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Structure Geotechnical Report

F.A.U. Route 7972
Section 22-00492-01-BR
Sangamon County
Job No. ---
Contract No. ---
PTB No. N/A
North Grand Avenue Over NSRR and
IMRR
Structure No. 084-9973

June 2022



Table of Contents

1. Project Description3

2. Location.....3

3. Proposed Structures3

4. Site Investigation3

5. Laboratory Investigation4

6. Subsurface Profile4

7. Geotechnical Evaluations5

8. Design Recommendations5

9. Construction Considerations9

References11

Appendix12

Tables

Table 1: Pile Design Parameters.....6

Table 2: LPILE Parameters6

Table 3: Seismic Design Parameters9

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1. Project Description

This report provides geotechnical data and recommendations for the proposed North Grand Avenue Over Norfolk Southern railroad (NSRR) and Illinois Midland railroad (IMRR) Bridge, which is part of the Springfield Rail Improvements Project. The project includes the relocation of the existing UP tracks from the 3rd Street corridor to the 10th Street corridor. The project includes modifications to four existing grade separations and nine new grade separations. The bridge and retaining walls covered by this structure geotechnical report will be new structures carrying North Grand Avenue over the railroad.

Nearby project features that have an impact on the design or construction of the proposed bridge and retaining walls include the North Grand Avenue roadway. Geotechnical recommendations for the street alignment are contained in a geotechnical report prepared by Hanson Professional Services Inc. (Hanson).

2. Location

The proposed North Grand Avenue Over NSRR and IMRR is located in the central portion of Sangamon County, within Sections 22, 23, 26, and 27 of Township 16 North, Range 5 West. Structure Number 084-9973 carries North Grand Avenue over NSRR at Sta. 997+34.78 and over IMRR at Sta. 999+48.02.

3. Proposed Structures

The general structure configuration was determined from an informal type study as discussed later in this report. The proposed grade separation structure will be a two-span bridge with closed stub abutments and a multi-column bent-type pier. The bridge measures, along CL Roadway, 220 ft - 0 1/4 in. from CL West Bearing to CL Pier and 151 ft - 6 3/4 in. from CL Pier to CL East Bearing. The west abutment and pier are skewed 60 degrees left ahead and the east abutment has no skew. The superstructure of the bridge will be a concrete deck supported on 88-inch web plate girders. MSE retaining walls will be utilized at the abutments to reduce the footprint of the embankment section and reduce the length of the bridge. The profile grade of North Grand Avenue will be raised by up to 40 ft, allowing it to pass over the railroads.

The proposed structures will be supported on driven pile foundations. Based on information provided by the structure designer, vertical service loads of approximately 2,500 kips at the west abutment, 1,600 kips at the east abutment and 10,300 kips per pier will be applied to the foundations.

The proposed bridge will be constructed with North Grand Avenue open to traffic. The substructures for the new bridge will be constructed conventionally over the existing railway lines.

4. Site Investigation

The project site is located in a developed, urban area. The existing North Grand Avenue railroad crossing is at grade. Existing grade along the street ranges from approximately Elev. 600.1 to Elev. 606.1 with the highest point near 11th Street and the lowest point near 19th Street. Adjacent properties consist of residential properties, commercial properties, a high school, and a rail switch yard.

Test borings were completed in September and October 2013 using a drill rig operated by Professional Services Industries, Inc. Twenty-seven (27) borings were drilled at the location of the proposed structure. All borings were advanced using hollow stem augers. NQ-sized core samples were collected at three locations. Standard Penetration Test (SPT) samples were generally collected at 2.5 ft intervals. All SPT samples were collected using an automatic hammer. The borings were advanced to depths between 5.0 and 55.0 ft.

The boring locations are shown on the Boring Location Plan included in the Appendix. Boring logs and rock core photos are also included in the Appendix.

5. Laboratory Investigation

Soil samples from the borings were tested in Hanson's soils laboratory. The laboratory analysis consisted of moisture content determinations, unconfined strength tests of SPT samples, 1-dimensional consolidation tests of SPT samples, unconsolidated-undrained triaxial testing of SPT samples, and unconfined strength tests of rock core samples. The results of the tests are indicated on the subsurface data profile.

6. Subsurface Profile

Subsurface data profiles for the proposed bridge and retaining walls are presented in the Appendix for use by the structure designer. The data profiles include all of the borings that were drilled near the proposed structures. The general subsurface profile consists of deposits of fill material, loess, glacial till, weathered shale, and shale bedrock.

Asphalt, concrete, and brick pavement and aggregate or oil and chip surfacing between 0.19 and 0.98 ft. thick were encountered at the ground surface nineteen (19) in boring locations.

Topsoil was encountered at two (2) boring locations at the ground surface and was 0.30 and 0.34 ft thick.

A layer of fill was encountered at six (6) boring locations. The fill was between 2.2 and 9.0 ft thick and extended from the ground surface or base of pavement to the top of the loess or glacial till. The fill material was variable at the boring locations and contained variable amounts of: silty clay, sandy silt, sand, cinders, rock fragments, brick, or gravel. SPT N-values between 3 and 11 blows per foot penetration were recorded for the fill materials. A hand penetrometer reading of 2.00 tsf and an unconfined compressive strength of 9.38 tsf were recorded in the fill materials.

Silt to clay loam (loess) was encountered beneath the topsoil, pavement, surfacing, or fill materials at all boring locations except B-162 (where the fill materials were present to the top of the glacial till). The loess was present to the boring termination depths (between 5.0 and 10.0 ft) at B-148 through B-150, B-151, B-153, B-154, and B-179 through B-181. At other boring locations, the loess was between 5.0 and 15.5 ft thick. SPT N-values between 2 and 12 blows per foot penetration and unconfined compressive strengths between 0.30 to 12.00 tsf were recorded in the loess.

Stiff Clay (glacial till) was encountered beneath the loess or fill materials at B-155 through B-162, B-164, B-165 and B-175 through B-179. The glacial till was present to the boring termination depths (between 5.0 and 15.0 ft) at B-155 through B-157, B-166, B-171, and B-178. At other boring locations, the glacial till was between 5.0 and 8.0 ft thick. SPT N-values between 3 and 8 blows per foot penetration and unconfined compressive strengths between 0.43 to 2.33 tsf were recorded in the glacial till.

Below the till layer, a highly weathered sand, clayey, and micaceous shale was encountered at B-159 through B-162, B-164, B-165, and B-175 through B-177. The highly weathered shale was 5.0 ft thick at the boring locations. SPT N-values between 10 blows per foot and 50 blows per 4 inches penetration and hand penetrometer readings of 4.50 tsf were recorded in the highly weathered shale.

Below the highly weathered shale, weathered sandy, micaceous shale was encountered at B-159 through B-162, B-164, B-165, and B-175 through B-177 and was present to the boring termination depths between 25.0 and

55.0 ft. This stratum was cored in B-160, B-162, and B-164. Hand penetrometer reading of 4.50 tsf were recorded in the shale. Unconfined strengths measured in three tests on rock cores were between 3.6 and 32.2 tsf.

Groundwater was encountered during drilling at six (6) boring locations at depths between 6.0 ft and 20.0 ft during drilling. Groundwater was measured at a depth of 7.0 ft at B-164 at the end of drilling. The borings were drilled during an unusually dry period.

According to maps prepared by the Illinois State Geological Survey Directory of Coal Mines, the site has not been undermined. The closest mapped mine is the Sangamon Coal Company No. 2 Mine shown to be approximately 1,500 feet west-southwest of the site

7. Geotechnical Evaluations

Several retaining wall, bridge configurations, and alignments were considered for the proposed grade separation. A roadway overpass would require embankment slopes and/or retaining walls along both sides of the street due to the narrow ROW, adjacent high value property, and the high school on the north side of the property. An underpass would require the use of retaining walls along both sides of the street due to the narrow ROW adjacent high value property, and the high school on the north side of the property. An alignment shift to the south would reduce the amount of high value property required. An alignment shift and embankment incorporating slopes and MSE retaining walls are the best choice for the conditions at this site, because they can be constructed with minimal new ROW acquisition and the least disruption to the surrounding properties.

A combined configuration consisting of a MSE wall in the taller sections of the grade separation where the ROW required for slopes is not available and standard embankment slopes where the slopes will not require a large ROW acquisition was selected. The MSE walls will be constructed along with temporary slopes where there is limited ROW and street relocation required. Permanent slopes will be constructed after the street relocations are completed and in other areas.

The relatively steep profile grade along North Grand Avenue results in rapidly varying wall heights. The combined configuration was selected as a compromise between the ROW required for fill slopes and the added expense of retaining walls. Embankment widths of greater than 300 ft would be required at the maximum fill heights and the length of the spill slope would increase the structure length if only embankment construction were utilized.

Although MSE wall systems are extremely flexible and can tolerate significant total and differential settlements without undue distress, they require good foundation soils to provide acceptable factors of safety against bearing capacity or global stability failures. Slope stability analyses were necessary for global stability of the MSE, the maximum fill height at the transition between the MSE wall and embankment slope, and where temporary slopes will be constructed. Settlement analyses were required for the MSE walls and embankments. Bearing capacity analyses were required for the MSE walls.

8. Design Recommendations

The proposed bridge substructures should be supported on driven pile foundations with the tips founded in the shale bedrock. Table 8.1 lists design parameters for several different pile sizes at each substructure location. Pile lengths were estimated based on the borings, assumed ground elevations and cutoff elevations indicated in the table. Due to the variability of the bedrock elevation across the site, it is recommended that the estimated pile length shown on the plans be the maximum length. Estimated pile lengths for the structure plans should be adjusted based on final cutoff elevations.

Table 8.1 Pile Design Parameters

Location	Cutoff Elevation (ft)	Pile Type	Nominal Required Bearing, R_N (kips)	Factored Load Loss from Downdrag, R_{Sdd} (kips)	Factored Resistance Available, R_F (kips)	Estimated Pile Length (ft)
West Abutment	625.7	HP 10x42	335	80	57	44
		HP 12x53	418	96	80	44
		HP 12x63	497	97	109	45
		HP 14x73	578	113	142	45
		HP 14x89	705	115	210	47
		HP 14x117	929	117	316	50
Pier	600.3	HP 10x42	335	---	163	28
		HP 12x53	418	---	207	28
		HP 12x63	497	---	264	30
		HP 14x73	578	---	292	29
		HP 14x89	705	---	361	31
		HP 14x117	929	---	504	35
East Abutment	603.5	HP 10x42	335	87	50	51
		HP 12x53	418	105	71	51
		HP 12x63	497	106	100	52
		HP 14x73	578	124	131	52
		HP 14x89	705	125	199	54
		HP 14x117	929	128	305	57

One test pile should be driven at each abutment and pier.

The structure designer should evaluate lateral resistance of the piles based on both soil and structure properties. Soil parameters for generating P-y curves with the LPILE computer program are given in Table 8.2. Factored axial and factored lateral loads should be used for structural design of the piles. The P-multipliers in AASHTO Table 10.7.2.4-1 should be used in the analyses. Estimated pile lengths are based on assumed penetration into bedrock and piles may reach bearing at shorter lengths. To be conservative, lateral design should assume no more than 2 ft penetration into weathered shale or shale.

Table 8.2 LPILE Parameters

Top Elevation	Stratum	LPILE Soil Type	Soil Parameters
Profile grade	Select backfill	sand	$\phi=34^\circ$ $\gamma'=125$ pcf $k=225$ pci
Ground Surface	Silty clay/clayey silt	stiff clay w/o water	$c=1,500$ psf $\gamma'=62$ pcf
578.0	Weathered Shale	weak rock	$q_u=79.8$ psi, $E_r=125$ ksi, $RQD=50$, $k=0.0005$, $\gamma'=77$ pcf

Driven piles at the abutments may be constructed prior to, or after construction of the MSE wall. If piles are to be driven after the walls are completed, pile sleeves will be required. The pile sleeves should extend through the reinforced soil mass and any granular fill placed below it. If piles are constructed after the subsurface soils have been allowed to consolidate, the above downdrag losses can be neglected.

The native soils have a nominal bearing capacity that varies between of 8,000 psf and 15,600 psf at the west wall and between 9,300 psf and 11,200 psf at the east wall. These capacities consider all soil layers within the zone of influence. The native soils have an undrained sliding resistance of 1,300 psf along the west wall and 1,550 psf along the east wall. The drained sliding resistance is 0.48 times the effective vertical stress for the entire wall. The proposed walls would not meet the Standard Specifications for Highway Bridges (AASHTO) requirements for bearing pressure and sliding stability.

Slope stability analyses of the wall's highest point near the west abutment completed to determine the overall stability of the wall. Results of those analyses are included in the Appendix. The 1.19 factor of safety does not satisfy AASHTO requirements.

Settlement estimates for the tallest sections of the MSE walls and embankments is estimated to be between 1.7 and 3.0 inches based on the IDOT simplified method for estimating settlement (form BBS 150). A maximum estimated settlement of 3.4 inches was calculated using laboratory test data from consolidation tests completed on selected samples recovered from the site. The walls and embankments should be designed to accommodate a 3.4 inch magnitude of maximum consolidation settlement.

The estimated time necessary for 90% of the consolidation settlement to be completed varies between 2 and 43 months for the various soil layers encountered at the site. The time required to reduce the remaining settlement to be less than 1.0 inches is 150 days after completion of the MSE walls. Final grading and construction of base courses and pavements should be delayed for a minimum of 150 days after completion of the MSE walls and embankments to allow for settlement to occur.

The native cohesive soils found at this site are relatively weak and will not support the weight of a conventional MSE wall. Typically, the alternative solutions are to either reduce the wall's bearing pressure or to increase the foundation soils' strength. Several potential treatment options were considered. Widening the reinforced soil mass and raising the wall in stages are not feasible for this wall. Removal and replacement of the foundation soils is not feasible due to the depth of removal required. The use of lightweight aggregate and ground improvement with aggregate columns are possible solutions.

The removal and replacement of the softer soils would normally be an ideal solution. At this wall, the depth of excavation necessary below the base of the reinforced soil mass would require additional excavation to lay back slopes at the west and east wall locations and additional shoring to support the North Grand Avenue during wall construction at the west wall location. Also, the volume of material to be removed and replaced is cost prohibitive. The cost of the temporary work renders the removal and replacement alternative uneconomical when compared to the other possible solutions.

The use of lightweight granular backfill with a total unit weight of 75 pcf or less would reduce the applied bearing pressures to acceptable values. The lightweight aggregate must be used within the reinforced soil mass and within the backfill behind the reinforced soil mass. It is estimated that more than 50,000 cubic yards of lightweight aggregate would be needed at the wall locations. The cost of this material is not economical when compared to other possible solutions.

Vibrator compacted aggregate columns tipped in the highly weathered shale or shale could increase the allowable bearing capacities, global factor of safety for stability, and factor of safety for sliding above the minimum required parameters. Our preliminary analyses indicate that columns with an area replacement ratio of 35 to 40 percent would be sufficient for all of the above parameters. Although ground improvement with tamper compacted aggregate columns was not expressly investigated, it is expected that the wall also could be successfully constructed using that technology. The cost of aggregate column ground improvement is expected to be significantly lower than the other feasible solutions.

When designing for the external stability of the MSE wall, it should be assumed that the reinforced soil mass will be composed of a granular select backfill and the fill behind the reinforced soil mass will be embankment material as defined by the IDOT Standard Specifications for Road and Bridge Construction (IDOT Standard specifications). Both materials should be assumed to have a total unit weight of 125 pcf. The active earth pressure coefficient of the embankment fill could vary greatly depending on the actual material used, but should be assumed to be 0.36 for design. Near the wall corners, where the backfill will be the select material placed behind the other face, an active earth pressure coefficient of 0.28 may be used.

Aggregate column ground improvement (ACGI) is the recommended treatment option. The results are highly dependent upon the equipment and techniques used to install the aggregate columns. The contractors that perform this type of work routinely design the improvement to specific geotechnical performance requirements. The lump sum cost of the treatment is expected to be approximately \$315,000.

The ACGI should include the footprint of the reinforced soil mass and extend 4 ft beyond the wall face of the reinforced soil mass.

For the east MSE wall north of the roadway, the ACGI should be constructed in all areas where the wall height is equal to or greater than 14.0 ft. For the east MSE wall south of the roadway, the ACGI should be constructed from the abutment to the point where the wall transitions up the embankment. These limits should take precedence over the approximate stationing provided below.

For the west MSE wall, the ACGI should be constructed in all areas where the wall height is equal to or greater than 18.0 ft. These limits should take precedence over the approximate stationing provided below.

Based on the wall layout shown on the current TSL drawings, specific limits of the ACGI would be as follows:

- West wall north of roadway – 992+80 to the west abutment
- West wall south of roadway – 992+70 to the west abutment
- West wall at abutment – entire wall footprint
- East wall north of roadway – 1001+00 to the west abutment
- East wall south of roadway – 1001+60 to the west abutment
- East wall at abutment – entire wall footprint

The contractor should be required to satisfy the following performance requirements:

1. Minimum factor of safety of 1.5 against global slope stability failure of permanent condition.
2. Nominal bearing resistance of 14,900 psf (West wall) 14,200 psf (East wall).
3. Factored bearing resistance of 9,650 psf (West wall) 9,200 psf (East wall).
4. Total settlement measured at the base of the wall not to exceed 4.0 inches.
5. Total settlement measured on the pavement not to exceed 1.0 inch.
6. Differential settlement measured along the base of the wall not to exceed 1/100.
7. Primary consolidation of the soil within the depth of the ACGI to be at least 90 percent complete when the bridge piles are to be driven. Any required waiting periods shall be coordinated with the bridge construction schedule.

Between the MSE walls, aggregate column ground improvement should be performed to facilitate an increased settlement rate of the subsurface soils so the embankment between the walls does not experience differential settlement with respect to the settlement of the walls over time. Treatment in these areas is not required for the

stability of the walls or embankment. Treatment consisting of a 10 ft triangular grid for individual ACGI units will be sufficient to reduce the differential settlement to less than 1.0 inches between the MSE walls and embankment.

It should be noted that some of these performance requirements can be satisfied without any improvement to the native subgrade. The global stability and allowable bearing capacity requirements will control the design of the aggregate column ground improvement.

With the ground improvement, a conventional precast panel MSE wall is feasible. The theoretical top of leveling pad or base of reinforced soil mass may be located at the minimum embedment required by IDOT (3'-6" below finished grade). Any removals or other excavation below the reinforced soil mass should be backfilled with either the select backfill used in the reinforced soil mass or the granular material used as a drainage layer or working platform for the aggregate column ground improvement design. Other material outside the limits of the reinforced soil mass may be embankment fill in accordance with the IDOT Standard Specifications.

The external stability design should be completed using the parameters defined above. In areas with ground improvement, the applied bearing pressures should not be compared to allowable bearing capacities of the native soils. Instead, the estimated applied bearing pressures will be given as a performance requirement for the aggregate column ground improvement. The minimum length to height ratio specified by AASHTO (0.70) will be acceptable for the entire wall.

The project is located in a region of low seismic activity, which is caused primarily by earthquakes in the New Madrid Fault Zone, 225 miles south of the site. The subsurface profile to a depth of 100 feet consists of up to 23 feet of stiff clayey silt and silty clay, overlying very stiff clay shale, sandy shale, and shale bedrock. This profile is indicative of Soil Type C. Seismic design parameters obtained from the USGS web based design ground motions for AASHTO Guide Specifications are listed in Table 8.3. The soils found at the site are not liquefaction-susceptible for the design earthquakes.

Table 8.3 Seismic Design Parameters

PGA	S _{DS}	S _{D1}
0.071	0.201	0.107

9. Construction Considerations

The specifications and special provisions require that the contractor take responsibility for the final design of much of the MSE structures.

The construction of MSE walls is covered by the IDOT Standard Specifications (Section 522). The external stability of the MSE walls is the responsibility of the design engineer.

The construction of aggregate column improvement is covered by Guide Bridge Special Provision No. 71, Aggregate Column Ground Improvement (Revised: October 4, 2010), and should be included in the construction documents.

The ground improvement contractor will need to assign strength and consolidation properties to the native soils to design the aggregate columns. All of the soils laboratory data in the Appendix to this report should be included in the contract documents. Usually, this is accomplished by adding a "Geotechnical Investigation Laboratory Data" section to the special provisions.

Obstructions, such as old footings, pavements, utilities, etc., that are within the area to be treated with aggregate column ground improvement generally should be removed. Although it is possible to predrill the columns through large obstructions or space the columns around smaller obstructions, this increases the cost and reduces the effectiveness of the ground improvement.

The piles for the bridge abutments, which are located within the reinforced soil mass for this wall, will interfere with the placement and compaction of the select backfill. The piles must either be driven prior to placing the select backfill or driven through sleeves after placing the select backfill. Pile sleeves should be in accordance with Article 522.09 of the IDOT Standard Specifications.

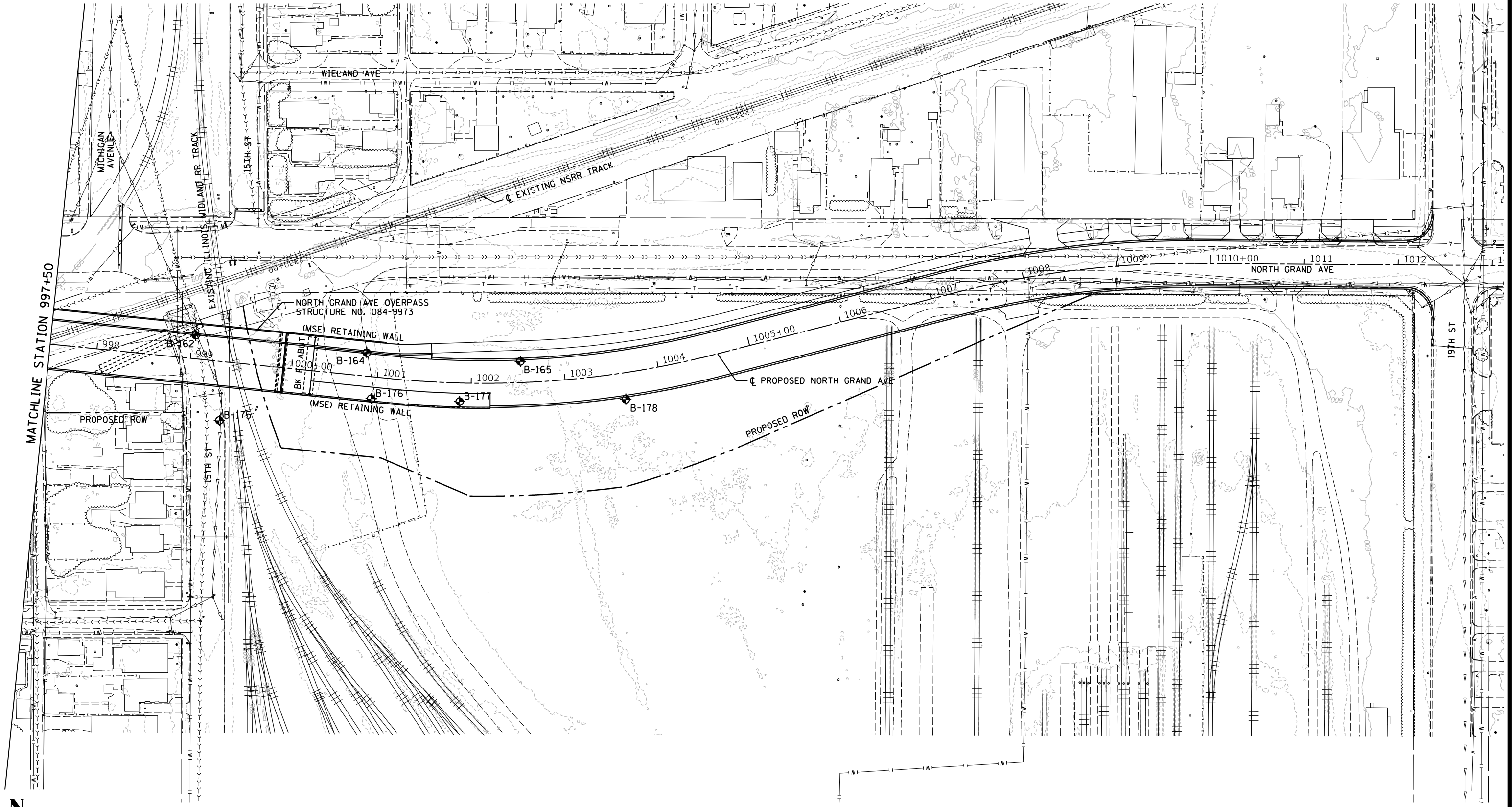
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Appendix

Boring Location Plan
Subsurface Data Profile
Boring Logs
Rock Core Photographs
Laboratory Test Results

084-9973-SGR-00 5/24/2022 madau00223



LEGEND
◆ B-090 BORING LOCATION



BORING LOCATION PLAN	
NORTH GRAND AVENUE OVER NSRR S.N. 084-9973 SPRINGFIELD, ILLINOIS	
09L0179B	5/24/22

B-160			
Sta. 995+65, 20' LT			
	N	Qu	w%
603.8	OIL & CHIP.		
603.29	10	3.50S 24	Black very fine sandy silty CLAY.
600.29	8	3.09B 23	Brown and gray very fine sandy silty CLAY.
597.79	6	1.94B 26	Brown and gray very fine sandy SILT.
	6	2.91S 24	
592.79	4	1.09B 24	Gray to brownish-gray very fine sandy clayey SILT.
	4	1.51B 23	
587.79	4	1.16B 30	Brown and gray very fine sandy silty CLAY.
585.29	32	4.50P 15	Brownish-gray fine sandy SHALE.
580.29	50/5"	10	Gray fine sandy SHALE.
	50/4"	9	
573.79	Rec. = 75% RQD = xx% Rec. = 90% RQD = xx% Rec. = 93% RQD = xx%		Gray sandy SHALE, micaceous.
565.29	Rec. = 100% RQD = xx%		Gray clayey SHALE.
	Rec. = 94% RQD = xx%		
554.29	Rec. = 100% RQD = xx%		COAL.
553.79	Bottom of Hole = 50.0 feet		

B-162			
Sta. 999+03, 25' LT			
	N	Qu	w%
602.4	ASPHALT.		
602.17	CONCRETE.		
601.42	11	4	Brown silty fine to medium SAND, trace coarse sand and small gravel - FILL.
	4	5	
	3	6	Brown silty fine to medium SAND, trace coarse sand and small gravel and brown and gray very fine sandy SILT - FILL.
593.92	3	6	
592.42			Brown and gray very fine sandy SILT, some clay.
	5	1.71B 22	
588.92	3	0.89B 24	Brown and gray very fine to fine sandy silty CLAY, trace small gravel.
	4	1.09B 24	
583.92	7	2.06S 25	Brown and gray fine sandy silty CLAY.
578.92	50/4"	4.50P 14	Brown and gray SHALE - highly weathered.
573.92	50/5"	8	Gray micaceous fine sandy SHALE.
572.42	Rec. = 100% RQD = 21% Rec. = 75% RQD = 69% Rec. = 100% RQD = 96% Rec. = 93% RQD = 93% Rec. = 100% RQD = 67%		Gray clayey SHALE, trace sand, micaceous.
567.42			Gray sandy SHALE, micaceous.
561.92			Gray clayey SHALE.
	Rec. = 82% RQD = 49%		
553.42	Bottom of Hole = 49.0 feet		

B-164			
Sta. 1000+86, 25' LT			
	N	Qu	w%
603.5	ASPHALT.		
602.87	6	2.50P 27	Black very fine sandy silty CLAY.
599.95	7	2.00P 24	Brown and gray very fine sandy SILT, some clay, calcareous.
597.45		25	Brown and gray very fine sandy SILT, calcareous.
595.5	6	1.47B 24	
	4	0.97B 24	Brown very fine sandy SILT, some clay.
589.95	3	0.97B 25	Brown very fine sandy clayey SILT.
587.45		24	Brown and gray very fine sandy silty CLAY.
	10	1.86S 23	
579.95	50/4"	15	Brown and gray weathered fine sandy SHALE.
574.95	50/5"	13	Gray micaceous fine sandy SHALE.
573.45	Rec. = 56% RQD = xx%		Gray sandy SHALE, micaceous.
	Rec. = 100% RQD = xx%		
565.95			Gray clayey SHALE.
561.95	Rec. = 73% RQD = xx%		COAL.
559.95			Gray shaley CLAY.
	Rec. = 92% RQD = xx%		
555.45			Gray SHALE, some sand.
	Rec. = 69% RQD = xx%		
548.45	Bottom of Hole = 55.0 feet		

LEGEND

N Standard Penetration Test N (blows/ft)

Qu Unconfined Strength (tsf)

w% Natural Moisture Content (%)

DD Water Surface Elevation Encountered in Boring
558.10 DD = during drilling
Oh = at completion
24h = 24 hours after completion

DESIGNED	EJM	11/01/13
DRAWN	EJM	11/01/13
REVIEWED	RG	11/10/13

p:\hansoninc-pw\bentley.comhanson-pw-0\Documents\09Jobs\09L0179B\Usable Segments III - V - VINCAD\Geo\Sheet\084-9973-SGR-100



USER NAME = madau00223	DESIGNED - EJM	REVISED -
	CHECKED - RGC	REVISED -
PLOT SCALE =	DRAWN - EJM	REVISED -
PLOT DATE = 1/15/20	CHECKED - RGC	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SUBSURFACE DATA PROFILE
STRUCTURE NO. 084-9973

SHEET NO. OF SHEETS

F.A.U. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
	19-00488-00-BR	SANGAMON		1
		CONTRACT NO.		
		ILLINOIS FED. AID PROJECT		

DESIGNED	EJM	11/01/13
DRAWN	EJM	11/01/13
REVIEWED	RGC	11/10/13

LEGEND

N Standard Penetration Test N (blows/ft)

Qu Unconfined Strength (tsf)

w% Natural Moisture Content (%)

DD Water Surface Elevation Encountered in Boring
558.10 DD = during drilling
Oh = at completion
24h = 24 hours after completion

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USER NAME = madau00223	DESIGNED - EJM	REVISED -
	CHECKED - RGC	REVISED -
PLOT SCALE =	DRAWN - EJM	REVISED -
PLOT DATE = 1/15/20	CHECKED - RGC	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SUBSURFACE DATA PROFILE
NORTH GRAND AVENUE OVERPASS

SHEET NO. OF SHEETS

F.A.U. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
	19-00488-00-BR	SANGAMON		2
		CONTRACT NO.		
		ILLINOIS FED. AID PROJECT		

B-159			
Sta. 995+12, 66' LT			
603.4	N	Qu	w%
603.19			ASPHALT.
602.44	6	29	CONCRETE.
599.86			Brown very fine sandy silty CLAY, trace coarse sand and small gravel - FILL.
	5	1.75S	25
	4	1.94B	29
			Olive, brown and gray very fine sandy SILT.
594.86	3	0.70B	24
			Reddish-brown very fine sandy clayey SILT.
592.36	3	0.78B	26
			Brown very fine sandy SILT, some clay.
589.86			
DD	5	1.57S	27
587.4			Brown very fine sandy SILT, some clay.
	8	1.94S	27
584.86			
	66	4.74B	18
			Brown, dark brown and gray very fine sandy silty CLAY.
579.86			
578.36	50	11	Brown micaceous very fine sandy SILT (weathered SHALE).
			Bottom of Hole = 25.0 feet

B-158			
Sta. 994+37, 75' LT			
603.7	N	Qu	w%
603.54			ASPHALT.
602.88	5	1.50P	29
			CONCRETE.
600.21			Black very fine sandy silty CLAY, trace roots.
	5	1.55B	25
			Brown and gray very fine sandy SILT, some clay.
597.71	4	0.3B	29
			Olive and gray very fine sandy SILT.
595.21	4	1.09B	23
			Brown and gray very fine to fine sandy clayey SILT.
DD	3	1.32B	25
590.21			
	4	1.32B	25
			Brown and gray very fine to fine sandy silty CLAY.
	5	1.00P	23
585.21			
583.71	65	4.50P	17
			Brown weathered fine sandy SHALE.
			Bottom of Hole = 20.0 feet

B-157			
Sta. 993+91, 81' LT			
603.8	N	Qu	w%
603.59			ASPHALT.
603.01	5	22	CONCRETE.
			Brown-gray and black very fine sandy SILT and silty CLAY - FILL.
600.34	4	0.80P	28
			Brown and gray very fine sandy SILT, some clay.
	4	1.78S	32
595.34	5	1.16B	23
			Reddish-brown and gray very fine to fine sandy clayey SILT.
592.84			
DD	4	0.70B	26
590.34			Brown and gray very fine sandy clayey SILT.
588.84	4	0.78S	29
			Brown and dark gray very fine sandy silty CLAY.
			Bottom of Hole = 15.0 feet

B-156			
Sta. 993+34, 98' LT			
604.1	N	Qu	w%
603.87			ASPHALT.
603.37	6	2.13B	31
603.20			CONCRETE.
600.62			AGGREGATE.
	4	1.30P	25
			Dark gray and brown very fine sandy silty CLAY.
598.12	4	1.50P	29
			Brown and gray very fine sandy SILT, trace clay.
595.62	4	1.28B	22
			Brown and gray very fine sandy SILT, trace oxidized spots.
	3	0.97B	25
591.62			Reddish-brown and gray very fine to fine sandy clayey SILT, trace small gravel.
			Bottom of Hole = 12.5 feet

LEGEND

N Standard Penetration Test N (blows/ft)

Qu Unconfined Strength (tsf)

w% Natural Moisture Content (%)

DD Water Surface Elevation Encountered in Boring
558.10 DD = during drilling
Oh = at completion
24h = 24 hours after completion

DESIGNED	EJM	11/01/13
DRAWN	EJM	11/01/13
REVIEWED	RGC	11/10/13

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	CHECKED - RGC	REVISED -
PLOT SCALE =	DRAWN - EJM	REVISED -
PLOT DATE = 1/15/20	CHECKED - RGC	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SUBSURFACE DATA PROFILE
NORTH GRAND AVENUE OVERPASS

SHEET NO. OF SHEETS

F.A.U. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
	19-00488-00-BR	SANGAMON		3
CONTRACT NO.				
ILLINOIS FED. AID PROJECT				

Sta. 990+79, 117' LT			
	N	Qu	w%
604.9			
604.61			ASPHALT.
603.94	9	2.50P 29	CONCRETE.
601.44			Dark gray very fine sandy silty CLAY.
598.94	5	2.00P 24	Olive and gray very fine sandy SILT.
598.4			
597.44	4	1.35S 28	Gray very fine sandy SILT.
Bottom of Hole = 7.5 feet			

B-164			
Sta. 1000+86, 25' LT			
	<u>N</u>	<u>Qu</u>	<u>w%</u>
603.5			
602.87			ASPHALT.
599.95	6	2.50P	27
597.45	7	2.00P	24
597.45			Brown and gray very fine sandy SILT, some clay, calcareous.
595.5			Brown and gray very fine sandy SILT, calcareous.
592.45	6	1.47B	24
589.95	4	0.97B	24
587.45	3	0.97B	25
			Brown very fine sandy clayey SILT.
			Brown and gray very fine sandy silty CLAY.
	10	1.86S	23
579.95	50/4"		15
			Brown and gray weathered fine sandy SHALE.
574.95	50/5"		13
573.45			Gray micaceous fine sandy SHALE.
			Rec. = 56% RQD = xx%
			Gray sandy SHALE, micaceous.
			Rec. = 100% RQD = xx%
565.95			Gray clayey SHALE.
			Rec. = 73% RQD = xx%
561.95			COAL.
559.95			Gray shaley CLAY.
			Rec. = 32% RQD = xx%
555.45			Gray SHALE, some sand.
			Rec. = 69% RQD = xx%
548.45			Bottom of Hole = 55.0 feet

DESIGNED	EJM	11/01/13
DRAWN	EJM	11/01/13
REVIEWED	RGC	11/10/13

DESIGNED	EJM	11/01/13
DRAWN	EJM	11/01/13
REVIEWED	RG	11/10/13

LEGEND

N Standard Penetration Test N (blows/ft)

Qu Unconfined Strength (tsf)

w% Natural Moisture Content (%)

DD Water Surface Elevation Encountered in Boring
558.10 DD = during drilling
Oh = at completion
24h = 24 hours after completion

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USER NAME = madau00223	DESIGNED - EJM	REVIS
	CHECKED - RGC	REVIS
PLOT SCALE =	DRAWN - EJM	REVIS
PLOT DATE = 1/15/20	CHECKED - RGC	REVIS

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SUBSURFACE DATA PROFILE
NORTH GRAND AVENUE OVERPASS

SHEET NO. OF SHEETS

F.A.U. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
	19-00488-00-BR	SANGAMON		5
		CONTRACT NO.		
		ILLINOIS FED. AID PROJECT		

B-162 Sta. 999+03, 25' LT			
602.4	N	Qu	w%
602.17			
601.42			ASPHALT. CONCRETE.
	11	4	Brown silty fine to medium SAND, trace coarse sand and small gravel - FILL.
	4	5	
	3	6	Brown silty fine to medium SAND, trace coarse sand and small gravel and brown and gray very fine sandy SILT - FILL.
593.92			
592.42	3	6	
	5	1.71B	22 Brown and gray very fine sandy SILT, some clay.
588.92			
	3	0.89B	24 Brown and gray very fine to fine sandy silty CLAY, trace small gravel.
	4	1.09B	24
583.92			
	7	2.06S	25 Brown and gray fine sandy silty CLAY.
578.92			
	50/4"	4.50P	14 Brown and gray SHALE - highly weathered.
573.92			
572.42	50/5"	8	Gray micaceous fine sandy SHALE.
	Rec. = 100%		Gray clayey SHALE, trace sand, micaceous.
	RQD = 21%		
	Rec. = 75%		
	RQD = 69%		
	Rec. = 100%		
	RQD = 96%		
567.42			Gray sandy SHALE, micaceous.
	Rec. = 93%		
	RQD = 93%		
	Rec. = 100%		
	RQD = 67%		
561.92			Gray clayey SHALE.
	Rec. = 82%		
	RQD = 49%		
553.42			Bottom of Hole = 49.0 feet

B-175 Sta. 999+37, 63' RT			
603.0	N	Qu	w%
602.26			CONCRETE.
	6	2.00P	26 Brown and gray very fine sandy silty CLAY.
599.51			
	5	0.62B	23 Brown and gray very fine sandy SILT, trace clay.
	6	1.44B	25
592.01			
	3	0.43B	24 Brown and gray very fine to fine sandy silty CLAY.
	4	1.16B	24
		23	
		22	
584.51			
	50/5"	4.50P	12 Brown SHALE - highly weathered.
579.51			
	50/3"	4.50P	10 Gray fine sandy SHALE.
	50/5"		8
573.01			Bottom of Hole = 30.0 feet

B-176 Sta. 1000+96, 23' RT			
603.1	N	Qu	w%
602.60			ASPHALT.
	5		24 Black very fine to fine sandy clayey SILT.
597.10			
	6		25 Brown and gray very fine sandy SILT, trace clay, trace limestone fragments.
594.60			
	5	1.55B	27 Brown and gray very fine sandy SILT.
592.10			
	3	0.93B	27 Brown very fine sandy clayey SILT.
589.60			
			Brown and gray very fine sandy silty CLAY.
	6	2.33B	25
584.60			
583.1	DD	21	2.52B 16 Brown and gray very fine sandy SILT and weathered SHALE.
579.60			
	50/4"	4.50P	11 Brown and gray weathered fine sandy SHALE.
	50/4"	4.50P	12
574.60			Bottom of Hole = 28.5 feet

B-177 Sta. 1001+96, 23' RT			
601.2	N	Qu	w%
	9	9.38S	17 Dark brown and brown very fine sandy silty CLAY, trace small gravel - FILL.
597.73			
	7		21 Brown and gray very fine sandy SILT, trace clay.
595.23			
	7	2.52B	25 Brown and gray very fine sandy SILT.
592.23			
	4	0.74B	24 Brownish-gray very fine sandy clayey SILT.
	4	1.20B	23
587.23			
	5	0.97B	23 Gray very fine sandy silty CLAY, trace small gravel.
585.23			
	13	2.50P	9 Brown and gray very fine sandy silty CLAY.
582.73			
	50/5"	4.50P	14 Brown and gray weathered very fine sandy SHALE.
576.23			
	50/4"	4.50P	13 Bottom of Hole = 25.0 feet

B-178

Sta. 1003+61.28' RT

	N	Qu	w%	
600.4				
	10	12.00	B 18	Dark brown and gray very fine sandy silty CLAY.
596.92	7	1.86	S 22	Brown and gray very fine sandy SILT, trace clay.
594.42	7	1.75	B 25	Brown and gray very fine sandy SILT.
591.92	4	1.24	B 23	Brownish-gray very fine sandy clayey SILT.
589.42	4	0.78	B 26	Brownish-gray very fine sandy clayey SILT, some oxidized spots.
586.92	4	0.93	B 24	Gray very fine sandy silty CLAY.
585.42				Bottom of Hole = 15.0 feet

LEGEND

- N

Standard Penetration Test N (blows/ft)
- Qu

Unconfined Strength (tsf)
- w%

Natural Moisture Content (%)
- DD

Water Surface Elevation Encountered in Boring
- 558.10

DD = during drilling

0h = at completion

24h = 24 hours after completion

DESIGNED	EJM	11/01/13
DRAWN	EJM	11/01/13
REVIEWED	RGC	11/10/13

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USER NAME = madau00223	DESIGNED - EJM	REVISED -
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PLOT SCALE =	DRAWN - EJM	REVISED -
PLOT DATE = 1/15/20	CHECKED - RGC	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SUBSURFACE DATA PROFILE
NORTH GRAND AVENUE OVERPASS

SHEET NO. OF SHEETS

F.A.U. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
	19-00488-00-BR	SANGAMON		6
		CONTRACT NO.		
		ILLINOIS FED. AID PROJECT		

**HANSON****SOIL BORING LOG**Page 1 of 1Date 10/14/13ROUTE _____ DESCRIPTION Springfield Rail Improvements Project LOGGED BY ARPSECTION _____ LOCATION NE ¼ of SEC. 27, TWP. 16N, RNG. 5W, 3rd P.M.COUNTY Sangamon DRILLING METHOD Hollow Stem Auger HAMMER TYPE Auto

STRUCT. NO. _____
 Station _____
 BORING NO. B-148
 Station 985+07
 Offset 21' RT
 Ground Surface Elev. 606.1 ft

D E P T H (ft)	B L O W S (/6")	U C S Qu (tsf)	M O I S T (%)
-------------------------------	--------------------------------	----------------------------	------------------------------

Surface Water Elev. _____
 Stream Bed Elev. _____
 Groundwater Elev.:
 First Encounter Dry ft
 Upon Completion _____ ft
 After _____ Hrs. _____ ft

ASPHALT.	605.80			
CONCRETE.	605.13			
Dark gray and brown very fine sandy silty CLAY.	2	2	1.94S	30
	2	2		
	3	3		
	602.63			
Brown and gray very fine sandy SILT, some clay.	4	3	0.30P	29
		2		
		3		
	601.13			
End of Boring				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
 The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)

**HANSON****SOIL BORING LOG**Page 1 of 1Date 10/14/13ROUTE _____ DESCRIPTION Springfield Rail Improvements Project LOGGED BY ARPSECTION _____ LOCATION NE ¼ of SEC. 27, TWP. 16N, RNG. 5W, 3rd P.M.COUNTY Sangamon DRILLING METHOD Hollow Stem Auger HAMMER TYPE Auto

STRUCT. NO. _____
 Station _____
 BORING NO. B-149
 Station 986+38
 Offset 14' RT
 Ground Surface Elev. 605.4 ft

D E P T H (ft)	B L O W S (/6")	U C S Qu (tsf)	M O I S T (%)
-------------------------------	--------------------------------	----------------------------	------------------------------

Surface Water Elev. _____
 Stream Bed Elev. _____
 Groundwater Elev.:
 First Encounter Dry ft
 Upon Completion _____ ft
 After _____ Hrs. _____ ft

ASPHALT.	605.19			
CONCRETE.	604.44			
Dark gray and brown very fine sandy silty CLAY.	2	1 3 3	2.47B	31
	601.94			
Brown and gray very fine sandy SILT, trace clay and calcareous concretions.	4	2 2 3	2.00P	26
	600.44			
End of Boring				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
 The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)

**HANSON****SOIL BORING LOG**Page 1 of 1Date 10/14/13ROUTE _____ DESCRIPTION Springfield Rail Improvements Project LOGGED BY ARPSECTION _____ LOCATION NE ¼ of SEC. 27, TWP. 16N, RNG. 5W, 3rd P.M.COUNTY Sangamon DRILLING METHOD Hollow Stem Auger HAMMER TYPE Auto

STRUCT. NO. _____
 Station _____
 BORING NO. B-150
 Station 987+66
 Offset 32' LT
 Ground Surface Elev. 605.7 ft

D E P T H	B L O W S	U C S Qu	M O I S T
(ft)	(/6")	(tsf)	(%)

Surface Water Elev. _____
 Stream Bed Elev. _____
 Groundwater Elev.:
 First Encounter Dry ft
 Upon Completion _____ ft
 After _____ Hrs. _____ ft

ASPHALT. 605.37
 CONCRETE. 605.12
 BRICK. 604.87
 Dark gray very fine sandy silty
 CLAY. 2
602.20
 Olive and gray very fine sandy
 SILT. 4
600.70
 End of Boring

	3	3.71B	28
	3		
	5		
	2	2.13S	25
	3		
	4		

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
 The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)

**HANSON****SOIL BORING LOG**Page 1 of 1Date 9/13/13ROUTE _____ DESCRIPTION Springfield Rail Improvements Project LOGGED BY ARPSECTION _____ LOCATION NE ¼ of SEC. 27, TWP. 16N, RNG. 5W, 3rd P.M.COUNTY Sangamon DRILLING METHOD Hollow Stem Auger HAMMER TYPE Auto

STRUCT. NO. _____
 Station _____
 BORING NO. B-151
 Station 988+85
 Offset 30' RT
 Ground Surface Elev. 606.1 ft

D E P T H	B L O W S	U C S Qu	M O I S T
(ft)	(/6")	(tsf)	(%)

Surface Water Elev. _____
 Stream Bed Elev. _____
 Groundwater Elev.:
 First Encounter Dry ft
 Upon Completion _____ ft
 After _____ Hrs. _____ ft

ASPHALT 605.84Black and gray very fine sandy silty
CLAY, some cinders - FILL.

1	2.00P	24
2		
3		

602.59Brown and gray very fine sandy silty
CLAY.

2	2.27B	25
3		
5		

601.09

End of Boring

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
 The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)

**HANSON****SOIL BORING LOG**Page 1 of 1Date 9/12/13ROUTE _____ DESCRIPTION Springfield Rail Improvements Project LOGGED BY ARPSECTION _____ LOCATION NE ¼ of SEC. 27, TWP. 16N, RNG. 5W, 3rd P.M.COUNTY Sangamon DRILLING METHOD Hollow Stem Auger HAMMER TYPE Auto

STRUCT. NO. _____
 Station _____
 BORING NO. B-152
 Station 989+48
 Offset 255' RT
 Ground Surface Elev. 607.6 ft

D E P T H (ft)	B L O W S (/6")	U C S Qu (tsf)	M O I S T (%)
-------------------------------	--------------------------------	----------------------------	------------------------------

Surface Water Elev. _____
 Stream Bed Elev. _____
 Groundwater Elev.:
 First Encounter Dry ft
 Upon Completion _____ ft
 After _____ Hrs. _____ ft

ASPHALT.	607.40			
AGGREGATE.	607.07			
Black very fine sandy silty CLAY, trace organics.	2	6 4 5	3.00P	28
	604.07			
Brown very fine sandy silty CLAY, trace small gravel.	4	3 3 4	1.44S	26
	602.57			
End of Boring				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
 The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)

**HANSON****SOIL BORING LOG**Page 1 of 1Date 10/14/13ROUTE _____ DESCRIPTION Springfield Rail Improvements Project LOGGED BY ARPSECTION _____ LOCATION NE ¼ of SEC. 27, TWP. 16N, RNG. 5W, 3rd P.M.COUNTY Sangamon DRILLING METHOD Hollow Stem Auger HAMMER TYPE Auto

STRUCT. NO. _____
 Station _____
 BORING NO. B-153
 Station 989+89
 Offset 85' LT
 Ground Surface Elev. 605.3 ft

D E P T H (ft)	B L O W S (/6")	U C S Qu (tsf)	M O I S T (%)
-------------------------------	--------------------------------	----------------------------	------------------------------

Surface Water Elev. _____
 Stream Bed Elev. _____
 Groundwater Elev.:
 First Encounter Dry ft
 Upon Completion _____ ft
 After _____ Hrs. _____ ft

ASPHALT.	605.03			
CONCRETE.	604.36			
Brown and gray very fine sandy SILT, trace clay.		1	1.00P	27
		1		
		1		
	601.78			
Olive and gray very fine sandy SILT.		1	1.94S	24
		1		
		2		
	599.28			
Gray very fine sandy SILT.		1	1.55S	28
		2		
		2		
	597.78			
End of Boring				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
 The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)

**HANSON****SOIL BORING LOG**Page 1 of 1Date 10/14/13ROUTE _____ DESCRIPTION Springfield Rail Improvements Project LOGGED BY ARPSECTION _____ LOCATION NE ¼ of SEC. 27, TWP. 16N, RNG. 5W, 3rd P.M.COUNTY Sangamon DRILLING METHOD Hollow Stem Auger HAMMER TYPE Auto

STRUCT. NO. _____
 Station _____
 BORING NO. B-154
 Station 990+79
 Offset 102' LT
 Ground Surface Elev. 604.9 ft

D E P T H (ft)	B L O W S (/6")	U C S Qu (tsf)	M O I S T (%)
-------------------------------	--------------------------------	----------------------------	------------------------------

Surface Water Elev. _____
 Stream Bed Elev. _____
 Groundwater Elev.:
 First Encounter 598.4 ft ▼
 Upon Completion _____ ft
 After _____ Hrs. _____ ft

ASPHALT.	604.61			
CONCRETE.	603.94			
Dark gray very fine sandy silty CLAY.	2	1 4 5	2.50P	29
	601.44			
Olive and gray very fine sandy SILT.	4	3 3 2	2.00P	24
	598.94			
Gray very fine sandy SILT.	6 ▼	1 2 2	1.35S	28
	597.44			
End of Boring				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
 The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)

**HANSON****SOIL BORING LOG**Page 1 of 1Date 10/14/13ROUTE _____ DESCRIPTION Springfield Rail Improvements Project LOGGED BY ARPSECTION _____ LOCATION NE ¼ of SEC. 27, TWP. 16N, RNG. 5W, 3rd P.M.COUNTY Sangamon DRILLING METHOD Hollow Stem Auger HAMMER TYPE Auto

STRUCT. NO. _____
 Station _____
 BORING NO. B-155
 Station 992+19
 Offset 103' LT
 Ground Surface Elev. 604.4 ft

D E P T H (ft)	B L O W S (/6")	U C S Qu (tsf)	M O I S T (%)
-------------------------------	--------------------------------	----------------------------	------------------------------

Surface Water Elev. _____
 Stream Bed Elev. _____
 Groundwater Elev.:
 First Encounter _____ Dry ft
 Upon Completion _____ ft
 After _____ Hrs. _____ ft

ASPHALT.	604.26			
CONCRETE.	603.51			
Brown very fine sandy silty CLAY, some rock fragments - FILL.		1		27
		1		
	2	2		
	600.93			
Brown and gray very fine sandy SILT.		2	1.59B	25
		2		
		3		
	6	1	1.85B	29
		2		
		1		
	8			
	595.93			
Reddish-brown and gray very fine to fine sandy clayey SILT.		2	0.85B	23
		2		
		3		
	594.43			
End of Boring	10			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
 The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)

**HANSON****SOIL BORING LOG**Page 1 of 1Date 10/14/13ROUTE _____ DESCRIPTION Springfield Rail Improvements Project LOGGED BY ARPSECTION _____ LOCATION NE ¼ of SEC. 27, TWP. 16N, RNG. 5W, 3rd P.M.COUNTY Sangamon DRILLING METHOD Hollow Stem Auger HAMMER TYPE Auto

STRUCT. NO. _____
 Station _____
 BORING NO. B-156
 Station 993+18
 Offset 94' LT
 Ground Surface Elev. 604.1 ft

D E P T H (ft)	B L O W S (/6")	U C S Qu (tsf)	M O I S T (%)
-------------------------------	--------------------------------	----------------------------	------------------------------

Surface Water Elev. _____
 Stream Bed Elev. _____
 Groundwater Elev.:
 First Encounter Dry ft
 Upon Completion _____ ft
 After _____ Hrs. _____ ft

ASPHALT.	603.87			
CONCRETE.	603.37			
AGGREGATE	603.20			
Dark gray and brown very fine sandy silty CLAY.	2	2	2.13B	31
	4	2		
	600.62			
Brown and gray very fine sandy SILT, trace clay.	4	2	1.30P	25
		2		
		2		
	598.12			
Brown and gray very fine sandy SILT, trace oxidized spots.	6	1	1.50P	29
		2		
		2		
	595.62			
Reddish-brown and gray very fine to fine sandy clayey SILT, trace small gravel.	2	2	1.28B	22
		2		
	10			
		2	0.97B	25
		1		
	12	2		
	591.62			

End of Boring

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
 The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)

**HANSON****SOIL BORING LOG**Page 1 of 1Date 10/14/13ROUTE _____ DESCRIPTION Springfield Rail Improvements Project LOGGED BY ARPSECTION _____ LOCATION NE ¼ of SEC. 27, TWP. 16N, RNG. 5W, 3rd P.M.COUNTY Sangamon DRILLING METHOD Hollow Stem Auger HAMMER TYPE Auto

STRUCT. NO. _____
 Station _____
 BORING NO. B-157
 Station 993+83
 Offset 81' LT
 Ground Surface Elev. 603.8 ft

D E P T H	B L O W S	U C S Qu	M O I S T
(ft)	(/6")	(tsf)	(%)

Surface Water Elev. _____
 Stream Bed Elev. _____
 Groundwater Elev.:
 First Encounter 590.3 ft ▼
 Upon Completion _____ ft
 After _____ Hrs. _____ ft

ASPHALT.	603.59			
CONCRETE.	603.01			
Brown-gray and black very fine sandy SILT and silty CLAY - FILL.	2			22
	3			
	2			
	600.34			
Brown and gray very fine sandy SILT, some clay.	2	0.80P		28
	2			
	2			
	6	1.78S		32
	2			
	2			
	8			
	595.34			
Reddish-brown and gray very fine to fine sandy clayey SILT.	2	1.16B		23
	3			
	2			
	10			
	592.84			
Brown and gray very fine sandy clayey SILT.	woh	0.70B		26
	2			
	2			
	590.34 ▼			
Brown and dark gray very fine sandy silty CLAY.	1	0.78S		29
	2			
	2			
	588.84			
End of Boring				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
 The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

**HANSON****SOIL BORING LOG**Page 1 of 1Date 10/14/13ROUTE _____ DESCRIPTION Springfield Rail Improvements Project LOGGED BY ARPSECTION _____ LOCATION NE ¼ of SEC. 27, TWP. 16N, RNG. 5W, 3rd P.M.COUNTY Sangamon DRILLING METHOD Hollow Stem Auger HAMMER TYPE Auto

STRUCT. NO. _____
 Station _____
 BORING NO. B-158
 Station 994+30
 Offset 76' LT
 Ground Surface Elev. 603.7 ft

D E P T H	B L O W S	U C S Qu	M O I S T
(ft)	(/6")	(tsf)	(%)

Surface Water Elev. _____
 Stream Bed Elev. _____
 Groundwater Elev.:
 First Encounter 590.2 ft ▼
 Upon Completion _____ ft
 After _____ Hrs. _____ ft

ASPHALT.	603.54			
CONCRETE.	602.88			
Black very fine sandy silty CLAY, trace roots.	2	1	1.50P	29
		2		
		3		
	600.21			
Brown and gray very fine sandy SILT, some clay.	4	2	1.55B	25
		3		
		2		
	597.71			
Olive and gray very fine sandy SILT.	6	3	0.30P	29
		2		
		2		
	595.21			
Brown and gray very fine to fine sandy clayey SILT.	8	3	1.09B	23
		2		
		2		
	590.21 ▼			
Brown and gray very fine to fine sandy silty CLAY.	12	1	1.32B	25
		2		
		1		
	590.21 ▼			
Brown and gray very fine to fine sandy silty CLAY.	14	1	1.32B	25
		2		
		2		
	16	woh	1.00P	23
		1		
		4		
	18			
	585.21			
Brown weathered fine sandy SHALES.	18	9	4.50P	17
		25		
		40		
	583.71			
	20			

End of Boring

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)

The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)

**HANSON****SOIL BORING LOG**Page 1 of 1Date 10/14/13ROUTE _____ DESCRIPTION Springfield Rail Improvements Project LOGGED BY ARPSECTION _____ LOCATION NE ¼ of SEC. 27, TWP. 16N, RNG. 5W, 3rd P.M.COUNTY Sangamon DRILLING METHOD Hollow Stem Auger HAMMER TYPE Auto

STRUCT. NO. _____ Station _____	D E P T H (ft)	B L O W S (/6")	U C S Qu (tsf)	M O I S T (%)	Surface Water Elev. _____ Stream Bed Elev. _____	D E P T H (ft)	B L O W S (/6")	U C S Qu (tsf)	M O I S T (%)
BORING NO. <u>B-159</u> Station <u>995+07</u> Offset <u>68' LT</u> Ground Surface Elev. <u>603.4</u> ft					Groundwater Elev.: First Encounter <u>587.4</u> ft ▼ Upon Completion _____ ft After _____ Hrs. _____ ft				
ASPHALT. <u>603.19</u>					Brown micaceous very fine sandy SILT (Weathered SHALE). (continued from previous page)				
CONCRETE. <u>602.44</u>									
Brown very fine sandy silty CLAY, trace coarse sand and small gravel - FILL.	2	2 4		29		22			
<u>599.86</u>						<u>579.86</u>			
Olive, brown and gray very fine sandy SILT.	4	2 3 2	1.75S	25	Gray fine sandy SHALE.	24			
						<u>578.36</u>	50		11
	6	2 2 2	1.94B	29	End of Boring				
<u>594.86</u>	8								
Reddish-brown very fine sandy clayey SILT.	10	2 1 2	0.70B	24					
<u>592.36</u>									
Brown very fine sandy SILT, some clay.	12	woh 1 2	0.78B	26					
<u>589.86</u>									
Brown, dark brown and gray very fine sandy silty CLAY.	14	2 3 2	1.57S	27					
	16	3 3 5	1.94S	27					
<u>584.86</u>	18								
Brown micaceous very fine sandy SILT (Weathered SHALE).	20	8 23 43	4.74B	18					

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)

**HANSON****SOIL BORING LOG**Page 1 of 2Date 9/26/13ROUTE _____ DESCRIPTION Springfield Rail Improvements Project LOGGED BY ARPSECTION _____ LOCATION NE ¼ of SEC. 27, TWP. 16N, RNG. 5W, 3rd P.M.COUNTY Sangamon DRILLING METHOD Hollow Stem Auger HAMMER TYPE Auto

STRUCT. NO. _____ Station _____	D E P T H (ft)	B L O W S (/6")	U C S Qu (tsf)	M O I S T (%)	Surface Water Elev. _____ Stream Bed Elev. _____	D E P T H (ft)	B L O W S (/6")	U C S Qu (tsf)	M O I S T (%)
BORING NO. <u>B-160</u> Station <u>995+59</u> Offset <u>20' LT</u> Ground Surface Elev. <u>603.8</u> ft					Groundwater Elev.: First Encounter _____ Dry ft Upon Completion _____ ft After _____ Hrs. _____ ft				
OIL & CHIP <u>603.29</u> Black very fine sandy silty CLAY.					Brownish-gray fine sandy SHALE. (continued from previous page)				
	2	4 4 6	3.50S	24		22			
<u>600.29</u>					<u>580.29</u>				
Brown and gray very fine sandy silty CLAY.	4	3 4 4	3.09B	23	Gray fine sandy SHALE.	24	50/5"		10
<u>597.79</u>						26			
Brown and gray very fine sandy SILT.	6	3 3 3	1.94B	26		28			
	8					30	50/4"		9
	10	3 2 4	2.91S	24	<u>573.79</u>				
<u>592.79</u>					see Rock Core log.				
Gray to brownish-gray very fine sandy clayey SILT.	12	3 2 2	1.09B	24		32			
	14	2 2 2	1.51B	23		34			
<u>587.79</u>						36			
Brown and gray very fine sandy silty CLAY.	16	1 2 2	1.16B	30		38			
<u>585.29</u>									
Brownish-gray fine sandy SHALE.	18	5 12 20	4.50P	15					
	20					40			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)



ROCK CORE LOG

Page 2 of 2Date 9/26/13ROUTE _____ DESCRIPTION Springfield Rail Improvements Project LOGGED BY ARPSECTION _____ LOCATION NE ¼ of SEC. 27, TWP. 16N, RNG. 5W, 3rd P.M.COUNTY Sangamon CORING METHOD NQ CoreSTRUCT. NO. _____ CORING BARREL TYPE & SIZE NQ

Station _____

Core Diameter 1.874 inTop of Rock Elev. 573.79 ftBegin Core Elev. 573.79 ftBORING NO. B-160Station 995+59Offset 20' LTGround Surface Elev. 603.79

D E P T H (ft)	C O R E (#)	R E C O V E R Y (%)	R Q D (%)	C O R E T I M E (min/ft)	S T R E N G T H (tsf)
573.79	Run 1	75			
32	Run 2	90			
34	Run 3	93			
36					
38					
565.29	Run 4	100			
40					
42					
44	Run 5	94			
46					
48					
554.29	Run 6	100			
553.79					
COAL.					
End of Boring					

Color pictures of the cores _____

Cores will be stored for examination until _____

The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

BBS, form 138 (Rev. 8-99)

**HANSON****SOIL BORING LOG**Page 1 of 1Date 9/11/13ROUTE _____ DESCRIPTION Springfield Rail Improvements Project LOGGED BY ARPSECTION _____ LOCATION NE ¼ of SEC. 27, TWP. 16N, RNG. 5W, 3rd P.M.COUNTY Sangamon DRILLING METHOD Hollow Stem Auger HAMMER TYPE Auto

STRUCT. NO. _____
 Station _____
 BORING NO. B-161
 Station 996+53
 Offset 41' LT
 Ground Surface Elev. 603.3 ft

D E P T H (ft)	B L O W S (/6")	U C S Qu (tsf)	M O I S T (%)	Surface Water Elev. _____ Stream Bed Elev. _____ Groundwater Elev.: First Encounter _____ Dry ft Upon Completion _____ ft After _____ Hrs. _____ ft	D E P T H (ft)	B L O W S (/6")	U C S Qu (tsf)	M O I S T (%)
TOPSOIL _____ 603.00				Brown fine sandy SHALE - highly weathered. (continued from previous page)				
Brown and gray very fine sandy clayey SILT, trace calcareous concretions, some oxidized spots.	3 4 4	3.49B	23		22			
		2.10B 1.90B	24 21 23	579.83				
				Gray fine sandy SHALE.	24	50/5"		10
					26			
597.33	6	5 4 4	3.00P		28			
594.83	8	3 2 3	1.94B			50/3"		8
	10			573.33	30			
				End of Boring				
592.33								
Brown very fine sandy silty CLAY.		1.04B	25					
	12							
	14	1 2 3	1.16S					
587.33	16	2 2 3	1.36S					
	18							
584.83								
Brown fine sandy SHALE - highly weathered.	4 15 32	4.50P	13					
	20							

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
 The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)



SOIL BORING LOG

Page 1 of 2

Date 9/12/13

ROUTE	DESCRIPTION	LOGGED BY
	Springfield Rail Improvements Project	ARP

SECTION _____ **LOCATION** NW ¼ of SEC. 26, TWP. 16N, RNG. 5W, 3rd P.M.

COUNTY Sangamon **DRILLING METHOD** Hollow Stem Auger **HAMMER TYPE** Auto

STRUCT. NO. _____
 Station _____
 BORING NO. _____ B-162
 Station _____ 998+97
 Offset _____ 25' LT
 Ground Surface Elev. _____ 602.4 ft

D E P T H	B L O W S	U C S Qu	M O I S T
(ft)	(/6")	(tsf)	(%)

Surface Water Elev. _____
Stream Bed Elev. _____

Groundwater Elev.: _____
First Encounter _____ Dry ft
Upon Completion _____ ft
After _____ Hrs. _____ ft

D E P T H	B L O W S	U C S Qu	M O I S T
(ft)	(/6")	(tsf)	(%)

ASPHALT.	602.17				Brown and gray fine sandy silty CLAY.			
CONCRETE.	601.42				(continued from previous page)			
Brown silty fine to medium SAND, trace coarse sand and small gravel - FILL.	2	10 5 6		4		22		
	4	2 2 2		5	Brown and gray SHALE - highly weathered.	24	2 50/4"	4.50P 14
	6	1 1 2		6		26		
	8					28		
	593.92					573.92		
Brown silty fine to medium SAND, trace coarse sand and small gravel and brown and gray very fine sandy SILT - FILL .	10	2 2 1		6	Gray micaceous fine sandy SHALE.		50/5"	8
Brown and gray very fine sandy SILT, some clay.					see Rock Core log.	30		
		2 2 3	1.71B	22		32		
	588.92							
Brown and gray very fine to fine sandy silty CLAY, trace small gravel.	14	WH 1 2	0.89B	24		34		
	16	WH 2 2	1.09B	24		36		
	18					38		
	583.92							
Brown and gray fine sandy silty CLAY.		2 2 5	2.06S	25				
	20					40		

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)



ROCK CORE LOG

Page 2 of 2Date 9/12/13ROUTE _____ DESCRIPTION Springfield Rail Improvements Project LOGGED BY ARPSECTION _____ LOCATION NW ¼ of SEC. 26, TWP. 16N, RNG. 5W, 3rd P.M.COUNTY Sangamon CORING METHOD NQ CoreSTRUCT. NO. _____ CORING BARREL TYPE & SIZE NQ

Station _____

BORING NO. B-162Station 998+97Offset 25' LTGround Surface Elev. 602.42Core Diameter 1.874 inTop of Rock Elev. 572.42 ftBegin Core Elev. 572.42 ft

D E P T H (ft)	C O R E (#)	R E C O V E R Y (%)	R Q D (%)	C O R E T I M E (min/ft)	S T R E N G T H (tsf)
572.42	Run 1	100	21		
32	Run 2	75	69		
34	Run 3	100	96		
567.42	Run 4	93	93		
36	Run 5	100	67		
38	Run 6	82	49		
40					
42					
44					
46					
48					
561.92					
553.42					
End of Boring					

Color pictures of the cores _____

Cores will be stored for examination until _____

The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

BBS, form 138 (Rev. 8-99)

**HANSON****SOIL BORING LOG**Page 1 of 2Date 9/30/13ROUTE _____ DESCRIPTION Springfield Rail Improvements Project LOGGED BY ARPSECTION _____ LOCATION NW ¼ of SEC. 26, TWP. 16N, RNG. 5W, 3rd P.M.COUNTY Sangamon DRILLING METHOD Hollow Stem Auger HAMMER TYPE Auto

STRUCT. NO. _____ Station _____	D E P T H (ft)	B L O W S (/6")	U C S Qu (tsf)	M O I S T (%)	Surface Water Elev. _____ Stream Bed Elev. _____	D E P T H (ft)	B L O W S (/6")	U C S Qu (tsf)	M O I S T (%)
BORING NO. <u>B-164</u> Station <u>1000+80</u> Offset <u>25' LT</u> Ground Surface Elev. <u>603.5</u> ft					Groundwater Elev.: First Encounter <u>590.0</u> ft ▼ Upon Completion <u>595.5</u> ft ▽ After _____ Hrs. _____ ft				
ASPHALT. <u>602.87</u>					Brown and gray very fine sandy silty CLAY. (continued from previous page)				
Black very fine sandy silty CLAY.	2	2	2.50P	27		22			
	4								
<u>599.95</u>					<u>579.95</u>				
Brown and gray very fine sandy SILT, some clay, calcareous.	4	4	2.00P	24	Brown and gray weathered fine sandy SHALE.	24	27		15
	3						50/4"		
	7								
<u>597.45</u>	6			25		26			
Brown and gray very fine sandy SILT, calcareous.				23					
	8					28			
					<u>574.95</u>		50/5"		13
	3	1.47B	24		Gray micaceous fine sandy SHALE.				
	3								
	3				<u>573.45</u>	30			
<u>592.45</u>					see Rock Core log.				
Brown very fine sandy SILT, some clay.	12	2	0.97B	24		32			
	2								
	2								
<u>589.95</u> ▼									
Brown very fine sandy clayey SILT.	14	1	0.97B	25		34			
	1								
	2								
<u>587.45</u>	16			24		36			
Brown and gray very fine sandy silty CLAY.									
	18					38			
	3	1.86S	23						
	4								
	6								
	20					40			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)



ROCK CORE LOG

Page 2 of 2Date 9/30/13ROUTE _____ DESCRIPTION Springfield Rail Improvements Project LOGGED BY ARPSECTION _____ LOCATION NW ¼ of SEC. 26, TWP. 16N, RNG. 5W, 3rd P.M.COUNTY Sangamon CORING METHOD NQ CoreSTRUCT. NO. _____ CORING BARREL TYPE & SIZE NQ

Station _____

BORING NO. B-164Station 1000+80Offset 25' LTGround Surface Elev. 603.45Core Diameter 1.874 inTop of Rock Elev. 573.45 ftBegin Core Elev. 573.45 ft

DESCRIPTION	DEPTH (ft)	CORE (#)	RECOVERY (%)	RQD (%)	CORE TIME (min/ft)	STRENGTH (tsf)
Gray sandy SHALE, micaceous.	573.45	Run 1	56			
	32					
	34					
		Run 2	100			
	36					
	565.95					
Gray clayey SHALE.	38					
	40					
		Run 3	73			
	561.95					
COAL.	42					
	559.95					
Gray shaley CLAY.	44					
		Run 4	92			
	46					
	555.45					
Gray SHALE, some sand.	48					
	50					
		Run 5	69			
	52					
	54					
	548.45					
End of Boring						

Color pictures of the cores _____

Cores will be stored for examination until _____

The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

BBS, form 138 (Rev. 8-99)

**HANSON****SOIL BORING LOG**Page 1 of 1Date 10/1/13ROUTE _____ DESCRIPTION Springfield Rail Improvements Project LOGGED BY ARPSECTION _____ LOCATION NW ¼ of SEC. 26, TWP. 16N, RNG. 5W, 3rd P.M.COUNTY Sangamon DRILLING METHOD Hollow Stem Auger HAMMER TYPE Auto

STRUCT. NO. _____ Station _____	D E P T H (ft)	B L O W S (/6")	U C S Qu (tsf)	M O I S T (%)	Surface Water Elev. _____ Stream Bed Elev. _____	D E P T H (ft)	B L O W S (/6")	U C S Qu (tsf)	M O I S T (%)
BORING NO. <u>B-165</u> Station <u>1002+48</u> Offset <u>23' LT</u> Ground Surface Elev. <u>601.2</u> ft					Groundwater Elev.: First Encounter _____ Dry ft Upon Completion _____ ft After _____ Hrs. _____ ft				
Dark brown and brown very fine sandy silty CLAY.	2	6 6 5	10.69S	17	Brown weathered clayey SHALE. (continued from previous page)	22			
597.70					577.70				
Brown and gray very fine sandy SILT, trace clay.	4	4 3 4	2.00P	24	Brown and gray weathered SHALE.	24	21 50	4.50P	13
595.20					576.70				
Brown very fine sandy SILT.	6	4 3 3	2.27S	27	End of Boring				
592.70									
Dark brown very fine sandy SILT, some clay.	8	3 2 2	1.47B	26					
590.20									
Brownish-gray very fine sandy clayey SILT.	12	2 2 1	0.78B	28					
587.70									
Gray very fine sandy silty CLAY.	14	2 2 2	1.20S	26					
585.20									
Olive and gray very fine sandy silty CLAY.	16	1 3 3	1.44S	30					
582.70									
Brown weathered clayey SHALE.	18	3 4 13	4.50P	17					
	20								

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)

**HANSON****SOIL BORING LOG**Page 1 of 1Date 10/1/13ROUTE _____ DESCRIPTION Springfield Rail Improvements Project LOGGED BY ARPSECTION _____ LOCATION NW ¼ of SEC. 26, TWP. 16N, RNG. 5W, 3rd P.M.COUNTY Sangamon DRILLING METHOD Hollow Stem Auger HAMMER TYPE Auto

STRUCT. NO. _____
 Station _____
 BORING NO. B-166
 Station 1004+53
 Offset 25' LT
 Ground Surface Elev. 600.2 ft

D E P T H	B L O W S	U C S Qu	M O I S T
(ft)	(/6")	(tsf)	(%)

Surface Water Elev. _____
 Stream Bed Elev. _____
 Groundwater Elev.:
 First Encounter _____ Dry ft
 Upon Completion _____ ft
 After _____ Hrs. _____ ft

Dark brown very fine sandy silty CLAY.

1	5	4.50P	18
2	5		
	7		

596.74

Brown and gray very fine sandy SILT, trace clay.

4	4	1.36B	21
	2		
	5		
6	4	0.91B	24
	4		
	3		

591.24

Brownish-gray very fine sandy clayey SILT.

10	3	0.54B	25
	1		
	2		
12	2	0.39S	26
	2		
	2		

586.74

Gray very fine sandy silty CLAY, trace small gravel.

14	1	1.05B	23
	2		
	3		

585.24

End of Boring

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
 The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)

**HANSON****SOIL BORING LOG**Page 1 of 1Date 9/13/13ROUTE _____ DESCRIPTION Springfield Rail Improvements Project LOGGED BY ARPSECTION _____ LOCATION NE ¼ of SEC. 27, TWP. 16N, RNG. 5W, 3rd P.M.COUNTY Sangamon DRILLING METHOD Hollow Stem Auger HAMMER TYPE Auto

STRUCT. NO. _____
 Station _____
 BORING NO. B-170
 Station 991+94
 Offset 127' RT
 Ground Surface Elev. 605.6 ft

D E P T H	B L O W S	U C S Qu	M O I S T
(ft)	(/6")	(tsf)	(%)

Surface Water Elev. _____
 Stream Bed Elev. _____
 Groundwater Elev.:
 First Encounter Dry ft
 Upon Completion _____ ft
 After _____ Hrs. _____ ft

TOPSOIL.	605.22			
Black very fine sandy SILT and CINDERS - FILL.		3		27
		2		
	603.05	2		
Brown and gray very fine sandy silty CLAY.				
		1	2.27B	25
		3		
		4		
	599.55			
Brown and gray very fine sandy SILT.		3	1.50P	28
		2		
		3		
		2	1.44B	26
		3		
		3		
	595.55			
End of Boring	10			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
 The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)

**HANSON****SOIL BORING LOG**Page 1 of 1Date 9/13/13ROUTE _____ DESCRIPTION Springfield Rail Improvements Project LOGGED BY ARPSECTION _____ LOCATION NE ¼ of SEC. 27, TWP. 16N, RNG. 5W, 3rd P.M.COUNTY Sangamon DRILLING METHOD Hollow Stem Auger HAMMER TYPE Auto

STRUCT. NO. _____
 Station _____
 BORING NO. B-171
 Station 993+21
 Offset 97' RT
 Ground Surface Elev. 605.8 ft

D E P T H (ft)	B L O W S (/6")	U C S Qu (tsf)	M O I S T (%)
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Surface Water Elev. _____
 Stream Bed Elev. _____
 Groundwater Elev.:
 First Encounter _____ Dry ft
 Upon Completion _____ ft
 After _____ Hrs. _____ ft

AGGREGATE.	605.61			
CINDERS and BRICK - FILL.				
	4		44	
	2			
	2			
	602.27			
Brown and gray very fine sandy silty CLAY, some oxidized spots.	4	1	1.85B	31
		2		
		3		
	599.77			
Brown very fine sandy SILT, trace clay and oxidized spots.	6	2	2.06B	23
		2		
		3		
	8			
		1	0.91B	27
		2		
		3		
	10			
	594.77			
Brown and gray very fine sandy clayey SILT.	3	1.24B	24	
		2		
	12	3		
	592.27			
Brown and gray very fine sandy Silty CLAY, trace small gravel.	2	0.62B	26	
	14	1		
		2		
	590.77			
End of Boring				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
 The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)

**HANSON****SOIL BORING LOG**Page 1 of 1Date 9/13/13ROUTE _____ DESCRIPTION Springfield Rail Improvements Project LOGGED BY ARPSECTION _____ LOCATION NW ¼ of SEC. 26, TWP. 16N, RNG. 5W, 3rd P.M.COUNTY Sangamon DRILLING METHOD Hollow Stem Auger HAMMER TYPE Auto

STRUCT. NO. _____
 Station _____
 BORING NO. B-175
 Station 999+32
 Offset 63' RT
 Ground Surface Elev. 603.0 ft

D E P T H (ft)	B L O W S (/6")	U C S Qu (tsf)	M O I S T (%)
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Surface Water Elev. _____
 Stream Bed Elev. _____
 Groundwater Elev.:
 First Encounter _____ Dry ft
 Upon Completion _____ ft
 After _____ Hrs. _____ ft

D E P T H (ft)	B L O W S (/6")	U C S Qu (tsf)	M O I S T (%)
-------------------------------	--------------------------------	----------------------------	------------------------------

CONCRETE.	602.26				Brown SHALE - highly weathered. (continued from previous page)				
Brown and gray very fine sandy silty CLAY.	2	3	2.00P	26					
	2	3							
	599.51				579.51				
Brown and gray very fine sandy SILT, trace clay.	4	2	0.62B	23	Gray fine sandy SHALE.	34	4.50P	10	
		2				50/3"			
		2							
	6								
	8								
		2	1.44B	25		50/5"		8	
		3							
	10	3							
					End of Boring	573.01			
	592.01					30			
Brown and gray very fine to fine sandy silty CLAY.	12	1	0.43B	24					
		2							
		1							
	14	1	1.16B	24					
		2							
		2							
	16			23					
				22					
	18								
	584.51								
Brown SHALE - highly weathered.	11	36	4.50P	12					
		50/5"							
	20								

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
 The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)

**HANSON****SOIL BORING LOG**Page 1 of 1Date 9/30/13ROUTE _____ DESCRIPTION Springfield Rail Improvements Project LOGGED BY ARPSECTION _____ LOCATION NW ¼ of SEC. 26, TWP. 16N, RNG. 5W, 3rd P.M.COUNTY Sangamon DRILLING METHOD Hollow Stem Auger HAMMER TYPE Auto

STRUCT. NO. _____ Station _____	D E P T H (ft)	B L O W S (/6")	U C S Qu (tsf)	M O I S T (%)	Surface Water Elev. _____ Stream Bed Elev. _____	D E P T H (ft)	B L O W S (/6")	U C S Qu (tsf)	M O I S T (%)
BORING NO. <u>B-176</u> Station <u>1000+90</u> Offset <u>23' RT</u> Ground Surface Elev. <u>603.1</u> ft					Groundwater Elev.: First Encounter <u>583.1</u> ft ▼ Upon Completion _____ ft After _____ Hrs. _____ ft				
ASPHALT. <u>602.60</u> Black very fine to fine sandy clayey SILT.	2	3 2 3		24	Brown and gray very fine sandy SILT and weathered SHALE. (continued from previous page)	22			
	4				<u>579.60</u> Brown and gray weathered fine sandy SHALE.	24	40 50"4	4.50P	11
<u>597.10</u> Brown and gray very fine sandy SILT, trace clay, trace limestone fragments.	6	4 2 4		25		26			
	8				<u>574.60</u> End of Boring	28	37 50"4	4.50P	12
<u>594.60</u> Brown and gray very fine sandy SILT.	10	2 3 2	1.55B	27					
<u>592.10</u> Brown very fine sandy clayey SILT.	12	2 1 2	0.93B	27					
<u>589.60</u> Brown and gray very fine sandy silty CLAY.	14								
	16	2 2 4	2.33B	25					
<u>584.60</u> Brown and gray very fine sandy SILT and weathered SHALE.	18								
	20	4 9 12	2.52B	16					

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)

**HANSON****SOIL BORING LOG**Page 1 of 1Date 10/1/13ROUTE _____ DESCRIPTION Springfield Rail Improvements Project LOGGED BY ARPSECTION _____ LOCATION NW ¼ of SEC. 26, TWP. 16N, RNG. 5W, 3rd P.M.COUNTY Sangamon DRILLING METHOD Hollow Stem Auger HAMMER TYPE Auto

STRUCT. NO. _____ Station _____	D E P T H (ft)	B L O W S (/6")	U C S Qu (tsf)	M O I S T (%)	Surface Water Elev. _____ Stream Bed Elev. _____	D E P T H (ft)	B L O W S (/6")	U C S Qu (tsf)	M O I S T (%)
BORING NO. <u>B-177</u> Station <u>1001+82</u> Offset <u>20' RT</u> Ground Surface Elev. <u>601.2</u> ft					Groundwater Elev.: First Encounter _____ Dry ft Upon Completion _____ ft After _____ Hrs. _____ ft				
Dark brown and brown very fine sandy silty CLAY, trace small gravel - FILL.	2	5 4 5	9.38S	17	Brown and gray weathered very fine sandy SHALE. (continued from previous page)	22			
597.73	4	4 3 4		21		24	37 50/4"	4.50P	13
Brown and gray very fine sandy SILT, trace clay.					576.23				
595.23	6	4 4 3	2.52B	25	End of Boring				
Brown and gray very fine sandy SILT.	8								
592.23	10	3 2 2	0.74B	24					
Brownish-gray very fine sandy clayey SILT.	12	2 1 3	1.20B	23					
587.23	14	2 2 3	0.97B	23					
Gray very fine sandy silty CLAY, trace small gravel.	16	3 6 7	2.50P	9					
585.23	18								
Brown and gray very fine sandy silty CLAY.	20	15 30 50/5"	4.50P	14					
582.73									
Brown and gray weathered very fine sandy SHALE.									

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)

**HANSON****SOIL BORING LOG**Page 1 of 1Date 10/1/13ROUTE _____ DESCRIPTION Springfield Rail Improvements Project LOGGED BY ARPSECTION _____ LOCATION NW ¼ of SEC. 26, TWP. 16N, RNG. 5W, 3rd P.M.COUNTY Sangamon DRILLING METHOD Hollow Stem Auger HAMMER TYPE Auto

STRUCT. NO. _____
 Station _____
 BORING NO. B-178
 Station 1003+55
 Offset 28' RT
 Ground Surface Elev. 600.4 ft

D E P T H (ft)	B L O W S (/6")	U C S Qu (tsf)	M O I S T (%)
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Surface Water Elev. _____
 Stream Bed Elev. _____
 Groundwater Elev.:
 First Encounter Dry ft
 Upon Completion _____ ft
 After _____ Hrs. _____ ft

Dark brown and gray very fine sandy silty CLAY.

5	12.00B	18
4		
6		

596.92

Brown and gray very fine sandy SILT, trace clay.

3	1.86S	22
3		
4		

594.42

Brown and gray very fine sandy SILT.

3	1.75B	25
3		
4		

591.92

Brownish-gray very fine sandy clayey SILT.

2	1.24B	23
2		
2		

589.42

Brownish-gray very fine sandy clayey SILT, some oxidized spots.

2	0.78B	26
2		
2		

586.92

Gray very fine sandy silty CLAY.

1	0.93B	24
2		
2		

585.42

End of Boring

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
 The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)

**HANSON****SOIL BORING LOG**Page 1 of 1Date 10/1/13ROUTE _____ DESCRIPTION Springfield Rail Improvements Project LOGGED BY ARPSECTION _____ LOCATION NW ¼ of SEC. 26, TWP. 16N, RNG. 5W, 3rd P.M.COUNTY Sangamon DRILLING METHOD Hollow Stem Auger HAMMER TYPE Auto

STRUCT. NO. _____
 Station _____
 BORING NO. B-179
 Station 1005+49
 Offset 25' RT
 Ground Surface Elev. 600.0 ft

D E P T H	B L O W S	U C S Qu	M O I S T
(ft)	(/6")	(tsf)	(%)

Surface Water Elev. _____
 Stream Bed Elev. _____
 Groundwater Elev.:
 First Encounter _____ Dry ft
 Upon Completion _____ ft
 After _____ Hrs. _____ ft

Dark brown and brown very fine sandy silty CLAY.

4	10.04B	19
4		
7		

596.48

Brown and gray very fine sandy SILT, trace clay.

4	1.67B	24
3		
4		

593.98

Brown and gray very fine sandy SILT.

6	2.68B	24
5		
4		
4		

591.48

Brownish-gray very fine sandy clayey SILT.

2	1.16B	24
2		
2		

589.98

End of Boring

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
 The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)

**HANSON****SOIL BORING LOG**Page 1 of 1Date 10/1/13ROUTE _____ DESCRIPTION Springfield Rail Improvements Project LOGGED BY ARPSECTION _____ LOCATION NW ¼ of SEC. 26, TWP. 16N, RNG. 5W, 3rd P.M.COUNTY Sangamon DRILLING METHOD Hollow Stem Auger HAMMER TYPE Auto

STRUCT. NO. _____
 Station _____
 BORING NO. B-180
 Station 1007+67
 Offset 26' RT
 Ground Surface Elev. 600.1 ft

D E P T H	B L O W S	U C S Qu	M O I S T
(ft)	(/6")	(tsf)	(%)

Surface Water Elev. _____
 Stream Bed Elev. _____
 Groundwater Elev.:
 First Encounter Dry ft
 Upon Completion _____ ft
 After _____ Hrs. _____ ft

Dark brown very fine sandy silty
CLAY

3	2.89B	25
4		
6		

596.61

Brown and gray very fine sandy
SILT, trace clay

3	1.40B	22
2		
3		

595.11

End of Boring

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
 The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)

**HANSON****SOIL BORING LOG**Page 1 of 1Date 10/1/13ROUTE _____ DESCRIPTION Springfield Rail Improvements Project LOGGED BY ARPSECTION _____ LOCATION NW ¼ of SEC. 26, TWP. 16N, RNG. 5W, 3rd P.M.COUNTY Sangamon DRILLING METHOD Hollow Stem Auger HAMMER TYPE Auto

STRUCT. NO. _____
 Station _____
 BORING NO. B-181
 Station 1010+74
 Offset 42' RT
 Ground Surface Elev. 599.9 ft

D E P T H (ft)	B L O W S (/6")	U C S Qu (tsf)	M O I S T (%)
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Surface Water Elev. _____
 Stream Bed Elev. _____
 Groundwater Elev.:
 First Encounter _____ Dry ft
 Upon Completion _____ ft
 After _____ Hrs. _____ ft

OIL & CHIP 599.46Dark brown and brown very fine
sandy silty CLAY

3			32
2			
4			

596.36Brown and gray very fine sandy
SILT.

3	1.30P	25
2		
3		

594.86

End of Boring

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
 The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)



Boring B-160 30.0 - 38.5 ft.			
<u>Run</u>	<u>Depth (ft)</u>	<u>REC (%)</u>	<u>RQD (%)</u>
1	30.0 - 32.0	75	Data not available
2	32.0 - 34.0	90	
3	34.0 - 38.5	93	



Boring B-160 38.5 - 48.0 ft.			
<u>Run</u>	<u>Depth (ft)</u>	<u>REC (%)</u>	<u>RQD (%)</u>
4	38.5 - 43.5	100	Data not available
5	43.5 - 48.0	94	



Boring B-160 48.0 - 50.0 ft.			
<u>Run</u>	<u>Depth (ft.)</u>	<u>REC (%)</u>	<u>RQD (%)</u>
5	48.0 - 50.0	100	Data not available



Boring B-162 30.0 - 39.0 ft.			
<u>Run</u>	<u>Depth (ft.)</u>	<u>REC (%)</u>	<u>RQD (%)</u>
1	30.0 - 32.0	100	21
2	32.0 - 34.0	75	69
3	34.0 - 36.0	100	96
4	36.0 - 39.0	93	93



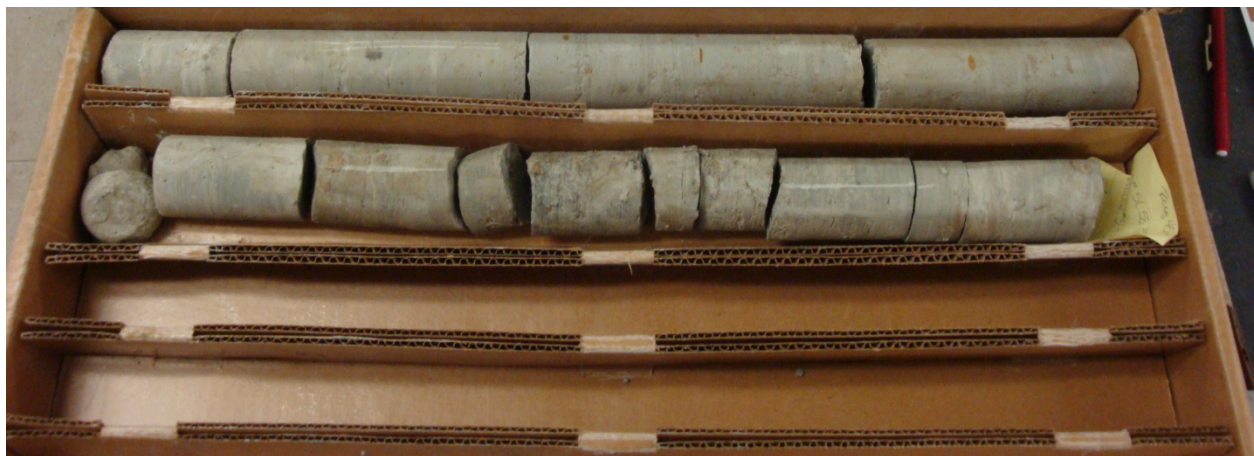
Boring B-162			
39.0 - 49.0 ft.			
<u>Run</u>	<u>Depth (ft)</u>	<u>REC (%)</u>	<u>RQD (%)</u>
5	39.0 - 44.0	100	67
6	44.0 - 49.0	82	49



Boring B-164			
30.0 - 39.5 ft.			
<u>Run</u>	<u>Depth (ft.)</u>	<u>REC (%)</u>	<u>RQD (%)</u>
1	30.0 - 34.5	56	No data
2	34.5 - 39.5	100	available

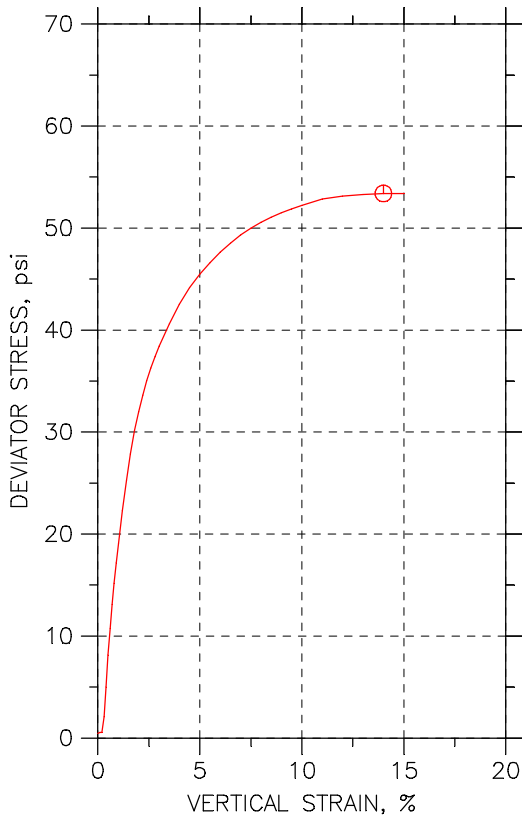
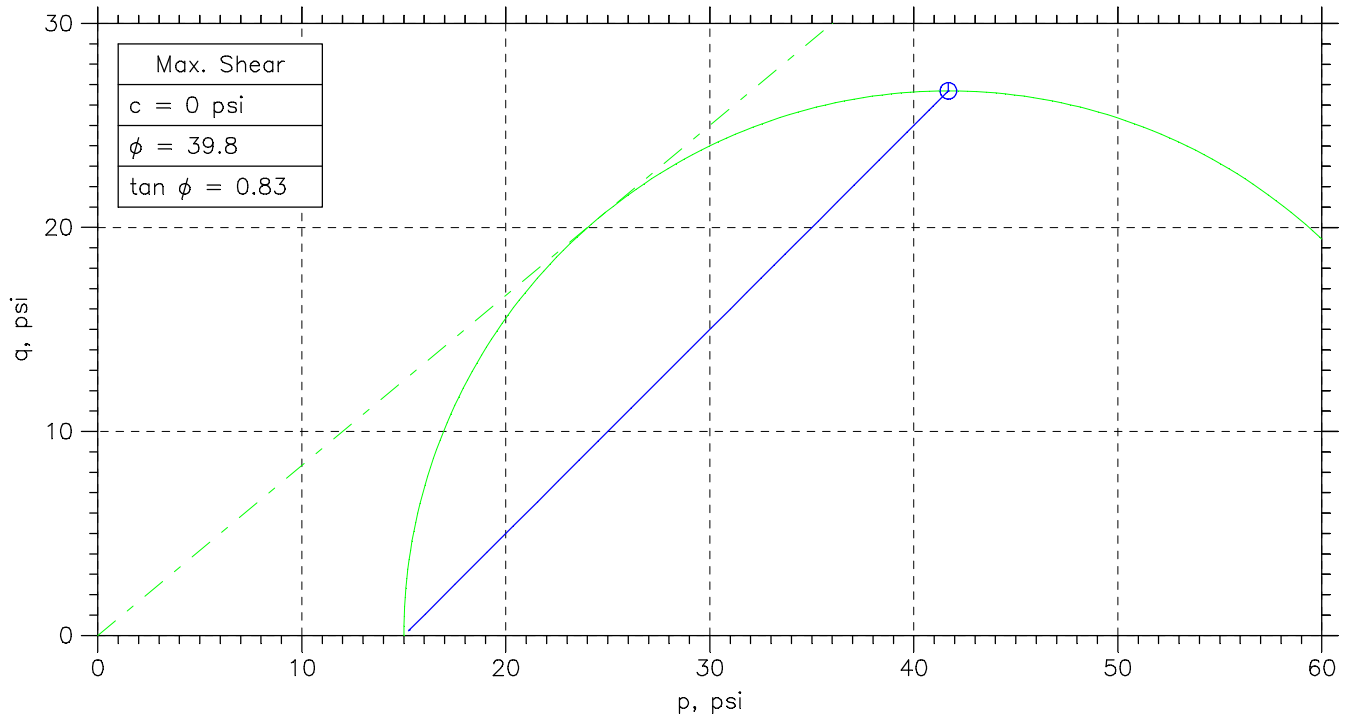


Boring B-164 39.5 - 49.5 ft.			
<u>Run</u>	<u>Depth (ft.)</u>	<u>REC (%)</u>	<u>RQD (%)</u>
3	39.5 - 44.5	73	No data
4	44.5 - 49.5	92	available



Boring B-164 49.5 - 55.0 ft.			
<u>Run</u>	<u>Depth (ft.)</u>	<u>REC (%)</u>	<u>RQD (%)</u>
4	49.5 - 50.0	92	No data
5	50.0 - 55.0	69	available

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D2850



Symbol	⊕			
Sample No.	2-3			
Test No.	1			
Depth	4.0-4.5			
Tested by	RIN			
Test Date	11/19/2013			
Checked by	JKP			
Check Date				
Diameter, in	2.865			
Height, in	5.821			
Water Content, %	23.2			
Dry Density, pcf	102.9			
Saturation, %	101.1			
Void Ratio	0.607			
Confining Stress, psi	15			
Undrained Strength, psi	26.69			
Max. Dev. Stress, psi	53.38			
Strain at Failure, %	14			
Strain Rate, %/min	1			
Estimated Specific Gravity	2.65			
Liquid Limit	29			
Plastic Limit	20			
Plasticity Index	9			

	Project: SPFLD. Rail Improvememts				
	Location: Springfield, Illinois				
	Project No.: 09L0179B				
	Boring No.: B-161				
	Sample Type: Tube				
	Description: Brn. vf. sandy SILT, some oxidized spots.				
	Remarks: 2500 # Load Cell Loadtrac II # 258112 LVDT55386				

Phase calculations based on start of test.

TRIAXIAL TEST

Project: SPFLD. Rail Improvememts
 Boring No.: B-161
 Sample No.: 2-3
 Test No.: 1

Location: Springfield, Illinois
 Tested By: RIN
 Test Date: 11/19/2013
 Sample Type: Tube

Project No.: 09L0179B
 Checked By: JPK
 Depth: 4.0-4.5
 Elevation: N/A

Soil Description: Brn. vf. sandy SILT, some oxidized spots.
 Remarks: 2500 # Load Cell Loadtrac II # 258112 LVDT55386

Specimen Height: 5.82 in
 Specimen Area: 6.45 in²
 Specimen Volume: 37.53 in³

Piston Area: 0.00 in²
 Piston Friction: 0.00 lb
 Piston weight: 0.00 lb

Filter Strip Correction: 0.00 psi
 Membrane Correction: 0.00 lb/in
 Correction Type: Uniform

Liquid Limit: 29

Plastic Limit: 20

Estimated Specific Gravity: 2.65

	Before Test Trimmings	Before Test Specimen+Ring	After Test Specimen+Ring	After Test Trimmings
Container ID	4	---	7	7
Wt. Container + Wet Soil, gm	90.04	1248.6	1248.6	1286.3
Wt. Container + Dry Soil, gm	73.81	1013.8	1013.8	1060.2
Wt. Container, gm	3.75	---	50.1	50.1
Wt. Dry Soil, gm	70.06	1013.8	1013.8	1010.1
Water Content, %	23.17	23.17	23.17	22.39
Void Ratio	---	0.61	0.61	---
Degree of Saturation, %	---	101.05	100.00	---
Dry Unit Weight, pcf	---	102.91	102.51	---

Initial

End of Initialization

End of Consolidation/A

End of Saturation

End of Consolidation/B

End of Shear

At Failure

TRIAXIAL TEST

Project: SPFLD. Rail Improvemnts
Boring No.: B-161
Sample No.: 2-3
Test No.: 1

Location: Springfield, Illinois
Tested By: RIN
Test Date: 11/19/2013
Sample Type: Tube

Project No.: 09L0179B
Checked By: JPK
Depth: 4.0-4.5
Elevation: N/A

Soil Description: Brn. vf. sandy SILT, some oxidized spots.
Remarks: 2500 # Load Cell Loadtrac II # 258112 LVDT55386

Specimen Height: 5.82 in
Specimen Area: 6.45 in²
Specimen Volume: 37.53 in³

Piston Area: 0.00 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 psi
Membrane Correction: 0.00 lb/in
Correction Type: Uniform

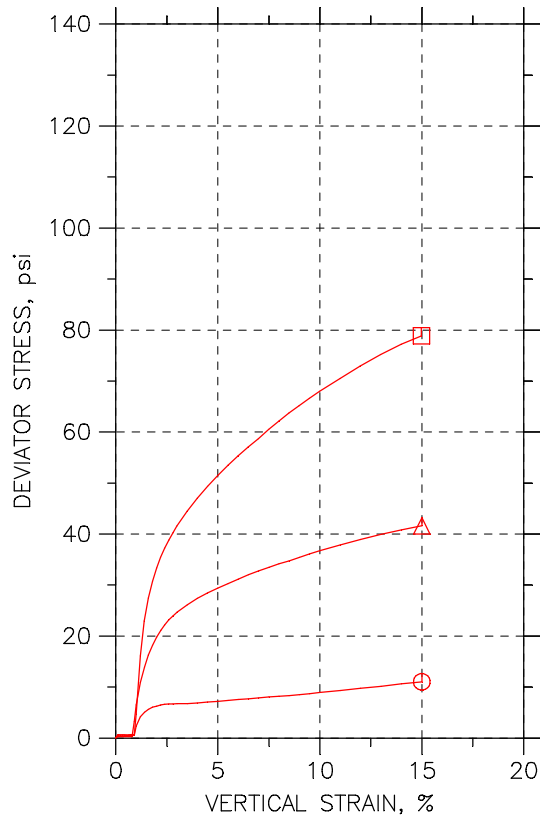
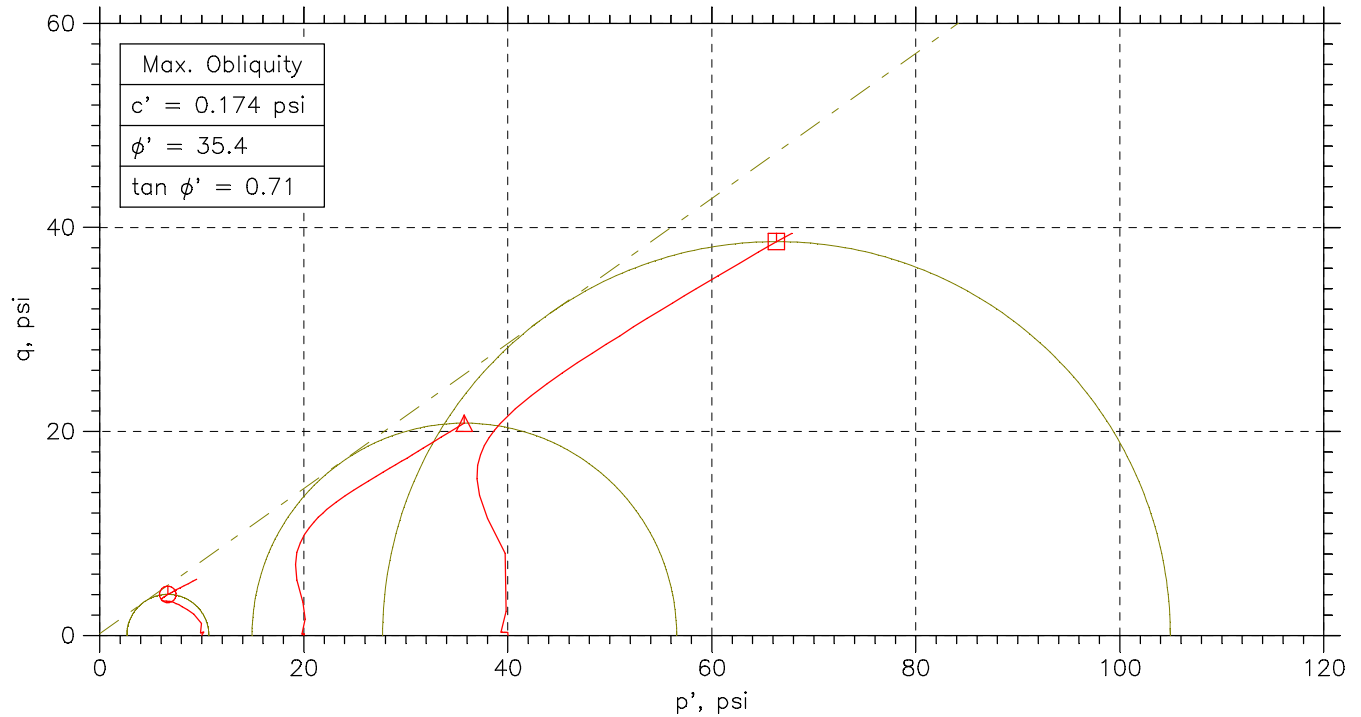
Liquid Limit: 29

Plastic Limit: 20

Estimated Specific Gravity: 2.65

	Time min	Vertical Strain %	Corrected Area in ²	Deviator Load lb	Deviator Stress psi	Vertical Stress psi	p psi	q psi
1	0	0	6.4467	2.9288	0.45432	15.454	15.227	0.22716
2	0.10603	0.10014	6.4532	3.6122	0.55976	15.56	15.28	0.27988
3	0.20327	0.20222	6.4598	3.6122	0.55919	15.559	15.28	0.27959
4	0.30493	0.3043	6.4664	13.57	2.0986	17.099	16.049	1.0493
5	0.40217	0.40153	6.4727	32.315	4.9925	19.992	17.496	2.4962
6	0.5039	0.50361	6.4794	52.817	8.1516	23.152	19.076	4.0758
7	0.60548	0.6018	6.4858	69.707	10.748	25.748	20.374	5.3738
8	0.70715	0.70194	6.4923	85.132	13.113	28.113	21.556	6.5564
9	0.80438	0.80013	6.4987	98.604	15.173	30.173	22.586	7.5864
10	0.90605	0.90319	6.5055	111.69	17.168	32.168	23.584	8.584
11	1.0034	1.0082	6.5124	124.09	19.054	34.054	24.527	9.5269
12	1.1978	1.2007	6.5251	145.37	22.278	37.278	26.139	11.139
13	1.3967	1.401	6.5383	165.28	25.279	40.279	27.64	12.64
14	1.5911	1.6012	6.5516	182.37	27.836	42.836	28.918	13.918
15	1.7945	1.8044	6.5652	197.99	30.158	45.158	30.079	15.079
16	1.9889	2.0008	6.5783	210.49	31.997	46.997	30.998	15.998
17	2.1878	2.2001	6.5918	221.62	33.62	48.62	31.81	16.81
18	2.3867	2.4004	6.6053	231.38	35.029	50.029	32.515	17.515
19	2.5856	2.6016	6.6189	240.07	36.27	51.27	33.135	18.135
20	2.789	2.8029	6.6326	247.98	37.387	52.387	33.694	18.694
21	2.9879	3.0032	6.6463	255.4	38.427	53.427	34.213	19.213
22	3.4832	3.5029	6.6807	271.41	40.625	55.625	35.313	20.313
23	3.987	4.0016	6.7155	285.56	42.523	57.523	36.262	21.262
24	4.4953	4.5033	6.7507	298.16	44.167	59.167	37.083	22.083
25	5.008	5.004	6.7863	308.51	45.46	60.46	37.73	22.73
26	5.5208	5.5008	6.822	317.97	46.61	61.61	38.305	23.305
27	6.0423	6.0034	6.8585	326.66	47.629	62.629	38.815	23.815
28	6.5594	6.5002	6.8949	334.57	48.524	63.524	39.262	24.262
29	7.081	7.0019	6.9321	341.89	49.32	64.32	39.66	24.66
30	7.6026	7.5016	6.9696	348.43	49.994	64.994	39.997	24.997
31	8.1153	8.0004	7.0073	354.19	50.546	65.546	40.273	25.273
32	8.628	8.503	7.0458	359.66	51.046	66.046	40.523	25.523
33	9.1363	9.0017	7.0844	364.84	51.498	66.498	40.749	25.749
34	9.6446	9.5024	7.1236	369.52	51.873	66.873	40.936	25.936
35	10.153	10.004	7.1634	374.01	52.212	67.212	41.106	26.106
36	11.156	11.002	7.2436	382.7	52.833	67.833	41.416	26.416
37	12.151	12	7.3258	389.15	53.12	68.12	41.56	26.56
38	13.145	13.003	7.4103	394.91	53.291	68.291	41.646	26.646
39	14.131	14.002	7.4964	400.18	53.383	68.383	41.692	26.692
40	15.112	15	7.5844	404.86	53.381	68.381	41.691	26.691

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



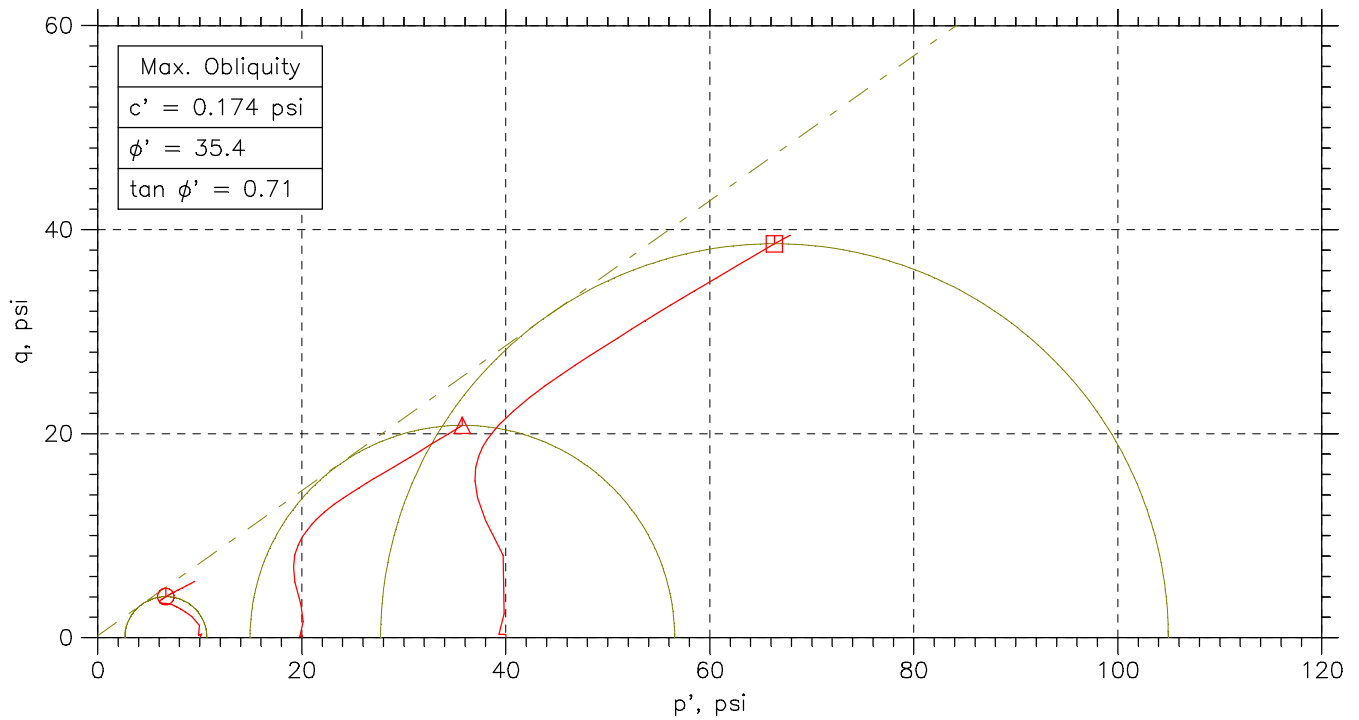
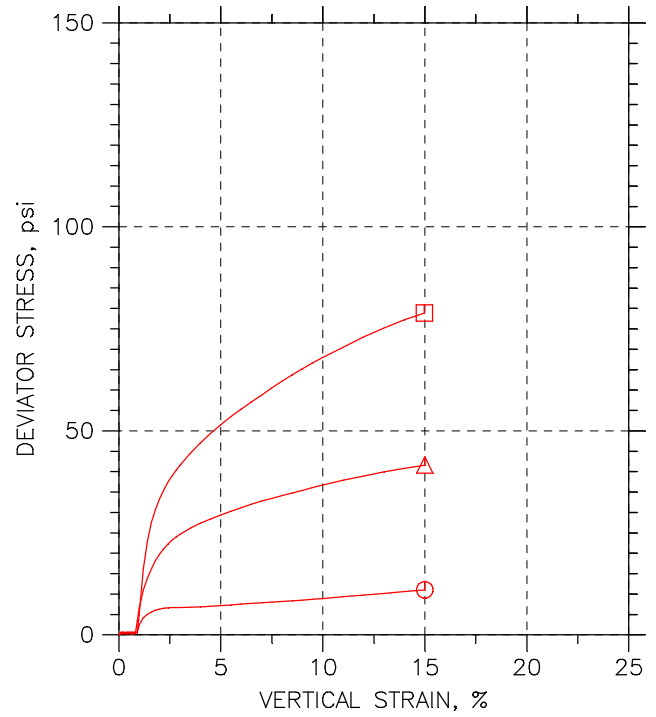
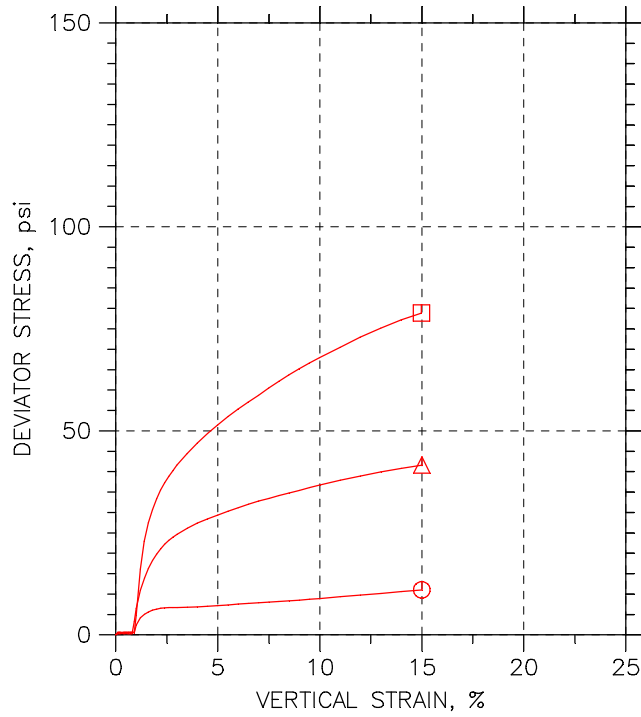
Symbol	○	△	□	
Sample No.	3-1	3-2	3-3	
Test No.	1 of 3	2 of 3	3 of 3	
Depth	6.0-6.5	6.5-7.0	7.0-7.5	
Initial	Diameter, in	2.867	2.874	2.871
	Height, in	5.821	5.664	5.055
	Water Content, %	24.6	24.6	23.2
	Dry Density, pcf	95.07	99.61	102.9
	Saturation, %	87.9	98.7	101.2
Before Shear	Void Ratio	0.74	0.661	0.607
	Water Content, %	27.1	23.6	21.7
	Dry Density, pcf	96.33	101.8	105.
	Saturation*, %	100.0	100.0	100.0
	Void Ratio	0.717	0.625	0.575
	Back Press., psi	92.	62.02	61.99
Ver. Eff. Cons. Stress, psi		9.937	19.98	40.01
Shear Strength, psi		5.508	20.81	39.43
Strain at Failure, %		15	15	15
Strain Rate, %/min		0.0625	0.0625	0.0625
B-Value		0.96	0.96	0.97
Estimated Specific Gravity		2.65	2.65	2.65
Liquid Limit		0	32	0
Plastic Limit		0	12	0

	Project: SPFLD Rail Improvements				
	Location: Springfield, Illinois				
	Project No.: 09L0179B				
	Boring No.: B-164				
	Sample Type:				
	Description: Brn. & gray vf. sandy Silt.				
	Remarks: 2500 # Load Cell Loadtrac II # 258112 FlowTrac II 13610 & 13610B & LVDT55306				

Phase calculations based on start of test.

* Saturation is set to 100% for phase calculations

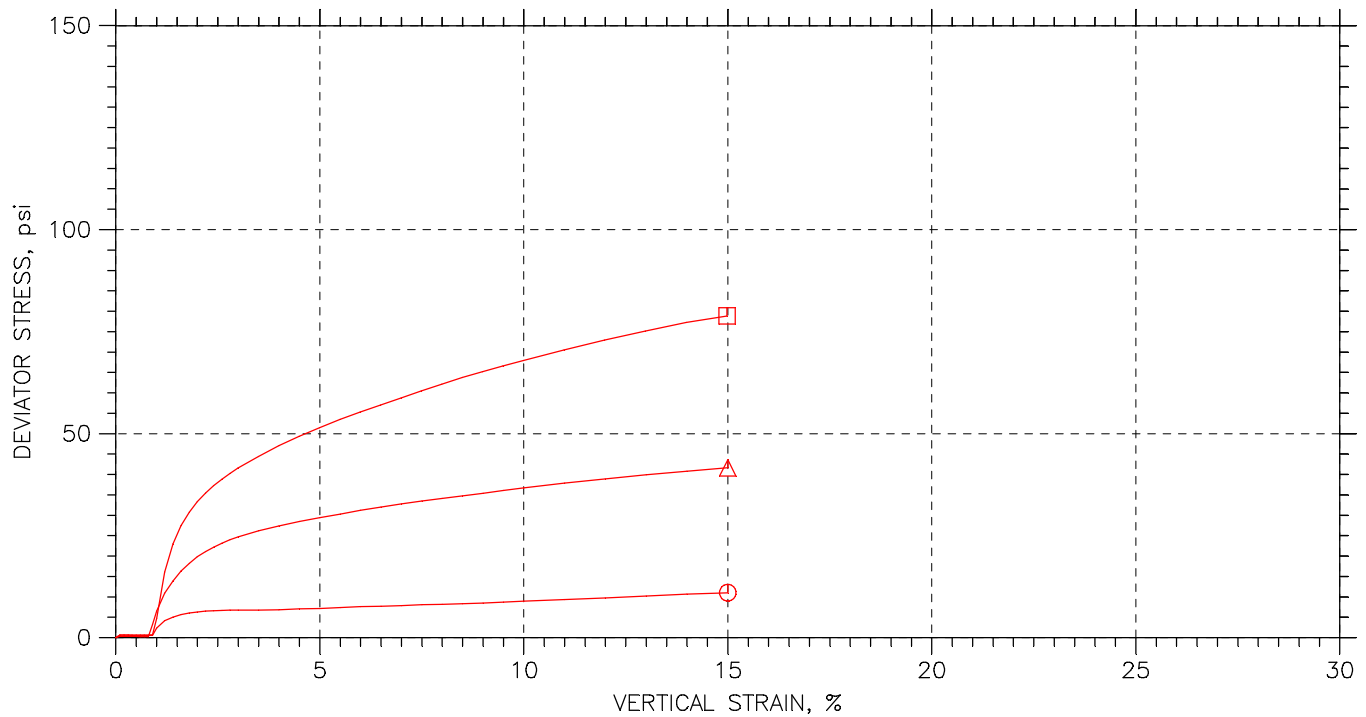
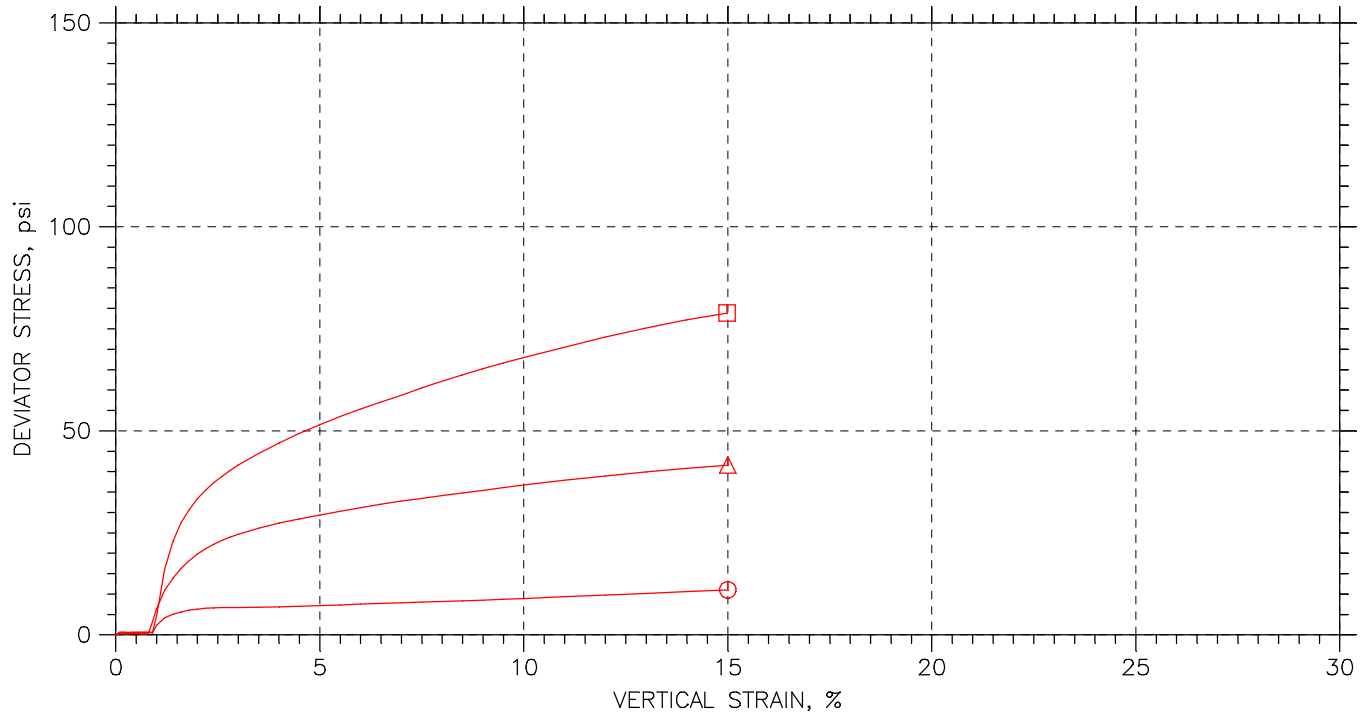
CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
○	3-1	1 of 3	6.0-6.5	RIN	11-11-2013	JPK		B164-3-1 CU.dat
△	3-2	2 of 3	6.5-7.0	RIN	11-11-2013	JPK		B164-3-2A CU.dat
□	3-3	3 of 3	7.0-7.5	RIN	11-13-2013	JPK		B164-3-3 CU.dat

			
	Project: SPFLD Rail Improvements	Location: Springfield, Illinois	Project No.: 09L0179B
	Boring No.: B-164	Sample Type:	
	Description: Brn. & gray vf. sandy Silt.		
	Remarks: 2500 # Load Cell Loadtrac II # 258112 FlowTrac II 13610 & 13610B & LVDT55306		

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
⊙	3-1	1 of 3	6.0-6.5	RIN	11-11-2013	JPK		B164-3-1 CU.dat
△	3-2	2 of 3	6.5-7.0	RIN	11-11-2013	JPK		B164-3-2A CU.dat
□	3-3	3 of 3	7.0-7.5	RIN	11-13-2013	JPK		B164-3-3 CU.dat

			
	Project: SPFLD Rail Improvements	Location: Springfield, Illinois	Project No.: 09L0179B
	Boring No.: B-164	Sample Type:	
	Description: Brn. & gray vf. sandy Silt.		
	Remarks: 2500 # Load Cell Loadtrac II # 258112 FlowTrac II 13610 & 13610B & LVDT55306		

TRIAXIAL TEST

Project: SPFLD Rail Improvements
Boring No.: B-164
Sample No.: 3-1
Test No.: 1 of 3

Location: Springfield, Illinois
Tested By: RIN
Test Date: 11-11-2013
Sample Type:

Project No.: 09L0179B
Checked By: JPK
Depth: 6.0-6.5
Elevation: N/A

Soil Description: Brn. & gray vf. sandy Silt.
Remarks: 2500 # Load Cell Loadtrac II # 258112

FlowTrac II 13610 & 13610B & LVDT55306

Specimen Height: 5.82 in
Specimen Area: 6.45 in²
Specimen Volume: 37.57 in³

Piston Area: 0.20 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 psi
Membrane Correction: 0.00 lb/in
Correction Type: Uniform

Liquid Limit: 0

Plastic Limit: 0

Estimated Specific Gravity: 2.65

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	13	---	1	1
Wt. Container + Wet Soil, gm	67.01	1167.7	1191.3	1242.3
Wt. Container + Dry Soil, gm	54.53	937.48	937.48	993.56
Wt. Container, gm	3.71	---	50.07	50.07
Wt. Dry Soil, gm	50.82	937.48	937.48	943.49
Water Content, %	24.56	24.56	27.07	26.37
Void Ratio	---	0.74	0.72	---
Degree of Saturation, %	---	87.92	100.00	---
Dry Unit Weight, pcf	---	95.069	96.33	---

Initial

Height: 5.8207 in
Area: 6.4539 in²
Volume: 37.566 in³

Moisture: 24.56 %
Void Ratio: 0.74
Dry Unit Weight: 95.069 pcf
Saturation: 87.92 %

End of Initialization

Time: 2.1835 min
Total Vertical Stress: 2.9806 psi
Total Horizontal Stress: 2.995 psi
Pore Pressure: 1.985 psi
Effective Vertical Stress: 0.99564 psi
Effective Horizontal Stress: 1.01 psi

Height Change: 0.00022593 in
Area Change: -0.025868 in²
Volume Change: -0.1491 in³

Height: 5.8205 in
Area: 6.4798 in²
Volume: 37.715 in³

Moisture: 24.79 %
Void Ratio: 0.75
Dry Unit Weight: 94.694 pcf
Saturation: 87.92 %

End of Consolidation/A

Time: 2.1835 min
Total Vertical Stress: 2.9806 psi
Total Horizontal Stress: 2.995 psi
Pore Pressure: 1.985 psi
Effective Vertical Stress: 0.99564 psi
Effective Horizontal Stress: 1.01 psi

Height Change: 0.00022593 in
Area Change: -0.025868 in²
Volume Change: -0.1491 in³

Height: 5.8205 in
Area: 6.4798 in²
Volume: 37.715 in³

Moisture: 24.79 %
Void Ratio: 0.75
Dry Unit Weight: 94.694 pcf
Saturation: 87.92 %

End of Saturation

Time: 113.1 min
Total Vertical Stress: 92.97 psi
Total Horizontal Stress: 92.995 psi
Pore Pressure: 91.994 psi
Effective Vertical Stress: 0.97657 psi
Effective Horizontal Stress: 1.0012 psi

Height Change: 0.0069472 in
Area Change: -0.39754 in²
Volume Change: -2.2664 in³

Height: 5.8138 in
Area: 6.8515 in²
Volume: 37.997 in³
Volume Correction: 1.836 in³

Moisture: 28.49 %
Void Ratio: 0.76
Dry Unit Weight: 93.993 pcf
Saturation: 99.32 %

End of Consolidation/B

Time: 197.73 min
Total Vertical Stress: 101.95 psi
Total Horizontal Stress: 101.94 psi
Pore Pressure: 92.004 psi
Effective Vertical Stress: 9.9449 psi
Effective Horizontal Stress: 9.9374 psi

Height Change: 0.0061565 in
Area Change: -0.23803 in²
Volume Change: -1.3443 in³

Height: 5.8145 in
Area: 6.692 in²
Volume: 37.075 in³

Moisture: 27.07 %
Void Ratio: 0.72
Dry Unit Weight: 96.33 pcf
Saturation: 100.00 %

End of Shear

Time: 437.1 min
Total Vertical Stress: 113.02 psi
Total Horizontal Stress: 102 psi
Pore Pressure: 98.002 psi
Effective Vertical Stress: 15.017 psi
Effective Horizontal Stress: 4.0021 psi

Height Change: 0.87834 in
Area Change: -1.419 in²
Volume Change: -1.3443 in³

Height: 4.9424 in
Area: 7.8729 in²
Volume: 37.075 in³

Moisture: 27.07 %
Void Ratio: 0.72
Dry Unit Weight: 96.33 pcf
Saturation: 100.00 %

At Failure

Time: 437.1 min
Total Vertical Stress: 113.02 psi
Total Horizontal Stress: 102 psi
Pore Pressure: 98.002 psi
Effective Vertical Stress: 15.017 psi
Effective Horizontal Stress: 4.0021 psi

Height Change: 0.87834 in
Area Change: -1.419 in²
Volume Change: -1.3443 in³

Height: 4.9424 in
Area: 7.8729 in²
Volume: 37.075 in³

Moisture: 27.07 %
Void Ratio: 0.72
Dry Unit Weight: 96.33 pcf
Saturation: 100.00 %

TRIAXIAL TEST

Project: SPFLD Rail Improvements
Boring No.: B-164
Sample No.: 3-1
Test No.: 1 of 3

Location: Springfield, Illinois
Tested By: RIN
Test Date: 11-11-2013
Sample Type:

Project No.: 09L0179B
Checked By: JPK
Depth: 6.0-6.5
Elevation: N/A

Soil Description: Brn. & gray vf. sandy Silt.

Remarks: 2500 # Load Cell Loadtrac II # 258112 FlowTrac II 13610 & 13610B & LVDT55306

Specimen Height: 5.81 in
Specimen Area: 6.69 in²
Specimen Volume: 37.07 in³

Piston Area: 0.20 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 psi
Membrane Correction: 0.00 lb/in
Correction Type: Uniform

Liquid Limit: 0

Plastic Limit: 0

Estimated Specific Gravity: 2.65

	Time min	Vertical Strain %	Volumetric Strain %	Corrected Area in ²	Deviator Load lb	Deviator Stress psi	Pore Pressure psi	Horizontal Stress psi	Vertical Stress psi
1	0	0	0	6.692	0.1368	0.020442	92.004	102	102.02
2	1.7413	0.10005	0	6.6987	4.4553	0.66511	92.145	102	102.67
3	3.306	0.2001	0	6.7054	4.1627	0.6208	92.198	101.99	102.62
4	4.8839	0.30016	0	6.7121	3.9645	0.59065	92.237	102	102.59
5	6.5237	0.40021	0	6.7188	3.8663	0.57544	92.276	102	102.58
6	8.053	0.50026	0	6.7256	3.7681	0.56027	92.305	102	102.56
7	9.6177	0.60031	0	6.7324	3.7691	0.55985	92.334	102	102.56
8	11.222	0.70037	0	6.7392	3.5718	0.53001	92.364	102	102.53
9	12.791	0.80042	0	6.746	3.6709	0.54417	92.383	102	102.54
10	14.36	0.90047	0	6.7528	3.5718	0.52894	92.403	102	102.53
11	15.987	1.0005	0	6.7596	15.944	2.3587	93.205	101.99	104.35
12	19.174	1.2006	0	6.7733	28.116	4.1511	94.859	101.99	106.15
13	22.343	1.4007	0	6.787	34.202	5.0393	95.92	102	107.04
14	25.512	1.6008	0	6.8008	38.227	5.6209	96.713	102	107.62
15	28.69	1.8009	0	6.8147	41.074	6.0272	97.272	102	108.03
16	31.797	2.0001	0	6.8285	42.84	6.2737	97.686	102	108.28
17	35.001	2.2002	0	6.8425	44.51	6.5049	98.007	102	108.5
18	38.166	2.4003	0	6.8565	45.196	6.5917	98.27	102	108.6
19	41.296	2.6004	0	6.8706	45.883	6.6782	98.498	102	108.68
20	44.412	2.8005	0	6.8848	46.178	6.7072	98.688	102	108.71
21	47.599	3.0006	0	6.899	46.375	6.722	98.854	102	108.72
22	55.471	3.5009	0	6.9347	46.963	6.7721	99.175	102	108.78
23	63.298	4.0001	0	6.9708	47.748	6.8498	99.369	102	108.85
24	71.219	4.5004	0	7.0073	49.32	7.0384	99.476	102	109.04
25	79.122	5.0007	0	7.0442	50.497	7.1686	99.515	102	109.17
26	87.087	5.5009	0	7.0815	52.068	7.3526	99.515	102	109.36
27	94.998	6.0002	0	7.1191	53.933	7.5758	99.486	102	109.58
28	102.92	6.5005	0	7.1572	55.209	7.7138	99.452	102	109.72
29	110.86	7.0007	0	7.1957	56.584	7.8635	99.403	102	109.87
30	118.81	7.5	0	7.2345	58.253	8.052	99.364	102	110.06
31	126.76	8.0003	0	7.2739	59.332	8.1569	99.291	102	110.16
32	134.74	8.5006	0	7.3137	60.903	8.3273	99.228	102	110.33
33	142.73	9.0008	0	7.3539	62.573	8.5089	99.155	102	110.51
34	150.66	9.5001	0	7.3944	64.34	8.7011	99.077	102	110.7
35	158.65	10	0	7.4355	66.302	8.917	98.995	102	110.92
36	174.61	11.002	0	7.5192	70.229	9.34	98.81	102	111.34
37	190.64	12	0	7.6045	74.058	9.7387	98.615	102	111.74
38	206.82	13.001	0	7.692	78.181	10.164	98.416	102	112.17
39	223.11	14.001	0	7.7814	82.697	10.628	98.211	102	112.63
40	239.36	15	0	7.8729	86.722	11.015	98.002	102	113.02

TRIAXIAL TEST

Project: SPFLD Rail Improvements
Boring No.: B-164
Sample No.: 3-1
Test No.: 1 of 3

Location: Springfield, Illinois
Tested By: RIN
Test Date: 11-11-2013
Sample Type:

Project No.: 09L0179B
Checked By: JPK
Depth: 6.0-6.5
Elevation: N/A

Soil Description: Brn. & gray vf. sandy Silt.

Remarks: 2500 # Load Cell Loadtrac II # 258112 FlowTrac II 13610 & 13610B & LVDT55306

Specimen Height: 5.81 in
Specimen Area: 6.69 in²
Specimen Volume: 37.07 in³

Piston Area: 0.20 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 psi
Membrane Correction: 0.00 lb/in
Correction Type: Uniform

Liquid Limit: 0

Plastic Limit: 0

Estimated Specific Gravity: 2.65

	Vertical Strain %	Total Vertical Stress psi	Total Horizontal Stress psi	Excess Pore Pressure psi	A Parameter	Effective Vertical Stress psi	Effective Horizontal Stress psi	Stress Ratio	Effective p psi	q psi
1	0.00	102.02	102	0	0.000	10.016	9.9959	1.002	10.006	0.010221
2	0.10	102.67	102	0.14109	0.211	10.525	9.8597	1.067	10.192	0.33255
3	0.20	102.62	101.99	0.1946	0.332	10.417	9.7964	1.063	10.107	0.3104
4	0.30	102.59	102	0.23352	0.401	10.358	9.7672	1.060	10.063	0.29532
5	0.40	102.58	102	0.27244	0.482	10.304	9.7283	1.059	10.016	0.28772
6	0.50	102.56	102	0.30164	0.550	10.259	9.6991	1.058	9.9793	0.28013
7	0.60	102.56	102	0.33083	0.613	10.225	9.6651	1.058	9.945	0.27992
8	0.70	102.53	102	0.36002	0.697	10.171	9.6407	1.055	9.9057	0.265
9	0.80	102.54	102	0.37948	0.725	10.161	9.6164	1.057	9.8885	0.27208
10	0.90	102.53	102	0.39894	0.775	10.131	9.6018	1.055	9.8663	0.26447
11	1.00	104.35	101.99	1.2017	0.518	11.143	8.7845	1.269	9.9638	1.1794
12	1.20	106.15	101.99	2.8558	0.693	11.286	7.1352	1.582	9.2107	2.0755
13	1.40	107.04	102	3.9164	0.780	11.119	6.0795	1.829	8.5991	2.5196
14	1.60	107.62	102	4.7094	0.841	10.907	5.2865	2.063	8.0969	2.8105
15	1.80	108.03	102	5.2689	0.877	10.754	4.727	2.275	7.7406	3.0136
16	2.00	108.28	102	5.6824	0.908	10.592	4.3183	2.453	7.4552	3.1368
17	2.20	108.5	102	6.0035	0.926	10.497	3.9924	2.629	7.2448	3.2524
18	2.40	108.6	102	6.2662	0.953	10.326	3.7345	2.765	7.0304	3.2958
19	2.60	108.68	102	6.4949	0.975	10.184	3.5059	2.905	6.8449	3.3391
20	2.80	108.71	102	6.6846	0.999	10.023	3.3161	3.023	6.6697	3.3536
21	3.00	108.72	102	6.85	1.022	9.8679	3.1458	3.137	6.5069	3.361
22	3.50	108.78	102	7.1711	1.061	9.6018	2.8296	3.393	6.2157	3.3861
23	4.00	108.85	102	7.3657	1.078	9.4848	2.635	3.600	6.0599	3.4249
24	4.50	109.04	102	7.4728	1.065	9.5615	2.5231	3.790	6.0423	3.5192
25	5.00	109.17	102	7.5117	1.050	9.6577	2.4891	3.880	6.0734	3.5843
26	5.50	109.36	102	7.5117	1.024	9.8417	2.4891	3.954	6.1654	3.6763
27	6.00	109.58	102	7.4825	0.990	10.094	2.5183	4.008	6.3062	3.7879
28	6.50	109.72	102	7.4484	0.968	10.266	2.5523	4.022	6.4092	3.8569
29	7.00	109.87	102	7.3998	0.943	10.464	2.601	4.023	6.5327	3.9318
30	7.50	110.06	102	7.3609	0.916	10.692	2.6399	4.050	6.6659	4.026
31	8.00	110.16	102	7.2879	0.895	10.87	2.7129	4.007	6.7913	4.0785
32	8.50	110.33	102	7.2246	0.869	11.103	2.7761	4.000	6.9398	4.1637
33	9.00	110.51	102	7.1517	0.843	11.353	2.8442	3.992	7.0986	4.2544
34	9.50	110.7	102	7.0738	0.815	11.623	2.9221	3.978	7.2726	4.3506
35	10.00	110.92	102	6.9911	0.785	11.927	3.0096	3.963	7.4681	4.4585
36	11.00	111.34	102	6.8063	0.730	12.534	3.1945	3.924	7.8645	4.67
37	12.00	111.74	102	6.6116	0.680	13.128	3.3891	3.874	8.2584	4.8693
38	13.00	112.17	102	6.4122	0.632	13.753	3.5886	3.832	8.6706	5.082
39	14.00	112.63	102	6.2078	0.585	14.42	3.7929	3.802	9.1067	5.3138
40	15.00	113.02	102	5.9986	0.545	15.017	4.0021	3.752	9.5097	5.5076

TRIAXIAL TEST

Project: SPFLD Rail Improvements
Boring No.: B-164
Sample No.: 3-2
Test No.: 2 of 3

Location: Springfield, Illinois
Tested By: RIN
Test Date: 11-11-2013
Sample Type:

Project No.: 09L0179B
Checked By: JPK
Depth: 6.5-7.0
Elevation: N/A

Soil Description: Brn. & gray vf. sandy Silt.
Remarks: 2500 # Load Cell Loadtrac II # 258112

FlowTrac II 13610 & 13610B & LVDT55306

Specimen Height: 5.66 in
Specimen Area: 6.49 in²
Specimen Volume: 36.73 in³

Piston Area: 0.20 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 psi
Membrane Correction: 0.00 lb/in
Correction Type: None

Liquid Limit: 32

Plastic Limit: 12

Estimated Specific Gravity: 2.65

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	14	---	4	4
Wt. Container + Wet Soil, gm	86.58	1196.8	1187.1	1243.4
Wt. Container + Dry Soil, gm	70.22	960.5	960.5	1011.1
Wt. Container, gm	3.72	---	50.04	50.04
Wt. Dry Soil, gm	66.5	960.5	960.5	961.08
Water Content, %	24.60	24.60	23.59	24.16
Void Ratio	---	0.66	0.63	---
Degree of Saturation, %	---	98.67	100.00	---
Dry Unit Weight, pcf	---	99.615	101.79	---

Initial

Height: 5.6636 in
Area: 6.4858 in²
Volume: 36.733 in³

Moisture: 24.60 %
Void Ratio: 0.66
Dry Unit Weight: 99.615 pcf
Saturation: 98.67 %

End of Initialization

Time: 2.1437 min
Total Vertical Stress: 3.9697 psi
Total Horizontal Stress: 3.9836 psi
Pore Pressure: 2.0093 psi
Effective Vertical Stress: 1.9605 psi
Effective Horizontal Stress: 1.9743 psi

Height Change: -0.00028241 in
Area Change: 0 in²
Volume Change: 0.12381 in³

Height: 5.6639 in
Area: 6.4858 in²
Volume: 36.609 in³

Moisture: 24.39 %
Void Ratio: 0.66
Dry Unit Weight: 99.951 pcf
Saturation: 98.67 %

End of Consolidation/A

Time: 2.1437 min
Total Vertical Stress: 3.9697 psi
Total Horizontal Stress: 3.9836 psi
Pore Pressure: 2.0093 psi
Effective Vertical Stress: 1.9605 psi
Effective Horizontal Stress: 1.9743 psi

Height Change: -0.00028241 in
Area Change: 0 in²
Volume Change: 0.12381 in³

Height: 5.6639 in
Area: 6.4858 in²
Volume: 36.609 in³

Moisture: 24.39 %
Void Ratio: 0.66
Dry Unit Weight: 99.951 pcf
Saturation: 98.67 %

End of Saturation

Time: 75.819 min
Total Vertical Stress: 63.998 psi
Total Horizontal Stress: 64 psi
Pore Pressure: 61.996 psi
Effective Vertical Stress: 2.0022 psi
Effective Horizontal Stress: 2.0041 psi

Height Change: -0.00096018 in
Area Change: 0 in²
Volume Change: -0.083323 in³
Volume Correction: 0.18389 in³

Height: 5.6646 in
Area: 6.4858 in²
Volume: 36.632 in³

Moisture: 24.75 %
Void Ratio: 0.66
Dry Unit Weight: 99.888 pcf
Saturation: 99.94 %

End of Consolidation/B

Time: 163.74 min
Total Vertical Stress: 81.986 psi
Total Horizontal Stress: 81.999 psi
Pore Pressure: 62.015 psi
Effective Vertical Stress: 19.97 psi
Effective Horizontal Stress: 19.984 psi

Height Change: -0.0010167 in
Area Change: 0 in²
Volume Change: 0.60205 in³

Height: 5.6646 in
Area: 6.4858 in²
Volume: 35.947 in³

Moisture: 23.59 %
Void Ratio: 0.63
Dry Unit Weight: 101.79 pcf
Saturation: 100.00 %

End of Shear

Time: 404 min
Total Vertical Stress: 123.63 psi
Total Horizontal Stress: 82.004 psi
Pore Pressure: 67.08 psi
Effective Vertical Stress: 56.55 psi
Effective Horizontal Stress: 14.924 psi

Height Change: 0.84869 in
Area Change: 0 in²
Volume Change: 0.60205 in³

Height: 4.8149 in
Area: 6.4858 in²
Volume: 35.947 in³

Moisture: 23.59 %
Void Ratio: 0.63
Dry Unit Weight: 101.79 pcf
Saturation: 100.00 %

At Failure

Time: 404 min
Total Vertical Stress: 123.63 psi
Total Horizontal Stress: 82.004 psi
Pore Pressure: 67.08 psi
Effective Vertical Stress: 56.55 psi
Effective Horizontal Stress: 14.924 psi

Height Change: 0.84869 in
Area Change: 0 in²
Volume Change: 0.60205 in³

Height: 4.8149 in
Area: 6.4858 in²
Volume: 35.947 in³

Moisture: 23.59 %
Void Ratio: 0.63
Dry Unit Weight: 101.79 pcf
Saturation: 100.00 %

TRIAXIAL TEST

Project: SPFLD Rail Improvements
Boring No.: B-164
Sample No.: 3-2
Test No.: 2 of 3

Location: Springfield, Illinois
Tested By: RIN
Test Date: 11-11-2013
Sample Type:

Project No.: 09L0179B
Checked By: JPK
Depth: 6.5-7.0
Elevation: N/A

Soil Description: Brn. & gray vf. sandy Silt.

Remarks: 2500 # Load Cell Loadtrac II # 258112 FlowTrac II 13610 & 13610B & LVDT55306

Specimen Height: 5.66 in
Specimen Area: 6.49 in²
Specimen Volume: 35.95 in³

Piston Area: 0.20 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 psi
Membrane Correction: 0.00 lb/in
Correction Type: None

Liquid Limit: 32

Plastic Limit: 12

Estimated Specific Gravity: 2.65

	Time min	Vertical Strain %	Volumetric Strain %	Corrected Area in ²	Deviator Load lb	Deviator Stress psi	Pore Pressure psi	Horizontal Stress psi	Vertical Stress psi
1	0	0	0	6.4858	0.10916	0.01683	62.005	82.004	82.021
2	1.6397	0.10071	0	6.4858	1.8772	0.28943	62.113	81.999	82.288
3	3.2398	0.20042	0	6.4858	1.8762	0.28928	62.151	82.004	82.293
4	4.8088	0.30012	0	6.4858	1.9753	0.30457	62.185	81.999	82.303
5	6.3959	0.40083	0	6.4858	1.8772	0.28943	62.22	81.999	82.288
6	7.987	0.50054	0	6.4858	1.9744	0.30442	62.249	82.004	82.308
7	9.5649	0.60025	0	6.4858	1.6808	0.25916	62.273	81.999	82.258
8	11.147	0.70095	0	6.4858	1.778	0.27415	62.297	82.004	82.278
9	12.747	0.80066	0	6.4858	1.778	0.27415	62.322	82.004	82.278
10	14.432	0.90037	0	6.4858	20.824	3.2107	63.465	81.999	85.21
11	16.09	1.0001	0	6.4858	42.029	6.4802	65.323	81.999	88.479
12	19.29	1.2005	0	6.4858	70.793	10.915	68.135	81.999	92.914
13	22.451	1.4009	0	6.4858	90.131	13.897	69.756	82.004	95.901
14	25.646	1.6003	0	6.4858	105.64	16.288	70.821	81.999	98.287
15	28.806	1.8007	0	6.4858	118.01	18.196	71.449	81.999	100.19
16	32.015	2.0002	0	6.4858	128.52	19.815	71.828	81.999	101.81
17	35.145	2.2006	0	6.4858	136.86	21.102	72.032	82.004	103.11
18	38.301	2.401	0	6.4858	143.93	22.191	72.135	82.004	104.2
19	41.47	2.6004	0	6.4858	150.31	23.175	72.169	82.004	105.18
20	44.586	2.8008	0	6.4858	155.41	23.962	72.149	82.023	105.99
21	47.737	3.0002	0	6.4858	160.03	24.674	72.101	82.004	106.68
22	55.671	3.5008	0	6.4858	169.65	26.157	71.901	82.004	108.16
23	63.614	4.0003	0	6.4858	177.6	27.383	71.633	81.999	109.38
24	71.534	4.5009	0	6.4858	184.47	28.443	71.351	81.999	110.44
25	79.455	5.0004	0	6.4858	190.56	29.381	71.069	81.999	111.38
26	87.406	5.5009	0	6.4858	196.45	30.289	70.792	81.999	112.29
27	95.336	6.0005	0	6.4858	202.25	31.183	70.51	81.984	113.17
28	103.26	6.5	0	6.4858	207.74	32.03	70.242	81.999	114.03
29	111.22	7.0006	0	6.4858	212.55	32.772	69.989	82.004	114.78
30	119.22	7.5001	0	6.4858	217.07	33.468	69.741	82.004	115.47
31	127.2	8.0007	0	6.4858	221.39	34.134	69.507	81.999	116.13
32	135.16	8.5002	0	6.4858	225.31	34.739	69.279	82.004	116.74
33	143.11	9.0007	0	6.4858	229.53	35.39	69.06	81.999	117.39
34	151.06	9.5003	0	6.4858	234.15	36.102	68.851	81.999	118.1
35	159.13	10.001	0	6.4858	238.07	36.707	68.646	81.999	118.71
36	175.16	11.001	0	6.4858	245.73	37.888	68.286	82.004	119.89
37	191.34	12.001	0	6.4858	252.31	38.902	67.941	81.999	120.9
38	207.51	13	0	6.4858	258.99	39.931	67.625	81.994	121.93
39	223.81	14	0	6.4858	264.68	40.809	67.338	81.999	122.81
40	240.26	15	0	6.4858	269.98	41.626	67.08	82.004	123.63

TRIAXIAL TEST

Project: SPFLD Rail Improvements
Boring No.: B-164
Sample No.: 3-2
Test No.: 2 of 3

Location: Springfield, Illinois
Tested By: RIN
Test Date: 11-11-2013
Sample Type:

Project No.: 09L0179B
Checked By: JPK
Depth: 6.5-7.0
Elevation: N/A

Soil Description: Brn. & gray vf. sandy Silt.

Remarks: 2500 # Load Cell Loadtrac II # 258112 FlowTrac II 13610 & 13610B & LVDT55306

Specimen Height: 5.66 in
Specimen Area: 6.49 in²
Specimen Volume: 35.95 in³

Piston Area: 0.20 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 psi
Membrane Correction: 0.00 lb/in
Correction Type: None

Liquid Limit: 32

Plastic Limit: 12

Estimated Specific Gravity: 2.65

	Vertical Strain %	Total Vertical Stress psi	Total Horizontal Stress psi	Excess Pore Pressure psi	A Parameter	Effective Vertical Stress psi	Effective Horizontal Stress psi	Stress Ratio	Effective p psi	q psi
1	0.00	82.021	82.004	0	0.000	20.015	19.998	1.001	20.007	0.008415
2	0.10	82.288	81.999	0.10703	0.410	20.176	19.886	1.015	20.031	0.14471
3	0.20	82.293	82.004	0.14595	0.536	20.142	19.852	1.015	19.997	0.14464
4	0.30	82.303	81.999	0.18001	0.643	20.118	19.813	1.015	19.966	0.15228
5	0.40	82.288	81.999	0.21406	0.803	20.069	19.779	1.015	19.924	0.14471
6	0.50	82.308	82.004	0.24325	0.846	20.059	19.755	1.015	19.907	0.15221
7	0.60	82.258	81.999	0.26758	1.124	19.985	19.726	1.013	19.855	0.12958
8	0.70	82.278	82.004	0.2919	1.134	19.981	19.706	1.014	19.843	0.13707
9	0.80	82.278	82.004	0.31623	1.229	19.956	19.682	1.014	19.819	0.13707
10	0.90	85.21	81.999	1.4595	0.458	21.745	18.534	1.173	20.139	1.6054
11	1.00	88.479	81.999	3.318	0.514	23.156	16.675	1.389	19.916	3.2401
12	1.20	92.914	81.999	6.13	0.563	24.778	13.863	1.787	19.321	5.4575
13	1.40	95.901	82.004	7.7501	0.558	26.145	12.248	2.135	19.197	6.9484
14	1.60	98.287	81.999	8.8155	0.542	27.466	11.178	2.457	19.322	8.1442
15	1.80	100.19	81.999	9.4431	0.520	28.746	10.55	2.725	19.648	9.0978
16	2.00	101.81	81.999	9.8226	0.496	29.986	10.171	2.948	20.078	9.9076
17	2.20	103.11	82.004	10.027	0.476	31.073	9.9714	3.116	20.522	10.551
18	2.40	104.2	82.004	10.129	0.457	32.061	9.8692	3.249	20.965	11.096
19	2.60	105.18	82.004	10.163	0.439	33.01	9.8351	3.356	21.423	11.588
20	2.80	105.99	82.023	10.144	0.423	33.836	9.8741	3.427	21.855	11.981
21	3.00	106.68	82.004	10.095	0.409	34.577	9.9032	3.491	22.24	12.337
22	3.50	108.16	82.004	9.8956	0.379	36.26	10.103	3.589	23.181	13.079
23	4.00	109.38	81.999	9.628	0.352	37.749	10.365	3.642	24.057	13.692
24	4.50	110.44	81.999	9.3458	0.329	39.09	10.648	3.671	24.869	14.221
25	5.00	111.38	81.999	9.0637	0.309	40.311	10.93	3.688	25.62	14.691
26	5.50	112.29	81.999	8.7863	0.290	41.497	11.207	3.703	26.352	15.145
27	6.00	113.17	81.984	8.5042	0.273	42.658	11.475	3.718	27.066	15.591
28	6.50	114.03	81.999	8.2366	0.257	43.787	11.757	3.724	27.772	16.015
29	7.00	114.78	82.004	7.9836	0.244	44.786	12.015	3.728	28.401	16.386
30	7.50	115.47	82.004	7.7355	0.231	45.731	12.263	3.729	28.997	16.734
31	8.00	116.13	81.999	7.502	0.220	46.626	12.491	3.733	29.559	17.067
32	8.50	116.74	82.004	7.2733	0.209	47.464	12.725	3.730	30.095	17.37
33	9.00	117.39	81.999	7.0544	0.200	48.329	12.939	3.735	30.634	17.695
34	9.50	118.1	81.999	6.8452	0.190	49.25	13.148	3.746	31.199	18.051
35	10.00	118.71	81.999	6.6408	0.181	50.06	13.353	3.749	31.706	18.354
36	11.00	119.89	82.004	6.2808	0.166	51.605	13.717	3.762	32.661	18.944
37	12.00	120.9	81.999	5.9354	0.153	52.96	14.058	3.767	33.509	19.451
38	13.00	121.93	81.994	5.6192	0.141	54.301	14.369	3.779	34.335	19.966
39	14.00	122.81	81.999	5.3321	0.131	55.47	14.661	3.783	35.066	20.405
40	15.00	123.63	82.004	5.0743	0.122	56.55	14.924	3.789	35.737	20.813

TRIAXIAL TEST

Project: SPFLD Rail Improvements
Boring No.: B-164
Sample No.: 3-3
Test No.: 3 of 3

Location: Springfield, Illinois
Tested By: RIN
Test Date: 11-13-2013
Sample Type:

Project No.: 09L0179B
Checked By: JPK
Depth: 7.0-7.5
Elevation: N/A

Soil Description: Brn. & gray vf. sandy Silt.
Remarks: 2500 # Load Cell Loadtrac II # 258112

FlowTrac II 13610 & 13610B & LVDT55306

Specimen Height: 5.05 in
Specimen Area: 6.48 in²
Specimen Volume: 32.73 in³

Piston Area: 0.20 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 psi
Membrane Correction: 0.00 lb/in
Correction Type: None

Liquid Limit: 0

Plastic Limit: 0

Estimated Specific Gravity: 2.65

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	11	---	1	1
Wt. Container + Wet Soil, gm	76.98	1089.4	1076.4	1130
Wt. Container + Dry Soil, gm	63.2	884.4	884.4	933.01
Wt. Container, gm	3.76	---	50.08	50.08
Wt. Dry Soil, gm	59.44	884.4	884.4	882.93
Water Content, %	23.18	23.18	21.71	22.31
Void Ratio	---	0.61	0.58	---
Degree of Saturation, %	---	101.19	100.00	---
Dry Unit Weight, pcf	---	102.94	105.02	---

Initial

Height: 5.0547 in
Area: 6.4752 in²
Volume: 32.73 in³

Moisture: 23.18 %
Void Ratio: 0.61
Dry Unit Weight: 102.94 pcf
Saturation: 101.19 %

End of Initialization

Time: 2.5327 min
Total Vertical Stress: 4.0132 psi
Total Horizontal Stress: 4.0128 psi
Pore Pressure: 1.9947 psi
Effective Vertical Stress: 2.0185 psi
Effective Horizontal Stress: 2.0181 psi

Height Change: -0.00084722 in
Area Change: 0 in²
Volume Change: 0.068498 in³

Height: 5.0555 in
Area: 6.4752 in²
Volume: 32.662 in³

Moisture: 23.05 %
Void Ratio: 0.60
Dry Unit Weight: 103.15 pcf
Saturation: 101.19 %

End of Consolidation/A

Time: 2.5327 min
Total Vertical Stress: 4.0132 psi
Total Horizontal Stress: 4.0128 psi
Pore Pressure: 1.9947 psi
Effective Vertical Stress: 2.0185 psi
Effective Horizontal Stress: 2.0181 psi

Height Change: -0.00084722 in
Area Change: 0 in²
Volume Change: 0.068498 in³

Height: 5.0555 in
Area: 6.4752 in²
Volume: 32.662 in³

Moisture: 23.05 %
Void Ratio: 0.60
Dry Unit Weight: 103.15 pcf
Saturation: 101.19 %

End of Saturation

Time: 76.269 min
Total Vertical Stress: 63.998 psi
Total Horizontal Stress: 64 psi
Pore Pressure: 61.991 psi
Effective Vertical Stress: 2.0071 psi
Effective Horizontal Stress: 2.009 psi

Height Change: -0.0033889 in
Area Change: 0 in²
Volume Change: -0.18514 in³
Volume Correction: -0.13477 in³

Height: 5.0581 in
Area: 6.4752 in²
Volume: 33.05 in³

Moisture: 23.52 %
Void Ratio: 0.62
Dry Unit Weight: 101.94 pcf
Saturation: 100.09 %

End of Consolidation/B

Time: 170.77 min
Total Vertical Stress: 102 psi
Total Horizontal Stress: 101.99 psi
Pore Pressure: 61.986 psi
Effective Vertical Stress: 40.015 psi
Effective Horizontal Stress: 40.009 psi

Height Change: -0.0037842 in
Area Change: 0 in²
Volume Change: 0.78486 in³

Height: 5.0585 in
Area: 6.4752 in²
Volume: 32.08 in³

Moisture: 21.71 %
Void Ratio: 0.58
Dry Unit Weight: 105.02 pcf
Saturation: 100.00 %

End of Shear

Time: 410.44 min
Total Vertical Stress: 180.86 psi
Total Horizontal Stress: 102 psi
Pore Pressure: 73.589 psi
Effective Vertical Stress: 107.27 psi
Effective Horizontal Stress: 28.415 psi

Height Change: 0.75386 in
Area Change: 0 in²
Volume Change: 0.78486 in³

Height: 4.3008 in
Area: 6.4752 in²
Volume: 32.08 in³

Moisture: 21.71 %
Void Ratio: 0.58
Dry Unit Weight: 105.02 pcf
Saturation: 100.00 %

At Failure

Time: 410.44 min
Total Vertical Stress: 180.86 psi
Total Horizontal Stress: 102 psi
Pore Pressure: 73.589 psi
Effective Vertical Stress: 107.27 psi
Effective Horizontal Stress: 28.415 psi

Height Change: 0.75386 in
Area Change: 0 in²
Volume Change: 0.78486 in³

Height: 4.3008 in
Area: 6.4752 in²
Volume: 32.08 in³

Moisture: 21.71 %
Void Ratio: 0.58
Dry Unit Weight: 105.02 pcf
Saturation: 100.00 %

TRIAXIAL TEST

Project: SPFLD Rail Improvements
Boring No.: B-164
Sample No.: 3-3
Test No.: 3 of 3

Location: Springfield, Illinois
Tested By: RIN
Test Date: 11-13-2013
Sample Type:

Project No.: 09L0179B
Checked By: JPK
Depth: 7.0-7.5
Elevation: N/A

Soil Description: Brn. & gray vf. sandy Silt.

Remarks: 2500 # Load Cell Loadtrac II # 258112 FlowTrac II 13610 & 13610B & LVDT55306

Specimen Height: 5.06 in
Specimen Area: 6.48 in²
Specimen Volume: 32.08 in³

Piston Area: 0.20 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 psi
Membrane Correction: 0.00 lb/in
Correction Type: None

Liquid Limit: 0

Plastic Limit: 0

Estimated Specific Gravity: 2.65

	Time min	Vertical Strain %	Volumetric Strain %	Corrected Area in ²	Deviator Load lb	Deviator Stress psi	Pore Pressure psi	Horizontal Stress psi	Vertical Stress psi
1	0	0	0	6.4752	0.23497	0.036287	61.991	102	102.04
2	1.7767	0.10049	0	6.4752	3.8663	0.59709	62.312	102	102.6
3	3.4652	0.19987	0	6.4752	3.8673	0.59724	62.429	102	102.6
4	5.1008	0.30036	0	6.4752	3.8834	0.59973	62.531	101.92	102.52
5	6.7185	0.39973	0	6.4752	3.9645	0.61225	62.633	102	102.62
6	8.3627	0.50022	0	6.4752	4.0627	0.62741	62.721	102	102.63
7	10.016	0.5996	0	6.4752	4.0627	0.62741	62.803	102	102.63
8	11.7	0.69897	0	6.4752	4.1608	0.64257	62.881	102	102.65
9	13.348	0.79946	0	6.4752	4.2599	0.65788	62.954	102	102.66
10	14.966	0.89884	0	6.4752	4.3572	0.6729	63.022	102	102.68
11	16.725	0.99933	0	6.4752	30.668	4.7361	64.54	102	106.74
12	20.283	1.1992	0	6.4752	104.3	16.107	70.305	102	118.11
13	23.629	1.3979	0	6.4752	148.67	22.959	75.462	102	124.96
14	26.935	1.5978	0	6.4752	177.73	27.447	78.498	102	129.45
15	30.233	1.7977	0	6.4752	198.93	30.722	80.4	102	132.73
16	33.53	1.9975	0	6.4752	215.91	33.344	81.626	102	135.35
17	36.77	2.1974	0	6.4752	229.46	35.437	82.41	102	137.44
18	40.08	2.3973	0	6.4752	241.24	37.256	82.92	102	139.26
19	43.311	2.5971	0	6.4752	251.45	38.833	83.237	102	140.84
20	46.564	2.7959	0	6.4752	260.58	40.243	83.422	102	142.25
21	49.831	2.9957	0	6.4752	269.22	41.577	83.519	102	143.58
22	57.919	3.4949	0	6.4752	287.68	44.427	83.475	102	146.43
23	66.056	3.994	0	6.4752	304.56	47.035	83.203	102	149.03
24	74.136	4.4942	0	6.4752	319.58	49.354	82.823	102	151.36
25	82.132	4.9933	0	6.4752	333.33	51.477	82.371	101.99	153.47
26	90.074	5.4924	0	6.4752	346.28	53.478	81.904	102	155.48
27	97.96	5.9915	0	6.4752	358.26	55.328	81.407	102	157.33
28	105.89	6.4906	0	6.4752	369.35	57.041	80.911	102	159.04
29	113.8	6.9897	0	6.4752	380.25	58.724	80.396	102	160.72
30	121.71	7.4888	0	6.4752	391.74	60.498	79.919	101.99	162.49
31	129.64	7.9879	0	6.4752	402.24	62.12	79.422	102	164.12
32	137.55	8.4881	0	6.4752	412.74	63.742	78.926	102.01	165.75
33	145.43	8.9872	0	6.4752	421.97	65.167	78.445	102	167.17
34	153.26	9.4863	0	6.4752	431.2	66.592	77.978	102	168.59
35	161.18	9.9855	0	6.4752	440.04	67.957	77.511	102	169.96
36	176.81	10.984	0	6.4752	456.33	70.473	76.63	102	172.48
37	192.51	11.982	0	6.4752	472.43	72.96	75.788	102	174.96
38	208.24	12.981	0	6.4752	486.76	75.173	75.005	102	177.18
39	223.91	13.979	0	6.4752	500.02	77.22	74.27	102	179.22
40	239.67	14.978	0	6.4752	510.62	78.857	73.589	102	180.86

TRIAXIAL TEST

Project: SPFLD Rail Improvements
Boring No.: B-164
Sample No.: 3-3
Test No.: 3 of 3

Location: Springfield, Illinois
Tested By: RIN
Test Date: 11-13-2013
Sample Type:

Project No.: 09L0179B
Checked By: JPK
Depth: 7.0-7.5
Elevation: N/A

Soil Description: Brn. & gray vf. sandy Silt.

Remarks: 2500 # Load Cell Loadtrac II # 258112 FlowTrac II 13610 & 13610B & LVDT55306

Specimen Height: 5.06 in
Specimen Area: 6.48 in²
Specimen Volume: 32.08 in³

Piston Area: 0.20 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 psi
Membrane Correction: 0.00 lb/in
Correction Type: None

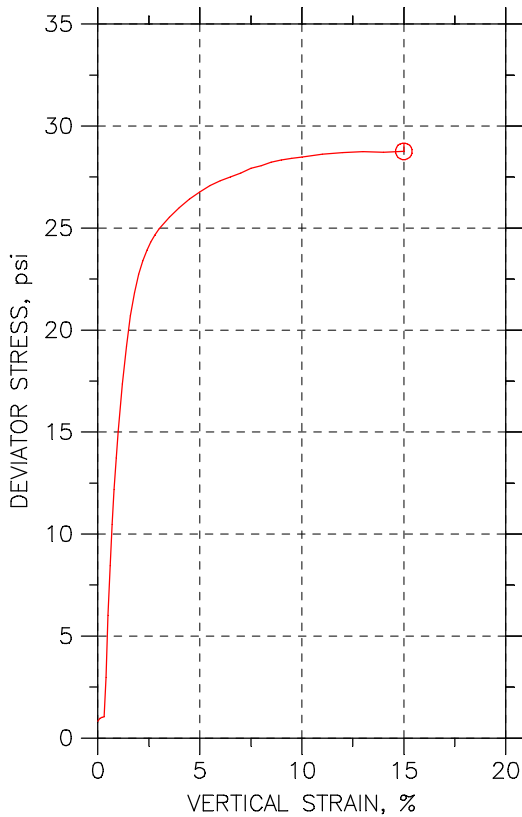
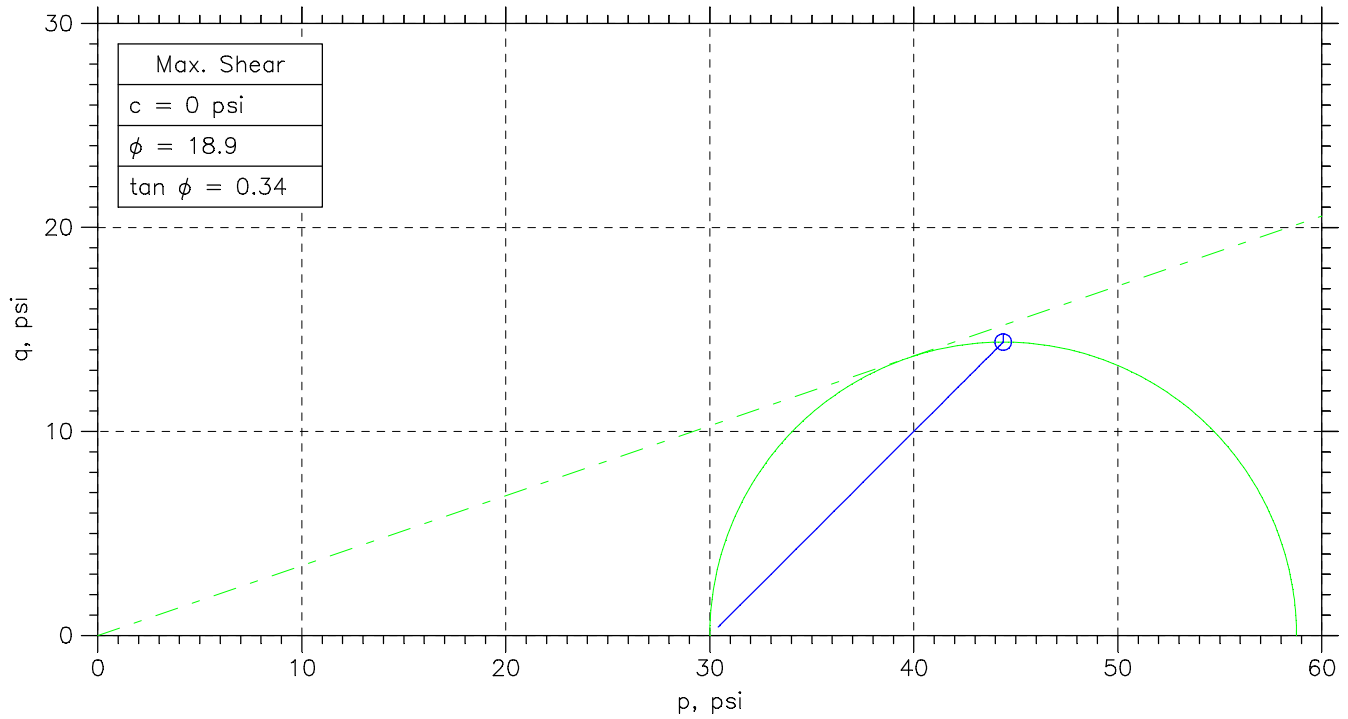
Liquid Limit: 0

Plastic Limit: 0

Estimated Specific Gravity: 2.65

	Vertical Strain %	Total Vertical Stress psi	Total Horizontal Stress psi	Excess Pore Pressure psi	A Parameter	Effective Vertical Stress psi	Effective Horizontal Stress psi	Stress Ratio	Effective p psi	q psi
1	0.00	102.04	102	0	0.000	40.045	40.009	1.001	40.027	0.018144
2	0.10	102.6	102	0.3211	0.564	40.289	39.692	1.015	39.991	0.29855
3	0.20	102.6	102	0.43786	0.781	40.168	39.571	1.015	39.869	0.29862
4	0.30	102.52	101.92	0.54002	1.105	39.986	39.386	1.015	39.686	0.29987
5	0.40	102.62	102	0.64219	1.107	39.984	39.371	1.016	39.677	0.30613
6	0.50	102.63	102	0.72976	1.226	39.911	39.284	1.016	39.597	0.31371
7	0.60	102.63	102	0.81247	1.366	39.828	39.201	1.016	39.515	0.31371
8	0.70	102.65	102	0.89031	1.460	39.766	39.123	1.016	39.444	0.32129
9	0.80	102.66	102	0.96329	1.550	39.703	39.045	1.017	39.374	0.32894
10	0.90	102.68	102	1.0314	1.612	39.655	38.982	1.017	39.319	0.33645
11	1.00	106.74	102	2.5493	0.542	42.195	37.459	1.126	39.827	2.3681
12	1.20	118.11	102	8.3144	0.517	47.801	31.694	1.508	39.748	8.0534
13	1.40	124.96	102	13.471	0.588	49.497	26.537	1.865	38.017	11.48
14	1.60	129.45	102	16.507	0.602	50.948	23.501	2.168	37.225	13.724
15	1.80	132.73	102	18.409	0.600	52.326	21.604	2.422	36.965	15.361
16	2.00	135.35	102	19.635	0.589	53.722	20.378	2.636	37.05	16.672
17	2.20	137.44	102	20.419	0.577	55.031	19.595	2.808	37.313	17.718
18	2.40	139.26	102	20.93	0.562	56.34	19.084	2.952	37.712	18.628
19	2.60	140.84	102	21.246	0.547	57.6	18.768	3.069	38.184	19.416
20	2.80	142.25	102	21.431	0.533	58.825	18.583	3.166	38.704	20.121
21	3.00	143.58	102	21.528	0.518	60.058	18.481	3.250	39.269	20.788
22	3.49	146.43	102	21.484	0.484	62.952	18.524	3.398	40.738	22.214
23	3.99	149.03	102	21.212	0.451	65.832	18.797	3.502	42.314	23.517
24	4.49	151.36	102	20.832	0.422	68.535	19.181	3.573	43.858	24.677
25	4.99	153.47	101.99	20.38	0.396	71.101	19.624	3.623	45.362	25.739
26	5.49	155.48	102	19.913	0.373	73.574	20.096	3.661	46.835	26.739
27	5.99	157.33	102	19.417	0.351	75.92	20.592	3.687	48.256	27.664
28	6.49	159.04	102	18.92	0.332	78.129	21.088	3.705	49.609	28.521
29	6.99	160.72	102	18.405	0.314	80.328	21.604	3.718	50.966	29.362
30	7.49	162.49	101.99	17.928	0.297	82.574	22.076	3.740	52.325	30.249
31	7.99	164.12	102	17.432	0.281	84.702	22.582	3.751	53.642	31.06
32	8.49	165.75	102.01	16.935	0.266	86.825	23.083	3.761	54.954	31.871
33	8.99	167.17	102	16.454	0.253	88.727	23.56	3.766	56.143	32.584
34	9.49	168.59	102	15.987	0.240	90.614	24.022	3.772	57.318	33.296
35	9.99	169.96	102	15.52	0.228	92.446	24.489	3.775	58.467	33.978
36	10.98	172.48	102	14.639	0.208	95.848	25.374	3.777	60.611	35.237
37	11.98	174.96	102	13.797	0.189	99.176	26.216	3.783	62.696	36.48
38	12.98	177.18	102	13.014	0.173	102.17	26.999	3.784	64.586	37.587
39	13.98	179.22	102	12.279	0.159	104.95	27.729	3.785	66.339	38.61
40	14.98	180.86	102	11.598	0.147	107.27	28.415	3.775	67.844	39.429

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D2850



Symbol	Ⓢ			
Sample No.	7-2			
Test No.	1			
Depth	16.5-17.0			
Tested by	RIN			
Test Date	11/19/2013			
Checked by	JKP			
Check Date				
Diameter, in	2.86			
Height, in	5.882			
Water Content, %	24.4			
Dry Density, pcf	100.8			
Saturation, %	101.0			
Void Ratio	0.641			
Confining Stress, psi	30			
Undrained Strength, psi	14.38			
Max. Dev. Stress, psi	28.76			
Strain at Failure, %	15			
Strain Rate, %/min	1			
Estimated Specific Gravity	2.65			
Liquid Limit	40			
Plastic Limit	15			
Plasticity Index	25			

	Project: SPFLD. Rail Improvememts				
	Location: Springfield, Illinois				
	Project No.: 09L0179B				
	Boring No.: B-164				
	Sample Type: Tube				
	Description: Brown and gray very fine sandy silty CLAY.				
	Remarks: 2500 # Load Cell Loadtrac II # 258112 LVDT55386				

Phase calculations based on start of test.

TRIAXIAL TEST

Project: SPFLD. Rail Improvememts
 Boring No.: B-164
 Sample No.: 7-2
 Test No.: 1

Location: Springfield, Illinois
 Tested By: RIN
 Test Date: 11/19/2013
 Sample Type: Tube

Project No.: 09L0179B
 Checked By: JPK
 Depth: 16.5-17.0
 Elevation: N/A

Soil Description: Brown and gray very fine sandy silty CLAY.
 Remarks: 2500 # Load Cell Loadtrac II # 258112 LVDT55386

Specimen Height: 5.88 in
 Specimen Area: 6.43 in²
 Specimen Volume: 37.80 in³

Piston Area: 0.00 in²
 Piston Friction: 0.00 lb
 Piston weight: 0.00 lb

Filter Strip Correction: 0.00 psi
 Membrane Correction: 0.00 lb/in
 Correction Type: Uniform

Liquid Limit: 40

Plastic Limit: 15

Estimated Specific Gravity: 2.65

	Before Test Trimmings	Before Test Specimen+Ring	After Test Specimen+Ring	After Test Trimmings
Container ID	17	---	10	10
Wt. Container + wet Soil, gm	74.07	1244.5	1244.5	1299.4
Wt. Container + Dry Soil, gm	60.25	1000.1	1000.1	1054.3
Wt. Container, gm	3.7	---	49.92	49.92
Wt. Dry Soil, gm	56.55	1000.1	1000.1	1004.4
Water Content, %	24.44	24.44	24.44	24.40
Void Ratio	---	0.64	0.65	---
Degree of Saturation, %	---	101.01	100.00	---
Dry Unit Weight, pcf	---	100.8	100.41	---

Initial

End of Initialization

End of Consolidation/A

End of Saturation

End of Consolidation/B

End of Shear

At Failure

TRIAXIAL TEST

Project: SPFLD. Rail Improvemnts
Boring No.: B-164
Sample No.: 7-2
Test No.: 1

Location: Springfield, Illinois
Tested By: RIN
Test Date: 11/19/2013
Sample Type: Tube

Project No.: 09L0179B
Checked By: JPK
Depth: 16.5-17.0
Elevation: N/A

Soil Description: Brown and gray very fine sandy silty CLAY.
Remarks: 2500 # Load Cell Loadtrac II # 258112 LVDT55386

Specimen Height: 5.88 in
Specimen Area: 6.43 in²
Specimen Volume: 37.80 in³

Piston Area: 0.00 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 psi
Membrane Correction: 0.00 lb/in
Correction Type: Uniform

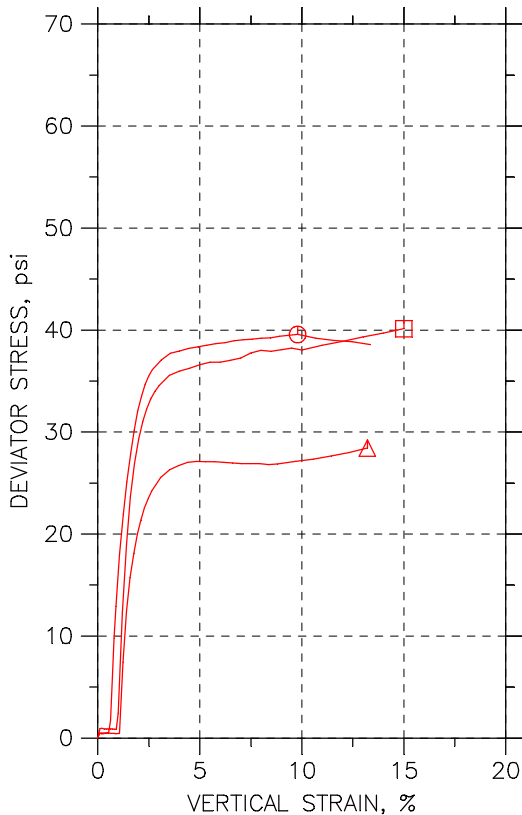
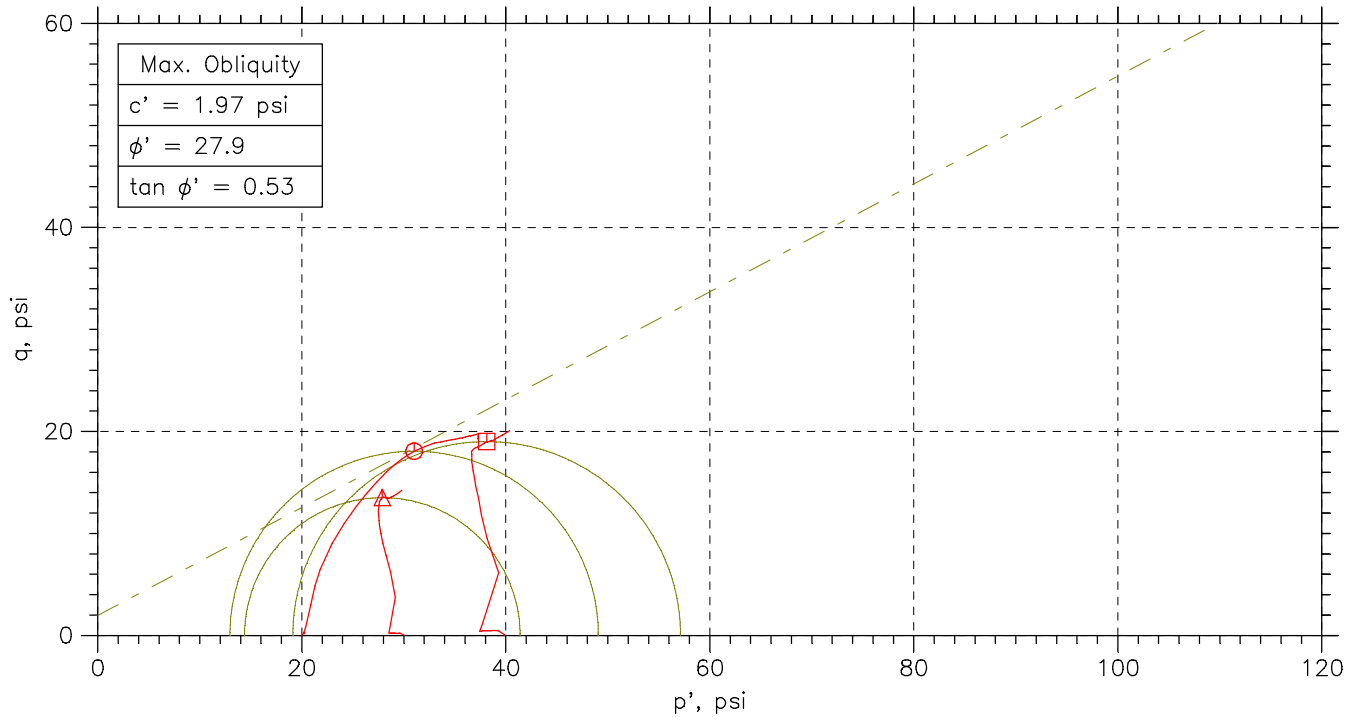
Liquid Limit: 40

Plastic Limit: 15

Estimated Specific Gravity: 2.65

	Time min	Vertical Strain %	Corrected Area in ²	Deviator Load lb	Deviator Stress psi	Vertical Stress psi	p psi	q psi
1	0	0	6.4256	5.2719	0.82046	30.82	30.41	0.41023
2	0.10593	0.10391	6.4323	6.2482	0.97138	30.971	30.486	0.48569
3	0.19875	0.20012	6.4385	6.5411	1.0159	31.016	30.508	0.50797
4	0.29598	0.30019	6.4449	6.7363	1.0452	31.045	30.523	0.52261
5	0.39323	0.40121	6.4515	19.135	2.966	32.966	31.483	1.483
6	0.49488	0.5032	6.4581	38.856	6.0166	36.017	33.008	3.0083
7	0.59213	0.60133	6.4645	54.574	8.4422	38.442	34.221	4.2211
8	0.68937	0.7014	6.471	67.754	10.47	40.47	35.235	5.2352
9	0.7866	0.80146	6.4775	78.884	12.178	42.178	36.089	6.089
10	0.88827	0.90441	6.4842	89.037	13.731	43.731	36.866	6.8656
11	0.9855	1.0016	6.4906	97.628	15.041	45.041	37.521	7.5207
12	1.1756	1.2007	6.5037	112.86	17.353	47.353	38.676	8.6765
13	1.3745	1.4018	6.5169	125.16	19.205	49.205	39.603	9.6026
14	1.5645	1.6	6.5301	135.12	20.692	50.692	40.346	10.346
15	1.7634	1.8002	6.5434	142.83	21.828	51.828	40.914	10.914
16	1.9623	2.0041	6.557	149.08	22.736	52.736	41.368	11.368
17	2.1568	2.2014	6.5702	153.67	23.388	53.388	41.694	11.694
18	2.3557	2.4053	6.584	157.47	23.918	53.918	41.959	11.959
19	2.5502	2.6016	6.5972	160.5	24.329	54.329	42.164	12.164
20	2.7491	2.8037	6.6109	163.04	24.662	54.662	42.331	12.331
21	2.948	3.0019	6.6244	165.38	24.965	54.965	42.483	12.483
22	3.4474	3.5051	6.659	169.97	25.525	55.525	42.762	12.762
23	3.9425	4.0006	6.6934	174.07	26.007	56.007	43.003	13.003
24	4.4463	4.5037	6.7286	177.78	26.422	56.422	43.211	13.211
25	4.9502	5.0012	6.7639	181.1	26.775	56.775	43.387	13.387
26	5.4629	5.5024	6.7997	184.13	27.078	57.078	43.539	13.539
27	5.9801	6.0037	6.836	186.76	27.32	57.32	43.66	13.66
28	6.4928	6.5002	6.8723	189.01	27.503	57.503	43.751	13.751
29	7.0188	7.0043	6.9096	191.35	27.694	57.694	43.847	13.847
30	7.5359	7.5008	6.9466	193.99	27.925	57.925	43.963	13.963
31	8.0575	8.0021	6.9845	195.94	28.054	58.054	44.027	14.027
32	8.5658	8.5004	7.0225	198.28	28.235	58.235	44.118	14.118
33	9.0785	9.0027	7.0613	200.14	28.343	58.343	44.171	14.171
34	9.5912	9.5049	7.1005	201.8	28.42	58.42	44.21	14.21
35	10.095	10	7.1396	203.36	28.483	58.483	44.242	14.242
36	11.107	11.003	7.22	206.58	28.612	58.612	44.306	14.306
37	12.111	12.007	7.3024	209.61	28.704	58.704	44.352	14.352
38	13.101	13.003	7.386	212.34	28.749	58.749	44.375	14.375
39	14.091	14.003	7.4719	214.49	28.706	58.706	44.353	14.353
40	15.072	15.002	7.5597	217.42	28.76	58.76	44.38	14.38

CONSOLIDATED UNDRAINED TRIAXIAL TEST



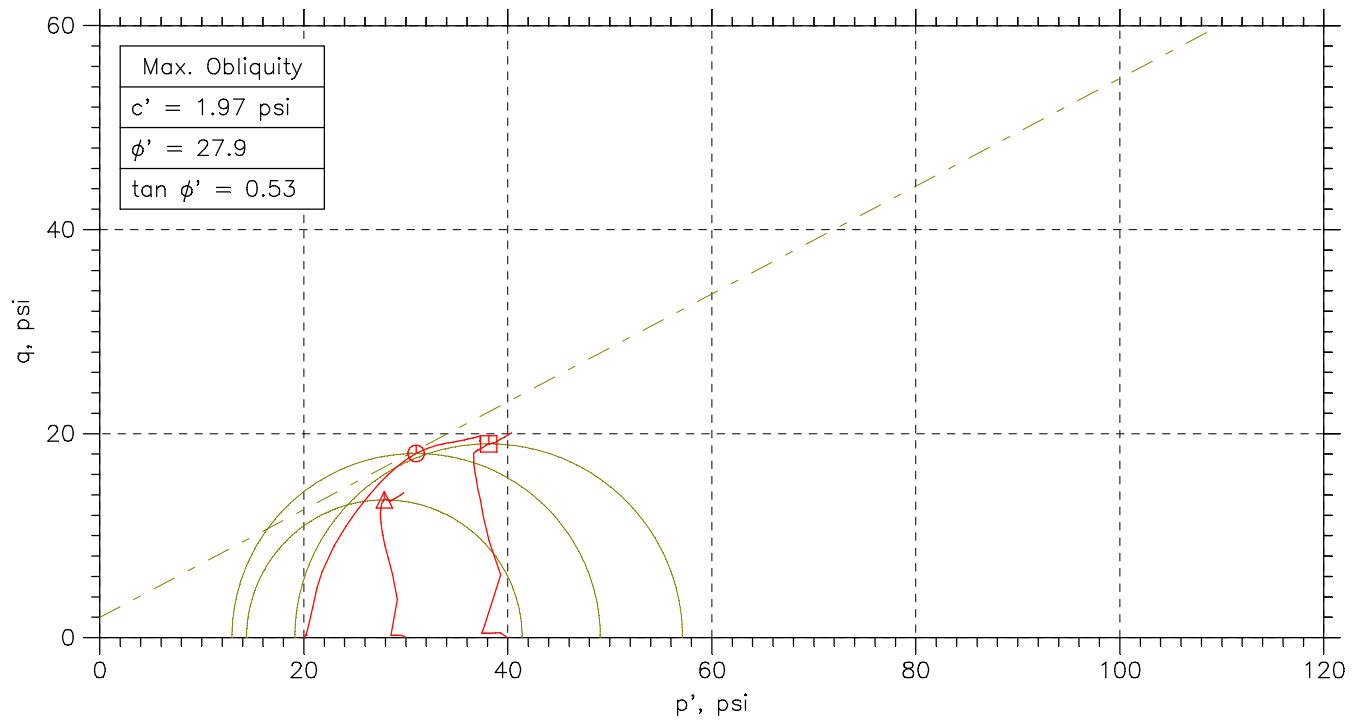
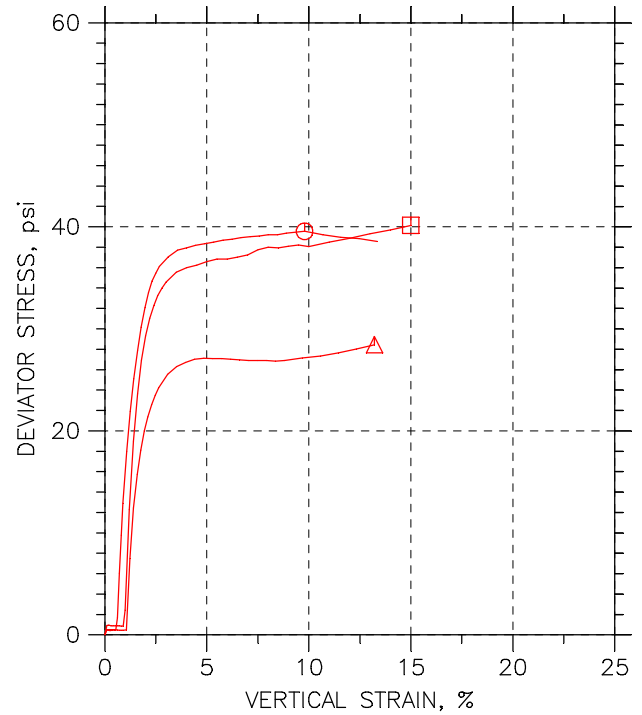
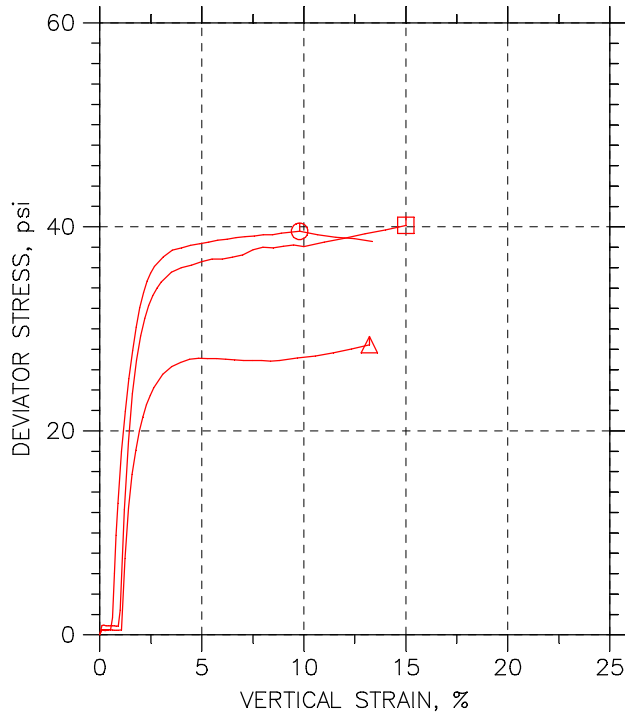
Symbol	⊙	Δ	□	
Sample No.	7-2	7-3	7-4	
Test No.	1 of 3	2 of 3	3 of 3	
Depth	16.5-17.0	17.0-17.5	17.5-18.0	
Initial	Diameter, in	2.861	2.893	2.854
	Height, in	5.674	5.73	5.858
	Water Content, %	22.6	22.6	21.9
	Dry Density, pcf	103.5	102.2	105.3
	Saturation, %	100.0	97.0	101.7
Before Shear	Void Ratio	0.599	0.618	0.571
	Water Content, %	23.7	22.2	20.1
	Dry Density, pcf	101.7	104.2	107.9
	Saturation*, %	100.0	100.0	100.0
	Void Ratio	0.627	0.588	0.533
	Back Press., psi	82.	72.01	72.
	Ver. Eff. Cons. Stress, psi	20.	29.99	39.99
	Shear Strength, psi	19.78	14.22	20.07
	Strain at Failure, %	9.79	13.2	15
	Strain Rate, %/min	0.0625	0.0625	0.0625
	B-Value	0.95	0.95	0.95
	Estimated Specific Gravity	2.65	2.65	2.65
	Liquid Limit	0	40	0
	Plastic Limit	0	24	0

	Project: SPFLD Rail Improvements				
	Location: Springfield, Illinois				
	Project No.: 09L0179B				
	Boring No.: B-175				
	Sample Type:				
	Description: Brn. & gray vf. sandy Silt.				
Remarks: 2500 # Load Cell Loadtrac II # 258112 FlowTrac II 13610 & 13610B & LVDT55306					

Phase calculations based on start of test.

* Saturation is set to 100% for phase calculations

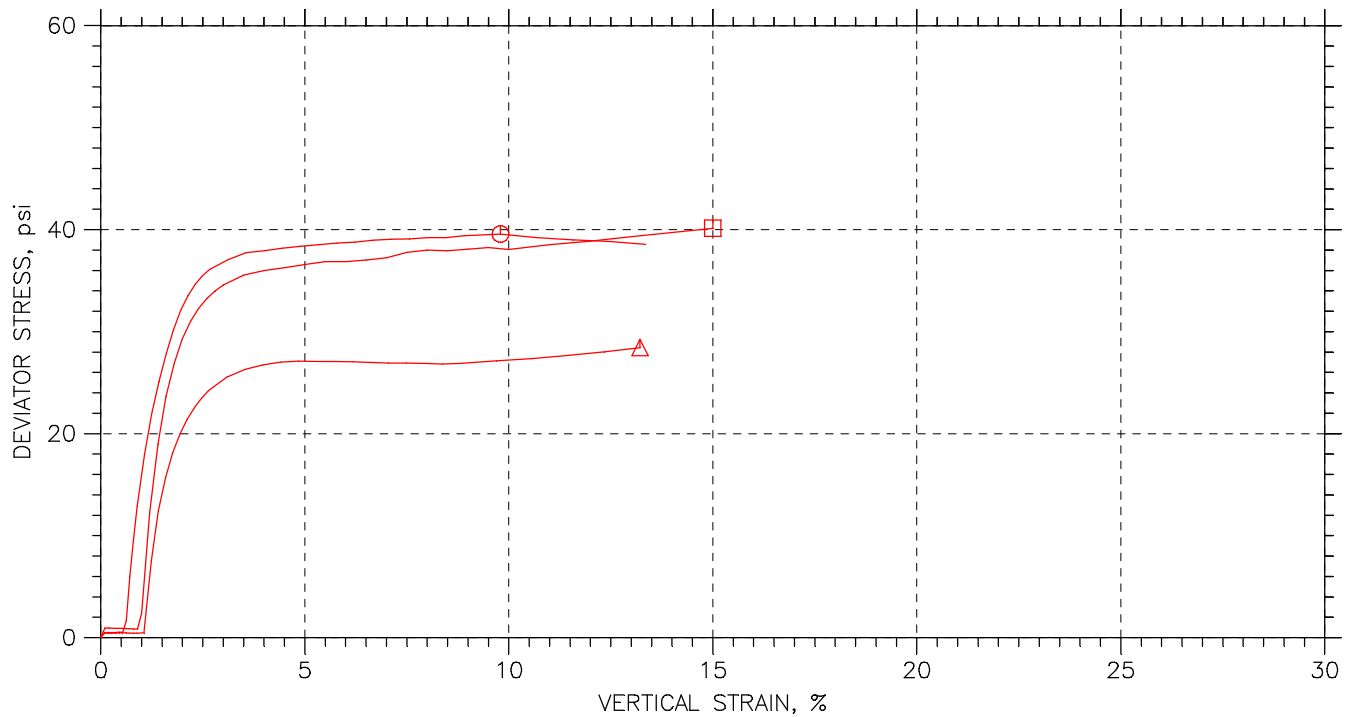
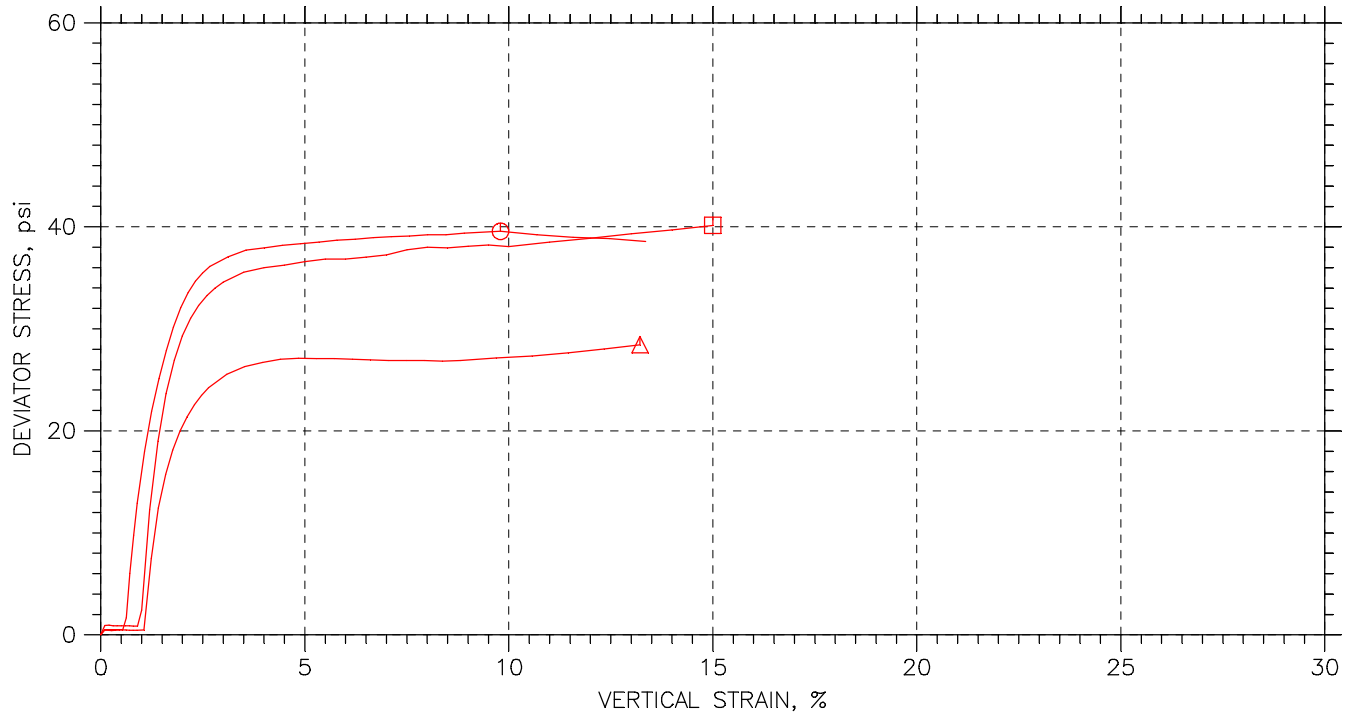
CONSOLIDATED UNDRAINED TRIAXIAL TEST



	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
⊙	7-2	1 of 3	16.5-17.0	RIN	11-13-2013	JPK		B-175-7-2 CU.dat
△	7-3	2 of 3	17.0-17.5	RIN	11-14-2013	JPK		B-175-7-3 CU.dat
□	7-4	3 of 3	17.5-18.0	RIN	11-15-2013	JPK		B-175-7-4 CU.dat

			
	Project: SPFLD Rail Improvements	Location: Springfield, Illinois	Project No.: 09L0179B
	Boring No.: B-175	Sample Type:	
	Description: Brn. & gray vf. sandy Silt.		
	Remarks: 2500 # Load Cell Loadtrac II # 258112 FlowTrac II 13610 & 13610B & LVDT55306		

CONSOLIDATED UNDRAINED TRIAXIAL TEST



	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
⊙	7-2	1 of 3	16.5-17.0	RIN	11-13-2013	JPK		B-175-7-2 CU.dat
△	7-3	2 of 3	17.0-17.5	RIN	11-14-2013	JPK		B-175-7-3 CU.dat
□	7-4	3 of 3	17.5-18.0	RIN	11-15-2013	JPK		B-175-7-4 CU.dat

			
	Project: SPFLD Rail Improvements	Location: Springfield, Illinois	Project No.: 09L0179B
	Boring No.: B-175	Sample Type:	
	Description: Brn. & gray vf. sandy Silt.		
	Remarks: 2500 # Load Cell Loadtrac II # 258112 FlowTrac II 13610 & 13610B & LVDT55306		

TRIAXIAL TEST

Project: SPFLD Rail Improvements
Boring No.: B-175
Sample No.: 7-2
Test No.: 1 of 3

Location: Springfield, Illinois
Tested By: RIN
Test Date: 11-13-2013
Sample Type:

Project No.: 09L0179B
Checked By: JPK
Depth: 16.5-17.0
Elevation: N/A

Soil Description: Brn. & gray vf. sandy Silt.
Remarks: 2500 # Load Cell Loadtrac II # 258112

FlowTrac II 13610 & 13610B & LVDT55306

Specimen Height: 5.67 in
Specimen Area: 6.43 in²
Specimen Volume: 36.48 in³

Piston Area: 0.20 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 psi
Membrane Correction: 0.00 lb/in
Correction Type: None

Liquid Limit: 0

Plastic Limit: 0

Estimated Specific Gravity: 2.65

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	20	---	12	12
Wt. Container + Wet Soil, gm	82.27	1215	1225.6	1258.6
Wt. Container + Dry Soil, gm	67.78	990.94	990.94	1031.1
Wt. Container, gm	3.69	---	49.98	49.98
Wt. Dry Soil, gm	64.09	990.94	990.94	981.14
Water Content, %	22.61	22.61	23.68	23.18
Void Ratio	---	0.60	0.63	---
Degree of Saturation, %	---	100.05	100.00	---
Dry Unit Weight, pcf	---	103.47	101.65	---

Initial

Height: 5.674 in
Area: 6.4301 in²
Volume: 36.484 in³

Moisture: 22.61 %
Void Ratio: 0.60
Dry Unit Weight: 103.47 pcf
Saturation: 100.05 %

End of Initialization

Time: 2.2636 min
Total Vertical Stress: 4.0074 psi
Total Horizontal Stress: 4.0225 psi
Pore Pressure: 1.985 psi
Effective Vertical Stress: 2.0224 psi
Effective Horizontal Stress: 2.0376 psi

Height Change: -0.008811 in
Area Change: 0 in²
Volume Change: -0.0071999 in³

Height: 5.6828 in
Area: 6.4301 in²
Volume: 36.491 in³

Moisture: 22.62 %
Void Ratio: 0.60
Dry Unit Weight: 103.45 pcf
Saturation: 100.05 %

End of Consolidation/A

Time: 2.2636 min
Total Vertical Stress: 4.0074 psi
Total Horizontal Stress: 4.0225 psi
Pore Pressure: 1.985 psi
Effective Vertical Stress: 2.0224 psi
Effective Horizontal Stress: 2.0376 psi

Height Change: -0.008811 in
Area Change: 0 in²
Volume Change: -0.0071999 in³

Height: 5.6828 in
Area: 6.4301 in²
Volume: 36.491 in³

Moisture: 22.62 %
Void Ratio: 0.60
Dry Unit Weight: 103.45 pcf
Saturation: 100.05 %

End of Saturation

Time: 100.81 min
Total Vertical Stress: 84.003 psi
Total Horizontal Stress: 84 psi
Pore Pressure: 81.991 psi
Effective Vertical Stress: 2.0114 psi
Effective Horizontal Stress: 2.0092 psi

Height Change: -0.040158 in
Area Change: 0 in²
Volume Change: -1.2569 in³
Volume Correction: -0.0063616 in³

Height: 5.7142 in
Area: 6.4301 in²
Volume: 37.748 in³

Moisture: 24.69 %
Void Ratio: 0.65
Dry Unit Weight: 100.01 pcf
Saturation: 100.00 %

End of Consolidation/B

Time: 210.8 min
Total Vertical Stress: 102.01 psi
Total Horizontal Stress: 102 psi
Pore Pressure: 82.001 psi
Effective Vertical Stress: 20.005 psi
Effective Horizontal Stress: 19.998 psi

Height Change: -0.040441 in
Area Change: 0 in²
Volume Change: -0.64662 in³

Height: 5.7144 in
Area: 6.4301 in²
Volume: 37.137 in³

Moisture: 23.68 %
Void Ratio: 0.63
Dry Unit Weight: 101.65 pcf
Saturation: 100.00 %

End of Shear

Time: 454.2 min
Total Vertical Stress: 140.57 psi
Total Horizontal Stress: 102 psi
Pore Pressure: 84.054 psi
Effective Vertical Stress: 56.517 psi
Effective Horizontal Stress: 17.945 psi

Height Change: 0.72268 in
Area Change: 0 in²
Volume Change: -0.64659 in³

Height: 4.9513 in
Area: 6.4301 in²
Volume: 37.137 in³

Moisture: 23.68 %
Void Ratio: 0.63
Dry Unit Weight: 101.65 pcf
Saturation: 100.00 %

At Failure

Time: 390.9 min
Total Vertical Stress: 141.56 psi
Total Horizontal Stress: 102 psi
Pore Pressure: 84.468 psi
Effective Vertical Stress: 57.096 psi
Effective Horizontal Stress: 17.532 psi

Height Change: 0.51923 in
Area Change: 0 in²
Volume Change: -0.64659 in³

Height: 5.1548 in
Area: 6.4301 in²
Volume: 37.137 in³

Moisture: 23.68 %
Void Ratio: 0.63
Dry Unit Weight: 101.65 pcf
Saturation: 100.00 %

TRIAXIAL TEST

Project: SPFLD Rail Improvements
Boring No.: B-175
Sample No.: 7-2
Test No.: 1 of 3

Location: Springfield, Illinois
Tested By: RIN
Test Date: 11-13-2013
Sample Type:

Project No.: 09L0179B
Checked By: JPK
Depth: 16.5-17.0
Elevation: N/A

Soil Description: Brn. & gray vf. sandy Silt.

Remarks: 2500 # Load Cell Loadtrac II # 258112 FlowTrac II 13610 & 13610B & LVDT55306

Specimen Height: 5.71 in
Specimen Area: 6.43 in²
Specimen Volume: 37.14 in³

Piston Area: 0.20 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 psi
Membrane Correction: 0.00 lb/in
Correction Type: None

Liquid Limit: 0

Plastic Limit: 0

Estimated Specific Gravity: 2.65

	Time min	Vertical Strain %	Volumetric Strain %	Corrected Area in ²	Deviator Load lb	Deviator Stress psi	Pore Pressure psi	Horizontal Stress psi	Vertical Stress psi
1	0	0	0	6.4301	0.1368	0.021275	81.991	102	102.02
2	1.9977	0.089944	0	6.4301	3.1829	0.495	82.054	101.98	102.48
3	3.5844	0.1789	0	6.4301	3.1791	0.49441	82.064	102	102.5
4	5.1491	0.26786	0	6.4301	3.1801	0.49456	82.069	102	102.49
5	6.7182	0.35681	0	6.4301	3.1801	0.49456	82.079	102	102.49
6	8.3005	0.44577	0	6.4301	3.3755	0.52495	82.084	102	102.53
7	9.8873	0.53472	0	6.4301	3.3755	0.52495	82.089	102	102.53
8	11.531	0.62368	0	6.4301	10.739	1.6701	82.439	102	103.67
9	13.22	0.71263	0	6.4301	38.816	6.0366	84.137	102	108.04
10	14.838	0.80159	0	6.4301	62.867	9.7771	85.601	102	111.78
11	16.46	0.89055	0	6.4301	82.992	12.907	86.676	102	114.91
12	19.739	1.0685	0	6.4301	115.58	17.976	88.043	102	119.98
13	22.997	1.2474	0	6.4301	140.81	21.899	88.822	102	123.9
14	26.223	1.4253	0	6.4301	161.43	25.105	89.284	102	127.1
15	29.454	1.6032	0	6.4301	179.2	27.869	89.556	102	129.87
16	32.685	1.7811	0	6.4301	193.92	30.159	89.693	102	132.16
17	35.921	1.959	0	6.4301	206.3	32.084	89.707	101.97	134.05
18	39.183	2.1369	0	6.4301	215.62	33.533	89.625	102	135.54
19	42.409	2.3148	0	6.4301	222.89	34.663	89.474	101.98	136.65
20	45.702	2.4937	0	6.4301	228.09	35.472	89.269	102	137.48
21	48.964	2.6716	0	6.4301	232.21	36.113	89.046	102	138.11
22	57.185	3.1164	0	6.4301	238.3	37.06	88.442	102	139.06
23	65.393	3.5612	0	6.4301	242.61	37.73	87.863	102.03	139.76
24	73.637	4.007	0	6.4301	243.89	37.93	87.357	102	139.93
25	81.969	4.4517	0	6.4301	245.56	38.19	86.9	102	140.19
26	90.287	4.8975	0	6.4301	246.64	38.357	86.506	102	140.36
27	98.61	5.3423	0	6.4301	247.62	38.51	86.175	102	140.51
28	106.91	5.7871	0	6.4301	248.7	38.678	85.888	102	140.68
29	115.24	6.2328	0	6.4301	249.29	38.77	85.635	102	140.77
30	123.47	6.6776	0	6.4301	250.47	38.953	85.426	102	140.96
31	131.61	7.1224	0	6.4301	251.06	39.045	85.246	102	141.04
32	139.72	7.5682	0	6.4301	251.45	39.106	85.085	101.99	141.1
33	147.83	8.0129	0	6.4301	252.14	39.212	84.949	102	141.22
34	155.94	8.4577	0	6.4301	252.24	39.228	84.818	102	141.23
35	164.02	8.9035	0	6.4301	253.32	39.396	84.691	102	141.4
36	180.1	9.794	0	6.4301	254.4	39.564	84.468	102	141.56
37	196.05	10.684	0	6.4301	252.14	39.212	84.312	102	141.22
38	211.85	11.574	0	6.4301	250.67	38.983	84.195	102	140.98
39	227.65	12.465	0	6.4301	249.78	38.846	84.112	102	140.85
40	243.4	13.354	0	6.4301	248.02	38.571	84.054	102	140.57

TRIAXIAL TEST

Project: SPFLD Rail Improvements
Boring No.: B-175
Sample No.: 7-2
Test No.: 1 of 3

Location: Springfield, Illinois
Tested By: RIN
Test Date: 11-13-2013
Sample Type:

Project No.: 09L0179B
Checked By: JPK
Depth: 16.5-17.0
Elevation: N/A

Soil Description: Brn. & gray vf. sandy Silt.

Remarks: 2500 # Load Cell Loadtrac II # 258112 FlowTrac II 13610 & 13610B & LVDT55306

Specimen Height: 5.71 in
Specimen Area: 6.43 in²
Specimen Volume: 37.14 in³

Piston Area: 0.20 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 psi
Membrane Correction: 0.00 lb/in
Correction Type: None

Liquid Limit: 0

Plastic Limit: 0

Estimated Specific Gravity: 2.65

	Vertical Strain %	Total Vertical Stress psi	Total Horizontal Stress psi	Excess Pore Pressure psi	A Parameter	Effective Vertical Stress psi	Effective Horizontal Stress psi	Stress Ratio	Effective p psi	q psi
1	0.00	102.02	102	0	0.000	20.03	20.008	1.001	20.019	0.010637
2	0.09	102.48	101.98	0.063246	0.164	20.425	19.93	1.025	20.178	0.2475
3	0.18	102.5	102	0.072976	0.144	20.435	19.94	1.025	20.187	0.24721
4	0.27	102.49	102	0.077841	0.164	20.425	19.93	1.025	20.178	0.24728
5	0.36	102.49	102	0.087571	0.185	20.415	19.921	1.025	20.168	0.24728
6	0.45	102.53	102	0.092437	0.174	20.446	19.921	1.026	20.183	0.26247
7	0.53	102.53	102	0.097302	0.184	20.441	19.916	1.026	20.178	0.26247
8	0.62	103.67	102	0.44759	0.271	21.231	19.561	1.085	20.396	0.83507
9	0.71	108.04	102	2.1455	0.357	23.899	17.863	1.338	20.881	3.0183
10	0.80	111.78	102	3.6099	0.370	26.175	16.398	1.596	21.287	4.8885
11	0.89	114.91	102	4.6851	0.364	28.23	15.323	1.842	21.777	6.4534
12	1.07	119.98	102	6.0522	0.337	31.932	13.956	2.288	22.944	8.9878
13	1.25	123.9	102	6.8306	0.312	35.082	13.183	2.661	24.132	10.95
14	1.43	127.1	102	7.2928	0.291	37.821	12.715	2.974	25.268	12.553
15	1.60	129.87	102	7.5652	0.272	40.312	12.443	3.240	26.377	13.934
16	1.78	132.16	102	7.7014	0.256	42.466	12.307	3.451	27.386	15.079
17	1.96	134.05	101.97	7.716	0.242	44.346	12.263	3.616	28.305	16.042
18	2.14	135.54	102	7.6333	0.228	45.913	12.38	3.709	29.146	16.766
19	2.31	136.65	101.98	7.4825	0.216	47.174	12.511	3.771	29.843	17.332
20	2.49	137.48	102	7.2782	0.205	48.207	12.735	3.785	30.471	17.736
21	2.67	138.11	102	7.0544	0.195	49.067	12.954	3.788	31.01	18.057
22	3.12	139.06	102	6.4511	0.174	50.622	13.562	3.733	32.092	18.53
23	3.56	139.76	102.03	5.8722	0.155	51.901	14.17	3.663	33.035	18.865
24	4.01	139.93	102	5.3662	0.141	52.577	14.647	3.590	33.612	18.965
25	4.45	140.19	102	4.9089	0.129	53.289	15.099	3.529	34.194	19.095
26	4.90	140.36	102	4.5148	0.118	53.856	15.498	3.475	34.677	19.179
27	5.34	140.51	102	4.184	0.109	54.339	15.829	3.433	35.084	19.255
28	5.79	140.68	102	3.8969	0.101	54.794	16.116	3.400	35.455	19.339
29	6.23	140.77	102	3.6439	0.094	55.139	16.369	3.368	35.754	19.385
30	6.68	140.96	102	3.4347	0.088	55.531	16.578	3.350	36.055	19.476
31	7.12	141.04	102	3.2547	0.083	55.798	16.753	3.331	36.276	19.522
32	7.57	141.1	101.99	3.0942	0.079	56.015	16.909	3.313	36.462	19.553
33	8.01	141.22	102	2.958	0.075	56.267	17.055	3.299	36.661	19.606
34	8.46	141.23	102	2.8266	0.072	56.409	17.182	3.283	36.795	19.614
35	8.90	141.4	102	2.7001	0.068	56.708	17.313	3.275	37.011	19.698
36	9.79	141.56	102	2.4763	0.063	57.096	17.532	3.257	37.314	19.782
37	10.68	141.22	102	2.3206	0.059	56.905	17.692	3.216	37.299	19.606
38	11.57	140.98	102	2.2039	0.057	56.788	17.804	3.190	37.296	19.492
39	12.46	140.85	102	2.1212	0.055	56.738	17.892	3.171	37.315	19.423
40	13.35	140.57	102	2.0628	0.054	56.517	17.945	3.149	37.231	19.286

TRIAXIAL TEST

Project: SPFLD Rail Improvements
Boring No.: B-175
Sample No.: 7-3
Test No.: 2 of 3

Location: Springfield, Illinois
Tested By: RIN
Test Date: 11-14-2013
Sample Type:

Project No.: 09L0179B
Checked By: JPK
Depth: 17.0-17.5
Elevation: N/A

Soil Description: Brn. & gray vf. sandy Silt.
Remarks: 2500 # Load Cell Loadtrac II # 258112

FlowTrac II 13610 & 13610B & LVDT55306

Specimen Height: 5.73 in
Specimen Area: 6.57 in²
Specimen Volume: 37.66 in³

Piston Area: 0.20 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 psi
Membrane Correction: 0.00 lb/in
Correction Type: None

Liquid Limit: 40

Plastic Limit: 24

Estimated Specific Gravity: 2.65

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	19	---	1	1
Wt. Container + Wet Soil, gm	51.87	1239.4	1235.1	1280
Wt. Container + Dry Soil, gm	42.98	1010.8	1010.8	1049.5
Wt. Container, gm	3.67	---	50.07	50.07
Wt. Dry Soil, gm	39.31	1010.8	1010.8	999.38
Water Content, %	22.62	22.62	22.20	23.07
Void Ratio	---	0.62	0.59	---
Degree of Saturation, %	---	96.98	100.00	---
Dry Unit Weight, pcf	---	102.25	104.16	---

Initial

Height: 5.7303 in
Area: 6.572 in²
Volume: 37.659 in³
Moisture: 22.62 %
Void Ratio: 0.62
Dry Unit Weight: 102.25 pcf
Saturation: 96.98 %

End of Initialization

Time: 2.1836 min
Total Vertical Stress: 4.003 psi
Total Horizontal Stress: 4.0176 psi
Pore Pressure: 1.9752 psi
Effective Vertical Stress: 2.0278 psi
Effective Horizontal Stress: 2.0424 psi

Height Change: 0.0019768 in
Area Change: 0 in²
Volume Change: -0.10551 in³
Height: 5.7283 in
Area: 6.572 in²
Volume: 37.765 in³

Moisture: 22.78 %
Void Ratio: 0.62
Dry Unit Weight: 101.96 pcf
Saturation: 96.98 %

End of Consolidation/A

Time: 2.1836 min
Total Vertical Stress: 4.003 psi
Total Horizontal Stress: 4.0176 psi
Pore Pressure: 1.9752 psi
Effective Vertical Stress: 2.0278 psi
Effective Horizontal Stress: 2.0424 psi

Height Change: 0.0019768 in
Area Change: 0 in²
Volume Change: -0.10551 in³
Height: 5.7283 in
Area: 6.572 in²
Volume: 37.765 in³

Moisture: 22.78 %
Void Ratio: 0.62
Dry Unit Weight: 101.96 pcf
Saturation: 96.98 %

End of Saturation

Time: 88.306 min
Total Vertical Stress: 73.998 psi
Total Horizontal Stress: 73.998 psi
Pore Pressure: 71.998 psi
Effective Vertical Stress: 1.9996 psi
Effective Horizontal Stress: 1.9993 psi

Height Change: 0.0062129 in
Area Change: 0 in²
Volume Change: -0.66557 in³
Height: 5.7241 in
Area: 6.572 in²
Volume: 37.916 in³
Volume Correction: 0.40886 in³

Moisture: 23.69 %
Void Ratio: 0.63
Dry Unit Weight: 101.56 pcf
Saturation: 99.80 %

End of Consolidation/B

Time: 200.82 min
Total Vertical Stress: 102.01 psi
Total Horizontal Stress: 102 psi
Pore Pressure: 72.013 psi
Effective Vertical Stress: 29.992 psi
Effective Horizontal Stress: 29.987 psi

Height Change: -0.01107 in
Area Change: 0 in²
Volume Change: 0.28243 in³
Height: 5.7414 in
Area: 6.572 in²
Volume: 36.968 in³

Moisture: 22.20 %
Void Ratio: 0.59
Dry Unit Weight: 104.16 pcf
Saturation: 100.00 %

End of Shear

Time: 443.87 min
Total Vertical Stress: 130.43 psi
Total Horizontal Stress: 102 psi
Pore Pressure: 86.433 psi
Effective Vertical Stress: 43.999 psi
Effective Horizontal Stress: 15.566 psi

Height Change: 0.74764 in
Area Change: 0 in²
Volume Change: 0.28247 in³
Height: 4.9827 in
Area: 6.572 in²
Volume: 36.968 in³

Moisture: 22.20 %
Void Ratio: 0.59
Dry Unit Weight: 104.16 pcf
Saturation: 100.00 %

At Failure

Time: 443.87 min
Total Vertical Stress: 130.43 psi
Total Horizontal Stress: 102 psi
Pore Pressure: 86.433 psi
Effective Vertical Stress: 43.999 psi
Effective Horizontal Stress: 15.566 psi

Height Change: 0.74764 in
Area Change: 0 in²
Volume Change: 0.28247 in³
Height: 4.9827 in
Area: 6.572 in²
Volume: 36.968 in³

Moisture: 22.20 %
Void Ratio: 0.59
Dry Unit Weight: 104.16 pcf
Saturation: 100.00 %

TRIAXIAL TEST

Project: SPFLD Rail Improvements
Boring No.: B-175
Sample No.: 7-3
Test No.: 2 of 3

Location: Springfield, Illinois
Tested By: RIN
Test Date: 11-14-2013
Sample Type:

Project No.: 09L0179B
Checked By: JPK
Depth: 17.0-17.5
Elevation: N/A

Soil Description: Brn. & gray vf. sandy Silt.

Remarks: 2500 # Load Cell Loadtrac II # 258112 FlowTrac II 13610 & 13610B & LVDT55306

Specimen Height: 5.74 in
Specimen Area: 6.57 in²
Specimen Volume: 36.97 in³

Piston Area: 0.20 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 psi
Membrane Correction: 0.00 lb/in
Correction Type: None

Liquid Limit: 40

Plastic Limit: 24

Estimated Specific Gravity: 2.65

	Time min	Vertical Strain %	Volumetric Strain %	Corrected Area in ²	Deviator Load lb	Deviator Stress psi	Pore Pressure psi	Horizontal Stress psi	Vertical Stress psi
1	0	0	0	6.572	0.13585	0.020671	71.984	102	102.03
2	1.8384	0.088538	0	6.572	2.9828	0.45386	72.616	102	102.46
3	3.4473	0.17708	0	6.572	2.877	0.43777	72.816	102.04	102.48
4	5.0164	0.26463	0	6.572	2.7874	0.42413	72.967	102	102.42
5	6.6076	0.35317	0	6.572	2.8894	0.43965	73.093	101.98	102.42
6	8.1546	0.44072	0	6.572	3.081	0.4688	73.19	102	102.47
7	9.7546	0.52926	0	6.572	3.1791	0.48374	73.288	102	102.49
8	11.359	0.61682	0	6.572	3.0819	0.46894	73.37	102	102.47
9	12.95	0.70536	0	6.572	2.9837	0.45401	73.443	102	102.45
10	14.524	0.79291	0	6.572	2.9837	0.45401	73.516	102	102.45
11	16.141	0.88145	0	6.572	2.8856	0.43907	73.584	102	102.44
12	19.328	1.0575	0	6.572	3.081	0.4688	73.696	102	102.47
13	22.639	1.2336	0	6.572	49.025	7.4598	76.552	102	109.46
14	25.901	1.4097	0	6.572	81.716	12.434	79.525	102	114.43
15	29.14	1.5858	0	6.572	103.31	15.72	81.617	102	117.72
16	32.389	1.7629	0	6.572	119.12	18.125	83.13	102	120.12
17	35.673	1.939	0	6.572	131.39	19.992	84.244	102	121.99
18	38.944	2.1151	0	6.572	140.52	21.382	85.076	102	123.39
19	42.206	2.2912	0	6.572	148.27	22.562	85.718	102	124.57
20	45.472	2.4673	0	6.572	154.26	23.473	86.214	102	125.47
21	48.738	2.6434	0	6.572	159.17	24.22	86.598	102	126.22
22	56.973	3.0841	0	6.572	167.91	25.549	87.221	102	127.55
23	65.238	3.5248	0	6.572	172.82	26.296	87.513	102	128.3
24	73.499	3.9646	0	6.572	175.57	26.714	87.615	102	128.71
25	81.8	4.4053	0	6.572	177.53	27.013	87.615	102	129.01
26	90.167	4.846	0	6.572	178.22	27.118	87.557	102	129.12
27	98.516	5.2867	0	6.572	178.02	27.088	87.484	102	129.09
28	106.83	5.7265	0	6.572	178.02	27.088	87.391	102	129.09
29	115.08	6.1672	0	6.572	177.63	27.028	87.299	101.99	129.02
30	123.29	6.6079	0	6.572	177.24	26.968	87.226	102	128.97
31	131.43	7.0486	0	6.572	176.84	26.908	87.153	102	128.91
32	139.52	7.4894	0	6.572	176.84	26.909	87.085	102	128.91
33	147.58	7.9291	0	6.572	176.74	26.894	87.027	102	128.89
34	155.62	8.3698	0	6.572	176.25	26.819	86.963	102	128.82
35	163.7	8.8106	0	6.572	176.65	26.879	86.91	102	128.88
36	179.76	9.691	0	6.572	178.31	27.133	86.808	102	129.14
37	195.69	10.572	0	6.572	179.69	27.342	86.696	102	129.34
38	211.49	11.453	0	6.572	181.75	27.655	86.584	102	129.66
39	227.27	12.334	0	6.572	184.11	28.014	86.506	102	130.02
40	243.05	13.215	0	6.572	186.86	28.432	86.433	102	130.43

TRIAXIAL TEST

Project: SPFLD Rail Improvements
Boring No.: B-175
Sample No.: 7-3
Test No.: 2 of 3

Location: Springfield, Illinois
Tested By: RIN
Test Date: 11-14-2013
Sample Type:

Project No.: 09L0179B
Checked By: JPK
Depth: 17.0-17.5
Elevation: N/A

Soil Description: Brn. & gray vf. sandy Silt.

Remarks: 2500 # Load Cell Loadtrac II # 258112 FlowTrac II 13610 & 13610B & LVDT55306

Specimen Height: 5.74 in
Specimen Area: 6.57 in²
Specimen Volume: 36.97 in³

Piston Area: 0.20 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 psi
Membrane Correction: 0.00 lb/in
Correction Type: None

Liquid Limit: 40

Plastic Limit: 24

Estimated Specific Gravity: 2.65

	Vertical Strain %	Total Vertical Stress psi	Total Horizontal Stress psi	Excess Pore Pressure psi	A Parameter	Effective Vertical Stress psi	Effective Horizontal Stress psi	Stress Ratio	Effective p psi	q psi
1	0.00	102.03	102	0	0.000	30.041	30.021	1.001	30.031	0.010335
2	0.09	102.46	102	0.63246	1.460	29.842	29.388	1.015	29.615	0.22693
3	0.18	102.48	102.04	0.83193	1.901	29.665	29.228	1.015	29.446	0.21888
4	0.26	102.42	102	0.98275	2.448	29.457	29.033	1.015	29.245	0.21207
5	0.35	102.42	101.98	1.1092	2.706	29.327	28.887	1.015	29.107	0.21982
6	0.44	102.47	102	1.2065	2.692	29.283	28.814	1.016	29.048	0.2344
7	0.53	102.49	102	1.3038	2.816	29.2	28.717	1.017	28.959	0.24187
8	0.62	102.47	102	1.3865	3.104	29.098	28.629	1.016	28.864	0.23447
9	0.71	102.45	102	1.4595	3.379	29.01	28.556	1.016	28.783	0.227
10	0.79	102.45	102	1.5325	3.548	28.937	28.483	1.016	28.71	0.227
11	0.88	102.44	102	1.6006	3.837	28.854	28.415	1.015	28.635	0.21953
12	1.06	102.47	102	1.7125	3.821	28.777	28.308	1.017	28.542	0.2344
13	1.23	109.46	102	4.5683	0.615	32.907	25.447	1.293	29.177	3.7299
14	1.41	114.43	102	7.5409	0.608	34.909	22.475	1.553	28.692	6.217
15	1.59	117.72	102	9.6329	0.614	36.103	20.383	1.771	28.243	7.8601
16	1.76	120.12	102	11.146	0.616	36.995	18.87	1.961	27.932	9.0626
17	1.94	121.99	102	12.26	0.614	37.748	17.756	2.126	27.752	9.9962
18	2.12	123.39	102	13.092	0.613	38.31	16.929	2.263	27.619	10.691
19	2.29	124.57	102	13.734	0.609	38.848	16.286	2.385	27.567	11.281
20	2.47	125.47	102	14.23	0.607	39.258	15.785	2.487	27.522	11.736
21	2.64	126.22	102	14.615	0.604	39.621	15.401	2.573	27.511	12.11
22	3.08	127.55	102	15.237	0.597	40.332	14.783	2.728	27.558	12.775
23	3.52	128.3	102	15.529	0.591	40.787	14.491	2.815	27.639	13.148
24	3.96	128.71	102	15.632	0.586	41.099	14.384	2.857	27.741	13.357
25	4.41	129.01	102	15.632	0.579	41.397	14.384	2.878	27.891	13.507
26	4.85	129.12	102	15.573	0.575	41.565	14.447	2.877	28.006	13.559
27	5.29	129.09	102	15.5	0.573	41.608	14.52	2.865	28.064	13.544
28	5.73	129.09	102	15.408	0.569	41.701	14.613	2.854	28.157	13.544
29	6.17	129.02	101.99	15.315	0.567	41.724	14.696	2.839	28.21	13.514
30	6.61	128.97	102	15.242	0.566	41.742	14.773	2.825	28.258	13.484
31	7.05	128.91	102	15.169	0.564	41.76	14.851	2.812	28.305	13.454
32	7.49	128.91	102	15.101	0.562	41.823	14.914	2.804	28.369	13.454
33	7.93	128.89	102	15.043	0.560	41.867	14.973	2.796	28.42	13.447
34	8.37	128.82	102	14.98	0.559	41.86	15.041	2.783	28.45	13.409
35	8.81	128.88	102	14.926	0.556	41.968	15.09	2.781	28.529	13.439
36	9.69	129.14	102	14.824	0.547	42.329	15.197	2.785	28.763	13.566
37	10.57	129.34	102	14.712	0.539	42.645	15.304	2.787	28.975	13.671
38	11.45	129.66	102	14.6	0.528	43.076	15.42	2.793	29.248	13.828
39	12.33	130.02	102	14.522	0.519	43.512	15.498	2.808	29.505	14.007
40	13.21	130.43	102	14.449	0.509	43.999	15.566	2.827	29.783	14.216

TRIAXIAL TEST

Project: SPFLD Rail Improvements
Boring No.: B-175
Sample No.: 7-4
Test No.: 3 of 3

Location: Springfield, Illinois
Tested By: RIN
Test Date: 11-15-2013
Sample Type:

Project No.: 09L0179B
Checked By: JPK
Depth: 17.5-18.0
Elevation: N/A

Soil Description: Brn. & gray vf. sandy Silt.
Remarks: 2500 # Load Cell Loadtrac II # 258112

FlowTrac II 13610 & 13610B & LVDT55306

Specimen Height: 5.86 in
Specimen Area: 6.40 in²
Specimen Volume: 37.48 in³

Piston Area: 0.20 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 psi
Membrane Correction: 0.00 lb/in
Correction Type: None

Liquid Limit: 0

Plastic Limit: 0

Estimated Specific Gravity: 2.65

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	16	---	4	4
Wt. Container + Wet Soil, gm	41.85	1263	1244.4	1296.9
Wt. Container + Dry Soil, gm	34.99	1035.9	1035.9	1079.7
Wt. Container, gm	3.7	---	50.04	50.04
Wt. Dry Soil, gm	31.29	1035.9	1035.9	1029.7
Water Content, %	21.92	21.92	20.12	21.09
Void Ratio	---	0.57	0.53	---
Degree of Saturation, %	---	101.74	100.00	---
Dry Unit Weight, pcf	---	105.3	107.9	---

Initial

Height: 5.8583 in
Area: 6.3973 in²
Volume: 37.477 in³

Moisture: 21.92 %
Void Ratio: 0.57
Dry Unit Weight: 105.3 pcf
Saturation: 101.74 %

End of Initialization

Time: 2.1922 min
Total Vertical Stress: 3.979 psi
Total Horizontal Stress: 3.9933 psi
Pore Pressure: 1.9995 psi
Effective Vertical Stress: 1.9794 psi
Effective Horizontal Stress: 1.9937 psi

Height Change: -0.00033889 in
Area Change: 0 in²
Volume Change: -0.0078218 in³

Height: 5.8586 in
Area: 6.3973 in²
Volume: 37.485 in³

Moisture: 21.94 %
Void Ratio: 0.57
Dry Unit Weight: 105.28 pcf
Saturation: 101.74 %

End of Consolidation/A

Time: 2.1922 min
Total Vertical Stress: 3.979 psi
Total Horizontal Stress: 3.9933 psi
Pore Pressure: 1.9995 psi
Effective Vertical Stress: 1.9794 psi
Effective Horizontal Stress: 1.9937 psi

Height Change: -0.00033889 in
Area Change: 0 in²
Volume Change: -0.0078218 in³

Height: 5.8586 in
Area: 6.3973 in²
Volume: 37.485 in³

Moisture: 21.94 %
Void Ratio: 0.57
Dry Unit Weight: 105.28 pcf
Saturation: 101.74 %

End of Saturation

Time: 88.2 min
Total Vertical Stress: 73.983 psi
Total Horizontal Stress: 73.998 psi
Pore Pressure: 71.994 psi
Effective Vertical Stress: 1.9891 psi
Effective Horizontal Stress: 2.0042 psi

Height Change: -0.0013556 in
Area Change: 0 in²
Volume Change: -0.22965 in³
Volume Correction: -0.21384 in³

Height: 5.8597 in
Area: 6.3973 in²
Volume: 37.921 in³

Moisture: 22.29 %
Void Ratio: 0.59
Dry Unit Weight: 104.07 pcf
Saturation: 100.17 %

End of Consolidation/B

Time: 316.36 min
Total Vertical Stress: 111.99 psi
Total Horizontal Stress: 111.99 psi
Pore Pressure: 72.003 psi
Effective Vertical Stress: 39.982 psi
Effective Horizontal Stress: 39.989 psi

Height Change: -0.0021463 in
Area Change: 0 in²
Volume Change: 1.1163 in³

Height: 5.8604 in
Area: 6.3973 in²
Volume: 36.575 in³

Moisture: 20.12 %
Void Ratio: 0.53
Dry Unit Weight: 107.9 pcf
Saturation: 100.00 %

End of Shear

Time: 554.91 min
Total Vertical Stress: 152.14 psi
Total Horizontal Stress: 112 psi
Pore Pressure: 91.717 psi
Effective Vertical Stress: 60.422 psi
Effective Horizontal Stress: 20.286 psi

Height Change: 0.87693 in
Area Change: 0 in²
Volume Change: 1.1163 in³

Height: 4.9814 in
Area: 6.3973 in²
Volume: 36.575 in³

Moisture: 20.12 %
Void Ratio: 0.53
Dry Unit Weight: 107.9 pcf
Saturation: 100.00 %

At Failure

Time: 554.91 min
Total Vertical Stress: 152.14 psi
Total Horizontal Stress: 112 psi
Pore Pressure: 91.717 psi
Effective Vertical Stress: 60.422 psi
Effective Horizontal Stress: 20.286 psi

Height Change: 0.87693 in
Area Change: 0 in²
Volume Change: 1.1163 in³

Height: 4.9814 in
Area: 6.3973 in²
Volume: 36.575 in³

Moisture: 20.12 %
Void Ratio: 0.53
Dry Unit Weight: 107.9 pcf
Saturation: 100.00 %

TRIAXIAL TEST

Project: SPFLD Rail Improvements
Boring No.: B-175
Sample No.: 7-4
Test No.: 3 of 3

Location: Springfield, Illinois
Tested By: RIN
Test Date: 11-15-2013
Sample Type:

Project No.: 09L0179B
Checked By: JPK
Depth: 17.5-18.0
Elevation: N/A

Soil Description: Brn. & gray vf. sandy Silt.

Remarks: 2500 # Load Cell Loadtrac II # 258112 FlowTrac II 13610 & 13610B & LVDT55306

Specimen Height: 5.86 in
Specimen Area: 6.40 in²
Specimen Volume: 36.57 in³

Piston Area: 0.20 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 psi
Membrane Correction: 0.00 lb/in
Correction Type: None

Liquid Limit: 0

Plastic Limit: 0

Estimated Specific Gravity: 2.65

	Time min	Vertical Strain %	Volumetric Strain %	Corrected Area in ²	Deviator Load lb	Deviator Stress psi	Pore Pressure psi	Horizontal Stress psi	Vertical Stress psi
1	0	0	0	6.3973	0.15537	0.024286	72.013	111.97	112
2	1.7149	0.10023	0	6.3973	5.9427	0.92893	73.205	112	112.93
3	3.3149	0.20046	0	6.3973	6.0399	0.94413	73.672	112	112.95
4	4.906	0.3007	0	6.3973	5.7454	0.89809	73.988	112	112.9
5	6.4796	0.40093	0	6.3973	5.7454	0.89809	74.231	112	112.9
6	8.0486	0.5002	0	6.3973	5.7454	0.89809	74.421	112	112.9
7	9.6089	0.60043	0	6.3973	5.6472	0.88274	74.587	112	112.88
8	11.2	0.70066	0	6.3973	5.6472	0.88274	74.728	112	112.88
9	12.783	0.80089	0	6.3973	5.4518	0.8522	74.854	112	112.85
10	14.356	0.90016	0	6.3973	5.4518	0.8522	74.961	112	112.85
11	15.947	1.0004	0	6.3973	15.465	2.4174	75.467	112	114.41
12	19.311	1.2009	0	6.3973	78.49	12.269	78.848	112	124.27
13	22.529	1.4004	0	6.3973	121.39	18.975	83.31	112	130.97
14	25.707	1.6008	0	6.3973	151.23	23.64	86.2	112	135.64
15	28.858	1.8003	0	6.3973	172.24	26.924	88.131	112	138.92
16	32.018	2.0008	0	6.3973	187.46	29.303	89.605	112	141.3
17	35.157	2.2003	0	6.3973	198.55	31.037	90.617	112	143.04
18	38.3	2.4008	0	6.3973	206.5	32.28	91.357	112	144.28
19	41.431	2.6003	0	6.3973	212.79	33.262	91.901	112	145.26
20	44.582	2.8007	0	6.3973	217.4	33.983	92.315	112	145.98
21	47.712	3.0002	0	6.3973	221.13	34.566	92.626	112	146.57
22	55.568	3.5004	0	6.3973	227.41	35.548	93.108	112	147.55
23	63.445	4.0006	0	6.3973	230.16	35.978	93.346	112	147.98
24	71.362	4.5008	0	6.3973	231.93	36.254	93.434	112	148.26
25	79.212	5	0	6.3973	234.09	36.592	93.424	112	148.59
26	87.095	5.5002	0	6.3973	235.76	36.853	93.361	112	148.85
27	94.981	6.0004	0	6.3973	235.75	36.851	93.269	112.05	148.9
28	102.85	6.5006	0	6.3973	236.85	37.023	93.181	111.95	148.97
29	110.75	7.0008	0	6.3973	238.31	37.252	93.079	112	149.25
30	118.67	7.5001	0	6.3973	241.55	37.758	92.981	112	149.76
31	126.66	8.0012	0	6.3973	243.12	38.004	92.879	112	150.01
32	134.59	8.5005	0	6.3973	242.63	37.927	92.753	112	149.92
33	142.5	9.0007	0	6.3973	243.61	38.08	92.651	112	150.08
34	150.44	9.5009	0	6.3973	244.59	38.234	92.548	112	150.23
35	158.37	10	0	6.3973	243.42	38.05	92.456	112	150.05
36	174.32	11	0	6.3973	246.36	38.51	92.315	112	150.51
37	190.38	12.001	0	6.3973	248.72	38.878	92.154	112	150.88
38	206.34	13.001	0	6.3973	251.56	39.323	91.999	112	151.33
39	222.38	14.001	0	6.3973	254.02	39.708	91.853	111.98	151.69
40	238.54	15	0	6.3973	256.77	40.137	91.717	112	152.14

TRIAXIAL TEST

Project: SPFLD Rail Improvements
Boring No.: B-175
Sample No.: 7-4
Test No.: 3 of 3

Location: Springfield, Illinois
Tested By: RIN
Test Date: 11-15-2013
Sample Type:

Project No.: 09L0179B
Checked By: JPK
Depth: 17.5-18.0
Elevation: N/A

Soil Description: Brn. & gray vf. sandy Silt.

Remarks: 2500 # Load Cell Loadtrac II # 258112 FlowTrac II 13610 & 13610B & LVDT55306

Specimen Height: 5.86 in
Specimen Area: 6.40 in²
Specimen Volume: 36.57 in³

Piston Area: 0.20 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 0.00 psi
Membrane Correction: 0.00 lb/in
Correction Type: None

Liquid Limit: 0

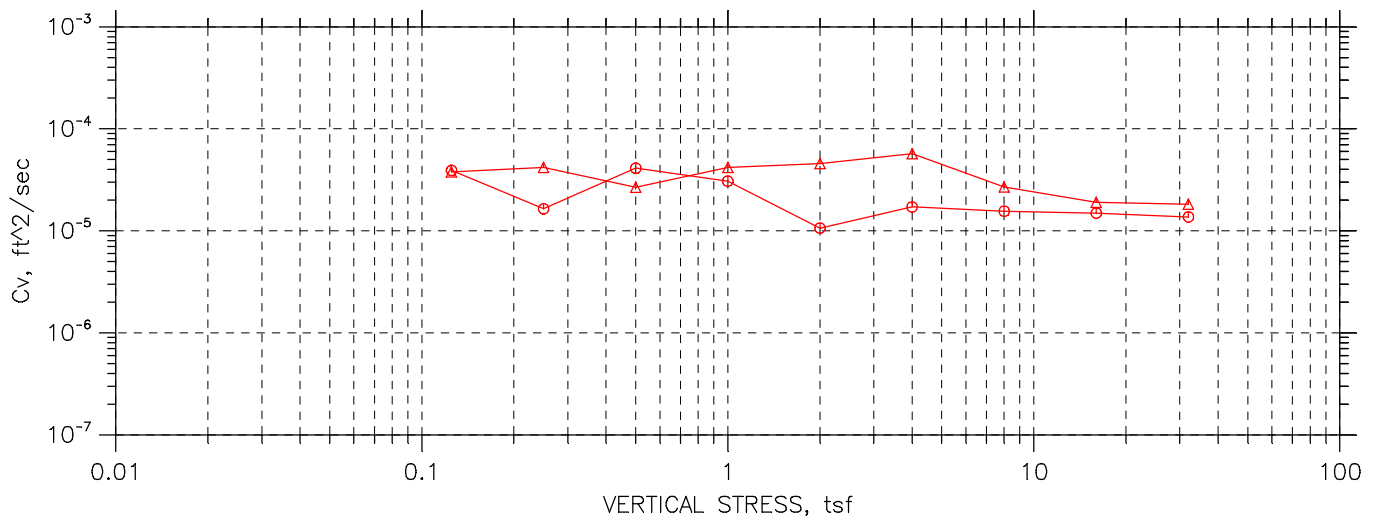
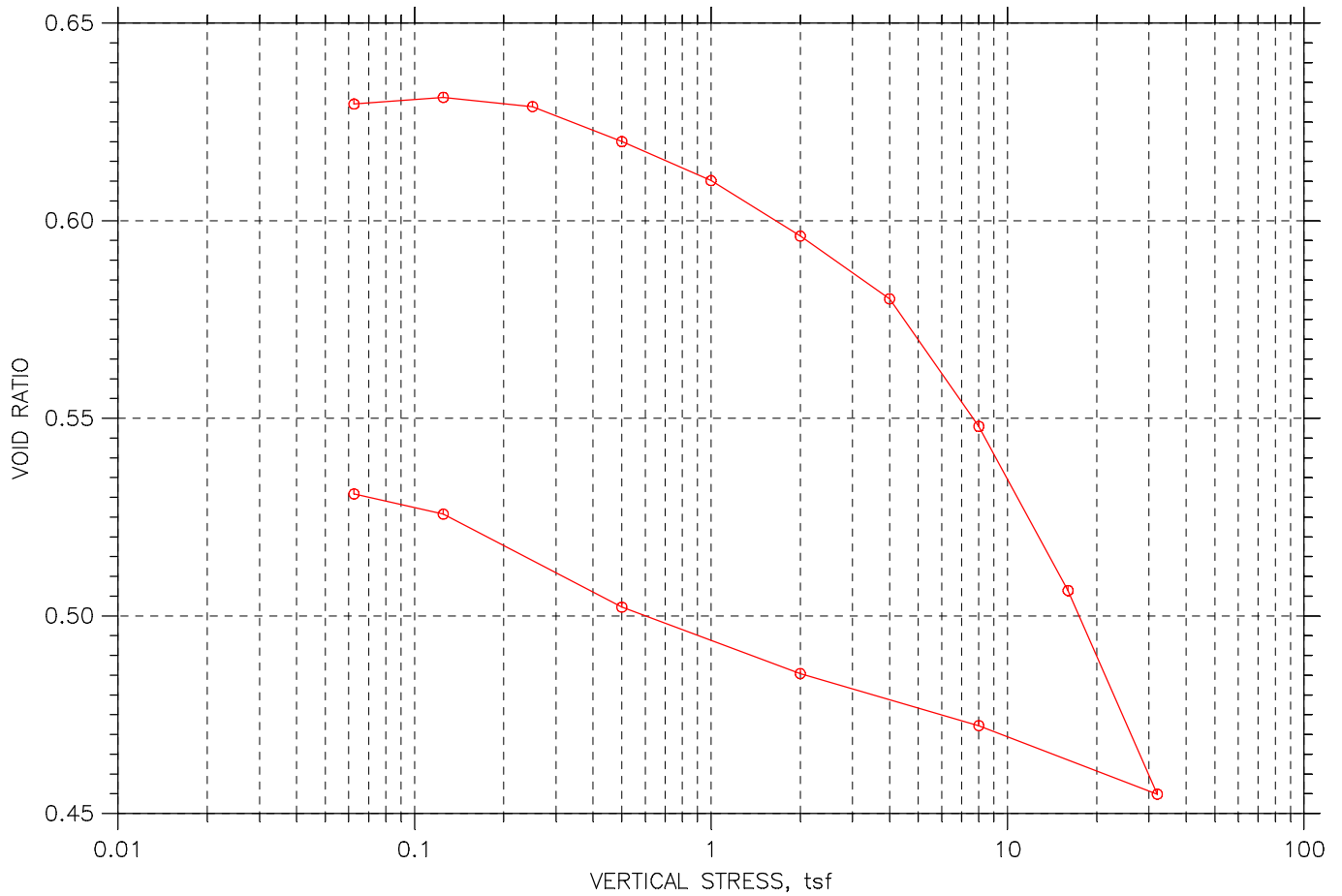
Plastic Limit: 0

Estimated Specific Gravity: 2.65

	Vertical Strain %	Total Vertical Stress psi	Total Horizontal Stress psi	Excess Pore Pressure psi	A Parameter	Effective Vertical Stress psi	Effective Horizontal Stress psi	Stress Ratio	Effective p psi	q psi
1	0.00	112	111.97	0	0.000	39.984	39.96	1.001	39.972	0.012143
2	0.10	112.93	112	1.1919	1.291	39.721	38.792	1.024	39.257	0.46446
3	0.20	112.95	112	1.659	1.772	39.274	38.33	1.025	38.802	0.47206
4	0.30	112.9	112	1.9752	2.227	38.912	38.014	1.024	38.463	0.44904
5	0.40	112.9	112	2.2185	2.505	38.669	37.771	1.024	38.22	0.44904
6	0.50	112.9	112	2.4082	2.723	38.479	37.581	1.024	38.03	0.44904
7	0.60	112.88	112	2.5736	2.964	38.298	37.416	1.024	37.857	0.44137
8	0.70	112.88	112	2.7147	3.128	38.157	37.275	1.024	37.716	0.44137
9	0.80	112.85	112	2.8412	3.402	37.995	37.143	1.023	37.569	0.4261
10	0.90	112.85	112	2.9482	3.532	37.888	37.036	1.023	37.462	0.4261
11	1.00	114.41	112	3.4542	1.433	38.948	36.53	1.066	37.739	1.2087
12	1.20	124.27	112	6.8354	0.556	45.418	33.149	1.370	39.284	6.1346
13	1.40	130.97	112	11.297	0.595	47.663	28.688	1.661	38.175	9.4876
14	1.60	135.64	112	14.187	0.600	49.438	25.798	1.916	37.618	11.82
15	1.80	138.92	112	16.118	0.598	50.791	23.866	2.128	37.328	13.462
16	2.00	141.3	112	17.592	0.600	51.695	22.392	2.309	37.044	14.651
17	2.20	143.04	112	18.604	0.599	52.422	21.385	2.451	36.903	15.518
18	2.40	144.28	112	19.344	0.599	52.925	20.646	2.564	36.785	16.14
19	2.60	145.26	112	19.888	0.597	53.363	20.101	2.655	36.732	16.631
20	2.80	145.98	112	20.302	0.597	53.666	19.682	2.727	36.674	16.992
21	3.00	146.57	112	20.613	0.596	53.942	19.376	2.784	36.659	17.283
22	3.50	147.55	112	21.095	0.593	54.438	18.889	2.882	36.664	17.774
23	4.00	147.98	112	21.333	0.593	54.629	18.651	2.929	36.64	17.989
24	4.50	148.26	112	21.421	0.590	54.822	18.568	2.952	36.695	18.127
25	5.00	148.59	112	21.411	0.585	55.165	18.573	2.970	36.869	18.296
26	5.50	148.85	112	21.348	0.579	55.494	18.641	2.977	37.068	18.426
27	6.00	148.9	112.05	21.256	0.575	55.629	18.778	2.963	37.203	18.426
28	6.50	148.97	111.95	21.168	0.573	55.791	18.768	2.973	37.279	18.512
29	7.00	149.25	112	21.066	0.565	56.175	18.923	2.969	37.549	18.626
30	7.50	149.76	112	20.969	0.555	56.779	19.021	2.985	37.9	18.879
31	8.00	150.01	112	20.866	0.549	57.126	19.123	2.987	38.125	19.002
32	8.50	149.92	112	20.74	0.547	57.171	19.245	2.971	38.208	18.963
33	9.00	150.08	112	20.638	0.542	57.432	19.352	2.968	38.392	19.04
34	9.50	150.23	112	20.536	0.537	57.683	19.449	2.966	38.566	19.117
35	10.00	150.05	112	20.443	0.537	57.596	19.546	2.947	38.571	19.025
36	11.00	150.51	112	20.302	0.527	58.192	19.682	2.957	38.937	19.255
37	12.00	150.88	112	20.141	0.518	58.721	19.843	2.959	39.282	19.439
38	13.00	151.33	112	19.986	0.508	59.327	20.003	2.966	39.665	19.662
39	14.00	151.69	111.98	19.84	0.500	59.833	20.125	2.973	39.979	19.854
40	15.00	152.14	112	19.704	0.490	60.422	20.286	2.979	40.354	20.068

CONSOLIDATION TEST DATA

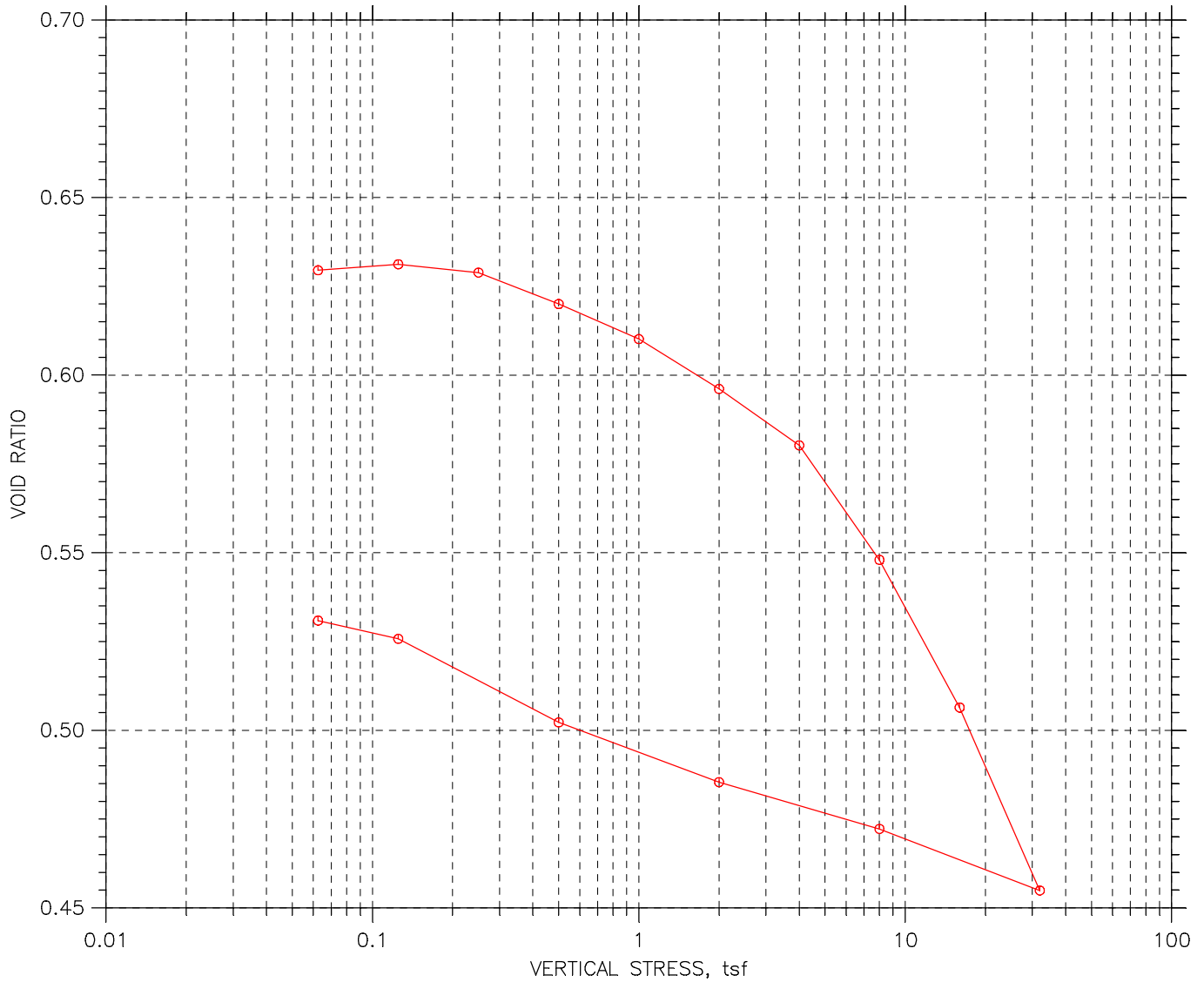
SUMMARY REPORT



Project: SPFLD. Rail Improvements	Location: Springfield, Illinois	Project No.: 09L0179B
Boring No.: B161	Tested By: RIN	Checked By: JPK
Sample No.: 2-2	Test Date: 11-12-20013	Depth: 3.5-4.0
Test No.: 1	Sample Type: Tube	Elevation: N/A
Description: Brn. & gray vf. sandy Silt.		
Remarks: User Must update correct calibration factors and node ID before proceeding to any test.		

CONSOLIDATION TEST DATA

SUMMARY REPORT



					Before Test	After Test
Overburden Pressure: 0 tsf				Water Content, %	23.42	20.73
Preconsolidation Pressure: 0 tsf				Dry Unit Weight, pcf	101.47	108.07
Compression Index: 0				Saturation, %	98.43	103.47
Diameter: 2.5 in		Height: 0.993 in		Void Ratio	0.63	0.53
LL: 29	PL: 20	PI: 9	GS: 2.65	Back Pressure, tsf	0	0

Project: SPFLD. Rail Improvements	Location: Springfield, Illinois	Project No.: 09L0179B
Boring No.: B161	Tested By: RIN	Checked By: JPK
Sample No.: 2-2	Test Date: 11-12-20013	Depth: 3.5-4.0
Test No.: 1	Sample Type: Tube	Elevation: N/A
Description: Brn. & gray vf. sandy Silt.		
Remarks: User Must update correct calibration factors and node ID before proceeding to any test.		

CONSOLIDATION TEST DATA

Project: SPFLD. Rail Improvements
 Boring No.: B161
 Sample No.: 2-2
 Test No.: 1

Location: Springfield, Illinois
 Tested By: RIN
 Test Date: 11-12-20013
 Sample Type: Tube

Project No.: 09L0179B
 Checked By: JPK
 Depth: 3.5-4.0
 Elevation: N/A

Soil Description: Brn. & gray vf. sandy Silt.

Remarks: User Must update correct calibration factors and node ID before proceeding to any test.

Estimated Specific Gravity: 2.65
 Initial Void Ratio: 0.63
 Final Void Ratio: 0.53

Liquid Limit: 29
 Plastic Limit: 20
 Plasticity Index: 9

Initial Height: 0.99 in
 Specimen Diameter: 2.50 in

	Before Consolidation		After Consolidation	
	Trimmings	Specimen+Ring	Specimen+Ring	Trimmings
Container ID	2	RING	19	19
Wt. Container + Wet Soil, gm	140.08	370.47	366.98	366.98
Wt. Container + Dry Soil, gm	123.87	340.07	340.07	340.07
Wt. Container, gm	50.17	210.24	210.24	210.24
Wt. Dry Soil, gm	73.7	129.83	129.83	129.83
Water Content, %	21.99	23.42	20.73	20.73
Void Ratio	---	0.63	0.53	---
Degree of Saturation, %	---	98.43	103.47	---
Dry Unit Weight, pcf	---	101.47	108.07	---

CONSOLIDATION TEST DATA

Project: SPFLD. Rail Improvements
Boring No.: B161
Sample No.: 2-2
Test No.: 1

Location: Springfield, Illinois
Tested By: RIN
Test Date: 11-12-20013
Sample Type: Tube

Project No.: 09L0179B
Checked By: JPK
Depth: 3.5-4.0
Elevation: N/A

Soil Description: Brn. & gray vf. sandy Silt.

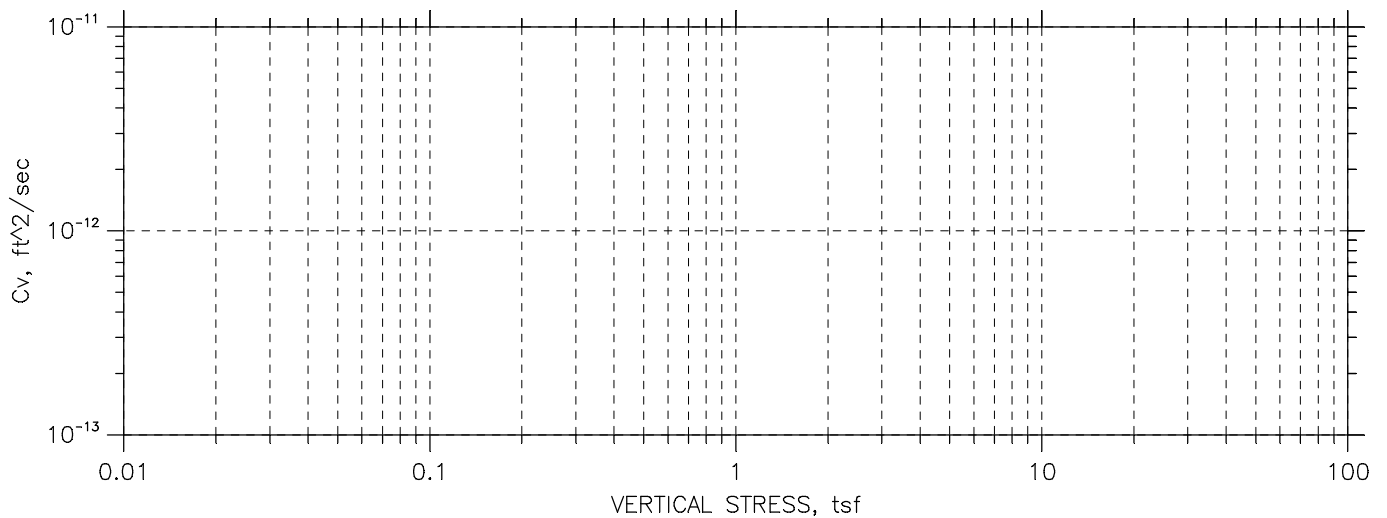
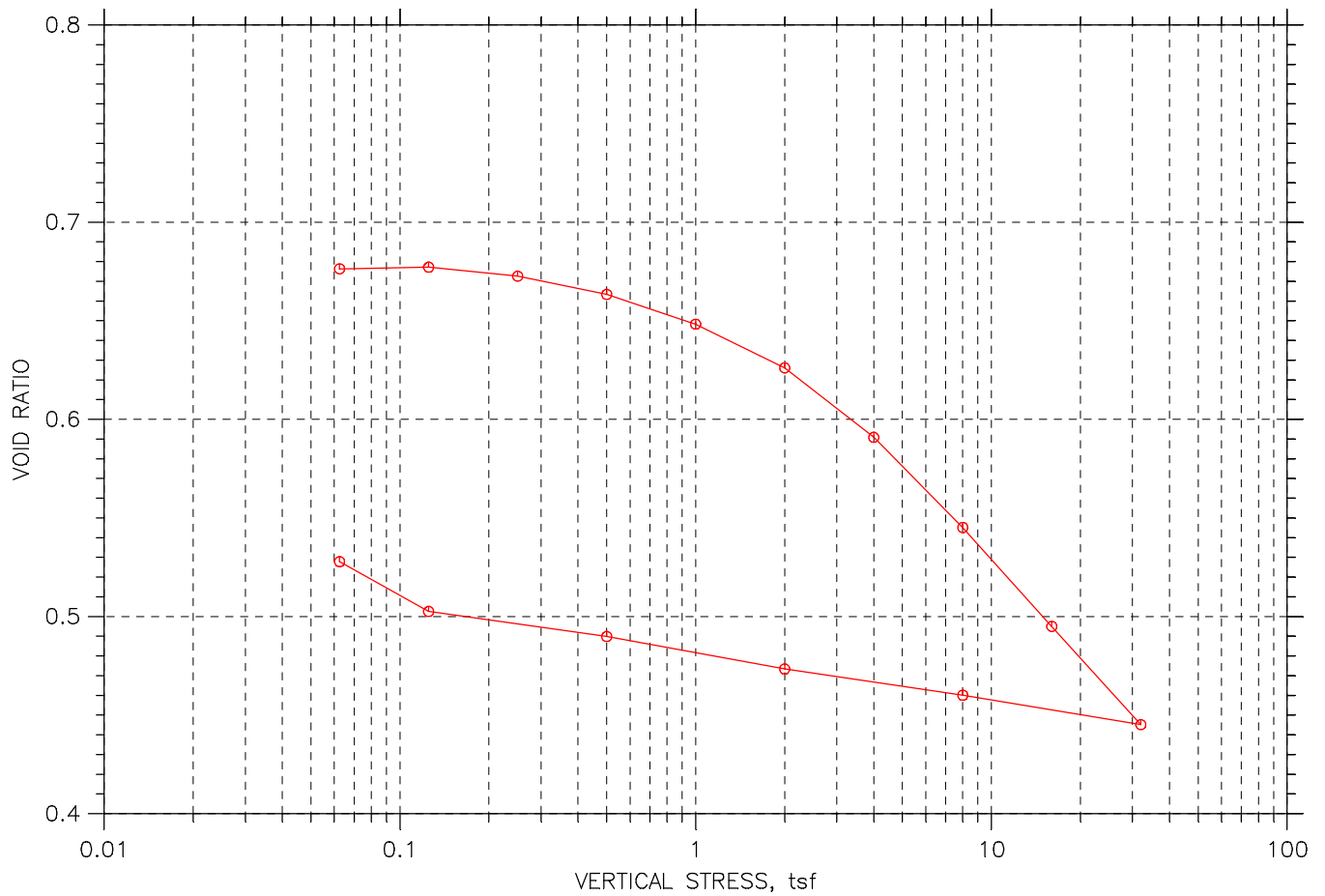
Remarks: User Must update correct calibration factors and node ID before proceeding to any test.

	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv ft^2/sec	Mv 1/tsf	k ft/day
1	0.0625	0.0005336	0.630	0.05	0.0	0.00e+000	8.60e-003	0.00e+000
2	0.125	-0.0004894	0.631	-0.05	0.6	3.91e-005	-1.65e-002	-1.74e-003
3	0.25	0.000935	0.629	0.09	1.5	1.65e-005	1.15e-002	5.09e-004
4	0.5	0.006313	0.620	0.64	0.6	4.11e-005	2.17e-002	2.40e-003
5	1	0.01233	0.610	1.24	0.8	3.07e-005	1.21e-002	1.00e-003
6	2	0.02088	0.596	2.10	2.2	1.06e-005	8.61e-003	2.47e-004
7	4	0.03056	0.580	3.08	1.3	1.72e-005	4.88e-003	2.25e-004
8	8	0.0502	0.548	5.06	1.4	1.56e-005	4.94e-003	2.08e-004
9	16	0.07551	0.506	7.60	1.4	1.49e-005	3.19e-003	1.28e-004
10	32	0.1069	0.455	10.76	1.5	1.37e-005	1.98e-003	7.29e-005
11	8	0.09633	0.472	9.70	0.1	2.03e-004	4.43e-004	2.43e-004
12	2	0.08831	0.485	8.89	0.3	7.90e-005	1.35e-003	2.87e-004
13	0.5	0.07807	0.502	7.86	9.6	2.12e-006	6.87e-003	3.93e-005
14	0.125	0.06373	0.526	6.42	59.8	3.49e-007	3.85e-002	3.62e-005
15	0.0625	0.06061	0.531	6.10	0.0	0.00e+000	5.03e-002	0.00e+000

	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Log. T50 min	Cv ft^2/sec	Mv 1/tsf	k ft/day	Ca %
1	0.0625	0.0005336	0.630	0.05	0.0	0.00e+000	8.60e-003	0.00e+000	0.00e+000
2	0.125	-0.0004894	0.631	-0.05	0.1	3.78e-005	-1.65e-002	-1.68e-003	0.00e+000
3	0.25	0.000935	0.629	0.09	0.1	4.18e-005	1.15e-002	1.29e-003	0.00e+000
4	0.5	0.006313	0.620	0.64	0.2	2.67e-005	2.17e-002	1.56e-003	0.00e+000
5	1	0.01233	0.610	1.24	0.1	4.19e-005	1.21e-002	1.37e-003	0.00e+000
6	2	0.02088	0.596	2.10	0.1	4.55e-005	8.61e-003	1.06e-003	0.00e+000
7	4	0.03056	0.580	3.08	0.1	5.70e-005	4.88e-003	7.49e-004	0.00e+000
8	8	0.0502	0.548	5.06	0.2	2.68e-005	4.94e-003	3.58e-004	0.00e+000
9	16	0.07551	0.506	7.60	0.3	1.90e-005	3.19e-003	1.64e-004	0.00e+000
10	32	0.1069	0.455	10.76	0.3	1.82e-005	1.98e-003	9.70e-005	0.00e+000
11	8	0.09633	0.472	9.70	0.0	1.02e-004	4.43e-004	1.21e-004	0.00e+000
12	2	0.08831	0.485	8.89	0.0	1.37e-004	1.35e-003	4.98e-004	0.00e+000
13	0.5	0.07807	0.502	7.86	0.0	0.00e+000	6.87e-003	0.00e+000	0.00e+000
14	0.125	0.06373	0.526	6.42	0.0	0.00e+000	3.85e-002	0.00e+000	0.00e+000
15	0.0625	0.06061	0.531	6.10	0.0	0.00e+000	5.03e-002	0.00e+000	0.00e+000

CONSOLIDATION TEST DATA

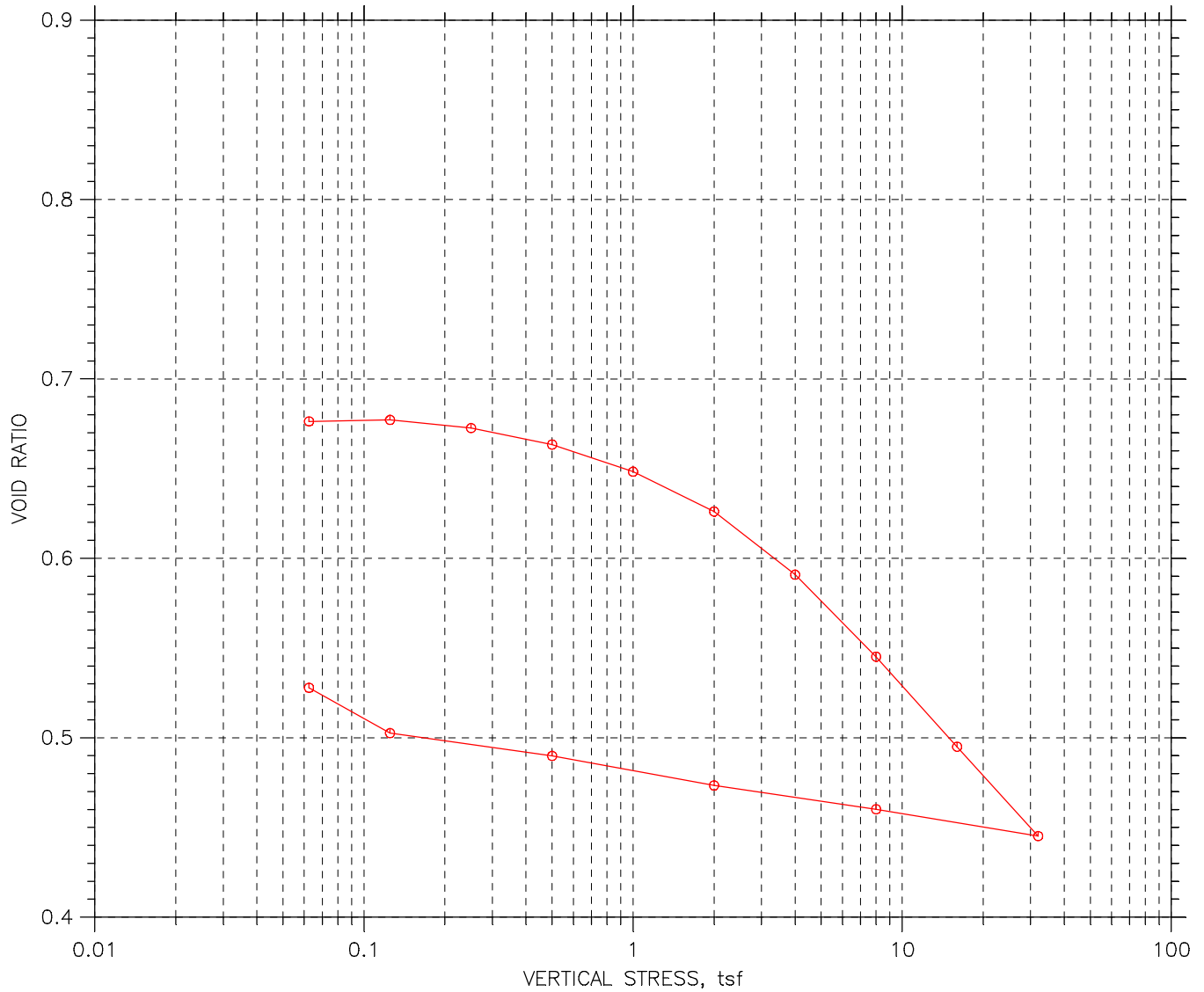
SUMMARY REPORT



Project: SPFLD. Rail Improvements	Location: Springfield, Illinois	Project No.: 09L0179B
Boring No.: B161	Tested By: RIN	Checked By: JPK
Sample No.: 5-2	Test Date: 11-13-2013	Depth: 11.5-12.0
Test No.: 1	Sample Type: Tube	Elevation: N/A
Description: Brn. & gray vf. sandy silty Clay.		
Remarks: User Must update correct calibration factors and node ID before proceeding to any test.		

CONSOLIDATION TEST DATA

SUMMARY REPORT



					Before Test	After Test
Overburden Pressure: 0 tsf				Water Content, %	25.37	19.85
Preconsolidation Pressure: 0 tsf				Dry Unit Weight, pcf	98.704	108.28
Compression Index: 0				Saturation, %	99.44	99.64
Diameter: 2.499 in		Height: 1 in		Void Ratio	0.68	0.53
LL: 35	PL: 18	PI: 17	GS: 2.65	Back Pressure, tsf	0	0

Project: SPFLD. Rail Improvements	Location: Springfield, Illinois	Project No.: 09L0179B
Boring No.: B161	Tested By: RIN	Checked By: JPK
Sample No.: 5-2	Test Date: 11-13-2013	Depth: 11.5-12.0
Test No.: 1	Sample Type: Tube	Elevation: N/A
Description: Brn. & gray vf. sandy silty Clay.		
Remarks: User Must update correct calibration factors and node ID before proceeding to any test.		

CONSOLIDATION TEST DATA

Project: SPFLD. Rail Improvements
 Boring No.: B161
 Sample No.: 5-2
 Test No.: 1

Location: Springfield, Illinois
 Tested By: RIN
 Test Date: 11-13-2013
 Sample Type: Tube

Project No.: 09L0179B
 Checked By: JPK
 Depth: 11.5-12.0
 Elevation: N/A

Soil Description: Brn. & gray vf. sandy silty Clay.

Remarks: User Must update correct calibration factors and node ID before proceeding to any test.

Estimated Specific Gravity: 2.65
 Initial Void Ratio: 0.68
 Final Void Ratio: 0.53

Liquid Limit: 35
 Plastic Limit: 18
 Plasticity Index: 17

Initial Height: 1.00 in
 Specimen Diameter: 2.50 in

	Before Consolidation		After Consolidation	
	Trimmings	Specimen+Ring	Specimen+Ring	Trimmings
Container ID	3	RING	12	12
Wt. Container + Wet Soil, gm	141.15	374.81	367.79	367.79
Wt. Container + Dry Soil, gm	123.17	342.57	342.57	342.57
Wt. Container, gm	49.99	215.49	215.49	215.49
Wt. Dry Soil, gm	73.18	127.08	127.08	127.08
Water Content, %	24.57	25.37	19.85	19.85
Void Ratio	---	0.68	0.53	---
Degree of Saturation, %	---	99.44	99.64	---
Dry Unit Weight, pcf	---	98.704	108.28	---

CONSOLIDATION TEST DATA

Project: SPFLD. Rail Improvements
 Boring No.: B161
 Sample No.: 5-2
 Test No.: 1

Location: Springfield, Illinois
 Tested By: RIN
 Test Date: 11-13-2013
 Sample Type: Tube

Project No.: 09L0179B
 Checked By: JPK
 Depth: 11.5-12.0
 Elevation: N/A

Soil Description: Brn. & gray vf. sandy silty Clay.

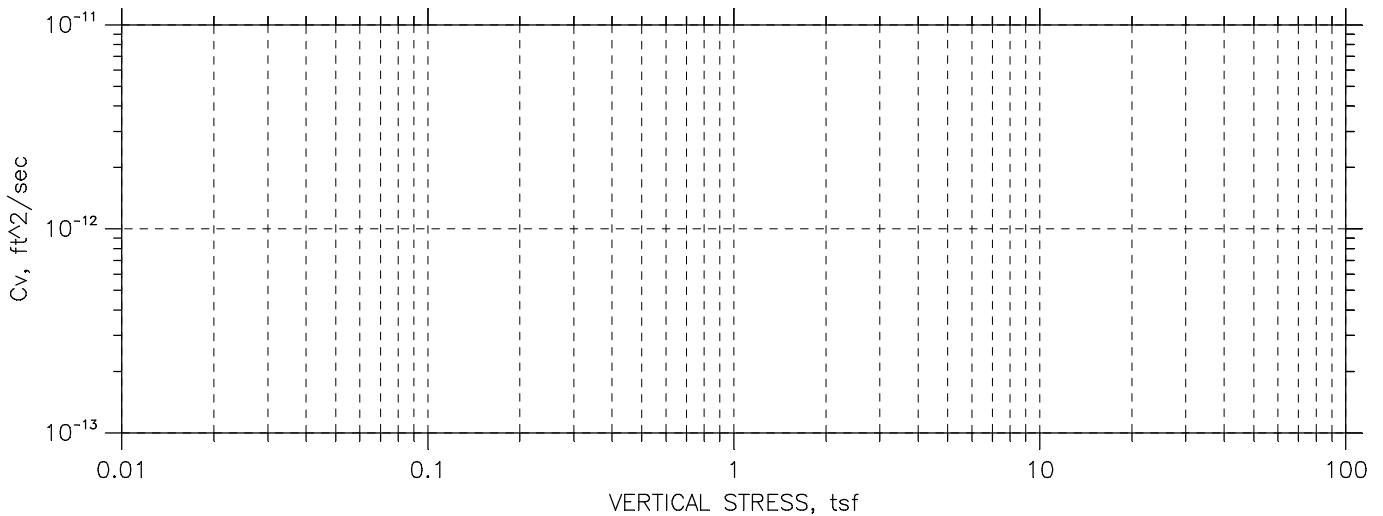
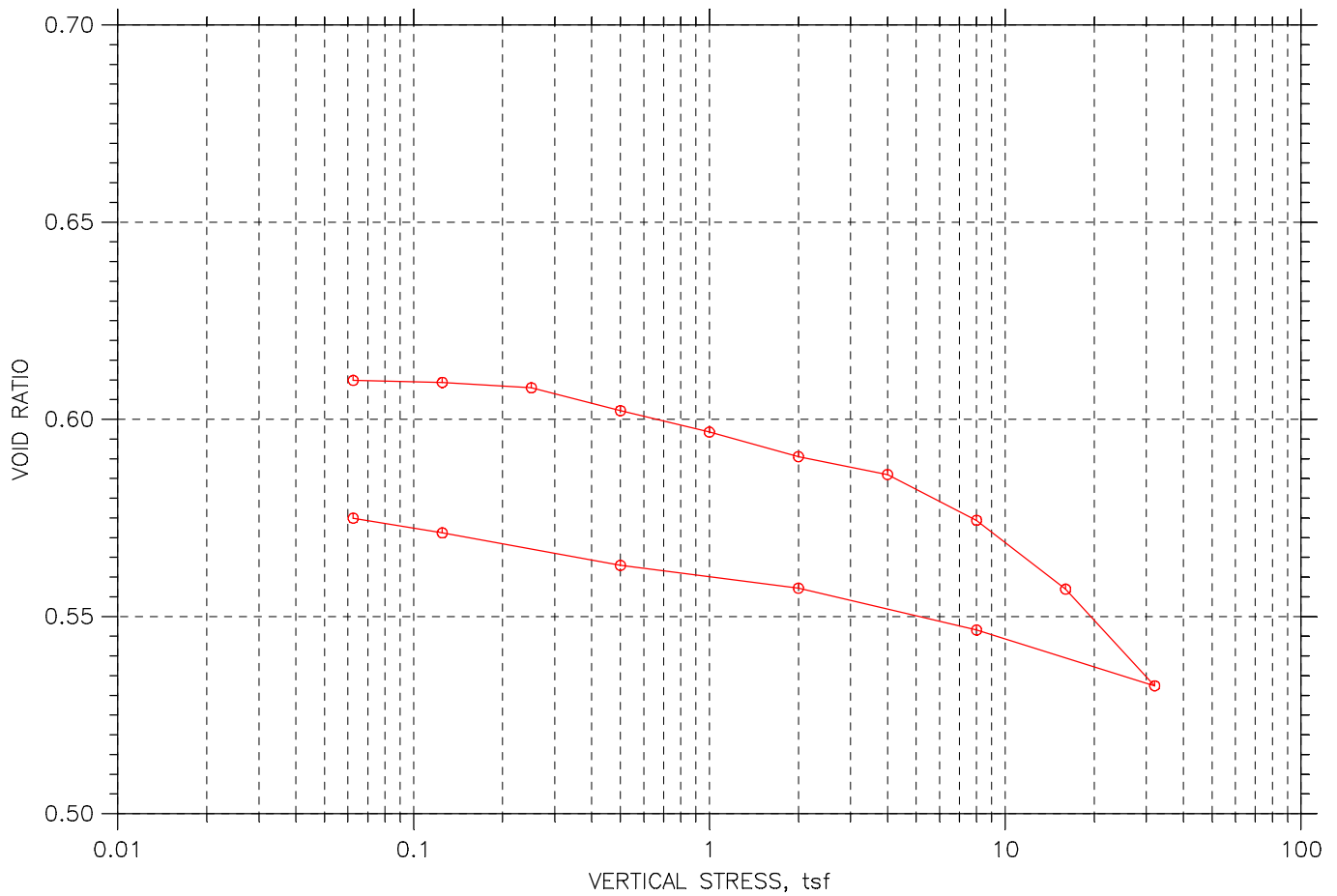
Remarks: User Must update correct calibration factors and node ID before proceeding to any test.

	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv ft ² /sec	Mv 1/tsf	k ft/day
1	0.0625	-0.0001451	0.676	-0.01	22.3	1.10e-006	-2.32e-003	-6.88e-006
2	0.125	-0.000651	0.677	-0.07	2.1	1.19e-005	-8.09e-003	-2.60e-004
3	0.25	0.002082	0.673	0.21	9.4	2.60e-006	2.19e-002	1.54e-004
4	0.5	0.007574	0.663	0.76	9.5	2.57e-006	2.20e-002	1.52e-004
5	1	0.0166	0.648	1.66	9.4	2.54e-006	1.81e-002	1.24e-004
6	2	0.02982	0.626	2.98	9.0	2.62e-006	1.32e-002	9.32e-005
7	4	0.05084	0.591	5.08	14.9	1.51e-006	1.05e-002	4.29e-005
8	8	0.07813	0.545	7.81	14.0	1.53e-006	6.82e-003	2.82e-005
9	16	0.1081	0.495	10.81	13.9	1.46e-006	3.74e-003	1.47e-005
10	32	0.1378	0.445	13.78	8.8	2.14e-006	1.86e-003	1.07e-005
11	8	0.1289	0.460	12.89	0.1	1.70e-004	3.71e-004	1.70e-004
12	2	0.1209	0.473	12.09	1.3	1.40e-005	1.32e-003	5.01e-005
13	0.5	0.1111	0.490	11.11	52.4	3.66e-007	6.55e-003	6.45e-006
14	0.125	0.1035	0.503	10.35	45.4	4.31e-007	2.02e-002	2.35e-005
15	0.0625	0.08844	0.528	8.84	437.1	4.59e-008	2.41e-001	2.98e-005

	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Log. T50 min	Cv ft ² /sec	Mv 1/tsf	k ft/day	Ca %
1	0.0625	-0.0001451	0.676	-0.01	0.0	0.00e+000	-2.32e-003	0.00e+000	0.00e+000
2	0.125	-0.000651	0.677	-0.07	0.1	5.79e-005	-8.09e-003	-1.26e-003	0.00e+000
3	0.25	0.002082	0.673	0.21	0.0	0.00e+000	2.19e-002	0.00e+000	0.00e+000
4	0.5	0.007574	0.663	0.76	1.4	4.11e-006	2.20e-002	2.44e-004	0.00e+000
5	1	0.0166	0.648	1.66	0.0	0.00e+000	1.81e-002	0.00e+000	0.00e+000
6	2	0.02982	0.626	2.98	0.0	0.00e+000	1.32e-002	0.00e+000	0.00e+000
7	4	0.05084	0.591	5.08	3.9	1.36e-006	1.05e-002	3.85e-005	0.00e+000
8	8	0.07813	0.545	7.81	0.0	0.00e+000	6.82e-003	0.00e+000	0.00e+000
9	16	0.1081	0.495	10.81	0.0	0.00e+000	3.74e-003	0.00e+000	0.00e+000
10	32	0.1378	0.445	13.78	0.0	0.00e+000	1.86e-003	0.00e+000	0.00e+000
11	8	0.1289	0.460	12.89	0.0	9.54e-005	3.71e-004	9.54e-005	0.00e+000
12	2	0.1209	0.473	12.09	0.0	0.00e+000	1.32e-003	0.00e+000	0.00e+000
13	0.5	0.1111	0.490	11.11	10.7	4.15e-007	6.55e-003	7.32e-006	0.00e+000
14	0.125	0.1035	0.503	10.35	10.7	4.26e-007	2.02e-002	2.32e-005	0.00e+000
15	0.0625	0.08844	0.528	8.84	101.4	4.60e-008	2.41e-001	2.99e-005	0.00e+000

CONSOLIDATION TEST DATA

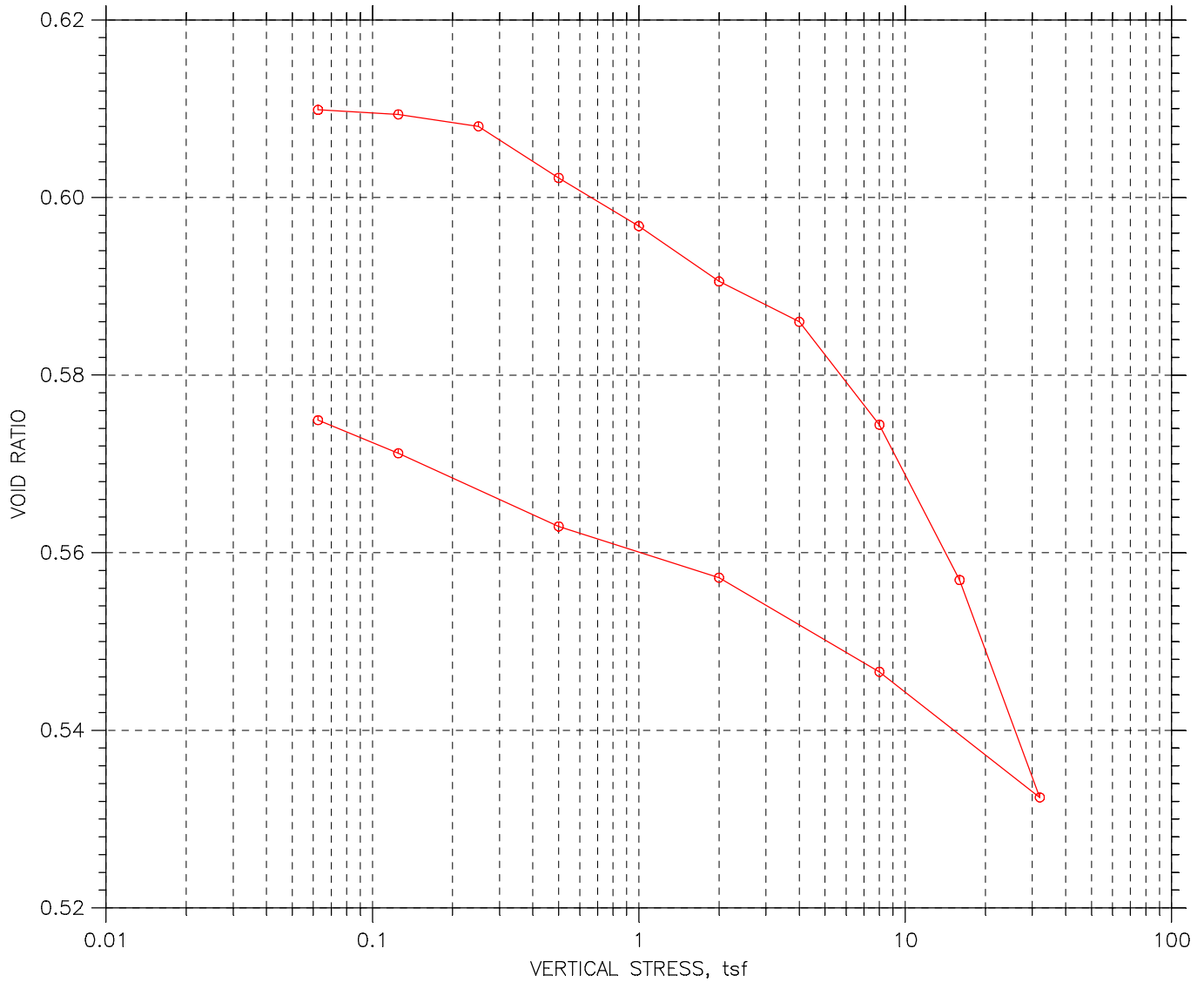
SUMMARY REPORT



Project: SPFLD. Rail Improvements	Location: Springfield, Illinois	Project No.: 09L0179B
Boring No.: B-175	Tested By: RIN	Checked By: JPK
Sample No.: 3-2	Test Date: 11-14-2013	Depth: 6.5-7.0
Test No.: 1	Sample Type: Tube	Elevation: N/A
Description: Brn. & gray vf. sandy Silt, tr. clay.		
Remarks:		

CONSOLIDATION TEST DATA

SUMMARY REPORT



					Before Test	After Test
Overburden Pressure: 0 tsf				Water Content, %	24.38	23.01
Preconsolidation Pressure: 0 tsf				Dry Unit Weight, pcf	102.49	105.04
Compression Index: 0				Saturation, %	105.21	106.05
Diameter: 2.501 in		Height: 0.9878 in		Void Ratio	0.61	0.57
LL: 29	PL: 24	PI: 5	GS: 2.65	Back Pressure, tsf	0	0

Project: SPFLD. Rail Improvements	Location: Springfield, Illinois	Project No.: 09L0179B
Boring No.: B-175	Tested By: RIN	Checked By: JPK
Sample No.: 3-2	Test Date: 11-14-2013	Depth: 6.5-7.0
Test No.: 1	Sample Type: Tube	Elevation: N/A
Description: Brn. & gray vf. sandy Silt, tr. clay.		
Remarks:		

CONSOLIDATION TEST DATA

Project: SPFLD. Rail Improvements
 Boring No.: B-175
 Sample No.: 3-2
 Test No.: 1

Location: Springfield, Illinois
 Tested By: RIN
 Test Date: 11-14-2013
 Sample Type: Tube

Project No.: 09L0179B
 Checked By: JPK
 Depth: 6.5-7.0
 Elevation: N/A

Soil Description: Brn. & gray vf. sandy Silt, tr. clay.
 Remarks:

Estimated Specific Gravity: 2.65
 Initial Void Ratio: 0.61
 Final Void Ratio: 0.57

Liquid Limit: 29
 Plastic Limit: 24
 Plasticity Index: 5

Initial Height: 0.99 in
 Specimen Diameter: 2.50 in

	Before Consolidation		After Consolidation	
	Trimmings	Specimen+Ring	Specimen+Ring	Trimmings
Container ID	3	RING	13	13
Wt. Container + Wet Soil, gm	185.26	372.82	371.03	371.03
Wt. Container + Dry Soil, gm	158.78	340.99	340.99	340.99
Wt. Container, gm	50.01	210.43	210.43	210.43
Wt. Dry Soil, gm	108.77	130.56	130.56	130.56
Water Content, %	24.34	24.38	23.01	23.01
Void Ratio	---	0.61	0.57	---
Degree of Saturation, %	---	105.21	106.05	---
Dry Unit Weight, pcf	---	102.49	105.04	---

CONSOLIDATION TEST DATA

Project: SPFLD. Rail Improvements
 Boring No.: B-175
 Sample No.: 3-2
 Test No.: 1

Location: Springfield, Illinois
 Tested By: RIN
 Test Date: 11-14-2013
 Sample Type: Tube

Project No.: 09L0179B
 Checked By: JPK
 Depth: 6.5-7.0
 Elevation: N/A

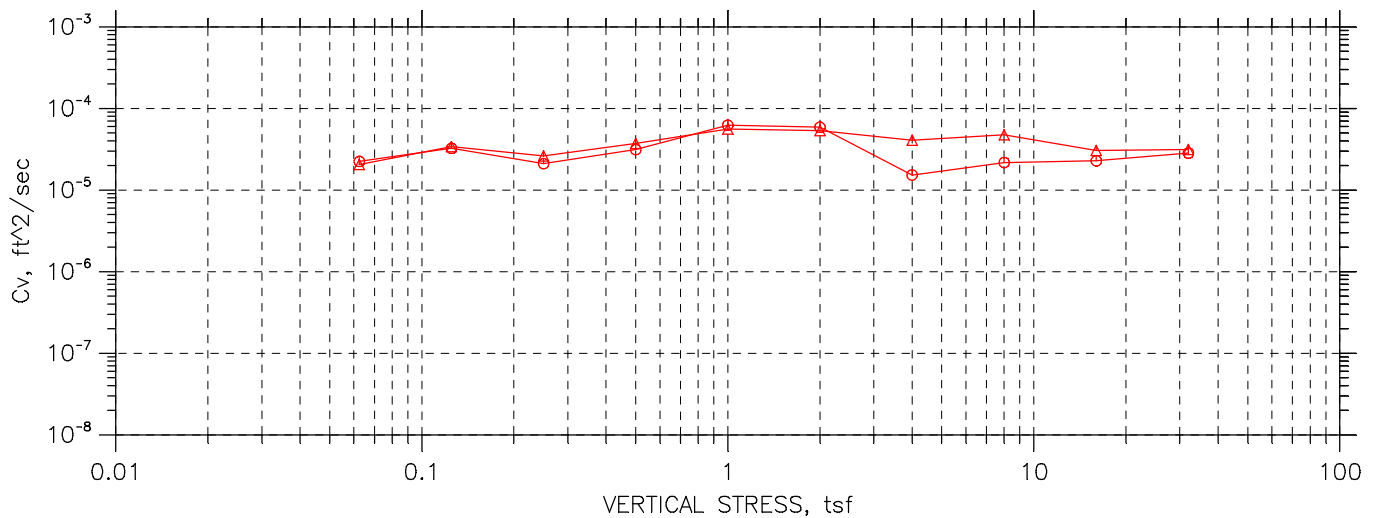
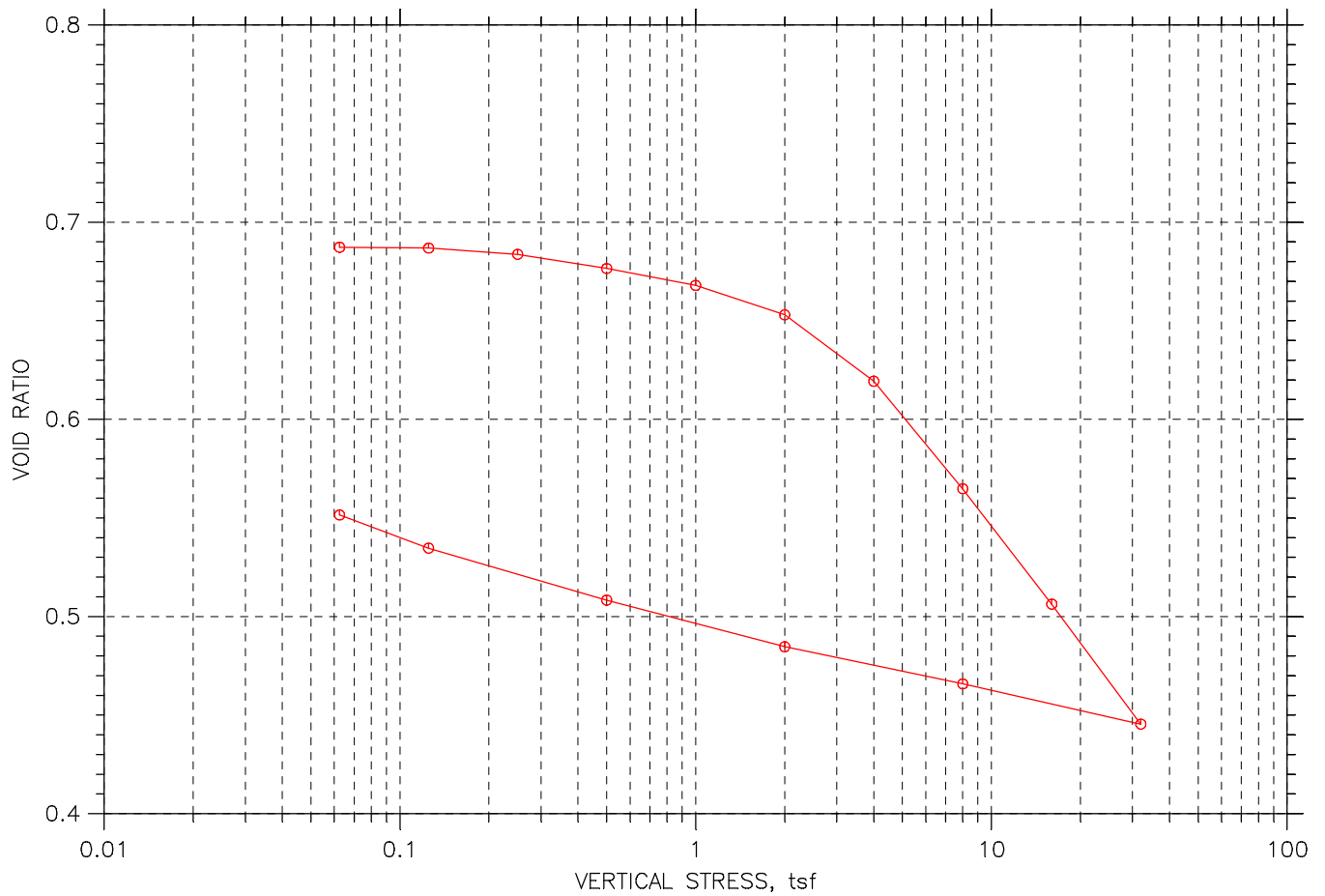
Soil Description: Brn. & gray vf. sandy Silt, tr. clay.
 Remarks:

	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv ft^2/sec	Mv 1/tsf	k ft/day
1	0.0625	0.00257	0.610	0.26	0.8	2.85e-005	4.16e-002	3.20e-003
2	0.125	0.002888	0.609	0.29	4.6	5.15e-006	5.16e-003	7.16e-005
3	0.25	0.003715	0.608	0.38	4.3	5.51e-006	6.69e-003	9.94e-005
4	0.5	0.007267	0.602	0.74	0.6	3.72e-005	1.44e-002	1.44e-003
5	1	0.01059	0.597	1.07	0.7	3.16e-005	6.72e-003	5.73e-004
6	2	0.0144	0.591	1.46	0.2	1.05e-004	3.86e-003	1.10e-003
7	4	0.01718	0.586	1.74	0.2	1.41e-004	1.41e-003	5.34e-004
8	8	0.02428	0.574	2.46	0.1	1.91e-004	1.80e-003	9.27e-004
9	16	0.03498	0.557	3.54	0.1	1.90e-004	1.35e-003	6.94e-004
10	32	0.04996	0.532	5.06	0.1	1.94e-004	9.48e-004	4.97e-004
11	8	0.04131	0.547	4.18	0.1	2.64e-004	3.65e-004	2.60e-004
12	2	0.03481	0.557	3.52	0.1	3.48e-004	1.10e-003	1.03e-003
13	0.5	0.03128	0.563	3.17	0.2	1.39e-004	2.38e-003	8.93e-004
14	0.125	0.02624	0.571	2.66	0.6	3.83e-005	1.36e-002	1.41e-003
15	0.0625	0.02396	0.575	2.43	18.5	1.23e-006	3.69e-002	1.22e-004

	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Log. T50 min	Cv ft^2/sec	Mv 1/tsf	k ft/day	Ca %
1	0.0625	0.00257	0.610	0.26	0.2	2.90e-005	4.16e-002	3.25e-003	0.00e+000
2	0.125	0.002888	0.609	0.29	0.2	3.23e-005	5.16e-003	4.48e-004	0.00e+000
3	0.25	0.003715	0.608	0.38	0.2	2.57e-005	6.69e-003	4.64e-004	0.00e+000
4	0.5	0.007267	0.602	0.74	0.2	3.39e-005	1.44e-002	1.31e-003	0.00e+000
5	1	0.01059	0.597	1.07	0.1	4.93e-005	6.72e-003	8.93e-004	0.00e+000
6	2	0.0144	0.591	1.46	0.1	5.84e-005	3.86e-003	6.07e-004	0.00e+000
7	4	0.01718	0.586	1.74	0.0	1.08e-004	1.41e-003	4.09e-004	0.00e+000
8	8	0.02428	0.574	2.46	0.0	1.65e-004	1.80e-003	8.00e-004	0.00e+000
9	16	0.03498	0.557	3.54	0.0	1.61e-004	1.35e-003	5.89e-004	0.00e+000
10	32	0.04996	0.532	5.06	0.0	1.21e-004	9.48e-004	3.10e-004	0.00e+000
11	8	0.04131	0.547	4.18	0.0	1.09e-004	3.65e-004	1.07e-004	0.00e+000
12	2	0.03481	0.557	3.52	0.0	1.73e-004	1.10e-003	5.12e-004	0.00e+000
13	0.5	0.03128	0.563	3.17	0.1	5.35e-005	2.38e-003	3.44e-004	0.00e+000
14	0.125	0.02624	0.571	2.66	0.2	3.23e-005	1.36e-002	1.18e-003	0.00e+000
15	0.0625	0.02396	0.575	2.43	0.0	0.00e+000	3.69e-002	0.00e+000	0.00e+000

CONSOLIDATION TEST DATA

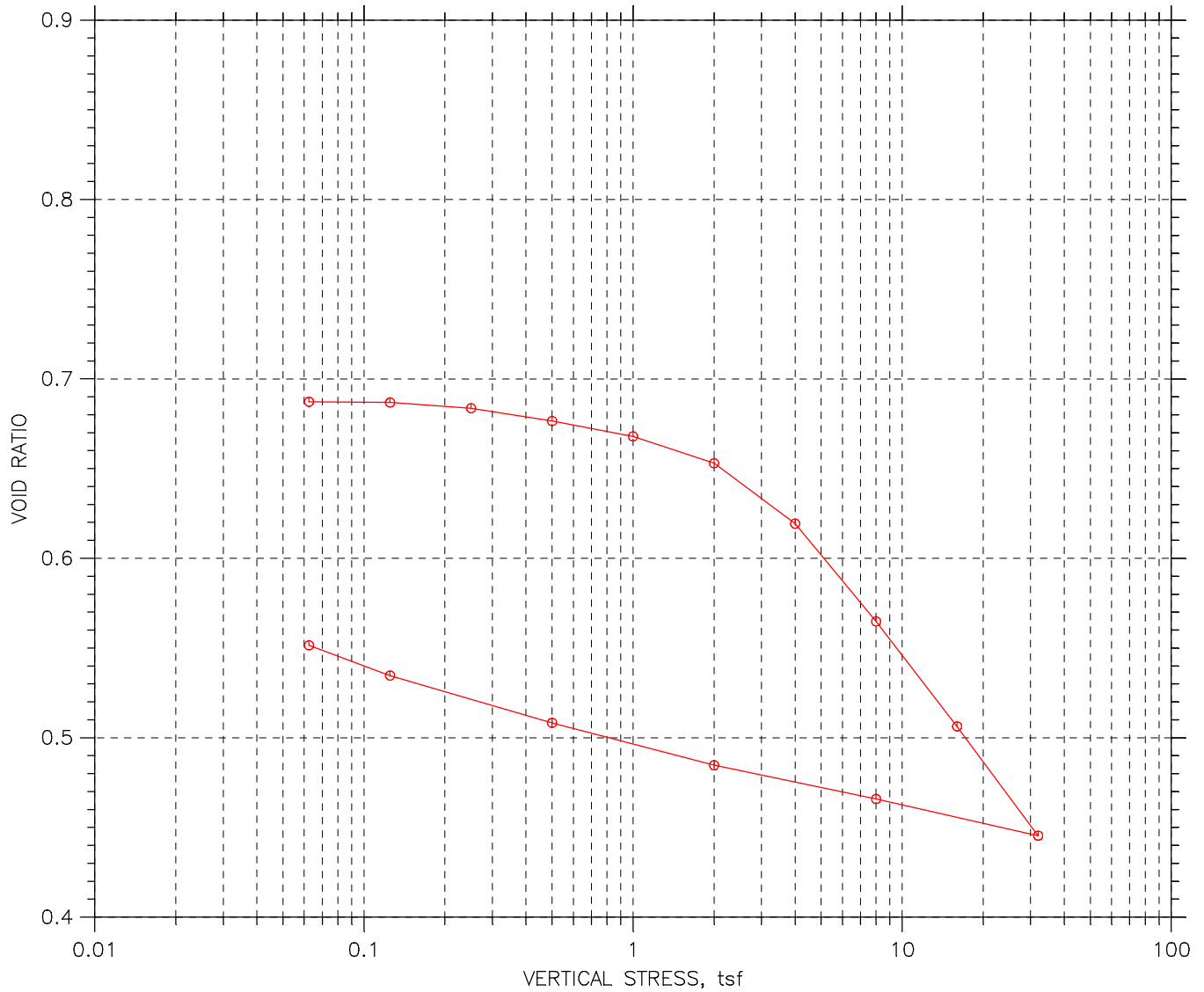
SUMMARY REPORT



Project: SPFLD. Rail Improvements	Location: Springfield, Illinois	Project No.: 09L0179B
Boring No.: B-176	Tested By: RIN	Checked By: JPK
Sample No.: 6-2	Test Date: 11-15-2013	Depth: 13.5-14.0
Test No.: 1	Sample Type: Tube	Elevation: N/A
Description: Brn. vf. sandy silty CLAY.		
Remarks:		

CONSOLIDATION TEST DATA

SUMMARY REPORT



				Before Test	After Test	
Overburden Pressure: 0 tsf				Water Content, %	24.39	18.39
Preconsolidation Pressure: 0 tsf				Dry Unit Weight, pcf	97.809	106.63
Compression Index: 0				Saturation, %	93.47	88.39
Diameter: 2.5 in		Height: 1.001 in		Void Ratio	0.69	0.55
LL: 38	PL: 18	PI: 20	GS: 2.65	Back Pressure, tsf	0	0

Project: SPFLD. Rail Improvements	Location: Springfield, Illinois	Project No.: 09L0179B
Boring No.: B-176	Tested By: RIN	Checked By: JPK
Sample No.: 6-2	Test Date: 11-15-2013	Depth: 13.5-14.0
Test No.: 1	Sample Type: Tube	Elevation: N/A
Description: Brn. vf. sandy silty CLAY.		
Remarks:		

CONSOLIDATION TEST DATA

Project: SPFLD. Rail Improvements
 Boring No.: B-176
 Sample No.: 6-2
 Test No.: 1

Location: Springfield, Illinois
 Tested By: RIN
 Test Date: 11-15-2013
 Sample Type: Tube

Project No.: 09L0179B
 Checked By: JPK
 Depth: 13.5-14.0
 Elevation: N/A

Soil Description: Brn. vf. sandy silty CLAY.
 Remarks:

Estimated Specific Gravity: 2.65
 Initial Void Ratio: 0.69
 Final Void Ratio: 0.55

Liquid Limit: 38
 Plastic Limit: 18
 Plasticity Index: 20

Initial Height: 1.00 in
 Specimen Diameter: 2.50 in

	Before Consolidation		After Consolidation	
	Trimmings	Specimen+Ring	Specimen+Ring	Trimmings
Container ID	2	RING	11	11
Wt. Container + Wet Soil, gm	156.58	371.85	364.29	364.29
Wt. Container + Dry Soil, gm	136.21	341.09	341.09	341.09
Wt. Container, gm	50.19	214.96	214.96	214.96
Wt. Dry Soil, gm	86.02	126.13	126.13	126.13
Water Content, %	23.68	24.39	18.39	18.39
Void Ratio	---	0.69	0.55	---
Degree of Saturation, %	---	93.47	88.39	---
Dry Unit Weight, pcf	---	97.809	106.63	---

CONSOLIDATION TEST DATA

Project: SPFLD. Rail Improvements
 Boring No.: B-176
 Sample No.: 6-2
 Test No.: 1

Location: Springfield, Illinois
 Tested By: RIN
 Test Date: 11-15-2013
 Sample Type: Tube

Project No.: 09L0179B
 Checked By: JPK
 Depth: 13.5-14.0
 Elevation: N/A

Soil Description: Brn. vf. sandy silty CLAY.
 Remarks:

	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt. T90 min	Cv ft^2/sec	Mv 1/tsf	k ft/day
1	0.0625	0.002457	0.687	0.25	1.1	2.24e-005	3.93e-002	2.37e-003
2	0.125	0.002694	0.687	0.27	0.8	3.24e-005	3.80e-003	3.32e-004
3	0.25	0.004587	0.684	0.46	1.2	2.10e-005	1.51e-002	8.59e-004
4	0.5	0.008818	0.676	0.88	0.8	3.13e-005	1.69e-002	1.43e-003
5	1	0.01388	0.668	1.39	0.4	6.23e-005	1.01e-002	1.70e-003
6	2	0.02274	0.653	2.27	0.4	5.89e-005	8.85e-003	1.41e-003
7	4	0.04265	0.619	4.26	1.5	1.53e-005	9.95e-003	4.10e-004
8	8	0.07491	0.565	7.49	1.0	2.17e-005	8.06e-003	4.72e-004
9	16	0.1095	0.506	10.95	0.9	2.28e-005	4.33e-003	2.66e-004
10	32	0.1456	0.445	14.54	0.7	2.84e-005	2.25e-003	1.72e-004
11	8	0.1335	0.466	13.34	0.1	1.67e-004	5.03e-004	2.26e-004
12	2	0.1223	0.485	12.22	2.4	7.72e-006	1.86e-003	3.87e-005
13	0.5	0.1084	0.508	10.83	14.5	1.33e-006	9.30e-003	3.32e-005
14	0.125	0.09276	0.535	9.27	54.9	3.62e-007	4.16e-002	4.06e-005
15	0.0625	0.08279	0.551	8.27	233.3	8.77e-008	1.59e-001	3.77e-005

	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Log. T50 min	Cv ft^2/sec	Mv 1/tsf	k ft/day	Ca %
1	0.0625	0.002457	0.687	0.25	0.3	2.05e-005	3.93e-002	2.17e-003	0.00e+000
2	0.125	0.002694	0.687	0.27	0.2	3.41e-005	3.80e-003	3.50e-004	0.00e+000
3	0.25	0.004587	0.684	0.46	0.2	2.62e-005	1.51e-002	1.07e-003	0.00e+000
4	0.5	0.008818	0.676	0.88	0.2	3.71e-005	1.69e-002	1.69e-003	0.00e+000
5	1	0.01388	0.668	1.39	0.1	5.57e-005	1.01e-002	1.52e-003	0.00e+000
6	2	0.02274	0.653	2.27	0.1	5.35e-005	8.85e-003	1.28e-003	0.00e+000
7	4	0.04265	0.619	4.26	0.1	4.07e-005	9.95e-003	1.09e-003	0.00e+000
8	8	0.07491	0.565	7.49	0.1	4.74e-005	8.06e-003	1.03e-003	0.00e+000
9	16	0.1095	0.506	10.95	0.2	3.05e-005	4.33e-003	3.55e-004	0.00e+000
10	32	0.1456	0.445	14.54	0.1	3.13e-005	2.25e-003	1.90e-004	0.00e+000
11	8	0.1335	0.466	13.34	0.0	9.38e-005	5.03e-004	1.27e-004	0.00e+000
12	2	0.1223	0.485	12.22	0.0	0.00e+000	1.86e-003	0.00e+000	0.00e+000
13	0.5	0.1084	0.508	10.83	0.0	0.00e+000	9.30e-003	0.00e+000	0.00e+000
14	0.125	0.09276	0.535	9.27	14.8	3.12e-007	4.16e-002	3.49e-005	0.00e+000
15	0.0625	0.08279	0.551	8.27	0.0	0.00e+000	1.59e-001	0.00e+000	0.00e+000