GEOTECHNICAL ENGINEERING REPORT

FUTURE WRC SITE, PHASE I
BETWEEN I-10 & SANTA CRUZ RIVER
BETWEEN EL CAMINO DEL CERRO & SWEETWATER DRIVE
TUCSON, ARIZONA

TERRACON PROJECT NO. 63085095
SEPTEMBER 2, 2008

Prepared for:

PIMA COUNTY PROCUREMENT DEPARTMENT
DESIGN AND CONSTRUCTION SERVICES
130 WEST CONGRESS STREET, 3RD FLOOR
TUCSON, ARIZONA 85701

ATTN: Jerome Rizzo
Contracts Officer

Registered Professional Engineer (Civil)
CERTIFICATE NO.
31130
OLEG B.
LYSYJ
Date Signed 9-2-08
ARIZONA U.S.A.
Expires 03/31/2009

Prepared by:

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Terracon

Terracon
Consulting Engineers & Scientists

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September 2, 2008

Pima County Procurement Department
Design and Construction Services
130 West Congress Street, 3rd Floor
Tucson, Arizona 85701

Attn: Jerome Rizzo
Contracts Officer

RE: Geotechnical Engineering Report
Future WRC Site, Phase I
Between I-10 and Santa Cruz River
Between El Camino Del Cerro and Sweetwater Drive
Tucson, Arizona
Terracon Project No. 63085095

Terracon has completed the preliminary geotechnical engineering exploration for the proposed Future Water Reclamation Campus (WRC) that will replace the existing Roger Road WWTP to be located between Interstate 10 and Santa Cruz River and Between El Camino Del Cerro and Sweetwater Drive, in Tucson, Arizona. This study was performed in general accordance with our proposal number D6308109, Revision No. 2 dated June 3, 2008. The results of our engineering study are attached.

Collapsible soils were found across the site at various depths. Expansive soil and existing fill were found in several locations across the site, in several boring locations at various depths.

We appreciate being of service to you in the geotechnical engineering phase of this project. If you have any questions concerning this report or any of our testing, inspection, design and consulting services, please do not hesitate to contact us.

Sincerely,
Terracon

for

Jennifer Hall, E.I.T.
Staff Engineer

Oleg B. Lysyj, P.E.
Principal

Copies to: Addressee (3)

N:\Projects\2008\63085095\63085095.rpt.dot

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Registered Professional Engineer (Civil)
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ARIZONA, U.S.A.

Expires 03/31/2009

GEOTECHNICAL ENGINEERING REPORT

FUTURE WRC SITE, PHASE I
BETWEEN I-10 & SANTA CRUZ RIVER
BETWEEN EL CAMINO DEL CERRO & SWEETWATER
TUCSON, ARIZONA

TERRACON PROJECT NO. 63085095

INTRODUCTION

This report contains the results of our preliminary geotechnical engineering exploration for the proposed Future WRC that will replace the existing Roger Road WWTP to be located between I-10 and Santa Cruz River and Between El Camino Del Cerro and Sweetwater Drive, in Tucson, Arizona.

The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- subsurface soil conditions
- groundwater conditions

The recommendations contained in this report are based upon the results of field and laboratory testing, engineering analyses, and experience with similar soil conditions, structures and our understanding of the proposed project.

PROJECT DESCRIPTION

We understand the proposed project consists of the development of a new Water Reclamation Campus to replace the existing Roger Road WWTP. The general area of the new facility is known, but the exact boundaries and location of facilities within the campus may shift depending on subsurface soil conditions.

Therefore a preliminary scope of work for a geotechnical investigation has been identified by Pima County as the Phase I geotechnical services. The purpose of these services will be to gain a comprehensive understanding of the subsurface soil conditions over this 40-acre site, over which about 16-acres will eventually be selected for the actual campus.

A detailed scope of geotechnical investigation has also been determined once the actual site is selected. The purpose of these services will be to provide foundation design criteria and earthwork recommendations for the structures in the facility.

SITE EXPLORATION PROCEDURES

The scope of the services performed for this project included site reconnaissance by a geotechnical engineer, a subsurface exploration program, laboratory testing, and engineering analyses.

Field Exploration: A total of 17 test borings were drilled on July 24 to August 1, 2008. The borings were drilled to approximate depths of 40-½ to 60-½ feet at the locations shown on the Site Plan, Figure 1. All borings were drilled within 20 feet of the areas shown on Figure 1, Preliminary Soil Boring Layout Plan in the Soil Investigation at Future WRC Site report provided to us by Pima County. Borings were advanced with a truck-mounted drilling rig, utilizing 7-½ inch diameter hollow-stem auger.

The explorations were located in the field by measurements from property lines and existing site features. Ground surface elevations and GPS coordinates at each exploration location were obtained by Engineering Surveying Photogrammetry, LLC with a LEICA 1200 system. The accuracy of exploration locations and elevations should only be assumed to the level implied by the methods used to determine each.

Continuous lithologic logs of each boring were recorded by the geotechnical engineer during the exploration operations. At selected intervals, samples of the subsurface materials were taken by driving split-spoon or ring-barrel samplers. Bulk samples of subsurface materials were obtained from borings in pavement areas.

Penetration resistance measurements were obtained by driving the split-spoon and ring-barrel into the subsurface materials with a 140-pound hammer falling 30 inches. The penetration resistance value is a useful index in estimating the consistency, relative density or hardness of the materials encountered.

Groundwater conditions were evaluated in each boring at the time of site exploration.

Laboratory Testing: Samples retrieved during the field exploration were taken to the laboratory for observation by the project geotechnical engineer and were classified in accordance with the Unified Soil Classification System described in Appendix C. At that time, the field descriptions were confirmed or modified as necessary and an applicable

laboratory testing program was formulated to determine engineering properties of the subsurface materials. Boring logs were prepared and are presented in Appendix A.

Laboratory tests were conducted on selected soil samples and are presented in Appendix B and on the Logs of Borings. The test results were used for the geotechnical engineering analyses.

Selected soil samples were tested for the following engineering properties:

- Moisture Content
- Dry Density
- Consolidation
- Resistivily/pH
- Sulfate Content
- Gradation/Percent Fines
- Atterberg Limits
- Swell
- Chloride Content
- Direct Shear

SITE CONDITIONS

The site consists of a fenced off area that is undeveloped and has been previously used as leach beds by the Roger Road Waste Water Treatment Plant (WWTP). The Roger Road WWTP is located south of the existing property. The Santa Cruz River bounds the western side of the property. Cleared undeveloped land bounds the eastern side of the property. The land to the east contains a few trees and is overgrown with weeds. A large retention/detention basin bounds the northern side of the property. There are several piles of trash in the retention/detention basin to the north. Two concrete culverts run from the northeast corner to the existing retention/detention basin to the north. There is a paved road along the eastern boundary. There is an exposed pipe line with several breakages in it, running along the western side of the existing paved road. A reclaimed water line runs along the eastern side of the southern half of the existing paved road. The southern third of the property is fenced off, and is being used as a nursery. There are several mesquite trees on the southern third side of the site. There are a couple of metal white boxes and vertical pipes on the western side next to the Santa Cruz River that look like monitoring wells. Overhead utilities run along the northern side of the property. There are several berms separating the old leach beds.

SUBSURFACE SOIL CONDITIONS

Soil Conditions: As presented on the Logs of Boring, surface soils to depths of 5 to 9 feet consisted mostly of sandy lean clay or sandy silty lean clay. Silty sand with varying amounts of gravel and clayey sandy gravel subsurface soils were encountered in a few of the borings at depths of 7 to 13 feet. The materials underlying the surface soils and extending to a depth

of 12 to 27 feet consisted mostly of silty sand with varying amounts of grave, l or sand with varying amount of silt and gravel. The materials from 12 to 27 feet and extending to the maximum depth of exploration consisted mostly of sandy gravel with trace amounts of silt or clay or clayey sand with varying amounts of gravel. A few locations contained sands with varying amount of silty, clay and gravel

Field and Laboratory Test Results: Field penetration test results indicate that the clay soils vary from stiff to hard in consistency. The sand soils vary from loose to very dense in relative density.

Laboratory test results indicate that the subsoils at shallow depth exhibit low to moderate compression at in-situ moisture contents. The soils over the entire site show a significant tendency for hydro-compaction when elevated in moisture content. When water is added to samples of laboratory compacted near-surface soils, the materials exhibit low expansion potential under light loading conditions such as those imposed by floor slabs except in borings B-01, B-05 and B-15 which show a moderate expansion potential.

Groundwater Conditions: Groundwater was not observed in most of the exploration at the time of field exploration. Groundwater was encountered in boring locations B-2, B-4, B-6, B-13, B-14 and B-16 at depths of 22 to 37 feet. These observations represent groundwater conditions at the time of the field exploration and may not be indicative of other times, or at other locations. Groundwater conditions can change with varying seasonal and weather conditions, and other factors.

ENGINEERING RECOMMENDATIONS

Geotechnical Considerations: The soils encountered have shown consistent collapse potential across the entire site at various depths. The soils in the areas of boring locations B-01, B-05 and B-15 show moderate swell potential and should not be used as engineered fill. There are also several boring locations that show existing fill that will have to be removed before development of the site.

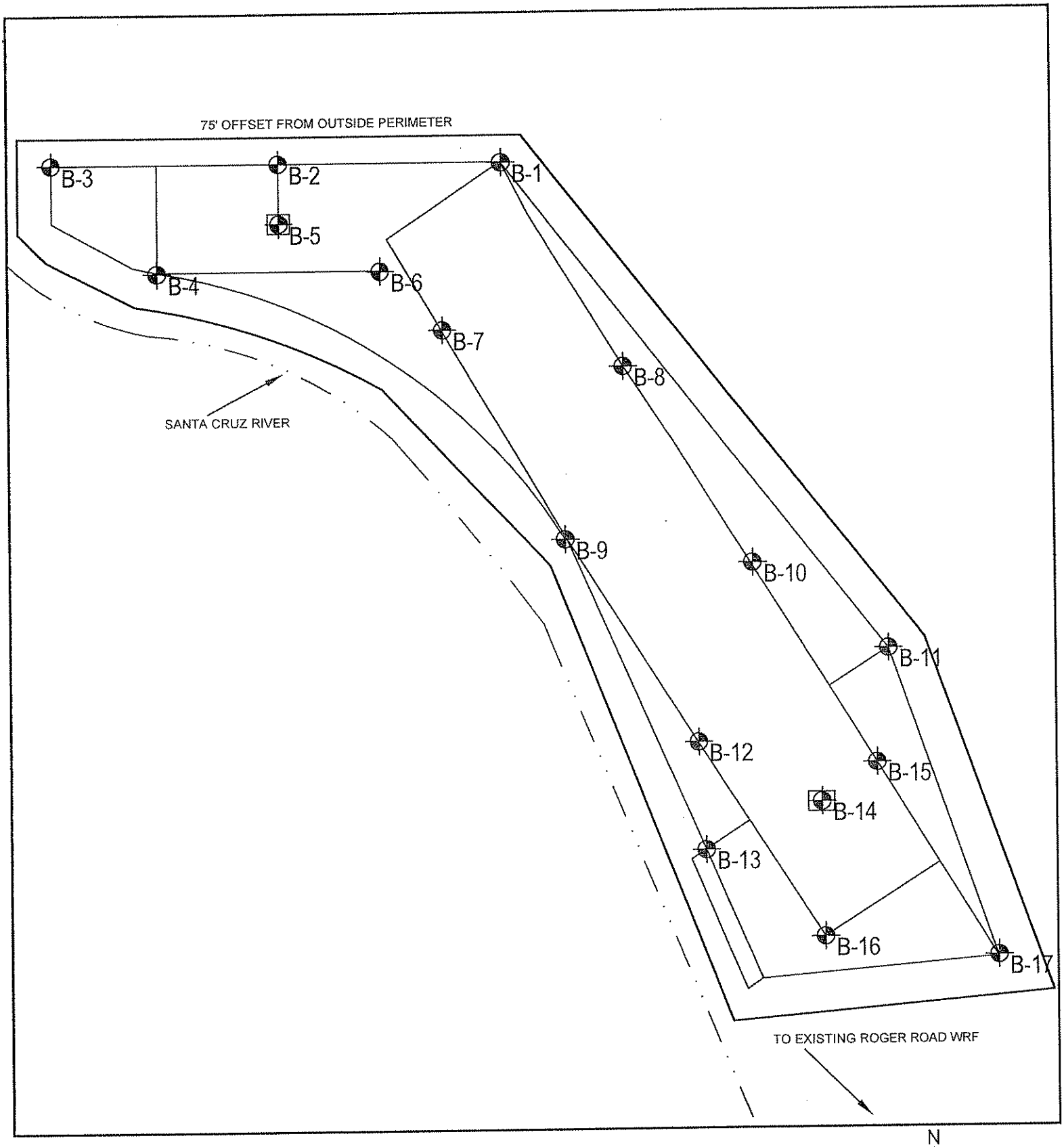
GENERAL COMMENTS

Terracon should be retained to review the final design plans and specifications so comments can be made regarding interpretation and implementation of our geotechnical recommendations in the design and specifications. Terracon also should be retained to provide testing and observation during excavation, grading, foundation and construction phases of the project.

The analysis and recommendations presented in this report are based upon the data obtained from the borings performed at the indicated locations and from other information discussed in this report. This report does not reflect variations which may occur between borings or across the site. The nature and extent of such variations may not become evident until construction. If variations appear, it will be necessary to reevaluate the recommendations of this report.

The scope of services for this project does not include either specifically or by implication any environmental assessment of the site or identification of contaminated or hazardous materials or conditions. If the owner is concerned about the potential for such contamination, other studies should be undertaken.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, either express or implied, are intended or made. In the event that changes in the nature, design, or location of the project as outlined in this report, are planned, the conclusions and recommendations contained in this report shall not be considered valid unless Terracon reviews the changes, and either verifies or modifies the conclusions of this report in writing.



LEGEND

⊕ APPROXIMATE BORING LOCATION

N

Project Mngr: OBL	Project No. 63085095	Terracon Consulting Engineers and Scientists	SITE PLAN
Drawn By: HPS	Scale: NONE	355 SOUTH EUCLID, SUITE 107 TUCSON, ARIZONA 85719	FUTURE WRC SITE, PHASE I
Checked By: OBL	File No. 63085095	PH. (520) 770-1789 FAX. (520) 792-2539	BETWEEN I-10 & SANTA CRUZ RIVER
Approved By: OBL	Date: 09-2008		PIMA COUNTY PROCUREMENT DEPARTMENT
			TUCSON ARIZONA

FIG. No. 1

LOG OF BORING NO. B-01

CLIENT
Pima County Regional Water Reclamation

SITE
Tucson, Arizona

PROJECT
Future WRC Site

Boring Location: N70511.830 E73831.845

Approx. Surface Elev.: 2247.02 ft

GRAPHIC LOG	DESCRIPTION		DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY (in)	BLOWS/FT.	TESTS WATER CONTENT, %	DRY DENSITY pcf	Liquid Limit	PLASTICITY INDEX	-200
	SANDY LEAN CLAY; dark brown, very stiff, medium plasticity fines, no cementation			CL	1	BS					45	25	79
				CL	2	RS	12	18	11	85			
			5	CL	3	RS	12	16	10	89			
		8 / 2239		SP	4	RS	12	16					
	SAND TRACE CLAY; brown, loose to medium dense, non-plastic fines, no cementation		10	SP	5	RS	12	18	4	92			
				SP	6	RS	0	23					
		16 / 2231	15	SP	7	RS	12	22	5				
	GRAVELLY SAND TRACE SILT; brown, medium dense, non-plastic fines, no cementation			SP	8	RS	0	23					
		21 / 2226	20	SP	9	RS	12	27					18
	CLAYEY SAND WITH GRAVEL; brown, medium dense, low plasticity fines, no cementation			SC	10	RS	0	22					
			25	SC	11	RS	0	21					
		28 / 2219		GC-GM	12	RS	12	54					
	GRAVEL WITH CLAY AND SILT TRACE SAND; brown, medium to very dense, low plasticity fines, no to weak cementation		30	GC-GM	13	RS	0	80/12"			24	8	12
				GC-GM	14	SS	0	50/6"					
			35										

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft		
WL	None WD	None AB
WL		
WL	Backfilled Upon Completion	

Terracon

BORING STARTED	7-24-08		
BORING COMPLETED	7-24-08		
RIG	CME 75	FOREMAN	JNH
Approved	OBL	JOB #	63085095

LOG OF BORING NO. B-01

CLIENT: Pima County Regional Water Reclamation

SITE: Tucson, Arizona

PROJECT: Future WRC Site

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY (in)	BLOWS/FT.	TESTS WATER CONTENT, %	DRY DENSITY pcf	Liquid Limit	PLASTICITY INDEX	-200
	GRAVEL WITH CLAY AND SILT TRACE SAND; brown, medium to very dense, low plasticity fines, no to weak cementation		GC-GM	15	SS	12	75/12"					
			GC-GM	16	SS	9	87/9"					
	40 2207	40										
	40.5 2206.5 **GRAVEL TRACE SAND AND CLAY**; brown, very dense, low plasticity fines, weak cementation		GP	17	SS	2	50/4"					
	Bottom of Boring											

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft		
WL	None WD	None AB
WL		
WL	Backfilled Upon Completion	

Terracon

BORING STARTED	7-24-08		
BORING COMPLETED	7-24-08		
RIG	CME 75	FOREMAN	JNH
Approved	OBL	JOB #	63085095

LOG OF BORING NO. B-02

CLIENT
Pima County Regional Water Reclamation

SITE
Tucson, Arizona

PROJECT
Future WRC Site

Boring Location: N70511.340 E73272.062

Approx. Surface Elev.: 2241.97 ft

DEPTH, ft.	DESCRIPTION	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY (in)	BLOWS/FT.	TESTS WATER CONTENT, %	DRY DENSITY pcf	Liquid Limit	PLASTICITY INDEX	-200
	CLAYEY SAND WITH GRAVEL; brown, medium to very dense, low plasticity fines, no cementation; trace gravel 2.5' to 5'	SC	1	BS							
		SC	2	RS	12	81/11"					
5		SC	3	RS	12	48					
7 / 2235	**CLAYEY SILTY SAND**; brown, medium dense, low plasticity fines, no cementation	SC-SM	4	RS	12	19	5	87			
10		SC-SM	5	RS	12	20					
12 / 2230	**SILTY SAND**; brown, loose, non-plastic fines, no cementation	SM	6	RS	12	18	1	97			
15		SM	7	RS	12	33					
17 / 2225	**GRAVELLY SILTY SAND**; brown, medium dense, non-plastic fines, no cementation	SM	8	RS	12	44					
19 / 2223	**GRAVELLY SAND TRACE SILT**; brown, loose to medium dense, non-plastic fines, no cementation										
20		SP	9	RS	12	13	1	101	24	7	19
21 / 2221	**CLAYEY SAND WITH GRAVEL**; brown, medium dense, medium plasticity fines, no cementation	SC	10	RS	0	27					
25		SC	11	RS	0	49					
27 / 2215	**GRAVELLY SAND TRACE SILT**; brown, dense to very dense, non-plastic fines, weak to moderate cementation	SP	12	SS	12	48					
30		SP	13	SS	2	50/6"					
		SP	14	SS	6	90/10"					
35											

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft		
WL	▽ 22	▼ 22
WL	▽	▼
WL	Backfilled Upon Completion	

Terracon

BORING STARTED	7-24-08		
BORING COMPLETED	7-24-08		
RIG	CME 75	FOREMAN	JNH
Approved	OBL	JOB #	63085095

LOG OF BORING NO. B-02

CLIENT
Pima County Regional Water Reclamation

SITE
Tucson, Arizona

PROJECT
Future WRC Site

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY (in)	SAMPLES BLOWS/FT.	TESTS WATER CONTENT, %	TESTS DRY DENSITY pcf	TESTS Liquid Limit	TESTS PLASTICITY INDEX	TESTS -200
			SP	15	SS	12	50/6"			30	12	8
37	2205											
	GRAVEL WITH SAND AND SILT; brown, very dense, non-plastic fines, no cementation		GP	16	SS	12	74					
40.5	2201.5	40	~~GP~~	~~17~~	~~SS~~	~~2~~	~~50/2"~~					
	Bottom of Boring											

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft		
WL	▽ 22	▼ 22
WL	▼	▼
WL	Backfilled Upon Completion	

Terracon

BORING STARTED	7-24-08		
BORING COMPLETED	7-24-08		
RIG	CME 75	FOREMAN	JNH
Approved	OBL	JOB #	63085095

LOG OF BORING NO. B-03

CLIENT
Pima County Regional Water Reclamation

SITE
Tucson, Arizona

PROJECT
Future WRC Site

Boring Location: N70551.007 E72704.930

Approx. Surface Elev.: 2243.23 ft

DEPTH, ft.	DESCRIPTION	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY (in)	BLOWS/FT.	TESTS WATER CONTENT, %	DRY DENSITY pcf	Liquid Limit	PLASTICITY INDEX	-200
	FILL: SILTY SAND WITH GRAVEL; brown, loose to very dense, non-plastic fines, no cementation	SM	1	BS					NP	NP	26
		SM	2	RS	12	50/3"					
5		SM	3	RS	12	19					
		SM	4	RS	12	7	13	97			
9	2234										
	SILTY SAND; brown, loose, non-plastic fines, no cementation										
10		SM	5	RS	12	18					
12	2231										
	GRAVELLY SAND TRACE SILT; brown, loose, non-plastic fines, weak cementation	SP	6	RS	12	16					
14	2229										
	SILTY CLAYEY SAND; brown, loose, low plasticity fines, weak cementation										
15		SC-SM	7	RS	12	16					
17	2226										
	GRAVELLY SAND TRACE SILT; brown, medium dense, non-plastic fines, weak cementation	SP	8	RS	12	0					
20		SP	9	RS	0	29					
		SP	10	RS	12	38					
25	2218										
25	**CLAYEY SAND WITH GRAVEL**; brown, medium dense, medium plasticity fines, weak cementation	SC	11	RS	12	44			NP	NP	12
27	2216										
	GRAVELLY SAND TRACE SILT; brown, medium dense to dense, non-plastic fines, weak cementation	SP	12	SS	1	33					
30		SP	13	SS	4	18					
32	2211						2	105			
	GRAVELLY CLAYEY SAND WITH COBBLES; brown, medium to very dense, low plasticity fines, no to weak cementation	SC	14	RS	12	22					
35											

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft		
WL	None WD	None AB
WL		
WL	Backfilled Upon Completion	

Terracon

BORING STARTED	7-24-08		
BORING COMPLETED	7-24-08		
RIG	CME 75	FOREMAN	JNH
Approved	OBL	JOB #	63085095

BOREHOLE 2000 63085095.GPJ TERR2000.GDT 8/29/08

LOG OF BORING NO. B-03

CLIENT
Pima County Regional Water Reclamation

SITE
Tucson, Arizona

PROJECT
Future WRC Site

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY (in)	BLOWS/FT.	TESTS WATER CONTENT, %	DRY DENSITY pcf	Liquid Limit	PLASTICITY INDEX	-200
	GRAVELLY CLAYEY SAND WITH COBBLES; brown, medium to very dense, low plasticity fines, no to weak cementation		SC	15	SS	6	44					
			SC	16	SS	16	57					
		40	SC	17	SS	18	82/12"					
	41.5 2201.5 Bottom of Boring											

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft		
WL	None WD	None AB
WL		
WL	Backfilled Upon Completion	

Terracon

BORING STARTED	7-24-08		
BORING COMPLETED	7-24-08		
RIG	CME 75	FOREMAN	JNH
Approved	OBL	JOB #	63085095

LOG OF BORING NO. B-04

CLIENT
Pima County Regional Water Reclamation

SITE
Tucson, Arizona

PROJECT
Future WRC Site

Boring Location: N70321.360 E73012.792

Approx. Surface Elev.: 2243.82 ft

DEPTH, ft.	DESCRIPTION	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY (in)	BLOWS/FT.	TESTS WATER CONTENT, %	DRY DENSITY pcf	Liquid Limit	PLASTICITY INDEX	-200
	FILL: CLAYEY SAND; brown, loose, medium plasticity fines, no cementation	CL	1	BS							
		SC	2	RS	12	15	7	100			
4	2240										
	SANDY LEAN CLAY; brown, stiff to very stiff, medium plasticity fines, no cementation	CL	3	RS	12	16					
		CL	4	RS	12	7					
9	2235										
	SILTY SAND; brown, loose, non-plastic fines, no cementation	SM	5	RS	12	16					
12	2232										
	SANDY LEAN CLAY; brown, medium dense, medium plasticity fines, no cementation	CL	6	RS	12	25					
14	2230										
	SANDY LEAN CLAY WITH GRAVEL; brown, loose, medium plasticity fines, no cementation	CL	7	RS	12	9	6	107	33	12	53
17	2227										
	SANDY GRAVEL TRACE SILT; brown, medium dense, non-plastic fines, no cementation	GP	8	RS	12	29					
		GP	9	RS	12	50					
22	2222										
	GRAVELLY SAND WITH CLAY; brown, medium dense, low plasticity fines, no cementation	SP-SC	10	RS	12	56					
25	2219										
	GRAVELLY SAND TRACE SILT; brown, medium dense, non-plastic fines, no cementation	SP	11	RS	12	29	1	104			
27	2217										
	SANDY GRAVEL TRACE SILT; brown, medium to very dense, non-plastic fines, no cementation	GP	12	RS	12	55					
		GP	13	RS	12	76/11"					
		GP	14	RS	12	55					

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft		
WL	▽ 35	▼ 35
WL	▽	▼
WL	Backfilled Upon Completion	

Terracon

BORING STARTED	7-28-08		
BORING COMPLETED	7-28-08		
RIG	CME 75	FOREMAN	RP
Approved	OBL	JOB #	63085095

BOREHOLE 2000 63085095.GPJ TERR2000.GDT 10/3/08

LOG OF BORING NO. B-04

CLIENT
Pima County Regional Water Reclamation

SITE
Tucson, Arizona

PROJECT
Future WRC Site

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY (in)	SAMPLES BLOWS/FT.	TESTS WATER CONTENT, %	TESTS DRY DENSITY pcf	TESTS Liquid Limit	TESTS PLASTICITY INDEX	TESTS -200
	SANDY GRAVEL TRACE SILT; brown, medium to very dense, non-plastic fines, no cementation		GP	15	RS	12	75					
			GP	16	RS	0	50/5"					
		40	GP	17	RS	5	50/5"					
	41 2203 Bottom of Boring											

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft		
WL	▽ 35	▼ 35
WL	▽	▼
WL	Backfilled Upon Completion	

Terracon

BORING STARTED	7-28-08		
BORING COMPLETED	7-28-08		
RIG	CME 75	FOREMAN	RP
Approved	OBL	JOB #	63085095

LOG OF BORING NO. B-05

CLIENT
Pima County Regional Water Reclamation

SITE
Tucson, Arizona

PROJECT
Future WRC Site

Boring Location: N70441.609 E73275.254

Approx. Surface Elev.: 2237.77 ft

DESCRIPTION	Elev.	DEPTH, ft.	USCS SYMBOL	NUMBER	TYPE	RECOVERY (in)	BLOWS/FT.	WATER CONTENT, %	DRY DENSITY pcf	Liquid Limit	PLASTICITY INDEX	-200
FILL: SANDY SILTY LEAN CLAY TRACE GRAVEL; brown, stiff to very stiff, low plasticity fines, no cementation			CL-ML	1	BS					24	6	65
			CL-ML	2	RS	12	7	4	96			
		5	CL-ML	3	RS	12	16					
	2231 (7)											
GRAVELLY SAND TRACE SILT; brown, medium dense, non-plastic fines, no cementation			SP	4	RS	12	27					
		10	SP	5	RS	12	25	2				
	2224 (14)		SP	6	RS	0	58					
SANDY GRAVEL TRACE SILT; brown, loose to medium dense, non-plastic fines, no cementation		15	GP	7	RS	12	15					
	2219 (19)		GP	8	RS	10	37					
GRAVELLY SAND TRACE SILT; brown, medium dense, non-plastic fines, no cementation		20	SP	9	RS	12	47					
	2216 (22)											
GRAVELLY SAND WITH CLAY; brown, medium to very dense, low plasticity fines, no cementation			SP-SC	10	RS	12	21					
		25	SP-SC	11	RS	8	45					
	2209 (29)		SP-SC	12	RS	6	50/6"					
SANDY GRAVEL TRACE CLAY; brown, very dense, low plasticity fines, no cementation		30	GP	13	RS	4	50/4"					
			GP	14	RS	5	50/5"					
		35										

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft		
WL	None WD	None AB
WL		
WL	Backfilled Upon Completion	

Terracon

BORING STARTED	8-1-08		
BORING COMPLETED	8-1-08		
RIG	CME 75	FOREMAN	RP
Approved	OBL	JOB #	63085095

LOG OF BORING NO. B-05

CLIENT: Pima County Regional Water Reclamation

SITE: Tucson, Arizona

PROJECT: Future WRC Site

GRAPHIC LOG	DESCRIPTION		DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY (in)	BLOWS/FT.	TESTS WATER CONTENT, %	DRY DENSITY pcf	Liquid Limit	PLASTICITY INDEX	-200
	SANDY GRAVEL TRACE CLAY; brown, very dense, low plasticity fines, no cementation			GP	15	RS	4	50/4"					
				GP	16	RS	6	50/6"					
39		2199											
	GRAVELLY CLAYEY SAND; brown, very dense, low plasticity fines, no cementation		40	SC	17	RS	3	50/3"					
42		2196											
	CLAYEY GRAVEL WITH SAND; brown, very dense, low plasticity fines, no cementation			GC	18	RS	6	50/6"					
			45	GC	19	RS	4	50/4"			26	11	12
47		2191											
	CLAYEY GRAVELLY SAND; brown, very dense, low plasticity fines, no cementation			SC	20	RS	10	61/10"					
			50	SC	21	RS	6	50/5"					
				SC	22	RS	8	75					
	with gravel		55	SC	23	RS	6	50/6"					
57		2181											
	SANDY GRAVEL WITH CLAY; brown, very dense, low plasticity fines, no cementation			GP	24	RS	12	80/11"					
60.5	trace clay	2177.5	60	GP	25	RS	4	50/4"					
	Bottom of Boring												

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft		
WL	None WD	None AB
WL		
WL	Backfilled Upon Completion	

Terracon

BORING STARTED	8-1-08		
BORING COMPLETED	8-1-08		
RIG	CME 75	FOREMAN	RP
Approved	OBL	JOB #	63085095

LOG OF BORING NO. B-06

CLIENT
Pima County Regional Water Reclamation

SITE
Tucson, Arizona

PROJECT
Future WRC Site

Boring Location: N70252.662 E73477.313

Approx. Surface Elev.: 2242.25 ft

DESCRIPTION	Depth	Elev.
SANDY LEAN CLAY; brown, very stiff, low to medium plasticity fines, no cementation	7	2235.5
CLAYEY SAND TRACE GRAVEL; brown, loose, low plasticity fines, no cementation	12	2230.5
SAND TRACE GRAVEL AND SILT; brown, medium dense, non-plastic fines, no cementation	14	2228.5
SANDY GRAVEL TRACE SILT; brown, loose to very dense, non-plastic fines, no cementation	32	▼ 2210.5
GRAVEL TRACE CLAY AND SAND; brown, very dense, low plasticity fines, no cementation	34	2208.5

Continued Next Page

DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY (in)	BLOWS/FT.	TESTS WATER CONTENT, %	DRY DENSITY pcf	Liquid Limit	PLASTICITY INDEX	-200
	CL	1	BS							
	CL	2	RS	12	19					
5	CL	3	RS	12	10	10	88			
	SC	4	RS	12	10					
10	SC	5	RS	12	13	8	97			
	SP	6	RS	12	25					
15	GP	7	RS	12	38					
	GP	8	RS	12	17	7	106			
20	GP	9	RS	10	66/12"					
	GP	10	RS	12	46					
25	GP	11	RS	0	52					
	GP	12	RS	10	47					
30	GP	13	RS	12	76/11"					
	GP	14	RS	8	66/7"					
35										

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft		
WL	▽ 32	▼ 32
WL	▽	▼
WL	Backfilled Upon Completion	

Terracon

BORING STARTED	7-31-08		
BORING COMPLETED	7-31-08		
RIG	CME 75	FOREMAN	RP
Approved	OBL	JOB #	63085095

LOG OF BORING NO. B-06

CLIENT
Pima County Regional Water Reclamation

SITE
Tucson, Arizona

PROJECT
Future WRC Site

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY (in)	BLOWS/FT.	TESTS WATER CONTENT, %	DRY DENSITY pcf	Liquid Limit	PLASTICITY INDEX	-200
	CLAYEY GRAVEL WITH SAND; brown, dense to very dense, low plasticity fines, no cementation		GC	15	RS	6	50/6"					
			GC	16	RS	9	80/9"					
		40	GC	17	RS	12	75					
	41 2201.5 Bottom of Boring											

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft		
WL	▽ 32	▼ 32
WL	▽	▼
WL	Backfilled Upon Completion	

Terracon

BORING STARTED	7-31-08		
BORING COMPLETED	7-31-08		
RIG	CME 75	FOREMAN	RP
Approved	OBL	JOB #	63085095

LOG OF BORING NO. B-07

CLIENT: Pima County Regional Water Reclamation

SITE: Tucson, Arizona

PROJECT: Future WRC Site

Boring Location: N70127.876 E73662.769

Approx. Surface Elev.: 2237.86 ft

DEPTH, ft.	DESCRIPTION	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY (in)	BLOWS/FT.	TESTS WATER CONTENT, %	DRY DENSITY pcf	Liquid Limit	PLASTICITY INDEX	-200
	SILTY SAND WITH GRAVEL; brown, medium dense, non-plastic fines, no cementation	SM	1	BS					19	3	36
		SM	2	RS	12	39	2	112			
5		SM	3	RS	12	30					
		SM	4	RS	0	27					
9	2229										
10	**GRAVELLY SAND WITH SILT**; brown, loose, non-plastic fines, no cementation	SP-SM	5	RS	12	15	3	101			
		SP-SM	6	RS	12	16					
15		SP-SM	7	RS	0	16			NP	NP	9
17	2221										
	CLAYEY GRAVEL WITH SAND; brown, medium dense, low plasticity fines, no cementation	GC	8	RS	12	33					
20	2218										
20	**GRAVELLY SAND TRACE SILT**; brown, dense to very dense, non-plastic fines, no cementation	SP	9	RS	12	65/12"					
		SP	10	RS	12	65					
25		SP	11	RS	8	80					
		SP	12	RS	12	85					
29	2209										
30	**SANDY GRAVEL TRACE CLAY**; brown, very dense, low plasticity fines, no cementation	GP	13	RS	6	50/6"					
		GP	14	RS	9	90/9"					
35											

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft		
WL	None WD	None AB
WL		
WL	Backfilled Upon Completion	

Terracon

BORING STARTED	7-28-08		
BORING COMPLETED	7-28-08		
RIG	CME 75	FOREMAN	RP
Approved	OBL	JOB #	63085095

BOREHOLE 2000 63085095.GPJ TERR2000.GDT 9/2/08

LOG OF BORING NO. B-07

CLIENT
Pima County Regional Water Reclamation

SITE
Tucson, Arizona

PROJECT
Future WRC Site

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY (in)	BLOWS/FT.	TESTS WATER CONTENT, %	DRY DENSITY pcf	Liquid Limit	PLASTICITY INDEX	-200
	SANDY GRAVEL TRACE CLAY; brown, very dense, low plasticity fines, no cementation		GP	15	RS	12	90/11"					
			GP	16	RS	12	95/11"					
		40	GP	17	RS	12	93/11"					
	41 2197 Bottom of Boring											

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft		
WL	None WD	None AB
WL		
WL	Backfilled Upon Completion	

Terracon

BORING STARTED	7-28-08		
BORING COMPLETED	7-28-08		
RIG	CME 75	FOREMAN	RP
Approved	OBL	JOB #	63085095

LOG OF BORING NO. B-08

CLIENT
Pima County Regional Water Reclamation

SITE
Tucson, Arizona

PROJECT
Future WRC Site

Boring Location: N69979.772 E74028.541

Approx. Surface Elev.: 2240.42 ft

DEPTH, ft.	DESCRIPTION	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY (in)	BLOWS/FT.	TESTS WATER CONTENT, %	DRY DENSITY pcf	Liquid Limit	PLASTICITY INDEX	-200
	SANDY LEAN CLAY; brown, very stiff to hard, low plasticity fines, no cementation	CL	1	BS					25	7	59
		CL	2	RS	12	24					
5		CL	3	RS	12	17					
7 / 2233.5	**GRAVELLY SAND TRACE SILT**; brown, medium dense, non-plastic fines, no cementation	SP	4	RS	12	27					
8 / 2232.5	**SAND TRACE SILT AND GRAVEL**; brown, loose, non-plastic fines, no cementation	SP	5	RS	12	15					
10		SP	6	RS	12	13					
14 / 2226.5	**SANDY GRAVEL TRACE CLAY**; brown, medium dense, low plasticity fines, no cementation	GP	7	RS	12	44					
15		GP	8	RS	12	23					
19 / 2221.5	**SAND TRACE SILT AND GRAVEL**; brown, loose, non-plastic fines, no cementation	SP	9	RS	12	15	5	99			
20		GP	10	RS	12	26					
22 / 2218.5	**SANDY GRAVEL TRACE CLAY**; brown, medium dense, low plasticity fines, no cementation	SP	11	RS	12	54					
24 / 2216.5	**GRAVELY SAND TRACE SILT**; brown, medium dense, non-plastic fines, no cementation	GP	12	RS	12	65					
25		GP	13	RS	8	80					
27 / 2213.5	**SANDY GRAVEL TRACE CLAY**; brown, dense to very dense, low plasticity fines, no cementation	GP	14	RS	6	50/6"					
30											
35											

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft		
WL	None WD	None AB
WL		
WL	Backfilled Upon Completion	

Terracon

BORING STARTED	7-28-08		
BORING COMPLETED	7-28-08		
RIG	CME 75	FOREMAN	RP
Approved	OBL	JOB #	63085095

LOG OF BORING NO. B-08

CLIENT
Pima County Regional Water Reclamation

SITE
Tucson, Arizona

PROJECT
Future WRC Site

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY (in)	BLOWS/FT.	TESTS WATER CONTENT, %	DRY DENSITY pcf	Liquid Limit	PLASTICITY INDEX	-200
	SANDY GRAVEL TRACE CLAY; brown, dense to very dense, low plasticity fines, no cementation		GP	15	RS	6	50/6"					
			GP	16	RS	9	90/9"					
	40.5 2200	40		17	RS	6	50/6"					
	Bottom of Boring											

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft		
WL	None WD	None AB
WL		
WL	Backfilled Upon Completion	

Terracon

BORING STARTED	7-28-08		
BORING COMPLETED	7-28-08		
RIG	CME 75	FOREMAN	RP
Approved	OBL	JOB #	63085095

LOG OF BORING NO. B-09

CLIENT: Pima County Regional Water Reclamation

SITE: Tucson, Arizona

PROJECT: Future WRC Site

Boring Location: N69714.918 E73820.353

Approx. Surface Elev.: 2240.11 ft

DEPTH, ft.	DESCRIPTION	USCS SYMBOL	NUMBER	TYPE	RECOVERY (in)	BLOWS/FT.	WATER CONTENT, %	DRY DENSITY pcf	Liquid Limit	PLASTICITY INDEX	-200
	SANDY LEAN CLAY TRACE GRAVEL; brown, very stiff, low plasticity fines, no cementation	CL	1	BS					24	8	66
		CL	2	RS	12	14	6	107			
5	2235 **SILTY SAND**; brown, loose to medium dense, non-plastic fines, no cementation	SM	3	RS	12	30					
		SM	4	RS	0	16					
10	2230 **GRAVELLY SAND TRACE SILT**; brown, medium dense, non-plastic fines, no cementation	SP	5	RS	12	21	2				
13	2227 **GRAVELLY SAND WITH SILT**; brown, medium to very dense, non-plastic fines, no cementation	SP-SM	6	RS	12	29					
15		SP-SM	7	RS	12	37					
		SP-SM	8	RS	12	27			22	3	12
20		SP-SM	9	RS	12	43					
		SP-SM	10	RS	12	75/12"					
25		SP-SM	11	RS	6	50/5"					
		SP-SM	12	RS	8	86/10"					
30	2210	GP	13	RS	6	50/6"					
31	2209 **SANDY GRAVEL TRACE CLAY**; brown, very dense, non-plastic fines, no cementation										
33	2207 **SAND WITH GRAVEL TRACE SILT**; brown, very dense, non-plastic fines, no cementation	SP	14	RS	6	50/6"					
34	2206										
35											

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft		
WL	None WD	None AB
WL		
WL	Backfilled Upon Completion	

Terracon

BORING STARTED	7-29-08		
BORING COMPLETED	7-29-08		
RIG	CME 75	FOREMAN	RP
Approved	OBL	JOB #	63085095

BOREHOLE 2000 63085095.GPJ TERR2000.GDT 8/29/08

LOG OF BORING NO. B-09

CLIENT
Pima County Regional Water Reclamation

SITE
Tucson, Arizona

PROJECT
Future WRC Site

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY (in)	BLOWS/FT.	TESTS WATER CONTENT, %	DRY DENSITY pcf	Liquid Limit	PLASTICITY INDEX	-200
	GRAVELLY SAND TRACE SILT; brown, very dense, non-plastic fines, no cementation		SP	15	RS	12	85/11"					
	GRAVELLY SAND TRACE CLAY; brown, very dense, low plasticity fines, no cementation		SP	16	RS	6	50/4"					
	40.5 2199.5	40		17	RS	6	50/6"					
	Bottom of Boring											

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft		
WL	None WD	None AB
WL		
WL	Backfilled Upon Completion	

Terracon

BORING STARTED	7-29-08		
BORING COMPLETED	7-29-08		
RIG	CME 75	FOREMAN	RP
Approved	OBL	JOB #	63085095

LOG OF BORING NO. B-10

CLIENT
Pima County Regional Water Reclamation

SITE
Tucson, Arizona

PROJECT
Future WRC Site

Boring Location: N69639.392 E74335.076

Approx. Surface Elev.: 2241.26 ft

DESCRIPTION	Depth	Elev.
SANDY SILTY LEAN CLAY; brown, stiff, low plasticity fines, no cementation	7	2234.5
CLAYEY SAND WITH SILT; brown, loose, low plasticity fines, no cementation	9	2232.5
SAND WITH GRAVEL TRACE SILT; brown, medium dense, non-plastic fines, no cementation	12	2229.5
SANDY GRAVEL TRACE SILT; brown, medium to very dense, non-plastic fines, no cementation	27	2214.5
GRAVEL; brown, medium dense, non-plastic fines, no cementation	29	2212.5
SANDY GRAVELWITH CLAY; brown, dense to very dense, low plasticity fines, no cementation		

Continued Next Page

DEPTH, ft.	USCS SYMBOL	NUMBER	TYPE	RECOVERY (in)	BLOWS/FT.	WATER CONTENT, %	DRY DENSITY pcf	Liquid Limit	PLASTICITY INDEX	-200
	CL-ML	1	BS							
	CL-ML	2	RS	12	7	15	106			
5	CL-ML	3	RS	12	7					
	SC	4	RS	12	13					
10	SP	5	RS	12	26					
	GP	6	RS	12	51					
15	GP	7	RS	0	50/6"					
	GP	8	RS	12	78					
20	GP	9	RS	12	42					
	GP	10	RS	12	78					
25	GP	11	RS	8	50/4"					
	GP	12	RS	4	56					
30	GP	13	RS	8	70					
	GP	14	RS	12	50/6"					
35										

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft		
WL	None WD	None AB
WL		
WL	Backfilled Upon Completion	

Terracon

BORING STARTED	7-29-08		
BORING COMPLETED	7-29-08		
RIG	CME 75	FOREMAN	RP
Approved	OBL	JOB #	63085095

LOG OF BORING NO. B-10

CLIENT
Pima County Regional Water Reclamation

SITE
Tucson, Arizona

PROJECT
Future WRC Site

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY (in)	BLOWS/FT.	TESTS WATER CONTENT, %	DRY DENSITY pcf	Liquid Limit	PLASTICITY INDEX	-200
	SANDY GRAVELWITH CLAY; brown, dense to very dense, low plasticity fines, no cementation		GP	15	RS	12	95/11"					
			GP	16	RS	12	80/11"					
	40.5 2201	40		17	RS	12	50/6"					
	Bottom of Boring											

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft		
WL	None WD	None AB
WL		
WL	Backfilled Upon Completion	

Terracon

BORING STARTED	7-29-08		
BORING COMPLETED	7-29-08		
RIG	CME 75	FOREMAN	RP
Approved	OBL	JOB #	63085095

LOG OF BORING NO. B-11

CLIENT: Pima County Regional Water Reclamation

SITE: Tucson, Arizona

PROJECT: Future WRC Site

Boring Location: N69419.410 E74698.289

Approx. Surface Elev.: 2246.17 ft

DEPTH, ft.	DESCRIPTION	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY (in)	BLOWS/FT.	TESTS WATER CONTENT, %	DRY DENSITY pcf	Liquid Limit	PLASTICITY INDEX	-200
	GRAVELLY SAND TRACE SILT; brown, medium to very dense, non-plastic fines, no cementation										
5											
10		SP	1	RS	10	85/10"					
		SP	2	RS	12	27					
15		SP	3	RS	12	19					
		SP	4	RS	12	33					
20		SP-SC	5	RS	12	45					
		SP	6	RS	12	42					
25		GP	7	RS	12	80/12"					
		GP	8	RS	12	65					
30		GP	9	RS	8	82/9"					
		GP	10	RS	6	50/5"					
35											

20 — 2226

GRAVELLY SAND WITH CLAY; brown, medium dense, low plasticity fines, no cementation

23 — 2223

SAND WITH GRAVEL TRACE SILT; brown, medium dense, non-plastic fines, no cementation

25 — 2221

SANDY GRAVEL TRACE SILT; brown, dense to very dense, non-plastic fines, no cementation

35 — 2211

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft		
WL	None WD	None AB
WL		
WL	Backfilled Upon Completion	

Terracon

BORING STARTED	7-31-08		
BORING COMPLETED	7-31-08		
RIG	CME 75	FOREMAN	RP
Approved	OBL	JOB #	63085095

BOREHOLE 2000 63085095.GPJ TERR2000.GDT 8/29/08

LOG OF BORING NO. B-11

CLIENT
Pima County Regional Water Reclamation

SITE
Tucson, Arizona

PROJECT
Future WRC Site

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY (in)	SAMPLES BLOWS/FT.	TESTS WATER CONTENT, %	TESTS DRY DENSITY pcf	TESTS Liquid Limit	TESTS PLASTICITY INDEX	TESTS -200
	SANDY GRAVEL WITH CLAY; brown, very dense, low plasticity fines, no cementation		GP-GC	11	RS	10	80/10"					
			GP-GC	12	RS	6	50/6"					
	40.5 2205.5	40		13	RS	6	50/5"					
	Bottom of Boring											

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft		
WL	None WD	None AB
WL		
WL	Backfilled Upon Completion	

Terracon

BORING STARTED	7-31-08		
BORING COMPLETED	7-31-08		
RIG	CME 75	FOREMAN	RP
Approved	OBL	JOB #	63085095

LOG OF BORING NO. B-12

CLIENT
Pima County Regional Water Reclamation

SITE
Tucson, Arizona

PROJECT
Future WRC Site

Boring Location: N69208.417 E74299.573

Approx. Surface Elev.: 2244.99 ft

DEPTH, ft.	DESCRIPTION		USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY (in)	BLOWS/FT.	TESTS WATER CONTENT, %	DRY DENSITY pcf	Liquid Limit	PLASTICITY INDEX	-200
	FILL: SANDY LEAN CLAY TRACE GRAVEL; brown, very stiff, low plasticity fines, no cementation		CL	1	BS							
			CL	2	RS	12	19	5	95			
5		2240										
	SILTY SAND WITH GRAVEL; brown, medium dense, non-plastic fines, no cementation		SM	3	RS	12	53					
7.5		2237.5										
	SANDY GRAVEL TRACE SILT; brown, medium dense, non-plastic fines, no cementation		GP	4	RS	12	41					
10		2235										
	SAND TRACE SILT AND GRAVEL; brown, medium dense, non-plastic fines, no cementation		SP	5	RS	8	25					
			SP	6	RS	12	24					
16		2229	SP	7	RS	12	23	2	98			
	GRAVELLY SAND TRACE SILT; brown, medium dense, non-plastic fines, no cementation		SP	8	RS	0	45					
20		2225										
	SANDY GRAVEL TRACE SILT; brown, dense, non-plastic fines, no cementation		GP	9	RS	12	59					
			GP	10	RS	12	77					
25		2220										
	SANDY GRAVEL TRACE CLAY; brown, medium to very dense, low plasticity fines, no cementation		GP	11	RS	12	30					
			GP	12	RS	6	50/6"					
29		2216										
	CLAYEY SAND WITH GRAVEL; brown, very dense, low plasticity fines, no cementation		SC	13	RS	6	50/4"					
			SC	14	RS	6	50/3"					
34		2211										
35												

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft		
WL	None WD	None AB
WL		
WL	Backfilled Upon Completion	

Terracon

BORING STARTED	7-30-08		
BORING COMPLETED	7-30-08		
RIG	CME 75	FOREMAN	RP
Approved	OBL	JOB #	63085095

BOREHOLE 2000 63085095.GPJ TERR2000.GDT 8/29/08

LOG OF BORING NO. B-12

CLIENT
Pima County Regional Water Reclamation

SITE
Tucson, Arizona

PROJECT
Future WRC Site

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY (in)	BLOWS/FT.	TESTS WATER CONTENT, %	DRY DENSITY pcf	Liquid Limit	PLASTICITY INDEX	-200
	SANDY GRAVEL TRACE CLAY; brown, dense to very dense, low plasticity fines, no cementation		GP	15	RS	8	71					
			GP	16	RS	12	80/12"					
		40	GP	17	RS	12	85/12"					
	41 2204 Bottom of Boring											

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft		
WL	None WD	None AB
WL		
WL	Backfilled Upon Completion	

Terracon

BORING STARTED	7-30-08		
BORING COMPLETED	7-30-08		
RIG	CME 75	FOREMAN	RP
Approved	OBL	JOB #	63085095

LOG OF BORING NO. B-13

CLIENT
Pima County Regional Water Reclamation

SITE
Tucson, Arizona

PROJECT
Future WRC Site

Boring Location: N68884.197 E74312.564

Approx. Surface Elev.: 2245.44 ft

DEPTH, ft.	DESCRIPTION	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY (in)	BLOWS/FT.	TESTS WATER CONTENT, %	DRY DENSITY pcf	Liquid Limit	PLASTICITY INDEX	-200
	SILTY SAND TRACE GRAVEL; brown, loose to medium dense, non-plastic fines, no cementation	SM	1	BS					NP	NP	34
		SM	2	RS	12	34					
5		SM	3	RS	12	12	9	82			
		SM	4	RS	12	17					
10		SM	5	RS	0	20					
13	2232.5										
	SANDY GRAVEL TRACE SILT; brown, medium dense, non-plastic fines, no cementation	GP	6	RS	0	7					
15		GP	7	RS	8	40					
17	2228.5										
	GRAVELLY SAND TRACE SILT; brown, dense, non-plastic fines, no cementation	SP	8	RS	12	64					
20	2225.5										
	SANDY TRACE SILT; brown, dense to very dense, non-plastic fines, no cementation	GP	9	RS	5	75/7"					
		GP	10	RS	8	65					
25		GP	11	RS	5	50/6"					
		GP	12	RS	0	50/3"					
29	2216.5										
	SANDY GRAVEL TRACE CLAY; brown, very dense, low plasticity fines, no cementation ▼										
30		GP	13	RS	9	91/9"					
32	2213.5										
	SAND WITH GRAVEL TRACE CLAY; brown, very dense, low plasticity fines, no cementation	SP	14	RS	4	50/4"					
34	2211.5										
35											

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft		
WL	▽ 30	▼ 30
WL	▽	▼
WL	Backfilled Upon Completion	

Terracon

BORING STARTED	7-31-08		
BORING COMPLETED	7-31-08		
RIG	CME 75	FOREMAN	RP
Approved	OBL	JOB #	63085095

LOG OF BORING NO. B-13

CLIENT
Pima County Regional Water Reclamation

SITE
Tucson, Arizona

PROJECT
Future WRC Site

GRAPHIC LOG	DESCRIPTION		DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY (in)	BLOWS/FT.	TESTS WATER CONTENT, %	DRY DENSITY pcf	Liquid Limit	PLASTICITY INDEX	-200
	GRAVELLY SAND TRACE CLAY; brown, very dense, low plasticity fines, no cementation			SP	15	RS	4	50/4"					
				SP	16	RS	6	50/5"					
39		2206.5											
	SANDY GRAVEL TRACE CLAY; brown, dense, low plasticity fines, no cementation		40	GP	17	RS	12	72					
41		2204.5											
	Bottom of Boring												

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft		
WL	▽ 30	▼ 30
WL	▽	▼
WL	Backfilled Upon Completion	

Terracon

BORING STARTED	7-31-08		
BORING COMPLETED	7-31-08		
RIG	CME 75	FOREMAN	RP
Approved	OBL	JOB #	63085095

LOG OF BORING NO. B-14

CLIENT
Pima County Regional Water Reclamation

SITE
Tucson, Arizona

PROJECT
Future WRC Site

Boring Location: N69046.538 E74552.838

Approx. Surface Elev.: 2244.96 ft

DEPTH, ft.	DESCRIPTION	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY (in)	BLOWS/FT.	TESTS WATER CONTENT, %	DRY DENSITY pcf	Liquid Limit	PLASTICITY INDEX	-200
	SANDY LEAN CLAY TRACE GRAVEL; brown, very stiff, medium plasticity fines, no cementation	CL	1	BS					37	18	57
		CL	2	RS	12	12	17	83			
5		CL	3	RS	12	16					
7 / 2238	**SAND WITH GRAVEL TRACE SILT**; brown, loose to medium dense, non-plastic fines, no cementation	SP	4	RS	12	16	2	102			
10		SP	5	RS	12	29					
14 / 2231		SP	6	RS	0	80/10"					
15	**GRAVELLY SAND TRACE SILT**; brown, very dense, non-plastic fines, no cementation	SP	7	RS	8	44					
17 / 2228	**GRAVELLY SAND TRACE CLAY**; brown, medium to very dense, low plasticity fines, no cementation	SP	8	RS	8	55					
20		SP	9	RS	12	75/12"					
		SP	10	RS	0	78/9"					
25		SP	11	RS	0	51					
27 / 2218	**SANDY GRAVEL WITH CLAY**; brown, medium to very dense, low plasticity fines, no cementation	GP	12	RS	10	52					
30		GP	13	RS	12	43					
		GP	14	RS	9	92/9"					
35											

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft		
WL	▽ 30	▼ 30
WL	▽	▼
WL	Backfilled Upon Completion	

Terracon

BORING STARTED	8-1-08		
BORING COMPLETED	8-1-08		
RIG	CME 75	FOREMAN	RP
Approved	OBL	JOB #	63085095

BOREHOLE 2000 63085095.GPJ TERR2000.GDT 10/3/08

LOG OF BORING NO. B-14

CLIENT
Pima County Regional Water Reclamation

SITE
Tucson, Arizona

PROJECT
Future WRC Site

GRAPHIC LOG	DESCRIPTION		DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY (in)	BLOWS/FT.	TESTS WATER CONTENT, %	DRY DENSITY pcf	Liquid Limit	PLASTICITY INDEX	-200
	SANDY GRAVEL WITH CLAY; brown, medium to very dense, low plasticity fines, no cementation	39 / 2206		GP	15	RS	0	50/3"					
				GP	16	RS	6	88/10"					
	CLAYEY SAND TRACE GRAVEL; brown, very dense, low plasticity fines, no cementation	44 / 2201	40	SC	17	RS	6	50/6"					
				SC	18	RS	6	50/4"					
	SAND WITH CLAY TRACE GRAVEL; brown, very dense, low plasticity fines, no cementation	49 / 2196	45	SP-SC	19	RS	6	50/5"					
				SP-SC	20	RS	6	50/6"					
	GRAVELLY SAND WITH CLAY; brown, very dense, low plasticity fines, no cementation	57 / 2188	50	SP-SC	21	RS	6	50/6"					
				SP-SC	22	RS	12	85/12"					
			55	SP-SC	23	RS	12	80/11"					
	CLAYEY SAND TRACE GRAVEL; brown, very dense, low plasticity fines, no cementation	60.5 / 2184.5		SC	24	RS	6	50/6"					
	Bottom of Boring		60		25	RS	6	50/6"					

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft		
WL	▽ 30	▼ 30
WL	▽	▼
WL	Backfilled Upon Completion	

Terracon

BORING STARTED	8-1-08		
BORING COMPLETED	8-1-08		
RIG	CME 75	FOREMAN	RP
Approved	OBL	JOB #	63085095

LOG OF BORING NO. B-15

CLIENT
Pima County Regional Water Reclamation

SITE
Tucson, Arizona

PROJECT
Future WRC Site

Boring Location: N69128.212 E74685.018

Approx. Surface Elev.: 2242.15 ft

DESCRIPTION	Depth, ft.	Elev.	USCS Symbol	Sample Number	Type	Recovery (in)	Blows/Ft.	Water Content, %	Dry Density pcf	Liquid Limit	Plasticity Index	-200
SANDY LEAN CLAY TRACE GRAVEL; brown, very stiff to hard, medium plasticity fines, no cementation			CL	1	BS					31	14	74
			CL	2	RS	12	16	7	79			
	5		CL	3	RS	6	41					
	7	2235										
SILTY SAND TRACE GRAVEL; brown, loose to medium dense, non-plastic fines, no cementation			SM	4	RS	8	8	1				
	10		SM	5	RS	12	15			NP	NP	12
			SM	6	RS	0	17					
	15		SM	7	RS	0	34					
	17	2225										
SANDY GRAVEL TRACE SILT; brown, very dense, non-plastic fines, no cementation			GP	8	RS	6	50/6"					
	20		GP	9	RS	6	50/6"					
	22	2220										
GRAVELLY SAND TRACE SILT; brown, medium to very dense, non-plastic fines, no cementation			SP	10	RS	12	48					
	25		SP	11	RS	12	31					
			SP	12	RS	6	50/6"					
	29	2213										
GRAVELLY SAND WITH CLAY; brown, very dense, low plasticity fines, no cementation	30		SP-SC	13	RS	6	50/5"					
	32	2210										
CLAYEY SAND WITH GRAVEL; brown, dense, low plasticity fines, no cementation			SC	14	RS	12	50					
	34	2208										
	35											

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft		
WL	None WD	None AB
WL		
WL	Backfilled Upon Completion	

Terracon

BORING STARTED	7-30-08		
BORING COMPLETED	7-30-08		
RIG	CME 75	FOREMAN	RP
Approved	OBL	JOB #	63085095

LOG OF BORING NO. B-15

CLIENT
Pima County Regional Water Reclamation

SITE
Tucson, Arizona

PROJECT
Future WRC Site

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY (in)	SAMPLES BLOWS/FT.	TESTS WATER CONTENT, %	TESTS DRY DENSITY pcf	TESTS Liquid Limit	TESTS PLASTICITY INDEX	TESTS -200
	SILTY SAND WITH GRAVEL; brown, very dense, non-plastic fines, no cementation		SM	15	RS	0	50/3"					
			SM	16	RS	12	94/10"					
	40.5 2201.5	40		17	RS	6	50/6"					
	Bottom of Boring											

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft		
WL	None WD	None AB
WL		
WL	Backfilled Upon Completion	

Terracon

BORING STARTED	7-30-08		
BORING COMPLETED	7-30-08		
RIG	CME 75	FOREMAN	RP
Approved	OBL	JOB #	63085095

LOG OF BORING NO. B-16

CLIENT
Pima County Regional Water Reclamation

SITE
Tucson, Arizona

PROJECT
Future WRC Site

Boring Location: N68758.166 E74538.109

Approx. Surface Elev.: 2245.83 ft

DEPTH, ft.	DESCRIPTION	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY (in)	BLOWS/FT.	TESTS WATER CONTENT, %	DRY DENSITY pcf	Liquid Limit	PLASTICITY INDEX	-200
	SANDY LEAN CLAY; brown, stiff to very stiff, low to medium plasticity fines, no cementation	CL	1	BS							
		CL	2	RS	12	6	11	108			
5		CL	3	RS	12	9					
7 / 2239	**GRAVELLY SAND WITH SILT**; brown, loose to medium dense, non-plastic fines, no cementation	SP-SM	4	RS	12	21					
10		SP-SM	5	RS	12	15	1	108			
14 / 2232		SP-SM	6	RS	12	20					
15	**GRAVELLY SAND TRACE SILT**; brown, medium dense, non-plastic fines, no cementation	SP	7	RS	12	41					
17 / 2229	**GRAVELLY SAND TRACE CLAY**; brown, medium dense, low plasticity fines, no cementation	SP	8	RS	12	27					
20 / 2226	**GRAVEL WITH SAND SILT AND CLAY**; brown, dense, low plasticity fines, no cementation	GP-GC	9	RS	0	63			22	4	6
22 / 2224	**GRAVELLY SAND WITH SILT**; brown, very dense, non-plastic fines, no cementation	SP-SM	10	RS	0	50/1"					
25 / 2221	**GRAVELLY SAND TRACE CLAY**; brown, very dense, low plasticity fines, no cementation	SP-SC	11	RS	12	67/12"					
		SP-SC	12	SS	18	64					
30 / 2216	**SANDY GRAVEL TRACE CLAY**; brown, very dense, low plasticity fines, no cementation	GP-GC	13	RS	6	50/3"					
		GP-GC	14	SS	3	50/3"					
35											

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft		
WL	∇ 37	▼ 37
WL	▼	▼
WL	Backfilled Upon Completion	

Terracon

BORING STARTED	7-30-08		
BORING COMPLETED	7-30-08		
RIG	CME 75	FOREMAN	RP
Approved	OBL	JOB #	63085095

LOG OF BORING NO. B-16

CLIENT
Pima County Regional Water Reclamation

SITE
Tucson, Arizona

PROJECT
Future WRC Site

GRAPHIC LOG	DESCRIPTION		DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY (in)	BLOWS/FT.	TESTS WATER CONTENT, %	DRY DENSITY pcf	Liquid Limit	PLASTICITY INDEX	-200
	SANDY GRAVEL TRACE CLAY; brown, very dense, low plasticity fines, no cementation			GP-GC	15	SS	14	65					
				GP-GC	16	SS	14	81					
	40	2206	40										
	GRAVELLY CLAYEY SAND; brown, very dense, low plasticity fines, no cementation			SC	17	SS	18	59					
	41.5	2204.5											
	Bottom of Boring												

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft		
WL	▽ 37	▼ 37
WL	▽	▼
WL	Backfilled Upon Completion	

Terracon

BORING STARTED	7-30-08		
BORING COMPLETED	7-30-08		
RIG	CME 75	FOREMAN	RP
Approved	OBL	JOB #	63085095

LOG OF BORING NO. B-17

CLIENT
Pima County Regional Water Reclamation

SITE
Tucson, Arizona

PROJECT
Future WRC Site

Boring Location: N68715.534 E74967.062

Approx. Surface Elev.: 2246.95 ft

DESCRIPTION	Elev.	Depth, ft.
CLAYEY SANDY GRAVEL; brown, loose to very dense, low plasticity fines	2240	7
SAND TRACE GRAVEL AND SILT; brown, loose, non-plastic fines	2238	9
GRAVELLY SAND TRACE SILT; brown, medium dense, non-plastic fines	2235	12
SANDY GRAVEL TRACE SILT; brown, medium dense, non-plastic fines	2233	14
SANDY GRAVEL WITH SILT; brown, loose to medium dense, non-plastic fines	2227	20
GRAVELLY SAND WITH SILT; brown, medium dense, non-plastic fines	2223	24
GRAVELLY SAND WITH CLAY; brown, dense, low plasticity fines	2220	27
GRAVELLY SAND TRACE SILT; brown, very dense, non-plastic fines, no cementation	2213	34

DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY (in)	BLOWS/FT.	TESTS WATER CONTENT, %	DRY DENSITY pcf	Liquid Limit	PLASTICITY INDEX	-200
	GC	1	BS					27	8	23
	GC	2	RS	12	69/12"					
5	GC	3	RS	12	14	1	111			
	SP	4	RS	12	18					
10	SP	5	RS	12	32					
	GP	6	RS	12	28					
15	GP	7	RS	0	12			NP	NP	8
	GP	8	RS	12	21	2	105			
20	SP-SM	9	RS	0	34			NP	NP	11
	SP-SM	10	RS	0	22					
25	SP-SC	11	SS	8	39					
	SP	12	RS	12	96/12"					
30	SP	13	RS	0	88/10"					
	SP	14	SS	8	81/8"					
35										

Continued Next Page

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft		
WL	None WD	None AB
WL		
WL	Backfilled Upon Completion	

Terracon

BORING STARTED	7-29-08		
BORING COMPLETED	7-29-08		
RIG	CME 75	FOREMAN	RP
Approved	OBL	JOB #	63085095

LOG OF BORING NO. B-17

CLIENT
Pima County Regional Water Reclamation

SITE
Tucson, Arizona

PROJECT
Future WRC Site

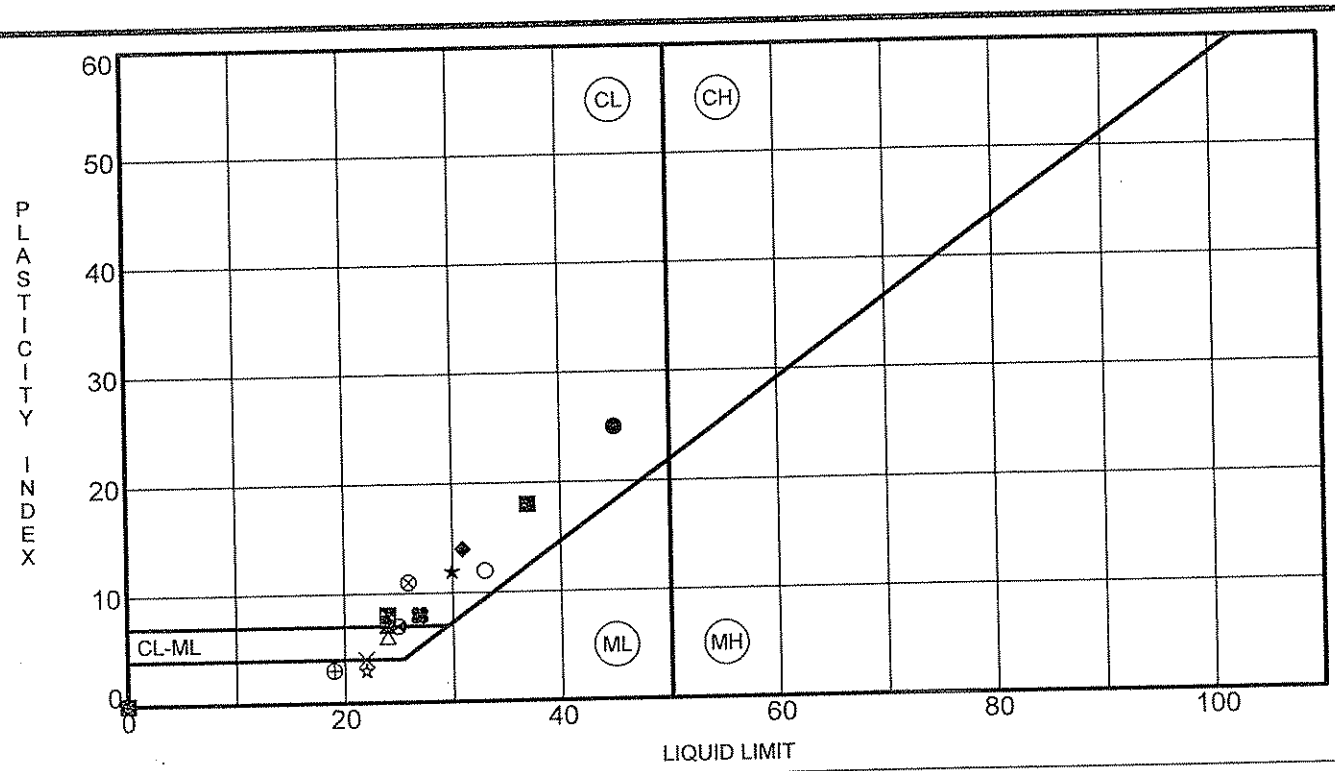
GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	TYPE	RECOVERY (in)	BLOWS/FT.	TESTS WATER CONTENT, %	DRY DENSITY pcf	Liquid Limit	PLASTICITY INDEX	-200
	GRAVELLY SAND TRACE CLAY; brown, very dense, low plasticity fines, no cementation		SP	15	SS	16	50					
37	2210											
	GRAVELLY SAND WITH CLAY; brown, dense to very dense, low plasticity fines, no cementation		SP-SC	16	SS	16	49					
		40	SP-SC	17	SS	0	52					
41.5	2205.5											
	Bottom of Boring											

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft		
WL	None WD	None AB
WL		
WL	Backfilled Upon Completion	

Terracon

BORING STARTED	7-29-08		
BORING COMPLETED	7-29-08		
RIG	CME 75	FOREMAN	RP
Approved	OBL	JOB #	63085095

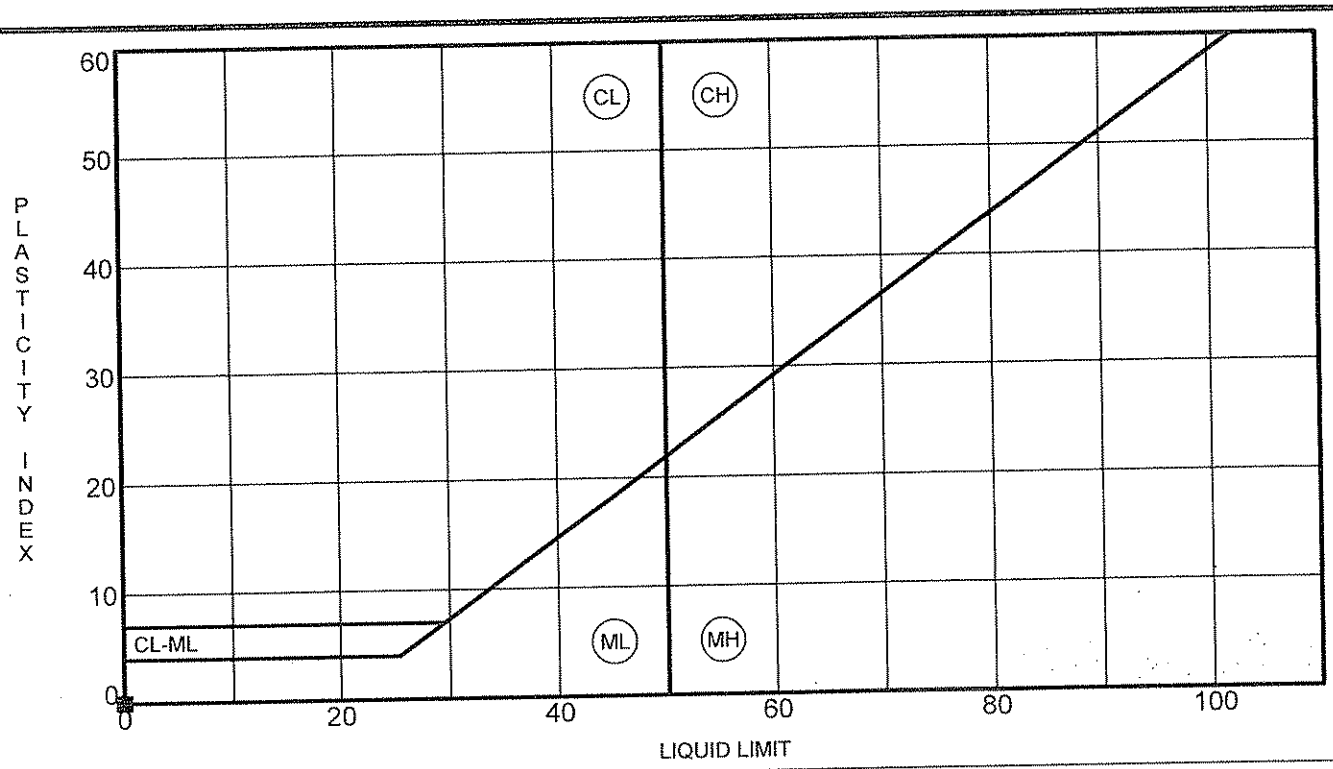


Specimen Identification			LL	PL	PI	%Fines	Classification
●	B-01	0.0ft - 5.0ft	45	20	25	79	SANDY LEAN CLAY (CL)
⊠	B-01	30.0ft - 31.0ft	24	16	8	12	GRAVEL WITH CLAY AND SILT TRACE SAND (GC-GM)
▲	B-02	20.0ft - 21.0ft	24	17	7	19	GRAVELLY SAND TRACE SILT (SP)
★	B-02	35.0ft - 36.5ft	30	18	12	8	GRAVELLY SAND TRACE SILT (SP)
⊙	B-03	0.0ft - 5.0ft	NP	NP	NP	26	FILL: SILTY SAND WITH GRAVEL (SM)
✡	B-03	25.0ft - 26.0ft	NP	NP	NP	12	GRAVELLY SAND TRACE SILT (SP)
○	B-04	15.0ft - 16.0ft	33	21	12	53	SANDY LEAN CLAY WITH GRAVEL (CL)
△	B-05	0.0ft - 5.0ft	24	18	6	65	FILL: SANDY SILTY LEAN CLAY TRACE GRAVEL (CL-ML)
⊗	B-05	45.0ft - 46.0ft	26	15	11	12	CLAYEY GRAVEL WITH SAND (GC)
⊕	B-07	0.0ft - 5.0ft	19	16	3	36	SILTY SAND WITH GRAVEL (SM)
□	B-07	15.0ft - 16.0ft	NP	NP	NP	9	GRAVELLY SAND WITH SILT (SP-SM)
⊖	B-08	0.0ft - 5.0ft	25	18	7	59	SANDY LEAN CLAY (CL)
◕	B-09	0.0ft - 5.0ft	24	16	8	66	SANDY LEAN CLAY TRACE GRAVEL (CL)
☆	B-09	17.5ft - 18.5ft	22	19	3	12	GRAVELLY SAND WITH SILT (SP-SM)
⊠	B-13	0.0ft - 5.0ft	NP	NP	NP	34	SILTY SAND TRACE GRAVEL (SM)
■	B-14	0.0ft - 5.0ft	37	19	18	57	SANDY LEAN CLAY TRACE GRAVEL (CL)
◆	B-15	0.0ft - 5.0ft	31	17	14	74	SANDY LEAN CLAY TRACE GRAVEL (CL)
◇	B-15	10.0ft - 11.0ft	NP	NP	NP	12	SILTY SAND TRACE GRAVEL (SM)
×	B-16	20.0ft - 21.0ft	22	18	4	6	GRAVELLY SAND TRACE CLAY (SP)
⊠	B-17	0.0ft - 5.0ft	27	19	8	23	CLAYEY SANDY GRAVEL (GC)

Terracon

ATTERBERG LIMITS RESULTS

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 9-2-08

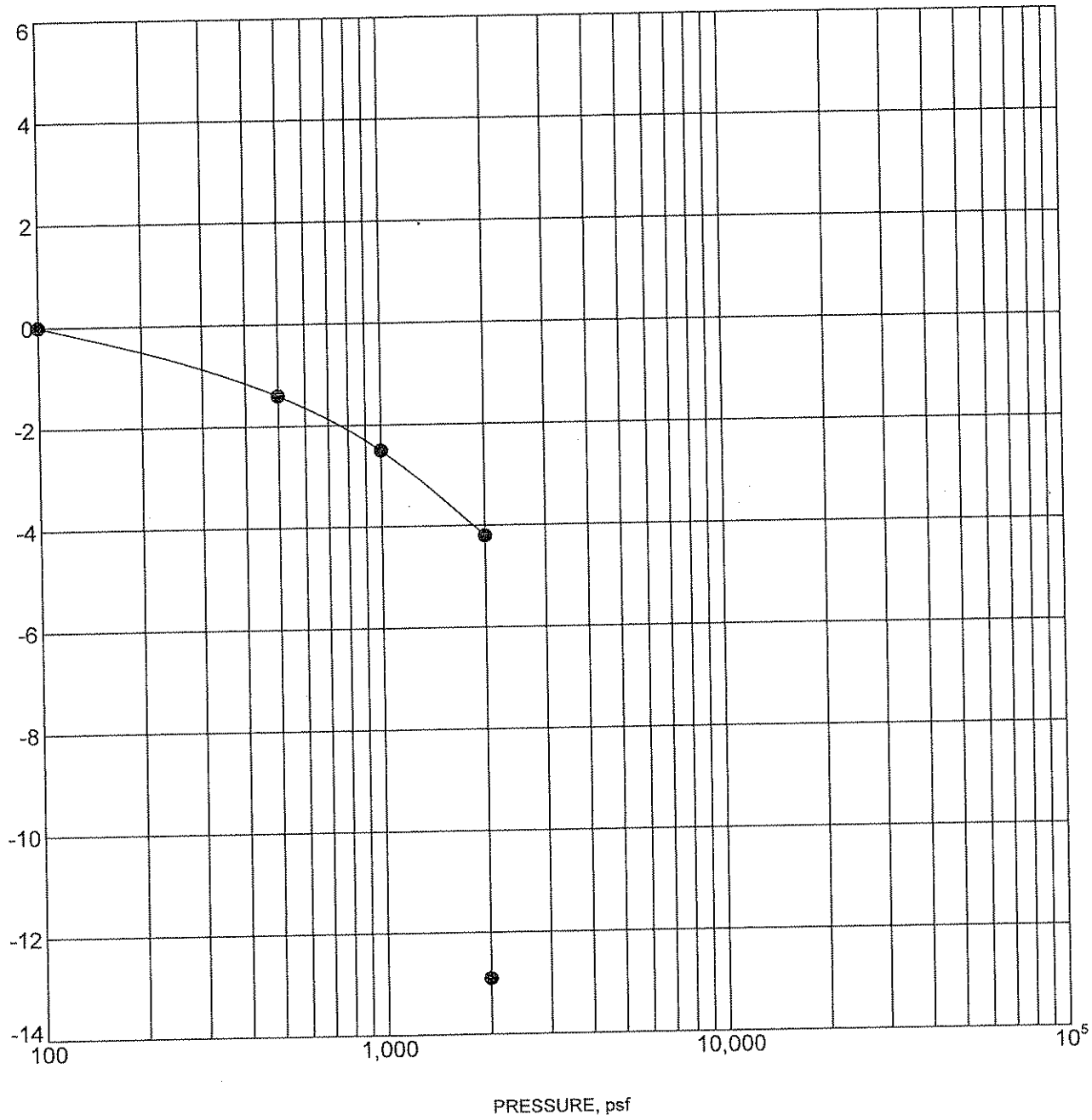


	Specimen Identification		LL	PL	PI	%Fines	Classification
●	B-17	15.0ft - 16.0ft	NP	NP	NP	8	SANDY GRAVEL WITH SILT (GP)
☒	B-17	20.0ft - 21.0ft	NP	NP	NP	11	SANDY GRAVEL WITH SILT (GP)

Terracon

ATTERBERG LIMITS RESULTS

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 9-2-08



Specimen Identification		Classification	γ_d, pcf	WC,%
● B-01	5.0ft - 6.0ft	SANDY LEAN CLAY (CL)	89	10

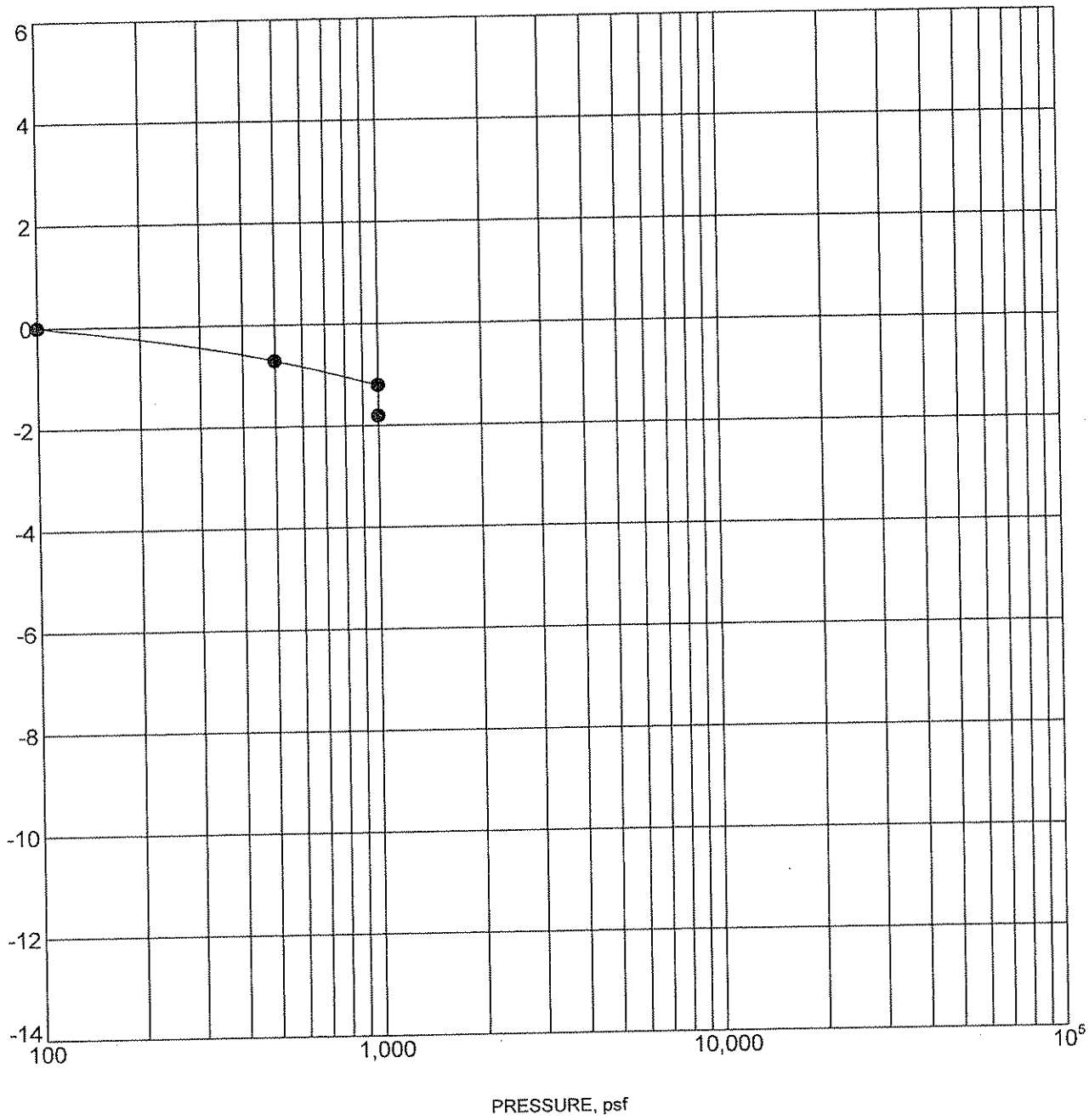
Notes:

Terracon

CONSOLIDATION TEST

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08

TC CONSOL STRAIN 63085095.GPJ TERRACON.GDT 8/29/08



Specimen Identification			Classification	γ_d, pcf	WC,%
●	B-01	10.0ft - 11.0ft	SAND TRACE CLAY (SP)	92	4

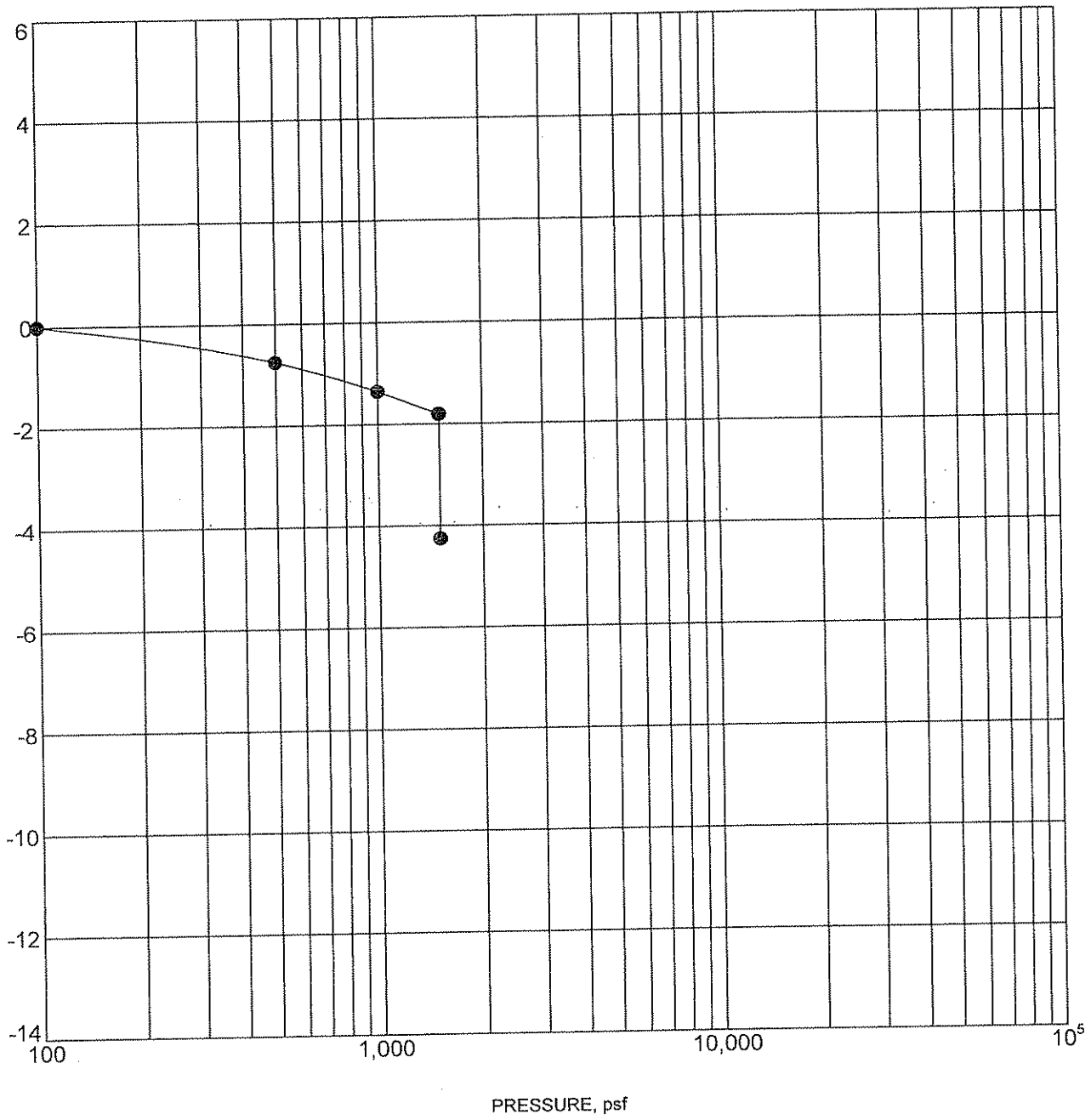
Notes:

Terracon

CONSOLIDATION TEST

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08

TC CONSOL STRAIN 63085095.GPJ TERRACON.GDT 8/29/08



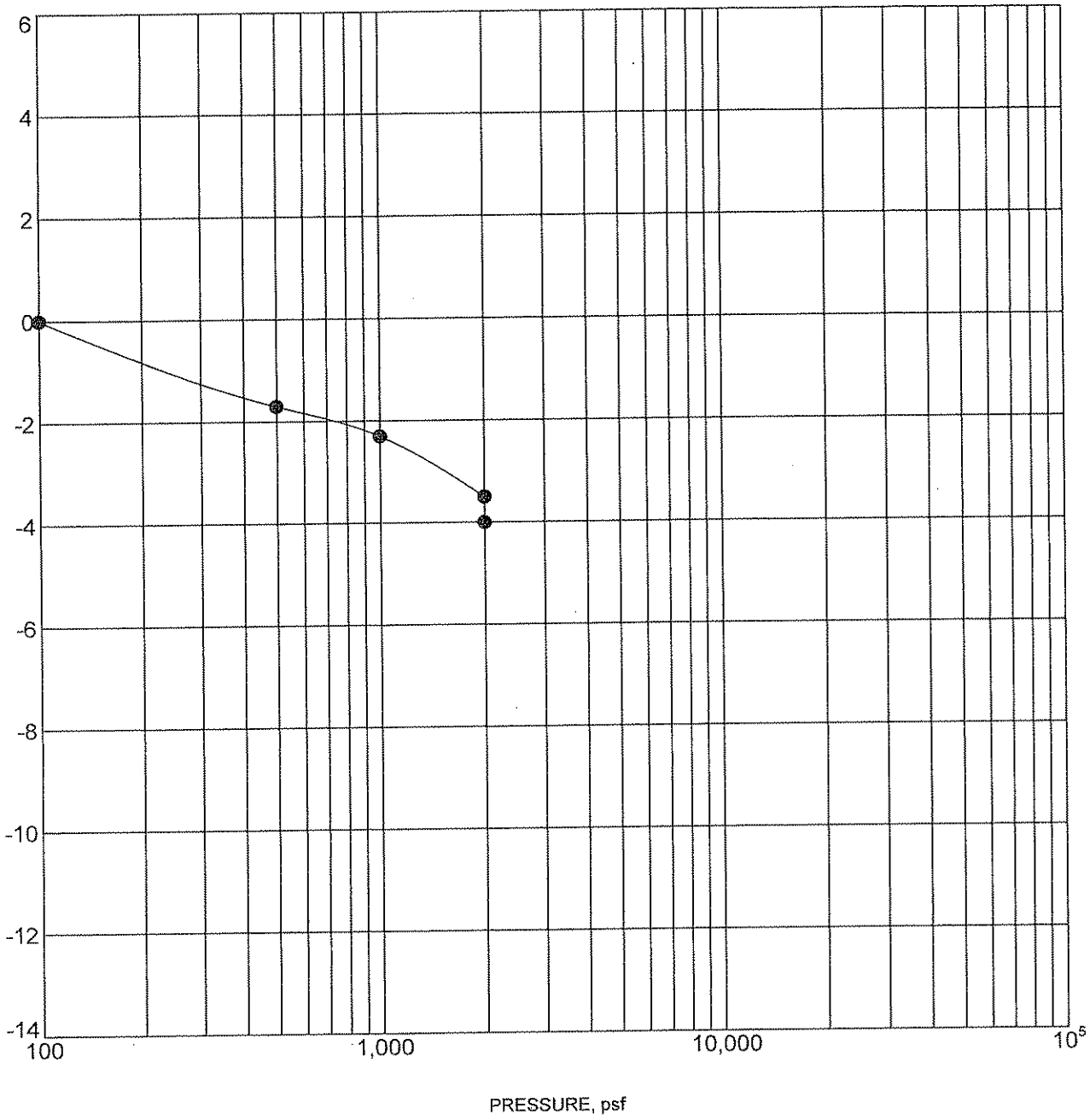
Specimen Identification			Classification	γ_d, pcf	WC,%
●	B-02	12.5ft - 13.5ft	SILTY SAND (SM)	97	1

Notes:

Terracon

CONSOLIDATION TEST

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08



Specimen Identification			Classification	γ_d, pcf	WC,%
●	B-02	20.0ft - 21.0ft	GRAVELLY SAND TRACE SILT (SP)	101	1

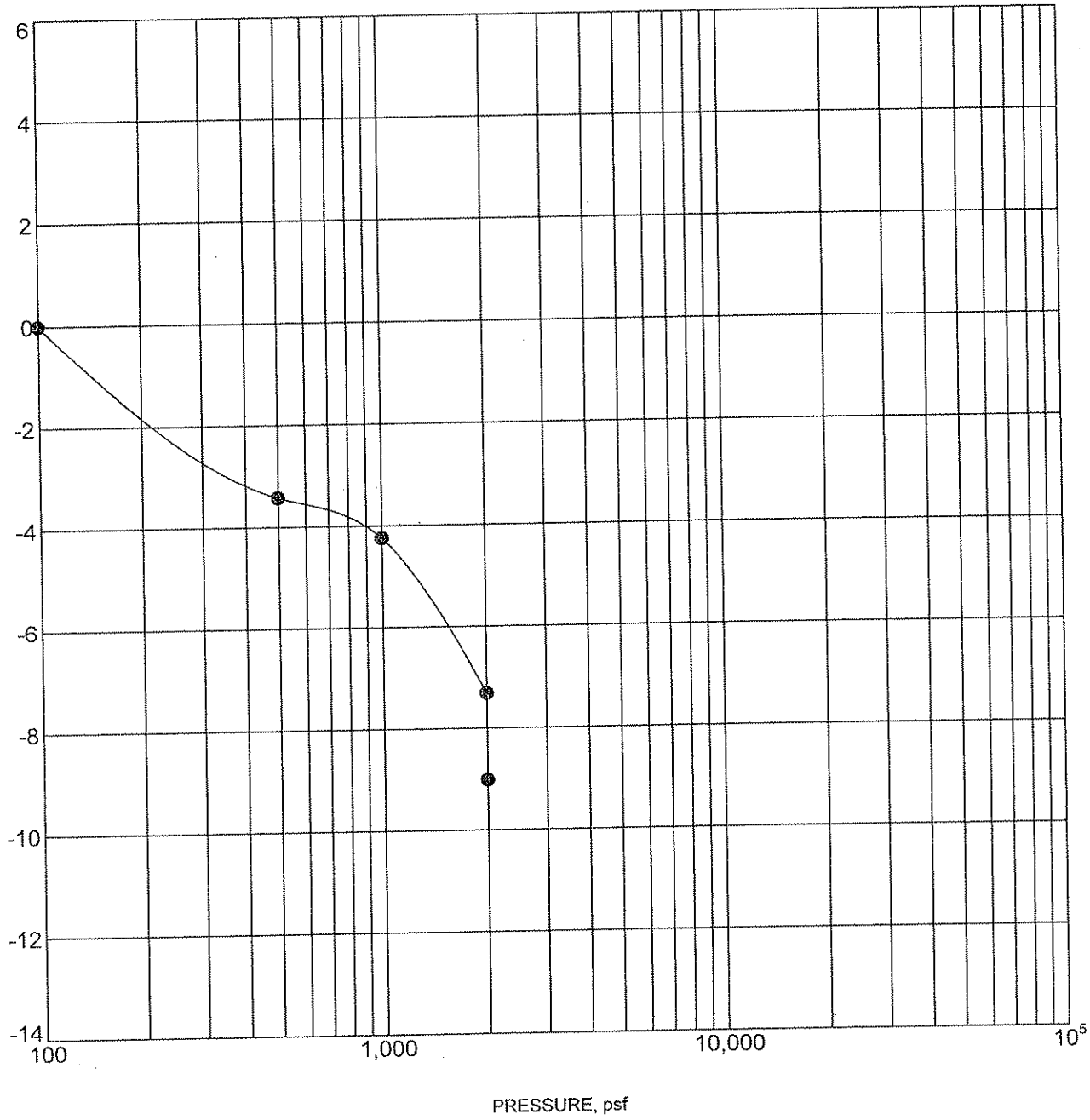
Notes:

Terracon

CONSOLIDATION TEST

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08

TC CONSOL STRAIN 63085095.GPJ TERRACON.GDT 8/29/08



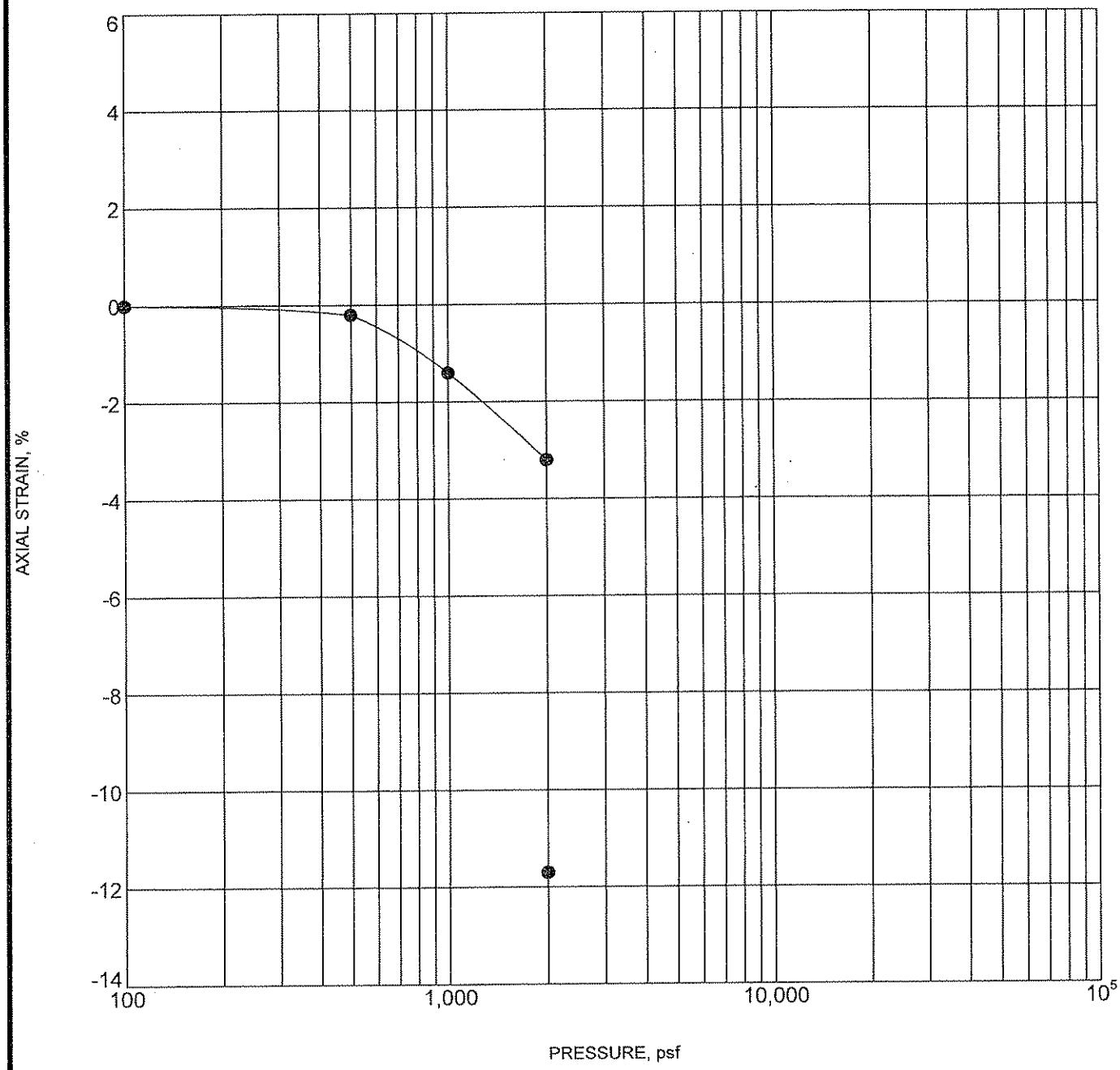
Specimen Identification			Classification	γ_d, pcf	WC,%
●	B-03	7.5ft - 8.5ft	FILL: SILTY SAND WITH GRAVEL (SM)	97	13

Notes:

Terracon

CONSOLIDATION TEST

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08



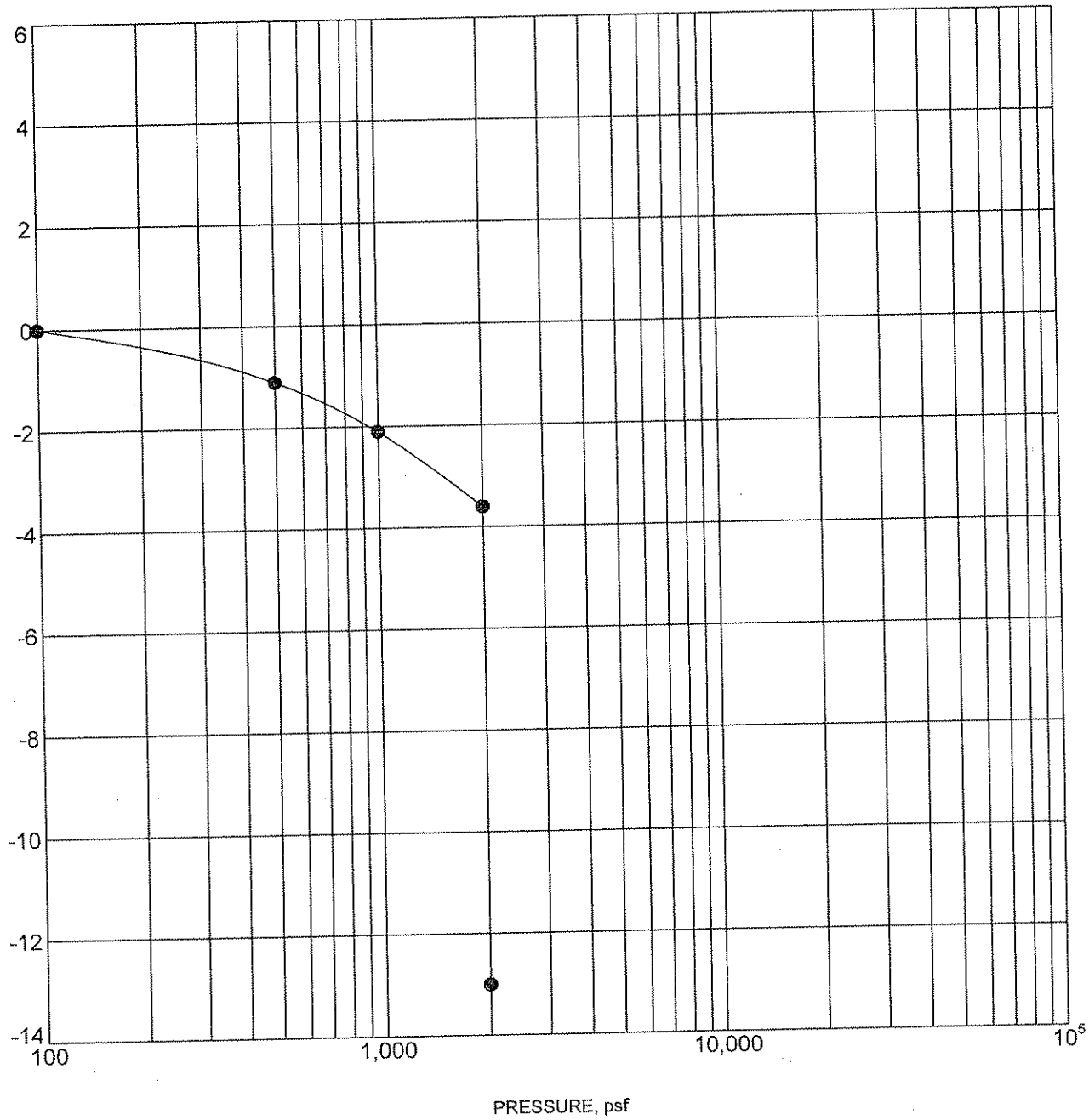
Specimen Identification			Classification	γ_d, pcf	WC,%
●	B-04	2.5ft - 3.5ft	FILL: CLAYEY SAND (SC)	100	7

Notes:

Terracon

CONSOLIDATION TEST

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08



Specimen Identification			Classification	γ_d, pcf	WC,%
●	B-04	15.0ft - 16.0ft	SANDY LEAN CLAY WITH GRAVEL (CL)	107	6

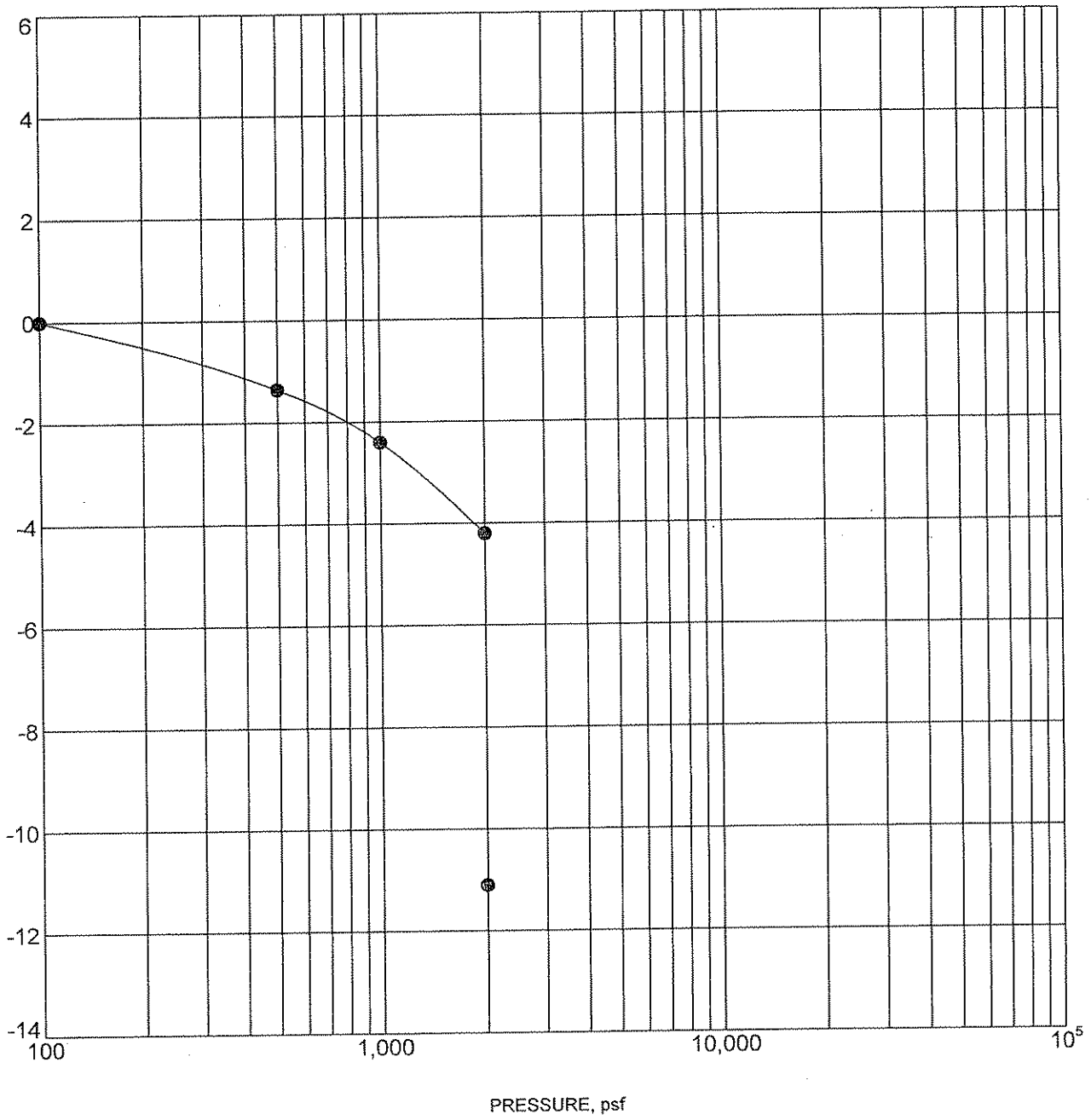
Notes:

Terracon

CONSOLIDATION TEST

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 9-2-08

TC_CONSOL_STRAIN 63085095.GPJ TERRACON.GDT 9/2/08



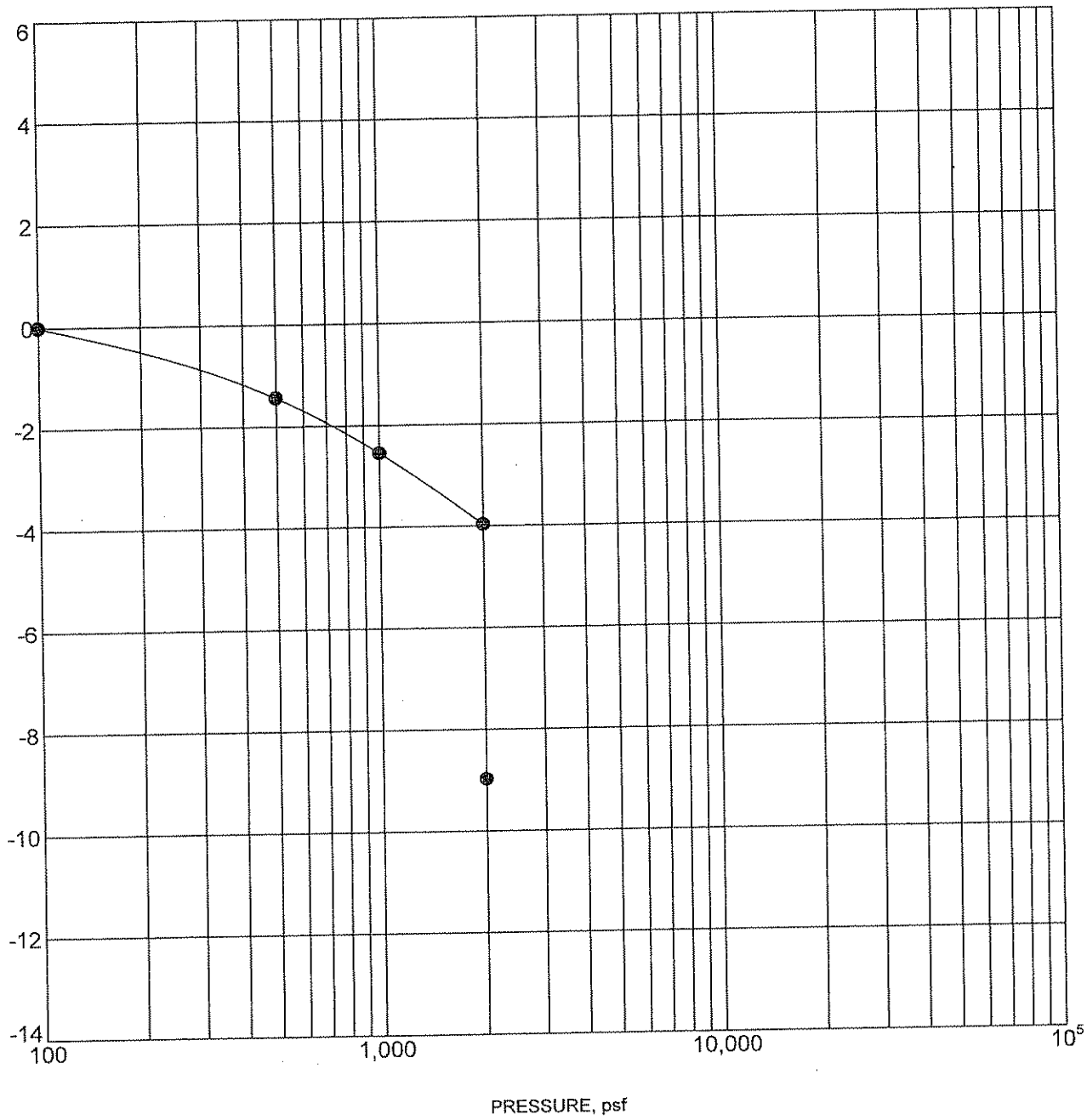
Specimen Identification			Classification	γ_d, pcf	WC,%
●	B-05	2.5ft - 3.5ft	FILL: SANDY SILTY LEAN CLAY TRACE GRAVEL (CL-ML)	96	4

Notes:

Terracon

CONSOLIDATION TEST

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08



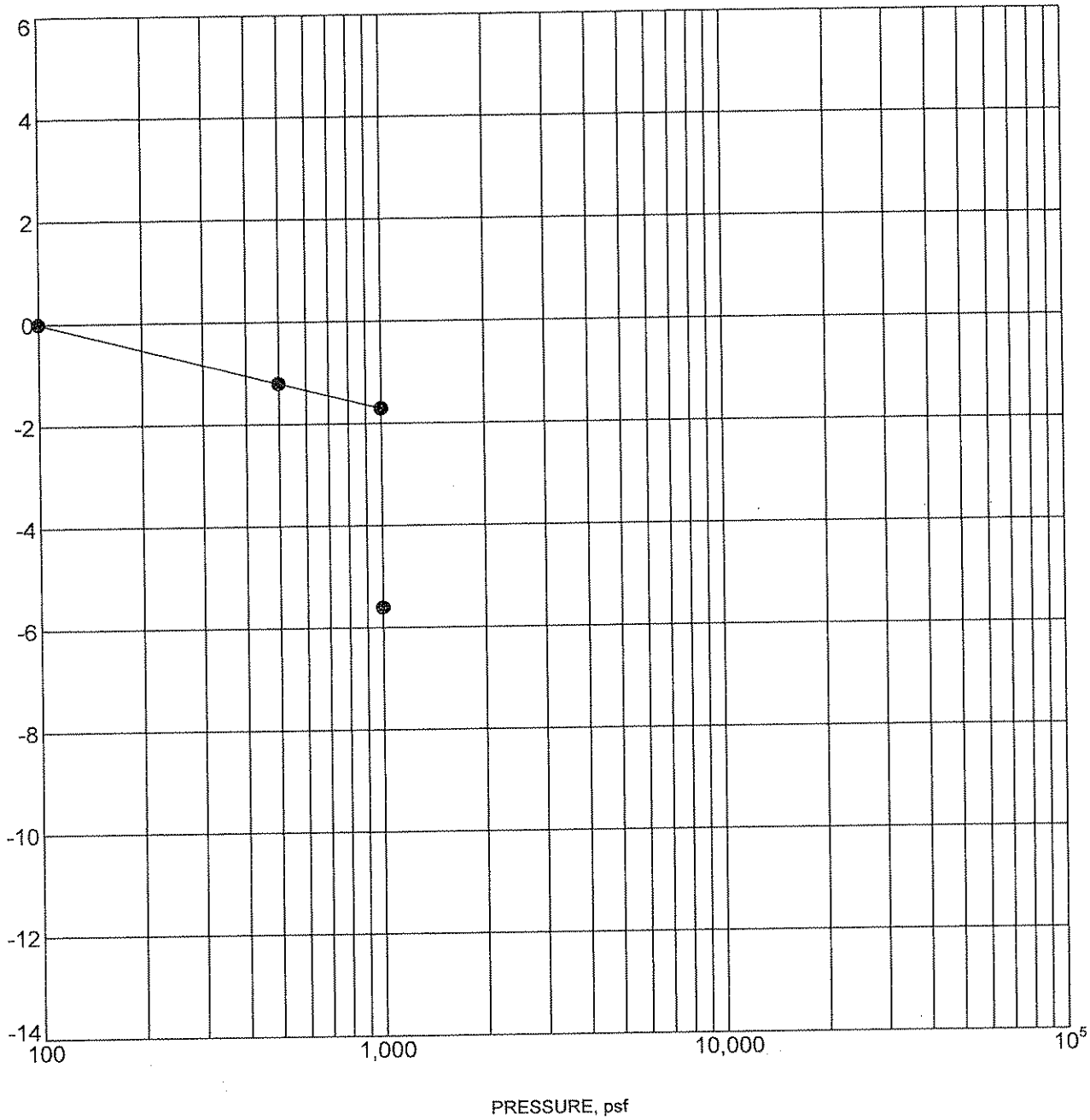
Specimen Identification			Classification	γ_d, pcf	WC,%
●	B-06	5.0ft - 6.0ft	SANDY LEAN CLAY (CL)	88	10

Notes:

Terracon

CONSOLIDATION TEST

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08



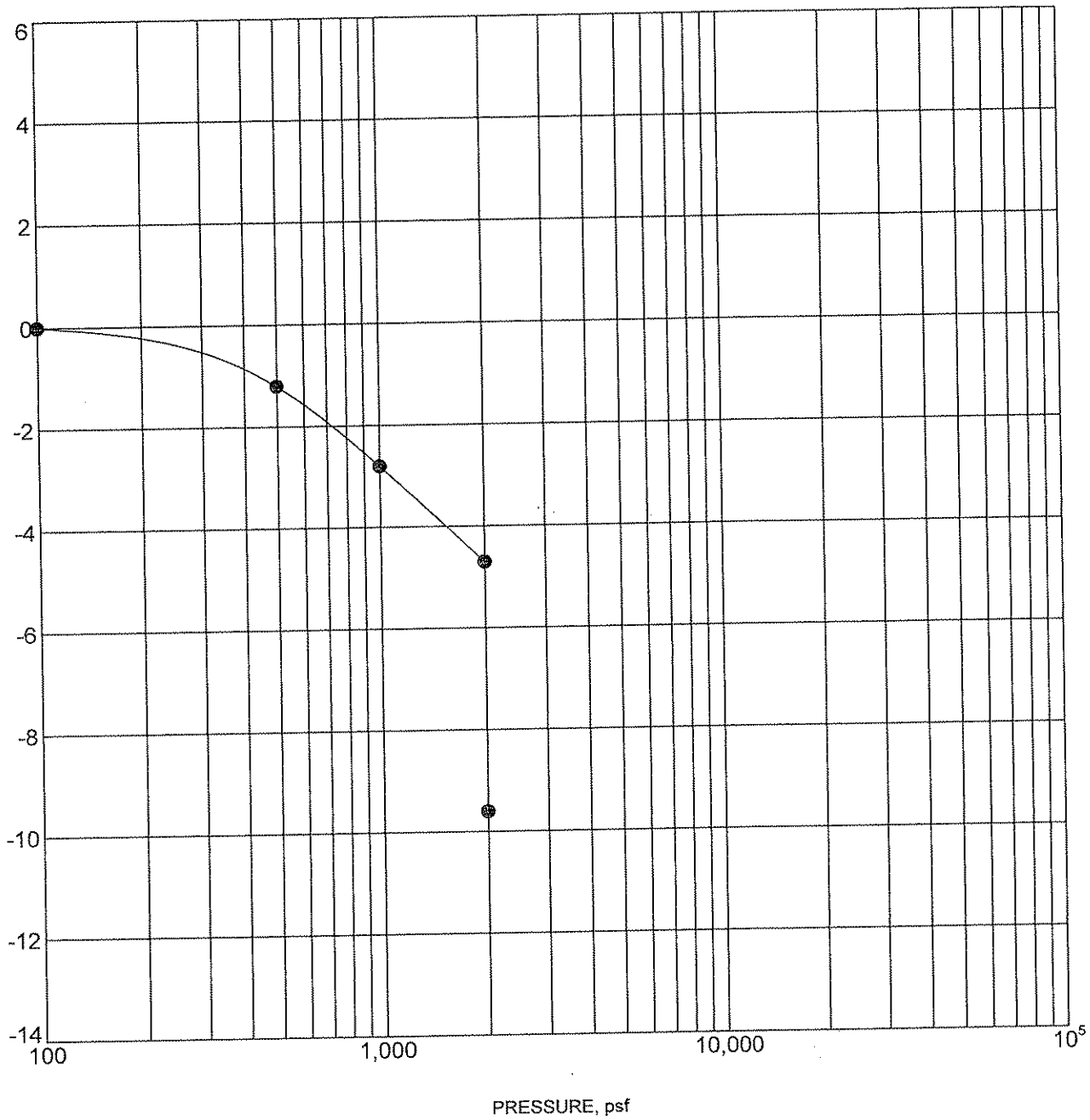
Specimen Identification		Classification	γ_d, pcf	WC,%
● B-06	10.0ft - 11.0ft	CLAYEY SAND TRACE GRAVEL (SC)	97	8

Notes:

Terracon

CONSOLIDATION TEST

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08



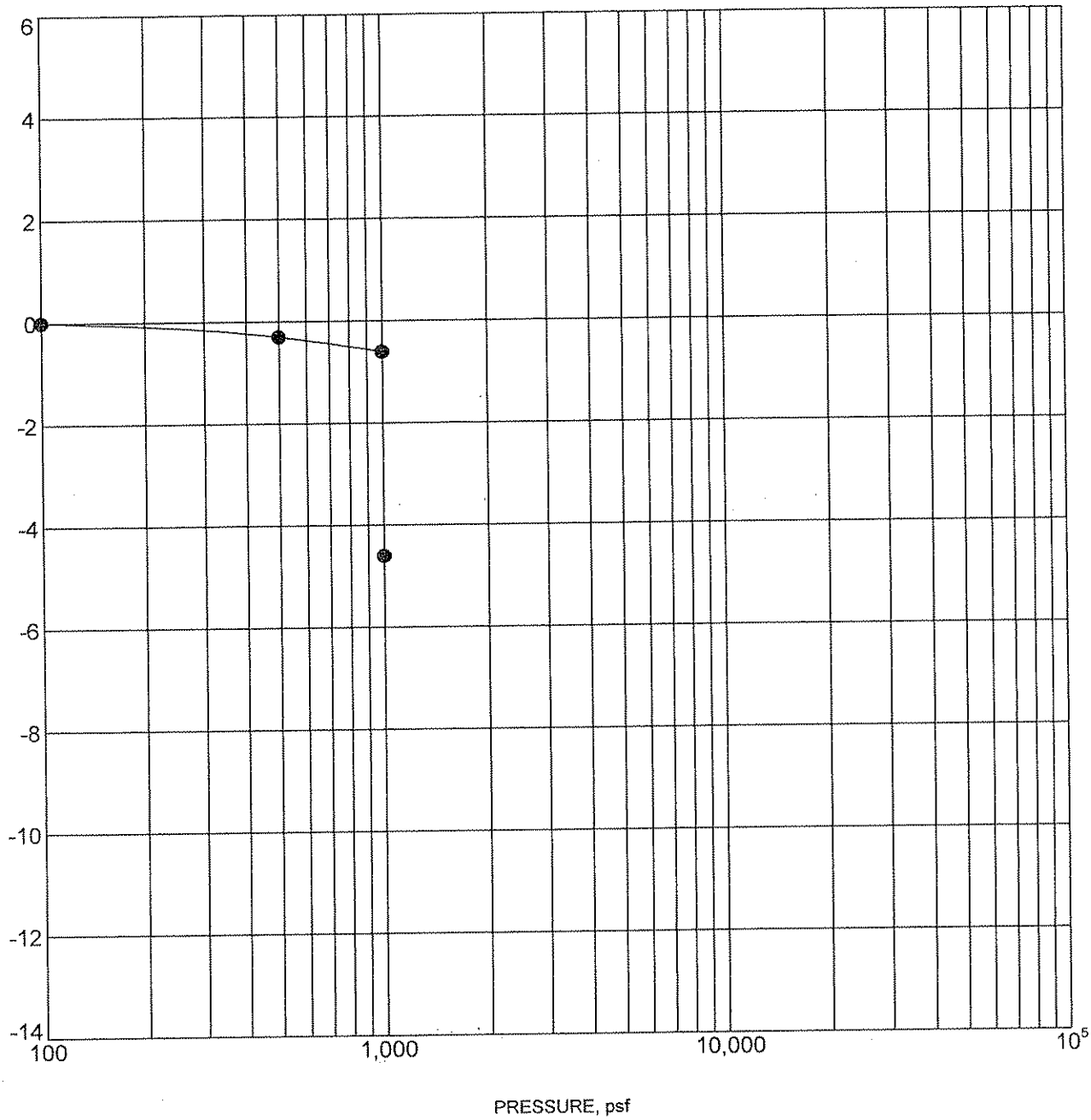
Specimen Identification			Classification	γ_d, pcf	WC,%
●	B-06	17.5ft - 18.5ft	SANDY GRAVEL TRACE SILT (GP)	106	7

Notes:

Terracon

CONSOLIDATION TEST

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08



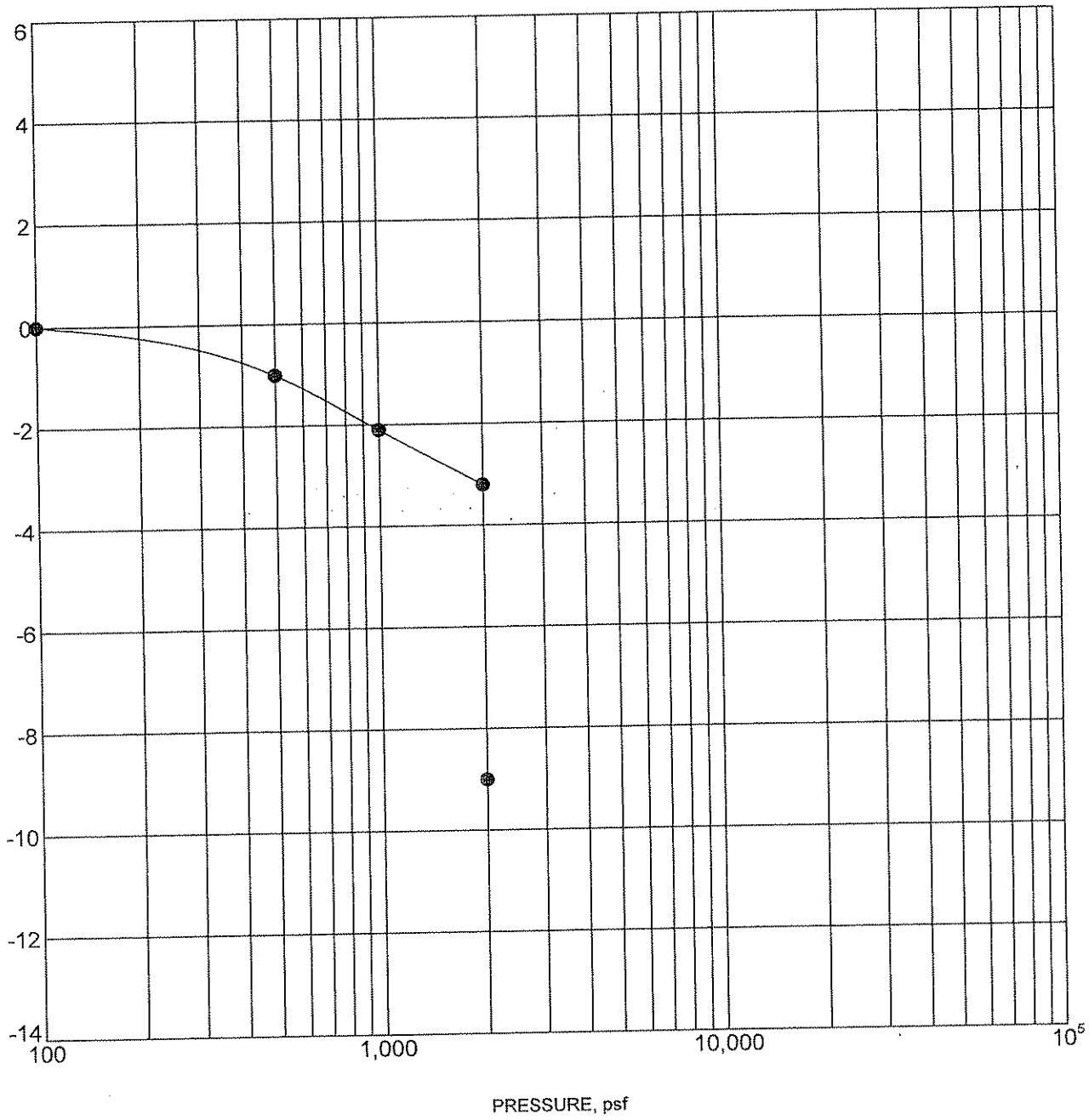
Specimen Identification		Classification	γ_d, pcf	WC,%
● B-07	10.0ft - 11.0ft	GRAVELLY SAND WITH SILT (SP-SM)	101	3

Notes:

Terracon

CONSOLIDATION TEST

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08



Specimen Identification			Classification	γ_d, pcf	WC,%
●	B-09	2.5ft - 3.5ft	SANDY LEAN CLAY TRACE GRAVEL (CL)	107	6

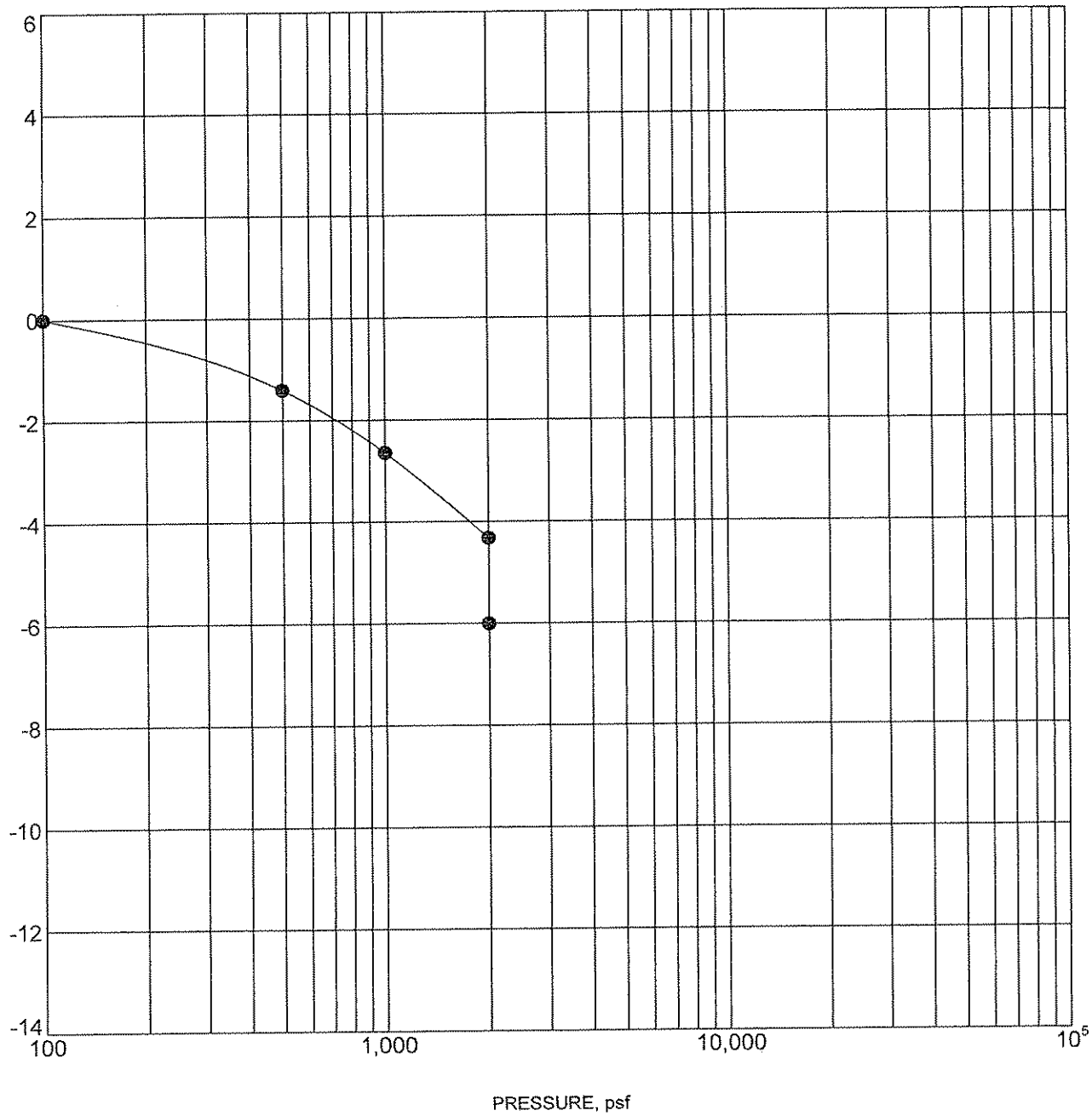
Notes:

Terracon

CONSOLIDATION TEST

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08

TC CONSOL STRAIN 63085095.GPJ TERRACON.GDT 8/29/08



Specimen Identification		Classification	γ_d, pcf	WC,%
● B-10	2.5ft - 3.5ft	SANDY SILTY LEAN CLAY (CL-ML)	106	15

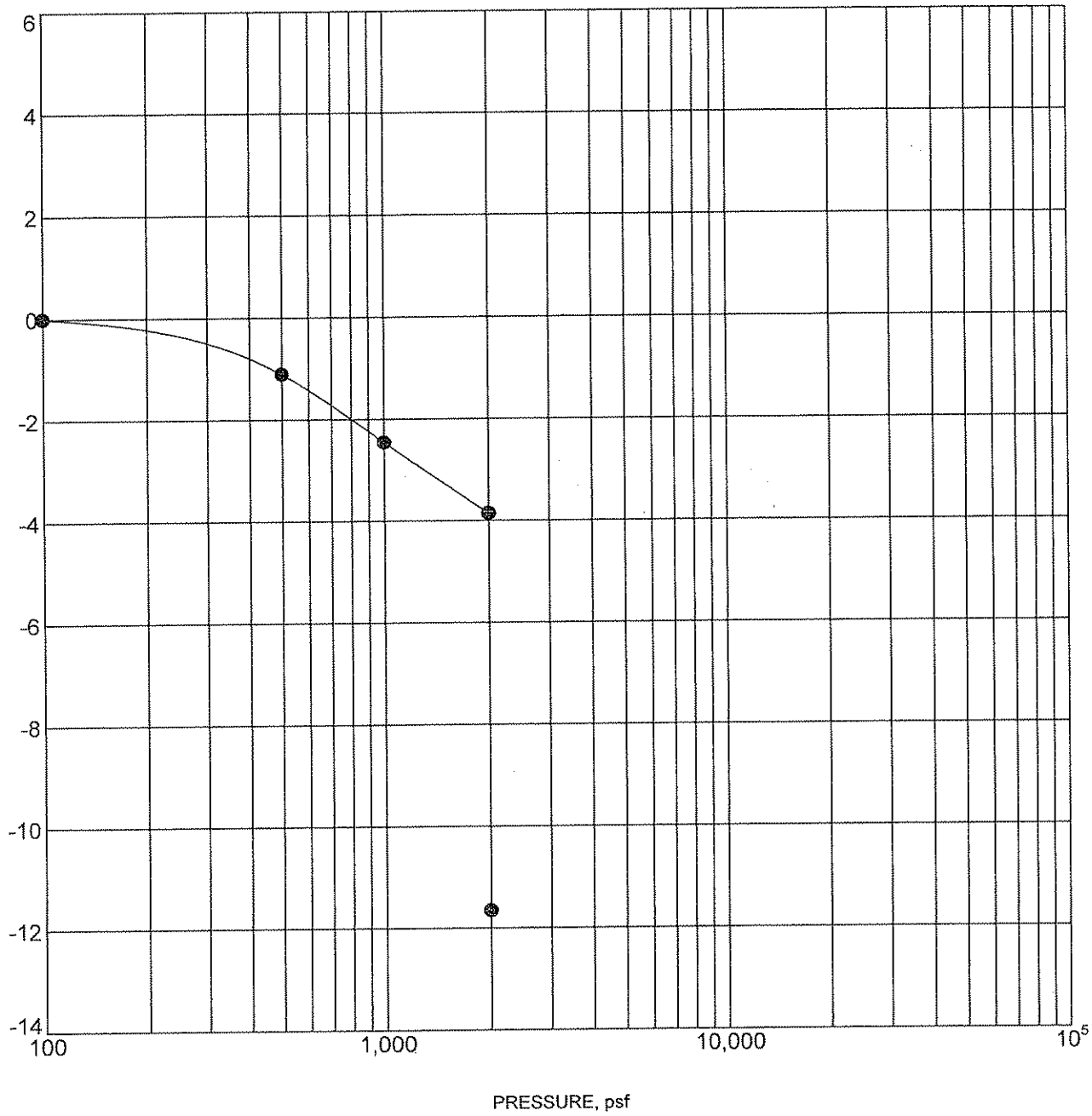
Notes:

Terracon

CONSOLIDATION TEST

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08

TC CONSOL STRAIN 63085095.GPJ TERRACON.GDT 8/29/08



Specimen Identification		Classification	γ_d, pcf	WC,%
● B-12	2.5ft - 3.5ft	FILL: SANDY LEAN CLAY TRACE GRAVEL (CL)	95	5

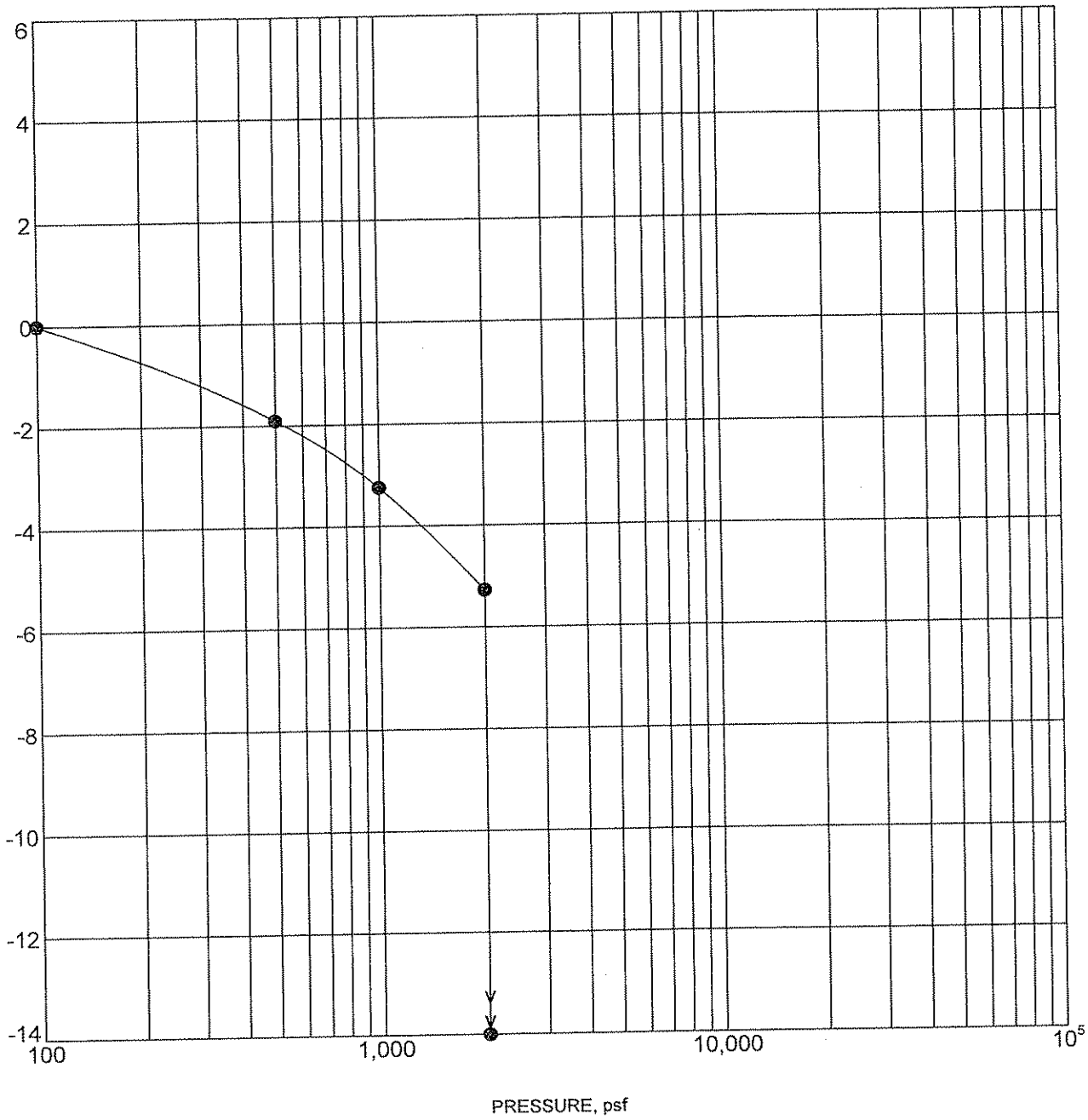
Notes:

Terracon

CONSOLIDATION TEST

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08

TC CONSOL STRAIN 63085095.GPJ TERRACON.GDT 8/29/08



Specimen Identification			Classification	γ_d, pcf	WC,%
●	B-13	5.0ft - 6.0ft	SILTY SAND TRACE GRAVEL (SM)	82	9

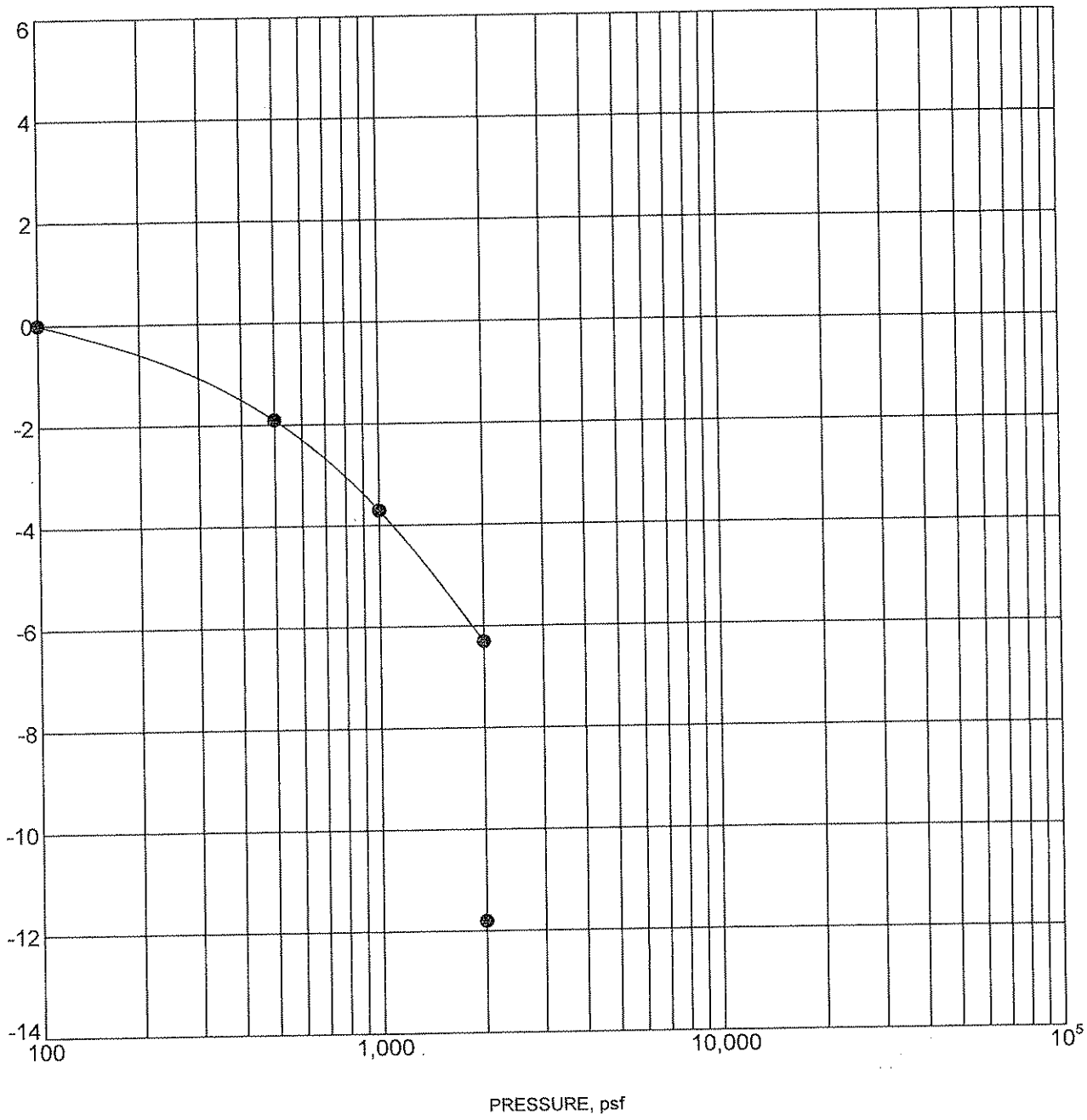
Notes:

Terracon

CONSOLIDATION TEST

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08

TC CONSOL STRAIN 63085095.GPJ TERRACON.GDT 8/29/08



Specimen Identification		Classification	γ_d, pcf	WC,%
● B-14	2.5ft - 3.5ft	SANDY LEAN CLAY TRACE GRAVEL (CL)	83	17

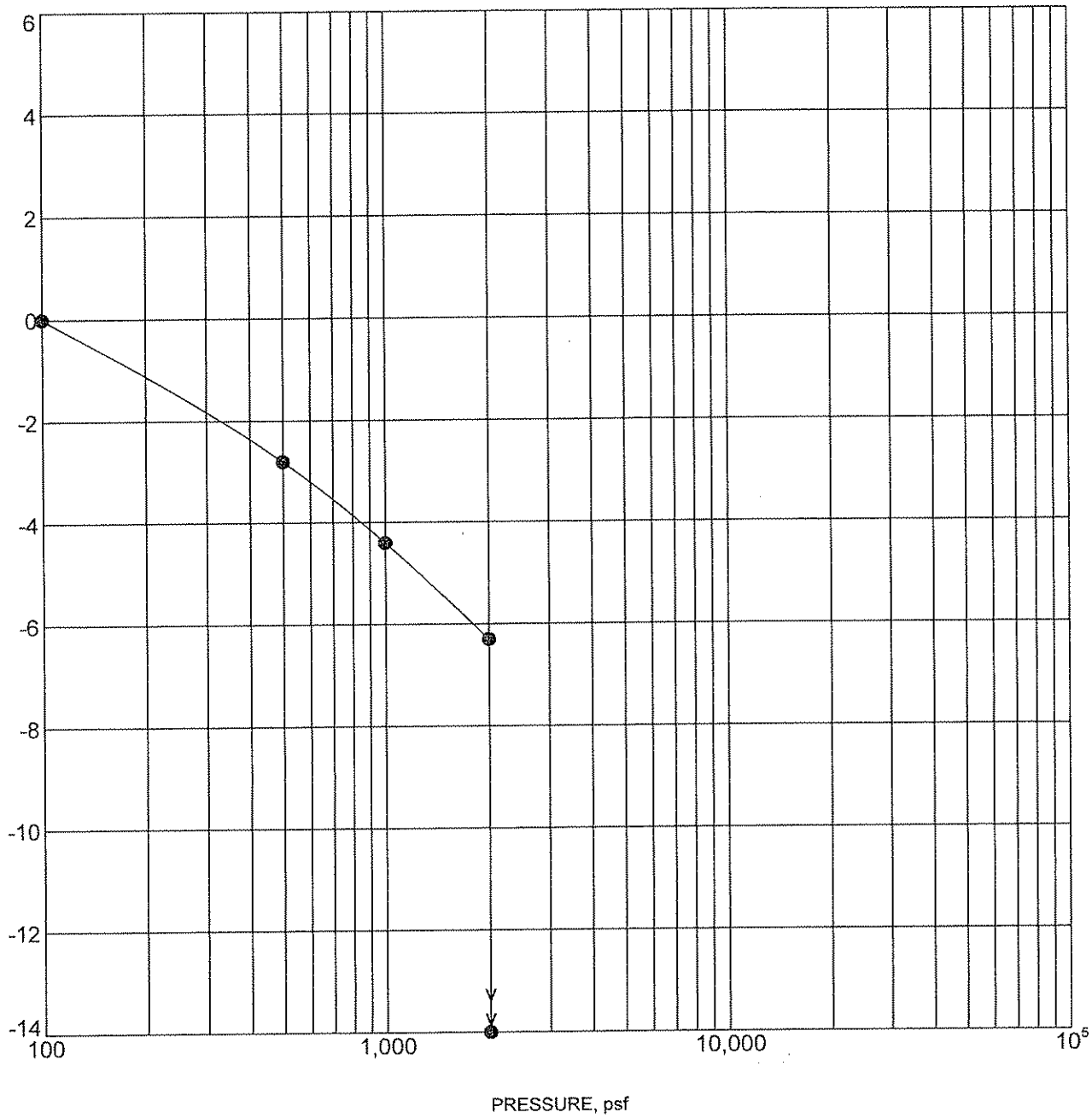
Notes:

Terracon

CONSOLIDATION TEST

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08

TC CONSOL STRAIN 63085095.GPJ TERRACON.GDT 8/29/08



Specimen Identification			Classification	γ_d, pcf	WC,%
●	B-15	2.5ft - 3.5ft	SANDY LEAN CLAY TRACE GRAVEL (CL)	79	7

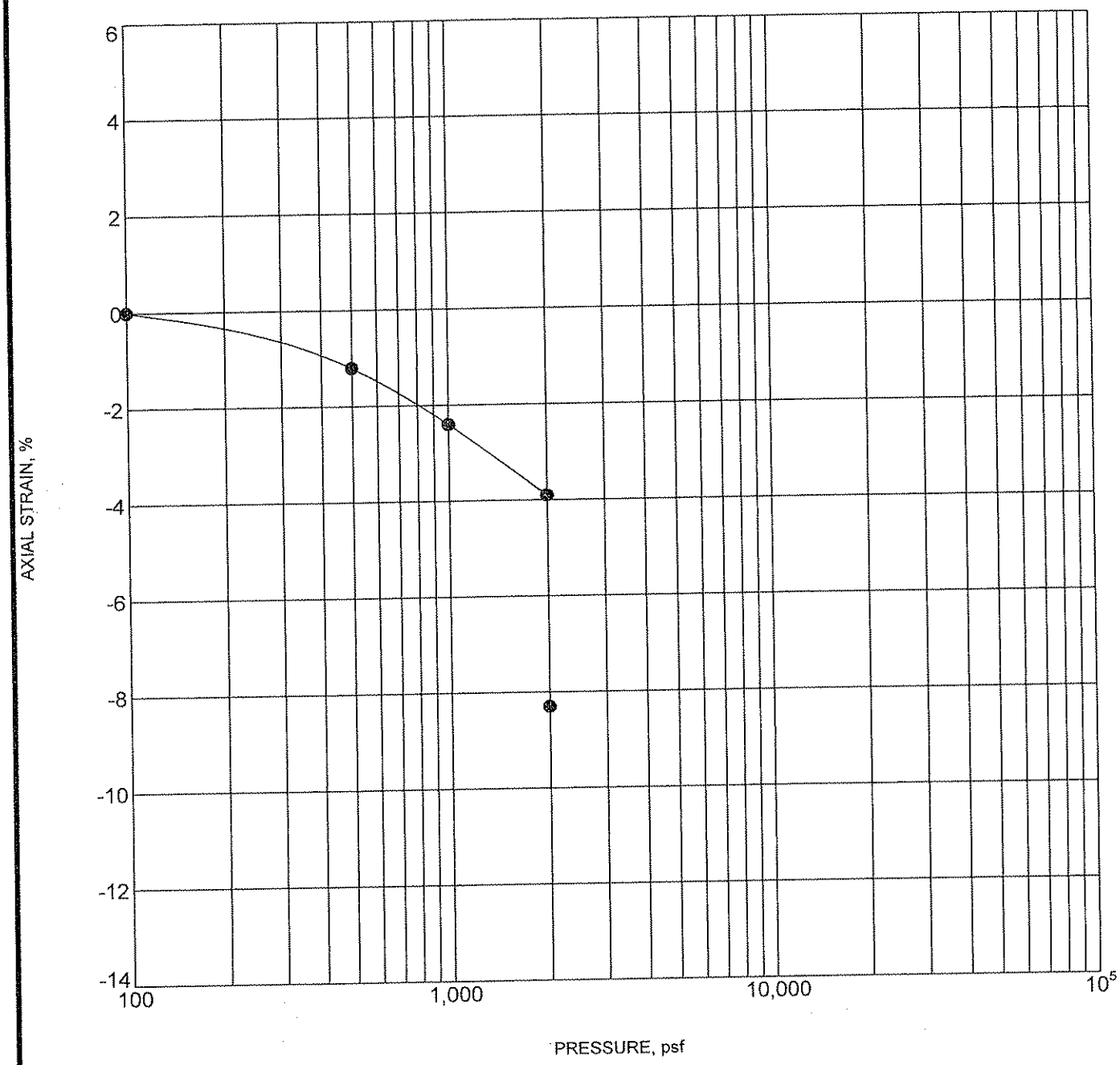
Notes:

Terracon

CONSOLIDATION TEST

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08

TC CONSOL STRAIN 63085095.GPJ TERRACON.GDT 8/29/08



Specimen Identification		Classification	γ_d, pcf	WC,%
● B-16	2.5ft - 3.5ft	SANDY LEAN CLAY (CL)	108	11

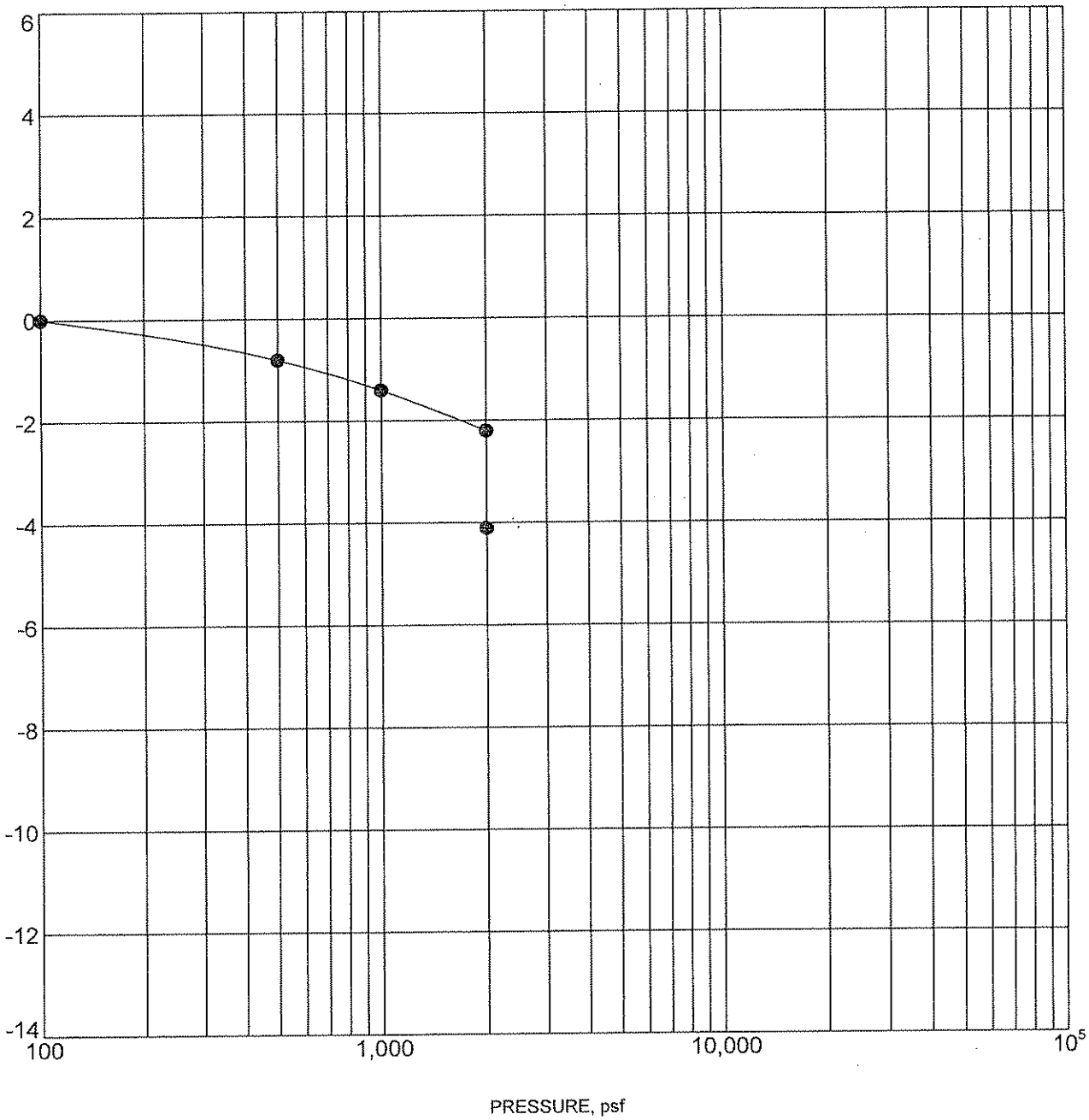
Notes:

Terracon

CONSOLIDATION TEST

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08

TC CONSOL STRAIN 63085095.GPJ TERRACON.GDT 8/29/08



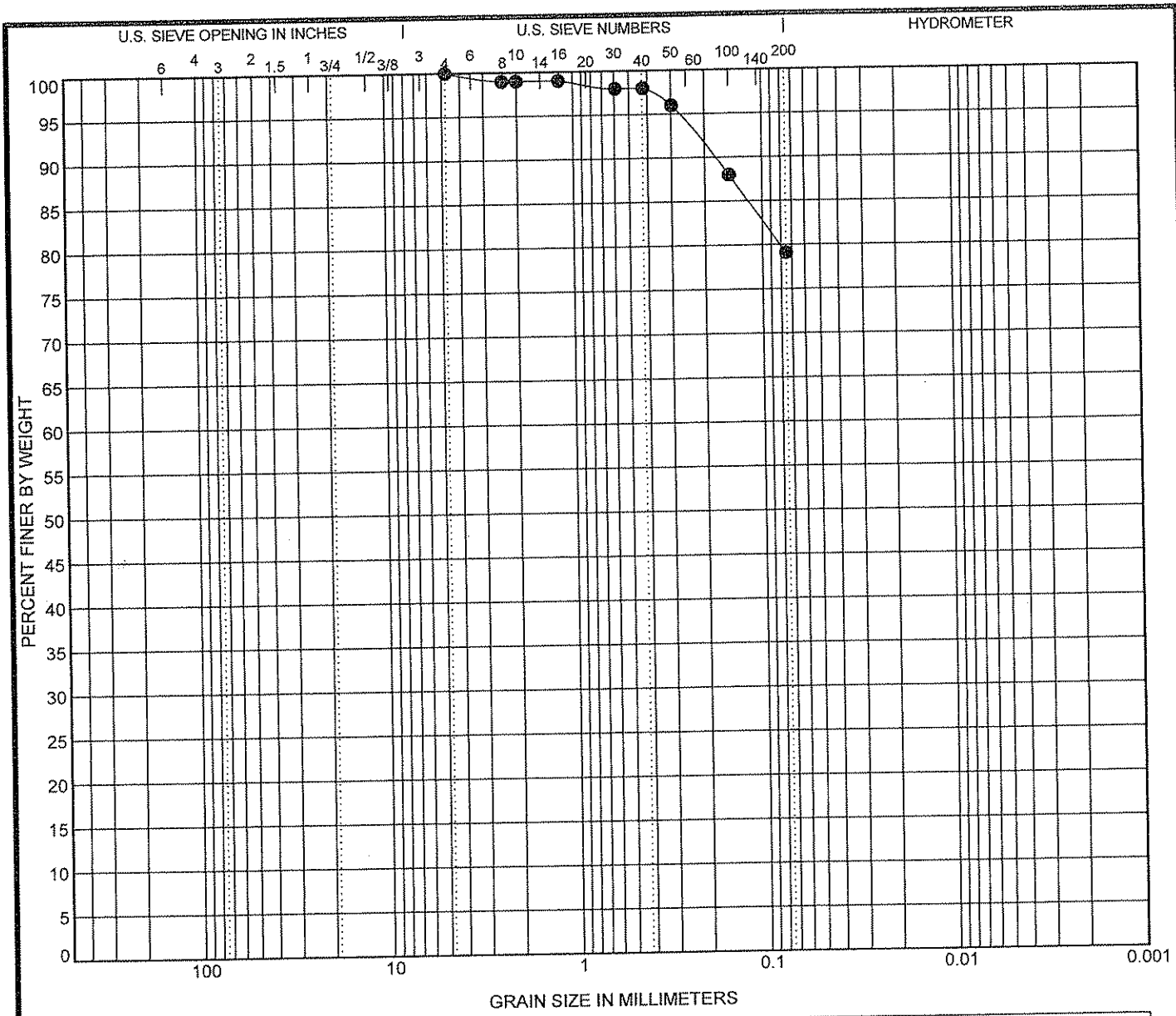
Specimen Identification			Classification	γ_d, pcf	WC,%
●	B-17	5.0ft - 6.0ft	CLAYEY SANDY GRAVEL (GC)	111	1

Notes:

Terracon

CONSOLIDATION TEST

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-01	0.0ft - 5.0ft	SANDY LEAN CLAY (CL)	45	20	25		
☒								
▲								
★								
⊙								

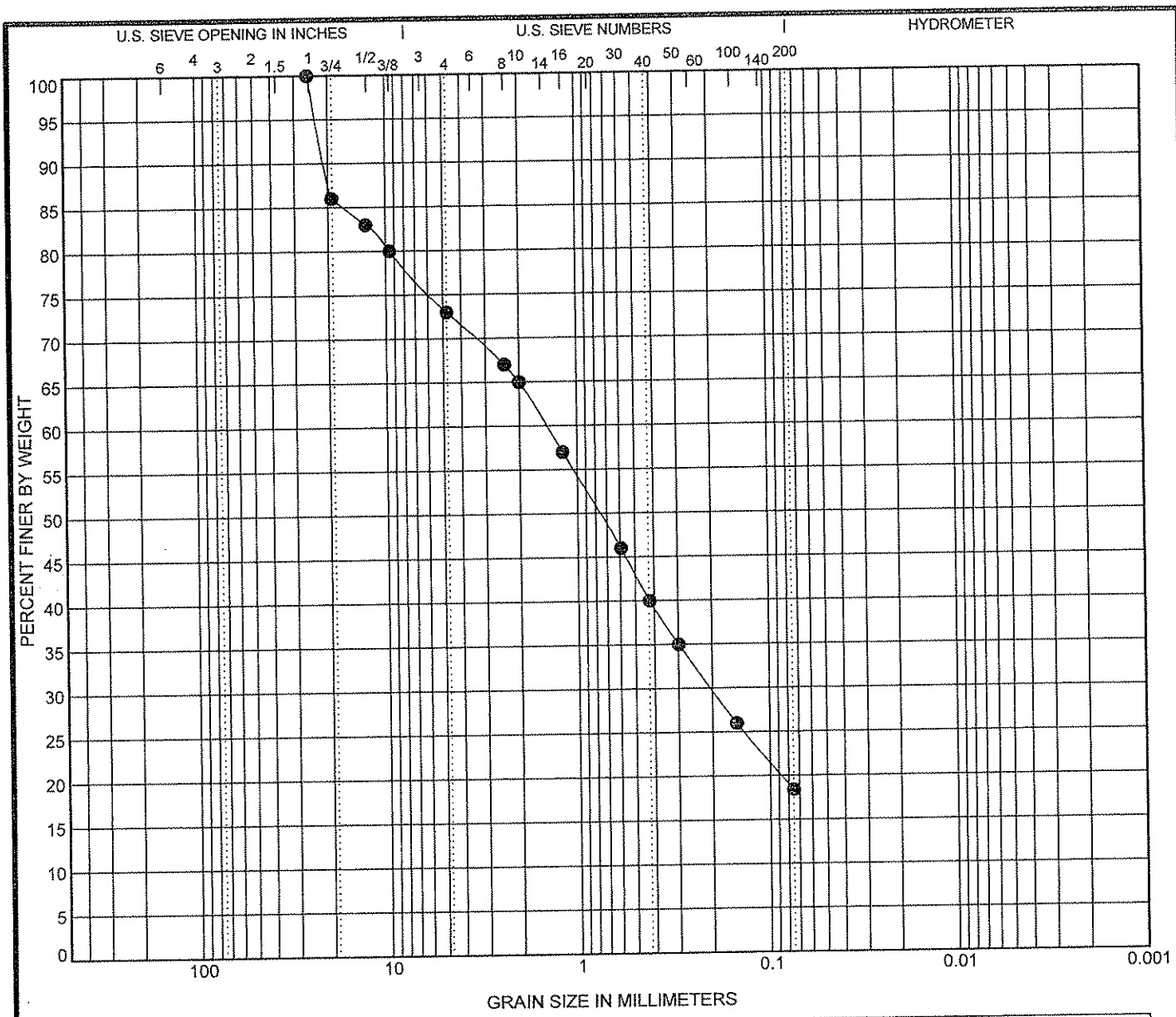
	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-01	0.0ft - 5.0ft	4.75				0.0	20.9	79.1	
☒										
▲										
★										
⊙										

Terracon

GRAIN SIZE DISTRIBUTION

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08

TC GRAIN SIZE 63085095.GPJ TERRACON.GDT 8/29/08



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	B-01 20.0ft - 21.0ft	GRAVELLY SAND TRACE SILT (SP)					
⊠							
▲							
★							
⊙							

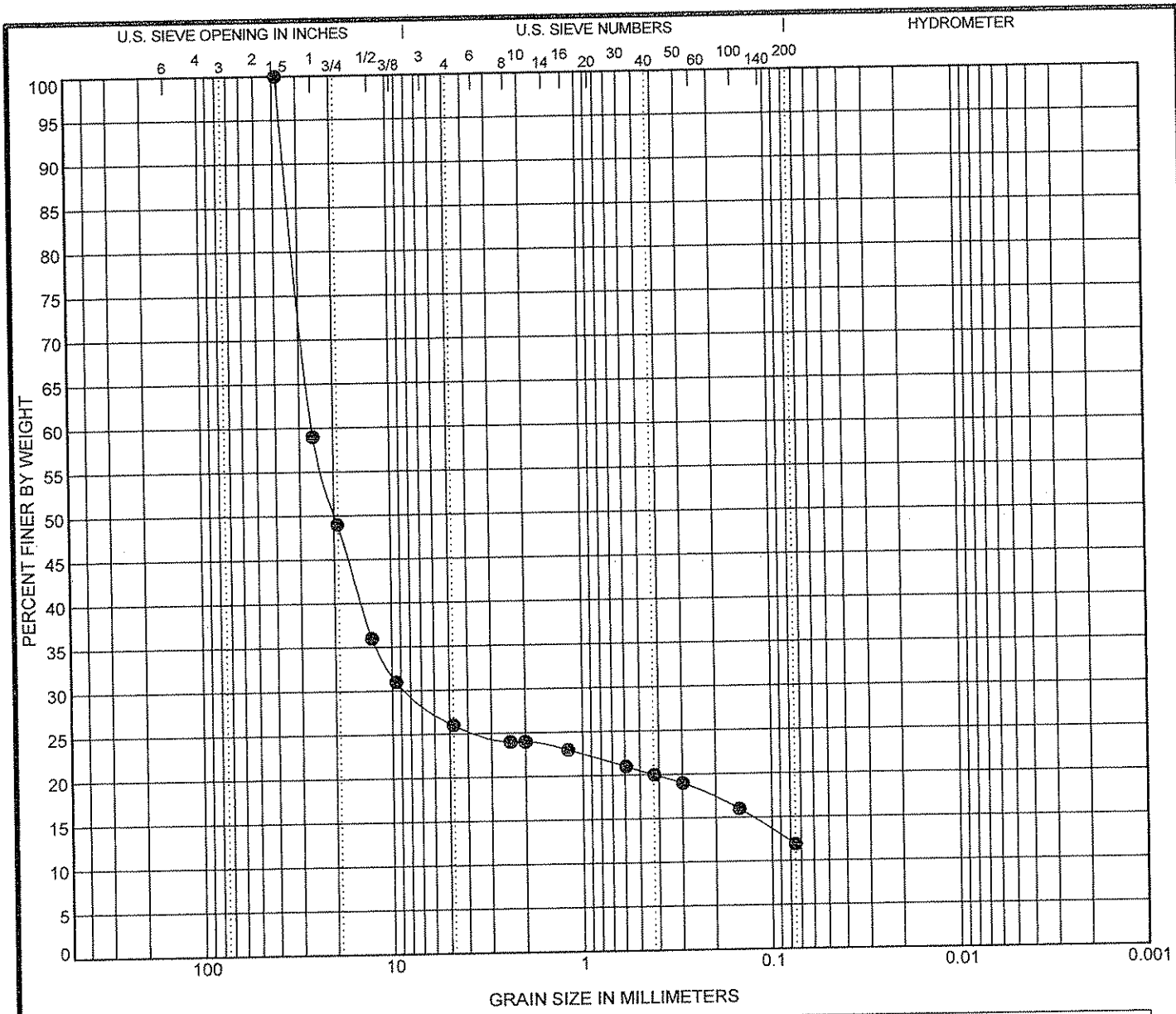
	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-01 20.0ft - 21.0ft	25.4	1.446	0.202		27.0	54.6	18.4	
⊠									
▲									
★									
⊙									

Terracon

GRAIN SIZE DISTRIBUTION

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08

TC GRAIN SIZE 63085095.GPJ TERRACON.GDT 8/29/08



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-01	30.0ft - 31.0ft	GRAVEL WITH CLAY AND SILT TRACE SAND (GC-GM)	24	16	8	48.87	470.14
⊠								
▲								
★								
⊙								

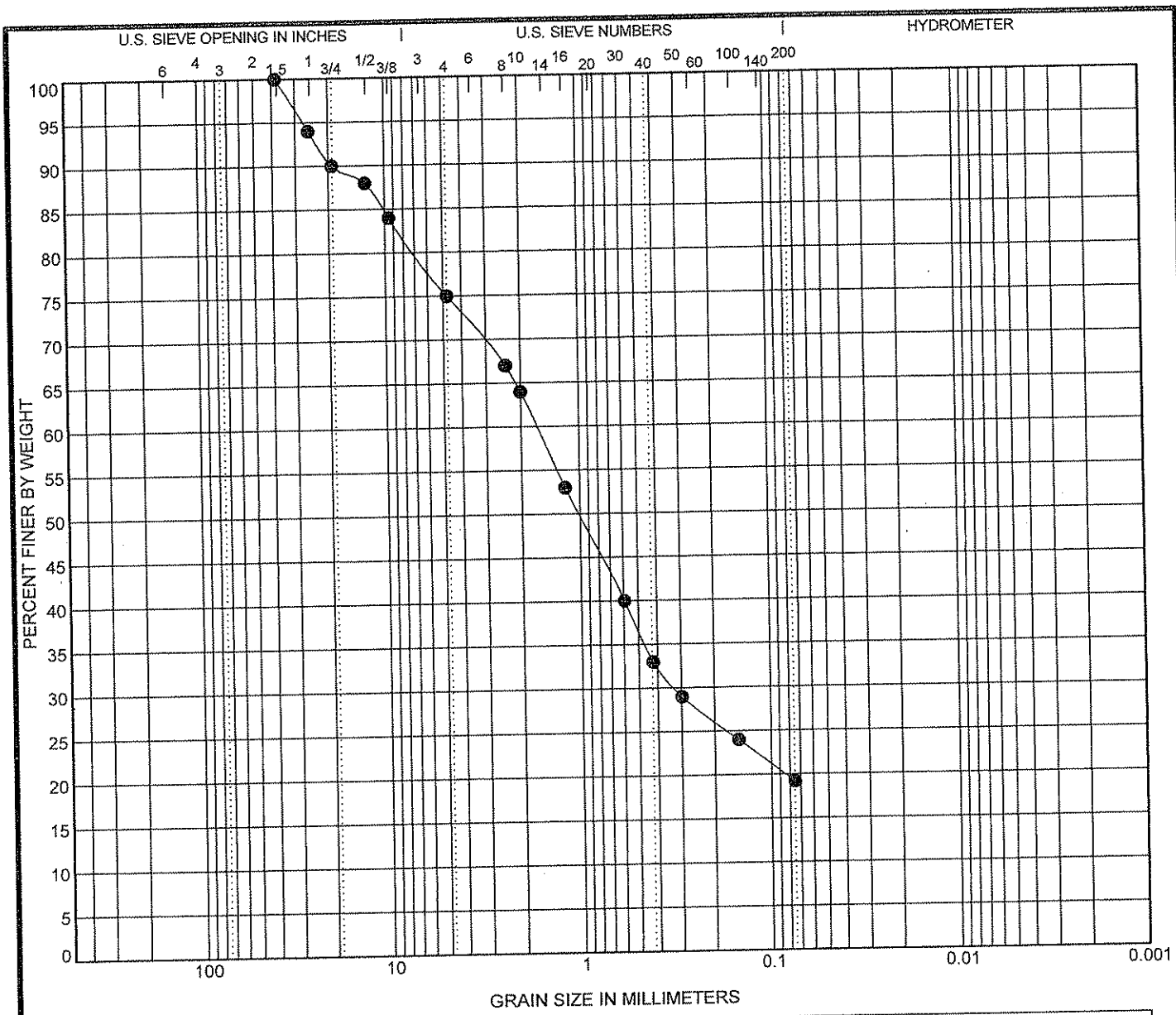
	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-01	30.0ft - 31.0ft	38.1	25.652	8.27		74.0	14.1	11.9	
⊠										
▲										
★										
⊙										

Terracon

GRAIN SIZE DISTRIBUTION

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08

TC_GRAIN_SIZE_63085095.GPJ TERRACON.GDT 8/29/08



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	B-02 20.0ft - 21.0ft	GRAVELLY SAND TRACE SILT (SP)	24	17	7		
⊠							
▲							
★							
⊙							

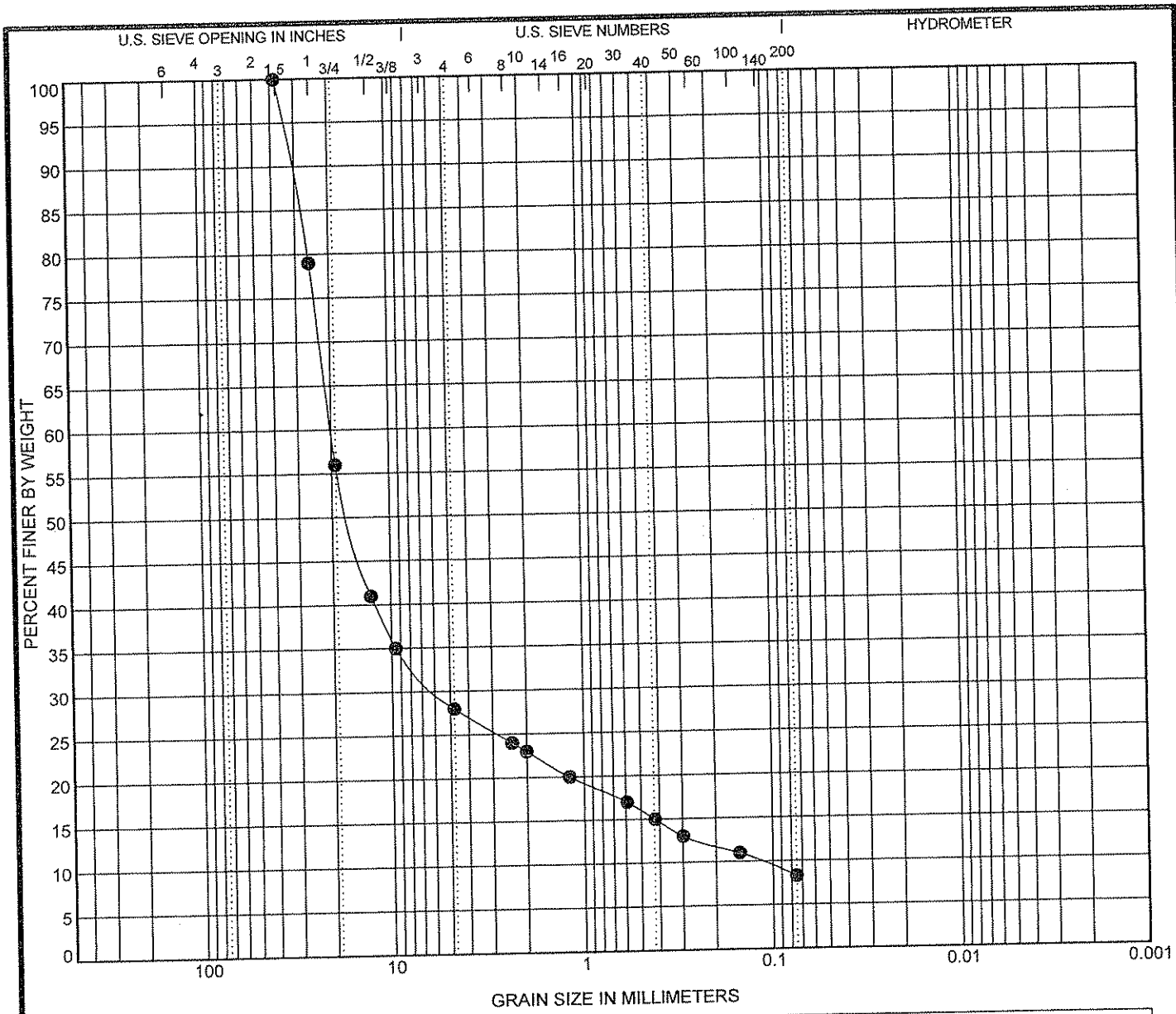
	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-02 20.0ft - 21.0ft	38.1	1.656	0.324		25.0	55.8	19.2	
⊠									
▲									
★									
⊙									

Terracon

GRAIN SIZE DISTRIBUTION

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08

TC_GRAIN_SIZE 63085095.GPJ TERRACON.GDT 8/29/08



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	B-02 35.0ft - 36.5ft	GRAVELLY SAND TRACE SILT (SP)	30	18	12	14.46	173.70
⊠							
▲							
★							
⊙							

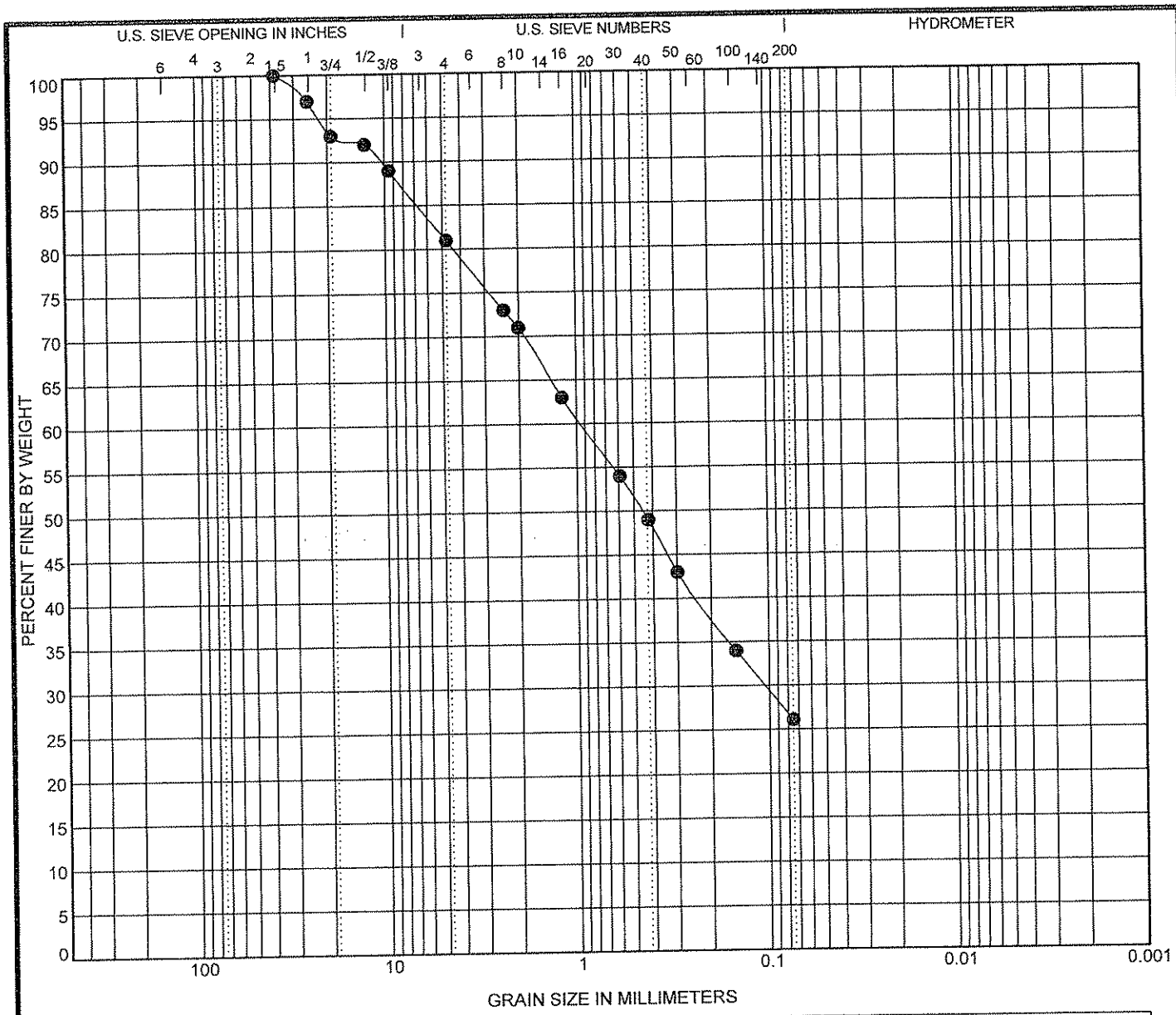
	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-02 35.0ft - 36.5ft	38.1	20.071	5.79	0.116	72.0	19.7	8.3	
⊠									
▲									
★									
⊙									

Terracon

GRAIN SIZE DISTRIBUTION

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08

TC GRAIN SIZE 63085095.GPJ TERRACON.GDT 8/29/08



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-03	0.0ft - 5.0ft	FILL: SILTY SAND WITH GRAVEL (SM)	NP	NP	NP		
⊠								
▲								
★								
⊙								

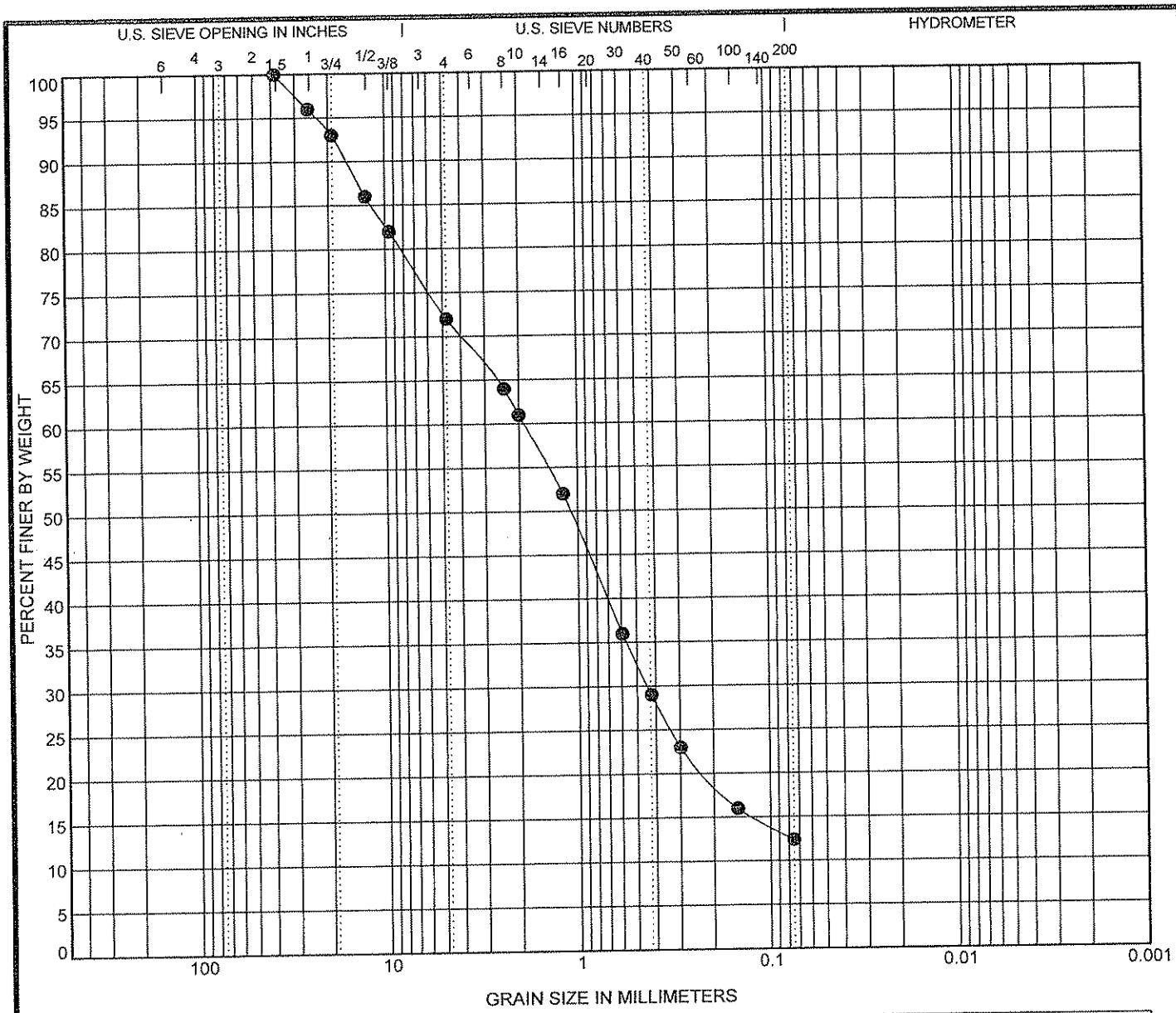
	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-03	0.0ft - 5.0ft	38.1	0.942	0.105		19.0	54.9	26.1	
⊠										
▲										
★										
⊙										

Terracon

GRAIN SIZE DISTRIBUTION

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08

TC GRAIN SIZE 63085095.GPJ TERRACON.GDT 8/29/08



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	B-03 25.0ft - 26.0ft	GRAVELLY SAND TRACE SILT (SP)	NP	NP	NP	2.17	39.78
⊠							
▲							
★							
⊙							

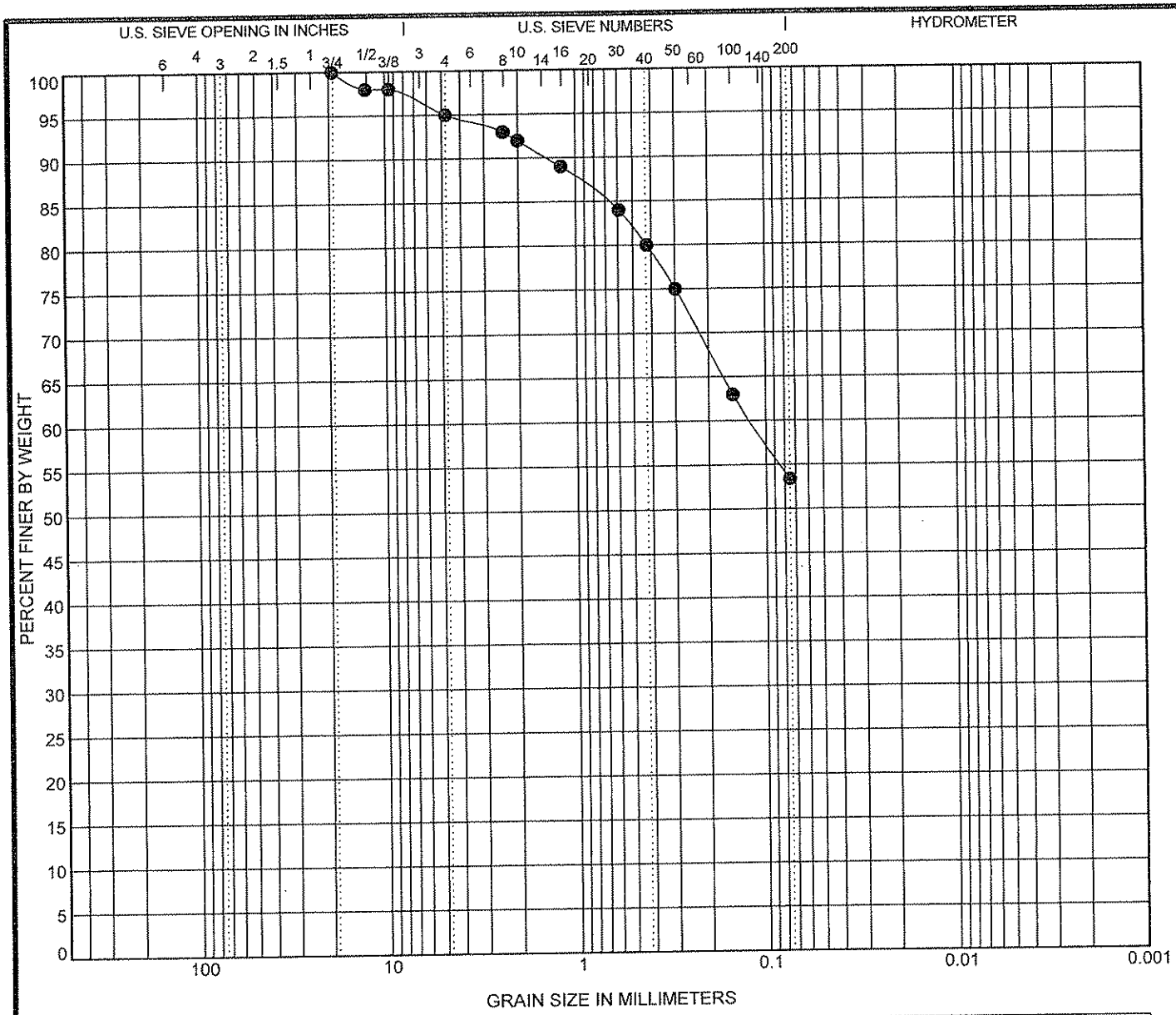
	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-03 25.0ft - 26.0ft	38.1	1.888	0.441		28.0	59.6	12.4	
⊠									
▲									
★									
⊙									

Terracon

GRAIN SIZE DISTRIBUTION

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08

TC GRAIN SIZE 63085095.GPJ TERRACON.GDT 8/29/08



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	B-04 15.0ft - 16.0ft	CLAYEY SAND WITH GRAVEL (SC)	33	21	12		
⊠							
▲							
★							
⊙							

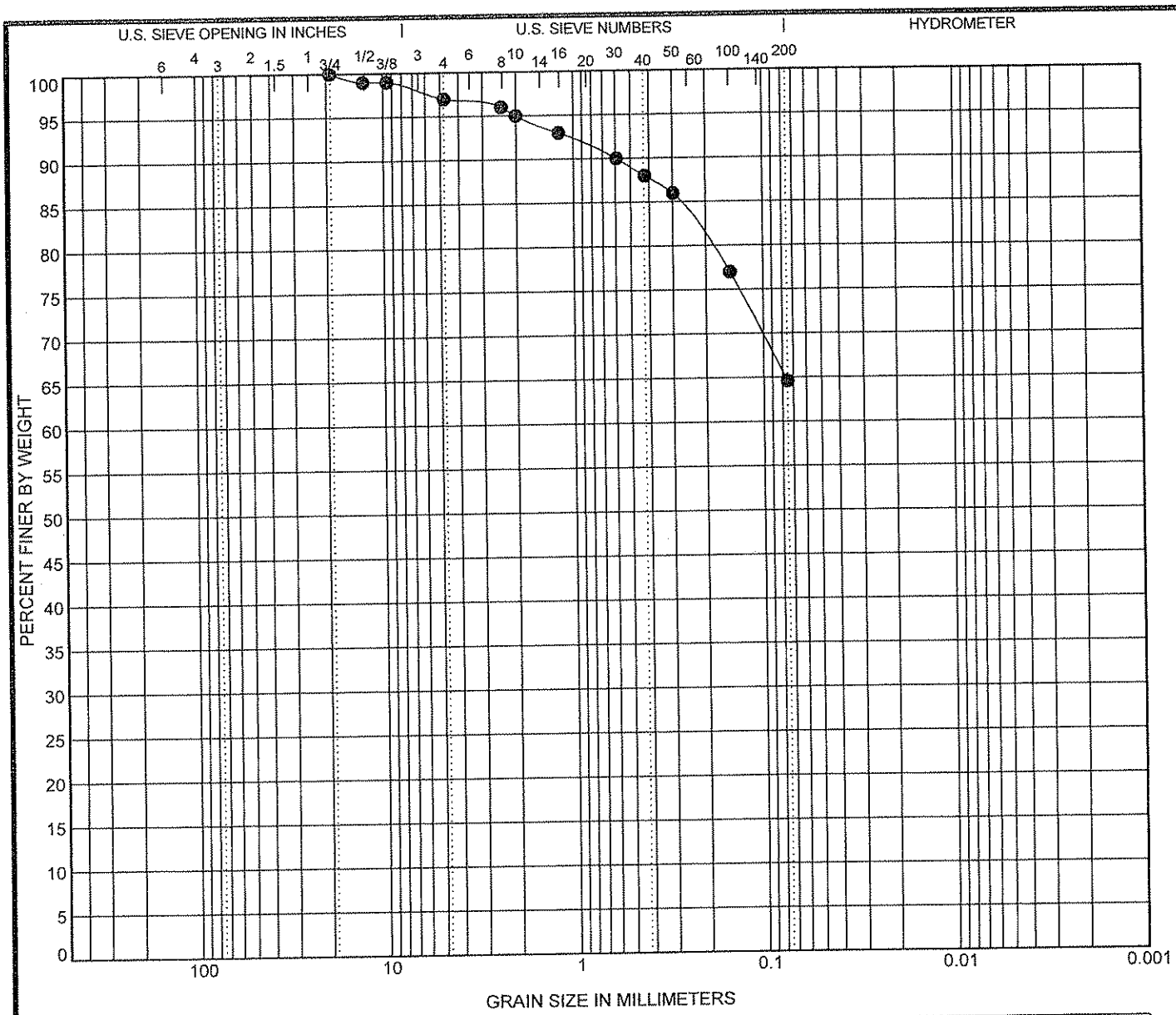
	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-04 15.0ft - 16.0ft	19.1	0.12			5.0	41.6	53.4	
⊠									
▲									
★									
⊙									

Terracon

GRAIN SIZE DISTRIBUTION

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 9-2-08

TC GRAIN SIZE 63085095.GPJ TERRACON.GDT 9/2/08



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-05	0.0ft - 5.0ft	FILL: SANDY SILTY LEAN CLAY TRACE GRAVEL (CL-ML)	24	18	6		
⊠								
▲								
★								
⊙								

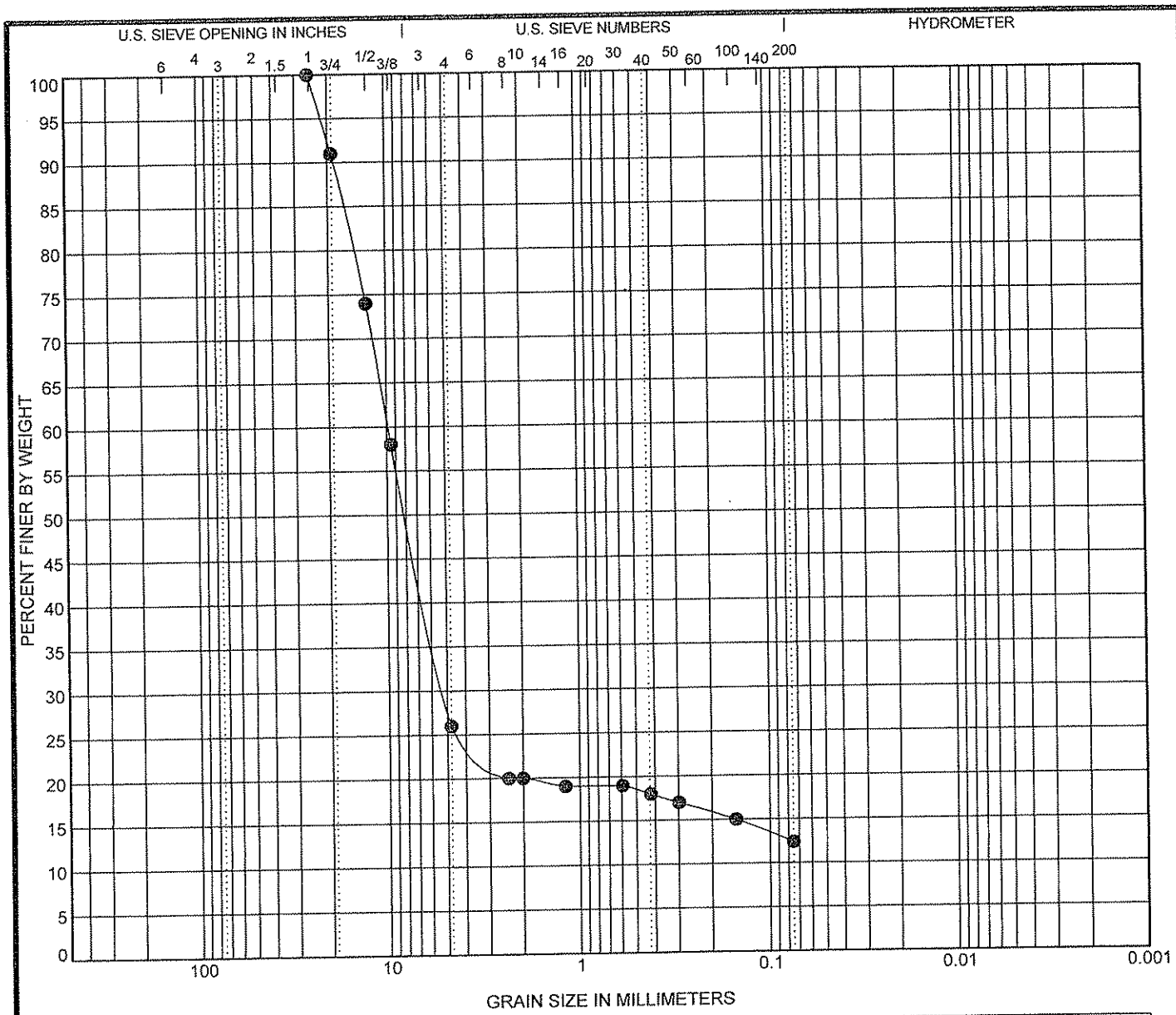
	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-05	0.0ft - 5.0ft	19.1				3.0	32.4	64.6	
⊠										
▲										
★										
⊙										

Terracon

GRAIN SIZE DISTRIBUTION

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08

TC GRAIN SIZE 63085095.GPJ TERRACON.GDT 8/29/08



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	B-05 45.0ft - 46.0ft	CLAYEY GRAVEL WITH SAND (GC)	26	15	11	68.44	247.52
⊠							
▲							
★							
⊙							

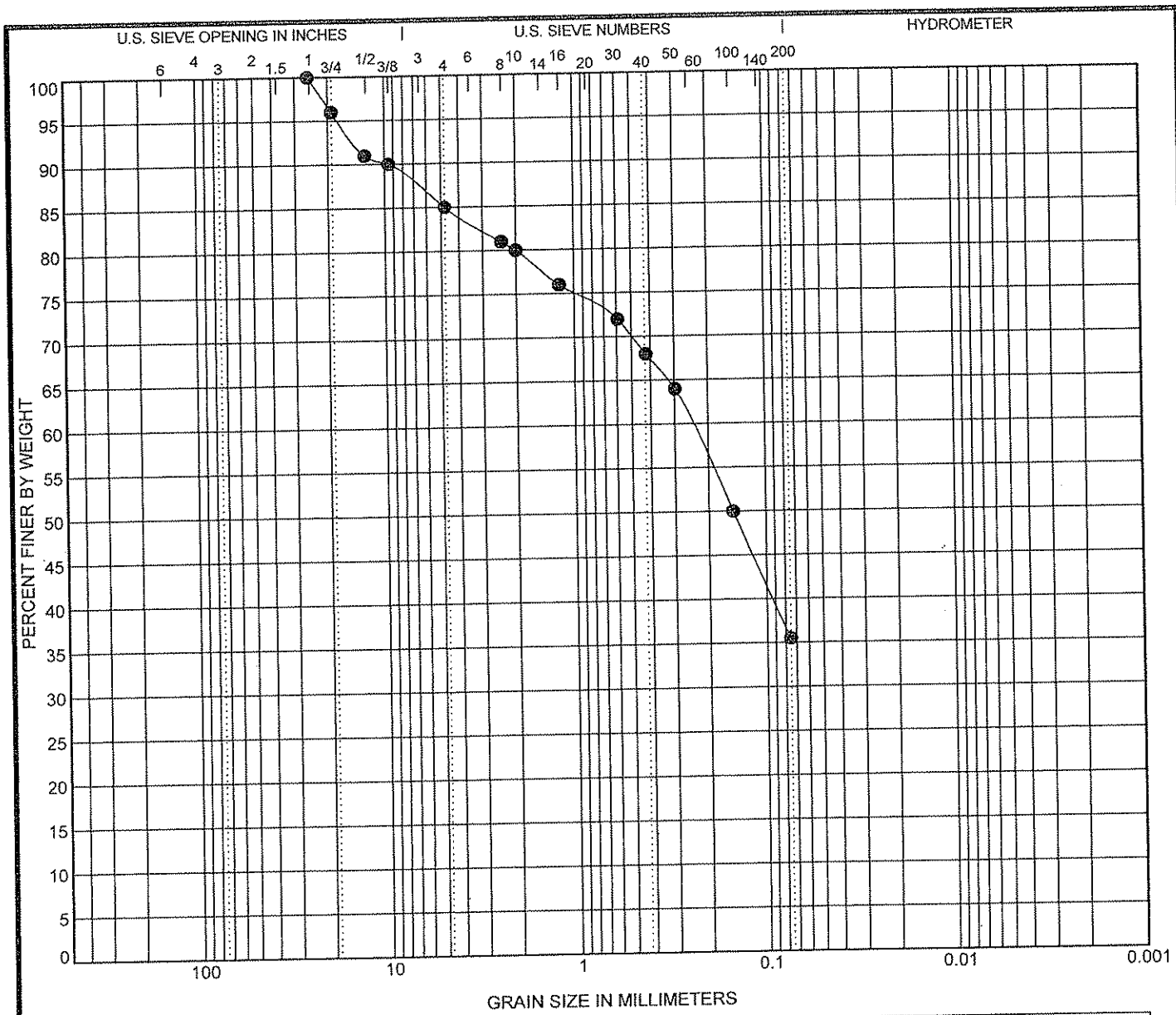
	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-05 45.0ft - 46.0ft	25.4	9.851	5.18		74.0	13.6	12.4	
⊠									
▲									
★									
⊙									

Terracon

GRAIN SIZE DISTRIBUTION

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08

TC GRAIN SIZE 63085095.GPJ TERRACON.GDT 8/29/08



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-07	0.0ft - 5.0ft	SILTY SAND WITH GRAVEL (SM)	19	16	3		
⊠								
▲								
★								
⊙								

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-07	0.0ft - 5.0ft	25.4	0.244			15.0	49.5	35.5	
⊠										
▲										
★										
⊙										

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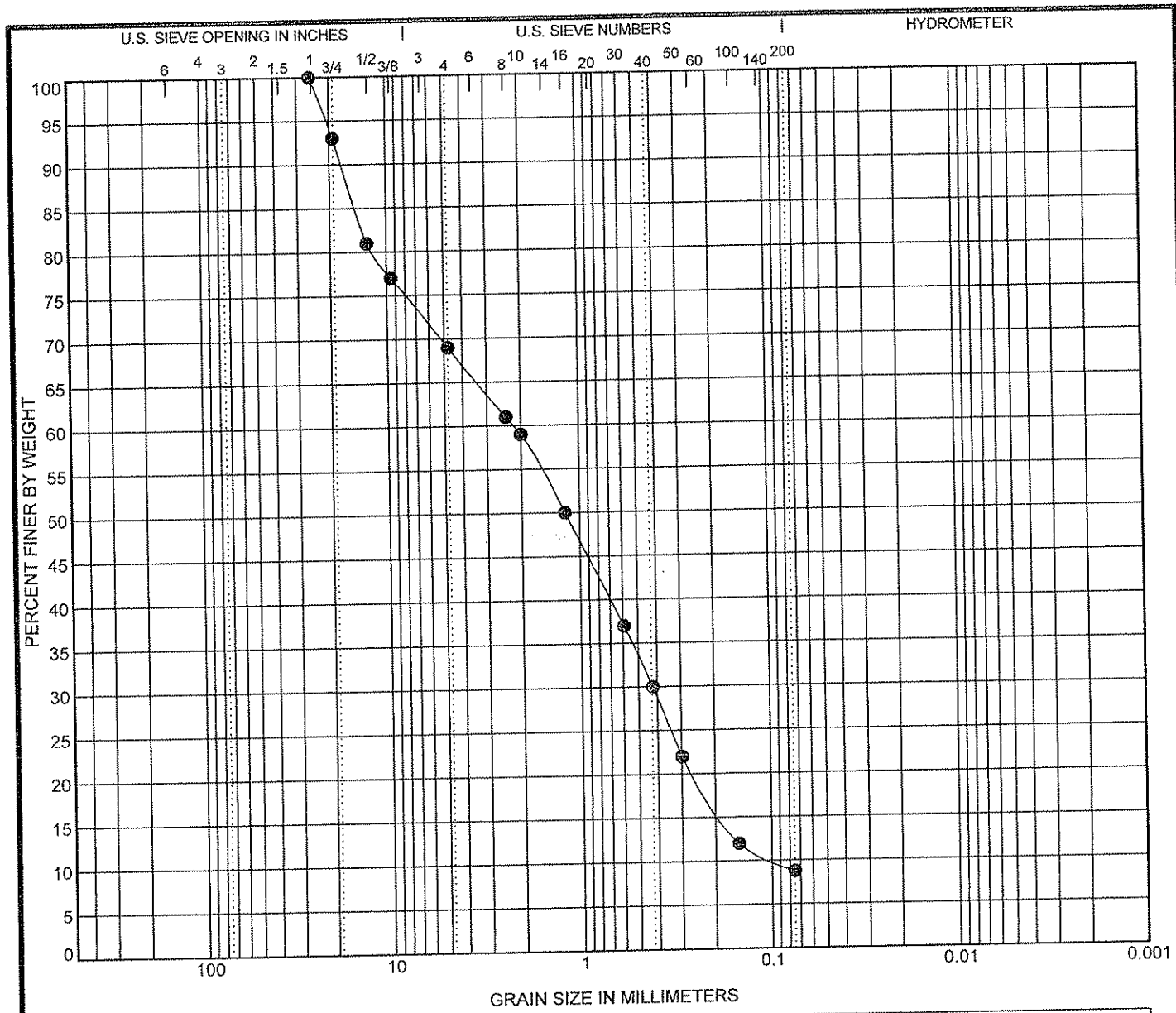
GRAIN SIZE DISTRIBUTION

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08

TC GRAIN SIZE 63085095.GPJ TERRACON.GDT 8/29/08



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	B-07 15.0ft - 16.0ft	GRAVELLY SAND WITH SILT (SP-SM)	NP	NP	NP	0.83	22.49
☒							
▲							
★							
⊙							

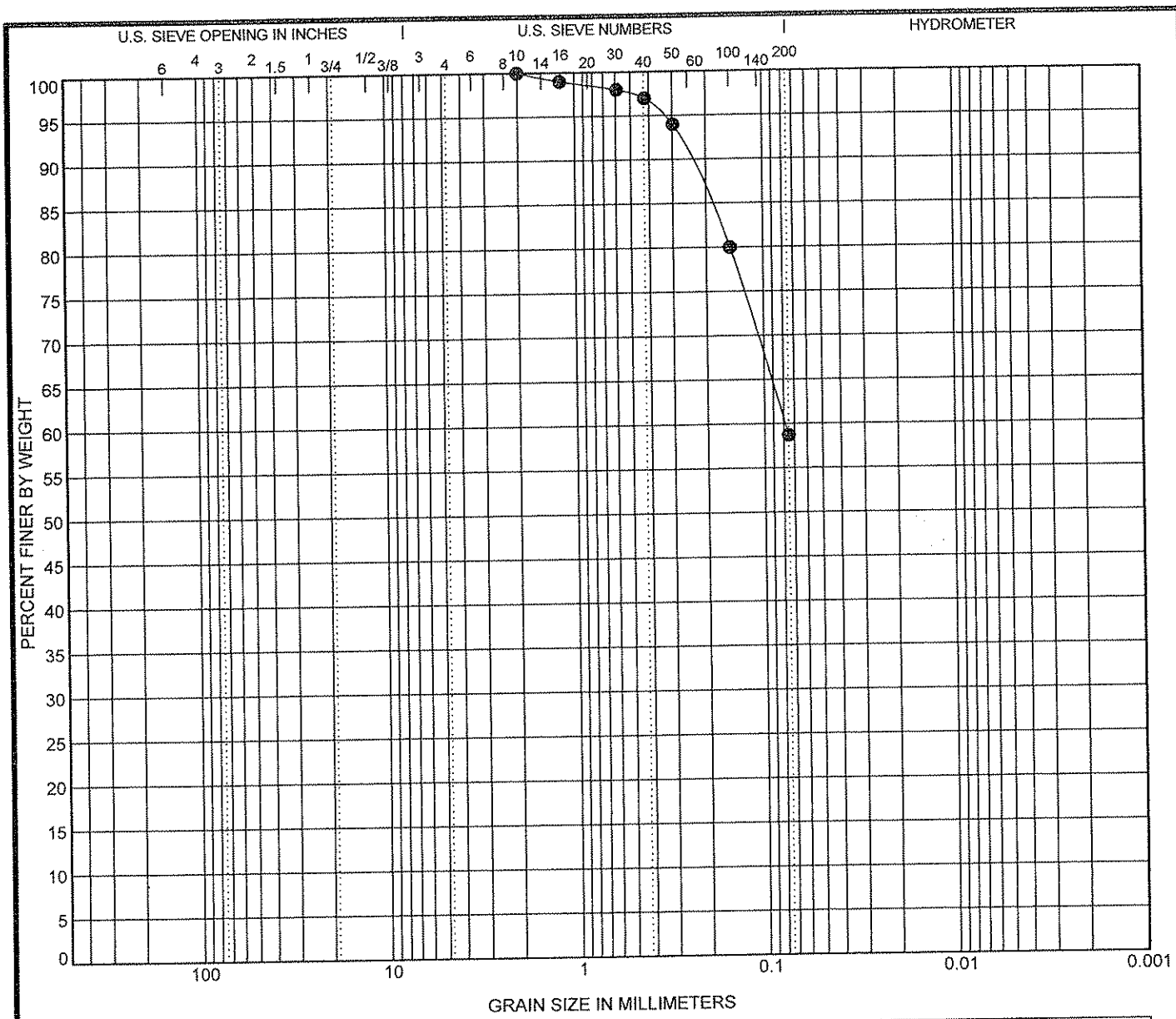
	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-07 15.0ft - 16.0ft	25.4	2.182	0.42	0.097	31.0	60.2	8.8	
☒									
▲									
★									
⊙									

Terracon

GRAIN SIZE DISTRIBUTION

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08

TC_GRAIN_SIZE_63085095.GPJ TERRACON.GDT 8/29/08



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-08	0.0ft - 5.0ft	SANDY LEAN CLAY (CL)	25	18	7		
⊠								
▲								
★								
⊙								

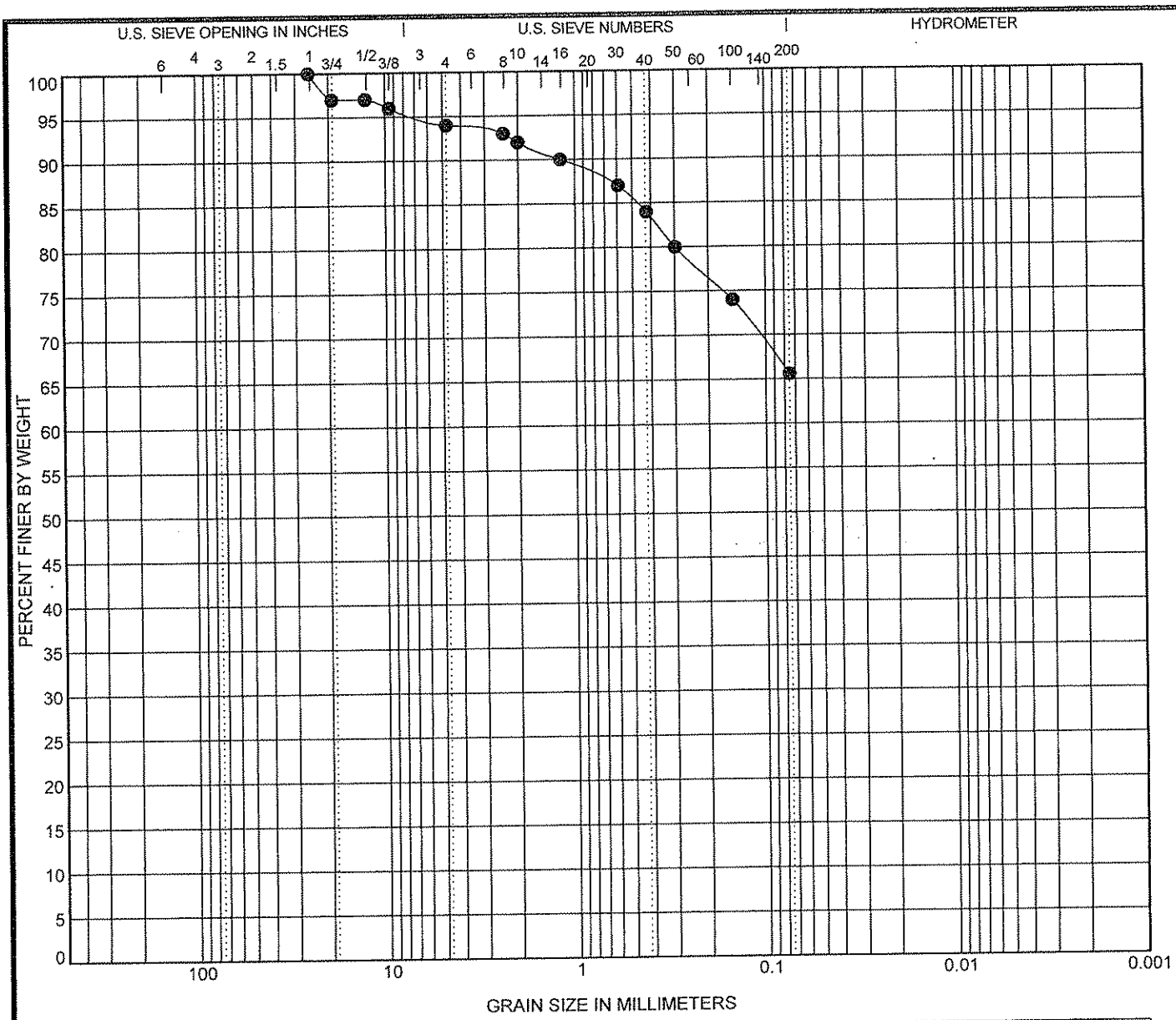
	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-08	0.0ft - 5.0ft	2	0.078			0.0	41.3	58.7	
⊠										
▲										
★										
⊙										

Terracon

GRAIN SIZE DISTRIBUTION

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08

TC GRAIN SIZE 63085095.GPJ TERRACON.GDT 8/29/08



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-09	0.0ft - 5.0ft	SANDY LEAN CLAY TRACE GRAVEL (CL)	24	16	8		
⊠								
▲								
★								
⊙								

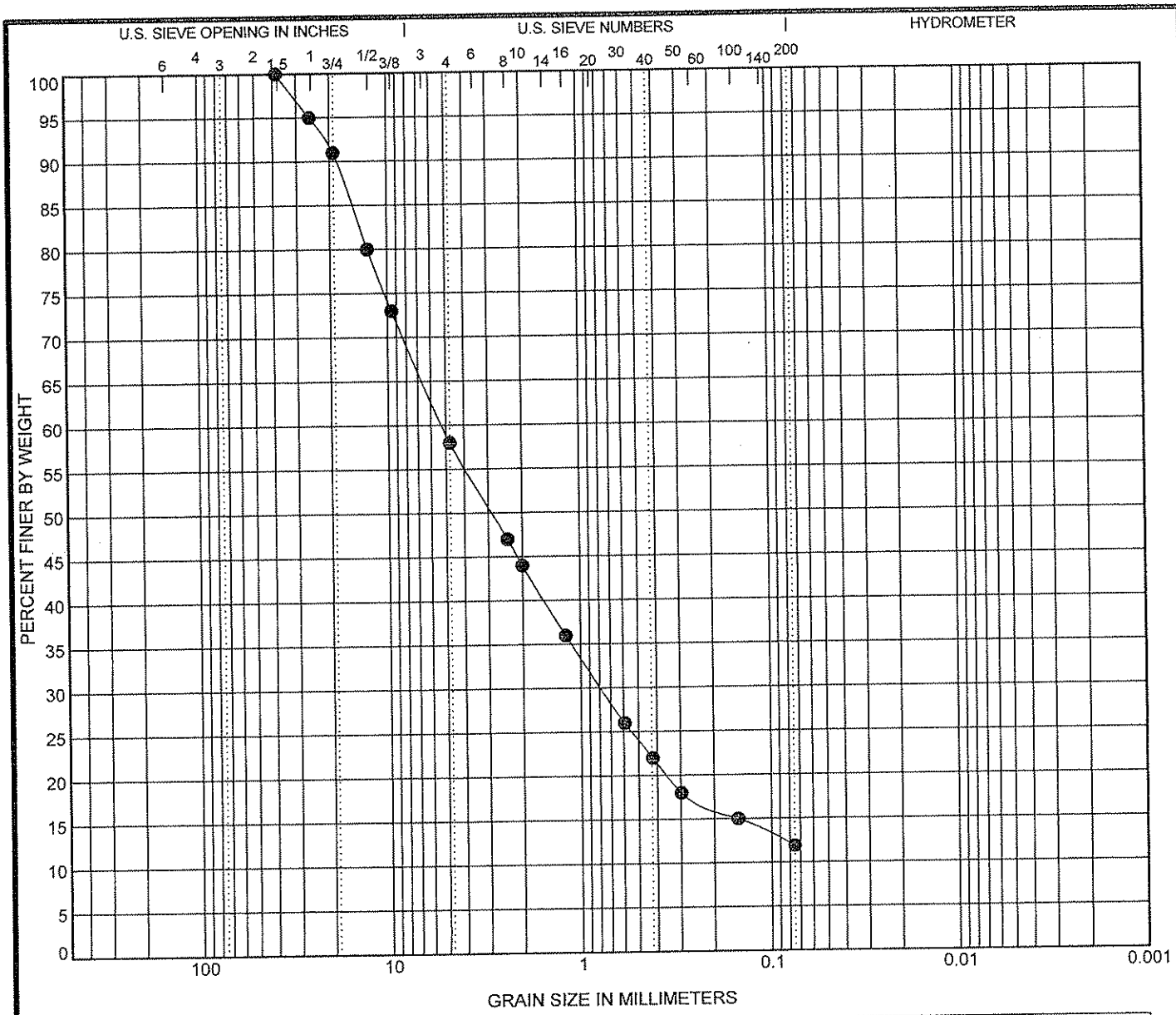
	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-09	0.0ft - 5.0ft	25.4				6.0	28.4	65.6	
⊠										
▲										
★										
⊙										

Terracon

GRAIN SIZE DISTRIBUTION

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08

TC GRAIN SIZE 63085095.GPJ TERRACON.GDT 8/29/08



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	B-09 17.5ft - 18.5ft	GRAVELLY SAND WITH SILT (SP-SM)	22	19	3	2.38	105.80
☒							
▲							
★							
⊙							

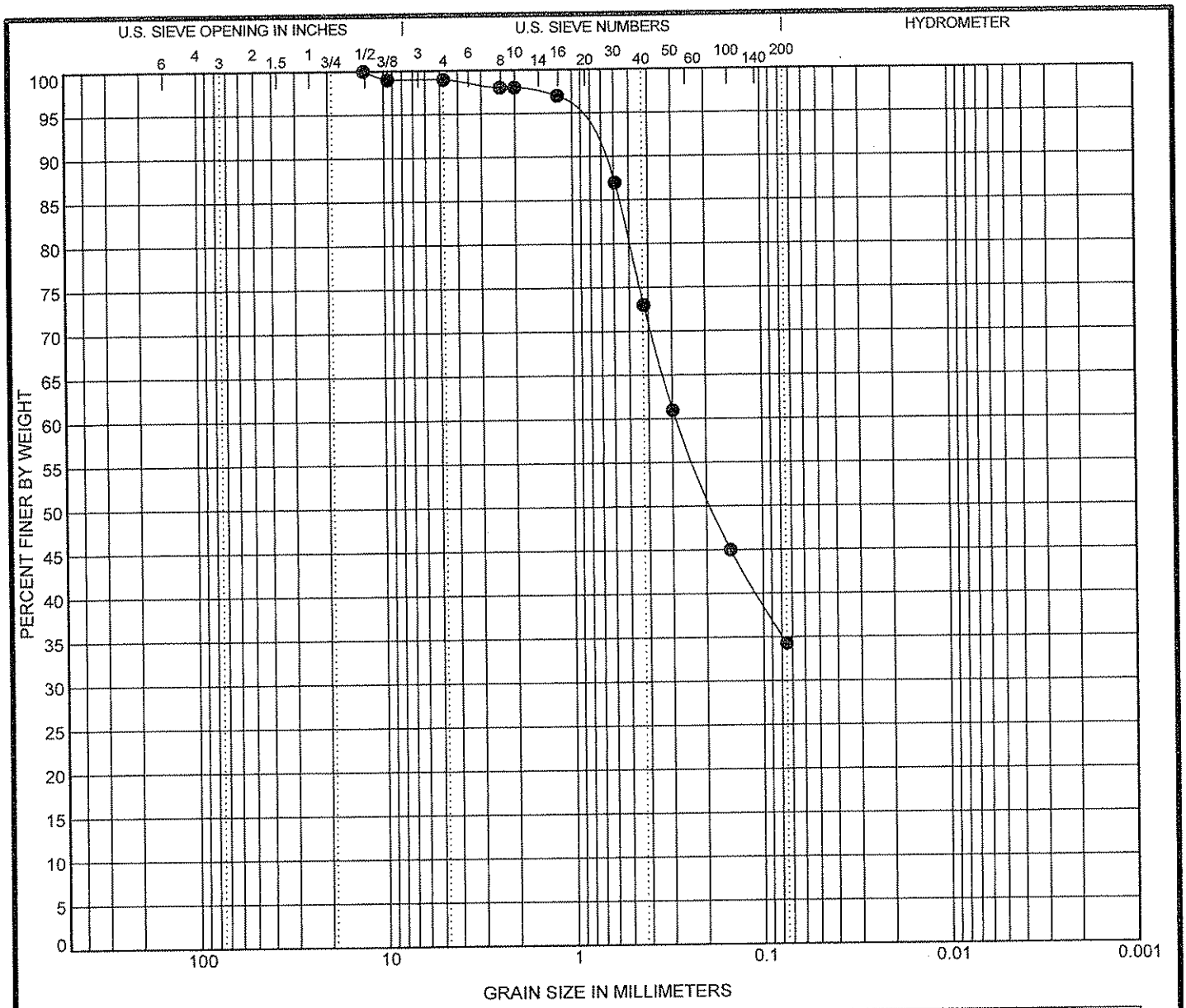
	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-09 17.5ft - 18.5ft	38.1	5.21	0.781		42.0	46.1	11.9	
☒									
▲									
★									
⊙									

Terracon

GRAIN SIZE DISTRIBUTION

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08

TC GRAIN SIZE 63085095.GPJ TERRACON.GDT 8/29/08



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-13	0.0ft - 5.0ft	SILTY SAND TRACE GRAVEL (SM)	NP	NP	NP		
⊠								
▲								
★								
⊙								

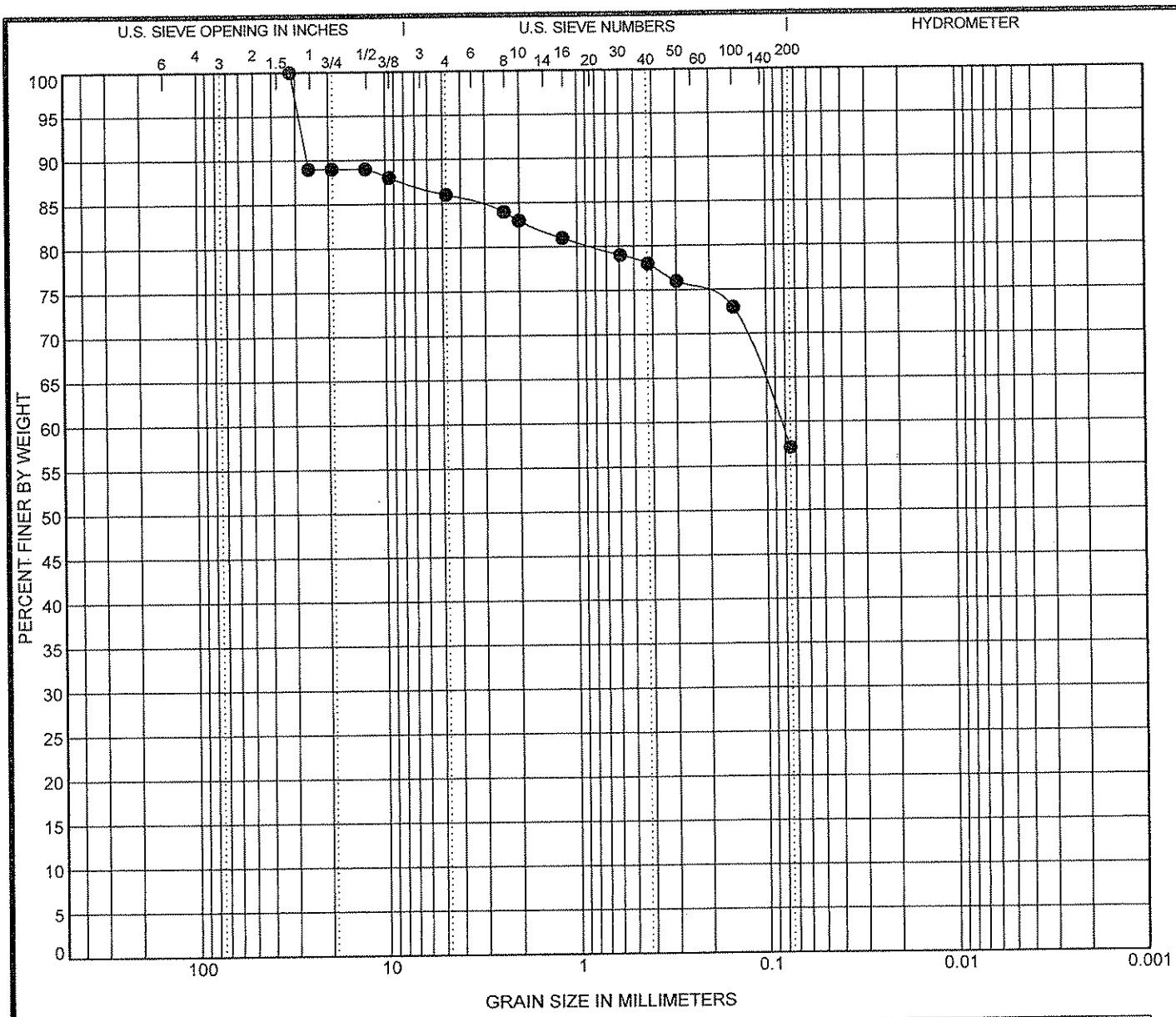
	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-13	0.0ft - 5.0ft	12.7	0.284			1.0	64.7	34.3	
⊠										
▲										
★										
⊙										

Terracon

GRAIN SIZE DISTRIBUTION

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08

TC GRAIN SIZE 63085095.GPJ TERRACON.GDT 8/29/08



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-14	0.0ft - 5.0ft	SANDY LEAN CLAY TRACE GRAVEL (CL)	37	19	18		
⊠								
▲								
★								
⊙								

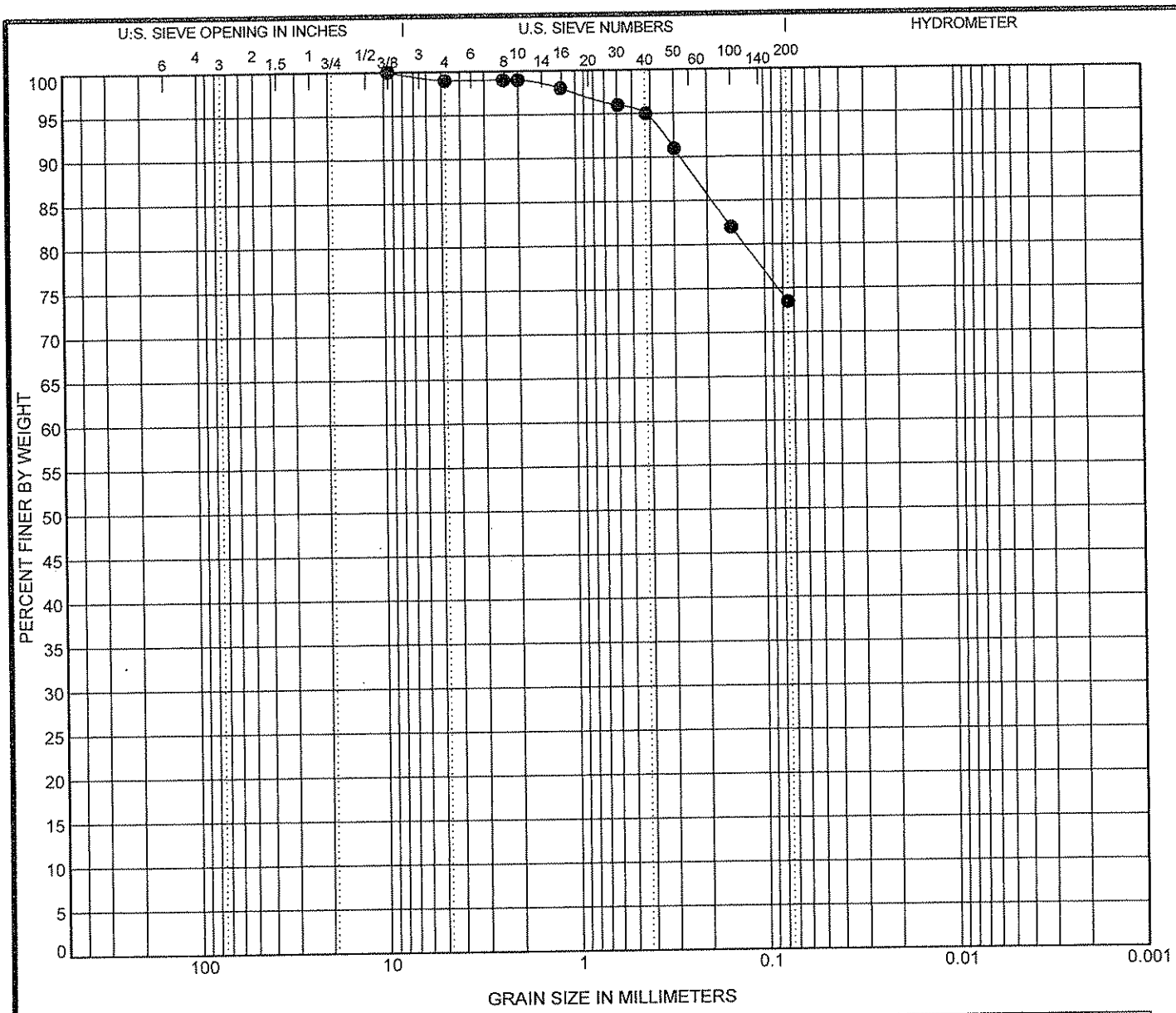
	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-14	0.0ft - 5.0ft	31.75	0.085			14.0	28.9	57.1	
⊠										
▲										
★										
⊙										

Terracon

GRAIN SIZE DISTRIBUTION

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08

TC GRAIN SIZE 63085095.GPJ TERRACON.GDT 8/29/08



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-15	0.0ft - 5.0ft	SANDY LEAN CLAY TRACE GRAVEL (CL)	31	17	14		
⊠								
▲								
★								
⊙								

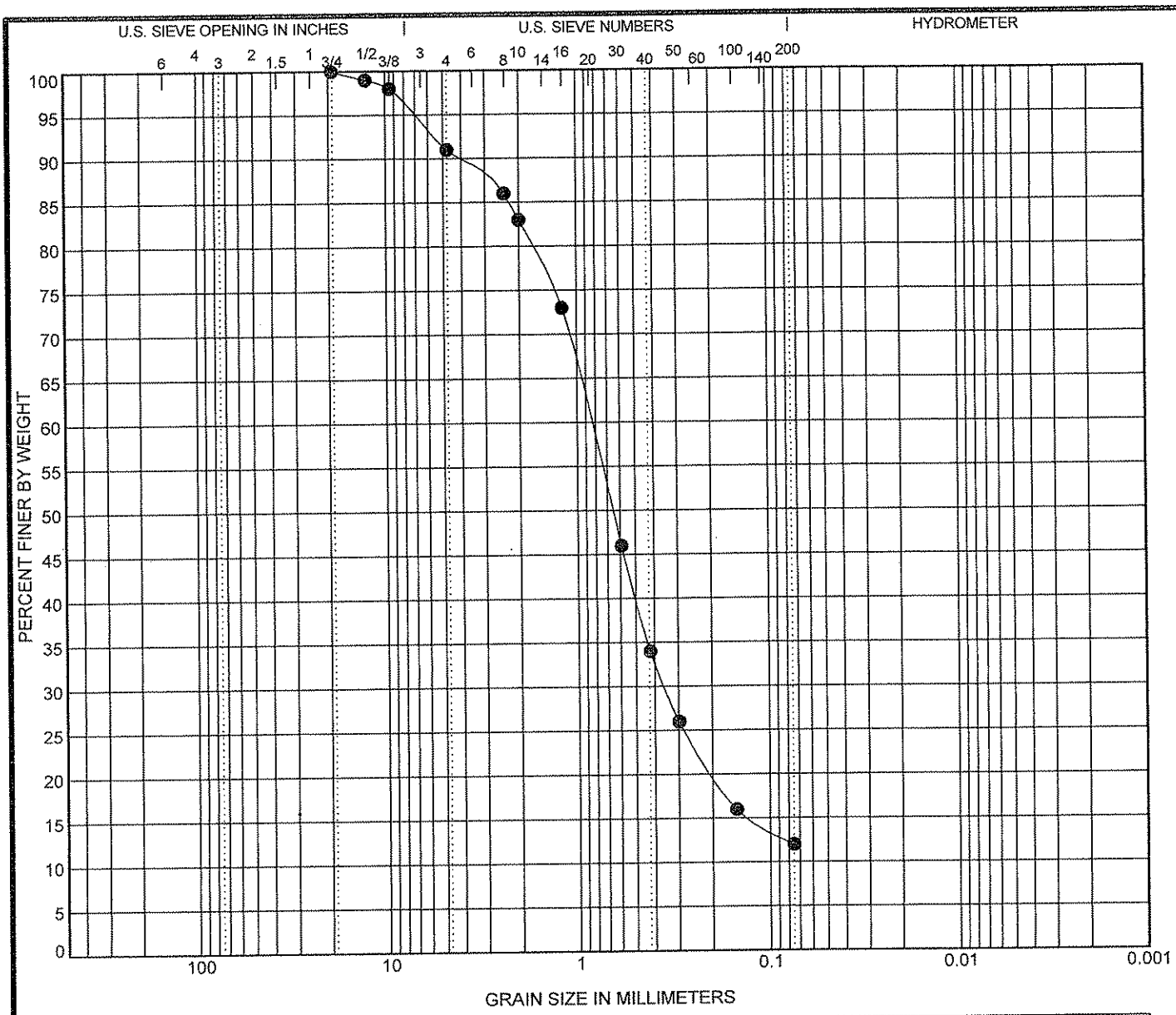
	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-15	0.0ft - 5.0ft	9.5				1.0	25.5	73.5	
⊠										
▲										
★										
⊙										

Terracon

GRAIN SIZE DISTRIBUTION

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08

TC GRAIN SIZE 63085095.GPJ TERRACON.GDT 8/29/08



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	B-15 10.0ft - 11.0ft	SILTY SAND TRACE GRAVEL (SM)	NP	NP	NP	2.76	15.95
■							
▲							
★							
⊙							

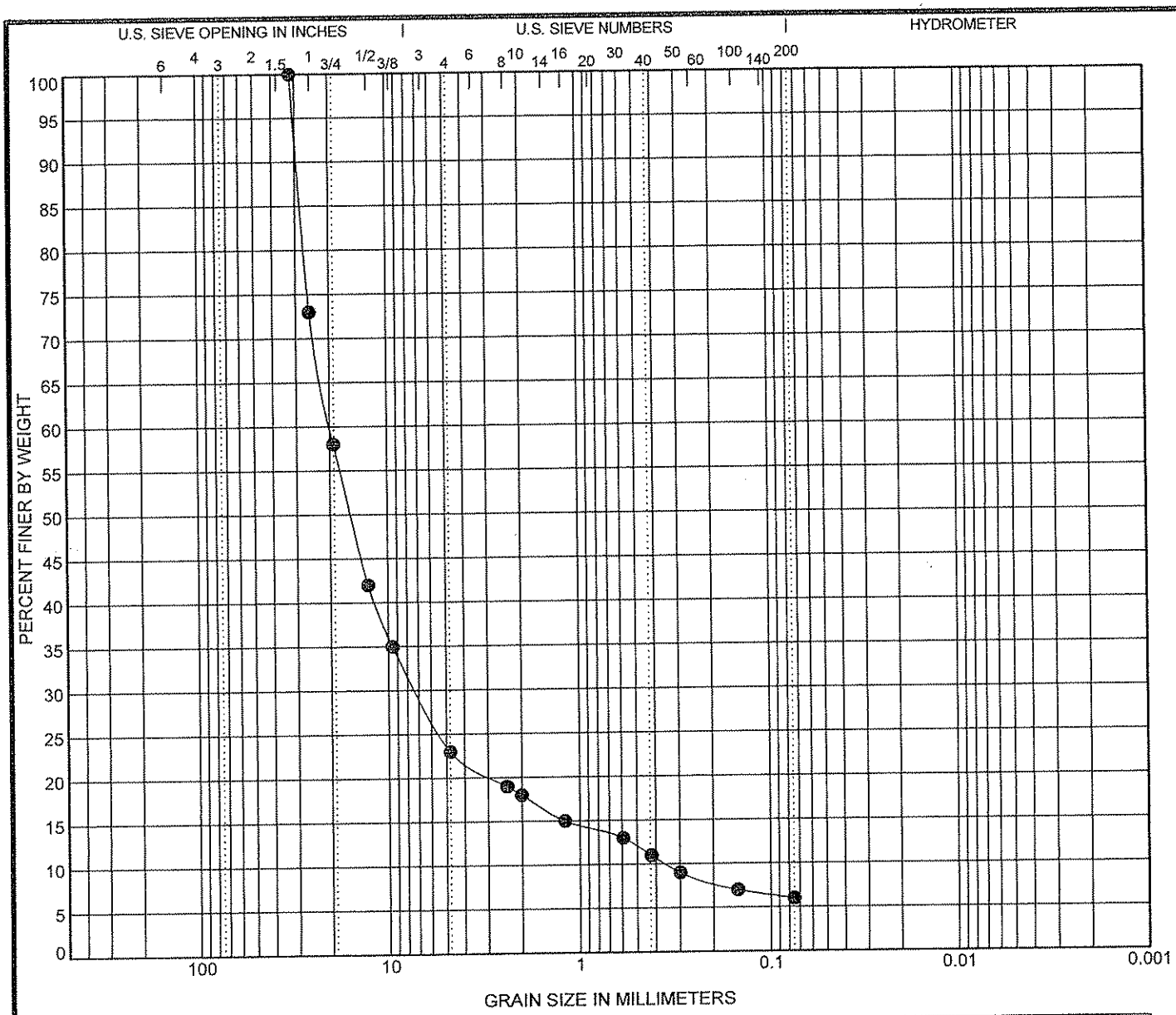
	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-15 10.0ft - 11.0ft	19.1	0.849	0.353		9.0	79.0	12.0	
■									
▲									
★									
⊙									

Terracon

GRAIN SIZE DISTRIBUTION

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08

TC GRAIN SIZE 63085095.GPJ TERRACON.GDT 8/29/08



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	B-16 20.0ft - 21.0ft	GRAVELLY SAND TRACE CLAY (SP)	22	18	4	7.23	56.17
⊠							
▲							
★							
⊙							

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-16 20.0ft - 21.0ft	31.75	19.84	7.117	0.353	77.0	17.0	6.0	
⊠									
▲									
★									
⊙									

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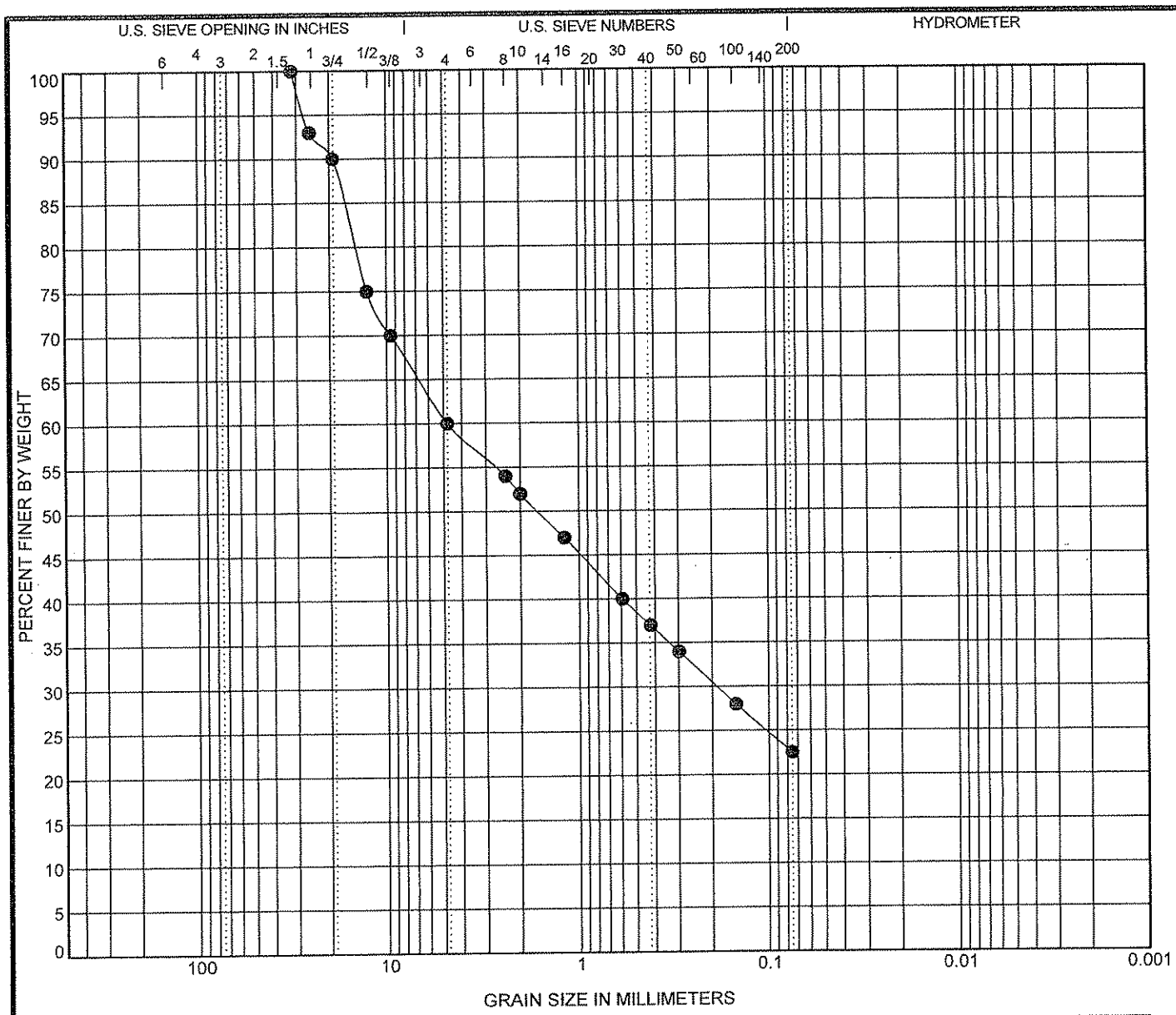
GRAIN SIZE DISTRIBUTION

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08

TC GRAIN SIZE 63085095.GPJ TERRACON.GDT 8/29/08



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-17	0.0ft - 5.0ft	CLAYEY SANDY GRAVEL (GC)	27	19	8		
⊠								
▲								
★								
⊙								

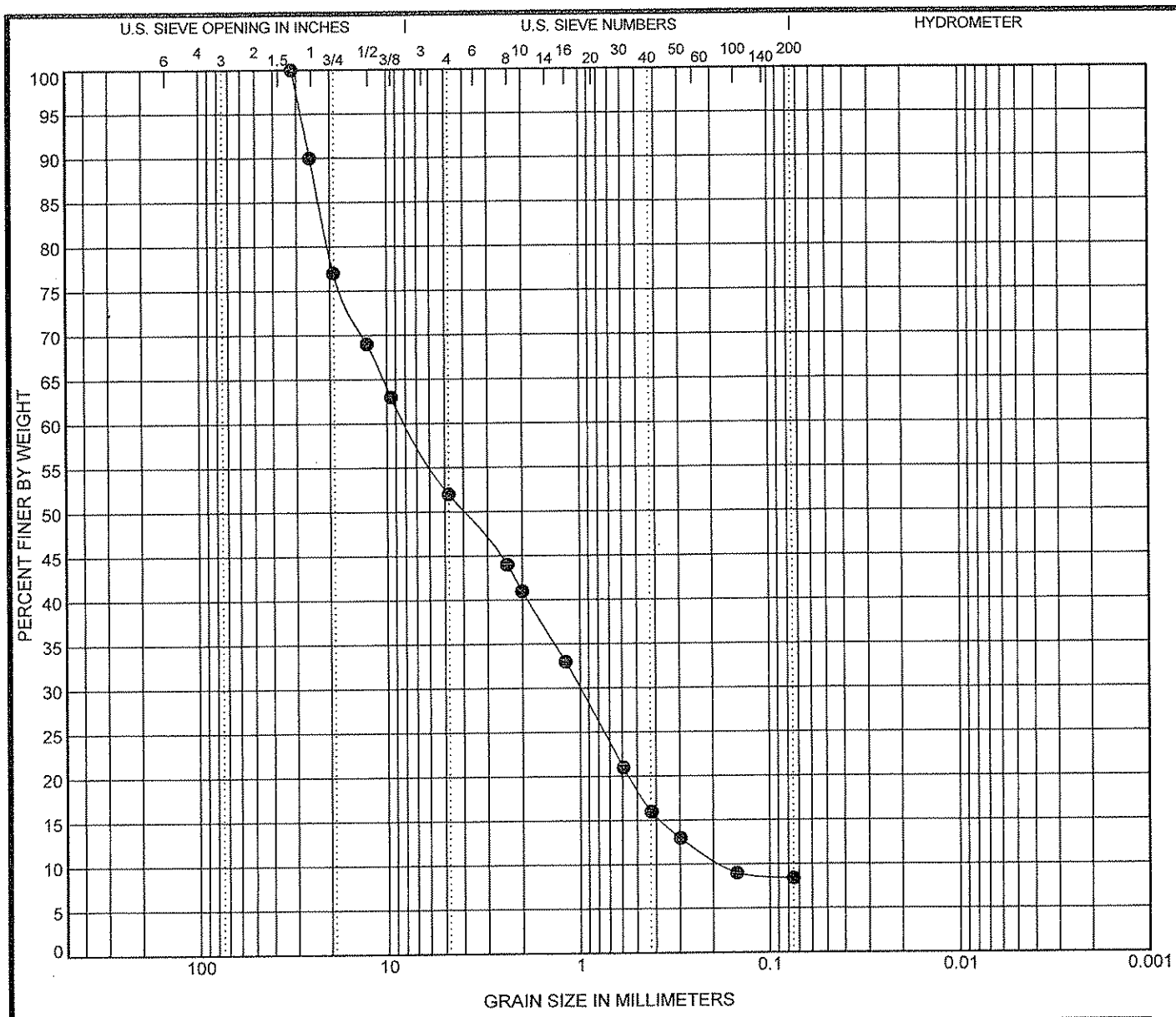
	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-17	0.0ft - 5.0ft	31.75	4.75	0.188		40.0	37.5	22.5	
⊠										
▲										
★										
⊙										

Terracon

GRAIN SIZE DISTRIBUTION

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08

TC GRAIN SIZE 63085095.GPJ TERRACON.GDT 8/29/08



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-17	15.0ft - 16.0ft	SANDY GRAVEL WITH SILT (GP)	NP	NP	NP	0.72	44.42
☒								
▲								
★								
⊙								

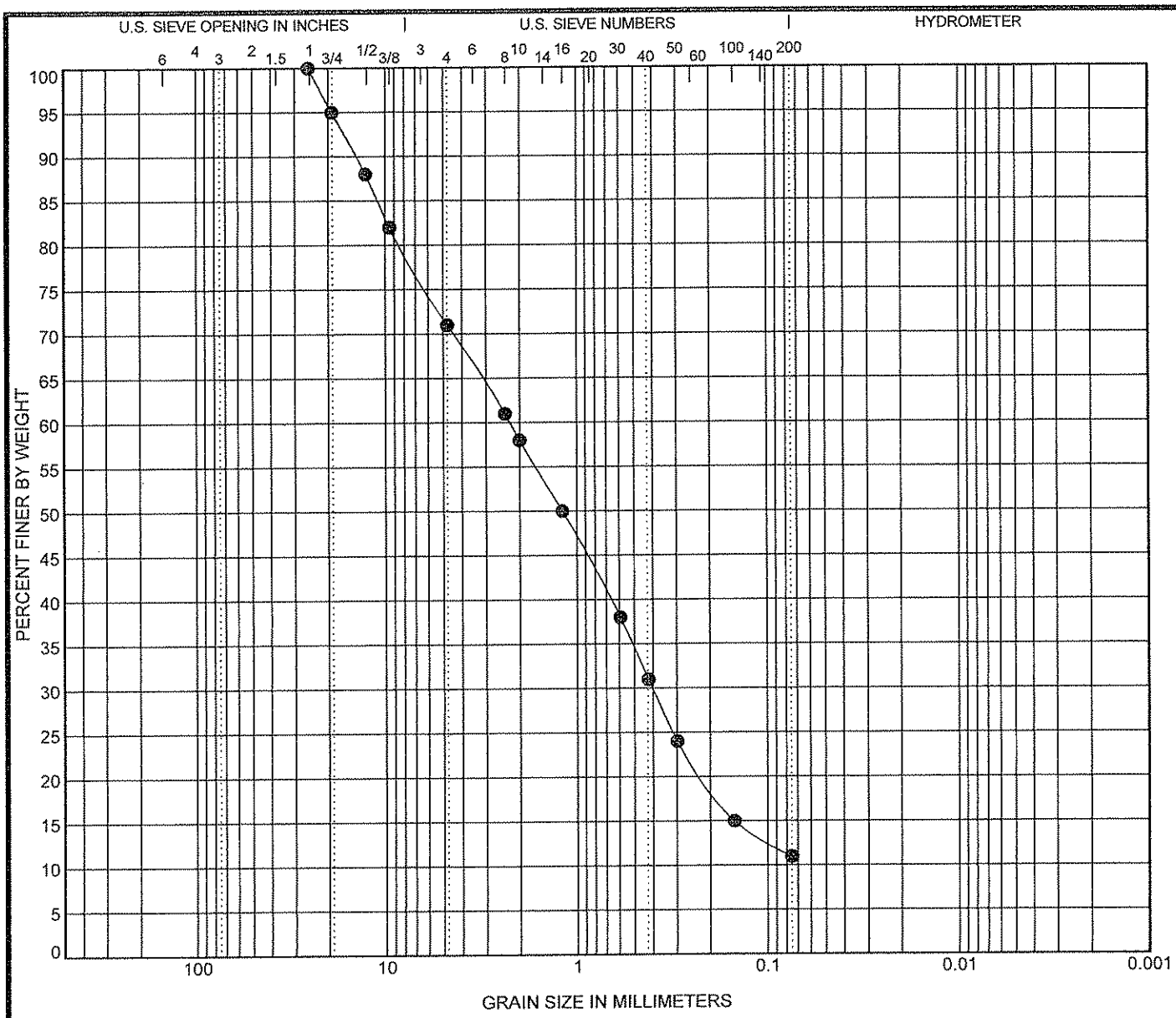
	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-17	15.0ft - 16.0ft	31.75	7.864	0.999	0.177	48.0	43.6	8.4	
☒										
▲										
★										
⊙										

Terracon

GRAIN SIZE DISTRIBUTION

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08

TC_GRAIN_SIZE_63085095.GPJ TERRACON.GDT 8/29/08



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	B-17 20.0ft - 21.0ft	SANDY GRAVEL WITH SILT (GP)	NP	NP	NP	1.13	35.55
⊠							
▲							
★							
⊙							

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-17 20.0ft - 21.0ft	25.4	2.246	0.4		29.0	60.0	11.0	
⊠									
▲									
★									
⊙									

Terracon

GRAIN SIZE DISTRIBUTION

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08

TC GRAIN SIZE 63085095.GPJ TERRACON.GDT 8/29/08

Borehole No.	Depth (ft.)	USCS Soil Class.	In-Situ Properties		Classification				Remolded Expansion				Corrosivity				Remarks
			Dry Density (pcf)	Water Content (%)	Passing #200 Sieve (%)	Atterberg Limits LL	PL	PI	Dry Density (pcf)	Water Content (%)	Surcharge (psf)	Expansion (%)	pH	Resistivity (ohm-cm)	Chlorides (ppm)	Sulfates (ppm)	
B-01	0.0 - 5.0	CL			79	45	20	25	98.4	16	144	6.2					3, 4
B-01	2.5 - 3.5	CL	85	11													1, 2
B-01	5.0 - 6.0	CL	89	10													1, 2
B-01	10.0 - 11.0	SP	92	4													1, 2
B-01	15.0 - 16.0	SP		5													2
B-01	20.0 - 21.0	SP			18												
B-01	30.0 - 31.0	GC-GM			12	24	16	8									
B-02	7.5 - 8.5	SC-SM	87	5													1, 2
B-02	12.5 - 13.5	SM	97	1													1, 2
B-02	20.0 - 21.0	SP	101	1	19	24	17	7									1
B-02	35.0 - 36.5	SP			8	30	18	12									
B-03	0.0 - 5.0	SM			26	NP	NP	NP									
B-03	7.5 - 8.5	SM	97	13													1, 2
B-03	25.0 - 26.0	SP			12	NP	NP	NP									
B-03	31.5 -		105	2													1, 2
B-04	2.5 - 3.5	SC	100	7													1, 2
B-04	15.0 - 16.0	SC	107	6		33	21	12									1
B-04	25.0 - 26.0	SP-SC	104	1													1, 2
B-05	0.0 - 5.0	CL-ML			65	24	18	6	110.2	10.1	144	2.72					3, 4
B-05	2.5 - 3.5	CL-ML	96	4													1, 2
B-05	10.0 - 11.0	SP		2													2
B-05	45.0 - 46.0	GC			12	26	15	11									
B-06	5.0 - 6.0	CL	88	10													1, 2
B-06	10.0 - 11.0	SC	97	8													1, 2
B-06	17.5 - 18.5	GP	106	7													1, 2

REMARKS
1. Dry density and/or moisture determined from one or more rings of a multi-ring sample.
2. Visual Classification.
3. Submerged to approximate saturation.
4. Compacted density (approximately 95% of ASTM D698 maximum density at moisture content slightly below optimum).
5. Corrosivity Results reported as 0 indicate the sample was at a Non-Detectible level.

Terracon

SUMMARY OF LABORATORY RESULTS

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08

Borehole No.	Depth (ft.)	USCS Soil Class.	In-Situ Properties		Classification				Remolded Expansion				Corrosivity				Remarks
			Dry Density (pcf)	Water Content (%)	Passing #200 Sieve (%)	Atterberg Limits LL	PL	PI	Dry Density (pcf)	Water Content (%)	Surcharge (psf)	Expansion (%)	pH	Resistivity (ohm-cm)	Chlorides (ppm)	Sulfates (ppm)	
B-07	0.0 - 5.0	SM			36	19	16	3	115.1	7.5	144	1.2					3, 4
B-07	2.5 - 3.5	SM	112	2													1, 2
B-07	10.0 - 11.0	SP-SM	101	3													1, 2
B-07	15.0 - 16.0	SP-SM			9	NP	NP	NP									
B-08	0.0 - 5.0	CL			59	25	18	7									
B-08	20.0 - 21.0	SP	99	5													1, 2
B-09	0.0 - 5.0	CL			66	24	16	8	109	10.7	144	1.5					3, 4
B-09	2.5 - 3.5	CL	107	6													1, 2
B-09	10.0 - 11.0	SM		2													2
B-09	17.5 - 18.5	SP-SM			12	22	19	3									
B-10	2.5 - 3.5	CL-ML	106	15													1, 2
B-12	2.5 - 3.5	CL	95	5													1, 2
B-12	15.0 - 16.0	SP	98	2													1, 2
B-13	0.0 - 5.0	SM			34	NP	NP	NP	113.6	8.1	144	0.92					3, 4
B-13	5.0 - 6.0	SM	82	9													1, 2
B-14	0.0 - 5.0	CL			57	37	19	18									
B-14	2.5 - 3.5	CL	83	17													1, 2
B-14	7.5 - 8.5	SP	102	2													1, 2
B-15	0.0 - 5.0	CL			74	31	17	14	107.7	11.2	144	3.7					3, 4
B-15	2.5 - 3.5	CL	79	7													1, 2
B-15	7.5 - 8.5	SM		1													2
B-15	10.0 - 11.0	SM			12	NP	NP	NP									
B-16	2.5 - 3.5	CL	108	11													1, 2
B-16	10.0 - 11.0	SP-SM	108	1													1, 2
B-16	20.0 - 21.0	SP			6	22	18	4									

REMARKS
1. Dry density and/or moisture determined from one or more rings of a multi-ring sample.
2. Visual Classification.
3. Submerged to approximate saturation.
4. Compacted density (approximately 95% of ASTM D698 maximum density at moisture content slightly below optimum).
5. Corrosivity Results reported as 0 indicate the sample was at a Non-Detectible level.

Terracon

SUMMARY OF LABORATORY RESULTS

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 9-2-08

Borehole No.	Depth (ft.)	USCS Soil Class.	In-Situ Properties		Classification				Remolded Expansion				Corrosivity				Remarks
			Dry Density (pcf)	Water Content (%)	Passing #200 Sieve (%)	Atterberg Limits			Dry Density (pcf)	Water Content (%)	Surcharge (psf)	Expansion (%)	pH	Resistivity (ohm-cm)	Chlorides (ppm)	Sulfates (ppm)	
						LL	PL	PI									
B-17	0.0 - 5.0	GC			23	27	19	8	113.6	8.2	144	0.25					3, 4
B-17	5.0 - 6.0	GC	111	1													1, 2
B-17	15.0 - 16.0	GP			8	NP	NP	NP									
B-17	17.5 - 18.5	GP	105	2													1, 2
B-17	20.0 - 21.0	GP			11	NP	NP	NP									

REMARKS
1. Dry density and/or moisture determined from one or more rings of a multi-ring sample.
2. Visual Classification.
3. Submerged to approximate saturation.
4. Compacted density (approximately 95% of ASTM D698 maximum density at moisture content slightly below optimum).
5. Corrosivity Results reported as 0 indicate the sample was at a Non-Detectible level.

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SUMMARY OF LABORATORY RESULTS

Project: Future WRC Site
Site: Tucson, Arizona
Job #: 63085095
Date: 8-29-08

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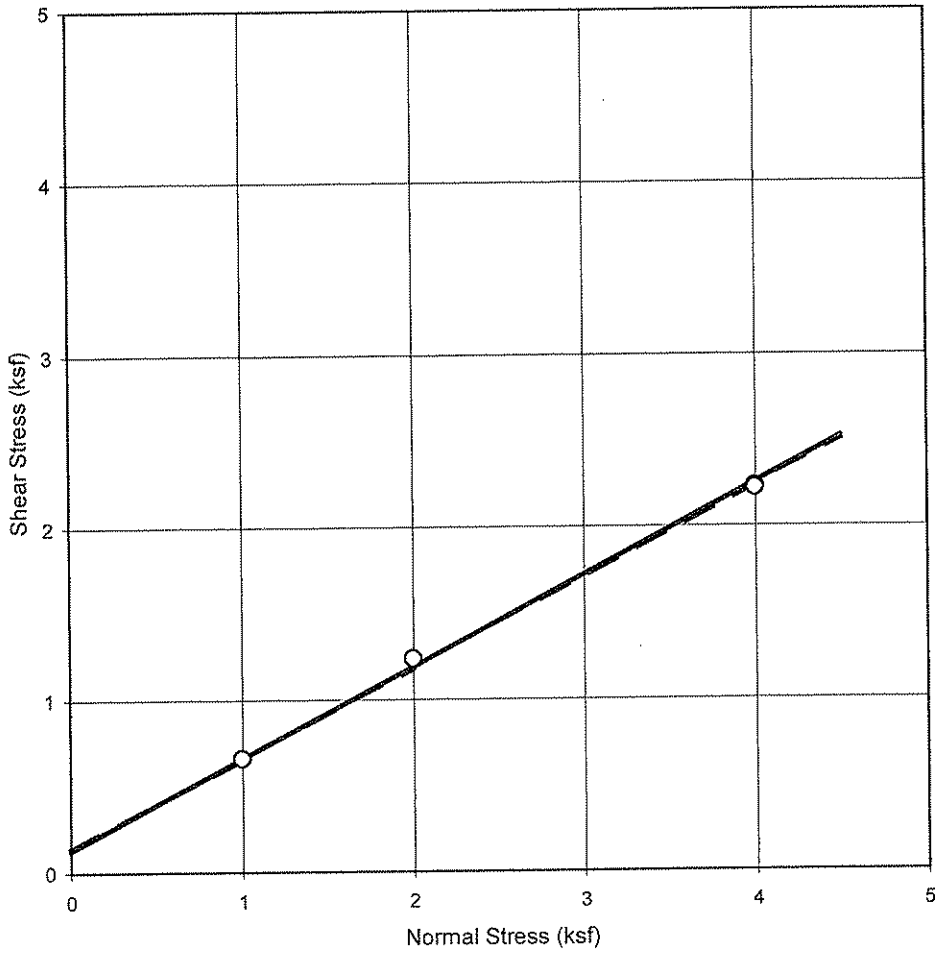
MOISTURE AND UNIT WEIGHT (DENSITY) DETERMINATION

Project: New WRC Site
Proj. No: 63085095
By: CP Date: 08/13/08

			Eqn:	1	2	3	4	5	6	7	8	9
Sample and Soil Information	Boring No.:			B-5	B-8	B-14						
	Sample No.:											
	Sample Depth:			5'	2.5'	5'						
	Soil Classification: (USCS Symbol)			ML	ML	CL						
	Pocket Penetrometer [tsf]			4.25	> 4.5	> 4.5						
Density	No. of Rings:	N_r		4	5	4						
	Mass of Soil (Wet) and Rings [g]:	M_{s+r}		617.4	823.4	722.4						
	Mass of Rings [g]:	M_r	1	170	212.5	170						
	Mass of Soil (Wet) [g]:	M_s	2	447.4	610.9	552.4						
	Wet Density [pcf]:	γ	3	92.7	101.2	114.4						
	Dry Density [pcf]:	γ_d	4	80.2	94.5	99.7						
Mositure Content	Dish No:											
	Mass Dish [g]:	M_t		208.1	203.3	202.9						
	Mass of Soil (Wet) + Dish [g]:	M_{sw+t}		430.7	325.5	421.7						
	Mass of Soil (Dry) + Dish [g]:	M_{sd+t}		400.7	317.4	393.6						
	Mass Of Water [g]:	M_w	5	30	8.1	28.1						
	Mass of Soil (Dry) [g]:	M_{sd}	6	192.6	114.1	190.7						
	Moisture Content [%]:	w	7	**15.6%**	**7.1%**	**14.7%**						
Properties	Specific Gravity	G_s		2.68	2.68	2.68						
	Degree of Saturation [%]	S	8	38.5%	24.7%	58.3%						
	Void Ratio:	e	9	1.09	0.77	0.68						
	Porosity:	n	10	0.52	0.43	0.40						

Average Mass of One Ring, M_{r1}: 42.5 [g]

Standards:
ASTM D 2216-98: Mositure Content



Project Name:	:	New WRC Site
Project No.	:	63085095
Boring No.	:	B-5
Sample No.	:	NA
Depth (ft)	:	5
Soil Type	:	Brown Sandy Silt (ML)
Test Condition	:	Remolded to 100% RC at opt. MC
Initial Dry Density	:	80.7 pcf
Moisture Content (before)	:	15.1 %
Moisture Content (after)	:	21.8 %

INTERPRETED STRENGTH DATA

	Peak	Ultimate
COHESION (PSF) :	150	150
FRICTION ANGLE :	28 °	28 °

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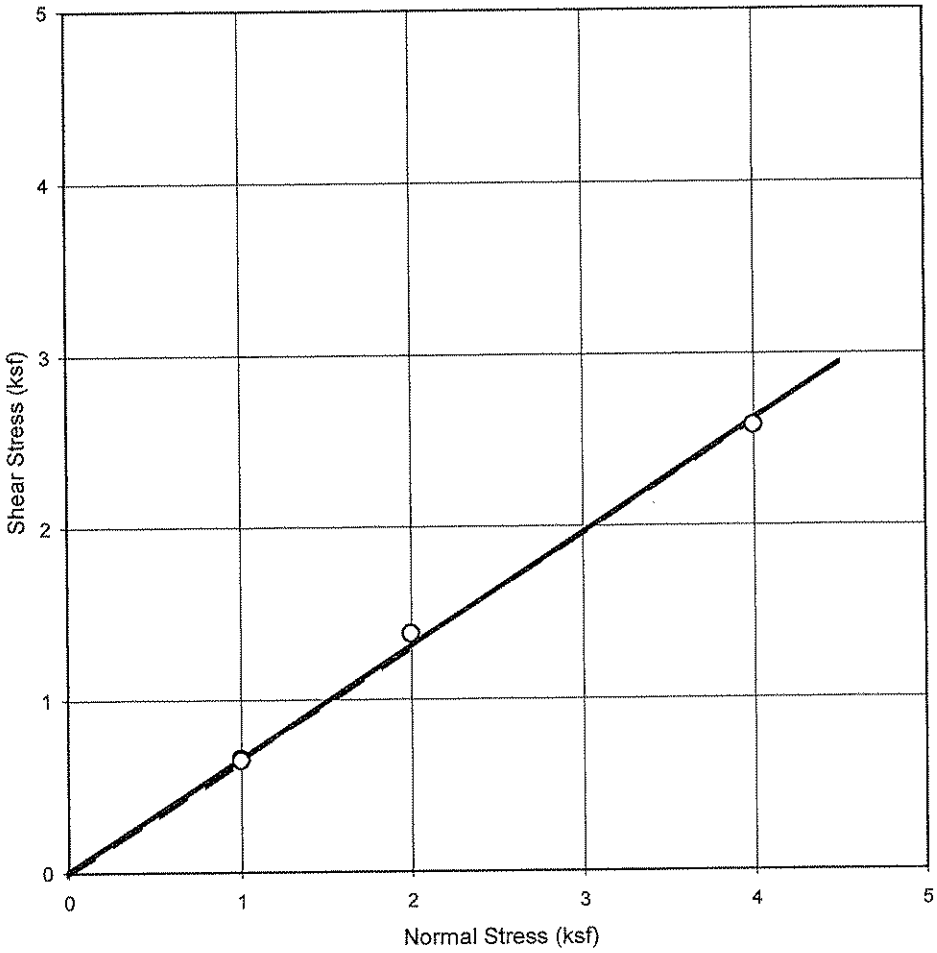
Consulting Engineers & Scientists

Direct Shear Test Result
ASTM D 3080
Aug-2008

Geotechnical Department



Project Name:	:	New WRC Site
Project No.	:	63085095
Boring No.	:	B-2
Sample No.	:	NA
Depth (ft)	:	2.5
Soil Type	:	Brown Sandy Silt (ML)
Test Condition	:	Remolded to 100% RC at opt. MC
Initial Dry Density	:	94.6 pcf
Moisture Content (before)	:	7.3 %
Moisture Content (after)	:	23.3 %

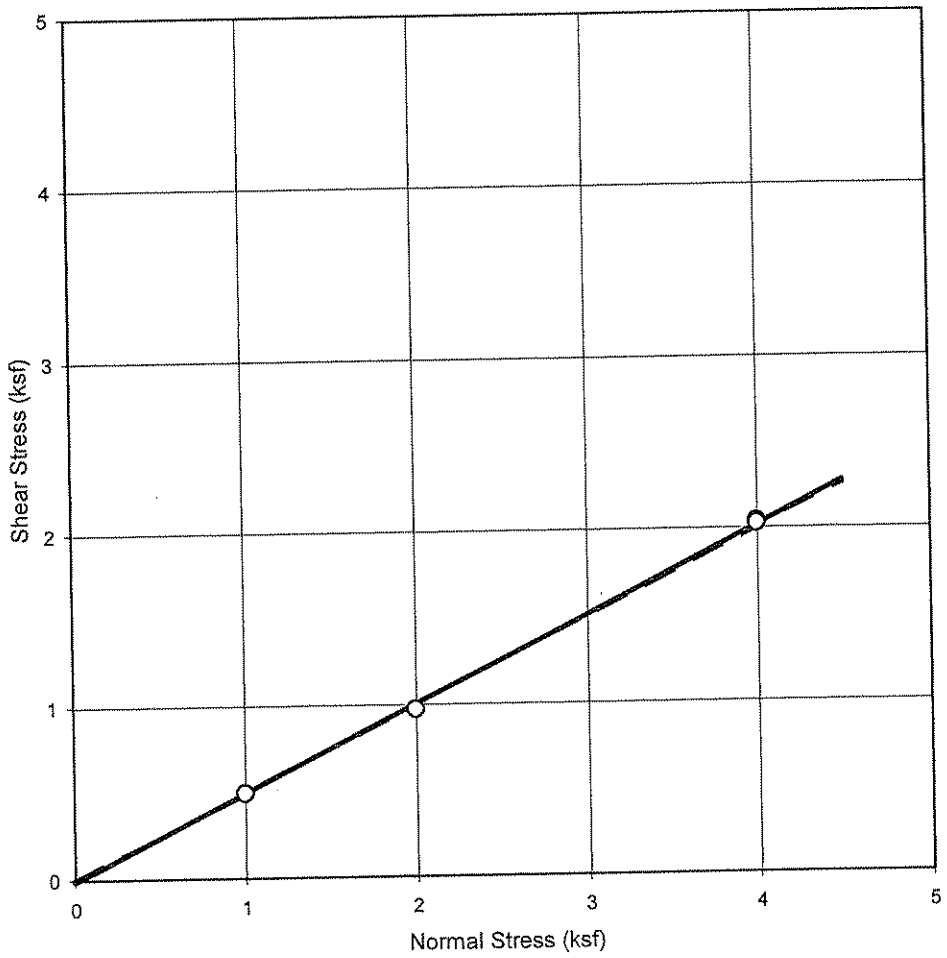
INTERPRETED STRENGTH DATA

	Peak	Ultimate
COHESION (PSF) :	0	0
FRICTION ANGLE :	33 °	33 °

Terracon
Consulting Engineers & Scientists

Direct Shear Test Result
ASTM D 3080
Aug-2008

Geotechnical Department



Project Name:	:	New WRC Site
Project No.	:	63085095
Boring No.	:	B-14
Sample No.	:	NA
Depth (ft)	:	5
Soil Type	:	Brown Sandy Clay (CL)
Test Condition	:	Remolded to 100% RC at opt. MC
Initial Dry Density	:	100.2 pcf
Moisture Content (before)	:	15.0 %
Moisture Content (after)	:	22.4 %

INTERPRETED STRENGTH DATA

	Peak	Ultimate
COHESION (PSF) :	0	0
FRICTION ANGLE :	27 °	27 °

Terracon
Consulting Engineers & Scientists

Direct Shear Test Result
ASTM D 3080
Aug-2008

Geotechnical Department

Turner Laboratories, Inc.

Date: *02-Sep-08*

CLIENT: Terracon, Inc.
Lab Order: 0808370
Project: New WRC Site 63085095
Lab ID: 0808370-01A

Client Sample ID: B-2 0-5
Collection Date: 8/4/2008 7:00:00 AM
Matrix: SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ANIONS IN SOLIDS BY ION CHROMATOGRAPHY		**E300**				Analyst: **JM**
Chloride	130	50		mg/Kg	5	8/14/2008 5:57:00 PM
Sulfate	440	250		mg/Kg	5	8/14/2008 5:57:00 PM
PH OF SOLID AND LIQUID WASTES		**SW9045D**				Analyst: **JM**
pH	7.7	0		pH Units	1	8/12/2008 3:46:00 PM
temperature	20	0		Degrees C	1	8/12/2008 3:46:00 PM
MINIMUM RESISTIVITY		**AZ236A**				Analyst: **JM**
Minimum Resistivity	180	0		ohm-cm	1	8/21/2008 2:30:00 PM

Qualifiers:

ND - Not Detected at or above the PQL
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
PQL - Practical Quantitation Limit
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Turner Laboratories, Inc.

Date: *02-Sep-08*

CLIENT: Terracon, Inc.
Lab Order: 0808370
Project: New WRC Site 63085095
Lab ID: 0808370-02A

Client Sample ID: B-4 0-5
Collection Date: 8/4/2008 8:00:00 AM
Matrix: SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ANIONS IN SOLIDS BY ION CHROMATOGRAPHY		**E300**				Analyst: JM
Chloride	180	10		mg/Kg	1	8/13/2008 7:23:00 PM
Sulfate	4,100	2,500		mg/Kg	50	8/14/2008 6:51:00 PM
PH OF SOLID AND LIQUID WASTES		**SW9045D**				Analyst: JM
pH	6.6	0		pH Units	1	8/12/2008 3:48:00 PM
temperature	20	0		Degrees C	1	8/12/2008 3:48:00 PM
MINIMUM RESISTIVITY		**AZ236A**				Analyst: JM
Minimum Resistivity	110	0		ohm-cm	1	8/21/2008 2:30:00 PM

Qualifiers:

ND - Not Detected at or above the PQL
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
PQL - Practical Quantitation Limit
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Turner Laboratories, Inc.

Date: *02-Sep-08*

CLIENT: Terracon, Inc.
Lab Order: 0808370
Project: New WRC Site 63085095
Lab ID: 0808370-03A

Client Sample ID: B-6 0-5
Collection Date: 8/4/2008 9:00:00 AM
Matrix: SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ANIONS IN SOLIDS BY ION CHROMATOGRAPHY		**E300**				Analyst: JM
Chloride	49	10		mg/Kg	1	8/13/2008 7:42:00 PM
Sulfate	300	100		mg/Kg	2	8/14/2008 7:10:00 PM
PH OF SOLID AND LIQUID WASTES		**SW9045D**				Analyst: JM
pH	7.7	0		pH Units	1	8/12/2008 3:50:00 PM
temperature	20	0		Degrees C	1	8/12/2008 3:50:00 PM
MINIMUM RESISTIVITY		**AZ236A**				Analyst: JM
Minimum Resistivity	180	0		ohm-cm	1	8/21/2008 2:30:00 PM

Qualifiers:

ND - Not Detected at or above the PQL
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
PQL - Practical Quantitation Limit
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Turner Laboratories, Inc.

Date: *02-Sep-08*

CLIENT: Terracon, Inc.
Lab Order: 0808370
Project: New WRC Site 63085095
Lab ID: 0808370-04A

Client Sample ID: B-10 0-5
Collection Date: 8/4/2008 10:00:00 AM
Matrix: SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ANIONS IN SOLIDS BY ION CHROMATOGRAPHY		**E300**				Analyst: **JM**
Chloride	35	10		mg/Kg	1	8/13/2008 8:00:00 PM
Sulfate	340	100		mg/Kg	2	8/14/2008 7:28:00 PM
PH OF SOLID AND LIQUID WASTES		**SW9045D**				Analyst: **JM**
pH	7.8	0		pH Units	1	8/12/2008 3:52:00 PM
temperature	20	0		Degrees C	1	8/12/2008 3:52:00 PM
MINIMUM RESISTIVITY		**AZ236A**				Analyst: **JM**
Minimum Resistivity	190	0		ohm-cm	1	8/22/2008 10:00:00 AM

Qualifiers:

ND - Not Detected at or above the PQL
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
PQL - Practical Quantitation Limit
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Turner Laboratories, Inc.

Date: *02-Sep-08*

CLIENT: Terracon, Inc.
Lab Order: 0808370
Project: New WRC Site 63085095
Lab ID: 0808370-05A

Client Sample ID: B-12 0-5
Collection Date: 8/4/2008 11:00:00 AM
Matrix: SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ANIONS IN SOLIDS BY ION CHROMATOGRAPHY		**E300**				Analyst: JM
Chloride	110	10		mg/Kg	1	8/13/2008 8:55:00 PM
Sulfate	710	250		mg/Kg	5	8/14/2008 7:46:00 PM
PH OF SOLID AND LIQUID WASTES		**SW9045D**				Analyst: JM
pH	9.0	0		pH Units	1	8/12/2008 3:54:00 PM
temperature	20	0		Degrees C	1	8/12/2008 3:54:00 PM
MINIMUM RESISTIVITY		**AZ236A**				Analyst: JM
Minimum Resistivity	240	0		ohm-cm	1	8/22/2008 10:00:00 AM

Qualifiers:

ND - Not Detected at or above the PQL
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
PQL - Practical Quantitation Limit
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Turner Laboratories, Inc.

Date: *02-Sep-08*

CLIENT: Terracon, Inc.
Lab Order: 0808370
Project: New WRC Site 63085095
Lab ID: 0808370-06A

Client Sample ID: B-16 0-5
Collection Date: 8/16/2008 12:00:00 PM
Matrix: SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
ANIONS IN SOLIDS BY ION CHROMATOGRAPHY		**E300**				Analyst: **JM**
Chloride	160	10		mg/Kg	1	8/13/2008 9:13:00 PM
Sulfate	1,300	500		mg/Kg	10	8/14/2008 8:04:00 PM
PH OF SOLID AND LIQUID WASTES		**SW9045D**				Analyst: **JM**
pH	8.5	0		pH Units	1	8/12/2008 3:56:00 PM
temperature	20	0		Degrees C	1	8/12/2008 3:56:00 PM
MINIMUM RESISTIVITY		**AZ236A**				Analyst: **JM**
Minimum Resistivity	240	0		ohm-cm	1	8/22/2008 10:00:00 AM

Qualifiers:

ND - Not Detected at or above the PQL
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
PQL - Practical Quantitation Limit
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

GENERAL NOTES

DRILLING & SAMPLING SYMBOLS:

SS:	Split Spoon - 1-3/8" I.D., 2" O.D., unless otherwise noted	HS:	Hollow Stem Auger
ST:	Thin-Walled Tube - 2" O.D., unless otherwise noted	PA:	Power Auger
RS:	Ring Sampler - 2.42" I.D., 3" O.D., unless otherwise noted	HA:	Hand Auger
DB:	Diamond Bit Coring - 4", N, B	RB:	Rock Bit
BS:	Bulk Sample or Auger Sample	WB:	Wash Boring or Mud Rotary

The number of blows required to advance a standard 2-inch O.D. split-spoon sampler (SS) the last 12 inches of the total 18-inch penetration with a 140-pound hammer falling 30 inches is considered the "Standard Penetration" or "N-value". For 3" O.D. ring samplers (RS) the penetration value is reported as the number of blows required to advance the sampler 12 inches using a 140-pound hammer falling 30 inches, reported as "blows per foot," and is not considered equivalent to the "Standard Penetration"or "N-value".

WATER LEVEL MEASUREMENT SYMBOLS:

WL:	Water Level	WS:	While Sampling	N/E:	Not Encountered
WCI:	Wet Cave in	WD:	While Drilling		
DCI:	Dry Cave in	BCR:	Before Casing Removal		
AB:	After Boring	ACR:	After Casing Removal		

Water levels indicated on the boring logs are the levels measured in the borings at the times indicated. Groundwater levels at other times and other locations across the site could vary. In pervious soils, the indicated levels may reflect the location of groundwater. In low permeability soils, the accurate determination of groundwater levels may not be possible with only short-term observations.

DESCRIPTIVE SOIL CLASSIFICATION: Soil classification is based on the Unified Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

CONSISTENCY OF FINE-GRAINED SOILS

Unconfined Compressive Strength, Qu, psf	Standard Penetration or N-value (SS) Blows/Ft.	Consistency
< 500	0 - 1	Very Soft
500 – 1,000	2 - 4	Soft
1,000 – 2,000	4 - 8	Medium Stiff
2,000 – 4,000	8 -15	Stiff
4,000 – 8,000	15 - 30	Very Stiff
8,000+	> 30	Hard

RELATIVE DENSITY OF COARSE-GRAINED SOILS

Standard Penetration or N-value (SS) Blows/Ft.	Ring Sampler (RS) Blows/Ft.	Relative Density
0 – 3	0-6	Very Loose
4 – 9	7-18	Loose
10 – 29	19-58	Medium Dense
30 – 49	59-98	Dense
> 50	> 99	Very Dense

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 15
With	15 – 29
Modifier	> 30

GRAIN SIZE TERMINOLOGY

Major Component of Sample	Particle Size
Boulders	Over 12 in. (300mm)
Cobbles	12 in. to 3 in. (300mm to 75 mm)
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)
Sand	#4 to #200 sieve (4.75mm to 0.075mm)
Silt or Clay	Passing #200 Sieve (0.075mm)

RELATIVE PROPORTIONS OF FINES

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 5
With	5 – 12
Modifiers	> 12

PLASTICITY DESCRIPTION

Term	Plasticity Index
Non-plastic	0
Low	1-10
Medium	11-30
High	> 30

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UNIFIED SOIL CLASSIFICATION SYSTEM

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

[A] Based on the material passing the 3-in. (75-mm) sieve

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

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

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

[E] $Cu = D_{60}/D_{10}$ $\quad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥ 15% sand, add "with sand" to group name.

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

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

[I] If soil contains ≥ 15% gravel, add "with gravel" to group name.

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

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

[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.

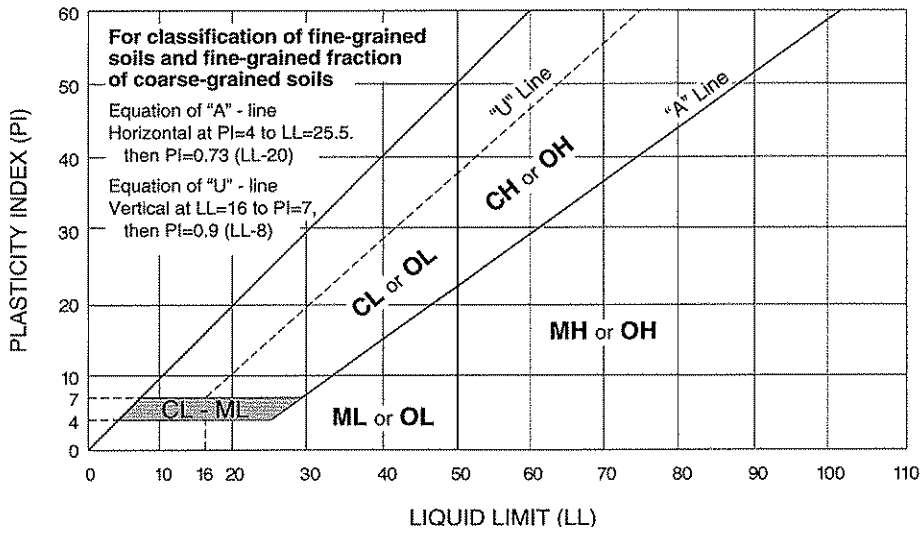
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

[N] PI ≥ 4 and plots on or above "A" line.

[O] PI < 4 or plots below "A" line.

[P] PI plots on or above "A" line.

[Q] PI plots below "A" line.



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Form 111—6/98