Appendix E

Geotechnical Data Report

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Geotechnical Data Report

Prepared for:

Baker Pump Station -
City of Dallas
Major Flood Management and Storm Drainage Projects

February, 2009

Prepared by

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1 Introduction 1
1.1 Project Background 1
1.2 Project Description 1
1.3 Purpose of the Report 1
1.4 Role of the Program Management Consultant 1
2 Subsurface Investigations 3
2.1 Boring Program and Requirements 3
2.2 Drilling Procedures 3
2.3 Drilling Equipment 4
2.4 Field Logging of Samples 5
2.4.1 Soil Description 5
2.4.2 Rock Descriptions 5
2.4.3 Recovery / RQD 6
2.5 Groundwater 6
3 Laboratory Testing 7
3.1 Laboratory Testing Requests 7
3.2 Testing Performed 7
3.3 Testing Laboratories 7

1 Introduction

1.1 Project Background

The City of Dallas operates numerous flood management pumping stations along the Trinity River which collect storm water run off, and conveys the runoff through or over the existing levee for discharge into the Trinity River. The existing Old and New Baker Pump stations are a part of this flood control system.

In order to provide increased pump capacity and limit flooding up stream of the existing Baker pump stations the City has requested that a new pump station be constructed which will share the sump area with the New Baker Pump Station and which will provide an increase in the total pump capacity at the Baker location.

The City has contracted with Jacobs / Carter Burgess to design the new pump station. This design includes the geotechnical design of the new pump station being undertaken by Fugro Consultants, Inc.

1.2 Project Description

The new Baker pump station will be constructed to the west of the existing New and Old Baker stations on land to be acquired which front Irving Boulevard. The new facility will be located on the opposite side of the existing sump from the existing buildings. The proposed pump station construction will include a new access to the station from Irving Boulevard, sump improvements including a new head wall and culverts at the Oaklawn – Hampton Sump Connection, and some re-construction of the head wall adjacent to the New Baker pump station.

1.3 Purpose of the Report

The purpose of the Geotechnical Data Report (GDR) for the Baker Pump Station is to present the data which was collected during the preliminary and final geotechnical investigations. This data includes the boring logs, which outline the existing site soil and rock stratigraphy, and the laboratory test results. The GDR presents the fact concerning the ground and groundwater conditions as observed. Other design reports will be prepared by the project geotechnical consultant, Fugro, which will contain geotechnical recommendation and any interpretations of this data.

1.4 Role of the Program Management Consultant

HNTB has been hired by the City of Dallas to act as the Program Management Consultant (PMC), for the various projects of the overall flood management improvement project. Part of HNTB's role as PMC is to coordinate and oversee the field drilling operations and laboratory testing as requested by the geotechnical design consultants. At the Baker pump station we reviewed the preliminary and final geotechnical boring requests, as outlined in the memoranda

from Jacobs / Carter Burgess and Fugro dated November 28, 2007 and October 1, 2008, respectively.

Representatives of the PMC coordinated with the geotechnical project consultant, Mas-Tek Engineering & Associates, Inc., to provide the field drilling and laboratory testing in accordance with the geotechnical design consultant's requests. The PMC also provided preliminary boring logs and laboratory testing results to the design team to facilitate the design process prior to completion of this GDR.

2 Subsurface Investigations

2.1 Boring Program and Requirements

The subsurface investigations for the proposed pump station included soil borings and rock cores. The following table lists the borings and provides their location and total depth drilled. Additionally, the boring locations are shown in the attached Appendix A .

The borings were numbered BB-1 through BB-11A. Borings BB-1 through BB-3 were drilled in January and February, 2008 and constituted the preliminary borings for the project. The remaining borings were drilled in October, 2008 and were the final investigations for the project. The drilling requests are provided in the attached Appendix A.

Boring Locations and Depths

Boring	Location		Depth	Ground Surface Elevation
	North	East		
BB-1	6976740	2478872	100’	392.1
BB-2	6977712	2479381	100’	405.1
BB-3	6976564	2478919	100’	404.4
BB-3A	6977518	2479254	32.8’	404.6
BB-4	6977586	2479213	52’	405.0
BB-5	6977803	2479697	51.5’	404.9
BB-6	6977721	2479509	30.5’	405.4
BB-7	6977891	2479365	11’	405.5
BB-8	6977995	2479447	10’	404.2
BB-9	6977449	2479189	65’	432.3
BB-10	6977336	2479135	39.5’	405.6
BB-11	6977357	2479627	30.5’	408.9
BB-11A	6977341	2479571	50’	409.0

Northing and Easting are approximate Texas State Plane Coordinates (NAD 83)

2.2 Drilling Procedures

Drilling procedures were outlined by Fugro, in their boring request memoranda. These drilling procedures included sampling intervals, required sample sizes for undisturbed soil samples and rock cores, and any other special instructions. Additionally, due to the proximity of some of the borings to the existing Trinity River levee, selected borings of special interest to the Corps of Engineers were drilled in accordance with US Army Corps of Engineers ER 1110-1-1807 “Procedures for Drilling in Earth Embankments.”

In general, samples of the overburden soils were taken continuously through the top 10 feet and at 5 foot intervals thereafter in the preliminary borings BB-1 through BB-3. In the final borings

BB-3A through BB-11A, samples of the overburden soils were taken at 2.5 foot intervals after the top 10 feet, and continuously in the weathered shale.

Those borings which were to include rock coring were drilled to the auger or split spoon refusal depth, at which point the augers were seated into the top of rock and coring was begun through the hollow stems. All rock coring was performed using clear water as the drilling fluid, with re-circulating pressure maintained at a minimum to prevent damage to softer or more weathered sections of core.

Rock cores were reviewed in the field and placed in cardboard or wooden core boxes. All portions of rock core longer than four inches were wrapped in foil, then cellophane to protect the core from moisture loss. The core boxes were labeled in the field to identify the specific boring, and depth for each core run. Core runs were maintained at five feet or less, depending on the degree of difficulty in recovering the rock core. Also during rock coring Texas Highway Department (THD) cone penetration testing was performed at approximately five foot intervals within the shale and at the bottom of the boring.

Upon completion those borings within 200 feet of the toe of the levee were grouted in accordance with the U.S. Army Corps of Engineers requirements.

2.3 Drilling Equipment

In general, all of the borings were drilled with the same basic equipment. The following outlines the general equipment used during the field investigations.

Soil Drilling Equipment – All of the borings were drilled through the overburden soils using hollow stem augers. The majority of the borings were drilled using 3 ¼" I.D. hollow stem augers, with the exception of BB-4 and BB-5. These borings were drilled using 10 ¼" I.D. augers. All hollow stems were equipped with internal "reverse" augers during drilling operations to prevent the build up of cuttings within the hollow stems.

Rock Coring Equipment – Rock coring was performed with double barrel rock coring equipment, equipped with carbide stepped core bits. Standard NX sized rock cores, which produce nominal 2" diameter cores, were used at all of the borings, with the exception of BB-4 and BB-5. These borings were cored using HX sized rock core, which produce nominal 4" diameter core samples.

Soil Sampling Equipment – Soil samples were obtained by the use of either driven split spoon samplers or 3" diameter Shelby tubes. Spilt spoon sampling was performed in granular soils in general accordance with ASTM D1586. The split spoon sampler was driven either by a safety or automatic style hammer, depending on the drilling rig used.

Undisturbed samples were obtained using thick walled Shelby tubes, with pushes varying from 1 to 2 feet depending on the consistency of the materials encountered. In accordance with local practices the tubes were field extruded; samples were double wrapped in plastic and placed in cardboard samples boxes.

Drilling Equipment - Due to the time between the preliminary and final boring investigations and the accelerated nature of the final investigation, a number of different drilling rigs were utilized during the investigation. The following lists the borings and the drilling rig used at each.

BB-1	CME 55 – ATV mounted – Automatic hammer
BB-2	Gardner Denver 1000R – Truck mounted – Automatic hammer
BB-3	Mobile Drill B-57 – Truck mounted – Safety hammer
BB-3A	Mobile Drill B-57 – Truck mounted – Safety hammer
BB-4	CME 75 – Truck mounted (Soil); Gardner Denver 1000R (Rock)
BB-5	CME 75 – Truck mounted – Automatic hammer
BB-6	CME 75 – Truck mounted – Automatic hammer
BB-7	Mobile Drill B-57 – Truck mounted – Safety hammer
BB-8	Mobile Drill B-57 – Truck mounted – Safety hammer
BB-9	CME 75 – Truck mounted – Automatic hammer
BB-10	CME 75 – Truck mounted – Automatic hammer
BB-11	Mobile Drill B-57 – Truck mounted – Safety hammer
BB-11A	Mobile Drill B-57 – Truck mounted – Safety hammer

2.4 Field Logging of Samples

All boring samples were field logged by a geotechnical engineer or field geologist during the drilling operations. The field descriptions are based predominantly on visual and textural observations of the soils and rock cores. The final descriptions contained on the borings logs are based on the field descriptions and have been updated based on any subsequent laboratory testing.

2.4.1 Soil Description

Field descriptions of the overburden soils were based on the ASTM D2488. The soil description contains five main descriptive components: consistency, color, major and minor soil constituents and moisture. The soil descriptions are based on standard geotechnical terminology, as outlined in the attached Appendix D.

Additionally, during sampling pocket penetrometer readings were taken on selected undisturbed samples to provide additional information for the soil consistency. Also, the borings were not left open for 24 hour water readings; as such the moisture descriptions should not be used as an indicator of the presence of absence of the groundwater table.

2.4.2 Rock Descriptions

Rock descriptions were made by a geotechnical engineer or geologist at the time of drilling. Rock descriptions generally consist of eight components: lithology, continuity, hardness, weathering, color, texture, bedding/foliation, and joint spacing.

In addition to descriptions of the rock itself any discontinuities, or solution features encountered were described in the log. The rock and discontinuity descriptions are based on standard geological terminology, as shown on the "Visual Description of Rock Core" in Appendix D.

2.4.3 Recovery / RQD

Recovery and the Rock Quality Designation (RQD) are reported for all of the rock core runs. Recovery is reported as a percentage based on the amount of rock recovered compared to the total core run. Recovery values less than 100% indicate that some portion of the core was not recovered. This lost recovery may be the result of a number of factors. Efforts were made, when possible, to determine the likely cause of lost recovery and these were noted on the boring logs.

RQD values are reported as a percentage of the total of rock core pieces, 4 inches or longer in length, compared to the total core run. RQD values less than 100% indicates the presence of breaks closer than 4 inches apart. Due to difficulties during extraction of the core in selected instances, some of the core segments were not brought to the surface for visual observation. These instances of lost recovery the RQD associated with these samples may no be indicative of the actual quality of the rock in situ.

It should be noted that due to the weak nature of the rock it is difficult to distinguish natural breaks, which affect the RQD analysis, from mechanically-induced breaks, which do not affect the RQD. In the field if a break could not be conclusively determined to be of a mechanically-induced nature, it was assumed to be natural. As such, the RQD values should be considered to be on the conservative side.

2.5 Groundwater

Due to the U.S. Corps of Engineers requirements concerning drilling adjacent to the levee, none of the borings were able to be left open for extended water level readings. The groundwater levels noted on the logs are consistent with observations of water noted on the drill rods used to obtain samples. As such these ground water readings may not represent the long-term static groundwater level. No historical data search was performed by the PMC as a part of this GDR.

3 Laboratory Testing

3.1 Laboratory Testing Requests

The nature and extent of laboratory testing was determined by the geotechnical design consultant, Fugro, based on their review of the preliminary boring logs, provided at the time of the drilling. These laboratory requests were transmitted to the PMC, and in turn forwarded to the geotechnical testing laboratory. The laboratory requests are included in the attached Appendix C.

3.2 Testing Performed

The laboratory test requests included the following tests: natural moisture content, Atterberg Limits, grain size analysis, percent passing #200 sieve, unconfined compressive strength, unit weight, consolidation, consolidated-undrained triaxial testing (CU), unconsolidated-undrained triaxial testing (UU), drained direct shear testing, and sulfate content testing.

Laboratory test requested, were provided by Fugro to the PMC based on the draft boring logs. These requests and any specific testing procedures or requirements were forwarded to the testing laboratory by the PMC.

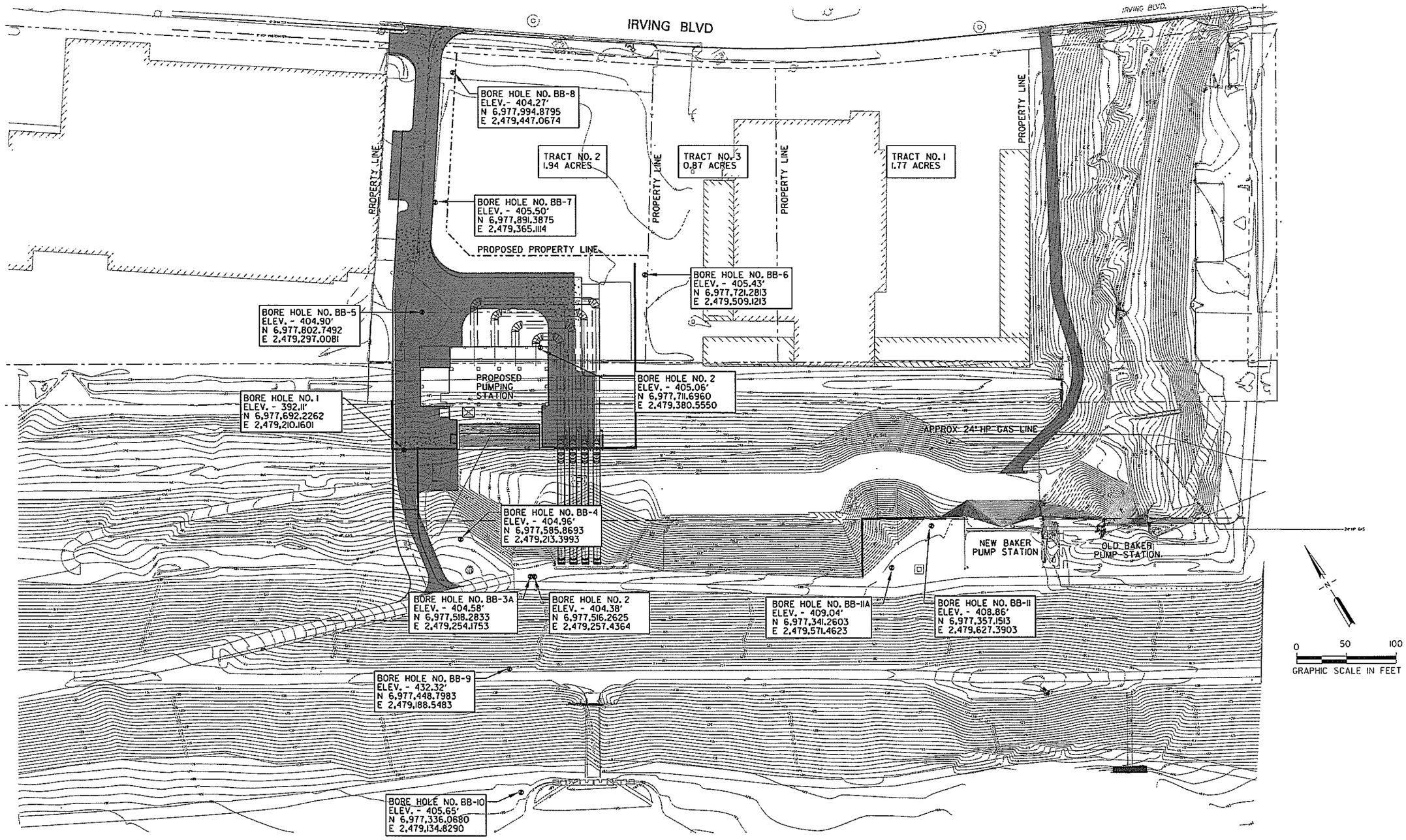
The results of the laboratory testing are included in the attached Appendix C.

3.3 Testing Laboratories

Four laboratories were used to process the laboratory testing due to the time constraints and the ability to perform certain tests. The primary testing laboratory was Mas-Tek, the project geotechnical consultant. In addition to Mas-Tek additional samples were tested by Fugro Consultants, Inc., Houston, TX, Geotesting Express, Boxborough, MA, and Anachem, Inc, Allen, TX.

Appendix A –

Boring Locations
and Field Investigation Requests



CONTRACT NO. 09-XXXX

MARK	DESCRIPTION	DATE	APPR.

SCALE: AS SHOWN
DESIGNED BY:
DRAWN BY:
REVIEWED BY:
CHECKED BY:
PROJECT NO: 02427100
FILE NAME:
DATE:

THESE DOCUMENTS ARE FOR REVIEW ONLY AND NOT INTENDED FOR CONSTRUCTION, BIDDING, OR PERMIT PURPOSES. THEY WERE PREPARED BY, OR UNDER THE SUPERVISION OF: A.C. PETRASEK, JR., P.E. # 35168

JACOBS ENGINEERING GROUP, INC. #2966

Carter::Burgess
CONSULTANTS IN ENGINEERING, ARCHITECTURE, CONSTRUCTION MANAGEMENT AND RELATED SERVICES
7950 ELMBROOK DRIVE, DALLAS, TEXAS, 75254
PHONE (214) 638-0145, FAX (214) 638-0447

CITY OF DALLAS DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION
BAKER STORM WATER PUMPING STATION

BORE HOLE LOCATIONS

VERIFY SCALE
0 1
BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT 1 INCH ON THIS SHEET, ADJUST SCALE

SHEET REF. NO.
LB-1
OF

USER= cgruthersgg
PLOTTED= 2/6/2009 10:12:10 AM
PEN TABLE= DALLAS-HALF.tbl
PLOT DRIVER= $PLTDRV1$
SCALE= 99.9574 ' / IN.
DGN=I:\PW\02427100 City of Dallas Flood Management\DESIGN\BAKER PUMP STATION\CIVIL\SHEET LB1-277B-600BLB.sht

JACOBS
Carter Burgess

MEMO

DATE: November 28, 2007

TO: HNTB
Freese & Nichols
File

FROM: Gary Dreighton, P.E.

SUBJECT: Preliminary Boring Locations for Baker Storm Water Pump Station

Three (3) preliminary boring locations have been identified in the attached drawing with this memo. The locations of these borings are predicated upon finalizing the Baker pump station location. Additional borings will be required throughout the design phase of the project. These additional borings will be identified and submitted to HNTB at an appropriate time.

Based on our conversations with our geotechical engineer, the preliminary borings should penetrate at least 30 to 40 feet below the bottom of the pump station. On this basis, the borings should probably be 100 feet deep.

With regard to laboratory tests on samples obtained from the borings, the type of test and number of tests will depend to some degree on the types of soils and rock encountered. For three (3) borings to 100' depth, following is a listing of what the geotech would envision for the preliminary borings:

1. Soil moisture content	20 tests
2. Soil dry density	10 tests
3. Atterberg limits	10 tests
4. -200 sieve	12 tests
5. Full sieve analysis	6 tests
6. Permeability (flexible wall)	6 tests
7. Soil unconfined compression	12 tests
8. Soil unconsolidated undrained triaxial shear	3 test points
9. Soil consolidated undrained triaxial shear w/pore pressure	6 test points
10. Overburden swell	8 tests
11. Swell-consolidation (ASTM D 4546, Method C)	3 tests
12. Rock moisture content	30 tests
13. Rock dry density	20 tests
14. Rock unconfined compression	20 tests

The shale samples used for tests will require special care, since these materials will deteriorate rapidly upon removal from the ground. A double wrap of foil and poly helps keep test samples from drying out. It would be useful to obtain photographs of the rock core samples, if this can be worked into the program.

When we get closer to the start time for drilling, it may be useful to coordinate with the field and laboratory representatives in an effort to optimize the information obtained.

Let me know if you have any questions.

Sincerely,

Gary Dreighton, P.E

Attachments: 1 exhibit
CC: Bruce Bailey, Ph.D., P.E.

TRACT NO. 1

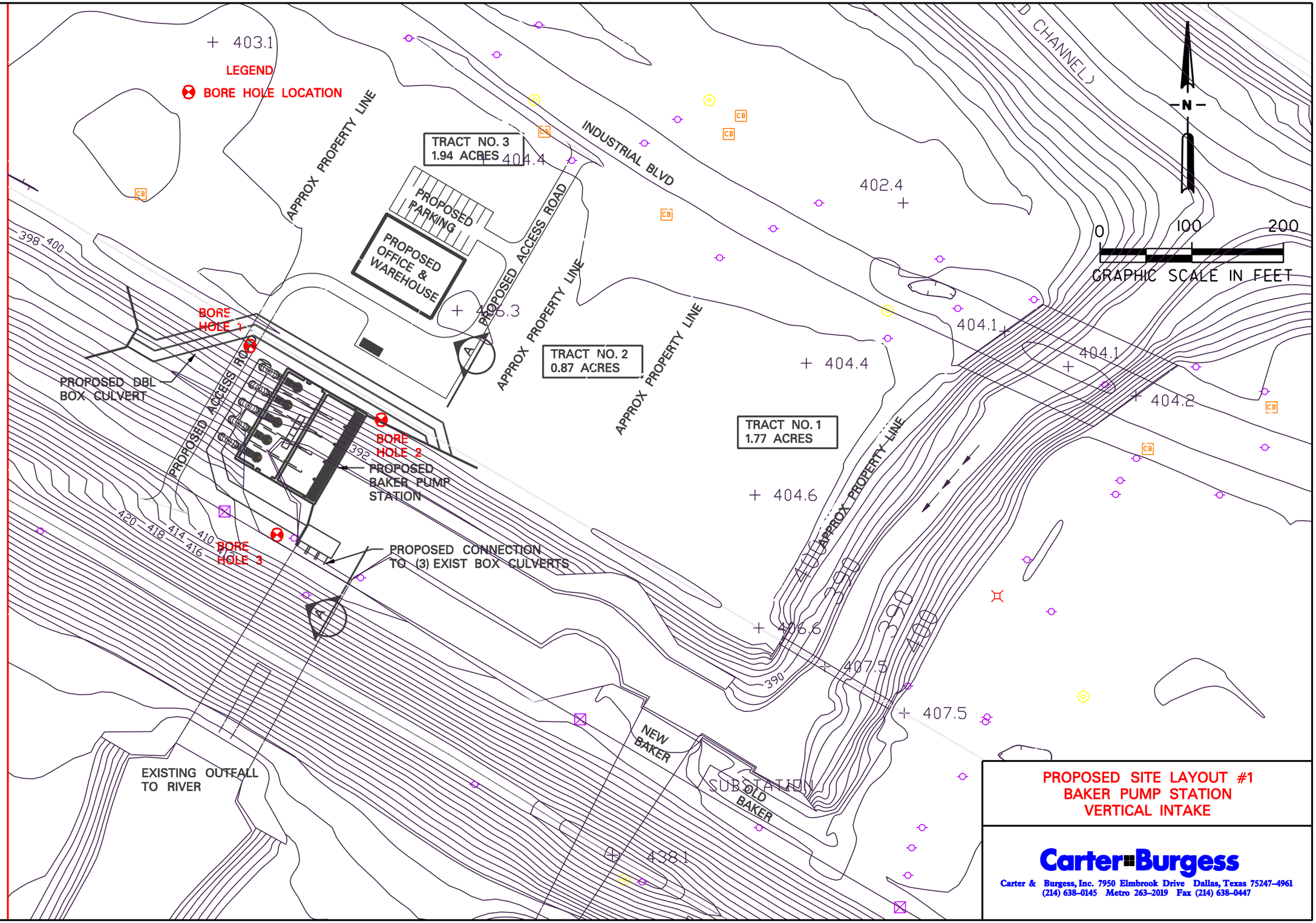
Account
GIS Id: 00000775832000100
Number: 00000775832000100
Account Type: COMMERCIAL
Location
Address: 2323 IRVING BLVD
Mapsco: 44-F (DALLAS)
Owner
CMC CONCRETE ACCESSOR INC
DBA SHEPLERS
9103 ALMEDA RD
HOUSTON, TEXAS 77054-4319
2007 Certified Values
Improvement:
Land:
Market Value:
$877,680
+ $308,400
=$1,186,080

TRACT NO. 2

Account
GIS Id: 00000775832000000
Number: 00000775832000000
Account Type: COMMERCIAL
Location
Address: 2327 IRVING BLVD
Neighborhood: UNASSIGNED
Mapsco: 44-F (DALLAS)
Owner
CMC CONCRETE ACCESSOR INC
DBA SHEPLERS
9103 ALMEDA RD
HOUSTON, TEXAS 77054-4319
2007 Certified Values
Improvement:
Land:
Market Value: $0
+ $151,590
=$151,590

TRACT NO. 3

Account
GIS Id: 00000775822000000
Number: 00000775822000000
Account Type: COMMERCIAL
Location
Address: 2331 IRVING BLVD
Mapsco: 44-B (DALLAS)
Owner
CMC CONCRETE ACCESSOR INC
DBA SHEPLERS
9103 ALMEDA RD
HOUSTON, TEXAS 77054-4319
2007 Certified Values
Improvement:
Land:
Market Value:
$0
+ $338,020
=$338,020



PROPOSED SITE LAYOUT #1
BAKER PUMP STATION
VERTICAL INTAKE

Carter Burgess

Carter & Burgess, Inc. 7950 Elmbrook Drive Dallas, Texas 75247-4961
(214) 638-0145 Metro 263-2019 Fax (214) 638-0447

...\BAKER_SITE_BORE_LOCATION_LAYOUT_1.dgn 11/28/2007 11:27:11 AM

FUGRO CONSULTANTS, INC.

Project No. 0707-1089
October 1, 2008

2880 Virgo Lane
Dallas, Texas 75229
Tel: 972-484-8301
Fax: 972-620-7328

Mr. Albert C. Petrasek, Ph.D., P.E.
Vice President
Jacobs Carter & Burgess
7950 Elmbrook Drive
Dallas, TX 75247

REQUEST FOR FINAL GEOTECHNICAL INVESTIGATION INFORMATION
FIELD DRILLING AND LABORATORY TESTING
BAKER AND PAVAHO STORMWATER PUMPING STATIONS
CITY OF DALLAS, DEPARTMENT OF
PUBLIC WORKS AND TRANSPORTATION
DALLAS, TEXAS

Dear Mr. Petrasek:

In response to conversations at our project meeting with Corps of Engineers (USACE) representatives at your office on Thursday, September 18, we developed this request for final geotechnical borings and laboratory testing at the subject sites. We understand that no changes in facility locations were indicated as a result of review of the 35 percent submittal to the City (Dallas Flood Control District, DFCD).

For the Baker site field work:

1. Drill and sample nine additional borings, BB-3A, BB-4, BB-5, BB-6, BB-7, BB-8, BB-9, BB-10, and BB-11 at locations shown in the attached boring plan named "Baker."

2. Drill and sample BB-3A to 35-foot depth within five feet of preliminary Boring BB-3. The purpose of this boring is to obtain additional samples of the silty sand or other granular soils (11.5 to 19.5 feet) and the underlying clay (19.5 to 24.5 feet). In clays above 11.5 feet, obtain Shelby Tube (ST) samples at 2.5-foot intervals. In sands, obtain Standard Penetration Tests (SPT) also at 2.5-foot intervals. In clays below 19.5 feet, obtain Shelby Tube (ST) samples at 2.5-foot intervals. In weathered shale, obtain ST samples at 2.5-foot intervals as possible and STP samples at 2.5-foot intervals where shale is too hard for ST samples. For this boring and all remaining borings, use automatic hammer for SPT tests.

3. Drill and sample BB-4 to 50-foot depth. In overburden soils, obtain ST or STP samples at 2.5-foot intervals, as above. Obtain continuous-interval samples in weathered and unweathered shale. Record color of the weathered and unweathered shale on the logs along with related logging details. For soft shale, obtain ST samples. For firmer shale, in which reasonable sample recovery is possible (75 percent recovery or higher), obtain 4-inch diameter rock core samples using core barrel with split inner barrel. If problems develop with obtaining adequate recovery,

shorten core runs to 2 feet. Double wrap testable samples of shale, first with foil, and then in poly sample bag with tight wrap. Run Texas Cone Penetration (TCP) tests in weathered and unweathered shale at 5-foot intervals. Again, use automatic hammer for TCP tests.

4. Drill and sample BB-5 to 50-foot depth. Obtain samples and information as for BB-4.

5. Drill and sample BB-6 to 30-foot depth. Obtain samples and information as for BB-4, with ST and SPT samples for overburden soils obtained at 2.5-foot intervals and rock coring can be performed using NX-size coring equipment at this location (nominal 2-inch diameter core).

6. Drill and sample BB-7 and BB-8 to 10-foot depth. ST and SPT samples should be obtained at continuous intervals to 5 feet and at 2.5-foot intervals below 5 feet.

7. Drill and sample BB-9 to obtain rock core of at least 5 feet of gray, unweathered shale (estimated boring depth of 65 feet). Drill and sample overburden soils and weathered shale as for BB-3A. Rock core can be NX size in this boring.

8. Drill and sample BB-10 to obtain rock core of at least 5 feet of gray, unweathered shale (estimated boring depth of 35 feet). Drill and sample overburden soils and weathered shale as for BB-3A. Rock core can be NX size in this boring.

9. Drill and sample BB-11 to obtain rock core of at least 20 feet of gray, unweathered shale (estimated boring depth of 50 feet). Drill and sample overburden soils and weathered shale as for BB-3A. Rock core can be NX size in this boring.

Borings BB-3a, 4, 9, 10, and 11 are subject to requirements in USACE regulations in ER 1110-1-1807 and backfilled with cement-bentonite grout per EM 1110-1-1804 (USACE documents available at http://www.usace.army.mil/publications/). Hollow-stem augers shall be used to advance all borings through overburden soils and weathered shale. Rock coring shall be performed through hollow-stem auger casing seated in the shale bedrock.

To minimize disturbance to sands below the water table, add water to hollow stem auger casing during sampling (except where this may conflict with USACE procedures for drilling through or near levees).

Record as-drilled ground surface elevation and location coordinates (grid coordinates) on each boring log.

<u>For the Baker geotechnical laboratory tests</u>, the following test types and approximate numbers of tests are estimated:

1. Natural moisture content, soil and shale samples, assume 100 tests.

2. Atterberg limits, assume 25 tests.

3. -200 sieve analyses, assume 30 tests.

4. Sieve and hydrometer tests, assume 20 sieve tests and 10 hydrometer tests.

5. Flexible wall permeability tests on remolded samples of granular soils (ASTM D 5084), assume 5 tests.

6. Swell / consolidation tests (ASTM D 4546 method C), assume 5 tests.

7. Direct shear tests (ASTM D 3080), mostly on weathered shale and clay specimens, assume 5 tests with 3 individual points for each test (total of 15 specimen points). Let specimens reach settlement / swell equilibrium prior to shear. Shear at very low displacement rate (0.5mm/hr). Continue tests to 0.25-inch displacement.

8. Unconsolidated-undrained triaxial shear tests (ASTM D 2850), assume 8 tests (single-point tests).

9. Consolidated-undrained triaxial shear tests with pore pressure measurements (ASTM D 4767), assume 5 tests (three-point tests for total of 15 individual test specimens).

10. Soil corrosivity test (series: pH, ASTM D4972; sulfates, ASTM C1580; lab resistivity, ASTM G57; chlorides, AASHTO T291; redox, ASTM D1498), assume test series on 5 samples.

11. Sulfate content for lime sulfate pavement subgrade (EPA 9038 or EPA 375.4, 10:1 dilution ratio), assume 3 tests.

For direct shear tests and triaxial shear tests, confining pressures will be included on laboratory assignment sheet.

Edit and finalize all boring logs (preliminary and final) for consistency with laboratory test results after laboratory tests have been completed. Obtain and include as-drilled ground surface elevations and location grid coordinates on logs for each boring. To minimize potential construction confusion for bearing depths in shale, identify all tan or gray shale on logs with TCP penetrations of greater than 3 inches for 100 blows as "WEATHERED SHALE." Identify gray shale with TCP penetrations of 3 inches or less for 100 blows as "SHALE."

<u>For the Pavaho site field work:</u>

1. Drill and sample two additional borings, PB-3, and PB-4 at locations shown in the attached boring plan named "Pavaho."

2. Drill and sample PB-3 to 50-foot depth. In overburden soils, obtain samples at 2.5-foot intervals, Shelby Tubes (ST) in clays and Standard Penetration Tests (SPT) in sands. Use automatic hammer for SPT tests.

3. Obtain continuous-interval samples in weathered and unweathered shale. Record color of the weathered and unweathered shale on the logs along with related logging details. For very soft shale, obtain ST samples. For firmer shale, in which reasonable recovery is possible (see above), obtain 4-inch diameter rock core samples using core barrel with split inner barrel. Double wrap testable samples of shale, first with foil, and then place in poly sample bag.

4. Run Texas Cone Penetration (TCP) tests in weathered and unweathered shale at 5-foot intervals. Again, use automatic hammer.

5. Drill and sample PB-4 to 50-foot depth. Obtain samples and information as for PB-3.

Borings PB-3 and 4 are subject to requirements in COE regulations in ER 1110-1-1807 and backfilled with cement-bentonite grout per EM 1110-1-1804. Hollow-stem augers shall be used to advance all borings through overburden soils and weathered shale. Rock coring shall be performed through hollow-stem auger casing seated in the shale bedrock.

To minimize disturbance to sands below the water table, add water to hollow stem auger casing during sampling (except where this may conflict with Corps of Engineers (COE) procedures for drilling through or near levees).

Record as-drilled ground surface elevation and location coordinates on each boring log.

For the Pavaho geotechnical laboratory tests, the following test types and approximate numbers of tests are estimated:

1. Natural moisture content, soil and shale samples, assume 30 tests.

2. Atterberg limits, assume 10 tests.

3. -200 sieve analyses, assume 10 tests.

4. Sieve analyses, assume 5 tests.

5. Swell / consolidation tests (ASTM D 4546 method C), assume 3 tests.

6. Direct shear tests (ASTM D 3080), mostly on weathered shale and clay specimens, assume 4 tests with 3 individual points for each test. Let specimens reach settlement / swell equilibrium prior to shear. Shear at very low displacement rate (0.5mm/hr). Continue tests to 0.25-inch displacement.

7. Unconsolidated-undrained triaxial shear tests (ASTM D 2850), assume 6 tests (single-point tests).

8. Consolidated-undrained triaxial shear tests with pore pressure measurements (ASTM D 4767), assume 3 tests (three-point tests for total of 9 individual test specimens).

9. Soil corrosivity test (series: pH, ASTM D4972; sulfates, ASTM C1580; lab resistivity, ASTM G57; chlorides, AASHTO T291; redox, ASTM D1498), assume test series on 3 samples.

10. Sulfate content for lime sulfate pavement subgrade (EPA 9038 or EPA 375.4, 10:1 dilution ratio), assume 2 tests.

As for the Baker site, edit and finalize all boring logs (preliminary and final) for consistency with laboratory test results after laboratory tests have been completed. Obtain and include as-drilled ground surface elevations and location grid coordinates on logs for each boring. To minimize potential construction confusion for bearing depths in shale, identify all tan or gray shale on logs with TCP penetrations of greater than 3 inches for 100 blows as "WEATHERED SHALE." Identify gray shale with TCP penetrations of 3 inches or less for 100 blows as "SHALE."

As for the preliminary borings at these sites, coordinate field activities with DFCD and USACE prior to mobilizing to the site. Check all drilling locations for possible utility conflicts. Offset locations may be required to stay clear of utilities, for worker safety, for access, or for other reasons.

Unless otherwise directed by DFCD or by USACE, dispose of drill cuttings from grouted boreholes on the ground surface at each respective pump station site at locations designated by City representatives. The cuttings shall be leveled at the surface. Use drill cuttings to backfill boreholes not grouted, and level and compact soils near the ground surface.

Submit copies of boring logs and laboratory tests results to Fugro as they are completed. Also send copies to Dallas Flood Control District and USACE, hard copies and electronic copies, as requested. Copies of the geotechnical report (hard copies and electronic copies) will be submitted by Fugro to Carter Burgess for their use and for distribution to DFCD and USACE.

Please call if you have any questions about information in the above request or if any additional clarification is required.

Very truly yours,

FUGRO CONSULTANTS, INC.

Bruce Bailey, Ph.D., P.E.
Senior Engineering Consultant

Attachments: "Baker" and "Pavaho" Boring Plans

INDUSTRIAL BLVD

IRVING BLVD.

LIMITS OF CONSTRUCTION

APPROX PROPERTY LINE

PROPOSED PROPERTY LINE

TRACT NO. 3
1.94 ACRES

TRACT NO. 2
0.87 ACRES

TRACT NO. 1
1.77 ACRES

PROPOSED DBL 30' WIDE ACCESS GATE

PROPOSED 6' HIGH SECURITY CHAIN LINK FENCE - SEE DETAILS

PROP ONCOR ELECTRIC

PROPOSED PROPERTY LINE

BORE HOLE #2
N 6,977,711.6960
E 2,479,380.5550

PROPOSED DBL 26' WIDE ACCESS GATE

PROPOSED DBL 28' WIDE ACCESS GATE

COVERED AREA

ELECTRICAL ROOM

MECHANICAL ROOM

PROPOSED 3 - 8'X4' BOX CULVERT

APPROX RAILROAD R.O.W.

PROPOSED FLARED WINGWALLS

PROPOSED BAKER PUMP STATION

APPROX 24" HP GAS LINE

PROPOSED PARALLEL WINGWALL

CAUTION !!! HIGH PRESSURE GAS LINES

EXISTING H.P. GAS LINE TO BE RELOCATED BY OTHERS

PROPOSED CONNECTION TO (3) EXIST BOX CULVERTS SEE DETAIL ON SHEET

APPROX ELEC ESMT

24" HP GAS

NEW BAKER

OLD BAKER

BORE HOLE #1
N 6,977,692.2270
E 2,479,210.1610

CAUTION !!! OVERHEAD POWER LINES

BORE HOLE #3
N 6,977,516.2630
E 2,479,257.4310

EXISTING 6'-10' X 10' GRAVITY SLUICES

PARKING LOT TO BE USED FOR CONTRACTOR'S STORAGE

BB2

BB3

BB3A

BB4

BB9

BB10

BB11

0 50 100
GRAPHIC SCALE IN FEET

Baker

CONTRACT NO.

MARK	DESCRIPTION	DATE	APPR.

SCALE: AS SHOWN
DESIGNED BY:
DRAWN BY:
REVIEWED BY:
CHECKED BY:
PROJECT NO.: 02427100
FILE NAME:
DATE:

THESE DOCUMENTS ARE FOR REVIEW ONLY AND NOT INTENDED FOR CONSTRUCTION, BIDDING, OR PERMIT PURPOSES. THEY WERE PREPARED BY, OR UNDER THE SUPERVISION OF: A.C. PETRASEK, JR., P.E. # 39188

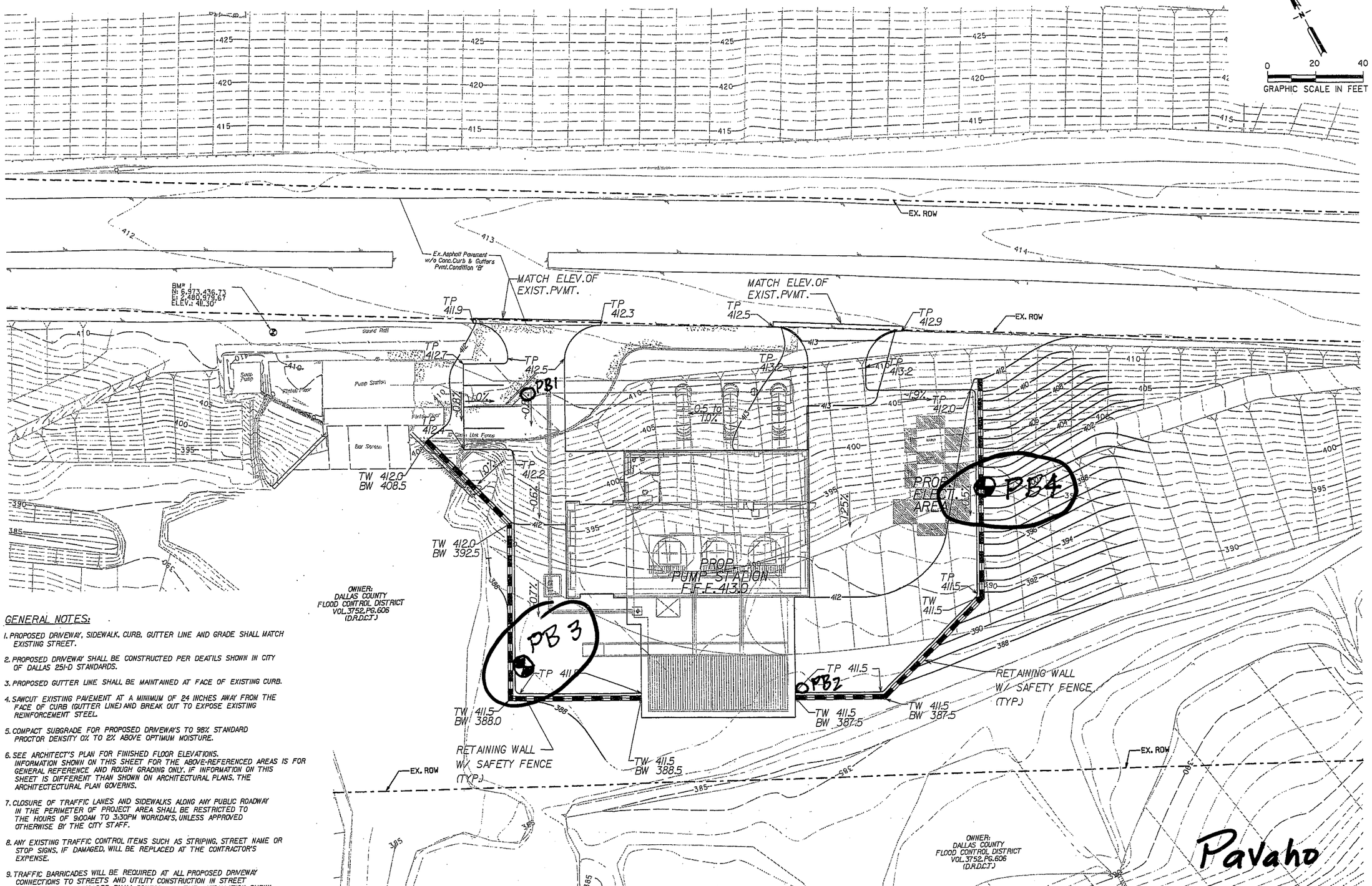
Carter+Burgess
CONSULTANTS IN ENGINEERING, ARCHITECTURE, CONSTRUCTION MANAGEMENT AND RELATED SERVICES
7950 ELMBROOK DRIVE, DALLAS, TEXAS, 75254
PHONE (214) 638-0145, FAX (214) 638-0447

CITY OF DALLAS DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION
BAKER STORMWATER PUMPING STATION

BAKER SITE PLAN

VERIFY SCALE
0 1
BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT 1 INCH ON THIS SHEET, ADJUST SCALE

SHEET REF. NO.
C-1
OF



GENERAL NOTES:

1. PROPOSED DRIVEWAY, SIDEWALK, CURB, GUTTER LINE AND GRADE SHALL MATCH EXISTING STREET.
2. PROPOSED DRIVEWAY SHALL BE CONSTRUCTED PER DEATILS SHOWN IN CITY OF DALLAS 251-D STANDARDS.
3. PROPOSED GUTTER LINE SHALL BE MAINTAINED AT FACE OF EXISTING CURB.
4. SAWCUT EXISTING PAVEMENT AT A MINIMUM OF 24 INCHES AWAY FROM THE FACE OF CURB (GUTTER LINE) AND BREAK OUT TO EXPOSE EXISTING REINFORCEMENT STEEL.
5. COMPACT SUBGRADE FOR PROPOSED DRIVEWAY'S TO 98% STANDARD PROCTOR DENSITY 0% TO 2% ABOVE OPTIMUM MOISTURE.
6. SEE ARCHITECT'S PLAN FOR FINISHED FLOOR ELEVATIONS. INFORMATION SHOWN ON THIS SHEET FOR THE ABOVE-REFERENCED AREAS IS FOR GENERAL REFERENCE AND ROUGH GRADING ONLY. IF INFORMATION ON THIS SHEET IS DIFFERENT THAN SHOWN ON ARCHITECTURAL PLANS, THE ARCHITECTECTURAL PLAN GOVERNS.
7. CLOSURE OF TRAFFIC LANES AND SIDEWALKS ALONG ANY PUBLIC ROADWAY IN THE PERIMETER OF PROJECT AREA SHALL BE RESTRICTED TO THE HOURS OF 9:00AM TO 3:30PM WORKDAYS, UNLESS APPROVED OTHERWISE BY THE CITY STAFF.
8. ANY EXISTING TRAFFIC CONTROL ITEMS SUCH AS STRIPING, STREET NAME OR STOP SIGNS, IF DAMAGED, WILL BE REPLACED AT THE CONTRACTOR'S EXPENSE.
9. TRAFFIC BARRICADES WILL BE REQUIRED AT ALL PROPOSED DRIVEWAY CONNECTIONS TO STREETS AND UTILITY CONSTRUCTION IN STREET RIGHT-OF-WAY. BARRICADES SHALL CONFORM TO THE INSTALLATION SHOWN IN THE '1980 TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES,' AS CURRENTLY AMENDED, TEXAS DEPARTMENT OF TRANSPORTATION.

MARK	DESCRIPTION	DATE	APPR.

SCALE: AS SHOWN
DESIGNED BY: UEG
DRAWN BY: UEG
REVIEWED BY: UEG
CHECKED BY: UEG
PROJECT NO.: 02427700 \ 0710
FILE NAME: 27C100GPGP.DGN
DATE: SEPT. 2008

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FAISAL S. SYED, P.E.
#84833

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CITY OF DALLAS DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION
PAVAHO STORMWATER PUMPING STATION

GRADING PLAN

VERIFY SCALE
0 1
BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT 1 INCH ON THIS SHEET, ADJUST SCALE

SHEET REF. NO.
C-4
OF

CONTRACT NO. 09-XXXX

USER= UEG
PLOTTED= 9/3/2008 11:19:27 AM
PEN TABLE= UEG.bdr.tbl
PLOT DRIVER= PDF-UEG-Full.plt
SCALE= AS SHOWN
DGN= P:\UEG\DESIGN\2007\07-10 CB-PAVAHO\CAD\Sheets\27C100GPGP.dgn

Appendix B –

Boring Logs

HNTB

LOG OF BORING

BORING NO. **BB-1**

SHEET 1 OF 4

PROJECT City of Dallas - Major Flood and Storm Drainage Projects
Baker Pump Station - Dallas, Texas

NORTHING 6976740 ft
EASTING 2478872 ft

EXPLORATION CONTRACTOR GEDCO / Mas-Tek
STARTED 1-23-2008

ENGINEERS REP. Edwin R. Strode Jr.
LOGGED BY William Cappell (Mas Tek)
COMPLETED 1-27-2008

GROUNDWATER

ENCOUNTERED DURING
DRILLING AT Dry
HOURS AFTER DRILLING
HOURS AFTER DRILLING
HOURS AFTER DRILLING
HOURS AFTER DRILLING

BORING METHOD

DEPTH MUD STARTED

SAMPLE TYPE AND DATA

U Undisturbued Sample
S Split Barrel
C Rock Core

DEPTH BELOW SURFACE(feet)	SAMPLE INTERVAL AND TYPE	SAMPLE NUMBER	SAMPLE RECOVERY(in) CORE RECOVERY(%)	SAMPLE RQD(%)	PENETRATION TEST RESULTS Blows per Interval (inches) 0-6	6-12	12-18	"N" Value	POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System Textural (Visual)	ELEV. DATUM ELEV. (feet) 392.1
	U	ST-1	10							Medium stiff, moist, brown, SAND and CLAY, little gravel (SC) 4.0	388.1
	U	ST-2	12								
	U	ST-3	8								
	U	ST-4	10								
	U	ST-5	10								
5	S	SS-6			12	13	15	28		Medium dense, moist, tan, SAND and gravel, little clay (SC) 10.0	382.1
	S	SS-6	10		15	14	19	33			
10										Light gray Shaley CLAY [CL] (Weathered Shale) Top of Rock 15' 15.0	377.1
15	C	RC-1	50	50						Calcareous SHALE (Eagle Ford) - sound to extremely fractured, fresh to moderately weathered, moderately hard to soft, dark gray, fine grained, thick bedded	
	C	RC-2	0	0							
20	C	RC-3	77	77							
25	C	RC-4	0	0							

REMARKS: Boring grouted in accordance with Corps of Engineers requirements upon completion
25' - THD - 50 / 2 1/2" - 50 / 2 1/2"

HNTB

LOG OF BORING

BORING NO. **BB-1**

SHEET **2** OF **4**

PROJECT **City of Dallas - Major Flood and Storm Drainage Projects**
Baker Pump Station - Dallas, Texas

NORTHING **6976740 ft**
EASTING **2478872 ft**

EXPLORATION CONTRACTOR **GEDCO / Mas-Tek**
STARTED **1-23-2008**

ENGINEERS REP. **Edwin R. Strode Jr.** LOGGED BY **William Cappell (Mas Tek)**
COMPLETED **1-27-2008**

DEPTH BELOW SURFACE(feet)	SAMPLE INTERVAL AND TYPE	SAMPLE NUMBER	SAMPLE RECOVERY(in) CORE RECOVERY(%)	SAMPLE RQD(%)	PENETRATION TEST RESULTS Blows per Interval (inches) 0-6	6-12	12-18	"N" Value	POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System **Textural (Visual)**	ELEV. DATUM / ELEV. (feet) 392.1
										26.3' - Joint 70 deg 27.0' - 1/8" LIMESTONE layer	
30	C	RC-5	56	56							
35										35.5' - 2" LIMESTONE layer	
40	C	RC-6	85	85							
45											
50	C	RC-7	90	90						51.3' - Joint, 45 deg, smooth 53' - Joint, 45 deg, rough 56.5' - Joint, 0 deg, rough 56.7' - Joint, 0 deg, rough	
55	C										

REMARKS:
25' - THD - 50 / 2 1/2" - 50 / 2 1/2"
35' - THD - 50 / 2 1/2" - 50 / 1"
45' - THD - 50 / 2" - 50 / 1"
55' - THD - 50 / 2" - 50 / 2 1/2"

HNTB

LOG OF BORING

BORING NO. **BB-1**

SHEET **3** OF **4**

PROJECT **City of Dallas - Major Flood and Storm Drainage Projects**
Baker Pump Station - Dallas, Texas

NORTHING **6976740 ft**
EASTING **2478872 ft**

EXPLORATION CONTRACTOR **GEDCO / Mas-Tek**
STARTED **1-23-2008**

ENGINEERS REP. **Edwin R. Strode Jr.** LOGGED BY **William Cappell (Mas Tek)**
COMPLETED **1-27-2008**

DEPTH BELOW SURFACE(feet)	SAMPLE INTERVAL AND TYPE	SAMPLE NUMBER	SAMPLE RECOVERY(in) CORE RECOVERY(%)	SAMPLE RQD(%)	PENETRATION TEST RESULTS Blows per Interval (inches) 0-6	6-12	12-18	"N" Value	POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System **Textural (Visual)**	ELEV. DATUM / ELEV. (feet) 392.1
60	C	RC-8	76	74							
										62.3' - Joint, 10 deg, rough 63.5' - Joint, 45 deg, slickensided	
65										65.0' - Joint, 10 deg, rough 65.2' - Joint, 45 deg, slickensided	
										65.8' - 1/8" LIMESTONE layer	
70	C	RC-9	71	71							
										72.0' - 3" LIMESTONE layer	
75										75.0' - Joint 45 deg, rough	
80	C	RC-10	50	50							
85										85.0' - 6" LIMESTONE layer	
	C										

REMARKS:
65' - THD - 50 / 2 1/2" - 50 / 1"
75' - THD 50 / 1/4" - 50 / 1/4"
80-83' Possible Limestone layers, per drilling action, no core recovery
85' - THD 50 / 1/2" - 50 / 1/4"

HNTB

LOG OF BORING

BORING NO. **BB-1**

SHEET **4** OF **4**

PROJECT **City of Dallas - Major Flood and Storm Drainage Projects**
Baker Pump Station - Dallas, Texas

NORTHING **6976740 ft**
EASTING **2478872 ft**

EXPLORATION CONTRACTOR **GEDCO / Mas-Tek**
STARTED **1-23-2008**

ENGINEERS REP. **Edwin R. Strode Jr.** LOGGED BY **William Cappell (Mas Tek)**
COMPLETED **1-27-2008**

DEPTH BELOW SURFACE(feet)	SAMPLE INTERVAL AND TYPE	SAMPLE NUMBER	SAMPLE RECOVERY(in) CORE RECOVERY(%)	SAMPLE RQD(%)	PENETRATION TEST RESULTS Blows per Interval (inches) 0-6	6-12	12-18	"N" Value	POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System **Textural (Visual)**	ELEV. DATUM / ELEV. (feet)
											392.1
90	C	RC-11	80	67						90.5' - Joint, 45 deg 90.8' - Joint, 45 deg 91.0' - Joint, 45 deg 91.0' - Joint, 80 deg 91.4' - Joint, 5 deg 92.5' - Joint, 5 deg 93.0' - Joint, 45 deg 93.4' - 5" LIMESTONE layer	
95	C	RC-12	100	100						95.6' - 1/4" Calcite layer	
										100.0	292.1
100										Bottom of boring 100'	
105											
110											
115											
120											

REMARKS: 95' - THD - 50 / 1/4" - 50 / 1/4"
100' - THD - 50 / 1" - 50 / 1"

HNTB

LOG OF BORING

BORING NO. **BB-2**

SHEET **1** OF **4**

PROJECT **City of Dallas - Major Flood and Storm Drainage Projects**
Baker Pump Station - Dallas, Texas

NORTHING **6977712 ft**
EASTING **2479381 ft**

EXPLORATION CONTRACTOR **GEDCO / Mas-Tek**
STARTED **2-26-2008**

ENGINEERS REP. **Edwin R. Strode Jr.** LOGGED BY **William Cappell (Mas Tek)**
COMPLETED **2-28-2008**

GROUNDWATER

ENCOUNTERED DURING
DRILLING AT **24.0**
HOURS AFTER DRILLING
HOURS AFTER DRILLING
HOURS AFTER DRILLING
HOURS AFTER DRILLING

BORING METHOD

DEPTH MUD STARTED

SAMPLE TYPE AND DATA

U Undisturbued Sample
S Split Barrel
C Rock Core

DEPTH BELOW SURFACE(feet)	SAMPLE INTERVAL AND TYPE	SAMPLE NUMBER	SAMPLE RECOVERY(in) CORE RECOVERY(%)	SAMPLE RQD(%)	PENETRATION TEST RESULTS Blows per Interval (inches) 0-6	6-12	12-18	"N" Value	POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System **Textural (Visual)**		ELEV. DATUM ELEV. (feet)
											0.4	405.1 / 404.7
	U	ST-1	18						1.5P	Concrete Pavement; Stiff, gray to yellow brown, moist, Sandy CLAY, trace gravel (FILL)	2.5	402.6
	U	ST-2	12						2.3P			
	U	ST-3	12						1.4P 1.9P	Stiff to medium stiff, grayish brown, moist CLAY (CH)	4.0	401.1
	U	ST-4	12						2.2P			
5	U	ST-5	12						2.3P	Very stiff, dark gray, moist, CLAY (CH)	6.0	399.1
	U	ST-6	12						3.0P	Very stiff, grayish brown, moist, CLAY, trace sand (CH)		
	U	ST-7	12						3.2P 4.0P		8.0	397.1
	U	ST-8	12						4.5+P	Medium dense, brown, moist, SAND, with clay (SC)	9.0	396.1
	U	ST-9	12						4.5P 2.2P	Medium dense, brown, moist, SAND with silt (SM)	10.0	395.1
10												
	U	ST-10	12						1.0P	Medium dense, yellow brown to red brown, moist, SAND with clay (SC)		
15	U	ST-11	6								17.0	388.1
	S	SS-12	18		13	26	31	57		Very dense, yellow brown, moist, fine grained SAND, some gravel (SP-SM)	21.0	384.1
20										Very dense, tan, moist to wet, GRAVEL, some sand (GW)	24.0	381.1
25										Weathered Shale	25.0	380.1

REMARKS: Boring grouted in accordance with Corps of Engineer requirements upon completion
25' - THD - 50 / 1" - 50 / 1/2"

HNTB

LOG OF BORING

BORING NO. **BB-2**

SHEET **2** OF **4**

PROJECT **City of Dallas - Major Flood and Storm Drainage Projects**
Baker Pump Station - Dallas, Texas

NORTHING **6977712 ft**
EASTING **2479381 ft**

EXPLORATION CONTRACTOR **GEDCO / Mas-Tek**
STARTED **2-26-2008**

ENGINEERS REP. **Edwin R. Strode Jr.** LOGGED BY **William Cappell (Mas Tek)**
COMPLETED **2-28-2008**

DEPTH BELOW SURFACE(feet)	SAMPLE INTERVAL AND TYPE	SAMPLE NUMBER	SAMPLE RECOVERY(in) CORE RECOVERY(%)	SAMPLE RQD(%)	PENETRATION TEST RESULTS Blows per Interval (inches) 0-6	6-12	12-18	"N" Value	POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System **Textural (Visual)**	ELEV. DATUM / ELEV. (feet) 405.1
										SHALE (Eagle Ford) - Sound, soft to very soft, fresh, dark gray, fine grained, thick bedded, moderately close to wide joints	
30	C	RC-1	71	71							
35											
										39' - 1/4" LIMESTONE layer	
40	C	RC-2	75	75							
										42.5' - 1/4" LIMESTONE layer	
45											
50	C	RC-3	88	88							
55											
	C										

REMARKS:
25' - THD - 50 / 1" - 50 / 1/2"
35' - THD - 50 / 1" - 50 / 1/2"
45' - THD - 50 / 3/4" - 50 / 1/4"
55' - THD - 50 / 1" - 50 / 1/4"

HNTB

LOG OF BORING

BORING NO. **BB-2**

SHEET **3** OF **4**

PROJECT **City of Dallas - Major Flood and Storm Drainage Projects**
Baker Pump Station - Dallas, Texas

NORTHING **6977712 ft**
EASTING **2479381 ft**

EXPLORATION CONTRACTOR **GEDCO / Mas-Tek**
STARTED **2-26-2008**

ENGINEERS REP. **Edwin R. Strode Jr.** LOGGED BY **William Cappell (Mas Tek)**
COMPLETED **2-28-2008**

ELEV. DATUM
ELEV. (feet) 405.1

DEPTH BELOW SURFACE(feet)	SAMPLE INTERVAL AND TYPE	SAMPLE NUMBER	SAMPLE RECOVERY(in) CORE RECOVERY(%)	SAMPLE RQD(%)	PENETRATION TEST RESULTS Blows per Interval (inches) 0-6	6-12	12-18	"N" Value	POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System **Textural (Visual)**
	C	RC-4	92	92						
60										SHALE (Eagle Ford) - Sound, soft to very soft, fresh, dark gray, fine grained, thick bedded, moderately close to wide joints
	C	RC-5	52	52						
65										
	C	RC-6	0	0						
70										
	C	RC-7	12	12						
75										75.5' - Joint - 45 deg, fresh, undulating, smooth
										78.6-78.1' - Joint - 90 deg, fresh, stepped, smooth
80	C	RC-8	66	60						79.3' - 2" LIMESTONE layer
										81' - 1" LIMESTONE layer
										82' - Joint - 80 deg, fresh, undulating, smooth
										81.8' - 1/4" LIMESTONE layer
85										
	C									86.5' - Pyrite noted

REMARKS:
65' - THD - 50 / 1/4" - 50 / 1/4"
75' - THD - 50 / 2" - 50 / 1 3/4"
85' - THD - 50 / 2" - 50 / 1 3/4"

HNTB

LOG OF BORING

BORING NO. **BB-2**

SHEET **4** OF **4**

PROJECT **City of Dallas - Major Flood and Storm Drainage Projects**
Baker Pump Station - Dallas, Texas

NORTHING **6977712 ft**
EASTING **2479381 ft**

EXPLORATION CONTRACTOR **GEDCO / Mas-Tek**
STARTED **2-26-2008**

ENGINEERS REP. **Edwin R. Strode Jr.** LOGGED BY **William Cappell (Mas Tek)**
COMPLETED **2-28-2008**

DEPTH BELOW SURFACE(feet)	SAMPLE INTERVAL AND TYPE	SAMPLE NUMBER	SAMPLE RECOVERY(in) CORE RECOVERY(%)	SAMPLE RQD(%)	PENETRATION TEST RESULTS Blows per Interval (inches) 0-6	6-12	12-18	"N" Value	POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System **Textural (Visual)**	ELEV. DATUM / ELEV. (feet) 405.1
90	C	RC-9	68	68						SHALE (Eagle Ford) - Sound, soft to very soft, fresh, dark gray, fine grained, thick bedded, moderately close to wide joints	
										94' - 1/4" LIMESTONE layer	
95										95.3' - 1/2" LIMESTONE layer	
	C	RC-10	53	53							
100										100.0	305.1
										Bottom of Boring 100'	
105											
110											
115											
120											

REMARKS: 95' - THD - 50 / 1" - 50 / 1"
100' - THD - 50 / 2" - 50 / 1"

HNTB

LOG OF BORING

BORING NO. **BB-3**

SHEET **1** OF **4**

PROJECT **City of Dallas - Major Flood and Storm Drainage Projects**
Baker Pump Station - Dallas, Texas

NORTHING **6976564 ft**
EASTING **2478919 ft**

EXPLORATION CONTRACTOR **GEDCO / Mas-Tek**
STARTED **1-26-2008**

ENGINEERS REP. **Edwin R. Strode Jr.** LOGGED BY **William Cappell (Mas Tek)**
COMPLETED **2-2-2008**

GROUNDWATER

ENCOUNTERED DURING
DRILLING AT **Dry**
____ HOURS AFTER DRILLING
____ HOURS AFTER DRILLING
____ HOURS AFTER DRILLING
____ HOURS AFTER DRILLING

BORING METHOD

____ DEPTH MUD STARTED

SAMPLE TYPE AND DATA

U Undisturbued Sample
S Split Barrel
C Rock Core

DEPTH BELOW SURFACE(feet)	SAMPLE INTERVAL AND TYPE	SAMPLE NUMBER	SAMPLE RECOVERY(in) CORE RECOVERY(%)	SAMPLE RQD(%)	PENETRATION TEST RESULTS Blows per Interval (inches) 0-6	6-12	12-18	"N" Value	POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System **Textural (Visual)**	ELEV. DATUM ____ ELEV. (feet) 404.4
										Concrete 0.8	403.6
	U	ST-1	12							Stiff, brown, moist, SAND with clay, trace gravel (SC)	
	U	ST-2	10								
	U	ST-3	10								
	U	ST-4	12							5.0	399.4
5											
	U	ST-5	12							Stiff, light brown, moist, SAND with clay, little gravel (SC)	
	U	ST-6	10								
	U	ST-7	10								
10										11.5	392.9
	S	SS-8	12		13	13	15	28		Medium dense, brown,moist, SAND and GRAVEL, some silt [SM]	
15											
	S	SS-9	8		9	7	7	14		19.5	384.9
20										Medium stiff, moist, gray CLAY (CH)	
	U	ST-10	12							24.5	379.9
25										Weathered SHALE (CH) 25.0	379.4

REMARKS: Boring Grouted in accordance with Corps of Engineers requirements after completion

25' - THD - 50/ 3" - 50/ 1/2"; 35' - THD - 50/ 0" - 50/ 1/4"; 45' - THD - 50/ 1" - 50/ 1/2"; 55' - THD - 50/ 1/2" - 50/ 1/4"

HNTB

LOG OF BORING

BORING NO. **BB-3**

SHEET **2** OF **4**

PROJECT **City of Dallas - Major Flood and Storm Drainage Projects**
Baker Pump Station - Dallas, Texas

NORTHING **6976564 ft**
EASTING **2478919 ft**

EXPLORATION CONTRACTOR **GEDCO / Mas-Tek**
STARTED **1-26-2008**

ENGINEERS REP. **Edwin R. Strode Jr.** LOGGED BY **William Cappell (Mas Tek)**
COMPLETED **2-2-2008**

DEPTH BELOW SURFACE(feet)	SAMPLE INTERVAL AND TYPE	SAMPLE NUMBER	SAMPLE RECOVERY(in) CORE RECOVERY(%)	SAMPLE RQD(%)	PENETRATION TEST RESULTS Blows per Interval (inches) 0-6	6-12	12-18	"N" Value	POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System **Textural (Visual)**	ELEV. DATUM ELEV. (feet) 404.4
30	C	RC1	69	31						SHALE (Eagle Ford) moderately to extremely fractured, fresh to highly weathered, soft, black, fine grained, thick bedded	
										32.0	372.4
35										SHALE (Eagle Ford) sound, soft to very soft, moderately weathered, blue gray, fine grained, thick bedded, wide joints 34.8' - Joint, 0 deg, discolored, planar, smooth, clay infill	
40	C	RC2	73	69						42.8' - Joint, 0 deg, discolored, planar, rough, open	
45										45.1' - Joint, 0 deg, discolored, planar, rough, open 45.3' - Joint, 0 deg, discolored, planar, rough, open 45.5' - 1/2" Bentonite Seam 46.5' - Joint, 0 deg, discolored, planar, rough, open 47.0' - 1/4" Calcite Seam 47.1' - Joint, 0 deg, discolored, planar, smooth, open	
50	C	RC3	22	12							
										55.0	349.4
55	C									SHALE (Eagle Ford) sound, moderately hard, fresh to moderately weathered, black, fine grained, thick bedded, wide joints	

REMARKS: 25' - THD - 50/ 3" - 50/ 1/2"; 35' - THD - 50/ 0" - 50/ 1/4"; 45' - THD - 50/ 1" - 50/ 1/2"; 55' - THD - 50/ 1/2" - 50/ 1/4"

RC-1 - lost recovery appears to have happened between 26.4-31.8'

RC-2 - Lost recovery consists of about 5" of material destroyed during THD testing and 28" left in hole and not recovered

RC-3 - Lost recovery appears to be related to very soft shale below 47'

HNTB

LOG OF BORING

BORING NO. **BB-3**

SHEET **3** OF **4**

PROJECT **City of Dallas - Major Flood and Storm Drainage Projects**
Baker Pump Station - Dallas, Texas

NORTHING **6976564 ft**
EASTING **2478919 ft**

EXPLORATION CONTRACTOR **GEDCO / Mas-Tek**
STARTED **1-26-2008**

ENGINEERS REP. **Edwin R. Strode Jr.** LOGGED BY **William Cappell (Mas Tek)**
COMPLETED **2-2-2008**

DEPTH BELOW SURFACE(feet)	SAMPLE INTERVAL AND TYPE	SAMPLE NUMBER	SAMPLE RECOVERY(in) CORE RECOVERY(%)	SAMPLE RQD(%)	PENETRATION TEST RESULTS Blows per Interval (inches) 0-6	6-12	12-18	"N" Value	POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System **Textural (Visual)**	ELEV. DATUM ELEV. (feet)
											404.4
60	C	RC4	100	95						55.5' - Joint, 0 deg, decomposed, planar, smooth, open, clay infill 56.1' - Joint, 0 deg, fresh, planar, rough, open 58.0' - Joint, 0 deg, fresh, planar, rough, open 59.0' - Joint, 0 deg, fresh, planar, rough, open 60.8' - Joint, 0 deg, fresh, planar, rough, open 61.5' - Joint, 0 deg, fresh, planar, rough, open 62.7' - Joint, 0 deg, fresh, planar, rough, open 63.3' - Joint, 0 deg, fresh, planar, rough, open 65.0	339.4
65										SHALE (Eagle Ford) sound, moderately hard to soft, fresh, blue gray, fine grained, thick bedded, wide joints	
70	C	RC5	84	76						72.6' - Joint, 0 deg, fresh, planar, smooth, open 73.8' - Joint, 0 deg, decomposed, planar, smooth, open, clay infill	
75										75.3' - Joint, 10 deg, fresh, planar, smooth, open	
80	C	RC6	50	36						77.1' - Joint, 0 deg, decomposed, planar, rough, open 79.0' - Joint, 0 deg, decomposed, planar, smooth, 79.6-80' - SANDSTONE seam 79.3' - Joint, 0 deg, decomposed, plana, smooth, open 79.6' - Joint, 0 deg, decomposed, planar, smooth, open 85.0	319.4
85	C									SHALE (Eagle Ford) moderately fractured, moderately hard, slightly to highly weathered, blue gray, fine grained, thick bedded, wide joints, with tan Sandstone seams	

REMARKS:

RC-5 - Lost recovery appears to be associated with damage during THD testing.

65' - THD - 50/ 2" - 50/ 2"

75' - THD - 50/ 1 1/4" - 50/ 1 1/4"

RC-6 - Lost recovery appears to have occurred below Sandstone seam

85' - THD - 50/ 1/2" - 50/ 1/4"

HNTB

LOG OF BORING

BORING NO. **BB-3**

SHEET **4** OF **4**

PROJECT **City of Dallas - Major Flood and Storm Drainage Projects**
Baker Pump Station - Dallas, Texas

NORTHING **6976564 ft**
EASTING **2478919 ft**

EXPLORATION CONTRACTOR **GEDCO / Mas-Tek**
STARTED **1-26-2008**

ENGINEERS REP. **Edwin R. Strode Jr.** LOGGED BY **William Cappell (Mas Tek)**
COMPLETED **2-2-2008**

DEPTH BELOW SURFACE(feet)	SAMPLE INTERVAL AND TYPE	SAMPLE NUMBER	SAMPLE RECOVERY(in) CORE RECOVERY(%)	SAMPLE RQD(%)	PENETRATION TEST RESULTS Blows per Interval (inches) 0-6	6-12	12-18	"N" Value	POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System **Textural (Visual)**	ELEV. DATUM / ELEV. (feet) 404.4
90	C	RC7	11	9						SHALE (Eagle Ford) moderately fractured, moderately hard, slightly to highly weathered, blue gray, fine grained, thick bedded, wide joints, with tan Sandstone seams	
										95.0	309.4
95	C	RC8	100	83						SHALE (Eagle Ford) sound, moderately hard, fresh, blue gray, fine grained, thick bedded, wide joints 97.5' - Joint, 0 deg, fresh, planar, smooth, open 99.8' - Joint, 0 deg, fresh, planar, rough, open	
										100.0	304.4
100										Bottom of Boring 100'	
105											
110											
115											
120											

REMARKS: RC-7 - Lost recovery appears to have happened between Sandstone seams
95' - THD - 50/ 1/2" - 50/ 1/4"

HNTB

LOG OF BORING

BORING NO. **BB-3A**

SHEET 1 OF 2

PROJECT City of Dallas - Major Flood and Storm Drainage Projects
Baker Pump Station - Dallas, Texas

NORTHING 6977518 ft
EASTING 2479254 ft

EXPLORATION CONTRACTOR GEDCO / Mas-Tek
STARTED 10-16-2008

ENGINEERS REP. Edwin R. Strode Jr.
LOGGED BY Edwin R. Strode Jr.
COMPLETED 10-17-2008

GROUNDWATER

ENCOUNTERED DURING
DRILLING AT 13.0
HOURS AFTER DRILLING
HOURS AFTER DRILLING
HOURS AFTER DRILLING
HOURS AFTER DRILLING

BORING METHOD

DEPTH MUD STARTED

SAMPLE TYPE AND DATA

S Split Barrel
U Undisturbued Sample

DEPTH BELOW SURFACE(feet)	SAMPLE INTERVAL AND TYPE	SAMPLE NUMBER	SAMPLE RECOVERY(in) CORE RECOVERY(%)	SAMPLE RQD(%)	PENETRATION TEST RESULTS Blows per Interval (inches) 0-6	6-12	12-18	"N" Value	POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System Textural (Visual)		ELEV. DATUM ELEV. (feet) 404.6
										10 " Concrete - 2" Aggregate Subbase	1.0	403.6
	S	SS-1	16		6	4	8	12		Stiff, dark gray, moist, CLAY, little sand, little gravel (CL)	3.5	401.1
	U	ST-2	24							Stiff, dark gray and brown, moist, CLAY, some sand, little gravel (CL)	6.0	398.6
5	U	ST-3	12									
	S	SS-4	15		6	7	6	13		Stiff, brown, moist, CLAY and SAND, little gravel (CL)	7.5	397.1
	U	ST-5	12							Medium dense, tan, moist to wet, SAND, with gravel, little clay (SC-SM)		
10	S	SS-6	16		6	8	11	19				
	S	SS-7	18		11	13	13	26			14.5	390.1
15	S	SS-8	16		13	15	14	29		Medium dense to dense, brown, wet, SAND, some gravel, little clay (SC)		
	S	SS-9	16		15	16	18	34			19.5	385.1
20	S	SS-10	18		2	5	7	12		Soft, brown, wet, CLAY, little sand, trace gravel (CL)		
	U	ST-11									25.0	379.6
25												

REMARKS: Boring grouted in accordance with Corps of Engineers requirements after completion
Water noted on rods at 13'

HNTB

LOG OF BORING

BORING NO. **BB-3A**

SHEET **2** OF **2**

PROJECT **City of Dallas - Major Flood and Storm Drainage Projects**
Baker Pump Station - Dallas, Texas

NORTHING **6977518 ft**
EASTING **2479254 ft**

EXPLORATION CONTRACTOR **GEDCO / Mas-Tek**
STARTED **10-16-2008**

ENGINEERS REP. **Edwin R. Strode Jr.** LOGGED BY **Edwin R. Strode Jr.**
COMPLETED **10-17-2008**

DEPTH BELOW SURFACE(feet)	SAMPLE: INTERVAL AND TYPE	SAMPLE: NUMBER	SAMPLE: RECOVERY(in) CORE RECOVERY(%)	SAMPLE: RQD(%)	PENETRATION TEST RESULTS: Blows per Interval (inches) 0-6	6-12	12-18	"N" Value	POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System **Textural (Visual)**	ELEV. DATUM / ELEV. (feet)
											404.6
	S	SS-12	5		50/5					Gray Weathered SHALE	
	S	SS-13	10		45	50/5.5					
30	S	SS-14	9		39	50/5					
	S	SS-15	4		50/4					32.8	371.8
										Bottom of Boring 32.8'	
35											
40											
45											
50											
55											

REMARKS:

HNTB

LOG OF BORING

BORING NO. **BB-4**

SHEET 1 OF 2

PROJECT City of Dallas - Major Flood and Storm Drainage Projects
Baker Pump Station - Dallas, Texas

NORTHING 6977586 ft
EASTING 2479213 ft

EXPLORATION CONTRACTOR GEDCO / Mas-Tek
STARTED 10-13-2008

ENGINEERS REP. Edwin R. Strode Jr.
LOGGED BY Edwin R. Strode Jr.
COMPLETED 10-17-2008

GROUNDWATER

ENCOUNTERED DURING
DRILLING AT Dry
HOURS AFTER DRILLING
HOURS AFTER DRILLING
HOURS AFTER DRILLING
HOURS AFTER DRILLING

BORING METHOD

DEPTH MUD STARTED

SAMPLE TYPE AND DATA

U Undisturbued Sample
S Split Barrel
C Rock Core

DEPTH BELOW SURFACE(feet)	SAMPLE INTERVAL AND TYPE	SAMPLE NUMBER	RECOVERY(in) CORE RECOVERY(%)	RQD(%)	PENETRATION TEST RESULTS Blows per Interval (inches) 0-6	6-12	12-18	"N" Value	POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System Textural (Visual)	ELEV. DATUM ELEV. (feet) 405.0
	U	ST-1	12							Medium dense, dark brown, moist, SAND and CLAY, trace gravel (SC)	
	U	ST-2	12						2.0P		
	U	ST-3	12							4.0	401.0
5	U	ST-4	13						3.0P	Dense, brown, moist, SAND and CLAY, some gravel (SC)	
	U	ST-5	14							7.0	398.0
										Very stiff, dark gray, moist, CLAY, little sand, some gravel (CH)	397.0
	U	ST-6	16						2.5P	Very stiff, orangish brown, moist SAND and CLAY, little gravel (SC)	
10											
	S	SS-7	18		5	6	6	12		13.5	391.5
										Medium dense, tan, moist medium to fine SAND, little clay (SC)	
15	S	SS-8	18		9	23	37	60		15.5	389.5
										Very dense, tan, moist, coarse to fine SAND, some gravel, trace clay (SC) 17.0	388.0
	S	SS-9	18		15	23	19	42		Dense to medium dense, tan, moist, coarse to fine poorly graded SAND, with gravel, trace silt (SP)	
20	S	SS-10	18		10	10	11	21		21.5	383.5
	U	ST-11	12							Gray Weathered SHALE (CH)	
	U	ST-12	10								
25											

REMARKS: Boring grouted in accordance with Corps of Engineers requirements after completion

HNTB

LOG OF BORING

BORING NO. **BB-4**

SHEET **2** OF **2**

PROJECT **City of Dallas - Major Flood and Storm Drainage Projects**
Baker Pump Station - Dallas, Texas

NORTHING **6977586 ft**
EASTING **2479213 ft**

EXPLORATION CONTRACTOR **GEDCO / Mas-Tek**
STARTED **10-13-2008**

ENGINEERS REP. **Edwin R. Strode Jr.** LOGGED BY **Edwin R. Strode Jr.**
COMPLETED **10-17-2008**

DEPTH BELOW SURFACE(feet)	SAMPLE INTERVAL AND TYPE	SAMPLE NUMBER	SAMPLE RECOVERY(in) CORE RECOVERY(%)	SAMPLE RQD(%)	PENETRATION TEST RESULTS Blows per Interval (inches) 0-6	6-12	12-18	"N" Value	POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System **Textural (Visual)**	ELEV. DATUM / ELEV. (feet)
											405.0
	C	RC-1	23	23						Weathered SHALE - Sound, soft to very soft, moderately weathered, dark gray, fine grained, massive, wide joints	
30											
	C	RC-2	50	27							
35											
	C	RC-3	79	71							
	C	RC-4	80	80						37.3' - Joint, 0 deg, fresh, stepped, smooth, tight 41' - Joint, 0 deg, decomposed, planar, smooth, 1/2" bentonite infill	
40											
	C	RC-5	70	59							
	C	RC-6	0	0						44.0	361.0
45	C	RC-7	54	33						SHALE - Sound, soft to very soft, moderately weathered, dark gray, fine grained, massive, wide joints, some limestone layers	
	C	RC-8	92	71						45.7' - Joint, 0 deg, fresh, planar, smooth, tight 45.8' - Joint, 0 deg, fresh, planar, smooth, tight 49.3' - Joint, 0 deg, fresh, planar, smooth, tight 49.5' - Joint, 0 deg, fresh, planar, smooth, tight 49.7' - Joint, 0 deg, fresh, planar, smooth, tight	
	C	RC-9	100	79							
50											
	C	RC-10	100	54						52.0	353.0
55										Bottom of boring 52'	

REMARKS: 25' - THD - 50/3" - 50/2"; 30' - THD - 50 / 2 3/4" - 50 / 1 1/4"; 35' - THD - 50 / 3" - 50 / 1"; 39' - THD - 50 / 3" - 50 / 1 1/4"; 44' - THD - 50 / 1 1/2" - 50 / 3/4"; 50' - THD - 50 / 1 1/4" - 50 / 3/4"

HNTB

LOG OF BORING

BORING NO. **BB-5**

SHEET 1 OF 2

PROJECT **City of Dallas - Major Flood and Storm Drainage Projects**
Baker Pump Station - Dallas, Texas

NORTHING **6977803 ft**
EASTING **2479297 ft**

EXPLORATION CONTRACTOR **GEDCO / Mas-Tek**
STARTED **10-21-2008**

ENGINEERS REP. **Edwin R. Strode Jr.** LOGGED BY **Edwin R. Strode Jr.**
COMPLETED **10-24-2008**

GROUNDWATER

ENCOUNTERED DURING
DRILLING AT **22.5**
HOURS AFTER DRILLING
HOURS AFTER DRILLING
HOURS AFTER DRILLING
HOURS AFTER DRILLING

BORING METHOD

DEPTH MUD STARTED

SAMPLE TYPE AND DATA

U Undisturbued Sample
S Split Barrel
C Rock Core

DEPTH BELOW SURFACE(feet)	SAMPLE INTERVAL AND TYPE	SAMPLE NUMBER	SAMPLE RECOVERY(in) CORE RECOVERY(%)	SAMPLE RQD(%)	PENETRATION TEST RESULTS Blows per Interval (inches) 0-6	6-12	12-18	"N" Value	POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System **Textural (Visual)**		ELEV. DATUM ELEV. (feet) 404.9
										Concrete	1.0	403.9
										Gravel Subbase	2.0	402.9
	U	ST-1	24							Soft, dark gray, moist, organic CLAY (OL)	5.0	399.9
5	U	ST-2	24						2.5P	Stiff, dark brown, moist, CLAY, some sand, trace gravel (CL)	8.0	396.9
	U	ST-3	22						3.0P	Stiff, orangish brown, moist, SAND and CLAY, trace gravel (SC)	10.0	394.9
10	U	ST-4	12							Medium dense, tan, moist, SAND, trace gravel, little silt and clay (SM)	12.5	392.4
	S	SS-5	18		4	11	13	24		Medium dense, tan, moist, SAND, little gravel, trace clay [SC]	16.0	388.9
15	S	SS-6	18		6	6	8	14				
	S	SS-7	16		6	13	30	43		Medium dense to dense, tan, moist, SAND, little gravel, trace clay (SP-SC)	22.5	382.4
20	S	SS-8	16		7	14	14	28				
	S	SS-9	16		25	42	50/4			Weathered SHALE	24.0	380.9
25	C	RC-1	33	0								

REMARKS: 24' - THD - 50/ 2 3/4" - 50/ 1 3/4"

HNTB

LOG OF BORING

BORING NO. **BB-5**

SHEET **2** OF **2**

PROJECT **City of Dallas - Major Flood and Storm Drainage Projects**
Baker Pump Station - Dallas, Texas

NORTHING **6977803 ft**
EASTING **2479297 ft**

EXPLORATION CONTRACTOR **GEDCO / Mas-Tek**
STARTED **10-21-2008**

ENGINEERS REP. **Edwin R. Strode Jr.** LOGGED BY **Edwin R. Strode Jr.**
COMPLETED **10-24-2008**

DEPTH BELOW SURFACE(feet)	SAMPLE INTERVAL AND TYPE	SAMPLE NUMBER	SAMPLE RECOVERY(in) CORE RECOVERY(%)	SAMPLE RQD(%)	PENETRATION TEST RESULTS Blows per Interval (inches) 0-6	6-12	12-18	"N" Value	POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System **Textural (Visual)**	ELEV. DATUM ELEV. (feet) 404.9
	C										
	C	RC-2	0	0						Weathered SHALE, extremely fractured, very soft, moderately to highly weathered, dark gray, fine grained, thick bedded	
	C	RC-3	100	0							
30	C	RC-4	50	50						31.0	373.9
	C	RC-5	100	100						Weathered SHALE, sound, soft, moderately to highly weathered, dark gray, fine grained, thick bedded 34.0	370.9
35	C	RC-6	96	82						Weathered SHALE, moderately fractured to sound, soft, moderately weathered, dark gray, fine grained, thick bedded	
	C	RC-7	100	89						35' - 2 1/2" Bentonite seam	
40	C	RC-8	100	66						36' - Joint, 0 deg, fresh, planar, smooth, tight 38.1' - Joint, 0 deg, decomposed, planar, smooth, tight	
	C	RC-9	100	100						Numerous Limestone seams 42-42.5' 44.0	360.9
45	C	RC-10	100	83						SHALE, moderately to extremely fractured, soft, fresh, dark gray, fine grained, thick bedded	
	C	RC-11	57	57						45.5-46' - 6" Bentonite Seam	
50										51.5	353.4
55										Bottom of Boring 51.5'	

REMARKS: 26' - THD - 50/ 2 1/2" - 50/ 1 3/4"; 32' - THD - 50/ 3" - 50/ 2 1/8"; 38' - THD - 50/ 3 1/4" - 50/ 2"; 44' - THD - 50/ 1 3/4" - 50/ 1"; 51' - THD -
Necking of core noted 39-40'

HNTB

LOG OF BORING

BORING NO. **BB-6**

SHEET 1 OF 2

PROJECT **City of Dallas - Major Flood and Storm Drainage Projects**
Baker Pump Station - Dallas, Texas

NORTHING **6977721 ft**
EASTING **2479509 ft**

EXPLORATION CONTRACTOR **GEDCO / Mas-Tek**
STARTED **10-13-2008**

ENGINEERS REP. **Edwin R. Strode Jr.** LOGGED BY **Michael Roland**
COMPLETED **10-17-2008**

GROUNDWATER

ENCOUNTERED DURING
DRILLING AT **Dry**
HOURS AFTER DRILLING
HOURS AFTER DRILLING
HOURS AFTER DRILLING
HOURS AFTER DRILLING

BORING METHOD

DEPTH MUD STARTED

SAMPLE TYPE AND DATA

U Undisturbued Sample
S Split Barrel
C Rock Core

DEPTH BELOW SURFACE(feet)	SAMPLE INTERVAL AND TYPE	SAMPLE NUMBER	RECOVERY(in) CORE RECOVERY(%)	RQD(%)	PENETRATION TEST RESULTS Blows per Interval (inches) 0-6	6-12	12-18	"N" Value	POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System **Textural (Visual)**		ELEV. DATUM ELEV. (feet) 405.4
										0-7" Concrete	0.6	404.8
	U	ST-1								Gray SAND and CLAY, with gravel (SC) FILL	2.0	403.4
	U	ST-2								Medium stiff, dark gray and brown, moist, CLAY with sand (CL) FILL	3.5	401.9
	U	ST-3								Medium stiff, dark gray, moist, SAND with CLAY (SC) FILL	4.7	400.7
5										Stiff, dark gray, moist CLAY (CH)	6.0	399.4
	U	ST-4								Stiff, dark gray, moist, elastic SILT, trace sand, trace gravel (MH)		
	U	ST-5									10.0	395.4
10												
	U	ST-6								Medium dense, brown, moist SILT, with sand, trace gravel (ML)	12.5	392.9
	U	ST-7								Medium dense, brown, moist, medium to fine SAND, trace silt (SM)	15.0	390.4
15												
	U	ST-8								Medium dense, brown and light gray, moist CLAY and SAND (CL)	17.5	387.9
	S	SS-9			4	4	5	9		Medium dense, light gray and tan, moist, SAND and CLAY (SC) with interbedded clay layers	20.0	385.4
20												
	S	SS-10			8	18	20	38		Medium dense, tan, moist, coarse to fine SAND, with gravel, trace clay (SP)	22.5	382.9
	S	SS-11			4	5	7	12		Weathered SHALE	24.0	381.4
25	C											

REMARKS: Boring backfilled upon completion

24' - THD - 50/ 4" - 50/3"; 30.5' - THD - 50/ 1 1/2" - 50/ 1 1/2"

HNTB

LOG OF BORING

BORING NO. **BB-6**

SHEET **2** OF **2**

PROJECT **City of Dallas - Major Flood and Storm Drainage Projects**
Baker Pump Station - Dallas, Texas

NORTHING **6977721 ft**
EASTING **2479509 ft**

EXPLORATION CONTRACTOR **GEDCO / Mas-Tek**
STARTED **10-13-2008**

ENGINEERS REP. **Edwin R. Strode Jr.** LOGGED BY **Michael Roland**
COMPLETED **10-17-2008**

DEPTH BELOW SURFACE(feet)	SAMPLE: INTERVAL AND TYPE	SAMPLE: NUMBER	SAMPLE: RECOVERY(in) CORE RECOVERY(%)	SAMPLE: RQD(%)	PENETRATION TEST RESULTS: Blows per Interval (inches) 0-6	6-12	12-18	"N" Value	POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System **Textural (Visual)**	ELEV. DATUM / ELEV. (feet)
											405.4
	C	RC-1	97	97						SHALE, sound, moderately weathered, dark gray, fine grained, thick bedded	
	C	RC-2	100	100							
30										30.5	374.9
										Bottom of boring 30.5'	
35											
40											
45											
50											
55											

REMARKS:

HNTB

LOG OF BORING

BORING NO. **BB-7**

SHEET 1 OF 1

PROJECT City of Dallas - Major Flood and Storm Drainage Projects
Baker Pump Station - Dallas, Texas

NORTHING 6977891 ft
EASTING 2479365 ft

EXPLORATION CONTRACTOR GEDCO / Mas-Tek
STARTED 10-13-2008

ENGINEERS REP. Edwin R. Strode Jr.
LOGGED BY Willaim Cappell
COMPLETED 10-17-2008

GROUNDWATER

ENCOUNTERED DURING
DRILLING AT
HOURS AFTER DRILLING
HOURS AFTER DRILLING
HOURS AFTER DRILLING
HOURS AFTER DRILLING

BORING METHOD

DEPTH MUD STARTED

SAMPLE TYPE AND DATA

U Undisturbued Sample
S Split Barrel

DEPTH BELOW SURFACE(feet)	SAMPLE INTERVAL AND TYPE	SAMPLE NUMBER	SAMPLE RECOVERY(in) CORE RECOVERY(%)	SAMPLE RQD(%)	PENETRATION TEST RESULTS Blows per Interval (inches) 0-6	6-12	12-18	"N" Value	POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System Textural (Visual)	ELEV. DATUM ELEV. (feet)
											405.5
	U	ST-1	6							0-6" Concrete - 6-12" Aggregate base 0.5 / 1.0	405.0 / 404.5
	U	ST-2	12							Dark gray-brown SAND with gravel, trace clay (SP) 2.5	403.0
	S	SS-3			3	3	5	8	1.8P	Loose, dark gray-brown, moist elastic SILT(MH) Possible FILL 4.5	401.0
5	U	ST-4	12						2.3P 2.9P	Very stiff, dark, moist gray-brown CLAY (CH) 7.0	398.5
	U	ST-5	12						2.3P 1.7P	Medium stiff, dark brown, moist, CLAY (CH) 9.5	396.0
10	U	ST-6	12						2.3P 2.8P	Stiff, yellow brown and gray, moist, CLAY with sand (CH) 11.0	394.5
										Bottom of Boring 11'	
15											
20											
25											

REMARKS: Boring backfilled upon completion

HNTB

LOG OF BORING

BORING NO. **BB-8**

SHEET 1 OF 1

PROJECT City of Dallas - Major Flood and Storm Drainage Projects
Baker Pump Station - Dallas, Texas

NORTHING 6977995 ft
EASTING 2479447 ft

EXPLORATION CONTRACTOR GEDCO / Mas-Tek
STARTED 10-22-2008

ENGINEERS REP. Edwin R. Strode Jr.
LOGGED BY Edwin R. Strode Jr.
COMPLETED 10-22-2008

GROUNDWATER

ENCOUNTERED DURING DRILLING AT Dry
HOURS AFTER DRILLING
HOURS AFTER DRILLING
HOURS AFTER DRILLING
HOURS AFTER DRILLING

BORING METHOD

DEPTH MUD STARTED

SAMPLE TYPE AND DATA

S Split Barrel

DEPTH BELOW SURFACE(feet)	SAMPLE INTERVAL AND TYPE	SAMPLE NUMBER	RECOVERY(in) CORE RECOVERY(%)	RQD(%)	PENETRATION TEST RESULTS Blows per Interval (inches) 0-6	6-12	12-18	"N" Value	POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System Textural (Visual)	ELEV. (feet)
										0.1	404.2
										0-2" Asphalt; 2-12" Aggregate Subbase 1.0	403.3
	S	SS-1	18		3	5	6	11		Medium stiff, dark gray, moist, SILT, trace sand (ML) 3.0	401.3
	S	SS-2	18		4	6	8	14		Medium stiff, dark gray, most, CLAY, trace sand, trace gravel [CL]	
5	S	SS-3	18		5	6	7	13			
	S	SS-4	18		4	5	6	11			
	S	SS-5	18		5	6	9	15		10.0	394.3
10										Bottom of boring 10'	
15											
20											
25											

ELEV. DATUM

REMARKS: Boring backfilled upon completion

HNTB

LOG OF BORING

BORING NO. **BB-9**

SHEET **1** OF **3**

PROJECT **City of Dallas - Major Flood and Storm Drainage Projects**
Baker Pump Station - Dallas, Texas

NORTHING **6977449 ft**
EASTING **2479189 ft**

EXPLORATION CONTRACTOR **GEDCO / Mas-Tek**
STARTED **10-15-2008**

ENGINEERS REP. **Edwin R. Strode Jr.** LOGGED BY **Edwin R. Strode Jr.**
COMPLETED **10-21-2008**

GROUNDWATER

ENCOUNTERED DURING
DRILLING AT **25.0**
HOURS AFTER DRILLING
HOURS AFTER DRILLING
HOURS AFTER DRILLING
HOURS AFTER DRILLING

BORING METHOD

DEPTH MUD STARTED

SAMPLE TYPE AND DATA

U Undisturbued Sample
S Split Barrel
C Rock Core

DEPTH BELOW SURFACE(feet)	SAMPLE INTERVAL AND TYPE	SAMPLE NUMBER	SAMPLE RECOVERY(in) CORE RECOVERY(%)	SAMPLE RQD(%)	PENETRATION TEST RESULTS Blows per Interval (inches) 0-6	6-12	12-18	"N" Value	POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System **Textural (Visual)**	ELEV. DATUM ELEV. (feet) 432.3
	U	ST-1	12						2.5P	0-1.5' - Aggregate Subbase 1.5	430.8
	U	ST-2	9							Stiff, dark brown, moist, CLAY, trace sand, trace gravel (CL)	
	U	ST-3	10						3.0P		
	U	ST-4	14								
5										6.0	426.3
	U	ST-5	16						3.0P	Stiff, dark gray, moist, CLAY, trace sand, trace gravel (CH)	
	U	ST-6	12								
	U	ST-7	12						2.0P		
	U	ST-8	10								
10											
	U	ST-9	24						1.5P		
15										15.5	416.8
	U	ST-10	24							Stiff, orange brown, moist, CLAY and SAND (CL) 16.5	415.8
	U	ST-11	24						1.0P	Soft, dark gray, moist, CLAY, trace sand, trace gravel (CL)	
20											
	U	ST-12	24								
	U	ST-13	24						1.25P		
25										25.0	407.3

REMARKS: Boring grouted in accordance with Corps of Engineers requirements after completion

HNTB

LOG OF BORING

BORING NO. **BB-9**

SHEET **2** OF **3**

PROJECT **City of Dallas - Major Flood and Storm Drainage Projects**
Baker Pump Station - Dallas, Texas

NORTHING **6977449 ft**
EASTING **2479189 ft**

EXPLORATION CONTRACTOR **GEDCO / Mas-Tek**
STARTED **10-15-2008**

ENGINEERS REP. **Edwin R. Strode Jr.** LOGGED BY **Edwin R. Strode Jr.**
COMPLETED **10-21-2008**

DEPTH BELOW SURFACE(feet)	SAMPLE INTERVAL AND TYPE	SAMPLE NUMBER	SAMPLE RECOVERY(in) CORE RECOVERY(%)	SAMPLE RQD(%)	PENETRATION TEST RESULTS Blows per Interval (inches) 0-6	6-12	12-18	"N" Value	POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System **Textural (Visual)**	ELEV. DATUM ELEV. (feet) 432.3
	U	ST-14	24							Stiff, dark gray, wet, CLAY, trace sand, trace gravel (CH) 27.0	405.3
	U	ST-15	24						2.5P	Medium stiff, dark gray, wet, CLAY, little sand, trace gravel (CL) - with interbedded brown clayey sand layers 30.0	402.3
30	U	ST-16	24							Medium stiff, dark brown, wet, CLAY, with sand, trace gravel (CL) 35.0	397.3
	U	ST-17	20								
35	U	ST-18	6							Medium dense, tan, wet, SAND, little gravel, little clay (SC) 42.0	390.3
	S	SS-19	16		8	9	17	26			
	S	SS-20	14		17	21	22	43			
40	S	SS-21	16		14	14	13	27			
	S	SS-22	18		6	7	9	16		Loose, light gray, wet, SAND, little clay, little gravel (SC) 43.5	388.8
										Gray, wet, CLAY with sand, trace gravel (CL) 45.0	387.3
45	S	SS-23	16		10	16	20	36		Medium dense, tan, wet, SAND, with gravel, trace fines (SP) 49.0	383.3
	S	SS-24	16		13	12	12	24			
50	U	ST-25	24						3.5P	Weathered SHALE 54.0	378.3
55	C									Weathered SHALE, slightly fractured, very soft, moderately weathered, dark gray, fine grained, thick bedded	

REMARKS: Hole augered to 54' and THD performed

54' - THD - 42/ 6" - 50/ 3 1/2"; 60' - THD - 50/ 1 3/4" - 50/ 2 1/4"; 65' - THD - 50/ 4 1/2" - 50/ 2 1/2"

HNTB

LOG OF BORING

BORING NO. **BB-9**

SHEET **3** OF **3**

PROJECT **City of Dallas - Major Flood and Storm Drainage Projects**
Baker Pump Station - Dallas, Texas

NORTHING **6977449 ft**
EASTING **2479189 ft**

EXPLORATION CONTRACTOR **GEDCO / Mas-Tek**
STARTED **10-15-2008**

ENGINEERS REP. **Edwin R. Strode Jr.** LOGGED BY **Edwin R. Strode Jr.**
COMPLETED **10-21-2008**

DEPTH BELOW SURFACE(feet)	SAMPLE: INTERVAL AND TYPE	SAMPLE: NUMBER	SAMPLE: RECOVERY(in) CORE RECOVERY(%)	SAMPLE: RQD(%)	PENETRATION TEST RESULTS: Blows per Interval (inches) 0-6	6-12	12-18	"N" Value	POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System **Textural (Visual)**	ELEV. DATUM / ELEV. (feet)
											432.3
	C	RC-1	87	62						56' - 1/2" Bentonite seam 57' - Possible shear, 45 deg, fresh, planar, smooth, tight	
60											
	C	RC-2	67	67						64' - Joint, 0 deg, fresh, planar, smooth, 1/4" clay infill 65.0	367.3
65										Bottom of Boring 65'	
70											
75											
80											
85											

REMARKS:

HNTB

LOG OF BORING

BORING NO. **BB-10**

SHEET 1 OF 2

PROJECT **City of Dallas - Major Flood and Storm Drainage Projects**
Baker Pump Station - Dallas, Texas

NORTHING **6977336 ft**
EASTING **2479135 ft**

EXPLORATION CONTRACTOR **GEDCO / Mas-Tek**
STARTED **10-14-2008**

ENGINEERS REP. **Edwin R. Strode Jr.** LOGGED BY **Edwin R. Strode Jr.**
COMPLETED **10-15-2008**

GROUNDWATER

ENCOUNTERED DURING
DRILLING AT **16.0**
____ HOURS AFTER DRILLING
____ HOURS AFTER DRILLING
____ HOURS AFTER DRILLING
____ HOURS AFTER DRILLING

BORING METHOD

____ DEPTH MUD STARTED

SAMPLE TYPE AND DATA

U Undisturbued Sample
C Rock Core

DEPTH BELOW SURFACE(feet)	SAMPLE INTERVAL AND TYPE	SAMPLE NUMBER	SAMPLE RECOVERY(in) CORE RECOVERY(%)	SAMPLE RQD(%)	PENETRATION TEST RESULTS Blows per Interval (inches) 0-6	6-12	12-18	"N" Value	POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System **Textural (Visual)**	ELEV. DATUM ____ ELEV. (feet) 405.6
	U	ST-1	10							Stiff, dark brown, moist, CLAY, little sand, trace gravel (CL) 2.0	403.6
	U	ST-2	10						3.0P		
	U	ST-3	12							Stiff, brown, moist, CLAY, with sand, trace gravel (CL) 4.0	401.6
	U	ST-4	12						2.5P		
	U	ST-5	10							Stiff, dark brown, moist, CLAY, little sand, trace gravel (CL) - with intebedded sand and gravel layers	
5	U	ST-6	10						1.5P		
	U	ST-7	12								
	U	ST-8	12						1.0P		
	U	ST-9	12								
	U	ST-10	12						1.5P	9.5	396.2
10										Soft, dark brown, moist, CLAY, little sand, trace gravel (CL) 12.5	393.2
	U	ST-11	16							Soft, gray, moist, SAND and CLAY with gravel (SC)	
15										16.0	389.6
	U	ST-12	14						1.75P	Stiff, light gray, wet, CLAY, with sand, trace gravel (CL) 18.0	387.6
	U	ST-13	10							Soft, dark gray, wet, CLAY, trace sand (CL)	
20	U	ST-14	12						1.0P	22.5	383.2
	U	ST-15	14							Weathered SHALE 24.5	381.2
25	C										

REMARKS: Boring grouted in accordance with Corps of Engineers requirements after completion

HNTB

LOG OF BORING

BORING NO. **BB-10**

SHEET **2** OF **2**

PROJECT **City of Dallas - Major Flood and Storm Drainage Projects**
Baker Pump Station - Dallas, Texas

NORTHING **6977336 ft**
EASTING **2479135 ft**

EXPLORATION CONTRACTOR **GEDCO / Mas-Tek**
STARTED **10-14-2008**

ENGINEERS REP. **Edwin R. Strode Jr.** LOGGED BY **Edwin R. Strode Jr.**
COMPLETED **10-15-2008**

DEPTH BELOW SURFACE(feet)	SAMPLE: INTERVAL AND TYPE	SAMPLE: NUMBER	SAMPLE: RECOVERY(in) CORE RECOVERY(%)	SAMPLE: RQD(%)	PENETRATION TEST RESULTS: Blows per Interval (inches) 0-6	6-12	12-18	"N" Value	POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System **Textural (Visual)**	ELEV. DATUM / ELEV. (feet)
											405.6
	C	RC-1	48	48						Weathered SHALE, sound, soft to very soft, slightly weathered, dark gray, fine grained, thick bedded 24-25.5' - Numerous pits 26.5' - Possible shear, 45 deg, fresh, planar, smooth, tight	
30	C	RC-2	100	100						31' - 3" Bentonite layer 33' - 2" Bentonite layer 34.5	371.2
35	C	RC-3	67	67						SHALE, sound, soft, fresh, dark gray, fine grained, thick bedded 39.5	366.2
40										Bottom of Boring 39.5'	
45											
50											
55											

REMARKS: 24.5' - THD - 50/ 4 1/4" - 50/ 2 1/2"; 34.5' - THD - 50/ 1 1/2" - 50/ 1"; 39.5' - THD - 50/ 2" - 50/1 3/4"

HNTB

LOG OF BORING

BORING NO. **BB-11**

SHEET 1 OF 2

PROJECT City of Dallas - Major Flood and Storm Drainage Projects
Baker Pump Station - Dallas, Texas

NORTHING 6977357 ft
EASTING 2479627 ft

EXPLORATION CONTRACTOR GEDCO / Mas-Tek
STARTED 10-16-2008
ENGINEERS REP. Edwin R. Strode Jr.
LOGGED BY Edwin R. Strode Jr.
COMPLETED 10-16-2008

GROUNDWATER

ENCOUNTERED DURING
DRILLING AT Dry
HOURS AFTER DRILLING
HOURS AFTER DRILLING
HOURS AFTER DRILLING
HOURS AFTER DRILLING

BORING METHOD

DEPTH MUD STARTED

SAMPLE TYPE AND DATA

U Undisturbued Sample

DEPTH BELOW SURFACE(feet)	SAMPLE INTERVAL AND TYPE	SAMPLE NUMBER	SAMPLE RECOVERY(in) CORE RECOVERY(%)	SAMPLE RQD(%)	PENETRATION TEST RESULTS Blows per Interval (inches) 0-6	6-12	12-18	"N" Value	POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System Textural (Visual)	ELEV. DATUM / ELEV. (feet)
											408.9
										0-7" Concrete 0.7	408.2
	U	ST-1	12							Medium stiff, dark gray, moist, CLAY, trace sand, trace gravel [CL]	
	U	ST-2	16							3.5	405.4
	U	ST-3	12						0.5P	Very soft, gray-black, moist, organic CLAY, trace sand [OL]	
5	U	ST-4	14								
	U	ST-5	12						1.0P		
	U	ST-6	10								
10										10.5	398.4
	U	ST-7	12						1.5P	Soft, gray, moist, CLAY, trace sand, trace gravel [CL]	
15	U	ST-8	12								
	U	ST-9	12						1.25P		
										19.5	389.4
20	U	ST-10	12							Medium stiff, brown, moist, SAND and CLAY, trace gravel [SC] 21.5	387.4
	U	ST-11	12						1.75P	Soft, gray, moist, CLAY [CH] with interbedded clayey sand layers	
25											

REMARKS: Boring grouted in accordance with Corps of Engineers requirements after completion

HNTB

LOG OF BORING

BORING NO. **BB-11**

SHEET **2** OF **2**

PROJECT **City of Dallas - Major Flood and Storm Drainage Projects**
Baker Pump Station - Dallas, Texas

NORTHING **6977357 ft**
EASTING **2479627 ft**

EXPLORATION CONTRACTOR **GEDCO / Mas-Tek**
STARTED **10-16-2008**

ENGINEERS REP. **Edwin R. Strode Jr.** LOGGED BY **Edwin R. Strode Jr.**
COMPLETED **10-16-2008**

DEPTH BELOW SURFACE(feet)	SAMPLE: INTERVAL AND TYPE	SAMPLE: NUMBER	SAMPLE: RECOVERY(in) CORE RECOVERY(%)	SAMPLE: RQD(%)	PENETRATION TEST RESULTS: Blows per Interval (inches) 0-6	6-12	12-18	"N" Value	POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System **Textural (Visual)**	ELEV. DATUM / ELEV. (feet)
											408.9
	U	ST-12	12							Soft, gray, moist, CLAY [CH] with interbedded clayey sand layers	
	U	ST-13	12								
30	U	ST-14	6							30.0	378.9
										30.5 Concrete	378.4
										Bottom of boring 30.5'	
35											
40											
45											
50											
55											

REMARKS: Encountered pump station head wall foundation at 30.5', boring offset and re-drilled as BB-11A

HNTB

LOG OF BORING

BORING NO. **BB-11A**

SHEET 1 OF 2

PROJECT City of Dallas - Major Flood and Storm Drainage Projects
Baker Pump Station - Dallas, Texas

NORTHING 6977341 ft
EASTING 2479571 ft

EXPLORATION CONTRACTOR GEDCO / Mas-Tek
STARTED 10-28-2008

ENGINEERS REP. Edwin R. Strode Jr.
LOGGED BY Edwin R. Strode Jr.
COMPLETED 10-31-2008

GROUNDWATER

ENCOUNTERED DURING
DRILLING AT Dry
HOURS AFTER DRILLING
HOURS AFTER DRILLING
HOURS AFTER DRILLING
HOURS AFTER DRILLING

BORING METHOD

DEPTH MUD STARTED

SAMPLE TYPE AND DATA

U Undisturbued Sample
S Split Barrel
C Rock Core

DEPTH BELOW SURFACE(feet)	SAMPLE INTERVAL AND TYPE	SAMPLE NUMBER	SAMPLE RECOVERY(in) CORE RECOVERY(%)	SAMPLE RQD(%)	PENETRATION TEST RESULTS Blows per Interval (inches) 0-6	6-12	12-18	"N" Value	POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System Textural (Visual)	ELEV. DATUM ELEV. (feet) 409.0
										0-12" Concrete 1.0	408.0
	U	ST-1	12						2.2P 2.5P	Very Stiff, dark brown, moist, CLAY (CH) 4.5	404.5
5	U	ST-2	12						1.4P 2.3P	Veru stiff, dark brown, moist, CLAY, with sand, little gravel (CH) 7.0	402.0
	U	ST-3	12						2.6P 2.8P	Very stiff, dark gray, moist, CLAY, trace sand (CH) 12.0	397.0
10	U	ST-4	12						2.4P 2.7P		
	U	ST-5	12						4.1P 4.1P	Hard, brown, moist, CLAY and SAND (CL) 17.5	391.5
15	U	ST-6	12						3.7P		
	S	SS-7	14		6	6	8	14		Medium dense, brown, moist, SAND, trace fines (SM) 20.0	389.0
20	S	SS-8			6	8	10	18		Medium dense, light brown, moist, SAND, trace fines (SM) 22.0	387.0
	S	SS-9			17	31	47	78		Very dense, brown, moist, SAND, some gravel, trace clay (SC)	
25											

REMARKS: Boring grouted in accordance with Corps of Engineers requirements after completion

HNTB

LOG OF BORING

BORING NO. **BB-11A**

SHEET 2 OF 2

PROJECT **City of Dallas - Major Flood and Storm Drainage Projects**
Baker Pump Station - Dallas, Texas

NORTHING **6977341 ft**
EASTING **2479571 ft**

EXPLORATION CONTRACTOR **GEDCO / Mas-Tek**
STARTED **10-28-2008**

ENGINEERS REP. **Edwin R. Strode Jr.** LOGGED BY **Edwin R. Strode Jr.**
COMPLETED **10-31-2008**

DEPTH BELOW SURFACE(feet)	SAMPLE INTERVAL AND TYPE	SAMPLE NUMBER	SAMPLE RECOVERY(in) CORE RECOVERY(%)	SAMPLE RQD(%)	PENETRATION TEST RESULTS Blows per Interval (inches) 0-6	6-12	12-18	"N" Value	POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System **Textural (Visual)**	ELEV. DATUM ELEV. (feet) 409.0
	S	SS-10			10	12	13	25			
										26.0	383.0
										26.5	382.5
										Weathered Shale	
	C	RC-1	94	94						SHALE, sound, moderately weathered, dark gray, fine grained, thick bedded	
30											
	C	RC-2	87	87							
35											
	C	RC-3	97	97							
40											
	C	RC-4	94	94							
45											
	C	RC-5	98	98							
										50.0	359.0
50											
										Bottom of Boring 50'	
55											

REMARKS: 27' - THD - 50/ 4 3/4" - 50/ 2 3/4"; 40' - THD - 50/ 2" - 50/ 1 3/4"; 50' - THD - 50/ 1" - 50/ 3/4"

Appendix C –

Laboratory Test Results

Fugro Consultants, Inc.
Laboratory Test Requests

LABORATORY TEST ASSIGNMENTS

JOB NUMBER : 707-1089
JOB NAME : Baker Pump Station
LOCATION : Dallas TX
ASSIGNED BY : BB

DATE : FEB 1 1 2008
DATE NEEDED :

SHEET 1 of 2

FUGRO

BORING NO.	DEPTH, FT	PROPERTIES & GRAIN SIZE: Moisture Content (ASTM D2216)	Atterberg Limits (ASTM D4318)	Dry Unit Weight	Passing #200 Sieve (ASTM D1140)	Sieve Analysis 3 in. To #200 (ASTM D422)	Hydrometer (ASTM D422)	STRENGTH: Unconfined Compression (Soil/Rock)	Triaxial Compression (See Codes)	Direct Shear (See Codes) (ASTMD3080)	Hand Penetrometer	VOLUMETRIC: Free Swell Modified Overburden	One Dimensional Swell (See Codes)	Consolidation (ASTM D 2435) Specify Method A or B	OTHER TESTS: Lime Series Specify pH or PI	Soil Resistivity	Soil Soluble Sulfate	Soil pH	
B-1	1-2	✓																	
	3-4	✓	✓	✓	✓			✓											
	5-6.5	✓				✓													
	8.5-10	✓						✓											
	20-24	✓	✓					✓	← one sample in this core interval (wrapped samples typical)										
	25-35	✓	✓					✓											
	35-45	✓	✓					✓											
	45-55	✓	✓					✓											
	55-65	✓	✓					✓											
	65-75	✓	✓					✓											
	75-85	✓	✓					✓											
	85-95	✓	✓					✓											

LABORATORY USE ONLY
DATE RECEIVED :
DATE COMPLETED :

CONSOLIDATION CODES (loads in tsf)
A. Sat, 0.125, 0.25, 0.5, 1, 2, 4, 8, 16, 4, 1, 0.25
B. 0.125, 0.25, 0.5, 1, Sat, 2, 4, 8, 16, 4, 1, 0.25
C.
D.
E.

DIRECT SHEAR CODES (loads in tsf)
A. Consolidation phase Apply Incrementally ☐ Apply in one step ☐
Peak
Normal Loads:
Shear Phase
Peak ☐ Post Peak ☐
Remold at % of MDD/OMC /
B. Consolidation phase Apply Incrementally ☐ Apply in one step ☐
Peak
Normal Loads:
Shear Phase
Peak ☐ Post Peak ☐
Remold at % of MDD/OMC /

TRIAXIAL COMPRESSION CODES (ASTM D4767, D2850, D2166)
A. UUTx ☐ CUTx ☐
Confining Stress psi
Notes:
B. UUTx ☐ CUTx ☐
Confining Stress psi
Notes:

ONE DIMENSIONAL SWELL OF COHESIVE SOILS (ASTM D4546)
A. ☐ B. ☐ C. ☐

GrfcTblLAB_ASSIGNMENT_SHEET 3/14/07 11:11:38 AM

LABORATORY TEST ASSIGNMENTS

FUGRO

JOB NUMBER : 707-1089
JOB NAME :
LOCATION :
ASSIGNED BY :

DATE :
DATE NEEDED :

SHEET 2 of 2

		PROPERTIES & GRAIN SIZE						STRENGTH				VOLUMETRIC			OTHER TESTS				
BORING NO.	DEPTH, FT	Moisture Content (ASTM D2216)	Atterberg Limits (ASTM D4318)	Dry Unit Weight	Passing #200 Sieve (ASTM D1140)	Sieve Analysis 3 in. To #200 (ASTM D422)	Hydrometer (ASTM D422)	Unconfined Compression (Soil/Rock)	Triaxial Compression (See Codes)	Direct Shear (See Codes) (ASTMD3080)	Hand Penetrometer	Free Swell Modified Overburden	One Dimensional Swell (See Codes)	Consolidation (ASTM D 2435) Specify Method A or B	Lime Series Specify pH or PI	Soil Resistivity	Soil Soluble Sulfate	Soil pH	
B-3	3-4	/	/	/	/			/											
	7-8	/			/														
	9-10	/		/				/											
	13.5-15	/				/													
	24-25	/	/	/				/											
	25-35	/	/					/	← one sample in 10' core interval (wrapped sample, typical)										
	35-45	/	/					/											
	45-55	/	/					/											
	55-65	/	/					/											
	65-75	/	/					/											
	75-85	/	/					/											
	85-95	/	/					/											

LABORATORY USE ONLY

DATE RECEIVED :

DATE COMPLETED :

CONSOLIDATION CODES (loads in tsf)

A. Sat, 0.125, 0.25, 0.5, 1, 2, 4, 8, 16, 4, 1, 0.25

B. 0.125, 0.25, 0.5, 1, Sat, 2, 4, 8, 16, 4, 1, 0.25

C.

D.

E.

DIRECT SHEAR CODES (loads in tsf)

A. Consolidation phase Apply Incrementally ☐
Peak Apply in one step ☐

Normal Loads: ☐ ☐ ☐

Shear Phase
Peak ☐ Post Peak ☐

Remold at ☐ % of MDD/OMC ☐/☐

B. Consolidation phase Apply Incrementally ☐
Peak Apply in one step ☐

Normal Loads: ☐ ☐ ☐

Shear Phase
Peak ☐ Post Peak ☐

Remold at ☐ % of MDD/OMC ☐/☐

TRIAXIAL COMPRESSION CODES (ASTM D4767, D2850, D2166)

A. UUTx ☐ CUTx ☐
Confining Stress Notes: ☐ psi

B. UUTx ☐ CUTx ☐
Confining Stress Notes: ☐ psi

ONE DIMENSIONAL SWELL OF COHESIVE SOILS (ASTM D4546)

A. ☐ B. ☐ C. ☐

GrfcTblLAB_ASSIGNMENT_SHEET 3/14/07 11:11:38 AM

LABORATORY TEST ASSIGNMENTS

FUGRO

JOB NUMBER : 707-1089
JOB NAME : Baker Pump Station
LOCATION : Dallas TX
ASSIGNED BY : BB.

DATE : MAR 14 2008
DATE NEEDED :

SHEET 1 of 1

BORING NO.	DEPTH, FT	PROPERTIES & GRAIN SIZE						STRENGTH				VOLUMETRIC			OTHER TESTS				
		Moisture Content (ASTM D2216)	Atterberg Limits (ASTM D4318)	Dry Unit Weight	Passing #200 Sieve (ASTM D1140)	Sieve Analysis 3 in. To #200 (ASTM D422)	Hydrometer (ASTM D422)	Unconfined Compression (Soil/Rock)	Triaxial Compression (See Codes)	Direct Shear (See Codes) (ASTMD3080)	Hand Penetrometer	Free Swell Modified Overburden	One Dimensional Swell (See Codes)	Consolidation (ASTM D 2435) Specify Method A or B	Lime Series Specify pH or PI	Soil Resistivity	Soil Soluble Sulfate	Soil pH	
BB-2	1-2	✓																	
	3-4	✓																	
	5-6	✓	✓	✓				✓											
	7-8	✓	✓		✓														
	9-10	✓	✓		✓														
	14-15	✓				✓													
	18.5-20	✓				✓													
	25-35	✓		✓				✓											
	35-45	✓		✓				✓											
	45-55	✓		✓				✓											
	60-65	✓		✓				✓											
	70-75	✓		✓				✓											
	85-95	✓		✓				✓											

LABORATORY USE ONLY

DATE RECEIVED :

DATE COMPLETED :

CONSOLIDATION CODES (loads in tsf)

A. Sat, 0.125, 0.25, 0.5, 1, 2, 4, 8, 16, 4, 1, 0.25

B. 0.125, 0.25, 0.5, 1, Sat, 2, 4, 8, 16, 4, 1, 0.25

C.

D.

E.

DIRECT SHEAR CODES (loads in tsf)

A. Consolidation phase Apply Incrementally ☐ Apply in one step ☐
Peak

Normal Loads:

Shear Phase
Peak ☐ Post Peak ☐

Remold at % of MDD/OMC /

B. Consolidation phase Apply Incrementally ☐ Apply in one step ☐
Peak

Normal Loads:

Shear Phase
Peak ☐ Post Peak ☐

Remold at % of MDD/OMC /

TRIAXIAL COMPRESSION CODES (ASTM D4767, D2850, D2166)

A. UUTx ☐ CUTx ☐
Confining Stress psi
Notes:

B. UUTx ☐ CUTx ☐
Confining Stress psi
Notes:

ONE DIMENSIONAL SWELL OF COHESIVE SOILS (ASTM D4546)

A. ☐ B. ☐ C. ☐

GrfcTblLAB_ASSIGNMENT_SHEET 3/14/07 11:11:38 AM

LABORATORY TEST ASSIGNMENTS

JOB NO.	PROJECT ENGINEER	PROJECT SUPERVISOR	SHEET 1 OF 1
707-1089	Bruce Bailey	Baker Pump Station	

ASSIGNED BY	DATE ASSIGNED	DATE DUE
BB	OCT 31 2008	

HOLE NO.	SAMPLE NO.	DEPTH (FEET)	SAMPLE TYPE	PROPERTIES W	PROPERTIES UDW	PROPERTIES Gs	LIMITS AL	LIMITS LI	UNCONFINED U	UNCONFINED Ur	MINIATURE VANE V	MINIATURE VANE Vr	TRIAXIAL UU	TRIAXIAL UUr	TRIAXIAL CU	TRIAXIAL CD	STRESS-STRAIN	DIRECT SHEAR CU	DIRECT SHEAR CD	COMPRESSIBILITY CON	COMPRESSIBILITY SWE	GRAIN SIZE SIEV	GRAIN SIZE -200	GRAIN SIZE HYD	COMPACTION OM	COMPACTION MIN.-MAX.	MICRO EXAM				REMARKS
BB-3A	1	1.5-3	SS	/																											
	2	3-5	ST	/	/				(/)	include curve																					
	4	6-7.5	SS	/																											
	6	9-11	SS	/																			/								
	7	12.5-14	SS	/			/															/									
	8	15-16.5	SS	/																			/								
	9	17.5-19	SS	/			/															/									
	10	20-21.5	SS	/			/																/								
	11	22.5-24.5	ST	/	/										/																See e-mail
	12	25-25.5	SS	/																											
	13	27.5-28.0	SS	/																											
	14	30-31	SS	/																											
	15	32.5-33	SS	/																											

REMARKS

LABORATORY TEST ASSIGNMENTS

JOB NO.	PROJECT ENGINEER	PROJECT SUPERVISOR	SHEET 1 OF 1
707-1089	B Bailey		

ASSIGNED BY	DATE ASSIGNED	DATE DUE
BB	OCT 27 2008	

HOLE NO.	SAMPLE NO.	DEPTH (FEET)	SAMPLE TYPE	PROPERTIES W	PROPERTIES UDW	PROPERTIES Gs	LIMITS AL	LIMITS LI	UNCONFINED U	UNCONFINED Ur	MINIATURE VANE V	MINIATURE VANE Vr	TRIAXIAL UU	TRIAXIAL UUr	TRIAXIAL CU	TRIAXIAL CD	STRESS-STRAIN	DIRECT SHEAR CU	DIRECT SHEAR CD	COMPRESSIBILITY CON	COMPRESSIBILITY SWE	GRAIN SIZE SIEV	GRAIN SIZE -200	GRAIN SIZE HYD	COMPACTION OM	COMPACTION MIN.-MAX.	MICRO EXAM				REMARKS
BB4	3	3-4	ST	/	/																		/								
	4	4-6	ST	/																			/								
	6	8-10	ST	/			/																/								
	9	17.5-19	SS	/																		/									
	10	20-21.5	SS	/																		/									
	11	21.5-	ST	/																											
	12	23.5	ST	/			/												/												See e-mail
	RC1	27-28	RC	/	/								/							/											See email
	RC2	30-31	RC	/	/														/												See email
	RC3	35-37	RC	/	/				/																						
	RC8	46-48	RC	/	/				/	Include Curve																					

REMARKS

FUGRO

LABORATORY TEST ASSIGNMENTS

JOB NO: 707-1089

PROJECT ENGINEER: B Bailey

PROJECT SUPERVISOR:

SHEET 1 OF 1

ASSIGNED BY: BB

DATE ASSIGNED: OCT 30 2008

DATE DUE:

HOLE NO	SAMPLE NO.	DEPTH (FEET)	SAMPLE TYPE	PROPERTIES W	PROPERTIES UDW	PROPERTIES Gs	LIMITS AL	LIMITS LI	UNCONFINED U	UNCONFINED Ur	MINIATURE VANE V	MINIATURE VANE Vr	TRIAXIAL UU	TRIAXIAL UUr	TRIAXIAL CU	TRIAXIAL CD	STRESS-STRAIN	DIRECT SHEAR CU	DIRECT SHEAR CD	COMPRESSIBILITY CON	COMPRESSIBILITY SWE	GRAIN SIZE SIEV	GRAIN SIZE -200	GRAIN SIZE HYD	COMPACTION OM	COMPACTION MIN-MAX	MICRO EXAM				REMARKS
BB5	1	2.5-5	ST	/	/		/		/																						See e-mail
	2	5-7	ST	/	/				⊘	curve																					
	3	7-9.5	ST	/																			/								
	4	10-12	ST	/																			/								
	5	12.5-14	SS	/																		/									
	6	15-16.5	SS	/																			/								
	7	17.5-19	SS	/																		/									
	8	20-21.5	SS	/																		/									
	RC1	24-26	RC	/																											
	RC3	28-30	RC	/																											
	RC4	30-32	RC	/	}		/												/	/											See e mail
	RC5	32-34	RC	/	}				/										/	/											See e-mail
	RC6	35	RC	/	/														/												See e-mail
	RC7	36.5-38.5	RC	/	/		/												/	/											See e mail
	RC8	38.5-41	RC	/	/				⊘	curve																					
	RC10	44-46.5	RC	/	/		/		/																						See e-mail
	RC10	45.5-46	RC																/												See email

oct 31

REMARKS

FUGRO

LABORATORY TEST ASSIGNMENTS

JOB NO. 707-1089

PROJECT ENGINEER Bruce Barley

PROJECT ~~SUPERVISOR~~ Baker Pump Station

SHEET 1 OF 1

ASSIGNED BY BB.

DATE ASSIGNED NOV 5 2008

DATE DUE

HOLE NO.	SAMPLE NO.	DEPTH (FEET)	SAMPLE TYPE	PROPERTIES			LIMITS		UNCON-FINED		MINIATURE VANE		TRIAXIAL				STRESS-STRAIN	DIRECT SHEAR		COMPRES-SIBILITY		GRAIN SIZE			COMPAC-TION		MICRO EXAM				REMARKS
				W	UDW	Gs	AL	LI	U	Ur	V	Vr	UU	UUr	CU	CD		CU	CD	CON	SWE	SIEV	-200	HYD	OM	MIN.-MAX.					
BB6	1	1-2	ST	/																			/								
	2	2-3	ST	/																			/								
	3	3-5	ST	/	/		/		/	Curve													/								
	4	5.5-7.5	ST	/	/		/													/											see email
	5	7.5-9.5	ST	/	/				/																						
	6	10-12	ST	/	/		/		/	Curve												/									
	7	12.5-14.5	ST	/																			/								
	8	15-17	ST	/	/				/														/								
	9	17.5-19	SS	/																			/								
	10	20-21.5	SS	/																		/									
	11	22.5-24	SS	/																											
	RC1	24-27	RC	/	/				/	Curve																					
	RC2	27-30.5	RC	/	/				/																						

REMARKS

FUGRO

LABORATORY TEST ASSIGNMENTS

JOB NO. 707-1089

PROJECT ENGINEER Bruce Bailey

PROJECT ~~SUPERVISOR~~ Baker. Pump Station

SHEET 1 OF 1

ASSIGNED BY BB

DATE ASSIGNED NOV 5 2008

DATE DUE

HOLE NO.	SAMPLE NO.	DEPTH (FEET)	SAMPLE TYPE	PROPERTIES W	PROPERTIES UDW	PROPERTIES Gs	LIMITS AL	LIMITS LI	UNCONFINED U	UNCONFINED Ur	MINIATURE VANE V	MINIATURE VANE Vr	TRIAXIAL UU	TRIAXIAL UUr	TRIAXIAL CU	TRIAXIAL CD	STRESS-STRAIN	DIRECT SHEAR CU	DIRECT SHEAR CD	COMPRESSIBILITY CON	COMPRESSIBILITY SWE	GRAIN SIZE SIEV	GRAIN SIZE -200	GRAIN SIZE HYD	COMPACTION OM	COMPACTION MIN.-MAX.	MICRO EXAM	SULFATES			REMARKS
887	1	0.5-1	ST	/																			/					/			See e-mail
	2	1-2.5	ST	/	/		/		/	Cone													/					/			
	3	2.5-4	SS	/			/																/					/			
	4	4-6	ST	/	/				/	Cone																					
	5	75-85	ST	/	/		/		/																						
	6	10-11	ST	/																											

REMARKS

FUGRO

LABORATORY TEST ASSIGNMENTS

JOB NO. 707-1089

PROJECT ENGINEER Bruce Barley

PROJECT SUPERVISOR Baker Pump Station

SHEET 1 OF 1

ASSIGNED BY BB

DATE ASSIGNED OCT 3 1 2008

DATE DUE

HOLE NO.	SAMPLE NO.	DEPTH (FEET)	SAMPLE TYPE	PROPERTIES			LIMITS		UNCON-FINED		MINIATURE VANE		TRIAXIAL				STRESS-STRAIN	DIRECT SHEAR		COMPRES-SIBILITY		GRAIN SIZE			COMPAC-TION		MICRO EXAM	Sulfate			REMARKS
				W	UDW	Gs	AL	LI	U	Ur	V	Vr	UU	UUr	CU	CD		CU	CD	CON	SWE	SIEV	-200	HYD	OM	MIN.-MAX.					
BB-8	1	1-2.5	SS	/			/																/					/			See email
	2	2.5-4	SS	/																											
	3	4-5.5	SS	/																			/								
	4	7-8.5	SS	/																											
	5	8.5-10	SS	/																											

REMARKS

LABORATORY TEST ASSIGNMENTS

JOB NO. 707-1089

PROJECT ENGINEER Bruce Bailey

PROJECT SUPERVISOR Baker Pump Station

SHEET 1 OF ___

ASSIGNED BY BB

DATE ASSIGNED OCT 3 1 2008

DATE DUE

HOLE NO.	SAMPLE NO.	DEPTH (FEET)	SAMPLE TYPE	PROPERTIES W	PROPERTIES UDW	PROPERTIES Gs	LIMITS AL	LIMITS LI	UNCONFINED U	UNCONFINED Ur	MINIATURE VANE V	MINIATURE VANE Vr	TRIAXIAL UU	TRIAXIAL UUr	TRIAXIAL CU	TRIAXIAL CD	STRESS-STRAIN	DIRECT SHEAR CU	DIRECT SHEAR CD	COMPRESSIBILITY CON	COMPRESSIBILITY SWE	GRAIN SIZE SIEV	GRAIN SIZE -200	GRAIN SIZE HYD	COMPACTION OM	COMPACTION MIN.-MAX.	MICRO EXAM				REMARKS
B89	4	3-5	ST	/	/				/																						
	6	7-8	ST	/	/				⊘	Cancel																					
	7	8-9	ST	/			/																/								
	8	10-12	ST	/	/								/																		See email
	9	12.5-14.5	ST	/	/										/																See email
	10	15-17	ST	/	/				⊘	Cancel																					
	11	17.5-19.5	ST	/	/									}	/																See email
	12	19.5-21.5	ST	/	/		/																								See email
	13	22.5-24.5	ST	/	/								/																		See email
	14	25-27	ST	/			/																								
	15	27.5-29.5	ST	/																											
	16	29.5-31.5	ST	/	} /										/																See email
	17	32.5-34.5	ST	/			/								/																See email
	19	35.5-37	SS	/																		/									
	20	37.5-39	SS	/																			/								
	21	40-41.5	SS	/																		/									
	22	42.5-44	SS	/																			/								
	23	45-46	SS	/																			/								
	24	47.5-49	SS	/																		/									
	25	50-52	SS	/																											
	RC1	55-60	RC	/	/				⊘	Cancel																					
	RC2	60-65	RC	/	/				/																						

REMARKS

FUGRO

LABORATORY TEST ASSIGNMENTS

JOB NO.	PROJECT ENGINEER	~~PROJECT~~ SUPERVISOR	SHEET 1 OF 1
707-1089	Bruce Bailey	Baker Pump Station	
ASSIGNED BY: BB.		DATE ASSIGNED: NOV 3 2008	DATE DUE

HOLE NO.	SAMPLE NO.	DEPTH (FEET)	SAMPLE TYPE	PROPERTIES W	PROPERTIES UDW	PROPERTIES Gs	LIMITS AL	LIMITS LI	UNCONFINED U	UNCONFINED Ur	MINIATURE VANE V	MINIATURE VANE Vr	TRIAXIAL UU	TRIAXIAL UUr	TRIAXIAL CU	TRIAXIAL CD	STRESS-STRAIN	DIRECT SHEAR CU	DIRECT SHEAR CD	COMPRESSIBILITY CON	COMPRESSIBILITY SWE	GRAIN SIZE SIEV	GRAIN SIZE -200	GRAIN SIZE HYD	COMPACTION OM	COMPACTION MIN.-MAX.	MICRO EXAM				REMARKS
BB	6	5-6	ST	/			/																/								
10	8	7-8	ST	/	/				/		Cancel																				
	11	12-13	ST	/			/																/								
	12	15-17	ST	/																			/								
	13	17-19	ST	/			/																/								
	14	20-22	ST	/	/				/														/								
	RC1	27-28	RC	/	/				/		Cancel																				
	RC3	37-38	RC	/	/				/																						

REMARKS

FUGRO

LABORATORY TEST ASSIGNMENTS

JOB NO. 707-1089

PROJECT ENGINEER Bruce Barley

PROJECT ~~SUPERVISOR~~ Baker Pump Station

SHEET 1 OF 1

ASSIGNED BY BB

DATE ASSIGNED NOV 3 2008

DATE DUE

HOLE NO.	SAMPLE NO.	DEPTH (FEET)	SAMPLE TYPE	PROPERTIES W	PROPERTIES UDW	PROPERTIES Gs	LIMITS AL	LIMITS LI	UNCONFINED U	UNCONFINED Ur	MINIATURE VANE V	MINIATURE VANE Vr	TRIAXIAL UU	TRIAXIAL UUr	TRIAXIAL CU	TRIAXIAL CD	STRESS-STRAIN	DIRECT SHEAR CU	DIRECT SHEAR CD	COMPRESSIBILITY CON	COMPRESSIBILITY SWE	GRAIN SIZE SIEV	GRAIN SIZE -200	GRAIN SIZE HYD	COMPACTION OM	COMPACTION MIN.-MAX.	MICRO EXAM				REMARKS
BB-11	3	4-5	ST	/																											
	4	5-7	ST	/																											
	5	7-9	ST	/	/		/						/																		See email
	6	10-11	ST	/																											
	7	12.5-13.5	ST	/	/																										See email
	8	15-16	ST	/	/		/						/					/				/									
	9	17.5-18.5	ST	/	/																										↓
	10	20-21	ST	/			/															/									
	11	22.5-23.5	ST	/	/																										See email
	12	23.5-25	ST	/	/		/						/					/				/									
	13	27.5-28	ST	/	/																										↓

REMARKS

LABORATORY TEST ASSIGNMENTS

JOB NO.	PROJECT ENGINEER	PROJECT ~~SUPERVISOR~~	SHEET 1 OF 1
707-1089	Bruce Bailey	Baker Pump Station	

ASSIGNED BY	DATE ASSIGNED	DATE DUE
BB	NOV 5 2008	

HOLE NO.	SAMPLE NO.	DEPTH (FEET)	SAMPLE TYPE	PROPERTIES W	PROPERTIES UDW	PROPERTIES Gs	LIMITS AL	LIMITS LI	UNCONFINED U	UNCONFINED Ur	MINIATURE VANE V	MINIATURE VANE Vr	TRIAXIAL UU	TRIAXIAL UUr	TRIAXIAL CU	TRIAXIAL CD	STRESS-STRAIN	DIRECT SHEAR CU	DIRECT SHEAR CD	COMPRESSIBILITY CON	COMPRESSIBILITY SWE	GRAIN SIZE SIEV	GRAIN SIZE -200	GRAIN SIZE HYD	COMPACTION OM	COMPACTION MIN.-MAX.	MICRO EXAM				REMARKS
BB-11A	1	2.5-3.5	ST	/	/				/																						
	2	5-6	ST	/																			/								
	3	7.5-8.5	ST	/	/		/																								See email
	4	10-11	ST	/	/																										↓
	5	12.5-13.5	ST	/	/				/	Curve																					
	6	15-17.5	ST	/	/								/										/								See email
	7	17.5-19	SS	/			/																/								
	8	20-21.5	SS	/																		/									
	9	22.5-24	SS	/																		/									
	10	25-26.5	SS	/																		/									
	RC1	26.5-30	RC	/	/				/																						
	RC2	30-35	RC	/	/				/	Curve																					
	RC3	35-40	RC	/	/				/																						
	RC4	40-45	RC	/	/				/	Curve																					
	RC5	45-50	RC	/	/				/																						

REMARKS

Mas-Tek Engineering Associates
and
ANACHEM Inc.

Laboratory Results

Percentage By Weight Passing the No. 200 Sieve and Determination of Moisture Content

Project:	Pump Station	Project No.:	E07-1218	Date:	3/10/08

Boring No.	Other Test	Depth, ft.	Tare ID	Wet + Tare, g	Dry + Tare,g	Tare,g	Dry + Tare after wash	Percent Moisture	% Passing No. 200
B-1		1-2	79	410.65	358.39	122.17		22.1	
	PI,-200,QU	3.5-5	M	409.80	396.61	87.95	339.15	4.3	18.6
	Sieve	5-6.5	NO SAMPLE						
** Bag Sam.	** P.P.	8.5-10	119	494.81	449.95	123.51		13.7	
B-3	PI,-200,QU	3-4	A-115	539.50	468.20	84.90	285.32	18.6	47.7
	-200	7-8	C-10	675.55	623.08	110.88	504.25	10.2	23.2
	Sieve	13.5-15	L	470.41	447.92	83.38		6.2	

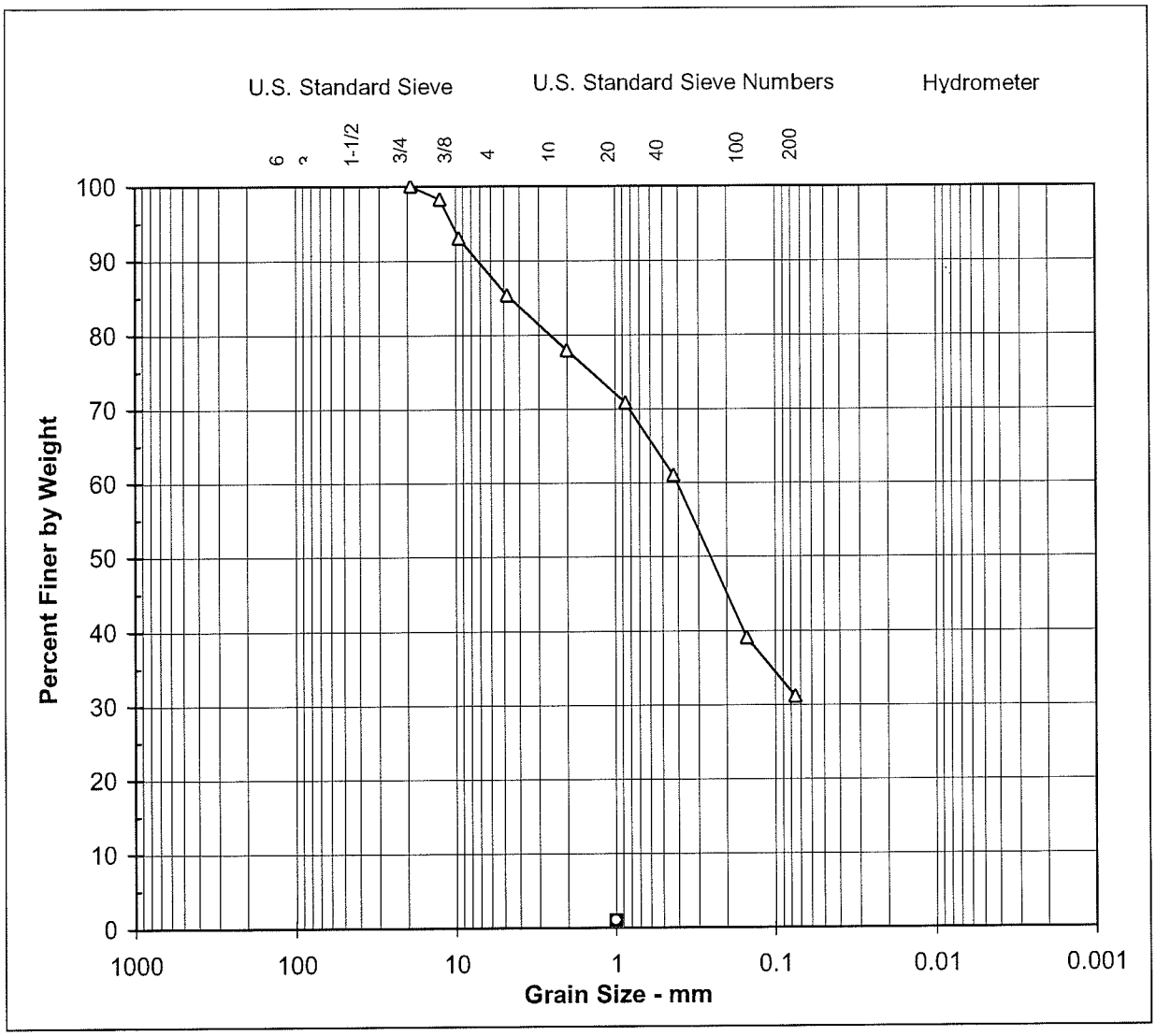
Tested By:	HS/AM	Computed By:	AM	Checked By:	AM

Atterberg Limits

Project:	Pump Station	Project No.:	E07-1218	Date:	3/17/08

Boring No.	Sample No.	Depth, ft.	Tare ID	Wet + Tare, g	Dry + Tare, g	Tare, g	Number of Blows	Percent Moisture	Correction Factor	Liquid Limit	Tare ID	Wet + Tare, g	Dry + Tare, g	Tare, g	Plastic Limit	Plasticity Index
B-1		3-4	18	44.472	38.853	15.209	21	23.765014	0.9791	23	68	26.586	25.416	15.441	12	11
		20-24	104	31.628	25.571	15.420	20	59.668998	0.9734	58	109	26.428	24.354	15.368	23	35
		25-35	129	39.200	30.565	15.431	20	57.056958	0.9734	56	99	25.820	23.980	15.450	22	34
		35-45	82	35.545	27.715	15.428	21	63.725889	0.9791	62	87	26.700	24.368	15.452	26	36
		45-55	15	31.366	25.350	15.388	28	60.38948	1.0138	61	26	26.123	23.984	15.568	25	36
		55-65	1	31.325	23.925	15.535	24	88.200238	0.9951	88	135	25.865	23.279	15.351	33	55
		65-75	84	31.735	24.158	15.421	30	86.723132	1.0223	89	19	25.798	23.145	15.198	33	56
		75-85	119	34.058	25.676	15.383	30	81.433984	1.0223	83	97	25.270	22.975	15.353	30	53
		85-95	68	33.101	24.125	15.438	30	103.32681	1.0223	106	60	24.293	21.856	15.500	38	68
B-3		3-4	132	36.255	29.675	15.430	29	46.191646	1.0181	47	54	25.330	23.665	15.307	20	27
		24-25	8	36.035	28.576	15.441	26	56.78721	1.004	57	72	24.876	23.102	15.340	23	34
		25-35	27	38.615	30.015	15.480	20	59.167527	0.9734	58	127	25.783	23.858	15.465	23	35
		35-45	48	33.500	26.888	15.358	23	57.346054	0.9902	57	37	25.805	23.808	15.260	23	34
		45-55	144	37.150	29.618	15.364	20	52.841308	0.9734	51	85	27.380	25.199	15.171	22	29
		55-65	70	33.580	26.535	15.480	21	63.72682	0.9791	62	14	26.115	23.891	15.407	26	36
		65-75	10	35.431	25.241	15.238	25	101.86944	1	102	57	25.080	22.497	15.375	36	66
		75-85	112	33.700	24.968	15.428	29	91.530398	1.0181	93	6	25.433	22.875	15.428	34	59
		85-95	36	32.615	24.264	15.380	28	94.00045	1.0138	95	81	26.851	23.871	15.358	35	60

Tested By:	HS	Computed By:	AM	Checked By:	AM

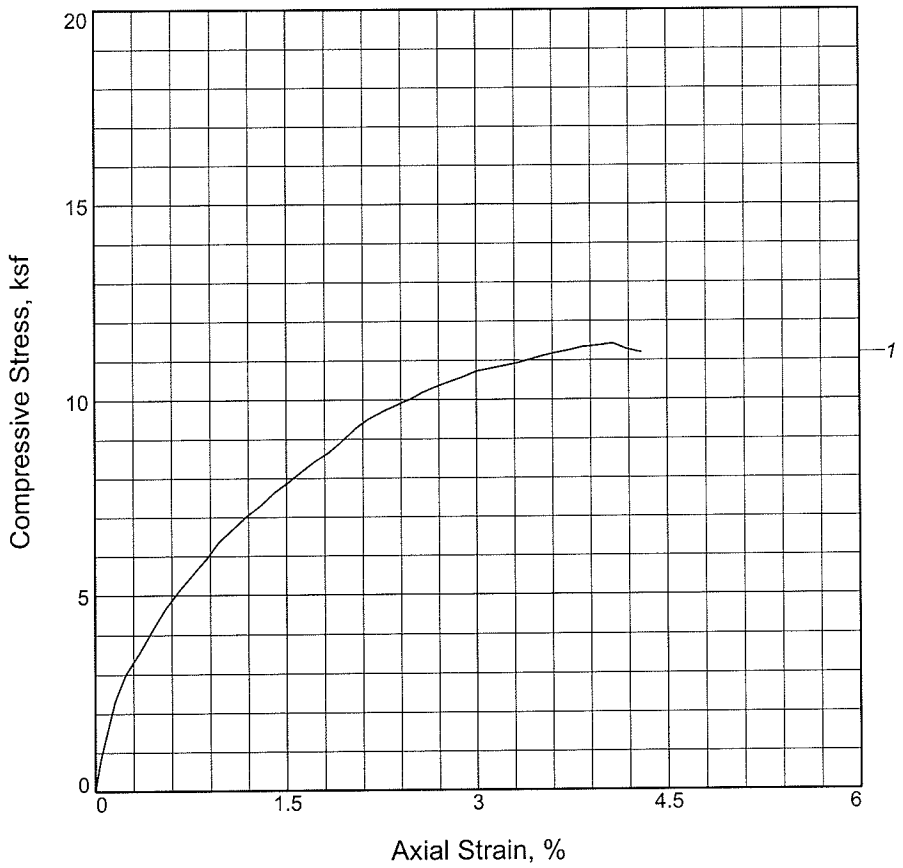


Legend	Boring No	Depth, ft	% Gravel	% Sand	% -#200	LL	PI
△	B-3	13.5-15	14.7	54.2	31.1		
□							
○							

Legend	Boring No	Depth	Material Description	USCS
△	B-3	13.5-15		
□				
○				

RESULTS OF SIEVE ANALYSIS	
Pump Station E07-1208	
MAS-TEK Engineering	
E07-1208	FIGURE

UNCONFINED COMPRESSION TEST



Specimen No:	1			
Unconfined strength, ksf	11.415			
Undrained shear strength, ksf	5.708			
Failure strain, %	4.1			
Strain at peak, %	4.1			
Water content, %	18.4			
Wet density, pcf	128.7			
Dry density, pcf	108.7			
Saturation, %	89.1			
Void ratio	0.5627			
Specimen diameter, in.	2.04			
Specimen height, in.	4.54			
Height/diameter ratio	2.23			

Description:

LL = 58	**PL =** 23	**PI =** 35	**Assumed GS=** 2.72	**Type:** Shelby Tube

Project No.: E07-1218
Date Sampled: February 2008
Remarks:
Slightly Slickensided

Client:

Project: Pump Station

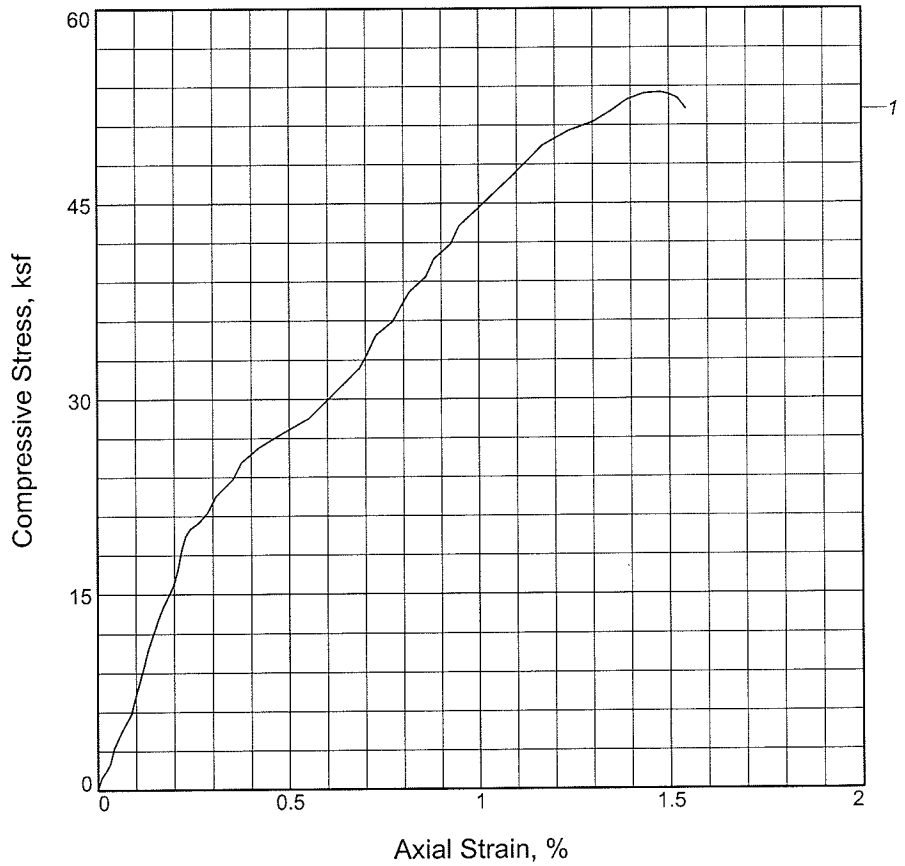
Location: B-1
Depth: 20'-24'

UNCONFINED COMPRESSION TEST

MAS-TEK Engineering & Associates, Inc.

Figure 1

UNCONFINED COMPRESSION TEST



Specimen No:	1			
Unconfined strength, ksf	53.499			
Undrained shear strength, ksf	26.750			
Failure strain, %	1.5			
Strain at peak, %	1.5			
Water content, %	16.5			
Wet density, pcf	131.5			
Dry density, pcf	112.9			
Saturation, %	89.0			
Void ratio	0.5036			
Specimen diameter, in.	2.04			
Specimen height, in.	4.53			
Height/diameter ratio	2.22			

Description:

LL = 62	**PL =** 26	**PI =** 36	**Assumed GS=** 2.72	**Type:** Shelby Tube

Project No.: E07-1218
Date Sampled: February 2008
Remarks:

Client:

Project: Pump Station

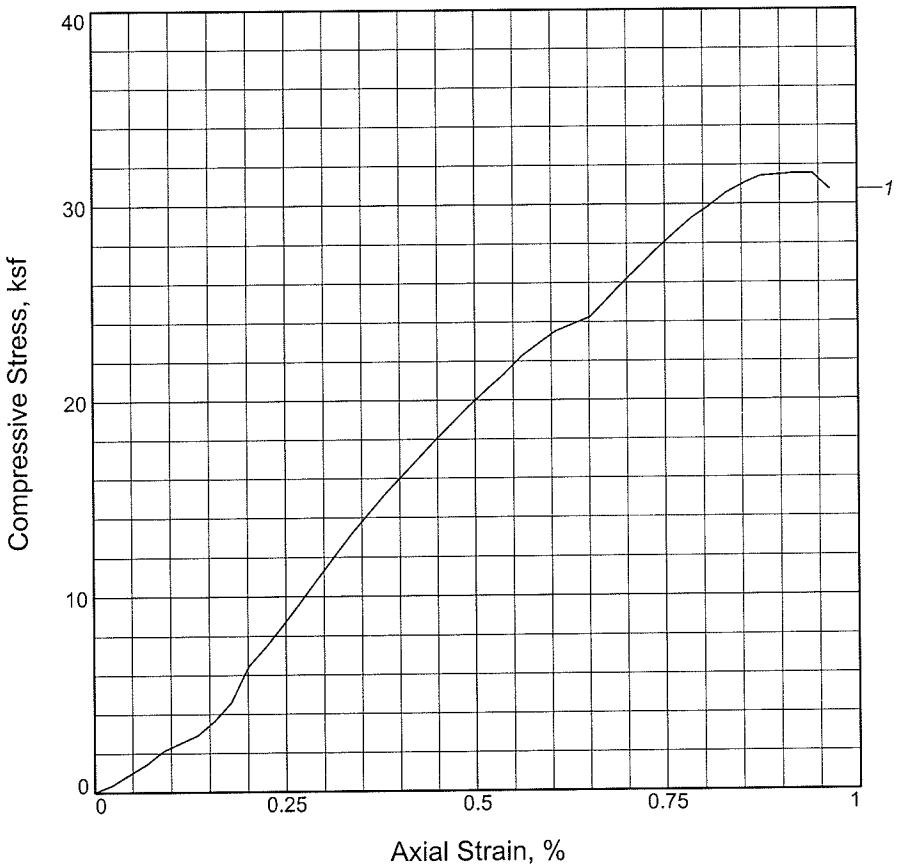
Location: B-1
Depth: 35'-45'

UNCONFINED COMPRESSION TEST

MAS-TEK Engineering & Associates, Inc.

Figure 1

UNCONFINED COMPRESSION TEST



Specimen No:	1			
Unconfined strength, ksf	31.541			
Undrained shear strength, ksf	15.770			
Failure strain, %	0.9			
Strain at peak, %	0.9			
Water content, %	18.6			
Wet density, pcf	135.5			
Dry density, pcf	114.2			
Saturation, %	103.9			
Void ratio	0.4866			
Specimen diameter, in.	2.03			
Specimen height, in.	4.46			
Height/diameter ratio	2.19			

Description:

LL = 88	**PL =** 33	**PI =** 55	**Assumed GS=** 2.72	**Type:** Shelby Tube

Project No.: E07-1218
Date Sampled: February 2008
Remarks:

Client:

Project: Pump Station

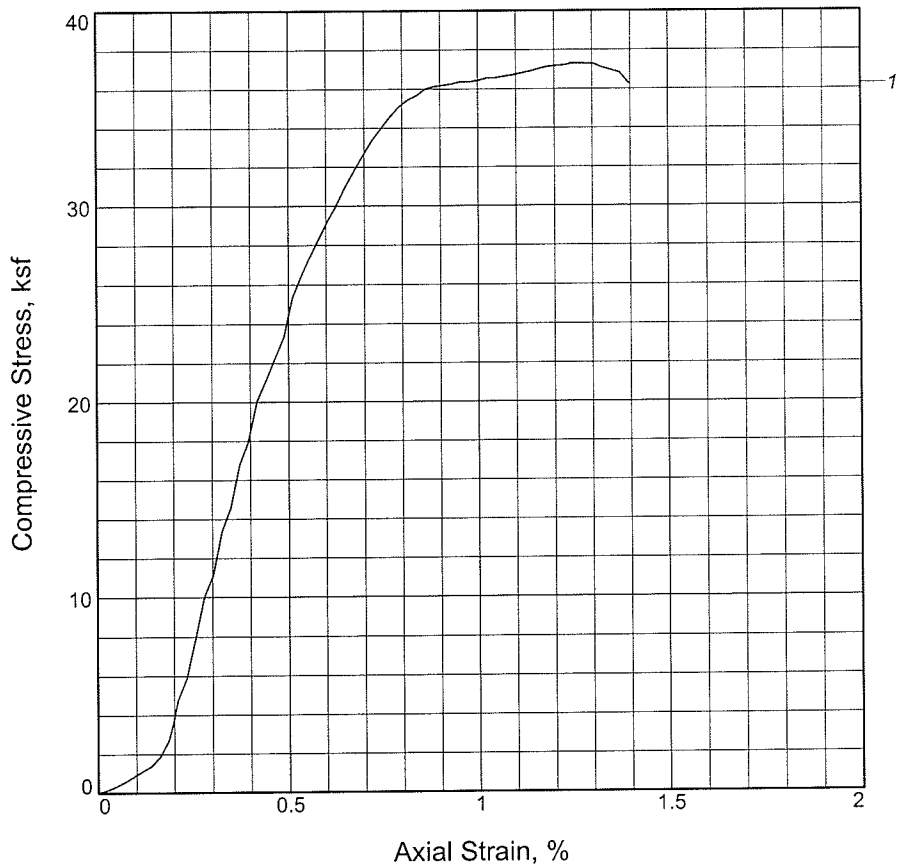
Location: B-1
Depth: 55'-65'

UNCONFINED COMPRESSION TEST

MAS-TEK Engineering & Associates, Inc.

Figure 1

UNCONFINED COMPRESSION TEST



Specimen No:	1			
Unconfined strength, ksf	37.293			
Undrained shear strength, ksf	18.646			
Failure strain, %	1.2			
Strain at peak, %	1.2			
Water content, %	19.4			
Wet density, pcf	133.3			
Dry density, pcf	111.6			
Saturation, %	101.4			
Void ratio	0.5217			
Specimen diameter, in.	2.02			
Specimen height, in.	4.30			
Height/diameter ratio	2.13			

Description:

LL = 106	**PL =** 38	**PI =** 68	**Assumed GS=** 2.72	**Type:** Shelby Tube

Project No.: E07-1218
Date Sampled: February 2008
Remarks:

Client:

Project: Pump Station

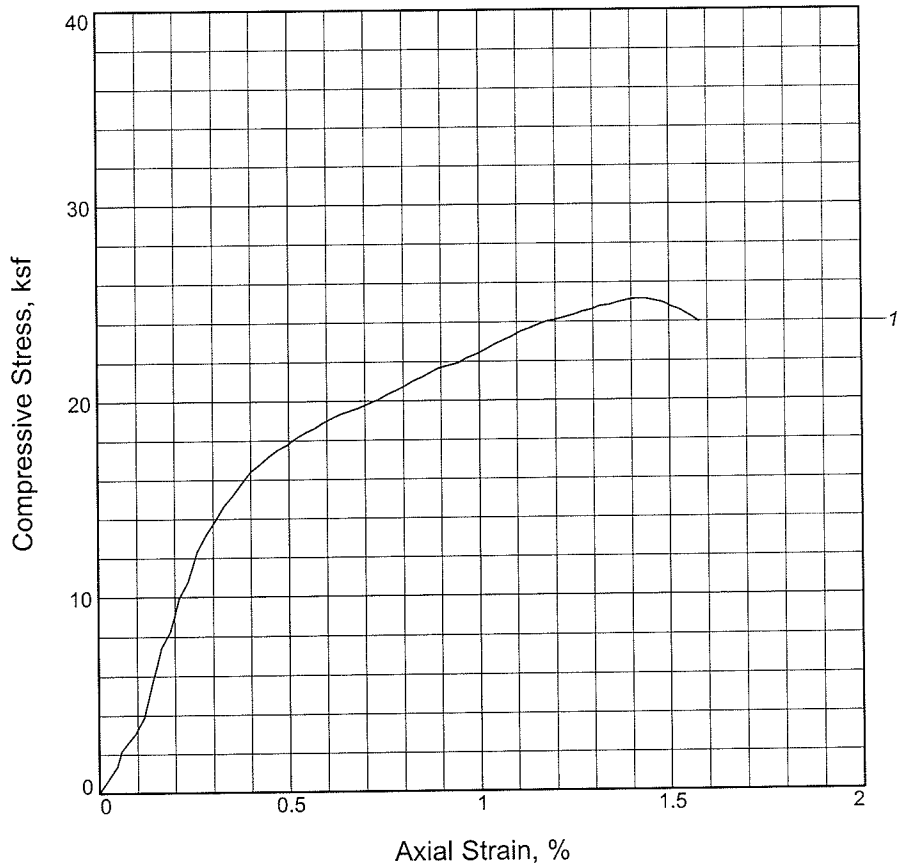
Location: B-1
Depth: 85'-95'

UNCONFINED COMPRESSION TEST

MAS-TEK Engineering & Associates, Inc.

Figure 1

UNCONFINED COMPRESSION TEST



Specimen No:	1			
Unconfined strength, ksf	25.143			
Undrained shear strength, ksf	12.572			
Failure strain, %	1.4			
Strain at peak, %	1.4			
Water content, %	14.7			
Wet density, pcf	136.8			
Dry density, pcf	119.2			
Saturation, %	94.5			
Void ratio	0.4241			
Specimen diameter, in.	2.03			
Specimen height, in.	4.24			
Height/diameter ratio	2.09			

Description:

LL = 58	**PL =** 23	**PI =** 35	**Assumed GS=** 2.72	**Type:** Shelby Tube

Project No.: E07-1218
Date Sampled: February 2008
Remarks:

Client:

Project: Pump Station

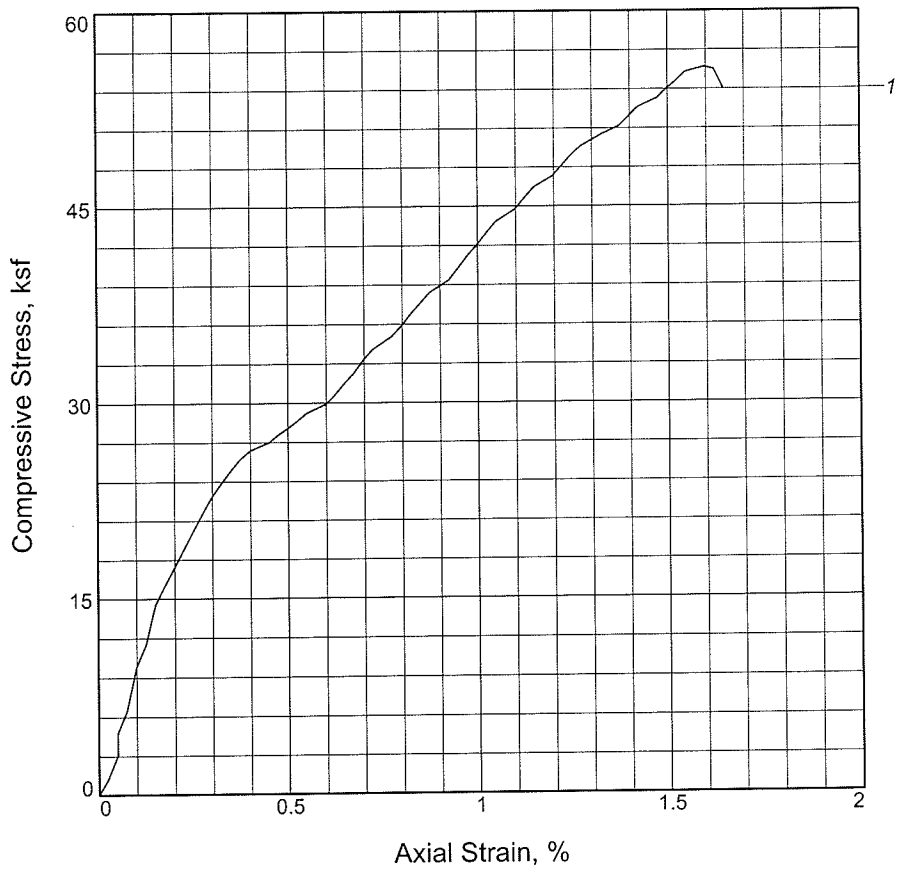
Location: B-3
Depth: 25'-35'

UNCONFINED COMPRESSION TEST

MAS-TEK Engineering & Associates, Inc.

Figure 1

UNCONFINED COMPRESSION TEST



Specimen No:	1			
Unconfined strength, ksf	55.676			
Undrained shear strength, ksf	27.838			
Failure strain, %	1.6			
Strain at peak, %	1.6			
Water content, %	16.4			
Wet density, pcf	133.2			
Dry density, pcf	114.5			
Saturation, %	92.1			
Void ratio	0.4833			
Specimen diameter, in.	2.02			
Specimen height, in.	4.01			
Height/diameter ratio	1.98			

Description:

LL = 62	**PL =** 26	**PI =** 36	**Assumed GS=** 2.72	**Type:** Shelby Tube

Project No.: E07-1218
Date Sampled: February 2008
Remarks:

Client:

Project: Pump Station

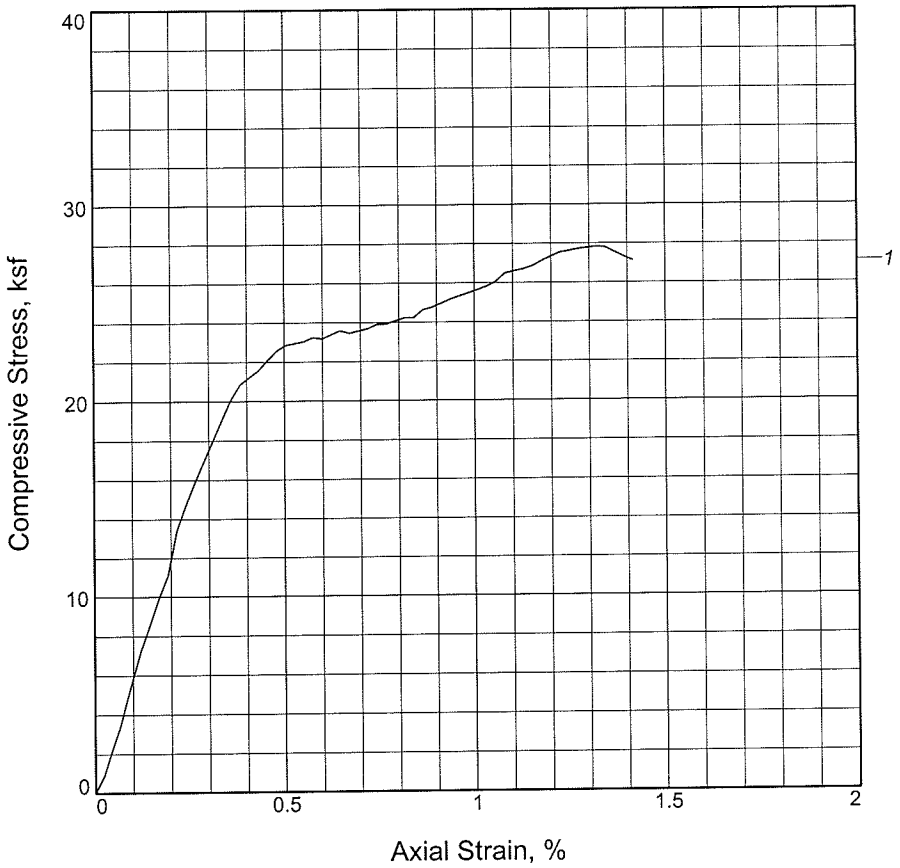
Location: B-3
Depth: 55'-65'

UNCONFINED COMPRESSION TEST

MAS-TEK Engineering & Associates, Inc.

Figure 1

UNCONFINED COMPRESSION TEST



Specimen No:	1			
Unconfined strength, ksf	27.820			
Undrained shear strength, ksf	13.910			
Failure strain, %	1.3			
Strain at peak, %	1.3			
Water content, %	19.4			
Wet density, pcf	134.7			
Dry density, pcf	112.8			
Saturation, %	104.6			
Void ratio	0.5048			
Specimen diameter, in.	2.04			
Specimen height, in.	4.17			
Height/diameter ratio	2.04			

Description:

LL = 93	**PL =** 34	**PI =** 59	**Assumed GS=** 2.72	**Type:** Shelby Tube

Project No.: E07-1218
Date Sampled: February 2008
Remarks:

Client:

Project: Pump Station

Location: B-3
Depth: 75'-85'

UNCONFINED COMPRESSION TEST

MAS-TEK Engineering & Associates, Inc.

Figure 1

							DATA ENTERED BY:		AM			TESTED BY:		AM/HS	
				JOB NUMBER:	E08-0214		CHECKED BY:		AM			DATE:		3/17/08	
BORING	DEPTH, FEET	OTHER TESTS	TARE NUMBER	TARE, GMS	WET+TARE, GMS	DRY+TARE, GMS	**MOISTURE, %**	DIAMETER (in.)	HEIGHT (in.)	WEIGHT (grams)	**DRY DENSITY (pcf)**	PEAK LOAD (lbs)	DEFLECTION (in.)	**UNC. STRESS (ksf)**	**% STRAIN**
B-1	3-4	PI,-200,**	M	87.95	409.80	396.61	**4.3**	UNTESTABLE				UNTESABLE			
	20-24	PI,**	150	125.68	623.50	546.00	**18.4**	2.035	4.537	498.50	**108.6**	268.8	0.185	**11.41**	**4.1**
	25-35	PI	171	125.28	660.40	586.80	**15.9**	2.037	4.649	536.20	**116.3**	425.9	0.066	**18.56**	**1.4**
	35-45	PI,**	179	126.50	631.80	560.30	**16.5**	2.045	4.532	514.00	**113.0**	1238.6	0.067	**53.52**	**1.5**
	45-55	PI	192	125.37	599.70	534.60	**15.9**	2.042	4.446	510.20	**115.2**	1569.6	0.077	**67.85**	**1.7**
	55-65	PI,**	133	125.00	616.90	539.80	**18.6**	2.031	4.456	513.30	**114.2**	716.7	0.042	**31.56**	**0.9**
	65-75	PI	46	122.40	453.80	402.50	**18.3**	1.652	4.392	334.60	**114.4**	469.2	0.052	**31.15**	**1.2**
	75-85	PI	177	125.20	614.30	541.90	**17.4**	2.033	4.247	490.50	**115.4**	971.1	0.065	**42.41**	**1.5**
	85-95	PI,**	151	125.40	595.40	518.90	**19.4**	2.019	4.296	481.20	**111.6**	839.9	0.056	**37.29**	**1.3**
B-1	20-24	Slightly Slickensided													

J:\PROJECTS\Engineering\E2007\E07-1218\Lab\Unconfined \ ** Stress-Strain Curve

JOB NUMBER:	E07-1218	DATA ENTERED BY:	AM	TESTED BY:	AM/HS
		CHECKED BY:	AM	DATE:	3/17/08

BORING	DEPTH, FEET	OTHER TESTS	TARE NUMBER	TARE, GMS	WET+TARE, GMS	DRY+TARE, GMS	**MOISTURE, %**	DIAMETER (in.)	HEIGHT (in.)	WEIGHT (grams)	**DRY DENSITY (pcf)**	PEAK LOAD (lbs)	DEFLECTION (in.)	**UNC. STRESS (ksf)**	**% STRAIN**
B-3	3-4	PI,-200,**	A-115	84.90	539.50	468.20	**18.6**	UNTESTABLE				UNTESTABLE			
	9-10	**	64	125.80	506.20	470.67	**10.3**	2.745	2.828	591.30	**122.0**	UNTESTABLE			
	24-25	PI	42	123.23	470.90	419.11	**17.5**	2.780	5.643	1171.80	**110.9**	620.0	0.244	**14.08**	**4.3**
	25-35	PI,**	162	125.20	609.00	546.90	**14.7**	2.032	4.243	494.10	**119.3**	574.5	0.061	**25.15**	**1.4**
	35-45	PI	63	123.20	575.80	514.80	**15.6**	2.036	4.302	495.00	**116.5**	857.6	0.075	**37.27**	**1.7**
	45-55	PI	153	125.60	485.40	442.90	**13.4**	2.033	3.834	446.70	**120.5**	1234.0	0.060	**53.87**	**1.6**
	55-65	PI,**	37	123.00	559.10	497.80	**16.4**	2.024	4.008	450.90	**114.5**	1264.2	0.064	**55.68**	**1.6**
	65-75	PI	103	123.60	553.00	476.50	**21.7**	2.030	3.999	446.30	**108.0**	473.0	0.021	**20.94**	**0.5**
	75-85	PI,**	58	125.50	578.40	504.80	**19.4**	2.041	4.168	482.30	**112.8**	644.9	0.055	**28.00**	**1.3**
	85-95	PI	108	121.60	542.30	474.70	**19.1**	2.046	4.148	480.70	**112.8**	789.8	0.064	**34.07**	**1.5**
B-3	24-25	Slightly Slickensided													
	65-75	Slickensided													

Percentage By Weight Passing the No. 200 Sieve and Determination of Moisture Content

Project:	Pump Station	Project No.:	E07-1218	Date:	3/24/08

Boring No.	Other Test	Depth, ft.	Tare ID	Wet + Tare, g	Dry + Tare,g	Tare,g	Dry + Tare after wash	Percent Moisture	% Passing No. 200
B-2		1-2	236	340.88	299.80	126.46		23.7	
		3-4	132	393.68	331.02	125.15		30.4	
	PI,-200	7-8	A-115	558.30	492.20	84.88	278.19		52.5
	PI,-200	9-10	A-125	520.10	473.22	83.93	323.42	12.0	38.5
	Sieve	14-15	B-101	359.29	335.30	110.35		10.7	
	Sieve	18.5-20	B-109	1007.30	974.60	110.33		3.8	

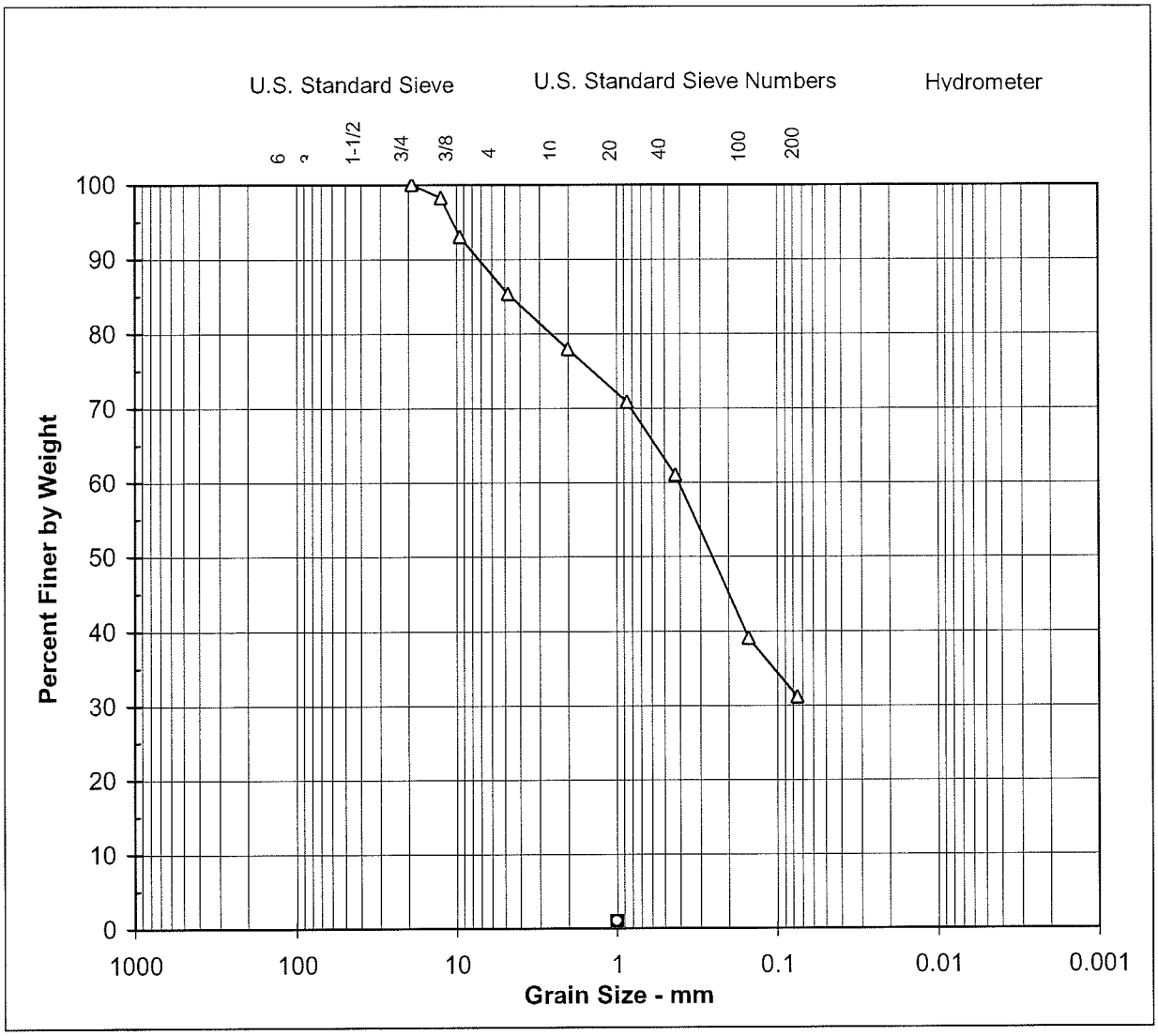
Tested By:	HS	Computed By:	AM	Checked By:	AM

Atterberg Limits

Project:	Pump Station	Project No.:	E07-1218	Date:	3/25/08

Boring No.	Sample No.	Depth, ft.	Tare ID	Wet + Tare, g	Dry + Tare, g	Tare, g	Number of Blows	Percent Moisture	Correction Factor	Liquid Limit	Tare ID	Wet + Tare, g	Dry + Tare, g	Tare, g	Plastic Limit	Plasticity Index
B-2		5-6	51	36.400	28.941	15.570	30	55.784908	1.0223	57	150	24.988	23.354	15.360	20	37
		7-8	71	35.481	29.832	15.408	25	39.163894	1	39	135	25.411	24.135	15.371	15	24
		9-10	39	38.705	34.293	15.528	20	23.511857	0.9734	23	7	25.643	23.701	15.231	23	0

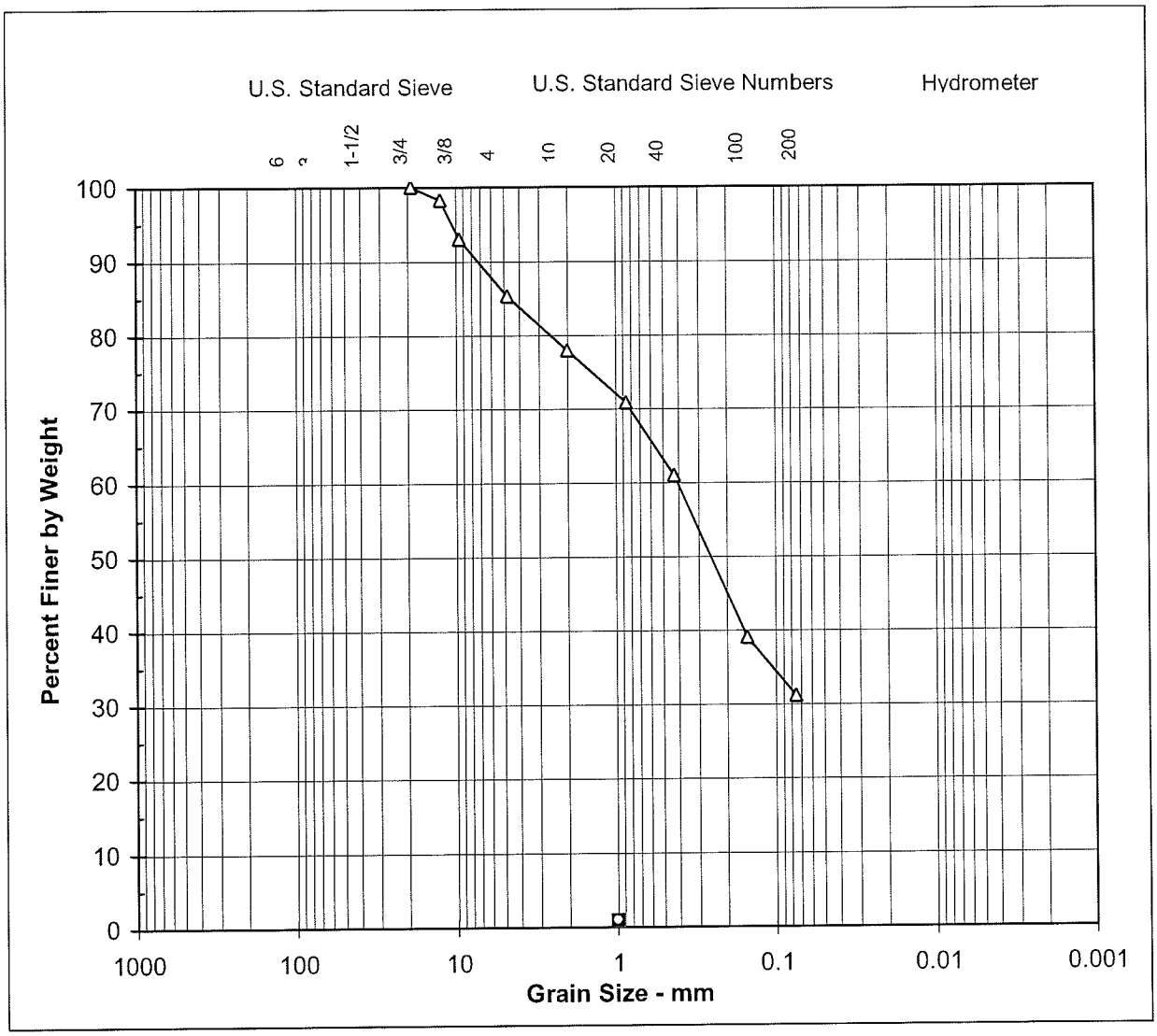
Tested By:	HS/AM	Computed By:	AM	Checked By:	AM



Legend	Boring No	Depth, ft	% Gravel	% Sand	% -#200	LL	PI
△	B-2	14-15	8.4	57.5	34.1		
□							
○							

Legend	Boring No	Depth	Material Description	USCS
△	B-2	14-15		
□				
○				

RESULTS OF SIEVE ANALYSIS	
Pump Station E07-1208	
MAS-TEK Engineering	
E07-1208	FIGURE



Legend	Boring No	Depth, ft	% Gravel	% Sand	% -#200	LL	PI
△	B-2	18.5-20	26.7	64.4	8.9		
□							
○							

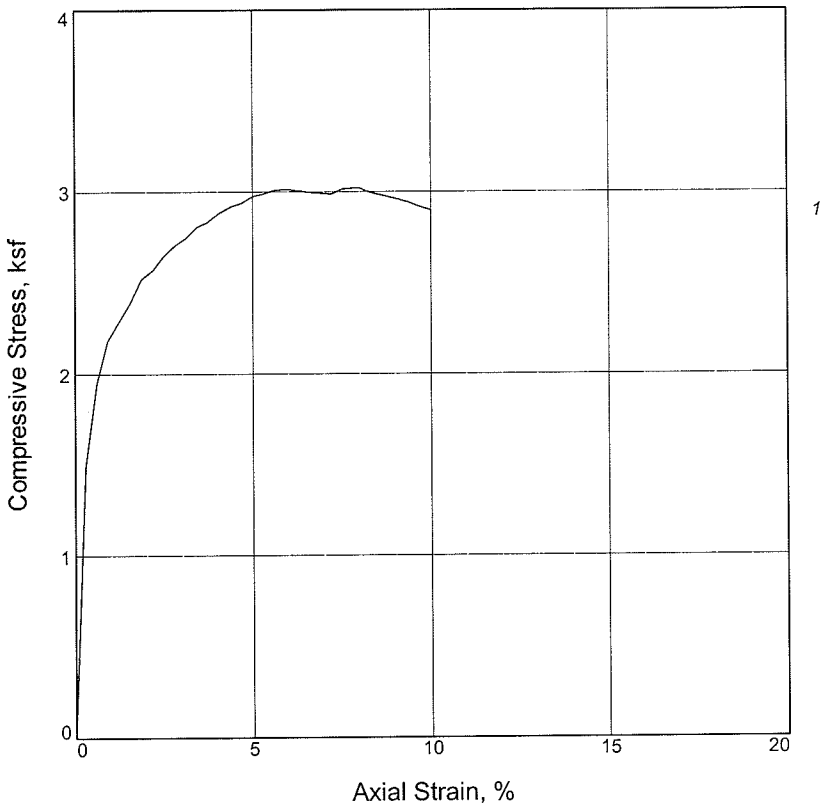
Legend	Boring No	Depth	Material Description	USCS
△	B-2	18.5-20		
□				
○				

RESULTS OF SIEVE ANALYSIS	
Pump Station E07-1208	
MAS-TEK Engineering	
E07-1208	FIGURE

JOB NUMBER:	E07-1218						DATA ENTERED BY:		AM			TESTED BY:		AM	
							CHECKED BY:		AM			DATE:		3/31/08	
BORING	DEPTH, FEET	OTHER TESTS	TARE NUMBER	TARE, GMS	WET+TARE, GMS	DRY+TARE, GMS	**MOISTURE, %**	DIAMETER (in.)	HEIGHT (in.)	WEIGHT (grams)	**DRY DENSITY (pcf)**	PEAK LOAD (lbs)	DEFLECTION (in.)	**UNC. STRESS (ksf)**	**% STRAIN**
B-2	5-6	PI,**	175	124.80	548.80	446.60	**31.8**	2.747	5.474	1017.40	**90.6**	135.1	0.438	**3.02**	**8.0**
	25-35		236	126.50	678.70	603.20	**15.8**	2.108	4.469	553.00	**116.6**	807.4	0.062	**32.84**	**1.4**
	35-45	**	18	125.00	542.30	483.00	**16.6**	2.065	4.040	481.90	**116.4**	652.7	0.058	**27.66**	**1.4**
	45-55		25	123.90	512.10	457.10	**16.5**	1.990	4.498	481.30	**112.5**	1206.5	0.074	**54.96**	**1.6**
	60-65	**	23	123.90	546.70	470.40	**22.0**	1.973	4.052	420.50	**106.0**	444.9	0.021	**20.85**	**0.5**
	70-75		20	123.70	500.20	438.80	**19.5**	1.882	3.999	391.70	**112.2**	592.1	0.053	**30.23**	**1.3**
	85-95	**	145	126.30	566.20	500.00	**17.7**	2.020	4.000	452.70	**114.3**	697.9	0.050	**30.96**	**1.2**

J:\PROJECTS\Engineering\E2007\E07-1218\Lab\Unconfined \ ** Stress-Strain Curve

UNCONFINED COMPRESSION TEST



Specimen No:	1			
Unconfined strength, ksf	3.020			
Undrained shear strength, ksf	1.510			
Failure strain, %	8.0			
Strain at peak, %	8.0			
Water content, %	31.8			
Wet density, pcf	119.5			
Dry density, pcf	90.7			
Saturation, %	99.0			
Void ratio	0.8727			
Specimen diameter, in.	2.75			
Specimen height, in.	5.47			
Height/diameter ratio	1.99			

Description:

LL = 57	**PL =** 20	**PI =** 37	**Assumed GS=** 2.72	**Type:** Shelby Tube

Project No.: E07-1218
Date Sampled: February 2008
Remarks:
Slightly Slickensided

Client:

Project: Pump Station

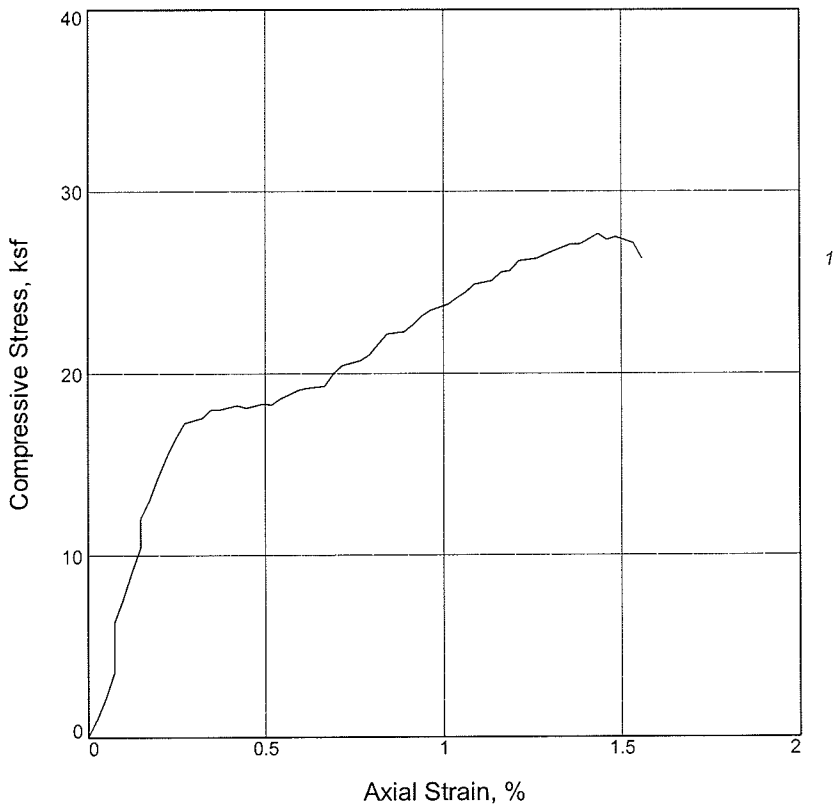
Location: B-2
Depth: 5'-6'

UNCONFINED COMPRESSION TEST

MAS-TEK Engineering & Associates, Inc.

Figure 1

UNCONFINED COMPRESSION TEST



Specimen No:	1			
Unconfined strength, ksf	27.661			
Undrained shear strength, ksf	13.830			
Failure strain, %	1.4			
Strain at peak, %	1.4			
Water content, %	16.6			
Wet density, pcf	135.7			
Dry density, pcf	116.4			
Saturation, %	98.2			
Void ratio	0.4588			
Specimen diameter, in.	2.06			
Specimen height, in.	4.04			
Height/diameter ratio	1.96			

Description:

LL =	**PL =**	**PI =**	**Assumed GS=** 2.72	**Type:** Shelby Tube

Project No.: E07-1218
Date Sampled: February 2008
Remarks:

Client:

Project: Pump Station

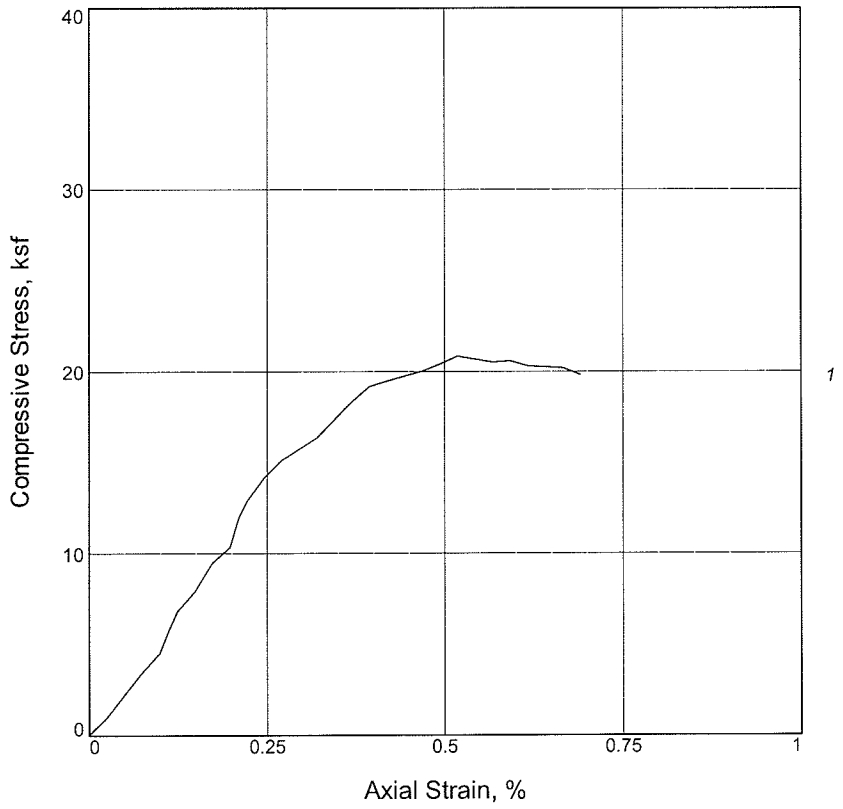
Location: B-2
Depth: 35'-45'

UNCONFINED COMPRESSION TEST

MAS-TEK Engineering & Associates, Inc.

Figure 1

UNCONFINED COMPRESSION TEST



Specimen No:	1			
Unconfined strength, ksf	20.846			
Undrained shear strength, ksf	10.423			
Failure strain, %	0.5			
Strain at peak, %	0.5			
Water content, %	22.0			
Wet density, pcf	129.3			
Dry density, pcf	106.0			
Saturation, %	99.4			
Void ratio	0.6023			
Specimen diameter, in.	1.97			
Specimen height, in.	4.05			
Height/diameter ratio	2.05			

Description:

LL =	**PL =**	**PI =**	**Assumed GS=** 2.72	**Type:** Shelby Tube

Project No.: E07-1218
Date Sampled: February 2008
Remarks:
Slickensided

Client:

Project: Pump Station

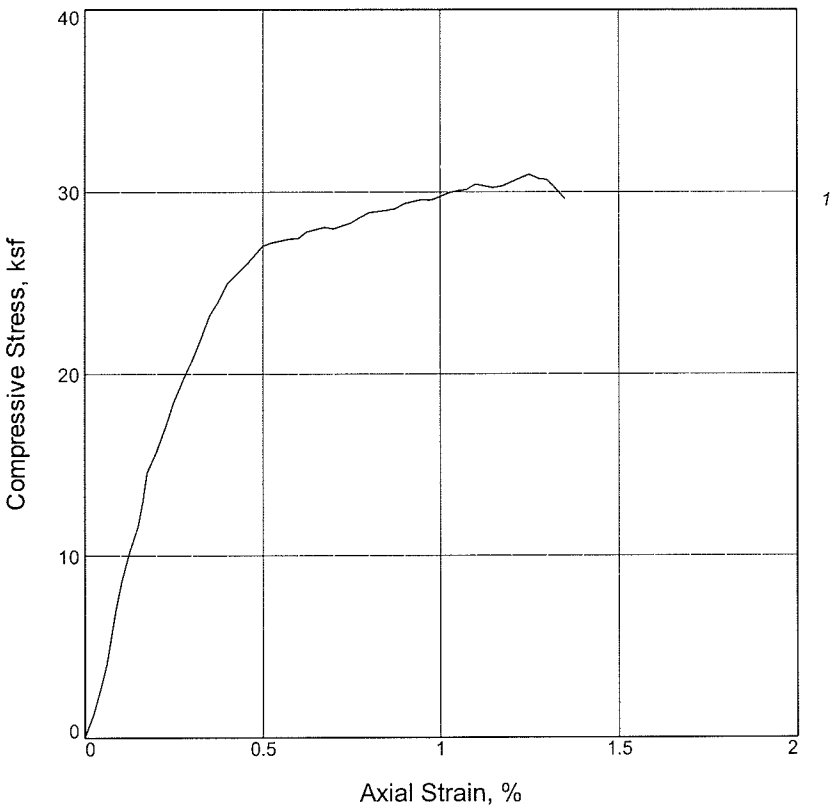
Location: B-2
Depth: 60'-65'

UNCONFINED COMPRESSION TEST

Figure 1

MAS-TEK Engineering & Associates, Inc.

UNCONFINED COMPRESSION TEST



Specimen No:	1			
Unconfined strength, ksf	30.967			
Undrained shear strength, ksf	15.484			
Failure strain, %	1.3			
Strain at peak, %	1.3			
Water content, %	17.7			
Wet density, pcf	134.5			
Dry density, pcf	114.3			
Saturation, %	99.2			
Void ratio	0.4857			
Specimen diameter, in.	2.02			
Specimen height, in.	4.00			
Height/diameter ratio	1.98			

Description:

LL =	**PL =**	**PI =**	**Assumed GS=** 2.72	**Type:** Shelby Tube

Project No.: E07-1218
Date Sampled: February 2008
Remarks:

Client:

Project: Pump Station

Location: B-2
Depth: 85'-95'

UNCONFINED COMPRESSION TEST

Figure 1

MAS-TEK Engineering & Associates, Inc.

Percentage By Weight Passing the No. 200 Sieve and Determination of Moisture Content

Project:	Baker Pump Station	Project No.:	E08-1003	Date:	11/11/08

Boring No.	Other Test	Depth, ft.	Tare ID	Wet + Tare, g	Dry + Tare,g	Tare,g	Dry + Tare after wash	Percent Moisture	% Passing No. 200
BB-3A		1.5-3	226	538.35	454.11	125.81		25.7	
		6-7.5	230	533.25	494.81	124.71		10.4	
	-200	9-11	B-101	749.55	699.22	110.31	590.58	8.5	18.4
	PI/SIEVE	12.5-14	B	520.08	490.71	82.51		7.2	
	-200	15-16.5	C-33	711.66	675.95	109.90	510.90	6.3	29.2
	PI/SIEVE	17.5-19	A-116	388.18	362.01	84.31		9.4	
	PI/-200	20-21.5	B-107	418.11	371.33	109.42	203.32	17.9	64.1
		25-25.5	149	369.35	337.51	126.01		15.1	
		27.5-28	178	477.31	430.11	125.35		15.5	
		30-31	170	523.15	468.11	126.03		16.1	
		32.5-33	52	381.81	350.91	123.81		13.6	
BB-4	-200/Unit Wt	3-4	C-75	634.75	583.18	87.11	297.22	10.4	57.6
	-200	4-6	C-72	480.15	440.71	88.41	240.99	11.2	56.7
	PI/-200	8-10	A-118	450.81	417.56	84.75	293.98	10.0	37.1
	SIEVE	17.5-19	G	782.71	751.81	82.95		4.6	
	SIEVE	20-21.5	A-125	859.30	797.50	83.94		8.7	

Tested By:	HS	Computed By:	KLA	Checked By:	KLA

Percentage By Weight Passing the No. 200 Sieve and Determination of Moisture Content

Project:	Baker Pump Station	Project No.:	E08-1003	Date:	11/11/08

Boring No.	Other Test	Depth, ft.	Tare ID	Wet + Tare, g	Dry + Tare,g	Tare,g	Dry + Tare after wash	Percent Moisture	% Passing No. 200
BB-5	-200	7-9.5	B-109	487.81	446.90	110.41	293.34	12.2	45.6
	-200	10-12	C-8	648.15	599.11	110.55	429.49	10.0	34.7
	SIEVE	12.5-14	C-47	787.80	747.35	86.70		6.1	
	-200	15-16.5	C-36	703.35	664.20	110.35	567.26	7.1	17.5
	SIEVE	17.5-19	A-117	700.15	672.51	85.25		4.7	
	SIEVE	20-21.5	A-136	729.33	668.18	84.15		10.5	
		24-26		NO SAMPLE					
		28-30		NO SAMPLE					
BB-6	-200	1-2	C-54	568.81	526.00	87.05	425.67	9.8	22.9
	-200	2.5-3	A-100	348.81	283.45	84.18	96.43	32.8	93.9
	-200	3.7-4.5	C-71	616.95	582.58	87.72	496.76	6.9	17.3
	PI	3-5	103	419.58	376.33	123.53		17.1	
	-200	12.5-14.5	C-52	587.58	524.71	86.71	317.79	14.4	47.2
	Qu/PI/-200	15-17	C-42	415.30	370.69	87.27	186.16	15.7	65.1
	-200	17.5-19	C-74	554.18	478.55	87.70	258.00	19.4	56.4
	SIEVE	20-21.5	C-64	636.25	572.21	87.08		13.2	
B-7		22.5-24	119	631.11	560.85	123.63		16.1	
	-200/Sulfate	0.5-1	A-131	554.21	517.56	83.93	483.42	8.5	7.9
	Qu/PI/-200/Sulfate	1-2.5	C-41	589.25	553.02	87.85	515.85	7.8	8.0
	PI/-200/Sulfate	2.5-4	A-109	359.55	298.00	84.55	120.43	28.8	83.2
		10-11	229	442.65	400.31	124.88		15.4	

Tested By:	HS	Computed By:	KLA	Checked By:	KLA

Percentage By Weight Passing the No. 200 Sieve and Determination of Moisture Content

Project:	Baker Pump Station	Project No.:	E08-1003	Date:	11/13/08

Boring No.	Other Test	Depth, ft.	Tare ID	Wet + Tare, g	Dry + Tare,g	Tare,g	Dry + Tare after wash	Percent Moisture	% Passing No. 200
BB-8	PI/-200/Sulfate	1-2.5	170	353.70	302.11	126.06	146.09	29.3	88.6
		2.5-4	112	414.82	360.14	123.21		23.1	
	-200	4-5.5	206	427.91	359.48	125.17	140.30	29.2	93.5
		7-8.5	137	389.39	333.43	125.23		26.9	
		8.5-10	110	367.28	320.70	123.10		23.6	
BB-9	PI/-200	8-9	115	415.20	365.10	124.77	168.55	20.8	81.8
	PI	25-27	118	318.25	286.17	125.18		19.9	
		27.5-29.5	189	479.55	421.76	125.36		19.5	
	SIEVE	35.5-37	155	469.51	436.24	124.38		10.7	
	-200	37.5-39	44	637.61	604.00	123.08	518.06	7.0	17.9
	SIEVE	40-41.5	107	725.88	680.56	123.25		8.1	
	-200	42.5-44	74	625.00	542.80	123.68	266.33	19.6	66.0
	-200	45-46	100	638.81	579.31	123.63	526.22	13.1	11.7
	SIEVE	47.5-49	101	756.95	693.40	123.48		11.2	
		50-52	149	574.00	511.00	126.05		16.4	
BB-10	PI/-200	5-6	178	479.31	442.40	125.35	248.45	11.6	61.2
	PI/-200	12-13	52	436.00	394.70	123.85	277.90	15.2	43.1
	-200	15-17	147	426.88	383.30	125.70	217.05	16.9	64.5
	PI/-200	17-19	75	479.88	425.90	123.88	218.70	17.9	68.6
	Qu/-200	20-22	186	375.91	337.10	125.72	198.55	18.4	65.5

Tested By:	HS	Computed By:	KLA	Checked By:	KLA

Percentage By Weight Passing the No. 200 Sieve and Determination of Moisture Content

Project:	Baker Pump Station	Project No.:	E08-1003	Date:	11/13/08

Boring No.	Other Test	Depth, ft.	Tare ID	Wet + Tare, g	Dry + Tare,g	Tare,g	Dry + Tare after wash	Percent Moisture	% Passing No. 200
BB-8	PI/-200/Sulfate	1-2.5	170	353.70	302.11	126.06	146.09	29.3	88.6
		2.5-4	112	414.82	360.14	123.21		23.1	
	-200	4-5.5	206	427.91	359.48	125.17	140.30	29.2	93.5
		7-8.5	137	389.39	333.43	125.23		26.9	
		8.5-10	110	367.28	320.70	123.10		23.6	
BB-9	PI/-200	8-9	115	415.20	365.10	124.77	182.63	20.8	75.9
	PI	25-27	118	318.25	286.17	125.18		19.9	
		27.5-29.5	189	479.55	421.76	125.36		19.5	
	SIEVE	35.5-37	155	469.51	436.24	124.38		10.7	
	-200	37.5-39	44	637.61	604.00	123.08	518.06	7.0	17.9
	SIEVE	40-41.5	107	725.88	680.56	123.25		8.1	
	-200	42.5-44	74	625.00	542.80	123.68	266.33	19.6	66.0
	-200	45-46	100	638.81	579.31	123.63	526.22	13.1	11.7
	SIEVE	47.5-49	101	756.95	693.40	123.48		11.2	
		50-52	149	574.00	511.00	126.05		16.4	
BB-10	PI/-200	5-6	178	479.31	442.40	125.35	248.45	11.6	61.2
	PI/-200	12-13	52	436.00	394.70	123.85	277.90	15.2	43.1
	-200	15-17	147	426.88	383.30	125.70	217.05	16.9	64.5
	PI/-200	17-19	75	479.88	425.90	123.88	218.70	17.9	68.6
	Qu/-200	20-22	186	375.91	337.10	125.72	198.55	18.4	65.5

Tested By:	HS	Computed By:	KLA	Checked By:	KLA

Percentage By Weight Passing the No. 200 Sieve and Determination of Moisture Content

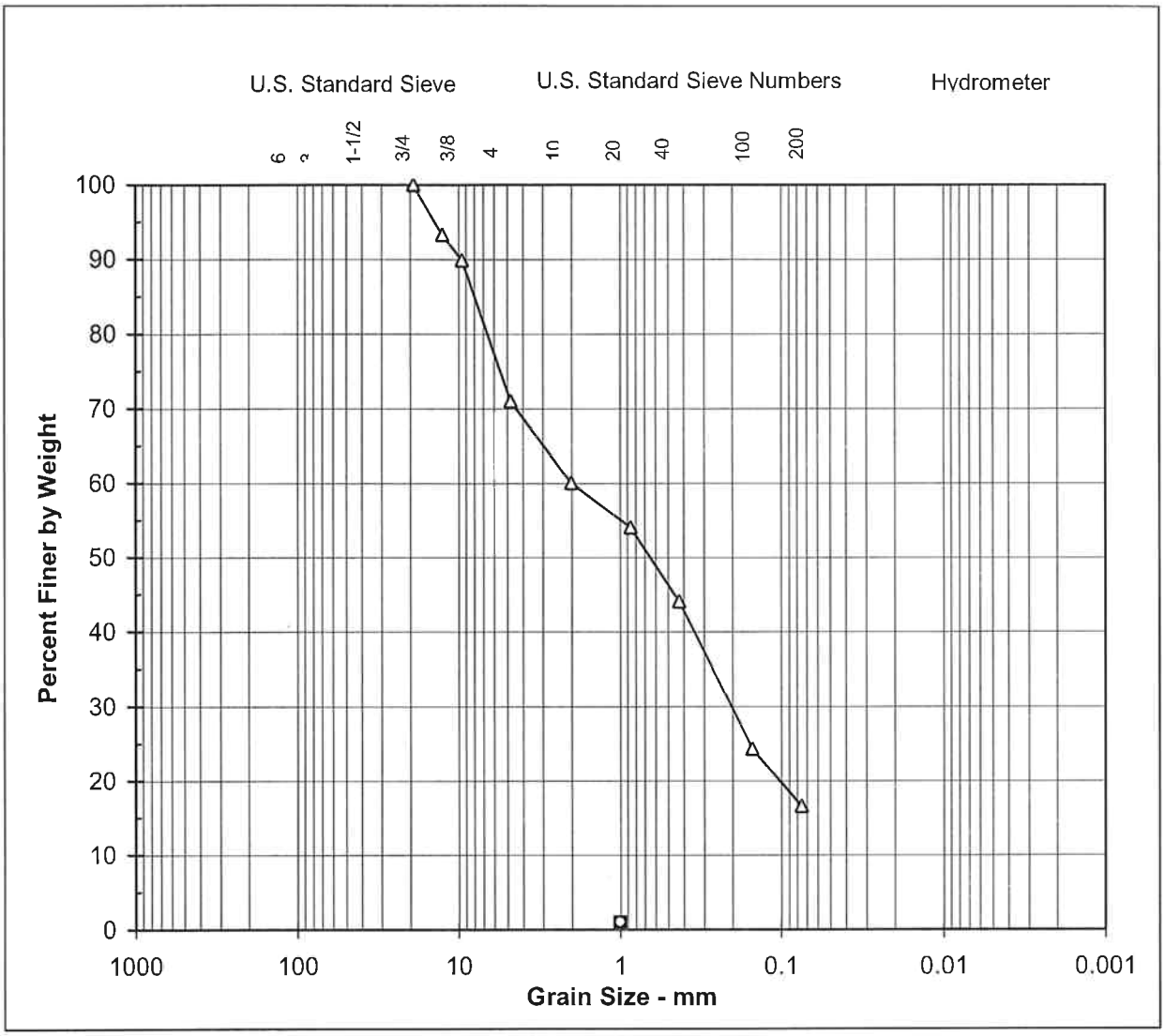
Project:	Baker Pump Station	Project No.:	E08-1003	Date:	11/13/08

Boring No.	Other Test	Depth, ft.	Tare ID	Wet + Tare, g	Dry + Tare,g	Tare,g	Dry + Tare after wash	Percent Moisture	% Passing No. 200
BB-11		4-5	62	479.71	419.90	123.43		20.2	
		5-7	199	432.13	383.40	125.91		18.9	
		10-11		NO SAMPLE					
	PI/SIEVE	20-21	86	532.71	484.40	122.41		13.3	
B-11A	-200	5-6	26	724.61	650.90	123.41	404.86	14.0	46.6
	PI/-200	17.5-19	226	519.00	475.80	125.81	342.53	12.3	38.1
	SIEVE	20-21.5	4	521.71	498.50	127.35		6.3	
	SIEVE	22.5-24	70	517.80	494.77	122.58		6.2	
	SIEVE	25-26.5	3	736.28	708.20	123.55		4.8	

Tested By:	HS	Computed By:	KLA	Checked By:	KLA

							DATA ENTERED BY:		KLA			TESTED BY:		JP	
			JOB NUMBER:	E08-1003			CHECKED BY:		KLA			DATE:		11/11&12/2008	
BORING	DEPTH, FEET	OTHER TESTS	TARE NUMBER	TARE, GMS	WET+TARE, GMS	DRY+TARE, GMS	**MOISTURE, %**	DIAMETER (in.)	HEIGHT (in.)	WEIGHT (grams)	**DRY DENSITY (pcf)**	PEAK LOAD (psi)	DEFLECTION (in.)	**UNC. STRESS (ksf)**	**% STRAIN**
BB-3A	3-5		75	123.90	451.50	406.31	**16.0**	2.645	5.389	1054.60	**116.9**	27.7		**3.99**	**14.9**
BB-4	3-4	-200	C-75	87.11	634.75	583.18	**10.4**	2.759	4.554	976.00	**123.7**				
	35-37	PI	W	87.63	482.10	427.40	**16.1**	3.689	7.571	2924.90	**118.6**	211.8		**30.50**	**1.9**
	46-48	PI	C-13	110.44	535.90	475.70	**16.5**	3.821	4.601	1832.50	**113.6**	276.4		**39.80**	**2.1**
BB-5	2.5-4.5	PI	63	123.30	250.00	220.63	**30.2**	2.706	5.151	894.60	**88.4**	32.9		**4.74**	**6.6**
	5-7		147	125.69	428.60	375.81	**21.1**	2.768	4.971	992.50	**104.4**	59.1		**8.51**	**9.3**
	38.5-41		C-56	88.68	487.20	429.40	**17.0**	3.055	5.878	1533.30	**115.9**	157.5		**22.68**	**1.8**
	44-46.5	PI	U	88.04	548.96	483.60	**16.5**	3.237	5.570	1593.40	**113.6**	410.8		**59.16**	**2.1**
BB-6	3-3.7	PI/-200	SEE MOISTURE/-200 SHEET					UNTESTABLE							
	7.5-9.5		215	125.90	426.20	363.47	**26.4**	2.578	5.437	911.30	**96.8**	54.4		**7.84**	**14.2**
	10-12	PI/Sieve	M	87.90	526.50	471.94	**14.2**	2.758	5.331	1135.20	**118.9**	36.8		**5.29**	**4.4**
	15-17	-200	C-42	87.27	415.30	370.69	**15.7**	2.675	4.238	779.50	**107.7**	12.3		**1.77**	**5.9**
	24.5-25		203	125.30	578.02	516.90	**15.6**	2.040	4.485	515.53	**115.9**	118.7		**17.09**	**2.3**
	27.8-28.3		89	122.80	625.50	556.40	**15.9**	2.047	4.380	506.40	**115.4**	202.2		**29.12**	**2.6**
BB7	1-2.5	PI/-200/Sulfate	SEE MOISTURE/-200 SHEET					UNTESTABLE							
	4-6		95	123.26	469.03	390.60	**29.3**	2.700	5.210	941.40	**92.9**	38.4		**5.53**	**4.7**
	7.5-8.5	PI	23	123.88	384.89	336.58	**22.7**	2.719	4.921	938.20	**101.9**	37.4		**5.38**	**12.4**

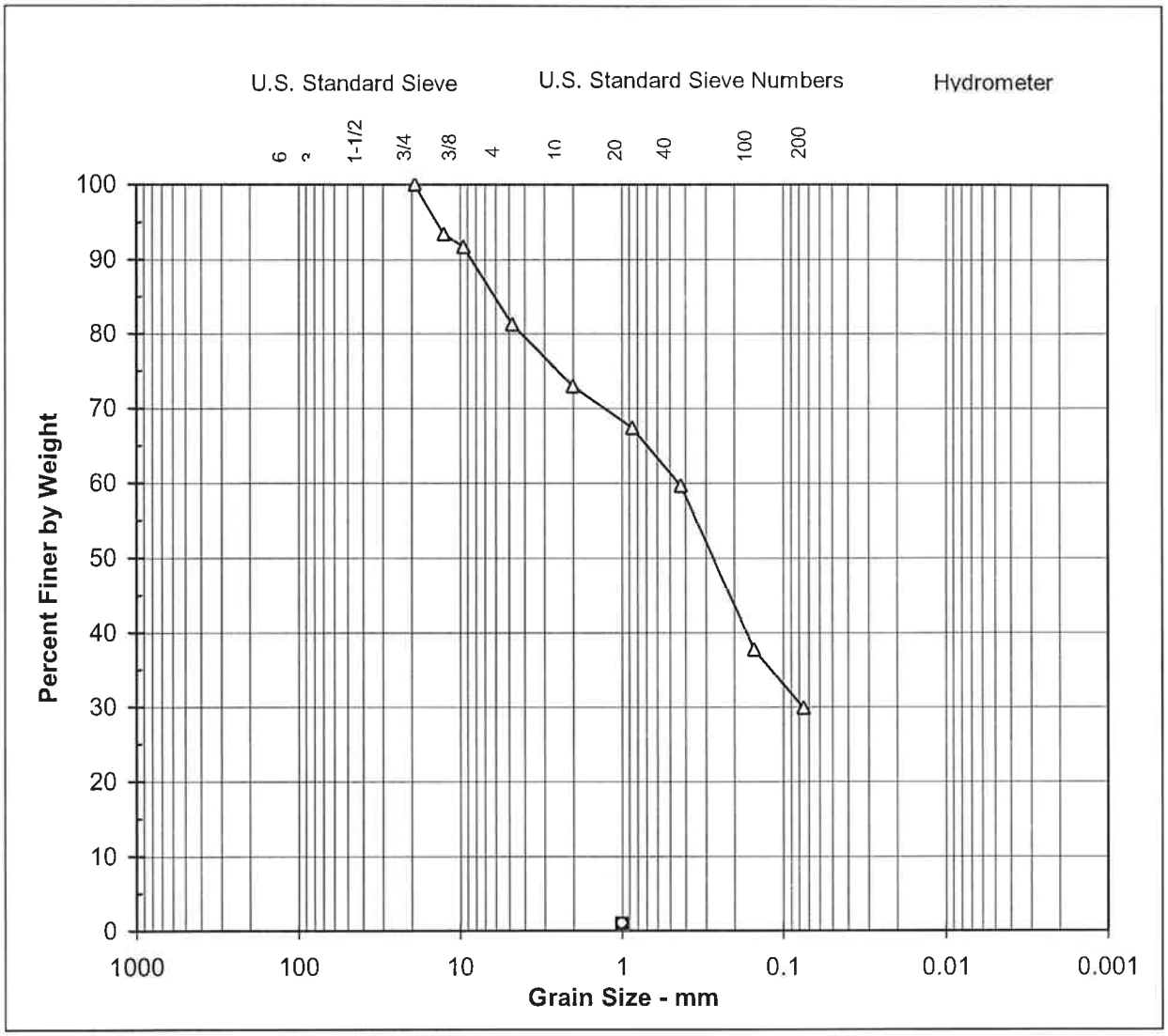
							DATA ENTERED BY:		KLA			TESTED BY:			
			JOB NUMBER:	E08-1003			CHECKED BY:		KLA			DATE:			
BORING	DEPTH, FEET	OTHER TESTS	TARE NUMBER	TARE, GMS	WET+TARE, GMS	DRY+TARE, GMS	**MOISTURE, %**	DIAMETER (in.)	HEIGHT (in.)	WEIGHT (grams)	**DRY DENSITY (pcf)**	PEAK LOAD (psi)	DEFLECTION (in.)	**UNC. STRESS (ksf)**	**% STRAIN**
BB-9	3-5		142	126.49	516.40	472.60	**12.7**	UNTESTABLE							
	7-8		220	124.60	455.70	401.86	**19.4**	2.761	5.455	1116.50	**109.1**	37.3		**5.37**	**3.1**
	15-17		198	126.10	345.90	309.78	**19.7**	2.585	4.193	717.93	**103.8**	30.6		**4.40**	**4.6**
	55.5-56		235	126.36	601.54	541.40	**14.5**	2.024	4.092	475.74	**120.2**	202.6		**29.17**	**1.6**
	61.5-62		39	123.74	562.12	506.50	**14.5**	1.996	4.453	503.48	**120.2**	190.8		**27.47**	**2.6**
BB-10	7-8		159	125.40	447.60	401.29	**16.8**	2.584	5.509	996.40	**112.5**	108.3		**15.59**	**9.3**
	20-22	-200	186	125.72	375.91	337.10	**18.4**	2.687	4.901	932.00	**108.0**	26.7		**3.85**	**13.5**
	27.5-28		166	125.22	578.86	521.80	**14.4**	1.987	4.097	454.62	**119.2**	239.0		**34.42**	**1.7**
	37.5-38		13	124.55	656.95	594.61	**13.3**	2.042	4.473	533.06	**122.4**	324.0		**46.66**	**2.2**
BB-11A	12.5-13.5		234	126.05	396.53	366.39	**12.5**	2.690	5.351	1112.40	**123.8**	62.3		**8.96**	**9.3**
	28.5-29		68	123.20	649.64	571.51	**17.4**	2.056	4.553	527.10	**113.1**	118.6		**17.08**	**0.6**
	34-35		58	125.66	638.48	571.64	**15.0**	2.034	4.456	511.34	**117.0**	207.4		**29.87**	**2.0**
	38-39		24	124.52	622.68	563.80	**13.4**	2.001	4.367	498.90	**122.0**	184.1		**26.51**	**1.8**
	44-44.5		184	125.06	583.83	522.38	**15.5**	2.051	3.932	462.46	**117.5**	246.1		**35.43**	**3.0**
	45.46		114	124.36	636.40	563.92	**16.5**	2.016	4.621	513.03	**113.7**	274.4		**39.52**	**2.4**



Legend	Sample No	Depth, ft	% Gravel	% Sand	% -#200	LL	PI
△	BB-3A	12.5-14	29.0	54.5	16.5		
□							
○							

Legend	Sample No	Depth	Material Description	USCS
△	BB-3A	12.5-14		
□				
○				

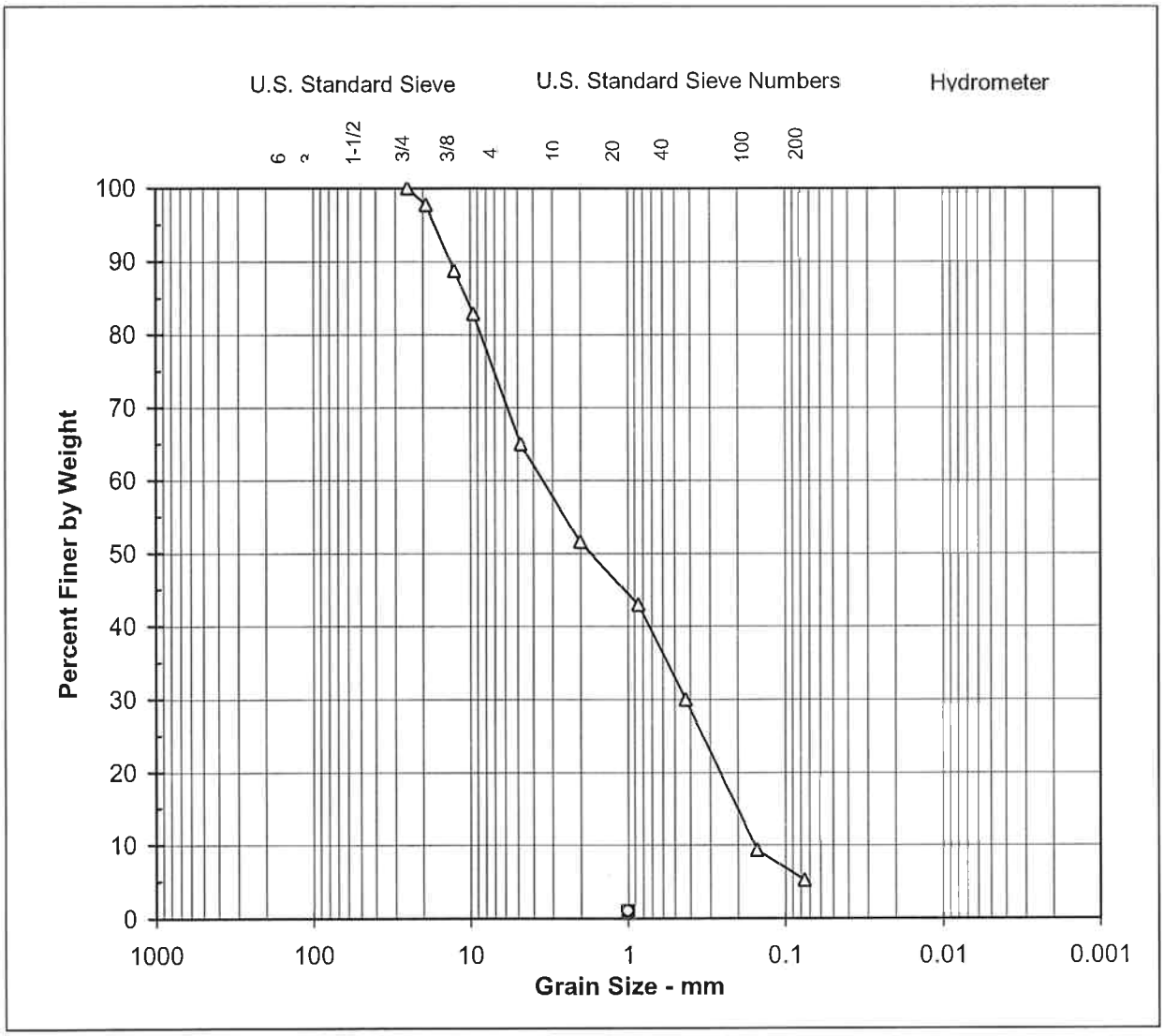
RESULTS OF SIEVE ANALYSIS	
Baker Pump Station E08-1003	
Mas-Tek Engineering	
E08-1003	FIGURE



Legend	Sample No	Depth, ft	% Gravel	% Sand	% -#200	LL	PI
△	BB-3A	17.5-19	18.8	51.4	29.8		
□							
○							

Legend	Sample No	Depth	Material Description	USCS
△	BB-3A	17.5-19		
□				
○				

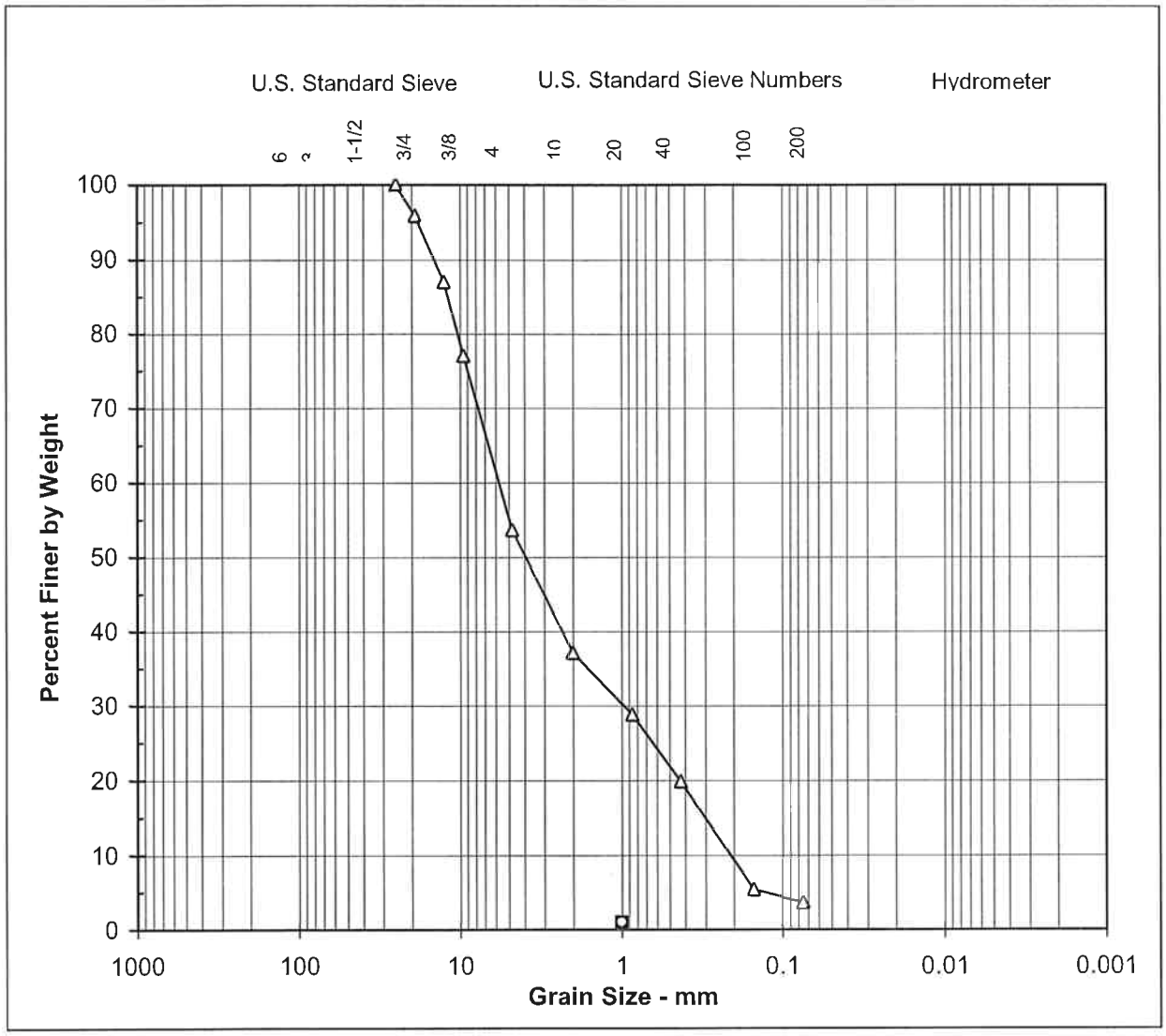
RESULTS OF SIEVE ANALYSIS	
Baker Pump Station E08-1003	
Mas-Tek Engineering	
E08-1003	FIGURE



Legend	Sample No	Depth, ft	% Gravel	% Sand	% -#200	LL	PI
△	BB-4	17.5-19	35.1	59.7	5.2		
□							
○							

Legend	Sample No	Depth	Material Description	USCS
△	BB-4	17.5-19		
□				
○				

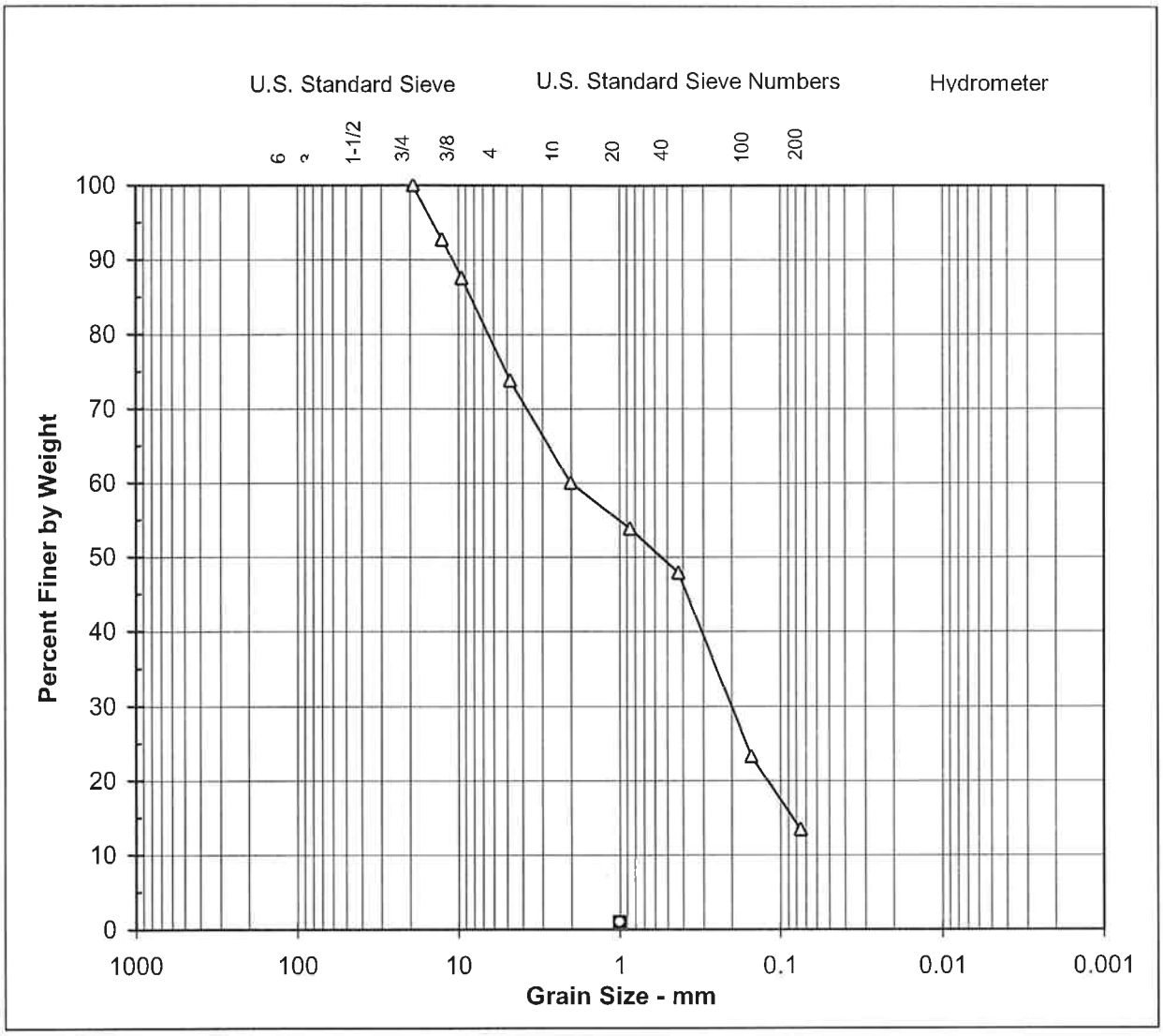
RESULTS OF SIEVE ANALYSIS	
Baker Pump Station E08-1003	
Mas-Tek Engineering	
E08-1003	FIGURE



Legend	Sample No	Depth, ft	% Gravel	% Sand	% -#200	LL	PI
△	BB-4	20-21.5	46.4	49.9	3.7		
□							
○							

Legend	Sample No	Depth	Material Description	USCS
△	BB-4	20-21.5		
□				
○				

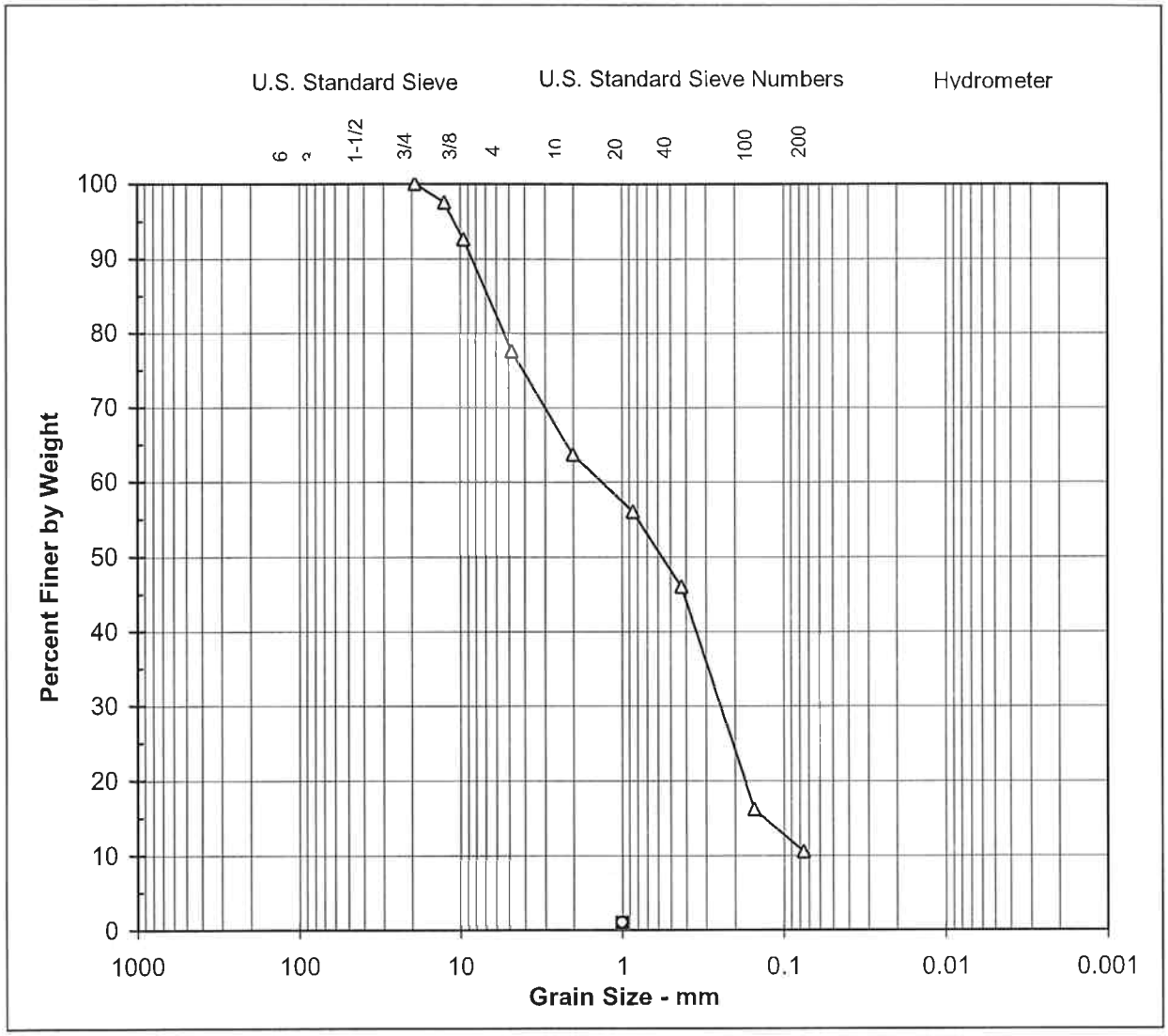
RESULTS OF SIEVE ANALYSIS	
Baker Pump Station E08-1003	
Mas-Tek Engineering	
E08-1003	FIGURE



Legend	Sample No	Depth, ft	% Gravel	% Sand	% -#200	LL	PI
△	BB-5	12.5-14	26.2	60.4	13.4		
□							
○							

Legend	Sample No	Depth	Material Description	USCS
△	BB-5	12.5-14		
□				
○				

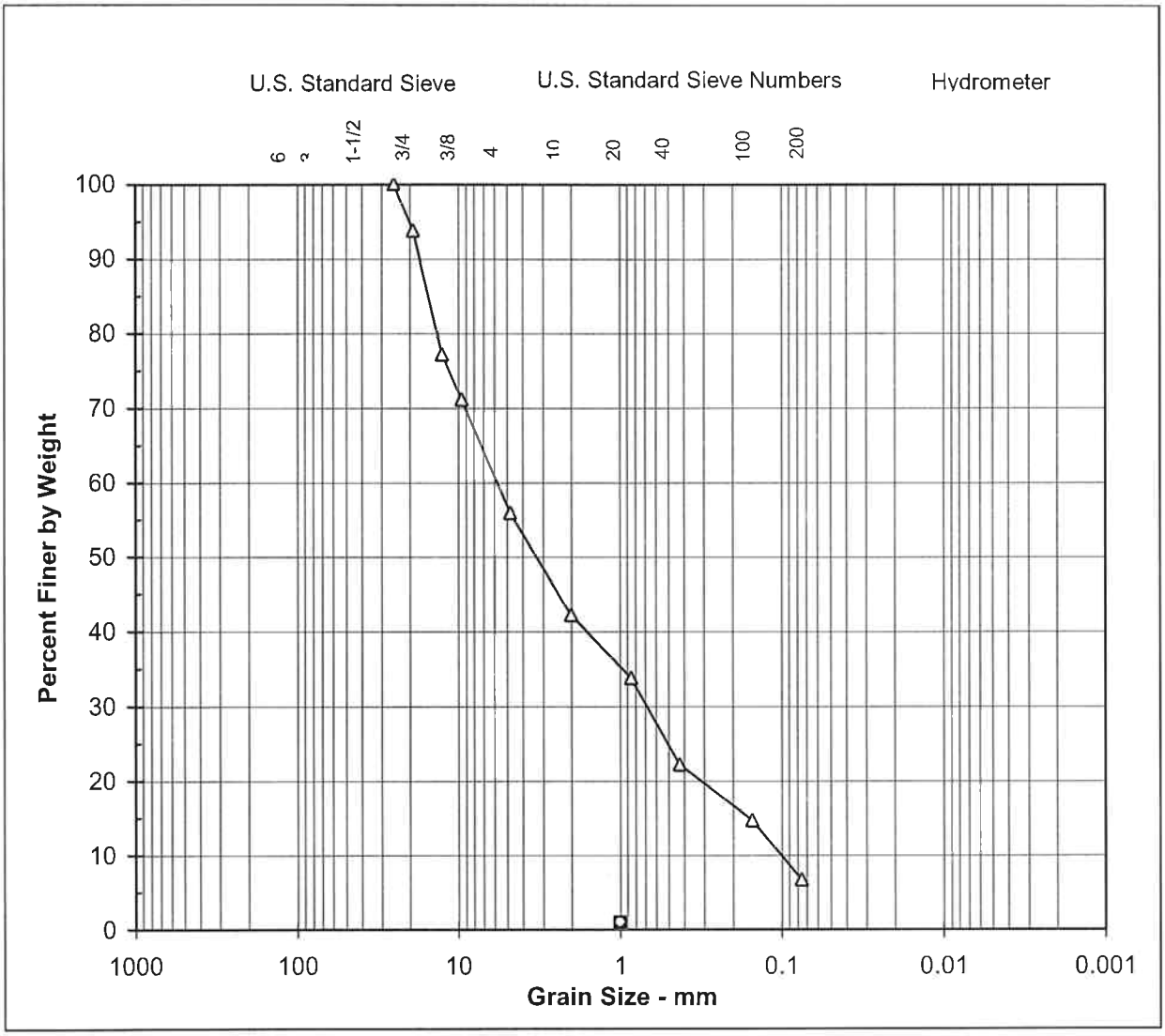
RESULTS OF SIEVE ANALYSIS	
Baker Pump Station E08-1003	
Mas-Tek Engineering	
E08-1003	FIGURE



Legend	Sample No	Depth, ft	% Gravel	% Sand	% -#200	LL	PI
△	BB-5	17.5-19	22.5	67.0	10.5		
□							
○							

Legend	Sample No	Depth	Material Description	USCS
△	BB-5	17.5-19		
□				
○				

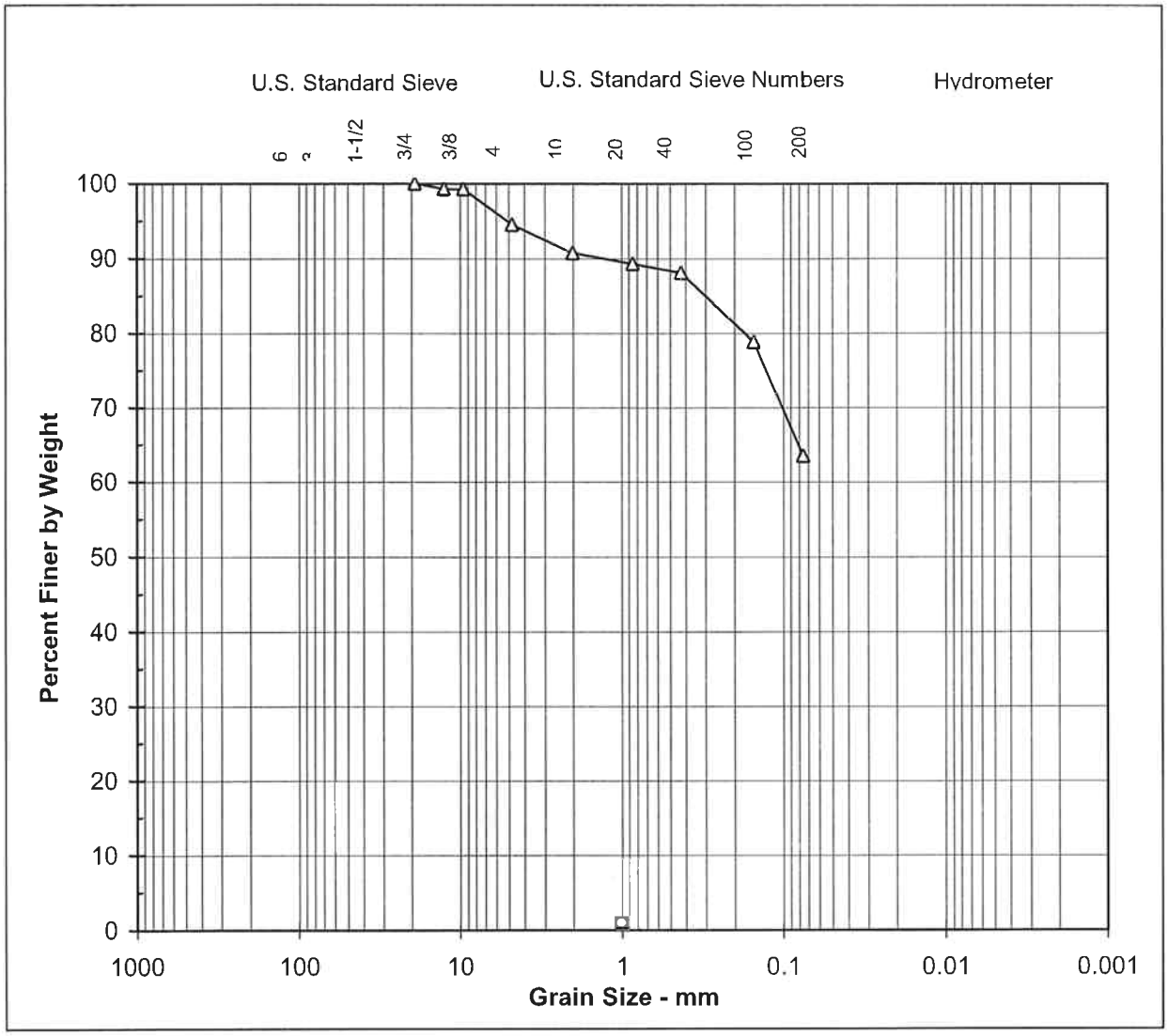
RESULTS OF SIEVE ANALYSIS	
Baker Pump Station E08-1003	
Mas-Tek Engineering	
E08-1003	FIGURE



Legend	Sample No	Depth, ft	% Gravel	% Sand	% -#200	LL	PI
△	BB-5	20-21.5	44.1	49.2	6.7		
□							
○							

Legend	Sample No	Depth	Material Description	USCS
△	BB-5	20-21.5		
□				
○				

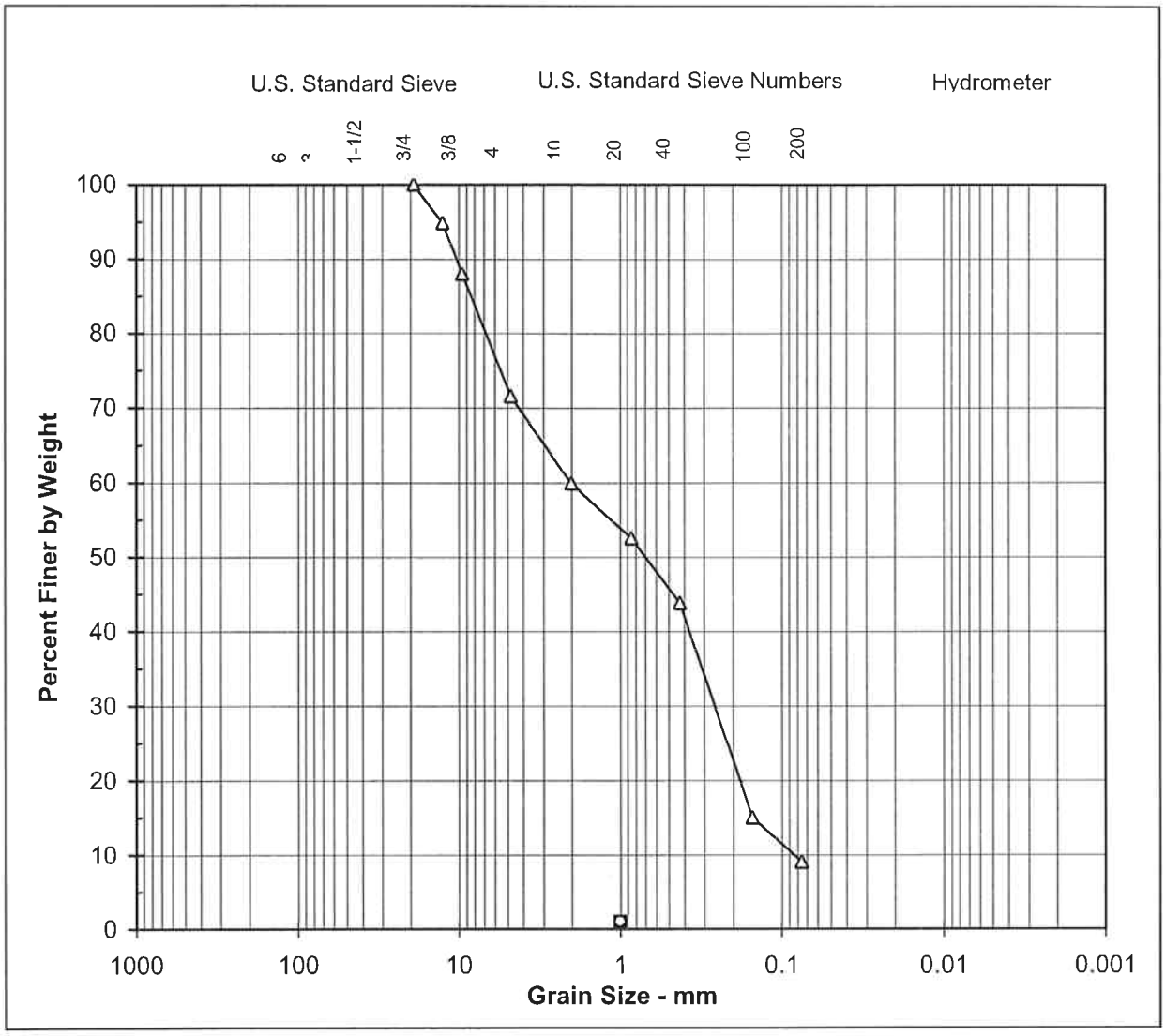
RESULTS OF SIEVE ANALYSIS	
Baker Pump Station E08-1003	
Mas-Tek Engineering	
E08-1003	FIGURE



Legend	Sample No	Depth, ft	% Gravel	% Sand	% -#200	LL	PI
△	BB-6	10-12	5.5	31.0	63.5		
□							
○							

Legend	Sample No	Depth	Material Description	USCS
△	BB-6	10-12		
□				
○				

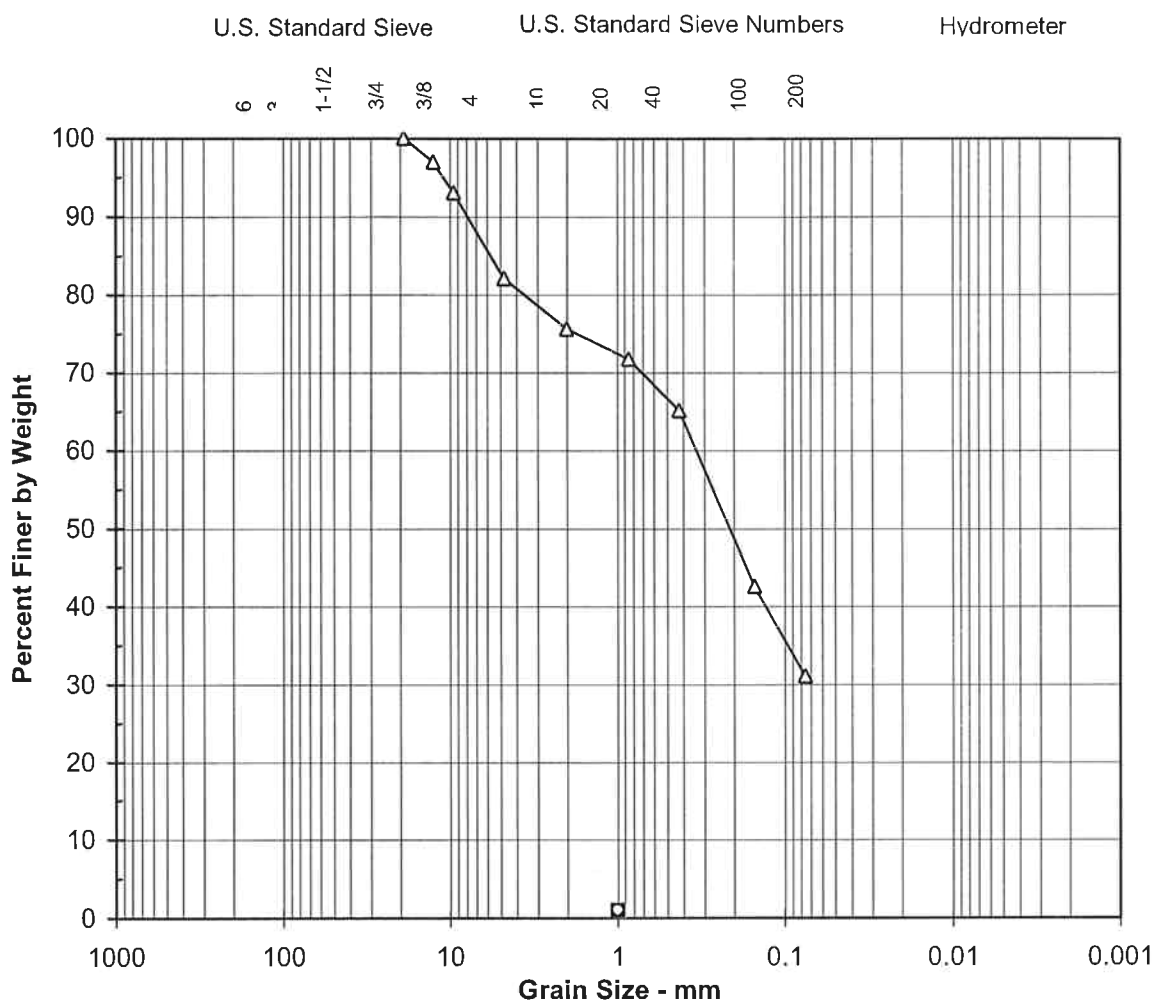
RESULTS OF SIEVE ANALYSIS	
Baker Pump Station E08-1003	
Mas-Tek Engineering	
E08-1003	FIGURE



Legend	Sample No	Depth, ft	% Gravel	% Sand	% -#200	LL	PI
△	BB-6	20-21.5	28.5	62.5	9.0		
□							
○							

Legend	Sample No	Depth	Material Description	USCS
△	BB-6	20-21.5		
□				
○				

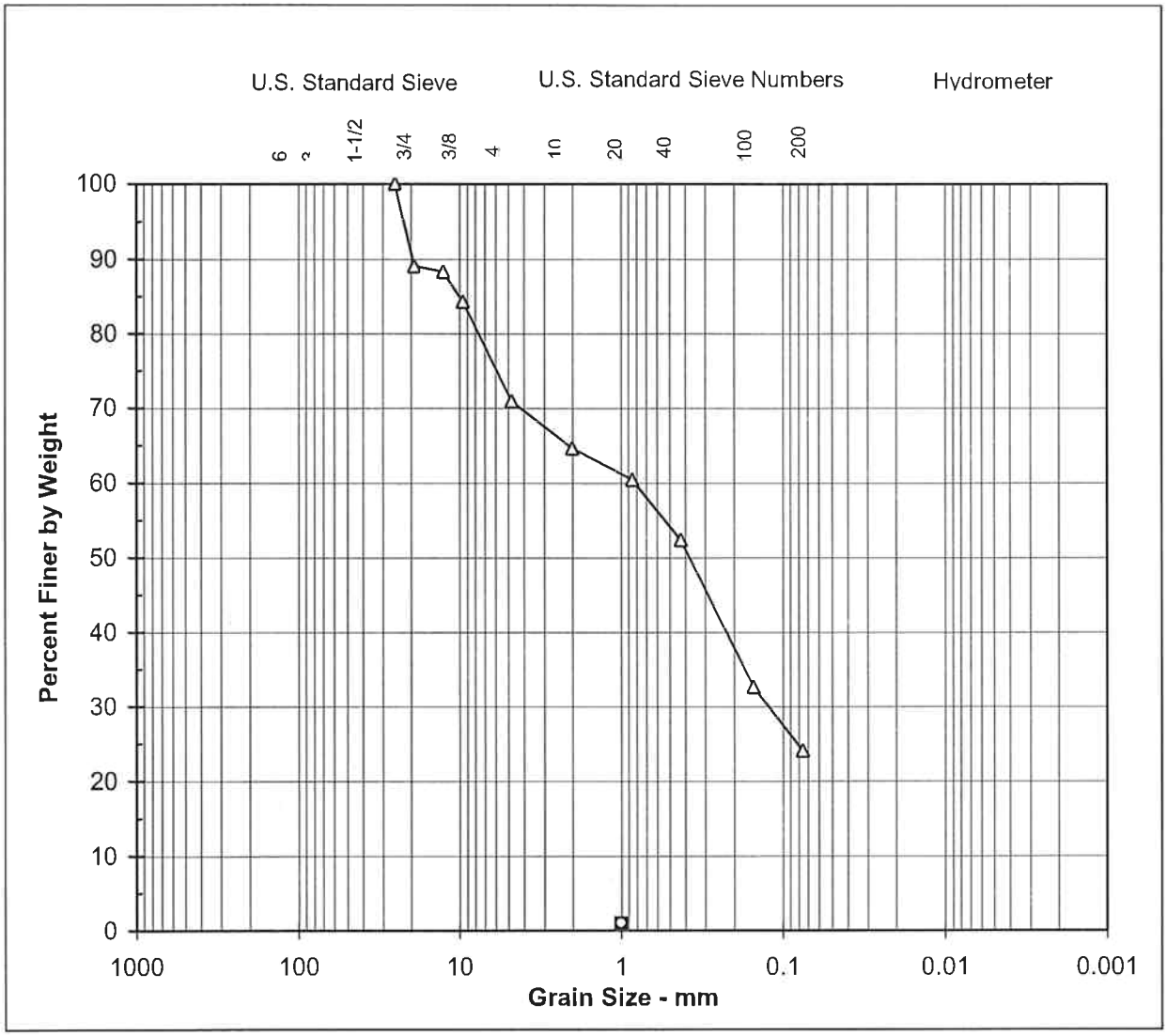
RESULTS OF SIEVE ANALYSIS	
Baker Pump Station E08-1003	
Mas-Tek Engineering	
E08-1003	FIGURE



Legend	Sample No	Depth, ft	% Gravel	% Sand	% -#200	LL	PI
△	BB-9	35.5-37	17.9	51.0	31.1		
□							
○							

Legend	Sample No	Depth	Material Description	USCS
△	BB-9	35.5-37		
□				
○				

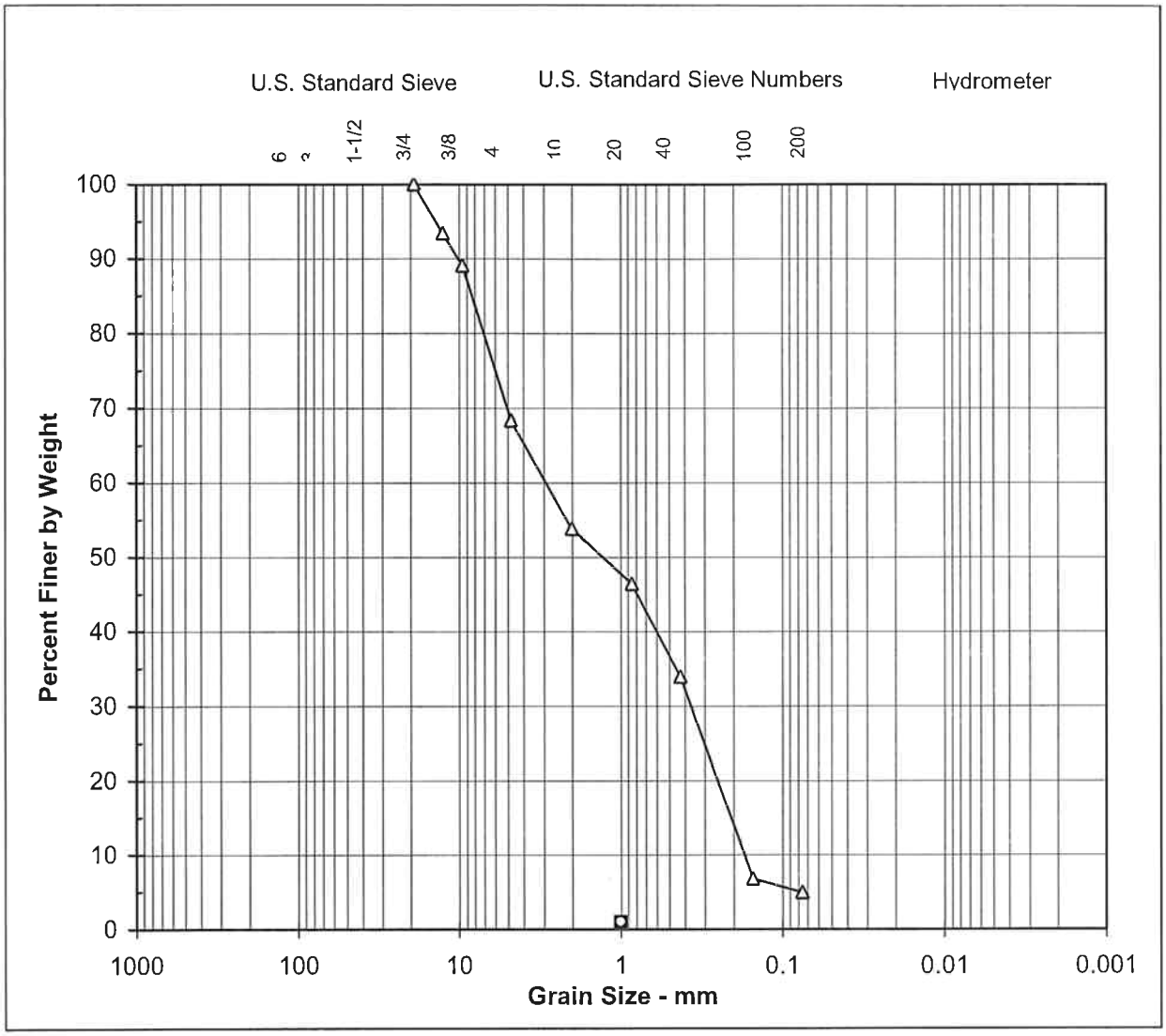
RESULTS OF SIEVE ANALYSIS	
Baker Pump Station E08-1003	
Mas-Tek Engineering	
E08-1003	FIGURE



Legend	Sample No	Depth, ft	% Gravel	% Sand	% -#200	LL	PI
△	BB-9	40-41.5	29.1	46.9	24.0		
□							
○							

Legend	Sample No	Depth	Material Description	USCS
△	BB-9	40-41.5		
□				
○				

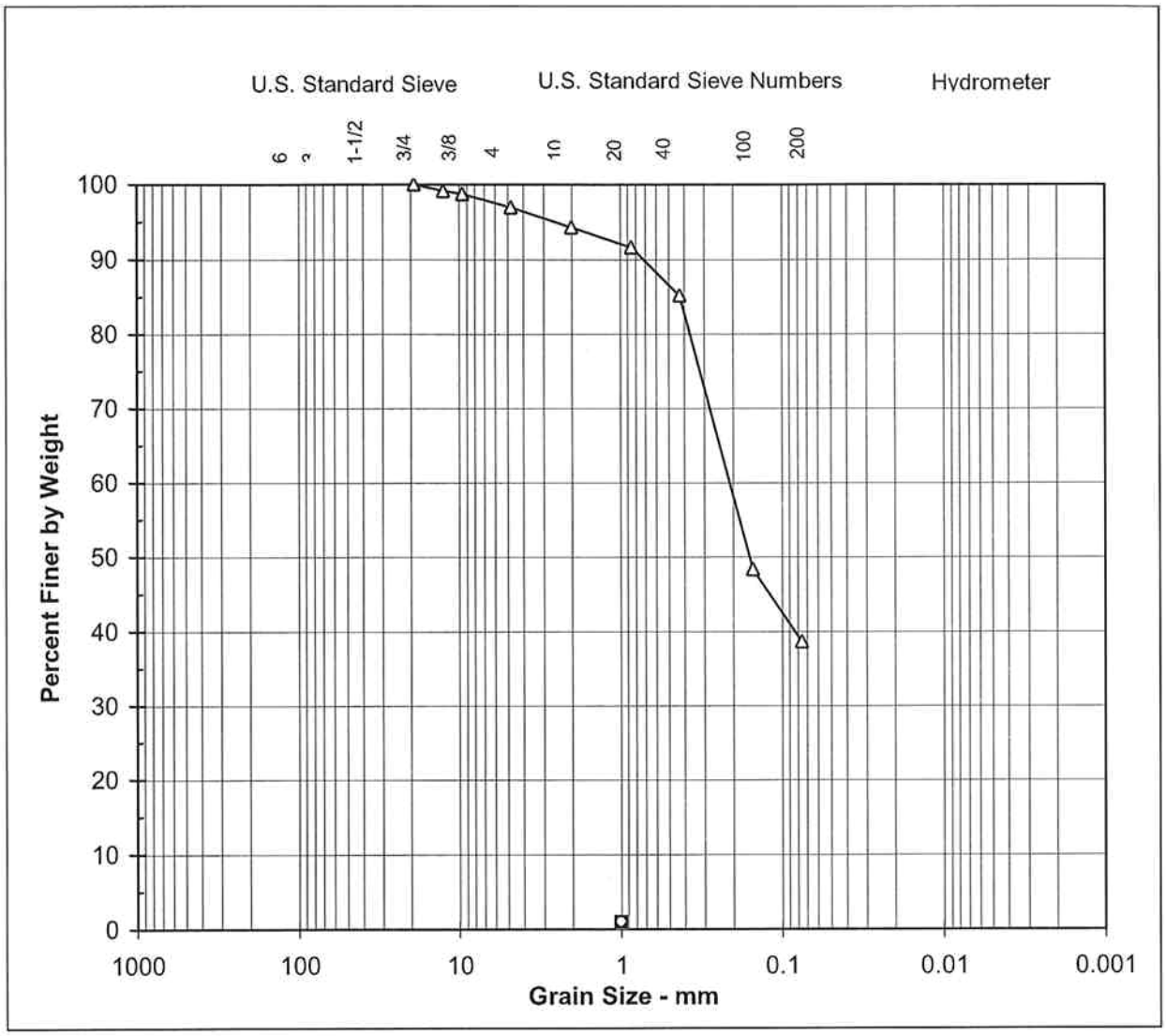
RESULTS OF SIEVE ANALYSIS	
Baker Pump Station E08-1003	
Mas-Tek Engineering	
E08-1003	FIGURE



Legend	Sample No	Depth, ft	% Gravel	% Sand	% -#200	LL	PI
△	BB-9	47.5-49	31.7	63.4	4.9		
□							
○							

Legend	Sample No	Depth	Material Description	USCS
△	BB-9	47.5-49		
□				
○				

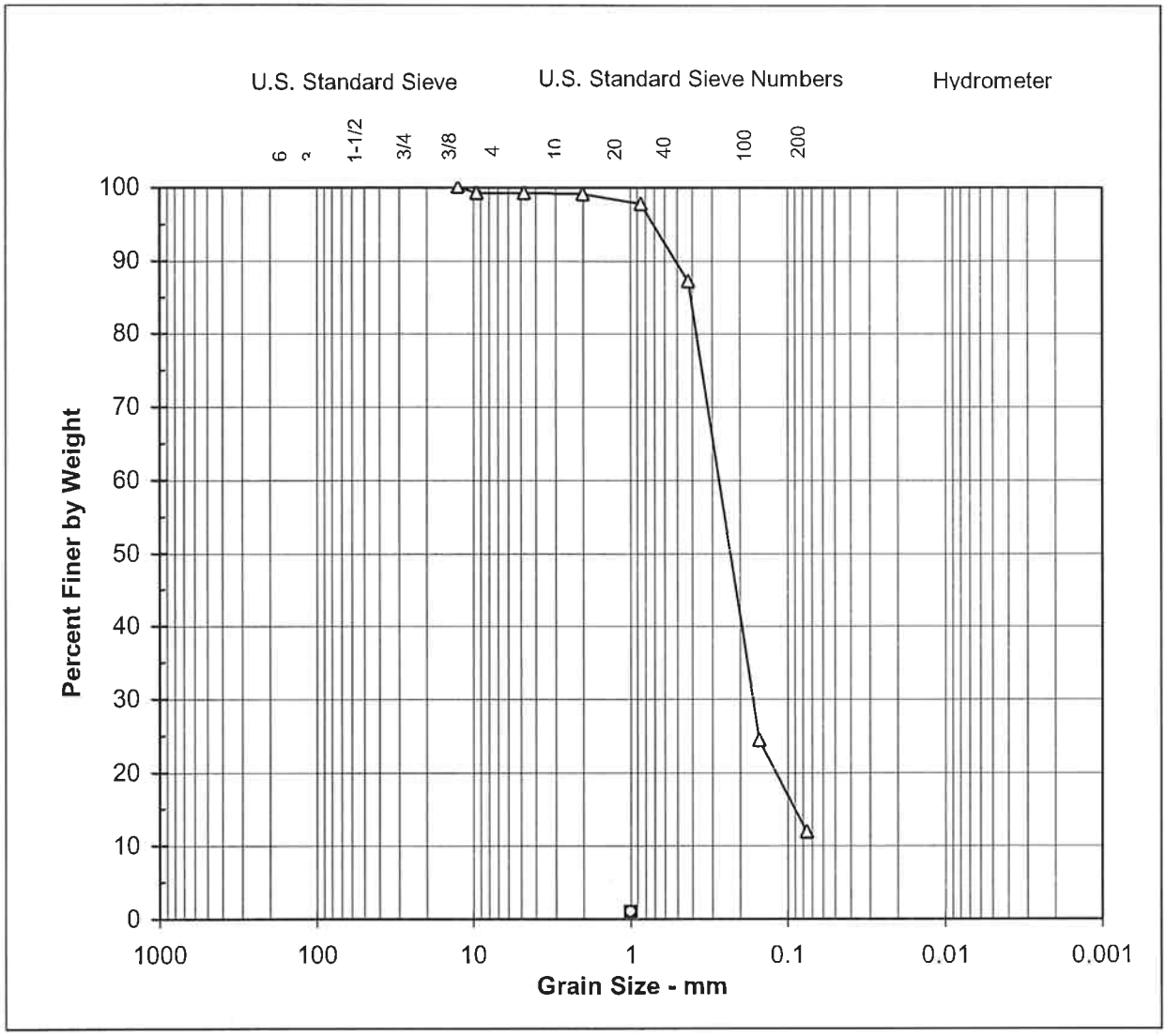
RESULTS OF SIEVE ANALYSIS	
Baker Pump Station E08-1003	
Mas-Tek Engineering	
E08-1003	FIGURE



Legend	Sample No	Depth, ft	% Gravel	% Sand	% -#200	LL	PI
△	BB-11	20-21	3.1	58.3	38.6		
□							
○							

Legend	Sample No	Depth	Material Description	USCS
△	BB-11	20-21		
□				
○				

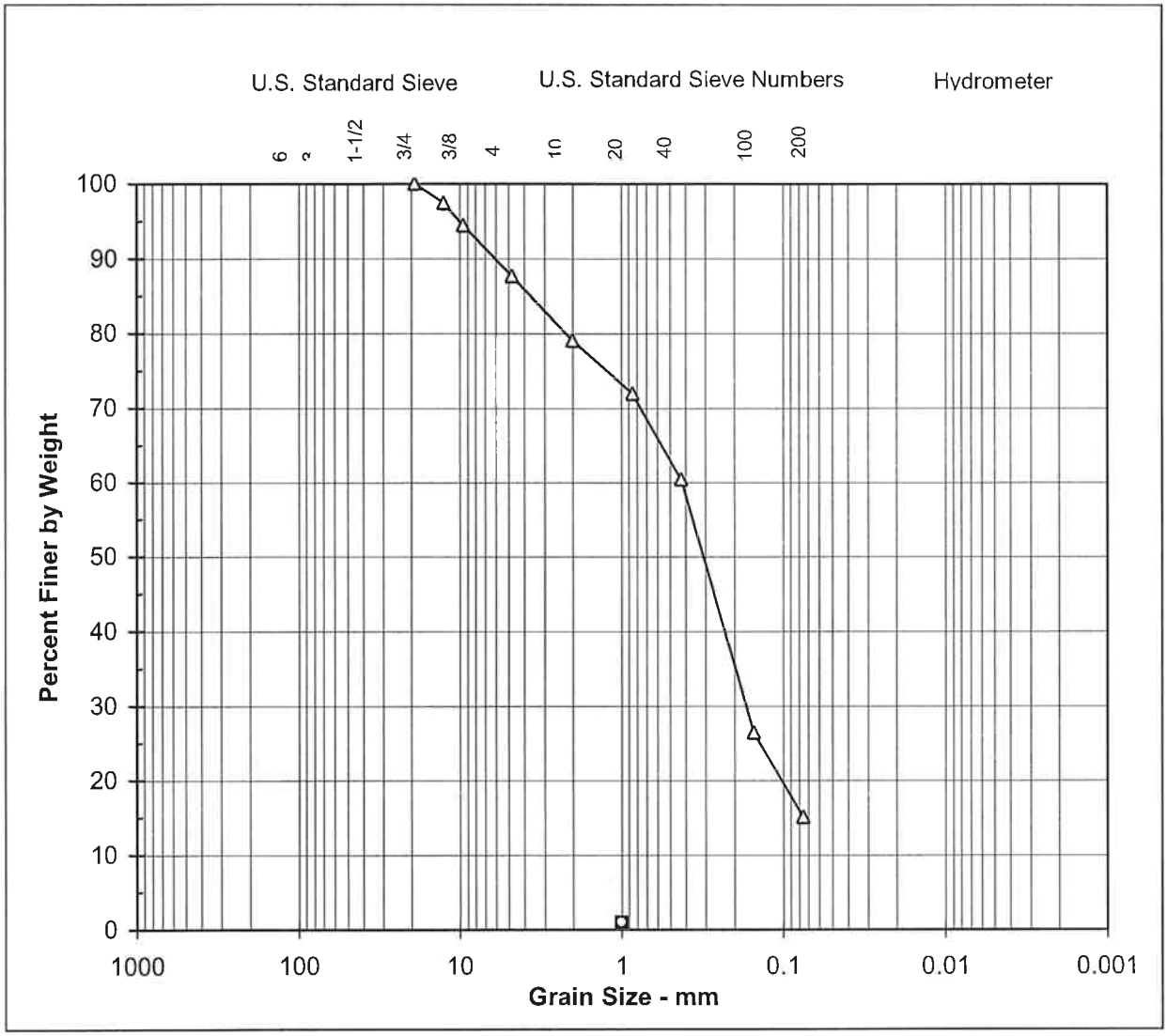
RESULTS OF SIEVE ANALYSIS	
Baker Pump Station E08-1003	
Mas-Tek Engineering	
E08-1003	FIGURE



Legend	Sample No	Depth, ft	% Gravel	% Sand	% -#200	LL	PI
△	BB-11A	20-21.5	0.7	87.4	11.9		
□							
○							

Legend	Sample No	Depth	Material Description	USCS
△	BB-11A	20-21.5		
□				
○				

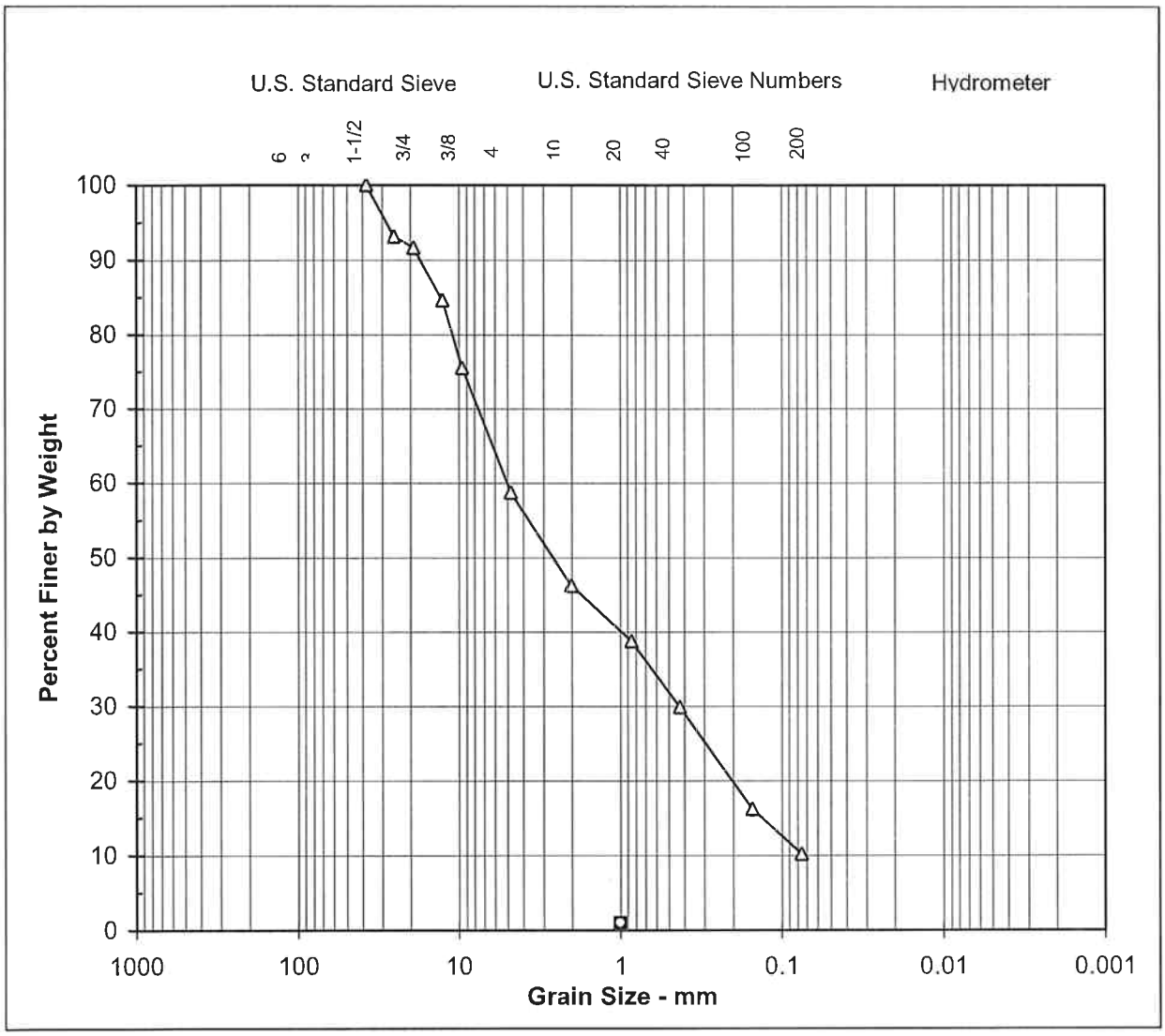
RESULTS OF SIEVE ANALYSIS	
Baker Pump Station E08-1003	
Mas-Tek Engineering	
E08-1003	FIGURE



Legend	Sample No	Depth, ft	% Gravel	% Sand	% -#200	LL	PI
△	BB-11A	22.5-24	12.3	72.6	15.1		
□							
○							

Legend	Sample No	Depth	Material Description	USCS
△	BB-11A	22.5-24		
□				
○				

RESULTS OF SIEVE ANALYSIS	
Baker Pump Station E08-1003	
Mas-Tek Engineering	
E08-1003	FIGURE



Legend	Sample No	Depth, ft	% Gravel	% Sand	% -#200	LL	PI
△	BB-11A	25-26.5	41.3	48.5	10.2		
□							
○							

Legend	Sample No	Depth	Material Description	USCS
△	BB-11A	25-26.5		
□				
○				

RESULTS OF SIEVE ANALYSIS	
Baker Pump Station E08-1003	
Mas-Tek Engineering	
E08-1003	FIGURE

Atterberg Limits

Project:	Baker Pump Station	Project No.:	E08-1003	Date:	11/13&14/2008

Boring No.	Sample No.	Depth, ft.	Tare ID	Wet + Tare, g	Dry + Tare, g	Tare, g	Number of Blows	Percent Moisture	Correction Factor	Liquid Limit	Tare ID	Wet + Tare, g	Dry + Tare, g	Tare, g	Plastic Limit	Plasticity Index
BB-3A		12.5-14	30	31.127	28.468	15.519	23	20.5344	0.9902	20	56	25.154	24.095	15.297	12	8
		17.5-19	117	41.559	35.770	15.227	29	28.17992	1.0181	29	107	24.523	23.568	15.327	12	17
		20-21.5	94	42.389	34.031	15.373	30	44.7958	1.0223	46	68	25.617	24.197	15.448	16	30
BB-4		8-10	106	42.562	36.159	15.304	22	30.70247	0.9846	30	35	24.431	23.374	15.570	14	16
		22-23	52	37.951	29.867	15.445	20	56.05325	0.9734	55	144	24.992	23.346	15.371	21	34
BB-5	Wet	2.5-4.5	10	36.301	27.680	15.250	30	69.3564	1.0223	71	65	22.209	20.801	15.342	26	45
	Dry	2.5-5	56	32.321	25.611	15.300	21	65.07613	0.9791	64					0	64
		44-46.5						0	0	0					0	0
BB-6		3-3.7	11	38.594	30.160	15.438	26	57.28841	1.004	58	29	24.629	23.077	15.275	20	38
		5.5-7.5	25	36.796	28.307	15.447	25	66.01089	1	66	41	25.081	23.363	15.569	22	44
		10-12	37	34.554	28.971	15.238	28	40.6539	1.0138	41					0	41
BB-7		1-2.5	98	41.809	35.181	15.393	23	33.49505	0.9902	33	121	23.894	22.786	15.433	15	18
		2.5-4	122	38.481	29.231	15.391	30	66.83526	1.0223	68	18	24.347	22.615	15.181	23	45
		7.5-8.5	5	35.830	28.018	15.493	23	62.37126	0.9902	62	142	24.398	22.795	15.308	21	41
BB-8		1-2.5	77	33.321	27.327	15.379	30	50.16739	1.0223	51	99	25.751		15.468	0	51
BB-9		8-9	79	41.284	32.250	15.398	24	53.60788	0.9951	53	134	23.386	22.173	15.261	18	35
	GeoTest	19.5-21						0	0	0					0	0
		25-27	110	38.990	31.184	15.410	30	49.4865	1.0223	51	150	24.253	22.857	15.363	19	32
	GeoTest	32.5-34						0	0	0					0	0

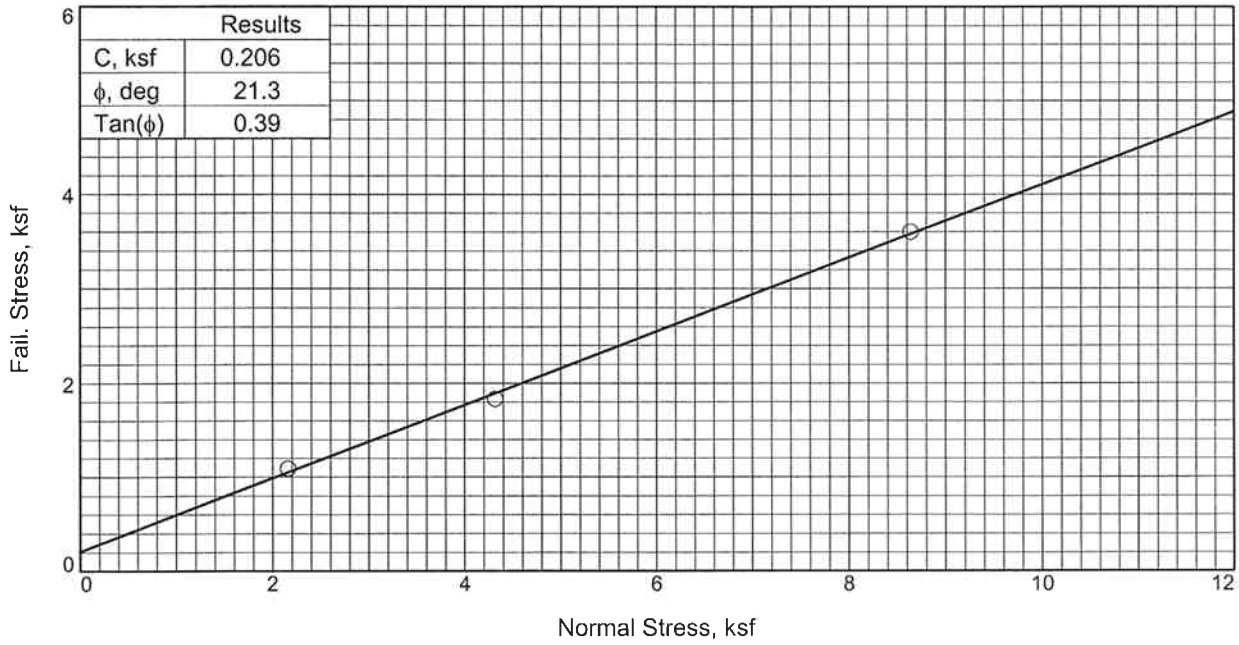
Tested By:	AM	Computed By:	KLA	Checked By:	KLA

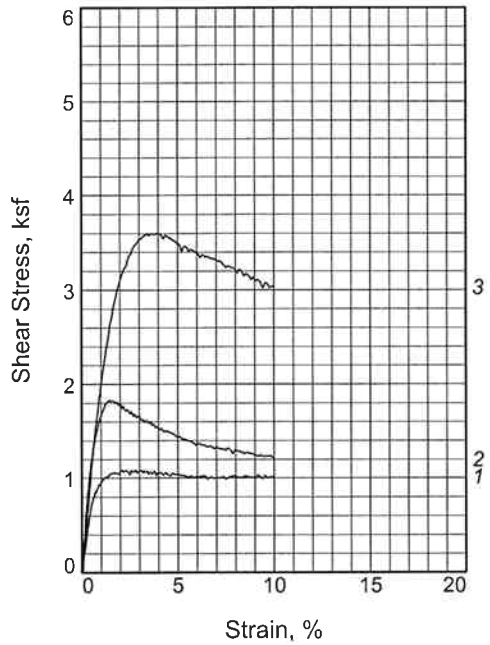
Atterberg Limits

Project:	Baker Pump Station	Project No.:	E08-1003	Date:	11/14/08

Boring No.	Sample No.	Depth, ft.	Tare ID	Wet + Tare, g	Dry + Tare, g	Tare, g	Number of Blows	Percent Moisture	Correction Factor	Liquid Limit	Tare ID	Wet + Tare, g	Dry + Tare, g	Tare, g	Plastic Limit	Plasticity Index
BB-10		5-6	38	37.272	30.507	15.259	21	44.36647	0.9791	43	47	24.606	23.315	15.468	16	27
		12-13	139	40.574	33.313	15.459	24	40.66876	0.9951	40	90	23.898	22.787	15.008	14	26
		17-19	134	39.750	31.720	15.258	20	48.77901	0.9734	47	137	24.644	23.398	15.435	16	31
BB-11	Wet	7-9						0	0	0					0	0
	Dry	7-9						0	0	0					0	0
		15-16						0	0	0					0	0
		20-21	101	42.835	35.492	15.311	30	36.38571	1.0223	37	104	24.875	23.624	15.421	15	22
		23.5-25						0	0	0					0	0
B-11A	**GeoTest**	7.5-8.5						0	0	0					0	0
		17.5-19	119	43.359	39.174	15.378	29	17.58699	1.0181	18	81	24.975	23.586	15.371	17	1

Tested By:	Computed By: KLA	Checked By: KLA





Specimen No:		1	2	3
Initial	Water Content, %	15.9	16.3	16.0
	Dry Density, pcf	109.4	109.4	106.6
	Saturation, %	78.8	81.1	74.0
	Void Ratio	0.5458	0.5459	0.5864
	Diameter, in.	2.50	2.50	2.50
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	19.8	19.7	19.7
	Dry Density, pcf	109.3	109.3	108.0
	Saturation, %	97.9	97.3	94.3
	Void Ratio	0.5477	0.5481	0.5665
	Diameter, in.	2.50	2.50	2.50
	Height, in.	1.01	1.00	0.99
Normal Stress, ksf		2.160	4.320	8.640
Fail. Stress, ksf		1.088	1.831	3.596
Strain, %		2.1	1.4	4.0
Ult. Stress, ksf				
Strain, %				
Strain at peak, %		2.1	1.4	4.0

Sample Type: Shelby Tube
Description: Gray Shale

LL= 55 **PL=** 21 **PI=** 34
Assumed Specific Gravity= 2.71
Remarks:

Figure 1

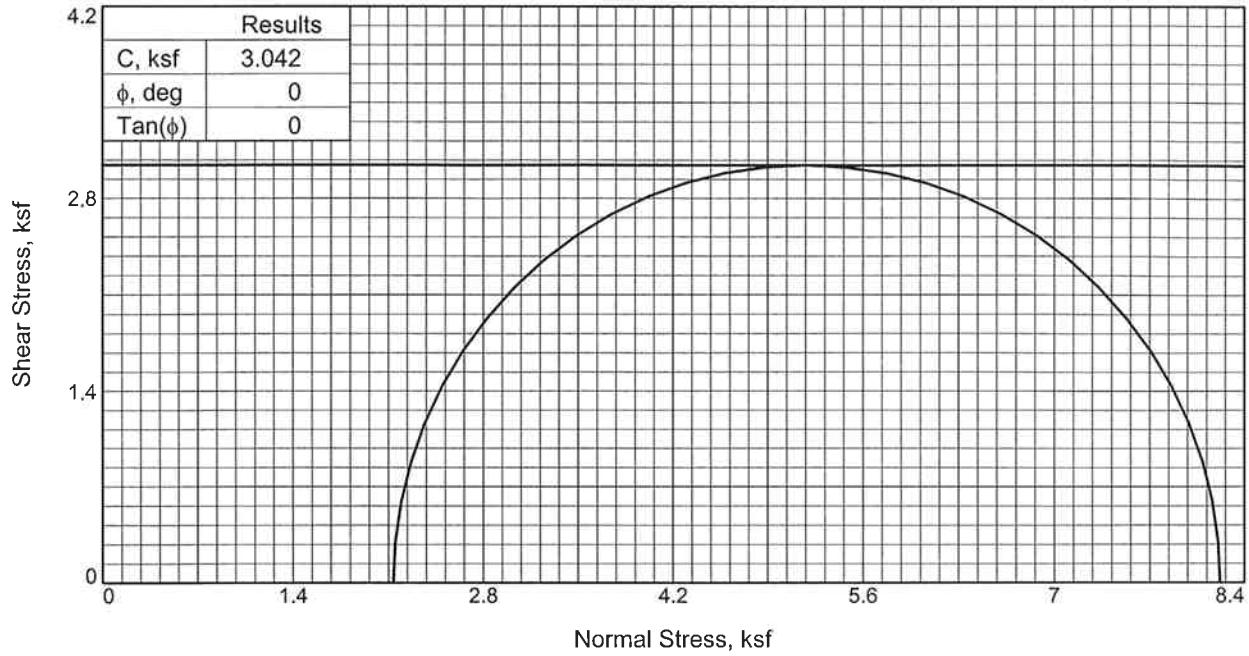
Client: Fugro

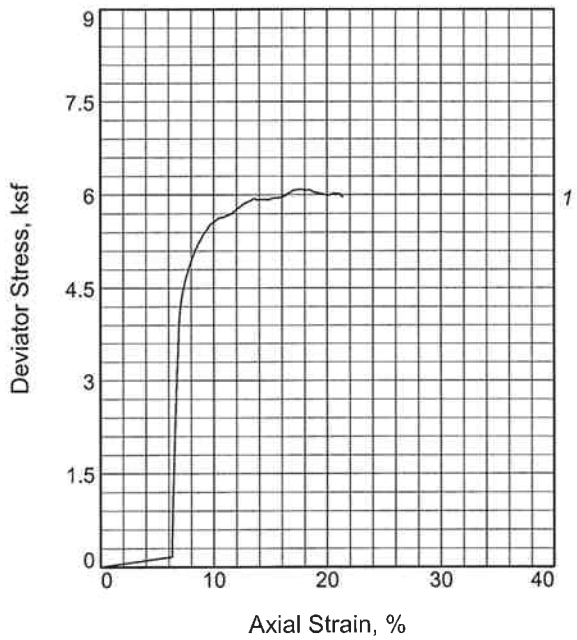
Project: Baker Pump Station

Location: BB-4
Depth: 22'-23'
Proj. No.: E08-1003 **Date Sampled:** 11/10/2008

DIRECT SHEAR TEST REPORT

Tested By: Ali Moghaddam **Checked By:** Ali Moghaddam





Specimen No:		1
Initial	Water Content, %	13.4
	Dry Density, pcf	115.5
	Saturation, %	77.7
	Void Ratio	0.4702
	Diameter, in.	2.77
	Height, in.	5.63
At Test	Water Content, %	13.4
	Dry Density, pcf	115.5
	Saturation, %	77.7
	Void Ratio	0.4702
	Diameter, in.	2.77
	Height, in.	5.63
Strain at peak, %		17.6
Back Pressure, psi		0.000
Cell Pressure, psi		14.852
Fail. Stress, ksf		6.084
Strain, %		17.6
Ult. Stress, ksf		
Strain, %		
σ_1 Failure, ksf		8.223
σ_3 Failure, ksf		2.139

Type of Test:
Unconsolidated Undrained

Sample Type: Shelby Tube

Description:

Assumed Specific Gravity= 2.72

Remarks: Testing performed per Fugro's specifications.

Client: HNTB

Project: Baker Pump Station

Location: BB-9

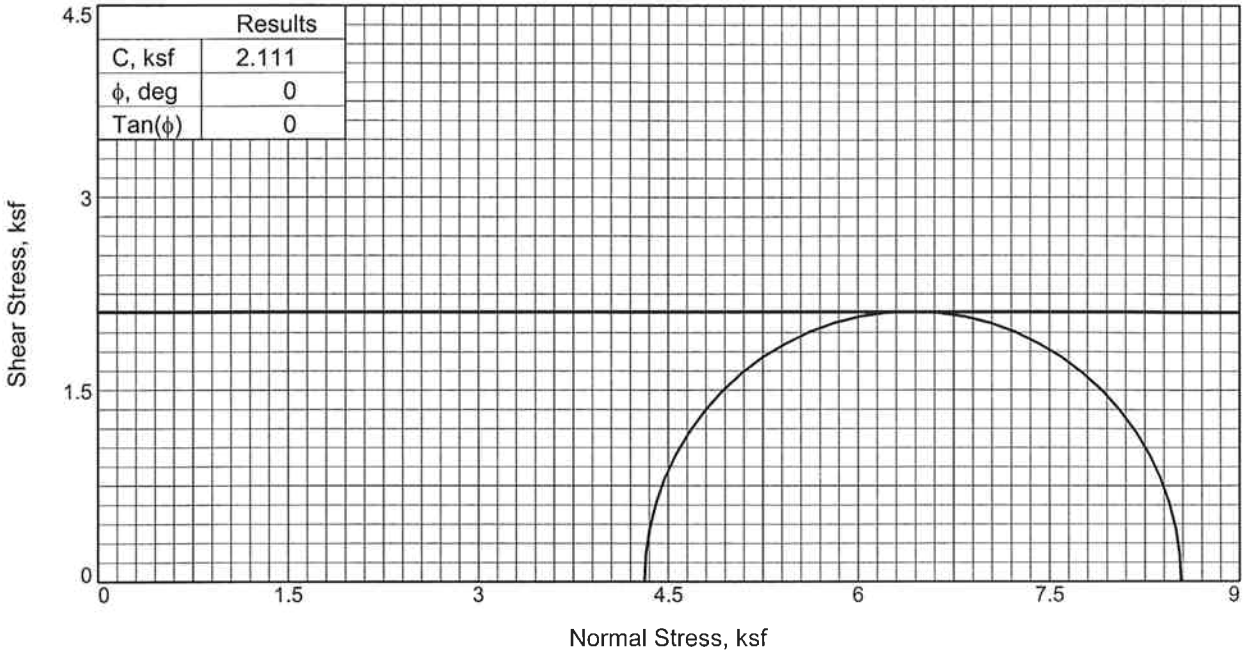
Depth: 10'-12'

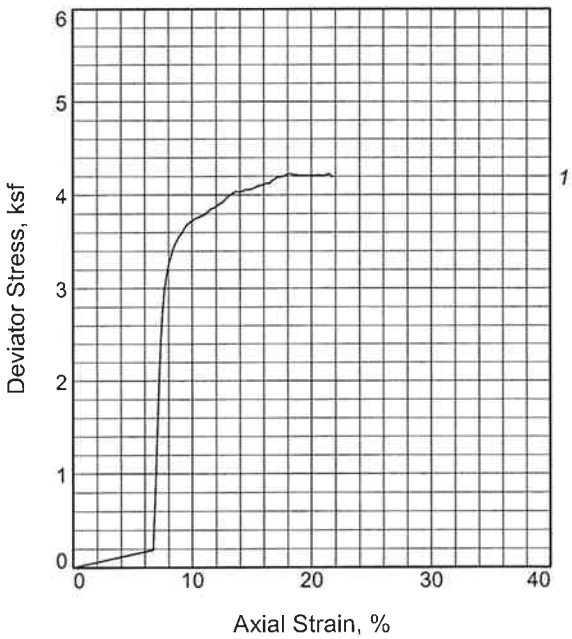
Proj. No.: E08-1003 **Date Sampled:**

TRIAXIAL SHEAR TEST REPORT

MAS-TEK Engineering & Associates, Inc.

Figure 1





Specimen No:		1
Initial	Water Content, %	19.3
	Dry Density, pcf	107.3
	Saturation, %	90.0
	Void Ratio	0.5828
	Diameter, in.	2.71
	Height, in.	5.59
At Test	Water Content, %	19.3
	Dry Density, pcf	107.3
	Saturation, %	90.0
	Void Ratio	0.5828
	Diameter, in.	2.71
	Height, in.	5.59
Strain at peak, %		18.2
Back Pressure, psi		0.000
Cell Pressure, psi		29.953
Fail. Stress, ksf		4.223
Strain, %		18.2
Ult. Stress, ksf		
Strain, %		
σ_1 Failure, ksf		8.536
σ_3 Failure, ksf		4.313

Type of Test:
Unconsolidated Undrained

Sample Type: Shelby Tube

Description:

Assumed Specific Gravity= 2.72

Remarks: Testing performed per Fugro's specifications.

Figure 1

Client: HNTB

Project: Baker Pump Station

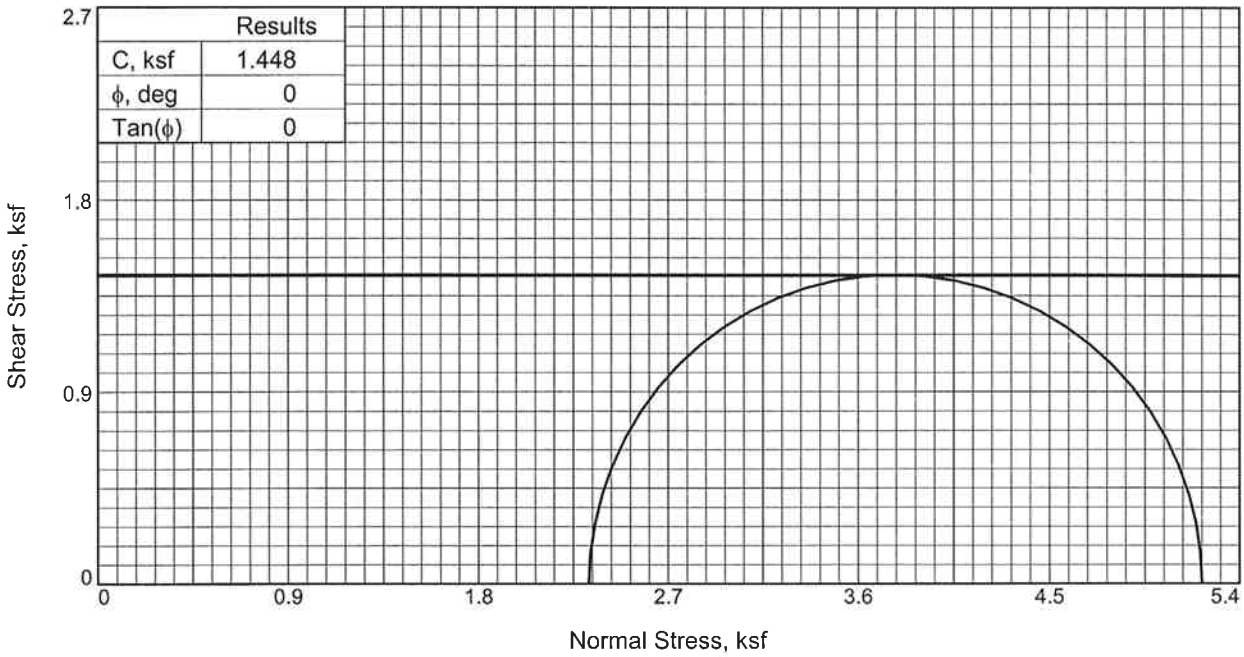
Location: BB-9

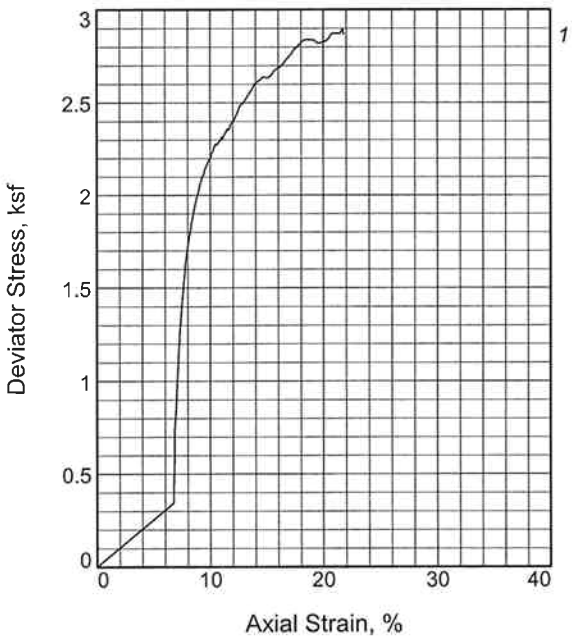
Depth: 22.5'-24.5'

Proj. No.: E08-1003 **Date Sampled:**

TRIAXIAL SHEAR TEST REPORT

MAS-TEK Engineering & Associates, Inc.





Specimen No:		1
Initial	Water Content, %	16.9
	Dry Density, pcf	112.4
	Saturation, %	90.0
	Void Ratio	0.5110
	Diameter, in.	2.71
	Height, in.	5.58
At Test	Water Content, %	16.9
	Dry Density, pcf	112.4
	Saturation, %	90.0
	Void Ratio	0.5110
	Diameter, in.	2.71
	Height, in.	5.58
Strain at peak, %		21.7
Back Pressure, psi		0.000
Cell Pressure, psi		16.149
Fail. Stress, ksf		2.896
Strain, %		21.7
Ult. Stress, ksf		
Strain, %		
σ_1 Failure, ksf		5.222
σ_3 Failure, ksf		2.325

Type of Test:
Unconsolidated Undrained

Sample Type: Shelby Tube

Description:

Assumed Specific Gravity= 2.72

Remarks: Testing performed per Fugro's specifications.

Figure 1

Client: HNTB

Project: Baker Pump Station

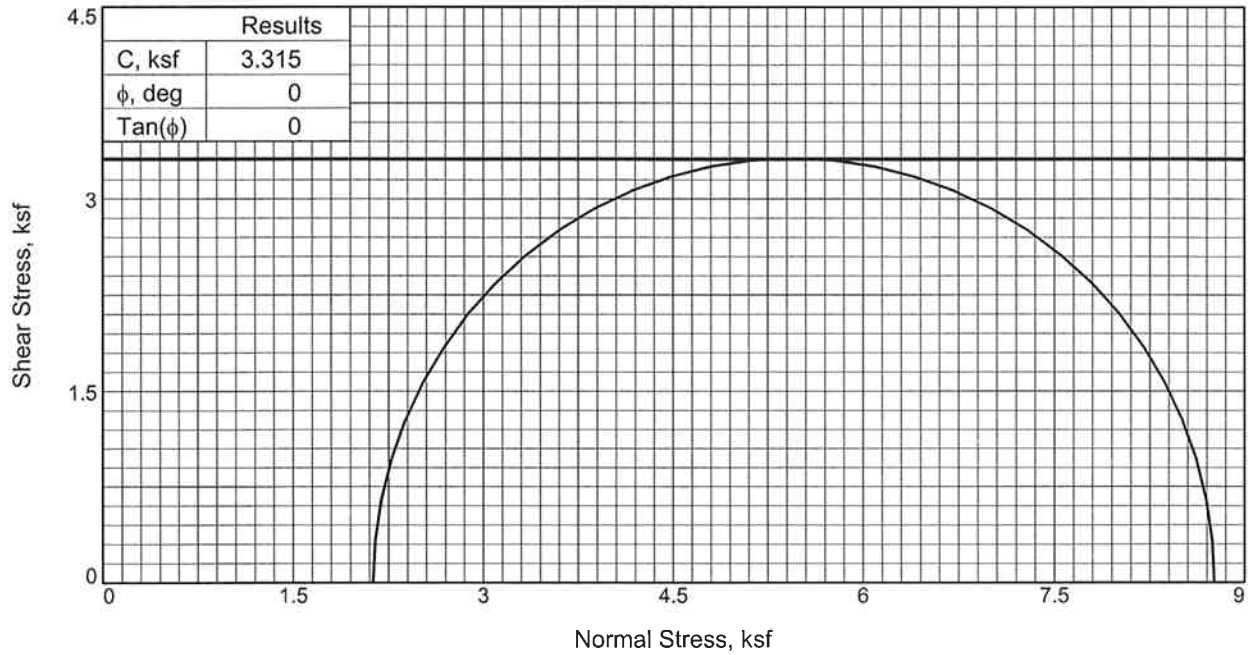
Location: BB-11

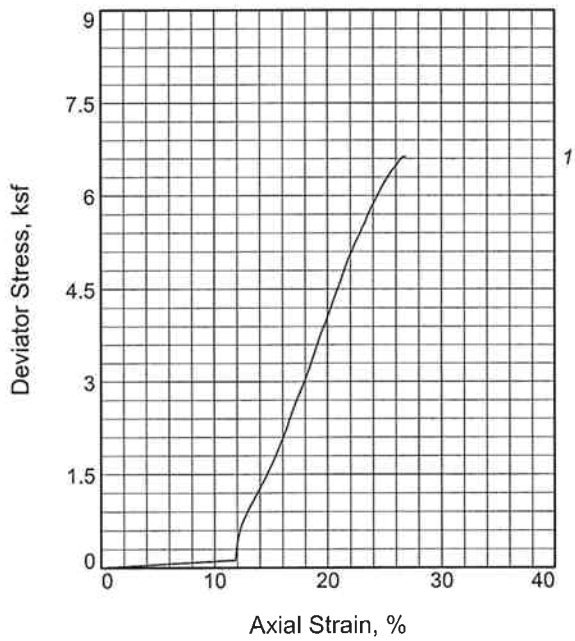
Depth: 7'-9'

Proj. No.: E08-1003 **Date Sampled:**

TRIAXIAL SHEAR TEST REPORT

MAS-TEK Engineering & Associates, Inc.





Specimen No:		1
Initial	Water Content, %	11.5
	Dry Density, pcf	116.3
	Saturation, %	67.8
	Void Ratio	0.4600
	Diameter, in.	2.74
	Height, in.	2.29
At Test	Water Content, %	11.5
	Dry Density, pcf	116.3
	Saturation, %	67.8
	Void Ratio	0.4600
	Diameter, in.	2.74
	Height, in.	2.29
Strain at peak, %		26.9
Back Pressure, psi		0.000
Cell Pressure, psi		14.797
Fail. Stress, ksf		6.631
Strain, %		26.9
Ult. Stress, ksf		
Strain, %		
σ_1 Failure, ksf		8.762
σ_3 Failure, ksf		2.131

Type of Test:
Unconsolidated Undrained

Sample Type: Shelby Tube

Description:

Assumed Specific Gravity= 2.72

Remarks: Testing performed per Fugro's specifications.

Client: HNTB

Project: Baker Pump Station

Location: BB-11A

Depth: 15'-17.5'

Proj. No.: E08-1003 **Date Sampled:**

TRIAXIAL SHEAR TEST REPORT

MAS-TEK Engineering & Associates, Inc.

Figure 1

ANACHEM INC.
8 Prestige Circle, Suite 104 Allen, Texas 75002
972-727-9003 • FAX # 972-727-9686 • 1-800-966-1186

ACCREDITED IN ACCORDANCE WITH nelac Certification No. T104704198

nelap Certification No. T104704198

Analytical Report

Thursday, November 20, 2008

William Cappell
Alliance Geotech. -MasTec
3228 Halifax St., Ste. A
Dallas, TX 75247

Tel: 972-444-8889
Fax: 972-444-8893

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NOV 24 2008

Re: E08-1003

Order No.: 0811095

Dear William Cappell:

Anachem, Inc. received 4 sample(s) on 11/13/2008 for the analyses presented in the following report.

Howard Hayden
Lab Director

5 Total Pages

Anachem, Inc. **Date:** *20-Nov-08*

CLIENT: Alliance Geotech. -MasTec
Project: E08-1003
Lab Order: 0811095

CASE NARRATIVE

On receipt, the temperature of this submission did not meet method preservation requirements.

Anachem, Inc.

nelap
Certification No. T104704198

Date: *20-Nov-08*

CLIENT: Alliance Geotech. -MasTec
Project: E08-1003

Lab Order: 0811095

Lab ID: 0811095-01 **Collection Date:** 11/12/2008
Client Sample ID: BB-7 0.5-1.0ft **Matrix:** SOLID
Location:

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
SOLUBLE SULFATE BY MODIFIED METHOD 9038				Batch: **R53154**		Analyst: **BB**
Sulfate	180	50	N	mg/Kg	1	11/20/2008

Lab ID: 0811095-02 **Collection Date:** 11/12/2008
Client Sample ID: BB-7 1.0-2.5ft **Matrix:** SOLID
Location:

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
SOLUBLE SULFATE BY MODIFIED METHOD 9038				Batch: **R53154**		Analyst: **BB**
Sulfate	180	50	N	mg/Kg	1	11/20/2008

Lab ID: 0811095-03 **Collection Date:** 11/12/2008
Client Sample ID: BB-7 2.5-4.0ft **Matrix:** SOLID
Location:

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
SOLUBLE SULFATE BY MODIFIED METHOD 9038				Batch: **R53154**		Analyst: **BB**
Sulfate	120	50	N	mg/Kg	1	11/20/2008

Lab ID: 0811095-04 **Collection Date:** 11/12/2008
Client Sample ID: BB-8 1.0-2.5ft **Matrix:** SOLID
Location:

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
SOLUBLE SULFATE BY MODIFIED METHOD 9038				Batch: **R53154**		Analyst: **BB**
Sulfate	97	50	N	mg/Kg	1	11/20/2008

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Estimated Value
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
N	Not Included on NELAC Scope of Accreditation	ND	Not Detected at the Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Anachem, Inc.

Date: *20-Nov-08*

CLIENT: Alliance Geotech. -MasTec
Work Order: 0811095
Project: E08-1003

nelap
Certification No. T104704198

ANALYTICAL QC SUMMARY REPORT

BatchID: R53154

Sample ID: **MB-R53154** SampType: **MBLK** Batch ID: **R53154** Units: **mg/Kg** Prep Date: RunNo: **53154**
Test Name: **Soluble Sulfate by Modified Method 9038** Analysis Date: **11/20/2008** SeqNo: **574728**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfate	ND	50									N

Sample ID: **LCS** SampType: **LCS** Batch ID: **R53154** Units: **mg/Kg** Prep Date: RunNo: **53154**
Test Name: **Soluble Sulfate by Modified Method 9038** Analysis Date: **11/20/2008** SeqNo: **574736**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfate	198.0	50	200	0	99	80	120	0	0		N

Sample ID: **LCSD** SampType: **LCSD** Batch ID: **R53154** Units: **mg/Kg** Prep Date: RunNo: **53154**
Test Name: **Soluble Sulfate by Modified Method 9038** Analysis Date: **11/20/2008** SeqNo: **574737**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfate	200.0	50	200	0	100	80	120	198	1.01	20	N

Sample ID: **0811095-02AMS** SampType: **MS** Batch ID: **R53154** Units: **mg/Kg** Prep Date: RunNo: **53154**
Test Name: **Soluble Sulfate by Modified Method 9038** Analysis Date: **11/20/2008** SeqNo: **574732**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfate	340.0	50	200	180	80	75	125	0	0		N

Sample ID: **0811095-02AMSD** SampType: **MSD** Batch ID: **R53154** Units: **mg/Kg** Prep Date: RunNo: **53154**
Test Name: **Soluble Sulfate by Modified Method 9038** Analysis Date: **11/20/2008** SeqNo: **574733**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfate	354.0	50	200	180	87	75	125	340	4.03	25	N

Qualifiers:

E	Estimated Value	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
N	Not Included on NELAC Scope of Accreditation	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike Recovery outside accepted recovery limits				

Anachem, Inc.

nelap
Certification No. 02093

Alliance Geotech. -MasTec

Thursday, November 20, 2008

Order No.: 0811095

Project E08-1003

Glossary

mg/Kg:	milligrams per kilogram (ppm)
mg/Kg-Dry:	milligrams per kilogram reported on a dry weight basis (ppm)
mg/L:	milligrams per liter (ppm)
ug/Kg:	micrograms per kilogram (ppb)
ug/Kg-Dry:	micrograms per kilogram reported on a dry weight basis (ppb)
ug/L:	micrograms per liter (ppb)
DF:	Dilution Factor
DUP:	Sample Duplicate
LCS1:	Continuing Calibration Verification
LCS/LCSD:	Laboratory Control Sample/Laboratory Control Sample Duplicate
Limit:	Reporting Limit
MBLK:	Method Blank
MQL:	Method Quantification Limit
MS/MSD:	Matrix Spike/Matrix Spike Duplicate:
ND:	Analyte NOT DETECTED at or above the Limit or SDL
PQL:	Practical Quantification Limit
RPD:	Relative Percent Difference
SDL:	Sample Detection Limit
Surr:	Surrogate
%:	Percent Recovery

GeoTesting Express, Inc.
Laboratory Results

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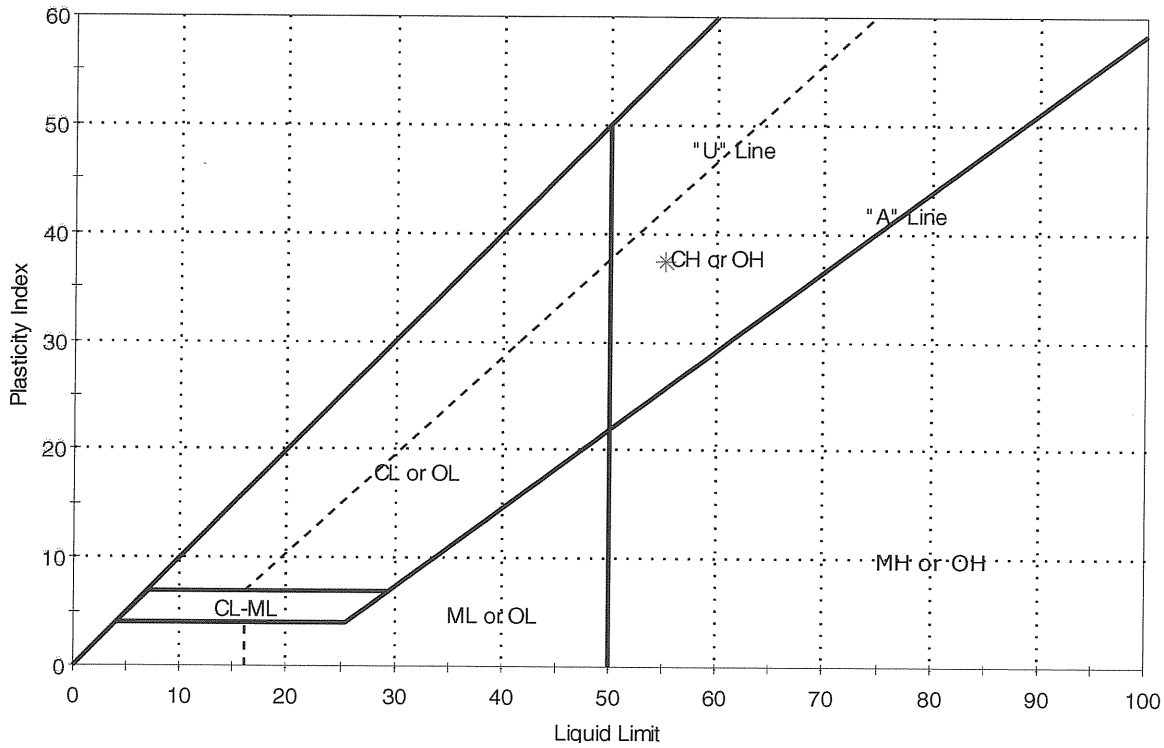
Client:	Mas-Tek Engineering & Assoc.		
Project:	Baker Pump Station		
Location:		Project No:	GTX-8704
Boring ID: BB-11A	Sample Type: ---	Tested By:	ap
Sample ID:ST-3	Test Date: 12/11/08	Checked By:	jdt
Depth : 7.5-8.5 ft	Test Id: 143010		
Test Comment:	---		
Sample Description:	Moist, dark olive brown clay		
Sample Comment:	---		

Atterberg Limits - ASTM D 4318-05



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
✳	ST-3	BB-11A	7.5-8.5 ft	22	55	18	37	0	

Sample Prepared using the WET method

Dry Strength: VERY HIGH
Dilentancy: SLOW
Toughness: LOW

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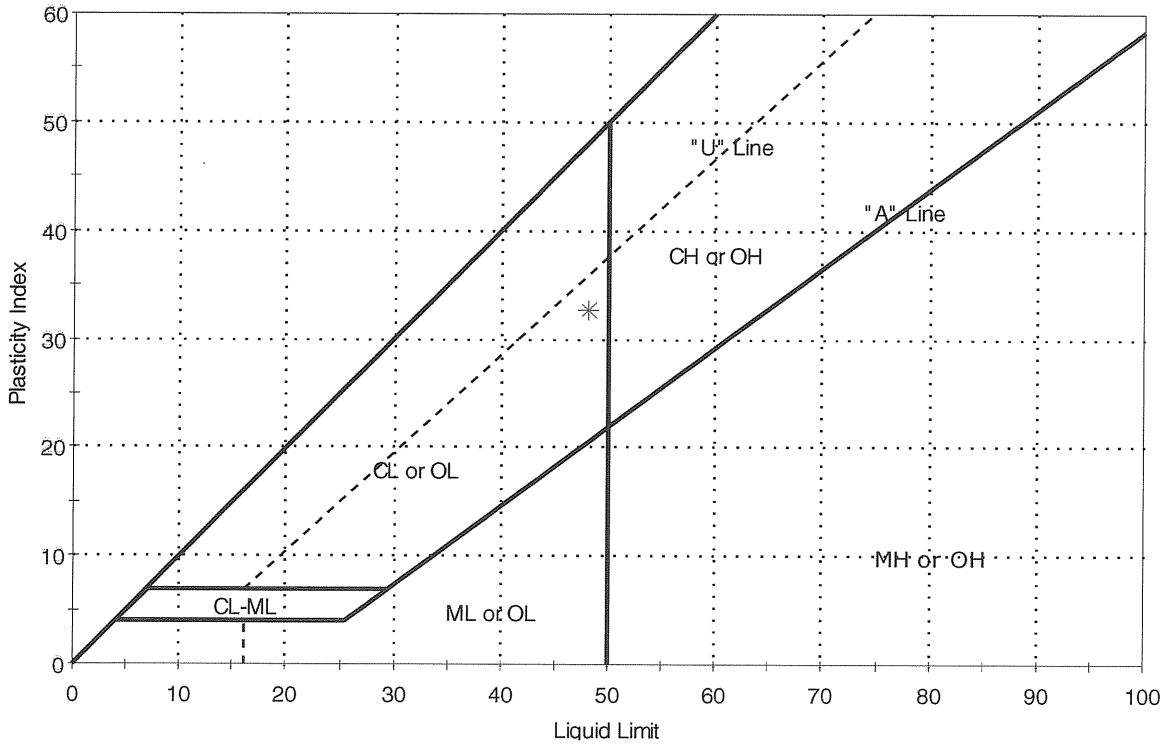
Client:	Mas-Tek Engineering & Assoc.		
Project:	Baker Pump Station		
Location:		Project No:	GTX-8704
Boring ID: BB-9	Sample Type: ---	Tested By:	ap
Sample ID:ST-16	Test Date: 12/08/08	Checked By:	jdt
Depth : 30.0-32.0 ft	Test Id: 143000		
Test Comment: ---			
Sample Description: Moist, very dark brown and brown clay			
Sample Comment: ---			

Atterberg Limits - ASTM D 4318-05



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
✳	ST-16	BB-9	30.0-32.0 ft	15	48	15	33	0	

Sample Prepared using the WET method

Dry Strength: VERY HIGH
Dilentancy: SLOW
Toughness: LOW

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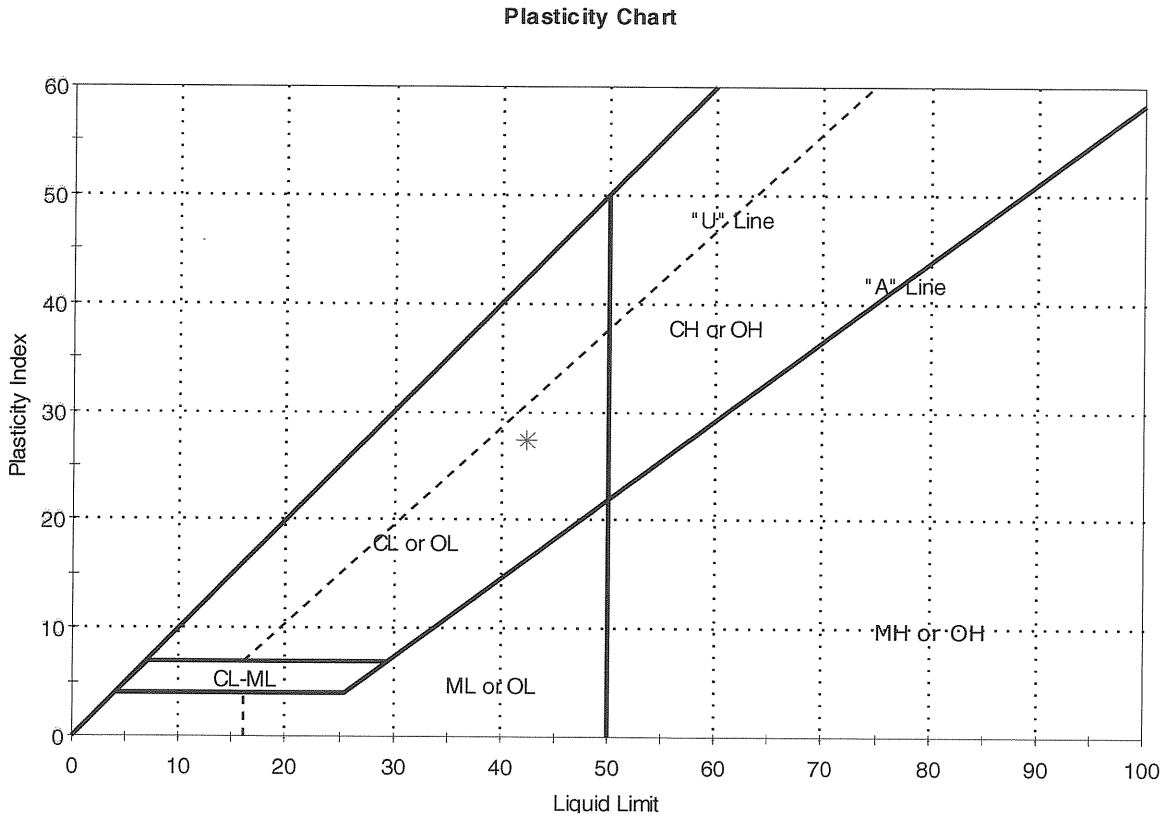
Client:	Mas-Tek Engineering & Assoc.		
Project:	Baker Pump Station		
Location:		Project No:	GTX-8704
Boring ID: BB-9	Sample Type: ---	Tested By:	ap
Sample ID:ST-12	Test Date: 12/11/08	Checked By:	jdt
Depth : 20.0-22.0 ft	Test Id: 142997		
Test Comment: ---			
Sample Description: Moist, dark olive brown clay			
Sample Comment: ---			

Atterberg Limits - ASTM D 4318-05



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
*	ST-12	BB-9	20.0-22.0 ft	18	42	15	27	0	

Sample Prepared using the WET method

Dry Strength: VERY HIGH
Dilentancy: SLOW
Toughness: LOW

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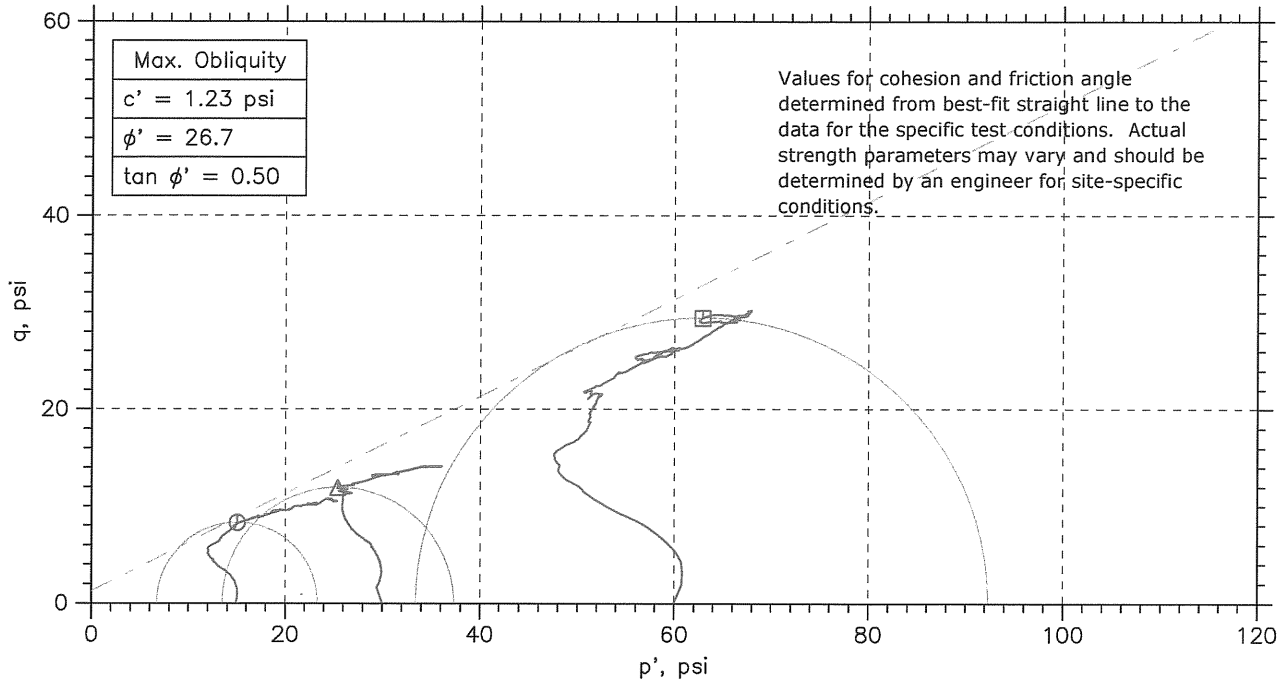
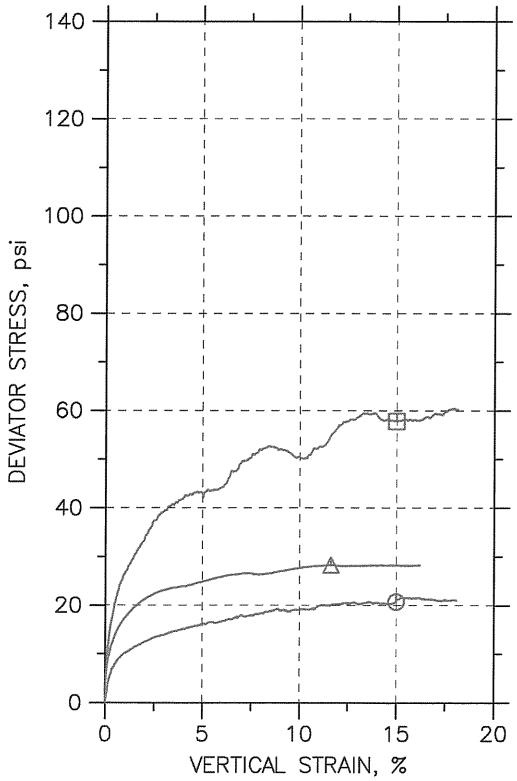
CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767





Symbol		⦶	△	⊡	
Sample No.		ST-9	ST-9	ST-9	
Test No.		CU-1-1	CU-1-2	CU-1-3	
Depth		12.5-14.5	12.5-14.5	12.5-14.5	
Initial	Diameter, in	2	2	2	
	Height, in	3.96	3.95	3.9	
	Water Content, %	15.9	16.3	15.5	
	Dry Density, pcf	112.	109.8	110.5	
	Saturation, %	84.8	82.4	79.8	
	Void Ratio	0.505	0.535	0.525	
Before Shear	Water Content, %	18.5	17.5	16.6	
	Dry Density, pcf	112.4	114.4	116.4	
	Saturation*, %	100.0	100.0	100.0	
	Void Ratio	0.5	0.474	0.448	
	Back Press., psi	124.	139.	121.	
Ver. Eff. Cons. Stress, psi		15.	30.	60.01	
Shear Strength, psi		10.37	14.16	28.91	
Strain at Failure, %		15	11.6	15	
Strain Rate, %/min		0.003	0.003	0.003	
B-Value		0.93	0.92	0.95	
Estimated Specific Gravity		2.7	2.7	2.7	
Liquid Limit		---	---	---	
Plastic Limit		---	---	---	

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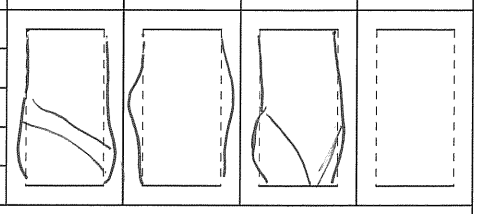
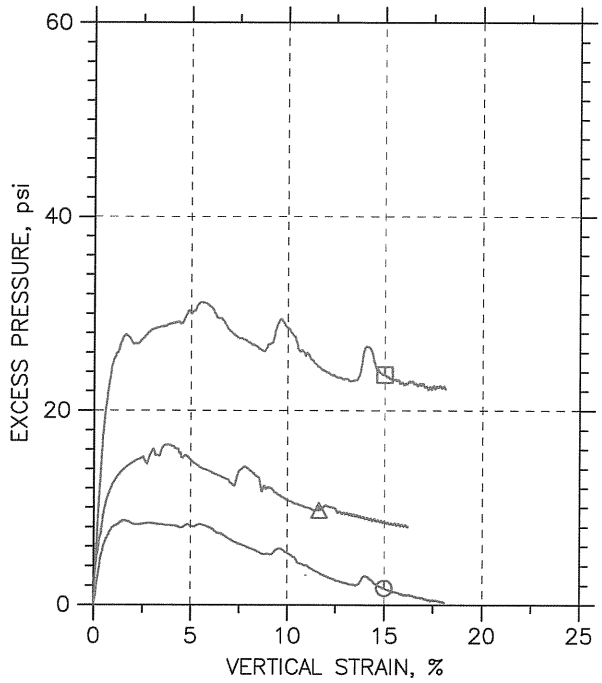
Project: Baker Pump Station
Location: ---
Project No.: GTX-8704
Boring No.: BB-9
Sample Type: core
Description: Moist, dark olive brown clay
Remarks: System R

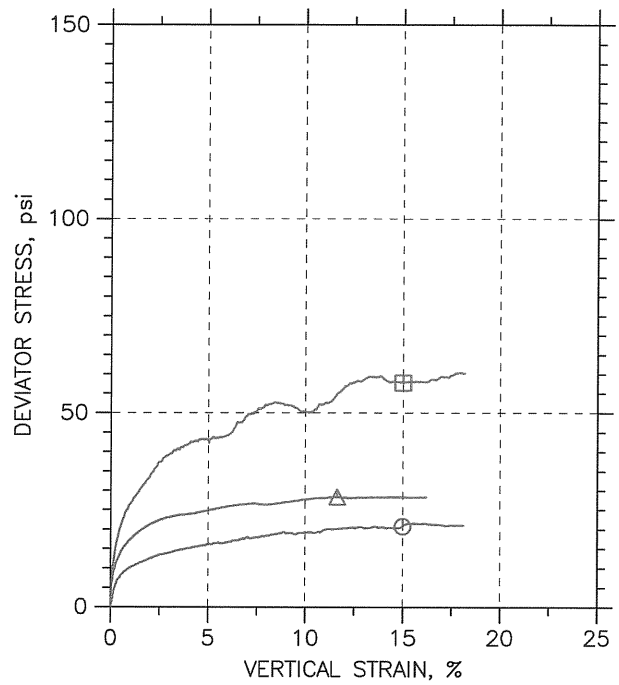


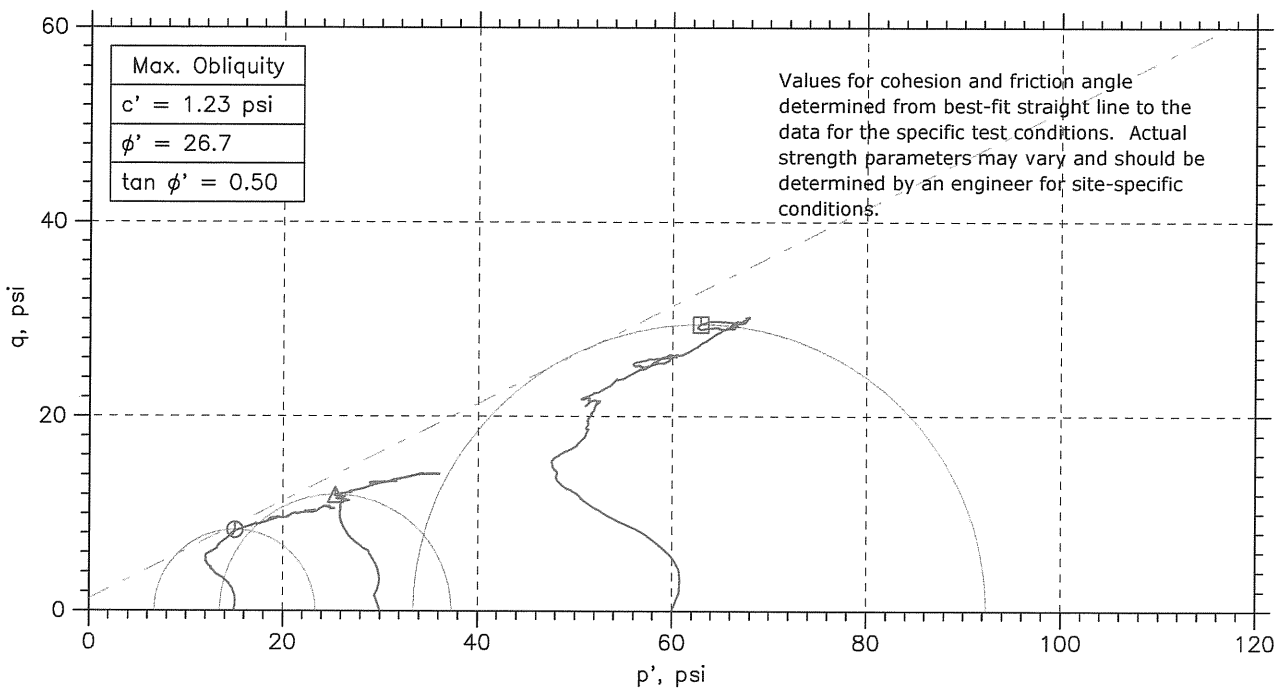
Mon, 08-DEC-2008 13:19:04

Phase calculations based on start and end of test.
* Saturation is set to 100% for phase calculations.

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767







	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
⦶	ST-9	CU-1-1	12.5-14.5	md	12/01/08	jdt		8704-CU-1-1n.dat
△	ST-9	CU-1-2	12.5-14.5	md	12/01/08	jdt		8704-CU-1-2n.dat
⊡	ST-9	CU-1-3	12.5-14.5	md	12/01/08	jdt		8704-CU-1-3n.dat

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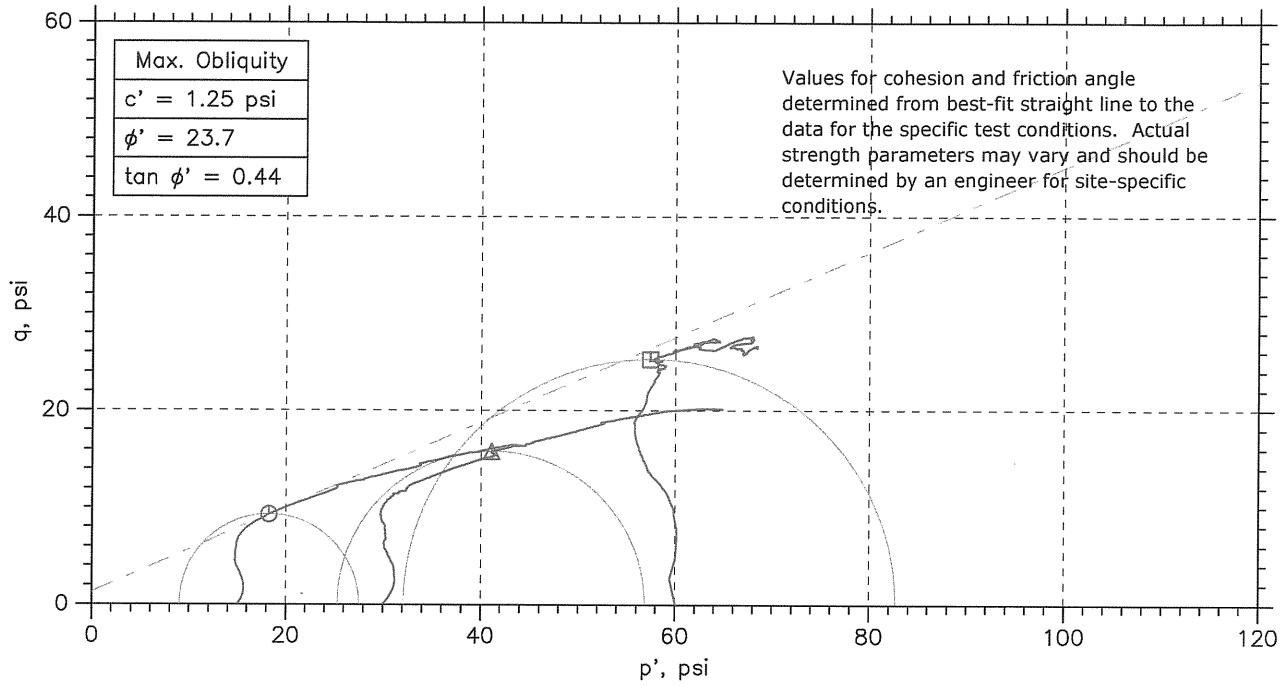
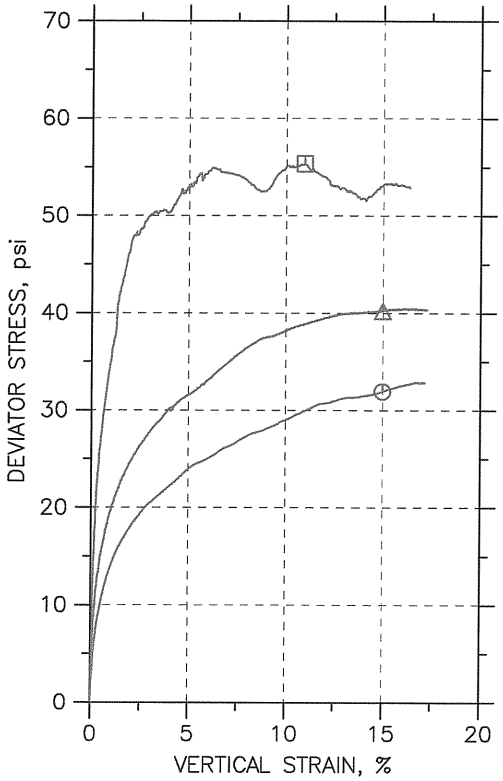
Project: Baker Pump Station	Location: ---	Project No.: GTX-8704
Boring No.: BB-9	Sample Type: core	
Description: Moist, dark olive brown clay		
Remarks: System R		

Mon, 08-DEC-2008 13:19:16

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767





Symbol		⦶	△	⊡	
Sample No.		ST-16	ST-16	ST-16	
Test No.		CU-2-1	CU-2-2	CU-2-3	
Depth		30-32	30-32	30-32	
Initial	Diameter, in	2.01	2	2	
	Height, in	4.05	3.98	3.97	
	Water Content, %	14.5	15.4	12.0	
	Dry Density, pcf	117.6	111.5	116.3	
	Saturation, %	90.4	81.2	72.0	
	Void Ratio	0.434	0.512	0.449	
Before Shear	Water Content, %	16.6	17.1	18.9	
	Dry Density, pcf	116.4	115.3	111.6	
	Saturation*, %	100.0	100.0	100.0	
	Void Ratio	0.448	0.462	0.511	
	Back Press., psi	147.5	127.	118.	
Ver. Eff. Cons. Stress, psi		15.	29.99	59.96	
Shear Strength, psi		15.97	20.11	27.67	
Strain at Failure, %		15	15	10.9	
Strain Rate, %/min		0.003	0.003	0.003	
B-Value		0.84	0.88	0.90	
Estimated Specific Gravity		2.7	2.7	2.7	
Liquid Limit		48	48	48	
Plastic Limit		15	15	15	

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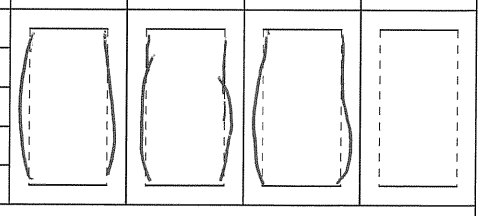
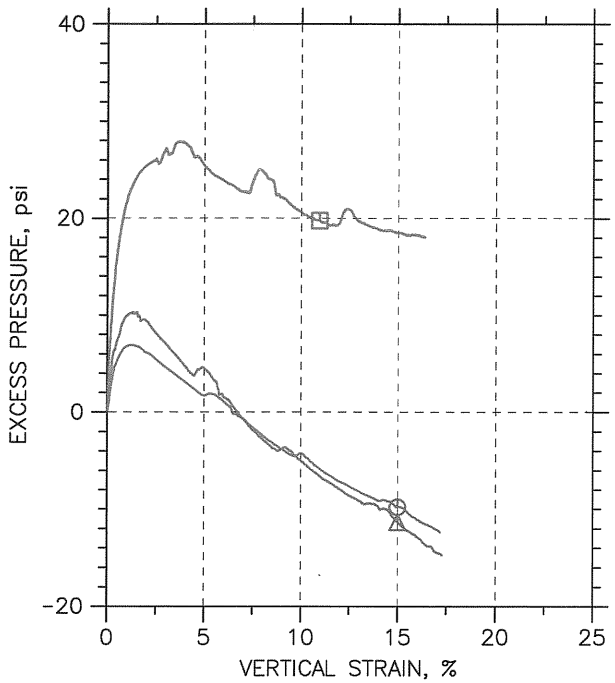
Project: Baker Pump Station
Location: ---
Project No.: GTX-8704
Boring No.: BB-9
Sample Type: core
Description: Moist, very dark brown and brown clay
Remarks: System D

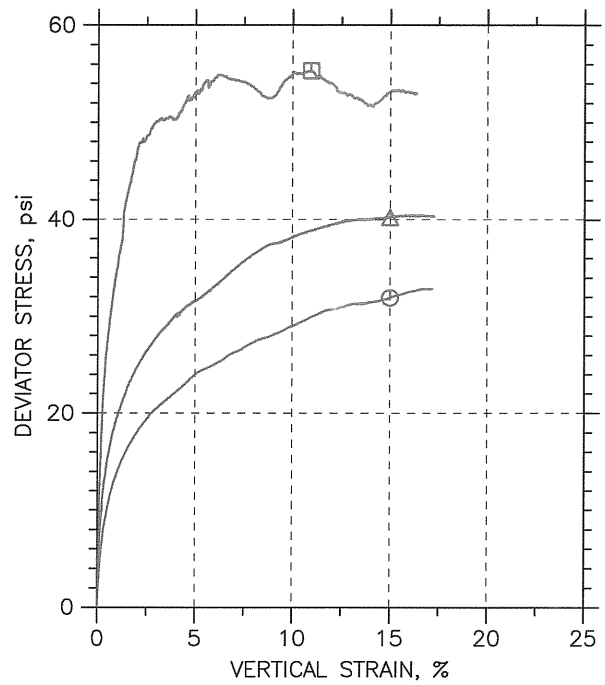


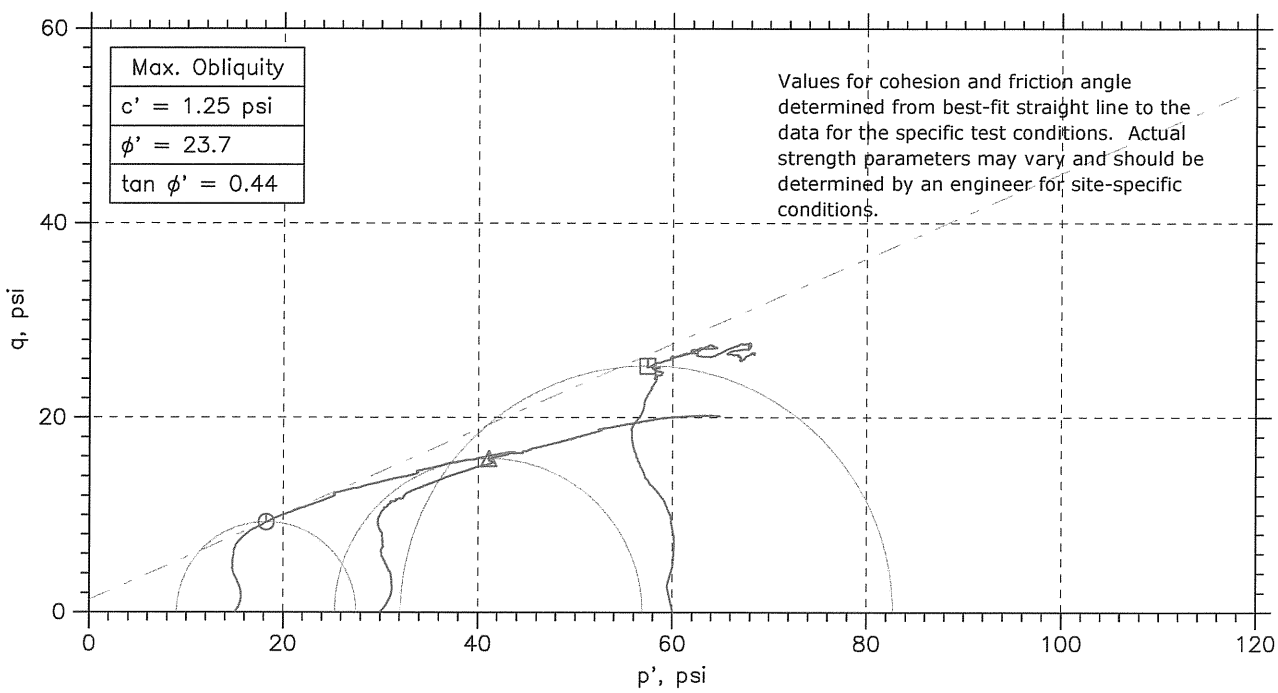
Tue, 09-DEC-2008 08:44:57

Phase calculations based on start and end of test.
* Saturation is set to 100% for phase calculations.

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767







	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
⊙	ST-16	CU-2-1	30-32	md	12/02/08	jdt		8704-CU-2-1n.dat
△	ST-16	CU-2-2	30-32	md	12/02/08	jdt		8704-CU-2-2n.dat
⊡	ST-16	CU-2-3	30-32	md	12/01/08	jdt		8704-CU-2-3n.dat

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Project: Baker Pump Station	Location: ---	Project No.: GTX-8704
Boring No.: BB-9	Sample Type: core	
Description: Moist, very dark brown and brown clay		
Remarks: System D		

Tue, 09-DEC-2008 08:45:08

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Client:	Mas-Tek Engineering & Assoc.		
Project:	Baker Pump Station		
Location:		Project No:	GTX-8704
Boring ID: ---	Sample Type: ---	Tested By:	ap
Sample ID:---	Test Date: 12/23/08	Checked By:	n/a
Depth : ---	Sample Id: ---		

Moisture Content of Soil - ASTM D 2216-05

Boring ID	Sample ID	Depth	Description	Moisture Content,%
BB-9	ST-9	12.5-14.5 ft	Moist, dark olive brown clay	16.4
BB-9	ST-11	17.5-19.5 ft	Moist, dark olive brown clay	16.1
BB-9	ST-12	20.0-22.0 ft	Moist, dark olive brown clay	18.1
BB-9	ST-16	30.0-32.0 ft	Moist, very dark brown and brown clay	15
BB-9	ST-17	32.5-34.5 ft	Moist, olive brown silt	18.7

Notes: Temperature of Drying : 110º Celsius

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Client:	Mas-Tek Engineering & Assoc.		
Project:	Baker Pump Station		
Location:		Project No:	GTX-8704
Boring ID: ---	Sample Type: ---	Tested By:	ap
Sample ID:---	Test Date: 12/23/08	Checked By:	n/a
Depth : ---	Sample Id: ---		

Moisture Content of Soil - ASTM D 2216-05

Boring ID	Sample ID	Depth	Description	Moisture Content,%
BB-11A	ST-3	7.5-8.5 ft	Moist, dark olive brown clay	21.5
BB-11A	ST-4	10.0-11.0 ft	Moist, olive brown clay	14.9
BB-11	ST-11	22.5-23.5 ft	Moist, very dark grayish brown sandy clay	25.4
BB-11	ST-12	25.0-26.0 ft	Moist, dark olive brown silt	26.1
BB-11	ST-13	27.5-28.5 ft	Moist, dark olive brown clay	22.7

Notes: Temperature of Drying : 110° Celsius

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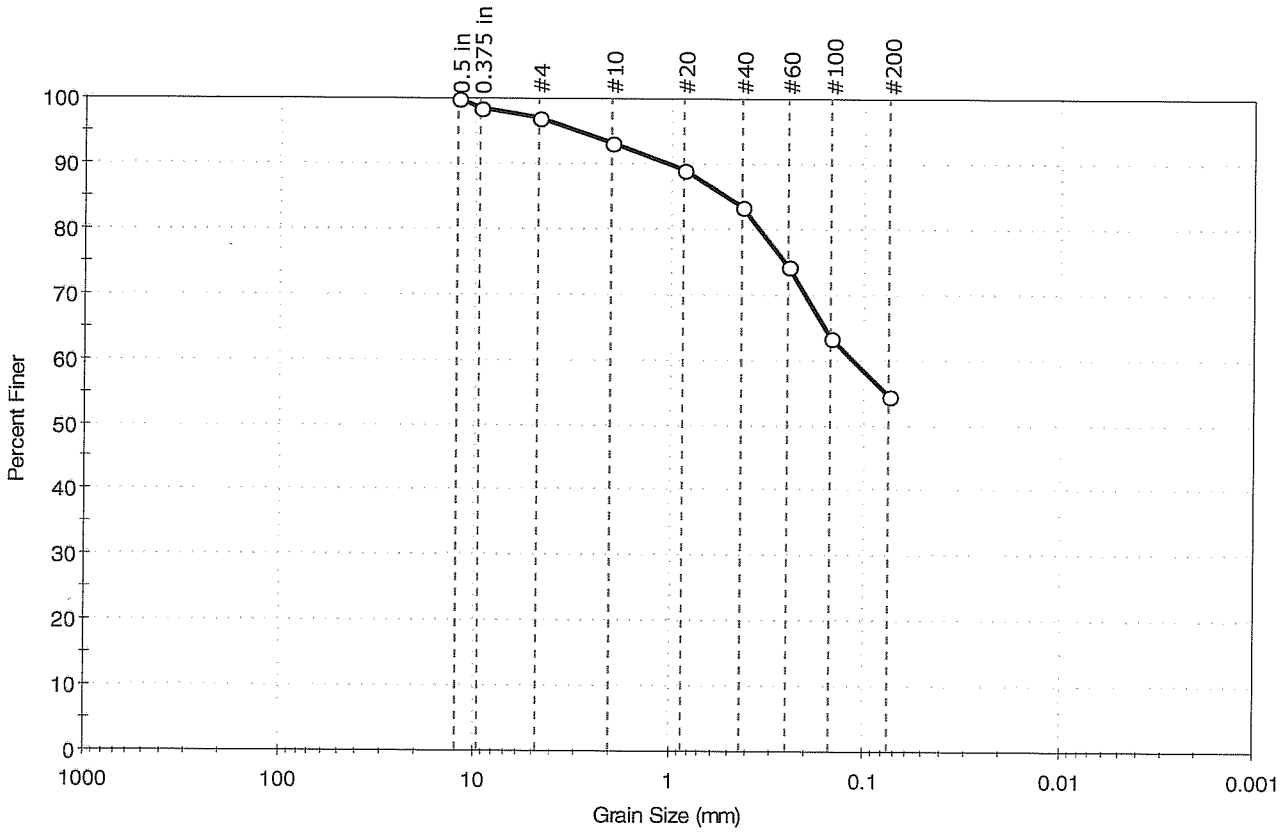
Client:	Mas-Tek Engineering & Assoc.		
Project:	Baker Pump Station		
Location:		Project No:	GTX-8704
Boring ID: BB-11	Sample Type: ---	Tested By:	ap
Sample ID:ST-11	Test Date: 12/17/08	Checked By:	jdt
Depth : 22.5-23.5 ft	Test Id: 143006		
Test Comment: ---			
Sample Description: Moist, very dark grayish brown sandy clay			
Sample Comment: ---			

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	2.9	42.5	54.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.5 in	12.50	100		
0.375 in	9.50	98		
#4	4.75	97		
#10	2.00	93		
#20	0.85	89		
#40	0.42	84		
#60	0.25	74		
#100	0.15	63		
#200	0.075	55		

Coefficients

D_{85} = 0.5073 mm	D_{30} = N/A
D_{60} = 0.1145 mm	D_{15} = N/A
D_{50} = N/A	D_{10} = N/A
C_u = N/A	C_c = N/A

Classification

ASTM Sandy lean clay (CL)

AASHTO Clayey Soils (A-7-6 (12))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

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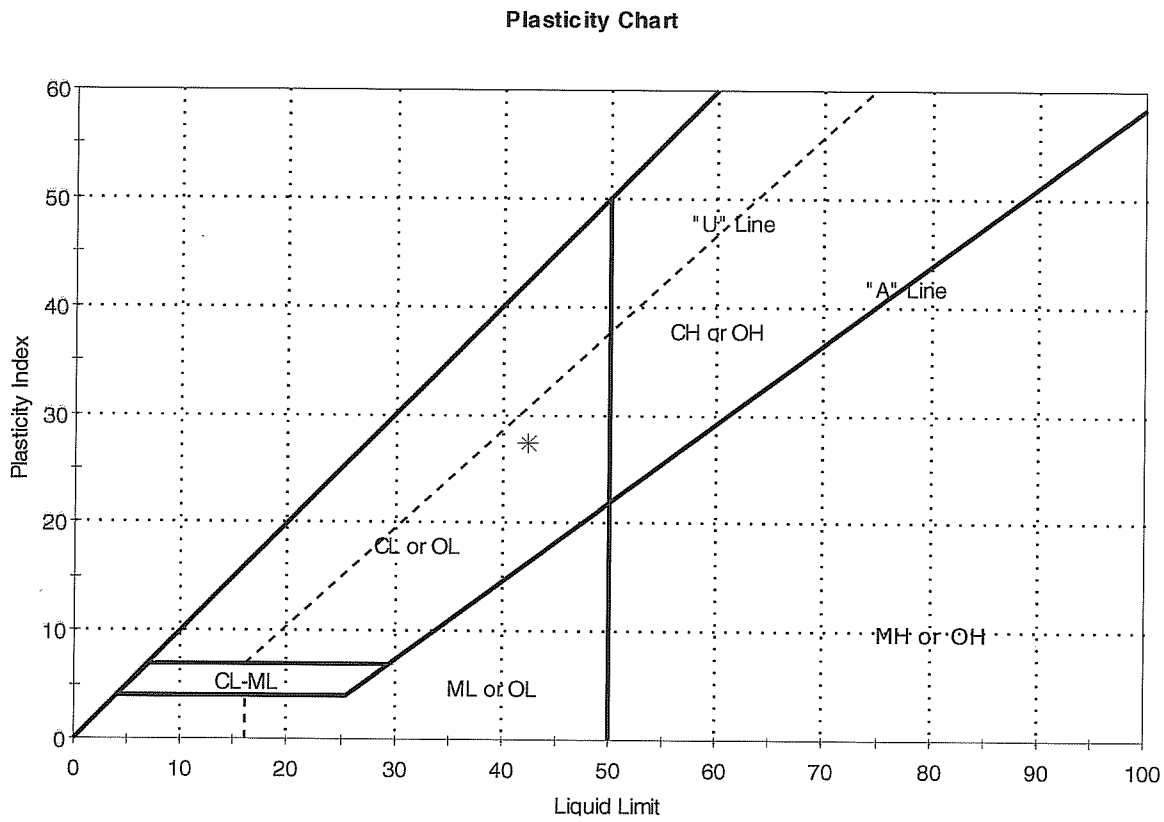
Client:	Mas-Tek Engineering & Assoc.		
Project:	Baker Pump Station		
Location:		Project No:	GTX-8704
Boring ID: BB-9	Sample Type: ---	Tested By:	ap
Sample ID:ST-12	Test Date: 12/11/08	Checked By:	jdt
Depth : 20.0-22.0 ft	Test Id: 142997		
Test Comment: ---			
Sample Description: Moist, dark olive brown clay			
Sample Comment: ---			

Atterberg Limits - ASTM D 4318-05



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
✳	ST-12	BB-9	20.0-22.0 ft	18	42	15	27	0	

Sample Prepared using the WET method

Dry Strength: VERY HIGH
Dilentancy: SLOW
Toughness: LOW

printed 12/16/2008 11:38:36 AM

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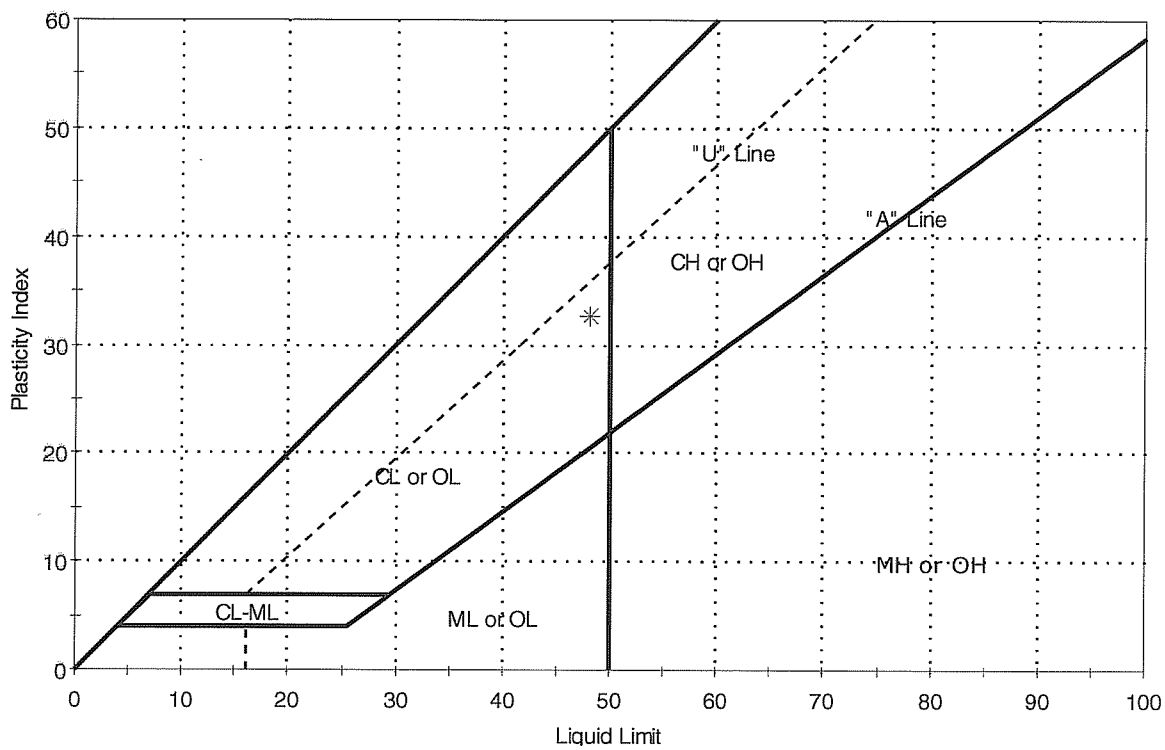
Client:	Mas-Tek Engineering & Assoc.		
Project:	Baker Pump Station		
Location:		Project No:	GTX-8704
Boring ID: BB-9	Sample Type: ---	Tested By:	ap
Sample ID:ST-16	Test Date: 12/08/08	Checked By:	jdt
Depth : 30.0-32.0 ft	Test Id: 143000		
Test Comment: ---			
Sample Description: Moist, very dark brown and brown clay			
Sample Comment: ---			

Atterberg Limits - ASTM D 4318-05



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
*	ST-16	BB-9	30.0-32.0 ft	15	48	15	33	0	

Sample Prepared using the WET method

Dry Strength: VERY HIGH
Dilentancy: SLOW
Toughness: LOW

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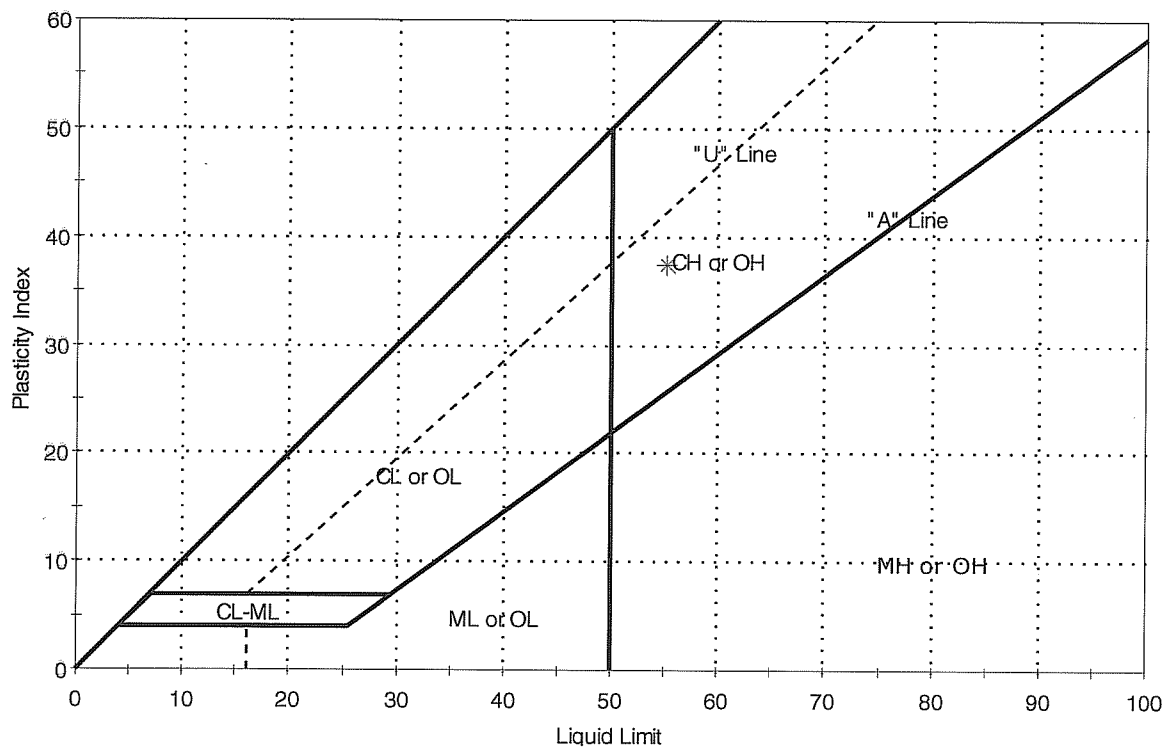
Client:	Mas-Tek Engineering & Assoc.		
Project:	Baker Pump Station		
Location:		Project No:	GTX-8704
Boring ID: BB-11A	Sample Type: ---	Tested By:	ap
Sample ID:ST-3	Test Date: 12/11/08	Checked By:	jdt
Depth : 7.5-8.5 ft	Test Id: 143010		
Test Comment:	---		
Sample Description:	Moist, dark olive brown clay		
Sample Comment:	---		

Atterberg Limits - ASTM D 4318-05



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
*	ST-3	BB-11A	7.5-8.5 ft	22	55	18	37	0	

Sample Prepared using the WET method

Dry Strength: VERY HIGH
Dilentancy: SLOW
Toughness: LOW

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GeoTesting express
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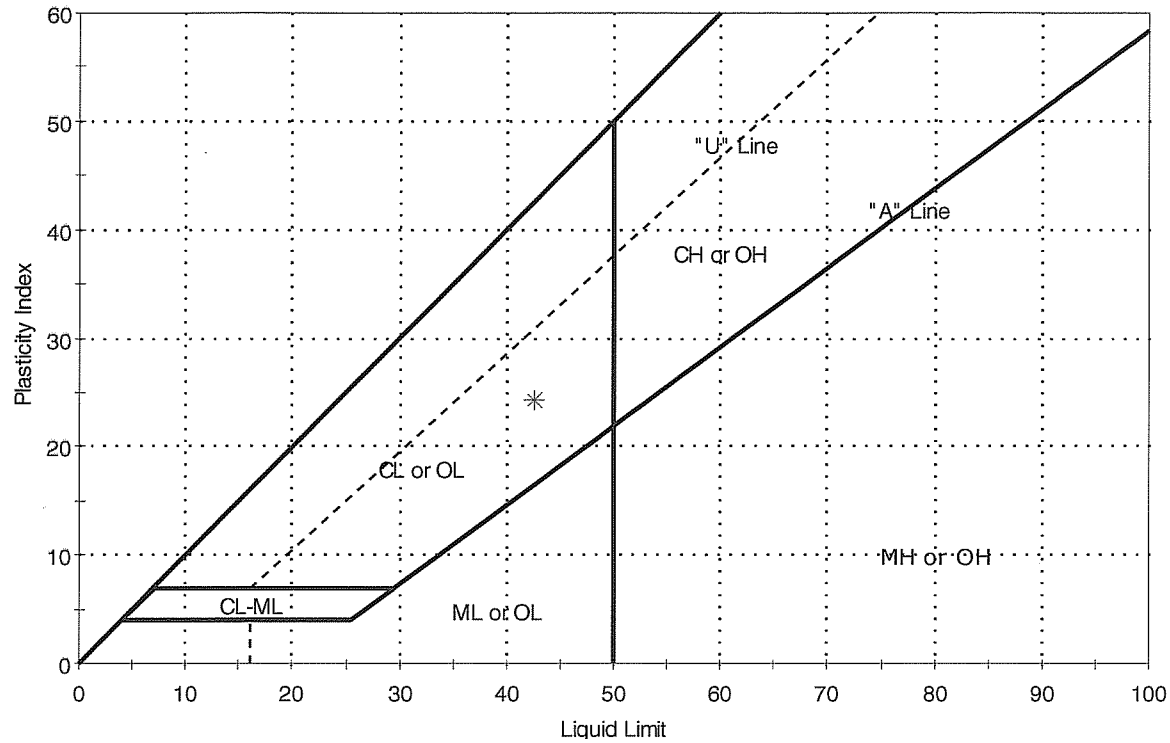
Client:	Mas-Tek Engineering & Assoc.		
Project:	Baker Pump Station		
Location:		Project No:	GTX-8704
Boring ID: BB-11	Sample Type: ---	Tested By:	ap
Sample ID:ST-11	Test Date: 12/16/08	Checked By:	jdt
Depth : 22.5-23.5 ft	Test Id: 143007		
Test Comment:	---		
Sample Description:	Moist, very dark grayish brown sandy clay		
Sample Comment:	---		

Atterberg Limits - ASTM D 4318-05



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
*	ST-11	BB-11	22.5-23.5 ft	25	43	18	25	0	Sandy lean clay (CL)

Sample Prepared using the WET method
16% Retained on #40 Sieve
Dry Strength: VERY HIGH
Dilentancy: SLOW
Toughness: LOW

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GeoTesting express
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Client:	Mas-Tek Engineering & Assoc.				
Project:	Baker Pump Station				
Location:				Project No:	GTX-8704
Boring ID:	BB-9	Sample Type:	---	Tested By:	md
Sample ID:	ST-9	Test Date:	12/23/08	Checked By:	jdt
Depth :	12.5-14.5 ft	Test Id:	142993		
Test Comment:	---				
Sample Description:	Moist, dark olive brown clay				
Sample Comment:	---				

Density of Soil In Place by the Drive Cylinder Method - ASTM D 2937-04

Boring ID	Sample ID	Depth	Visual Description	Sample Diameter, in	Sample Height, in	Bulk Density, pcf	Moisture Content, %	Dry Density, pcf
BB-9	ST-9	12.5-14.5 ft	Moist, dark olive brown clay	2.00	3.96	130	15.9	112

Notes: Density determined on undisturbed samples provided to GeoTesting Express.
Moisture Content determined by ASTM D 2216.

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Client:	Mas-Tek Engineering & Assoc.		
Project:	Baker Pump Station		
Location:		Project No:	GTX-8704
Boring ID: BB-9	Sample Type: ---	Tested By:	md
Sample ID:ST-11	Test Date: 12/23/08	Checked By:	jdt
Depth : 17.5-19.5 ft	Test Id: 142995		
Test Comment: ---			
Sample Description: Moist, dark olive brown clay			
Sample Comment: ---			

Density of Soil In Place by the Drive Cylinder Method - ASTM D 2937-04

Boring ID	Sample ID	Depth	Visual Description	Sample Diameter, in	Sample Height, in	Bulk Density, pcf	Moisture Content, %	Dry Density, pcf
BB-9	ST-11	17.5-19.5 ft	Moist, dark olive brown clay	2.57	2.32	132	16.1	114

Notes: Density determined on undisturbed samples provided to GeoTesting Express.
Moisture Content determined by ASTM D 2216.

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Client:	Mas-Tek Engineering & Assoc.		
Project:	Baker Pump Station		
Location:		Project No:	GTX-8704
Boring ID: BB-9	Sample Type: ---	Tested By:	md
Sample ID:ST-12	Test Date: 12/15/08	Checked By:	jdt
Depth : 20.0-22.0 ft	Test Id: 142996		
Test Comment: ---			
Sample Description: Moist, dark olive brown clay			
Sample Comment: ---			

Density of Soil In Place by the Drive Cylinder Method - ASTM D 2937-04

Boring ID	Sample ID	Depth	Visual Description	Sample Diameter, in	Sample Height, in	Bulk Density, pcf	Moisture Content, %	Dry Density, pcf
BB-9	ST-12	20.0-22.0 ft	Moist, dark olive brown clay	2.01	4.05	132	20	110

Notes: Density determined on undisturbed samples provided to GeoTesting Express.
Moisture Content determined by ASTM D 2216.

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Client:	Mas-Tek Engineering & Assoc.		
Project:	Baker Pump Station		
Location:		Project No:	GTX-8704
Boring ID: BB-9	Sample Type: ---	Tested By:	md
Sample ID:ST-16	Test Date: 12/23/08	Checked By:	jdt
Depth : 30.0-32.0 ft	Test Id: 142999		
Test Comment: ---			
Sample Description: Moist, very dark brown and brown clay			
Sample Comment: ---			

Density of Soil In Place by the Drive Cylinder Method - ASTM D 2937-04

Boring ID	Sample ID	Depth	Visual Description	Sample Diameter, in	Sample Height, in	Bulk Density, pcf	Moisture Content, %	Dry Density, pcf
BB-9	ST-16	30.0-32.0 ft	Moist, very dark brown and brown clay	2.01	4.05	138	15.2	119

Notes: Density determined on undisturbed samples provided to GeoTesting Express.
Moisture Content determined by ASTM D 2216.

GeoTesting express
a subsidiary of Geocomp Corporation

Client:	Mas-Tek Engineering & Assoc.		
Project:	Baker Pump Station		
Location:		Project No:	GTX-8704
Boring ID: BB-11A	Sample Type: ---	Tested By:	md
Sample ID:ST-3	Test Date: 12/23/08	Checked By:	jdt
Depth : 7.5-8.5 ft	Test Id: 143009		
Test Comment: ---			
Sample Description: Moist, dark olive brown clay			
Sample Comment: ---			

Density of Soil In Place by the Drive Cylinder Method - ASTM D 2937-04

Boring ID	Sample ID	Depth	Visual Description	Sample Diameter, in	Sample Height, in	Bulk Density, pcf	Moisture Content, %	Dry Density, pcf
BB-11A	ST-3	7.5-8.5 ft	Moist, dark olive brown clay	2.00	4.12	129	19.2	108

Notes: Density determined on undisturbed samples provided to GeoTesting Express.
Moisture Content determined by ASTM D 2216.

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Client:	Mas-Tek Engineering & Assoc.				
Project:	Baker Pump Station				
Location:				Project No:	GTX-8704
Boring ID:	BB-11A	Sample Type:	---	Tested By:	md
Sample ID:	ST-4	Test Date:	12/23/08	Checked By:	jdt
Depth :	10.0-11.0 ft	Test Id:	143008		
Test Comment:	---				
Sample Description:	Moist, olive brown clay				
Sample Comment:	---				

Density of Soil In Place by the Drive Cylinder Method - ASTM D 2937-04

Boring ID	Sample ID	Depth	Visual Description	Sample Diameter, in	Sample Height, in	Bulk Density, pcf	Moisture Content, %	Dry Density, pcf
BB-11A	ST-4	10.0-11.0 ft	Moist, olive brown clay	2.00	4.04	136	18.8	115

Notes: Density determined on undisturbed samples provided to GeoTesting Express.
Moisture Content determined by ASTM D 2216.

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a subsidiary of Geocomp Corporation

Client:	Mas-Tek Engineering & Assoc.		
Project:	Baker Pump Station		
Location:		Project No:	GTX-8704
Boring ID: BB-11	Sample Type: ---	Tested By:	md
Sample ID:ST-11	Test Date: 12/18/08	Checked By:	jdt
Depth : 22.5-23.5 ft	Test Id: 143002		
Test Comment: ---			
Sample Description: Moist, very dark grayish brown sandy clay			
Sample Comment: ---			

Density of Soil In Place by the Drive Cylinder Method - ASTM D 2937-04

Boring ID	Sample ID	Depth	Visual Description	Sample Diameter, in	Sample Height, in	Bulk Density, pcf	Moisture Content, %	Dry Density, pcf
BB-11	ST-11	22.5-23.5 ft	Moist, very dark grayish brown sandy clay	2.00	4.10	120	24.1	97.0

Notes: Density determined on undisturbed samples provided to GeoTesting Express.
Moisture Content determined by ASTM D 2216.

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Client:	Mas-Tek Engineering & Assoc.		
Project:	Baker Pump Station		
Location:		Project No:	GTX-8704
Boring ID: BB-11	Sample Type: ---	Tested By:	md
Sample ID:ST-12	Test Date: 12/23/08	Checked By:	jdt
Depth : 25.0-26.0 ft	Test Id: 143004		
Test Comment: ---			
Sample Description: Moist, dark olive brown silt			
Sample Comment: ---			

Density of Soil In Place by the Drive Cylinder Method - ASTM D 2937-04

Boring ID	Sample ID	Depth	Visual Description	Sample Diameter, in	Sample Height, in	Bulk Density, pcf	Moisture Content, %	Dry Density, pcf
BB-11	ST-12	25.0-26.0 ft	Moist, dark olive brown silt	2.00	4.20	112	29.2	87.0

Notes: Density determined on undisturbed samples provided to GeoTesting Express.
Moisture Content determined by ASTM D 2216.

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Client:	Mas-Tek Engineering & Assoc.		
Project:	Baker Pump Station		
Location:		Project No:	GTX-8704
Boring ID: BB-11	Sample Type: ---	Tested By:	md
Sample ID:ST-13	Test Date: 12/23/08	Checked By:	jdt
Depth : 27.5-28.5 ft	Test Id: 143003		
Test Comment: ---			
Sample Description: Moist, dark olive brown clay			
Sample Comment: ---			

Density of Soil In Place by the Drive Cylinder Method - ASTM D 2937-04

Boring ID	Sample ID	Depth	Visual Description	Sample Diameter, in	Sample Height, in	Bulk Density, pcf	Moisture Content, %	Dry Density, pcf
BB-11	ST-13	27.5-28.5 ft	Moist, dark olive brown clay	2.01	4.10	129	22.1	105

Notes: Density determined on undisturbed samples provided to GeoTesting Express.
Moisture Content determined by ASTM D 2216.

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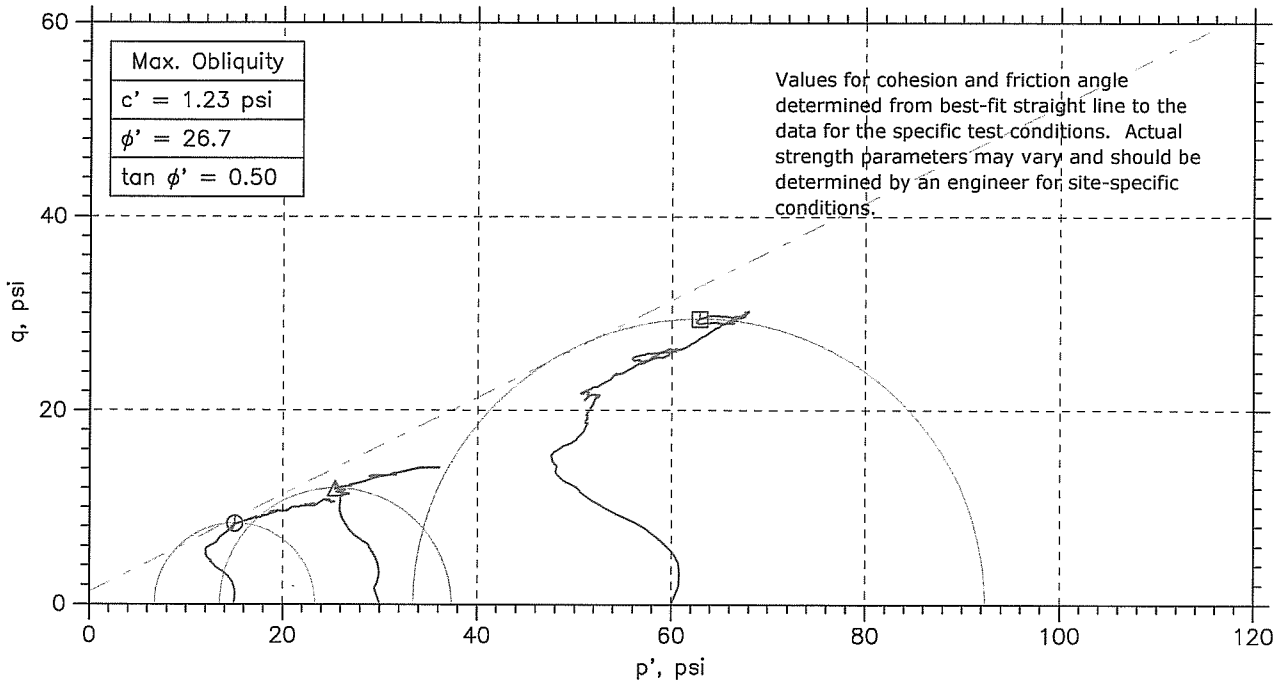
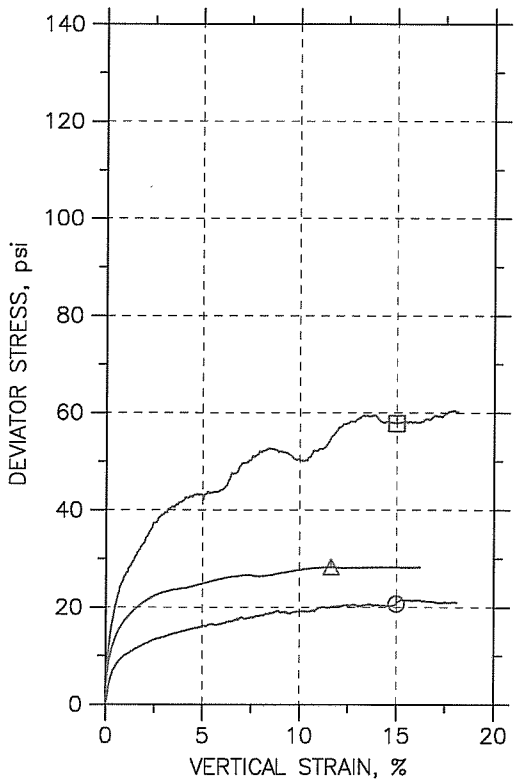
CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767





Symbol		⏲	△	⊡	
Sample No.		ST-9	ST-9	ST-9	
Test No.		CU-1-1	CU-1-2	CU-1-3	
Depth		12.5-14.5	12.5-14.5	12.5-14.5	
Initial	Diameter, in	2	2	2	
	Height, in	3.96	3.95	3.9	
	Water Content, %	15.9	16.3	15.5	
	Dry Density, pcf	112.	109.8	110.5	
	Saturation, %	84.8	82.4	79.8	
	Void Ratio	0.505	0.535	0.525	
Before Shear	Water Content, %	18.5	17.5	16.6	
	Dry Density, pcf	112.4	114.4	116.4	
	Saturation*, %	100.0	100.0	100.0	
	Void Ratio	0.5	0.474	0.448	
	Back Press., psi	124.	139.	121.	
Ver. Eff. Cons. Stress, psi		15.	30.	60.01	
Shear Strength, psi		10.37	14.16	28.91	
Strain at Failure, %		15	11.6	15	
Strain Rate, %/min		0.003	0.003	0.003	
B-Value		0.93	0.92	0.95	
Estimated Specific Gravity		2.7	2.7	2.7	
Liquid Limit		---	---	---	
Plastic Limit		---	---	---	

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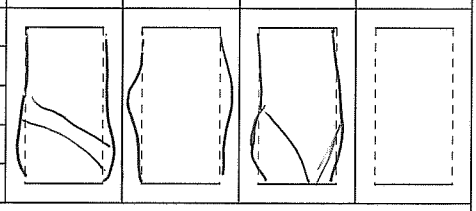
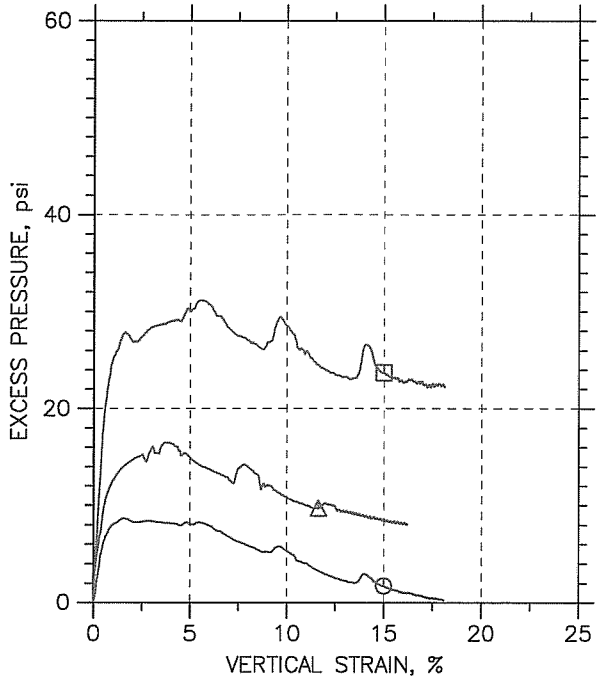
Project: Baker Pump Station
Location: ---
Project No.: GTX-8704
Boring No.: BB-9
Sample Type: core
Description: Moist, dark olive brown clay
Remarks: System R

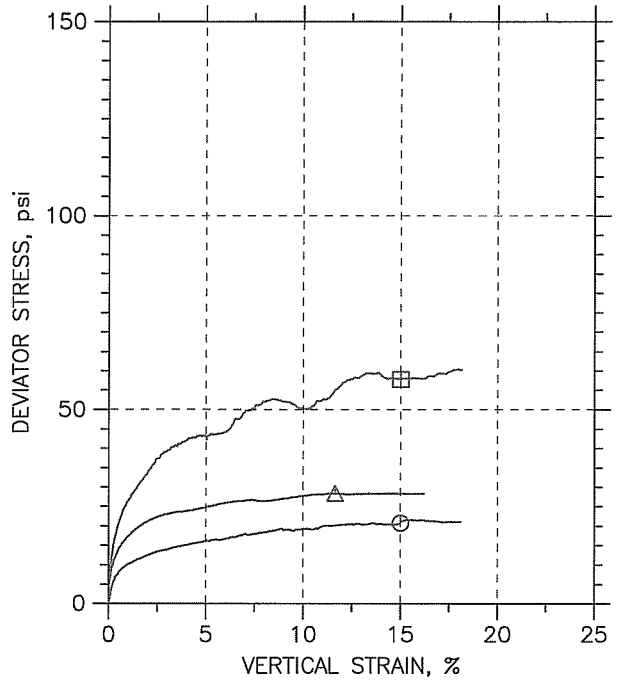


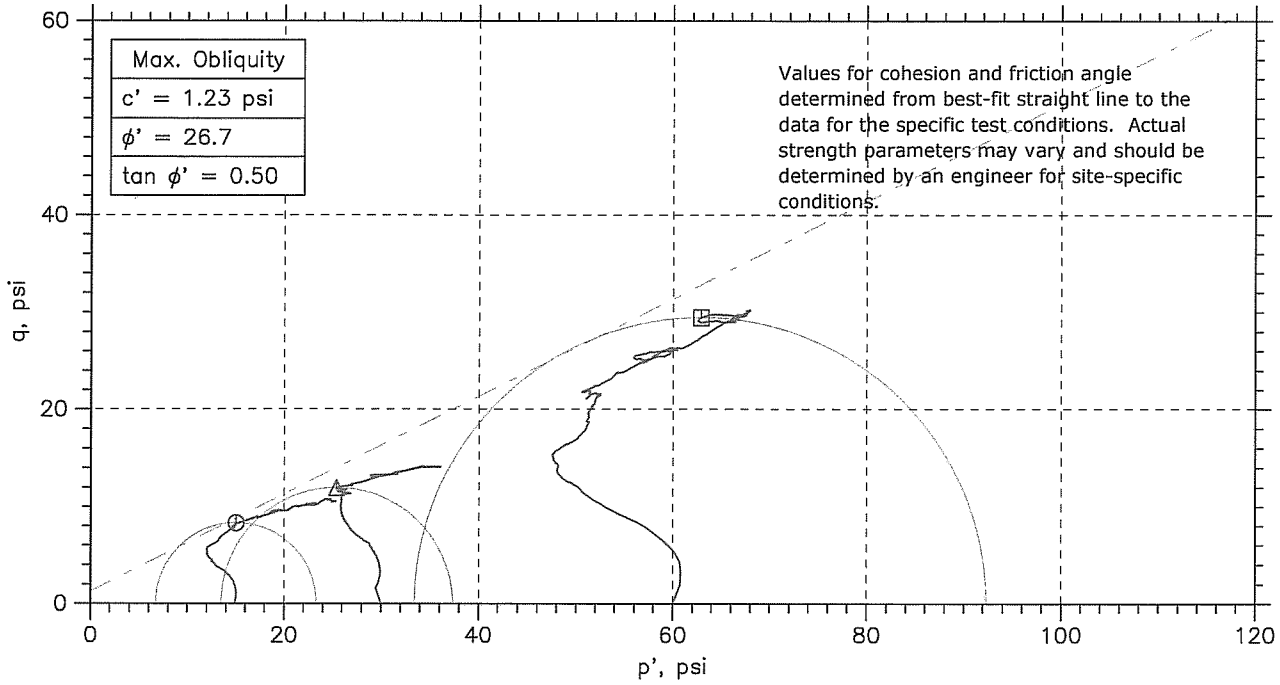
Mon, 08-DEC-2008 13:19:04

Phase calculations based on start and end of test.
* Saturation is set to 100% for phase calculations.

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767







	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
⊙	ST-9	CU-1-1	12.5-14.5	md	12/01/08	jdt		8704-CU-1-1n.dat
△	ST-9	CU-1-2	12.5-14.5	md	12/01/08	jdt		8704-CU-1-2n.dat
⊡	ST-9	CU-1-3	12.5-14.5	md	12/01/08	jdt		8704-CU-1-3n.dat

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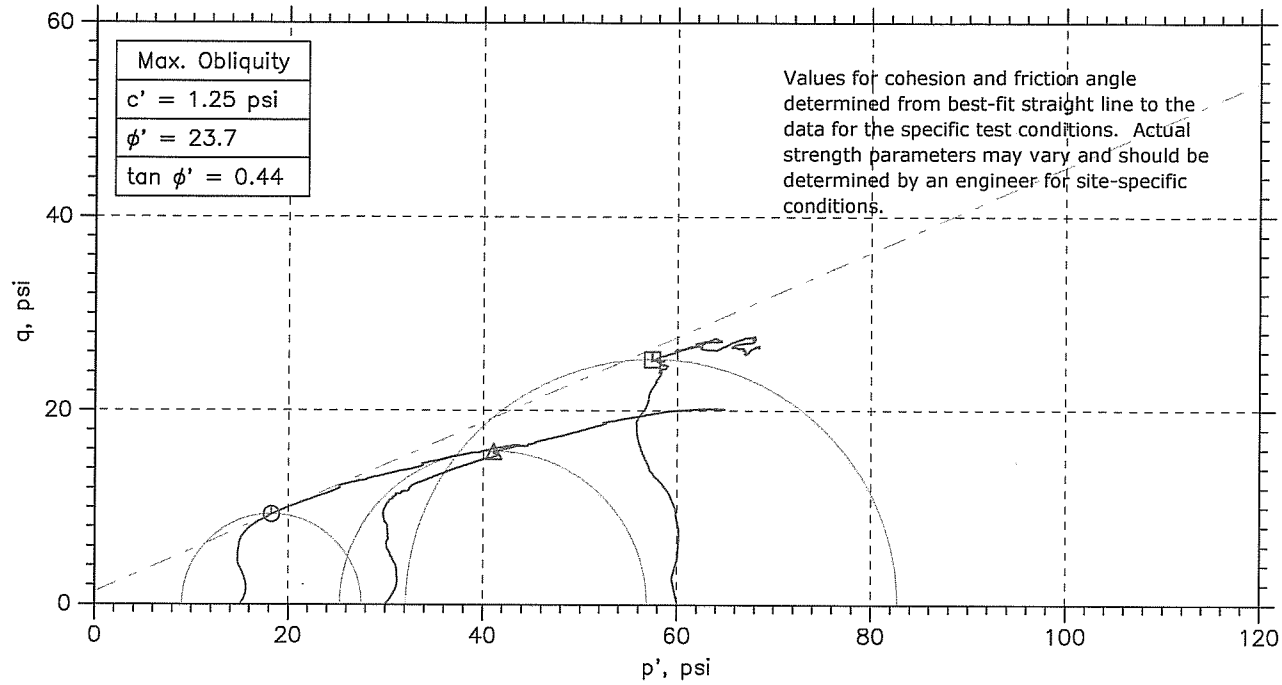
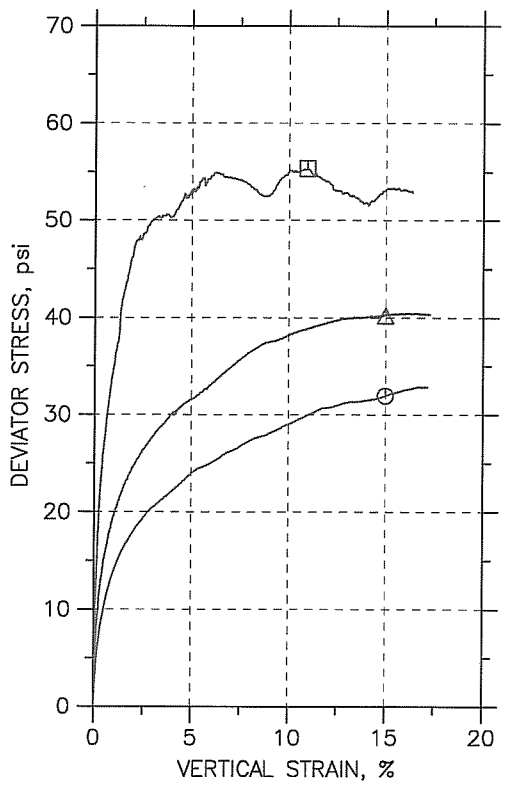
Project: Baker Pump Station	Location: ---	Project No.: GTX-8704
Boring No.: BB-9	Sample Type: core	
Description: Moist, dark olive brown clay		
Remarks: System R		

Mon, 08-DEC-2008 13:19:16

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767





Symbol		⦶	△	⊡	
Sample No.		ST-16	ST-16	ST-16	
Test No.		CU-2-1	CU-2-2	CU-2-3	
Depth		30-32	30-32	30-32	
Initial	Diameter, in	2.01	2	2	
	Height, in	4.05	3.98	3.97	
	Water Content, %	14.5	15.4	12.0	
	Dry Density, pcf	117.6	111.5	116.3	
	Saturation, %	90.4	81.2	72.0	
	Void Ratio	0.434	0.512	0.449	
Before Shear	Water Content, %	16.6	17.1	18.9	
	Dry Density, pcf	116.4	115.3	111.6	
	Saturation*, %	100.0	100.0	100.0	
	Void Ratio	0.448	0.462	0.511	
	Back Press., psi	147.5	127.	118.	
Ver. Eff. Cons. Stress, psi		15.	29.99	59.96	
Shear Strength, psi		15.97	20.11	27.67	
Strain at Failure, %		15	15	10.9	
Strain Rate, %/min		0.003	0.003	0.003	
B-Value		0.84	0.88	0.90	
Estimated Specific Gravity		2.7	2.7	2.7	
Liquid Limit		48	48	48	
Plastic Limit		15	15	15	

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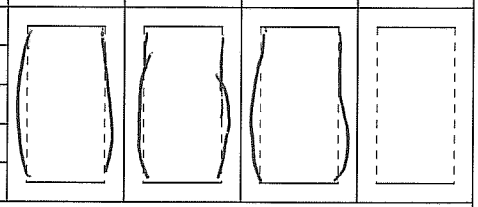
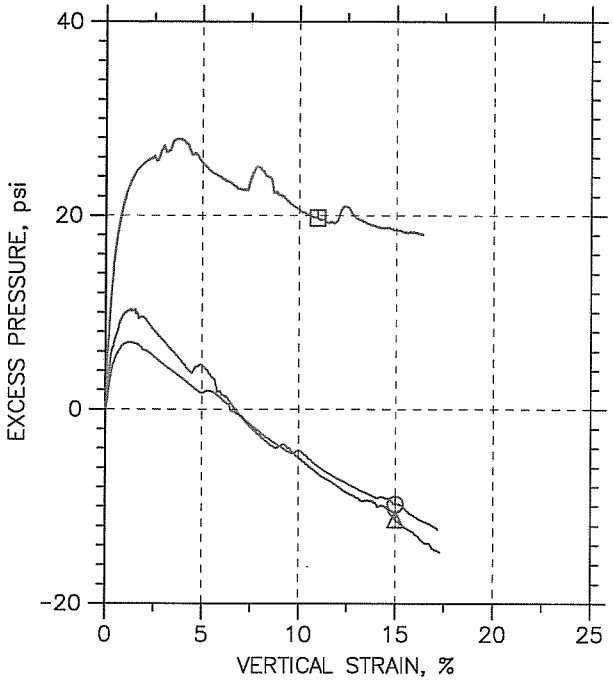
Project: Baker Pump Station
Location: ---
Project No.: GTX-8704
Boring No.: BB-9
Sample Type: core
Description: Moist, very dark brown and brown clay
Remarks: System D

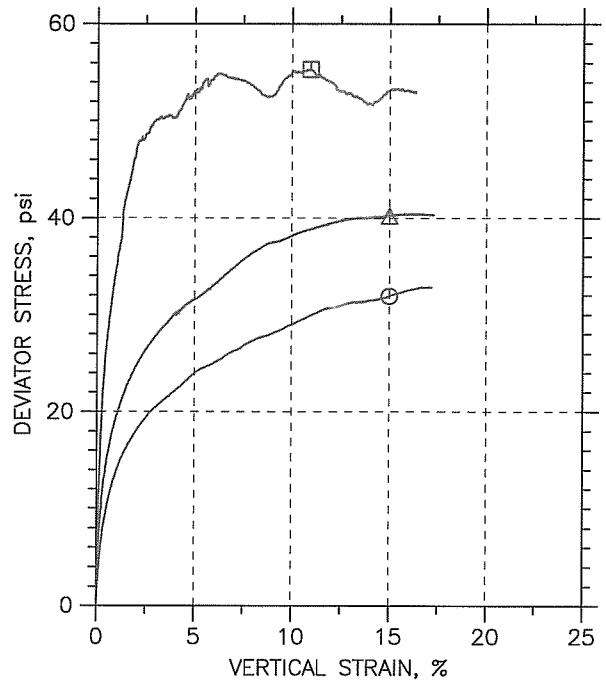


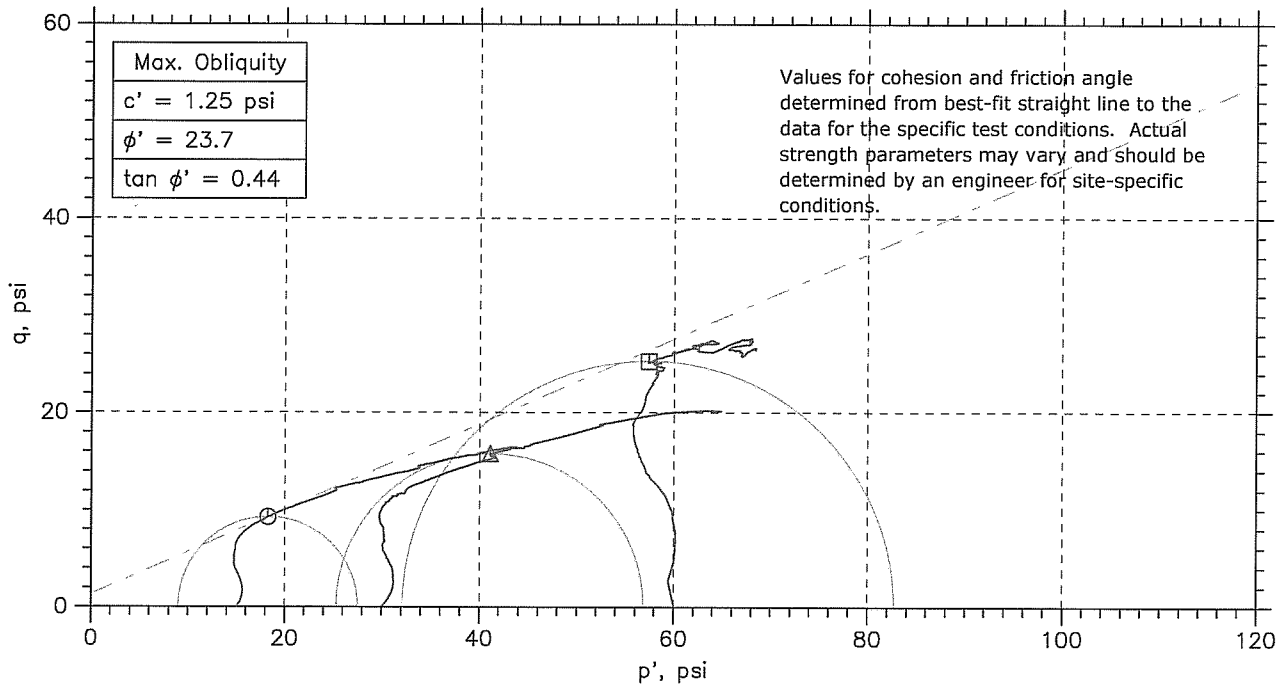
Phase calculations based on start and end of test.
* Saturation is set to 100% for phase calculations.

Tue, 09-DEC-2008 08:44:57

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767







	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
⦶	ST-16	CU-2-1	30-32	md	12/02/08	jdt		8704-CU-2-1n.dat
△	ST-16	CU-2-2	30-32	md	12/02/08	jdt		8704-CU-2-2n.dat
⊡	ST-16	CU-2-3	30-32	md	12/01/08	jdt		8704-CU-2-3n.dat

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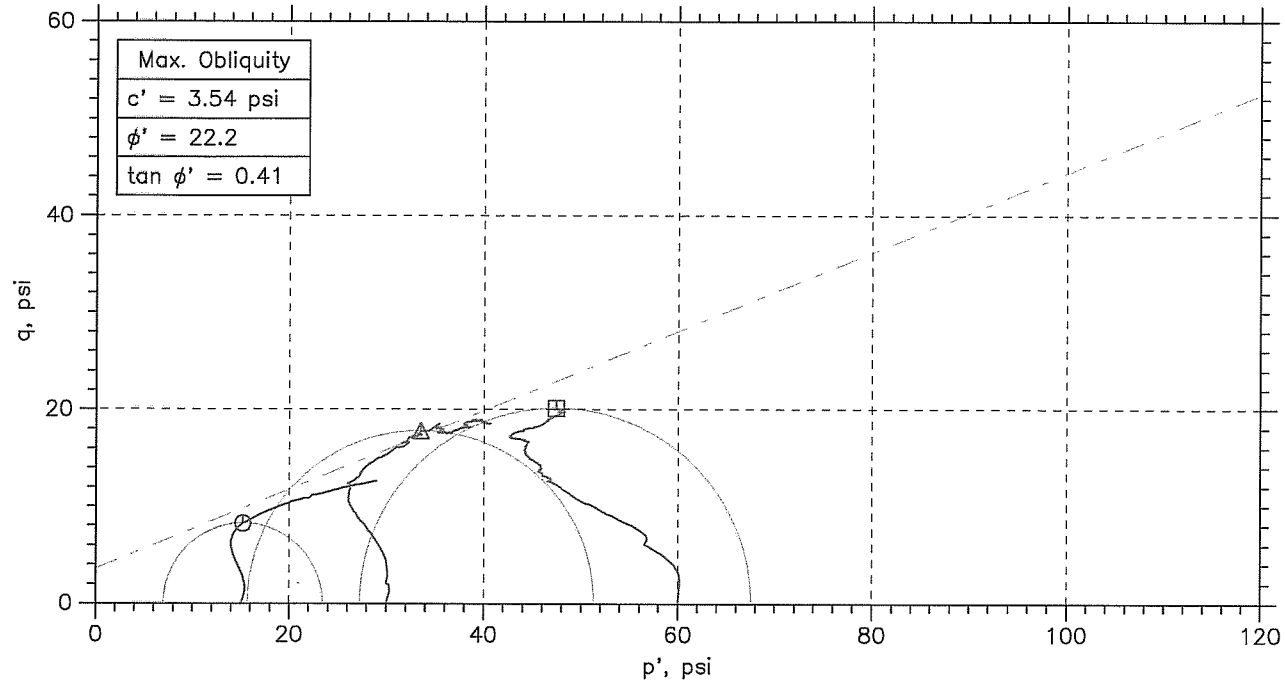
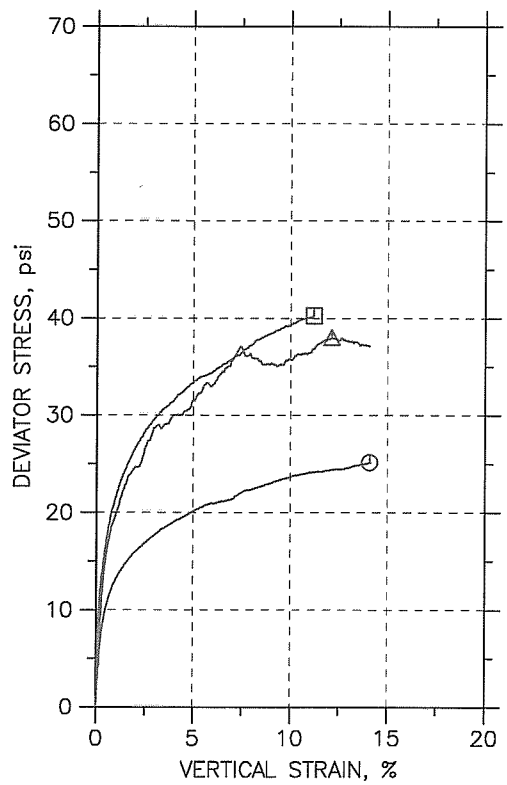
Project: Baker Pump Station	Location: ---	Project No.: GTX-8704
Boring No.: BB-9	Sample Type: core	
Description: Moist, very dark brown and brown clay		
Remarks: System D		

Tue, 09-DEC-2008 08:45:08

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767





Symbol		⦶	△	⊡	
Sample No.		ST-12	ST-12	ST-9	
Test No.		CU-3-1	CU-3-2	CU-3-3A	
Depth		20-22	20-22	17.5-19.5	
Initial	Diameter, in	2.01	2.01	2.01	
	Height, in	4.05	4	4.2	
	Water Content, %	19.1	19.5	6.5	
	Dry Density, pcf	111.3	105.6	125.9	
	Saturation, %	100.0	88.6	52.0	
	Void Ratio	0.515	0.596	0.339	
Before Shear	Water Content, %	18.0	18.1	13.6	
	Dry Density, pcf	113.5	113.2	123.3	
	Saturation*, %	100.0	100.0	100.0	
	Void Ratio	0.486	0.49	0.367	
	Back Press., psi	118.	142.	123.8	
Ver. Eff. Cons. Stress, psi		15.01	29.99	59.96	
Shear Strength, psi		12.59	19.02	20.13	
Strain at Failure, %		14.1	12.1	11.2	
Strain Rate, %/min		0.0035	0.0035	0.0035	
B-Value		0.94	0.93	0.95	
Estimated Specific Gravity		2.7	2.7	2.7	
Liquid Limit		42	42	42	
Plastic Limit		15	15	15	

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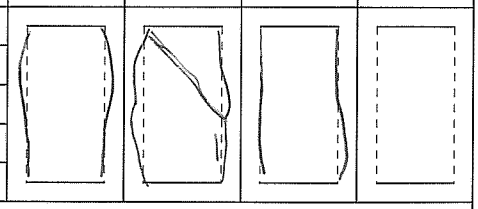
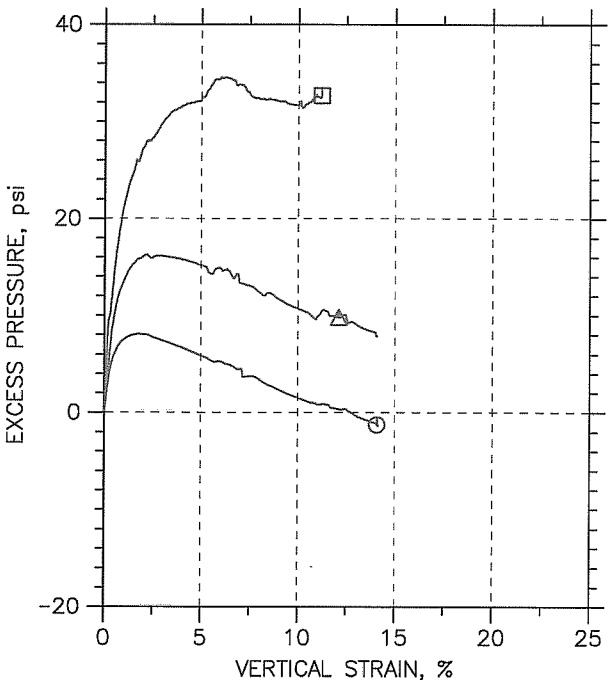
Project: Baker Pump Station
Location: ---
Project No.: GTX-8704
Boring No.: BB-9
Sample Type: core
Description: Moist, dark olive brown clay
Remarks: System R

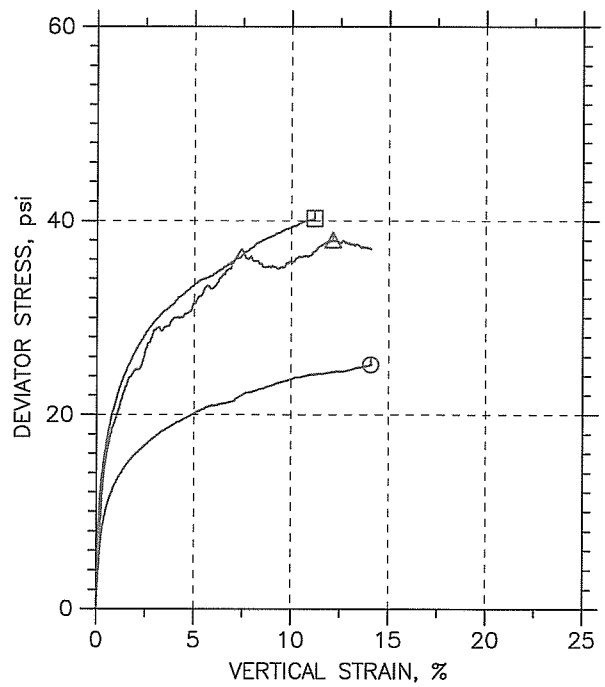


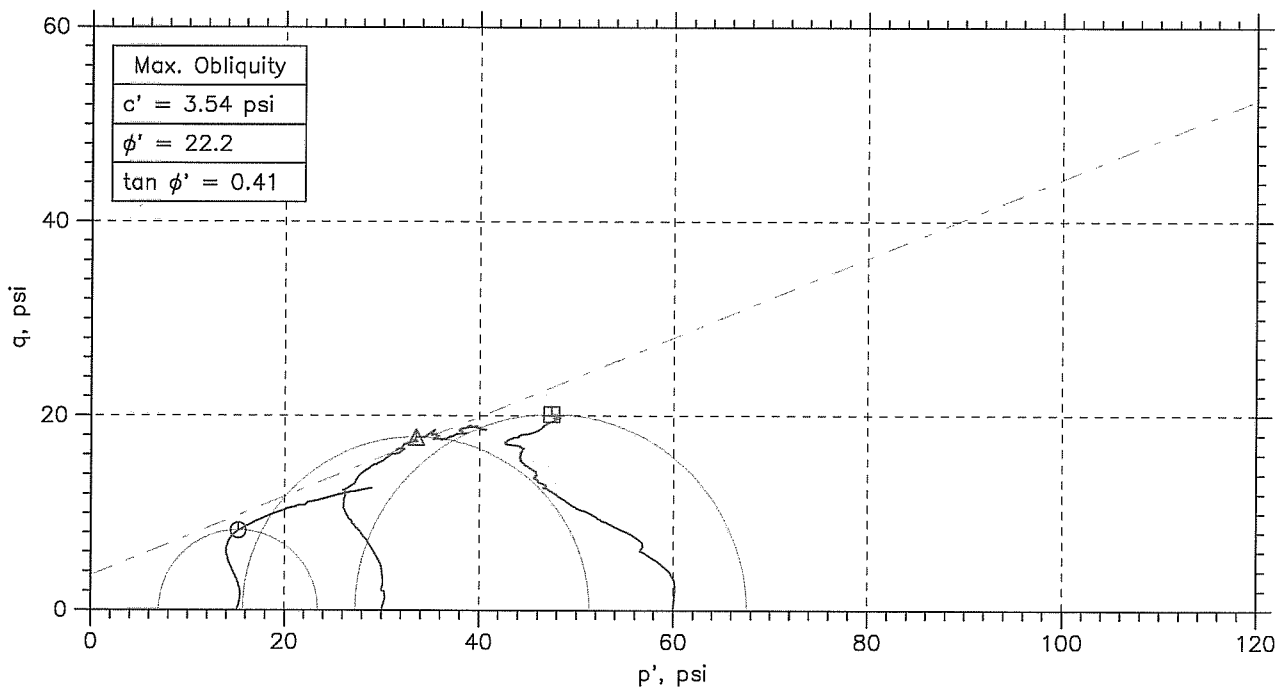
Tue, 23-DEC-2008 10:49:52

Phase calculations based on start and end of test.
* Saturation is set to 100% for phase calculations.

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767







	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
○	ST-12	CU-3-1	20-22	md	12/07/08	jdt		8704-CU-3-1n.dat
△	ST-12	CU-3-2	20-22	md	12/07/08	jdt		8704-CU-3-2n.dat
□	ST-9	CU-3-3A	17.5-19.5	md	12/15/08	jdt		8704-CU-3-3-An.dat

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Project: Baker Pump Station	Location: ---	Project No.: GTX-8704
Boring No.: BB-9	Sample Type: core	
Description: Moist, dark olive brown clay		
Remarks: System R		

Tue, 23-DEC-2008 10:49:58

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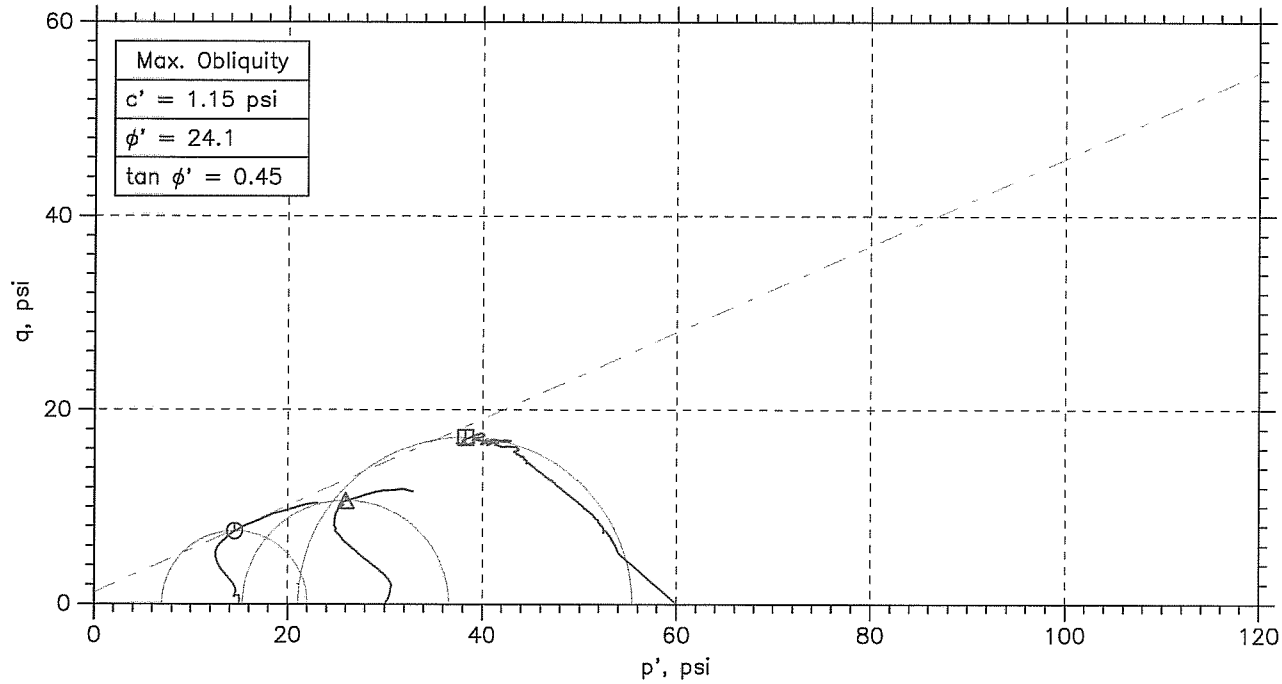

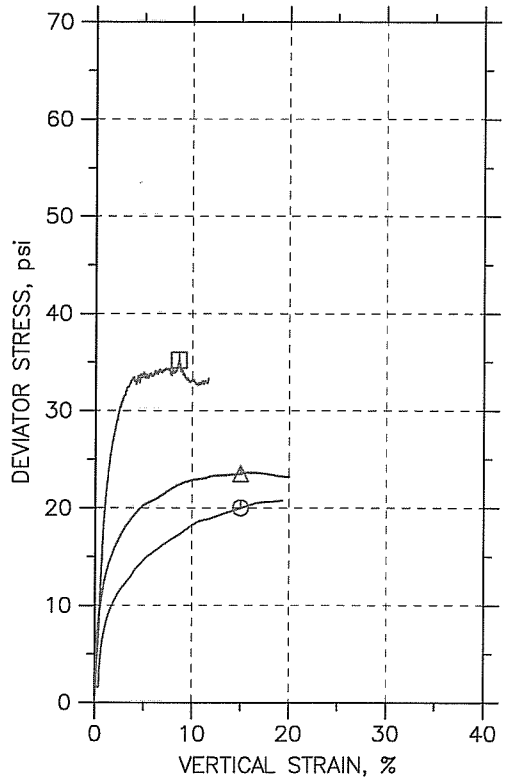

Symbol		⦶	△	⊡	
Sample No.		ST-13	ST-12	ST-12	
Test No.		CU-4-1A	CU-4-2A	CU-4-3	
Depth		27.5-28.5	22.5-23.5	25-26	
Initial	Diameter, in	2	2	2	
	Height, in	4.1	4.1	4.2	
	Water Content, %	21.9	24.1	29.2	
	Dry Density, pcf	102.9	96.72	86.92	
	Saturation, %	92.7	87.4	83.8	
	Void Ratio	0.637	0.743	0.939	
Before Shear	Water Content, %	19.3	23.2	25.6	
	Dry Density, pcf	110.9	103.6	99.63	
	Saturation*, %	100.0	100.0	100.0	
	Void Ratio	0.521	0.627	0.692	
	Back Press., psi	127.	127.	117.8	
Ver. Eff. Cons. Stress, psi		15.01	30.01	60.04	
Shear Strength, psi		10.01	11.77	17.61	
Strain at Failure, %		15	15	8.6	
Strain Rate, %/min		0.0035	0.0035	0.0035	
B-Value		0.94	0.93	0.95	
Estimated Specific Gravity		2.7	2.7	2.7	
Liquid Limit		43	43	43	
Plastic Limit		18	18	18	

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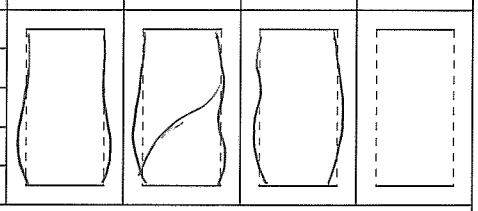
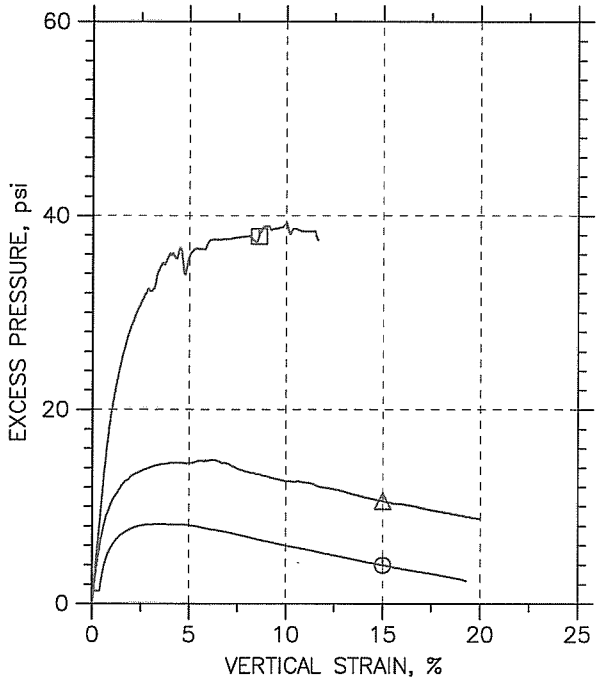
Project: Baker Pump Station
Location: ---
Project No.: GTX-8704
Boring No.: BB-11
Sample Type: core
Description: Moist, dark olive brown clay
Remarks: System D

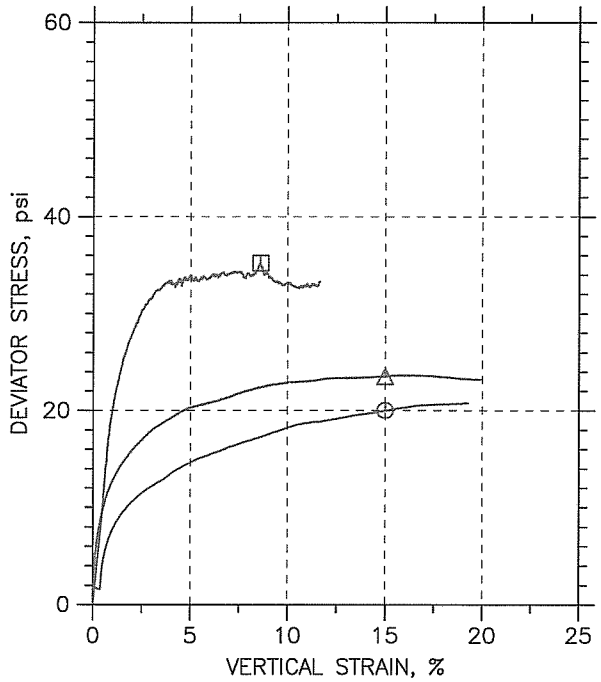


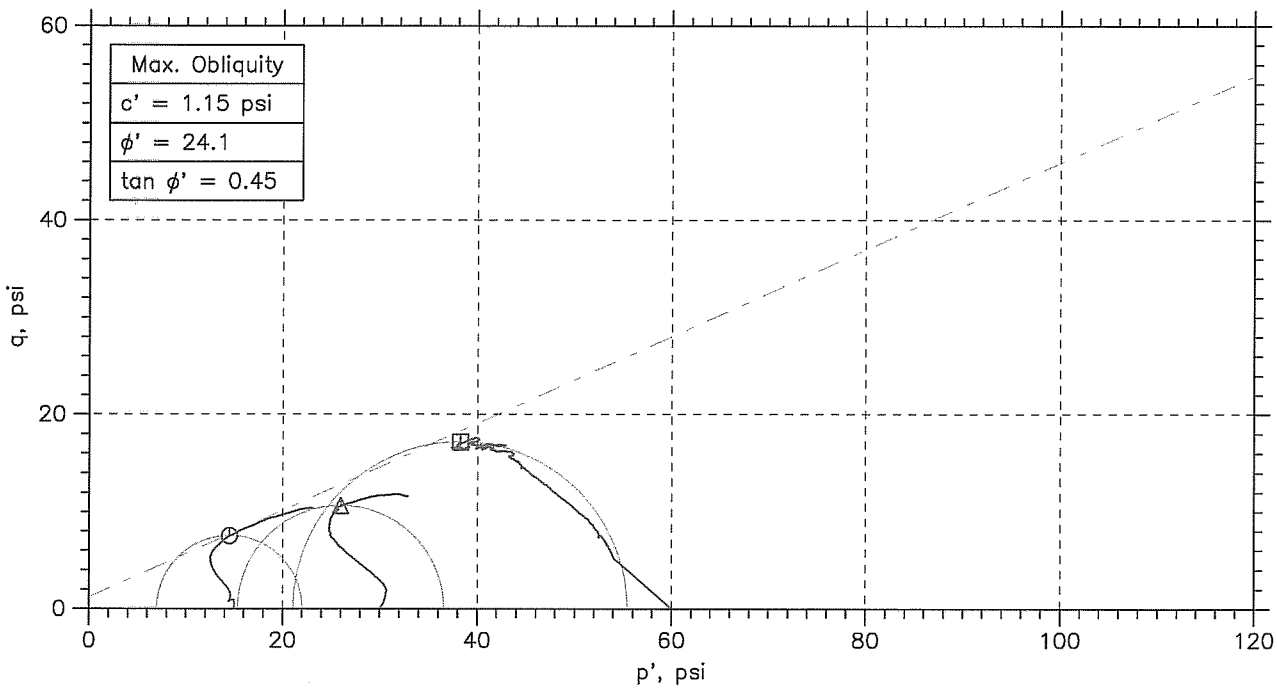
Tue, 23-DEC-2008 10:56:17

Phase calculations based on start and end of test.
* Saturation is set to 100% for phase calculations.

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767







	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
⊙	ST-13	CU-4-1A	27.5-28.5	md	12/17/08	jdt		8704-CU-4-1An.dat
△	ST-12	CU-4-2A	22.5-23.5	md	12/15/08	jdt		8704-CU-4-2An.dat
⊡	ST-12	CU-4-3	25-26	md	12/07/08	jdt		8704-CU-4-3n.dat

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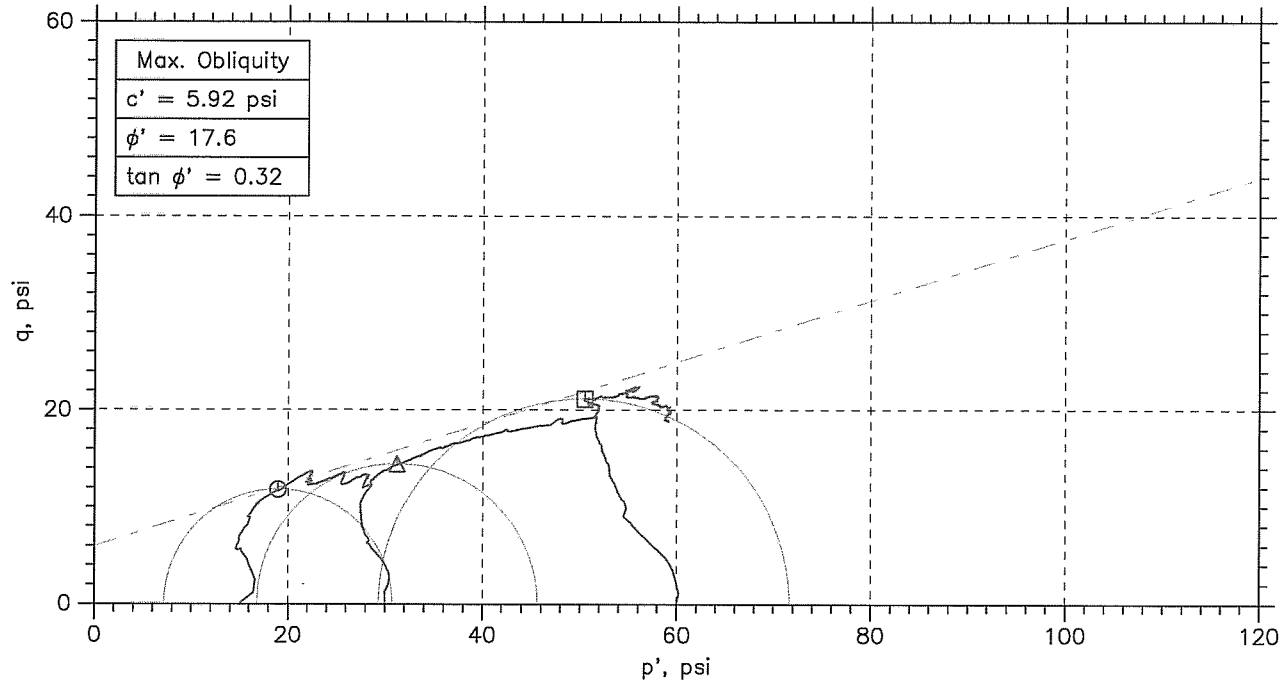
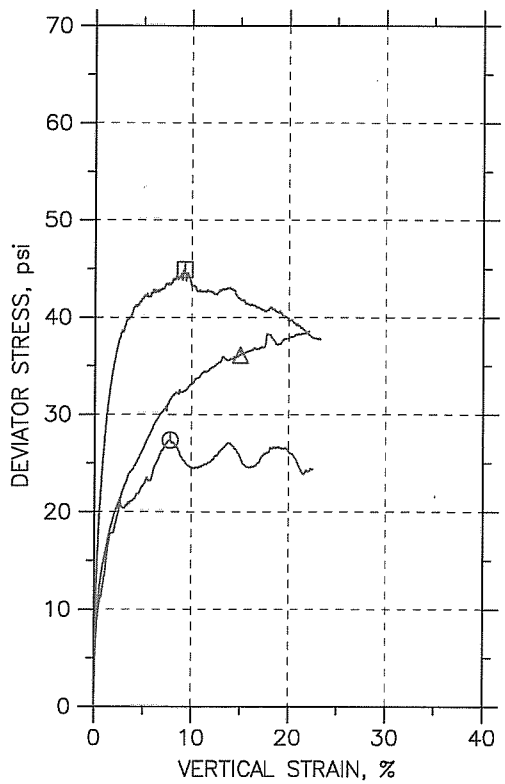
Project: Baker Pump Station	Location: ---	Project No.: GTX-8704
Boring No.: BB-11	Sample Type: core	
Description: Moist, dark olive brown clay		
Remarks: System D		

Tue, 23-DEC-2008 10:56:26

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767





Symbol		⦶	△	⊡	
Sample No.		ST-3	ST-4	ST-3	
Test No.		CU-5-1A	CU-5-2A	CU-5-3 A	
Depth		7.5-8.5	10-11	7.5-8.5	
Initial	Diameter, in	2	2.01	2	
	Height, in	4.15	4.08	4.12	
	Water Content, %	21.4	15.5	19.2	
	Dry Density, pcf	105.6	115.1	108.1	
	Saturation, %	97.1	90.3	92.9	
	Void Ratio	0.596	0.464	0.559	
Before Shear	Water Content, %	24.0	16.9	20.4	
	Dry Density, pcf	102.3	115.7	108.6	
	Saturation*, %	100.0	100.0	100.0	
	Void Ratio	0.648	0.456	0.552	
	Back Press., psi	123.7	130.	123.8	
Ver. Eff. Cons. Stress, psi		14.99	29.99	60.	
Shear Strength, psi		13.69	18.07	22.45	
Strain at Failure, %		7.77	15	9.23	
Strain Rate, %/min		0.0035	0.0035	0.0035	
B-Value		0.91	0.90	0.94	
Estimated Specific Gravity		2.7	2.7	2.7	
Liquid Limit		55	55	55	
Plastic Limit		18	18	18	

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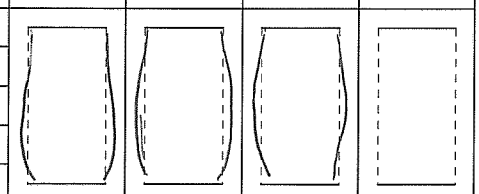
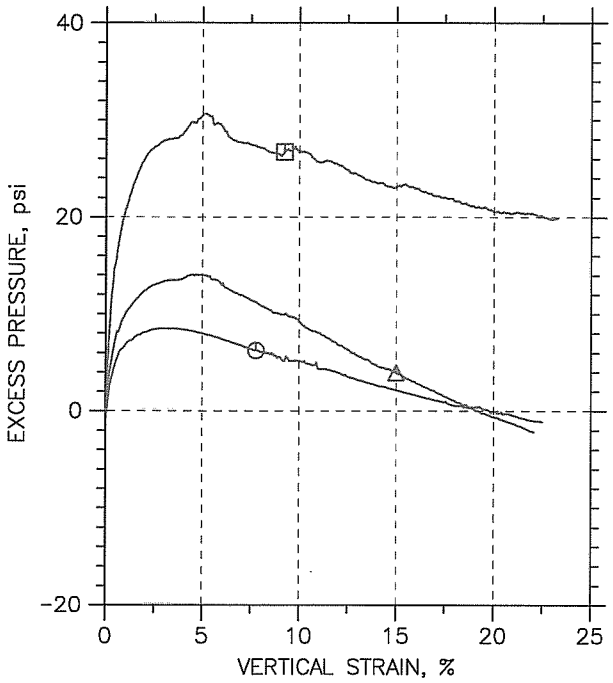
Project: Baker Pump Station
Location: ---
Project No.: GTX-8704
Boring No.: BB-11A
Sample Type: core
Description: Moist, dark olive brown clay
Remarks: System B

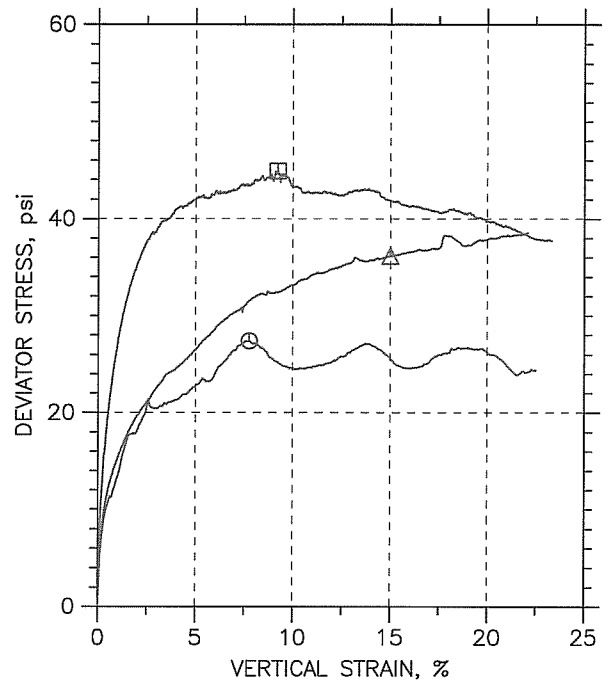


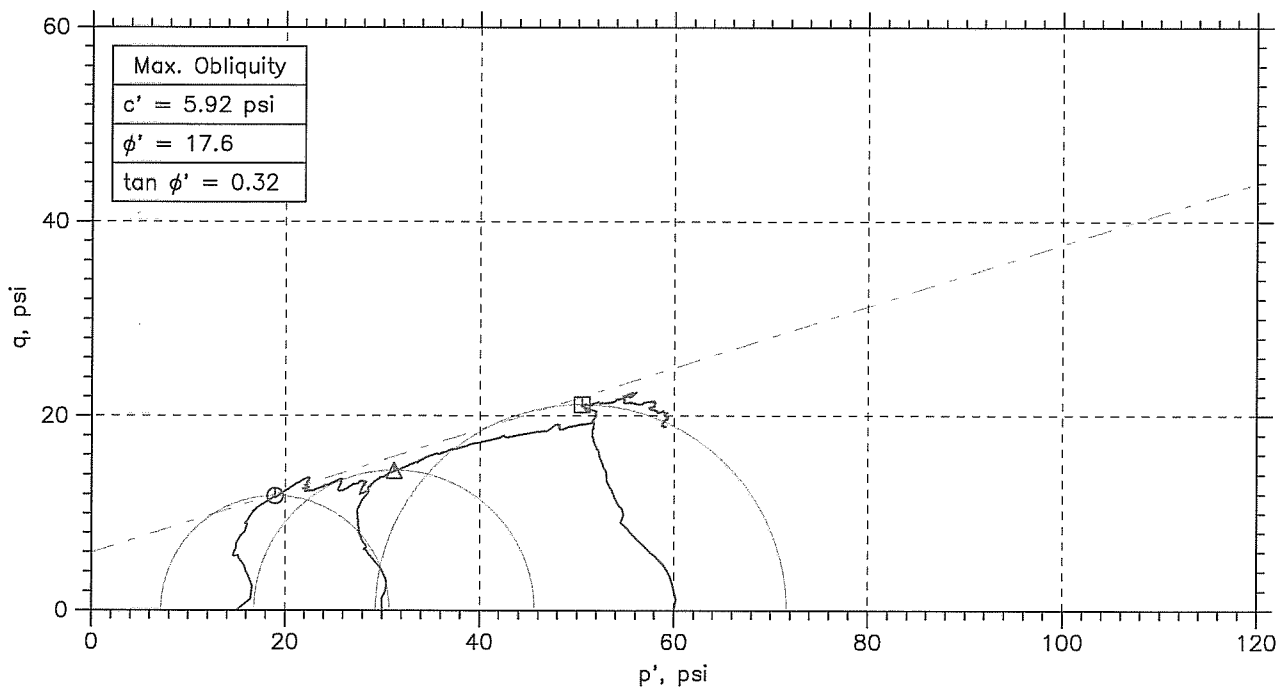
Phase calculations based on start and end of test.
* Saturation is set to 100% for phase calculations.

Tue, 23-DEC-2008 10:54:25

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767







	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
⊙	ST-3	CU-5-1A	7.5-8.5	md	12/10/08	jdt		8704-CU-5-1An.dat
△	ST-4	CU-5-2A	10-11	md	12/10/08	jdt		8704-CU-5-2An.dat
⊡	ST-3	CU-5-3 A	7.5-8.5	md	12/15/08	jdt		8704-CU-5-3An.dat

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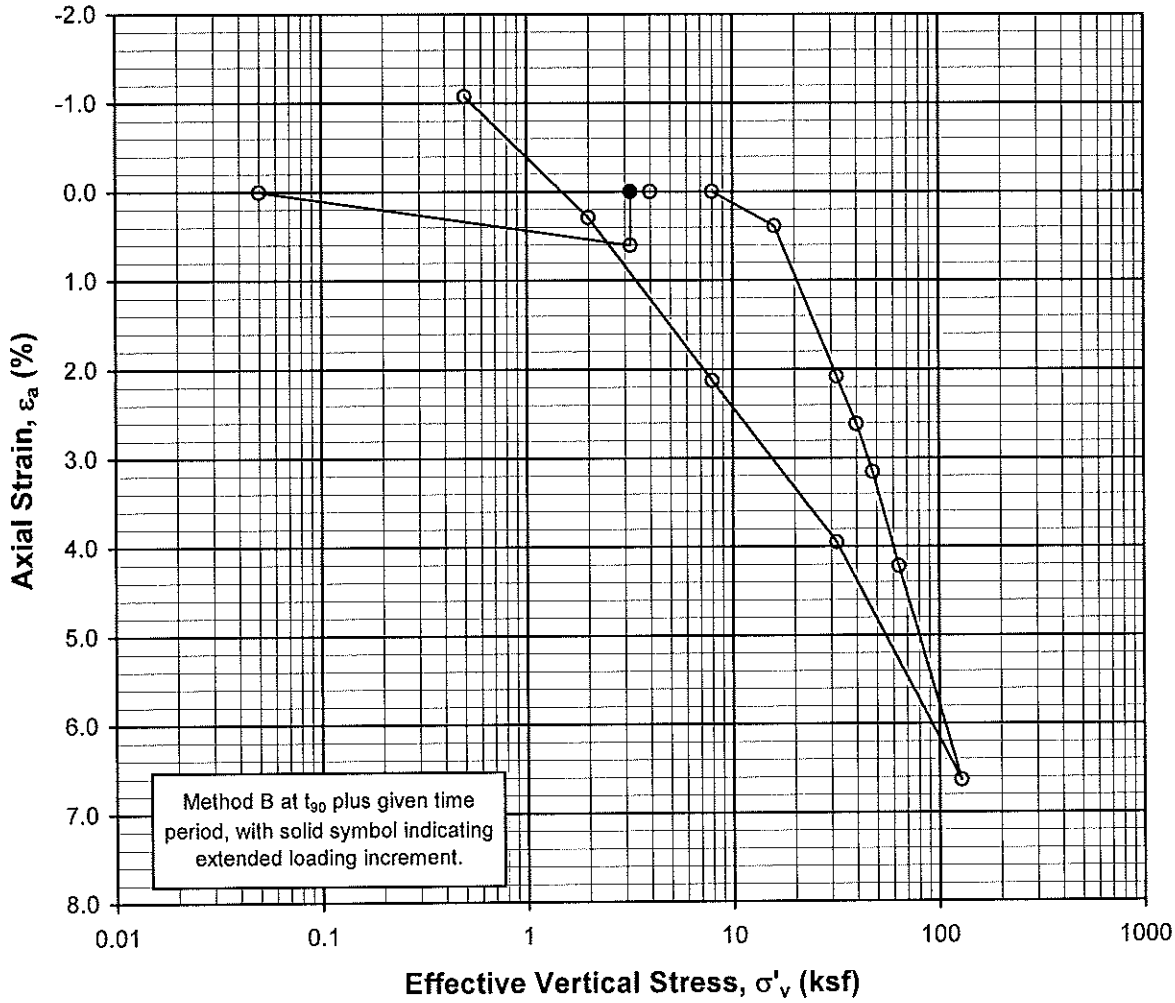
Project: Baker Pump Station	Location: ---	Project No.: GTX-8704
Boring No.: BB-11A	Sample Type: core	
Description: Moist, dark olive brown clay		
Remarks: System B		

Tue, 23-DEC-2008 10:54:33

Fugro Consultants, Inc. - Houston
Laboratory Results



SWELL TEST

Sample No. RC1a - Depth ft

Boring BB4

PLATE

ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Setup / Take Down

Project Number: 0411-08-1717 | Test Station No.: T1 | File Name: BB4_RC1a
Task No.: NA | Specific Gravity, G_s: 2.750 [X] Meas. ; [ ] Assumed | Ring No.: 24
Project Name: | Assig. Remarks: Swell Test Method C | Ring Area, A_r (cm^2) = 31.866
TEST TYPE: [ ] Incremental (D 2435); [X] Swell / Settlement (D 4546); [ ] Collapse (D 5333); | Ring Height (mm) = 19.06
[ ] Method A; [ ] Method B; [X] Method C; [ ] Other Test Type:
Dial No.: DG 024 | DT No.: DT 024 | Calib. Factor (mm/V/V): 2193.6016 | Excit. Volt, (V): 9.932 | Ch. No.: 24

[ ] Tube [X] Field Extruded	[ ] Liner [ ] Remolded	[ ] Tamping	[ ] Constant Effort: Blows/Tamps per Layer =
Boring No.: BB4	[ ] LPC Core	[ ] Impact/Rammer	Rammer Wgt.(lbf)= No. Layers =
Sample No.: RC1	Compostite No.:	[ ] Pluviated:	Tamper Force (lbf)= Drop (in.) =
Depth (ft):	Specimen No.: a	[ ] Kneading	[ ] Undercompaction: U_{ni} (%) = Dia. (in.) =
[ ] Spec. Selection by X-ray;	[ ] Geomarine Sample		Ref. Effort= % Comp. = ± Opt.=

Water Content (W);	Initial - Trimming Location			Final, W_{at}	Soil and Ring Masses	Initial	Final
	Top (W1)	Bottom (W2)	Sides (W3)	(see below)	Mass Moist Soil + Ring (g)	204.83	209.00
Container No.	671	953	142	671	Mass Ring (g)	76.44	
Mass Moist Soil + Container (g)	172.30	182.89	142.10	69.45	Mass Moist Soil, $M_{t,o}$ or $M_{t,at}$ (g)	128.39	132.56
Mass Dry Soil + Container (g)	154.16	162.91	127.56	63.70	EXCESS DRY SOIL (soil not incl. in final mass above)		
Mass Container (g)	32.03	31.97	31.69	32.03	Container No.		953
WATER CONTENT (%)	14.85	15.26	15.17	18.16	Mass Dry Soil + Container (g)		32.22
Avg. Initial Water Content, W4 (%)	15.09	Final W_{at}: [X] Slice ; [ ] Whole Spec.			Mass Container (g)		31.97
[ ] See attached data sheet(s) for additional water contents					Mass Excess Dry Soil, $M_{d,es}$ (g)		0.25

Soil Height: Measurements (mm)								
Initial				Final				
with Spec.	without Spec.			with Spec.	without Spec.			
19.180				20.040	0.280			
19.180				20.110	0.330			
19.180				20.040	0.310			
19.180				19.960	0.300			
19.180				19.870	0.310			
[ ]	[ ]	Yes ;	[X] No	[ ]	[ ]	Yes ;	[X] No	Require H_{gb} & d_{gb} (1)
[ ]	[ ]	Yes ;	[X] No	[ ]	[X]	Yes ;	[ ] No	Filter Paper Included:

(1) Req. block ht. to set bench comparator so the final soil ht. can be determined directly by the diff. between the reading with and without spec. : ~ 12.7 mm; CRS ~ 25 mm
Enter value of H_{gb} & d_{gb} only when that value has to be included in the determination of the soil height.

Soil Height: Calculations, (mm)	Initial	Final
Height of Gauge Block, H_{gb} (1)	0.000	0.000
Reading on Gauge Block, d_{gb}	0.000	0.000
Avg. Reading on Soil, d_{soil}	19.180	20.004
Avg. Reading on Apparatus without Specimen, d_{app}	0.000	0.306
Soil Height, $H = d_{soil} - d_{app} + H_{gb} - d_{gb}$	19.180	19.698

Soil Height: Final by Dial Change During Test (mm)	
Initial Height, H_o	19.180
Final (end of test) Corr. Total Spec. Deformation, $\Delta H_{c,f}$	-0.206
Final Calculated Height, $H_{f,c} = H_o - \Delta H_{c,f}$	19.386
Final Soil Height Measurement, $H_{f,m}$	19.698
Normalized Difference in %, $(H_{f,c} - H_{f,m})/H_o$	-1.63

Estimated Initial Unit Weight

Total, $\gamma_{t,o}$ (pcf)= 131.14 | Dry, $\gamma_{d,o}$ (pcf)= 113.94

Filter Paper Used: [X] Whatman No. 54; [ ] Other
Incremental Test: Top & Bottom: [X] Yes ; [ ] No
CRS Test: Top Only: [ ] Yes ; [ ] No

Soil Extruded During Loading	
Container No.	1142
Mass Dry Soil + Cont. (g)	31.84
Mass Cont. (g)	31.69
Dry Mass - Soil Extruded During Loading, $M_{d,et}$ (g)	0.15

Sketch of Specimen

Photo taken of Sliced Test Specimen: [ ] Yes ; [X] No

Final Visual Description: Clay, olive gray amorphing to Shale

Trimming/Etc. Remarks: Extruded 4" Tube Sample

Method of trimming periphery: [X] "Casagrande" Lathe ; [ ] Cutting Shoe ; [ ] Wire Saw; [ ] Other
Method of trimming ends: [ ] Wire Saw & Sharp (knife) Straight Edge; [X] Wire Saw & Straight Edge; [ ] Wire Saw

Trim./Recon. By: GP | Setup By: GP | Prelim. Calc. By: LF | Take Down By: GP
Date: 11/21/2008 | Date: 11/21/2008 | Final Calc. By: LF | Date: 12/8/2008
Reviewed By: HP

Note: NA - Not Applicable

ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Calculations & Summary

Project Number: 0411-08-1717 Test Station No.: T1 File Name: BB4_RC1a

Task No.: NA Specific Gravity, G_s: 2.750 [X] Measured ; [ ] Assumed.

Calculations Corrected for Salt (dissolved solids): [X] No or, [ ] Yes, with Concentration = _____ g/kg

Cal.-Routine	ITEM	Water Content, (%)	Mass Dry Soil, (g)	Degree of Saturation, S in %		
				Height Initial	Final Height Meas.	Final Height Dial
1	Initial, Top, W1	14.85	111.79	81.5	94.4	98.8
2	" Bottom, W2	15.26	111.39	82.9	95.6	100.0
3	" Sides, W3	15.17	111.48	82.6	95.3	99.8
4	" Average, W4	15.09	111.55	82.4	95.1	99.6
5	" Back Calculated (1)	14.03	112.59 (3)	78.7	92.0	96.4
6	Final	18.16	112.44 (2)	79.3	92.4	96.8

Calculated Specific Gravity for Final Saturation = 100%:

Used Cal. Routine No. 5 to obtain the mass of dry soil

and final height by: [X] Measurement; [ ] Dial Change.

Back Cal. G_s = 2.638

Avg. G_s (measured/assumed) & Back Cal. G_s = 2.694

Calculation Constant, K = (unit conversion) / $G_s \times \rho_w \times A_r$	
Estimated, K_e	0.11432
Final Selected, K_f	0.11432

Calculated Mass Dry Soil for Final Saturation = 100%: using measured/assumed G_s

and final height by: [X] Measurement; [ ] Dial Change.

Back Cal. Mass Dry Soil, (g) = 109.85

Avg. Back Calculated and Measured Mass Dry Soil (g) = 111.14

Summary of Specimen Physical Properties

Specific Gravity G_s = 2.750		[ ] Assumed		To make S_f = 100% at end of test.	
		[X] Measured		Avg. of measured/assumed G_s and G_s to make S_f = 100%	
Mass Dry Soil, (g)	Initial: 112.59	[X] From Cal. Routine No.	5	Note: Routine #5 is based on final measurements.	
	Final (4): 112.44	[ ] Make S_f = 100%, or;		Avg. of measured & make S_f = 100%	
Initial Height (mm) = 19.18		[X] Measured ;		Back Calculated	Back-cal. Sat. (%) = NA
Final Height (mm) = 19.70		[X] Measured ;		Initial H_o & dial change during loading	

	Water Content, w (%)	Void Ratio, e	Degree of Saturation, S (%)	Total Unit Weight, γ_t (pcf)	Dry Unit Weight, γ_d (pcf)	Height of Solids, H_s (2,4) (mm)	Extruded soil loss proportioned in increasing loading increments (5) : From	To (ksf)
Initial	14.0	0.490	78.7	131.1	115.0	12.871		
Final	17.9	0.532	92.4	131.8	111.8	12.854	64.00	128.00

Graphical Construction	σ'_p (ksf)	ε_a (%)	CR	RR	SR	Liquid Limit (LL)	? Value
Casagrande Method						Plastic Limit (PL)	? Value
Becker Method		Becker minimium σ'_p (ksf):				Plasticity Index (PI)	

NA - Indicates not applicable

Notes:

(1) Back Calculated based on final mass of oven-dry soil (corrected for dry mass of any excess and extruded soil).

(2) Corrected for any excess dry soil (soil stuck to ring, filter paper, etc.).

(3) This value is only different from the final value if there is soil extrusion during loading.

(4) Final is only different from the initial value if there is soil extrusion during loading.

(5) There should not be any soil loss in a CRS test, unless stress increments are applied.

Calculated By: LF Reviewed By: HP

Date: 12/10/2008

ONE - DIMENSIONAL CONSOLIDATION TEST:
INCREMENTAL LOADING SUMMARY (Data Input by Hand)

Project Number: 0411-08-1717
Task No.: NA
Project Name:

Test Station No.: T1
Date; Start: 11/21/2008
Completed: 12/8/2008
[X] Undisturbed or ;
[ ] Reconstituted - Specimen.

File Name: BB4_RC1a
Dial / DT No.: DG 024
Channel No.: 24
DT Factor (mm/V/V): 2193.6016
Nominal Excit. Voltage (V_E): 9.932
Initial Height, H_o (mm): 19.18

Notes:

(1) W - water added, S - stress level applied to prevent swelling, P - indicates that the extended loading data point will be part of the consolidation curve.

(2) Increasing deformation reading indicates: [ ] compression; or [X] swell.

(3) Equals reading at seating stress

(4) "Incr. App. Flex. Corr." for first stress (load) increment equals the 0 % primary consol. value determined by the square root fitting method.

(5) "Incr. App. Flex. Corr." equals the incremental values obtained during the apparatus calibration for simular stress (load) increments..

(6) "Total Def. Corr." equals the seating stress reading plus the sum of the incr. app. flex.corrections up to and including the given (nth) loading increment.

Loading Data By: GP , _____ , _____ , _____

Reviewed By: HP

Remarks:

(1)	Final Applied Effective Stress, $\sigma'_{v,c}$ (ksf)	Final Deformation Reading DT $DT_{rf,n}$ (volts)	Final Deformation Reading Dial or Cal. Value, $d_{arf,n}$ (2) (mm)	Incremental App. Flex. Correction $\Delta d_{afc,n}$ (mm)		Total App. Flexibility Correction $\Sigma\Delta d_{afc,n}$ (2) (mm)		Corr. Total Specimen Deformation $\Delta H_{c,n}$ (2) (mm)	Axial (Volumetric) Strain, $\varepsilon_{a,n}$ ($\varepsilon_{v,n}$) $\Delta H_{c,n} / H_o$ (%)	Duration of Stress (Load) Increment (hr)
	0.00		5.000	0.000		5.000	(3)	0.000	0.00	0.000
	0.05		4.996	0.003	(4)	4.997	(6)	0.001	0.01	0.083
	3.20		4.792	0.089	(5)	4.908	"	0.116	0.60	0.000
P	3.20		4.908	0.000	"	4.908	"	0.000	0.00	0.352
	4.00		4.893	0.015	"	4.893	"	0.000	0.00	0.033
	8.00		4.845	0.048	"	4.845	"	0.000	0.00	1.343
	16.00		4.718	0.052	"	4.793	"	0.075	0.39	10.183
	32.00		4.340	0.053	"	4.740	"	0.400	2.09	54.373
	40.00		4.218	0.020	"	4.720	"	0.502	2.62	24.031
	48.00		4.099	0.015	"	4.705	"	0.606	3.16	24.150
	64.00		3.864	0.031	"	4.674	"	0.810	4.22	139.931
	128.00		3.316	0.085	"	4.589	"	1.273	6.64	27.219
	32.00		3.912	-0.081	"	4.670	"	0.758	3.95	24.275
	8.00		4.326	-0.065	"	4.735	"	0.409	2.13	24.004
	2.00		4.730	-0.051	"	4.786	"	0.056	0.29	24.102
	0.50		5.030	-0.038	"	4.824	"	-0.206	-1.07	49.068
					"		"			
					"		"			
					"		"			
					"		"			
					"		"			
					"		"			
					"		"			

ONE - DIMENSIONAL CONSOLIDATION TEST: INCREMENTAL LOADING DATA (Input: Deformation & Fitting Data)

Project Number: 0411-08-1717
Task No.: NA
Project Name:

Test Station No.: T1
Data; Start: 11/21/2008
Completed: 12/8/2008
Initial Height, H_o (mm): 19.18

Dial / DT No.: DG 024
Channel No.: 24
DT Factor (mm/V/V): 2193.6016
Excitation Voltage,V: 9.932

File Name: BB4_RC1a

Notes:
(1) W - water added, S - stress level applied to prevent swelling, P - indicates that the extended loading data point will be part of the consolidation curve.
(2) Increasing deformation reading or fitting value indicates: [ ] compression; or [X] swell.
(3) Value in brackets indicates, it is an assumed value.

Summary Data Inputted By: GP , LF , _____ Reviewed By: HP

(1)	Final Applied Effective Stress, $\sigma'_{v,c}$ (ksf)	Volumetric (Axial) Strain, $\varepsilon_{v,n}$ ($\varepsilon_{a,n}$) $\Delta H_{c,n} / H_o$ (%)	Void Ratio e_n	Duration of Stress (Load) Increment (hr)	Final Deformation Reading, $d_{rf,n}$ (2) (mm)	Total App. Flexibility Correction $\Sigma\Delta d_{afc,n}$ (2) (mm)	Fitting Method — Deformation Fitting Data Corrected for Total App. Flexibility Corr.: [ ] Yes; [X] No — Square Root of Time: t_{90} (min)	d_o (mm)	d_{90} (mm)	Log of Time: t_{50} (min)	d_o (mm)	d_{100} (mm)	Estimated Dry Mass of Soil Extruded During Incr. $\Delta M_{d,et}$ (g)	Cumm. Dry Mass of Soil Extr. During Incr(s). $\Sigma\Delta M_{d,et}$ (g)	Slope of Secondary Comp. Line (mm / Δlog t)
	0.00	0.00	0.490	0.000	5.000	5.000	Data summarized below applies to the stress (load) increment associated with the final applied eff. stress on that line.								
	0.05	0.01	0.490	0.083	4.996	4.997									
	3.20	0.60	0.481	0.000	4.792	4.908									
P	3.20	0.00	0.490	0.352	4.908	4.908									
	4.00	0.00	0.490	0.033	4.893	4.893									
	8.00	0.00	0.490	1.343	4.845	4.845									
	16.00	0.39	0.484	10.183	4.718	4.793									
	32.00	2.09	0.459	54.373	4.340	4.740									
	40.00	2.62	0.451	24.031	4.218	4.720									
	48.00	3.16	0.443	24.150	4.099	4.705									
	64.00	4.22	0.427	139.931	3.864	4.674									
	128.00	6.64	0.391	27.219	3.316	4.589									
	32.00	3.95	0.431	24.275	3.912	4.670									
	8.00	2.13	0.458	24.004	4.326	4.735									
	2.00	0.29	0.486	24.102	4.730	4.786									
	0.50	-1.07	0.506	49.068	5.030	4.824									

ONE - DIMENSIONAL CONSOLIDATION TEST: INCREMENTAL LOADING RESULTS (Load & Time - Deformation Properties)

Project Number: 0411-08-1717 | Boring No.: BB4 | Test Station No.: T1 | File Name: BB4_RC1a

Task No.: NA | Sample No.: RC1 | Date; Start: 11/21/2008

Project Name: | Penetration (ft): | Completed: 12/8/2008

ASTM Test Method: [ ] D 2435 [X] D 4546 [ ] D 5333 Method Used: [ ] A , [ ] B, or [X] C [X] Undisturbed or ; [ ] Reconstituted - Specimen.

Final Description of Specimen: Clay, olive gray amorphing to Shale

Ring No.: 24 | Area (cm^2): 31.87 | Solids Height, $H_{s,o}$ (mm): 12.871 | Specific Gravity, G_s = 2.750

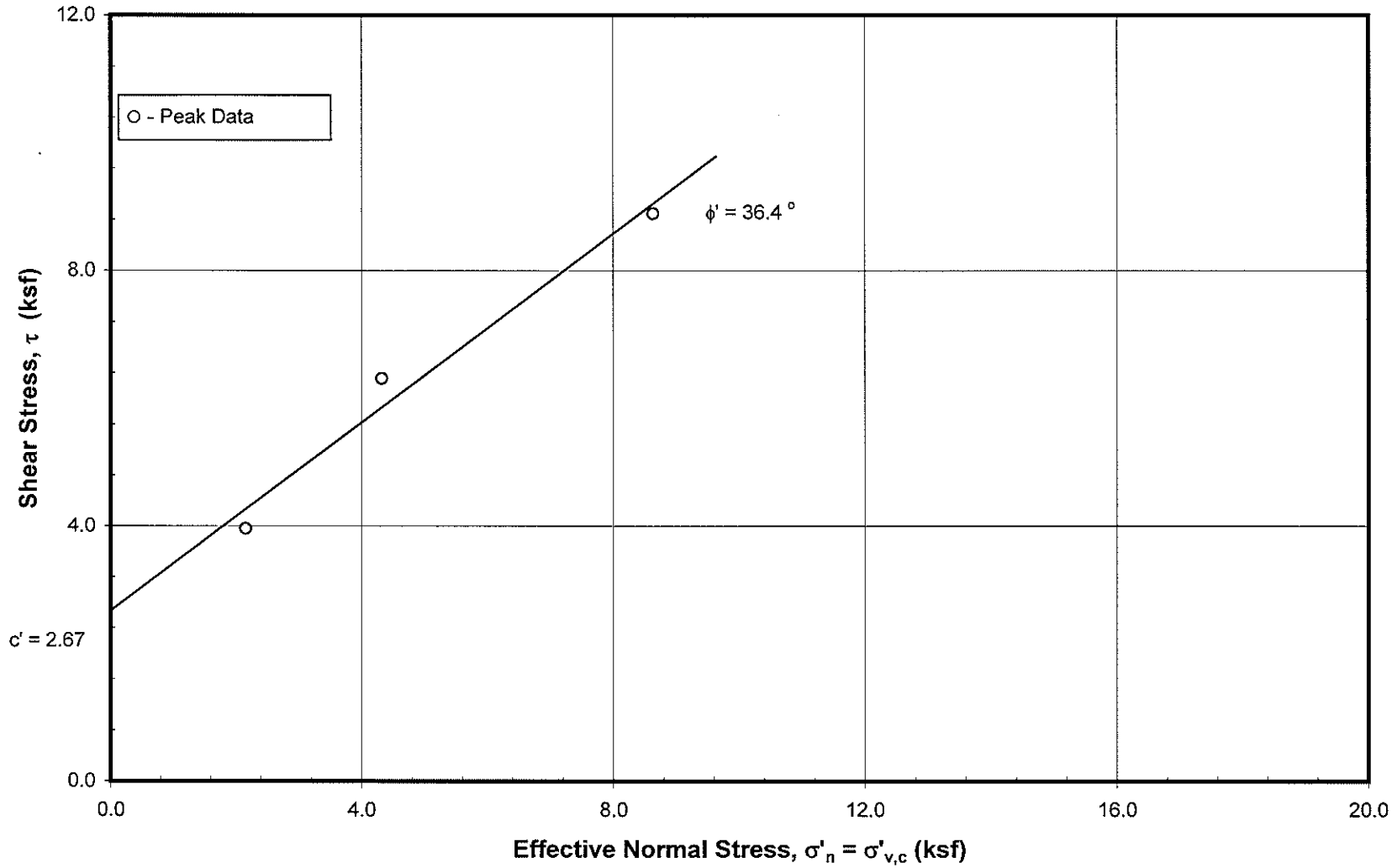
Initial:	Height:	H_o:	19.18	Water	14.0	Void	0.490	Deg. of	78.7	Total Unit	131.1	Dry Unit	115.0
Final:	(mm)	H_f:	19.70	Content (%):	17.9	Ratio:	0.532	Sat. (%):	92.4	Weight (pcf):	131.8	Weight (pcf):	111.8

Notes:

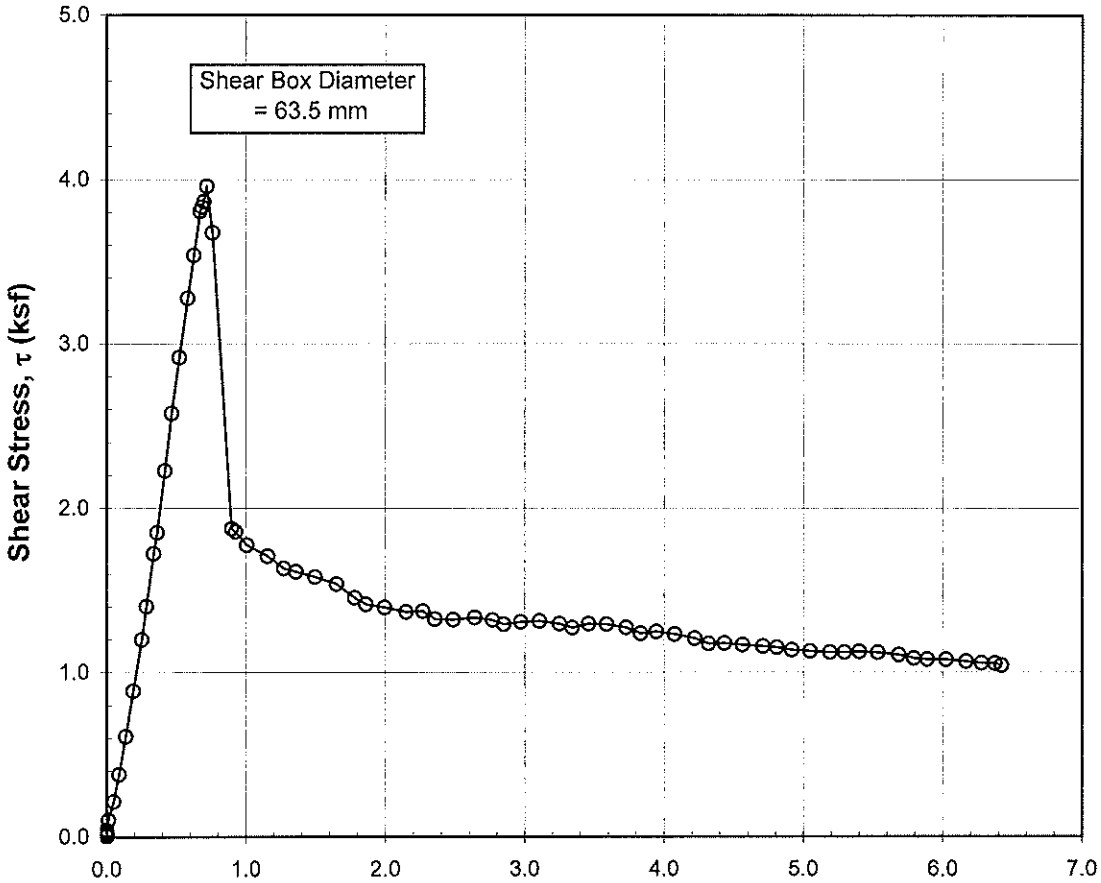
(1) W - water added, S - stress level applied to prevent swelling, P - indicates that the extended loading data point will be part of the consolidation curve.

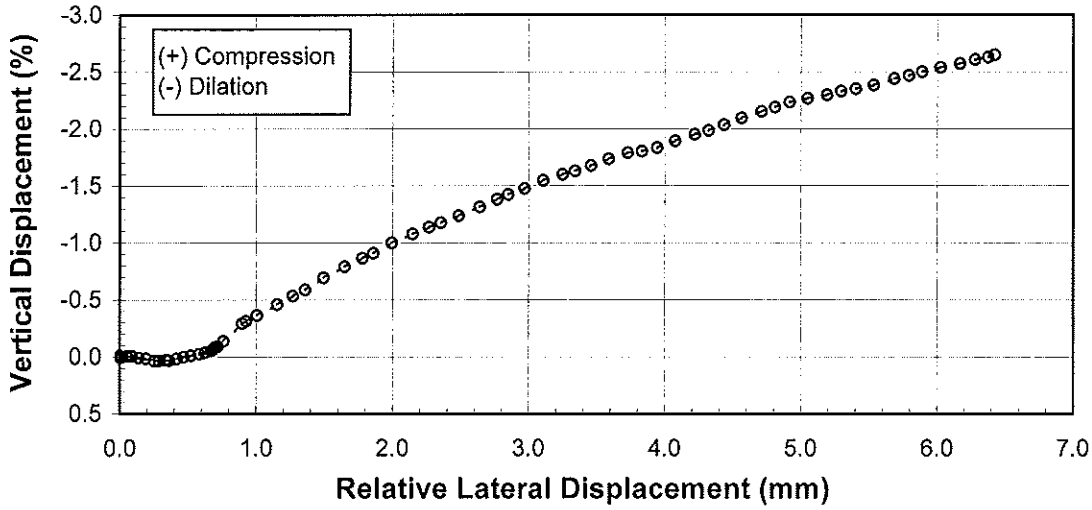
Summary Data Inputed By: GP | Calculations By: LF | Reviewed By: HP

						Based on Square Root of Time Fitting Method						Based on Log of Time Fitting Method						Average	
(1)	Final Applied Effective Stress, $\sigma'_{v,c}$ (ksf)	Average Applied Effective Stress, $\sigma'_{v,avg}$ (ksf)	Corr. Vol. Axial Strain $\varepsilon_{v,n}$ ($\varepsilon_{ac,n}$) $\Delta H_{c,n} / H_o$ (%)	Void Ratio, e_n	Rate of Sec. Comp., c_α $\Delta d_{0,50} / H_o$ Δ Log t x 10^{-4}	Void Ratio at 50% Consol. e_{50}	Vol. Strain at 50% Consol. $\varepsilon_{v,50}$ (%)	Vol. Strain at 100% Consol. $\varepsilon_{v,100}$ (%)	Coef. of Consol. c_v (m^2/y)	Hydraulic Conductivity k @ 20°C (m/y)	Primary Compression Ratio, r_p (%)	Void Ratio at 50% Consol. e_{50}	Vol. Strain at 50% Consol. $\varepsilon_{v,50}$ (%)	Vol. Strain at 100% Consol. $\varepsilon_{v,100}$ (%)	Coef. of Consol. c_v (m^2/y)	Hydraulic Conductivity k @ 20°C (m/y)	Primary Compression Ratio, r_p (%)	Coef. of Consol. c_v (m^2/y)	Hydraulic Conductivity k (m/y)
	0.00	0.00	0.00	0.49	NA	Data summarized below applies to the stress (load) increment associated with the final applied eff. stress on that line.													
	0.05	0.03	0.01	0.49															
	3.20	1.63	0.60	0.48															
P	3.20	1.63	0.00	0.49															
	4.00	3.60	0.00	0.49															
	8.00	6.00	0.00	0.49															
	16.00	12.00	0.39	0.48															
	32.00	24.00	2.09	0.46															
	40.00	36.00	2.62	0.45															
	48.00	44.00	3.16	0.44															
	64.00	56.00	4.22	0.43															
	128.00	96.00	6.64	0.39															
	32.00	80.00	3.95	0.43															
	8.00	20.00	2.13	0.46															
	2.00	5.00	0.29	0.49															
	0.50	1.25	-1.07	0.51															



DRAINED DIRECT SHEAR TEST: Test Series - (Peak)
Soil - Soil Interface & OCR = Unkown
Boring: BB4 - Sample: RC2c - Depth: 32 ft





DRAINED DIRECT SHEAR TEST: 1st Test in Test Series

Soil - Soil Interface $\sigma'_{v,c}$ = 2.16 ksf

Boring: BB4 - Sample: RC2a - Depth: 31.3 ft

Reviewed By: _____

PLATE ?

DIRECT SHEAR TEST (ASTM D 3080): Setup / Take Down

Project Number: 0411-08-1717 | Apparatus No.: 3F | File Name: BB4_RC2a
Task Number: | Assign. Units: [X] ksf; or Other: | Ring No.: FL1
Project Name: | Series $\sigma'_{v,c}$ or $\sigma'_{n,c}$: 2.16 , | Area - Shear Box, A_{sb} (cm^2): 31.864
" & | Height - Shear Box, H_{sb} (mm):
This Test $\sigma'_{v,c}$ or $\sigma'_{n,c}$: 2.16 ; NA ; & NA | Shear Box: [X] Circular [ ] Square
Induced OCR: NA ; Max. $\sigma'_{v,max}$: NA | Specific Gravity: 2.75 [X] Assumed;
Multistage: [X] No; [ ] Yes | Residual/Multishearing: [X] No; [ ] Yes | Precut Failure Plane [X] No; [ ] Yes [ ] Measured
Assign. Remarks:

[ ] Tube [ ] Field Extruded	[ ] Liner [X] Core	[ ] Tampling	[ ] Constant Effort:	Blows/Tamps per Layer =	
Boring No.: BB4	[ ] Reconstituted	[ ] Kneading	Rammer:Wgt.(lbf)=	Tamper: Force (lbf)=	
Sample No.: RC2	Compostite No.:	[ ] Inpact/Rammer	Drop(in.)=	Dia.(in.)=	
Depth (ft): 31.3	Specimen No.: a	[ ] Pluviated:	[ ] Undercompaction: U_{nl} (%) =	Ref.Effort=	
[ ] Spec. Selection by X - Ray;	[ ] Geomarine Sample		No. Layers =	% Comp=	± Opt.=

Water Content (WC);	Initial - Trimming Location			Final, W_{at}
	Top (W1)	Bottom (W2)	Sides (W3)	(see below)
Container No.	181	2008	4133	177
Mass Moist Soil + Container (g)	68.39	105.82	92.93	190.33
Mass Dry Soil + Container (g)	64.24	97.04	86.10	165.90
Mass Container (g)	30.30	30.38	30.24	16.80
WATER CONTENT (%)	12.23	13.17	12.23	16.38
Avg. Initial WC, W4 (%)	12.54	Final W_{at}: Soil with free water trimmed away		
[ ] See attached data sheet(s) for additional water contents				

Soil and Ring Masses (g)	Initial	Final
Mass Moist Soil+Trimming Ring	372.38	NA
Mass Trimming Ring, etc.	199.88	NA
Mass Moist Soil	172.50	NA
Excess Dry Soil (soil not included in final water content)		
Container No.		
Mass Dry Soil + Cont. (g)		
Mass Container (g)		
Mass Excess Dry Soil (g)	0.00	

Soil Height: Measurements[1]	
Initial (mm)	
with Spec., H_{soil}	without Spec., H_{app}
25.13	
24.99	
25.04	
25.10	
25.02	
Block Used [2]:	[ ] Yes ; [X] No

(1) Measured in trimming ring, not shear box.

Soil Height/Volume: Calc., (mm)	Initial
Height of Gauge Block, H_{gb} [2]	NA
Reading on Gauge Block, R_{gb}	NA
Avg. Reading on Soil, H_{soil}	25.06
Avg. Reading on Apparatus without Specimen, H_{app}	0.00
Soil Height, $H = H_{soil} - H_{app} + H_{gb} - R_{gb}$	25.06
Initial Soil Volume, V_o (cm^3)	79.84

Estimated Initial Unit Weight	
Total, $\gamma_{t,o}$ (pcf)= 134.89	Dry, $\gamma_{d,o}$ (pcf)= 119.85

(2) Req. block ht. to set bench comparator so the initial soil ht. can be determined directly by the diff. between the reading with and without spec. Enter value for H_{gb} and d_{gb} only when these values have to be included in the determination of the soil height.
(3) Equals wgt. top cap, loading hanger and Bellofram piston (if used). (4) Reduced value if soil will dilate during shear.

Apparatus Information:	
	Wgt. of Top Shear Ring, M_{sb} (lbf) = 2.09 Dead Wgt. of Loading System[3] (lbf)= 4.7
	Top Shear Ring Supported by Counter Force: [ ] Yes ; [X] No: Shear Ring Free to Move Up & Down: [ ] Yes ; [X] No:
	Porous Inserts: [X] Stone; [ ] Metal; **Do not use filter paper over porours inserts.** Free to Rotate: [ ] Yes ; [X] No:
	Porous Inserts with Additional Shear Transfer Features: [ ] None; [ ] Pins; [ ] Grid Plate; [X] Waffle Stone; [ ] Other:
	Apparatus deformation under consolidation load determined: [ ] Yes ; [X] No

Sketch of Specimen

Photo taken of Sliced Test Specimen: [ ] Yes ; [X] No
Final Visual Description: Clay, very stiff, dark gray with silt pockets (shale)
Trimming/Etc. Remarks:

Method of trimming periphery: [X] "Casagrande" Lathe ; [ ] Cutting Shoe ; [ ] Wire Saw; [ ] Other
Method of trimming ends: [ ] Wire Saw & Sharp (knife) Straight Edge; [X] Wire Saw & Straight Edge; [ ] Wire Saw; [ ] Other
For soils containig sand, ~100 % passes sieve size: [ ] #4 (4.75 mm); [ ] #10 (2.0 mm); [ ] #20 (0.85 mm) or; [ ] #40 (0.425 mm)
Shear Box Gap Setting[4]: Clays, 0.50 to 0.65 mm; Sands,1 mm to sieve size (mm) for 100 % passing

Trim./Recon. By: BBN Set up By: HC Prelim. Cal. By: HC Taken Down By: PL
Date: 12/2/2008 Date: 12/2/2008 Final Cal. By: MR Date: 12/4/2008
Reviewed By: HP

DIRECT SHEAR TEST (ASTM D 3080): SPECIMEN CALCULATIONS & SUMMARY

Project Number: 0411-08-1717 Boring/Exploration No.: BB4 Type Test: DS
Task Number: Sample No.: RC2 Specific Gravitiy, G_s: 2.75
Project Name: Penetration/Depth (ft): 31.3
Calculations Corrected for Salt (dissolved soilids): [X] No or, [ ] Yes, with salinity, S_{ppt} : _____ ppt

Water Content Copied/Derived From:		Water Content, $W_{o,n}$ (%)	Mass Dry Soil, $M_{do,n}$ (g)	Degree of Sat., $S_{o,n}$ (%)
Initial,	Top, W1	12.23	153.71	79.0
"	Bottom, W2	13.17	152.42	82.7
"	Sides, W3	12.23	153.71	79.0
"	Average, W4	12.54	153.28	80.2
"	Assumed, W	12.54	153.28	80.2
Final (After Test/Shear)		16.38		

Back-calculated Data		Input Data for Back Calculation	
Item	Value	$S_{o,n}$ (%)	
Initial Mass Dry Soil, $M_{d,o}$			G_s
Specific Gravity, G_s			$M_{d,o}$ (g)

Calculation Constant: = (unit conversion) / $G_s \times \rho_w \times A_{sb}$	
Estimated	0.11433
Final Selected	0.11433

Soil Height: Final by Dial Change During Test (mm)		For Multistage Testing	
		2nd Stage	3rd Stage
Initial Height, H_o	25.06		
Change in Height During Consol.(not corrected for apparatus flexability)	0.11	NA	NA
Height after Consolidation, H_c	24.94	NA	NA
Change in Height During **Initial** Shear (+ compression, - dilation)	-0.66	NA	NA
Change in Height During Repeated/Residual Shear	NA	NA	NA
Change in Height During Consol. to Max. Consol. Stress	NA	NA	NA
Final Soil Height (After Test/Shear), H_{at}	25.60	NA	NA

Summary of Specimen Physical Properties: Initial Conditions

Area, A_{sb}	31.864 , cm^2			
Specific Gravity, G_s	2.750	X	Assumed	[ ] Measured
Mass Dry Soil, Md (g)	153.28	X	Based on average water content	[ ] Value based on one of the above values

	Water Content, w (%)	Total Unit Weight, γ_t (pcf)	Dry Unit Weight, γ_d (pcf)	Void Ratio, e	Degree of Saturation, S (%)	Height, H (mm)	Volume, V (cm^3)
Initial:	12.5	134.88	119.85	0.430	80.2	25.06	79.84

Consolidation Summary: Stress Units = (ksf)	Stage:	1st	2nd	3rd		1st	2nd	3rd
	$\sigma'_{n,c}$ or $\sigma'_{v,c}$	2.16	NA	NA	$\varepsilon_{a,c}$ (%)	0.45	NA	NA
	$\sigma'_{v,max}$	NA	NA	NA	$\varepsilon_{a,max}$ (%)	NA	NA	NA
	OCR	NA	NA	NA	t_c (days)	1.3	NA	NA

Remarks:
NA - Not Applicable

Calculated by: MR Reviewed by: HP
Date: 12/8/2008

DRAINED DIRECT SHEAR TEST: Test Results

Project Number: 0411-08-1717
Task No.:
Project Name:
File Name: BB4_RC2a
Shear Box Dia./Width: 63.5 (mm)
Shear Box: [X] Circular [ ] Square

App. No.: 3F
Consol. Stress, $\sigma'_{v,c}$: 2.16 (ksf)
Induced OCR: NA
$\sigma'_{v,max}$: NA (ksf)
Specimen Ht.: 24.94 (mm)
Vert. Strain During Consol.: 0.45 (%)

Boring No.: BB4
Sample No.: RC2
Specimen No.: a
Depth (ft): 31.3

Part of Test Series: [X] No; [ ] Yes If yes, Test: NA of NA
Multistage: [X] No; [ ] Yes If yes, Test Stage No.: NA
Residual/Multishearing: [X] No; [ ] Yes Precut Failure Plane [X] No; [ ] Yes

Initial Test Conditions:				
Water Content, w (%)	Total Unit Weight, γ_t (pcf)	Dry Unit Weight, γ_d (pcf)	Void Ratio, e	Degree of Saturation, S (%)
12.5	134.88	119.85	0.430	80.2

Shearing Data For:
- [X] Intact - Without Repeated Shearing (Peak Data)
- [ ] Intact - Before Repeated Shearing (Peak Data)
- [ ] After Rapid Repeated Shearing (Residual Data)
- [ ] Continuous Shearing: Forwards & Backwards (Peak & Residual Data)

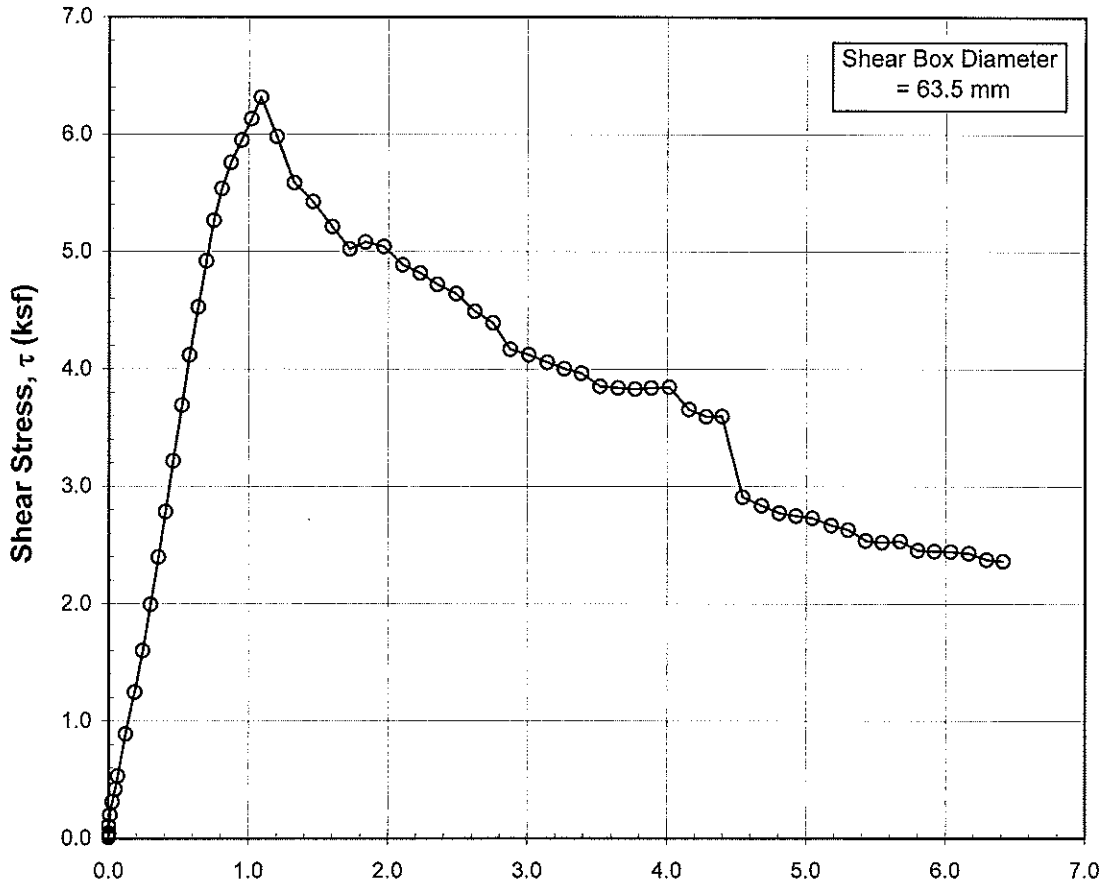
Avg. Lat. Displacement Rate (mm/h): 0.45875

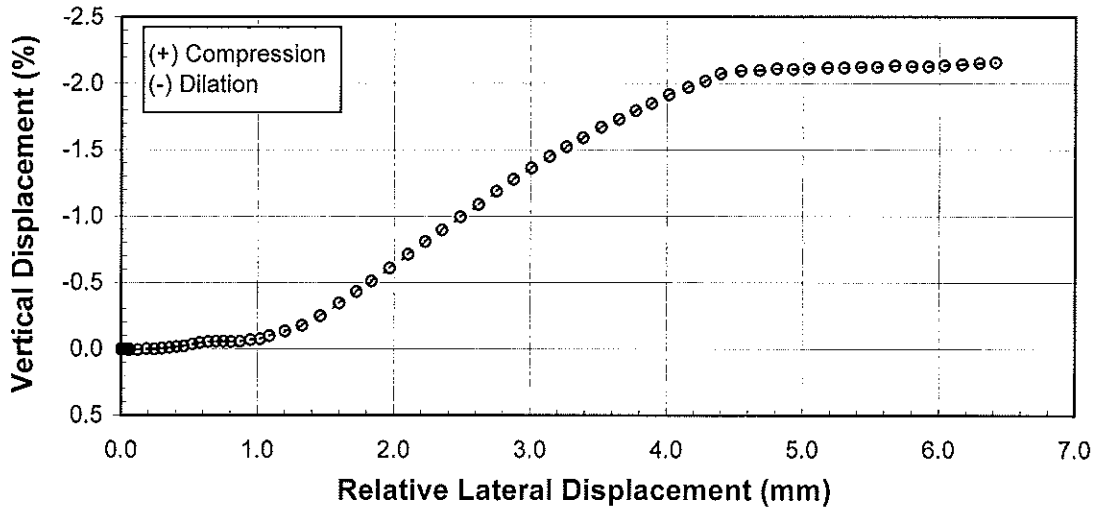
Elapsed Time (min)	Rel. Lateral Displacement (mm)	Horiz. Force (lbf)	Vert. Displacement (%)	Shear Stress, τ (kips/ft^2)
0.00	0.0000	-0.28	0.00	-0.01
3.00	0.0012	-0.28	0.00	-0.01
6.00	0.0003	-0.28	-0.01	-0.01
9.00	0.0009	-0.27	-0.01	-0.01
12.00	0.0003	-0.28	0.00	-0.01
15.00	0.0019	0.13	0.01	0.00
18.00	0.0033	0.66	0.00	0.02
21.00	0.0009	1.39	0.00	0.04
24.00	0.0135	3.52	0.00	0.10
33.00	0.0519	7.38	-0.01	0.22
42.00	0.0905	13.02	0.00	0.38
51.00	0.1383	20.93	0.01	0.61
60.00	0.1923	30.42	0.02	0.89
69.00	0.2547	41.17	0.04	1.20
78.00	0.2880	48.10	0.03	1.40
87.00	0.3397	59.14	0.03	1.72
96.00	0.3641	63.49	0.03	1.85
105.00	0.4204	76.39	0.02	2.23
114.00	0.4692	88.35	0.00	2.58
123.00	0.5237	100.01	-0.01	2.92
132.00	0.5836	112.35	-0.02	3.28
141.00	0.6269	121.32	-0.04	3.54
150.00	0.6733	130.52	-0.05	3.81
153.00	0.6855	131.43	-0.06	3.83
156.00	0.6990	132.54	-0.08	3.86
159.00	0.7195	135.74	-0.09	3.96
162.00	0.7608	126.06	-0.14	3.68
165.00	0.8990	64.31	-0.29	1.87
168.00	0.9281	63.67	-0.31	1.86
177.00	1.0080	60.91	-0.36	1.78
190.00	1.1554	58.64	-0.46	1.71
205.00	1.2710	56.06	-0.53	1.63
220.00	1.3591	55.36	-0.59	1.61
235.00	1.4959	54.23	-0.69	1.58
250.00	1.6496	52.77	-0.79	1.54
265.00	1.7801	49.88	-0.86	1.45

Sign Convention:
(+) Compression or Fowards
(-) Dilation or Backwards

Elapsed Time (min)	Rel. Lateral Displacement (mm)	Horiz. Force (lbf)	Vert. Displacement (%)	Shear Stress, τ (kips/ft^2)
280.00	1.8611	48.54	-0.91	1.42
295.00	1.9948	47.86	-1.00	1.40
310.00	2.1485	46.91	-1.08	1.37
325.00	2.2674	47.09	-1.14	1.37
340.00	2.3548	45.40	-1.17	1.32
355.00	2.4857	45.31	-1.24	1.32
370.00	2.6404	45.75	-1.31	1.33
385.00	2.7685	45.23	-1.38	1.32
400.00	2.8498	44.34	-1.42	1.29
415.00	2.9704	44.82	-1.48	1.31
430.00	3.1078	45.00	-1.55	1.31
445.00	3.2507	44.45	-1.60	1.30
460.00	3.3425	43.62	-1.63	1.27
475.00	3.4597	44.43	-1.68	1.30
490.00	3.5889	44.33	-1.74	1.29
505.00	3.7297	43.67	-1.79	1.27
520.00	3.8330	42.45	-1.80	1.24
535.00	3.9456	42.81	-1.83	1.25
550.00	4.0770	42.28	-1.89	1.23
565.00	4.2205	41.40	-1.95	1.21
580.00	4.3215	40.28	-1.99	1.17
595.00	4.4353	40.41	-2.04	1.18
610.00	4.5633	40.07	-2.09	1.17
625.00	4.7118	39.76	-2.15	1.16
640.00	4.8100	39.53	-2.19	1.15
655.00	4.9175	39.00	-2.23	1.14
670.00	5.0499	38.72	-2.27	1.13
685.00	5.1918	38.49	-2.30	1.12
700.00	5.2956	38.50	-2.33	1.12
715.00	5.4019	38.63	-2.35	1.13
730.00	5.5348	38.46	-2.38	1.12
745.00	5.6846	37.96	-2.44	1.11
760.00	5.7925	37.25	-2.47	1.09
775.00	5.8893	37.01	-2.50	1.08
790.00	6.0244	36.98	-2.54	1.08
805.00	6.1682	36.58	-2.57	1.07
820.00	6.2784	36.26	-2.61	1.06
835.00	6.3750	36.18	-2.63	1.05
840.00	6.4226	35.73	-2.65	1.04

Sign Convention:
(+) Compression or Fowards
(-) Dilation or Backwards





DRAINED DIRECT SHEAR TEST: 2nd Test in Test Series

Soil - Soil Interface $\sigma'_{v,c}$ = 4.32 ksf

Boring: BB4 - Sample: RC2b - Depth: 31.6 ft

Reviewed By: _____

PLATE ?

DIRECT SHEAR TEST (ASTM D 3080): Setup / Take Down

Project Number: 0411-08-1717 | Apparatus No.: 2F | File Name: BB4_RC2b
Task Number: | Assign. Units: [X] ksf; or Other: | Ring No.: FL1
Project Name: | Series $\sigma'_{v,c}$ or $\sigma'_{n,c}$: 4.32 , | Area - Shear Box, A_{sb} (cm^2): 31.864
" & | Height - Shear Box, H_{sb} (mm):
This Test $\sigma'_{v,c}$ or $\sigma'_{n,c}$: 4.32 ; NA ; & NA | Shear Box: [X] Circular [ ] Square
Induced OCR: NA ; Max. $\sigma'_{v,max}$: NA | Specific Gravity: 2.75 [X] Assumed; [ ] Measured
Multistage: [X] No; [ ] Yes Residual/Multishearing: [X] No; [ ] Yes Precut Failure Plane [X] No; [ ] Yes
Assign. Remarks:

[ ] Tube [ ] Field Extruded	[ ] Liner [X] Core	[ ] Tampling	[ ] Constant Effort:	Blows/Tamps per Layer =	
Boring No.: BB4	[ ] Reconstituted	[ ] Kneading	Rammer Wgt.(lbf)=	Tamper: Force (lbf)=	
Sample No.: RC2	Compostite No.:	[ ] Inpact/Rammer	Drop(in.)=	Dia.(in.)=	
Depth (ft): 31.6	Specimen No.: b	[ ] Pluviated:	[ ] Undercompaction: U_{nl} (%) =	Ref.Effort=	
[ ] Spec. Selection by X - Ray;	[ ] Geomarine Sample		No. Layers =	% Comp=	± Opt.=

Water Content (WC);	Initial - Trimming Location			Final, W_{at}	Soil and Ring Masses (g)	Initial	Final
	Top (W1)	Bottom (W2)	Sides (W3)	(see below)	Mass Moist Soil+Trimming Ring	371.82	NA
Container No.	638	2029	4085	2112	Mass Trimming Ring, etc.	199.88	NA
Mass Moist Soil + Container (g)	86.77	93.95	88.45	191.12	Mass Moist Soil	171.94	NA
Mass Dry Soil + Container (g)	79.79	86.53	81.12	164.60	Excess Dry Soil (soil not included in final water content)		
Mass Container (g)	31.93	30.65	31.34	17.26	Container No.		
WATER CONTENT (%)	14.58	13.28	14.72	18.00	Mass Dry Soil + Cont. (g)		
Avg. Initial WC, W4 (%)	14.20	Final W_{at}: Soil with free water trimmed away			Mass Container (g)		
[ ] See attached data sheet(s) for additional water contents					Mass Excess Dry Soil (g)	0.00	

Soil Height: Measurements(1)	
Initial (mm)	
with Spec., H_{soil}	without Spec., H_{app}
25.03	
24.98	
24.95	
24.99	
24.96	
Block Used (2):	[ ] Yes ; [X] No

(1) Measured in trimming ring, not shear box.

Soil Height/Volume: Calc., (mm)	Initial
Height of Gauge Block, H_{gb} (2)	NA
Reading on Gauge Block, R_{gb}	NA
Avg. Reading on Soil, H_{soil}	24.98
Avg. Reading on Apparatus without Specimen, H_{app}	0.00
Soil Height, $H = H_{soil} - H_{app} + H_{gb} - R_{gb}$	24.98
Initial Soil Volume, V_o (cm^3)	79.60

Estimated Initial Unit Weight	
Total, $\gamma_{t,o}$ (pcf)= 134.85	Dry, $\gamma_{d,o}$ (pcf)= 118.08

(2) Req. block ht. to set bench comparator so the initial soil ht. can be determined directly by the diff. between the reading with and without spec. Enter value for H_{gb} and d_{gb} only when these values have to be included in the determination of the soil height.
(3) Equals wgt. top cap, loading hanger and Bellofram piston (if used). (4) Reduced value if soil will dilate during shear.

Apparatus Information:	
	Wgt. of Top Shear Ring, M_{sb} (lbf) = 2.07 Dead Wgt. of Loading System(3) (lbf)= 4.81
	Top Shear Ring Supported by Counter Force: [ ] Yes ; [X] No: Shear Ring Free to Move Up & Down: [ ] Yes ; [X] No:
	Porous Inserts: [X] Stone; [ ] Metal; **Do not use filter paper over porours inserts.** Free to Rotate: [ ] Yes ; [X] No:
	Porous Inserts with Additional Shear Transfer Features: [ ] None; [ ] Pins; [ ] Grid Plate; [X] Waffle Stone; [ ] Other:
	Apparatus deformation under consolidation load determined: [ ] Yes ; [X] No

Sketch of Specimen

Photo taken of Sliced Test Specimen: [ ] Yes ; [X] No

Final Visual Description: Clay, very stiff, dark gray with silt pockets and shell fragments

Trimming/Etc. Remarks:

Method of trimming periphery: [X] "Casagrande" Lathe ; [ ] Cutting Shoe ; [ ] Wire Saw; [ ] Other
Method of trimming ends: [ ] Wire Saw & Sharp (knife) Straight Edge; [X] Wire Saw & Straight Edge; [ ] Wire Saw; [ ] Other
For soils containig sand, ~100 % passes sieve size: [ ] #4 (4.75 mm); [ ] #10 (2.0 mm); [ ] #20 (0.85 mm) or; [ ] #40 (0.425 mm)
Shear Box Gap Setting(4): Clays, 0.50 to 0.65 mm; Sands,1 mm to sieve size (mm) for 100 % passing

Trim./Recon. By: DBN Set up By: HC Prelim. Cal. By: HC Taken Down By: PL
Date: 12/2/2008 Date: 12/2/2008 Final Cal. By: MR Date: 12/4/2008
Reviewed By: HP

DIRECT SHEAR TEST (ASTM D 3080): SPECIMEN CALCULATIONS & SUMMARY

Project Number: 0411-08-1717 Boring/Exploration No.: BB4 Type Test: DS
Task Number: Sample No.: RC2 Specific Gravitiy, G_s: 2.75
Project Name: Penetration/Depth (ft): 31.6
Calculations Corrected for Salt (dissolved soilids): [X] No or, [ ] Yes, with salinity, S_{ppt} : _____ ppt

Water Content Copied/Derived From:	Water Content, $W_{o,n}$ (%)	Mass Dry Soil, $M_{do,n}$ (g)	Degree of Sat., $S_{o,n}$ (%)
Initial, Top, W1	14.58	150.06	87.9
" Bottom, W2	13.28	151.79	83.1
" Sides, W3	14.72	149.87	88.4
" Average, W4	14.20	150.57	86.5
" Assumed, W	14.20	150.56	86.5
Final (After Test/Shear)	18.00		

Back-calculated Data		Input Data for Back Calculation	
Item	Value	$S_{o,n}$ (%)	
Initial Mass Dry Soil, $M_{d,o}$			G_s
Specific Gravity, G_s			$M_{d,o}$ (g)

Calculation Constant: = (unit conversion) / $G_s \times \rho_w \times A_{sb}$	
Estimated	0.11433
Final Selected	0.11433

Soil Height: Final by Dial Change During Test (mm)		For Multistage Testing	
		2nd Stage	3rd Stage
Initial Height, H_o	24.98		
Change in Height During Consol.(not corrected for apparatus flexability)	0.24	NA	NA
Height after Consolidation, H_c	24.74	NA	NA
Change in Height During **Initial** Shear (+ compression, - dilation)	-0.53	NA	NA
Change in Height During Repeated/Residual Shear	NA	NA	NA
Change in Height During Consol. to Max. Consol. Stress	NA	NA	NA
Final Soil Height (After Test/Shear), H_{at}	25.28	NA	NA

Summary of Specimen Physical Properties: Initial Conditions

Area, A_{sb}	31.864 , cm^2							
Specific Gravity, G_s	2.750		X	Assumed		Measured		
Mass Dry Soil, Md (g)	150.57		X	Based on average water content		Value based on one of the above values		
	Water Content, w (%)	Total Unit Weight, γ_t (pcf)	Dry Unit Weight, γ_d (pcf)	Void Ratio, e	Degree of Saturation, S (%)	Height, H (mm)	Volume, V (cm^3)	
Initial:	14.2	134.84	118.08	0.451	86.5	24.98	79.60	

Consolidation Summary: Stress Units = (ksf)	Stage:	1st	2nd	3rd		1st	2nd	3rd
	$\sigma'_{n,c}$ or $\sigma'_{v,c}$	4.32	NA	NA	$\varepsilon_{a,c}$ (%)	0.96	NA	NA
	$\sigma'_{v,max}$	NA	NA	NA	$\varepsilon_{a,max}$ (%)	NA	NA	NA
	OCR	NA	NA	NA	t_c (days)	1.2	NA	NA

Remarks:
NA - Not Applicable

Calculated by: MR Reviewed by: HP
Date: 12/8/2008

DRAINED DIRECT SHEAR TEST: Test Results

Project Number: 0411-08-1717
Task No.:
Project Name:
File Name: BB4_RC2b
Shear Box Dia./Width: 63.5 (mm)
Shear Box: [X] Circular [ ] Square

App. No.: 2F
Consol. Stress, $\sigma'_{v,c}$: 4.32 (ksf)
Induced OCR: NA
$\sigma'_{v,max}$: NA (ksf)
Specimen Ht.: 24.74 (mm)
Vert. Strain During Consol.: 0.96 (%)

Boring No.: BB4
Sample No.: RC2
Specimen No.: b
Depth (ft): 31.6

Part of Test Series: [X] No; [ ] Yes If yes, Test: NA of NA
Multistage: [X] No; [ ] Yes If yes, Test Stage No.: NA
Residual/Multishearing: [X] No; [ ] Yes Precut Failure Plane [X] No; [ ] Yes

Initial Test Conditions:				
Water Content, w (%)	Total Unit Weight, γ_t (pcf)	Dry Unit Weight, γ_d (pcf)	Void Ratio, e	Degree of Saturation, S (%)
14.2	134.84	118.08	0.451	86.5

Shearing Data For:
[X] Intact - Without Repeated Shearing (Peak Data)
[ ] Intact - Before Repeated Shearing (Peak Data)
[ ] After Rapid Repeated Shearing (Residual Data)
[ ] Continuous Shearing: Forwards & Backwards (Peak & Residual Data)

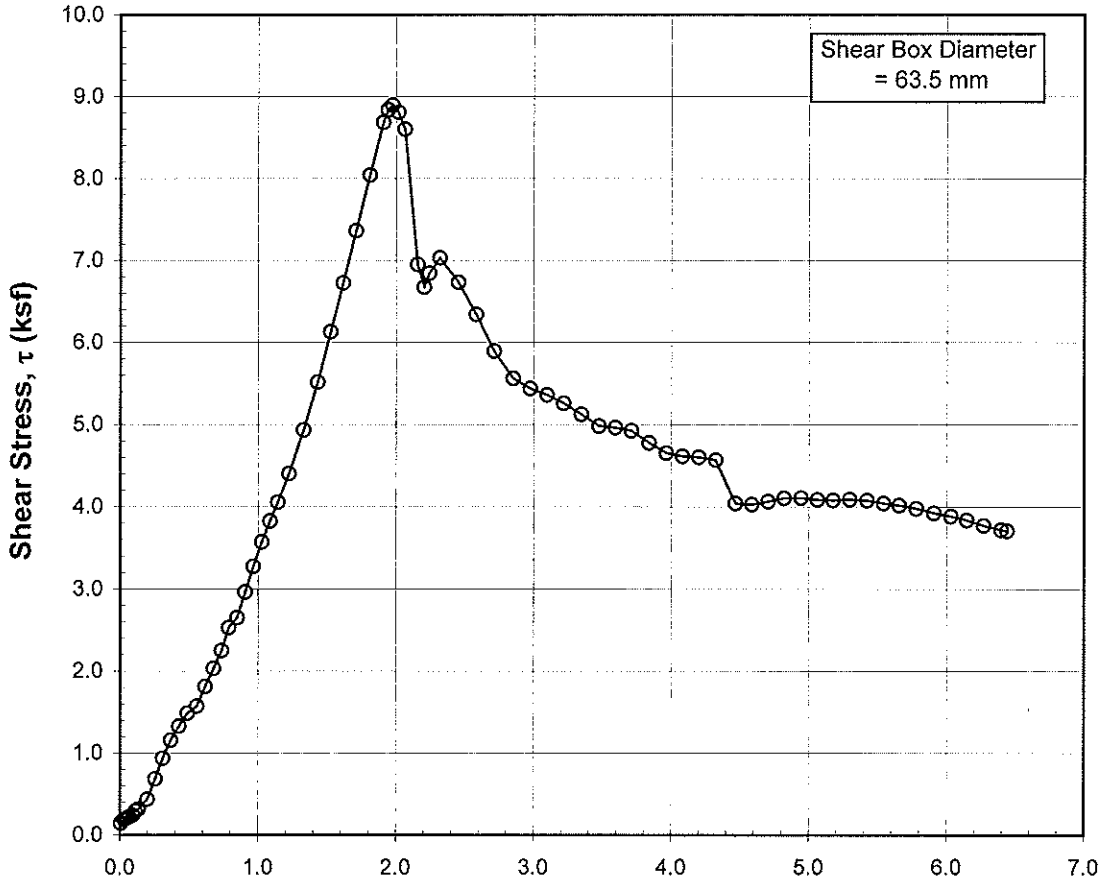
Avg. Lat. Displacement Rate (mm/h): 0.47802

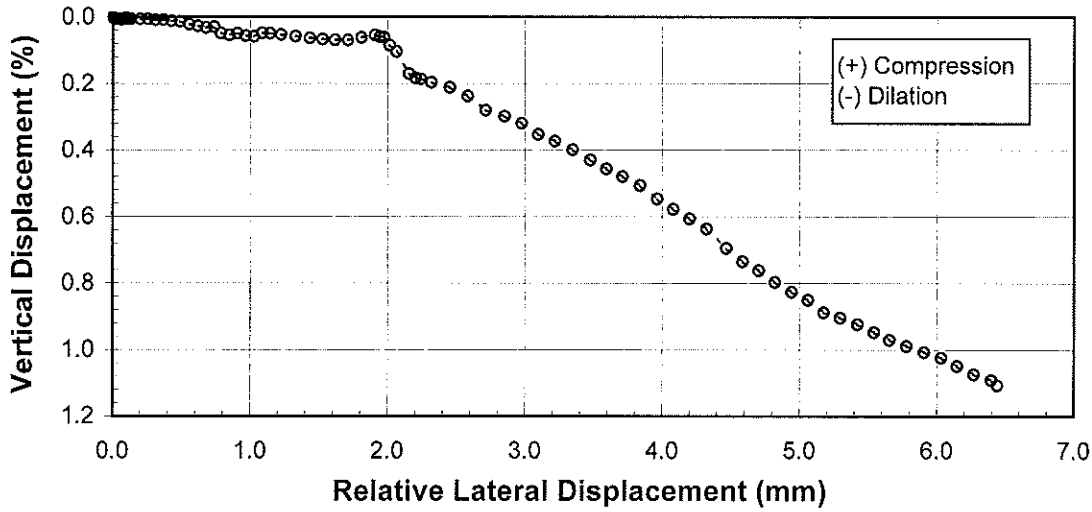
Elapsed Time (min)	Rel. Lateral Displacement (mm)	Horiz. Force (lbf)	Vert. Displacement (%)	Shear Stress, τ (kips/ft^2)
0.00	0.0000	0.27	0.00	0.01
3.00	-0.0041	0.46	0.00	0.01
6.00	-0.0005	0.93	0.00	0.03
9.00	0.0020	1.58	0.00	0.05
12.00	-0.0002	3.63	0.00	0.11
15.00	0.0099	6.84	0.00	0.20
18.00	0.0260	10.67	0.00	0.31
21.00	0.0470	14.39	0.00	0.42
24.00	0.0650	18.25	0.01	0.53
33.00	0.1221	30.52	0.01	0.89
42.00	0.1873	42.73	0.00	1.25
51.00	0.2440	54.90	0.00	1.60
60.00	0.3004	68.42	0.00	1.99
69.00	0.3568	82.21	-0.01	2.40
78.00	0.4067	95.45	-0.02	2.78
87.00	0.4614	110.30	-0.02	3.22
96.00	0.5239	126.59	-0.04	3.69
105.00	0.5774	141.19	-0.05	4.12
114.00	0.6396	155.25	-0.05	4.53
123.00	0.6983	168.75	-0.06	4.92
132.00	0.7514	180.58	-0.06	5.27
141.00	0.8067	189.87	-0.05	5.54
150.00	0.8725	197.52	-0.06	5.76
159.00	0.9496	204.10	-0.07	5.95
168.00	1.0197	210.32	-0.08	6.13
177.00	1.0879	216.61	-0.10	6.32
190.00	1.2020	205.10	-0.13	5.98
205.00	1.3268	191.60	-0.18	5.59
220.00	1.4610	186.05	-0.25	5.42
235.00	1.5986	178.74	-0.34	5.21
250.00	1.7241	172.25	-0.43	5.02
265.00	1.8362	174.27	-0.51	5.08
280.00	1.9691	172.93	-0.61	5.04
295.00	2.1041	167.59	-0.71	4.89
310.00	2.2302	165.23	-0.81	4.82
325.00	2.3525	161.90	-0.90	4.72

Sign Convention:
(+) Compression or Fowards
(-) Dilation or Backwards

Elapsed Time (min)	Rel. Lateral Displacement (mm)	Horiz. Force (lbf)	Vert. Displacement (%)	Shear Stress, τ (kips/ft^2)
340.00	2.4867	159.20	-0.99	4.64
355.00	2.6215	154.02	-1.09	4.49
370.00	2.7523	150.66	-1.19	4.39
385.00	2.8761	142.94	-1.28	4.17
400.00	3.0087	141.35	-1.36	4.12
415.00	3.1419	139.16	-1.45	4.06
430.00	3.2648	137.29	-1.52	4.00
445.00	3.3866	135.95	-1.59	3.96
460.00	3.5195	132.17	-1.67	3.85
475.00	3.6494	131.70	-1.73	3.84
490.00	3.7712	131.39	-1.79	3.83
505.00	3.8872	131.72	-1.85	3.84
520.00	4.0162	131.93	-1.92	3.85
535.00	4.1573	125.40	-1.97	3.66
550.00	4.2830	123.33	-2.02	3.60
565.00	4.3968	123.37	-2.07	3.60
580.00	4.5459	99.78	-2.09	2.91
595.00	4.6825	97.31	-2.10	2.84
610.00	4.8089	95.15	-2.11	2.77
625.00	4.9280	94.31	-2.11	2.75
640.00	5.0457	93.64	-2.11	2.73
655.00	5.1814	91.54	-2.12	2.67
670.00	5.3032	90.23	-2.12	2.63
685.00	5.4292	87.04	-2.12	2.54
700.00	5.5474	86.58	-2.12	2.52
715.00	5.6765	86.90	-2.13	2.53
730.00	5.8014	84.24	-2.13	2.46
745.00	5.9214	83.98	-2.13	2.45
760.00	6.0374	83.85	-2.13	2.44
775.00	6.1677	83.38	-2.14	2.43
790.00	6.2952	81.50	-2.15	2.38
805.00	6.4135	81.09	-2.16	2.36

Sign Convention:
(+) Compression or Fowards
(-) Dilation or Backwards





DRAINED DIRECT SHEAR TEST: 3rd Test in Test Series

Soil - Soil Interface $\sigma'_{v,c}$ = 8.64 ksf

Boring: BB4 - Sample: RC2c - Depth: 32 ft

Reviewed By: _____

PLATE ?

DIRECT SHEAR TEST (ASTM D 3080): Setup / Take Down

Project Number: 0411-08-1717 | Apparatus No.: 1F | File Name: BB4_RC2c
Task Number: | Assign. Units: [X] ksf; or Other: | Ring No.: FL1
Project Name: | Series $\sigma'_{v,c}$ or $\sigma'_{n,c}$: 8.64 , | Area - Shear Box, A_{sb} (cm^2): 31.864
" & | Height - Shear Box, H_{sb} (mm):
This Test $\sigma'_{v,c}$ or $\sigma'_{n,c}$: 8.64 ; NA ; & NA | Shear Box: [X] Circular [ ] Square
Induced OCR: NA ; Max. $\sigma'_{v,max}$: NA | Specific Gravity: 2.75 [X] Assumed; [ ] Measured
Multistage: [X] No; [ ] Yes Residual/Multishearing: [X] No; [ ] Yes Precut Failure Plane [X] No; [ ] Yes
Assign. Remarks:

[X] Tube [ ] Field Extruded [ ] Liner [ ]	[ ] Tampling	[ ] Constant Effort:	Blows/Tamps per Layer =
Boring No.: BB4 [ ] Reconstituted	[ ] Kneading	Rammer:Wgt.(lbf)=	Tamper: Force (lbf)=
Sample No.: RC2 Compostite No.:	[ ] Inpact/Rammer	Drop(in.)=	Dia.(in.)=
Depth (ft): 32 Specimen No.: c	[ ] Pluviated:	[ ] Undercompaction: U_{nl} (%) =	Ref.Effort=
[X] Spec. Selection by X - Ray; [X] Geomarine Sample		No. Layers =	% Comp= ± Opt.=

Water Content (WC);	Initial - Trimming Location			Final, W_{at}
	Top (W1)	Bottom (W2)	Sides (W3)	(see below)
Container No.	628	922	6036	77
Mass Moist Soil + Container (g)	86.58	107.16	77.96	187.62
Mass Dry Soil + Container (g)	79.70	97.23	72.10	161.10
Mass Container (g)	31.61	31.67	31.67	17.02
WATER CONTENT (%)	14.31	15.15	14.49	18.41
Avg. Initial WC, W4 (%)	14.65	Final W_{at}: Soil with free water trimmed away		
[ ] See attached data sheet(s) for additional water contents				

Soil and Ring Masses (g)	Initial	Final
Mass Moist Soil+Trimming Ring	368.15	NA
Mass Trimming Ring, etc.	199.88	NA
Mass Moist Soil	168.27	NA
Excess Dry Soil (soil not included in final water content)		
Container No.		
Mass Dry Soil + Cont. (g)		
Mass Container (g)		
Mass Excess Dry Soil (g)	0.00	

Soil Height: Measurements[1]	
Initial (mm)	
with Spec., H_{soil}	without Spec., H_{app}
25.04	
24.98	
24.98	
25.07	
24.97	
Block Used [2]: [ ] Yes ; [X] No	

(1) Measured in trimming ring, not shear box.

Soil Height/Volume: Calc., (mm)	Initial
Height of Gauge Block, H_{gb} [2]	NA
Reading on Gauge Block, R_{gb}	NA
Avg. Reading on Soil, H_{soil}	25.01
Avg. Reading on Apparatus without Specimen, H_{app}	0.00
Soil Height, $H = H_{soil} - H_{app} + H_{gb} - R_{gb}$	25.01
Initial Soil Volume, V_o (cm^3)	79.69

Estimated Initial Unit Weight	
Total, $\gamma_{t,o}$ (pcf)= 131.83	Dry, $\gamma_{d,o}$ (pcf)= 114.99

(2) Req. block ht. to set bench comparator so the initial soil ht. can be determined directly by the diff. between the reading with and without spec. Enter value for H_{gb} and d_{gb} only when these values have to be included in the determination of the soil height.
(3) Equals wgt. top cap, loading hanger and Bellofram piston (if used). (4) Reduced value if soil will dilate during shear.

Apparatus Information:	
	Wgt. of Top Shear Ring, M_{sb} (lbf) = 2.57 Dead Wgt. of Loading System[3] (lbf)= 4.87
	Top Shear Ring Supported by Counter Force: [ ] Yes ; [X] No: Shear Ring Free to Move Up & Down: [ ] Yes ; [X] No:
	Porous Inserts: [X] Stone; [ ] Metal; **Do not use filter paper over porours inserts.** Free to Rotate: [ ] Yes ; [X] No:
	Porous Inserts with Additional Shear Transfer Features: [ ] None; [ ] Pins; [ ] Grid Plate; [X] Waffle Stone; [ ] Other:
	Apparatus deformation under consolidation load determined: [ ] Yes ; [X] No

Sketch of Specimen

Photo taken of Sliced Test Specimen: [ ] Yes ; [X] No

Final Visual Description: Clay, very stiff, dark gray with silt pockets (shale)

Trimming/Etc. Remarks:

Method of trimming periphery: [X] "Casagrande" Lathe ; [ ] Cutting Shoe ; [ ] Wire Saw; [ ] Other
Method of trimming ends: [ ] Wire Saw & Sharp (knife) Straight Edge; [X] Wire Saw & Straight Edge; [ ] Wire Saw; [ ] Other
For soils containig sand, ~100 % passes sieve size: [ ] #4 (4.75 mm); [ ] #10 (2.0 mm); [ ] #20 (0.85 mm) or; [ ] #40 (0.425 mm)
Shear Box Gap Setting[4]: Clays, 0.50 to 0.65 mm; Sands,1 mm to sieve size (mm) for 100 % passing

Trim./Recon. By: DBN Set up By: HC Prelim. Cal. By: HC Taken Down By: PL
Date: 12/2/2008 Date: 12/2/2008 Final Cal. By: MR Date: 12/4/2008
Reviewed By: HP

DIRECT SHEAR TEST (ASTM D 3080): SPECIMEN CALCULATIONS & SUMMARY

Project Number: 0411-08-1717 Boring/Exploration No.: BB4 Type Test: DS
Task Number: Sample No.: RC2 Specific Gravitiy, G_s: 2.75
Project Name: Penetration/Depth (ft): 32
Calculations Corrected for Salt (dissolved soilids): [X] No or, [ ] Yes, with salinity, S_{ppt} : ppt

Water Content Copied/Derived From:	Water Content, $W_{o,n}$ (%)	Mass Dry Soil, $M_{do,n}$ (g)	Degree of Sat., $S_{o,n}$ (%)
Initial, Top, W1	14.31	147.21	81.0
" Bottom, W2	15.15	146.14	83.8
" Sides, W3	14.49	146.97	81.6
" Average, W4	14.65	146.77	82.2
" Assumed, W	14.65	146.77	82.2
Final (After Test/Shear)	18.41		

Back-calculated Data		Input Data for Back Calculation	
Item	Value	$S_{o,n}$ (%)	
Initial Mass Dry Soil, $M_{d,o}$			G_s
Specific Gravity, G_s			$M_{d,o}$ (g)

Calculation Constant: = (unit conversion) / $G_s \times \rho_w \times A_{sb}$	
Estimated	0.11433
Final Selected	0.11433

Soil Height: Final by Dial Change During Test (mm)		For Multistage Testing	
		2nd Stage	3rd Stage
Initial Height, H_o	25.01		
Change in Height During Consol.(not corrected for apparatus flexability)	0.55	NA	NA
Height after Consolidation, H_c	24.46	NA	NA
Change in Height During **Initial** Shear (+ compression, - dilation)	0.27	NA	NA
Change in Height During Repeated/Residual Shear	NA	NA	NA
Change in Height During Consol. to Max. Consol. Stress	NA	NA	NA
Final Soil Height (After Test/Shear), H_{at}	24.19	NA	NA

Summary of Specimen Physical Properties: Initial Conditions

Area, A_{sb}	31.864 , cm^2			
Specific Gravity, G_s	2.750	X	Assumed	[ ] Measured
Mass Dry Soil, Md (g)	146.77	X	Based on average water content	[ ] Value based on one of the above values

	Water Content, w (%)	Total Unit Weight, γ_t (pcf)	Dry Unit Weight, γ_d (pcf)	Void Ratio, e	Degree of Saturation, S (%)	Height, H (mm)	Volume, V (cm^3)
Initial:	14.6	131.83	114.98	0.490	82.2	25.01	79.69

Consolidation Summary: Stress Units = (ksf)	Stage:	1st	2nd	3rd		1st	2nd	3rd
	$\sigma'_{n,c}$ or $\sigma'_{v,c}$	8.64	NA	NA	$\varepsilon_{a,c}$ (%)	2.21	NA	NA
	$\sigma'_{v,max}$	NA	NA	NA	$\varepsilon_{a,max}$ (%)	NA	NA	NA
	OCR	NA	NA	NA	t_c (days)	1.1	NA	NA

Remarks:
NA - Not Applicable

Calculated by: MR Reviewed by: HP
Date: 12/8/2008

DRAINED DIRECT SHEAR TEST: Test Results

Project Number: 0411-08-1717
Task No.:
Project Name:
File Name: BB4_RC2c
Shear Box Dia./Width: 63.5 (mm)
Shear Box: [X] Circular [ ] Square

App. No.: 1F
Consol. Stress, $\sigma'_{v,c}$: 8.64 (ksf)
Induced OCR: NA
$\sigma'_{v,max}$: NA (ksf)
Specimen Ht.: 24.46 (mm)
Vert. Strain During Consol.: 2.21 (%)

Boring No.: BB4
Sample No.: RC2
Specimen No.: c
Depth (ft): 32

Part of Test Series: [X] No; [ ] Yes If yes, Test: NA of NA
Multistage: [X] No; [ ] Yes If yes, Test Stage No.: NA
Residual/Multishearing: [X] No; [ ] Yes Precut Failure Plane [X] No; [ ] Yes

Initial Test Conditions:				
Water Content, w (%)	Total Unit Weight, γ_t (pcf)	Dry Unit Weight, γ_d (pcf)	Void Ratio, e	Degree of Saturation, S (%)
14.6	131.83	114.98	0.490	82.2

Shearing Data For:
[X] Intact - Without Repeated Shearing (Peak Data)
[ ] Intact - Before Repeated Shearing (Peak Data)
[ ] After Rapid Repeated Shearing (Residual Data)
[ ] Continuous Shearing: Forwards & Backwards (Peak & Residual Data)

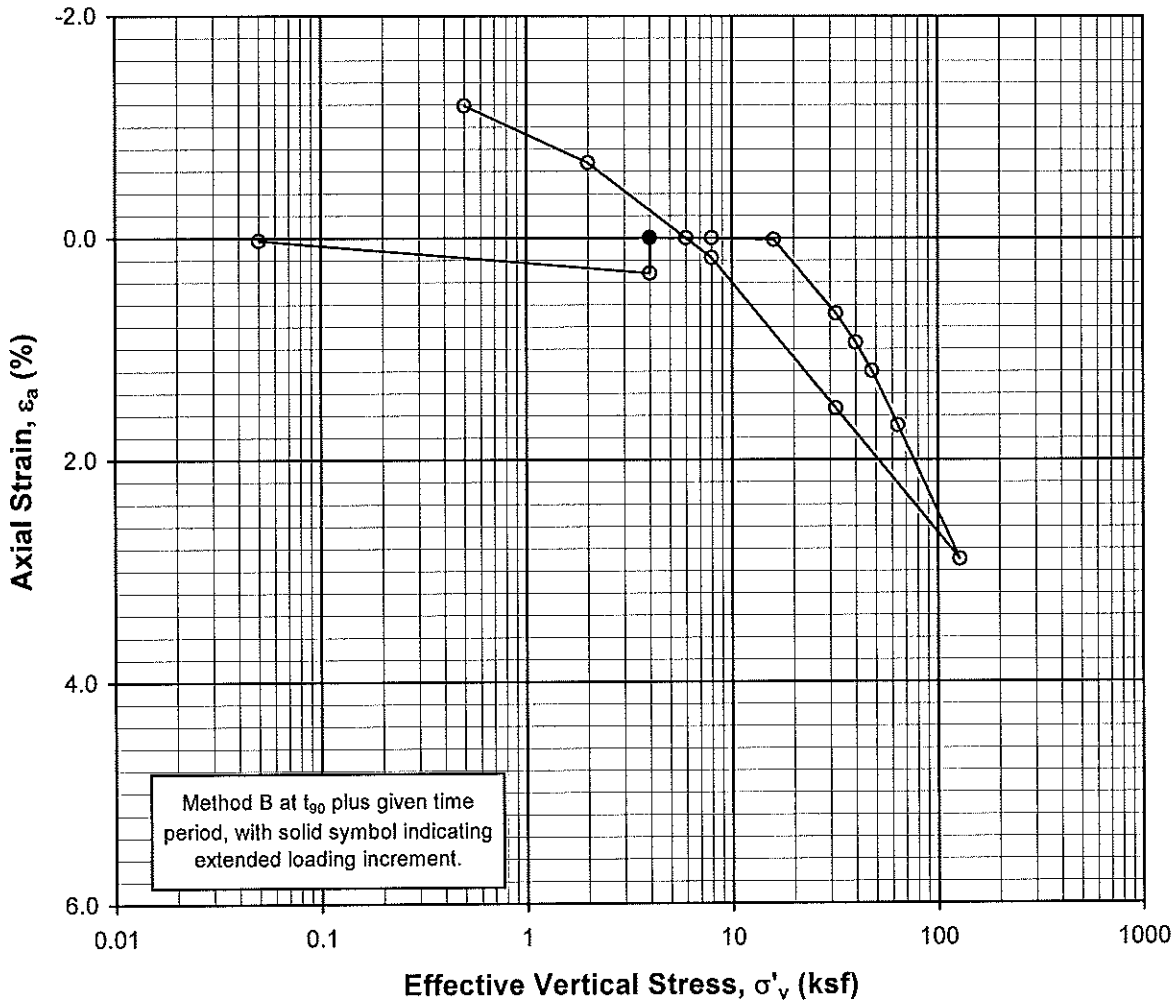
Avg. Lat. Displacement Rate (mm/h): 0.45993

Elapsed Time (min)	Rel. Lateral Displacement (mm)	Horiz. Force (lbf)	Vert. Displacement (%)	Shear Stress, τ (kips/ft^2)
0.00	0.0000	-0.19	0.00	-0.01
3.00	-0.0013	1.17	0.00	0.03
6.00	0.0070	4.92	0.00	0.14
9.00	0.0296	6.55	0.01	0.19
12.00	0.0502	7.01	0.01	0.20
15.00	0.0713	7.63	0.01	0.22
18.00	0.0949	8.30	0.00	0.24
21.00	0.1133	10.02	0.00	0.29
24.02	0.1363	10.86	0.01	0.32
33.00	0.2001	15.01	0.01	0.44
42.00	0.2566	23.47	0.01	0.68
51.00	0.3113	32.08	0.01	0.94
60.00	0.3688	39.66	0.01	1.16
69.02	0.4285	45.55	0.01	1.33
78.00	0.4903	50.93	0.01	1.49
87.00	0.5589	53.92	0.02	1.57
96.00	0.6186	62.16	0.03	1.81
105.00	0.6794	69.71	0.03	2.03
114.02	0.7368	77.21	0.03	2.25
123.00	0.7880	86.73	0.05	2.53
132.00	0.8495	90.90	0.05	2.65
141.00	0.9079	101.60	0.05	2.96
150.00	0.9665	112.27	0.06	3.27
159.02	1.0275	122.43	0.06	3.57
168.00	1.0865	131.24	0.05	3.83
177.00	1.1428	139.04	0.05	4.05
190.00	1.2234	150.94	0.05	4.40
205.00	1.3295	169.13	0.06	4.93
220.02	1.4322	189.15	0.06	5.51
235.00	1.5255	210.23	0.07	6.13
250.00	1.6163	230.60	0.07	6.72
265.02	1.7108	252.51	0.07	7.36
280.00	1.8100	275.76	0.06	8.04
295.00	1.9075	297.83	0.05	8.68
300.00	1.9417	303.09	0.06	8.84
305.00	1.9728	305.06	0.06	8.89

Sign Convention:
(+) Compression or Fowards
(-) Dilation or Backwards

Elapsed Time (min)	Rel. Lateral Displacement (mm)	Horiz. Force (lbf)	Vert. Displacement (%)	Shear Stress, τ (kips/ft^2)
310.02	2.0154	302.05	0.09	8.81
315.00	2.0641	294.94	0.10	8.60
320.00	2.1559	238.36	0.17	6.95
325.00	2.2039	228.87	0.18	6.67
330.00	2.2409	234.70	0.19	6.84
340.00	2.3174	241.13	0.20	7.03
355.02	2.4512	230.89	0.21	6.73
370.00	2.5811	217.43	0.24	6.34
385.00	2.7130	202.07	0.28	5.89
400.02	2.8503	190.69	0.30	5.56
415.00	2.9756	186.46	0.32	5.44
430.00	3.0969	183.79	0.35	5.36
445.02	3.2179	180.33	0.37	5.26
460.00	3.3466	175.71	0.40	5.12
475.00	3.4750	170.85	0.43	4.98
490.02	3.5923	170.13	0.46	4.96
505.00	3.7105	168.87	0.48	4.92
520.00	3.8382	163.86	0.51	4.78
535.02	3.9641	159.62	0.55	4.65
550.00	4.0802	158.21	0.58	4.61
565.00	4.2002	157.86	0.61	4.60
580.02	4.3231	156.65	0.64	4.57
595.00	4.4670	138.56	0.69	4.04
610.00	4.5856	138.08	0.73	4.03
625.02	4.7038	139.40	0.76	4.06
640.00	4.8208	140.82	0.80	4.11
655.00	4.9435	140.89	0.83	4.11
670.02	5.0625	140.15	0.85	4.09
685.00	5.1774	139.89	0.89	4.08
700.00	5.2977	140.25	0.90	4.09
715.02	5.4231	139.88	0.92	4.08
730.00	5.5429	138.62	0.95	4.04
745.00	5.6569	137.81	0.97	4.02
760.02	5.7801	136.47	0.99	3.98
775.00	5.9076	134.54	1.01	3.92
790.00	6.0304	133.23	1.02	3.88
805.02	6.1468	131.61	1.05	3.84
820.00	6.2689	129.37	1.07	3.77
835.00	6.3960	127.55	1.09	3.72
840.00	6.4390	127.16	1.11	3.71

Sign Convention:
(+) Compression or Fowards
(-) Dilation or Backwards



SWELL TEST

Sample No. RC5a - Depth 34.00 ft

Boring BB5

PLATE

ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Setup / Take Down

Project Number: 0411-08-1717 | Test Station No.: T2 | File Name: BB5_RC5a
Task No.: NA | Specific Gravity, G_s: 2.750 [X] Meas. ; [ ] Assumed | Ring No.: 23
Project Name: | Assig. Remarks: Swell Test Method C | Ring Area, A_r (cm^2) = 31.721
TEST TYPE: [ ] Incremental (D 2435); [X] Swell / Settlement (D 4546); [ ] Collapse (D 5333); Ring Height (mm) = 19.08
[ ] Method A; [ ] Method B; [X] Method C; [ ] Other Test Type:
Dial No.: DG 023 | DT No.: DT 023 | Calib. Factor (mm/V/V): 2270.1894 | Excit. Volt, (V): 9.932 | Ch. No.: 23

[ ] Tube [X] Field Extruded	[ ] Liner [ ] Remolded	[ ] Tamping	[ ] Constant Effort: Blows/Tamps per Layer =
Boring No.: BB5	[ ] LPC Core	[ ] Impact/Rammer	Rammer Wgt.(lbf)= No. Layers =
Sample No.: RC5	Compostite No.:	[ ] Pluviated:	Tamper Force (lbf)= Drop (in.) =
Depth (ft): 34.00	Specimen No.: a	[ ] Kneading	[ ] Undercompaction: U_{ni} (%) = Dia. (in.) =
[ ] Spec. Selection by X-ray;	[ ] Geomarine Sample		Ref. Effort= % Comp. = ± Opt.=

Water Content (W);	Initial - Trimming Location			Final, W_{at}
	Top (W1)	Bottom (W2)	Sides (W3)	(see below)
Container No.	1118	C30	577	1118
Mass Moist Soil + Container (g)	145.29	128.46	148.51	67.74
Mass Dry Soil + Container (g)	131.54	115.16	133.01	63.64
Mass Container (g)	31.87	30.07	32.20	31.87
WATER CONTENT (%)	13.80	15.63	15.38	12.91
Avg. Initial Water Content, W4 (%)	14.93	Final W_{at}:	[X] Slice ;	[ ] Whole Spec.

[ ] See attached data sheet(s) for additional water contents

Soil and Ring Masses	Initial	Final
Mass Moist Soil + Ring (g)	213.35	216.30
Mass Ring (g)	77.16	
Mass Moist Soil, $M_{t,o}$ or $M_{t,at}$ (g)	136.19	139.14
EXCESS DRY SOIL (soil not incl. in final mass above)		
Container No.	C30	
Mass Dry Soil + Container (g)	30.11	
Mass Container (g)	30.07	
Mass Excess Dry Soil, $M_{d,es}$ (g)	0.04	

Soil Height: Measurements (mm)			
Initial		Final	
with Spec.	without Spec.	with Spec.	without Spec.
19.500		20.140	0.170
19.500		20.100	0.250
19.500		20.040	0.250
19.500		19.920	0.160
19.500		20.080	0.230
[ ] Yes ;	[X] No	[ ] Yes ;	[X] No — Require H_{gb} & d_{gb}(1)
[ ] Yes ;	[X] No	[X] Yes ;	[ ] No — Filter Paper Included:

(1) Req. block ht. to set bench comparator so the final soil ht. can be determined directly by the diff. between the reading with and without spec. : ~ 12.7 mm; CRS ~ 25 mm
Enter value of H_{gb} & d_{gb} only when that value has to be included in the determination of the soil height.

Soil Height: Calculations, (mm)	Initial	Final
Height of Gauge Block, H_{gb} (1)	0.000	0.000
Reading on Gauge Block, d_{gb}	0.000	0.000
Avg. Reading on Soil, d_{soil}	19.500	20.056
Avg. Reading on Apparatus without Specimen, d_{app}	0.000	0.212
Soil Height, $H = d_{soil} - d_{app} + H_{gb} - d_{gb}$	19.500	19.844

Soil Height: Final by Dial Change During Test (mm)	
Initial Height, H_o	19.500
Final (end of test) Corr. Total Spec. Deformation, $\Delta H_{c,f}$	-0.232
Final Calculated Height, $H_{f,c} = H_o - \Delta H_{c,f}$	19.732
Final Soil Height Measurement, $H_{f,m}$	19.844
Normalized Difference in %, $(H_{f,c} - H_{f,m})/H_o$	-0.57

Estimated Initial Unit Weight	
Total, $\gamma_{t,o}$ (pcf)= 137.45	Dry, $\gamma_{d,o}$ (pcf)= 119.59

Filter Paper Used: [X] Whatman No. 54; [ ] Other
Incremental Test: Top & Bottom: [X] Yes ; [ ] No
CRS Test: Top Only: [ ] Yes ; [ ] No

Soil Extruded During Loading	
Container No.	577
Mass Dry Soil + Cont. (g)	32.19
Mass Cont. (g)	32.20
Dry Mass - Soil Extruded During Loading, $M_{d,et}$ (g)	-0.01

Sketch of Specimen

Photo taken of Sliced Test Specimen: [ ] Yes ; [X] No

Final Visual Description: Clay, olive gray amorphing to Shale with shell fragment and peat

Trimming/Etc. Remarks: Extruded 4" Tube Sample

Method of trimming periphery: [X] "Casagrande" Lathe ; [ ] Cutting Shoe ; [ ] Wire Saw; [ ] Other
Method of trimming ends: [ ] Wire Saw & Sharp (knife) Straight Edge; [X] Wire Saw & Straight Edge; [ ] Wire Saw

Trim./Recon. By: GP | Setup By: GP | Prelim. Calc. By: GP | Take Down By: GP
Date: 11/22/2008 | Date: 11/22/2008 | Final Calc. By: LF | Date: 12/8/2008
Reviewed By: HP

Note: NA - Not Applicable

ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Calculations & Summary

Project Number: 0411-08-1717 Test Station No.: T2 File Name: BB5_RC5a

Task No.: NA Specific Gravity, G_s: 2.750 [X] Measured ; [ ] Assumed.

Calculations Corrected for Salt (dissolved solids): [X] No or, [ ] Yes, with Concentration = _____ g/kg

Cal.-Routine	ITEM	Water Content, (%)	Mass Dry Soil, (g)	Degree of Saturation, S in %		
				Height	Final Height	
				Initial	Meas.	Dial
1	Initial, Top, W1	13.80	119.68	90.6	100.8	102.6
2	" Bottom, W2	15.63	117.78	97.3	106.8	108.7
3	" Sides, W3	15.38	118.04	96.4	106.0	107.9
4	" Average, W4	14.93	118.49	94.9	104.6	106.5
5	" Back Calculated (1)	10.48	123.27 (3)	76.4	88.1	89.9
6	Final	12.91	123.28 (2)	76.3	88.1	89.9

Calculated Specific Gravity for Final Saturation = 100%:

Used Cal. Routine No. 5 to obtain the mass of dry soil

and final height by: [X] Measurement; [ ] Dial Change.

Back Cal. G_s = 2.625

Avg. G_s (measured/assumed) & Back Cal. G_s = 2.687

Calculation Constant, K = (unit conversion) / $G_s \times \rho_w \times A_r$	
Estimated, K_e	0.11484
Final Selected, K_f	0.11484

Calculated Mass Dry Soil for Final Saturation = 100%: using measured/assumed G_s

and final height by: [X] Measurement; [ ] Dial Change.

Back Cal. Mass Dry Soil, (g) = 119.91

Avg. Back Calculated and Measured Mass Dry Soil (g) = 121.59

Summary of Specimen Physical Properties

Specific Gravity G_s = 2.750		[ ] Assumed	[ ]	To make S_f = 100% at end of test.	
		[X] Measured	[ ]	Avg. of measured/assumed G_s and G_s to make S_f = 100%	
Mass Dry Soil, (g)	Initial: 123.27	[X] From Cal. Routine No.	5	Note: Routine #5 is based on final measurements.	
	Final (4): 123.28	[ ] Make S_f = 100%, or;	[ ]	Avg. of measured & make S_f = 100%	
Initial Height (mm) = 19.50		[X] Measured ;	[ ]	Back Calculated	Back-cal. Sat. (%) = NA
Final Height (mm) = 19.84		[X] Measured ;	[ ]	Initial H_o & dial change during loading	

	Water Content, w (%)	Void Ratio, e	Degree of Saturation, S (%)	Total Unit Weight, γ_t (pcf)	Dry Unit Weight, γ_d (pcf)	Height of Solids, H_s (2,4) (mm)	Extruded soil loss proportioned in increasing loading increments (5) :	
							From	To (ksf)
Initial	10.5	0.377	76.4	137.5	124.4	14.156		
Final	12.9	0.402	88.1	138.0	122.3	14.157	64.00	128.00

Graphical Construction	σ'_p (ksf)	ε_a (%)	CR	RR	SR	Liquid Limit (LL)	? Value	
Casagrande Method						Plastic Limit (PL)	? Value	
Becker Method		Becker minimum σ'_p (ksf):				Plasticity Index (PI)		

NA - Indicates not applicable

Notes:

(1) Back Calculated based on final mass of oven-dry soil (corrected for dry mass of any excess and extruded soil).

(2) Corrected for any excess dry soil (soil stuck to ring, filter paper, etc.).

(3) This value is only different from the final value if there is soil extrusion during loading.

(4) Final is only different from the initial value if there is soil extrusion during loading.

(5) There should not be any soil loss in a CRS test, unless stress increments are applied.

Calculated By: LF Reviewed By: HP

Date: 12/10/2008

ONE - DIMENSIONAL CONSOLIDATION TEST: INCREMENTAL LOADING SUMMARY (Data Input by Hand)

Project Number: 0411-08-1717
Task No.: NA
Project Name:

Test Station No.: T2
Date; Start: 11/22/2008
Completed: 12/8/2008
[X] Undisturbed or ;
[ ] Reconstituted - Specimen.

File Name: BB5_RC5a
Dial / DT No.: DG 023
Channel No.: 23
DT Factor (mm/V/V): 2270.1894
Nominal Excit. Voltage (V_E): 9.932
Initial Height, H_o (mm): 19.50

Notes:

(1) W - water added, S - stress level applied to prevent swelling, P - indicates that the extended loading data point will be part of the consolidation curve.

(2) Increasing deformation reading indicates: [ ] compression; or [X] swell.

(3) Equals reading at seating stress

(4) "Incr. App. Flex. Corr." for first stress (load) increment equals the 0 % primary consol. value determined by the square root fitting method.

(5) "Incr. App. Flex. Corr." equals the incremental values obtained during the apparatus calibration for simular stress (load) increments..

(6) "Total Def. Corr." equals the seating stress reading plus the sum of the incr. app. flex.corrections up to and including the given (nth) loading increment.

Loading Data By: GP , LF , , Reviewed By: HP

Remarks:

(1)	Final Applied Effective Stress, $\sigma'_{v,c}$ (ksf)	Final Deformation Reading: DT $DT_{rf,n}$ (volts)	Final Deformation Reading: Dial or Cal. Value, $d_{arf,n}$ (2) (mm)	Incremental App. Flex. Correction $\Delta d_{afc,n}$ (mm)		Total App. Flexibility Correction $\Sigma\Delta d_{afc,n}$ (2) (mm)		Corr. Total Specimen Deformation $\Delta H_{c,n}$ (2) (mm)	Axial (Volumetric) Strain, $\varepsilon_{a,n}$ ($\varepsilon_{v,n}$) $\Delta H_{c,n} / H_o$ (%)	Duration of Stress (Load) Increment (hr)
	0.00		5.000	0.000		5.000	(3)	0.000	0.00	0.000
	0.05		4.992	0.003	(4)	4.997	(6)	0.005	0.03	0.084
	4.00		4.831	0.104	(5)	4.893	"	0.062	0.32	0.000
P	4.00		4.893	0.000	"	4.893	"	0.000	0.00	0.264
	6.00		4.869	0.024	"	4.869	"	0.000	0.00	0.017
	8.00		4.845	0.024	"	4.845	"	0.000	0.00	0.037
	16.00		4.790	0.052	"	4.793	"	0.003	0.02	0.764
	32.00		4.607	0.053	"	4.740	"	0.133	0.68	63.590
	40.00		4.536	0.020	"	4.720	"	0.184	0.94	24.038
	48.00		4.471	0.015	"	4.705	"	0.234	1.20	24.153
	64.00		4.344	0.031	"	4.674	"	0.330	1.69	139.878
	128.00		4.024	0.085	"	4.589	"	0.565	2.90	27.214
	32.00		4.370	-0.081	"	4.670	"	0.300	1.54	24.334
	8.00		4.700	-0.065	"	4.735	"	0.035	0.18	24.022
	2.00		4.918	-0.051	"	4.786	"	-0.132	-0.68	24.084
	0.50		5.056	-0.038	"	4.824	"	-0.232	-1.19	48.211
					"		"			
					"		"			
					"		"			
					"		"			
					"		"			
					"		"			
					"		"			

ONE - DIMENSIONAL CONSOLIDATION TEST: INCREMENTAL LOADING DATA (Input: Deformation & Fitting Data)

Project Number: 0411-08-1717
Task No.: NA
Project Name:

Test Station No.: T2
Data; Start: 11/22/2008
Completed: 12/8/2008
Initial Height, H_o (mm): 19.50

Dial / DT No.: DG 023
Channel No.: 23
DT Factor (mm/V/V): 2270.1894
Excitation Voltage,V: 9.932

File Name: BB5_RC5a

Notes:
(1) W - water added, S - stress level applied to prevent swelling, P - indicates that the extended loading data point will be part of the consolidation curve.
(2) Increasing deformation reading or fitting value indicates: [ ] compression; or [X] swell.
(3) Value in brackets indicates, it is an assumed value.

Summary Data Inputted By: GP , _____ , _____ Reviewed By: HP

(1)	Final Applied Effective Stress, $\sigma'_{v,c}$ (ksf)	Volumetric (Axial) Strain, $\varepsilon_{v,n}$ ($\varepsilon_{a,n}$) $\Delta H_{c,n} / H_o$ (%)	Void Ratio e_n	Duration of Stress (Load) Increment (hr)	Final Deformation Reading, $d_{rf,n}$ (2) (mm)	Total App. Flexibility Correction $\Sigma\Delta d_{afc,n}$ (2) (mm)	Fitting Method — Deformation Fitting Data Corrected for Total App. Flexibility Corr.: [ ] Yes; [X] No — Square Root of Time: t_{90} (min)	d_o (mm)	d_{90} (mm)	Log of Time: t_{50} (min)	d_o (mm)	d_{100} (mm)	Estimated Dry Mass of Soil Extruded During Incr. $\Delta M_{d,et}$ (g)	Cumm. Dry Mass of Soil Extr. During Incr(s). $\Sigma\Delta M_{d,et}$ (g)	Slope of Secondary Comp. Line (mm / Δlog t)
	0.00	0.00	0.377	0.000	5.000	5.000	Data summarized below applies to the stress (load) increment associated with the final applied eff. stress on that line.								
	0.05	0.03	0.377	0.084	4.992	4.997									
	4.00	0.32	0.373	0.000	4.831	4.893									
P	4.00	0.00	0.377	0.264	4.893	4.893									
	6.00	0.00	0.377	0.017	4.869	4.869									
	8.00	0.00	0.377	0.037	4.845	4.845									
	16.00	0.02	0.377	0.764	4.790	4.793									
	32.00	0.68	0.368	63.590	4.607	4.740									
	40.00	0.94	0.364	24.038	4.536	4.720									
	48.00	1.20	0.361	24.153	4.471	4.705									
	64.00	1.69	0.354	139.878	4.344	4.674									
	128.00	2.90	0.338	27.214	4.024	4.589									
	32.00	1.54	0.356	24.334	4.370	4.670									
	8.00	0.18	0.375	24.022	4.700	4.735									
	2.00	-0.68	0.387	24.084	4.918	4.786									
	0.50	-1.19	0.394	48.211	5.056	4.824									

ONE - DIMENSIONAL CONSOLIDATION TEST: INCREMENTAL LOADING RESULTS (Load & Time - Deformation Properties)

Project Number: 0411-08-1717 | Boring No.: BB5 | Test Station No.: T2 | File Name: BB5_RC5a

Task No.: NA | Sample No.: RC5 | Date; Start: 11/22/2008

Project Name: | Penetration (ft): 34 | Completed: 12/8/2008

ASTM Test Method: [ ] D 2435 [X] D 4546 [ ] D 5333 Method Used: [ ] A , [ ] B, or [X] C [X] Undisturbed or ; [ ] Reconstituted - Specimen.

Final Description of Specimen: Clay, olive gray amorphing to Shale with shell fragment and peat

Ring No.: 23 | Area (cm^2): 31.72 | Solids Height, $H_{s,o}$ (mm): 14.156 | Specific Gravity, G_s = 2.750

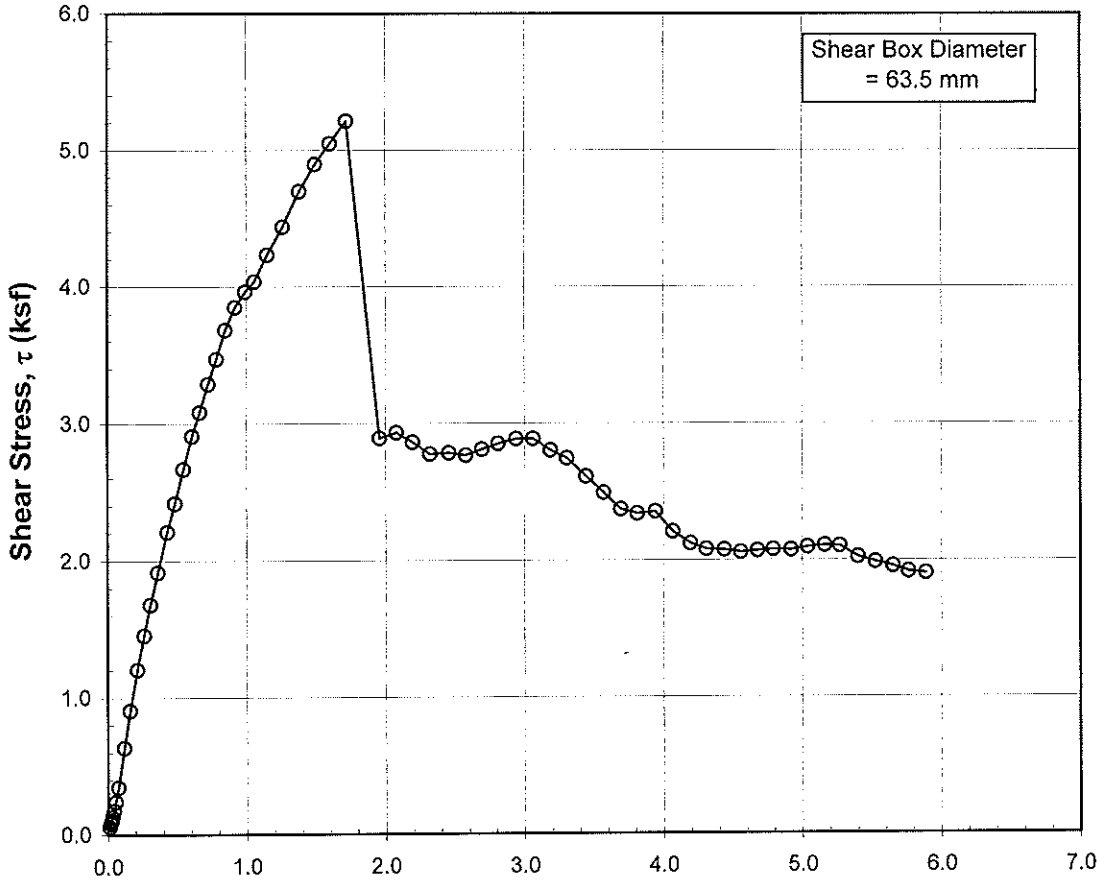
Initial:	Height:	H_o:	19.50	Water	10.5	Void	0.377	Deg. of	76.4	Total Unit	137.5	Dry Unit	124.4
Final:	(mm)	H_f:	19.84	Content (%):	12.9	Ratio:	0.402	Sat. (%):	88.1	Weight (pcf):	138.0	Weight (pcf):	122.3

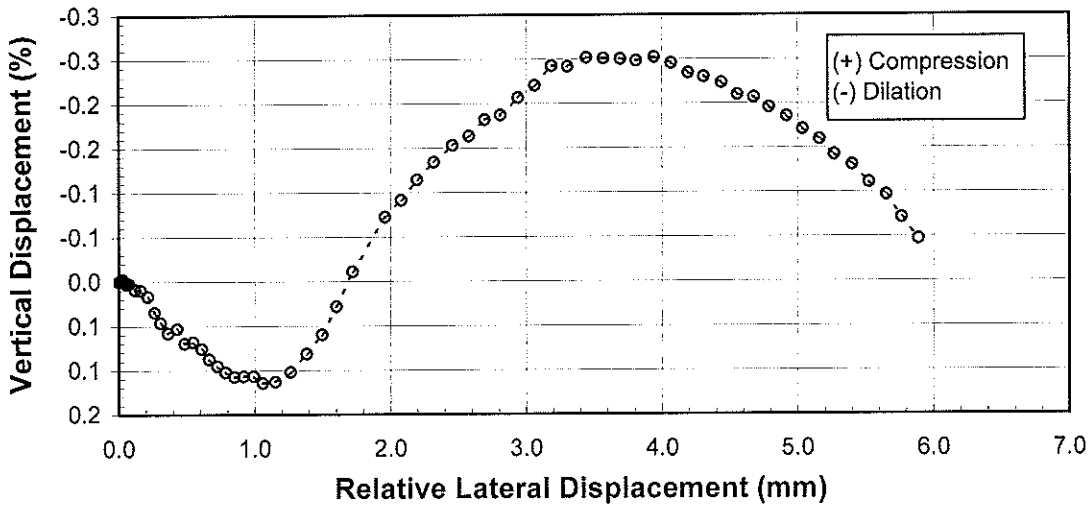
Notes:

(1) W - water added, S - stress level applied to prevent swelling, P - indicates that the extended loading data point will be part of the consolidation curve.

Summary Data Inputed By: GP | Calculations By: LF | Reviewed By: HP

						Based on Square Root of Time Fitting Method						Based on Log of Time Fitting Method						Average	
(1)	Final Applied Effective Stress, $\sigma'_{v,c}$ (ksf)	Average Applied Effective Stress, $\sigma'_{v,avg}$ (ksf)	Corr. Vol. Axial Strain $\varepsilon_{v,n}$ ($\varepsilon_{ac,n}$) $\Delta H_{c,n} / H_o$ (%)	Void Ratio, e_n	Rate of Sec. Comp., c_α $\Delta d_{a,sc} / H_p$ Δ Log t x 10^{-4}	Void Ratio at 50% Consol. e_{50}	Vol. Strain at 50% Consol. $\varepsilon_{v,50}$ (%)	Vol. Strain at 100% Consol. $\varepsilon_{v,100}$ (%)	Coef. of Consol. c_v (m^2/y)	Hydraulic Conductivity k @ 20°C (m/y)	Primary Compression Ratio, r_p (%)	Void Ratio at 50% Consol. e_{50}	Vol. Strain at 50% Consol. $\varepsilon_{v,50}$ (%)	Vol. Strain at 100% Consol. $\varepsilon_{v,100}$ (%)	Coef. of Consol. c_v (m^2/y)	Hydraulic Conductivity k @ 20°C (m/y)	Primary Compression Ratio, r_p (%)	Coef. of Consol. c_v (m^2/y)	Hydraulic Conductivity k (m/y)
	0.00	0.00	0.00	0.38	NA	Data summarized below applies to the stress (load) increment associated with the final applied eff. stress on that line.													
	0.05	0.03	0.03	0.38															
	4.00	2.03	0.32	0.37															
P	4.00	2.03	0.00	0.38															
	6.00	5.00	0.00	0.38															
	8.00	7.00	0.00	0.38															
	16.00	12.00	0.02	0.38															
	32.00	24.00	0.68	0.37															
	40.00	36.00	0.94	0.36															
	48.00	44.00	1.20	0.36															
	64.00	56.00	1.69	0.35															
	128.00	96.00	2.90	0.34															
	32.00	80.00	1.54	0.36															
	8.00	20.00	0.18	0.38															
	2.00	5.00	-0.68	0.39															
	0.50	1.25	-1.19	0.39															





DRAINED DIRECT SHEAR TEST

Soil - Soil Interface $\sigma'_{v,c}$ = 4.32 ksf

Boring: BB5 - Sample: RC6a - Depth: ft

Reviewed By: _____

PLATE ?

DIRECT SHEAR TEST (ASTM D 3080): Setup / Take Down

Project Number: 0411-08-1717 | Apparatus No.: 4F | File Name: BB5_RC6a
Task Number: | Assign. Units: [X] ksf; or Other: psi | Ring No.: FL1
Project Name: | Series $\sigma'_{v,c}$ or $\sigma'_{n,c}$: 4.32 , | Area - Shear Box, A_{sb} (cm^2): 31.864
" & | Height - Shear Box, H_{sb} (mm):
This Test $\sigma'_{v,c}$ or $\sigma'_{n,c}$: 4.32 ; NA ; & NA | Shear Box: [X] Circular [ ] Square
Induced OCR: NA ; Max. $\sigma'_{v,max}$: NA | Specific Gravity: 2.75 [X] Assumed; [ ] Measured
Multistage: [X] No; [ ] Yes | Residual/Multishearing: [X] No; [ ] Yes | Precut Failure Plane [X] No; [ ] Yes
Assign. Remarks:

[ ] Tube [ ] Field Extruded	[ ] Liner [X] Core	[ ] Tampling	[ ] Constant Effort:	Blows/Tamps per Layer =
Boring No.: BB5	[ ] Reconstituted	[ ] Kneading	Rammer:Wgt.(lbf)=	Tamper: Force (lbf)=
Sample No.: RC6	Compostite No.:	[ ] Inpact/Rammer	Drop(in.)=	Dia.(in.)=
Depth (ft):	Specimen No.: a	[ ] Pluviated:	[ ] Undercompaction: U_{ni} (%) =	Ref.Effort=
[ ] Spec. Selection by X - Ray;	[ ] Geomarine Sample		No. Layers =	% Comp= ± Opt.=

Water Content (WC);	Initial - Trimming Location			Final, W_{at}
	Top (W1)	Bottom (W2)	Sides (W3)	(see below)
Container No.	C-48	764	1171	2112
Mass Moist Soil + Container (g)	89.16	119.87	78.72	94.47
Mass Dry Soil + Container (g)	83.13	108.23	72.99	81.08
Mass Container (g)	30.00	31.67	32.46	17.19
WATER CONTENT (%)	11.35	15.20	14.14	20.96
Avg. Initial WC, W4 (%)	13.56	Final W_{at}: Soil with free water trimmed away		
[ ] See attached data sheet(s) for additional water contents				

Soil and Ring Masses (g)	Initial	Final
Mass Moist Soil+Trimming Ring	368.17	NA
Mass Trimming Ring, etc.	199.88	NA
Mass Moist Soil	168.29	NA
Excess Dry Soil (soil not included in final water content)		
Container No.		
Mass Dry Soil + Cont. (g)		
Mass Container (g)		
Mass Excess Dry Soil (g)	0.00	

Soil Height: Measurements(1)	
Initial (mm)	
with Spec., H_{soil}	without Spec., H_{app}
24.99	
24.98	
24.95	
24.88	
24.95	
Block Used (2):	[ ] Yes ; [X] No

Soil Height/Volume: Calc., (mm)	Initial
Height of Gauge Block, H_{gb} (2)	NA
Reading on Gauge Block, R_{gb}	NA
Avg. Reading on Soil, H_{soil}	24.95
Avg. Reading on Apparatus without Specimen, H_{app}	0.00
Soil Height, $H = H_{soil} - H_{app} + H_{gb} - R_{gb}$	24.95
Initial Soil Volume, V_o (cm^3)	79.50

Estimated Initial Unit Weight	
Total, $\gamma_{t,o}$ (pcf)= 132.15	Dry, $\gamma_{d,o}$ (pcf)= 116.37

(1) Measured in trimming ring, not shear box.

(2) Req. block ht. to set bench comparator so the initial soil ht. can be determined directly by the diff. between the reading with and without spec. Enter value for H_{gb} and d_{gb} only when these values have to be included in the determination of the soil height.
(3) Equals wgt. top cap, loading hanger and Bellofram piston (if used). (4) Reduced value if soil will dilate during shear.

Apparatus Information:	
	Wgt. of Top Shear Ring, M_{sb} (lbf) = 2.05 Dead Wgt. of Loading System(3) (lbf)= 4.93
	Top Shear Ring Supported by Counter Force: [ ] Yes ; [X] No: Shear Ring Free to Move Up & Down: [ ] Yes ; [X] No:
	Porous Inserts: [X] Stone; [ ] Metal; **Do not use filter paper over porours inserts.** Free to Rotate: [ ] Yes ; [X] No:
	Porous Inserts with Additional Shear Transfer Features: [ ] None; [ ] Pins; [ ] Grid Plate; [X] Waffle Stone; [ ] Other:
	Apparatus deformation under consolidation load determined: [ ] Yes ; [X] No

Sketch of Specimen

Photo taken of Sliced Test Specimen: [ ] Yes ; [X] No
Final Visual Description: Clay, Very Stiff, dark gray, with silt seams and sand pockets

Trimming/Etc. Remarks:

Method of trimming periphery: [X] "Casagrande" Lathe ; [ ] Cutting Shoe ; [ ] Wire Saw; [ ] Other
Method of trimming ends: [ ] Wire Saw & Sharp (knife) Straight Edge; [X] Wire Saw & Straight Edge; [ ] Wire Saw; [ ] Other
For soils containig sand, ~100 % passes sieve size: [ ] #4 (4.75 mm); [ ] #10 (2.0 mm); [ ] #20 (0.85 mm) or; [ ] #40 (0.425 mm)
Shear Box Gap Setting(4): Clays, 0.50 to 0.65 mm; Sands,1 mm to sieve size (mm) for 100 % passing

Trim./Recon. By: DBN Set up By: HC Prelim. Cal. By: HC Taken Down By: PL
Date: 12/1/2008 Date: 12/1/2008 Final Cal. By: MR Date: 12/3/2008
Reviewed By: HP

DIRECT SHEAR TEST (ASTM D 3080): SPECIMEN CALCULATIONS & SUMMARY

Project Number: 0411-08-1717 Boring/Exploration No.: BB5 Type Test: DS
Task Number: Sample No.: RC6 Specific Gravitiy, G_s: 2.75
Project Name: Penetration/Depth (ft):
Calculations Corrected for Salt (dissolved soilids): [X] No or, [ ] Yes, with salinity, S_{ppt} : ppt

Water Content Copied/Derived From:		Water Content, $W_{o,n}$ (%)	Mass Dry Soil, $M_{do,n}$ (g)	Degree of Sat., $S_{o,n}$ (%)
Initial,	Top, W1	11.35	151.14	70.3
"	Bottom, W2	15.20	146.08	84.6
"	Sides, W3	14.14	147.44	81.0
"	Average, W4	13.56	148.19	78.9
"	Assumed, W	13.56	148.19	78.9
Final (After Test/Shear)		20.96		

Back-calculated Data		Input Data for Back Calculation	
Item	Value	$S_{o,n}$ (%)	
Initial Mass Dry Soil, $M_{d,o}$			G_s
Specific Gravity, G_s			$M_{d,o}$ (g)

Calculation Constant: = (unit conversion) / $G_s \times \rho_w \times A_{sb}$	
Estimated	0.11433
Final Selected	0.11433

Soil Height: Final by Dial Change During Test (mm)		For Multistage Testing 2nd Stage	3rd Stage
Initial Height, H_o	24.95		
Change in Height During Consol.(not corrected for apparatus flexability)	0.79	NA	NA
Height after Consolidation, H_c	24.16	NA	NA
Change in Height During **Initial** Shear (+ compression, - dilation)	-0.01	NA	NA
Change in Height During Repeated/Residual Shear	NA	NA	NA
Change in Height During Consol. to Max. Consol. Stress	NA	NA	NA
Final Soil Height (After Test/Shear), H_{at}	24.17	NA	NA

Summary of Specimen Physical Properties: Initial Conditions

Area, A_{sb}	31.864 , cm^2							
Specific Gravity, G_s	2.750		X	Assumed		Measured		
Mass Dry Soil, Md (g)	148.19		X	Based on average water content		Value based on one of the above values		
	Water Content, w (%)	Total Unit Weight, γ_t (pcf)	Dry Unit Weight, γ_d (pcf)	Void Ratio, e	Degree of Saturation, S (%)	Height, H (mm)	Volume, V (cm^3)	
Initial:	13.6	132.15	116.37	0.473	78.9	24.95	79.50	

Consolidation Summary: Stress Units = (ksf)	Stage:	1st	2nd	3rd		1st	2nd	3rd
	$\sigma'_{n,c}$ or $\sigma'_{v,c}$	4.32	NA	NA	$\varepsilon_{a,c}$ (%)	3.15	NA	NA
	$\sigma'_{v,max}$	NA	NA	NA	$\varepsilon_{a,max}$ (%)	NA	NA	NA
	OCR	NA	NA	NA	t_c (days)	0.6	NA	NA

Remarks:
NA - Not Applicable

Calculated by: MR Reviewed by: HP
Date: 12/8/2008

DRAINED DIRECT SHEAR TEST: Test Results

Project Number: 0411-08-1717
Task No.:
Project Name:
File Name: BB5_RC6a
Shear Box Dia./Width: 63.5 (mm)
Shear Box: [X] Circular [ ] Square

App. No.: 4F
Consol. Stress, $\sigma'_{v,c}$: 4.32 (ksf)
Induced OCR: NA
$\sigma'_{v,max}$: NA (ksf)
Specimen Ht.: 24.16 (mm)
Vert. Strain During Consol.: 3.15 (%)

Boring No.: BB5
Sample No.: RC6
Specimen No.: a
Depth (ft):

Part of Test Series: [X] No; [ ] Yes If yes, Test: NA of NA
Multistage: [X] No; [ ] Yes If yes, Test Stage No.: NA
Residual/Multishearing: [X] No; [ ] Yes Precut Failure Plane [X] No; [ ] Yes

Initial Test Conditions:				
Water Content, w (%)	Total Unit Weight, γ_t (pcf)	Dry Unit Weight, γ_d (pcf)	Void Ratio, e	Degree of Saturation, S (%)
13.6	132.15	116.37	0.473	78.9

Shearing Data For:
[X] Intact - Without Repeated Shearing (Peak Data)
[ ] Intact - Before Repeated Shearing (Peak Data)
[ ] After Rapid Repeated Shearing (Residual Data)
[ ] Continuous Shearing: Forwards & Backwards (Peak & Residual Data)

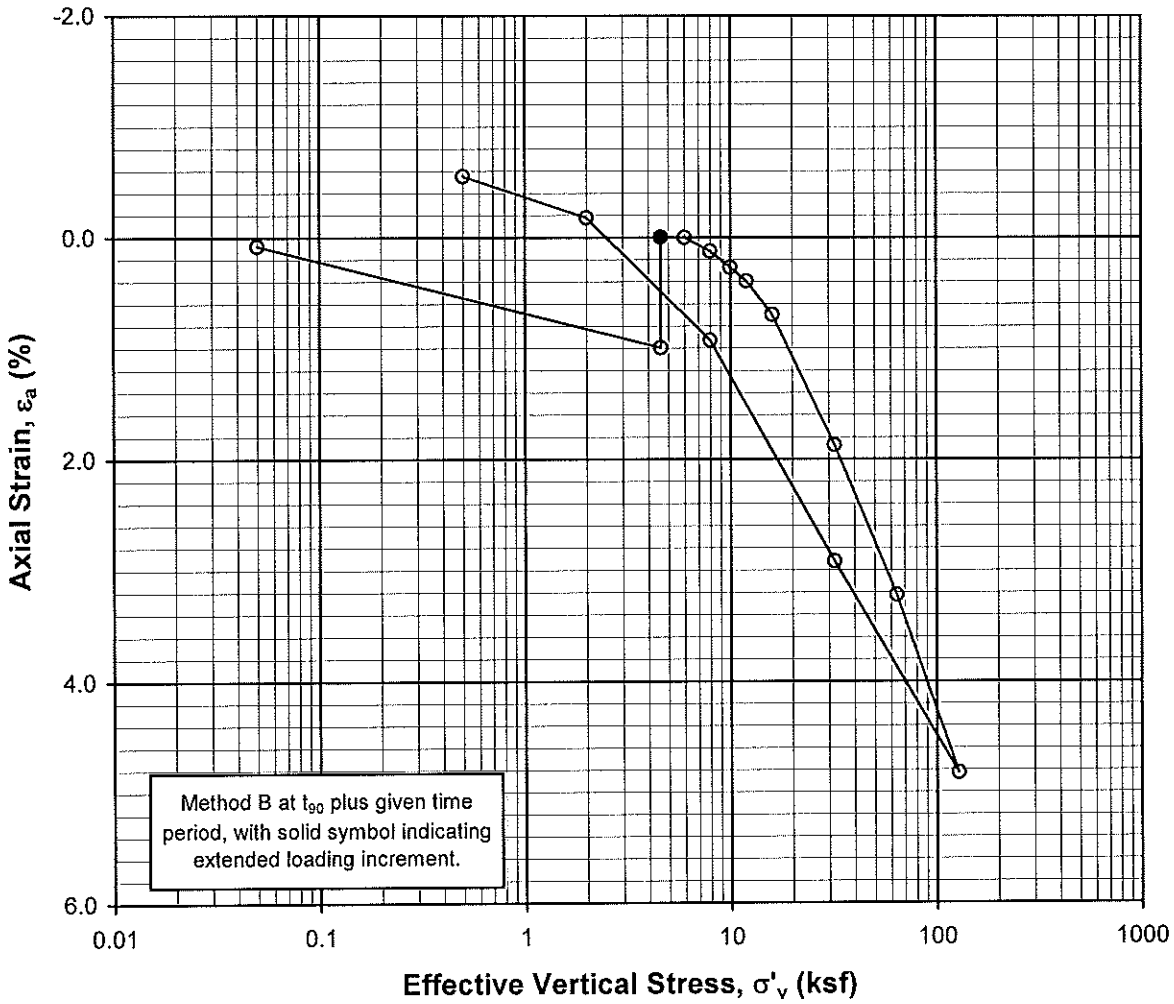
Avg. Lat. Displacement Rate (mm/h): 0.46493

Elapsed Time (min)	Rel. Lateral Displacement (mm)	Horiz. Force (lbf)	Vert. Displacement (%)	Shear Stress, τ (kips/ft^2)
0.00	0.0000	-0.04	0.00	0.00
3.00	-0.0020	0.37	0.00	0.01
6.00	0.0131	1.98	0.00	0.06
9.00	0.0209	2.90	0.00	0.08
12.00	0.0274	3.63	0.00	0.11
15.00	0.0321	4.45	0.00	0.13
18.00	0.0433	6.12	0.00	0.18
21.00	0.0566	8.25	0.00	0.24
24.00	0.0760	11.89	0.00	0.35
33.00	0.1193	21.81	0.01	0.64
42.00	0.1613	31.10	0.01	0.91
51.00	0.2143	41.32	0.02	1.20
60.00	0.2635	49.94	0.03	1.46
69.00	0.3089	57.64	0.05	1.68
78.00	0.3627	65.70	0.06	1.92
87.00	0.4307	75.77	0.05	2.21
96.00	0.4857	82.93	0.07	2.42
105.00	0.5465	91.45	0.07	2.67
114.00	0.6094	99.71	0.08	2.91
123.00	0.6647	105.66	0.09	3.08
132.00	0.7256	112.73	0.10	3.29
141.00	0.7856	119.00	0.10	3.47
150.00	0.8500	126.28	0.11	3.68
159.00	0.9190	131.97	0.11	3.85
168.00	0.9927	135.88	0.11	3.96
177.00	1.0599	138.47	0.11	4.04
190.00	1.1522	145.19	0.11	4.23
205.00	1.2637	152.20	0.10	4.44
220.00	1.3827	161.10	0.08	4.70
235.00	1.4968	167.93	0.06	4.90
250.00	1.6025	173.13	0.03	5.05
265.00	1.7194	178.79	-0.01	5.21
280.00	1.9576	99.17	-0.07	2.89
295.00	2.0792	100.54	-0.09	2.93
310.00	2.1960	98.14	-0.11	2.86
325.00	2.3193	95.17	-0.13	2.77

Sign Convention:
(+) Compression or Fowards
(-) Dilation or Backwards

Elapsed Time (min)	Rel. Lateral Displacement (mm)	Horiz. Force (lbf)	Vert. Displacement (%)	Shear Stress, τ (kips/ft^2)
340.00	2.4559	95.49	-0.15	2.78
355.00	2.5788	94.86	-0.16	2.77
370.00	2.6946	96.36	-0.18	2.81
385.00	2.8105	97.76	-0.19	2.85
400.00	2.9411	98.97	-0.21	2.89
415.00	3.0628	98.99	-0.22	2.89
430.00	3.1875	96.13	-0.24	2.80
445.00	3.3053	94.11	-0.24	2.74
460.00	3.4447	89.55	-0.25	2.61
475.00	3.5706	85.47	-0.25	2.49
490.00	3.6951	81.36	-0.25	2.37
505.00	3.8119	80.27	-0.25	2.34
520.00	3.9426	80.72	-0.25	2.35
535.00	4.0680	75.73	-0.25	2.21
550.00	4.1943	72.77	-0.23	2.12
565.00	4.3085	71.32	-0.23	2.08
580.00	4.4389	71.13	-0.22	2.07
595.00	4.5565	70.56	-0.21	2.06
610.00	4.6787	70.93	-0.21	2.07
625.00	4.7902	71.22	-0.20	2.08
640.00	4.9203	71.10	-0.19	2.07
655.00	5.0391	71.82	-0.17	2.09
670.00	5.1617	72.23	-0.16	2.11
685.00	5.2702	72.13	-0.14	2.10
700.00	5.4009	69.38	-0.13	2.02
715.00	5.5255	68.15	-0.11	1.99
730.00	5.6531	67.08	-0.10	1.96
745.00	5.7643	65.73	-0.07	1.92
760.00	5.8891	65.30	-0.05	1.90

Sign Convention:
(+) Compression or Fowards
(-) Dilation or Backwards



SWELL TEST

Sample No. RC7a - Depth 38.50 ft

Boring BB5

PLATE

ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Setup / Take Down

Project Number: 0411-08-1717 | Test Station No.: T6 | File Name: BB5_RC7a
Task No.: NA | Specific Gravity, G_s: 2.750 [X] Meas. ; [ ] Assumed | Ring No.: T6
Project Name: | Assig. Remarks: Incremental Consolidation with Loop | Ring Area, A_r (cm^2) = 31.755
TEST TYPE: [ ] Incremental (D 2435); [X] Swell / Settlement (D 4546); [ ] Collapse (D 5333); Ring Height (mm) = 19.00
[ ] Method A; [ ] Method B; [X] Method C; [ ] Other Test Type:
Dial No.: DG 006 | DT No.: DT 006 | Calib. Factor (mm/V/V): 6.083 | Excit. Volt, (V): 9.997 | Ch. No.: 6

[ ] Tube [X] Field Extruded	[ ] Liner [ ] Remolded	[ ] Tamping	[ ] Constant Effort: Blows/Tamps per Layer =
Boring No.: BB5	[ ] LPC Core	[ ] Impact/Rammer	Rammer Wgt.(lbf)= No. Layers =
Sample No.: RC7	Compostite No.:	[ ] Pluviated:	Tamper Force (lbf)= Drop (in.) =
Depth (ft): 38.50	Specimen No.: a	[ ] Kneading	[ ] Undercompaction: U_{ni} (%) = Dia. (in.) =
[ ] Spec. Selection by X-ray;	[ ] Geomarine Sample		Ref. Effort= % Comp. = ± Opt.=

Water Content (W);	Initial - Trimming Location			Final, W_{at}
	Top (W1)	Bottom (W2)	Sides (W3)	(see below)
Container No.	918	669	505	918
Mass Moist Soil + Container (g)	153.23	148.65	140.25	71.28
Mass Dry Soil + Container (g)	135.64	131.55	124.18	65.67
Mass Container (g)	31.61	32.14	31.70	31.61
WATER CONTENT (%)	16.91	17.20	17.38	16.47
Avg. Initial Water Content, W4 (%)	17.16	Final W_{at}: [X] Slice ; [ ] Whole Spec.		
[ ] See attached data sheet(s) for additional water contents				

Soil and Ring Masses	Initial	Final
Mass Moist Soil + Ring (g)	205.35	206.48
Mass Ring (g)	75.37	
Mass Moist Soil, $M_{t,o}$ or $M_{t,at}$ (g)	129.98	131.11
EXCESS DRY SOIL (soil not incl. in final mass above)		
Container No.	669	
Mass Dry Soil + Container (g)	32.28	
Mass Container (g)	32.14	
Mass Excess Dry Soil, $M_{d,es}$ (g)	0.14	

Soil Height: Measurements (mm)

Initial with Spec.	Initial without Spec.	Final with Spec.	Final without Spec.
19.160		19.880	0.730
19.160		19.900	0.710
19.160		19.800	0.530
19.160		19.810	0.540
19.160		19.890	0.580
[ ] Yes ; [X] No		[ ] Yes ; [X] No	Require H_{gb} & d_{gb} (1)
[ ] Yes ; [X] No		[X] Yes ; [ ] No	Filter Paper Included:

(1) Req. block ht. to set bench comparator so the final soil ht. can be determined directly by the diff. between the reading with and without spec. : ~ 12.7 mm; CRS ~ 25 mm
Enter value of H_{gb} & d_{gb} only when that value has to be included in the determination of the soil height.

Soil Height: Calculations, (mm)	Initial	Final
Height of Gauge Block, H_{gb} (1)	0.000	0.000
Reading on Gauge Block, d_{gb}	0.000	0.000
Avg. Reading on Soil, d_{soil}	19.160	19.856
Avg. Reading on Apparatus without Specimen, d_{app}	0.000	0.618
Soil Height, $H = d_{soil} - d_{app} + H_{gb} - d_{gb}$	19.160	19.238

Soil Height: Final by Dial Change During Test (mm)	
Initial Height, H_o	19.160
Final (end of test) Corr. Total Spec. Deformation, $\Delta H_{c,f}$	-0.106
Final Calculated Height, $H_{f,c} = H_o - \Delta H_{c,f}$	19.266
Final Soil Height Measurement, $H_{f,m}$	19.238
Normalized Difference in %, $(H_{f,c} - H_{f,m})/H_o$	0.15

Estimated Initial Unit Weight

Total, $\gamma_{t,o}$ (pcf)= 133.37 | Dry, $\gamma_{d,o}$ (pcf)= 113.83

Filter Paper Used: [X] Whatman No. 54; [ ] Other
Incremental Test: Top & Bottom: [X] Yes ; [ ] No
CRS Test: Top Only: [ ] Yes ; [ ] No

Soil Extruded During Loading	
Container No.	505
Mass Dry Soil + Cont. (g)	31.82
Mass Cont. (g)	31.70
Dry Mass - Soil Extruded During Loading, $M_{d,et}$ (g)	0.12

Sketch of Specimen

Photo taken of Sliced Test Specimen: [ ] Yes ; [X] No

Final Visual Description: Clay, olive gray amorphing to Platy Shale with shell fragments and sand pockets

Trimming/Etc. Remarks: Extruded 4" Tube Sample

Method of trimming periphery: [X] "Casagrande" Lathe ; [ ] Cutting Shoe ; [ ] Wire Saw; [ ] Other
Method of trimming ends: [ ] Wire Saw & Sharp (knife) Straight Edge; [X] Wire Saw & Straight Edge; [ ] Wire Saw

Trim./Recon. By: GP | Setup By: GP | Prelim. Calc. By: GP | Take Down By: GP
Date: 11/20/2008 | Date: 11/20/2008 | Final Calc. By: LF | Date: 12/8/2008
Reviewed By: HP

Note: NA - Not Applicable

ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Calculations & Summary

Project Number: 0411-08-1717 Test Station No.: T6 File Name: BB5_RC7a

Task No.: NA Specific Gravity, G_s: 2.750 [X] Measured ; [ ] Assumed.

Calculations Corrected for Salt (dissolved solids): [X] No or, [ ] Yes, with Concentration = _____ g/kg

Cal.-Routine	ITEM	Water Content, (%)	Mass Dry Soil, (g)	Degree of Saturation, S in %		
				Height Initial	Final Height Meas.	Final Height Dial
1	Initial, Top, W1	16.91	111.18	92.6	97.0	96.6
2	" Bottom, W2	17.20	110.90	93.5	97.8	97.4
3	" Sides, W3	17.38	110.74	94.0	98.4	97.9
4	" Average, W4	17.16	110.94	93.4	97.7	97.3
5	" Back Calculated (1)	15.20	112.83 (3)	87.0	91.6	91.2
6	Final	16.47	112.71 (2)	87.5	92.0	91.6

Calculated Specific Gravity for Final Saturation = 100%:

Used Cal. Routine No. 5 to obtain the mass of dry soil

and final height by: [X] Measurement; [ ] Dial Change.

Back Cal. G_s = 2.642

Avg. G_s (measured/assumed) & Back Cal. G_s = 2.696

Calculation Constant, K = (unit conversion) / $G_s \times \rho_w \times A_r$	
Estimated, K_e	0.11472
Final Selected, K_f	0.11472

Calculated Mass Dry Soil for Final Saturation = 100%: using measured/assumed G_s

and final height by: [X] Measurement; [ ] Dial Change.

Back Cal. Mass Dry Soil, (g) = 110.20

Avg. Back Calculated and Measured Mass Dry Soil (g) = 111.46

Summary of Specimen Physical Properties

Specific Gravity G_s = 2.750		[ ] Assumed	[ ]	To make S_f = 100% at end of test.	
		[X] Measured	[ ]	Avg. of measured/assumed G_s and G_s to make S_f = 100%	
Mass Dry Soil, (g)	Initial: 112.83	[X] From Cal. Routine No.	5	Note: Routine #5 is based on final measurements.	
	Final (4): 112.71	[ ] Make S_f = 100%, or;	[ ]	Avg. of measured & make S_f = 100%	
Initial Height (mm) = 19.16		[X] Measured ;	[ ]	Back Calculated	Back-cal. Sat. (%) = NA
Final Height (mm) = 19.24		[X] Measured ;	[ ]	Initial H_o & dial change during loading	

	Water Content, w (%)	Void Ratio, e	Degree of Saturation, S (%)	Total Unit Weight, γ_t (pcf)	Dry Unit Weight, γ_d (pcf)	Height of Solids, H_s (2,4) (mm)	Extruded soil loss proportioned in increasing loading increments (5) : From	To (ksf)
Initial	15.2	0.480	87.0	133.4	115.8	12.944		
Final	16.3	0.488	92.0	134.0	115.2	12.930	64.00	128.00

Graphical Construction	σ'_p (ksf)	ε_a (%)	CR	RR	SR	Liquid Limit (LL)	? Value
Casagrande Method						Plastic Limit (PL)	? Value
Becker Method		Becker minimium σ'_p (ksf):				Plasticity Index (PI)	

NA - Indicates not applicable

Notes:

(1) Back Calculated based on final mass of oven-dry soil (corrected for dry mass of any excess and extruded soil).

(2) Corrected for any excess dry soil (soil stuck to ring, filter paper, etc.).

(3) This value is only different from the final value if there is soil extrusion during loading.

(4) Final is only different from the initial value if there is soil extrusion during loading.

(5) There should not be any soil loss in a CRS test, unless stress increments are applied.

Calculated By: LF Reviewed By: HP

Date: 12/10/2008

ONE - DIMENSIONAL CONSOLIDATION TEST: INCREMENTAL LOADING SUMMARY (Data Input by Hand)

Project Number: 0411-08-1717
Task No.: NA
Project Name:

Test Station No.: T6
Date; Start: 11/20/2008
Completed: 12/8/2008
[X] Undisturbed or ;
[ ] Reconstituted - Specimen.

File Name: BB5_RC7a
Dial / DT No.: DG 006
Channel No.: 6
DT Factor (mm/V/V): 6.083
Nominal Excit. Voltage (V_E): 9.997
Initial Height, H_o (mm): 19.16

Notes:

(1) W - water added, S - stress level applied to prevent swelling, P - indicates that the extended loading data point will be part of the consolidation curve.

(2) Increasing deformation reading indicates: [ ] compression; or [X] swell.

(3) Equals reading at seating stress

(4) "Incr. App. Flex. Corr." for first stress (load) increment equals the 0 % primary consol. value determined by the square root fitting method.

(5) "Incr. App. Flex. Corr." equals the incremental values obtained during the apparatus calibration for simular stress (load) increments..

(6) "Total Def. Corr." equals the seating stress reading plus the sum of the incr. app. flex.corrections up to and including the given (nth) loading increment.

Loading Data By: GP , LF , , Reviewed By: HP

Remarks:

(1)	Final Applied Effective Stress, $\sigma'_{v,c}$ (ksf)	Final Deformation Reading: DT $DT_{rf,n}$ (volts)	Final Deformation Reading: Dial or Cal. Value, $d_{arf,n}$ (2) (mm)	Incremental App. Flex. Correction $\Delta d_{afc,n}$ (mm)		Total App. Flexibility Correction $\Sigma\Delta d_{afc,n}$ (2) (mm)		Corr. Total Specimen Deformation $\Delta H_{c,n}$ (2) (mm)	Axial (Volumetric) Strain, $\varepsilon_{a,n}$ ($\varepsilon_{v,n}$) $\Delta H_{c,n} / H_o$ (%)	Duration of Stress (Load) Increment (hr)
	0.00		4.000	0.000		4.000	(3)	0.000	0.00	0.000
	0.05		3.982	0.003	(4)	3.997	(6)	0.015	0.08	0.084
	4.60		3.686	0.120	(5)	3.877	"	0.191	1.00	0.000
P	4.60		3.877	0.000	"	3.877	"	0.000	0.00	4.124
	6.00		3.859	0.018	"	3.859	"	0.000	0.00	0.535
	8.00		3.811	0.024	"	3.835	"	0.024	0.13	24.291
	10.00		3.769	0.014	"	3.821	"	0.052	0.27	64.344
	12.00		3.731	0.014	"	3.807	"	0.076	0.40	24.187
	16.00		3.648	0.025	"	3.782	"	0.134	0.70	24.927
	32.00		3.370	0.053	"	3.729	"	0.359	1.87	4.739
	32.00		3.358	0.000	"	3.729	"	0.371	1.94	138.621
	64.00		3.046	0.065	"	3.664	"	0.618	3.23	27.736
	128.00		2.654	0.085	"	3.579	"	0.925	4.83	24.127
	32.00		3.100	-0.081	"	3.660	"	0.560	2.92	24.025
	8.00		3.547	-0.065	"	3.725	"	0.178	0.93	24.056
	2.00		3.810	-0.051	"	3.776	"	-0.034	-0.18	47.622
	0.50		3.920	-0.038	"	3.814	"	-0.106	-0.55	26.299
					"		"			
					"		"			
					"		"			
					"		"			
					"		"			
					"		"			

ONE - DIMENSIONAL CONSOLIDATION TEST: INCREMENTAL LOADING DATA (Input: Deformation & Fitting Data)

Project Number: 0411-08-1717
Task No.: NA
Project Name:

Test Station No.: T6
Data; Start: 11/20/2008
Completed: 12/8/2008
Initial Height, H_o (mm): 19.16

Dial / DT No.: DG 006
Channel No.: 6
DT Factor (mm/V/V): 6.083
Excitation Voltage,V: 9.997

File Name: BB5_RC7a

Notes:
(1) W - water added, S - stress level applied to prevent swelling, P - indicates that the extended loading data point will be part of the consolidation curve.
(2) Increasing deformation reading or fitting value indicates: [ ] compression; or [X] swell.
(3) Value in brackets indicates, it is an assumed value.

Summary Data Inputted By: LF, GP, _____ Reviewed By: HP

(1)	Final Applied Effective Stress, $\sigma'_{v,c}$ (ksf)	Volumetric (Axial) Strain, $\varepsilon_{v,n}$ ($\varepsilon_{a,n}$) $\Delta H_{c,n} / H_o$ (%)	Void Ratio e_n	Duration of Stress (Load) Increment (hr)	Final Deformation Reading, $d_{rf,n}$ (2) (mm)	Total App. Flexibility Correction $\Sigma\Delta d_{afc,n}$ (2) (mm)	Fitting Method — Deformation Fitting Data Corrected for Total App. Flexibility Corr.: [ ] Yes; [X] No — Square Root of Time: t_{90} (min)	d_o (mm)	d_{90} (mm)	Log of Time: t_{50} (min)	d_o (mm)	d_{100} (mm)	Estimated Dry Mass of Soil Extruded During Incr. $\Delta M_{d,et}$ (g)	Cumm. Dry Mass of Soil Extr. During Incr(s). $\Sigma\Delta M_{d,et}$ (g)	Slope of Secondary Comp. Line (mm / Δlog t)
	0.00	0.00	0.480	0.000	4.000	4.000	Data summarized below applies to the stress (load) increment associated with the final applied eff. stress on that line.								
	0.05	0.08	0.479	0.084	3.982	3.997									
	4.60	1.00	0.465	0.000	3.686	3.877									
P	4.60	0.00	0.480	4.124	3.877	3.877									
	6.00	0.00	0.480	0.535	3.859	3.859									
	8.00	0.13	0.478	24.291	3.811	3.835									
	10.00	0.27	0.476	64.344	3.769	3.821									
	12.00	0.40	0.474	24.187	3.731	3.807									
	16.00	0.70	0.470	24.927	3.648	3.782									
	32.00	1.87	0.453	4.739	3.370	3.729									
	32.00	1.94	0.452	138.621	3.358	3.729									
	64.00	3.23	0.433	27.736	3.046	3.664									
	128.00	4.83	0.409	24.127	2.654	3.579									
	32.00	2.92	0.437	24.025	3.100	3.660									
	8.00	0.93	0.466	24.056	3.547	3.725									
	2.00	-0.18	0.483	47.622	3.810	3.776									
	0.50	-0.55	0.488	26.299	3.920	3.814									

ONE - DIMENSIONAL CONSOLIDATION TEST: INCREMENTAL LOADING RESULTS (Load & Time - Deformation Properties)

Project Number: 0411-08-1717 | Boring No.: BB5 | Test Station No.: T6 | File Name: BB5_RC7a

Task No.: NA | Sample No.: RC7 | Date; Start: 11/20/2008

Project Name: | Penetration (ft): 38.5 | Completed: 12/8/2008

ASTM Test Method: [ ] D 2435 [X] D 4546 [ ] D 5333 Method Used: [ ] A , [ ] B, or [X] C [X] Undisturbed or ; [ ] Reconstituted - Specimen.

Final Description of Specimen: Clay, olive gray amorphing to Platy Shale with shell fragments and sand pockets

Ring No.: T6 | Area (cm^2): 31.75 | Solids Height, $H_{s,o}$ (mm): 12.944 | Specific Gravity, G_s = 2.750

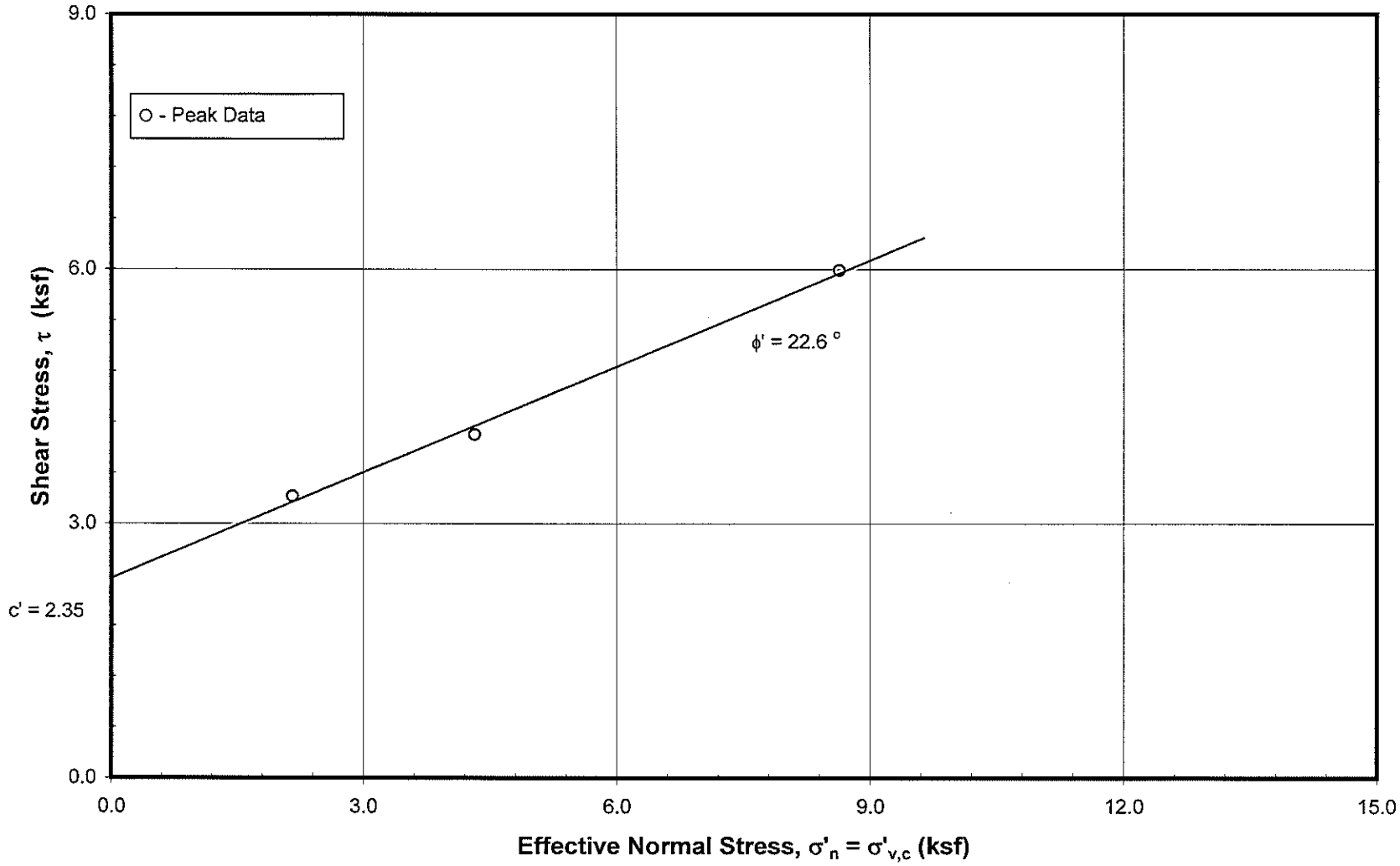
Initial:	Height:	H_o:	19.16	Water	15.2	Void	0.480	Deg. of	87.0	Total Unit	133.4	Dry Unit	115.8
Final:	(mm)	H_f:	19.24	Content (%):	16.3	Ratio:	0.488	Sat. (%):	92.0	Weight (pcf):	134.0	Weight (pcf):	115.2

Notes:

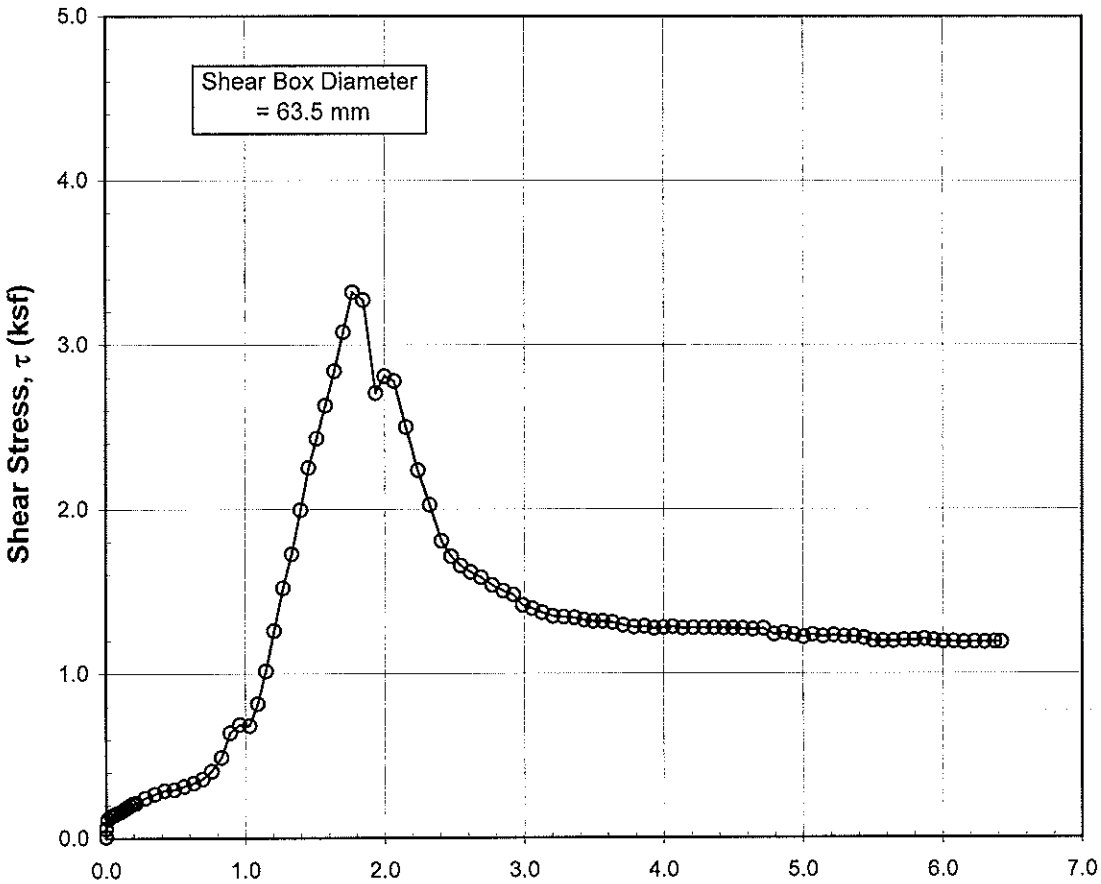
(1) W - water added, S - stress level applied to prevent swelling, P - indicates that the extended loading data point will be part of the consolidation curve.

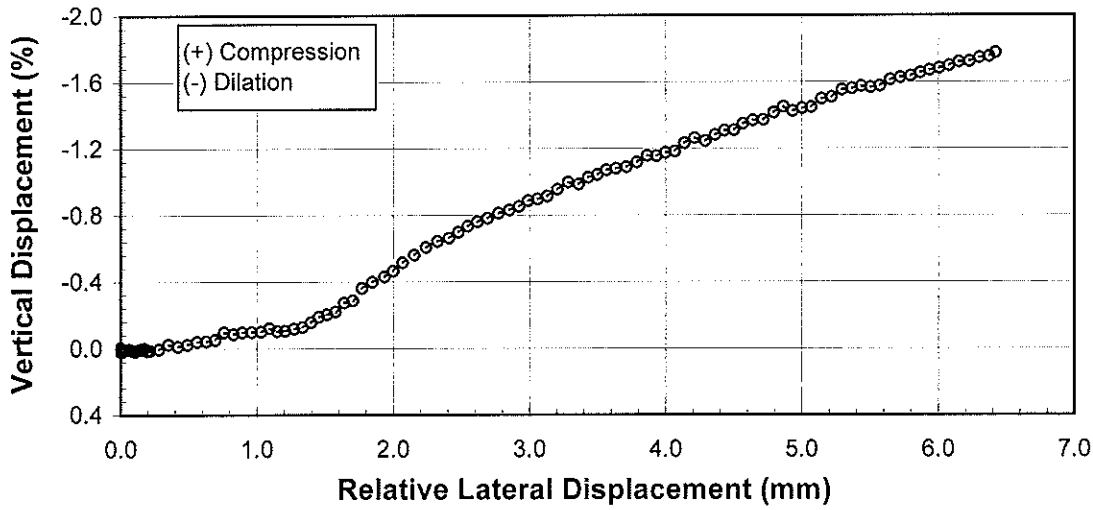
Summary Data Inputed By: LF | Calculations By: LF | Reviewed By: HP

	Final Applied Effective Stress, $\sigma'_{v,c}$ (ksf)	Average Applied Effective Stress, $\sigma'_{v,avg}$ (ksf)	Corr. Vol. Axial Strain $\varepsilon_{v,n}$ ($\varepsilon_{ac,n}$) $\Delta H_{c,n} / H_o$ (%)	Void Ratio, e_n	Rate of Sec. Comp., c_α $\Delta d_{p,sc} / H_p$ Δ Log t x 10^{-4}	Based on Square Root of Time Fitting Method: Void Ratio at 50% Consol. e_{50}	Vol. Strain at 50% Consol. $\varepsilon_{v,50}$ (%)	Vol. Strain at 100% Consol. $\varepsilon_{v,100}$ (%)	Coef. of Consol. c_v (m^2/y)	Hydraulic Conductivity k @ 20°C (m/y)	Primary Compression Ratio, r_p (%)	Based on Log of Time Fitting Method: Void Ratio at 50% Consol. e_{50}	Vol. Strain at 50% Consol. $\varepsilon_{v,50}$ (%)	Vol. Strain at 100% Consol. $\varepsilon_{v,100}$ (%)	Coef. of Consol. c_v (m^2/y)	Hydraulic Conductivity k @ 20°C (m/y)	Primary Compression Ratio, r_p (%)	Average: Coef. of Consol. c_v (m^2/y)	Hydraulic Conductivity k (m/y)
(1)																			
	0.00	0.00	0.00	0.48	NA	Data summarized below applies to the stress (load) increment associated with the final applied eff. stress on that line.													
	0.05	0.03	0.08	0.48															
	4.60	2.32	1.00	0.47															
P	4.60	2.32	0.00	0.48															
	6.00	5.30	0.00	0.48															
	8.00	7.00	0.13	0.48															
	10.00	9.00	0.27	0.48															
	12.00	11.00	0.40	0.47															
	16.00	14.00	0.70	0.47															
	32.00	24.00	1.87	0.45															
	32.00	24.00	1.94	0.45															
	64.00	48.00	3.23	0.43															
	128.00	96.00	4.83	0.41															
	32.00	80.00	2.92	0.44															
	8.00	20.00	0.93	0.47															
	2.00	5.00	-0.18	0.48															
	0.50	1.25	-0.55	0.49															



DRAINED DIRECT SHEAR TEST: Test Series - (Peak)
Soil - Soil Interface & OCR = Unkown
Boring: BB5 - Sample: RC7d - Depth: ft





DRAINED DIRECT SHEAR TEST: 1st Test in Test Series

Soil - Soil Interface $\sigma'_{v,c}$ = 2.16 ksf

Boring: BB5 - Sample: RC7b - Depth: ft

Reviewed By: _____

PLATE ?

DIRECT SHEAR TEST (ASTM D 3080): Setup / Take Down

Project Number: 0411-08-1717 | Apparatus No.: 1F | File Name: BB5_RC7b
Task Number: | Assign. Units: [X] ksf; or Other: | Ring No.: FL1
Project Name: | Series $\sigma'_{v,c}$ or $\sigma'_{n,c}$: 2.16 , | Area - Shear Box, A_{sb} (cm^2): 31.864
" & | Height - Shear Box, H_{sb} (mm):
This Test $\sigma'_{v,c}$ or $\sigma'_{n,c}$: 2.16 ; NA ; & NA | Shear Box: [X] Circular [ ] Square
Induced OCR: NA ; Max. $\sigma'_{v,max}$: NA | Specific Gravity: 2.75 [X] Assumed; [ ] Measured
Multistage: [X] No; [ ] Yes | Residual/Multishearing: [X] No; [ ] Yes | Precut Failure Plane [X] No; [ ] Yes
Assign. Remarks:

[ ] Tube [ ] Field Extruded	[ ] Liner [X] Core	[ ] Tampling	[ ] Constant Effort:	Blows/Tamps per Layer =	
Boring No.: BB5	[ ] Reconstituted	[ ] Kneading	Rammer:Wgt.(lbf)=	Tamper: Force (lbf)=	
Sample No.: RC7	Compostite No.:	[ ] Inpact/Rammer	Drop(in.)=	Dia.(in.)=	
Depth (ft):	Specimen No.: b	[ ] Pluviated:	[ ] Undercompaction: U_{nl} (%) =	Ref.Effort=	
[ ] Spec. Selection by X - Ray;	[ ] Geomarine Sample		No. Layers =	% Comp=	± Opt.=

Water Content (WC);	Initial - Trimming Location			Final, W_{at}	Soil and Ring Masses (g)	Initial	Final
	Top (W1)	Bottom (W2)	Sides (W3)	(see below)	Mass Moist Soil+Trimming Ring	366.89	NA
Container No.	778	5099		593	Mass Trimming Ring, etc.	199.85	NA
Mass Moist Soil + Container (g)	102.76	97.38		82.52	Mass Moist Soil	167.04	NA
Mass Dry Soil + Container (g)	95.80	90.35		74.34	Excess Dry Soil (soil not included in final water content)		
Mass Container (g)	32.04	30.66		31.52	Container No.		
WATER CONTENT (%)	10.92	11.78		19.10	Mass Dry Soil + Cont. (g)		
Avg. Initial WC, W4 (%)	11.35	Final W_{at}: Soil with free water trimmed away			Mass Container (g)		
[ ] See attached data sheet(s) for additional water contents					Mass Excess Dry Soil (g)	0.00	

Soil Height: Measurements[1]	
Initial (mm)	
with Spec., H_{soil}	without Spec., H_{app}
25.19	
25.02	
25.09	
25.21	
25.01	
Block Used [2]:	[ ] Yes ; [X] No

(1) Measured in trimming ring, not shear box.

Soil Height/Volume: Calc., (mm)	Initial
Height of Gauge Block, H_{gb} [2]	NA
Reading on Gauge Block, R_{gb}	NA
Avg. Reading on Soil, H_{soil}	25.10
Avg. Reading on Apparatus without Specimen, H_{app}	0.00
Soil Height, $H = H_{soil} - H_{app} + H_{gb} - R_{gb}$	25.10
Initial Soil Volume, V_o (cm^3)	79.99

Estimated Initial Unit Weight	
Total, $\gamma_{t,o}$ (pcf)= 130.37	Dry, $\gamma_{d,o}$ (pcf)= 117.08

(2) Req. block ht. to set bench comparator so the initial soil ht. can be determined directly by the diff. between the reading with and without spec. Enter value for H_{gb} and d_{gb} only when these values have to be included in the determination of the soil height.
(3) Equals wgt. top cap, loading hanger and Bellofram piston (if used). (4) Reduced value if soil will dilate during shear.

Apparatus Information:	
	Wgt. of Top Shear Ring, M_{sb} (lbf) = Dead Wgt. of Loading System[3] (lbf)=
	Top Shear Ring Supported by Counter Force: [ ] Yes ; [X] No: Shear Ring Free to Move Up & Down: [ ] Yes ; [X] No:
	Porous Inserts: [X] Stone; [ ] Metal; **Do not use filter paper over porours inserts.** Free to Rotate: [ ] Yes ; [X] No:
	Porous Inserts with Additional Shear Transfer Features: [ ] None; [ ] Pins; [ ] Grid Plate; [X] Waffle Stone; [ ] Other:
	Apparatus deformation under consolidation load determined: [ ] Yes ; [X] No

Sketch of Specimen

Photo taken of Sliced Test Specimen: [ ] Yes ; [X] No

Final Visual Description: Clay, Very Stiff, olive gray, with shell fragments and silt seams (shale)

Trimming/Etc. Remarks:

Method of trimming periphery: [X] "Casagrande" Lathe ; [ ] Cutting Shoe ; [ ] Wire Saw; [ ] Other
Method of trimming ends: [ ] Wire Saw & Sharp (knife) Straight Edge; [X] Wire Saw & Straight Edge; [ ] Wire Saw; [ ] Other
For soils containig sand, ~100 % passes sieve size: [ ] #4 (4.75 mm); [ ] #10 (2.0 mm); [ ] #20 (0.85 mm) or; [ ] #40 (0.425 mm)
Shear Box Gap Setting[4]: Clays, 0.50 to 0.65 mm; Sands,1 mm to sieve size (mm) for 100 % passing

Trim./Recon. By: DBN Set up By: HP/DBN Prelim. Cal. By: HC Taken Down By: PL
Date: 11/24/2008 Date: 11/24/2008 Final Cal. By: MR Date: 12/2/2008
Reviewed By: HP

DIRECT SHEAR TEST (ASTM D 3080): SPECIMEN CALCULATIONS & SUMMARY

Project Number: 0411-08-1717 Boring/Exploration No.: BB5 Type Test: DS
Task Number: Sample No.: RC7 Specific Gravitiy, G_s: 2.75
Project Name: Penetration/Depth (ft):
Calculations Corrected for Salt (dissolved soilids): [X] No or, [ ] Yes, with salinity, S_{ppt} : ppt

Water Content Copied/Derived From:	Water Content, $W_{o,n}$ (%)	Mass Dry Soil, $M_{do,n}$ (g)	Degree of Sat., $S_{o,n}$ (%)
Initial, Top, W1	10.92	150.60	65.5
" Bottom, W2	11.78	149.44	69.0
" Sides, W3			
" Average, W4	11.35	150.02	67.3
" Assumed, W	11.35	150.01	67.3
Final (After Test/Shear)	19.10		

Back-calculated Data Item	Value	Input Data for Back Calculation $S_{o,n}$ (%)	
Initial Mass Dry Soil, $M_{d,o}$			G_s
Specific Gravity, G_s			$M_{d,o}$ (g)

Calculation Constant: = (unit conversion) / $G_s \times \rho_w \times A_{sb}$	
Estimated	0.11433
Final Selected	0.11433

Soil Height: Final by Dial Change During Test (mm)		For Multistage Testing 2nd Stage	3rd Stage
Initial Height, H_o	25.10		
Change in Height During Consol.(not corrected for apparatus flexability)	-0.21	NA	NA
Height after Consolidation, H_c	25.32	NA	NA
Change in Height During **Initial** Shear (+ compression, - dilation)	-0.45	NA	NA
Change in Height During Repeated/Residual Shear	NA	NA	NA
Change in Height During Consol. to Max. Consol. Stress	NA	NA	NA
Final Soil Height (After Test/Shear), H_{at}	25.76	NA	NA

Summary of Specimen Physical Properties: Initial Conditions

Area, A_{sb}	31.864 , cm^2							
Specific Gravity, G_s	2.750		X	Assumed		Measured		
Mass Dry Soil, Md (g)	150.02		X	Based on average water content		Value based on one of the above values		
	Water Content, w (%)	Total Unit Weight, γ_t (pcf)	Dry Unit Weight, γ_d (pcf)	Void Ratio, e	Degree of Saturation, S (%)	Height, H (mm)	Volume, V (cm^3)	
Initial:	11.3	130.36	117.08	0.464	67.3	25.10	79.99	

Consolidation Summary: Stress Units = (ksf)	Stage:	1st	2nd	3rd		1st	2nd	3rd
	$\sigma'_{n,c}$ or $\sigma'_{v,c}$	2.16	NA	NA	$\varepsilon_{a,c}$ (%)	-0.84	NA	NA
	$\sigma'_{v,max}$	NA	NA	NA	$\varepsilon_{a,max}$ (%)	NA	NA	NA
	OCR	NA	NA	NA	t_c (days)	5.7	NA	NA

Remarks:
NA - Not Applicable

Calculated by: MR Reviewed by: HP
Date: 12/4/2008

DRAINED DIRECT SHEAR TEST: Test Results

Project Number: 0411-08-1717
Task No.:
Project Name:
File Name: BB5_RC7b
Shear Box Dia./Width: 63.5 (mm)
Shear Box: [X] Circular [ ] Square

App. No.: 1F
Consol. Stress, $\sigma'_{v,c}$: 2.16 (ksf)
Induced OCR: NA
$\sigma'_{v,max}$: NA (ksf)
Specimen Ht.: 25.32 (mm)
Vert. Strain During Consol.: -0.84 (%)

Boring No.: BB5
Sample No.: RC7
Specimen No.: b
Depth (ft):

Part of Test Series: [X] No; [ ] Yes If yes, Test: NA of NA
Multistage: [X] No; [ ] Yes If yes, Test Stage No.: NA
Residual/Multishearing: [X] No; [ ] Yes Precut Failure Plane [X] No; [ ] Yes

Initial Test Conditions:				
Water Content, w (%)	Total Unit Weight, γ_t (pcf)	Dry Unit Weight, γ_d (pcf)	Void Ratio, e	Degree of Saturation, S (%)
11.3	130.36	117.08	0.464	67.3

Shearing Data For:	
[X]	Intact - Without Repeated Shearing (Peak Data)
[ ]	Intact - Before Repeated Shearing (Peak Data)
[ ]	After Rapid Repeated Shearing (Residual Data)
[ ]	Continuous Shearing: Forwards & Backwards (Peak & Residual Data)

Avg. Lat. Displacement Rate (mm/h): 0.45374

Elapsed Time (min)	Rel. Lateral Displacement (mm)	Horiz. Force (lbf)	Vert. Displacement (%)	Shear Stress, τ (kips/ft^2)
0.00	0.0000	0.28	0.00	0.01
0.60	-0.0031	0.28	0.00	0.01
1.50	-0.0001	0.33	-0.01	0.01
2.40	-0.0033	0.27	0.01	0.01
3.30	-0.0018	0.30	0.01	0.01
4.20	-0.0038	0.40	0.00	0.01
5.10	-0.0030	0.50	-0.02	0.01
6.00	-0.0037	0.55	0.02	0.02
6.90	-0.0035	0.49	0.01	0.01
7.80	-0.0010	0.61	0.01	0.02
8.70	-0.0031	0.54	0.01	0.02
9.60	-0.0034	0.56	0.00	0.02
10.50	-0.0019	0.56	0.01	0.02
11.40	-0.0030	0.67	0.01	0.02
12.30	-0.0039	0.67	0.01	0.02
13.20	-0.0035	0.72	0.01	0.02
14.10	-0.0033	0.75	0.01	0.02
15.00	-0.0023	0.71	0.00	0.02
15.90	-0.0031	0.76	0.01	0.02
16.80	-0.0032	0.75	0.01	0.02
17.70	-0.0026	0.94	0.01	0.03
18.60	-0.0022	0.72	0.00	0.02
19.50	-0.0034	0.91	0.01	0.03
20.40	-0.0026	1.06	0.01	0.03
21.30	-0.0031	1.11	0.02	0.03
22.20	-0.0024	1.11	0.00	0.03
23.10	-0.0015	1.00	0.01	0.03
24.00	-0.0018	1.13	0.00	0.03
27.00	-0.0011	1.77	0.02	0.05
30.00	0.0004	1.98	0.02	0.06
33.00	0.0132	3.98	0.02	0.12
36.00	0.0364	4.66	0.01	0.14
39.00	0.0617	4.92	0.01	0.14
42.00	0.0825	5.24	0.01	0.15
45.00	0.1067	5.51	0.02	0.16
48.00	0.1304	5.98	0.01	0.17

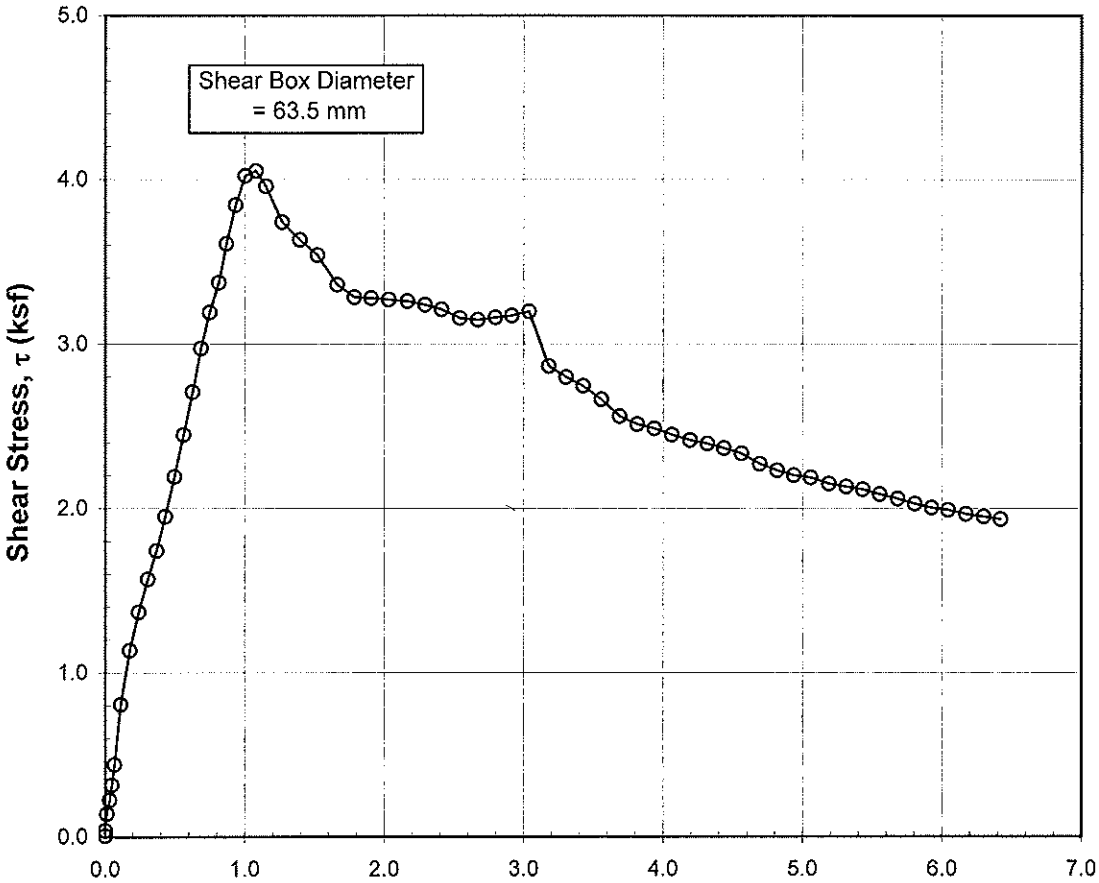
Sign Convention:
(+) Compression or Fowards
(-) Dilation or Backwards

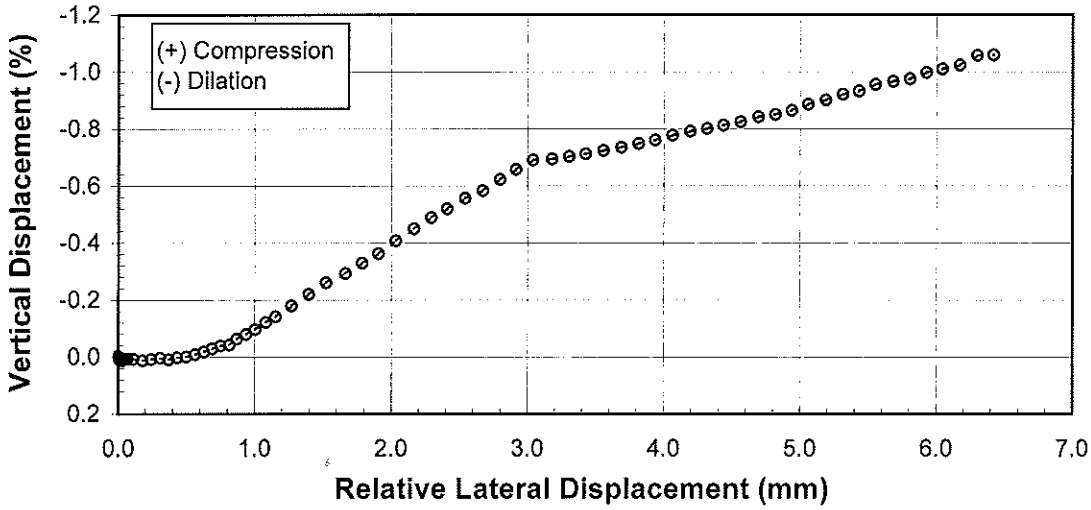
Sign Convention:
(+) Compression or Fowards
(-) Dilation or Backwards

Elapsed Time (min)	Rel. Lateral Displacement (mm)	Horiz. Force (lbf)	Vert. Displacement (%)	Shear Stress, τ (kips/ft^2)
51.00	0.1537	6.43	0.01	0.19
54.00	0.1744	6.82	0.00	0.20
57.00	0.1943	7.16	0.01	0.21
60.00	0.2172	7.35	0.01	0.21
69.00	0.2821	8.39	0.00	0.24
78.00	0.3509	9.18	-0.02	0.27
87.00	0.4213	9.92	-0.01	0.29
96.00	0.4900	10.09	-0.02	0.29
105.00	0.5615	10.80	-0.04	0.31
114.00	0.6305	11.47	-0.04	0.33
123.00	0.6944	12.32	-0.05	0.36
132.00	0.7602	13.98	-0.10	0.41
141.00	0.8295	16.83	-0.09	0.49
150.00	0.8924	21.96	-0.10	0.64
159.00	0.9614	23.68	-0.10	0.69
168.00	1.0307	23.45	-0.10	0.68
177.00	1.0907	28.01	-0.12	0.82
186.00	1.1485	34.83	-0.10	1.02
195.00	1.2074	43.25	-0.11	1.26
204.00	1.2712	52.14	-0.12	1.52
213.00	1.3342	59.22	-0.13	1.73
222.00	1.3975	68.42	-0.16	1.99
231.00	1.4544	77.25	-0.19	2.25
240.00	1.5135	83.32	-0.20	2.43
249.00	1.5752	90.22	-0.22	2.63
258.00	1.6388	97.41	-0.27	2.84
267.00	1.7037	105.53	-0.29	3.08
276.00	1.7705	113.86	-0.36	3.32
285.00	1.8469	112.22	-0.40	3.27
294.00	1.9358	92.84	-0.43	2.71
303.00	1.9993	96.34	-0.46	2.81
312.00	2.0676	95.34	-0.51	2.78
321.00	2.1537	85.75	-0.56	2.50
330.00	2.2401	76.70	-0.61	2.24
339.00	2.3255	69.48	-0.64	2.03
348.00	2.4085	61.96	-0.66	1.81
357.00	2.4780	58.71	-0.70	1.71
366.00	2.5473	56.77	-0.73	1.66
375.00	2.6167	55.46	-0.76	1.62
384.00	2.6921	54.36	-0.78	1.58
393.00	2.7717	52.74	-0.81	1.54
402.00	2.8517	51.54	-0.83	1.50
411.00	2.9233	50.73	-0.85	1.48
420.00	2.9903	48.53	-0.89	1.41
429.00	3.0591	47.84	-0.90	1.39
438.00	3.1298	46.98	-0.91	1.37
447.00	3.2049	46.25	-0.95	1.35
456.00	3.2843	46.10	-1.00	1.34
465.00	3.3616	45.91	-0.99	1.34
474.00	3.4309	45.44	-1.03	1.32
483.00	3.4980	45.17	-1.04	1.32
492.00	3.5648	45.17	-1.07	1.32
501.00	3.6343	44.96	-1.08	1.31
510.00	3.7112	44.36	-1.09	1.29
519.00	3.7887	43.98	-1.12	1.28
528.00	3.8638	44.12	-1.16	1.29
537.00	3.9324	43.70	-1.15	1.27
546.00	4.0001	43.83	-1.17	1.28
555.00	4.0667	44.02	-1.18	1.28
564.00	4.1386	43.74	-1.23	1.28
573.00	4.2129	43.80	-1.26	1.28
582.00	4.2910	43.77	-1.24	1.28

Elapsed Time (min)	Rel. Lateral Displacement (mm)	Horiz. Force (lbf)	Vert. Displacement (%)	Shear Stress, τ (kips/ft^2)
591.00	4.3635	43.78	-1.28	1.28
600.00	4.4335	43.73	-1.31	1.27
609.00	4.5010	43.71	-1.31	1.27
618.00	4.5686	43.64	-1.35	1.27
627.00	4.6424	43.46	-1.37	1.27
636.00	4.7175	43.64	-1.37	1.27
645.00	4.7944	42.45	-1.42	1.24
654.00	4.8653	42.76	-1.45	1.25
663.00	4.9342	42.36	-1.42	1.24
672.00	5.0039	41.91	-1.44	1.22
681.00	5.0701	42.37	-1.45	1.24
690.00	5.1450	42.01	-1.50	1.22
699.00	5.2194	42.25	-1.51	1.23
708.00	5.2959	41.98	-1.55	1.22
717.00	5.3676	41.96	-1.56	1.22
726.00	5.4360	41.68	-1.57	1.22
735.00	5.5049	41.11	-1.57	1.20
744.00	5.5735	41.04	-1.58	1.20
753.00	5.6485	41.02	-1.61	1.20
762.00	5.7239	41.19	-1.63	1.20
771.00	5.7982	41.23	-1.63	1.20
780.00	5.8696	41.46	-1.65	1.21
789.00	5.9372	41.18	-1.67	1.20
798.00	6.0066	40.93	-1.68	1.19
807.00	6.0795	40.92	-1.70	1.19
816.00	6.1527	40.76	-1.72	1.19
825.00	6.2284	40.87	-1.72	1.19
834.00	6.3022	40.84	-1.74	1.19
843.00	6.3732	40.89	-1.75	1.19
849.00	6.4204	40.84	-1.77	1.19

Sign Convention:
(+) Compression or Fowards
(-) Dilation or Backwards





DRAINED DIRECT SHEAR TEST: 2nd Test in Test Series

Soil - Soil Interface $\sigma'_{v,c}$ = 4.32 ksf

Boring: BB5 - Sample: RC7c - Depth: ft

Reviewed By: _____

PLATE ?

DIRECT SHEAR TEST (ASTM D 3080): Setup / Take Down

Project Number: 0411-08-1717 | Apparatus No.: 2F | File Name: BB5_RC7c
Task Number: | Assign. Units: [X] ksf; or Other: | Ring No.: FL-1
Project Name: | Series $\sigma'_{v,c}$ or $\sigma'_{n,c}$: 4.32 , | Area - Shear Box, A_{sb} (cm^2): 31.864
" & | Height - Shear Box, H_{sb} (mm):
This Test $\sigma'_{v,c}$ or $\sigma'_{n,c}$: 4.32 ; NA ; & NA | Shear Box: [X] Circular [ ] Square
Induced OCR: NA ; Max. $\sigma'_{v,max}$: NA | Specific Gravity: 2.75 [X] Assumed; [ ] Measured
Multistage: [X] No; [ ] Yes | Residual/Multishearing: [X] No; [ ] Yes | Precut Failure Plane [X] No; [ ] Yes
Assign. Remarks:

[ ] Tube [ ] Field Extruded [ ] Liner [X] Core	[ ] Tampling	[ ] Constant Effort:	Blows/Tamps per Layer =
Boring No.: BB5 [ ] Reconstituted	[ ] Kneading	Rammer Wgt.(lbf)=	Tamper: Force (lbf)=
Sample No.: RC7 Compostite No.:	[ ] Inpact/Rammer	Drop(in.)=	Dia.(in.)=
Depth (ft): Specimen No.: c	[ ] Pluviated:	[ ] Undercompaction: U_{nl} (%) =	Ref.Effort=
[ ] Spec. Selection by X - Ray; [ ] Geomarine Sample		No. Layers =	% Comp= ± Opt.=

Water Content (WC);	Initial - Trimming Location			Final, W_{at}	Soil and Ring Masses (g)	Initial	Final
	Top (W1)	Bottom (W2)	Sides (W3)	(see below)	Mass Moist Soil+Trimming Ring	373.25	NA
Container No.	1143	5010		706	Mass Trimming Ring, etc.	199.85	NA
Mass Moist Soil + Container (g)	108.39	104.85		65.61	Mass Moist Soil	173.40	NA
Mass Dry Soil + Container (g)	102.48	98.19		59.43	Excess Dry Soil (soil not included in final water content)		
Mass Container (g)	31.91	30.80		31.67	Container No.		
WATER CONTENT (%)	8.37	9.88		22.26	Mass Dry Soil + Cont. (g)		
Avg. Initial WC, W4 (%)	9.13	Final W_{at}: Soil with free water trimmed away			Mass Container (g)		
[ ] See attached data sheet(s) for additional water contents					Mass Excess Dry Soil (g)	0.00	

Soil Height: Measurements(1)	
Initial (mm)	
with Spec., H_{soil}	without Spec., H_{app}
26.35	
26.28	
26.26	
26.30	
26.35	
Block Used (2):	[ ] Yes ; [X] No

(1) Measured in trimming ring, not shear box.

Soil Height/Volume: Calc., (mm)	Initial
Height of Gauge Block, H_{gb} (2)	NA
Reading on Gauge Block, R_{gb}	NA
Avg. Reading on Soil, H_{soil}	26.31
Avg. Reading on Apparatus without Specimen, H_{app}	0.00
Soil Height, $H = H_{soil} - H_{app} + H_{gb} - R_{gb}$	26.31
Initial Soil Volume, V_o (cm^3)	83.83

Estimated Initial Unit Weight	
Total, $\gamma_{t,o}$ (pcf)= 129.14	Dry, $\gamma_{d,o}$ (pcf)= 118.34

(2) Req. block ht. to set bench comparator so the initial soil ht. can be determined directly by the diff. between the reading with and without spec. Enter value for H_{gb} and d_{gb} only when these values have to be included in the determination of the soil height.
(3) Equals wgt. top cap, loading hanger and Bellofram piston (if used). (4) Reduced value if soil will dilate during shear.

Apparatus Information:	
	Wgt. of Top Shear Ring, M_{sb} (lbf) = Dead Wgt. of Loading System(3) (lbf)=
	Top Shear Ring Supported by Counter Force: [ ] Yes ; [X] No: Shear Ring Free to Move Up & Down: [ ] Yes ; [X] No:
	Porous Inserts: [X] Stone; [ ] Metal; **Do not use filter paper over porours inserts.** Free to Rotate: [ ] Yes ; [X] No:
	Porous Inserts with Additional Shear Transfer Features: [ ] None; [ ] Pins; [ ] Grid Plate; [X] Waffle Stone; [ ] Other:
	Apparatus deformation under consolidation load determined: [ ] Yes ; [X] No

Sketch of Specimen

Photo taken of Sliced Test Specimen: [ ] Yes ; [X] No

Final Visual Description: Clay, Very Stiff, olive gray, with shell fragments and silt seams (shale)

Trimming/Etc. Remarks:

Method of trimming periphery: [X] "Casagrande" Lathe ; [ ] Cutting Shoe ; [ ] Wire Saw; [ ] Other
Method of trimming ends: [ ] Wire Saw & Sharp (knife) Straight Edge; [X] Wire Saw & Straight Edge; [ ] Wire Saw; [ ] Other
For soils containig sand, ~100 % passes sieve size: [ ] #4 (4.75 mm); [ ] #10 (2.0 mm); [ ] #20 (0.85 mm) or; [ ] #40 (0.425 mm)
Shear Box Gap Setting(4): Clays, 0.50 to 0.65 mm; Sands,1 mm to sieve size (mm) for 100 % passing

Trim./Recon. By: DBN Set up By: HP/DBN Prelim. Cal. By: HC Taken Down By: PL
Date: 11/24/2008 Date: 11/24/2008 Final Cal. By: MR Date: 12/2/2008
Reviewed By: HP

DIRECT SHEAR TEST (ASTM D 3080): SPECIMEN CALCULATIONS & SUMMARY

Project Number: 0411-08-1717 Boring/Exploration No.: BB5 Type Test: DS
Task Number: Sample No.: RC7 Specific Gravitiy, G_s: 2.75
Project Name: Penetration/Depth (ft):
Calculations Corrected for Salt (dissolved soilids): [X] No or, [ ] Yes, with salinity, S_{ppt} ____ ppt

Water Content Copied/Derived From:	Water Content, $W_{o,n}$ (%)	Mass Dry Soil, $M_{do,n}$ (g)	Degree of Sat., $S_{o,n}$ (%)
Initial, Top, W1	8.37	160.00	52.6
" Bottom, W2	9.88	157.80	59.3
" Sides, W3			
" Average, W4	9.13	158.89	56.0
" Assumed, W	9.13	158.89	56.0
Final (After Test/Shear)	22.26		

Back-calculated Data Item	Value	Input Data for Back Calculation $S_{o,n}$ (%)	
Initial Mass Dry Soil, $M_{d,o}$			G_s
Specific Gravity, G_s			$M_{d,o}$ (g)

Calculation Constant: = (unit conversion) / $G_s \times \rho_w \times A_{sb}$	
Estimated	0.11433
Final Selected	0.11433

Soil Height: Final by Dial Change During Test (mm)		For Multistage Testing 2nd Stage	3rd Stage
Initial Height, H_o	26.31		
Change in Height During Consol.(not corrected for apparatus flexability)	-0.50	NA	NA
Height after Consolidation, H_c	26.81	NA	NA
Change in Height During **Initial** Shear (+ compression, - dilation)	-0.28	NA	NA
Change in Height During Repeated/Residual Shear	NA	NA	NA
Change in Height During Consol. to Max. Consol. Stress	NA	NA	NA
Final Soil Height (After Test/Shear), H_{at}	27.09	NA	NA

Summary of Specimen Physical Properties: Initial Conditions

Area, A_{sb}	31.864 , cm^2							
Specific Gravity, G_s	2.750		X	Assumed		Measured		
Mass Dry Soil, Md (g)	158.89		X	Based on average water content		Value based on one of the above values		
	Water Content, w (%)	Total Unit Weight, γ_t (pcf)	Dry Unit Weight, γ_d (pcf)	Void Ratio, e	Degree of Saturation, S (%)	Height, H (mm)	Volume, V (cm^3)	
Initial:	9.1	129.13	118.33	0.448	56.0	26.31	83.83	

Consolidation Summary: Stress Units = (ksf)	Stage:	1st	2nd	3rd		1st	2nd	3rd
	$\sigma'_{n,c}$ or $\sigma'_{v,c}$	4.32	NA	NA	$\varepsilon_{a,c}$ (%)	-1.90	NA	NA
	$\sigma'_{v,max}$	NA	NA	NA	$\varepsilon_{a,max}$ (%)	NA	NA	NA
	OCR	NA	NA	NA	t_c (days)	5.04	NA	NA

Remarks:
NA - Not Applicable

Calculated by: MR Reviewed by: HP
Date: 12/4/2008

DRAINED DIRECT SHEAR TEST: Test Results

Project Number: 0411-08-1717
Task No.:
Project Name:
File Name: BB5_RC7c
Shear Box Dia./Width: 63.5 (mm)
Shear Box: [X] Circular [ ] Square

App. No.: 2F
Consol. Stress, $\sigma'_{v,c}$: 4.32 (ksf)
Induced OCR: NA
$\sigma'_{v,max}$: NA (ksf)
Specimen Ht.: 26.81 (mm)
Vert. Strain During Consol.: -1.90 (%)

Boring No.: BB5
Sample No.: RC7
Specimen No.: c
Depth (ft):

Part of Test Series: [X] No; [ ] Yes If yes, Test: NA of NA
Multistage: [X] No; [ ] Yes If yes, Test Stage No.: NA
Residual/Multishearing: [X] No; [ ] Yes Precut Failure Plane [X] No; [ ] Yes

Initial Test Conditions:				
Water Content, w (%)	Total Unit Weight, γ_t (pcf)	Dry Unit Weight, γ_d (pcf)	Void Ratio, e	Degree of Saturation, S (%)
9.1	129.13	118.33	0.448	56.0

Shearing Data For:
[X] Intact - Without Repeated Shearing (Peak Data)
[ ] Intact - Before Repeated Shearing (Peak Data)
[ ] After Rapid Repeated Shearing (Residual Data)
[ ] Continuous Shearing: Forwards & Backwards (Peak & Residual Data)

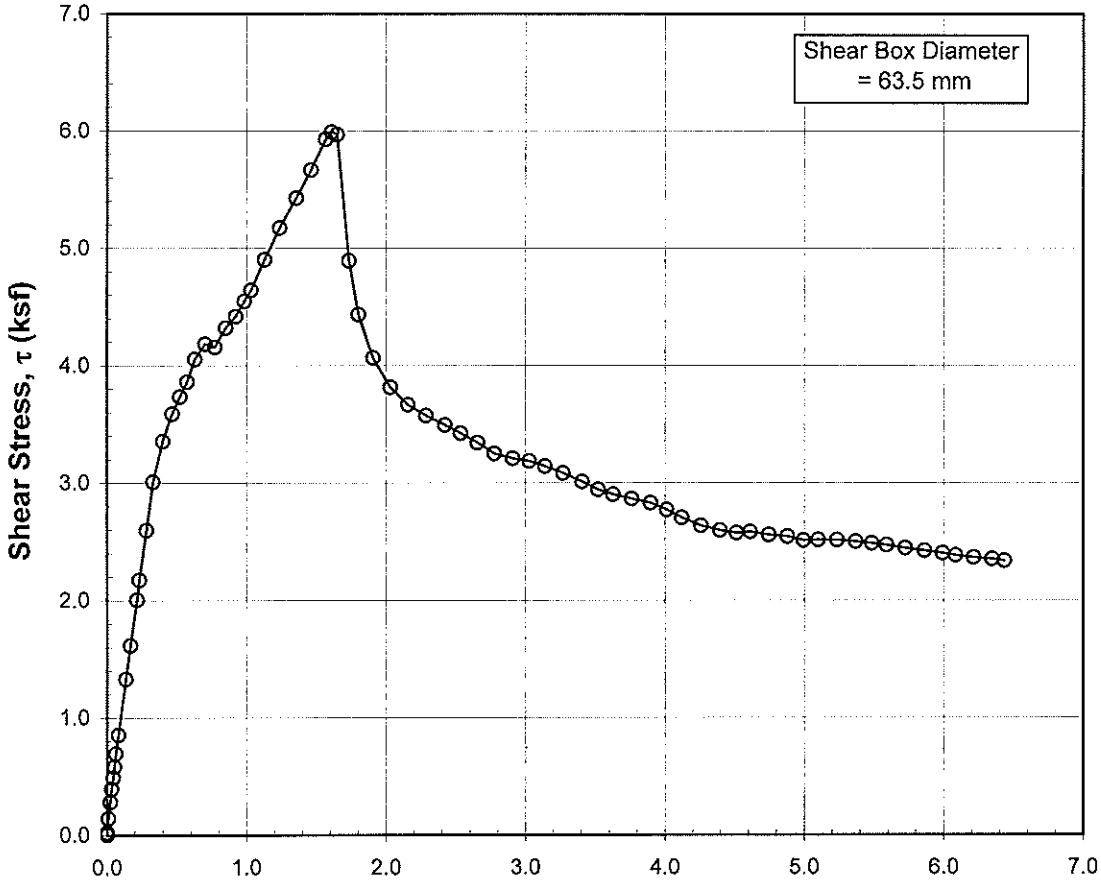
Avg. Lat. Displacement Rate (mm/h): 0.47855

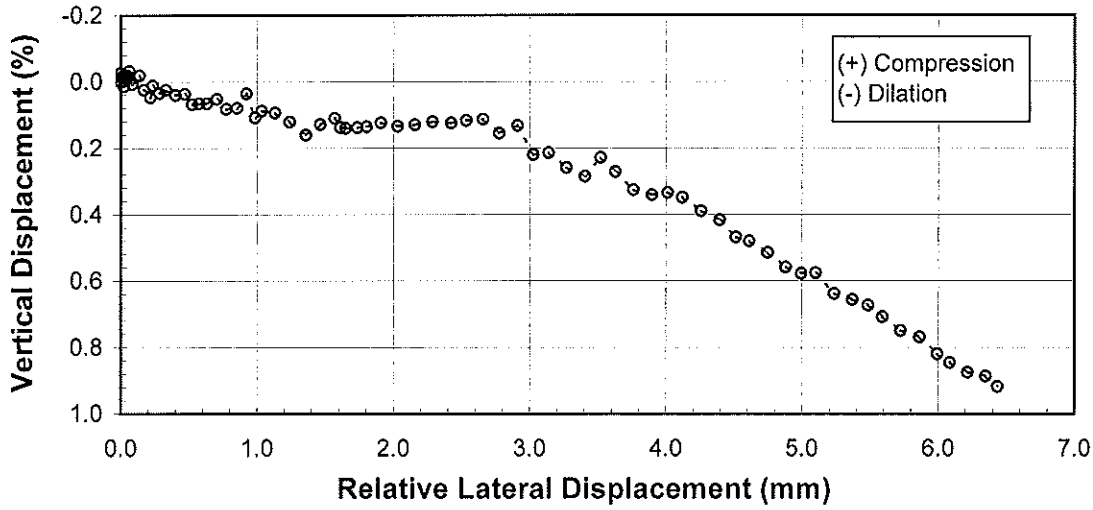
Elapsed Time (min)	Rel. Lateral Displacement (mm)	Horiz. Force (lbf)	Vert. Displacement (%)	Shear Stress, τ (kips/ft^2)
0.00	0.0000	0.21	0.00	0.01
3.00	0.0011	-0.07	0.00	0.00
6.00	-0.0034	0.88	0.00	0.03
9.00	-0.0002	1.31	0.00	0.04
12.00	-0.0019	2.69	0.00	0.08
15.00	0.0128	4.80	0.01	0.14
18.00	0.0319	7.71	0.01	0.22
21.00	0.0484	10.85	0.01	0.32
24.00	0.0675	15.10	0.01	0.44
33.00	0.1132	27.64	0.01	0.81
42.00	0.1794	38.95	0.01	1.14
51.00	0.2434	46.96	0.01	1.37
60.00	0.3083	53.83	0.00	1.57
69.00	0.3717	59.78	0.01	1.74
78.00	0.4331	66.87	0.00	1.95
87.00	0.4986	75.17	0.00	2.19
96.00	0.5643	83.94	-0.01	2.45
105.00	0.6288	92.86	-0.02	2.71
114.00	0.6880	101.96	-0.03	2.97
123.00	0.7512	109.47	-0.04	3.19
132.00	0.8150	115.64	-0.04	3.37
141.00	0.8697	123.74	-0.06	3.61
150.00	0.9373	131.82	-0.08	3.84
159.00	1.0054	137.91	-0.10	4.02
168.00	1.0821	138.95	-0.12	4.05
177.00	1.1546	135.73	-0.14	3.96
190.00	1.2703	128.28	-0.18	3.74
205.00	1.3973	124.56	-0.22	3.63
220.00	1.5238	121.40	-0.26	3.54
235.00	1.6648	115.23	-0.29	3.36
250.00	1.7872	112.63	-0.33	3.28
265.00	1.9064	112.45	-0.36	3.28
280.00	2.0334	112.13	-0.41	3.27
295.00	2.1668	111.79	-0.45	3.26
310.00	2.2930	111.04	-0.49	3.24
325.00	2.4097	110.10	-0.52	3.21

Sign Convention:
(+) Compression or Fowards
(-) Dilation or Backwards

Elapsed Time (min)	Rel. Lateral Displacement (mm)	Horiz. Force (lbf)	Vert. Displacement (%)	Shear Stress, τ (kips/ft^2)
340.00	2.5419	108.30	-0.56	3.16
355.00	2.6710	107.92	-0.58	3.15
370.00	2.7977	108.43	-0.62	3.16
385.00	2.9146	108.77	-0.66	3.17
400.00	3.0393	109.64	-0.69	3.20
415.00	3.1803	98.28	-0.69	2.87
430.00	3.3054	95.97	-0.70	2.80
445.00	3.4274	94.15	-0.71	2.74
460.00	3.5587	91.34	-0.72	2.66
475.00	3.6910	87.83	-0.74	2.56
490.00	3.8169	86.16	-0.75	2.51
505.00	3.9384	85.26	-0.76	2.49
520.00	4.0644	83.95	-0.78	2.45
535.00	4.1945	82.81	-0.79	2.41
550.00	4.3187	82.05	-0.80	2.39
565.00	4.4374	81.14	-0.81	2.37
580.00	4.5631	80.02	-0.83	2.33
595.00	4.6944	77.87	-0.84	2.27
610.00	4.8192	76.49	-0.85	2.23
625.00	4.9396	75.46	-0.86	2.20
640.00	5.0603	75.02	-0.89	2.19
655.00	5.1902	73.69	-0.90	2.15
670.00	5.3151	73.11	-0.92	2.13
685.00	5.4329	72.53	-0.93	2.11
700.00	5.5527	71.52	-0.96	2.09
715.00	5.6831	70.60	-0.97	2.06
730.00	5.8058	69.53	-0.97	2.03
745.00	5.9272	68.72	-1.00	2.00
760.00	6.0452	68.26	-1.01	1.99
775.00	6.1730	67.42	-1.02	1.97
790.00	6.3003	66.88	-1.06	1.95
805.00	6.4205	66.35	-1.06	1.93

Sign Convention:
(+) Compression or Fowards
(-) Dilation or Backwards





DRAINED DIRECT SHEAR TEST: 3rd Test in Test Series

Soil - Soil Interface $\sigma'_{v,c}$ = 8.64 ksf

Boring: BB5 - Sample: RC7d - Depth: ft

Reviewed By: _____

PLATE ?

DIRECT SHEAR TEST (ASTM D 3080): Setup / Take Down

Project Number: 0411-08-1717 | Apparatus No.: 3F | File Name: BB5_RC7d
Task Number: | Assign. Units: [X] ksf; or Other: | Ring No.: FL1
Project Name: | Series $\sigma'_{v,c}$ or $\sigma'_{n,c}$: 8.64 , | Area - Shear Box, A_{sb} (cm^2): 31.864
" & | Height - Shear Box, H_{sb} (mm):
This Test $\sigma'_{v,c}$ or $\sigma'_{n,c}$: 8.64 ; NA ; & NA | Shear Box: [X] Circular [ ] Square
Induced OCR: NA ; Max. $\sigma'_{v,max}$: NA | Specific Gravity: 2.75 [X] Assumed; [ ] Measured
Multistage: [X] No; [ ] Yes | Residual/Multishearing: [X] No; [ ] Yes | Precut Failure Plane [X] No; [ ] Yes
Assign. Remarks:

[ ] Tube [ ] Field Extruded [ ] Liner [X] Core	[ ] Tampling	[ ] Constant Effort:	Blows/Tamps per Layer =
Boring No.: BB5 [ ] Reconstituted	[ ] Kneading	Rammer:Wgt.(lbf)=	Tamper: Force (lbf)=
Sample No.: RC7 Compostite No.:	[ ] Inpact/Rammer	Drop(in.)=	Dia.(in.)=
Depth (ft): Specimen No.: d	[ ] Pluviated:	[ ] Undercompaction: U_{nl} (%) =	Ref.Effort=
[ ] Spec. Selection by X - Ray; [ ] Geomarine Sample		No. Layers =	% Comp= ± Opt.=

Water Content (WC);	Initial - Trimming Location			Final, W_{at}	Soil and Ring Masses (g)	Initial	Final
	Top (W1)	Bottom (W2)	Sides (W3)	(see below)	Mass Moist Soil+Trimming Ring	366.05	NA
Container No.	180	771		717	Mass Trimming Ring, etc.	199.85	NA
Mass Moist Soil + Container (g)	113.90	126.64		65.48	Mass Moist Soil	166.20	NA
Mass Dry Soil + Container (g)	105.85	116.76		58.62	Excess Dry Soil (soil not included in final water content)		
Mass Container (g)	30.42	31.53		31.66	Container No.		
WATER CONTENT (%)	10.67	11.59		25.45	Mass Dry Soil + Cont. (g)		
Avg. Initial WC, W4 (%)	11.13	Final W_{at}: Soil with free water trimmed away			Mass Container (g)		
[ ] See attached data sheet(s) for additional water contents					Mass Excess Dry Soil (g)		0.00

Soil Height: Measurements(1)	
Initial (mm)	
with Spec., H_{soil}	without Spec., H_{app}
25.35	
25.44	
25.28	
25.25	
25.38	
Block Used (2):	[ ] Yes ; [X] No

Soil Height/Volume: Calc., (mm)	Initial
Height of Gauge Block, H_{gb} (2)	NA
Reading on Gauge Block, R_{gb}	NA
Avg. Reading on Soil, H_{soil}	25.34
Avg. Reading on Apparatus without Specimen, H_{app}	0.00
Soil Height, $H = H_{soil} - H_{app} + H_{gb} - R_{gb}$	25.34
Initial Soil Volume, V_o (cm^3)	80.74

Estimated Initial Unit Weight	
Total, $\gamma_{t,o}$ (pcf)= 128.50	Dry, $\gamma_{d,o}$ (pcf)= 115.63

(1) Measured in trimming ring, not shear box.

(2) Req. block ht. to set bench comparator so the initial soil ht. can be determined directly by the diff. between the reading with and without spec. Enter value for H_{gb} and d_{gb} only when these values have to be included in the determination of the soil height.
(3) Equals wgt. top cap, loading hanger and Bellofram piston (if used). (4) Reduced value if soil will dilate during shear.

Apparatus Information:	
	Wgt. of Top Shear Ring, M_{sb} (lbf) = Dead Wgt. of Loading System(3) (lbf)=
	Top Shear Ring Supported by Counter Force: [ ] Yes ; [X] No: Shear Ring Free to Move Up & Down: [ ] Yes ; [X] No:
	Porous Inserts: [X] Stone; [ ] Metal; **Do not use filter paper over porours inserts.** Free to Rotate: [ ] Yes ; [X] No:
	Porous Inserts with Additional Shear Transfer Features: [ ] None; [ ] Pins; [ ] Grid Plate; [X] Waffle Stone; [ ] Other:
	Apparatus deformation under consolidation load determined: [ ] Yes ; [X] No

Sketch of Specimen

Photo taken of Sliced Test Specimen: [ ] Yes ; [X] No

Final Visual Description: Clay, Very Stiff, olive gray, with shell fragments and silt seams (shale)

Trimming/Etc. Remarks:

Method of trimming periphery: [X] "Casagrande" Lathe ; [ ] Cutting Shoe ; [ ] Wire Saw; [ ] Other
Method of trimming ends: [ ] Wire Saw & Sharp (knife) Straight Edge; [X] Wire Saw & Straight Edge; [ ] Wire Saw; [ ] Other
For soils containig sand, ~100 % passes sieve size: [ ] #4 (4.75 mm); [ ] #10 (2.0 mm); [ ] #20 (0.85 mm) or; [ ] #40 (0.425 mm)
Shear Box Gap Setting(4): Clays, 0.50 to 0.65 mm; Sands,1 mm to sieve size (mm) for 100 % passing

Trim./Recon. By: DBN Set up By: HP Prelim. Cal. By: HC Taken Down By: PL
Date: 11/25/2008 Date: 11/25/2008 Final Cal. By: MR Date: 12/2/2008
Reviewed By: HP

DIRECT SHEAR TEST (ASTM D 3080): SPECIMEN CALCULATIONS & SUMMARY

Project Number: 0411-08-1717 Boring/Exploration No.: BB5 Type Test: DS
Task Number: Sample No.: RC7 Specific Gravitiy, G_s: 2.75
Project Name: Penetration/Depth (ft):
Calculations Corrected for Salt (dissolved soilids): [X] No or, [ ] Yes, with salinity, S_{ppt} : ppt

Water Content Copied/Derived From:	Water Content, $W_{o,n}$ (%)	Mass Dry Soil, $M_{do,n}$ (g)	Degree of Sat., $S_{o,n}$ (%)
Initial, Top, W1	10.67	150.17	61.7
" Bottom, W2	11.59	148.94	65.3
" Sides, W3			
" Average, W4	11.13	149.55	63.5
" Assumed, W	11.13	149.55	63.5
Final (After Test/Shear)	25.45		

Back-calculated Data Item	Value	Input Data for Back Calculation $S_{o,n}$ (%)	
Initial Mass Dry Soil, $M_{d,o}$			G_s
Specific Gravity, G_s			$M_{d,o}$ (g)

Calculation Constant: = (unit conversion) / $G_s \times \rho_w \times A_{sb}$	
Estimated	0.11433
Final Selected	0.11433

Soil Height: Final by Dial Change During Test (mm)		For Multistage Testing 2nd Stage	3rd Stage
Initial Height, H_o	25.34		
Change in Height During Consol.(not corrected for apparatus flexability)	2.82	NA	NA
Height after Consolidation, H_c	22.52	NA	NA
Change in Height During **Initial** Shear (+ compression, - dilation)	0.21	NA	NA
Change in Height During Repeated/Residual Shear	NA	NA	NA
Change in Height During Consol. to Max. Consol. Stress	NA	NA	NA
Final Soil Height (After Test/Shear), H_{at}	22.32	NA	NA

Summary of Specimen Physical Properties: Initial Conditions

Area, A_{sb}	31.864 , cm^2							
Specific Gravity, G_s	2.750		X	Assumed		Measured		
Mass Dry Soil, Md (g)	149.55		X	Based on average water content		Value based on one of the above values		
	Water Content, w (%)	Total Unit Weight, γ_t (pcf)	Dry Unit Weight, γ_d (pcf)	Void Ratio, e	Degree of Saturation, S (%)	Height, H (mm)	Volume, V (cm^3)	
Initial:	11.1	128.50	115.63	0.482	63.5	25.34	80.74	

Consolidation Summary: Stress Units = (ksf)	Stage:	1st	2nd	3rd		1st	2nd	3rd
	$\sigma'_{n,c}$ or $\sigma'_{v,c}$	8.64	NA	NA	$\varepsilon_{a,c}$ (%)	11.11	NA	NA
	$\sigma'_{v,max}$	NA	NA	NA	$\varepsilon_{a,max}$ (%)	NA	NA	NA
	OCR	NA	NA	NA	t_c (days)	4.7	NA	NA

Remarks:
NA - Not Applicable

Calculated by: MR Reviewed by: HP
Date: 12/4/2008

DRAINED DIRECT SHEAR TEST: Test Results

Project Number: 0411-08-1717
Task No.:
Project Name:
File Name: BB5_RC7d
Shear Box Dia./Width: 63.5 (mm)
Shear Box: [X] Circular [ ] Square

App. No.: 3F
Consol. Stress, $\sigma'_{v,c}$: 8.64 (ksf)
Induced OCR: NA
$\sigma'_{v,max}$: NA (ksf)
Specimen Ht.: 22.52 (mm)
Vert. Strain During Consol.: 11.11 (%)

Boring No.: BB5
Sample No.: RC7
Specimen No.: d
Depth (ft):

Part of Test Series: [X] No; [ ] Yes If yes, Test: NA of NA
Multistage: [X] No; [ ] Yes If yes, Test Stage No.: NA
Residual/Multishearing: [X] No; [ ] Yes Precut Failure Plane [X] No; [ ] Yes

Initial Test Conditions:				
Water Content, w (%)	Total Unit Weight, γ_t (pcf)	Dry Unit Weight, γ_d (pcf)	Void Ratio, e	Degree of Saturation, S (%)
11.1	128.50	115.63	0.482	63.5

Shearing Data For:		
	X	Intact - Without Repeated Shearing (Peak Data)
		Intact - Before Repeated Shearing (Peak Data)
		After Rapid Repeated Shearing (Residual Data)
		Continuous Shearing: Forwards & Backwards (Peak & Residual Data)

Avg. Lat. Displacement Rate (mm/h): 0.46518

Elapsed Time (min)	Rel. Lateral Displacement (mm)	Horiz. Force (lbf)	Vert. Displacement (%)	Shear Stress, τ (kips/ft^2)
0.00	0.0000	0.07	0.00	0.00
3.00	-0.0004	0.71	-0.03	0.02
6.00	0.0093	4.91	-0.01	0.14
9.00	0.0233	9.70	0.01	0.28
12.00	0.0317	13.54	-0.01	0.39
15.00	0.0452	16.79	-0.01	0.49
18.00	0.0523	20.00	-0.02	0.58
21.00	0.0627	23.85	-0.03	0.70
24.00	0.0830	29.31	0.01	0.85
33.00	0.1360	45.60	-0.02	1.33
42.00	0.1694	55.44	0.02	1.62
51.00	0.2165	68.76	0.05	2.00
60.00	0.2330	74.53	0.01	2.17
69.00	0.2832	89.04	0.03	2.60
78.00	0.3300	103.20	0.02	3.01
87.00	0.4005	115.05	0.04	3.35
96.00	0.4678	123.08	0.04	3.59
105.00	0.5229	128.04	0.07	3.73
114.00	0.5740	132.41	0.07	3.86
123.00	0.6302	139.00	0.07	4.05
132.00	0.7037	143.40	0.05	4.18
141.00	0.7726	142.51	0.08	4.15
150.00	0.8513	148.14	0.08	4.32
159.00	0.9226	151.49	0.04	4.42
168.00	0.9853	155.96	0.11	4.55
177.00	1.0333	159.18	0.09	4.64
190.00	1.1306	168.10	0.09	4.90
205.00	1.2387	177.46	0.12	5.17
220.00	1.3574	186.15	0.16	5.43
235.00	1.4633	194.35	0.13	5.67
250.00	1.5674	203.33	0.11	5.93
255.00	1.6091	205.37	0.14	5.99
260.00	1.6482	204.71	0.14	5.97
265.00	1.7332	167.84	0.14	4.89
270.00	1.8018	152.06	0.14	4.43
280.00	1.9067	139.42	0.12	4.07

Sign Convention:
(+) Compression or Fowards
(-) Dilation or Backwards

Elapsed Time (min)	Rel. Lateral Displacement (mm)	Horiz. Force (lbf)	Vert. Displacement (%)	Shear Stress, τ (kips/ft^2)
295.00	2.0309	130.86	0.13	3.82
310.00	2.1570	125.75	0.13	3.67
325.00	2.2861	122.56	0.12	3.57
340.00	2.4228	119.83	0.12	3.49
355.00	2.5340	117.43	0.12	3.42
370.00	2.6560	114.68	0.11	3.34
385.00	2.7755	111.49	0.16	3.25
400.00	2.9095	110.05	0.13	3.21
415.00	3.0272	109.27	0.22	3.19
430.00	3.1397	107.77	0.21	3.14
445.00	3.2702	105.75	0.26	3.08
460.00	3.4073	103.27	0.28	3.01
475.00	3.5220	100.92	0.23	2.94
490.00	3.6295	99.52	0.27	2.90
505.00	3.7626	98.26	0.33	2.86
520.00	3.8973	97.04	0.34	2.83
535.00	4.0148	95.03	0.33	2.77
550.00	4.1216	92.75	0.35	2.70
565.00	4.2600	90.41	0.39	2.64
580.00	4.3974	89.03	0.42	2.60
595.00	4.5155	88.29	0.47	2.57
610.00	4.6138	88.65	0.48	2.58
625.00	4.7483	87.74	0.52	2.56
640.00	4.8808	87.26	0.56	2.54
655.00	4.9957	86.15	0.58	2.51
670.00	5.1010	86.29	0.58	2.52
685.00	5.2363	86.23	0.64	2.51
700.00	5.3705	85.82	0.66	2.50
715.00	5.4853	85.29	0.67	2.49
730.00	5.5909	84.80	0.71	2.47
745.00	5.7261	83.89	0.75	2.45
760.00	5.8640	83.16	0.77	2.42
775.00	5.9931	82.43	0.82	2.40
790.00	6.0860	81.80	0.85	2.38
805.00	6.2162	81.16	0.87	2.37
820.00	6.3473	80.78	0.89	2.36
830.00	6.4350	80.25	0.92	2.34

Sign Convention:
(+) Compression or Fowards
(-) Dilation or Backwards

Appendix D –

Soil and Rock Descriptive Information

GRAY

GRAY-BROWN

OLIVE-BROWN

OLIVE

OLIVE-GRAY

DARK BROWN

RED-GRAY

RED-BROWN

BROWN

RED

LIGHT BROWN

TAN

YELLOW-BROWN

RED-YELLOW

YELLOW

GRAIN SIZE

	Clear Sieve Openings 12"	3"	3/4"		U.S. Standard Sieve 4	10	40	200	
SOILS	Boulders	Cobbles	Gravel						Silts and Clays
			Coarse	Fine	Coarse	Medium	Fine		
FILLS	Blocks	Pieces	Fragments		Particles				Specks
	300mm	75mm	19mm		4.75mm	2.0mm	0.042mm	75µm	

APPARENT/RELATIVE DENSITY – COARSE GRAINED SOIL

APPARENT DENSITY	SPT (blows/ft)	RELATIVE DENSITY (%)
Very loose	0-4	0-15
Loose	5-10	15-35
Medium Dense	11-30	35-65
Dense	31-50	65-85
Very Dense	>50	85-100

CONSISTENCY – FINE GRAINED SOIL

CONSISTENCY	SPT (blows/ft)	Unconfined Compressive Strength	Thumb Test
Very Soft	0-2	<0.25	Easily penetrated by fist
Soft	2-4	0.25-0.5	Easily penetrated by Thumb >1"
Medium Stiff	4-8	0.5-1.0	Penetrated by thumb with moderate pressure
Stiff	8-15	1.0-2.0	Readily indented by thumb, but penetrated with great effort
Very Stiff	15-30	2.0-4.0	Readily indented by thumb
Hard	>30	>4.0	Indented with difficulty by thumbnail

SOIL DESCRIPTIVE TERMS

Lens – Zone of soil < 1" thick
Seam – Zone of soil between 1 and 6 inches thick
Layer – Zone of soil > 6" thick
Interbedded – Alternating layers or lenses of differing soils
Pockets – Inclusion of an isolated area of one soil into a matrix of a differing soil
Slickensided – Clay soils with planes of separation with glossy surfaces
Trace – Indicates <5% of a soil type by weight
Little – Indicates 5 to 12 percent of a soil type by weight
Some – Indicates 12 to 35 percent of a soil type by weight
And – Indicates 35 to 50 percent of a soil type by weight

SUGGESTED ABBREVIATIONS

C – Coarse	VF – Very Fine	R – Red	Y – Yellow	Gn – Green	Tr – Trace
M – Medium	Frag – Fragments	W – White	L – Light	B – Brown	Sm – Some
F – Fine	G – Gray	Bk – Black	D – Dark	V – Very	

SOIL DESCRIPTION EXAMPLES

Soft, dark gray, Sandy Silt, wet
Dense, yellow, Silty fine SAND, some gravel, moist
Stiff, dark brown, CLAY, trace organics (roots), thin lenses of brown silt (FILL)

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FINE-GRAINED SOILS
IDENTIFICATION FLOW CHART

Group Symbol				Group Name
ML (SILT)	<30% plus No. 200	<15% plus No. 200		SILT
		15-25% plus No. 200	% sand ≥ % gravel	SILT, little sand
			% sand < % gravel	SILT, little gravel
	≥30% plus No.200	% sand ≥ % gravel	< 15% gravel	Sandy SILT
			≥ 15% gravel	Sandy SILT, little gravel
		% sand < % gravel	< 15% sand	Gravelly SILT
			≥ 15% sand	Gravelly SILT, little sand
MH (ELASTIC SILT)	<30% plus No. 200	<15% plus No. 200		elastic SILT
		15-25% plus No. 200	% sand ≥ % gravel	elastic SILT, little sand
			% sand < % gravel	elastic SILT, little gravel
	≥30% plus No.200	% sand ≥ % gravel	< 15% gravel	Sandy elastic SILT
			≥ 15% gravel	Sandy elastic SILT, little gravel
		% sand < % gravel	< 15% sand	Gravelly elastic SILT
			≥ 15% sand	Gravelly elastic SILT, little sand
CL (LEAN CLAY)	<30% plus No. 200	<15% plus No. 200		lean CLAY
		15-25% plus No. 200	% sand ≥ % gravel	lean CLAY, little sand
			% sand < % gravel	lean CLAY, little gravel
	≥30% plus No.200	% sand ≥ % gravel	< 15% gravel	Sandy lean CLAY
			≥ 15% gravel	Sandy lean CLAY, little gravel
		% sand < % gravel	< 15% sand	Gravelly lean CLAY
			≥ 15% sand	Gravelly lean CLAY, little sand
CH (FAT CLAY)	<30% plus No. 200	<15% plus No. 200		fat CLAY
		15-25% plus No. 200	% sand ≥ % gravel	fat CLAY, little sand
			% sand < % gravel	fat CLAY, little gravel
	≥30% plus No.200	% sand ≥ % gravel	< 15% gravel	Sandy fat CLAY
			≥ 15% gravel	Sandy fat CLAY, little sand
		% sand < % gravel	< 15% sand	Gravelly fat CLAY
			≥ 15% sand	Gravelly fat CLAY, little gravel
OL/OH (ORGANIC SOILS)	<30% plus No. 200	<15% plus No. 200		ORGANIC SOIL
		15-25% plus No. 200	% sand ≥ % gravel	ORGANIC SOIL, little sand
			% sand < % gravel	ORGANIC SOIL, little gravel
	≥30% plus No.200	% sand ≥ % gravel	< 15% gravel	Sandy ORGANIC SOIL
			≥ 15% gravel	Sandy ORGANIC SOIL, little gravel
		% sand < % gravel	< 15% sand	Gravelly ORGANIC SOIL
			≥ 15% sand	Gravelly ORGANIC SOIL, little sand

Note: percentages are based on visual estimates of fines, sand and gravel to the nearest 5%

HNTB

COARSE-GRAINED SOILS
IDENTIFICATION FLOW CHART

				Group Symbol		Group Name
GRAVEL %Gravel > %Sand	≤5% fines	Well-Graded		**GW**	<15% sand	well-graded GRAVEL
					≥ 15% sand	well-graded GRAVEL, little sand
		Poorly-Graded		**GP**	<15% sand	poorly-graded GRAVEL
					≥ 15% sand	poorly-graded GRAVEL, little sand
	10% fines	Well-Graded	fines = ML or MH	**GW-GM**	<15% sand	well-graded GRAVEL, little silt
					≥ 15% sand	well-graded GRAVEL, little silt, little sand
			fines = CL or CH	**GW-GC**	<15% sand	well-graded GRAVEL, little clay
					≥ 15% sand	well-graded GRAVEL, little clay, little sand
		Poorly-Graded	fines = ML or MH	**GP-GM**	<15% sand	poorly-graded GRAVEL, little silt
					≥ 15% sand	poorly-graded GRAVEL, little silt, little sand
			fines = CL or CH	**GP-GC**	<15% sand	poorly-graded GRAVEL, little clay
					≥ 15% sand	poorly-graded GRAVEL, little clay, little sand
	≥ 15% fines		fines = ML or MH	**GM**	<15% sand	Silty GRAVEL
					≥ 15% sand	Silty GRAVEL, little sand
			fines = CL or CH	**GC**	<15% sand	Clayey GRAVEL
					≥ 15% sand	Clayey GRAVEL, little sand
SAND % Sand > % Gravel	≤5% fines	Well-Graded		**SW**	<15% gravel	well-graded SAND
					≥ 15% gravel	well-graded SAND, little gravel
		Poorly-Graded		**SP**	<15% gravel	poorly-graded SAND
					≥ 15% gravel	poorly-graded SAND, little gravel
	10% fines	Well-Graded	fines = ML or MH	**SW-SM**	<15% gravel	well-graded SAND, little silt
					≥ 15% gravel	well-graded SAND, little silt, little gravel
			fines = CL or CH	**SW-SC**	<15% gravel	well-graded SAND, little clay
					≥ 15% gravel	well-graded SAND, little clay, little gravel
		Poorly-Graded	fines = ML or MH	**SP-SM**	<15% gravel	poorly-graded SAND, little silt
					≥ 15% gravel	poorly-graded SAND, little gravel
			fines = CL or CH	**SP-SC**	<15% gravel	poorly-graded SAND, little clay
					≥ 15% gravel	poorly-graded SAND, little clay, little gravel
	≥ 15% fines		fines = ML or MH	**SM**	<15% gravel	Silty SAND
					≥ 15% gravel	Silty SAND, little gravel
			fines = CL or CH	**SC**	<15% gravel	Clayey SAND
					≥ 15% gravel	Clayey SAND, little gravel

Note: percentages are based on visual estimates of fines, sand and gravel to the nearest 5%

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FINE GRAINED SOIL MANUAL TESTING CRITERIA

DILATANCY

Description	Criteria
None	No visible change in specimen
Slow	Water appears slowly on the surface of the specimen during shaking and does not disappear or disappears slowly upon squeezing
Rapid	Water appears quickly on the surface during shaking and disappears quickly upon squeezing.

TOUGHNESS

Description	Criteria
Low	Only slight pressure is required to roll a 1/8” thread near the plastic limit. the thread and lump are weak and soft
Medium	Medium pressure is required to roll the thread to near the plastic limit. the thread and lump have medium stiffness
High	Considerable pressure is required to roll the thread to near the plastic limit. The thread and the lump have very high stiffness

PLASTICITY

Description	Criteria
Non plastic	A 1/8” thread cannot be rolled at any water content
Low	The thread can barely be rolled and the lump cannot be reformed when drier than the plastic limit
Medium	The thread is easily rolled and not much time is required to reach the plastic limit. The thread cannot be re-rolled after reaching the plastic limit. The lump crumbles when re formed.
High	It takes considerable time rolling and kneading to reach the plastic limit. The thread can be re-rolled several times after reaching the plastic limit. The lump can be formed without crumbling when drier than the plastic limit

DRY STRENGTH

Description	Criteria
None	Dry specimen crumbles into powder with pressure of handling
Low	Dry specimen crumbles into powder with some finger pressure
Medium	Dry specimen breaks into pieces with considerable finger pressure
High	Dry specimen cannot be broken with finger pressure, but will break between thumb and a hard surface
Very High	Dry specimen cannot be broken between thumb and hard surface

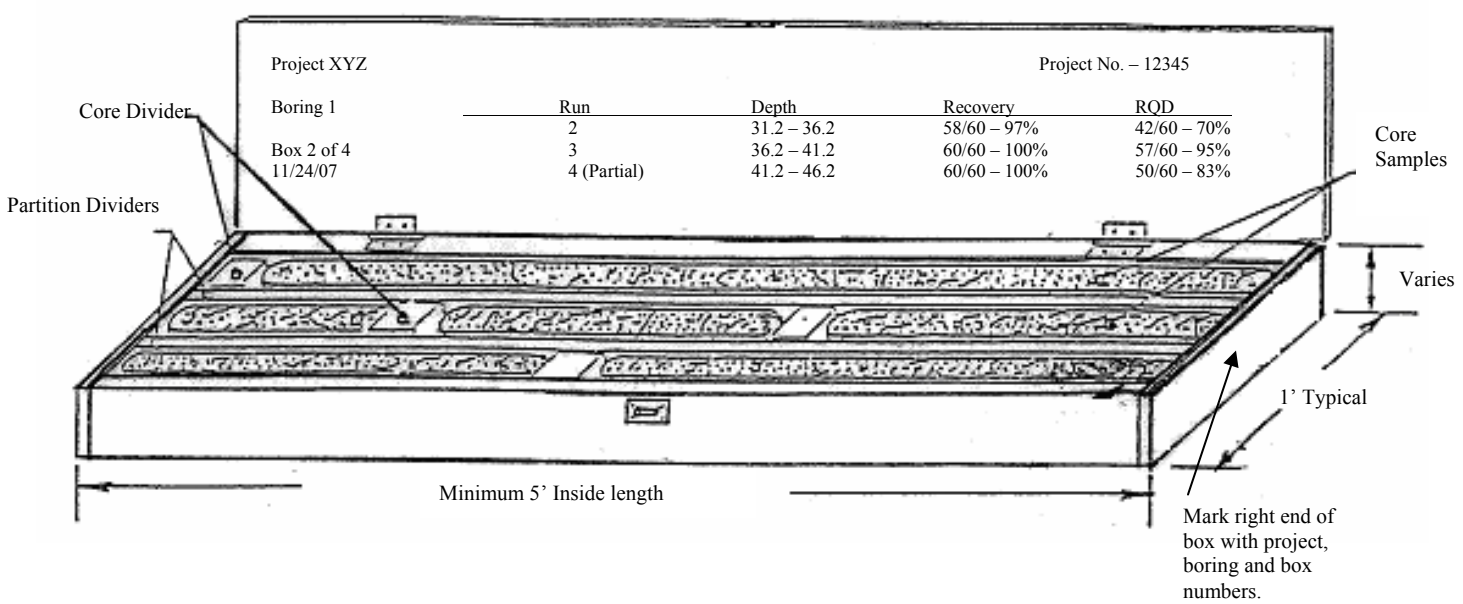
SUMMARY OF TEST RESULTS				
	Dilatancy	Toughness	Plasticity	Dry Strength
ML	slow-rapid	low	none-low	none-low
MH	none-slow	low-medium	low-medium	low-medium
CL	none-slow	medium	medium	medium-high
CH	none	high	high	high-very high

HNTB

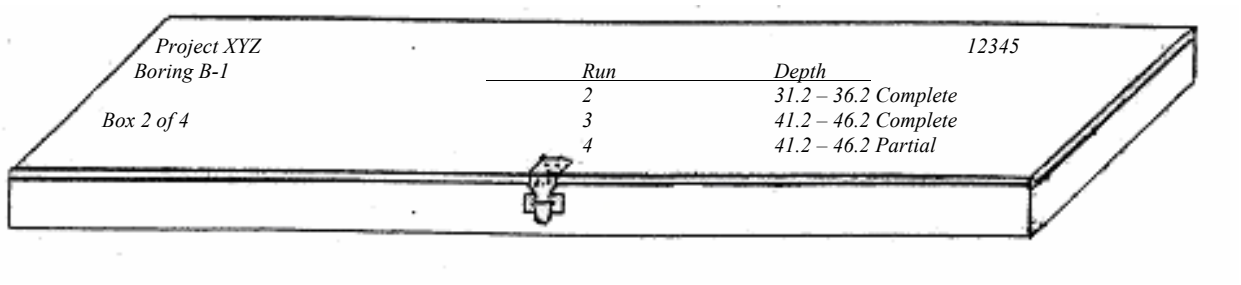
PROPER MARKING OF SAMPLE CONTAINERS

Rock Core Box

Inside Top Cover



Outside Top Cover



Notes:

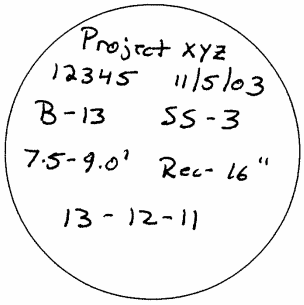
- Cores are to be placed with the top of the core in the uppermost left position available in the box. Increasing core depth should proceed in book fashion, left to right, top to bottom.
- Core dividers should be placed, between core runs as needed, and marked to indicate the run number and depth below the divider.
- Core boxes should be constructed of minimum ½" plywood, be equipped with a minimum of 3 hinges evenly spaced along the top, and with a secure latching mechanism.
- Photographs of core boxes should show the core and inside cover and be taken after completion of all coring to be placed in the box.

HNTB

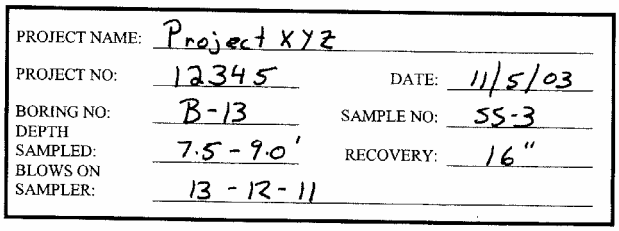
PROPER MARKING OF SAMPLE CONTAINERS

Soil Jar Samples

Jar Lid



Jar Label

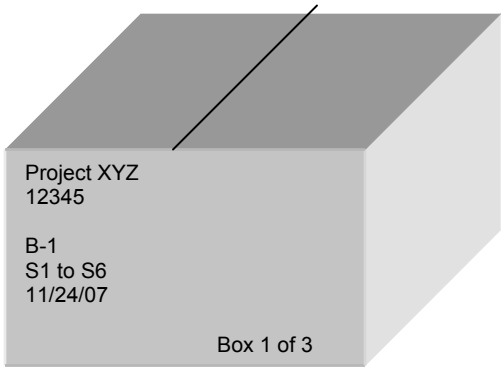


PROJECT NAME:	Project XYZ		
PROJECT NO:	12345	DATE:	11/5/03
BORING NO:	B-13	SAMPLE NO:	SS-3
DEPTH SAMPLED:	7.5 - 9.0'	RECOVERY:	16"
BLOWS ON SAMPLER:	13 - 12 - 11		

Contractor may provide pre-printed label or lid sticker. At a minimum the following information must be marked on the sample.

Project Name	Date	Sample Depths
Project Number	Boring Number	Blow Count

Jar Box



Jar boxes should be constructed of heavy cardboard and have internal dividers to separate the jar samples. Care should be taken to prevent the boxes from becoming wet during drilling or at the final storage facility.

HNTB

VISUAL DESCRIPTION OF ROCK CORE

ROCK CORE

Description of the general rock mass

LITHOLOGY
Identify the rock classification: LIMESTONE, SANDSTONE, SHALE, GRANITE, DIORTIE, etc. If know include formation name.

ROCK CONTINUITY
General description of the brokenness of the rock core as a whole:

Extremely Fractured – Core segments less than 1" long
Moderately Fractured – Core segments 1 to 4" long
Slightly Fractured – Core segments 4" to 8" long
Sound – Core segments greater than 8" long

FIELD HARDNESS
A measure of resistance to scratching or abrasion

Very Hard – Cannot be scratched with a knife
Hard – Can be scratched with a knife only with difficulty
Medium Hard – Can readily be scratched with a knife
Soft – Can be easily gouged with a knife
Very Soft – Can be carved with a knife or grooved with a fingernail

WEATHERING
The degree of alteration produced by chemical of mechanical processes

Fresh – Rock is unstained, may be fractured but discontinuities are not stained
Slightly Weathered – Rock is unstained. Discontinuities show some surface discoloration
Moderately Weathered – Discontinuity surfaces are stained. Discoloration may extend into rock along discontinuity.
Highly Weathered – Individual rock fragments are thoroughly stained. Some of the rock is altered or decomposed.
Severely Weathered – Most of the rock is decomposed to a soil-like material.

COLOR
Rock color is described as basic colors or combinations such as gray, green-gray, red-brown; or modified such as light gray, dark brown.

TEXTURE
General physical appearance of a rock including grain size as follows:

Fine-grained – Grains barely visible to unaided eye up to 1/16" diameter
Medium-grained – Grains between 3/16 to 1/16" diameter
Coarse-grained – Grains between 3/16 to 1/4" diameter
Very coarse-grained – Grains larger than 1/4" diameter

BEDDING/FOLIATION
The relative thickness of the beds

Laminated – less than 0.5 inches
Very thin – 0.5 to 2 inches
Thin – 2 inches to 1 foot
Medium – 1 foot to 3 feet
Thick – 3 to 10 feet
Massive – More than 10 feet

JOINT SPACING
General spacing of joints

Very close – 0.5 to 2 inches
Close – 2 inches to 1 foot
Moderately Close – 1 to 3 feet
Wide – 3 to 10 feet
Very Wide – More than 10 feet

EXAMPLES

GRANITE – Moderately fractured, hard, moderately weathered, Green-gray, fine grained, massive, wide joints

LIMESTONE (Austin Chalk) – Slightly fractured, soft, slightly weathered, Light tan, thin bedding, moderately close joints

DISCONTINUITIES

Description of individual discontinuities

DIP ANGLE
Measured as the angle below the horizontal perpendicular to the long axis of the core. Record to the nearest 5 degrees.

WEATHERING
General Description of the weathering at the opposing faces of the discontinuity
Fresh – No visible sign of weathering
Discolored – Some staining of joint face
Decomposed – Portions of rock are decomposed to soil
Disintegrated – The rock is weathered to a soil.

ROUGHNESS
Appearance of the faces of the discontinuity

Large Scale Appearance:
Stepped – Joint exhibits angular steps
Planar – Joint lies within a single plane across the core
Undulating – Joint exhibits a curves profile

Small Scale Appearance:
Rough – Joint surface is rough to the touch
Smooth – Joint surface is largely smooth
Slickensided – Joint is very smooth and appears polished to the eye

APERTURE
The description of the "gap" between the rock faces

Tight – Core pieces can be fitted together with almost no sign of a break and no void spaces
Open – Core pieces which cannot be tightly fitted together without showing voids.

INFILLING

A description of materials infilling joints, e.g. calcite, chlorite, clay, silt, etc.

DISCONTINUITY TYPE

Joint – Simple fracture, with no displacement. May occur as group of parallel joints called a Set.
Shear – Fracture along which differential movement has occurred.
Fault – Major fracture along which large scale movement has occurred.

SOLUTION FEATURES

Description based on approximate size of opening, note and infilling of the feature
Pit – barely visible to ¼ inch diameter
Vug – ¼ to 2 inches
Cavity – 2 inches to 2 feet
Cave – greater than 2 feet

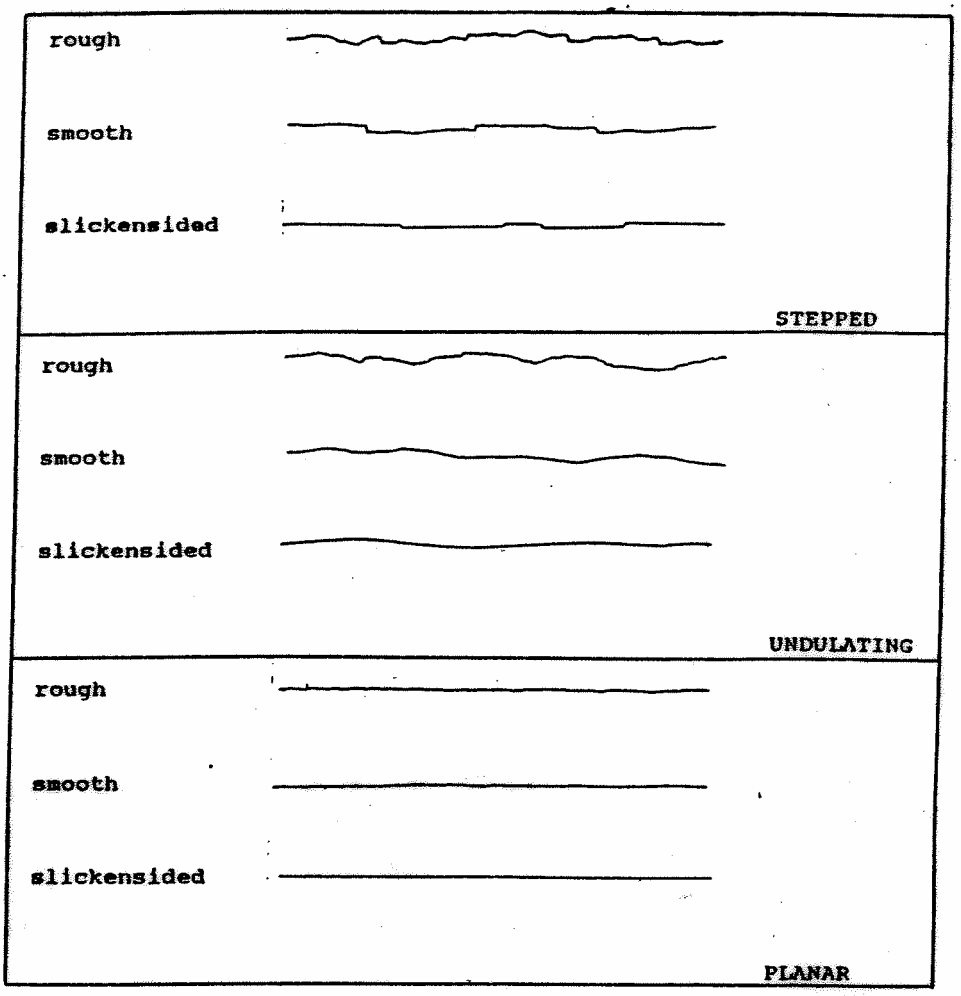
EXAMPLES

44.5' – 15 degree, fresh, stepped, rough, tight

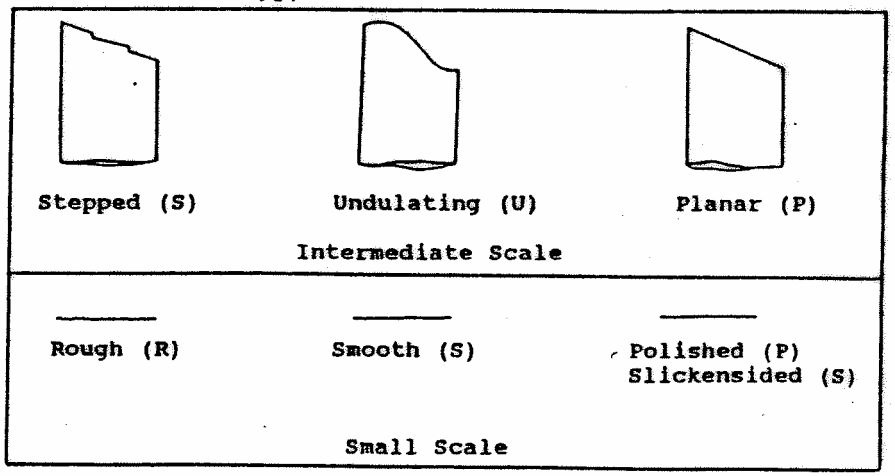
49.7' – Vug with calcite infilling

154.5' – 25 degree, discolored, planar, smooth, open, gray clay infilling

VISUAL EXAMPLES OF ROUGHNESS



A. For outcrop, tunnel and open cut rock mapping. Length of each profile is in the range of 3 to 30 ft., horizontal scale = vertical scale.



B. For Rock Core Logging

From: Edwin Strode [estrode@HNTB.com]
Sent: Monday, May 18, 2009 6:56 PM
To: Bailey, Bruce FCLDA
Subject: Total Stress Paths for Baker
Attachments: Total Stress Plots 051809.pdf

Bruce,

Here are the total stress paths for the Baker Pump Station.

-----Original Message-----
From: Tomei, Joseph D [mailto:jdt@geotesting.com]
Sent: Monday, May 18, 2009 8:29 AM
To: Edwin Strode
Cc: Mike Roland
Subject: RE: Mas-Tek Project

Total stress plots attached for Baker Pump Station.

The last swell test finished up over the weekend. I send result to you tomorrow.

Joe Tomei
Laboratory Manager
Geocomp Corporation/GeoTesting Express, Inc.
1145 Massachusetts Avenue
Boxborough, MA 01719

978 635 0012 Tel
978 635 0266 Fax
jdt@geotesting.com
<http://www.geocomp.com>
<http://www.geotesting.com>

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From: Edwin Strode [mailto:estrode@HNTB.com]
Sent: Friday, May 15, 2009 11:09 AM
To: Tomei, Joseph D
Cc: 'Mike Roland'
Subject: RE: Mas-Tek Project

Joe,

Thanks. Unfortunately I didn't need the old ones from Hampton, Charlie, or Trinity Portland re-plotted. The older tests, which they wanted re-plotted, were performed in December for the Baker pump station. I'm not sure if you still have the info in your system. I'm attaching the files we'd gotten with the effective stress plots, that they'd like plotted in total stress, for your reference.

Also have you completed that last swell you were still running for Pavaho?

-----Original Message-----
From: Tomei, Joseph D [mailto:jdt@geotesting.com]
Sent: Friday, May 15, 2009 9:35 AM
To: Mike Roland; Edwin Strode
Subject: RE: Mas-Tek Project

Total Stress Path Plots attached

Joe Tomei
Laboratory Manager
Geocomp Corporation/GeoTesting Express, Inc.
1145 Massachusetts Avenue
Boxborough, MA 01719

978 635 0012 Tel
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jdt@geotesting.com
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From: Mike Roland [mailto:MRoland@aggengr.com]
Sent: Wednesday, May 13, 2009 11:18 AM
To: Tomei, Joseph D; Edwin Strode
Subject: RE: Mas-Tek Project

thanks

From: Tomei, Joseph D [mailto:jdt@geotesting.com]
Sent: Wednesday, May 13, 2009 9:49 AM
To: Edwin Strode; Mike Roland
Subject: RE: Mas-Tek Project

No problem. It will take a little bit of time to go back through them, but we can do it. I'll send them when available.

Joe Tomei
Laboratory Manager
Geocomp Corporation/GeoTesting Express, Inc.
1145 Massachusetts Avenue
Boxborough, MA 01719

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jdt@geotesting.com
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From: Edwin Strode [mailto:estrode@HNTB.com]
Sent: Wednesday, May 13, 2009 10:35 AM
To: Mike Roland
Cc: Tomei, Joseph D
Subject: RE: Mas-Tek Project

Mike,

I got a request from the Bruce Bailey for the recently completed Pavaho test results from GeoTesting. He would like to have the CU tests re-plotted in terms of total stress, as opposed to the effective stress as shown on the results.

Also he wanted to know if it would be possible to have the information for the CU test for the Baker Pump Station which were completed in mid December, also replotted for the total stress case and not the effective. I hope that the data's still there to be re-plotted.

Thanks.
-----Original Message-----
From: Tomei, Joseph D [mailto:jdt@geotesting.com]
Sent: Monday, May 11, 2009 1:05 PM
To: Mike Roland
Cc: Edwin Strode
Subject: RE: Mas-Tek Project

I have attached additional results (Pavaho). We are still working on the report for one last Swell test we ran. I will send this tomorrow. You will not find a direct shear test result for sample Pavaho PB-3 32.58 ft. The sample crumbled when removed from the packaging (it was not cohesive).

Joe Tomei
Laboratory Manager
Geocomp Corporation/GeoTesting Express, Inc.
1145 Massachusetts Avenue
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From: Mike Roland [mailto:MRoland@aggengr.com]
Sent: Friday, May 08, 2009 8:50 AM
To: Tomei, Joseph D
Cc: Edwin Strode
Subject: RE: Mas-Tek Project

Joesph,

What is the status of the remaining testing for Pavaho Pump Station?

Regards,

Michael D. Roland, P.E.
Geotechnical Consultant
Mas-Tek Engineering & Associates
5132 Sharp Street
Dallas, Texas 75247

Phone: (972) 709-7384
Cell: (214) 500-3100
Email: mroland@aggengr.com

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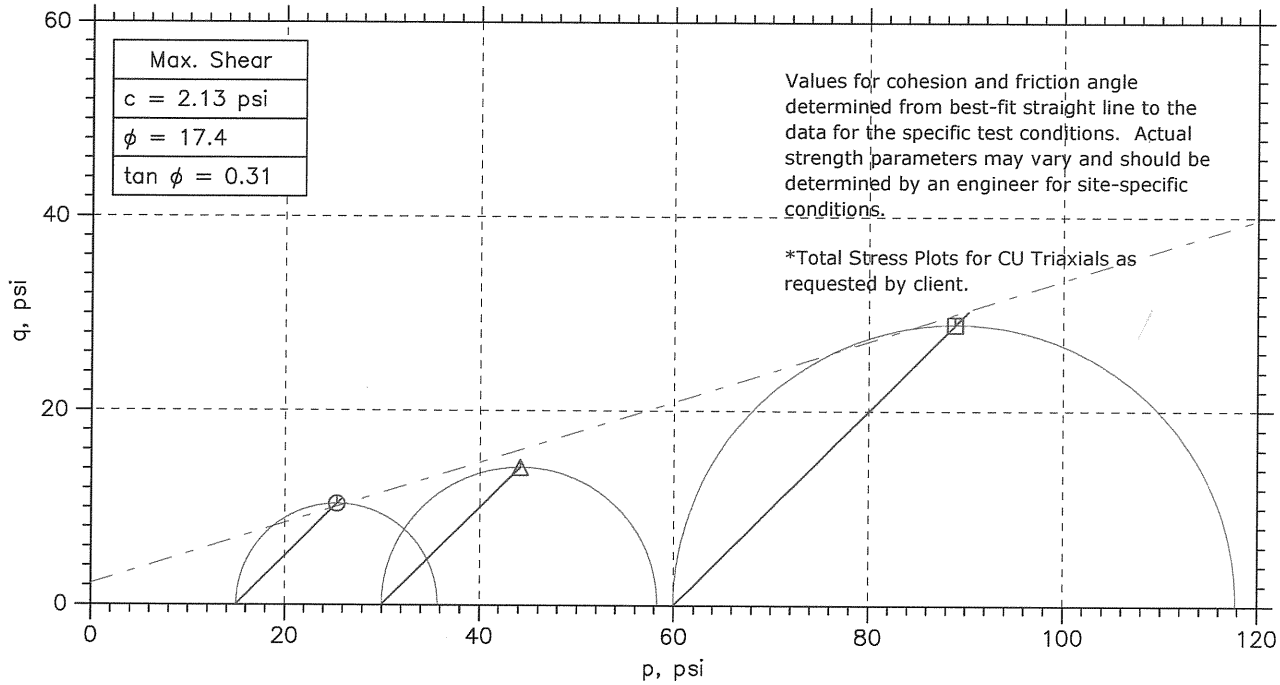
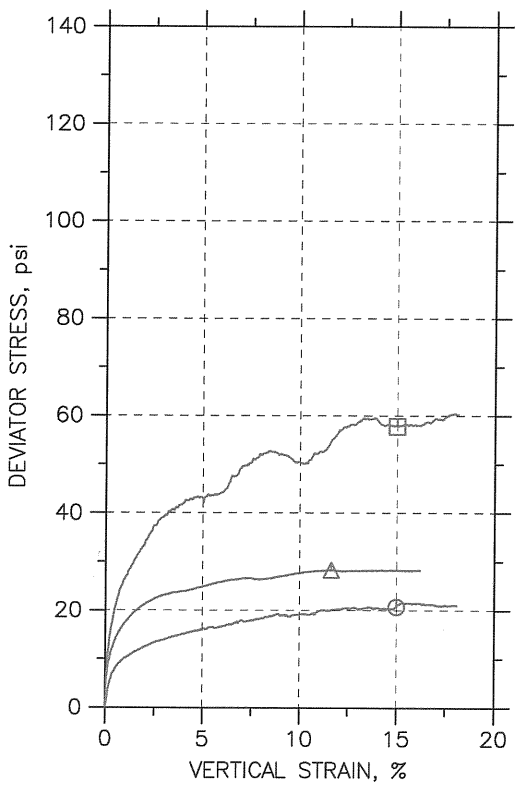
CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767





Symbol		⏲	△	⊡	
Sample No.		ST-9	ST-9	ST-9	
Test No.		CU-1-1	CU-1-2	CU-1-3	
Depth		12.5-14.5	12.5-14.5	12.5-14.5	
Initial	Diameter, in	2	2	2	
	Height, in	3.96	3.95	3.9	
	Water Content, %	15.9	16.3	15.5	
	Dry Density, pcf	112.	109.8	110.5	
	Saturation, %	84.8	82.4	79.8	
	Void Ratio	0.505	0.535	0.525	
Before Shear	Water Content, %	18.5	17.5	16.6	
	Dry Density, pcf	112.4	114.4	116.4	
	Saturation*, %	100.0	100.0	100.0	
	Void Ratio	0.5	0.474	0.448	
	Back Press., psi	124.	139.	121.	
Ver. Eff. Cons. Stress, psi		15.	30.	60.01	
Shear Strength, psi		10.37	14.16	28.91	
Strain at Failure, %		15	11.6	15	
Strain Rate, %/min		0.003	0.003	0.003	
B-Value		0.93	0.92	0.95	
Estimated Specific Gravity		2.7	2.7	2.7	
Liquid Limit		---	---	---	
Plastic Limit		---	---	---	

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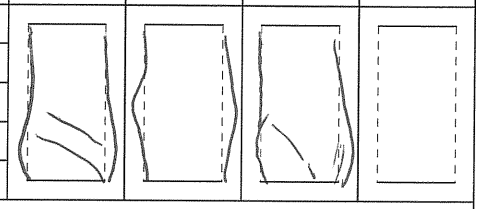
a subsidiary of Geocomp Corporation

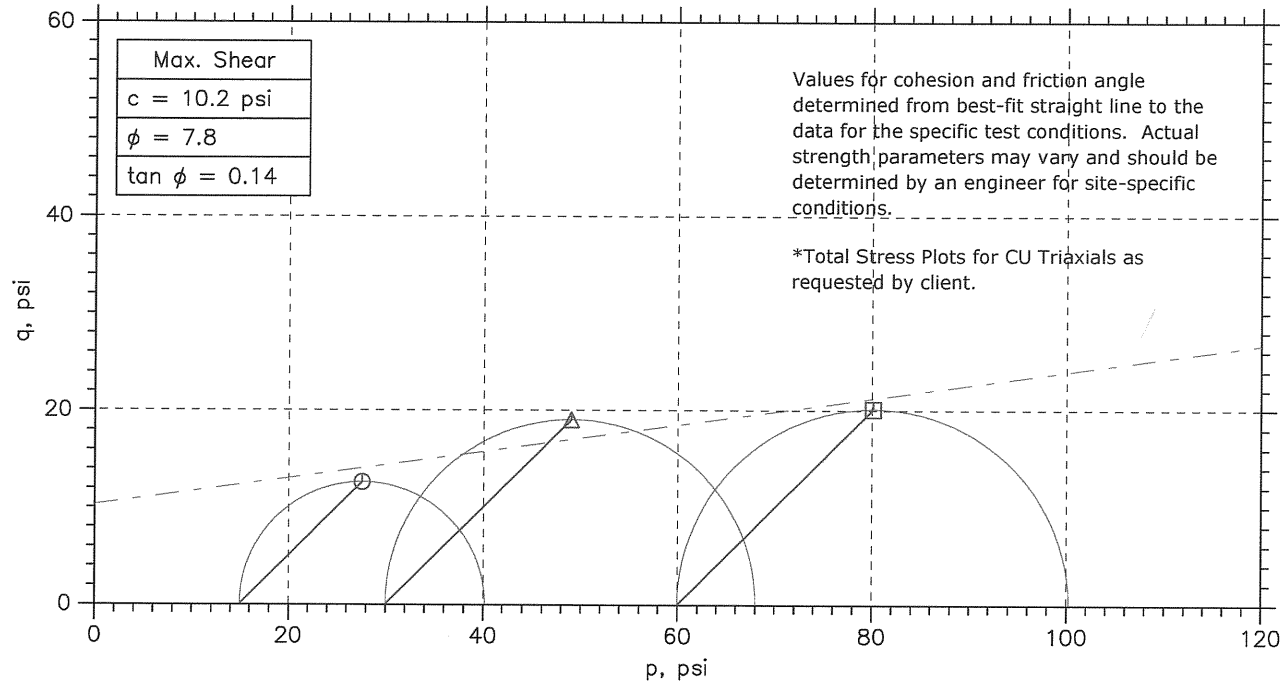
Project: Baker Pump Station
Location: ---
Project No.: GTX-8704
Boring No.: BB-9
Sample Type: core
Description: Moist, dark olive brown clay
Remarks: System R

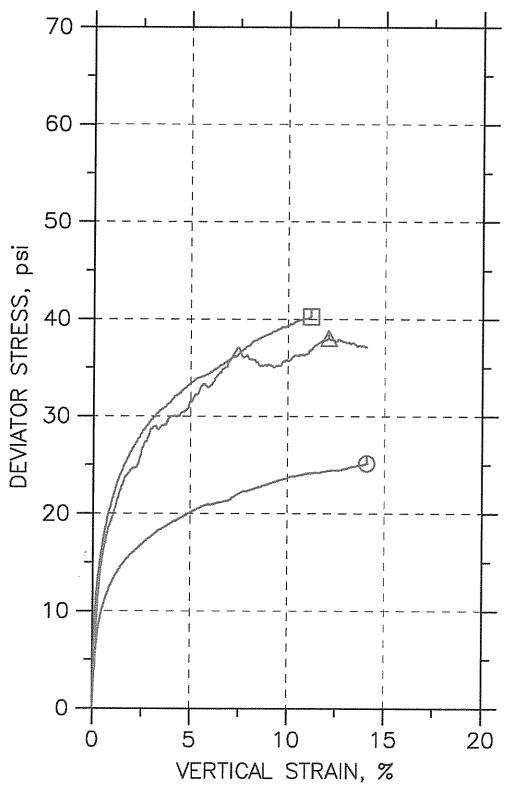


Fri, 15-MAY-2009 14:02:17

Phase calculations based on start and end of test.
* Saturation is set to 100% for phase calculations.

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767





Symbol		⏲	△	⊡	
Sample No.		ST-12	ST-12	ST-9	
Test No.		CU-3-1	CU-3-2	CU-3-3A	
Depth		20-22	20-22	17.5-19.5	
Initial	Diameter, in	2.01	2.01	2.01	
	Height, in	4.05	4	4.2	
	Water Content, %	19.1	19.5	6.5	
	Dry Density, pcf	111.3	105.6	125.9	
	Saturation, %	100.0	88.6	52.0	
	Void Ratio	0.515	0.596	0.339	
Before Shear	Water Content, %	18.0	18.1	13.6	
	Dry Density, pcf	113.5	113.2	123.3	
	Saturation*, %	100.0	100.0	100.0	
	Void Ratio	0.486	0.49	0.367	
	Back Press., psi	118.	142.	123.8	
Ver. Eff. Cons. Stress, psi		15.01	29.99	59.96	
Shear Strength, psi		12.59	19.02	20.13	
Strain at Failure, %		14.1	12.1	11.2	
Strain Rate, %/min		0.0035	0.0035	0.0035	
B-Value		0.94	0.93	0.95	
Estimated Specific Gravity		2.7	2.7	2.7	
Liquid Limit		42	42	42	
Plastic Limit		15	15	15	

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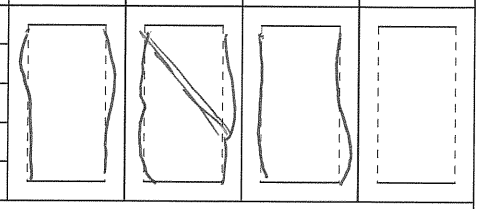
Project: Baker Pump Station
Location: ---
Project No.: GTX-8704
Boring No.: BB-9
Sample Type: core
Description: Moist, dark olive brown clay
Remarks: System R

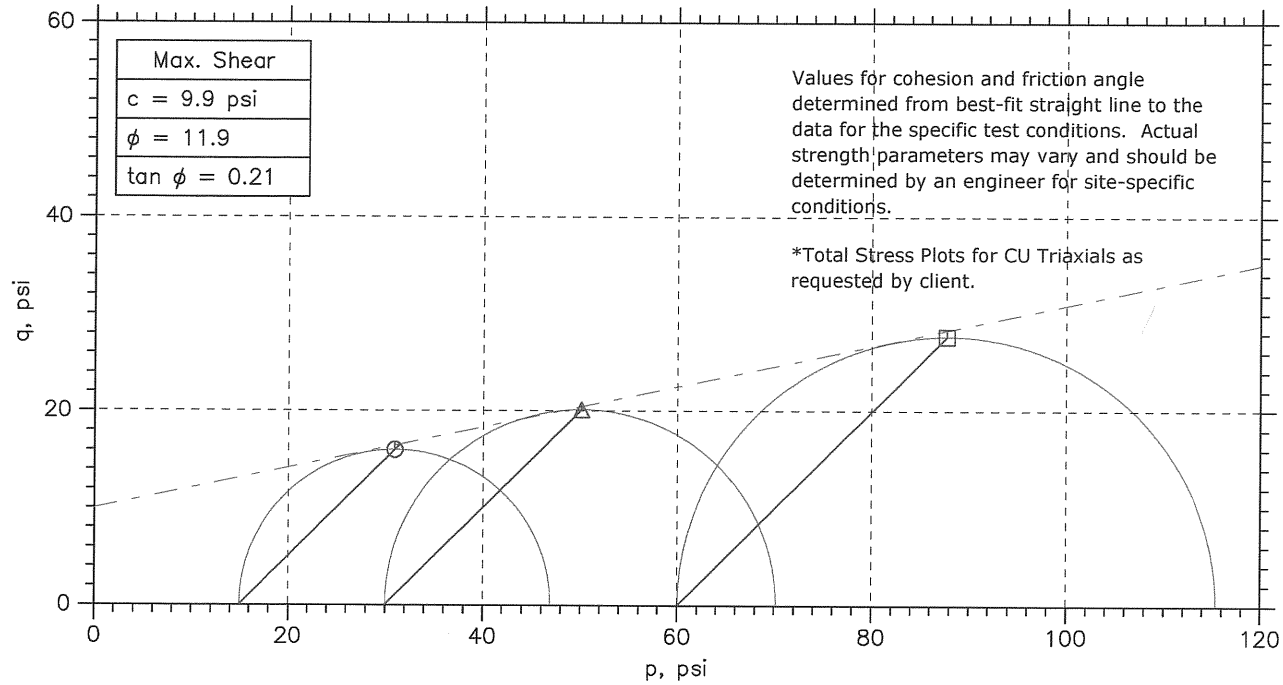


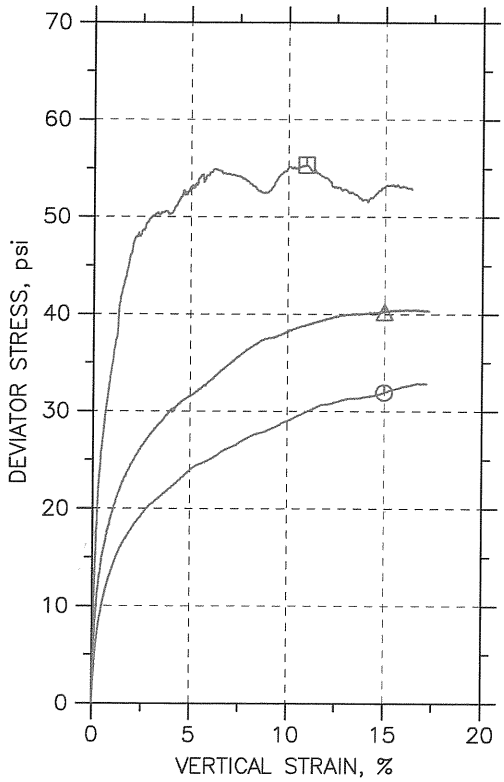
Fri, 15-MAY-2009 14:03:49

Phase calculations based on start and end of test.

* Saturation is set to 100% for phase calculations.

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767





Symbol		⦶	△	⊡	
Sample No.		ST-16	ST-16	ST-16	
Test No.		CU-2-1	CU-2-2	CU-2-3	
Depth		30-32	30-32	30-32	
Initial	Diameter, in	2.01	2	2	
	Height, in	4.05	3.98	3.97	
	Water Content, %	14.5	15.4	12.0	
	Dry Density, pcf	117.6	111.5	116.3	
	Saturation, %	90.4	81.2	72.0	
	Void Ratio	0.434	0.512	0.449	
Before Shear	Water Content, %	16.6	17.1	18.9	
	Dry Density, pcf	116.4	115.3	111.6	
	Saturation*, %	100.0	100.0	100.0	
	Void Ratio	0.448	0.462	0.511	
	Back Press., psi	147.5	127.	118.	
Ver. Eff. Cons. Stress, psi		15.	29.99	59.96	
Shear Strength, psi		15.97	20.11	27.67	
Strain at Failure, %		15	15	10.9	
Strain Rate, %/min		0.003	0.003	0.003	
B-Value		0.84	0.88	0.90	
Estimated Specific Gravity		2.7	2.7	2.7	
Liquid Limit		48	48	48	
Plastic Limit		15	15	15	

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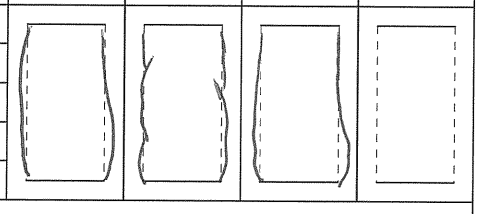
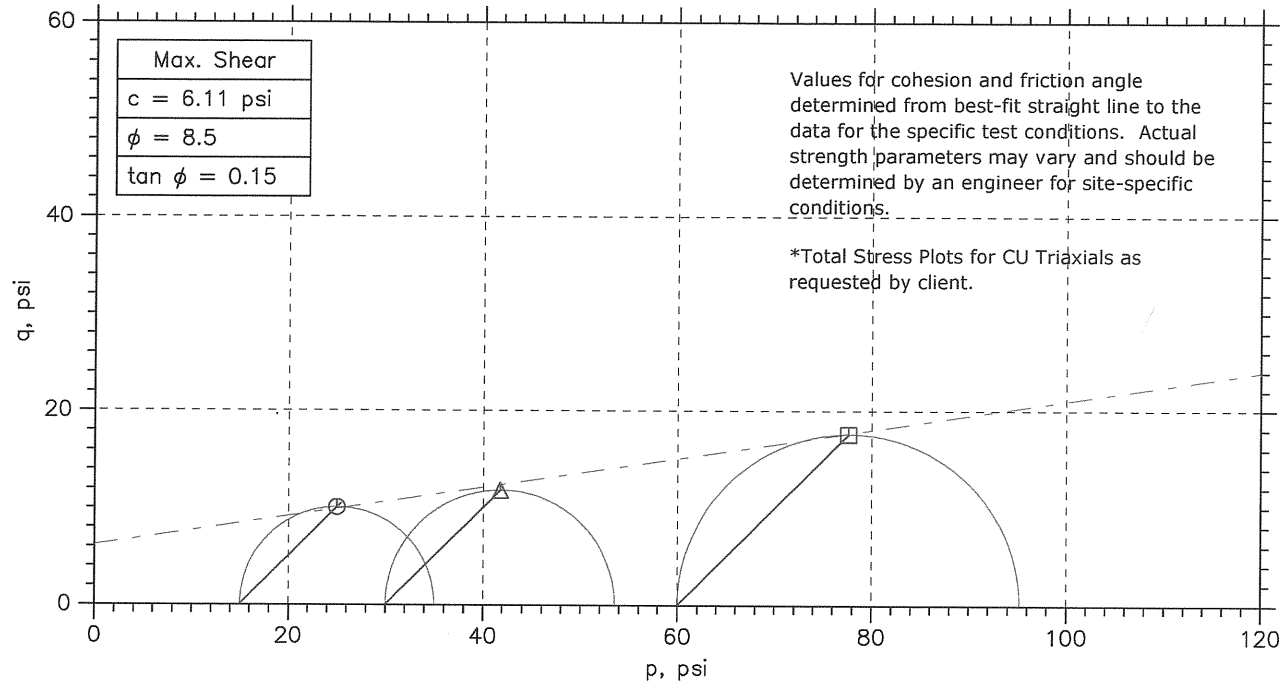
Project: Baker Pump Station
Location: ---
Project No.: GTX-8704
Boring No.: BB-9
Sample Type: core
Description: Moist, very dark brown and brown clay
Remarks: System D

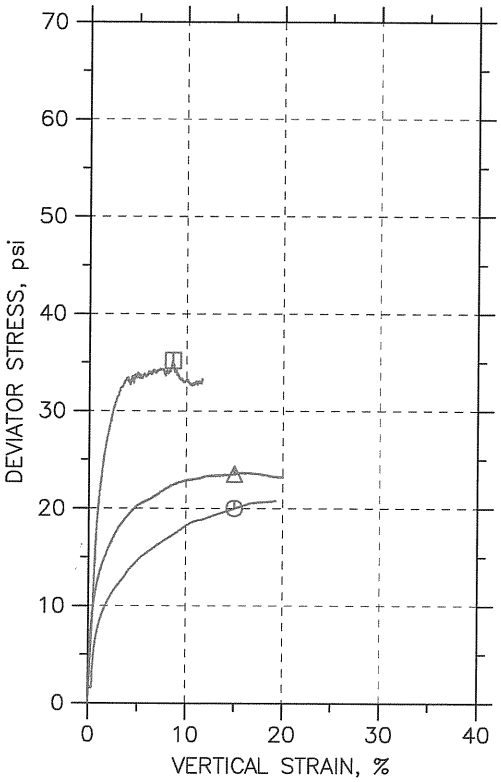


Fri, 15-MAY-2009 14:03:15

Phase calculations based on start and end of test.
* Saturation is set to 100% for phase calculations.

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767





Symbol		⦶	△	⊡	
Sample No.		ST-13	ST-12	ST-12	
Test No.		CU-4-1A	CU-4-2A	CU-4-3	
Depth		27.5-28.5	22.5-23.5	25-26	
Initial	Diameter, in	2	2	2	
	Height, in	4.1	4.1	4.2	
	Water Content, %	21.9	24.1	29.2	
	Dry Density, pcf	102.9	96.72	86.92	
	Saturation, %	92.7	87.4	83.8	
	Void Ratio	0.637	0.743	0.939	
Before Shear	Water Content, %	19.3	23.2	25.6	
	Dry Density, pcf	110.9	103.6	99.63	
	Saturation*, %	100.0	100.0	100.0	
	Void Ratio	0.521	0.627	0.692	
	Back Press., psi	127.	127.	117.8	
Ver. Eff. Cons. Stress, psi		15.01	30.01	60.04	
Shear Strength, psi		10.01	11.77	17.61	
Strain at Failure, %		15	15	8.6	
Strain Rate, %/min		0.0035	0.0035	0.0035	
B-Value		0.94	0.93	0.95	
Estimated Specific Gravity		2.7	2.7	2.7	
Liquid Limit		43	43	43	
Plastic Limit		18	18	18	

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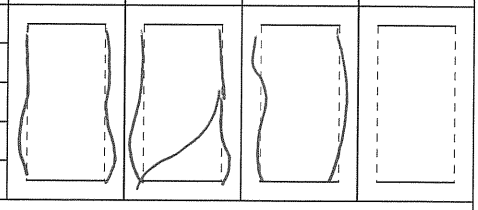
Project: Baker Pump Station
Location: ---
Project No.: GTX-8704
Boring No.: BB-11
Sample Type: core
Description: Moist, dark olive brown clay
Remarks: System D



Fri, 15-MAY-2009 14:04:38

Phase calculations based on start and end of test.
* Saturation is set to 100% for phase calculations.

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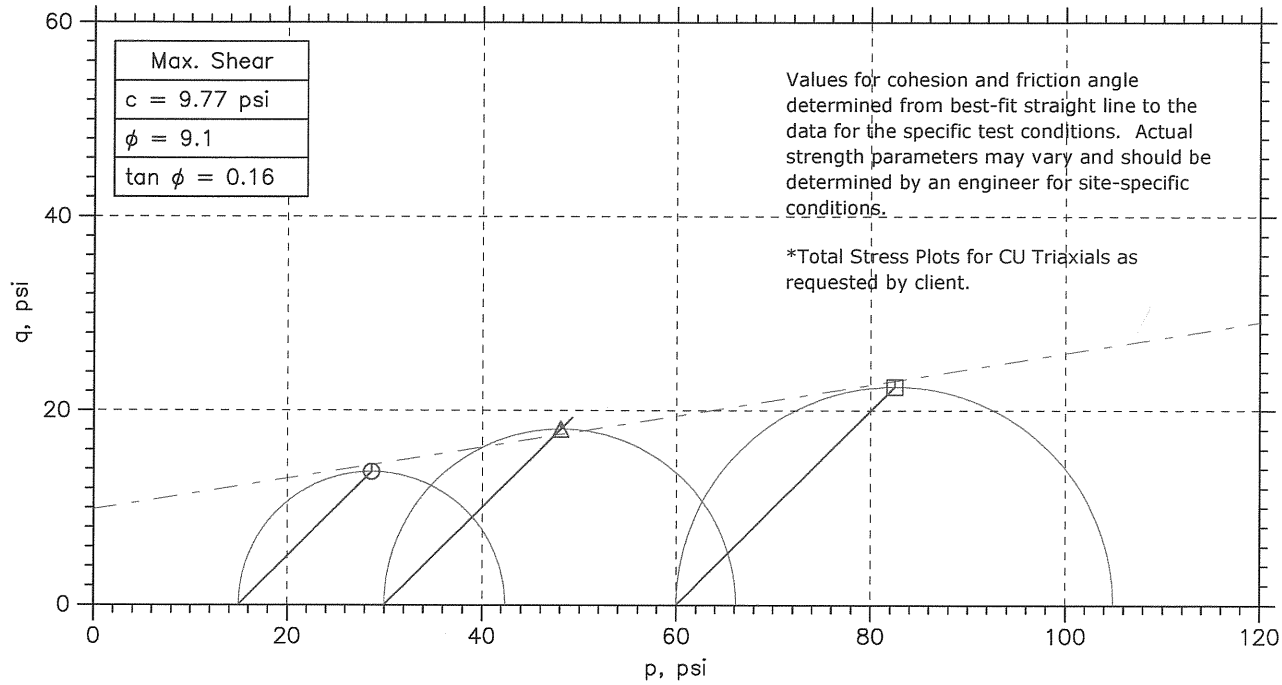

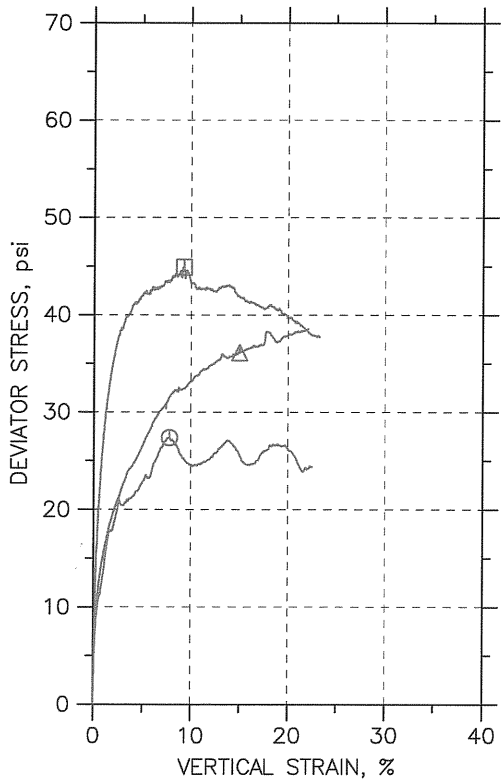

Symbol		⏲	△	⊡	
Sample No.		ST-3	ST-4	ST-3	
Test No.		CU-5-1A	CU-5-2A	CU-5-3 A	
Depth		7.5-8.5	10-11	7.5-8.5	
Initial	Diameter, in	2	2.01	2	
	Height, in	4.15	4.08	4.12	
	Water Content, %	21.4	15.5	19.2	
	Dry Density, pcf	105.6	115.1	108.1	
	Saturation, %	97.1	90.3	92.9	
	Void Ratio	0.596	0.464	0.559	
Before Shear	Water Content, %	24.0	16.9	20.4	
	Dry Density, pcf	102.3	115.7	108.6	
	Saturation*, %	100.0	100.0	100.0	
	Void Ratio	0.648	0.456	0.552	
	Back Press., psi	123.7	130.	123.8	
Ver. Eff. Cons. Stress, psi		14.99	29.99	60.	
Shear Strength, psi		13.69	18.07	22.45	
Strain at Failure, %		7.77	15	9.23	
Strain Rate, %/min		0.0035	0.0035	0.0035	
B-Value		0.91	0.90	0.94	
Estimated Specific Gravity		2.7	2.7	2.7	
Liquid Limit		55	55	55	
Plastic Limit		18	18	18	

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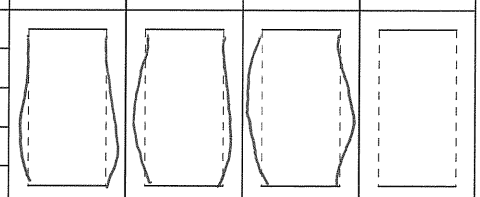
a subsidiary of Geocomp Corporation

Project: Baker Pump Station
Location: ---
Project No.: GTX-8704
Boring No.: BB-11A
Sample Type: core
Description: Moist, dark olive brown clay
Remarks: System B



Fri, 15-MAY-2009 14:05:20

Phase calculations based on start and end of test.

* Saturation is set to 100% for phase calculations.

From: Edwin Strode [estrode@HNTB.com]
Sent: Thursday, June 04, 2009 9:20 AM
To: Bailey, Bruce FCLDA
Cc: Nabil Hourani
Subject: Baker Logs with coordinate and elevation data
Attachments: BB-12.pdf; BB-13.pdf; BB-14.pdf

Bruce,

We've received the coordinate and elevation data for the borings. I've added that info to the draft logs and have attached them for your use.

Edwin R. Strode Jr.
Geotechnical Engineer

The HNTB Companies

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HNTB

LOG OF BORING

BORING NO. **BB-12**

SHEET 1 OF 2

PROJECT City of Dallas - Major Flood and Storm Drainage Projects
Baker Pump Station - Dallas, Texas

NORTHING 6977231 ft
EASTING 2479896 ft

EXPLORATION CONTRACTOR GEDCO / Mas-Tek
STARTED 4-7-2009

ENGINEERS REP. Edwin R. Strode Jr.
LOGGED BY Mike Roland(Mas Tek)
COMPLETED 4-8-2009

GROUNDWATER

ENCOUNTERED DURING
DRILLING AT 27.8
HOURS AFTER DRILLING
HOURS AFTER DRILLING
HOURS AFTER DRILLING
HOURS AFTER DRILLING

BORING METHOD

DEPTH MUD STARTED

SAMPLE TYPE AND DATA

U Undisturbued Sample
S Split Barrel
C Rock Core

DEPTH BELOW SURFACE(feet)	SAMPLE INTERVAL AND TYPE	SAMPLE NUMBER	RECOVERY(in) CORE RECOVERY(%)	RQD(%)	PENETRATION TEST RESULTS Blows per Interval (inches) 0-6	6-12	12-18	"N" Value	POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System Textural (Visual)	ELEV. DATUM ELEV. (feet) 406.0
	U	ST-1	6						4.5+P	0-4.5" Asphalt - 4.5-12" Dark brown CLAY with gracel and sand (CH) 1.0	405.0
	U	ST-2							4.2P	Hard, moist, dark brown CLAY with gravel (CL) FILL 3.5	402.5
	S	SS-3	18		17	10	7	17			
	U	ST-4	12						1.4P	Stiff, moist, dark brown CLAY, trace gravel (CH) FILL 7.3	398.7
5	U	ST-5	12						1.6P		
	U	ST-6	12						1.8P		
	U	ST-7	12						2.3P	Stiff to soft, moist, dark brown and grayish brown CLAY (CH) 10.3	395.7
	U	ST-8	10						3.6P		
	U	ST-9	10						3.7P		
10	U	ST-10	10							Hard, moist, brown and grayish brown, CLAY with sand, trace gravel (CL-CH) 14.0	392.0
	U	ST-11	10						4.5P		
	U	ST-12	12						4.5P		
	U	ST-13	10						4.5+P		
	U	ST-14	12						4.5+P	Very stiff to hard, moist, reddish brown, CLAY with sand (CL) 17.0	389.0
15	U	ST-15	11						4.5+P		
	U	ST-16	10						2.0+P		
	U	ST-17	11						1.3+P	Stiff, moist, reddish brown, CLAY and SAND (CL) 18.5	387.5
	S	SS-18	18		6	6	10	16		Medium dense, moist, red brown, SAND, with sandy clay seams (SP-SC) 20.0	386.0
20	S	SS-19	16		9	15	27	42		Red brown, moist, dense, coarse to fine SAND, some gravel (SP) 21.0	385.0
	S	SS-20	16		6	13	18	31		Medium dense to dense, moist GRAVEL with trace sand (GP)	
	S	SS-21	18		6	10	18	28			
25	S	SS-22	18		3	5	8	13			

REMARKS: Boring grouted upon completion in accordance with Corps of Engineers requirements.
THD @ 25.5' - 50/5", 50/4 1/2"; THD @ 28' - 50/1 1/2", 50/1"

HNTB

LOG OF BORING

BORING NO. **BB-12**

SHEET **2** OF **2**

PROJECT **City of Dallas - Major Flood and Storm Drainage Projects**
Baker Pump Station - Dallas, Texas

NORTHING **6977231 ft**
EASTING **2479896 ft**

EXPLORATION CONTRACTOR **GEDCO / Mas-Tek**
STARTED **4-7-2009**

ENGINEERS REP. **Edwin R. Strode Jr.** LOGGED BY **Mike Roland(Mas Tek)**
COMPLETED **4-8-2009**

DEPTH BELOW SURFACE(feet)	SAMPLE: INTERVAL AND TYPE	SAMPLE: NUMBER	SAMPLE: RECOVERY(in) CORE RECOVERY(%)	SAMPLE: RQD(%)	PENETRATION TEST RESULTS: Blows per Interval (inches) 0-6	6-12	12-18	"N" Value	POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System **Textural (Visual)**	ELEV. DATUM / ELEV. (feet)
											406.0
	S									25.5	380.5
	S	SS-23	8		3	50/5				Dark gray, moist to wet, Weathered Shale (CH)	
	S	SS-24	10		31	49	50/3.75				
30											
	S	SS-25			37	50/5					
										35.0	371.0
35											
	C	RC-1	95	95						Calcareous SHALE (Eagle Ford), moderately fractured to sound, fresh, soft, dark gray, fine grained, massive	
40											
	C	RC-2	90	90							
45											
	C	RC-3	90	90							
										50.0	356.0
50											
55											

REMARKS: THD @ 35' - 50 / 3/4", 50 / 1/2"; THD @ 40' - 50 / 1/2", 50 / 3/4", THD @ 45' - 50 / 1", 50 / 1", THD @ 50' - 50 / 1", 50 / 3/4"

HNTB

LOG OF BORING

BORING NO. **BB-13**

SHEET 1 OF 3

PROJECT City of Dallas - Major Flood and Storm Drainage Projects
Baker Pump Station - Dallas, Texas

NORTHING 6977228 ft
EASTING 2479573 ft

EXPLORATION CONTRACTOR GEDCO / Mas-Tek
STARTED 4-16-2009

ENGINEERS REP. Edwin R. Strode Jr.
LOGGED BY Aaron Allen (Mas Tek)
COMPLETED 4-23-2009

GROUNDWATER

ENCOUNTERED DURING DRILLING AT 51.0
___ HOURS AFTER DRILLING
___ HOURS AFTER DRILLING
___ HOURS AFTER DRILLING
___ HOURS AFTER DRILLING

BORING METHOD

- [ ] Hollow Stem Auger 6.5" O.D.
- [ ]
- [ ]
- [ ]
- [ ]

___ DEPTH MUD STARTED

SAMPLE TYPE AND DATA

- [S] Split Barrel
- [U] Undisturbued Sample
- [C] Rock Core
- [ ]
- [ ]
- [ ]

DEPTH BELOW SURFACE(feet)	SAMPLE INTERVAL AND TYPE	SAMPLE NUMBER	SAMPLE RECOVERY(in) CORE RECOVERY(%)	SAMPLE RQD(%)	PENETRATION TEST RESULTS Blows per Interval (inches) 0-6	6-12	12-18	"N" Value	POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System Textural (Visual)	ELEV. DATUM ___ ELEV. (feet) 435.0
	S	SS-1	6		8	6	3	9		Dark brown, stiff, moist, gravelly CLAY (CL) FILL 1.5	433.5
	S	SS-2	11.5		2	4	6	10		Dark brown, stiff, moist, sandy CLAY, with gravel (CL) FILL 3.0	432.0
	U	ST-3	12						2.75P	Dark brown, stiff to very stiff, moist, CLAY, with sandy clay seams (CL) FILL	
5	U	ST-4	19						4.25P	5-6' - Tan Sandy CLAY layer	
	U	ST-5	16						2.0P	With calcite nods below 7'	
	U	ST-6	20						2.63P		
10	U	ST-7	22						1.5P		
	U	ST-8	22						1.63P	14.0	421.0
15	U	ST-9	17						1.75P	Tan, very stiff, moist, sandy CLAY, with calcite nods (CL) FILL 16.0	419.0
	U	ST-10	24						1.75P	Dark brown, stiff, moist, CLAY with sandy clay seams (CH) FILL	
	U	ST-11	24						1.63P		
20	U	ST-12	26						1.75P		
	U	ST-13	19.5						2.3P		
25	U									With orange sand seams below 24' 25.0	410.0

REMARKS: Boring grouted upon completion in accordance with Corps of Engineers requirements.

HNTB

LOG OF BORING

BORING NO. **BB-13**

SHEET **2** OF **3**

PROJECT **City of Dallas - Major Flood and Storm Drainage Projects**
Baker Pump Station - Dallas, Texas

NORTHING **6977228 ft**
EASTING **2479573 ft**

EXPLORATION CONTRACTOR **GEDCO / Mas-Tek**
STARTED **4-16-2009**

ENGINEERS REP. **Edwin R. Strode Jr.** LOGGED BY **Aaron Allen (Mas Tek)**
COMPLETED **4-23-2009**

DEPTH BELOW SURFACE(feet)	SAMPLE INTERVAL AND TYPE	NUMBER	RECOVERY(in) CORE RECOVERY(%)	RQD(%)	PENETRATION TEST RESULTS Blows per Interval (inches) 0-6	6-12	12-18	"N" Value	POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System **Textural (Visual)**	ELEV. DATUM ELEV. (feet) 435.0
	U	ST-14	23.5						1.7P	Light brown and dark brown, mottled, stiff, moist, sandy CLAY, with clacite nods (CH) FILL	
	U	ST-15	24						1.4P		
30	U	ST-16	24						1.67P		
	U	ST-17	22						1.5P	With tan sand layers below 31.5' 32.0	403.0
	U	ST-18	12						3.0P	Dark brown, very stiff, moist, CLAY with calcite nods (CH) FILL	
35	U	ST-19	24						2.55P		
	U	ST-20	22.5						4.0P	38.0	397.0
	U	ST-21	24						4.35P	Light brown, hard, moist, sandy CLAY (CL)	
40	U	ST-22	20						4.5P	With gray sandy CLAY layers below 41'	
	U	ST-23	24						1.75P	43.0	392.0
45	S	SS-24	12		24	10	18	28		Light brown, medium dense, moist, SAND (SP) 45.5	389.5
	S	SS-25	14		10	15	23	38		Orange brown, dense to very dense, moist, SAND (SP)	
	S	SS-26	11		10	41	50	91			
	S	SS-27	6		45	50/3					
50	S	SS-28	7		38	50/5				50.0	385.0
	S	SS-29	12		35	31	21	52		Tan and brown, very dense, moist to wet, SAND with gravel (SP) 52.5	382.5
	S	SS-30	15		12	23	36	59		Gray, hard, wet, weathered SHALE (CH)	
55										55.5	379.5
	C	RC-1	97	97							

REMARKS: THD @ 53.5' - 50/4.25", 50/2"; THD @ 55.5' - 50/2.5", 50/1.75"

HNTB

LOG OF BORING

BORING NO. **BB-13**

SHEET 3 OF 3

PROJECT **City of Dallas - Major Flood and Storm Drainage Projects**
Baker Pump Station - Dallas, Texas

NORTHING **6977228 ft**
EASTING **2479573 ft**

EXPLORATION CONTRACTOR **GEDCO / Mas-Tek**
STARTED **4-16-2009**

ENGINEERS REP. **Edwin R. Strode Jr.** LOGGED BY **Aaron Allen (Mas Tek)**
COMPLETED **4-23-2009**

DEPTH BELOW SURFACE(feet)	SAMPLE INTERVAL AND TYPE	SAMPLE NUMBER	SAMPLE RECOVERY(in) CORE RECOVERY(%)	SAMPLE RQD(%)	PENETRATION TEST RESULTS Blows per Interval (inches) 0-6	6-12	12-18	"N" Value	POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System **Textural (Visual)**	ELEV. DATUM ELEV. (feet) 435.0
	C									Weathered SHALE (Eagle Ford) - sound, moderately hard, fresh, dark gray, fine grained, laminated, with bentonite seams	
60	C	RC-2	100	58						63.0	372.0
65	C	RC-2	90	85						SHALE (Eagle Ford) - sound to moderatley fractured, moderately hard, fresh, dark gray, fine grained, laminated	
70	C	RC-3	95	93						70.3' - 1" Bentonite seam	
75	C	RC-4	91	87							
80	C	RC-5	58 95	70						80-85' - with thin Limestone seams	
85	C	RC-6	4 86 5	82						88.1	346.9
										Bottom of Boring 88.1'	

REMARKS: THD @ 58.7' - 50/5", 50/2"; THD @ 63.8' - 50/1", 50/0.75", THD @ 68.8' - 50/1.25", 50/1"
THD @ 73.9' - 50/1.5", 50/1.25"; THD @ 78.5' - 50/1.5", 50/1"
THD @ 83.3' - 50/2", 50/1", THD @ 88.1' - 50/0.75", 50/0.5"

HNTB

LOG OF BORING

BORING NO. **BB-14**

SHEET 1 OF 3

PROJECT City of Dallas - Major Flood and Storm Drainage Projects
Baker Pump Station - Dallas, Texas

NORTHING 6977127 ft
EASTING 2479477 ft

EXPLORATION CONTRACTOR GEDCO / Mas-Tek
STARTED 4-23-2009

ENGINEERS REP. Edwin R. Strode Jr.
LOGGED BY Mike Roland(Mas Tek)
COMPLETED 5-12-2009

GROUNDWATER

ENCOUNTERED DURING
DRILLING AT 24.0
HOURS AFTER DRILLING
HOURS AFTER DRILLING
HOURS AFTER DRILLING
HOURS AFTER DRILLING

BORING METHOD

DEPTH MUD STARTED

SAMPLE TYPE AND DATA

S Split Barrel
U Undisturbued Sample
C Rock Core

DEPTH BELOW SURFACE(feet)	SAMPLE INTERVAL AND TYPE	SAMPLE NUMBER	SAMPLE RECOVERY(in) CORE RECOVERY(%)	SAMPLE RQD(%)	PENETRATION TEST RESULTS Blows per Interval (inches) 0-6	6-12	12-18	"N" Value	POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System Textural (Visual)	ELEV. DATUM ELEV. (feet) 407.2
	S	SS-1	16		3	3	3	6		Dark brown, very stiff, moist, CLAY, with sandy clay, trace gravel, trace calcite nods (CL) FILL	
	U	ST-2	18						3.33P		
	U	ST-3	6						3.5P		
5	S	SS-4	12		10	13	20	33		5.0	402.2
	S	SS-5	9		15	16	13	29		Brown, stiff to very stiff, moist, brown, CLAY with gravel (CL) Possible FILL	
	S	SS-6	15		4	8	6	14		8.0	399.2
	U	ST-7	22						3.2P	Dark brown, very stiff, moist CLAY with calcite nods (CL)	
10	U	ST-8	23						3.25P		
	U	ST-9	24						3.8P	With sandy clay seams below 13' 14.0	393.2
15	U	ST-10	24						3.6P	Light brown and light gray, very stiff, moist, sandy CLAY, with calcite nods (CL)	
	U	ST-11	13						2.4P	19.0	388.2
	S	SS-12	13		6	5	4	9		Light brown and light gray, very stiff, moist, clayey SAND (SC)	
20	S	SS-13	14		4	3	12	15		21.5	385.7
	S	SS-14	15		16	32	37	69		Light brown, very dense, moist to wet, SAND with gravel (SP)	
	S	SS-15	17		15	21	18	39			
25	S									25.0	382.2

REMARKS: Boring grouted upon completion in accordance with Corps of Engineers requirements.
THD @ 26' - 39/6", 50/5.75"; THD @ 28' - 50/4", 50/3.25"; THD @ 30' - 50/6", 50/3.5"

HNTB

LOG OF BORING

BORING NO. **BB-14**

SHEET **2** OF **3**

PROJECT **City of Dallas - Major Flood and Storm Drainage Projects**
Baker Pump Station - Dallas, Texas

NORTHING **6977127 ft**
EASTING **2479477 ft**

EXPLORATION CONTRACTOR **GEDCO / Mas-Tek**
STARTED **4-23-2009**

ENGINEERS REP. **Edwin R. Strode Jr.** LOGGED BY **Mike Roland(Mas Tek)**
COMPLETED **5-12-2009**

DEPTH BELOW SURFACE(feet)	SAMPLE INTERVAL AND TYPE	SAMPLE NUMBER	RECOVERY(in) CORE RECOVERY(%)	RQD(%)	PENETRATION TEST RESULTS Blows per Interval (inches) 0-6	6-12	12-18	"N" Value	POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System **Textural (Visual)**	ELEV. DATUM / ELEV. (feet) 407.2
	S	SS-16	11		7	7	14	21		Dark gray, wet, Weathered SHALE (CL)	
30	S	SS-17	16		12	35	50/5				
	U	ST-10								With sand seams below 32.5'	
35	S	SS-19	16		24	50	50/3.75				
	S	SS-20	10		50	50/4					
40	S	SS-21	5		50/5.5						
	S	SS-22	5		50/5.5						
45										45.0	362.2
	C	RC-1	65	0						Weathered SHALE (Eagle Ford) - extremely fractured, moderately hard, dark gray, fine grained, laminated	
50										50.0	357.2
	C	RC-2	90	38						SHALE (Eagle Ford) - sound to moderately fractured, moderately hard, dark gray, fine grained, laminated 50-52.5' - Extremely fractured 53-55' - Numerous thin Limestone seams	
55	C										

REMARKS: THD @ 26' - 39/6", 50/5.75"; THD @ 28' - 50/4", 50/3.25"; THD @ 30' - 50/6", 50/3.5"
THD @ 35' - 50/6", 50/4"; THD @ 40' - 50/4.5", 50/3.5"; THD @ 45' - 50/4", 50/2.5"
THD @ 50' - 50/1", 50/1"; THD @ 55' - 50/0.75", 50/0.75"; THD @ 60' - 50/0.5", 50/0.5"

HNTB

LOG OF BORING

BORING NO. **BB-14**

SHEET **3** OF **3**

PROJECT **City of Dallas - Major Flood and Storm Drainage Projects**
Baker Pump Station - Dallas, Texas

NORTHING **6977127 ft**
EASTING **2479477 ft**

EXPLORATION CONTRACTOR **GEDCO / Mas-Tek**
STARTED **4-23-2009**

ENGINEERS REP. **Edwin R. Strode Jr.** LOGGED BY **Mike Roland(Mas Tek)**
COMPLETED **5-12-2009**

DEPTH BELOW SURFACE(feet)	SAMPLE: INTERVAL AND TYPE	SAMPLE: NUMBER	SAMPLE: RECOVERY(in) CORE RECOVERY(%)	SAMPLE: RQD(%)	PENETRATION TEST RESULTS: Blows per Interval (inches) 0-6	6-12	12-18	"N" Value	POCKET PENETROMETER(P) or TORVANE(T) (tsf)	SOIL DESCRIPTION (Color, Consistency, Modifier, MATERIAL, Moisture, Classification) Soil Classification System **Textural (Visual)**	ELEV. DATUM / ELEV. (feet)
											407.2
	C	RC-3	98	83						SHALE (Eagle Ford) - sound to moderately fractured, moderately hard, dark gray, fine grained, laminated	
60											
	C	RC-4	98	85							
										65.0	342.2
65										Bottom of boring 65'	
70											
75											
80											
85											

REMARKS: THD @ 65' - 50/0.75", 50/0.75"

From: Edwin Strode [estrode@HNTB.com]
Sent: Monday, June 29, 2009 9:22 AM
To: Bailey, Bruce FCLDA
Subject: Lab Results for Baker
Attachments: BB-12 Lab Results.pdf; BB-13 Lab Results.pdf; BB-14 Lab Results.pdf

Bruce,

Attached are lab results for the newest Baker borings. We're still waiting for the triaxial results to come in and I'll forward them to you when I receive them.

If you have any questions please let me know.

Edwin R. Strode Jr.
Geotechnical Engineer

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MAS-TEK ENGINEERING & ASSOCIATES, INC.

LABORATORY TEST SUMMARY

PROJECT: Baker Pump Station **PROJECT NO.:** E09-0208

BORING NO.	SAMPLE ID	DEPTH, FEET	% MOISTURE	DRY DENSITY (pcf)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	-200 SIEVE		UNC. STRESS (ksf)	% STRAIN		CONFINING PRESSURE (psi)	UU. STRESS (ksf)	% STRAIN
BB-12	ST2	1-2	9.3												
	SS3	2-3.5	6.0		29	14	15	21.4							
	ST4	3.5-4.5	20.2												
	ST5	4.5-5.5			54	24	30								
	ST6	6-7	23.2												
	ST8	8-9	25.2	97.0						6.87	6.5				
	ST10	10-11	17.0		52	17	35								
	ST12	12-13	13.2	116.6	34	14	20			6.84	7.0				
	ST14	14-15	13.5					60.2							
	ST16	16-17	12.5	115.3						2.02	8.5				
	ST17	17-18	13.9					38.3							
	ST18	18-19.5	16.0		30	14	16	55.0							
	SS19	19.5-21	12.2												
	SS20	21-22.5	8.7					4.5							
	SS21	22.5-24	Not Enough Sample for Permeability												
	SS22	22-23.5	8.9					2.4							

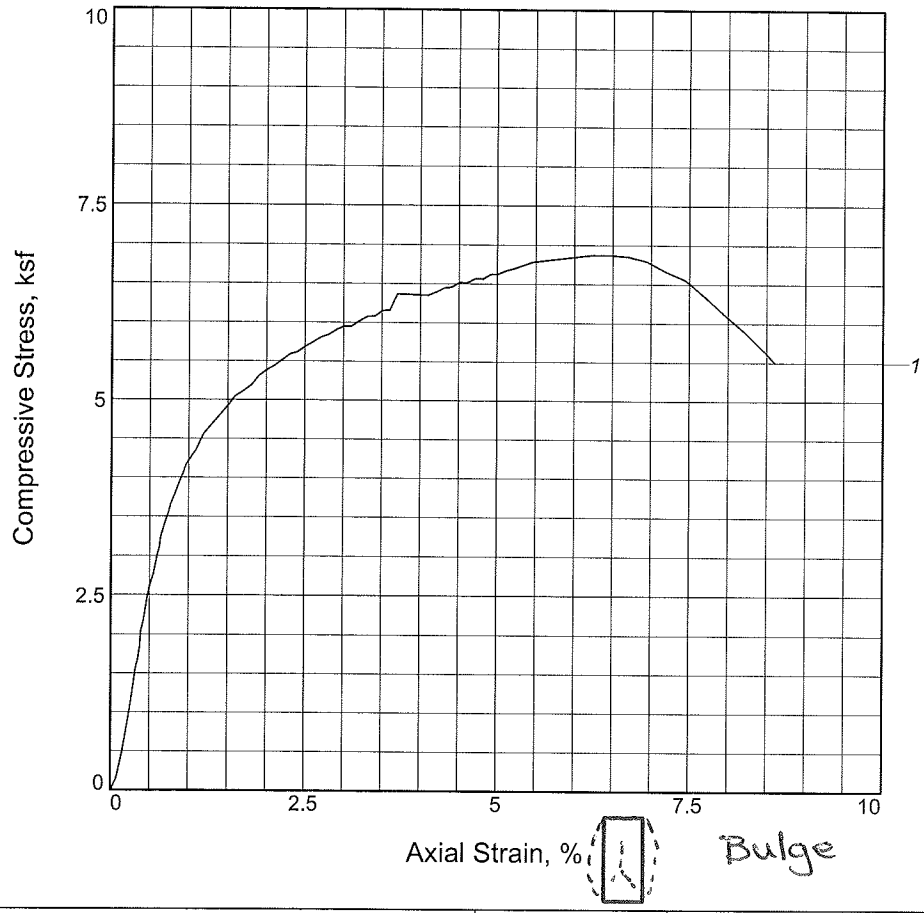
MAS-TEK ENGINEERING & ASSOCIATES, INC.

LABORATORY TEST SUMMARY

PROJECT: Baker Pump Station **PROJECT NO.:** E09-0208

BORING NO.	SAMPLE ID	DEPTH, FEET	% MOISTURE	DRY DENSITY (pcf)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	-200 SIEVE		UNC. STRESS (ksf)	% STRAIN		CONFINING PRESSURE (psi)	UU. STRESS (ksf)	% STRAIN
BB-12	SS23	26-27.5	16.8												
	SS24	28.5-29.7	18.4		56	19	37								
	SS25	32-33	17.4												
	RC1	37-37.5	15.3	117.2						26.31	2.1				
	RC2	43.5-44	14.1	121.0						30.77	1.6				
	RC3	49.5-50	16.1	115.7						40.84	2.8				

UNCONFINED COMPRESSION TEST



Specimen No:	1			
Unconfined strength, ksf	6.870			
Undrained shear strength, ksf	3.435			
Failure strain, %	6.5			
Strain at peak, %	6.5			
Water content, %	25.2			
Wet density, pcf	121.4			
Dry density, pcf	96.9			
Saturation, %	92.3			
Void ratio	0.7387			
Specimen diameter, in.	2.74			
Specimen height, in.	5.33			
Height/diameter ratio	1.95			

Description: Dark gray snd brown Clay

LL =	**PL =**	**PI =**	**Assumed GS=** 2.70	**Type:** Undisturbed

Project No.: E09-0208
Date Sampled: 4/7/2009
Remarks:

Client: HNTB

Project: Baker Pump Station

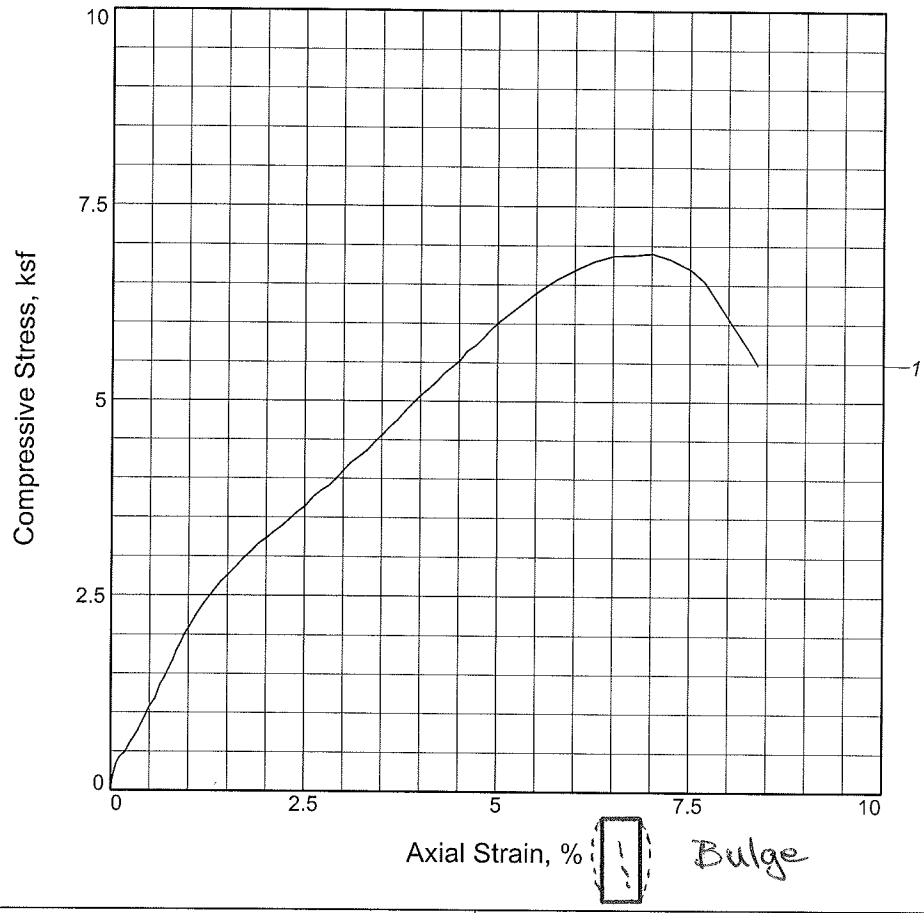
Location: BB-12
Sample Number: ST8 **Depth:** 8'-9'

UNCONFINED COMPRESSION TEST

Figure _____

MAS-TEK Engineering & Associates, Inc.

UNCONFINED COMPRESSION TEST



Specimen No:	1			
Unconfined strength, ksf	6.896			
Undrained shear strength, ksf	3.448			
Failure strain, %	7.0			
Strain at peak, %	7.0			
Water content, %	13.2			
Wet density, pcf	131.9			
Dry density, pcf	116.6			
Saturation, %	79.7			
Void ratio	0.4456			
Specimen diameter, in.	2.72			
Specimen height, in.	3.42			
Height/diameter ratio	1.26			

Description: Yellow, brown and gray sandy CLAY

LL =	**PL =**	**PI =**	**Assumed GS=** 2.70	**Type:** Undisturbed

Project No.: E09-0208
Date Sampled: 4/7/2009
Remarks:

Client: HNTB

Project: Baker Pump Station

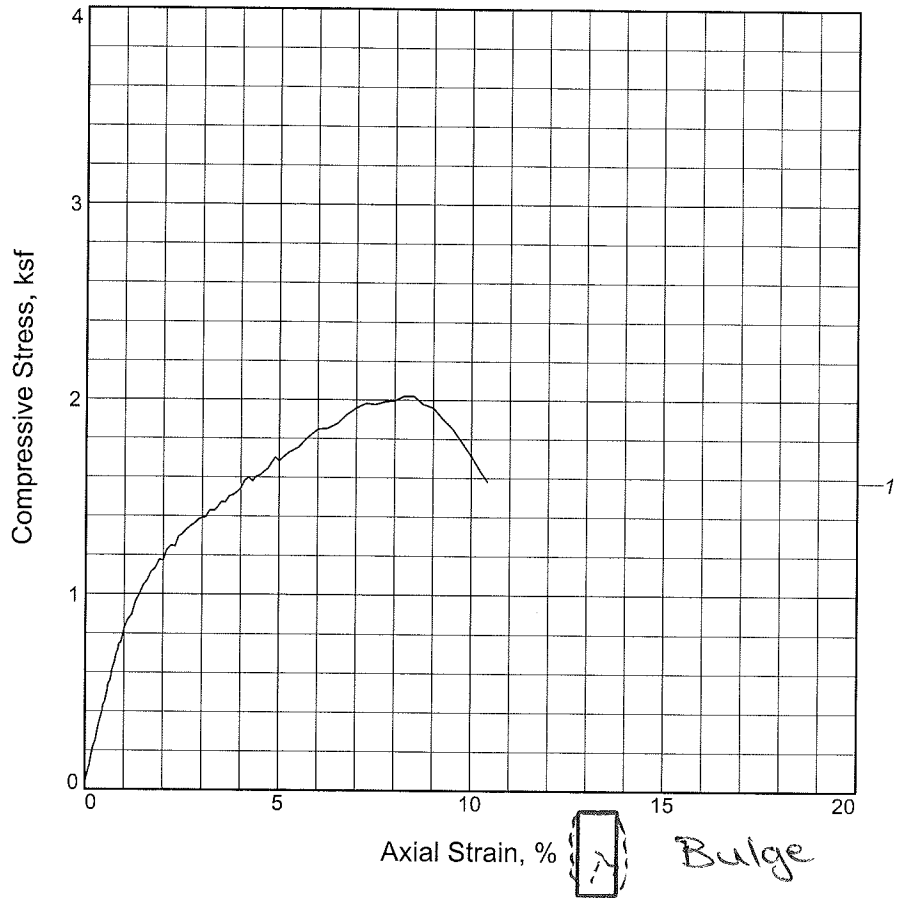
Location: BB-12
Sample Number: ST12 **Depth:** 12'-13'

UNCONFINED COMPRESSION TEST

Figure _____

MAS-TEK Engineering & Associates, Inc.

UNCONFINED COMPRESSION TEST



Specimen No:	1			
Unconfined strength, ksf	2.020			
Undrained shear strength, ksf	1.010			
Failure strain, %	8.5			
Strain at peak, %	8.5			
Water content, %	12.5			
Wet density, pcf	129.6			
Dry density, pcf	115.3			
Saturation, %	72.9			
Void ratio	0.4625			
Specimen diameter, in.	2.62			
Specimen height, in.	5.33			
Height/diameter ratio	2.03			

Description: Brown and gray sandy CLAY w/ trace gravel

LL =	**PL =**	**PI =**	**Assumed GS=** 2.70	**Type:** Undisturbed

Project No.: E09-0208
Date Sampled: 4/7/2009
Remarks:

Client: HNTB

Project: Baker Pump Station

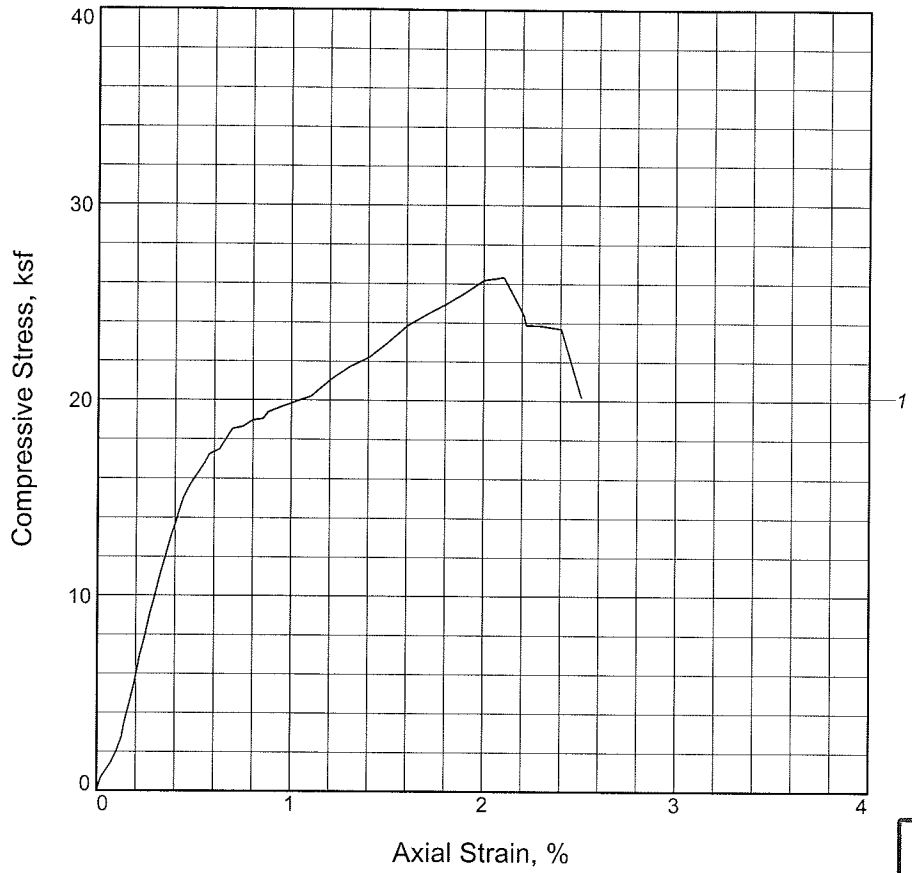
Location: BB-12
Sample Number: ST16 **Depth:** 16'-17'

UNCONFINED COMPRESSION TEST

MAS-TEK Engineering & Associates, Inc.

Figure _____

UNCONFINED COMPRESSION TEST



Slightly Slickensided

Specimen No:	1	2		
Unconfined strength, ksf	26.306			
Undrained shear strength, ksf	13.153			
Failure strain, %	2.1			
Strain at peak, %	2.1	2.1		
Water content, %	15.3	15.3		
Wet density, pcf	135.2	N/A		
Dry density, pcf	117.2	N/A		
Saturation, %	93.0	N/A		
Void ratio	0.4491	N/A		
Specimen diameter, in.	2.02			
Specimen height, in.	4.22			
Height/diameter ratio	2.09			

Description: Dark gray SHALE

LL =	**PL =**	**PI =**	**Assumed GS=** 2.72	**Type:** Undisturbed

Project No.: E09-0208
Date Sampled: 4/7/2009
Remarks:

Client: HNTB

Project: Baker Pump Station

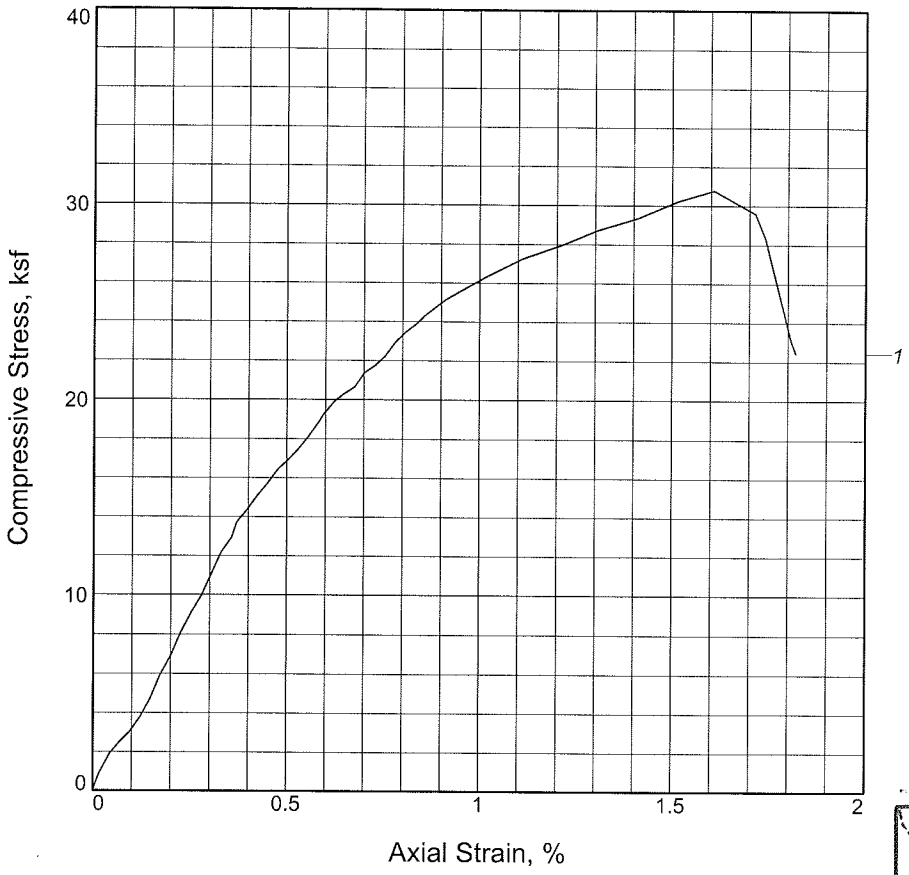
Location: BB-12
Sample Number: RC1 **Depth:** 37'-37.5'

UNCONFINED COMPRESSION TEST

Figure _____

MAS-TEK Engineering & Associates, Inc.

UNCONFINED COMPRESSION TEST



Specimen No:	1			
Unconfined strength, ksf	30.766			
Undrained shear strength, ksf	15.383			
Failure strain, %	1.6			
Strain at peak, %	1.6			
Water content, %	14.1			
Wet density, pcf	138.0			
Dry density, pcf	120.9			
Saturation, %	95.0			
Void ratio	0.4044			
Specimen diameter, in.	2.03			
Specimen height, in.	4.33			
Height/diameter ratio	2.13			

Description: Dark gray SHALE

LL =	**PL =**	**PI =**	**Assumed GS=** 2.72	**Type:** Undisturbed

Project No.: E09-0208
Date Sampled: 4/7/2009
Remarks:

Client: HNTB

Project: Baker Pump Station

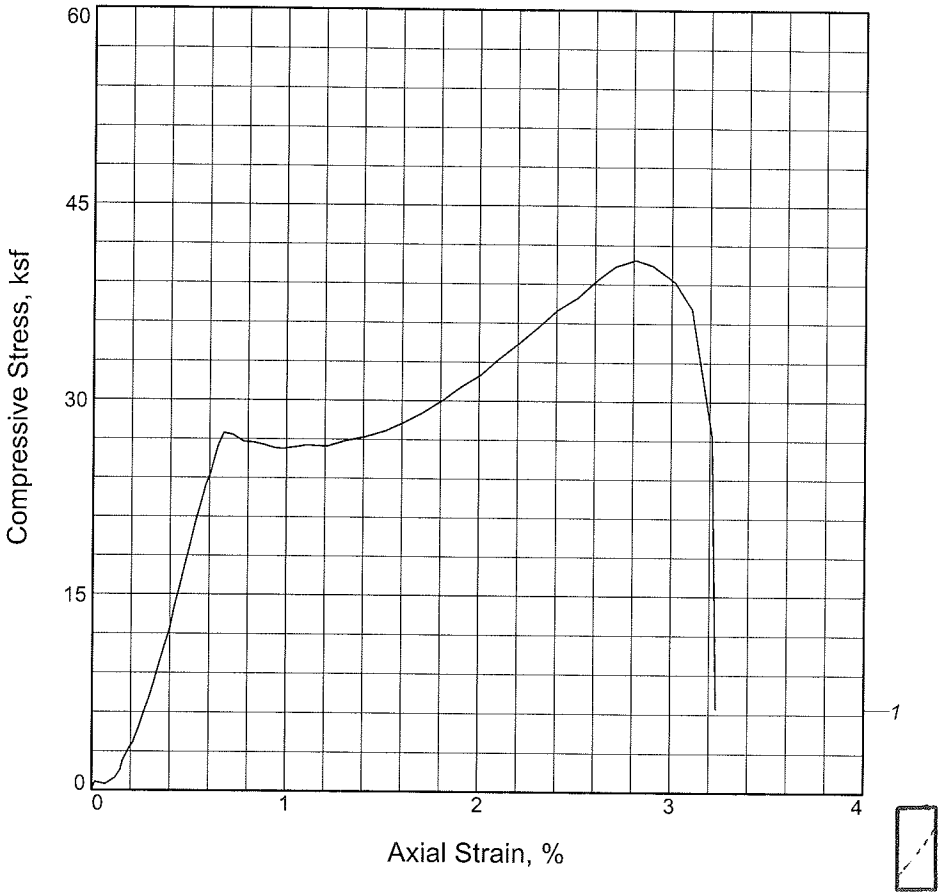
Location: BB-12
Sample Number: RC2 **Depth:** 43.5'-44'

UNCONFINED COMPRESSION TEST

MAS-TEK Engineering & Associates, Inc.

Figure _____

UNCONFINED COMPRESSION TEST



Specimen No:	1			
Unconfined strength, ksf	40.839			
Undrained shear strength, ksf	20.420			
Failure strain, %	2.8			
Strain at peak, %	2.8			
Water content, %	16.1			
Wet density, pcf	134.3			
Dry density, pcf	115.7			
Saturation, %	93.4			
Void ratio	0.4675			
Specimen diameter, in.	2.06			
Specimen height, in.	4.20			
Height/diameter ratio	2.04			

Description: Dark gray SHALE

LL =	**PL =**	**PI =**	**Assumed GS=** 2.72	**Type:** Undisturbed

Project No.: E09-0208
Date Sampled: 4/7/2009
Remarks:

Client: HNTB

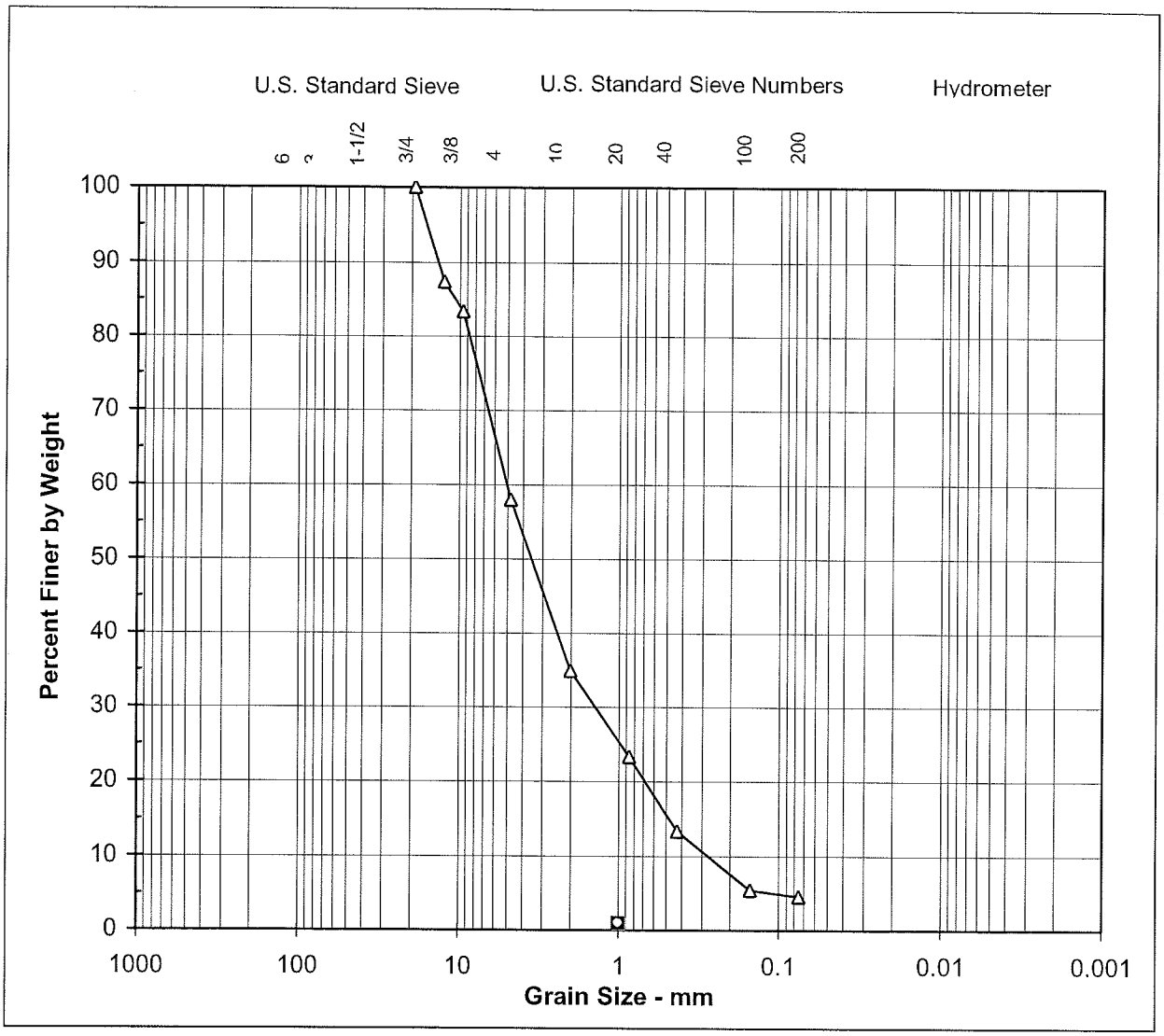
Project: Baker Pump Station

Location: BB-12
Sample Number: RC3 **Depth:** 49.5'-50'

UNCONFINED COMPRESSION TEST

MAS-TEK Engineering & Associates, Inc.

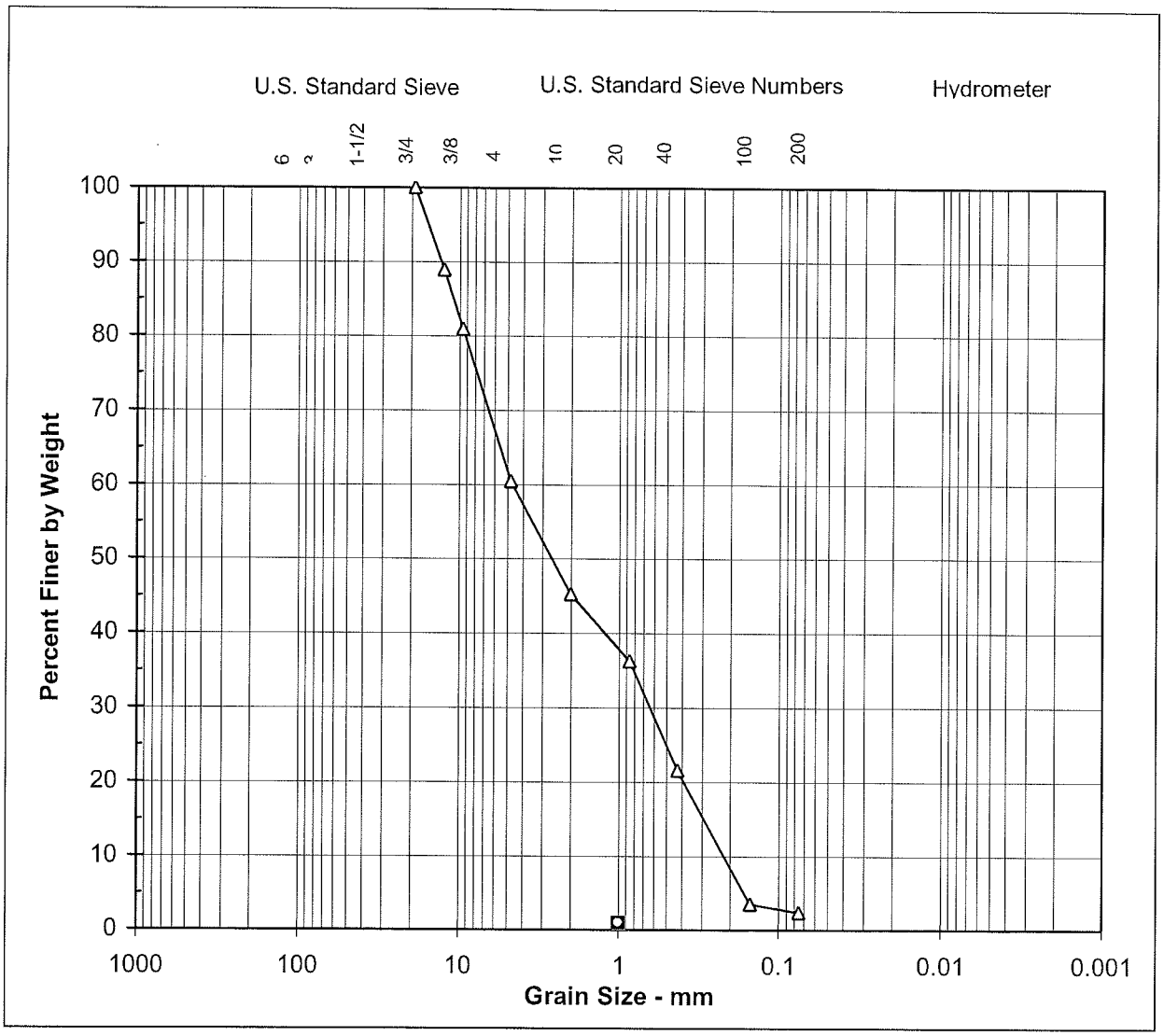
Figure _____



Legend	Boring No	Depth, ft	% Gravel	% Sand	% -#200	LL	PI
△	BB-12	21-22.5	42.1	53.4	4.5		
□							
○							

Legend	Boring No	Depth	Material Description	USCS
△	BB-12	21-22.5		
□				
○				

RESULTS OF SIEVE ANALYSIS	
Baker Pump Station E09-0208	
MAS-TEK Engineering & Associates	
E09-0208	FIGURE



Legend	Boring No	Depth, ft	% Gravel	% Sand	% -#200	LL	PI
△	BB-12	24-25.5	39.6	58.1	2.3		
□							
○							

Legend	Boring No	Depth	Material Description	USCS
△	BB-12	24-25.5		
□				
○				

RESULTS OF SIEVE ANALYSIS	
Baker Pump Station E09-0208	
MAS-TEK Engineering & Associates	
E09-0208	FIGURE

MAS-TEK ENGINEERING & ASSOCIATES, INC.

LABORATORY TEST SUMMARY

PROJECT:	Baker Pump Station	PROJECT NO.:	E09-0208

BORING NO.	SAMPLE ID	DEPTH, FEET	% MOISTOURE	DRY DENSITY (pcf)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	-200 SIEVE		UNC. STRESS (ksf)	% STRAIN		CONFINING PRESSURE (psi)	UU. STRESS (ksf)	% STRAIN
BB-13	SS2	1.5-3	No Sample												
	ST3	3-4	17.3												
	ST4	5-6	12.8					44.2							
	ST5	7-8	23.0	94.9						2.15	1.5				
	ST6	9-10	27.3												
	ST7	10-12			48	16	32								
	ST8	12-13	23.6	92.9						1.24	1.5				
	ST9	15-16	19.8	103.2				73.1		3.15	1.7		20		
	ST10	16-17	22.9	101.4						4.03	2.2				
	ST11	18-20			73	24	49								
	ST12	20-22.2	23.3												
	ST13	23-24	25.2	96.6						3.25	2.6		25		
	ST14	24-25	27.1												
	ST15	26.5-28.5			37	16	21								
	ST16	28.5-29	20.3	106.7						5.52	8.3				
	ST17	30-31	18.3	106.1						3.79	4.3		30		

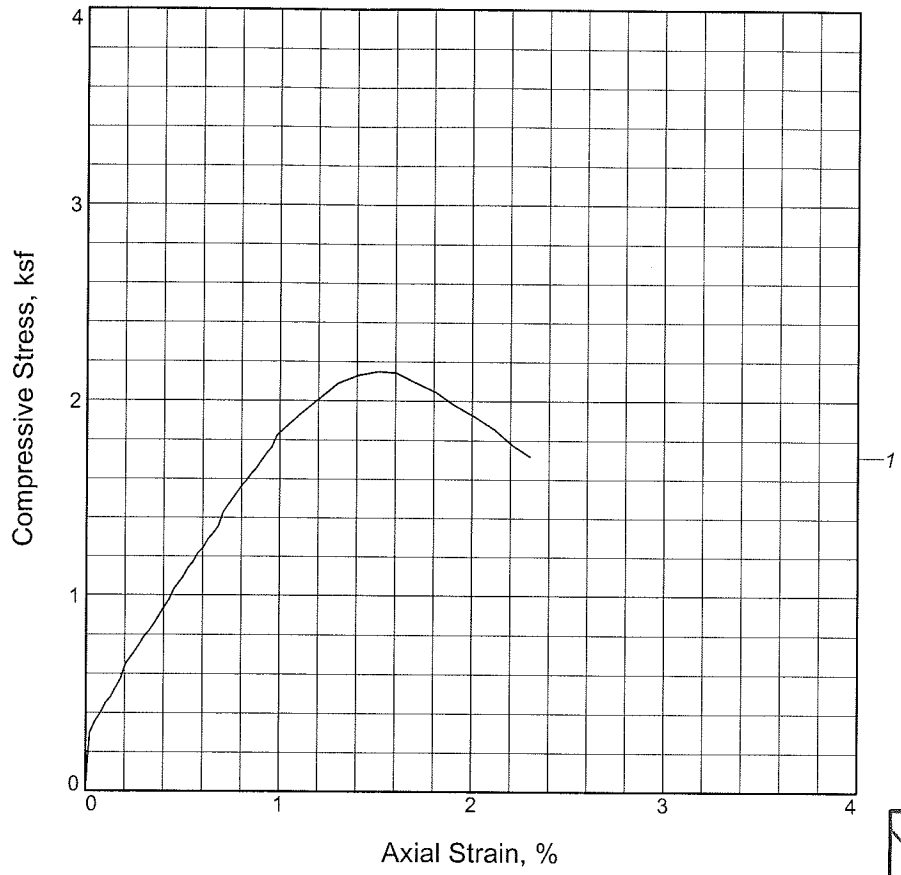
MAS-TEK ENGINEERING & ASSOCIATES, INC.

LABORATORY TEST SUMMARY

PROJECT: Baker Pump Station **PROJECT NO.:** E09-0208

BORING NO.	SAMPLE ID	DEPTH, FEET	% MOISTOURE	DRY DENSITY (pcf)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	-200 SIEVE		UNC. STRESS (ksf)	% STRAIN		CONFINING PRESSURE (psi)	UU. STRESS (ksf)	% STRAIN
BB-13	ST18	33-34	36.5	81.8						6.16	2.8				
	ST19	35-36			60	20	40								
	ST20	36.5-38.2	16.8												
	ST21	39-40	15.4	113.1	34	15	19			8.28	5.0				
	ST22	40.2-42.2	11.9												
	ST23	42.2-44.2	8.3												
	SS24	44.2-45.8	9.4												
	SS25	45.8-47.2	2.5												
	SS26	47.2-48.7	3.2												
	SS29	50.5-52	8.4												
	RC1	57.5-58	17.0	114.6						28.06	2.2				
	RC2	60-60.5	15.3	118.1						29.72	1.9				
	RC2	67-67.5	15.0	119.6						19.59	1.9				
	RC3	70.3-70.9	13.9	121.9						43.49	1.9				
	RC4	75.9-76.4	14.8	117.6						48.92	2.0				
	RC5	82-82.5	14.1	118.2						30.30	2.0				
	RC6	85.8-86.6	15.9	113.6						41.20	1.6				
	ST13	22-23	21.0	102.5						5.64	4.7				

UNCONFINED COMPRESSION TEST



Slickensided

Specimen No:	1			
Unconfined strength, ksf	2.148			
Undrained shear strength, ksf	1.074			
Failure strain, %	1.5			
Strain at peak, %	1.5			
Water content, %	23.0			
Wet density, pcf	116.8			
Dry density, pcf	94.9			
Saturation, %	80.1			
Void ratio	0.7764			
Specimen diameter, in.	1.94			
Specimen height, in.	3.79			
Height/diameter ratio	1.96			

Description: Dark brown CLAY w/ tan sandy clay and seams gravel (Fill)

LL =	**PL =**	**PI =**	**Assumed GS=** 2.70	**Type:** Undisturbed

Project No.: E09-0208
Date Sampled: 4/16/2009
Remarks:

Client: HNTB

Project: Baker Pump Station

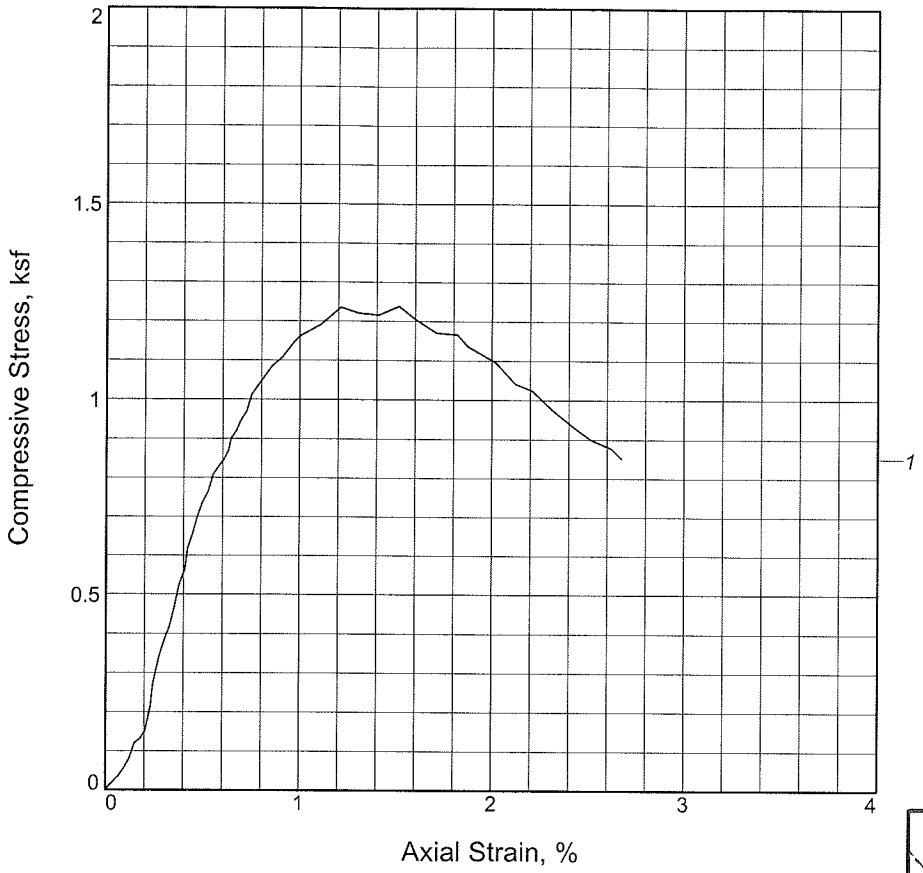
Location: BB-13
Sample Number: ST5 **Depth:** 7'-8'

UNCONFINED COMPRESSION TEST

Figure _____

MAS-TEK Engineering & Associates, Inc.

UNCONFINED COMPRESSION TEST



Specimen No:	1			
Unconfined strength, ksf	1.238			
Undrained shear strength, ksf	0.619			
Failure strain, %	1.5			
Strain at peak, %	1.5			
Water content, %	23.6			
Wet density, pcf	114.8			
Dry density, pcf	92.9			
Saturation, %	78.2			
Void ratio	0.8153			
Specimen diameter, in.	1.95			
Specimen height, in.	3.73			
Height/diameter ratio	1.91			

Description: Dark brown CLAY w/ tan sandy clay and seams gravel (Fill)

LL =	**PL =**	**PI =**	**Assumed GS=** 2.70	**Type:** Undisturbed

Project No.: E09-0208
Date Sampled: 4/16/2009
Remarks:

Client: HNTB

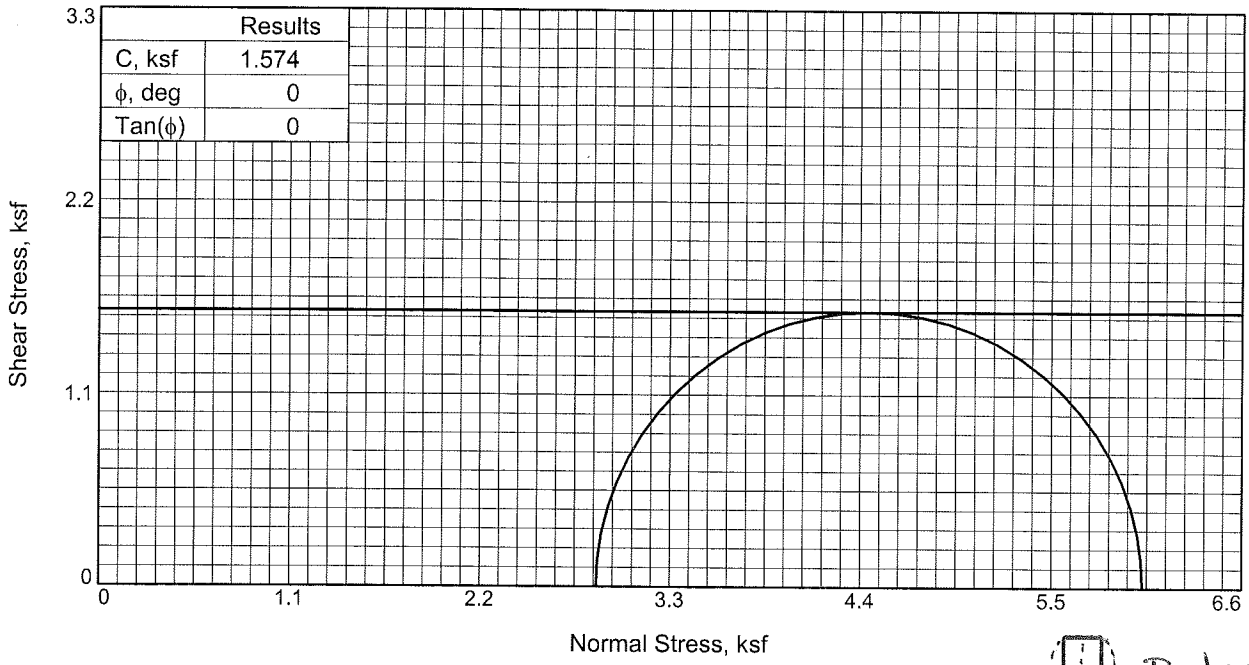
Project: Baker Pump Station

Location: BB-13
Sample Number: ST8 **Depth:** 12'-13'

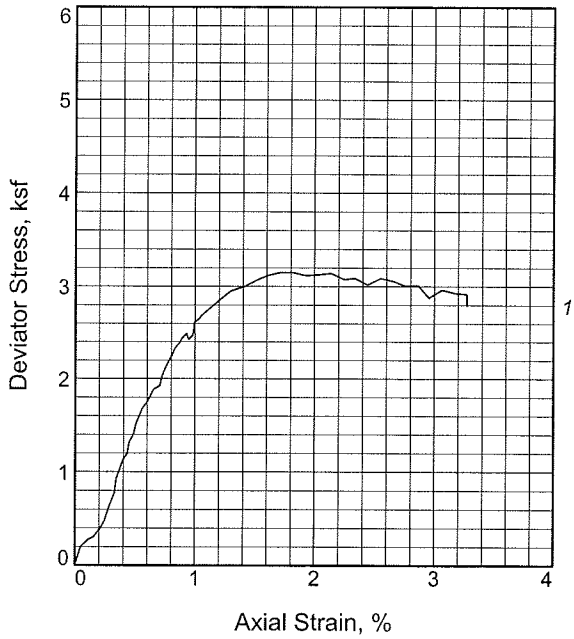
UNCONFINED COMPRESSION TEST

MAS-TEK Engineering & Associates, Inc.

Figure _____



Bulge



Specimen No:		1
Initial	Water Content, %	19.8
	Dry Density, pcf	103.2
	Saturation, %	84.2
	Void Ratio	0.6391
	Diameter, in.	1.91
	Height, in.	3.67
At Test	Water Content, %	19.8
	Dry Density, pcf	103.2
	Saturation, %	84.2
	Void Ratio	0.6391
	Diameter, in.	1.91
	Height, in.	3.67
Strain at peak, %		1.7
Back Pressure, psi		0.000
Cell Pressure, psi		19.977
Fail. Stress, ksf		3.148
Strain, %		1.7
Ult. Stress, ksf		
Strain, %		
σ_1 Failure, ksf		6.025
σ_3 Failure, ksf		2.877

Type of Test:
Unconsolidated Undrained

Sample Type: Undisturbed

Description: Very stiff tan sandy CLAY w/ dark brown clay with calcareous nodules (FILL)

Assumed Specific Gravity= 2.71

Remarks:

Client: HNTB

Project: Baker Pump Station

Location: BB-13

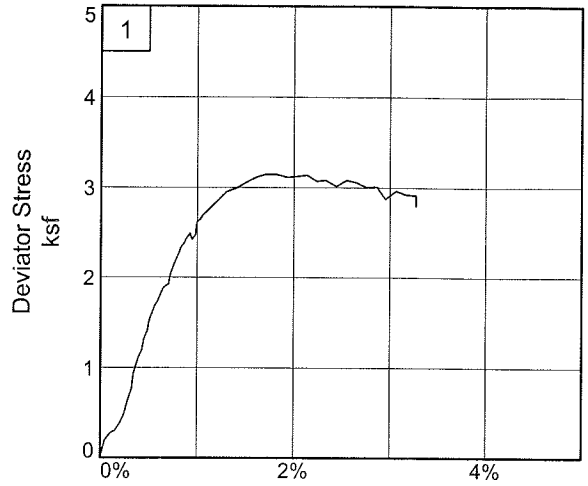
Sample Number: ST9 **Depth:** 15'-16'

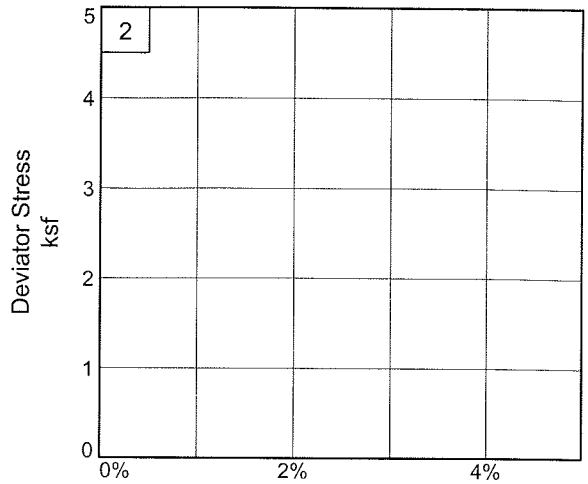
Proj. No.: E09-0208 **Date Sampled:** 4/16/2009

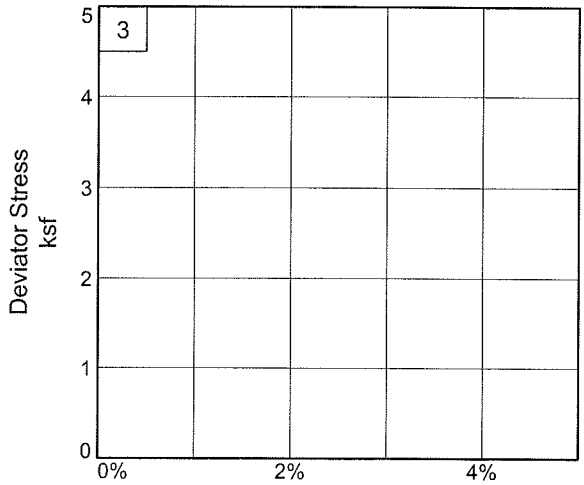
TRIAXIAL SHEAR TEST REPORT

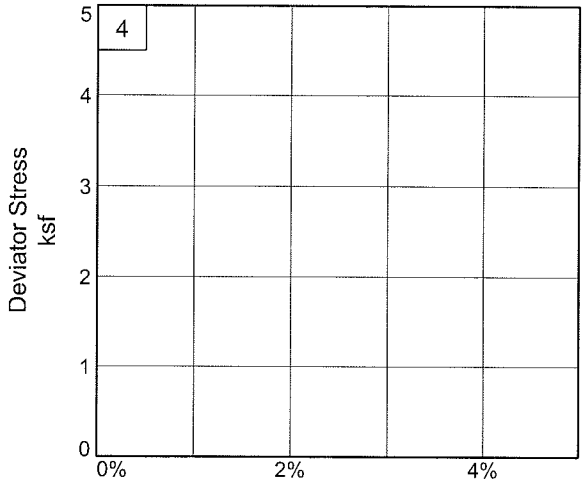
MAS-TEK Engineering & Associates, Inc.

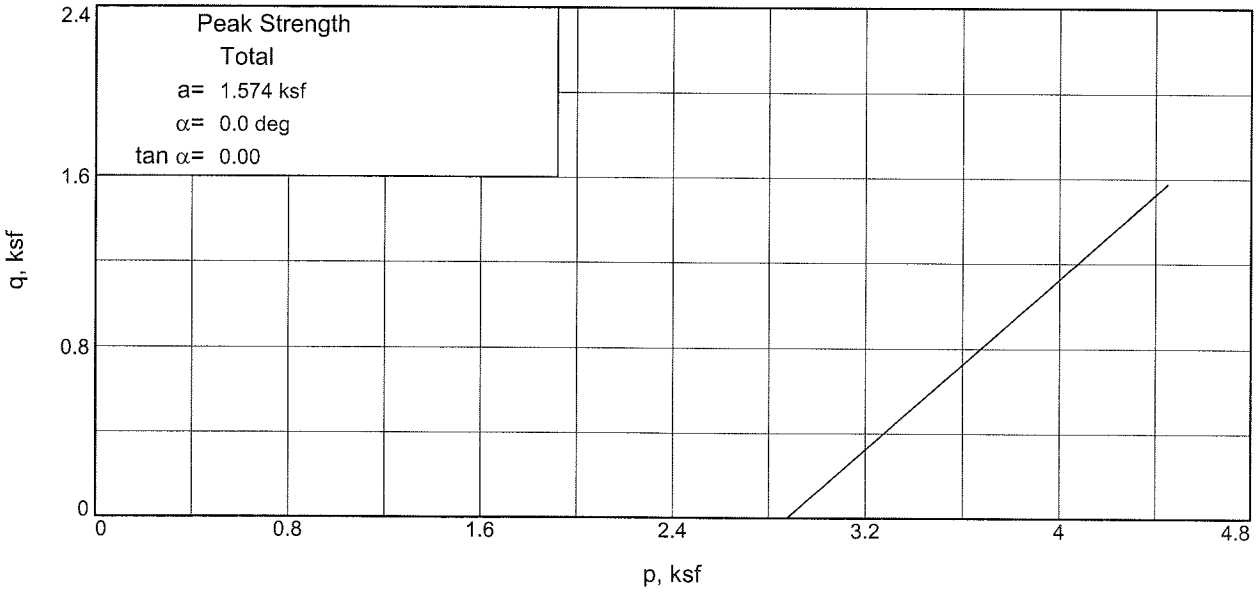
Figure _____







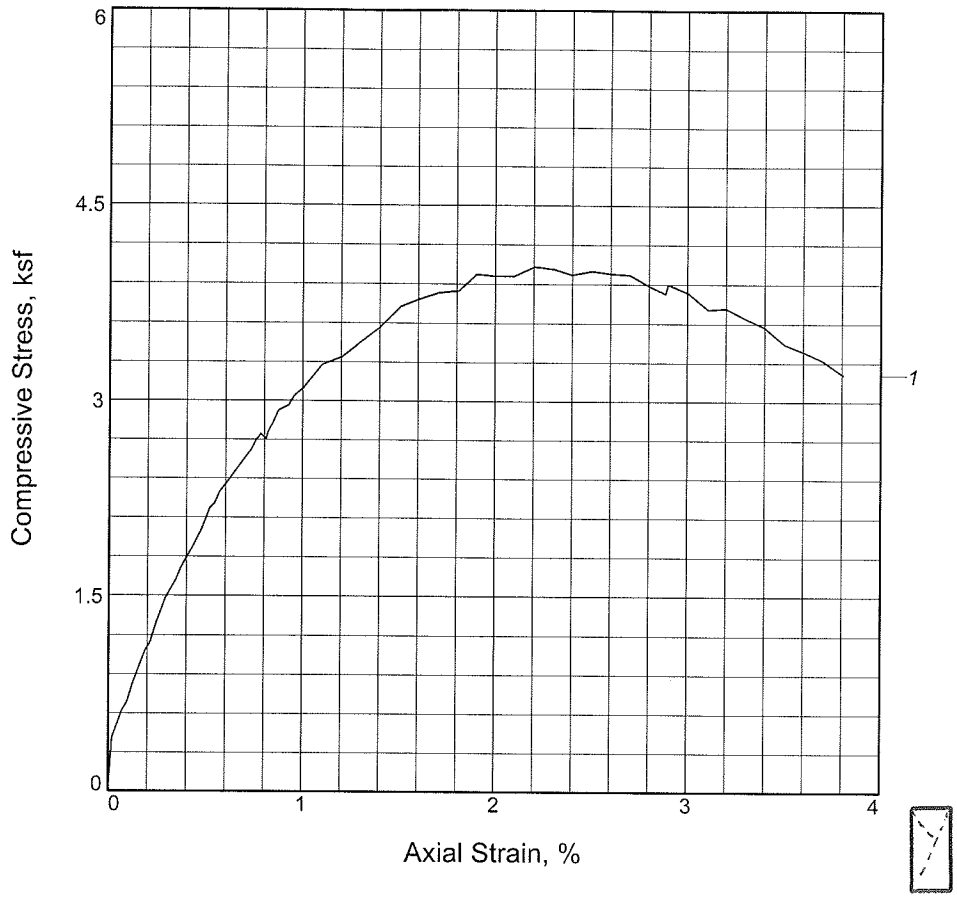




Client: HNTB
Project: Baker Pump Station
Location: BB-13 **Depth:** 15'-16' **Sample Number:** ST9
Project No.: E09-0208 **Figure** _____

MAS-TEK Engineering & Associates, Inc.

UNCONFINED COMPRESSION TEST



Specimen No:	1			
Unconfined strength, ksf	4.031			
Undrained shear strength, ksf	2.015			
Failure strain, %	2.2			
Strain at peak, %	2.2			
Water content, %	22.9			
Wet density, pcf	124.6			
Dry density, pcf	101.4			
Saturation, %	93.2			
Void ratio	0.6630			
Specimen diameter, in.	1.95			
Specimen height, in.	3.94			
Height/diameter ratio	2.02			

Description: Dark brown CLAY w/ trace of sand and sandy clay seams (FILL)

LL =	**PL =**	**PI =**	**Assumed GS=** 2.70	**Type:** Undisturbed

Project No.: E09-0208
Date Sampled: 4/16/2009
Remarks:

Client: HNTB

Project: Baker Pump Station

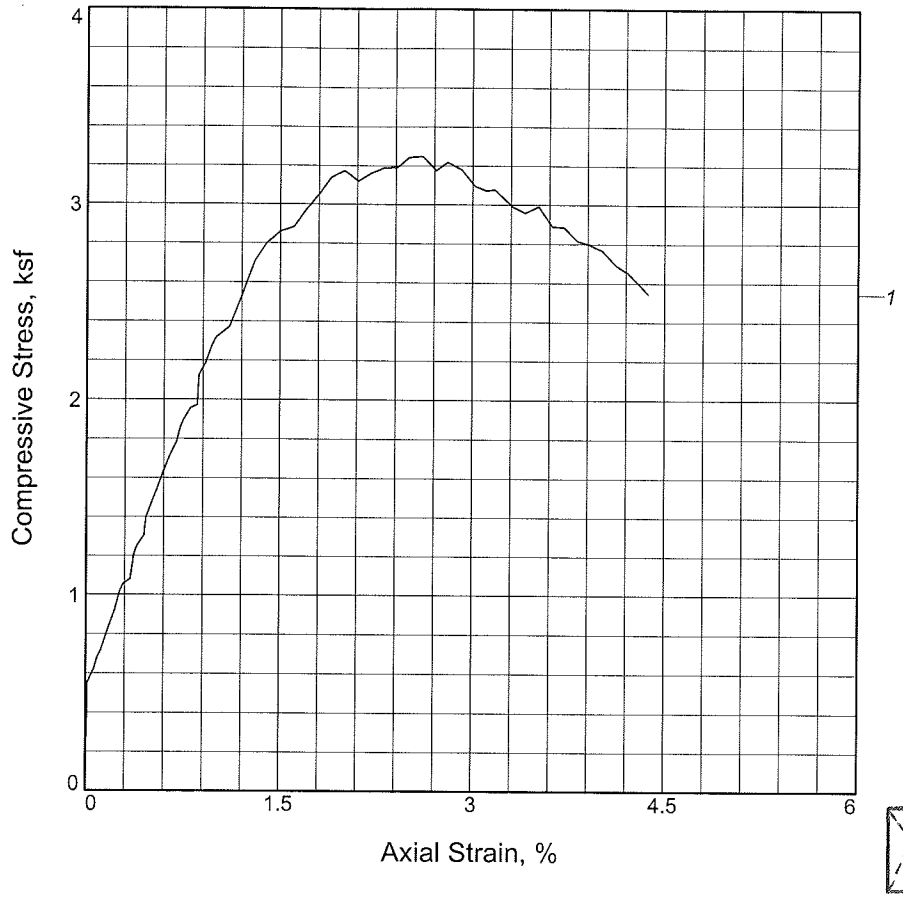
Location: BB-13
Sample Number: ST10 **Depth:** 16'-17'

UNCONFINED COMPRESSION TEST

MAS-TEK Engineering & Associates, Inc.

Figure _____

UNCONFINED COMPRESSION TEST



Specimen No:	1			
Unconfined strength, ksf	3.248			
Undrained shear strength, ksf	1.624			
Failure strain, %	2.6			
Strain at peak, %	2.6			
Water content, %	25.2			
Wet density, pcf	121.0			
Dry density, pcf	96.6			
Saturation, %	91.6			
Void ratio	0.7443			
Specimen diameter, in.	1.88			
Specimen height, in.	3.95			
Height/diameter ratio	2.10			

Description: Dark brown CLAY w/ trace of sand and sandy clay seams and orange brown sand layers (FILL)

LL =	**PL =**	**PI =**	**Assumed GS=** 2.70	**Type:** Undisturbed

Project No.: E09-0208
Date Sampled: 4/16/2009
Remarks:

Figure _____

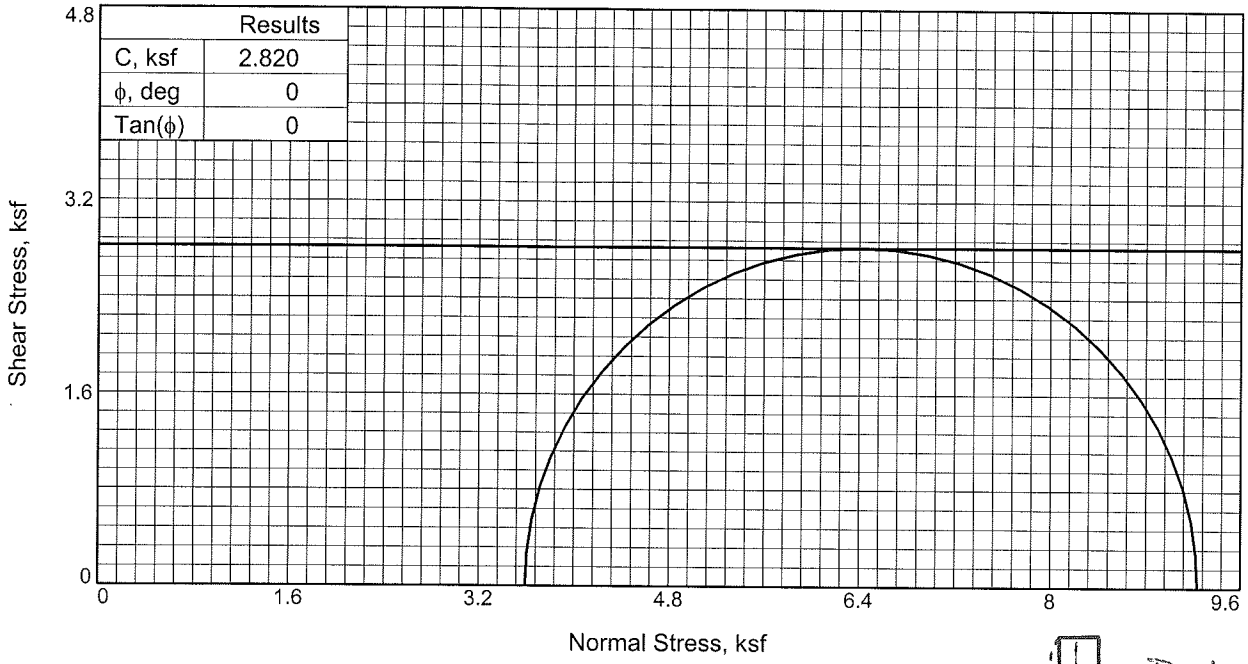
Client: HNTB

Project: Baker Pump Station

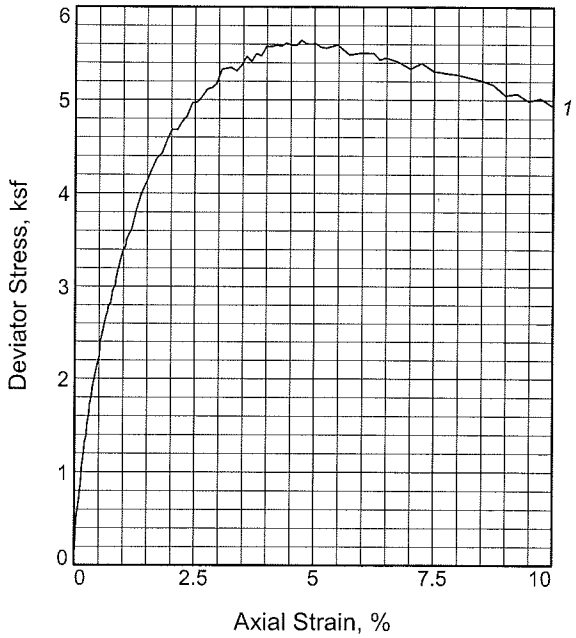
Location: BB-13
Sample Number: ST13 **Depth:** 23'-24'

UNCONFINED COMPRESSION TEST

MAS-TEK Engineering & Associates, Inc.



Bulge



Specimen No:		1
Initial	Water Content, %	21.0
	Dry Density, pcf	102.5
	Saturation, %	87.9
	Void Ratio	0.6440
	Diameter, in.	1.95
	Height, in.	3.95
At Test	Water Content, %	23.9
	Dry Density, pcf	102.5
	Saturation, %	100.0
	Void Ratio	0.6440
	Diameter, in.	1.95
	Height, in.	3.95
Strain at peak, %		4.7
Back Pressure, psi		0.000
Cell Pressure, psi		24.979
Fail. Stress, ksf		5.640
Strain, %		4.7
Ult. Stress, ksf		
Strain, %		
σ_1 Failure, ksf		9.237
σ_3 Failure, ksf		3.597

Type of Test:
Unconsolidated Undrained

Sample Type: Undisturbed

Description: Dark brown CLAY w/ trace of sand and sandy clay seams (FILL)

Assumed Specific Gravity= 2.7

Remarks:

Client: HNTB

Project: Baker Pump Station

Location: BB-13

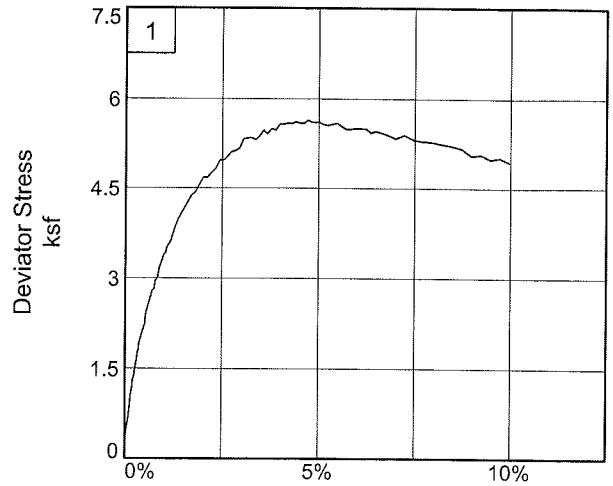
Sample Number: ST13 **Depth:** 22'-23'

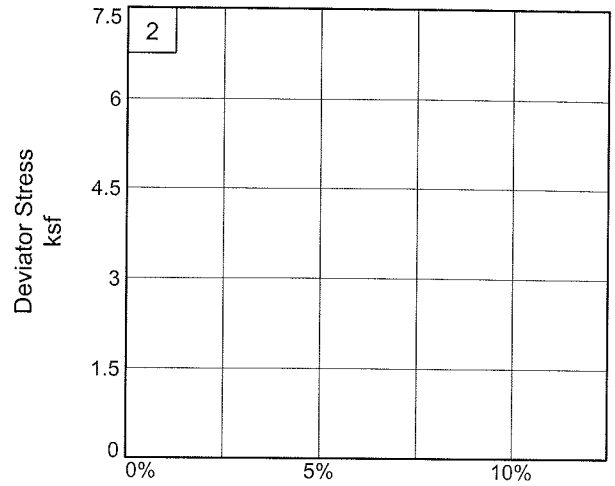
Proj. No.: E09-0208 **Date Sampled:** 4/16/2009

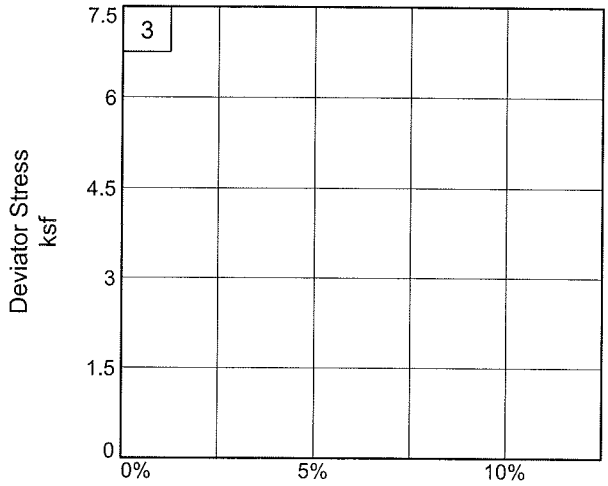
TRIAXIAL SHEAR TEST REPORT

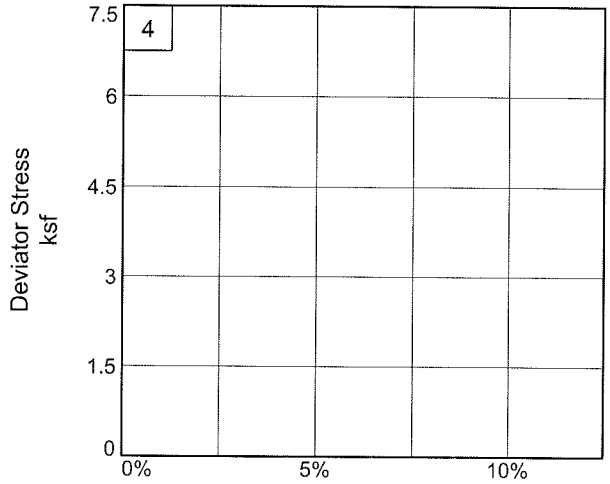
MAS-TEK Engineering & Associates, Inc.

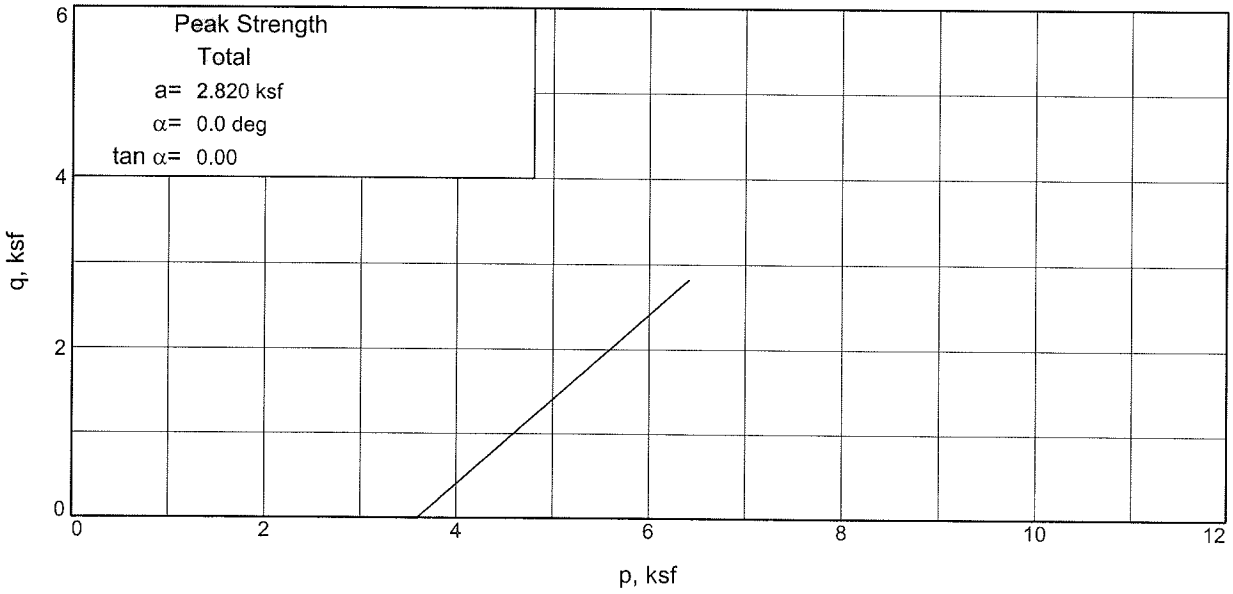
Figure _____







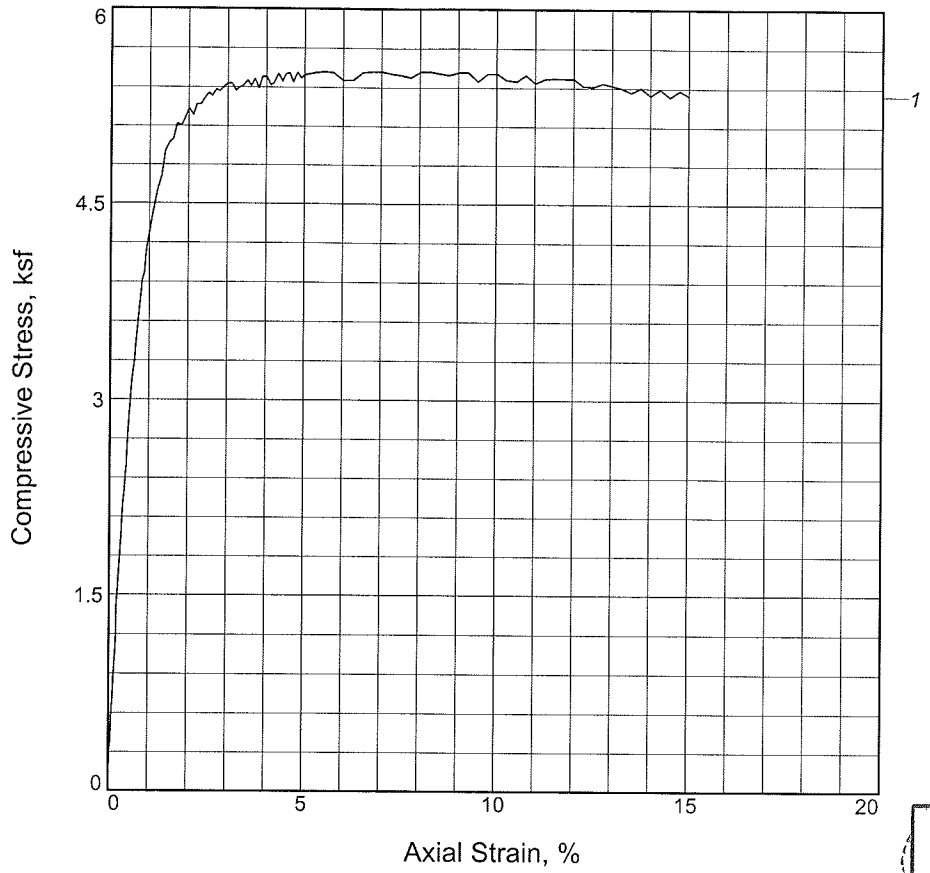




Client: HNTB
Project: Baker Pump Station
Location: BB-13 **Depth:** 22'-23' **Sample Number:** ST13
Project No.: E09-0208 **Figure** _____

MAS-TEK Engineering & Associates, Inc.

UNCONFINED COMPRESSION TEST



Bulge

Specimen No:	1			
Unconfined strength, ksf	5.521			
Undrained shear strength, ksf	2.761			
Failure strain, %	8.3			
Strain at peak, %	8.3			
Water content, %	20.3			
Wet density, pcf	128.4			
Dry density, pcf	106.7			
Saturation, %	94.7			
Void ratio	0.5801			
Specimen diameter, in.	1.94			
Specimen height, in.	3.84			
Height/diameter ratio	1.98			

Description: Light brown sandy CLAY w/ dark brown clay and calcareous nodules (FILL)

LL =	**PL =**	**PI =**	**Assumed GS=** 2.70	**Type:** Undisturbed

Project No.: E09-0208
Date Sampled: 4/16/2009
Remarks:

Client: HNTB

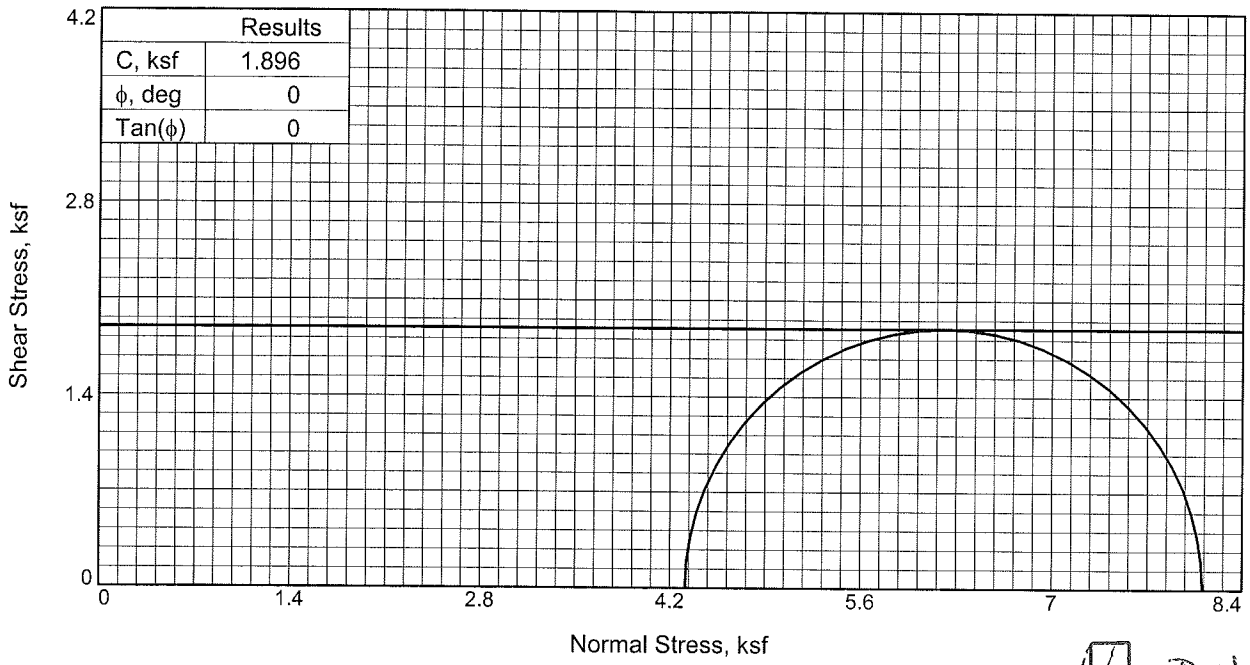
Project: Baker Pump Station

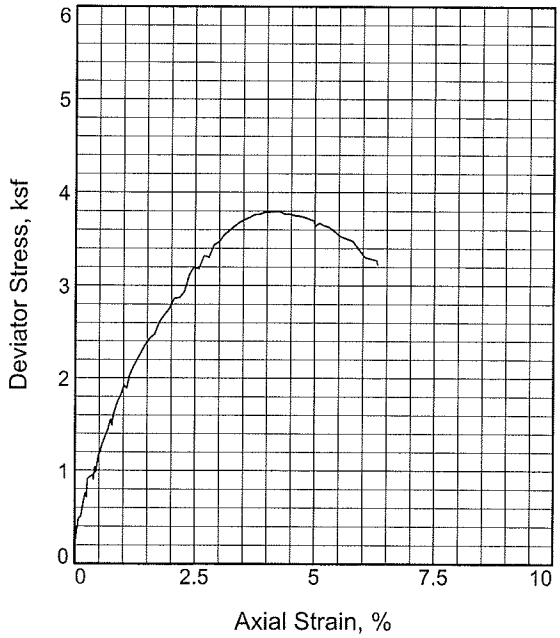
Location: BB-13
Sample Number: ST16 **Depth:** 28.5'-29'

UNCONFINED COMPRESSION TEST

Figure _____

MAS-TEK Engineering & Associates, Inc.





Specimen No:		1
Initial	Water Content, %	18.3
	Dry Density, pcf	106.1
	Saturation, %	83.9
	Void Ratio	0.5887
	Diameter, in.	1.93
	Height, in.	3.82
At Test	Water Content, %	18.3
	Dry Density, pcf	106.1
	Saturation, %	83.9
	Void Ratio	0.5887
	Diameter, in.	1.93
	Height, in.	3.82
Strain at peak, %		4.3
Back Pressure, psi		0.000
Cell Pressure, psi		29.969
Fail. Stress, ksf		3.793
Strain, %		4.3
Ult. Stress, ksf		
Strain, %		
σ_1 Failure, ksf		8.108
σ_3 Failure, ksf		4.316

Type of Test:
Unconsolidated Undrained

Sample Type: Undisturbed

Description: Light brown sandy CLAY w/ dark brown clay, calcareous nodules and tan sand layers (FILL)

Assumed Specific Gravity= 2.70

Remarks:

Client: HNTB

Project: Baker Pump Station

Location: BB-13

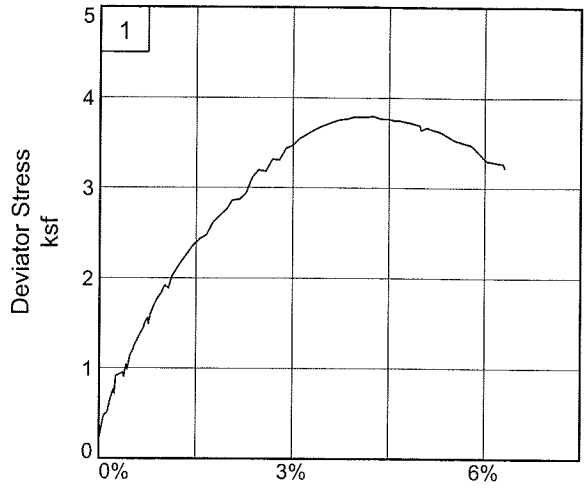
Sample Number: ST17 **Depth:** 30'-31'

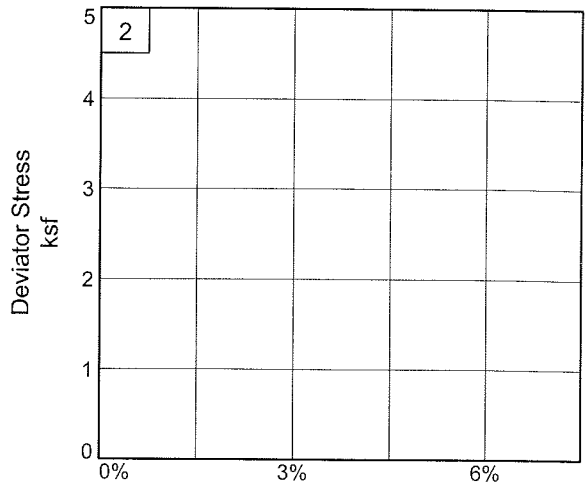
Proj. No.: E09-0208 **Date Sampled:** 4/16/2009

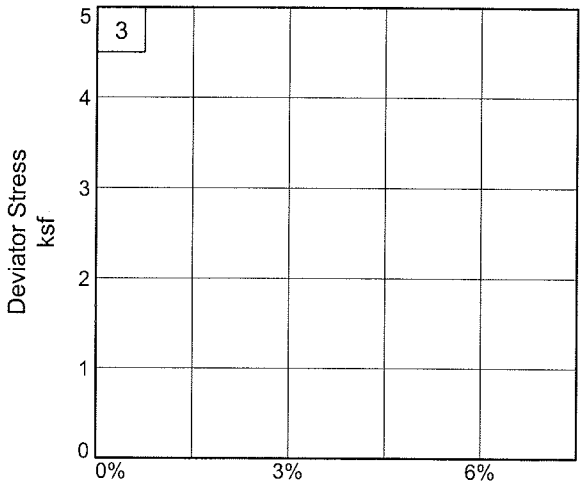
TRIAXIAL SHEAR TEST REPORT

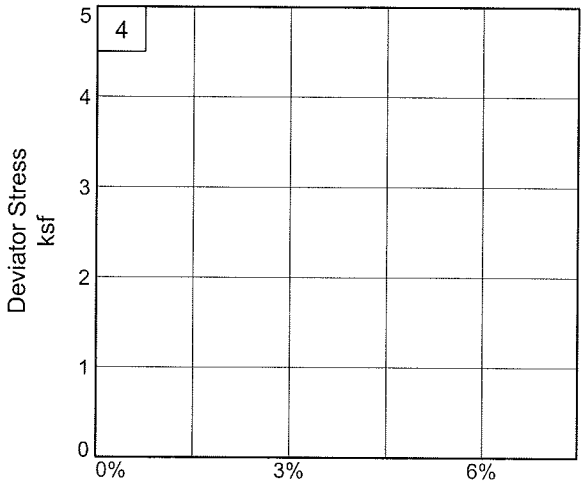
MAS-TEK Engineering & Associates, Inc.

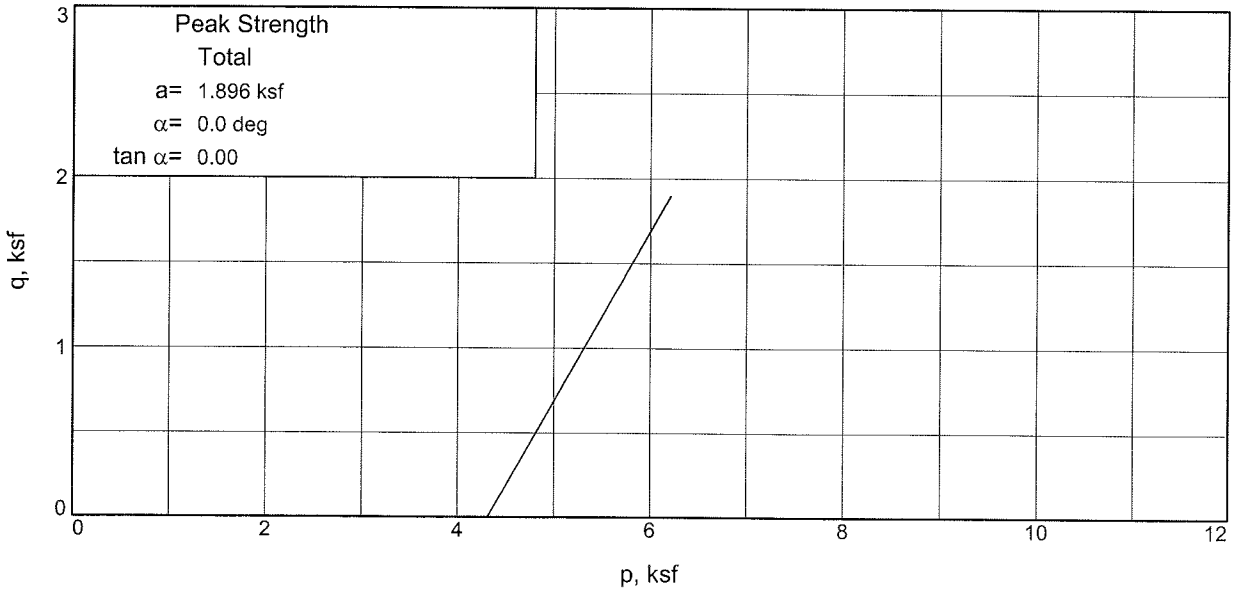
Figure _____







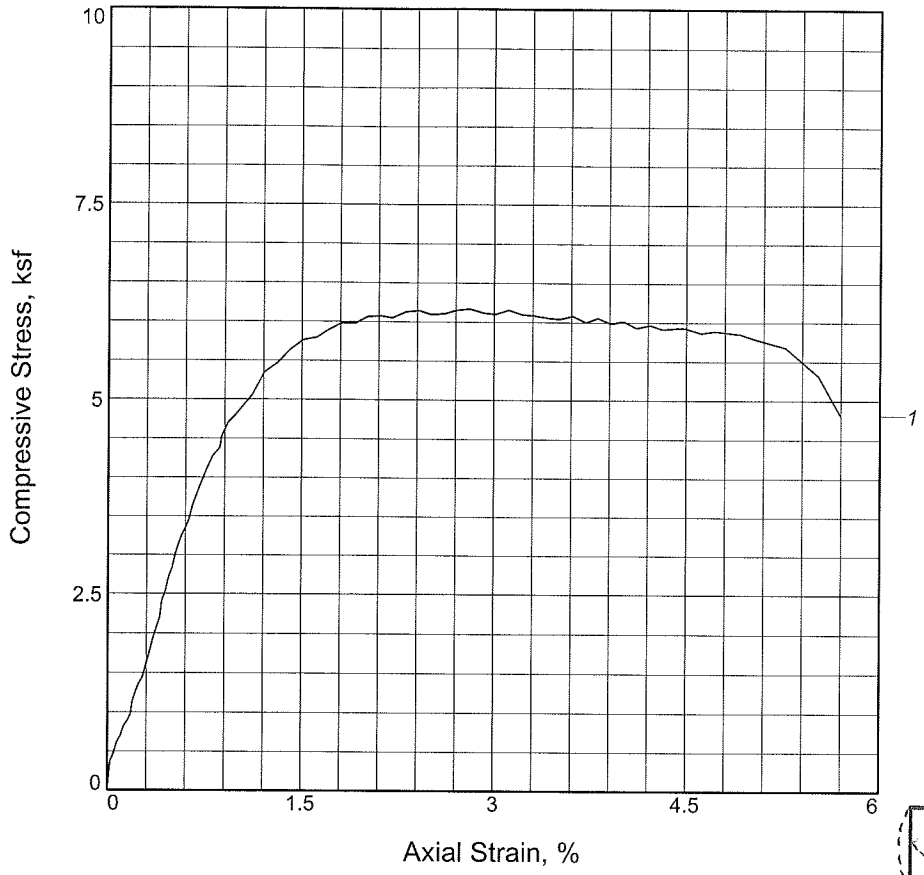




Client: HNTB
Project: Baker Pump Station
Location: BB-13 **Depth:** 30'-31' **Sample Number:** ST17
Project No.: E09-0208 **Figure** _____

MAS-TEK Engineering & Associates, Inc.

UNCONFINED COMPRESSION TEST



Bulge

Specimen No:	1			
Unconfined strength, ksf	6.164			
Undrained shear strength, ksf	3.082			
Failure strain, %	2.8			
Strain at peak, %	2.8			
Water content, %	36.5			
Wet density, pcf	111.6			
Dry density, pcf	81.8			
Saturation, %	92.8			
Void ratio	1.0612			
Specimen diameter, in.	1.95			
Specimen height, in.	3.94			
Height/diameter ratio	2.02			

Description: Very stiff dark brown CLAY w/ calcareous nodules, light brown sandy clay and gravels

LL =	**PL =**	**PI =**	**Assumed GS=** 2.70	**Type:** Undisturbed

Project No.: E09-0208
Date Sampled: 4/16/2009
Remarks:

Client: HNTB

Project: Baker Pump Station

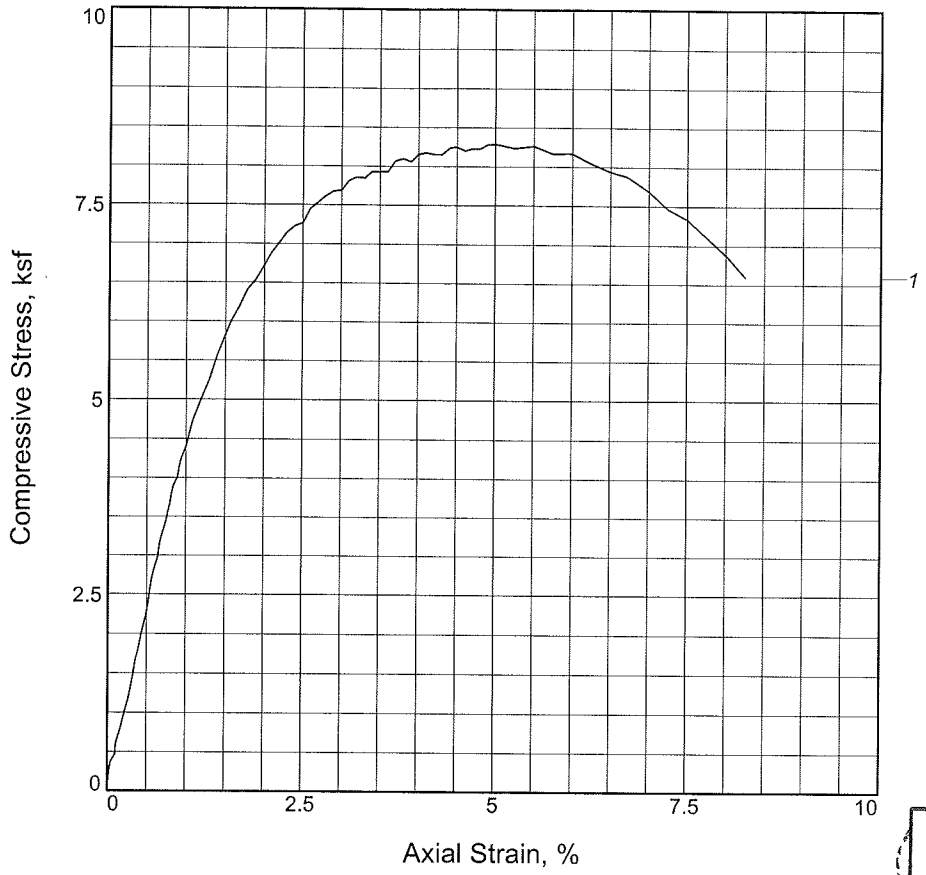
Location: BB-13
Sample Number: ST18 **Depth:** 33'-34'

UNCONFINED COMPRESSION TEST

MAS-TEK Engineering & Associates, Inc.

Figure _____

UNCONFINED COMPRESSION TEST



Specimen No:	1			
Unconfined strength, ksf	8.282			
Undrained shear strength, ksf	4.141			
Failure strain, %	5.0			
Strain at peak, %	5.0			
Water content, %	15.4			
Wet density, pcf	130.6			
Dry density, pcf	113.1			
Saturation, %	85.1			
Void ratio	0.4899			
Specimen diameter, in.	1.96			
Specimen height, in.	3.94			
Height/diameter ratio	2.01			

Description: Light brown sandy CLAY

LL = 34	**PL =** 15	**PI =** 19	**Assumed GS=** 2.70	**Type:** Undisturbed

Project No.: E09-0208
Date Sampled: 4/16/2009
Remarks:

Client: HNTB

Project: Baker Pump Station

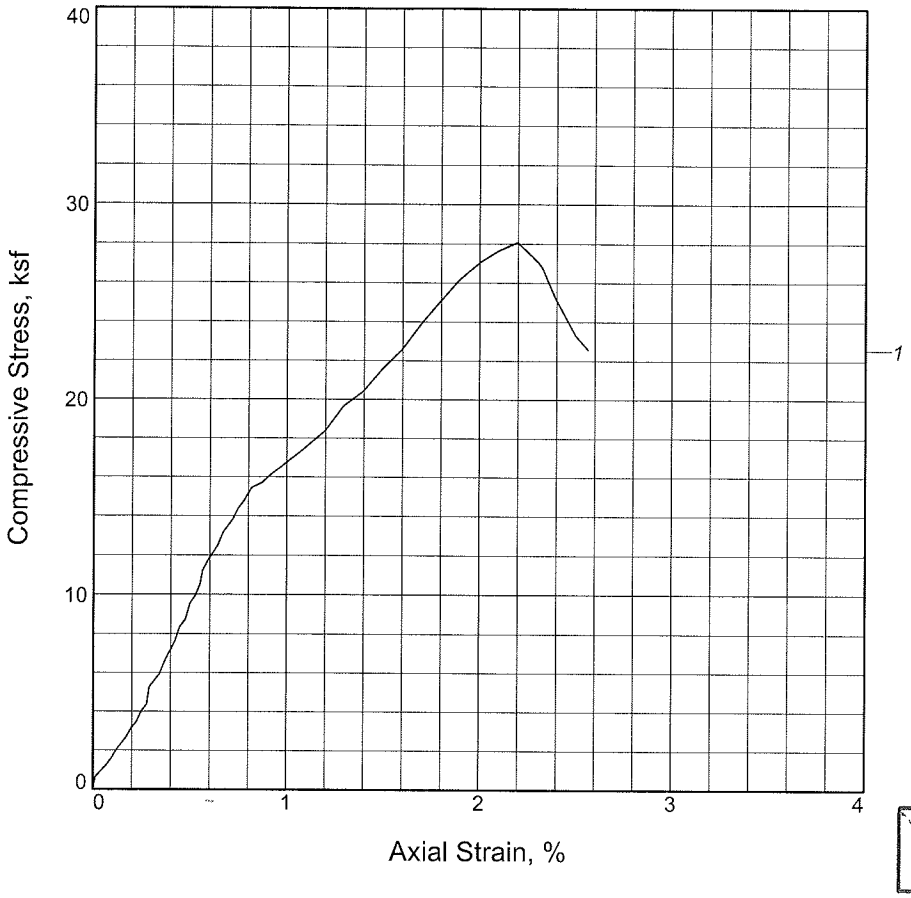
Location: BB-13
Sample Number: ST21 **Depth:** 39'-40'

UNCONFINED COMPRESSION TEST

MAS-TEK Engineering & Associates, Inc.

Figure _____

UNCONFINED COMPRESSION TEST



Specimen No:	1			
Unconfined strength, ksf	28.058			
Undrained shear strength, ksf	14.029			
Failure strain, %	2.2			
Strain at peak, %	2.2			
Water content, %	17.0			
Wet density, pcf	134.1			
Dry density, pcf	114.6			
Saturation, %	96.0			
Void ratio	0.4819			
Specimen diameter, in.	1.86			
Specimen height, in.	3.97			
Height/diameter ratio	2.13			

Description: Moderately hard dark gray SHALE

LL =	**PL =**	**PI =**	**Assumed GS=** 2.72	**Type:** Undisturbed

Project No.: E09-0208
Date Sampled: 4/16/2009
Remarks:

Figure _____

Client: HNTB

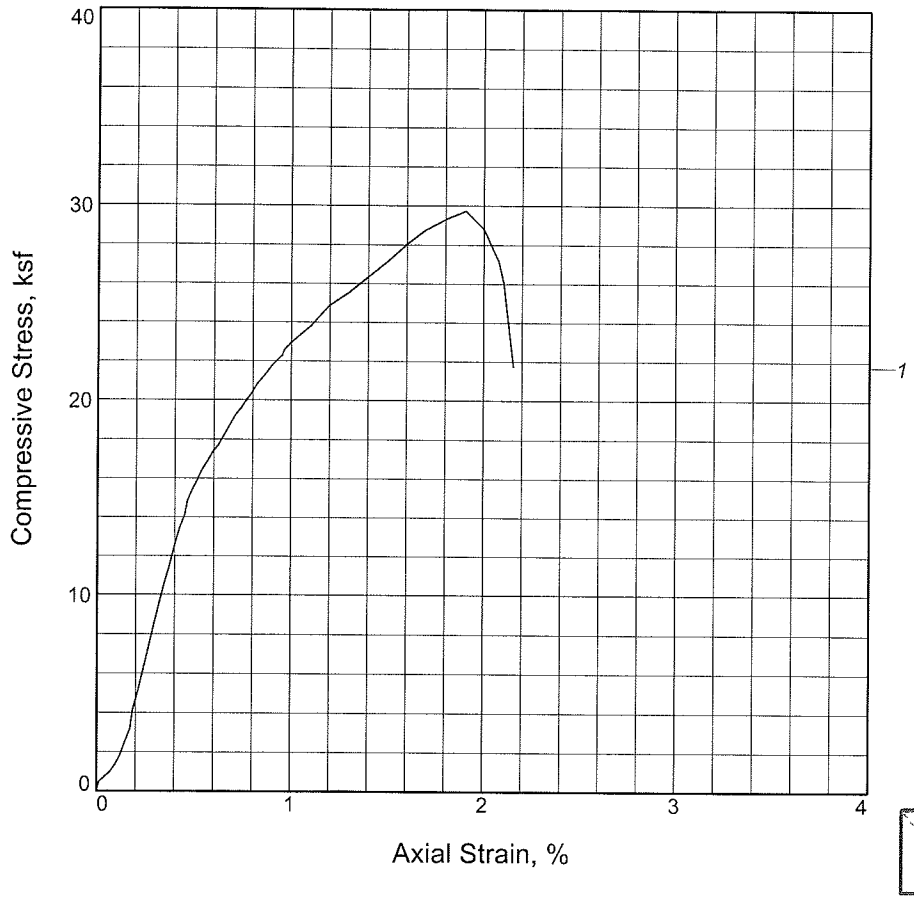
Project: Baker Pump Station

Location: BB-13
Sample Number: RC1 **Depth:** 57.5'-58'

UNCONFINED COMPRESSION TEST

MAS-TEK Engineering & Associates, Inc.

UNCONFINED COMPRESSION TEST



Specimen No:	1			
Unconfined strength, ksf	29.723			
Undrained shear strength, ksf	14.862			
Failure strain, %	1.9			
Strain at peak, %	1.9			
Water content, %	15.3			
Wet density, pcf	136.1			
Dry density, pcf	118.1			
Saturation, %	94.8			
Void ratio	0.4377			
Specimen diameter, in.	2.01			
Specimen height, in.	4.08			
Height/diameter ratio	2.03			

Description: Hard dark gray SHALE

LL =	**PL =**	**PI =**	**Assumed GS=** 2.72	**Type:** Undisturbed

Project No.: E09-0208
Date Sampled: 4/16/2009
Remarks:

Figure _____

Client: HNTB

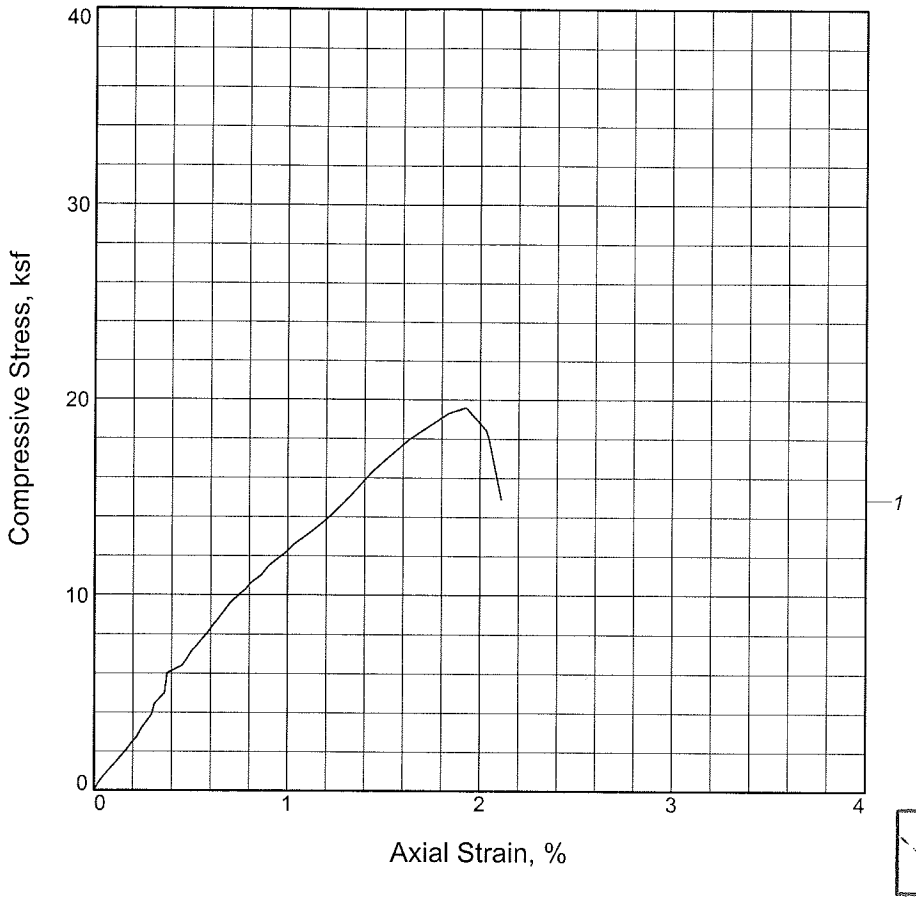
Project: Baker Pump Station

Location: BB-13
Sample Number: RC2 **Depth:** 60'-60.5'

UNCONFINED COMPRESSION TEST

MAS-TEK Engineering & Associates, Inc.

UNCONFINED COMPRESSION TEST



Specimen No:	1			
Unconfined strength, ksf	19.592			
Undrained shear strength, ksf	9.796			
Failure strain, %	1.9			
Strain at peak, %	1.9			
Water content, %	15.0			
Wet density, pcf	137.5			
Dry density, pcf	119.6			
Saturation, %	97.0			
Void ratio	0.4202			
Specimen diameter, in.	1.81			
Specimen height, in.	3.59			
Height/diameter ratio	1.99			

Description: Hard dark gray SHALE

LL =	**PL =**	**PI =**	**Assumed GS=** 2.72	**Type:** Undisturbed

Project No.: E09-0208
Date Sampled: 4/16/2009
Remarks:

Figure _____

Client: HNTB

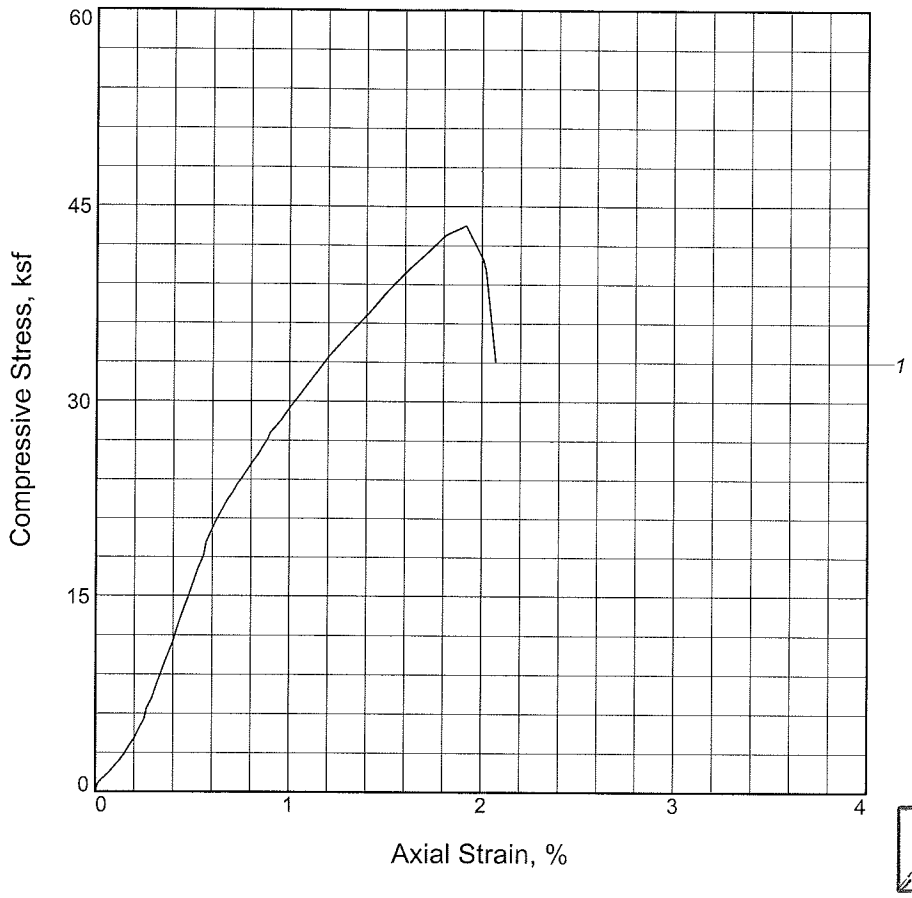
Project: Baker Pump Station

Location: BB-13
Sample Number: RC2 **Depth:** 67'-67.5'

UNCONFINED COMPRESSION TEST

MAS-TEK Engineering & Associates, Inc.

UNCONFINED COMPRESSION TEST



Specimen No:	1			
Unconfined strength, ksf	43.491			
Undrained shear strength, ksf	21.746			
Failure strain, %	1.9			
Strain at peak, %	1.9			
Water content, %	13.9			
Wet density, pcf	138.9			
Dry density, pcf	121.9			
Saturation, %	96.4			
Void ratio	0.3933			
Specimen diameter, in.	1.98			
Specimen height, in.	4.25			
Height/diameter ratio	2.15			

Description: Hard dark gray SHALE

LL =	**PL =**	**PI =**	**Assumed GS=** 2.72	**Type:** Undisturbed

Project No.: E09-0208
Date Sampled: 4/16/2009
Remarks:

Figure _____

Client: HNTB

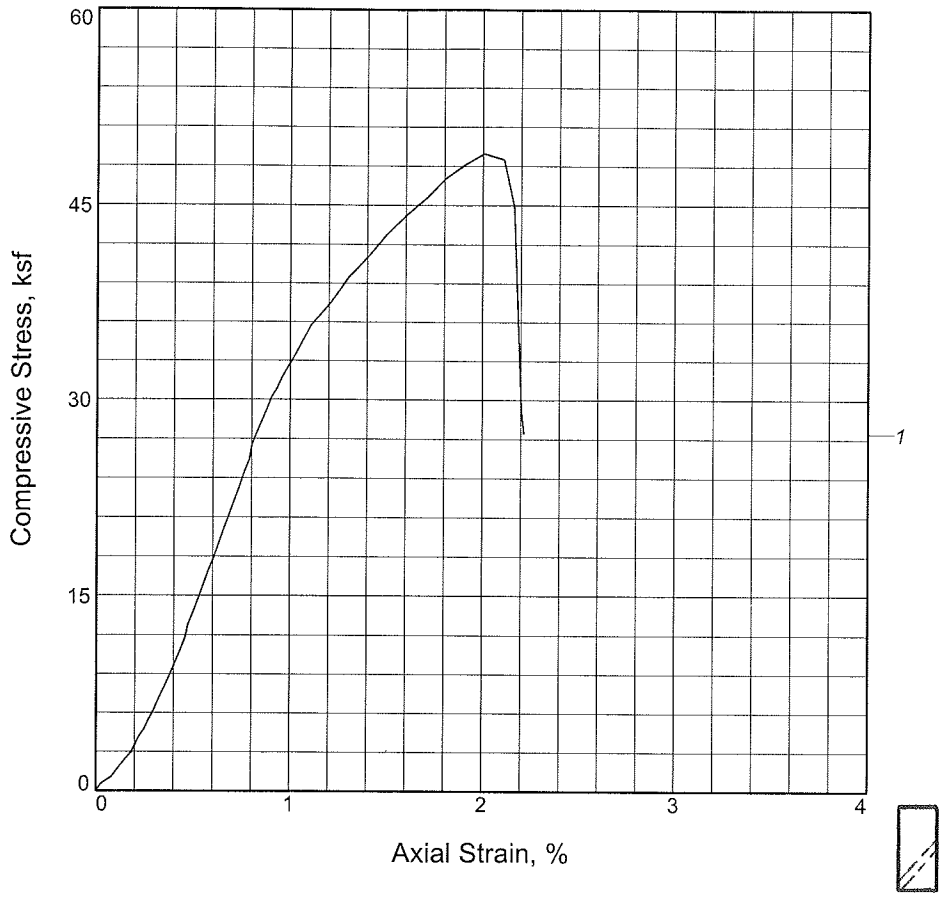
Project: Baker Pump Station

Location: BB-13
Sample Number: RC3 **Depth:** 70.3'-70.9'

UNCONFINED COMPRESSION TEST

MAS-TEK Engineering & Associates, Inc.

UNCONFINED COMPRESSION TEST



Specimen No:	1			
Unconfined strength, ksf	48.924			
Undrained shear strength, ksf	24.462			
Failure strain, %	2.0			
Strain at peak, %	2.0			
Water content, %	14.8			
Wet density, pcf	135.1			
Dry density, pcf	117.6			
Saturation, %	90.9			
Void ratio	0.4436			
Specimen diameter, in.	2.02			
Specimen height, in.	3.95			
Height/diameter ratio	1.95			

Description: Hard dark gary SHALE

LL =	**PL =**	**PI =**	**Assumed GS=** 2.72	**Type:** Undisturbed

Project No.: E09-0208
Date Sampled: 4/16/2009
Remarks:

Client: HNTB

Project: Baker Pump Station

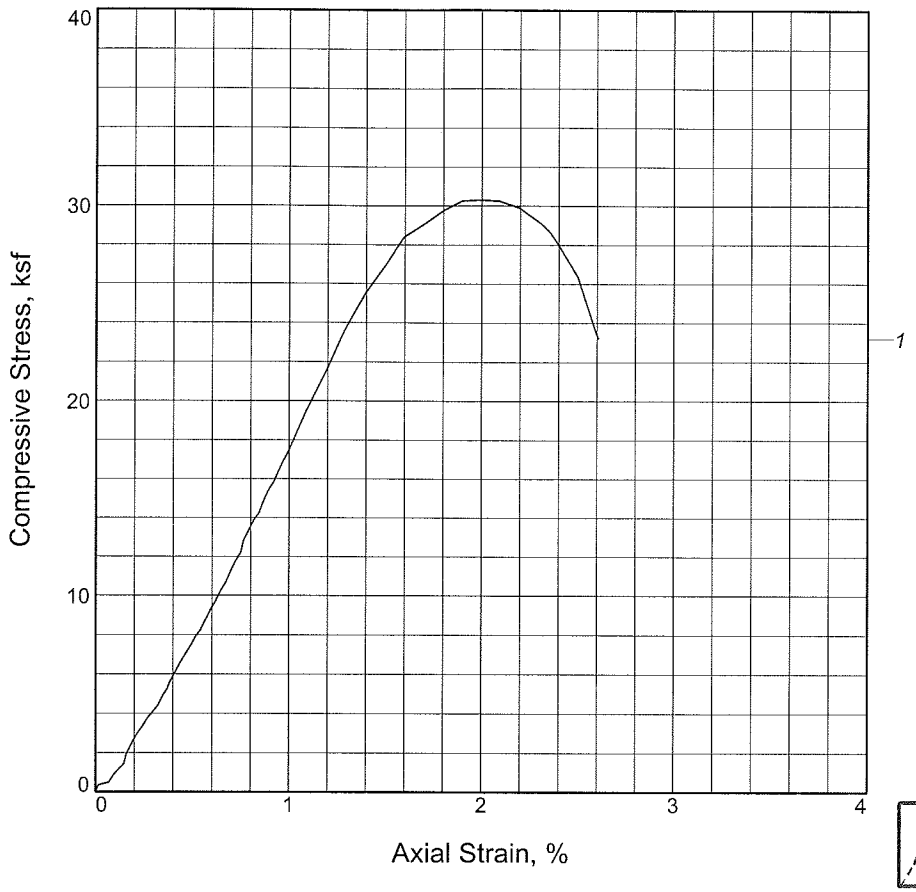
Location: BB-13
Sample Number: RC4 **Depth:** 75.9'-76.4'

UNCONFINED COMPRESSION TEST

MAS-TEK Engineering & Associates, Inc.

Figure _____

UNCONFINED COMPRESSION TEST



Slickensided

Specimen No:	1			
Unconfined strength, ksf	30.302			
Undrained shear strength, ksf	15.151			
Failure strain, %	2.0			
Strain at peak, %	2.0			
Water content, %	14.1			
Wet density, pcf	135.0			
Dry density, pcf	118.3			
Saturation, %	88.2			
Void ratio	0.4359			
Specimen diameter, in.	2.03			
Specimen height, in.	4.18			
Height/diameter ratio	2.06			

Description: Hard dark gray SHALE

LL =	**PL =**	**PI =**	**Assumed GS=** 2.72	**Type:** Undisturbed

Project No.: E09-0208
Date Sampled: 4/16/2009
Remarks:

Client: HNTB

Project: Baker Pump Station

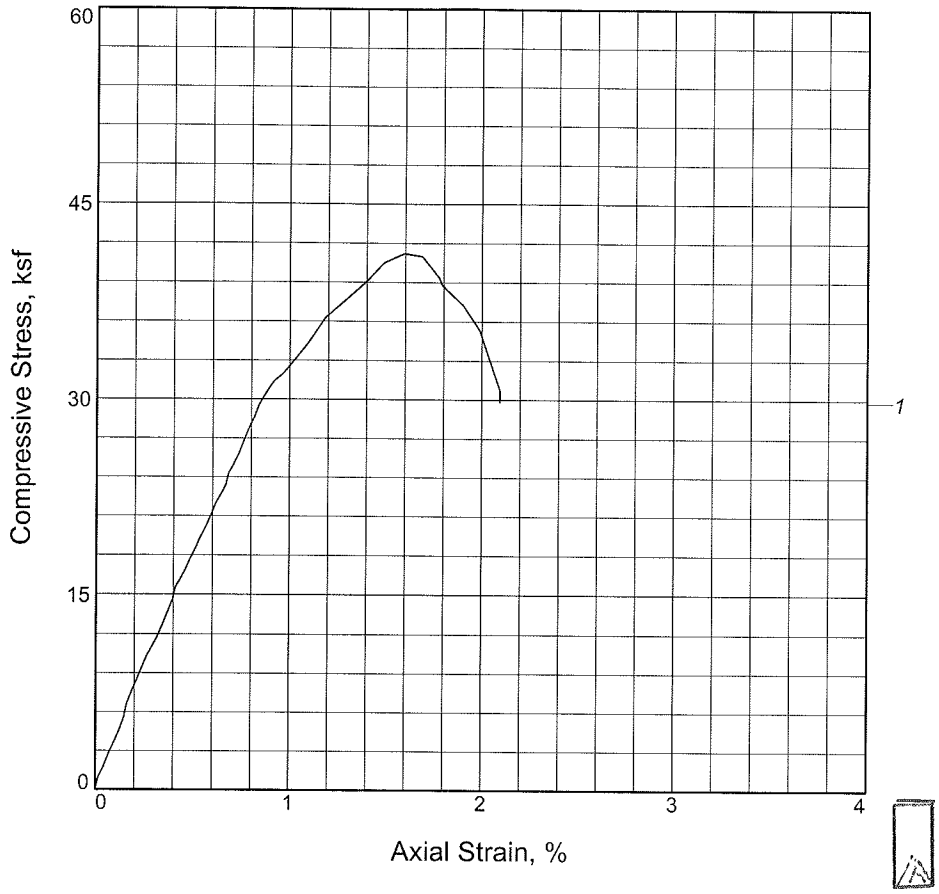
Location: BB-13
Sample Number: RC5 **Depth:** 82'-82.5'

UNCONFINED COMPRESSION TEST

Figure _____

MAS-TEK Engineering & Associates, Inc.

UNCONFINED COMPRESSION TEST



Specimen No:	1			
Unconfined strength, ksf	41.201			
Undrained shear strength, ksf	20.600			
Failure strain, %	1.6			
Strain at peak, %	1.6			
Water content, %	15.9			
Wet density, pcf	131.7			
Dry density, pcf	113.6			
Saturation, %	87.4			
Void ratio	0.4947			
Specimen diameter, in.	1.92			
Specimen height, in.	4.19			
Height/diameter ratio	2.18			

Description: Hard dark gray SHALE

LL =	**PL =**	**PI =**	**Assumed GS=** 2.72	**Type:** Undisturbed

Project No.: E09-0208
Date Sampled: 4/16/2009
Remarks:

Client: HNTB

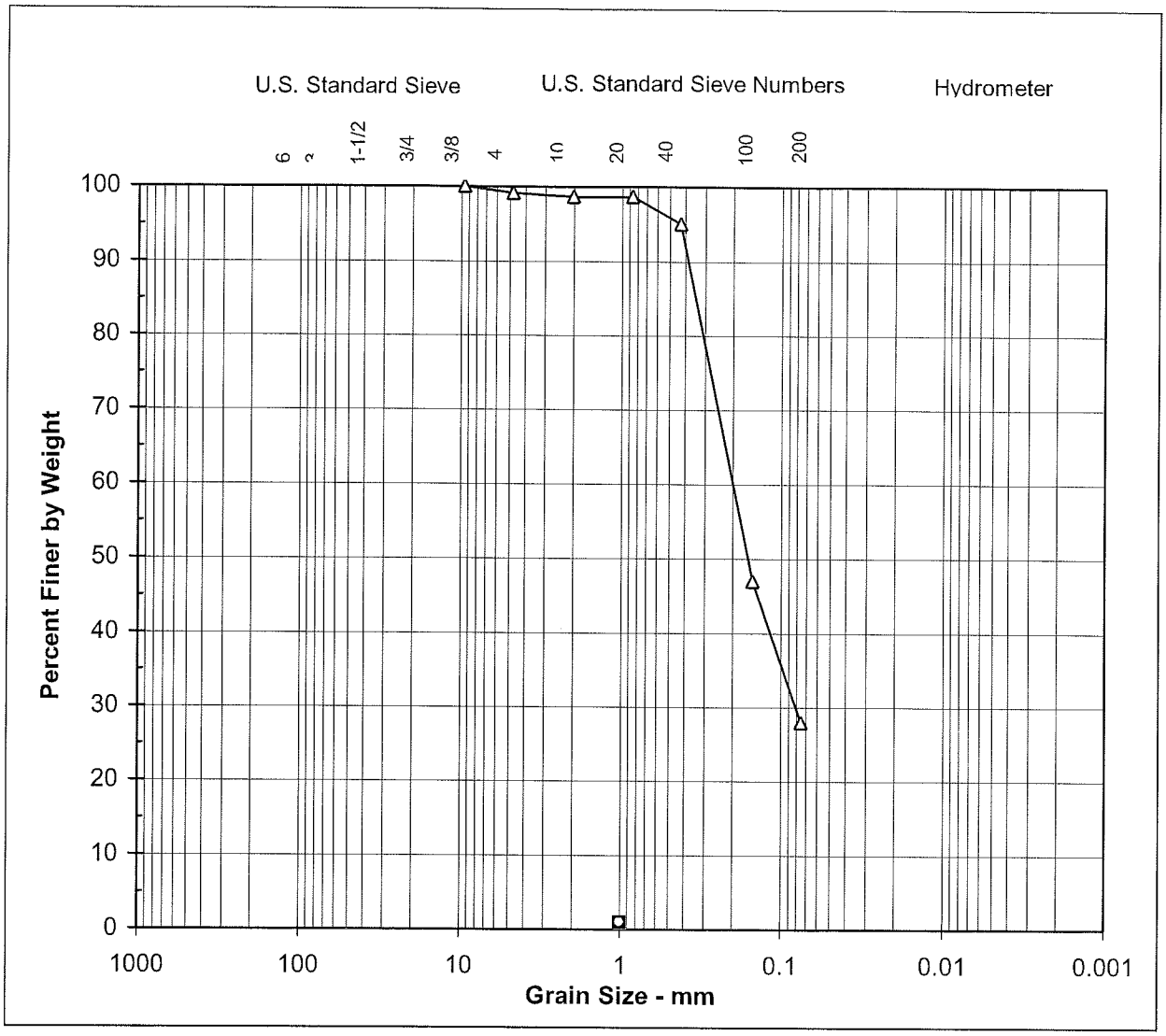
Project: Baker Pump Station

Location: BB-13
Sample Number: RC6 **Depth:** 85.8'-86.6'

UNCONFINED COMPRESSION TEST

MAS-TEK Engineering & Associates, Inc.

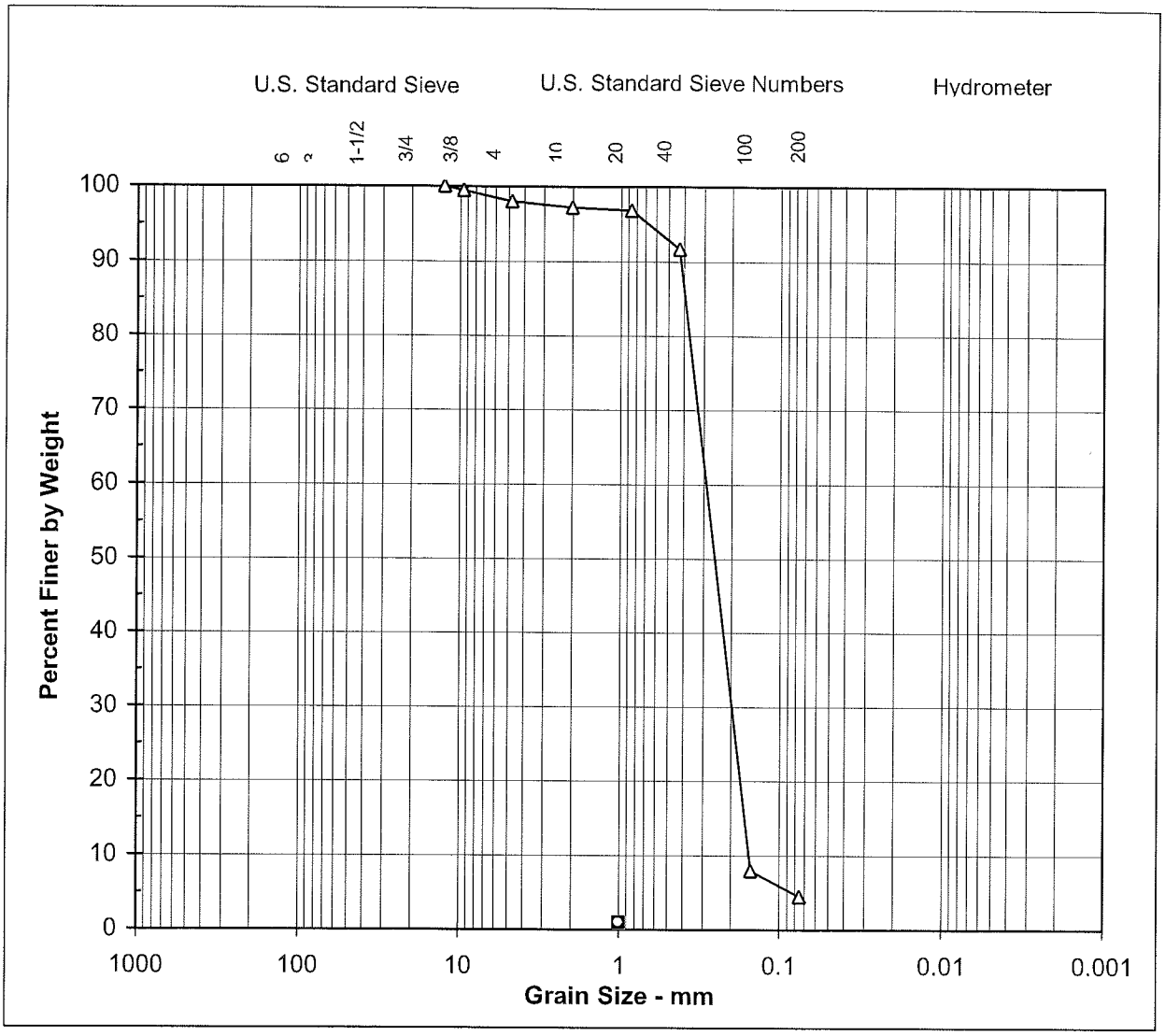
Figure _____



Legend	Boring No	Depth, ft	% Gravel	% Sand	% -#200	LL	PI
△	BB-13	44.2-45.8	0.9	71.2	27.9		
□							
○							

Legend	Boring No	Depth	Material Description	USCS
△	BB-13	44.2-45.8		
□				
○				

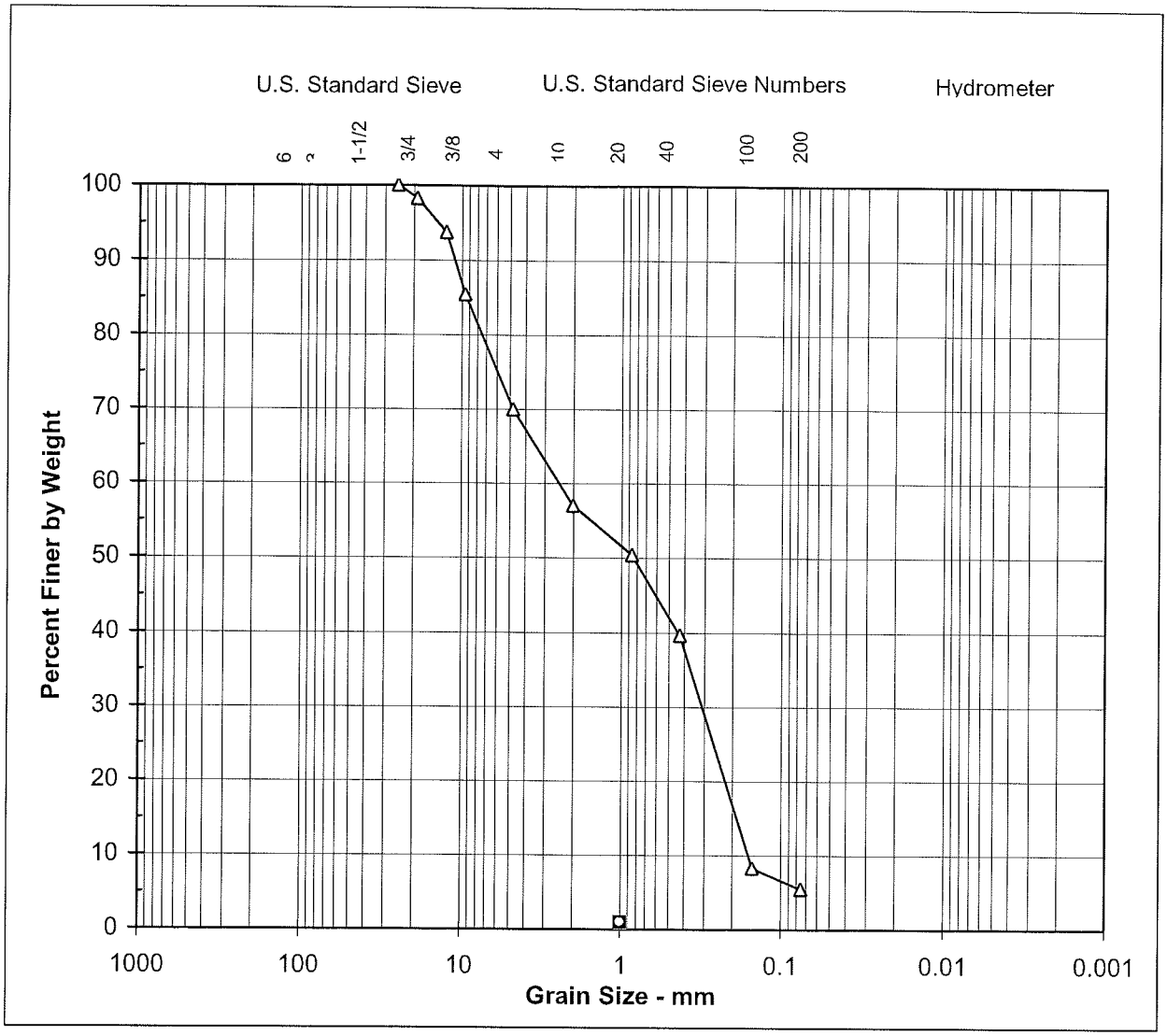
RESULTS OF SIEVE ANALYSIS	
Baker Pump Station E09-0208	
MAS-TEK Engineering & Associates	
E09-0208	FIGURE



Legend	Boring No	Depth, ft	% Gravel	% Sand	% -#200	LL	PI
△	BB-13	45.8-47.2	2.0	93.6	4.4		
□							
○							

Legend	Boring No	Depth	Material Description	USCS
△	BB-13	45.8-47.2		
□				
○				

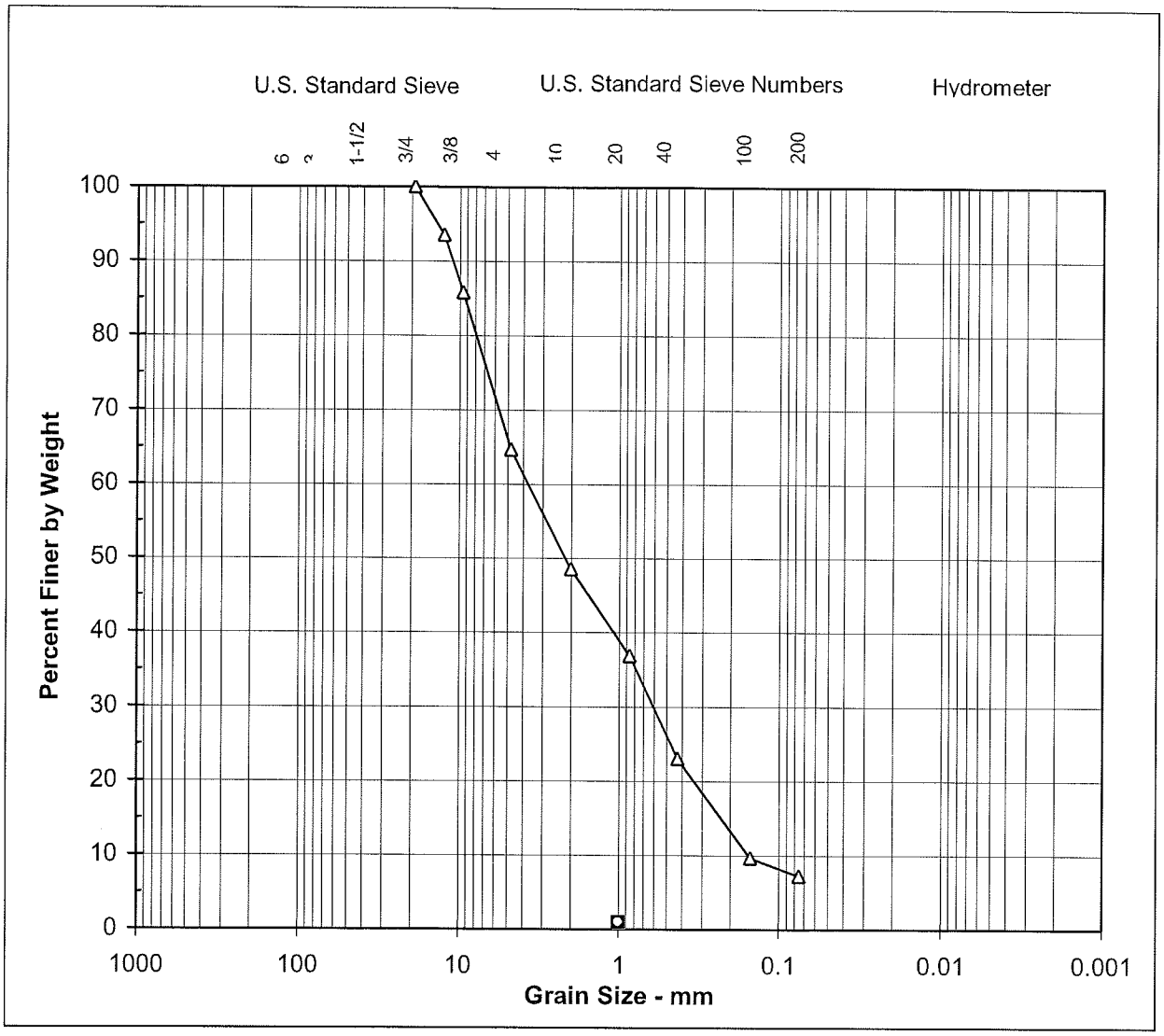
RESULTS OF SIEVE ANALYSIS	
Baker Pump Station E09-0208	
MAS-TEK Engineering & Associates	
E09-0208	FIGURE



Legend	Boring No	Depth, ft	% Gravel	% Sand	% -#200	LL	PI
△	BB-13	47.2-48.7	30.1	64.5	5.4		
□							
○							

Legend	Boring No	Depth	Material Description	USCS
△	BB-13	47.2-48.7		
□				
○				

RESULTS OF SIEVE ANALYSIS	
Baker Pump Station E09-0208	
MAS-TEK Engineering & Associates	
E09-0208	FIGURE



Legend	Boring No	Depth, ft	% Gravel	% Sand	% -#200	LL	PI
△	BB-13	50.5-52	35.4	57.4	7.2		
□							
○							

Legend	Boring No	Depth	Material Description	USCS
△	BB-13	50.5-52		
□				
○				

RESULTS OF SIEVE ANALYSIS	
Baker Pump Station E09-0208	
MAS-TEK Engineering & Associates	
E09-0208	FIGURE

MAS-TEK ENGINEERING & ASSOCIATES, INC.

LABORATORY TEST SUMMARY

PROJECT:	Baker Pump Station										PROJECT NO.:	E09-0208			
BORING NO.	SAMPLE ID	DEPTH, FEET	% MOISTOURE	DRY DENSITY (pcf)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	-200 SIEVE		UNC. STRESS (ksf)	% STRAIN		CONFINING PRESSURE (psi)	UU. STRESS (ksf)	% STRAIN
BB-14	ST2	2.5-3.5	11.2	119.4	37	20	17			7.50	3.6				
	SS4	4-5.5	7.3												
	SS5	5.5-7	7.1		40	16	24								
	SS6	7-8.5	10.3												
	ST7	8.5-9.5	26.6	95.1						4.06	1.0				
	ST8	10.5-12.5			62	21	41								
	ST9	13.5-14.5	16.0												
	ST10	14.5-15.5	12.5	113.8						4.93	1.4		15		
	ST11	16.5-18.5			37	15	22								
	SS13	20.21.5	9.4												
	SS14	21.5-23	3.0												
	SS15	23-24.5	7.2												
	SS16	24.5-26	20.9		63	22	41								
	SS17	30-31.5	15.9												
	ST18	32.5-34.5	18.0									Not testable			
	SS19	35-36.5	17.0												

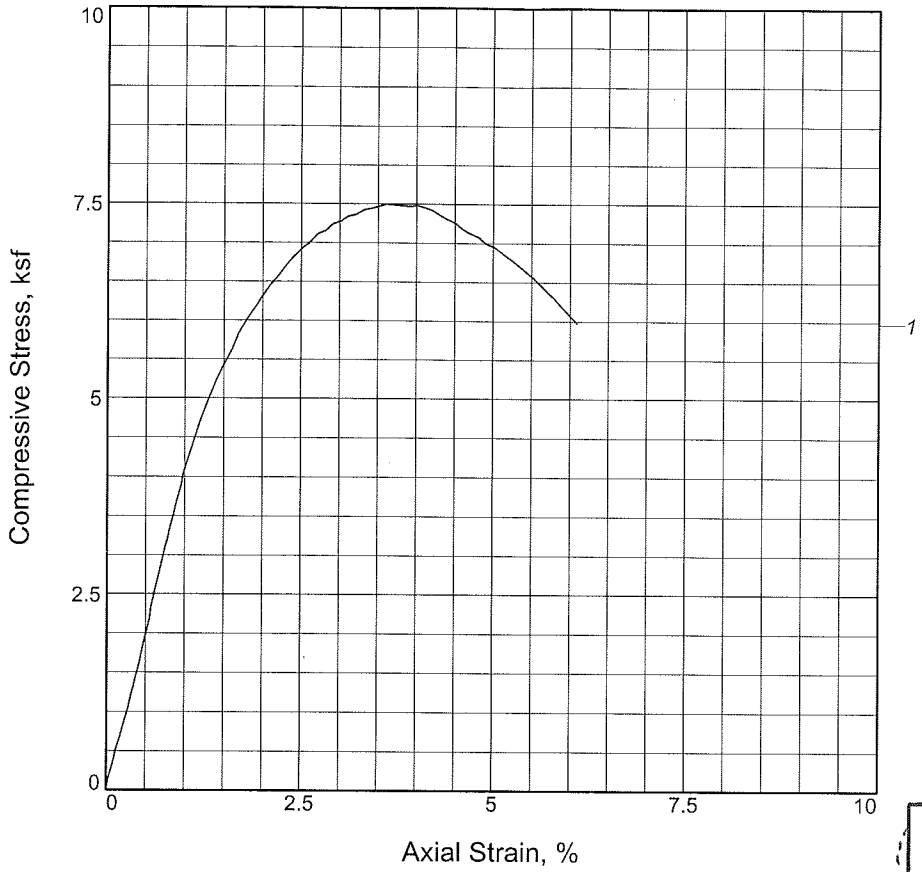
MAS-TEK ENGINEERING & ASSOCIATES, INC.

LABORATORY TEST SUMMARY

PROJECT: Baker Pump Station **PROJECT NO.:** E09-0208

BORING NO.	SAMPLE ID	DEPTH, FEET	% MOISTOURE	DRY DENSITY (pcf)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	-200 SIEVE		UNC. STRESS (ksf)	% STRAIN		CONFINING PRESSURE (psi)	UU. STRESS (ksf)	% STRAIN
BB-14	SS21	40-40.5	18.0												
	RC2	52.6-53.1	13.8	119.6						58.56	2.7				
	RC3	56-56.5	16.3	112.9						54.27	2.5				
	RC4	63-63.5	15.4	115.2						62.43	1.5				

UNCONFINED COMPRESSION TEST



Bulge

Specimen No:	1			
Unconfined strength, ksf	7.495			
Undrained shear strength, ksf	3.747			
Failure strain, %	3.6			
Strain at peak, %	3.6			
Water content, %	11.2			
Wet density, pcf	132.7			
Dry density, pcf	119.4			
Saturation, %	73.1			
Void ratio	0.4122			
Specimen diameter, in.	2.87			
Specimen height, in.	3.46			
Height/diameter ratio	1.21			

Description: Very stiff dark brown CLAY w/ light brown sandy clay, gravel and calcareous nodules

LL = 37	**PL =** 20	**PI =** 17	**Assumed GS=** 2.70	**Type:** Undisturbed

Project No.: E09-0208
Date Sampled: 4/23/2009
Remarks:

Client: HNTB

Project: Baker Pump Station

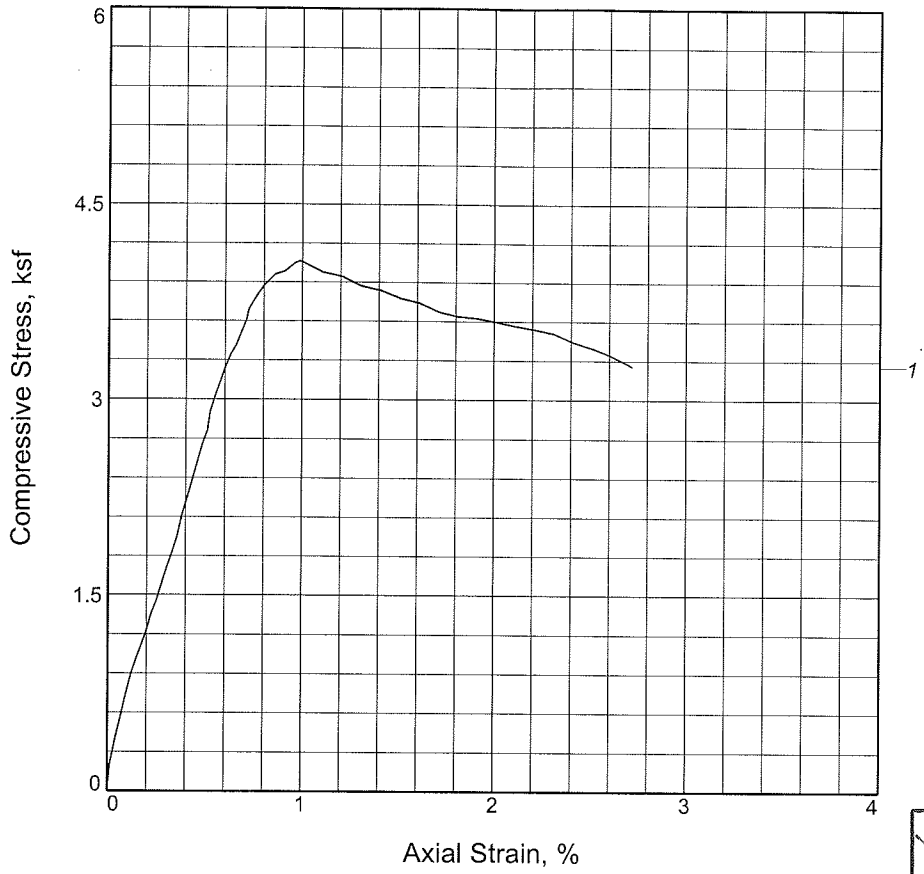
Location: BB-14
Sample Number: ST2 **Depth:** 2.5'-3.5'

UNCONFINED COMPRESSION TEST

Figure _____

MAS-TEK Engineering & Associates, Inc.

UNCONFINED COMPRESSION TEST



slickensided

Specimen No:	1			
Unconfined strength, ksf	4.061			
Undrained shear strength, ksf	2.031			
Failure strain, %	1.0			
Strain at peak, %	1.0			
Water content, %	26.6			
Wet density, pcf	120.3			
Dry density, pcf	95.1			
Saturation, %	92.9			
Void ratio	0.7732			
Specimen diameter, in.	2.86			
Specimen height, in.	4.77			
Height/diameter ratio	1.67			

Description: Very stiff dark brown CLAY w/ calcareous nodules

LL =	**PL =**	**PI =**	**Assumed GS=** 2.70	**Type:** Undisturbed

Project No.: E09-0208
Date Sampled: 4/23/2009
Remarks:

Client: HNTB

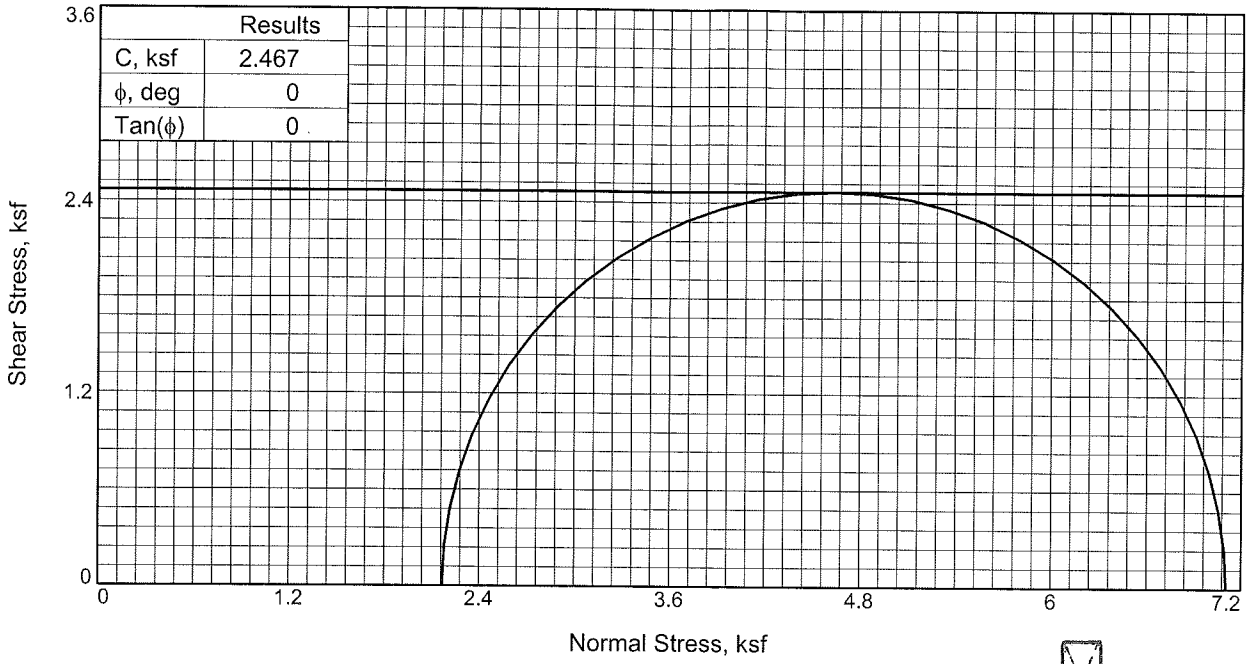
Project: Baker Pump Station

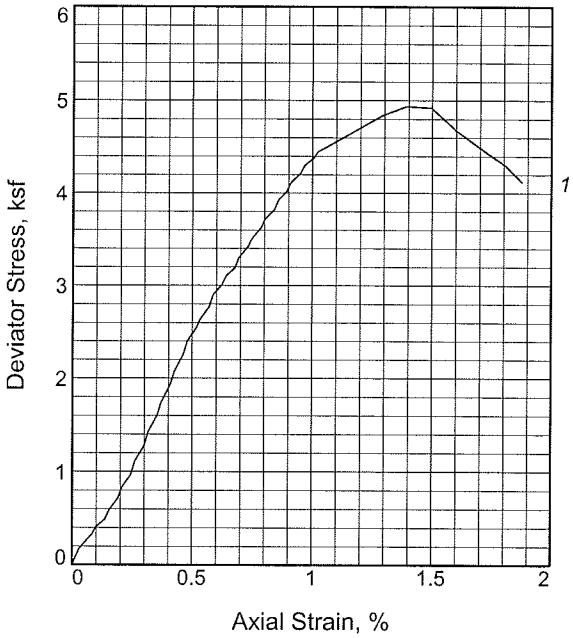
Location: BB-14
Sample Number: ST7 **Depth:** 8.5'-9.5'

UNCONFINED COMPRESSION TEST

Figure _____

MAS-TEK Engineering & Associates, Inc.





Specimen No:		1
Initial	Water Content, %	12.5
	Dry Density, pcf	113.8
	Saturation, %	70.3
	Void Ratio	0.4807
	Diameter, in.	2.83
	Height, in.	5.12
At Test	Water Content, %	17.8
	Dry Density, pcf	113.8
	Saturation, %	100.0
	Void Ratio	0.4807
	Diameter, in.	2.83
	Height, in.	5.12
Strain at peak, %		1.4
Back Pressure, psi		0.000
Cell Pressure, psi		15.080
Fail. Stress, ksf		4.933
Strain, %		1.4
Ult. Stress, ksf		
Strain, %		
σ_1 Failure, ksf		7.105
σ_3 Failure, ksf		2.171

Type of Test:
Unconsolidated Undrained

Sample Type: Undisturbed

Description: Very stiff light brown and light gray sandy CLAY w/ calcareouse nodules

Assumed Specific Gravity= 2.70

Remarks:

Figure _____

Client: HNTB

Project: Baker Pump Station

Location: BB-14

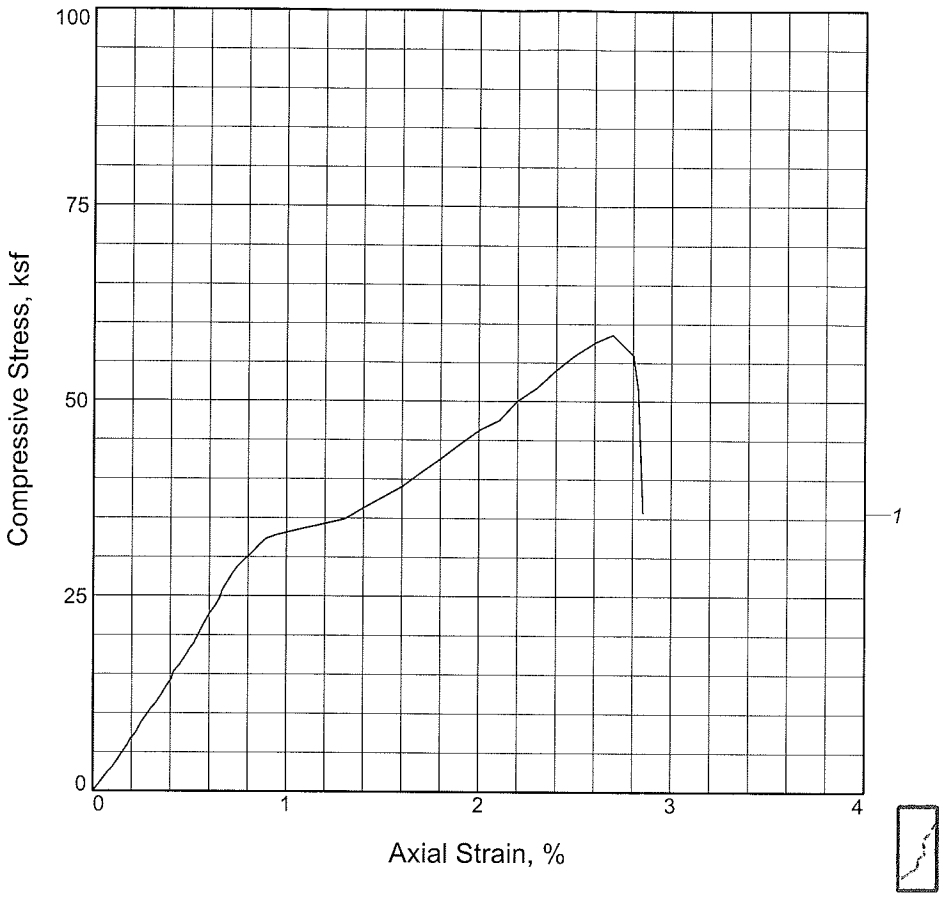
Sample Number: ST10 **Depth:** 14.5'-15.5'

Proj. No.: E09-0208 **Date Sampled:** 4/23/2009

TRIAXIAL SHEAR TEST REPORT

MAS-TEK Engineering & Associates, Inc.

UNCONFINED COMPRESSION TEST



Specimen No:	1			
Unconfined strength, ksf	58.556			
Undrained shear strength, ksf	29.278			
Failure strain, %	2.7			
Strain at peak, %	2.7			
Water content, %	13.8			
Wet density, pcf	136.1			
Dry density, pcf	119.6			
Saturation, %	89.2			
Void ratio	0.4194			
Specimen diameter, in.	2.04			
Specimen height, in.	4.16			
Height/diameter ratio	2.04			

Description: Hard dark gray SHALE

LL =	**PL =**	**PI =**	**Assumed GS=** 2.72	**Type:** Undisturbed

Project No.: E09-0208
Date Sampled: 4/23/2009
Remarks:

Client: HNTB

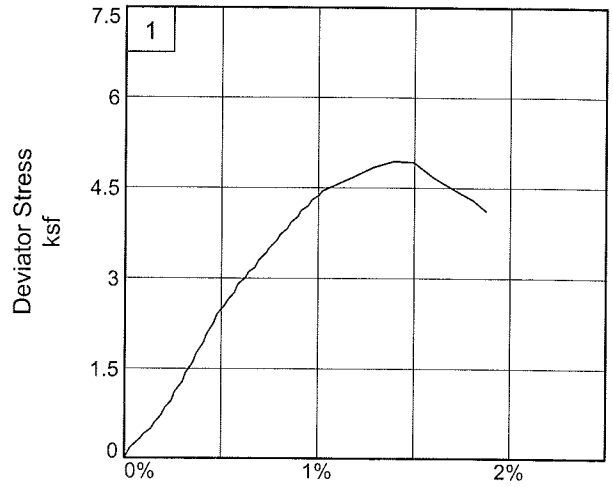
Project: Baker Pump Station

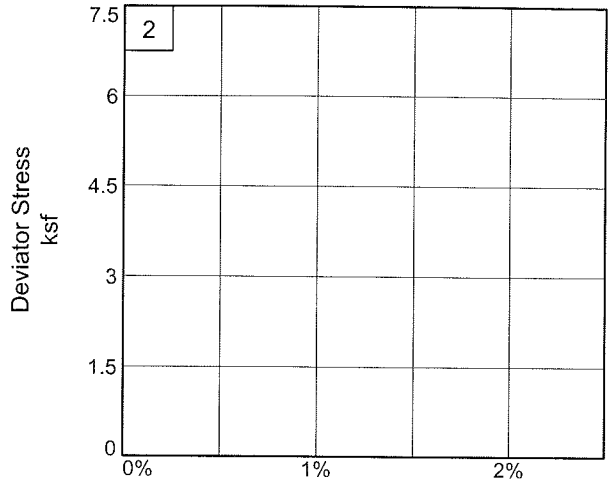
Location: BB-14
Sample Number: RC2 **Depth:** 52.6'-53.1'

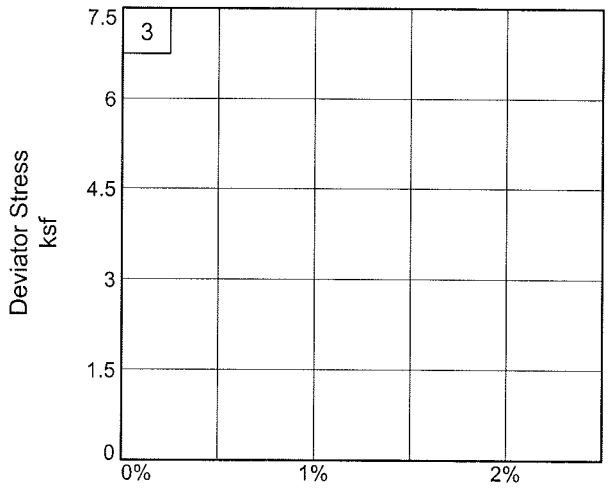
UNCONFINED COMPRESSION TEST

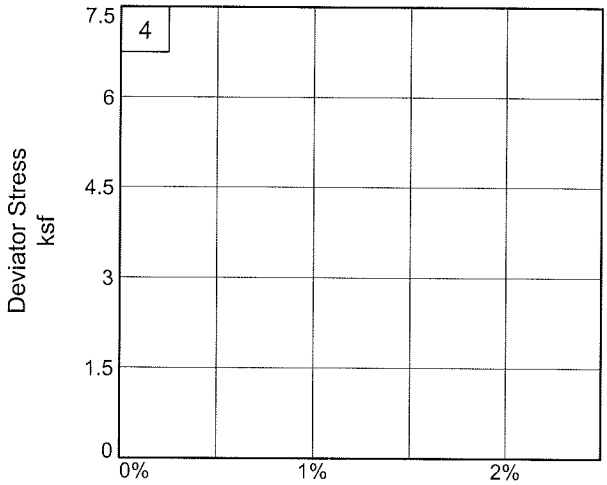
Figure _____

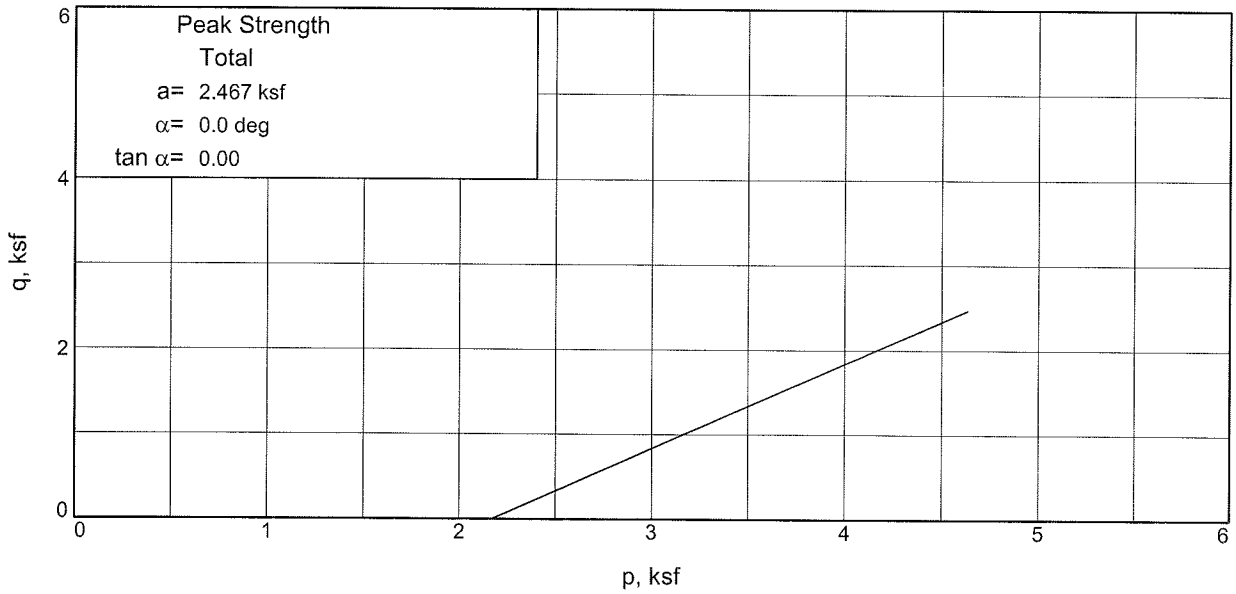
MAS-TEK Engineering & Associates, Inc.







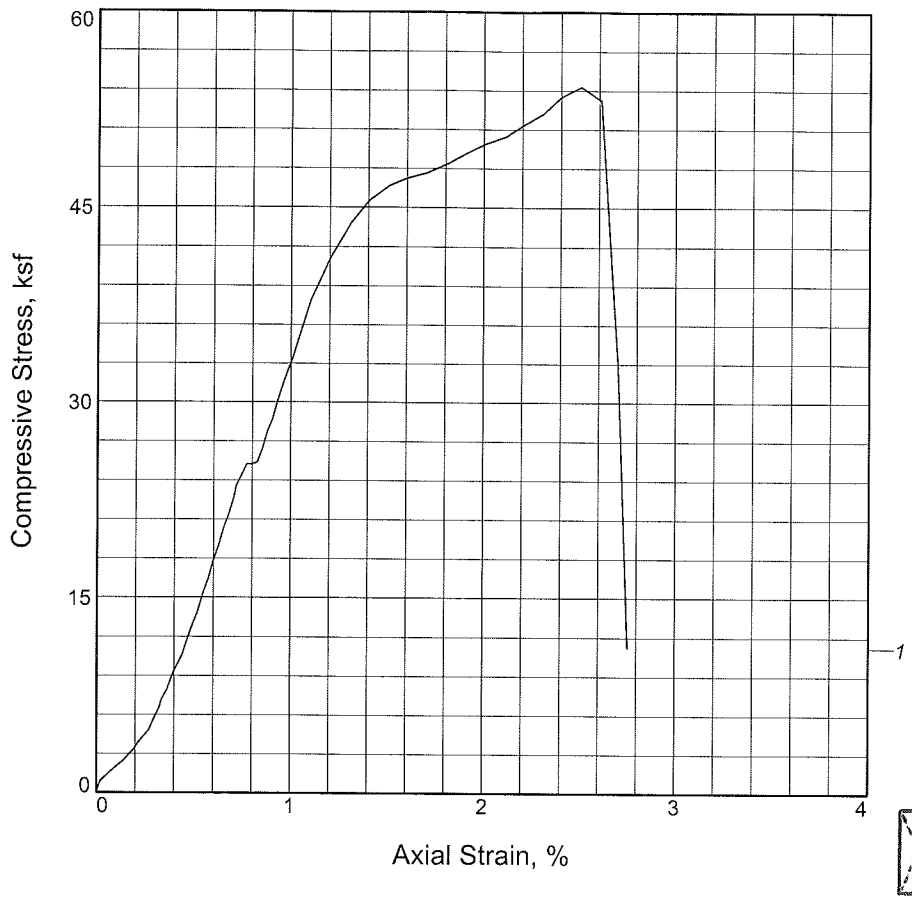




Client: HNTB
Project: Baker Pump Station
Location: BB-14 **Depth:** 14.5'-15.5' **Sample Number:** ST10
Project No.: E09-0208 **Figure** _____

MAS-TEK Engineering & Associates, Inc.

UNCONFINED COMPRESSION TEST



Specimen No:	1			
Unconfined strength, ksf	54.270			
Undrained shear strength, ksf	27.135			
Failure strain, %	2.5			
Strain at peak, %	2.5			
Water content, %	16.3			
Wet density, pcf	131.3			
Dry density, pcf	112.9			
Saturation, %	88.0			
Void ratio	0.5041			
Specimen diameter, in.	2.06			
Specimen height, in.	4.34			
Height/diameter ratio	2.11			

Description: Hard dark gray SHALE

LL =	**PL =**	**PI =**	**Assumed GS=** 2.72	**Type:** Undisturbed

Project No.: E09-0208
Date Sampled: 4/23/2009
Remarks:

Client: HNTB

Project: Baker Pump Station

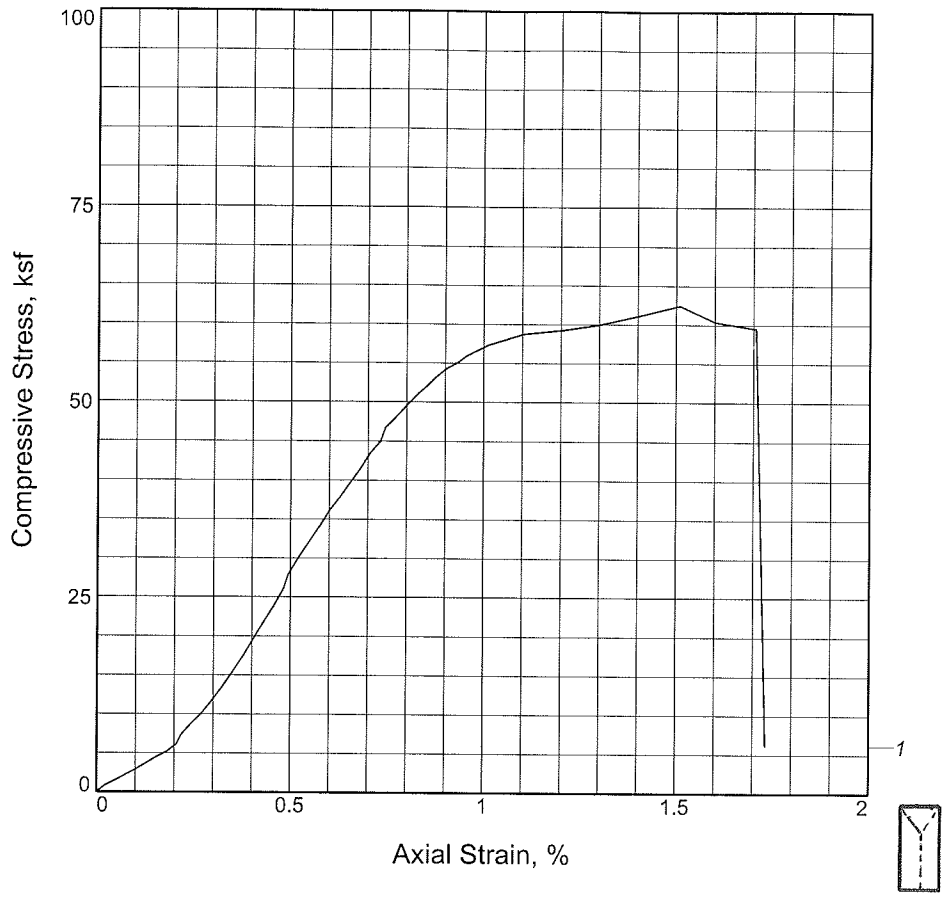
Location: BB-14
Sample Number: RC3 **Depth:** 56'-56.5'

UNCONFINED COMPRESSION TEST

Figure _____

MAS-TEK Engineering & Associates, Inc.

UNCONFINED COMPRESSION TEST



Specimen No:	1			
Unconfined strength, ksf	62.426			
Undrained shear strength, ksf	31.213			
Failure strain, %	1.5			
Strain at peak, %	1.5			
Water content, %	15.4			
Wet density, pcf	132.7			
Dry density, pcf	115.0			
Saturation, %	87.8			
Void ratio	0.4760			
Specimen diameter, in.	2.04			
Specimen height, in.	4.38			
Height/diameter ratio	2.15			

Description: Hard dark gray SHALE

LL =	**PL =**	**PI =**	**Assumed GS=** 2.72	**Type:** Undisturbed

Project No.: E09-0208
Date Sampled: 4/23/2009
Remarks:

Client: HNTB

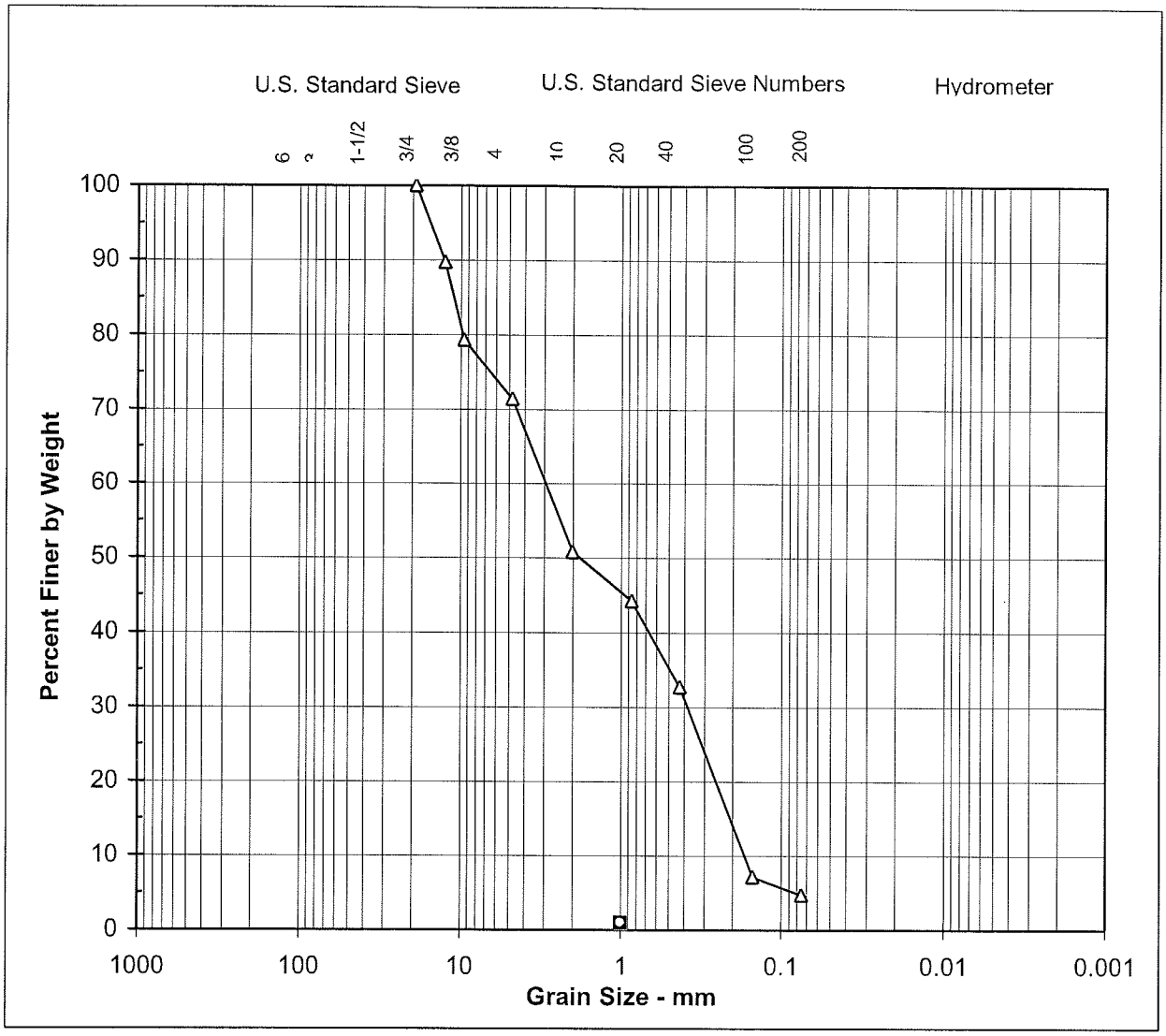
Project: Baker Pump Station

Location: BB-14
Sample Number: RC4 **Depth:** 63'-63.5'

UNCONFINED COMPRESSION TEST

Figure _____

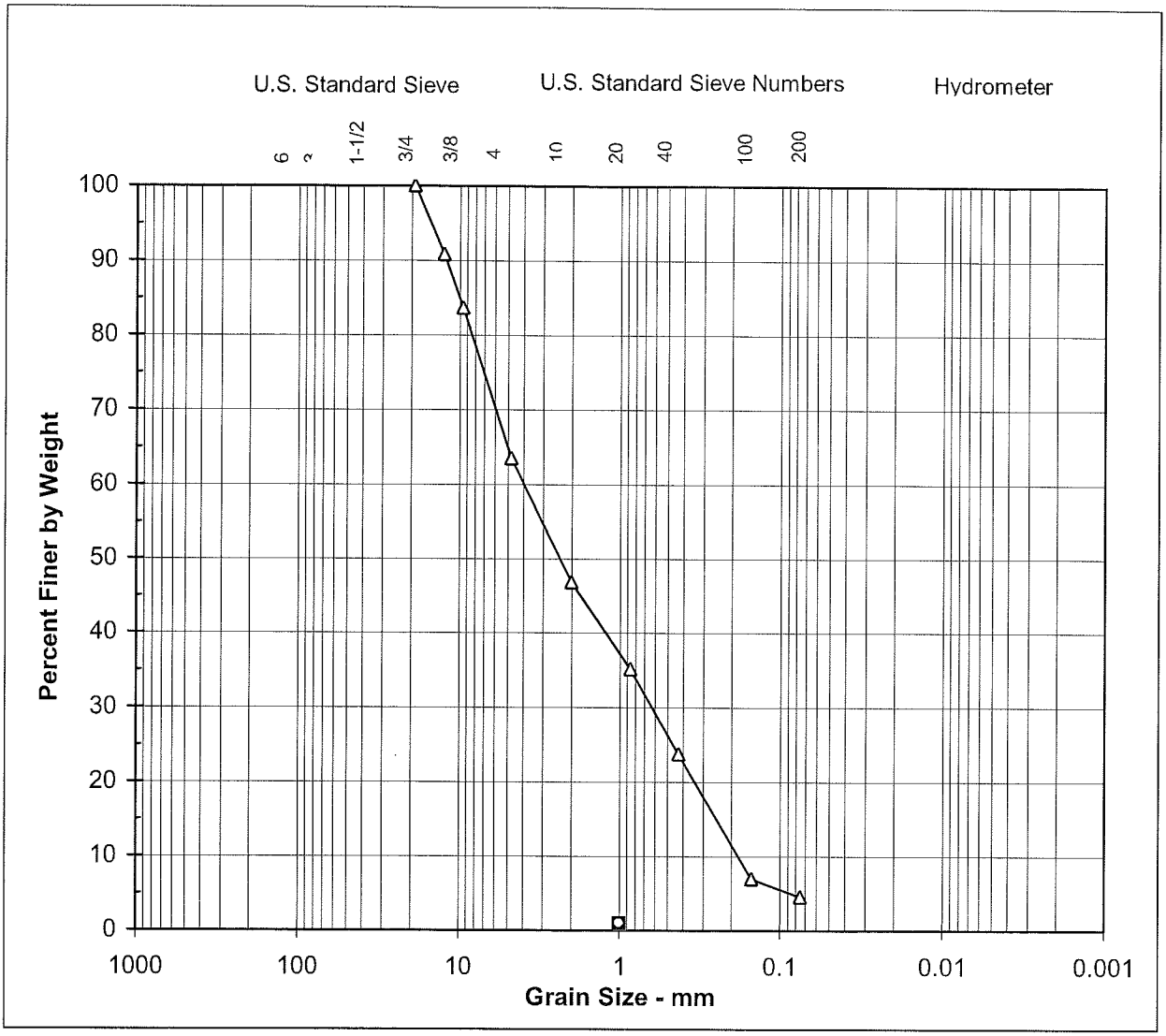
MAS-TEK Engineering & Associates, Inc.



Legend	Boring No	Depth, ft	% Gravel	% Sand	% -#200	LL	PI
△	BB-14	21.5-23	28.6	66.7	4.7		
□							
○							

Legend	Boring No	Depth	Material Description	USCS
△	BB-14	21.5-23		
□				
○				

RESULTS OF SIEVE ANALYSIS	
Baker Pump Station E09-0208	
MAS-TEK Engineering & Associates	
E09-0208	FIGURE



Legend	Boring No	Depth, ft	% Gravel	% Sand	% -#200	LL	PI
△	BB-14	23-24.5	36.5	59.0	4.5		
□							
○							

Legend	Boring No	Depth	Material Description	USCS
△	BB-14	23-24.5		
□				
○				

RESULTS OF SIEVE ANALYSIS	
Baker Pump Station E09-0208	
MAS-TEK Engineering & Associates	
E09-0208	**FIGURE**

From: Edwin Strode [estrode@HNTB.com]
Sent: Friday, July 10, 2009 5:59 AM
To: Bailey, Bruce FCLDA
Cc: Nabil Hourani
Subject: FW: Baker Pump Station
Attachments: results 070909.pdf

Bruce,

Here are the direct shear and Consolidation test results for the Baker pump station. The CU's will follow. Did you want them to plot the CU's in terms of effective or total stress?

From: Mike Roland [mailto:MRoland@aggengr.com]
Sent: Thursday, July 09, 2009 5:03 PM
To: Edwin Strode
Subject: FW: Baker Pump Station

From: Tomei, Joseph D [mailto:jdt@geotesting.com]
Sent: Thursday, July 09, 2009 7:17 AM
To: Mike Roland
Subject: Baker Pump Station

Mike, direct shears and consolidation attached for Baker Pump Station project. We are still working on the CU Triaxials. I will forward them as they are completed.

Joe Tomei
Laboratory Manager
Geocomp Corporation/GeoTesting Express, Inc.
1145 Massachusetts Avenue
Boxborough, MA 01719

978 635 0012 Tel
978 635 0266 Fax
jdt@geotesting.com
<http://www.geocomp.com>
<http://www.geotesting.com>

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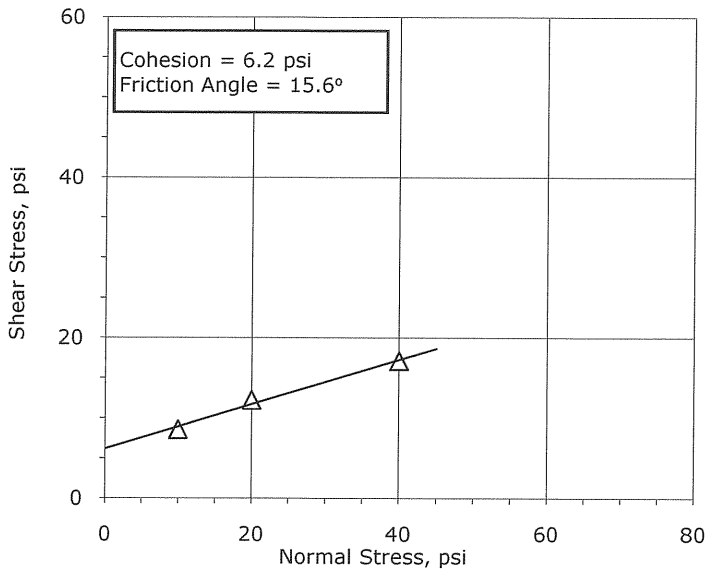
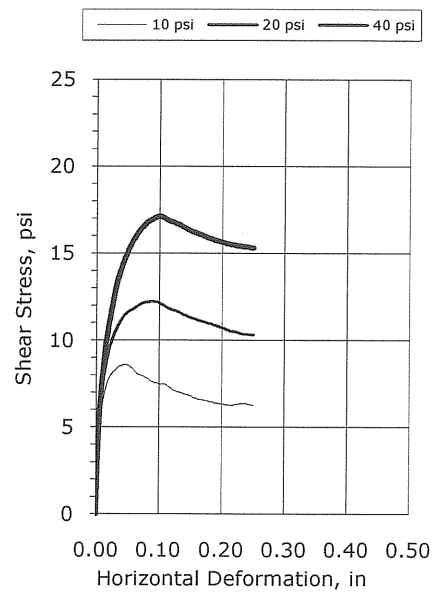
GeoTesting express
a subsidiary of Geocomp Corporation

Client:	Mas-Tek Engineering
Project Name:	Baker Pump Station
Project Location:	---
GTX #:	8704
Test Date:	6/22/2009
Tested By:	njh
Checked By:	jdt
Boring ID:	BB-12
Sample ID:	ST-2
Depth, ft:	4.5-5.5 ft.
Visual Description:	Moist, dark brown clay

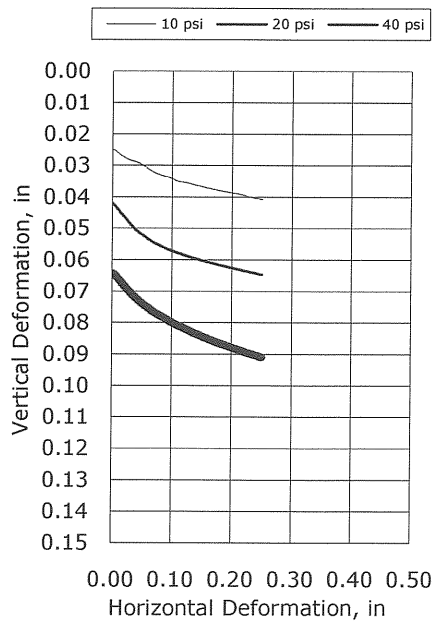
Direct Shear Test of Soils Under Consolidated Drained Conditions by ASTM D 3080-04





Test No.:	DS4	DS5	DS6
Initial Diameter, in:	2.5	2.5	2.5
Initial Height, in:	1.0	1.0	1.0
Initial Mass, grams:	156	154	151
Initial Dry Density, pcf:	96.7	94.6	90.3
Initial Moisture Content, %:	24.6	26.0	29.5
Initial Bulk Density, pcf:	121	119	117
Initial Degree of Saturation:	90.0	90.1	92.5
Initial Void Ratio:	0.74	0.78	0.86
Final Dry Density, pcf:	101	101	100
Final Moisture Content, %:	28.1	28.3	32.8
Final Bulk Density, pcf:	129	130	132
Normal Stress, psi:	10	20	40
Maximum Shear Stress, psi	8.6	12.3	17.1
Shear Rate, in/min:	0.0004	0.0004	0.0004
t_{50}:			

Sample Type:	Tube
Estimated Specific Gravity:	2.70
Liquid Limit:	---
Plastic Limit:	---
Plasticity Index:	---
% Passing #200 sieve:	---
Soil Classification:	---
Group Symbol:	---

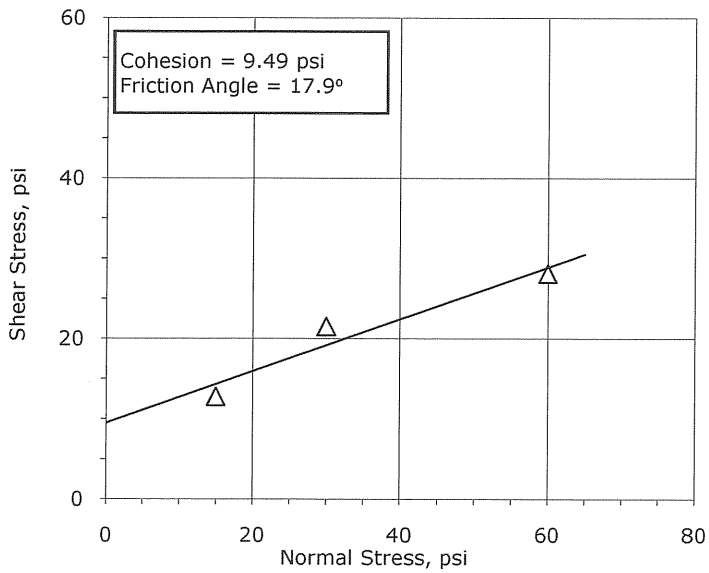


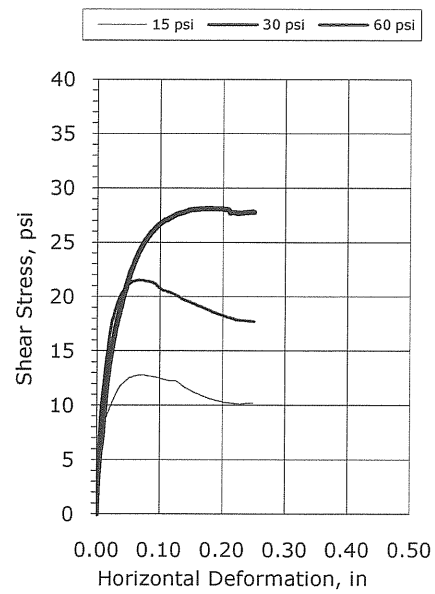
Notes: Moisture content obtained before shear from sample trimmings
Moisture Content determined by ASTM D 2216

GeoTesting express
a subsidiary of Geocomp Corporation

Client:	Mas-Tek Engineering
Project Name:	Baker Pump Station
Project Location:	---
GTX #:	8704
Test Date:	6/26/2009
Tested By:	njh/md
Checked By:	jdt
Boring ID:	BB-13
Sample ID:	ST-21
Depth, ft:	38.2-40.2 ft.
Visual Description:	Moist, brown silty clay

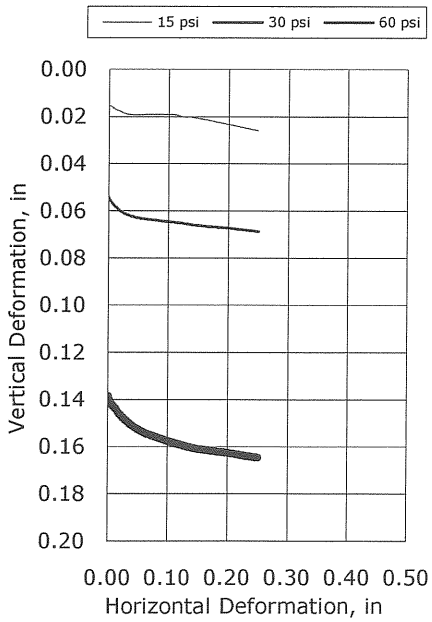
Direct Shear Test of Soils Under Consolidated Drained Conditions by ASTM D 3080-04





Test No.:	DS10	DS11	DS12
Initial Diameter, in:	2.5	2.5	2.5
Initial Height, in:	1.0	1.0	1.0
Initial Mass, grams:	167	162	162
Initial Dry Density, pcf:	113	110	110
Initial Moisture Content, %:	14.7	14.2	14.7
Initial Bulk Density, pcf:	129	126	126
Initial Degree of Saturation:	80.2	72.5	73.7
Initial Void Ratio:	0.49	0.53	0.54
Final Dry Density, pcf:	116	118	131
Final Moisture Content, %:	18.8	16.5	17.4
Final Bulk Density, pcf:	138	138	154
Normal Stress, psi:	15	30	60
Maximum Shear Stress, psi	12.8	21.5	28.1
Shear Rate, in/min:	0.0004	0.0004	0.0004
t_{50}:			

Sample Type:	Tube
Estimated Specific Gravity:	2.70
Liquid Limit:	---
Plastic Limit:	---
Plasticity Index:	---
% Passing #200 sieve:	---
Soil Classification:	---
Group Symbol:	---

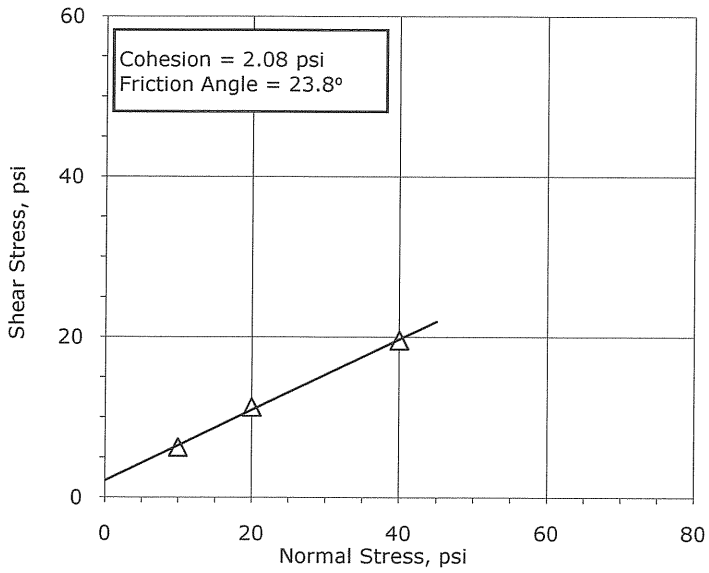


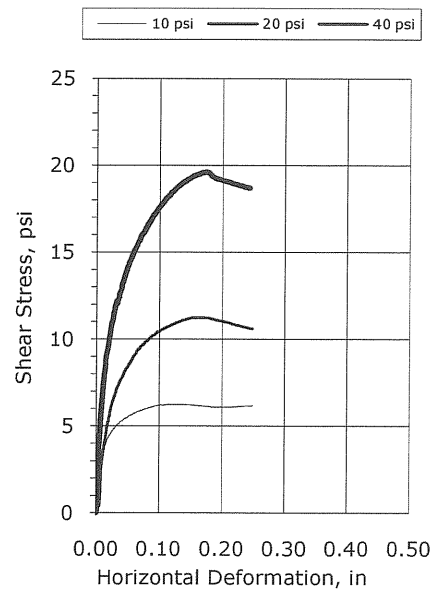
Notes: Moisture content obtained before shear from sample trimmings
Moisture Content determined by ASTM D 2216

GeoTesting express
a subsidiary of Geocomp Corporation

Client:	Mas-Tek Engineering
Project Name:	Baker Pump Station
Project Location:	---
GTX #:	8704
Test Date:	6/26/2009
Tested By:	njh/md
Checked By:	jdt
Boring ID:	BB-14
Sample ID:	ST-8
Depth, ft:	10.5-12 ft.
Visual Description:	Moist, brown silty clay

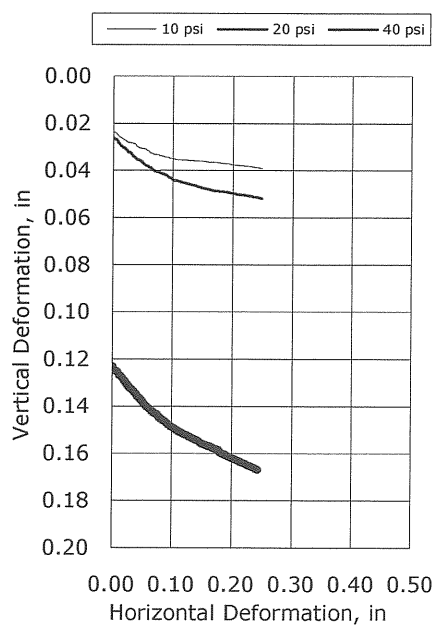
Direct Shear Test of Soils Under Consolidated Drained Conditions by ASTM D 3080-04





Test No.:	DS7	DS8	DS9
Initial Diameter, in:	2.5	2.5	2.5
Initial Height, in:	1.0	1.0	1.0
Initial Mass, grams:	152	151	153
Initial Dry Density, pcf:	97.9	97.4	98.7
Initial Moisture Content, %:	20.7	20.5	20.6
Initial Bulk Density, pcf:	118	117	119
Initial Degree of Saturation:	77.8	75.6	78.5
Initial Void Ratio:	0.72	0.73	0.71
Final Dry Density, pcf:	102	103	118
Final Moisture Content, %:	27.7	25.5	25.1
Final Bulk Density, pcf:	130	129	148
Normal Stress, psi:	10	20	40
Maximum Shear Stress, psi	6.3	11.3	19.6
Shear Rate, in/min:	0.0003	0.0003	0.0003
t_{50}:			

Sample Type:	Tube
Estimated Specific Gravity:	2.70
Liquid Limit:	---
Plastic Limit:	---
Plasticity Index:	---
% Passing #200 sieve:	---
Soil Classification:	---
Group Symbol:	---

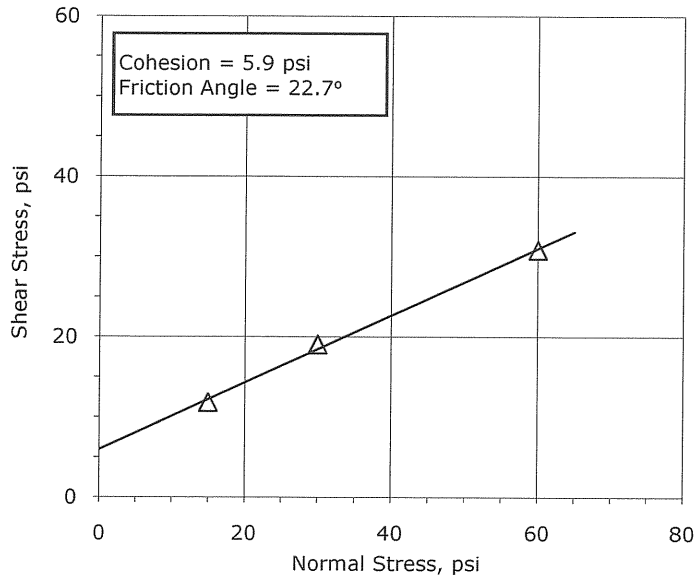


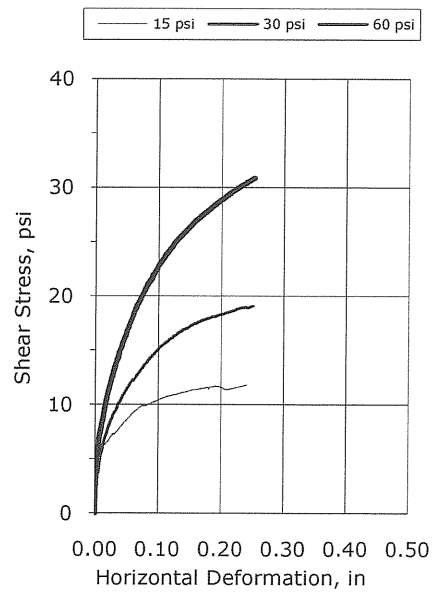
Notes: Moisture content obtained before shear from sample trimmings
Moisture Content determined by ASTM D 2216

GeoTesting express
a subsidiary of Geocomp Corporation

Client:	Mas-Tek Engineering
Project Name:	Baker Pump Station
Project Location:	---
GTX #:	8704
Test Date:	6/22/2009
Tested By:	njh
Checked By:	jdt
Boring ID:	BB-14
Sample ID:	ST-11
Depth, ft:	16.5-18.5
Visual Description:	Moist, yellowish brown sandy clay

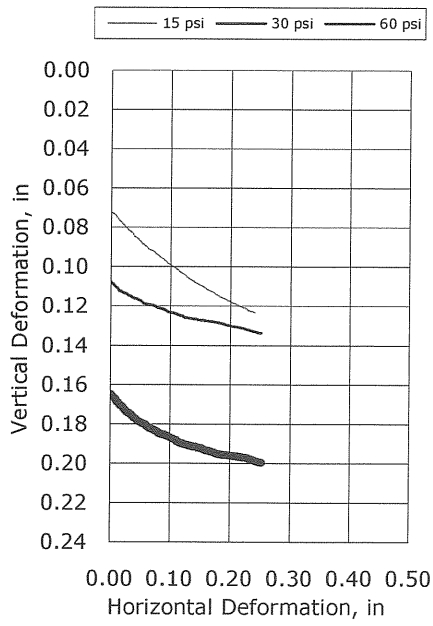
Direct Shear Test of Soils Under Consolidated Drained Conditions by ASTM D 3080-04





Test No.:	DS1	DS2	DS3
Initial Diameter, in:	2.5	2.5	2.5
Initial Height, in:	1.0	1.0	1.0
Initial Mass, grams:	151	159	146
Initial Dry Density, pcf:	104	104	100
Initial Moisture Content, %:	13.0	18.6	13.3
Initial Bulk Density, pcf:	117	123	113
Initial Degree of Saturation:	56.3	80.45	52.6
Initial Void Ratio:	0.62	0.62	0.68
Final Dry Density, pcf:	118	120	125
Final Moisture Content, %:	21.5	19.4	17.4
Final Bulk Density, pcf:	144	143	147
Normal Stress, psi:	15	30	60
Maximum Shear Stress, psi	11.8	19.1	30.8
Shear Rate, in/min:	0.0005	0.0005	0.0005
t_{50}:			

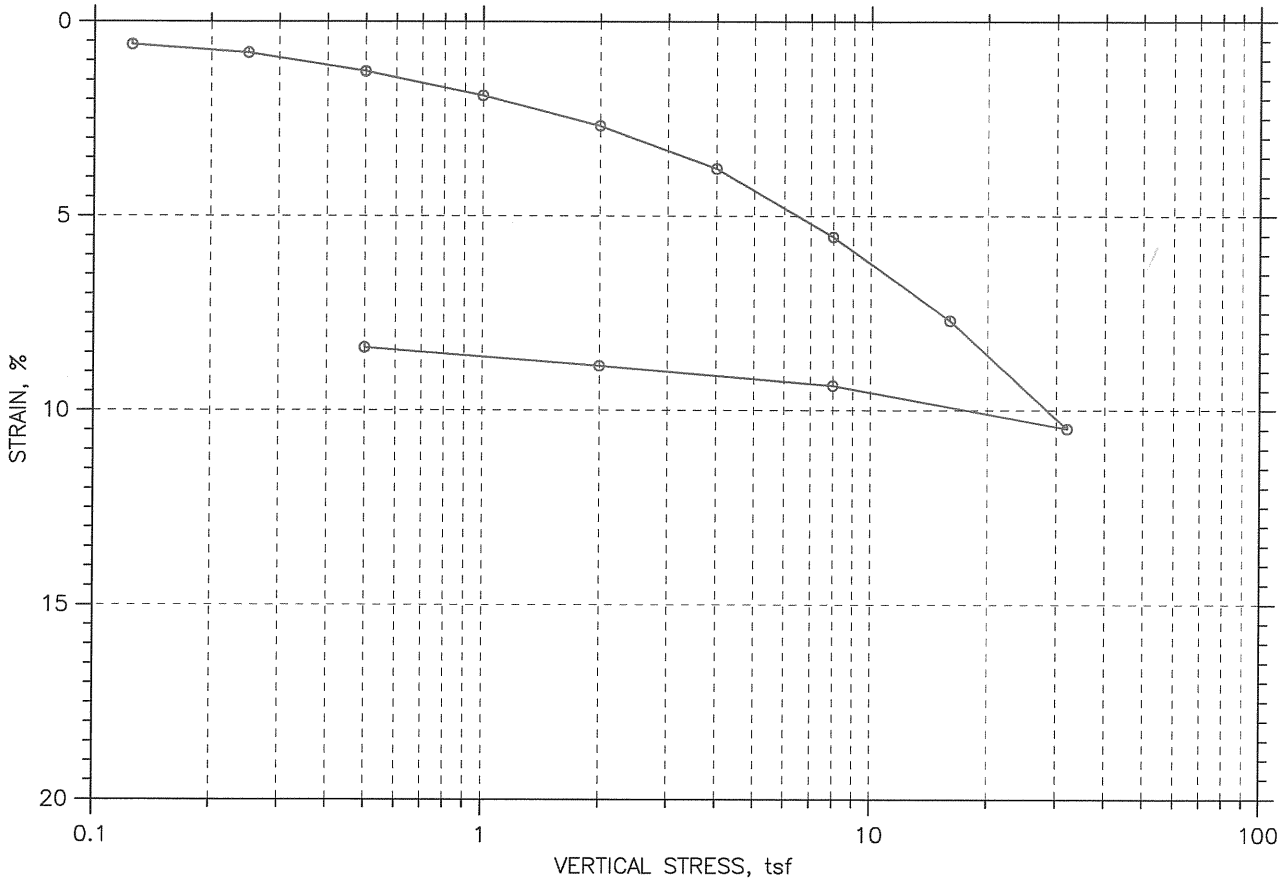
Sample Type:	Tube
Estimated Specific Gravity:	2.70
Liquid Limit:	---
Plastic Limit:	---
Plasticity Index:	---
% Passing #200 sieve:	---
Soil Classification:	---
Group Symbol:	---

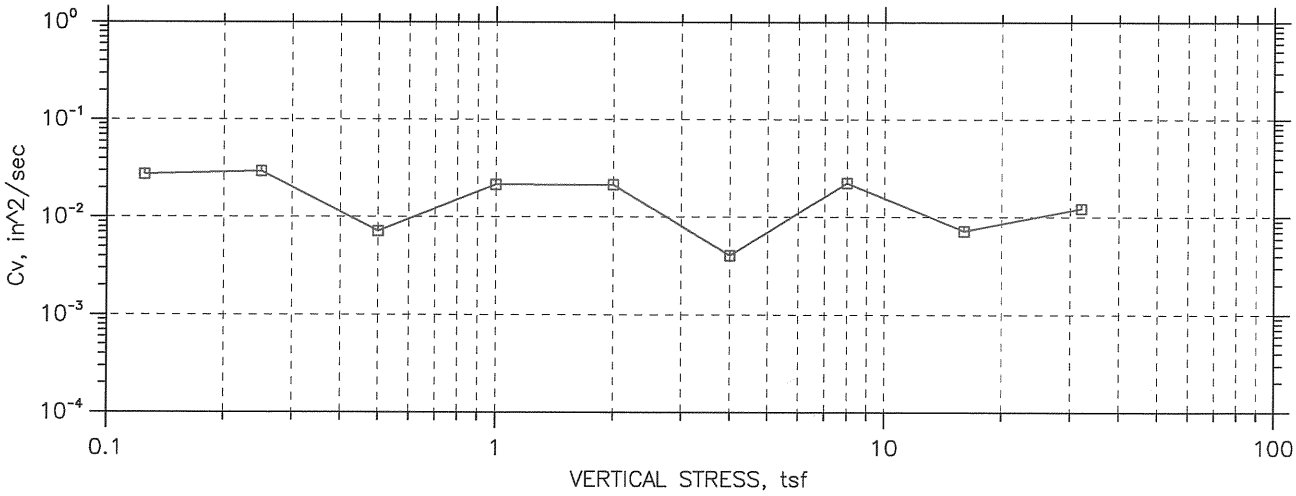


Notes: Moisture content obtained before shear from sample trimmings
Moisture Content determined by ASTM D 2216

CONSOLIDATION TEST DATA

SUMMARY REPORT



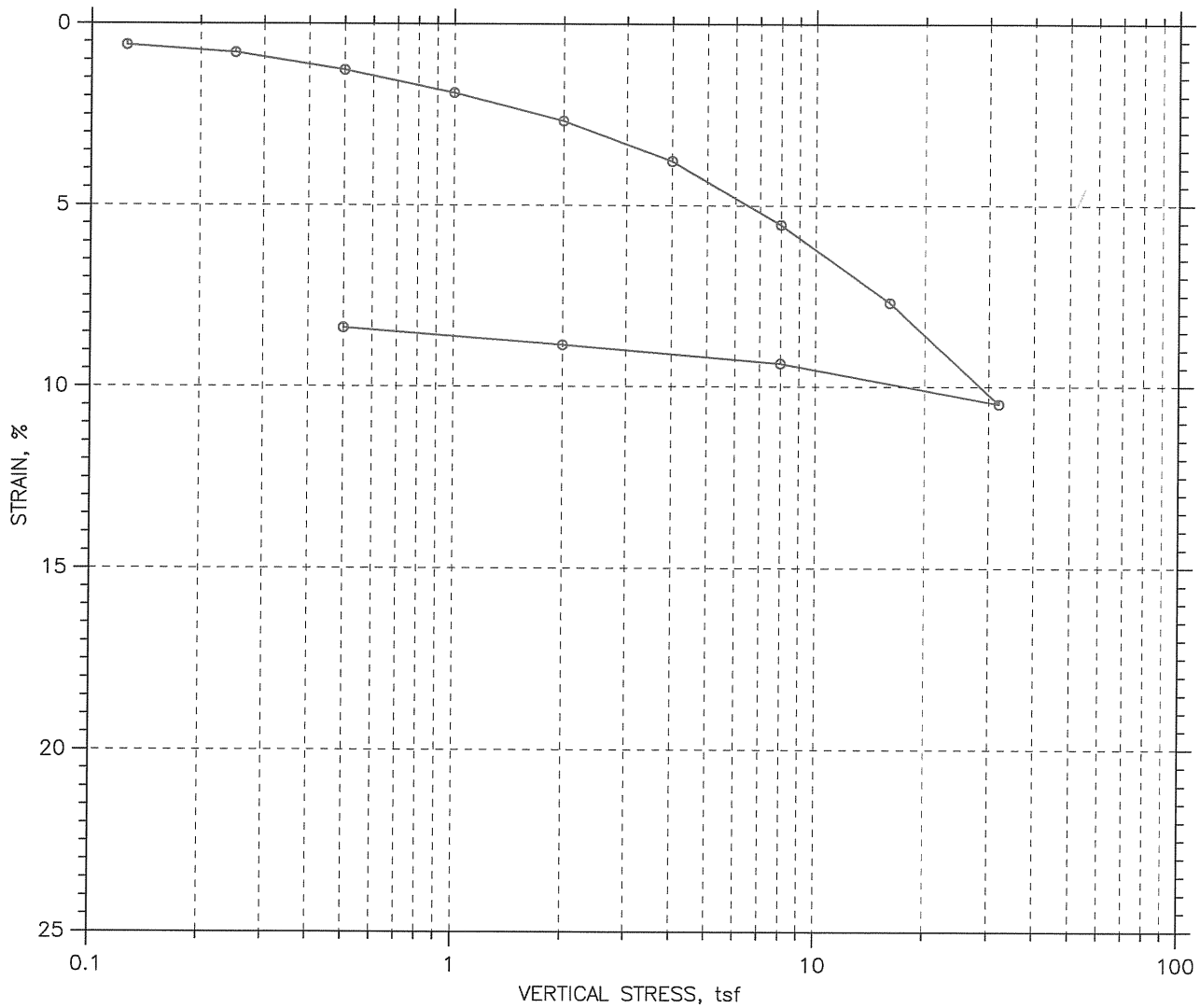


GeoTesting express a subsidiary of Geocomp Corporation	Project: Baker Pump Station	Location: ---	Project No.: GTX-8704
	Boring No.: BB-12	Tested By: md	Checked By: jdt
	Sample No.: ST-12	Test Date: 06/15/09	Depth: 12-13
	Test No.: C-1	Sample Type: core	Elevation: ---
	Description: Moist, yellowish brown clay with sand		
	Remarks: System C		

Tue, 07-JUL-2009 16:50:20

CONSOLIDATION TEST DATA

SUMMARY REPORT



					Before Test	After Test
Overburden Pressure: ---				Water Content, %	13.99	13.06
Preconsolidation Pressure: ---				Dry Unit Weight, pcf	114.	124.4
Compression Index: ---				Saturation, %	79.29	100.00
Diameter: 2.5 in		Height: 1 in		Void Ratio	0.48	0.35
LL: ---	PL: ---	PI: ---	GS: 2.69			

GeoTesting express a subsidiary of Geocomp Corporation	Project: Baker Pump Station	Location: ---	Project No.: GTX-8704
	Boring No.: BB-12	Tested By: md	Checked By: jdt
	Sample No.: ST-12	Test Date: 06/15/09	Depth: 12-13
	Test No.: C-1	Sample Type: core	Elevation: ---
	Description: Moist, yellowish brown clay with sand		
	Remarks: System C		

Tue, 07-JUL-2009 16:50:23

CONSOLIDATION TEST DATA

Project: Baker Pump Station
Boring No.: BB-12
Sample No.: ST-12
Test No.: C-1

Location: ---
Tested By: md
Test Date: 06/15/09
Sample Type: core

Project No.: GTX-8704
Checked By: jdt
Depth: 12-13
Elevation: ---

Soil Description: Moist, yellowish brown clay with sand
Remarks: System C

Estimated Specific Gravity: 2.69
Initial Void Ratio: 0.48
Final Void Ratio: 0.35

Liquid Limit: ---
Plastic Limit: ---
Plasticity Index: ---

Initial Height: 1.00 in
Specimen Diameter: 2.50 in

	Before Consolidation		After Consolidation	
	Trimmings	Specimen+Ring	Specimen+Ring	Trimmings
Container ID	3608	RING		4697
Wt. Container + Wet Soil, gm	260.2	375	373.63	173.83
Wt. Container + Dry Soil, gm	230.26	354.45	354.45	154.7
Wt. Container, gm	8.14	207.55	207.55	8.19
Wt. Dry Soil, gm	222.12	146.9	146.9	146.51
Water Content, %	13.48	13.99	13.06	13.06
Void Ratio	---	0.48	0.35	---
Degree of Saturation, %	---	79.29	100.00	---
Dry Unit Weight, pcf	---	114.01	124.43	---

Note: Specific Gravity and Void Ratios are calculated assuming the degree of saturation equals 100% at the end of the test. Therefore, values may not represent actual values for the specimen.

CONSOLIDATION TEST DATA

Project: Baker Pump Station
Boring No.: BB-12
Sample No.: ST-12
Test No.: C-1

Location: ---
Tested By: md
Test Date: 06/15/09
Sample Type: core

Project No.: GTX-8704
Checked By: jdt
Depth: 12-13
Elevation: ---

Soil Description: Moist, yellowish brown clay with sand
Remarks: System C

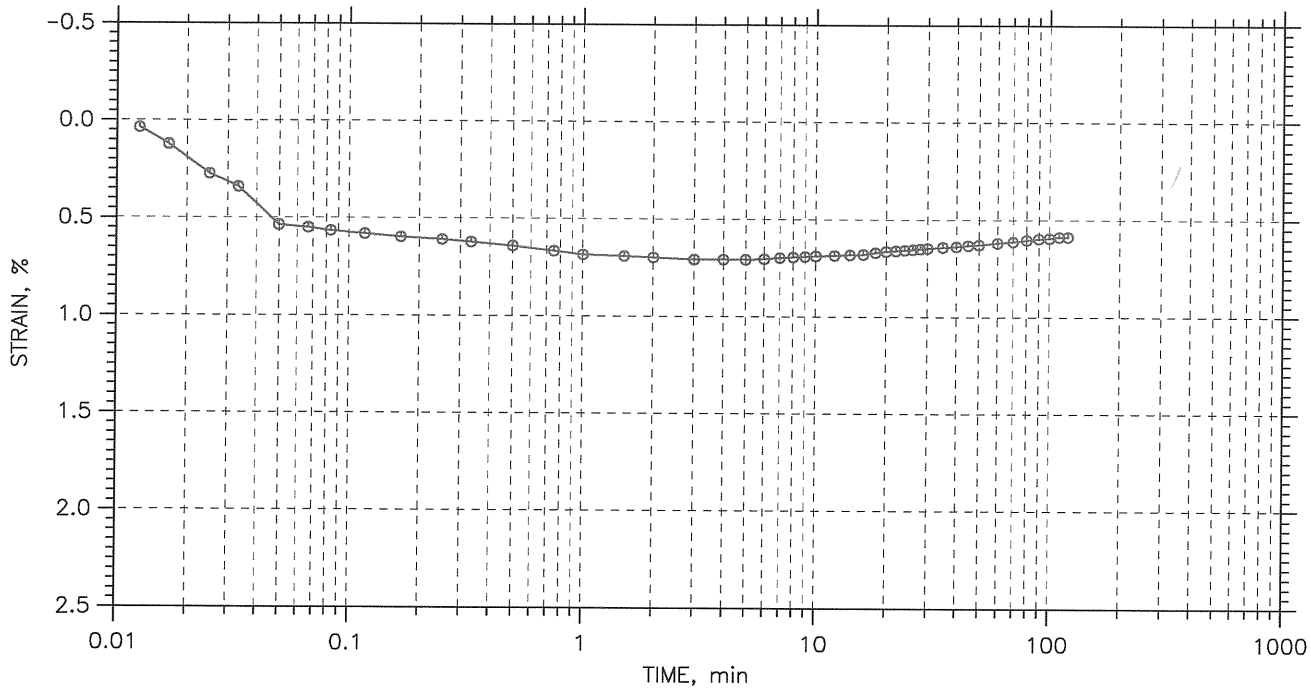
	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	T50 Fitting Sq.Rt. min	T50 Fitting Log min	Coefficient of Consolidation Sq.Rt. in^2/sec	Coefficient of Consolidation Log in^2/sec	Coefficient of Consolidation Ave. in^2/sec
1	0.125	0.005857	0.467	0.59	0.0	0.0	2.76e-002	0.00e+000	2.76e-002
2	0.25	0.007969	0.464	0.80	0.0	0.0	2.47e-002	3.66e-002	2.95e-002
3	0.5	0.01274	0.457	1.27	0.1	0.0	7.19e-003	0.00e+000	7.19e-003
4	1	0.01898	0.447	1.90	0.0	0.0	1.77e-002	2.78e-002	2.16e-002
5	2	0.02677	0.436	2.68	0.1	0.0	1.13e-002	2.20e-001	2.15e-002
6	4	0.03777	0.420	3.78	0.2	0.0	4.05e-003	0.00e+000	4.05e-003
7	8	0.05527	0.394	5.53	0.1	0.0	1.12e-002	1.53e+001	2.24e-002
8	16	0.07678	0.362	7.68	0.1	0.0	7.25e-003	0.00e+000	7.25e-003
9	32	0.1047	0.321	10.47	0.1	0.0	1.23e-002	0.00e+000	1.23e-002
10	8	0.09354	0.337	9.35	0.0	0.0	1.22e-001	0.00e+000	1.22e-001
11	2	0.08849	0.345	8.85	0.1	0.0	6.09e-003	0.00e+000	6.09e-003
12	0.5	0.08376	0.352	8.38	8.3	2.3	8.29e-005	2.97e-004	1.30e-004

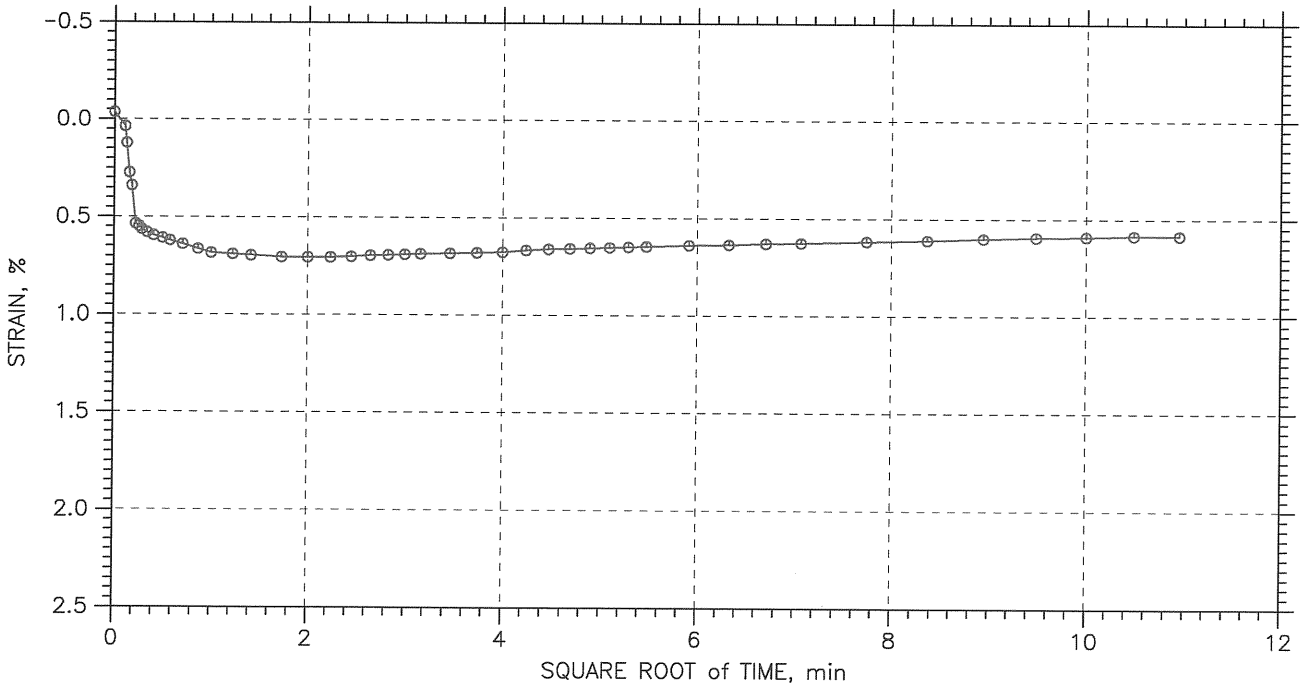
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 1 of 12

Stress: 0.125 tsf





GeoTesting express a subsidiary of Geocomp Corporation	Project: Baker Pump Station	Location: ---	Project No.: GTX-8704
	Boring No.: BB-12	Tested By: md	Checked By: jdt
	Sample No.: ST-12	Test Date: 06/15/09	Depth: 12-13
	Test No.: C-1	Sample Type: core	Elevation: ---
	Description: Moist, yellowish brown clay with sand		
	Remarks: System C		

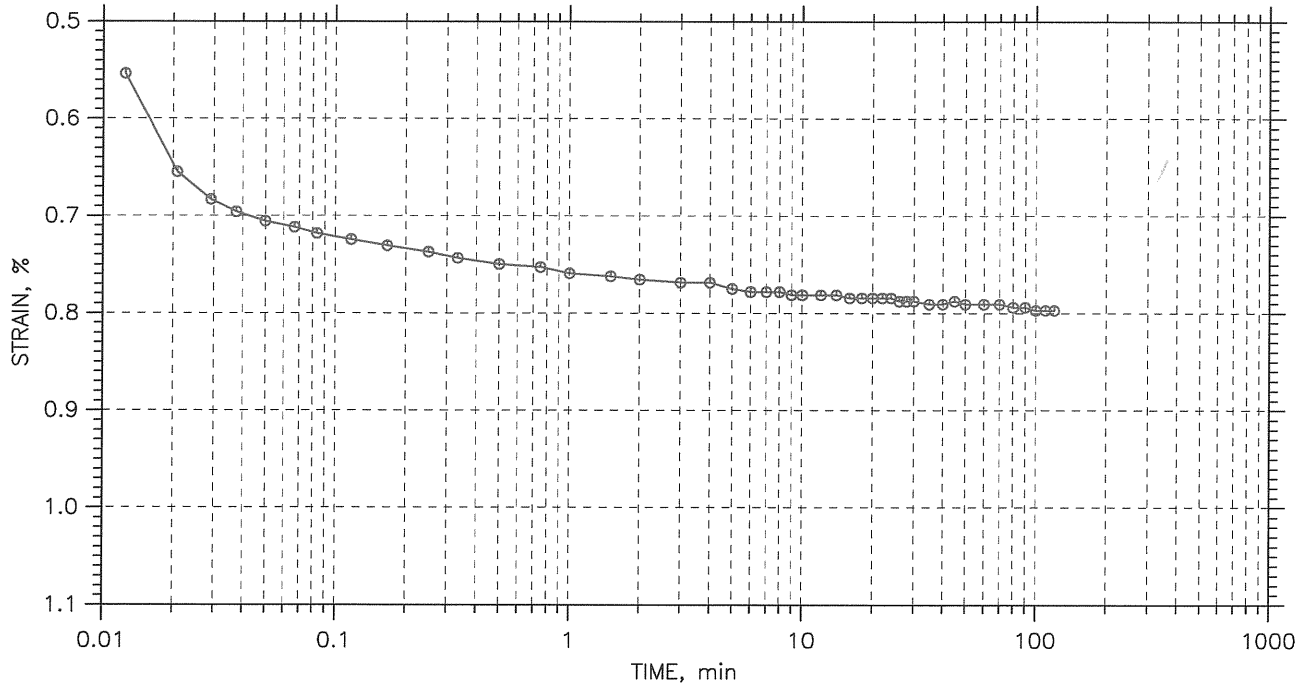
Tue, 07-JUL-2009 16:50:56

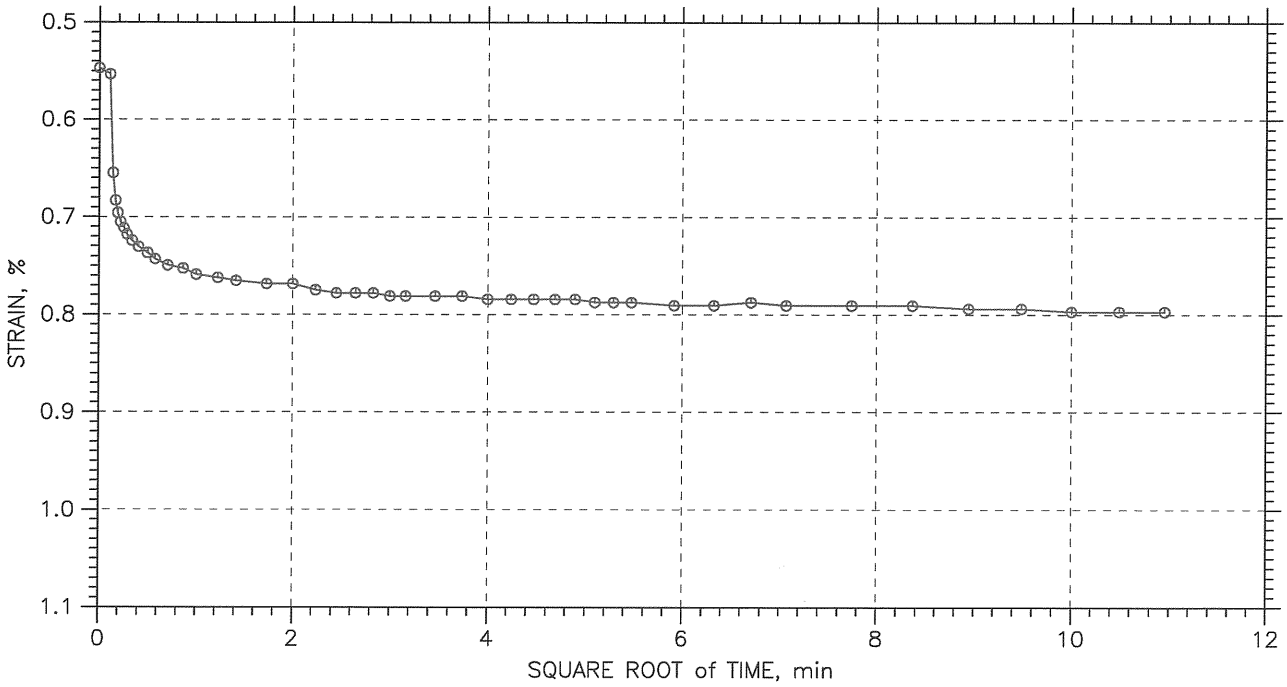
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 2 of 12

Stress: 0.25 tsf





GeoTesting express a subsidiary of Geocomp Corporation	Project: Baker Pump Station	Location: ---	Project No.: GTX-8704
	Boring No.: BB-12	Tested By: md	Checked By: jdt
	Sample No.: ST-12	Test Date: 06/15/09	Depth: 12-13
	Test No.: C-1	Sample Type: core	Elevation: ---
	Description: Moist, yellowish brown clay with sand		
	Remarks: System C		

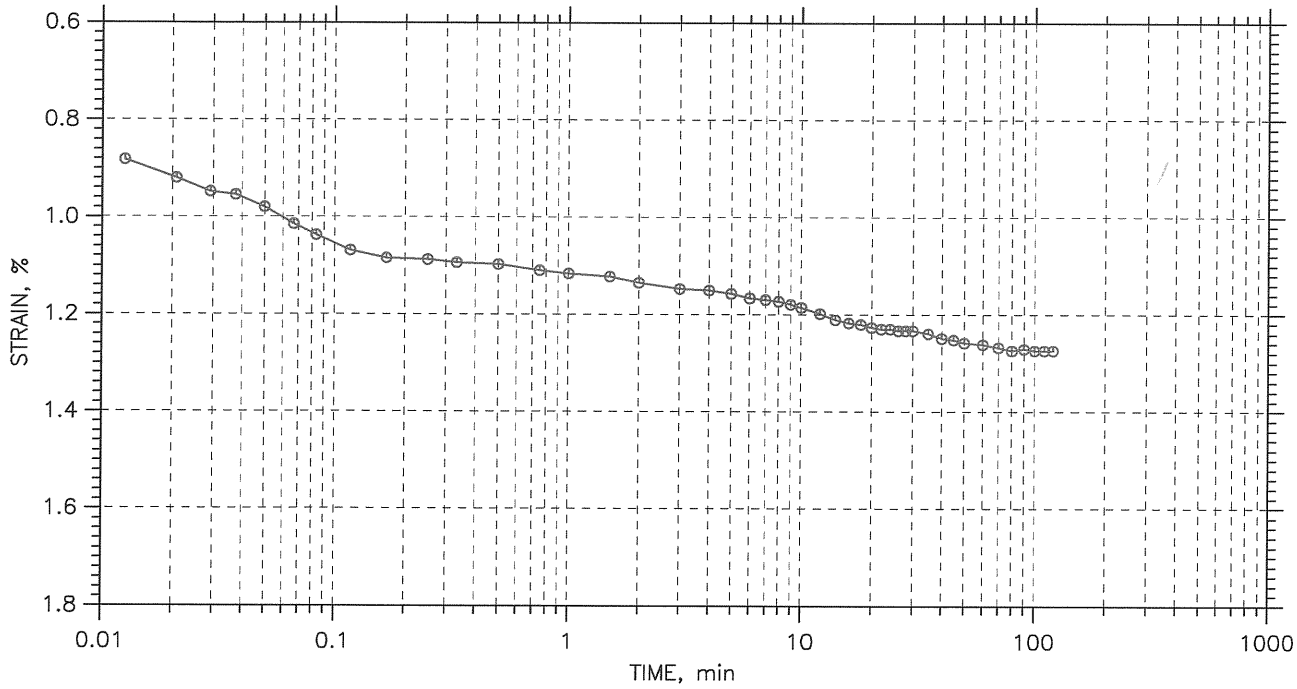
Tue, 07-JUL-2009 16:51:06

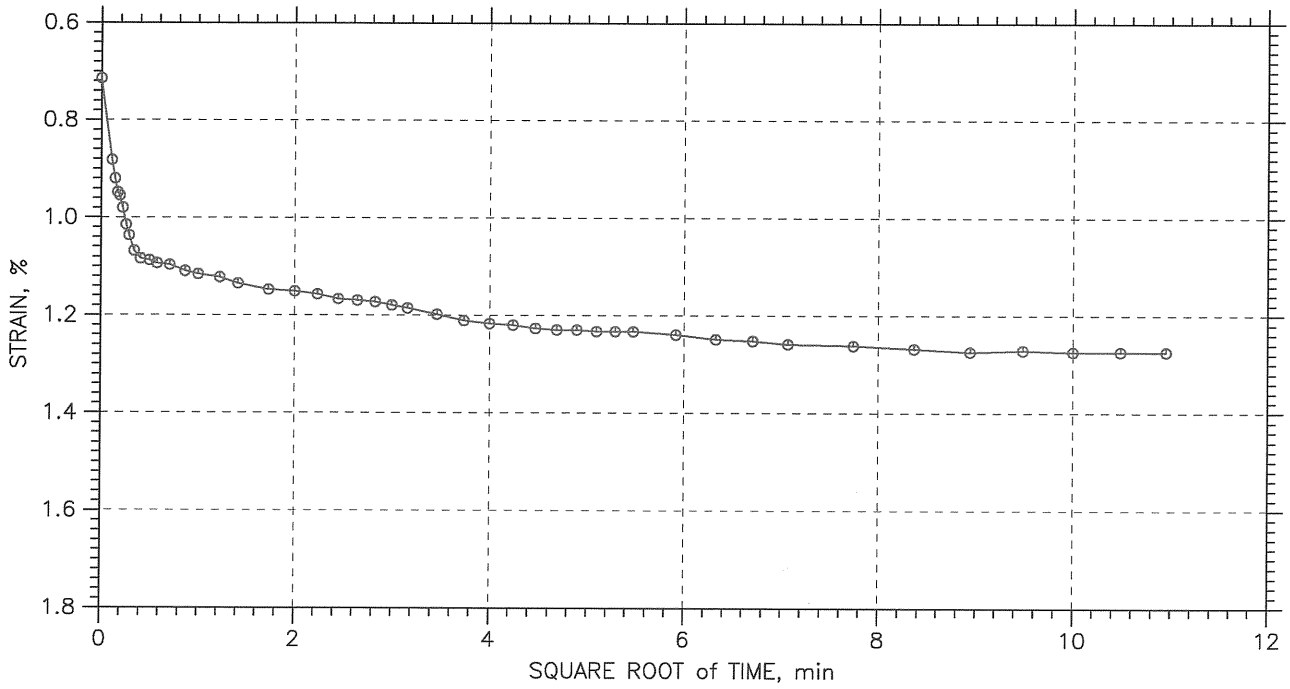
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 3 of 12

Stress: 0.5 tsf





GeoTesting express a subsidiary of Geocomp Corporation	Project: Baker Pump Station	Location: ---	Project No.: GTX-8704
	Boring No.: BB-12	Tested By: md	Checked By: jdt
	Sample No.: ST-12	Test Date: 06/15/09	Depth: 12-13
	Test No.: C-1	Sample Type: core	Elevation: ---
	Description: Moist, yellowish brown clay with sand		
	Remarks: System C		

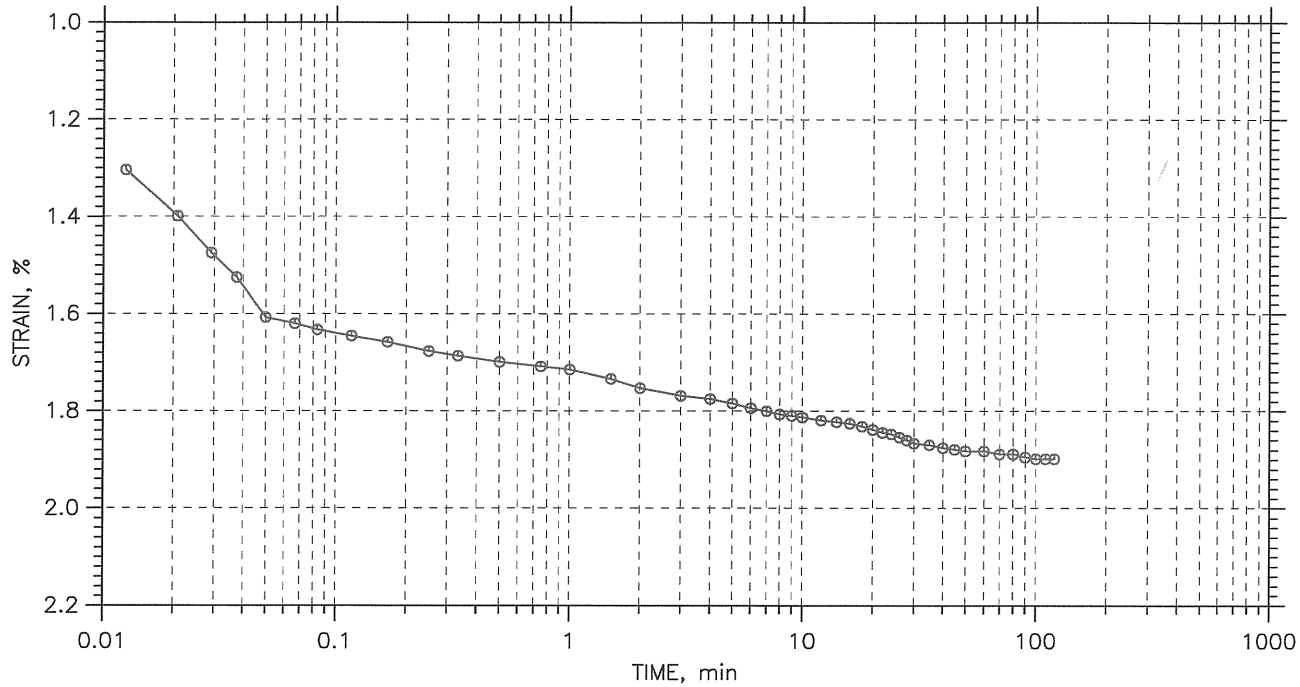
Tue, 07-JUL-2009 16:51:19

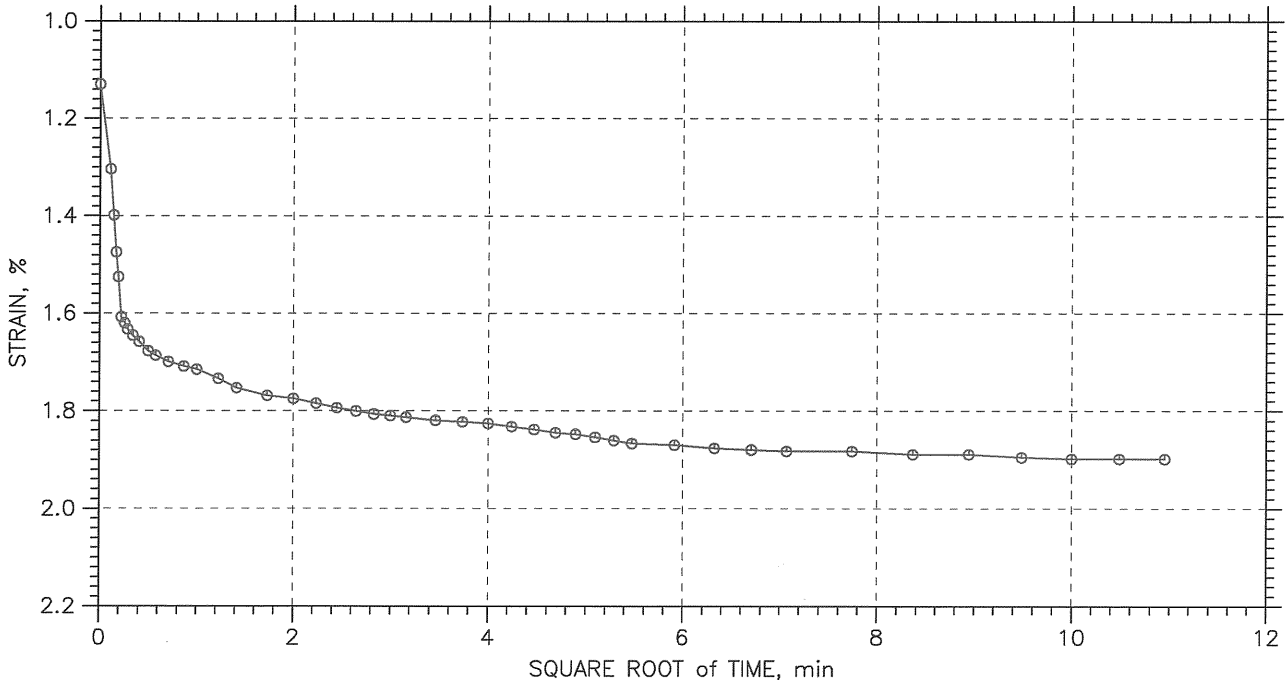
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 4 of 12

Stress: 1. tsf





GeoTesting express a subsidiary of Geocomp Corporation	Project: Baker Pump Station	Location: ---	Project No.: GTX-8704
	Boring No.: BB-12	Tested By: md	Checked By: jdt
	Sample No.: ST-12	Test Date: 06/15/09	Depth: 12-13
	Test No.: C-1	Sample Type: core	Elevation: ---
	Description: Moist, yellowish brown clay with sand		
	Remarks: System C		

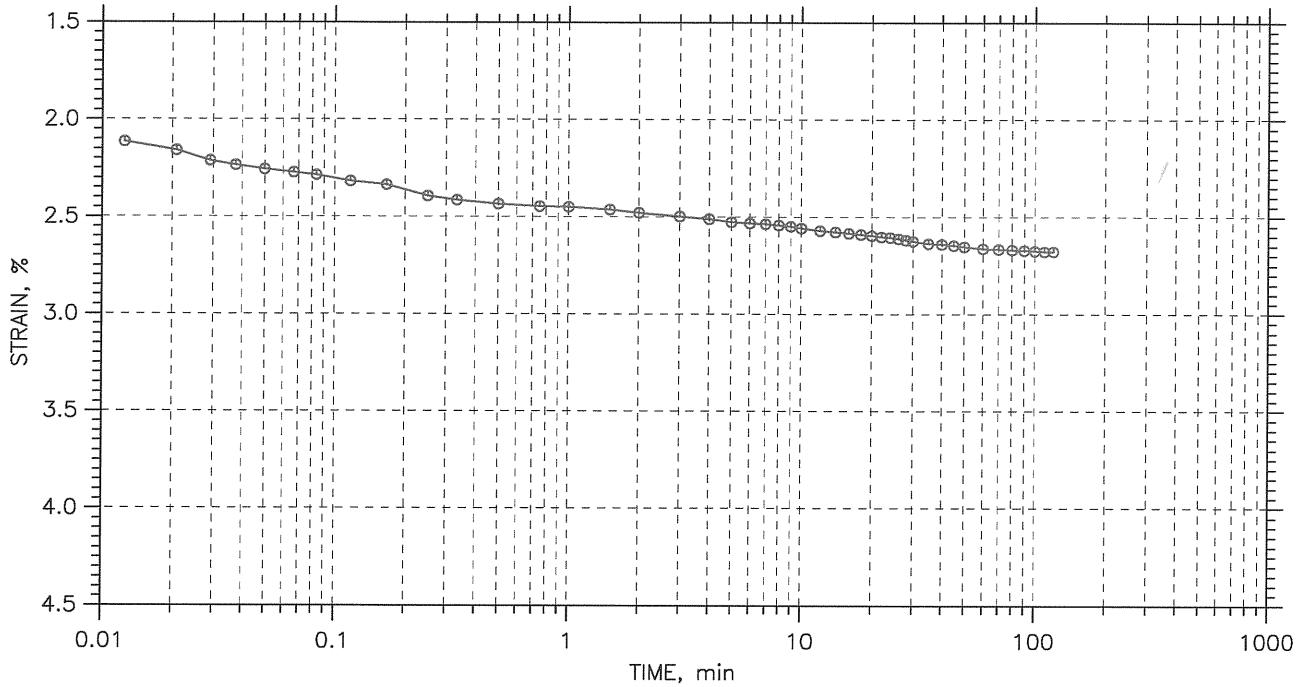
Tue, 07-JUL-2009 16:51:36

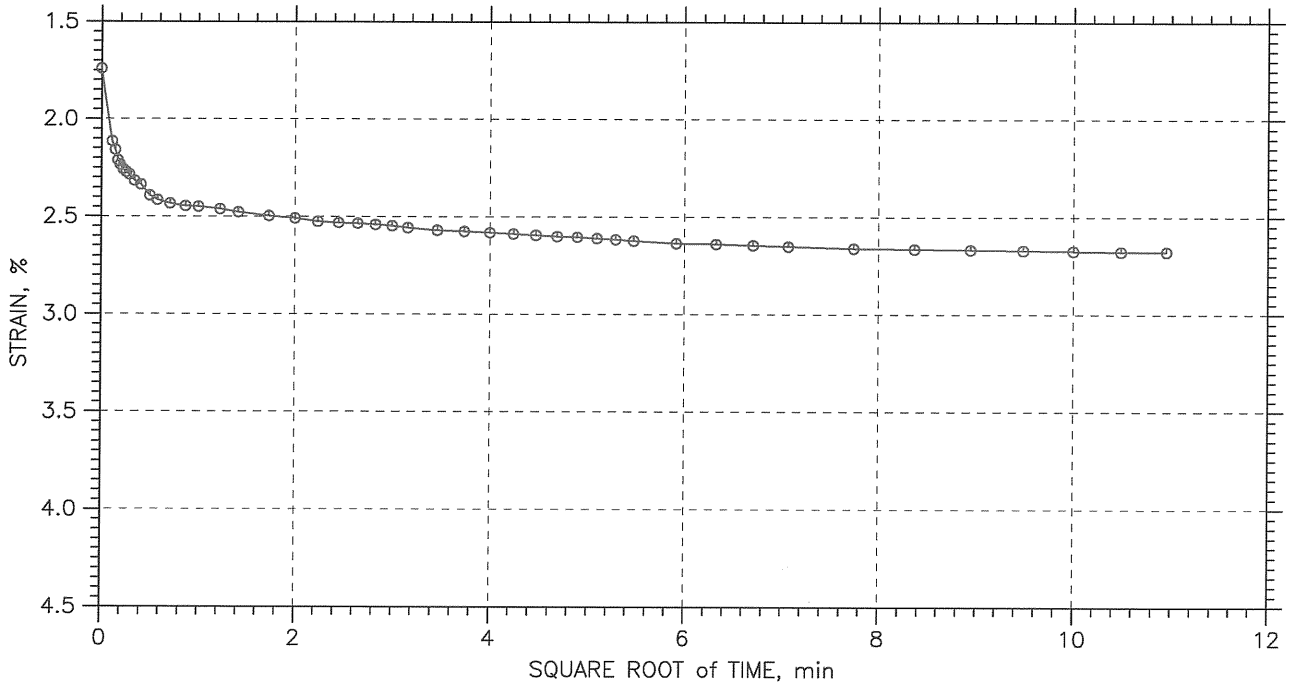
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 5 of 12

Stress: 2. tsf





GeoTesting express a subsidiary of Geocomp Corporation	Project: Baker Pump Station	Location: ---	Project No.: GTX-8704
	Boring No.: BB-12	Tested By: md	Checked By: jdt
	Sample No.: ST-12	Test Date: 06/15/09	Depth: 12-13
	Test No.: C-1	Sample Type: core	Elevation: ---
	Description: Moist, yellowish brown clay with sand		
	Remarks: System C		

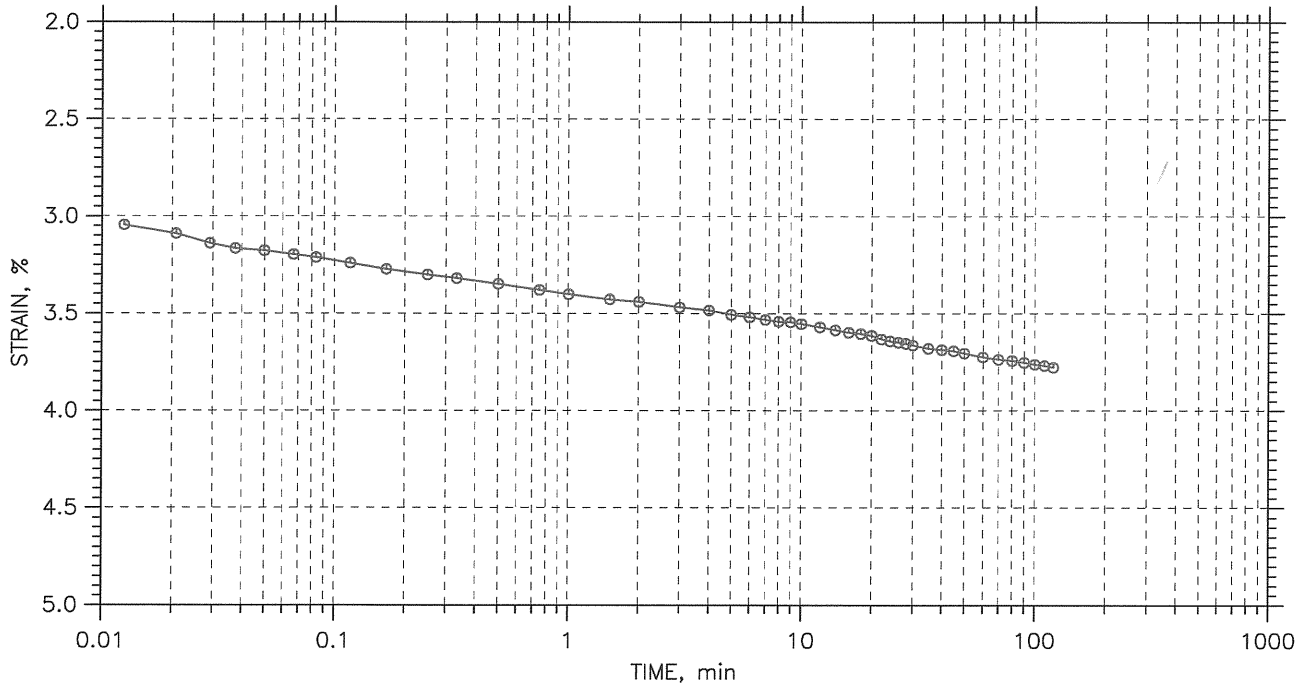
Tue, 07-JUL-2009 16:51:52

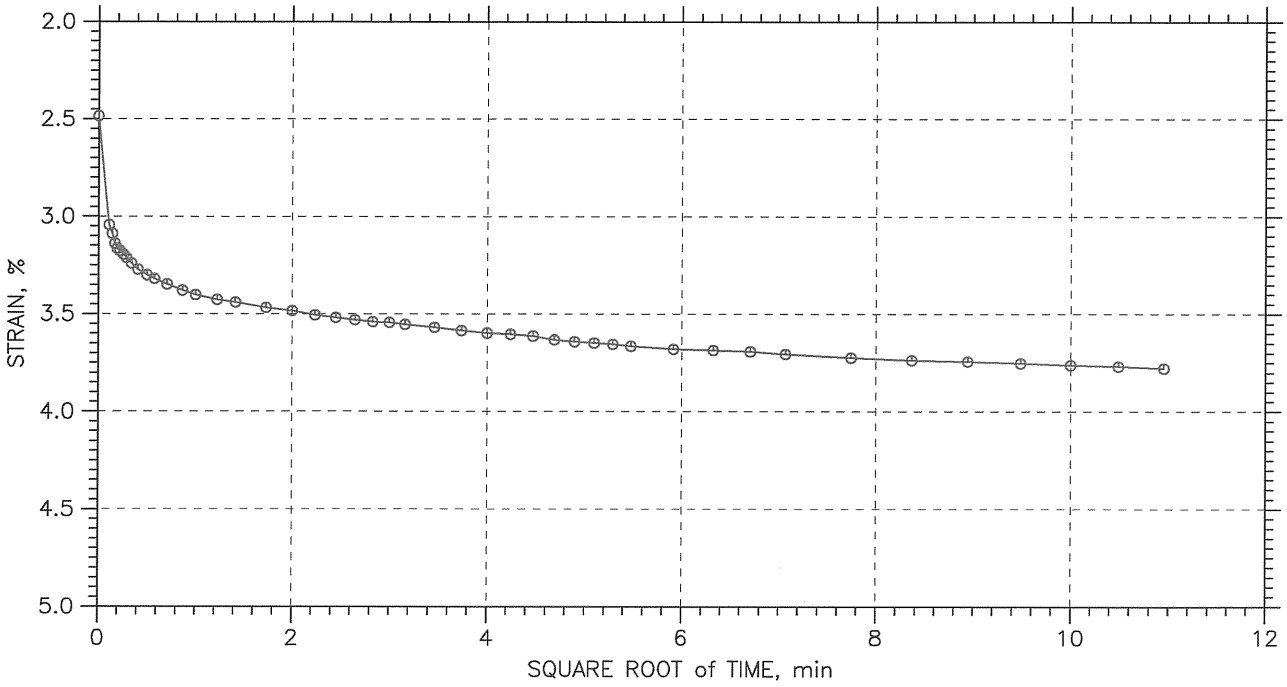
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 6 of 12

Stress: 4. tsf





GeoTesting express a subsidiary of Geocomp Corporation	Project: Baker Pump Station	Location: ---	Project No.: GTX-8704
	Boring No.: BB-12	Tested By: md	Checked By: jdt
	Sample No.: ST-12	Test Date: 06/15/09	Depth: 12-13
	Test No.: C-1	Sample Type: core	Elevation: ---
	Description: Moist, yellowish brown clay with sand		
	Remarks: System C		

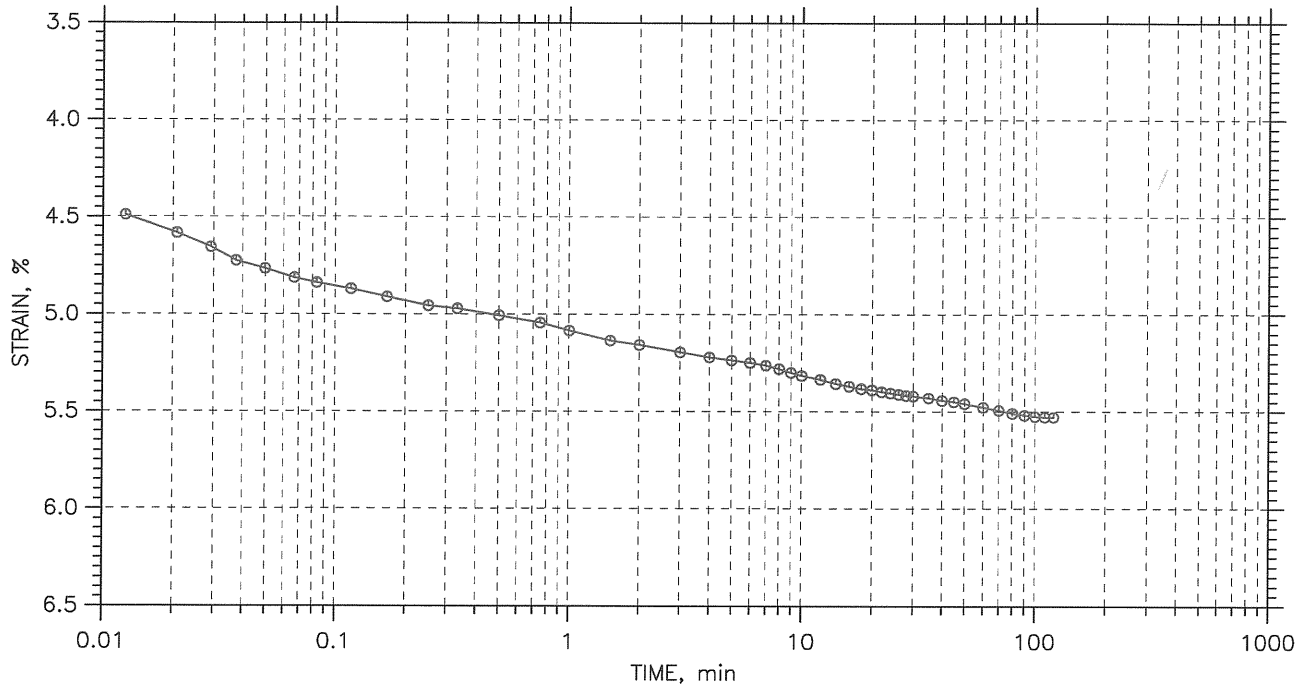
Tue, 07-JUL-2009 16:52:05

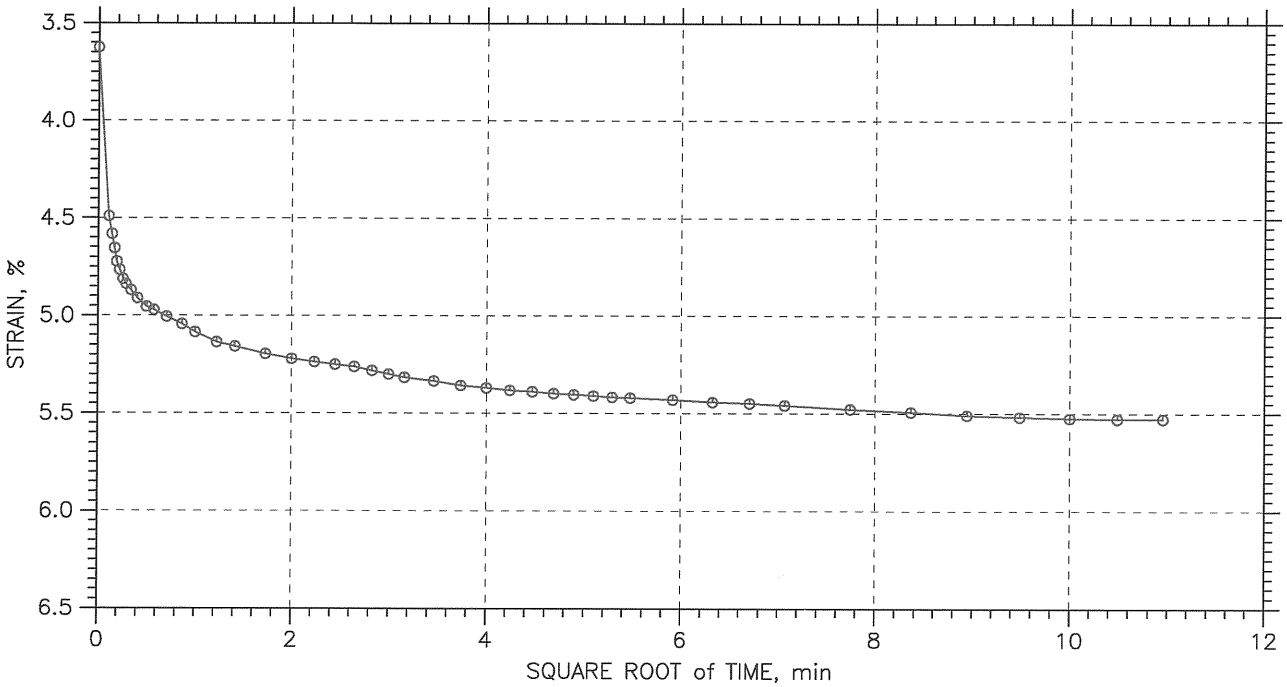
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 7 of 12

Stress: 8. tsf





GeoTesting express a subsidiary of Geocomp Corporation	Project: Baker Pump Station	Location: ---	Project No.: GTX-8704
	Boring No.: BB-12	Tested By: md	Checked By: jdt
	Sample No.: ST-12	Test Date: 06/15/09	Depth: 12-13
	Test No.: C-1	Sample Type: core	Elevation: ---
	Description: Moist, yellowish brown clay with sand		
	Remarks: System C		

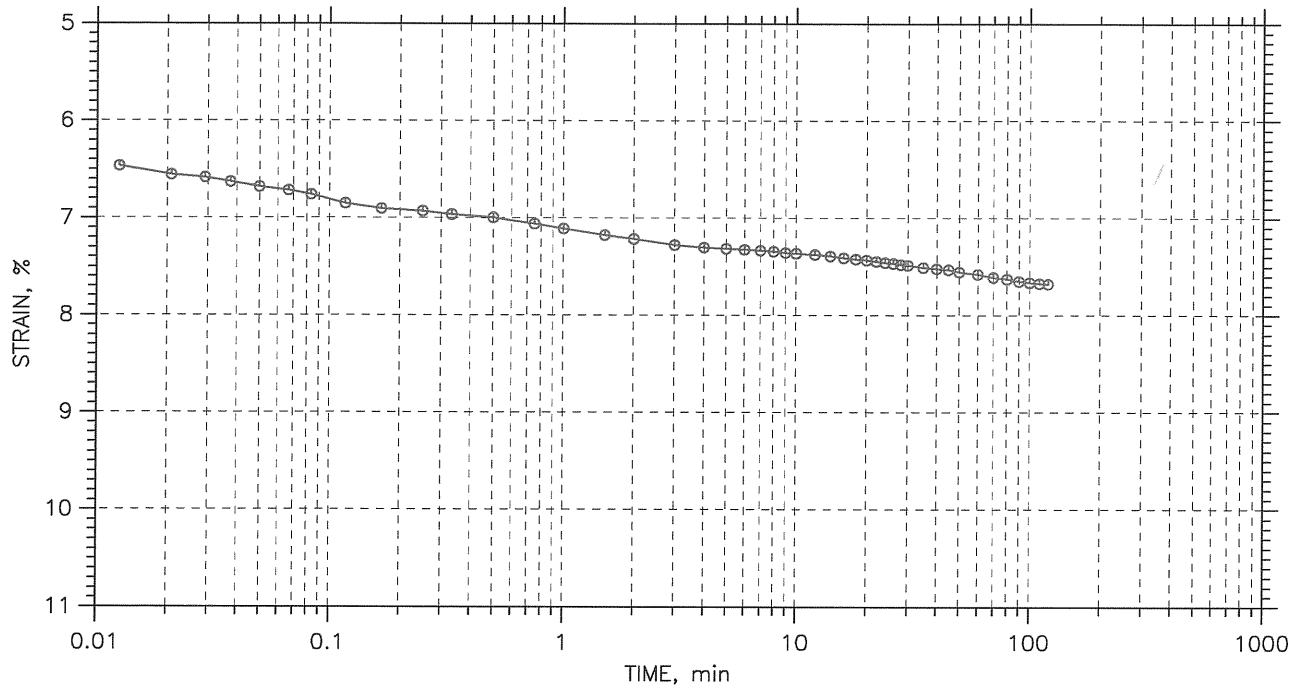
Tue, 07-JUL-2009 16:52:45

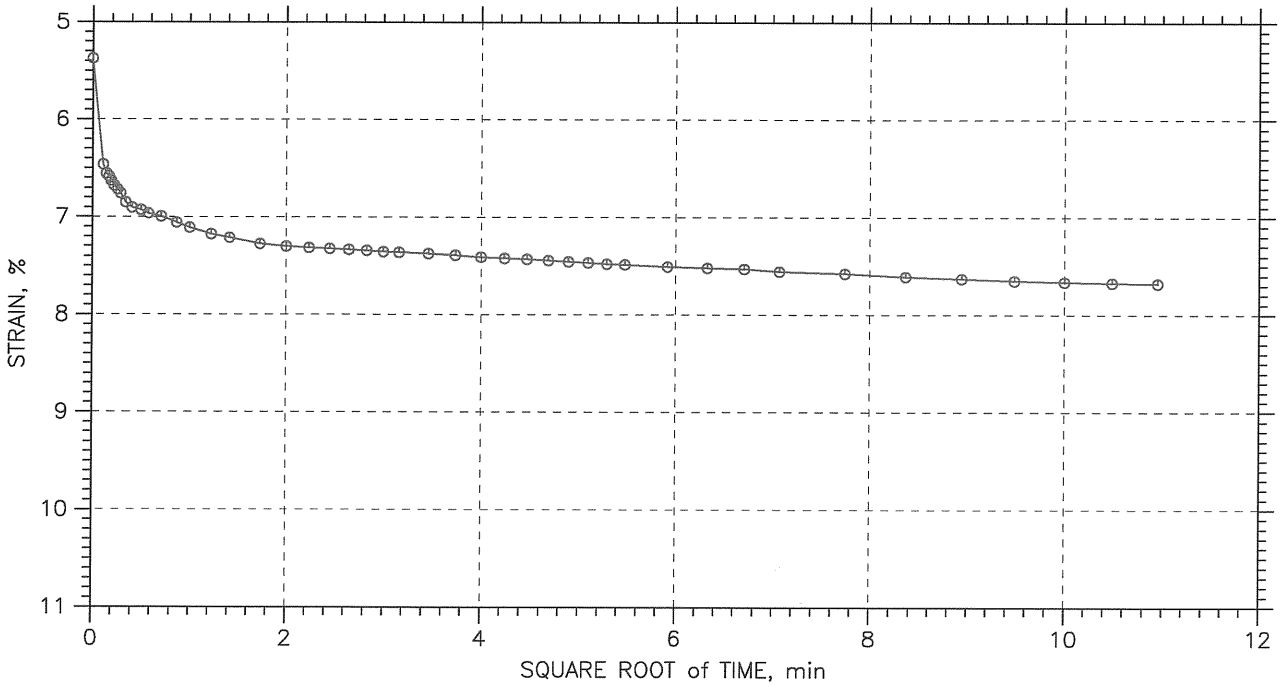
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 8 of 12

Stress: 16. tsf





GeoTesting express a subsidiary of Geocomp Corporation	Project: Baker Pump Station	Location: ---	Project No.: GTX-8704
	Boring No.: BB-12	Tested By: md	Checked By: jdt
	Sample No.: ST-12	Test Date: 06/15/09	Depth: 12-13
	Test No.: C-1	Sample Type: core	Elevation: ---
	Description: Moist, yellowish brown clay with sand		
	Remarks: System C		

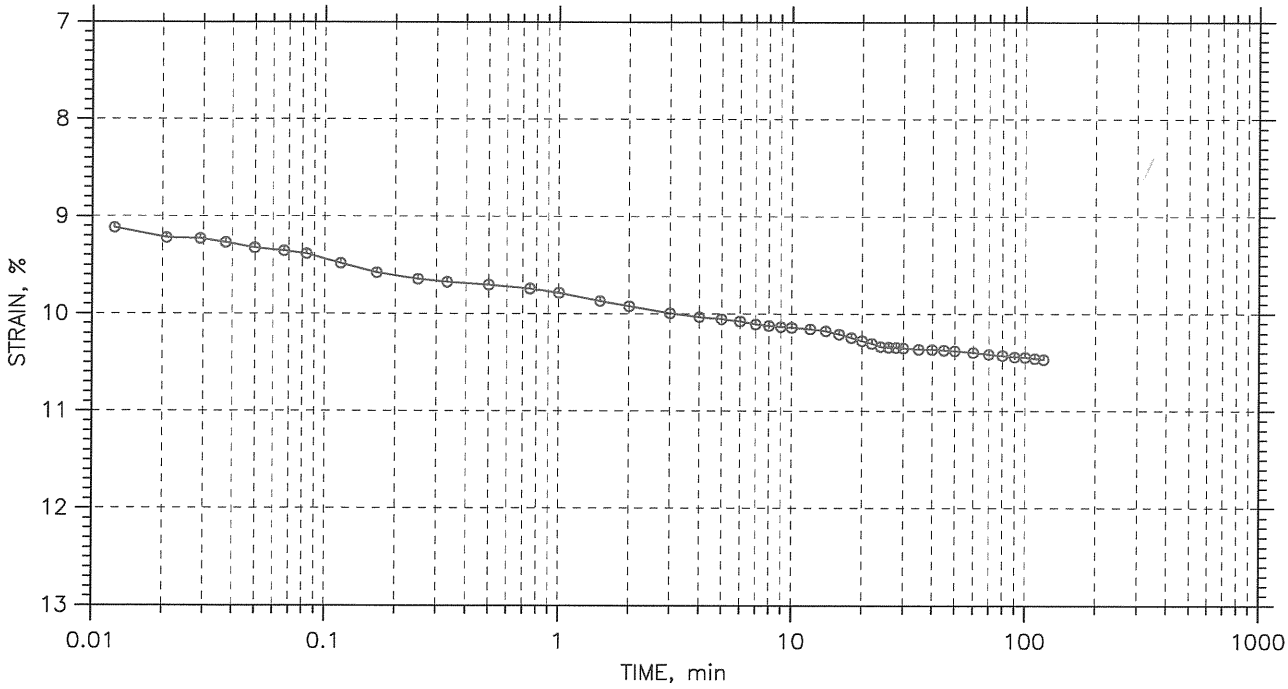
Tue, 07-JUL-2009 16:52:58

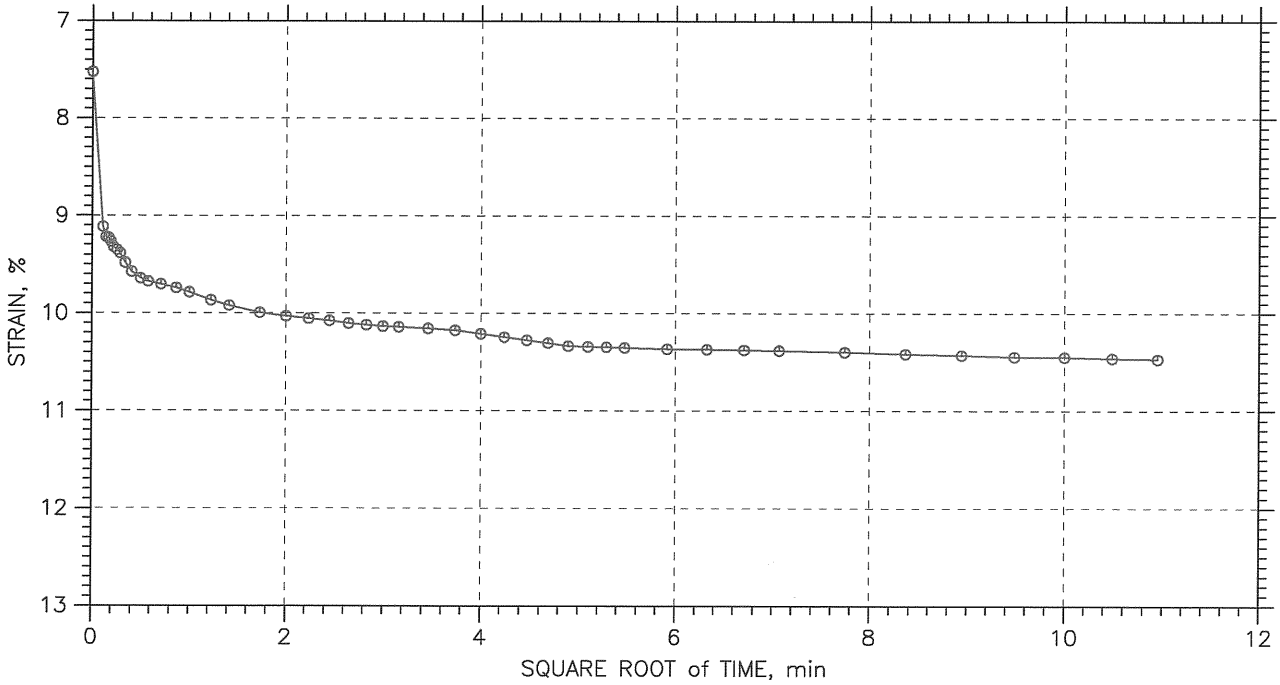
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 9 of 12

Stress: 32. tsf





GeoTesting express a subsidiary of Geocomp Corporation	Project: Baker Pump Station	Location: ---	Project No.: GTX-8704
	Boring No.: BB-12	Tested By: md	Checked By: jdt
	Sample No.: ST-12	Test Date: 06/15/09	Depth: 12-13
	Test No.: C-1	Sample Type: core	Elevation: ---
	Description: Moist, yellowish brown clay with sand		
	Remarks: System C		

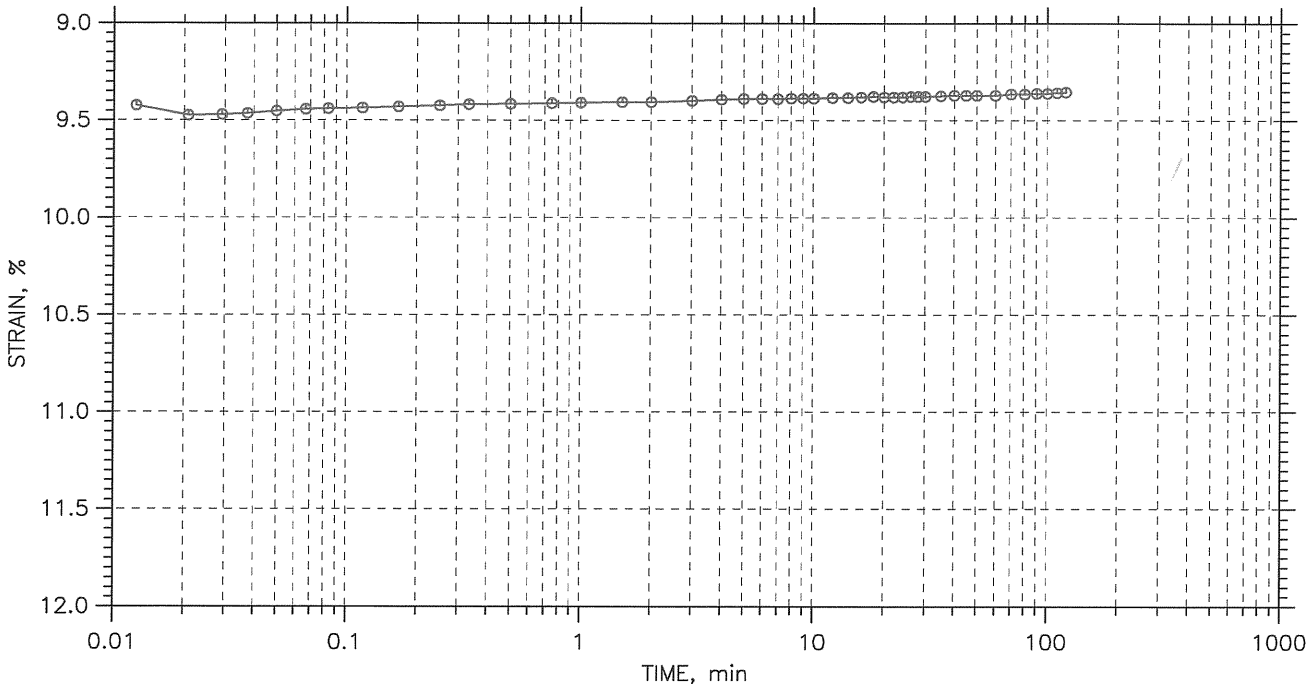
Tue, 07-JUL-2009 16:53:16

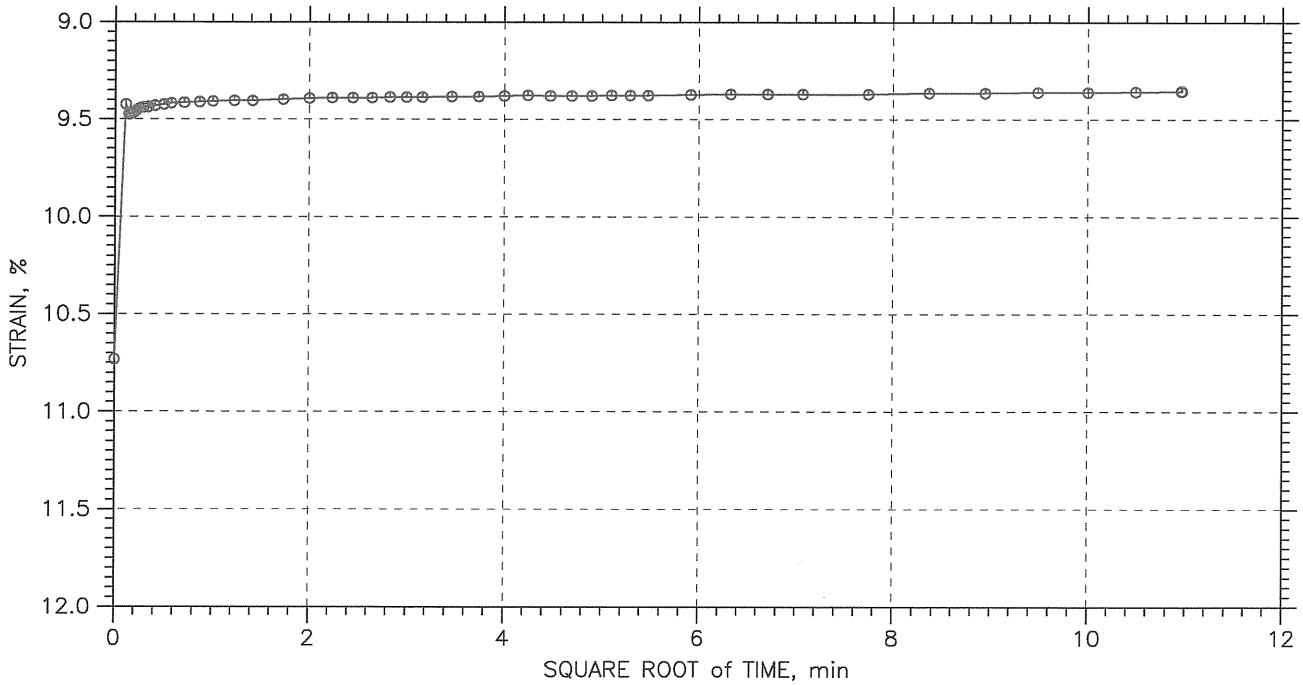
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 10 of 12

Stress: 8. tsf





GeoTesting express a subsidiary of Geocomp Corporation	Project: Baker Pump Station	Location: ---	Project No.: GTX-8704
	Boring No.: BB-12	Tested By: md	Checked By: jdt
	Sample No.: ST-12	Test Date: 06/15/09	Depth: 12-13
	Test No.: C-1	Sample Type: core	Elevation: ---
	Description: Moist, yellowish brown clay with sand		
	Remarks: System C		

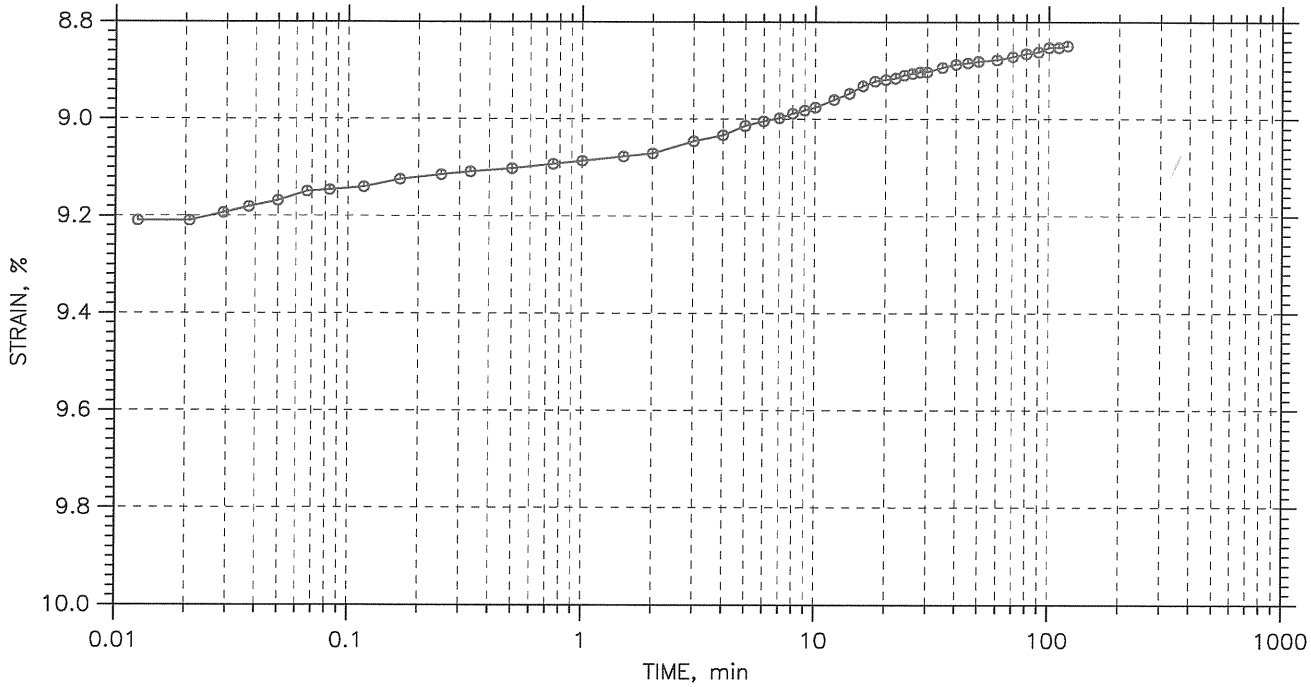
Tue, 07-JUL-2009 16:53:43

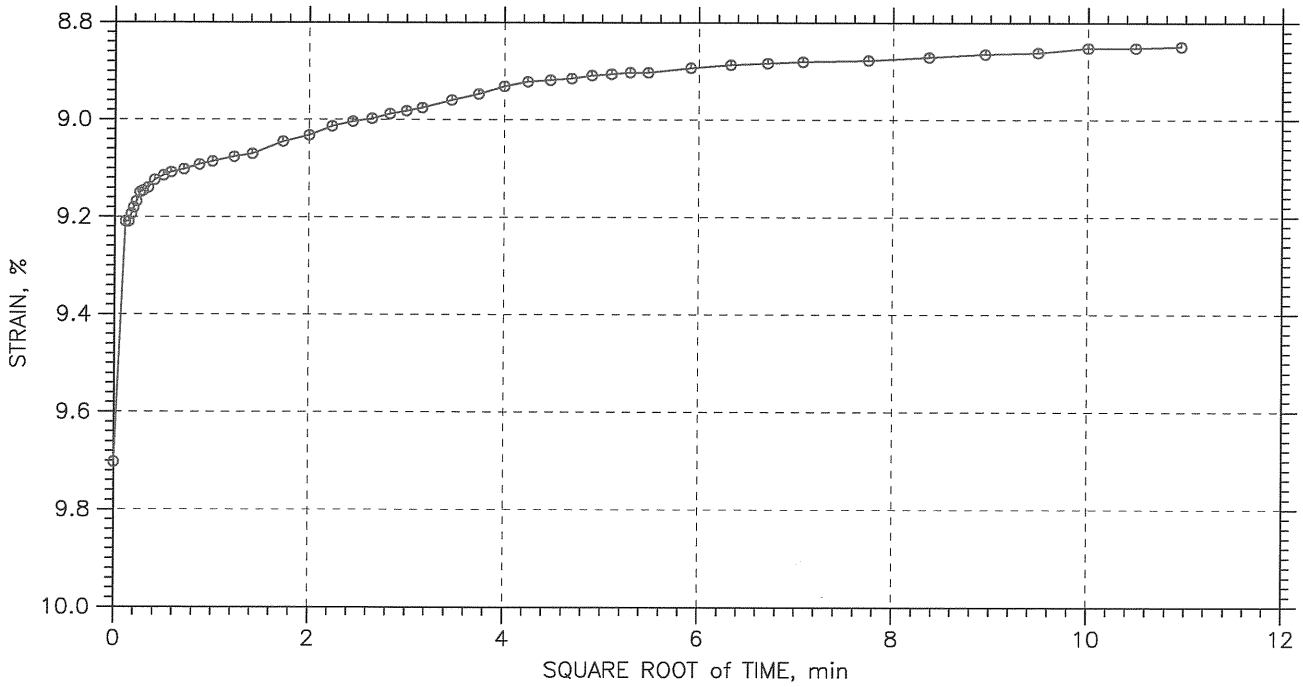
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 11 of 12

Stress: 2. tsf





GeoTesting express a subsidiary of Geocomp Corporation	Project: Baker Pump Station	Location: ---	Project No.: GTX-8704
	Boring No.: BB-12	Tested By: md	Checked By: jdt
	Sample No.: ST-12	Test Date: 06/15/09	Depth: 12-13
	Test No.: C-1	Sample Type: core	Elevation: ---
	Description: Moist, yellowish brown clay with sand		
	Remarks: System C		

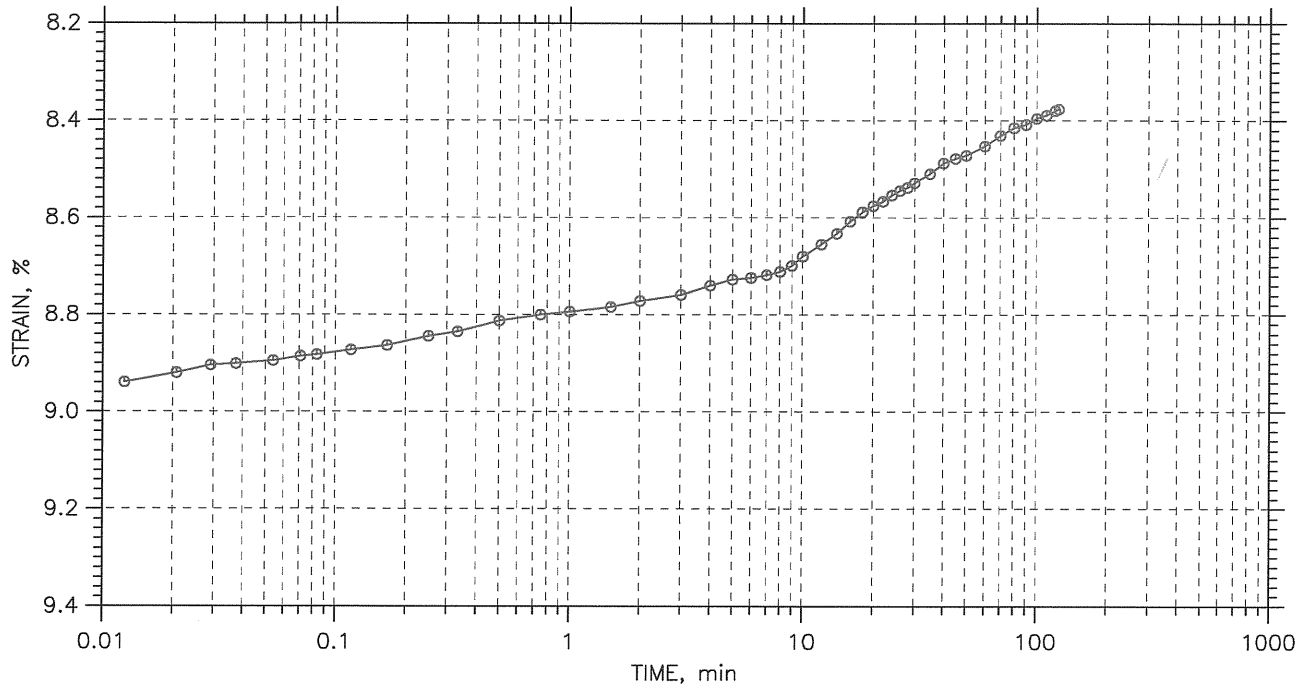
Tue, 07-JUL-2009 16:53:52

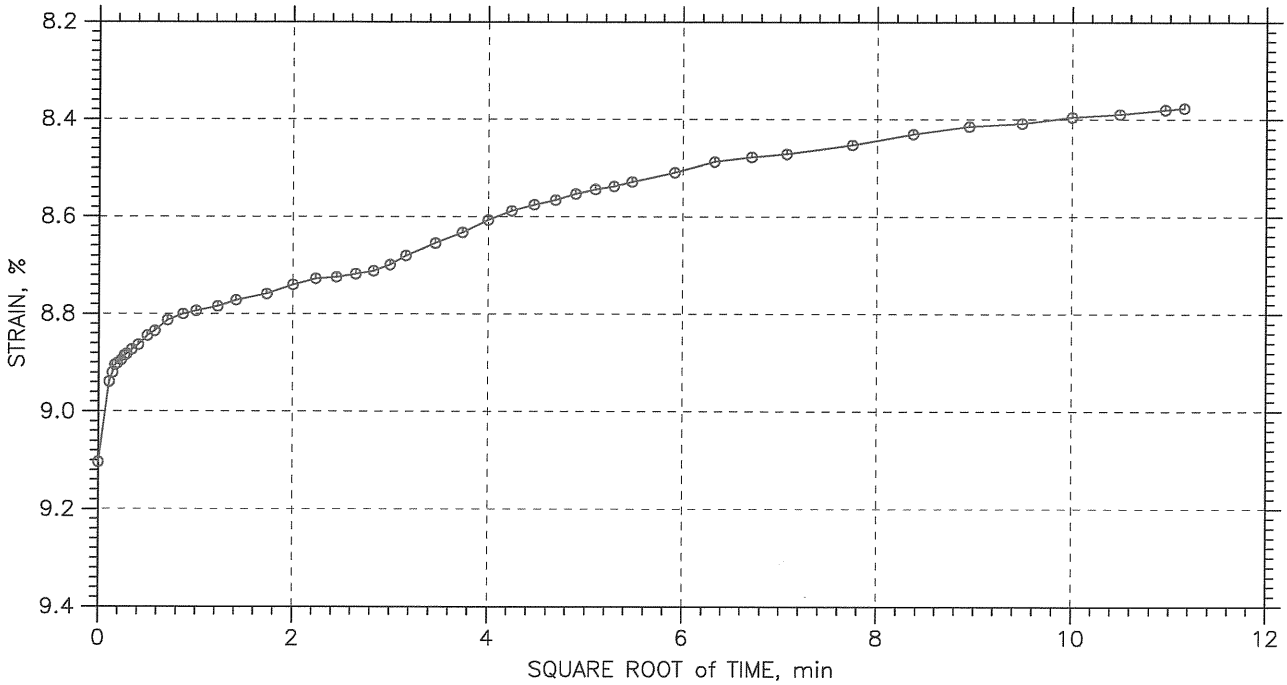
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 12 of 12

Stress: 0.5 tsf





GeoTesting express a subsidiary of Geocomp Corporation	Project: Baker Pump Station	Location: ---	Project No.: GTX-8704
	Boring No.: BB-12	Tested By: md	Checked By: jdt
	Sample No.: ST-12	Test Date: 06/15/09	Depth: 12-13
	Test No.: C-1	Sample Type: core	Elevation: ---
	Description: Moist, yellowish brown clay with sand		
	Remarks: System C		

Tue, 07-JUL-2009 16:54:03