

ARKANSAS DEPARTMENT OF TRANSPORTATION



SUBSURFACE INVESTIGATION

STATE JOB NO. 070458

FEDERAL AID PROJECT NO. FEDERAL AID PROJECT CPFCDs-NHPP-NHPE-0014(36)

UPRR GRADE SEPARATION (EAST OF LAFAYETTE CO. LINE) (S)

STATE HIGHWAY 82 SECTION 3

IN COLUMBIA COUNTY

The information contained herein was obtained by the Department for design and estimating purposes only. It is being furnished with the express understanding that said information does not constitute a part of the Proposal or Contract and represents only the best knowledge of the Department as to the location, character and depth of the materials encountered. The information is only included and made available so that bidders may have access to subsurface information obtained by the Department and is not intended to be a substitute for personal investigation, interpretation and judgment of the bidder. The bidder should be cognizant of the possibility that conditions affecting the cost and/or quantities of work to be performed may differ from those indicated herein.



Geotechnical Engineering Report

**Job No. 070458, UPRR Grade Separation
Buckner, Arkansas**

October 23, 2019

Terracon Project No. 35185112

Prepared for:

Michael Baker International, Inc.
Little Rock, Arkansas

Prepared by:

Terracon Consultants, Inc.
Little Rock, Arkansas



October 23, 2019

Michael Baker International, Inc.
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Little Rock, Arkansas 72201



Attn: Mr. Scott Thornsberry
P: (501) 244-1004
E: scott.thornsberry@mbakerintl.com

Re: Geotechnical Engineering Report
Job No. 070458, UPRR Grade Separation
Highway 82
Buckner, Arkansas
Terracon Project No. 35185112

Dear Mr. Thornsberry:

We have completed a subsurface exploration and geotechnical engineering evaluation for the referenced project. This study was performed in general accordance with Task Order No. 50, dated February, 2019. This report presents the findings of the subsurface exploration and provides geotechnical recommendations for designing and constructing the proposed bridge improvements for the proposed project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report, or if we may be of further service, please contact us.

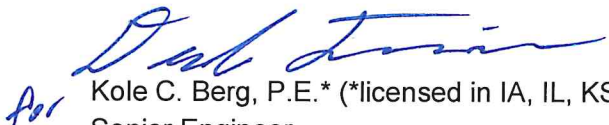
Sincerely,

Terracon Consultants, Inc.

Certificate of Authorization #223 Expires 12/31/2019


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Environmental

Facilities

Geotechnical

Materials

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Note: This report was originally delivered in a web-based format. For more interactive features, please view your project online at client.terracon.com.

ATTACHMENTS

GENERAL BORING PROFILES AND PILE RESISTANCE CURVES
EXPLORATION AND TESTING PROCEDURES
SITE LOCATION AND EXPLORATION PLANS
EXPLORATION RESULTS
SUPPORTING INFORMATION

Note: Refer to each individual Attachment for a listing of contents.

Geotechnical Engineering Report
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Highway 82
Buckner, Arkansas
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INTRODUCTION

This report presents the results of our subsurface exploration and geotechnical engineering services performed for the replacement of the existing UPRR railroad grade separation structure to be located on Highway 82 in Buckner, Arkansas. The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- Subsurface soil conditions
- Site preparation and earthwork
- Groundwater conditions
- Foundation design and construction
- Seismic site classification per IBC

The geotechnical engineering Scope of Services for this project included the advancement of 18 test borings to depths ranging from approximately 10 to 80 feet below existing site grades.

Maps showing the site and boring locations are shown in the **Site Location** and **Exploration Plan** sections, respectively. The results of the laboratory testing performed on soil samples obtained from the site during the field exploration are included on the boring logs and/or as separate graphs in the **Exploration Results** section.

SITE CONDITIONS

The following description of site conditions is derived from our site visit in association with the field exploration and our review of publicly available geologic and topographic maps.

Item	Description
Parcel Information	The project is located along Highway 82 in Lafayette County, Arkansas. The project will create a new roadway alignment over the existing Union Pacific Railroad. The new alignment is proposed to the southwest of the existing Highway 82. Approximate Latitude and Longitude: 33.3544°N, 93.4026°W See Site Location
Existing Improvements	The proposed alignment is planned through undeveloped land

Item	Description
Current Ground Cover	The proposed alignment was covered in dense trees and other vegetation. Access paths were cleared to allow the drilling equipment to reach the boring locations.
Existing Topography	From a Google Earth image about 40 feet of elevation difference was estimated along the proposed alignment. The alignment appeared to generally slope downward to the northwest.

PROJECT DESCRIPTION

Our initial understanding of the project was provided in our proposal and was discussed during project planning. A period of collaboration has transpired since the project was initiated, and our final understanding of the project conditions is as follows:

Item	Description
Project Description	ArDOT is proposing a new roadway alignment over the existing Union Pacific Railroad. We understand that a 35-foot embankment is planned over the existing railroad tracks to the southwest of the existing roadway alignment.
Embankment Construction	Embankment construction plans were not available at the time of this report. Through coordination with Michael Baker, we understand that on-site soils may be used as part of the embankment construction. Slope stability concerns for the side slope and spill slope of the embankment for different material types have been included for consideration.
Maximum Loads	Traffic loads are not known at this time
Grading/Slopes	We understand that a 35-foot tall embankment is planned for the project site.
Below-Grade Structures	None planned
Free-Standing Retaining Walls	None planned
Pavements	Pavement section design is not included in this scope of work. Resilient modulus testing of anticipated pavement subgrades is provided for the on-site soils.
Estimated Start of Construction	2020

GEOTECHNICAL CHARACTERIZATION

The embankment and bridge borings are within soils associated with the Claiborne Group. Soils associated with the Claiborne Group are typically medium to very fine-grained sands, silts and silty clays. The sands tend to be light to dark gray, white, brown or red, depending on the degree of weathering. The silt and clays are light to dark gray and sometimes variegated. The silts are

usually clayey, and the clays are normally silty or sandy. Because driven pile foundations are planned at each structure location, the borings were generalized on a boring by boring basis. The subsurface conditions at each boring location along with the soil parameters used for pile resistance curves can be found attached to this report.

GEOTECHNICAL OVERVIEW

Variable layers of lean and fat clay, silt, and sand were observed in the borings drilled for this project. Generalized profiles of the soil observed at each bridge location were developed. The results of our study indicate that the site can be developed for the proposed bridge replacements. During our study the following geotechnical conditions were identified:

- Large embankment fills
- Existing fill
- Low-strength soils
- Moisture-sensitive soils

The following discussion addresses these items and provides the basis for design recommendations present in the subsequent sections.

Large Embankment Fills

We understand that embankments on the order of about 35 feet tall are planned for the site to support a bridge structure over the existing Union Pacific Railroad. We understand that on-site soils are preferred for the use of fill soils for the embankment, but specific borrow sources have not been identified. Considerations for the slope stability of embankment slopes as well as general embankment settlements are addressed in the **General Embankment Settlement** and **Fill Embankment Slopes** sections.

Existing Fill

Borings R-1, R-2 and R-4 were performed on the shoulder of the existing roadway alignment. Existing pavement and aggregate base course were encountered in those borings to depths ranging from 1 to 2 feet below the existing ground surface. Information regarding the placement of the existing fill was not available at the time of this report. There is an inherent risk that otherwise unsuitable material within or buried by the fill will not be discovered that could result in unpredictable post-construction performance of the bridge foundations or roadway supported on existing fill.

Low-Strength Soils

Low-strength soils (SPT N-values less than or equal to 5 blows per foot or compressive strengths less than 1,000 psf) were observed in the borings. In the embankment and bridge borings, low-

strength soils were typically observed near the existing ground surface to depths up to about 5 feet. In their present condition, the low-strength soils are not suitable for providing direct support to the embankment fill planned for the site. We recommend that the low-strength soils be removed to a depth of about 5 feet prior to the construction of the embankment.

Low-strength soils were also observed in the roadway borings. The low-strength soils in the roadway borings were observed at varying and random depths throughout each boring log. In borings R-1 and R-3, surficial low-strength soils were encountered from the surface to depths ranging between 3½ to 5 feet. We recommend that these surficial low-strength soils are removed prior to the construction of the proposed roadway alignment. Other layers of low-strength soils observed in the performed roadway borings were deeper-seated, these low-strength soils do not need to be addressed unless cuts greater than 5 feet are planned near the roadway boring locations.

Moisture-Sensitive Soils

The silt and lean clay soils are moisture-sensitive and prone to further strength loss with increased moisture content. These soils could become unstable with typical earthwork and construction traffic, especially after precipitation events. Effective drainage should be completed early in the construction sequence and maintained after construction. If possible, the grading should be performed during the warmer and drier times of the year. If grading or construction is performed during the winter months, an increased risk for possible treatment of unstable subgrade will persist.

Based on the subsurface conditions observed as well as the conversations with the client, we understand that driven piles are being considered for support of the bridge. The **Deep Foundations** section addresses the support of the bridge on driven piles. We also understand that embankments up to 35 feet in height are planned for the project. The **Embankment Settlement** and **Slope Stability of Embankment** sections addresses geotechnical concerns for embankments of this magnitude. The **General Comments** section provides an understanding of the report limitations.

EARTHWORK

Earthwork should be performed as required in the ArDOT Standard Specifications for Highway Construction latest edition. The following recommendations for site preparation, excavation, subgrade preparation and placement of engineered fills on the project are considered general recommendations for earthwork. The evaluation of earthwork should include observation and testing of engineered fill, subgrade preparation, and other geotechnical conditions during construction of the project. Terracon should be retained during site preparation operations.

Fill Material Types

Fill materials should be free of organic matter and debris. Portions of the on-site soils or approved imported borrow materials may be used as fill material. If it is desired to use on-site material as engineered fill for this project, we recommend thorough testing prior to reuse. Undercutting or chemical stabilization of low-strength soils may be required.

We understand that the use of on-site soils is desired for the construction of the planned embankments. Slope stability recommendations based on the soil types that were observed and could be encountered in borrow areas are provided within this report. We recommend that the borrow areas are identified prior to construction, so that thorough testing can be performed prior to use.

While ArDOT has no specific requirement for borrow materials, they do require that the materials be capable of forming and maintaining a stable embankment slope when compacted. Therefore, we recommend avoiding elastic silts (MH) and organic soils (OL, OH and PT) when considering materials for use as borrow.

If borrow material is used for the construction of the planned embankments on this project we recommend that materials classifying as clayey gravels (GC), Low plasticity clays (CL), silts (ML), silty sand (SM), or clayey sands (SC) are used. We caution the use of high plasticity materials (such as fat clays). If fat clays are desired for use, we recommend project specific analysis of the embankment slopes. For the construction areas outside of the constructed embankments, we suggest that approved imported borrow soils meet the following material property requirements:

Sieve Size	Percent Finer by Weight (ASTM C136)
3 inch	100
No. 4	50-100
No. 200	15-50

- Plasticity Index.....20 (max)

Fill Compaction Requirements

Where fill is placed on existing slopes steeper than 5H:1V, benches should be cut into the existing slopes prior to fill placement. The benches should start at the toe of the slope and have a minimum vertical face height of 1 foot and a maximum vertical face height of 3 feet and should be cut wide enough to accommodate the compaction equipment. This benching will help provide a positive bond between the fill and natural soils and reduce the possibility of failure along the fill/natural soil interface. We recommend that fill slopes be filled beyond the planned final slopes face and then cut back to develop an adequately compacted slope face.

Earthwork Construction Considerations

We anticipate that shallow excavations can be accomplished with conventional construction equipment. Upon completion of filling and grading, care should be taken to maintain the subgrade water content prior to construction of pile caps or pavements. Construction traffic over the completed subgrades should be avoided. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. Any water that collects over or adjacent to, construction areas should be promptly removed. If the subgrade freezes, desiccates, saturates, or is disturbed, the affected material should be removed, or these materials should be scarified and moisture conditioned. All these procedures should be observed by Terracon.

If unstable subgrade conditions are encountered, the methods described below can be considered to improve subgrade strength. Common methods include scarification, moisture conditioning and compaction, removal of unstable materials and replacement with granular fill (with or without geosynthetics), and chemical stabilization. The appropriate method of improvement, if required, depends on factors such as schedule, weather, the size of area to be stabilized, and the nature of the instability.

If the exposed subgrade becomes unstable, methods outlines below can be considered.

- **Scarification and Compaction** – It may be feasible to scarify, dry and compact the exposed soils. The success of this procedure would depend primarily upon favorable weather and sufficient time to dry the soils. Stable subgrades likely would not be achievable if the thickness of the unstable soil is greater than about 1 foot, if the unstable soil is at or near the groundwater levels, or if construction is performed during a period of wet or cool weather when drying is difficult.
- **Crushed Stone** – The use of crushed stone or crushed gravel is the most common procedure to improve subgrade stability. Typical undercut depths would be expected to range from about 6 to 30 inches below the finished subgrade elevation. The use of high modulus geosynthetics (i.e., geotextile or geogrid) can also be considered after underground work such as utility construction is completed. Prior to placing the geotextile or geogrid, we recommend that all below-grade construction, such as utility line installation, be completed to avoid damaging the geosynthetics. Equipment should not be operated above the geosynthetics until one full lift of crushed stone fill is placed above it.

Further evaluation of the need for subgrade stabilization should be provided by a qualified geotechnical engineer during construction as the subgrade conditions are exposed on a broad scale.

Temporary excavations will probably be required during grading operations. As a minimum, excavations should be performed in accordance with OSHA 29 CFR, Part 1926, Subpart P,

“Excavations” and its appendices, and in accordance with any applicable local, and/or state regulations.

Construction site safety is the sole responsibility of the contractor who controls the means, methods, and sequencing of construction operations. Under no circumstances shall the information provided herein be interpreted to mean Terracon is assuming any responsibility for construction site safety, or the contractor's activities; such responsibility shall neither be implied nor inferred.

Construction Observation and Testing

The earthwork efforts should be observed and tested by the Geotechnical Engineer or approved technician. Observation and testing should include documentation of adequate removal of vegetation and topsoil, proofrolling, and mitigation of areas delineated by the proof-roll to require mitigation. If unanticipated conditions are encountered, the Geotechnical Engineer should be contacted to discuss mitigation options.

In addition to the documentation of the essential parameters necessary for construction, the continuation of the Geotechnical Engineer into the construction phase of the project provides the continuity to maintain the Geotechnical Engineer's evaluation of subsurface conditions, including assessing variations and associated design changes.

GENERAL EMBANKMENT SETTLEMENT

Lean clays, fat clays, and silty clays were observed throughout the soil borings. These soils have a high compressibility potential. We understand that the new overpass structure could require embankments on the order of about 35 feet. From a settlement analysis performed, we anticipate settlements in the range of about 12 to 18 inches for the highest section of the embankment. A slight overbuilding of the embankment may be necessary to compensate for the anticipated settlement.

FILL EMBANKMENT SLOPE CONSIDERATIONS

We understand that bridge approach embankments for the project will be up to about 35 feet tall. Borrow sources for the embankment fill materials have not yet been identified. The following recommendations may be considered prior to the identification of the embankment borrow source. The recommendations do not account for seepage or potential flooding that may dictate the use of flatter slopes. Detailed evaluation of the proposed borrow source materials should be undertaken prior to the final design and the results incorporated in the final slope stability and settlement recommendations.

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General Description	Silts and silty or clayey sands	Low plasticity clays	High plasticity clays	Clayey gravels
ASTM Classification	ML, SM, SC ¹	CL	CH ²	GC
Fill Side Slope**	2.5:1	2.5:1	3:1	2:1
Fill Spill Slope** (H* ≤ 20 feet)	2:1	2:1	2.5:1	2:1
Fill Spill Slope** (H* > 20 feet) ³	2.5:1	2.5:1	3:1	2:1
Embankment compression (H* ≤ 20 feet)	1.5%	1.4%	2.6%	1.2%
Embankment compression (H* > 20 feet)	2.8%	2.6%	3.9%	2.4%

H* is the total height between the toe of the slope and grade at top of slope/grade at the end of structure

Slope** is the horizontal to vertical slope

1. Erosion control may be required for soil types other than SC
2. High Plasticity index materials (PI > 50) should be used with caution and require project specific analysis of slope stability and compression.
3. Steeper slopes for low spill slopes (H* ≤ 20 feet) assume some form of slope protection to control erosion and cyclic moisture changes.

LATERAL EARTH PRESSURES

For planned wingwall or retaining walls planned at the bridge locations, the following lateral earth pressures can be utilized.

Lateral Earth Pressure Design Parameters				
Earth Pressure Condition ¹	Coefficient for Backfill Type	Surcharge Pressure ^{2, 3, 4} p ₁ (psf)	Effective Fluid Pressures (psf) ^{4, 5}	
			Unsaturated ⁶	Submerged ⁶
Active (K _a)	Granular - 0.31	(0.31)S	(40)H	(80)H
	Fine Grained - 0.41	(0.41)S	(50)H	(85)H
At-Rest (K ₀)	Granular - 0.47	0.47)S	(55)H	(90)H
	Fine Grained - 0.58	(0.58)S	(70)H	(105)H
Passive (K _p)	Granular - 3.25	---	(390)H	(250)H
	Fine Grained - 2.46	---	(295)H	(205)H

1. For active earth pressure, wall must rotate about base, with top lateral movements 0.002 H to 0.004 H, where H is wall height. For passive earth pressure, wall must move horizontally to mobilize resistance
2. Uniform surcharge, where S is surcharge pressure.
3. Loading from heavy compaction equipment is not included in surcharge or earth pressures

-
4. No safety factor is included in these values.
 5. Uniform, horizontally graded backfill, compacted to at least 95 percent of the ASTM D 698 maximum dry density, rendering a maximum unit weight of 120 pcf
 6. In order to achieve “Unsaturated” conditions, wall drainage must be provided. “Submerged” conditions are recommended when drainage behind walls is not incorporated into the design.
-

DEEP FOUNDATIONS

Soil Strength Parameters

Driven pile parameters used to determine the nominal resistances of piles are included as attachments at the end of the report. The values were developed based on our interpolation of the generalized stratigraphy of the borings near each bridge and our experience with the soils in the project area.

Driven Pile Resistances

Through coordination with Michael Baker, we understand that four different pile types are being considered for support of the planned bridge structure. These include: 18-inch steel pipe piles, 24-inch steel pipe piles, 18-inch square concrete piles, and 24-inch concrete piles. Based on the general profiles above, the driven piles resistances were determined at different depths. Graphical representations of the estimated resistances for each structure boring are presented in the end of this report.

For the graphs presented:

- The nominal resistances are applicable if the center-to-center spacing of the piles is equal to or greater than 3 times the maximum pile section dimension
- The factored resistance values are based on the nominal resistance multiplied by the structural resistance factor of 0.35 for clays and 0.45 for sands from **Resistance Factors for Geotechnical Resistance of Driven Piles, ϕ** [AASHTO 10.5.5.2.3-1]. The resistance factor can be increased if pile dynamic analysis or wave equation analyses is specified to be performed prior to construction.

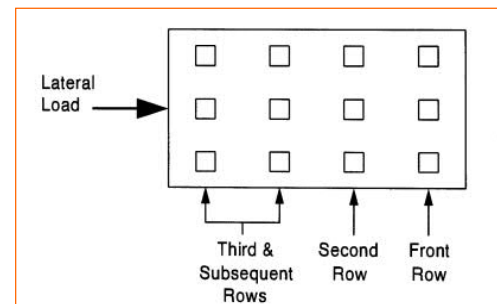
Wall thickness for pipe piles should be selected in consideration of the design nominal resistance (or conversely, the maximum nominal resistance, or structural limit state, should be established for the selected pipe pile section). The critical event occurs during driving, and pile stresses should be maintained less than $0.9F_y$ to reduce the potential for damage to the pile, where F_y = yield strength of the steel. This driving stress was often correlated to a maximum allowable design capacity of $0.25 \cdot F_y \cdot A_{st}$ using ASD methods (where A_{st} = cross sectional steel area). For LRFD design methods, resistance factors for the strength limit state are provided in AASHTO Article 6.5.4.2 for pipe pile sections; use of a pile tip is not considered necessary on this site.

Driven Pile Lateral Loading

The strength parameters listed in the Soil Strength Parameters can be used as input values for use in LPILE analyses. LPILE will estimate values of k_h and E_{50} based on the provided strength values. Effective unit soil weights should be used for input assuming a maximum groundwater level similar to flood stage elevation.

When piles are used in groups, the lateral resistances of the piles in the second, third, and subsequent rows of the group should be reduced as compared to the capacity of a single, independent pile. Guidance for applying p-multiplier factors to the p values in the p-y curves for each row of pile foundations within a pile group are as follows:

- Front row: $P_m = 0.8$;
- Second row: $P_m = 0.4$
- Third and subsequent row: $P_m = 0.3$.



The load resistances provided herein are based on the stresses induced in the supporting soil strata. The structural capacity of the piles should be checked to assure that they can safely accommodate the combined stresses induced by axial and lateral forces. Lateral deflections of piles should be evaluated using an appropriate analysis method, and will depend upon the pile's diameter, length, configuration, stiffness and "fixed head" or "free head" condition. We can provide additional analyses and estimates of lateral deflections for specific loading conditions upon request. The load-carrying capacity of piles may be improved by increasing the diameter of pipe piles.

Driven Pile Construction Considerations

The contractor should select a driving hammer and cushion combination which can install the selected piling without overstressing the pile material. The hammer should have a rated energy in foot-pounds at least equal to 15 percent of the design compressive load capacity in pounds. The contractor should submit the pile driving plan and the pile hammer-cushion combination to the engineer for evaluation of the driving stresses in advance of pile installation. During driving, a maximum of 10 blows per inch is recommended to reduce the potential of damage to the piles.

Pile driving conditions, hammer efficiency, and stress on the pile during driving could be better evaluated during installation using a Pile Driving Analyzer (PDA). A Terracon representative should observe pile driving operations. Each pile should be observed and checked for buckling, crimping and alignment in addition to recording penetration resistance, depth of embedment, and general pile driving operations.

The pile driving process should be observed by the Geotechnical Engineer or approved technician. Terracon should document the pile installation process including soil/rock and groundwater conditions encountered, consistency with expected conditions, and details of the installed pile.

Excavations for pile caps should be observed by the Geotechnical Engineer or approved technician. The base of all excavations should be free of water and loose soil, prior to placing concrete. Concrete should be placed soon after excavating to reduce bearing soil disturbance. Care should be taken to prevent wetting or drying of the bearing materials during construction. Excessively wet or dry material or any loose/disturbed material in the bottom of the footing excavations should be removed/reconditioned before foundation concrete is placed.

RESILIENT MODULUS TESTING

We understand that on-site soils or select fill could be used for the construction of pavement subgrade for the pavements and approaches associated with the new roadway alignment for this project. Resilient modulus testing of the on-site soils was conducted for the proposed roadway alignment of this project. The resilient modulus testing was conducted in general accordance with AASHTO T307-99. Bulk samples were collected from roadway Borings R-1 through R-4 and combined to create a single bulk sample. Laboratory resilient modulus values were determined for the bulk sample and are listed below.

A laboratory resilient modulus value was selected from tests performed on a sample remolded to a moisture content that was approximately 2 percent above its optimum moisture content. The laboratory resilient modulus value was selected from the tests performed at a chamber confining pressure of 2 psi with nominal maximum axial stress values ranging from 2 to 10 psi.

We understand from ArDOT that the laboratory tested values of resilient modulus must be converted to a resilient modulus for pavement design. As requested, we utilized a spreadsheet developed by the Client that converts resilient modulus values to R-values and then to a design resilient modulus value. Using the method specified to us by ArDOT, we recommend a design resilient modulus value of 3,100 psi to be utilized for the design of pavements on this project which utilize the tested materials for pavement subgrade.

We also understand that if select fill soils are used during construction, ArDOT will assume resilient modulus values in-line with the design values calculated from the laboratory resilient modulus tests. If different material types are proposed, additional laboratory testing may be necessary.

SEISMIC CONSIDERATIONS

The seismic design requirements for buildings and other structures are based on Seismic Design Category. Site Classification is required to determine the Seismic Design Category for a structure. The Site Classification is based on the upper 100 feet of the site profile defined by a weighted average value of either shear wave velocity, standard penetration resistance, or undrained shear strength in accordance with AASHTO Guide Specification for LRFD Bridge Design (2017). Based on the soil properties encountered at the site and as described on the exploration logs and results, it is our professional opinion that the **Seismic Site Class is D**. Subsurface explorations at this site were extended to a maximum depth of 120 feet.

GENERAL COMMENTS

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Natural variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. Terracon should be retained as the Geotechnical Engineer, where noted in this report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our Scope of Services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence or collaboration through this system are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client, and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly impact excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing.

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Site safety, cost estimating, excavation support, and dewatering requirements/design are the responsibility of others. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

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**General Profiles:****Boring B-1**

Stratum	Approximate Depth to Bottom of Stratum (feet)	Material Description	Consistency/Density	Undrained Shear Strength (psf)	Friction Angle (°)
1	28.5	Silty sand, sandy lean clay, sandy silty clay, and sandy silt	Medium stiff	1,000	0
2	43.5	Lean clay	Very stiff	2,000	0
3	60	Lean clay	Hard	3,500	0
4	80	Lean clay	Hard	4,000	0

Boring B-2

Stratum	Approximate Depth to Bottom of Stratum (feet)	Material Description	Consistency/Density	Undrained Shear Strength (psf)	Friction Angle (°)
1	13.5	Silty sand and sandy silty clay	Stiff to very stiff	1,500	0
2	28.5	Silty sand	Medium dense	0	28
3	43.5	Lean clay	Very stiff	2,000	0
4	60	Lean clay	Hard	3,500	0
5	80	Lean clay	Hard	4,000	0

Boring B-3

Stratum	Approximate Depth to Bottom of Stratum (feet)	Material Description	Consistency/Density	Undrained Shear Strength (psf)	Friction Angle (°)
1	18.5	Silty sand and sandy silt	Loose to medium dense	0	28
2	33.5	Lean clay	Very stiff	2,000	0
3	60	Lean clay	Hard	3,500	0
4	80	Lean clay	Hard	4,000	0

Geotechnical Engineering Report

Job No. 070458, UPRR Grade Separation ■ Highway 82, Buckner, Arkansas
October 23, 2019 ■ Terracon Project No. 35185112

**Boring B-4**

Stratum	Approximate Depth to Bottom of Stratum (feet)	Material Description	Consistency/Density	Undrained Shear Strength (psf)	Friction Angle (°)
1	8.5	Silty sand and sandy lean clay	Medium stiff	750	0
2	23.5	Silty sand, sandy fat clay and lean clay	Stiff to very stiff	1,000	0
3	33.5	Silty sand	Dense to very dense	0	32
4	50	Lean clay	Very stiff to hard	3,500	0
5	70	Lean clay	Very stiff to hard	4,000	0
6	80	Silty sand and silty clay	Very dense	0	34

Boring B-5

Stratum	Approximate Depth to Bottom of Stratum (feet)	Material Description	Consistency/Density	Undrained Shear Strength (psf)	Friction Angle (°)
1	8.5	Sandy lean clay	Medium stiff to stiff	1,000	0
2	23.5	Lean clay with sand	Stiff to hard	1,500	0
3	33.5	Lean clay with sand	Stiff to hard	3,000	0
4	60	Lean clay	Hard	3,000	0
5	70	Lean clay	Hard	3,500	0
4	100	Silty sand	Very dense	0	34

Geotechnical Engineering Report

Job No. 070458, UPRR Grade Separation ■ Highway 82, Buckner, Arkansas
October 23, 2019 ■ Terracon Project No. 35185112

**Boring B-6**

Stratum	Approximate Depth to Bottom of Stratum (feet)	Material Description	Consistency/Density	Undrained Shear Strength (psf)	Friction Angle (°)
1	5.5	Sandy lean clay	Soft to stiff	1,000	0
2	13.5	Clayey sand	Medium dense	0	28
3	28.5	Lean clay with sand and fat clay	Very stiff	2,000	0
4	70	Silty sand and lean clay	Hard	4,000	0
5	90	Clayey sand	Very dense	0	34

Boring B-7

Stratum	Approximate Depth to Bottom of Stratum (feet)	Material Description	Consistency/Density	Undrained Shear Strength (psf)	Friction Angle (°)
1	5	Sandy lean clay	Soft	500	0
2	18.5	Sandy lean clay	Stiff	1,000	0
3	33.5	Lean clay	Very stiff	2,500	0
4	48.5	Sandy silt and fat clay	Hard	3,500	0
5	60	Lean clay	Hard	3,500	0
4	80	Lean clay	Hard	4,000	0

Geotechnical Engineering Report

Job No. 070458, UPRR Grade Separation ■ Highway 82, Buckner, Arkansas
October 23, 2019 ■ Terracon Project No. 35185112

**Boring B-8 General Profile**

Stratum	Approximate Depth to Bottom of Stratum (feet)	Material Description	Consistency/Density	Undrained Shear Strength (psf)	Friction Angle (°)
1	5	Lean clay with sand	Soft to medium stiff	750	0
2	25	Sandy lean clay	Stiff	2,000	0
3	33.5	Sandy lean clay	Very stiff	3,000	0
4	80	Sandy fat clay and fat clay	Hard	4,000	0

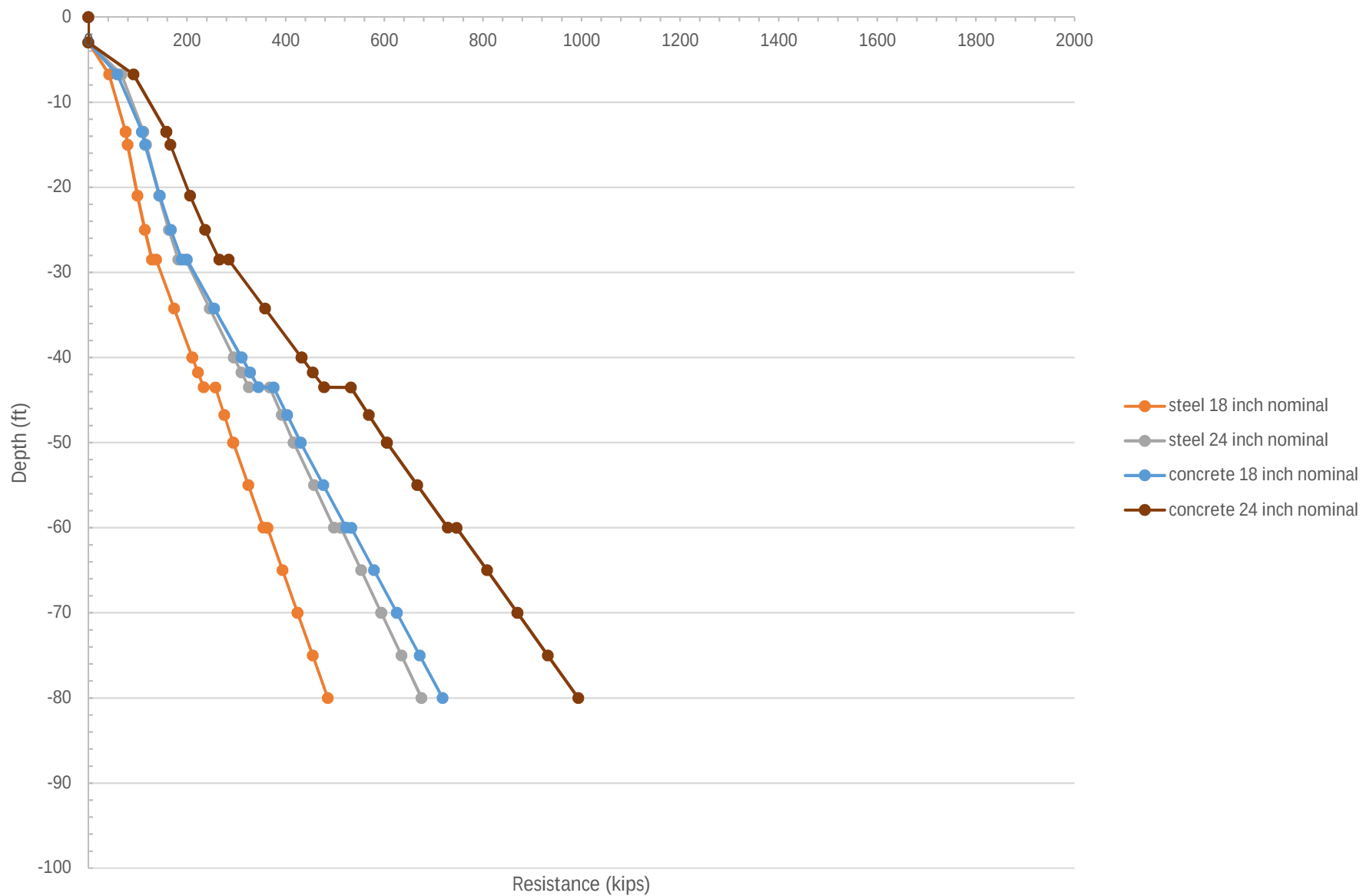
Geotechnical Engineering Report

Job No. 070458, UPRR Grade Separation ■ Highway 82, Buckner, Arkansas
October 23, 2019 ■ Terracon Project No. 35185112

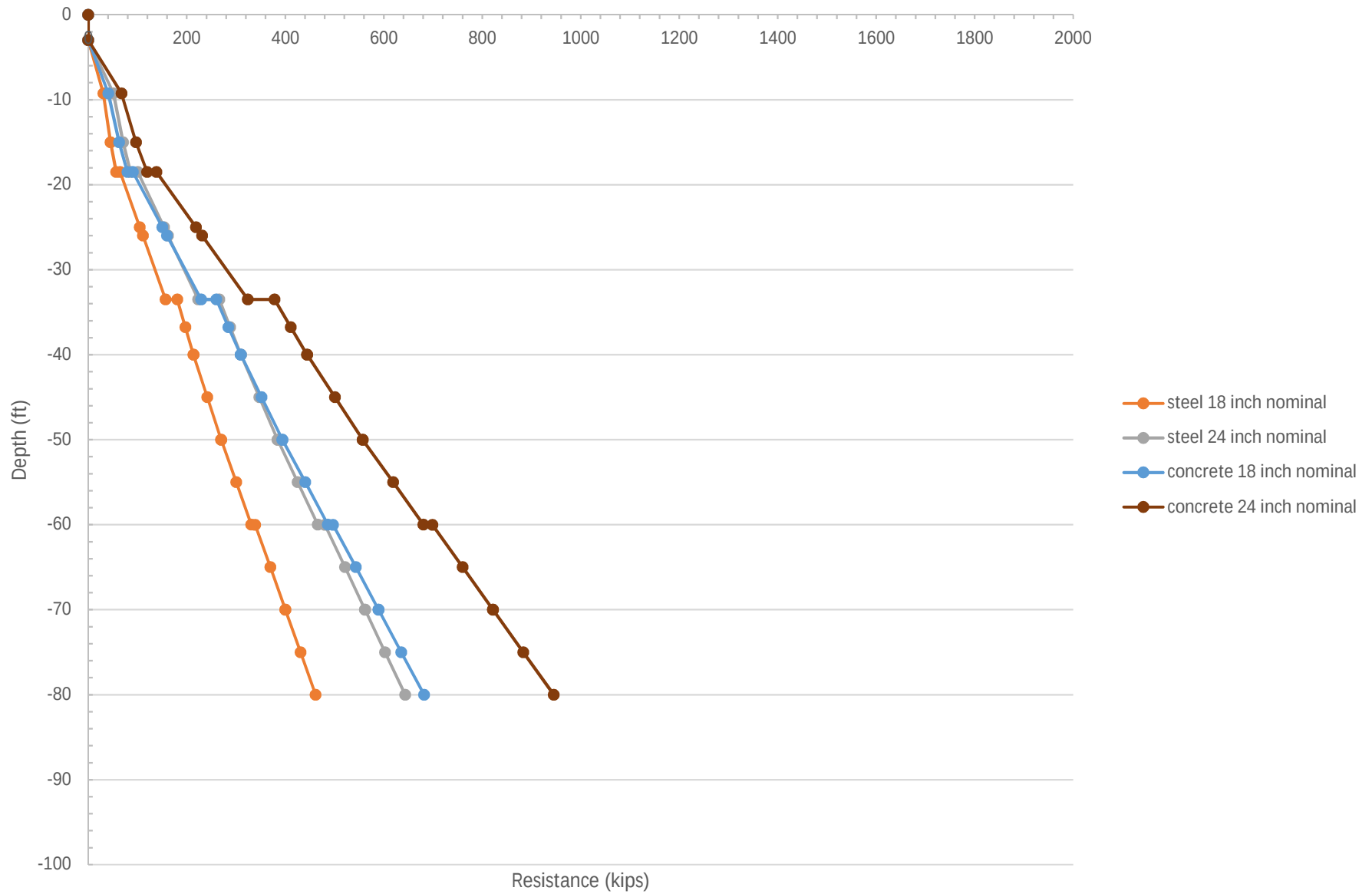
For the resistance graphs:

- The nominal resistances are applicable if the center-to-center spacing of the piles is equal to or greater than 3 times the maximum pile section dimension
- The factored resistance values are based on the nominal resistance multiplied by the structural resistance factor of 0.35 for clays and 0.45 for sands from **Resistance Factors for Geotechnical Resistance of Driven Piles, ϕ** [AASHTO 10.5.5.2.3-1]. The resistance factor can be increased if pile dynamic analysis or wave equation analyses is specified to be performed prior to construction.

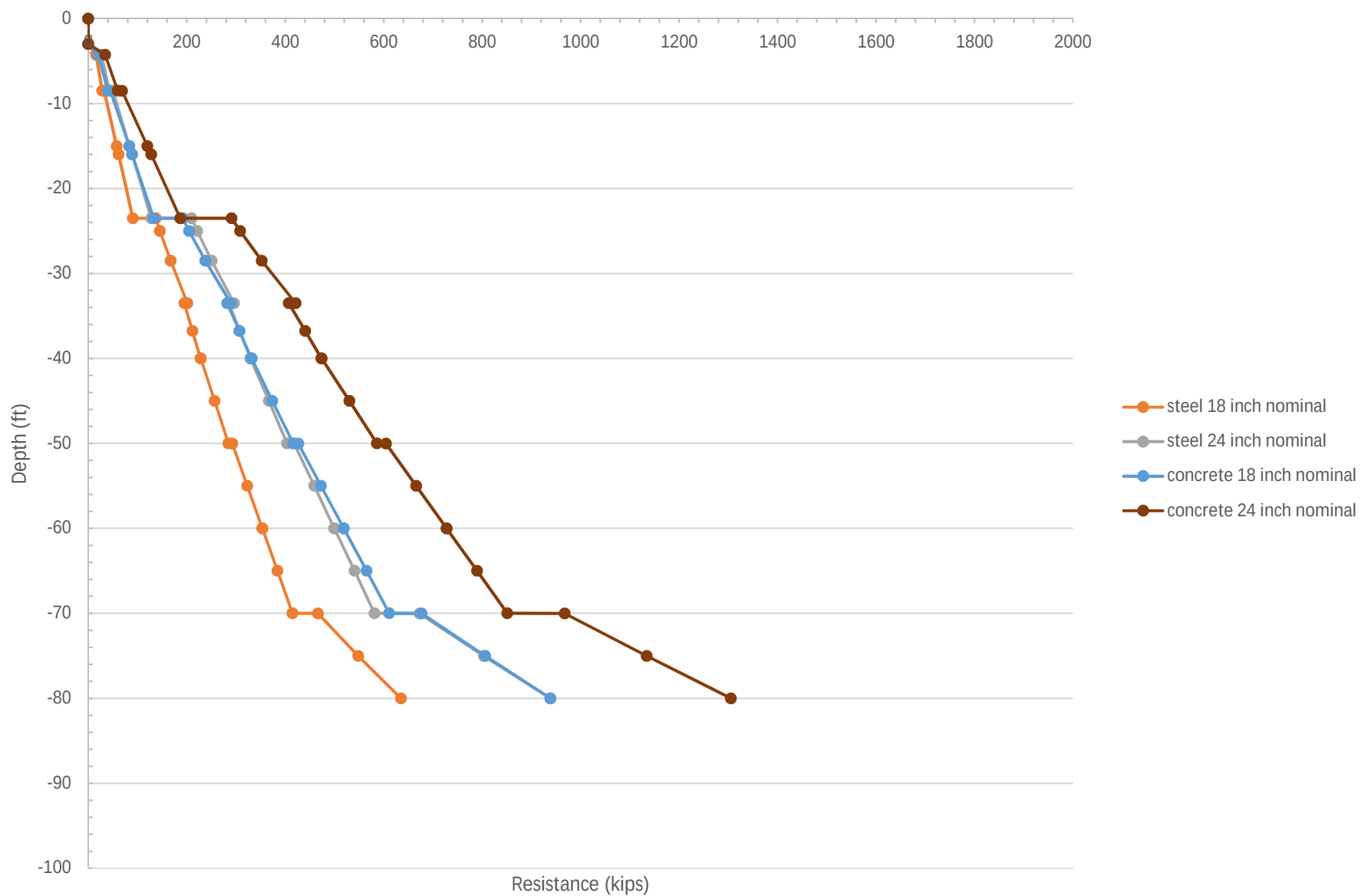
Job No. 070458, UPRR Grade Separation
Boring B-2 Resistances



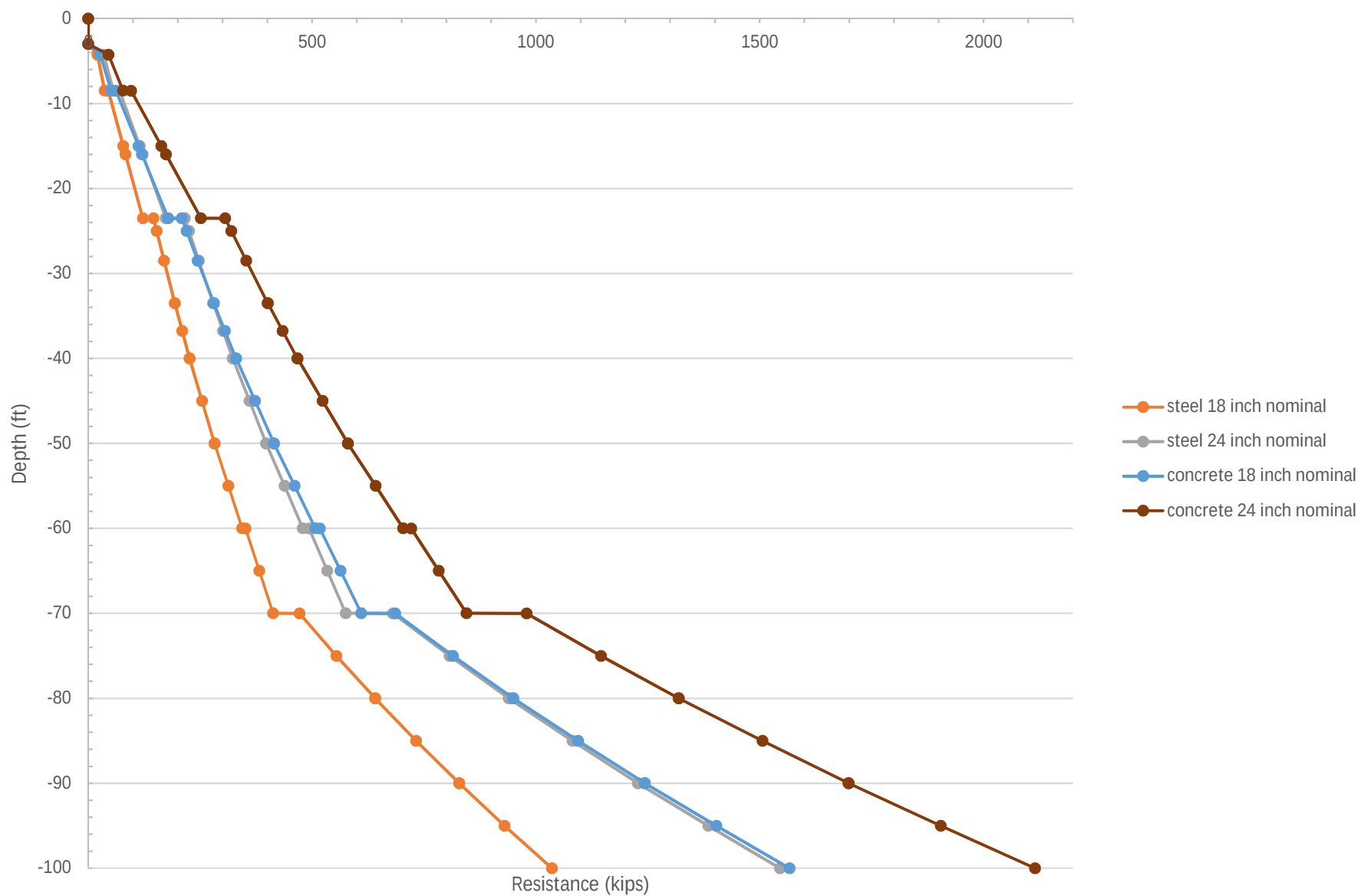
Job No. 070458, UPRR Grade Separation
Boring B-3 Resistances



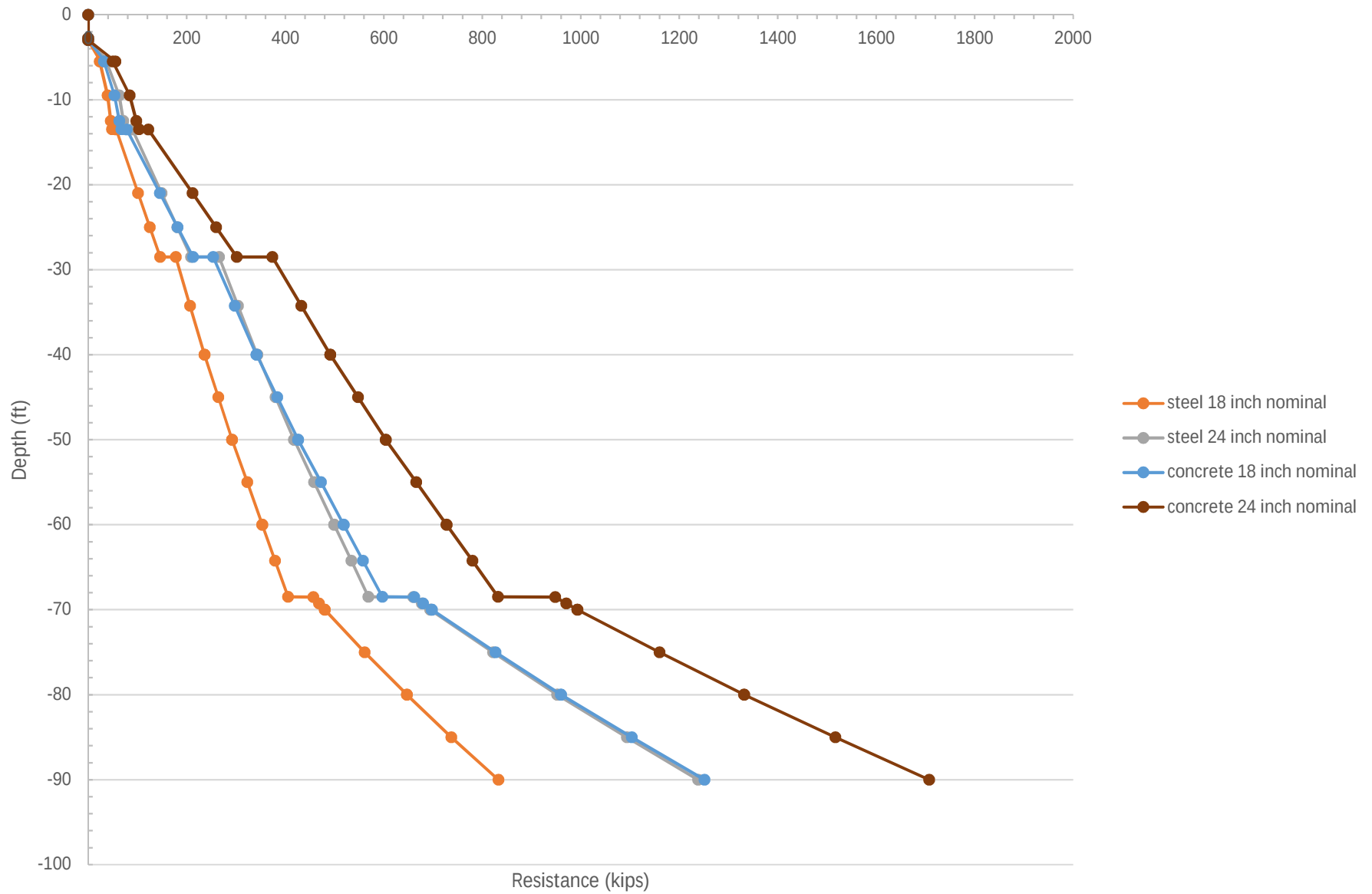
Job No. 070458, UPRR Grade Separation
Boring B-4 Resistances



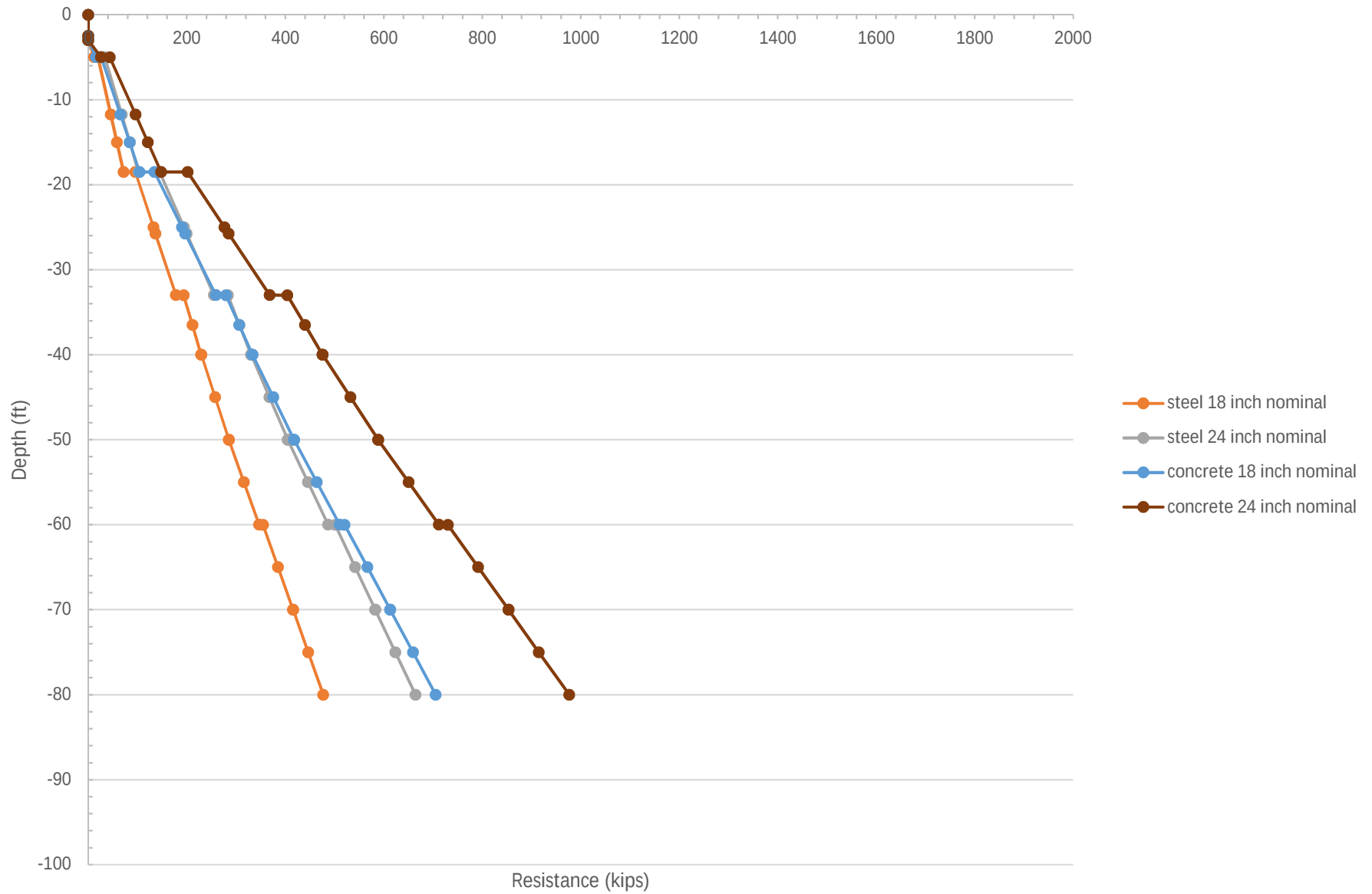
Job No. 070458, UPRR Grade Separation
Boring B-5 Resistances



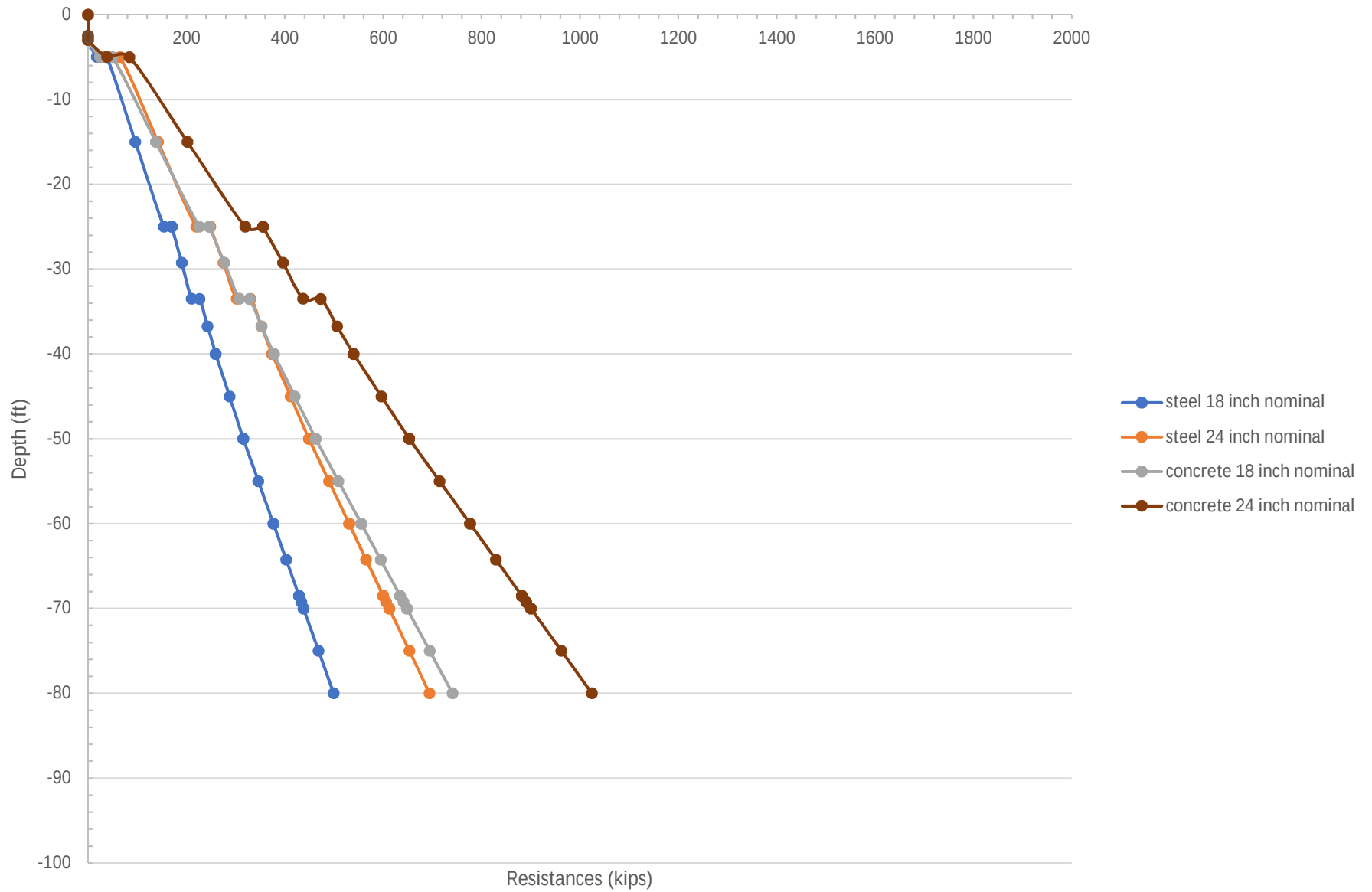
Job No. 070458, UPRR Grade Separation
Boring B-6 Resistances



Job No. 070458, UPRR Grade Separation
Boring B-7 Resistances



Job No. 070458, UPRR Grade Separation
Boring B-8 Resistances



ATTACHMENTS

EXPLORATION AND TESTING PROCEDURES

Field Exploration

Number of Borings	Boring Depth (feet)	Planned Location
8	79½ to 99½	Bridge and Embankment Borings
4	20 to 40	Roadway borings

Boring Layout and Elevations: The locations of the field exploration points (borings) were measured in the field by Terracon's exploration team using a hand-held GPS unit to measure the latitude and longitude. The coordinates and elevations were surveyed by Michael Baker after the completion of drilling.

Subsurface Exploration Procedures: We advanced the borings with a track-mounted, rotary drill rig using continuous flight augers and mud-rotary procedures. Five samples were obtained in the upper 10 feet of each boring. After the upper 10 feet, samples were obtained in 5-foot intervals up to a depth of about 50 feet then samples were obtained in 10-foot intervals to the termination depth. In the thin-walled tube sampling procedure, a thin-walled, seamless steel tube with a sharp cutting edge was pushed hydraulically into the soil to obtain a relatively undisturbed sample. In the split-barrel sampling procedure, a standard 2-inch outer diameter split-barrel sampling spoon was driven into the ground by a 140-pound automatic hammer falling a distance of 30 inches. The number of blows required to advance the sampling spoon the last 12 inches of a normal 18-inch penetration is recorded as the Standard Penetration Test (SPT) resistance value. The SPT resistance values, also referred to as N-values, are indicated on the boring logs at the test depths. We observed and recorded groundwater levels during drilling and sampling. For safety purposes, all borings were backfilled with auger cuttings after their completion. Pavements were patched with cold-mix asphalt and/or pre-mixed concrete, as appropriate.

The sampling depths, penetration distances, and other sampling information was recorded on the field boring logs. The samples were placed in appropriate containers and taken to our soil laboratory for testing and classification by a Geotechnical Engineer. Our exploration team prepared field boring logs as part of the drilling operations. These field logs included visual classifications of the materials encountered during drilling and our interpretation of the subsurface conditions between samples. Final boring logs were prepared from the field logs. The final boring logs represent the Geotechnical Engineer's interpretation of the field logs and include modifications based on observations and tests of the samples in our laboratory.

Geotechnical Engineering Report

Job No. 070458, UPRR Grade Separation ■ Buckner, Arkansas

October 23, 2019 ■ Terracon Project No. 35185112



Laboratory Testing

Representative soil samples were tested in the laboratory to measure their natural water content, gradation and Atterberg limits. The test results are provided on the appended boring logs and laboratory test reports.

The soil samples were classified in the laboratory based on visual observation, texture, plasticity, and the laboratory testing described above. The soil descriptions presented on the boring logs are in accordance with the enclosed General Notes and Unified Soil Classification System (USCS). The estimated USCS group symbols for native soils are shown on the boring logs, and a brief description of the USCS is included in this report.

SITE LOCATION AND EXPLORATION PLANS

Contents:

Site Location Plan

Exploration Plan

Note: All attachments are one page unless noted above.

SITE LOCATION PLAN

Job No. 070458 UPRR Grade Separation ■ Buckner, Arkansas
October 14, 2019 ■ Terracon Project No. 35185112

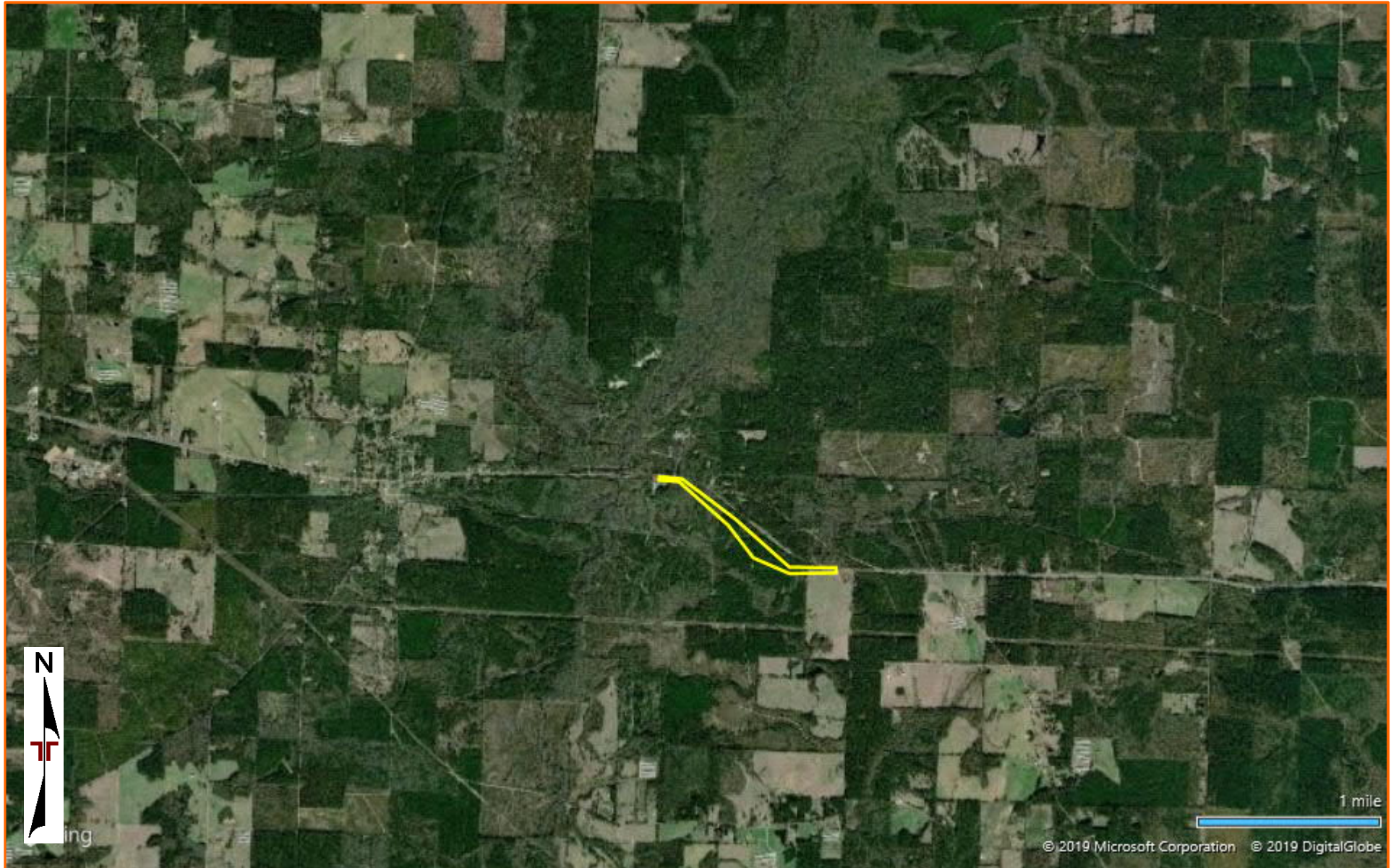


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT
INTENDED FOR CONSTRUCTION PURPOSES

AERIAL PHOTOGRAPHY PROVIDED BY
MICROSOFT BING MAPS



EXPLORATION PLAN – Roadway Borings

Job No. 070458 UPRR Grade Separation ■ Buckner, Arkansas

October 14, 2019 ■ Terracon Project No. 35185112



DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS
NOT INTENDED FOR CONSTRUCTION PURPOSES

AERIAL PHOTOGRAPHY PROVIDED
BY MICROSOFT BING MAPS

EXPLORATION PLAN- Roadway Borings

Job No. 070458 UPRR Grade Separation ■ Buckner, Arkansas
October 14, 2019 ■ Terracon Project No. 35185112

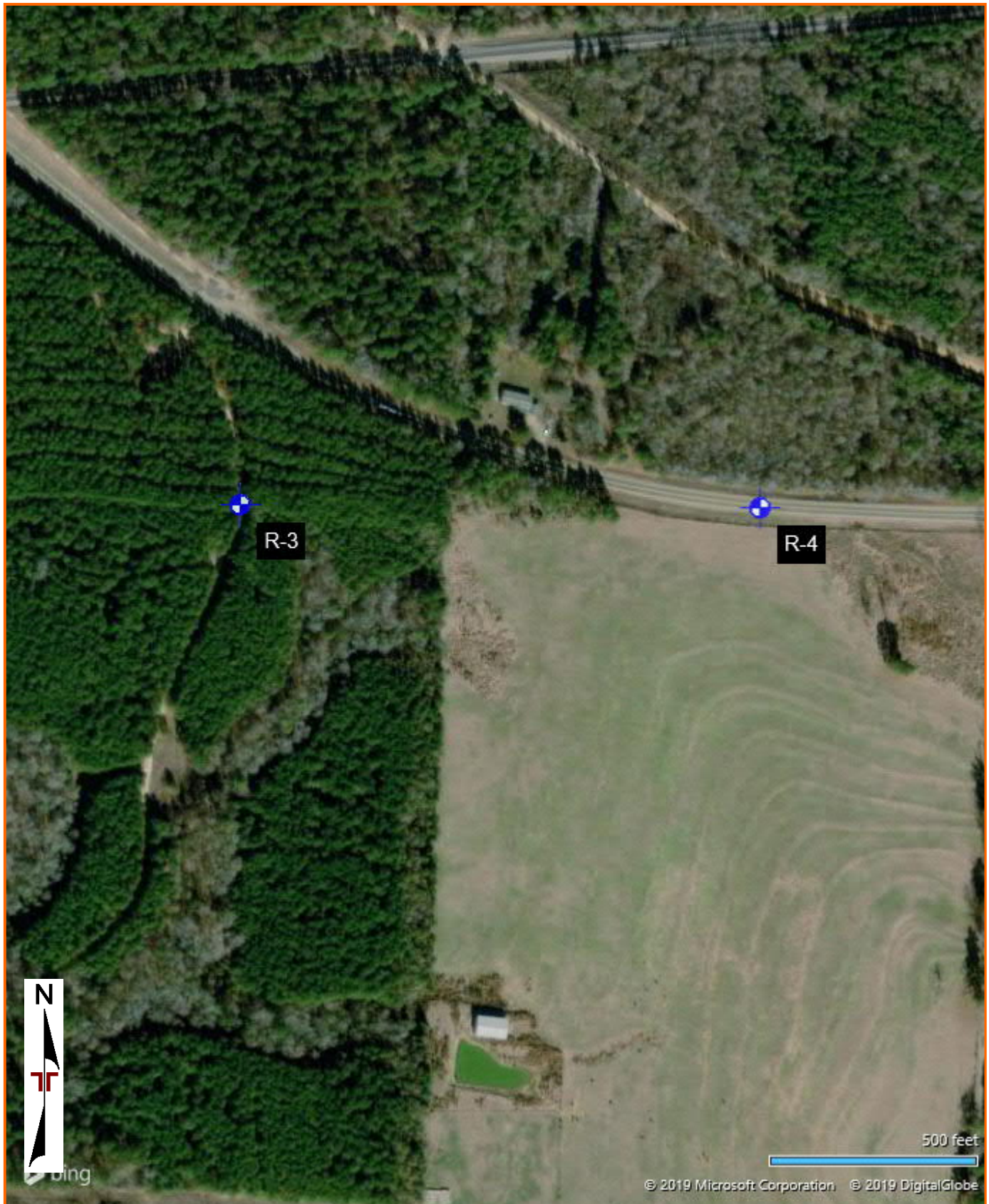


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS
NOT INTENDED FOR CONSTRUCTION PURPOSES

AERIAL PHOTOGRAPHY PROVIDED
BY MICROSOFT BING MAPS

EXPLORATION RESULTS

Contents:

Boring Logs (B-1 through B-8 and R-1 through R-4)
One dimensional Consolidation Properties of Soils Using Incremental Loading
Consolidated-Undrained Triaxial Compression Test
Particle Size Analysis of Soil
Liquid Limit, Plastic Limit and Plasticity Index of Soils

Note: All attachments are one page unless noted above.

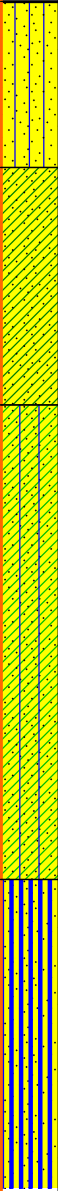
BORING LOG NO. B-1

Page 1 of 4

PROJECT: Job No. 070458, UPRR Grade Separation

CLIENT: Michael Baker International, LLC
Little Rock, Arkansas

SITE: Highway 82
Buckner, Arkansas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 33.3552° Longitude: -93.4034° DEPTH	DEPTH (FL.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LL-PL-PI	
	<u>SILTY SAND (SM)</u> , light reddish brown, loose											
	3.5			X	3-3-3 N=6				13			
				X	3-2-3 N=5				17			
	<u>SANDY LEAN CLAY (CL)</u> , reddish-brown and light gray, medium stiff	5							17		29-16-13	59
				X	5-4-3 N=7				20			
	8.5											
	<u>SANDY SILTY CLAY (CL-ML)</u> , reddish-brown and light gray, medium stiff	10									22-17-5	59
				X	5-4-3 N=7				23			
	18.5											
	<u>SANDY SILT (ML)</u> , with clay seams, reddish-brown, brown and gray, medium stiff	20									21-18-3	55
			X	5-5-3 N=8				32				
		25										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0 to 10 feet: Solid-stem auger
10 to 79.9 feet: Mud rotary

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:

Abandonment Method:

See [Supporting Information](#) for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

Water level not determined

Terracon

25809 I 30
Bryant, AR

Boring Started: 07-22-2019

Boring Completed: 07-22-2019

Drill Rig:

Driller: DB

Project No.: 35185112

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL - 35185112 JOB NO. 070458 UPRR FINAL.GPJ TERRACON.DATATEMPLATE.GDT 8/30/19

BORING LOG NO. B-1

Page 2 of 4

PROJECT: Job No. 070458, UPRR Grade Separation

CLIENT: Michael Baker International, LLC
Little Rock, Arkansas

SITE: Highway 82
Buckner, Arkansas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 33.3552° Longitude: -93.4034°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LL-PL-PI	
	DEPTH											
	SANDY SILT (ML) , with clay seams, reddish-brown, brown and gray, medium stiff (<i>continued</i>)											
	28.5											
	LEAN CLAY (CL) , with silt seams, light gray and gray, very stiff to hard											
		30									33-20-13	90
		35		X	6-10-12 N=22				23			
		40		X	6-11-14 N=25							
		45		X	10-13-19 N=32				22			
		50		X	9-13-21 N=34				23			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0 to 10 feet: Solid-stem auger
10 to 79.9 feet: Mud rotary

Abandonment Method:

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Water level not determined

Terracon

25809 I 30
Bryant, AR

Boring Started: 07-22-2019

Drill Rig:

Project No.: 35185112

Boring Completed: 07-22-2019

Driller: DB

BORING LOG NO. B-1

Page 3 of 4

PROJECT: Job No. 070458, UPRR Grade Separation

CLIENT: Michael Baker International, LLC
Little Rock, Arkansas

SITE: Highway 82
Buckner, Arkansas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 33.3552° Longitude: -93.4034° DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LL-PL-PI	
	LEAN CLAY (CL) , with silt seams, light gray and gray, very stiff to hard (<i>continued</i>)	55										
		60		X	12-21-50 N=71			24				
		65										
		70		X	50/6"			33				
		75										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0 to 10 feet: Solid-stem auger
10 to 79.9 feet: Mud rotary

Abandonment Method:

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Water level not determined

Terracon
25809 I 30
Bryant, AR

Boring Started: 07-22-2019

Drill Rig:

Project No.: 35185112

Boring Completed: 07-22-2019

Driller: DB

BORING LOG NO. B-1

Page 4 of 4

PROJECT: Job No. 070458, UPRR Grade Separation

CLIENT: Michael Baker International, LLC
Little Rock, Arkansas

SITE: Highway 82
Buckner, Arkansas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 33.3552° Longitude: -93.4034°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	DEPTH											
	LEAN CLAY (CL) , with silt seams, light gray and gray, very stiff to hard (<i>continued</i>)											
	79.9				18-24-50/5"				36			
	Boring Terminated at 79.9 Feet											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0 to 10 feet: Solid-stem auger
10 to 79.9 feet: Mud rotary

See [Exploration and Testing Procedures](#) for a
description of field and laboratory procedures
used and additional data (if any).

Notes:

Abandonment Method:

See [Supporting Information](#) for explanation of
symbols and abbreviations.

WATER LEVEL OBSERVATIONS

Water level not determined

Terracon
25809 I 30
Bryant, AR

Boring Started: 07-22-2019

Boring Completed: 07-22-2019

Drill Rig:

Driller: DB

Project No.: 35185112

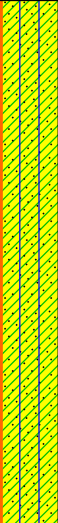
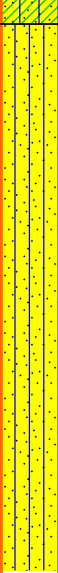
BORING LOG NO. B-2

Page 1 of 4

PROJECT: Job No. 070458, UPRR Grade Separation

CLIENT: Michael Baker International, LLC
Little Rock, Arkansas

SITE: Highway 82
Buckner, Arkansas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 33.3552° Longitude: -93.4032° DEPTH	DEPTH (FL.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LL-PL-PI	
 2.0  13.5 	<u>SILTY SAND (SM)</u> , brown, very loose											
					2-2-1 N=3				19			
					1-2-2 N=4				19			
			5				CU				22-16-6	68
					7-7-8 N=15				16			
			10						14			
					5-7-7 N=14				17			
					9-8-8 N=16				22		NP	41
			15									
	<u>SILTY SAND (SM)</u> , light brown, gray and reddish-brown, medium dense											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0 to 10 feet: Solid-stem auger
10 to 80 feet: mud rotary

Abandonment Method:
Boring backfilled with Auger Cuttings and/or Bentonite

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

9 feet after completion

Terracon

25809 I 30
Bryant, AR

Boring Started: 07-18-2019

Drill Rig:

Project No.: 35185112

Boring Completed: 07-18-2019

Driller: DB

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 35185112 JOB NO. 070458 UPRR FINAL.GPJ TERRACON.DATATEMPLATE.GDT 8/30/19

BORING LOG NO. B-2

Page 2 of 4

PROJECT: Job No. 070458, UPRR Grade Separation

CLIENT: Michael Baker International, LLC
Little Rock, Arkansas

SITE: Highway 82
Buckner, Arkansas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 33.3552° Longitude: -93.4032°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LL-PL-PI	
	DEPTH											
	SILTY SAND (SM) , light brown, gray and reddish-brown, medium dense <i>(continued)</i>											
28.5												
	LEAN CLAY (CL) , with silt seams, gray, very stiff to hard										33-14-19	90
		30										
					6-9-14 N=23				22			
	- with gravel at about 33.5 feet	35										
					9-14-15 N=29							
		40										
					11-16-20 N=36				25			
		45										
					11-21-23 N=44				25			
		50										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0 to 10 feet: Solid-stem auger
10 to 80 feet: mud rotary

Abandonment Method:
Boring backfilled with Auger Cuttings and/or Bentonite

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

9 feet after completion

Terracon

25809 I 30
Bryant, AR

Boring Started: 07-18-2019

Boring Completed: 07-18-2019

Drill Rig:

Driller: DB

Project No.: 35185112

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 35185112 JOB NO. 070458 UPRR FINAL GPJ TERRACON_DATATEMPLATE.GDT 8/30/19

BORING LOG NO. B-2

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PROJECT: Job No. 070458, UPRR Grade Separation

CLIENT: Michael Baker International, LLC
Little Rock, Arkansas

SITE: Highway 82
Buckner, Arkansas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 33.3552° Longitude: -93.4032°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LL-PL-PI	
DEPTH	LEAN CLAY (CL) , with silt seams, gray, very stiff to hard <i>(continued)</i>											
		55										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0 to 10 feet: Solid-stem auger
10 to 80 feet: mud rotary

Abandonment Method:
Boring backfilled with Auger Cuttings and/or Bentonite

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

9 feet after completion

Terracon
25809 I 30
Bryant, AR

Boring Started: 07-18-2019

Boring Completed: 07-18-2019

Drill Rig:

Driller: DB

Project No.: 35185112

BORING LOG NO. B-2

Page 4 of 4

PROJECT: Job No. 070458, UPRR Grade Separation

CLIENT: Michael Baker International, LLC
Little Rock, Arkansas

SITE: Highway 82
Buckner, Arkansas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 33.3552° Longitude: -93.4032°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	DEPTH											
	LEAN CLAY (CL) , with silt seams, gray, very stiff to hard (continued)											
	79.4			X	18-50/5"				21			
	Boring Terminated at 79.4 Feet											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0 to 10 feet: Solid-stem auger
10 to 80 feet: mud rotary

Abandonment Method:
Boring backfilled with Auger Cuttings and/or Bentonite

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

9 feet after completion

Terracon

25809 I 30
Bryant, AR

Boring Started: 07-18-2019

Drill Rig:

Project No.: 35185112

Boring Completed: 07-18-2019

Driller: DB

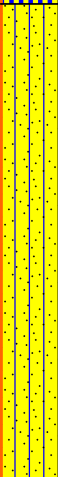
BORING LOG NO. B-3

Page 1 of 4

PROJECT: Job No. 070458, UPRR Grade Separation

CLIENT: Michael Baker International, LLC
Little Rock, Arkansas

SITE: Highway 82
Buckner, Arkansas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 33.3546° Longitude: -93.4032° DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	PERCENT FINES	
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LL-PL-PI		
	SILTY SAND (SM) , light gray, loose												
	2.0			X	1-2-3 N=5				18				
	SANDY SILT (ML) , brown, reddish-brown and light gray, soft			X	2-1-2 N=3				20		NP	65	
				X	1-1-2 N=3				23				
		5							20				
	SILTY SAND (SM) , with gravel, brown, light gray and dark brown, medium dense												
		10							20		NP	49	
	LEAN CLAY (CL) , with sand and silt seams, gray, very stiff to hard												
		15			X	5-7-12 N=19				25			
	LEAN CLAY (CL) , with sand and silt seams, gray, very stiff to hard												
		20							28				
	LEAN CLAY (CL) , with sand and silt seams, gray, very stiff to hard												
	LEAN CLAY (CL) , with sand and silt seams, gray, very stiff to hard												
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	LEAN CLAY (CL) , with sand and silt seams, gray, very stiff to hard												
	LEAN CLAY (CL) , with sand and silt seams, gray, very stiff to hard												

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0 to 10 feet: Solid-stem auger
10 to 80 feet: mud rotary

Abandonment Method:
Boring backfilled with Auger Cuttings and/or Bentonite

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

9 feet after completion

Terracon

25809 I 30
Bryant, AR

Boring Started: 07-18-2019

Drill Rig:

Project No.: 35185112

Boring Completed: 07-18-2019

Driller: DB

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 35185112 JOB NO. 070458 UPRR FINAL.GPJ TERRACON_DATATEMPLATE.GDT 8/30/19

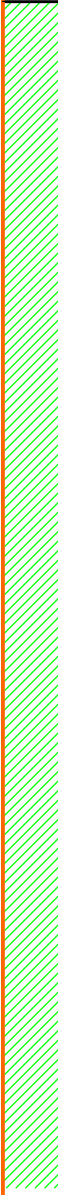
BORING LOG NO. B-3

Page 2 of 4

PROJECT: Job No. 070458, UPRR Grade Separation

CLIENT: Michael Baker International, LLC
Little Rock, Arkansas

SITE: Highway 82
Buckner, Arkansas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 33.3546° Longitude: -93.4032°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LL-PL-PI	
	LEAN CLAY (CL) , with sand and silt seams, gray, very stiff to hard (<i>continued</i>)											
		30		X	7-11-16 N=27				25			
		35		X	8-12-19 N=31						44-13-31	96
		40		X	10-13-20 N=33				23			
		45		X	10-13-24 N=37				22			
		50		X	11-14-25 N=39				24			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0 to 10 feet: Solid-stem auger
10 to 80 feet: mud rotary

Abandonment Method:
Boring backfilled with Auger Cuttings and/or Bentonite

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

 9 feet after completion

Terracon

25809 I 30
Bryant, AR

Boring Started: 07-18-2019

Drill Rig:

Project No.: 35185112

Boring Completed: 07-18-2019

Driller: DB

BORING LOG NO. B-3

Page 3 of 4

PROJECT: Job No. 070458, UPRR Grade Separation

CLIENT: Michael Baker International, LLC
Little Rock, Arkansas

SITE: Highway 82
Buckner, Arkansas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 33.3546° Longitude: -93.4032°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
DEPTH												
	LEAN CLAY (CL) , with sand and silt seams, gray, very stiff to hard (<i>continued</i>)											
		55										
		60		X	26-35-41 N=76				30			
		65										
		70		X	23-37-50/5"				31			
		75										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0 to 10 feet: Solid-stem auger
10 to 80 feet: mud rotary

Abandonment Method:
Boring backfilled with Auger Cuttings and/or Bentonite

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

9 feet after completion

Terracon
25809 I 30
Bryant, AR

Boring Started: 07-18-2019

Boring Completed: 07-18-2019

Drill Rig:

Driller: DB

Project No.: 35185112

BORING LOG NO. B-3

Page 4 of 4

PROJECT: Job No. 070458, UPRR Grade Separation

CLIENT: Michael Baker International, LLC
Little Rock, Arkansas

SITE: Highway 82
Buckner, Arkansas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 33.3546° Longitude: -93.4032°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	DEPTH											
	LEAN CLAY (CL) , with sand and silt seams, gray, very stiff to hard (<i>continued</i>)											
	79.9				23-33-50/5"				23			
	Boring Terminated at 79.9 Feet											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0 to 10 feet: Solid-stem auger
10 to 80 feet: mud rotary

Abandonment Method:
Boring backfilled with Auger Cuttings and/or Bentonite

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

9 feet after completion

Terracon

25809 I 30
Bryant, AR

Boring Started: 07-18-2019

Boring Completed: 07-18-2019

Drill Rig:

Driller: DB

Project No.: 35185112

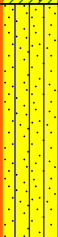
BORING LOG NO. B-4

Page 1 of 4

PROJECT: Job No. 070458, UPRR Grade Separation

CLIENT: Michael Baker International, LLC
Little Rock, Arkansas

SITE: Highway 82
Buckner, Arkansas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 33.3545° Longitude: -93.4027° DEPTH	DEPTH (FL.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LL-PL-PI	
 2.0  8.5  13.5  18.5  23.5 	<u>SILTY SAND (SM)</u> , fine grained, brown, very loose											
				X	1-1-2 N=3				13			
		<u>SANDY LEAN CLAY (CL)</u> , brown, gray and reddish-brown, medium stiff, mottled			X	1-2-3 N=5				19		
			5							17	34-14-20	52
					X	3-3-4 N=7				22		
		<u>SILTY SAND (SM)</u> , brown and light gray, loose										
			10							17	NP	31
		<u>SANDY FAT CLAY (CH)</u> , with silt seams, dark brown, stiff			X	2-4-6 N=10				36		
			15									
		<u>LEAN CLAY (CL)</u> , dark brown, very stiff					UU				31-16-15	89
			20									
	<u>SILTY SAND (SM)</u> , with clay seams, gray, dense to very dense											
		25			X	13-20-29 N=49			27			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0 to 10 feet: Solid-stem auger
10 to 80 feet: Mud rotary

Abandonment Method:
Boring backfilled with Auger Cuttings, spider plug and patched with asphalt

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Water level not determined

Terracon

25809 I 30
Bryant, AR

Boring Started: 07-23-2019

Drill Rig:

Project No.: 35185112

Boring Completed: 07-23-2019

Driller: DB

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL - 35185112 JOB NO. 070458 UPRR FINAL.GPJ TERRACON.DATATEMPLATE.GDT 8/30/19

BORING LOG NO. B-4

Page 2 of 4

PROJECT: Job No. 070458, UPRR Grade Separation

CLIENT: Michael Baker International, LLC
Little Rock, Arkansas

SITE: Highway 82
Buckner, Arkansas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 33.3545° Longitude: -93.4027° DEPTH	DEPTH (FL.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	PERCENT FINES	
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LL-PL-PI		
	SILTY SAND (SM) , with clay seams, gray, dense to very dense <i>(continued)</i>	30		X	11-26-40 N=66				24				
	FAT CLAY (CH) , with silt seams, dark gray and light gray, very stiff to hard	33.5	35		X	13-15-18 N=33				22			
		40		X	9-12-17 N=29					50-14-36	96		
		45		X	10-13-20 N=33				20				
		50		X	13-16-28 N=44				20				

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0 to 10 feet: Solid-stem auger
10 to 80 feet: Mud rotary

Abandonment Method:
Boring backfilled with Auger Cuttings, spider plug and patched with asphalt

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Water level not determined

Terracon

25809 I 30
Bryant, AR

Boring Started: 07-23-2019

Drill Rig:

Project No.: 35185112

Boring Completed: 07-23-2019

Driller: DB

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 35185112 JOB NO. 070458 UPRR FINAL GPJ TERRACON DATATEMPLATE GDT 8/30/19

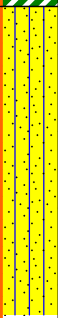
BORING LOG NO. B-4

Page 3 of 4

PROJECT: Job No. 070458, UPRR Grade Separation

CLIENT: Michael Baker International, LLC
Little Rock, Arkansas

SITE: Highway 82
Buckner, Arkansas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 33.3545° Longitude: -93.4027°	DEPTH (FL.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LL-PL-PI	
DEPTH												
	FAT CLAY (CH) , with silt seams, dark gray and light gray, very stiff to hard (<i>continued</i>)	55										
		60		X	13-29-50/5"			23				
		65										
68.5				X	27-50/5"			53				22
	SILTY SAND (SM) , dark gray and light gray, very dense	70										
		75										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0 to 10 feet: Solid-stem auger
10 to 80 feet: Mud rotary

Abandonment Method:
Boring backfilled with Auger Cuttings, spider plug and patched with asphalt

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Water level not determined

Terracon

25809 I 30
Bryant, AR

Boring Started: 07-23-2019

Drill Rig:

Project No.: 35185112

Boring Completed: 07-23-2019

Driller: DB

BORING LOG NO. B-4

Page 4 of 4

PROJECT: Job No. 070458, UPRR Grade Separation

CLIENT: Michael Baker International, LLC
Little Rock, Arkansas

SITE: Highway 82
Buckner, Arkansas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 33.3545° Longitude: -93.4027°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	DEPTH											
	SILTY SAND (SM) , dark gray and light gray, very dense (continued)											
	78.5											
	SILTY CLAY (CL-ML) , dark gray and light gray, hard				21-30-45 N=75				27			
	80.0	80										
	Boring Terminated at 80 Feet											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0 to 10 feet: Solid-stem auger
10 to 80 feet: Mud rotary

Abandonment Method:
Boring backfilled with Auger Cuttings, spider plug and
patched with asphalt

See [Exploration and Testing Procedures](#) for a
description of field and laboratory procedures
used and additional data (if any).

See [Supporting Information](#) for explanation of
symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Water level not determined

Terracon

25809 I 30
Bryant, AR

Boring Started: 07-23-2019

Drill Rig:

Project No.: 35185112

Boring Completed: 07-23-2019

Driller: DB

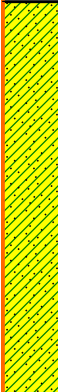
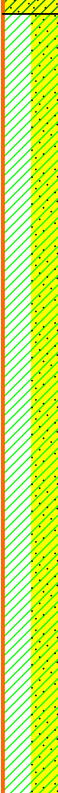
BORING LOG NO. B-5

Page 1 of 4

PROJECT: Job No. 070458, UPRR Grade Separation

CLIENT: Michael Baker International, LLC
Little Rock, Arkansas

SITE: Highway 82
Buckner, Arkansas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 33.3541° Longitude: -93.4024° DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	PERCENT FINES	
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LL-PL-PI		
	SANDY LEAN CLAY (CL) , brown, reddish-brown and gray, medium stiff to stiff	5			4-3-2 N=5	CU			14		30-16-14	58	
					2-3-3 N=6				17				
					4-4-5 N=9				19				
	8.5	LEAN CLAY WITH SAND (CL) , with sand and silt seams, brown, reddish brown and gray, stiff to hard	10							20		35-12-23	71
	- gray and light gray at about 20 feet	15			2-4-9 N=13				25				
		20							21		47-14-33	83	
		25		13-29-35 N=64				33					

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0 to 10 feet: Solid-stem auger
10 to 99.3 feet: mud rotary

Abandonment Method:
Boring backfilled with Auger Cuttings, spider plug and patched with asphalt

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Water level not determined

Terracon

25809 I 30
Bryant, AR

Boring Started: 07-22-2019

Drill Rig:

Project No.: 35185112

Boring Completed: 07-22-2019

Driller: DB

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL - 35185112 JOB NO. 070458 UPRR FINAL.GPJ TERRACON_DATATEMPLATE.GDT 8/30/19

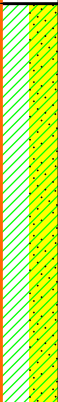
BORING LOG NO. B-5

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PROJECT: Job No. 070458, UPRR Grade Separation

CLIENT: Michael Baker International, LLC
Little Rock, Arkansas

SITE: Highway 82
Buckner, Arkansas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 33.3541° Longitude: -93.4024°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LL-PL-PI	
	DEPTH											
	LEAN CLAY WITH SAND (CL) , with sand and silt seams, brown, reddish brown and gray, stiff to hard <i>(continued)</i>											
	33.5	30		X	15-27-43 N=70				25			
	LEAN CLAY (CL) , gray and light gray, hard	35		X	10-16-27 N=43						38-13-25	93
		40		X	9-14-18 N=32				22			
		45		X	10-14-18 N=32						44-13-31	97
		50		X	10-17-27 N=44				23			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0 to 10 feet: Solid-stem auger
10 to 99.3 feet: mud rotary

Abandonment Method:
Boring backfilled with Auger Cuttings, spider plug and patched with asphalt

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Water level not determined

Terracon

25809 I 30
Bryant, AR

Boring Started: 07-22-2019

Drill Rig:

Project No.: 35185112

Boring Completed: 07-22-2019

Driller: DB

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL - 35185112 JOB NO. 070458 UPRR FINAL.GPJ TERRACON_DATATEMPLATE.GDT 8/30/19

BORING LOG NO. B-5

Page 4 of 4

PROJECT: Job No. 070458, UPRR Grade Separation

CLIENT: Michael Baker International, LLC
Little Rock, Arkansas

SITE: Highway 82
Buckner, Arkansas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 33.3541° Longitude: -93.4024°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
DEPTH												
	SILTY SAND (SM) , light gray and dark gray, very dense (continued)											
		80		X	46-42-50/4"				28			
		85										
		90		X	23-24-50/3"				29			
		95										
		99.3		X	43-50/4"				24			
	Boring Terminated at 99.3 Feet											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0 to 10 feet: Solid-stem auger
10 to 99.3 feet: mud rotary

Abandonment Method:
Boring backfilled with Auger Cuttings, spider plug and patched with asphalt

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Water level not determined

Terracon

25809 I 30
Bryant, AR

Boring Started: 07-22-2019

Drill Rig:

Project No.: 35185112

Boring Completed: 07-22-2019

Driller: DB

BORING LOG NO. B-6

Page 1 of 4

PROJECT: Job No. 070458, UPRR Grade Separation

CLIENT: Michael Baker International, LLC
Little Rock, Arkansas

SITE: Highway 82
Buckner, Arkansas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 33.3537° Longitude: -93.4021° DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LIMITS	
											LL-PL-PI	
	<u>SANDY LEAN CLAY (CL)</u> , brown, soft to still	5			3-2-1 N=3	UU			17		33-14-19	70
					1-2-3 N=5				17			
					3-3-6 N=9				18			
					15							
				6-8-8 N=16	17							
												
	<u>CLAYEY SAND (SC)</u> , reddish-brown, medium dense	10			5-7-7 N=14				20			45
												
												
												
												
												
<u>LEAN CLAY WITH SAND (CL)</u> , gray and brown, very stiff	15				UU				40-14-26	79		
												
												
												
												
												
<u>FAT CLAY (CH)</u> , gray, very stiff	20			4-6-9 N=15				27		66-18-48	97	
												
												
			No recovery									
												
												
		25										
												
												

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0 to 10 feet: Solid-stem auger
10 to 100 feet: mud rotary

Abandonment Method:
Boring backfilled with Auger Cuttings, spider plug and bentonite chips

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

12.5 feet after completion

Terracon
25809 I 30
Bryant, AR

Boring Started: 07-18-2019

Drill Rig:

Project No.: 35185112

Boring Completed: 07-18-2019

Driller: DB

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 35185112 JOB NO. 070458 UPRR FINAL.GPJ TERRACON.DATATEMPLATE.GDT 8/30/19

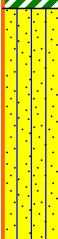
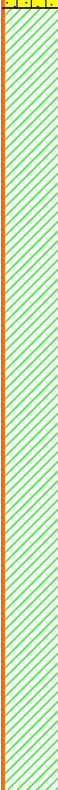
BORING LOG NO. B-6

Page 2 of 4

PROJECT: Job No. 070458, UPRR Grade Separation

CLIENT: Michael Baker International, LLC
Little Rock, Arkansas

SITE: Highway 82
Buckner, Arkansas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 33.3537° Longitude: -93.4021° DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LIMITS LL-PL-PI	
	FAT CLAY (CH) , gray, very stiff <i>(continued)</i>			X	3-6-12 N=18				22			
	28.5											
	SILTY SAND (SM) , fine grained, gray, very dense	30		X	10-28-50 N=78				25		NP	38
	LEAN CLAY (CL) , gray, hard	35		X	16-25-36 N=61				23			
		40		X	13-17-28 N=45						38-15-23	88
		45		X	8-13-21 N=34				26			
		50		X	4-30-22 N=52				23			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0 to 10 feet: Solid-stem auger
10 to 100 feet: mud rotary

Abandonment Method:
Boring backfilled with Auger Cuttings, spider plug and bentonite chips

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

 12.5 feet after completion

Terracon

25809 I 30
Bryant, AR

Boring Started: 07-18-2019

Drill Rig:

Project No.: 35185112

Boring Completed: 07-18-2019

Driller: DB

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 35185112 JOB NO. 070458 UPRR FINAL.GPJ TERRACON.DATATEMPLATE.GDT 8/30/19

BORING LOG NO. B-6

Page 3 of 4

PROJECT: Job No. 070458, UPRR Grade Separation

CLIENT: Michael Baker International, LLC
Little Rock, Arkansas

SITE: Highway 82
Buckner, Arkansas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 33.3537° Longitude: -93.4021°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LL-PL-PI	
DEPTH												
	<u>LEAN CLAY (CL)</u> , gray, hard <i>(continued)</i>	55										
		60		X	16-21-36 N=57			23				
	<u>CLAYEY SAND (SC)</u> , gray, very dense	65										
		70		X	41-35-43 N=78			24			24	
		75										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0 to 10 feet: Solid-stem auger
10 to 100 feet: mud rotary

Abandonment Method:
Boring backfilled with Auger Cuttings, spider plug and bentonite chips

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

12.5 feet after completion

Terracon

25809 I 30
Bryant, AR

Boring Started: 07-18-2019

Boring Completed: 07-18-2019

Drill Rig:

Driller: DB

Project No.: 35185112

BORING LOG NO. B-6

Page 4 of 4

PROJECT: Job No. 070458, UPRR Grade Separation

CLIENT: Michael Baker International, LLC
Little Rock, Arkansas

SITE: Highway 82
Buckner, Arkansas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 33.3537° Longitude: -93.4021°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	DEPTH											
	CLAYEY SAND (SC) , gray, very dense (continued)											
		80		X	31-38-37 N=75				24			
		85										
		90		X	22-34-50/5"				25			
		95										
	98.9			X	50/5"				23			
Boring Terminated at 98.9 Feet												

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0 to 10 feet: Solid-stem auger
10 to 100 feet: mud rotary

Abandonment Method:
Boring backfilled with Auger Cuttings, spider plug and
bentonite chips

See [Exploration and Testing Procedures](#) for a
description of field and laboratory procedures
used and additional data (if any).

See [Supporting Information](#) for explanation of
symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

12.5 feet after completion

Terracon
25809 I 30
Bryant, AR

Boring Started: 07-18-2019

Drill Rig:

Project No.: 35185112

Boring Completed: 07-18-2019

Driller: DB

BORING LOG NO. B-7

Page 2 of 4

PROJECT: Job No. 070458, UPRR Grade Separation

CLIENT: Michael Baker International, LLC
Little Rock, Arkansas

SITE: Highway 82
Buckner, Arkansas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 33.3536° Longitude: -93.4017° DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LL-PL-PI	
	LEAN CLAY (CL) , with sand and silt seams, gray, very stiff <i>(continued)</i>	30			8-12-12 N=24				20			
		33.5							25			
	SANDY SILT (ML) , gray, hard	35			42-39-50 N=89				26		NP	53
		38.5										
	FAT CLAY (CH) , gray, hard	40			10-28-37 N=65				23			
		45			11-18-22 N=40						50-14-36	95
		48.5										
	LEAN CLAY (CL) , with sand and silt seams, gray, hard	50			11-22-27 N=49				26			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0 to 10 feet: Solid-stem auger
10 to 100 feet: Mud rotary

Abandonment Method:
Boring backfilled with Auger Cuttings, spider plug and bentonite chips

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

11 feet after completion

Terracon
25809 I 30
Bryant, AR

Boring Started: 07-18-2019

Boring Completed: 07-18-2019

Drill Rig:

Driller: DB

Project No.: 35185112

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 35185112 JOB NO. 070458 UPRR FINAL.GPJ TERRACON_DATATEMPLATE.GDT 8/30/19

Page 3 of 4

CLIENT: Michael Baker International, LLC
Little Rock, Arkansas

SITE: Highway 82
Buckner, Arkansas

[illegible]

Hammer Type: Automatic

Advancement Method:
0 to 10 feet: Solid-stem auger
10 to 100 feet: Mud rotary

Abandonment Method:
Boring backfilled with Auger Cuttings, spider plug and bentonite chips

See **Exploration and Testing Procedures** for a description of field and laboratory procedures used and additional data (If any).

See **Supporting Information** for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

 11 feet after completion

Terracon

25809 | 30
Bryant, AR

Boring Started: 07-18-2019

Boring Completed: 07-18-2019

Drill Rig:

Driller: DB

Project No.: 35185112

BORING LOG NO. B-7

Page 4 of 4

PROJECT: Job No. 070458, UPRR Grade Separation

CLIENT: Michael Baker International, LLC
Little Rock, Arkansas

SITE: Highway 82
Buckner, Arkansas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 33.3536° Longitude: -93.4017°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	DEPTH											
	LEAN CLAY (CL) , with sand and silt seams, gray, hard (continued)											
	79.5			X	33-50/6"				38			
	Boring Terminated at 79.5 Feet											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0 to 10 feet: Solid-stem auger
10 to 100 feet: Mud rotary

Abandonment Method:
Boring backfilled with Auger Cuttings, spider plug and
bentonite chips

See [Exploration and Testing Procedures](#) for a
description of field and laboratory procedures
used and additional data (if any).

See [Supporting Information](#) for explanation of
symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

11 feet after completion

Terracon

25809 I 30
Bryant, AR

Boring Started: 07-18-2019

Boring Completed: 07-18-2019

Drill Rig:

Driller: DB

Project No.: 35185112

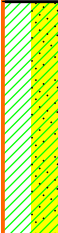
BORING LOG NO. B-8

Page 1 of 4

PROJECT: Job No. 070458, UPRR Grade Separation

CLIENT: Michael Baker International, LLC
Little Rock, Arkansas

SITE: Highway 82
Buckner, Arkansas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 33.3532° Longitude: -93.4016° DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	PERCENT FINES				
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LL-PL-PI					
	LEAN CLAY WITH SAND (CL) , brown, soft to medium stiff	5.0			3-2-2 N=4				15							
					3-3-4 N=7				19							
					3-4-5 N=9				18							
	SANDY LEAN CLAY (CL) , gray and brown, stiff to very stiff		5						20		46-16-30	68				
											4-5-6 N=11	25				
															22	
															4-7-7 N=14	25
												26				
																

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0 to 10 feet: Solid-stem auger
10 to 80 feet: mud rotary

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:

Abandonment Method:
Boring backfilled with Auger Cuttings and/or Bentonite

See [Supporting Information](#) for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

Water level not determined

Terracon

25809 I 30
Bryant, AR

Boring Started: 07-18-2019

Boring Completed: 07-18-2019

Drill Rig:

Driller: DB

Project No.: 35185112

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 35185112 JOB NO. 070458 UPRR FINAL.GPJ TERRACON.DATATEMPLATE.GDT 8/30/19

BORING LOG NO. B-8

Page 2 of 4

PROJECT: Job No. 070458, UPRR Grade Separation

CLIENT: Michael Baker International, LLC
Little Rock, Arkansas

SITE: Highway 82
Buckner, Arkansas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 33.3532° Longitude: -93.4016°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LIMITS LL-PL-PI	
	DEPTH											
	<u>SANDY LEAN CLAY (CL)</u> , gray and brown, stiff to very stiff (<i>continued</i>)			X	8-10-14 N=24				25			
		30		X	6-8-14 N=22				19			
	33.5	<u>SANDY FAT CLAY (CH)</u> , gray, hard		X	14-26-47 N=73				29			63
	35											
	38.5	<u>FAT CLAY (CH)</u> , with sand lenses, gray and dark gray, hard		X	21-36-50/5"				29		52-14-38	96
	40											
45			X	12-18-38 N=56				31				
			X	11-17-28 N=45								
50												

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0 to 10 feet: Solid-stem auger
10 to 80 feet: mud rotary

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

Notes:

Abandonment Method:
Boring backfilled with Auger Cuttings and/or Bentonite

See [Supporting Information](#) for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

Water level not determined

Terracon
25809 I 30
Bryant, AR

Boring Started: 07-18-2019

Boring Completed: 07-18-2019

Drill Rig:

Driller: DB

Project No.: 35185112

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 35185112 JOB NO. 070458 UPRR FINAL.GPJ TERRACON.DATATEMPLATE.GDT 8/30/19

BORING LOG NO. B-8

Page 3 of 4

PROJECT: Job No. 070458, UPRR Grade Separation

CLIENT: Michael Baker International, LLC
Little Rock, Arkansas

SITE: Highway 82
Buckner, Arkansas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 33.3532° Longitude: -93.4016°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	DEPTH											
	FAT CLAY (CH) , with sand lenses, gray and dark gray, hard (<i>continued</i>)											
		55										
		60		X	14-22-29 N=51				23			
		65										
		70		X	16-36-50/4"				25			86
		75										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0 to 10 feet: Solid-stem auger
10 to 80 feet: mud rotary

Abandonment Method:
Boring backfilled with Auger Cuttings and/or Bentonite

See [Exploration and Testing Procedures](#) for a
description of field and laboratory procedures
used and additional data (if any).

See [Supporting Information](#) for explanation of
symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Water level not determined

Terracon

25809 I 30
Bryant, AR

Boring Started: 07-18-2019

Drill Rig:

Project No.: 35185112

Boring Completed: 07-18-2019

Driller: DB

BORING LOG NO. B-8

Page 4 of 4

PROJECT: Job No. 070458, UPRR Grade Separation

CLIENT: Michael Baker International, LLC
Little Rock, Arkansas

SITE: Highway 82
Buckner, Arkansas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 33.3532° Longitude: -93.4016°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	DEPTH											
	FAT CLAY (CH) , with sand lenses, gray and dark gray, hard <i>(continued)</i>											
	79.5			X	24-50/5"				26			
	Boring Terminated at 79.5 Feet											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0 to 10 feet: Solid-stem auger
10 to 80 feet: mud rotary

Abandonment Method:
Boring backfilled with Auger Cuttings and/or Bentonite

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Water level not determined

Terracon

25809 I 30
Bryant, AR

Boring Started: 07-18-2019

Drill Rig:

Project No.: 35185112

Boring Completed: 07-18-2019

Driller: DB

Page 1 of 1

CLIENT: Michael Baker International, LLC
Little Rock, Arkansas

[illegible]

Hammer Type: Automatic

Project No.: 35185112

BORING LOG NO. R-2

Page 1 of 2

PROJECT: Job No. 070458, UPRR Grade Separation

CLIENT: Michael Baker International, LLC
Little Rock, Arkansas

SITE: Highway 82
Buckner, Arkansas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 33.3586° Longitude: -93.4085°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LL-PL-PI	
	DEPTH											
	0.2 <u>ASPHALT CONCRETE - 1.5 inches</u>											
	1.2 <u>AGGREGATE BASE COURSE - 12 inches</u>											
	<u>SANDY LEAN CLAY (CL)</u> , gray and brown, stiff to very soft											
		5		X	6-4-5 N=9			23		47-15-32	59	
				X	3-3-3 N=6			21				
				X	2-1-2 N=3			16				
				X	3-3-3 N=6			21				
				X	0-0-1 N=1			25		36-15-21	54	
	18.5 <u>CLAYEY SAND (SC)</u> , fine grained, gray and brown, loose to medium dense											
		20		X	6-6-7 N=13			22				
				X	4-3-1 N=4			27			18	
		25										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0 to 10 feet: Solid-stem auger
10 to 40 feet: Mud rotary

Abandonment Method:
Boring backfilled with Auger Cuttings, spider plug and patched with asphalt

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

7.5 feet while drilling

Terracon

25809 I 30
Bryant, AR

Boring Started: 07-17-2019

Drill Rig:

Project No.: 35185112

Boring Completed: 07-17-2019

Driller: DB

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 35185112 JOB NO. 070458 UPRR FINAL.GPJ TERRACON.DATATEMPLATE.GDT 8/30/19

BORING LOG NO. R-2

Page 2 of 2

PROJECT: Job No. 070458, UPRR Grade Separation

CLIENT: Michael Baker International, LLC
Little Rock, Arkansas

SITE: Highway 82
Buckner, Arkansas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 33.3586° Longitude: -93.4085°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	CLAYEY SAND (SC) , fine grained, gray and brown, loose to medium dense (<i>continued</i>)											
		30		X	5-4-7 N=11				22			
		35		X	3-3-4 N=7				19			
		40		X	10-10-10 N=20				21			
	Boring Terminated at 40 Feet											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0 to 10 feet: Solid-stem auger
10 to 40 feet: Mud rotary

Abandonment Method:
Boring backfilled with Auger Cuttings, spider plug and patched with asphalt

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

 7.5 feet while drilling

Terracon
25809 I 30
Bryant, AR

Boring Started: 07-17-2019

Boring Completed: 07-17-2019

Drill Rig:

Driller: DB

Project No.: 35185112

BORING LOG NO. R-3

Page 1 of 2

PROJECT: Job No. 070458, UPRR Grade Separation

CLIENT: Michael Baker International, LLC
Little Rock, Arkansas

SITE: Highway 82
Buckner, Arkansas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 33.3515° Longitude: -93.398°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LL-PL-PI	
	DEPTH											
	<u>SANDY LEAN CLAY (CL)</u> , brown, loose											
	3.5											
	<u>CLAYEY SAND (SC)</u> , reddish brown, brown and gray											
	13.5											
	<u>FAT CLAY (CH)</u> , dark brown and dark gray, stiff to hard											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0 to 10 feet: Solid-stem auger
10 to 40 feet: mud rotary

Abandonment Method:
Boring backfilled with Auger Cuttings and/or Bentonite

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

 7 feet after completion

Terracon

25809 I 30
Bryant, AR

Boring Started: 07-18-2019

Drill Rig:

Project No.: 35185112

Boring Completed: 07-18-2019

Driller: DB

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 35185112 JOB NO. 070458 UPRR FINAL.GPJ TERRACON.DATATEMPLATE.GDT 8/30/19

BORING LOG NO. R-3

Page 2 of 2

PROJECT: Job No. 070458, UPRR Grade Separation

CLIENT: Michael Baker International, LLC
Little Rock, Arkansas

SITE: Highway 82
Buckner, Arkansas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 33.3515° Longitude: -93.398°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LL-PL-PI	
	FAT CLAY (CH) , dark brown and dark gray, stiff to hard <i>(continued)</i> - with gravel at about 28.5 feet	30			6-50/6"				16			
		35			9-11-12 N=23				19			
		40.0			18-20-20 N=40				20			
	Boring Terminated at 40 Feet	40										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0 to 10 feet: Solid-stem auger
10 to 40 feet: mud rotary

Abandonment Method:
Boring backfilled with Auger Cuttings and/or Bentonite

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (if any).

See [Supporting Information](#) for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

 7 feet after completion

Terracon

25809 I 30
Bryant, AR

Boring Started: 07-18-2019

Drill Rig:

Project No.: 35185112

Boring Completed: 07-18-2019

Driller: DB

BORING LOG NO. R-4

Page 1 of 1

PROJECT: Job No. 070458, UPRR Grade Separation

CLIENT: Michael Baker International, LLC
Little Rock, Arkansas

SITE: Highway 82
Buckner, Arkansas

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 33.3515° Longitude: -93.3939°	DEPTH (FL.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LL-PL-PI	
	DEPTH											
	0.2' ASPHALT CONCRETE - 2 inches											
	1.2' AGGREGATE BASE COURSE - 12 inches											
	SANDY LEAN CLAY (CL) , brown, medium stiff to stiff											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0 to 20 feet: Hollow-stem auger

See [Exploration and Testing Procedures](#) for a description of field and laboratory procedures used and additional data (If any).

Notes:

Abandonment Method:
Boring backfilled with Auger Cuttings, spider plug and patched with asphalt

See [Supporting Information](#) for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

No free water observed

Terracon

25809 I 30
Bryant, AR

Boring Started: 07-17-2019

Boring Completed: 07-17-2019

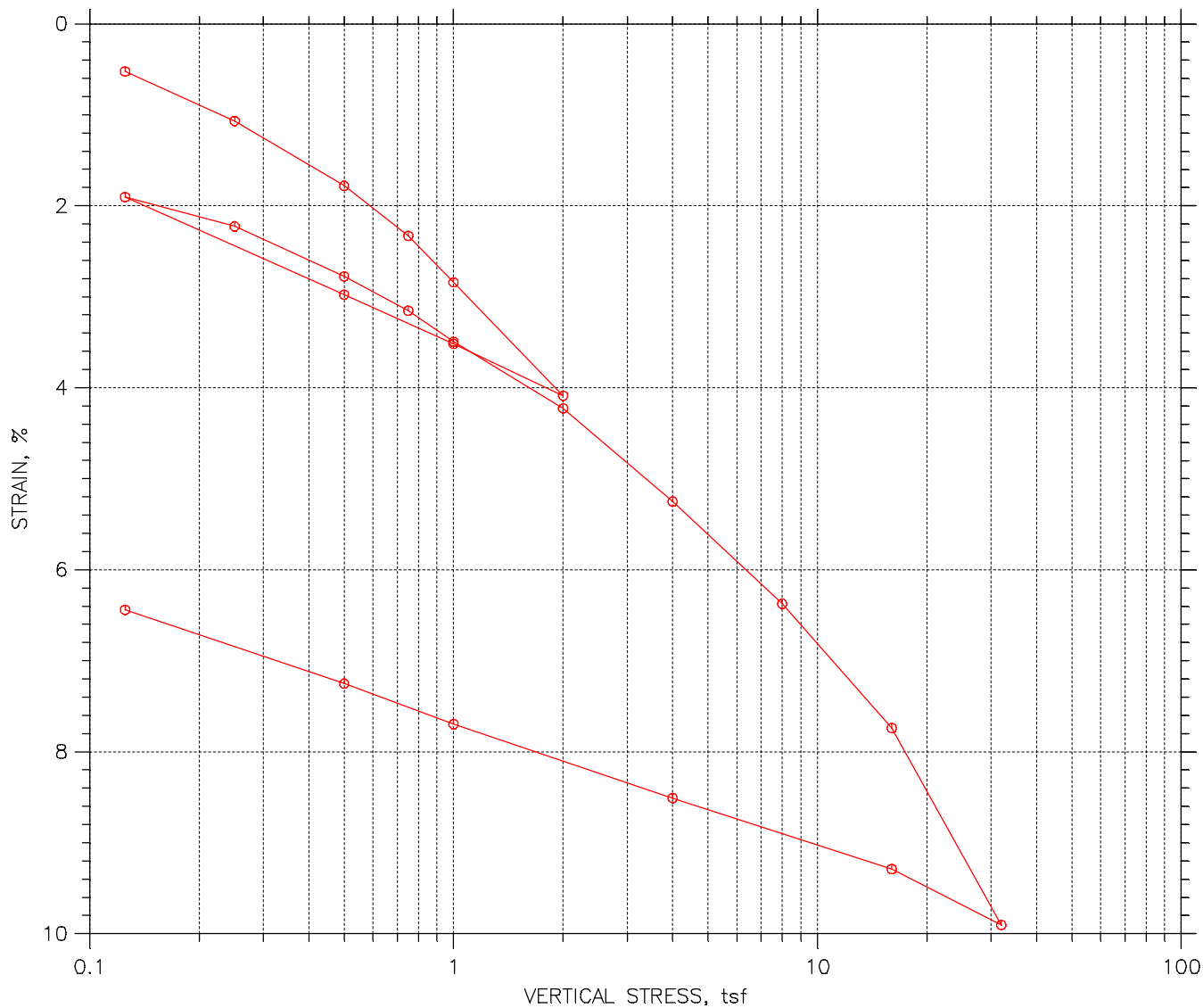
Drill Rig:

Driller: DB

Project No.: 35185112

One Dimensional Consolidation Properties of Soils
Using Incremental Loading
ASTM D2435

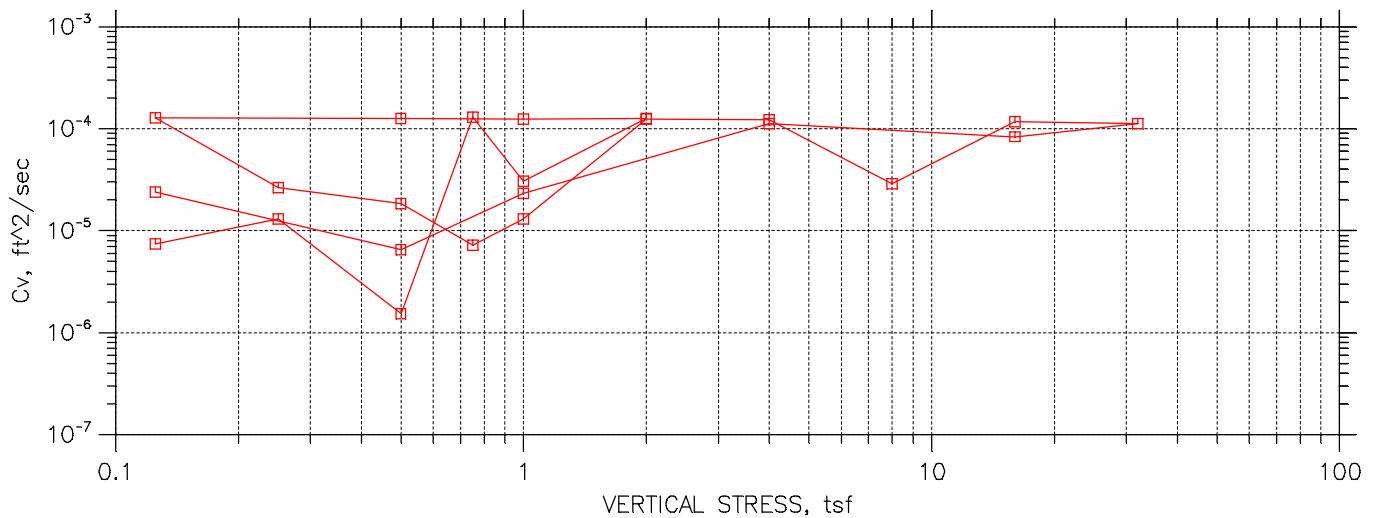
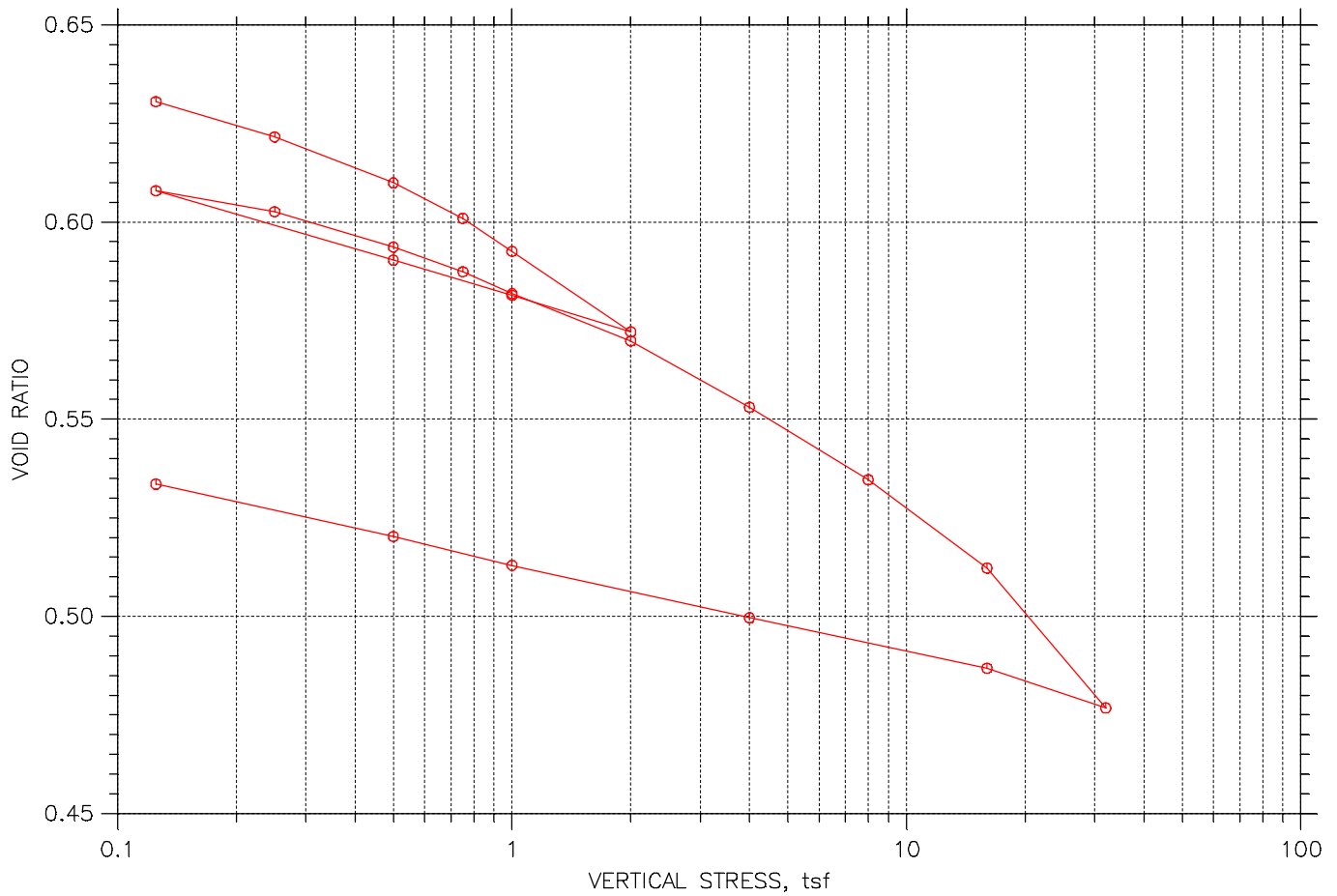
ONE DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS USING INCREMENTAL LOADING ASTM D2435



					Before Test	After Test
				Water Content, %	19.31	19.57
Preconsolidation Pressure: 3.9 tsf				Dry Unit Weight, pcf	103.6	110.7
Compression Index: 0.116				Saturation, %	82.18	99.76
Diameter: 2.502 in		Height: 0.7492 in		Void Ratio	0.64	0.53
LL: 22	PL: 17	PI: 5	GS: 2.72			

	Project: UPRR GRADE SEPARATION	Location: LITTLE ROCK, AR	Project No.: 35185112
	Boring No.: B-1 S-5	Tested By: BCM	Checked By: WPQ
	Sample No.: S-5	Test Date: 8/13/19	Depth: 8.5'-10.5'
	Test No.: B1S5CON	Sample Type: 3.0" ST	Elevation: -----
	Description: BROWN AND GRAY MOTTLED SANDY SILTY CLAY CL-ML		
	Remarks: Pc = 3.9 tsf Cc = 0.116 Ccr = 0.029 TEST PERFORMED AS PER ASTM D2435		

ONE DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS USING INCREMENTAL LOADING ASTM D2435



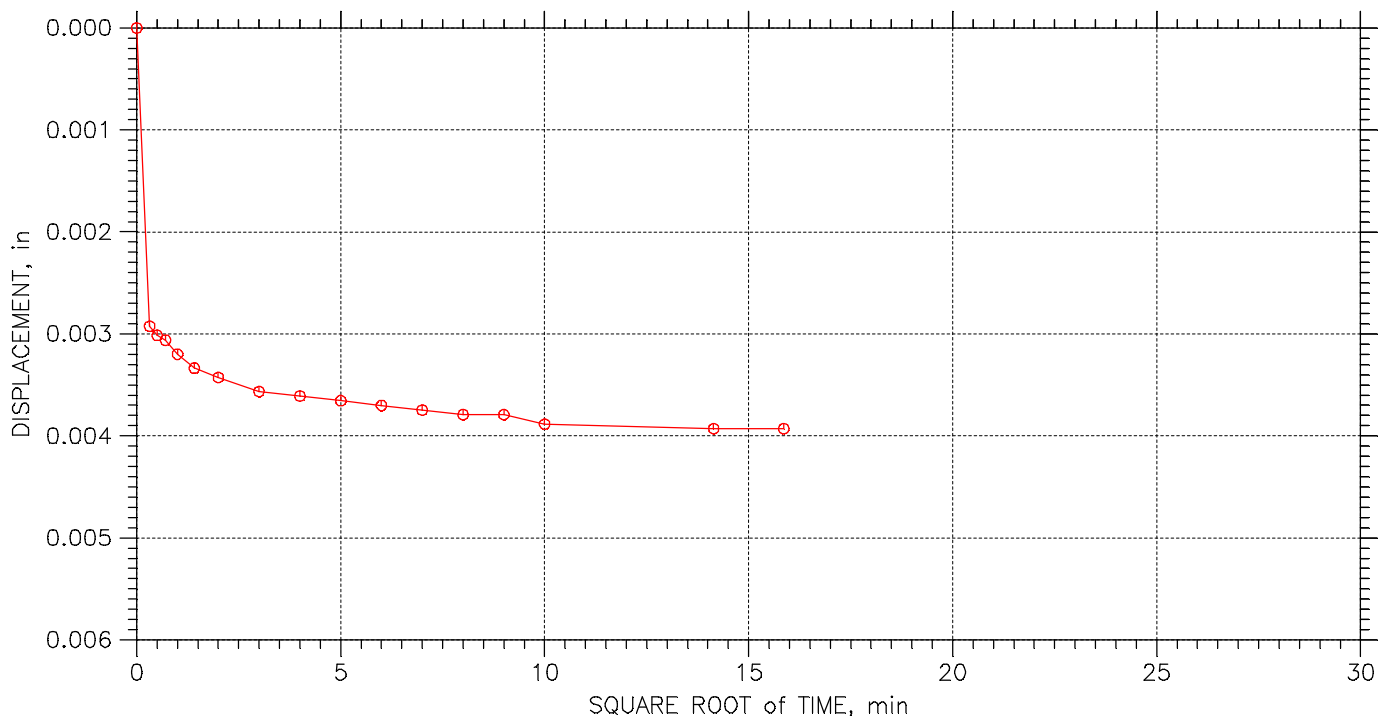
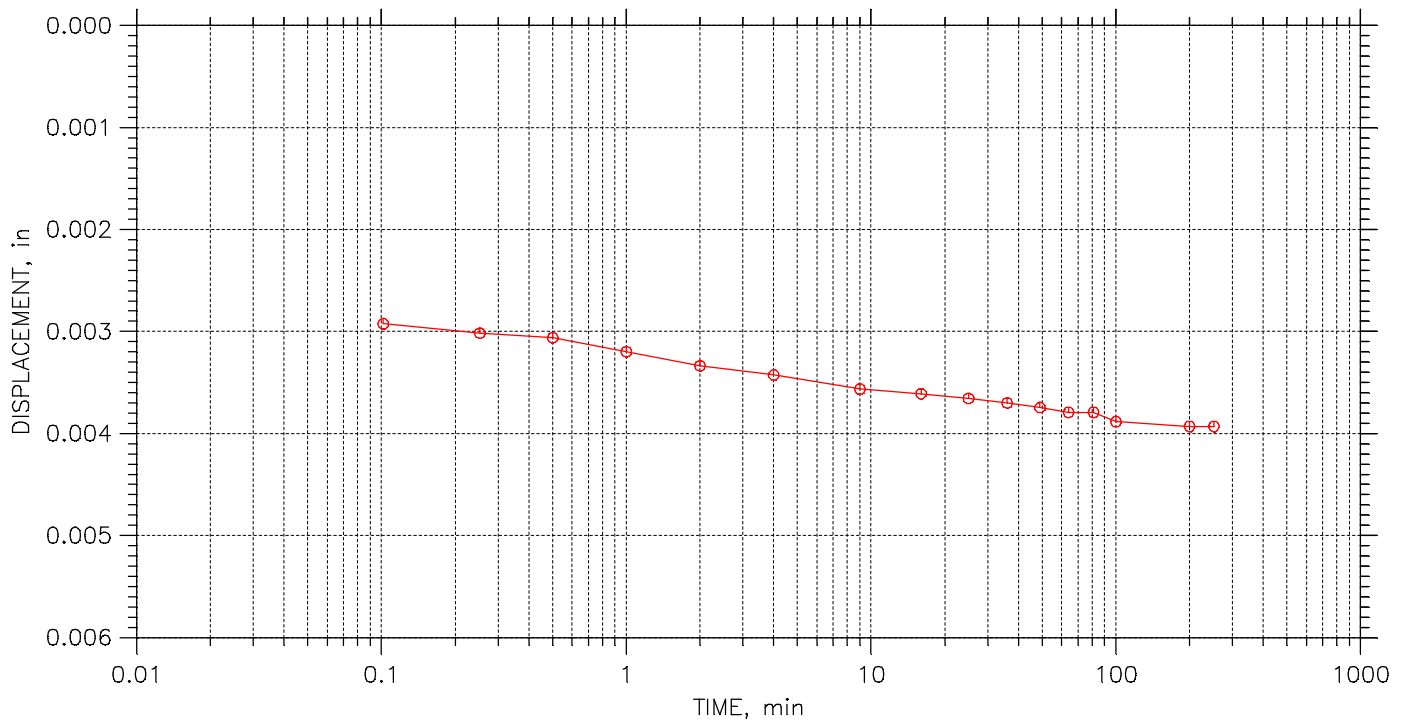
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	Test No.: B1S5CON	Sample Type: 3.0" ST	Elevation: -----
	Description: BROWN AND GRAY MOTTLED SANDY SILTY CLAY CL-ML		
	Remarks: $P_c = 3.9$ tsf $C_c = 0.116$ $C_{cr} = 0.029$ TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 1 of 23

Stress: 0.125 tsf



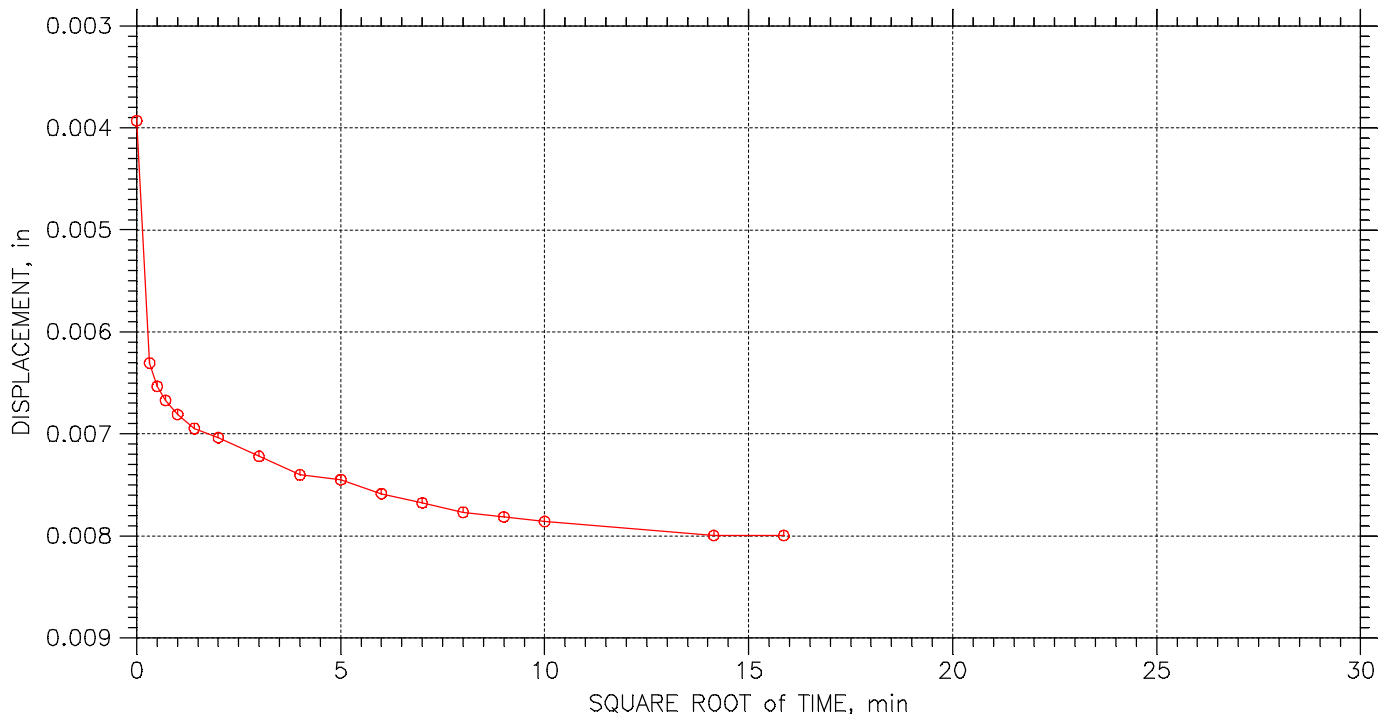
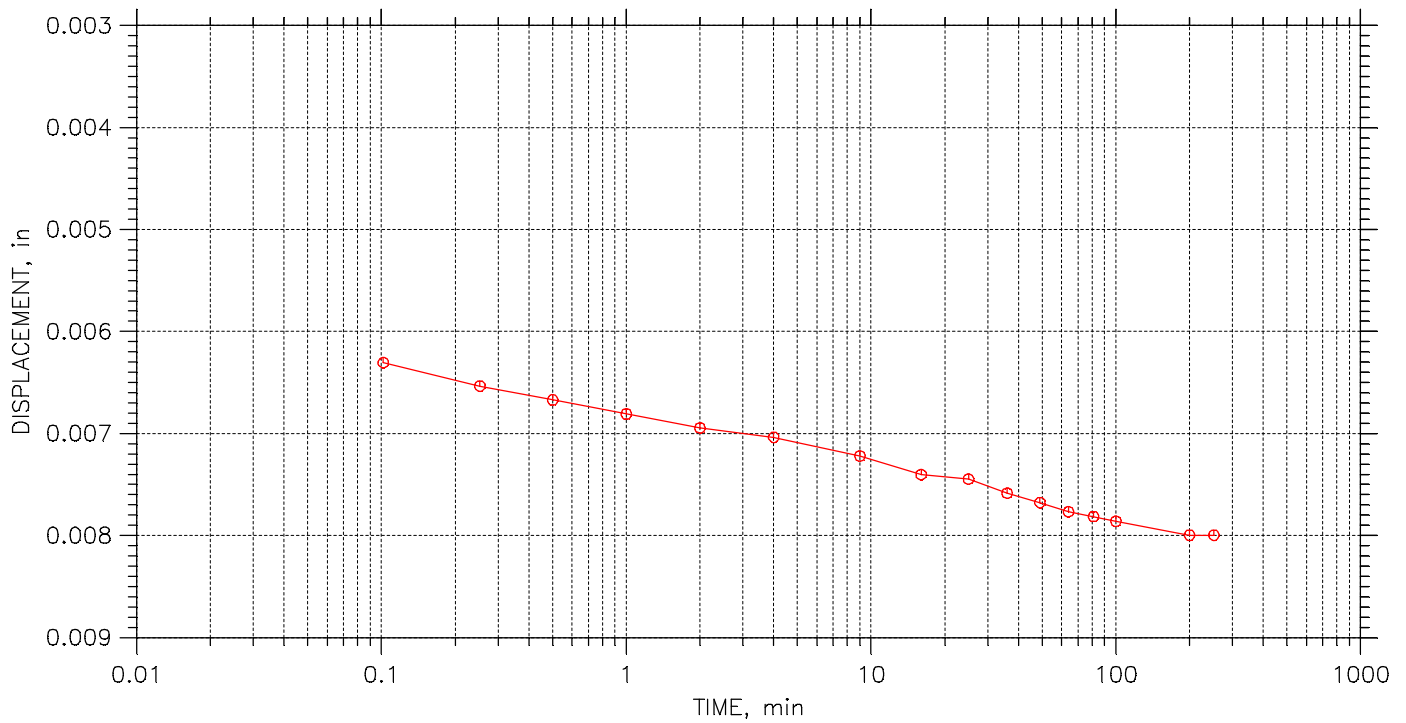
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	Test No.: B1S5CON	Sample Type: 3.0" ST	Elevation: -----
	Description: BROWN AND GRAY MOTTLED SANDY SILTY CLAY CL-ML		
	Remarks: Pc = 3.9 tsf Cc = 0.116 Ccr = 0.029 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 2 of 23

Stress: 0.25 tsf



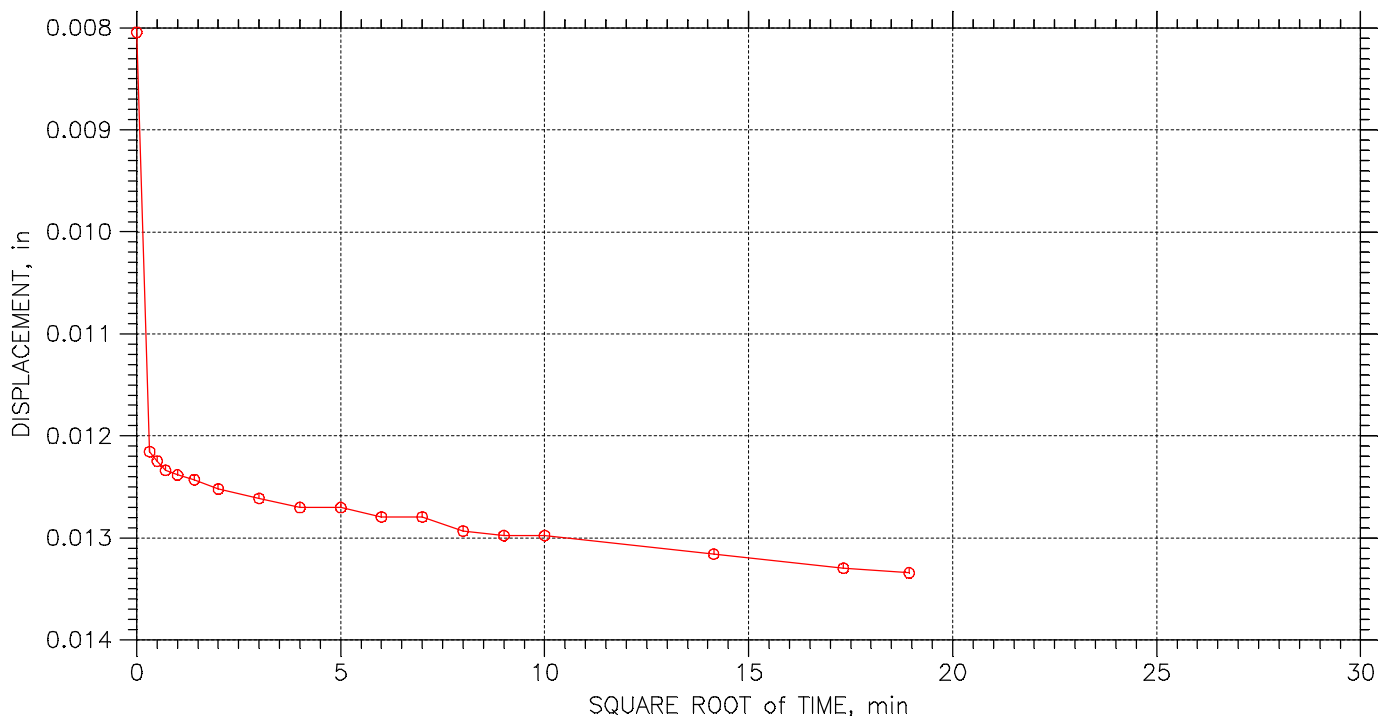
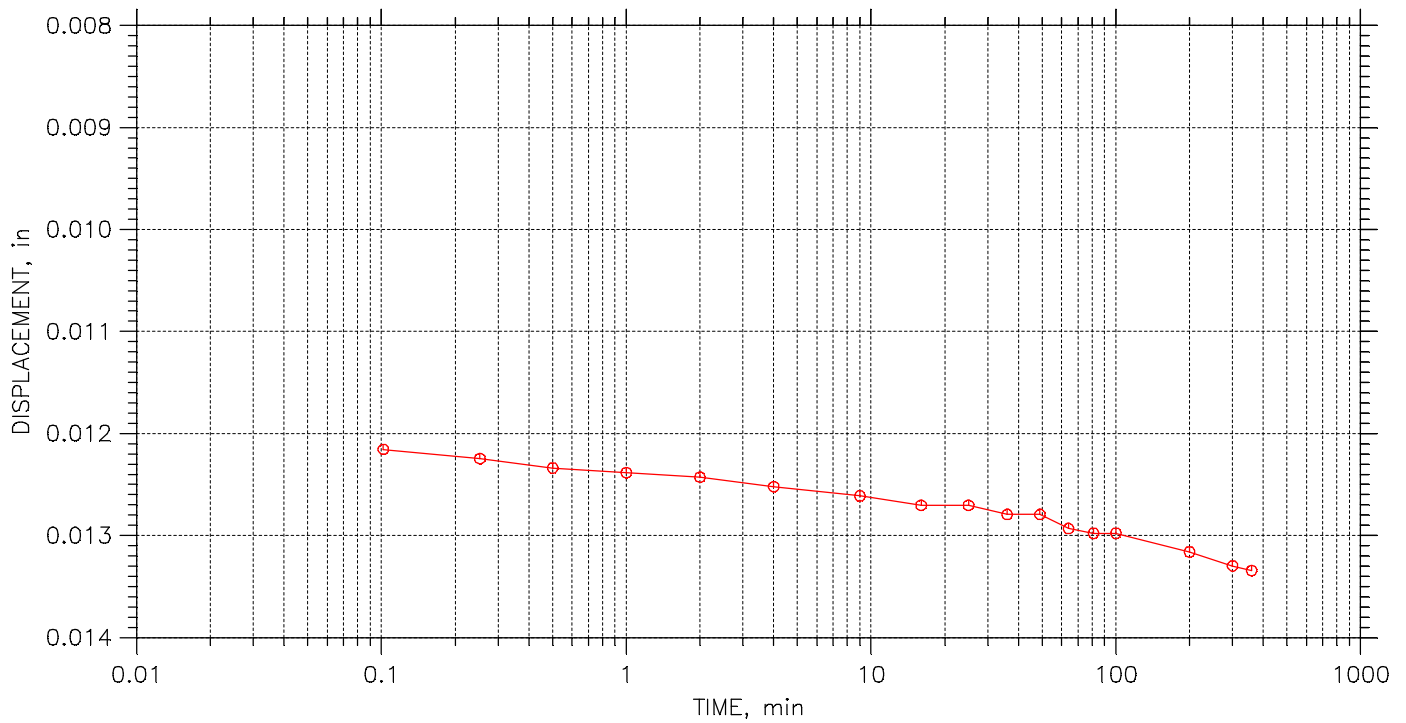
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	Test No.: B1S5CON	Sample Type: 3.0" ST	Elevation: -----
	Description: BROWN AND GRAY MOTTLED SANDY SILTY CLAY CL-ML		
	Remarks: Pc = 3.9 tsf Cc = 0.116 Ccr = 0.029 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 3 of 23

Stress: 0.5 tsf



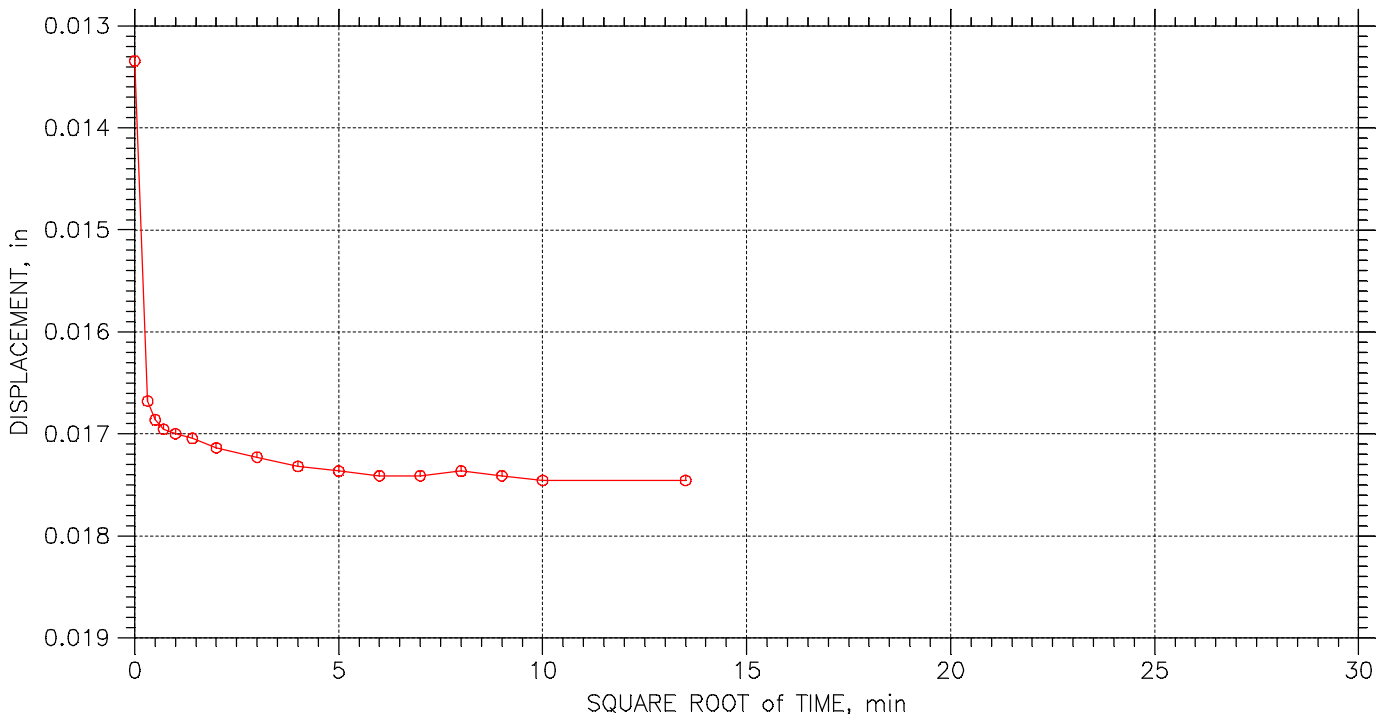
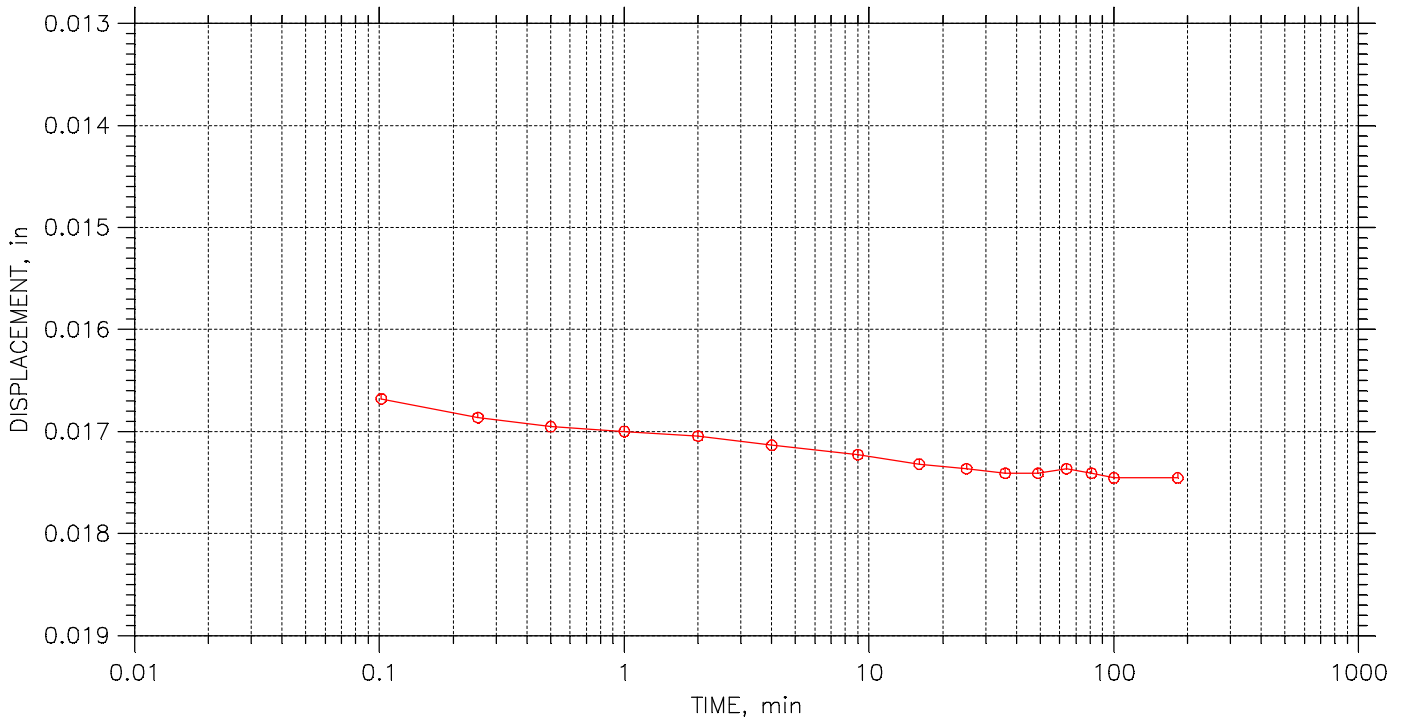
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	Test No.: B1S5CON	Sample Type: 3.0" ST	Elevation: -----
	Description: BROWN AND GRAY MOTTLED SANDY SILTY CLAY CL-ML		
	Remarks: Pc = 3.9 tsf Cc = 0.116 Ccr = 0.029 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 4 of 23

Stress: 0.75 tsf



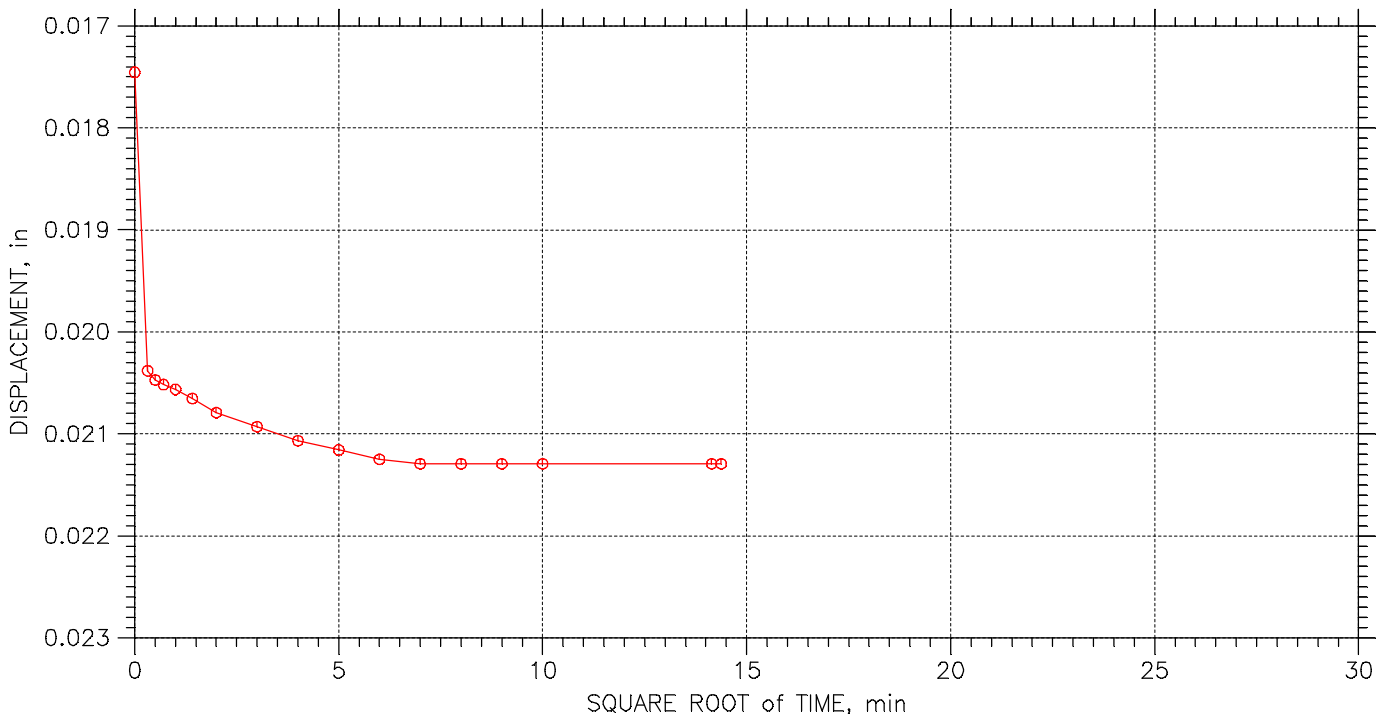
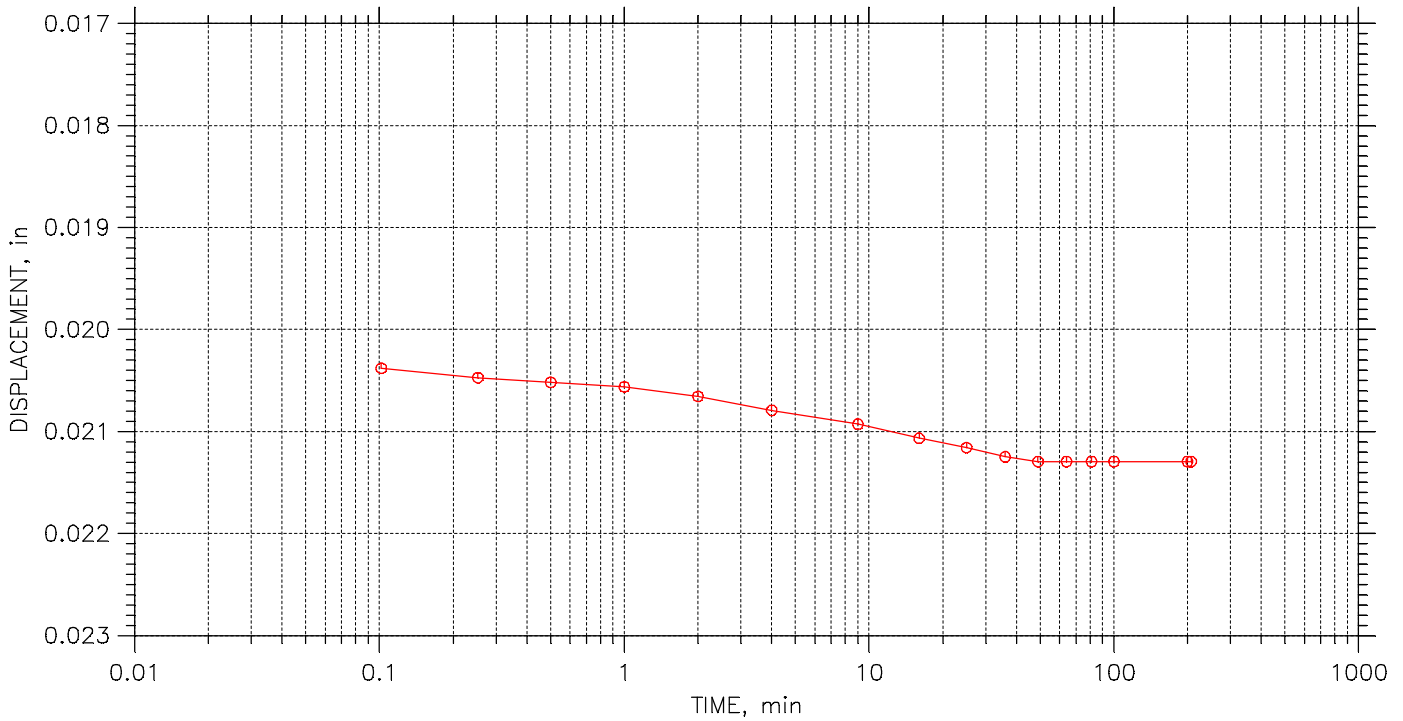
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	Sample No.: S-5	Test Date: 8/13/19	Depth: 8.5'-10.5'
	Test No.: B1S5CON	Sample Type: 3.0" ST	Elevation: -----
	Description: BROWN AND GRAY MOTTLED SANDY SILTY CLAY CL-ML		
	Remarks: Pc = 3.9 tsf Cc = 0.116 Ccr = 0.029 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 5 of 23

Stress: 1. tsf



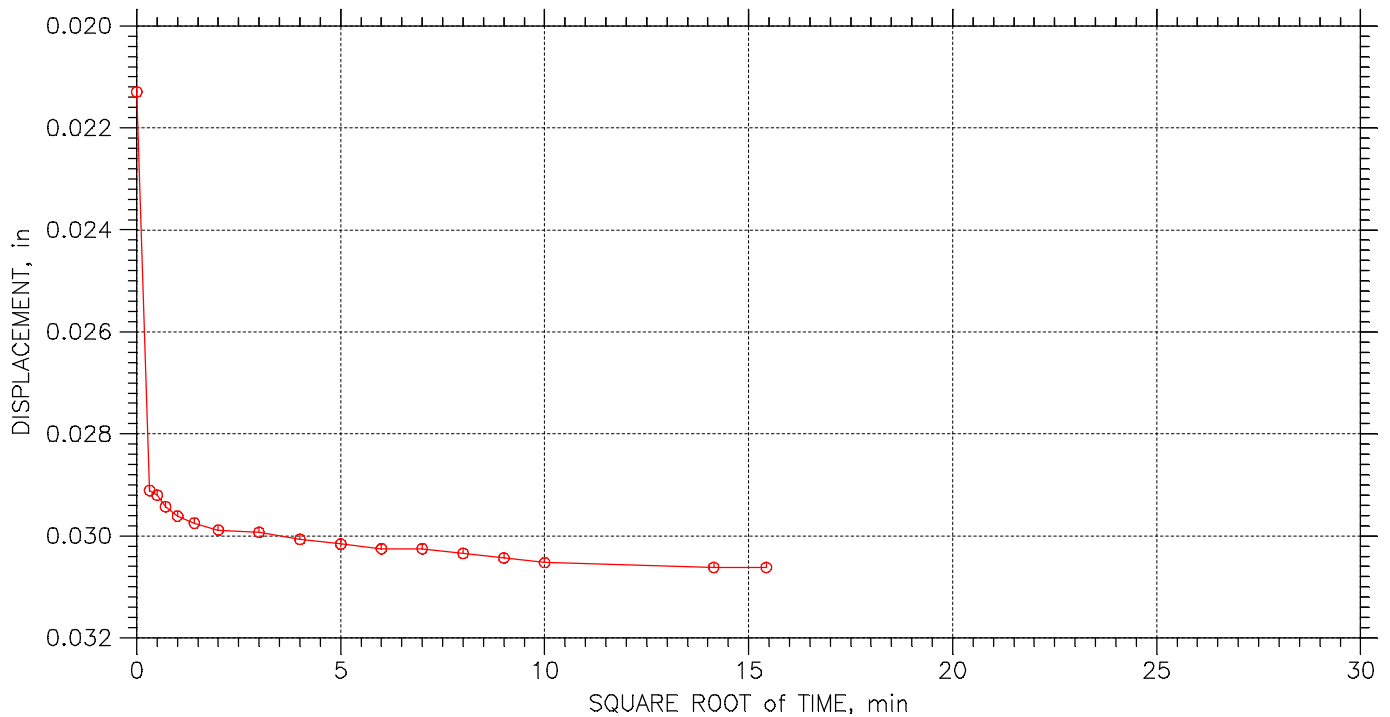
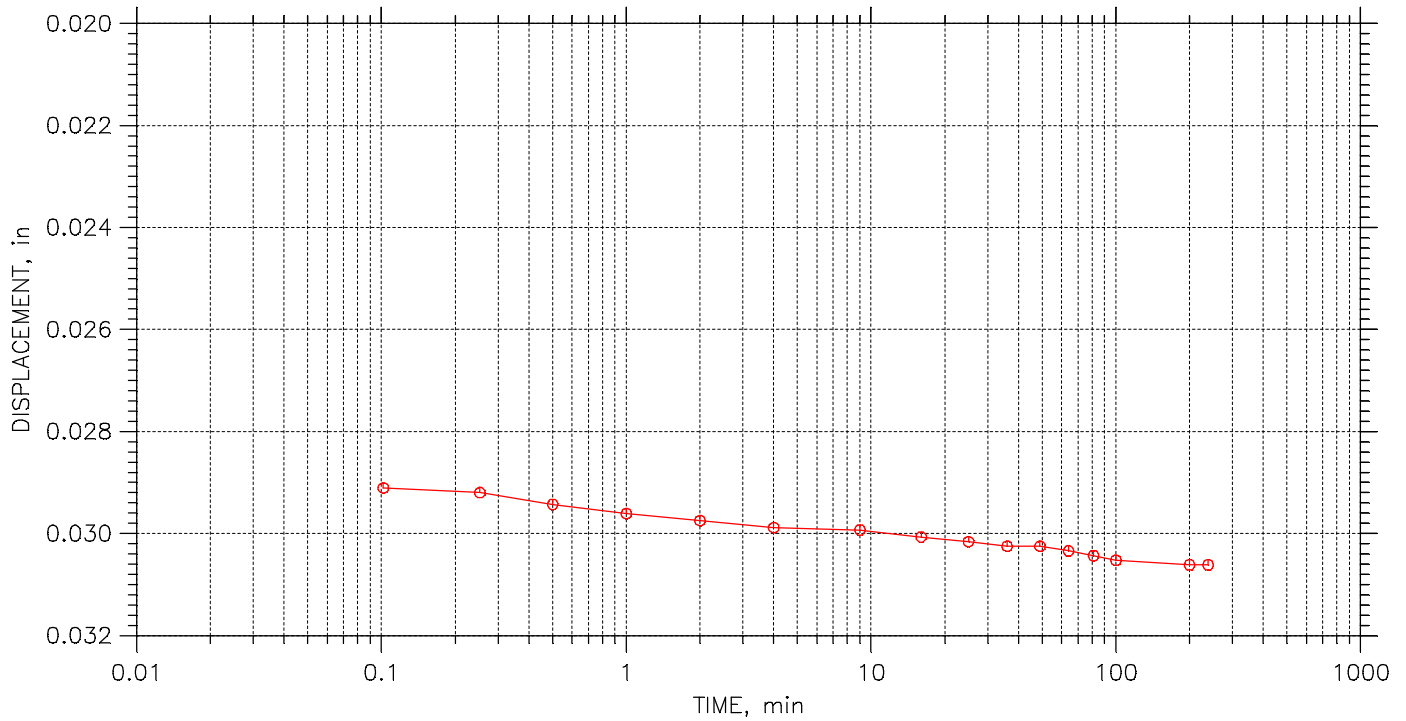
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	Sample No.: S-5	Test Date: 8/13/19	Depth: 8.5'-10.5'
	Test No.: B1S5CON	Sample Type: 3.0" ST	Elevation: -----
	Description: BROWN AND GRAY MOTTLED SANDY SILTY CLAY CL-ML		
	Remarks: Pc = 3.9 tsf Cc = 0.116 Ccr = 0.029 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 6 of 23

Stress: 2. tsf



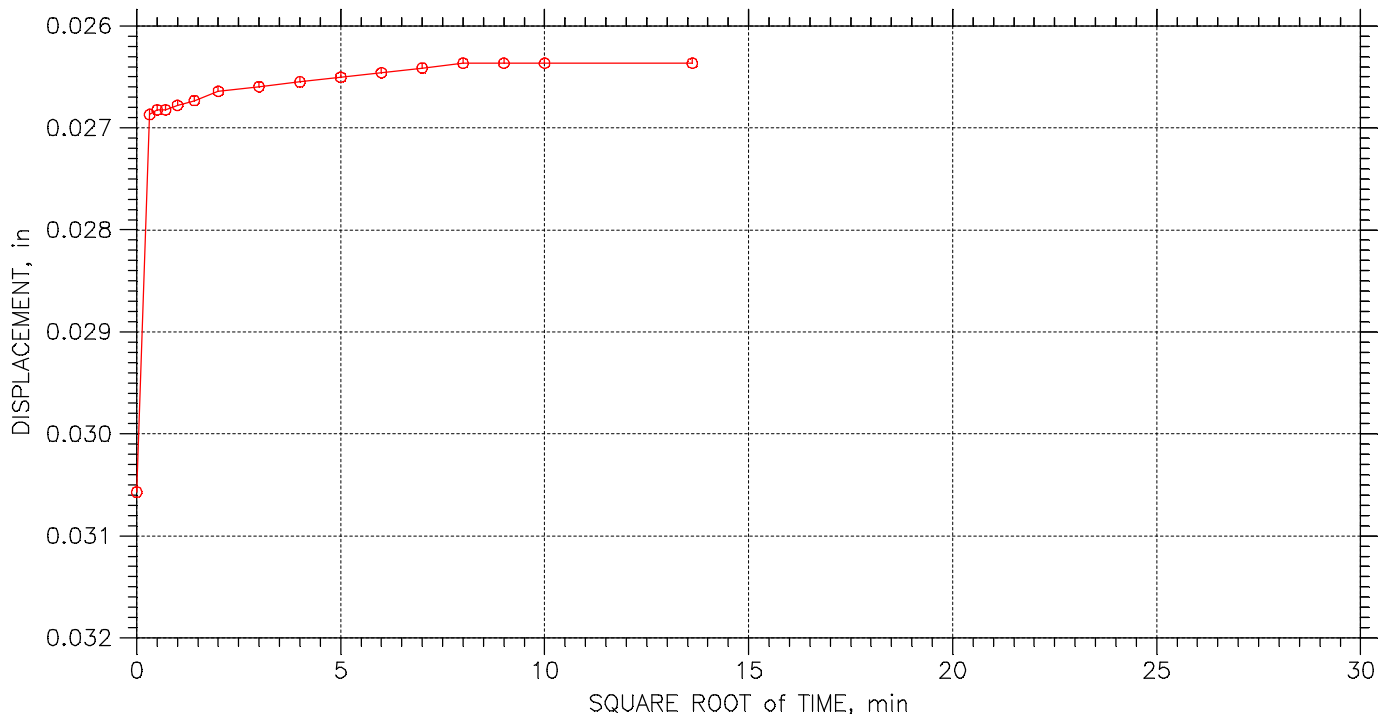
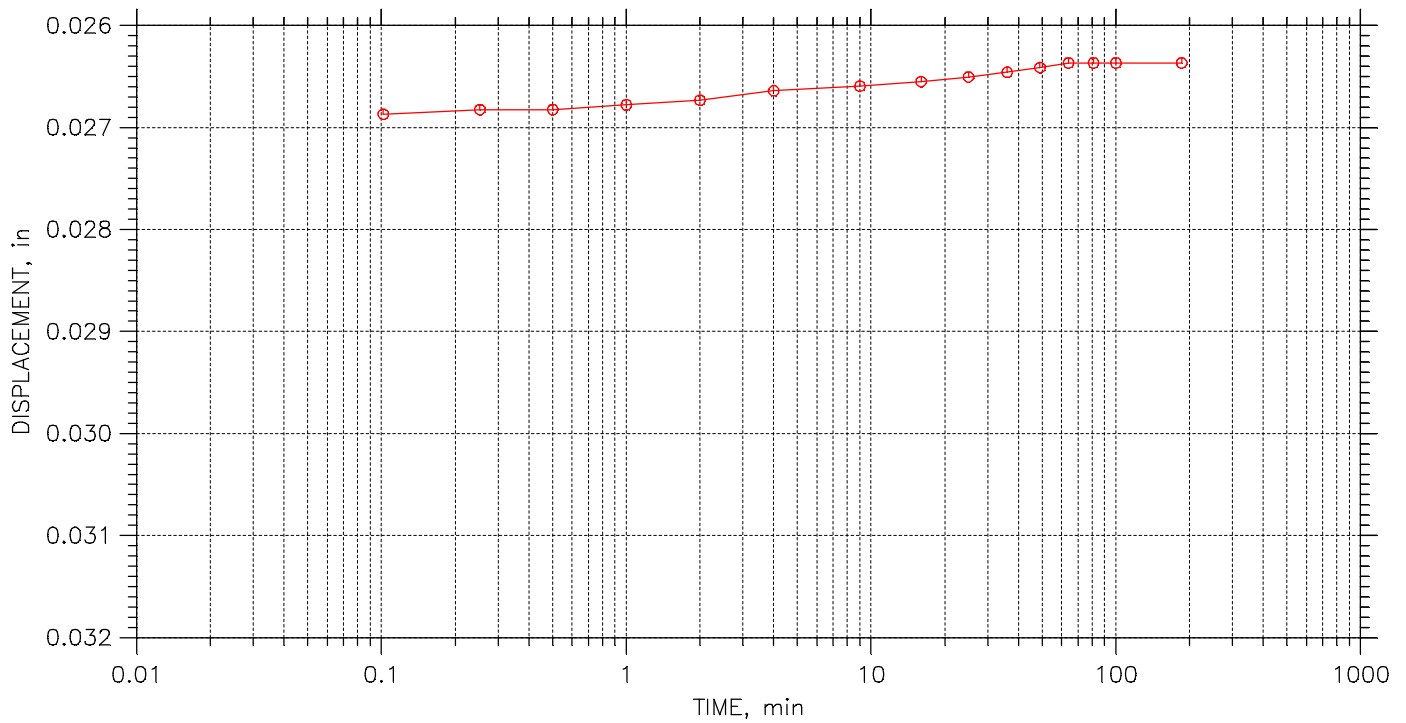
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	Test No.: B1S5CON	Sample Type: 3.0" ST	Elevation: -----
	Description: BROWN AND GRAY MOTTLED SANDY SILTY CLAY CL-ML		
	Remarks: Pc = 3.9 tsf Cc = 0.116 Ccr = 0.029 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 7 of 23

Stress: 1. tsf



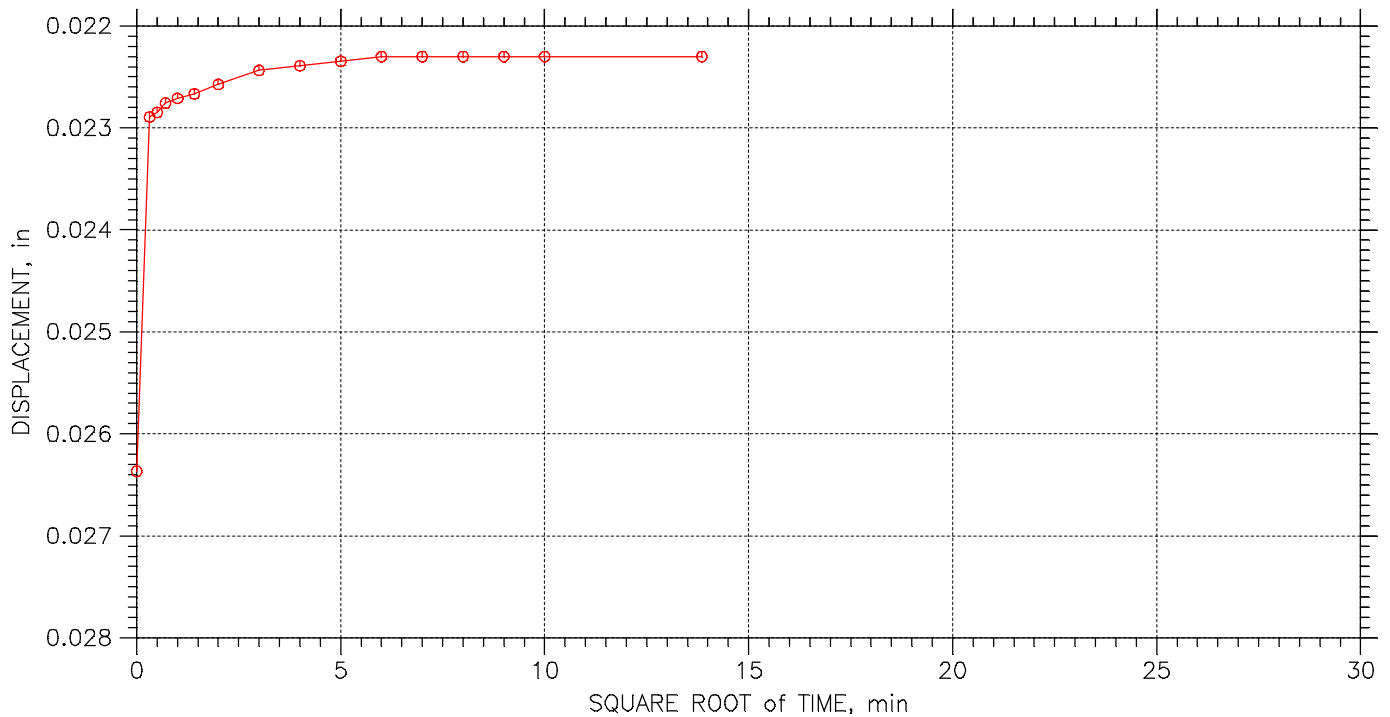
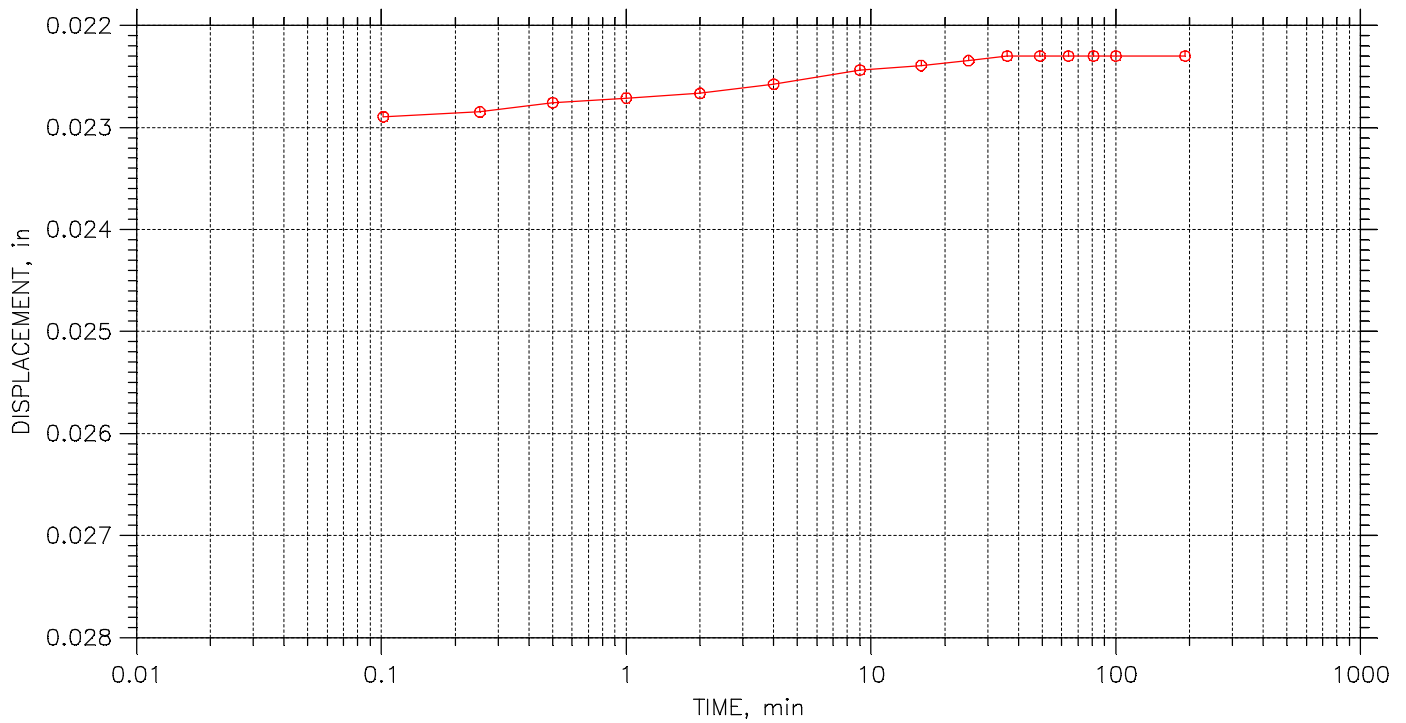
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	Description: BROWN AND GRAY MOTTLED SANDY SILTY CLAY CL-ML		
	Remarks: Pc = 3.9 tsf Cc = 0.116 Ccr = 0.029 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 8 of 23

Stress: 0.5 tsf



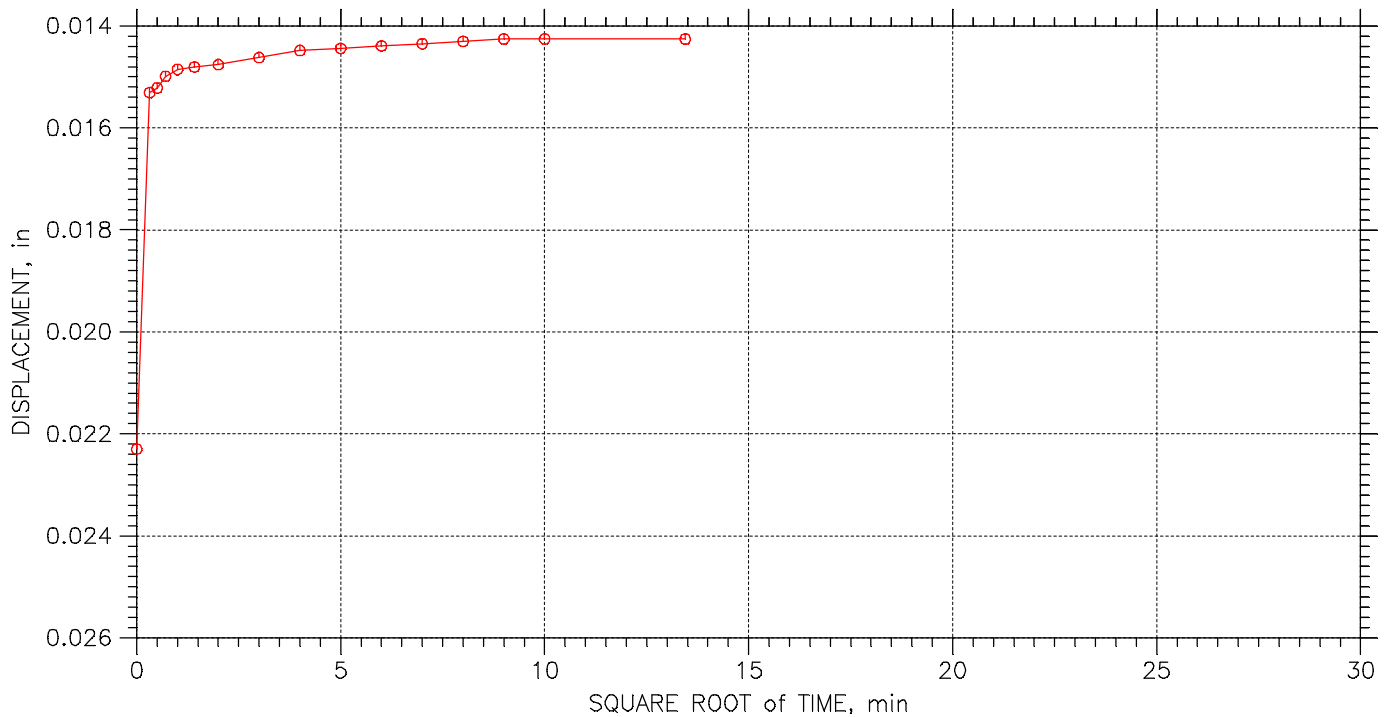
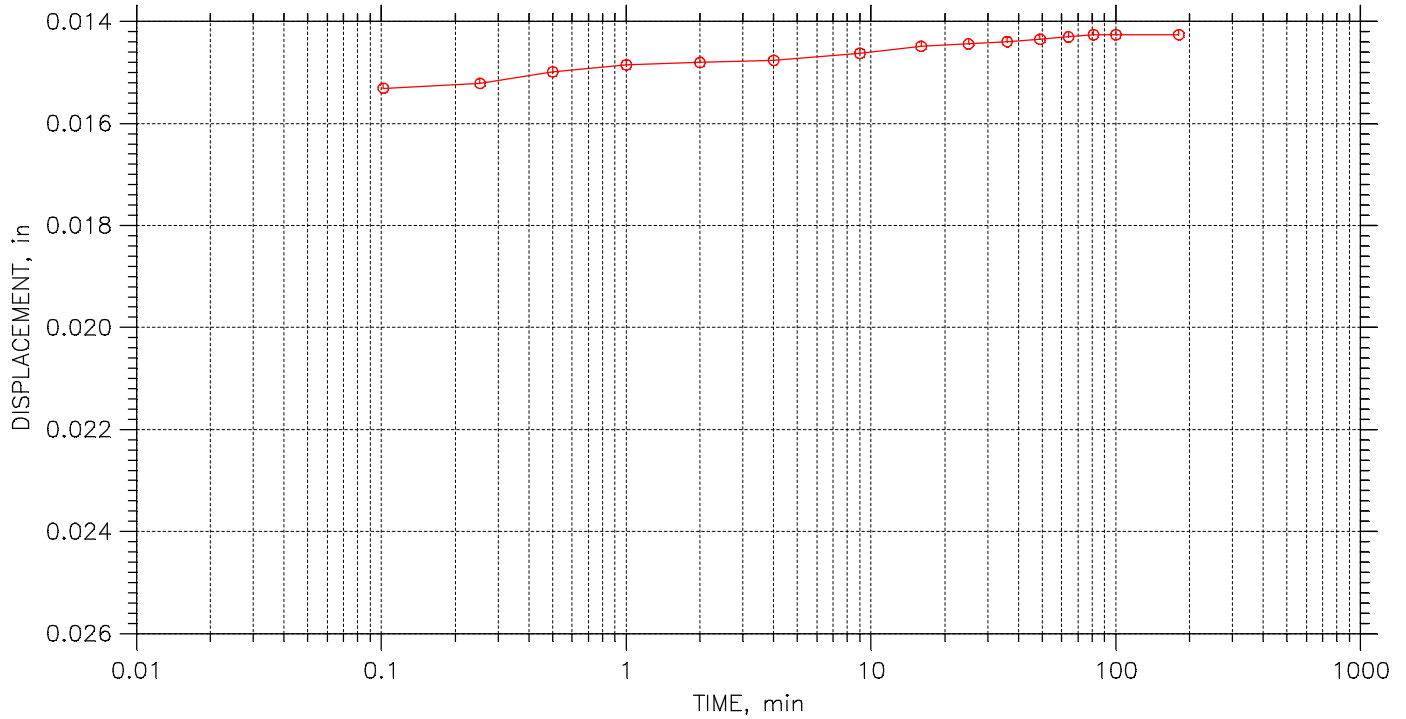
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	Test No.: B1S5CON	Sample Type: 3.0" ST	Elevation: -----
	Description: BROWN AND GRAY MOTTLED SANDY SILTY CLAY CL-ML		
	Remarks: Pc = 3.9 tsf Cc = 0.116 Ccr = 0.029 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 9 of 23

Stress: 0.125 tsf



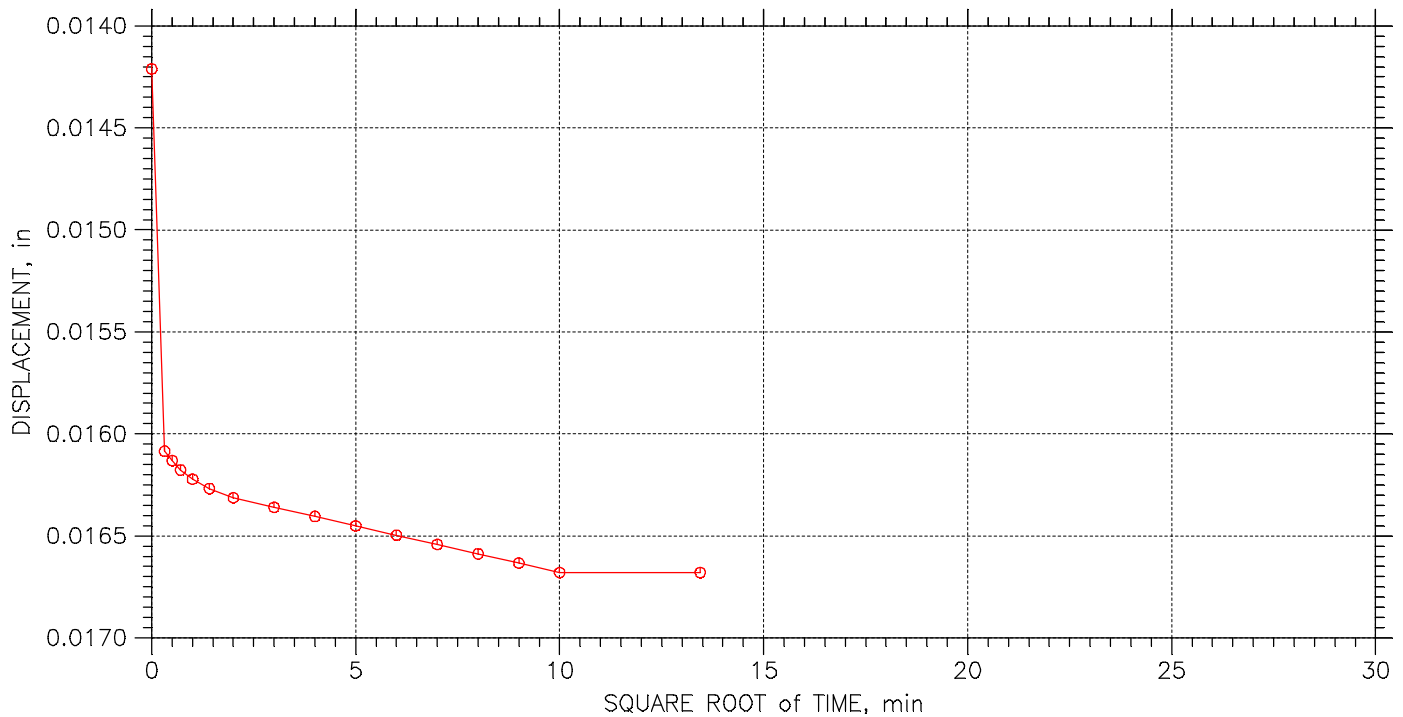
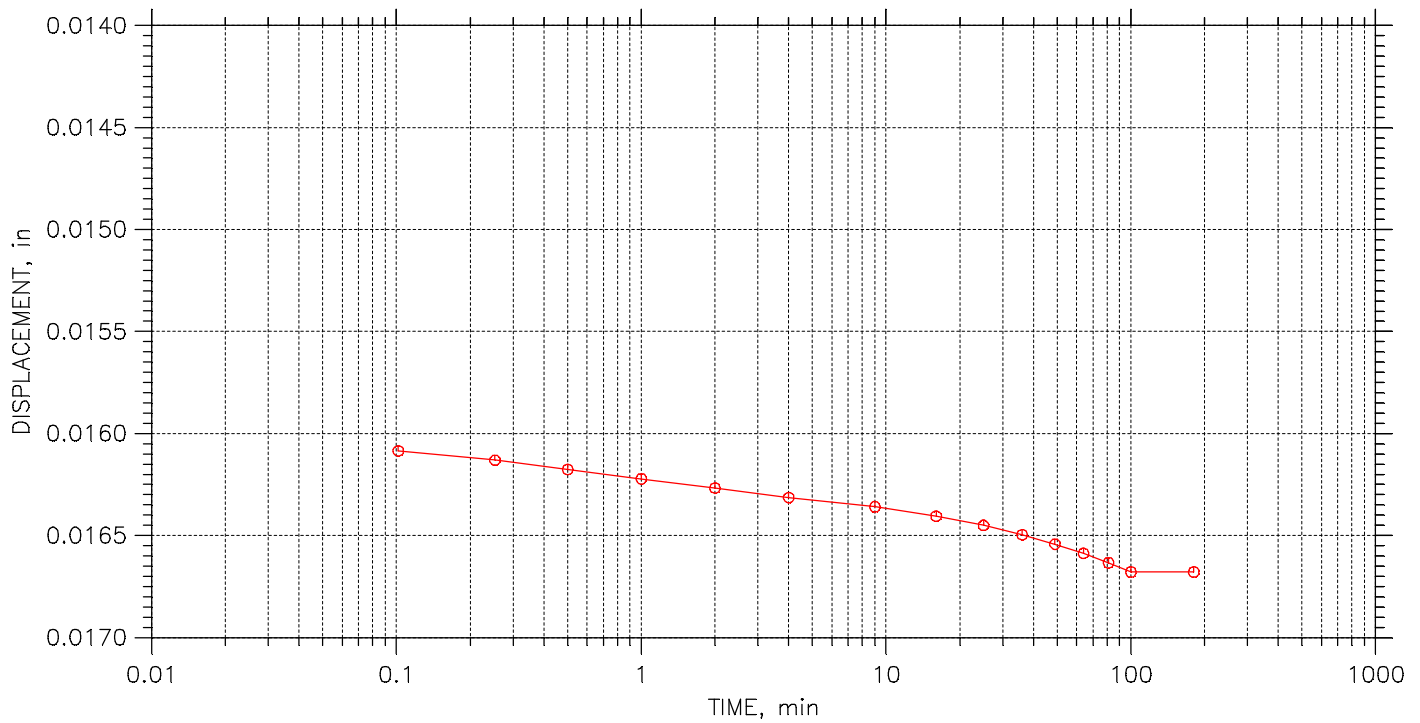
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	Description: BROWN AND GRAY MOTTLED SANDY SILTY CLAY CL-ML		
	Remarks: Pc = 3.9 tsf Cc = 0.116 Ccr = 0.029 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 10 of 23

Stress: 0.25 tsf



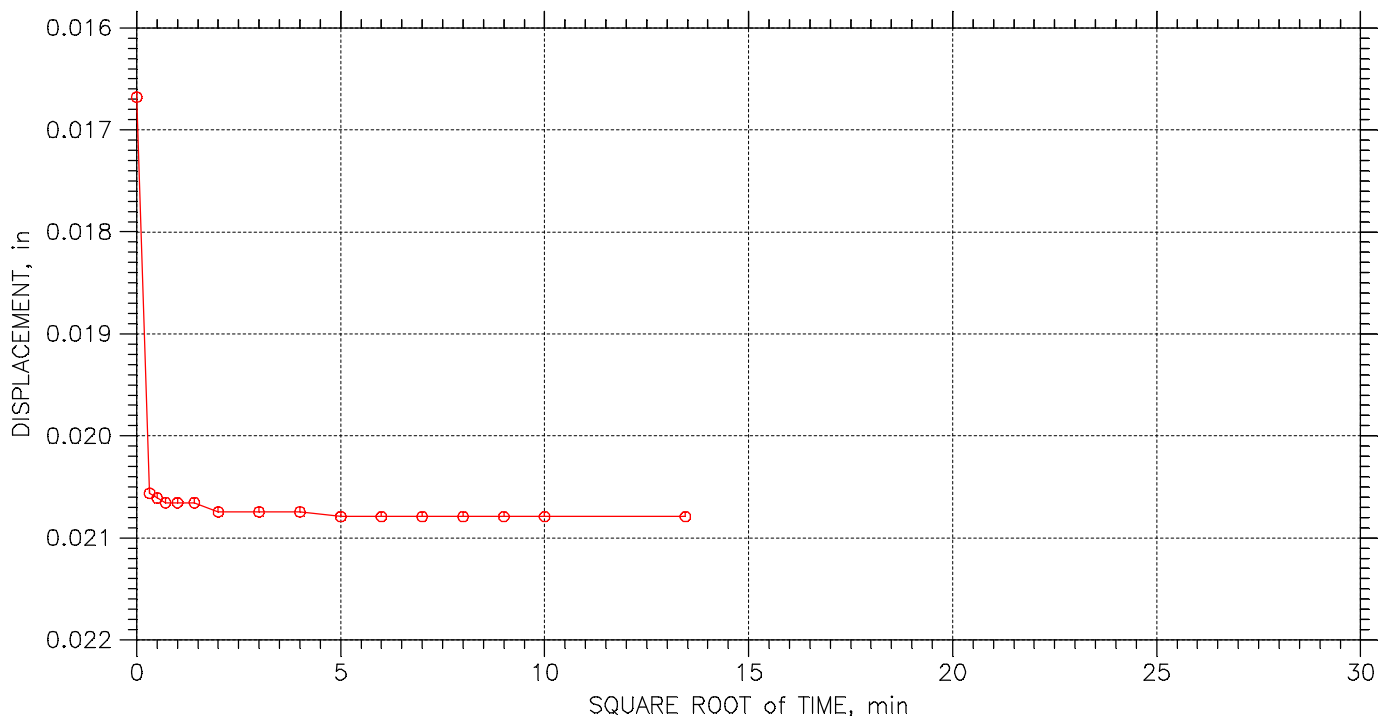
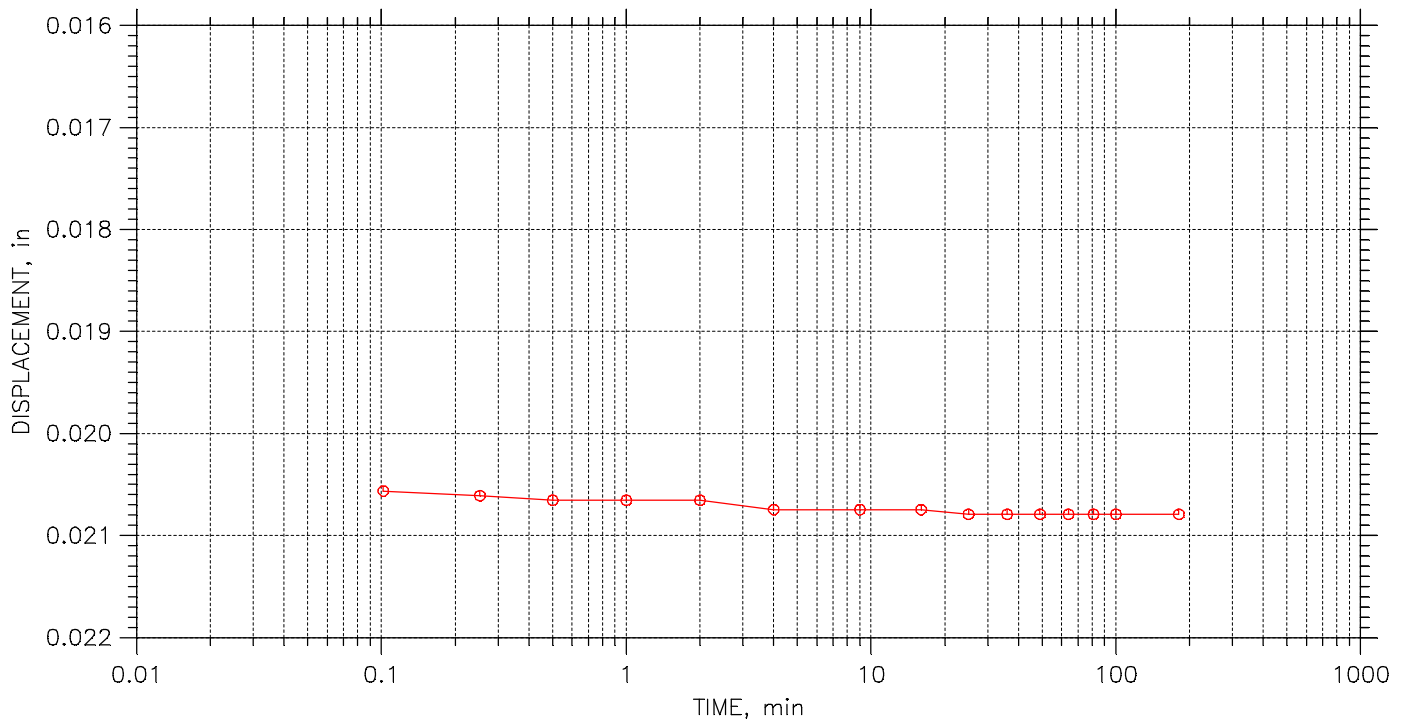
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	Test No.: B1S5CON	Sample Type: 3.0" ST	Elevation: -----
	Description: BROWN AND GRAY MOTTLED SANDY SILTY CLAY CL-ML		
	Remarks: Pc = 3.9 tsf Cc = 0.116 Ccr = 0.029 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 11 of 23

Stress: 0.5 tsf



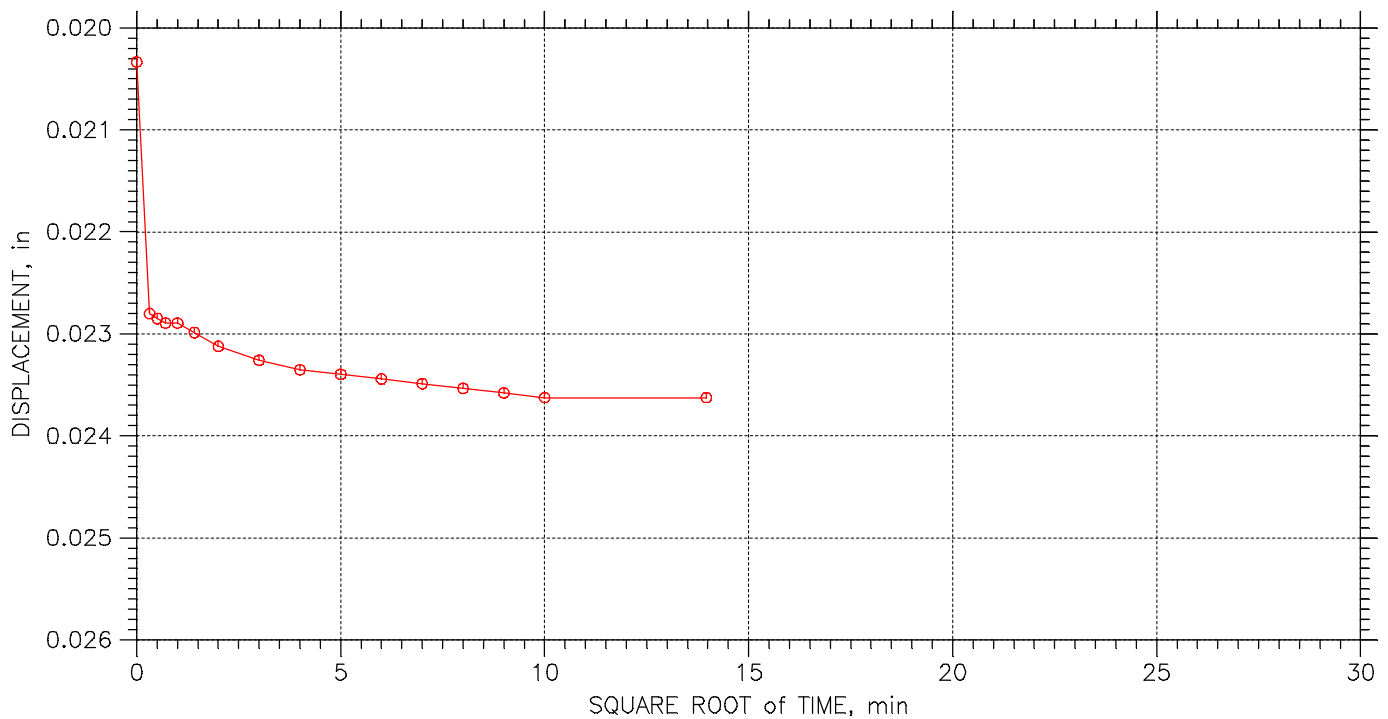
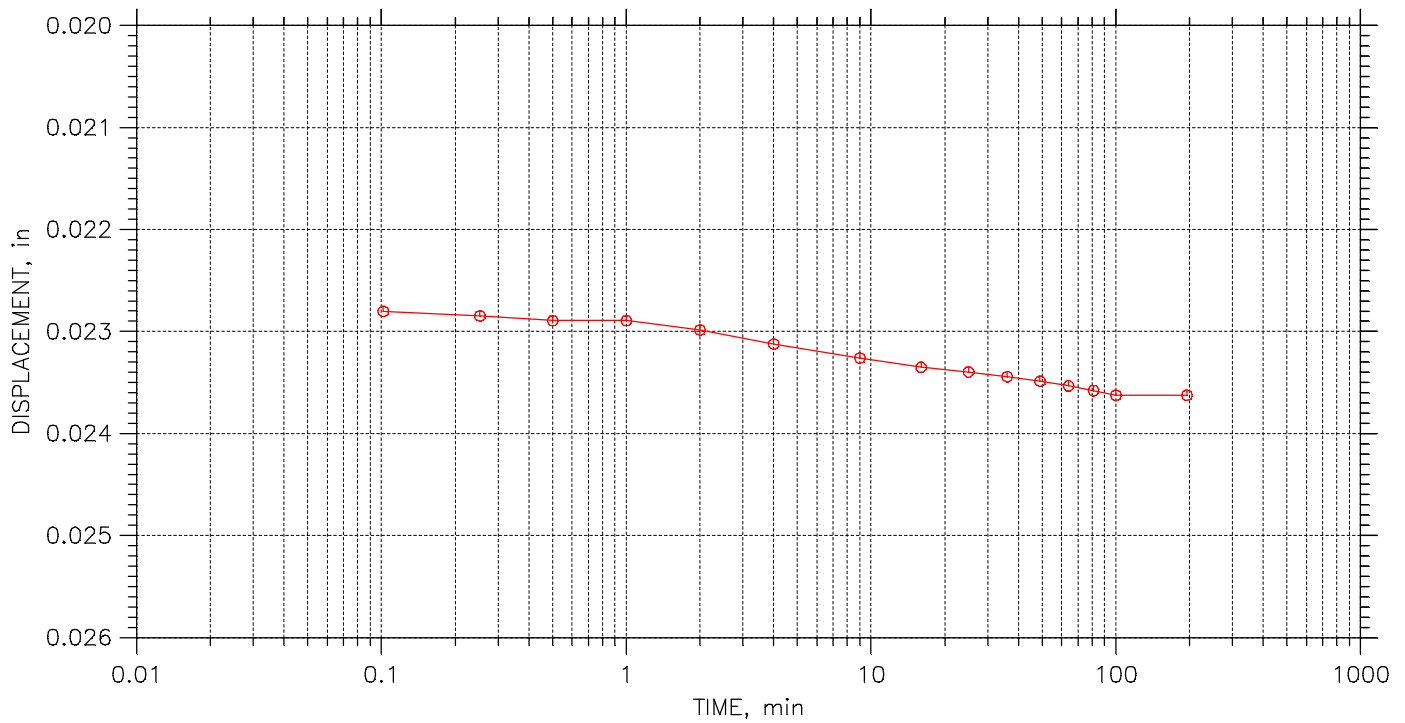
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	Test No.: B1S5CON	Sample Type: 3.0" ST	Elevation: -----
	Description: BROWN AND GRAY MOTTLED SANDY SILTY CLAY CL-ML		
	Remarks: Pc = 3.9 tsf Cc = 0.116 Ccr = 0.029 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 12 of 23

Stress: 0.75 tsf



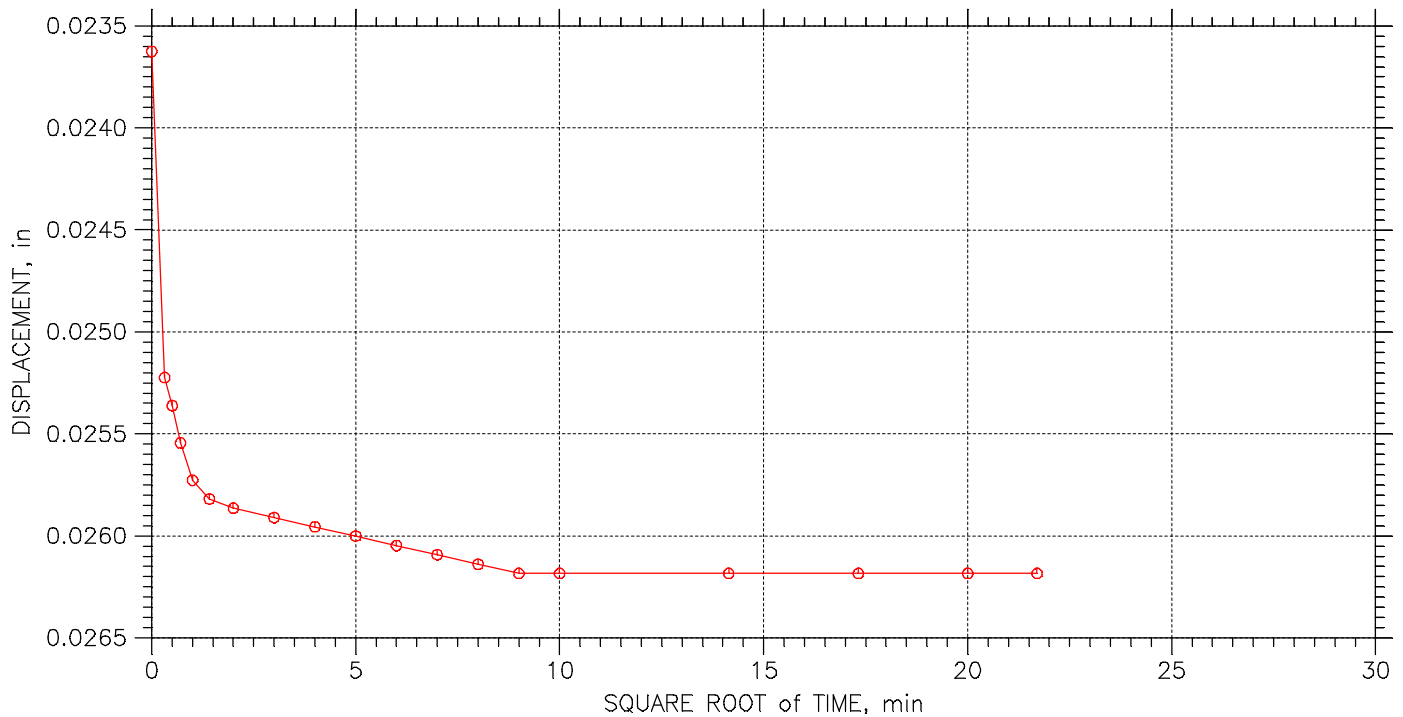
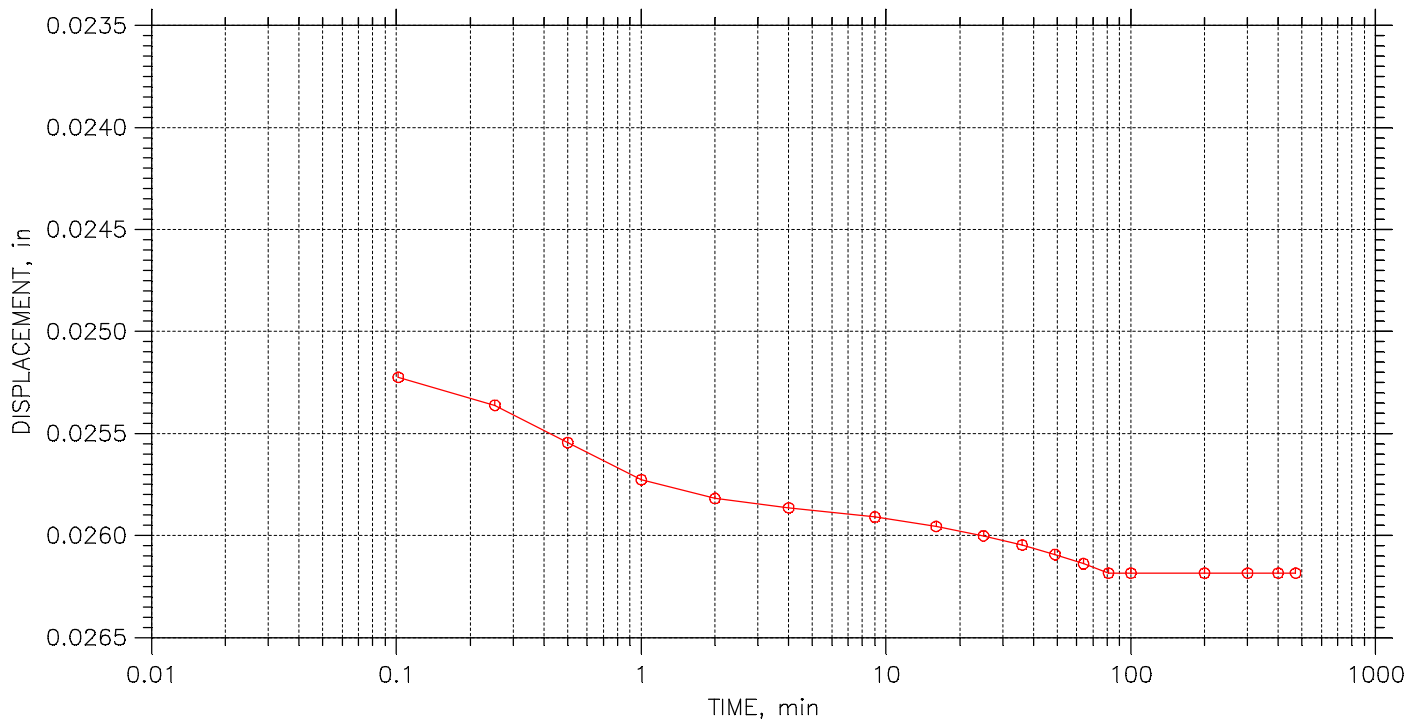
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	Test No.: B1S5CON	Sample Type: 3.0" ST	Elevation: -----
	Description: BROWN AND GRAY MOTTLED SANDY SILTY CLAY CL-ML		
	Remarks: Pc = 3.9 tsf Cc = 0.116 Ccr = 0.029 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 13 of 23

Stress: 1. tsf



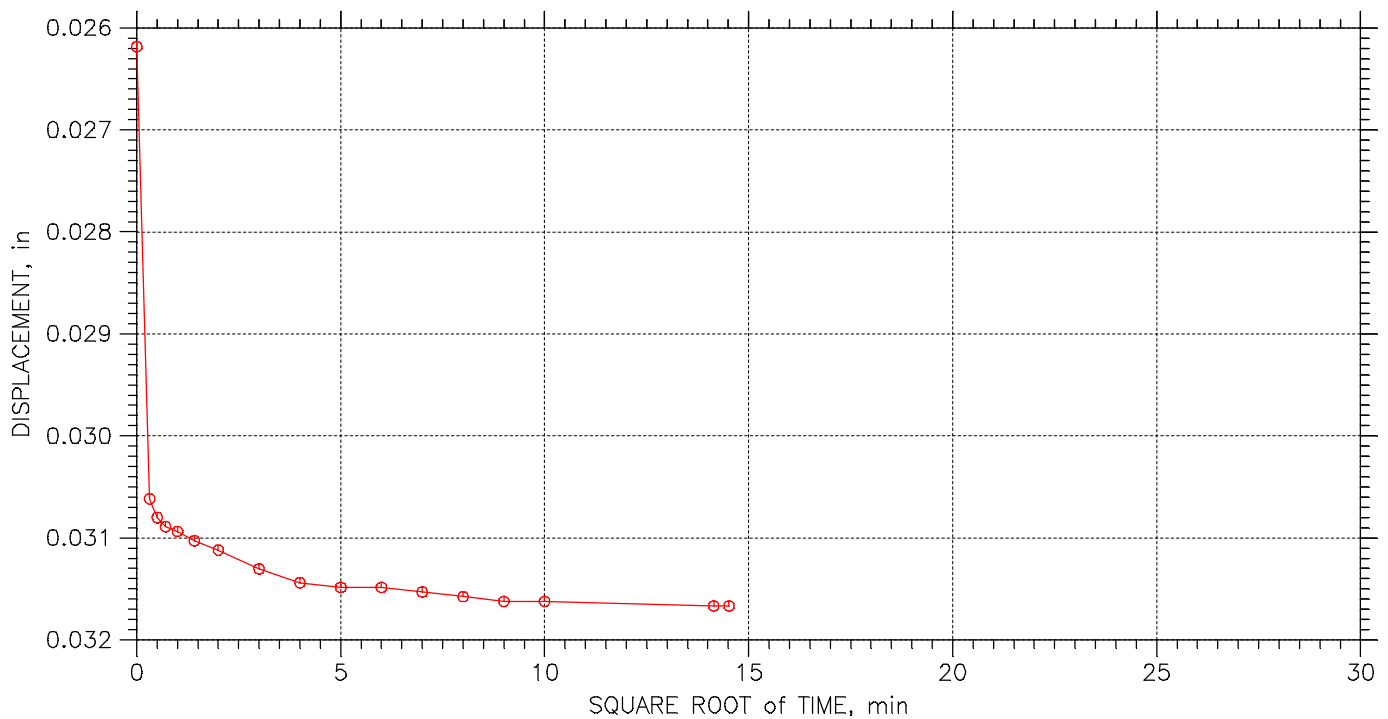
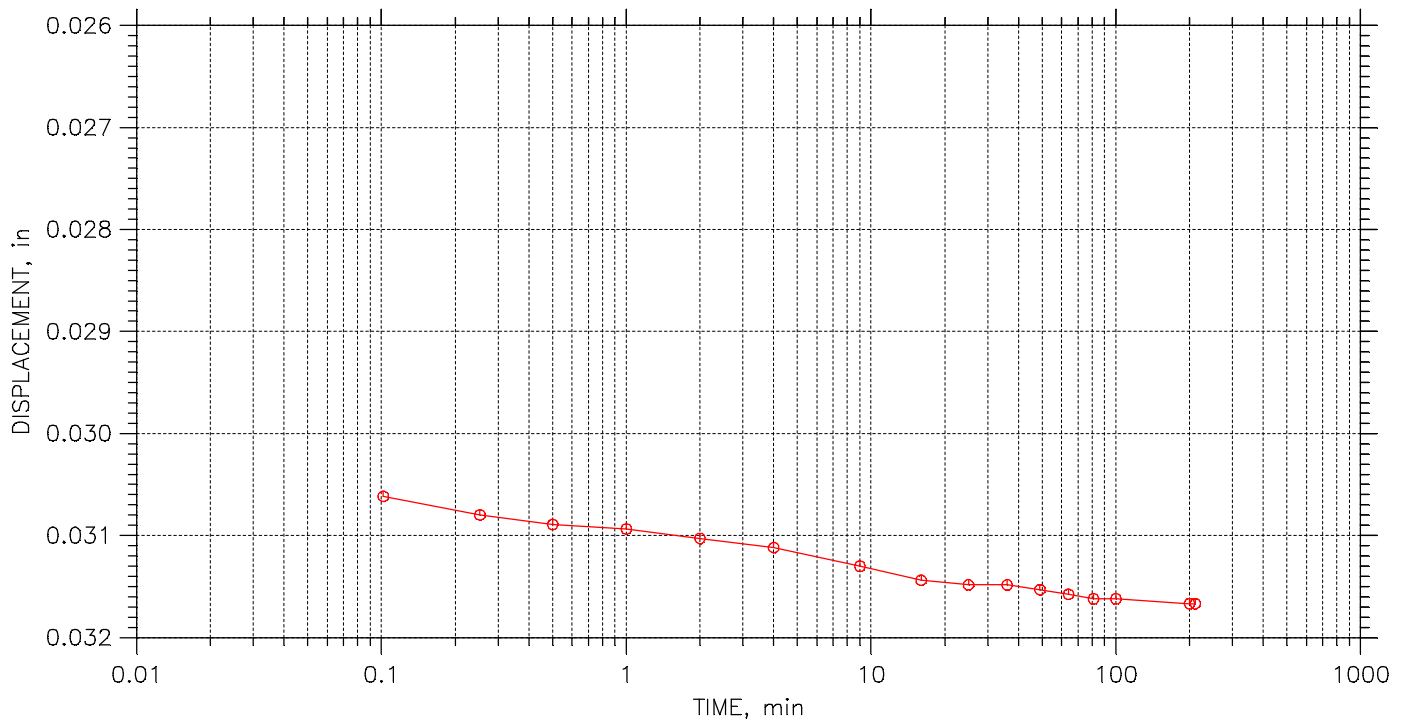
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	Test No.: B1S5CON	Sample Type: 3.0" ST	Elevation: -----
	Description: BROWN AND GRAY MOTTLED SANDY SILTY CLAY CL-ML		
	Remarks: Pc = 3.9 tsf Cc = 0.116 Ccr = 0.029 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 14 of 23

Stress: 2. tsf



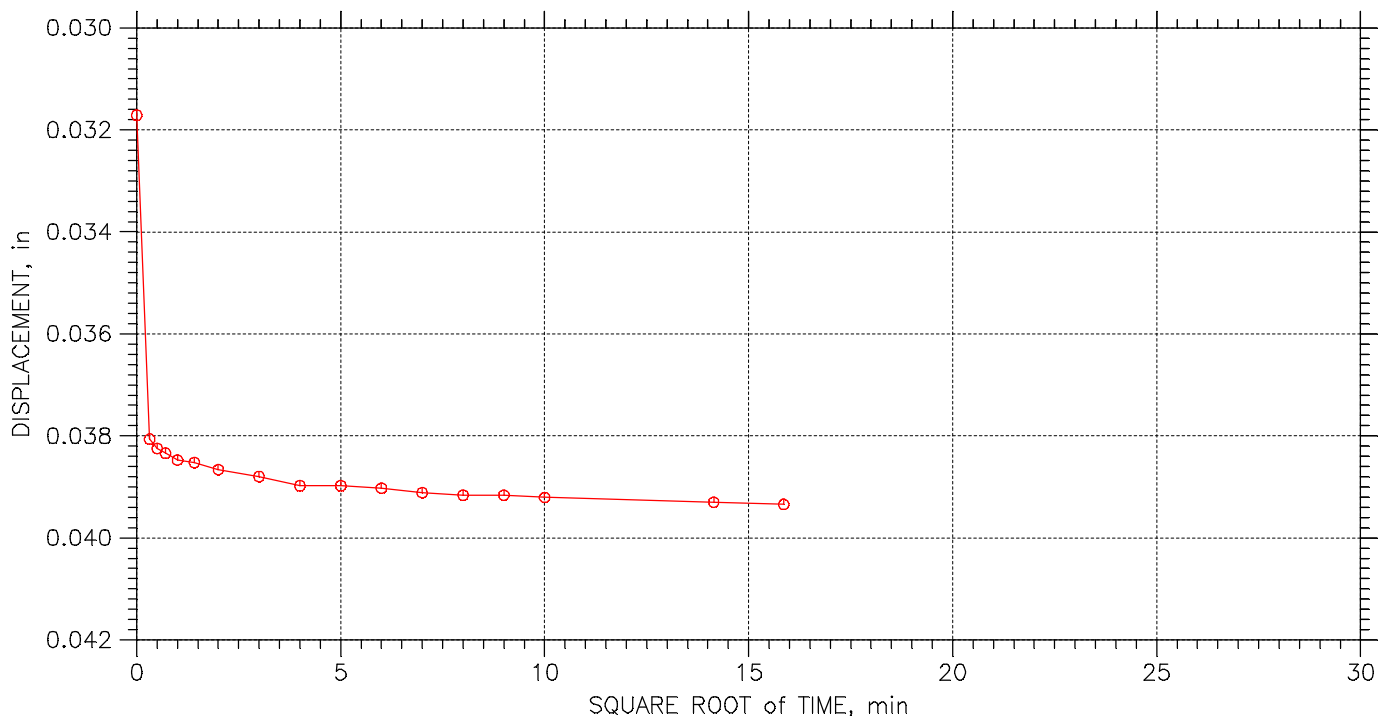
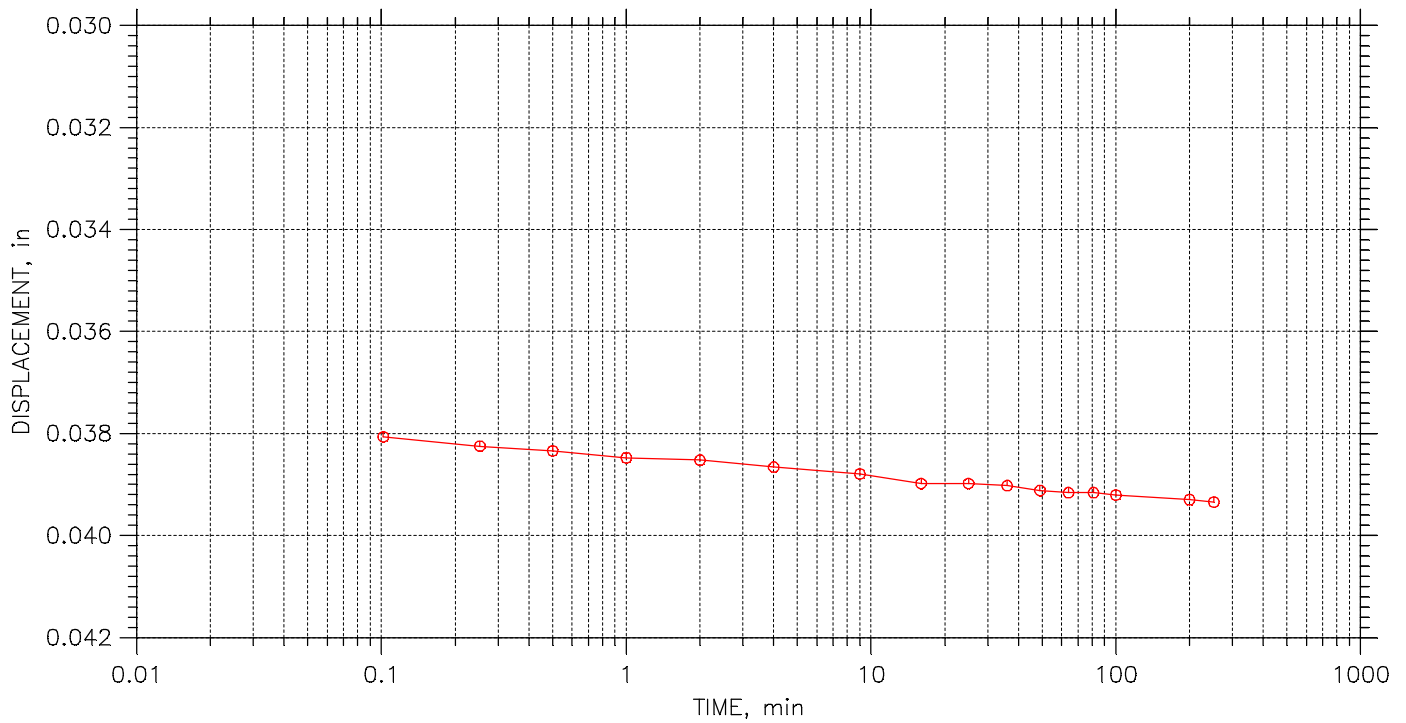
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	Sample No.: S-5	Test Date: 8/13/19	Depth: 8.5'-10.5'
	Test No.: B1S5CON	Sample Type: 3.0" ST	Elevation: -----
	Description: BROWN AND GRAY MOTTLED SANDY SILTY CLAY CL-ML		
	Remarks: Pc = 3.9 tsf Cc = 0.116 Ccr = 0.029 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 15 of 23

Stress: 4. tsf



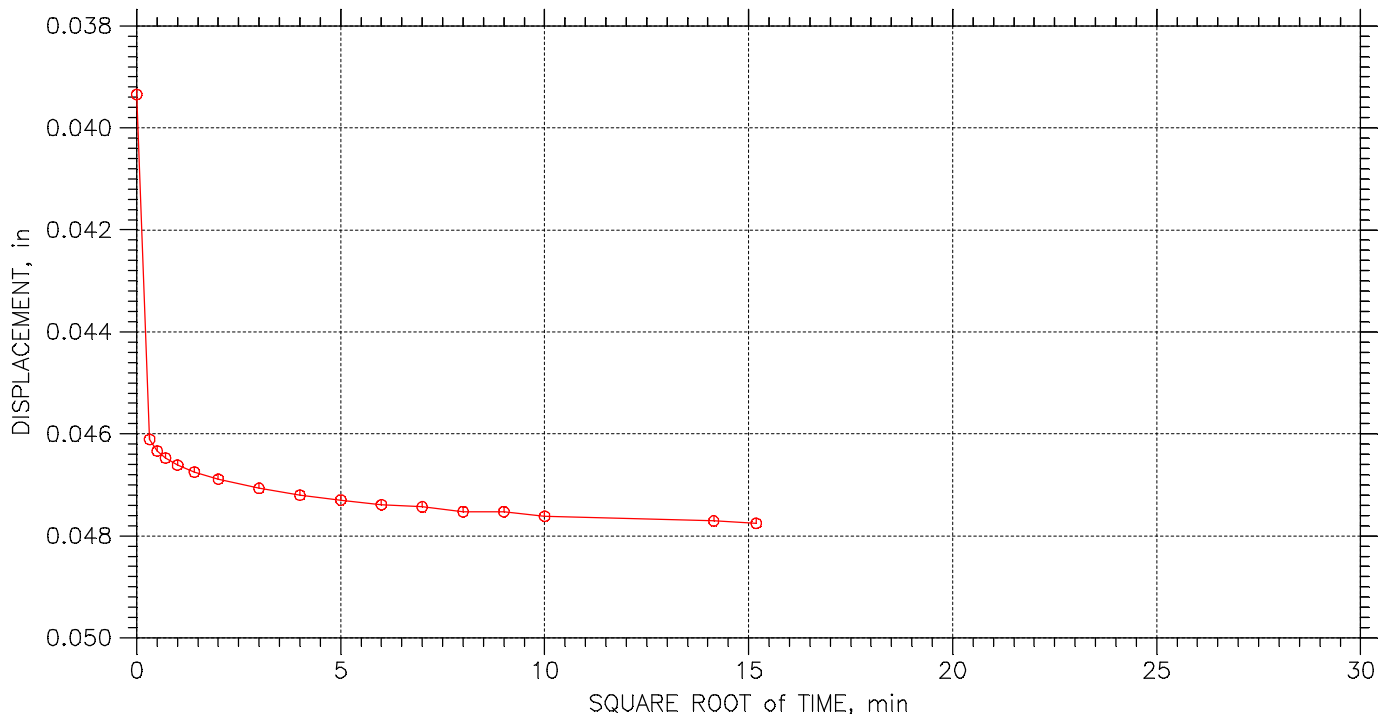
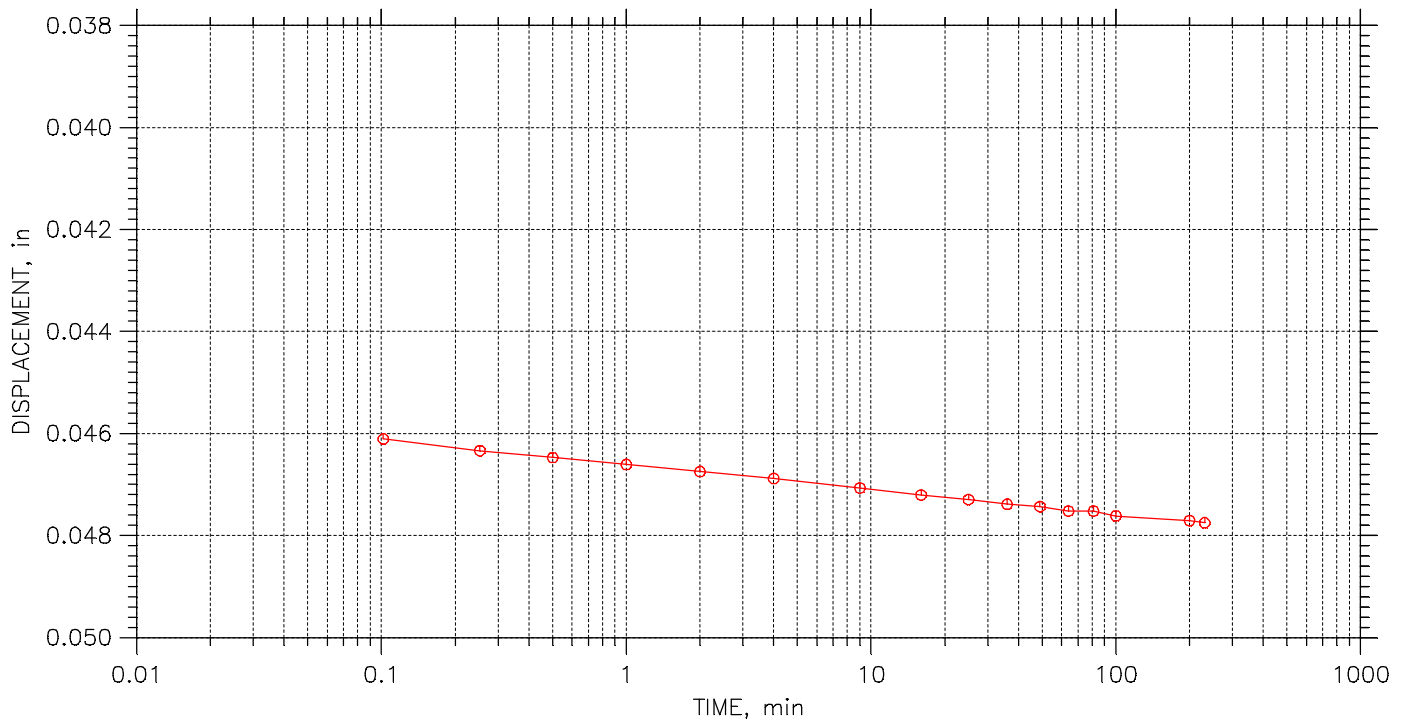
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	Sample No.: S-5	Test Date: 8/13/19	Depth: 8.5'-10.5'
	Test No.: B1S5CON	Sample Type: 3.0" ST	Elevation: -----
	Description: BROWN AND GRAY MOTTLED SANDY SILTY CLAY CL-ML		
	Remarks: Pc = 3.9 tsf Cc = 0.116 Ccr = 0.029 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 16 of 23

Stress: 8. tsf



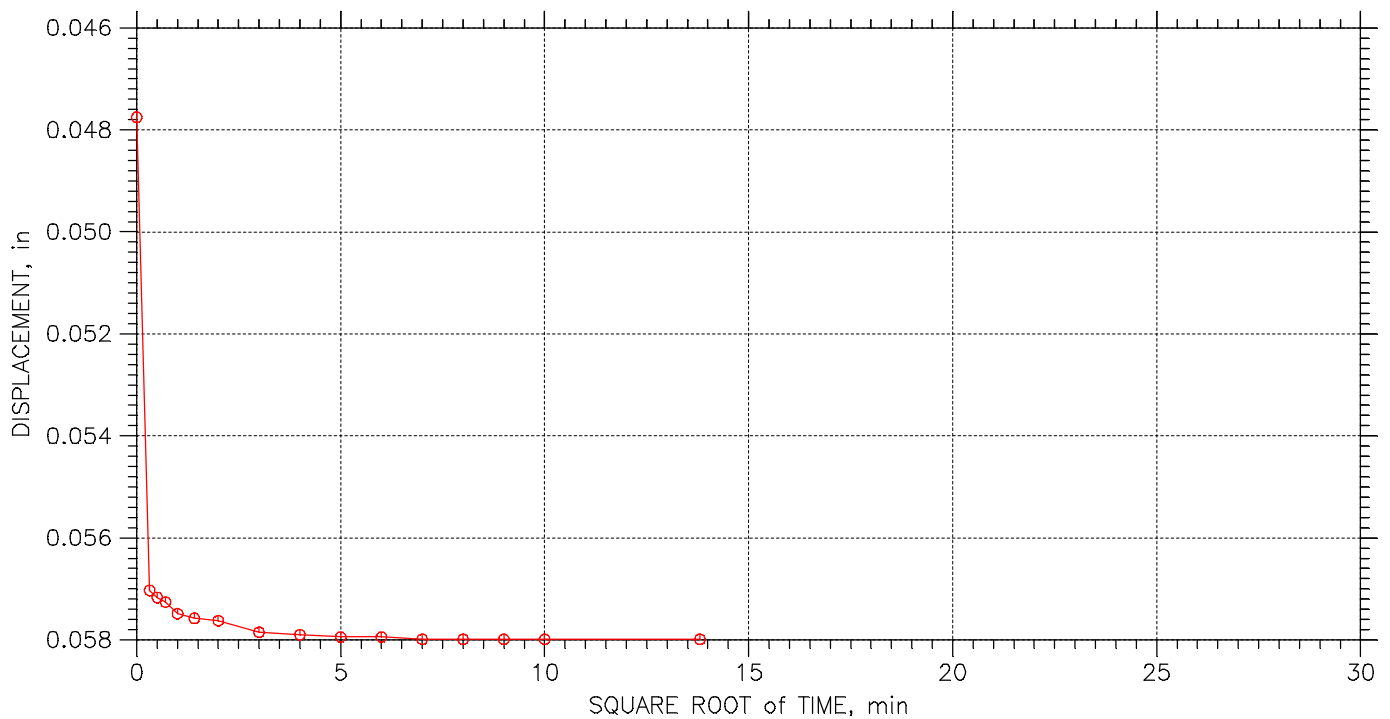
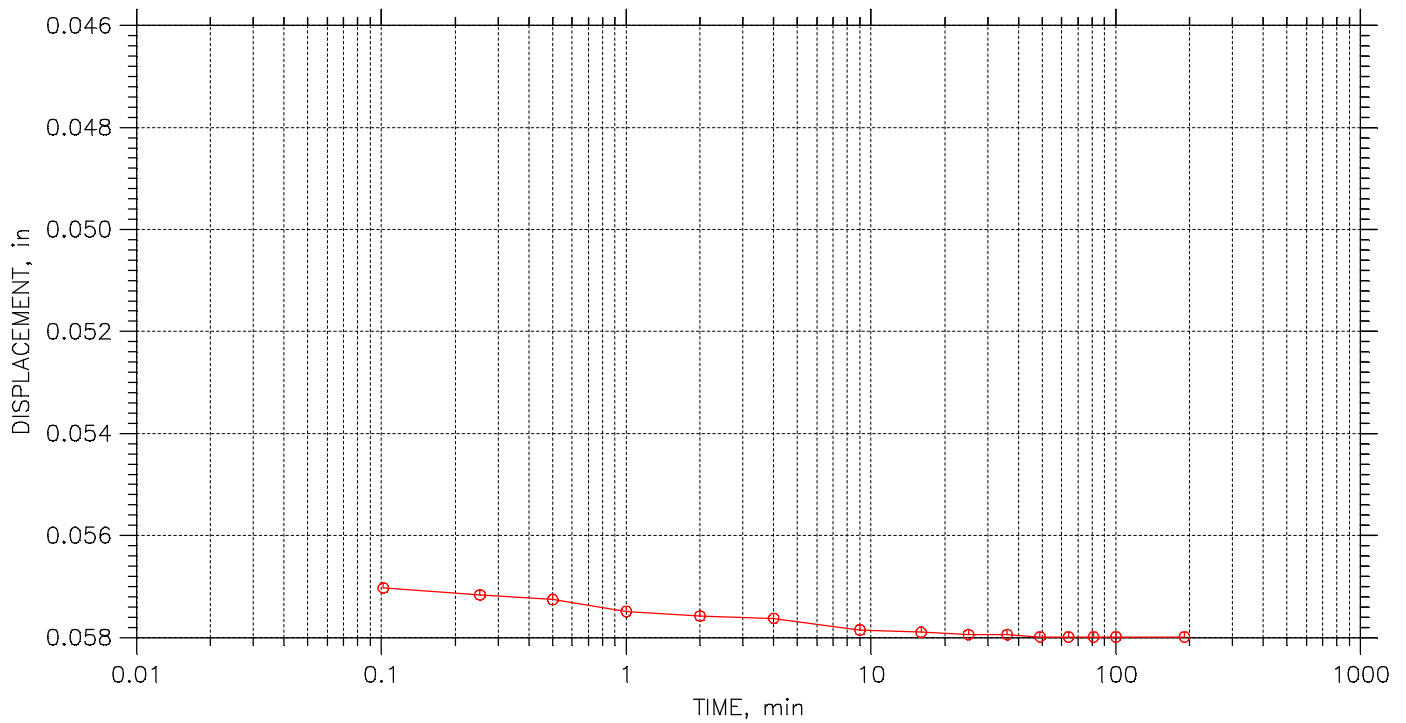
	Project: UPRR GRADE SEPARATION	Location: LITTLE ROCK, AR	Project No.: 35185112
	Boring No.: B-1 S-5	Tested By: BCM	Checked By: WPQ
	Sample No.: S-5	Test Date: 8/13/19	Depth: 8.5'-10.5'
	Test No.: B1S5CON	Sample Type: 3.0" ST	Elevation: -----
	Description: BROWN AND GRAY MOTTLED SANDY SILTY CLAY CL-ML		
	Remarks: Pc = 3.9 tsf Cc = 0.116 Ccr = 0.029 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 17 of 23

Stress: 16. tsf



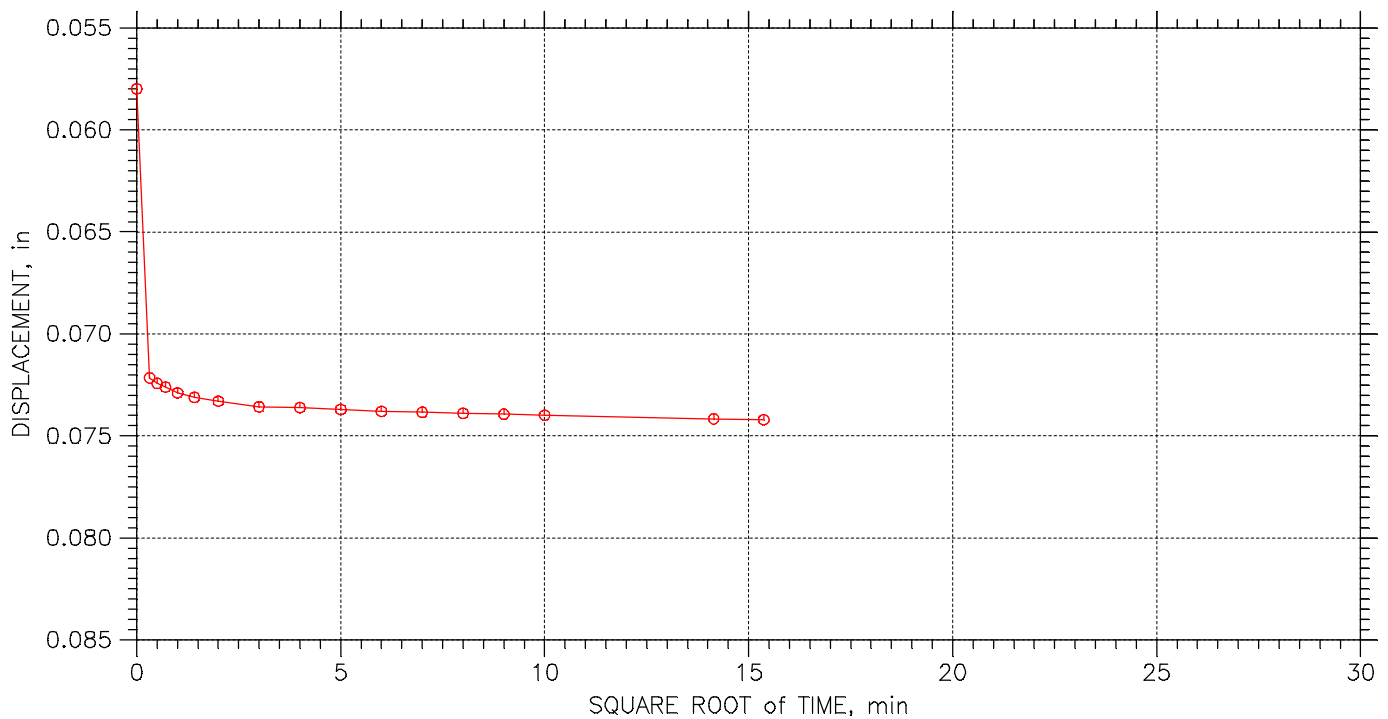
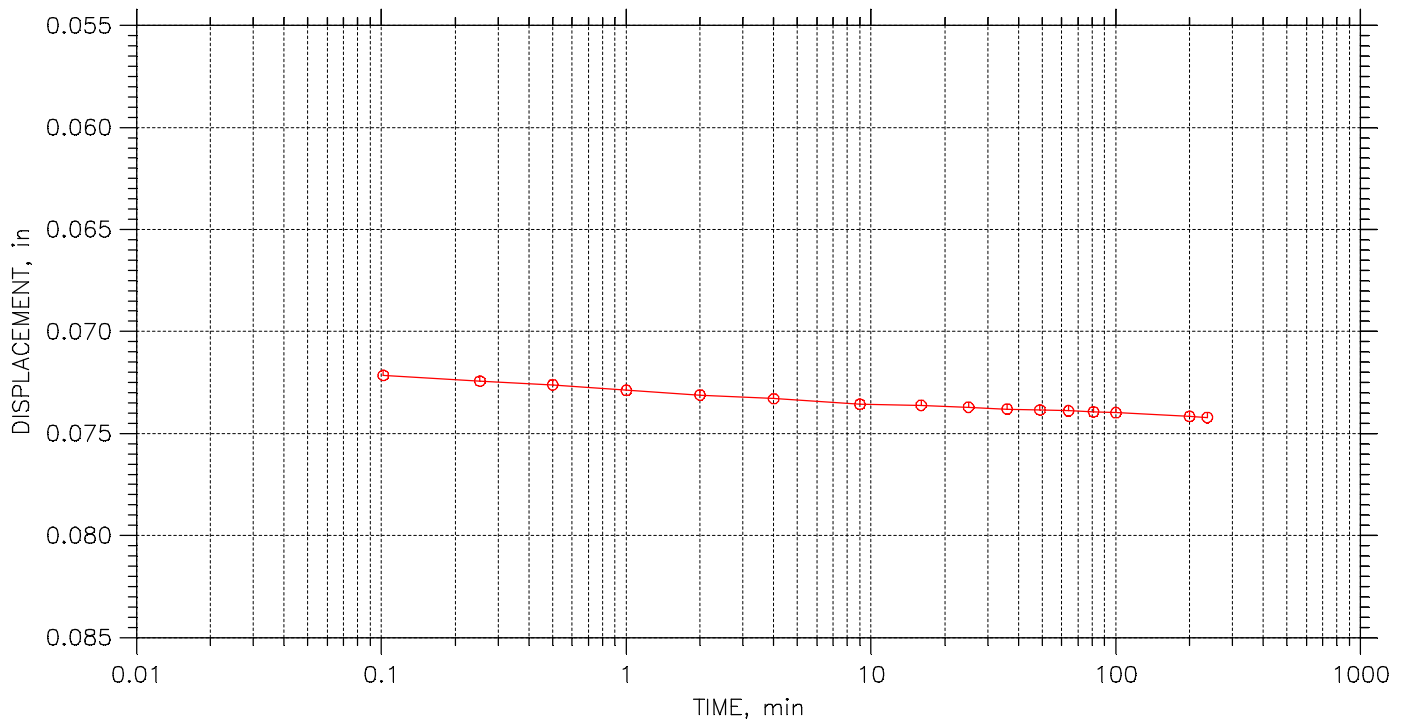
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	Boring No.: B-1 S-5	Tested By: BCM	Checked By: WPQ
	Sample No.: S-5	Test Date: 8/13/19	Depth: 8.5'-10.5'
	Test No.: B1S5CON	Sample Type: 3.0" ST	Elevation: -----
	Description: BROWN AND GRAY MOTTLED SANDY SILTY CLAY CL-ML		
	Remarks: Pc = 3.9 tsf Cc = 0.116 Ccr = 0.029 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 18 of 23

Stress: 32. tsf



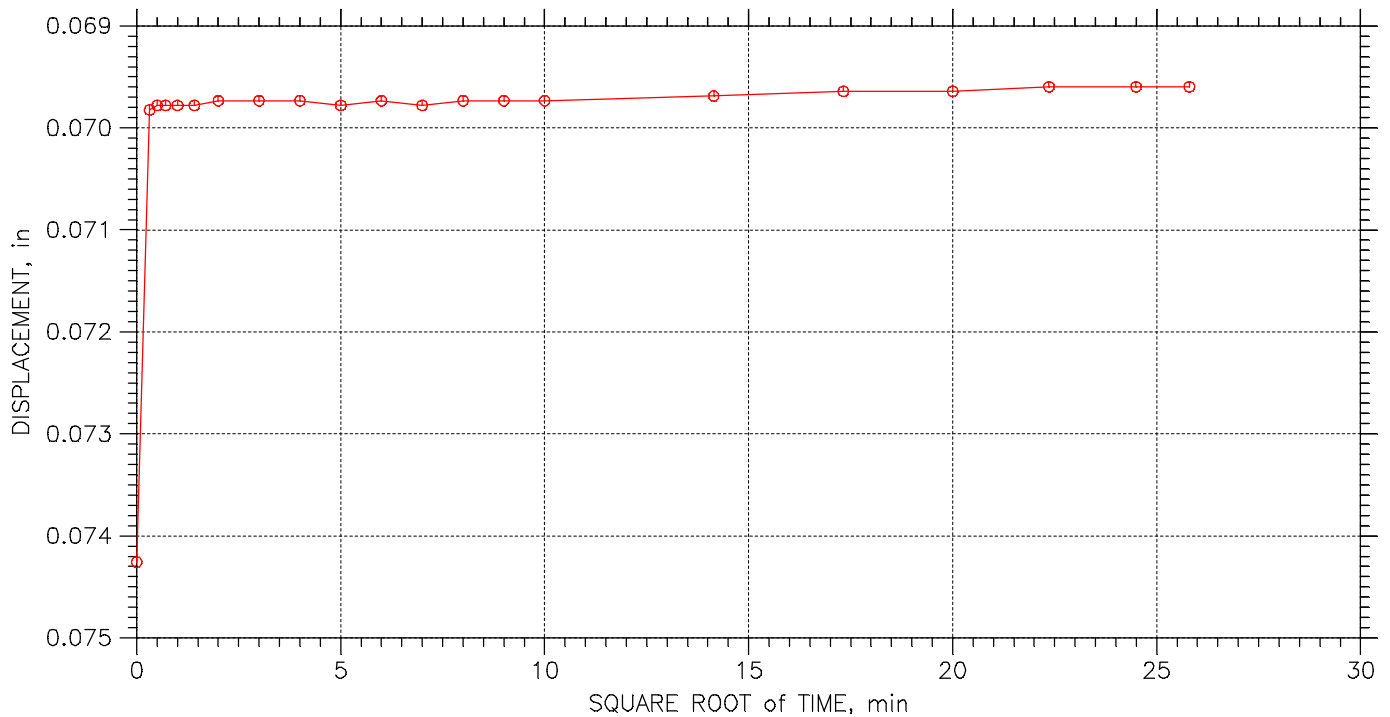
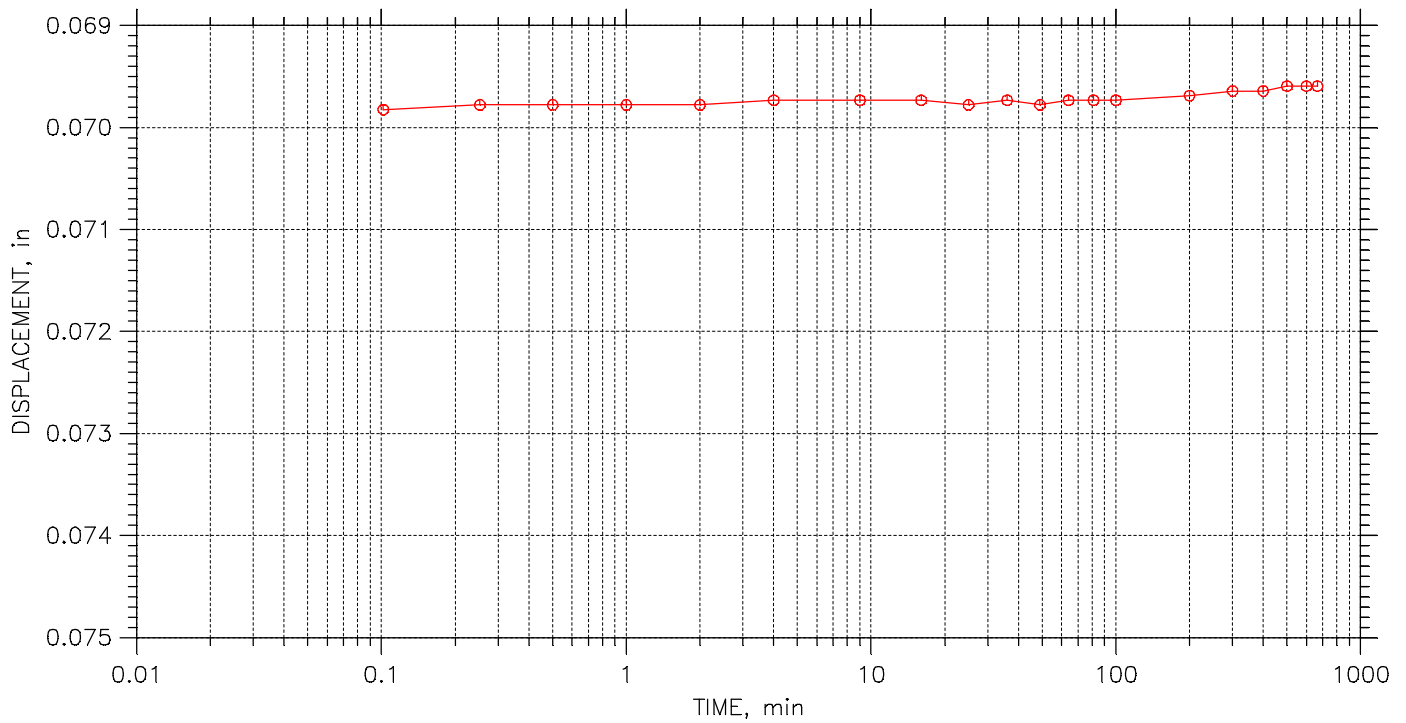
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	Boring No.: B-1 S-5	Tested By: BCM	Checked By: WPQ
	Sample No.: S-5	Test Date: 8/13/19	Depth: 8.5'-10.5'
	Test No.: B1S5CON	Sample Type: 3.0" ST	Elevation: -----
	Description: BROWN AND GRAY MOTTLED SANDY SILTY CLAY CL-ML		
	Remarks: Pc = 3.9 tsf Cc = 0.116 Ccr = 0.029 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 19 of 23

Stress: 16. tsf



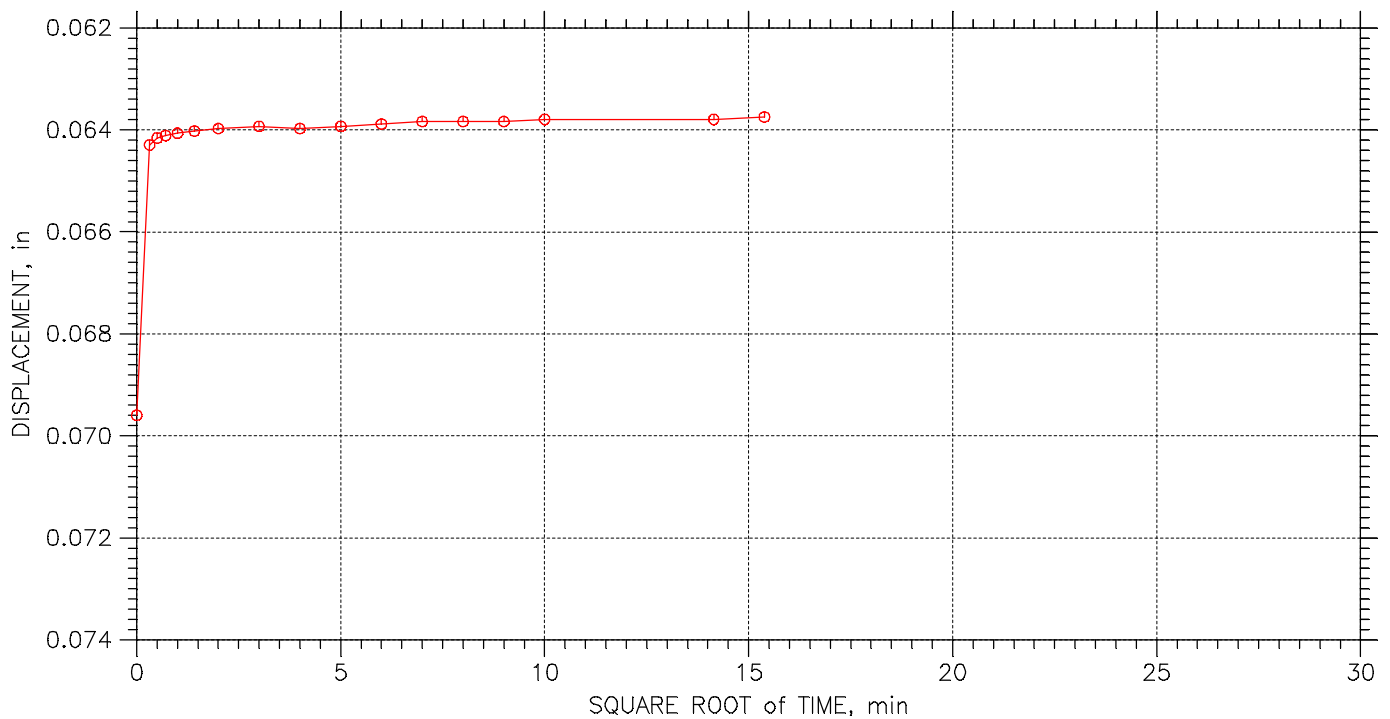
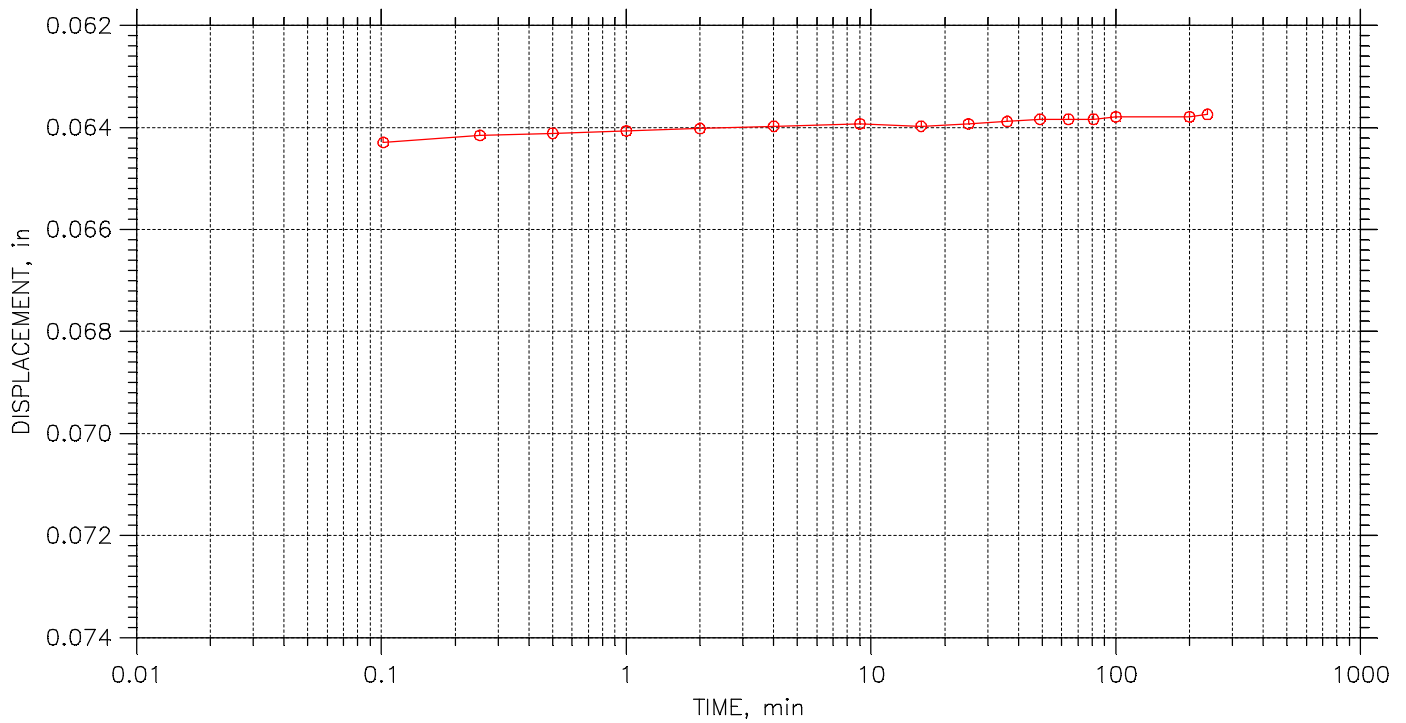
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	Boring No.: B-1 S-5	Tested By: BCM	Checked By: WPQ
	Sample No.: S-5	Test Date: 8/13/19	Depth: 8.5'-10.5'
	Test No.: B1S5CON	Sample Type: 3.0" ST	Elevation: -----
	Description: BROWN AND GRAY MOTTLED SANDY SILTY CLAY CL-ML		
	Remarks: Pc = 3.9 tsf Cc = 0.116 Ccr = 0.029 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 20 of 23

Stress: 4. tsf



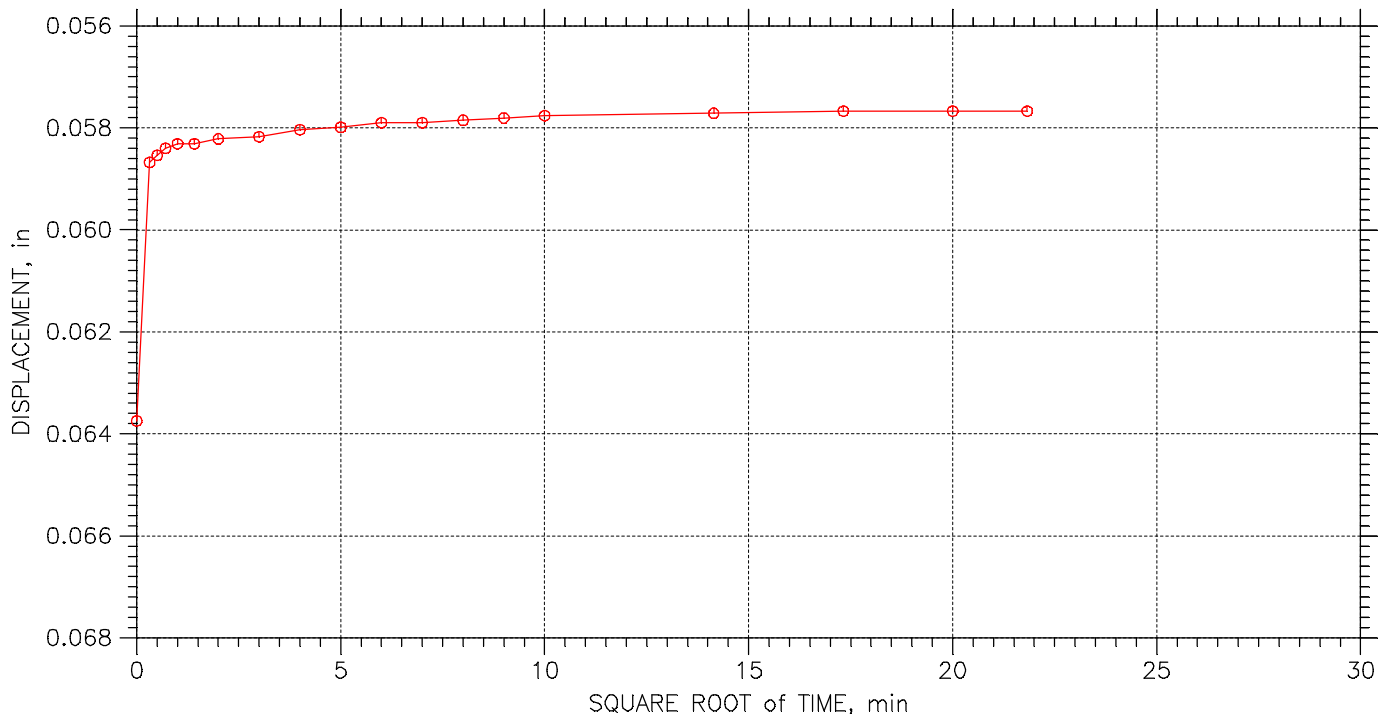
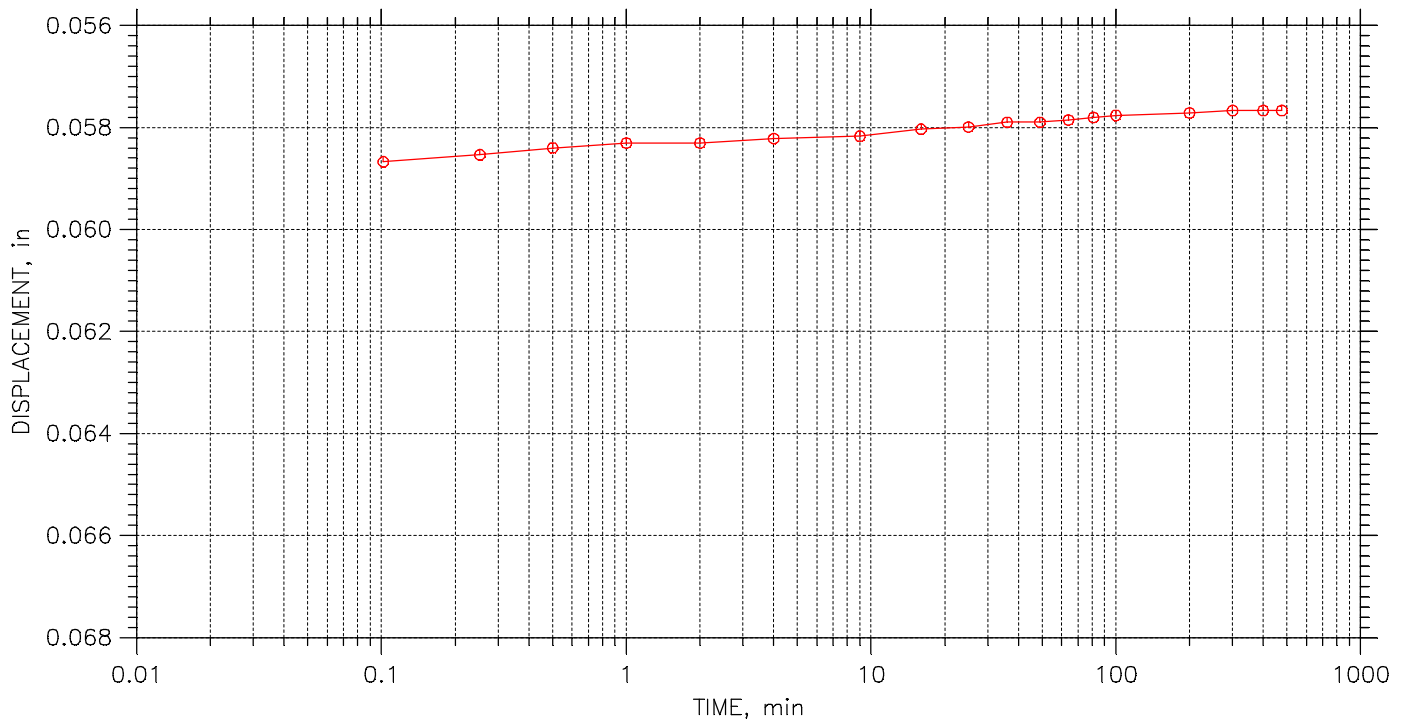
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	Boring No.: B-1 S-5	Tested By: BCM	Checked By: WPQ
	Sample No.: S-5	Test Date: 8/13/19	Depth: 8.5'-10.5'
	Test No.: B1S5CON	Sample Type: 3.0" ST	Elevation: -----
	Description: BROWN AND GRAY MOTTLED SANDY SILTY CLAY CL-ML		
	Remarks: Pc = 3.9 tsf Cc = 0.116 Ccr = 0.029 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 21 of 23

Stress: 1. tsf



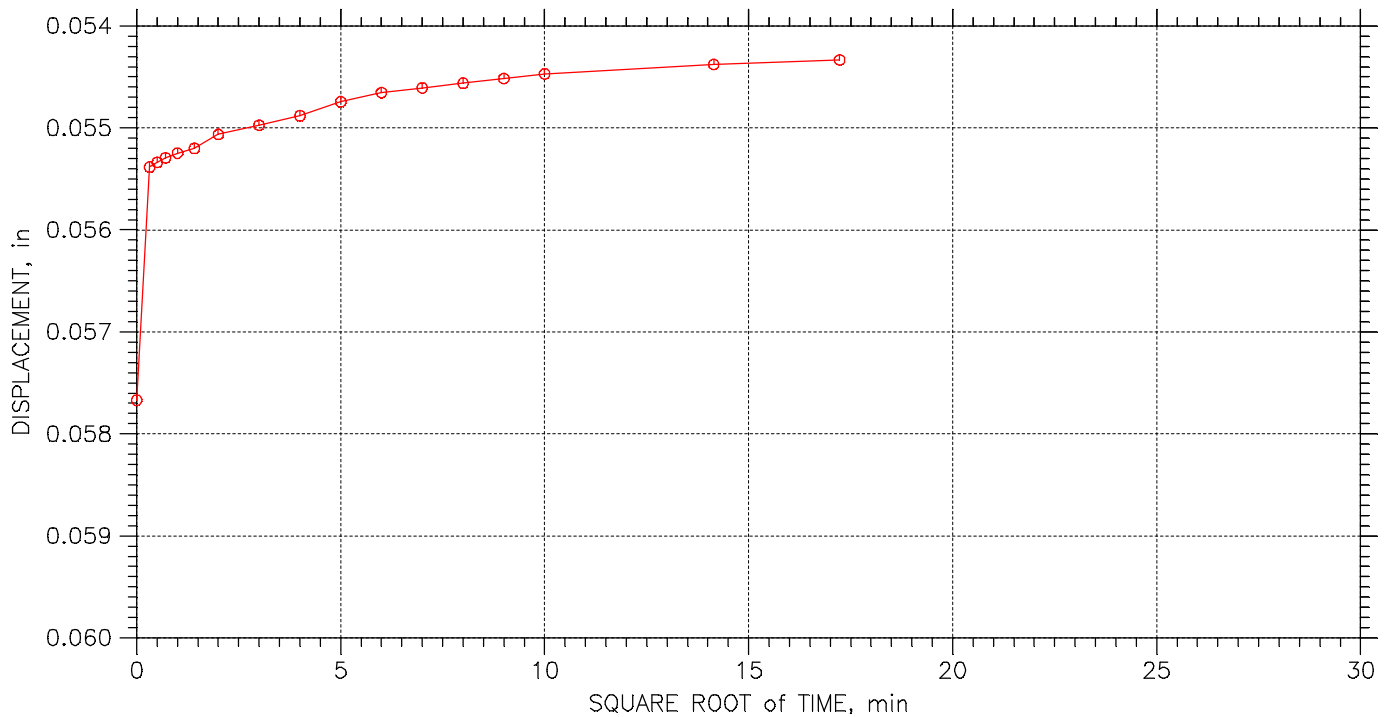
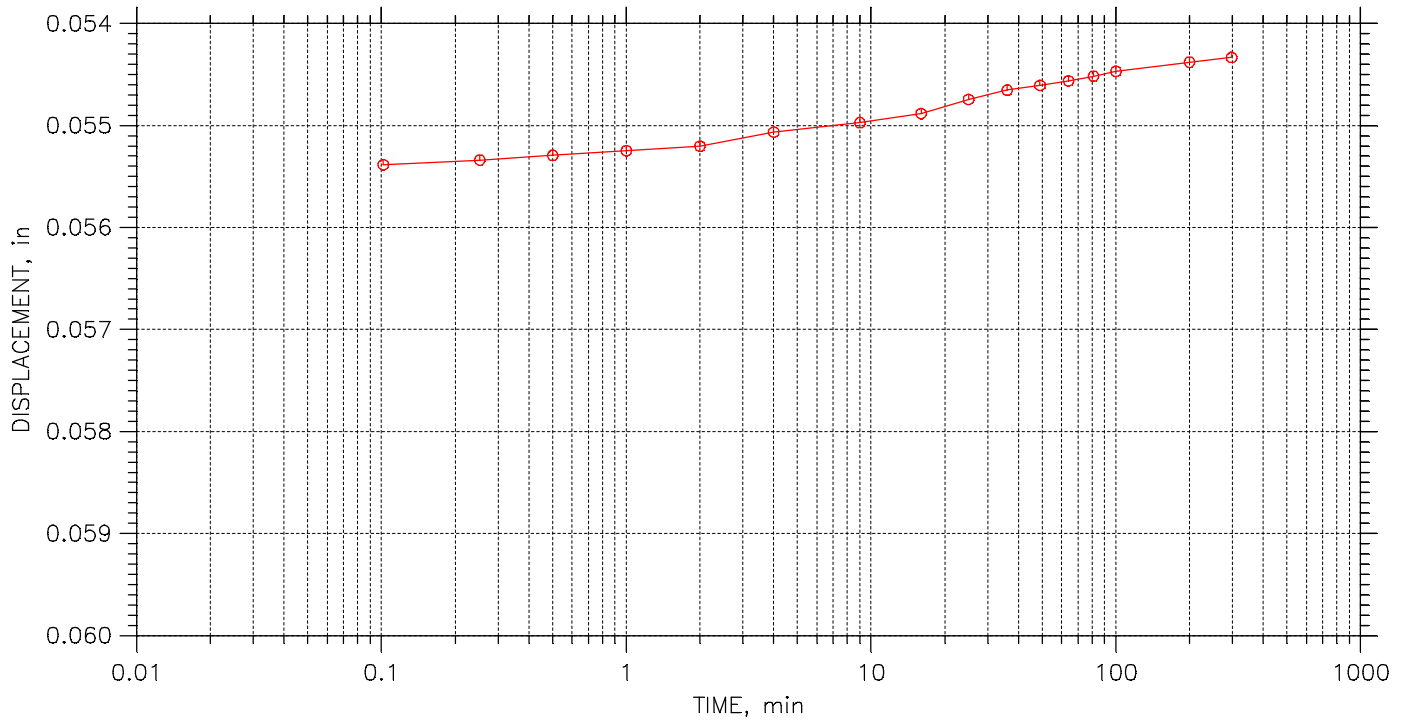
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	Boring No.: B-1 S-5	Tested By: BCM	Checked By: WPQ
	Sample No.: S-5	Test Date: 8/13/19	Depth: 8.5'-10.5'
	Test No.: B1S5CON	Sample Type: 3.0" ST	Elevation: -----
	Description: BROWN AND GRAY MOTTLED SANDY SILTY CLAY CL-ML		
	Remarks: $P_c = 3.9$ tsf $C_c = 0.116$ $C_{cr} = 0.029$ TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 22 of 23

Stress: 0.5 tsf



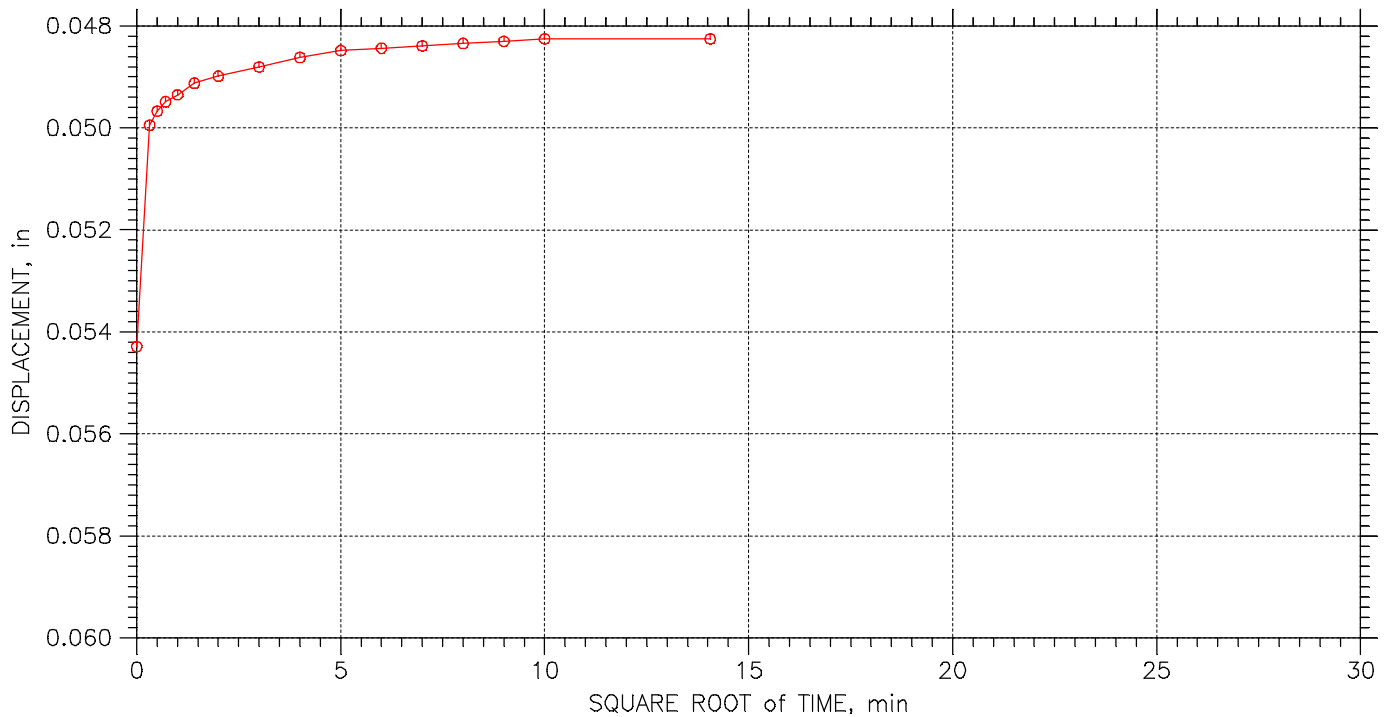
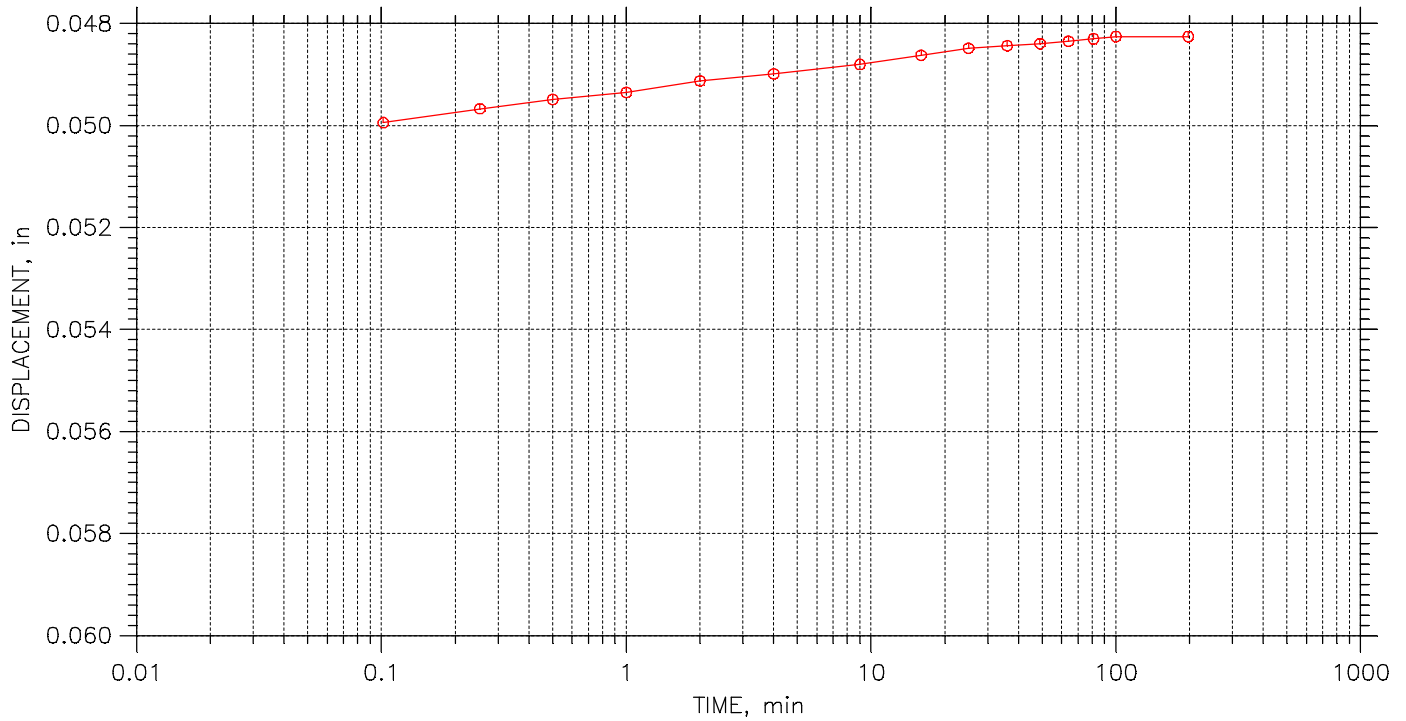
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	Boring No.: B-1 S-5	Tested By: BCM	Checked By: WPQ
	Sample No.: S-5	Test Date: 8/13/19	Depth: 8.5'-10.5'
	Test No.: B1S5CON	Sample Type: 3.0" ST	Elevation: -----
	Description: BROWN AND GRAY MOTTLED SANDY SILTY CLAY CL-ML		
	Remarks: $P_c = 3.9$ tsf $C_c = 0.116$ $C_{cr} = 0.029$ TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 23 of 23

Stress: 0.125 tsf



	Project: UPRR GRADE SEPARATION	Location: LITTLE ROCK, AR	Project No.: 35185112
	Boring No.: B-1 S-5	Tested By: BCM	Checked By: WPQ
	Sample No.: S-5	Test Date: 8/13/19	Depth: 8.5'-10.5'
	Test No.: B1S5CON	Sample Type: 3.0" ST	Elevation: -----
	Description: BROWN AND GRAY MOTTLED SANDY SILTY CLAY CL-ML		
	Remarks: $P_c = 3.9$ tsf $C_c = 0.116$ $C_{cr} = 0.029$ TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

Project: UPRR GRADE SEPARATION
 Boring No.: B-1 S-5
 Sample No.: S-5
 Test No.: B1S5CON

Location: LITTLE ROCK, AR
 Tested By: BCM
 Test Date: 8/13/19
 Sample Type: 3.0" ST

Project No.: 35185112
 Checked By: WPQ
 Depth: 8.5'-10.5'
 Elevation: -----



Soil Description: BROWN AND GRAY MOTTLED SANDY SILTY CLAY CL-ML
 Remarks: Pc = 3.9 tsf Cc = 0.116 Ccr = 0.029 TEST PERFORMED AS PER ASTM D2435

Estimated Specific Gravity: 2.72
 Initial Void Ratio: 0.64
 Final Void Ratio: 0.53

Liquid Limit: 22
 Plastic Limit: 17
 Plasticity Index: 5

Initial Height: 0.75 in
 Specimen Diameter: 2.50 in

	Before Consolidation		After Consolidation	
	Trimmings	Specimen+Ring	Specimen+Ring	Trimmings
Container ID	C-103	RING	RING	X-1
Wt. Container + Wet Soil, gm	122.52	196.24	196.5	167.14
Wt. Container + Dry Soil, gm	106.8	176.9	176.9	147.07
Wt. Container, gm	24.48	76.77	76.77	44.51
Wt. Dry Soil, gm	82.32	100.13	100.13	102.56
Water Content, %	19.10	19.31	19.57	19.57
Void Ratio	---	0.64	0.53	---
Degree of Saturation, %	---	82.18	99.76	---
Dry Unit Weight, pcf	---	103.6	110.73	---

CONSOLIDATION TEST DATA

Project: UPRR GRADE SEPARATION
Boring No.: B-1 S-5
Sample No.: S-5
Test No.: B1S5CON

Location: LITTLE ROCK, AR
Tested By: BCM
Test Date: 8/13/19
Sample Type: 3.0" ST

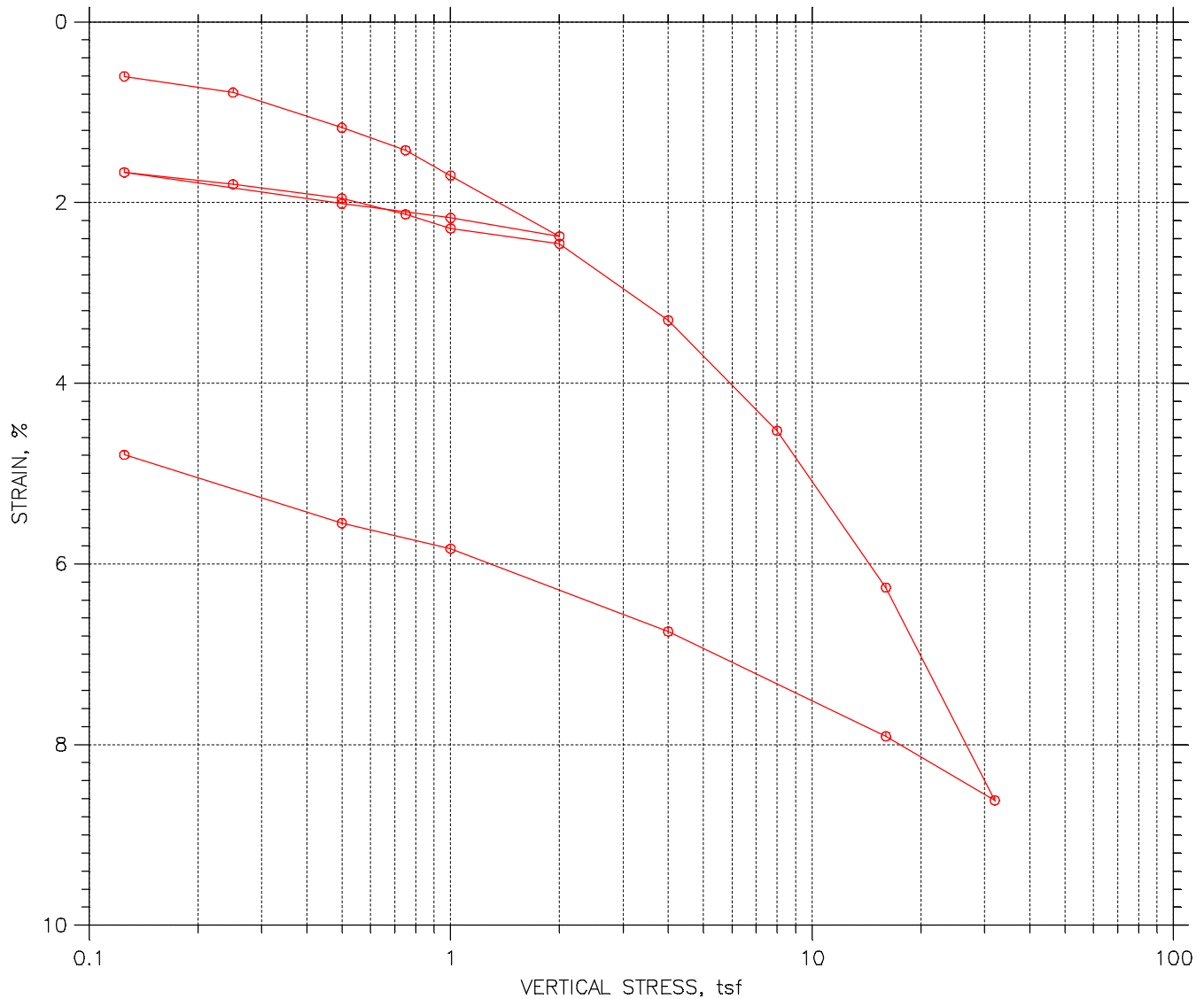
Project No.: 35185112
Checked By: WPQ
Depth: 8.5'-10.5'
Elevation: -----



Soil Description: BROWN AND GRAY MOTTLED SANDY SILTY CLAY CL-ML
Remarks: $P_c = 3.9$ tsf $C_c = 0.116$ $C_{cr} = 0.029$ TEST PERFORMED AS PER ASTM D2435

	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	T50 Fitting		Coefficient of Consolidation		
					Sq.Rt. min	Log min	Sq.Rt. ft ² /sec	Log ft ² /sec	Ave. ft ² /sec
1	0.125	0.00393	0.631	0.52	0.4	0.0	7.38e-006	0.00e+000	7.38e-006
2	0.25	0.007997	0.622	1.07	0.2	0.0	1.30e-005	0.00e+000	1.30e-005
3	0.5	0.01334	0.610	1.78	2.0	0.0	1.53e-006	0.00e+000	1.53e-006
4	0.75	0.01746	0.601	2.33	0.0	0.0	1.29e-004	0.00e+000	1.29e-004
5	1	0.02129	0.593	2.84	0.1	0.0	3.07e-005	0.00e+000	3.07e-005
6	2	0.03062	0.572	4.09	0.0	0.0	1.26e-004	0.00e+000	1.26e-004
7	1	0.02637	0.581	3.52	0.0	0.0	1.25e-004	0.00e+000	1.25e-004
8	0.5	0.0223	0.590	2.98	0.0	0.0	1.26e-004	0.00e+000	1.26e-004
9	0.125	0.01426	0.608	1.90	0.0	0.0	1.28e-004	0.00e+000	1.28e-004
10	0.25	0.01668	0.603	2.23	0.1	0.0	2.63e-005	0.00e+000	2.63e-005
11	0.5	0.02079	0.594	2.78	0.2	0.0	1.85e-005	0.00e+000	1.85e-005
12	0.75	0.02363	0.587	3.15	0.4	0.0	7.21e-006	0.00e+000	7.21e-006
13	1	0.02618	0.582	3.49	0.2	0.0	1.30e-005	0.00e+000	1.30e-005
14	2	0.03167	0.570	4.23	0.0	0.0	1.25e-004	0.00e+000	1.25e-004
15	4	0.03934	0.553	5.25	0.0	0.0	1.22e-004	0.00e+000	1.22e-004
16	8	0.04775	0.535	6.37	0.1	0.0	2.87e-005	0.00e+000	2.87e-005
17	16	0.05799	0.512	7.74	0.0	0.0	1.17e-004	0.00e+000	1.17e-004
18	32	0.07421	0.477	9.91	0.0	0.0	1.12e-004	0.00e+000	1.12e-004
19	16	0.0696	0.487	9.29	0.0	0.0	8.34e-005	0.00e+000	8.34e-005
20	4	0.06375	0.500	8.51	0.0	0.0	1.12e-004	0.00e+000	1.12e-004
21	1	0.05767	0.513	7.70	0.1	0.0	2.32e-005	0.00e+000	2.32e-005
22	0.5	0.05433	0.520	7.25	0.4	0.0	6.55e-006	0.00e+000	6.55e-006
23	0.125	0.04826	0.534	6.44	0.1	0.0	2.38e-005	0.00e+000	2.38e-005

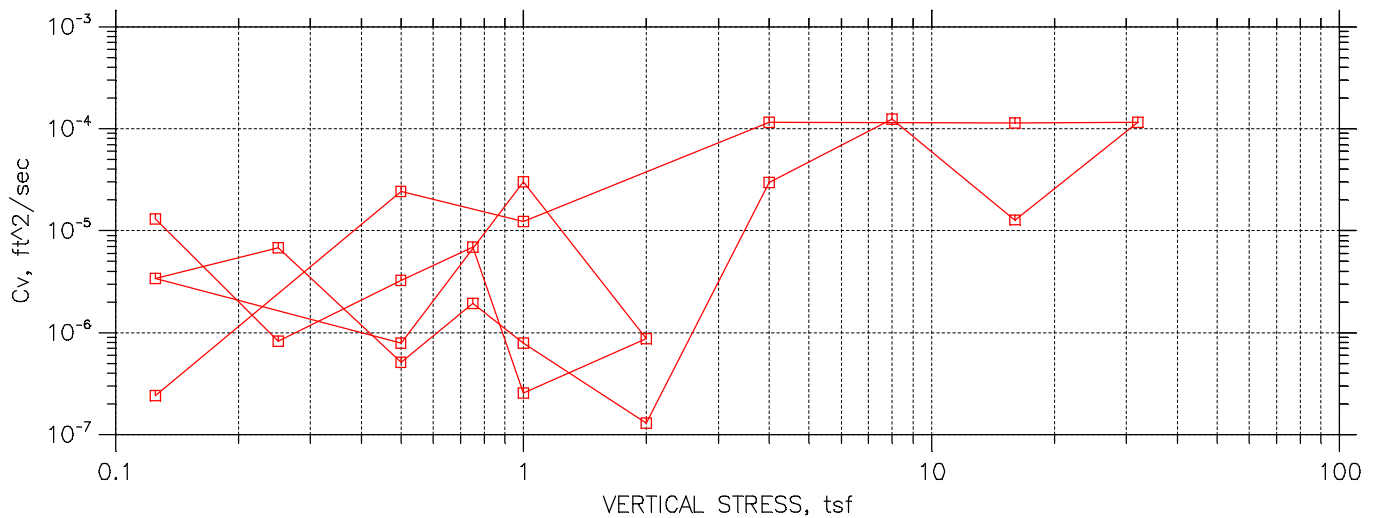
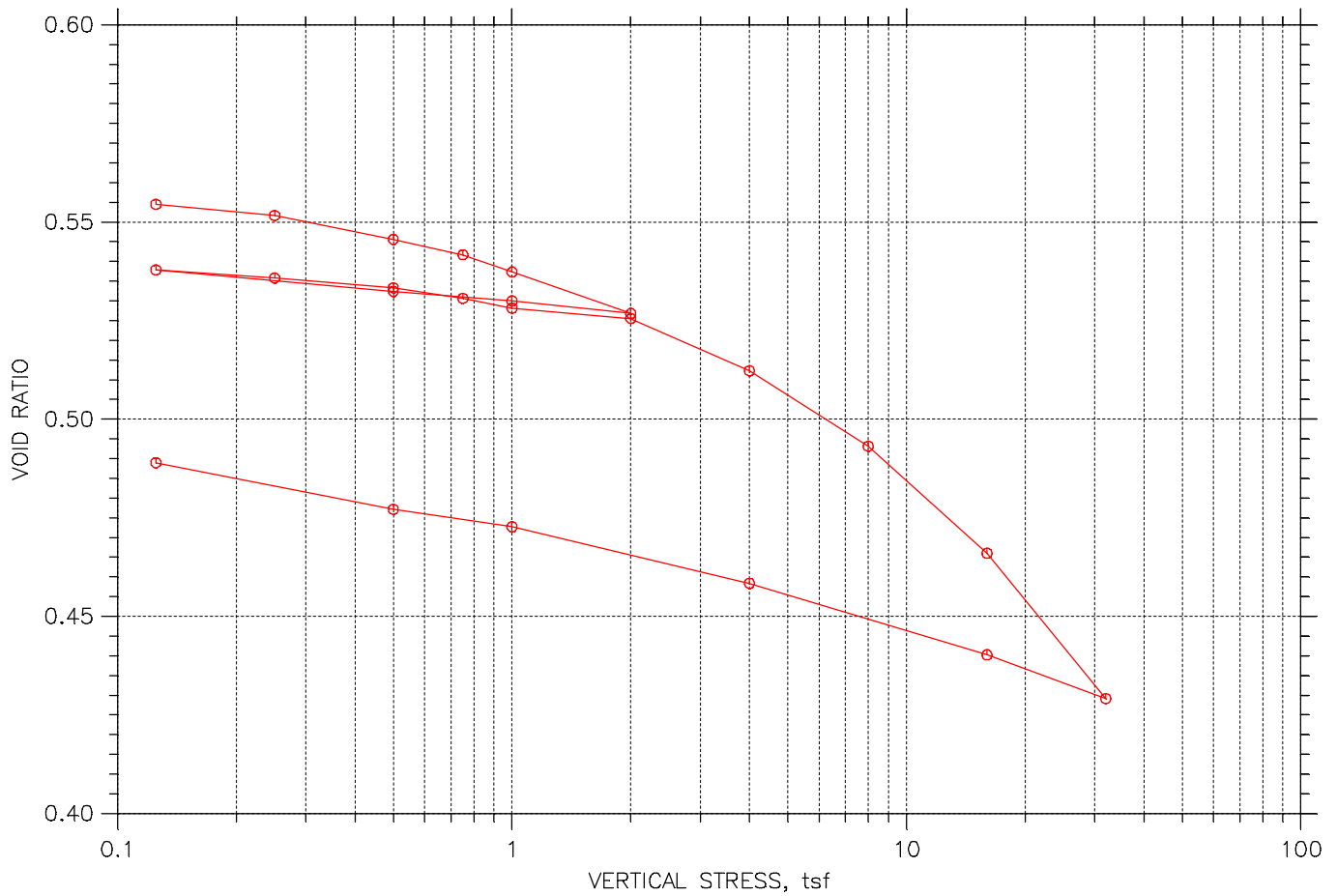
ONE DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS USING INCREMENTAL LOADING ASTM D2435



				Before Test	After Test	
				Water Content, %	19.53	18.01
Preconsolidation Pressure: 4.4 tsf				Dry Unit Weight, pcf	108.6	114.
Compression Index: 0.123				Saturation, %	94.18	100.19
Diameter: 2.501 in		Height: 0.7484 in		Void Ratio	0.56	0.49
LL: 20	PL: 18	PI: 2	GS: 2.72			

	Project: UPRR GRADE SEPARATION	Location: LITTLE ROCK, AR	Project No.: 35185112
	Boring No.: B-1 S-7	Tested By: BCM	Checked By: WPQ
	Sample No.: S-7	Test Date: 8/13/19	Depth: 18.5'-20.5'
	Test No.: B1S7CON	Sample Type: 3.0" ST	Elevation: ----
	Description: BROWN AND GRAY SANDY SILT		
	Remarks: Pc = 4.4 tsf Cc = 0.123 Ccr = 0.010 TEST PERFORMED AS PER ASTM D2435		

ONE DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS USING INCREMENTAL LOADING ASTM D2435



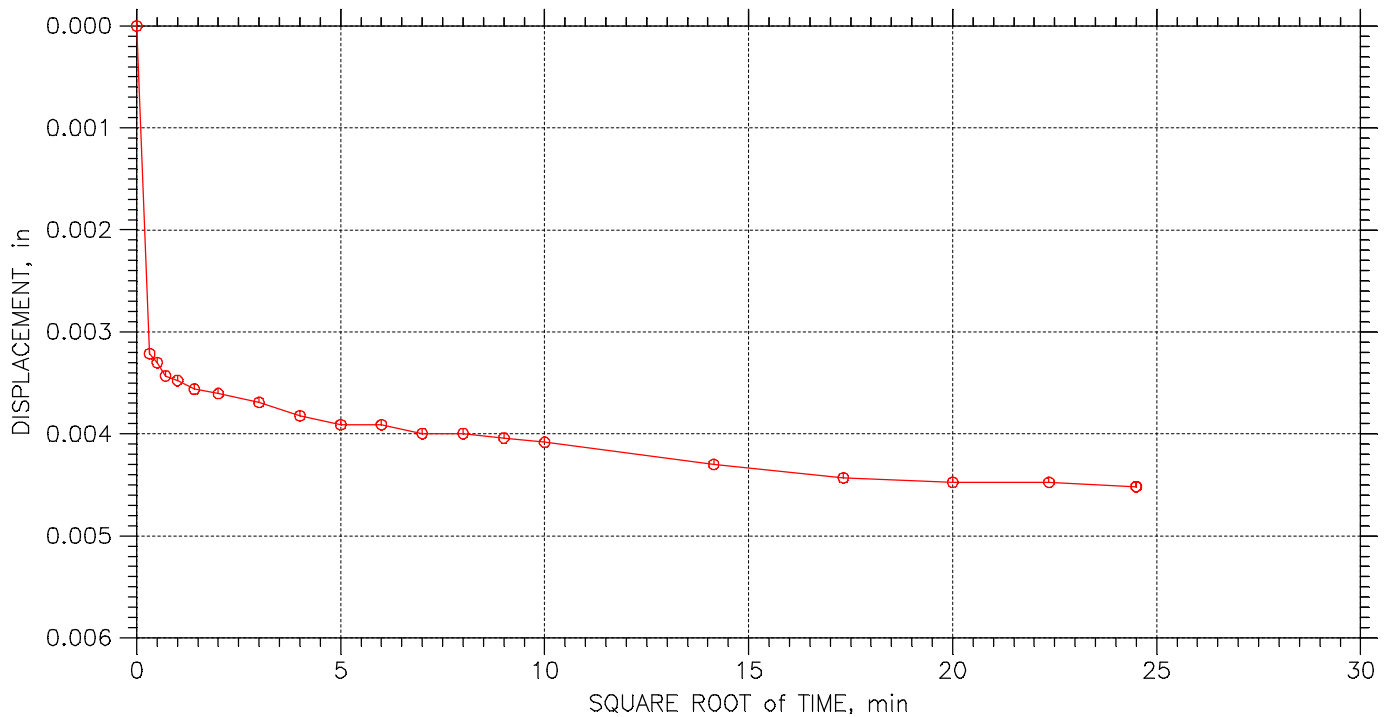
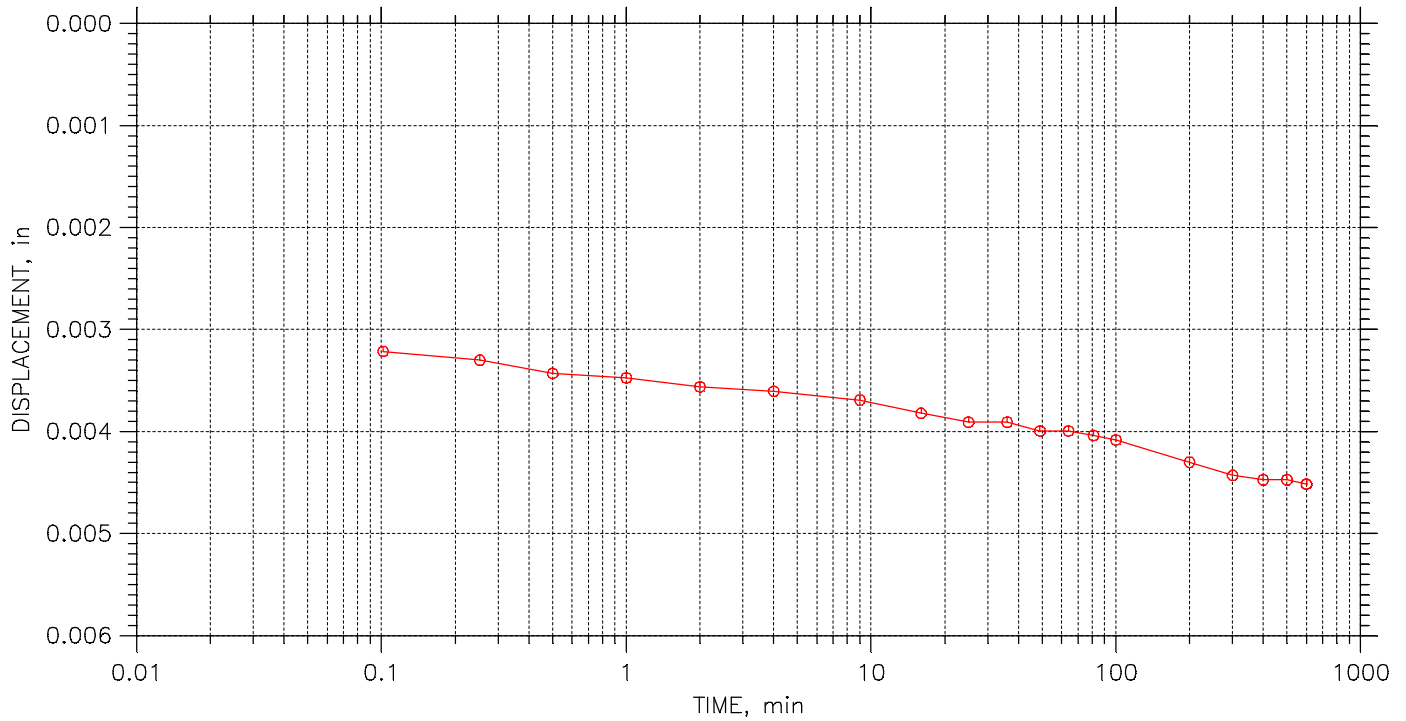
	Project: UPRR GRADE SEPARATION	Location: LITTLE ROCK, AR	Project No.: 35185112
	Boring No.: B-1 S-7	Tested By: BCM	Checked By: WPQ
	Sample No.: S-7	Test Date: 8/13/19	Depth: 18.5'-20.5'
	Test No.: B1S7CON	Sample Type: 3.0" ST	Elevation: ----
	Description: BROWN AND GRAY SANDY SILT		
	Remarks: $P_c = 4.4$ tsf $C_c = 0.123$ $C_{cr} = 0.010$ TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 1 of 23

Stress: 0.125 tsf



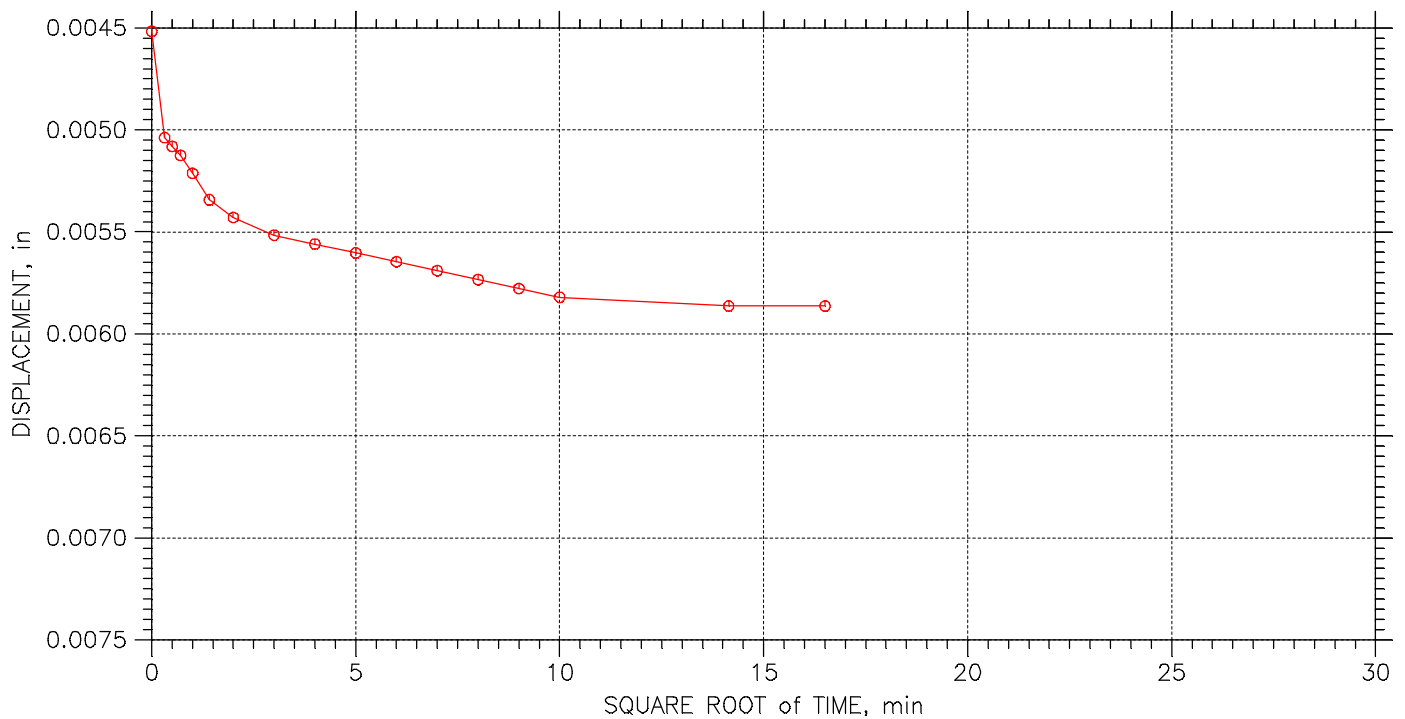
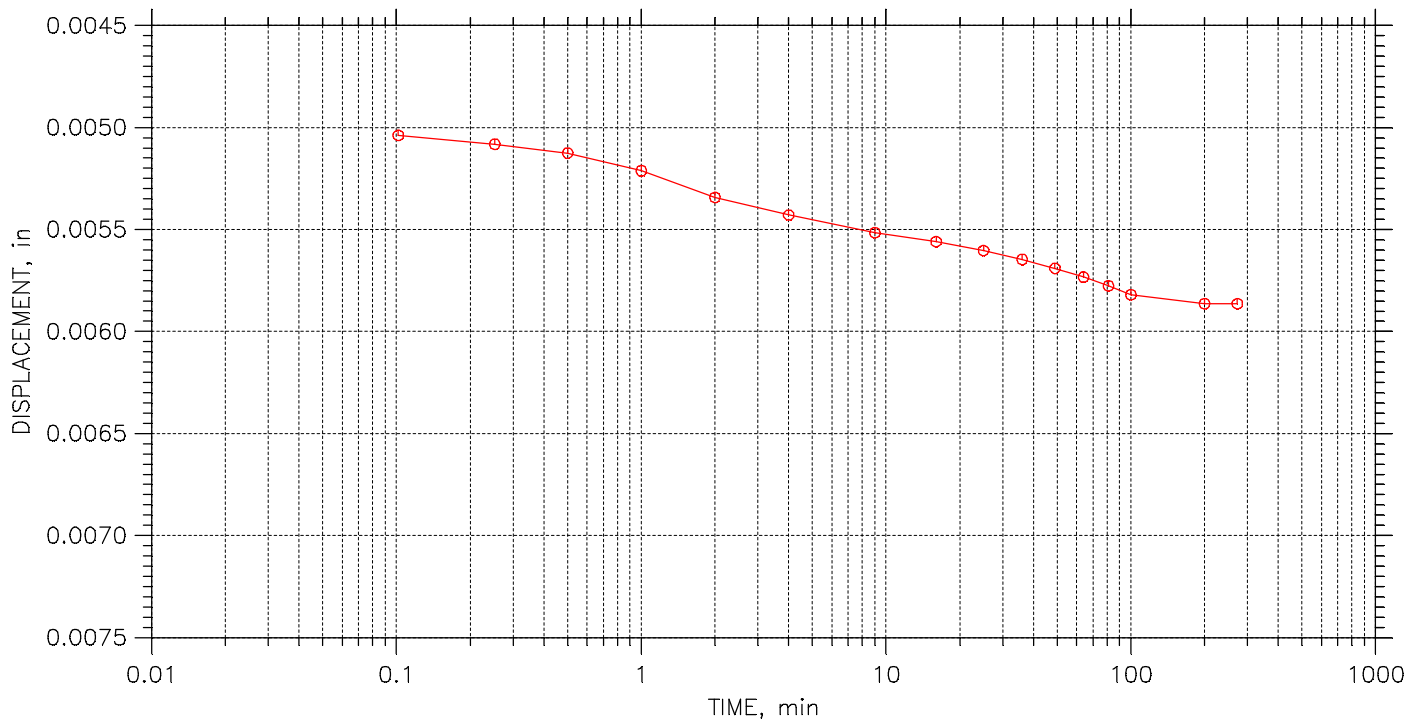
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	Boring No.: B-1 S-7	Tested By: BCM	Checked By: WPQ
	Sample No.: S-7	Test Date: 8/13/19	Depth: 18.5'-20.5'
	Test No.: B1S7CON	Sample Type: 3.0" ST	Elevation: ----
	Description: BROWN AND GRAY SANDY SILT		
	Remarks: Pc = 4.4 tsf Cc = 0.123 Ccr = 0.010 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 2 of 23

Stress: 0.25 tsf



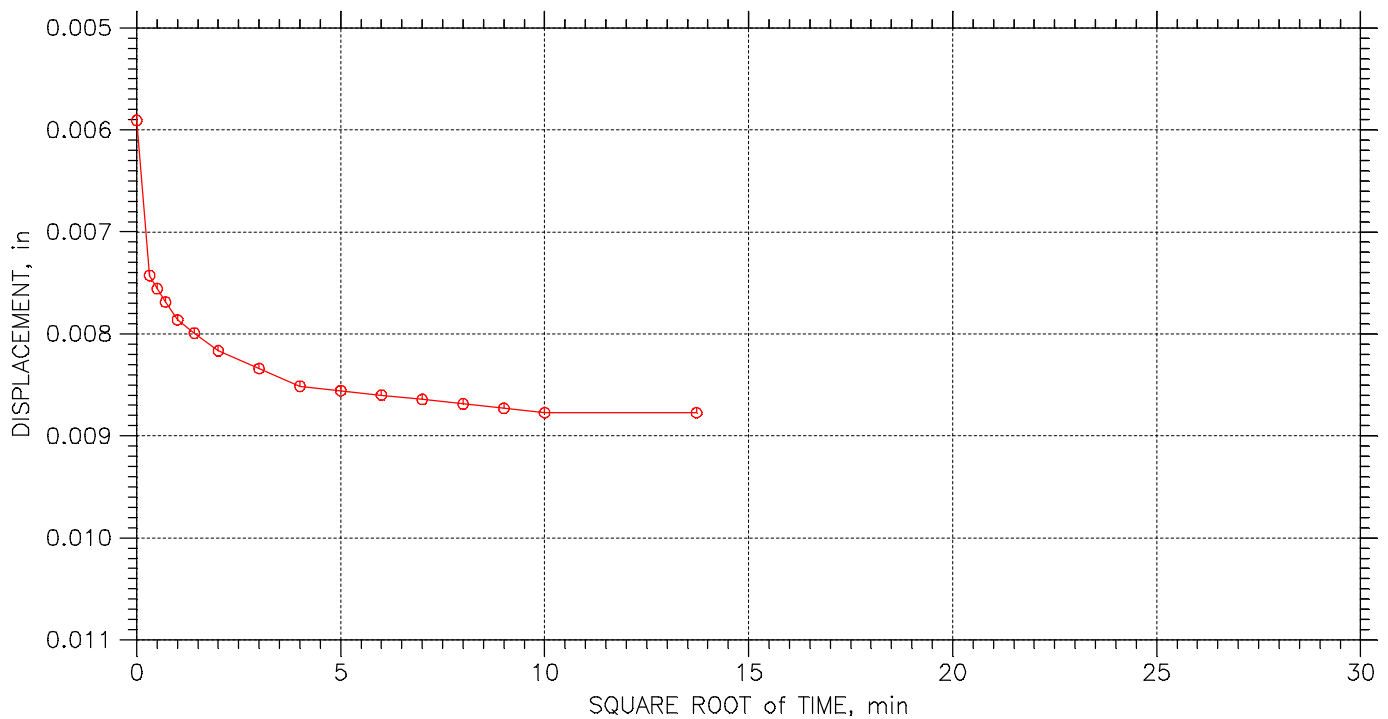
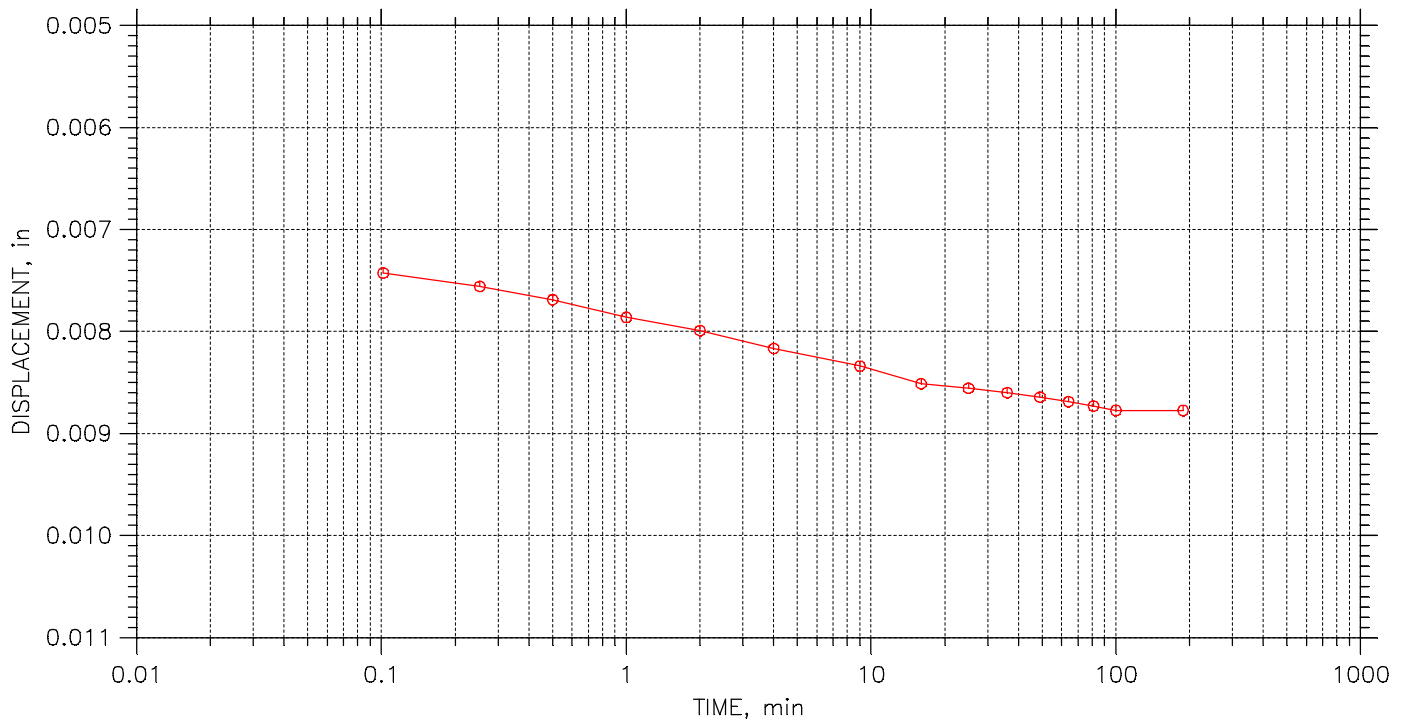
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	Boring No.: B-1 S-7	Tested By: BCM	Checked By: WPQ
	Sample No.: S-7	Test Date: 8/13/19	Depth: 18.5'-20.5'
	Test No.: B1S7CON	Sample Type: 3.0" ST	Elevation: ----
	Description: BROWN AND GRAY SANDY SILT		
	Remarks: Pc = 4.4 tsf Cc = 0.123 Ccr = 0.010 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 3 of 23

Stress: 0.5 tsf



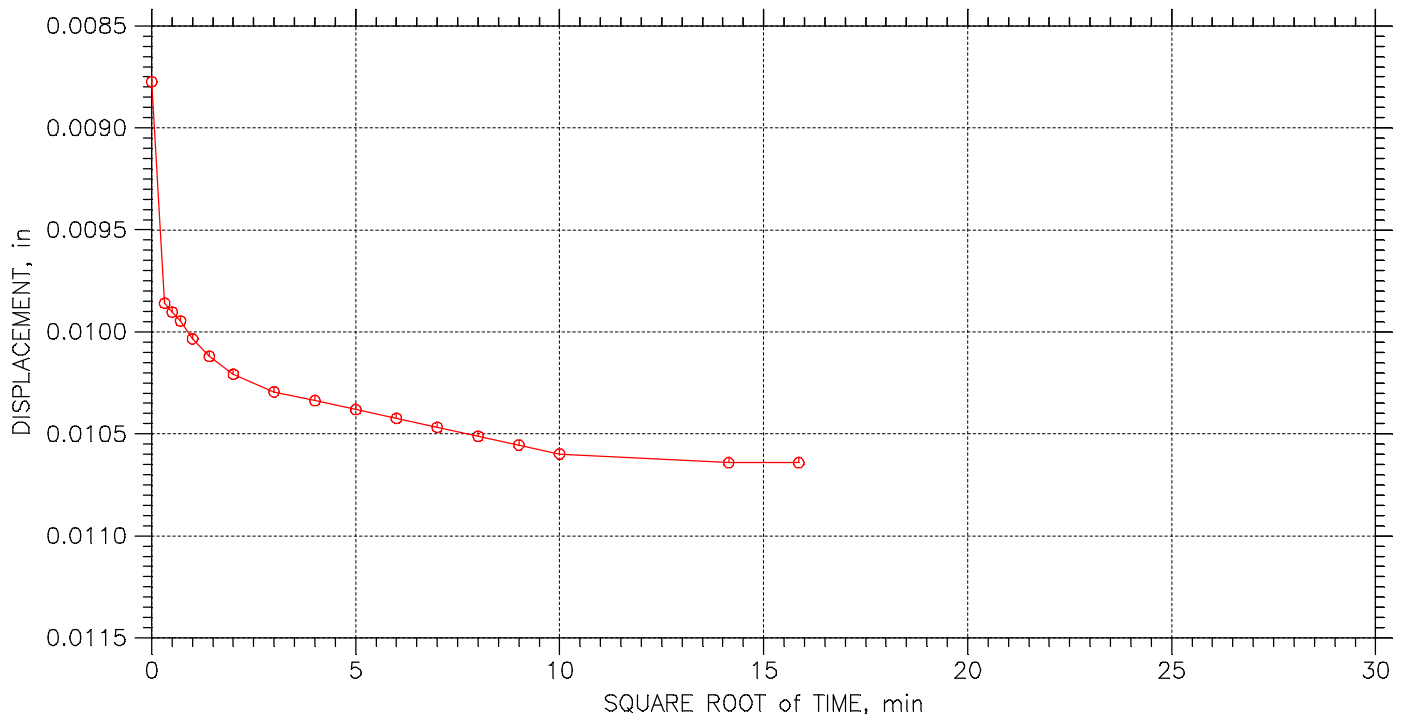
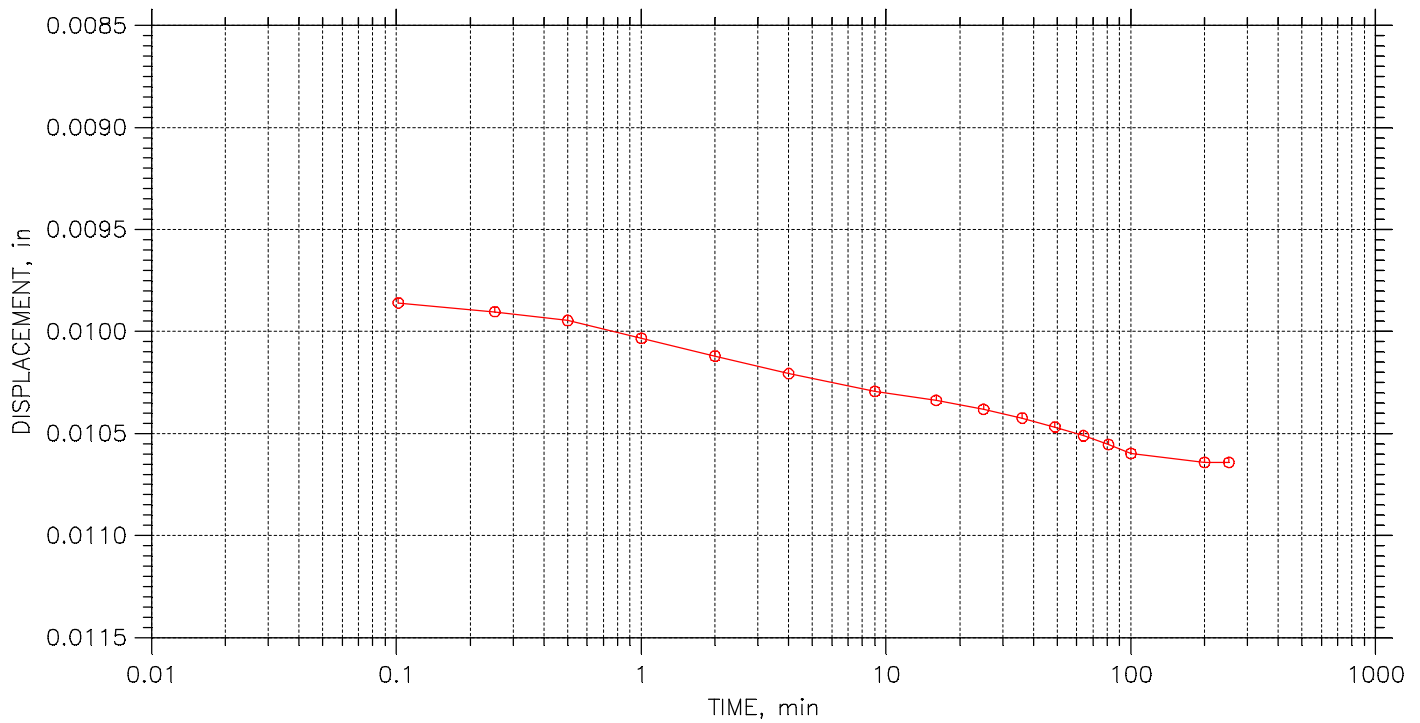
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	Boring No.: B-1 S-7	Tested By: BCM	Checked By: WPQ
	Sample No.: S-7	Test Date: 8/13/19	Depth: 18.5'-20.5'
	Test No.: B1S7CON	Sample Type: 3.0" ST	Elevation: ----
	Description: BROWN AND GRAY SANDY SILT		
	Remarks: Pc = 4.4 tsf Cc = 0.123 Ccr = 0.010 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 4 of 23

Stress: 0.75 tsf



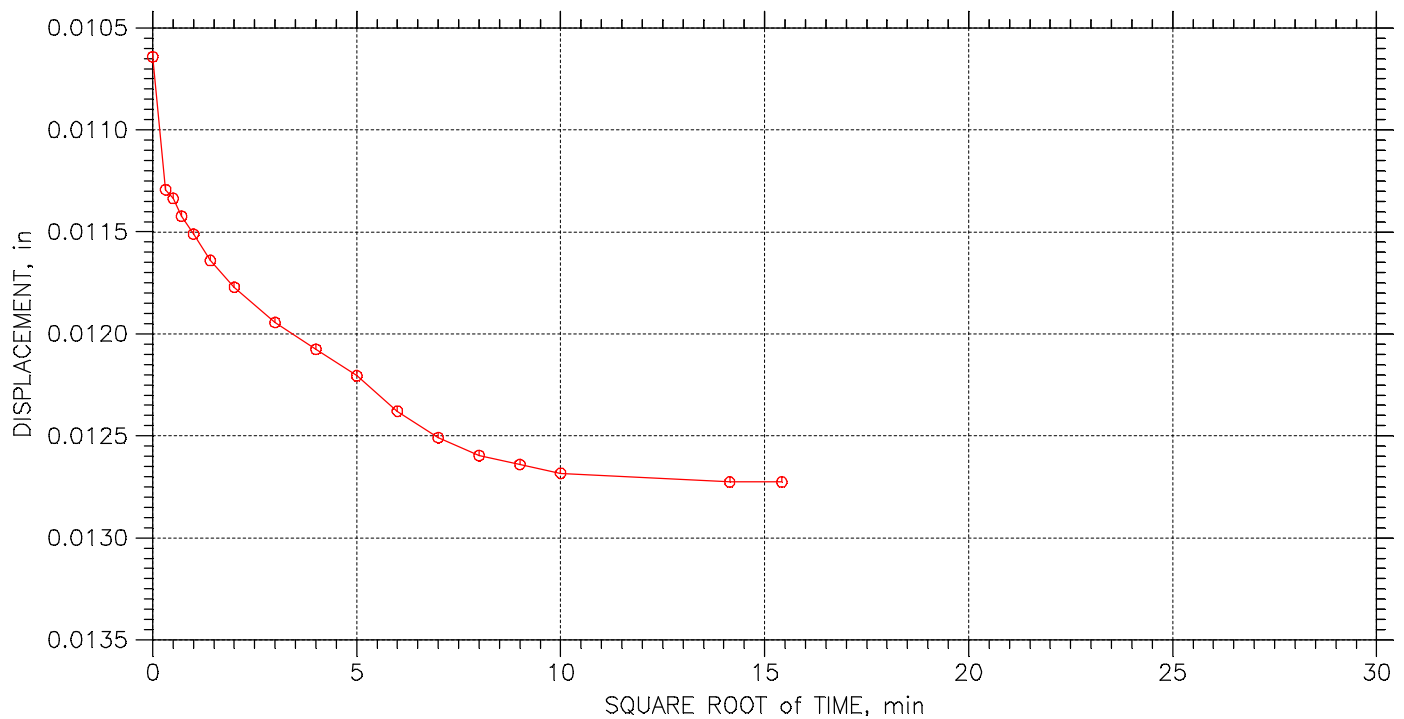
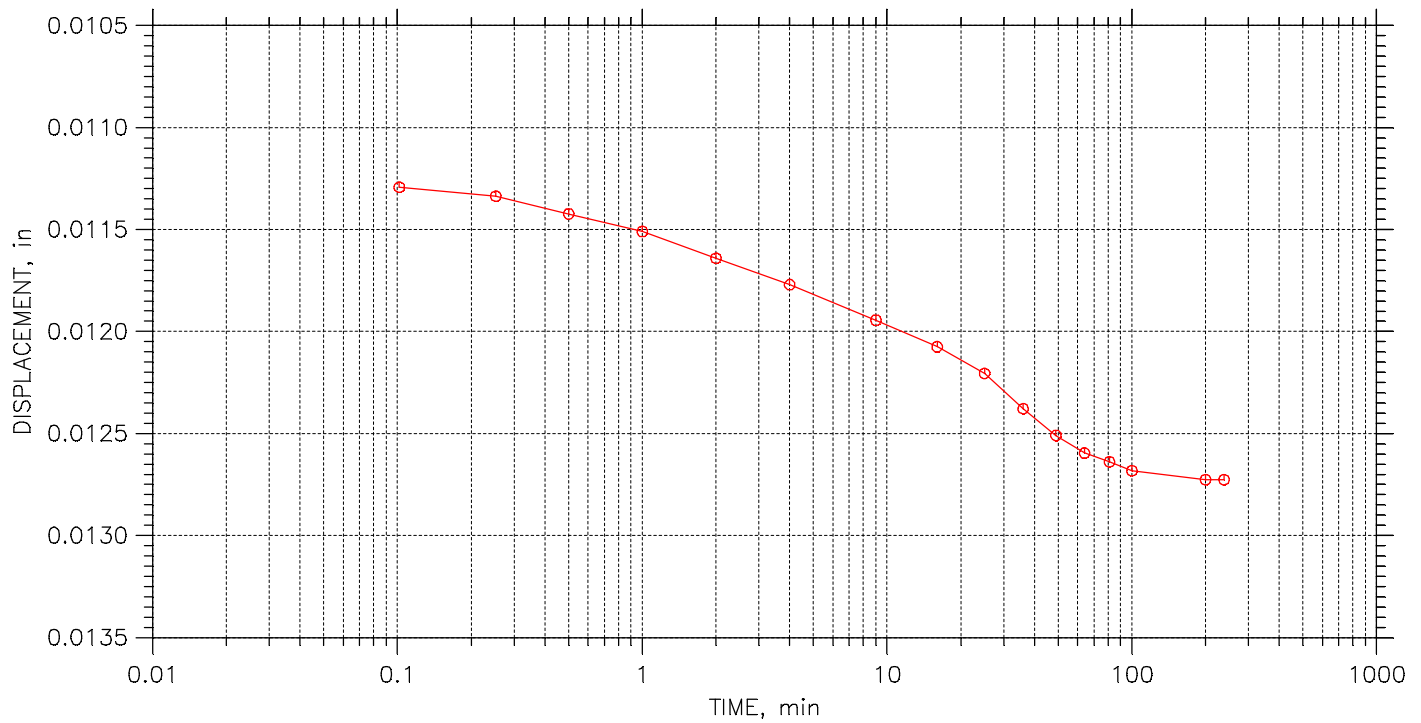
	Project: UPRR GRADE SEPARATION	Location: LITTLE ROCK, AR	Project No.: 35185112
	Boring No.: B-1 S-7	Tested By: BCM	Checked By: WPQ
	Sample No.: S-7	Test Date: 8/13/19	Depth: 18.5'-20.5'
	Test No.: B1S7CON	Sample Type: 3.0" ST	Elevation: ----
	Description: BROWN AND GRAY SANDY SILT		
	Remarks: Pc = 4.4 tsf Cc = 0.123 Ccr = 0.010 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 5 of 23

Stress: 1. tsf



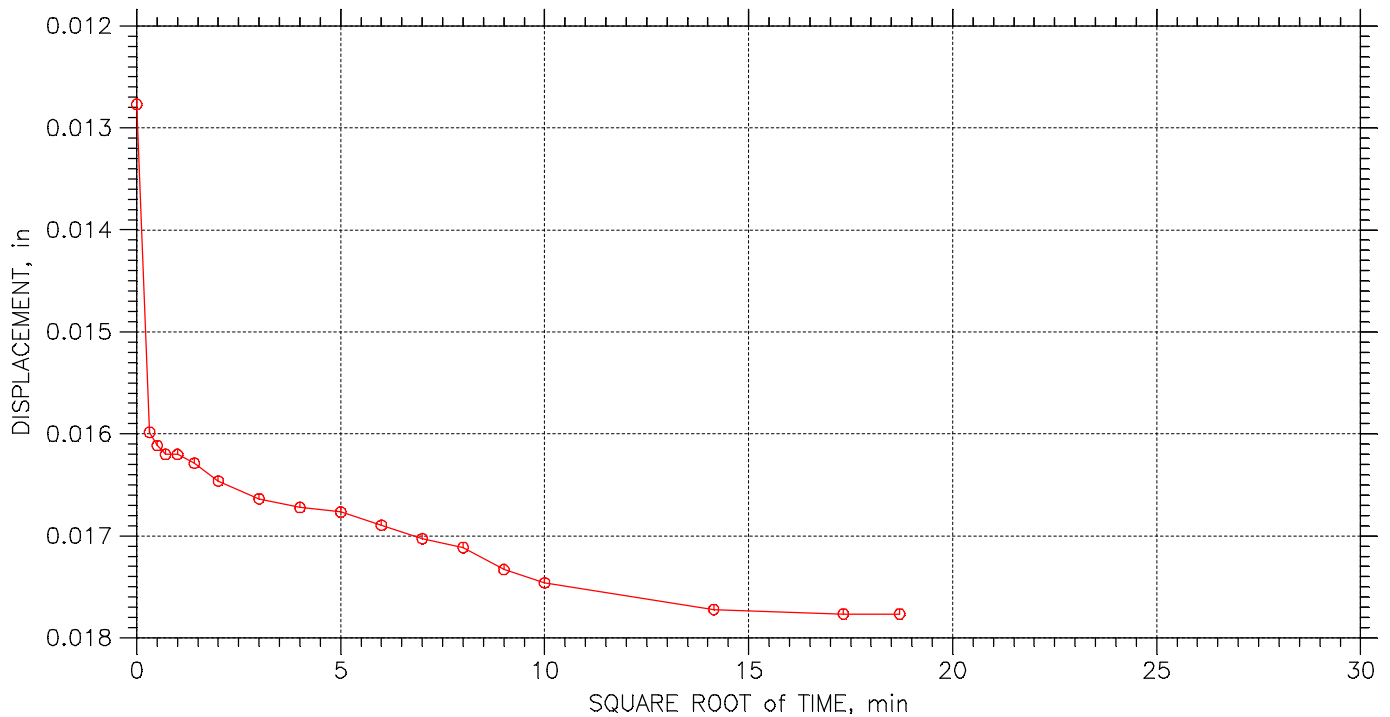
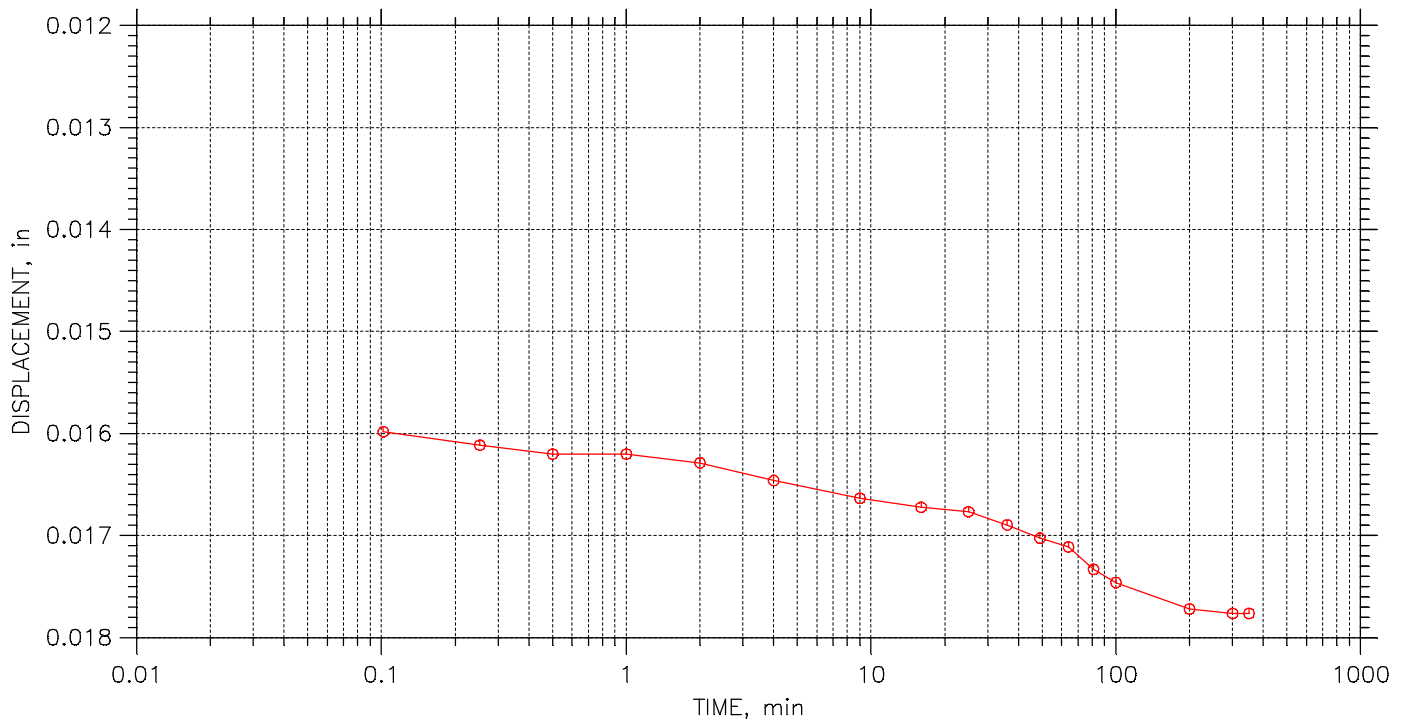
	Project: UPRR GRADE SEPARATION	Location: LITTLE ROCK, AR	Project No.: 35185112
	Boring No.: B-1 S-7	Tested By: BCM	Checked By: WPQ
	Sample No.: S-7	Test Date: 8/13/19	Depth: 18.5'-20.5'
	Test No.: B1S7CON	Sample Type: 3.0" ST	Elevation: ----
	Description: BROWN AND GRAY SANDY SILT		
	Remarks: Pc = 4.4 tsf Cc = 0.123 Ccr = 0.010 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 6 of 23

Stress: 2. tsf



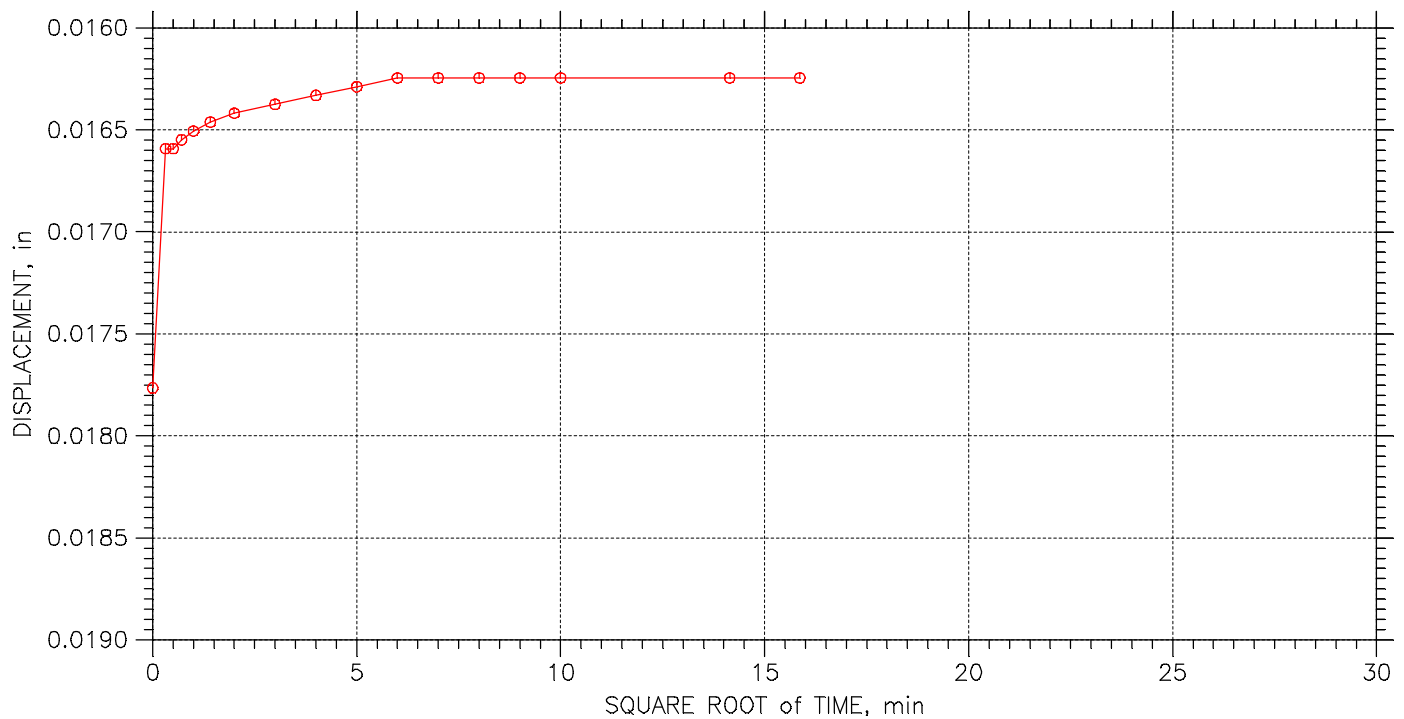
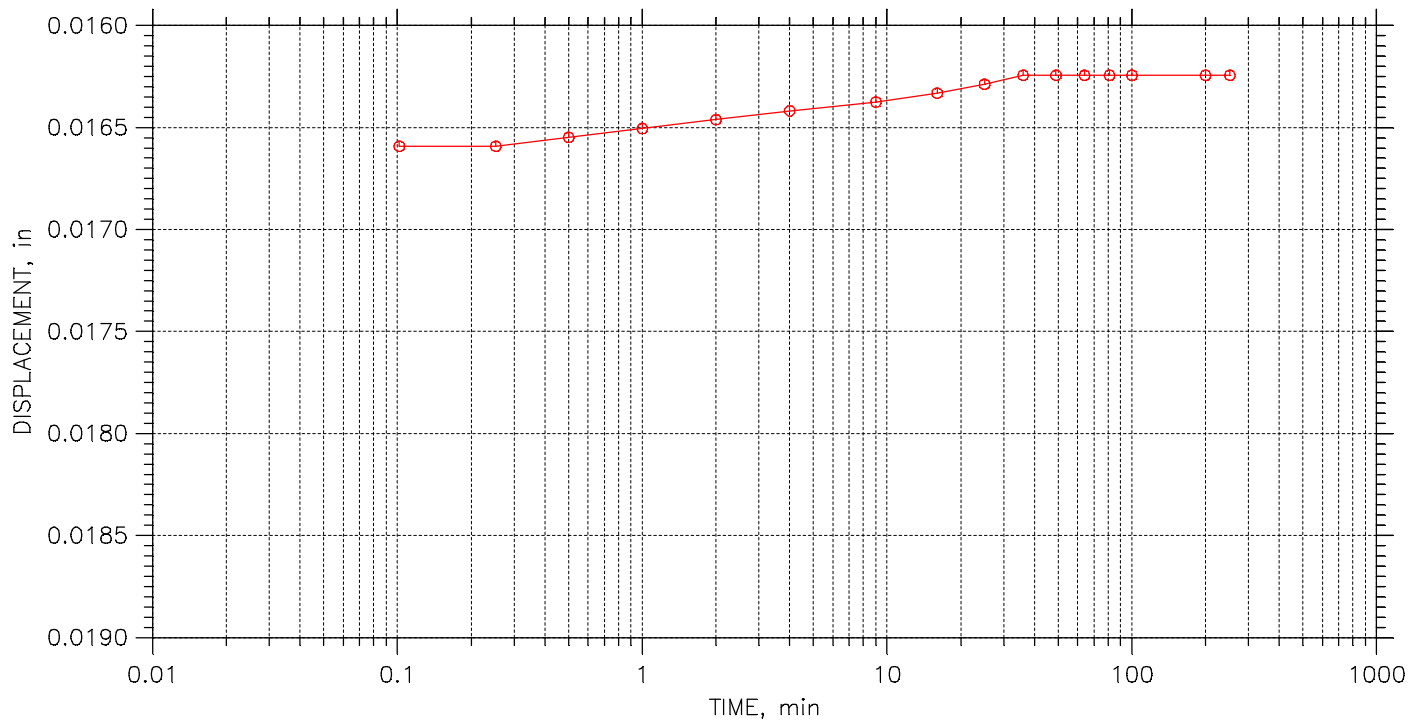
	Project: UPRR GRADE SEPARATION	Location: LITTLE ROCK, AR	Project No.: 35185112
	Boring No.: B-1 S-7	Tested By: BCM	Checked By: WPQ
	Sample No.: S-7	Test Date: 8/13/19	Depth: 18.5'-20.5'
	Test No.: B1S7CON	Sample Type: 3.0" ST	Elevation: ----
	Description: BROWN AND GRAY SANDY SILT		
	Remarks: Pc = 4.4 tsf Cc = 0.123 Ccr = 0.010 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 7 of 23

Stress: 1. tsf



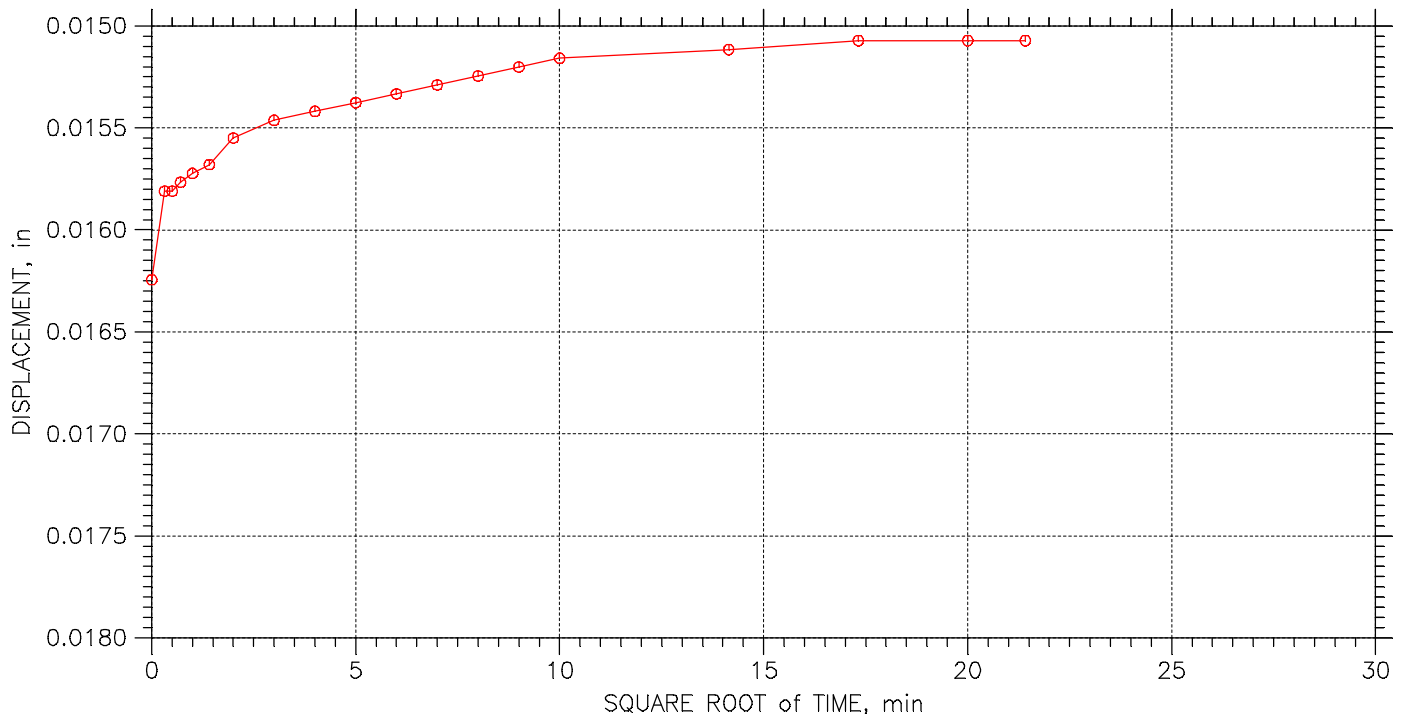
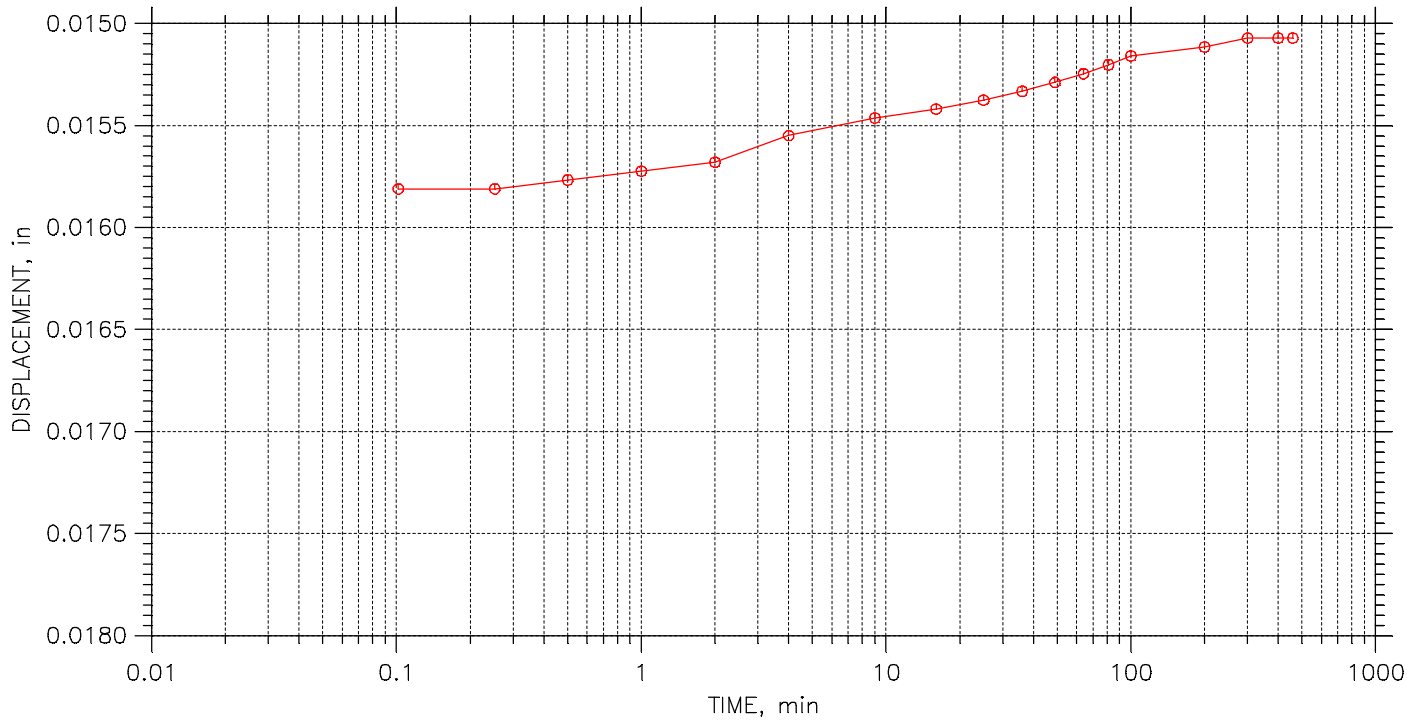
	Project: UPRR GRADE SEPARATION	Location: LITTLE ROCK, AR	Project No.: 35185112
	Boring No.: B-1 S-7	Tested By: BCM	Checked By: WPQ
	Sample No.: S-7	Test Date: 8/13/19	Depth: 18.5'-20.5'
	Test No.: B1S7CON	Sample Type: 3.0" ST	Elevation: ----
	Description: BROWN AND GRAY SANDY SILT		
	Remarks: Pc = 4.4 tsf Cc = 0.123 Ccr = 0.010 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 8 of 23

Stress: 0.5 tsf



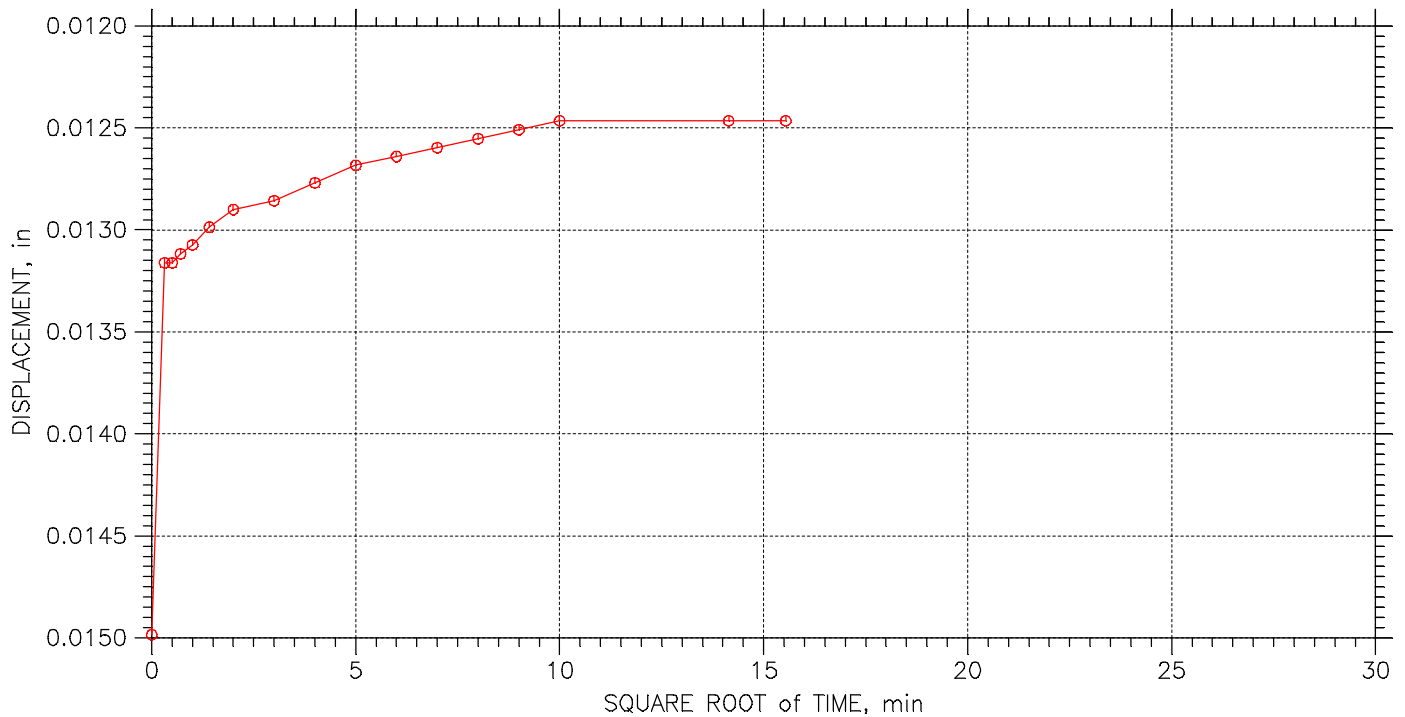
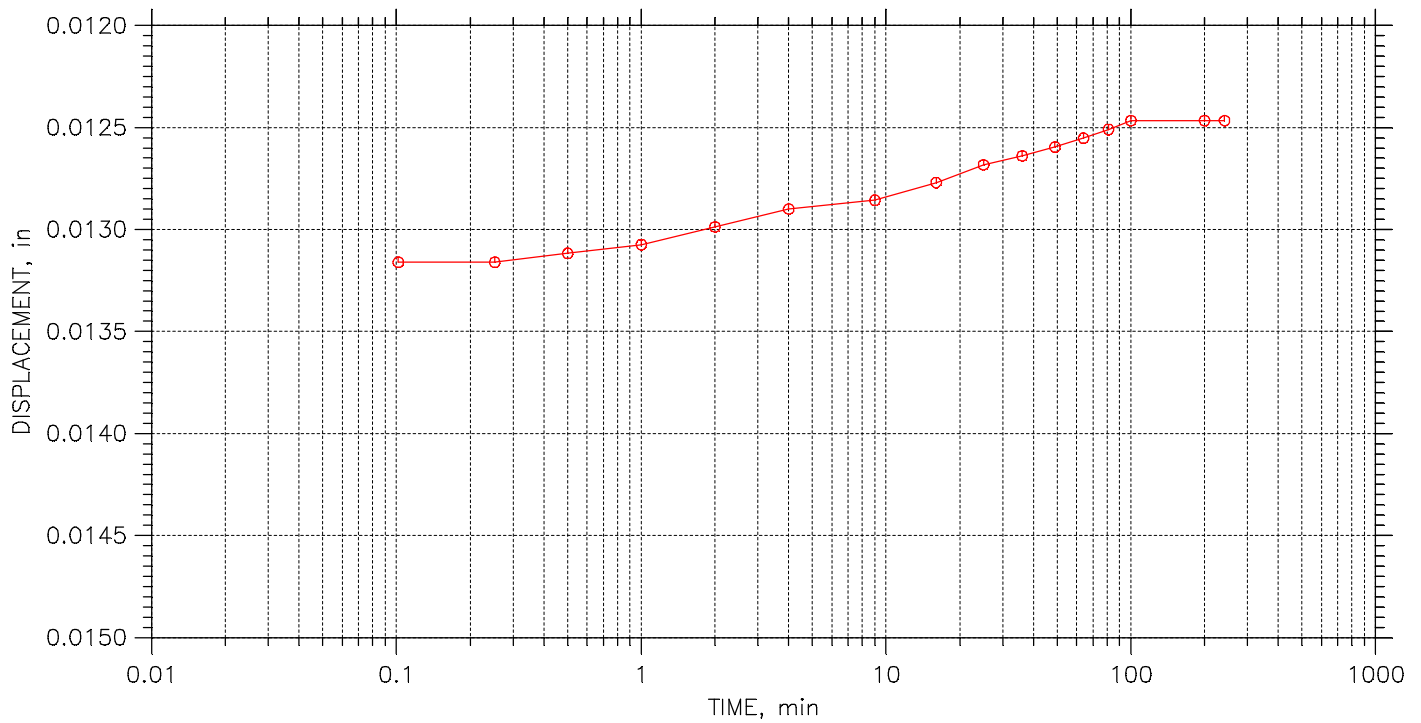
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	Boring No.: B-1 S-7	Tested By: BCM	Checked By: WPQ
	Sample No.: S-7	Test Date: 8/13/19	Depth: 18.5'-20.5'
	Test No.: B1S7CON	Sample Type: 3.0" ST	Elevation: ----
	Description: BROWN AND GRAY SANDY SILT		
	Remarks: Pc = 4.4 tsf Cc = 0.123 Ccr = 0.010 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 9 of 23

Stress: 0.125 tsf



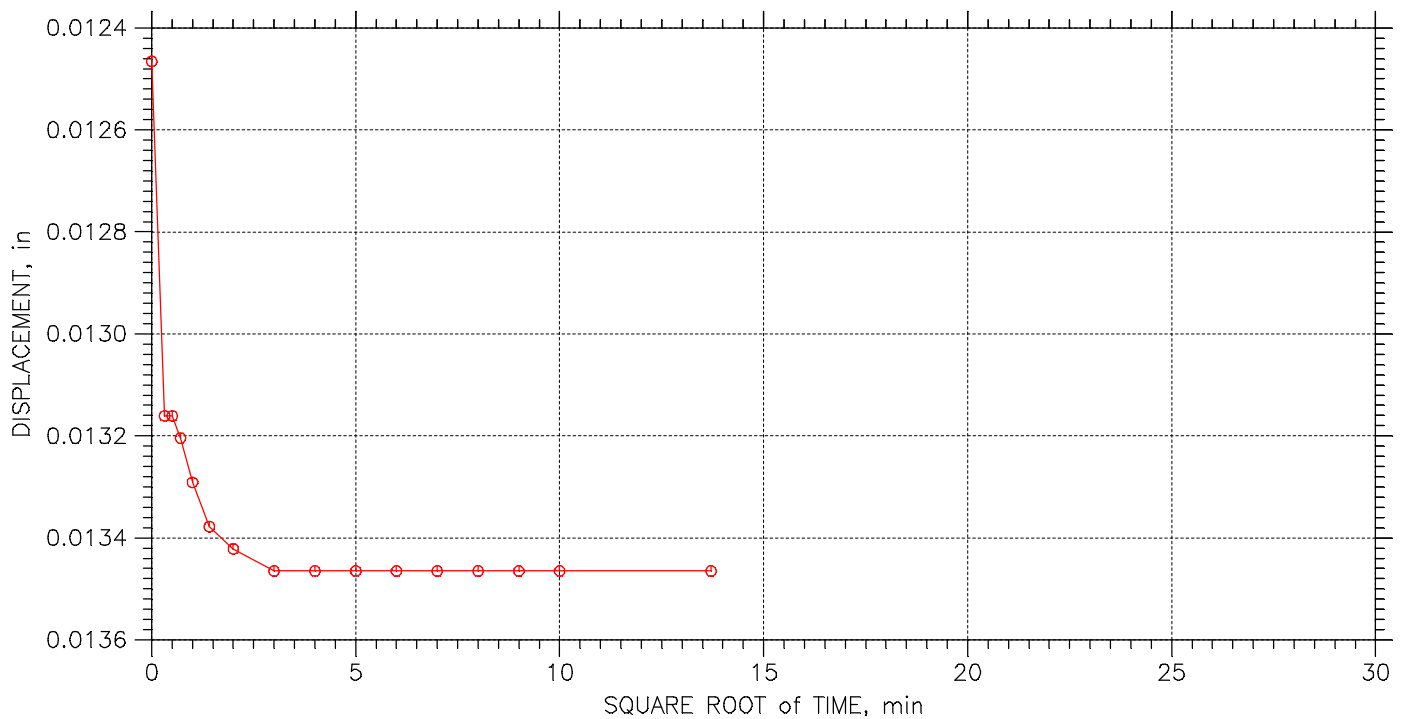
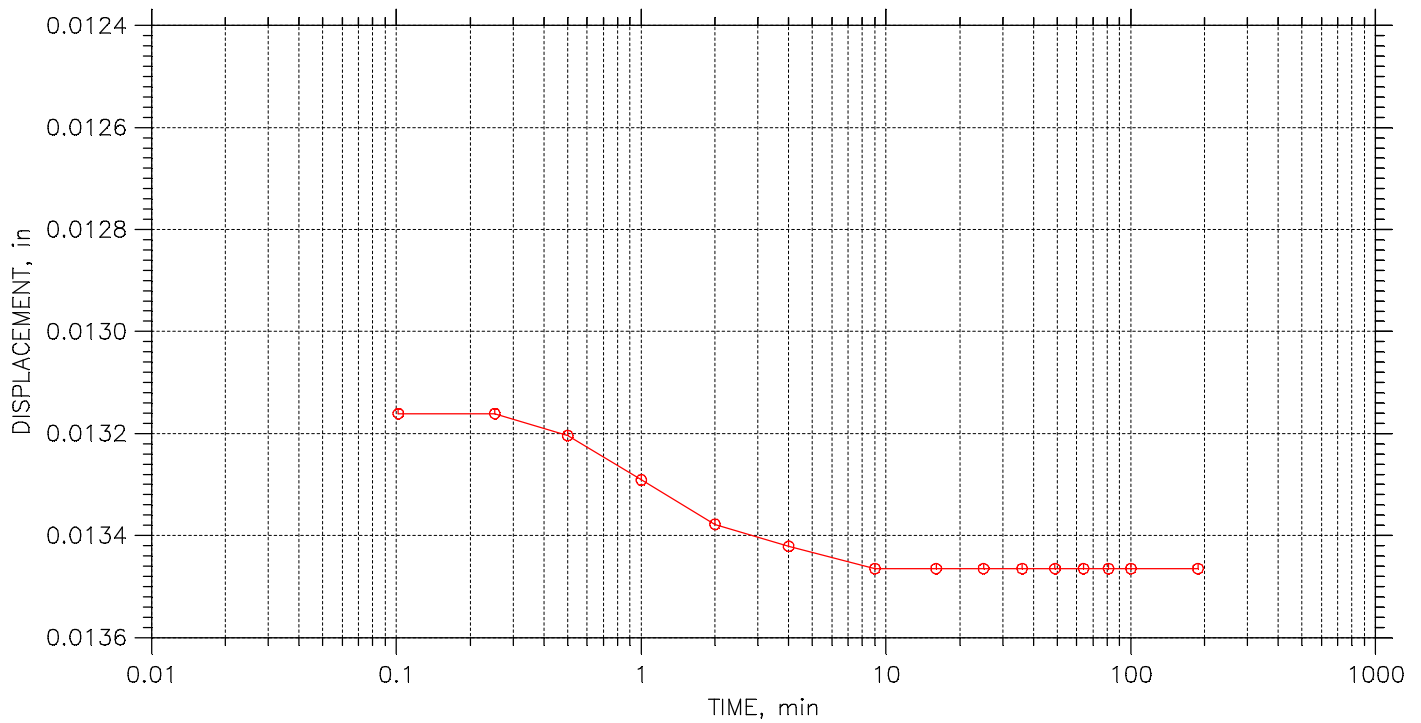
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	Boring No.: B-1 S-7	Tested By: BCM	Checked By: WPQ
	Sample No.: S-7	Test Date: 8/13/19	Depth: 18.5'-20.5'
	Test No.: B1S7CON	Sample Type: 3.0" ST	Elevation: ----
	Description: BROWN AND GRAY SANDY SILT		
	Remarks: Pc = 4.4 tsf Cc = 0.123 Ccr = 0.010 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 10 of 23

Stress: 0.25 tsf



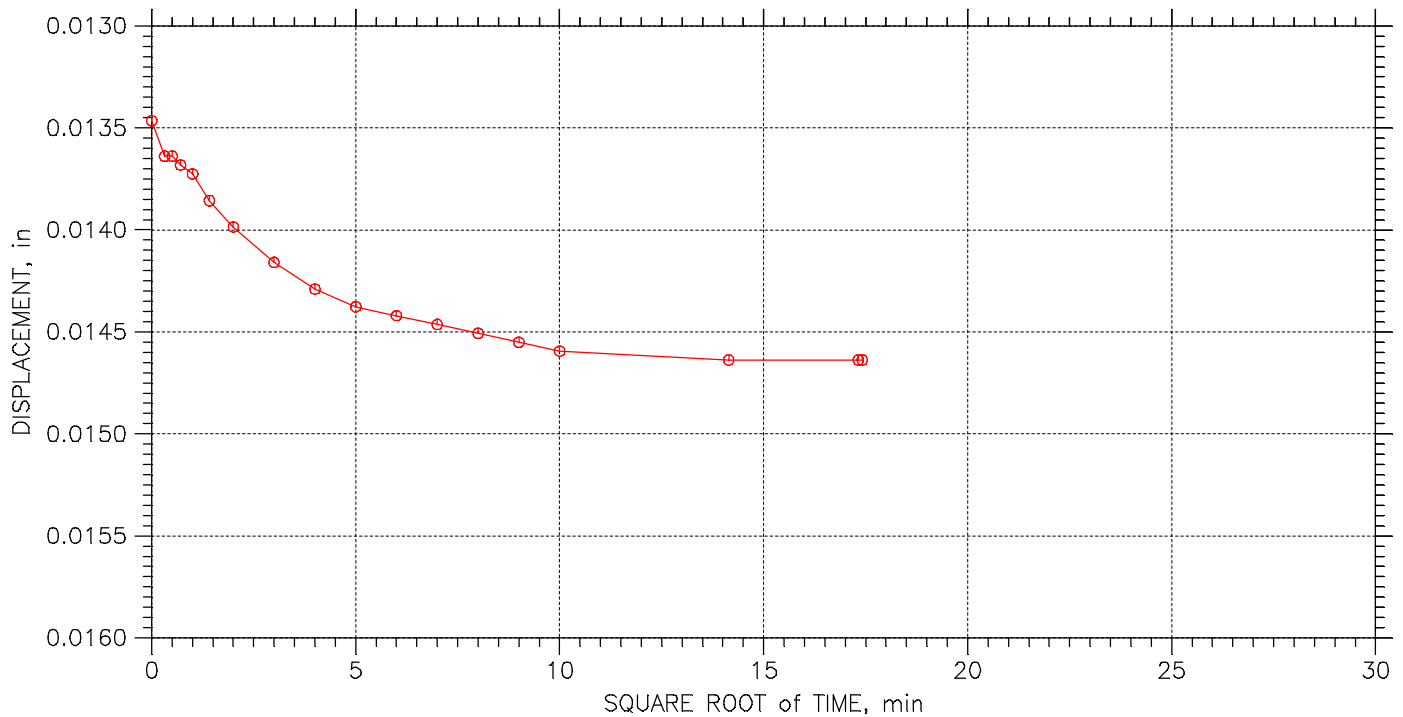
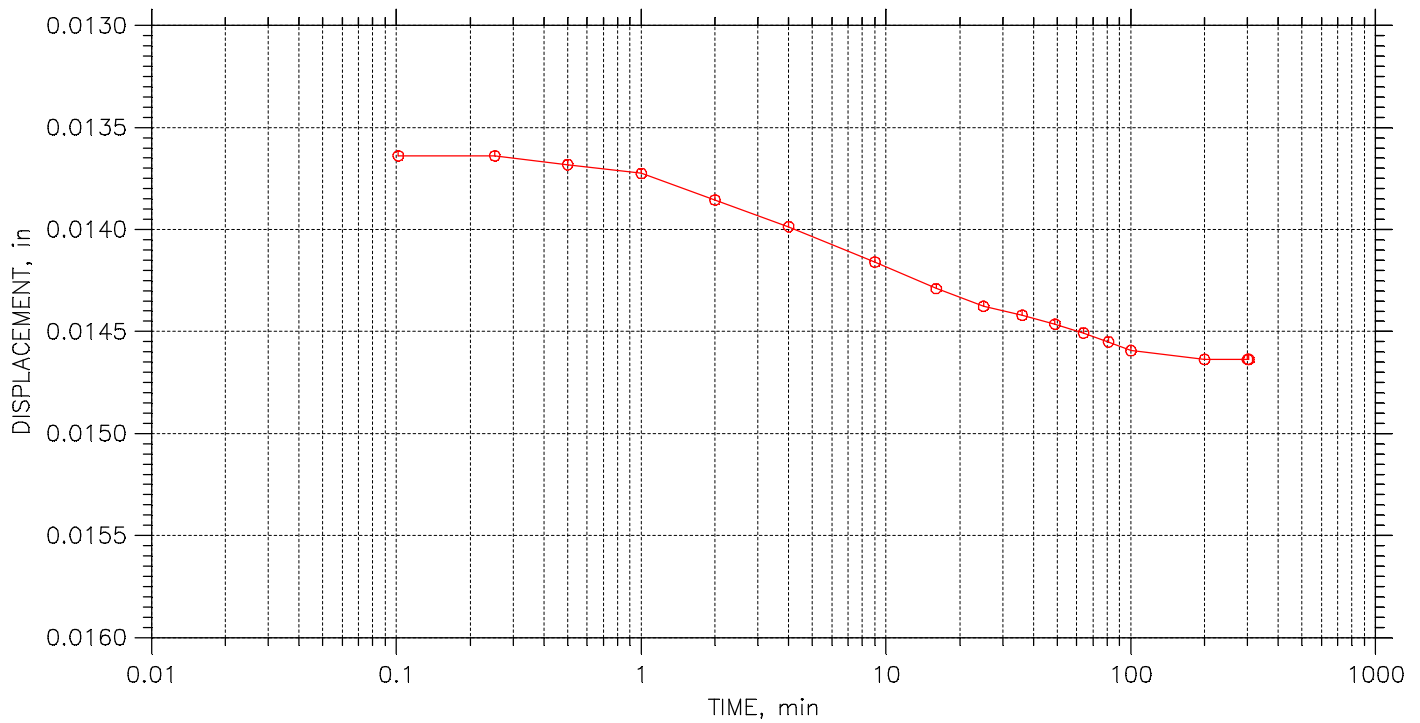
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	Boring No.: B-1 S-7	Tested By: BCM	Checked By: WPQ
	Sample No.: S-7	Test Date: 8/13/19	Depth: 18.5'-20.5'
	Test No.: B1S7CON	Sample Type: 3.0" ST	Elevation: ----
	Description: BROWN AND GRAY SANDY SILT		
	Remarks: Pc = 4.4 tsf Cc = 0.123 Ccr = 0.010 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 11 of 23

Stress: 0.5 tsf



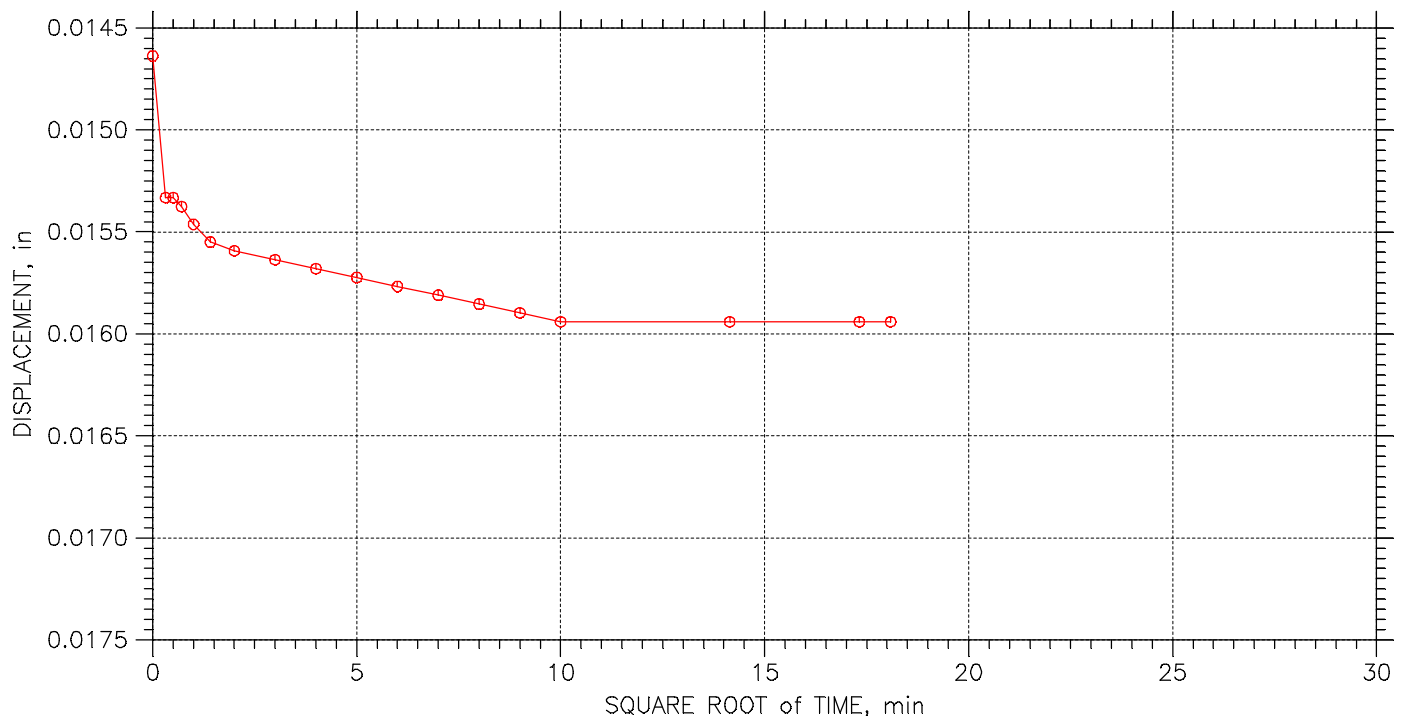
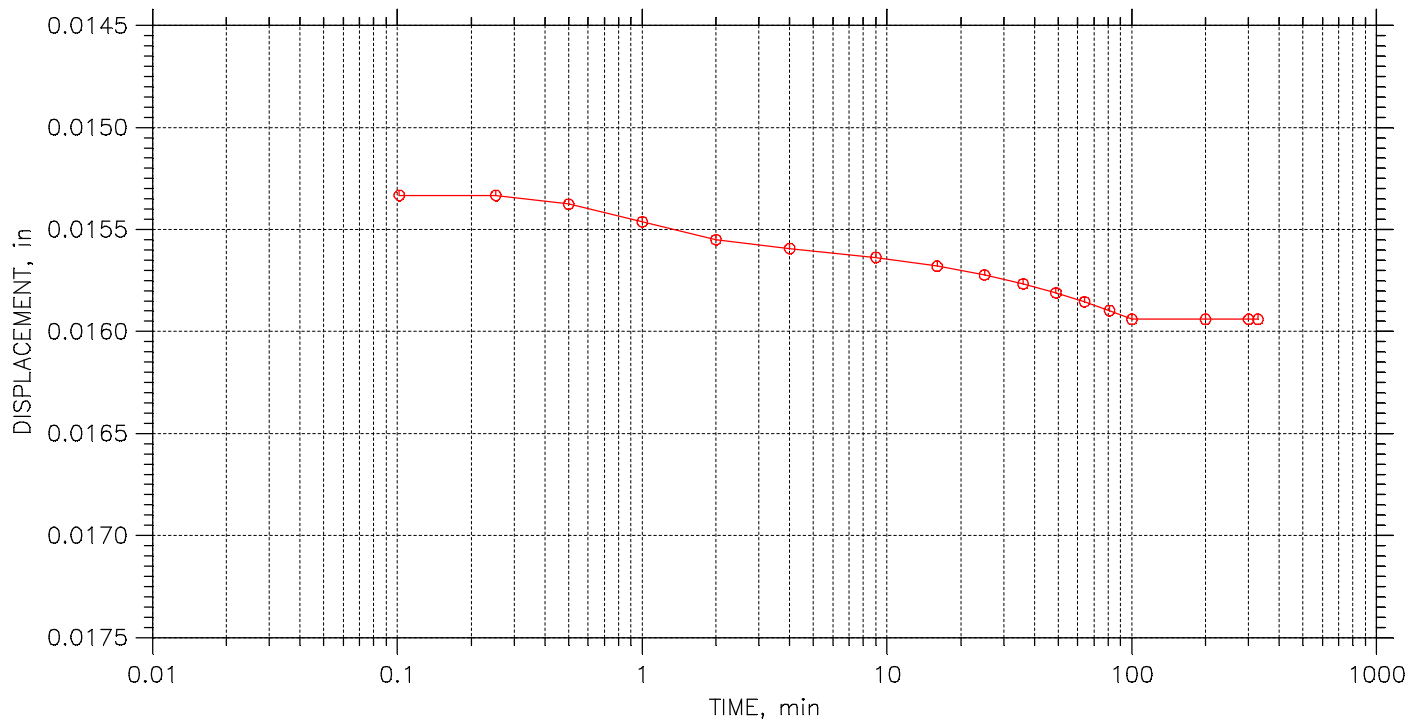
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	Boring No.: B-1 S-7	Tested By: BCM	Checked By: WPQ
	Sample No.: S-7	Test Date: 8/13/19	Depth: 18.5'-20.5'
	Test No.: B1S7CON	Sample Type: 3.0" ST	Elevation: ----
	Description: BROWN AND GRAY SANDY SILT		
	Remarks: Pc = 4.4 tsf Cc = 0.123 Ccr = 0.010 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 12 of 23

Stress: 0.75 tsf



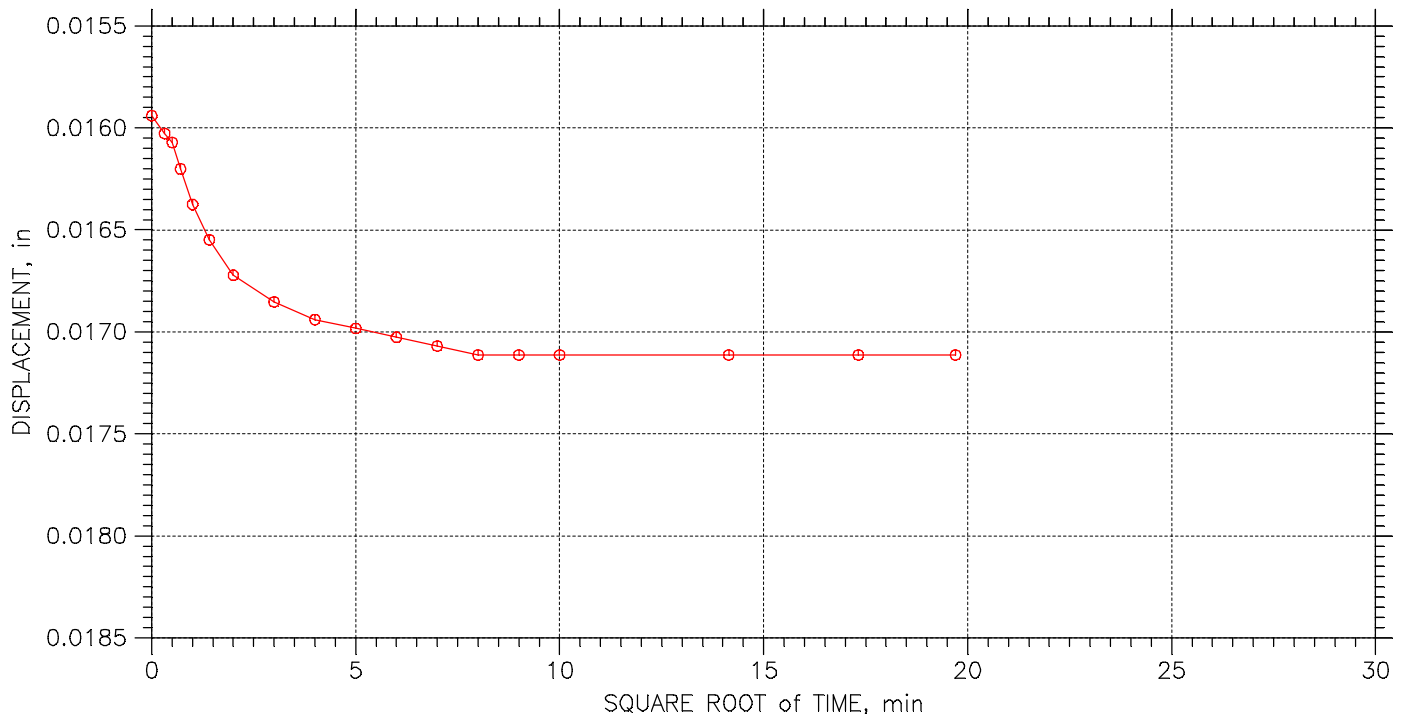
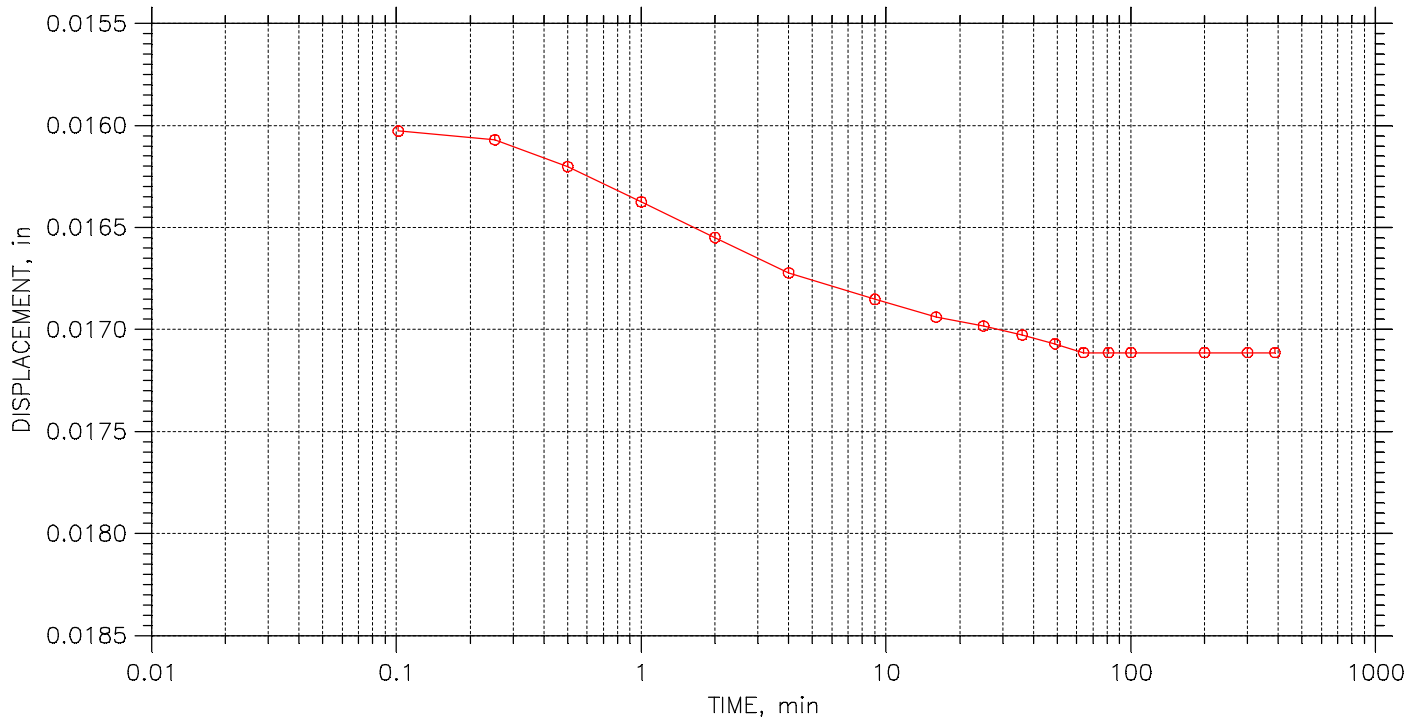
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	Boring No.: B-1 S-7	Tested By: BCM	Checked By: WPQ
	Sample No.: S-7	Test Date: 8/13/19	Depth: 18.5'-20.5'
	Test No.: B1S7CON	Sample Type: 3.0" ST	Elevation: ----
	Description: BROWN AND GRAY SANDY SILT		
	Remarks: Pc = 4.4 tsf Cc = 0.123 Ccr = 0.010 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 13 of 23

Stress: 1. tsf



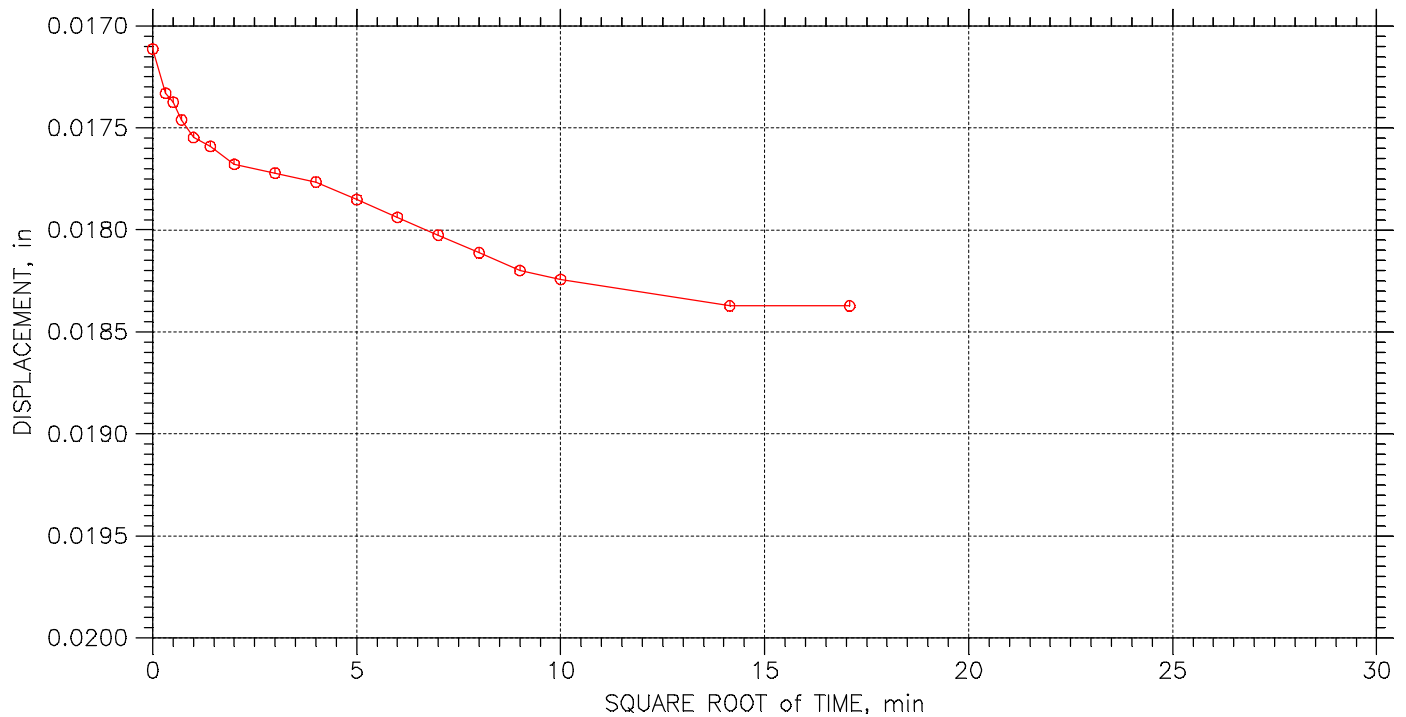
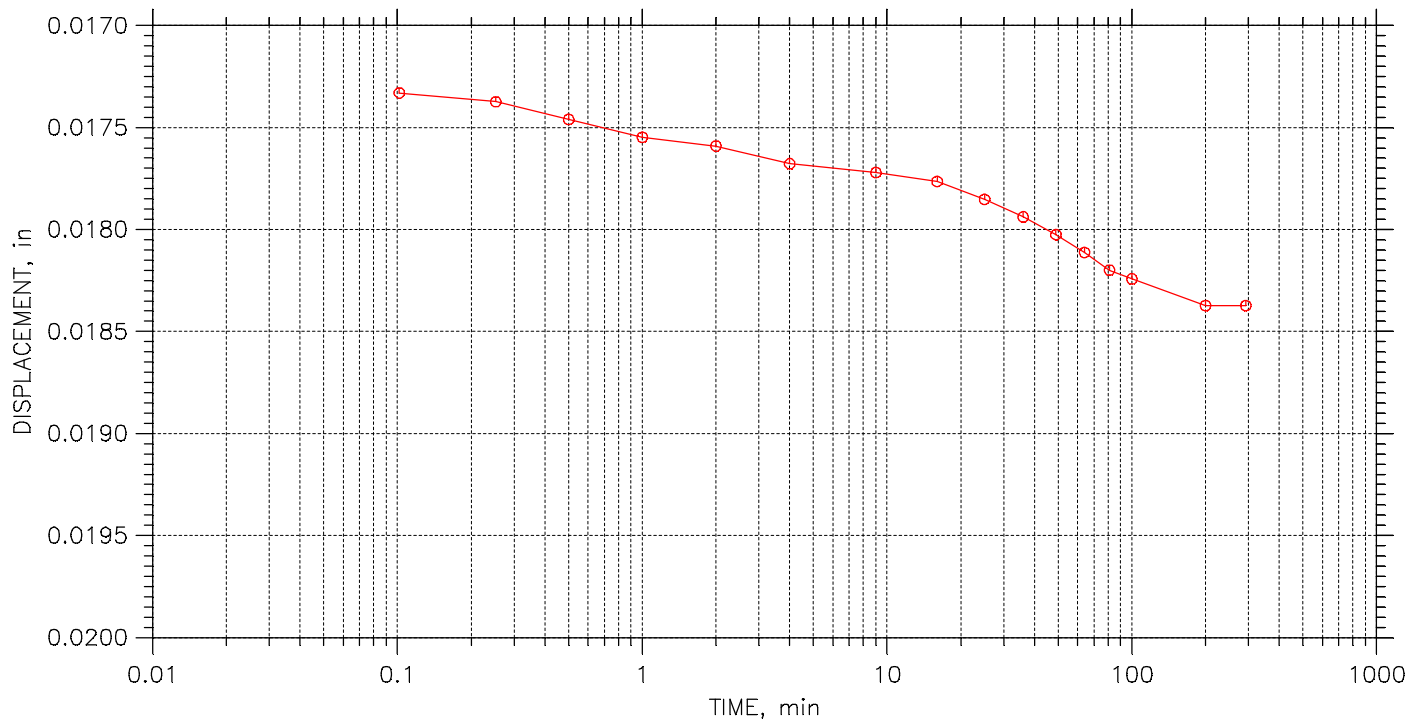
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	Boring No.: B-1 S-7	Tested By: BCM	Checked By: WPQ
	Sample No.: S-7	Test Date: 8/13/19	Depth: 18.5'-20.5'
	Test No.: B1S7CON	Sample Type: 3.0" ST	Elevation: ----
	Description: BROWN AND GRAY SANDY SILT		
	Remarks: Pc = 4.4 tsf Cc = 0.123 Ccr = 0.010 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 14 of 23

Stress: 2. tsf



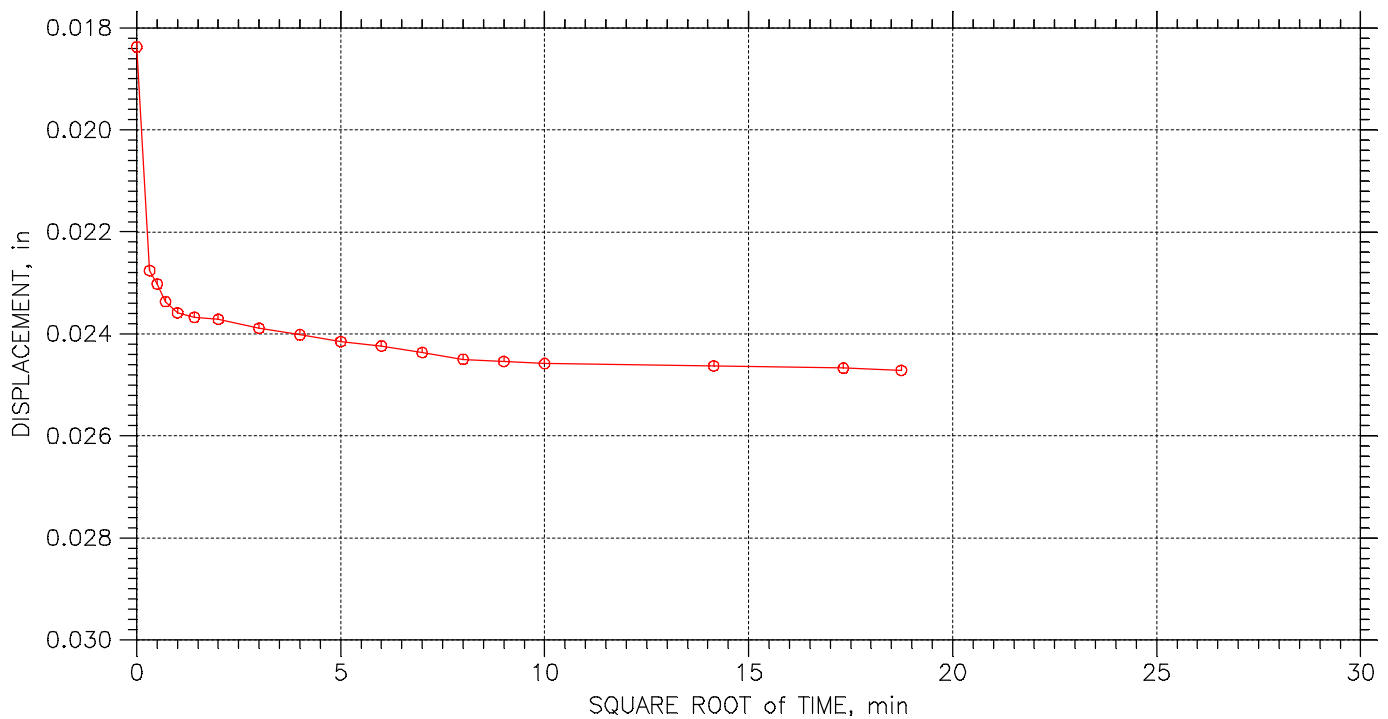
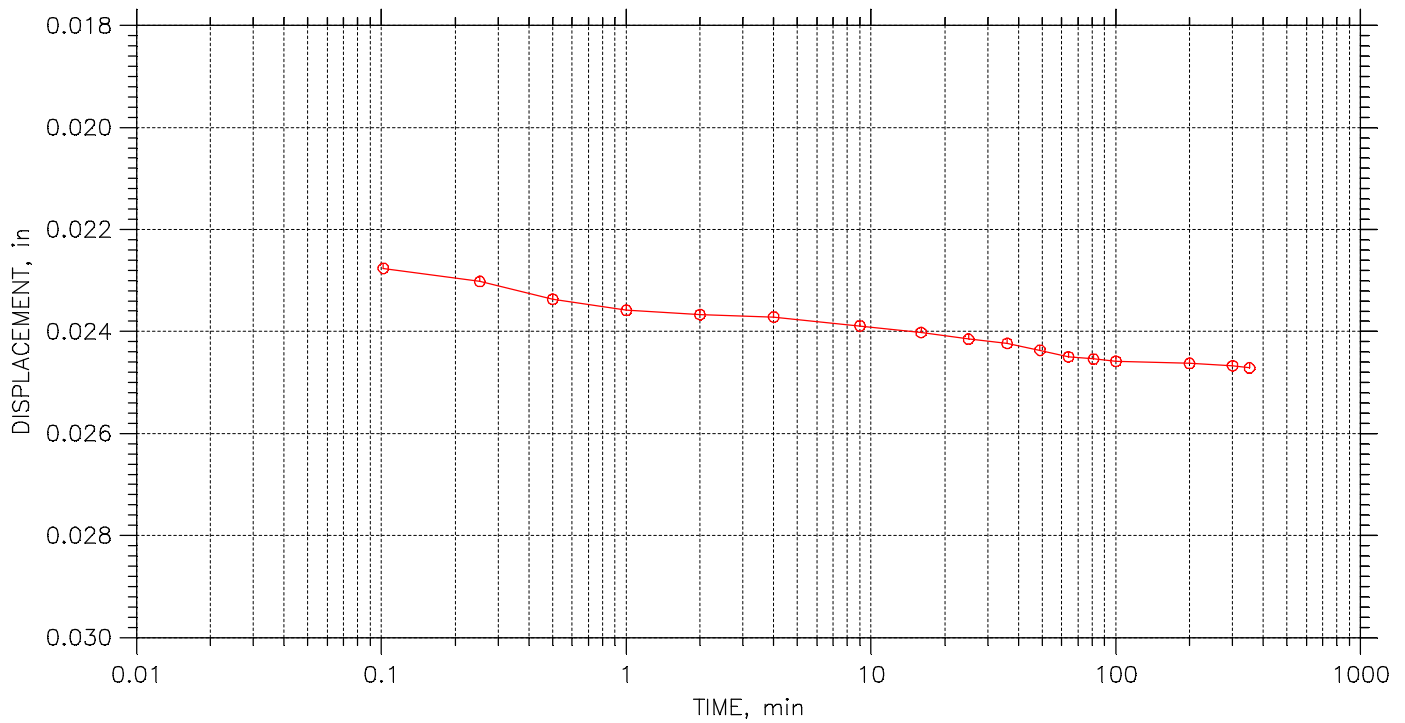
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	Boring No.: B-1 S-7	Tested By: BCM	Checked By: WPQ
	Sample No.: S-7	Test Date: 8/13/19	Depth: 18.5'-20.5'
	Test No.: B1S7CON	Sample Type: 3.0" ST	Elevation: ----
	Description: BROWN AND GRAY SANDY SILT		
	Remarks: Pc = 4.4 tsf Cc = 0.123 Ccr = 0.010 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 15 of 23

Stress: 4. tsf



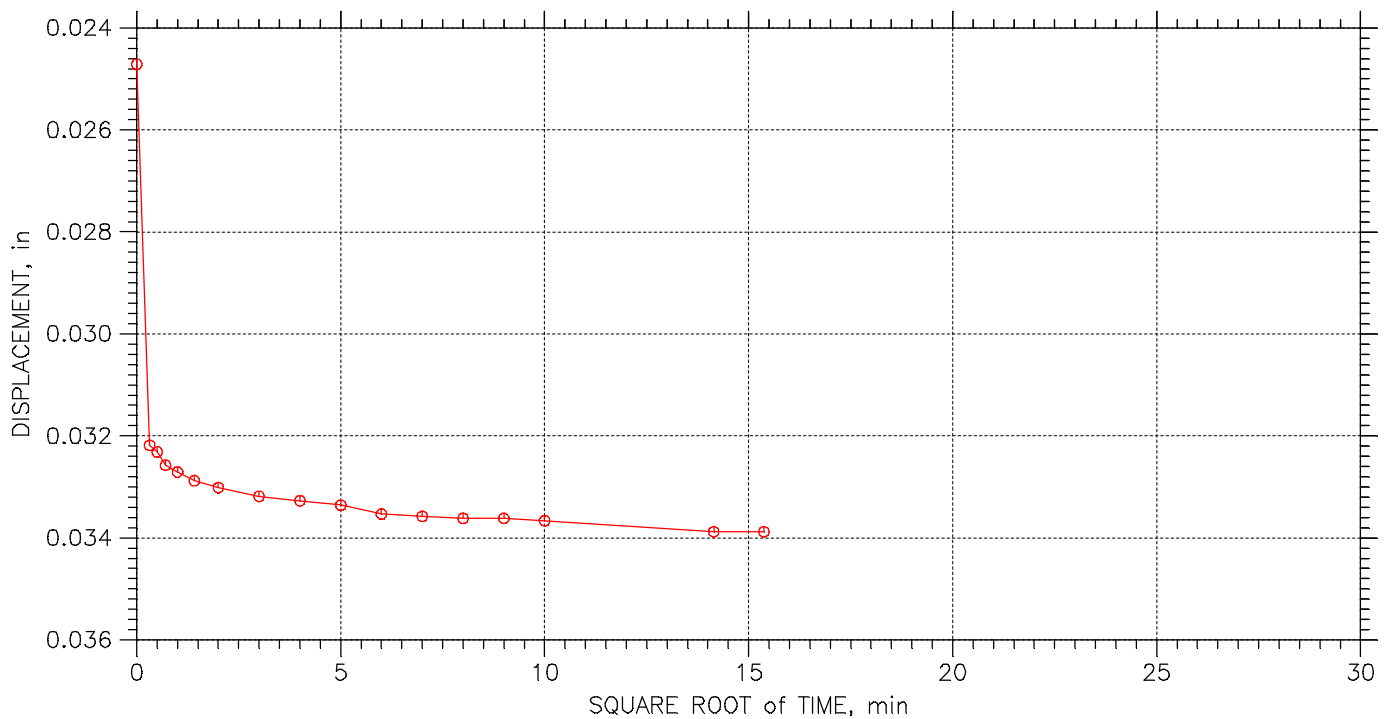
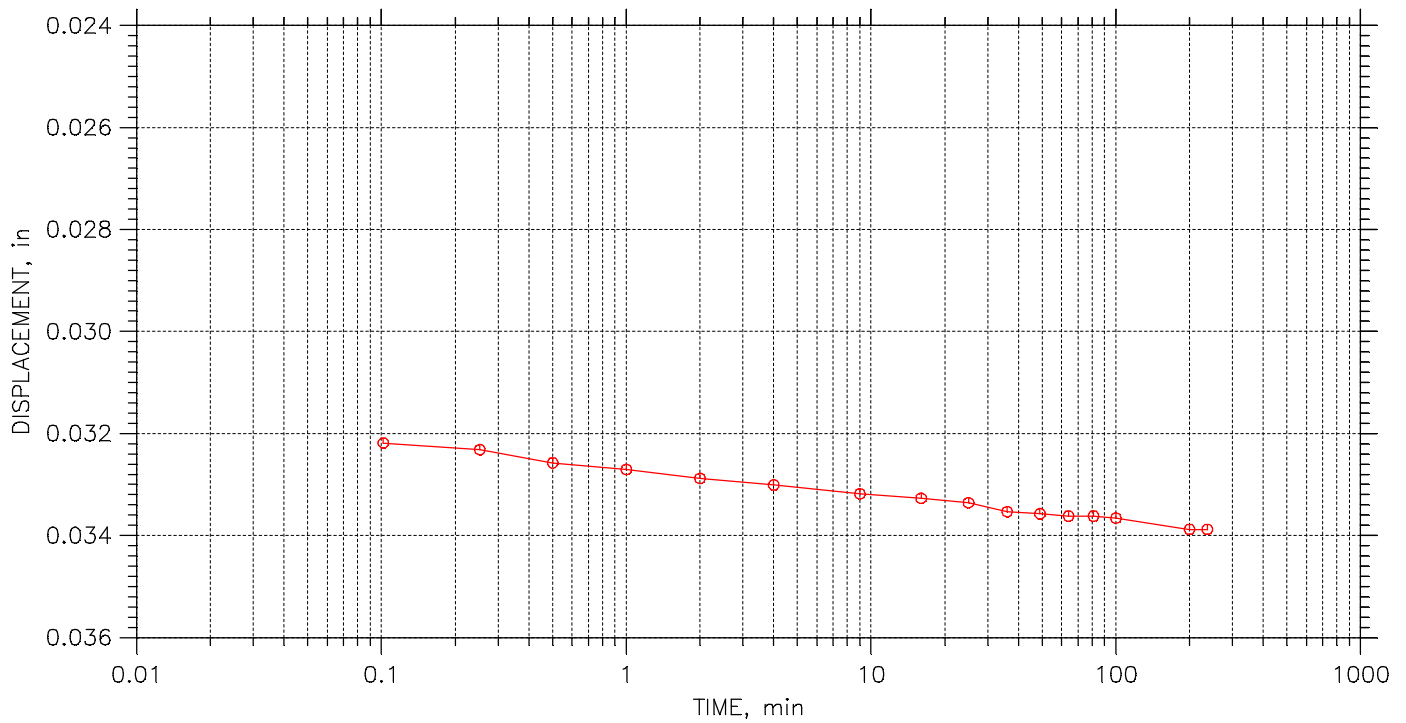
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	Boring No.: B-1 S-7	Tested By: BCM	Checked By: WPQ
	Sample No.: S-7	Test Date: 8/13/19	Depth: 18.5'-20.5'
	Test No.: B1S7CON	Sample Type: 3.0" ST	Elevation: ----
	Description: BROWN AND GRAY SANDY SILT		
	Remarks: Pc = 4.4 tsf Cc = 0.123 Ccr = 0.010 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 16 of 23

Stress: 8. tsf



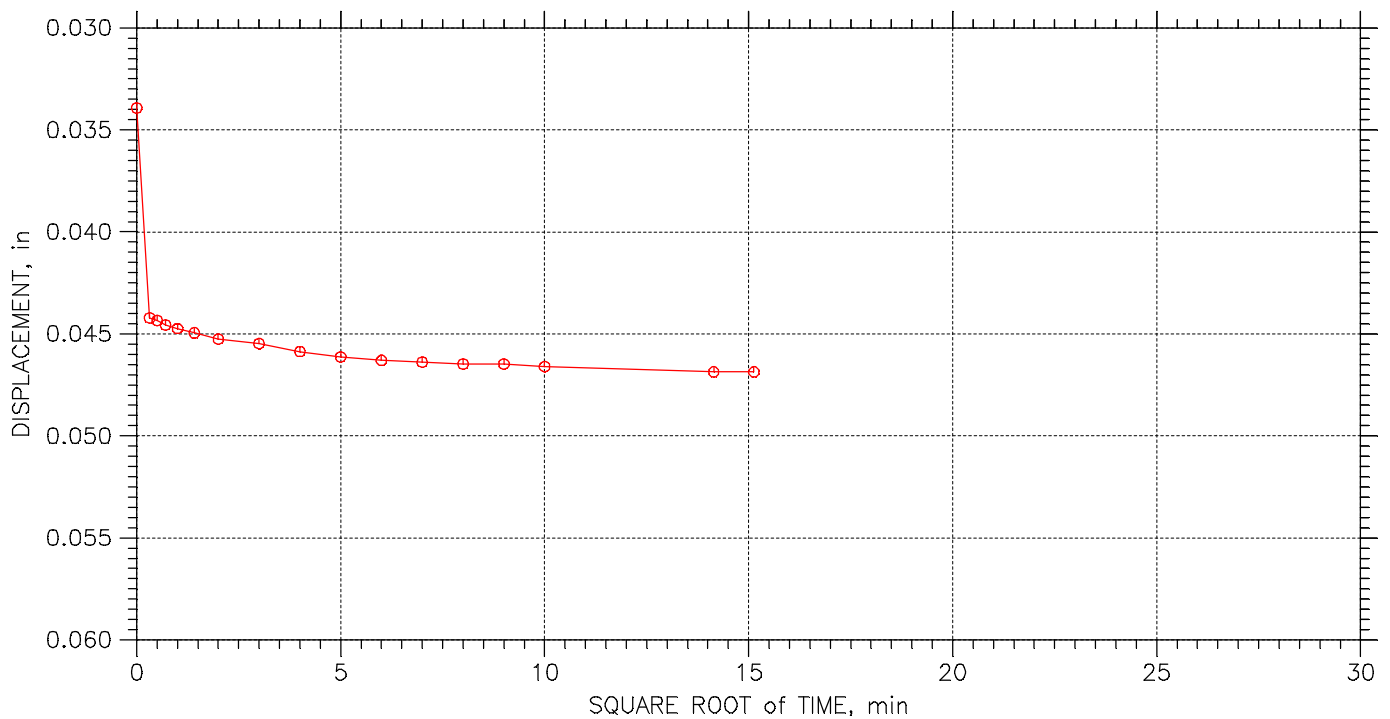
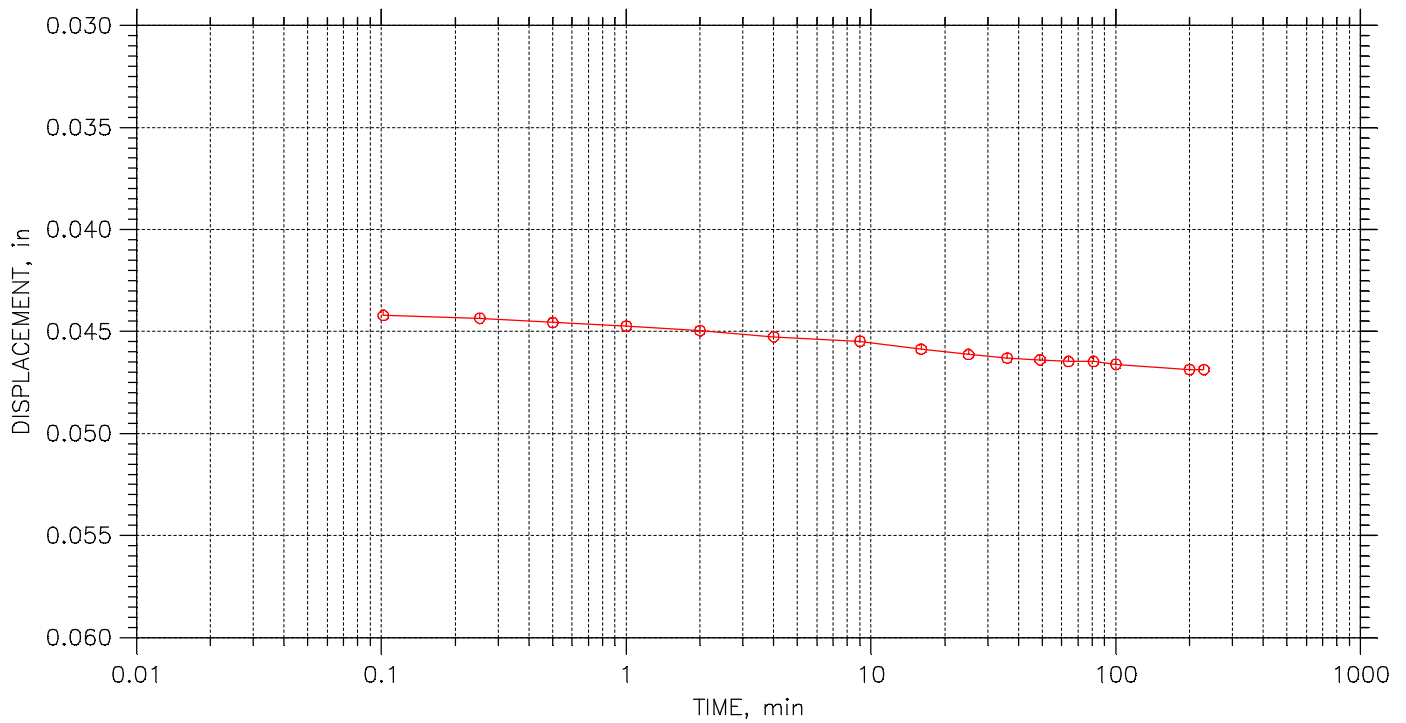
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	Boring No.: B-1 S-7	Tested By: BCM	Checked By: WPQ
	Sample No.: S-7	Test Date: 8/13/19	Depth: 18.5'-20.5'
	Test No.: B1S7CON	Sample Type: 3.0" ST	Elevation: ----
	Description: BROWN AND GRAY SANDY SILT		
	Remarks: Pc = 4.4 tsf Cc = 0.123 Ccr = 0.010 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 17 of 23

Stress: 16. tsf



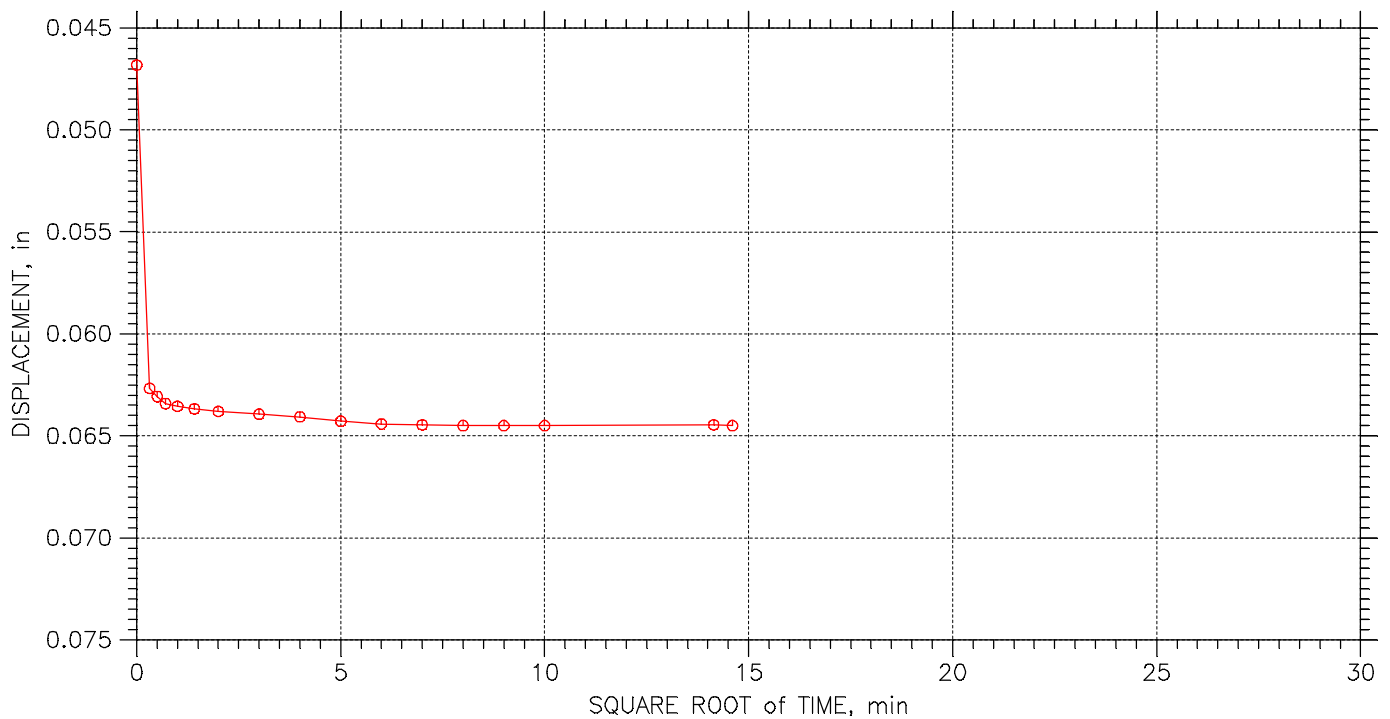
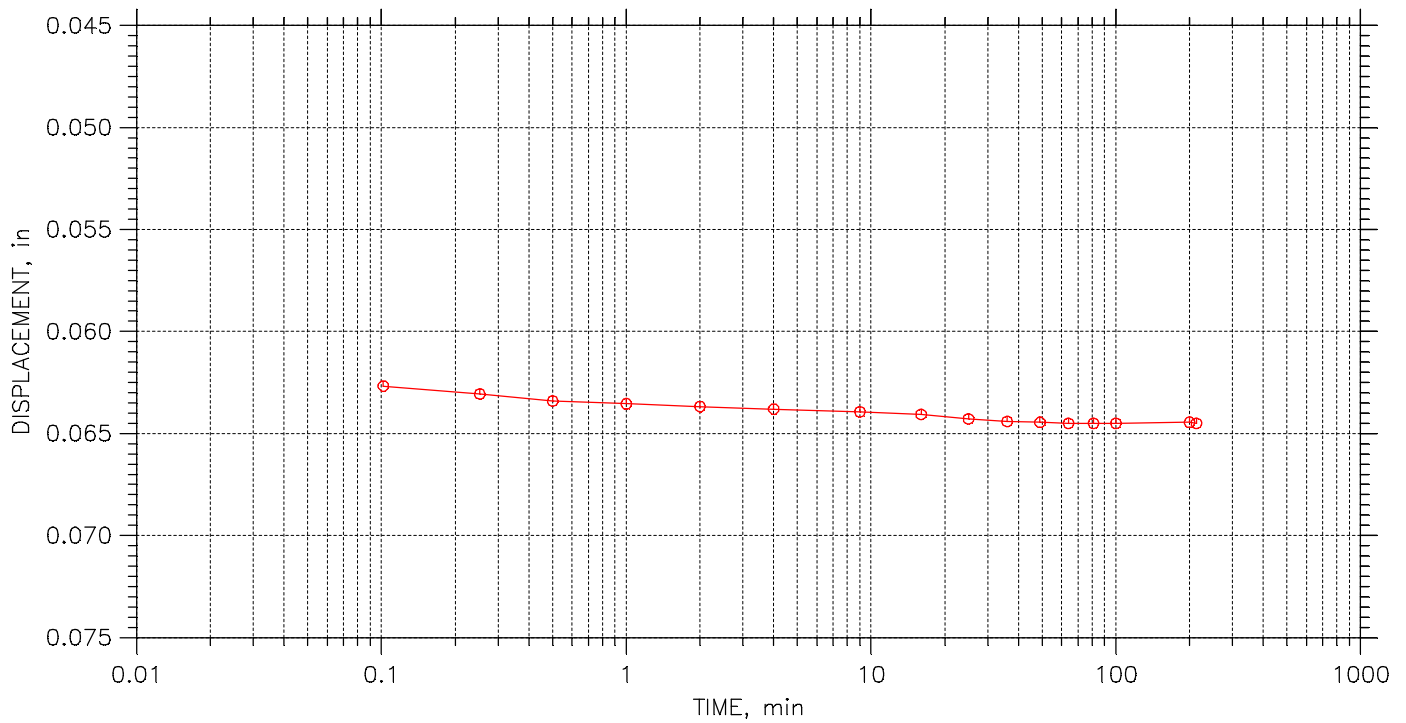
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	Boring No.: B-1 S-7	Tested By: BCM	Checked By: WPQ
	Sample No.: S-7	Test Date: 8/13/19	Depth: 18.5'-20.5'
	Test No.: B1S7CON	Sample Type: 3.0" ST	Elevation: ----
	Description: BROWN AND GRAY SANDY SILT		
	Remarks: Pc = 4.4 tsf Cc = 0.123 Ccr = 0.010 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 18 of 23

Stress: 32. tsf



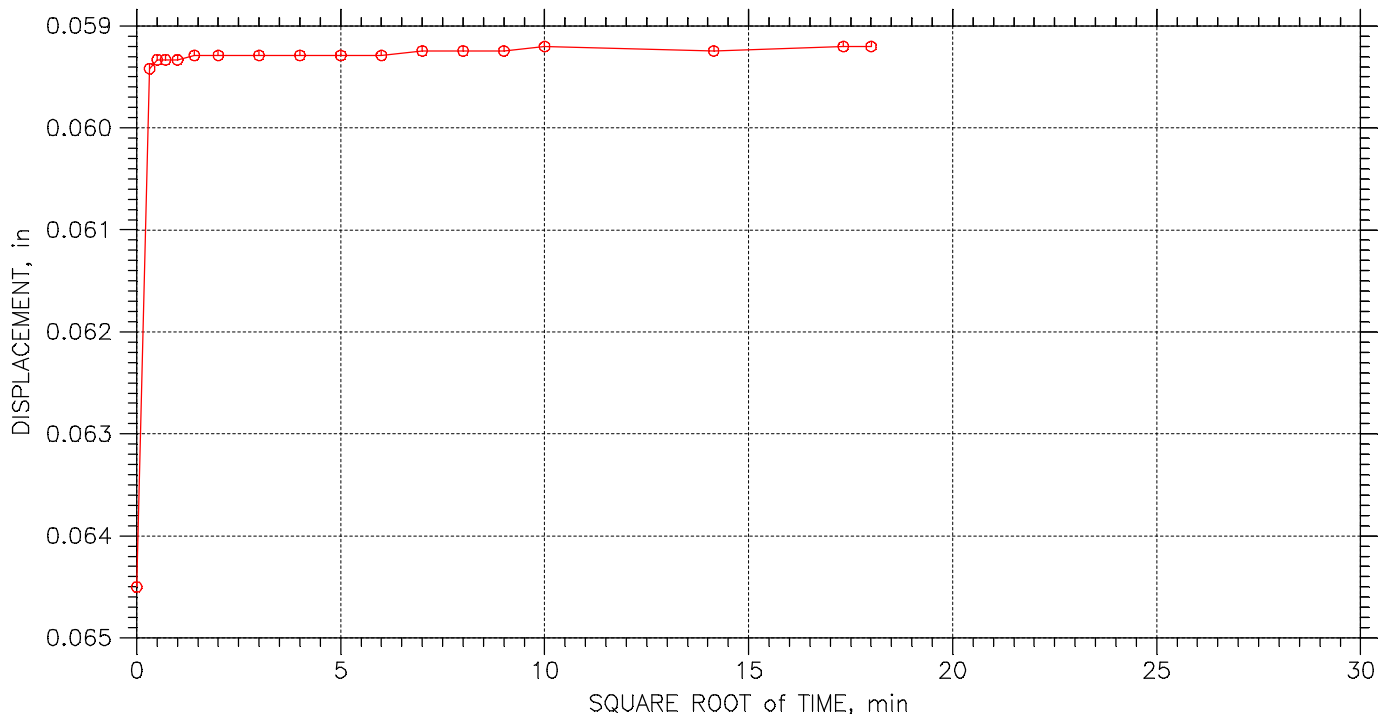
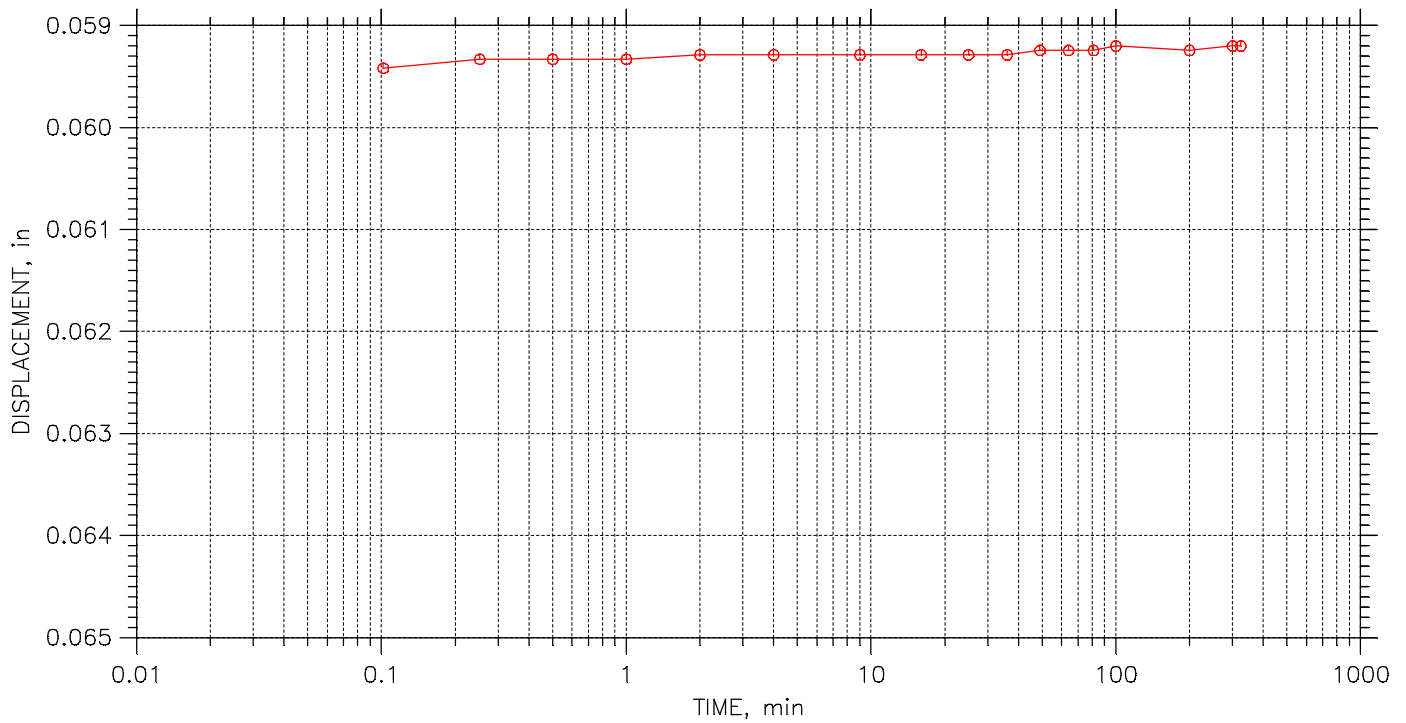
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	Boring No.: B-1 S-7	Tested By: BCM	Checked By: WPQ
	Sample No.: S-7	Test Date: 8/13/19	Depth: 18.5'-20.5'
	Test No.: B1S7CON	Sample Type: 3.0" ST	Elevation: ----
	Description: BROWN AND GRAY SANDY SILT		
	Remarks: Pc = 4.4 tsf Cc = 0.123 Ccr = 0.010 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 19 of 23

Stress: 16. tsf



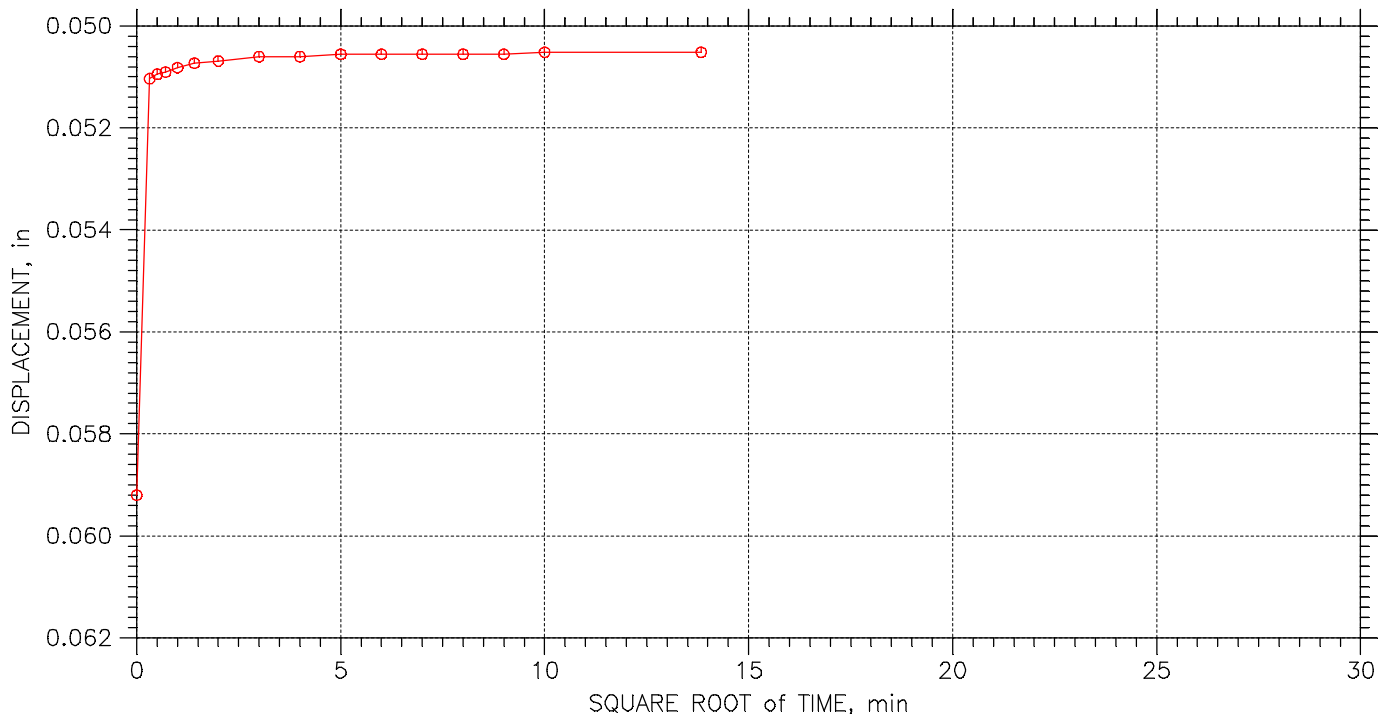
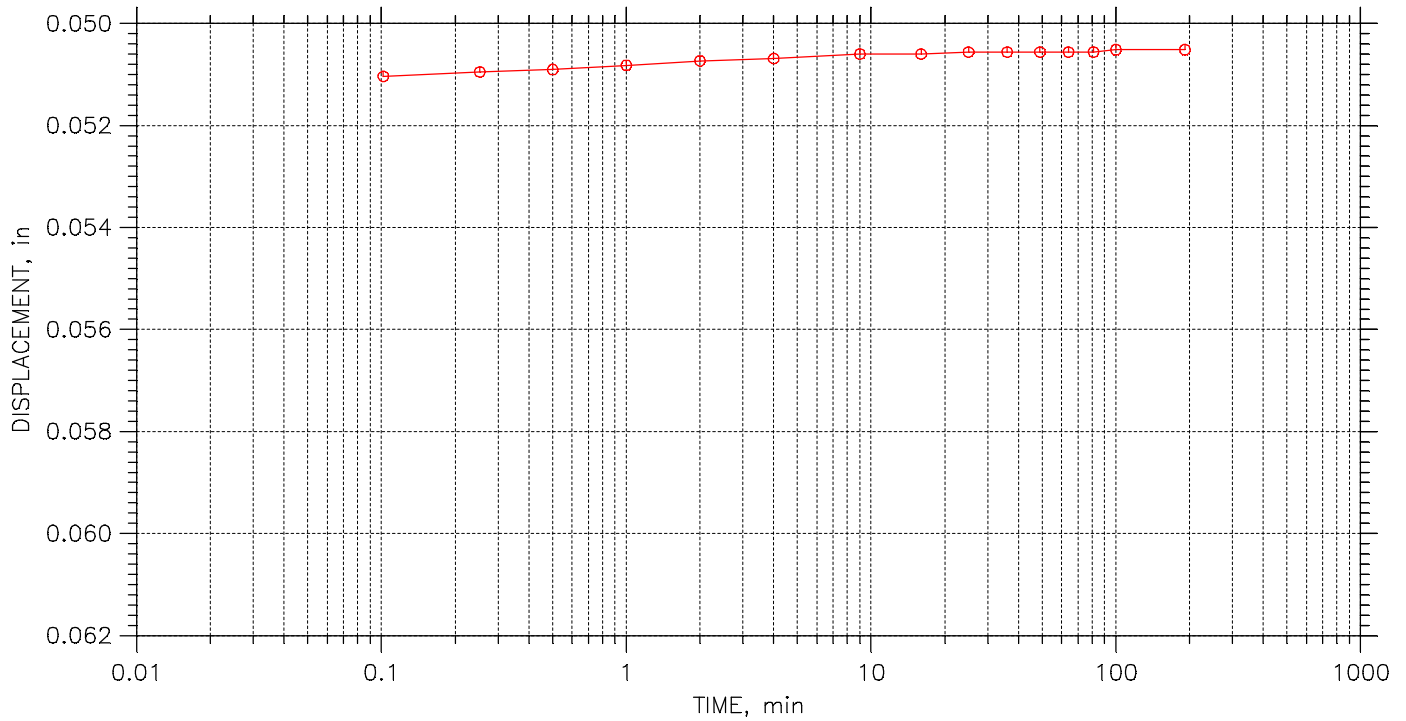
	Project: UPRR GRADE SEPARATION	Location: LITTLE ROCK, AR	Project No.: 35185112
	Boring No.: B-1 S-7	Tested By: BCM	Checked By: WPQ
	Sample No.: S-7	Test Date: 8/13/19	Depth: 18.5'-20.5'
	Test No.: B1S7CON	Sample Type: 3.0" ST	Elevation: ----
	Description: BROWN AND GRAY SANDY SILT		
	Remarks: Pc = 4.4 tsf Cc = 0.123 Ccr = 0.010 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 20 of 23

Stress: 4. tsf



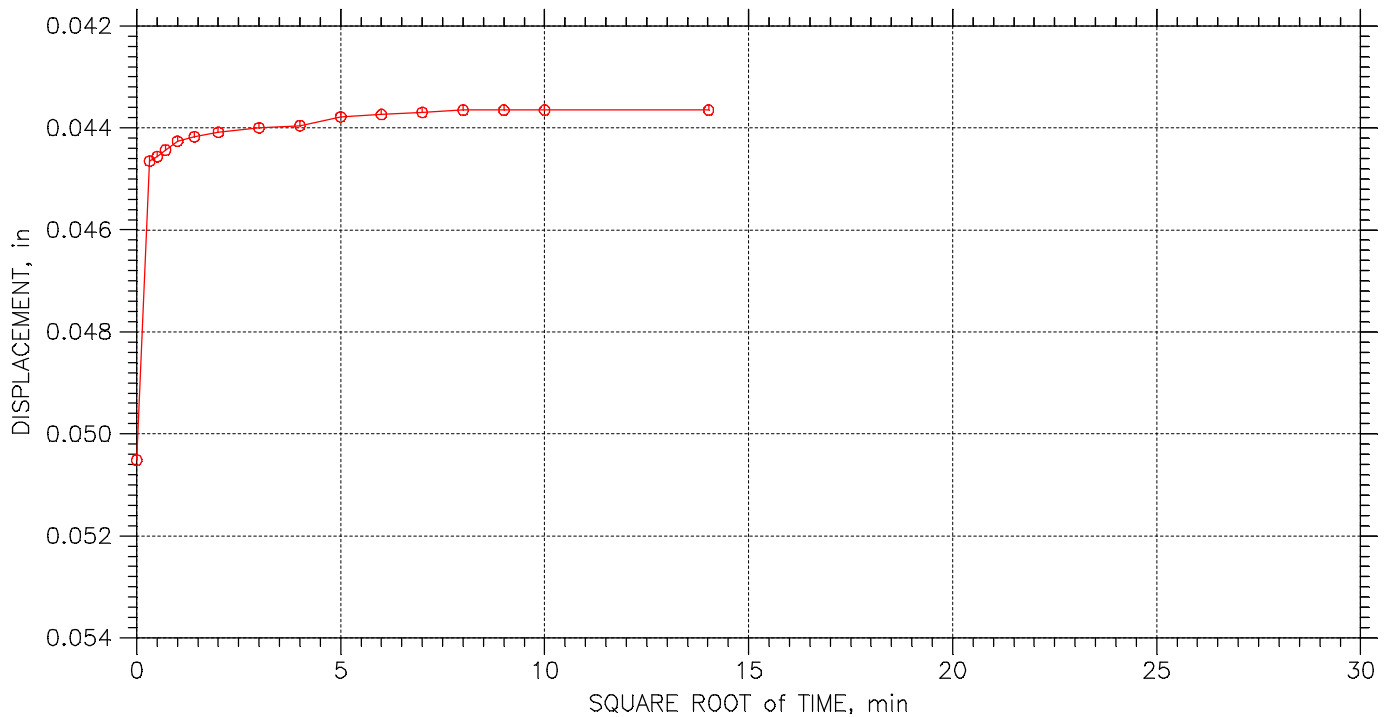
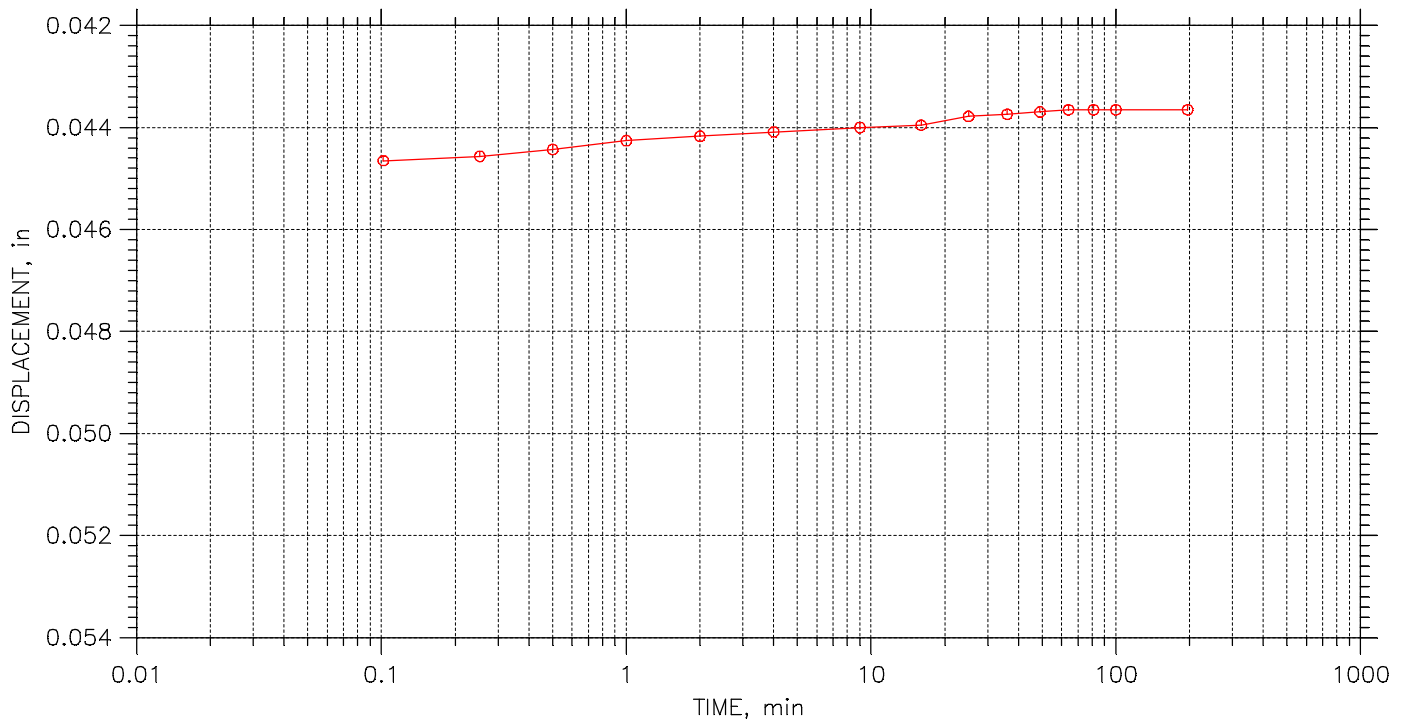
	Project: UPRR GRADE SEPARATION	Location: LITTLE ROCK, AR	Project No.: 35185112
	Boring No.: B-1 S-7	Tested By: BCM	Checked By: WPQ
	Sample No.: S-7	Test Date: 8/13/19	Depth: 18.5'-20.5'
	Test No.: B1S7CON	Sample Type: 3.0" ST	Elevation: ----
	Description: BROWN AND GRAY SANDY SILT		
	Remarks: Pc = 4.4 tsf Cc = 0.123 Ccr = 0.010 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 21 of 23

Stress: 1. tsf



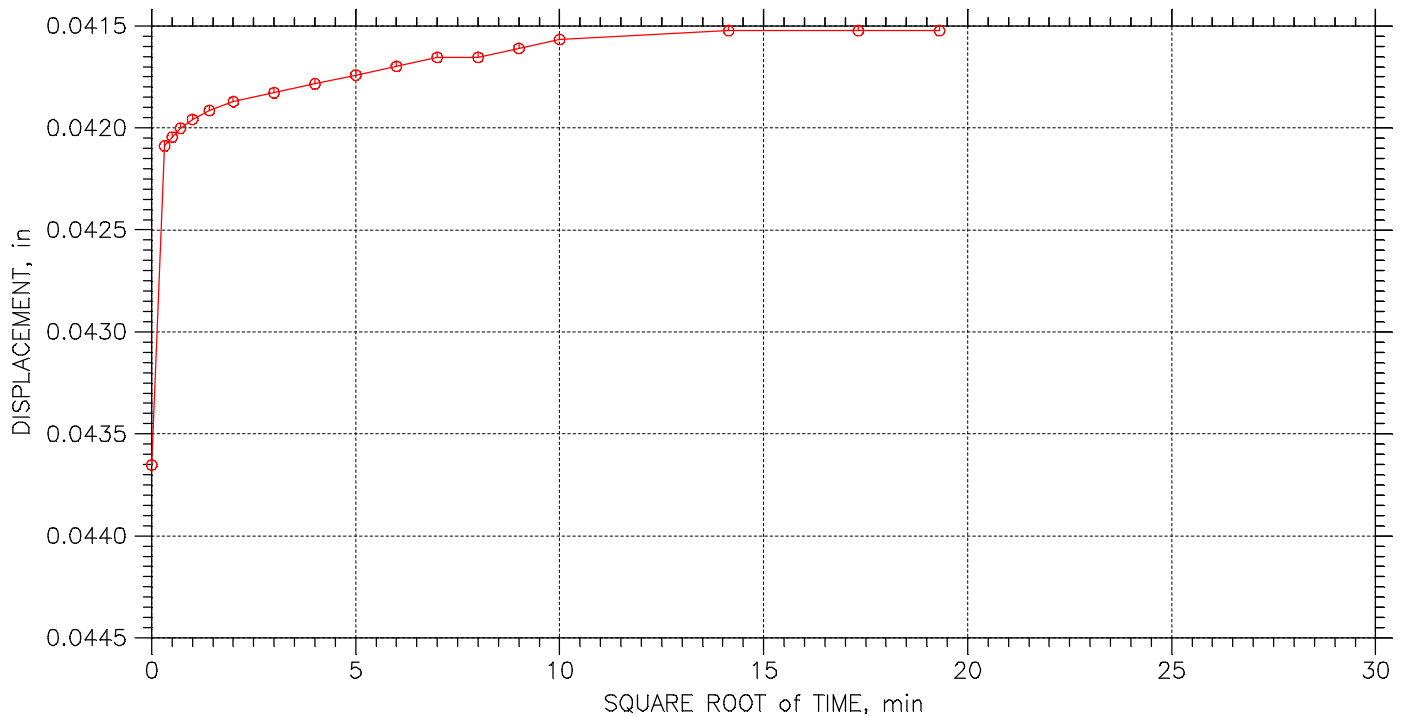
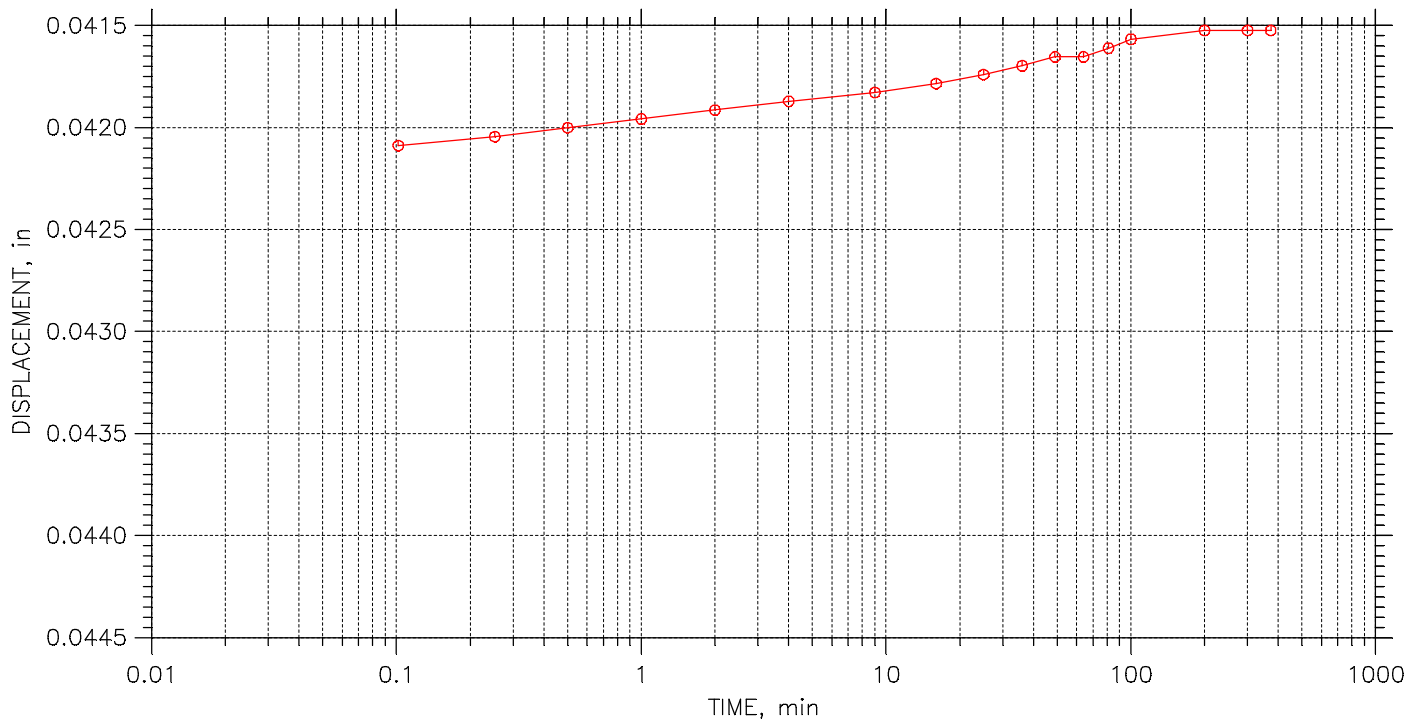
	Project: UPRR GRADE SEPARATION	Location: LITTLE ROCK, AR	Project No.: 35185112
	Boring No.: B-1 S-7	Tested By: BCM	Checked By: WPQ
	Sample No.: S-7	Test Date: 8/13/19	Depth: 18.5'-20.5'
	Test No.: B1S7CON	Sample Type: 3.0" ST	Elevation: ----
	Description: BROWN AND GRAY SANDY SILT		
	Remarks: Pc = 4.4 tsf Cc = 0.123 Ccr = 0.010 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 22 of 23

Stress: 0.5 tsf



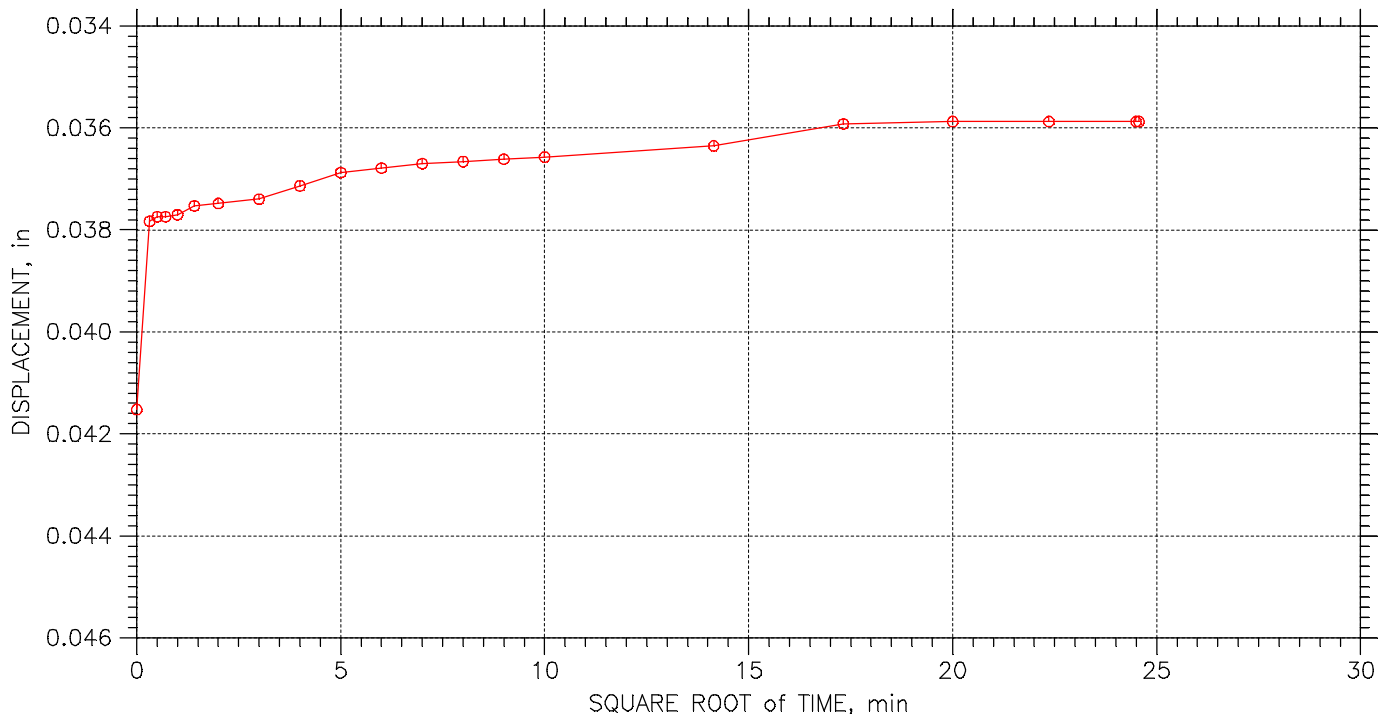
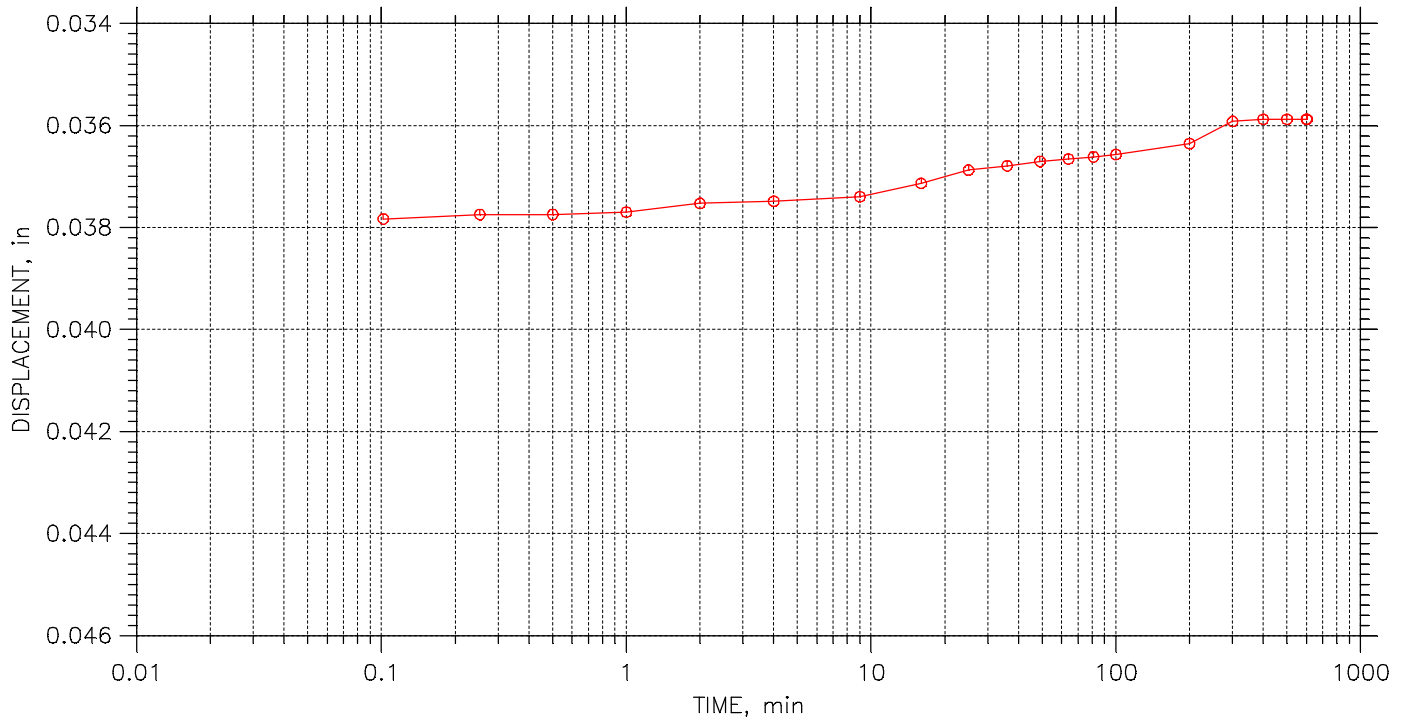
	Project: UPRR GRADE SEPARATION	Location: LITTLE ROCK, AR	Project No.: 35185112
	Boring No.: B-1 S-7	Tested By: BCM	Checked By: WPQ
	Sample No.: S-7	Test Date: 8/13/19	Depth: 18.5'-20.5'
	Test No.: B1S7CON	Sample Type: 3.0" ST	Elevation: ----
	Description: BROWN AND GRAY SANDY SILT		
	Remarks: Pc = 4.4 tsf Cc = 0.123 Ccr = 0.010 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 23 of 23

Stress: 0.125 tsf



	Project: UPRR GRADE SEPARATION	Location: LITTLE ROCK, AR	Project No.: 35185112
	Boring No.: B-1 S-7	Tested By: BCM	Checked By: WPQ
	Sample No.: S-7	Test Date: 8/13/19	Depth: 18.5'-20.5'
	Test No.: B1S7CON	Sample Type: 3.0" ST	Elevation: ----
	Description: BROWN AND GRAY SANDY SILT		
	Remarks: Pc = 4.4 tsf Cc = 0.123 Ccr = 0.010 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

Project: UPRR GRADE SEPARATION
 Boring No.: B-1 S-7
 Sample No.: S-7
 Test No.: B1S7CON

Location: LITTLE ROCK, AR
 Tested By: BCM
 Test Date: 8/13/19
 Sample Type: 3.0" ST

Project No.: 35185112
 Checked By: WPQ
 Depth: 18.5'-20.5'
 Elevation: ----



Soil Description: BROWN AND GRAY SANDY SILT
 Remarks: Pc = 4.4 tsf Cc = 0.123 Ccr = 0.010 TEST PERFORMED AS PER ASTM D2435

Estimated Specific Gravity: 2.72
 Initial Void Ratio: 0.56
 Final Void Ratio: 0.49

Liquid Limit: 20
 Plastic Limit: 18
 Plasticity Index: 2

Initial Height: 0.75 in
 Specimen Diameter: 2.50 in

	Before Consolidation		After Consolidation	
	Trimmings	Specimen+Ring	Specimen+Ring	Trimmings
Container ID	C-163	RING	RING	X-3
Wt. Container + Wet Soil, gm	131.15	199.58	197.99	166.18
Wt. Container + Dry Soil, gm	113.67	179.11	179.11	147.34
Wt. Container, gm	24.4	74.31	74.31	42.73
Wt. Dry Soil, gm	89.27	104.8	104.8	104.61
Water Content, %	19.58	19.53	18.01	18.01
Void Ratio	---	0.56	0.49	---
Degree of Saturation, %	---	94.18	100.19	---
Dry Unit Weight, pcf	---	108.58	114.04	---

CONSOLIDATION TEST DATA

Project: UPRR GRADE SEPARATION
Boring No.: B-1 S-7
Sample No.: S-7
Test No.: B1S7CON

Location: LITTLE ROCK, AR
Tested By: BCM
Test Date: 8/13/19
Sample Type: 3.0" ST

Project No.: 35185112
Checked By: WPQ
Depth: 18.5'-20.5'
Elevation: ----

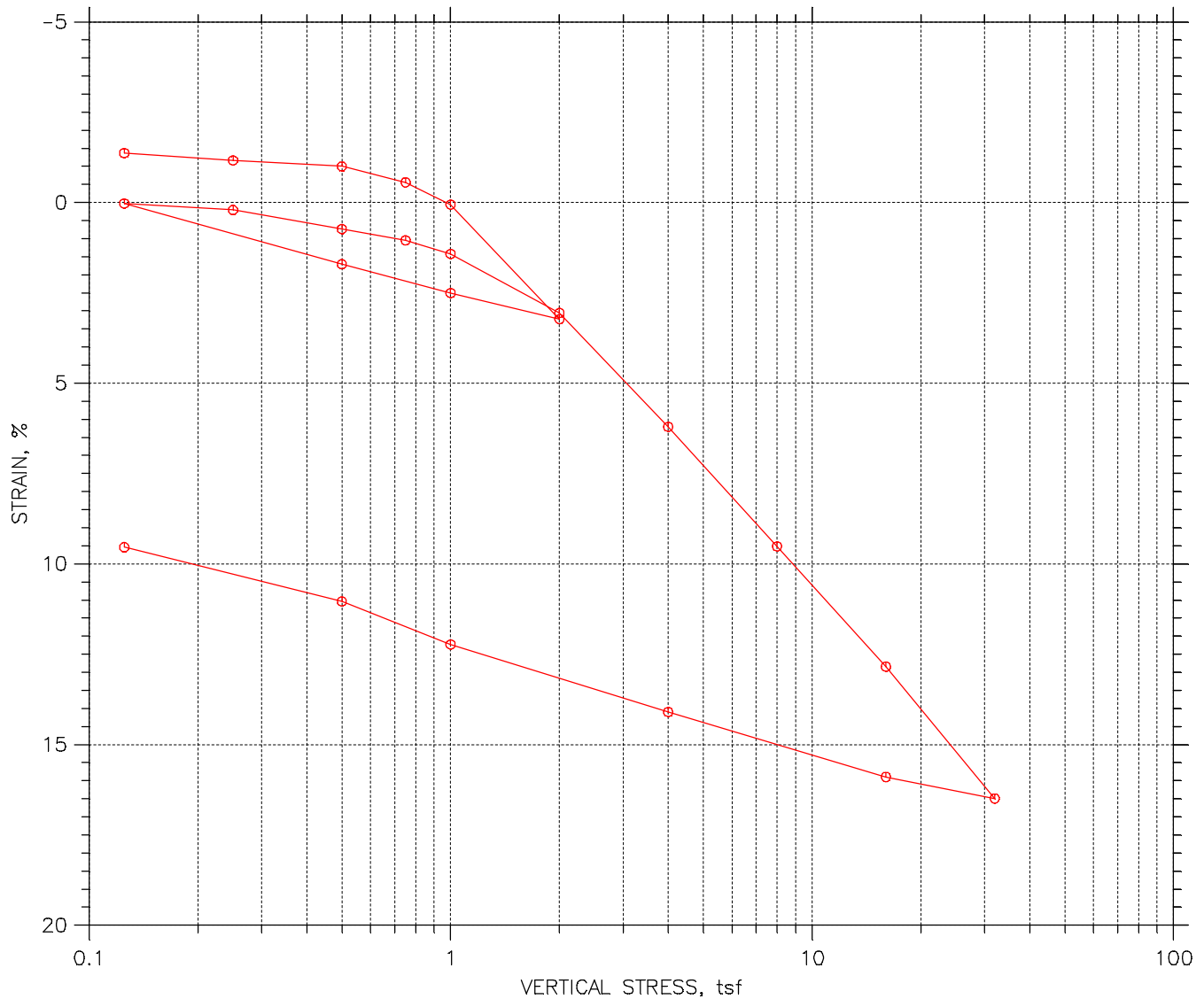


Soil Description: BROWN AND GRAY SANDY SILT

Remarks: Pc = 4.4 tsf Cc = 0.123 Ccr = 0.010 TEST PERFORMED AS PER ASTM D2435

	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	T50 Fitting		Coefficient of Consolidation		
					Sq.Rt. min	Log min	Sq.Rt. ft^2/sec	Log ft^2/sec	Ave. ft^2/sec
1	0.125	0.004517	0.554	0.60	0.2	0.0	1.31e-005	0.00e+000	1.31e-005
2	0.25	0.005864	0.552	0.78	3.8	0.0	8.20e-007	0.00e+000	8.20e-007
3	0.5	0.008774	0.546	1.17	1.0	0.0	3.25e-006	0.00e+000	3.25e-006
4	0.75	0.01064	0.542	1.42	0.5	0.0	6.86e-006	0.00e+000	6.86e-006
5	1	0.01273	0.537	1.70	12.1	0.0	2.55e-007	0.00e+000	2.55e-007
6	2	0.01776	0.527	2.37	3.5	0.0	8.71e-007	0.00e+000	8.71e-007
7	1	0.01624	0.530	2.17	0.1	0.0	3.02e-005	0.00e+000	3.02e-005
8	0.5	0.01507	0.532	2.01	3.9	0.0	7.87e-007	0.00e+000	7.87e-007
9	0.125	0.01247	0.538	1.67	0.9	0.0	3.40e-006	0.00e+000	3.40e-006
10	0.25	0.01346	0.536	1.80	0.5	0.0	6.80e-006	0.00e+000	6.80e-006
11	0.5	0.01464	0.533	1.96	6.6	5.5	4.69e-007	5.60e-007	5.10e-007
12	0.75	0.01594	0.531	2.13	1.6	0.0	1.94e-006	0.00e+000	1.94e-006
13	1	0.01711	0.528	2.29	3.9	0.0	7.87e-007	0.00e+000	7.87e-007
14	2	0.01837	0.526	2.45	23.3	0.0	1.31e-007	0.00e+000	1.31e-007
15	4	0.02471	0.512	3.30	0.1	0.0	2.98e-005	0.00e+000	2.98e-005
16	8	0.03388	0.493	4.53	0.0	0.0	1.24e-004	0.00e+000	1.24e-004
17	16	0.04687	0.466	6.26	0.2	0.0	1.27e-005	0.00e+000	1.27e-005
18	32	0.0645	0.429	8.62	0.0	0.0	1.15e-004	0.00e+000	1.15e-004
19	16	0.0592	0.440	7.91	0.0	0.0	1.13e-004	0.00e+000	1.13e-004
20	4	0.05051	0.458	6.75	0.0	0.0	1.16e-004	0.00e+000	1.16e-004
21	1	0.04365	0.473	5.83	0.2	0.0	1.24e-005	0.00e+000	1.24e-005
22	0.5	0.04152	0.477	5.55	0.1	0.0	2.44e-005	0.00e+000	2.44e-005
23	0.125	0.03588	0.489	4.79	11.8	0.0	2.43e-007	0.00e+000	2.43e-007

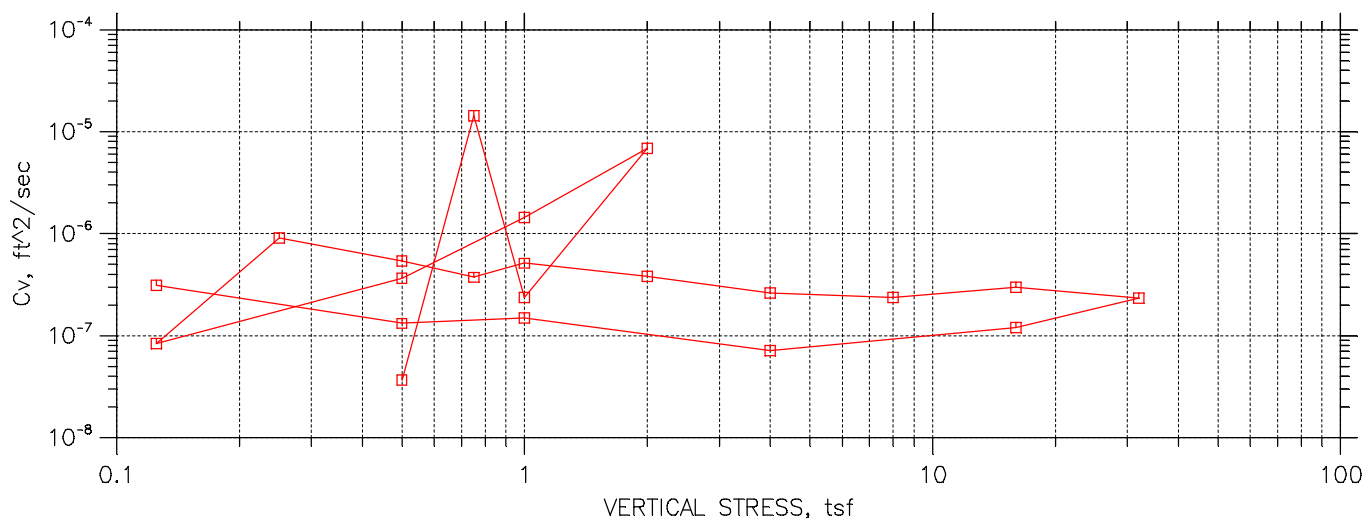
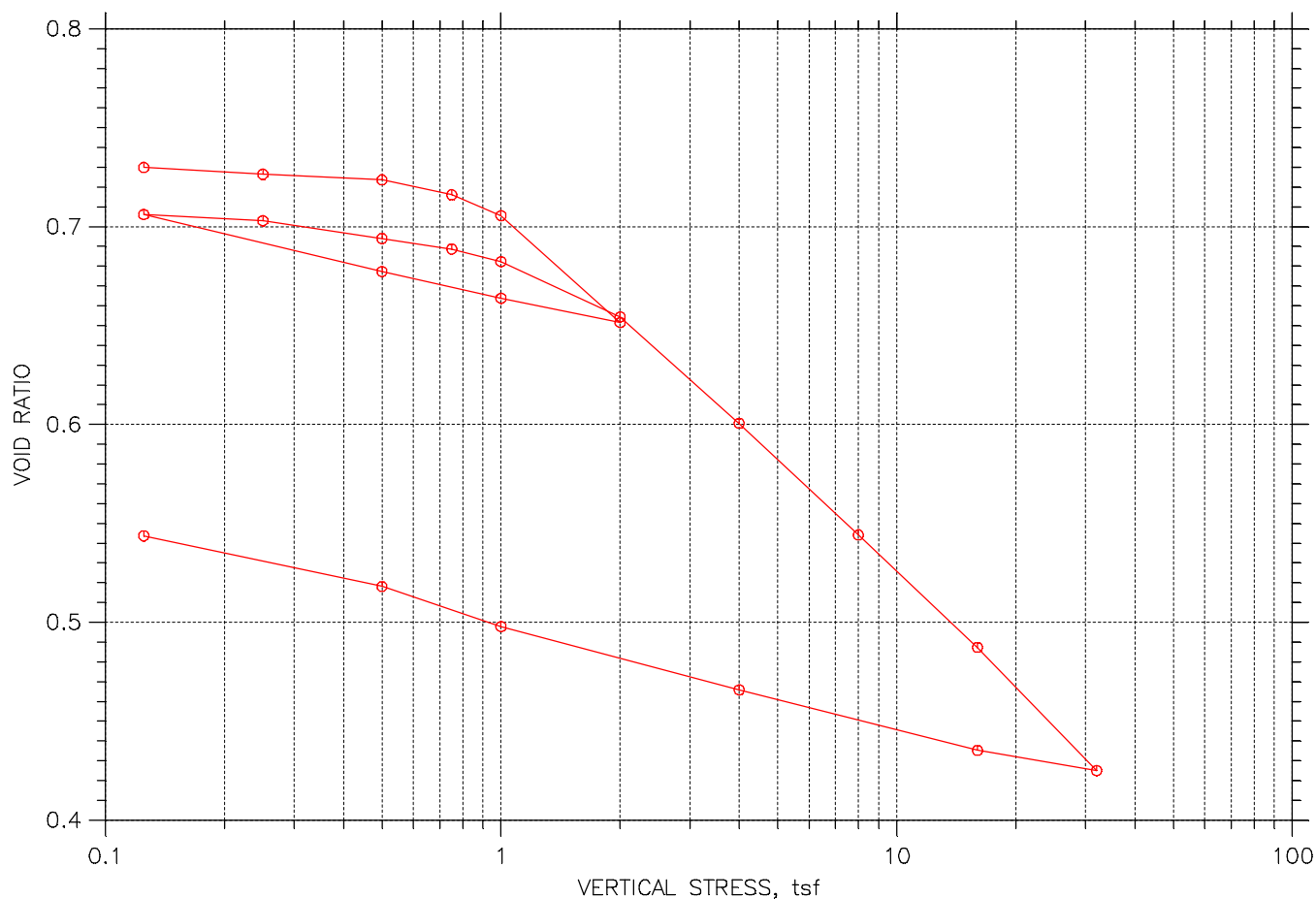
ONE DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS USING INCREMENTAL LOADING ASTM D2435



				Before Test	After Test	
				Water Content, %	20.24	19.20
Preconsolidation Pressure: 1.8 tsf				Dry Unit Weight, pcf	99.87	110.4
Compression Index: 0.206				Saturation, %	78.23	96.38
Diameter: 2.501 in		Height: 0.748 in		Void Ratio	0.71	0.54
LL: 33	PL: 20	PI: 13	GS: 2.73			

	Project: UPRR GRADE SEPARATION		Location: LITTLE ROCK, AR	Project No.: 35185112
	Boring No.: B-1 S-9		Tested By: BCM	Checked By: WPQ
	Sample No.: S-9		Test Date: 8/23/19	Depth: 28.5'-30.5'
	Test No.: B1S9CON		Sample Type: 3.0" ST	Elevation: -----
	Description: GRAY AND DARK GRAY LEAN CLAY			
	Remarks: Pc = 1.8 tsf Cc = 0.206 Ccr = 0.046 TEST PERFORMED AS PER ASTM D2435			

ONE DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS USING INCREMENTAL LOADING ASTM D2435



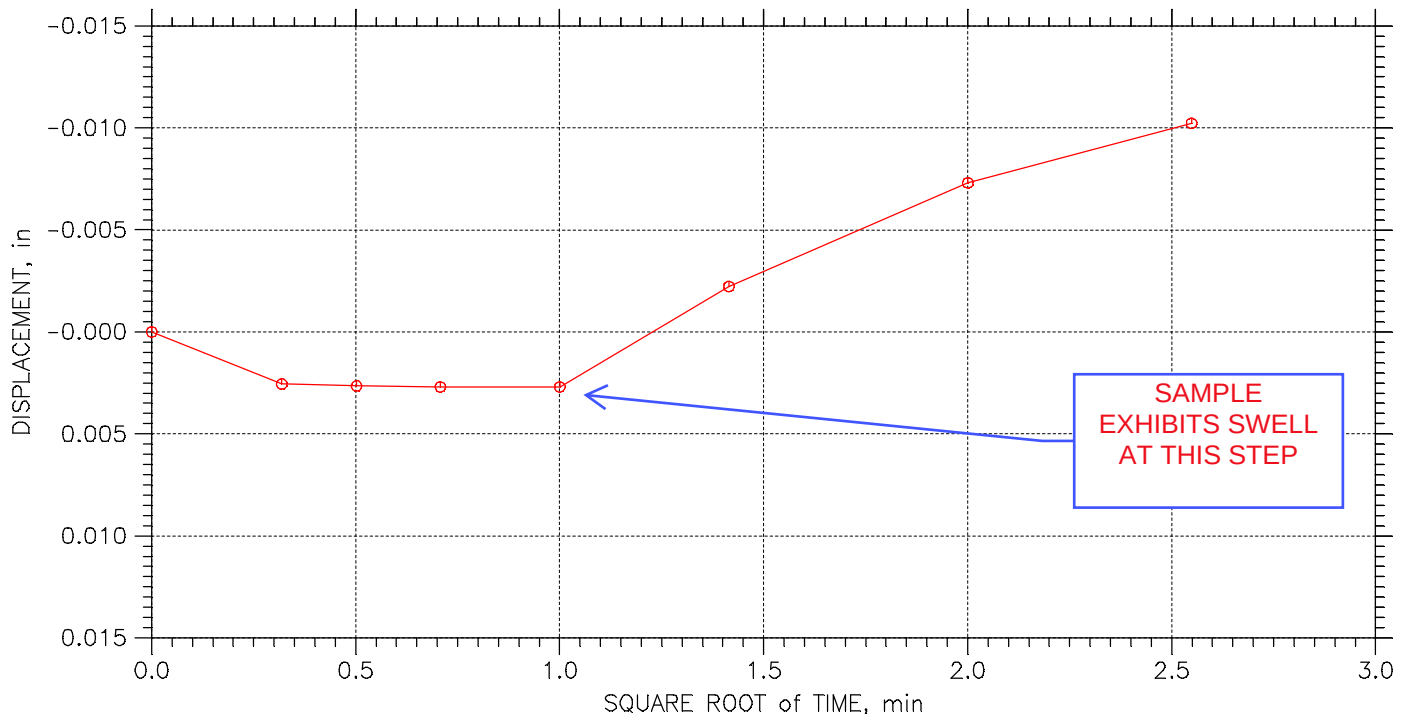
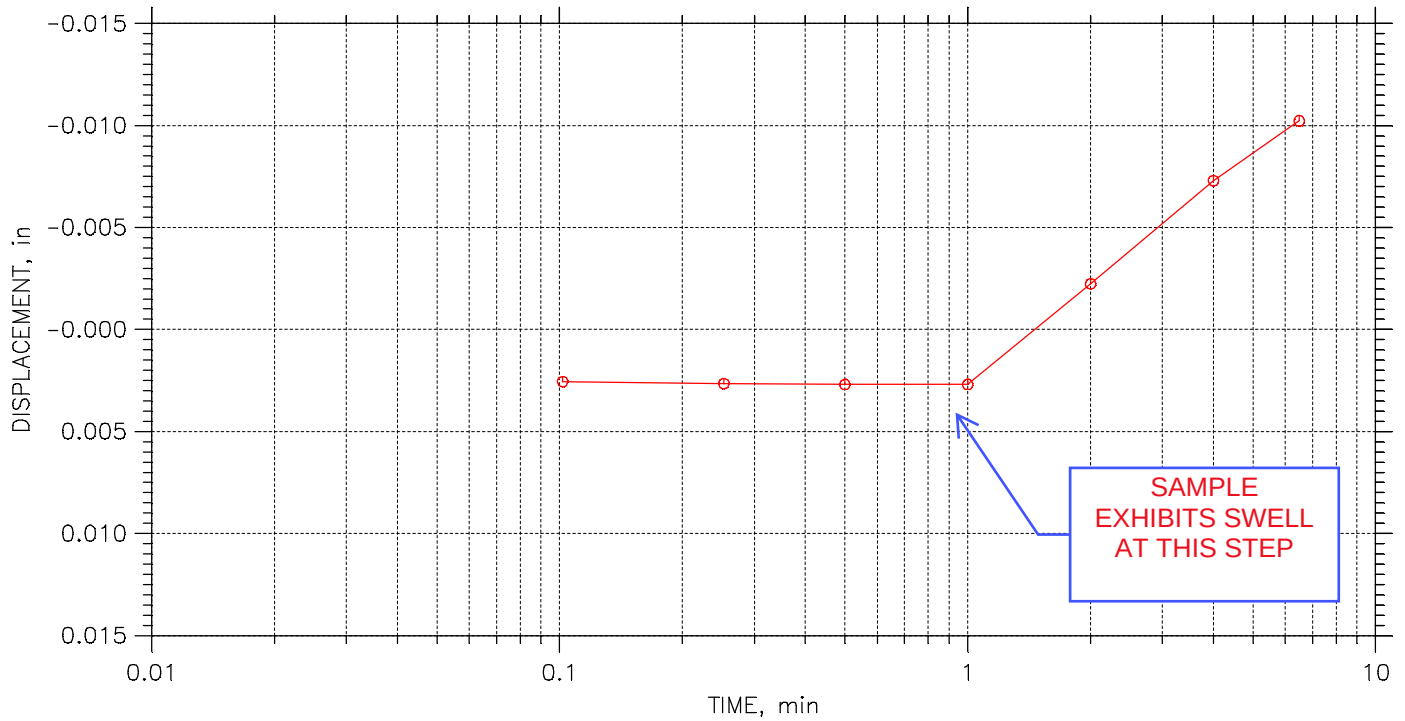
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	Boring No.: B-1 S-9	Tested By: BCM	Checked By: WPQ
	Sample No.: S-9	Test Date: 8/23/19	Depth: 28.5'-30.5'
	Test No.: B1S9CON	Sample Type: 3.0" ST	Elevation: -----
	Description: GRAY AND DARK GRAY LEAN CLAY		
	Remarks: $P_c = 1.8$ tsf $C_c = 0.206$ $C_{cr} = 0.046$ TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 1 of 23

Stress: 0.125 tsf



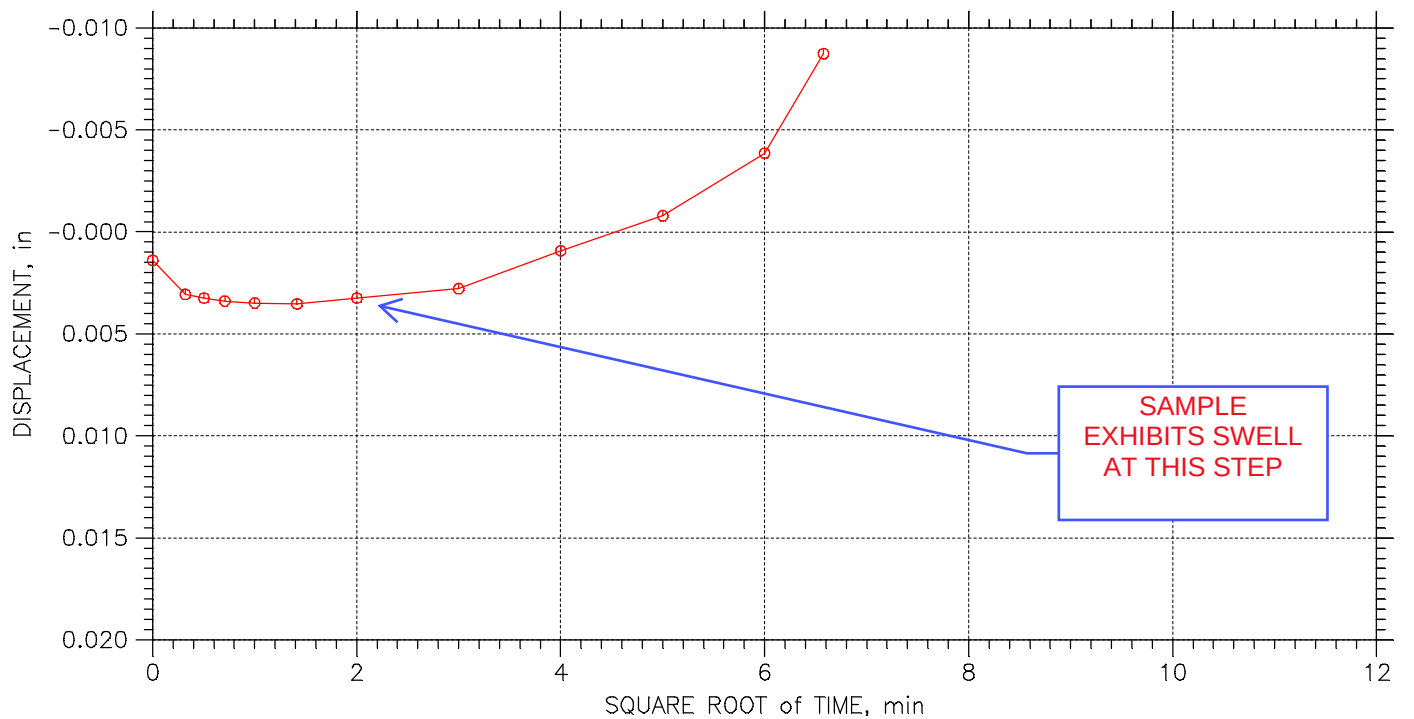
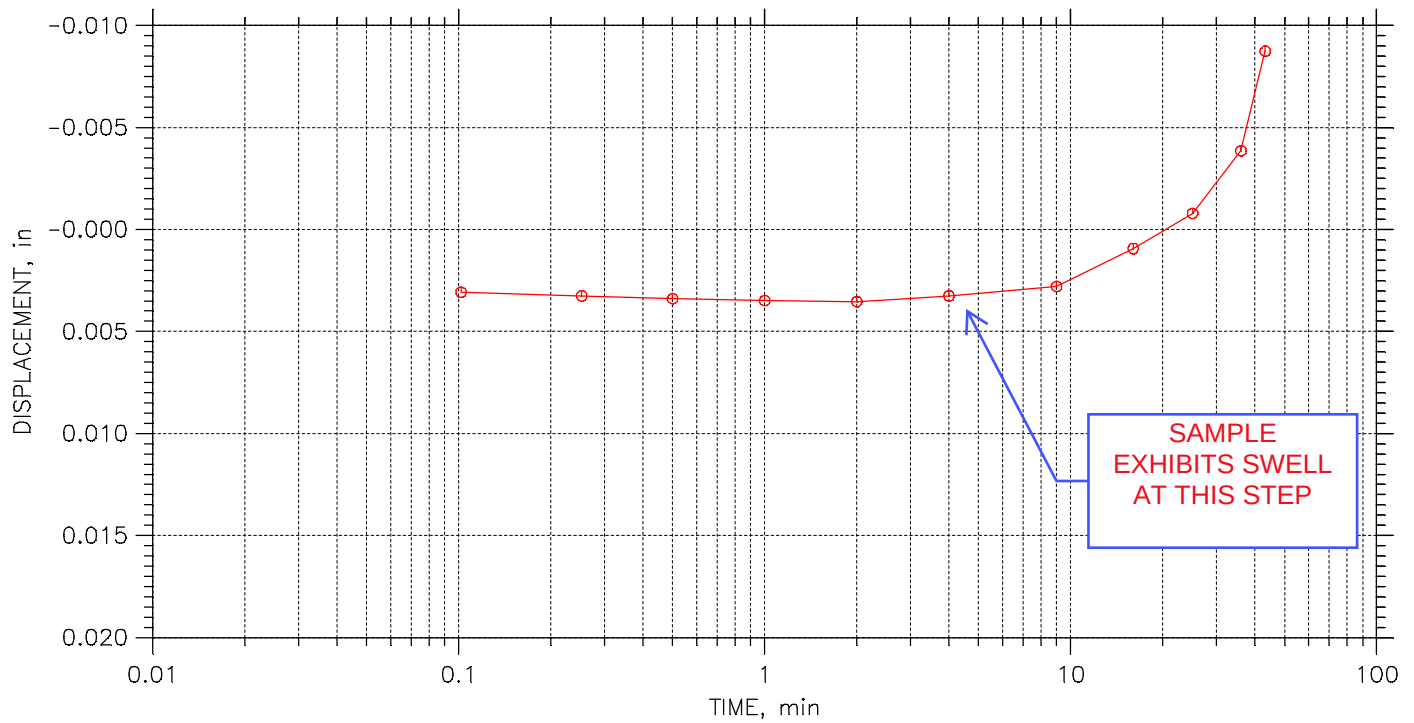
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	Boring No.: B-1 S-9	Tested By: BCM	Checked By: WPQ
	Sample No.: S-9	Test Date: 8/23/19	Depth: 28.5'-30.5'
	Test No.: B1S9CON	Sample Type: 3.0" ST	Elevation: -----
	Description: GRAY AND DARK GRAY LEAN CLAY		
	Remarks: Pc = 1.8 tsf Cc = 0.206 Ccr = 0.046 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 2 of 23

Stress: 0.25 tsf



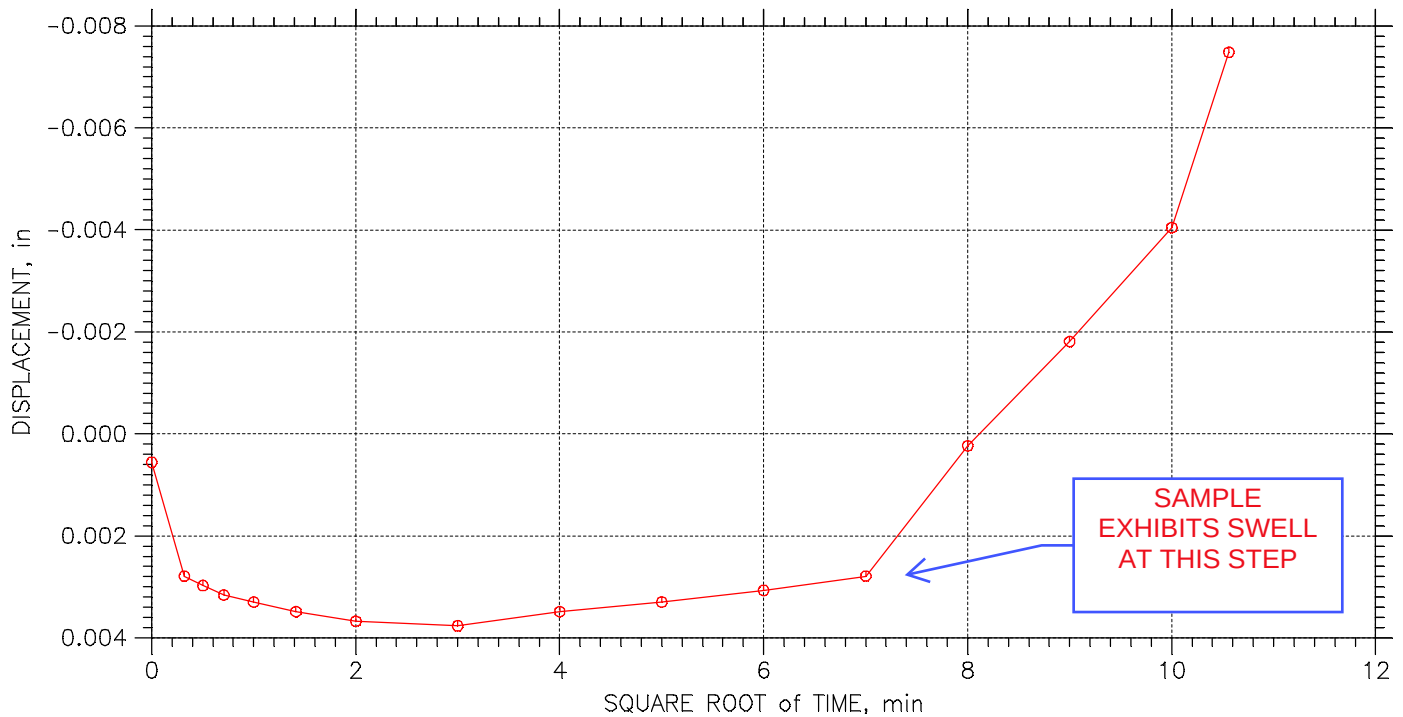
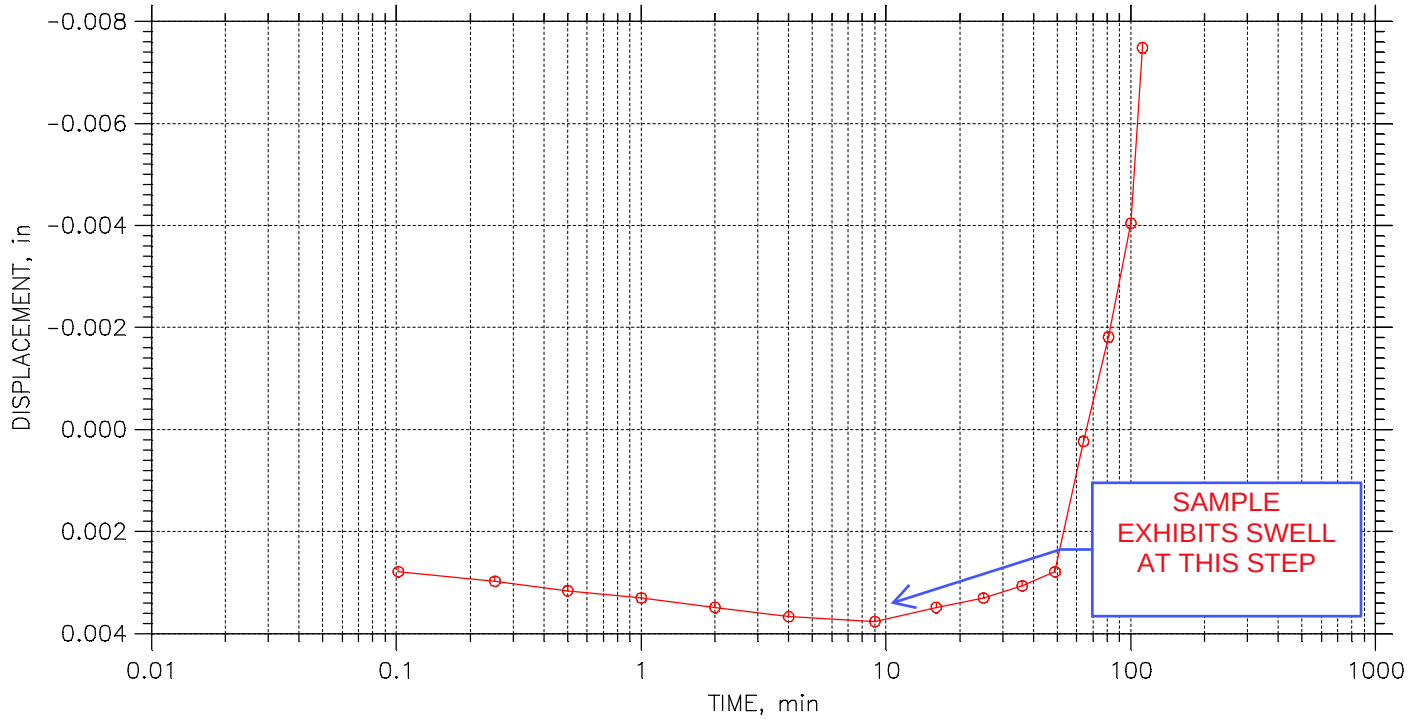
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	Boring No.: B-1 S-9	Tested By: BCM	Checked By: WPQ
	Sample No.: S-9	Test Date: 8/23/19	Depth: 28.5'-30.5'
	Test No.: B1S9CON	Sample Type: 3.0" ST	Elevation: -----
	Description: GRAY AND DARK GRAY LEAN CLAY		
	Remarks: Pc = 1.8 tsf Cc = 0.206 Ccr = 0.046 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 3 of 23

Stress: 0.5 tsf



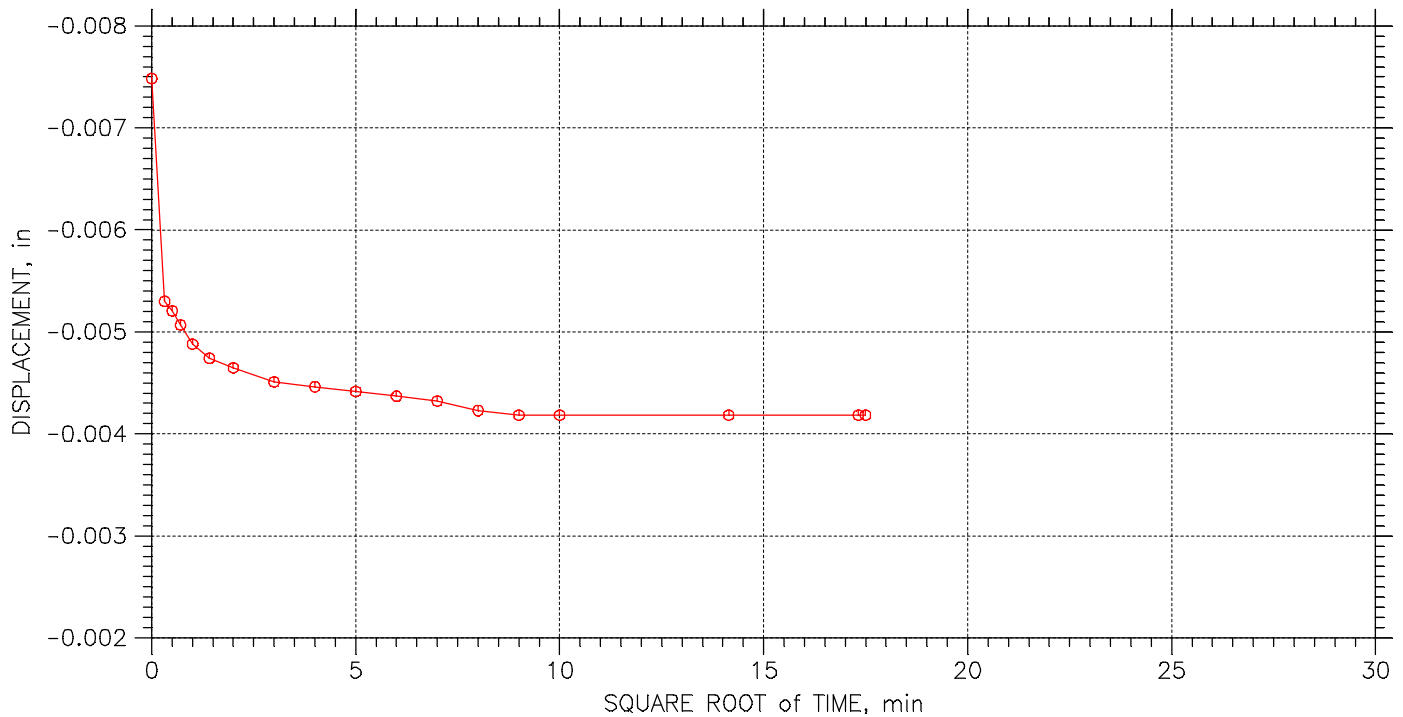
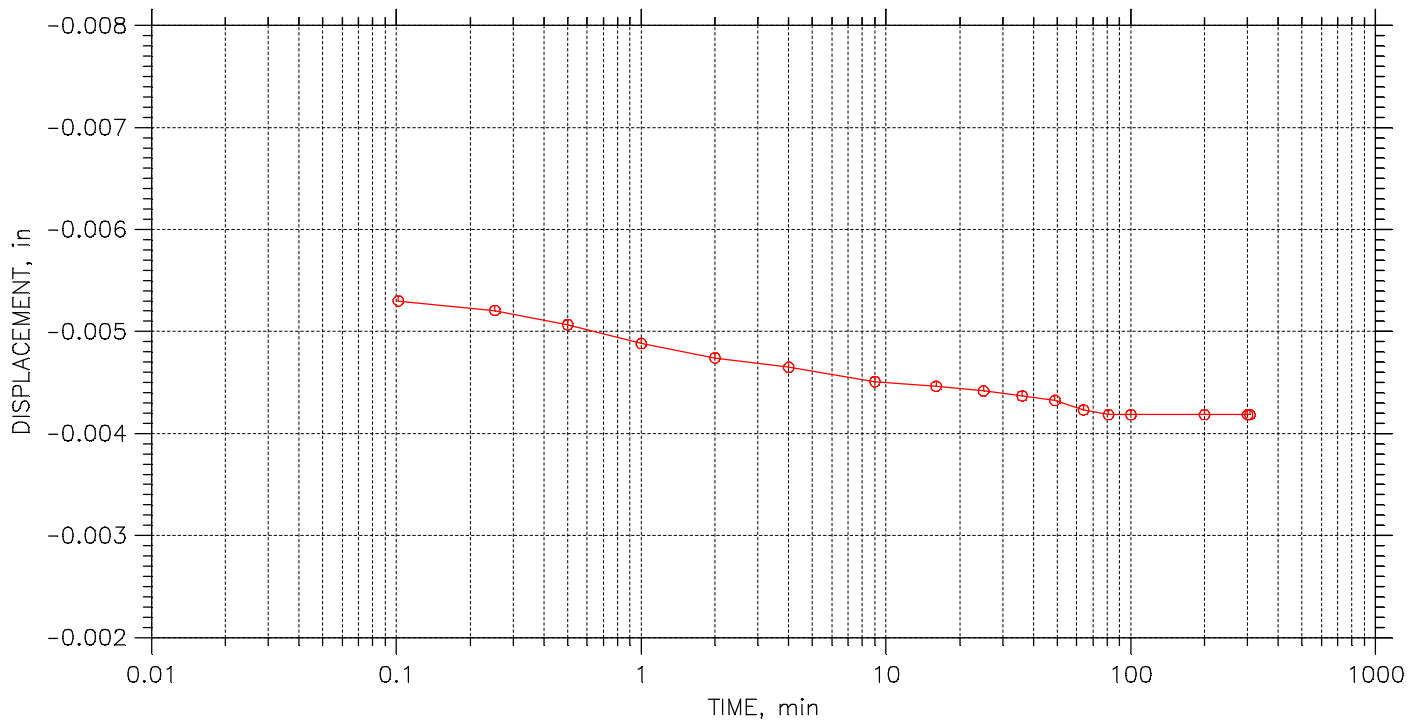
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	Boring No.: B-1 S-9	Tested By: BCM	Checked By: WPQ
	Sample No.: S-9	Test Date: 8/23/19	Depth: 28.5'-30.5'
	Test No.: B1S9CON	Sample Type: 3.0" ST	Elevation: -----
	Description: GRAY AND DARK GRAY LEAN CLAY		
	Remarks: Pc = 1.8 tsf Cc = 0.206 Ccr = 0.046 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 4 of 23

Stress: 0.75 tsf



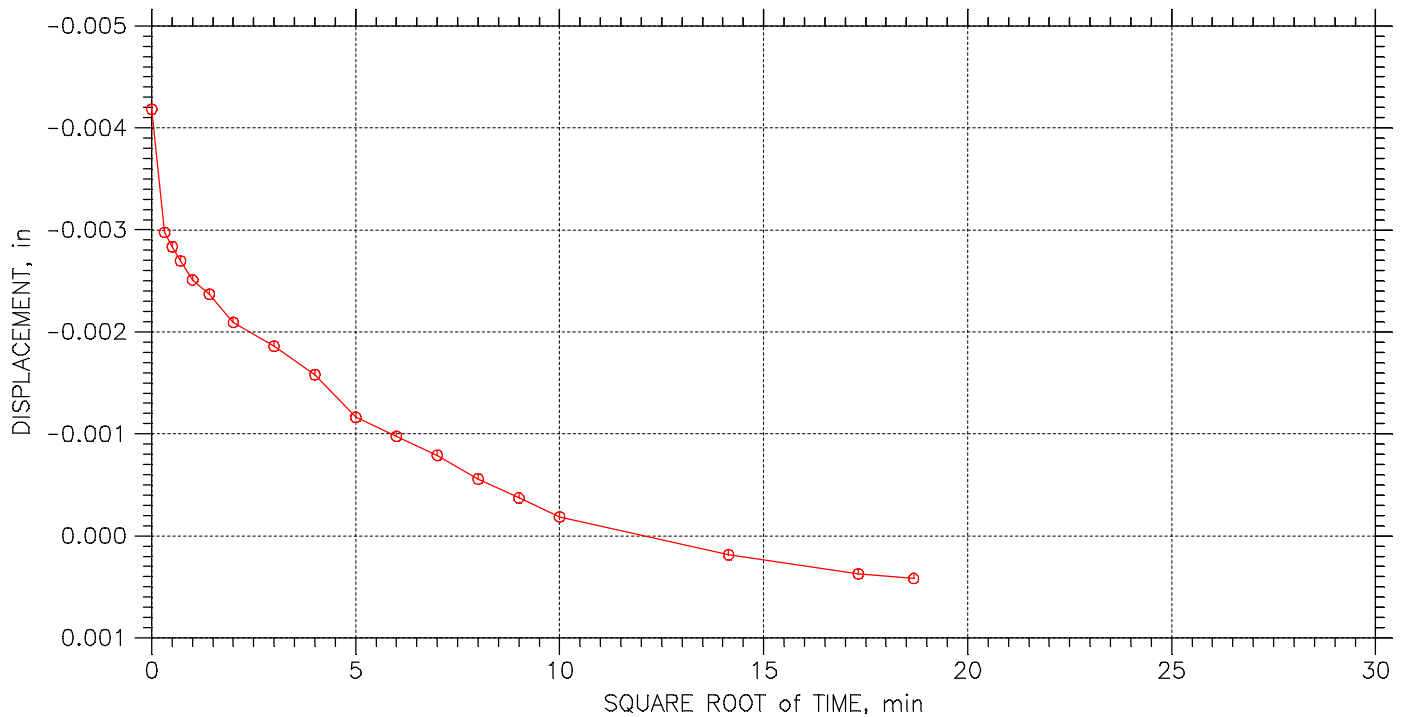
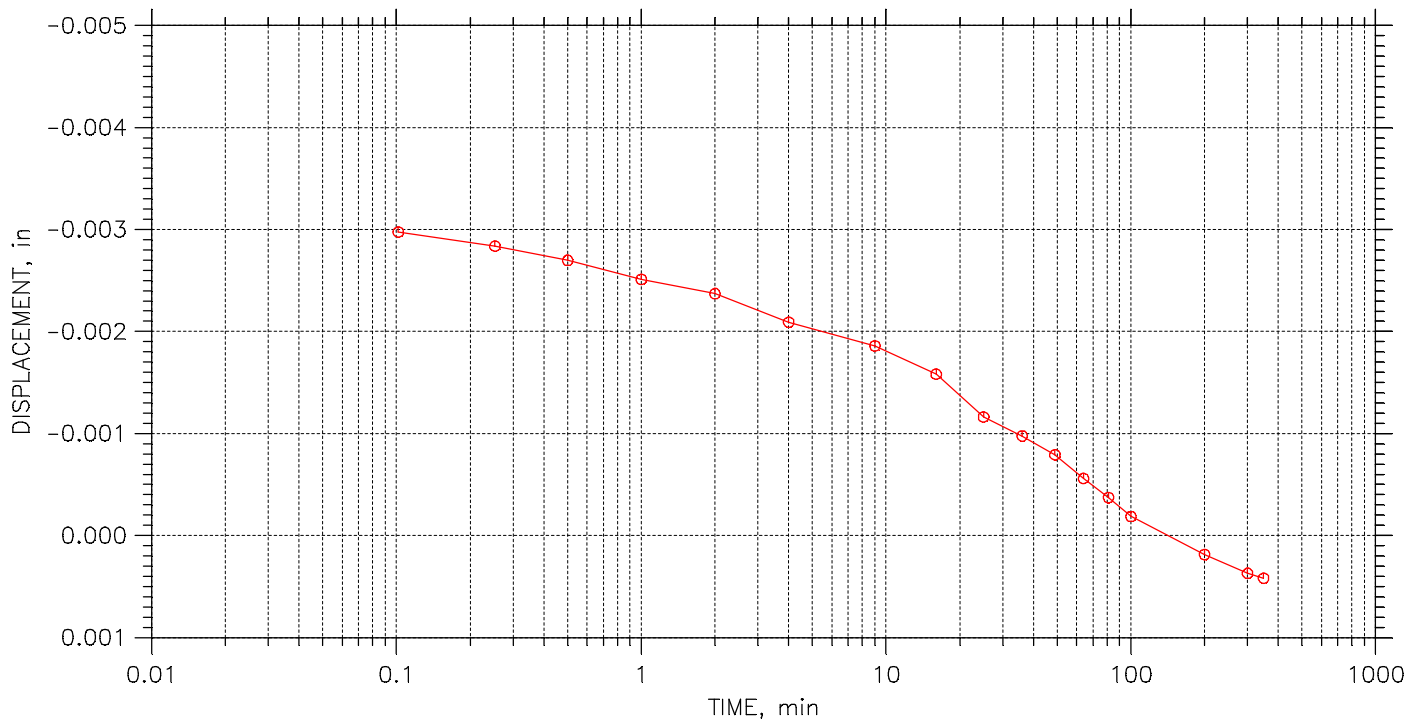
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	Boring No.: B-1 S-9	Tested By: BCM	Checked By: WPQ
	Sample No.: S-9	Test Date: 8/23/19	Depth: 28.5'-30.5'
	Test No.: B1S9CON	Sample Type: 3.0" ST	Elevation: -----
	Description: GRAY AND DARK GRAY LEAN CLAY		
	Remarks: Pc = 1.8 tsf Cc = 0.206 Ccr = 0.046 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 5 of 23

Stress: 1. tsf



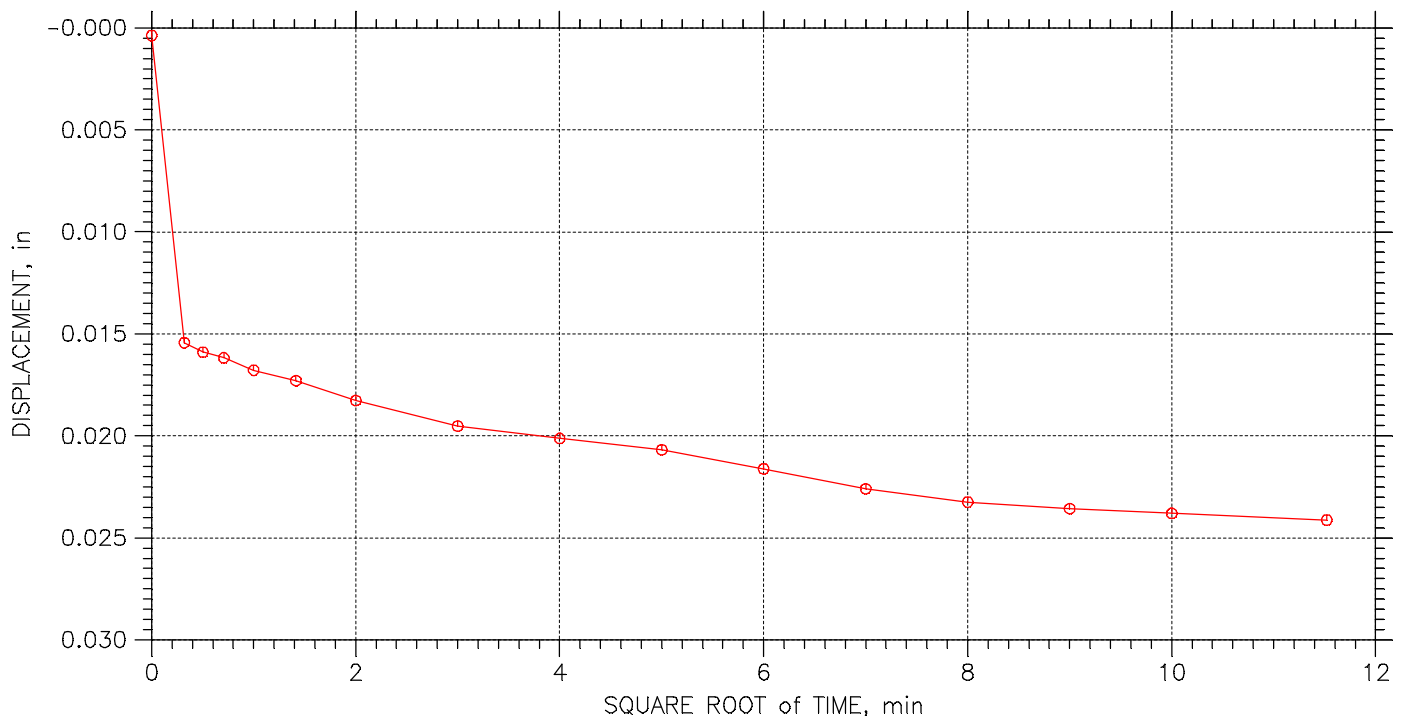
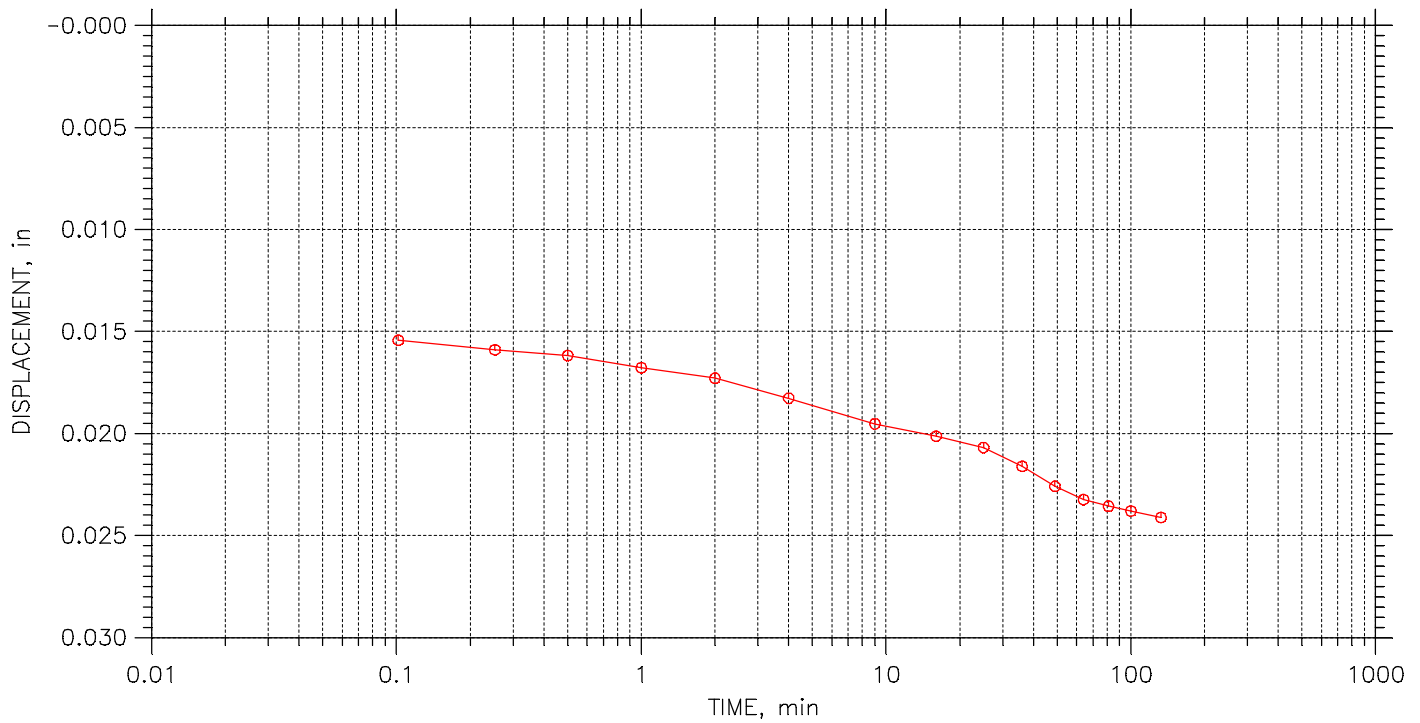
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	Boring No.: B-1 S-9	Tested By: BCM	Checked By: WPQ
	Sample No.: S-9	Test Date: 8/23/19	Depth: 28.5'-30.5'
	Test No.: B1S9CON	Sample Type: 3.0" ST	Elevation: -----
	Description: GRAY AND DARK GRAY LEAN CLAY		
	Remarks: Pc = 1.8 tsf Cc = 0.206 Ccr = 0.046 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 6 of 23

Stress: 2. tsf



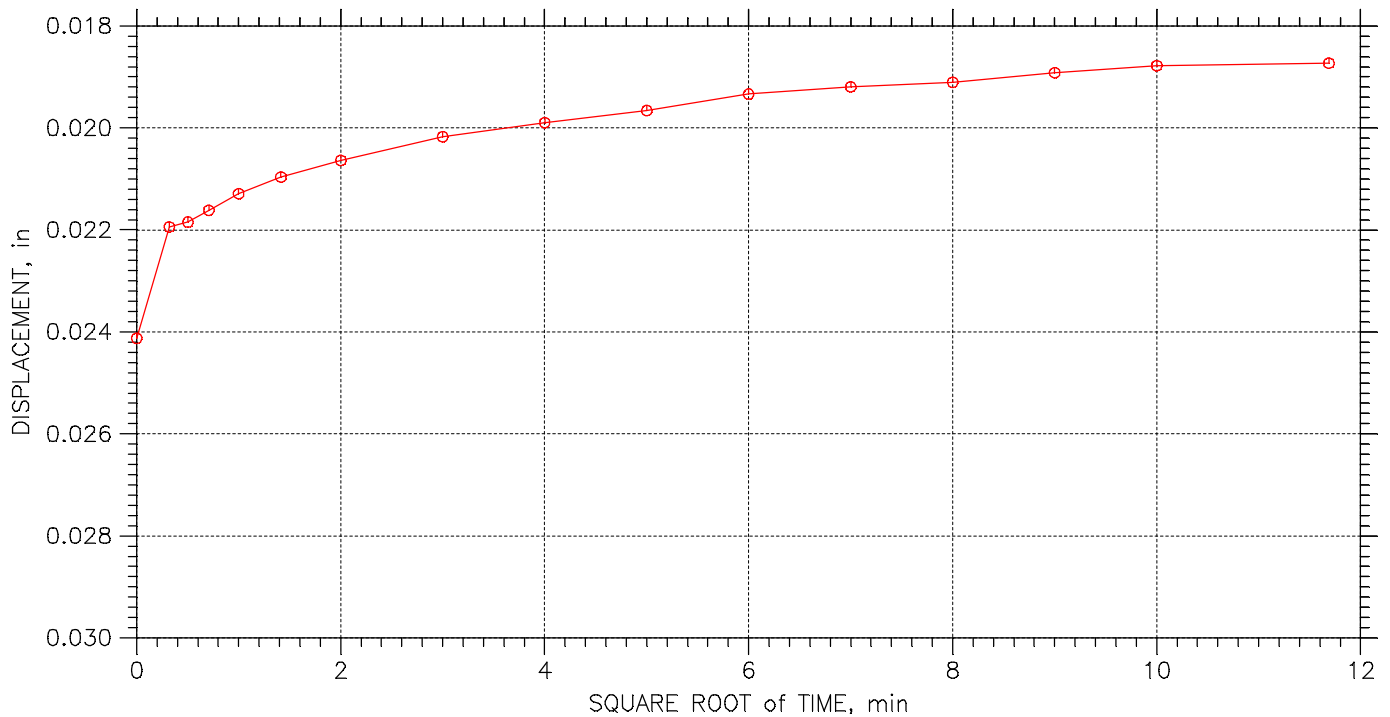
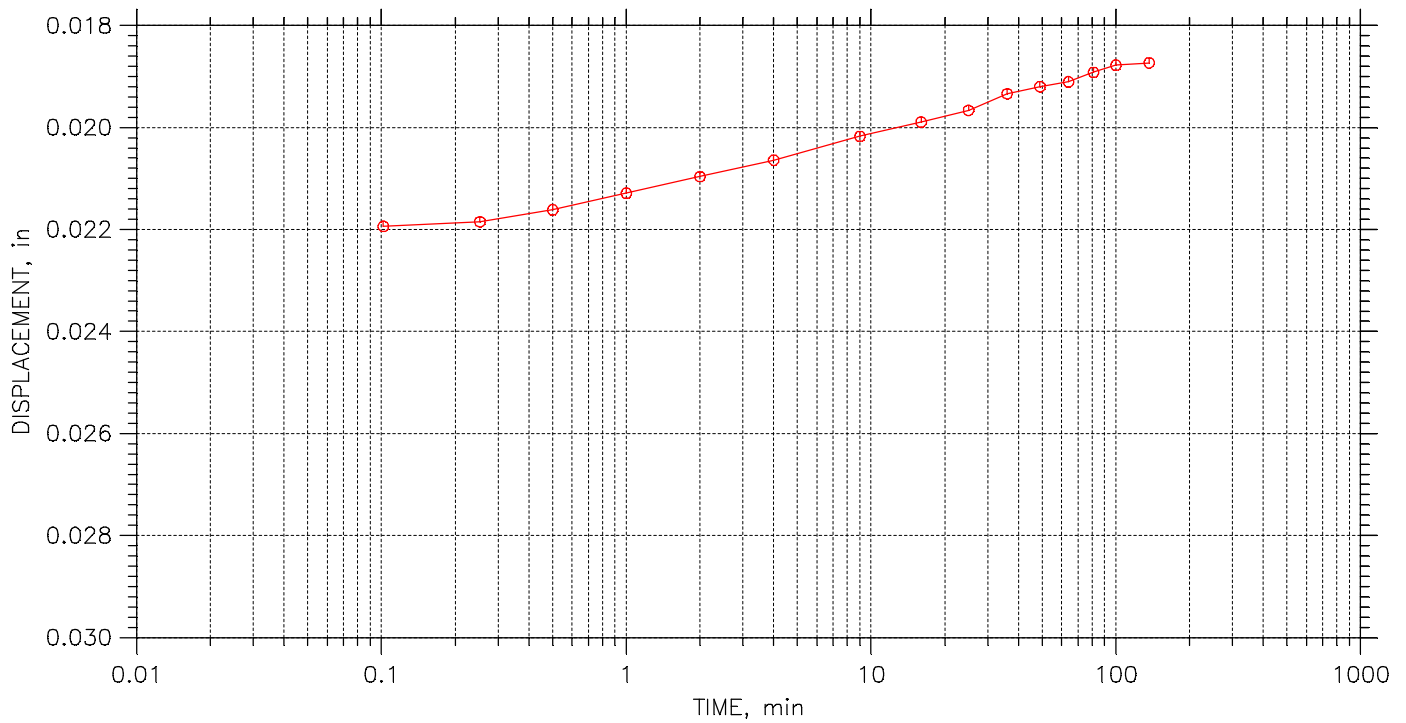
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	Boring No.: B-1 S-9	Tested By: BCM	Checked By: WPQ
	Sample No.: S-9	Test Date: 8/23/19	Depth: 28.5'-30.5'
	Test No.: B1S9CON	Sample Type: 3.0" ST	Elevation: -----
	Description: GRAY AND DARK GRAY LEAN CLAY		
	Remarks: Pc = 1.8 tsf Cc = 0.206 Ccr = 0.046 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 7 of 23

Stress: 1. tsf



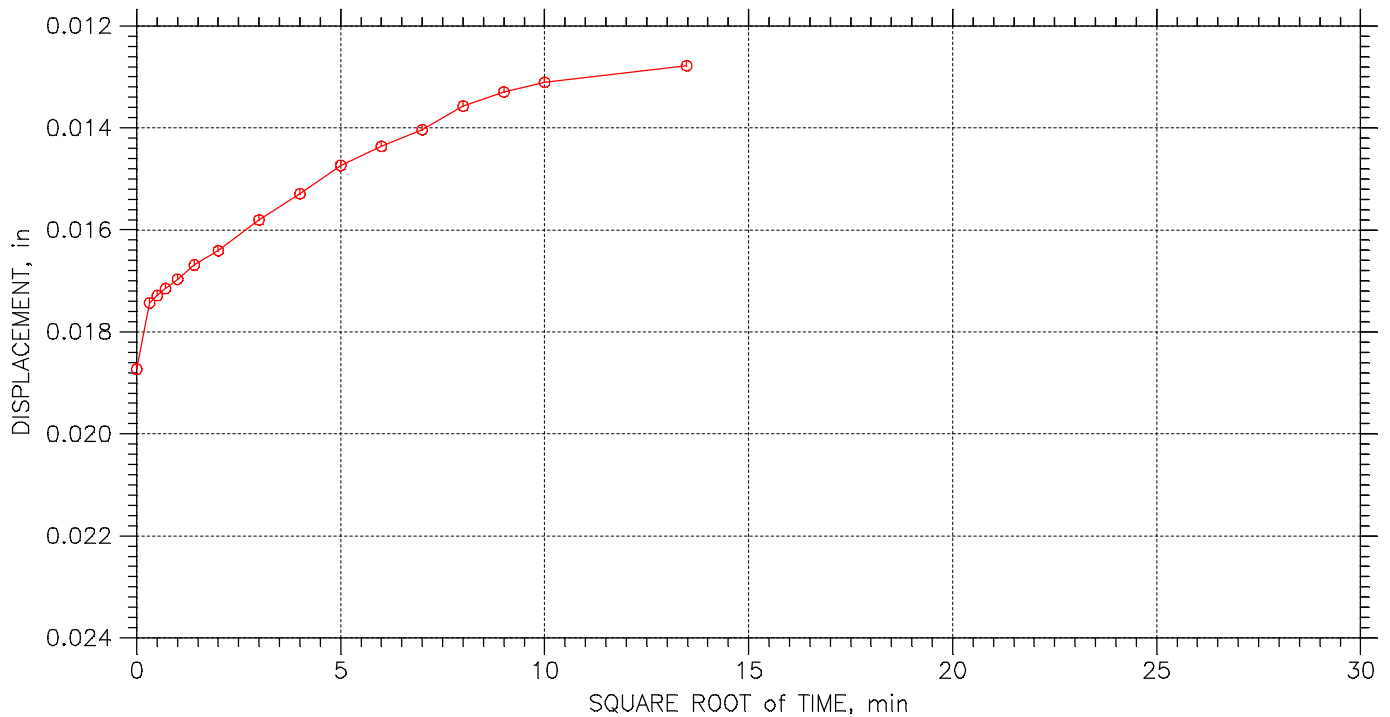
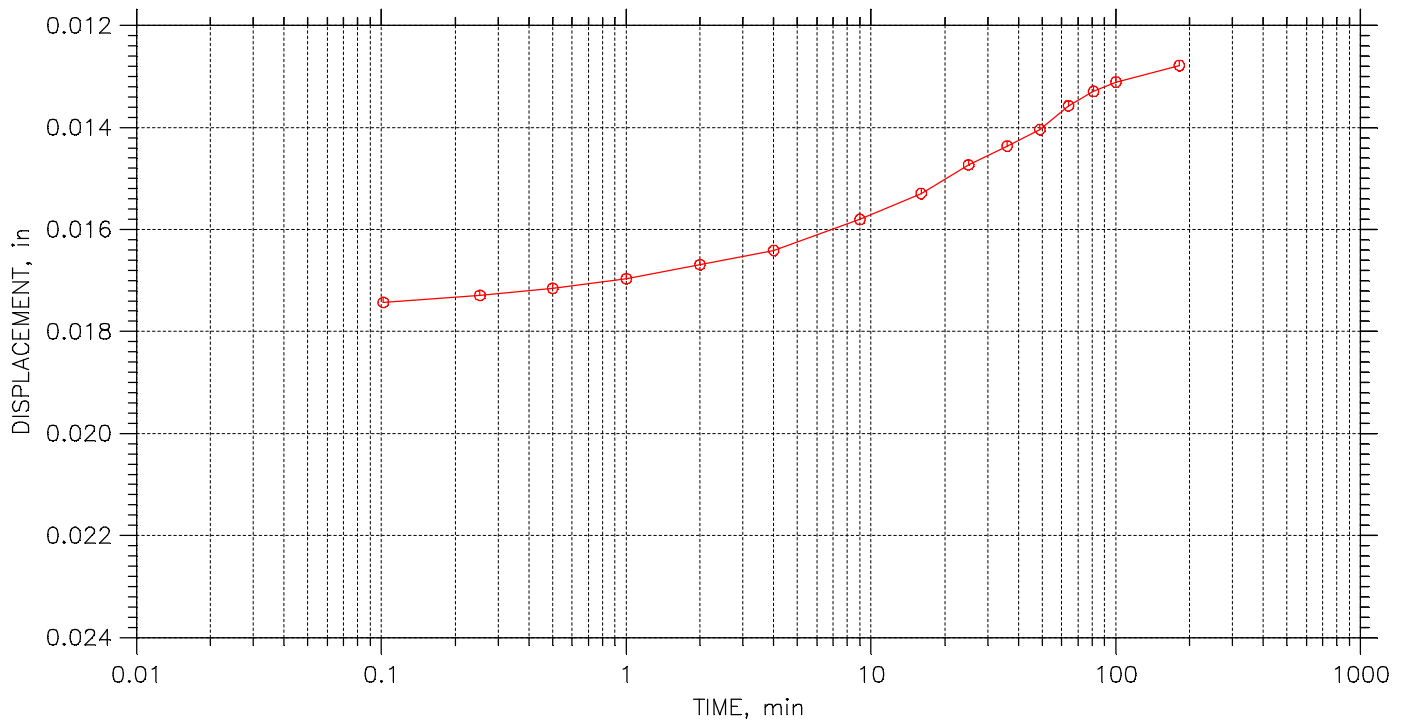
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	Boring No.: B-1 S-9	Tested By: BCM	Checked By: WPQ
	Sample No.: S-9	Test Date: 8/23/19	Depth: 28.5'-30.5'
	Test No.: B1S9CON	Sample Type: 3.0" ST	Elevation: -----
	Description: GRAY AND DARK GRAY LEAN CLAY		
	Remarks: Pc = 1.8 tsf Cc = 0.206 Ccr = 0.046 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 8 of 23

Stress: 0.5 tsf



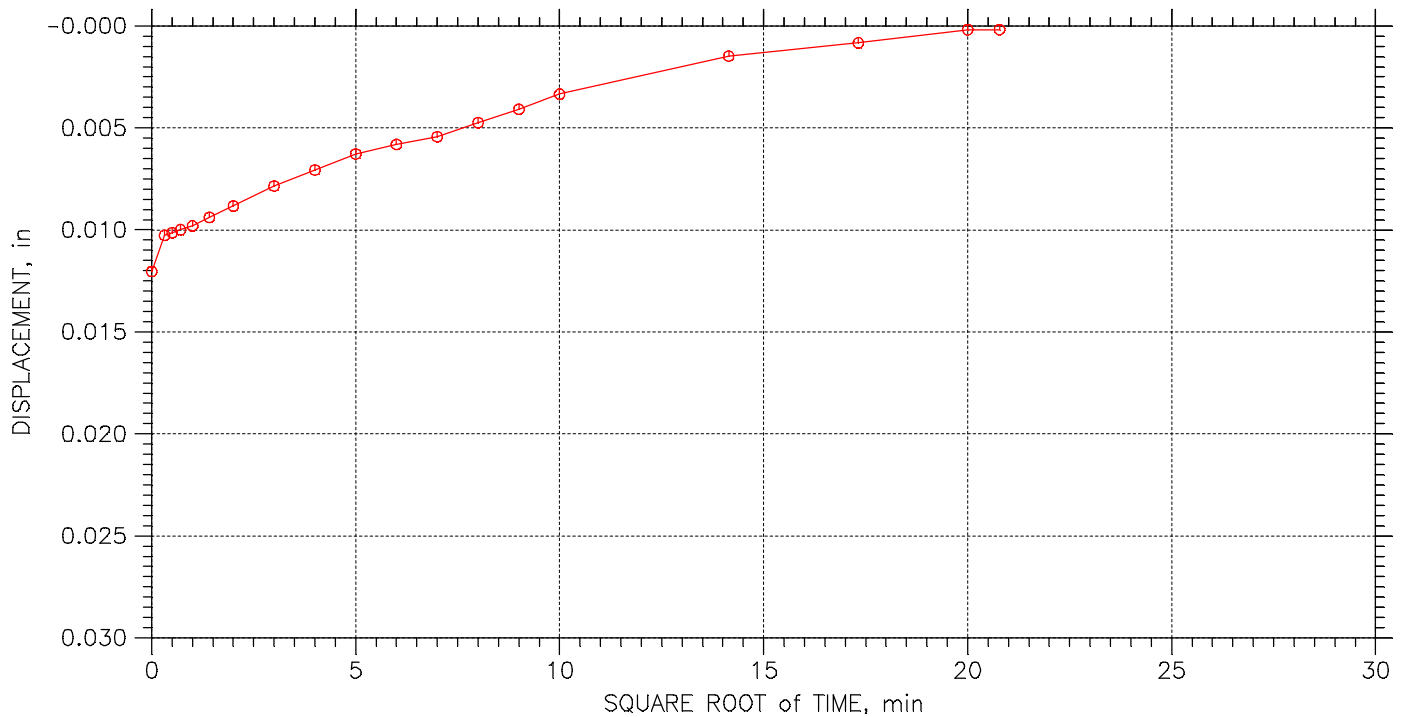
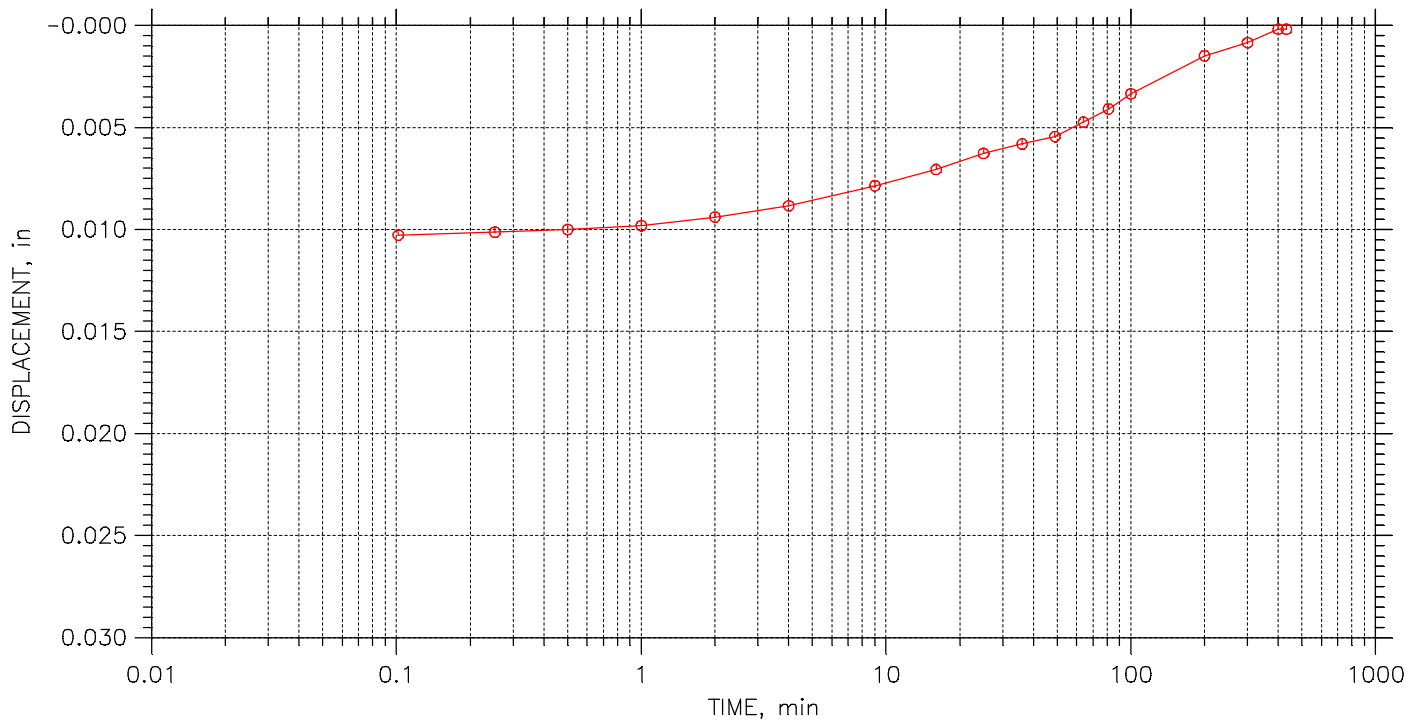
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	Sample No.: S-9	Test Date: 8/23/19	Depth: 28.5'-30.5'
	Test No.: B1S9CON	Sample Type: 3.0" ST	Elevation: -----
	Description: GRAY AND DARK GRAY LEAN CLAY		
	Remarks: Pc = 1.8 tsf Cc = 0.206 Ccr = 0.046 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 9 of 23

Stress: 0.125 tsf



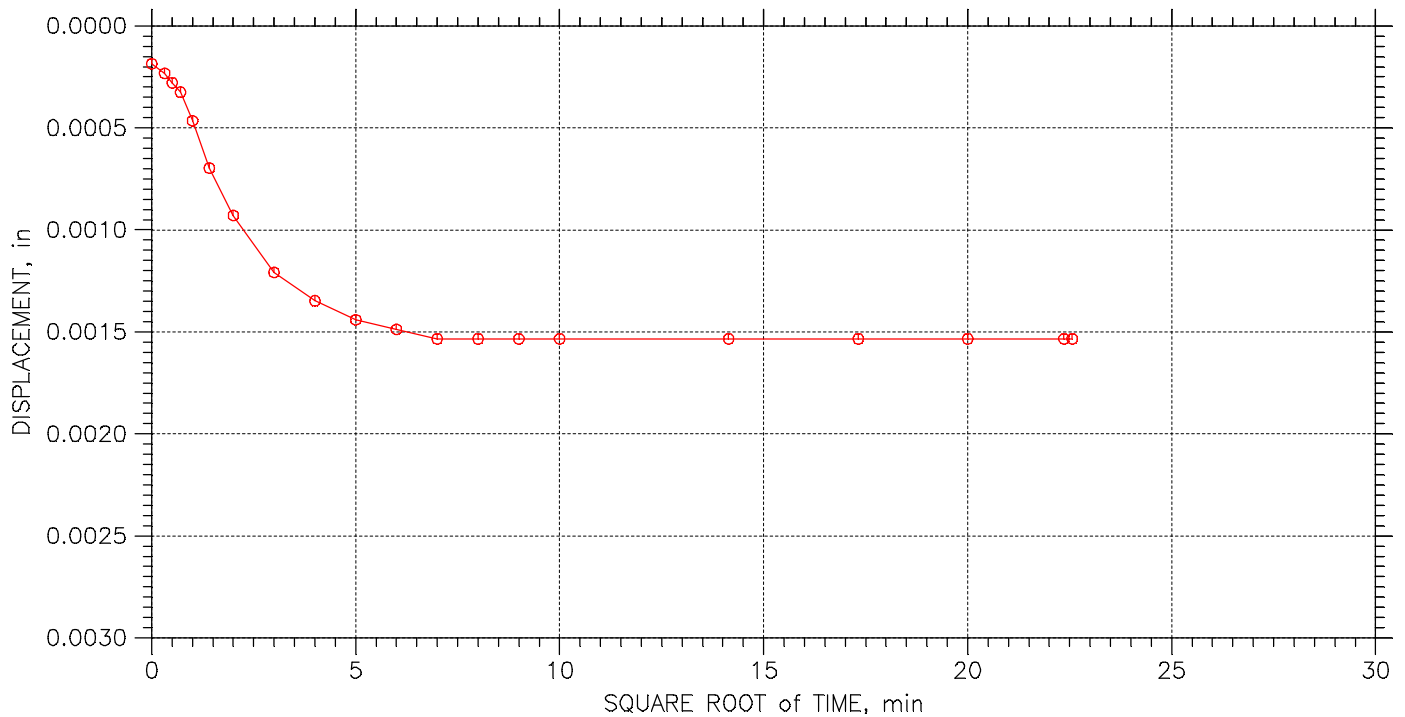
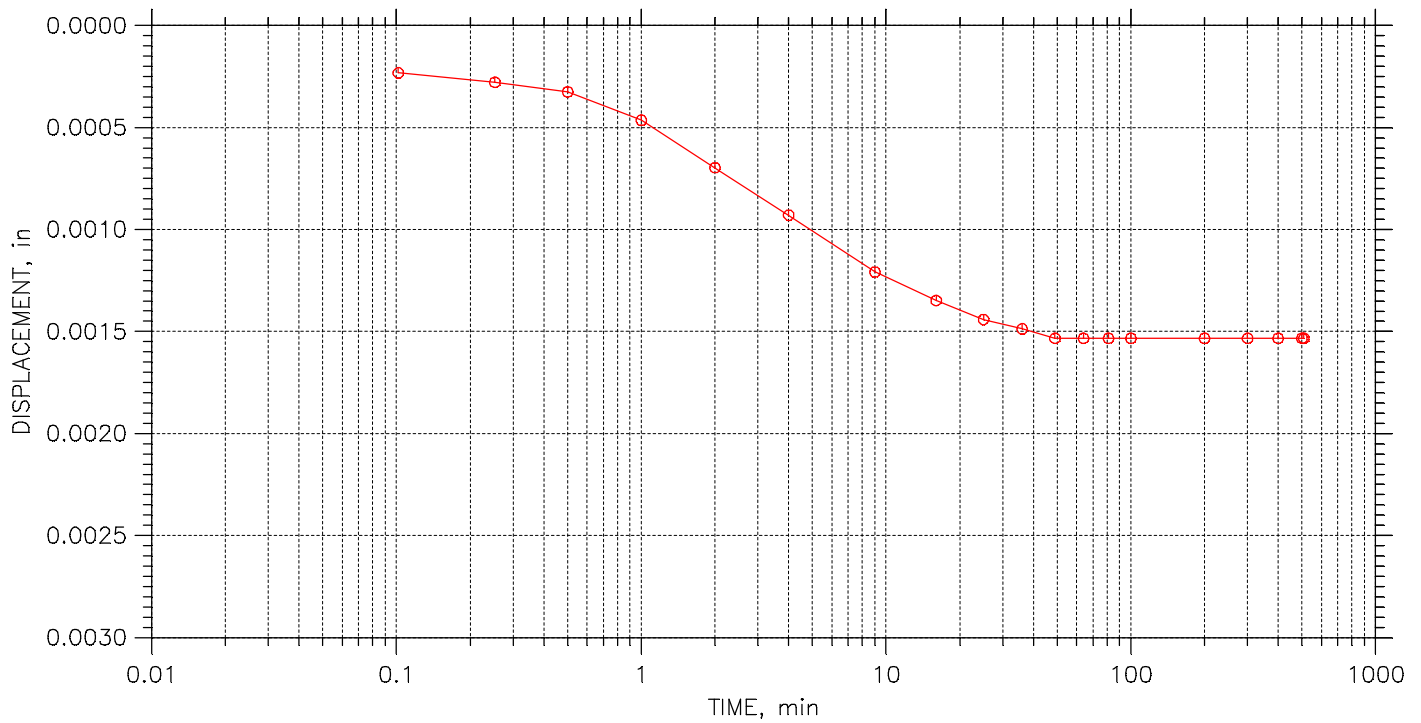
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	Boring No.: B-1 S-9	Tested By: BCM	Checked By: WPQ
	Sample No.: S-9	Test Date: 8/23/19	Depth: 28.5'-30.5'
	Test No.: B1S9CON	Sample Type: 3.0" ST	Elevation: -----
	Description: GRAY AND DARK GRAY LEAN CLAY		
	Remarks: Pc = 1.8 tsf Cc = 0.206 Ccr = 0.046 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 10 of 23

Stress: 0.25 tsf



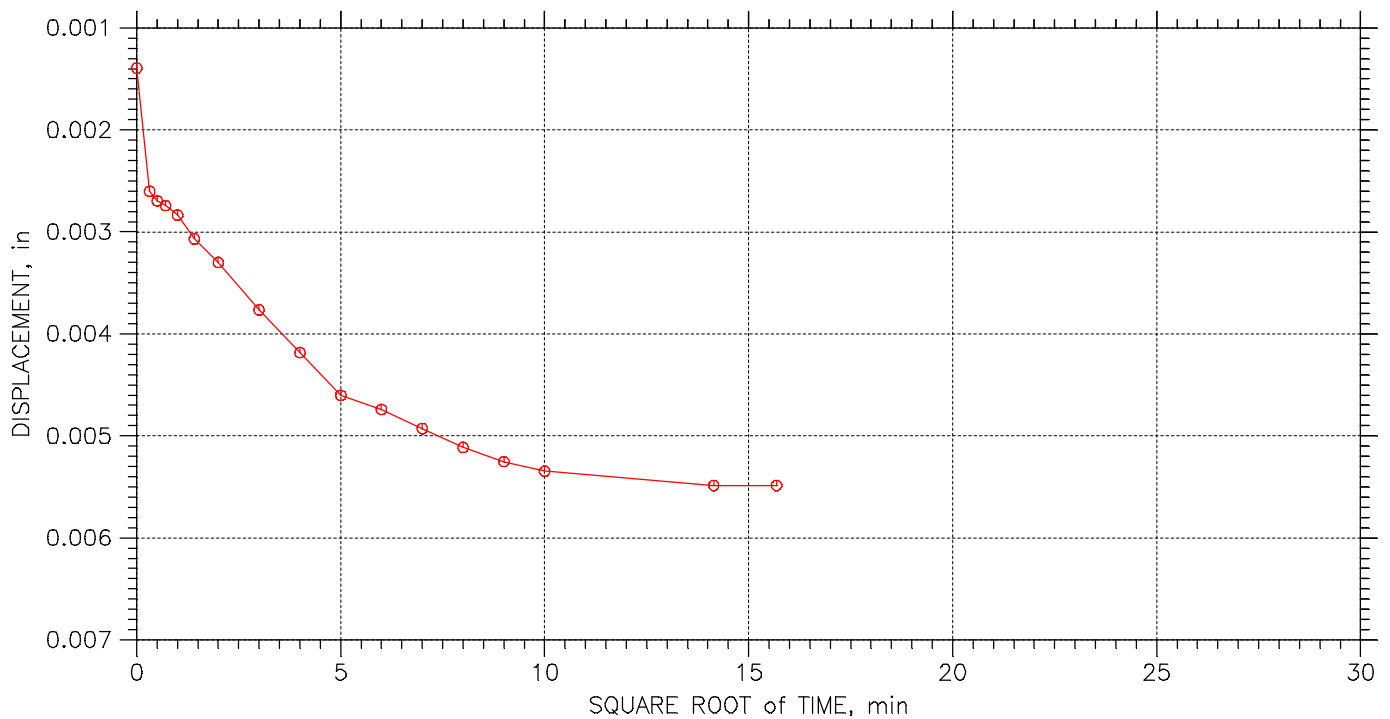
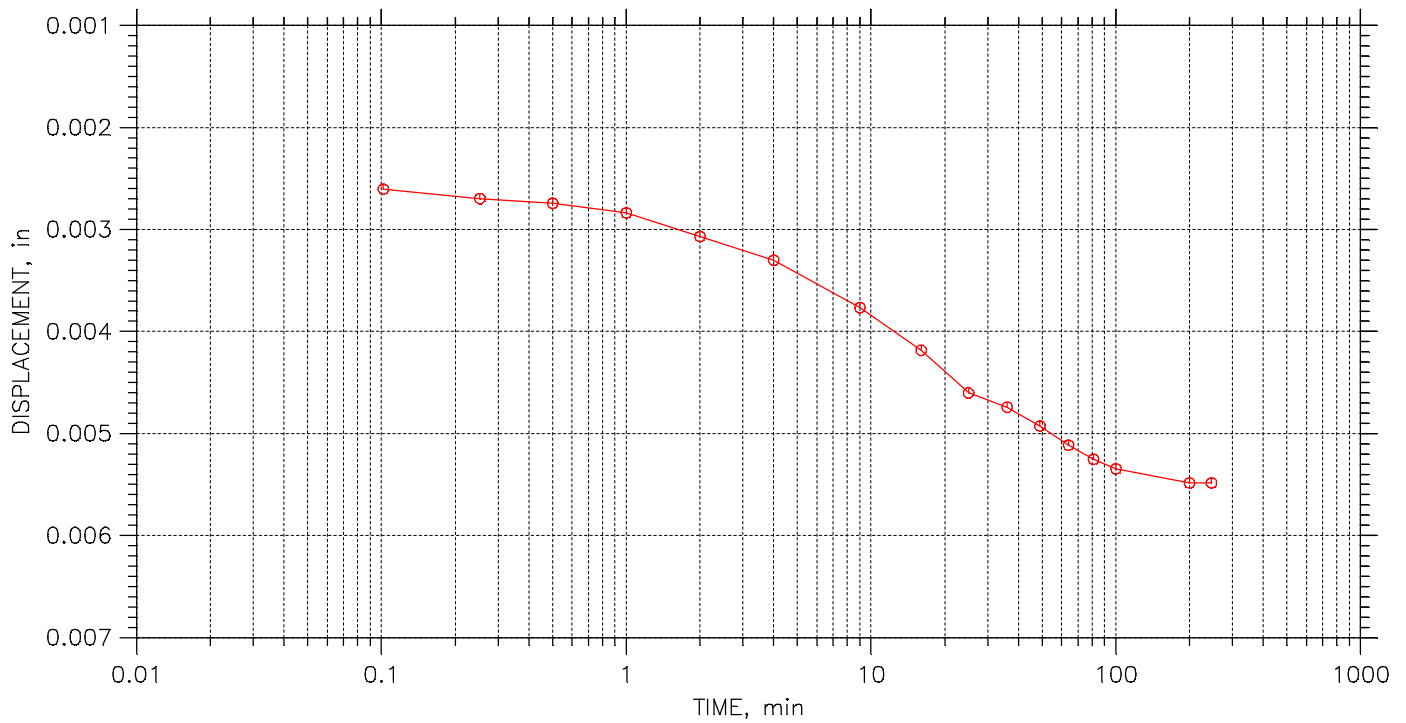
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	Boring No.: B-1 S-9	Tested By: BCM	Checked By: WPQ
	Sample No.: S-9	Test Date: 8/23/19	Depth: 28.5'-30.5'
	Test No.: B1S9CON	Sample Type: 3.0" ST	Elevation: -----
	Description: GRAY AND DARK GRAY LEAN CLAY		
	Remarks: Pc = 1.8 tsf Cc = 0.206 Ccr = 0.046 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 11 of 23

Stress: 0.5 tsf



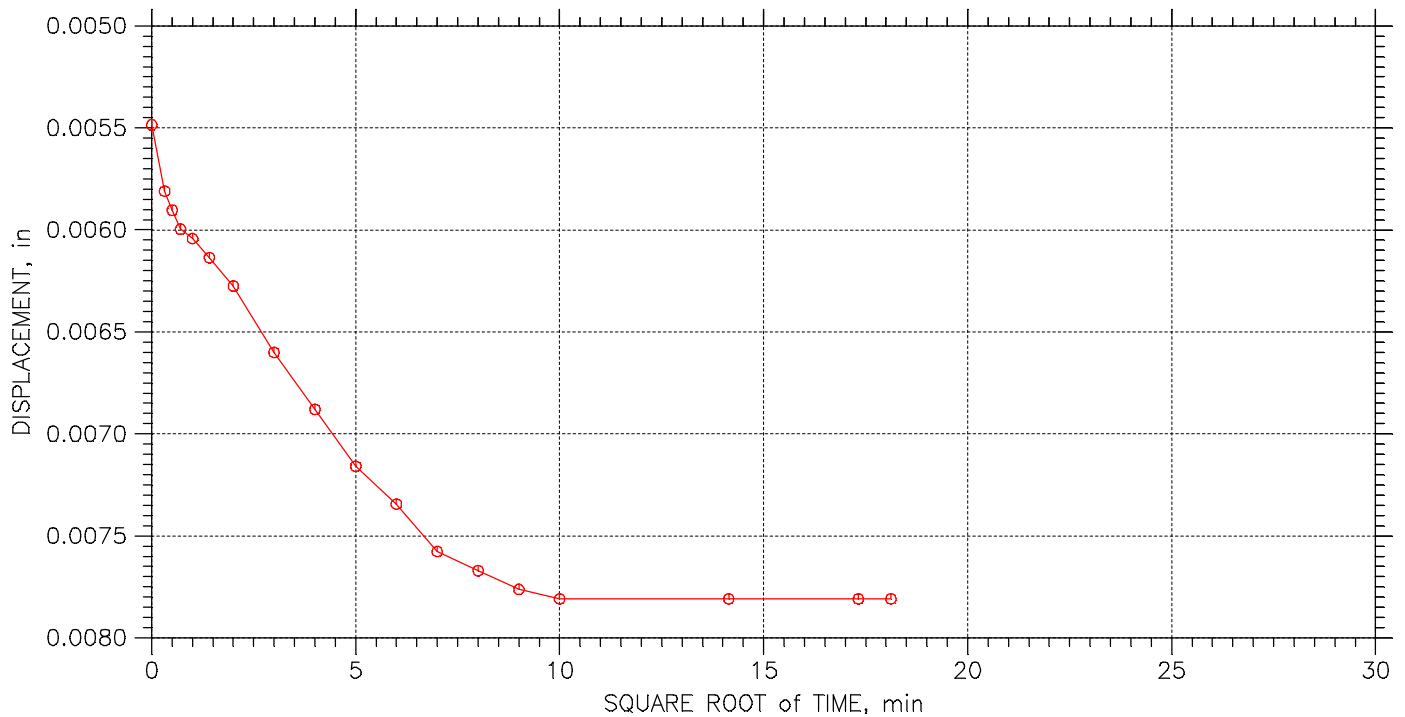
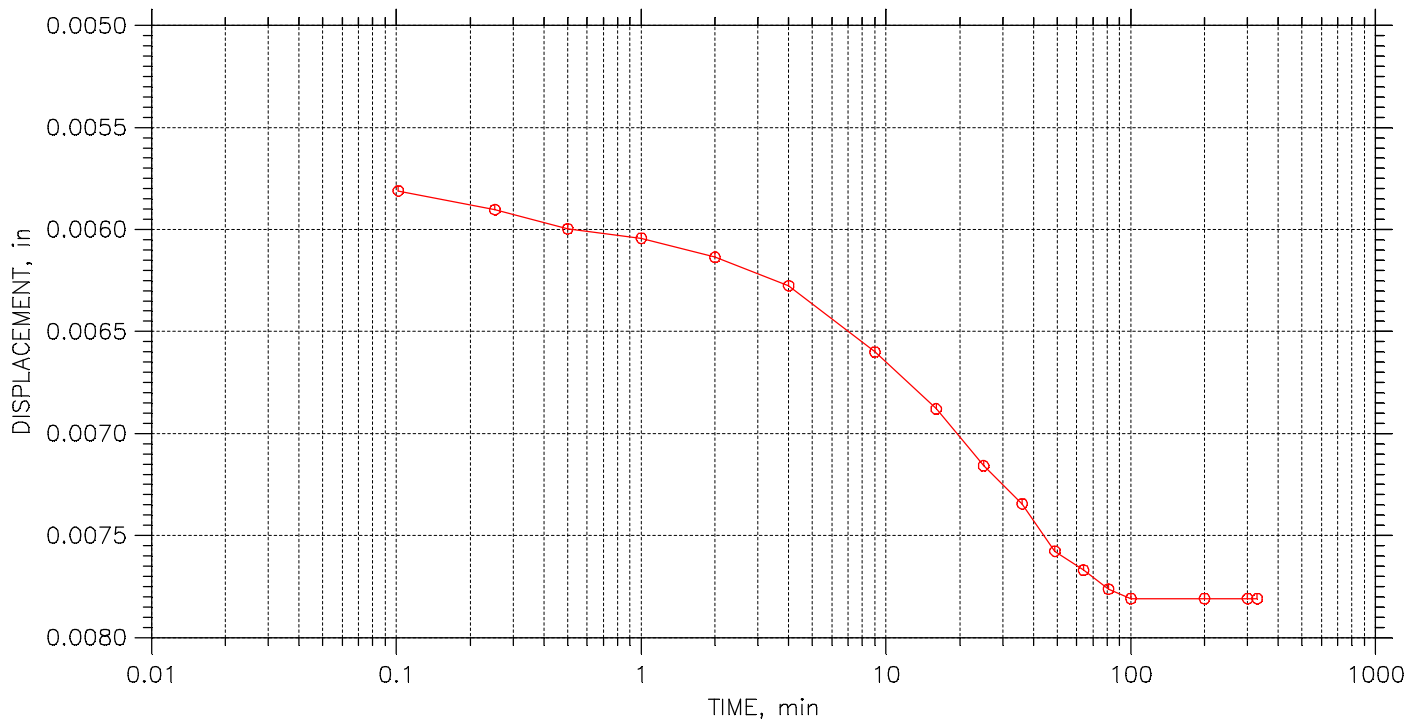
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	Boring No.: B-1 S-9	Tested By: BCM	Checked By: WPQ
	Sample No.: S-9	Test Date: 8/23/19	Depth: 28.5'-30.5'
	Test No.: B1S9CON	Sample Type: 3.0" ST	Elevation: -----
	Description: GRAY AND DARK GRAY LEAN CLAY		
	Remarks: Pc = 1.8 tsf Cc = 0.206 Ccr = 0.046 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 12 of 23

Stress: 0.75 tsf



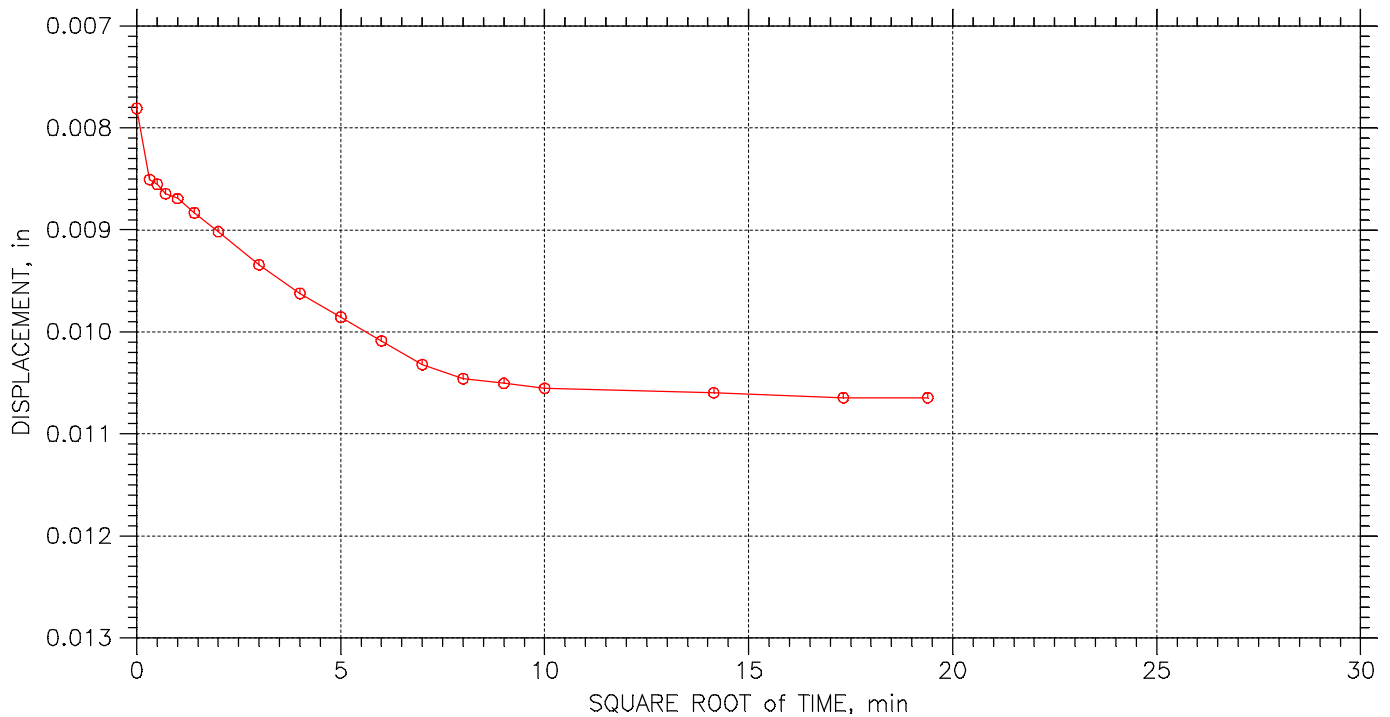
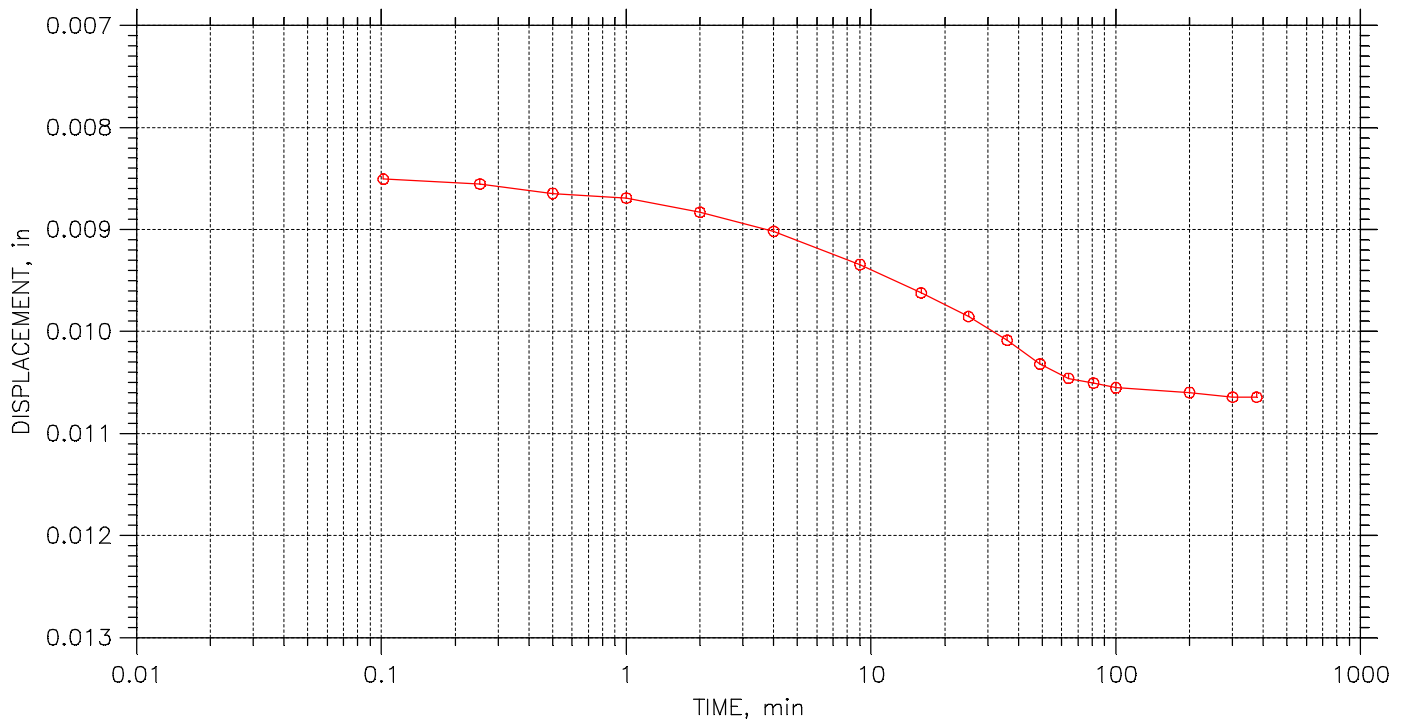
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	Boring No.: B-1 S-9	Tested By: BCM	Checked By: WPQ
	Sample No.: S-9	Test Date: 8/23/19	Depth: 28.5'-30.5'
	Test No.: B1S9CON	Sample Type: 3.0" ST	Elevation: -----
	Description: GRAY AND DARK GRAY LEAN CLAY		
	Remarks: Pc = 1.8 tsf Cc = 0.206 Ccr = 0.046 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 13 of 23

Stress: 1. tsf



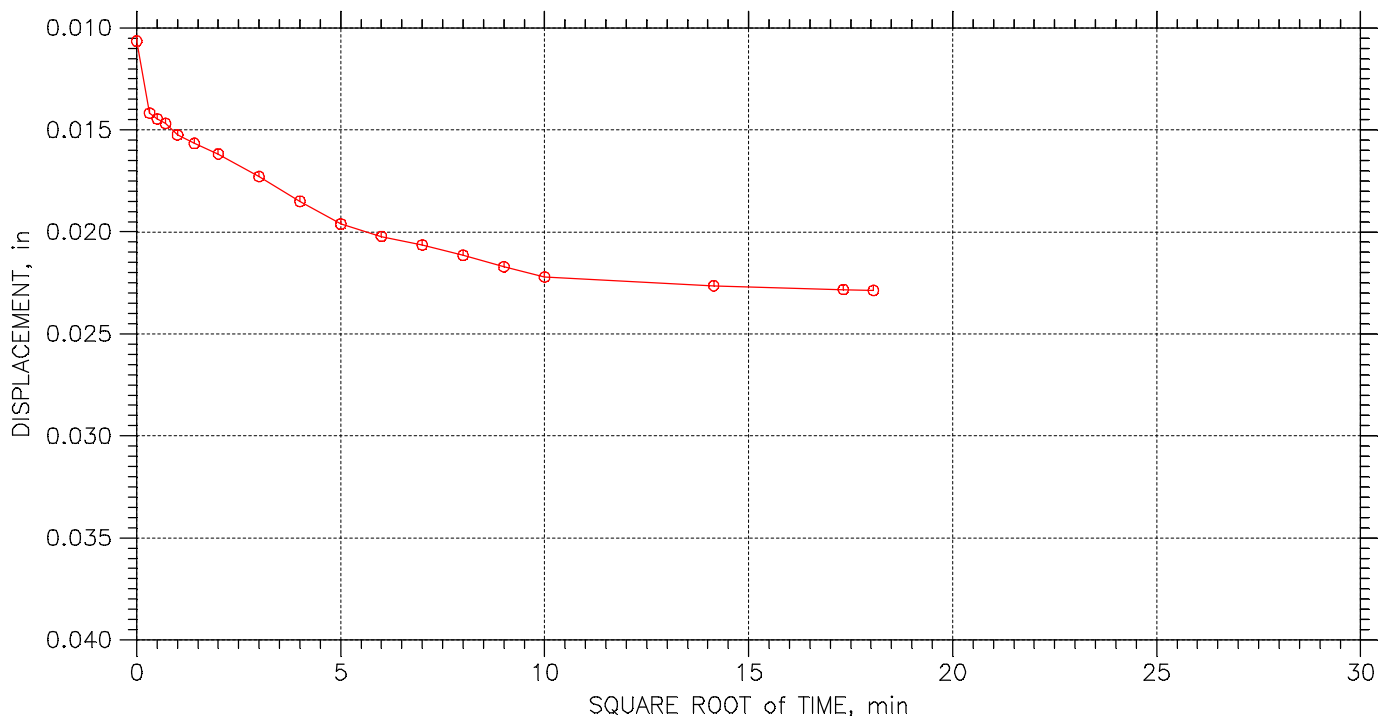
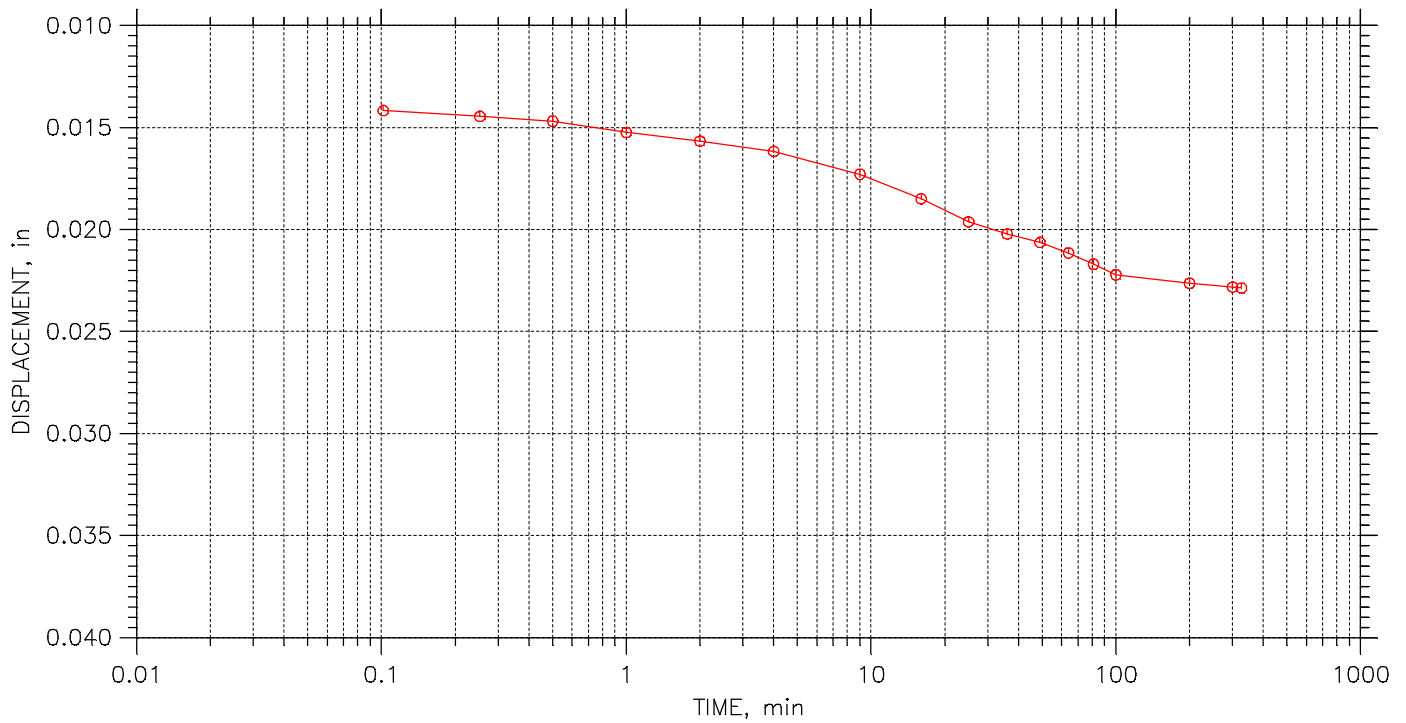
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	Sample No.: S-9	Test Date: 8/23/19	Depth: 28.5'-30.5'
	Test No.: B1S9CON	Sample Type: 3.0" ST	Elevation: -----
	Description: GRAY AND DARK GRAY LEAN CLAY		
	Remarks: Pc = 1.8 tsf Cc = 0.206 Ccr = 0.046 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 14 of 23

Stress: 2. tsf



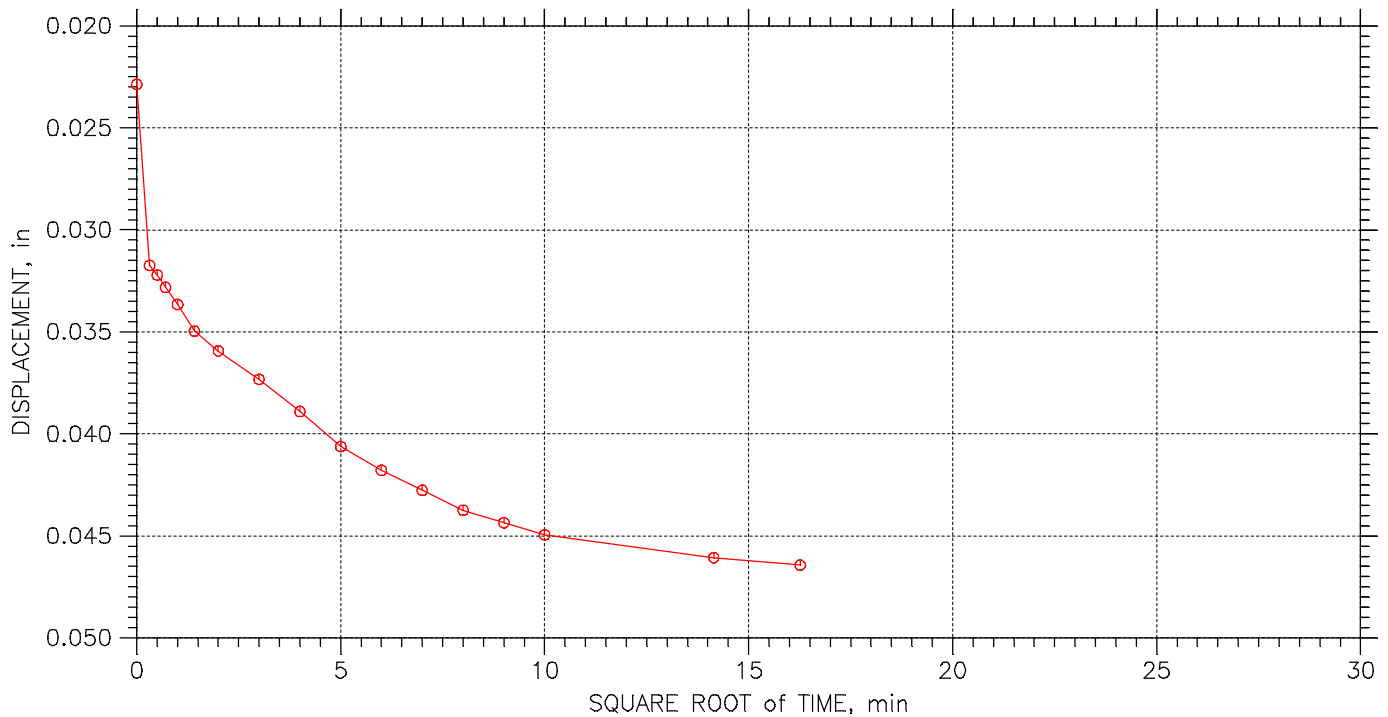
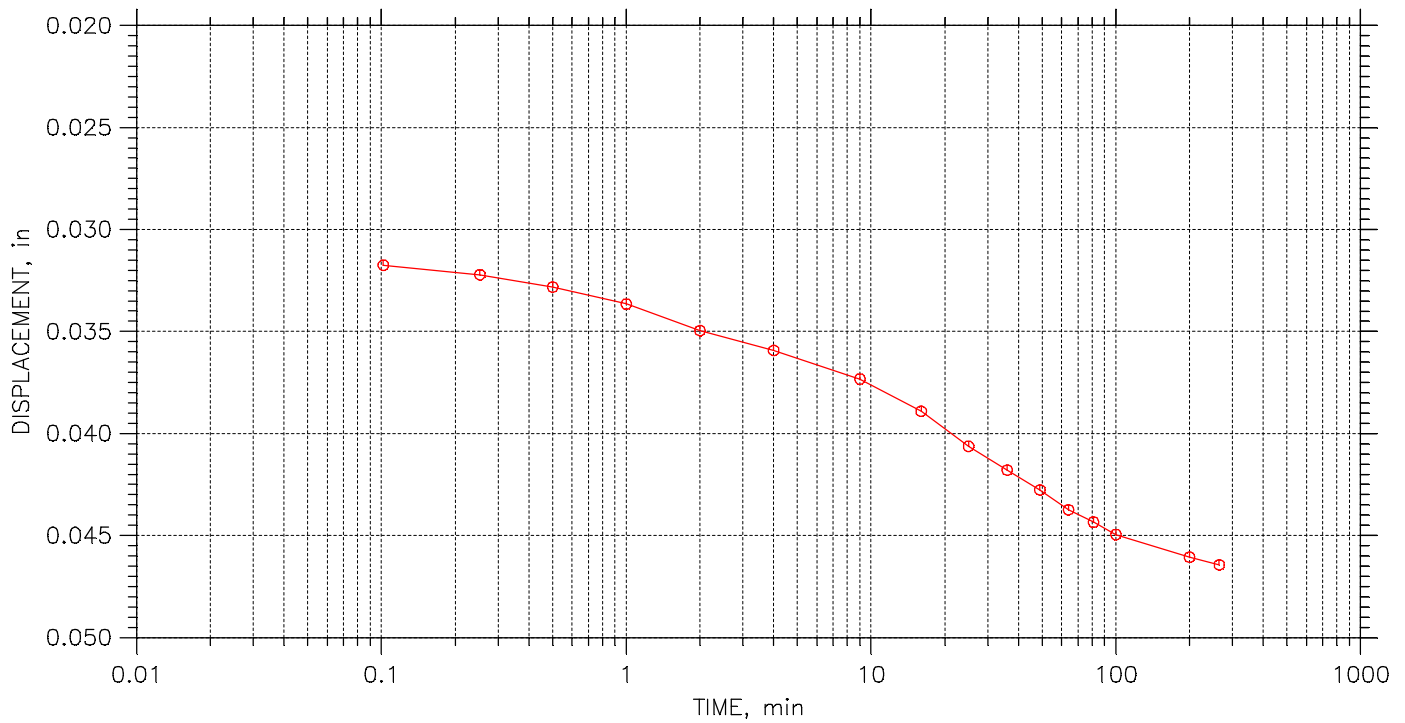
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	Boring No.: B-1 S-9	Tested By: BCM	Checked By: WPQ
	Sample No.: S-9	Test Date: 8/23/19	Depth: 28.5'-30.5'
	Test No.: B1S9CON	Sample Type: 3.0" ST	Elevation: -----
	Description: GRAY AND DARK GRAY LEAN CLAY		
	Remarks: Pc = 1.8 tsf Cc = 0.206 Ccr = 0.046 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 15 of 23

Stress: 4. tsf



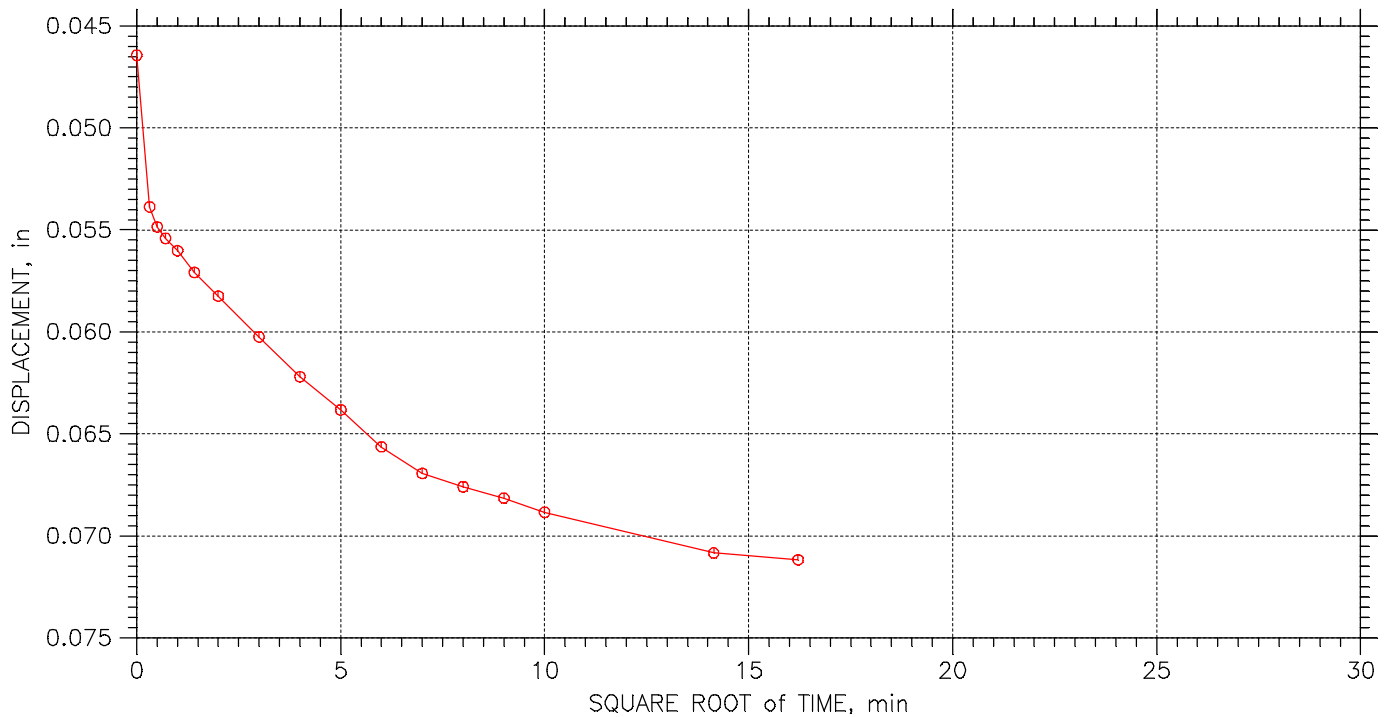
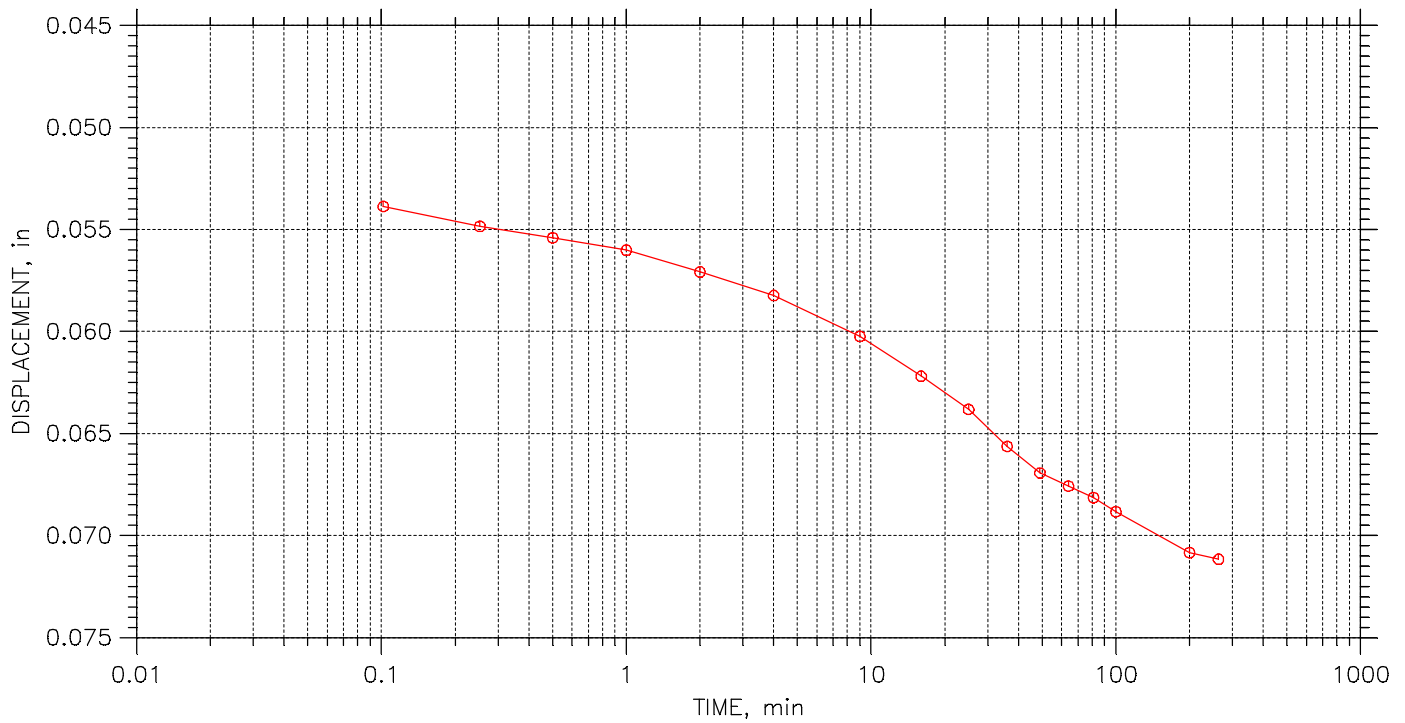
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	Boring No.: B-1 S-9	Tested By: BCM	Checked By: WPQ
	Sample No.: S-9	Test Date: 8/23/19	Depth: 28.5'-30.5'
	Test No.: B1S9CON	Sample Type: 3.0" ST	Elevation: -----
	Description: GRAY AND DARK GRAY LEAN CLAY		
	Remarks: Pc = 1.8 tsf Cc = 0.206 Ccr = 0.046 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 16 of 23

Stress: 8. tsf



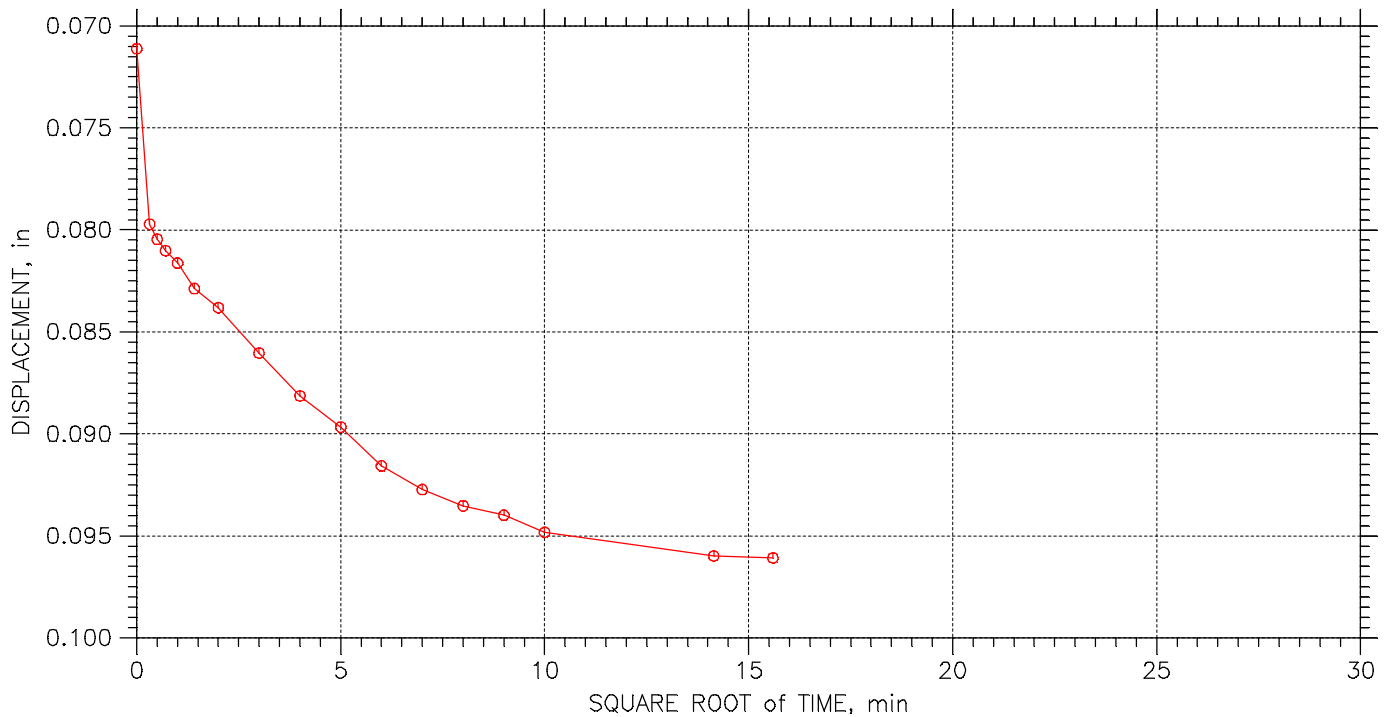
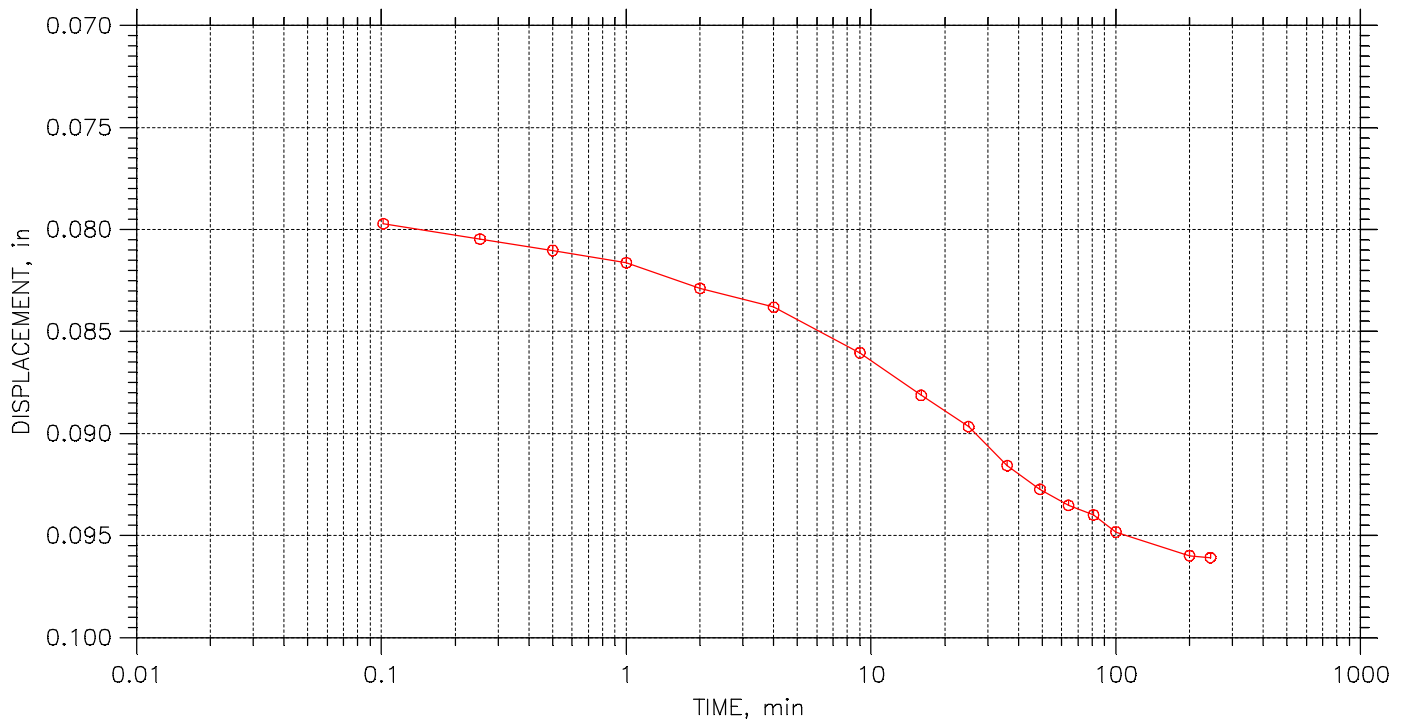
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	Boring No.: B-1 S-9	Tested By: BCM	Checked By: WPQ
	Sample No.: S-9	Test Date: 8/23/19	Depth: 28.5'-30.5'
	Test No.: B1S9CON	Sample Type: 3.0" ST	Elevation: -----
	Description: GRAY AND DARK GRAY LEAN CLAY		
	Remarks: Pc = 1.8 tsf Cc = 0.206 Ccr = 0.046 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 17 of 23

Stress: 16. tsf



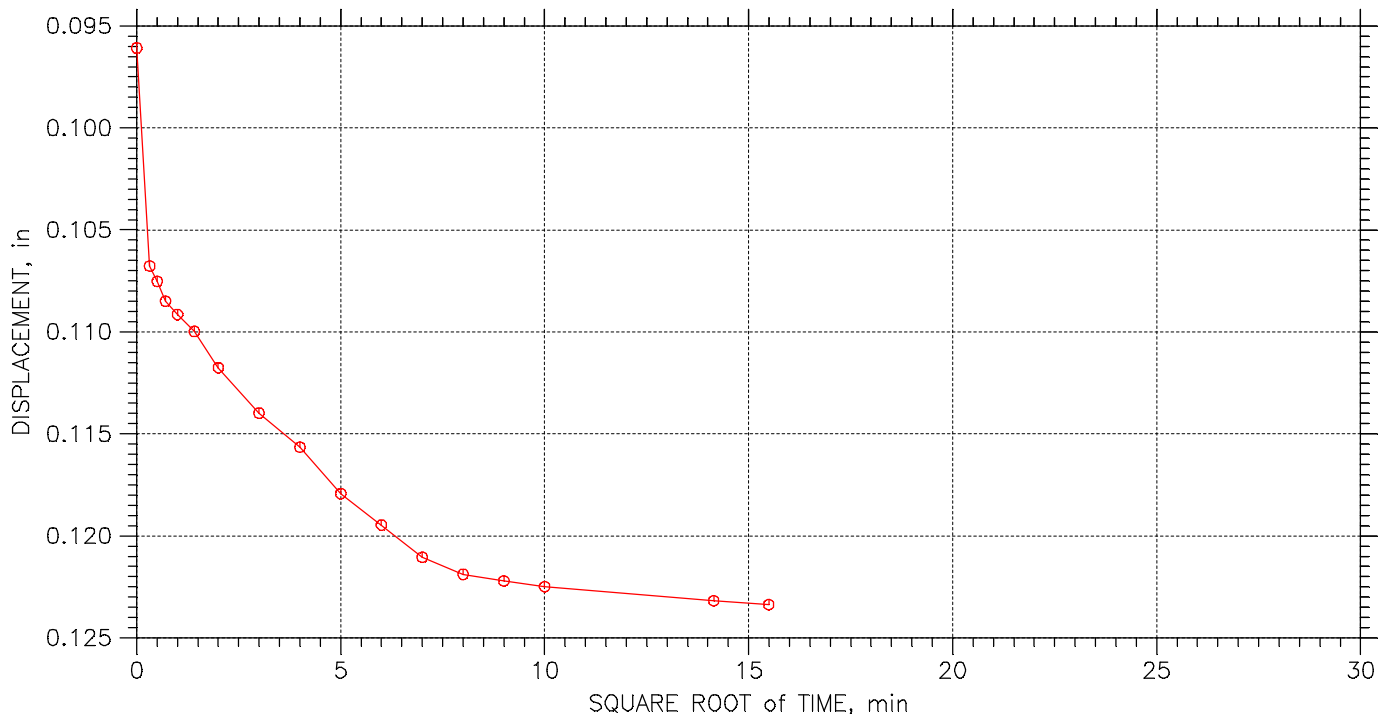
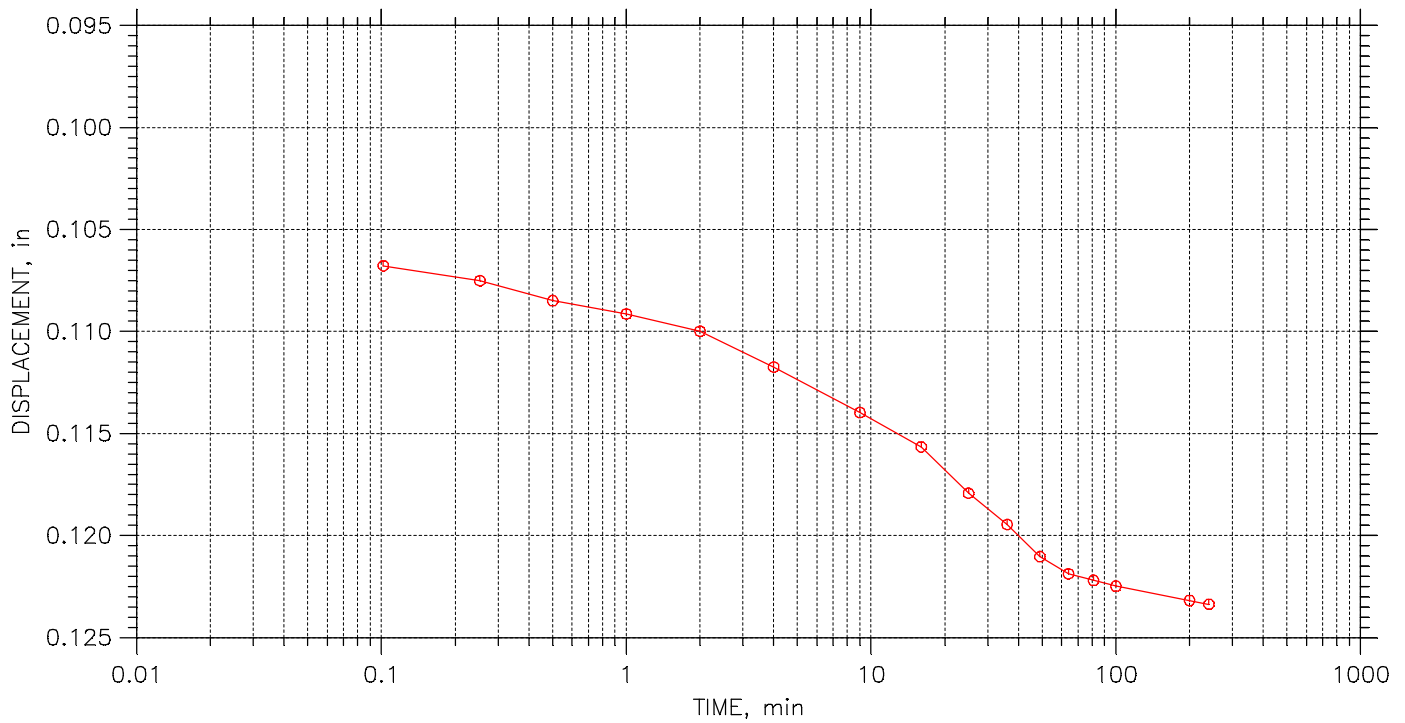
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	Boring No.: B-1 S-9	Tested By: BCM	Checked By: WPQ
	Sample No.: S-9	Test Date: 8/23/19	Depth: 28.5'-30.5'
	Test No.: B1S9CON	Sample Type: 3.0" ST	Elevation: -----
	Description: GRAY AND DARK GRAY LEAN CLAY		
	Remarks: Pc = 1.8 tsf Cc = 0.206 Ccr = 0.046 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 18 of 23

Stress: 32. tsf



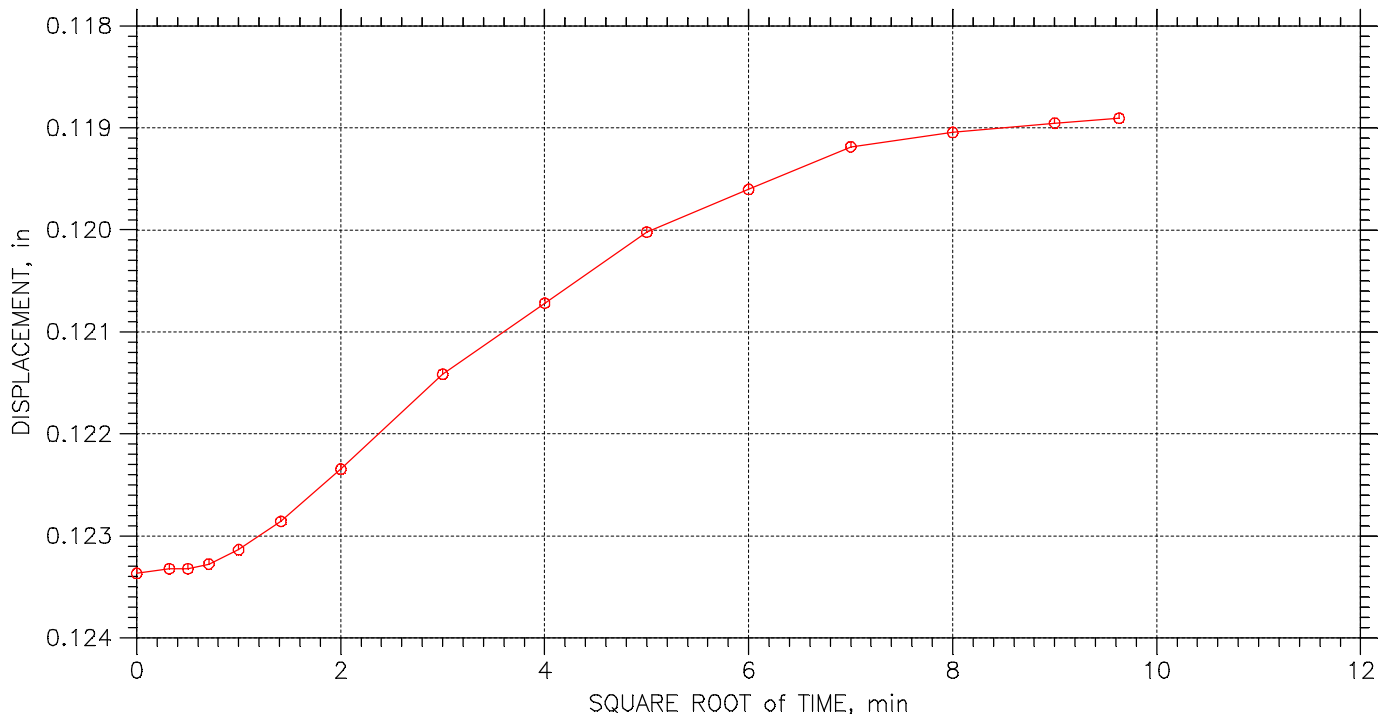
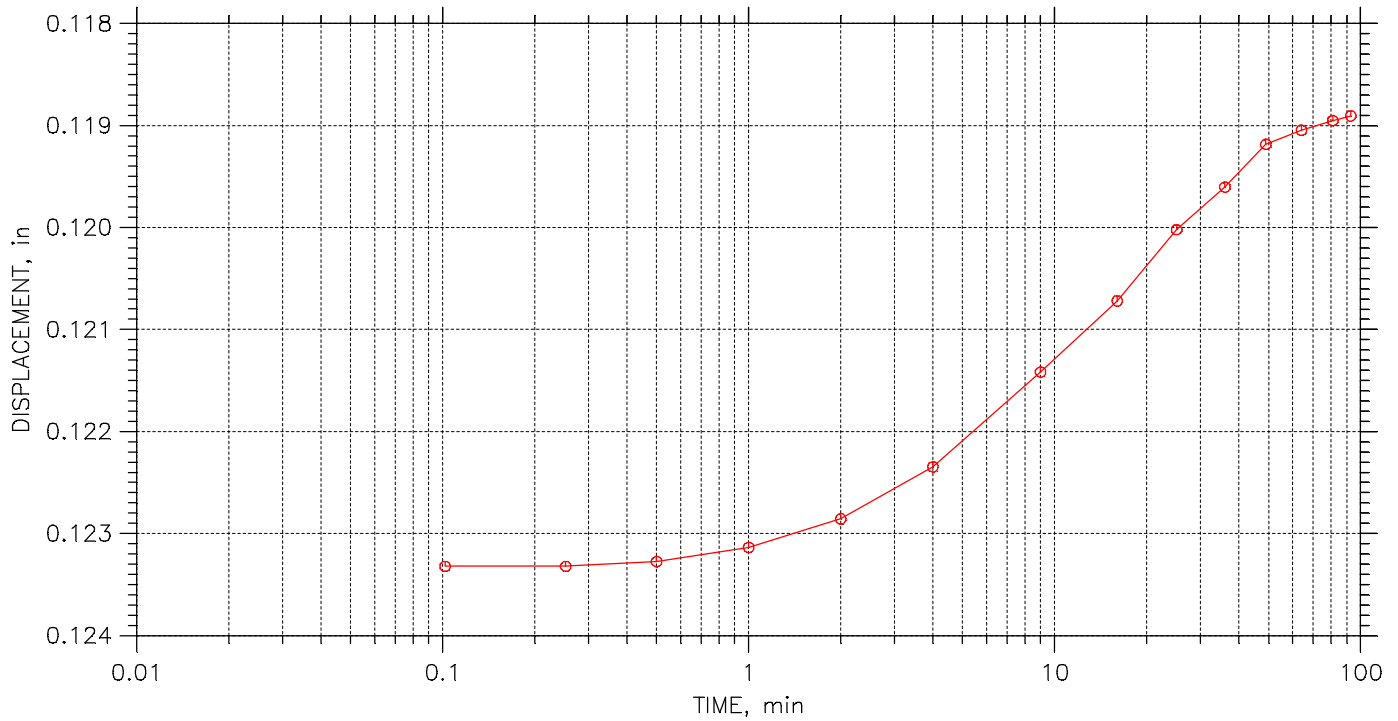
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	Boring No.: B-1 S-9	Tested By: BCM	Checked By: WPQ
	Sample No.: S-9	Test Date: 8/23/19	Depth: 28.5'-30.5'
	Test No.: B1S9CON	Sample Type: 3.0" ST	Elevation: -----
	Description: GRAY AND DARK GRAY LEAN CLAY		
	Remarks: Pc = 1.8 tsf Cc = 0.206 Ccr = 0.046 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 19 of 23

Stress: 16. tsf



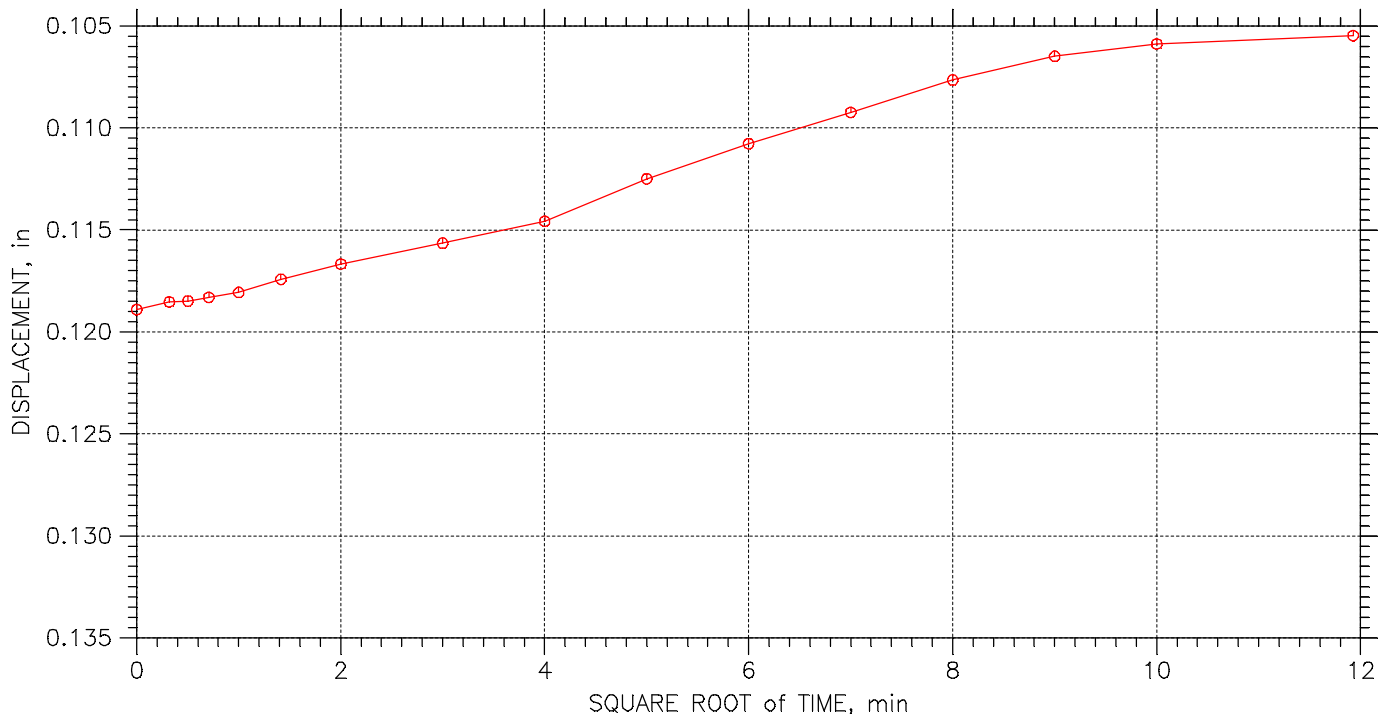
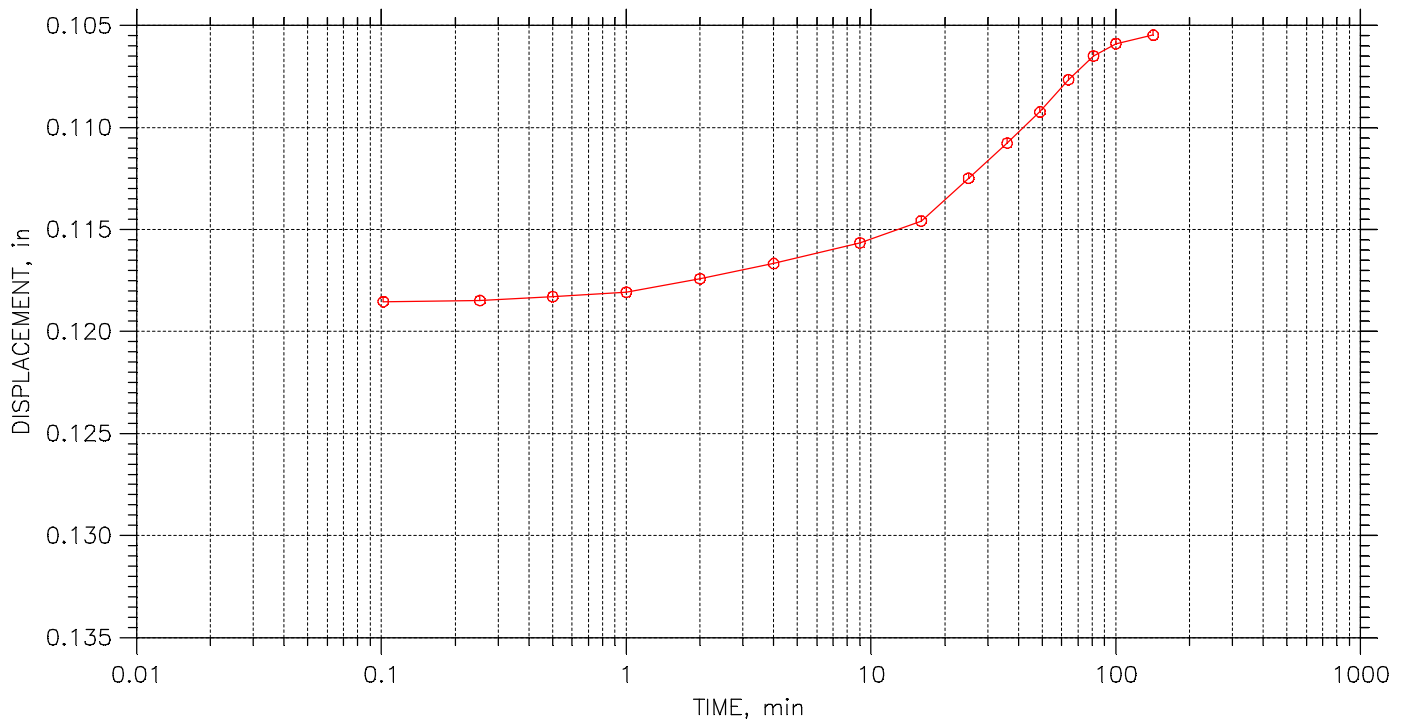
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	Boring No.: B-1 S-9	Tested By: BCM	Checked By: WPQ
	Sample No.: S-9	Test Date: 8/23/19	Depth: 28.5'-30.5'
	Test No.: B1S9CON	Sample Type: 3.0" ST	Elevation: -----
	Description: GRAY AND DARK GRAY LEAN CLAY		
	Remarks: Pc = 1.8 tsf Cc = 0.206 Ccr = 0.046 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 20 of 23

Stress: 4. tsf



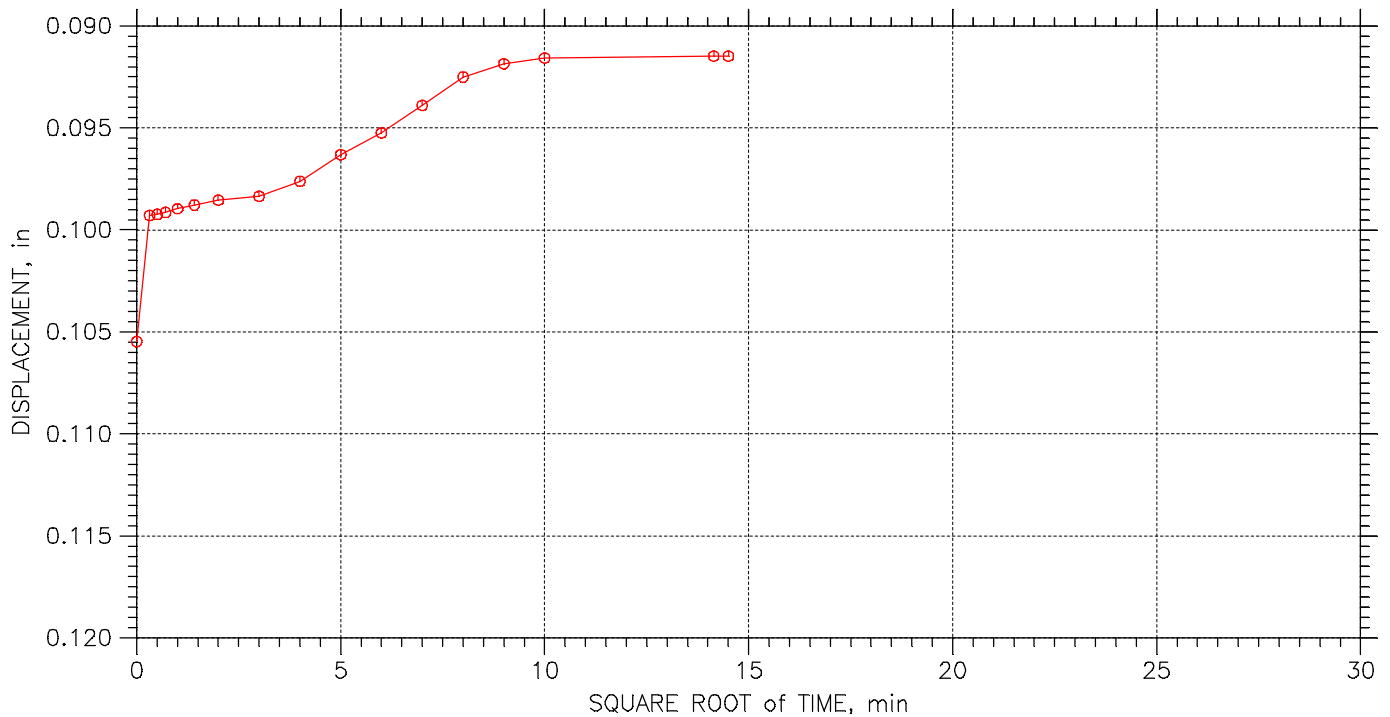
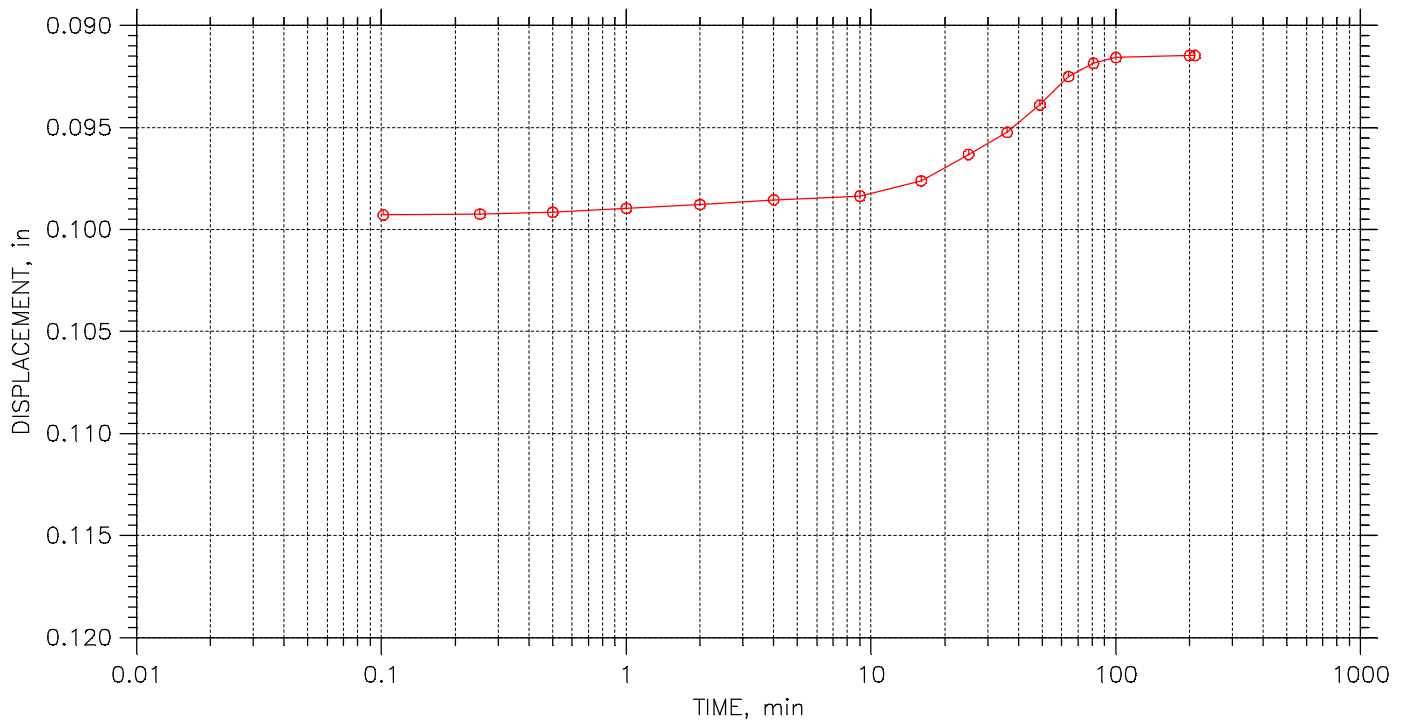
	Project: UPRR GRADE SEPARATION	Location: LITTLE ROCK, AR	Project No.: 35185112
	Boring No.: B-1 S-9	Tested By: BCM	Checked By: WPQ
	Sample No.: S-9	Test Date: 8/23/19	Depth: 28.5'-30.5'
	Test No.: B1S9CON	Sample Type: 3.0" ST	Elevation: -----
	Description: GRAY AND DARK GRAY LEAN CLAY		
	Remarks: Pc = 1.8 tsf Cc = 0.206 Ccr = 0.046 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 21 of 23

Stress: 1. tsf



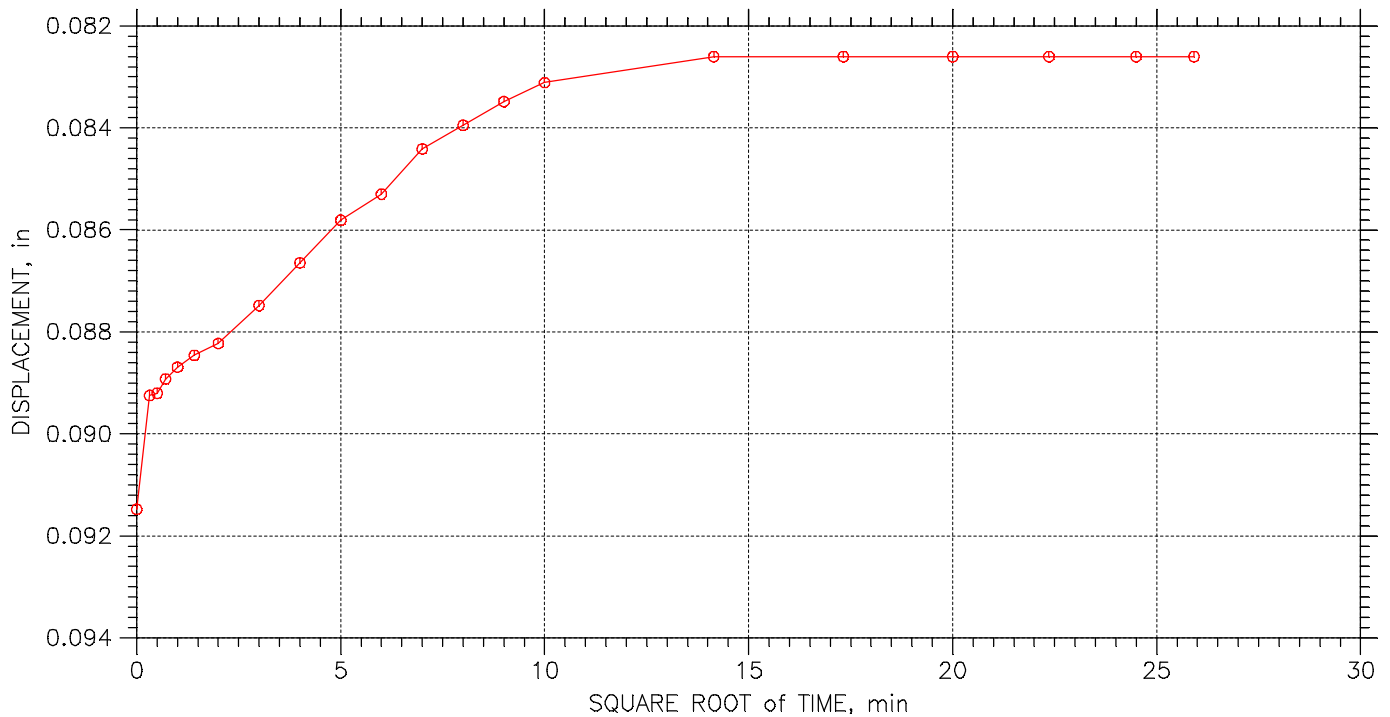
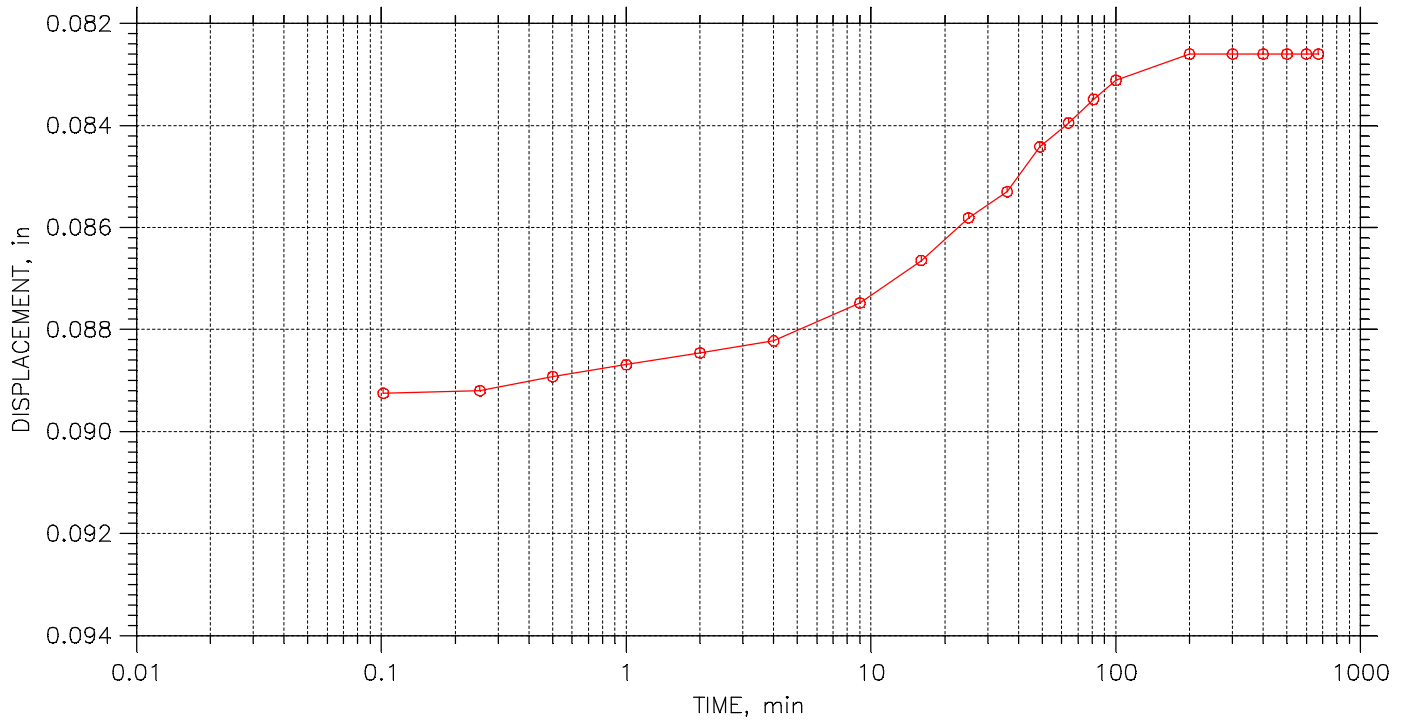
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	Boring No.: B-1 S-9	Tested By: BCM	Checked By: WPQ
	Sample No.: S-9	Test Date: 8/23/19	Depth: 28.5'-30.5'
	Test No.: B1S9CON	Sample Type: 3.0" ST	Elevation: -----
	Description: GRAY AND DARK GRAY LEAN CLAY		
	Remarks: Pc = 1.8 tsf Cc = 0.206 Ccr = 0.046 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 22 of 23

Stress: 0.5 tsf



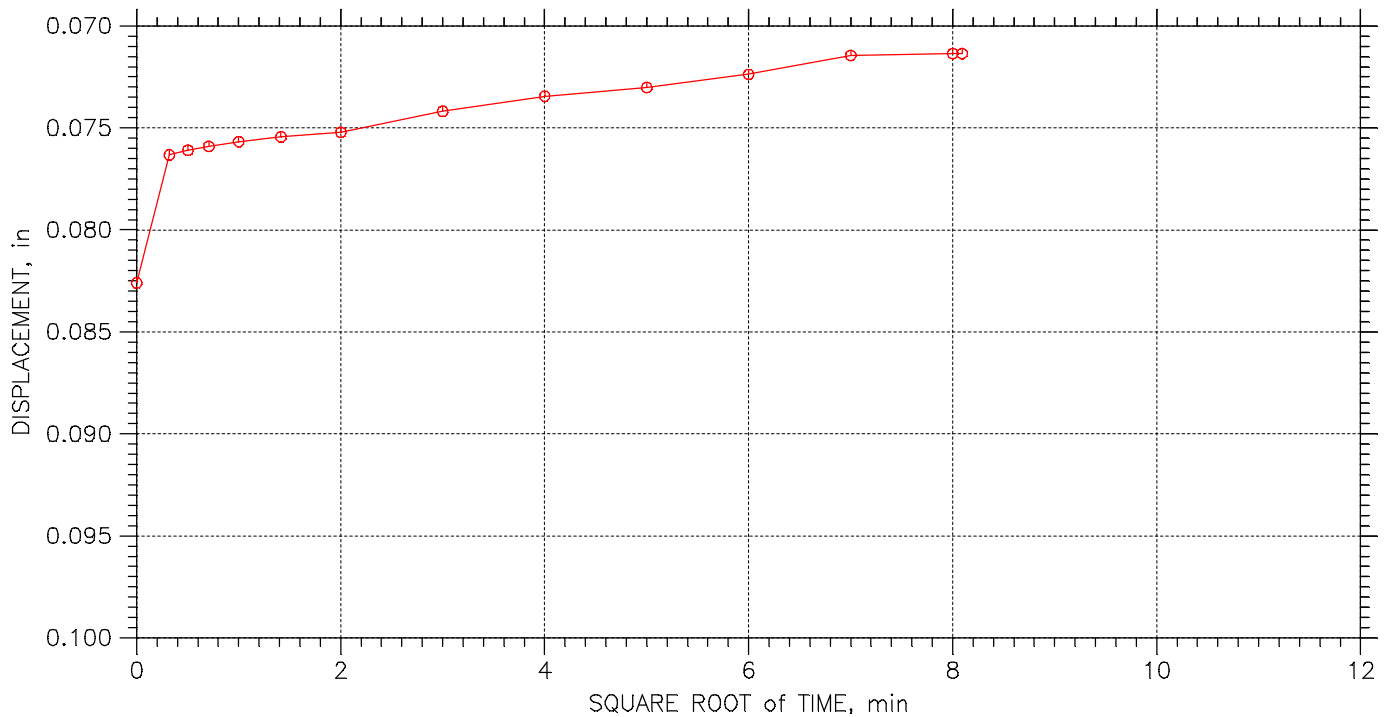
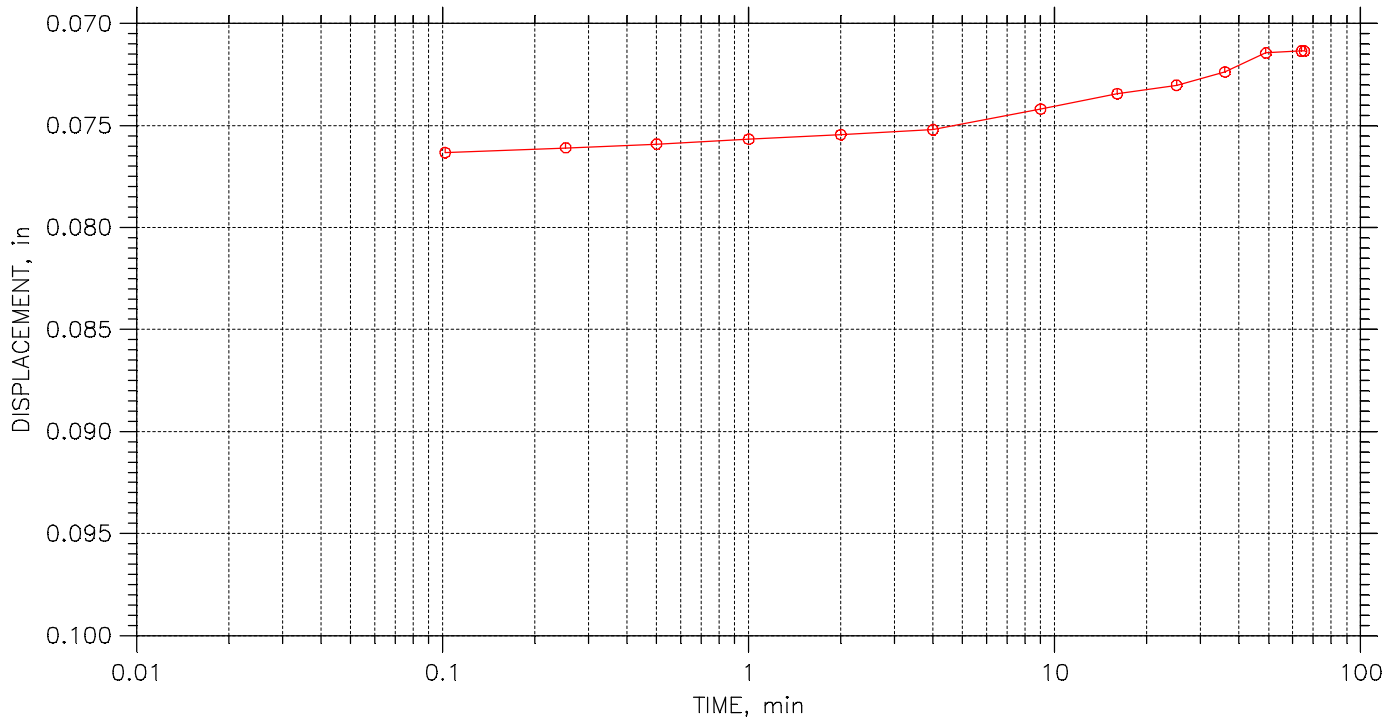
	Project: UPRR GRADE SEPARATION	Location: LITTLE ROCK, AR	Project No.: 35185112
	Boring No.: B-1 S-9	Tested By: BCM	Checked By: WPQ
	Sample No.: S-9	Test Date: 8/23/19	Depth: 28.5'-30.5'
	Test No.: B1S9CON	Sample Type: 3.0" ST	Elevation: -----
	Description: GRAY AND DARK GRAY LEAN CLAY		
	Remarks: Pc = 1.8 tsf Cc = 0.206 Ccr = 0.046 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 23 of 23

Stress: 0.125 tsf



	Project: UPRR GRADE SEPARATION	Location: LITTLE ROCK, AR	Project No.: 35185112
	Boring No.: B-1 S-9	Tested By: BCM	Checked By: WPQ
	Sample No.: S-9	Test Date: 8/23/19	Depth: 28.5'-30.5'
	Test No.: B1S9CON	Sample Type: 3.0" ST	Elevation: -----
	Description: GRAY AND DARK GRAY LEAN CLAY		
	Remarks: Pc = 1.8 tsf Cc = 0.206 Ccr = 0.046 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

Project: UPRR GRADE SEPARATION
 Boring No.: B-1 S-9
 Sample No.: S-9
 Test No.: B1S9CON

Location: LITTLE ROCK, AR
 Tested By: BCM
 Test Date: 8/23/19
 Sample Type: 3.0" ST

Project No.: 35185112
 Checked By: WPQ
 Depth: 28.5'-30.5'
 Elevation: -----



Soil Description: GRAY AND DARK GRAY LEAN CLAY
 Remarks: Pc = 1.8 tsf Cc = 0.206 Ccr = 0.046 TEST PERFORMED AS PER ASTM D2435

Estimated Specific Gravity: 2.73
 Initial Void Ratio: 0.71
 Final Void Ratio: 0.54

Liquid Limit: 33
 Plastic Limit: 20
 Plasticity Index: 13

Initial Height: 0.75 in
 Specimen Diameter: 2.50 in

Container ID	Before Consolidation		After Consolidation	
	Trimmings	Specimen+Ring	Specimen+Ring	Trimmings
	A-8	RING		X-5
Wt. Container + Wet Soil, gm	135.1	191.37	190.36	162.23
Wt. Container + Dry Soil, gm	116.05	171.87	171.87	143.16
Wt. Container, gm	31.22	75.55	75.55	43.79
Wt. Dry Soil, gm	84.83	96.321	96.321	99.366
Water Content, %	22.46	20.24	19.20	19.20
Void Ratio	---	0.71	0.54	---
Degree of Saturation, %	---	78.23	96.38	---
Dry Unit Weight, pcf	---	99.87	110.4	---

CONSOLIDATION TEST DATA

Project: UPRR GRADE SEPARATION
Boring No.: B-1 S-9
Sample No.: S-9
Test No.: B1S9CON

Location: LITTLE ROCK, AR
Tested By: BCM
Test Date: 8/23/19
Sample Type: 3.0" ST

Project No.: 35185112
Checked By: WPQ
Depth: 28.5'-30.5'
Elevation: -----

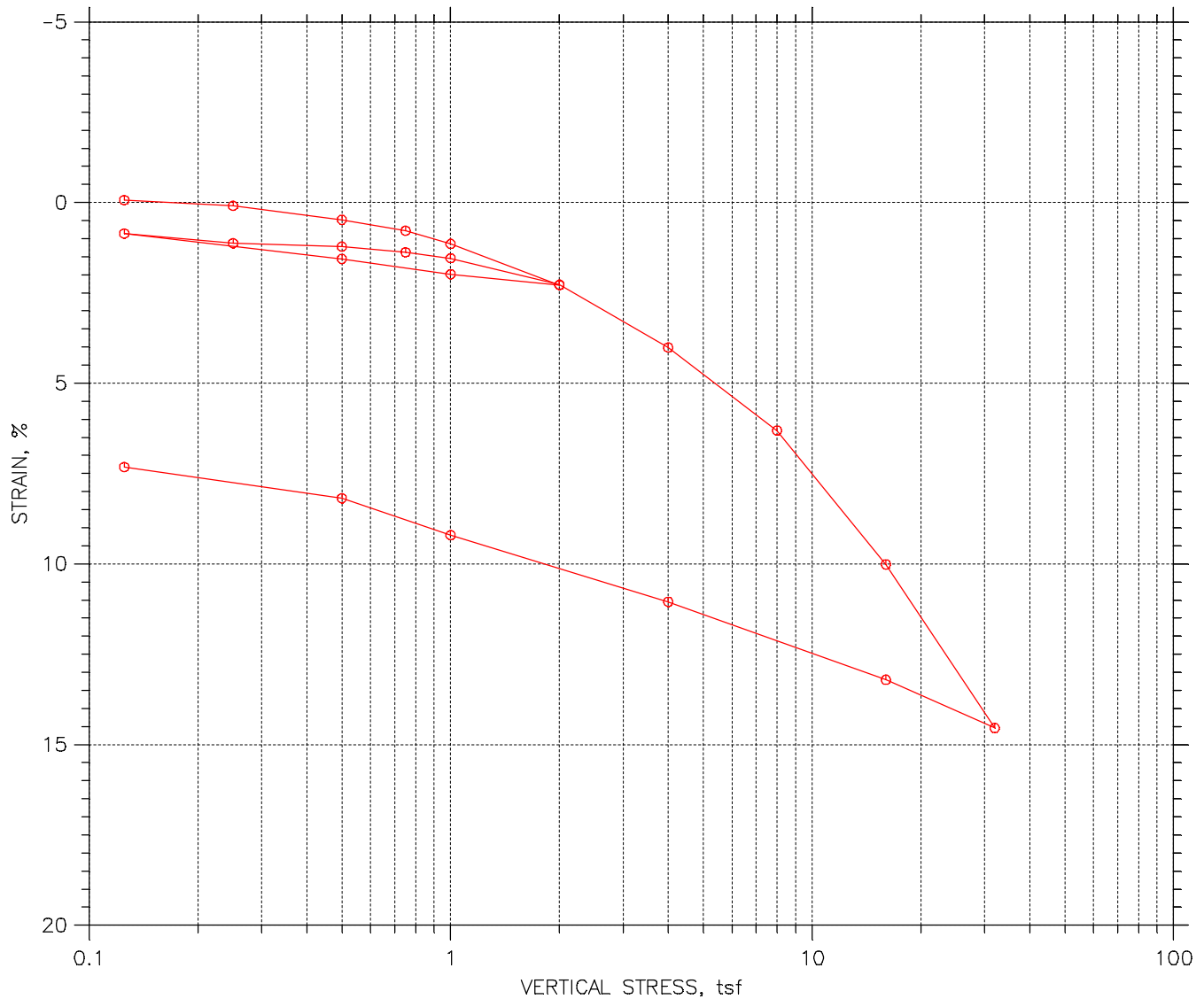


Soil Description: GRAY AND DARK GRAY LEAN CLAY

Remarks: Pc = 1.8 tsf Cc = 0.206 Ccr = 0.046 TEST PERFORMED AS PER ASTM D2435

	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	T50 Fitting		Coefficient of Consolidation		
					Sq.Rt. min	Log min	Sq.Rt. ft^2/sec	Log ft^2/sec	Ave. ft^2/sec
1	0.125	-0.01023	0.730	-1.37	0.0	0.0	0.00e+000	0.00e+000	0.00e+000
2	0.25	-0.008739	0.726	-1.17	0.0	0.0	0.00e+000	0.00e+000	0.00e+000
3	0.5	-0.007484	0.724	-1.00	0.0	88.3	0.00e+000	3.70e-008	3.70e-008
4	0.75	-0.004184	0.716	-0.56	0.2	0.0	1.43e-005	0.00e+000	1.43e-005
5	1	0.0004184	0.706	0.06	21.9	5.0	1.46e-007	6.36e-007	2.38e-007
6	2	0.02413	0.651	3.23	0.5	0.0	6.86e-006	0.00e+000	6.86e-006
7	1	0.01873	0.664	2.50	2.1	0.0	1.43e-006	0.00e+000	1.43e-006
8	0.5	0.01278	0.677	1.71	8.4	0.0	3.64e-007	0.00e+000	3.64e-007
9	0.125	0.0001859	0.706	0.02	39.6	35.4	7.94e-008	8.86e-008	8.37e-008
10	0.25	0.001534	0.703	0.21	3.5	0.0	9.11e-007	0.00e+000	9.11e-007
11	0.5	0.005485	0.694	0.73	5.8	0.0	5.42e-007	0.00e+000	5.42e-007
12	0.75	0.007809	0.689	1.04	8.4	0.0	3.73e-007	0.00e+000	3.73e-007
13	1	0.01064	0.682	1.42	6.1	0.0	5.13e-007	0.00e+000	5.13e-007
14	2	0.02287	0.654	3.06	8.4	7.6	3.65e-007	4.04e-007	3.84e-007
15	4	0.04644	0.601	6.21	11.1	0.0	2.62e-007	0.00e+000	2.62e-007
16	8	0.07117	0.544	9.51	11.5	0.0	2.36e-007	0.00e+000	2.36e-007
17	16	0.09608	0.487	12.84	8.4	0.0	3.00e-007	0.00e+000	3.00e-007
18	32	0.1234	0.425	16.49	10.0	0.0	2.33e-007	0.00e+000	2.33e-007
19	16	0.1189	0.435	15.90	18.7	0.0	1.20e-007	0.00e+000	1.20e-007
20	4	0.1055	0.466	14.10	32.1	0.0	7.18e-008	0.00e+000	7.18e-008
21	1	0.09148	0.498	12.23	16.1	0.0	1.49e-007	0.00e+000	1.49e-007
22	0.5	0.0826	0.518	11.04	18.9	0.0	1.32e-007	0.00e+000	1.32e-007
23	0.125	0.07135	0.544	9.54	8.3	0.0	3.11e-007	0.00e+000	3.11e-007

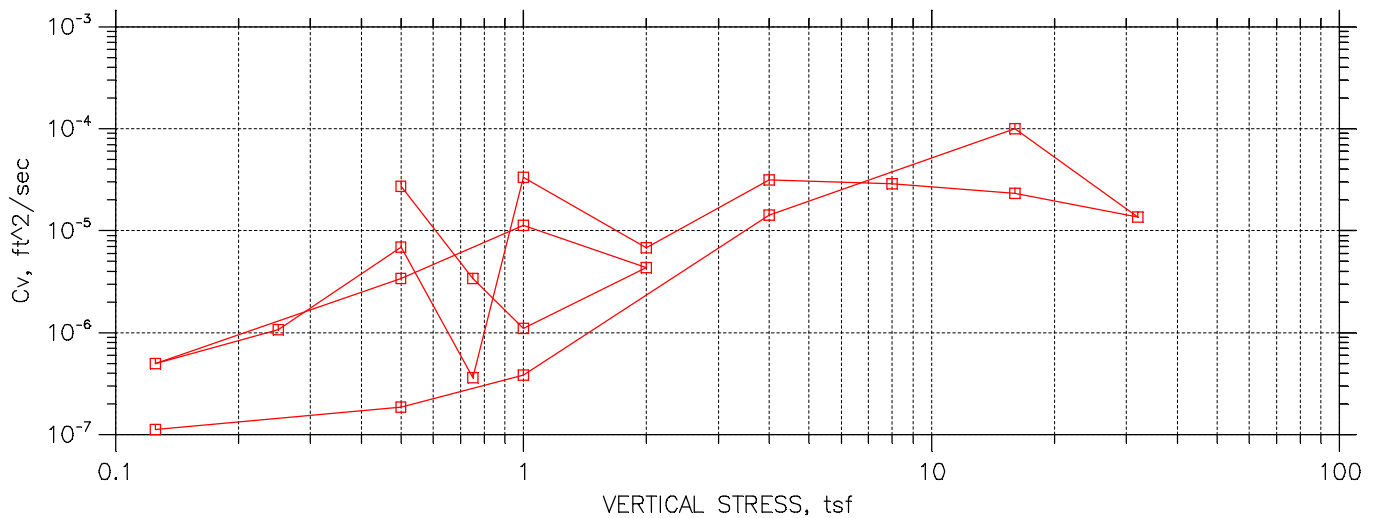
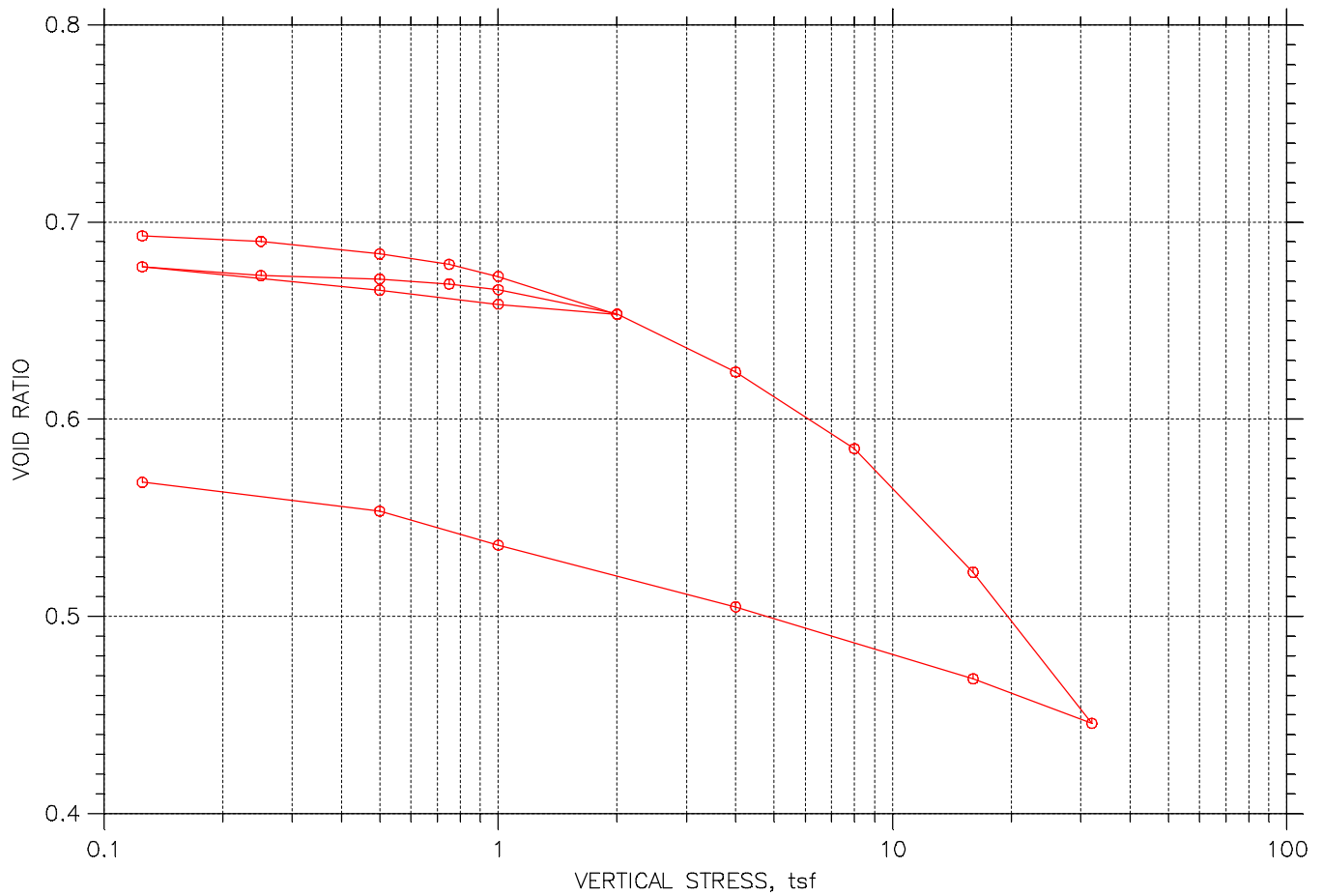
ONE DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS USING INCREMENTAL LOADING ASTM D2435



				Before Test	After Test	
				Water Content, %	24.42	21.04
Preconsolidation Pressure: 4.7 tsf				Dry Unit Weight, pcf	100.4	108.3
Compression Index: 0.252				Saturation, %	96.03	100.76
Diameter: 2.5 in		Height: 0.7496 in		Void Ratio	0.69	0.57
LL: 38	PL: 13	PI: 25	GS: 2.72			

	Project: UPRR GRADE SEPARATION	Location: LITTLE ROCK, AR	Project No.: 35185112
	Boring No.: B-7 S-5	Tested By: BCM	Checked By: WPQ
	Sample No.: S-5	Test Date: 8/13/19	Depth: 8.5'-10.0'
	Test No.: B7S5CON	Sample Type: 3.0" ST	Elevation: ----
	Description: RUST BROWN, BROWN AND GRAY SANDY LEAN CLAY		
	Remarks: Pc = 4.7 tsf Cc = 0.252 Ccr = 0.019 TEST PERFORMED AS PER ASTM D2435		

ONE DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS USING INCREMENTAL LOADING ASTM D2435



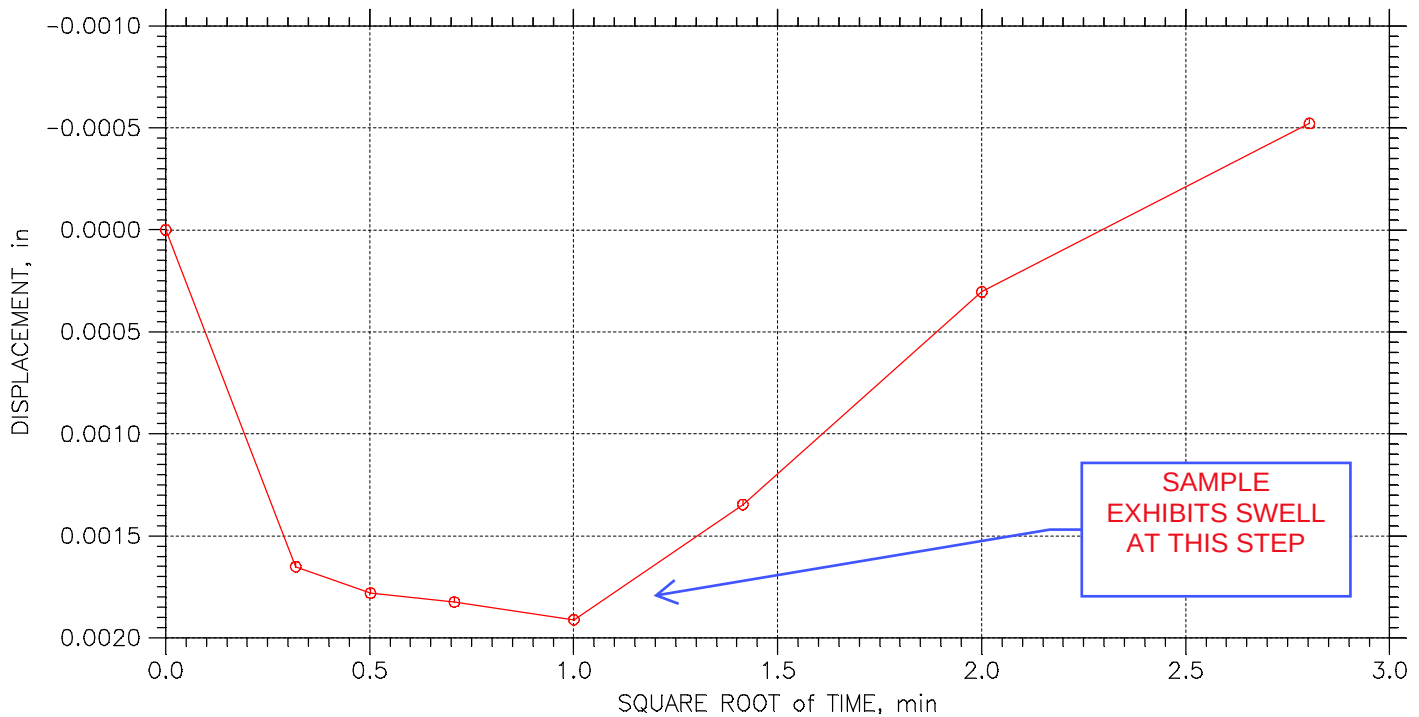
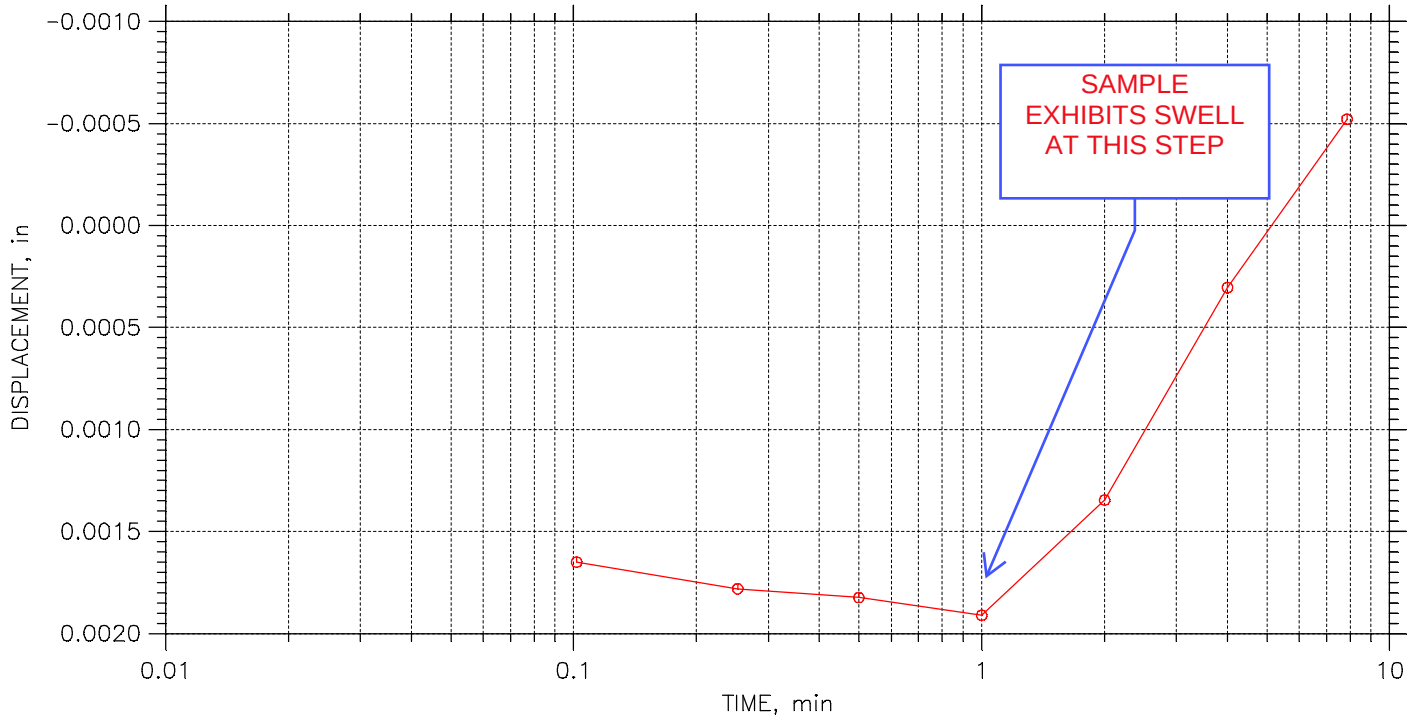
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	Boring No.: B-7 S-5	Tested By: BCM	Checked By: WPQ
	Sample No.: S-5	Test Date: 8/13/19	Depth: 8.5'-10.0'
	Test No.: B7S5CON	Sample Type: 3.0" ST	Elevation: ----
	Description: RUST BROWN, BROWN AND GRAY SANDY LEAN CLAY		
	Remarks: $P_c = 4.7$ tsf $C_c = 0.252$ $C_{cr} = 0.019$ TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 1 of 23

Stress: 0.125 tsf



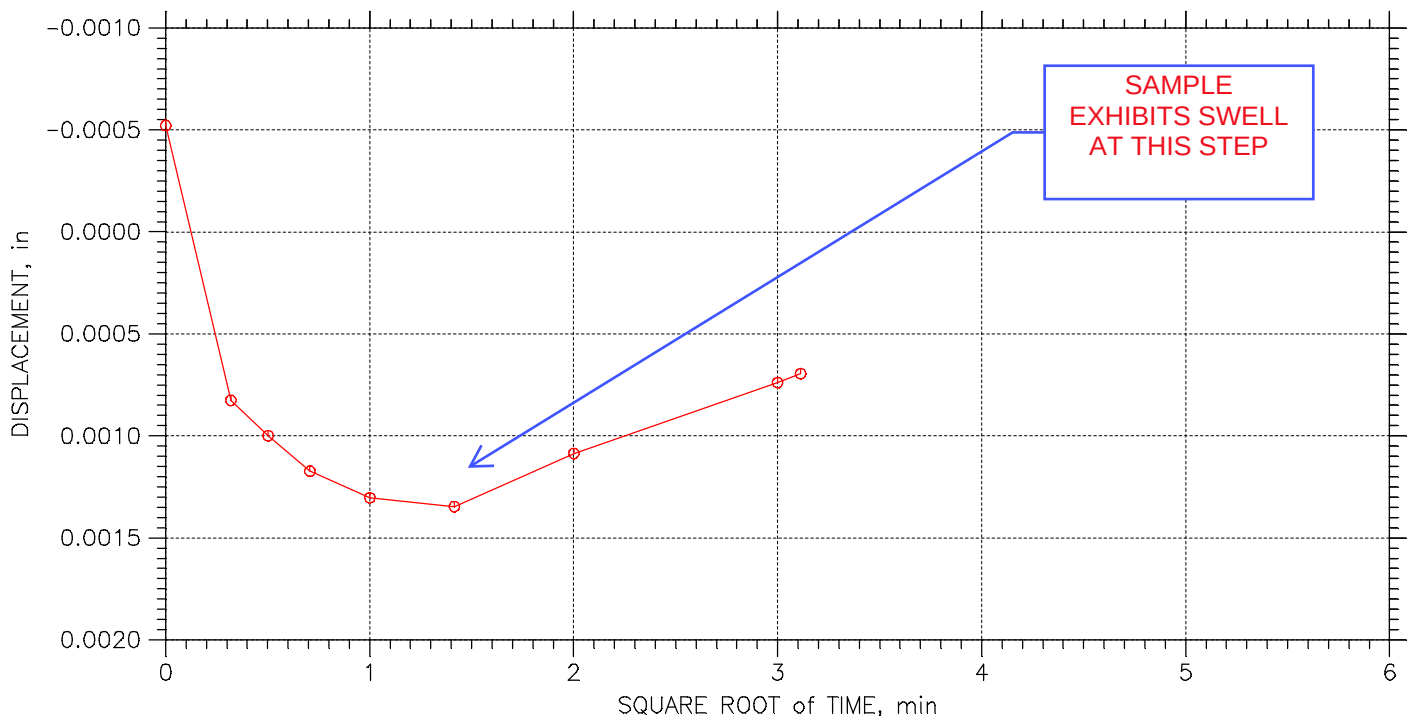
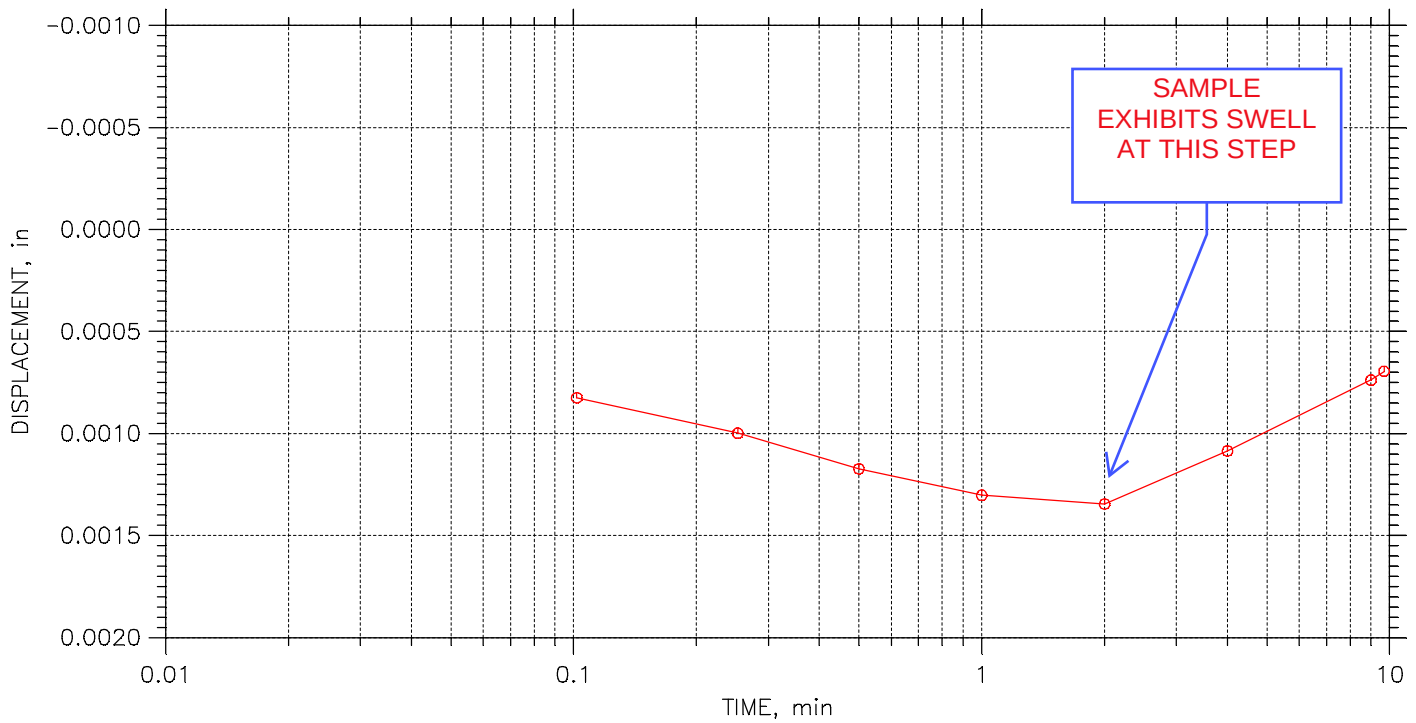
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	Boring No.: B-7 S-5	Tested By: BCM	Checked By: WPQ
	Sample No.: S-5	Test Date: 8/13/19	Depth: 8.5'-10.0'
	Test No.: B7S5CON	Sample Type: 3.0" ST	Elevation: ----
	Description: RUST BROWN, BROWN AND GRAY SANDY LEAN CLAY		
	Remarks: Pc = 4.7 tsf Cc = 0.252 Ccr = 0.019 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 2 of 23

Stress: 0.25 tsf



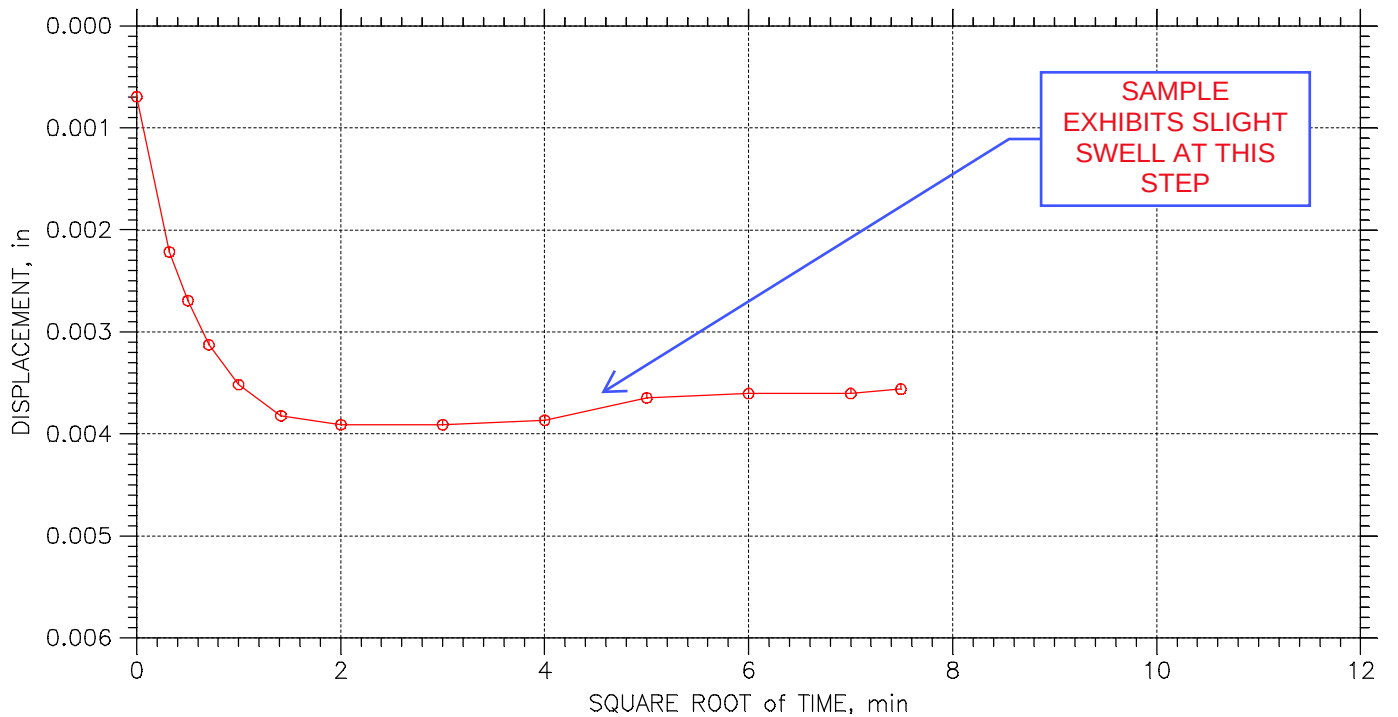
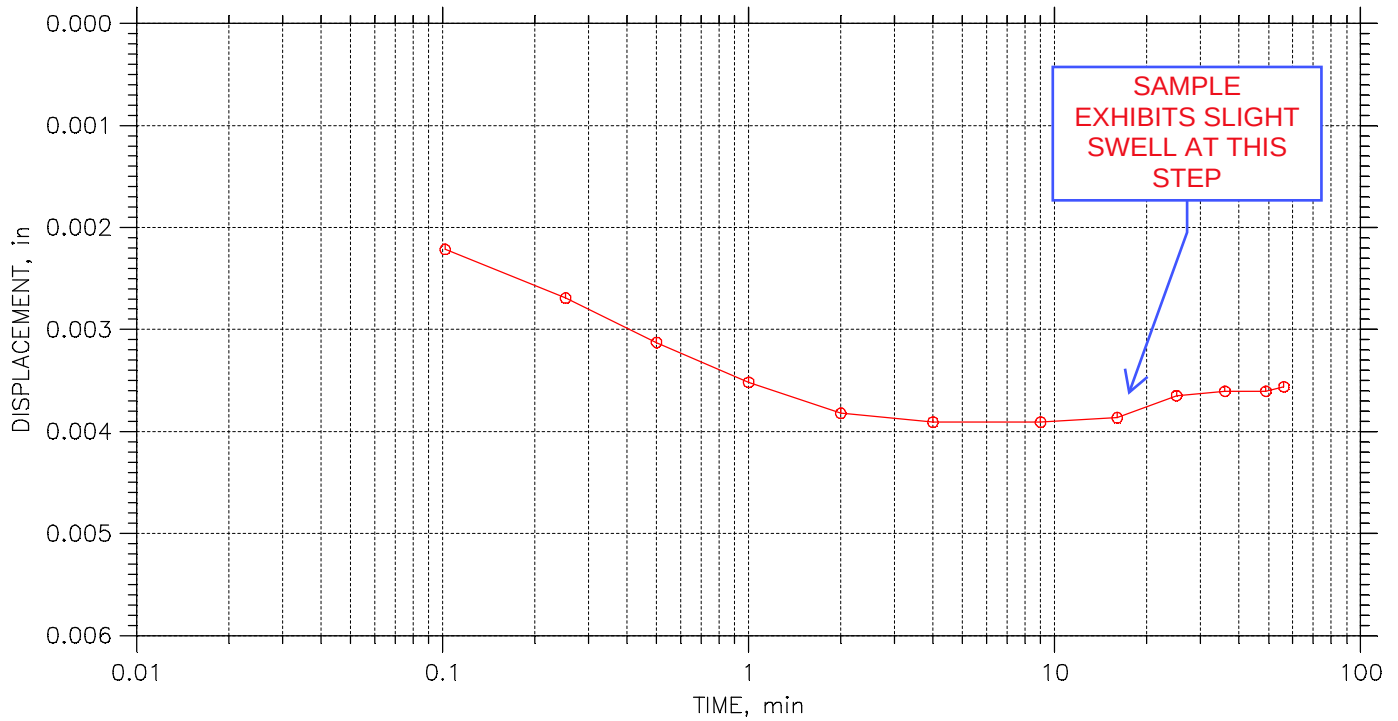
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	Boring No.: B-7 S-5	Tested By: BCM	Checked By: WPQ
	Sample No.: S-5	Test Date: 8/13/19	Depth: 8.5'-10.0'
	Test No.: B7S5CON	Sample Type: 3.0" ST	Elevation: ----
	Description: RUST BROWN, BROWN AND GRAY SANDY LEAN CLAY		
	Remarks: Pc = 4.7 tsf Cc = 0.252 Ccr = 0.019 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 3 of 23

Stress: 0.5 tsf



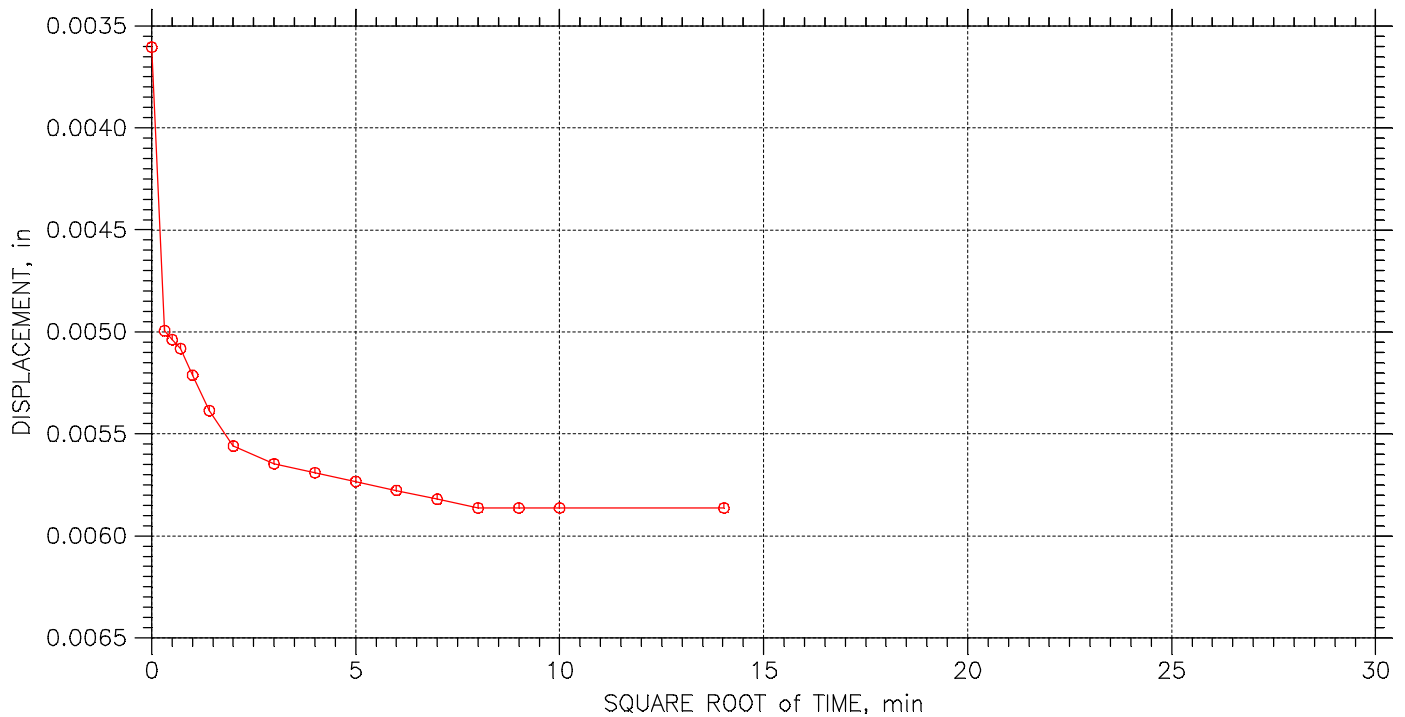
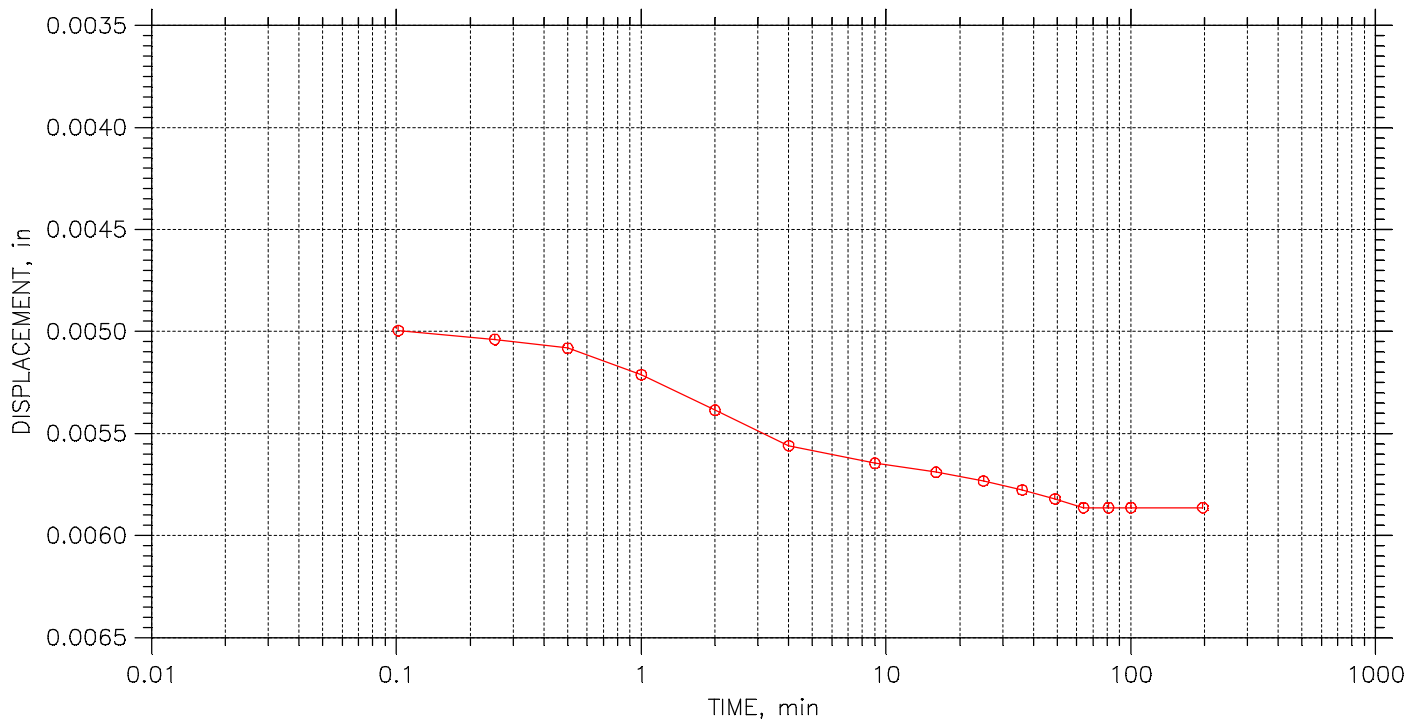
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	Boring No.: B-7 S-5	Tested By: BCM	Checked By: WPQ
	Sample No.: S-5	Test Date: 8/13/19	Depth: 8.5'-10.0'
	Test No.: B7S5CON	Sample Type: 3.0" ST	Elevation: ----
	Description: RUST BROWN, BROWN AND GRAY SANDY LEAN CLAY		
	Remarks: Pc = 4.7 tsf Cc = 0.252 Ccr = 0.019 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 4 of 23

Stress: 0.75 tsf



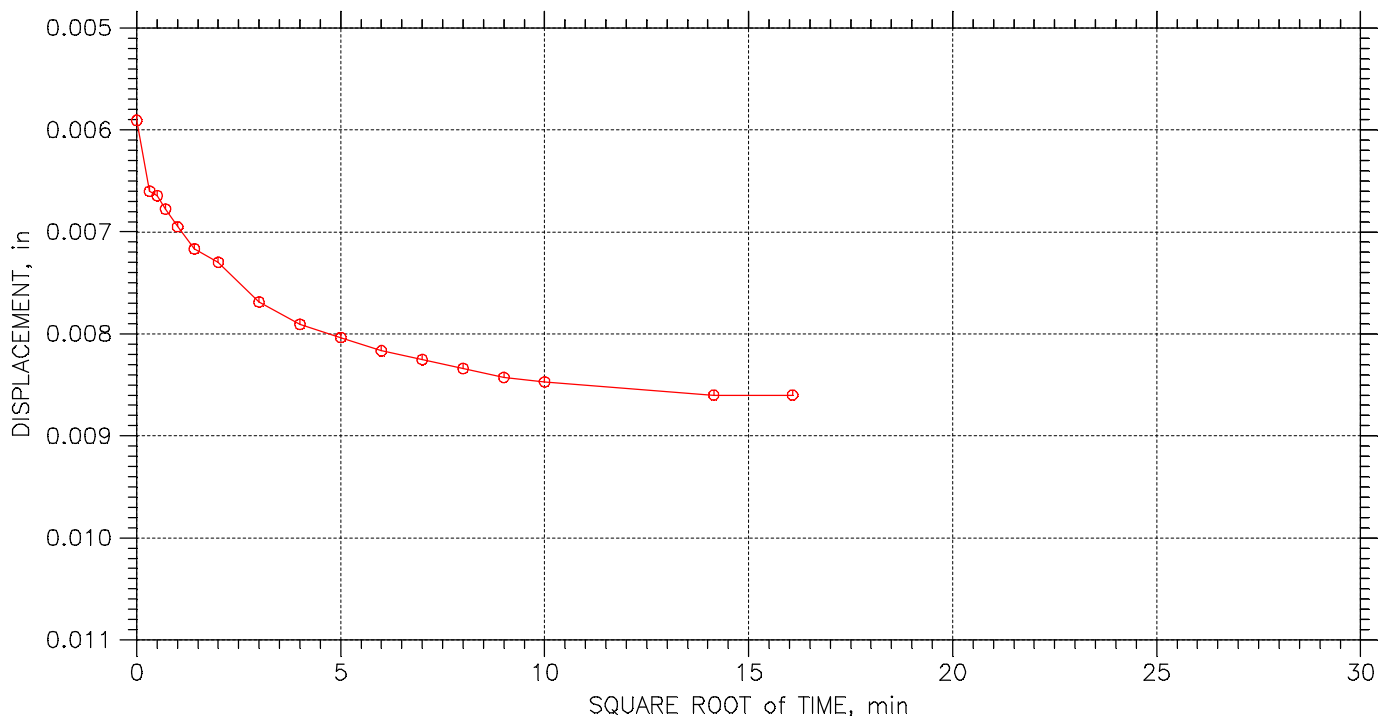
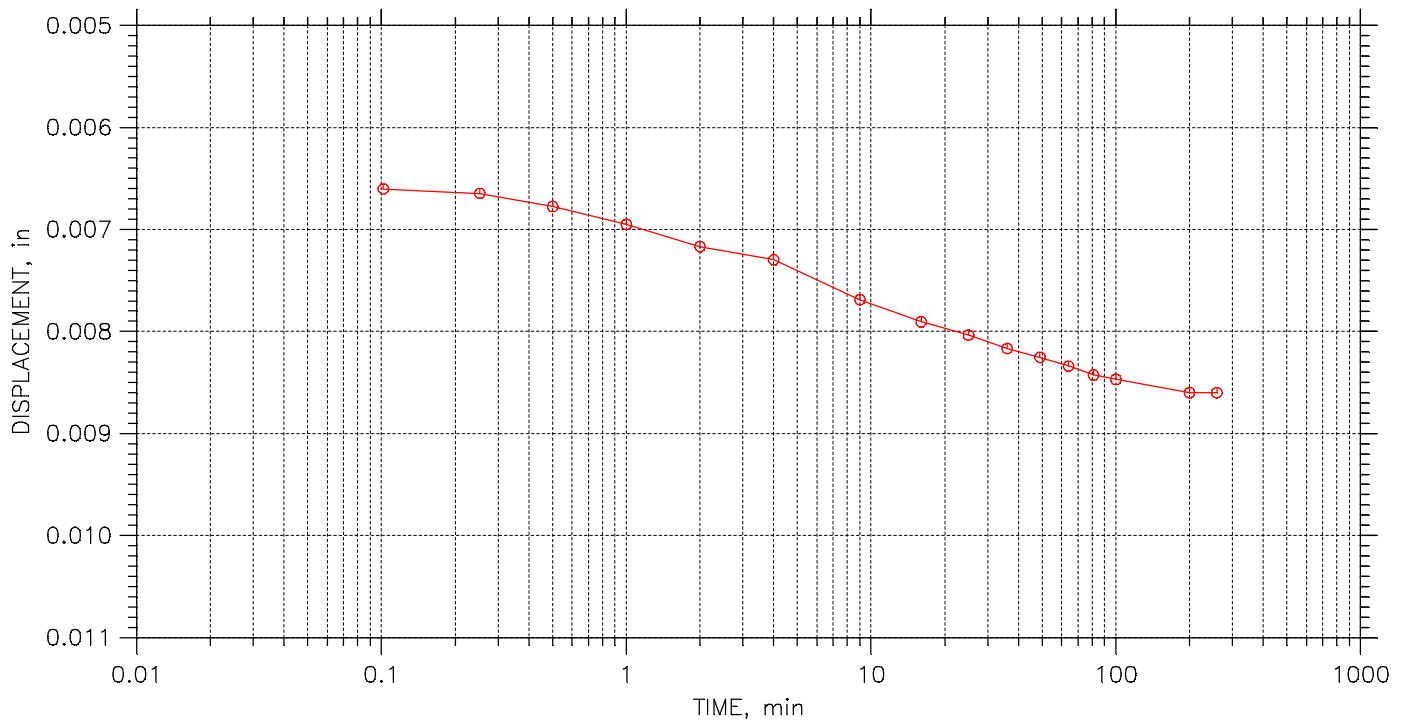
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	Boring No.: B-7 S-5	Tested By: BCM	Checked By: WPQ
	Sample No.: S-5	Test Date: 8/13/19	Depth: 8.5'-10.0'
	Test No.: B7S5CON	Sample Type: 3.0" ST	Elevation: ----
	Description: RUST BROWN, BROWN AND GRAY SANDY LEAN CLAY		
	Remarks: Pc = 4.7 tsf Cc = 0.252 Ccr = 0.019 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 5 of 23

Stress: 1. tsf



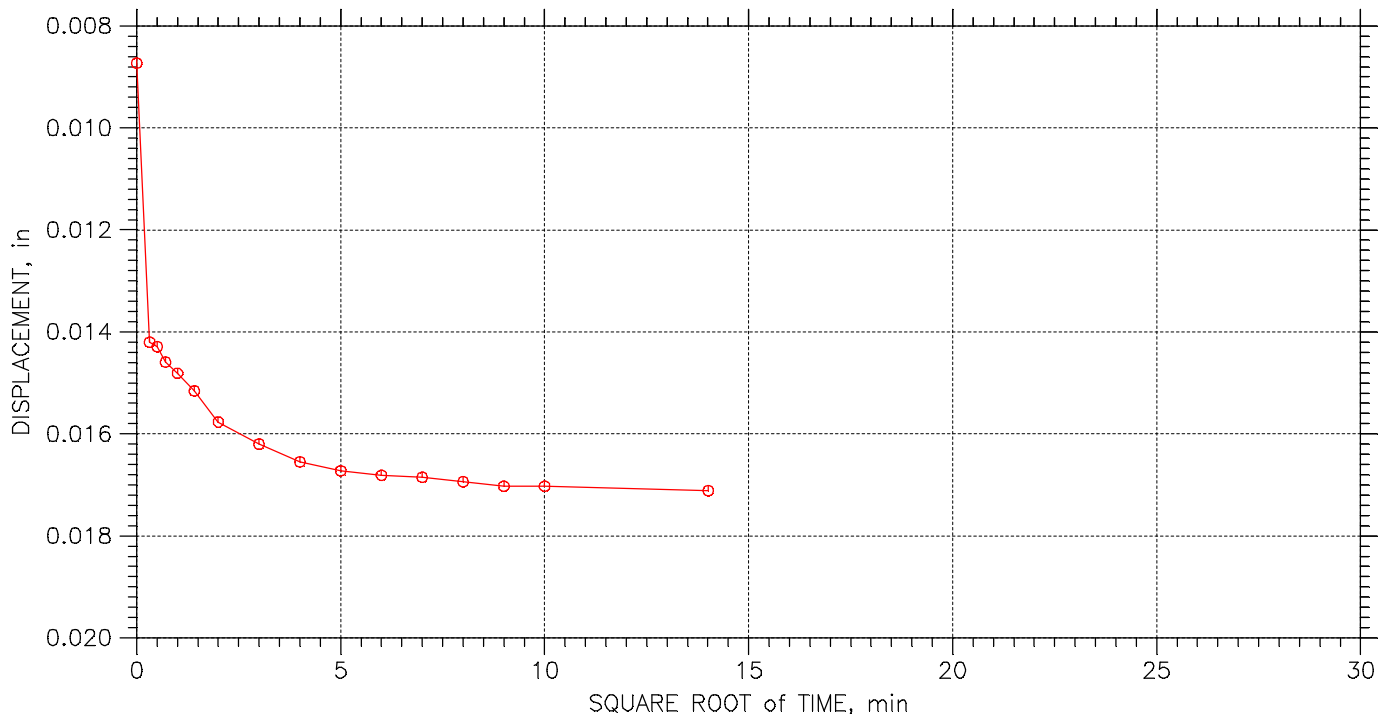
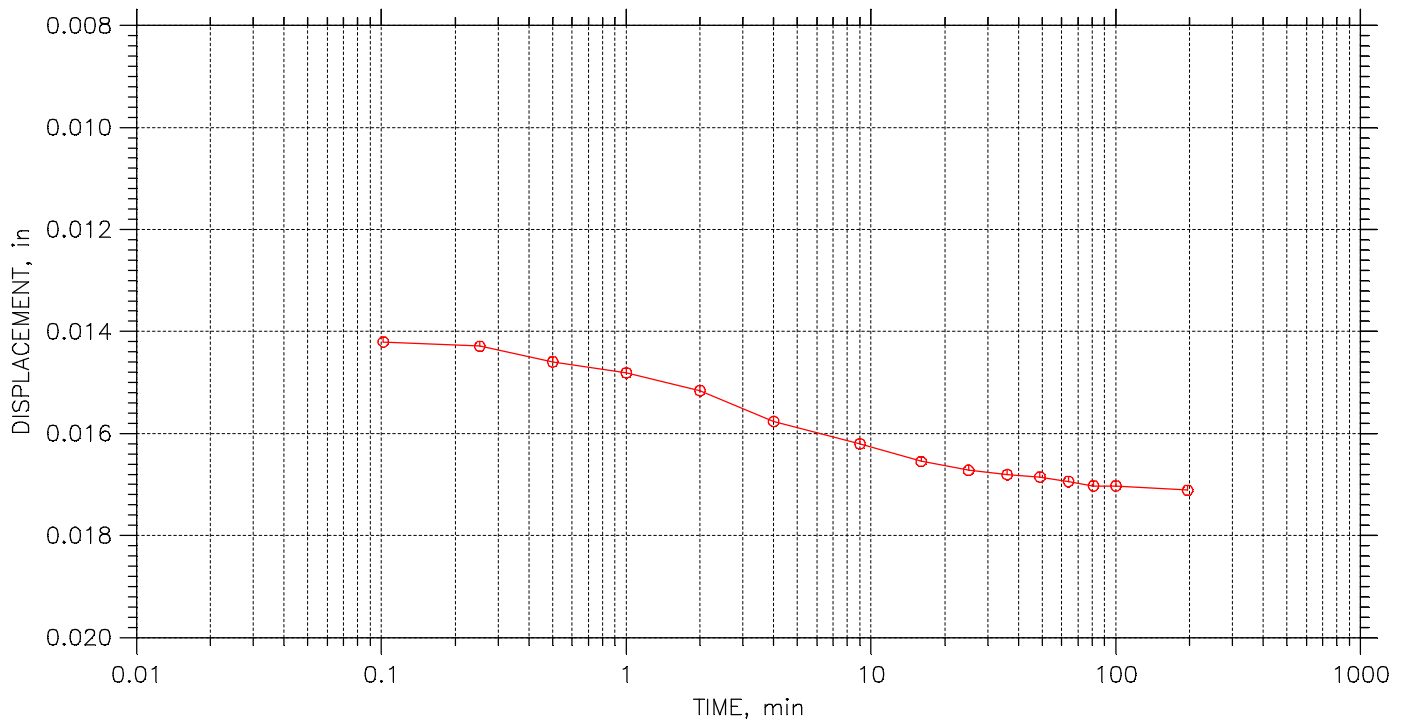
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	Boring No.: B-7 S-5	Tested By: BCM	Checked By: WPQ
	Sample No.: S-5	Test Date: 8/13/19	Depth: 8.5'-10.0'
	Test No.: B7S5CON	Sample Type: 3.0" ST	Elevation: ----
	Description: RUST BROWN, BROWN AND GRAY SANDY LEAN CLAY		
	Remarks: Pc = 4.7 tsf Cc = 0.252 Ccr = 0.019 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 6 of 23

Stress: 2. tsf



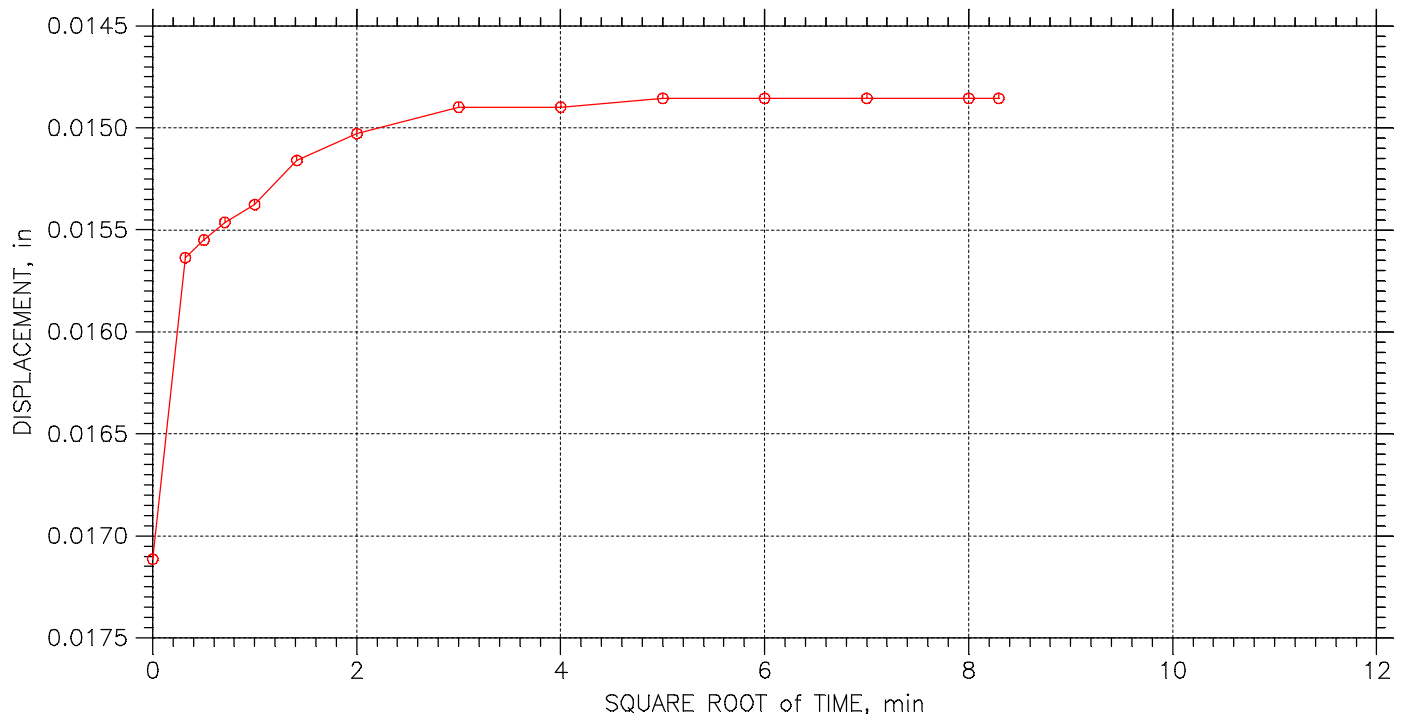
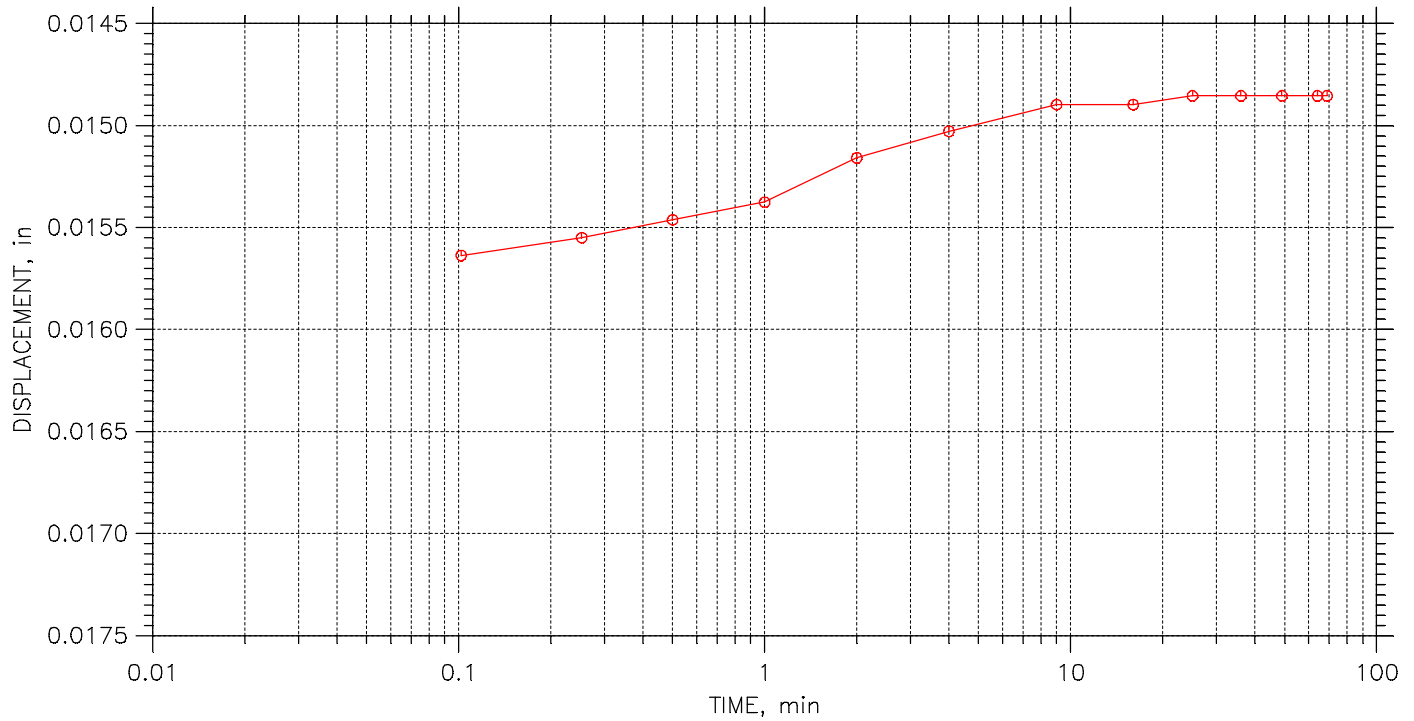
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	Boring No.: B-7 S-5	Tested By: BCM	Checked By: WPQ
	Sample No.: S-5	Test Date: 8/13/19	Depth: 8.5'-10.0'
	Test No.: B7S5CON	Sample Type: 3.0" ST	Elevation: ----
	Description: RUST BROWN, BROWN AND GRAY SANDY LEAN CLAY		
	Remarks: Pc = 4.7 tsf Cc = 0.252 Ccr = 0.019 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 7 of 23

Stress: 1. tsf



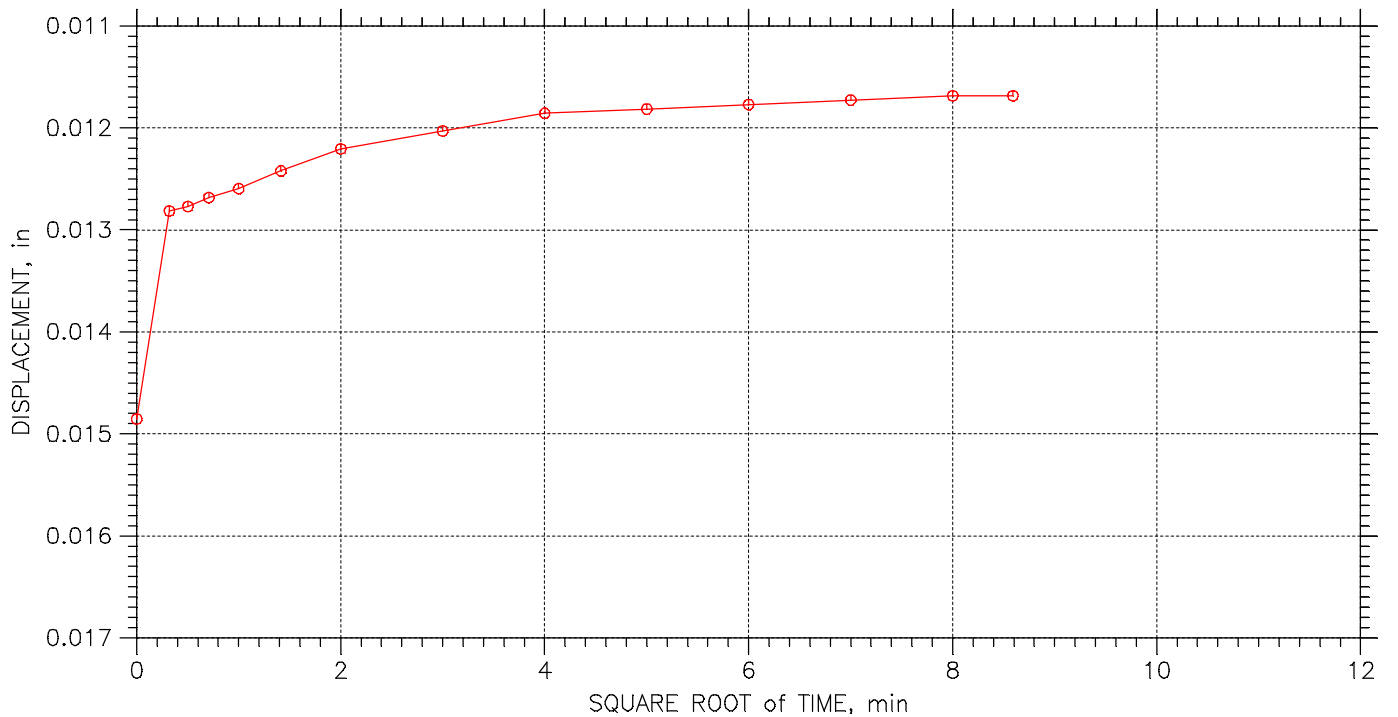
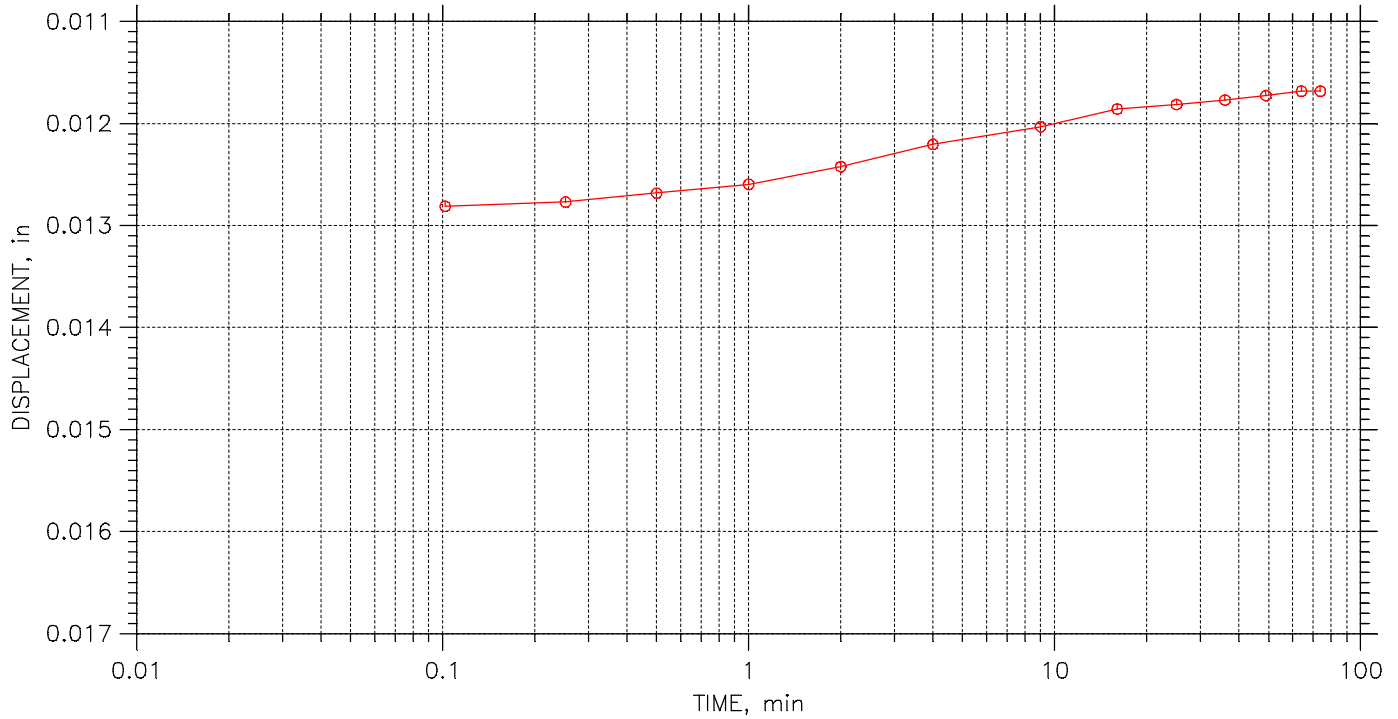
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	Boring No.: B-7 S-5	Tested By: BCM	Checked By: WPQ
	Sample No.: S-5	Test Date: 8/13/19	Depth: 8.5'-10.0'
	Test No.: B7S5CON	Sample Type: 3.0" ST	Elevation: ----
	Description: RUST BROWN, BROWN AND GRAY SANDY LEAN CLAY		
	Remarks: Pc = 4.7 tsf Cc = 0.252 Ccr = 0.019 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 8 of 23

Stress: 0.5 tsf



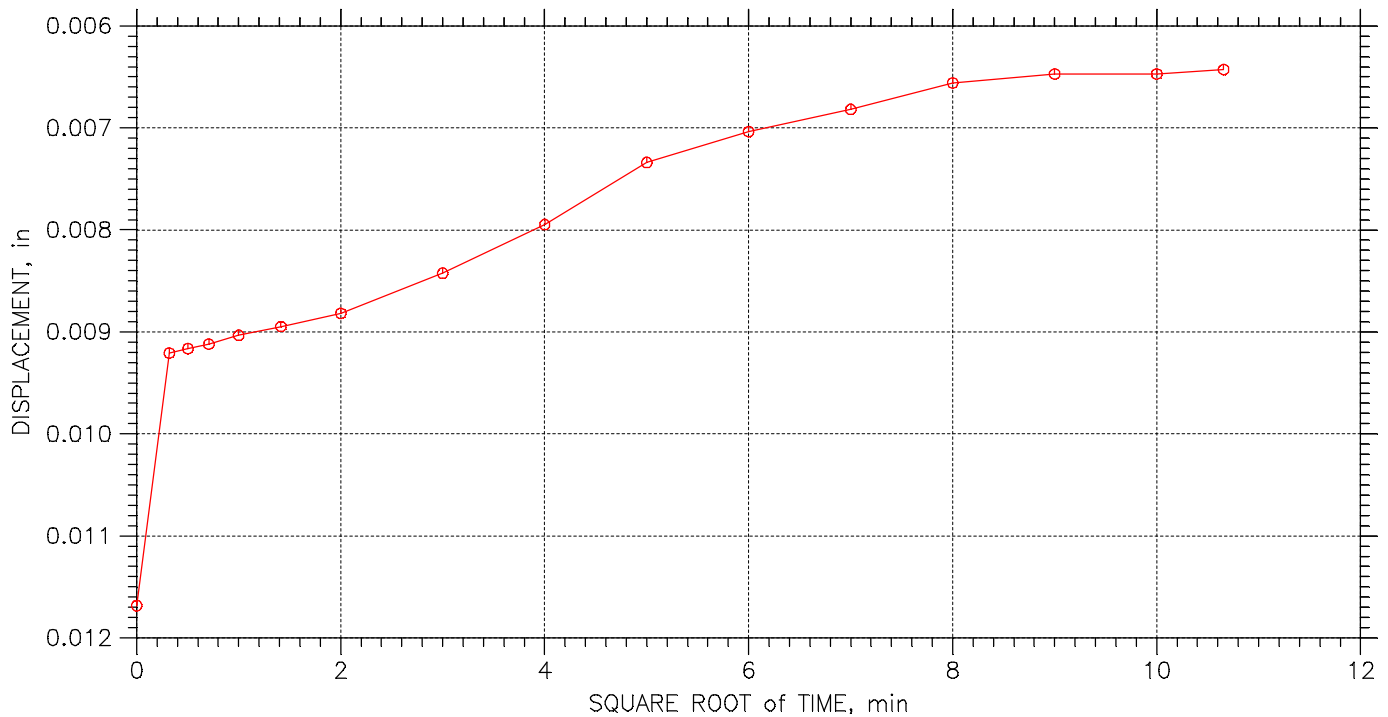
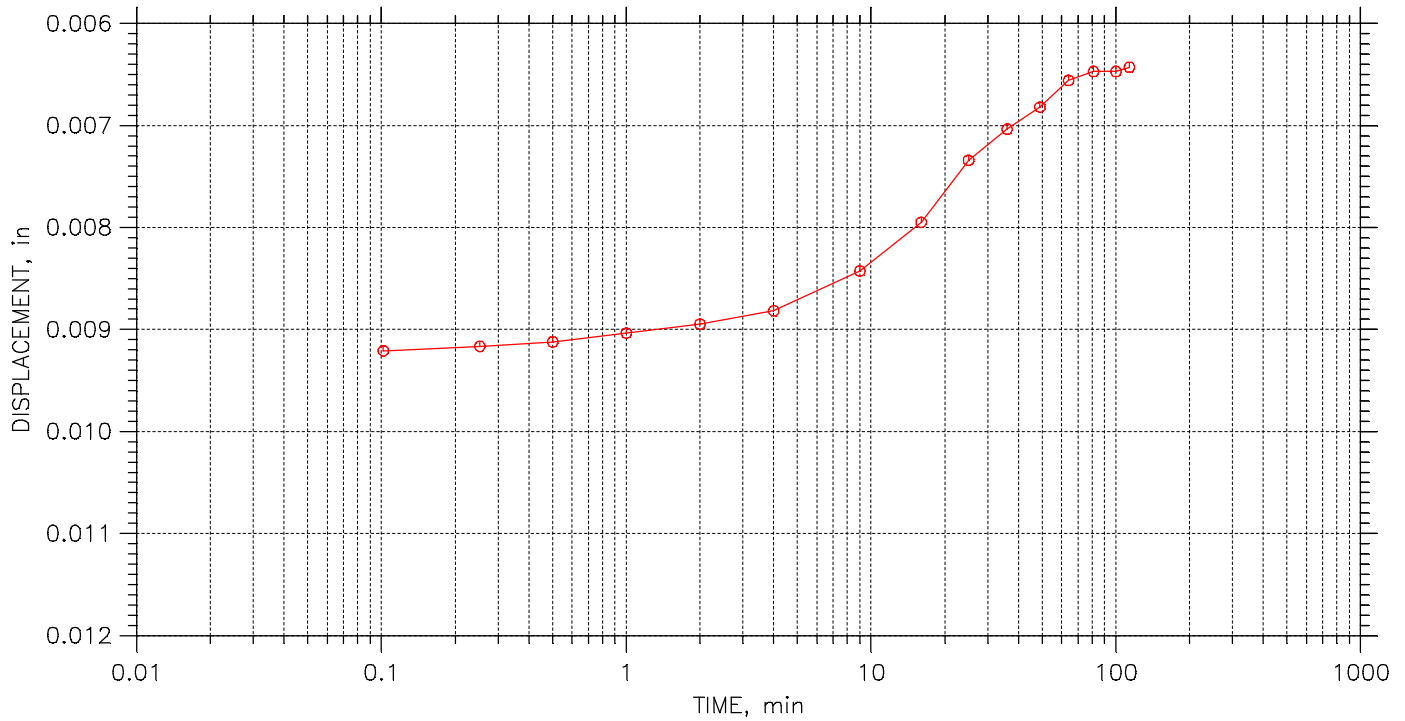
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	Test No.: B7S5CON	Sample Type: 3.0" ST	Elevation: ----
	Description: RUST BROWN, BROWN AND GRAY SANDY LEAN CLAY		
	Remarks: Pc = 4.7 tsf Cc = 0.252 Ccr = 0.019 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 9 of 23

Stress: 0.125 tsf



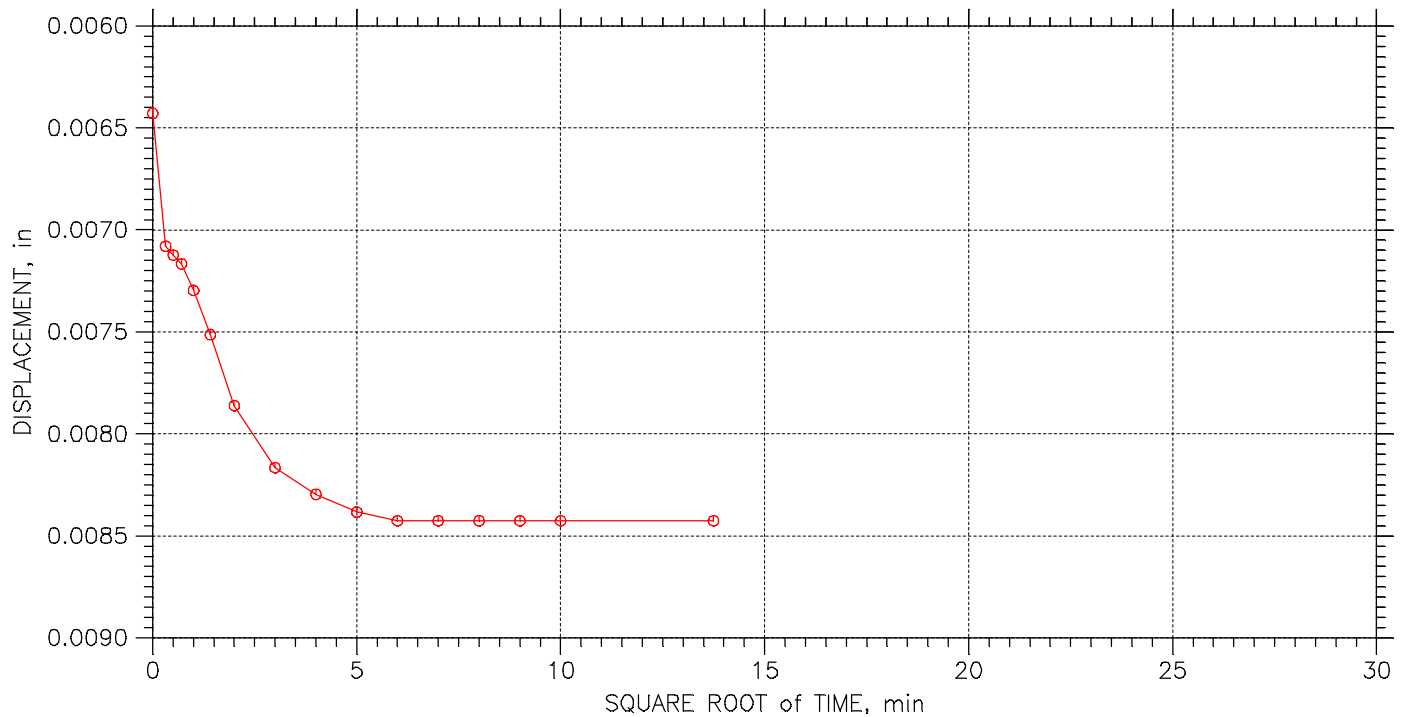
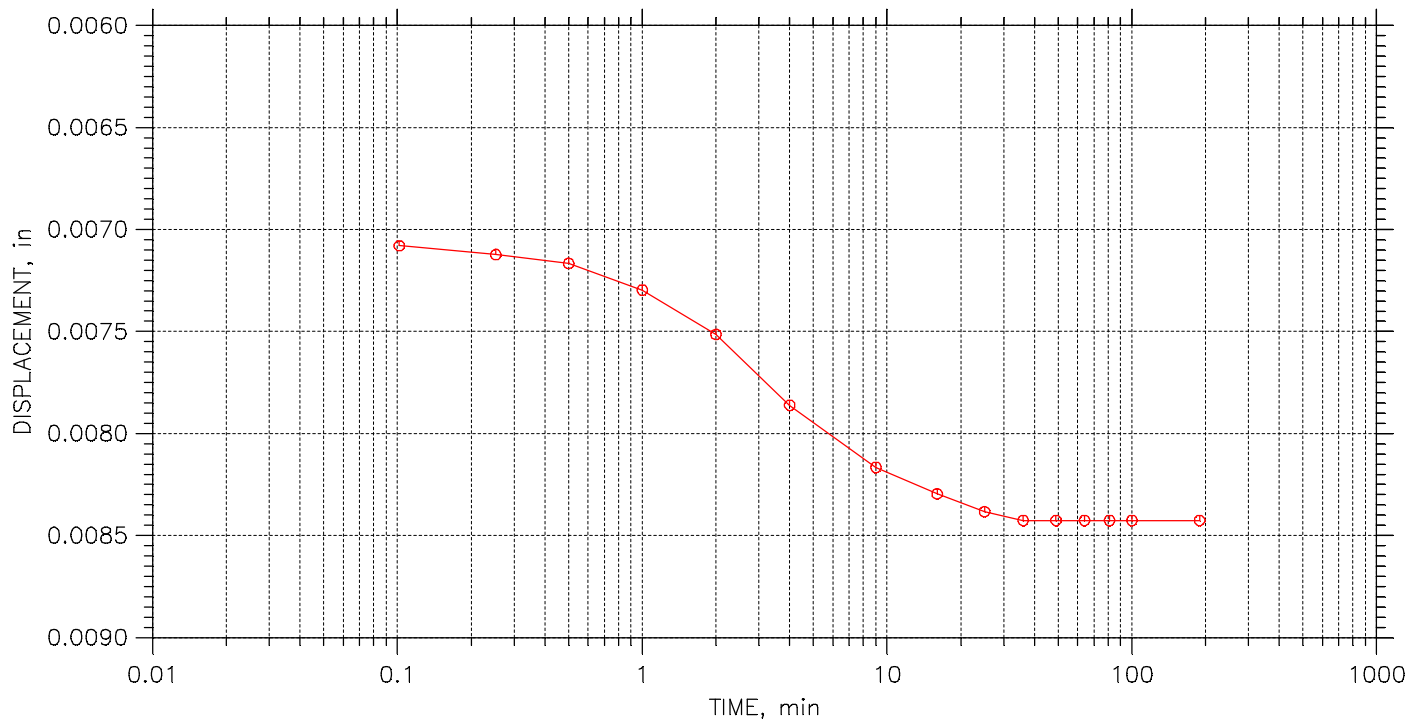
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	Sample No.: S-5	Test Date: 8/13/19	Depth: 8.5'-10.0'
	Test No.: B7S5CON	Sample Type: 3.0" ST	Elevation: ----
	Description: RUST BROWN, BROWN AND GRAY SANDY LEAN CLAY		
	Remarks: Pc = 4.7 tsf Cc = 0.252 Ccr = 0.019 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 10 of 23

Stress: 0.25 tsf



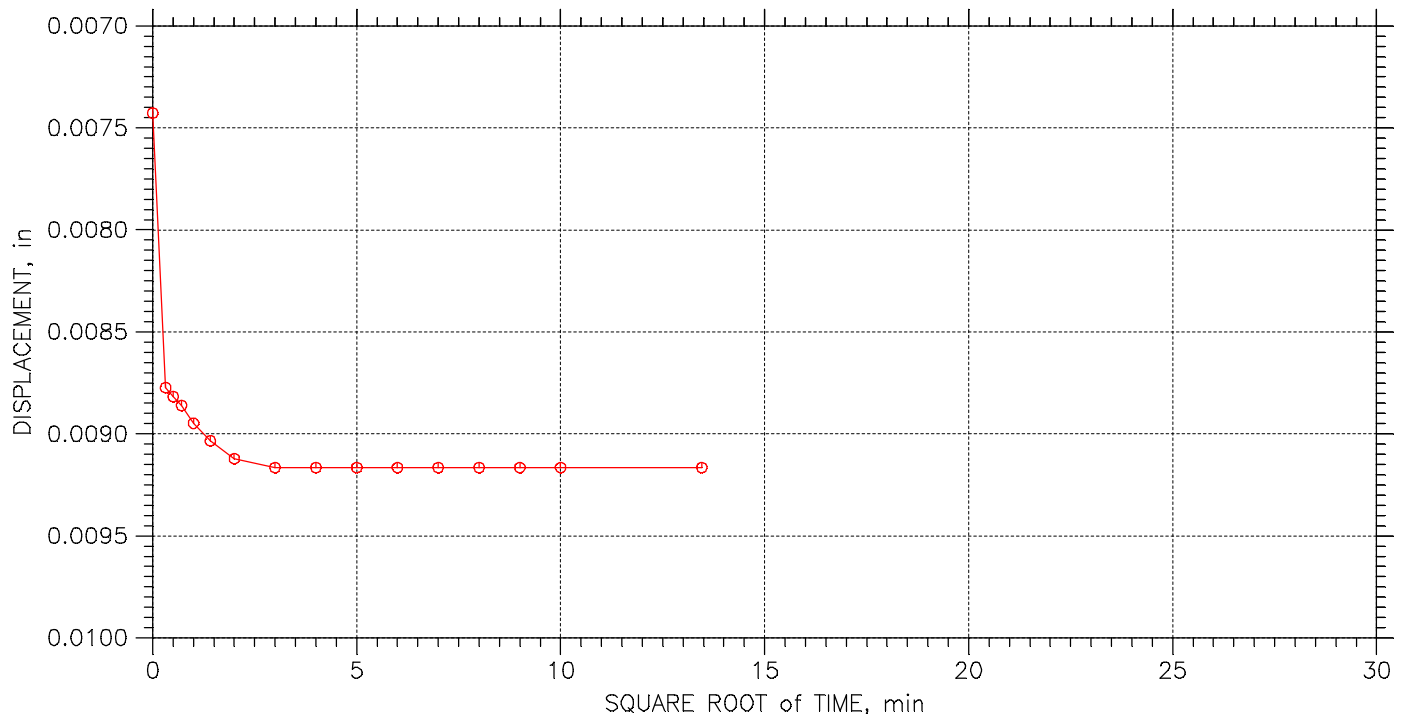
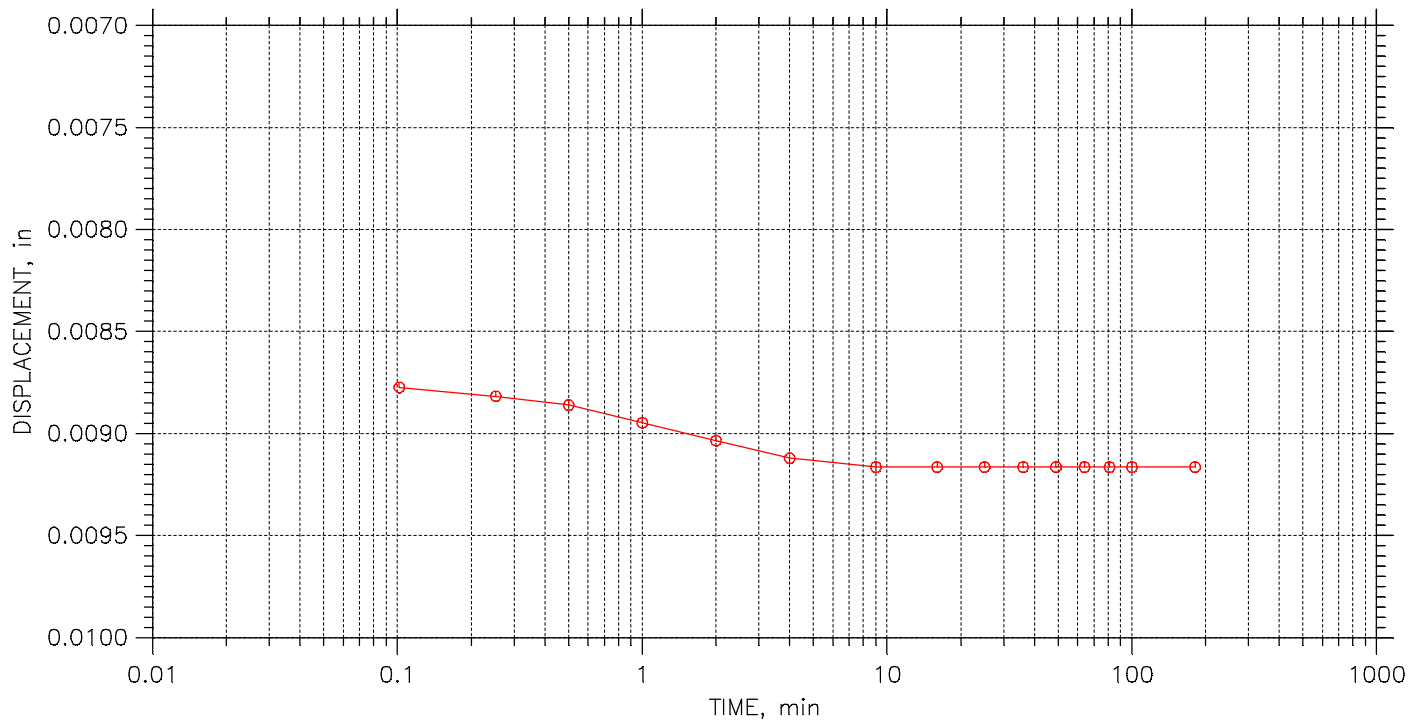
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	Boring No.: B-7 S-5	Tested By: BCM	Checked By: WPQ
	Sample No.: S-5	Test Date: 8/13/19	Depth: 8.5'-10.0'
	Test No.: B7S5CON	Sample Type: 3.0" ST	Elevation: ----
	Description: RUST BROWN, BROWN AND GRAY SANDY LEAN CLAY		
	Remarks: Pc = 4.7 tsf Cc = 0.252 Ccr = 0.019 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 11 of 23

Stress: 0.5 tsf



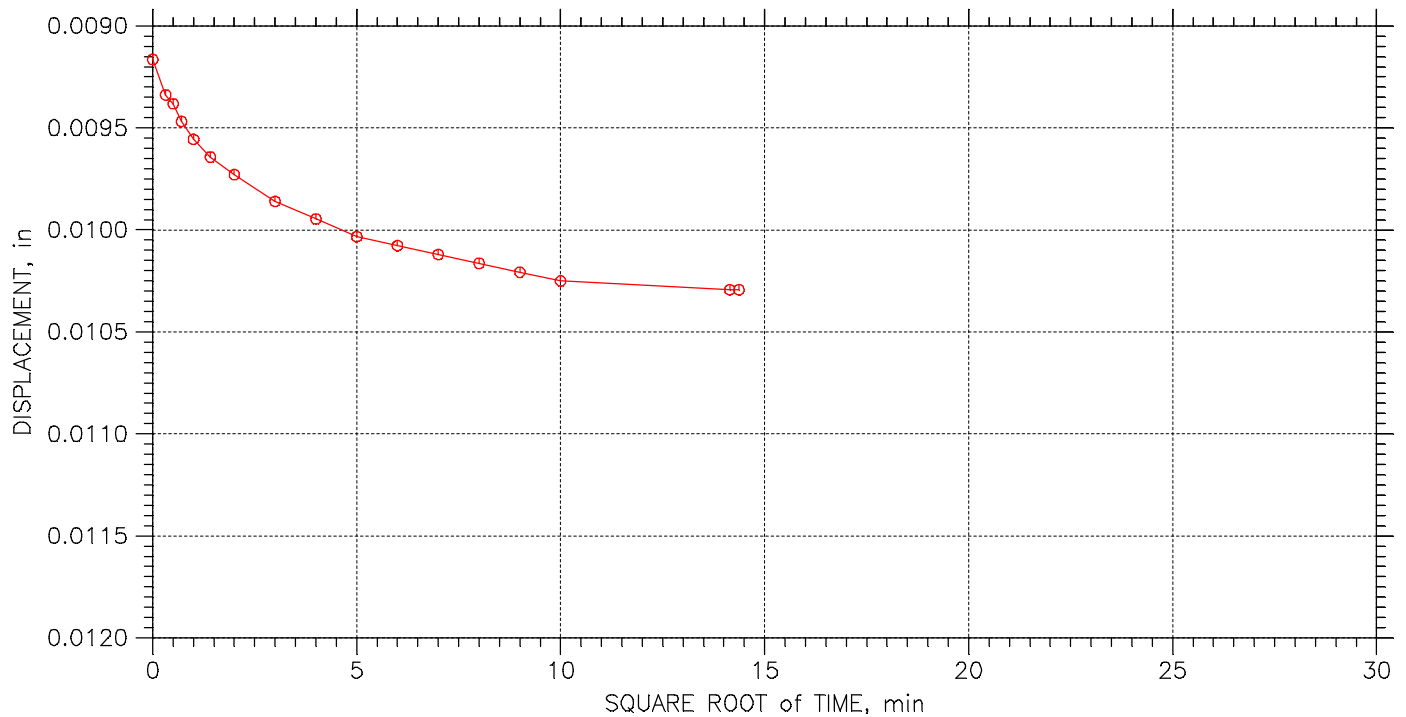
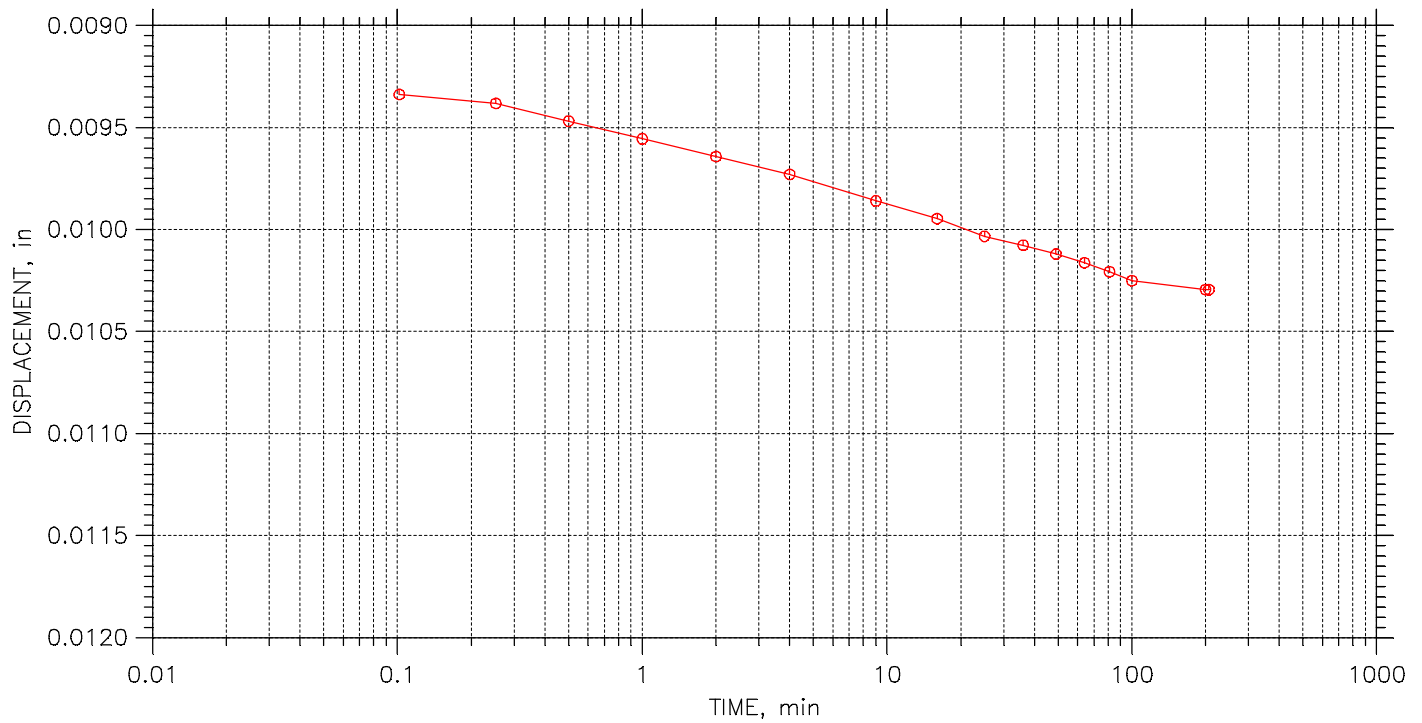
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	Boring No.: B-7 S-5	Tested By: BCM	Checked By: WPQ
	Sample No.: S-5	Test Date: 8/13/19	Depth: 8.5'-10.0'
	Test No.: B7S5CON	Sample Type: 3.0" ST	Elevation: ----
	Description: RUST BROWN, BROWN AND GRAY SANDY LEAN CLAY		
	Remarks: Pc = 4.7 tsf Cc = 0.252 Ccr = 0.019 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 12 of 23

Stress: 0.75 tsf



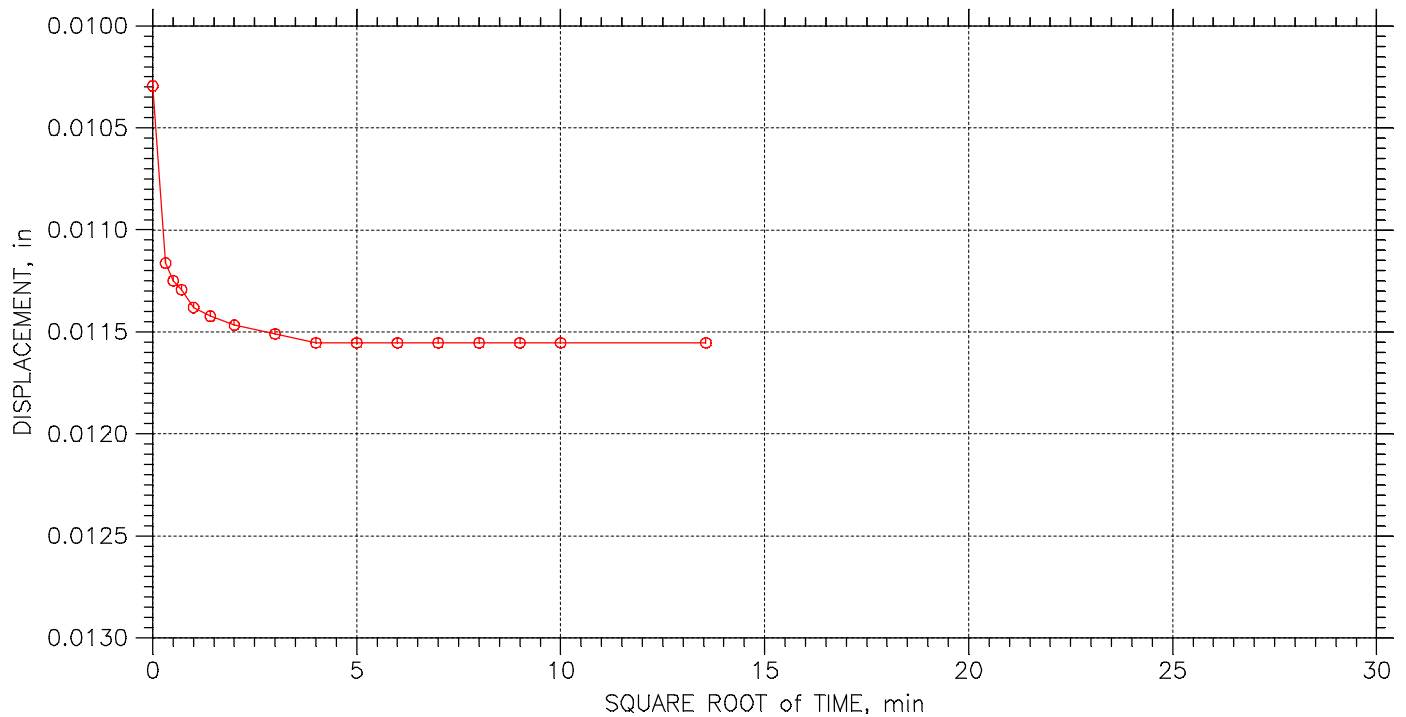
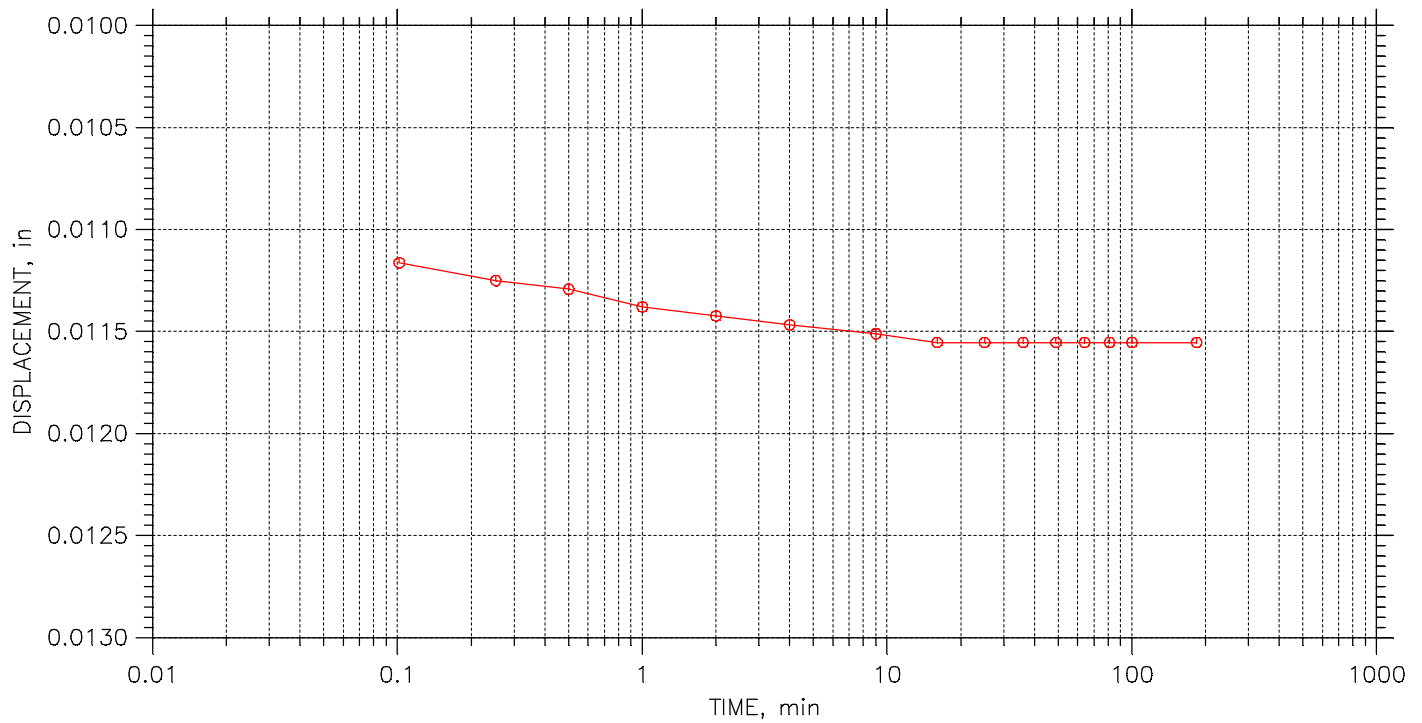
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	Boring No.: B-7 S-5	Tested By: BCM	Checked By: WPQ
	Sample No.: S-5	Test Date: 8/13/19	Depth: 8.5'-10.0'
	Test No.: B7S5CON	Sample Type: 3.0" ST	Elevation: ----
	Description: RUST BROWN, BROWN AND GRAY SANDY LEAN CLAY		
	Remarks: Pc = 4.7 tsf Cc = 0.252 Ccr = 0.019 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 13 of 23

Stress: 1. tsf



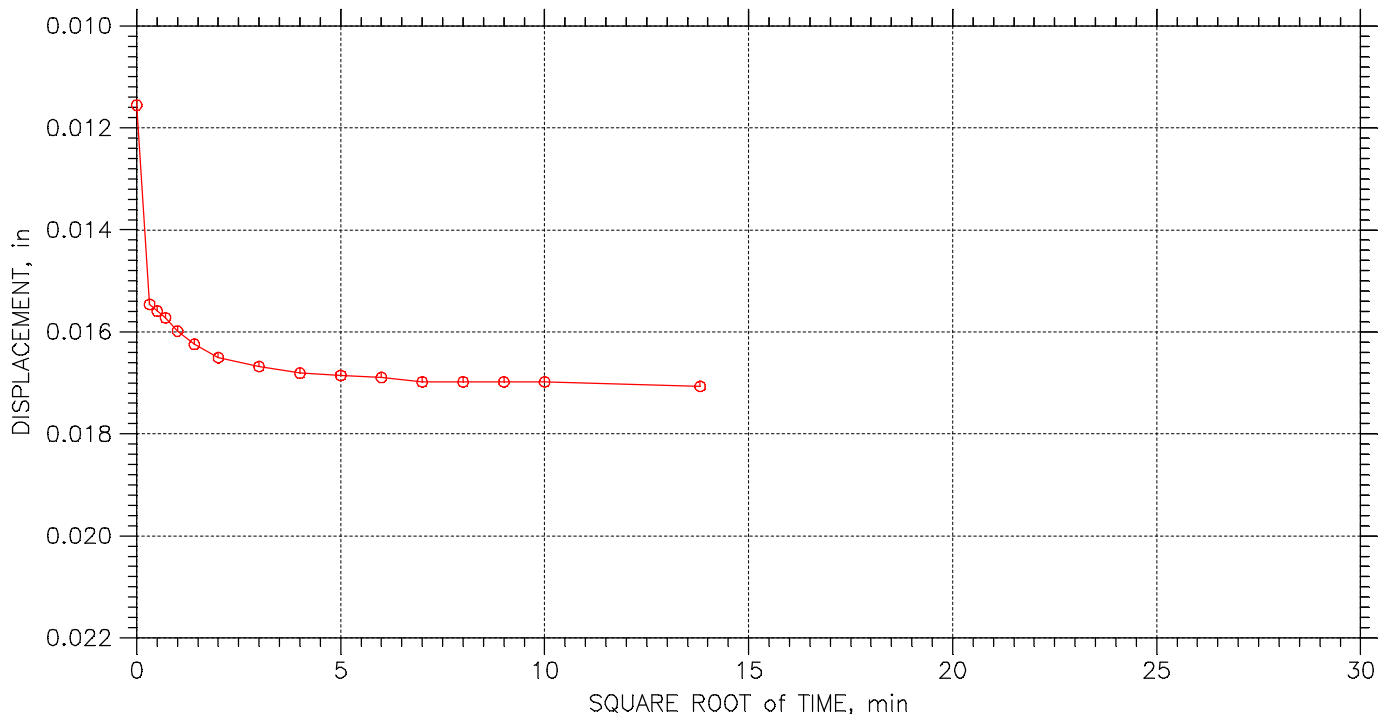
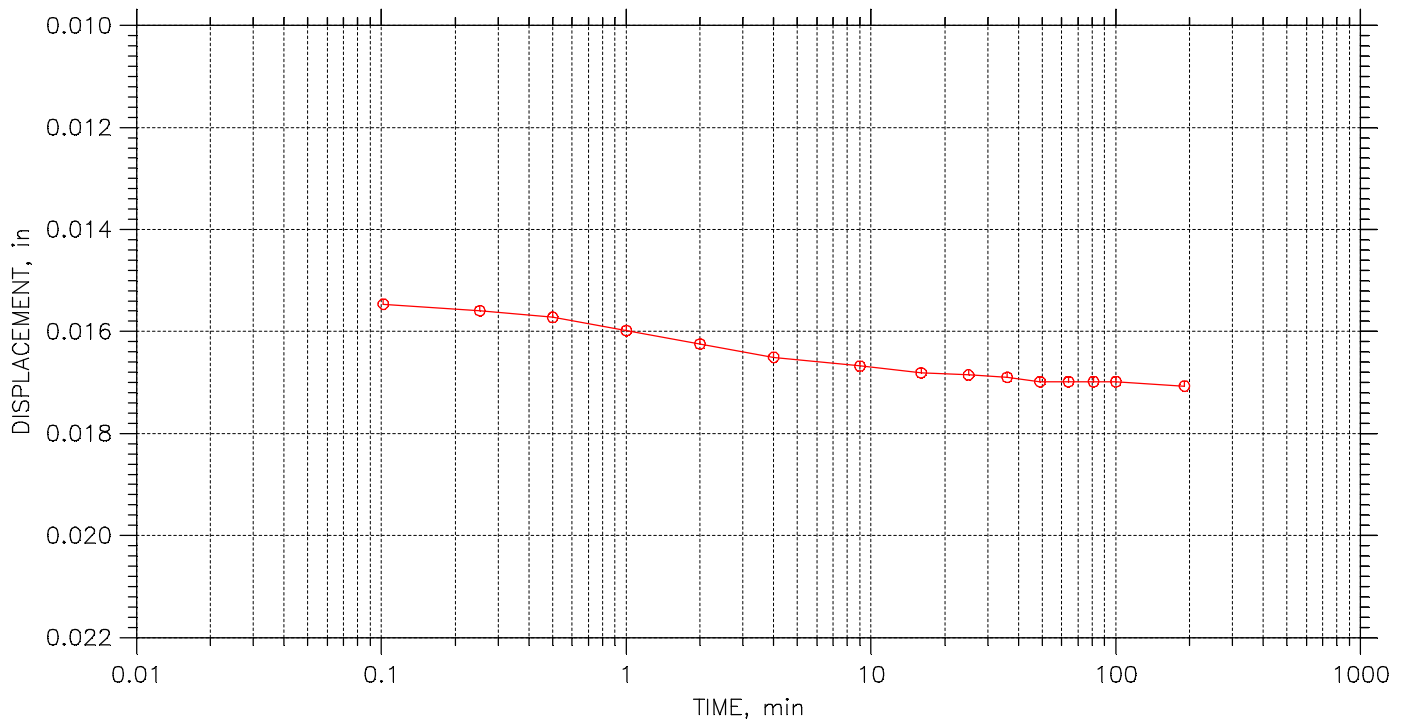
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	Boring No.: B-7 S-5	Tested By: BCM	Checked By: WPQ
	Sample No.: S-5	Test Date: 8/13/19	Depth: 8.5'-10.0'
	Test No.: B7S5CON	Sample Type: 3.0" ST	Elevation: ----
	Description: RUST BROWN, BROWN AND GRAY SANDY LEAN CLAY		
	Remarks: Pc = 4.7 tsf Cc = 0.252 Ccr = 0.019 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 14 of 23

Stress: 2. tsf



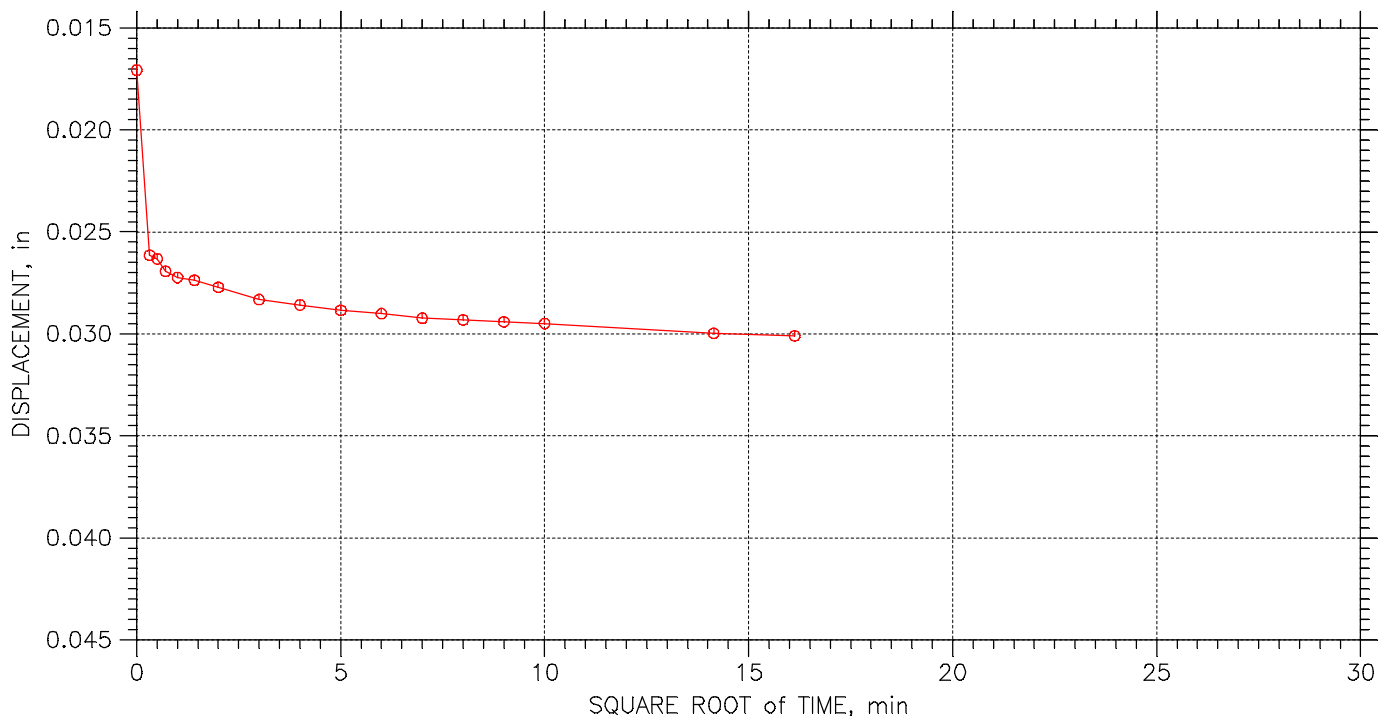
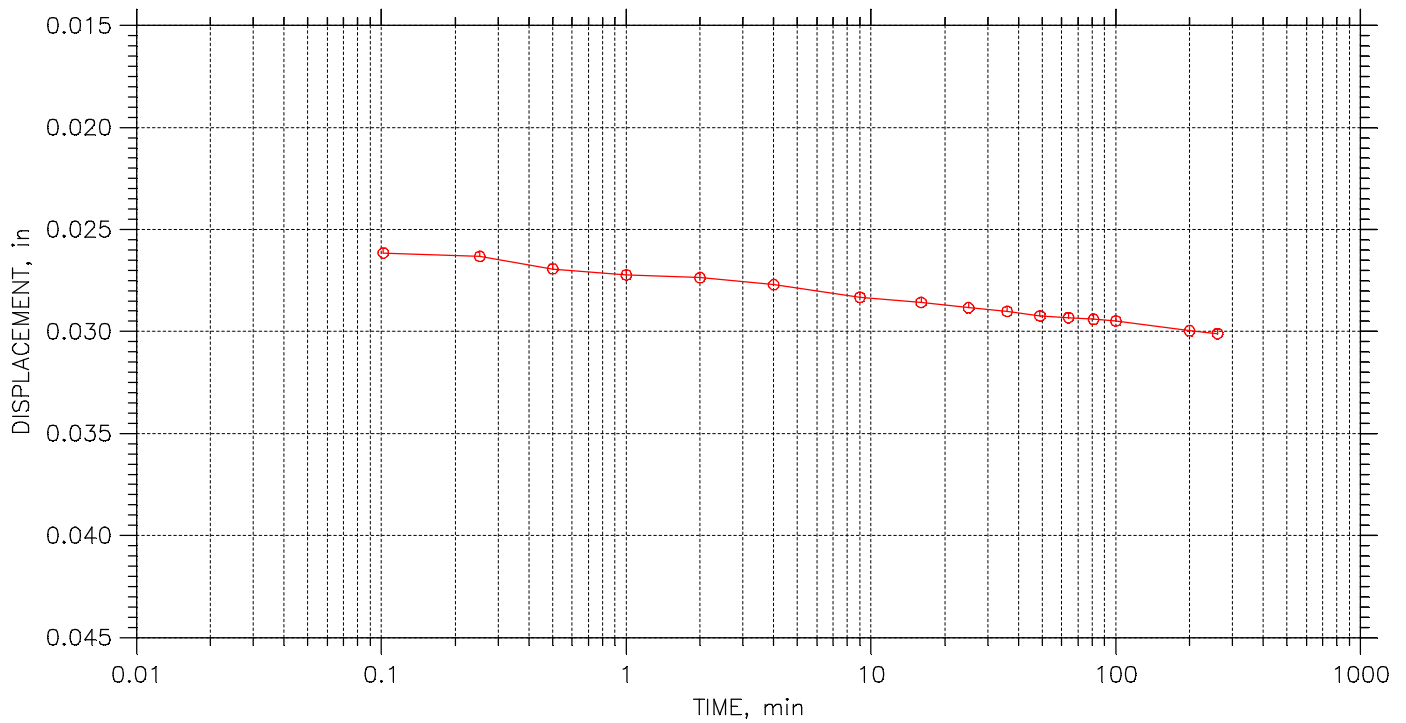
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	Boring No.: B-7 S-5	Tested By: BCM	Checked By: WPQ
	Sample No.: S-5	Test Date: 8/13/19	Depth: 8.5'-10.0'
	Test No.: B7S5CON	Sample Type: 3.0" ST	Elevation: ----
	Description: RUST BROWN, BROWN AND GRAY SANDY LEAN CLAY		
	Remarks: Pc = 4.7 tsf Cc = 0.252 Ccr = 0.019 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 15 of 23

Stress: 4. tsf



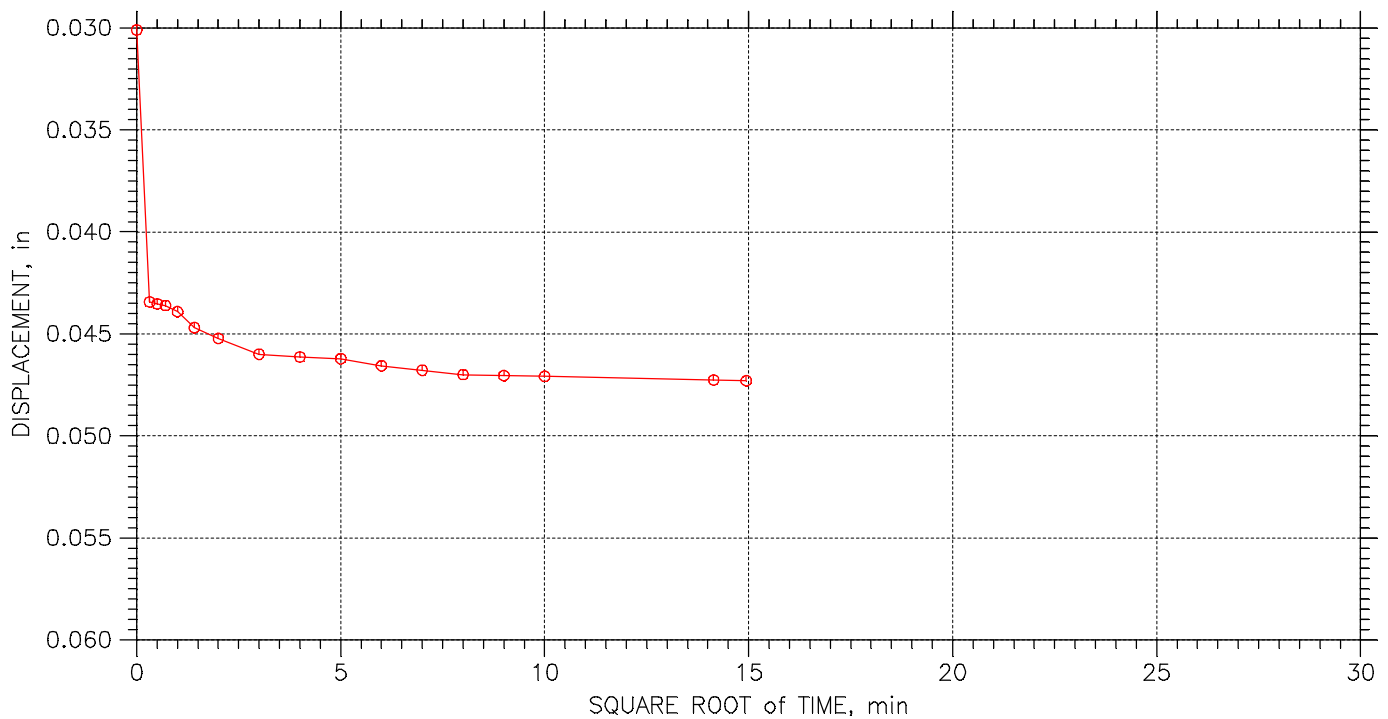
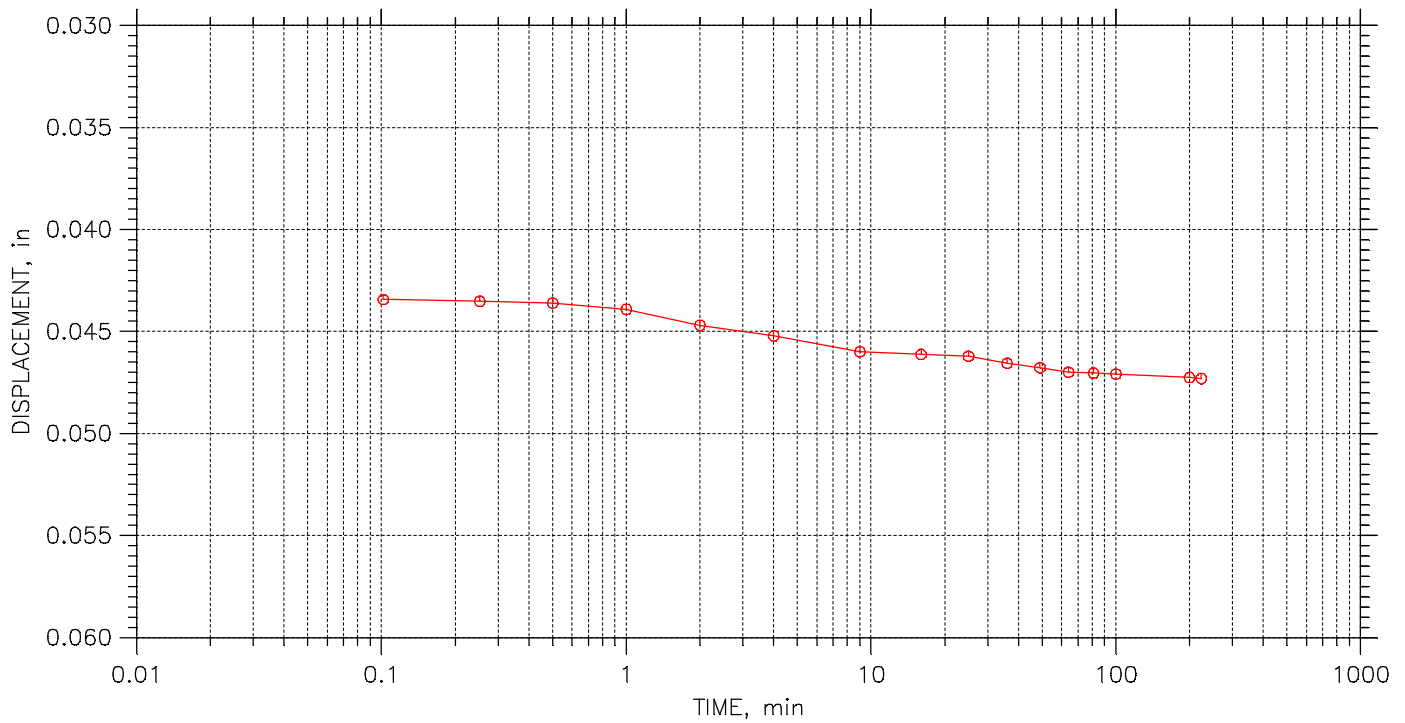
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	Boring No.: B-7 S-5	Tested By: BCM	Checked By: WPQ
	Sample No.: S-5	Test Date: 8/13/19	Depth: 8.5'-10.0'
	Test No.: B7S5CON	Sample Type: 3.0" ST	Elevation: ----
	Description: RUST BROWN, BROWN AND GRAY SANDY LEAN CLAY		
	Remarks: Pc = 4.7 tsf Cc = 0.252 Ccr = 0.019 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 16 of 23

Stress: 8. tsf



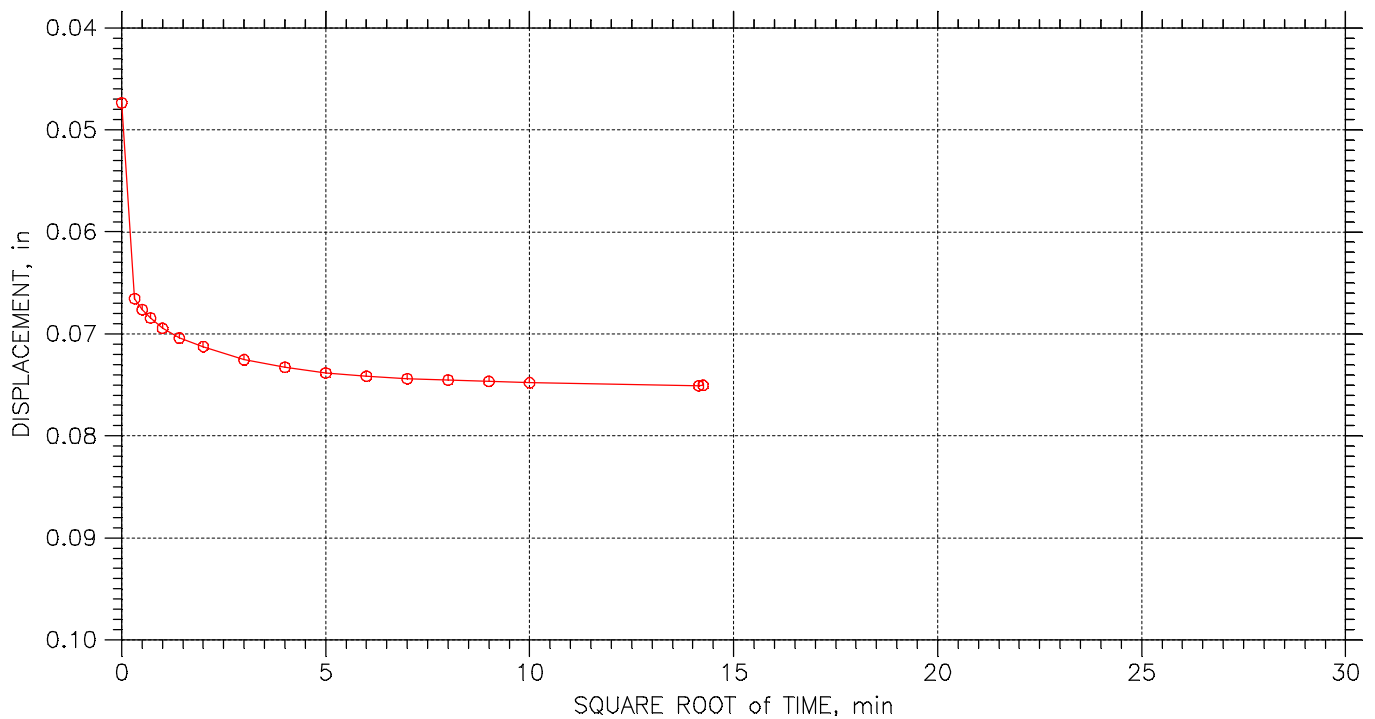
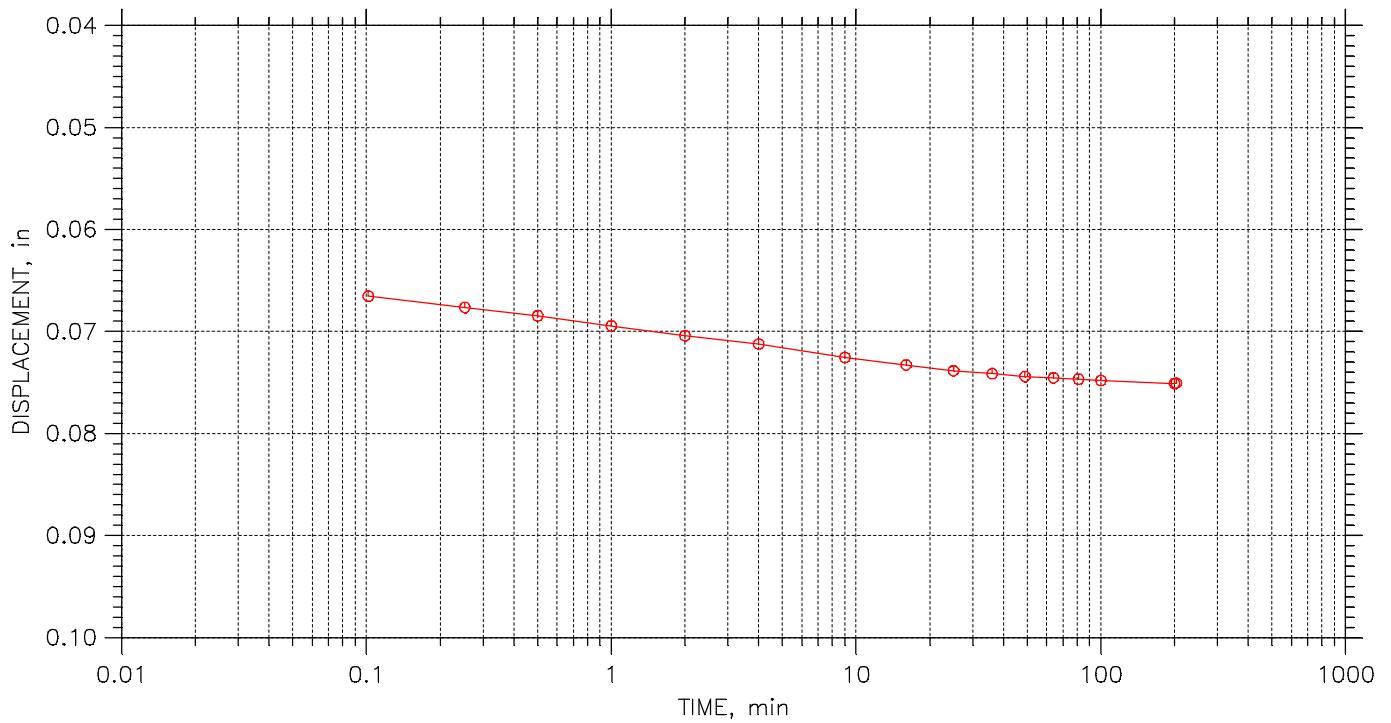
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	Boring No.: B-7 S-5	Tested By: BCM	Checked By: WPQ
	Sample No.: S-5	Test Date: 8/13/19	Depth: 8.5'-10.0'
	Test No.: B7S5CON	Sample Type: 3.0" ST	Elevation: ----
	Description: RUST BROWN, BROWN AND GRAY SANDY LEAN CLAY		
	Remarks: Pc = 4.7 tsf Cc = 0.252 Ccr = 0.019 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 17 of 23

Stress: 16. tsf



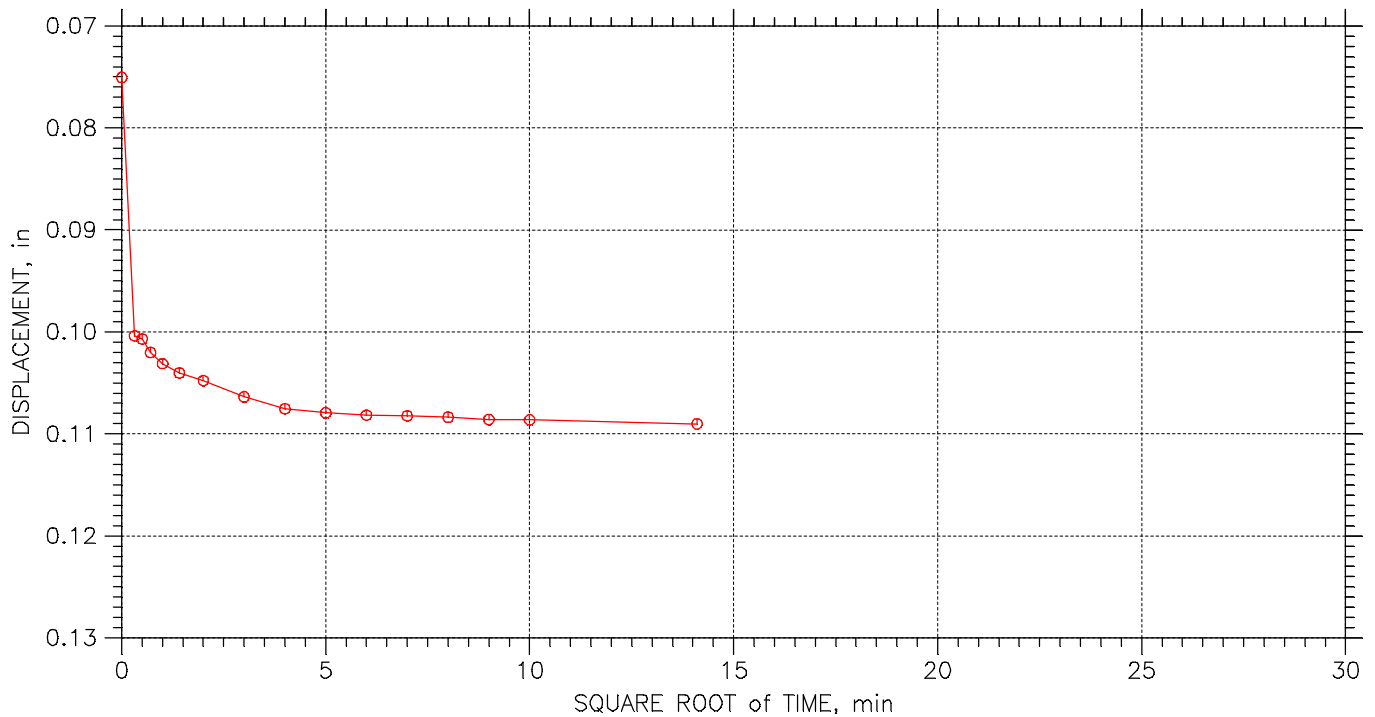
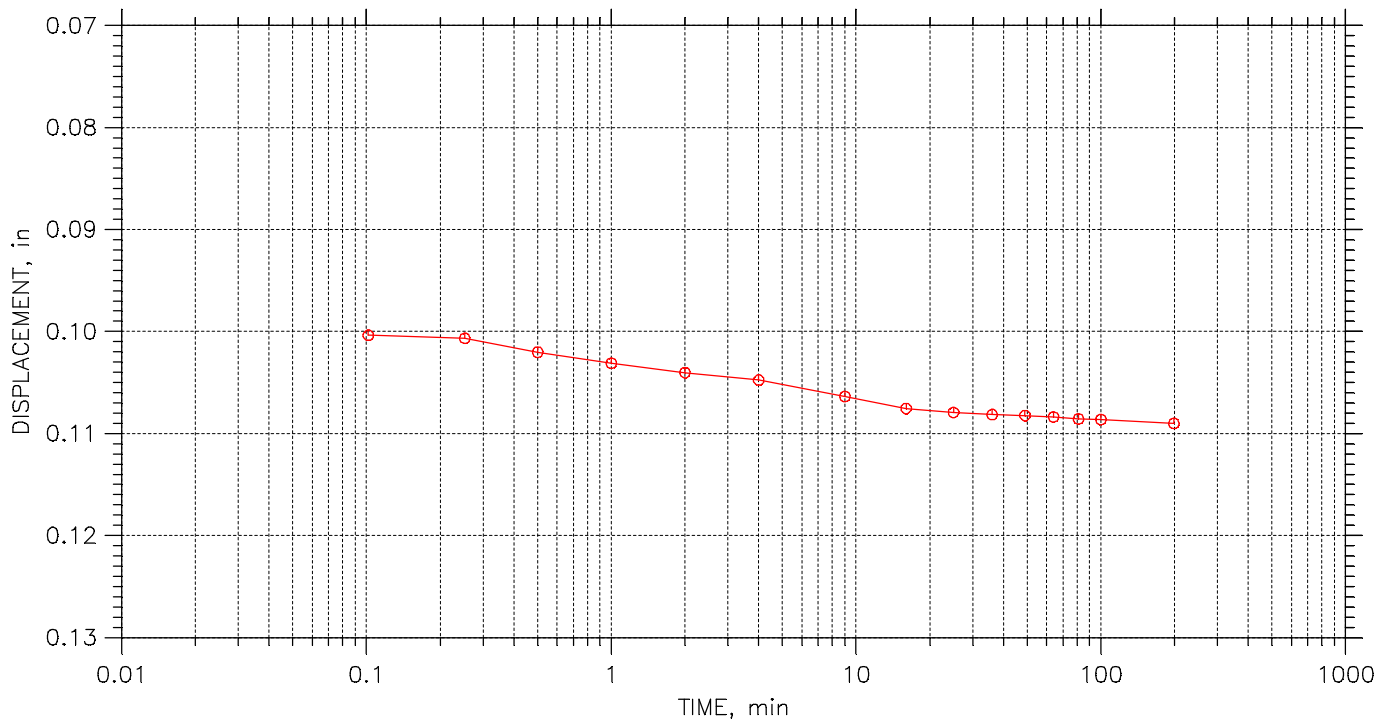
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	Boring No.: B-7 S-5	Tested By: BCM	Checked By: WPQ
	Sample No.: S-5	Test Date: 8/13/19	Depth: 8.5'-10.0'
	Test No.: B7S5CON	Sample Type: 3.0" ST	Elevation: ----
	Description: RUST BROWN, BROWN AND GRAY SANDY LEAN CLAY		
	Remarks: Pc = 4.7 tsf Cc = 0.252 Ccr = 0.019 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 18 of 23

Stress: 32. tsf



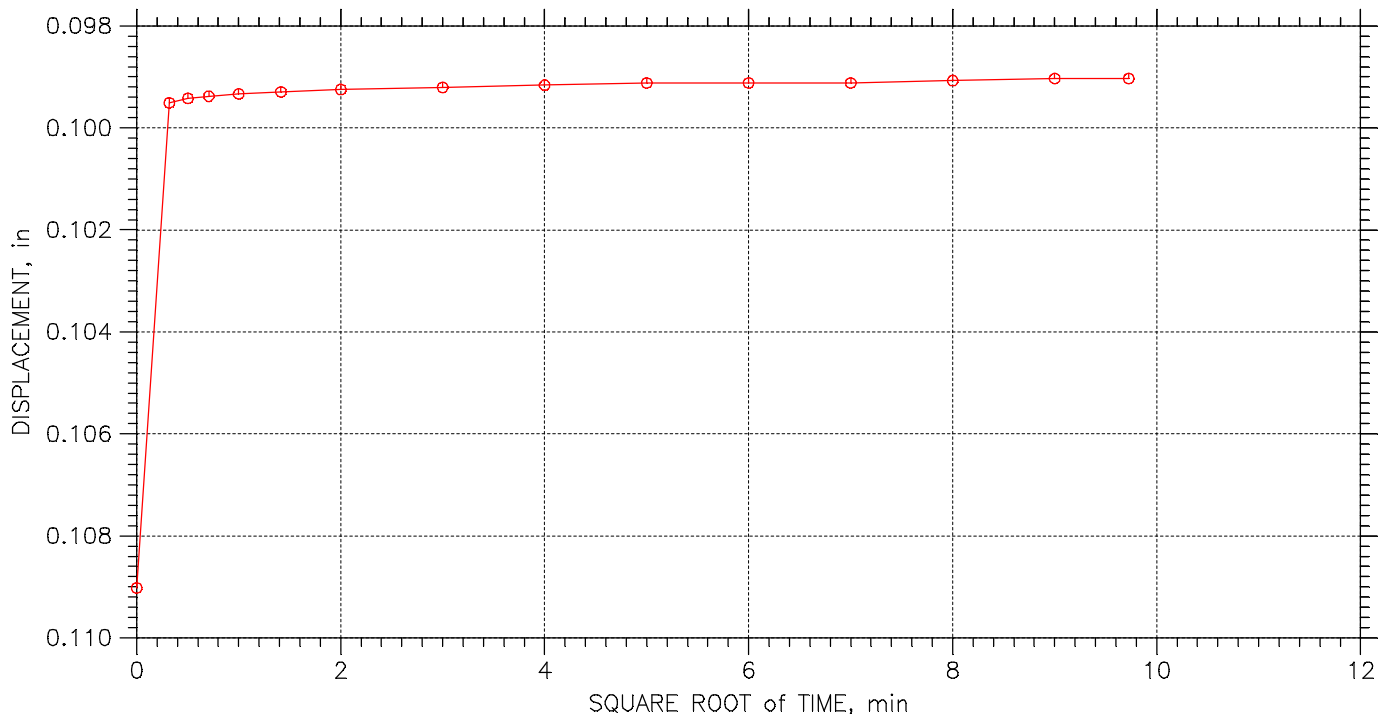
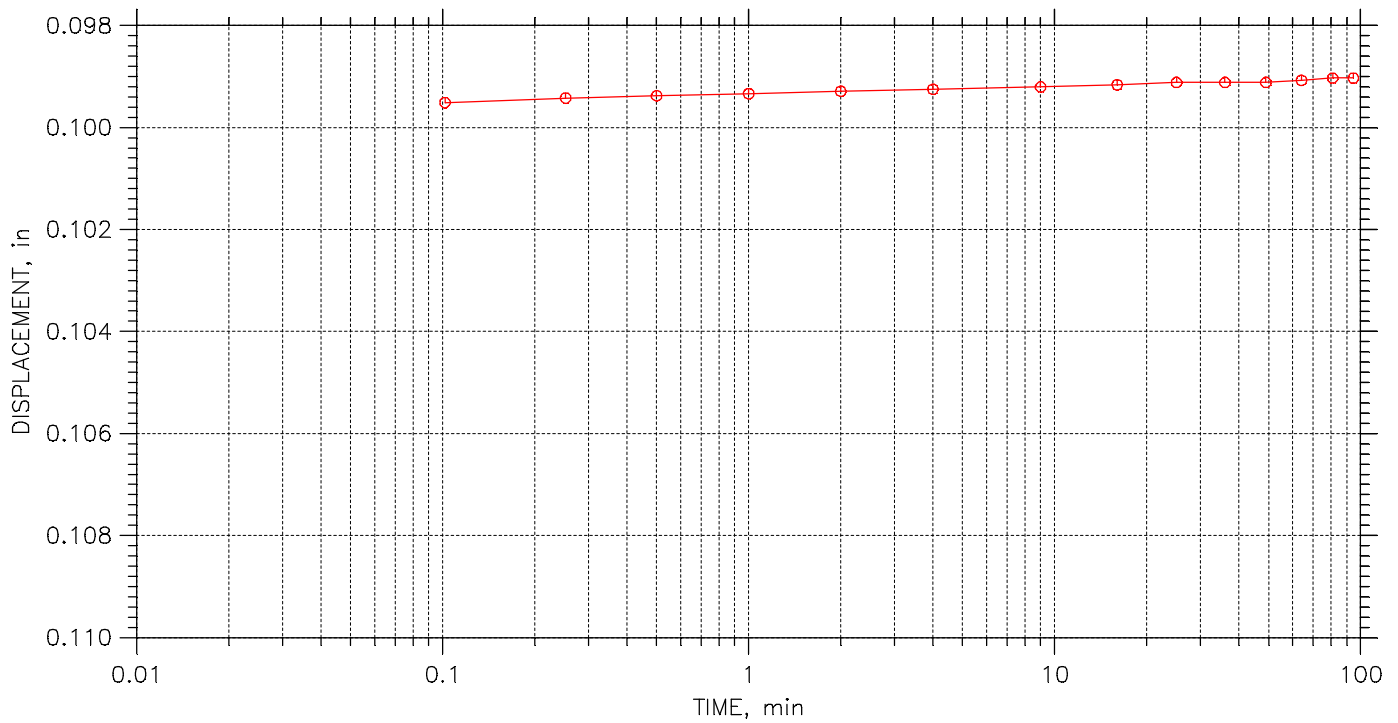
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	Boring No.: B-7 S-5	Tested By: BCM	Checked By: WPQ
	Sample No.: S-5	Test Date: 8/13/19	Depth: 8.5'-10.0'
	Test No.: B7S5CON	Sample Type: 3.0" ST	Elevation: ----
	Description: RUST BROWN, BROWN AND GRAY SANDY LEAN CLAY		
	Remarks: Pc = 4.7 tsf Cc = 0.252 Ccr = 0.019 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 19 of 23

Stress: 16. tsf



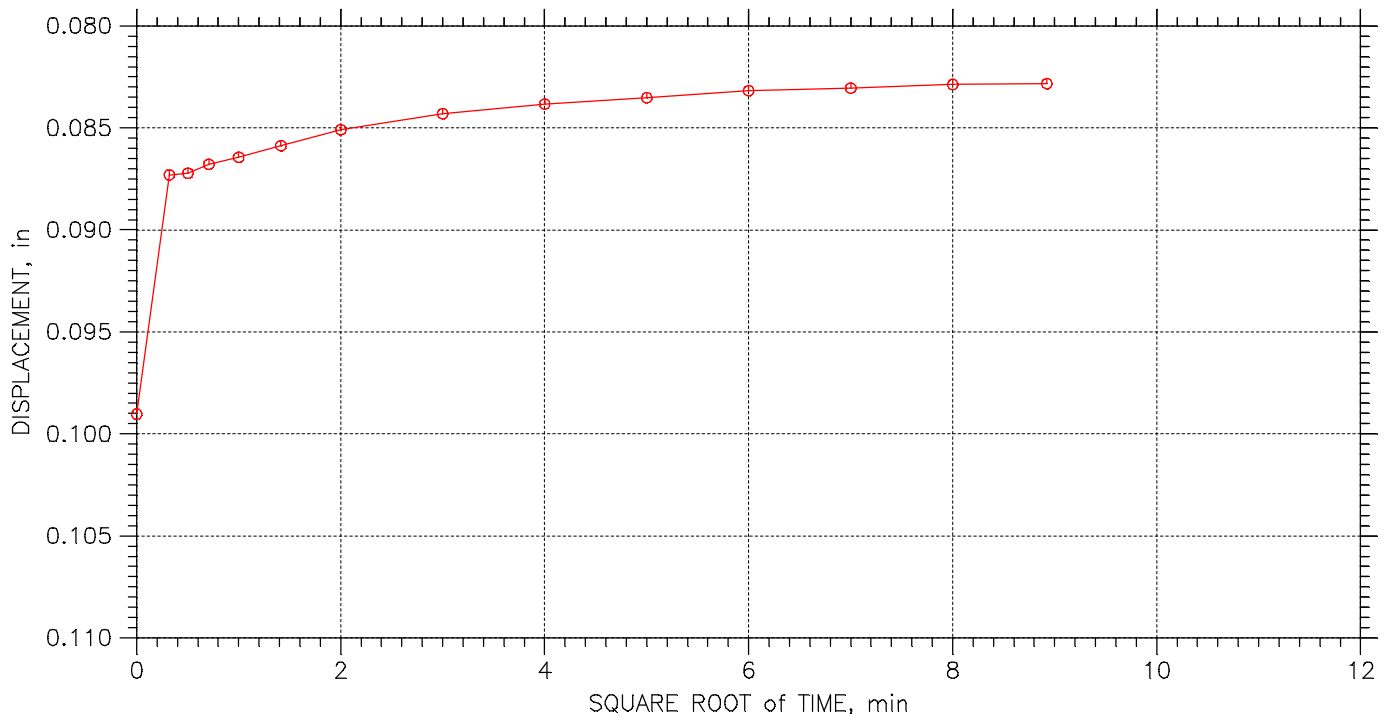
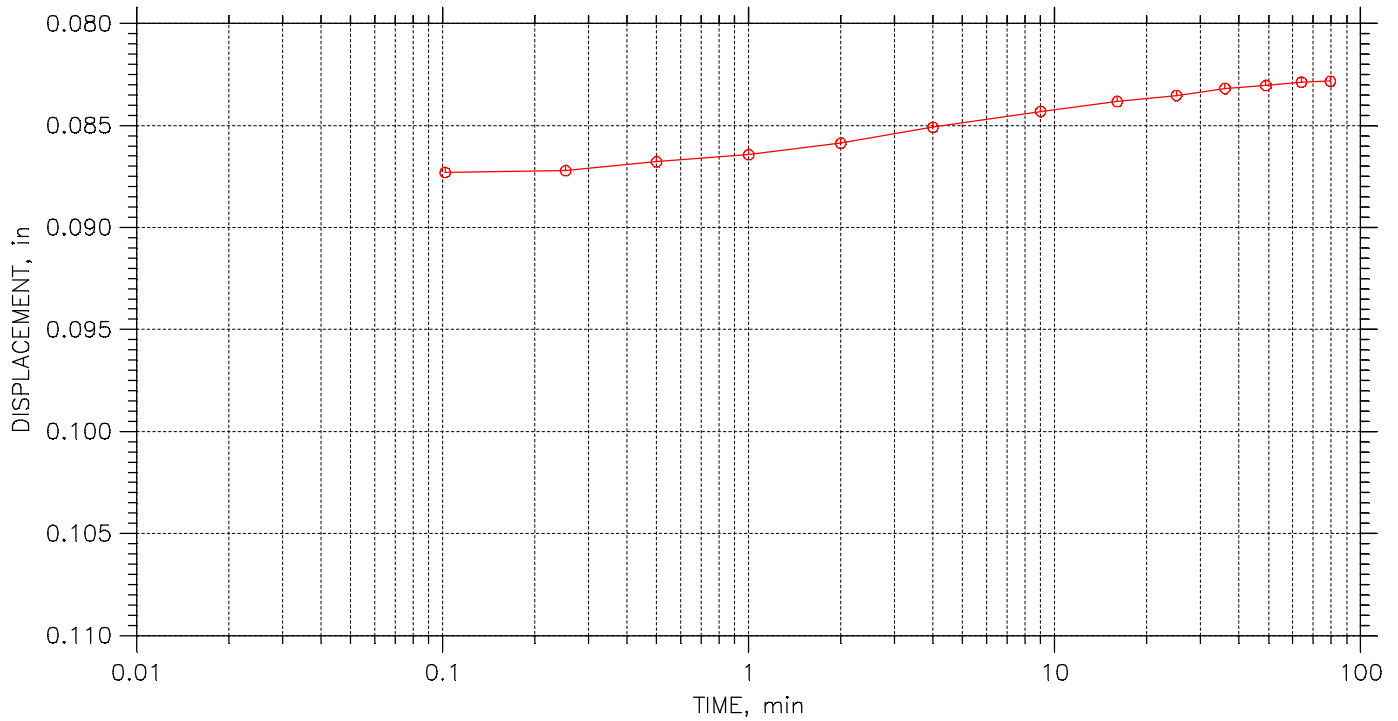
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	Boring No.: B-7 S-5	Tested By: BCM	Checked By: WPQ
	Sample No.: S-5	Test Date: 8/13/19	Depth: 8.5'-10.0'
	Test No.: B7S5CON	Sample Type: 3.0" ST	Elevation: ----
	Description: RUST BROWN, BROWN AND GRAY SANDY LEAN CLAY		
	Remarks: Pc = 4.7 tsf Cc = 0.252 Ccr = 0.019 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 20 of 23

Stress: 4. tsf



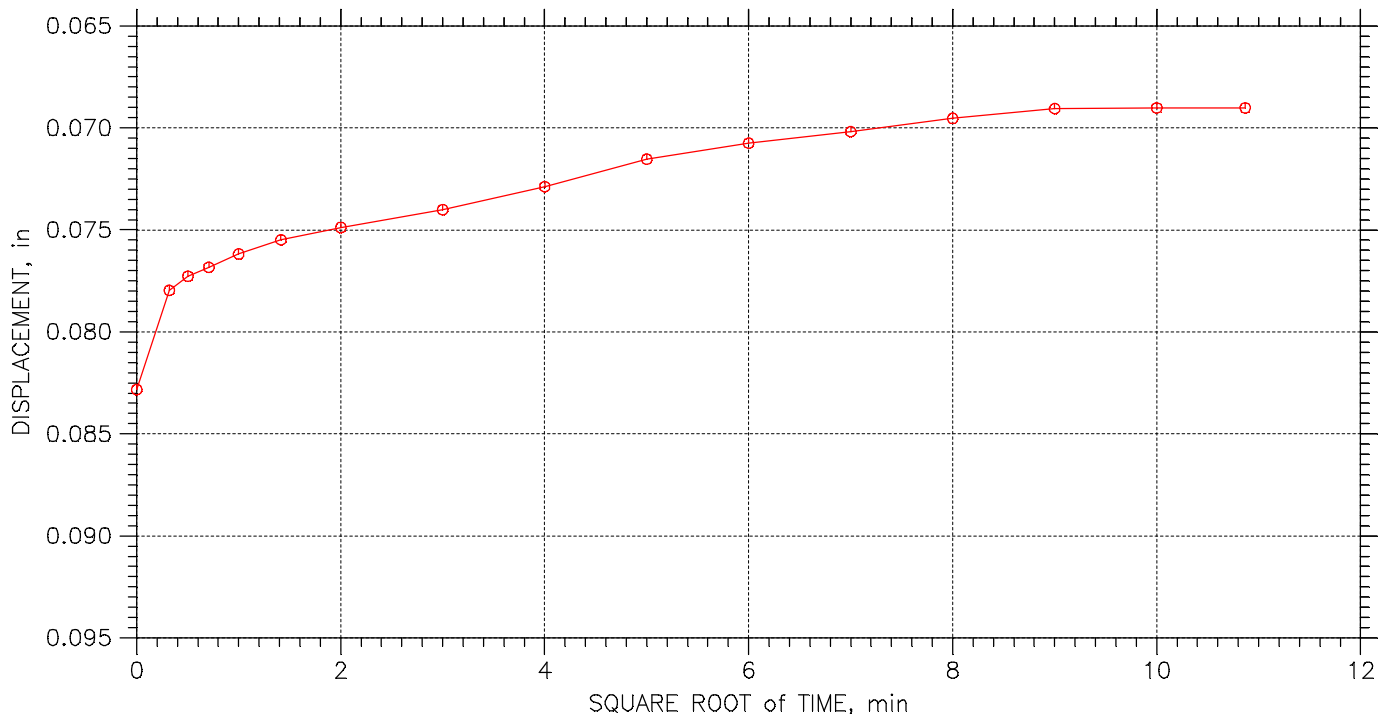
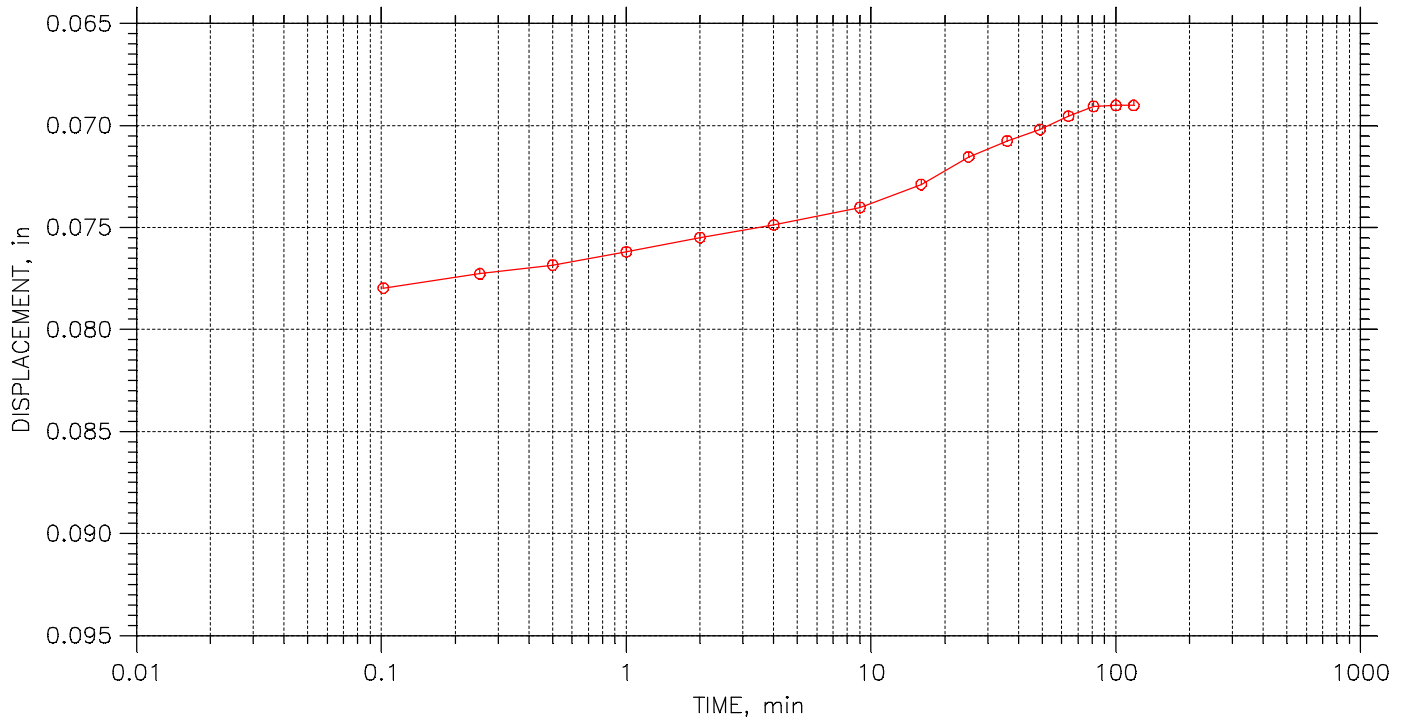
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	Boring No.: B-7 S-5	Tested By: BCM	Checked By: WPQ
	Sample No.: S-5	Test Date: 8/13/19	Depth: 8.5'-10.0'
	Test No.: B7S5CON	Sample Type: 3.0" ST	Elevation: ----
	Description: RUST BROWN, BROWN AND GRAY SANDY LEAN CLAY		
	Remarks: Pc = 4.7 tsf Cc = 0.252 Ccr = 0.019 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 21 of 23

Stress: 1. tsf



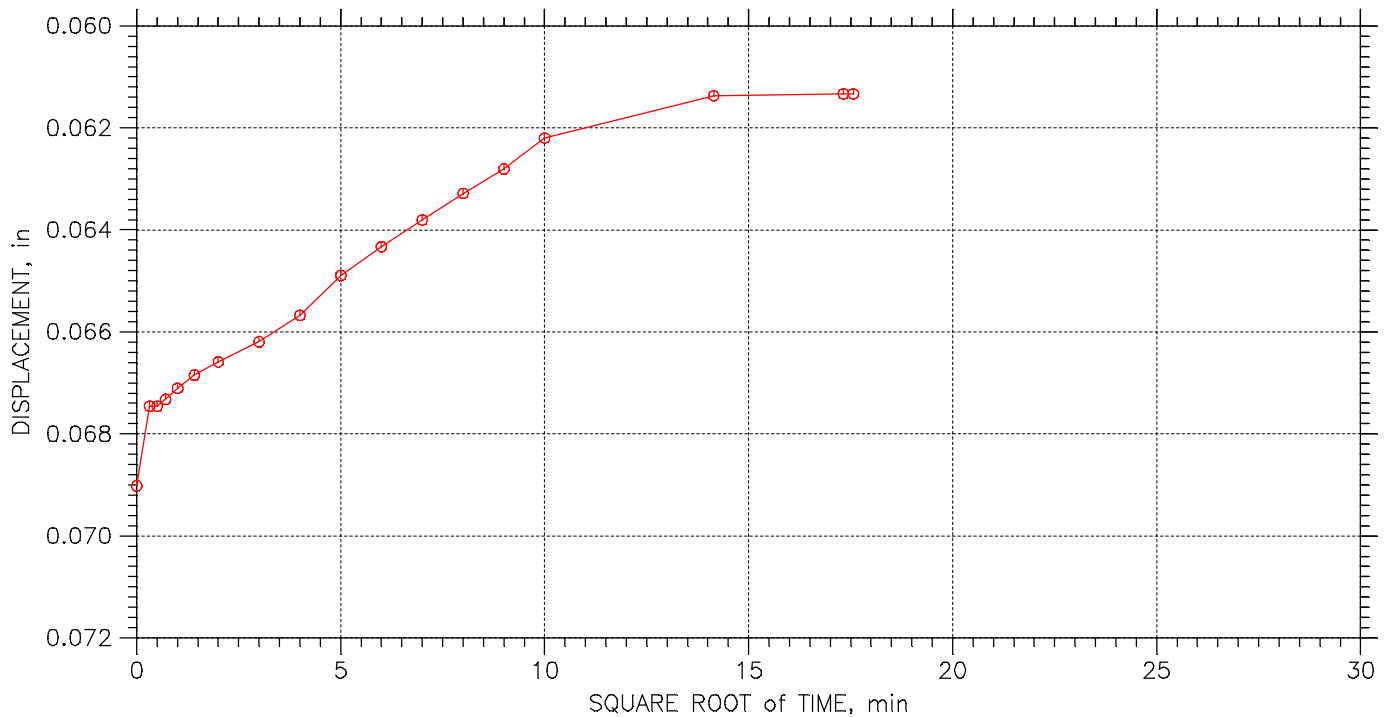
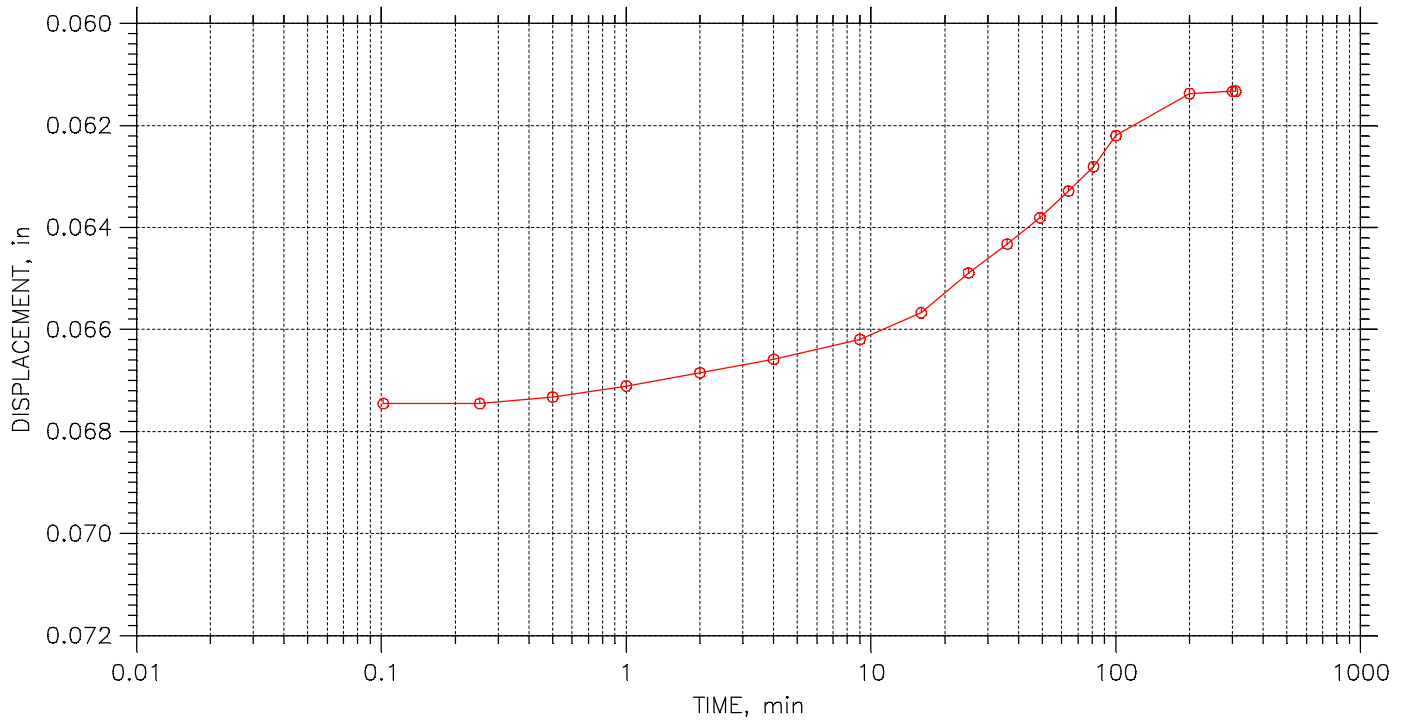
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	Boring No.: B-7 S-5	Tested By: BCM	Checked By: WPQ
	Sample No.: S-5	Test Date: 8/13/19	Depth: 8.5'-10.0'
	Test No.: B7S5CON	Sample Type: 3.0" ST	Elevation: ----
	Description: RUST BROWN, BROWN AND GRAY SANDY LEAN CLAY		
	Remarks: Pc = 4.7 tsf Cc = 0.252 Ccr = 0.019 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 22 of 23

Stress: 0.5 tsf



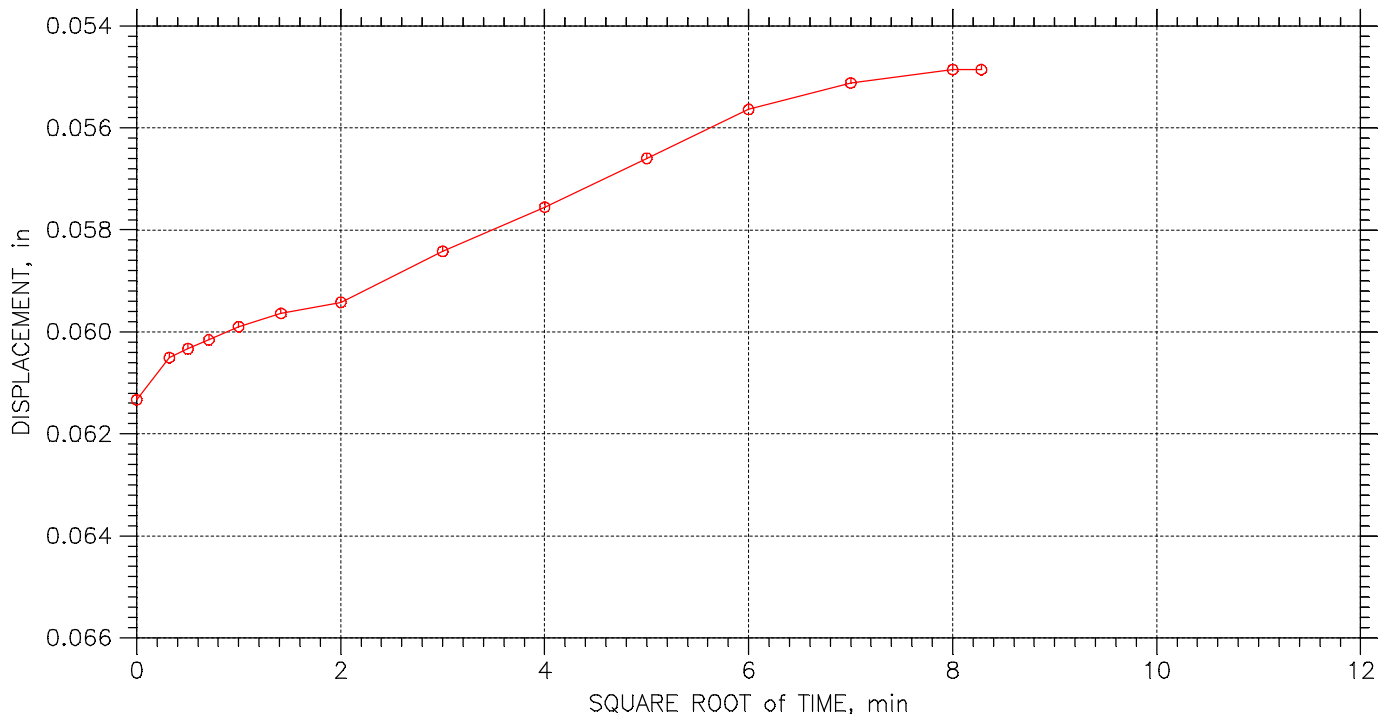
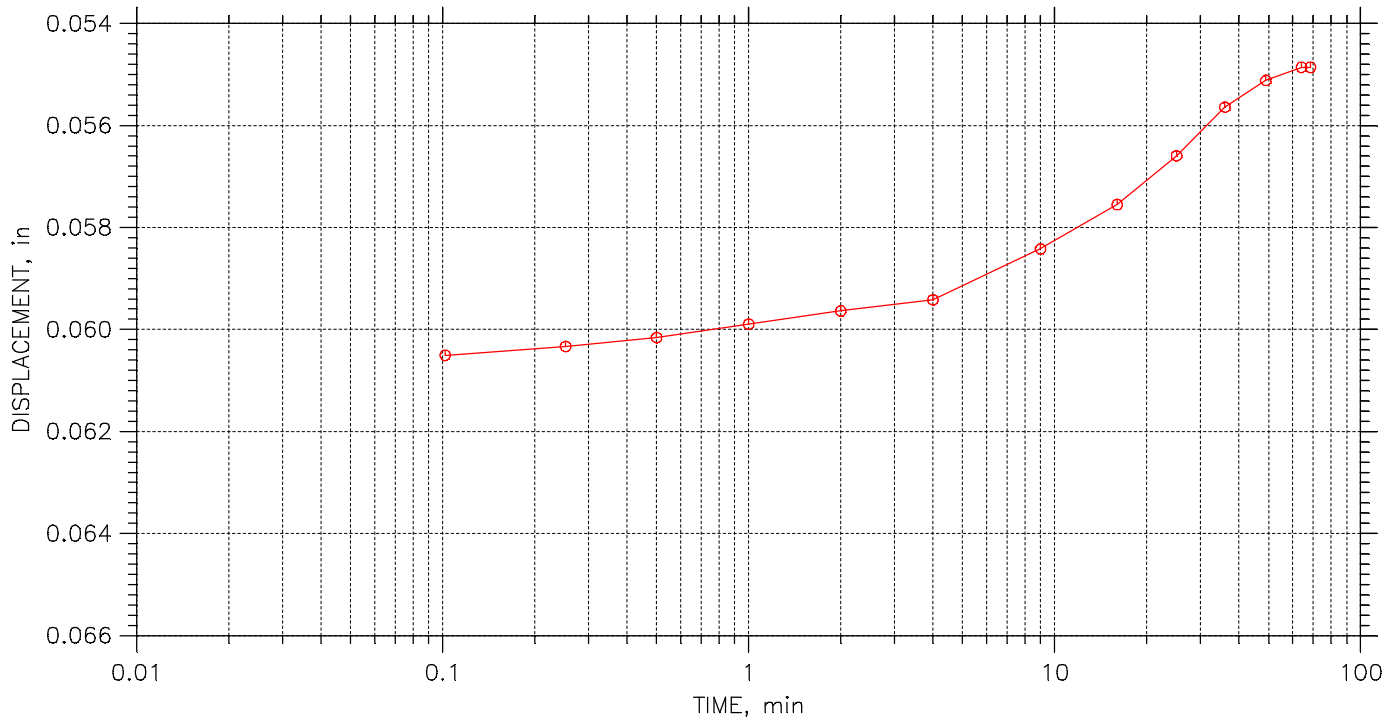
	Project: UPRR GRADE SEPARATION	Location: LITTLE ROCK, AR	Project No.: 35185112
	Boring No.: B-7 S-5	Tested By: BCM	Checked By: WPQ
	Sample No.: S-5	Test Date: 8/13/19	Depth: 8.5'-10.0'
	Test No.: B7S5CON	Sample Type: 3.0" ST	Elevation: ----
	Description: RUST BROWN, BROWN AND GRAY SANDY LEAN CLAY		
	Remarks: Pc = 4.7 tsf Cc = 0.252 Ccr = 0.019 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 23 of 23

Stress: 0.125 tsf



	Project: UPRR GRADE SEPARATION	Location: LITTLE ROCK, AR	Project No.: 35185112
	Boring No.: B-7 S-5	Tested By: BCM	Checked By: WPQ
	Sample No.: S-5	Test Date: 8/13/19	Depth: 8.5'-10.0'
	Test No.: B7S5CON	Sample Type: 3.0" ST	Elevation: ----
	Description: RUST BROWN, BROWN AND GRAY SANDY LEAN CLAY		
	Remarks: Pc = 4.7 tsf Cc = 0.252 Ccr = 0.019 TEST PERFORMED AS PER ASTM D2435		

CONSOLIDATION TEST DATA

Project: UPRR GRADE SEPARATION
Boring No.: B-7 S-5
Sample No.: S-5
Test No.: B7S5CON

Location: LITTLE ROCK, AR
Tested By: BCM
Test Date: 8/13/19
Sample Type: 3.0" ST

Project No.: 35185112
Checked By: WPQ
Depth: 8.5'-10.0'
Elevation: ----



Soil Description: RUST BROWN, BROWN AND GRAY SANDY LEAN CLAY
Remarks: Pc = 4.7 tsf Cc = 0.252 Ccr = 0.019 TEST PERFORMED AS PER ASTM D2435

Estimated Specific Gravity: 2.72
Initial Void Ratio: 0.69
Final Void Ratio: 0.57

Liquid Limit: 38
Plastic Limit: 13
Plasticity Index: 25

Initial Height: 0.75 in
Specimen Diameter: 2.50 in

Container ID	Before Consolidation		After Consolidation	
	Trimmings	Specimen+Ring	Specimen+Ring	Trimmings
	H-35	RING	RING	X-6
Wt. Container + Wet Soil, gm	109.52	200.54	197.26	157.15
Wt. Container + Dry Soil, gm	94.31	176.85	176.85	137.28
Wt. Container, gm	30.18	79.88	79.88	42.85
Wt. Dry Soil, gm	64.13	96.975	96.975	94.43
Water Content, %	23.72	24.42	21.04	21.04
Void Ratio	---	0.69	0.57	---
Degree of Saturation, %	---	96.03	100.76	---
Dry Unit Weight, pcf	---	100.37	108.29	---

CONSOLIDATION TEST DATA

Project: UPRR GRADE SEPARATION
Boring No.: B-7 S-5
Sample No.: S-5
Test No.: B7S5CON

Location: LITTLE ROCK, AR
Tested By: BCM
Test Date: 8/13/19
Sample Type: 3.0" ST

Project No.: 35185112
Checked By: WPQ
Depth: 8.5'-10.0'
Elevation: ----

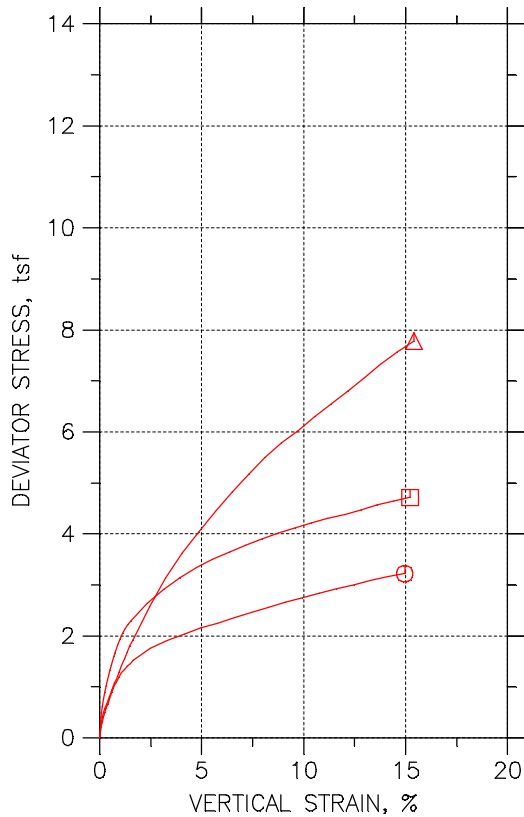
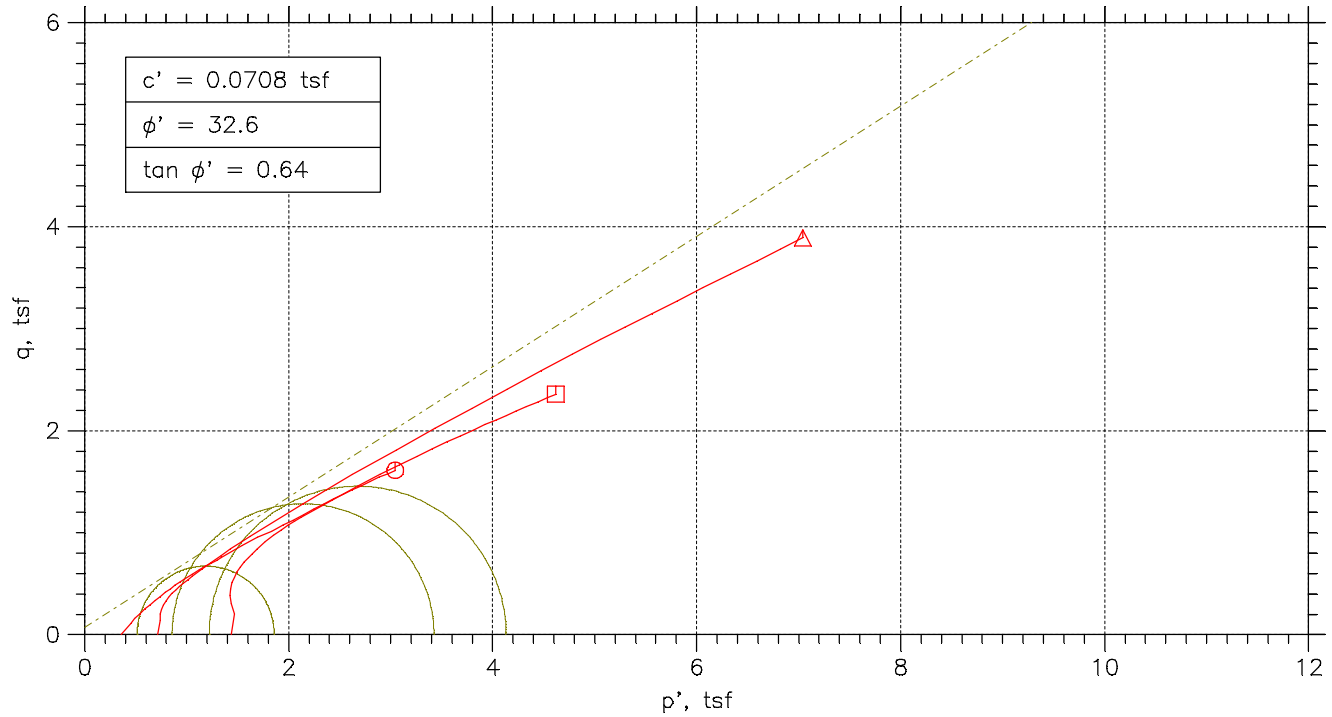


Soil Description: RUST BROWN, BROWN AND GRAY SANDY LEAN CLAY
Remarks: Pc = 4.7 tsf Cc = 0.252 Ccr = 0.019 TEST PERFORMED AS PER ASTM D2435

	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	T50 Fitting Sq.Rt. min	Log min	Coefficient of Consolidation Sq.Rt. ft^2/sec	Log ft^2/sec	Ave. ft^2/sec
1	0.125	-0.0005212	0.693	-0.07	0.0	0.0	0.00e+000	0.00e+000	0.00e+000
2	0.25	0.000695	0.690	0.09	0.0	0.0	0.00e+000	0.00e+000	0.00e+000
3	0.5	0.003562	0.684	0.48	0.1	0.0	2.73e-005	0.00e+000	2.73e-005
4	0.75	0.005864	0.679	0.78	0.9	0.0	3.39e-006	0.00e+000	3.39e-006
5	1	0.0086	0.672	1.15	3.5	2.1	8.89e-007	1.47e-006	1.11e-006
6	2	0.01711	0.653	2.28	0.7	0.0	4.37e-006	0.00e+000	4.37e-006
7	1	0.01485	0.658	1.98	0.3	0.0	1.13e-005	0.00e+000	1.13e-005
8	0.5	0.01168	0.665	1.56	0.9	0.0	3.41e-006	0.00e+000	3.41e-006
9	0.125	0.006428	0.677	0.86	6.3	0.0	4.98e-007	0.00e+000	4.98e-007
10	0.25	0.008426	0.673	1.12	3.0	0.0	1.07e-006	0.00e+000	1.07e-006
11	0.5	0.009165	0.671	1.22	0.5	0.0	6.90e-006	0.00e+000	6.90e-006
12	0.75	0.01029	0.669	1.37	8.6	0.0	3.64e-007	0.00e+000	3.64e-007
13	1	0.01155	0.666	1.54	0.1	0.0	3.33e-005	0.00e+000	3.33e-005
14	2	0.01707	0.653	2.28	0.5	0.0	6.80e-006	0.00e+000	6.80e-006
15	4	0.0301	0.624	4.02	0.1	0.0	3.16e-005	0.00e+000	3.16e-005
16	8	0.0473	0.585	6.31	0.1	0.0	2.89e-005	0.00e+000	2.89e-005
17	16	0.07506	0.522	10.01	0.1	0.0	2.32e-005	0.00e+000	2.32e-005
18	32	0.109	0.446	14.54	0.2	0.0	1.36e-005	0.00e+000	1.36e-005
19	16	0.09903	0.468	13.21	0.0	0.0	1.00e-004	0.00e+000	1.00e-004
20	4	0.08283	0.505	11.05	0.2	0.0	1.43e-005	0.00e+000	1.43e-005
21	1	0.06902	0.536	9.21	6.7	0.0	3.86e-007	0.00e+000	3.86e-007
22	0.5	0.06133	0.553	8.18	14.4	0.0	1.86e-007	0.00e+000	1.86e-007
23	0.125	0.05486	0.568	7.32	24.2	0.0	1.13e-007	0.00e+000	1.13e-007

Consolidated-Undrained Triaxial Compression Test ASTM D4767

CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST ASTM D4767



Symbol	⊖	Δ	□	
Test No.	5.0 PSI	10.0 PSI	20.0 PSI	
Initial	Diameter, in	2.8484	2.8488	2.8602
	Height, in	5.9535	6.0677	6.1346
	Water Content, %	18.97	17.36	17.76
	Dry Density, pcf	111.3	113.3	112.2
	Saturation, %	99.50	96.20	95.40
Before Shear	Void Ratio	0.51474	0.48713	0.50261
	Water Content, %	18.97	17.61	17.06
	Dry Density, pcf	111.5	114.2	115.4
	Saturation, %	100.00	100.00	100.00
	Void Ratio	0.51232	0.4754	0.46074
Back Press., tsf		5.0416	5.0428	5.0403
Minor Prin. Stress, tsf		0.3584	0.71721	1.4397
Max. Dev. Stress, tsf		3.2209	7.7791	4.7153
Time to Failure, min		1080	1140	1140
Strain Rate, %/min		0.049	0.049	0.049
B-Value		0.95	0.98	0.97
Estimated Specific Gravity		2.70	2.70	2.70
Liquid Limit		22	22	22
Plastic Limit		16	16	16
Plasticity Index		6	6	6

Project: UPRR GRADE SEPARATION
 Location: LITTLE ROCK, AR
 Project No.: 35185112
 Boring No.: B-2 S-3 Depth: 3.5'-5.5'
 Sample Type: 3.0" ST

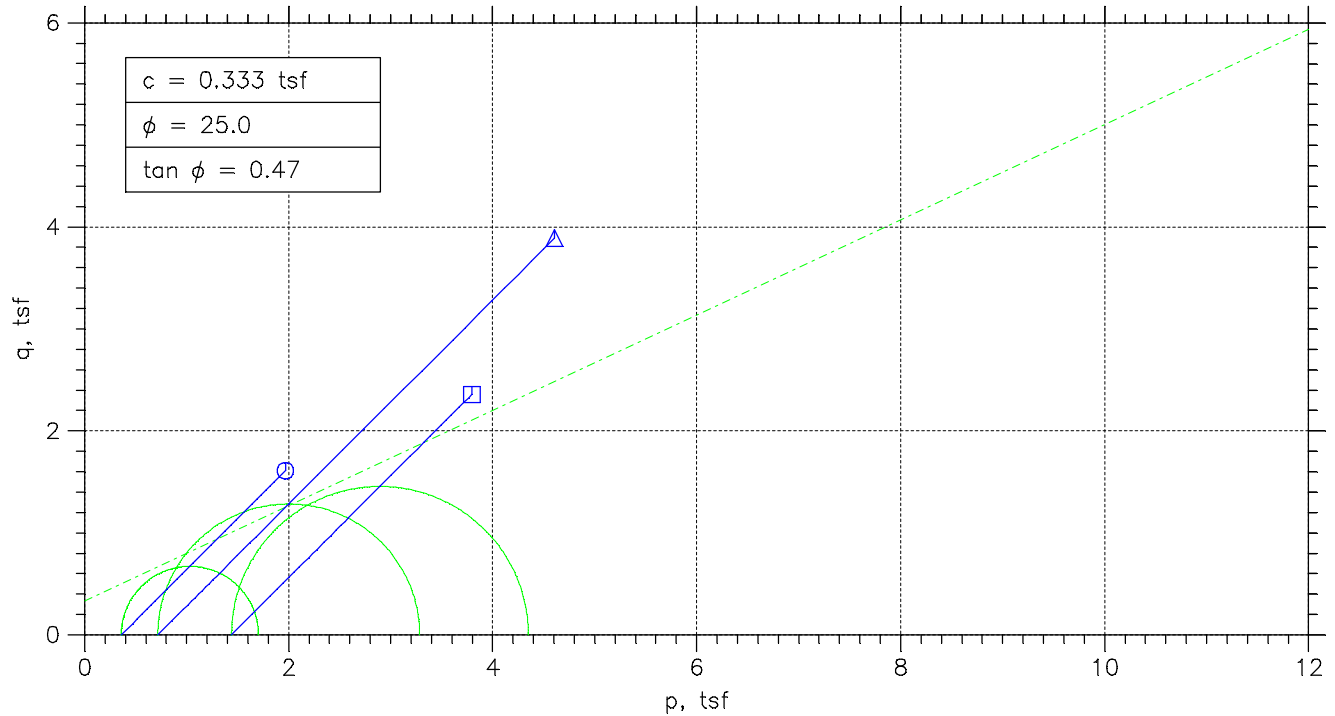
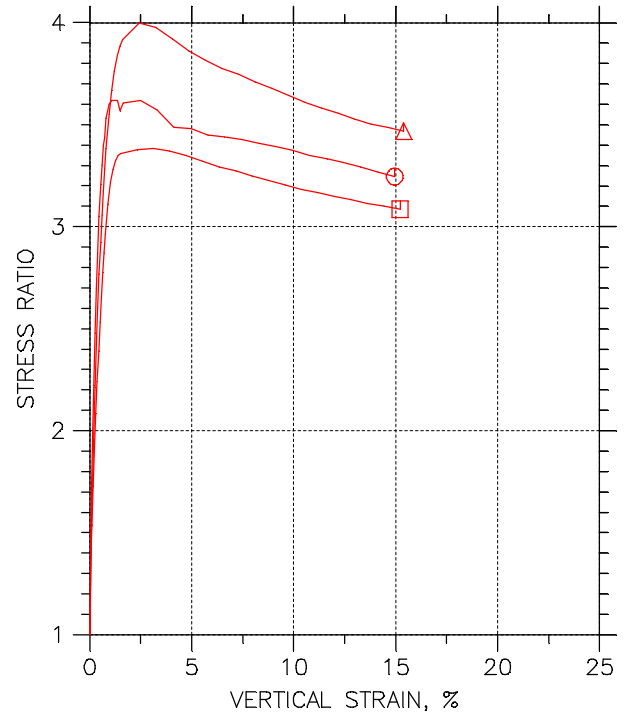
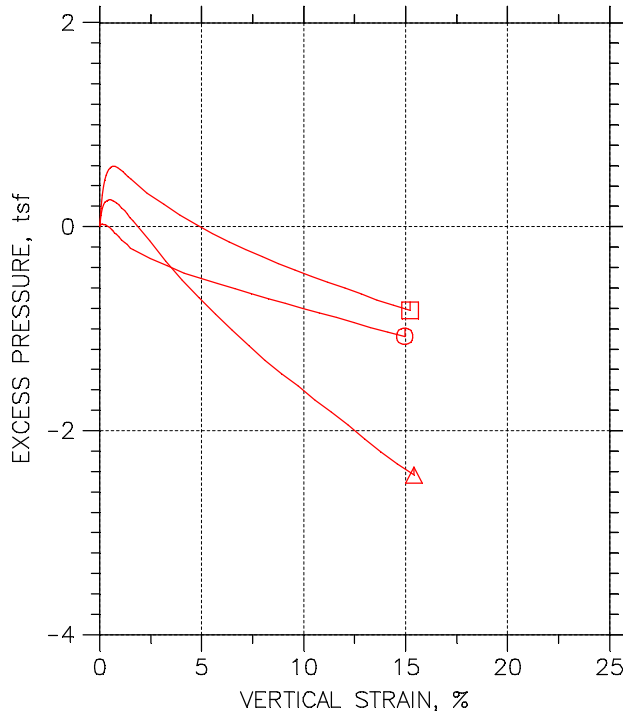
Note: Large Sand Layer Observed in the 10.0 psi Sample.



Description: BROWN AND GRAY MOTTLED SANDY SILTY CLAY CL-ML

Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767

CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST ASTM D4767



Project: UPRR GRADE SEPARATION	Location: LITTLE ROCK, AR	Project No.: 35185112
Boring No.: B-2 S-3	Tested By: WPQ	Checked By: BCM
Sample No.: S-3	Test Date: 8/19/19	Depth: 3.5'-5.5'
Test No.: B-2 S-3	Sample Type: 3.0" ST	Elevation: -
Description: BROWN AND GRAY MOTTLED SANDY SILTY CLAY CL-ML		
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767		

TRIAXIAL TEST

Project: UPRR GRADE SEPARATION
Boring No.: B-2 S-3
Sample No.: S-3
Test No.: 5.0 PSI

Location: LITTLE ROCK, AR
Tested By: WPQ
Test Date: 8/19/19
Sample Type: 3.0" ST

Project No.: 35185112
Checked By: BCM
Depth: 3.5'-5.5'
Elevation: -



Soil Description: BROWN AND GRAY MOTTLED SANDY SILTY CLAY CL-ML

Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767

Specimen Height: 5.95 in
Specimen Area: 6.37 in²
Specimen Volume: 37.94 in³

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

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

Liquid Limit: 22

Plastic Limit: 16

Estimated Specific Gravity: 2.70

	Time min	Vertical Strain %	Corrected Area in ²	Deviator Load lb	Deviator Stress tsf	Pore Pressure tsf	Horizontal Stress tsf	Vertical Stress tsf
1	0	0	6.3723	0	0	5.0416	5.4	5.4
2	5.0042	0.062954	6.3764	19.445	0.21957	5.0602	5.4	5.6196
3	10.001	0.12744	6.3805	28.147	0.31763	5.0672	5.4	5.7176
4	15.002	0.19654	6.3849	36.306	0.40941	5.0649	5.4	5.8094
5	20.003	0.26103	6.389	44.465	0.50109	5.0614	5.4	5.9011
6	25	0.32859	6.3934	52.08	0.5865	5.0544	5.4	5.9865
7	30	0.39615	6.3977	59.558	0.67027	5.0416	5.4	6.0703
8	35.003	0.46371	6.402	66.765	0.75087	5.034	5.4	6.1509
9	40.004	0.53281	6.4065	73.7	0.82829	5.0247	5.4	6.2283
10	45.001	0.6019	6.4109	80.091	0.89949	5.009	5.4	6.2995
11	50.002	0.66946	6.4153	86.21	0.96755	4.9968	5.4	6.3675
12	55.003	0.73702	6.4197	91.785	1.0294	4.9776	5.4	6.4294
13	60.002	0.80612	6.4241	97.224	1.0897	4.9694	5.4	6.4897
14	70.002	0.94431	6.4331	106.33	1.1901	4.9421	5.4	6.5901
15	80.004	1.0825	6.4421	114.09	1.2751	4.913	5.4	6.6751
16	90.003	1.2207	6.4511	120.48	1.3446	4.8868	5.4	6.7446
17	100	1.3604	6.4602	125.78	1.4018	4.8647	5.4	6.8018
18	110	1.5001	6.4694	131.08	1.4589	4.8321	5.4	6.8589
19	120	1.6399	6.4786	136.11	1.5127	4.8199	5.4	6.9127
20	180	2.4798	6.5344	159.23	1.7545	4.7303	5.4	7.1545
21	240	3.3043	6.5901	174.46	1.9061	4.6593	5.4	7.3061
22	300	4.1319	6.647	187.51	2.0311	4.5836	5.4	7.4311
23	360	4.9596	6.7049	200.43	2.1523	4.5319	5.4	7.5523
24	420	5.7841	6.7636	210.77	2.2437	4.4836	5.4	7.6437
25	480	6.6102	6.8234	223.28	2.356	4.4341	5.4	7.756
26	540	7.447	6.8851	235.38	2.4614	4.3858	5.4	7.8614
27	600	8.2808	6.9477	247.21	2.5619	4.3369	5.4	7.9619
28	660	9.1145	7.0114	259.04	2.6601	4.288	5.4	8.0601
29	720	9.9467	7.0762	270.32	2.7505	4.2415	5.4	8.1505
30	780	10.777	7.1421	281.2	2.8348	4.1938	5.4	8.2348
31	840	11.614	7.2097	292.35	2.9196	4.1495	5.4	8.3196
32	900	12.446	7.2782	303.23	2.9997	4.1036	5.4	8.3997
33	960	13.283	7.3485	314.92	3.0856	4.0541	5.4	8.4856
34	1020	14.12	7.4201	325.53	3.1588	4.007	5.4	8.5588
35	1080	14.952	7.4927	335.19	3.2209	3.9657	5.4	8.6209

TRIAXIAL TEST

Project: UPRR GRADE SEPARATION
Boring No.: B-2 S-3
Sample No.: S-3
Test No.: 5.0 PSI

Location: LITTLE ROCK, AR
Tested By: WPQ
Test Date: 8/19/19
Sample Type: 3.0" ST

Project No.: 35185112
Checked By: BCM
Depth: 3.5'-5.5'
Elevation: -



Soil Description: BROWN AND GRAY MOTTLED SANDY SILTY CLAY CL-ML

Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767

Specimen Height: 5.95 in
Specimen Area: 6.37 in²
Specimen Volume: 37.94 in³

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

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

Liquid Limit: 22

Plastic Limit: 16

Estimated Specific Gravity: 2.70

	Vertical Strain %	Total Vertical Stress tsf	Total Horizontal Stress tsf	Excess Pore Pressure tsf	A Parameter	Effective Vertical Stress tsf	Effective Horizontal Stress tsf	Stress Ratio	Effective p tsf	q tsf
1	0.00	5.4	5.4	0	0.000	0.3584	0.3584	1.000	0.3584	0
2	0.06	5.6196	5.4	0.018621	0.085	0.55934	0.33977	1.646	0.44956	0.10978
3	0.13	5.7176	5.4	0.025604	0.081	0.65042	0.33279	1.954	0.4916	0.15881
4	0.20	5.8094	5.4	0.023276	0.057	0.74453	0.33512	2.222	0.53982	0.2047
5	0.26	5.9011	5.4	0.019785	0.039	0.8397	0.33861	2.480	0.58915	0.25054
6	0.33	5.9865	5.4	0.012802	0.022	0.9321	0.34559	2.697	0.63884	0.29325
7	0.40	6.0703	5.4	0	0.000	1.0287	0.3584	2.870	0.69353	0.33514
8	0.46	6.1509	5.4	-0.0075647	-0.010	1.1168	0.36596	3.052	0.74139	0.37543
9	0.53	6.2283	5.4	-0.016875	-0.020	1.2036	0.37527	3.207	0.78941	0.41414
10	0.60	6.2995	5.4	-0.032587	-0.036	1.2905	0.39098	3.301	0.84072	0.44974
11	0.67	6.3675	5.4	-0.044807	-0.046	1.3708	0.4032	3.400	0.88698	0.48377
12	0.74	6.4294	5.4	-0.064009	-0.062	1.4518	0.4224	3.437	0.93711	0.51471
13	0.81	6.4897	5.4	-0.072156	-0.066	1.5202	0.43055	3.531	0.97538	0.54483
14	0.94	6.5901	5.4	-0.099505	-0.084	1.648	0.4579	3.599	1.053	0.59506
15	1.08	6.6751	5.4	-0.1286	-0.101	1.7621	0.487	3.618	1.1245	0.63754
16	1.22	6.7446	5.4	-0.15479	-0.115	1.8578	0.51318	3.620	1.1855	0.67231
17	1.36	6.8018	5.4	-0.1769	-0.126	1.9371	0.53529	3.619	1.2362	0.70091
18	1.50	6.8589	5.4	-0.20948	-0.144	2.0267	0.56788	3.569	1.2973	0.72943
19	1.64	6.9127	5.4	-0.2217	-0.147	2.0928	0.5801	3.608	1.3365	0.75635
20	2.48	7.1545	5.4	-0.31132	-0.177	2.4242	0.66971	3.620	1.547	0.87725
21	3.30	7.3061	5.4	-0.38231	-0.201	2.6468	0.74071	3.573	1.6937	0.95303
22	4.13	7.4311	5.4	-0.45796	-0.225	2.8475	0.81635	3.488	1.8319	1.0156
23	4.96	7.5523	5.4	-0.50975	-0.237	3.0205	0.86814	3.479	1.9443	1.0762
24	5.78	7.6437	5.4	-0.55804	-0.249	3.1601	0.91644	3.448	2.0383	1.1218
25	6.61	7.756	5.4	-0.60751	-0.258	3.3219	0.9659	3.439	2.1439	1.178
26	7.45	7.8614	5.4	-0.6558	-0.266	3.4756	1.0142	3.427	2.2449	1.2307
27	8.28	7.9619	5.4	-0.70468	-0.275	3.6249	1.0631	3.410	2.344	1.2809
28	9.11	8.0601	5.4	-0.75356	-0.283	3.772	1.112	3.392	2.442	1.33
29	9.95	8.1505	5.4	-0.80012	-0.291	3.909	1.1585	3.374	2.5338	1.3753
30	10.78	8.2348	5.4	-0.84783	-0.299	4.0411	1.2062	3.350	2.6236	1.4174
31	11.61	8.3196	5.4	-0.89206	-0.306	4.17	1.2505	3.335	2.7102	1.4598
32	12.45	8.3997	5.4	-0.93803	-0.313	4.2961	1.2964	3.314	2.7963	1.4999
33	13.28	8.4856	5.4	-0.98749	-0.320	4.4315	1.3459	3.293	2.8887	1.5428
34	14.12	8.5588	5.4	-1.0346	-0.328	4.5518	1.393	3.268	2.9724	1.5794
35	14.95	8.6209	5.4	-1.0759	-0.334	4.6553	1.4343	3.246	3.0448	1.6105

TRIAXIAL TEST

Project: UPRR GRADE SEPARATION
Boring No.: B-2 S-3
Sample No.: S-3
Test No.: 10.0 PSI

Location: LITTLE ROCK, AR
Tested By: BCM
Test Date: 8/19/19
Sample Type: 3.0" ST

Project No.: 35185112
Checked By: WPQ
Depth: 3.5'-5.5'
Elevation: ----



Soil Description: BROWN AND GRAY MOTTLED SANDY SILTY CLAY CL-ML

Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767.

Specimen Height: 6.07 in
Specimen Area: 6.37 in²
Specimen Volume: 38.68 in³

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

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

Liquid Limit: 22

Plastic Limit: 16

Estimated Specific Gravity: 2.70

	Time min	Vertical Strain %	Corrected Area in ²	Deviator Load lb	Deviator Stress tsf	Pore Pressure tsf	Horizontal Stress tsf	Vertical Stress tsf
1	0	0	6.3741	0	0	5.0428	5.76	5.76
2	5.002	0.064654	6.3782	24.561	0.27725	5.1548	5.76	6.0373
3	10.003	0.13088	6.3825	35.552	0.40106	5.2177	5.76	6.1611
4	15	0.20027	6.3869	44.101	0.49715	5.2562	5.76	6.2571
5	20.004	0.26492	6.391	51.564	0.58091	5.2807	5.76	6.3409
6	25.003	0.33273	6.3954	58.62	0.65995	5.2953	5.76	6.4199
7	30.003	0.39896	6.3996	65.133	0.73279	5.3029	5.76	6.4928
8	35.003	0.46677	6.404	71.375	0.80247	5.3064	5.76	6.5625
9	40.001	0.53458	6.4084	77.617	0.87205	5.3064	5.76	6.6321
10	45.004	0.60238	6.4127	83.859	0.94154	5.3023	5.76	6.7015
11	50.002	0.67019	6.4171	89.965	1.0094	5.2965	5.76	6.7694
12	55.002	0.738	6.4215	96.072	1.0772	5.2883	5.76	6.8372
13	60.004	0.80423	6.4258	102.31	1.1464	5.279	5.76	6.9064
14	70.003	0.93984	6.4346	114.8	1.2845	5.2562	5.76	7.0445
15	80.002	1.0755	6.4434	126.74	1.4162	5.2294	5.76	7.1762
16	90.003	1.2111	6.4523	138.95	1.5505	5.1991	5.76	7.3105
17	100	1.3498	6.4613	151.03	1.6829	5.1676	5.76	7.4429
18	110	1.4855	6.4702	162.29	1.806	5.1343	5.76	7.566
19	120	1.6242	6.4793	173.15	1.924	5.1005	5.76	7.684
20	180	2.4395	6.5335	232.99	2.5675	4.9034	5.76	8.3275
21	240	3.2437	6.5878	286.99	3.1366	4.7063	5.76	8.8966
22	300	4.0574	6.6437	334.49	3.625	4.5191	5.76	9.385
23	360	4.868	6.7003	376.01	4.0405	4.3471	5.76	9.8005
24	420	5.6738	6.7575	416.45	4.4371	4.1843	5.76	10.197
25	480	6.4827	6.816	455.93	4.8162	4.0257	5.76	10.576
26	540	7.2996	6.876	494.2	5.1748	3.8758	5.76	10.935
27	600	8.1022	6.9361	529.89	5.5005	3.7312	5.76	11.26
28	660	8.9159	6.998	562.72	5.7896	3.5994	5.76	11.55
29	720	9.7343	7.0615	591.36	6.0295	3.4793	5.76	11.79
30	780	10.546	7.1256	623.24	6.2975	3.3463	5.76	12.058
31	840	11.363	7.1913	654.05	6.5484	3.2227	5.76	12.308
32	900	12.182	7.2583	685.66	6.8016	3.0996	5.76	12.562
33	960	12.975	7.3245	719.18	7.0696	2.9637	5.76	12.83
34	1020	13.79	7.3937	752.29	7.3258	2.8343	5.76	13.086
35	1080	14.604	7.4642	783.91	7.5616	2.7188	5.76	13.322
36	1140	15.399	7.5343	814.03	7.7791	2.608	5.76	13.539

TRIAXIAL TEST

Project: UPRR GRADE SEPARATION
Boring No.: B-2 S-3
Sample No.: S-3
Test No.: 10.0 PSI

Location: LITTLE ROCK, AR
Tested By: BCM
Test Date: 8/19/19
Sample Type: 3.0" ST

Project No.: 35185112
Checked By: WPQ
Depth: 3.5'-5.5'
Elevation: ----



Soil Description: BROWN AND GRAY MOTTLED SANDY SILTY CLAY CL-ML

Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767.

Specimen Height: 6.07 in
Specimen Area: 6.37 in²
Specimen Volume: 38.68 in³

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

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

Liquid Limit: 22

Plastic Limit: 16

Estimated Specific Gravity: 2.70

	Vertical Strain %	Total Vertical Stress tsf	Total Horizontal Stress tsf	Excess Pore Pressure tsf	A Parameter	Effective Vertical Stress tsf	Effective Horizontal Stress tsf	Stress Ratio	Effective p tsf	q tsf
1	0.00	5.76	5.76	0	0.000	0.71721	0.71721	1.000	0.71721	0
2	0.06	6.0373	5.76	0.11197	0.404	0.88249	0.60524	1.458	0.74386	0.13863
3	0.13	6.1611	5.76	0.17496	0.436	0.94331	0.54225	1.740	0.74278	0.20053
4	0.20	6.2571	5.76	0.21345	0.429	1.0009	0.50376	1.987	0.75234	0.24857
5	0.26	6.3409	5.76	0.23794	0.410	1.0602	0.47927	2.212	0.76972	0.29045
6	0.33	6.4199	5.76	0.25252	0.383	1.1246	0.46469	2.420	0.79467	0.32997
7	0.40	6.4928	5.76	0.2601	0.355	1.1899	0.45711	2.603	0.8235	0.36639
8	0.47	6.5625	5.76	0.2636	0.328	1.2561	0.45361	2.769	0.85485	0.40123
9	0.53	6.6321	5.76	0.2636	0.302	1.3257	0.45361	2.922	0.88964	0.43603
10	0.60	6.7015	5.76	0.25952	0.276	1.3992	0.45769	3.057	0.92846	0.47077
11	0.67	6.7694	5.76	0.25368	0.251	1.4729	0.46352	3.178	0.96823	0.5047
12	0.74	6.8372	5.76	0.24552	0.228	1.5489	0.47169	3.284	1.0103	0.53859
13	0.80	6.9064	5.76	0.23619	0.206	1.6274	0.48102	3.383	1.0542	0.5732
14	0.94	7.0445	5.76	0.21345	0.166	1.7883	0.50376	3.550	1.146	0.64226
15	1.08	7.1762	5.76	0.18662	0.132	1.9468	0.53059	3.669	1.2387	0.7081
16	1.21	7.3105	5.76	0.15629	0.101	2.1115	0.56092	3.764	1.3362	0.77527
17	1.35	7.4429	5.76	0.1248	0.074	2.2753	0.59241	3.841	1.4339	0.84147
18	1.49	7.566	5.76	0.09156	0.051	2.4316	0.62565	3.887	1.5286	0.90298
19	1.62	7.684	5.76	0.057735	0.030	2.5835	0.65947	3.918	1.6215	0.96202
20	2.44	8.3275	5.76	-0.13938	-0.054	3.4241	0.85659	3.997	2.1404	1.2838
21	3.24	8.8966	5.76	-0.3365	-0.107	4.1903	1.0537	3.977	2.622	1.5683
22	4.06	9.385	5.76	-0.5237	-0.144	4.8659	1.2409	3.921	3.0534	1.8125
23	4.87	9.8005	5.76	-0.69574	-0.172	5.4535	1.4129	3.860	3.4332	2.0203
24	5.67	10.197	5.76	-0.85845	-0.193	6.0128	1.5757	3.816	3.7942	2.2186
25	6.48	10.576	5.76	-1.0171	-0.211	6.5505	1.7343	3.777	4.1424	2.4081
26	7.30	10.935	5.76	-1.167	-0.226	7.059	1.8842	3.746	4.4716	2.5874
27	8.10	11.26	5.76	-1.3116	-0.238	7.5293	2.0288	3.711	4.779	2.7502
28	8.92	11.55	5.76	-1.4434	-0.249	7.9502	2.1606	3.680	5.0554	2.8948
29	9.73	11.79	5.76	-1.5635	-0.259	8.3103	2.2807	3.644	5.2955	3.0148
30	10.55	12.058	5.76	-1.6965	-0.269	8.7112	2.4137	3.609	5.5624	3.1488
31	11.36	12.308	5.76	-1.8201	-0.278	9.0857	2.5373	3.581	5.8115	3.2742
32	12.18	12.562	5.76	-1.9432	-0.286	9.4619	2.6604	3.557	6.0612	3.4008
33	12.97	12.83	5.76	-2.0791	-0.294	9.8659	2.7963	3.528	6.3311	3.5348
34	13.79	13.086	5.76	-2.2085	-0.301	10.252	2.9257	3.504	6.5886	3.6629
35	14.60	13.322	5.76	-2.324	-0.307	10.603	3.0412	3.486	6.822	3.7808
36	15.40	13.539	5.76	-2.4348	-0.313	10.931	3.152	3.468	7.0416	3.8896

TRIAXIAL TEST

Project: UPRR GRADE SEPARATION
Boring No.: B-2 S-3
Sample No.: S-3
Test No.: 20.0 PSI

Location: LITTLE ROCK, AR
Tested By: WPQ
Test Date: 8/19/19
Sample Type: 3.0" ST

Project No.: 35185112
Checked By: BCM
Depth: 3.5'-5.5'
Elevation: ----



Soil Description: BROWN AND GRAY MOTTLED SANDY SILTY CLAY CL-ML

Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767

Specimen Height: 6.13 in
Specimen Area: 6.43 in²
Specimen Volume: 39.42 in³

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

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

Liquid Limit: 22

Plastic Limit: 16

Estimated Specific Gravity: 2.70

	Time min	Vertical Strain %	Corrected Area in ²	Deviator Load lb	Deviator Stress tsf	Pore Pressure tsf	Horizontal Stress tsf	Vertical Stress tsf
1	0	0	6.4253	0	0	5.0403	6.48	6.48
2	5.0007	0.053257	6.4287	36.615	0.41008	5.215	6.48	6.8901
3	10	0.11539	6.4327	54.652	0.6117	5.3466	6.48	7.0917
4	15	0.179	6.4368	68.348	0.76452	5.4351	6.48	7.2445
5	20.001	0.24409	6.441	80.418	0.89894	5.4986	6.48	7.3789
6	25	0.30771	6.4451	90.86	1.015	5.5435	6.48	7.495
7	30.002	0.37428	6.4494	100.9	1.1264	5.5726	6.48	7.6064
8	35	0.43789	6.4536	110.12	1.2285	5.5982	6.48	7.7085
9	40.003	0.50298	6.4578	118.8	1.3245	5.6145	6.48	7.8045
10	45.001	0.56363	6.4617	127.34	1.4189	5.6244	6.48	7.8989
11	50.001	0.63021	6.4661	135.48	1.5085	5.6297	6.48	7.9885
12	55.003	0.69382	6.4702	142.8	1.5891	5.6314	6.48	8.0691
13	60.002	0.75447	6.4741	150.26	1.671	5.6285	6.48	8.151
14	70.002	0.88022	6.4824	163.68	1.818	5.6192	6.48	8.298
15	80.001	1.006	6.4906	175.48	1.9466	5.6017	6.48	8.4266
16	90	1.1332	6.4989	185.38	2.0538	5.579	6.48	8.5338
17	100	1.2663	6.5077	193.93	2.1455	5.5563	6.48	8.6255
18	110	1.3921	6.516	201.52	2.2267	5.5318	6.48	8.7067
19	120	1.5252	6.5248	208.16	2.297	5.5062	6.48	8.777
20	180	2.327	6.5784	240.85	2.6361	5.3705	6.48	9.1161
21	240	3.1274	6.6327	268.1	2.9103	5.2587	6.48	9.3903
22	300	3.9188	6.6874	291.43	3.1377	5.1573	6.48	9.6177
23	360	4.7251	6.744	312.18	3.3329	5.0606	6.48	9.8129
24	420	5.5358	6.8018	330.49	3.4983	4.9733	6.48	9.9783
25	480	6.3405	6.8603	346.9	3.6407	4.8929	6.48	10.121
26	540	7.1512	6.9202	363.17	3.7785	4.8178	6.48	10.259
27	600	7.9604	6.981	377.81	3.8967	4.7467	6.48	10.377
28	660	8.7637	7.0425	392.33	4.011	4.6792	6.48	10.491
29	720	9.5759	7.1057	406.16	4.1155	4.6133	6.48	10.595
30	780	10.381	7.1695	419.58	4.2137	4.5499	6.48	10.694
31	840	11.185	7.2345	431.92	4.2986	4.4957	6.48	10.779
32	900	12.003	7.3018	443.99	4.3781	4.4415	6.48	10.858
33	960	12.804	7.3688	457.28	4.4681	4.3833	6.48	10.948
34	1020	13.597	7.4364	471.39	4.564	4.3221	6.48	11.044
35	1080	14.409	7.507	484.54	4.6473	4.2674	6.48	11.127
36	1140	15.221	7.5789	496.34	4.7153	4.2185	6.48	11.195

TRIAXIAL TEST

Project: UPRR GRADE SEPARATION
Boring No.: B-2 S-3
Sample No.: S-3
Test No.: 20.0 PSI

Location: LITTLE ROCK, AR
Tested By: WPQ
Test Date: 8/19/19
Sample Type: 3.0" ST

Project No.: 35185112
Checked By: BCM
Depth: 3.5'-5.5'
Elevation: ----



Soil Description: BROWN AND GRAY MOTTLED SANDY SILTY CLAY CL-ML

Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767

Specimen Height: 6.13 in
Specimen Area: 6.43 in²
Specimen Volume: 39.42 in³

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

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

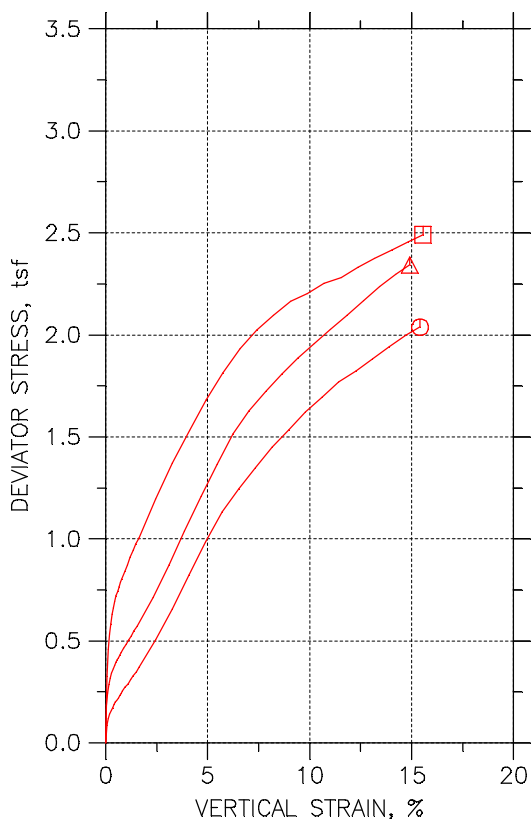
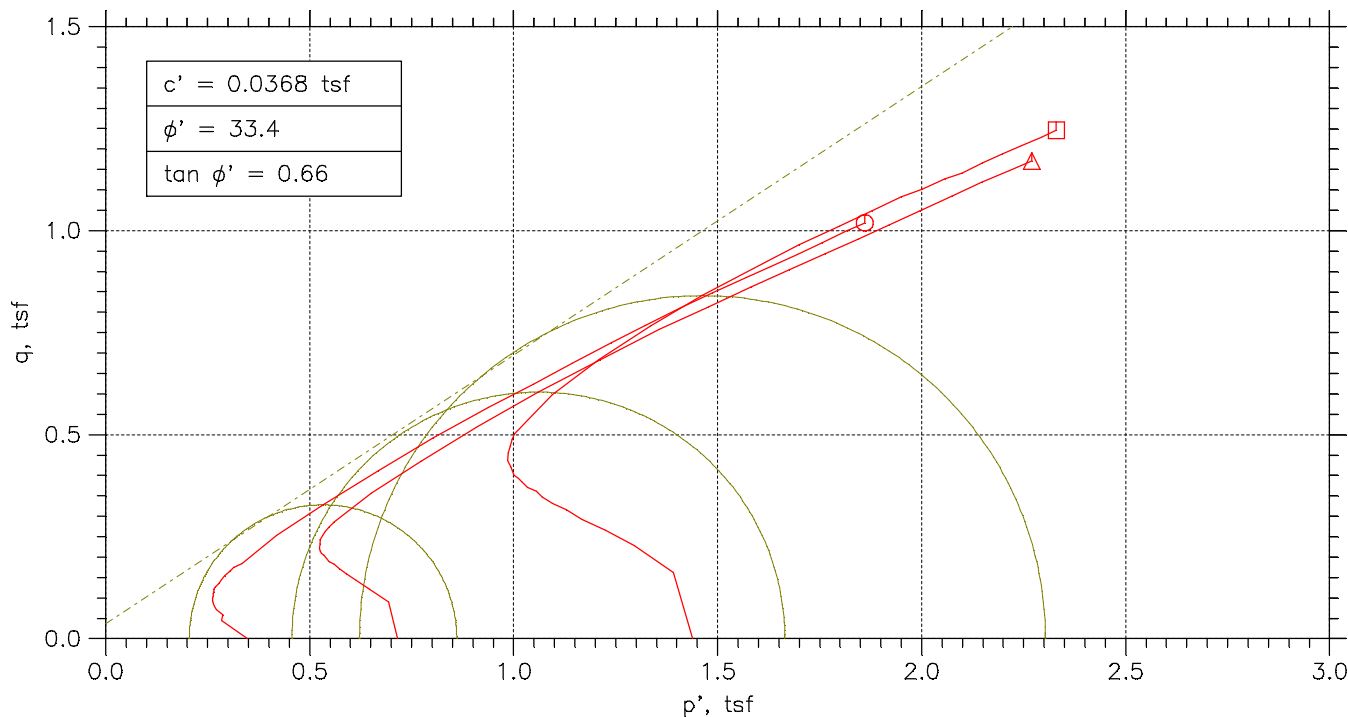
Liquid Limit: 22

Plastic Limit: 16

Estimated Specific Gravity: 2.70

	Vertical Strain %	Total Vertical Stress tsf	Total Horizontal Stress tsf	Excess Pore Pressure tsf	A Parameter	Effective Vertical Stress tsf	Effective Horizontal Stress tsf	Stress Ratio	Effective p tsf	q tsf
1	0.00	6.48	6.48	0	0.000	1.4397	1.4397	1.000	1.4397	0
2	0.05	6.8901	6.48	0.17473	0.426	1.6751	1.265	1.324	1.4701	0.20504
3	0.12	7.0917	6.48	0.30635	0.501	1.7451	1.1334	1.540	1.4392	0.30585
4	0.18	7.2445	6.48	0.39488	0.517	1.8094	1.0449	1.732	1.4271	0.38226
5	0.24	7.3789	6.48	0.45836	0.510	1.8803	0.98138	1.916	1.4309	0.44947
6	0.31	7.495	6.48	0.50321	0.496	1.9516	0.93653	2.084	1.444	0.50751
7	0.37	7.6064	6.48	0.53233	0.473	2.0338	0.90741	2.241	1.4706	0.56319
8	0.44	7.7085	6.48	0.55796	0.454	2.1103	0.88179	2.393	1.4961	0.61427
9	0.50	7.8045	6.48	0.57427	0.434	2.19	0.86548	2.530	1.5277	0.66225
10	0.56	7.8989	6.48	0.58417	0.412	2.2745	0.85558	2.658	1.565	0.70944
11	0.63	7.9885	6.48	0.58941	0.391	2.3589	0.85034	2.774	1.6046	0.75427
12	0.69	8.0691	6.48	0.59116	0.372	2.4377	0.84859	2.873	1.6431	0.79453
13	0.75	8.151	6.48	0.58824	0.352	2.5225	0.8515	2.962	1.687	0.83552
14	0.88	8.298	6.48	0.57892	0.318	2.6789	0.86082	3.112	1.7698	0.90902
15	1.01	8.4266	6.48	0.56145	0.288	2.8249	0.87829	3.216	1.8516	0.97331
16	1.13	8.5338	6.48	0.53874	0.262	2.9548	0.90101	3.279	1.9279	1.0269
17	1.27	8.6255	6.48	0.51602	0.241	3.0693	0.92372	3.323	1.9965	1.0728
18	1.39	8.7067	6.48	0.49156	0.221	3.1749	0.94818	3.348	2.0615	1.1134
19	1.53	8.777	6.48	0.46594	0.203	3.2709	0.97381	3.359	2.1223	1.1485
20	2.33	9.1161	6.48	0.33023	0.125	3.7456	1.1095	3.376	2.4275	1.318
21	3.13	9.3903	6.48	0.21841	0.075	4.1317	1.2213	3.383	2.6765	1.4552
22	3.92	9.6177	6.48	0.11707	0.037	4.4604	1.3227	3.372	2.8915	1.5689
23	4.73	9.8129	6.48	0.020385	0.006	4.7522	1.4194	3.348	3.0858	1.6664
24	5.54	9.9783	6.48	-0.066978	-0.019	5.005	1.5067	3.322	3.2559	1.7492
25	6.34	10.121	6.48	-0.14735	-0.040	5.2278	1.5871	3.294	3.4075	1.8204
26	7.15	10.259	6.48	-0.22248	-0.059	5.4408	1.6622	3.273	3.5515	1.8893
27	7.96	10.377	6.48	-0.29354	-0.075	5.6299	1.7333	3.248	3.6816	1.9483
28	8.76	10.491	6.48	-0.3611	-0.090	5.8118	1.8008	3.227	3.8063	2.0055
29	9.58	10.595	6.48	-0.42691	-0.104	5.9821	1.8667	3.205	3.9244	2.0577
30	10.38	10.694	6.48	-0.4904	-0.116	6.1438	1.9301	3.183	4.037	2.1068
31	11.19	10.779	6.48	-0.54456	-0.127	6.2829	1.9843	3.166	4.1336	2.1493
32	12.00	10.858	6.48	-0.59873	-0.137	6.4165	2.0385	3.148	4.2275	2.189
33	12.80	10.948	6.48	-0.65697	-0.147	6.5648	2.0967	3.131	4.3308	2.234
34	13.60	11.044	6.48	-0.71812	-0.157	6.7219	2.1579	3.115	4.4399	2.282
35	14.41	11.127	6.48	-0.77287	-0.166	6.8599	2.2126	3.100	4.5363	2.3236
36	15.22	11.195	6.48	-0.82179	-0.174	6.9768	2.2615	3.085	4.6192	2.3576

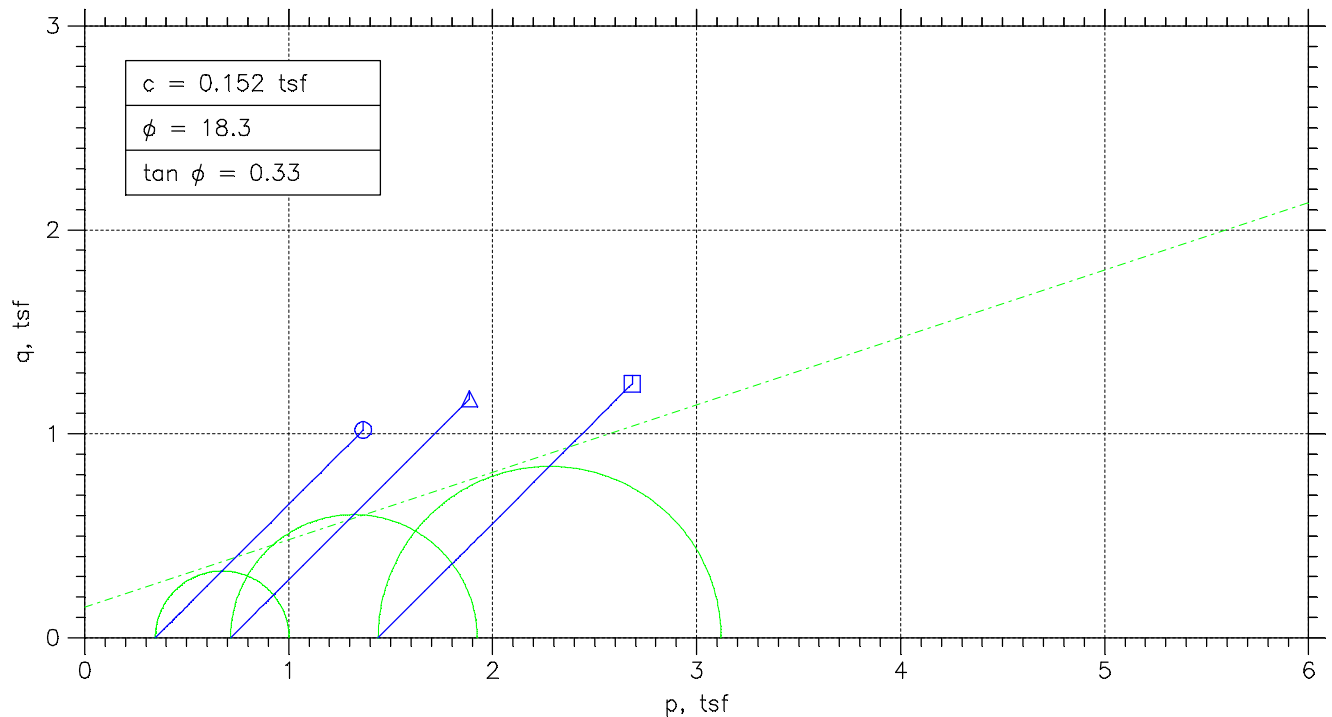
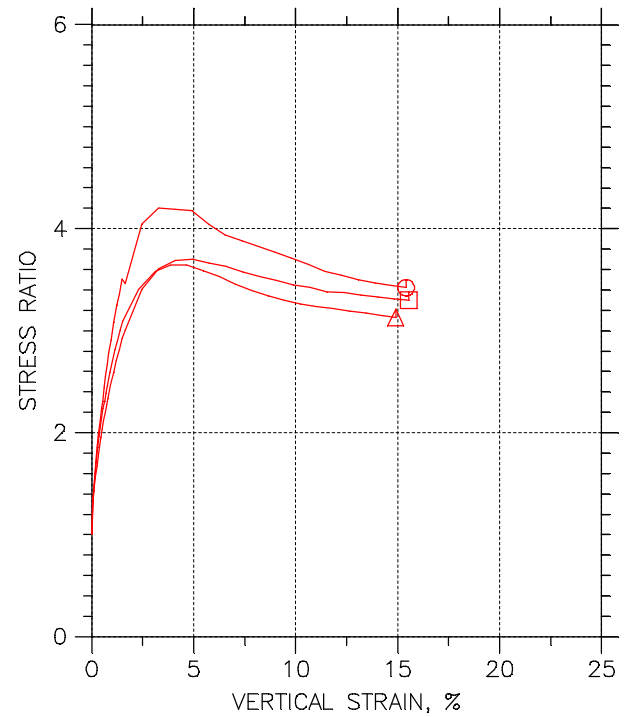
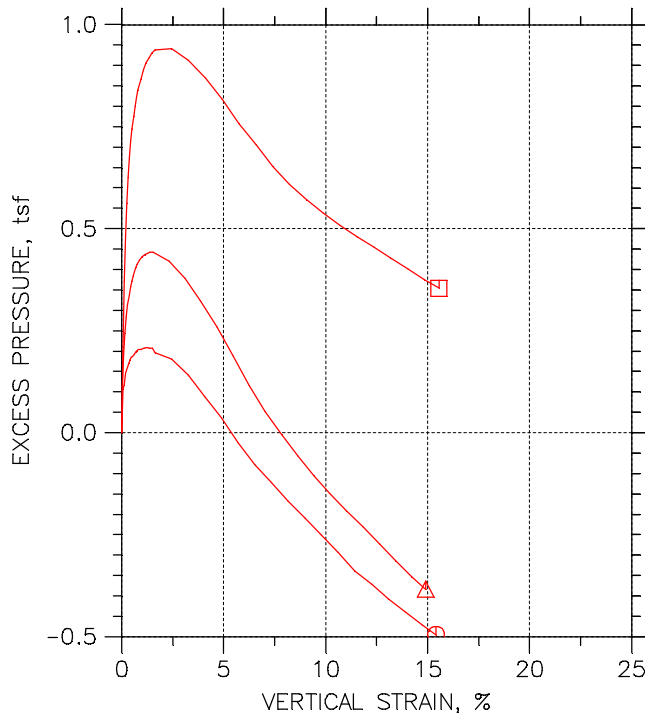
CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST ASTM D4767



Symbol	⊙	△	□	
Test No.	5.0 PSI	10.0 PSI	20.0 PSI	
Initial	Diameter, in	2.8051	2.8173	2.826
	Height, in	6.0524	6.2343	5.9976
	Water Content, %	19.74	20.07	18.09
	Dry Density, pcf	105.1	103.2	106.8
	Saturation, %	88.28	85.61	84.41
Before Shear	Void Ratio	0.60375	0.63293	0.57862
	Water Content, %	21.84	21.50	19.35
	Dry Density, pcf	106.	106.6	110.7
	Saturation, %	100.00	100.00	100.00
	Void Ratio	0.58962	0.58062	0.52255
	Back Press., tsf	5.0538	5.0445	5.0414
	Minor Prin. Stress, tsf	0.34618	0.71546	1.4386
	Max. Dev. Stress, tsf	2.0382	2.3421	2.4914
	Time to Failure, min	1130.9	1132	1132.7
	Strain Rate, %/min	0.049	0.049	0.049
	B-Value	0.96	0.99	0.95
	Estimated Specific Gravity	2.70	2.70	2.70
	Liquid Limit	30	30	30
	Plastic Limit	16	16	16
	Plasticity Index	14	14	14

Project: UPRR GRADE SEPARATION	Failure Sketch		
Location: LITTLE ROCK, AR			
Project No.: 35185112			
Boring No.: B-5 S-3 Depth: 3.5'-5.5'			
Sample Type: 3.0" ST			
Description: BROWN AND BROWNISH GRAY MOTTLED SANDY LEAN CLAY WITH SILT			
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED PER ASTM D4767			

CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST ASTM D4767



Project: UPRR GRADE SEPARATION	Location: LITTLE ROCK, AR	Project No.: 35185112
Boring No.: B-5 S-3	Tested By: WPQ	Checked By: BCM
Sample No.: S-3	Test Date: 8/19/19	Depth: 3.5'-5.5'
Test No.: B-5 S-3	Sample Type: 3.0" ST	Elevation: -
Description: BROWN AND BROWNISH GRAY MOTTLED SANDY LEAN CLAY WITH SILT		
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED PER ASTM D4767		

TRIAXIAL TEST

Project: UPRR GRADE SEPARATION
Boring No.: B-5 S-3
Sample No.: S-3
Test No.: 5.0 PSI

Location: LITTLE ROCK, AR
Tested By: WPQ
Test Date: 8/19/19
Sample Type: 3.0" ST

Project No.: 35185112
Checked By: BCM
Depth: 3.5'-5.5'
Elevation: -



Soil Description: BROWN AND BROWNISH GRAY MOTTLED SANDY LEAN CLAY WITH SILT
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED PER ASTM D4767

Specimen Height: 6.05 in
Specimen Area: 6.18 in²
Specimen Volume: 37.40 in³
Piston Area: 0.00 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb
Filter Strip Correction: 0.00 tsf
Membrane Correction: 0.00 lb/in
Correction Type: Uniform

Liquid Limit: 30
Plastic Limit: 16
Estimated Specific Gravity: 2.70

	Time min	Vertical Strain %	Corrected Area in ²	Deviator Load lb	Deviator Stress tsf	Pore Pressure tsf	Horizontal Stress tsf	Vertical Stress tsf
1	0	0	6.1801	0	0	5.0538	5.4	5.4
2	5.0015	0.067968	6.1843	7.6148	0.088655	5.1597	5.4	5.4887
3	10.002	0.13594	6.1885	10.198	0.11865	5.172	5.4	5.5187
4	15.002	0.2039	6.1927	12.238	0.14229	5.1993	5.4	5.5423
5	20.002	0.27187	6.1969	13.734	0.15957	5.2133	5.4	5.5596
6	25.003	0.34135	6.2012	14.958	0.17367	5.2237	5.4	5.5737
7	30.002	0.41083	6.2055	16.181	0.18774	5.2319	5.4	5.5877
8	35.002	0.47728	6.2097	17.269	0.20023	5.2383	5.4	5.6002
9	40.004	0.54676	6.214	17.949	0.20797	5.2406	5.4	5.608
10	45.001	0.61473	6.2183	19.037	0.22042	5.247	5.4	5.6204
11	50.003	0.68421	6.2226	19.989	0.23128	5.2511	5.4	5.6313
12	55.004	0.75218	6.2269	20.941	0.24213	5.2552	5.4	5.6421
13	60.004	0.82165	6.2313	21.892	0.25296	5.2575	5.4	5.653
14	70.001	0.95608	6.2397	23.524	0.27145	5.2581	5.4	5.6714
15	80.003	1.0935	6.2484	25.156	0.28987	5.261	5.4	5.6899
16	90.004	1.2295	6.257	26.924	0.30981	5.2627	5.4	5.7098
17	100	1.3639	6.2655	28.691	0.32971	5.2604	5.4	5.7297
18	110	1.4998	6.2742	30.459	0.34954	5.2604	5.4	5.7495
19	120	1.6342	6.2827	32.227	0.36932	5.2499	5.4	5.7693
20	180	2.4468	6.3351	44.465	0.50536	5.2342	5.4	5.9054
21	240	3.264	6.3886	58.199	0.6559	5.1952	5.4	6.0559
22	300	4.0811	6.443	73.564	0.82207	5.1423	5.4	6.2221
23	360	4.8967	6.4983	88.794	0.98382	5.0905	5.4	6.3838
24	420	5.7123	6.5545	103.07	1.1322	5.0282	5.4	6.5322
25	480	6.5325	6.612	114.49	1.2468	4.9758	5.4	6.6468
26	540	7.3526	6.6705	125.1	1.3503	4.9316	5.4	6.7503
27	600	8.1727	6.7301	135.57	1.4504	4.8862	5.4	6.8504
28	660	8.9823	6.7899	144.82	1.5356	4.8455	5.4	6.9356
29	720	9.7858	6.8504	154.2	1.6207	4.803	5.4	7.0207
30	780	10.614	6.9139	162.77	1.695	4.7605	5.4	7.095
31	840	11.434	6.9779	171.47	1.7693	4.7146	5.4	7.1693
32	900	12.254	7.0431	178.4	1.8238	4.6826	5.4	7.2238
33	960	13.079	7.1099	186.02	1.8837	4.6459	5.4	7.2837
34	1020	13.894	7.1773	193.5	1.9411	4.6145	5.4	7.3411
35	1080	14.711	7.246	201.11	1.9983	4.5831	5.4	7.3983
36	1130.9	15.414	7.3062	206.82	2.0382	4.5586	5.4	7.4382

TRIAXIAL TEST

Project: UPRR GRADE SEPARATION
Boring No.: B-5 S-3
Sample No.: S-3
Test No.: 5.0 PSI

Location: LITTLE ROCK, AR
Tested By: WPQ
Test Date: 8/19/19
Sample Type: 3.0" ST

Project No.: 35185112
Checked By: BCM
Depth: 3.5'-5.5'
Elevation: -



Soil Description: BROWN AND BROWNISH GRAY MOTTLED SANDY LEAN CLAY WITH SILT
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED PER ASTM D4767

Specimen Height: 6.05 in
Specimen Area: 6.18 in²
Specimen Volume: 37.40 in³
Piston Area: 0.00 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb
Filter Strip Correction: 0.00 tsf
Membrane Correction: 0.00 lb/in
Correction Type: Uniform

Liquid Limit: 30
Plastic Limit: 16
Estimated Specific Gravity: 2.70

	Vertical Strain %	Total Vertical Stress tsf	Total Horizontal Stress tsf	Excess Pore Pressure tsf	A Parameter	Effective Vertical Stress tsf	Effective Horizontal Stress tsf	Stress Ratio	Effective p tsf	q tsf
1	0.00	5.4	5.4	0	0.000	0.34618	0.34618	1.000	0.34618	0
2	0.07	5.4887	5.4	0.10591	1.195	0.32892	0.24027	1.369	0.2846	0.044327
3	0.14	5.5187	5.4	0.11813	0.996	0.3467	0.22805	1.520	0.28738	0.059327
4	0.20	5.5423	5.4	0.14548	1.022	0.34299	0.2007	1.709	0.27184	0.071143
5	0.27	5.5596	5.4	0.15944	0.999	0.3463	0.18673	1.855	0.26652	0.079784
6	0.34	5.5737	5.4	0.16992	0.978	0.34993	0.17626	1.985	0.26309	0.086833
7	0.41	5.5877	5.4	0.17806	0.948	0.35586	0.16811	2.117	0.26199	0.093872
8	0.48	5.6002	5.4	0.18446	0.921	0.36194	0.16171	2.238	0.26183	0.10012
9	0.55	5.608	5.4	0.18679	0.898	0.36735	0.15938	2.305	0.26337	0.10399
10	0.61	5.6204	5.4	0.19319	0.876	0.37341	0.15298	2.441	0.2632	0.11021
11	0.68	5.6313	5.4	0.19727	0.853	0.38019	0.14891	2.553	0.26455	0.11564
12	0.75	5.6421	5.4	0.20134	0.832	0.38697	0.14484	2.672	0.2659	0.12107
13	0.82	5.653	5.4	0.20367	0.805	0.39547	0.14251	2.775	0.26899	0.12648
14	0.96	5.6714	5.4	0.20425	0.752	0.41337	0.14193	2.913	0.27765	0.13572
15	1.09	5.6899	5.4	0.20716	0.715	0.42889	0.13902	3.085	0.28395	0.14494
16	1.23	5.7098	5.4	0.2089	0.674	0.44709	0.13727	3.257	0.29218	0.15491
17	1.36	5.7297	5.4	0.20658	0.627	0.46931	0.1396	3.362	0.30445	0.16485
18	1.50	5.7495	5.4	0.20658	0.591	0.48914	0.1396	3.504	0.31437	0.17477
19	1.63	5.7693	5.4	0.1961	0.531	0.51939	0.15007	3.461	0.33473	0.18466
20	2.45	5.9054	5.4	0.18039	0.357	0.67114	0.16579	4.048	0.41846	0.25268
21	3.26	6.0559	5.4	0.1414	0.216	0.86068	0.20477	4.203	0.53272	0.32795
22	4.08	6.2221	5.4	0.088449	0.108	1.0798	0.25773	4.190	0.66876	0.41104
23	4.90	6.3838	5.4	0.03666	0.037	1.2933	0.30952	4.179	0.80143	0.49191
24	5.71	6.5322	5.4	-0.025604	-0.023	1.504	0.37178	4.045	0.93789	0.56611
25	6.53	6.6468	5.4	-0.077975	-0.063	1.6709	0.42415	3.939	1.0475	0.62338
26	7.35	6.7503	5.4	-0.1222	-0.090	1.8187	0.46837	3.883	1.1435	0.67515
27	8.17	6.8504	5.4	-0.16759	-0.116	1.9641	0.51376	3.823	1.2389	0.72518
28	8.98	6.9356	5.4	-0.20832	-0.136	2.0901	0.5545	3.769	1.3223	0.76781
29	9.79	7.0207	5.4	-0.2508	-0.155	2.2177	0.59698	3.715	1.4073	0.81034
30	10.61	7.095	5.4	-0.29328	-0.173	2.3345	0.63945	3.651	1.487	0.84751
31	11.43	7.1693	5.4	-0.33925	-0.192	2.4547	0.68542	3.581	1.5701	0.88463
32	12.25	7.2238	5.4	-0.37125	-0.204	2.5412	0.71743	3.542	1.6293	0.91189
33	13.08	7.2837	5.4	-0.40791	-0.217	2.6378	0.75409	3.498	1.696	0.94187
34	13.89	7.3411	5.4	-0.43934	-0.226	2.7266	0.78551	3.471	1.7561	0.97055
35	14.71	7.3983	5.4	-0.47076	-0.236	2.8153	0.81693	3.446	1.8161	0.99917
36	15.41	7.4382	5.4	-0.4952	-0.243	2.8795	0.84137	3.422	1.8605	1.0191

TRIAXIAL TEST

Project: UPRR GRADE SEPARATION
Boring No.: B-5 S-3
Sample No.: S-3
Test No.: 10.0 PSI

Location: LITTLE ROCK, AR
Tested By: BCM
Test Date: 8/19/19
Sample Type: 3.0" ST

Project No.: 35185112
Checked By: WPQ
Depth: 3.5'-5.5'
Elevation: ----



Soil Description: BROWN AND BROWNISH GRAY MOTTLED SANDY LEAN CLAY WITH SILT

Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767.

Specimen Height: 6.23 in
Specimen Area: 6.23 in²
Specimen Volume: 38.86 in³

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

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

Liquid Limit: 30

Plastic Limit: 16

Estimated Specific Gravity: 2.70

	Time min	Vertical Strain %	Corrected Area in ²	Deviator Load lb	Deviator Stress tsf	Pore Pressure tsf	Horizontal Stress tsf	Vertical Stress tsf
1	0	0	6.2339	0	0	5.0445	5.76	5.76
2	5.0021	0.046044	6.2368	15.712	0.18138	5.1571	5.76	5.9414
3	10.002	0.10744	6.2407	21.117	0.24363	5.2352	5.76	6.0036
4	15.001	0.17036	6.2446	24.762	0.2855	5.2889	5.76	6.0455
5	20.004	0.23482	6.2486	27.527	0.31718	5.3286	5.76	6.0772
6	25.001	0.29929	6.2527	29.79	0.34303	5.3583	5.76	6.103
7	30.002	0.36528	6.2568	31.675	0.3645	5.3822	5.76	6.1245
8	35.003	0.42974	6.2609	32.932	0.37872	5.4014	5.76	6.1387
9	40.002	0.4942	6.2649	34.315	0.39436	5.416	5.76	6.1544
10	45.004	0.5602	6.2691	35.571	0.40854	5.4294	5.76	6.1685
11	50	0.6262	6.2732	36.451	0.41836	5.4405	5.76	6.1784
12	55.001	0.69066	6.2773	37.583	0.43107	5.4493	5.76	6.1911
13	60.004	0.75358	6.2813	38.588	0.44232	5.4569	5.76	6.2023
14	70	0.88097	6.2894	40.599	0.46478	5.4673	5.76	6.2248
15	80.003	1.0099	6.2975	42.359	0.48429	5.4761	5.76	6.2443
16	90.003	1.1388	6.3058	44.37	0.50662	5.4808	5.76	6.2666
17	100	1.2677	6.314	46.004	0.5246	5.4843	5.76	6.2846
18	110	1.3967	6.3222	48.141	0.54825	5.4866	5.76	6.3082
19	120	1.5256	6.3305	50.278	0.57183	5.4866	5.76	6.3318
20	180	2.3191	6.3819	63.099	0.71187	5.4644	5.76	6.4719
21	240	3.1064	6.4338	77.805	0.8707	5.4224	5.76	6.6307
22	300	3.8738	6.4852	93.517	1.0382	5.3676	5.76	6.7982
23	360	4.6673	6.5391	109.73	1.2082	5.3035	5.76	6.9682
24	420	5.4654	6.5944	125.07	1.3655	5.2323	5.76	7.1255
25	480	6.2482	6.6494	140.02	1.5162	5.1612	5.76	7.2762
26	540	7.0401	6.7061	151.59	1.6275	5.0964	5.76	7.3875
27	600	7.8413	6.7644	161.89	1.7232	5.0399	5.76	7.4832
28	660	8.6256	6.8224	171.32	1.808	4.988	5.76	7.568
29	720	9.4236	6.8825	180.25	1.8856	4.939	5.76	7.6456
30	780	10.229	6.9443	188.79	1.9574	4.8947	5.76	7.7174
31	840	11.021	7.0061	197.34	2.028	4.8533	5.76	7.788
32	900	11.827	7.0701	205.89	2.0967	4.8136	5.76	7.8567
33	960	12.634	7.1355	214.94	2.1688	4.771	5.76	7.9288
34	1020	13.426	7.2007	223.74	2.2371	4.7308	5.76	7.9971
35	1080	14.22	7.2674	231.65	2.2951	4.6923	5.76	8.0551
36	1132	14.907	7.3261	238.32	2.3421	4.6608	5.76	8.1021

TRIAXIAL TEST

Project: UPRR GRADE SEPARATION
Boring No.: B-5 S-3
Sample No.: S-3
Test No.: 10.0 PSI

Location: LITTLE ROCK, AR
Tested By: BCM
Test Date: 8/19/19
Sample Type: 3.0" ST

Project No.: 35185112
Checked By: WPQ
Depth: 3.5'-5.5'
Elevation: ----



Soil Description: BROWN AND BROWNISH GRAY MOTTLED SANDY LEAN CLAY WITH SILT
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED AS PER ASTM D4767.

Specimen Height: 6.23 in
Specimen Area: 6.23 in²
Specimen Volume: 38.86 in³

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

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

Liquid Limit: 30
Plastic Limit: 16
Estimated Specific Gravity: 2.70

	Vertical Strain %	Total Vertical Stress tsf	Total Horizontal Stress tsf	Excess Pore Pressure tsf	A Parameter	Effective Vertical Stress tsf	Effective Horizontal Stress tsf	Stress Ratio	Effective p tsf	q tsf
1	0.00	5.76	5.76	0	0.000	0.71546	0.71546	1.000	0.71546	0
2	0.05	5.9414	5.76	0.11255	0.621	0.78429	0.60291	1.301	0.6936	0.090691
3	0.11	6.0036	5.76	0.1907	0.783	0.76839	0.52476	1.464	0.64657	0.12181
4	0.17	6.0455	5.76	0.24435	0.856	0.75661	0.47111	1.606	0.61386	0.14275
5	0.23	6.0772	5.76	0.28401	0.895	0.74863	0.43145	1.735	0.59004	0.15859
6	0.30	6.103	5.76	0.31375	0.915	0.74474	0.40171	1.854	0.57322	0.17151
7	0.37	6.1245	5.76	0.33766	0.926	0.7423	0.3778	1.965	0.56005	0.18225
8	0.43	6.1387	5.76	0.35691	0.942	0.73727	0.35855	2.056	0.54791	0.18936
9	0.49	6.1544	5.76	0.37149	0.942	0.73833	0.34397	2.146	0.54115	0.19718
10	0.56	6.1685	5.76	0.3849	0.942	0.7391	0.33056	2.236	0.53483	0.20427
11	0.63	6.1784	5.76	0.39598	0.946	0.73784	0.31948	2.310	0.52866	0.20918
12	0.69	6.1911	5.76	0.40473	0.939	0.7418	0.31073	2.387	0.52626	0.21553
13	0.75	6.2023	5.76	0.41231	0.932	0.74547	0.30315	2.459	0.52431	0.22116
14	0.88	6.2248	5.76	0.42281	0.910	0.75743	0.29265	2.588	0.52504	0.23239
15	1.01	6.2443	5.76	0.43156	0.891	0.7682	0.2839	2.706	0.52605	0.24215
16	1.14	6.2666	5.76	0.43622	0.861	0.78586	0.27924	2.814	0.53255	0.25331
17	1.27	6.2846	5.76	0.43972	0.838	0.80034	0.27574	2.903	0.53804	0.2623
18	1.40	6.3082	5.76	0.44205	0.806	0.82165	0.27341	3.005	0.54753	0.27412
19	1.53	6.3318	5.76	0.44205	0.773	0.84524	0.27341	3.092	0.55932	0.28592
20	2.32	6.4719	5.76	0.41989	0.590	1.0074	0.29557	3.408	0.6515	0.35593
21	3.11	6.6307	5.76	0.3779	0.434	1.2083	0.33756	3.579	0.77291	0.43535
22	3.87	6.7982	5.76	0.32308	0.311	1.4306	0.39238	3.646	0.9115	0.51912
23	4.67	6.9682	5.76	0.25893	0.214	1.6647	0.45653	3.647	1.0606	0.6041
24	5.47	7.1255	5.76	0.18779	0.138	1.8932	0.52768	3.588	1.2104	0.68276
25	6.25	7.2762	5.76	0.11664	0.077	2.115	0.59882	3.532	1.3569	0.75809
26	7.04	7.3875	5.76	0.051903	0.032	2.2911	0.66356	3.453	1.4773	0.81376
27	7.84	7.4832	5.76	-0.0046655	-0.003	2.4433	0.72013	3.393	1.5817	0.8616
28	8.63	7.568	5.76	-0.056569	-0.031	2.5801	0.77203	3.342	1.676	0.90401
29	9.42	7.6456	5.76	-0.10556	-0.056	2.7066	0.82102	3.297	1.7638	0.9428
30	10.23	7.7174	5.76	-0.14988	-0.077	2.8228	0.86534	3.262	1.8441	0.97872
31	11.02	7.788	5.76	-0.19128	-0.094	2.9348	0.90674	3.237	1.9207	1.014
32	11.83	7.8567	5.76	-0.23094	-0.110	3.0431	0.9464	3.215	1.9947	1.0483
33	12.63	7.9288	5.76	-0.27351	-0.126	3.1578	0.98897	3.193	2.0734	1.0844
34	13.43	7.9971	5.76	-0.31375	-0.140	3.2663	1.0292	3.174	2.1478	1.1186
35	14.22	8.0551	5.76	-0.35224	-0.153	3.3628	1.0677	3.150	2.2152	1.1475
36	14.91	8.1021	5.76	-0.38373	-0.164	3.4413	1.0992	3.131	2.2703	1.1711

TRIAXIAL TEST

Project: UPRR GRADE SEPARATION
Boring No.: B-5 S-3
Sample No.: S-3
Test No.: 20.0 PSI

Location: LITTLE ROCK, AR
Tested By: WPQ
Test Date: 8/19/19
Sample Type: 3.0" ST

Project No.: 35185112
Checked By: BCM
Depth: 3.5'-5.5'
Elevation: ----



Soil Description: BROWN AND BROWNISH GRAY MOTTLED SANDY LEAN CLAY WITH SILT

Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED PER ASTM D4767

Specimen Height: 6.00 in
Specimen Area: 6.27 in²
Specimen Volume: 37.62 in³

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

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

Liquid Limit: 30

Plastic Limit: 16

Estimated Specific Gravity: 2.70

	Time min	Vertical Strain %	Corrected Area in ²	Deviator Load lb	Deviator Stress tsf	Pore Pressure tsf	Horizontal Stress tsf	Vertical Stress tsf
1	0	0	6.2723	0	0	5.0414	6.48	6.48
2	5.0037	0.054473	6.2758	28.394	0.32576	5.2517	6.48	6.8058
3	10.004	0.11803	6.2797	39.898	0.45744	5.4124	6.48	6.9374
4	15	0.18612	6.284	46.45	0.53221	5.5213	6.48	7.0122
5	20.004	0.25118	6.2881	50.964	0.58355	5.604	6.48	7.0635
6	25.003	0.31927	6.2924	55.187	0.63147	5.6669	6.48	7.1115
7	30.002	0.38737	6.2967	57.954	0.66267	5.7164	6.48	7.1427
8	35	0.45395	6.3009	60.72	0.69384	5.7566	6.48	7.1738
9	40.004	0.51901	6.3051	63.196	0.72166	5.7858	6.48	7.2017
10	45.003	0.58862	6.3095	65.089	0.74275	5.8172	6.48	7.2228
11	50.002	0.65973	6.314	67.127	0.76547	5.8411	6.48	7.2455
12	55.001	0.72631	6.3182	69.02	0.78653	5.862	6.48	7.2665
13	60.001	0.79592	6.3227	70.476	0.80256	5.8801	6.48	7.2826
14	70.003	0.9321	6.3314	73.971	0.8412	5.9075	6.48	7.3212
15	80	1.0698	6.3402	76.883	0.8731	5.9308	6.48	7.3531
16	90.001	1.209	6.3491	80.232	0.90985	5.9482	6.48	7.3898
17	100	1.3482	6.3581	83.29	0.94319	5.9605	6.48	7.4232
18	110	1.4905	6.3672	86.348	0.97641	5.9715	6.48	7.4564
19	120	1.6312	6.3763	88.969	1.0046	5.9791	6.48	7.4846
20	180	2.4543	6.4302	106.73	1.1951	5.9832	6.48	7.6751
21	240	3.2654	6.4841	123.33	1.3695	5.9547	6.48	7.8495
22	300	4.1006	6.5405	139.06	1.5308	5.911	6.48	8.0108
23	360	4.9253	6.5973	154.06	1.6813	5.858	6.48	8.1613
24	420	5.7439	6.6546	167.6	1.8134	5.7991	6.48	8.2934
25	480	6.5837	6.7144	180.12	1.9315	5.7467	6.48	8.4115
26	540	7.4023	6.7738	190.31	2.0229	5.6943	6.48	8.5029
27	600	8.224	6.8344	199.05	2.097	5.6506	6.48	8.577
28	660	9.0607	6.8973	207.35	2.1645	5.6122	6.48	8.6445
29	720	9.8763	6.9597	212.88	2.2023	5.5802	6.48	8.6823
30	780	10.698	7.0237	219.87	2.2539	5.5499	6.48	8.7339
31	840	11.539	7.0905	224.68	2.2815	5.5219	6.48	8.7615
32	900	12.361	7.157	231.81	2.3321	5.4969	6.48	8.8121
33	960	13.186	7.225	238.37	2.3754	5.4701	6.48	8.8554
34	1020	14.024	7.2954	244.77	2.4157	5.4427	6.48	8.8957
35	1080	14.827	7.3643	251.33	2.4572	5.4159	6.48	8.9372
36	1132.7	15.551	7.4273	257.01	2.4914	5.3955	6.48	8.9714

TRIAXIAL TEST

Project: UPRR GRADE SEPARATION
Boring No.: B-5 S-3
Sample No.: S-3
Test No.: 20.0 PSI

Location: LITTLE ROCK, AR
Tested By: WPQ
Test Date: 8/19/19
Sample Type: 3.0" ST

Project No.: 35185112
Checked By: BCM
Depth: 3.5'-5.5'
Elevation: ----



Soil Description: BROWN AND BROWNISH GRAY MOTTLED SANDY LEAN CLAY WITH SILT
Remarks: FAILURE CRITERIA = MAXIMUM EFFECTIVE STRESS RATIO TEST PERFORMED PER ASTM D4767

Specimen Height: 6.00 in
Specimen Area: 6.27 in²
Specimen Volume: 37.62 in³

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

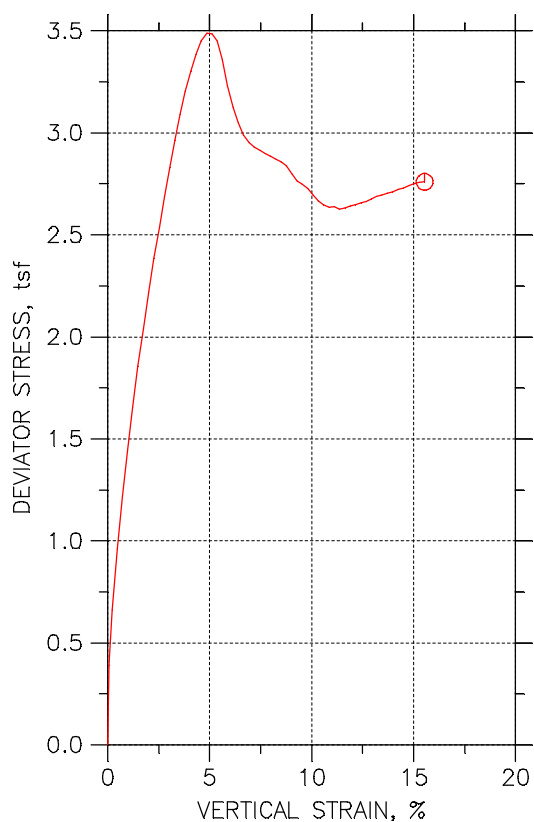
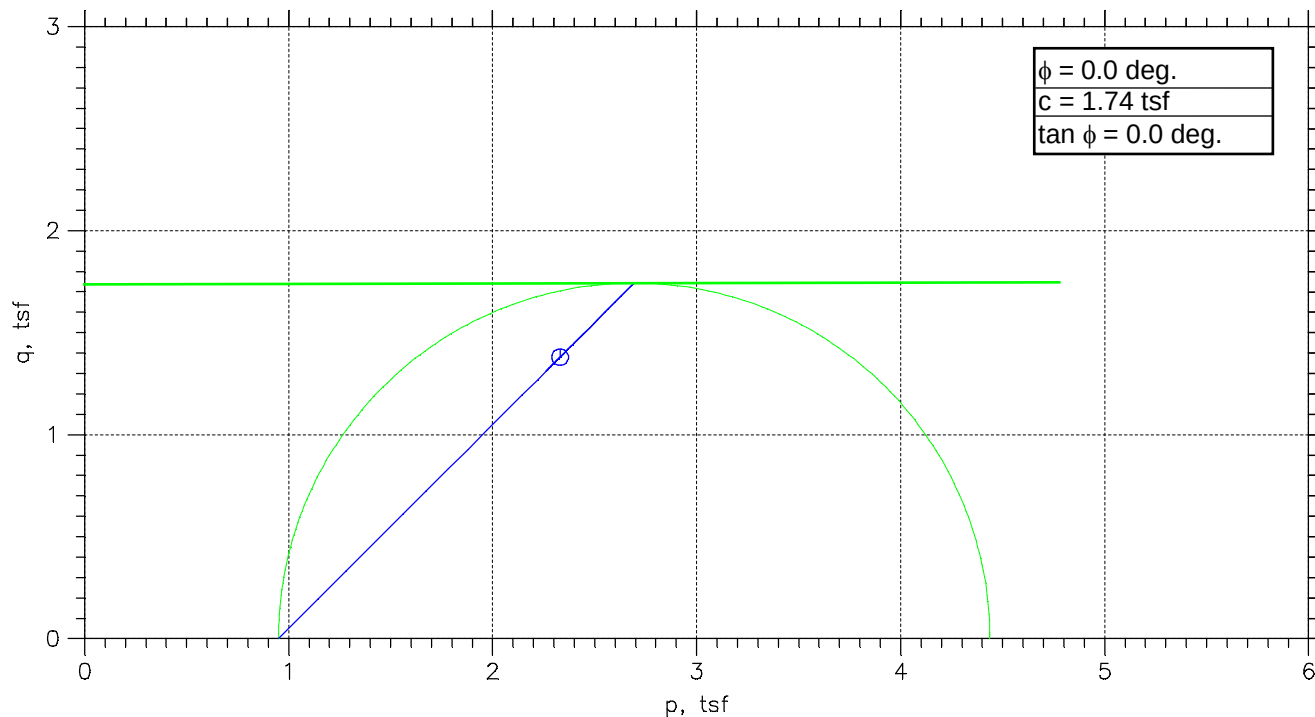
Filter Strip Correction: 0.00 tsf
Membrane Correction: 0.00 lb/in
Correction Type: Uniform

Liquid Limit: 30
Plastic Limit: 16
Estimated Specific Gravity: 2.70

	Vertical Strain %	Total Vertical Stress tsf	Total Horizontal Stress tsf	Excess Pore Pressure tsf	A Parameter	Effective Vertical Stress tsf	Effective Horizontal Stress tsf	Stress Ratio	Effective p tsf	q tsf
1	0.00	6.48	6.48	0	0.000	1.4386	1.4386	1.000	1.4386	0
2	0.05	6.8058	6.48	0.21025	0.645	1.5541	1.2283	1.265	1.3912	0.16288
3	0.12	6.9374	6.48	0.371	0.811	1.525	1.0676	1.428	1.2963	0.22872
4	0.19	7.0122	6.48	0.47991	0.902	1.4909	0.95867	1.555	1.2248	0.2661
5	0.25	7.0635	6.48	0.56262	0.964	1.4595	0.87596	1.666	1.1677	0.29177
6	0.32	7.1115	6.48	0.62552	0.991	1.4445	0.81306	1.777	1.1288	0.31573
7	0.39	7.1427	6.48	0.67502	1.019	1.4262	0.76356	1.868	1.0949	0.33134
8	0.45	7.1738	6.48	0.71521	1.031	1.4172	0.72337	1.959	1.0703	0.34692
9	0.52	7.2017	6.48	0.74433	1.031	1.4159	0.69425	2.039	1.0551	0.36083
10	0.59	7.2228	6.48	0.77578	1.044	1.4055	0.6628	2.121	1.0342	0.37138
11	0.66	7.2455	6.48	0.79966	1.045	1.4044	0.63892	2.198	1.0217	0.38273
12	0.73	7.2665	6.48	0.82063	1.043	1.4045	0.61795	2.273	1.0112	0.39326
13	0.80	7.2826	6.48	0.83868	1.045	1.4025	0.5999	2.338	1.0012	0.40128
14	0.93	7.3212	6.48	0.86606	1.030	1.4137	0.57252	2.469	0.99312	0.4206
15	1.07	7.3531	6.48	0.88935	1.019	1.4223	0.54923	2.590	0.98578	0.43655
16	1.21	7.3898	6.48	0.90683	0.997	1.4416	0.53175	2.711	0.98668	0.45492
17	1.35	7.4232	6.48	0.91906	0.974	1.4627	0.51952	2.816	0.99112	0.4716
18	1.49	7.4564	6.48	0.93012	0.953	1.4849	0.50846	2.920	0.99666	0.48821
19	1.63	7.4846	6.48	0.93769	0.933	1.5055	0.50089	3.006	1.0032	0.50231
20	2.45	7.6751	6.48	0.94177	0.788	1.6919	0.49681	3.406	1.0944	0.59756
21	3.27	7.8495	6.48	0.91323	0.667	1.8949	0.52535	3.607	1.2101	0.68476
22	4.10	8.0108	6.48	0.86955	0.568	2.0998	0.56903	3.690	1.3344	0.7654
23	4.93	8.1613	6.48	0.81655	0.486	2.3033	0.62203	3.703	1.4627	0.84066
24	5.74	8.2934	6.48	0.75773	0.418	2.4942	0.68085	3.663	1.5875	0.90668
25	6.58	8.4115	6.48	0.70531	0.365	2.6648	0.73327	3.634	1.699	0.96574
26	7.40	8.5029	6.48	0.65289	0.323	2.8086	0.78569	3.575	1.7971	1.0115
27	8.22	8.577	6.48	0.60921	0.291	2.9264	0.82937	3.528	1.8779	1.0485
28	9.06	8.6445	6.48	0.57077	0.264	3.0323	0.86781	3.494	1.9501	1.0823
29	9.88	8.6823	6.48	0.53874	0.245	3.1022	0.89984	3.447	2.001	1.1012
30	10.70	8.7339	6.48	0.50845	0.226	3.184	0.93013	3.423	2.0571	1.127
31	11.54	8.7615	6.48	0.4805	0.211	3.2396	0.95808	3.381	2.0988	1.1407
32	12.36	8.8121	6.48	0.45545	0.195	3.3152	0.98313	3.372	2.1492	1.166
33	13.19	8.8554	6.48	0.42866	0.180	3.3853	1.0099	3.352	2.1976	1.1877
34	14.02	8.8957	6.48	0.40129	0.166	3.453	1.0373	3.329	2.2452	1.2079
35	14.83	8.9372	6.48	0.3745	0.152	3.5213	1.0641	3.309	2.2927	1.2286
36	15.55	8.9714	6.48	0.35411	0.142	3.5759	1.0845	3.297	2.3302	1.2457

Unconsolidated-Undrained Triaxial
Compression Tests
ASTM D2850

UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST ASTM D2850



Symbol	⊙			
Test No.	13.2 PSI			
Initial	Diameter, in	2.8283		
	Height, in	5.9496		
	Water Content, %	21.60		
	Dry Density, pcf	105.17		
	Saturation, %	95.61		
Before Shear	Void Ratio	0.61453		
	Water Content, %	21.60		
	Dry Density, pcf	105.17		
	Saturation, %	95.61		
	Void Ratio	0.61453		
	Back Press., tsf	---		
	Minor Prin. Stress, tsf	0.9504		
	Max. Dev. Stress, tsf	3.4871		
	Time to Failure, min	4.7541		
	Strain Rate, %/min	1		
	B-Value	---		
	Estimated Specific Gravity	2.72		
	Liquid Limit	31		
	Plastic Limit	16		
	Plasticity Index	15		

Project: UPRR GRADE SEPARATION	Failure Sketch				
Location: LITTLE ROCK, AR					
Project No.: 35185112					
Boring No.: B-4 S-7 Depth: 18.5'-20.5'					
Sample Type: 3" ST					
Description: DARK BROWN TO DARK GRAY LEAN CLAY. NUMEROUS SAND SEAMS NOTED					
Remarks: FAILURE CRITERIA = MAXIMUM DEVIATOR STRESS TEST PERFORMED AS PER ASTM D2850.					

TRIAXIAL TEST

Project: UPRR GRADE SEPARATION
Boring No.: B-4 S-7
Sample No.: S-7
Test No.: 13.2 PSI

Location: LITTLE ROCK, AR
Tested By: BCM
Test Date: 8/20/19
Sample Type: 3" ST

Project No.: 35185112
Checked By: WPQ
Depth: 18.5'-20.5'
Elevation: ----



Soil Description: DARK BROWN TO DARK GRAY LEAN CLAY. NUMEROUS SAND SEAMS NOTED
Remarks: FAILURE CRITERIA = MAXIMUM DEVIATOR STRESS TEST PERFORMED AS PER ASTM D2850.

Specimen Height: 5.95 in
Specimen Area: 6.28 in²
Specimen Volume: 37.38 in³

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

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

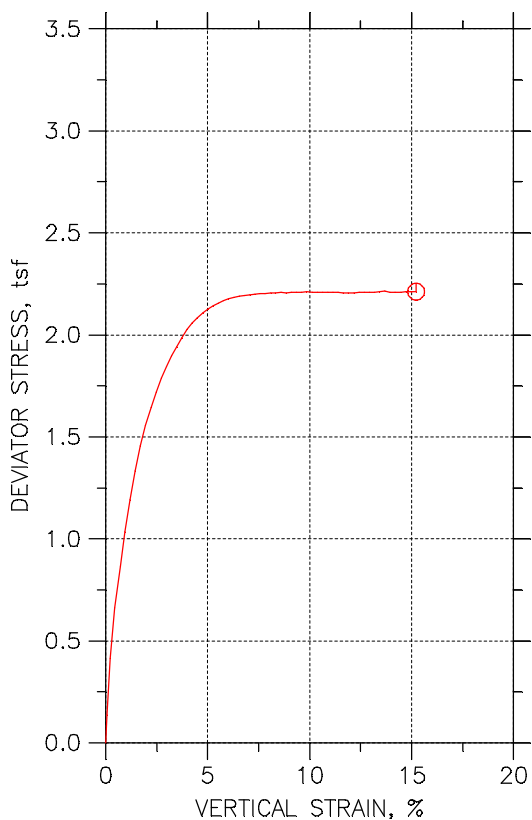
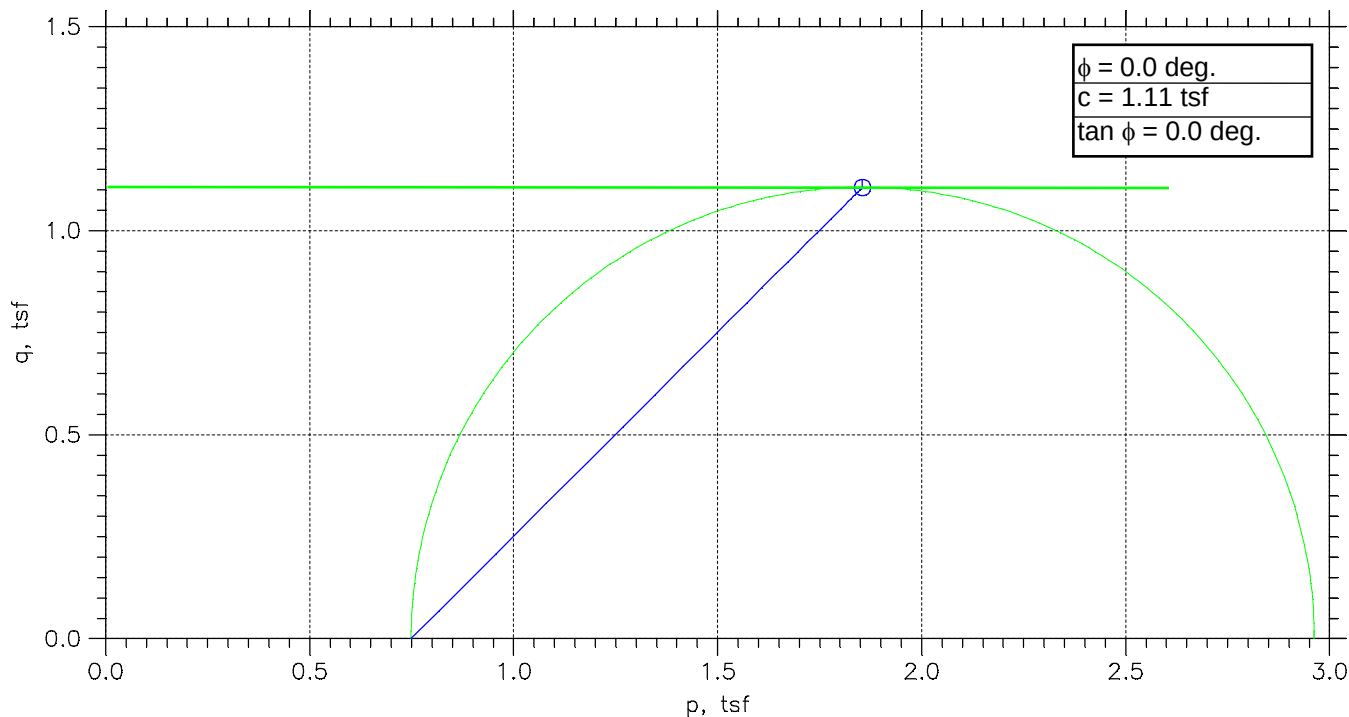
Liquid Limit: 31

Plastic Limit: 16

Estimated Specific Gravity: 2.72

	Time min	Vertical Strain %	Corrected Area in ²	Deviator Load lb	Deviator Stress tsf	Vertical Stress tsf	p tsf	q tsf
1	0	0	6.2828	0	0	0.9504	0.9504	0
2	0.1014	0.05224	6.2861	34.13	0.39092	1.3413	1.1459	0.19546
3	0.25195	0.20589	6.2958	57.927	0.66246	1.6129	1.2816	0.33123
4	0.5043	0.46402	6.3121	84.17	0.9601	1.9105	1.4304	0.48005
5	0.75222	0.72061	6.3284	107.01	1.2175	2.1679	1.5592	0.60876
6	1.0002	0.97259	6.3445	127.14	1.4428	2.3932	1.6718	0.72141
7	1.2525	1.2276	6.3609	146.45	1.6577	2.6081	1.7792	0.82883
8	1.5004	1.4858	6.3776	164.4	1.856	2.8064	1.8784	0.92798
9	1.7528	1.7454	6.3944	181.26	2.0409	2.9913	1.9709	1.0205
10	2.0007	2.0036	6.4113	197.44	2.2173	3.1677	2.059	1.1086
11	2.253	2.2709	6.4288	212.94	2.3848	3.3352	2.1428	1.1924
12	2.5009	2.5275	6.4457	227.35	2.5396	3.49	2.2202	1.2698
13	2.7533	2.7918	6.4633	241.63	2.6918	3.6422	2.2963	1.3459
14	3.0012	3.0438	6.4801	254.69	2.8298	3.7802	2.3653	1.4149
15	3.2536	3.3004	6.4973	267.6	2.9655	3.9159	2.4331	1.4827
16	3.5015	3.5539	6.5143	279.71	3.0915	4.0419	2.4961	1.5457
17	3.7538	3.812	6.5318	290.58	3.2031	4.1535	2.552	1.6016
18	4.0017	4.0686	6.5493	300.38	3.3022	4.2526	2.6015	1.6511
19	4.2541	4.3313	6.5673	308.81	3.3856	4.336	2.6432	1.6928
20	4.502	4.5895	6.585	315.6	3.4508	4.4012	2.6758	1.7254
21	4.7541	4.8553	6.6034	319.82	3.4871	4.4375	2.694	1.7436
22	5.002	5.1088	6.6211	320.5	3.4852	4.4356	2.693	1.7426
23	5.2541	5.3654	6.639	318.19	3.4507	4.4011	2.6758	1.7254
24	5.502	5.622	6.6571	310.57	3.359	4.3094	2.6299	1.6795
25	5.7544	5.8816	6.6755	299.56	3.231	4.1814	2.5659	1.6155
26	6.002	6.1382	6.6937	290.58	3.1256	4.076	2.5132	1.5628
27	6.2544	6.4056	6.7128	284.19	3.0482	3.9986	2.4745	1.5241
28	6.5023	6.6668	6.7316	279.57	2.9902	3.9406	2.4455	1.4951
29	6.7502	6.9326	6.7508	276.85	2.9527	3.9031	2.4268	1.4764
30	7.0025	7.1984	6.7702	275.63	2.9313	3.8817	2.416	1.4656
31	7.2505	7.455	6.7889	274.68	2.9131	3.8635	2.4069	1.4565
32	7.5028	7.7239	6.8087	274.27	2.9003	3.8507	2.4005	1.4501
33	7.7507	7.9805	6.8277	273.59	2.8851	3.8355	2.3929	1.4425
34	8.0031	8.2417	6.8471	272.91	2.8697	3.8201	2.3853	1.4349
35	8.251	8.4998	6.8665	272.5	2.8574	3.8078	2.3791	1.4287
36	8.5033	8.7579	6.8859	271.55	2.8393	3.7897	2.3701	1.4197
37	8.751	9.0238	6.906	268.28	2.7971	3.7475	2.3489	1.3985
38	9.0033	9.288	6.9261	265.97	2.7649	3.7153	2.3328	1.3824
39	9.251	9.5477	6.946	265.02	2.7471	3.6975	2.324	1.3736
40	9.5031	9.8135	6.9665	263.8	2.7264	3.6768	2.3136	1.3632
41	9.751	10.07	6.9864	261.49	2.6948	3.6452	2.2978	1.3474
42	10.003	10.328	7.0065	259.45	2.6661	3.6165	2.2835	1.3331
43	10.251	10.585	7.0266	258.36	2.6473	3.5977	2.2741	1.3237
44	10.503	10.844	7.047	257.81	2.6341	3.5845	2.2674	1.317
45	10.751	11.098	7.0671	258.9	2.6377	3.5881	2.2692	1.3188
46	11.004	11.365	7.0885	258.49	2.6256	3.576	2.2632	1.3128
47	11.252	11.63	7.1097	259.99	2.6329	3.5833	2.2669	1.3165
48	11.504	11.899	7.1314	261.76	2.6428	3.5932	2.2718	1.3214
49	11.752	12.158	7.1524	262.98	2.6473	3.5977	2.2741	1.3237
50	12.004	12.418	7.1736	264.61	2.6559	3.6063	2.2783	1.3279
51	12.252	12.674	7.1947	266.24	2.6644	3.6148	2.2826	1.3322
52	12.504	12.929	7.2158	268.15	2.6756	3.626	2.2882	1.3378
53	12.752	13.185	7.237	270.19	2.6881	3.6385	2.2944	1.344
54	13	13.438	7.2582	271.82	2.6964	3.6468	2.2986	1.3482
55	13.253	13.701	7.2803	273.32	2.703	3.6534	2.3019	1.3515
56	13.501	13.964	7.3025	274.81	2.7095	3.6599	2.3052	1.3548
57	13.753	14.232	7.3254	276.99	2.7224	3.6728	2.3116	1.3612
58	14.001	14.495	7.3479	278.62	2.7301	3.6805	2.3154	1.365
59	14.253	14.766	7.3712	280.66	2.7414	3.6918	2.3211	1.3707
60	14.501	15.024	7.3936	282.43	2.7503	3.7007	2.3255	1.3751
61	14.753	15.283	7.4163	284.06	2.7577	3.7081	2.3293	1.3789
62	15.001	15.537	7.4385	285.15	2.76	3.7104	2.3304	1.38

UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST ASTM D2850



Symbol	⊙			
Test No.	10.4 PSI			
Initial	Diameter, in	2.8551		
	Height, in	6.0772		
	Water Content, %	23.65		
	Dry Density, pcf	101.73		
	Saturation, %	96.12		
Before Shear	Void Ratio	0.66914		
	Water Content, %	23.65		
	Dry Density, pcf	101.73		
	Saturation, %	96.12		
	Void Ratio	0.66914		
	Back Press., tsf	---		
	Minor Prin. Stress, tsf	0.7488		
	Max. Dev. Stress, tsf	2.2135		
	Time to Failure, min	13.5		
	Strain Rate, %/min	1		
	B-Value	---		
	Estimated Specific Gravity	2.72		
	Liquid Limit	40		
	Plastic Limit	14		
	Plasticity Index	26		
Failure Sketch				

Project: UPRR GRADE SEPARATION
 Location: LITTLE ROCK, AR
 Project No.: 35185112
 Boring No.: B-6 S-7 Depth: 13.5'-15.5'
 Sample Type: 3" ST

Description: GRAY AND RUST BROWN LEAN CLAY WITH SAND. NUMEROUS SILT SEAMS NOTED

Remarks: FAILURE CRITERIA = MAXIMUM DEVIATOR STRESS TEST PERFORMED AS PER ASTM D2850.

TRIAXIAL TEST

Project: UPRR GRADE SEPARATION
Boring No.: B-6 S-7
Sample No.: S-7
Test No.: 10.4 PSI

Location: LITTLE ROCK, AR
Tested By: BCM
Test Date: 8/20/19
Sample Type: 3" ST

Project No.: 35185112
Checked By: WPQ
Depth: 13.5'-15.5'
Elevation: ----



Soil Description: GRAY AND RUST BROWN LEAN CLAY WITH SAND. NUMEROUS SILT SEAMS NOTED
Remarks: FAILURE CRITERIA = MAXIMUM DEVIATOR STRESS TEST PERFORMED AS PER ASTM D2850.

Specimen Height: 6.08 in
Specimen Area: 6.40 in²
Specimen Volume: 38.91 in³

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

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

Liquid Limit: 40

Plastic Limit: 14

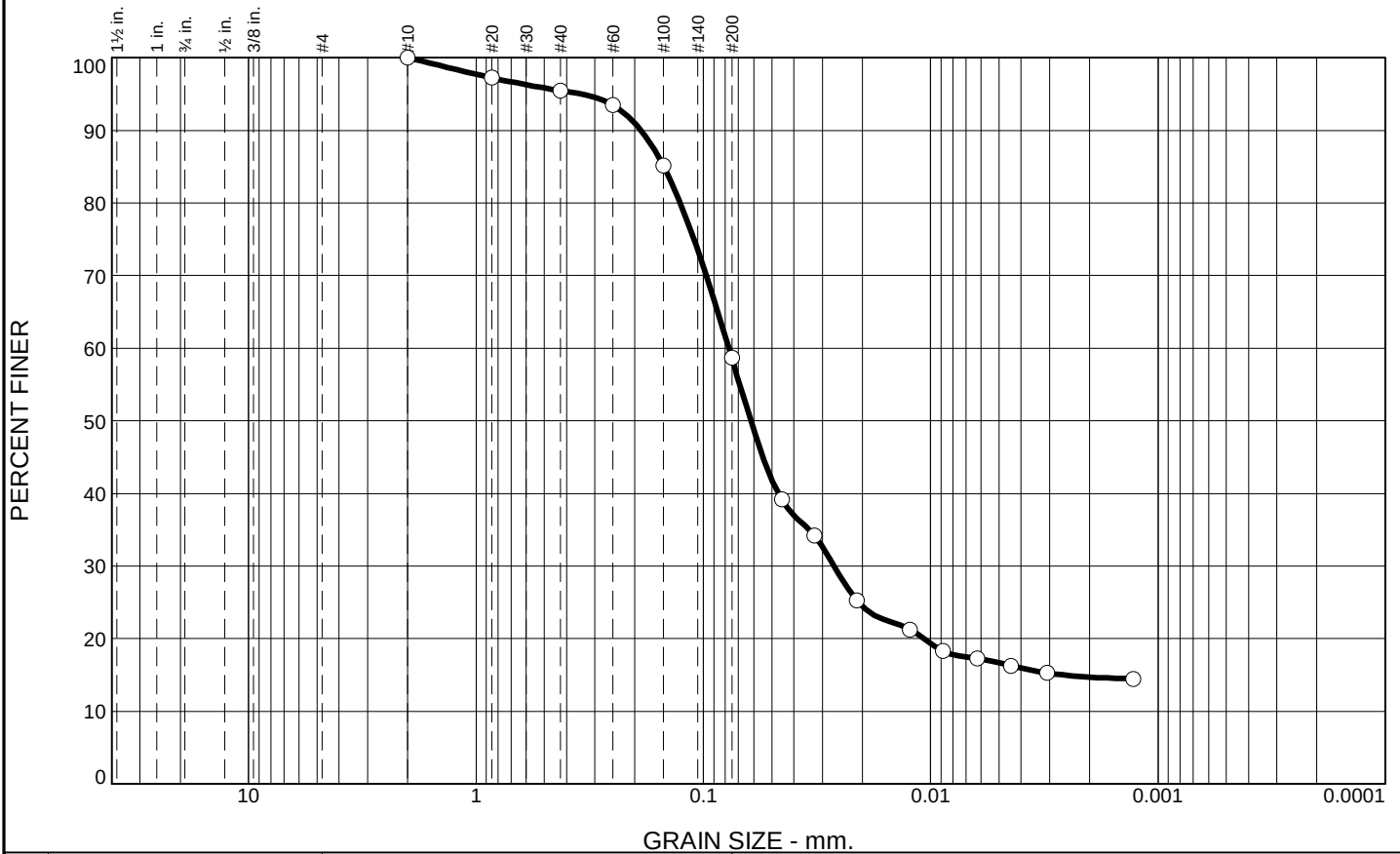
Estimated Specific Gravity: 2.72

	Time min	Vertical Strain %	Corrected Area in ²	Deviator Load lb	Deviator Stress tsf	Vertical Stress tsf	p tsf	q tsf
1	0	0	6.4023	0	0	0.7488	0.7488	0
2	0.1016	0.060169	6.4062	12.238	0.13754	0.88634	0.81757	0.068772
3	0.25215	0.20758	6.4156	36.986	0.41508	1.1639	0.95634	0.20754
4	0.50008	0.45428	6.4315	59.15	0.66218	1.411	1.0799	0.33109
5	0.75245	0.70849	6.448	77.507	0.86546	1.6143	1.1815	0.43273
6	1.0003	0.95218	6.4639	93.009	1.036	1.7848	1.2668	0.518
7	1.2524	1.2019	6.4802	107.42	1.1935	1.9423	1.3456	0.59677
8	1.5004	1.4531	6.4967	120.34	1.3337	2.0825	1.4156	0.66684
9	1.7527	1.7073	6.5135	131.76	1.4565	2.2053	1.477	0.72825
10	2.0006	1.9585	6.5302	141.14	1.5562	2.305	1.5269	0.77811
11	2.253	2.2172	6.5475	149.58	1.6448	2.3936	1.5712	0.82241
12	2.5009	2.4684	6.5644	156.78	1.7196	2.4684	1.6086	0.85982
13	2.7532	2.7287	6.5819	163.45	1.7879	2.5367	1.6428	0.89397
14	3.0012	2.9784	6.5989	169.16	1.8457	2.5945	1.6716	0.92283
15	3.2535	3.2326	6.6162	174.32	1.8971	2.6459	1.6973	0.94853
16	3.5014	3.4838	6.6334	178.95	1.9423	2.6911	1.72	0.97116
17	3.7538	3.738	6.6509	183.57	1.9872	2.736	1.7424	0.99362
18	4.0017	3.9922	6.6686	187.65	2.026	2.7748	1.7618	1.013
19	4.2541	4.2479	6.6864	191.05	2.0572	2.806	1.7774	1.0286
20	4.5019	4.5037	6.7043	194.04	2.0839	2.8327	1.7907	1.0419
21	4.7543	4.7654	6.7227	196.76	2.1073	2.8561	1.8024	1.0536
22	5.0022	5.0181	6.7406	199.21	2.1278	2.8766	1.8127	1.0639
23	5.2501	5.2708	6.7586	201.11	2.1425	2.8913	1.82	1.0712
24	5.5025	5.5311	6.7772	203.01	2.1568	2.9056	1.8272	1.0784
25	5.7504	5.7793	6.795	204.65	2.1684	2.9172	1.833	1.0842
26	6.0027	6.038	6.8137	206.01	2.1768	2.9256	1.8372	1.0884
27	6.2507	6.2892	6.832	207.23	2.1839	2.9327	1.8408	1.092
28	6.503	6.5464	6.8508	208.32	2.1894	2.9382	1.8435	1.0947
29	6.7509	6.8036	6.8697	209.13	2.1919	2.9407	1.8447	1.0959
30	7.0033	7.0624	6.8888	210.22	2.1972	2.946	1.8474	1.0986
31	7.2512	7.3196	6.908	211.04	2.1996	2.9484	1.8486	1.0998
32	7.5035	7.5768	6.9272	211.99	2.2034	2.9522	1.8505	1.1017
33	7.7512	7.8265	6.946	212.4	2.2017	2.9505	1.8496	1.1008
34	8.0033	8.0822	6.9653	213.35	2.2054	2.9542	1.8515	1.1027
35	8.2512	8.3304	6.9841	214.03	2.2064	2.9552	1.852	1.1032
36	8.5035	8.5846	7.0036	214.84	2.2087	2.9575	1.8532	1.1044
37	8.7515	8.8374	7.023	215.25	2.2068	2.9556	1.8522	1.1034
38	9.0036	9.0916	7.0426	215.93	2.2076	2.9564	1.8526	1.1038
39	9.2515	9.3488	7.0626	216.61	2.2083	2.9571	1.8529	1.1041
40	9.5038	9.615	7.0834	217.16	2.2073	2.9561	1.8525	1.1037
41	9.7517	9.8677	7.1033	218.11	2.2108	2.9596	1.8542	1.1054
42	10.004	10.129	7.1239	218.65	2.2099	2.9587	1.8537	1.1049
43	10.252	10.381	7.1439	219.2	2.2092	2.958	1.8534	1.1046
44	10.504	10.633	7.1641	219.74	2.2084	2.9572	1.853	1.1042
45	10.752	10.885	7.1843	220.42	2.209	2.9578	1.8533	1.1045
46	11.004	11.139	7.2049	220.96	2.2081	2.9569	1.8529	1.1041
47	11.252	11.389	7.2252	221.51	2.2074	2.9562	1.8525	1.1037
48	11.504	11.652	7.2467	221.92	2.2049	2.9537	1.8512	1.1024
49	11.752	11.907	7.2677	222.6	2.2052	2.954	1.8514	1.1026
50	12	12.165	7.289	223.41	2.2068	2.9556	1.8522	1.1034
51	12.252	12.422	7.3104	224.36	2.2097	2.9585	1.8537	1.1049
52	12.5	12.673	7.3315	224.91	2.2087	2.9575	1.8532	1.1044
53	12.753	12.929	7.353	225.45	2.2076	2.9564	1.8526	1.1038
54	13	13.176	7.3739	226.27	2.2093	2.9581	1.8535	1.1047
55	13.253	13.43	7.3955	227.08	2.2108	2.9596	1.8542	1.1054
56	13.5	13.684	7.4173	228.03	2.2135	2.9623	1.8556	1.1068
57	13.753	13.941	7.4395	228.31	2.2096	2.9584	1.8536	1.1048
58	14.001	14.194	7.4614	228.85	2.2083	2.9571	1.853	1.1042
59	14.253	14.459	7.4845	229.67	2.2094	2.9582	1.8535	1.1047
60	14.501	14.711	7.5067	230.48	2.2107	2.9595	1.8541	1.1053
61	14.753	14.969	7.5294	231.43	2.2131	2.9619	1.8554	1.1066
62	15	15.218	7.5515	231.98	2.2118	2.9606	1.8547	1.1059

Particle Size Analysis of Soils

ASTM D422

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



%+3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	4.5	36.8	42.0	16.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	97.2		
#40	95.5		
#60	93.5		
#100	85.1		
#200	58.7		
0.0452 mm.	39.1		
0.0325 mm.	34.2		
0.0211 mm.	25.2		
0.0124 mm.	21.3		
0.0088 mm.	18.3		
0.0063 mm.	17.3		
0.0044 mm.	16.3		
0.0031 mm.	15.3		
0.0013 mm.	14.5		

* (no specification provided)

<u>Soil Description</u>		
BROWN AND GRAY MOTTLED SANDY SILTY CLAY		
<u>Atterberg Limits</u>		
PL= 17	LL= 22	PI= 5
<u>Coefficients</u>		
D ₉₀ = 0.1882	D ₈₅ = 0.1492	D ₆₀ = 0.0772
D ₅₀ = 0.0619	D ₃₀ = 0.0266	D ₁₅ = 0.0026
D ₁₀ =	C _u =	C _c =
<u>Classification</u>		
USCS= CL-ML	AASHTO= A-4(0)	
<u>Remarks</u>		
F.M.=0.26		

Source of Sample: B-1
Sample Number: S-5

Depth: 8.5'-10.5'

Date: 8-14-19

Terracon

Client: MICHAEL BAKER INTERNATIONAL LLC
Project: UPRR GRADE SEPARATION

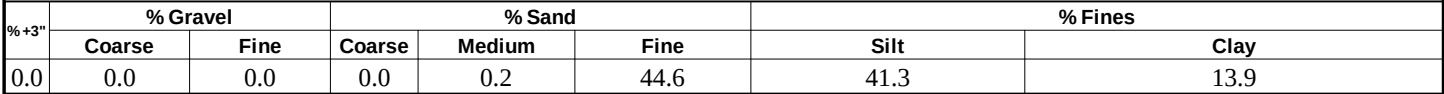
Project No: 35185112

Figure

Tested By: SJH

Checked By: WPQ

PERCENT FINER

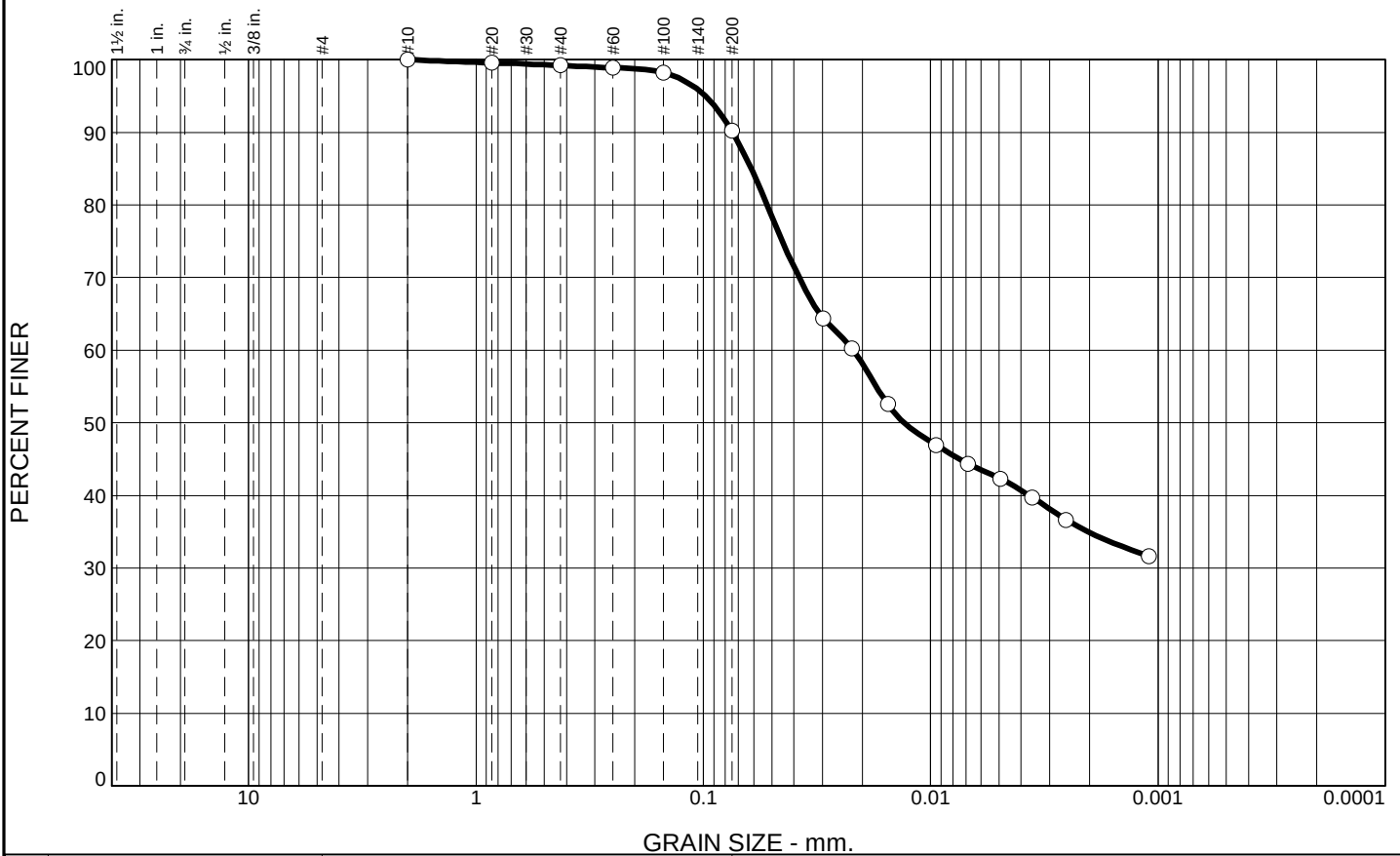


<u>Soil Description</u>		
BROWN AND GRAY SANDY SILT		
<u>Atterberg Limits</u>		
PL= 18	LL= 20	PI= 2
<u>Coefficients</u>		
D ₉₀ = 0.1632	D ₈₅ = 0.1427	D ₆₀ = 0.0837
D ₅₀ = 0.0654	D ₃₀ = 0.0305	D ₁₅ = 0.0074
D ₁₀ =	C _u =	C _c =
<u>Classification</u>		
USCS= ML	AASHTO= A-4(0)	
<u>Remarks</u>		
F.M.=0.14		

Terracon

Tested By: SJH **Checked By:** WPO

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



%+3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.8	9.0	47.8	42.4

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.6		
#40	99.2		
#60	98.9		
#100	98.2		
#200	90.2		
0.0296 mm.	64.4		
0.0222 mm.	60.3		
0.0154 mm.	52.6		
0.0095 mm.	46.9		
0.0069 mm.	44.4		
0.0049 mm.	42.3		
0.0036 mm.	39.7		
0.0025 mm.	36.6		
0.0011 mm.	31.6		

* (no specification provided)

<u>Soil Description</u>		
GRAY AND DARK GRAY LEAN CLAY		
<u>Atterberg Limits</u>		
PL= 20	LL= 33	PI= 13
<u>Coefficients</u>		
D ₉₀ = 0.0743	D ₈₅ = 0.0617	D ₆₀ = 0.0219
D ₅₀ = 0.0131	D ₃₀ =	D ₁₅ =
D ₁₀ =	C _u =	C _c =
<u>Classification</u>		
USCS= CL	AASHTO= A-6(11)	
<u>Remarks</u>		
F.M.=0.04		

Source of Sample: B-1 Depth: 28.5'-30.5'
Sample Number: S-9

Date: 8-14-19

Terracon

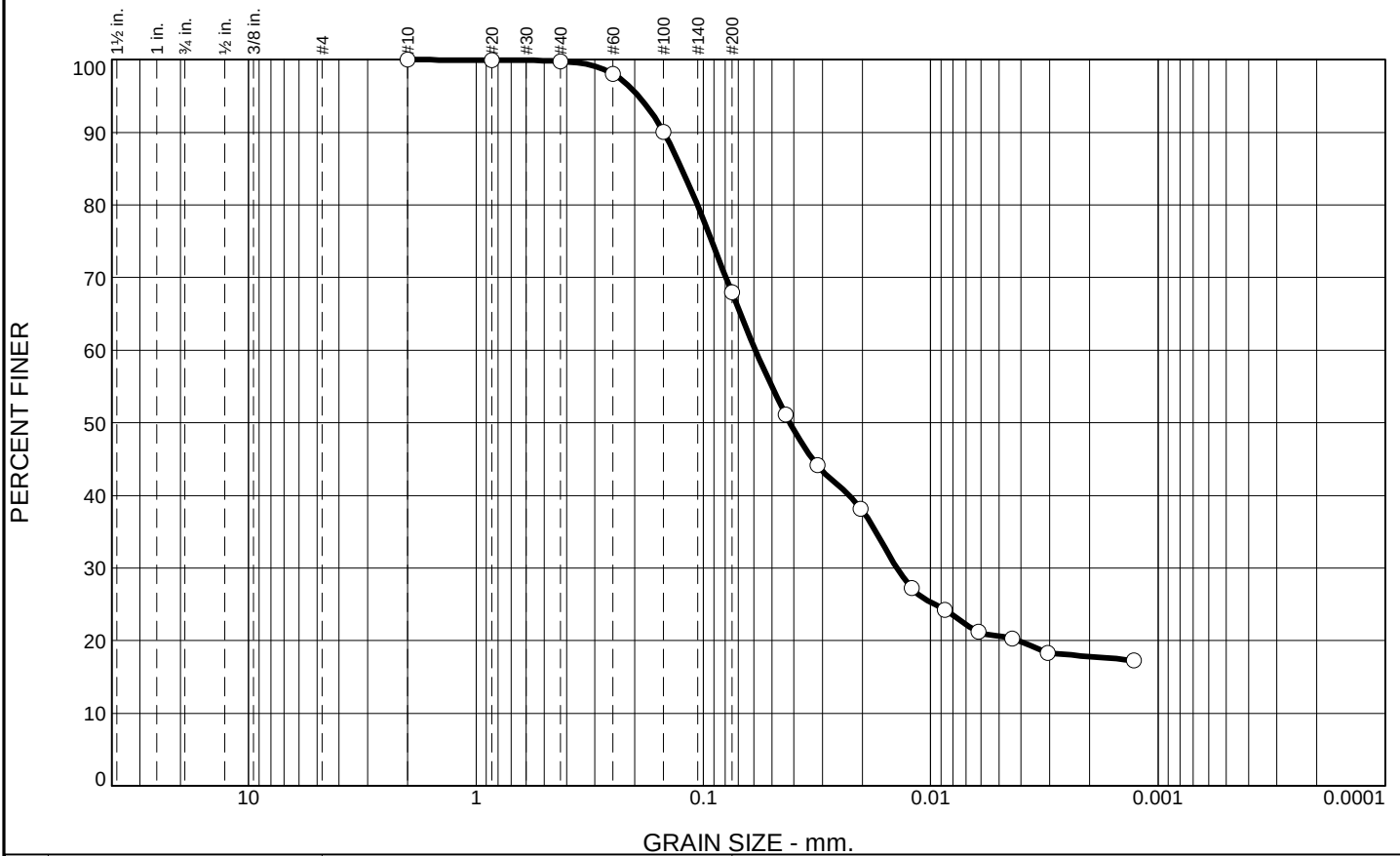
Client: MICHAEL BAKER INTERNATIONAL LLC
Project: UPRR GRADE SEPARATION

Project No: 35185112

Figure

Tested By: SJH Checked By: WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



%+3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.2	31.8	47.4	20.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.9		
#40	99.8		
#60	98.0		
#100	90.1		
#200	68.0		
0.0434 mm.	51.1		
0.0315 mm.	44.1		
0.0203 mm.	38.2		
0.0121 mm.	27.2		
0.0087 mm.	24.3		
0.0062 mm.	21.3		
0.0044 mm.	20.3		
0.0031 mm.	18.3		
0.0013 mm.	17.3		

* (no specification provided)

<u>Soil Description</u>		
BROWN AND GRAY MOTTLED SANDY SILTY CLAY		
<u>Atterberg Limits</u>		
PL= 16	LL= 22	PI= 6
<u>Coefficients</u>		
D ₉₀ = 0.1496	D ₈₅ = 0.1246	D ₆₀ = 0.0589
D ₅₀ = 0.0416	D ₃₀ = 0.0141	D ₁₅ =
D ₁₀ =	C _u =	C _c =
<u>Classification</u>		
USCS= CL-ML	AASHTO= A-4(2)	
<u>Remarks</u>		
F.M.=0.11		

Source of Sample: B-2
Sample Number: S-3

Depth: 3.5'-5.5'

Date: 8-14-19

Terracon

Client: MICHAEL BAKER INTERNATIONAL LLC

Project: UPRR GRADE SEPARATION

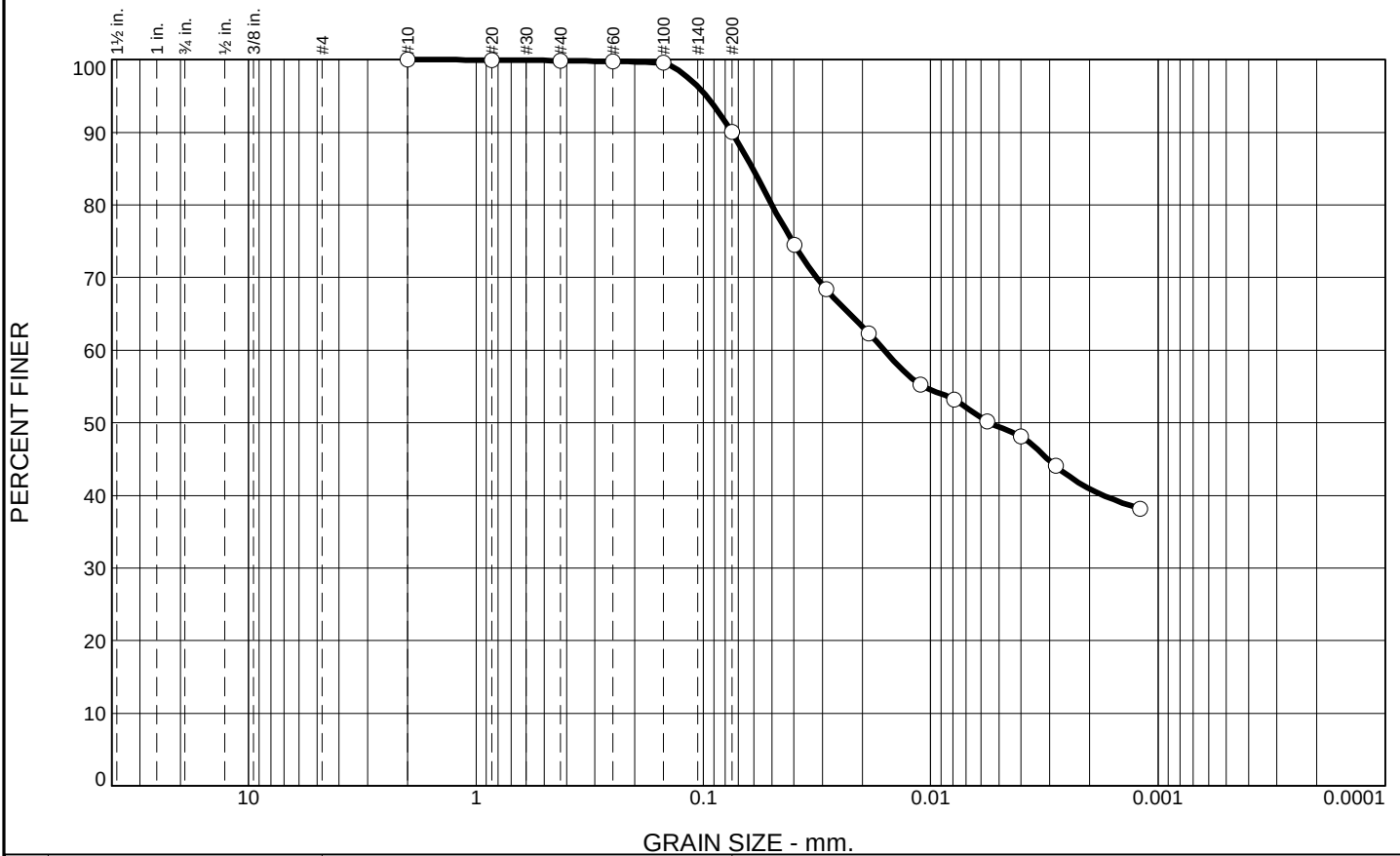
Project No: 35185112

Figure

Tested By: SJH

Checked By: WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



%+3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.2	9.8	40.6	49.4

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	100.0		
#40	99.8		
#60	99.8		
#100	99.6		
#200	90.0		
0.0398 mm.	74.5		
0.0289 mm.	68.4		
0.0187 mm.	62.3		
0.0111 mm.	55.2		
0.0079 mm.	53.2		
0.0056 mm.	50.1		
0.0040 mm.	48.1		
0.0028 mm.	44.1		
0.0012 mm.	38.1		

* (no specification provided)

<u>Soil Description</u>		
GRAY AND DARK GRAY - NUMEROUS SAND SEAMS NOTED		
<u>Atterberg Limits</u>		
PL= 14	LL= 33	PI= 19
<u>Coefficients</u>		
D ₉₀ = 0.0749	D ₈₅ = 0.0608	D ₆₀ = 0.0160
D ₅₀ = 0.0055	D ₃₀ =	D ₁₅ =
D ₁₀ =	C _u =	C _c =
<u>Classification</u>		
USCS= CL	AASHTO= A-6(16)	
<u>Remarks</u>		
F.M.=0.01		

Source of Sample: B-2 Depth: 28.5'-30.5'
Sample Number: S-10

Date: 8-14-19

Terracon

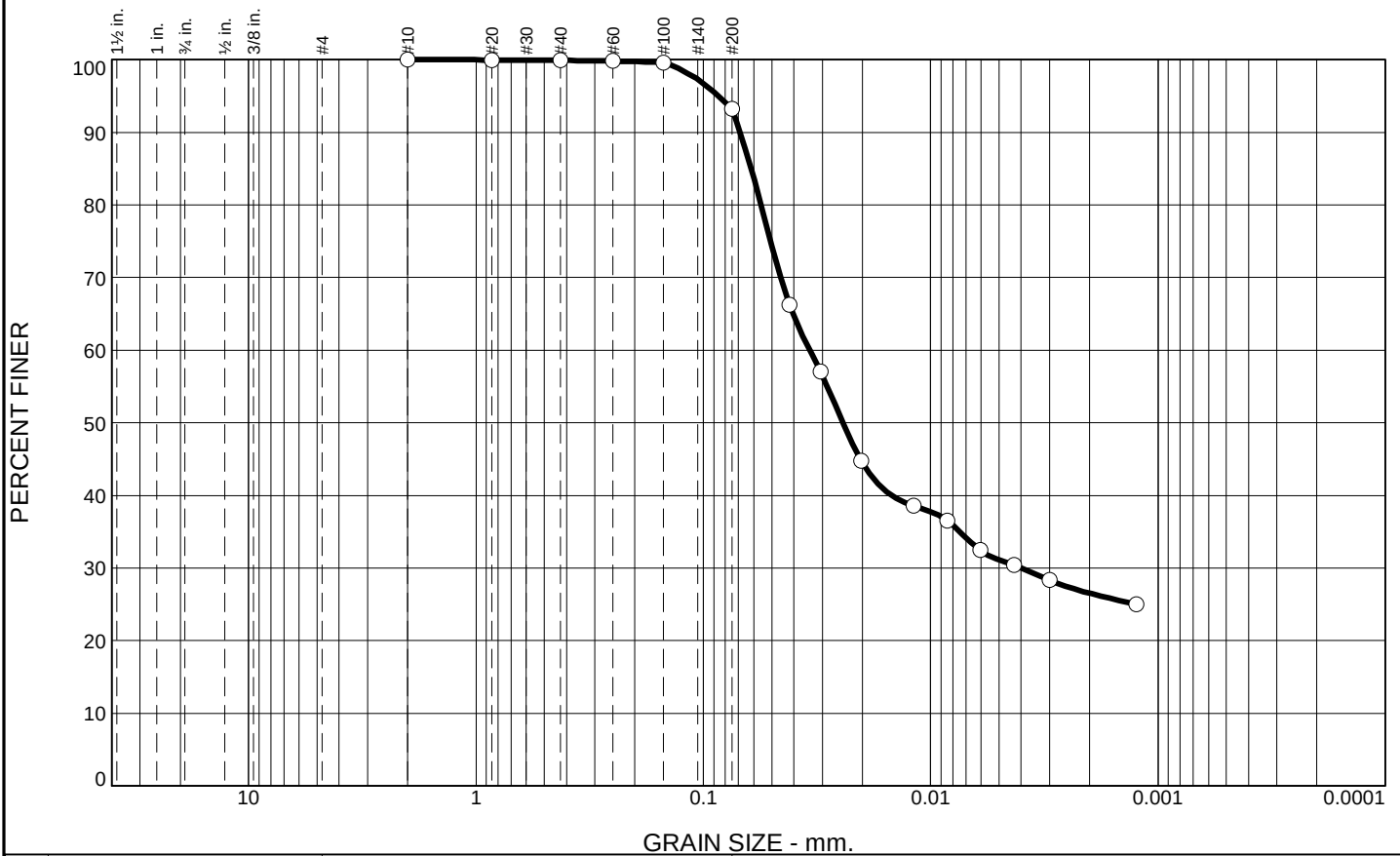
Client: MICHAEL BAKER INTERNATIONAL LLC
Project: UPRR GRADE SEPARATION

Project No: 35185112

Figure

Tested By: SJH Checked By: WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



%+3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.1	6.7	62.1	31.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	100.0		
#40	99.9		
#60	99.8		
#100	99.6		
#200	93.2		
0.0417 mm.	66.3		
0.0305 mm.	57.0		
0.0202 mm.	44.7		
0.0119 mm.	38.6		
0.0085 mm.	36.5		
0.0061 mm.	32.4		
0.0043 mm.	30.4		
0.0030 mm.	28.3		
0.0012 mm.	25.0		

* (no specification provided)

<u>Soil Description</u>		
BROWN AND GRAY LEAN CLAY - SAND AND SILT SEAMS NOTED		
<u>Atterberg Limits</u>		
PL= 13	LL= 39	PI= 26
<u>Coefficients</u>		
D ₉₀ = 0.0689	D ₈₅ = 0.0617	D ₆₀ = 0.0340
D ₅₀ = 0.0243	D ₃₀ = 0.0040	D ₁₅ =
D ₁₀ =	C _u =	C _c =
<u>Classification</u>		
USCS= CL	AASHTO= A-6(24)	
<u>Remarks</u>		
F.M.=0.01		

Source of Sample: B-2
Sample Number: S-15

Depth: 58.5'-60.0'

Date: 8-7-19

Terracon

Client: MICHAEL BAKER INTERNATIONAL LLC
Project: UPRR GRADE SEPARATION

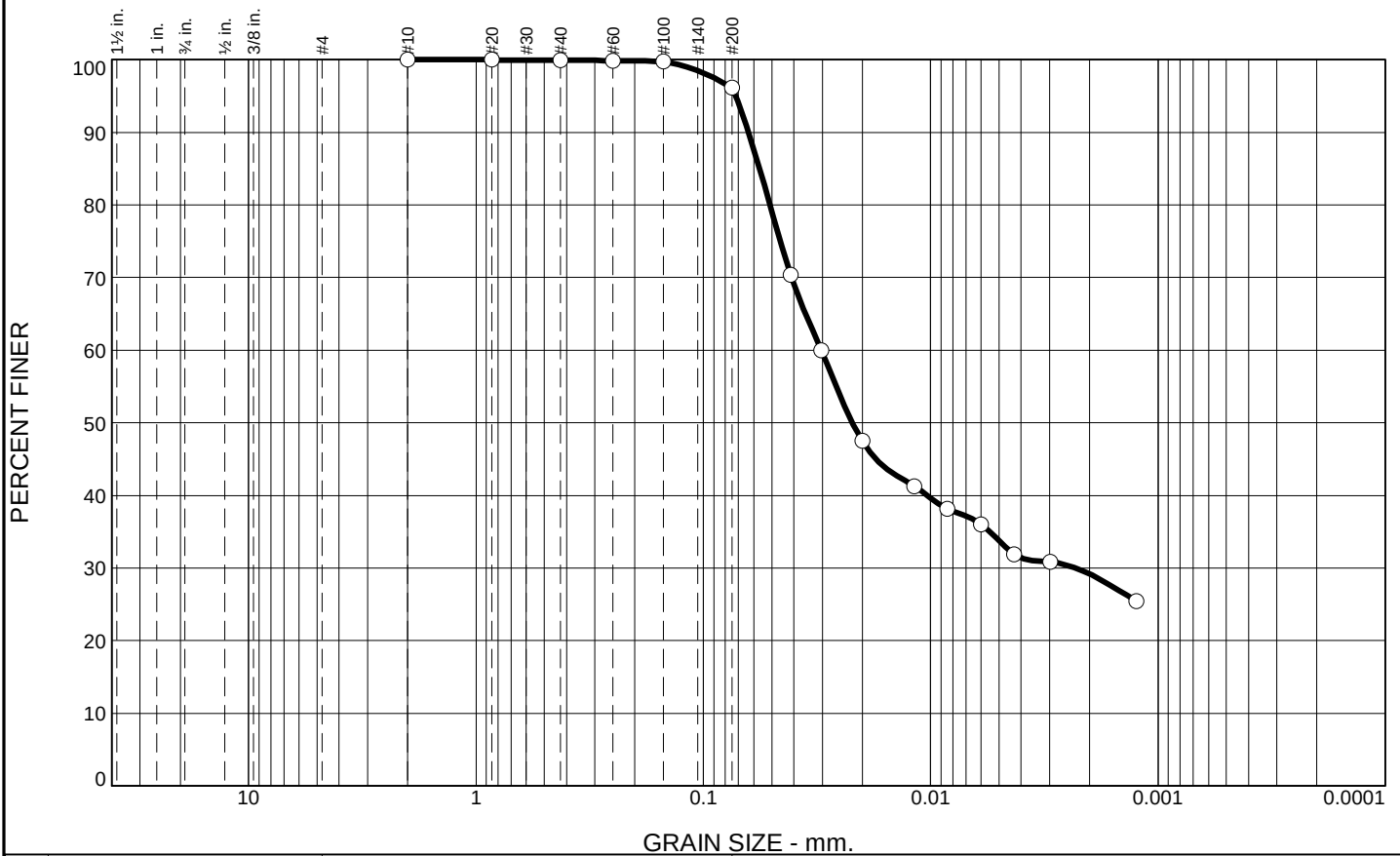
Project No: 35185112

Figure

Tested By: SJH

Checked By: WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



%+3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.1	3.7	62.5	33.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	100.0		
#40	99.9		
#60	99.9		
#100	99.8		
#200	96.2		
0.0412 mm.	70.3		
0.0303 mm.	60.0		
0.0200 mm.	47.5		
0.0118 mm.	41.2		
0.0084 mm.	38.1		
0.0060 mm.	36.0		
0.0043 mm.	31.9		
0.0030 mm.	30.8		
0.0012 mm.	25.4		

* (no specification provided)

Soil Description GRAY AND BROWN LEAN CLAY - SAND AND SILT SEAMS NOTED		
PL= 13	Atterberg Limits LL= 44	PI= 31
D ₉₀ = 0.0632 D ₅₀ = 0.0221 D ₁₀ =	Coefficients D ₈₅ = 0.0566 D ₃₀ = 0.0023 C _u =	D ₆₀ = 0.0303 D ₁₅ = C _c =
USCS= CL	Classification AASHTO= A-7-6(30)	
F.M.=0.00	Remarks	

Source of Sample: B-3
Sample Number: S-10

Depth: 33.5'-35.0'

Date: 8-6-19

Terracon

Client: MICHAEL BAKER INTERNATIONAL LLC
Project: UPRR GRADE SEPARATION

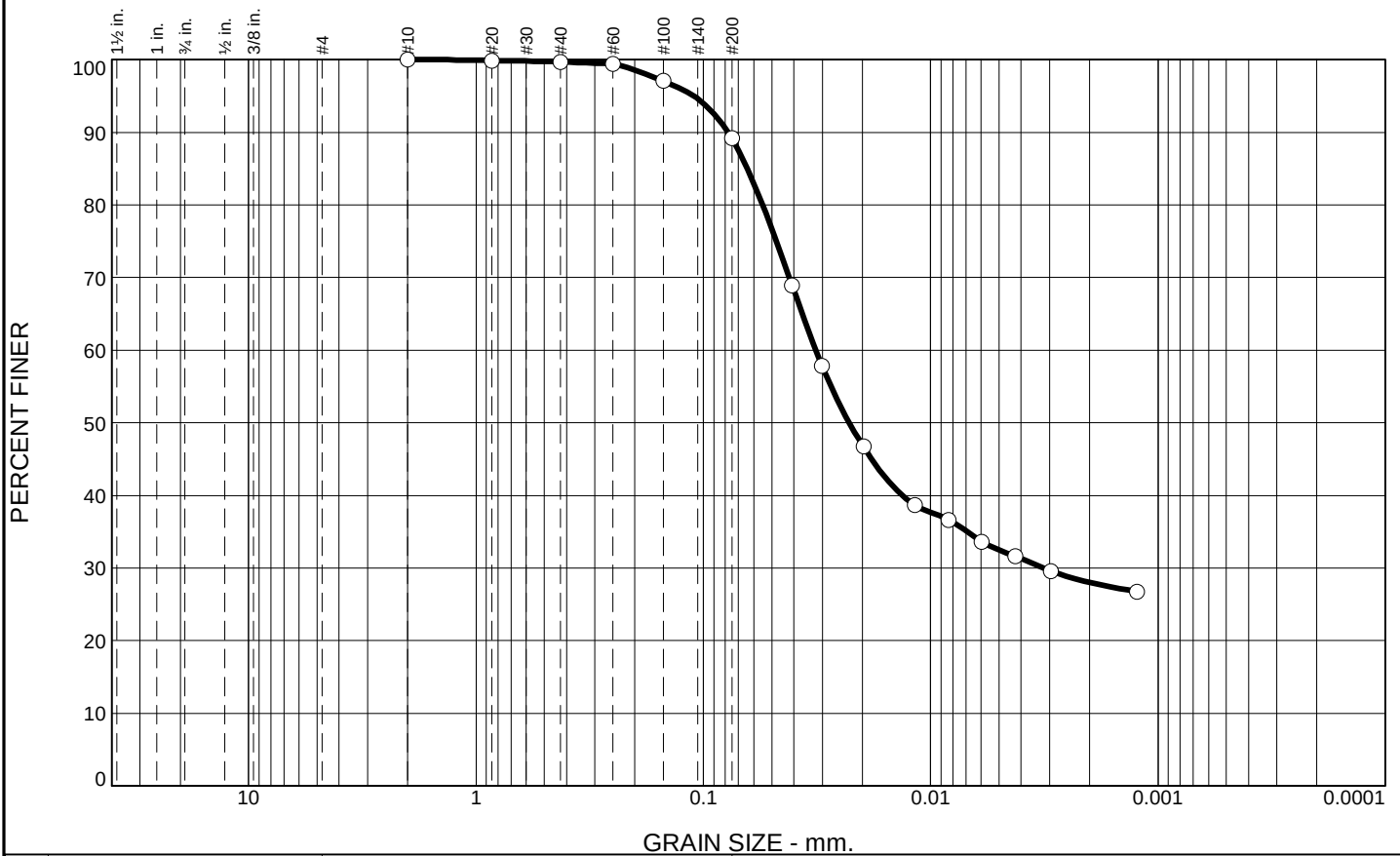
Project No: 35185112

Figure

Tested By: SJH

Checked By: WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



%+3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.3	10.5	56.7	32.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.9		
#40	99.7		
#60	99.4		
#100	97.1		
#200	89.2		
0.0407 mm.	68.9		
0.0300 mm.	57.8		
0.0198 mm.	46.7		
0.0117 mm.	38.7		
0.0083 mm.	36.6		
0.0060 mm.	33.6		
0.0042 mm.	31.6		
0.0030 mm.	29.6		
0.0012 mm.	26.7		

* (no specification provided)

<u>Soil Description</u>		
DARK BROWN AND DARK GRAY - NUMEROUS SAND SEAMS NOTED		
<u>Atterberg Limits</u>		
PL= 16	LL= 31	PI= 15
<u>Coefficients</u>		
D ₉₀ = 0.0779	D ₈₅ = 0.0641	D ₆₀ = 0.0320
D ₅₀ = 0.0228	D ₃₀ = 0.0032	D ₁₅ =
D ₁₀ =	C _u =	C _c =
<u>Classification</u>		
USCS= CL	AASHTO= A-6(12)	
<u>Remarks</u>		
F.M.=0.04		

Source of Sample: B-4
Sample Number: S-7

Depth: 18.5'-20.5'

Date: 8-14-19

Terracon

Client: MICHAEL BAKER INTERNATIONAL LLC
Project: UPRR GRADE SEPARATION

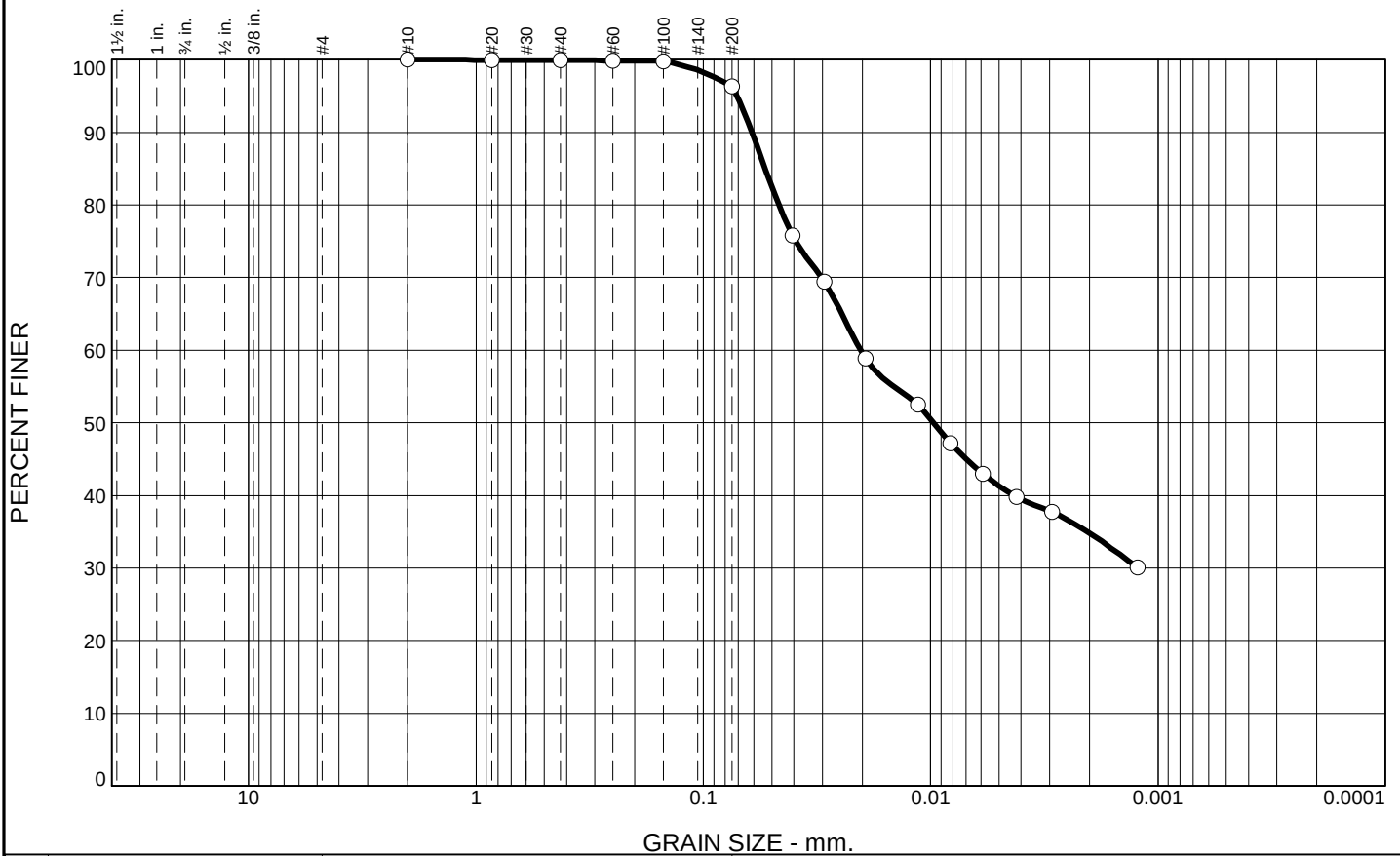
Project No: 35185112

Figure

Tested By: SJH

Checked By: WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



%+3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.1	3.6	55.0	41.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	100.0		
#40	99.9		
#60	99.9		
#100	99.8		
#200	96.3		
0.0405 mm.	75.8		
0.0294 mm.	69.4		
0.0193 mm.	58.8		
0.0114 mm.	52.5		
0.0082 mm.	47.2		
0.0059 mm.	43.0		
0.0042 mm.	39.8		
0.0029 mm.	37.7		
0.0012 mm.	30.1		

* (no specification provided)

<u>Soil Description</u>		
GRAY AND BROWN FAT CLAY - SAND AND SILT SEAMS NOTED		
<u>Atterberg Limits</u>		
PL= 14	LL= 50	PI= 36
<u>Coefficients</u>		
D ₉₀ = 0.0611	D ₈₅ = 0.0534	D ₆₀ = 0.0204
D ₅₀ = 0.0097	D ₃₀ =	D ₁₅ =
D ₁₀ =	C _u =	C _c =
<u>Classification</u>		
USCS= CH	AASHTO= A-7-6(36)	
<u>Remarks</u>		
F.M.=0.00		

Source of Sample: B-4 Depth: 38.5'-40.0'
Sample Number: S-11

Date: 8-6-19

Terracon

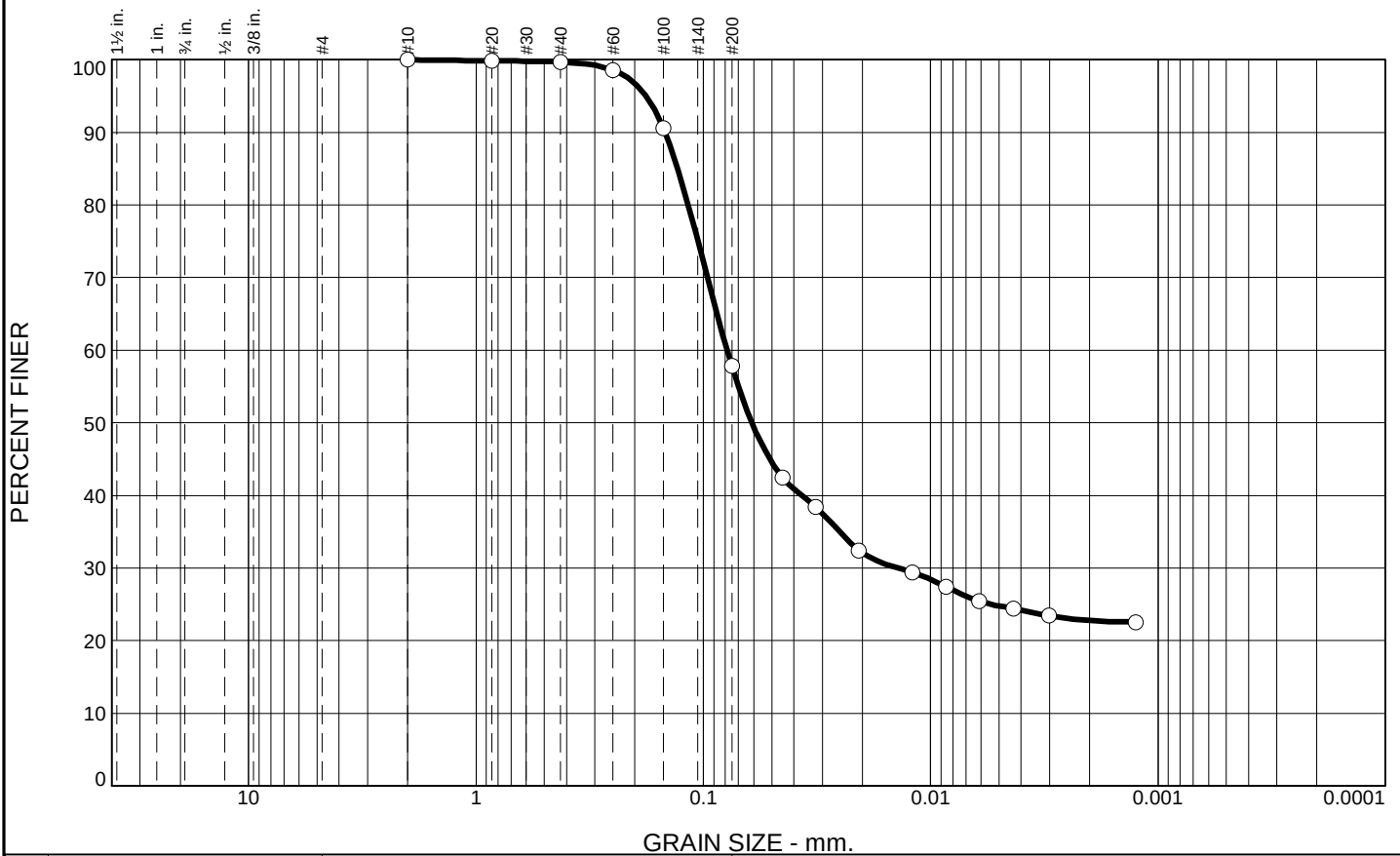
Client: MICHAEL BAKER INTERNATIONAL LLC
Project: UPRR GRADE SEPARATION

Project No: 35185112

Figure

Tested By: SJH Checked By: WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



%+3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.3	41.9	33.0	24.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.8		
#40	99.7		
#60	98.5		
#100	90.6		
#200	57.8		
0.0448 mm.	42.5		
0.0321 mm.	38.4		
0.0207 mm.	32.4		
0.0121 mm.	29.4		
0.0086 mm.	27.4		
0.0061 mm.	25.4		
0.0043 mm.	24.4		
0.0030 mm.	23.4		
0.0013 mm.	22.5		

* (no specification provided)

<u>Soil Description</u>		
BROWN AND BROWNISH GRAY MOTTLED		
<u>Atterberg Limits</u>		
PL= 16	LL= 30	PI= 14
<u>Coefficients</u>		
D ₉₀ = 0.1474	D ₈₅ = 0.1298	D ₆₀ = 0.0786
D ₅₀ = 0.0611	D ₃₀ = 0.0139	D ₁₅ =
D ₁₀ =	C _u =	C _c =
<u>Classification</u>		
USCS= CL	AASHTO= A-6(5)	
<u>Remarks</u>		
F.M.=0.11		

Source of Sample: B-5
Sample Number: S-3

Depth: 3.5'-5.5'

Date: 8-14-19

Terracon

Client: MICHAEL BAKER INTERNATIONAL LLC
Project: UPRR GRADE SEPARATION

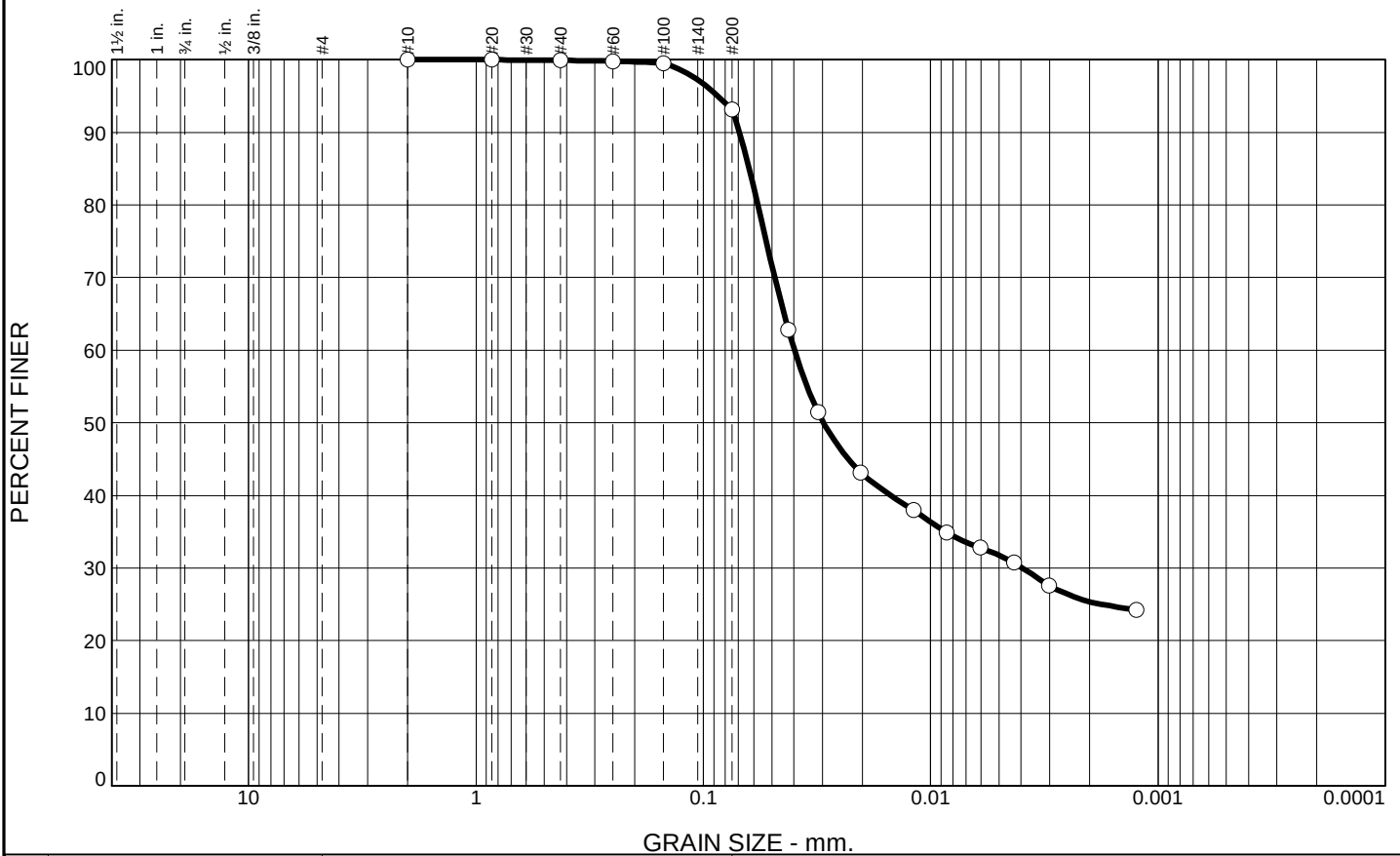
Project No: 35185112

Figure

Tested By: SJH

Checked By: WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



%+3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.1	6.7	61.5	31.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	100.0		
#40	99.9		
#60	99.8		
#100	99.5		
#200	93.2		
0.0424 mm.	62.8		
0.0312 mm.	51.4		
0.0203 mm.	43.2		
0.0119 mm.	38.0		
0.0085 mm.	34.9		
0.0061 mm.	32.8		
0.0043 mm.	30.7		
0.0030 mm.	27.6		
0.0012 mm.	24.3		

* (no specification provided)

<u>Soil Description</u>		
DARK GRAY LEAN CLAY		
<u>Atterberg Limits</u>		
PL= 13	LL= 38	PI= 25
<u>Coefficients</u>		
D ₉₀ = 0.0695	D ₈₅ = 0.0629	D ₆₀ = 0.0398
D ₅₀ = 0.0296	D ₃₀ = 0.0039	D ₁₅ =
D ₁₀ =	C _u =	C _c =
<u>Classification</u>		
USCS= CL	AASHTO= A-6(23)	
<u>Remarks</u>		
F.M.=0.01		

Source of Sample: B-5 Depth: 33.5'-35.0'
Sample Number: S-10

Date: 8-6-19

Terracon

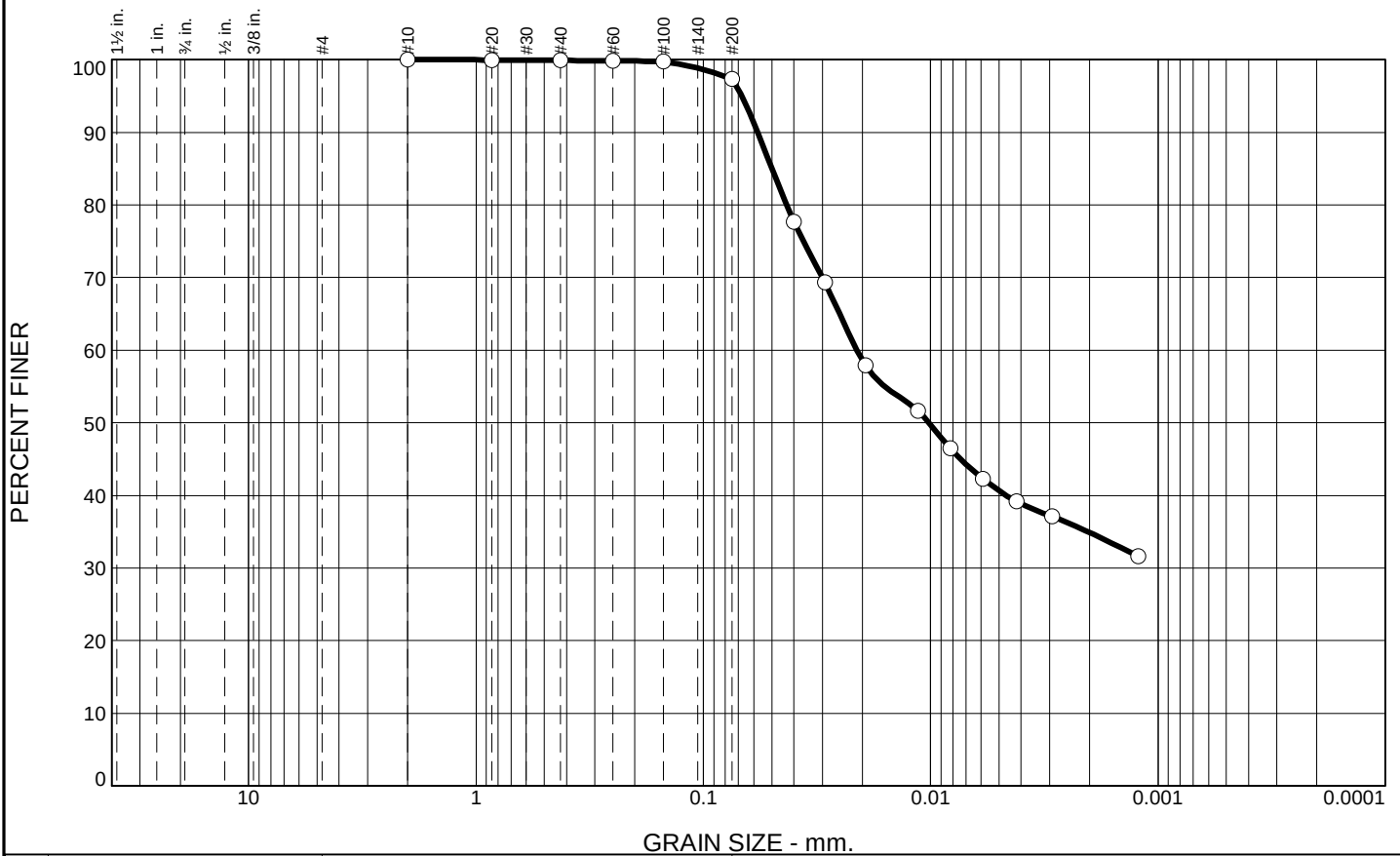
Client: MICHAEL BAKER INTERNATIONAL LLC
Project: UPRR GRADE SEPARATION

Project No: 35185112

Figure

Tested By: SJH Checked By: WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



%+3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.1	2.6	56.6	40.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	100.0		
#40	99.9		
#60	99.9		
#100	99.7		
#200	97.3		
0.0400 mm.	77.7		
0.0292 mm.	69.3		
0.0193 mm.	57.9		
0.0114 mm.	51.7		
0.0082 mm.	46.5		
0.0059 mm.	42.3		
0.0042 mm.	39.2		
0.0029 mm.	37.1		
0.0012 mm.	31.7		

* (no specification provided)

<u>Soil Description</u>		
BROWN AND GRAY LEAN CLAY - ORGANICS NOTED		
<u>Atterberg Limits</u>		
PL= 13	LL= 44	PI= 31
<u>Coefficients</u>		
D ₉₀ = 0.0576	D ₈₅ = 0.0499	D ₆₀ = 0.0211
D ₅₀ = 0.0102	D ₃₀ =	D ₁₅ =
D ₁₀ =	C _u =	C _c =
<u>Classification</u>		
USCS= CL	AASHTO= A-7-6(31)	
<u>Remarks</u>		
F.M.=0.00		

Source of Sample: B-5 Depth: 43.5'-45.0'
Sample Number: S-12

Date: 8-6-19

Terracon

Client: MICHAEL BAKER INTERNATIONAL LLC
Project: UPRR GRADE SEPARATION

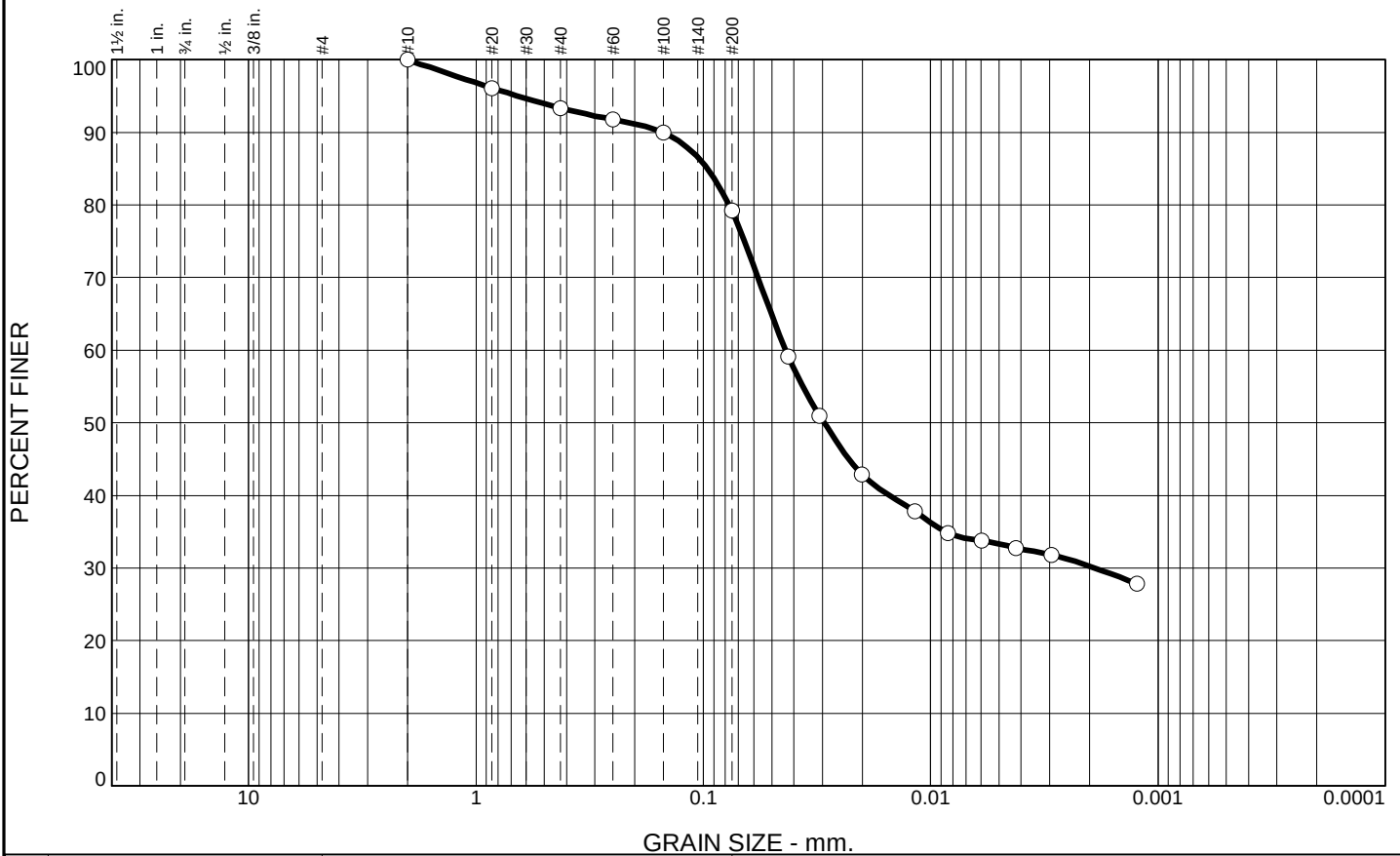
Project No: 35185112

Figure

Tested By: SJH

Checked By: WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



%+3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	6.7	14.1	45.9	33.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	96.1		
#40	93.3		
#60	91.8		
#100	89.9		
#200	79.2		
0.0423 mm.	59.1		
0.0308 mm.	51.0		
0.0200 mm.	42.9		
0.0118 mm.	37.8		
0.0084 mm.	34.8		
0.0060 mm.	33.8		
0.0042 mm.	32.8		
0.0029 mm.	31.8		
0.0012 mm.	27.8		

* (no specification provided)

<u>Soil Description</u>		
GRAY AND RUST BROWN LEAN CLAY WITH SAND - SILT SEAMS NOTED		
<u>Atterberg Limits</u>		
PL= 14	LL= 40	PI= 26
<u>Coefficients</u>		
D ₉₀ = 0.1514	D ₈₅ = 0.0960	D ₆₀ = 0.0435
D ₅₀ = 0.0294	D ₃₀ = 0.0019	D ₁₅ =
D ₁₀ =	C _u =	C _c =
<u>Classification</u>		
USCS= CL	AASHTO= A-6(19)	
<u>Remarks</u>		
F.M.=0.26		

Source of Sample: B-6 Depth: 13.5'-15.5'
Sample Number: S-7

Date: 8-14-19

Terracon

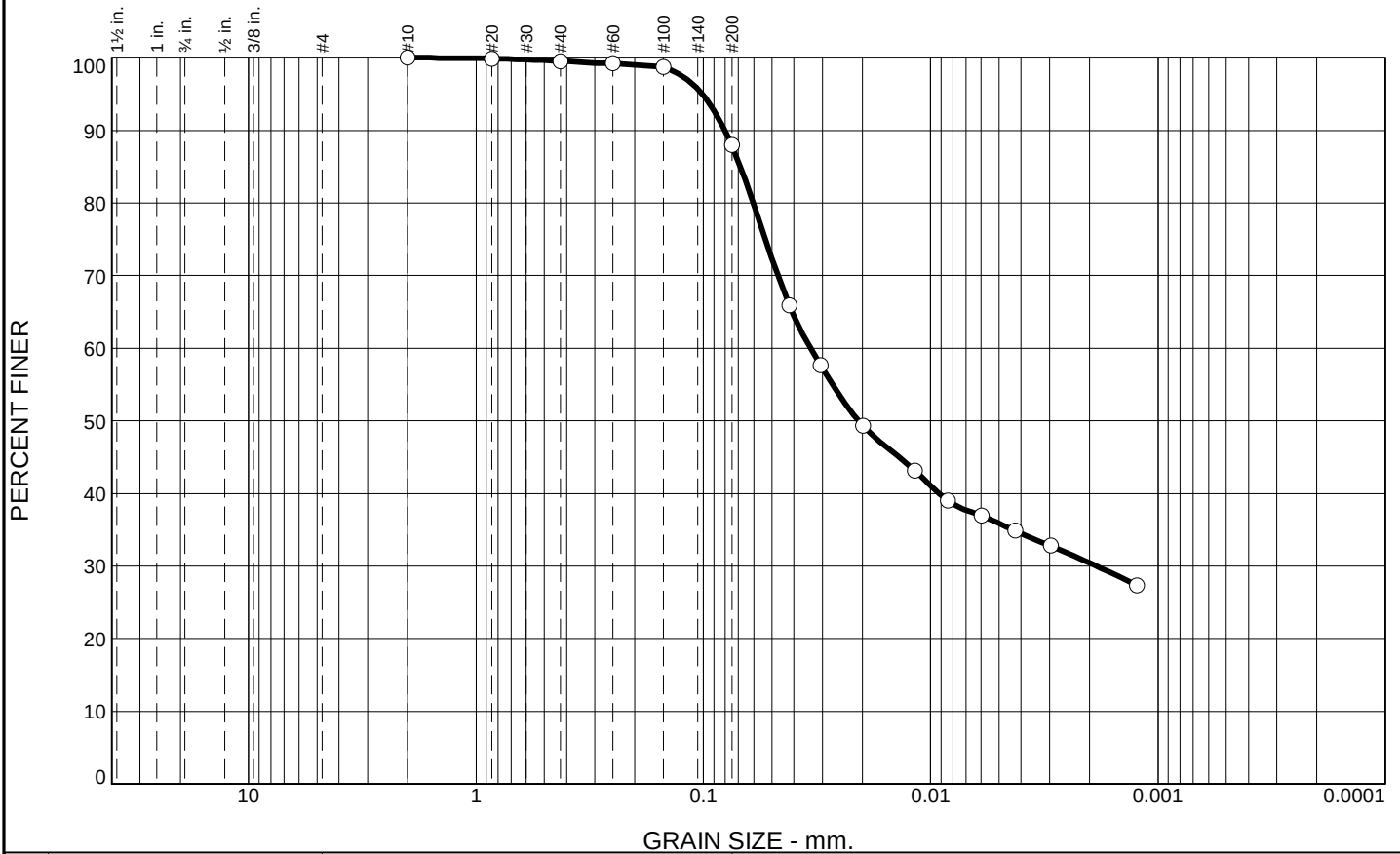
Client: MICHAEL BAKER INTERNATIONAL LLC
Project: UPRR GRADE SEPARATION

Project No: 35185112

Figure

Tested By: SJH Checked By: WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



%+3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.5	11.5	52.1	35.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.9		
#40	99.5		
#60	99.2		
#100	98.7		
#200	88.0		
0.0419 mm.	65.9		
0.0305 mm.	57.6		
0.0199 mm.	49.3		
0.0117 mm.	43.1		
0.0084 mm.	39.0		
0.0060 mm.	36.9		
0.0043 mm.	34.9		
0.0030 mm.	32.8		
0.0012 mm.	27.4		

* (no specification provided)

<u>Soil Description</u>		
BROWN AND DARK GRAY LEAN CLAY - SAND SEAMS NOTED		
<u>Atterberg Limits</u>		
PL= 15	LL= 38	PI= 23
<u>Coefficients</u>		
D ₉₀ = 0.0803	D ₈₅ = 0.0687	D ₆₀ = 0.0338
D ₅₀ = 0.0207	D ₃₀ = 0.0019	D ₁₅ =
D ₁₀ =	C _u =	C _c =
<u>Classification</u>		
USCS= CL	AASHTO= A-6(20)	
<u>Remarks</u>		
F.M.=0.02		

Source of Sample: B-6
Sample Number: S-13

Depth: 38.5'-40.0'

Date: 8-6-19

Terracon

Client: MICHAEL BAKER INTERNATIONAL LLC
Project: UPRR GRADE SEPARATION

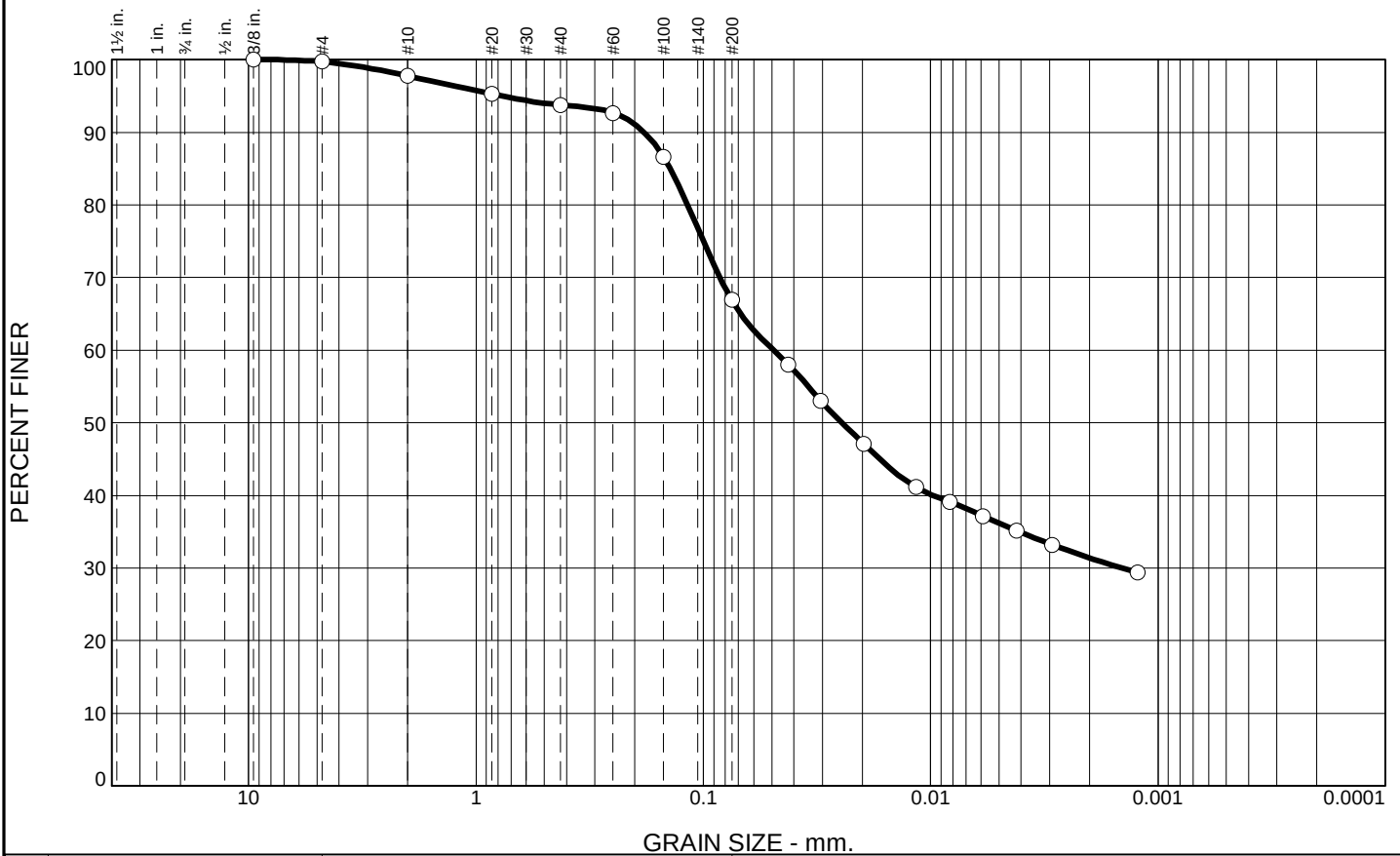
Project No: 35185112

Figure

Tested By: SJH

Checked By: WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



%+3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.3	1.9	4.1	26.8	30.7	36.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375	100.0		
#4	99.7		
#10	97.8		
#20	95.3		
#40	93.7		
#60	92.7		
#100	86.6		
#200	66.9		
0.0423 mm.	58.0		
0.0305 mm.	53.1		
0.0197 mm.	47.1		
0.0116 mm.	41.1		
0.0083 mm.	39.1		
0.0059 mm.	37.2		
0.0042 mm.	35.2		
0.0029 mm.	33.2		
0.0012 mm.	29.4		

* (no specification provided)

Source of Sample: B-7
Sample Number: S-5

Depth: 8.5'-10.5'

Date: 8-14-19

Soil Description

RUST BROWN, BROWN AND GRAY SANDY LEAN CLAY

Atterberg Limits

PL= 13

LL= 38

PI= 25

Coefficients

D₉₀= 0.1821

D₈₅= 0.1402

D₆₀= 0.0491

D₅₀= 0.0246

D₃₀= 0.0014

D₁₅=

D₁₀=

C_u=

C_c=

Classification

USCS= CL

AASHTO= A-6(14)

Remarks

F.M.=0.32

Terracon

Client: MICHAEL BAKER INTERNATIONAL LLC

Project: UPRR GRADE SEPARATION

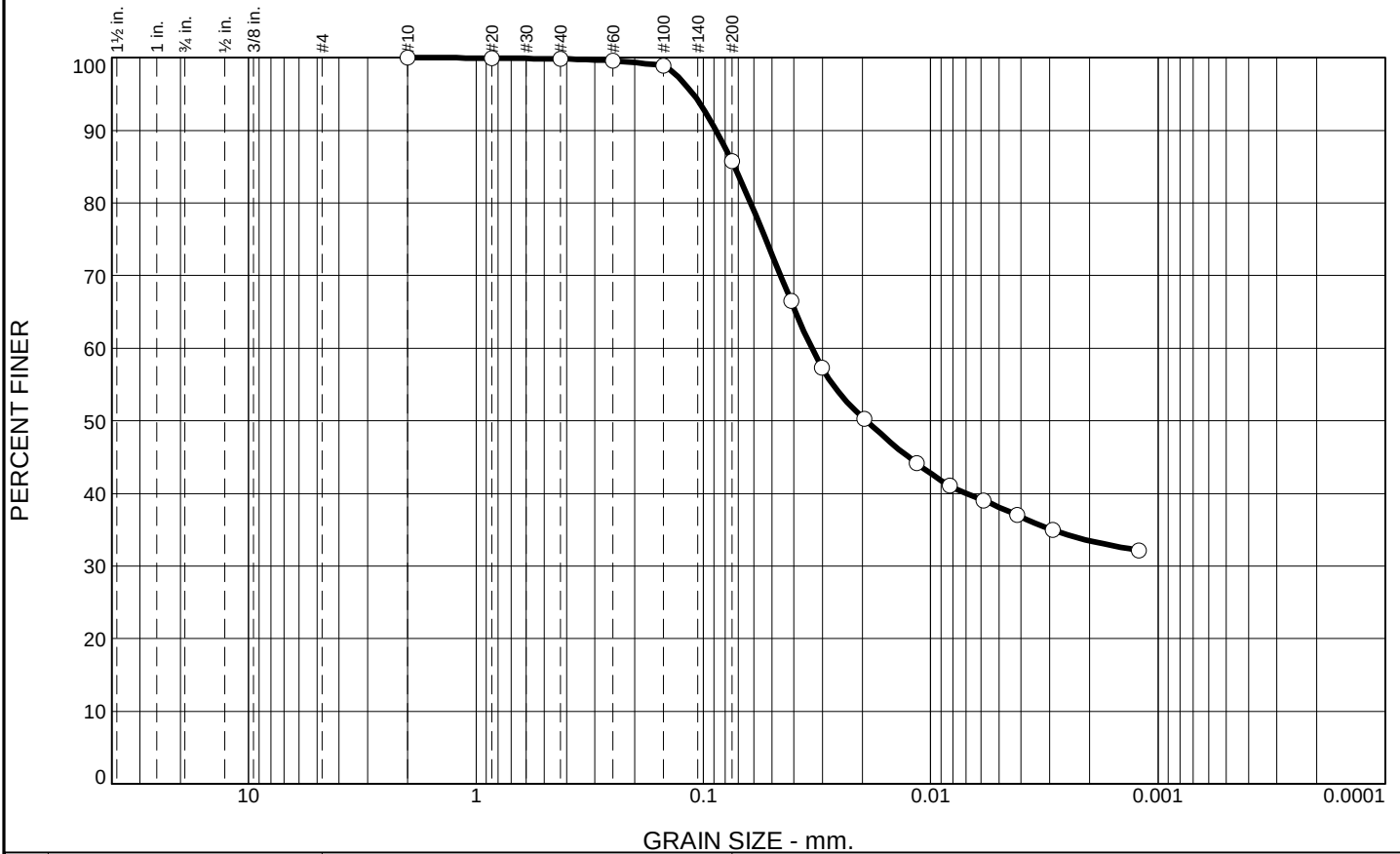
Project No: 35185112

Figure

Tested By: SJH

Checked By: WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



%+3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.2	14.0	47.7	38.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.9		
#40	99.8		
#60	99.6		
#100	98.9		
#200	85.8		
0.0412 mm.	66.5		
0.0301 mm.	57.4		
0.0195 mm.	50.2		
0.0115 mm.	44.1		
0.0082 mm.	41.1		
0.0059 mm.	39.0		
0.0042 mm.	37.0		
0.0029 mm.	35.0		
0.0012 mm.	32.1		

* (no specification provided)

<u>Soil Description</u>		
VERY DARK GRAY LEAN CLAY. NUMEROUS SILT SEAMS NOTED		
<u>Atterberg Limits</u>		
PL= 14	LL= 35	PI= 21
<u>Coefficients</u>		
D ₉₀ = 0.0879	D ₈₅ = 0.0730	D ₆₀ = 0.0333
D ₅₀ = 0.0192	D ₃₀ =	D ₁₅ =
D ₁₀ =	C _u =	C _c =
<u>Classification</u>		
USCS= CL	AASHTO= A-6(17)	
<u>Remarks</u>		
F.M.=0.02		

Source of Sample: B-7 Depth: 18.5'-20.0'
Sample Number: S-7

Date: 8-14-19

Terracon

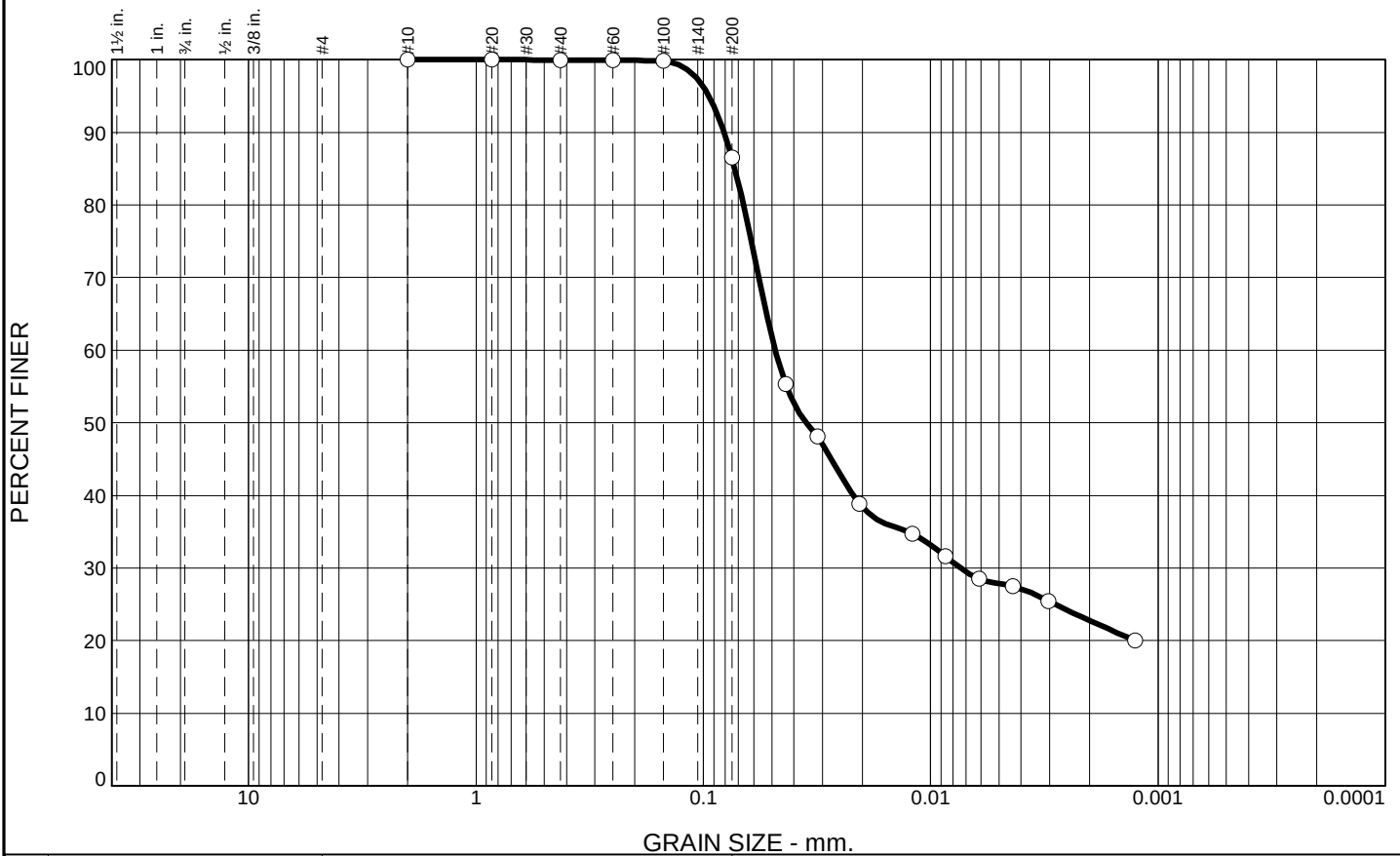
Client: MICHAEL BAKER INTERNATIONAL LLC
Project: UPRR GRADE SEPARATION

Project No: 35185112

Figure

Tested By: SJH Checked By: WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



%+3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.1	13.4	58.7	27.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	100.0		
#40	99.9		
#60	99.9		
#100	99.9		
#200	86.5		
0.0435 mm.	55.3		
0.0315 mm.	48.1		
0.0206 mm.	38.8		
0.0120 mm.	34.7		
0.0086 mm.	31.6		
0.0061 mm.	28.5		
0.0044 mm.	27.5		
0.0030 mm.	25.4		
0.0013 mm.	20.0		

* (no specification provided)

<u>Soil Description</u>		
GRAY AND BROWN FAT CLAY		
<u>Atterberg Limits</u>		
PL= 14	LL= 50	PI= 36
<u>Coefficients</u>		
D ₉₀ = 0.0810	D ₈₅ = 0.0728	D ₆₀ = 0.0482
D ₅₀ = 0.0352	D ₃₀ = 0.0074	D ₁₅ =
D ₁₀ =	C _u =	C _c =
<u>Classification</u>		
USCS= CH	AASHTO= A-7-6(31)	
<u>Remarks</u>		
F.M.=0.00		

Source of Sample: B-7
Sample Number: S-13

Depth: 43.5'-45.0'

Date: 8-6-19

Terracon

Client: MICHAEL BAKER INTERNATIONAL LLC
Project: UPRR GRADE SEPARATION

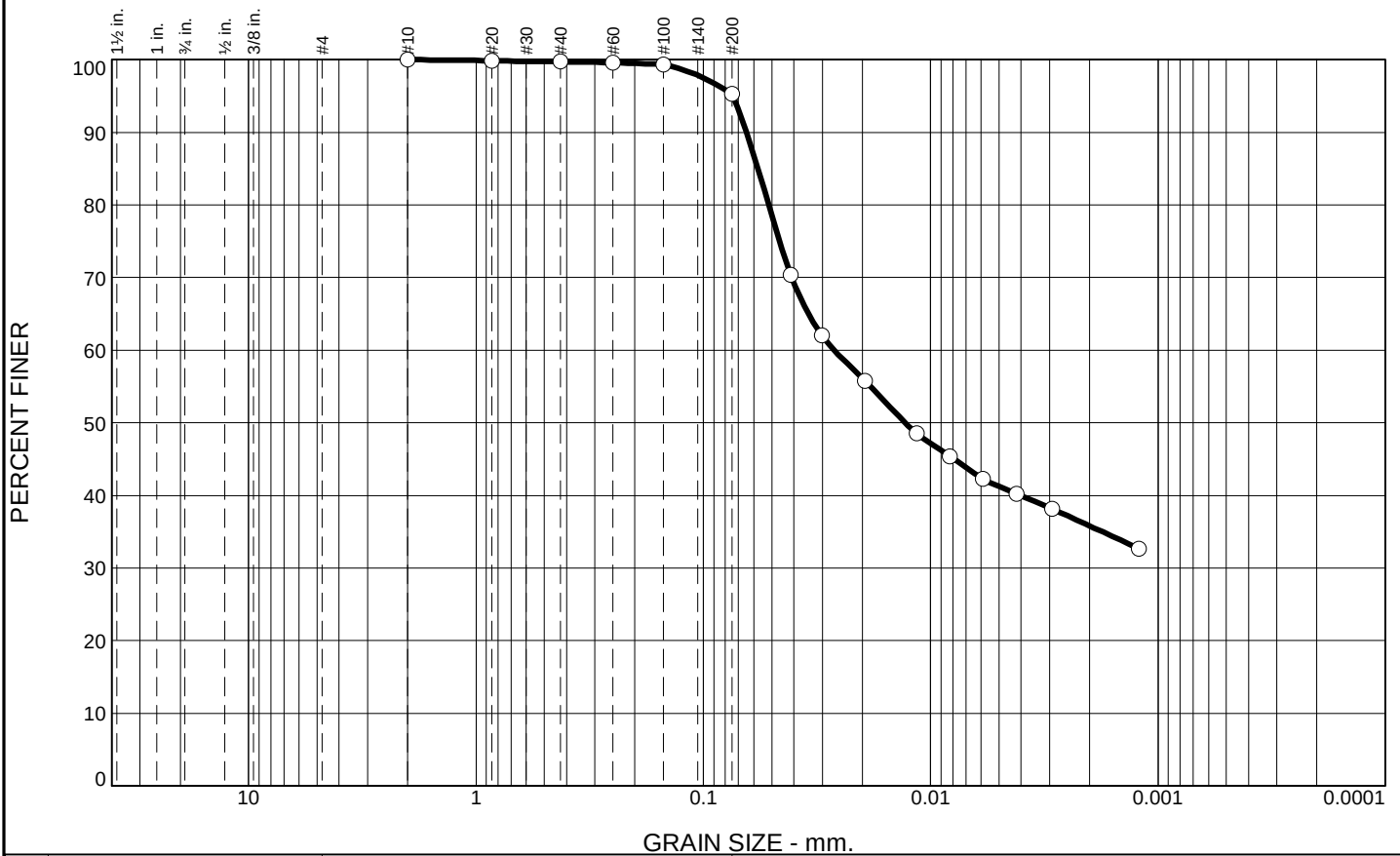
Project No: 35185112

Figure

Tested By: SJH

Checked By: WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



%+3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.3	4.5	54.0	41.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.9		
#40	99.7		
#60	99.6		
#100	99.4		
#200	95.2		
0.0412 mm.	70.4		
0.0301 mm.	62.0		
0.0195 mm.	55.8		
0.0115 mm.	48.5		
0.0082 mm.	45.4		
0.0059 mm.	42.3		
0.0042 mm.	40.2		
0.0029 mm.	38.1		
0.0012 mm.	32.7		

* (no specification provided)

<u>Soil Description</u>		
GRAY LEAN CLAY		
<u>Atterberg Limits</u>		
PL= 13	LL= 36	PI= 23
<u>Coefficients</u>		
D ₉₀ = 0.0646	D ₈₅ = 0.0575	D ₆₀ = 0.0266
D ₅₀ = 0.0130	D ₃₀ =	D ₁₅ =
D ₁₀ =	C _u =	C _c =
<u>Classification</u>		
USCS= CL	AASHTO= A-6(21)	
<u>Remarks</u>		
F.M.=0.01		

Source of Sample: B-7 Depth: 58.5'-60.0'
Sample Number: S-15

Date: 8-6-19

Terracon

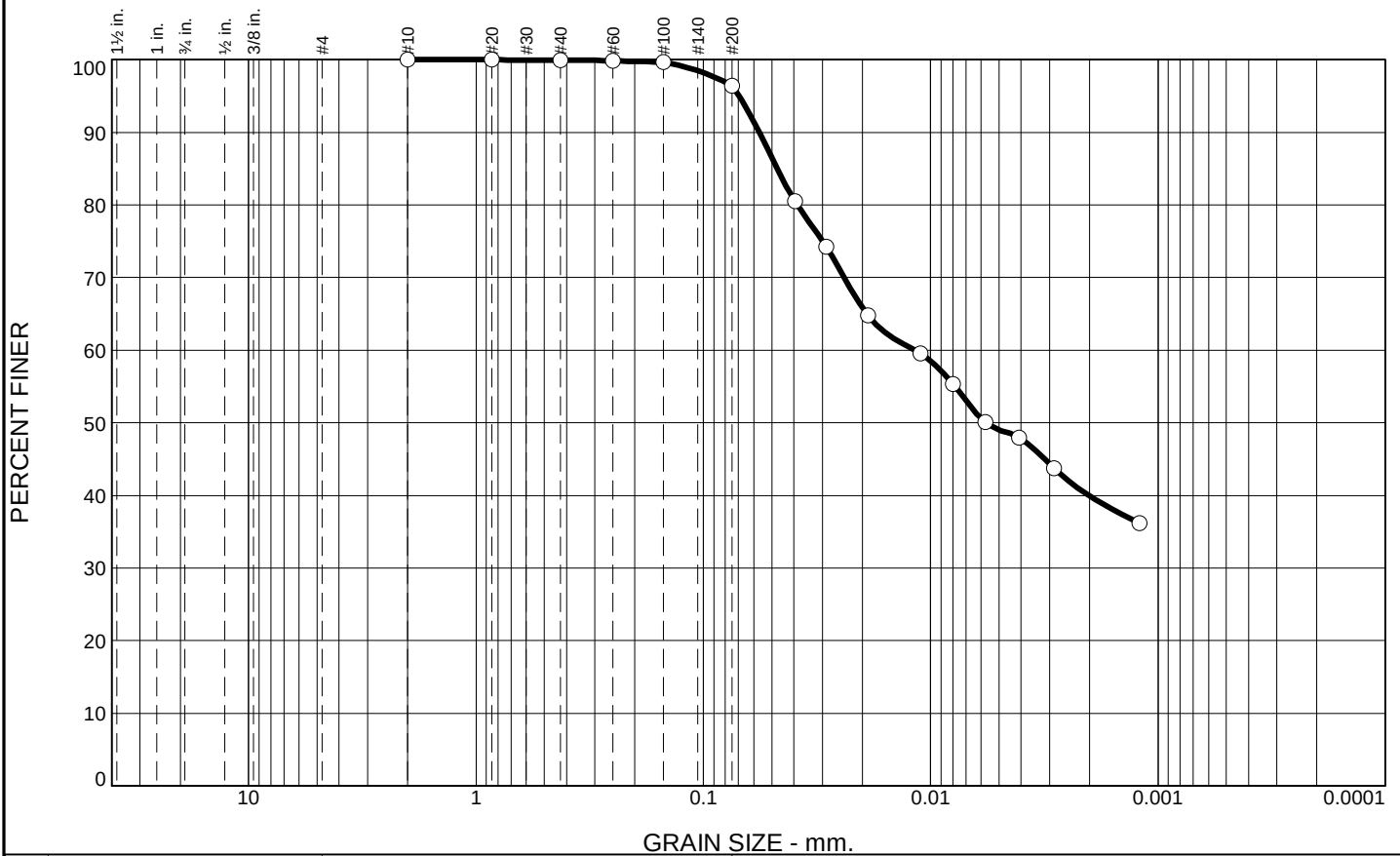
Client: MICHAEL BAKER INTERNATIONAL LLC
Project: UPRR GRADE SEPARATION

Project No: 35185112

Figure

Tested By: SJH Checked By: WPQ

PARTICLE SIZE ANALYSIS OF SOILS ASTM D422



%+3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.1	3.5	47.4	49.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	100.0		
#40	99.9		
#60	99.8		
#100	99.7		
#200	96.4		
0.0396 mm.	80.5		
0.0288 mm.	74.2		
0.0189 mm.	64.8		
0.0111 mm.	59.5		
0.0080 mm.	55.3		
0.0057 mm.	50.1		
0.0041 mm.	48.0		
0.0029 mm.	43.8		
0.0012 mm.	36.2		

* (no specification provided)

<u>Soil Description</u>		
GRAYISH BROWN FAT CLAY		
<u>Atterberg Limits</u>		
PL= 14	LL= 52	PI= 38
<u>Coefficients</u>		
D ₉₀ = 0.0568	D ₈₅ = 0.0474	D ₆₀ = 0.0118
D ₅₀ = 0.0057	D ₃₀ =	D ₁₅ =
D ₁₀ =	C _u =	C _c =
<u>Classification</u>		
USCS= CH	AASHTO= A-7-6(39)	
<u>Remarks</u>		
F.M.=0.00		

Source of Sample: B-8
Sample Number: S-14

Depth: 38.5'-40.0'

Date: 8-6-19

Terracon

Client: MICHAEL BAKER INTERNATIONAL LLC
Project: UPRR GRADE SEPARATION

Project No: 35185112

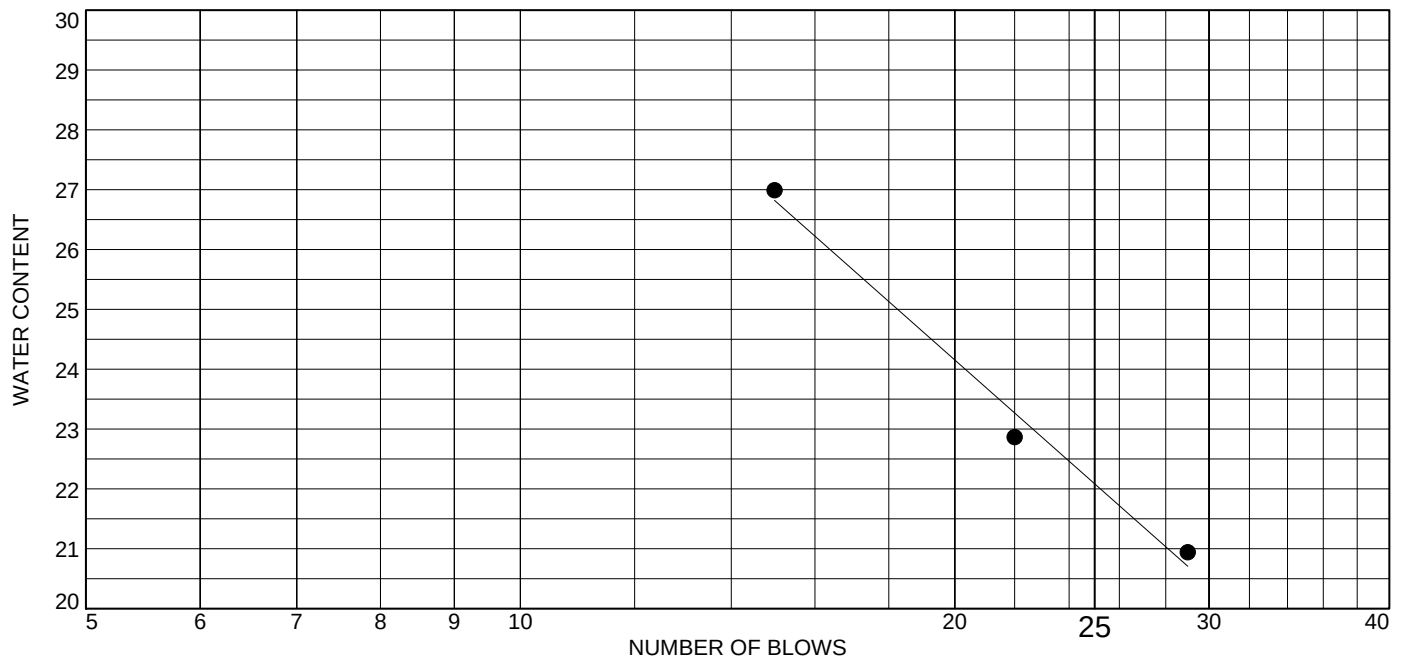
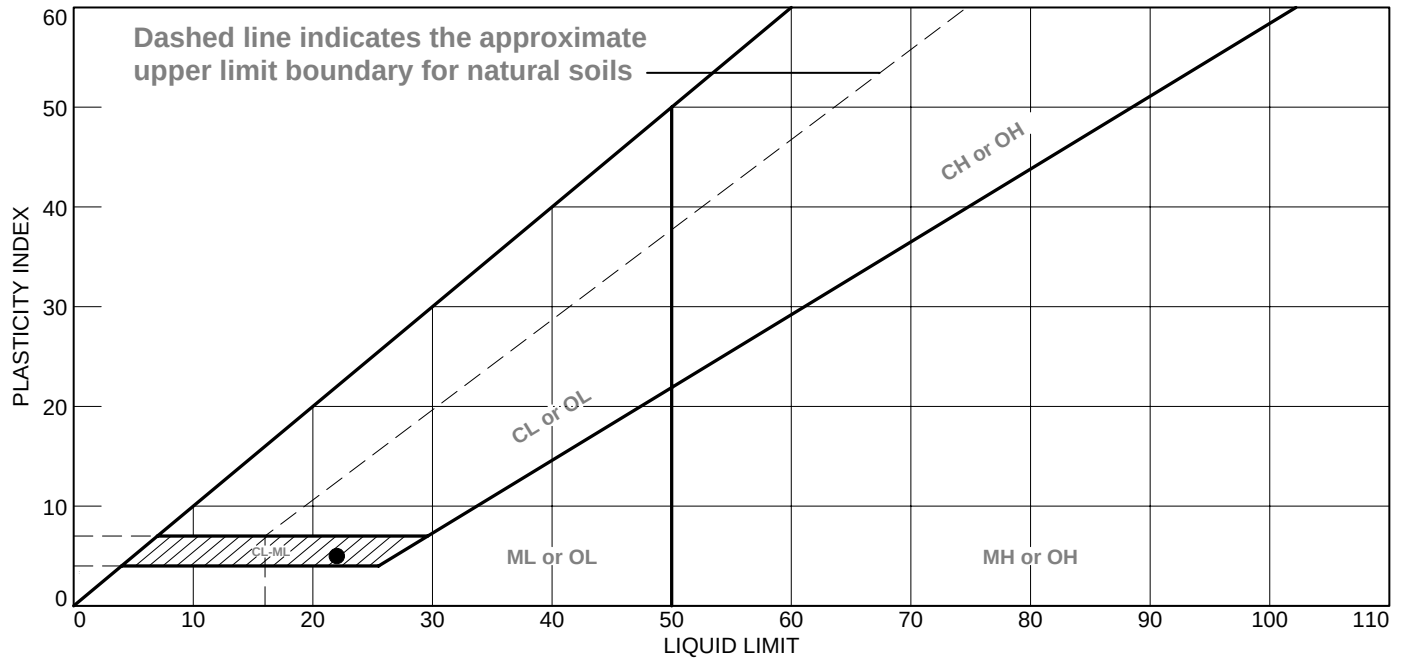
Figure

Tested By: SJH

Checked By: WPQ

Liquid Limit, Plastic Limit and
Plasticity Index of Soils
ASTM D4318

LIQUID AND PLASTIC LIMITS ASTM D4318



MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
BROWN AND GRAY MOTTLED SANDY SILTY CLAY	22	17	5	95.5	58.7	CL-ML

Project No. 35185112 **Client:** MICHAEL BAKER INTERNATIONAL LLC

Project: UPRR GRADE SEPARATION

Source of Sample: B-1 **Depth:** 8.5'-10.5'

Sample Number: S-5

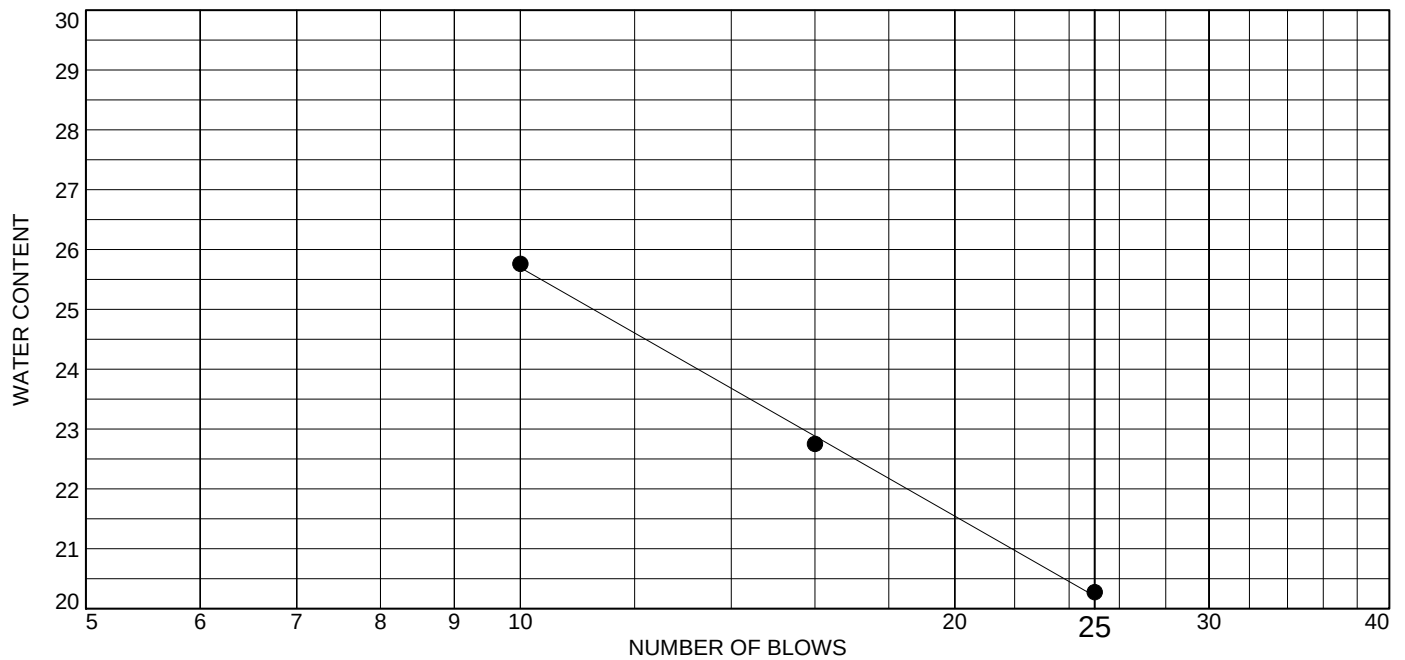
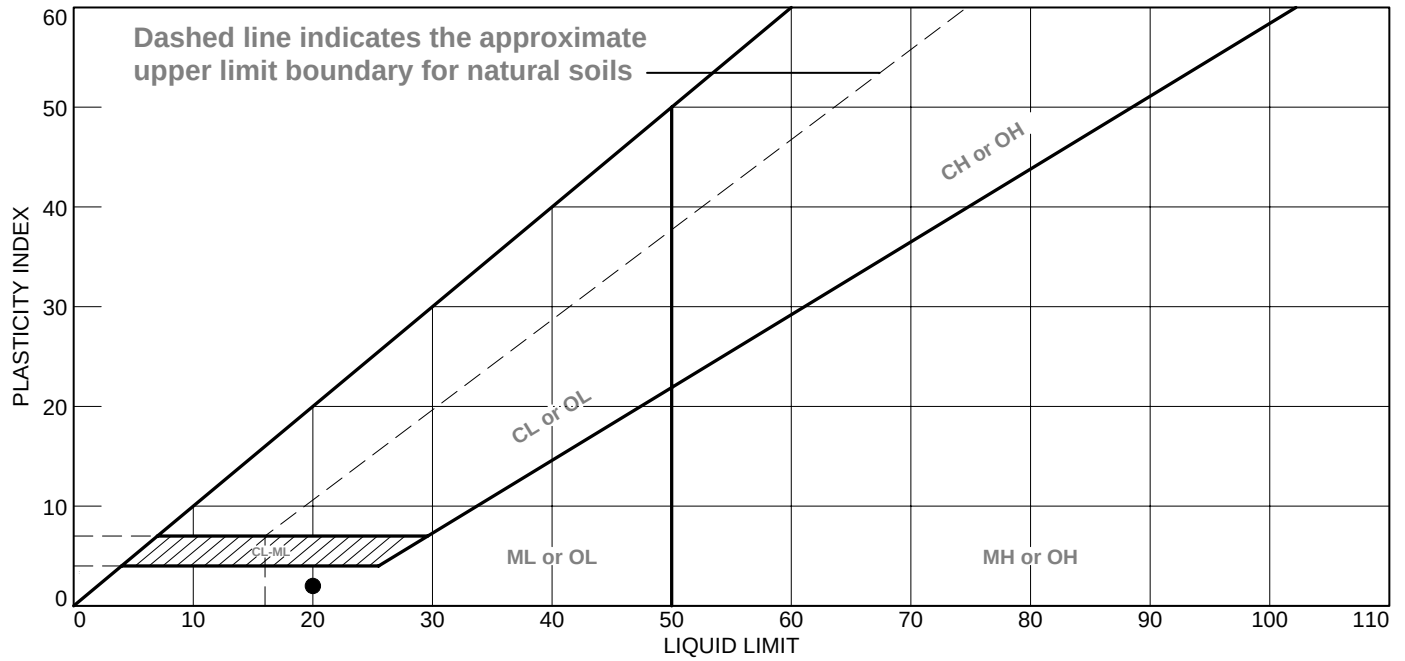
Remarks:

Terracon

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
•	BROWN AND GRAY SANDY SILT	20	18	2	99.8	55.2	ML

Project No. 35185112 **Client:** MICHAEL BAKER INTERNATIONAL LLC

Project: UPRR GRADE SEPARATION

Source of Sample: B-1 **Depth:** 18.5'-20.5'
Sample Number: S-7

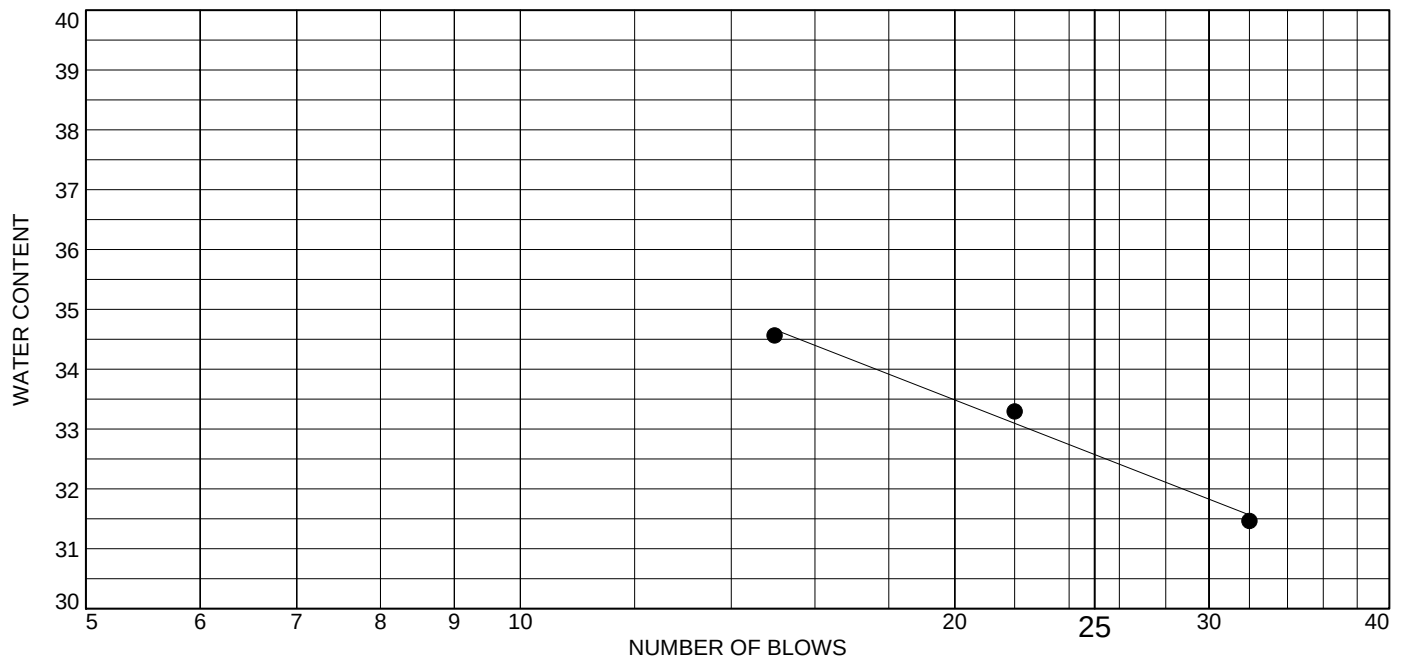
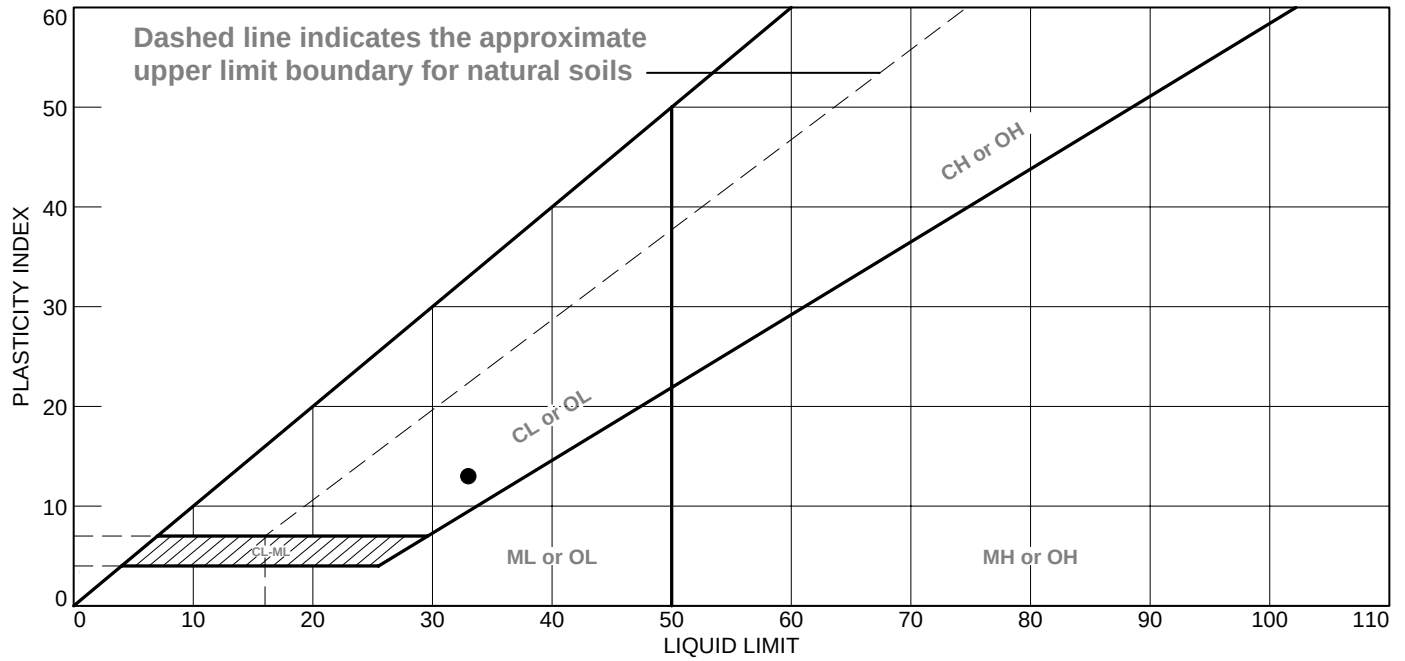
Terracon

Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
•	GRAY AND DARK GRAY LEAN CLAY	33	20	13	99.2	90.2	CL

Project No. 35185112 **Client:** MICHAEL BAKER INTERNATIONAL LLC

Project: UPRR GRADE SEPARATION

Source of Sample: B-1 **Depth:** 28.5'-30.5'
Sample Number: S-9

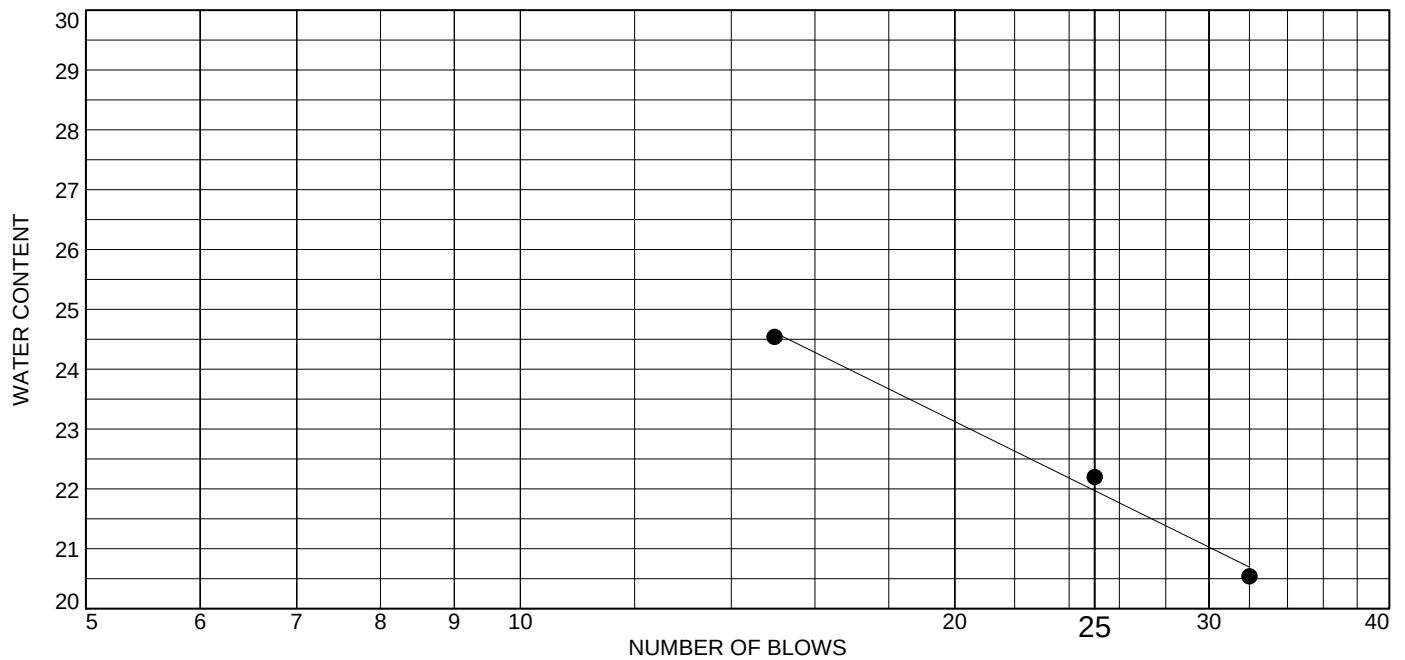
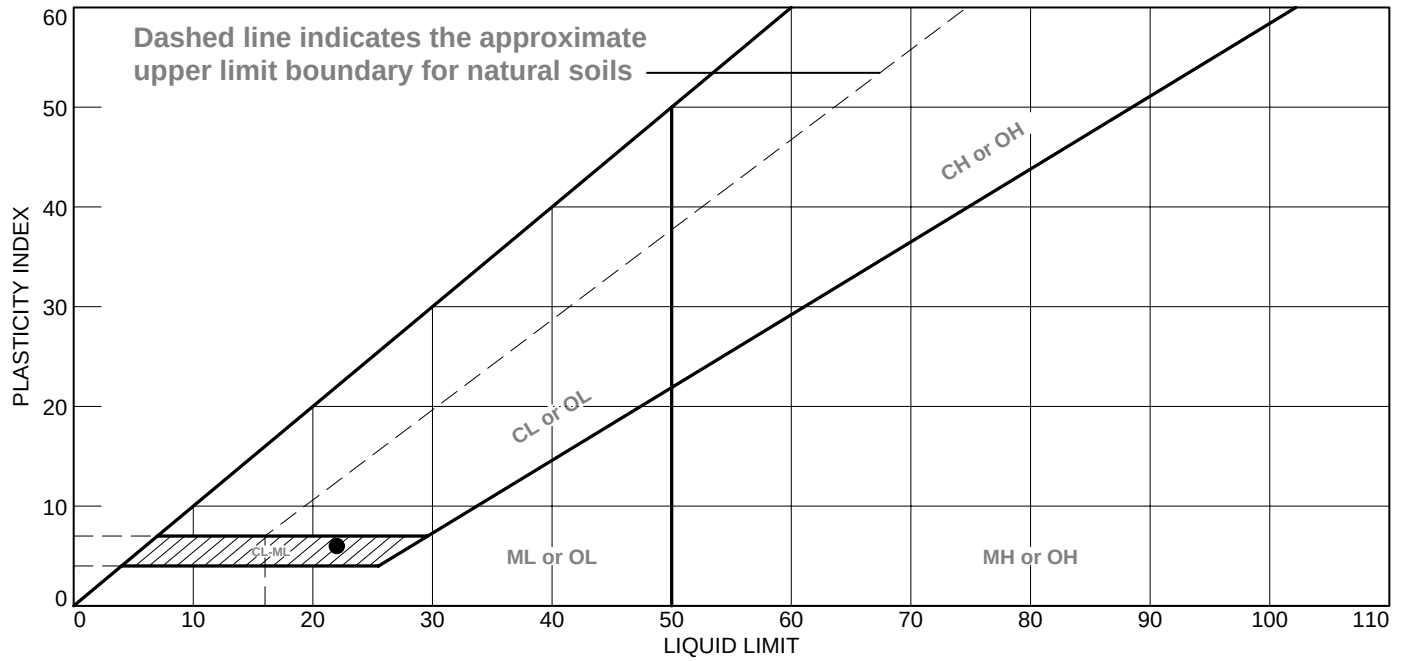
Terracon

Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318



MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
BROWN AND GRAY MOTTLED SANDY SILTY CLAY	22	16	6	99.8	68.0	CL-ML

Project No. 35185112 **Client:** MICHAEL BAKER INTERNATIONAL LLC

Project: UPRR GRADE SEPARATION

Source of Sample: B-2 **Depth:** 3.5'-5.5'

Sample Number: S-3

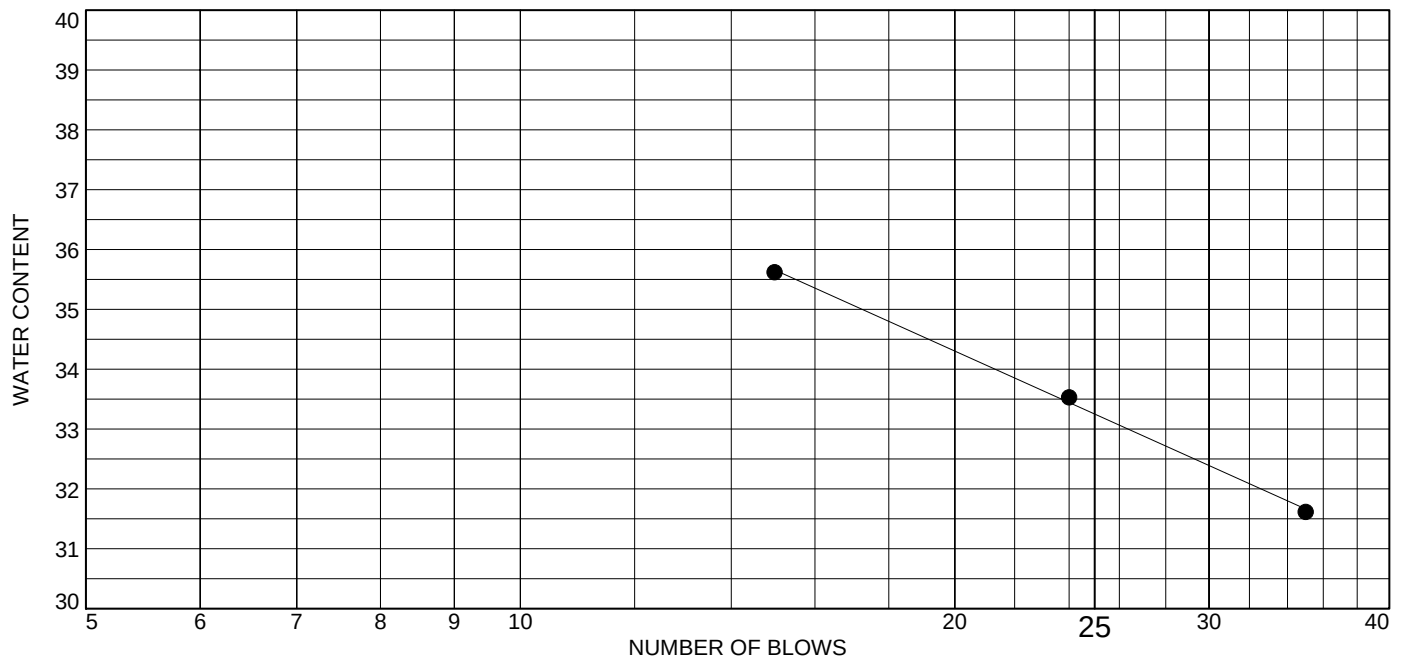
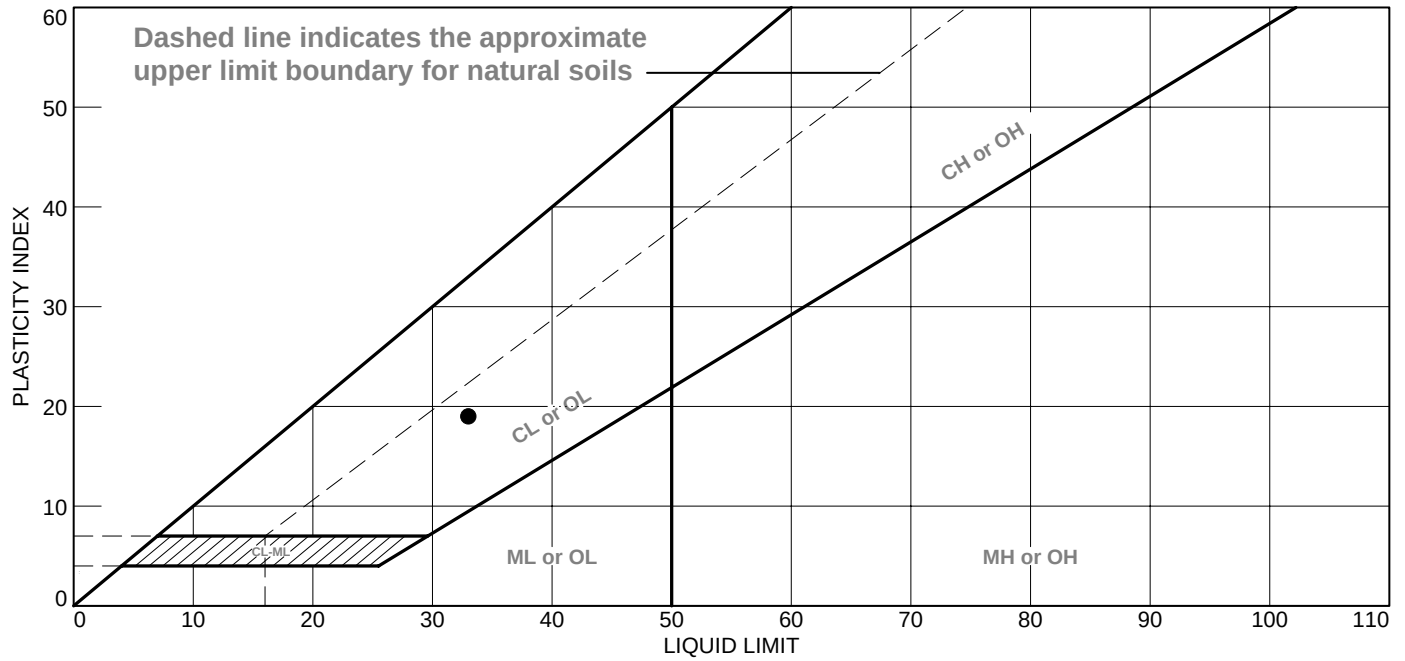
Remarks:

Terracon

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318



MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
GRAY AND DARK GRAY - NUMEROUS SAND SEAMS NOTED	33	14	19	99.8	90.0	CL

Project No. 35185112 **Client:** MICHAEL BAKER INTERNATIONAL LLC

Project: UPRR GRADE SEPARATION

Source of Sample: B-2 **Depth:** 28.5'-30.5'
Sample Number: S-10

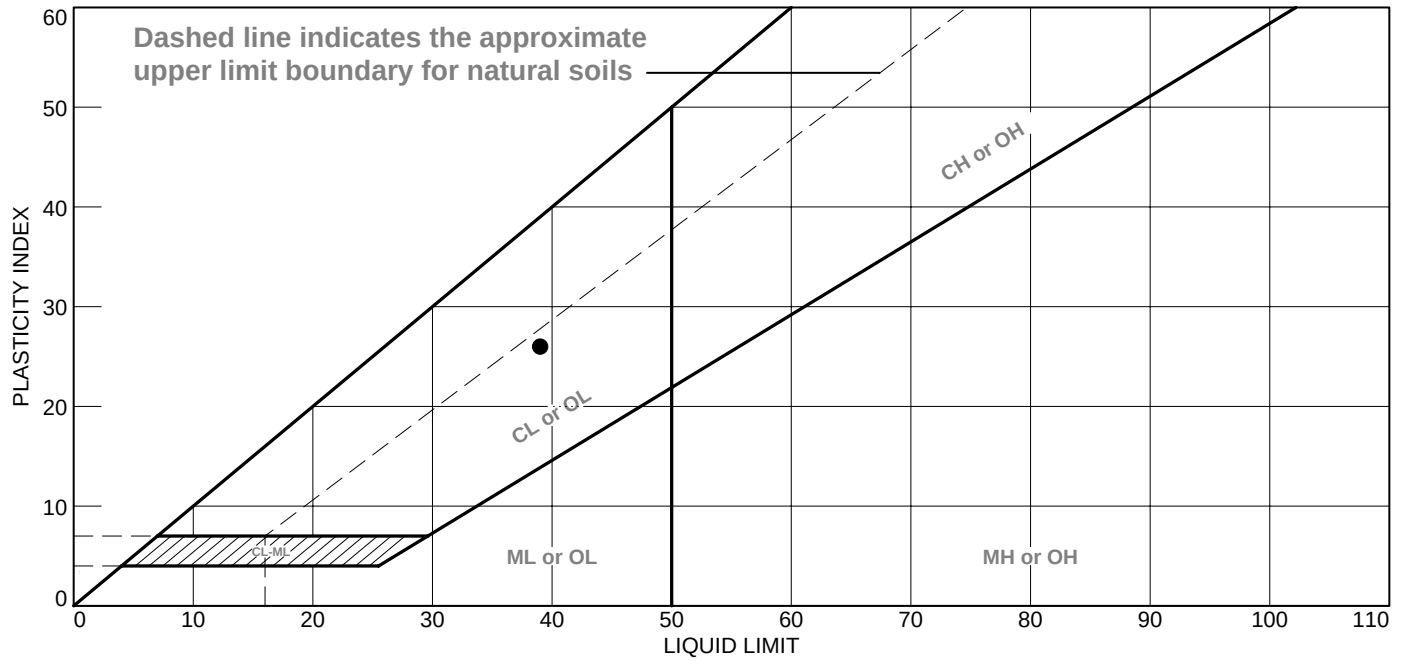
Terracon

Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318



MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
• BROWN AND GRAY LEAN CLAY - SAND AND SILT SEAMS NOTED	39	13	26	99.9	93.2	CL

Project No. 35185112 **Client:** MICHAEL BAKER INTERNATIONAL LLC

Project: UPRR GRADE SEPARATION

Source of Sample: B-2 **Depth:** 58.5'-60.0'
Sample Number: S-15

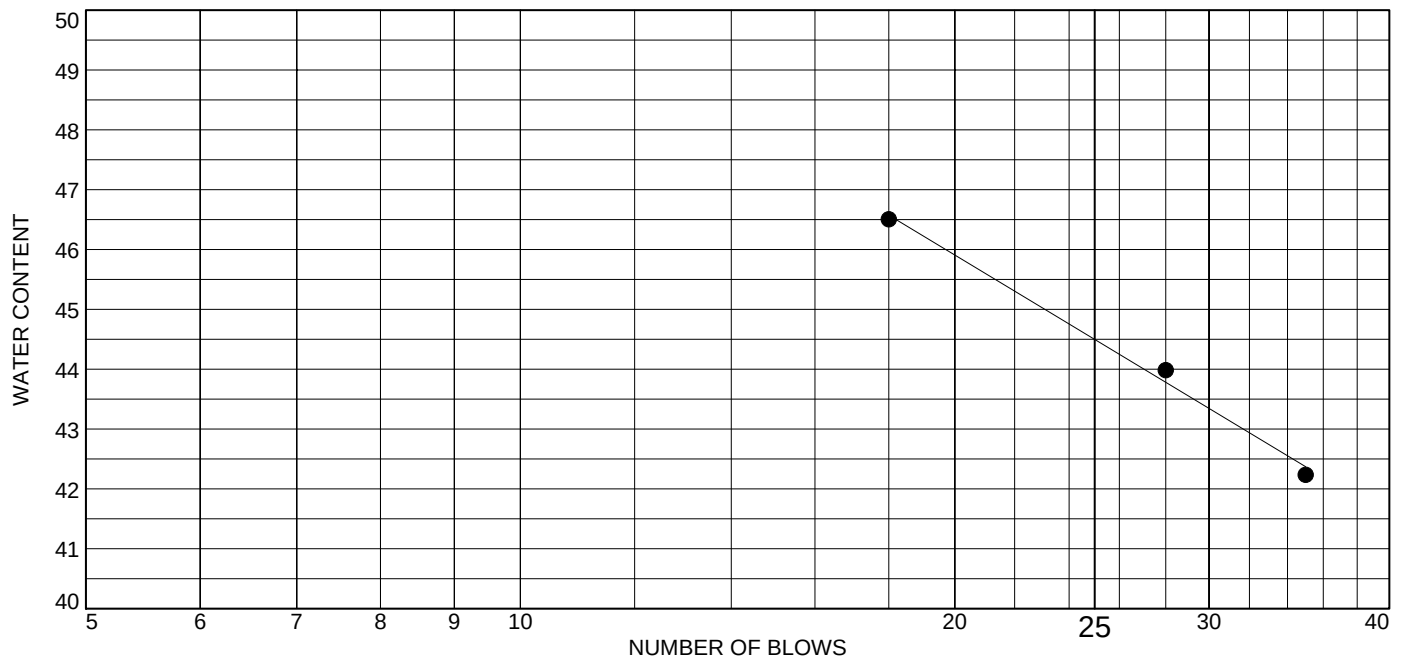
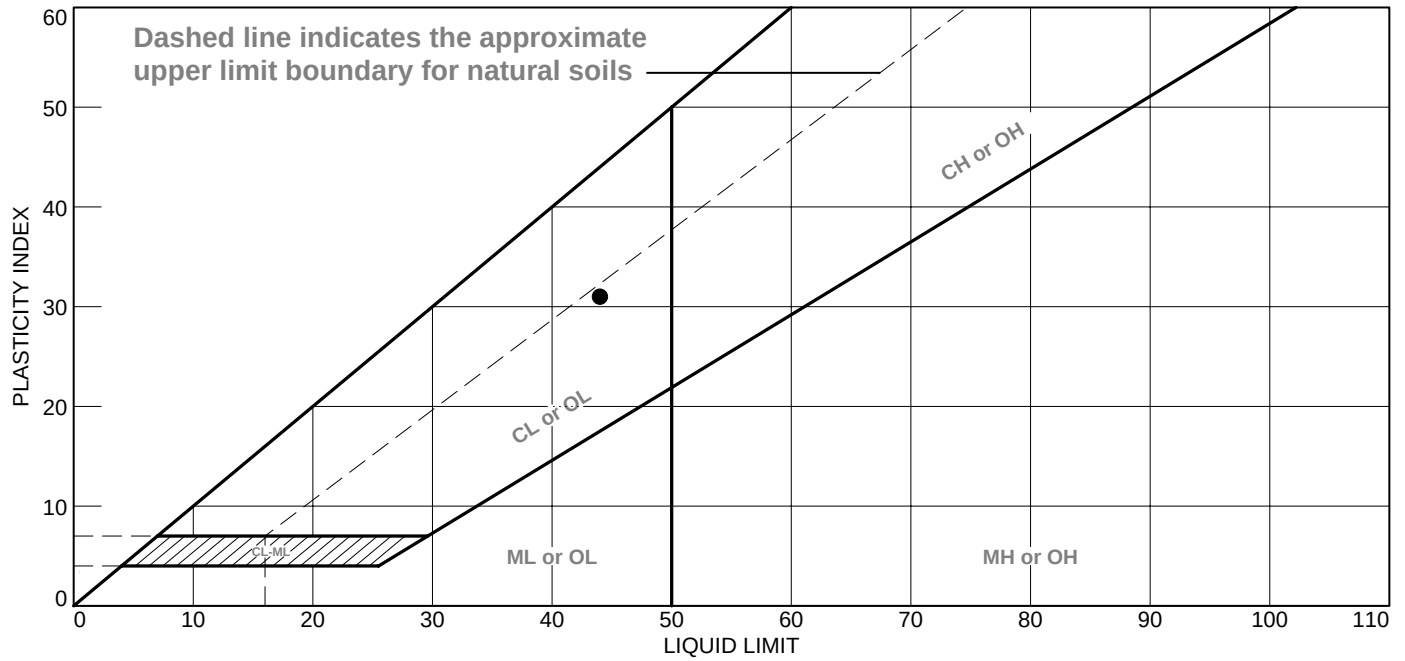
Terracon

Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318



MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
● GRAY AND BROWN LEAN CLAY - SAND AND SILT SEAMS NOTED	44	13	31	99.9	96.2	CL

Project No. 35185112 **Client:** MICHAEL BAKER INTERNATIONAL LLC

Project: UPRR GRADE SEPARATION

Source of Sample: B-3 **Depth:** 33.5'-35.0'
Sample Number: S-10

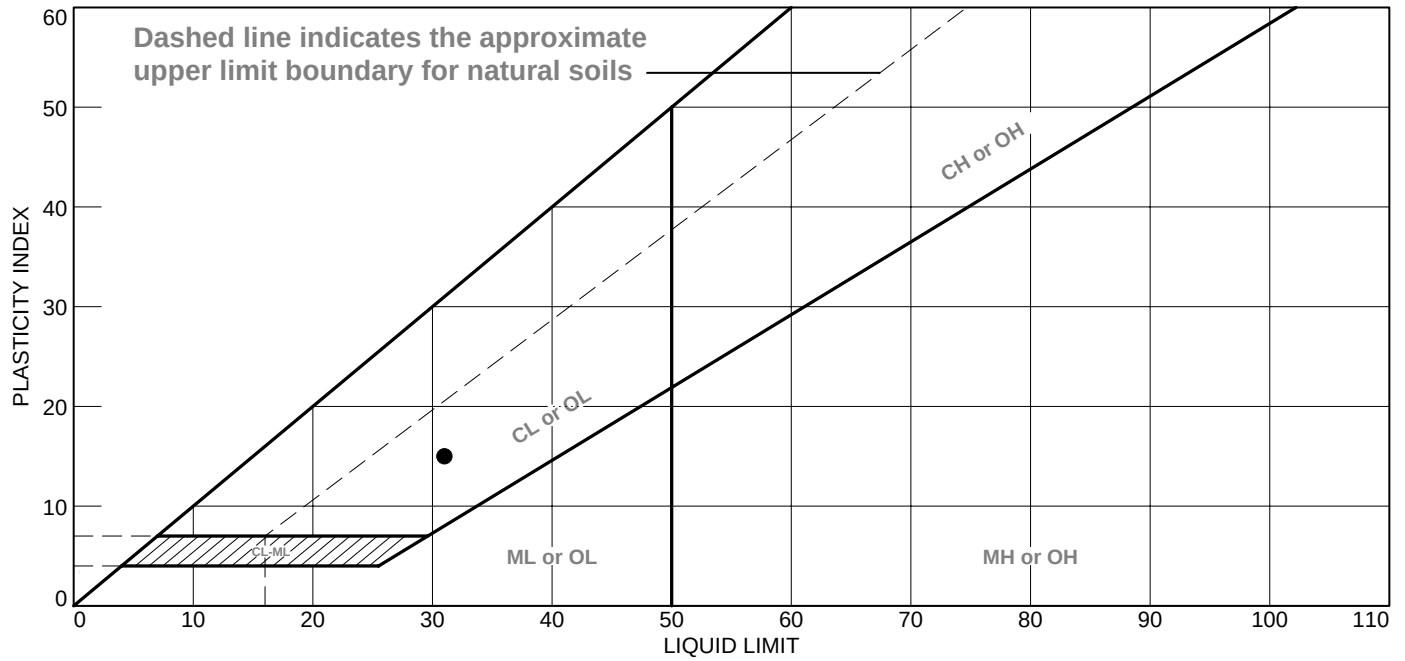
Terracon

Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318



MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
• DARK BROWN AND DARK GRAY - NUMEROUS SAND SEAMS NOTED	31	16	15	99.7	89.2	CL

Project No. 35185112 Client: MICHAEL BAKER INTERNATIONAL LLC

Project: UPRR GRADE SEPARATION

Source of Sample: B-4 Depth: 18.5'-20.5'
Sample Number: S-7

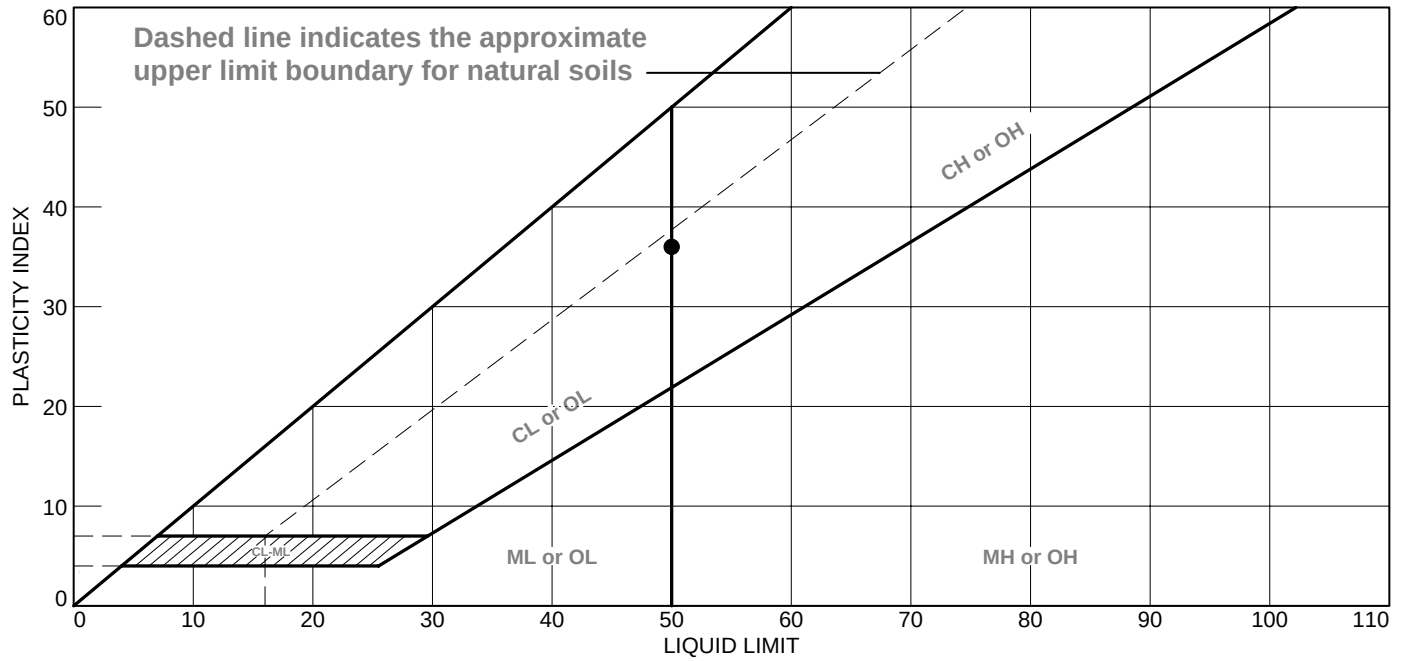
Terracon

Remarks:

Figure

Tested By: DT Checked By: WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	GRAY AND BROWN FAT CLAY - SAND AND SILT SEAMS NOTED	50	14	36	99.9	96.3	CH

Project No. 35185112 **Client:** MICHAEL BAKER INTERNATIONAL LLC

Project: UPRR GRADE SEPARATION

Source of Sample: B-4 **Depth:** 38.5'-40.0'
Sample Number: S-11

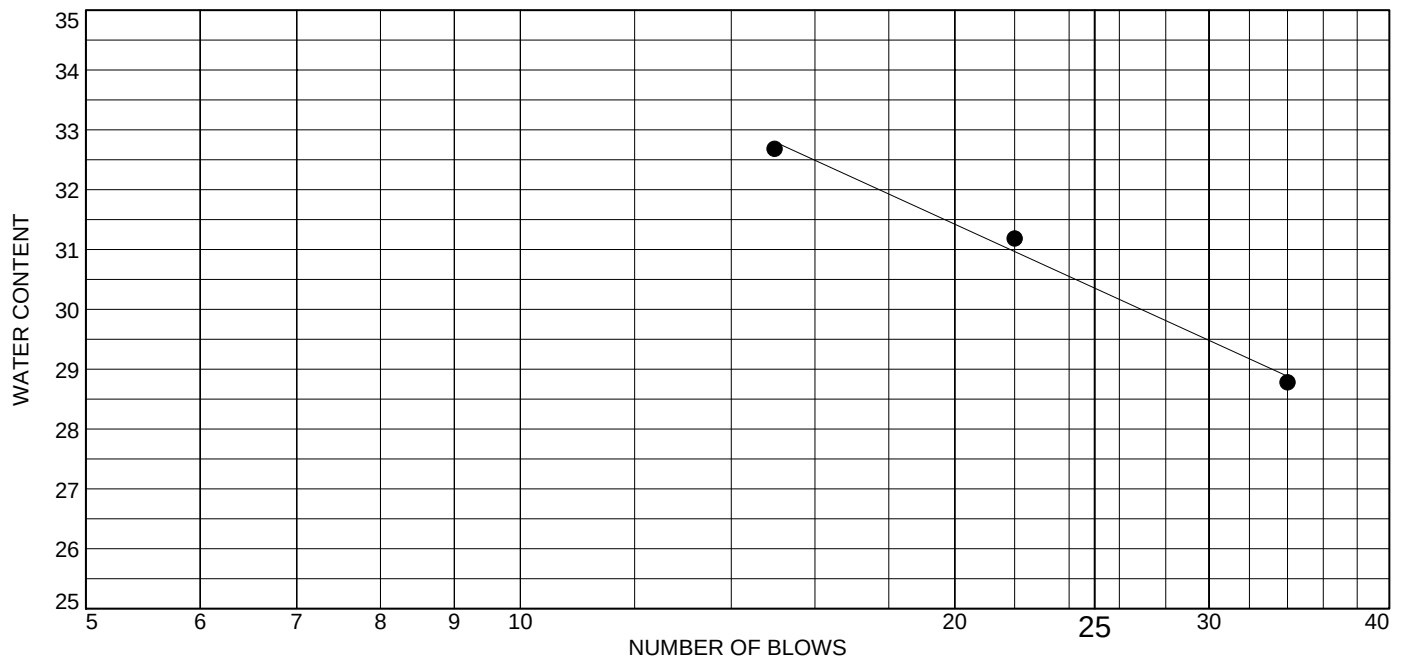
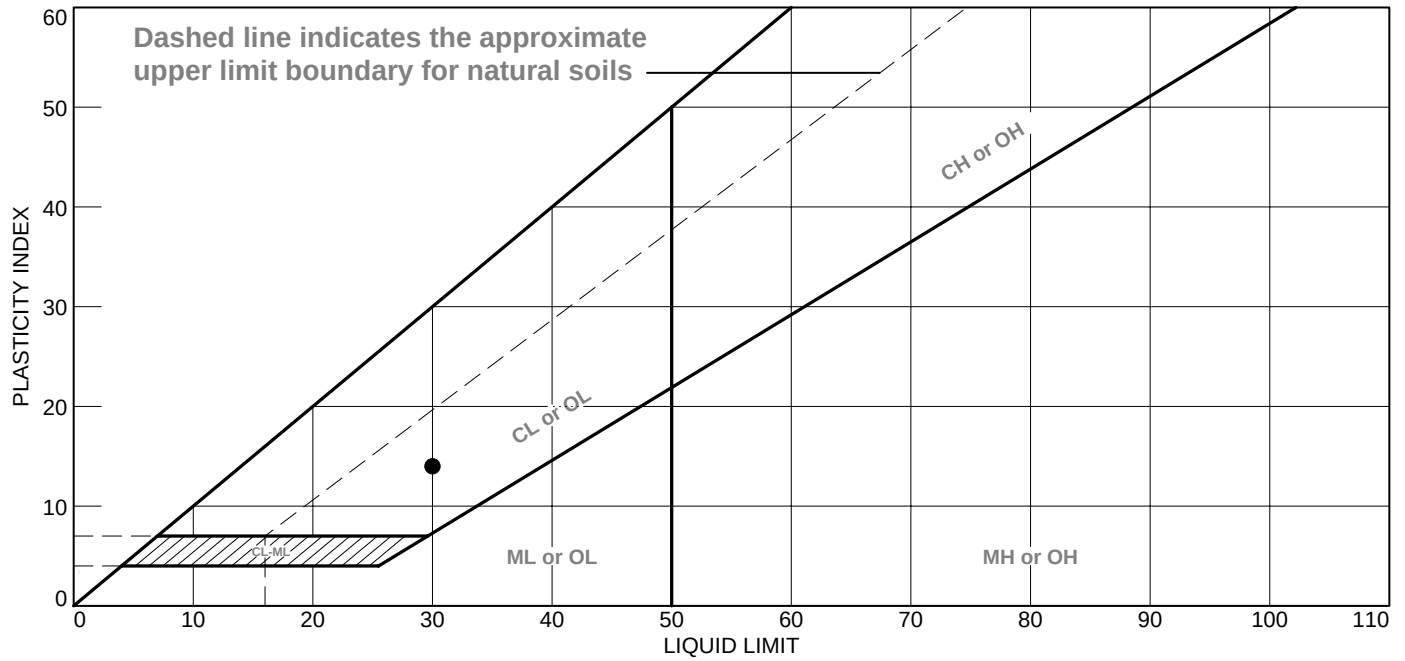
Terracon

Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318



MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
• BROWN AND BROWNISH GRAY MOTTLED	30	16	14	99.7	57.8	CL

Project No. 35185112 Client: MICHAEL BAKER INTERNATIONAL LLC

Project: UPRR GRADE SEPARATION

Source of Sample: B-5 Depth: 3.5'-5.5'
Sample Number: S-3

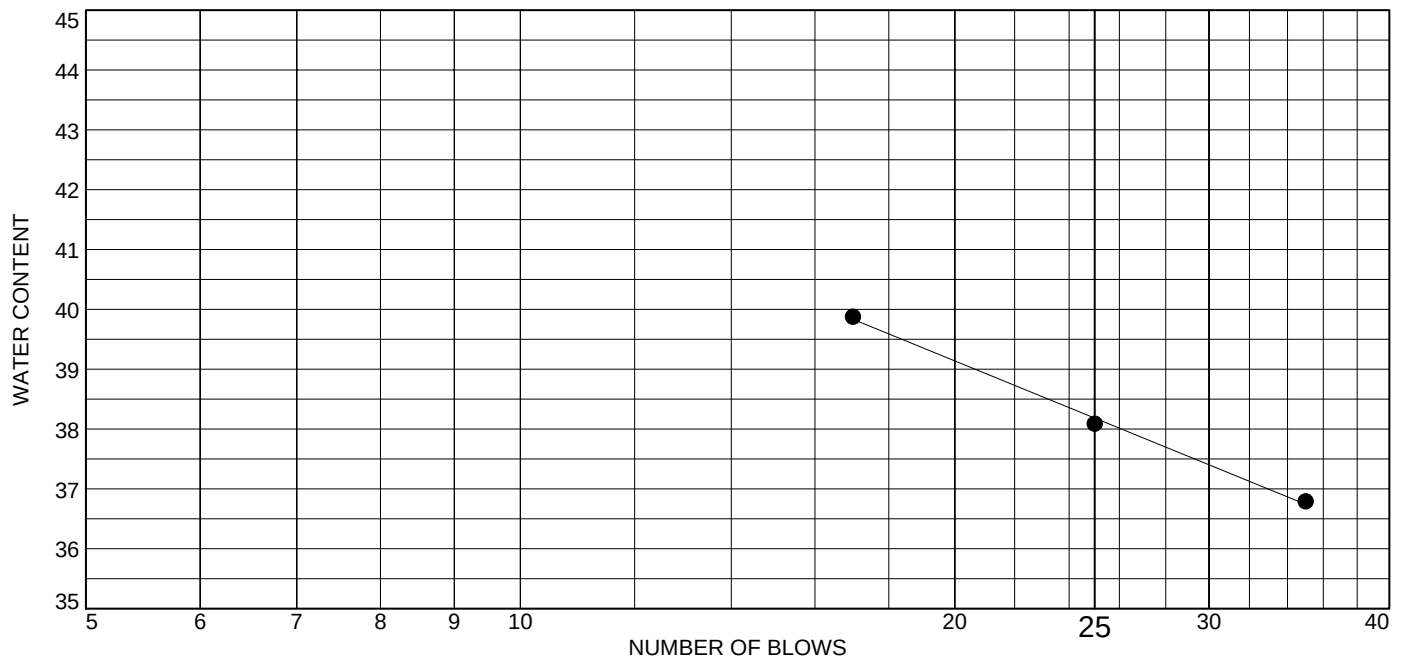
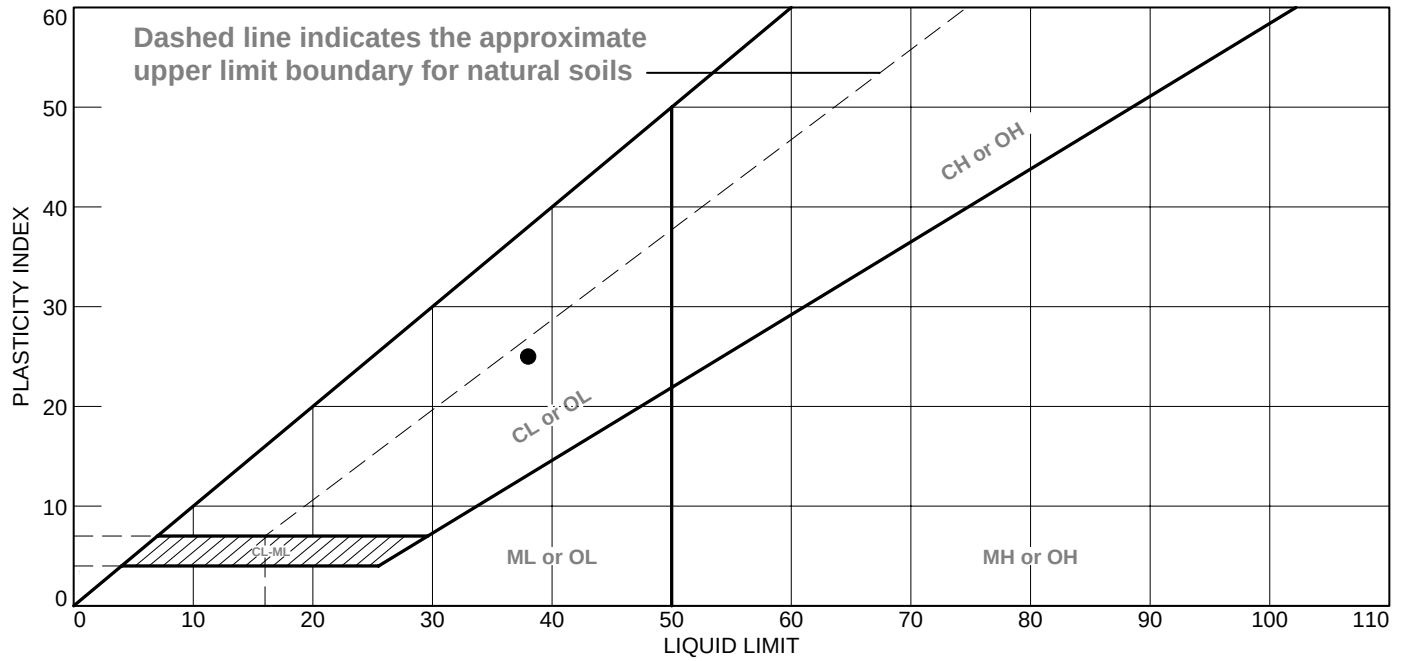
Terracon

Remarks:

Figure

Tested By: DT Checked By: WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
•	DARK GRAY LEAN CLAY	38	13	25	99.9	93.2	CL

Project No. 35185112 **Client:** MICHAEL BAKER INTERNATIONAL LLC

Project: UPRR GRADE SEPARATION

Source of Sample: B-5 **Depth:** 33.5'-35.0'
Sample Number: S-10

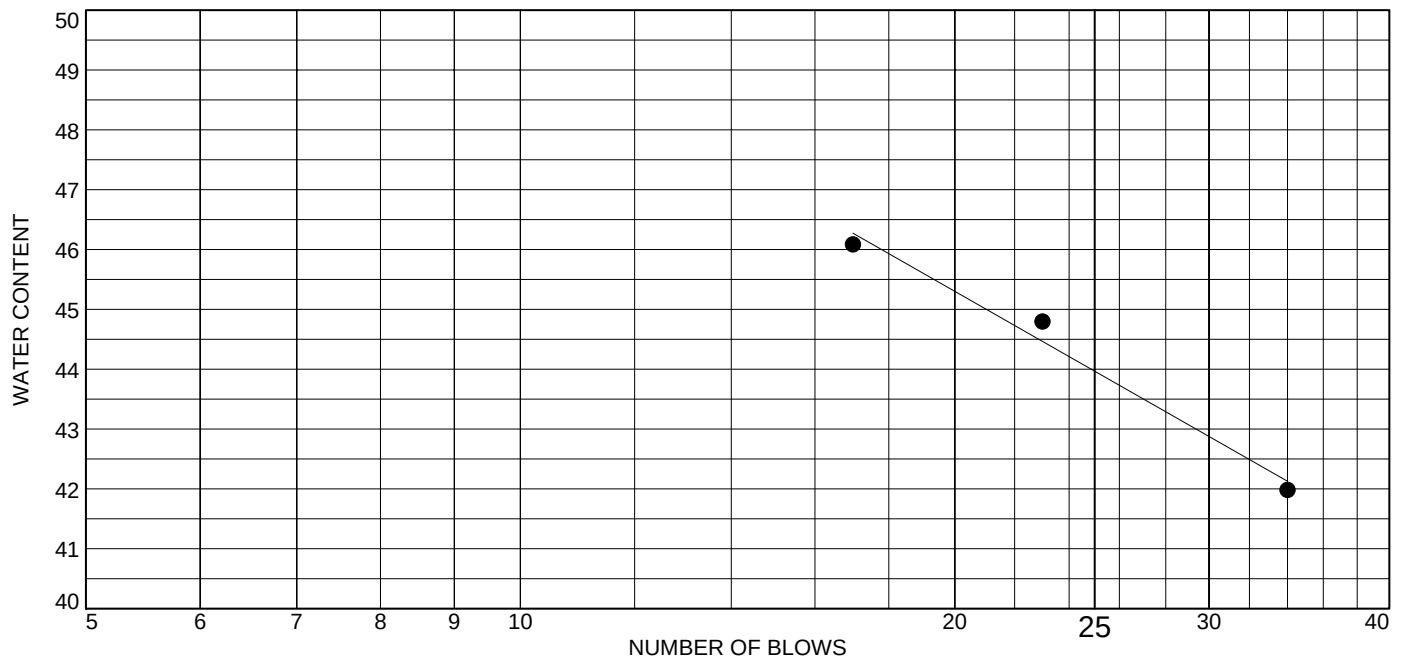
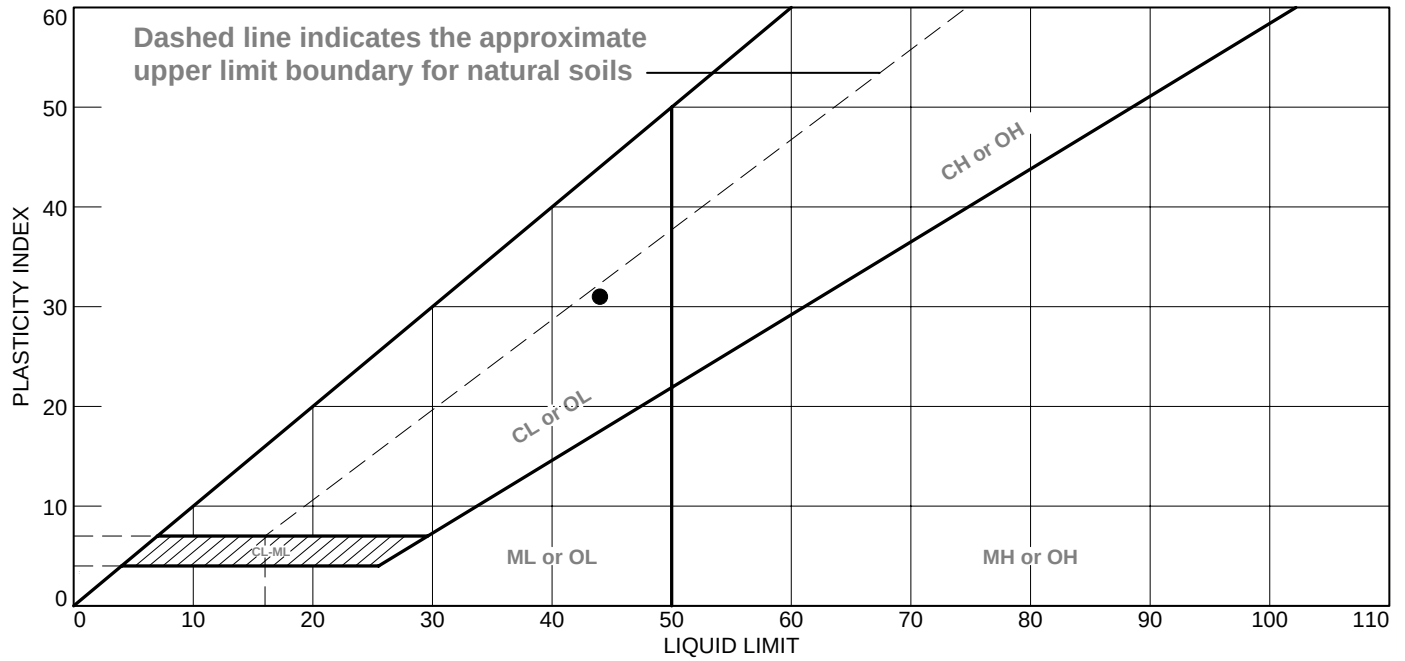
Terracon

Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318



MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
BROWN AND GRAY LEAN CLAY - ORGANICS NOTED	44	13	31	99.9	97.3	CL

Project No. 35185112 Client: MICHAEL BAKER INTERNATIONAL LLC

Project: UPRR GRADE SEPARATION

Source of Sample: B-5 Depth: 43.5'-45.0'
Sample Number: S-12

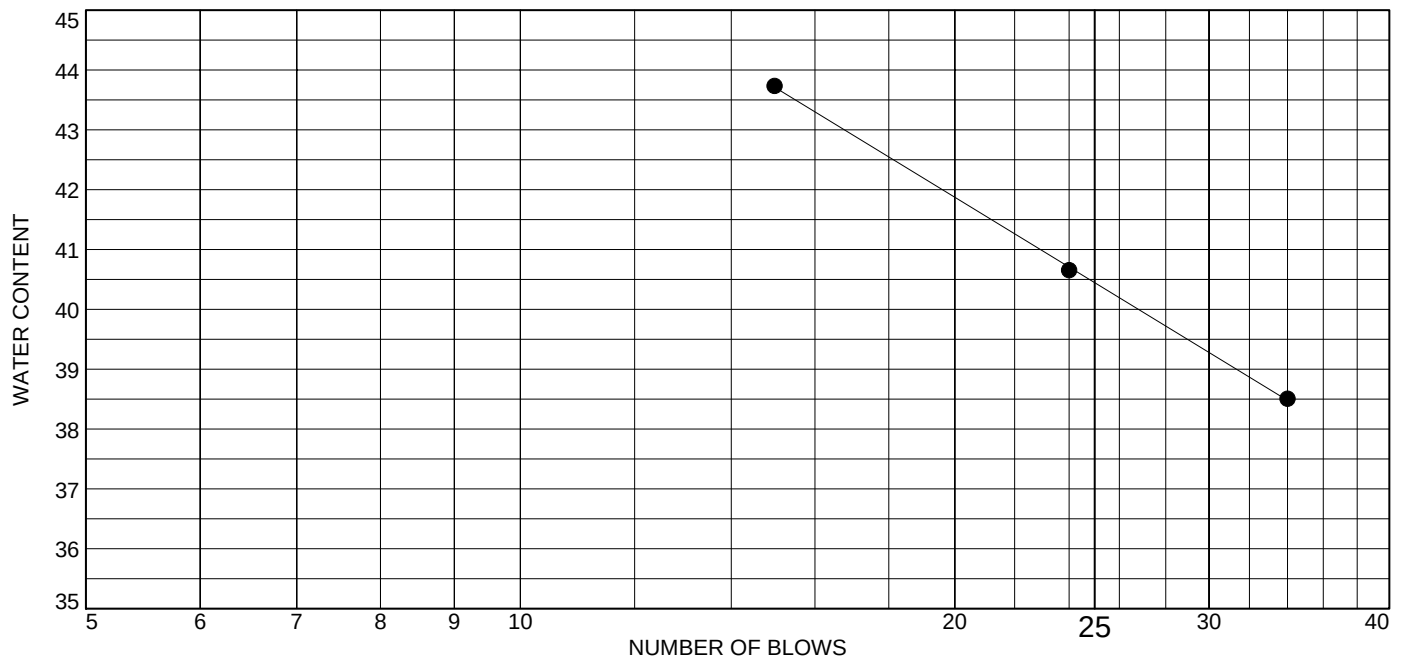
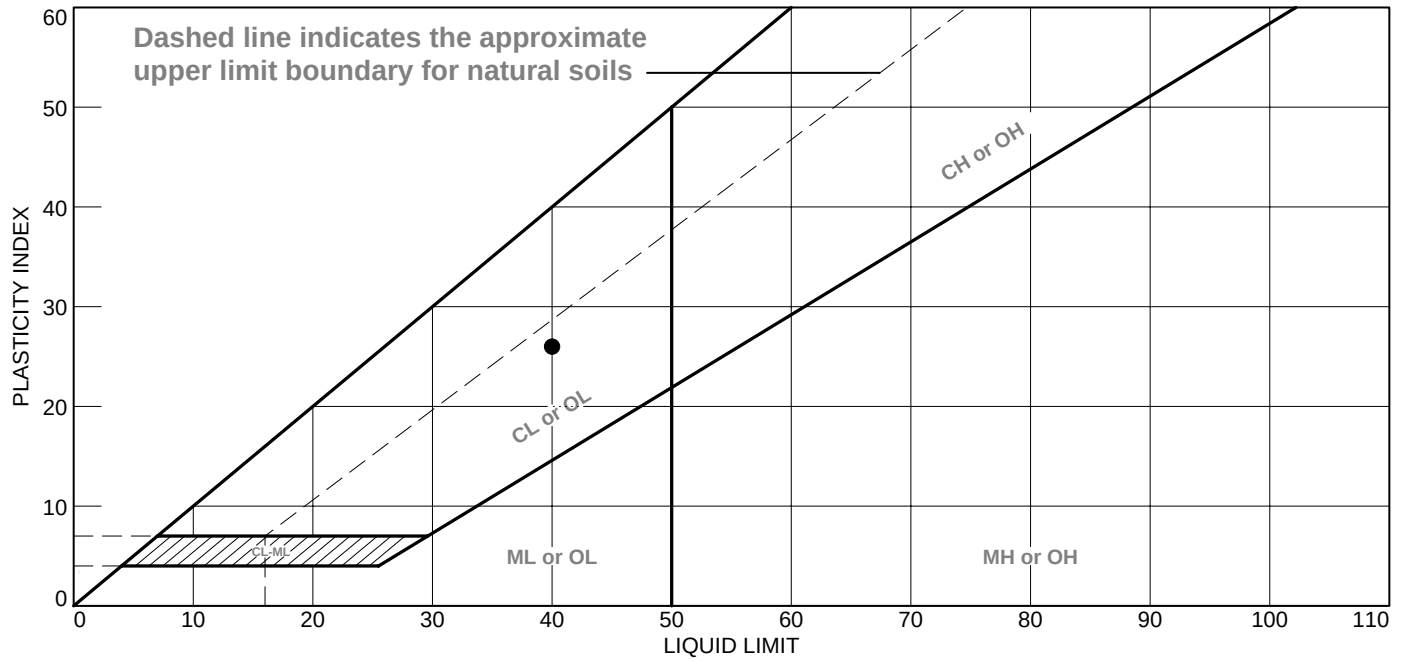
Terracon

Remarks:

Figure

Tested By: DT Checked By: WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318



MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
● GRAY AND RUST BROWN LEAN CLAY WITH SAND - SILT SEAMS NOTED	40	14	26	93.3	79.2	CL

Project No. 35185112 **Client:** MICHAEL BAKER INTERNATIONAL LLC

Project: UPRR GRADE SEPARATION

Source of Sample: B-6 **Depth:** 13.5'-15.5'
Sample Number: S-7

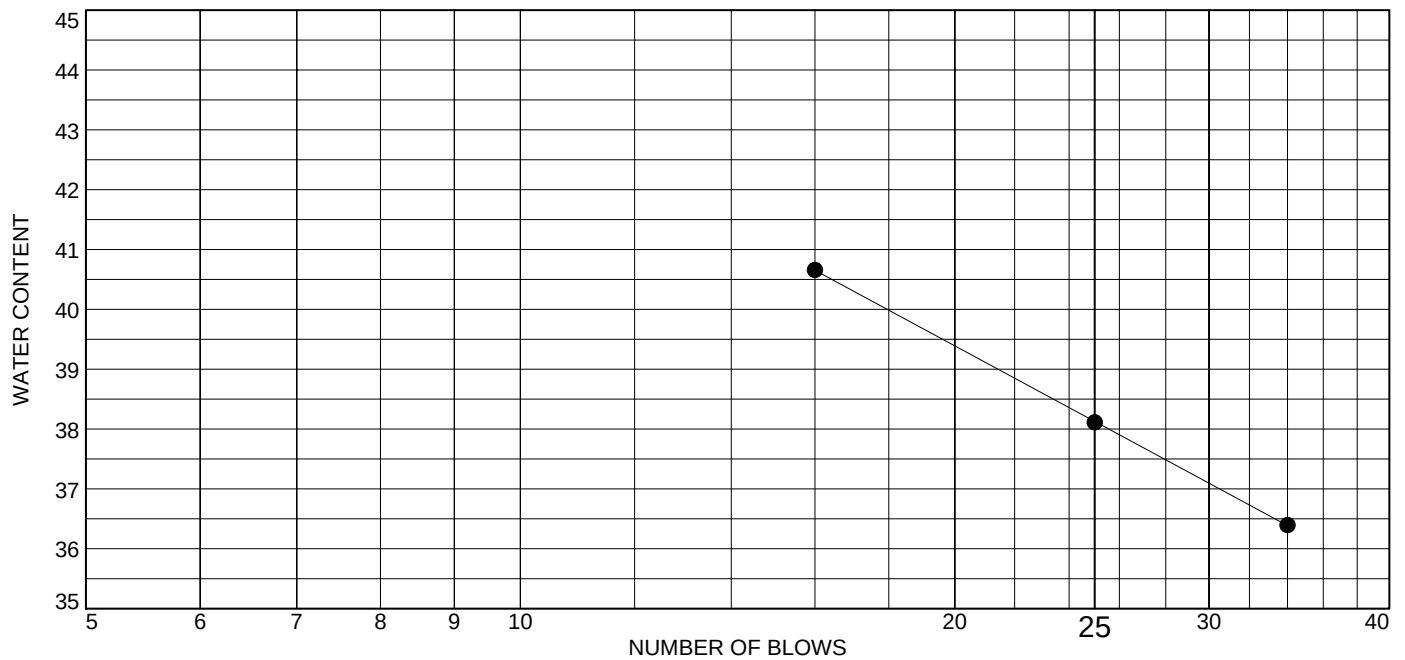
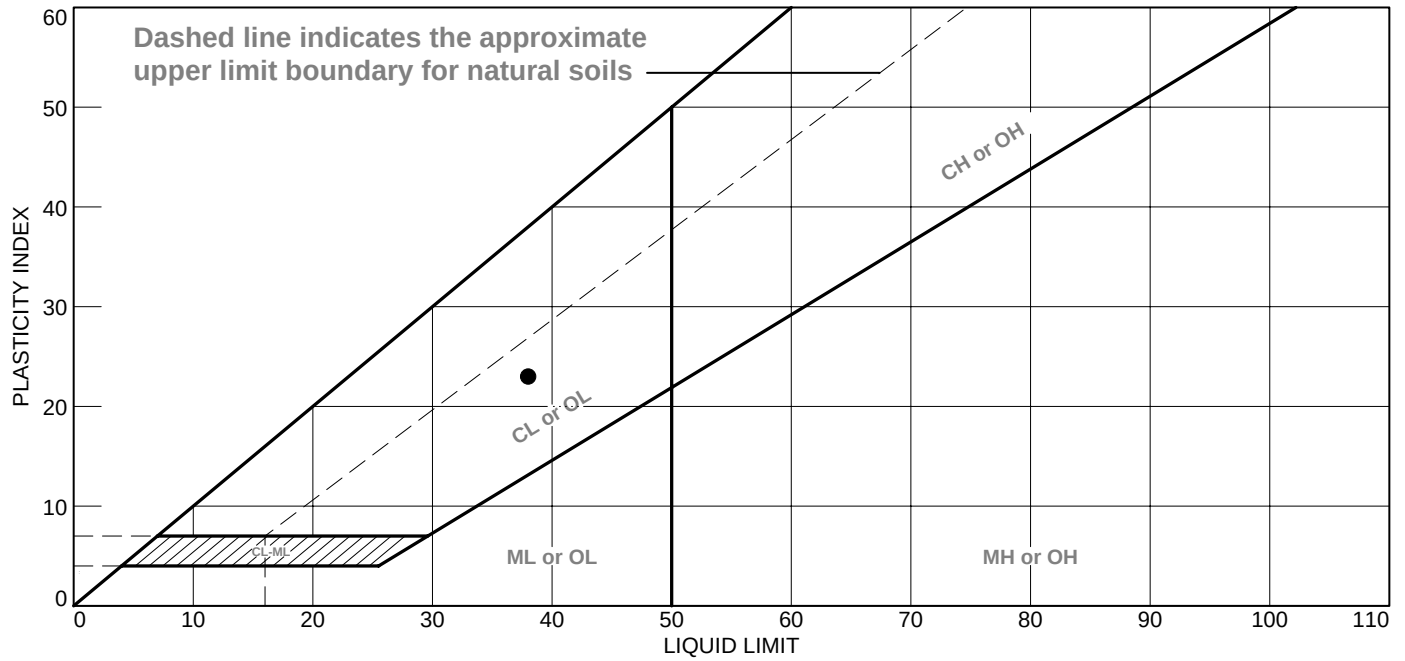
Terracon

Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318



MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
• BROWN AND DARK GRAY LEAN CLAY - SAND SEAMS NOTED	38	15	23	99.5	88.0	CL

Project No. 35185112 **Client:** MICHAEL BAKER INTERNATIONAL LLC

Project: UPRR GRADE SEPARATION

Source of Sample: B-6 **Depth:** 38.5'-40.0'
Sample Number: S-13

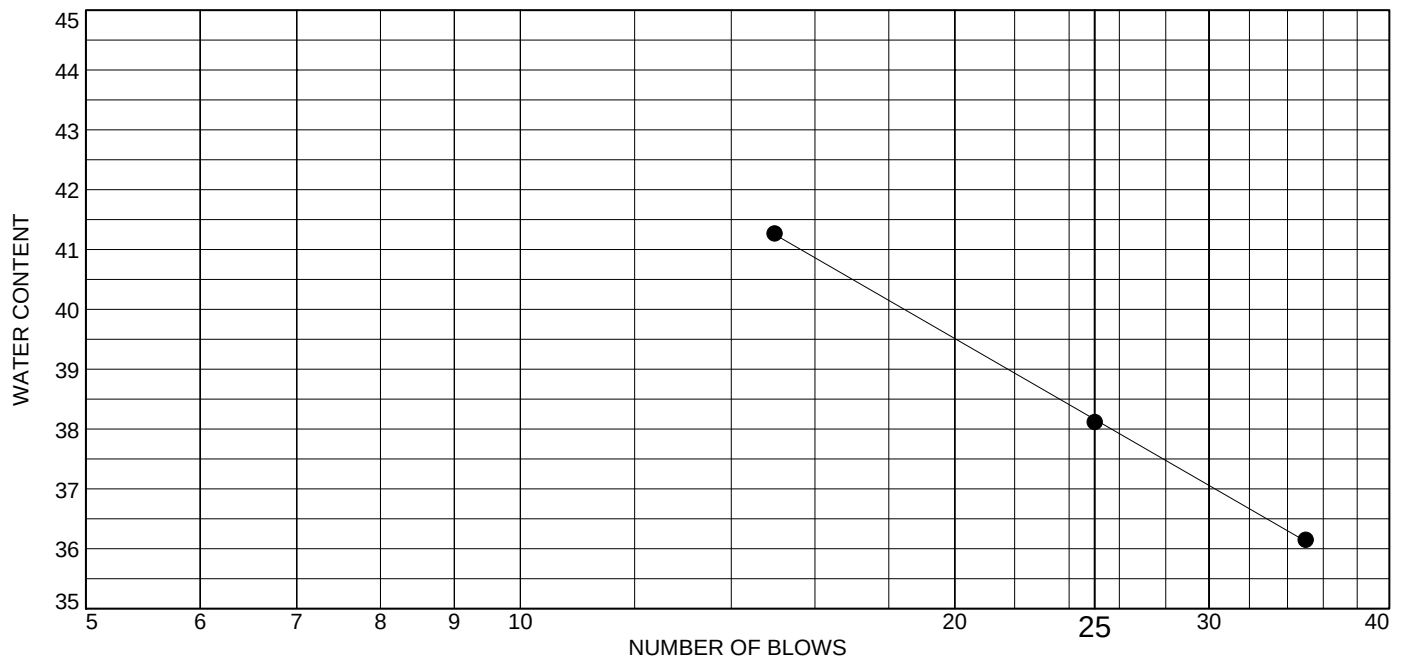
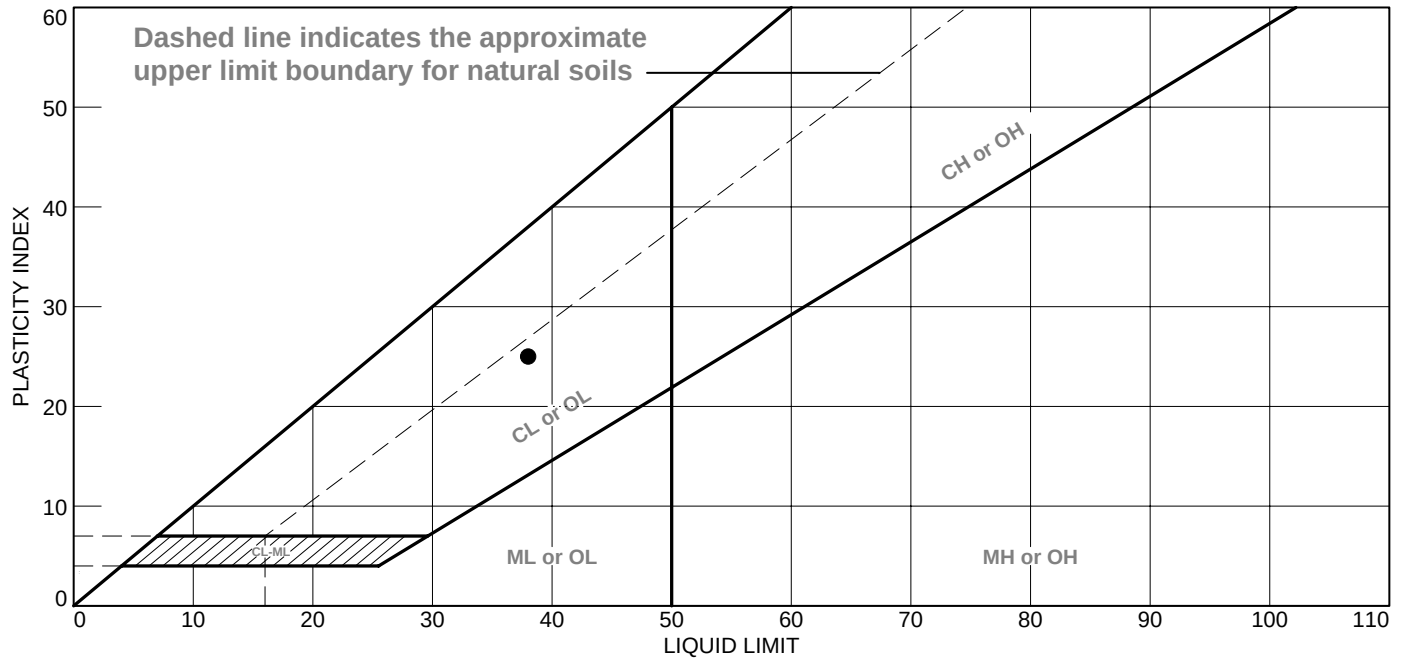
Terracon

Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318



MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
● RUST BROWN, BROWN AND GRAY SANDY LEAN CLAY	38	13	25	93.7	66.9	CL

Project No. 35185112 **Client:** MICHAEL BAKER INTERNATIONAL LLC

Project: UPRR GRADE SEPARATION

Source of Sample: B-7 **Depth:** 8.5'-10.5'
Sample Number: S-5

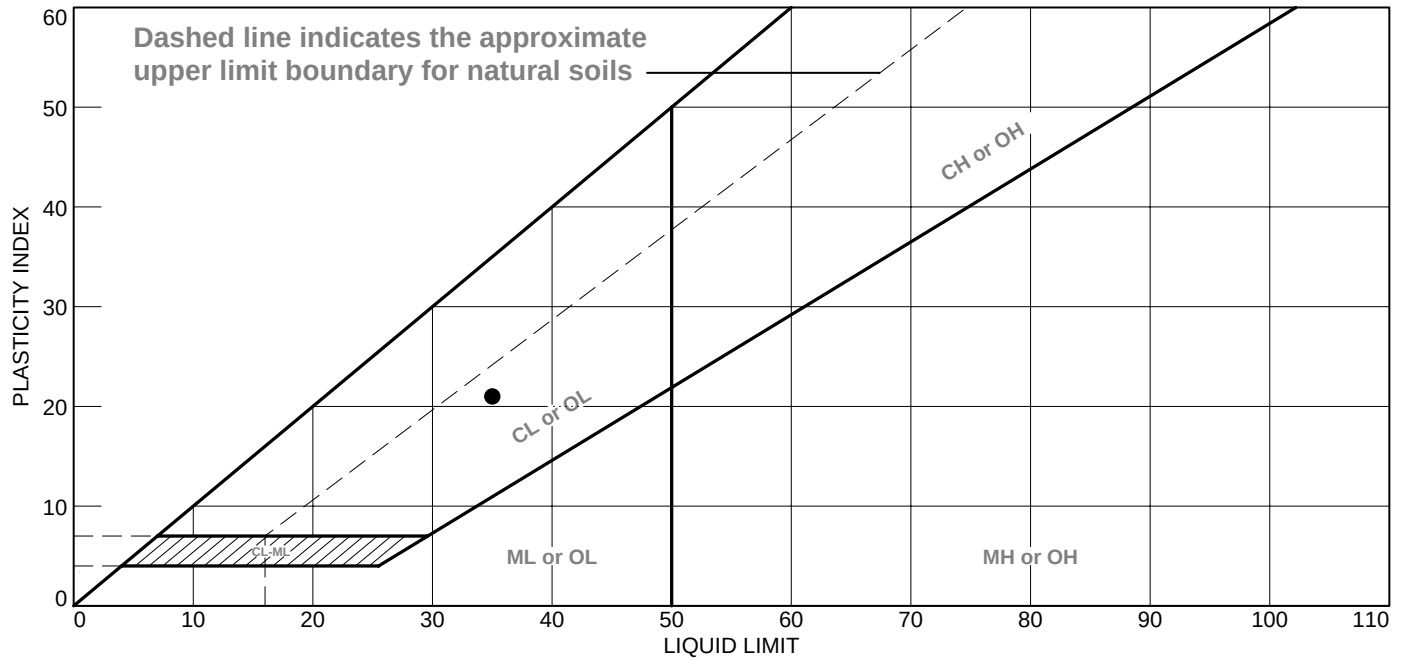
Terracon

Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318



MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
• VERY DARK GRAY LEAN CLAY. NUMEROUS SILT SEAMS NOTED	35	14	21	99.8	85.8	CL

Project No. 35185112 **Client:** MICHAEL BAKER INTERNATIONAL LLC

Project: UPRR GRADE SEPARATION

Source of Sample: B-7 **Depth:** 18.5'-20.0'
Sample Number: S-7

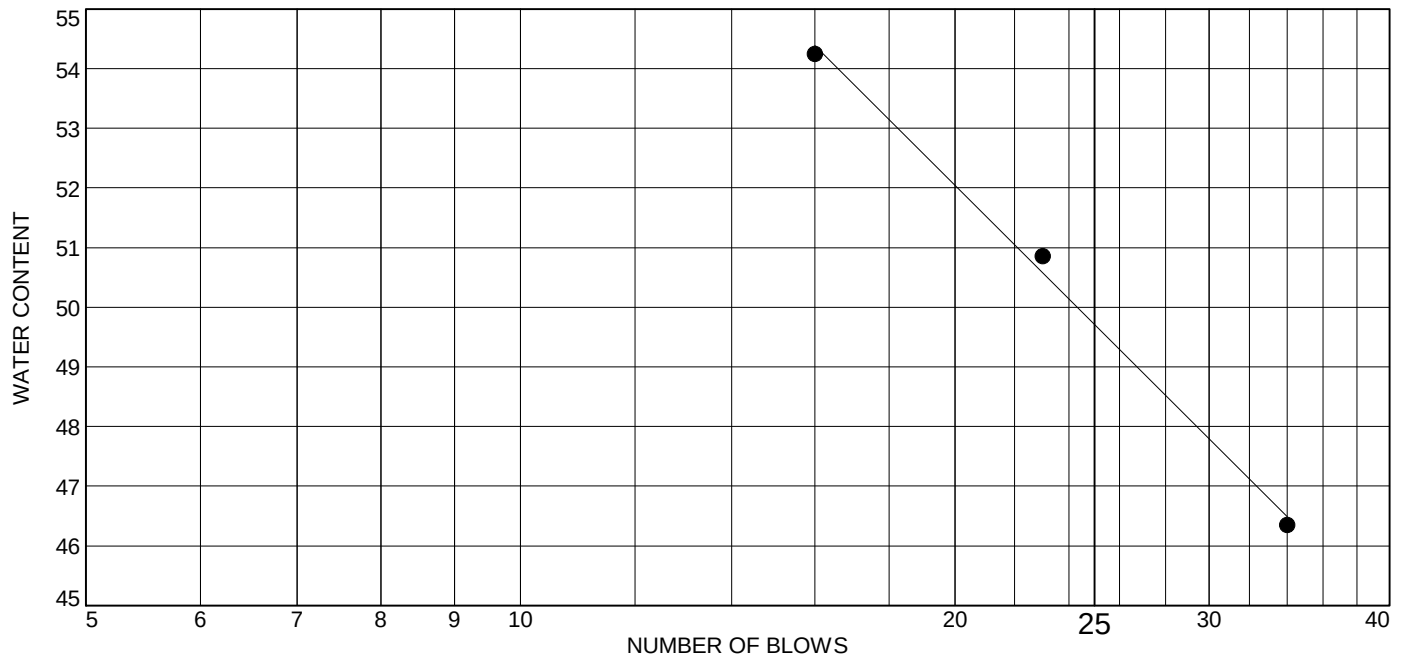
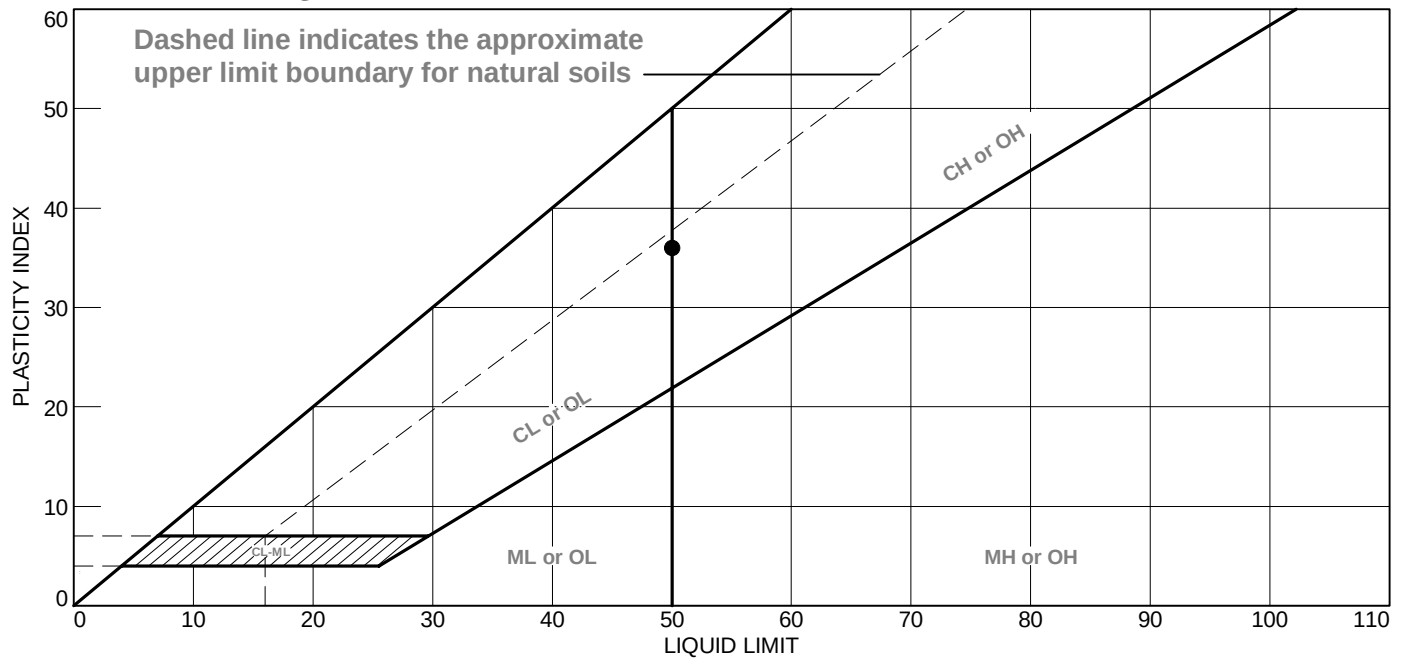
Terracon

Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
•	GRAY AND BROWN FAT CLAY	50	14	36	99.9	86.5	CH

Project No. 35185112 Client: MICHAEL BAKER INTERNATIONAL LLC

Project: UPRR GRADE SEPARATION

Source of Sample: B-7 Depth: 43.5'-45.0'

Sample Number: S-13

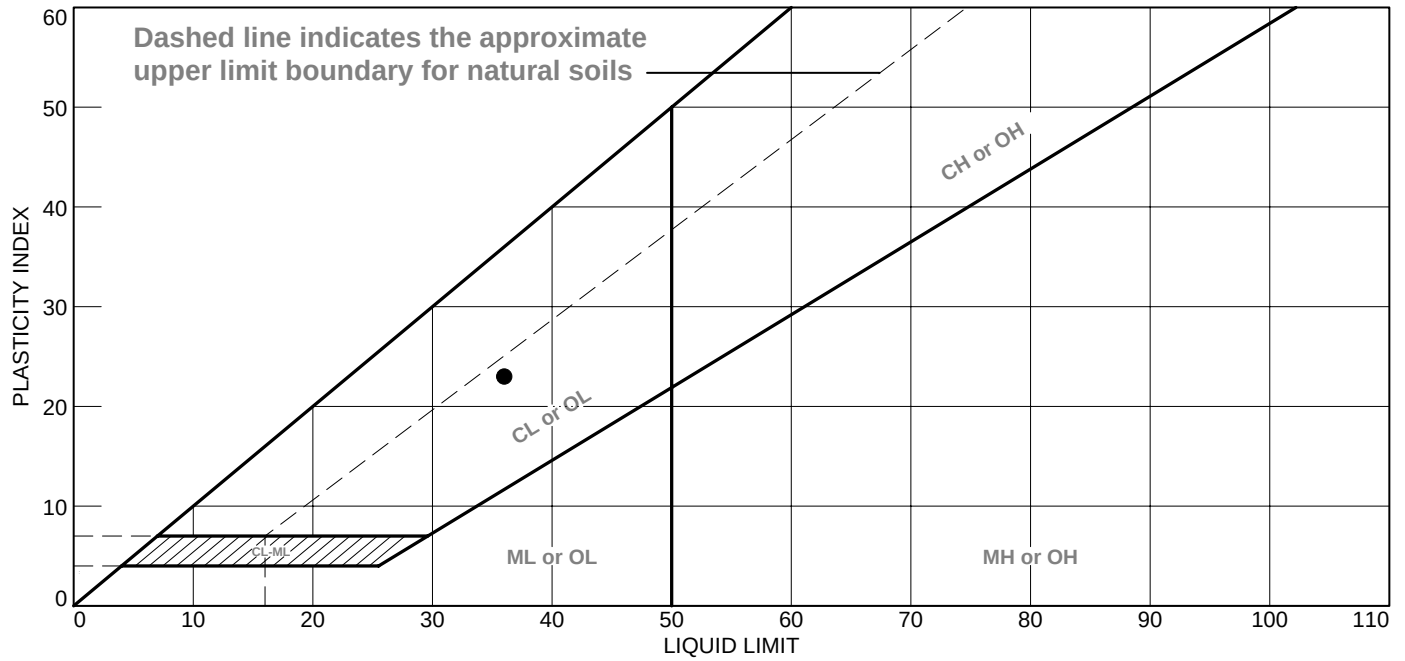
Remarks:

Terracon

Figure

Tested By: DT Checked By: WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	GRAY LEAN CLAY	36	13	23	99.7	95.2	CL

Project No. 35185112 **Client:** MICHAEL BAKER INTERNATIONAL LLC

Project: UPRR GRADE SEPARATION

Source of Sample: B-7 **Depth:** 58.5'-60.0'
Sample Number: S-15

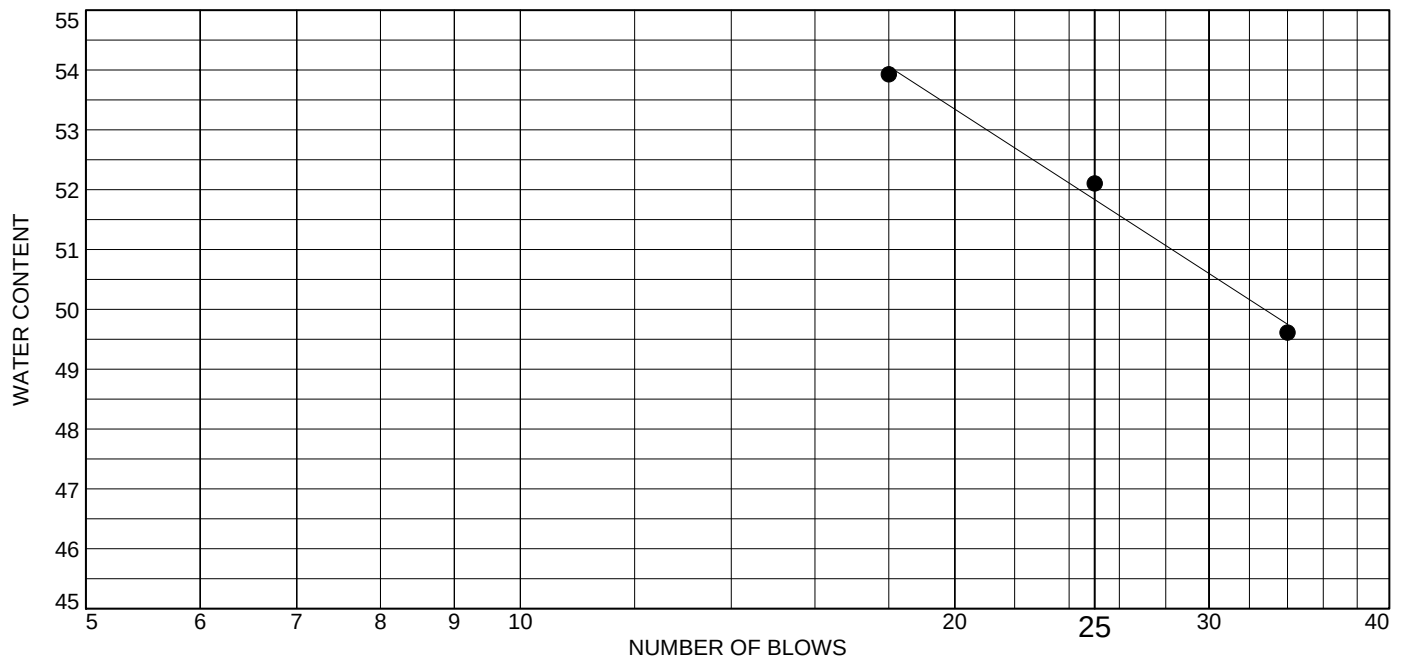
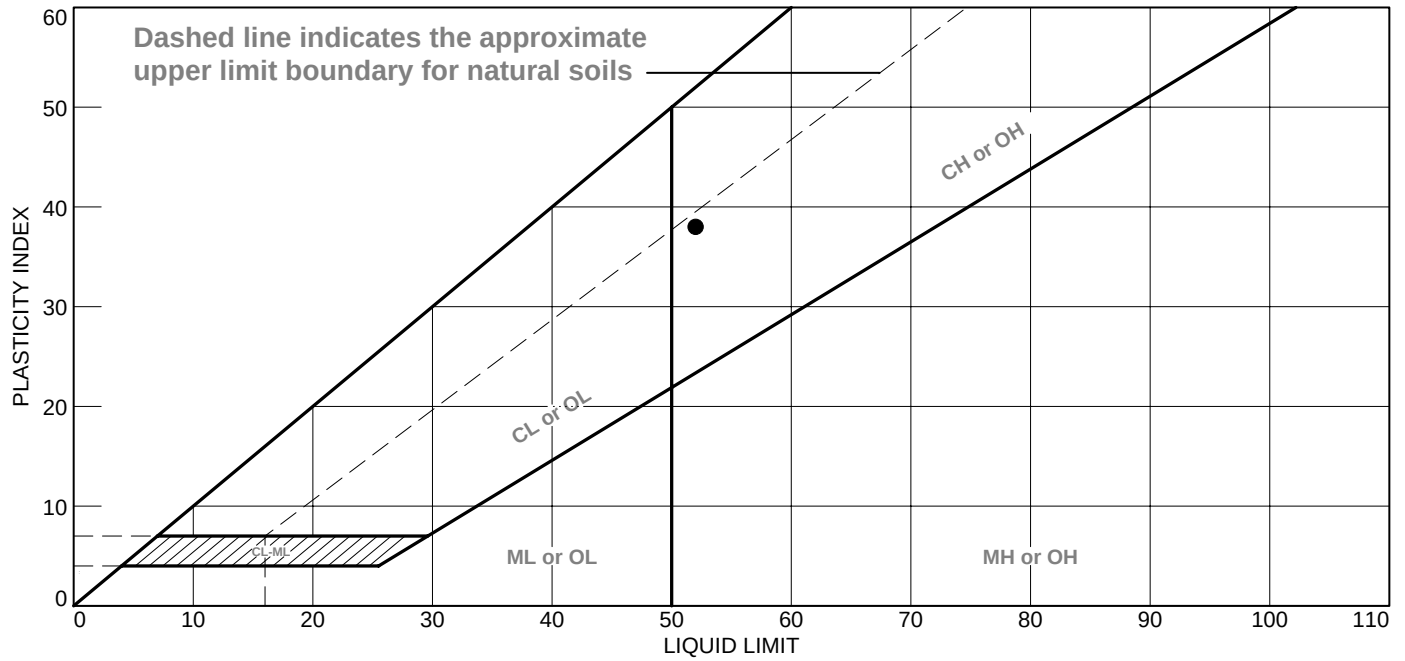
Terracon

Remarks:

Figure

Tested By: DT **Checked By:** WPQ

LIQUID AND PLASTIC LIMITS ASTM D4318



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
•	GRAYISH BROWN FAT CLAY	52	14	38	99.9	96.4	CH

Project No. 35185112 **Client:** MICHAEL BAKER INTERNATIONAL LLC

Project: UPRR GRADE SEPARATION

Source of Sample: B-8 **Depth:** 38.5'-40.0'
Sample Number: S-14

Terracon

Remarks:

Figure

Tested By: DT **Checked By:** WPQ

Laboratory Compaction Characteristics of Soil

4701 North Stiles Ave.
Oklahoma City, OK 73105
(405) 525 0453

Client Name: Michael Baker International, Inc.
Project Name: ArDOT Job No. 070458, UPRR
Location: Highway 82
Buckner, Arkansas
Source Material: Bulk 1 (0'-5')
Sample Description: Sandy Lean Clay, Brown
Material Designation: Lab 527 Sample date: _____
Test Method: Method A
Test Procedure: ASTM D-698
Sample Preparation: Dry
Rammer: X Mechanical _____ Manual

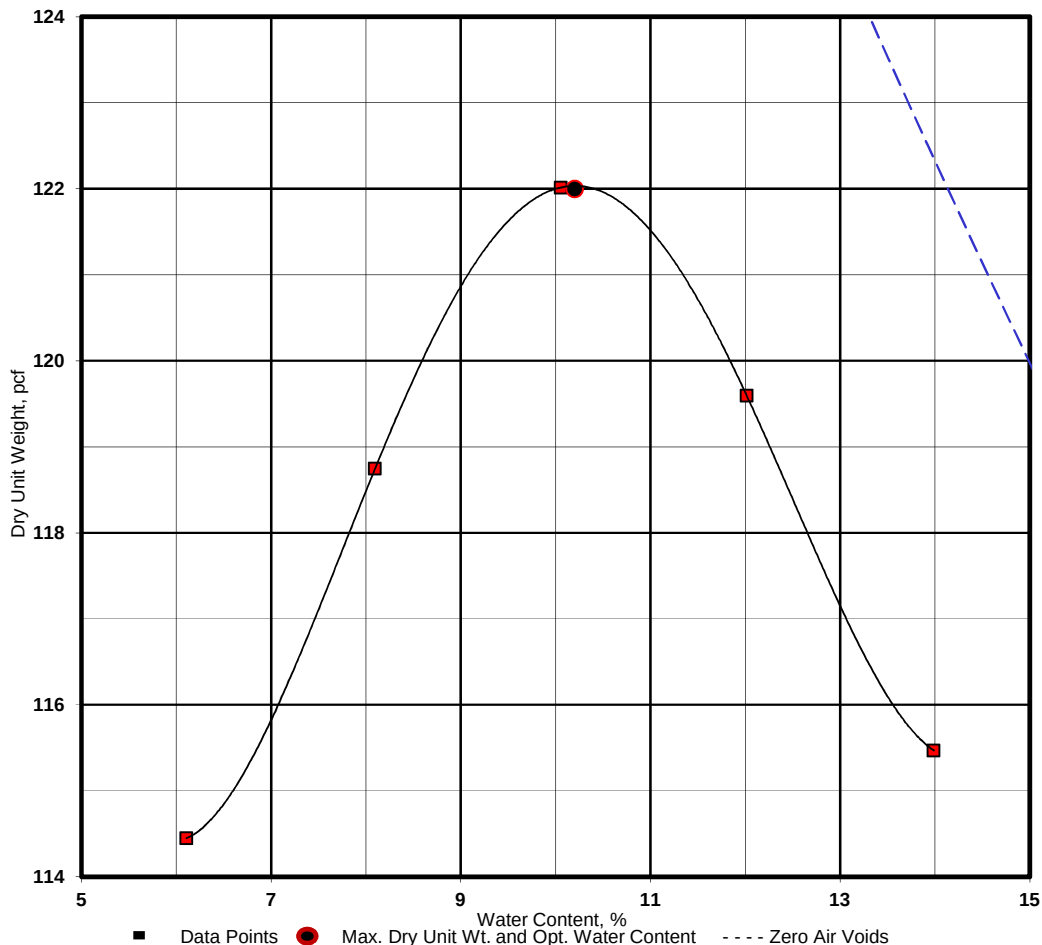
Project No.: 35185112 Date: 08/14/19

TEST RESULTS

Maximum Dry Unit Wt.: 122.0 pcf
Optimum Water Content: 10.2 %

Liquid Limit: 22 Plastic Limit: 12
Plasticity Index: 10
% passing # 200 sieve: 56.3
AASHTO Class. A-4 USCS: CL
Reviewed by: _____

Zero air voids for specific gravity of 2.70



Resilient Modulus Testing - AASHTO T 307-99 English Units

Report Date: 16-Sep-19
 Lab No.: Lab 527 RM 62 omc rerun
 Project No.: 35185112

Soil Map Unit: Bulk 1 OMC
 Soil Symbol: A-4 / CL
 Depth (in.): 0'-5'
 Compaction Method: Static
 Max. Dry Density (pcf): 122.0
 Opt. Moisture Content (%): 10.2
 Inside Mold Diameter (in): 3.94

Weight of Wet Soil (lb): 7.09
 Initial Sample Diameter (in): 3.94
 Initial Sample Height (in): 7.87
 Initial Sample Area (in²): 12.17
 Sample Volume (in³): 95.86
 Compacted Moisture Content(%): 10.2
 Wet Density (pcf): 127.7
 Dry Density (pcf): 115.9

Test Date: August 14, 2019
 Final Sample Height (in): 7.9
 Final Sample Wet Weight (lb): 7.08
 Final Moisture Content (%): 10.1
 Accumulated Strain (%): 0.06
 Percent Passing No. 10: 96
 Percent Passing No. 200: 56.3
 Liquid Limit: 22
 Plasticity Index: 10

Chamber Confining Pressure (S ₃) psi	Nominal Maximum Axial Stress (S _{cyclic}) psi	Actual Applied Max. Axial Load (P _{max}) lb	Actual Applied Cyclic Load (P _{cyclic}) lb	Actual Applied Contact Load (P _{contact}) lb	Actual Applied Max. Axial Stress (S _{max}) psi	Actual Applied Cyclic Stress (S _{cyclic}) psi	Actual Applied Contact Stress (S _{contact}) psi	Recov. Def. LVDT #1 Reading (H ₁) in	Recov. Def. LVDT #2 Reading (H ₂) in	Average Recov. Def. LVDT 1 and 2 (H _{avg}) in	Resilient Strain (ε _r) in/in	Resilient Modulus (M _r) psi
6.00	2.00	23.3	20.9	2.4	1.91	1.72	0.197	0.0008	0.0009	0.0008	0.000108	15,944
6.00	4.00	47.7	43.0	4.6	3.91	3.53	0.381	0.0017	0.0018	0.0018	0.000227	15,595
6.00	6.00	72.1	64.8	7.3	5.92	5.32	0.602	0.0029	0.0029	0.0029	0.000365	14,565
6.00	8.00	96.6	86.9	9.6	7.93	7.14	0.792	0.0042	0.0041	0.0041	0.000524	13,622
6.00	10.00	120.8	108.5	12.3	9.92	8.91	1.006	0.0055	0.0052	0.0054	0.000684	13,032
4.01	2.00	23.2	21.1	2.1	1.91	1.73	0.173	0.0009	0.0011	0.0010	0.000129	13,484
4.01	4.00	47.5	43.0	4.5	3.90	3.53	0.371	0.0021	0.0022	0.0022	0.000276	12,812
4.01	6.00	71.8	64.7	7.1	5.89	5.31	0.582	0.0034	0.0035	0.0035	0.000438	12,115
4.00	8.00	96.2	86.7	9.5	7.90	7.12	0.781	0.0048	0.0047	0.0048	0.000608	11,718
4.01	10.00	120.4	108.5	12.0	9.89	8.91	0.982	0.0062	0.0060	0.0061	0.000778	11,453
2.00	2.00	23.0	21.2	1.8	1.89	1.74	0.150	0.0012	0.0014	0.0013	0.000162	10,776
2.00	4.00	47.3	42.9	4.4	3.88	3.53	0.359	0.0026	0.0028	0.0027	0.000346	10,202
2.00	6.00	71.6	64.7	6.9	5.88	5.32	0.565	0.0042	0.0043	0.0043	0.000541	9,830
2.00	8.00	96.1	86.7	9.4	7.89	7.12	0.770	0.0058	0.0058	0.0058	0.000737	9,670
2.00	10.00	120.3	108.4	11.9	9.88	8.90	0.977	0.0073	0.0073	0.0073	0.000927	9,604

Resilient Modulus Testing - AASHTO T 307-99 English Units

Report Date: 16-Sep-19
 Lab No.: Lab 527 RM 62 omc+2
 Project No.: 35185112

Soil Map Unit: Bulk 1 OMC+2%
 Soil Symbol: CL
 Depth (in.): 0'-5'
 Compaction Method: Static
 Max. Dry Density (pcf): 122.0
 Opt. Moisture Content (%): 10.2
 Inside Mold Diameter (in): 3.94

Weight of Wet Soil (lb): 7.21
 Initial Sample Diameter (in): 3.94
 Initial Sample Height (in): 7.87
 Initial Sample Area (in²): 12.17
 Sample Volume (in³): 95.86
 Compacted Moisture Content(%): 12.3
 Wet Density (pcf): 130.0
 Dry Density (pcf): 115.8

Test Date: August 14, 2019
 Final Sample Height (in): 7.9
 Final Sample Wet Weight (lb): 7.21
 Final Moisture Content (%): 12.4
 Accumulated Strain (%): 0.22
 Percent Passing No. 10: 96
 Percent Passing No. 200: 56.3
 Liquid Limit: 22
 Plasticity Index: 10

Chamber Confining Pressure (S ₃) psi	Nominal Maximum Axial Stress (S _{cyclic}) psi	Actual Applied Max. Axial Load (P _{max}) lb	Actual Applied Cyclic Load (P _{cyclic}) lb	Actual Applied Contact Load (P _{contact}) lb	Actual Applied Max. Axial Stress (S _{max}) psi	Actual Applied Cyclic Stress (S _{cyclic}) psi	Actual Applied Contact Stress (S _{contact}) psi	Recov. Def. LVDT #1 Reading (H ₁) in	Recov. Def. LVDT #2 Reading (H ₂) in	Average Recov. Def. LVDT 1 and 2 (H _{avg}) in	Resilient Strain (ε _r) in/in	Resilient Modulus (M _r) psi
6.00	2.00	23.5	21.0	2.4	1.93	1.73	0.200	0.0010	0.0012	0.0011	0.000137	12,647
6.00	4.00	47.4	42.6	4.8	3.89	3.50	0.394	0.0021	0.0024	0.0022	0.000285	12,259
6.00	6.00	72.0	64.6	7.4	5.92	5.31	0.608	0.0036	0.0038	0.0037	0.000470	11,303
6.00	8.00	96.9	87.1	9.8	7.96	7.15	0.802	0.0052	0.0054	0.0053	0.000671	10,663
6.00	10.00	121.2	108.8	12.4	9.95	8.93	1.022	0.0066	0.0068	0.0067	0.000855	10,445
4.01	2.00	23.6	21.2	2.3	1.93	1.74	0.190	0.0012	0.0014	0.0013	0.000169	10,341
4.01	4.00	47.9	43.0	4.9	3.93	3.53	0.403	0.0027	0.0031	0.0029	0.000370	9,527
4.01	6.00	72.2	64.9	7.3	5.93	5.33	0.603	0.0045	0.0048	0.0046	0.000590	9,031
4.01	8.00	96.7	87.0	9.7	7.94	7.15	0.796	0.0062	0.0064	0.0063	0.000802	8,913
4.01	10.00	121.1	109.0	12.1	9.95	8.95	0.996	0.0078	0.0080	0.0079	0.001007	8,893
2.00	2.00	23.0	20.9	2.1	1.89	1.72	0.175	0.0016	0.0017	0.0016	0.000209	8,208
2.00	4.00	47.6	43.2	4.5	3.91	3.54	0.367	0.0036	0.0040	0.0038	0.000480	7,381
2.00	6.00	71.8	64.9	6.9	5.90	5.33	0.571	0.0057	0.0061	0.0059	0.000752	7,087
2.00	8.00	96.3	86.8	9.5	7.91	7.13	0.777	0.0077	0.0080	0.0078	0.000997	7,152
2.00	10.00	120.4	108.6	11.8	9.89	8.92	0.971	0.0096	0.0099	0.0097	0.001237	7,206

SUPPORTING INFORMATION

Contents:

General Notes

Unified Soil Classification System

Note: All attachments are one page unless noted above.

GENERAL NOTES

DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

Job No. 070458, UPRR Grade Separation ■ Buckner, Arkansas

Terracon Project No. 35185112

SAMPLING	WATER LEVEL	FIELD TESTS
 Grab Sample  Shelby Tube  Standard Penetration Test	 Water Initially Encountered  Water Level After a Specified Period of Time  Water Level After a Specified Period of Time Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.	N Standard Penetration Test Resistance (Blows/Ft.) (HP) Hand Penetrometer (T) Torvane (DCP) Dynamic Cone Penetrometer UC Unconfined Compressive Strength (PID) Photo-Ionization Detector (OVA) Organic Vapor Analyzer

DESCRIPTIVE SOIL CLASSIFICATION
Soil classification is based on the Unified Soil Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.
LOCATION AND ELEVATION NOTES
Unless otherwise noted, Latitude and Longitude are approximately determined using a hand-held GPS device. The accuracy of such devices is variable. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STRENGTH TERMS				
RELATIVE DENSITY OF COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance		CONSISTENCY OF FINE-GRAINED SOILS (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance		
Descriptive Term (Density)	Standard Penetration or N-Value Blows/Ft.	Descriptive Term (Consistency)	Unconfined Compressive Strength Qu, (psf)	Standard Penetration or N-Value Blows/Ft.
Very Loose	0 - 3	Very Soft	less than 500	0 - 1
Loose	4 - 9	Soft	500 to 1,000	2 - 4
Medium Dense	10 - 29	Medium Stiff	1,000 to 2,000	4 - 8
Dense	30 - 50	Stiff	2,000 to 4,000	8 - 15
Very Dense	> 50	Very Stiff	4,000 to 8,000	15 - 30
		Hard	> 8,000	> 30

RELATIVE PROPORTIONS OF SAND AND GRAVEL		RELATIVE PROPORTIONS OF FINES	
Descriptive Term(s) of other constituents	Percent of Dry Weight	Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	<15	Trace	<5
With	15-29	With	5-12
Modifier	>30	Modifier	>12
GRAIN SIZE TERMINOLOGY		PLASTICITY DESCRIPTION	
Major Component of Sample	Particle Size	Term	Plasticity Index
Boulders	Over 12 in. (300 mm)	Non-plastic	0
Cobbles	12 in. to 3 in. (300mm to 75mm)	Low	1 - 10
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)	Medium	11 - 30
Sand	#4 to #200 sieve (4.75mm to 0.075mm)	High	> 30
Silt or Clay	Passing #200 sieve (0.075mm)		

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests ^A					Soil Classification	
					Group Symbol	Group Name ^B
Coarse-Grained Soils: More than 50% retained on No. 200 sieve	Gravels: More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels: Less than 5% fines ^C	$Cu \geq 4$ and $1 \leq Cc \leq 3$ ^E	GW	Well-graded gravel ^F	
			$Cu < 4$ and/or $[Cc < 1$ or $Cc > 3.0]$ ^E	GP	Poorly graded gravel ^F	
		Gravels with Fines: More than 12% fines ^C	Fines classify as ML or MH	GM	Silty gravel ^{F, G, H}	
			Fines classify as CL or CH	GC	Clayey gravel ^{F, G, H}	
	Sands: 50% or more of coarse fraction passes No. 4 sieve	Clean Sands: Less than 5% fines ^D	$Cu \geq 6$ and $1 \leq Cc \leq 3$ ^E	SW	Well-graded sand ^I	
			$Cu < 6$ and/or $[Cc < 1$ or $Cc > 3.0]$ ^E	SP	Poorly graded sand ^I	
		Sands with Fines: More than 12% fines ^D	Fines classify as ML or MH	SM	Silty sand ^{G, H, I}	
			Fines classify as CL or CH	SC	Clayey sand ^{G, H, I}	
Fine-Grained Soils: 50% or more passes the No. 200 sieve	Silts and Clays: Liquid limit less than 50	Inorganic:	$PI > 7$ and plots on or above “A”	CL	Lean clay ^{K, L, M}	
			$PI < 4$ or plots below “A” line ^J	ML	Silt ^{K, L, M}	
		Organic:	Liquid limit - oven dried	< 0.75	OL	Organic clay ^{K, L, M, N}
			Liquid limit - not dried			Organic silt ^{K, L, M, O}
	Silts and Clays: Liquid limit 50 or more	Inorganic:	PI plots on or above “A” line	CH	Fat clay ^{K, L, M}	
			PI plots below “A” line	MH	Elastic Silt ^{K, L, M}	
		Organic:	Liquid limit - oven dried	< 0.75	OH	Organic clay ^{K, L, M, P}
			Liquid limit - not dried			Organic silt ^{K, L, M, Q}
Highly organic soils:	Primarily organic matter, dark in color, and organic odor			PT	Peat	

^A Based on the material passing the 3-inch (75-mm) sieve.

^B If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

^C Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

^D Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.

$$Cu = D_{60}/D_{10} \quad Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$$

^F If soil contains $\geq 15\%$ sand, add "with sand" to group name.

^G If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

^H If fines are organic, add "with organic fines" to group name.

^I If soil contains $\geq 15\%$ gravel, add "with gravel" to group name.

^J If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

^K If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

^L If soil contains $\geq 30\%$ plus No. 200 predominantly sand, add "sandy" to group name.

^M If soil contains $\geq 30\%$ plus No. 200, predominantly gravel, add "gravelly" to group name.

^N $PI \geq 4$ and plots on or above "A" line.

^O $PI < 4$ or plots below "A" line.

^P PI plots on or above "A" line.

^Q PI plots below "A" line.

