09/2013
Grnd. Elev. 445.70 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
440.7	5	6 (6) 10 (6)	CLAY, stiff, moist, dark brown, fat, with sand lenses. [Fill] (CH)			27.2	76	63		SPT:8-4-4 PP=2.75 tsf % Passing No. 200 Sieve: 95
			CLAY, soft, moist, light gray, fat, with sand/gravel lenses, calcareous inclusions, and ferrous stains. [Taylor Group] (CH)	0	57	16.7			134	PP=4.5+ tsf PP=4.5+ tsf % Passing No. 200 Sieve: 94
10		6 (6) 10 (6)				19.7	51	31		
				0	52	21.2			129	PP=4.5 tsf
15		8 (6) 9 (6)				17.8	52	31		PP=4.5+ tsf % Passing No. 200 Sieve: 90
				0	28					PP=4.5+ tsf
20		9 (6) 10 (6)				27.2			122	PP=4.5+ tsf
			CLAY, stiff, moist, tan and light gray, fat, blocky. [Taylor Group] (CH)	0	48					
25		19 (6) 20 (6)								
			SHALE, soft, dark gray, clay shale, highly weathered, fissured. [Taylor Group]	0	48	27.2			122	PP=4.5+ tsf
418.7										
415.7	30	34 (6) 29 (6)								

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 30.0 ft, and groundwater was not encountered to that depth. (N, E) = (10047361.89, 3150914.59)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: Rudy Ruiz Jr

Organization: HVJ Associates

BRIDGE BORING LOGS



DRILLING LOG

1 of 3

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole BR-2
Structure Bridge
Station 11145+13.01
Offset 88.31L

District Austin
Date 8/6/2013
Grnd. Elev. 462.90 ft
GW Elev. 419.90 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
460.9			CLAY, hard, dry, dark brown, sandy, fat, with gravel. [Fill] (CH)							PP=4.5+ tsf
			CLAY, soft, dry, brown, lean, with sand and calcareous inclusions. [Lower Colorado] (CL)			12.4	35	19		PP=4.5+ tsf % Passing No. 200 Sieve: 96
5		6 (6) 9 (6)								PP=4.5+ tsf
				0	81	16.7			135	PP=4.5+ tsf
10		9 (6) 11 (6)								
450.9			CLAY, very stiff, dry, brown, sandy, lean. [Lower Colorado] (CL)							PP=4.5+ tsf
15		22 (6) 26 (6)								
445.9			SAND, compact to dense, dry, tan, uncemented, clayey, with gravel. [Lower Colorado] (SC)			7.1	31	18		SPT:14-12-21 % Passing No. 200 Sieve: 22
20		19 (6) 28 (6)								SPT:15-27-40 % Passing No. 200 Sieve: 14
25		50 (5.5) 50 (4)				5.2	29	14		
30		50 (4) 50 (3.5)								SPT:50/4.5"

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 55.0 ft, and groundwater was encountered at 43 ft. Below 55.0 ft, wet drilling techniques were used to advance. (N, E) = (10049132.5, 3147678.4)

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Core Tech

Logger: Rudy Ruiz Jr

Organization: HVJ Associates



DRILLING LOG

2 of 3

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole BR-2
Structure Bridge
Station 11145+13.01
Offset 88.31L

District Austin
Date 8/6/2013
Grnd. Elev. 462.90 ft
GW Elev. 419.90 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
430.9			SAND, compact to dense, dry, tan, uncemented, clayey, with gravel. [Lower Colorado] (SC)							
			CLAY, soft to hard, moist, tan and light gray, lean, with sand. [Lower Colorado] (CL)			22.3	47	28		SPT:10-6-6 % Passing No. 200 Sieve: 84
35		7 (6) 6 (6)								
40		50 (4.75) 50 (1.25)								PP=2.5 tsf
420.9			SAND, compact to dense, moist, tan, uncemented, clayey, with gravel. [Lower Colorado] (SC)							SPT:26-21-25
45		39 (6) 50 (3.25)								
						14.0	42	22		SPT:7-21-11 % Passing No. 200 Sieve:24
50		12 (6) 36 (6)								
410.9			SHALE, soft, dark gray, clay shale, highly weathered, fissured. [Taylor Group]							SPT:15-33-49
55		50 (2.5) 50 (1)								
				0	97	20.1		128		PP=4.5+ tsf
60		50 (1.25) 50 (0.5)								

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 55.0 ft, and groundwater was encountered at 43 ft. Below 55.0 ft, wet drilling techniques were used to advance. (N, E) = (10049132.5, 3147678.4)

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Core Tech

Logger: Rudy Ruiz Jr

Organization: HVJ Associates



DRILLING LOG

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WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole BR-2
Structure Bridge
Station 11145+13.01
Offset 88.31L

District Austin
Date 8/6/2013
Grnd. Elev. 462.90 ft
GW Elev. 419.90 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
65		50 (1) 50 (0.25)	SHALE, soft, dark gray, clay shale, highly weathered, fissured. [Taylor Group]							PP=4.5+ tsf
				0	116	20.1			131	PP=4.5+ tsf
70		50 (1.75) 50 (0.75)								
										PP=4.5+ tsf
75		50 (1.5) 50 (0.5)								
				0	90	21.5			129	PP=4.5+ tsf
382.9 80		50 (2) 50 (1.25)								
85										
90										

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 55.0 ft, and groundwater was encountered at 43 ft. Below 55.0 ft, wet drilling techniques were used to advance. (N, E) = (10049132.5, 3147678.4)

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Core Tech

Logger: Rudy Ruiz Jr

Organization: HVJ Associates



DRILLING LOG

1 of 3

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole BR-4
Structure Bridge
Station 11149+11.31
Offset 90.79L

District Austin
Date 8/7/2013
Grnd. Elev. 458.90 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
454.9			CLAY, hard, dry, light brown, fat, with sand and gravel. [Fill] (CH)							PP=4.5+ tsf
5		6 (6) 9 (6)	CLAY, soft to stiff, dry, light brown, with sand, lean. [Lower Colorado]. (CL)							PP=4.5+ tsf
10		9 (6) 11 (6)				14.9	30	14		PP=4.5+ tsf PP=4.5+ tsf % Passing No. 200 Sieve: 75
15		13 (6) 27 (6)		0	16	12.9			129	PP=4.5+ tsf
441.9			SAND, slightly compact to compact, dry, tan, uncemented, clayey, with gravel. [Lower Colorado] (SC)							SPT:24-28-21
20		40 (6) 48 (6)								SPT:12-10-11
25		21 (6) 45 (6)								SPT:17-15-15
428.9 30		28 (6) 16 (6)								

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 50.0 ft, and groundwater was not encountered to that depth. Below 50.0 ft, wet drilling techniques were used to advance. (N, E) = (10048941.5, 3148027.6)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: Rudy Ruiz Jr.

Organization: HVJ Associates



DRILLING LOG

2 of 3

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole BR-4
Structure Bridge
Station 11149+11.31
Offset 90.79L

District Austin
Date 8/7/2013
Grnd. Elev. 458.90 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
422.9		4 (6) 3 (6)	CLAY, soft, dry, tan, sandy, lean. [Lower Colorado] (CL)							SPT:2-4-5
		50 (6) 50 (5)	GRAVEL, dense, moist, tan, uncemented, clayey, with sand. [Lower Colorado] (GC)							PP=1.5 tsf
		33 (6) 50 (2.5)								SPT:50/5"
		50 (1.25) 50 (0.5)	SHALE, soft, dark gray, clay shale, highly weathered, fissured. [Taylor Group]	0	145	19.6			130	PP=4.5+ tsf
410.9		50 (2) 50 (0.75)		0	127	19.1			129	PP=4.5+ tsf
		50 (1) 50 (0.75)		0	20	19.3			123	PP=4.5+ tsf

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 50.0 ft, and groundwater was not encountered to that depth. Below 50.0 ft, wet drilling techniques were used to advance. (N, E) = (10048941.5, 3148027.6)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: Rudy Ruiz Jr.

Organization: HVJ Associates



DRILLING LOG

3 of 3

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole BR-4
Structure Bridge
Station 11149+11.31
Offset 90.79L

District Austin
Date 8/7/2013
Grnd. Elev. 458.90 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
			SHALE, soft, dark gray, clay shale, highly weathered, fissured. [Taylor Group]							
65		50 (1) 50 (0.25)								PP=4.5+ tsf
70		50 (1) 50 (0.5)								SPT:32-46-50/4"
75		50 (1) 50 (0.5)								SPT:46-50/3"
378.9 80		50 (2.25) 50 (1)								SPT:42-50/3"
85										
90										
<p>Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 50.0 ft, and groundwater was not encountered to that depth. Below 50.0 ft, wet drilling techniques were used to advance. (N, E) = (10048941.5, 3148027.6)</p> <p>The ground water elevation was not determined during the course of this boring.</p>										

Driller: Core Tech

Logger: Rudy Ruiz Jr.

Organization: HVJ Associates



DRILLING LOG

1 of 3

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole BR-5
Structure Bridge
Station 11183+75.99
Offset 1.57R

District Austin
Date 8/1/2013
Grnd. Elev. 444.40 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
441.4			CLAY, hard, dry, dark brown, fat, with sand and gravel seams. [Fill] (CH)			20.4	72	40		PP=4.5+ tsf
										PP=4.5+ tsf
										% Passing No. 200 Sieve: 83
5		8 (6) 9 (6)	CLAY, soft, moist, olive green, sandy, fat. [Taylor Group] (CH)							
438.4										PP=4.5+ tsf
			CLAY, soft to stiff, moist, tan and light gray, sandy, fat, with calcite nodules. [Taylor Group] (CH)	0	36	18.5			128	PP=4.5+ tsf
10		9 (6) 9 (6)								PP=4.5+ tsf
										% Passing No. 200 Sieve: 64
						26.7	86	52		
15		7 (6) 8 (6)								PP=4.5+ tsf
										PP=4.5+ tsf
20		8 (6) 10 (6)								
				0	38	39.0			118	PP=4.5+ tsf
25		12 (6) 16 (6)								
416.4										PP=4.5+ tsf
30		50 (5.75) 50 (5.75)	SHALE, soft, dark gray, clay shale, highly weathered, fissured. [Taylor Group]							

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 40.0 ft, and groundwater was not encountered to that depth. Below 55.0 ft, wet drilling techniques were used to advance. (N, E) = (10047223.05, 3151035.02)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: Rudy Ruiz Jr.

Organization: HVJ Associates



DRILLING LOG

2 of 3

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole BR-5
Structure Bridge
Station 11183+75.99
Offset 1.57R

District Austin
Date 8/1/2013
Grnd. Elev. 444.40 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
			SHALE, soft, dark gray, clay shale, highly weathered, fissured. [Taylor Group]							PP=4.5+ tsf
						27.6	92	60		% Passing No. 200 Sieve: 98
35		50 (2) 50 (1.25)								PP=4.5+ tsf
										PP=4.5+ tsf
40		50 (1.25) 50 (1.25)								PP=4.5+ tsf
										PP=4.5+ tsf
45		50 (1.5) 50 (1.25)								PP=4.5+ tsf
										PP=4.5+ tsf
50		50 (1.5) 50 (1.25)								PP=4.5+ tsf
										PP=4.5+ tsf
				0	293	16.4			134	PP=4.5+ tsf
55		50 (1.75) 50 (1.25)								PP=4.5+ tsf
										PP=4.5+ tsf
60		50 (1.5) 50 (1.25)								PP=4.5+ tsf

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 40.0 ft, and groundwater was not encountered to that depth. Below 55.0 ft, wet drilling techniques were used to advance. (N, E) = (10047223.05, 3151035.02)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: Rudy Ruiz Jr.

Organization: HVJ Associates



DRILLING LOG

3 of 3

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole BR-5
Structure Bridge
Station 11183+75.99
Offset 1.57R

District Austin
Date 8/1/2013
Grnd. Elev. 444.40 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
			SHALE, soft, dark gray, clay shale, highly weathered, fissured. [Taylor Group]							
				0	232	17.5			130	PP=4.5+ tsf
65		50 (1.5) 50 (1.25)								
										PP=4.5+ tsf
70		50 (1.5) 50 (1.25)								
										SPT:20-22-30
75		50 (1.75) 50 (1.25)								
										SPT:27-33-40
364.4 80		50 (1.25) 50 (1)								
85										
90										

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 40.0 ft, and groundwater was not encountered to that depth. Below 55.0 ft, wet drilling techniques were used to advance. (N, E) = (10047223.05, 3151035.02)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: Rudy Ruiz Jr.

Organization: HVJ Associates



DRILLING LOG

1 of 3

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole BR-6
Structure Bridge
Station 11189+24.03
Offset 0.75R

District Austin
Date 8/1/2013
Grnd. Elev. 438.80 ft
GW Elev. 404.80 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
435.8			CLAY, hard, dry, light brown to dark brown, gravelly, fat. [Fill] (CH)							PP=4.5+ tsf
5		7 (6) 10 (6)	CLAY, soft, moist, dark brown, fat. [Lower Colorado] (CH)							PP=4.5+ tsf
432.8			CLAY, soft to stiff, moist, brown, fat, trace of sand. [Lower Colorado] (CH)			17.5	50	36		PP=4.5+ tsf % Passing No. 200 Sieve: 91
10		9 (6) 12 (6)								PP=3.0 tsf
				0	42	17.8			123	PP=3.0 tsf
15		9 (6) 14 (6)								PP=4.0 tsf
20		11 (6) 13 (6)		0	47	18.1			127	PP=3.0 tsf
25		7 (6) 9 (6)								PP=2.0 tsf
412.8			CLAY, hard, dry, light brown, sandy, lean, with gravel. [Lower Colorado] (CL)			20.7	43	30		% Passing No. 200 Sieve: 68
30		50 (5.5) 50 (3.5)								

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 45.0 ft, and groundwater was encountered at 34 ft. Below 45.0 ft, wet drilling techniques were used to advance. (N, E) = (10046941.72, 3151504.92)

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Core Tech

Logger: Rudy Ruiz Jr

Organization: HVJ Associates



DRILLING LOG

2 of 3

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole BR-6
Structure Bridge
Station 11189+24.03
Offset 0.75R

District Austin
Date 8/1/2013
Grnd. Elev. 438.80 ft
GW Elev. 404.80 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
405.8			CLAY, hard, dry, light brown, sandy, lean, with gravel. [Lower Colorado] (CL)							SPT:22-16-6 % Passing No. 200 Sieve: 15
35		50 (4.5) 50 (5)	SAND, dense, dry, light brown, uncemented, clayey, with gravel. [Lower Colorado] (SC)			10.2	33	14		
401.8			SHALE, soft, dark gray, clay shale, highly weathered, fissured. [Taylor Group]							PP=4.5+ tsf
40		50 (3.25) 50 (1.5)								PP=4.5+ tsf
45		50 (2) 50 (1.5)								PP=4.5+ tsf
50		50 (1.75) 50 (1)								PP=4.5+ tsf
55		50 (2) 50 (1.5)		0	128	29.3			124	PP=4.5+ tsf
60		50 (1.75) 50 (1)								PP=4.5+ tsf

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 45.0 ft, and groundwater was encountered at 34 ft. Below 45.0 ft, wet drilling techniques were used to advance. (N, E) = (10046941.72, 3151504.92)

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Core Tech

Logger: Rudy Ruiz Jr

Organization: HVJ Associates



DRILLING LOG

3 of 3

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole BR-6
Structure Bridge
Station 11189+24.03
Offset 0.75R

District Austin
Date 8/1/2013
Grnd. Elev. 438.80 ft
GW Elev. 404.80 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
65		50 (1) 50 (0.5)	SHALE, soft, dark gray, clay shale, highly weathered, fissured. [Taylor Group]							PP=4.5+ tsf
70		50 (1.75) 50 (0.5)								SPT:21-30-42
75		50 (1.5) 50 (0.5)								PP=4.5+ tsf
358.8 80		50 (1.75) 50 (1)								PP=4.5+ tsf
85										
90										

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 45.0 ft, and groundwater was encountered at 34 ft. Below 45.0 ft, wet drilling techniques were used to advance. (N, E) = (10046941.72, 3151504.92)

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Core Tech

Logger: Rudy Ruiz Jr

Organization: HVJ Associates



DRILLING LOG

1 of 3

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole BR-7
Structure Bridge
Station 11196+38.18
Offset 32.83R

District Austin
Date 8/2/2013
Grnd. Elev. 437.40 ft
GW Elev. 403.40 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
435.4			CLAY, hard, dry, dark brown, sandy, fat, with organics. [Fill] (CH)			46	22			PP=4.5+ tsf
			CLAY, soft, moist, brown, fat, with trace of sand. [Lower Colorado] (CH)			30.8	80	41		PP=1.5 tsf % Passing No. 200 Sieve: 94
432.4	5	5 (6) 9 (6)	CLAY, soft to stiff, moist, brown, lean. [Lower Colorado] (CL)			18.8	46	22		PP=4.5+ tsf % Passing No. 200 Sieve: 89
				0	68	17.8			134	PP=4.0 tsf
10		4 (6) 7 (6)								PP=2.5 tsf % Passing No. 200 Sieve: 88
15		7 (6) 9 (6)				21.5	43	20		PP=2.5 tsf
				0	28	22.2			126	PP=2.5 tsf
20		7 (6) 9 (6)								PP=2.0 tsf
				0	26	23.5			133	PP=2.0 tsf
25		6 (6) 8 (6)								PP=1.5 tsf
30		5 (6) 8 (6)								

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 40.0 ft, and groundwater was encountered at 34 ft. Below 40.0 ft, wet drilling techniques were used to advance. (N, E) = (10046484.46, 3152051.07)

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual ground water elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Core Tech

Logger: Rudy Ruiz Jr

Organization: HVJ Associates



DRILLING LOG

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WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole BR-7
Structure Bridge
Station 11196+38.18
Offset 32.83R

District Austin
Date 8/2/2013
Grnd. Elev. 437.40 ft
GW Elev. 403.40 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
			SHALE, soft, dark gray, clay shale, highly weathered, fissured. [Taylor Group]	0	14	29.5			110	PP=4.5+ tsf
65		50 (2) 50 (2)								
70		50 (1.75) 50 (0.75)								PP=4.5+ tsf
75		50 (1.75) 50 (1.5)		0	65	22.3			122	PP=4.5+ tsf
357.4 80		50 (1.75) 50 (1)								PP=4.5+ tsf
85										
90										

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 40.0 ft, and groundwater was encountered at 34 ft. Below 40.0 ft, wet drilling techniques were used to advance. (N, E) = (10046484.46, 3152051.07)

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Core Tech

Logger: Rudy Ruiz Jr

Organization: HVJ Associates



DRILLING LOG

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WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole BR-8
Structure Bridge
Station 11199+98.24
Offset 75.87L

District Austin
Date 8/2/2013
Grnd. Elev. 438.90 ft
GW Elev. 395.90 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
436.9			CLAY, hard, dry, dark brown, sandy, fat, with gravel. [Fill] (CH)							PP=4.5+ tsf
			SAND, loose, moist, light brown, uncemented, clayey, with gravel. [Lower Colorado] (SC)			8.5	32	14		PP=4.5+ tsf % Passing No. 200 Sieve: 48
433.9 5		8 (6) 9 (6)	CLAY, soft, moist, brown, fat. [Lower Colorado] (CH)							PP=4.5+ tsf
				0	69	17.3			132	PP=4.5+ tsf
10		5 (6) 5 (6)								PP=4.5+ tsf
15		5 (6) 6 (6)								PP=4.5+ tsf
20		6 (6) 6 (6)								PP=4.5+ tsf
				0	34	21.7			126	PP=4.5+ tsf
				0	38	23.8			121	PP=4.5+ tsf
						23.8	50	30		% Passing No. 200 Sieve: 94
25		6 (6) 5 (6)								
				0	28	25.1			120	PP=4.5+ tsf
30		6 (6) 7 (6)								

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 45.0 ft, and groundwater was encountered at 43 ft. Below 45.0 ft, wet drilling techniques were used to advance. (N, E) = (10046321.40, 3152390.00)

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Core Tech

Logger: Rudy Ruiz Jr

Organization: HVJ Associates



DRILLING LOG

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WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole BR-8
Structure Bridge
Station 11199+98.24
Offset 75.87L

District Austin
Date 8/2/2013
Grnd. Elev. 438.90 ft
GW Elev. 395.90 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
406.9			CLAY, soft, moist, brown, fat. [Lower Colorado] (CH)							
			CLAY, soft, moist, olive green to brown, fat, stratified with sand/gravel seams. [Taylor Group] (CH)			25.1	79	46		PP=4.5+ tsf % Passing No. 200 Sieve: 66
35		9 (6) 8 (6)								
401.9			SHALE, soft, dark gray, clay shale, highly weathered, fissured. [Taylor Group]							PP=4.5+ tsf
40		50 (5) 50 (6)								SPT:10-13-16
45		50 (6) 50 (5.5)								PP=4.5+ tsf
50		13 (6) 17 (6)								
				0	59	29.9			119	PP=4.5+ tsf
55		50 (3.5) 50 (3)								
				0	75	31.7			117	PP=4.5+ tsf
60		50 (4.5) 50 (4)								

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 45.0 ft, and groundwater was encountered at 43 ft. Below 45.0 ft, wet drilling techniques were used to advance. (N, E) = (10046321.40, 3152390.00)

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Core Tech

Logger: Rudy Ruiz Jr

Organization: HVJ Associates



DRILLING LOG

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WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole BR-8
Structure Bridge
Station 11199+98.24
Offset 75.87L

District Austin
Date 8/2/2013
Grnd. Elev. 438.90 ft
GW Elev. 395.90 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
			SHALE, soft, dark gray, clay shale, highly weathered, fissured. [Taylor Group]							
				0	79	28.1			122	PP=4.5+ tsf
65		50 (4) 50 (3.75)								
				0	83	28.5			120	PP=4.5+ tsf
70		50 (3.75) 50 (3)								
										SPT:17-18-22
75		50 (4.5) 50 (4)								
										SPT:16-19-23
358.9 80		50 (2) 50 (1.75)								
85										
90										

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 45.0 ft, and groundwater was encountered at 43 ft. Below 45.0 ft, wet drilling techniques were used to advance. (N, E) = (10046321.40, 3152390.00)

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Core Tech

Logger: Rudy Ruiz Jr

Organization: HVJ Associates



DRILLING LOG

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WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole BR-9
Structure Bridge
Station 11203+77.35
Offset 77.59L

District Austin
Date 8/5/2013
Grnd. Elev. 437.40 ft
GW Elev. 402.40 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
435.9			CLAY, hard, dry, dark brown, sandy, fat, with gravel. [Fill] (CH)				58	29		PP=4.5+ tsf
			CLAY, stiff, dry, brown, lean, with sand and gravel. [Lower Colorado] (CL)							PP=4.5+ tsf
5		18 (6) 17 (6)				12.1	43	28		% Passing No. 200 Sieve: 76
				0	166	12.7			125	PP=4.5+ tsf
10		17 (6) 17 (6)								PP=4.5+ tsf
						14.9	39	18		% Passing No. 200 Sieve: 80
15		12 (6) 14 (6)								PP=4.5+ tsf
				0	74	14.7			126	PP=3.0 tsf
20		10 (6) 8 (6)								PP=2.0 tsf
				0	47	13.1			138	PP=2.0 tsf
412.4 25		10 (6) 13 (6)	CLAY, soft, moist, tan and light gray, fat, with sand seams. [Taylor Group] (CH)							PP=1.5 tsf
						31.5	58	29		% Passing No. 200 Sieve: 86
30		6 (6) 8 (6)								

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 80.0 ft, and groundwater was encountered at 35 ft. (N, E) = (10046063.20, 3152667.57)

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Core Tech

Logger: Paul Williams

Organization: HVJ Associates



DRILLING LOG

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WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole BR-9
Structure Bridge
Station 11203+77.35
Offset 77.59L

District Austin
Date 8/5/2013
Grnd. Elev. 437.40 ft
GW Elev. 402.40 ft

Elev. (ft)	L O G	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
35		7 (6) 11 (6)	CLAY, soft, moist, tan and light gray, fat, with sand seams. [Taylor Group] (CH)							
398.4										PP=4.5+ tsf
40		50 (3.5) 50 (3)	SHALE, soft, dark gray, clay shale, highly weathered, fissured. [Taylor Group]							
				0	91	28.5			119	PP=4.5+ tsf
45		50 (2.5) 50 (2)								
				0	110	29.8			122	PP=4.5+ tsf
50		50 (2) 50 (1.25)								
				0	43	29.9			121	PP=4.5+ tsf
55		38 (6) 41 (6)								
										PP=4.5+ tsf
60		50 (5) 50 (5.75)								

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 80.0 ft, and groundwater was encountered at 35 ft. (N, E) = (10046063.20, 3152667.57)

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Core Tech

Logger: Paul Williams

Organization: HVJ Associates



DRILLING LOG

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WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole BR-9
Structure Bridge
Station 11203+77.35
Offset 77.59L

District Austin
Date 8/5/2013
Grnd. Elev. 437.40 ft
GW Elev. 402.40 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
			SHALE, soft, dark gray, clay shale, highly weathered, fissured. [Taylor Group]							
				0	22	29.4			120	PP=4.5+ tsf
65		50 (5) 50 (1.5)								
										PP=4.5+ tsf
70		50 (3) 50 (2)								
				0	71	30.5			125	PP=4.5+ tsf
75		50 (2) 50 (1.5)								
										PP=4.5+ tsf
357.4 80		50 (2) 50 (1)								
85										
90										

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 80.0 ft, and groundwater was encountered at 35 ft. (N, E) = (10046063.20, 3152667.57)

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Core Tech

Logger: Paul Williams

Organization: HVJ Associates



DRILLING LOG

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WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole BR-10
Structure Bridge
Station 11209+97.97
Offset 26.47R

District Austin
Date 7/30/2013
Grnd. Elev. 436.30 ft
GW Elev. 403.30 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
432.3	5	22 (6) 23 (6)	CLAY, very stiff, moist, dark brown, fat, with organics and sand/gravel seams. [Fill] (CH)			22.2	88	63		PP=4.5+ tsf PP=4.5+ tsf % Passing No. 200 Sieve: 96
426.3	10	23 (6) 26 (6)	CLAY, very stiff, dry, dark brown, sandy, lean, trace of gravel. [Lower Colorado] (CL)			12.0	39	23		PP=4.0 tsf PP=3.5 tsf % Passing No. 200 Sieve: 66
	15	13 (6) 14 (6)	SAND, slightly compact, moist, tan, uncemented, clayey, with clay pockets. [Lower Colorado] (SC)			15.5	56	36		SPT:7-9-13 % Passing No. 200 Sieve: 22
418.3	20	9 (6) 12 (6)	SAND, loose to slightly compact, moist, tan and light gray, uncemented clayey. [Lower Colorado] (SC)	0	64	20.3			129	PP=4.0 tsf PP=3.5 tsf
	25	7 (6) 8 (6)		0	25	27.3			124	PP=1.0 tsf
	30	7 (6) 10 (6)								

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 40.0 ft, and groundwater was encountered at 33 ft. Below 40 ft, wet drilling techniques were used to advance. (N, E) = (10045562.57, 3153048.87)

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Core Tech

Logger: Paul Williams

Organization: HVJ Associates



DRILLING LOG

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WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole BR-10
Structure Bridge
Station 11209+97.97
Offset 26.47R

District Austin
Date 7/30/2013
Grnd. Elev. 436.30 ft
GW Elev. 403.30 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
402.3			SAND, loose to slightly compact, moist, tan and light gray, uncemented, clayey. [Lower Colorado] (SC)							PP=1.0 tsf
35		26 (6) 35 (6)	SAND, compact, moist, tan and light gray, uncemented, clayey, with gravel. [Lower Colorado] (SC)			14.5	93	56		% Passing No. 200 Sieve: 30
398.8			SHALE, soft, dark gray, clay shale, highly weathered, fissured. [Taylor Group]							PP=2.0 tsf
40		50 (3.5) 50 (3.5)								
				0	86	29.2			120	PP=4.5+ tsf
45		50 (2.5) 50 (1.75)								
										PP=4.5+ tsf
50		50 (3.5) 50 (3)								
				0	28	34.6			116	PP=4.5+ tsf
55		50 (1.75) 50 (1.75)								
										PP=4.5+ tsf
60		50 (2.5) 50 (2)								

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 40.0 ft, and groundwater was encountered at 33 ft. Below 40 ft, wet drilling techniques were used to advance. (N, E) = (10045562.57, 3153048.87)

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Core Tech

Logger: Paul Williams

Organization: HVJ Associates



DRILLING LOG

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WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole BR-10
Structure Bridge
Station 11209+97.97
Offset 26.47R

District Austin
Date 7/30/2013
Grnd. Elev. 436.30 ft
GW Elev. 403.30 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
			SHALE, soft, dark gray, clay shale, highly weathered, fissured. [Taylor Group]	0	99	31.0			123	PP=4.5+ tsf
65		50 (4.25) 50 (1.5)								
70		50 (1.5) 50 (1.25)								PP=4.5+ tsf
				0	55	29.1			118	PP=4.5+ tsf
75		50 (2) 50 (1.25)								
										PP=4.5+ tsf
356.3 80		50 (2.25) 50 (1.5)								
85										
90										

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 40.0 ft, and groundwater was encountered at 33 ft. Below 40 ft, wet drilling techniques were used to advance. (N, E) = (10045562.57, 3153048.87)

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Core Tech

Logger: Paul Williams

Organization: HVJ Associates



DRILLING LOG

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WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole BR-11
Structure Bridge
Station 11215+94.12
Offset 0.32R

District Austin
Date 7/31/2013
Grnd. Elev. 440.00 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
438.			CLAY, very stiff, moist, dark brown, fat, with sand, organics, and sand seams. (Fill) (CH)							PP=4.5+ tsf
			CLAY, stiff, dry, brown, sandy, lean. [Lower Colorado] (CL)							SPT:8-11-11
		11 (6) 13 (6)				8.8	30	17		% Passing No. 200 Sieve: 62
5										PP=4.5+ tsf
434.			CLAY, soft, moist, brown, fat, with sand. [Lower Colorado] (CH)							PP=4.5+ tsf
				0	126	14.7			136	PP=4.5+ tsf
		10 (6) 10 (6)								
10										
				0	67	16.8			131	PP=4.5+ tsf
		10 (6) 10 (6)								
15										
										PP=4.0 tsf
		8 (6) 8 (6)				18.2	48	34		% Passing No. 200 Sieve: 67
20										
										SPT:7-10-10
						21.3	64	37		% Passing No. 200 Sieve: 73
		10 (6) 9 (6)								
25										
414.			SAND, slightly compact, moist, brown, uncemented, clayey. [Lower Colorado] (SC)							PP=3.0 tsf
						14.2	62	42		% Passing No. 200 Sieve: 35
		9 (6) 11 (6)								
30										

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 50.0 ft, and groundwater was not encountered to that depth. Below 50.0 ft, wet drilling techniques were used to advance. (N, E) = (10045175.21, 3153502.90)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: Paul Williams

Organization: HVJ Associates



DRILLING LOG

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WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole BR-11
Structure Bridge
Station 11215+94.12
Offset 0.32R

District Austin
Date 7/31/2013
Grnd. Elev. 440.00 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
407.			SAND, slightly compact, moist, brown, uncemented, clayey. [Lower Colorado] (SC)							
405.	35	32 (6) 24 (6)	SAND, compact, moist, tan, uncemented, clayey, with gravel. [Lower Colorado] (SC)							SPT:7-11-6
			SHALE, soft, dark gray, clay shale, highly weathered, fissured. [Taylor Group]							
						28.8	81	47		SPT:14-18-23 % Passing No. 200 Sieve: 98
	40	50 (3.25) 50 (2)								
										SPT:12-19-26
	45	50 (3.25) 50 (2)								
						30.6	86	31		SPT:16-21-26 % Passing No. 200 Sieve: 97
	50	50 (3) 50 (2.5)		0	117	24.7			122	RUN=51-55;REC=67%;RQD=58%
	55	50 (2) 50 (2)								
										SPT:13-17-21
	60	36 (6) 28 (6)								

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 50.0 ft, and groundwater was not encountered to that depth. Below 50.0 ft, wet drilling techniques were used to advance. (N, E) = (10045175.21, 3153502.90)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: Paul Williams

Organization: HVJ Associates



DRILLING LOG

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WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole BR-11
Structure Bridge
Station 11215+94.12
Offset 0.32R

District Austin
Date 7/31/2013
Grnd. Elev. 440.00 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
65		40 (6) 50 (5.5)	SHALE, soft, dark gray, clay shale, highly weathered, fissured. [Taylor Group]							PP=4.5+ tsf
				0	30	29.4			120	PP=4.5+ tsf
70		50 (4) 50 (3)								
75		50 (3) 50 (3)								SPT:23-32-35
360. 80		50 (2) 50 (2)								SPT:50/5"
85										
90										

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 50.0 ft, and groundwater was not encountered to that depth. Below 50.0 ft, wet drilling techniques were used to advance. (N, E) = (10045175.21, 3153502.90)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: Paul Williams

Organization: HVJ Associates



DRILLING LOG

1 of 3

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole BR-12
Structure Bridge
Station 11224+52.82
Offset 0.60R

District Austin
Date 7/29/2013
Grnd. Elev. 449.60 ft
GW Elev. 400.00 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
448.6			CLAY, very stiff, moist, dark brown, fat, with organics. [Fill] SAND, loose to slightly compact, moist, tan and brown, uncemented, clayey, with gravel. [Fill]			17.7	72	35		PP=4.5+ tsf % Passing No. 200 Sieve: 93 SPT:7-9-10
5		10 (6) 11 (6)								PP=1.0 tsf PP=1.0 tsf
10		3 (6) 4 (6)								
438.6			CLAY, soft, moist, yellowish tan, fat. [Fill]			30.3	61	31		PP=0.5 tsf % Passing No. 200 Sieve: 93
15		3 (6) 4 (6)								
20		5 (6) 8 (6)	CLAY, soft, moist, light brown, fat, with sand. [Lower Colorado] (CH)							PP=2.0 tsf
25		11 (6) 11 (6)								
				0	43	14.6			105	
30		5 (6) 8 (6)								

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 55.0 ft, and groundwater was encountered at 49.5 ft. Below 55.0 ft, wet drilling techniques were used to advance. (N, E) = (10044590.14, 3154131.34)

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Core Tech

Logger: Paul Williams

Organization: HVJ Associates



DRILLING LOG

2 of 3

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole BR-12
Structure Bridge
Station 11224+52.82
Offset 0.60R

District Austin
Date 7/29/2013
Grnd. Elev. 449.60 ft
GW Elev. 400.00 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
35		6 (6) 6 (6)	CLAY, soft, moist, light brown, fat, with sand. [Lower Colorado] (CH)			23.3	66	18		PP=1.0 tsf % Passing No. 200 Sieve: 76
411.1				0	41	21.7			115	PP=1.5 tsf
40		34 (6) 48 (6)	SAND, dense, moist, tan, uncemented, clayey, with gravel and clay pockets. [Lower Colorado] (SC)							PP=1.5 tsf
45		50 (3) 50 (3.5)								
400.6										SPT:12-12-8
50		8 (6) 13 (6)	CLAY, slightly compact, wet, tan and light gray, gravelly, fat. [Lower Colorado] (CH)							SPT:4-6-7
		23 (6) 22 (6)								
395.6										
55			SHALE, soft, dark gray, clay shale, highly weathered, fissured. [Taylor Group]							
		8 (6) 11 (6)								
60										

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 55.0 ft, and groundwater was encountered at 49.5 ft. Below 55.0 ft, wet drilling techniques were used to advance. (N, E) = (10044590.14, 3154131.34)

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Core Tech

Logger: Paul Williams

Organization: HVJ Associates



DRILLING LOG

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WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole BR-12
Structure Bridge
Station 11224+52.82
Offset 0.60R

District Austin
Date 7/29/2013
Grnd. Elev. 449.60 ft
GW Elev. 400.00 ft

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
			SHALE, soft, dark gray, clay shale, highly weathered, fissured. [Taylor Group]	0	28	23.6			118	PP=2.5 tsf
65		4 (6) 7 (6)		0	32	29.6			126	PP=3.0 tsf
70		5 (6) 9 (6)								
		5 (6) 7 (6)								
75										SPT:14-22-27
		48 (6) 50 (5)								
80										SPT:14-13-18
				0	75	24.5			112	PP=4.5+ tsf
85		38 (6) 50 (4)								
				0	35	19.6			127	PP=4.5+ tsf
359.6 90		50 (3.25) 50 (2.25)								

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 55.0 ft, and groundwater was encountered at 49.5 ft. Below 55.0 ft, wet drilling techniques were used to advance. (N, E) = (10044590.14, 3154131.34)

Any ground water elevation information provided on this boring log is representative of conditions existing on the day and for the specific location where this information was collected. The actual groundwater elevation may fluctuate due to time, climatic conditions, and/or construction activity.

Driller: Core Tech

Logger: Paul Williams

Organization: HVJ Associates



DRILLING LOG

1 of 3

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole BR-13
Structure Bridge
Station
Offset

District Austin
Date 7/29/2013
Grnd. Elev. 450.80 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
448.8			CLAY, hard, dry, light brown, sandy, fat, with gravel. [Fill] (CH)							PP=4.5+ tsf
			CLAY, very stiff, moist, olive-green, fat, with calcite deposits. [Navarro] (CH)			16.5	66	32		PP=4.5+ tsf % Passing No. 200 Sieve: 86
5		12 (6) 12 (6)								PP=4.5+ tsf
										PP=4.5+ tsf
										PP=4.5+ tsf
10		14 (6) 12 (6)								
				0	71	21.6			118	PP=4.5+ tsf
15		48 (6) 45 (6)								
										PP=4.5+ tsf
20		19 (6) 23 (6)								
										PP=4.5+ tsf
427.8			SHALE, soft, dark gray, clay shale, fissured. [Taylor Group]			19.7	69	34		% Passing No. 200 Sieve: 90
25		50 (4) 50 (2)								
				0	516	16.2			133	PP=4.5+ tsf
30		50 (0.75) 50 (0.25)								

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 50.0 ft, and groundwater was not encountered to that depth. Below 50.0 ft, wet drilling techniques were used to advance. (N, E) = (10044014.45, 3154704.72)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: Paul Williams

Organization: HVJ Associates



DRILLING LOG

2 of 3

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole BR-13
Structure Bridge
Station
Offset

District Austin
Date 7/29/2013
Grnd. Elev. 450.80 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
35		50 (1.25) 50 (0.75)	SHALE, soft, dark gray, clay shale, fissured. [Taylor Group]							SPT:28-31-40
40		50 (1.25) 50 (1)				18	64	29		SPT:18-26-27 % Passing No. 200 Sieve: 87
45		50 (3.25) 50 (2)								SPT:16-28-27
50		50 (5) 47 (6)		0	179	26.2			115	SPT:16-18-26 RUN=50-55;REC=65%;RQD=65%
55		50 (1.75) 50 (1.5)		0	222	27.2			123	RUN=55-60;REC=86%;RQD=72%
60		50 (3.5) 50 (2.5)								RUN=60-65;REC=70%;RQD=30%

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 50.0 ft, and groundwater was not encountered to that depth. Below 50.0 ft, wet drilling techniques were used to advance. (N, E) = (10044014.45, 3154704.72)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: Paul Williams

Organization: HVJ Associates



DRILLING LOG

3 of 3

WinCore
Version 3.1

County Travis
Highway SH 71
CSJ 0265-01-110

Hole BR-13
Structure Bridge
Station
Offset

District Austin
Date 7/29/2013
Grnd. Elev. 450.80 ft
GW Elev. N/A

Elev. (ft)	LOG	Texas Cone Penetrometer	Strata Description	Triaxial Test		Properties				Additional Remarks
				Lateral Press. (psi)	Deviator Stress (psi)	MC	LL	PI	Wet Den. (pcf)	
65		50 (2.5) 50 (2)	SHALE, soft, dark gray, clay shale, fissured. [Taylor Group]							SPT:16-20-27 RUN=70-75;REC=77%;RQD=47%
70		50 (2.75) 50 (2)		0	286	26.0			115	
75		50 (3.25) 50 (2)								
370.8 80		50 (2.75) 50 (2.25)								
85										
90										

Remarks: SPT-N Values are not standard (170-lb hammer). Boring advanced by dry drilling techniques to 50.0 ft, and groundwater was not encountered to that depth. Below 50.0 ft, wet drilling techniques were used to advance. (N, E) = (10044014.45, 3154704.72)

The ground water elevation was not determined during the course of this boring.

Driller: Core Tech

Logger: Paul Williams

Organization: HVJ Associates

APPENDIX B
LABORATORY TEST RESULTS SUMMARY

LABORATORY TEST RESULTS SUMMARY SH-71 HNTB Pavement Borings					
Boring Number	Depth (ft)	% Passing No. 200 Sieve	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)
P-1	2-4	56	36	20	8.6
	6-8	82	39	16	13.3
	13-15	80	36	11	10.9
P-2	2-3.5	85	23	10	13.2
	4-6	75			
	6-8	84	37	23	14.8
	8-10	79	30	17	15.7
P-3	4-6	33	non-plastic		10.4
	8-10	67	28	15	14.9
	13-15	49	26	14	11.4
P-4	4-6	77	52	24	17.5
	6-8	81			
	8-10	76	50	26	17.5
	13-15	91	53	39	22.3
P-5	2-4	85	51	23	28.8
	6-8	89	43	19	19.1
	8-10	88	57	23	23.5
P-6	4-6	86	72	46	16.9
	6-8	81			
	8-10	89	75	57	20.9
	13-15	89	45	31	15.8
P-7	4-6	43			8.0
	8-10	50	non-plastic		10.1
	13.5-15	22			6.0
P-8	2-4	61	38	25	15.2
	4-6	85			
	6-8	60	40	28	14.4
	8-10	78	49	33	20.5
P-9	2.5-4	71	27	13	7.9
	8-10	80	30	18	9.3
	13-15	93	42	22	13.5

LABORATORY TEST RESULTS SUMMARY SH-71 HNTB Pavement Borings					
Boring Number	Depth (ft)	% Passing No. 200 Sieve	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)
P-10	4-6	82	54	29	18.9
	6-8	68	49	34	15.7
	8-10	64			
	13-15	92	39	24	14.3
P-11					
P-12	2-4	73	55	32	15.3
	4-6	73	55	38	18.5
	6-8	65			
	8-10	47	24	11	9.1
P-13	4-6	70	29	14	21.4
	8-10	66	36	25	18.7
	13-15	20	40	29	23.0
P-14	2-4	63	34	23	14.0
	4-6	64	30	18	13.0
	8-9.5	17	24	13	4.8
P-15	2-4	85	53	38	24.6
	6-8	71	38	19	15.0
	13-15	45	24	14	10.5
P-16	4-6	65	89	59	25.9
	6-8	14	67	51	23.2
	13-15	8	40	28	17.6
P-17	2-4	30	48	34	10.5
	6-8	53	58	38	16.1
	13-15	37	27	16	10.5
P-18	4-6	87	69	42	31.4
	8-10	91	71	44	26.7
	13-15	47	49	31	10.7
P-19	4-6	65	34	23	14.7

LABORATORY TEST RESULTS SUMMARY SH-71 HNTB Pavement Borings					
Boring Number	Depth (ft)	% Passing No. 200 Sieve	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)
	8-10	43	25	15	11.7
	13-15	68	31	16	15.2
P-21	2-4	88	69	36	32.0
	4-6	93			
	6-8	73	60	43	18.9
	13-15	85	37	19	18.7
P-22	4-6	86	54	31	21.1
	8-10	88	37	23	18.6
	13-15	71	33	20	16.7
P-23	2-4	49	55	28	18.0
	4-6	81			
	6-8	82	48	33	16.7
	13-15	92	39	21	18.8
P-24	4-6	54	42	24	15.8
	8-10	65	32	21	14.8
	13-15	51	30	14	13.3
P-25	4-6	59	67	38	23.1
	6-8	70			
	8-10	67	76	50	24.3
	13-15	71	48	35	21.6
P-26	2-4	89	61	38	21.3
	6-8	83	43	31	15.3
	8-10	79	34	16	16.3
P-27	2-4	74	52	35	17.4
	4-6	89			
	6-8	80	52	30	18.3
	8-10	85	47	32	16.9
		85	71	71	75

LABORATORY TEST RESULTS SUMMARY

SH-71 HNTB

Retaining Wall Borings

Boring Number	Depth (ft)	% Passing No. 200 Sieve	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Unconfined Compressive Strength (psi)
RW-2	2-4				11.2	133	119	59
	13-15	48	35	22	11.0			
	18-20	43	24	12	11.2			
	24-25.5	19	20	8	4.0			
RW-3	6-8	69	81	64	18.8			
	8-10				18.8	129	109	206
	13-15	91	35	19	18.4			
	18-20				19.0	126		42
RW-4	2-4	57	34	20	13.6			
	8-10				14.1	135		57
	13-15	61	25	12	17.9			
	23-25	11	18	6	3.1			
RW-5	3-5	92	70	48	23.7			
	8-10				18.0	129		69
	13-15	80	37	20	15.6			
	18-20				18.6	130		53
RW-6	6-8	94	81	56	25.5			
	8-10				17.7	128		174
	18-20				20.1	128		50
	23-25	86	37	18	20.5			
RW-7	6-8	59	54	33	12.1			
	13-15				14.8	135		72
	18-20	63	84	58	29.1			
	28-30				22.5	131		71
RW-8	2-4	92	78	50	23.9			
	6-8				15.7	132		83
	13-15	90	38	22	18.5			
	18-20				18.5	130		39
RW-9	6-8	97	86	64	32.0			
	8-10				26.6	118		43
	18-20				23.4	128		112
	23-25	93	67	42	20.9			
RW-10	2-4	94	77	51	28.0			

LABORATORY TEST RESULTS SUMMARY**SH-71 HNTB****Retaining Wall Borings**

Boring Number	Depth (ft)	% Passing No. 200 Sieve	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Unconfined Compressive Strength (psi)
	6-8				33.9	118	88	42
	13-15	87	67	44	25.3			
	18-20				25.1	125	100	58
	23-25				21.4	128	106	150
RW-11	2-4				23.1	125	102	51
	6-8	87	50	25	24.9			
	8-10				26.4	118	93	35
	18-20				22.5	129	105	94
	23-25	97	70	48	24.8			
	28-30				27.2	124	97	62
RW-12	2-4	95	76	63	27.2			
	6-8				16.7	134	115	57
	8-10	94	51	31	19.7			
	13-15				21.2	129	106	52
	18-20	90	52	31	17.8			
	23-25							28
	28-30				27.2	122	96	48
		25	25	25	48	23	11	

LABORATORY TEST RESULTS SUMMARY SH-71 HNTB Bridge Borings								
Boring Number	Depth (ft)	% Passing No. 200 Sieve	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Unconfined Compressive Strength (psi)
BR-2	2-4	96	35	19	12.4			
	8-10				16.7	135	115	81
	18-20	22	31	18	7.1			
	23-25	14	29	14	5.2			
	33-35	84	47	28	22.3			
	48-50	24	42	22	14.0			
	58-60				20.1	128	107	97
	68-70				20.1	131	109	116
	78-80				21.5	129	107	90
BR-4	3-5		39	23				
	8-10	75	30	14	14.9			
	13-15				12.9	129	114	16
	48-50				19.6	130	108	145
	53-55				19.1	129	108	127
	58-60				19.3	123	103	20
BR-5	2-4	83	70	40	20.4			
	8-10				18.5	128	108	36
	13-15	64	86	52	26.7			
	23-25				39.0	118	85	38
	33-35	98	92	60	27.6			
	53-55				16.4	134	115	293
	63-65				17.5	130		232
BR-6	8-10	91	50	36	17.5			
	13-15				17.8	123		42
	23-25				18.1	127		47
	28-30	68	43	30	20.7			
	33-35	15	33	14	10.2			
	53-55				29.3	124		128
BR-7	2-4	94	80	41	30.8			
	6-8	89	46	22	18.8			
	8-10				17.8	134	114	68
	13-15	88	43	20	21.5			
	18-20				22.2	126	103	28
	23-25				23.5	133		26
	33-35				25.0	125	100	22
	43-45				29.1	121	94	61
	53-55				26.2	118	93	8

LABORATORY TEST RESULTS SUMMARY SH-71 HNTB Bridge Borings								
Boring Number	Depth (ft)	% Passing No. 200 Sieve	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Unconfined Compressive Strength (psi)
BR-8	63-65				29.5	110	85	14
	73-75				22.3	122		65
	2-4	48	32	14	8.5			
	8-10				17.3	132	113	69
	18-20				21.7	126	103	34
	23-25	94	50	31	23.8	121	99	38
	28-30				25.1	120	96	28
	33-35	66	79	32	25.1			
	53-55				29.9	119	92	59
	58-60				31.7	117		75
	63-65				28.1	122	95	79
	68-70				28.5	120	93	83
BR-9								
	3-5	76	43	28	12.1			
	6-8				12.7	125	111	166
	13-15	80	39	18	14.9			
	18-20				14.7	126	110	74
	23-25				13.1	138	122	47
	28-30	86	58	29	31.5			
	43-45				28.5	119	92	91
	48-50				29.8	122	94	110
	53-55				29.9	121	93	43
	63-65				29.4	120	93	22
	73-75				30.5	125	95	71
BR-10								
	2-4	96	88	62	22.2			
	8-10	66	39	23	12.0			
	14-15	22	56	36	15.5			
	19-21				20.3	129	107	64
	28-30				27.3	124	97	25
	33-35	30	93	56	14.5			
	43-45				29.2	120	93	86
	53-55				34.6	116	86	28
	63-65				31.0	123	94	99
	73-75				29.1	118	91	55
BR-11	3.5-5	62	30	17	8.8			
	8-10				14.7	136	118	126
	13-15				16.8	131	112	67
	18-20	67	48	34	18.2			

LABORATORY TEST RESULTS SUMMARY SH-71 HNTB Bridge Borings								
Boring Number	Depth (ft)	% Passing No. 200 Sieve	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Unconfined Compressive Strength (psi)
	23-25	73	64	37	21.3			
	28-30	35	62	42	14.2			
	38-40	98	81	47	28.8			
	48-50	97	86	31	30.6			
	54-55				24.7	122		117
	68-70				29.4	120	93	30
BR-12	0-2	90	72	35	17.7			
	13-15	93	61	31	30.3			
	28-30				14.6	105	92	43
	33-35	76	40	18	23.3			
	38-40				21.7	115		41
	63-65				23.6	118	95	28
	68-70				29.6	126		32
	83-85				24.5	112	90	75
	88-90				19.6	127	106	35
BR-13	2-3	86	66	32	16.5			
	13-15				21.6	118		71
	23-25	90	69	34	19.7			
	28-30				16.2	133	115	516
	38-40	87	64	29	18.0			
	50-52				26.2	115	91	179
	55-56				27.2	123	96	222
	70-71				26.0	115	92	286
		37	38	38	96	60	49	60

APPENDIX C
SULFATE CONTENT TEST RESULTS



September 19, 2013

Jason Schwarz
HVJ Associates, Inc.
4201 Freidrich Lane, Suite 110
Austin, Texas 78744-1045
TEL: (512) 447-9081
FAX (512) 443-3442
RE: SH 71

Order No.: 1309122

Dear Jason Schwarz:

DHL Analytical, Inc. received 9 sample(s) on 9/13/2013 for the analyses presented in the following report.

There were no problems with the analyses and all data for associated QC met EPA or laboratory specifications except where noted in the Case Narrative and all estimated uncertainties of results are within method specifications.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

A handwritten signature in red ink, appearing to read "John DuPont".

John DuPont
General Manager

This report was performed under the accreditation of the State of Texas Laboratory Certification Number: T104704211-13-11



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Sample Receipt Checklist

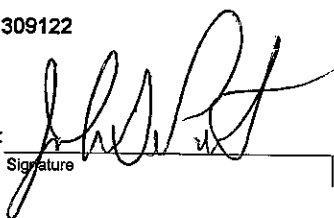
Client Name HVJ Associates, Inc.

Date Received: 9/13/2013

Work Order Number 1309122

Received by JGD

Checklist completed by:



9/13/2013

Signature

Date

Reviewed by

Initials

9/13/2013

Date

Carrier name LoneStar

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	25.1 °C
Water - VOA vials have zero headspace?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	No VOA vials submitted <input checked="" type="checkbox"/>
Water - pH<2 acceptable upon receipt?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	NA <input checked="" type="checkbox"/> LOT #
	Adjusted? _____	Checked by _____	
Water - pH>9 (S) or pH>12 (CN) acceptable upon receipt?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	NA <input checked="" type="checkbox"/> LOT #
	Adjusted? _____	Checked by _____	

Any No response must be detailed in the comments section below.

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding _____

Comments: _____

Corrective Action _____

CLIENT: HVJ Associates, Inc.**Project:** SH 71**Lab Order:** 1309122**CASE NARRATIVE**

Samples were analyzed using the methods outlined in the following references:

Sulfate Content in Soil by method TEX620J.

All method blanks, sample duplicates, laboratory spikes, and/or matrix spikes met quality assurance objectives.

DHL Analytical, Inc.**Date:** 19-Sep-13**CLIENT:** HVJ Associates, Inc.**Client Sample ID:** P-1 (2-4)**Project:** SH 71**Lab ID:** 1309122-01**Project No:** AG 1215282**Collection Date:** 09/12/13**Lab Order:** 1309122**Matrix:** SOIL

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
CHLORIDE AND SULFATE CONTENT IN SOIL		TEX620J					Analyst: JBC
Sulfate	37.7	2.00	4.99	N	ppm-dry	1	09/17/13 10:39 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

DHL Analytical, Inc.**Date:** 19-Sep-13**CLIENT:** HVJ Associates, Inc.**Client Sample ID:** P-5 (4-6)**Project:** SH 71**Lab ID:** 1309122-02**Project No:** AG 1215282**Collection Date:** 09/12/13**Lab Order:** 1309122**Matrix:** SOIL

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
CHLORIDE AND SULFATE CONTENT IN SOIL		TEX620J					Analyst: JBC
Sulfate	40.4	1.96	4.89	N	ppm-dry	1	09/17/13 11:20 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

DHL Analytical, Inc.**Date:** 19-Sep-13**CLIENT:** HVJ Associates, Inc.**Client Sample ID:** P-7 (2-4)**Project:** SH 71**Lab ID:** 1309122-03**Project No:** AG 1215282**Collection Date:** 09/12/13**Lab Order:** 1309122**Matrix:** SOIL

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
CHLORIDE AND SULFATE CONTENT IN SOIL		TEX620J					Analyst: JBC
Sulfate	78.0	1.98	4.95	N	ppm-dry	1	09/17/13 11:35 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

DHL Analytical, Inc.**Date:** 19-Sep-13**CLIENT:** HVJ Associates, Inc.**Client Sample ID:** P-9 (4-6)**Project:** SH 71**Lab ID:** 1309122-04**Project No:** AG 1215282**Collection Date:** 09/12/13**Lab Order:** 1309122**Matrix:** SOIL

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
CHLORIDE AND SULFATE CONTENT IN SOIL		TEX620J					Analyst: JBC
Sulfate	46.6	1.98	4.95	N	ppm-dry	1	09/17/13 11:50 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

DHL Analytical, Inc.**Date:** 19-Sep-13**CLIENT:** HVJ Associates, Inc.**Client Sample ID:** P-19 (2-4)**Project:** SH 71**Lab ID:** 1309122-05**Project No:** AG 1215282**Collection Date:** 09/12/13**Lab Order:** 1309122**Matrix:** SOIL

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
CHLORIDE AND SULFATE CONTENT IN SOIL		TEX620J					Analyst: JBC
Sulfate	148	1.98	4.95	N	ppm-dry	1	09/17/13 12:04 PM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

DHL Analytical, Inc.**Date:** 19-Sep-13**CLIENT:** HVJ Associates, Inc.**Client Sample ID:** P-22 (2-4)**Project:** SH 71**Lab ID:** 1309122-06**Project No:** AG 1215282**Collection Date:** 09/12/13**Lab Order:** 1309122**Matrix:** SOIL

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
CHLORIDE AND SULFATE CONTENT IN SOIL		TEX620J					Analyst: JBC
Sulfate	56.1	1.99	4.97	N	ppm-dry	1	09/17/13 12:19 PM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

DHL Analytical, Inc.**Date:** 19-Sep-13**CLIENT:** HVJ Associates, Inc.**Client Sample ID:** P-24 (4-6)**Project:** SH 71**Lab ID:** 1309122-07**Project No:** AG 1215282**Collection Date:** 09/12/13**Lab Order:** 1309122**Matrix:** SOIL

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
CHLORIDE AND SULFATE CONTENT IN SOIL		TEX620J					Analyst: JBC
Sulfate	47.3	1.98	4.96	N	ppm-dry	1	09/17/13 12:57 PM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

DHL Analytical, Inc.**Date:** 19-Sep-13**CLIENT:** HVJ Associates, Inc.**Client Sample ID:** P-26 (4-6)**Project:** SH 71**Lab ID:** 1309122-08**Project No:** AG 1215282**Collection Date:** 09/12/13**Lab Order:** 1309122**Matrix:** SOIL

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
CHLORIDE AND SULFATE CONTENT IN SOIL		TEX620J					Analyst: JBC
Sulfate	41.1	1.98	4.96	N	ppm-dry	1	09/17/13 01:12 PM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

DHL Analytical, Inc.**Date:** 19-Sep-13**CLIENT:** HVJ Associates, Inc.**Client Sample ID:** P-3 (2-4)**Project:** SH 71**Lab ID:** 1309122-09**Project No:** AG 1215282**Collection Date:** 09/12/13**Lab Order:** 1309122**Matrix:** SOIL

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
CHLORIDE AND SULFATE CONTENT IN SOIL		TEX620J					Analyst: JBC
Sulfate	138	1.95	4.87	N	ppm-dry	1	09/17/13 01:26 PM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	B	Analyte detected in the associated Method Blank
	C	Sample Result or QC discussed in the Case Narrative	DF	Dilution Factor
	E	TPH pattern not Gas or Diesel Range Pattern	J	Analyte detected between MDL and RL
	MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits
	N	Parameter not NELAC certified		

CLIENT: HVJ Associates, Inc.

Work Order: 1309122

Project: SH 71

ANALYTICAL QC SUMMARY REPORT

RunID: IC_130917A

The QC data in batch 59489 applies to the following samples: 1309122-01A, 1309122-02A, 1309122-03A, 1309122-04A, 1309122-05A, 1309122-06A, 1309122-07A, 1309122-08A, 1309122-09A

Sample ID	LCS-59489	Batch ID:	59489	TestNo:	Tex620J	Units:	ppm-dry			
SampType:	LCS	Run ID:	IC_130917A	Analysis Date:	9/17/2013 9:45:33 AM	Prep Date:	9/16/2013			
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit Qual

Sulfate	205	5.00	200.0	0	103	80	120			N
---------	-----	------	-------	---	-----	----	-----	--	--	---

Sample ID	LCSD-59489	Batch ID:	59489	TestNo:	Tex620J	Units:	ppm-dry			
SampType:	LCSD	Run ID:	IC_130917A	Analysis Date:	9/17/2013 10:00:10 AM	Prep Date:	9/16/2013			
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit Qual

Sulfate	209	5.00	200.0	0	104	80	120	1.60	20	N
---------	-----	------	-------	---	-----	----	-----	------	----	---

Sample ID	MB-59489	Batch ID:	59489	TestNo:	Tex620J	Units:	ppm-dry			
SampType:	MBLK	Run ID:	IC_130917A	Analysis Date:	9/17/2013 10:14:46 AM	Prep Date:	9/16/2013			
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit Qual

Sulfate	ND	5.00								N
---------	----	------	--	--	--	--	--	--	--	---

Sample ID	1309122-01A DUP	Batch ID:	59489	TestNo:	Tex620J	Units:	ppm-dry			
SampType:	DUP	Run ID:	IC_130917A	Analysis Date:	9/17/2013 11:06:23 AM	Prep Date:	9/16/2013			
Analyte		Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit Qual

Sulfate	35.8	4.98	0	37.68				5.25	25	N
---------	------	------	---	-------	--	--	--	------	----	---

Qualifiers:

B Analyte detected in the associated Method Blank

J Analyte detected between MDL and RL

ND Not Detected at the Method Detection Limit

RL Reporting Limit

J Analyte detected between SDL and RL

DF Dilution Factor

MDL Method Detection Limit

R RPD outside accepted control limits

S Spike Recovery outside control limits

N Parameter not NELAC certified

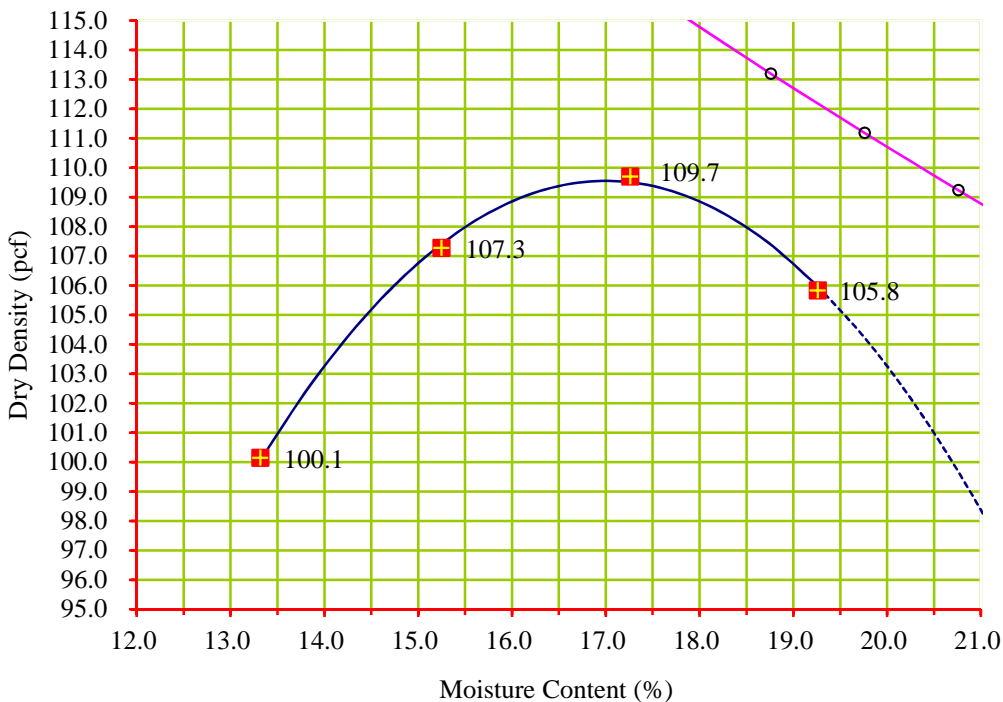
APPENDIX D
TEXAS TRIAXIAL TEST RESULTS



Houston | 4201 Freidrich Lane, Ste. 110
 Austin, TX 78744-1045
 512.447.9081 Ph
 Dallas | 512.443.3442 Fax
 San Antonio | www.hvj.com

Report No		Date Sampled	
Project Name	SH 71	Project Number	AG1215282
Client Name	HNTB	Work Order or CIP No.	
Lab. Technician	Jason Schwarz	Certification Type & No	Nicet II 111079
City Inspector		Report of	Moisture Density
Material Description		Material use Type	Texas Trixial
Material Source	#1	Date Tested	

Moisture - Density Relationship



Sieve Analysis

Size	% Passing	FAA adjusted
3"		
2"		
1 3/4"	100.0	
1 1/2"	100.0	
1"	100.0	
7/8"	100.0	
3/8"	100.0	
No. 4	100.0	
No. 10	98.9	100.0
No. 40	96.5	97.6
No. 200	76.0	76.8

Atterberg Limits

LL	PL	PI
39	16	22

Soil Classification

Unified:	CL	Group Index
AASHTO	A-6	12
FAA	E-7	

Test Method Used:

Soil Sampling	TEX-100E
Soil Preparation	TEX-101E
Liquid Limit	TEX-104E
Plastic Limit	TEX-105E
Plasticity Index	TEX-106E
Estimated Sieve Analysis	TEX-110E
Moisture Compaction M/D Relation	TEX 113-E
Standard Classification	ASTM D2487

* FAA classification with a * suffix indicates that it is possible to raise the classification if the coarse material is reasonably sound & fairly well graded.

Estimated Specific Gravity	2.75
----------------------------	------

Points on Graph: 4

Moisture Content in %	13.3	15.2	17.3	19.3
Dry Density (pcf)	100.1	107.3	109.7	105.8
Max Density (kg/m3)	1,754.9			
Maximum Density (pcf)	109.6			
Optimum Moisture(%)	17.0			

Std Error
0.14504

P.E. Signature

P.E. Seal

Report Review by: Jason Schwarz, PE
 Company Name HVJ Associates, Inc.
 Registration No. F-000646
 APPENDIX D-1-a

**HVJ ASSOCIATES, INC.
COMPACTION TEST**

Project: SH 71 **Project No.:** AG1215282

Client: _____ **Report No.:** #1

Sample Location: _____ **Date Sampled:** _____

Type of Material: _____ **Sampled by:** _____

Material Desc.: _____

Method of test: ☒ Tex-113-E

Mold Tare: _____ Mold Designation: 4"x6"

Mold Diameter (in): 4.0000

Rammer Type: ☐ Manual ☒ Mechanical

Hammer Wt.: ☒ 5.5-lbs ☒ 10-lbs

No. of Layers: ☐ 3 ☐ 5 ☒ other

Blows/Layer: ☐ 25 ☐ 56 ☒ other

Prep. Method: ☒ wet ☐ dry

☒ Tex-114-E

Sieve Size Est. % Ret.

3/4-in. _____

3/8-in. _____

1/4-in. _____

No. 4 _____

Oversize Corr.
Needed: ☐ yes ☒ no

Mold + wet soil (g)	4741	4942	5041	4993		
Mold tare (g)	2495	2495	2495	2495		
Sample Height (in)	6	6	6	6		
Mold Volume	0.044	0.044	0.044	0.044		
Wet soil (g)	2246	2447	2546	2498		
Wet unit weight (pcf)	113.48	123.64	128.64	126.21		
Water Added (% or g)	10	12	14	16		
Tare no.	CLA-8	CLA-4	CLA-2	CLA-9A		
Tare + wet soil (g)	2507.30	2634.60	2771.60	2749.30		
Tare + dry soil (g)	2239.00	2315.00	2397.00	2346.00		
Weight of water (g)	268.30	319.60	374.60	403.30		
Tare weight (g)	224.10	219.00	226.80	252.20		
Dry soil (g)	2014.90	2096.00	2170.20	2093.80		
Water content (%)	13.32	15.25	17.26	19.26		
Dry unit weight (pcf)	100.14	107.28	109.70	105.83		

Additional Tests Required:

Date Tested: _____

☒ Atterberg Limits

☒ Minus No. 200 Sieve Analysis

Tested by: _____

☐ Sieve Analysis

☐ Other

Checked by: _____

☐ Other

HVJ ASSOCIATES, INC.
ATTERBERG LIMITS DETERMINATION (ASTM D4318)

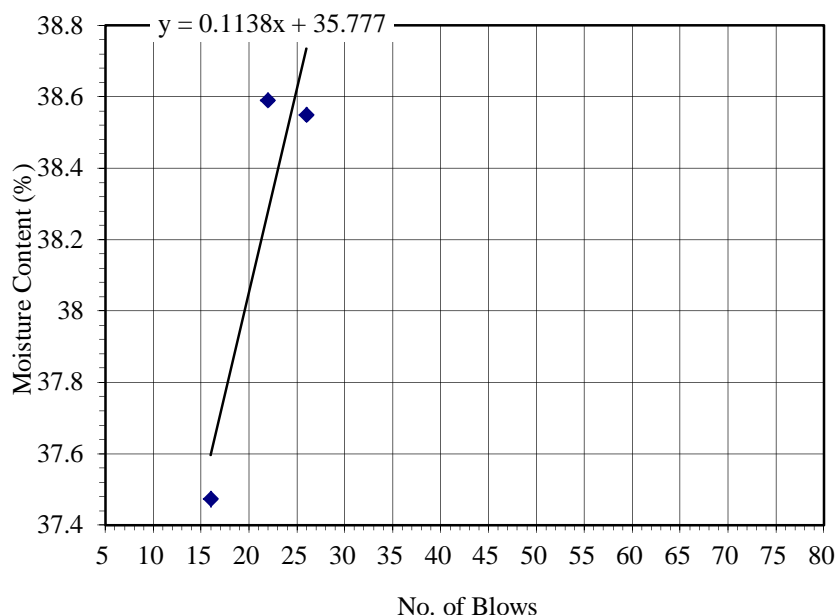
Project Name: SH 71 Project No.: AG1215282
 Report No.: Triax #1
 Client: _____ Date: _____

LIQUID LIMIT DETERMINATION

☒ Method A (Multipoint)

☐ Method B (One-Point)

Can No.	102	111	114		
Wet Wt + Tare (g)	30.2	26.84	29.41		
Dry Wt + Tare (g)	24.98	22.46	24.31		
Tare Wt (g)	11.05	11.11	11.08		
Moisture Content (%)	37.47	38.59	38.55		
No. of Blows	16	22	26		
Limit Limit (LL) - Method B	36	38	39		



Liquid Limit = 39

Plastic Limit = 16

Plasticity Index = 23

Estimated % of Mat.
 Retained on the
 No. 40 Sieve _____

PLASTIC LIMIT DETERMINATION

Can No.	105	112		
Wet Wt + Tare (g)	20.44	20.53		
Dry Wt + Tare (g)	19.16	19.2		
Tare Wt (g)	11.08	11.13		
Wt. of Dry Soil (g)	8.08	8.07		
Wt. of Water (g)	1.28	1.33		
Trial Plastic Limit	15.8	16.5		
PLASTIC LIMIT (PL)	16.2			

Date Tested: _____

Tested by: _____

Checked by: _____

HVJ ASSOCIATES, INC
SIEVE ANALYSIS (ASTM C-136)

Project Name: SH71 Project No.: AG1215282
Report No.: #1
Date: _____

Sample				
Tare Number	1245			
Total Weight + Tare	1406.9			
Tare Weight	447.9			
Sample Weight	1378.2			
Sieve Size/No.	Weight (grams)	Percent Retained	Percent Passing	Spec. % Passing
3"		0.0	100.0	
2"		0.0	100.0	
1-3/4"		0.0	100.0	
1-1/2"		0.0	100.0	
1"		0.0	100.0	
7/8"		0.0	100.0	
3/8"		0.0	100.0	
No. 4		0.0	100.0	
No. 10	15	1.1	98.9	
No. 40	48	3.5	96.5	
No. 200	331	24.0	76.0	
Pan	339	24.6	75.4	

Date Tested: _____
Tested by: _____
Checked by: _____



TEXAS DEPARTMENT OF TRANSPORTATION

TRIAxIAL COMPRESSION TESTS Tex-117-E

[Refresh Workbook](#)

File Version: 12/09/11 07:48:57

SAMPLE ID:	#1	SAMPLED DATE:	
TEST NUMBER:		LETTING DATE:	
SAMPLE STATUS:	Original	CONTROLLING CSJ:	
COUNTY:	TRAVIS	SPEC YEAR:	
SAMPLED BY:	Jason Schwarz	SPEC ITEM:	
SAMPLE LOCATION:	SH 71	SPECIAL PROVISION:	
MATERIAL CODE:		GRADE:	
MATERIAL NAME:	Dark brown fat clay with sand		
PRODUCER:	On-Site		
AREA ENGINEER:		PROJECT MANAGER:	

COURSE/LIFT:		STATION:		DIST. FROM CL:	
--------------	--	----------	--	----------------	--

Moisture-Density Data

Maximum Dry Density (pcf):	109.6
Optimum Moisture Content (%):	17.0
Hygroscopic Moisture Content (%):	
Mold Volume per Linear Inch (in ³ /in):	0.0163625

Mass of Mold (lb):	0
Mass of Material per Specimen (lb):	14.347
Mass of Water per Specimen (lb):	2.439

Performed By Tex-117-E:

<-- Select method of data collection.

Triaxial Test Data Sheet

Specimen Data

Specimen Number:	1	2	3	4	5	6	7	8	9
Cell No.:	1A	A	1C	1D	1E	1F			
Wet Mass Spec. & Mold, (lb):		15.986	16.587	16.515	16.085	16.334			
Wet Mass Specimen, (lb):		15.986	16.587	16.515	16.085	16.334			
Initial Height of Specimen, in.:		7.729	8.086	8.113	7.950	7.821			
Height of Stone 1, in.	0.000	0.000	0.000	0.000	0.000	0.000			
Height of Stone 2, in.	0.000	0.000	0.000	0.000	0.000	0.000			
New Height of Specimen, in.:	0.000	7.729	8.086	8.113	7.950	7.821			
Average Diameter, in.:		6.02	6.02	6.02	6.01	6.03			
Circumference, in. (manual):		18.922	18.925	18.916	18.884	18.934			
Area, in. ² :		28.49	28.50	28.47	28.38	28.53			
Avg. Cross Sectional Area, in. ² :		30.89	30.79	30.75	30.69	30.90			

Dry-Back Data

Wet Mass of Pan & Specimen, (lb)		17.524	17.762	17.696	16.570	17.782			
Dry Mass of Pan & Specimen, (lb):		14.927	15.207	15.115	14.087	14.952			
Mass of Pan, (lb):		1.548	1.186	1.197	0.498	1.490			
Dry Mass of Material, (lb):		13.380	14.021	13.918	13.589	13.461			
Mass of Water, (lb):		2.597	2.555	2.582	2.482	2.831			
Moisture Content, (%)		19.4	18.2	18.5	18.3	21.0			
Wet Density, (pcf):		126.4	125.4	124.4	123.7	127.6			
Dry Density, (pcf):		105.9	106.0	104.9	104.6	105.5			

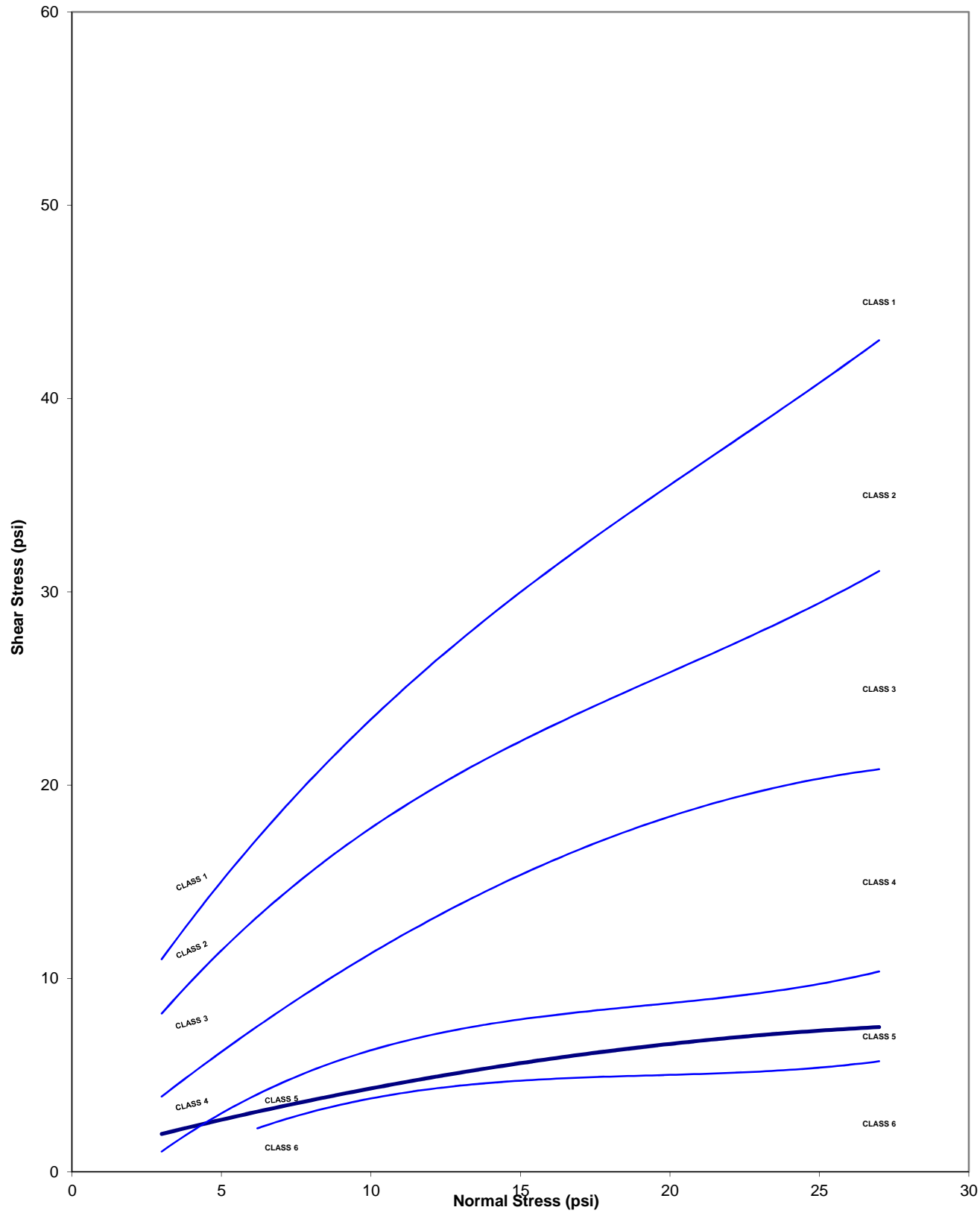
SCA Data									
Total Energy (lb-ft) Lift 1:									
Total Energy (lb-ft) Lift 2:									
Total Energy (lb-ft) Lift 3:									
Total Energy (lb-ft) Lift 4:									
Energy/Lift (lb-ft) Lift 1:									
Energy/Lift (lb-ft) Lift 2:									
Energy/Lift (lb-ft) Lift 3:									
Energy/Lift (lb-ft) Lift 4:									
Avg. Drop Ht. (lb-ft) Lift 1:									
Avg. Drop Ht. (lb-ft) Lift 2:									
Avg. Drop Ht. (lb-ft) Lift 3:									
Avg. Drop Ht. (lb-ft) Lift 4:									
No. of Blows (lb-ft) Lift 1:									
No. of Blows (lb-ft) Lift 2:									
No. of Blows (lb-ft) Lift 3:									
No. of Blows (lb-ft) Lift 4:									

Strength Data									
Lateral Pressure, psi.:		0	3	5	10	15			
Ring Factor, lbs./div		1	1	1	1	1			
Dead Load, lbs.:		0.000	0.000	0.000	0.000	0.000			
Max. Load Reading, div.		129	337	377	588	907			
Deformation at Max Load, in.		0.6000	0.6000	0.6000	0.6000	0.6000			
Uncorrected Stress, psi.:		4.5	11.8	13.2	20.7	31.8			
% Strain , in./in.:		7.76	7.42	7.40	7.55	7.67			
I-Strain, in./in.:		0.9224	0.9258	0.9260	0.9245	0.9233			
Corrected Stress, psi.:		4.2	10.9	12.3	19.2	29.4			
Classification:	5.8								
Internal Angle of Friction:	16.1								
Cohesion, psi:	1.1								
Correlation Factor:	0.9489								

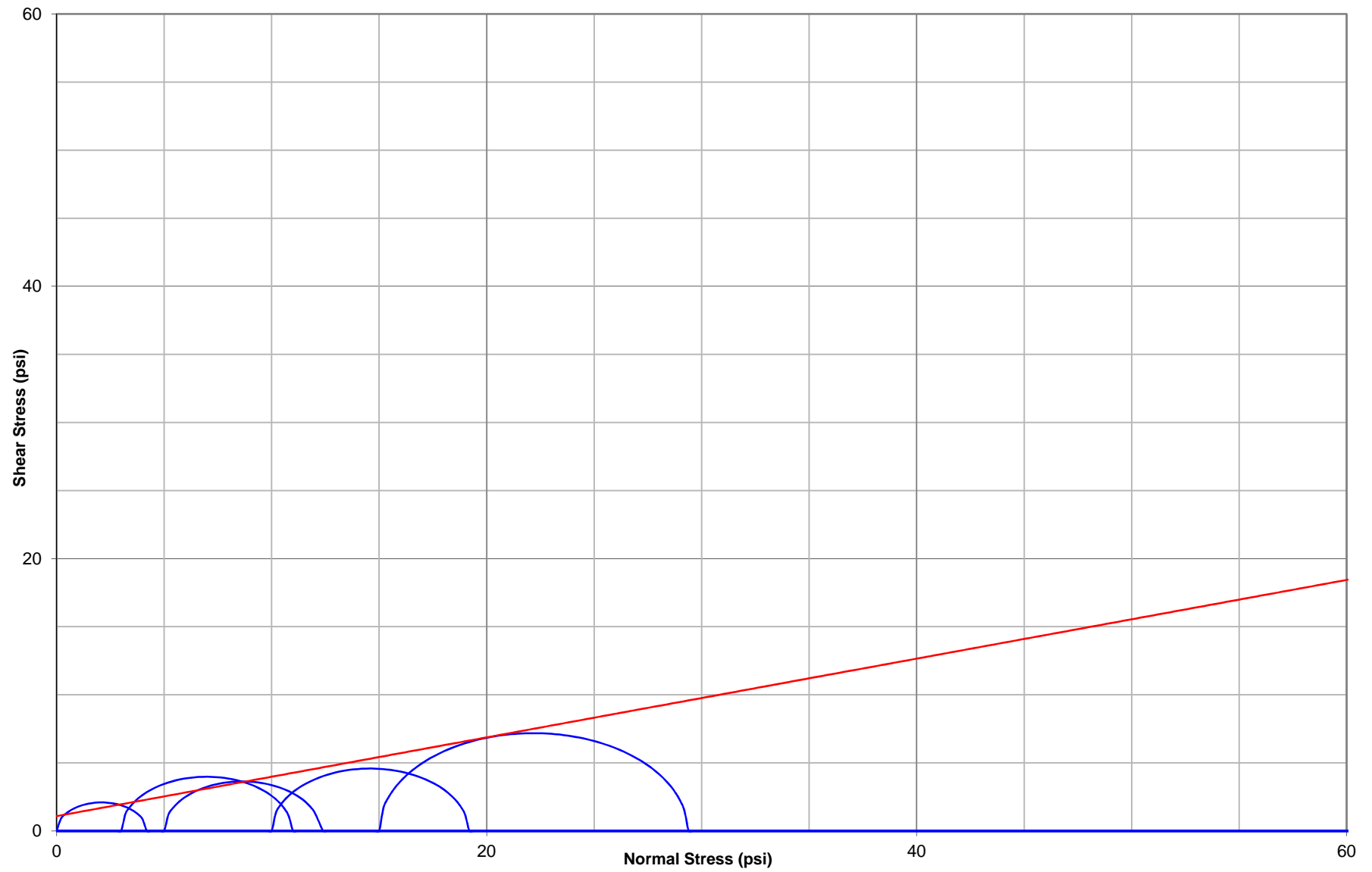
Remarks:

Test Method:	Tested By:	Tested Date:
TX117		
Test Stamp Code:	Omit Test:	Completed Date Reviewed By:
Locked By:	TxDOT:	District:
Authorized By:	Authorized Date:	

Classification Chart: #1



Mohr's Circles #1

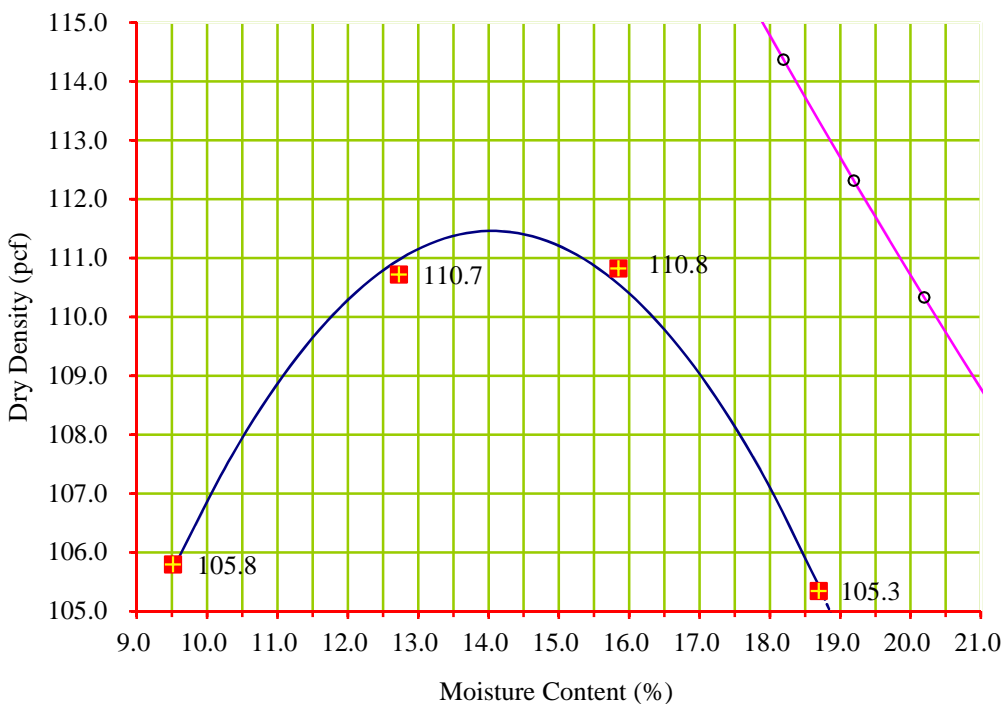




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 Dallas | 512.443.3442 Fax
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Report No		Date Sampled	
Project Name	SH 71	Project Number	AG1215282
Client Name	HNTB	Work Order or CIP No.	
Lab. Technician	Jason Schwarz	Certification Type & No	Nicet II 111079
City Inspector		Report of	Moisture Density
Material Description		Material use Type	Texas Trixial
Material Source	#2	Date Tested	

Moisture - Density Relationship



Sieve Analysis

Size	% Passing	FAA adjusted
3"		
2"		
1 3/4"	100.0	
1 1/2"	100.0	
1"	100.0	
7/8"	100.0	
3/8"	98.8	
No. 4	98.6	
No. 10	96.0	100.0
No. 40	90.6	94.4
No. 200	68.1	71.0

Atterberg Limits

LL	PL	PI
48	16	32
Soil Classification		
Unified:	CL	Group Index
AASHTO	A-7-5	15
FAA	E-8	

Test Method Used:

Soil Sampling	TEX-100E
Soil Preparation	TEX-101E
Liquid Limit	TEX-104E
Plastic Limit	TEX-105E
Plasticity Index	TEX-106E
Sieve Analysis	TEX-110E
Compaction M/D Relation	TEX 113-E
Standard Classification	ASTM D2487

Estimated Specific Gravity **2.75**

Points on Graph: 4

Moisture Content in %	9.5	12.7	15.8	18.7
Dry Density (pcf)	105.8	110.7	110.8	105.3
Max Density (kg/m3)	1,785.4			
Maximum Density (pcf)	111.5			
Optimum Moisture(%)	14.1			

Std Error
0.19330

* FAA classification with a * suffix indicates that it is possible to raise the classification if the coarse material is reasonably sound & fairly well graded.

P.E. Signature

P.E. Seal

Report Review by: Jason Schwarz, PE
 Company Name HVJ Associates, Inc.
 Registration No. F-000646
 APPENDIX D-2-a

HVJ ASSOCIATES, INC.
COMPACTION TEST

Project: SH 71 **Project No.:** AG1215282

Client: _____ **Report No.:** #2

Sample Location: _____ **Date Sampled:** _____

Type of Material: _____ **Sampled by:** _____

Material Desc.: _____

Method of test: ☒ **Tex-113-E**

Mold Tare: _____ Mold Designation: 6"x8.5"

Mold Diameter (in): 6.0000

Rammer Type: ☐ Manual ☒ Mechanical

Hammer Wt.: ☐ 5.5-lbs ☒ 10-lbs

No. of Layers: ☐ 3 ☐ 5 ☒ other

Blows/Layer: ☐ 25 ☐ 56 ☒ other

Prep. Method: ☒ wet ☐ dry

☐ **Tex-114-E**

Sieve Size Est. % Ret.

3/4-in. _____

3/8-in. _____

1/4-in. _____

No. 4 _____

Oversize Corr.
Needed: ☐ yes ☒ no

Mold + wet soil (g)	12215	12661	12869	12737		
Mold tare (g)	5179	5179	5179	5179		
Sample Height (in)	8.182	8.077	8.07	8.144		
Mold Volume	0.134	0.132	0.132	0.133		
Wet soil (g)	7036	7482	7690	7558		
Wet unit weight (pcf)	115.86	124.81	128.39	125.04		
Water Added (% or g)	6	9	12	15		
Tare no.	CLA-8	CLA-4	CLA-2	CLA-9A		
Tare + wet soil (g)	7679.00	7906.00	8179.00	8063.00		
Tare + dry soil (g)	7071.00	7074.00	7133.00	6876.00		
Weight of water (g)	608.00	832.00	1046.00	1187.00		
Tare weight (g)	681.00	536.00	533.00	527.00		
Dry soil (g)	6390.00	6538.00	6600.00	6349.00		
Water content (%)	9.51	12.73	15.85	18.70		
Dry unit weight (pcf)	105.80	110.72	110.83	105.34		

Additional Tests Required:

Date Tested: _____

☐ Atterberg Limits

Tested by: _____

☐ Minus No. 200 Sieve Analysis

☐ Sieve Analysis

Checked by: _____

☐ Other _____

☐ Other _____

HVJ ASSOCIATES, INC.
ATTERBERG LIMITS DETERMINATION (ASTM D4318)

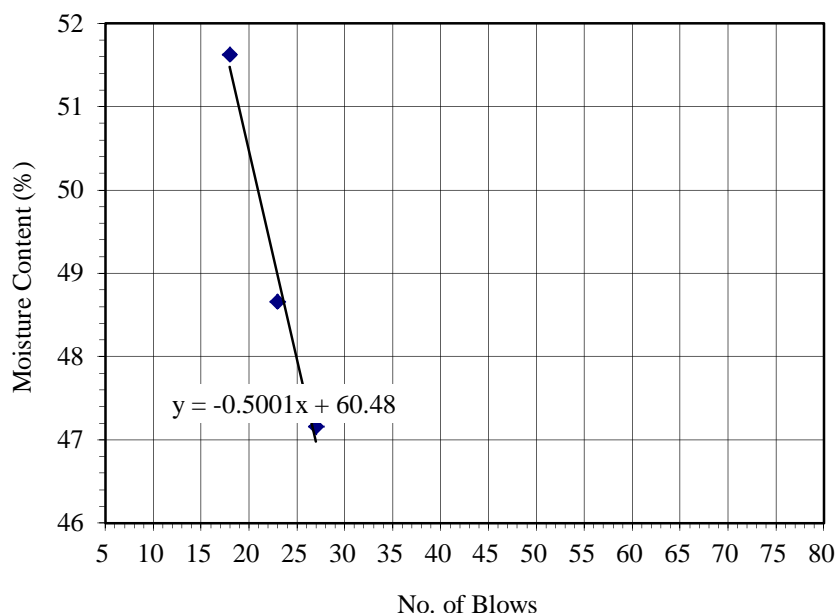
Project Name: SH 71 Project No.: AG1215282
 Report No.: #2
 Client: _____ Date: _____

LIQUID LIMIT DETERMINATION

☒ Method A (Multipoint)

☐ Method B (One-Point)

Can No.	113	100	110		
Wet Wt + Tare (g)	25.8	24.89	25.58		
Dry Wt + Tare (g)	21.07	20.37	20.65		
Tare Wt (g)	11.04	11.08	11.1		
Moisture Content (%)	47.16	48.65	51.62		
No. of Blows	27	23	18		
Limit Limit (LL) - Method B	48	48	50		



Liquid Limit = 48

Plastic Limit = 16

Plasticity Index = 32

Estimated % of Mat.

Retained on the
No. 40 Sieve _____

PLASTIC LIMIT DETERMINATION

Can No.	103	104		
Wet Wt + Tare (g)	22.02	22.69		
Dry Wt + Tare (g)	20.48	21.08		
Tare Wt (g)	11.1	11.04		
Wt. of Dry Soil (g)	9.38	10.04		
Wt. of Water (g)	1.54	1.61		
Trial Plastic Limit	16.4	16.0		
PLASTIC LIMIT (PL)	16.2			

Date Tested: _____

Tested by: _____

Checked by: _____

HVJ ASSOCIATES, INC
SIEVE ANALYSIS (ASTM C-136)

Project Name: SH 71 Project No.: AG1215282
Report No.: #2
Date: _____

Sample				
Tare Number	901			
Total Weight + Tare	3006			
Tare Weight	540			
Sample Weight	2912			
Sieve Size/No.	Weight (grams)	Percent Retained	Percent Passing	Spec. % Passing
3"		0.0	100.0	
2"		0.0	100.0	
1-3/4"		0.0	100.0	
1-1/2"		0.0	100.0	
1"		0.0	100.0	
7/8"		0.0	100.0	
3/8"	36	1.2	98.8	
No. 4	42	1.4	98.6	
No. 10	117	4.0	96.0	
No. 40	273	9.4	90.6	
No. 200	928	31.9	68.1	
Pan	937	32.2	67.8	

Date Tested: _____
Tested by: _____
Checked by: _____



TEXAS DEPARTMENT OF TRANSPORTATION

TRIAxIAL COMPRESSION TESTS Tex-117-E

[Refresh Workbook](#)

File Version: 12/09/11 07:48:57

SAMPLE ID:	#2	SAMPLED DATE:	
TEST NUMBER:		LETTING DATE:	
SAMPLE STATUS:	Original	CONTROLLING CSJ:	
COUNTY:	TRAVIS	SPEC YEAR:	
SAMPLED BY:	Jason Schwarz	SPEC ITEM:	
SAMPLE LOCATION:	SH 71	SPECIAL PROVISION:	
MATERIAL CODE:		GRADE:	
MATERIAL NAME:	Dark brown fat clay with sand		
PRODUCER:	On-Site		
AREA ENGINEER:		PROJECT MANAGER:	

COURSE/LIFT:		STATION:		DIST. FROM CL:	R
--------------	--	----------	--	----------------	---

Moisture-Density Data

Maximum Dry Density (pcf):	111.5
Optimum Moisture Content (%):	14.1
Hygroscopic Moisture Content (%):	
Mold Volume per Linear Inch (in ³ /in):	0.0163625

Mass of Mold (lb):	0
Mass of Material per Specimen (lb):	14.595
Mass of Water per Specimen (lb):	2.058

Performed By Tex-117-E:

<-- Select method of data collection.

Triaxial Test Data Sheet

Specimen Data

Specimen Number:	1	2	3	4	5	6	7	8	9
Cell No.:	1A	A	1C	1D	1E	1F			
Wet Mass Spec. & Mold, (lb):		16.854	16.781	16.982	16.541	16.903			
Wet Mass Specimen, (lb):		16.854	16.781	16.982	16.541	16.903			
Initial Height of Specimen, in.:		8.037	8.083	8.151	7.927	8.112			
Height of Stone 1, in.	0.000	0.000	0.000	0.000	0.000	0.000			
Height of Stone 2, in.	0.000	0.000	0.000	0.000	0.000	0.000			
New Height of Specimen, in.:	0.000	8.037	8.083	8.151	7.927	8.112			
Average Diameter, in.:		6.02	5.94	6.01	6.00	5.99			
Circumference, in. (manual):		18.919	18.661	18.878	18.837	18.818			
Area, in. ² :		28.48	27.71	28.36	28.24	28.18			
Avg. Cross Sectional Area, in. ² :		29.74	29.93	30.61	30.55	30.43			

Dry-Back Data

Wet Mass of Pan & Specimen, (lb)		17.335	17.921	17.701	18.131	18.512			
Dry Mass of Pan & Specimen, (lb):		15.179	15.836	15.587	15.891	16.367			
Mass of Pan, (lb):		0.498	1.182	1.177	1.199	1.490			
Dry Mass of Material, (lb):		14.680	14.654	14.409	14.691	14.877			
Mass of Water, (lb):		2.156	2.086	2.114	2.240	2.145			
Moisture Content, (%)		14.7	14.2	14.7	15.2	14.4			
Wet Density, (pcf):		128.2	126.9	127.3	127.5	127.3			
Dry Density, (pcf):		111.8	111.1	111.0	110.7	111.3			

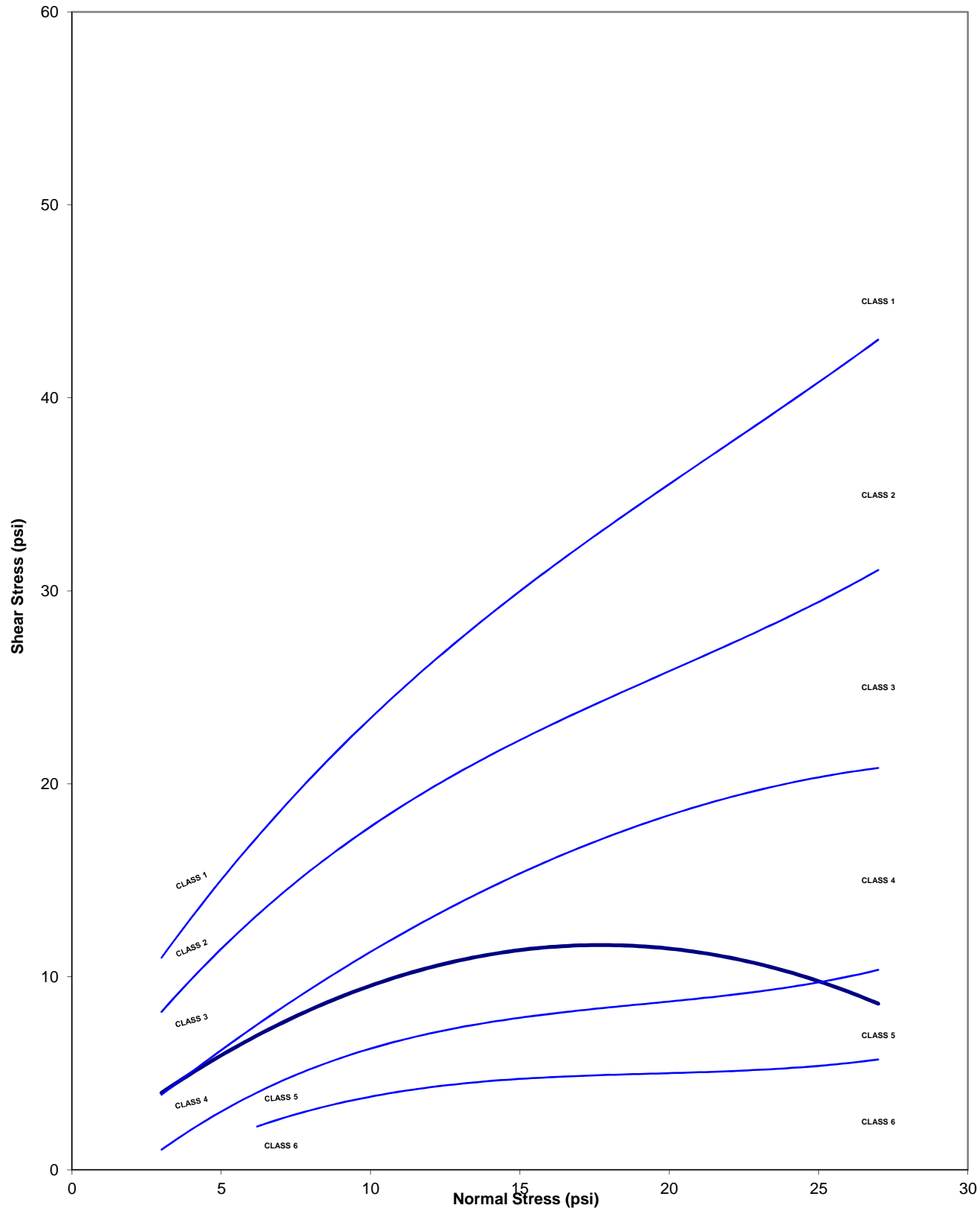
SCA Data									
Total Energy (lb-ft) Lift 1:									
Total Energy (lb-ft) Lift 2:									
Total Energy (lb-ft) Lift 3:									
Total Energy (lb-ft) Lift 4:									
Energy/Lift (lb-ft) Lift 1:									
Energy/Lift (lb-ft) Lift 2:									
Energy/Lift (lb-ft) Lift 3:									
Energy/Lift (lb-ft) Lift 4:									
Avg. Drop Ht. (lb-ft) Lift 1:									
Avg. Drop Ht. (lb-ft) Lift 2:									
Avg. Drop Ht. (lb-ft) Lift 3:									
Avg. Drop Ht. (lb-ft) Lift 4:									
No. of Blows (lb-ft) Lift 1:									
No. of Blows (lb-ft) Lift 2:									
No. of Blows (lb-ft) Lift 3:									
No. of Blows (lb-ft) Lift 4:									

Strength Data									
Lateral Pressure, psi.:		0	3	5	10	15			
Ring Factor, lbs./div		1	1	1	1	1			
Dead Load, lbs.:		0.000	0.000	0.000	0.000	0.000			
Max. Load Reading, div.		586	706	789	976	1150			
Deformation at Max Load, in.		0.3400	0.6000	0.6000	0.6000	0.6000			
Uncorrected Stress, psi.:		20.6	25.5	27.8	34.6	40.8			
% Strain , in./in.:		4.23	7.42	7.36	7.57	7.40			
I-Strain, in./in.:		0.9577	0.9258	0.9264	0.9243	0.9260			
Corrected Stress, psi.:		19.7	23.6	25.8	31.9	37.8			
Classification:	5.0								
Internal Angle of Friction:	22.3								
Cohesion, psi:	3.6								
Correlation Factor:	0.8021								

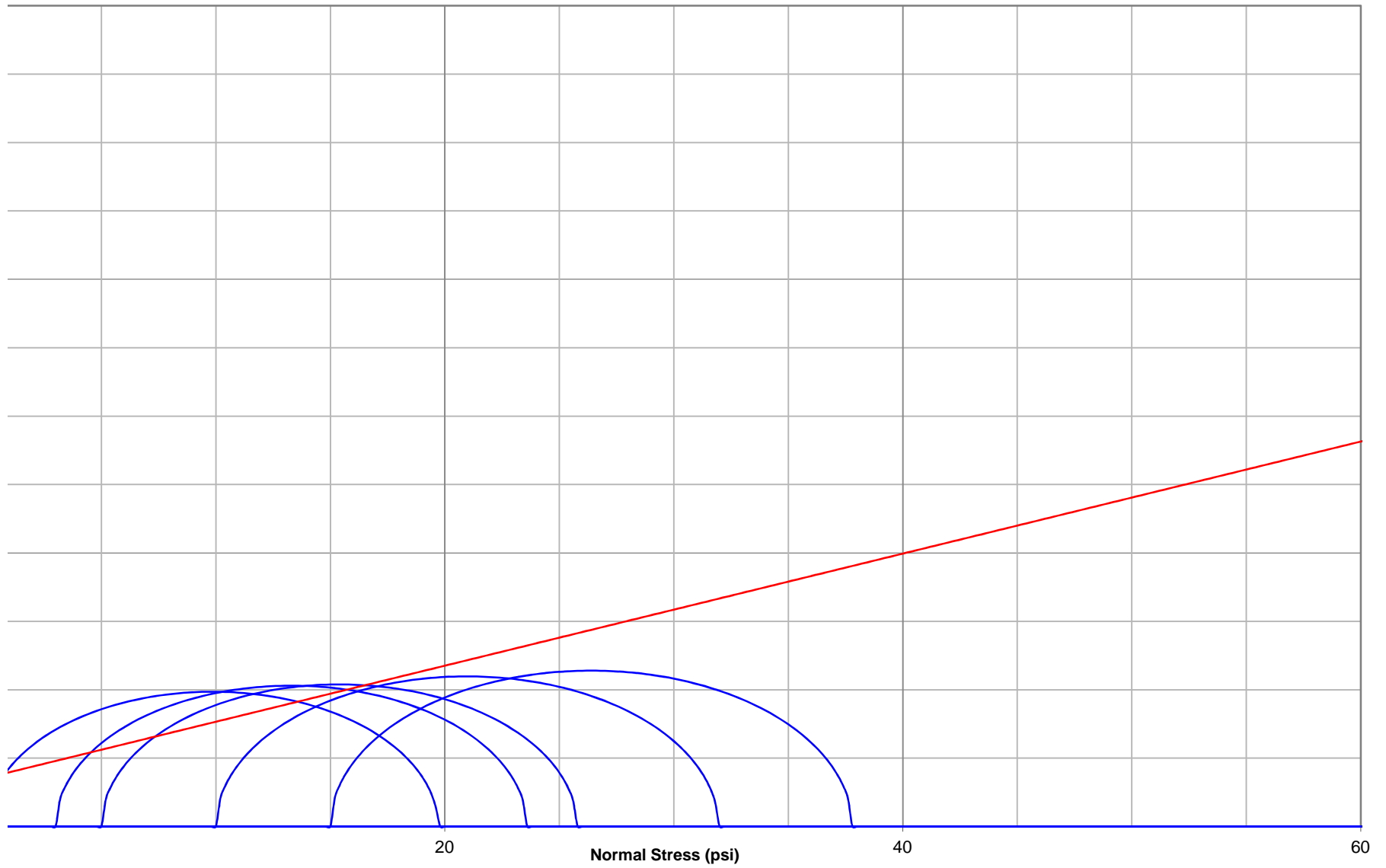
Remarks:

Test Method:	Tested By:	Tested Date:
TX117		
Test Stamp Code:	Omit Test:	Completed Da Reviewed By:
Locked By:	TxDOT:	District:
Authorized By:	Authorized Date:	

Classification Chart #2



Mohr's Circles #2

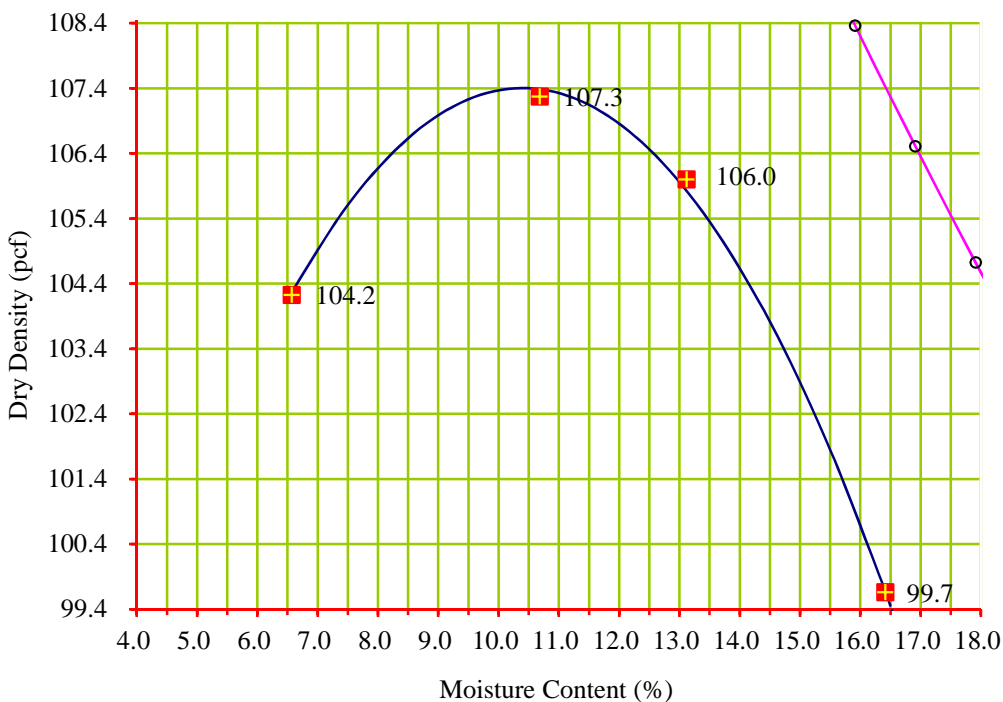




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 Dallas | 512.443.3442 Fax
 San Antonio | www.hvj.com

Report No		Date Sampled	
Project Name	SH 71	Project Number	AG 12 15282
Contractor Name		Work Order or CIP No.	
Lab. Technician		Certification Type & No	
City Inspector		Report of	
Material Description	Dark Brown Fat Clay (CH)'	Material use Type	
Material Source	130 WAB Triax	Date Tested	

Moisture - Density Relationship



Sieve Analysis

Size	% Passing	FAA adjusted
3"		
2"		
1 3/4"		
1 1/2"	100.0	
1"	94.7	
7/8"	91.8	
3/8"	79.1	
No. 4	66.9	
No. 10	59.9	100.0
No. 40	53.6	89.6
No. 200	44.2	73.8

Atterberg Limits

LL	PL	PI
56	22	34

Soil Classification

Unified:		Group Index
AASHTO	A-7-5	8
FAA	E-8	

Test Method Used:

Soil Sampling	TEX-100E
Soil Preparation	TEX-101E
Liquid Limit	TEX-104E
Plastic Limit	TEX-105E
Plasticity Index	TEX-106E
Sieve Analysis	TEX-110E
Compaction M/D Relation	TEX-113E
Standard Classification	ASTM D2487

Estimated Specific Gravity	2.40
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Points on Graph: 4

Moisture Content in %	6.6	10.7	13.1	16.4
Dry Density (pcf)	104.2	107.3	106.0	99.7
Max Density (kg/m3)	1,720.6			
Maximum Density (pcf)	107.4			
Optimum Moisture(%)	10.4			

Std Error	0.10495
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* FAA classification with a * suffix indicates that it is possible to raise the classification if the coarse material is reasonably sound & fairly well graded.

P.E. Signature

P.E. Seal

Report Review by: Jason Schwarz, PE
 Company Name: HVJ Associates, Inc.
 Registration No. F-000646
 APPENDIX D-3-a

HVJ ASSOCIATES, INC.
COMPACTION TEST

Project: SH 71 **Project No.:** AG 12 15282

Client: HNTB **Report No.:** _____

Sample Location: 130 WAB **Date Sampled:** _____

Type of Material: _____ **Sampled by:** _____

Material Desc.: Dark Brown Fat Clay (CH)

Method of test: ☐ Tex-113-E

Mold Tare: _____ Mold Designation: 6"x8.5"

Mold Diameter (in): 6.0000

Rammer Type: ☐ Manual ☒ Mechanical

Hammer Wt.: ☒ 5.5-lbs ☐ 10-lbs

No. of Layers: ☐ 3 ☐ 5 ☒ other

Blows/Layer: ☐ 25 ☐ 56 ☒ other

Prep. Method: ☒ wet ☐ dry

☒ Tex-114-E

Sieve Size Est. % Ret.

3/4-in. _____

3/8-in. _____

1/4-in. _____

No. 4 _____

Oversize Corr.
Needed: ☐ yes ☐ no

Mold + wet soil (g)	11854	12093	12332	12202		
Mold tare (g)	5179	5179	5179	5179		
Sample Height (in)	8.096	7.845	8.037	8.155		
Mold Volume	0.132	0.128	0.132	0.133		
Wet soil (g)	6675	6914	7153	7023		
Wet unit weight (pcf)	111.09	118.74	119.91	116.03		
Water Added (% or g)	3	6	9	12		
Tare no.	CLA-10	9A	3	8		
Tare + wet soil (g)	3899.00	4334.00	7789.00	3824.00		
Tare + dry soil (g)	3701.00	3981.00	6965.00	3380.00		
Weight of water (g)	198.00	353.00	824.00	444.00		
Tare weight (g)	687.00	676.00	683.00	675.00		
Dry soil (g)	3014.00	3305.00	6282.00	2705.00		
Water content (%)	6.57	10.68	13.12	16.41		
Dry unit weight (pcf)	104.24	107.29	106.01	99.67		

Additional Tests Required:

Date Tested: _____

☒ Atterberg Limits

☐ Minus No. 200 Sieve Analysis

Tested by: JRL

☒ Sieve Analysis

☐ Other _____

Checked by: _____

☐ Other _____

HVJ ASSOCIATES, INC.
ATTERBERG LIMITS DETERMINATION (ASTM D4318)

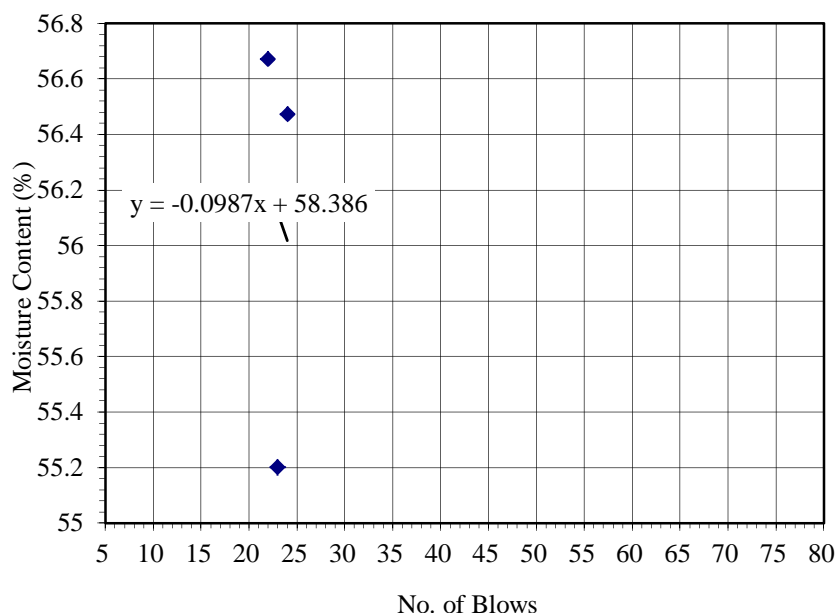
Project Name: SH 71 Project No.: AG 12 15282
 Client: HNTB Report No.: _____
 Date: _____

LIQUID LIMIT DETERMINATION

☒ Method A (Multipoint)

☐ Method B (One-Point)

Can No.	121	106	107		
Wet Wt + Tare (g)	22.41	22.27	22.46		
Dry Wt + Tare (g)	18.29	18.29	18.36		
Tare Wt (g)	11.02	11.08	11.1		
Moisture Content (%)	56.67	55.20	56.47		
No. of Blows	22	23	24		
Limit Limit (LL) - Method B	56	55	56		



Liquid Limit = 56

Plastic Limit = 22

Plasticity Index = 34

Estimated % of Mat.
 Retained on the
 No. 40 Sieve _____

PLASTIC LIMIT DETERMINATION

Can No.	102	113		
Wet Wt + Tare (g)	20.17	20.08		
Dry Wt + Tare (g)	18.52	18.43		
Tare Wt (g)	11.02	11.05		
Wt. of Dry Soil (g)	7.5	7.38		
Wt. of Water (g)	1.65	1.65		
Trial Plastic Limit	22.0	22.4		
PLASTIC LIMIT (PL)	22.2			

Date Tested: _____

Tested by: JRL

Checked by: _____

HVJ ASSOCIATES, INC
SIEVE ANALYSIS (ASTM C-136)

Project Name: SH 71 Project No.: AG 12 15282
Report No.: _____
Date: _____

Sample				
Tare Number				
Total Weight + Tare	3088			
Tare Weight	540			
Sample Weight	2548			
Sieve Size/No.	Weight (grams)	Percent Retained	Percent Passing	Spec. % Passing
3"		0.0	100.0	
2"		0.0	100.0	
1-3/4"		0.0	100.0	
1-1/2"		0.0	100.0	
1"	136	5.3	94.7	
7/8"	210	8.2	91.8	
3/8"	533	20.9	79.1	
No. 4	843	33.1	66.9	
No. 10	1022	40.1	59.9	
No. 40	1181	46.4	53.6	
No. 200	1422	55.8	44.2	
Pan	1447	56.8	43.2	

Date Tested: 9/14/12
Tested by: JRL
Checked by: _____



TEXAS DEPARTMENT OF TRANSPORTATION

TRIAxIAL COMPRESSION TESTS Tex-117-E

[Refresh Workbook](#)

File Version: 12/09/11 07:48:57

SAMPLE ID:	130 WAB	SAMPLED DATE:	
TEST NUMBER:		LETTING DATE:	
SAMPLE STATUS:	Original	CONTROLLING CSJ:	
COUNTY:	TRAVIS	SPEC YEAR:	
SAMPLED BY:	Jason Schwarz	SPEC ITEM:	
SAMPLE LOCATION:	SH 71	SPECIAL PROVISION:	
MATERIAL CODE:		GRADE:	
MATERIAL NAME:	Dark brown fat clay with sand		
PRODUCER:	On-Site		
AREA ENGINEER:		PROJECT MANAGER:	

COURSE/LIFT:		STATION:		DIST. FROM CL:	R
--------------	--	----------	--	----------------	---

Moisture-Density Data

Maximum Dry Density (pcf):	109.5
Optimum Moisture Content (%):	19.1
Hygroscopic Moisture Content (%):	
Mold Volume per Linear Inch (in ³ /in):	0.0163625

Mass of Mold (lb):	0
Mass of Material per Specimen (lb):	14.334
Mass of Water per Specimen (lb):	2.738

Performed By Tex-117-E:

<-- Select method of data collection.

Triaxial Test Data Sheet

Specimen Data

Specimen Number:	1	2	3	4	5	6	7	8	9
Cell No.:	1A	A	1C	1D	1E	1F			
Wet Mass Spec. & Mold, (lb):		16.618	16.671	16.579	16.627	16.583			
Wet Mass Specimen, (lb):		16.618	16.671	16.579	16.627	16.583			
Initial Height of Specimen, in.:		8.059	8.183	8.056	8.020	8.013			
Height of Stone 1, in.	0.000	0.000	0.000	0.000	0.000	0.000			
Height of Stone 2, in.	0.000	0.000	0.000	0.000	0.000	0.000			
New Height of Specimen, in.:	0.000	8.059	8.183	8.056	8.020	8.013			
Average Diameter, in.:		6.02	6.02	6.02	6.03	6.02			
Circumference, in. (manual):		18.912	18.906	18.922	18.931	18.900			
Area, in. ² :		28.46	28.44	28.49	28.52	28.43			
Avg. Cross Sectional Area, in. ² :		30.35	30.69	30.78	30.83	30.73			

Dry-Back Data

Wet Mass of Pan & Specimen, (lb)		17.767	17.840	17.725	17.760	17.754			
Dry Mass of Pan & Specimen, (lb):		14.555	14.667	14.555	14.546	14.508			
Mass of Pan, (lb):		1.188	1.195	1.188	1.182	1.190			
Dry Mass of Material, (lb):		13.366	13.472	13.366	13.364	13.318			
Mass of Water, (lb):		3.212	3.172	3.170	3.214	3.245			
Moisture Content, (%)		24.0	23.5	23.7	24.1	24.4			
Wet Density, (pcf):		126.0	124.5	125.8	126.7	126.5			
Dry Density, (pcf):		101.6	100.8	101.7	102.1	101.7			

SCA Data

Total Energy (lb-ft) Lift 1:									
Total Energy (lb-ft) Lift 2:									
Total Energy (lb-ft) Lift 3:									
Total Energy (lb-ft) Lift 4:									
Energy/Lift (lb-ft) Lift 1:									
Energy/Lift (lb-ft) Lift 2:									
Energy/Lift (lb-ft) Lift 3:									
Energy/Lift (lb-ft) Lift 4:									
Avg. Drop Ht. (lb-ft) Lift 1:									
Avg. Drop Ht. (lb-ft) Lift 2:									
Avg. Drop Ht. (lb-ft) Lift 3:									
Avg. Drop Ht. (lb-ft) Lift 4:									
No. of Blows (lb-ft) Lift 1:									
No. of Blows (lb-ft) Lift 2:									
No. of Blows (lb-ft) Lift 3:									
No. of Blows (lb-ft) Lift 4:									

Strength Data

Lateral Pressure, psi.:	0	3	5	10	15			
Ring Factor, lbs./div	1	1	1	1	1			
Dead Load, lbs.:	0.000	0.000	0.000	0.000	0.000			
Max. Load Reading, div.	508	740	982	1340	1637			
Deformation at Max Load, in.	0.5000	0.6000	0.6000	0.6000	0.6000			
Uncorrected Stress, psi.:	17.8	26.0	34.5	47.0	57.6			
% Strain , in./in.:	6.20	7.33	7.45	7.48	7.49			
I-Strain, in./in.:	0.9380	0.9267	0.9255	0.9252	0.9251			
Corrected Stress, psi.:	16.7	24.1	31.9	43.5	53.3			

Classification:	4.6
Internal Angle of Friction:	28.2
Cohesion, psi:	2.3
Correlation Factor:	0.9727

Remarks:

Test Method: Tested By: Tested Date:

TX117

Test Stamp Code: Omit Test: Completed Date Reviewed By:

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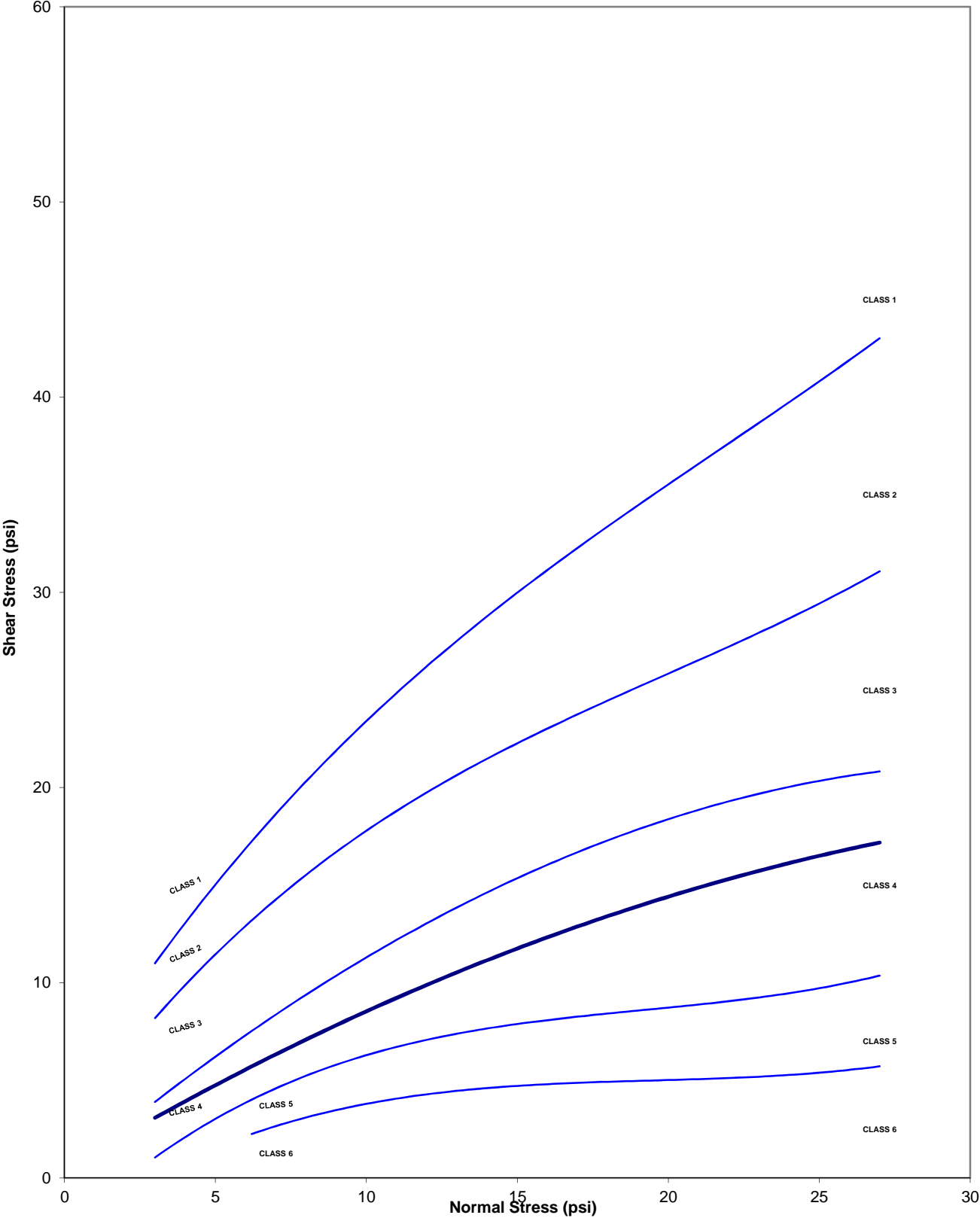
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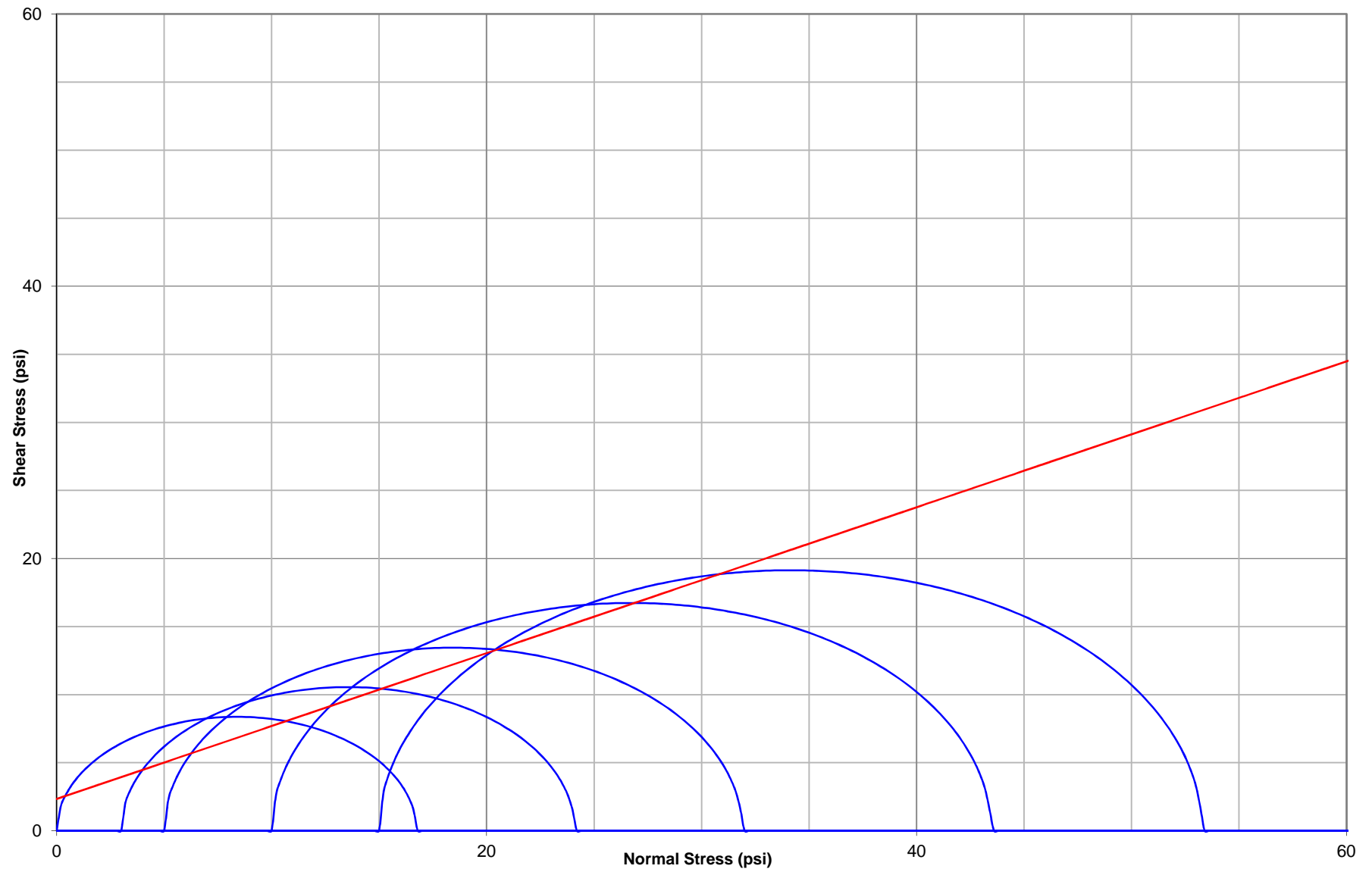
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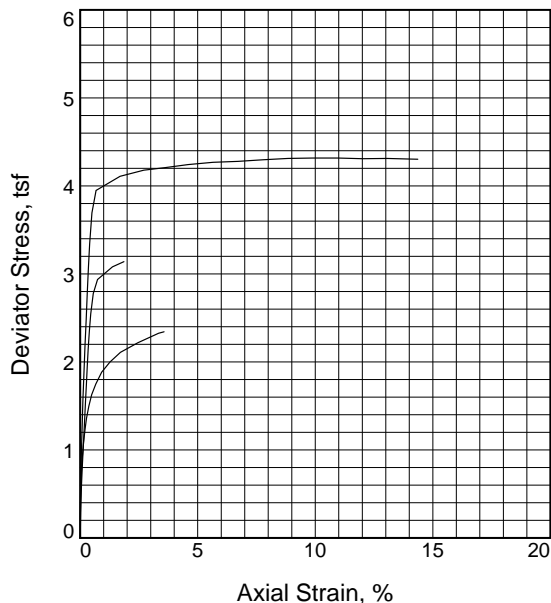
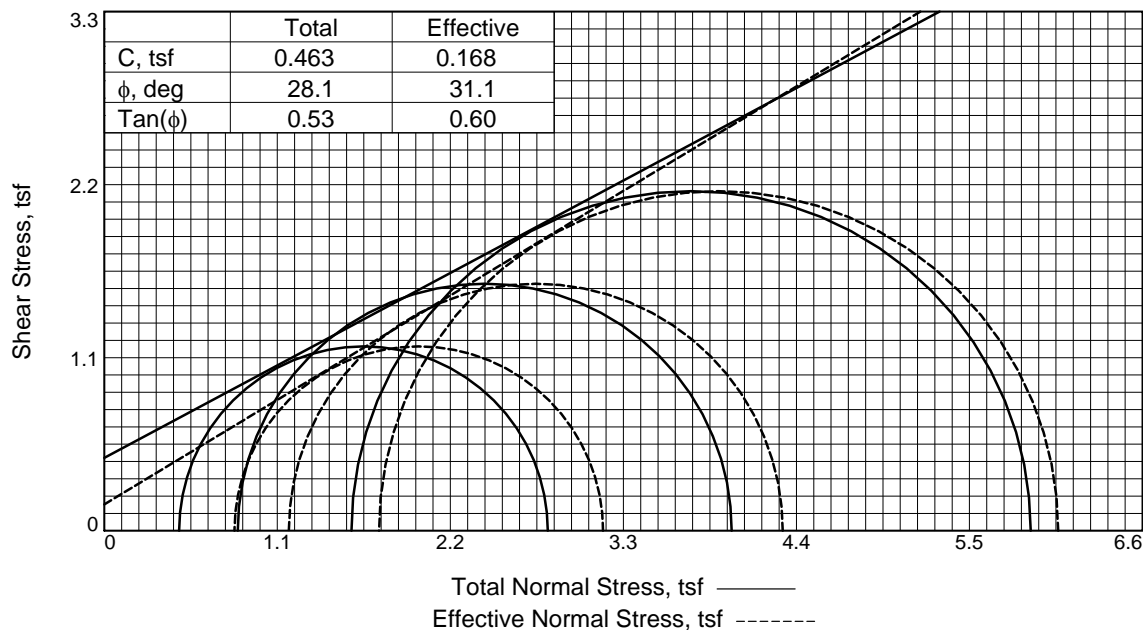
Classification Chart: 130 WAB



Mohr's Circles 130 WAB



APPENDIX E
CONSOLIDATED UNDRAINED TRIAXIAL TEST RESULTS



Sample No.		1	2	3
Initial	Water Content, %	13.9	13.9	13.9
	Dry Density, pcf	119.1	119.1	119.1
	Saturation, %	86.6	86.6	86.6
	Void Ratio	0.4419	0.4419	0.4419
	Diameter, in.	2.79	2.79	2.79
	Height, in.	5.56	5.56	5.56
At Test	Water Content, %	15.6	15.5	15.1
	Dry Density, pcf	120.1	120.5	121.2
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.4294	0.4253	0.4160
	Diameter, in.	2.78	2.83	2.85
	Height, in.	5.56	5.35	5.24
Strain rate, in./min.		0.01	0.01	0.02
Eff. Cell Pressure, tsf		0.48	0.85	1.57
Fail. Stress, tsf		2.34	3.14	4.32
Total Pore Pr., tsf		3.25	3.28	3.43
Strain, %		3.6	1.9	11.0
Ult. Stress, tsf				
Total Pore Pr., tsf				
Strain, %				
$\bar{\sigma}_1$ Failure, tsf		3.17	4.31	6.06
$\bar{\sigma}_3$ Failure, tsf		0.83	1.17	1.75

Type of Test:

CU with Pore Pressures

Sample Type: undisturbed

Description: brown silty clay with sand and calcareous nodules

Assumed Specific Gravity= 2.75

Remarks:

Figure _____

Client: HNTB

Project: SH 71

Source of Sample: RW-2

Depth: 8-10

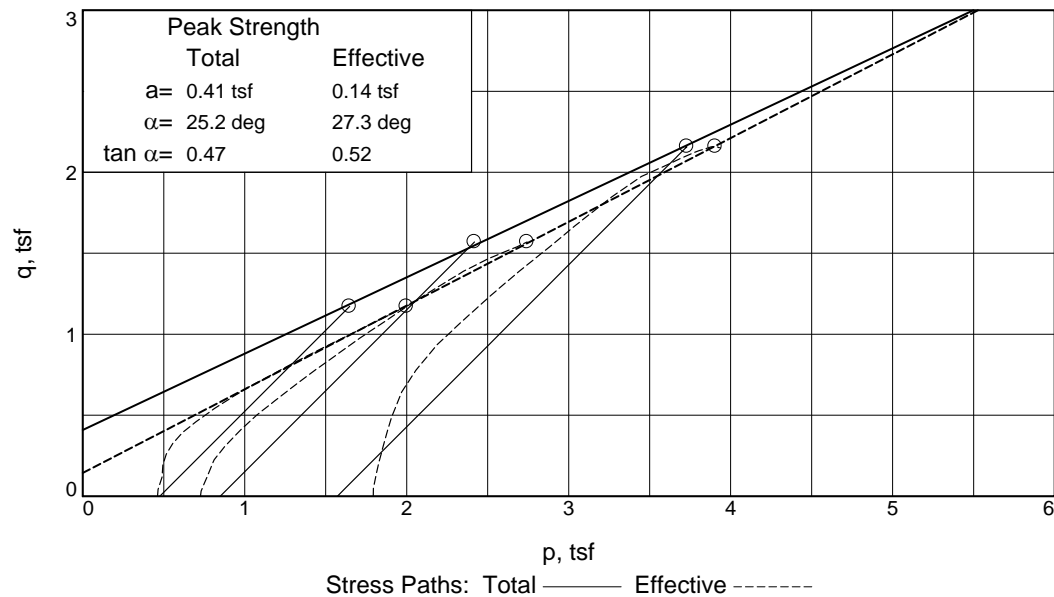
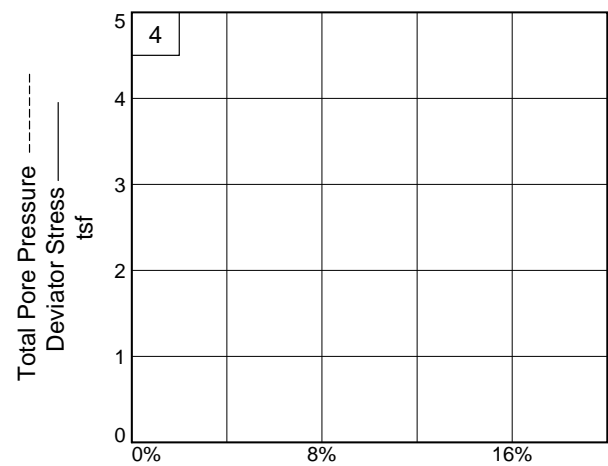
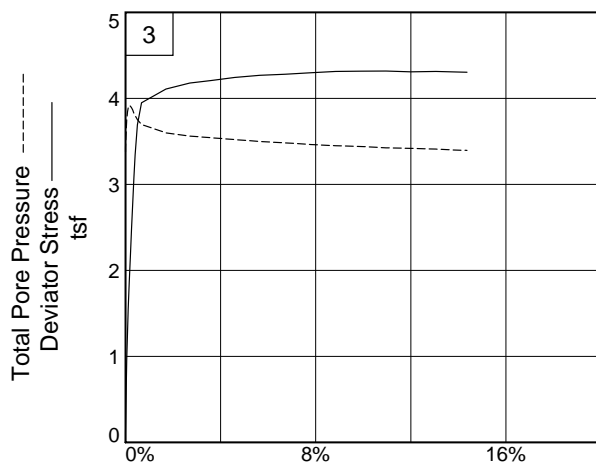
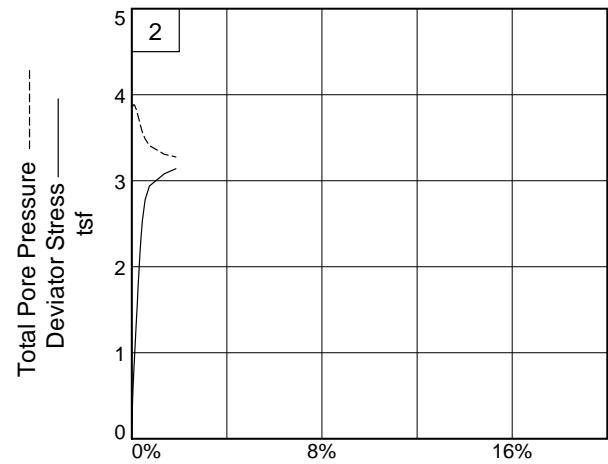
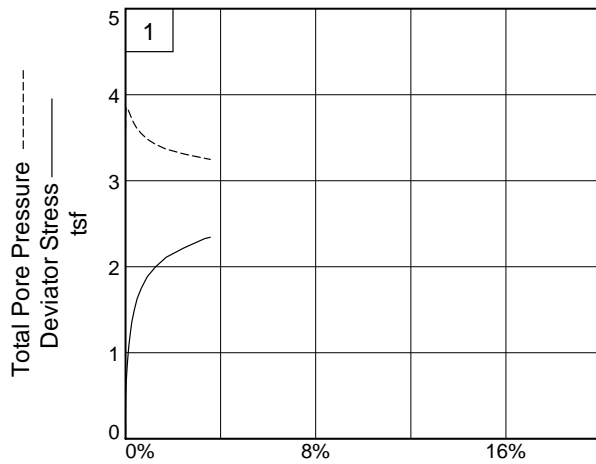
Sample Number: 5

Proj. No.: AG-12-15282

Date Sampled: 8/28/2013



6120 S. Dairy Ashford Rd.
Houston, TX 77072-1010



Client: HNTB

Project: SH 71

Source of Sample: RW-2

Depth: 8-10

Sample Number: 5

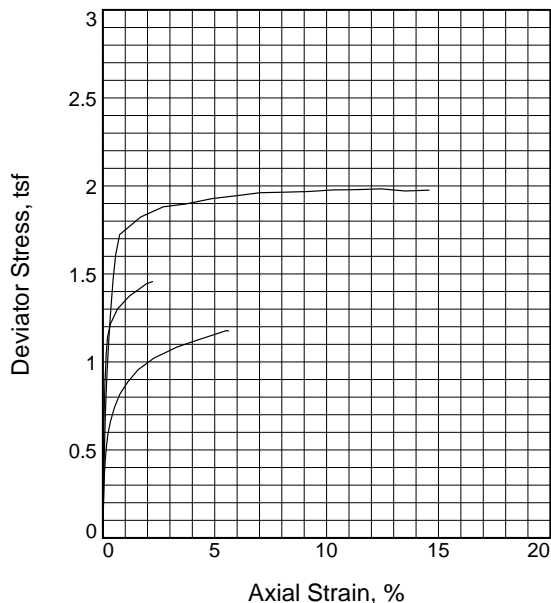
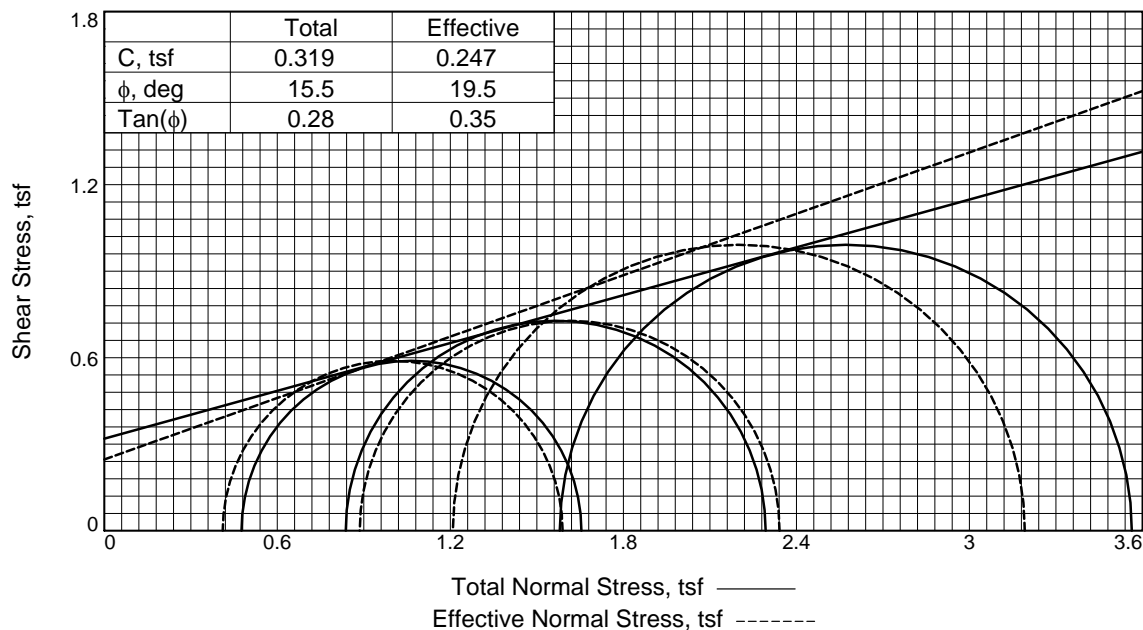
Project No.: AG-12-15282

Figure _____

HVJ ASSOCIATES, INC.

Tested By: KC

APPENDIX E-1-b



Sample No.		1	2	3
Initial	Water Content, %	21.2	21.2	21.2
	Dry Density, pcf	106.4	106.4	106.4
	Saturation, %	94.8	94.8	94.8
	Void Ratio	0.6138	0.6138	0.6138
	Diameter, in.	2.77	2.77	2.77
	Height, in.	5.47	5.47	5.47
At Test	Water Content, %	24.4	24.2	23.6
	Dry Density, pcf	102.8	103.2	104.1
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.6703	0.6643	0.6490
	Diameter, in.	2.80	2.88	2.90
	Height, in.	5.52	5.20	5.07
Strain rate, in./min.		0.01	0.01	0.02
Eff. Cell Pressure, tsf		0.48	0.84	1.58
Fail. Stress, tsf		1.18	1.46	1.98
Total Pore Pr., tsf		3.67	3.55	3.97
Strain, %		5.5	2.2	12.4
Ult. Stress, tsf				
Total Pore Pr., tsf				
Strain, %				
$\bar{\sigma}_1$ Failure, tsf		1.59	2.34	3.19
$\bar{\sigma}_3$ Failure, tsf		0.41	0.89	1.21

Type of Test:

CU with Pore Pressures

Sample Type: undisturbed

Description: light grey, light brown clay with calcareous deposits

Assumed Specific Gravity= 2.75

Remarks:

Figure _____

Client: HNTB

Project: SH 71

Source of Sample: RW-12

Depth: 8-10

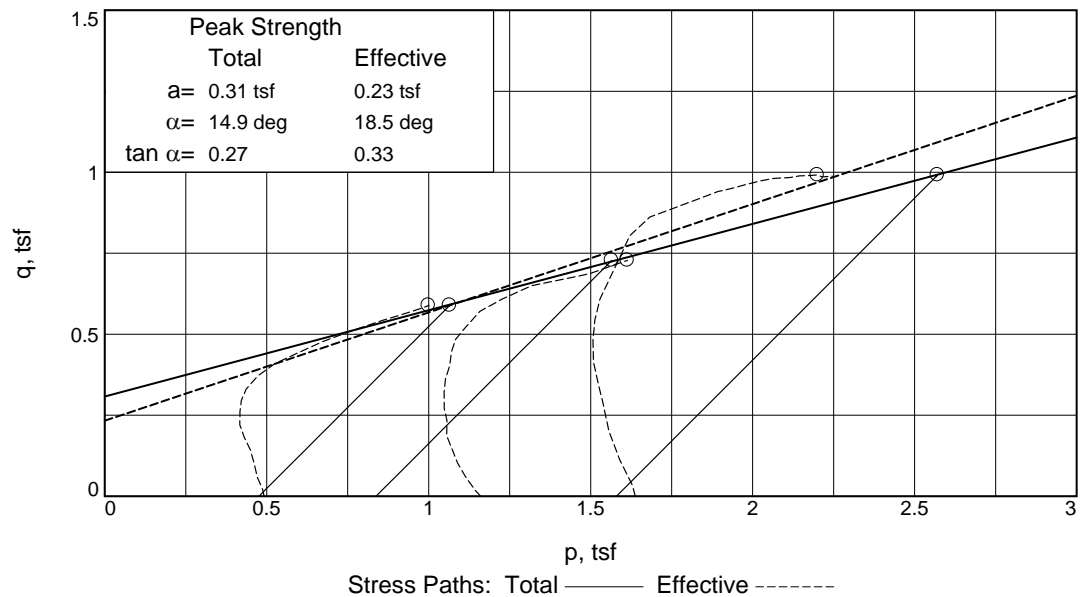
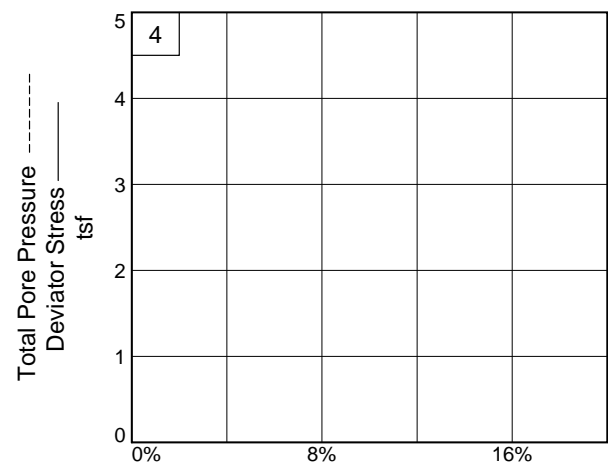
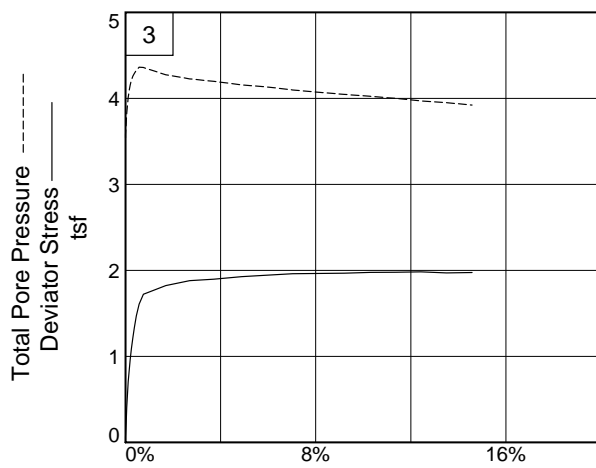
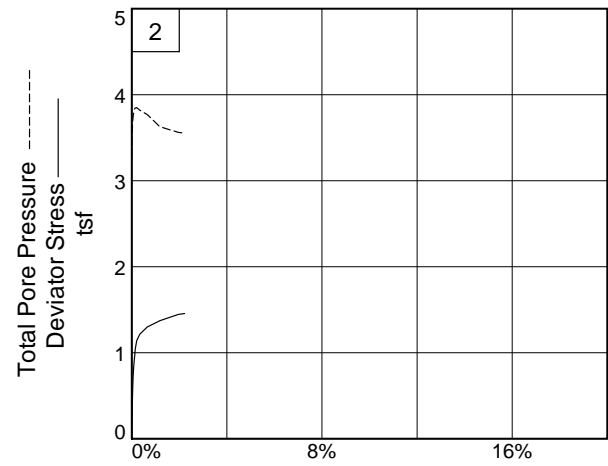
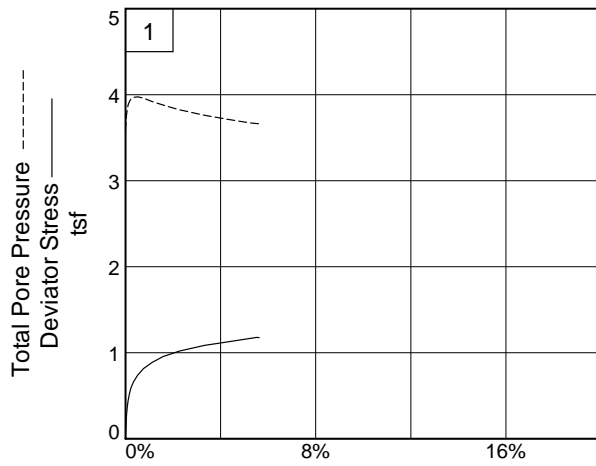
Sample Number: 5

Proj. No.: AG-12-15282

Date Sampled: 8/26/2013



6120 S. Dairy Ashford Rd.
Houston, TX 77072-1010



Client: HNTB

Project: SH 71

Source of Sample: RW-12

Depth: 8-10

Sample Number: 5

Project No.: AG-12-15282

Figure _____

HVJ ASSOCIATES, INC.

Tested By: KC

APPENDIX E-2-b

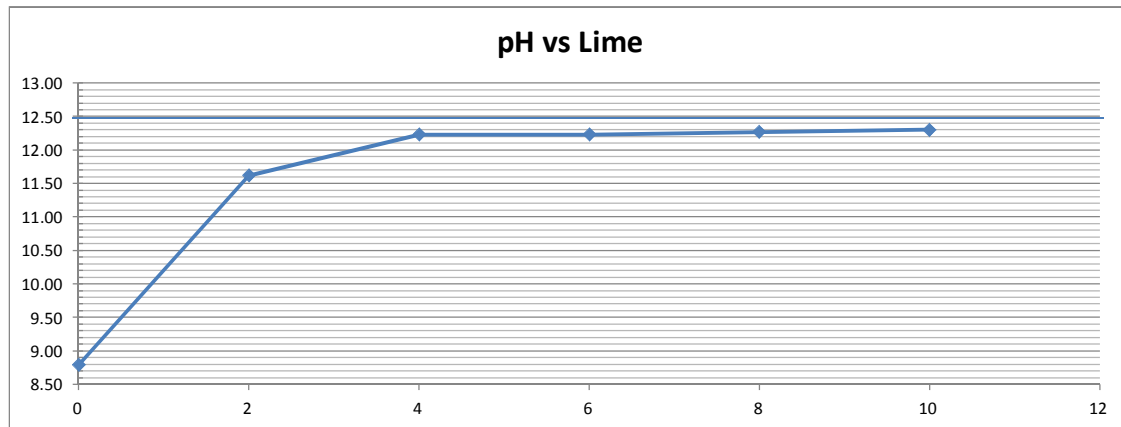
APPENDIX F

pH AND LIME SERIES TEST RESULTS

HVJ ASSOCIATES, INC.
pH - LIME SERIES
TEX-121-E

Project Name:	SH71	Client	HNTB
Project No.	AG-12-15282	Sample Location	#2
Date Tested:	9/23/2013	Sample Depth	2-4
Technician:	ZL	Date Calculated:	

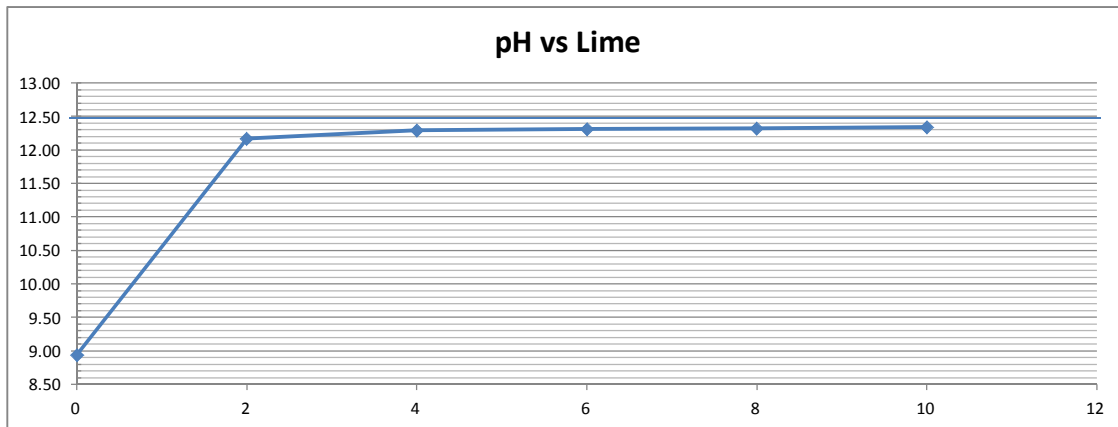
Lime (%)	0	2	4	6	8	10
pH	8.79	11.62	12.23	12.23	12.27	12.30
Temp °C	22.9	22.5	22.5	22.5	22.5	22.5



HVJ ASSOCIATES, INC.
pH - LIME SERIES
TEX-121-E

Project Name:	SH71	Client	HNTB
Project No.	AG-12-15282	Sample Location	71E
Date Tested:	9/23/2013	Sample Depth	2-4
Technician:	ZL	Date Calculated:	

Lime (%)	0	2	4	6	8	10
pH	8.94	12.17	12.29	12.31	12.32	12.34
Temp °C	23.3	21.9	22.1	22.2	22.2	21.8



APPENDIX G
SWELL TEST RESULTS

Project Name:	SH71	Boring No.	RW-7
Project No.	AG-12-15282	Sample No.	2
Date Tested:	9/9/2013 - 9/24/2013	Sample Depth	2-4
Technician:	KC	Date Calculated:	9/26/2013

Sample Data	Initial	Final	Test Data	Initial	Final
Sample Height (in)	0.788	0.784	Wet + Ring (g)	276.070	283.220
Diameter (in)	2.462	2.462	Dry + Ring (g)	256.490	256.490
Volume (cc)	61.474	61.123	Ring Wt. (g)	149.620	149.620
Height of Solids (in)	0.441	0.441	Moisture Data (Trimmings)		LL
Specific Gravity (assumed)	3.107	3.107	Wet + Tare (g)	127.060	
Moisture Content (%)	18.321	25.012	Dry + Tare (g)	112.070	PI
Wet Density (pcf)	128.354	136.391	Tare (g)	29.920	
Dry Density (pcf)	108.479	109.102	Moisture Content (%)	18.247	
Void Ratio	0.787	0.777	Sample Description	brown clay with calcareous nodules	
Percent Saturation	72.3	100.0			

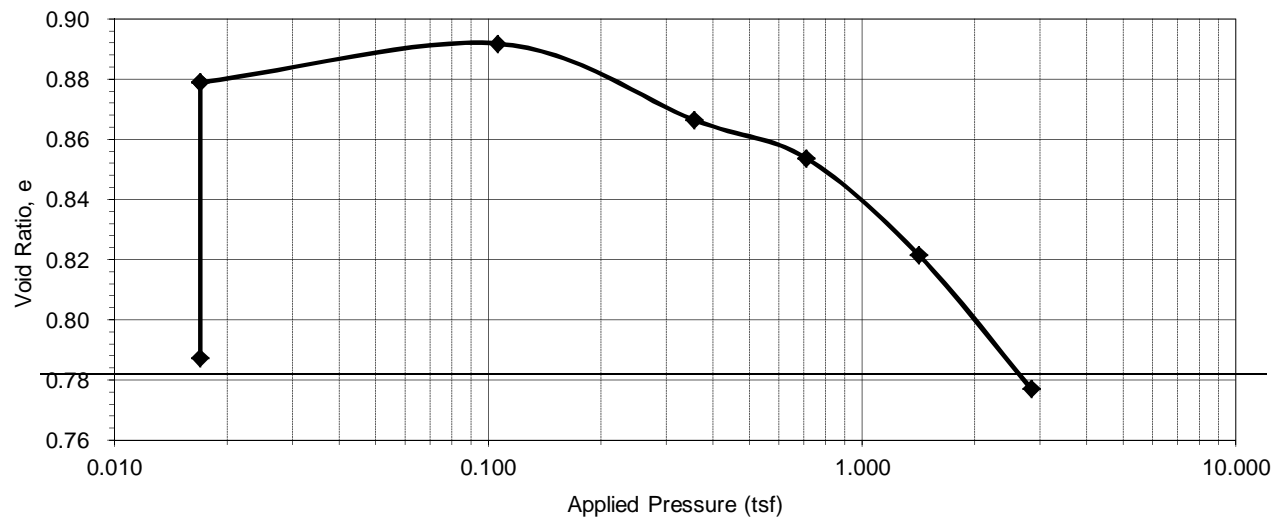
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HVJ ASSOCIATES, INC.
SWELL TEST RESULTS
ASTM TEST METHOD D4546, Test Method C

Project Name: SH71
Project No. AG-12-15282

Boring No. RW-7
Sample No. 2
Sample Depth 2-4'

e - Log(p) Curve



Swell Pressure (tsf) = 2.5
% Swell = 5.13

Project Name:	SH71	Boring No.	RW-9
Project No.	AG-12-15282	Sample No.	2
Date Tested:	9/9/2013 - 9/24/2013	Sample Depth	2-4
Technician:	KC	Date Calculated:	9/26/2013

Sample Data	Initial	Final	Test Data	Initial	Final
Sample Height (in)	0.788	0.786	Wet + Ring (g)	266.560	268.300
Diameter (in)	2.462	2.462	Dry + Ring (g)	238.410	238.410
Volume (cc)	61.474	61.318	Ring Wt. (g)	149.620	149.620
Height of Solids (in)	0.403	0.403	Moisture Data (Trimmings)		LL
Specific Gravity (assumed)	2.825	2.825	Wet + Tare (g)	117.970	
Moisture Content (%)	31.704	33.664	Dry + Tare (g)	96.810	PI
Wet Density (pcf)	118.701	120.774	Tare (g)	30.070	
Dry Density (pcf)	90.127	90.356	Moisture Content (%)	31.705	
Void Ratio	0.956	0.951	Sample Description	light brown clay	
Percent Saturation	93.7	100.0			

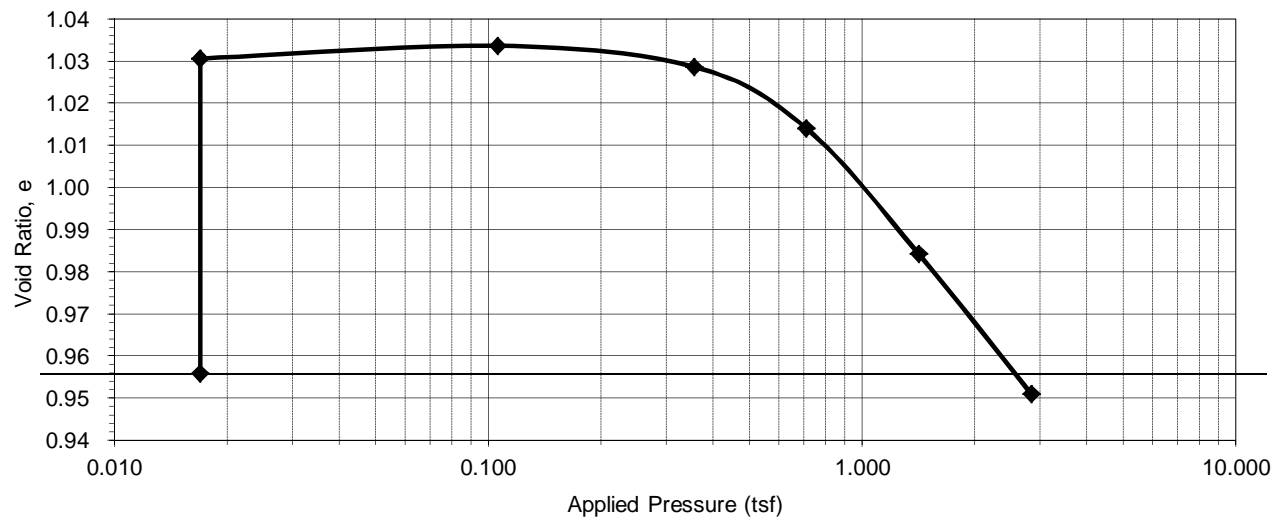
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HVJ ASSOCIATES, INC.
SWELL TEST RESULTS
ASTM TEST METHOD D4546, Test Method C

Project Name: SH71
Project No. AG-12-15282

Boring No. RW-9
Sample No. 2
Sample Depth 2-4'

e - Log(p) Curve



Swell Pressure (tsf) = 2
% Swell = 4.75

Project Name:	SH 71	Boring No.	P6
Project No.	AG-12-15282	Sample No.	4
Date Tested:	10/7/2013 - 10/24/2013	Sample Depth	6-8'
Technician:	KC	Date Calculated:	10/24/2013

Sample Data	Initial	Final	Test Data	Initial	Final
Sample Height (in)	0.750	0.741	Wet + Ring (g)	178.840	179.330
Diameter (in)	2.500	2.500	Dry + Ring (g)	156.050	156.050
Volume (cc)	60.330	59.574	Ring Wt. (g)	58.190	58.190
Height of Solids (in)	0.451	0.451	Moisture Data (Trimmings)		LL
Specific Gravity (assumed)	2.700	2.700	Wet + Tare (g)	127.200	
Moisture Content (%)	23.288	23.789	Dry + Tare (g)	108.840	PI
Wet Density (pcf)	124.790	126.887	Tare (g)	30.000	
Dry Density (pcf)	101.218	102.503	Moisture Content (%)	23.288	
Void Ratio	0.665	0.644	Sample Description	dark brown clay with calcareous nodules	
Percent Saturation	94.6	99.8			

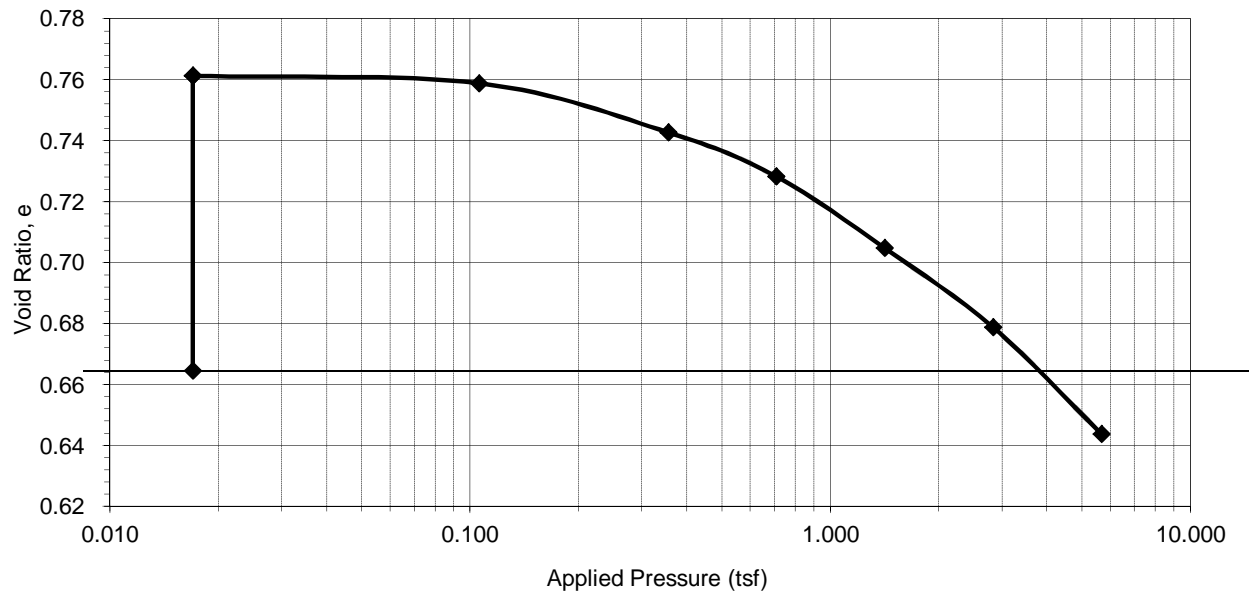
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HVJ ASSOCIATES, INC.
SWELL TEST RESULTS
ASTM TEST METHOD D4546, Test Method C

Project Name: SH 71
Project No. AG-12-15282

Boring No. P6
Sample No. 4
Sample Depth 6-8

e - Log(p) Curve



Swell Pressure (tsf) = 1.38
% Swell = 5.81

APPENDIX H
DRILLED SHAFT CAPACITY CHARTS BASED ON TCP

RETAINING WALL BORING LOGS



SOIL STRENGTH ANALYSIS

WinCore
Version 3.1

County Travis
Highway SH 71
Control 0265-01-110

Hole RW-2
Structure Retaining Wall
Station 11141+21.42
Offset 85.21L

District Austin
Date 08/14/2013
Grnd. Elev. 468.10 ft
GW Elev. N/A

TCP Capacity Values Used

Soil reduction factor of 0.7 applied

Strata No.	Elev. (Feet)		Design Type	Soil Factor	TCP N Value	TCP Unit Friction (TSF)	Accumulative Friction (T/F)
	From	To					
1	468.1	466.1	CL	60	0	0.00	0.00
2	466.1	462.6	CL	60	22	0.26	0.90
3	462.6	455.1	SC	70	21	0.21	2.47
3	455.1	450.1	SC	70	43	0.43	4.62
3	450.1	446.1	SC	70	160	0.90	8.22
3	446.1	444.1	SC	70	133	0.85	9.92
4	444.1	438.1	SC	70	49	0.49	12.86



SKIN FRICTION DESIGN

WinCore
Version 3.1

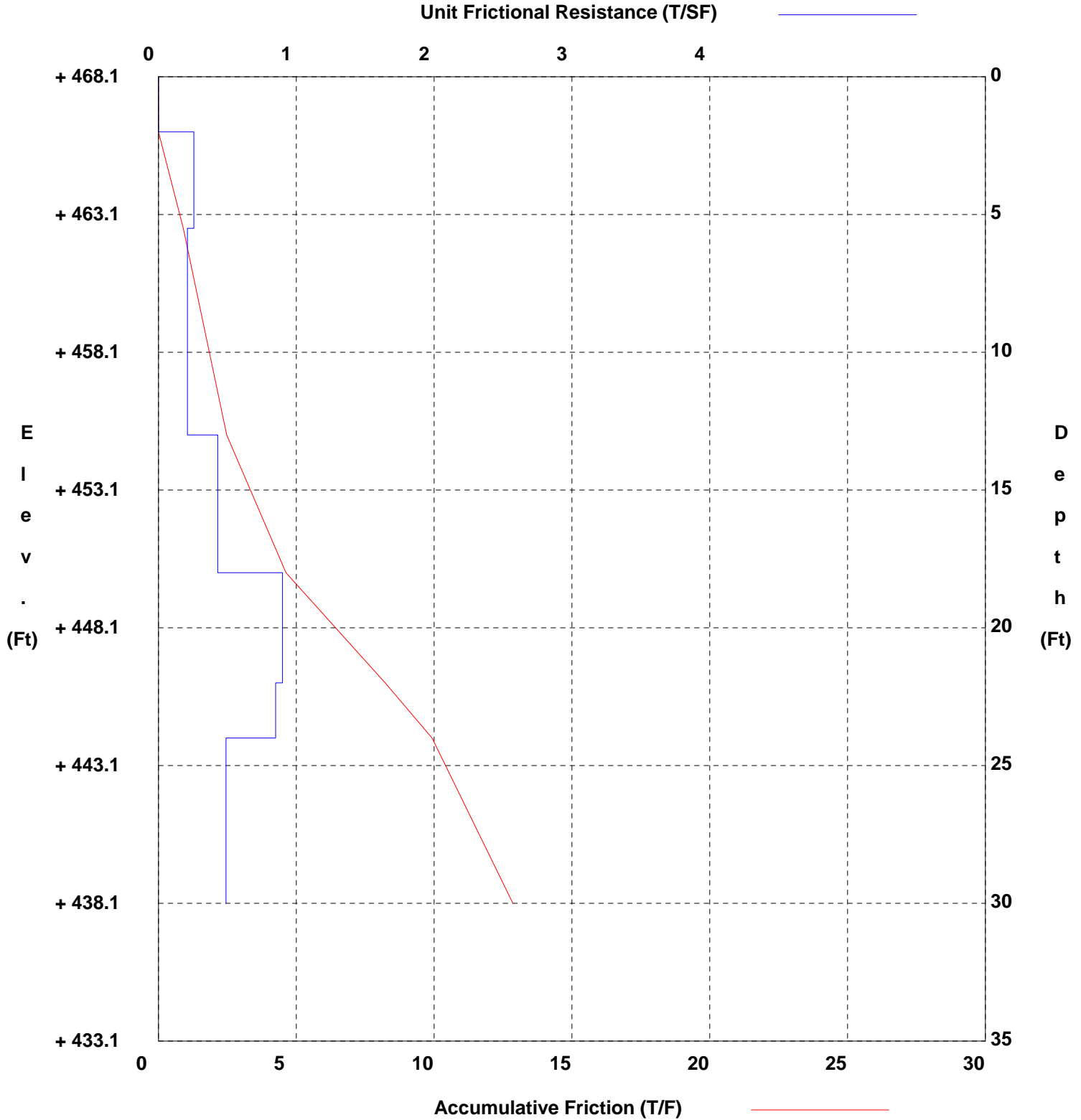
County Travis
Highway SH 71
Control 0265-01-110

Hole RW-2
Structure Retaining Wall
Station 11141+21.42
Offset 85.21L

District Austin
Date 08/14/2013
Grnd. Elev. 468.10 ft
GW Elev. N/A

Drilled Shaft Design: Soil Reduction Factor = 0.7

TCP Friction Values Used





POINT BEARING DESIGN

WinCore
Version 3.1

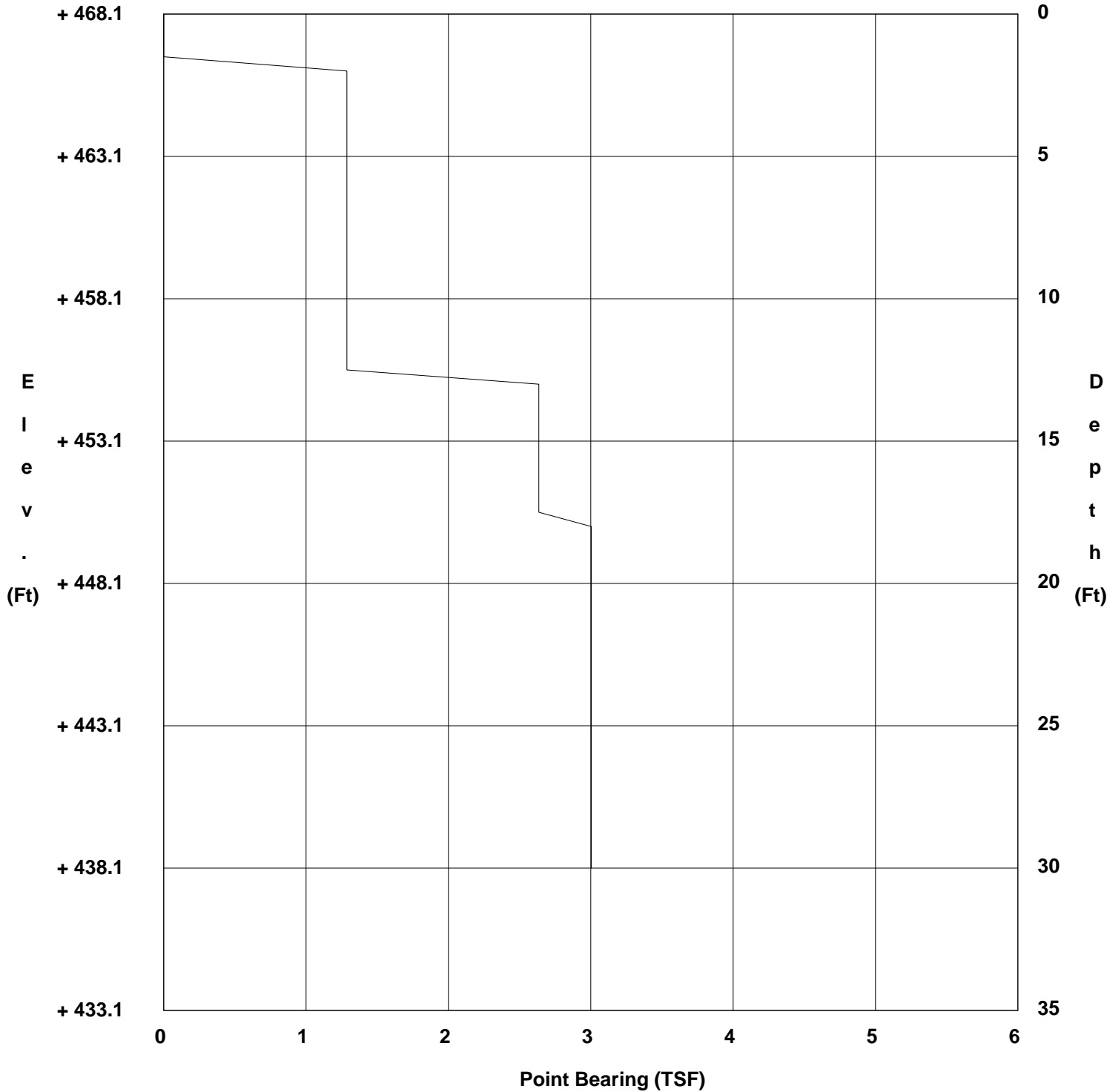
County Travis
Highway SH 71
Control 0265-01-110

Hole RW-2
Structure Retaining Wall
Station 11141+21.42
Offset 85.21L

District Austin
Date 08/14/2013
Grnd. Elev. 468.10 ft
GW Elev. N/A

Diameters Below Tip Checked = 2

TCP Bearing Values Used





SOIL STRENGTH ANALYSIS

WinCore
Version 3.1

County Travis
Highway SH 71
Control 0265-01-110

Hole RW-3
Structure Retaining Wall
Station 11151+91.17
Offset 72.89R

District Austin
Date 08/20/2013
Grnd. Elev. 455.50 ft
GW Elev. N/A

TCP Capacity Values Used

Soil reduction factor of 0.7 applied

Strata No.	Elev. (Feet)		Design Type	Soil Factor	TCP N Value	TCP Unit Friction (TSF)	Accumulative Friction (T/F)
	From	To					
1	455.5	447.5	CH	50	34	0.48	3.81
1	447.5	442.5	CH	50	32	0.45	6.05
2	442.5	437.5	CL	60	27	0.32	7.62
3	437.5	432.5	SC	70	19	0.19	8.57
3	432.5	428.0	SC	70	19	0.19	9.43
3	428.0	425.5	SC	70	21	0.21	9.95



SKIN FRICTION DESIGN

WinCore
Version 3.1

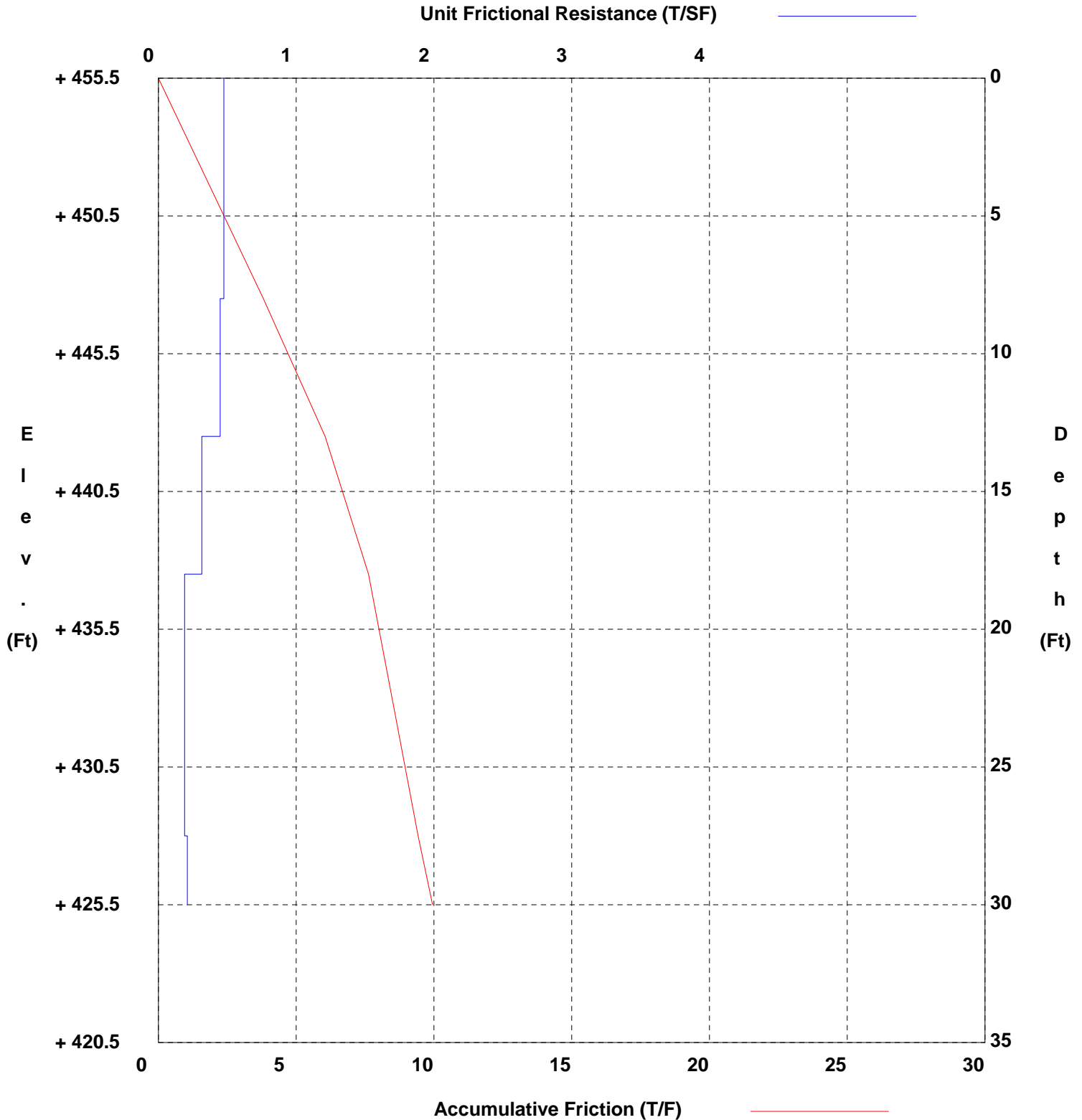
County Travis
Highway SH 71
Control 0265-01-110

Hole RW-3
Structure Retaining Wall
Station 11151+91.17
Offset 72.89R

District Austin
Date 08/20/2013
Grnd. Elev. 455.50 ft
GW Elev. N/A

Drilled Shaft Design: Soil Reduction Factor = 0.7

TCP Friction Values Used





POINT BEARING DESIGN

WinCore
Version 3.1

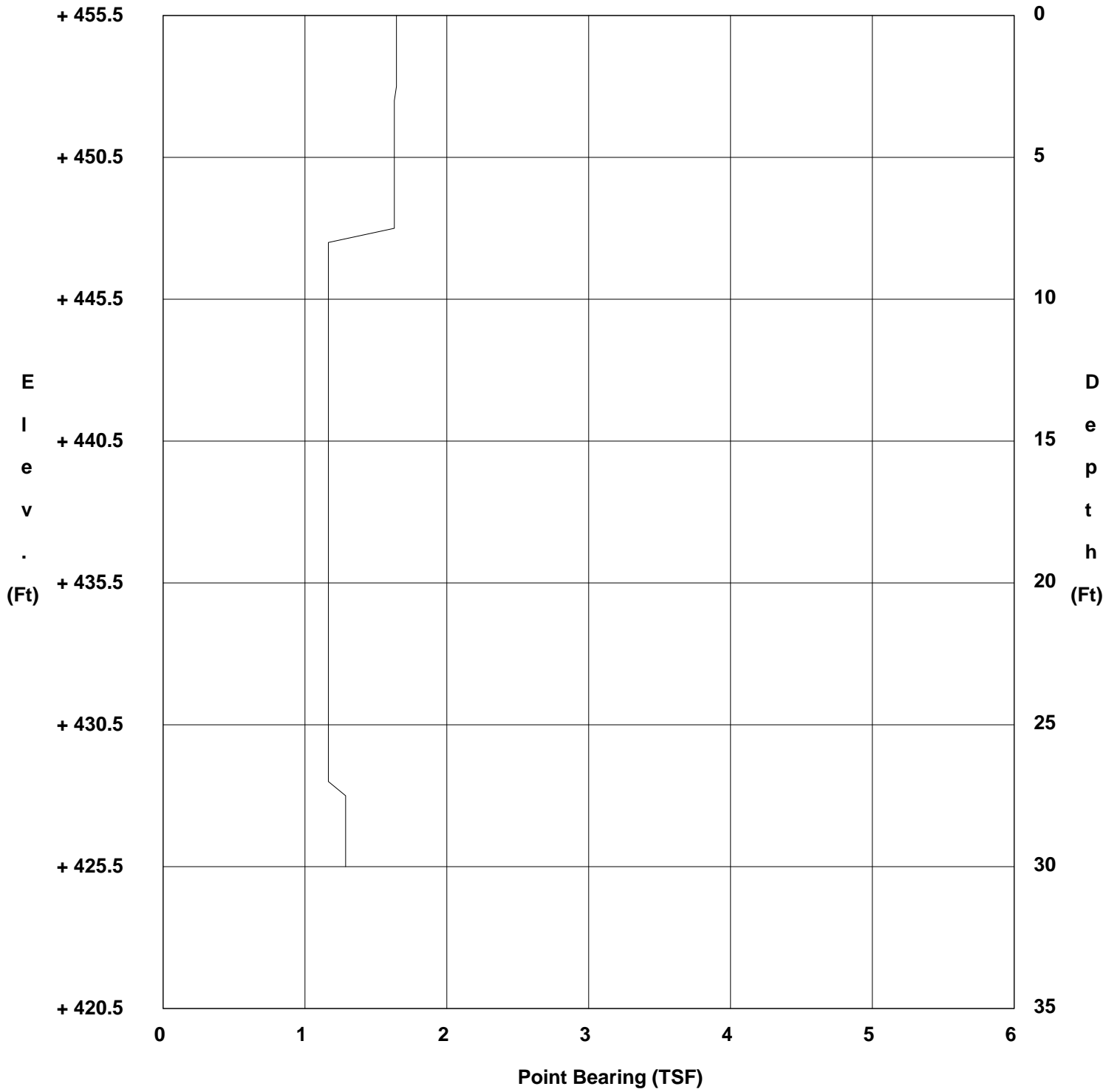
County Travis
Highway SH 71
Control 0265-01-110

Hole RW-3
Structure Retaining Wall
Station 11151+91.17
Offset 72.89R

District Austin
Date 08/20/2013
Grnd. Elev. 455.50 ft
GW Elev. N/A

Diameters Below Tip Checked = 2

TCP Bearing Values Used





SOIL STRENGTH ANALYSIS

WinCore
Version 3.1

County Travis
Highway SH 71
Control 0265-01-110

Hole RW-4
Structure Retaining Wall
Station 11151+47.34
Offset 93.09L

District Austin
Date 08/19/2013
Grnd. Elev. 455.40 ft
GW Elev. N/A

TCP Capacity Values Used

Soil reduction factor of 0.7 applied

Strata No.	Elev. (Feet)		Design Type	Soil Factor	TCP N Value	TCP Unit Friction (TSF)	Accumulative Friction (T/F)
	From	To					
1	455.4	453.4	CH	50	0	0.00	0.00
2	453.4	447.4	CL	60	11	0.13	0.77
2	447.4	442.4	CL	60	31	0.36	2.58
3	442.4	438.4	CL	60	44	0.51	4.63
4	438.4	432.4	GW-GC	80	171	0.96	10.42
4	432.4	427.9	GW-GC	80	91	0.80	14.00
4	427.9	425.4	GW-GC	80	94	0.82	16.04



SKIN FRICTION DESIGN

WinCore
Version 3.1

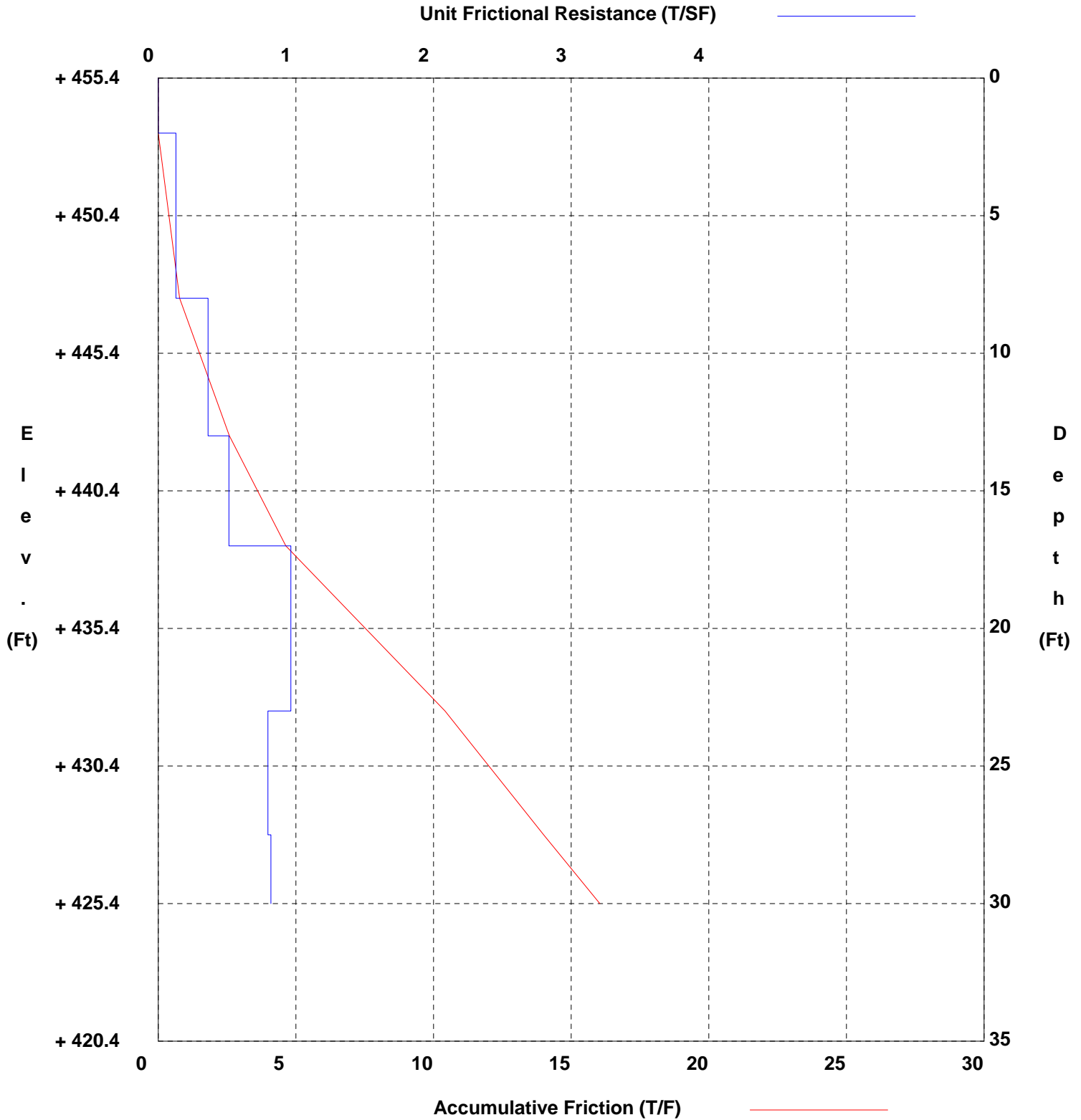
County Travis
Highway SH 71
Control 0265-01-110

Hole RW-4
Structure Retaining Wall
Station 11151+47.34
Offset 93.09L

District Austin
Date 08/19/2013
Grnd. Elev. 455.40 ft
GW Elev. N/A

Drilled Shaft Design: Soil Reduction Factor = 0.7

TCP Friction Values Used





POINT BEARING DESIGN

WinCore
Version 3.1

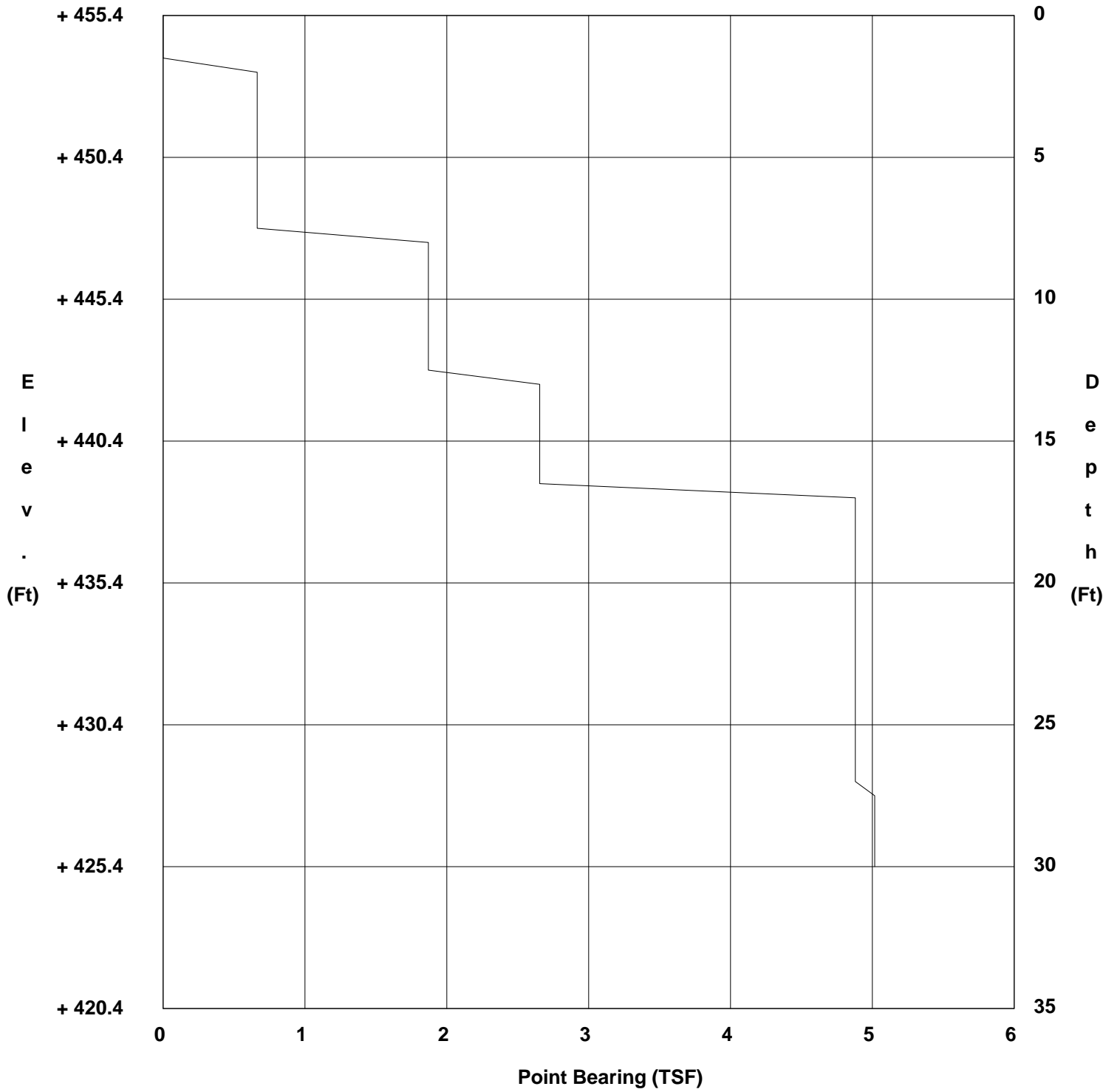
County Travis
Highway SH 71
Control 0265-01-110

Hole RW-4
Structure Retaining Wall
Station 11151+47.34
Offset 93.09L

District Austin
Date 08/19/2013
Grnd. Elev. 455.40 ft
GW Elev. N/A

Diameters Below Tip Checked = 2

TCP Bearing Values Used





SOIL STRENGTH ANALYSIS

WinCore
Version 3.1

County Travis
Highway SH 71
Control 0265-01-110

Hole RW-5
Structure Retaining Wall
Station 11155+38.42
Offset 117.28R

District Austin
Date 08/16/2013
Grnd. Elev. 453.60 ft
GW Elev. N/A

TCP Capacity Values Used

Soil reduction factor of 0.7 applied

Strata No.	Elev. (Feet)		Design Type	Soil Factor	TCP N Value	TCP Unit Friction (TSF)	Accumulative Friction (T/F)
	From	To					
1	453.6	445.6	CH	50	14	0.20	1.57
2	445.6	440.6	CL	60	29	0.34	3.26
2	440.6	433.6	CL	60	26	0.30	5.38
3	433.6	431.6	CL	60	19	0.22	5.83
3	431.6	427.1	CL	60	19	0.22	6.82
3	427.1	423.6	CL	60	16	0.19	7.48



SKIN FRICTION DESIGN

WinCore
Version 3.1

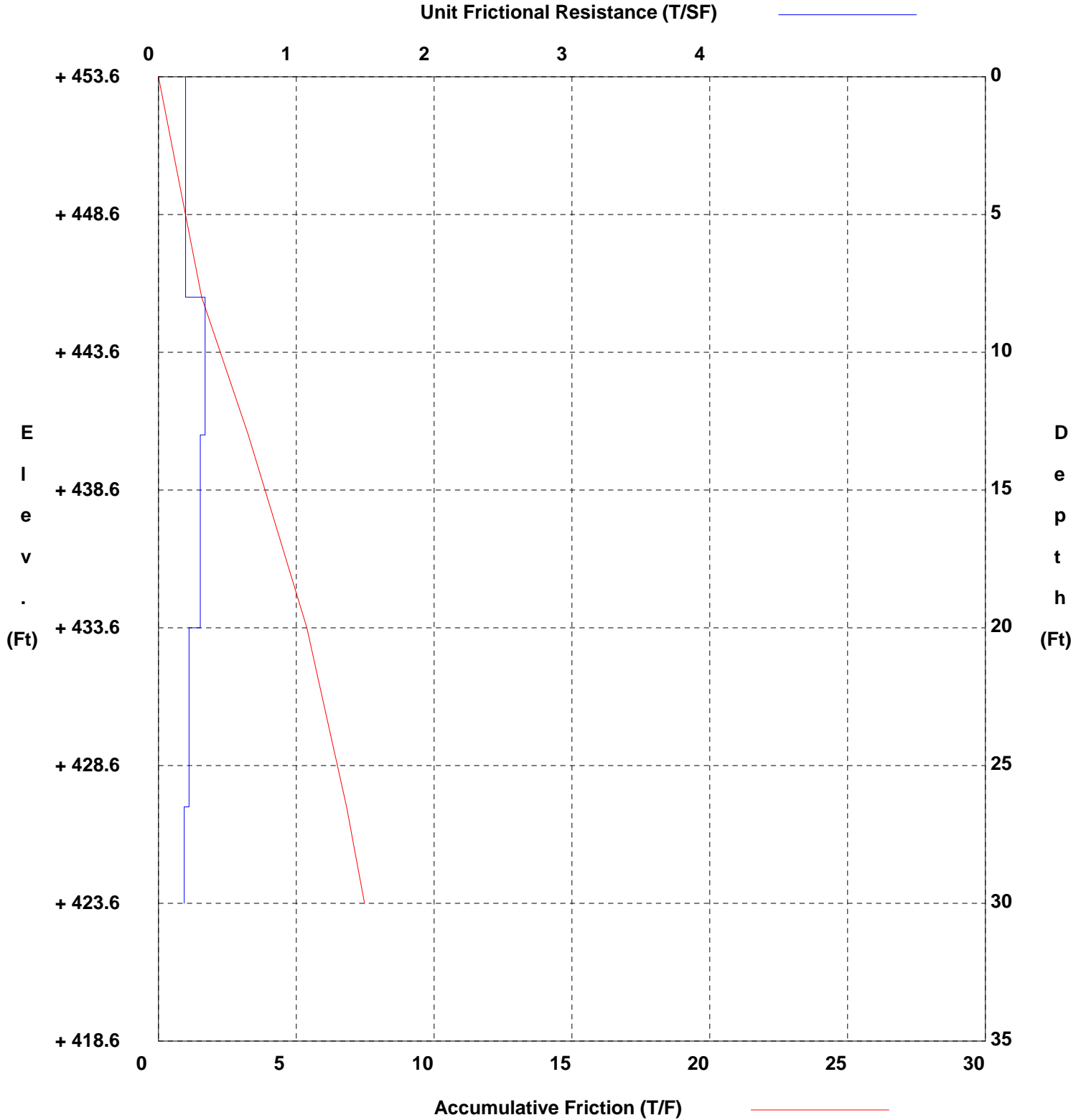
County Travis
Highway SH 71
Control 0265-01-110

Hole RW-5
Structure Retaining Wall
Station 11155+38.42
Offset 117.28R

District Austin
Date 08/16/2013
Grnd. Elev. 453.60 ft
GW Elev. N/A

Drilled Shaft Design: Soil Reduction Factor = 0.7

TCP Friction Values Used





POINT BEARING DESIGN

WinCore
Version 3.1

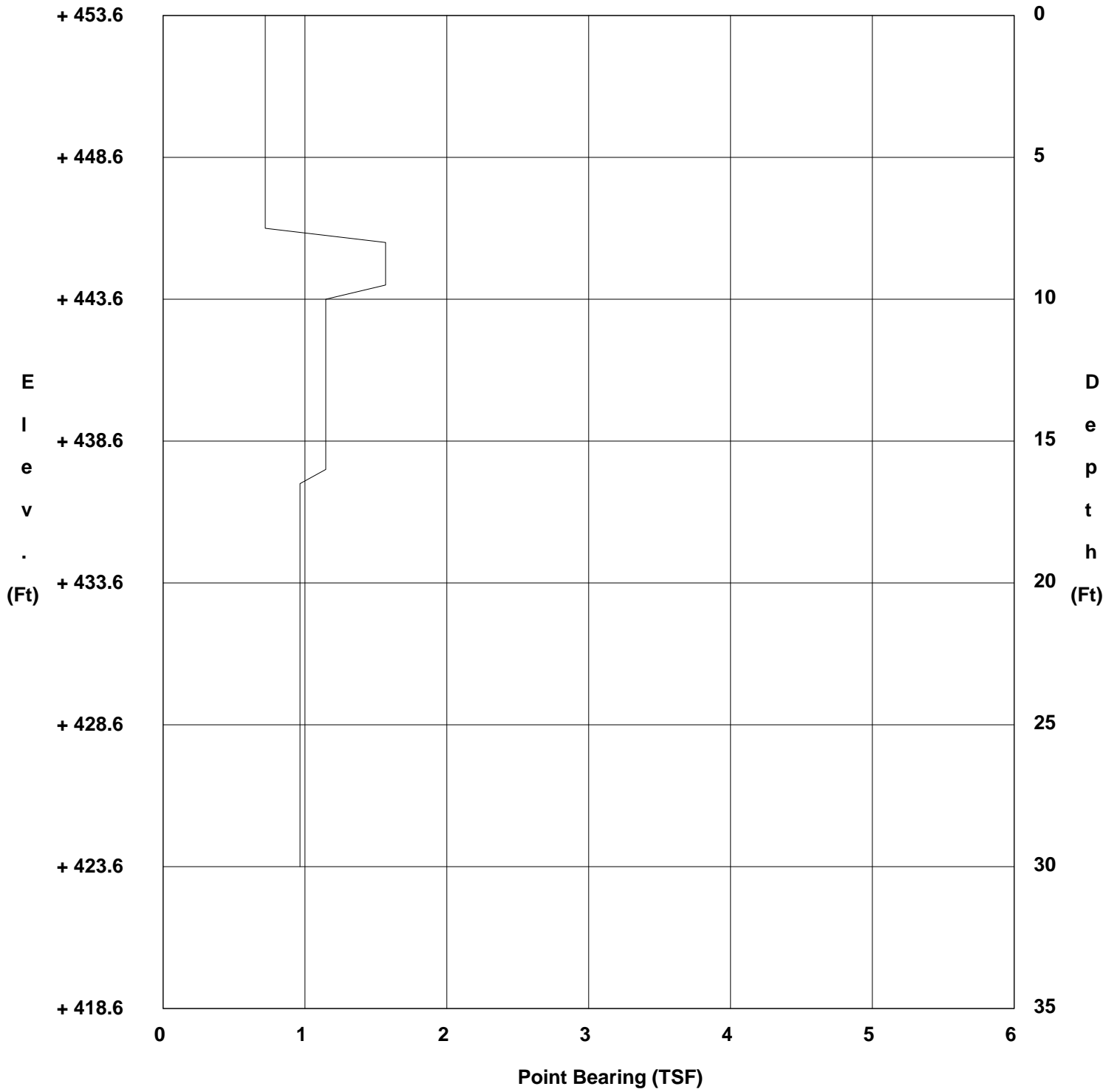
County Travis
Highway SH 71
Control 0265-01-110

Hole RW-5
Structure Retaining Wall
Station 11155+38.42
Offset 117.28R

District Austin
Date 08/16/2013
Grnd. Elev. 453.60 ft
GW Elev. N/A

Diameters Below Tip Checked = 2

TCP Bearing Values Used





SOIL STRENGTH ANALYSIS

WinCore
Version 3.1

County Travis
Highway SH 71
Control 0265-01-110

Hole RW-6
Structure Retaining Wall
Station 11155+38.62
Offset 92.80L

District Austin
Date 08/19/2013
Grnd. Elev. 451.50 ft
GW Elev. N/A

TCP Capacity Values Used

Soil reduction factor of 0.7 applied

Strata No.	Elev. (Feet)		Design Type	Soil Factor	TCP N Value	TCP Unit Friction (TSF)	Accumulative Friction (T/F)
	From	To					
1	451.5	447.5	CH	50	0	0.00	0.00
2	447.5	443.5	CH	50	11	0.15	0.62
3	443.5	438.5	CL	60	37	0.43	2.77
3	438.5	433.5	CL	60	32	0.37	4.64
4	433.5	428.5	CL	60	21	0.25	5.87
4	428.5	424.0	CL	60	28	0.33	7.34
4	424.0	421.5	CL	60	33	0.39	8.30



SKIN FRICTION DESIGN

WinCore
Version 3.1

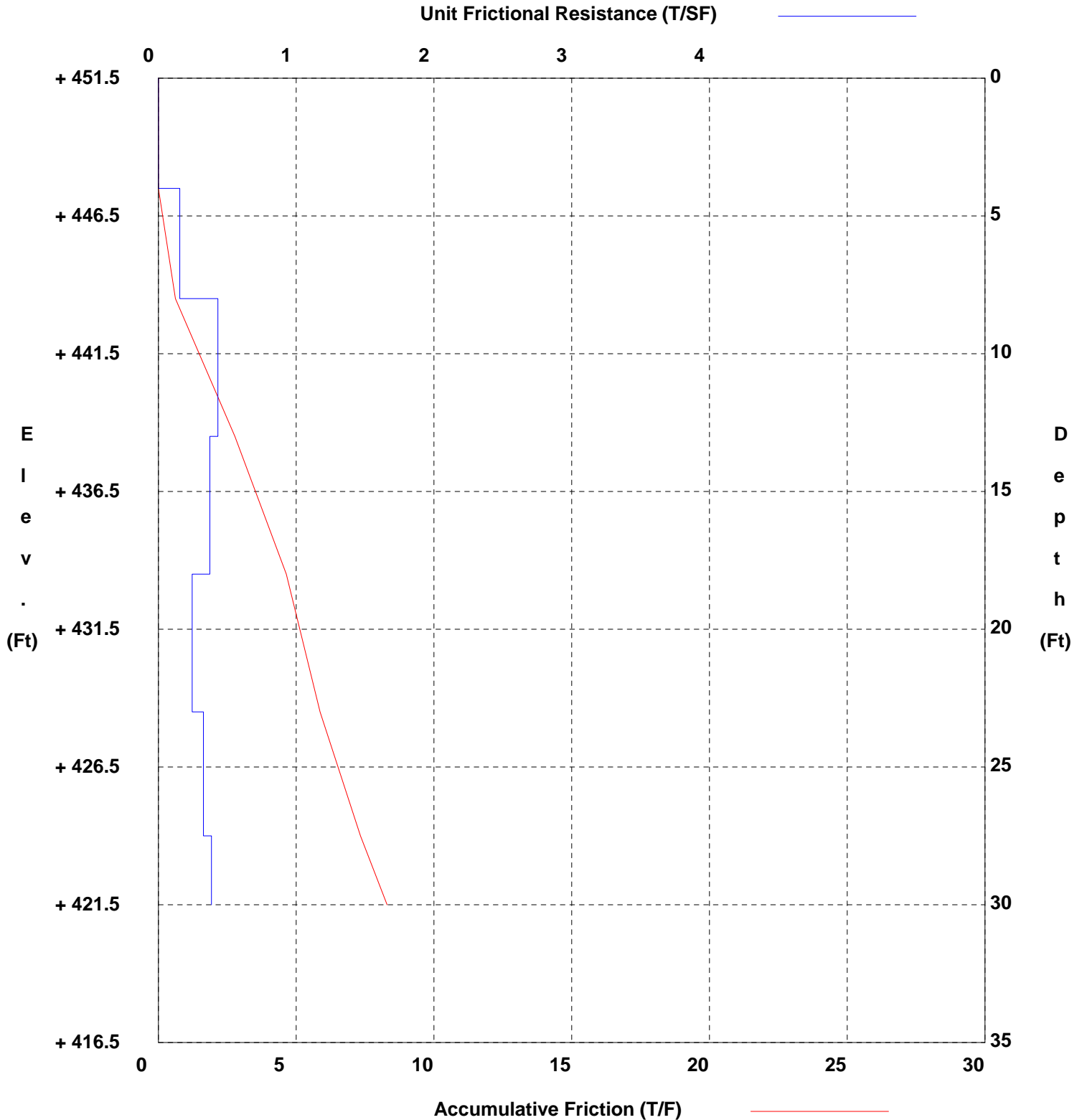
County Travis
Highway SH 71
Control 0265-01-110

Hole RW-6
Structure Retaining Wall
Station 11155+38.62
Offset 92.80L

District Austin
Date 08/19/2013
Grnd. Elev. 451.50 ft
GW Elev. N/A

Drilled Shaft Design: Soil Reduction Factor = 0.7

TCP Friction Values Used





POINT BEARING DESIGN

WinCore
Version 3.1

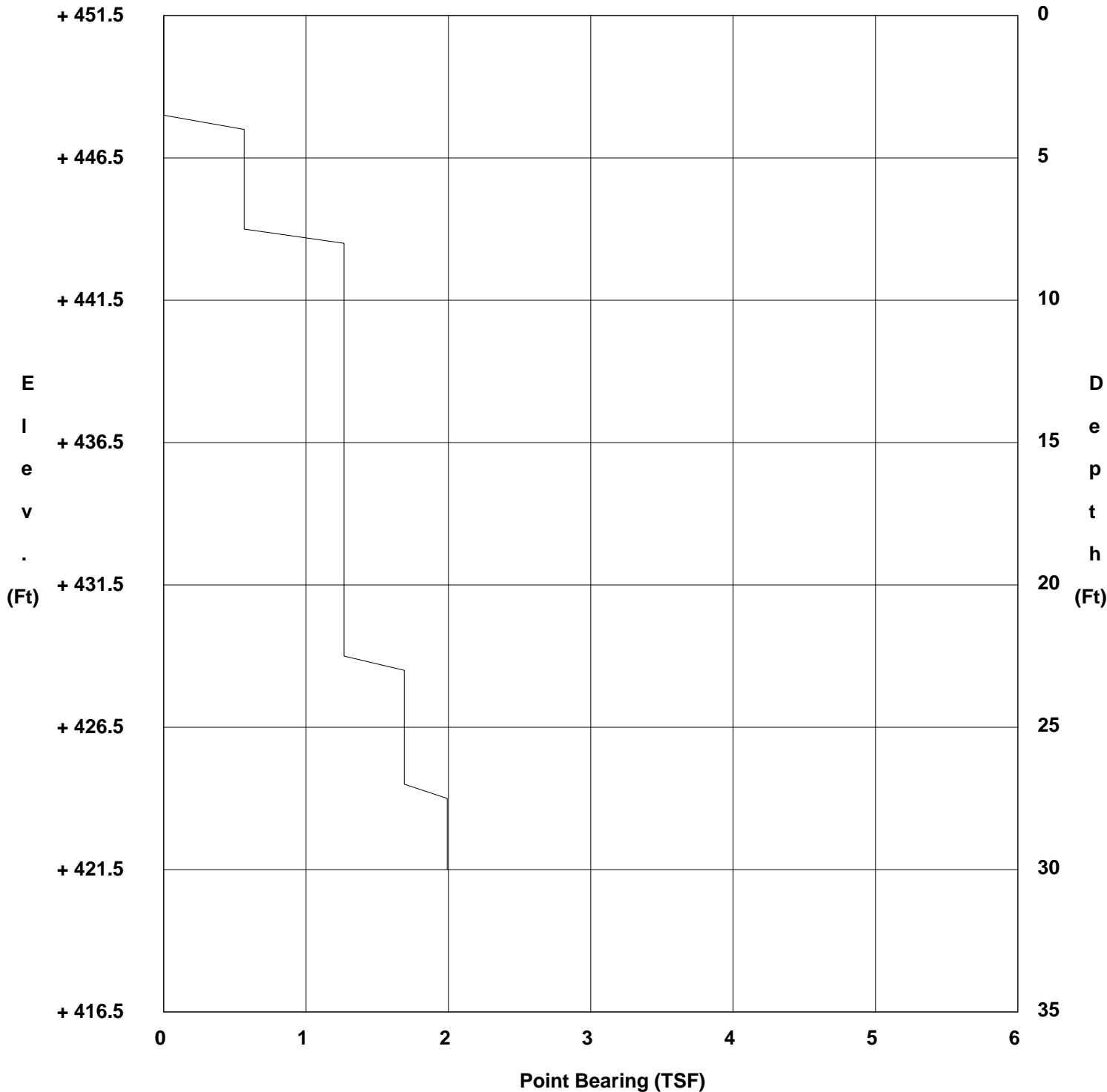
County Travis
Highway SH 71
Control 0265-01-110

Hole RW-6
Structure Retaining Wall
Station 11155+38.62
Offset 92.80L

District Austin
Date 08/19/2013
Grnd. Elev. 451.50 ft
GW Elev. N/A

Diameters Below Tip Checked = 2

TCP Bearing Values Used





SOIL STRENGTH ANALYSIS

WinCore
Version 3.1

County Travis
Highway SH 71
Control 0265-01-110

Hole RW-7
Structure Retaining Wall
Station 11160+70.16
Offset 92.25R

District Austin
Date 08/20/2013
Grnd. Elev. 452.00 ft
GW Elev. N/A

TCP Capacity Values Used

Soil reduction factor of 0.7 applied

Strata No.	Elev. (Feet)		Design Type	Soil Factor	TCP N Value	TCP Unit Friction (TSF)	Accumulative Friction (T/F)
	From	To					
1	452.0	445.0	CH	50	17	0.24	1.67
2	445.0	437.0	CL	60	24	0.28	3.91
3	437.0	434.0	CH	50	24	0.34	4.91
3	434.0	430.0	CH	50	14	0.20	5.70
4	430.0	425.0	SC	70	21	0.21	6.75
5	425.0	422.0	CH	50	44	0.62	8.60



SKIN FRICTION DESIGN

WinCore
Version 3.1

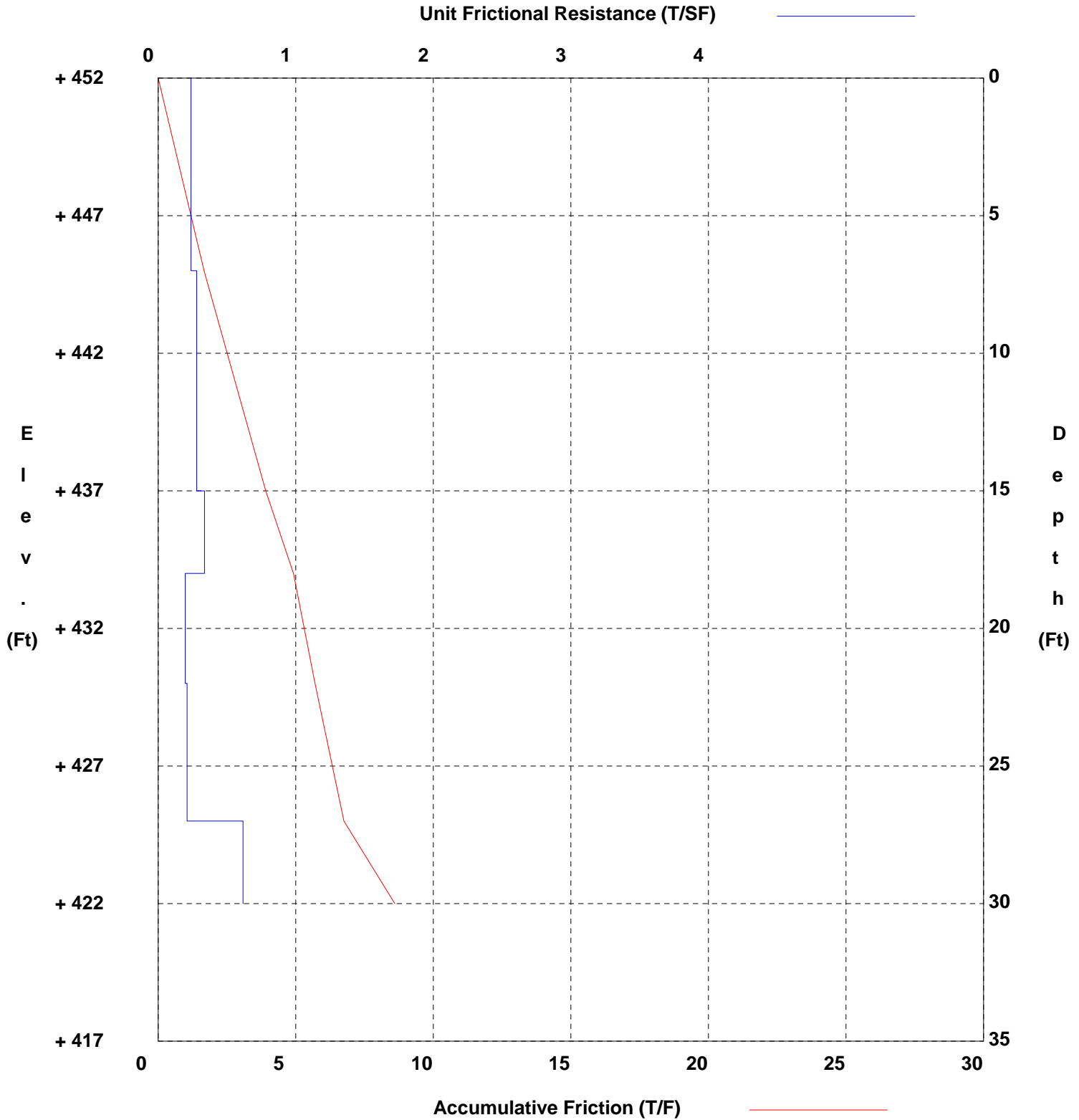
County Travis
Highway SH 71
Control 0265-01-110

Hole RW-7
Structure Retaining Wall
Station 11160+70.16
Offset 92.25R

District Austin
Date 08/20/2013
Grnd. Elev. 452.00 ft
GW Elev. N/A

Drilled Shaft Design: Soil Reduction Factor = 0.7

TCP Friction Values Used





POINT BEARING DESIGN

WinCore
Version 3.1

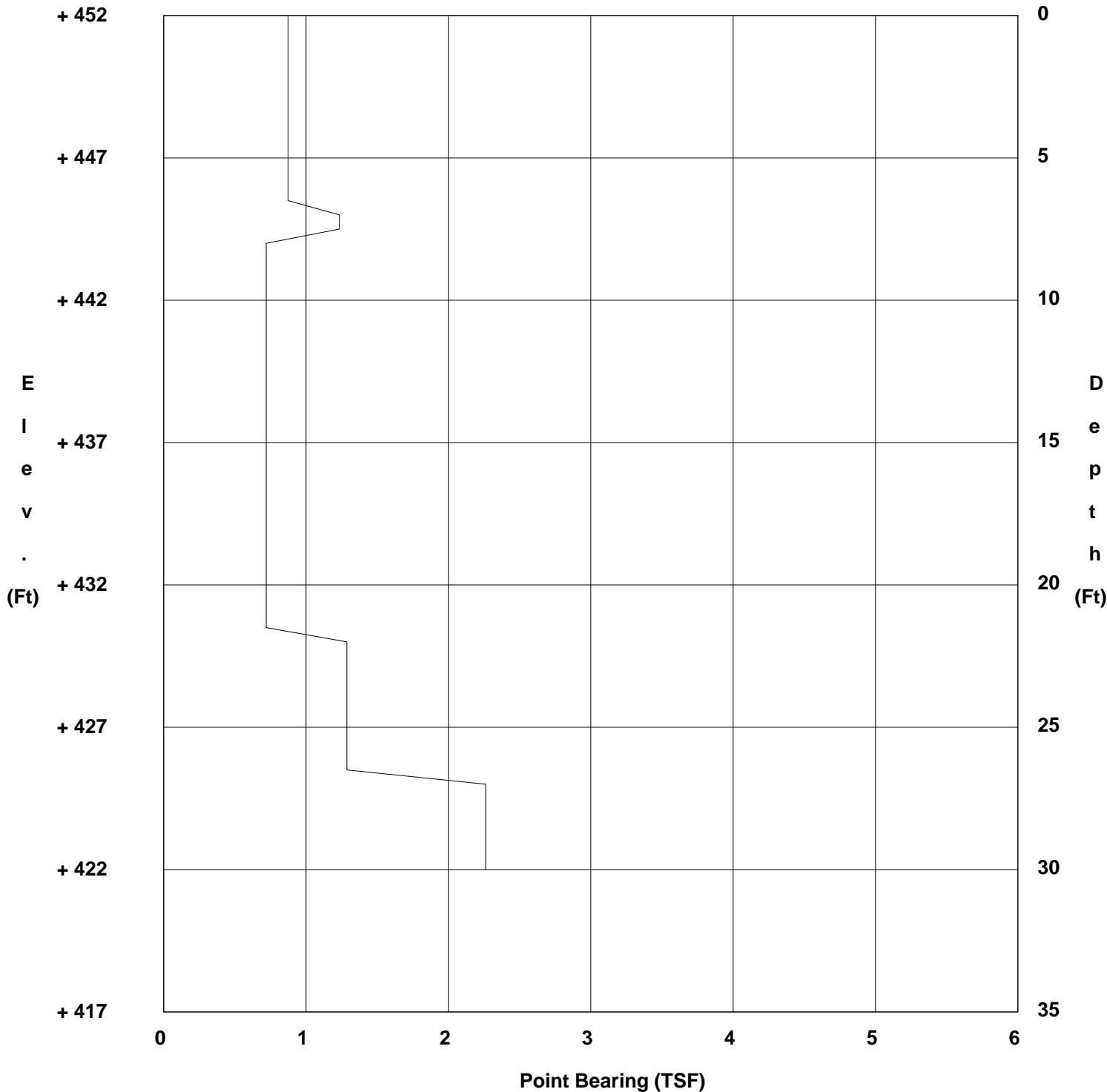
County Travis
Highway SH 71
Control 0265-01-110

Hole RW-7
Structure Retaining Wall
Station 11160+70.16
Offset 92.25R

District Austin
Date 08/20/2013
Grnd. Elev. 452.00 ft
GW Elev. N/A

Diameters Below Tip Checked = 2

TCP Bearing Values Used





SOIL STRENGTH ANALYSIS

WinCore
Version 3.1

County Travis
Highway SH 71
Control 0265-01-110

Hole RW-8
Structure Retaining Wall
Station 11159+50.12
Offset 90.69L

District Austin
Date 08/19/2013
Grnd. Elev. 449.40 ft
GW Elev. N/A

TCP Capacity Values Used

Soil reduction factor of 0.7 applied

Strata No.	Elev. (Feet)		Design Type	Soil Factor	TCP N Value	TCP Unit Friction (TSF)	Accumulative Friction (T/F)
	From	To					
1	449.4	444.4	CH	50	0	0.00	0.00
2	444.4	441.4	CL	60	24	0.28	0.84
2	441.4	436.4	CL	60	21	0.25	2.07
2	436.4	431.4	CL	60	25	0.29	3.52
2	431.4	427.4	CL	60	25	0.29	4.69
3	427.4	422.4	GC	80	83	0.73	8.32
4	422.4	419.4	GW-GC	80	79	0.69	10.40



SKIN FRICTION DESIGN

WinCore
Version 3.1

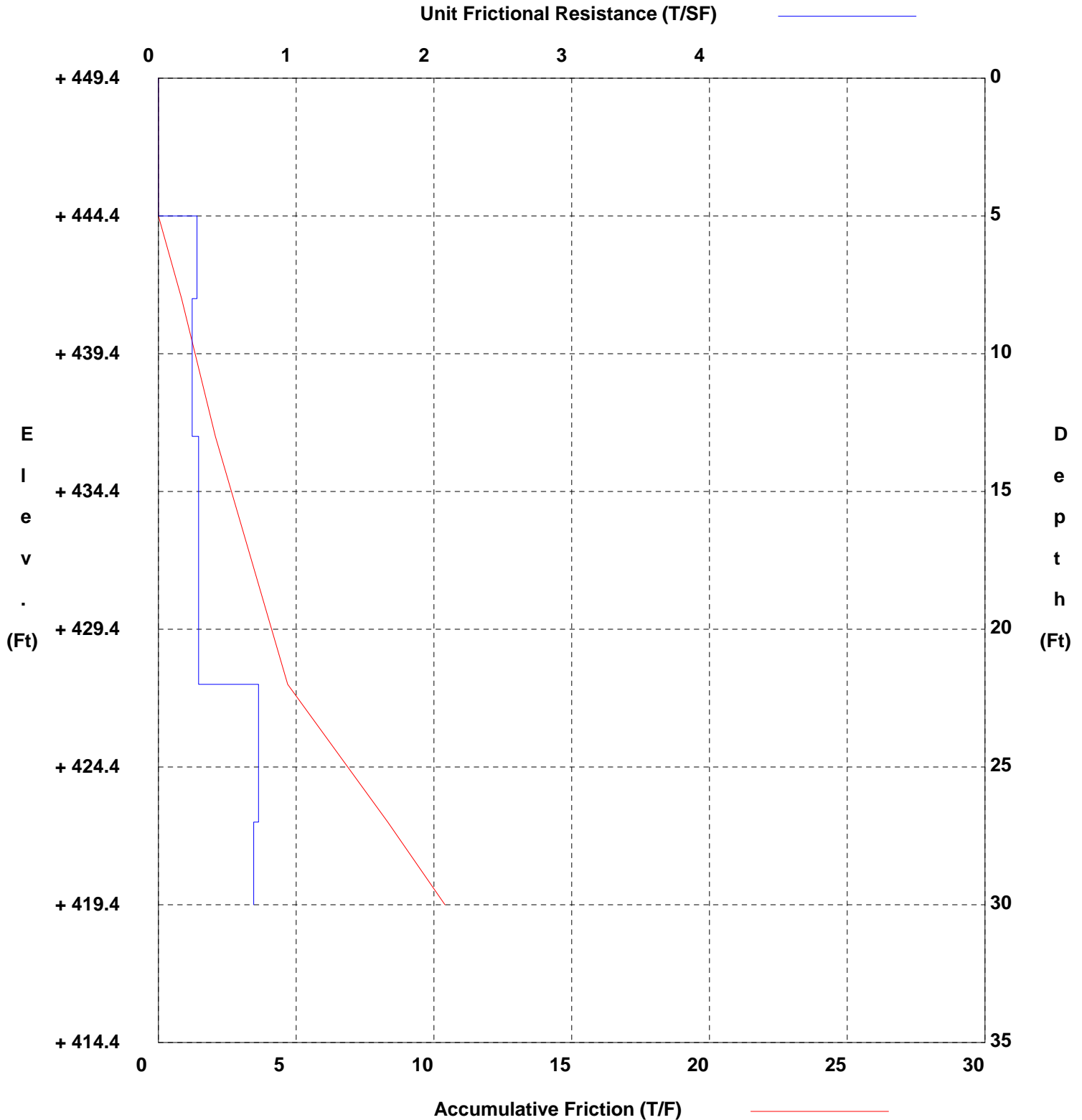
County Travis
Highway SH 71
Control 0265-01-110

Hole RW-8
Structure Retaining Wall
Station 11159+50.12
Offset 90.69L

District Austin
Date 08/19/2013
Grnd. Elev. 449.40 ft
GW Elev. N/A

Drilled Shaft Design: Soil Reduction Factor = 0.7

TCP Friction Values Used





POINT BEARING DESIGN

WinCore
Version 3.1

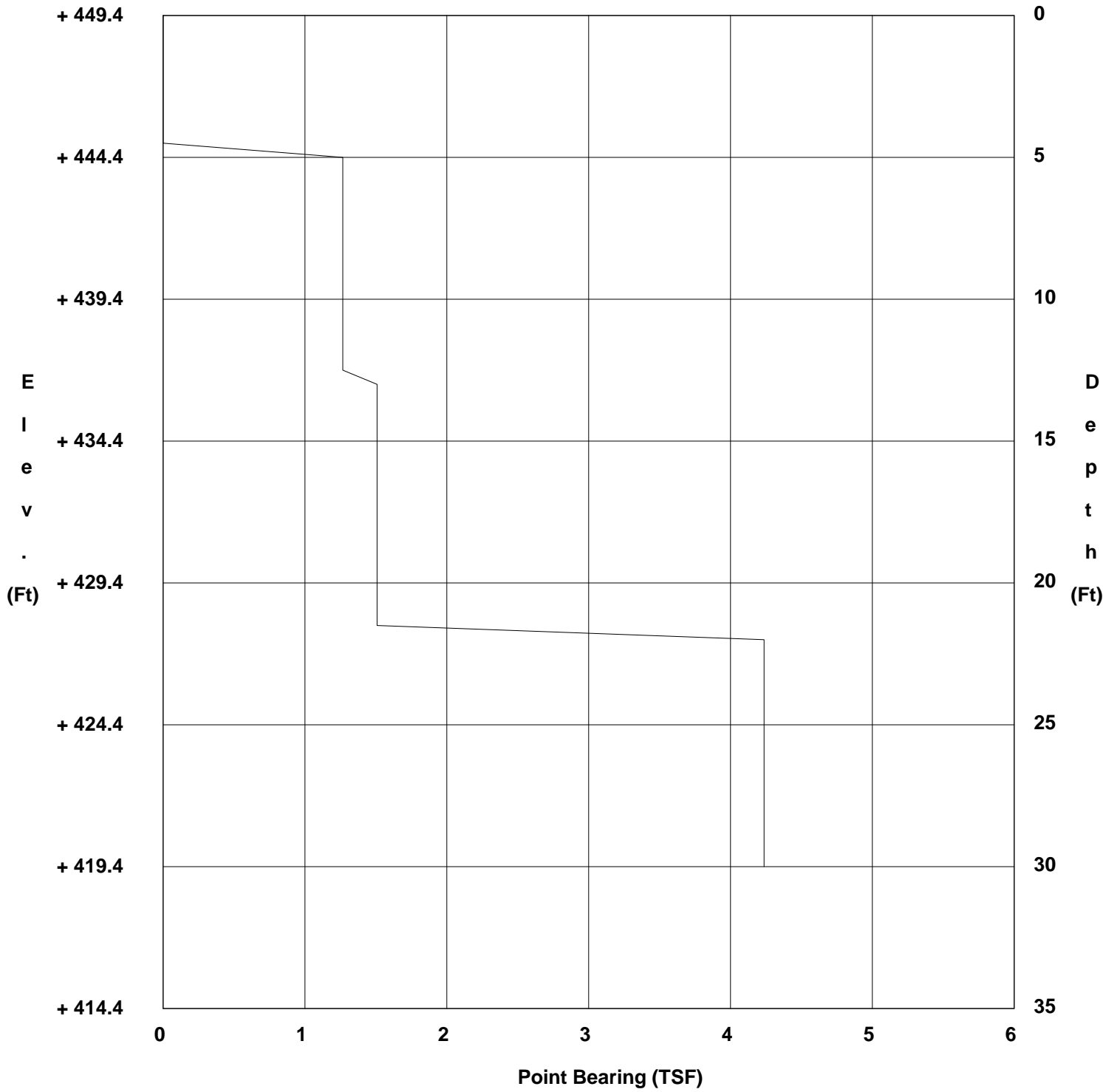
County Travis
Highway SH 71
Control 0265-01-110

Hole RW-8
Structure Retaining Wall
Station 11159+50.12
Offset 90.69L

District Austin
Date 08/19/2013
Grnd. Elev. 449.40 ft
GW Elev. N/A

Diameters Below Tip Checked = 2

TCP Bearing Values Used





SOIL STRENGTH ANALYSIS

WinCore
Version 3.1

County Travis
Highway SH 71
Control 0265-01-110

Hole RW-9
Structure Retaining Wall
Station 11177+86.15
Offset 3.18L

District Austin
Date 08/16/2013
Grnd. Elev. 450.50 ft
GW Elev. N/A

TCP Capacity Values Used

Soil reduction factor of 0.7 applied

Strata No.	Elev. (Feet)		Design Type	Soil Factor	TCP N Value	TCP Unit Friction (TSF)	Accumulative Friction (T/F)
	From	To					
1	450.5	448.5	CH	50	0	0.00	0.00
2	448.5	442.5	CH	50	14	0.20	1.18
2	442.5	437.5	CH	50	15	0.21	2.23
2	437.5	432.5	CH	50	55	0.77	6.08
2	432.5	428.5	CH	50	72	1.01	10.11
3	428.5	423.0	SHALE	80	400	2.25	22.48
3	423.0	420.5	SHALE	80	400	2.25	28.10



SKIN FRICTION DESIGN

WinCore
Version 3.1

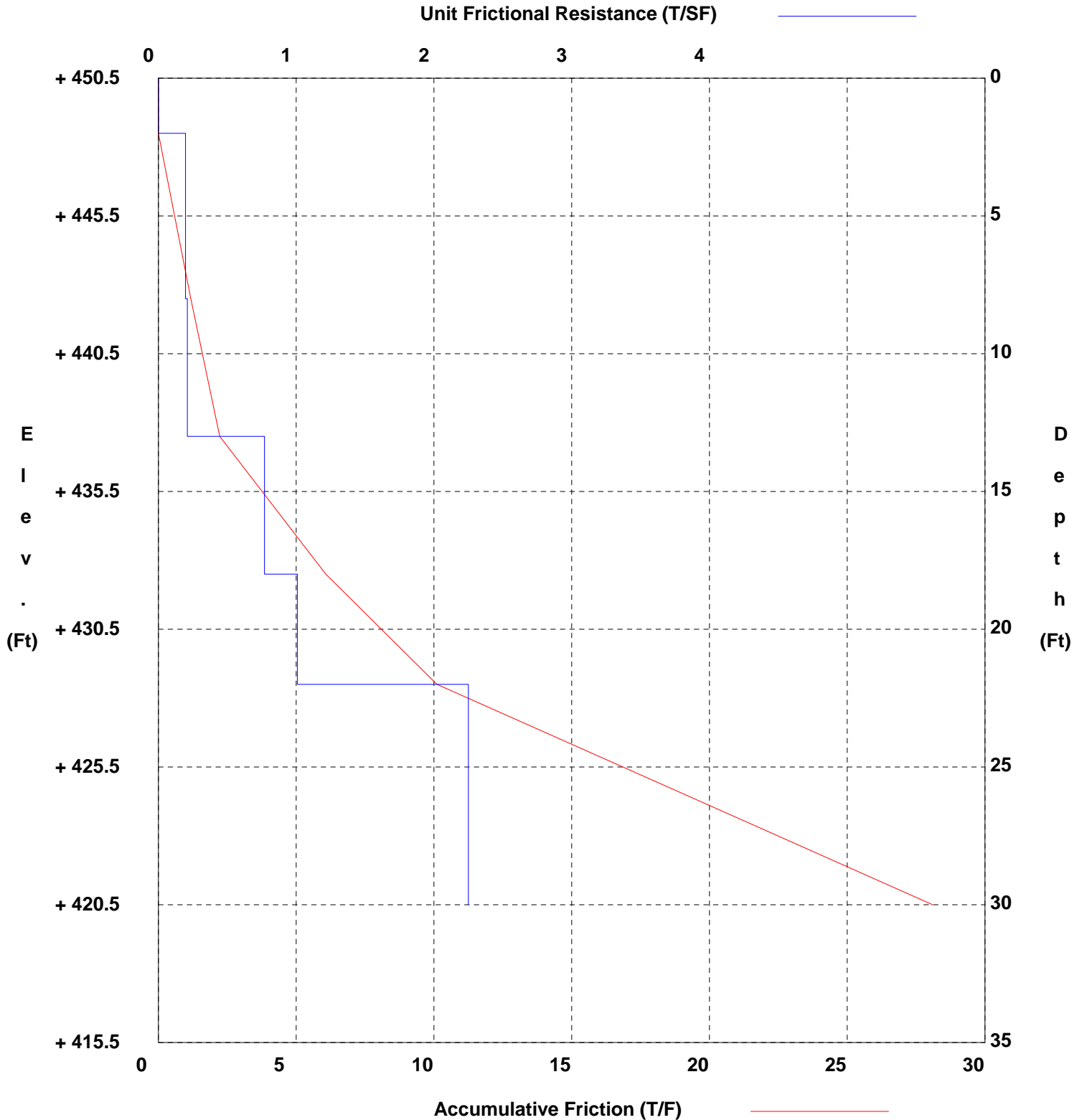
County Travis
Highway SH 71
Control 0265-01-110

Hole RW-9
Structure Retaining Wall
Station 11177+86.15
Offset 3.18L

District Austin
Date 08/16/2013
Grnd. Elev. 450.50 ft
GW Elev. N/A

Drilled Shaft Design: Soil Reduction Factor = 0.7

TCP Friction Values Used





POINT BEARING DESIGN

WinCore
Version 3.1

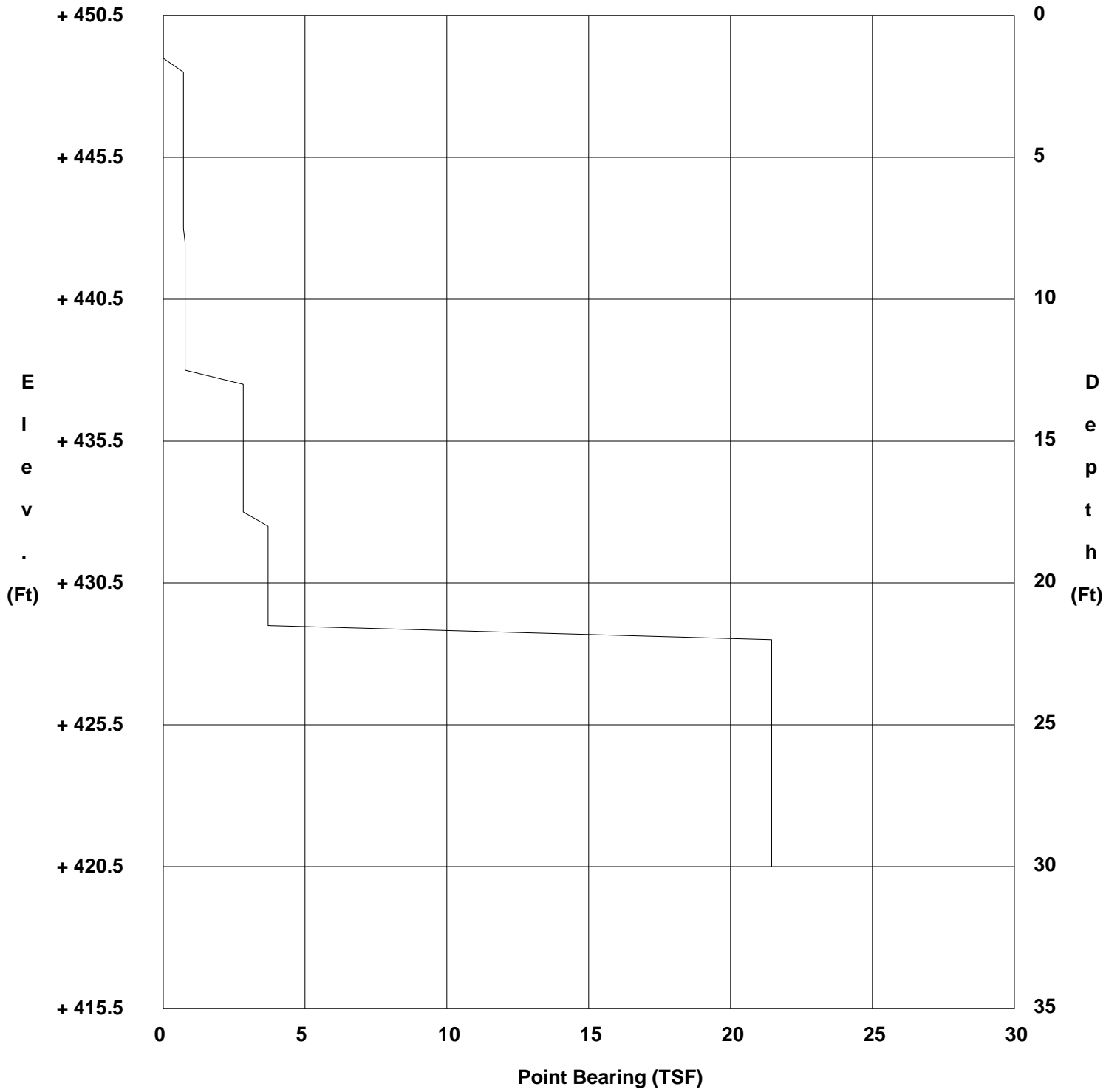
County Travis
Highway SH 71
Control 0265-01-110

Hole RW-9
Structure Retaining Wall
Station 11177+86.15
Offset 3.18L

District Austin
Date 08/16/2013
Grnd. Elev. 450.50 ft
GW Elev. N/A

Diameters Below Tip Checked = 2

TCP Bearing Values Used





SOIL STRENGTH ANALYSIS

WinCore
Version 3.1

County Travis
Highway SH 71
Control 0265-01-110

Hole RW-10
Structure Retaining Wall
Station 11179+34.66
Offset 79.59L

District Austin
Date 08/09/2013
Grnd. Elev. 449.60 ft
GW Elev. N/A

TCP Capacity Values Used

Soil reduction factor of 0.7 applied

Strata No.	Elev. (Feet)		Design Type	Soil Factor	TCP N Value	TCP Unit Friction (TSF)	Accumulative Friction (T/F)
	From	To					
1	449.6	447.6	CH	50	0	0.00	0.00
2	447.6	441.6	CH	50	18	0.25	1.51
2	441.6	436.6	CH	50	24	0.34	3.19
2	436.6	431.6	CH	50	54	0.76	6.97
2	431.6	426.6	CH	50	160	0.90	11.47
2	426.6	421.6	CH	50	282	1.59	19.41
3	421.6	419.6	SHALE	80	320	1.80	23.01



SKIN FRICTION DESIGN

WinCore
Version 3.1

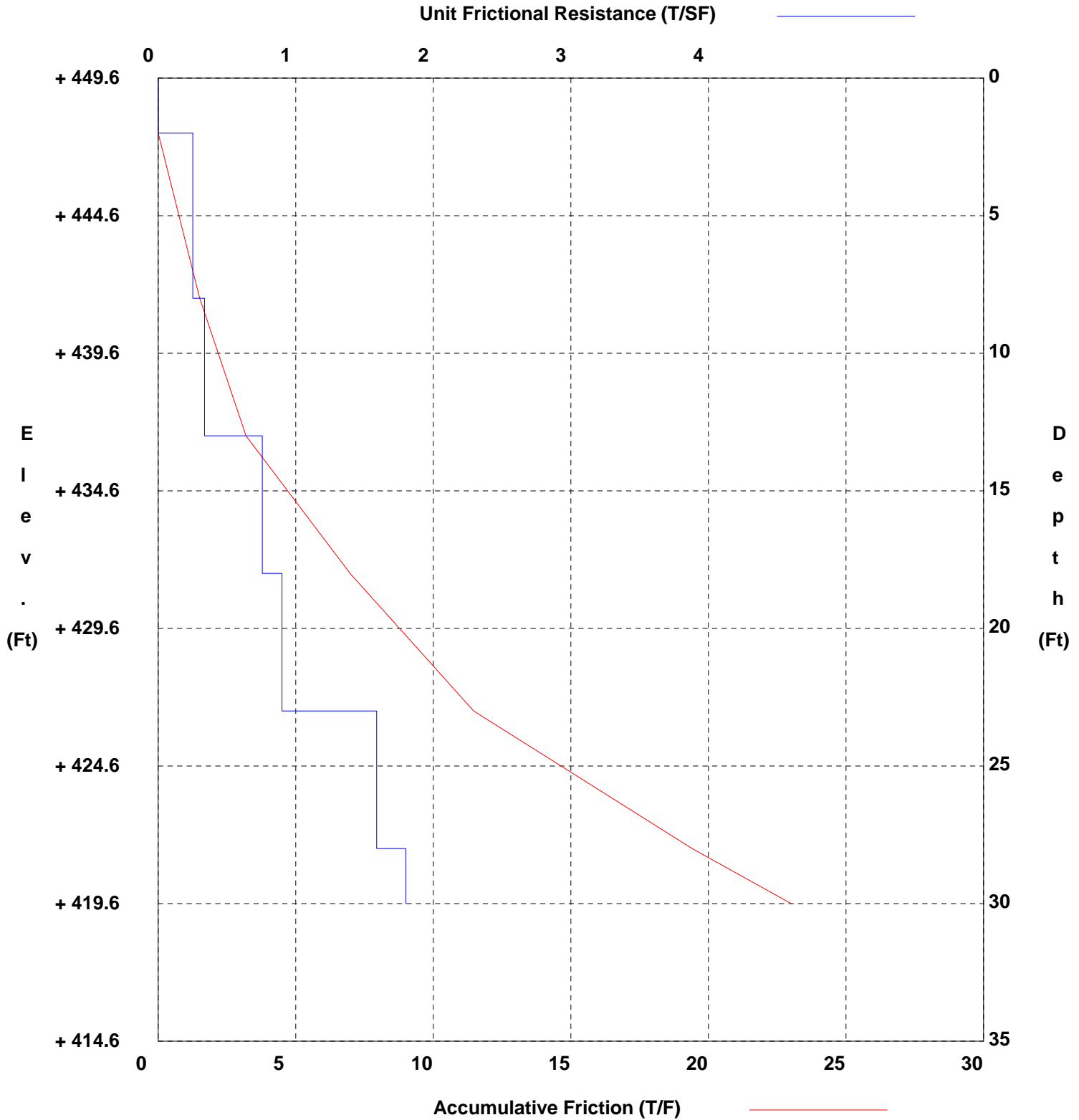
County Travis
Highway SH 71
Control 0265-01-110

Hole RW-10
Structure Retaining Wall
Station 11179+34.66
Offset 79.59L

District Austin
Date 08/09/2013
Grnd. Elev. 449.60 ft
GW Elev. N/A

Drilled Shaft Design: Soil Reduction Factor = 0.7

TCP Friction Values Used





POINT BEARING DESIGN

WinCore
Version 3.1

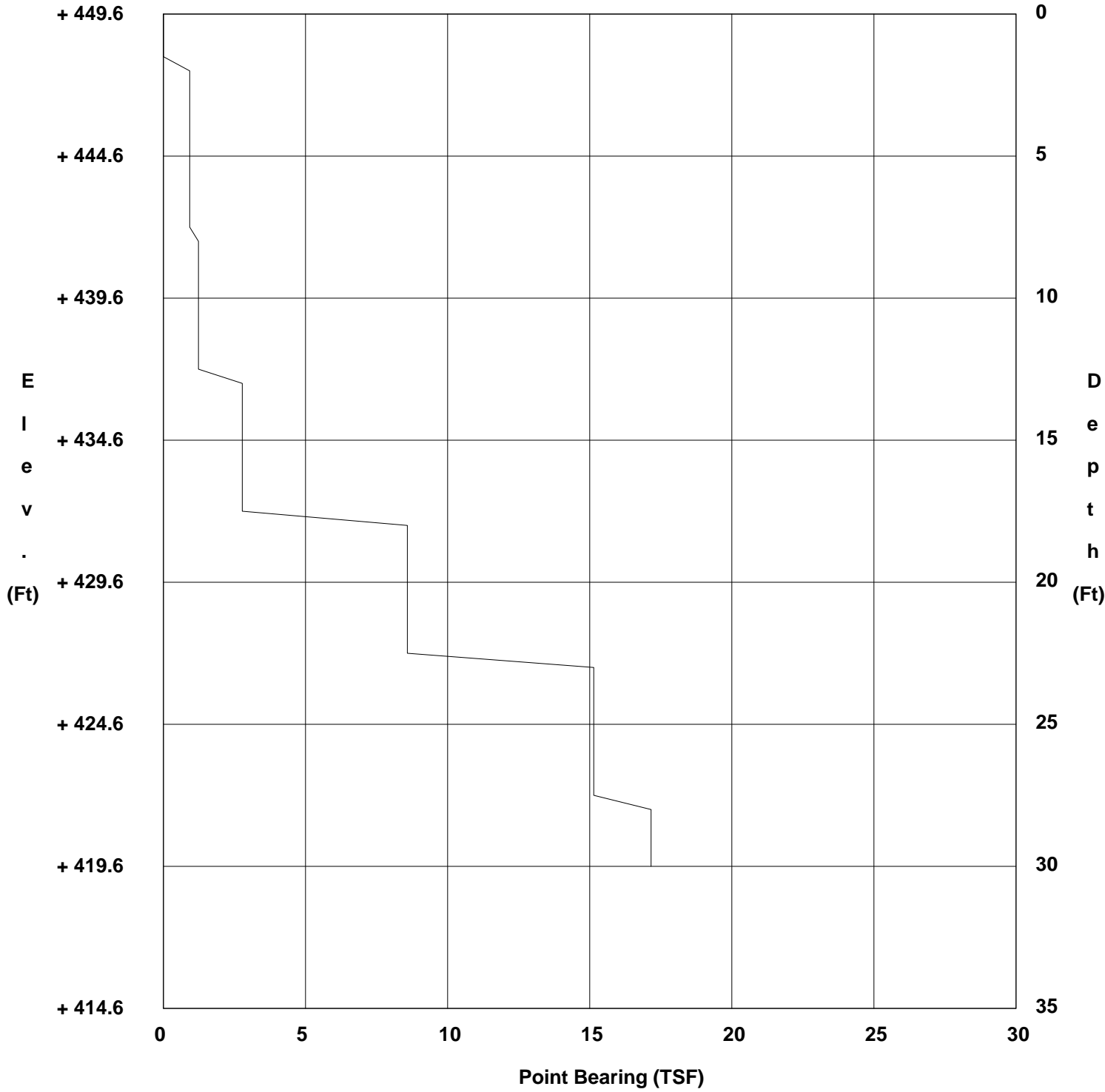
County Travis
Highway SH 71
Control 0265-01-110

Hole RW-10
Structure Retaining Wall
Station 11179+34.66
Offset 79.59L

District Austin
Date 08/09/2013
Grnd. Elev. 449.60 ft
GW Elev. N/A

Diameters Below Tip Checked = 2

TCP Bearing Values Used





SOIL STRENGTH ANALYSIS

WinCore
Version 3.1

County Travis
Highway SH 71
Control 0265-01-110

Hole RW-11
Structure Retaining Wall
Station 11180+70.81
Offset 15.32R

District Austin
Date 08/09/2013
Grnd. Elev. 447.80 ft
GW Elev. N/A

TCP Capacity Values Used

Soil reduction factor of 0.7 applied

Strata No.	Elev. (Feet)		Design Type	Soil Factor	TCP N Value	TCP Unit Friction (TSF)	Accumulative Friction (T/F)
	From	To					
1	447.8	446.8	CH	50	0	0.00	0.00
2	446.8	445.8	SC	70	0	0.00	0.00
3	445.8	443.8	CH	50	0	0.00	0.00
4	443.8	439.8	CH	50	15	0.21	0.84
4	439.8	432.8	CH	50	12	0.17	2.02
5	432.8	429.8	CH	50	35	0.49	3.49
5	429.8	424.8	CH	50	40	0.56	6.29
5	424.8	420.3	CH	50	42	0.59	8.93
5	420.3	417.8	CH	50	60	0.84	11.03



SKIN FRICTION DESIGN

WinCore
Version 3.1

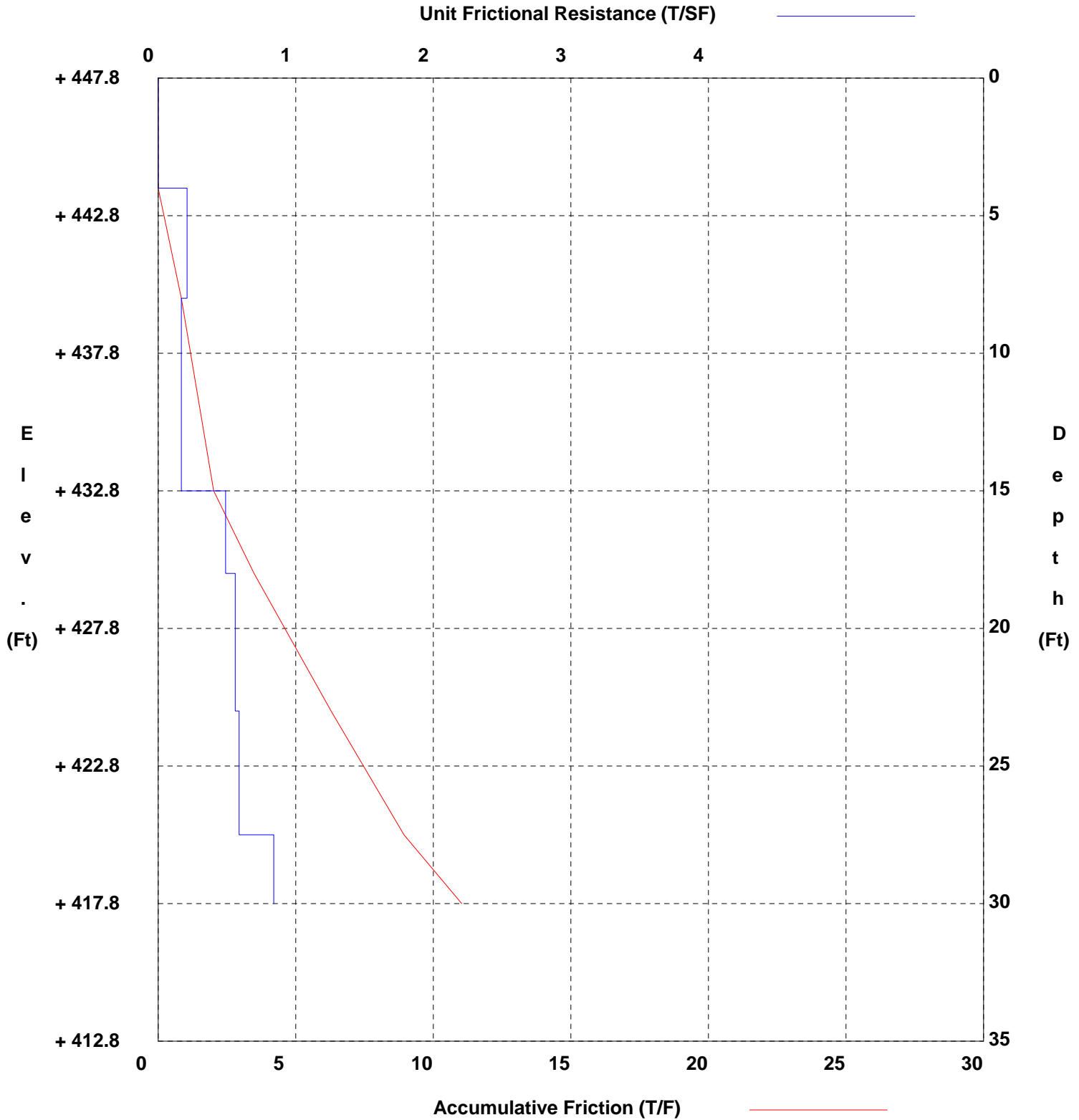
County Travis
Highway SH 71
Control 0265-01-110

Hole RW-11
Structure Retaining Wall
Station 11180+70.81
Offset 15.32R

District Austin
Date 08/09/2013
Grnd. Elev. 447.80 ft
GW Elev. N/A

Drilled Shaft Design: Soil Reduction Factor = 0.7

TCP Friction Values Used





POINT BEARING DESIGN

WinCore
Version 3.1

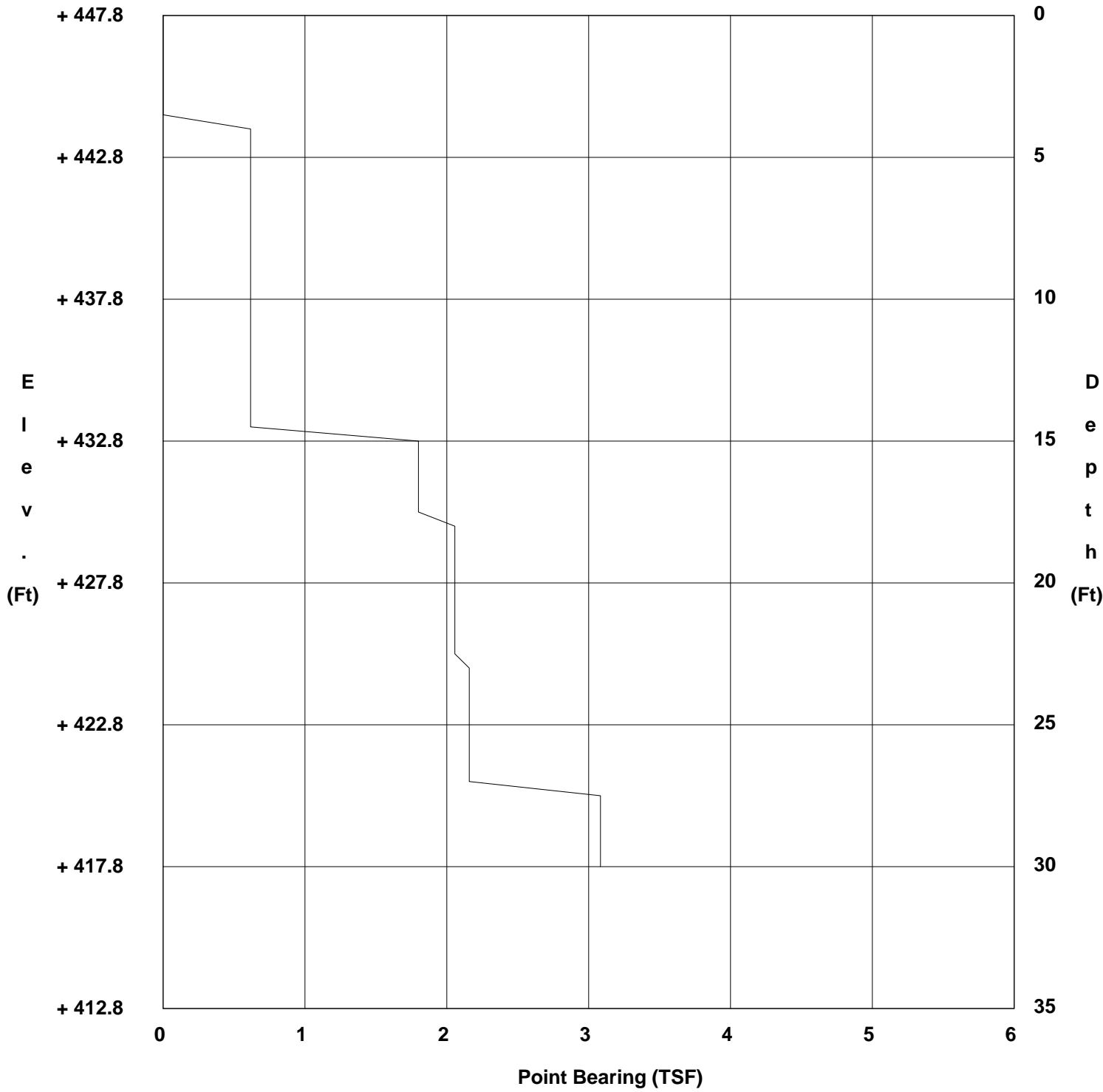
County Travis
Highway SH 71
Control 0265-01-110

Hole RW-11
Structure Retaining Wall
Station 11180+70.81
Offset 15.32R

District Austin
Date 08/09/2013
Grnd. Elev. 447.80 ft
GW Elev. N/A

Diameters Below Tip Checked = 2

TCP Bearing Values Used





SOIL STRENGTH ANALYSIS

WinCore
Version 3.1

County Travis
Highway SH 71
Control 0265-01-110

Hole RW-12
Structure Retaining Wall
Station 11182+06.19
Offset 66.30L

District Austin
Date 08/09/2013
Grnd. Elev. 445.70 ft
GW Elev. N/A

TCP Capacity Values Used

Soil reduction factor of 0.7 applied

Strata No.	Elev. (Feet)		Design Type	Soil Factor	TCP N Value	TCP Unit Friction (TSF)	Accumulative Friction (T/F)
	From	To					
1	445.7	440.7	CH	50	0	0.00	0.00
2	440.7	437.7	CH	50	16	0.22	0.67
2	437.7	432.7	CH	50	16	0.22	1.79
2	432.7	427.7	CH	50	17	0.24	2.98
2	427.7	423.7	CH	50	19	0.27	4.05
3	423.7	418.7	CH	50	39	0.55	6.78
4	418.7	415.7	SHALE	80	63	0.55	8.43



SKIN FRICTION DESIGN

WinCore
Version 3.1

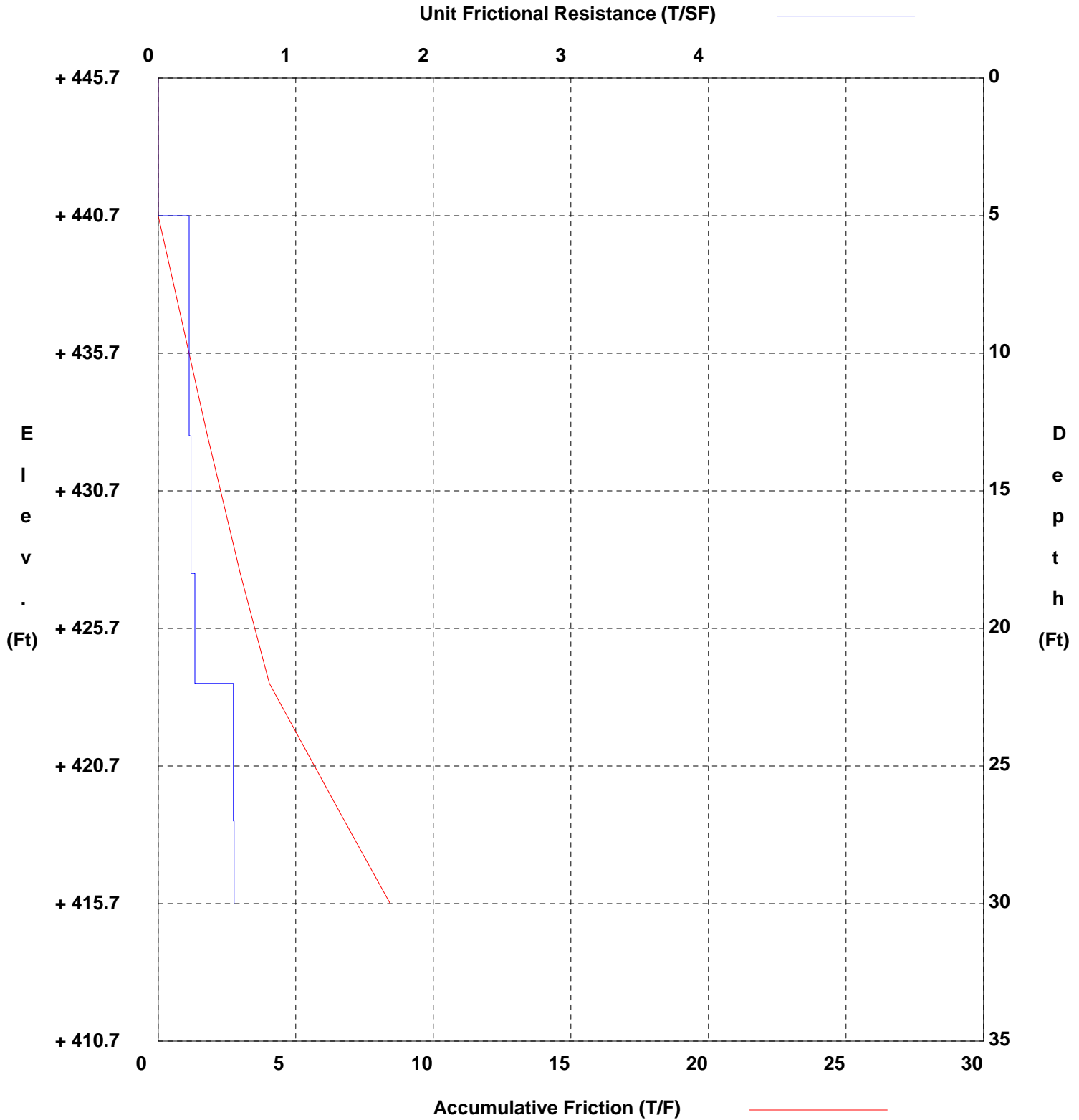
County Travis
Highway SH 71
Control 0265-01-110

Hole RW-12
Structure Retaining Wall
Station 11182+06.19
Offset 66.30L

District Austin
Date 08/09/2013
Grnd. Elev. 445.70 ft
GW Elev. N/A

Drilled Shaft Design: Soil Reduction Factor = 0.7

TCP Friction Values Used





POINT BEARING DESIGN

WinCore
Version 3.1

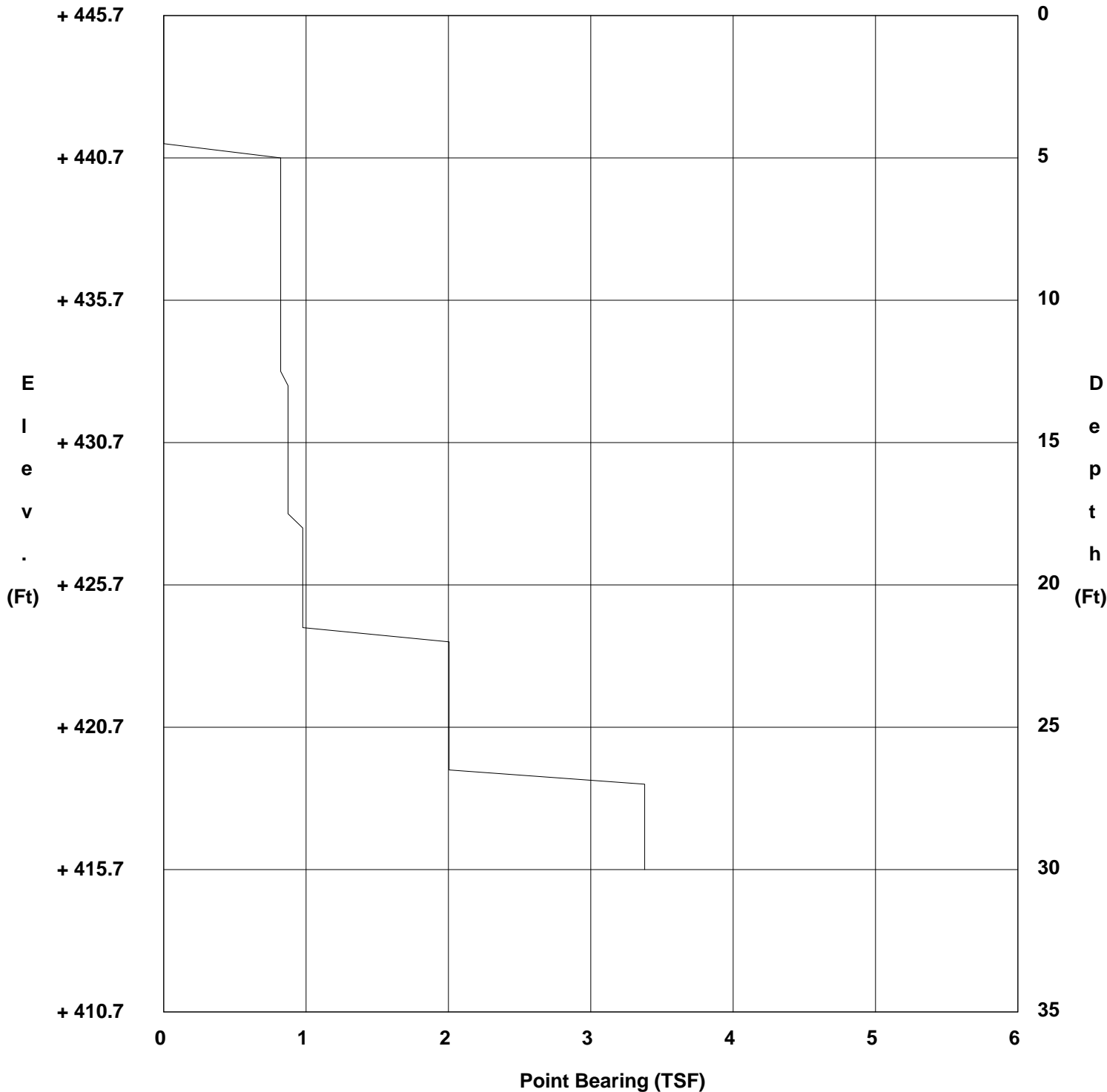
County Travis
Highway SH 71
Control 0265-01-110

Hole RW-12
Structure Retaining Wall
Station 11182+06.19
Offset 66.30L

District Austin
Date 08/09/2013
Grnd. Elev. 445.70 ft
GW Elev. N/A

Diameters Below Tip Checked = 2

TCP Bearing Values Used



BRIDGE BORING LOGS



SOIL STRENGTH ANALYSIS

WinCore
Version 3.1

County Travis
Highway SH 71
Control 0265-01-110

Hole BR-2
Structure Bridge
Station 11145+13.01
Offset 88.31L

District Austin
Date 8/6/2013
Grnd. Elev. 462.90 ft
GW Elev. 419.90 ft

TCP Capacity Values Used

Soil reduction factor of 0.7 applied

Strata No.	Elev. (Feet)		Design Type	Soil Factor	TCP N Value	TCP Unit Friction (TSF)	Accumulative Friction (T/F)
	From	To					
1	462.9	460.9	CH	50	0	0.00	0.00
2	460.9	454.9	CL	60	15	0.18	1.05
2	454.9	450.9	CL	60	20	0.23	1.98
3	450.9	445.9	CL	60	48	0.56	4.78
4	445.9	439.9	SC	70	47	0.47	7.60
4	439.9	434.9	SC	70	126	0.85	11.85
4	434.9	430.9	SC	70	160	0.90	15.45
5	430.9	424.9	CL	60	13	0.15	16.36
5	424.9	420.9	CL	60	200	1.12	20.86
6	420.9	414.9	SC	70	131	0.85	25.96
6	414.9	410.9	SC	70	48	0.48	27.88
7	410.9	404.9	SHALE	80	343	1.93	39.45
7	404.9	399.9	SHALE	80	686	3.25	55.70
7	399.9	394.9	SHALE	80	960	3.25	71.95
7	394.9	389.9	SHALE	80	480	2.70	85.44
7	389.9	385.4	SHALE	80	600	3.25	100.07
7	385.4	382.9	SHALE	80	369	2.08	105.26



SKIN FRICTION DESIGN

WinCore
Version 3.1

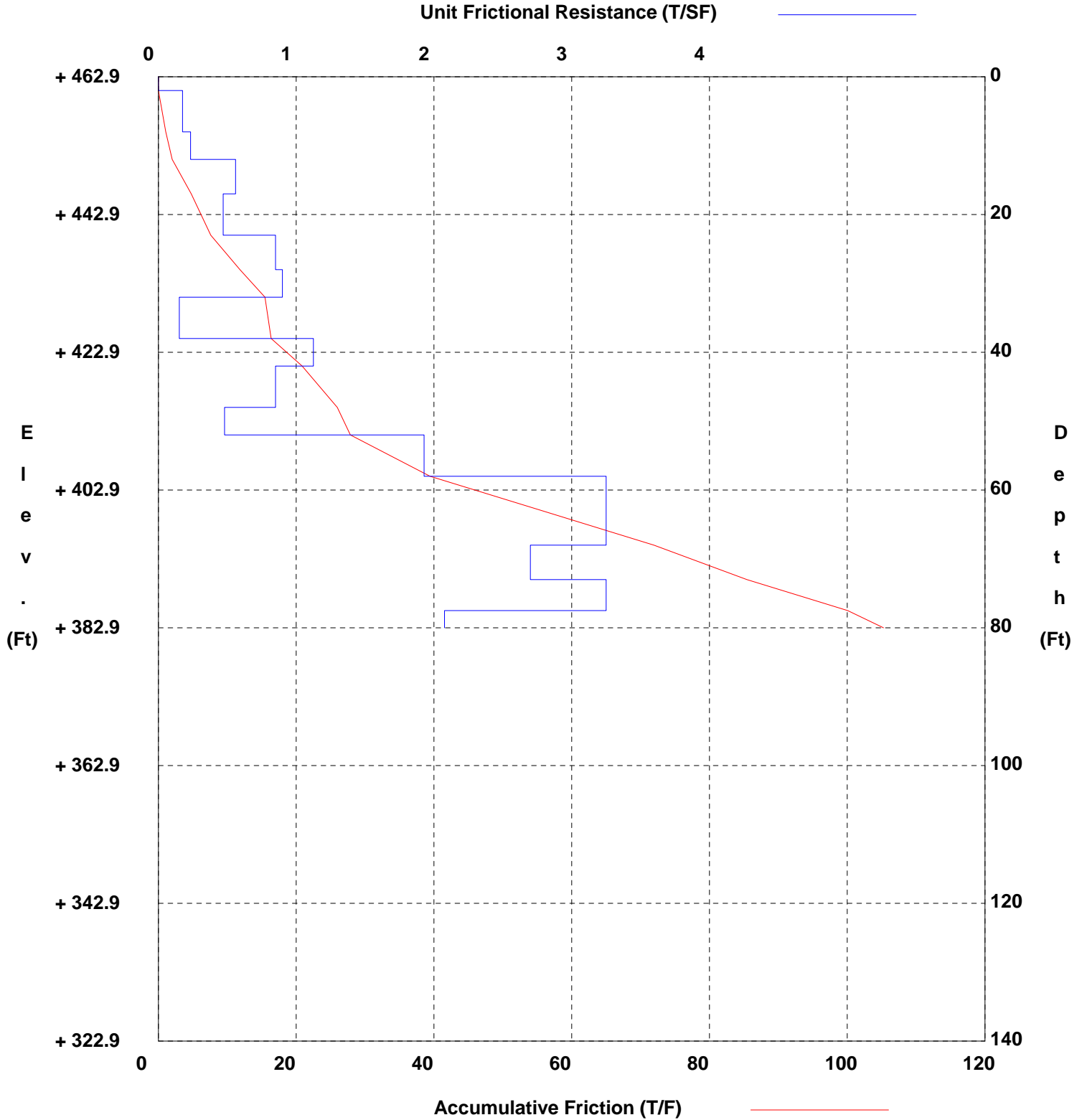
County Travis
Highway SH 71
Control 0265-01-110

Hole BR-2
Structure Bridge
Station 11145+13.01
Offset 88.31L

District Austin
Date 8/6/2013
Grnd. Elev. 462.90 ft
GW Elev. 419.90 ft

Drilled Shaft Design: Soil Reduction Factor = 0.7

TCP Friction Values Used





POINT BEARING DESIGN

WinCore
Version 3.1

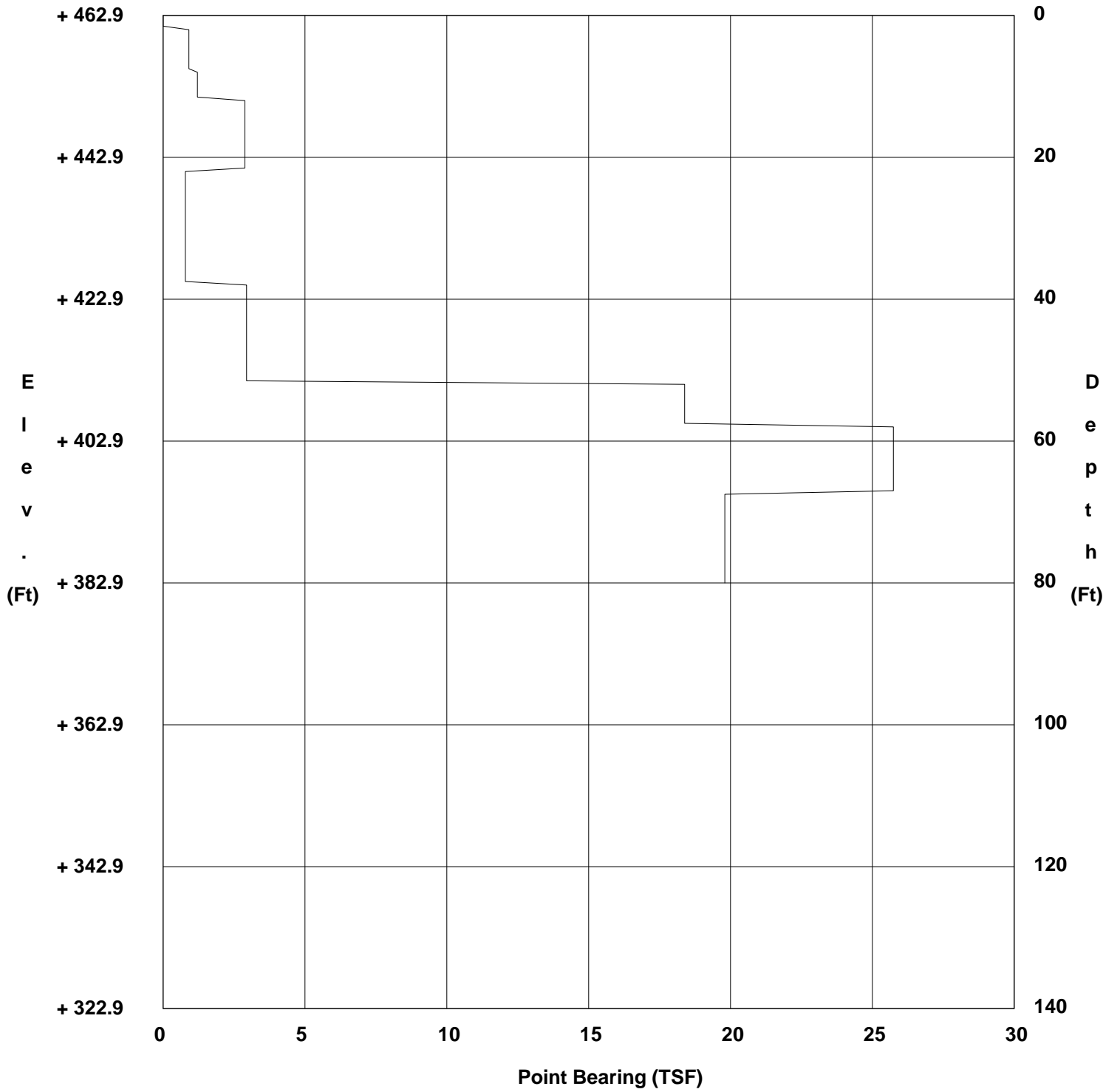
County Travis
Highway SH 71
Control 0265-01-110

Hole BR-2
Structure Bridge
Station 11145+13.01
Offset 88.31L

District Austin
Date 8/6/2013
Grnd. Elev. 462.90 ft
GW Elev. 419.90 ft

Diameters Below Tip Checked = 2

TCP Bearing Values Used





SOIL STRENGTH ANALYSIS

WinCore
Version 3.1

County Travis
Highway SH 71
Control 0265-01-110

Hole BR-4
Structure Bridge
Station 11149+11.31
Offset 90.79L

District Austin
Date 8/7/2013
Grnd. Elev. 458.90 ft
GW Elev. N/A

TCP Capacity Values Used

Soil reduction factor of 0.7 applied

Strata No.	Elev. (Feet)		Design Type	Soil Factor	TCP N Value	TCP Unit Friction (TSF)	Accumulative Friction (T/F)
	From	To					
1	458.9	454.9	CH	50	0	0.00	0.00
2	454.9	450.9	CL	60	15	0.18	0.70
2	450.9	445.9	CL	60	20	0.23	1.87
2	445.9	441.9	CL	60	40	0.47	3.73
3	441.9	435.9	SC	70	88	0.88	9.01
3	435.9	428.9	SC	70	66	0.66	13.63
4	428.9	425.9	CL	60	44	0.51	15.17
4	425.9	422.9	CL	60	7	0.08	15.42
5	422.9	415.9	GC	80	109	0.85	21.37
5	415.9	410.9	GC	80	153	0.86	25.67
6	410.9	405.9	SHALE	80	686	3.25	41.92
6	405.9	400.9	SHALE	80	436	2.45	54.19
6	400.9	395.9	SHALE	80	686	3.25	70.44
6	395.9	390.9	SHALE	80	960	3.25	86.69
6	390.9	385.9	SHALE	80	800	3.25	102.94
6	385.9	381.4	SHALE	80	800	3.25	117.56
6	381.4	378.9	SHALE	80	369	2.08	122.75



SKIN FRICTION DESIGN

WinCore
Version 3.1

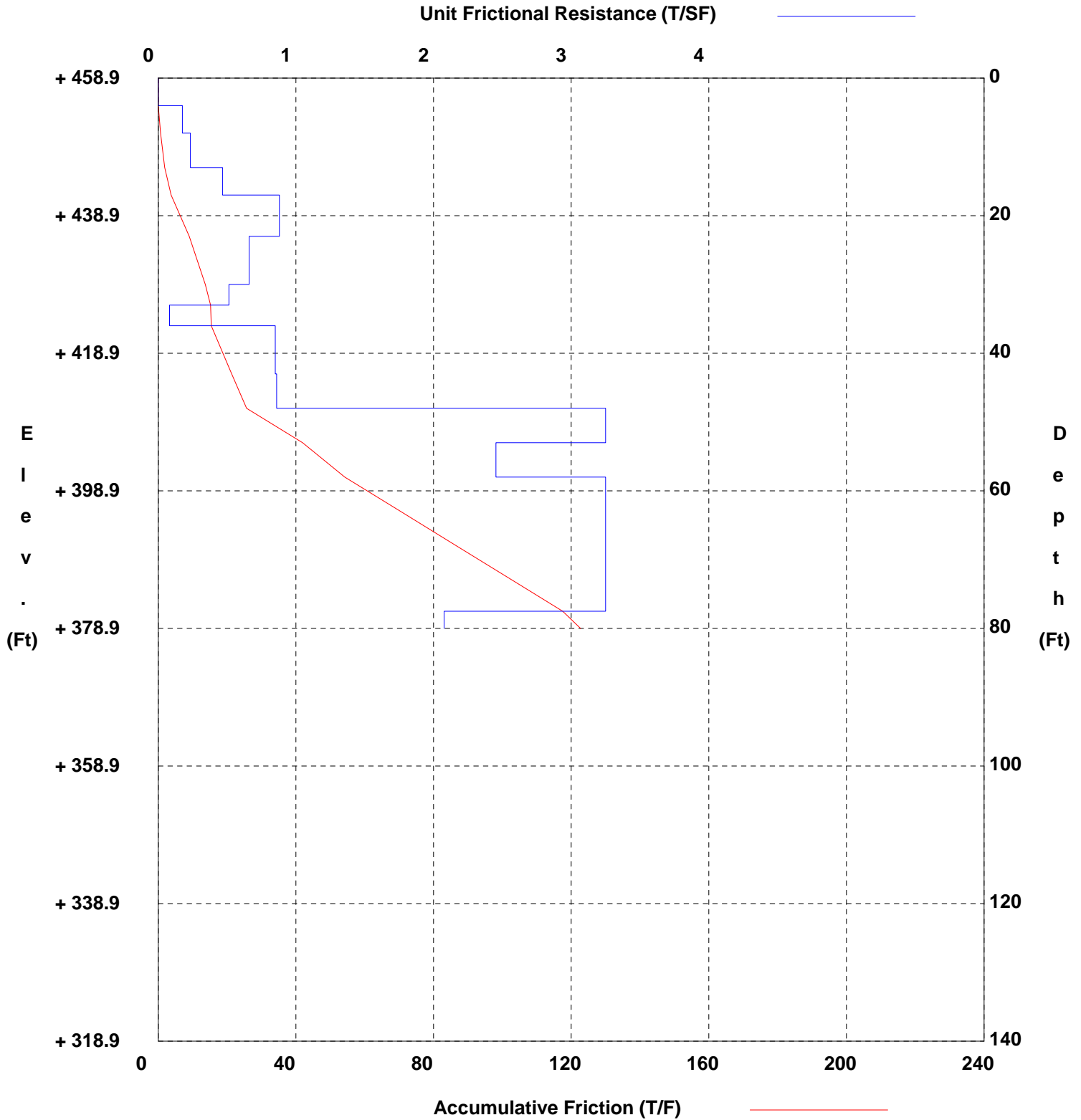
County Travis
Highway SH 71
Control 0265-01-110

Hole BR-4
Structure Bridge
Station 11149+11.31
Offset 90.79L

District Austin
Date 8/7/2013
Grnd. Elev. 458.90 ft
GW Elev. N/A

Drilled Shaft Design: Soil Reduction Factor = 0.7

TCP Friction Values Used





POINT BEARING DESIGN

WinCore
Version 3.1

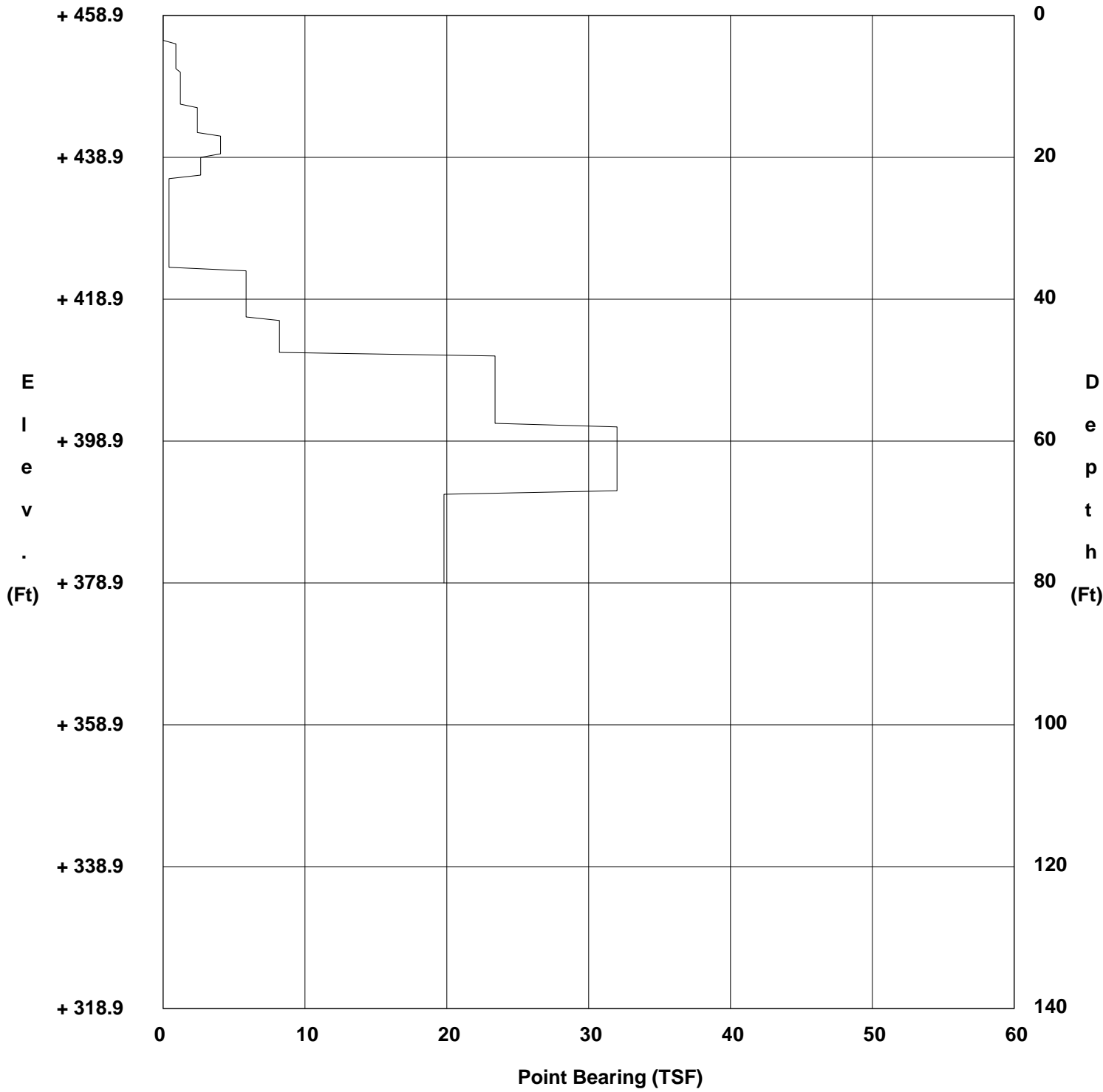
County Travis
Highway SH 71
Control 0265-01-110

Hole BR-4
Structure Bridge
Station 11149+11.31
Offset 90.79L

District Austin
Date 8/7/2013
Grnd. Elev. 458.90 ft
GW Elev. N/A

Diameters Below Tip Checked = 2

TCP Bearing Values Used





SOIL STRENGTH ANALYSIS

WinCore
Version 3.1

County Travis
Highway SH 71
Control 0265-01-110

Hole BR-5
Structure Bridge
Station 11183+75.99
Offset 1.57R

District Austin
Date 8/1/2013
Grnd. Elev. 444.40 ft
GW Elev. N/A

TCP Capacity Values Used

Soil reduction factor of 0.7 applied

Strata No.	Elev. (Feet)		Design Type	Soil Factor	TCP N Value	TCP Unit Friction (TSF)	Accumulative Friction (T/F)
	From	To					
1	444.4	441.4	CH	50	0	0.00	0.00
2	441.4	438.4	CH	50	17	0.24	0.71
3	438.4	431.4	CH	50	18	0.25	2.48
3	431.4	426.4	CH	50	15	0.21	3.53
3	426.4	421.4	CH	50	18	0.25	4.79
3	421.4	416.4	CH	50	28	0.39	6.75
4	416.4	411.4	SHALE	80	104	0.85	11.00
4	411.4	406.4	SHALE	80	369	2.08	21.38
4	406.4	401.4	SHALE	80	480	2.70	34.87
4	401.4	396.4	SHALE	80	436	2.45	47.14
4	396.4	391.4	SHALE	80	436	2.45	59.41
4	391.4	386.4	SHALE	80	400	2.25	70.66
4	386.4	381.4	SHALE	80	436	2.45	82.93
4	381.4	376.4	SHALE	80	436	2.45	95.19
4	376.4	371.4	SHALE	80	436	2.45	107.46
4	371.4	366.9	SHALE	80	400	2.25	117.58
4	366.9	364.4	SHALE	80	533	3.00	125.08



SKIN FRICTION DESIGN

WinCore
Version 3.1

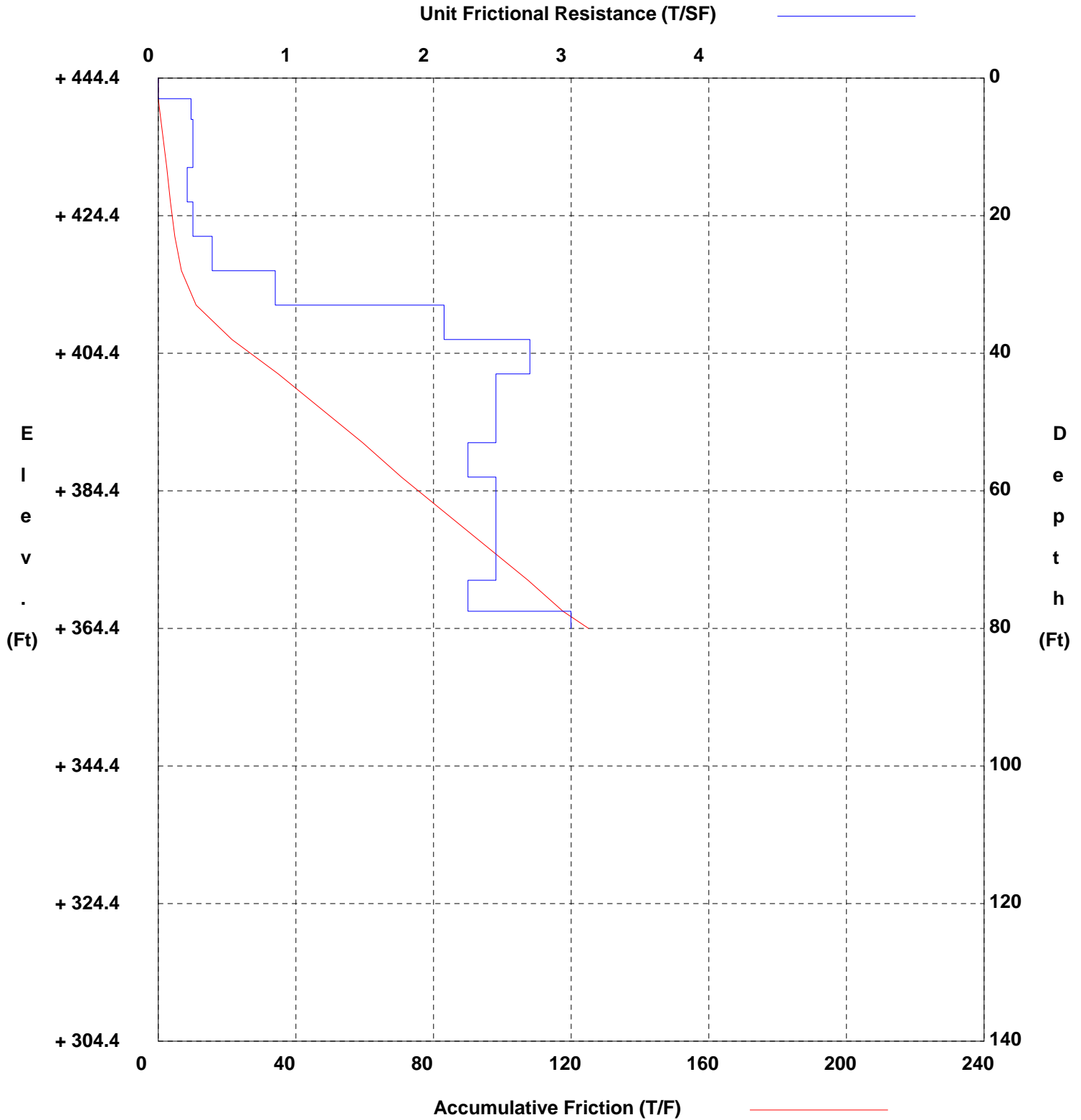
County Travis
Highway SH 71
Control 0265-01-110

Hole BR-5
Structure Bridge
Station 11183+75.99
Offset 1.57R

District Austin
Date 8/1/2013
Grnd. Elev. 444.40 ft
GW Elev. N/A

Drilled Shaft Design: Soil Reduction Factor = 0.7

TCP Friction Values Used





POINT BEARING DESIGN

WinCore
Version 3.1

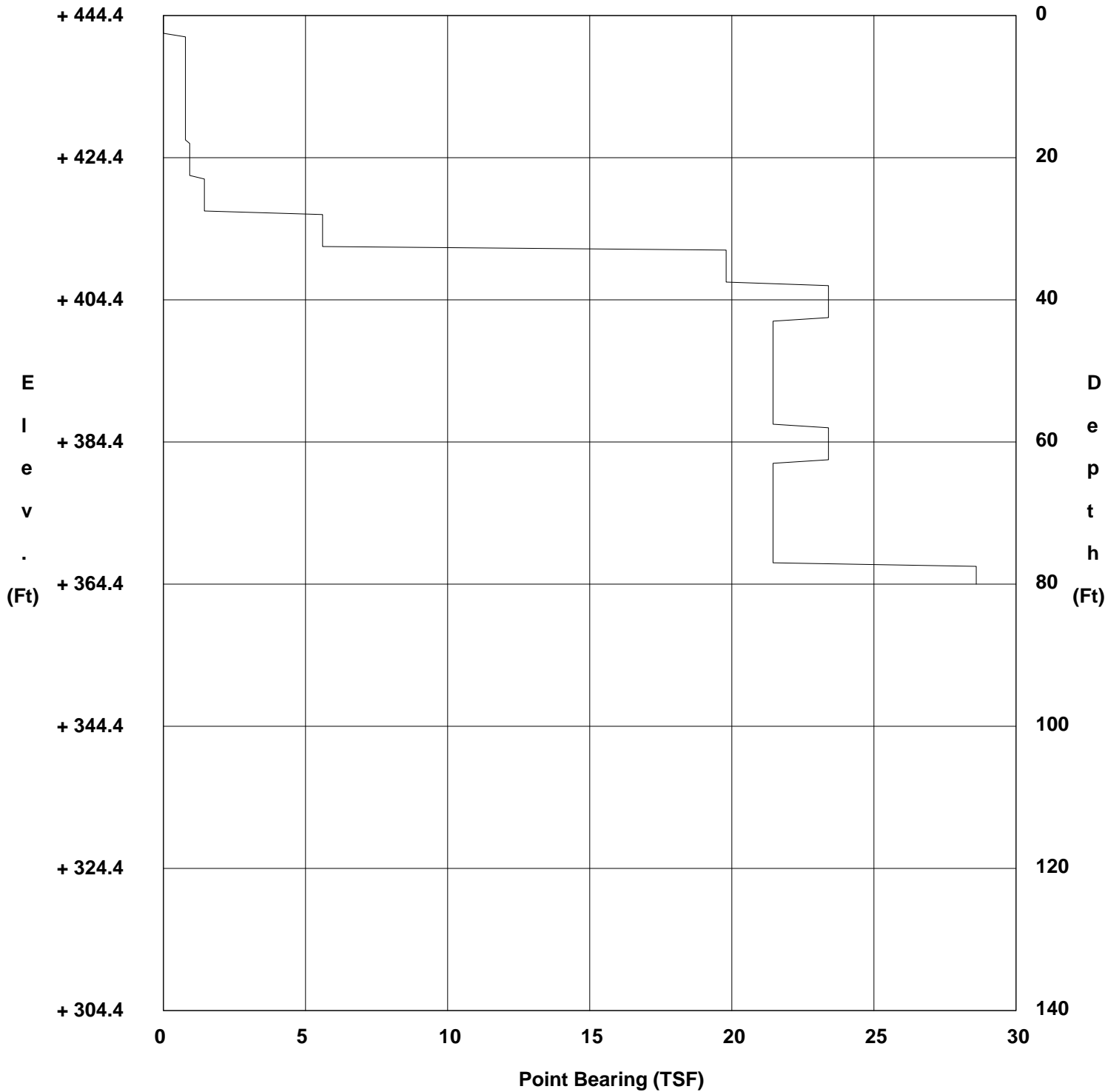
County Travis
Highway SH 71
Control 0265-01-110

Hole BR-5
Structure Bridge
Station 11183+75.99
Offset 1.57R

District Austin
Date 8/1/2013
Grnd. Elev. 444.40 ft
GW Elev. N/A

Diameters Below Tip Checked = 2

TCP Bearing Values Used





SOIL STRENGTH ANALYSIS

WinCore
Version 3.1

County Travis
Highway SH 71
Control 0265-01-110

Hole BR-6
Structure Bridge
Station 11189+24.03
Offset 0.75R

District Austin
Date 8/1/2013
Grnd. Elev. 438.90 ft
GW Elev. 404.80 ft

TCP Capacity Values Used

Soil reduction factor of 0.7 applied

Strata No.	Elev. (Feet)		Design Type	Soil Factor	TCP N Value	TCP Unit Friction (TSF)	Accumulative Friction (T/F)
	From	To					
1	438.9	435.9	CH	50	0	0.00	0.00
2	435.9	432.9	CH	50	17	0.24	0.71
3	432.9	425.9	CH	50	21	0.29	2.77
3	425.9	420.9	CH	50	23	0.32	4.38
3	420.9	415.9	CH	50	24	0.34	6.06
3	415.9	412.9	CH	50	16	0.22	6.73
4	412.9	405.9	CL	60	133	0.85	12.68
5	405.9	401.9	SC	70	126	0.85	16.08
6	401.9	395.9	SHALE	80	253	1.42	24.61
6	395.9	390.9	SHALE	80	343	1.93	34.25
6	390.9	385.9	SHALE	80	436	2.45	46.52
6	385.9	380.9	SHALE	80	343	1.93	56.15
6	380.9	375.9	SHALE	80	436	2.45	68.42
6	375.9	370.9	SHALE	80	800	3.25	84.67
6	370.9	365.9	SHALE	80	533	3.00	99.67
6	365.9	361.4	SHALE	80	600	3.25	114.29
6	361.4	358.9	SHALE	80	436	2.45	120.43



SKIN FRICTION DESIGN

WinCore
Version 3.1

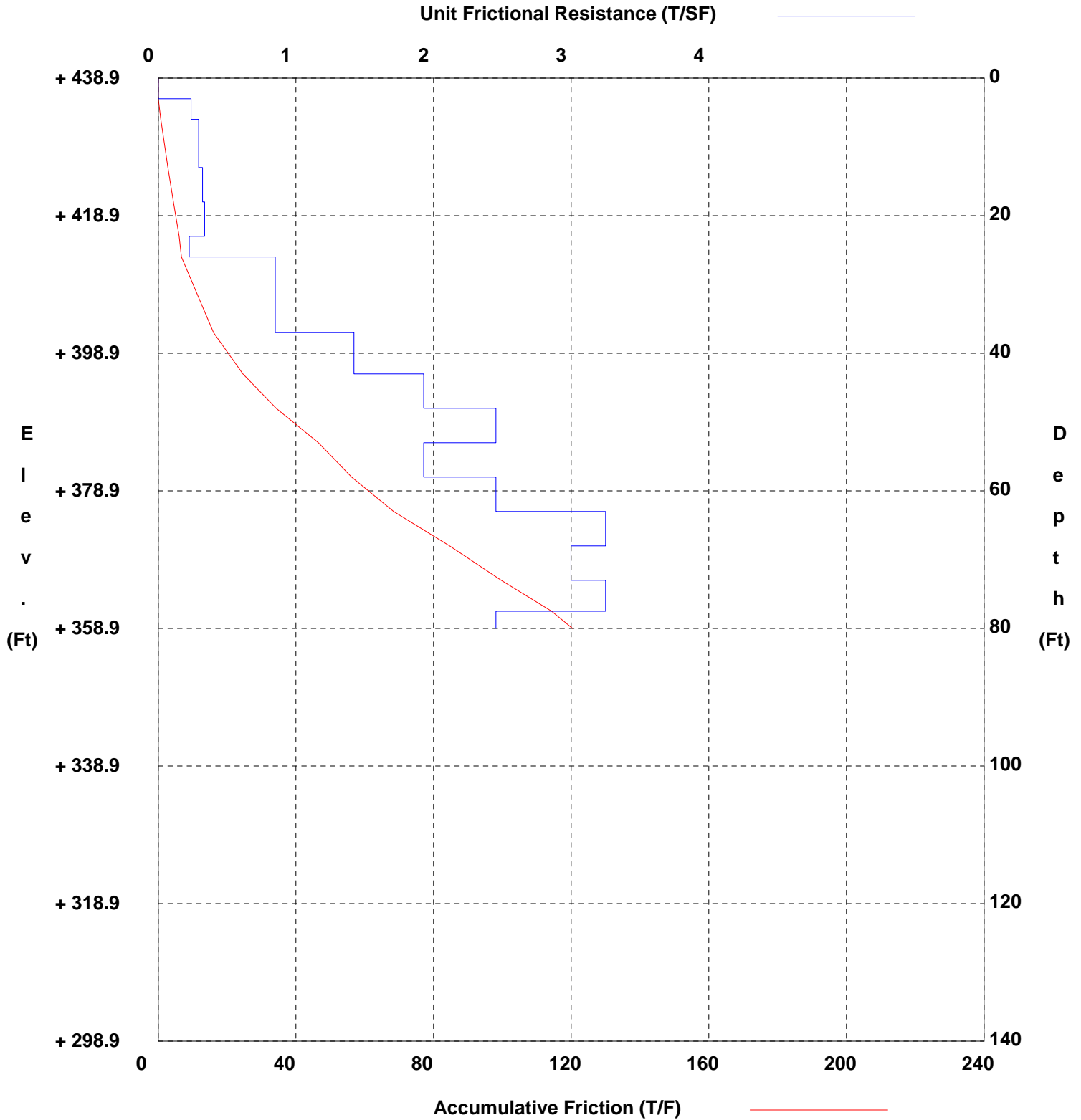
County Travis
Highway SH 71
Control 0265-01-110

Hole BR-6
Structure Bridge
Station 11189+24.03
Offset 0.75R

District Austin
Date 8/1/2013
Grnd. Elev. 438.90 ft
GW Elev. 404.80 ft

Drilled Shaft Design: Soil Reduction Factor = 0.7

TCP Friction Values Used





POINT BEARING DESIGN

WinCore
Version 3.1

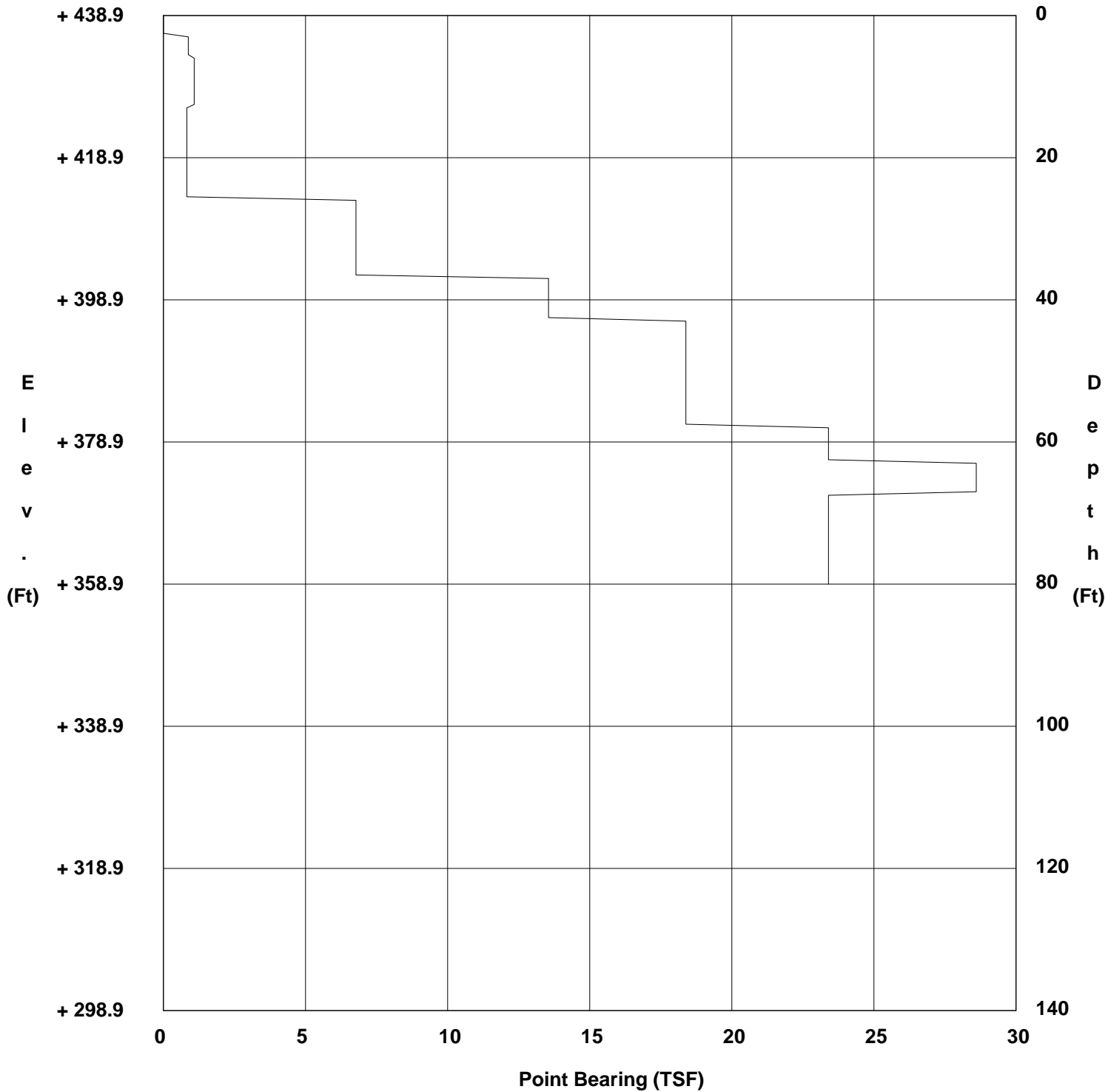
County Travis
Highway SH 71
Control 0265-01-110

Hole BR-6
Structure Bridge
Station 11189+24.03
Offset 0.75R

District Austin
Date 8/1/2013
Grnd. Elev. 438.90 ft
GW Elev. 404.80 ft

Diameters Below Tip Checked = 2

TCP Bearing Values Used





SOIL STRENGTH ANALYSIS

WinCore
Version 3.1

County Travis
Highway SH 71
Control 0265-01-110

Hole BR-7
Structure Bridge
Station 11196+38.18
Offset 32.83R

District Austin
Date 8/2/2013
Grnd. Elev. 437.40 ft
GW Elev. 403.30 ft

TCP Capacity Values Used

Soil reduction factor of 0.7 applied

Strata No.	Elev. (Feet)		Design Type	Soil Factor	TCP N Value	TCP Unit Friction (TSF)	Accumulative Friction (T/F)
	From	To					
1	437.4	435.4	CH	50	0	0.00	0.00
2	435.4	432.4	CH	50	0	0.00	0.00
3	432.4	429.4	CL	60	14	0.16	0.49
3	429.4	424.4	CL	60	11	0.13	1.13
3	424.4	419.4	CL	60	16	0.19	2.07
3	419.4	414.4	CL	60	16	0.19	3.00
3	414.4	409.4	CL	60	14	0.16	3.82
3	409.4	404.4	CL	60	13	0.15	4.57
3	404.4	401.4	CL	60	61	0.71	6.71
4	401.4	394.4	SHALE	80	85	0.74	11.89
4	394.4	389.4	SHALE	80	61	0.53	14.56
4	389.4	384.4	SHALE	80	82	0.72	18.14
4	384.4	379.4	SHALE	80	300	1.69	26.58
4	379.4	374.4	SHALE	80	185	1.04	31.77
4	374.4	369.4	SHALE	80	300	1.69	40.20
4	369.4	364.4	SHALE	80	480	2.70	53.70
4	364.4	359.9	SHALE	80	369	2.08	63.04
4	359.9	357.4	SHALE	80	436	2.45	69.17



SKIN FRICTION DESIGN

WinCore
Version 3.1

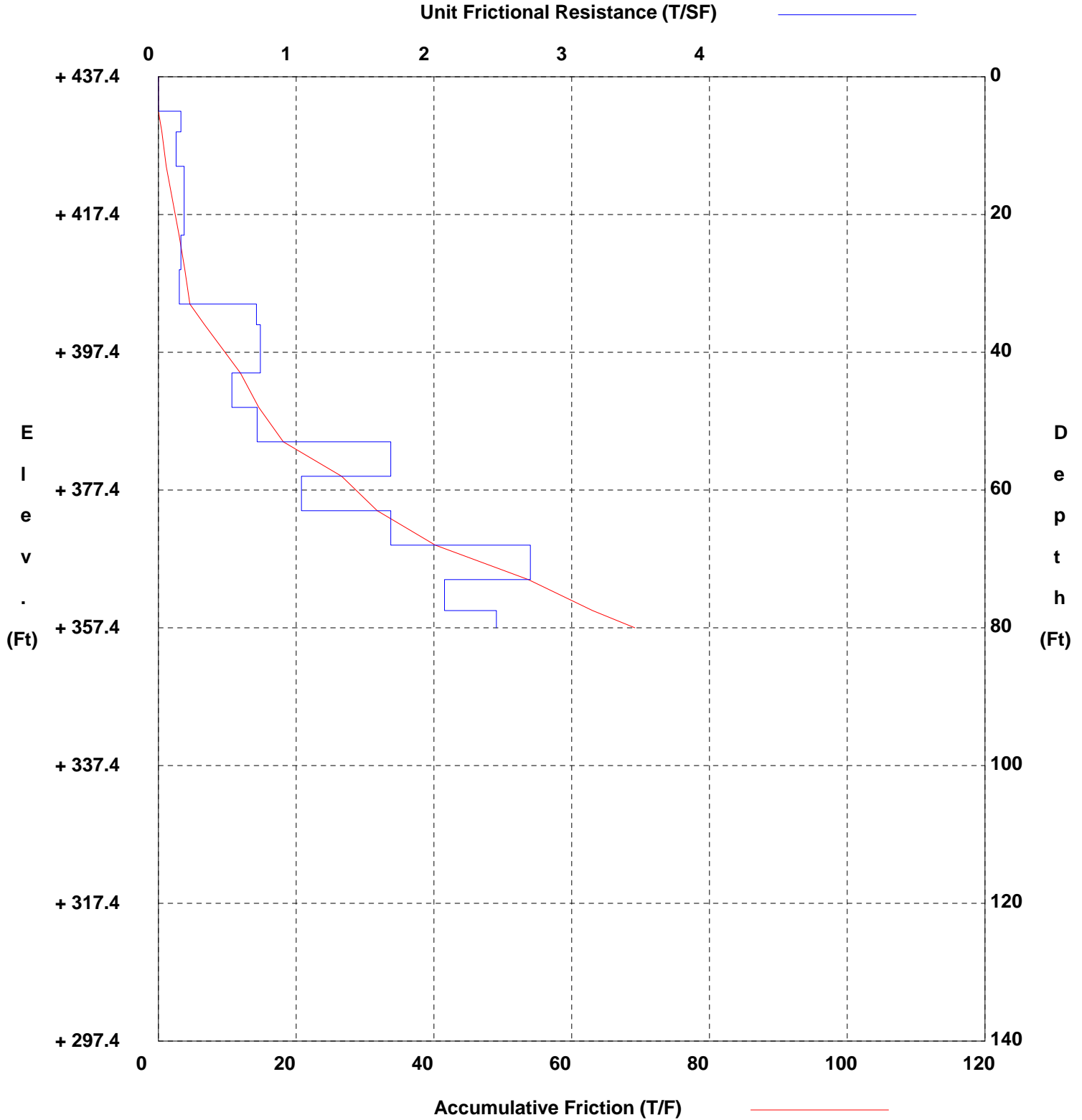
County Travis
Highway SH 71
Control 0265-01-110

Hole BR-7
Structure Bridge
Station 11196+38.18
Offset 32.83R

District Austin
Date 8/2/2013
Grnd. Elev. 437.40 ft
GW Elev. 403.30 ft

Drilled Shaft Design: Soil Reduction Factor = 0.7

TCP Friction Values Used





POINT BEARING DESIGN

WinCore
Version 3.1

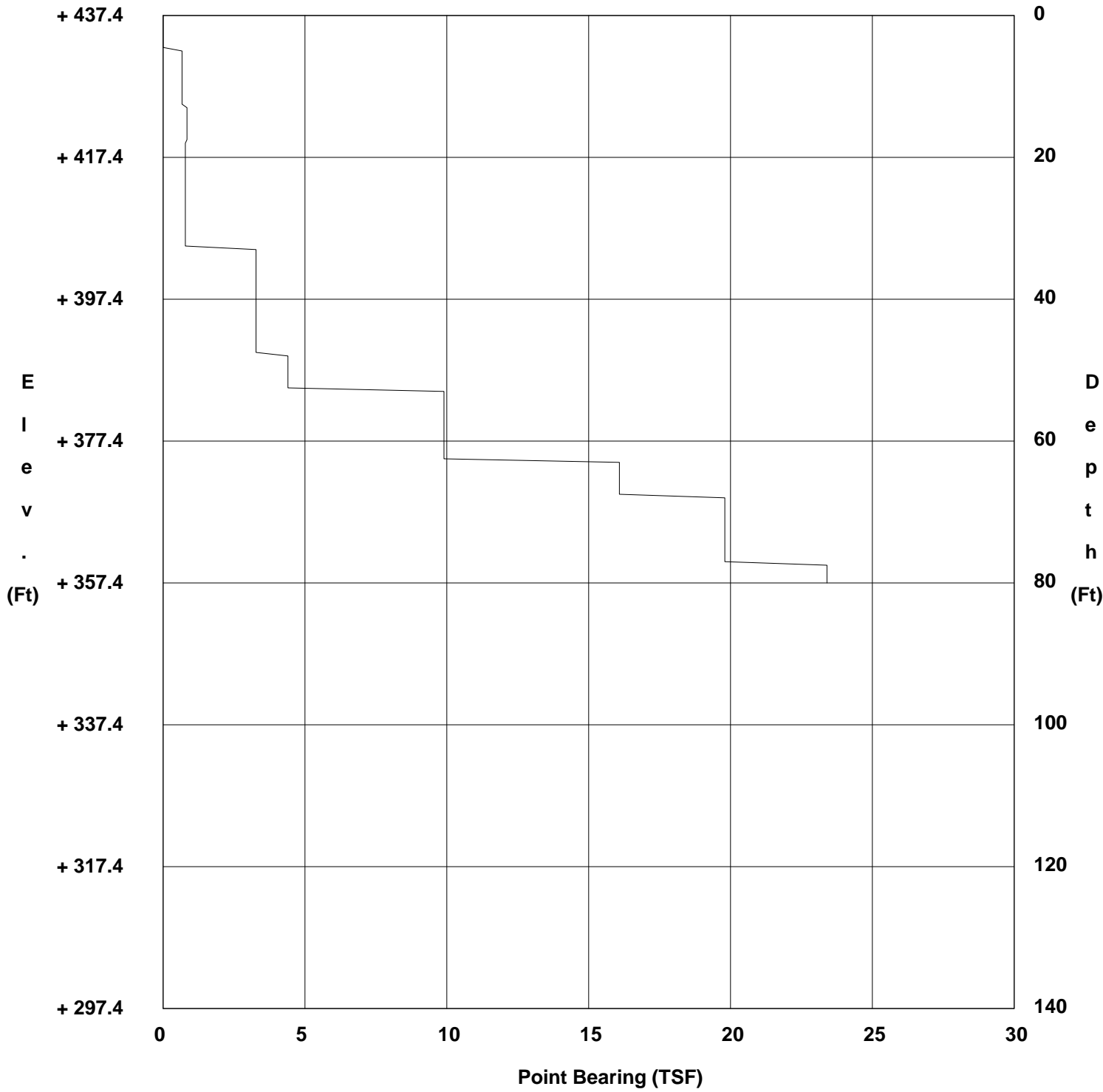
County Travis
Highway SH 71
Control 0265-01-110

Hole BR-7
Structure Bridge
Station 11196+38.18
Offset 32.83R

District Austin
Date 8/2/2013
Grnd. Elev. 437.40 ft
GW Elev. 403.30 ft

Diameters Below Tip Checked = 2

TCP Bearing Values Used





SOIL STRENGTH ANALYSIS

WinCore
Version 3.1

County Travis
Highway SH 71
Control 0265-01-110

Hole BR-8
Structure Bridge
Station 11199+98.24
Offset 75.87L

District Austin
Date 8/2/2013
Grnd. Elev. 438.90 ft
GW Elev. 395.90 ft

TCP Capacity Values Used

Soil reduction factor of 0.7 applied

Strata No.	Elev. (Feet)		Design Type	Soil Factor	TCP N Value	TCP Unit Friction (TSF)	Accumulative Friction (T/F)
	From	To					
1	438.9	436.9	CH	50	0	0.00	0.00
2	436.9	433.9	SC	70	0	0.00	0.00
3	433.9	430.9	CH	50	17	0.24	0.71
3	430.9	425.9	CH	50	10	0.14	1.41
3	425.9	420.9	CH	50	11	0.15	2.18
3	420.9	415.9	CH	50	12	0.17	3.02
3	415.9	410.9	CH	50	11	0.15	3.79
3	410.9	406.9	CH	50	13	0.18	4.52
4	406.9	401.9	CH	50	17	0.24	5.71
5	401.9	395.9	SHALE	80	109	0.85	10.81
5	395.9	390.9	SHALE	80	104	0.85	15.06
5	390.9	385.9	SHALE	80	30	0.26	16.37
5	385.9	380.9	SHALE	80	185	1.04	21.56
5	380.9	375.9	SHALE	80	141	0.85	25.81
5	375.9	370.9	SHALE	80	155	0.87	30.17
5	370.9	365.9	SHALE	80	178	1.00	35.17
5	365.9	361.4	SHALE	80	141	0.85	38.99
5	361.4	358.9	SHALE	80	320	1.80	43.49



SKIN FRICTION DESIGN

WinCore
Version 3.1

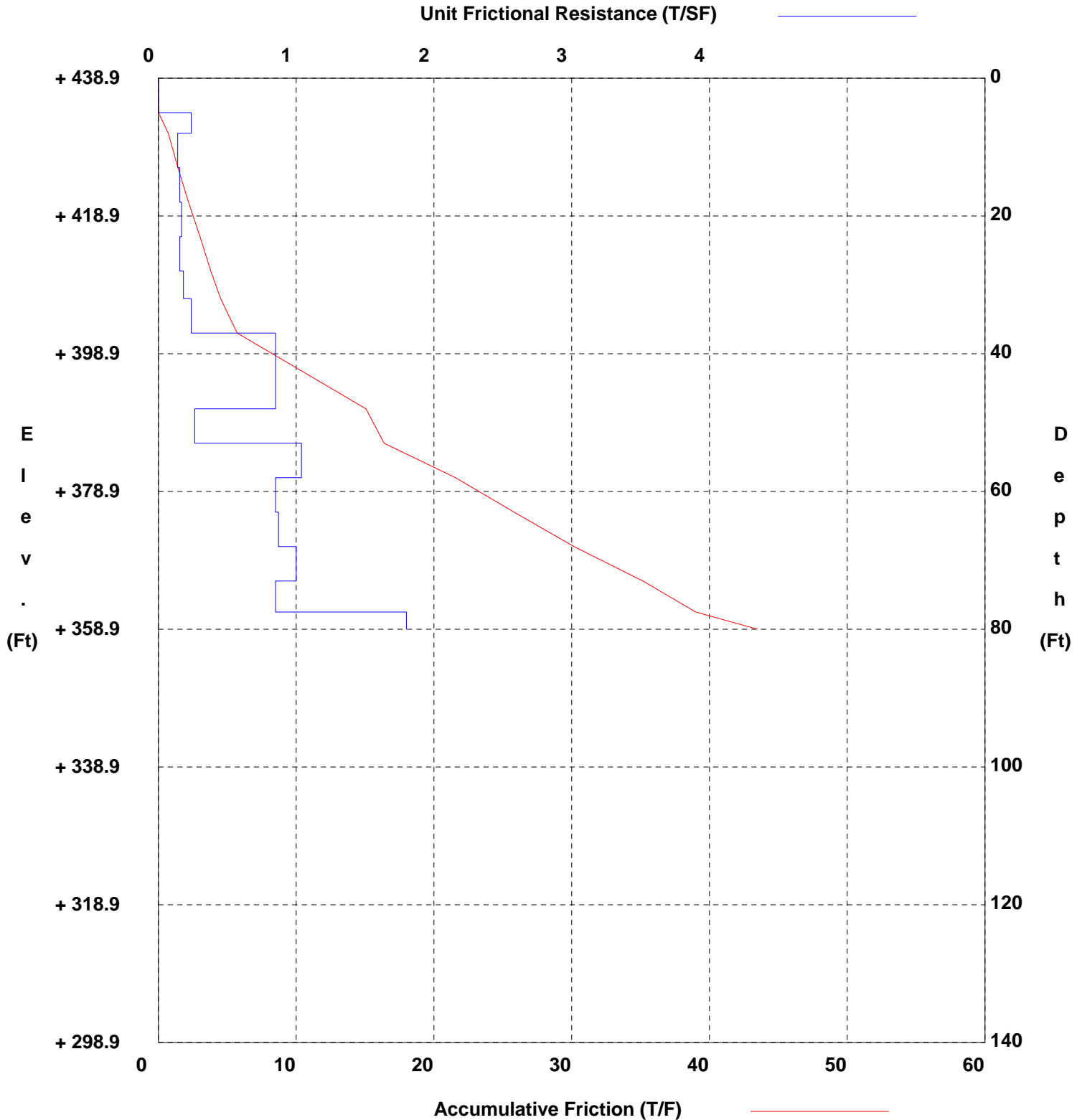
County Travis
Highway SH 71
Control 0265-01-110

Hole BR-8
Structure Bridge
Station 11199+98.24
Offset 75.87L

District Austin
Date 8/2/2013
Grnd. Elev. 438.90 ft
GW Elev. 395.90 ft

Drilled Shaft Design: Soil Reduction Factor = 0.7

TCP Friction Values Used





POINT BEARING DESIGN

WinCore
Version 3.1

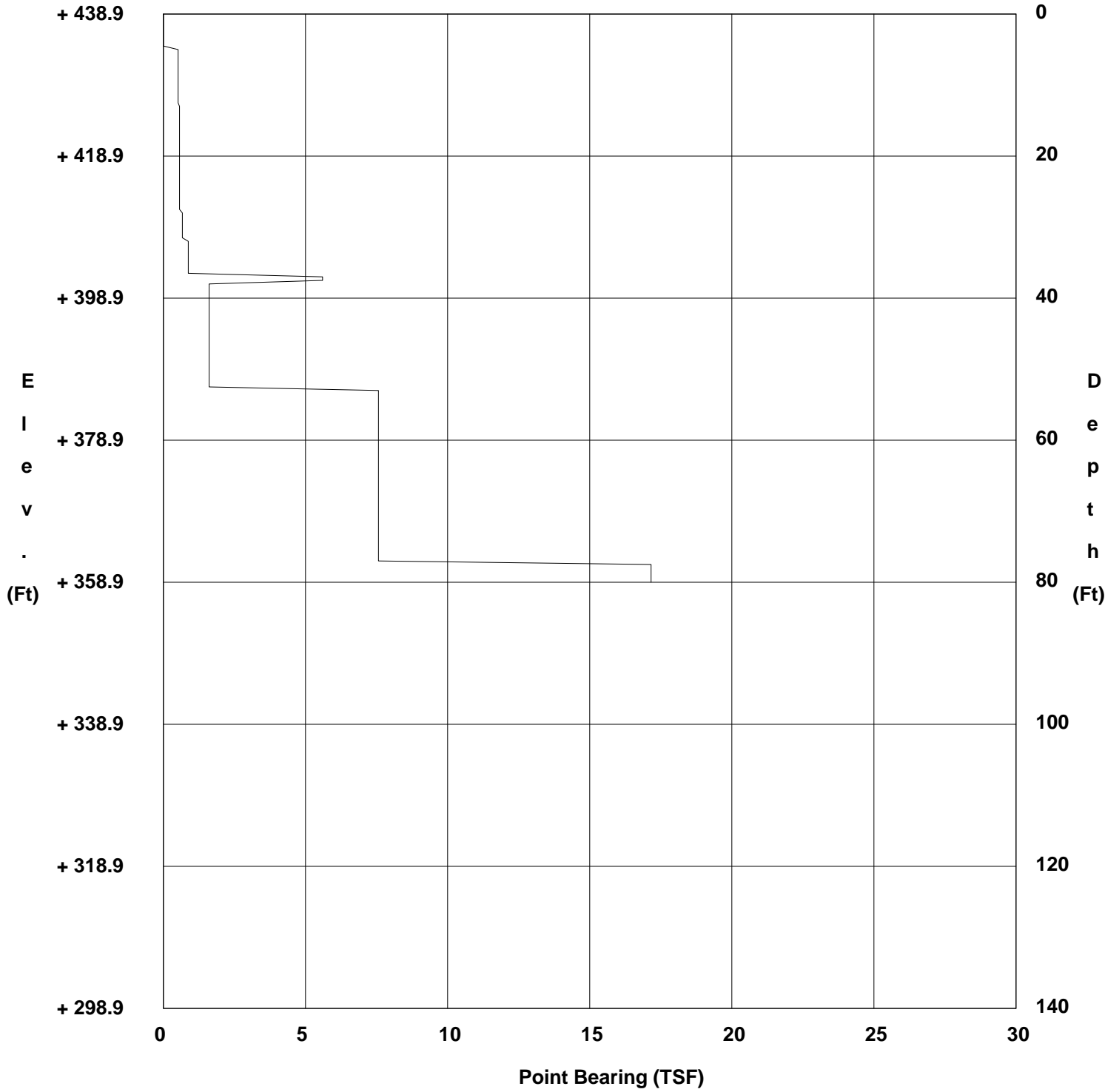
County Travis
Highway SH 71
Control 0265-01-110

Hole BR-8
Structure Bridge
Station 11199+98.24
Offset 75.87L

District Austin
Date 8/2/2013
Grnd. Elev. 438.90 ft
GW Elev. 395.90 ft

Diameters Below Tip Checked = 2

TCP Bearing Values Used





SOIL STRENGTH ANALYSIS

WinCore
Version 3.1

County Travis
Highway SH 71
Control 0265-01-110

Hole BR-9
Structure Bridge
Station 11203+77.35
Offset 77.59L

District Austin
Date 8/5/2013
Grnd. Elev. 437.40 ft
GW Elev. 402.40 ft

TCP Capacity Values Used

Soil reduction factor of 0.7 applied

Strata No.	Elev. (Feet)		Design Type	Soil Factor	TCP N Value	TCP Unit Friction (TSF)	Accumulative Friction (T/F)
	From	To					
1	437.4	435.9	CH	50	0	0.00	0.00
2	435.9	429.4	CL	60	35	0.41	2.65
2	429.4	424.4	CL	60	34	0.40	4.64
2	424.4	419.4	CL	60	26	0.30	6.15
2	419.4	412.4	CL	60	18	0.21	7.62
3	412.4	409.4	CH	50	23	0.32	8.59
3	409.4	404.4	CH	50	14	0.20	9.57
3	404.4	398.4	CH	50	18	0.25	11.08
4	398.4	394.4	SHALE	80	185	1.04	15.23
4	394.4	389.4	SHALE	80	267	1.50	22.73
4	389.4	384.4	SHALE	80	369	2.08	33.11
4	384.4	379.4	SHALE	80	79	0.69	36.57
4	379.4	374.4	SHALE	80	112	0.85	40.82
4	374.4	369.4	SHALE	80	185	1.04	46.01
4	369.4	364.4	SHALE	80	240	1.35	52.76
4	364.4	359.9	SHALE	80	343	1.93	61.43
4	359.9	357.4	SHALE	80	400	2.25	67.06



SKIN FRICTION DESIGN

WinCore
Version 3.1

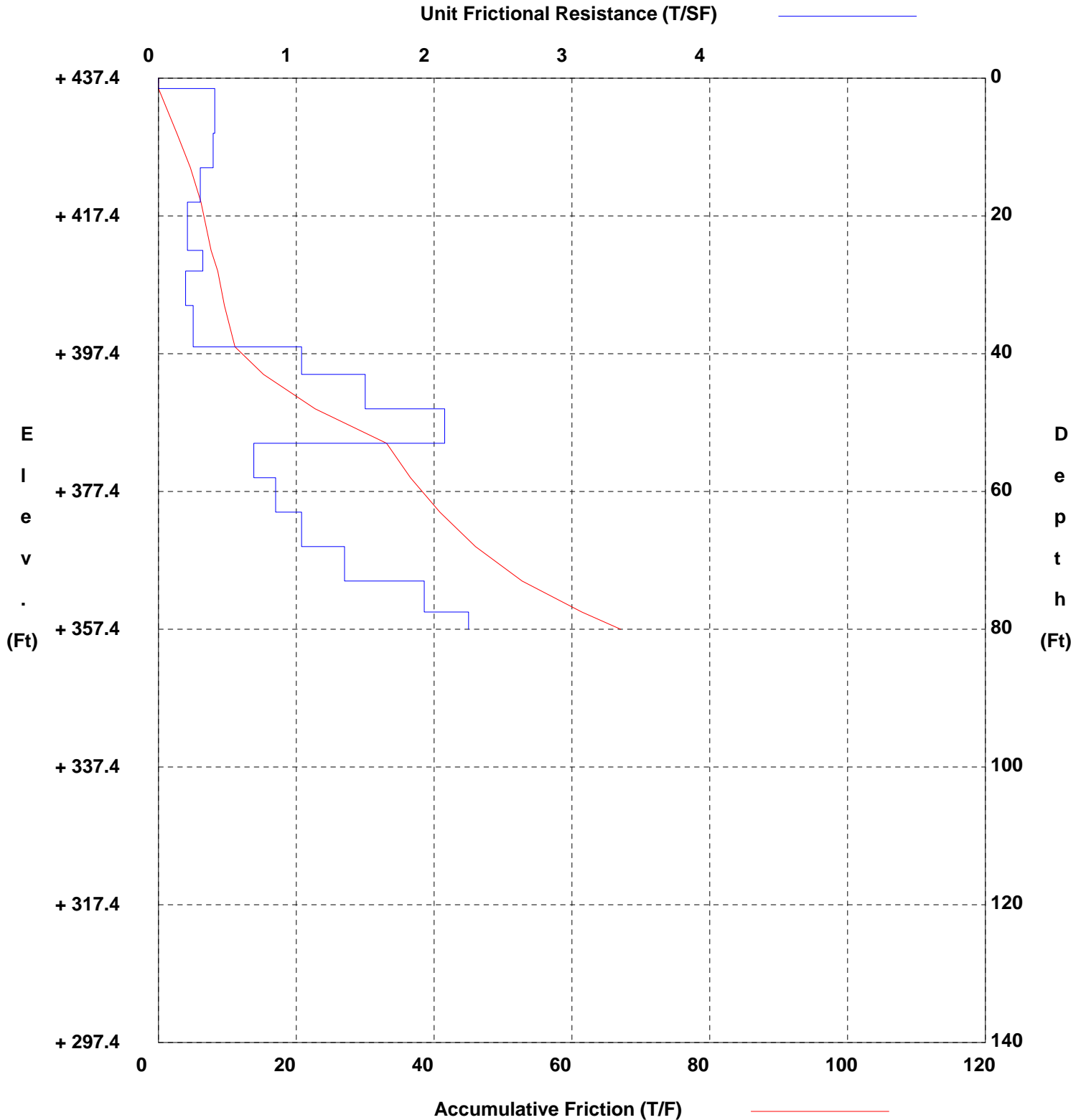
County Travis
Highway SH 71
Control 0265-01-110

Hole BR-9
Structure Bridge
Station 11203+77.35
Offset 77.59L

District Austin
Date 8/5/2013
Grnd. Elev. 437.40 ft
GW Elev. 402.40 ft

Drilled Shaft Design: Soil Reduction Factor = 0.7

TCP Friction Values Used





POINT BEARING DESIGN

WinCore
Version 3.1

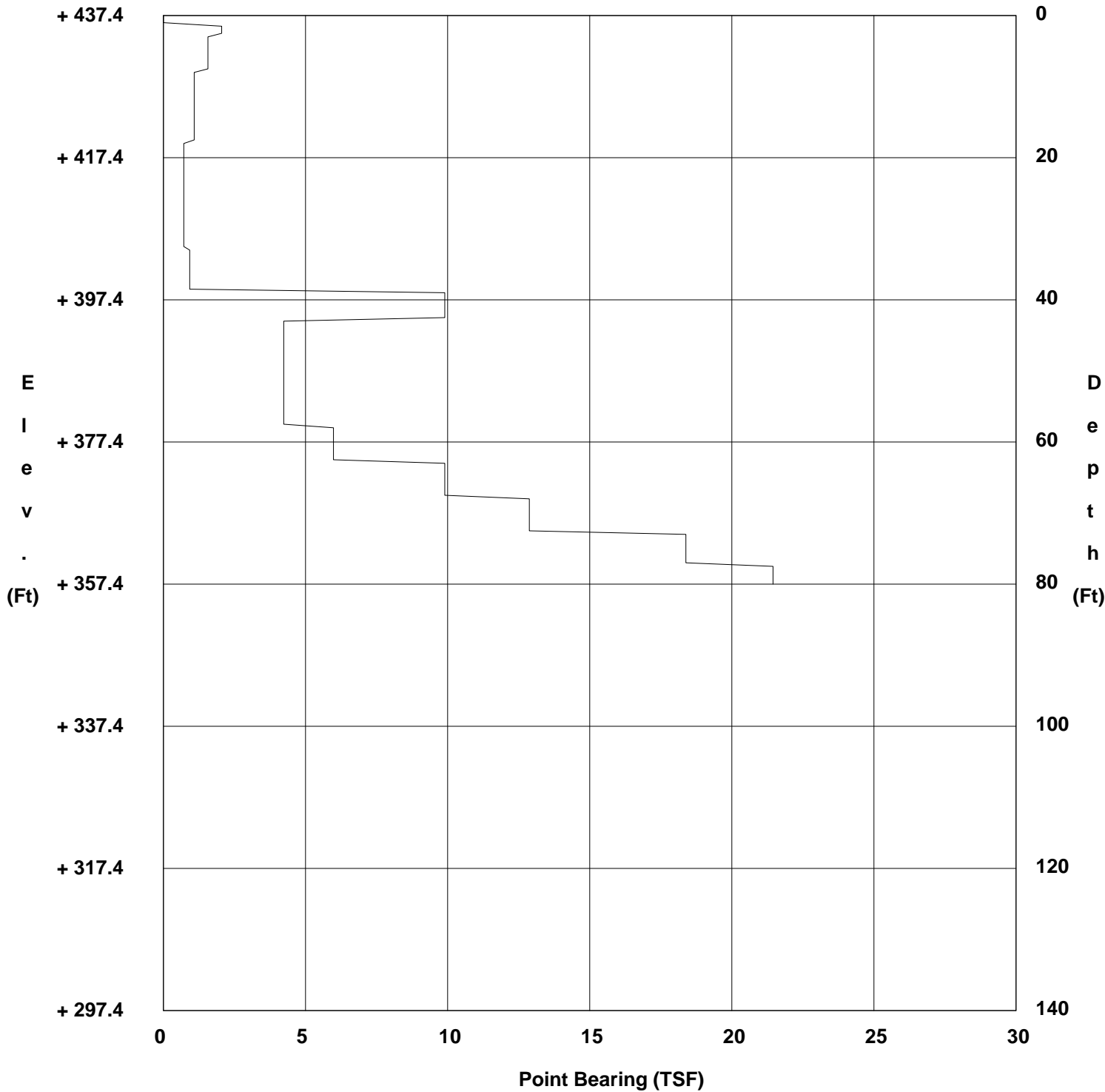
County Travis
Highway SH 71
Control 0265-01-110

Hole BR-9
Structure Bridge
Station 11203+77.35
Offset 77.59L

District Austin
Date 8/5/2013
Grnd. Elev. 437.40 ft
GW Elev. 402.40 ft

Diameters Below Tip Checked = 2

TCP Bearing Values Used





SOIL STRENGTH ANALYSIS

WinCore
Version 3.1

County Travis
Highway SH 71
Control 0265-01-110

Hole BR-10
Structure Bridge
Station 11209+97.97
Offset 26.47R

District Austin
Date 7/30/2013
Grnd. Elev. 436.30 ft
GW Elev. 403.30 ft

TCP Capacity Values Used

Soil reduction factor of 0.7 applied

Strata No.	Elev. (Feet)		Design Type	Soil Factor	TCP N Value	TCP Unit Friction (TSF)	Accumulative Friction (T/F)
	From	To					
1	436.3	432.3	CH	50	0	0.00	0.00
2	432.3	426.3	CL	60	45	0.53	3.15
3	426.3	423.3	SC	70	49	0.49	4.62
3	423.3	418.3	SC	70	27	0.27	5.97
4	418.3	413.3	SC	70	21	0.21	7.02
4	413.3	408.3	SC	70	15	0.15	7.77
4	408.3	402.3	SC	70	17	0.17	8.79
5	402.3	398.8	SC	70	61	0.61	10.93
6	398.8	393.3	SHALE	80	171	0.96	16.23
6	393.3	388.3	SHALE	80	282	1.59	24.17
6	388.3	383.3	SHALE	80	185	1.04	29.36
6	383.3	378.3	SHALE	80	343	1.93	38.99
6	378.3	373.3	SHALE	80	267	1.50	46.49
6	373.3	368.3	SHALE	80	209	1.17	52.36
6	368.3	363.3	SHALE	80	436	2.45	64.63
6	363.3	358.8	SHALE	80	369	2.08	73.97
6	358.8	356.3	SHALE	80	320	1.80	78.47



SKIN FRICTION DESIGN

WinCore
Version 3.1

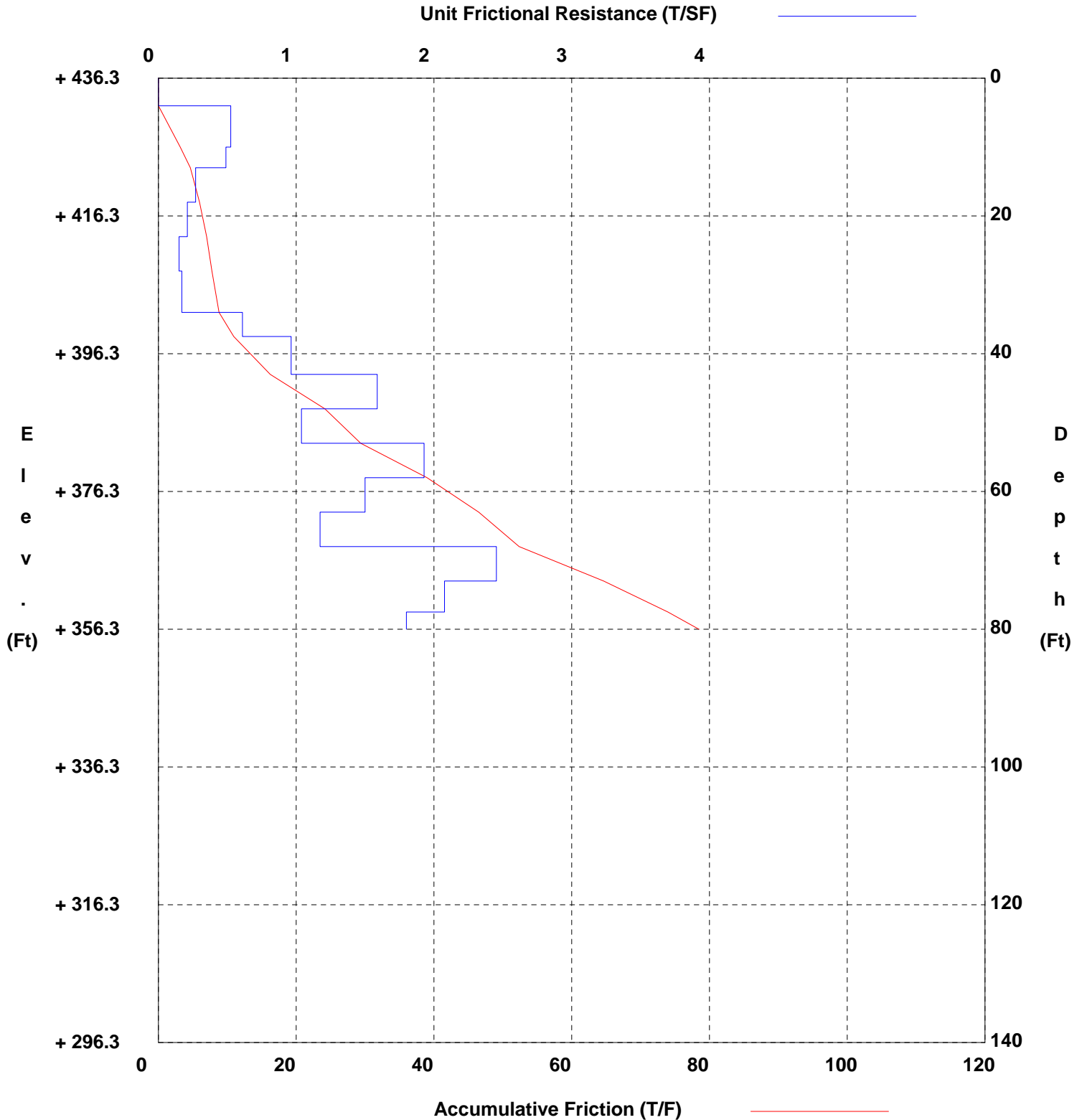
County Travis
Highway SH 71
Control 0265-01-110

Hole BR-10
Structure Bridge
Station 11209+97.97
Offset 26.47R

District Austin
Date 7/30/2013
Grnd. Elev. 436.30 ft
GW Elev. 403.30 ft

Drilled Shaft Design: Soil Reduction Factor = 0.7

TCP Friction Values Used





POINT BEARING DESIGN

WinCore
Version 3.1

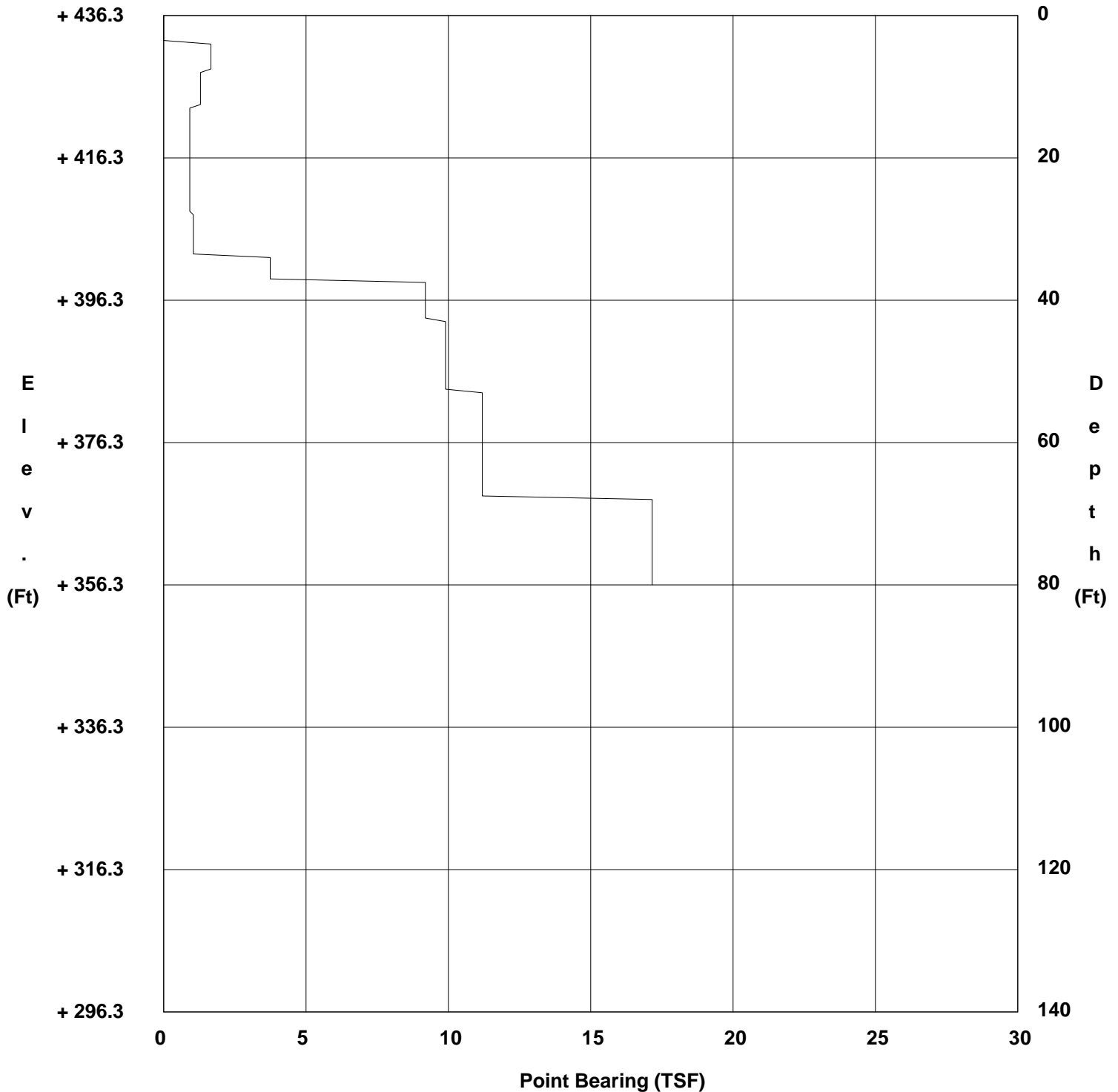
County Travis
Highway SH 71
Control 0265-01-110

Hole BR-10
Structure Bridge
Station 11209+97.97
Offset 26.47R

District Austin
Date 7/30/2013
Grnd. Elev. 436.30 ft
GW Elev. 403.30 ft

Diameters Below Tip Checked = 2

TCP Bearing Values Used





SOIL STRENGTH ANALYSIS

WinCore
Version 3.1

County Travis
Highway SH 71
Control 0265-01-110

Hole BR-11
Structure Bridge
Station 11215+94.12
Offset 0.32R

District Austin
Date 7/31/2013
Grnd. Elev. 440.00 ft
GW Elev. N/A

TCP Capacity Values Used

Soil reduction factor of 0.7 applied

Strata No.	Elev. (Feet)		Design Type	Soil Factor	TCP N Value	TCP Unit Friction (TSF)	Accumulative Friction (T/F)
	From	To					
1	440.0	438.0	CH	50	0	0.00	0.00
2	438.0	434.0	CL	60	24	0.28	1.12
3	434.0	427.0	CH	50	20	0.28	3.08
3	427.0	422.0	CH	50	20	0.28	4.48
3	422.0	417.0	CH	50	16	0.22	5.60
3	417.0	414.0	CH	50	19	0.27	6.40
4	414.0	407.0	SC	70	20	0.20	7.80
5	407.0	405.0	SC	70	20	0.20	8.20
6	405.0	402.0	SHALE	80	56	0.49	9.67
6	402.0	397.0	SHALE	80	229	1.29	16.09
6	397.0	392.0	SHALE	80	229	1.29	22.52
6	392.0	387.0	SHALE	80	218	1.23	28.65
6	387.0	382.0	SHALE	80	300	1.69	37.09
6	382.0	377.0	SHALE	80	64	0.56	39.89
6	377.0	372.0	SHALE	80	95	0.83	44.03
6	372.0	367.0	SHALE	80	171	0.96	48.85
6	367.0	362.5	SHALE	80	200	1.12	53.91
6	362.5	360.0	SHALE	80	300	1.69	58.12



SKIN FRICTION DESIGN

WinCore
Version 3.1

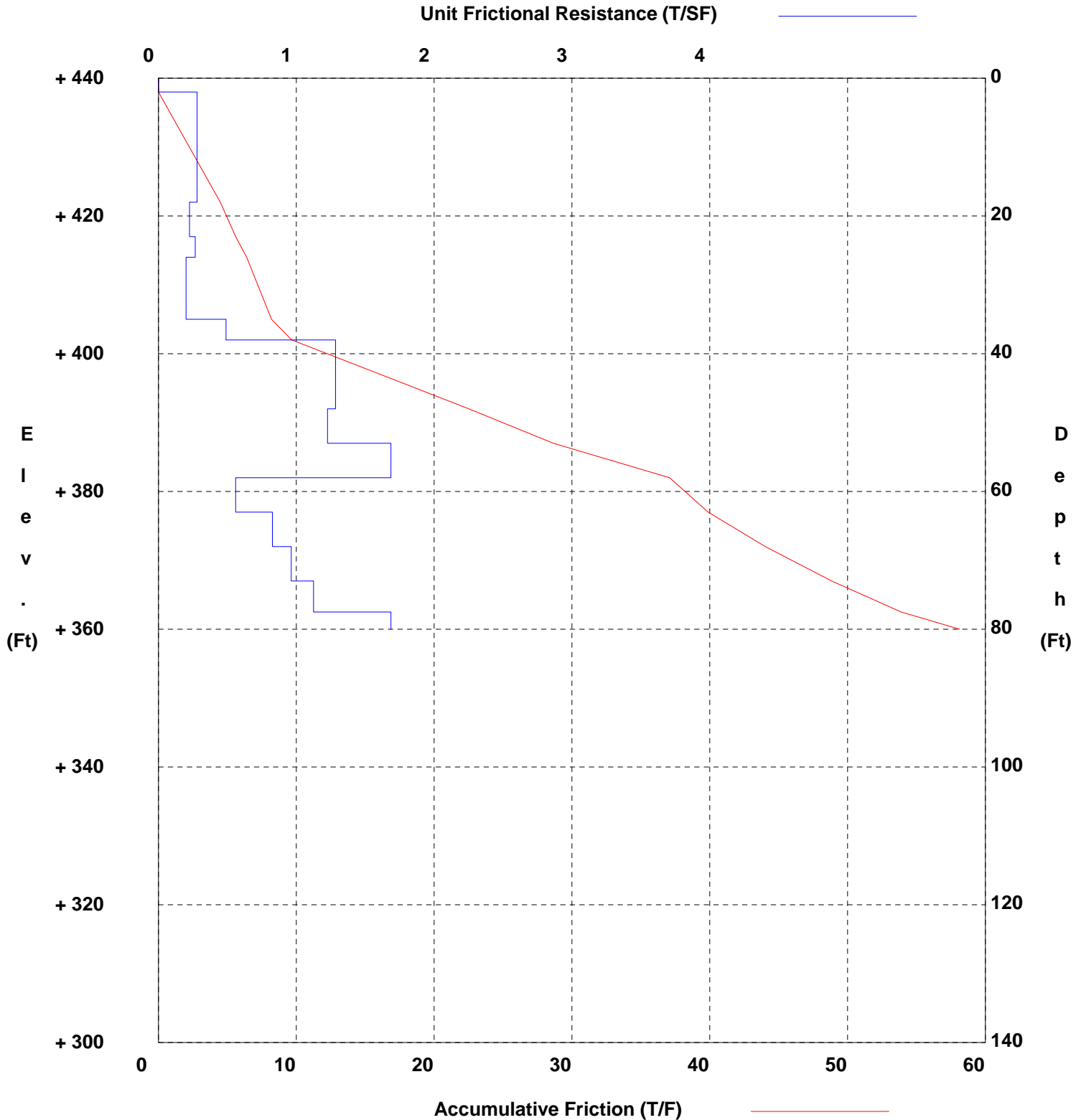
County Travis
Highway SH 71
Control 0265-01-110

Hole BR-11
Structure Bridge
Station 11215+94.12
Offset 0.32R

District Austin
Date 7/31/2013
Grnd. Elev. 440.00 ft
GW Elev. N/A

Drilled Shaft Design: Soil Reduction Factor = 0.7

TCP Friction Values Used





POINT BEARING DESIGN

WinCore
Version 3.1

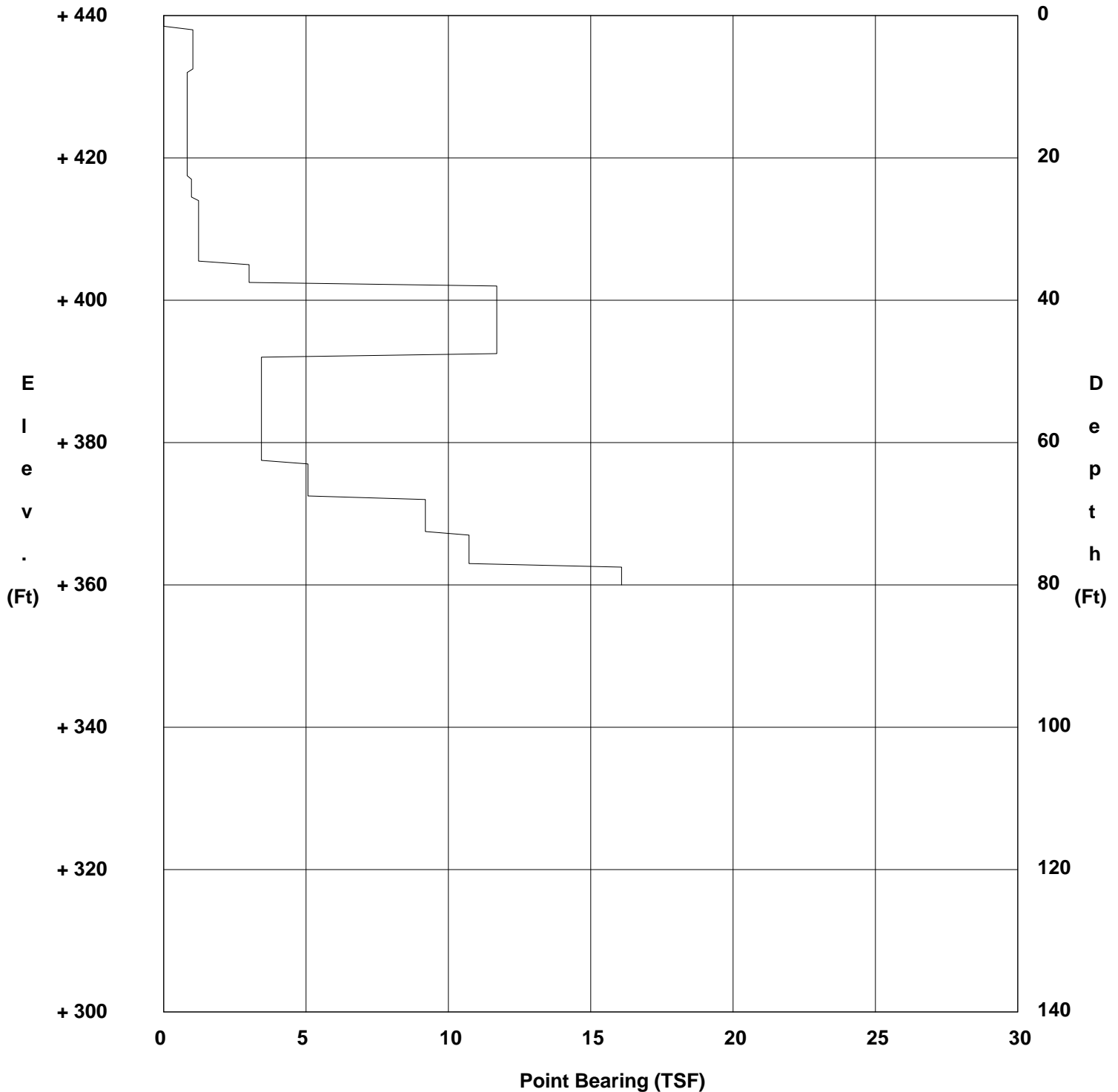
County Travis
Highway SH 71
Control 0265-01-110

Hole BR-11
Structure Bridge
Station 11215+94.12
Offset 0.32R

District Austin
Date 7/31/2013
Grnd. Elev. 440.00 ft
GW Elev. N/A

Diameters Below Tip Checked = 2

TCP Bearing Values Used





SOIL STRENGTH ANALYSIS

WinCore
Version 3.1

County Travis
Highway SH 71
Control 0265-01-110

Hole BR-12
Structure Bridge
Station 11224+52.82
Offset 0.60R

District Austin
Date 7/29/2013
Grnd. Elev. 449.60 ft
GW Elev. 400.00 ft

TCP Capacity Values Used

Soil reduction factor of 0.7 applied

Strata No.	Elev. (Feet)		Design Type	Soil Factor	TCP N Value	TCP Unit Friction (TSF)	Accumulative Friction (T/F)
	From	To					
1	449.6	448.6	CH	50	0	0.00	0.00
2	448.6	441.6	SC	70	21	0.21	1.47
2	441.6	438.6	SC	70	7	0.07	1.68
3	438.6	429.6	CH	50	7	0.10	2.56
4	429.6	426.6	CH	50	13	0.18	3.11
4	426.6	421.6	CH	50	22	0.31	4.65
4	421.6	416.6	CH	50	13	0.18	5.56
4	416.6	411.1	CH	50	12	0.17	6.48
5	411.1	409.6	SC	70	82	0.82	7.71
6	409.6	406.6	SC	70	82	0.82	10.17
6	406.6	400.6	SC	70	185	1.04	16.40
7	400.6	397.6	CH	50	21	0.29	17.28
7	397.6	395.6	CH	50	45	0.63	18.54
8	395.6	387.6	SHALE	80	19	0.17	19.87
8	387.6	381.6	SHALE	80	11	0.10	20.45
8	381.6	377.6	SHALE	80	14	0.12	20.94
8	377.6	373.6	SHALE	80	12	0.11	21.36
8	373.6	367.6	SHALE	80	108	0.85	26.46
8	367.6	362.1	SHALE	80	113	0.85	31.14
8	362.1	359.6	SHALE	80	218	1.23	34.20



SKIN FRICTION DESIGN

WinCore
Version 3.1

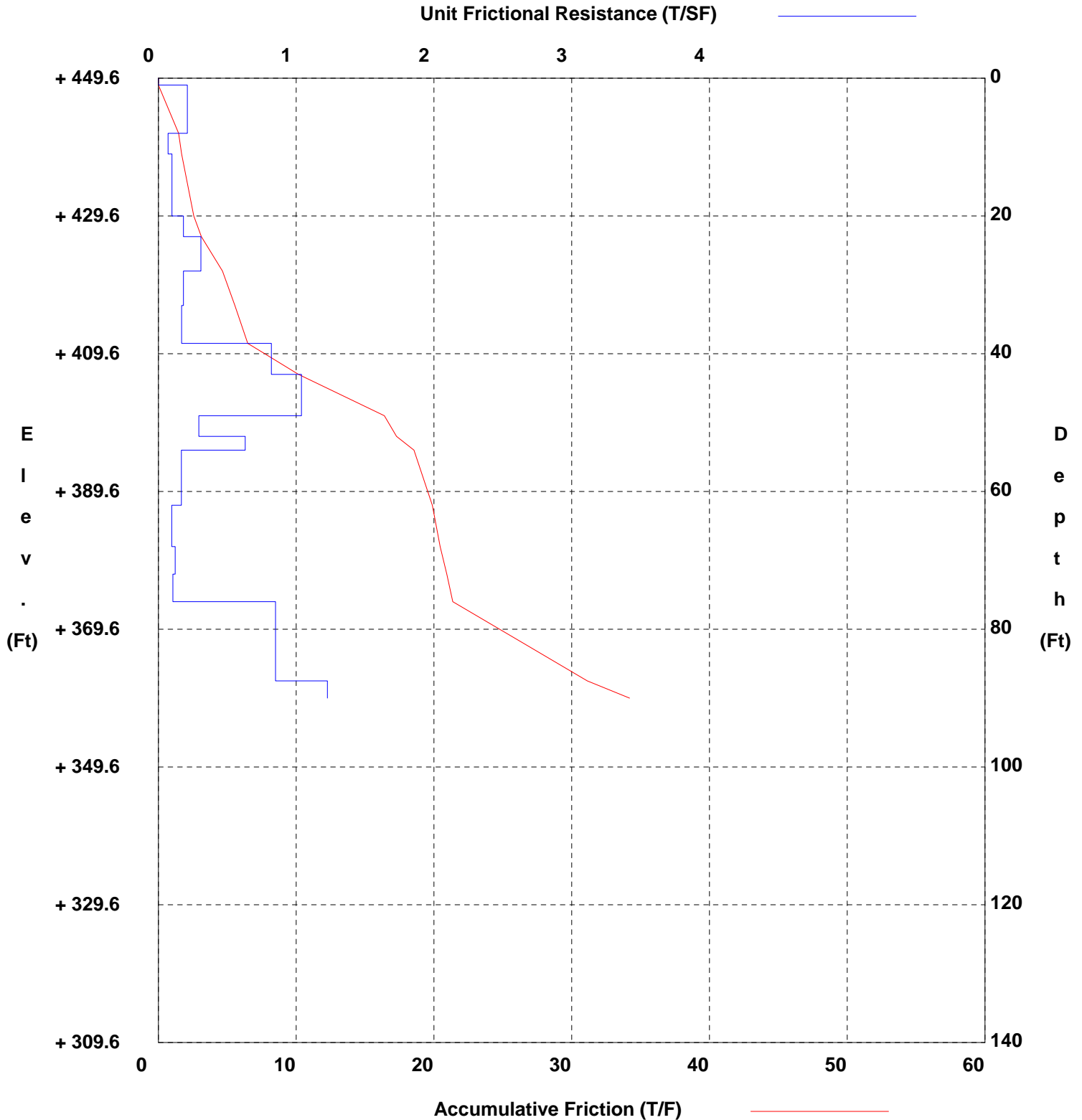
County Travis
Highway SH 71
Control 0265-01-110

Hole BR-12
Structure Bridge
Station 11224+52.82
Offset 0.60R

District Austin
Date 7/29/2013
Grnd. Elev. 449.60 ft
GW Elev. 400.00 ft

Drilled Shaft Design: Soil Reduction Factor = 0.7

TCP Friction Values Used





POINT BEARING DESIGN

WinCore
Version 3.1

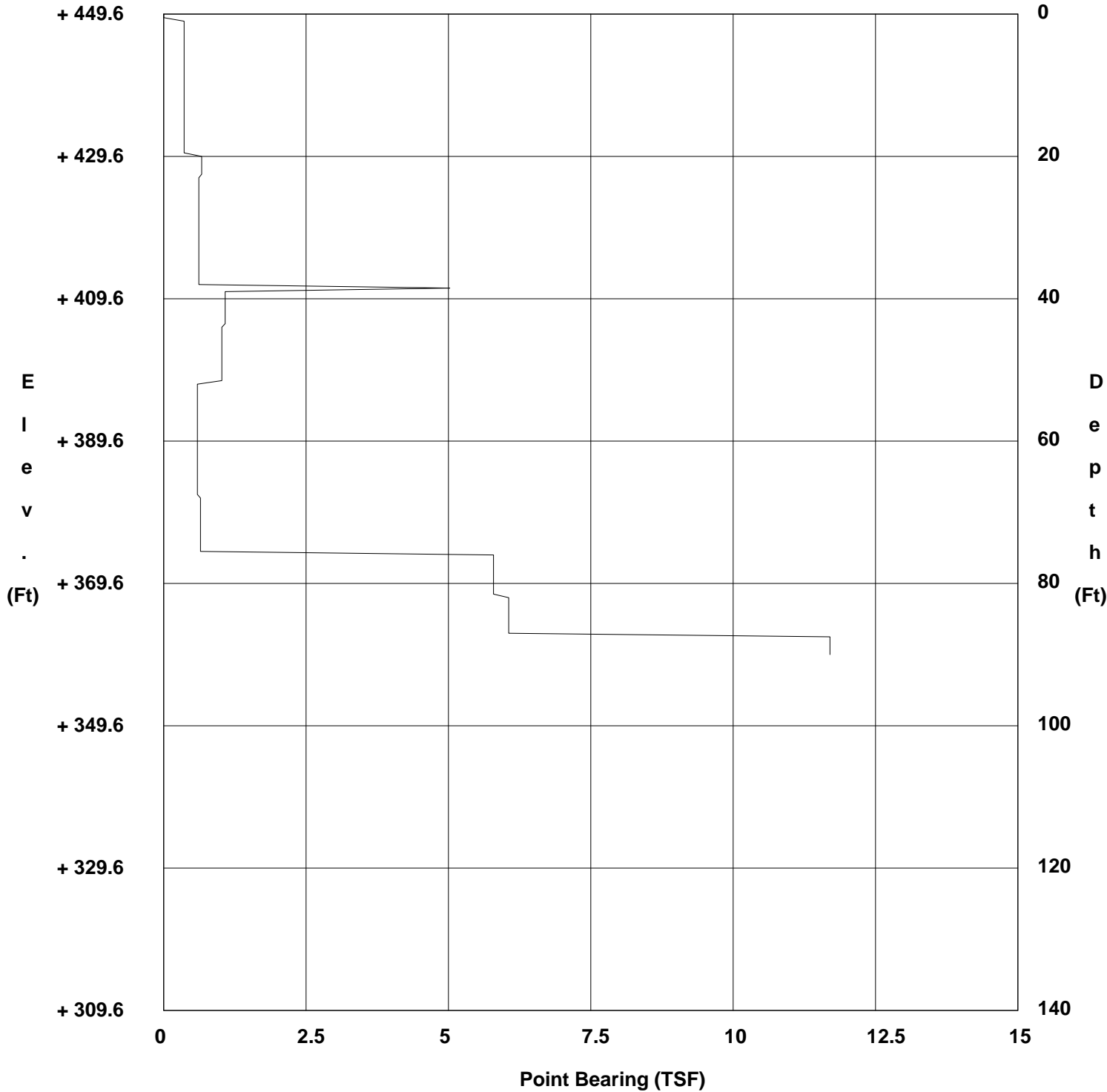
County Travis
Highway SH 71
Control 0265-01-110

Hole BR-12
Structure Bridge
Station 11224+52.82
Offset 0.60R

District Austin
Date 7/29/2013
Grnd. Elev. 449.60 ft
GW Elev. 400.00 ft

Diameters Below Tip Checked = 2

TCP Bearing Values Used





SOIL STRENGTH ANALYSIS

WinCore
Version 3.1

County Travis
Highway SH 71
Control 0265-01-110

Hole BR-13
Structure Bridge
Station
Offset

District Austin
Date 7/29/2013
Grnd. Elev. 450.80 ft
GW Elev. N/A

TCP Capacity Values Used

Soil reduction factor of 0.7 applied

Strata No.	Elev. (Feet)		Design Type	Soil Factor	TCP N Value	TCP Unit Friction (TSF)	Accumulative Friction (T/F)
	From	To					
1	450.8	448.8	CH	50	0	0.00	0.00
2	448.8	442.8	CH	50	24	0.34	2.02
2	442.8	437.8	CH	50	26	0.36	3.84
2	437.8	432.8	CH	50	93	1.30	10.35
2	432.8	427.8	CH	50	42	0.59	13.29
3	427.8	422.8	SHALE	80	200	1.12	18.91
3	422.8	417.8	SHALE	80	1200	3.25	35.16
3	417.8	412.8	SHALE	80	600	3.25	51.41
3	412.8	407.8	SHALE	80	533	3.00	66.40
3	407.8	402.8	SHALE	80	229	1.29	72.83
3	402.8	397.8	SHALE	80	107	0.85	77.08
3	397.8	392.8	SHALE	80	369	2.08	87.46
3	392.8	387.8	SHALE	80	200	1.12	93.08
3	387.8	382.8	SHALE	80	267	1.50	100.58
3	382.8	377.8	SHALE	80	253	1.42	107.68
3	377.8	373.3	SHALE	80	229	1.29	113.47
3	373.3	370.8	SHALE	80	240	1.35	116.84



SKIN FRICTION DESIGN

WinCore
Version 3.1

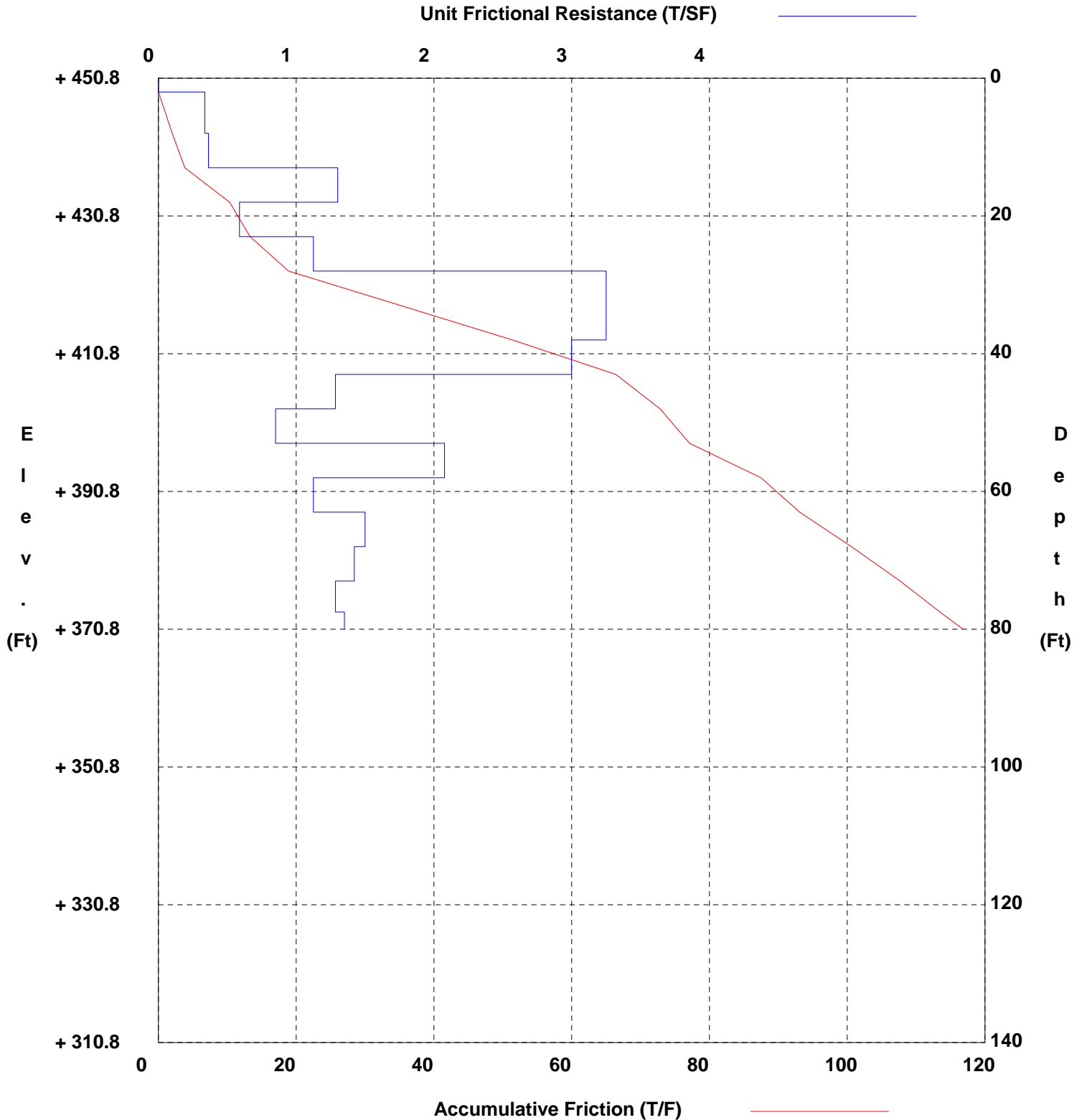
County Travis
Highway SH 71
Control 0265-01-110

Hole BR-13
Structure Bridge
Station
Offset

District Austin
Date 7/29/2013
Grnd. Elev. 450.80 ft
GW Elev. N/A

Drilled Shaft Design: Soil Reduction Factor = 0.7

TCP Friction Values Used





POINT BEARING DESIGN

WinCore
Version 3.1

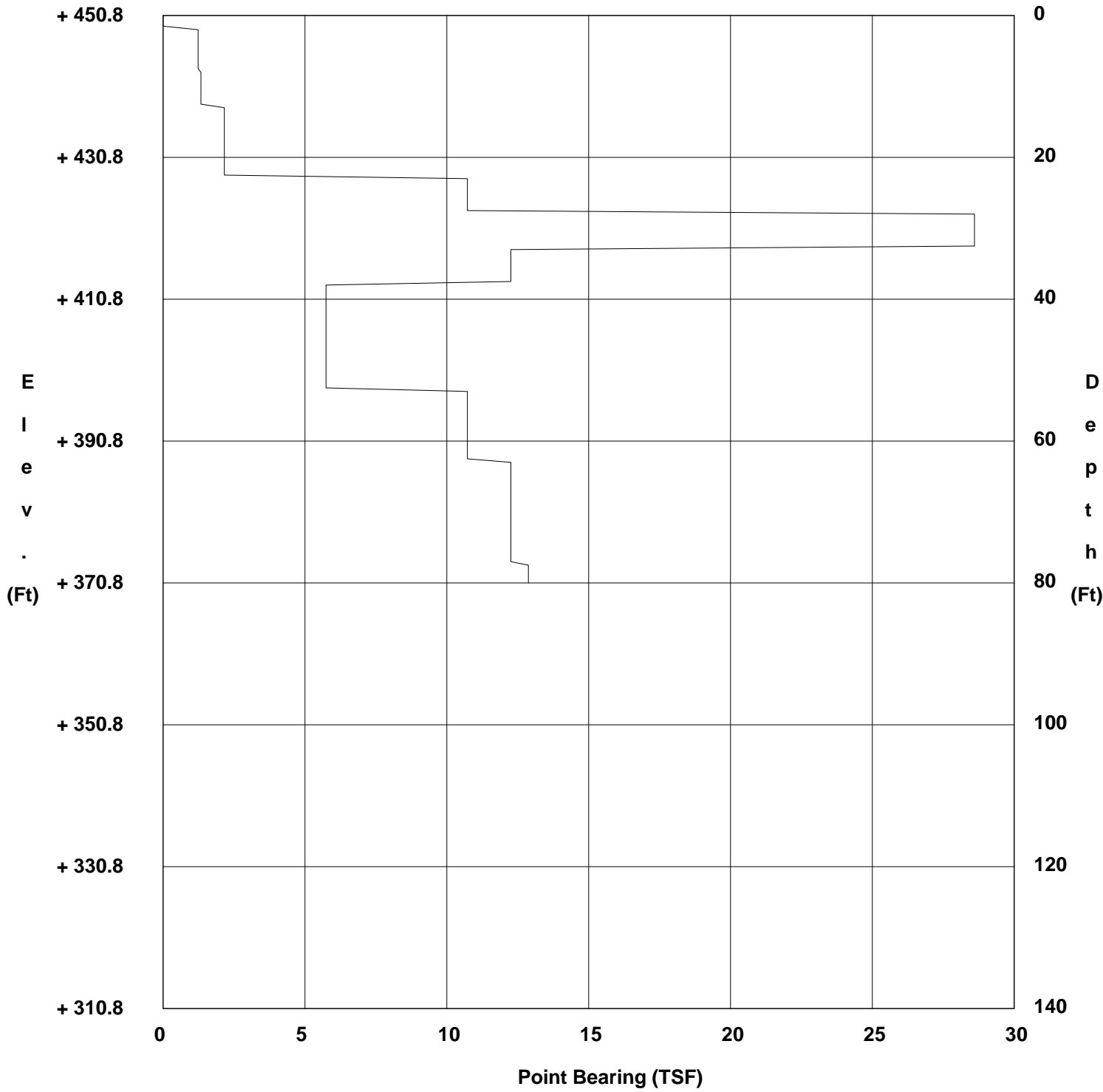
County Travis
Highway SH 71
Control 0265-01-110

Hole BR-13
Structure Bridge
Station
Offset

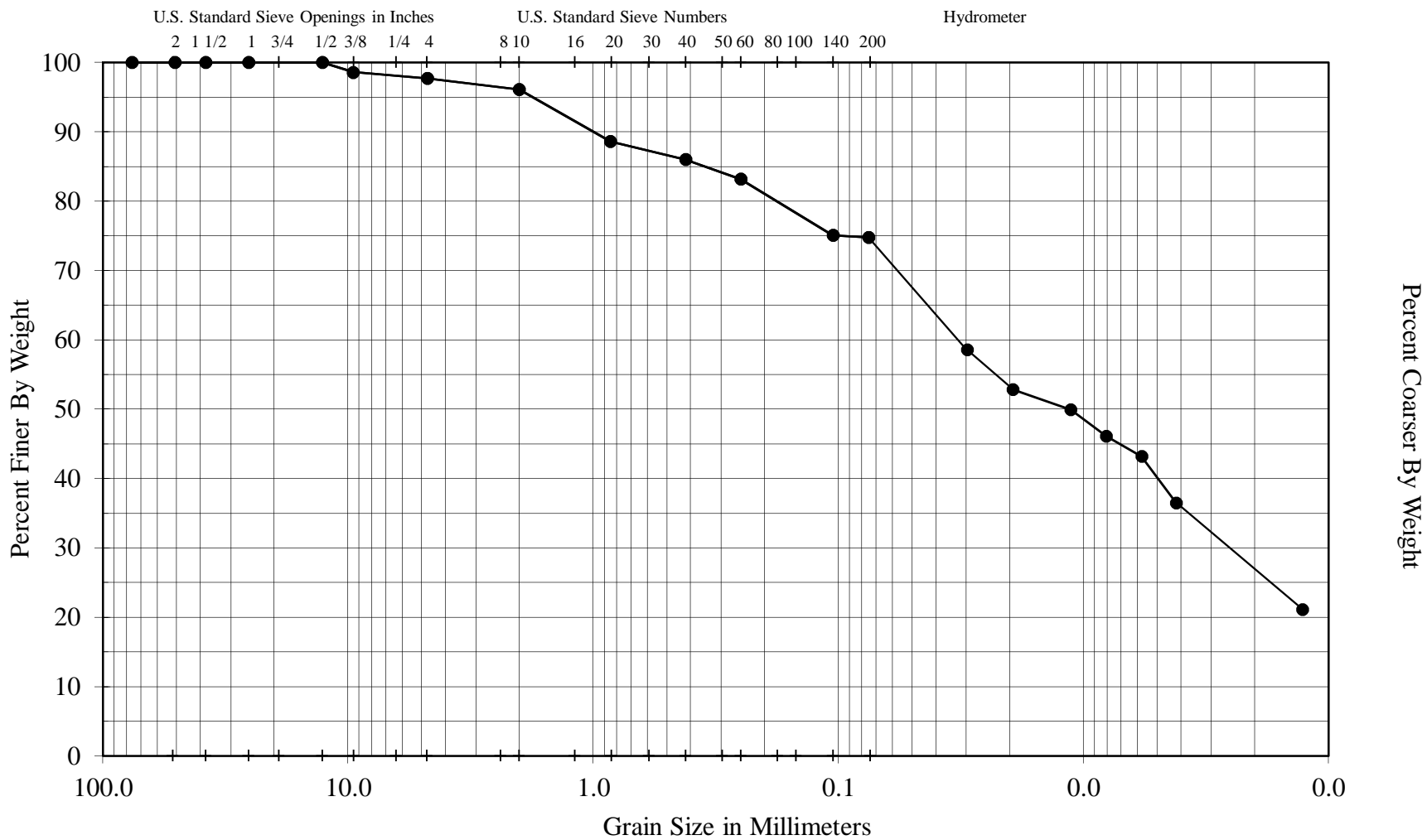
District Austin
Date 7/29/2013
Grnd. Elev. 450.80 ft
GW Elev. N/A

Diameters Below Tip Checked = 2

TCP Bearing Values Used



APPENDIX I
SIEVE/HYDROMETER RESULTS



Project No.
AG 12 15282

Depth, Ft.
P-2, 4-6

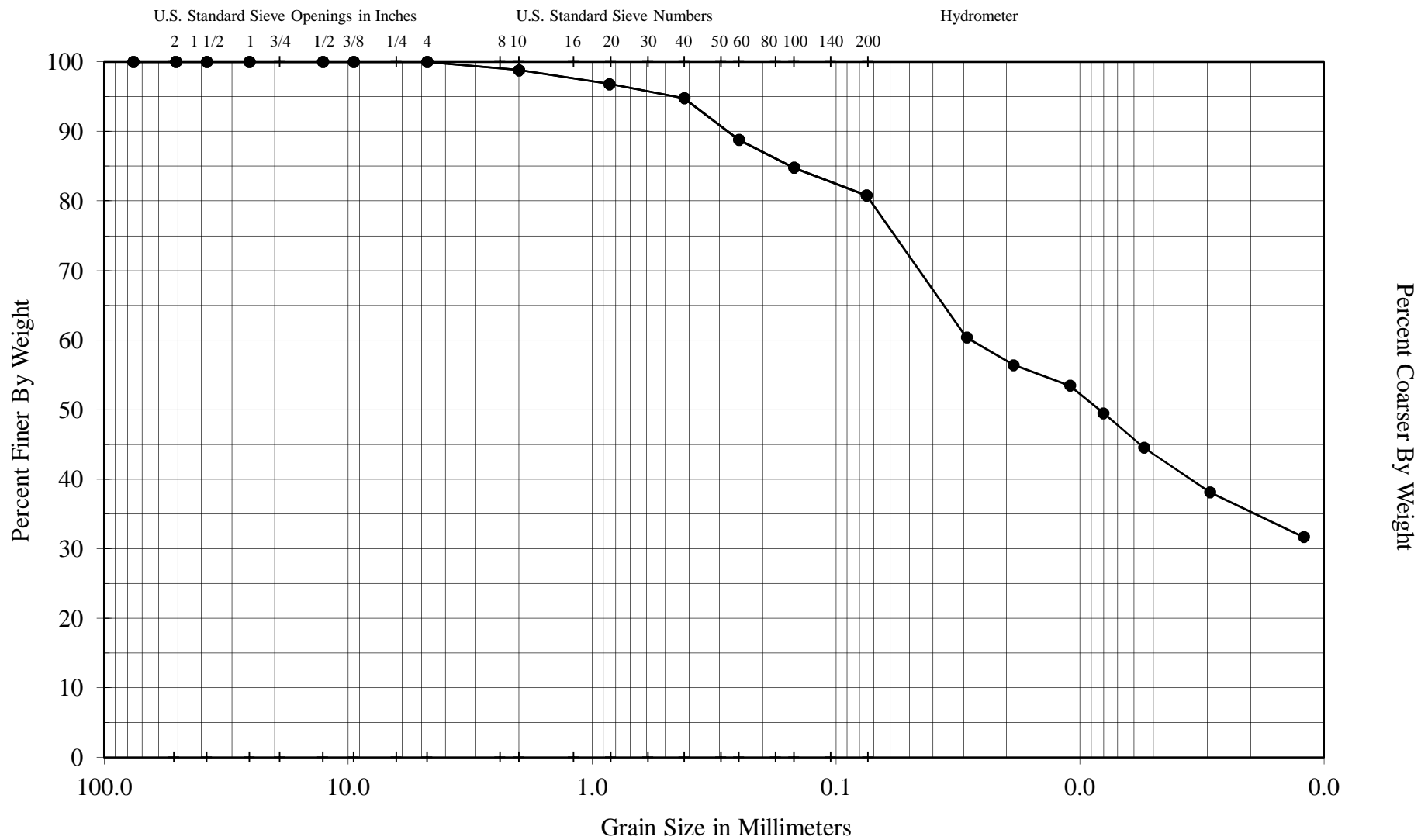
Classification
Lean Clay with Sand (CL)

HVJ ASSOCIATES, INC.

GRAIN SIZE ANALYSIS CURVE
SH 71 - FROM EAST RIVERSIDE TO SH 130

PROJECT NO.
AG 12 15282

APPENDIX I-1



Project No.
AG 12 15282

Depth, Ft.
P-4, 6-8

Classification
Fat Clay with Sand (CH)

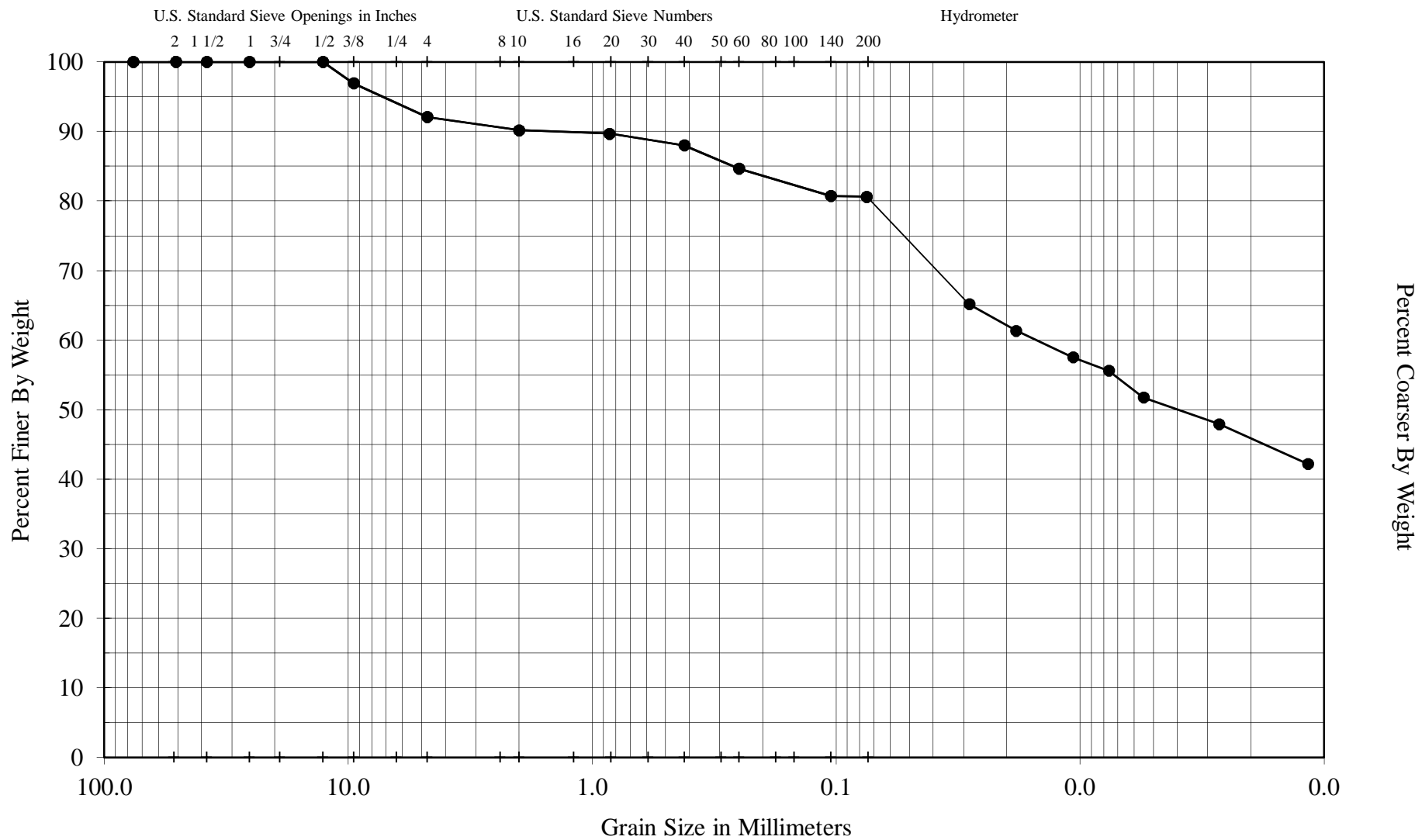
HVJ ASSOCIATES, INC.

GRAIN SIZE ANALYSIS CURVE
SH 71 - FROM EAST RIVERSIDE TO SH 130

PROJECT NO.

AG 12 15282

APPENDIX I-2



Project No.
AG 12 15282

Depth, Ft.
P-6, 6-8

Classification
Fat Clay (CH) with sand, trace of gravel

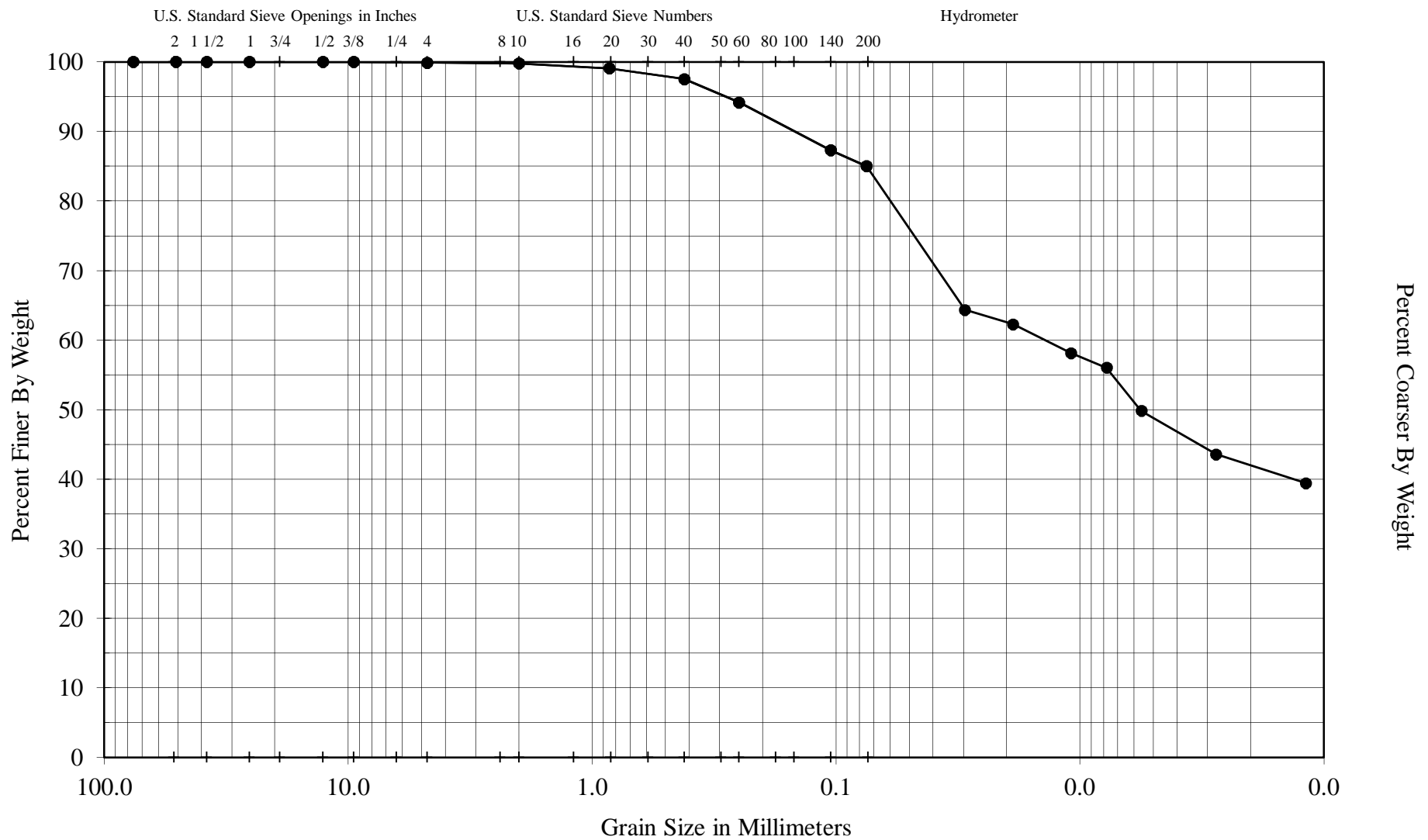
HVJ ASSOCIATES, INC.

GRAIN SIZE ANALYSIS CURVE
SH 71 - FROM EAST RIVERSIDE TO SH 130

PROJECT NO.

AG 12 15282

APPENDIX I-3



Project No.
AG 12 15282

Depth, Ft.
P-8, 4-6

Classification
Lean Clay (CL) with sand

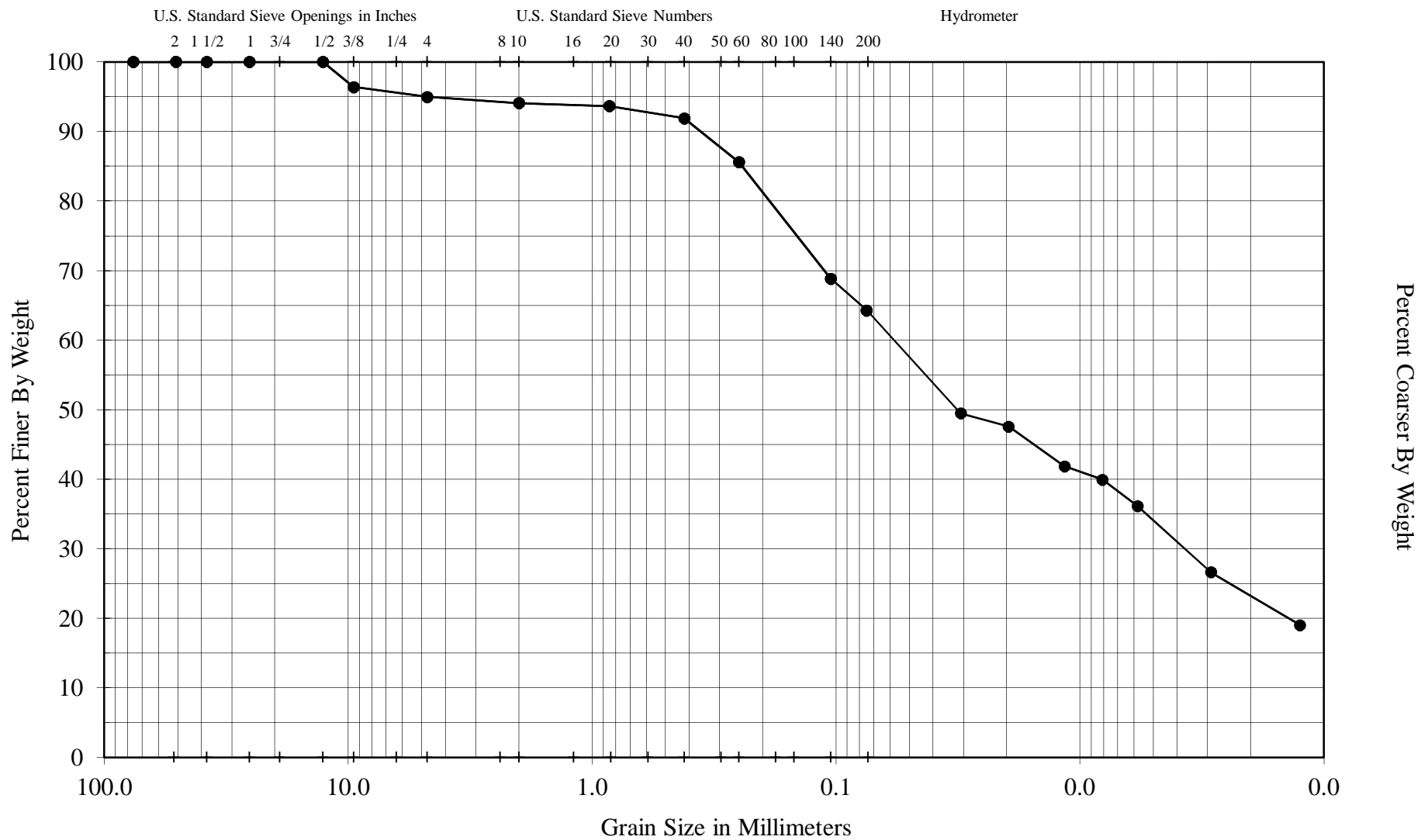
HVJ ASSOCIATES, INC.

GRAIN SIZE ANALYSIS CURVE
SH 71 - FROM EAST RIVERSIDE TO SH 130

PROJECT NO.

AG 12 15282

APPENDIX I-4



Project No.
AG 12 15282

Depth, Ft.
P-10, 8-10

Classification
Sandy Lean Clay (CL)

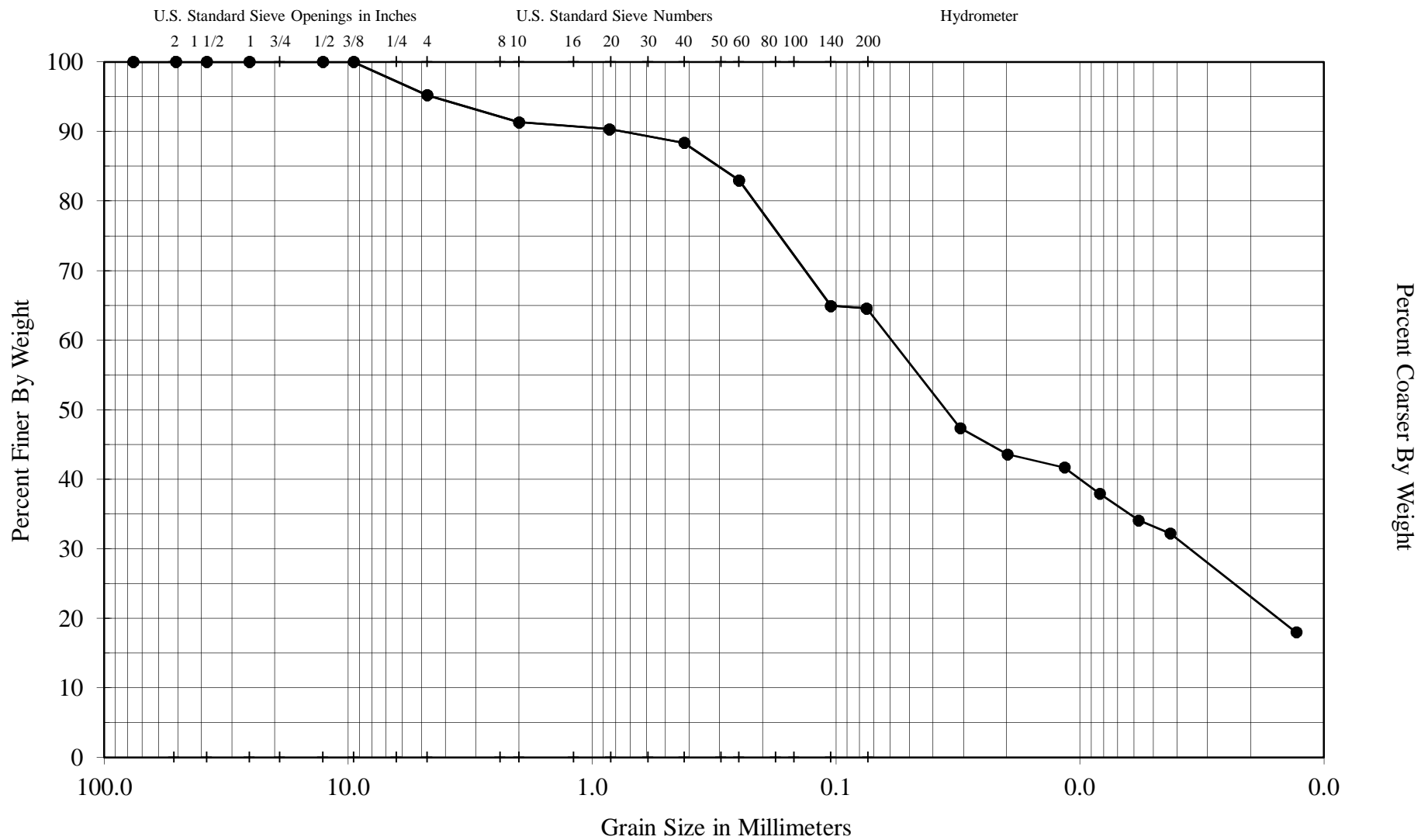
HVJ ASSOCIATES, INC.

GRAIN SIZE ANALYSIS CURVE
SH 71 - FROM EAST RIVERSIDE TO SH 130

PROJECT NO.

AG 12 15282

APPENDIX I-5



Project No.
AG 12 15282

Depth, Ft.
P-12, 6-8

Classification
Sandy Fat Clay (CH)

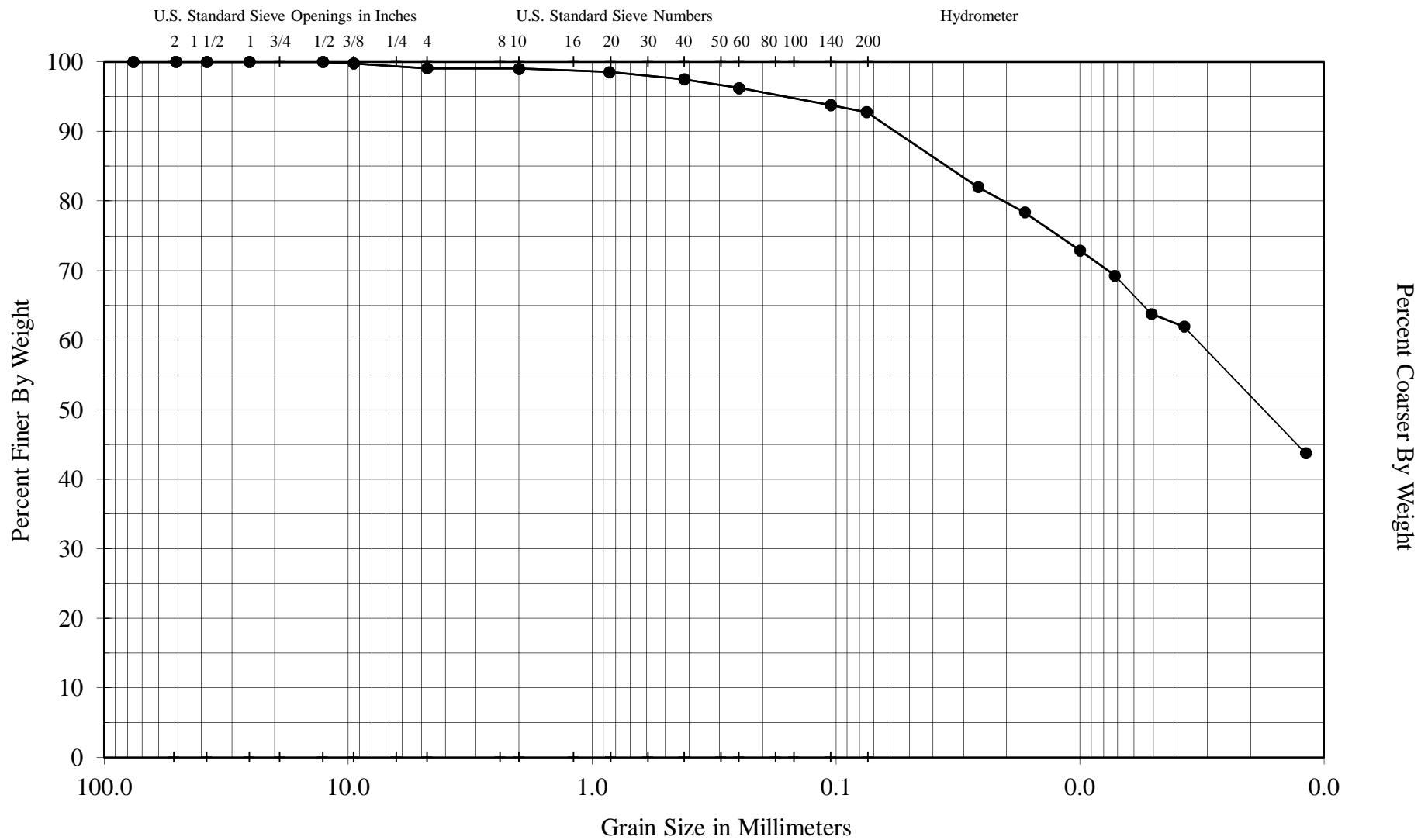
HVJ ASSOCIATES, INC.

GRAIN SIZE ANALYSIS CURVE
SH 71 - FROM EAST RIVERSIDE TO SH 130

PROJECT NO.

AG 12 15282

APPENDIX I-6



Project No.
AG 12 15282

Depth, Ft.
P-21, 4-6

Classification
Fat Clay (CH)

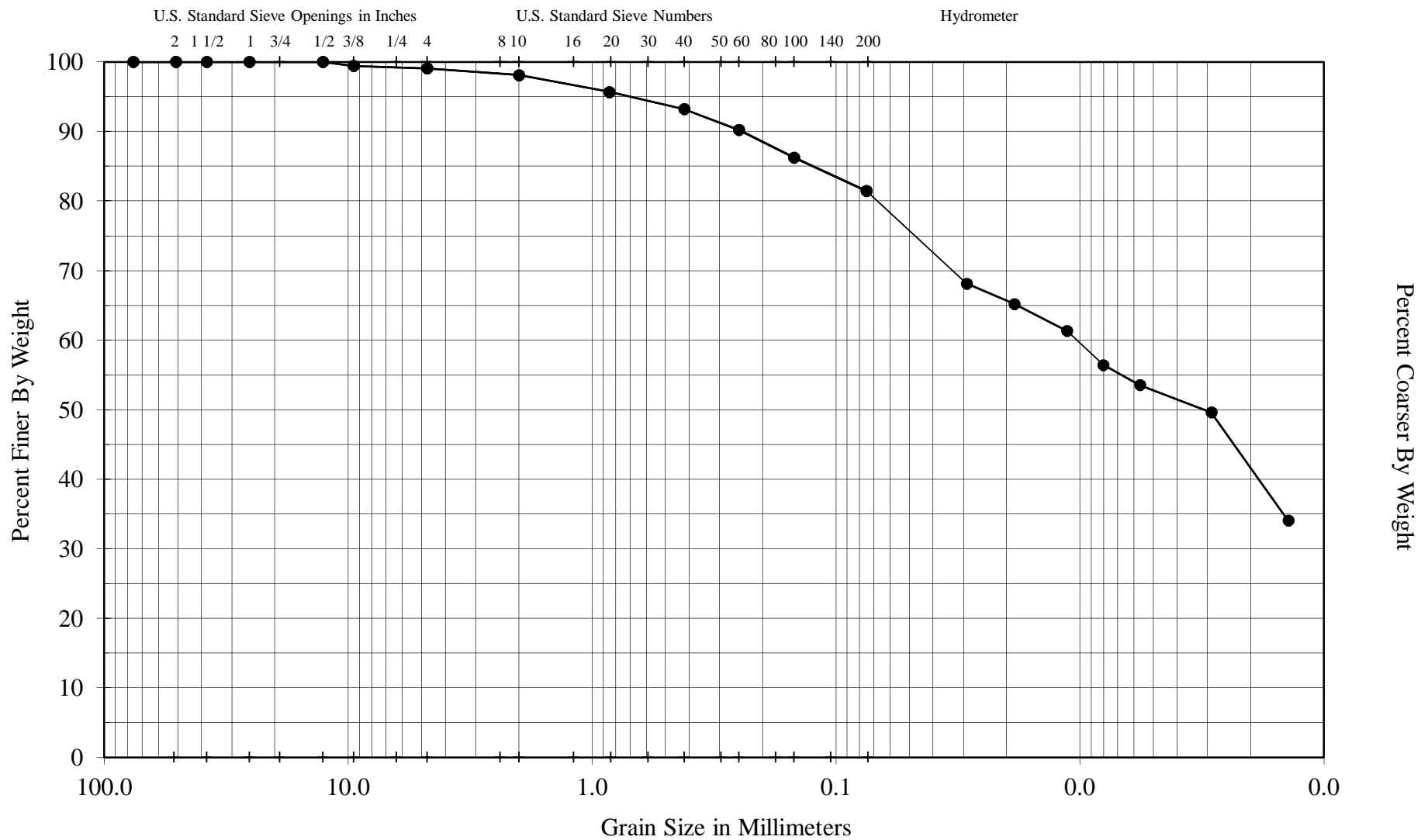
HVJ ASSOCIATES, INC.

GRAIN SIZE ANALYSIS CURVE
SH 71 - FROM EAST RIVERSIDE TO SH 130

PROJECT NO.

AG 12 15282

APPENDIX I-7



Project No.
AG 12 15282

Depth, Ft.
P-23, 4-6

Classification
Lean Clay with Sand (CL)

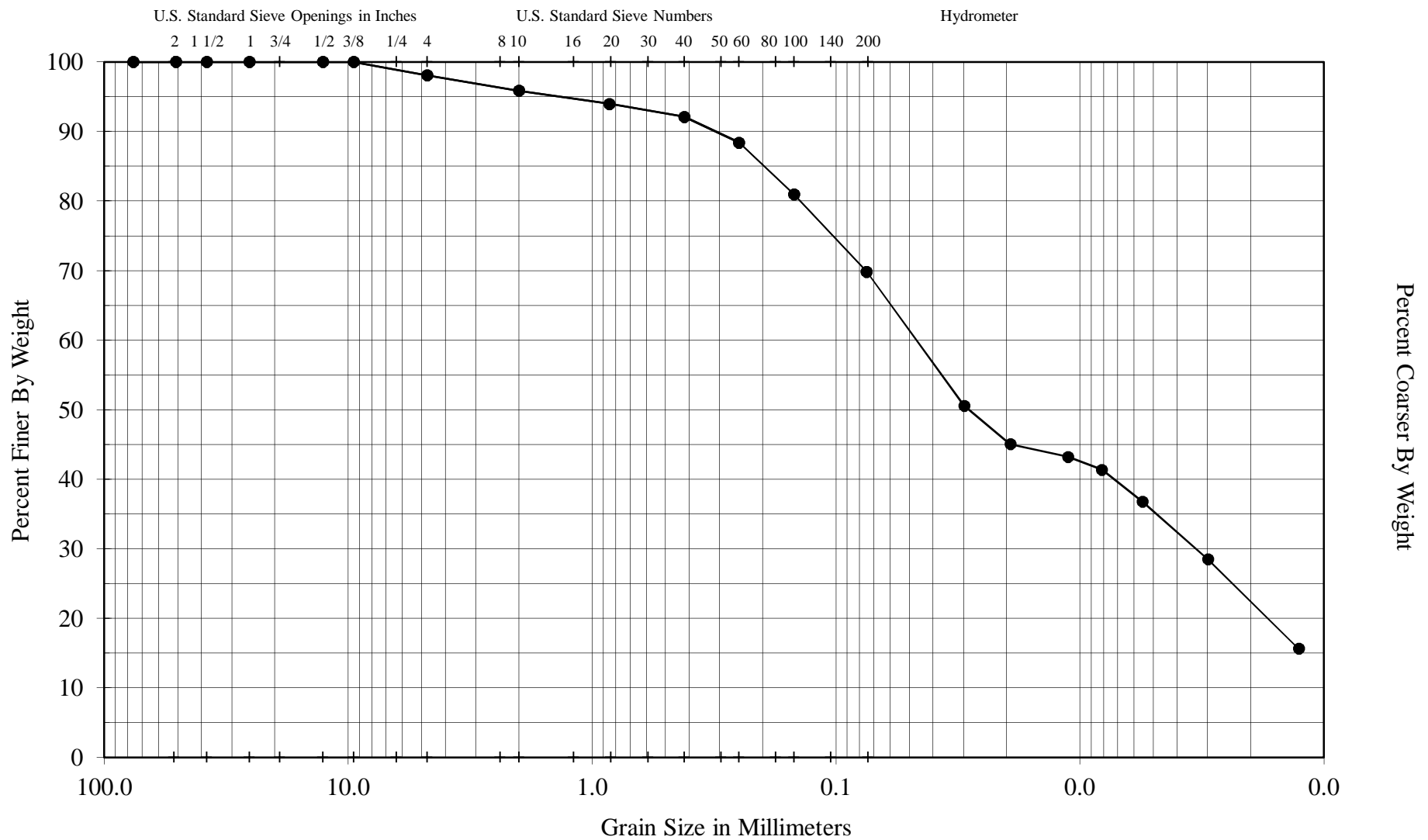
HVJ ASSOCIATES, INC.

GRAIN SIZE ANALYSIS CURVE
SH 71 - FROM EAST RIVERSIDE TO SH 130

PROJECT NO.

AG 12 15282

APPENDIX I-8



Project No.
AG 12 15282

Depth, Ft.
P-25, 6-8

Classification
Sandy Fat Clay (CH)

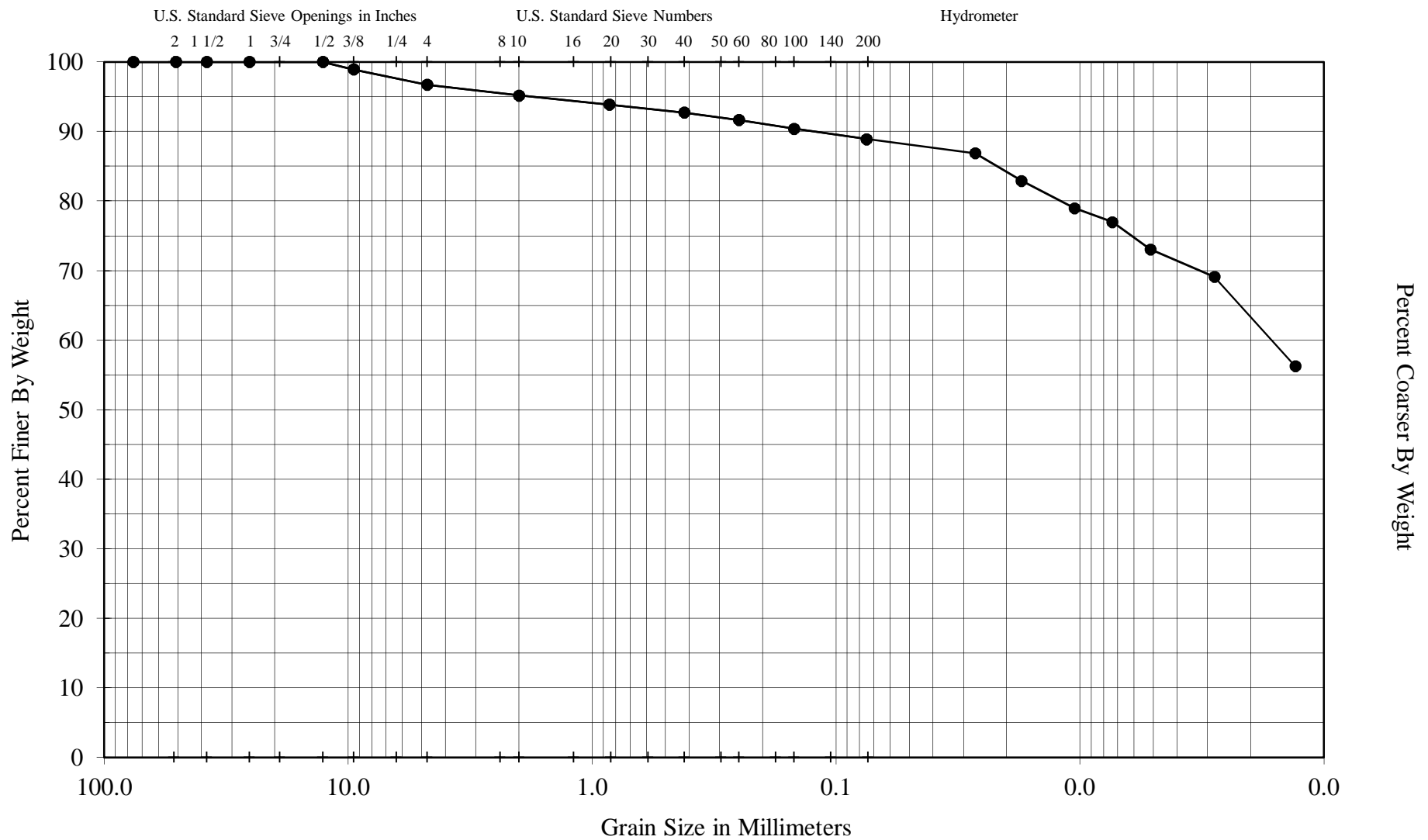
HVJ ASSOCIATES, INC.

GRAIN SIZE ANALYSIS CURVE
SH 71 - FROM EAST RIVERSIDE TO SH 130

PROJECT NO.

AG 12 15282

APPENDIX I-9



Project No.
AG 12 15282

Depth, Ft.
P-27, 4-6

Classification
Fat Clay (CH)

HVJ ASSOCIATES, INC.

GRAIN SIZE ANALYSIS CURVE
SH 71 - FROM EAST RIVERSIDE TO SH 130

PROJECT NO.

AG 12 15282

APPENDIX I-10