EXPLORATORY BORING NO. 1

Date Drilled: 12/20/07 | Client: Riverside Community Hospital

Equipment: CME 75 Track Rig | Driving Weight / Drop: 140 lbs./ 30 in.

Surface Elevation(ft): 799.0 | Logged by: VJR | Measured Depth to Water(ft): 39.0

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
		(SP) Sand, medium to coarse with fine, gravel and cobbles to 4", brown		X		50/4"	6.0	111	Ring
			▼ Groundwater						
40				X		50/4"	17.2	Dist.	Ring
45				X		21 50/5"	10.5	123	Ring, DS
50				X		50	11.8	128	Ring
55				X		50	12.4	125	Ring
60				X		50/4"	15.4	123	Ring
		NO BEDROCK REFUSAL AT 70.0' FILL TO 4.0' SLIGHT CAVING GROUNDWATER AT 39.0'							
65				X		50/4"	9.6	134	Ring
		END OF BORING		X		50/1"	N.R.	N.R.	Ring

BORING LOG - NO EQUIV & BLOW PER 6 IN 07881-3.GPJ CHJ.GDT 1/18/08

C.H.J.

PROPOSED HOSPITAL EXPANSION AND PARKING GARAGE
RIVERSIDE, CALIFORNIA

Job No. 07881-3

Enclosure B-1b

EXPLORATORY BORING NO. 2

Date Drilled: 12/20/07 | Client: Riverside Community Hospital

Equipment: CME 75 Track Rig | Driving Weight / Drop: 140 lbs./ 30 in.

Surface Elevation(ft): 800.0 | Logged by: VJR | Measured Depth to Water(ft): 36.0

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
		(ML) Sandy Silt, fine to medium with coarse and gravel to 1", light brown	Fill				7.3		SA, MDE, SE
				X		5 6 4			SPT
5		(ML) Sandy Silt, fine with medium, light brown	Native				7.9		
				X		3 2 2			SPT
10				X		3 3 5			SPT
15		(SP-SM) Sand, medium to coarse with fine, silt and gravel to 1", brown					3.3		
				X		5 6 6			SPT
20		(SP) Sand, medium to coarse with fine and gravel to 1", brown		X		19 24 19			SPT
25				X		41 50/5"			SPT
30		(SP-SM) Sand, fine to coarse with silt and gravel to 1", light brown		X		50			SPT

BORING LOG - NO EQUIV & BLOW PER 6 IN 07881-3.GPJ CHJ.GDT 1/18/08

C.H.J.

PROPOSED HOSPITAL EXPANSION AND PARKING GARAGE
RIVERSIDE, CALIFORNIA

Job No. 07881-3

Enclosure B-2a

EXPLORATORY BORING NO. 2

Date Drilled: 12/20/07 | Client: Riverside Community Hospital

Equipment: CME 75 Track Rig | Driving Weight / Drop: 140 lbs./ 30 in.

Surface Elevation(ft): 800.0 | Logged by: VJR | Measured Depth to Water(ft): 36.0

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
		(SP-SM) Sand, fine to coarse with silt and gravel to 1", light brown	▼ Groundwater	X		19 23 32			SPT
40				X		50/5"			SPT
		END OF BORING							
45		NO BEDROCK REFUSAL AT 43.0' FILL TO 4.0' SLIGHT CAVING GROUNDWATER AT 36.0'							
50									
55									
60									
65									

BORING LOG - NO EQUIV & BLOW PER 6 IN 07881-3.GPJ CHJ.GDT 1/18/08

C.H.J.

PROPOSED HOSPITAL EXPANSION AND PARKING GARAGE
RIVERSIDE, CALIFORNIA

Job No. 07881-3

Enclosure B-2b

EXPLORATORY BORING NO. 6

Date Drilled: 12/26/07 | Client: Riverside Community Hospital

Equipment: CME 75 Track Rig | Driving Weight / Drop: 140 lbs./ 30 in.

Surface Elevation(ft): 839.0 | Logged by: JMZ | Measured Depth to Water(ft): 76.7

DEPTH (ft)	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
	Asphalt							
	Base	Fill						
	(SM) Silty Sand, fine with gravel to 3", red brown					7.3		
			X		7 6 12	7.8	107	Ring
5	(SM) Silty Sand, fine, light brown	Native						
			X		12 20 31	14.1	106	Ring
10						10.8		
			X		9 13 17	10.8	120	Ring
15								
			X		9 16 39	15.0	117	Ring
20								
			X		11 13 18	12.8	113	Ring
25	(ML) Sandy Silt, fine, brown					25.0		
			X		13 19 23	24.4	102	Ring
30	(ML) Sandy Silt, fine with clay, red brown					13.6		
			X		13 18 30	13.3	122	Ring

BORING LOG - NO EQUIV & BLOW PER 6 IN 07881-3.GPJ CHJ.GDT 1/16/08

C.H.J.

PROPOSED HOSPITAL EXPANSION AND PARKING GARAGE
RIVERSIDE, CALIFORNIA

Job No. 07881-3

Enclosure B-6a

EXPLORATORY BORING NO. 6

Date Drilled: 12/26/07 | Client: Riverside Community Hospital

Equipment: CME 75 Track Rig | Driving Weight / Drop: 140 lbs./ 30 in.

Surface Elevation(ft): 839.0 | Logged by: JMZ | Measured Depth to Water(ft): 76.7

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
		(SC) Clayey Sand, fine to medium with silt, red brown					11.7		Cor.
				X		10 18 35	10.8	125	Ring
40		(SM) Silty Sand, fine to medium with coarse and gravel to 3/4", light brown					10.0		
				X		17 30 50	10.3	126	Ring
45		(SP-SM) Sand, fine to coarse with silt and gravel to 1", light brown					1.8		
				X		48 43 41	1.8	Dist.	Ring
50		(SP) Sand, fine to medium with coarse and gravel to 1", light brown							
				X		40 50/5"	N.R.	N.R.	Ring
55		(SP) Sand, fine to coarse with gravel and cobbles to 4", light brown							
				X		50	N.R.	N.R.	Ring
60									
				X		50/4"	3.0	112	Ring
65									
				X		50	3.3	96	Ring

BORING LOG - NO EQUIV & BLOW PER 6 IN 07881-3.GPJ CHJ.GDT 1/18/08

C.H.J.

PROPOSED HOSPITAL EXPANSION AND PARKING GARAGE
RIVERSIDE, CALIFORNIA

Job No. 07881-3

Enclosure B-6b

EXPLORATORY BORING NO. 6

Date Drilled: 12/26/07 | Client: Riverside Community Hospital

Equipment: CME 75 Track Rig | Driving Weight / Drop: 140 lbs./ 30 in.

Surface Elevation(ft): 839.0 | Logged by: JMZ | Measured Depth to Water(ft): 76.7

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
		(SP) Sand, fine to coarse with gravel and cobbles to 4", light brown		⊠		50/4"	4.2	105	Ring
75		(SM) Silty Sand, fine to coarse with clay and gravel 3", brown	▼ Groundwater	⊠		50/5"	9.6	114	Ring
80				⊠		50/2"	N.R.	N.R.	Ring
		END OF BORING							
85		NO BEDROCK REFUSAL AT 83.0' FILL TO 5.0' SLIGHT CAVING GROUNDWATER AT 76.7'							
90									
95									
100									

BORING LOG - NO EQUIV & BLOW PER 6 IN 07881-3.GPJ CHJ.GDT 1/18/08

C.H.J.

PROPOSED HOSPITAL EXPANSION AND PARKING GARAGE
RIVERSIDE, CALIFORNIA

Job No. 07881-3

Enclosure B-6c

EXPLORATORY BORING NO. 7

Date Drilled: 12/26/07 | Client: Riverside Community Hospital

Equipment: CME 75 Track Rig | Driving Weight / Drop: 140 lbs./ 30 in.

Surface Elevation(ft): 825.0 | Logged by: JMZ | Measured Depth to Water(ft): N.A.

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
		Asphalt							
		Base	Fill		X		6.5		
		(SM) Silty Sand, fine to medium with coarse and gravel to 3", brown							
		(SM) Silty Sand, fine to coarse with gravel to 1", brown	Native		X		5.8		Cor.
5				X		6 8 8			SPT
10				X		3 3 3			SPT
15				X		2 4 3			SPT
		(SP-SM) Sand, fine to medium with coarse and silt, light brown							
20				X		2 3 5			SPT
		(SP-SM) Sand, fine to coarse with silt and gravel to 1", light brown							
25				X		6 8 11			SPT
		(SP) Sand, fine to coarse, light brown							
30				X		8 12 19			SPT
		(SP) Sand, fine to coarse with gravel to 1", light brown							

BORING LOG - NO EQUIV & BLOW PER 6 IN 07881-3.GPJ CHJ.GDT 1/18/08

C.H.J.

PROPOSED HOSPITAL EXPANSION AND PARKING GARAGE
RIVERSIDE, CALIFORNIA

Job No. 07881-3

Enclosure B-7a

EXPLORATORY BORING NO. 7

Date Drilled: 12/26/07 | Client: Riverside Community Hospital

Equipment: CME 75 Track Rig | Driving Weight / Drop: 140 lbs./ 30 in.

Surface Elevation(ft): 825.0 | Logged by: JMZ | Measured Depth to Water(ft): N.A.

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
		(SP) Sand, fine to coarse with gravel to 1", light brown		X		13 26 21			SPT
40				X		10 15 17			SPT
45				X		14 50			SPT
50				X		18 27 29			SPT
		END OF BORING NO BEDROCK NO REFUSAL FILL TO 4.0' SLIGHT CAVING NO FREE GROUNDWATER							
55									
60									
65									

BORING LOG - NO EQUIV & BLOW PER 6 IN 07881-3.GPJ CHJ.GDT 1/18/08

C.H.J.

PROPOSED HOSPITAL EXPANSION AND PARKING GARAGE
RIVERSIDE, CALIFORNIA

Job No. 07881-3

Enclosure B-7b

EXPLORATORY BORING NO. 8

Date Drilled: 12/21/07 | Client: Riverside Community Hospital

Equipment: Limited Access Mole Rig | Driving Weight / Drop: 140 lbs./ 30 in.

Surface Elevation(ft): 810.0 | Logged by: TAD | Measured Depth to Water(ft): N.A.

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
		(SM) Silty Sand, fine with clay, dark brown	Fill		▨		14.2		
				☒		22 28 30	13.4	122	Ring
5									
		(SM) Silty sand, fine with clay, dark brown.	Native	☒		7 8 8	4.8	99	Ring
10									
				☒		3 3 4	6.0	138	Ring
15									
		(ML) Sandy Silt, fine with clay, dark brown		☒		5 6 7	N.R.	N.R.	Ring
20									
				☒		7 8 8	20.8	104	Ring
25		(SP) Sand, fine to coarse with gravel to 3", light brown							
				☒		10 15 30	1.6	114	Ring
30									
				☒		40 50	4.6	113	Ring
		END OF BORING NO BEDROCK, REFUSAL AT 31.0' FILL TO 7.0', SLIGHT CAVING NO FREE GROUNDWATER							

BORING LOG - NO EQUIV & BLOW PER 6 IN 07881-3.GPJ CHJ.GDT 1/18/08

C.H.J.

PROPOSED HOSPITAL EXPANSION AND PARKING GARAGE
RIVERSIDE, CALIFORNIA

Job No. 07881-3

Enclosure B-8

EXPLORATORY BORING NO. 9

Date Drilled: 12/21/07 | Client: Riverside Community Hospital

Equipment: Limited Access Mole Rig | Driving Weight / Drop: 140 lbs./ 30 in.

Surface Elevation(ft): 811.0 | Logged by: TAD | Measured Depth to Water(ft): N.A.

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
		(SM) Silty Sand, fine, medium brown	Fill				8.5		
5		(SM) Silty Sand, fine with clay, dark brown		X		14 14 15	8.7	127	Ring, Pass #200
		(ML) Sandy Silt, fine with clay, light brown	Native				10.7		
10				X		4 4 5	4.9	98	Ring
15				X		2 3 5	7.6	101	Ring, DS
20				X		7 10 11	8.2	115	Ring
25				X		8 10 25	1.9	113	Ring
		(SP) Sand, fine with medium to coarse, light brown		X		9 11 29	5.3	107	Ring
30		END OF BORING							
		NO BEDROCK REFUSAL AT 29.5' FILL TO 9.0' SLIGHT CAVING NO FREE GROUNDWATER							

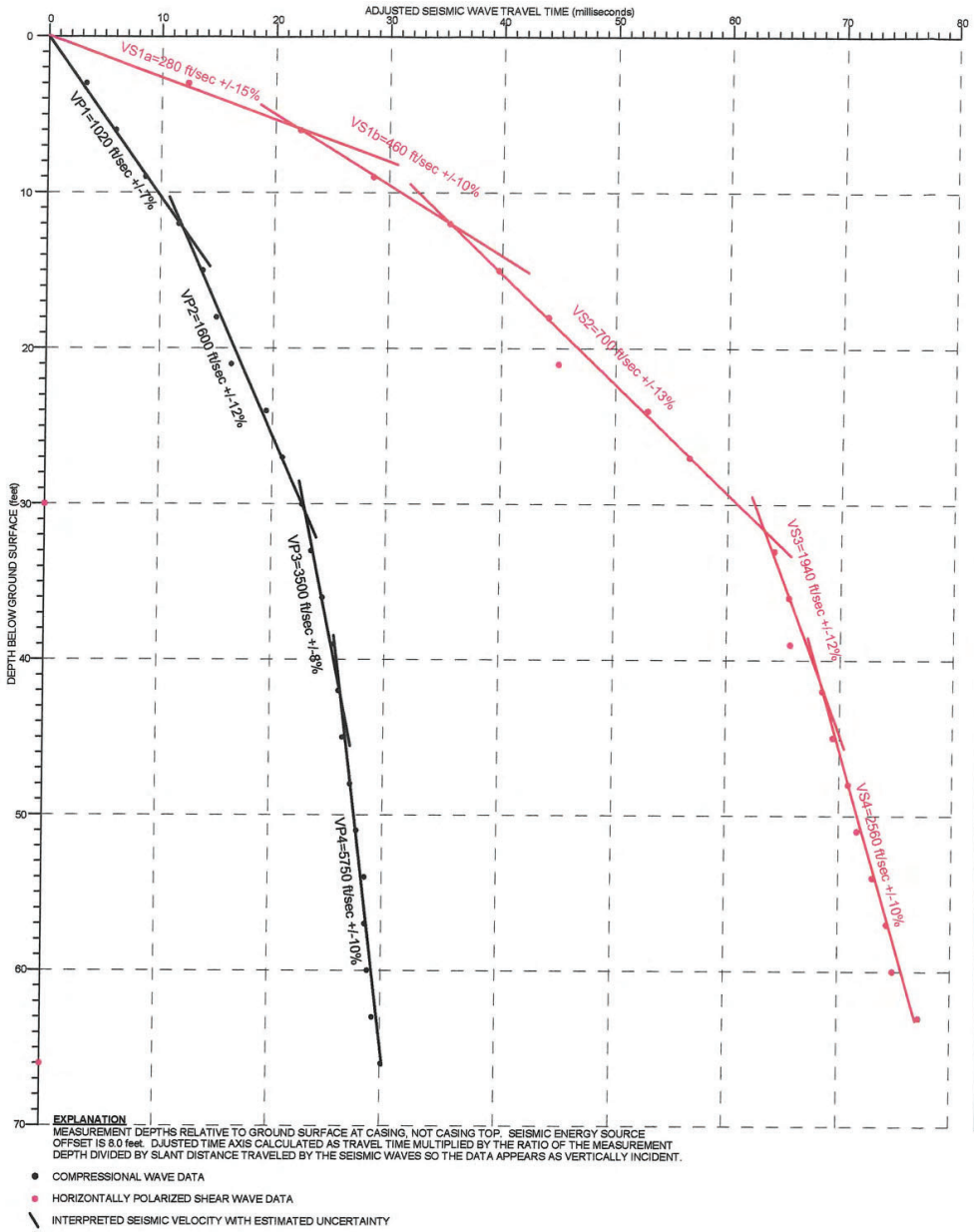
BORING LOG - NO EQUIV & BLOW PER 6 IN 07881-3.GPJ CHJ.GDT 1/18/08

C.H.J.

PROPOSED HOSPITAL EXPANSION AND PARKING GARAGE
RIVERSIDE, CALIFORNIA

Job No. 07881-3

Enclosure B-9



CHJ BORING LOG OF 12/20/07

SILTY SAND (SM) WITH GRAVEL FILL
DRY UNIT WEIGHT = 120 pcf
BLOW COUNTS = 14

SILTY SAND (SM)
DRY UNIT WEIGHT = 101-120 pcf
BLOW COUNT = 4-7

SAND (SP) WITH GRAVEL
DRY UNIT RATE = 104-117 pcf
BLOW COUNTS = 12-50

SAND (SP) WITH GRAVEL & COBBLES
DRY UNIT RATE = 111-134 pcf
BLOW COUNTS = >50

REFUSAL @ 70 feet - NO BEDROCK

VELOCITY CORRELATIONS WITH STRATIGRAPHY

DEPTH RANGE (feet)	COMPRESSIONAL VELOCITY (ft/sec)	SHEAR VELOCITY (ft/sec)	STRATIGRAPHY
0 - 12	1020 +/- 7%	280 +/-15% 460 +/-10%	SILTY SAND (SM) WITH GRAVEL FILL
12 - 31	1600 +/-12%	700 +/-13%	SILTY SAND (SM)
31 - 42	3500 +/-10%	1940 +/-12%	SAND (SP) WITH GRAVEL GROUND WATER @ 39 feet
42 - 66	5750 +/-10%	2560 +/-10%	SAND (SP) WITH GRAVEL AND COBBLES

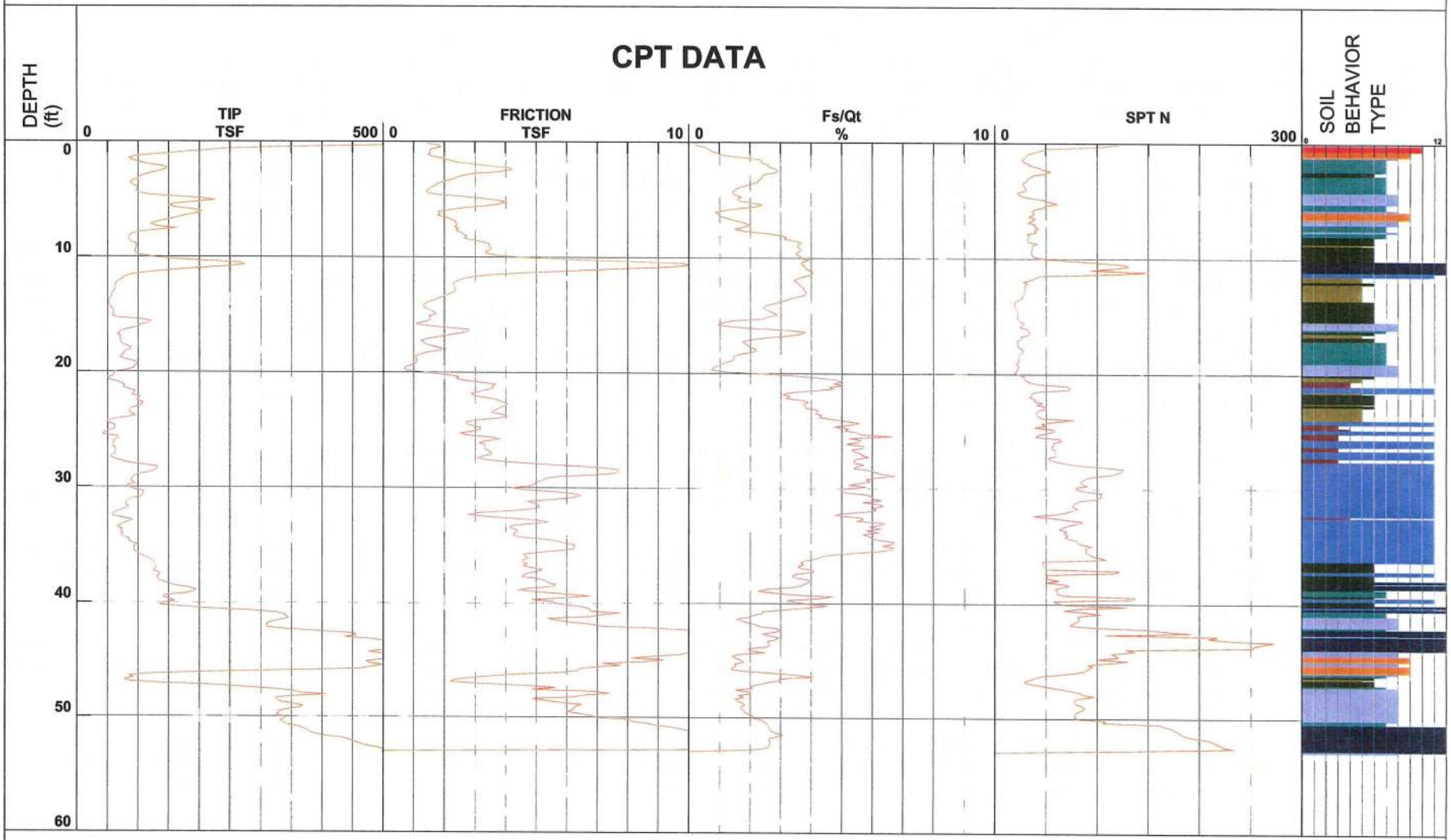
FIGURE 2
BORING B1
DOWNHOLE SEISMIC VELOCITY DATA AND INTERPRETED VELOCITY MODEL WITH STRATIGRAPHIC CORRELATIONS

PROPOSED BED TOWER & PARKING GARAGE
RIVERSIDE COMMUNITY HOSPITAL
TERRA PHYSICS

C.H.J. Inc

Location	Riverside Community Hospital	Operator	ML/JH	Filename	SDF(502).cpt
Job Number	07881-3	Cone Number	DSG1047	GPS	
Hole Number	CPT-01	Date and Time	12/20/2007 8:22:44 AM	Maximum Depth	53.15 ft
Water Table Depth		0.00 ft		Elevation	838 ft

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

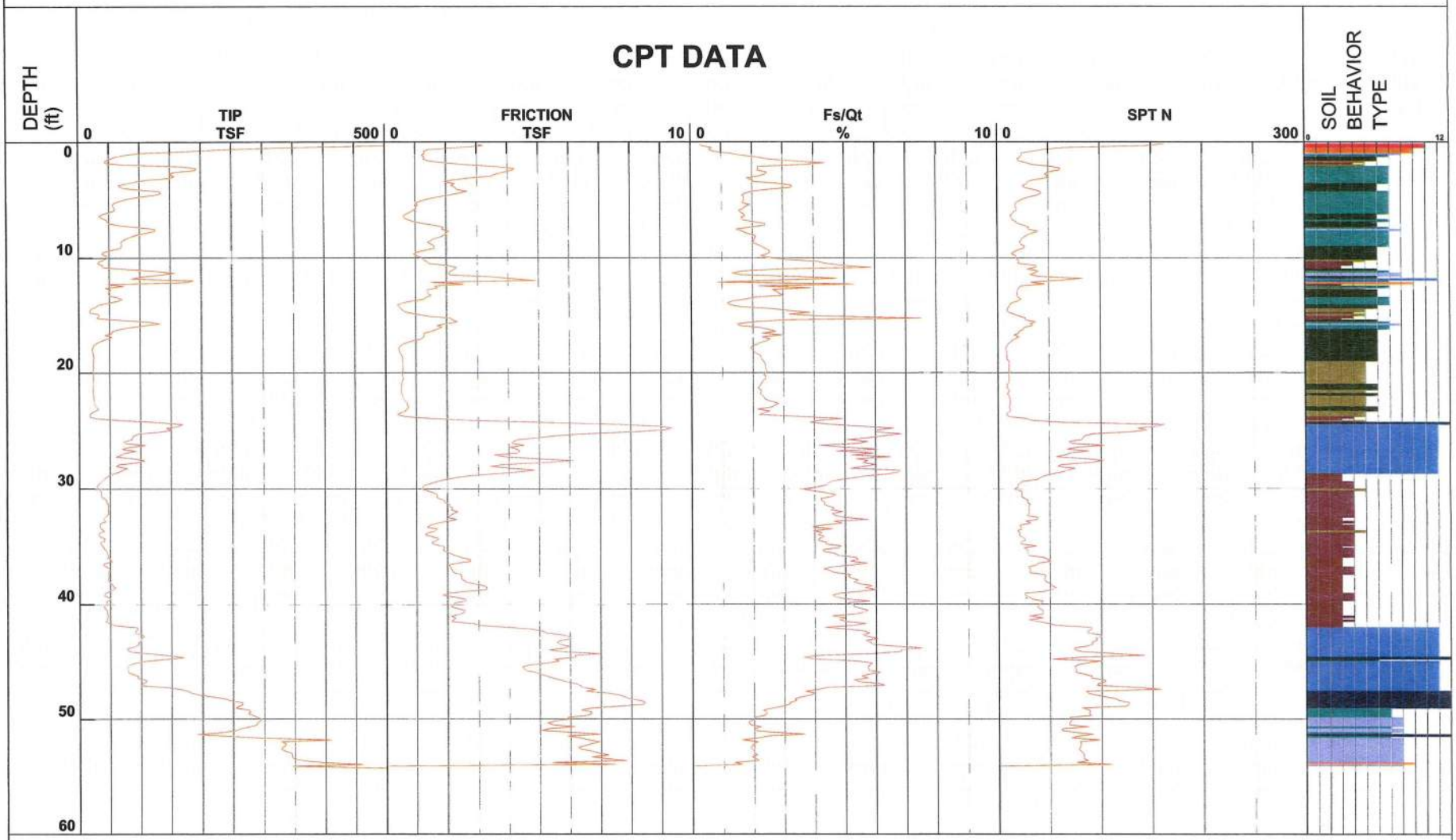
Depth Increment

*Soil behavior type and SPT based on data from UBC-1983

C.H.J. Inc

Location	Riverside Community Hospital	Operator	ML/JH	Filename	SDF(503).cpt
Job Number	07881-3	Cone Number	DSG1047	GPS	
Hole Number	CPT-02	Date and Time	12/20/2007 9:16:17 AM	Maximum Depth	54.30 ft
Water Table Depth		0.00 ft		Elevation	839 ft

CPT DATA



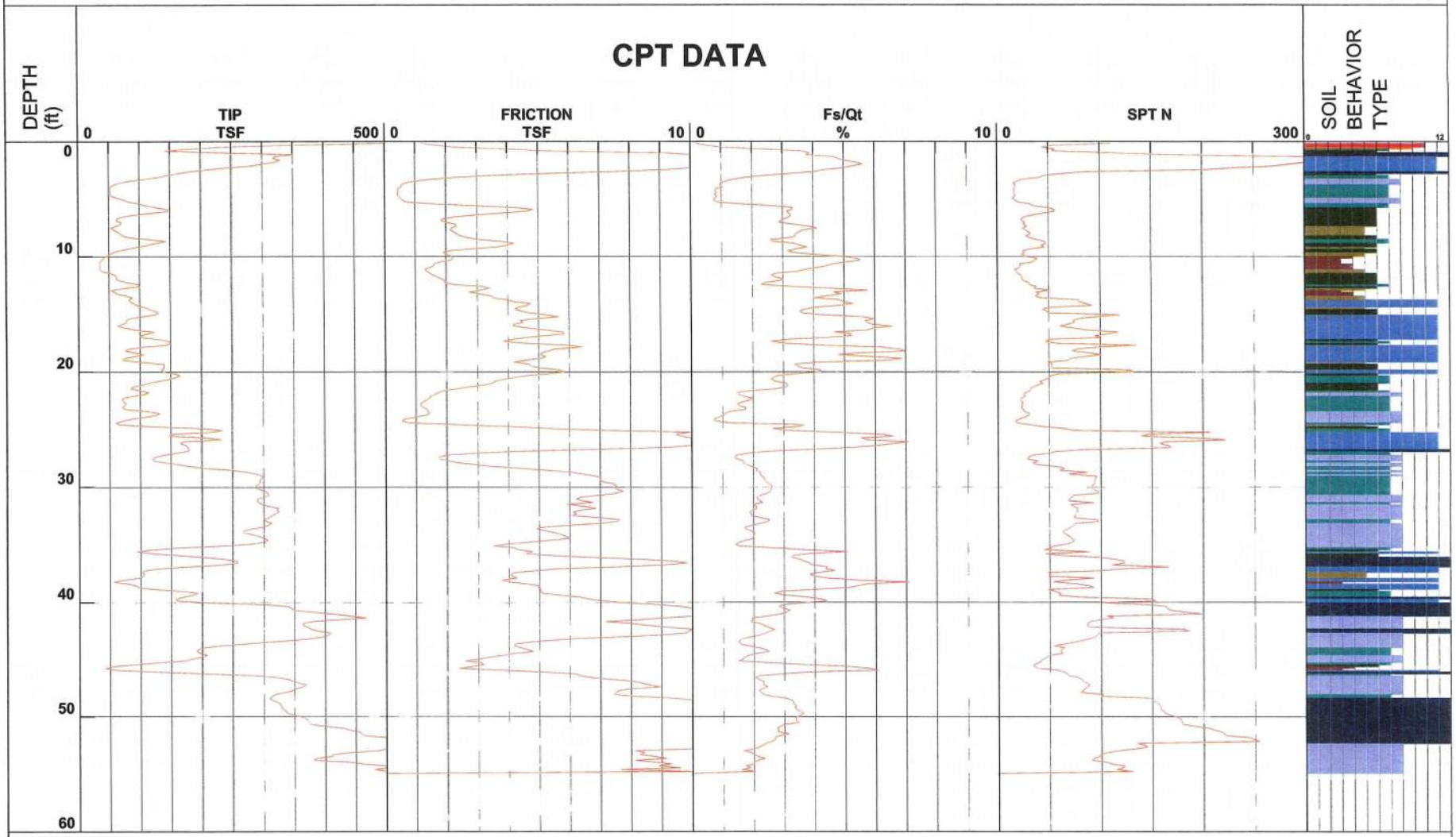
1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Depth Increment

*Soil behavior type and SPT based on data from UBC-1983

C.H.J. Inc

Location	Riverside Community Hospital	Operator	ML/JH	Filename	SDF(504).cpt
Job Number	07881-3	Cone Number	DSG1047	GPS	
Hole Number	CPT-03	Date and Time	12/20/2007 10:07:56 AM	Maximum Depth	55.12 ft
Water Table Depth		0.00 ft		Elevation	837 ft



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

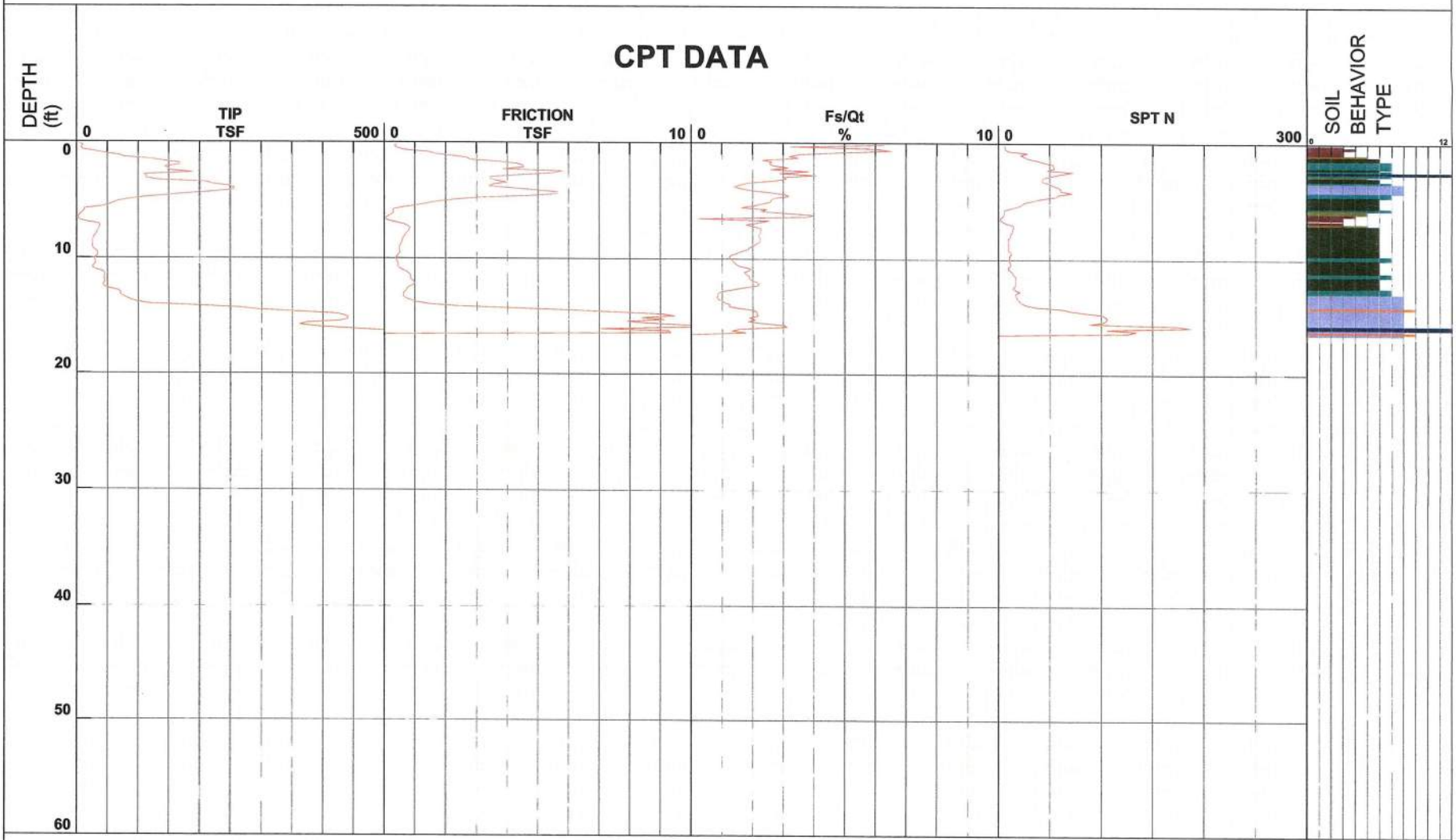
Depth Increment

*Soil behavior type and SPT based on data from UBC-1983

C.H.J. Inc

Location	Riverside Community Hospital	Operator	ML/JH	Filename	SDF(505).cpt
Job Number	07881-3	Cone Number	DSG1047	GPS	
Hole Number	CPT-04	Date and Time	12/20/2007 11:43:15 AM	Maximum Depth	16.73 ft
Water Table Depth		0.00 ft		Elevation	797 ft

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

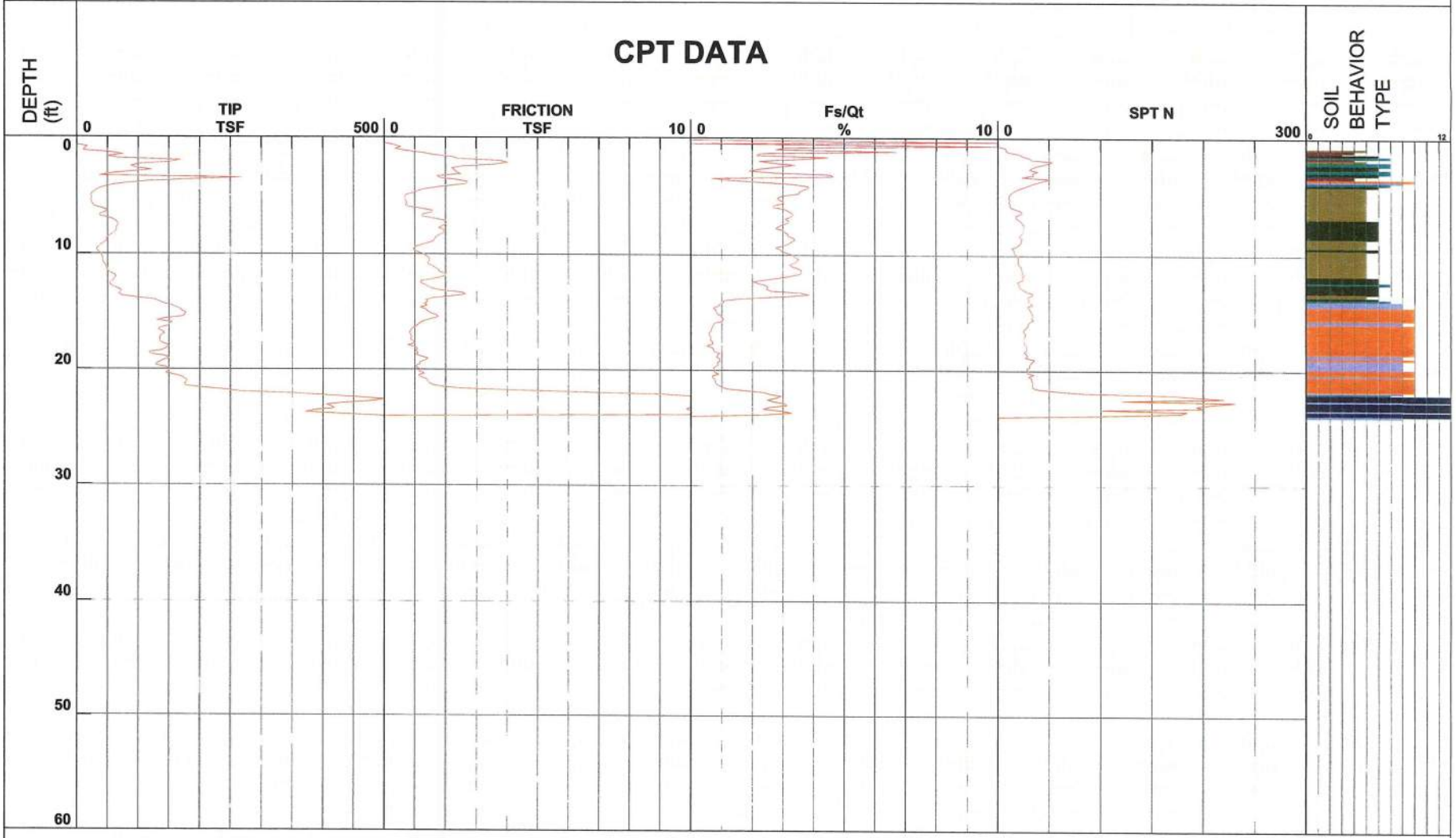
Depth Increment

*Soil behavior type and SPT based on data from UBC-1983

C.H.J. Inc

Location	Riverside Community Hospital	Operator	ML/JH	Filename	SDF(506).cpt
Job Number	07881-3	Cone Number	DSG1047	GPS	
Hole Number	CPT-05	Date and Time	12/20/2007 12:28:45 PM	Maximum Depth	24.28 ft
Water Table Depth		0.00 ft		Elevation	798 ft

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

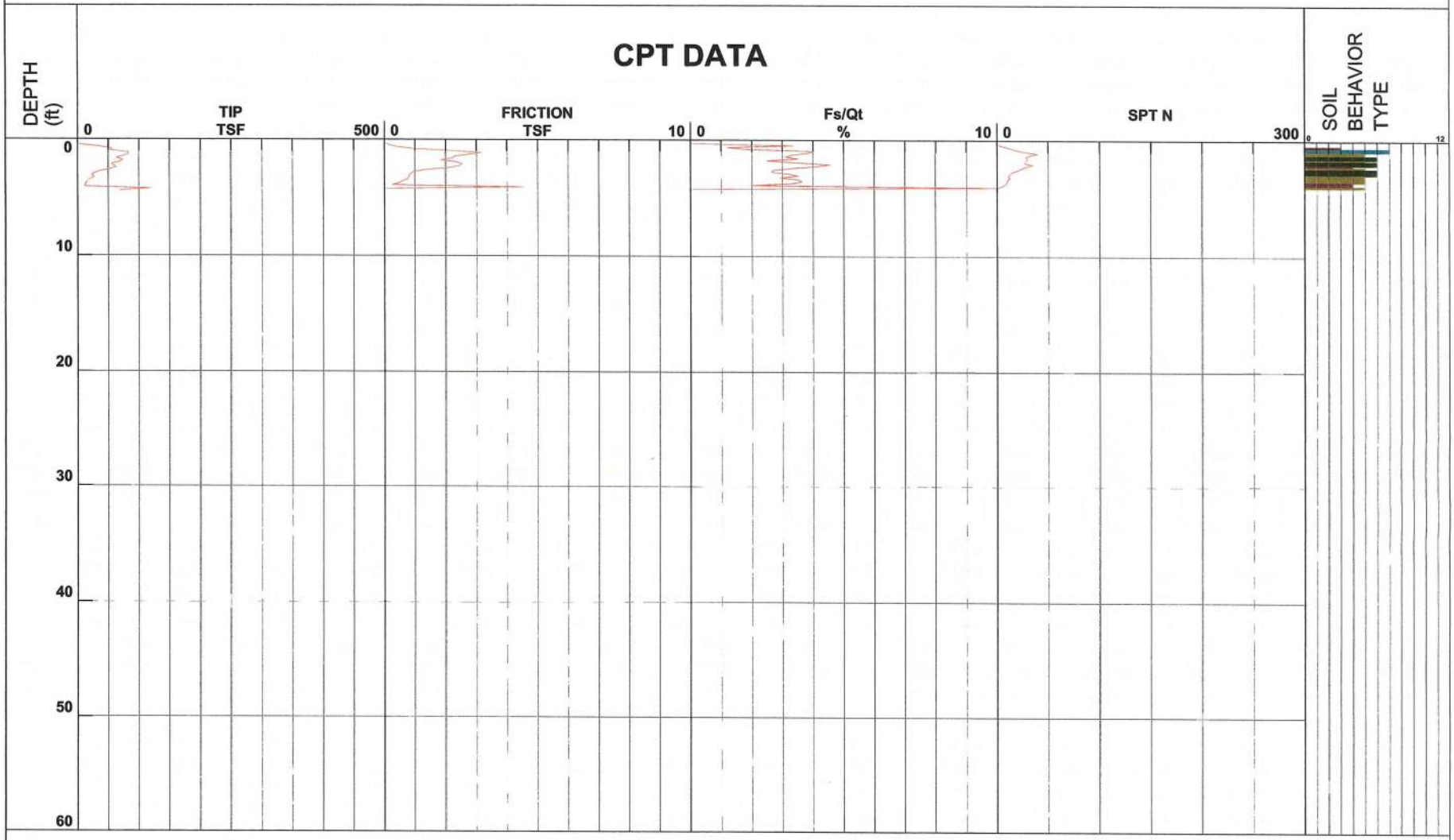
Depth Increment

*Soil behavior type and SPT based on data from UBC-1983

C.H.J. Inc

Location	Riverside Community Hospital	Operator	ML/JH	Filename	SDF(507).cpt
Job Number	07881-3	Cone Number	DSG1047	GPS	
Hole Number	CPT-06	Date and Time	12/20/2007 1:04:18 PM	Maximum Depth	4.43 ft
Water Table Depth		0.00 ft		Elevation	797 ft

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Depth Increment

*Soil behavior type and SPT based on data from UBC-1983

EXPLORATORY BORING NO. 1

Date Drilled: 10/20/12

Client: HCA Management Services, LP

Equipment: CME 55

Driving Weight / Drop: 130 lbs./30"

Surface Elevation(ft): 793.5

Logged by: VJR

Measured Depth to Water(ft): N/A

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES: DRIVE	SAMPLES: BULK	UNCORRECTED BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
		3.5" of Asphalt Concrete	Fill						
		5" of Aggregate Base							
		(SM) Silty Sand, fine to medium with coarse, with clay, brown		X		3 1 4	11.5		Cor., RV,SA,SE SPT
		(SM) Silty Sand, fine to medium, brown	Native				10.1		Cor., DS, Exp., Hydro., MDC,SA SPT, P#200
5				X		1 1 2			
		(SM) Silty Sand, fine to medium with gravel to 2", brown					3.1		
10				X		2 2 3			SPT, P#200
15		(SM) Silty Gravelly Sand, fine to medium with coarse and gravel to 2", brown		X		10 30 50/3"			SPT, P#200
20				X		37 50/5"			SPT, P#200
25				X		22 38 39			SPT, P#200
30				X		50 50/4"			SPT, P#200

BORING LOG - NO EQUIV & BLOW PER 6 IN 12735-3.GPJ CHJ.GDT 11/21/12

C.H.J.

MEDICAL OFFICE BUILDING
RIVERSIDE COMMUNITY HOSPITAL

Job No. 12735-3 Enclosure B-1a

EXPLORATORY BORING NO. 1

Date Drilled: 10/20/12

Client: HCA Management Services, LP

Equipment: CME 55

Driving Weight / Drop: 130 lbs./30"

Surface Elevation(ft): 793.5

Logged by: VJR

Measured Depth to Water(ft): N/A

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES: DRIVE	SAMPLES: BULK	UNCORRECTED BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
		(SM) Silty Sand, fine to coarse, with clay and gravel to 2", light brown		X		48 50/4"			SPT, P#200
		END OF BORING							
		NO BEDROCK REFUSAL AT 37.0' FILL TO 3.0', SLIGHT CAVING NO GROUNDWATER							
40									
45									
50									
55									
60									
65									

BORING LOG - NO EQUIV & BLOW PER 6 IN 12735-3.GPJ CHJ.GDT 11/21/12

C.H.J.

MEDICAL OFFICE BUILDING
RIVERSIDE COMMUNITY HOSPITAL

Job No. Enclosure
12735-3 B-1b

EXPLORATORY BORING NO. 2

Date Drilled: 10/24/12

Client: HCA Management Services, LP

Equipment: CME75

Driving Weight / Drop: 130 lbs./30"

Surface Elevation(ft): 792.5

Logged by: JMc

Measured Depth to Water(ft): 37.5

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES: DRIVE	SAMPLES: BULK	UNCORRECTED BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
		6" of Asphalt Concrete	Fill						
		5" of Aggregate Base					10.5		Cor.,RV, SA,SE
		(SM) Silty Sand, fine to medium, few clay and gravel to 1/2", brown							
		(SM) Silty Sand, fine with medium, brown	Native				8.2		Cor., DS, Exp., Hydro., MDC, SA
5						3 4 4			SPT, P#200
		(SP-SM) Sand with silt, fine to medium with coarse, brown					4.9		
10						2 3 4			SPT, P#200
		(SP-SM) Sand, fine to coarse with silt, brown							
15						20 30 27			SPT, P#200
		(SM) Silty Gravelly Sand, fine to medium with coarse, gravel to 1", brown							
20						32 27 27			SPT, P#200
25						39 50/5"			SPT, P#200
30						50/5"			SPT, P#200

BORING LOG - NO EQUIV & BLOW PER 6 IN 12735-3.GPJ CHJ.GDT 11/21/12

C.H.J.

MEDICAL OFFICE BUILDING
RIVERSIDE COMMUNITY HOSPITAL

Job No. 12735-3 Enclosure B-2a

EXPLORATORY BORING NO. 2

Date Drilled: 10/24/12

Client: HCA Management Services, LP

Equipment: CME75

Driving Weight / Drop: 130 lbs./30"

Surface Elevation(ft): 792.5

Logged by: JMc

Measured Depth to Water(ft): 37.5

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	UNCORRECTED BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
40		(SM) Silty Gravelly Sand, fine to medium with coarse, gravel to 1", brown	▼			50/3"			SPT, P#200
						50			SPT, P#200
45						41 50/4"			SPT, P#200
50						50/4"			SPT, P#200
55		END OF BORING NO BEDROCK NO REFUSAL FILL TO 3.5' NO CAVING GROUNDWATER AT 37.5'							
60									
65									

BORING LOG - NO EQUIV & BLOW PER 6 IN 12735-3.GPJ CHJ.GDT 11/21/12

C.H.J.

MEDICAL OFFICE BUILDING
RIVERSIDE COMMUNITY HOSPITAL

Job No. 12735-3 Enclosure B-2b

BORING 1

DATE DRILLED: January 11, 2013
EQUIPMENT USED: Rotary Wash
HOLE DIAMETER (in.): 5"
ELEVATION: 796**

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE; REFER TO PLOT PLAN FOR MORE ACCURATE LOCATION INFORMATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	SAMPLE LOC.	
795	0						4" thick Asphalt Concrete over 3" thick Base Course
							ML — SANDY SILT - medium stiff, moist, yellowish brown and olive yellow, some fine to coarse sand, some mica
	5		11.3	93	7		
790			24.6	92	12		
	10	7					Becomes olive brown to olive yellow, (68% passing No. 200 sieve)
785			4.3	104	17		SW-SM — WELL-GRADED SAND with SILT - medium dense, moist, olive yellow to yellowish brown, fine to coarse grained, some fine gravel (up to ½ inch in size), layers of Poorly Graded Sand
	15	17					
780			7.7	125	93/11"		Becomes very dense, some fine gravel (up to ¾ inch in size)
	20	78					
775			7.9	120	53/6"		Cobbles (up to 8 inches in size)
	25						Becomes fine to medium grained
770		64					
	30		15.5	120	50/5"		SW-SM — WELL-GRADED SAND with SILT and GRAVEL - very dense, wet, olive yellow, fine to coarse grained, fine gravel (up to ¾ inch in size)
765		55/6"					Increasing coarse sand and fine gravel
	35						
760			17.3	113	66/5"		Cobble (up to 10 inches in size) Granitic rock and cobbles (up to 6 inches in size)
	40						

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared By: LH
Checked By: LT 10/5/2012

Proposed Bed Tower Expansion
Riverside Community Hospital
Riverside, California

amec

LOG OF BORING
Project: 4953-13-0001 Figure: A-1.1a

BORING 1 (Continued)

DATE DRILLED: January 11, 2013
EQUIPMENT USED: Rotary Wash
HOLE DIAMETER (in.): 5"
ELEVATION: 796**

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	SAMPLE LOC.
755		52/6"				SM
						SW
	45					
750			--	--	73/6"	
		50/5"				
	50					
745						
	55					
740						
	60					
735						
	65					
730						
	70					
725						
	75					
720						
	80					

SILTY SAND - very dense, wet, light brown, fine to medium grained, granitic rock fragments

WELL-GRADED SAND with GRAVEL - very dense, wet, light brown, fine to coarse grained, some cobbles (up to 5 inches in size)

Cobbles (up to 5 inches in size)

Sample not recovered, 4-inch cobble

Layers of Poorly Graded Sand
END OF BORING AT 50 FEET

NOTES:

Drilling mud used during drilling process. Mud removed after completion of drilling to a depth of 33 feet. Water level measured at a depth of 31.5 feet after removal of drilling mud and a depth of 31.4 feet 15 minutes later. Boring backfilled with a cement bentonite grout

*Number of blows to drive the Crandall sampler 12 inches using a 140 pound automatic hammer falling 30 inches.

** Elevation based on topographic survey included on Enclosure A-2.1 of the report dated 1/22/08 by C.H.J. Incorporated.

Field Tech: AR
Prepared By: LH
Checked By: LT 10/5/2012

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE; REFER TO PLOT PLAN FOR MORE ACCURATE LOCATION INFORMATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Proposed Bed Tower Expansion
Riverside Community Hospital
Riverside, California

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LOG OF BORING
Project: 4953-13-0001 Figure: A-1.1b

B12SOIL_CRANDALL(DECIMAL_ELE) L:\70131 GEOTECH\GINTW\LIBRARY AMEC JUNE2012.GLB
P:\4953 GEOTECH\2013-PROJ\130001 RIVERSIDE COMMUNITY HOSP\3.2 ALL FIELD NOTES\130001.GPJ 2/28/13

BORING 2

DATE DRILLED: January 11, 2013
EQUIPMENT USED: Rotary Wash
HOLE DIAMETER (in.): 5"
ELEVATION: 794**

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE; REFER TO PLOT PLAN FOR MORE ACCURATE LOCATION INFORMATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	SAMPLE LOC.		
								4" thick Asphalt Concrete over 6" thick Base Course
							SM	SILTY SAND - loose, moist, yellowish brown, fine to coarse grained, trace fine gravel (up to ¼ inch in size)
790	5		19.0	104	11			
			14.7	111	21		SW	WELL-GRADED SAND - medium dense, moist, olive yellow to light brownish gray, fine to coarse grained, some gravel
785	10		19.8	103	50		SP	POORLY GRADED SAND - dense, moist, olive yellow to yellowish brown, fine to coarse grained, some fine gravel (up to ½ inch in size)
780	15	49					SP-SM	POORLY GRADED SAND with SILT - dense to very dense, moist, olive to brown, fine to medium, trace fine gravel (up to ½ inch in size)
			--	--	30/0"			Some cobbles, sample not recovered
775	20	78						Some fine to coarse gravel (up to ¾ inch in size)
			--	--	75/6"			Sample not recovered, 4-inch cobble
770	25						SW	WELL-GRADED SAND with GRAVEL - very dense, moist, olive yellow to light brownish gray, fine to coarse grained, granitic rock fragments, fine to coarse gravel (up to 2 inches in size)
		50/6"						Becomes olive, some silt
765	30		10.2	115	85			Some silty sand interbeds
		85						
760	35							
			11.0	116	53/6"			
755	40	56/6"						

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared By: LH
Checked By: LT 10/5/2012

Proposed Bed Tower Expansion
Riverside Community Hospital
Riverside, California

amec

LOG OF BORING
Project: 4953-13-0001 Figure: A-1.2a

BORING 2 (Continued)

DATE DRILLED: January 11, 2013
EQUIPMENT USED: Rotary Wash
HOLE DIAMETER (in.): 5"
ELEVATION: 794**

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	SAMPLE LOC.
750	45		22.4	106	63/6"	SW
745	50	97/9"				
740	55					
735	60					
730	65					
725	70					
720	75					
715	80					

Cobbles (up to 8 inches in size)

Less silt, more gravel, granitic rock fragments

END OF BORING AT 49½ FEET

NOTES:

Caving encountered below a depth of 29 feet after removal of drilling mud. Unable to measure water level. Boring backfilled with a cement bentonite grout.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE; REFER TO PLOT PLAN FOR MORE ACCURATE LOCATION INFORMATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Field Tech: AR
Prepared By: LH
Checked By: LT 10/5/2012

Proposed Bed Tower Expansion
Riverside Community Hospital
Riverside, California

amec

LOG OF BORING
Project: 4953-13-0001 Figure: A-1.2b

B12SOIL_CRANDALL(DECIMAL_FLE) L:\70131 GEOTECH\GINTW\LIBRARY AMEC JUNE2012.GLB
P:\4953 GEOTECH\2013-PROJ\130001 RIVERSIDE COMMUNITY HOSP\3.2 ALL FIELD NOTES\130001.GPJ 2/28/13

APPENDIX B
LABORATORY TESTING

APPENDIX B

LABORATORY TESTING

Laboratory testing was conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions and in the same locality. No warranty, express or implied, is made as to the correctness or serviceability of the test results, or the conclusions derived from these tests. Where a specific laboratory test method has been referenced, such as ASTM or Caltrans, the reference only applies to the specified laboratory test method, which has been used only as a guidance document for the general performance of the test and not as a "Test Standard". A brief test description follows.

Classification: Soils were visually classified according to the Unified Soil Classification System as established by the American Society of Civil Engineers per ASTM D2487. The soil classifications are shown on the boring logs in Appendix A.

Particle Size Analysis: Particle size analyses were performed in accordance with ASTM D422 and were used to supplement the visual soil classifications. The test results and associated soil classifications are summarized in Figures B-1.1 through B-1.12.

Atterberg Limits: ASTM D4318 was used to determine the liquid and plastic limits, and plasticity index of a selected clayey soil sample. The results are shown in selected Figures B-1.1 to B-1.12.

Expansion Index: The expansion potentials of selected soil samples were estimated in general accordance with the laboratory procedures outlined in ASTM D4829. The test results are summarized in Figure B-2, along with common criteria for evaluating the expansion potential.

pH and Resistivity: To assess the potential for reactivity with buried metals, selected soil samples were tested for pH and minimum saturated resistivity using Caltrans test method 643. The corrosivity test results are summarized in Figure B-3.

Sulfate Content: To assess the potential for reactivity with concrete, selected soil samples were tested for water soluble sulfate. The sulfate was extracted from the soil under vacuum using a 10:1 (water to dry soil) dilution ratio, and then tested for water soluble sulfate using ASTM D516. These test results are also shown in Figure B-3, along with criteria for evaluating soluble sulfate content.

Chloride Content: Soil samples were also tested for water soluble chloride. The chloride was extracted from the soil under vacuum using the 10:1 (water to dry soil) dilution ratio described above. The extracted solutions were then tested for water soluble chloride using a calibrated ion specific electronic probe. These test results are also shown in Figure B-3.

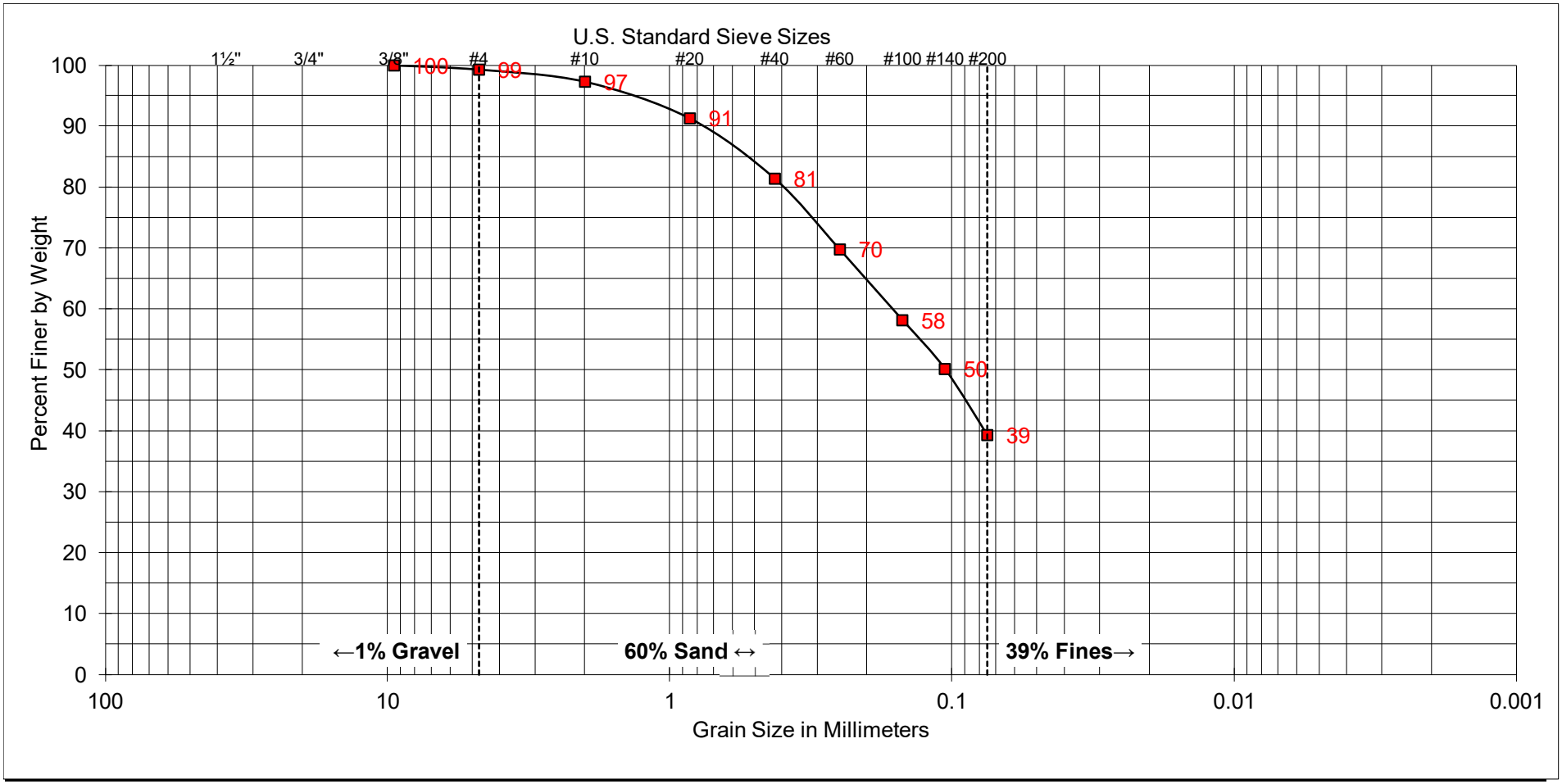
APPENDIX B

LABORATORY TESTING (Continued)

Consolidation: The one-dimensional consolidation properties of selected samples were evaluated in general accordance with ASTM D2435. The samples were inundated with water under a nominal seating load, allowed to swell, and then subjected to controlled stress increments while restrained laterally and drained axially. The test results are presented in Figures B-4.1 and B-4.2.

Direct Shear: The shear strengths of selected materials were assessed using direct shear testing conducted on relatively undisturbed soil samples in general accordance with ASTM D3080. The shear test results are shown in Figures B-5.1 to B-5.4. The tests are summarized in Figure B-5.5.

R-Value: R-Value tests were performed on selected samples of the subgrade soils collected from the site in general accordance with CTM 301. The test results are shown in Figure B-6.1 and B-6.2.



COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND
GRAVEL		SAND			CLAY

SAMPLE	
EXPLORATION ID:	B-1
SAMPLE DEPTH:	0' - 5'

UNIFIED SOIL CLASSIFICATION: SM

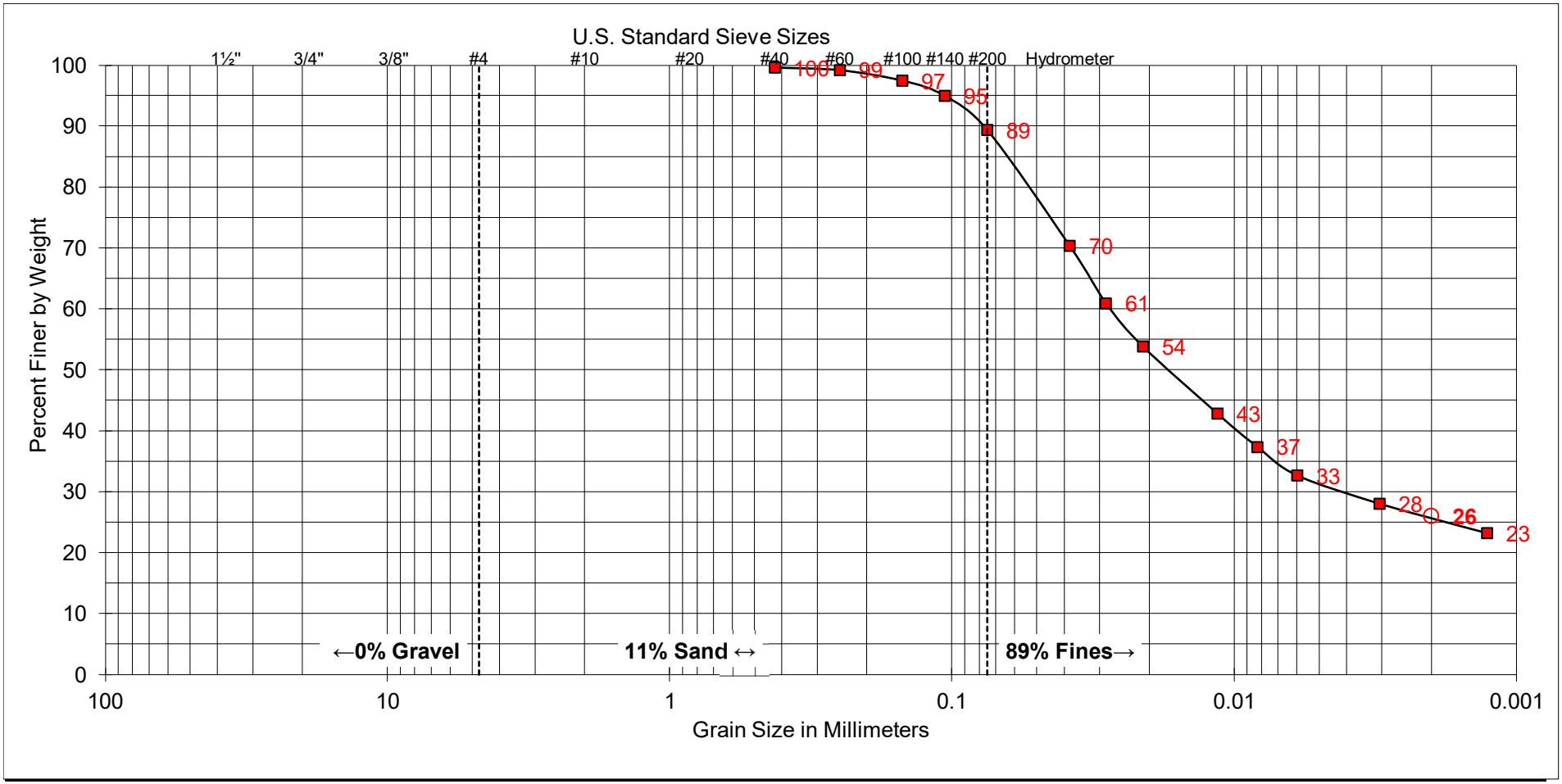
DESCRIPTION: SILTY SAND

ATTERBERG LIMITS	
LIQUID LIMIT:	---
PLASTIC LIMIT:	---
PLASTICITY INDEX:	---

GROUP DELTA

SOIL CLASSIFICATION

Document No. 24-0011
Project No. SD809
FIGURE B-1.1



COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND
GRAVEL		SAND			CLAY

SAMPLE	
EXPLORATION ID:	B-1
SAMPLE DEPTH:	20' - 21½'

UNIFIED SOIL CLASSIFICATION: CL

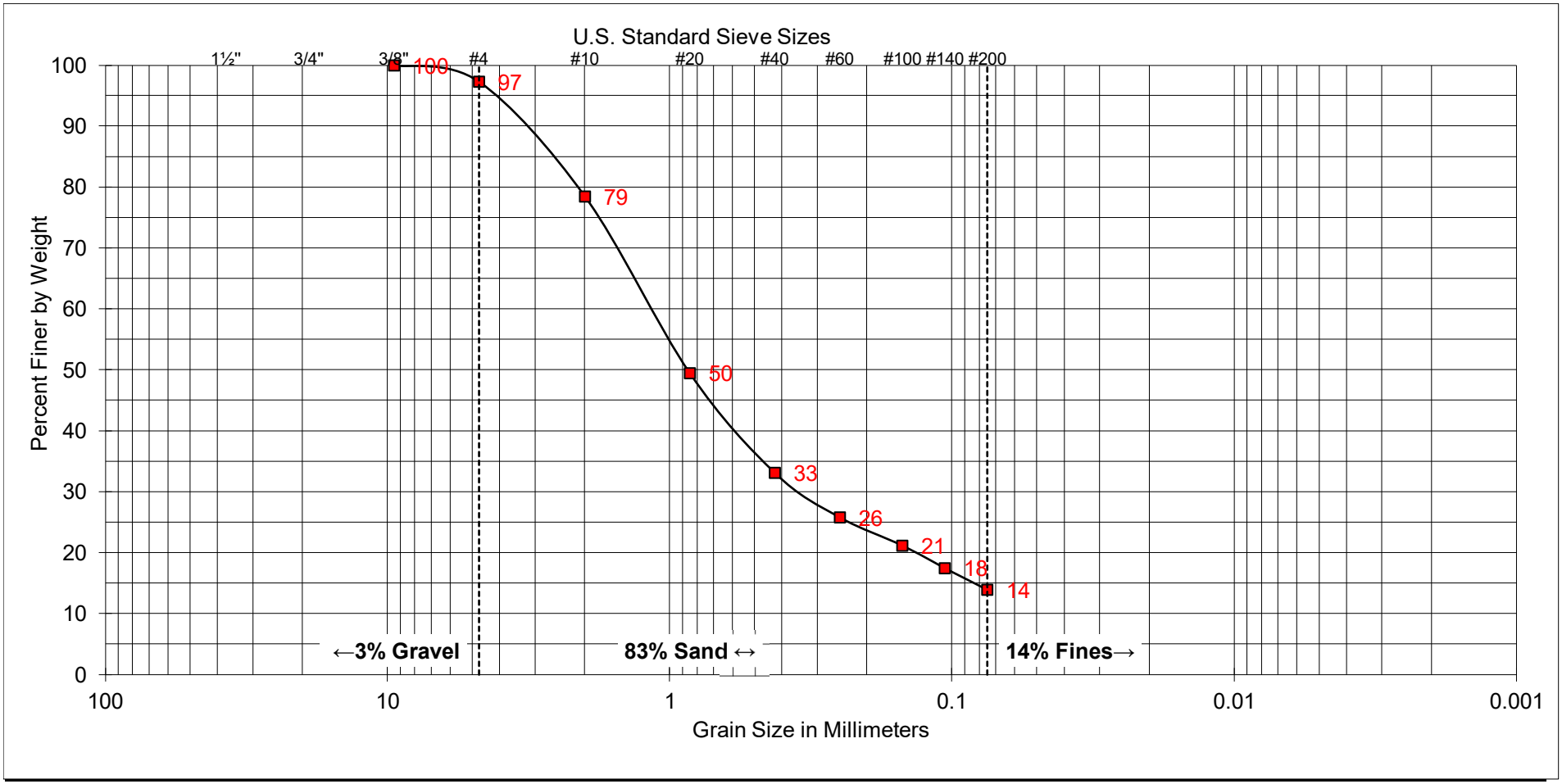
DESCRIPTION: LEAN CLAY

ATTERBERG LIMITS	
LIQUID LIMIT:	37
PLASTIC LIMIT:	19
PLASTICITY INDEX:	18

GROUP DELTA

SOIL CLASSIFICATION

Document No. 24-0011
Project No. SD809
FIGURE B-1.2



COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND
GRAVEL		SAND			CLAY

SAMPLE	
EXPLORATION ID:	B-2
SAMPLE DEPTH:	10' - 11½'

UNIFIED SOIL CLASSIFICATION: SM

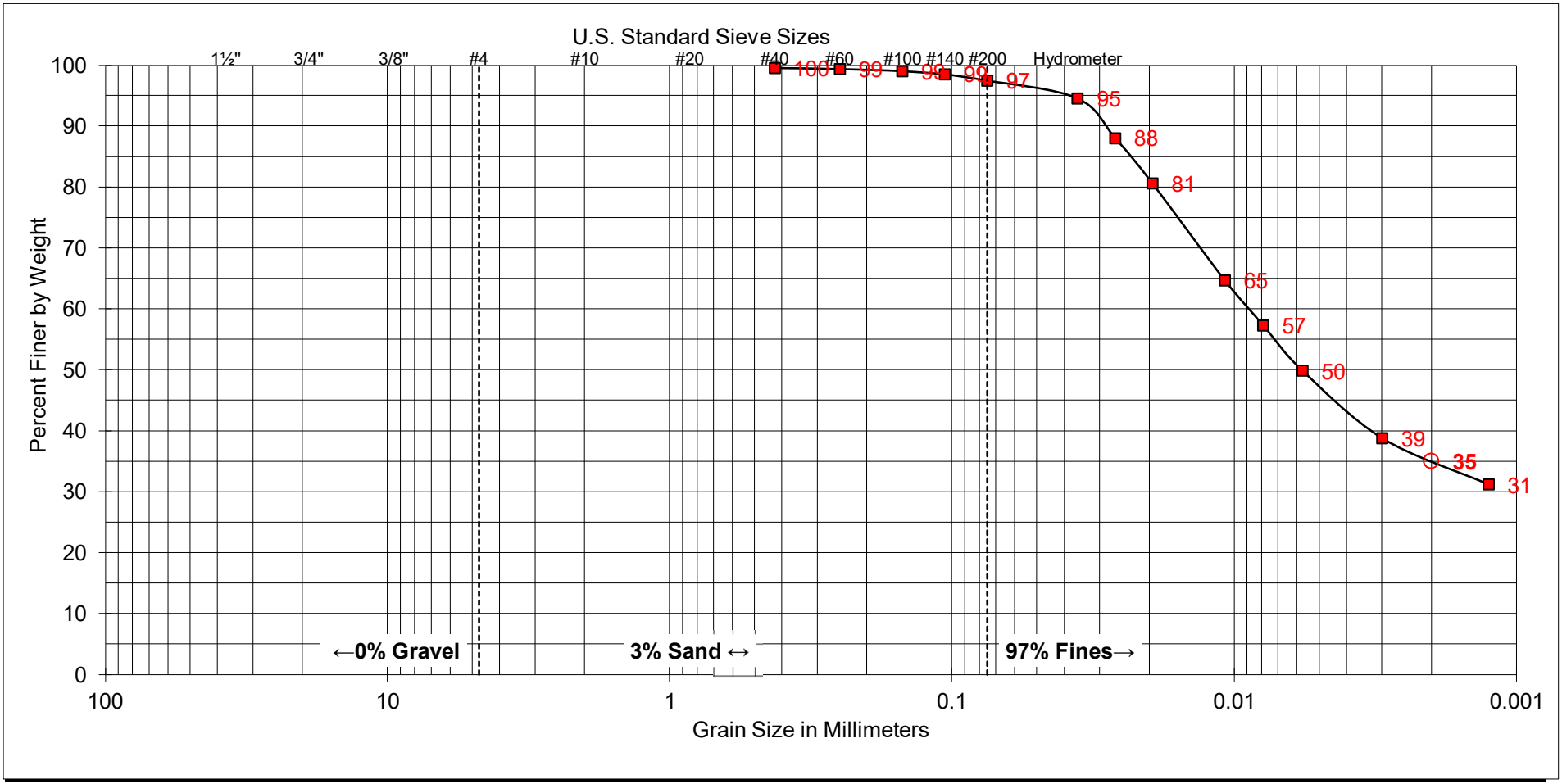
DESCRIPTION: SILTY SAND

ATTERBERG LIMITS	
LIQUID LIMIT:	---
PLASTIC LIMIT:	---
PLASTICITY INDEX:	---

GROUP DELTA

SOIL CLASSIFICATION

Document No. 24-0011
Project No. SD809
FIGURE B-1.3



COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND
GRAVEL		SAND			CLAY

SAMPLE	
EXPLORATION ID:	B-2
SAMPLE DEPTH:	20' - 21½'

UNIFIED SOIL CLASSIFICATION: CL

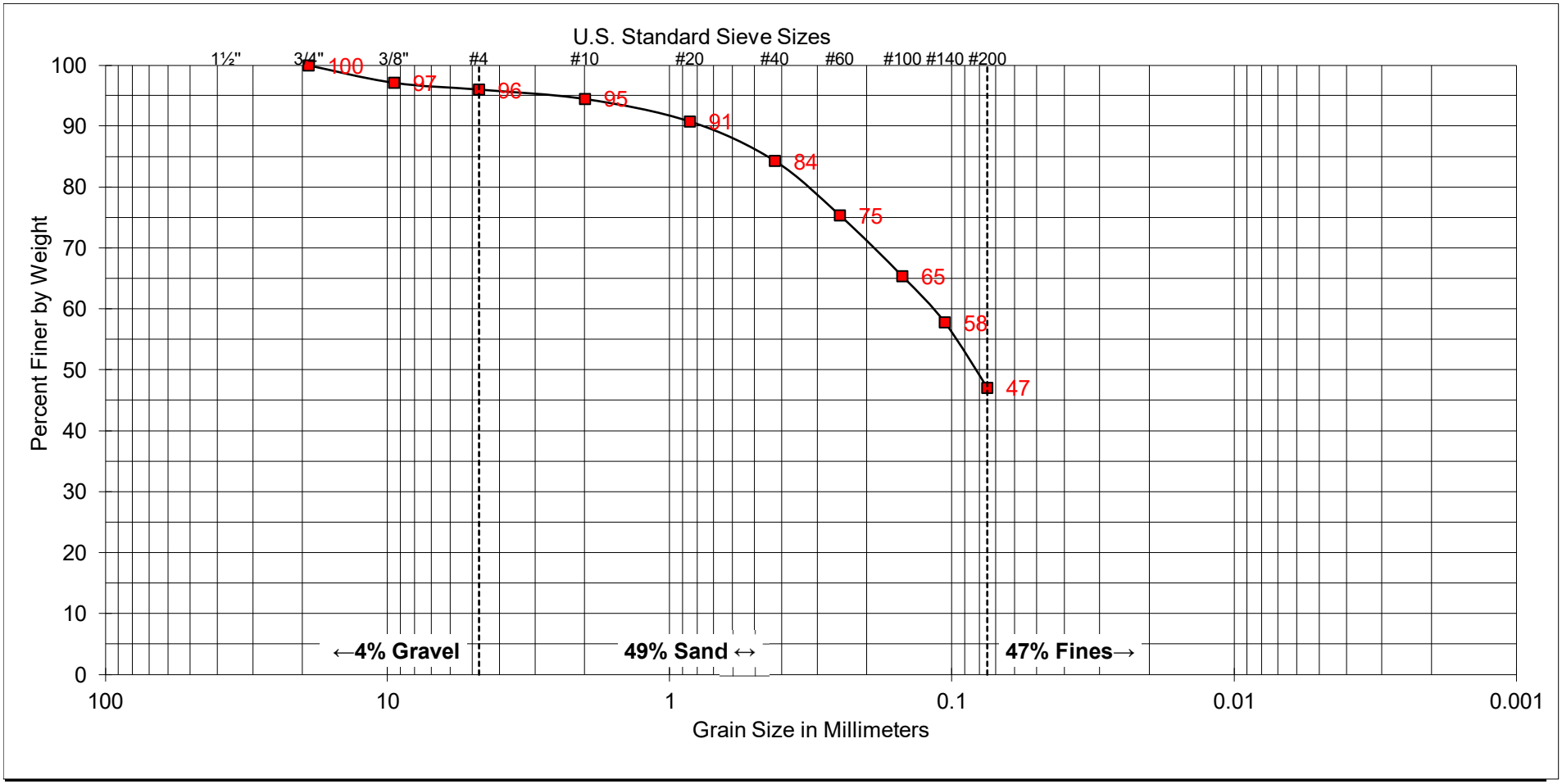
DESCRIPTION: LEAN CLAY

ATTERBERG LIMITS	
LIQUID LIMIT:	46
PLASTIC LIMIT:	22
PLASTICITY INDEX:	24

GROUP DELTA

SOIL CLASSIFICATION

Document No. 24-0011
Project No. SD809
FIGURE B-1.4



COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND
GRAVEL		SAND			CLAY

SAMPLE	
EXPLORATION ID:	B-3
SAMPLE DEPTH:	½' - 5'

UNIFIED SOIL CLASSIFICATION: SM

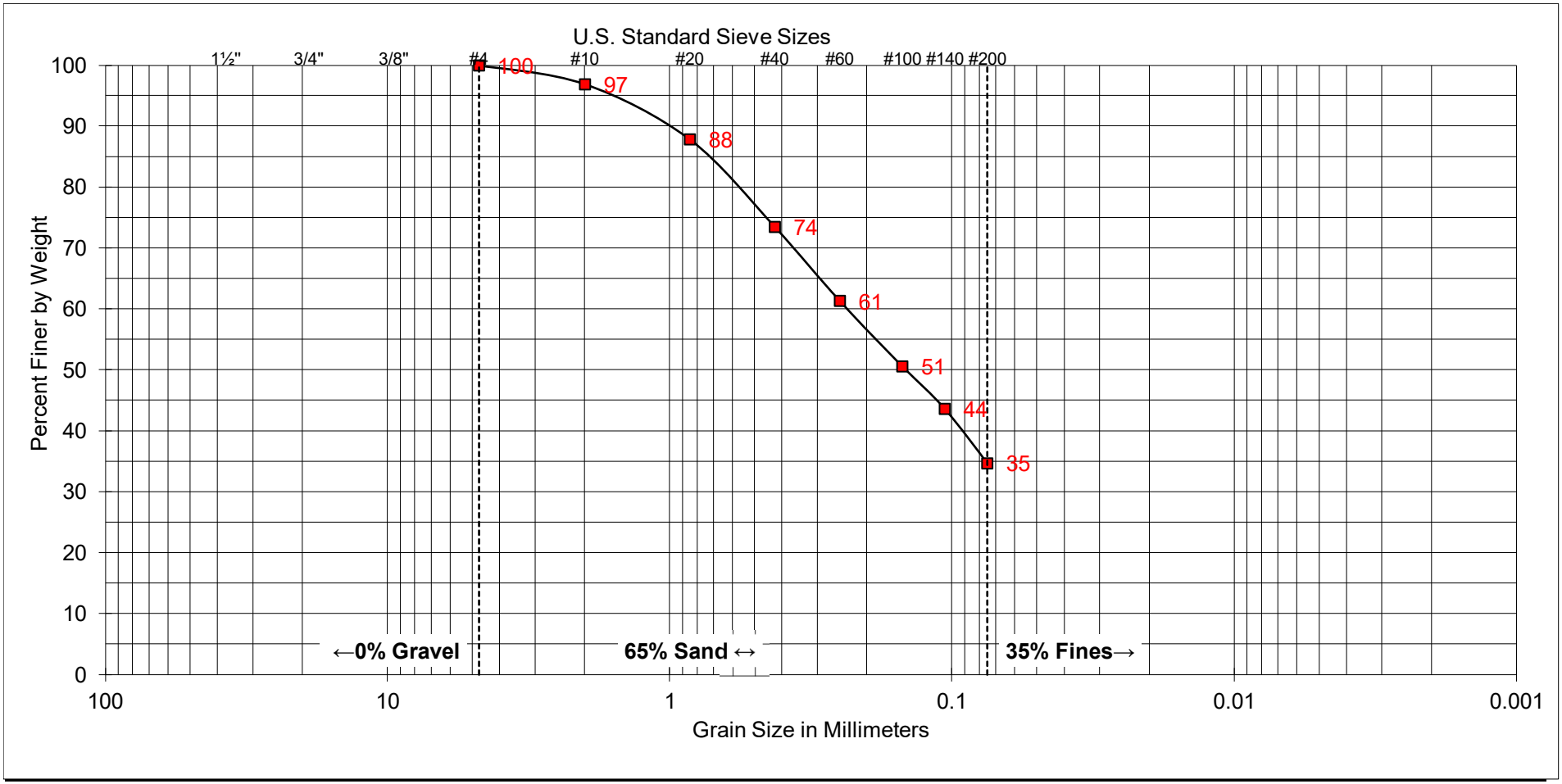
DESCRIPTION: SILTY SAND

ATTERBERG LIMITS	
LIQUID LIMIT:	---
PLASTIC LIMIT:	---
PLASTICITY INDEX:	---

GROUP DELTA

SOIL CLASSIFICATION

Document No. 24-0011
Project No. SD809
FIGURE B-1.5



COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND
GRAVEL		SAND			CLAY

SAMPLE	
EXPLORATION ID:	B-4
SAMPLE DEPTH:	5' - 6½'

UNIFIED SOIL CLASSIFICATION: SM

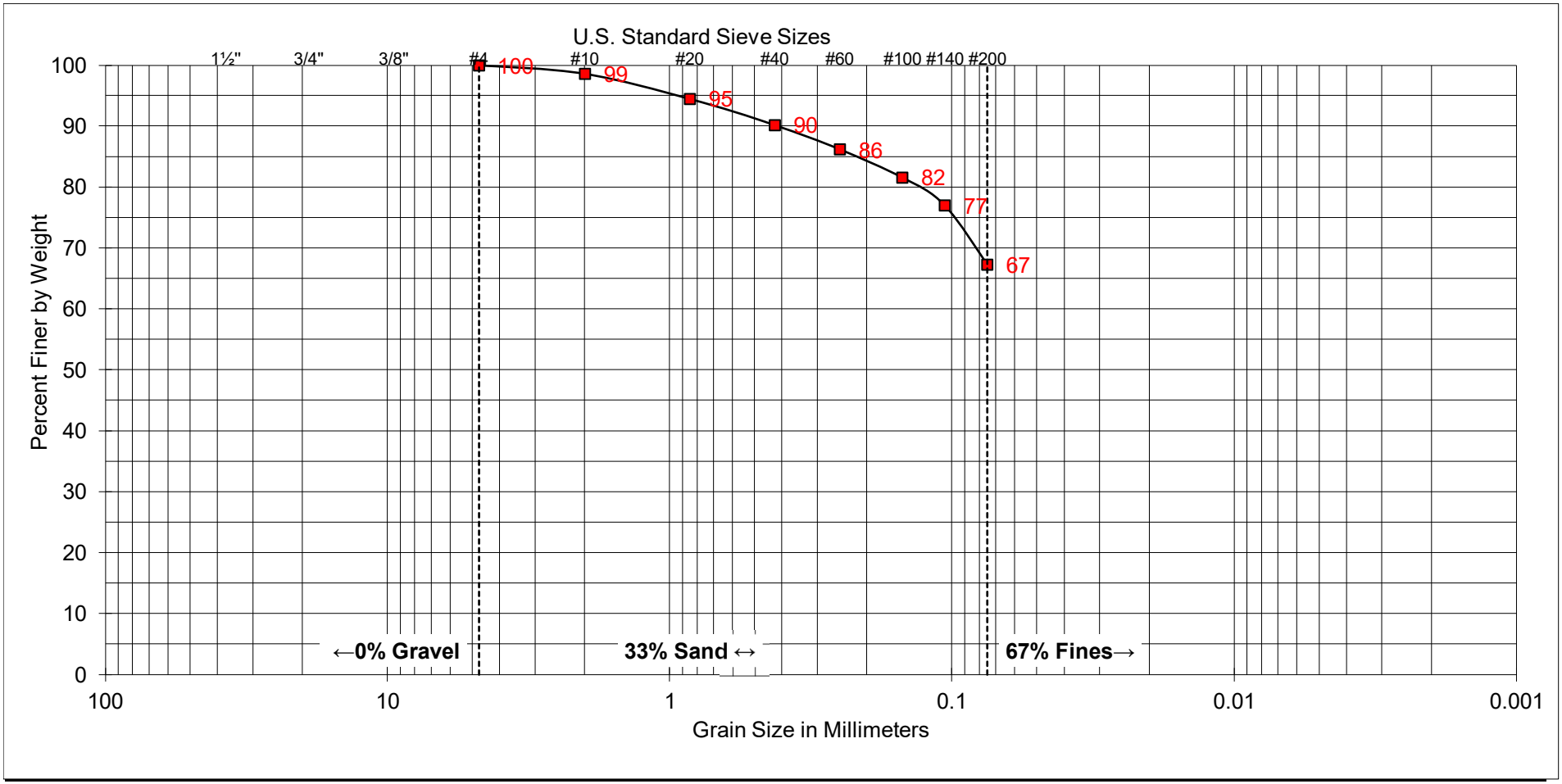
DESCRIPTION: SILTY SAND

ATTERBERG LIMITS	
LIQUID LIMIT:	---
PLASTIC LIMIT:	---
PLASTICITY INDEX:	---

GROUP DELTA

SOIL CLASSIFICATION

Document No. 24-0011
Project No. SD809
FIGURE B-1.6



COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND
GRAVEL		SAND			CLAY

SAMPLE	
EXPLORATION ID:	B-5
SAMPLE DEPTH:	5' - 6½'

UNIFIED SOIL CLASSIFICATION: ML

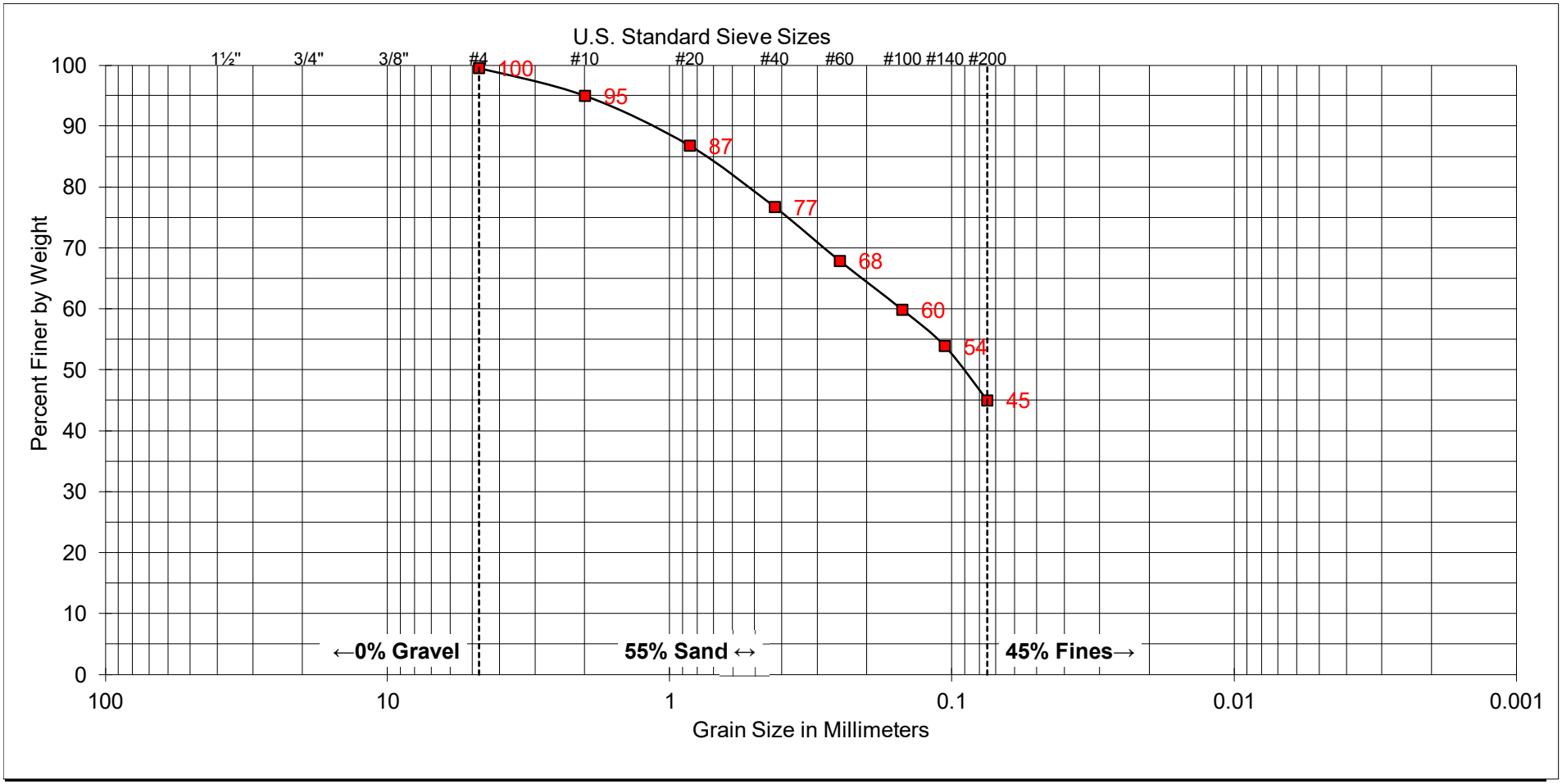
DESCRIPTION: SANDY SILT

ATTERBERG LIMITS	
LIQUID LIMIT:	---
PLASTIC LIMIT:	---
PLASTICITY INDEX:	---

GROUP DELTA

SOIL CLASSIFICATION

Document No. 24-0011
Project No. SD809
FIGURE B-1.7



COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND
GRAVEL		SAND			CLAY

SAMPLE	
EXPLORATION ID:	B-6
SAMPLE DEPTH:	½' - 5'

UNIFIED SOIL CLASSIFICATION: SC

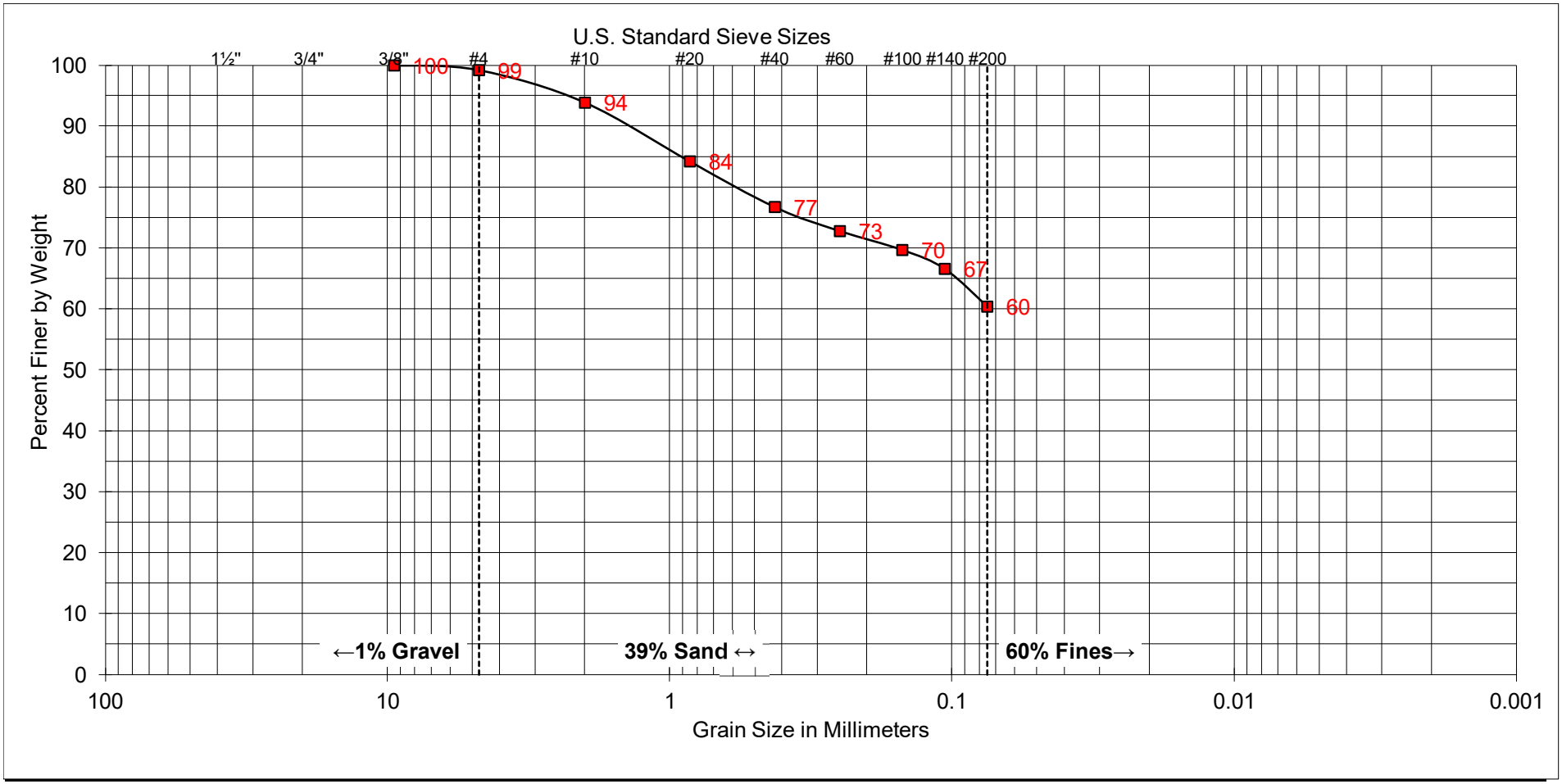
DESCRIPTION: CLAYEY SAND

ATTERBERG LIMITS	
LIQUID LIMIT:	---
PLASTIC LIMIT:	---
PLASTICITY INDEX:	---

GROUP DELTA

SOIL CLASSIFICATION

Document No. 24-0011
Project No. SD809
FIGURE B-1.8



COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND
GRAVEL		SAND			CLAY

SAMPLE	
EXPLORATION ID:	B-7
SAMPLE DEPTH:	10' - 11½'

UNIFIED SOIL CLASSIFICATION: ML

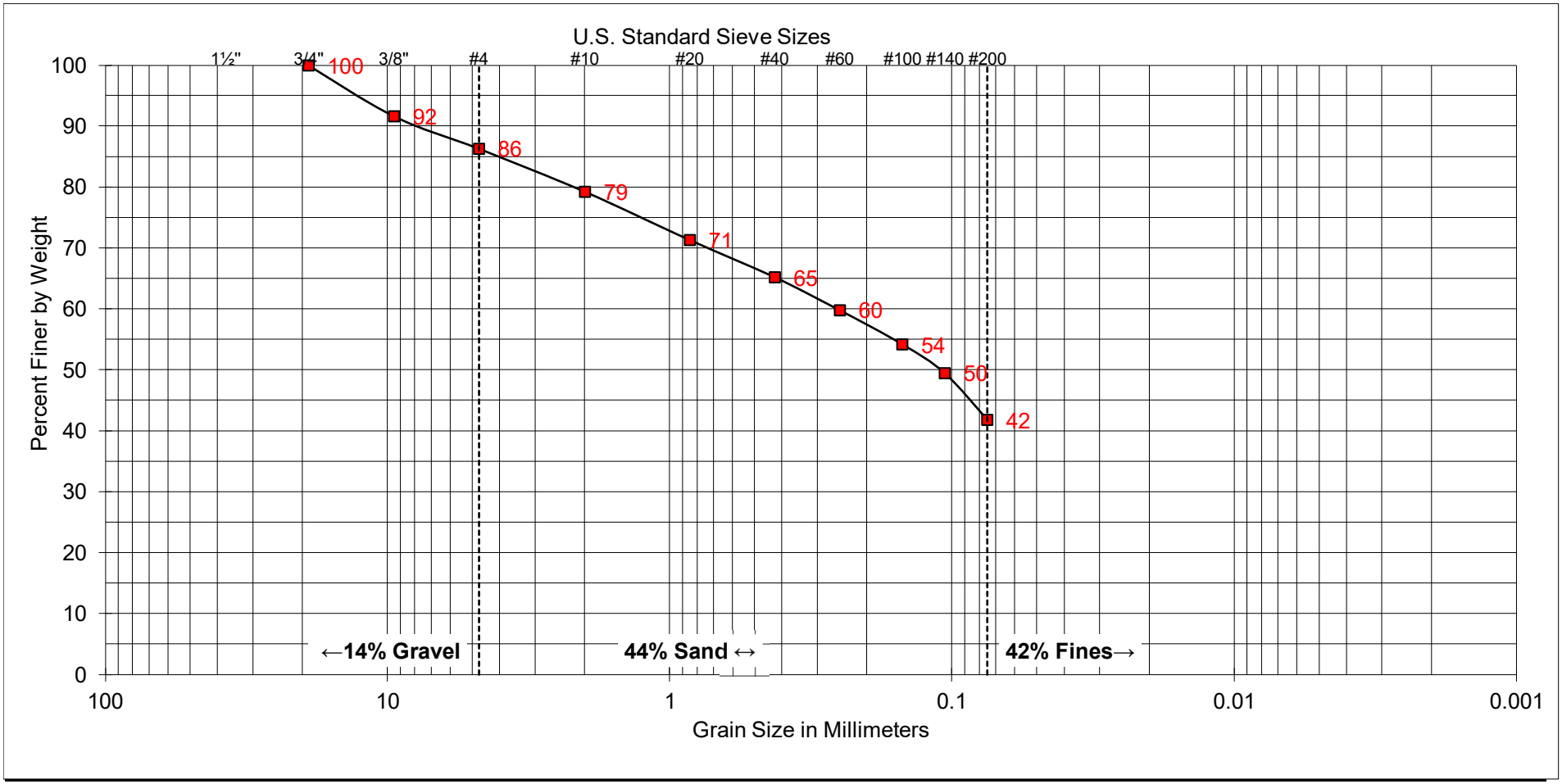
DESCRIPTION: SANDY SILT

ATTERBERG LIMITS	
LIQUID LIMIT:	---
PLASTIC LIMIT:	---
PLASTICITY INDEX:	---

GROUP DELTA

SOIL CLASSIFICATION

Document No. 24-0011
Project No. SD809
FIGURE B-1.9



COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND
GRAVEL		SAND			CLAY

SAMPLE	
EXPLORATION ID:	B-8
SAMPLE DEPTH:	0' - 5'

UNIFIED SOIL CLASSIFICATION: SM

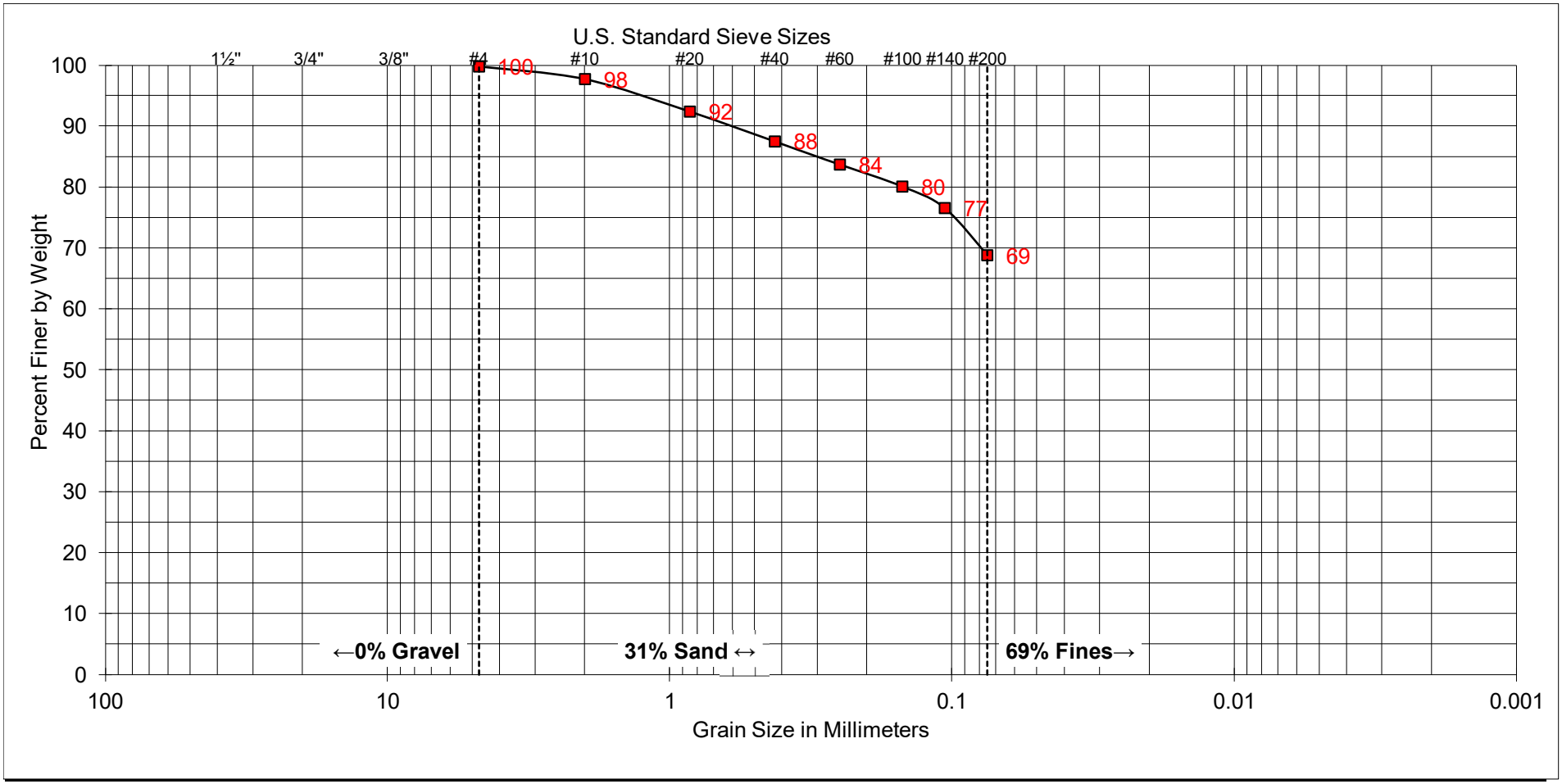
DESCRIPTION: SILTY SAND

ATTERBERG LIMITS	
LIQUID LIMIT:	---
PLASTIC LIMIT:	---
PLASTICITY INDEX:	---

GROUP DELTA

SOIL CLASSIFICATION

Document No. 24-0011
Project No. SD809
FIGURE B-1.10



COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND
GRAVEL		SAND			CLAY

SAMPLE	
EXPLORATION ID:	B-9
SAMPLE DEPTH:	10' - 11½'

UNIFIED SOIL CLASSIFICATION: ML

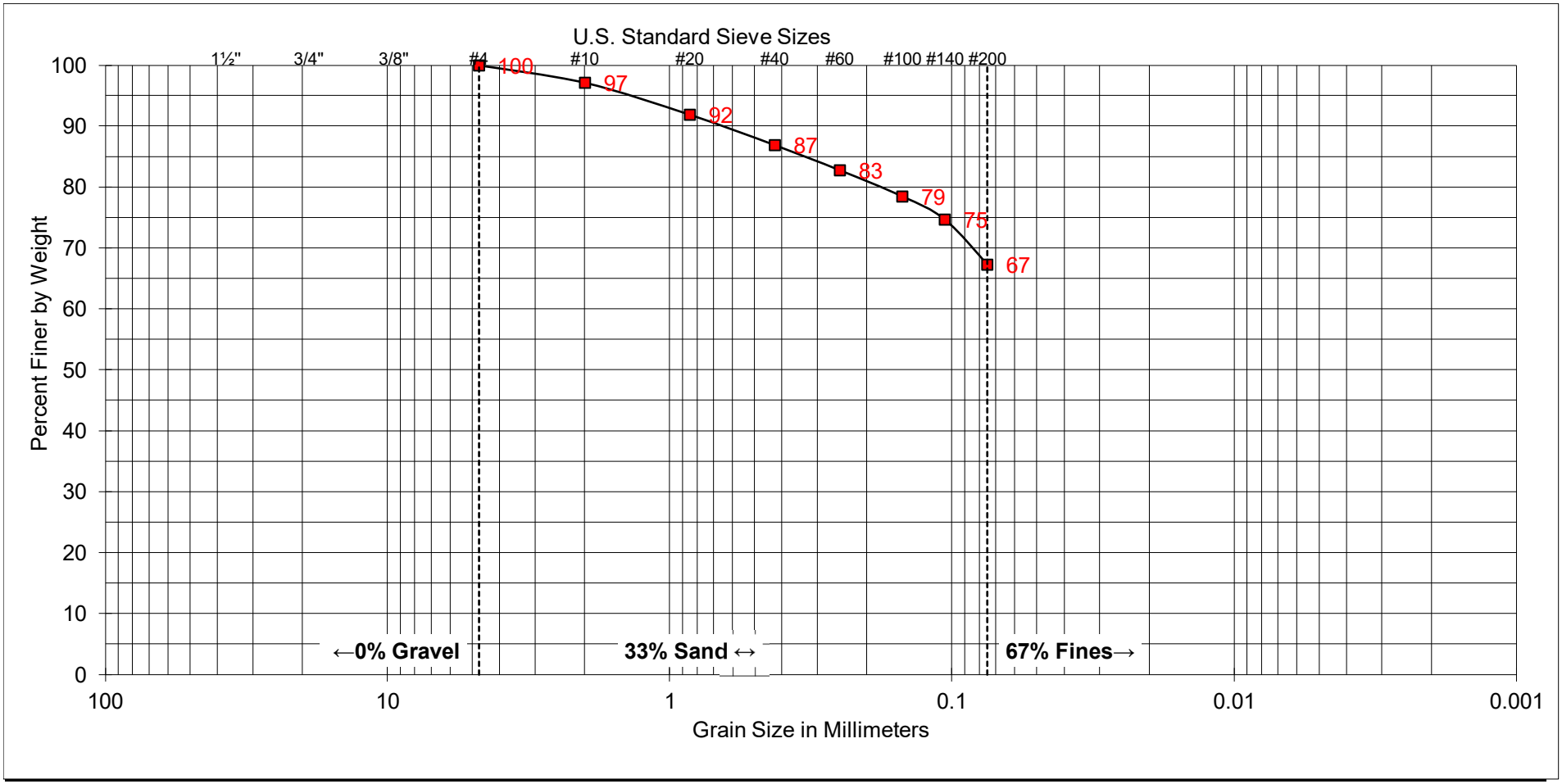
DESCRIPTION: SANDY SILT

ATTERBERG LIMITS	
LIQUID LIMIT:	---
PLASTIC LIMIT:	---
PLASTICITY INDEX:	---

GROUP DELTA

SOIL CLASSIFICATION

Document No. 24-0011
Project No. SD809
FIGURE B-1.11



COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND
GRAVEL		SAND			CLAY

SAMPLE	
EXPLORATION ID:	B-10
SAMPLE DEPTH:	1' - 5'

UNIFIED SOIL CLASSIFICATION: ML

DESCRIPTION: SANDY SILT

ATTERBERG LIMITS	
LIQUID LIMIT:	---
PLASTIC LIMIT:	---
PLASTICITY INDEX:	---

GROUP DELTA

SOIL CLASSIFICATION

Document No. 24-0011
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FIGURE B-1.12

EXPANSION TEST RESULTS
(ASTM D4829)

SAMPLE ID	DESCRIPTION	EXPANSION INDEX
B-3 @ ½' – 5'	**Fill**: Yellowish brown silty sand (SM).	0
B-6 @ ½' – 5'	**Fill**: Dark yellowish brown silty sand (SM).	1
B-8 @ 0' – 5'	**Fill**: Brown silty sand (SM).	0
B-10 @ 1' – 5'	**Fill**: Yellowish brown sandy silt (ML).	1

EXPANSION INDEX	POTENTIAL EXPANSION
0 to 20	Very low
21 to 50	Low
51 to 90	Medium
91 to 130	High
Above 130	Very High

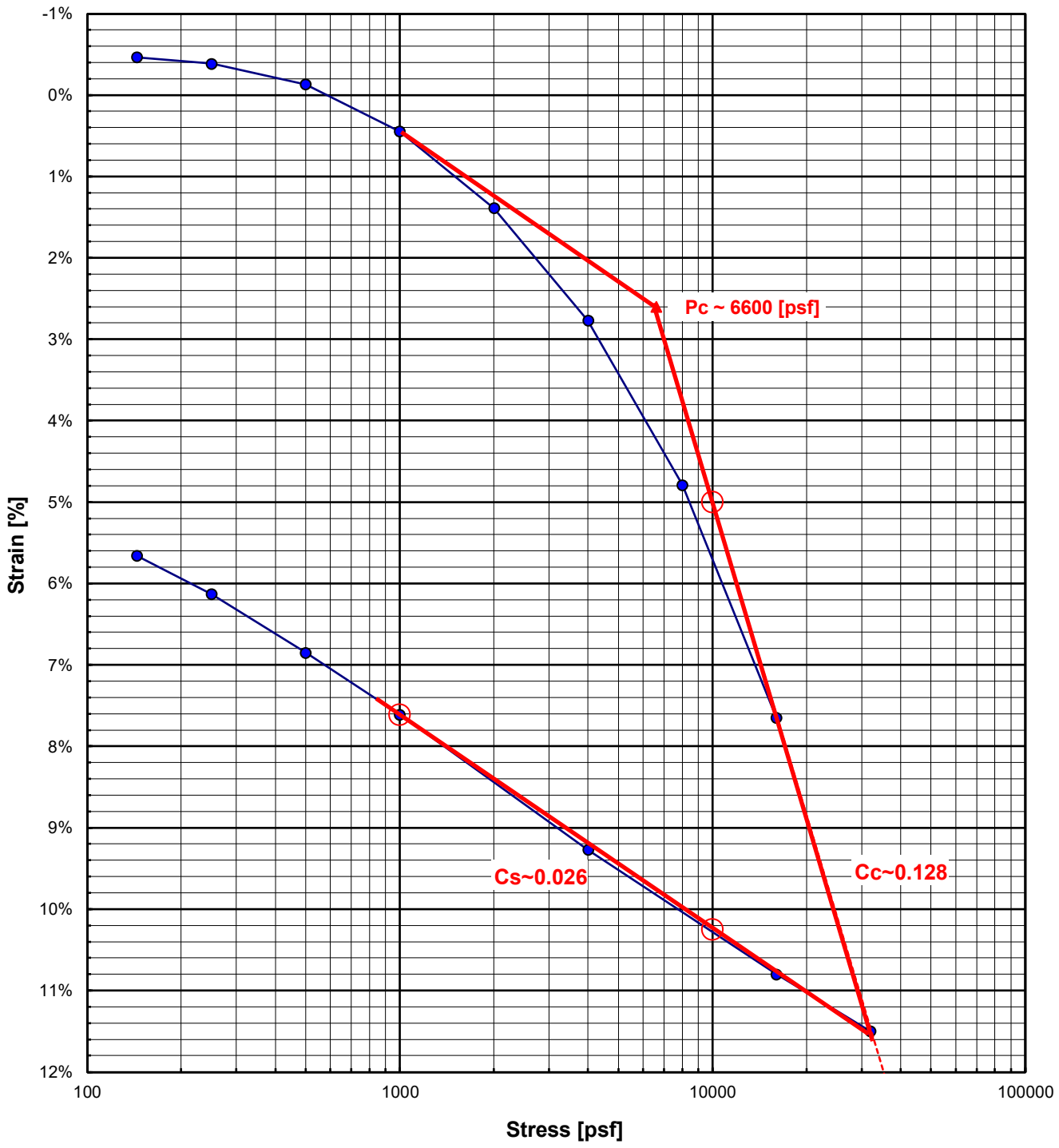
CORROSIVITY TEST RESULTS
(ASTM D516)

SAMPLE ID	pH	RESISTIVITY [OHM-CM]	SULFATE CONTENT [%]	CHLORIDE CONTENT [%]
B-3 @ ½' – 5'	7.7	4,230	< 0.01	< 0.01
B-6 @ ½' – 5'	8.4	3,220	< 0.01	< 0.01
B-8 @ 0' – 5'	8.2	3,610	< 0.01	< 0.01
B-10 @ 1' – 5'	7.7	2,460	< 0.01	< 0.01

SULFATE CONTENT [%]	SULFATE EXPOSURE	CEMENT TYPE
0.00 to 0.10	Negligible	-
0.10 to 0.20	Moderate	II, IP(MS), IS(MS)
0.20 to 2.00	Severe	V
Above 2.00	Very Severe	V plus pozzolan

SOIL RESISTIVITY [OHM-CM]	GENERAL DEGREE OF CORROSIVITY TO FERROUS METALS
0 to 1,000	Very Corrosive
1,000 to 2,000	Corrosive
2,000 to 5,000	Moderately Corrosive
5,000 to 10,000	Mildly Corrosive
Above 10,000	Slightly Corrosive

CHLORIDE (Cl) CONTENT [%]	GENERAL DEGREE OF CORROSIVITY TO METALS
0.00 to 0.03	Negligible
0.03 to 0.15	Corrosive
Above 0.15	Severely Corrosive



Sample:

B-1 @ 20' - 21½'

(Water added at seating load)

Description:

Yellow brown lean clay (CL)

(Estimated field curve in RED)

	Results	
Po:	2507	[psf]
Pc:	6600	[psf]
OCR:	2.6	
Cc:	0.214	
Cs:	0.044	

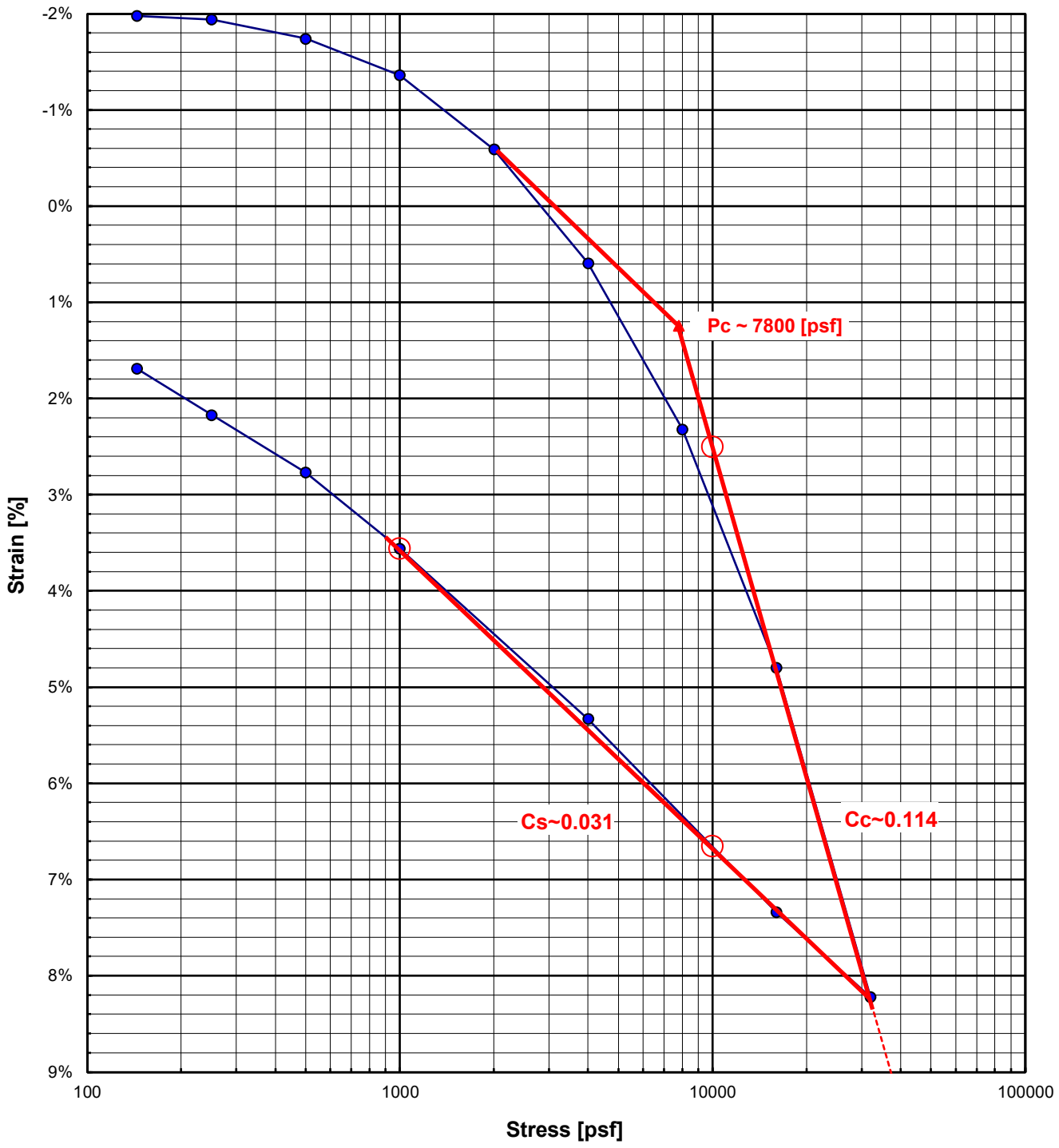
	Initial	Final	
Height:	1.0000	0.9434	[in]
Dry Density:	102.4	108.5	[pcf]
Void Ratio (e):	0.676	0.574	
Water Content:	22.4	21.0	[%]
Saturation:	91	100	[%]

Note: To find the traditional compression (Cc) and swell (Cs) indices, the values in strain domain were multiplied by 1.68 (or 1+e)

GROUP DELTA

CONSOLIDATION RESULTS

Document No. 24-0011
Project No. SD809
FIGURE B-4.1



Sample:

B-2 @ 20' - 21½'

(Water added at seating load)

Description:

Dark yellow brown lean clay (CL)

(Estimated field curve in RED)

Results		
Po:	2587	[psf]
Pc:	7800	[psf]
OCR:	3.0	
Cc:	0.195	
Cs:	0.053	

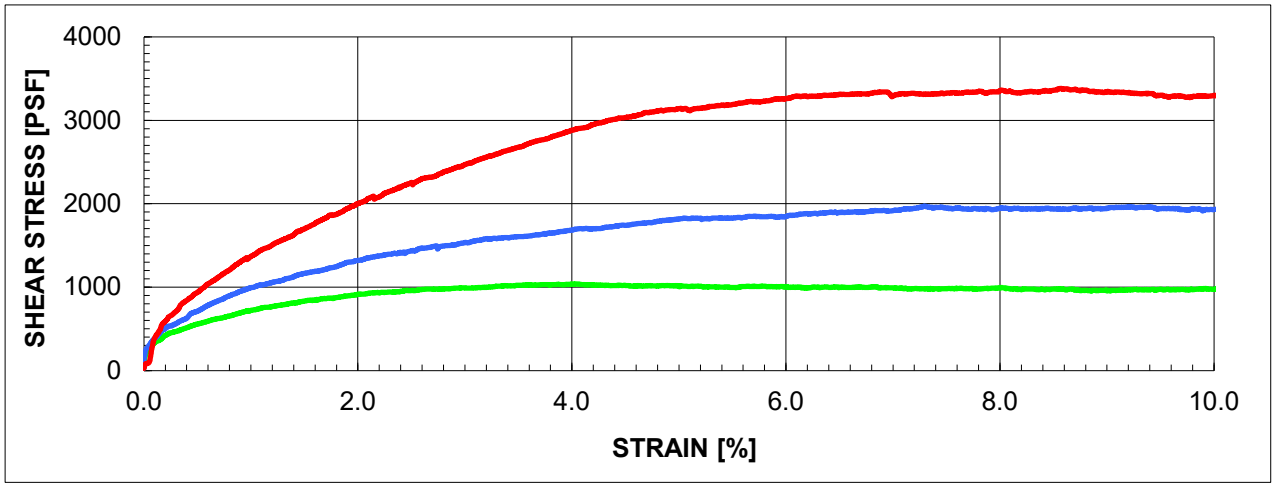
	Initial	Final	
Height:	1.0000	0.9831	[in]
Dry Density:	105.6	107.4	[pcf]
Void Ratio (e):	0.710	0.648	
Water Content:	22.6	22.9	[%]
Saturation:	90	100	[%]

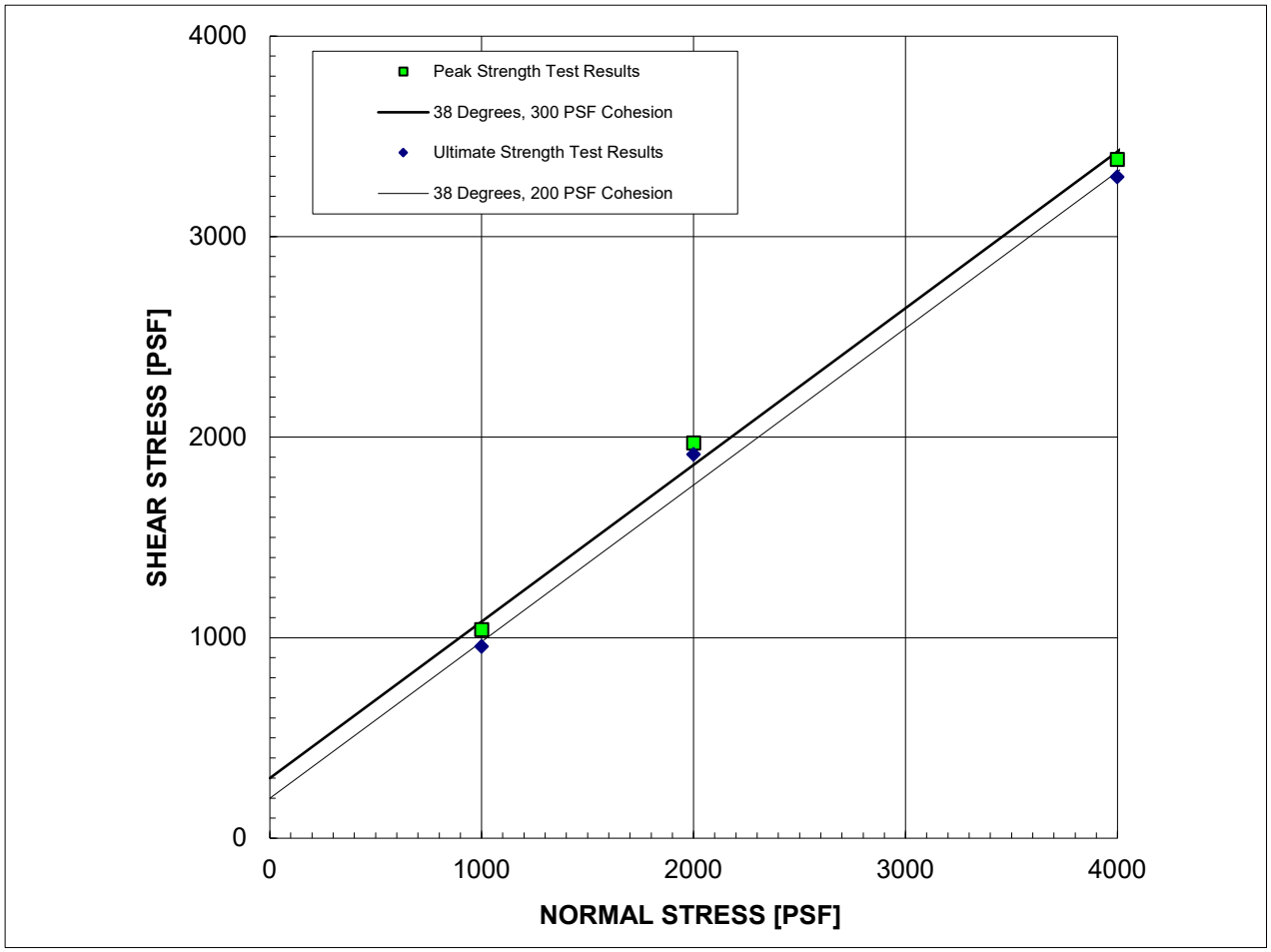
Note: To find the traditional compression (Cc) and swell (Cs) indices, the values in strain domain were multiplied by 1.71 (or 1+e)

GROUP DELTA

CONSOLIDATION RESULTS

Document No. 24-0011
Project No. SD809
FIGURE B-4.2





SAMPLE: B-2 @ 10' - 11½'

Young Alluvium (Qya): Dark yellowish brown silty sand (SM)	

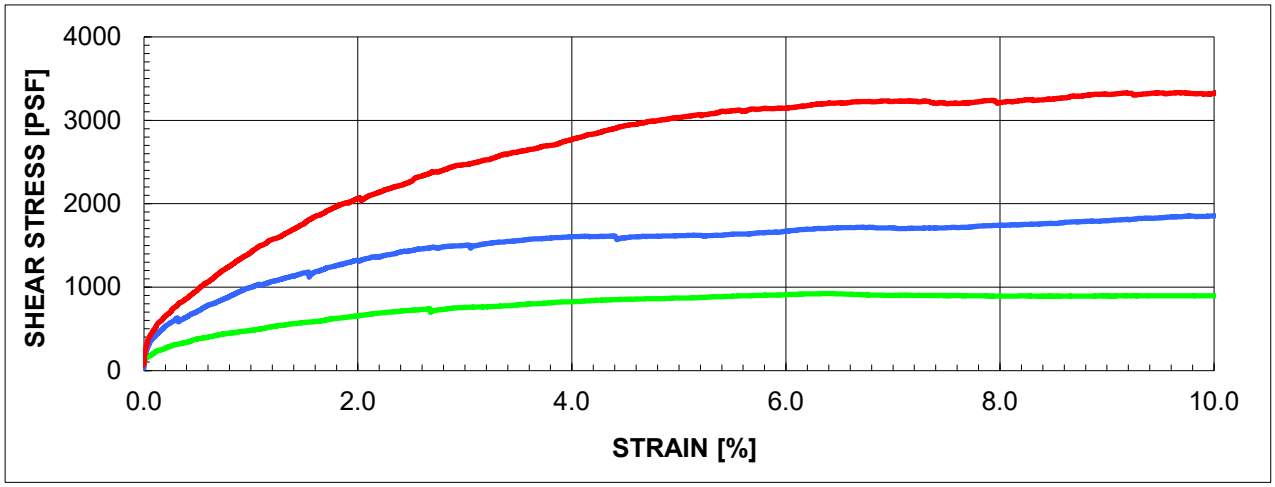
STRAIN RATE: 0.0030 IN/MIN
(Sample was consolidated and drained)

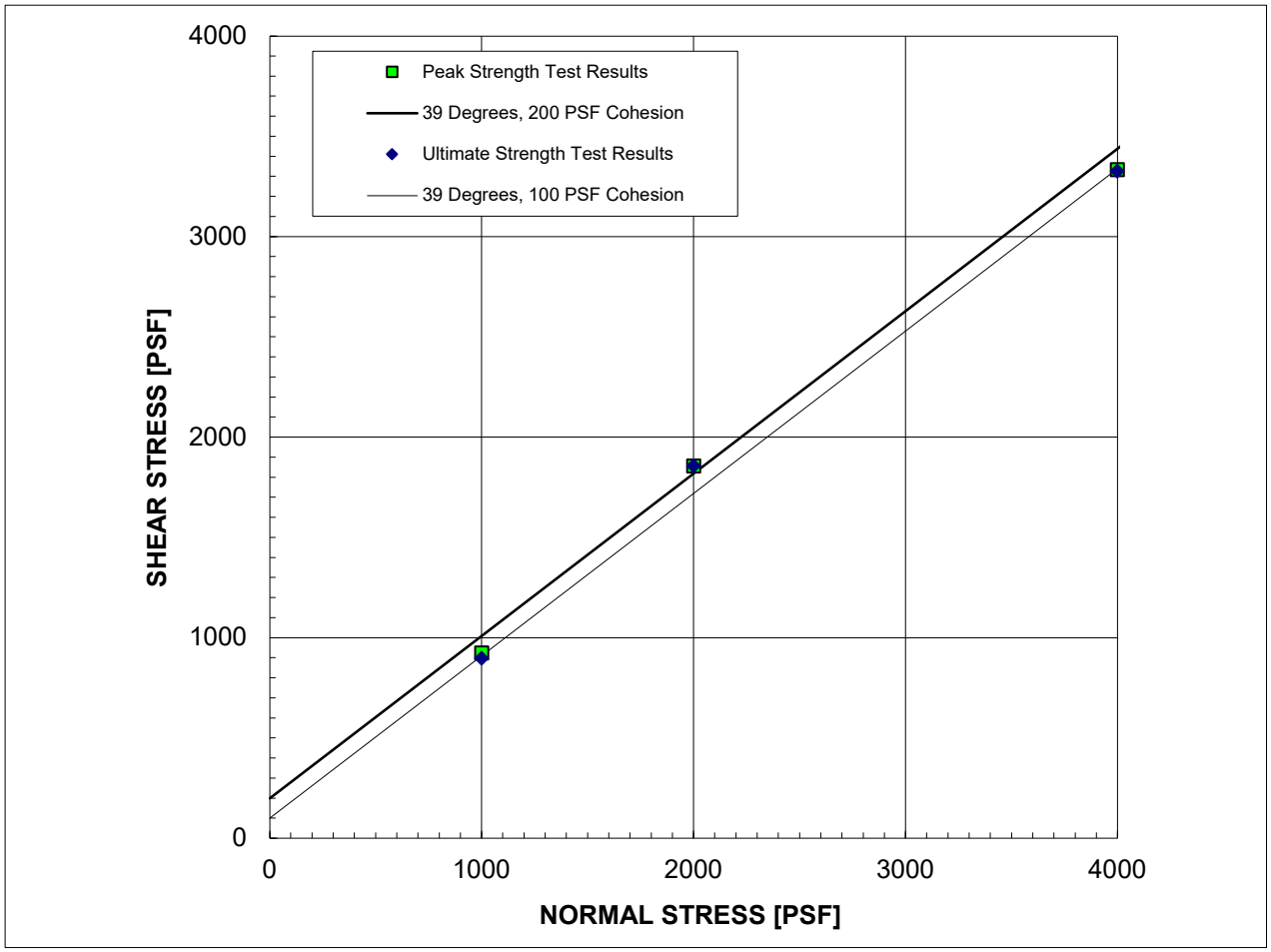
	PEAK	ULTIMATE
ϕ'	38 °	38 °
C'	300 PSF	200 PSF

	IN-SITU	AS-TESTED
γ_d	108.6 PCF	108.6 PCF
w_c	3.2 %	15.4 %

GROUP DELTA **DIRECT SHEAR TEST RESULTS**

Document No. 24-0011
Project No. SD809
FIGURE B-5.1





SAMPLE: B-4 @ 5' - 6½'

	PEAK	ULTIMATE
Young Alluvium (Qya): Yellowish brown silty sand (SM)		
ϕ'	39 °	39 °
C'	200 PSF	100 PSF

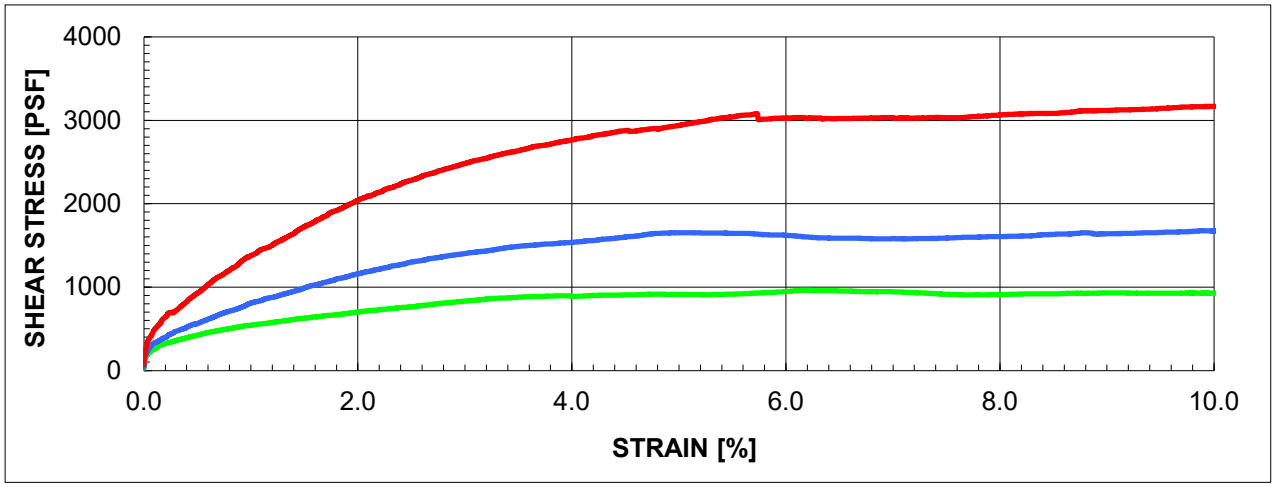
STRAIN RATE: 0.0030 IN/MIN
(Sample was consolidated and drained)

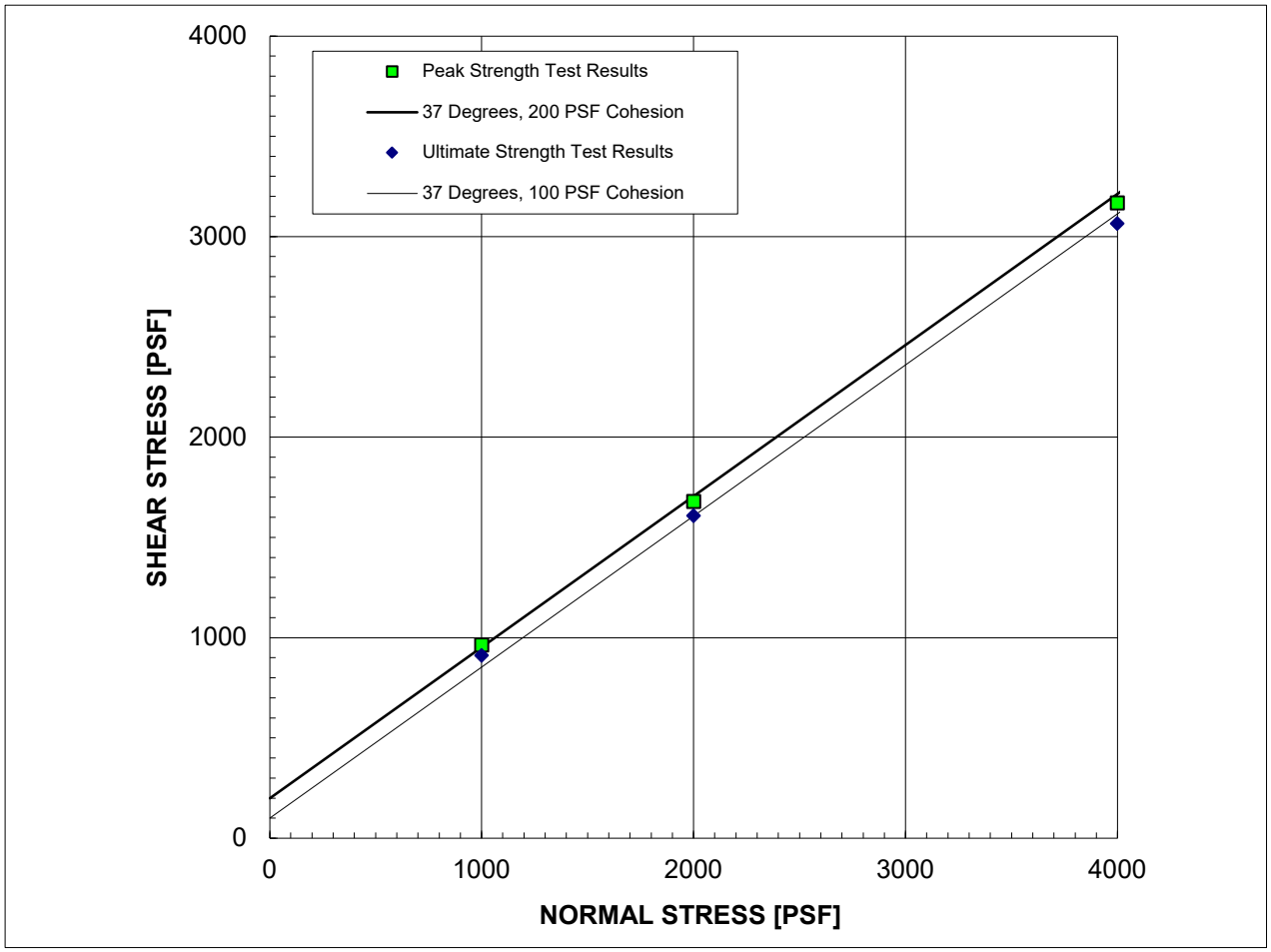
	IN-SITU	AS-TESTED
γ_d	112.3 PCF	112.3 PCF
w_c	9.4 %	15.7 %

GROUP DELTA

DIRECT SHEAR TEST RESULTS

Document No. 24-0011
Project No. SD809
FIGURE B-5.2





SAMPLE: B-10 @ 10' - 11½'

Artificial Fill (Qya): Yellowish brown silty sand (SM)	

STRAIN RATE: 0.0030 IN/MIN
(Sample was consolidated and drained)

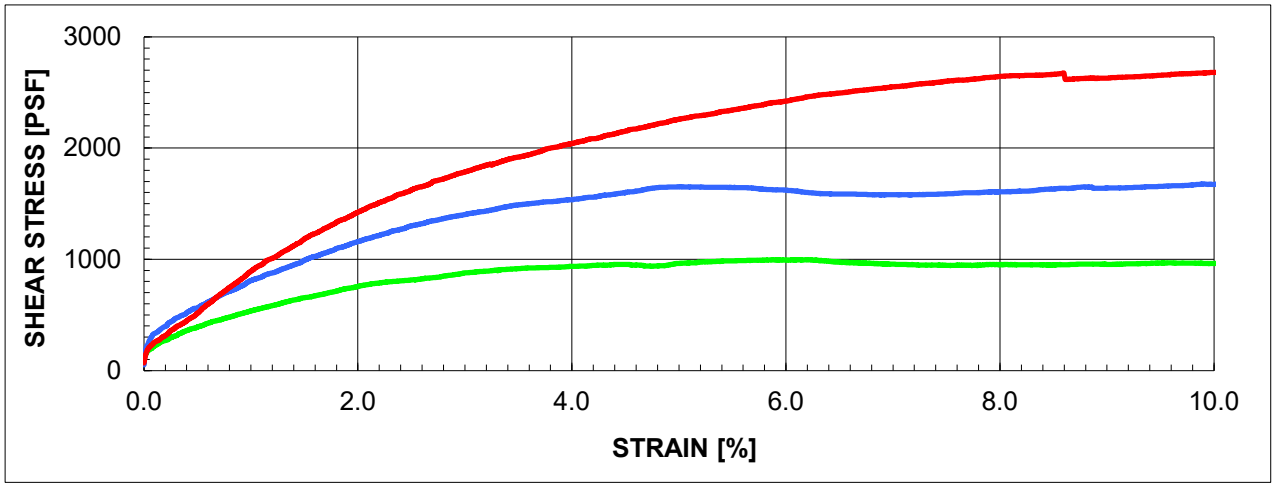
	PEAK	ULTIMATE
ϕ'	37 °	37 °
C'	200 PSF	100 PSF

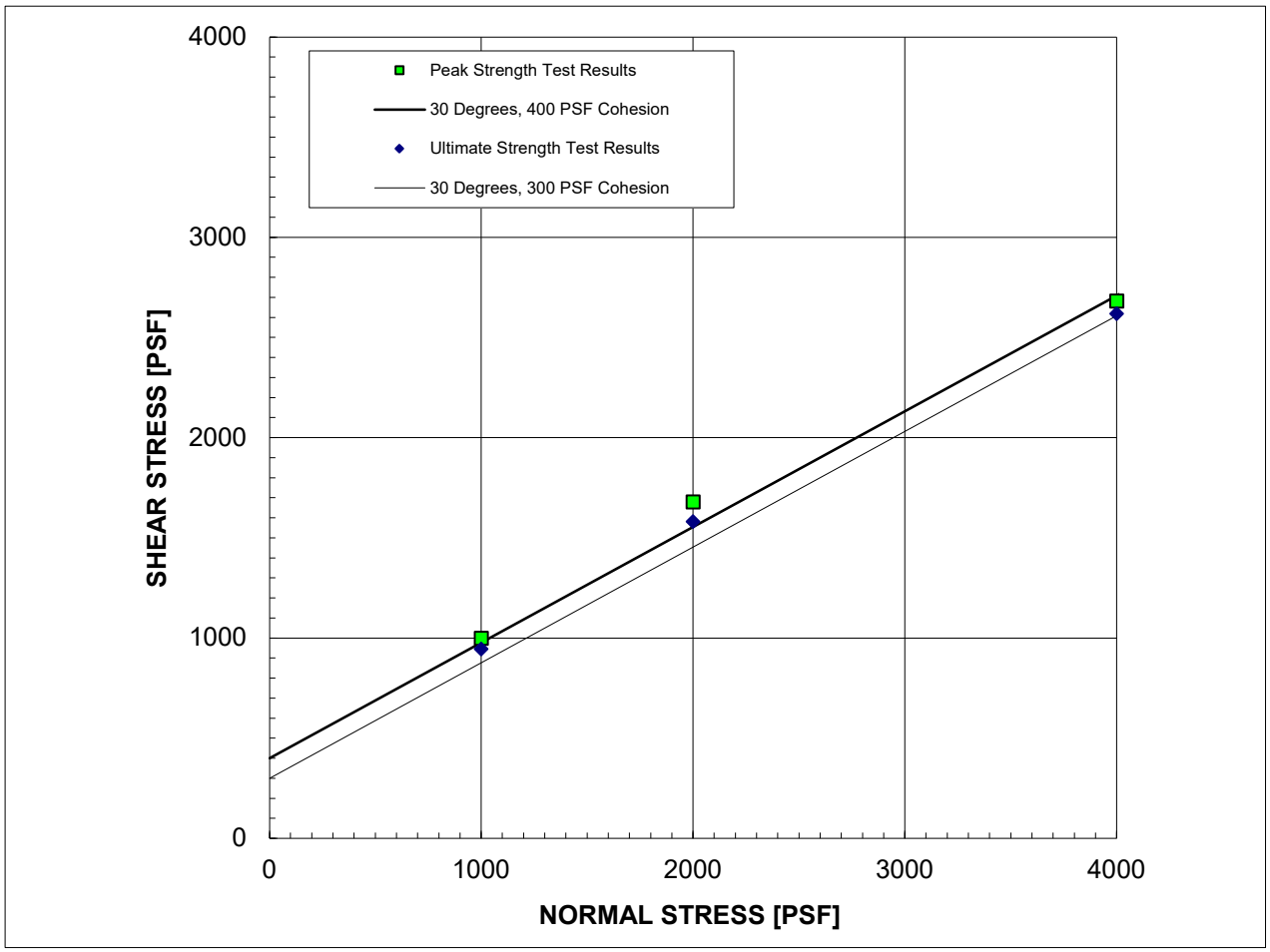
	IN-SITU	AS-TESTED
γ_d	98.5 PCF	98.5 PCF
w_c	5.8 %	26.3 %

GROUP DELTA

DIRECT SHEAR TEST RESULTS

Document No. 24-0011
Project No. SD809
FIGURE B-5.3





SAMPLE: B-10 @ 20' - 21½'

Artificial Fill (Qya):
Brownish yellow sandy silt (ML)

STRAIN RATE: 0.0002 IN/MIN
(Sample was consolidated and drained)

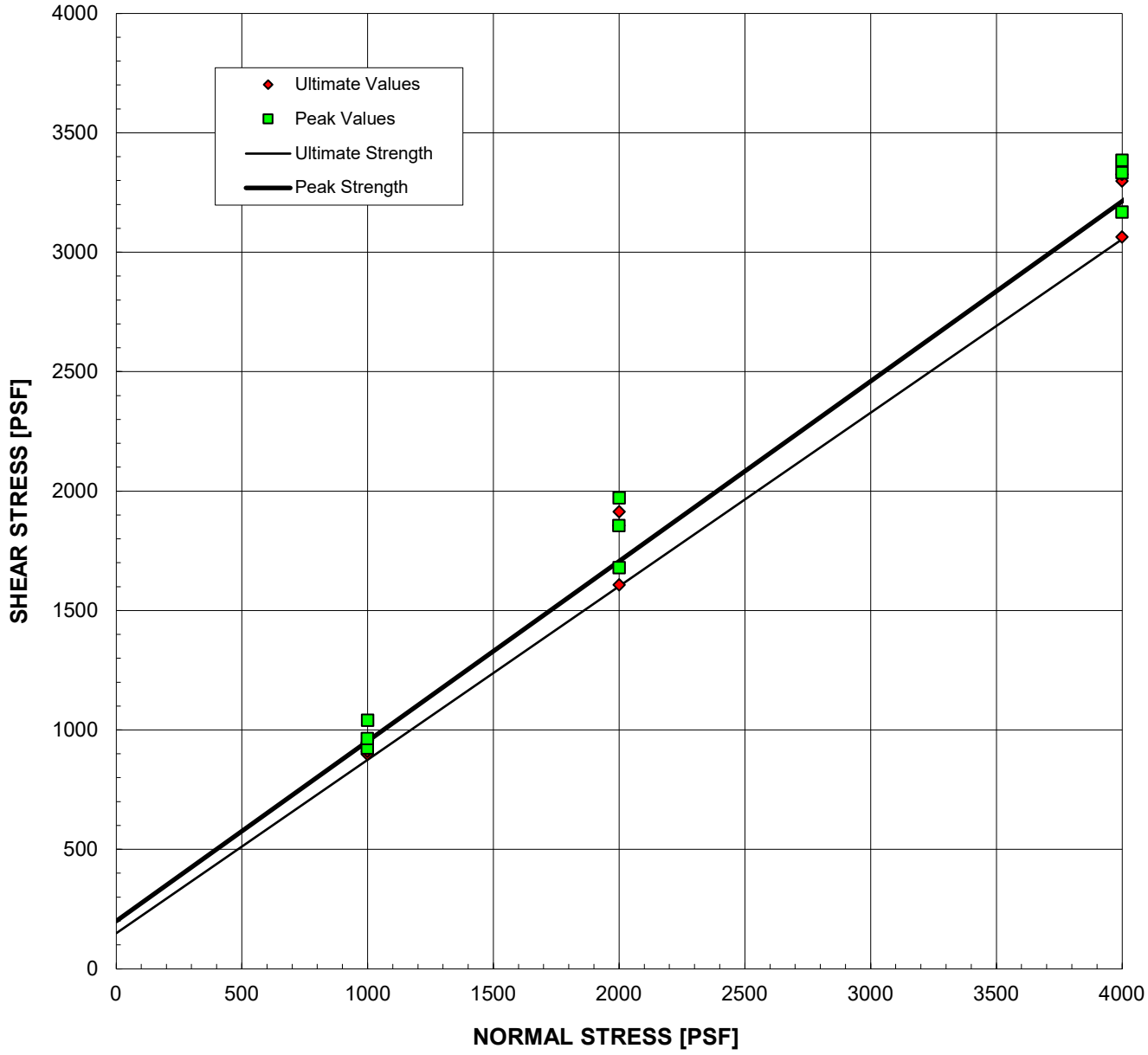
	PEAK	ULTIMATE
ϕ'	30 °	30 °
C'	400 PSF	300 PSF

	IN-SITU	AS-TESTED
γ_d	98.5 PCF	98.5 PCF
w_c	11.2 %	26.3 %

GROUP DELTA

DIRECT SHEAR TEST RESULTS

Document No. 24-0011
Project No. SD809
FIGURE B-5.4



DESCRIPTION

A summary of direct shear tests conducted on samples of the sandy fill and alluvium collected from the Garage and Tower sites at the Riverside Community Hospital.

	PEAK ESTIMATE	ULTIMATE ESTIMATE
ϕ'	37 °	36 °
C'	200 PSF	150 PSF

GROUP DELTA

DIRECT SHEAR TEST SUMMARY

Document No. 24-0011
Project No. SD809
FIGURE B-5.5

SAMPLE NO.: B-6 **SAMPLE DATE:** 4/3/24

SAMPLE LOCATION: ½' - 5' **TEST DATE:** 4/12/24

SAMPLE DESCRIPTION: Dark yellowish brown clayey sand (SC)

LABORATORY TEST DATA

	TEST SPECIMEN	1	2	3	4	5	
A	COMPACTOR PRESSURE	350	350	350			[PSI]
B	INITIAL MOISTURE	2.5	2.5	2.5			[%]
C	BATCH SOIL WEIGHT	1200	1200	1200			[G]
D	WATER ADDED	75	85	102			[ML]
E	WATER ADDED (D*(100+B)/C)	6.4	7.3	8.7			[%]
F	COMPACTION MOISTURE (B+E)	8.9	9.8	11.2			[%]
G	MOLD WEIGHT	2009.7	2016.1	2009.1			[G]
H	TOTAL BRIQUETTE WEIGHT	3083.5	3170.7	3160.9			[G]
I	NET BRIQUETTE WEIGHT (H-G)	1073.8	1154.6	1151.8			[G]
J	BRIQUETTE HEIGHT	2.38	2.43	2.55			[IN]
K	DRY DENSITY (30.3*I/((100+F)*J))	125.5	131.2	123.1			[PCF]
L	EXUDATION LOAD	7490	5459	3109			[LB]
M	EXUDATION PRESSURE (L/12.54)	597	435	248			[PSI]
N	STABILOMETER AT 1000 LBS	14	20	39			[PSI]
O	STABILOMETER AT 2000 LBS	24	33	73			[PSI]
P	DISPLACEMENT FOR 100 PSI	4.33	5.04	6.93			[Turns]
Q	R VALUE BY STABILOMETER	77	66	30			
R	CORRECTED R-VALUE (See Fig. 14)	75	64	30			
S	EXPANSION DIAL READING	0.0016	0.0007	0.0002			[IN]
T	EXPANSION PRESSURE (S*43,300)	69	30	9			[PSF]
U	COVER BY STABILOMETER	0.23	0.34	0.65			[FT]
V	COVER BY EXPANSION	0.53	0.23	0.07			[FT]

TRAFFIC INDEX:	5.0
GRAVEL FACTOR:	1.72
UNIT WEIGHT OF COVER [PCF]:	130
R-VALUE BY EXUDATION:	40
R-VALUE BY EXPANSION:	68
R-VALUE AT EQUILIBRIUM:	40

*Note: Gravel factor estimated from pavement section using CTM 301, Section C, Part b.

REV. 2, DATED 1/31/15

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ENGINEERS AND GEOLOGISTS
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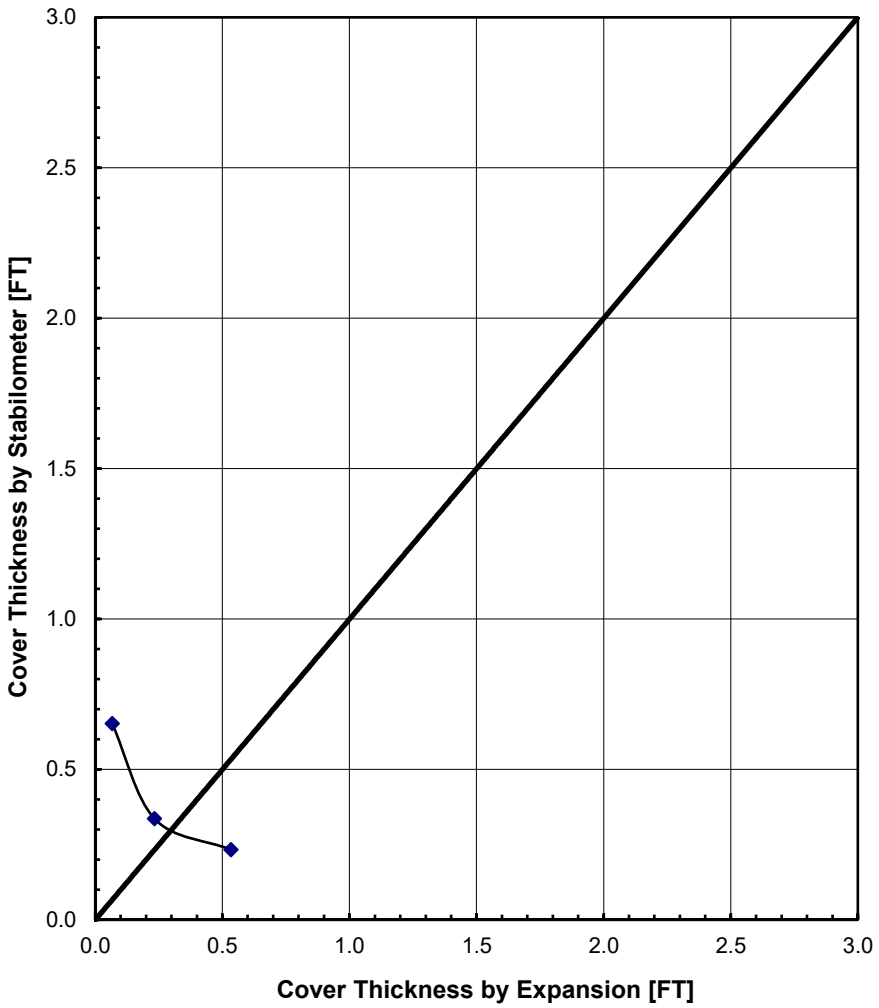
SAN DIEGO, CALIFORNIA 92126

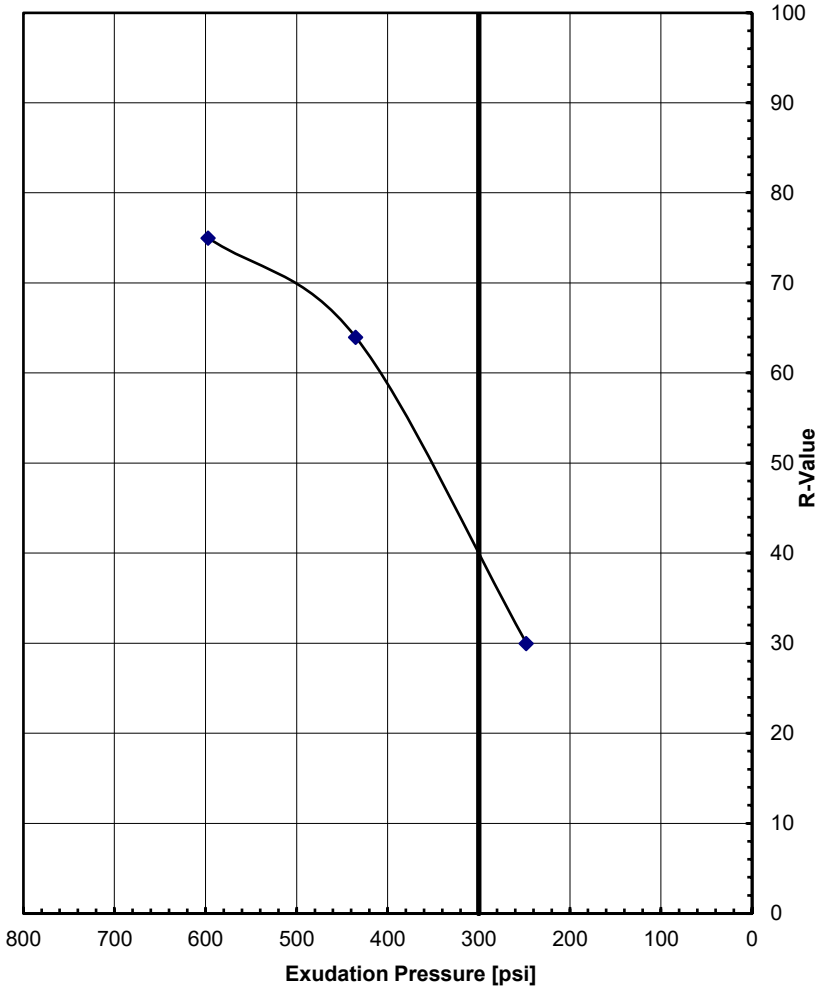
R-VALUE TEST RESULTS
CT301

Document No. 24-0011
Project No. SD809
FIGURE B-6.1a

Sample: B-6 @ ½' - 5'

R-Value at Equilibrium: 40





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COVER AND EXUDATION CHARTS

Document No. 24-0011
Project No. SD809
FIGURE B-6.1b

SAMPLE NO.: B-8 **SAMPLE DATE:** 4/1/24

SAMPLE LOCATION: 0' - 5' **TEST DATE:** 4/12/24

SAMPLE DESCRIPTION: Dark yellowish brown silty sand (SM)

LABORATORY TEST DATA

	TEST SPECIMEN	1	2	3	4	5	
A	COMPACTOR PRESSURE	290	250	210			[PSI]
B	INITIAL MOISTURE	2.2	2.2	2.2			[%]
C	BATCH SOIL WEIGHT	1200	1200	1200			[G]
D	WATER ADDED	90	100	105			[ML]
E	WATER ADDED (D*(100+B)/C)	7.7	8.5	8.9			[%]
F	COMPACTION MOISTURE (B+E)	9.9	10.7	11.1			[%]
G	MOLD WEIGHT	2004.8	2007.6	2074.3			[G]
H	TOTAL BRIQUETTE WEIGHT	3155.6	3197.7	3202.9			[G]
I	NET BRIQUETTE WEIGHT (H-G)	1150.8	1190.1	1128.6			[G]
J	BRIQUETTE HEIGHT	2.57	2.62	2.53			[IN]
K	DRY DENSITY (30.3*I/((100+F)*J))	123.5	124.3	121.6			[PCF]
L	EXUDATION LOAD	4172	3211	2450			[LB]
M	EXUDATION PRESSURE (L/12.54)	333	256	195			[PSI]
N	STABILOMETER AT 1000 LBS	39	45	46			[PSI]
O	STABILOMETER AT 2000 LBS	76	96	97			[PSI]
P	DISPLACEMENT FOR 100 PSI	6.55	6.74	7.18			[Turns]
Q	R VALUE BY STABILOMETER	30	20	18			
R	CORRECTED R-VALUE (See Fig. 14)	31	22	18			
S	EXPANSION DIAL READING	0.0000	0.0000	0.0000			[IN]
T	EXPANSION PRESSURE (S*43,300)	0	0	0			[PSF]
U	COVER BY STABILOMETER	0.70	0.79	0.83			[FT]
V	COVER BY EXPANSION	0.00	0.00	0.00			[FT]

TRAFFIC INDEX:	5.0
GRAVEL FACTOR:	1.58
UNIT WEIGHT OF COVER [PCF]:	130
R-VALUE BY EXUDATION:	27
R-VALUE BY EXPANSION:	100
R-VALUE AT EQUILIBRIUM:	27

*Note: Gravel factor estimated from pavement section using CTM 301, Section C, Part b.

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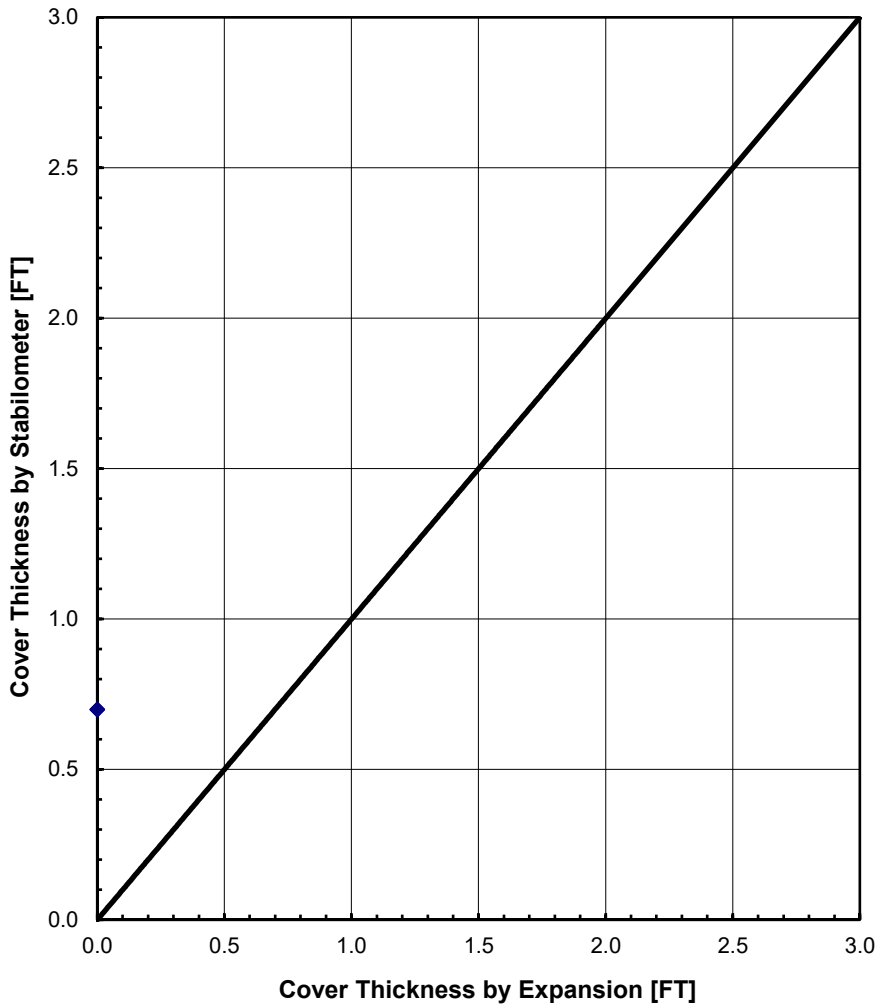
SAN DIEGO, CALIFORNIA 92126

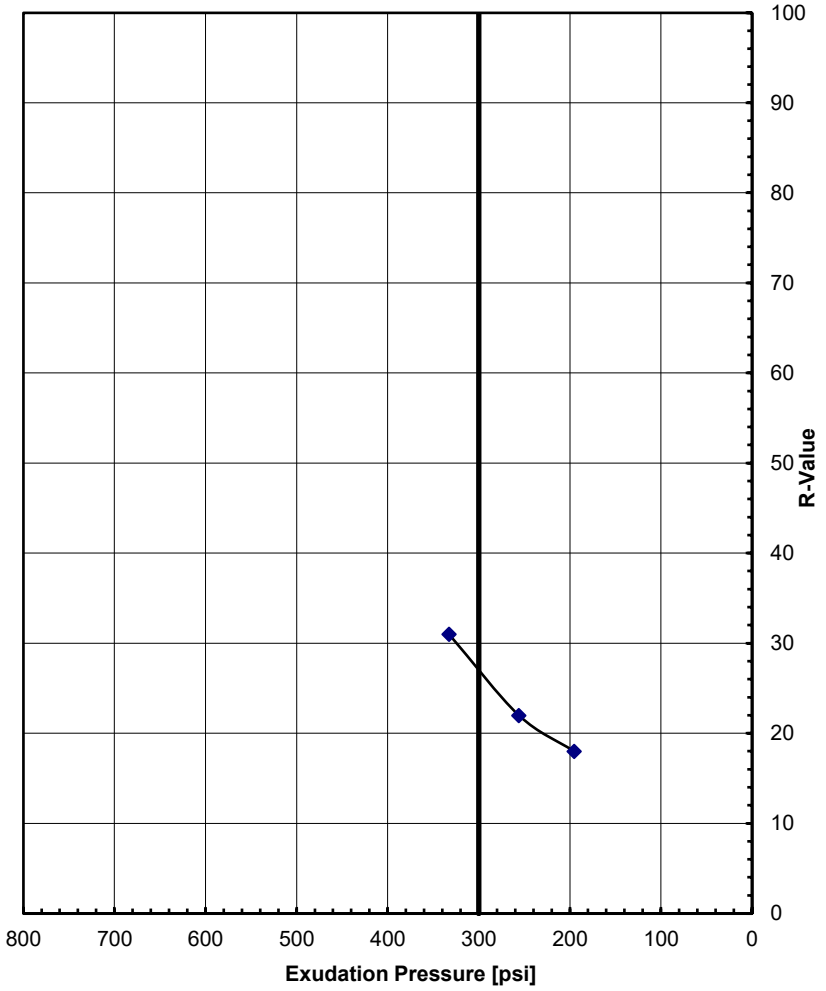
R-VALUE TEST RESULTS
CT301

Document No. 24-0011
Project No. SD809
FIGURE B-6.2a

Sample: B-8 @ 0' - 5'

R-Value at Equilibrium: 27





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COVER AND EXUDATION CHARTS

Document No. 24-0011
Project No. SD809
FIGURE B-6.2b

APPENDIX C
LIQUEFACTION ANALYSIS

APPENDIX C

LIQUEFACTION ANALYSES

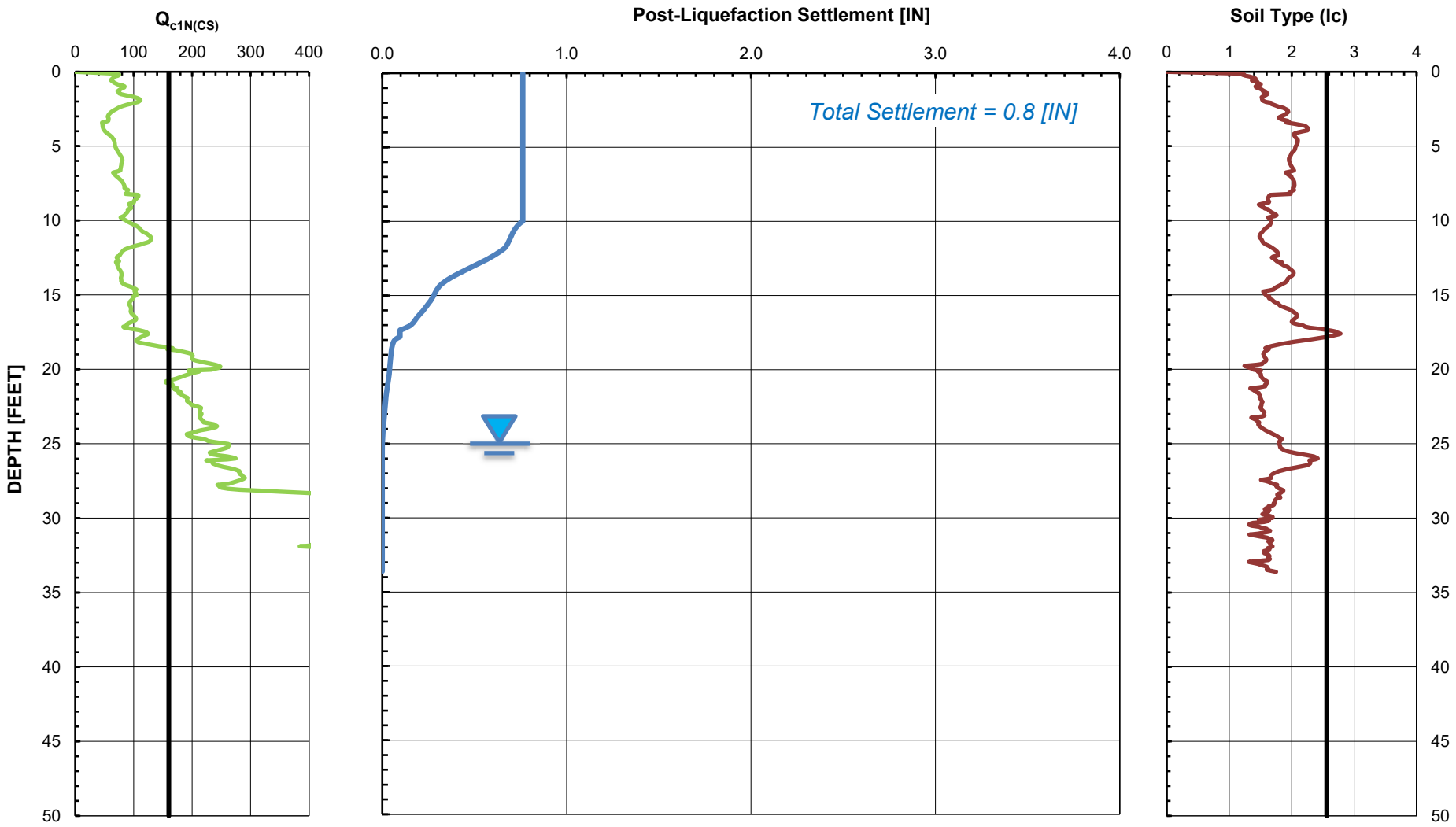
Liquefaction analyses were performed using the data gathered from the CPT soundings. The results are shown in Figures C-1 to C-5. The analyses were based on the procedures originally developed by Seed and Idriss and were conducted in general accordance with the recommended procedures for liquefaction analyses described in Section C4.4 of ASCE 61-14 (ASCE, 2014). The tip resistance (q_t) was normalized for overburden pressure and corrected for fines content (Youd et al., 2001). The fines correction was based on the Soil Behavior Type Index Ic (Robertson, 2010).

For each CPT sounding, the uncorrected Cone Resistance, Normalized Cone Resistance, the Soil Behavior Type (SBT), Factor of Safety against liquefaction, and estimated vertical settlement are plotted versus depth. A high groundwater elevation corresponding to a depth of 25-feet below grade was assumed for the analyses based on available historic data from the site vicinity as well as the groundwater levels we encountered during our recent subsurface explorations. The seismic demand used for the liquefaction analyses was equal to the Maximum Considered Earthquake Geometric Mean acceleration adjusted for site effects (PGA_M) for the Garage and Tower sites of 0.615g, based on the requirements of Section 11.8.3 of ASCE 7-16 for a Seismic Design Category D.

The vertical settlement plots for each CPT sounding show the estimated range of dynamic settlement resulting from a seismic demand equal to the PGA_M acceleration. At depths where the seismically induced shear stress exceeds the stress required to cause liquefaction, the Factor of Safety is less than 1.0, and seismic settlement may occur. Fine-grained soils with an Ic value greater than 2.6 are considered too clayey to liquefy, and granular soils with a normalized tip resistance greater than 160 are considered too dense to liquefy. Only soils that are both loose enough and sandy enough to liquefy contribute to the post-liquefaction settlement. Dry sand settlement above groundwater accounted for most of the estimated seismic settlement (Pradel, 1998). We assumed that a 10-foot-deep over-excavation below grade would be conducted for new building areas.

Each of the CPT analyses were conducted using three different assumptions. In the first figure for each CPT sounding (Case A), a spreadsheet was used to estimate seismic settlement with no data averaging. These analyses were then compared to results from a commercially available program CLiq V3.3.1.14, with the CPT data averaged across 3 depth increments (Case B), and with a thin layer correction applied (Case C). The results of these three parametric liquefaction analyses are tabulated below, along with the average settlement from the three different methods.

Exploration No.	A) Settlement (Raw CPT Data)	B) Settlement (Data Averaging)	C) Settlement (Thin Layer)	Average Settlement	Figure No.
CPT-1	0.8 Inches	0.6 Inches	0.5 Inches	**0.6 Inches**	C-1
CPT-2	1.3 Inches	1.0 Inches	1.0 Inches	**1.1 Inches**	C-2
CPT-3	0.0 Inches	0.0 Inches	0.0 Inches	**0.0 Inches**	C-3
CPT-4	1.9 Inches	2.7 Inches	2.7 Inches	**2.4 Inches**	C-4
CPT-5	0.5 Inches	0.3 Inches	0.3 Inches	**0.4 Inches**	C-5



GROUP DELTA

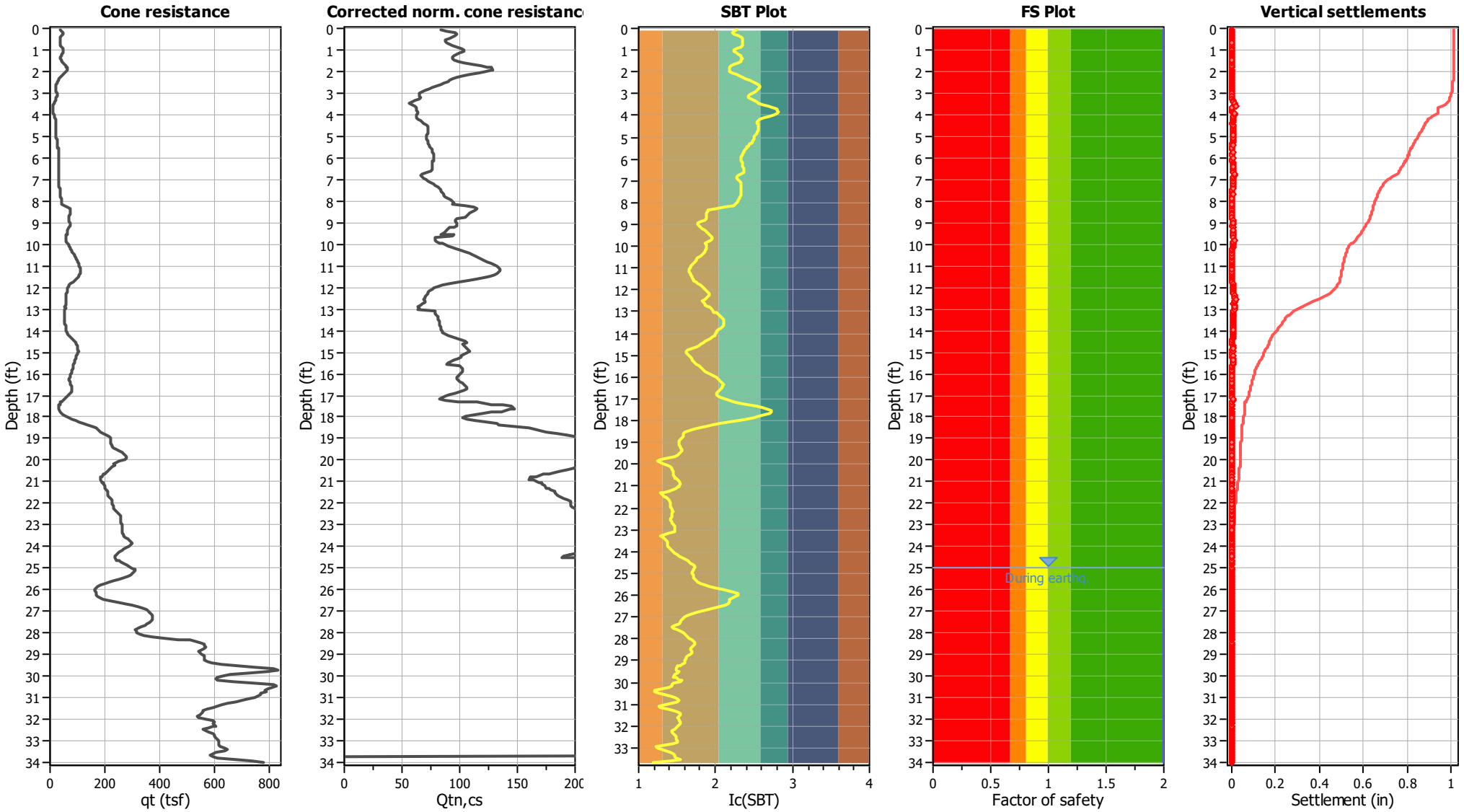
DYNAMIC SETTLEMENT (CPT-1)
(Seismic Demand ~ 0.615g)

Document No. 24-0011
Project No. SD809
FIGURE C-1a

Group Delta Consultants
9245 Activity Road, Suite 103
San Diego, California 92126
http://www.GroupDelta.com

Project: **Riverside Community Hospital**
Location: **Southeast of 14th Street and Brockton Avenue**

CPT-1
Total depth: 33.99 ft



Analysis method:	NCEER (1998)	G.W.T. (in-situ):	30.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	25.00 ft	Fill height:	N/A		
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w:	7.00	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.61	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based

FIGURE C-1b

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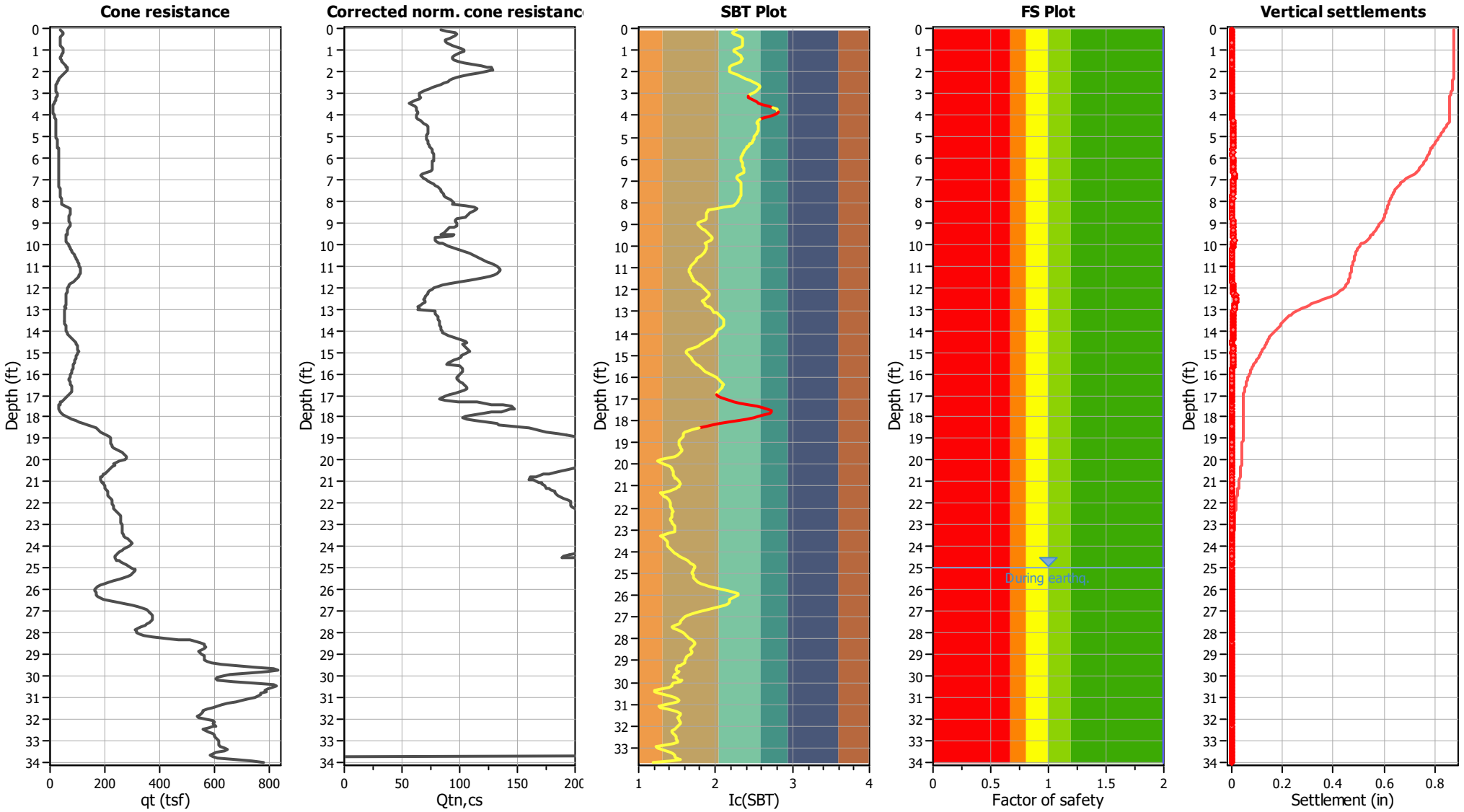
9245 Activity Road, Suite 103
San Diego, California 92126
http://www.GroupDelta.com

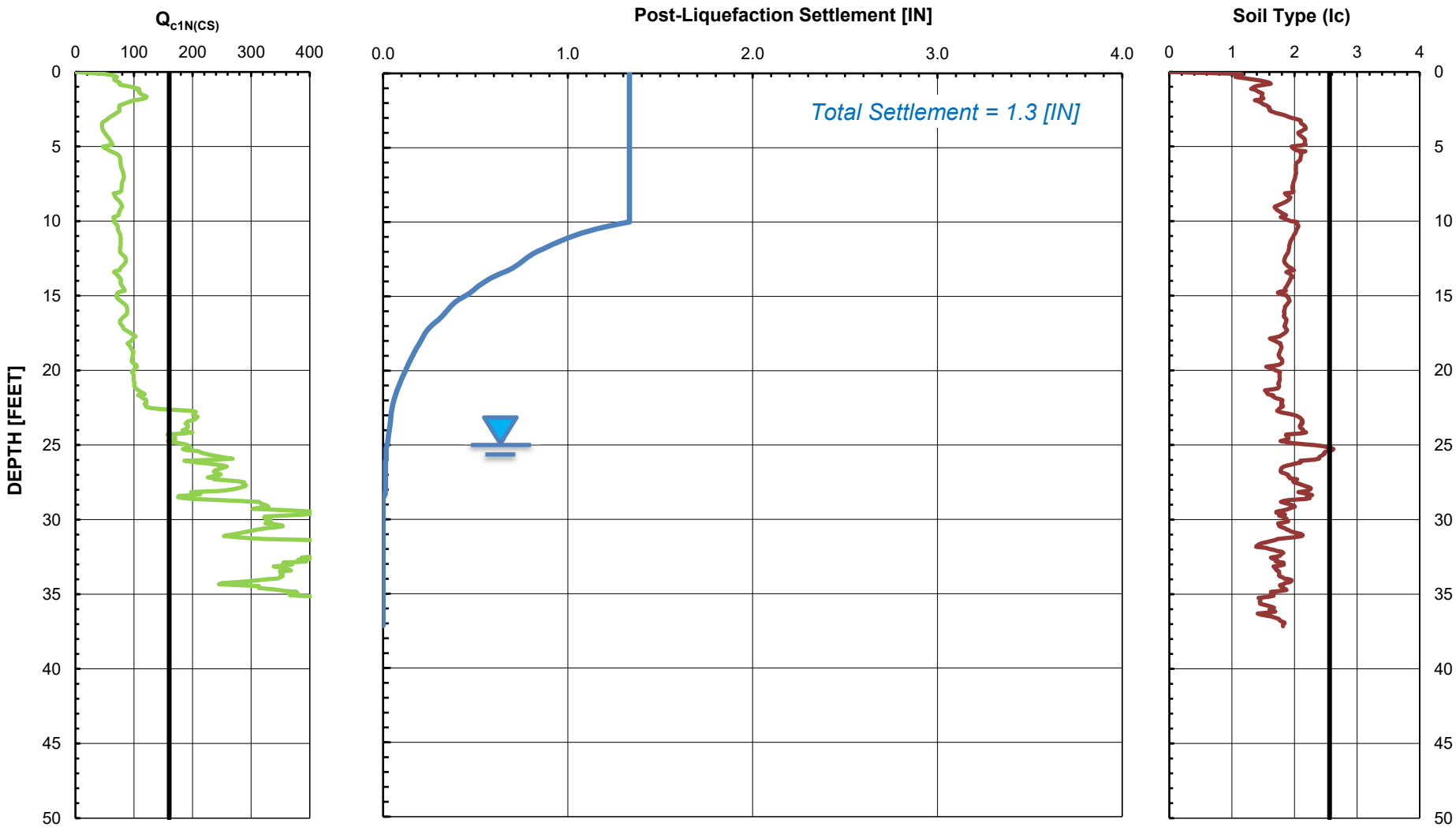
Project: **Riverside Community Hospital**
Location: **Southeast of 14th Street and Brockton Avenue**

CPT-1
Total depth: 33.99 ft



Analysis method:	NCEER (1998)	G.W.T. (in-situ):	30.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	25.00 ft	Fill height:	N/A		
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w:	7.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	N/A
Peak ground acceleration:	0.61	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based

FIGURE C-1c



GROUP DELTA

DYNAMIC SETTLEMENT (CPT-2)

(Seismic Demand ~ 0.615g)

Document No. 24-0011

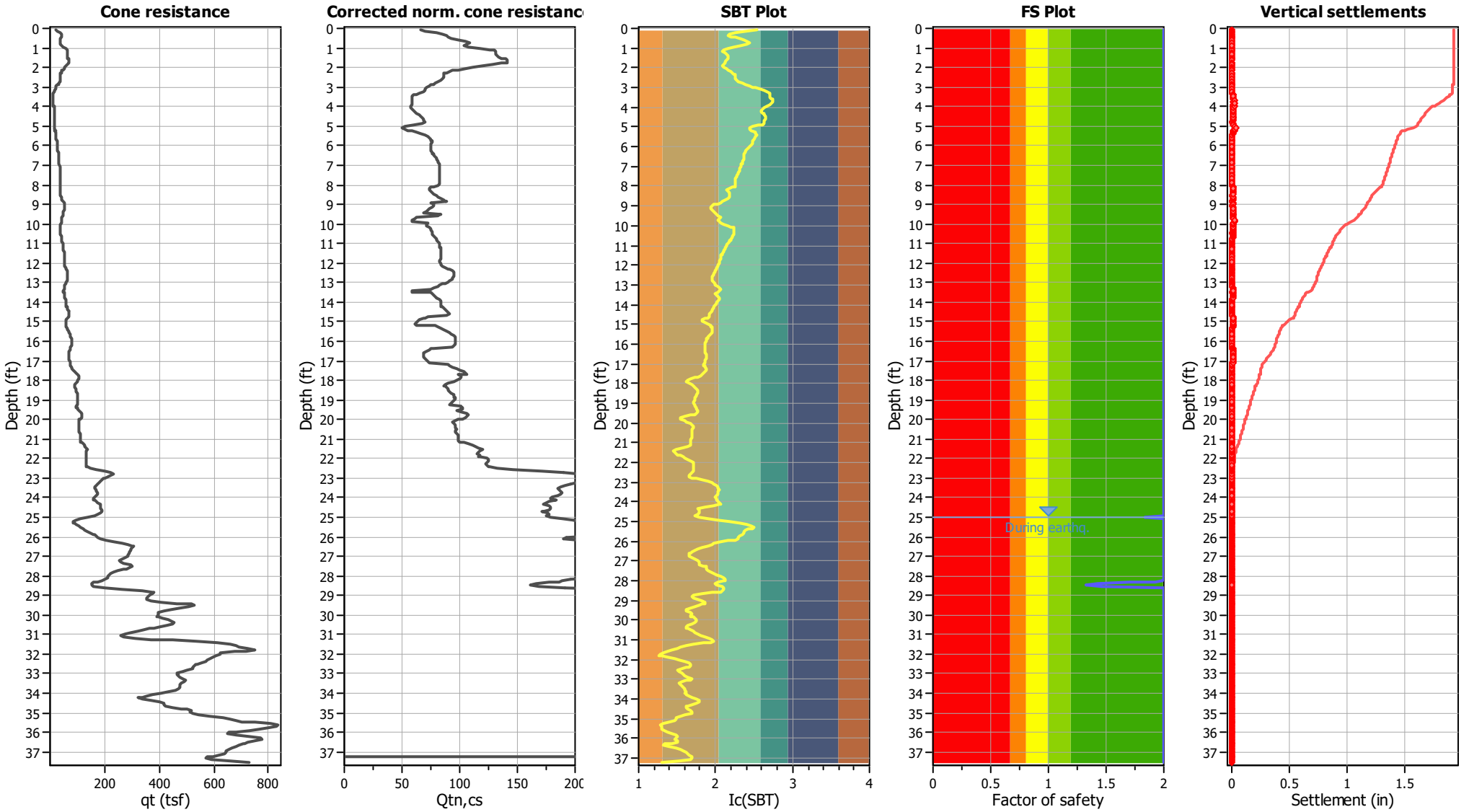
Project No. SD809

FIGURE C-2a

Group Delta Consultants
9245 Activity Road, Suite 103
San Diego, California 92126
http://www.GroupDelta.com

Project: **Riverside Community Hospital**
Location: **Southeast of 14th Street and Brockton Avenue**

CPT-2
Total depth: 37.54 ft



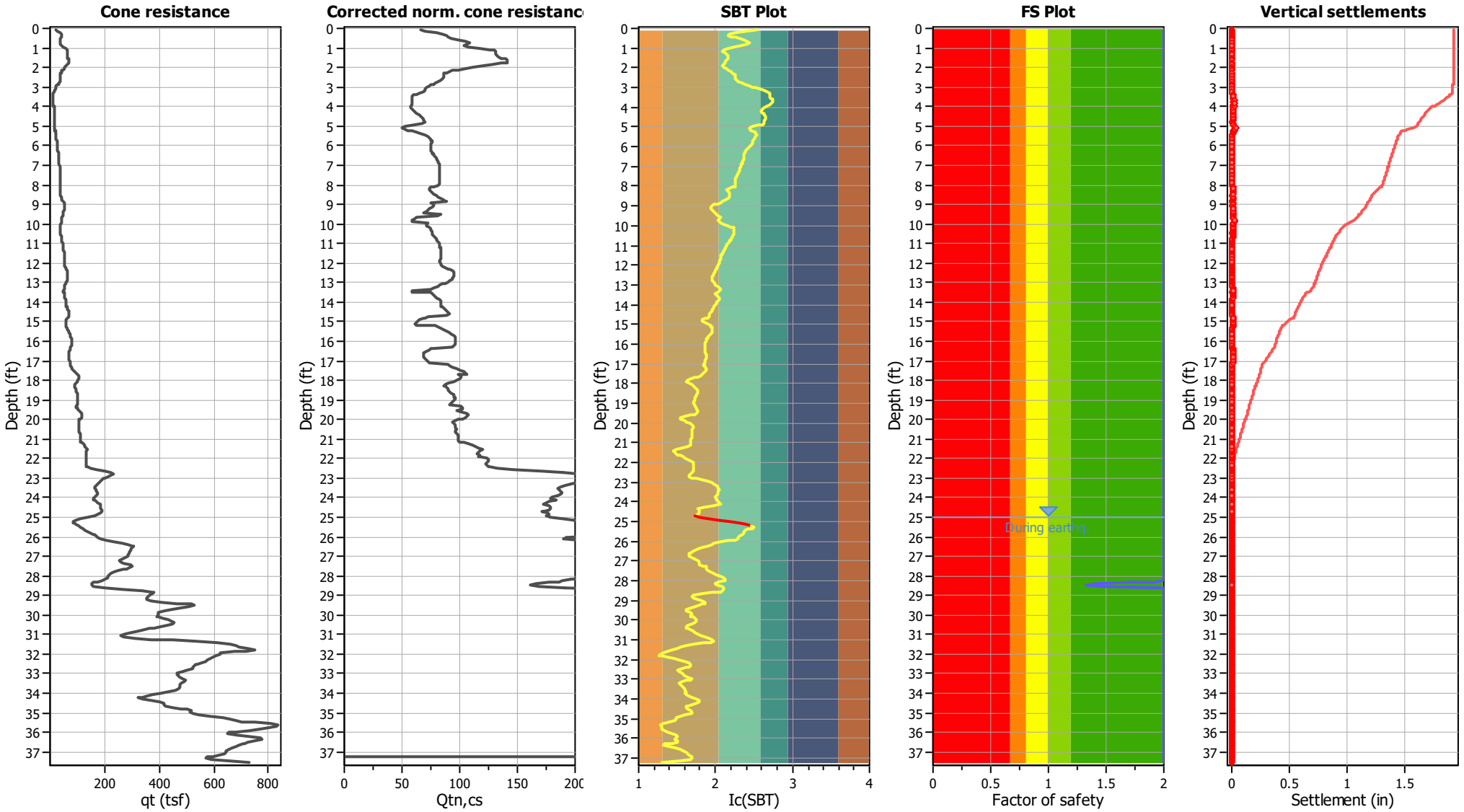
Analysis method:	NCEER (1998)	G.W.T. (in-situ):	30.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	25.00 ft	Fill height:	N/A		
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w:	7.00	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.61	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based

FIGURE C-2b

Group Delta Consultants
9245 Activity Road, Suite 103
San Diego, California 92126
http://www.GroupDelta.com

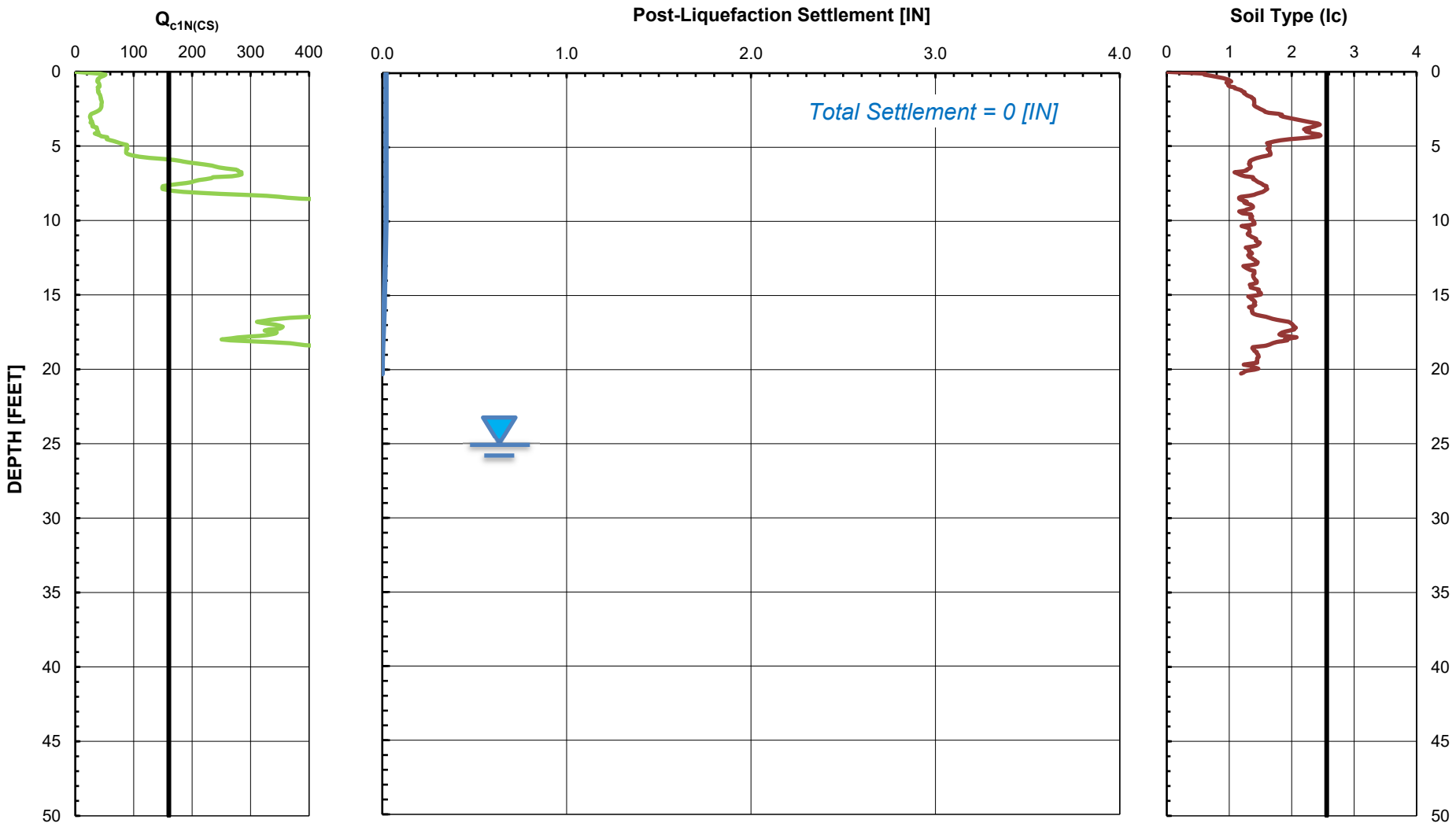
Project: **Riverside Community Hospital**
Location: **Southeast of 14th Street and Brockton Avenue**

CPT-2
Total depth: 37.54 ft



Analysis method:	NCEER (1998)	G.W.T. (in-situ):	30.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	25.00 ft	Fill height:	N/A		
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w:	7.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	N/A
Peak ground acceleration:	0.61	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based

FIGURE C-2c



GROUP DELTA

DYNAMIC SETTLEMENT (CPT-3)

(Seismic Demand ~ 0.615g)

Document No. 24-0011

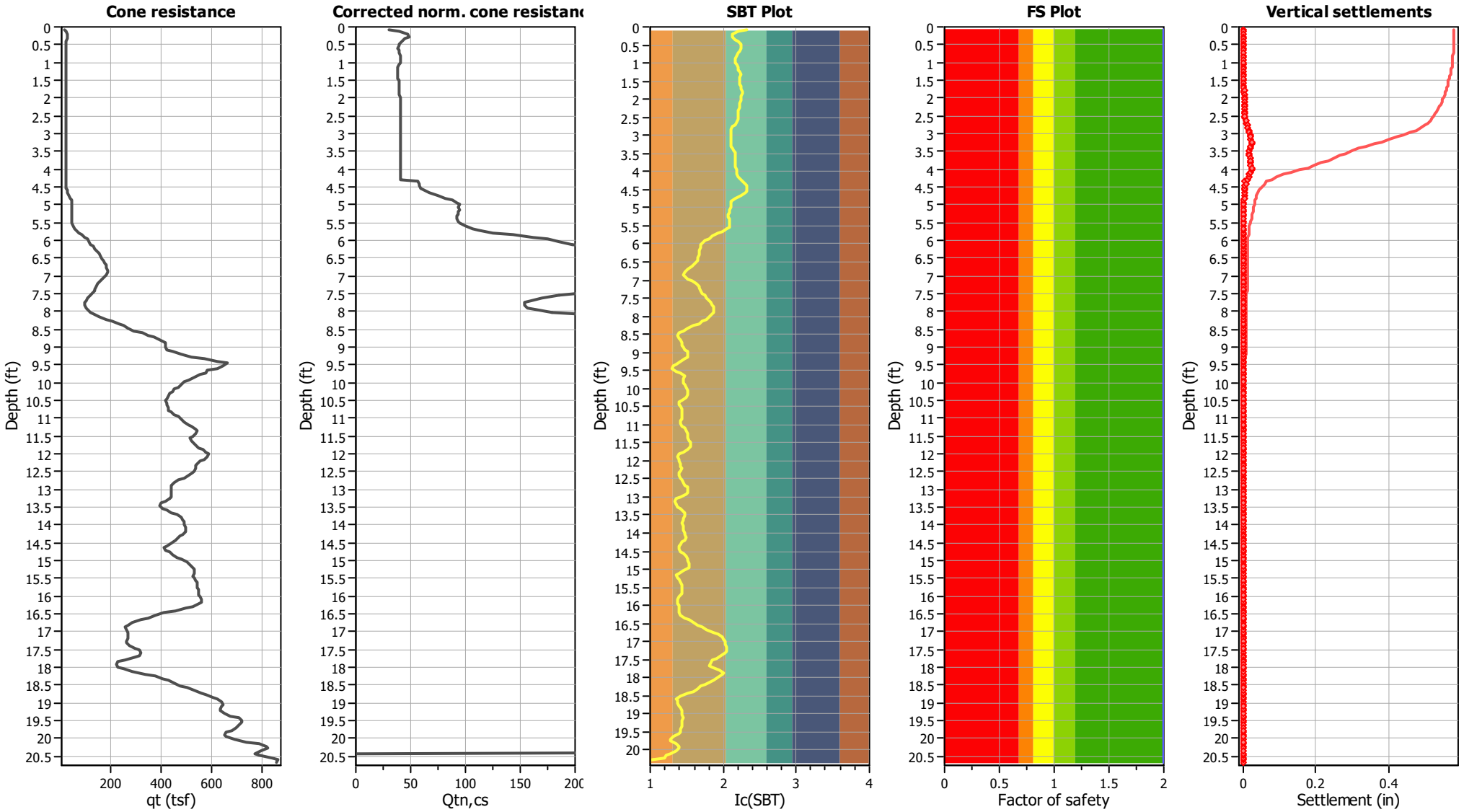
Project No. SD809

FIGURE C-3a

Group Delta Consultants
9245 Activity Road, Suite 103
San Diego, California 92126
http://www.GroupDelta.com

Project: Riverside Community Hospital
Location: Southeast of 14th Street and Brockton Avenue

CPT-3
Total depth: 20.67 ft



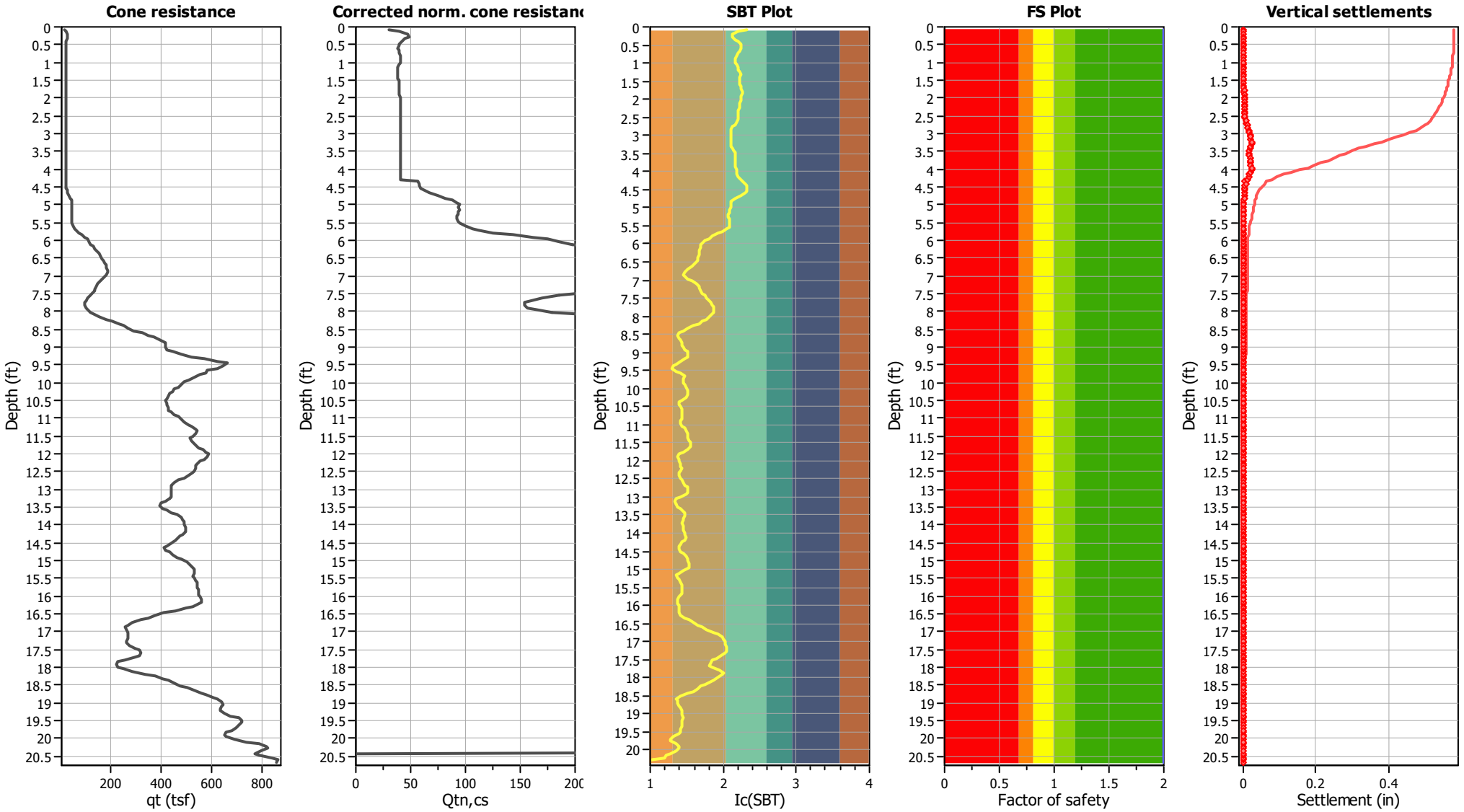
Analysis method:	NCEER (1998)	G.W.T. (in-situ):	30.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	25.00 ft	Fill height:	N/A		
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w:	7.00	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.61	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based

FIGURE C-3b

Group Delta Consultants
9245 Activity Road, Suite 103
San Diego, California 92126
http://www.GroupDelta.com

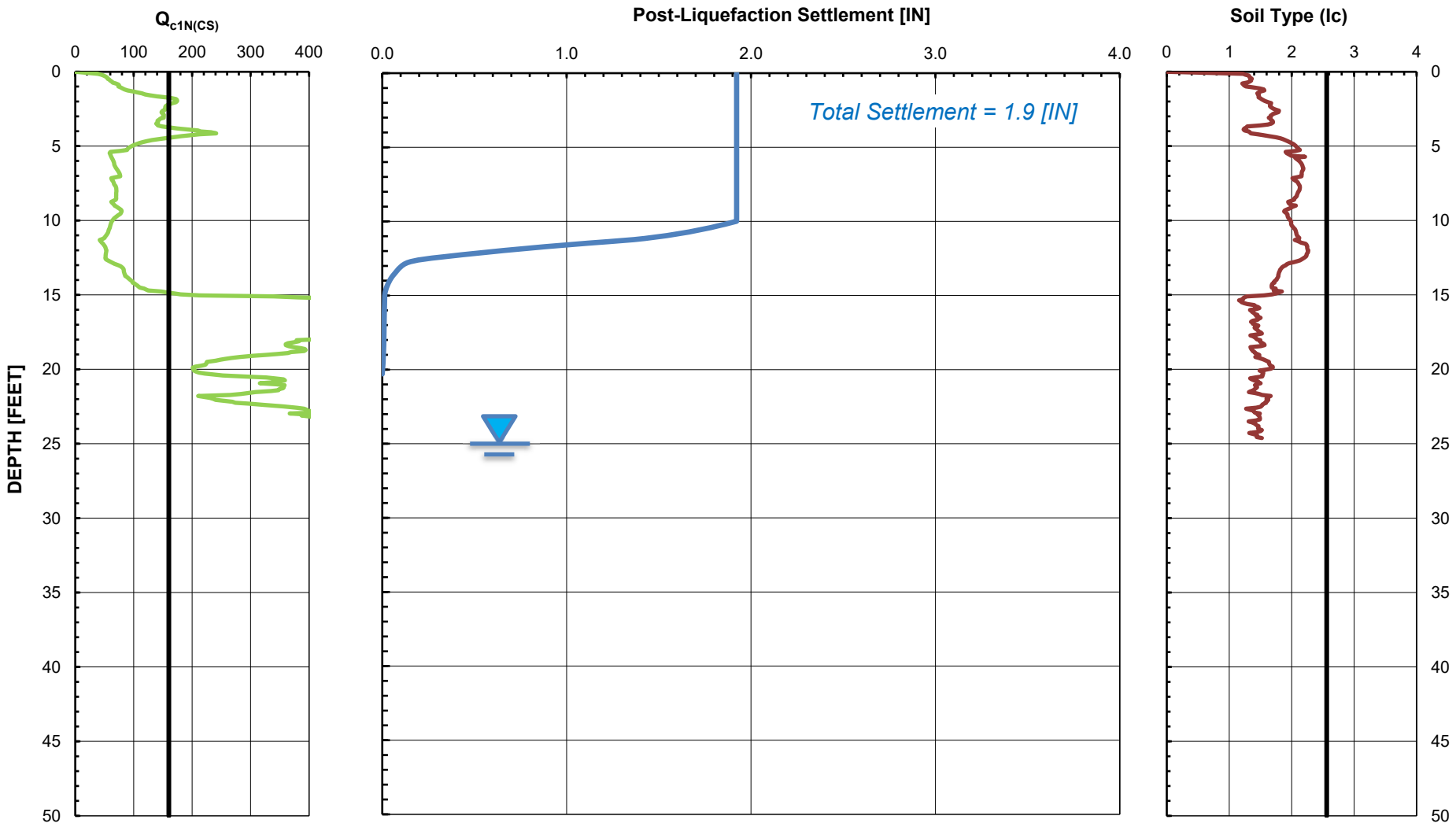
Project: **Riverside Community Hospital**
Location: **Southeast of 14th Street and Brockton Avenue**

CPT-3
Total depth: 20.67 ft



Analysis method:	NCEER (1998)	G.W.T. (in-situ):	30.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	25.00 ft	Fill height:	N/A		
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w:	7.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	N/A
Peak ground acceleration:	0.61	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based

FIGURE C-3c



GROUP DELTA

DYNAMIC SETTLEMENT (CPT-4)

(Seismic Demand ~ 0.564g)

Document No. 24-0011

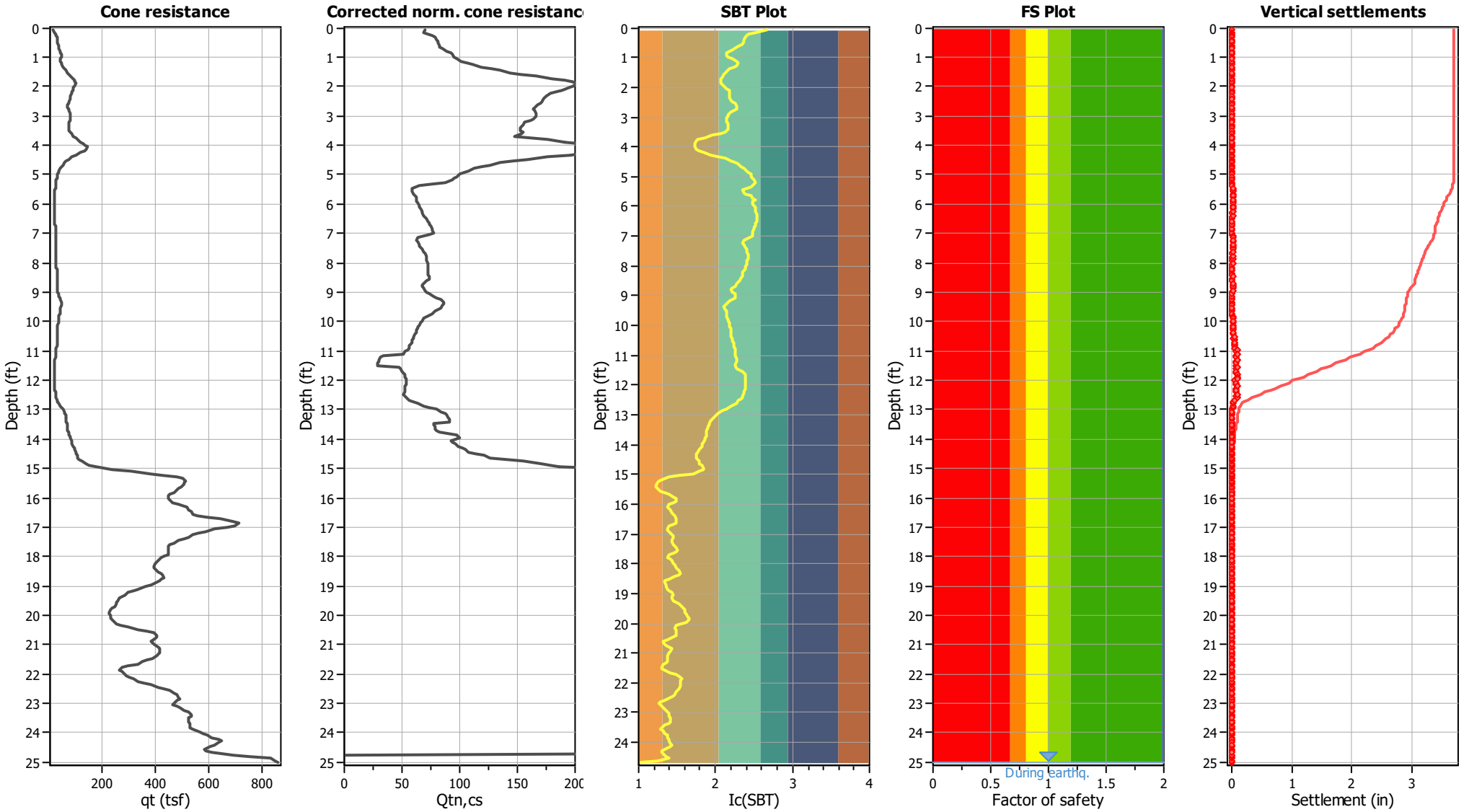
Project No. SD809

FIGURE C-4a

Group Delta Consultants
9245 Activity Road, Suite 103
San Diego, California 92126
http://www.GroupDelta.com

Project: **Riverside Community Hospital**
Location: **Southeast of 14th Street and Brockton Avenue**

CPT-4
Total depth: 25.01 ft



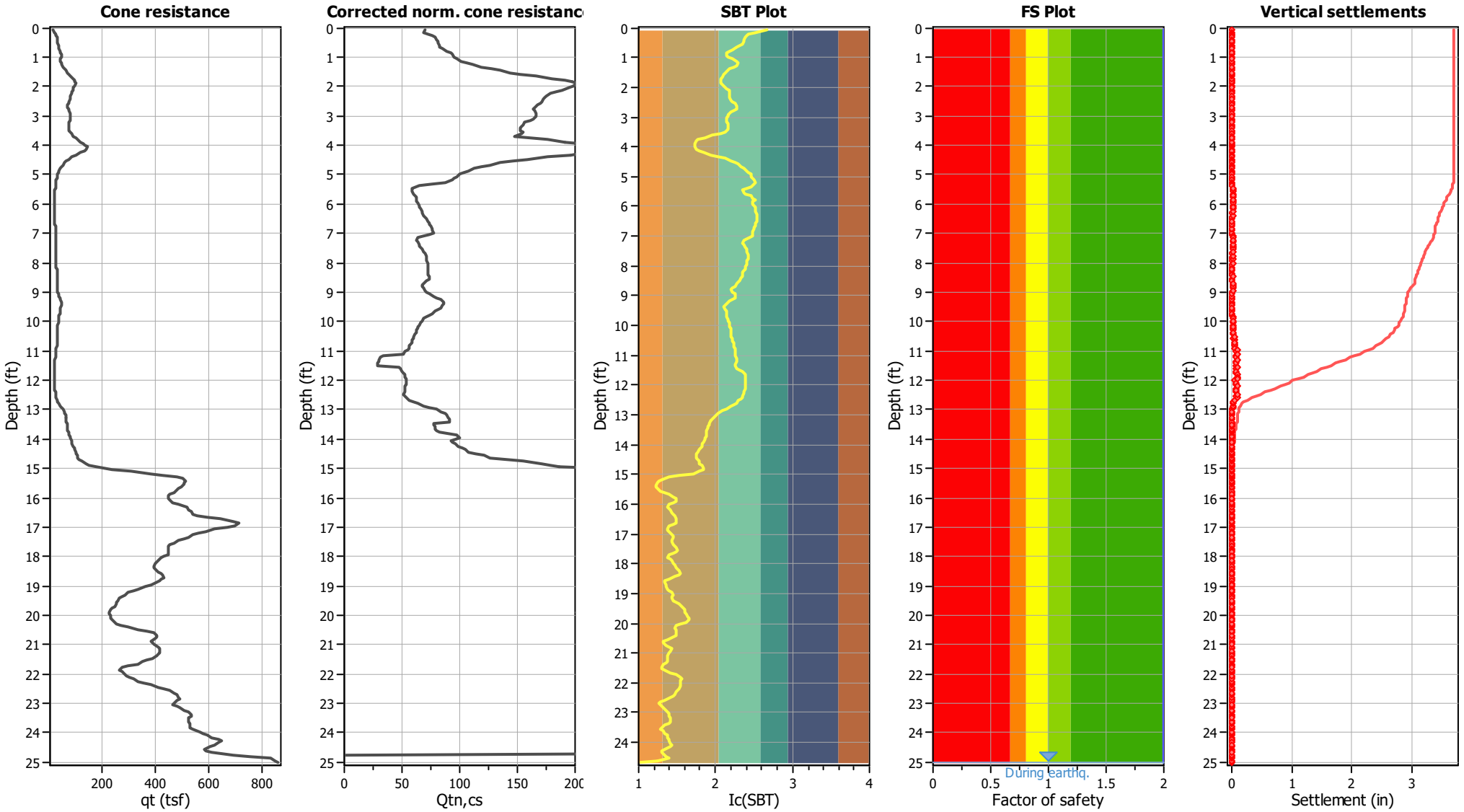
Analysis method:	NCEER (1998)	G.W.T. (in-situ):	30.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	25.00 ft	Fill height:	N/A		
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w:	7.00	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.61	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based

FIGURE C-4b

Group Delta Consultants
9245 Activity Road, Suite 103
San Diego, California 92126
http://www.GroupDelta.com

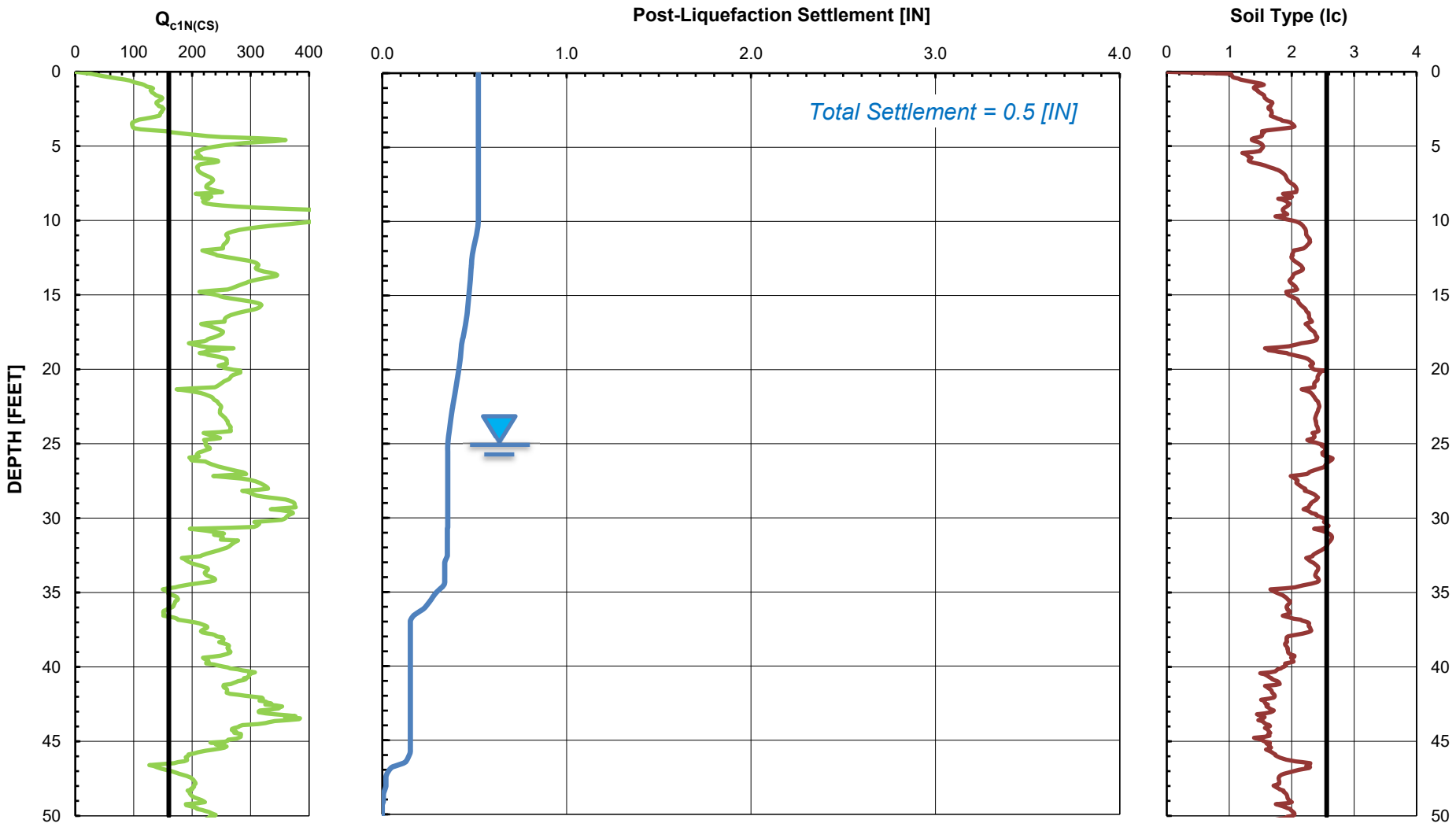
Project: **Riverside Community Hospital**
Location: **Southeast of 14th Street and Brockton Avenue**

CPT-4
Total depth: 25.01 ft



Analysis method:	NCEER (1998)	G.W.T. (in-situ):	30.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	25.00 ft	Fill height:	N/A		
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w:	7.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	N/A
Peak ground acceleration:	0.61	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based

FIGURE C-4c



GROUP DELTA

DYNAMIC SETTLEMENT (CPT-5)

(Seismic Demand ~ 0.615g)

Document No. 24-0011

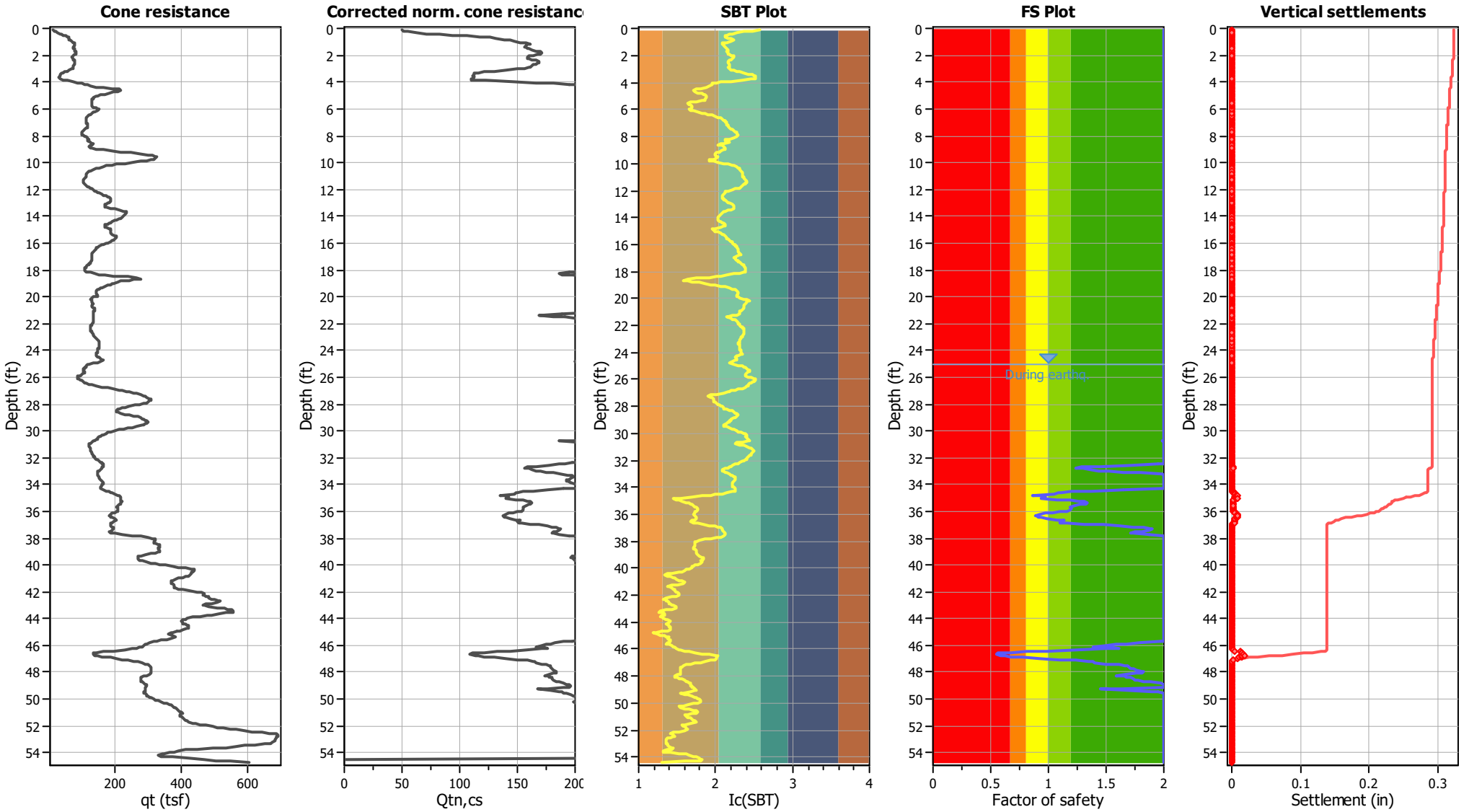
Project No. SD809

FIGURE C-5a

Group Delta Consultants
9245 Activity Road, Suite 103
San Diego, California 92126
http://www.GroupDelta.com

Project: **Riverside Community Hospital**
Location: **Southeast of 14th Street and Brockton Avenue**

CPT-5
Total depth: 54.73 ft



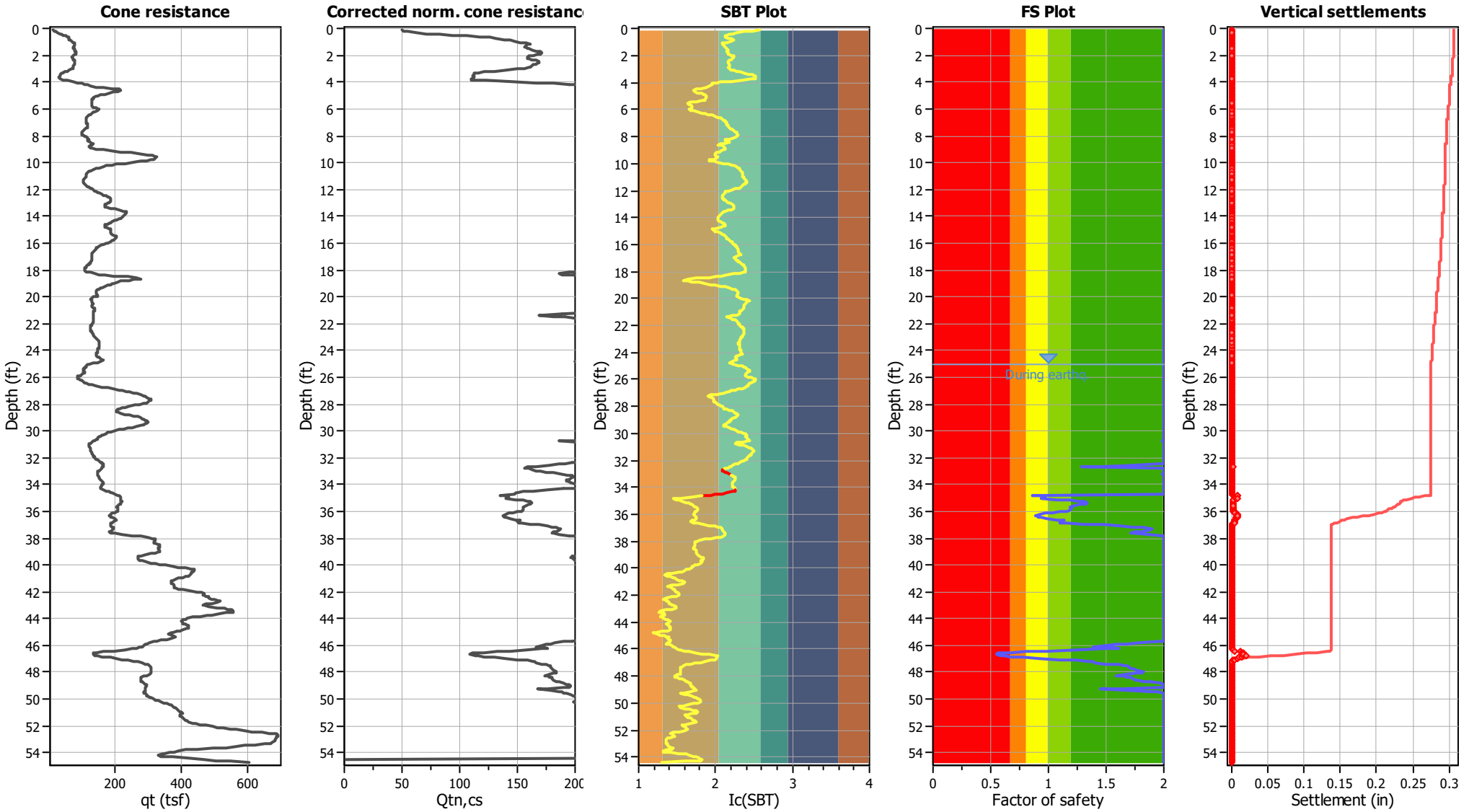
Analysis method:	NCEER (1998)	G.W.T. (in-situ):	30.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	25.00 ft	Fill height:	N/A		
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w:	7.00	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.56	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based

FIGURE C-5b

Group Delta Consultants
9245 Activity Road, Suite 103
San Diego, California 92126
http://www.GroupDelta.com

Project: **Riverside Community Hospital**
Location: **Southeast of 14th Street and Brockton Avenue**

CPT-5
Total depth: 54.73 ft



Analysis method:	NCEER (1998)	G.W.T. (in-situ):	30.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	25.00 ft	Fill height:	N/A		
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w:	7.00	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	N/A
Peak ground acceleration:	0.56	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based

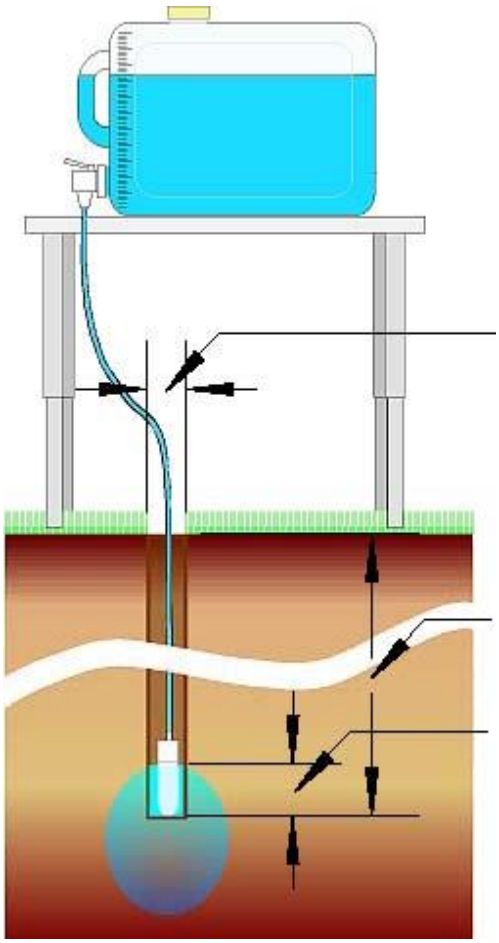
FIGURE C-5c

APPENDIX D
INFILTRATION ASSESSMENT

APPENDIX D

INFILTRATION ASSESSMENT

We understand that various detention basins, swales or pervious pavements will be incorporated into the development to help promote on-site infiltration. To aid in BMP design, the vertical infiltration rates were estimated at the six test locations provided in the RFP. The standard borehole percolation test method was used. The test configuration is depicted schematically below. The borehole percolation test method requires filling the borehole repeatedly to maintain a relatively constant water head throughout the test duration, while measuring the volume of water the percolates into the ground at specific time intervals. The approximate infiltration test locations are shown on the Exploration Plan, Figure 3A. The test results are presented in detail in the attached Figures D-1.1a through D-6.2b.



Per the County of Riverside BMP Design Manual, the borehole percolation test may be used for both planning level screening and BMP design purposes. Per the standards of practice, the percolation tests should be conducted at approximately the same depth and the same material as the base of the proposed storm water BMP. The Storm Water Manual also requires that two infiltration tests be conducted within 50-feet of each proposed BMP. We conducted two infiltration tests at each of the 6 BMP locations shown on the overall site Exploration Plan, Figure 3A.

The field infiltration tests were conducted in general accordance with the County of Riverside requirements. The borehole infiltration test wells were drilled to depths ranging from 3 to 8 feet below the ground surface. Prior to testing, each well was presoaked with water and allowed to drain. Water was then infiltrated into the soil with flow measurements taken at selected time intervals. Each infiltration test was continued until a relatively constant infiltration rate was attained for 60 minutes.

The field testing indicated preliminary factored infiltration rates that ranged widely from 0.02 to 1.32 inches per hour as shown in Figures D-1.1a through D-6.2b. A Factor of Safety of 2.0 is recommended for BMP design. Note that a factored infiltration rate above 0.50 inches per hour is commonly considered the minimum rate for effective “Full Infiltration” measures. An infiltration rate less than 0.05 inches per hour is commonly considered a “No Infiltration” condition.

BOREHOLE PERCOLATION TEST

Project Name: Riverside Hospital | **Date Drilled:** 4/2/2024 | **Borehole Radius (*r):** 2 in.

Project Number: SD809 | **Date Tested:** 4/3/2024 | **Casing Diameter:** 2 in.

Test Hole Number: I-1A | **Tested By:** CRJ/DMG | **Depth of Hole:** 5.3 ft

Drilling Method: Hand Auger | **Temperature:** 75 F | **Gravel Base Thickness:** 3 in.

DATA SHEET

Reading Number	Time Interval (min.)	Cumulative Time (min.)	Initial Depth to Water (ft.)	Final Depth to Water (ft.)	Avg. Height of Water above Gravel Base (in.)		Measured Drop in Water Level (in.)	Corrected Drop in Water Level[1] (in.)	Corrected Percolation Rate[1] (in./hour)	Unfactored Infiltration Rate* (in./hour)
	Δt	T	[from ground surface]		H_{avg}	H_{int}	ΔH	$ΔH_c$	$ΔH_c/Δt$	I_t
25	2.0	80	3.53	3.73	19.4	10.1*r	2.4	1.4	42.9	1.85
26	2.0	82	3.73	3.92	17.1	8.7*r	2.3	1.4	40.8	1.98
27	2.0	84	3.92	4.08	15.0	7.4*r	1.9	1.1	34.3	1.89
28	2.0	86	4.08	4.23	13.1	6.3*r	1.8	1.1	32.2	2.01
29	2.0	88	4.23	4.33	11.6	5.3*r	1.2	0.7	21.5	1.50
30	2.0	90	4.33	4.44	10.4	4.6*r	1.3	0.8	23.6	1.83
31	2.0	92	4.44	4.54	9.1	3.8*r	1.2	0.7	21.5	1.88
32	2.0	94	2.75	3.09	28.0	15.4*r	4.1	2.4	72.9	2.21
33	2.0	96	3.09	3.35	24.4	13.1*r	3.1	1.9	55.8	1.93
34	2.0	98	3.35	3.57	21.5	11.3*r	2.6	1.6	47.2	1.85
35	2.0	100	3.57	3.76	19.0	9.8*r	2.3	1.4	40.8	1.79
36	2.0	102	3.76	3.93	16.9	8.5*r	2.0	1.2	36.5	1.80
37	2.0	104	3.93	4.07	15.0	7.3*r	1.7	1.0	30.0	1.66
38	2.0	106	4.07	4.18	13.5	6.4*r	1.3	0.8	23.6	1.44
39	2.0	108	4.18	4.31	12.1	5.6*r	1.6	0.9	27.9	1.89
40	2.0	110	4.31	4.42	10.6	4.7*r	1.3	0.8	23.6	1.80
41	2.0	112	4.42	4.51	9.4	4*r	1.1	0.6	19.3	1.64
42	2.0	114	2.85	3.15	27.0	14.7*r	3.6	2.1	64.4	2.02
43	2.0	116	3.15	3.38	23.8	12.7*r	2.8	1.6	49.3	1.75
44	2.0	118	3.38	3.59	21.2	11.1*r	2.5	1.5	45.1	1.79
45	2.0	120	3.59	3.73	19.1	9.7*r	1.7	1.0	30.0	1.32
46	2.0	122	3.73	3.89	17.3	8.7*r	1.9	1.1	34.3	1.65
47	2.0	124	3.89	4.01	15.6	7.6*r	1.4	0.9	25.7	1.37
48	2.0	126	4.01	4.14	14.1	6.8*r	1.6	0.9	27.9	1.63
49	2.0	128	4.14	4.24	12.7	5.9*r	1.2	0.7	21.5	1.38
50	2.0	130	4.24	4.34	11.5	5.2*r	1.2	0.7	21.5	1.51
51	2.0	132	4.34	4.44	10.3	4.5*r	1.2	0.7	21.5	1.68
52	2.0	134	4.44	4.52	9.2	3.8*r	1.0	0.6	17.2	1.48
53	3.0	137	2.81	3.17	27.1	15*r	4.3	2.6	51.5	1.61
54	2.0	139	3.17	3.34	23.9	12.5*r	2.0	1.2	36.5	1.29
55	2.0	141	3.34	3.50	22.0	11.4*r	1.9	1.1	34.3	1.32
56	2.0	143	3.50	3.65	20.1	10.3*r	1.8	1.1	32.2	1.34
57	2.0	145	3.65	3.80	18.3	9.3*r	1.8	1.1	32.2	1.47
58	2.0	147	3.80	3.90	16.8	8.2*r	1.2	0.7	21.5	1.06
59	2.0	149	3.90	4.02	15.5	7.5*r	1.4	0.9	25.7	1.38
60	2.0	151	4.02	4.14	14.0	6.7*r	1.4	0.9	25.7	1.51

1: Porosity of gravel assumed to be 0.4 to correct drop in water.

*Porchet method used to convert percolation rate to infiltration rate.

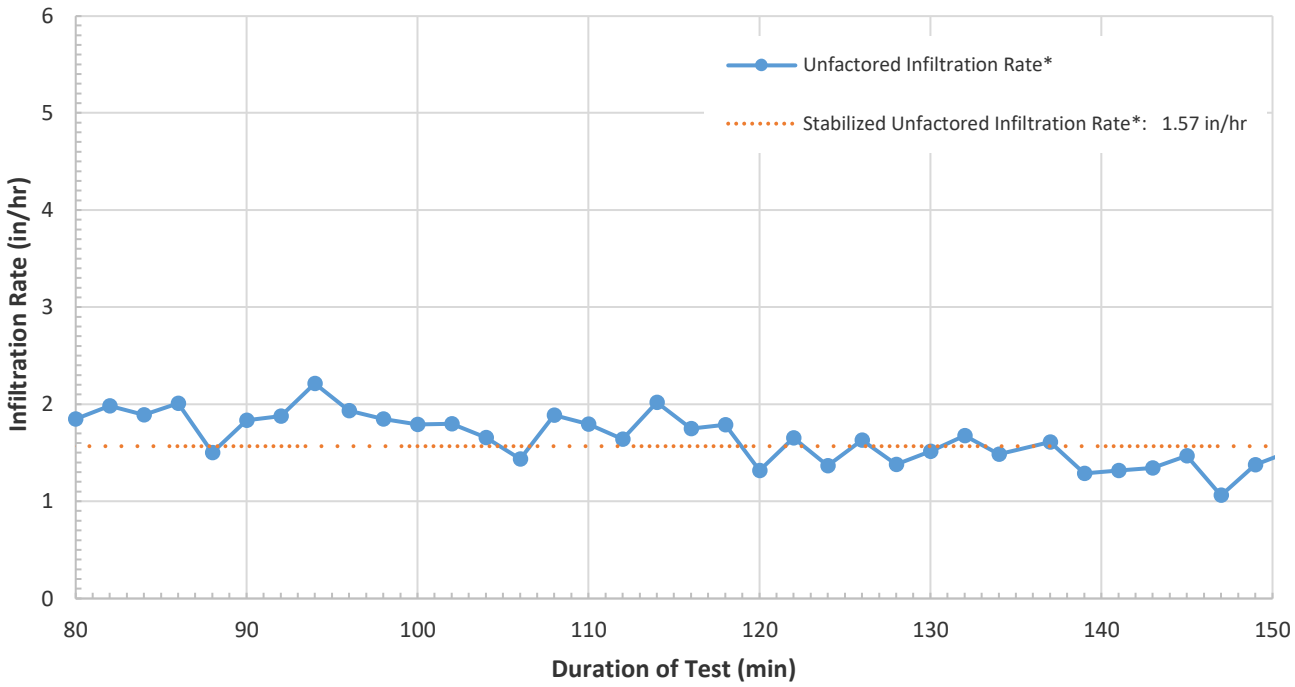
Stabilized, Unfactored Infiltration Rate*: 1.57 inch/hour

HCA Design and Construction **Riverside Community Hospital** **Riverside, California**	**BOREHOLE PERCOLATION TEST I-1A** **INFILTRATION RATE**	GROUP DELTA PROJECT NUMBER: **SD809** FIGURE NUMBER: **D-1.1a**

BOREHOLE PERCOLATION TEST

Project Name:	Riverside Hospital	**Date Drilled:**	4/2/2024	**Borehole Radius (*r):**	2 in.
Project Number:	SD809	**Date Tested:**	4/3/2024	**Casing Diameter:**	2 in.
Test Hole Number:	I-1A	**Tested By:**	CRJ/DMG	**Depth of Hole:**	5.3 ft
Drilling Method:	Hand Auger	**Temperature[3]:**	75 F	**Test Depth:**	3½ to 4½ ft

UNFACTORED INFILTRATION RATES* DURING TEST



Preliminary Factored Infiltration Rate[1]: 0.64 in/hr

Feasibility Screening Factor of Safety, F.S.[2]: 2.0

Temperature Correction Factor[2,3]: 0.82

Factored Infiltration Rate[2]	Design Condition[2]
Below 0.05	No Infiltration
0.05 to 0.50	Partial Infiltration
Above 0.50	Full Infiltration

*Porchet method used to convert percolation rate to infiltration rate.

1: Rate Factored by Factor of Safety and Temperature Correction Factor.

2: Reference: Riverside Design Handbook for Low Impact Developmnet BMP (2011).

3: Factor based on as-tested water temperature of 75 F and rainfall temperature of 60 F.

HCA Design and Construction Riverside Community Hospital Riverside, California	**BOREHOLE PERCOLATION TEST I-1A INFILTRATION RATE**	GROUP DELTA	
		PROJECT NUMBER **SD809**	FIGURE NUMBER **D-1.1b**

BOREHOLE PERCOLATION TEST

Project Name: Riverside Hospital | **Date Drilled:** 4/2/2024 | **Borehole Radius (*r):** 2 in.

Project Number: SD809 | **Date Tested:** 4/3/2024 | **Casing Diameter:** 2 in.

Test Hole Number: I-1B | **Tested By:** DMG | **Depth of Hole:** 5.2 ft

Drilling Method: Hand Auger | **Temperature:** 77 F | **Gravel Base Thickness:** 3 in.

DATA SHEET

Reading Number	Time Interval (min.)	Cumulative Time (min.)	Initial Depth to Water (ft.)	Final Depth to Water (ft.)	Avg. Height of Water above Gravel Base (in.)		Measured Drop in Water Level (in.)	Corrected Drop in Water Level[1] (in.)	Corrected Percolation Rate[1] (in./hour)	Unfactored Infiltration Rate* (in./hour)
	Δt	T	[from ground surface]		H_{avg}	H_{int}	ΔH	$ΔH_c$	$ΔH_c/Δt$	I_t
25	2.0	70	4.25	4.40	10.1	4.6*r	1.8	1.1	32.2	2.56
26	2.0	72	4.40	4.55	8.3	3.6*r	1.8	1.1	32.2	3.06
27	2.0	74	2.96	3.45	23.6	13.4*r	5.9	3.5	105.1	3.76
28	2.0	76	3.45	3.76	18.8	10.1*r	3.7	2.2	66.5	2.96
29	2.0	78	3.76	4.02	15.4	8*r	3.1	1.9	55.8	3.01
30	2.0	80	4.02	4.31	12.1	6.2*r	3.5	2.1	62.2	4.21
31	2.0	82	4.25	4.38	10.3	4.6*r	1.6	0.9	27.9	2.19
32	2.0	84	2.76	3.28	25.8	14.8*r	6.2	3.7	111.6	3.66
33	2.0	86	3.28	3.61	20.7	11.2*r	4.0	2.4	70.8	2.87
34	2.0	88	3.61	3.83	17.4	9*r	2.6	1.6	47.2	2.26
35	2.0	90	3.83	4.07	14.6	7.5*r	2.9	1.7	51.5	2.90
36	2.0	92	4.07	4.24	12.2	5.8*r	2.0	1.2	36.5	2.44
37	2.0	94	4.24	4.38	10.3	4.7*r	1.7	1.0	30.0	2.35
38	2.0	96	4.38	4.51	8.7	3.7*r	1.6	0.9	27.9	2.55
39	2.0	98	2.74	3.14	26.8	14.9*r	4.8	2.9	85.8	2.72
40	2.0	100	3.14	3.52	22.1	12.2*r	4.6	2.7	81.5	3.11
41	2.0	102	3.52	3.77	18.3	9.6*r	3.0	1.8	53.6	2.45
42	2.0	104	3.77	4.01	15.4	7.9*r	2.9	1.7	51.5	2.77
43	2.0	106	4.01	4.15	13.1	6.2*r	1.7	1.0	30.0	1.88
44	2.0	108	4.15	4.33	11.2	5.3*r	2.2	1.3	38.6	2.81
45	2.0	110	4.33	4.46	9.3	4*r	1.6	0.9	27.9	2.40
46	2.0	112	2.76	3.23	26.1	14.8*r	5.6	3.4	100.8	3.27
47	2.0	114	3.23	3.61	21.0	11.6*r	4.5	2.7	80.7	3.22
48	2.0	116	3.61	3.87	17.2	9*r	3.1	1.9	55.8	2.71
49	2.0	118	3.87	4.09	14.3	7.2*r	2.6	1.6	47.2	2.72
50	2.0	120	4.09	4.24	12.1	5.7*r	1.8	1.1	32.2	2.18
51	2.0	122	4.24	4.38	10.3	4.7*r	1.7	1.0	30.0	2.35
52	2.0	124	4.38	4.56	8.4	3.7*r	2.2	1.3	38.6	3.64
53	2.0	126	2.83	3.24	25.6	14.3*r	4.9	2.9	88.0	2.90
54	2.0	128	3.24	3.56	21.2	11.5*r	3.8	2.3	68.6	2.72
55	2.0	130	3.56	3.83	17.7	9.3*r	3.2	1.9	57.9	2.73
56	2.0	132	3.83	3.97	15.2	7.5*r	1.7	1.0	30.0	1.63
57	2.0	134	3.97	4.15	13.3	6.5*r	2.2	1.3	38.6	2.38
58	2.0	136	4.15	4.32	11.2	5.3*r	2.0	1.2	36.5	2.64
59	2.0	138	4.32	4.44	9.5	4.1*r	1.4	0.9	25.7	2.18
60	2.0	140	2.76	3.15	26.6	14.8*r	4.7	2.8	83.7	2.67

1: Porosity of gravel assumed to be 0.4 to correct drop in water.

*Porchet method used to convert percolation rate to infiltration rate.

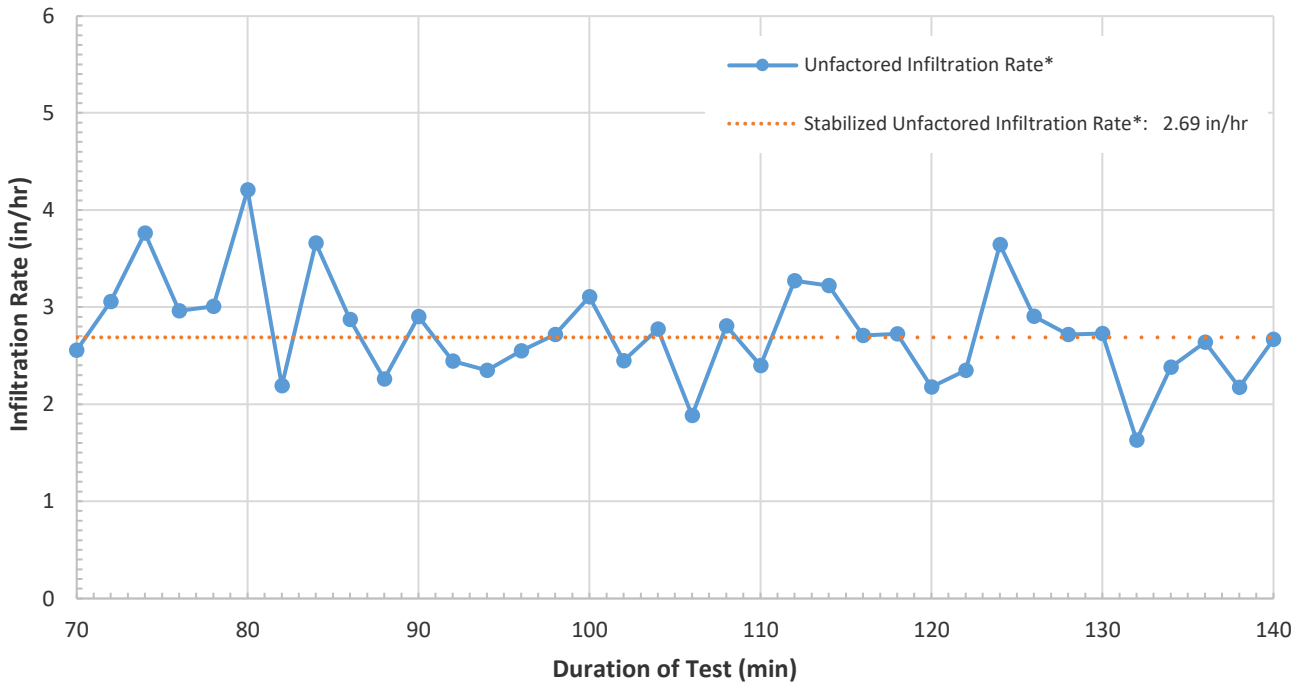
Stabilized, Unfactored Infiltration Rate*: 2.69 inch/hour

HCA Design and Construction **Riverside Community Hospital** **Riverside, California**	**BOREHOLE PERCOLATION TEST I-1B** **INFILTRATION RATE**	GROUP DELTA PROJECT NUMBER: **SD809** FIGURE NUMBER: **D-1.2a**

BOREHOLE PERCOLATION TEST

Project Name:	Riverside Hospital	**Date Drilled:**	4/2/2024	**Borehole Radius (*r):**	2 in.
Project Number:	SD809	**Date Tested:**	4/3/2024	**Casing Diameter:**	2 in.
Test Hole Number:	I-1B	**Tested By:**	DMG	**Depth of Hole:**	5.2 ft
Drilling Method:	Hand Auger	**Temperature[3]:**	77 F	**Test Depth:**	3½ to 4½ ft

UNFACTORED INFILTRATION RATES* DURING TEST



Preliminary Factored Infiltration Rate[1]: 1.08 in/hr

Feasibility Screening Factor of Safety, F.S.[2]: 2.0

Temperature Correction Factor[2,3]: 0.8

Factored Infiltration Rate[2]	Design Condition[2]
Below 0.05	No Infiltration
0.05 to 0.50	Partial Infiltration
Above 0.50	Full Infiltration

*Porchet method used to convert percolation rate to infiltration rate.

1: Rate Factored by Factor of Safety and Temperature Correction Factor.

2: Reference: Riverside Design Handbook for Low Impact Developmnet BMP (2011).

3: Factor based on as-tested water temperature of 77 F and rainfall temperature of 60 F.

HCA Design and Construction Riverside Community Hospital Riverside, California	**BOREHOLE PERCOLATION TEST I-1B INFILTRATION RATE**	GROUP DELTA	
		PROJECT NUMBER **SD809**	FIGURE NUMBER **D-1.2b**

BOREHOLE PERCOLATION TEST

Project Name: Riverside Hospital | **Date Drilled:** 4/1/2024 | **Borehole Radius (*r):** 4 in.

Project Number: SD809 | **Date Tested:** 4/4/2024 | **Casing Diameter:** 4 in.

Test Hole Number: I-2A | **Tested By:** DMG | **Depth of Hole:** 8.0 ft

Drilling Method: Hollow Stem Auger | **Temperature:** 65 F | **Gravel Base Thickness:** 2 in.

DATA SHEET

Reading Number	Time Interval (min.)	Cumulative Time (min.)	Initial Depth to Water (ft.)	Final Depth to Water (ft.)	Avg. Height of Water above Gravel Base (in.)		Measured Drop in Water Level (in.)	Corrected Drop in Water Level[1] (in.)	Corrected Percolation Rate[1] (in./hour)	Unfactored Infiltration Rate* (in./hour)
	Δt	T	[from ground surface]		H_{avg}	H_{int}	ΔH	ΔH_c	$\Delta H_c/\Delta t$	I_t
6	1.0	6	6.50	6.88	15.8	4*r	4.6	2.5	150.5	16.9
7	1.0	7	6.88	7.11	12.1	2.9*r	2.8	1.5	91.1	12.9
8	1.0	8	7.11	7.53	8.2	2.2*r	5.0	2.8	166.3	32.6
9	1.0	9	3.78	4.34	47.3	12.2*r	6.7	3.7	221.8	8.99
10	1.0	10	4.34	4.68	41.9	10.5*r	4.1	2.2	134.6	6.13
11	1.0	11	4.68	4.93	38.4	9.5*r	3.0	1.7	99.0	4.90
12	1.0	12	5.22	5.62	31.0	7.9*r	4.8	2.6	158.4	9.60
13	1.0	13	5.62	6.21	25.1	6.7*r	7.1	3.9	233.6	17.27
14	1.0	14	6.21	6.40	20.4	4.9*r	2.3	1.3	75.2	6.72
15	2.0	16	3.72	4.37	47.5	12.4*r	7.8	4.3	128.7	5.20
16	2.0	18	4.37	4.41	43.4	10.4*r	0.5	0.3	7.9	0.35
17	2.0	20	4.41	4.65	41.7	10.3*r	2.9	1.6	47.5	2.18
18	2.0	22	4.65	4.78	39.5	9.6*r	1.6	0.9	25.7	1.24
19	2.0	24	4.78	4.97	37.5	9.2*r	2.3	1.3	37.6	1.90
20	2.0	26	4.97	5.13	35.4	8.6*r	1.9	1.1	31.7	1.69
21	2.0	28	5.13	5.61	31.6	8.1*r	5.8	3.2	95.0	5.66
22	2.0	30	5.61	6.13	25.6	6.7*r	6.2	3.4	103.0	7.46
23	2.0	32	6.13	6.33	21.3	5.1*r	2.4	1.3	39.6	3.40
24	5.0	37	3.79	4.37	47.1	12.1*r	7.0	3.8	45.9	1.87
25	5.0	42	4.37	4.76	41.3	10.4*r	4.7	2.6	30.9	1.43
26	5.0	47	4.76	5.13	36.7	9.2*r	4.4	2.4	29.3	1.51
27	5.0	52	5.13	6.19	28.1	8.1*r	12.7	7.0	84.0	5.57
28	5.0	57	3.83	4.37	46.8	12*r	6.5	3.6	42.8	1.75
29	5.0	62	4.37	4.76	41.3	10.4*r	4.7	2.6	30.9	1.43
30	5.0	67	4.76	5.17	36.5	9.2*r	4.9	2.7	32.5	1.69
31	5.0	72	5.17	6.29	27.3	8*r	13.4	7.4	88.7	6.06
32	5.0	77	3.97	4.50	45.2	11.6*r	6.4	3.5	42.0	1.78
33	5.0	82	4.50	4.90	39.6	10*r	4.8	2.6	31.7	1.52
34	5.0	87	4.90	5.70	32.4	8.8*r	9.6	5.3	63.4	3.68
35	5.0	92	5.70	6.55	22.5	6.4*r	10.2	5.6	67.3	5.49
36	5.0	97	4.05	4.56	44.4	11.4*r	6.1	3.4	40.4	1.74
37	5.0	102	4.56	4.96	38.9	9.8*r	4.8	2.6	31.7	1.55
38	5.0	107	4.96	6.01	30.2	8.6*r	12.6	6.9	83.2	5.16
39	5.0	112	6.01	6.51	20.9	5.5*r	6.0	3.3	39.6	3.46
40	5.0	117	4.05	4.52	44.6	11.4*r	5.6	3.1	37.2	1.60
41	5.0	122	4.52	4.88	39.6	10*r	4.3	2.4	28.5	1.37

1: Porosity of gravel assumed to be 0.4 to correct drop in water.

*Porchet method used to convert percolation rate to infiltration rate.

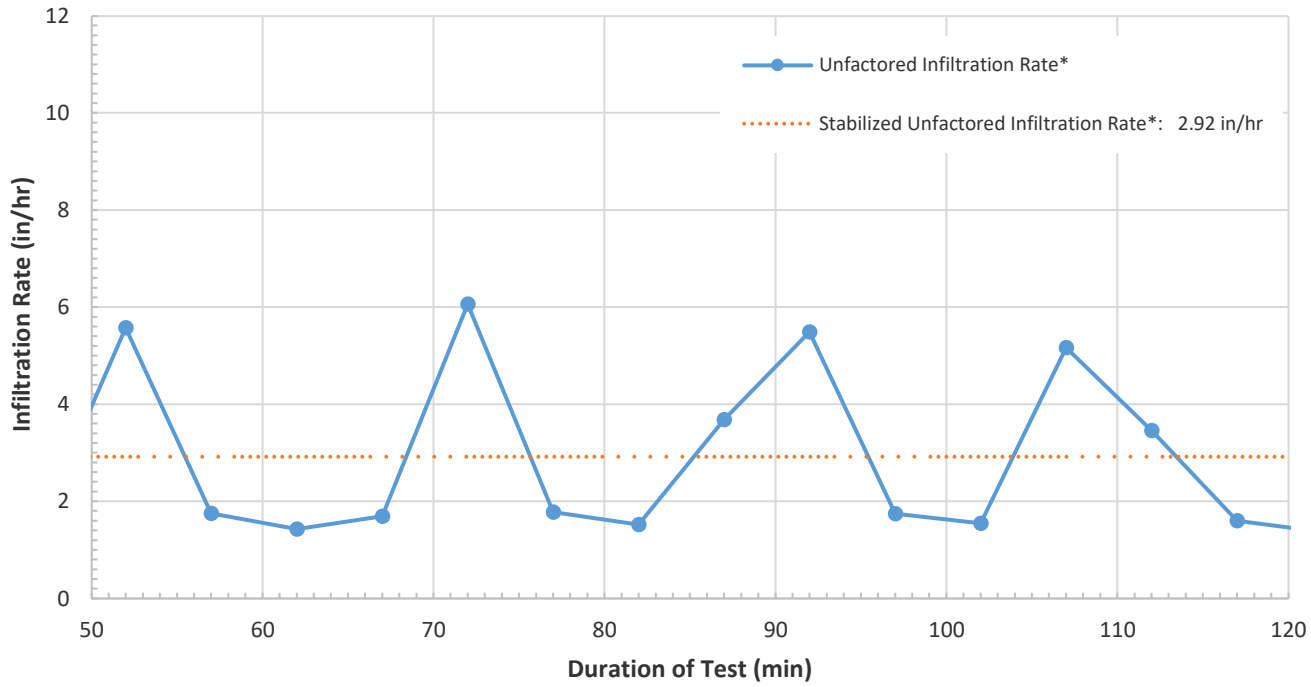
Stabilized, Unfactored Infiltration Rate*: 2.92 inch/hour

HCA Design and Construction **Riverside Community Hospital** **Riverside, California**	**BOREHOLE PERCOLATION TEST I-2A** **INFILTRATION RATE**	GROUP DELTA PROJECT NUMBER: **SD809** FIGURE NUMBER: **D-2.1a**

BOREHOLE PERCOLATION TEST

Project Name:	Riverside Hospital	**Date Drilled:**	4/1/2024	**Borehole Radius (*r):**	4 in.
Project Number:	SD809	**Date Tested:**	4/4/2024	**Casing Diameter:**	4 in.
Test Hole Number:	I-2A	**Tested By:**	DMG	**Depth of Hole:**	8.0 ft
Drilling Method:	Hollow Stem Auger	**Temperature[3]:**	65 F	**Test Depth:**	7½ to 8½ ft

UNFACTORED INFILTRATION RATES* DURING TEST



Preliminary Factored Infiltration Rate[1]: 1.36 in/hr

Feasibility Screening Factor of Safety, F.S.[2]: 2.0

Temperature Correction Factor[2,3]: 0.93

Factored Infiltration Rate[2]	Design Condition[2]
Below 0.05	No Infiltration
0.05 to 0.50	Partial Infiltration
Above 0.50	Full Infiltration

*Porchet method used to convert percolation rate to infiltration rate.

1: Rate Factored by Factor of Safety and Temperature Correction Factor.

2: Reference: Riverside Design Handbook for Low Impact Developmnet BMP (2011).

3: Factor based on as-tested water temperature of 65 F and rainfall temperature of 60 F.

HCA Design and Construction Riverside Community Hospital Riverside, California	**BOREHOLE PERCOLATION TEST I-2A INFILTRATION RATE**	GROUP DELTA	
		PROJECT NUMBER **SD809**	FIGURE NUMBER **D-2.1b**

BOREHOLE PERCOLATION TEST

Project Name: Riverside Hospital | **Date Drilled:** 4/1/2024 | **Borehole Radius (*r):** 4 in.

Project Number: SD809 | **Date Tested:** 4/4/2024 | **Casing Diameter:** 4 in.

Test Hole Number: I-2B | **Tested By:** DMG | **Depth of Hole:** 8.0 ft

Drilling Method: Hollow Stem Auger | **Temperature:** 60 F | **Gravel Base Thickness:** 2 in.

DATA SHEET

Reading Number	Time Interval (min.)	Cumulative Time (min.)	Initial Depth to Water (ft.)	Final Depth to Water (ft.)	Avg. Height of Water above Gravel Base (in.)		Measured Drop in Water Level (in.)	Corrected Drop in Water Level[1] (in.)	Corrected Percolation Rate[1] (in./hour)	Unfactored Infiltration Rate* (in./hour)
	Δt	T	[from ground surface]		H_{avg}	H_{int}	ΔH	$ΔH_c$	$ΔH_c/Δt$	I_t
1	1.0	1	4.19	4.77	42.3	10.9*r	7.0	3.8	229.7	10.4
2	1.0	2	4.77	5.65	33.5	9.2*r	10.6	5.8	348.5	19.6
8	2.0	4	3.69	4.21	48.6	12.4*r	6.2	3.4	103.0	4.07
9	2.0	6	4.21	4.57	43.4	10.9*r	4.3	2.4	71.3	3.14
10	2.0	8	4.57	5.13	37.8	9.8*r	6.7	3.7	110.9	5.57
11	2.0	10	5.13	5.65	31.4	8.1*r	6.2	3.4	103.0	6.17
12	2.0	12	5.65	5.98	26.3	6.6*r	4.0	2.2	65.3	4.62
13	2.0	14	5.98	6.21	22.9	5.6*r	2.8	1.5	45.5	3.66
14	5.0	19	3.67	4.42	47.5	12.5*r	9.0	5.0	59.4	2.40
15	5.0	24	4.42	5.51	36.5	10.3*r	13.1	7.2	86.3	4.49
16	5.0	29	5.51	6.03	26.8	7*r	6.2	3.4	41.2	2.86
17	5.0	34	6.03	6.47	21.0	5.4*r	5.3	2.9	34.8	3.03
18	5.0	39	3.66	4.32	48.2	12.5*r	7.9	4.4	52.3	2.08
19	5.0	44	4.32	5.19	39.0	10.6*r	10.4	5.7	68.9	3.36
20	5.0	49	5.19	5.83	29.9	7.9*r	7.7	4.2	50.7	3.18
21	5.0	54	5.83	6.25	23.6	6*r	5.0	2.8	33.3	2.60
22	5.0	59	3.77	4.31	47.6	12.2*r	6.5	3.6	42.8	1.73
23	5.0	64	4.31	5.09	39.6	10.6*r	9.4	5.1	61.8	2.97
24	5.0	69	5.09	5.81	30.6	8.2*r	8.6	4.8	57.0	3.49
25	5.0	74	5.81	6.22	23.9	6.1*r	4.9	2.7	32.5	2.51
26	5.0	79	3.88	4.34	46.7	11.9*r	5.5	3.0	36.4	1.50
27	5.0	84	4.34	5.06	39.6	10.5*r	8.6	4.8	57.0	2.74
28	5.0	89	5.06	5.72	31.4	8.3*r	7.9	4.4	52.3	3.13
29	5.0	94	5.72	6.14	24.9	6.4*r	5.0	2.8	33.3	2.48
30	5.0	99	6.14	6.43	20.6	5.1*r	3.5	1.9	23.0	2.03

1: Porosity of gravel assumed to be 0.4 to correct drop in water.

*Porchet method used to convert percolation rate to infiltration rate.

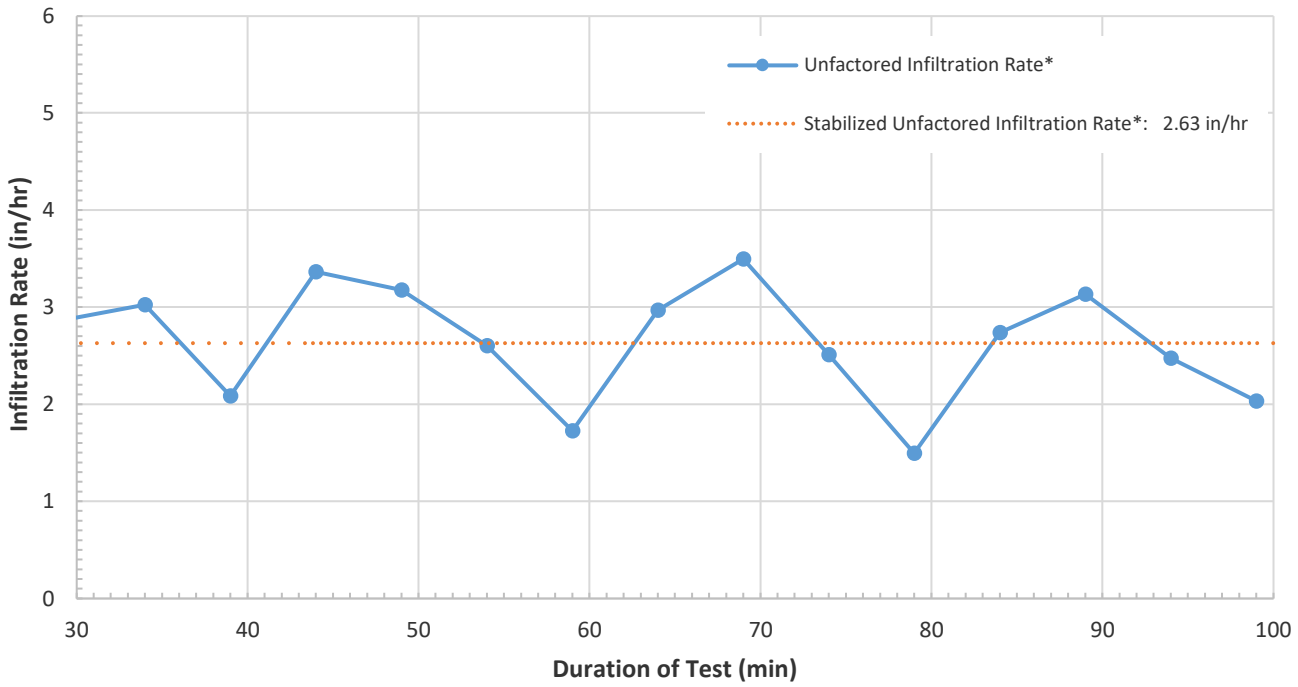
Stabilized, Unfactored Infiltration Rate*: 2.63 inch/hour

HCA Design and Construction **Riverside Community Hospital** **Riverside, California**	**BOREHOLE PERCOLATION TEST I-2B** **INFILTRATION RATE**	GROUP DELTA	
		PROJECT NUMBER **SD809**	FIGURE NUMBER **D-2.2a**

BOREHOLE PERCOLATION TEST

Project Name:	Riverside Hospital	**Date Drilled:**	4/1/2024	**Borehole Radius (*r):**	4 in.
Project Number:	SD809	**Date Tested:**	4/4/2024	**Casing Diameter:**	4 in.
Test Hole Number:	I-2B	**Tested By:**	DMG	**Depth of Hole:**	8.0 ft
Drilling Method:	Hollow Stem Auger	**Temperature[3]:**	60 F	**Test Depth:**	7½ to 8½ ft

UNFACTORED INFILTRATION RATES* DURING TEST



Preliminary Factored Infiltration Rate[1]: 1.32 in/hr

Feasibility Screening Factor of Safety, F.S.[2]: 2.0

Temperature Correction Factor[2,3]: 1

Factored Infiltration Rate[2]	Design Condition[2]
Below 0.05	No Infiltration
0.05 to 0.50	Partial Infiltration
Above 0.50	Full Infiltration

*Porchet method used to convert percolation rate to infiltration rate.

1: Rate Factored by Factor of Safety and Temperature Correction Factor.

2: Reference: Riverside Design Handbook for Low Impact Developmnet BMP (2011).

3: Factor based on as-tested water temperature of 60 F and rainfall temperature of 60 F.

HCA Design and Construction Riverside Community Hospital Riverside, California	**BOREHOLE PERCOLATION TEST I-2B INFILTRATION RATE**	GROUP DELTA	
		PROJECT NUMBER **SD809**	FIGURE NUMBER **D-2.2b**

BOREHOLE PERCOLATION TEST

Project Name: Riverside Hospital
Project Number: SD809
Test Hole Number: I-3A
Drilling Method: Hand Auger
Date Drilled: 4/3/2024
Date Tested: 4/4/2024
Tested By: DMG
Temperature: 70 F
Borehole Radius (*r): 2 in.
Casing Diameter: 2 in.
Depth of Hole: 5.3 ft
Gravel Base Thickness: 3 in.

DATA SHEET

Reading Number	Time Interval (min.)	Cumulative Time (min.)	Initial Depth to Water (ft.)	Final Depth to Water (ft.)	Avg. Height of Water above Gravel Base (in.)		Measured Drop in Water Level (in.)	Corrected Drop in Water Level[1] (in.)	Corrected Percolation Rate[1] (in./hour)	Unfactored Infiltration Rate* (in./hour)
	Δt	T	[from ground surface]		H_{avg}	H_{int}	ΔH	ΔH_c	$\Delta H_c/\Delta t$	I_t
1	24.0	24	1.80	2.30	38.4	22*r	6.0	3.6	8.9	0.20
2	25.0	49	2.30	2.75	32.7	18.5*r	5.4	3.2	7.7	0.20
3	10.0	59	2.75	2.94	28.9	15.5*r	2.3	1.4	8.2	0.24
4	10.0	69	2.94	3.06	27.0	14.1*r	1.4	0.9	5.1	0.16
5	10.0	79	3.06	3.24	25.2	13.3*r	2.2	1.3	7.7	0.26
6	10.0	89	3.24	3.38	23.3	12.1*r	1.7	1.0	6.0	0.22
7	10.0	99	3.38	3.44	22.1	11.1*r	0.7	0.4	2.6	0.10
8	10.0	109	3.44	3.55	21.1	10.7*r	1.3	0.8	4.7	0.19
9	10.0	119	3.55	3.68	19.7	10*r	1.6	0.9	5.6	0.24
10	10.0	129	3.68	3.74	18.5	9.1*r	0.7	0.4	2.6	0.12

1: Porosity of gravel assumed to be 0.4 to correct drop in water.
*Porchet method used to convert percolation rate to infiltration rate.

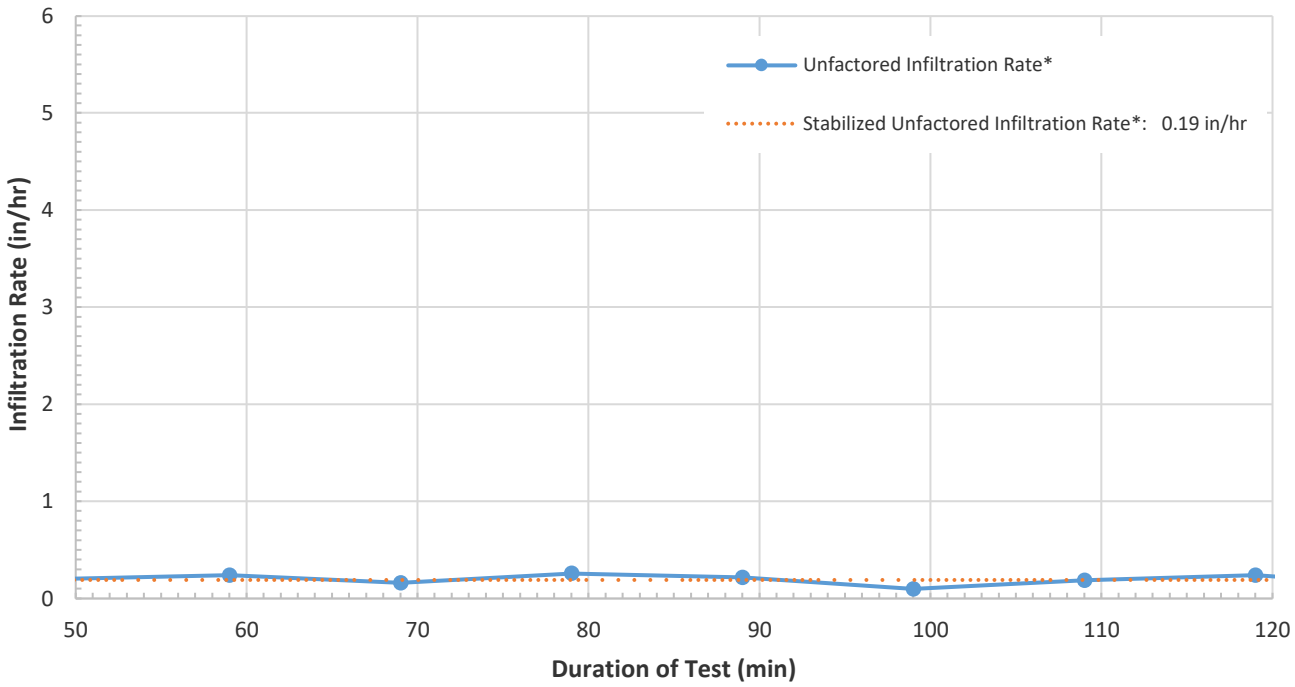
Stabilized, Unfactored Infiltration Rate*: 0.19 inch/hour

HCA Design and Construction **Riverside Community Hospital** **Riverside, California**	**BOREHOLE PERCOLATION TEST I-3A** **INFILTRATION RATE**	GROUP DELTA PROJECT NUMBER: **SD809** FIGURE NUMBER: **D-3.1a**

BOREHOLE PERCOLATION TEST

Project Name:	Riverside Hospital	**Date Drilled:**	4/3/2024	**Borehole Radius (*r):**	2 in.
Project Number:	SD809	**Date Tested:**	4/4/2024	**Casing Diameter:**	2 in.
Test Hole Number:	I-3A	**Tested By:**	DMG	**Depth of Hole:**	5.3 ft
Drilling Method:	Hand Auger	**Temperature[3]:**	70 F	**Test Depth:**	2½ to 3½ ft

UNFACTORED INFILTRATION RATES* DURING TEST



Preliminary Factored Infiltration Rate[1]: 0.08 in/hr

Feasibility Screening Factor of Safety, F.S.[2]: 2.0

Temperature Correction Factor[2,3]: 0.87

Factored Infiltration Rate[2]	Design Condition[2]
Below 0.05	No Infiltration
0.05 to 0.50	Partial Infiltration
Above 0.50	Full Infiltration

*Porchet method used to convert percolation rate to infiltration rate.

1: Rate Factored by Factor of Safety and Temperature Correction Factor.

2: Reference: Riverside Design Handbook for Low Impact Developmnet BMP (2011).

3: Factor based on as-tested water temperature of 70 F and rainfall temperature of 60 F.

HCA Design and Construction Riverside Community Hospital Riverside, California	**BOREHOLE PERCOLATION TEST I-3A INFILTRATION RATE**	GROUP DELTA	
		PROJECT NUMBER **SD809**	FIGURE NUMBER **D-3.1b**

BOREHOLE PERCOLATION TEST

Project Name: Riverside Hospital
Project Number: SD809
Test Hole Number: I-3B
Drilling Method: Hand Auger
Date Drilled: 4/3/2024
Date Tested: 4/4/2024
Tested By: DMG
Temperature: 70 F
Borehole Radius (*r): 2 in.
Casing Diameter: 2 in.
Depth of Hole: 5.3 ft
Gravel Base Thickness: 3 in.

DATA SHEET

Reading Number	Time Interval (min.)	Cumulative Time (min.)	Initial Depth to Water (ft.)	Final Depth to Water (ft.)	Avg. Height of Water above Gravel Base (in.)		Measured Drop in Water Level (in.)	Corrected Drop in Water Level[1] (in.)	Corrected Percolation Rate[1] (in./hour)	Unfactored Infiltration Rate* (in./hour)
	Δt	T	[from ground surface]		H_{avg}	H_{int}	ΔH	ΔH_c	$\Delta H_c/\Delta t$	I_t
1	25.0	25	2.98	3.03	27.0	13.9*r	0.6	0.4	0.9	0.03
2	25.0	50	3.03	3.15	26.0	13.5*r	1.4	0.9	2.1	0.07
3	10.0	60	3.15	3.17	25.1	12.7*r	0.2	0.1	0.9	0.03
4	10.0	70	3.17	3.21	24.8	12.6*r	0.5	0.3	1.7	0.06
5	10.0	80	3.21	3.22	24.5	12.3*r	0.1	0.1	0.4	0.01
6	10.0	90	3.22	3.26	24.2	12.2*r	0.5	0.3	1.7	0.06
7	10.0	100	3.26	3.27	23.9	12*r	0.1	0.1	0.4	0.02
8	10.0	110	3.27	3.28	23.7	11.9*r	0.1	0.1	0.4	0.02
9	10.0	120	3.28	3.30	23.6	11.8*r	0.2	0.1	0.9	0.03
10	10.0	130	3.30	3.34	23.2	11.7*r	0.5	0.3	1.7	0.06

1: Porosity of gravel assumed to be 0.4 to correct drop in water.
*Porchet method used to convert percolation rate to infiltration rate.

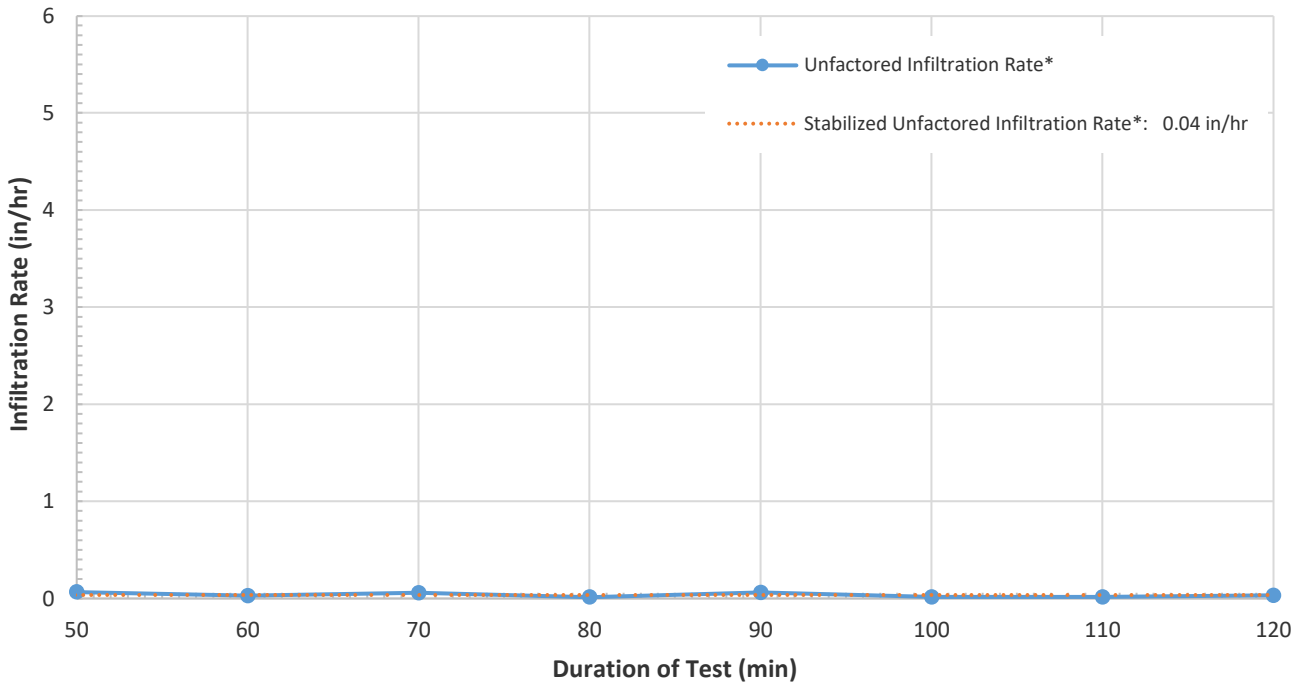
Stabilized, Unfactored Infiltration Rate*: 0.04 inch/hour

HCA Design and Construction **Riverside Community Hospital** **Riverside, California**	**BOREHOLE PERCOLATION TEST I-3B** **INFILTRATION RATE**	GROUP DELTA PROJECT NUMBER: **SD809** FIGURE NUMBER: **D-3.2a**

BOREHOLE PERCOLATION TEST

Project Name:	Riverside Hospital	**Date Drilled:**	4/3/2024	**Borehole Radius (*r):**	2 in.
Project Number:	SD809	**Date Tested:**	4/4/2024	**Casing Diameter:**	2 in.
Test Hole Number:	I-3B	**Tested By:**	DMG	**Depth of Hole:**	5.3 ft
Drilling Method:	Hand Auger	**Temperature[3]:**	70 F	**Test Depth:**	3 to 3½ ft

UNFACTORED INFILTRATION RATES* DURING TEST



Preliminary Factored Infiltration Rate[1]: 0.02 in/hr

Feasibility Screening Factor of Safety, F.S.[2]: 2.0

Temperature Correction Factor[2,3]: 0.87

Factored Infiltration Rate[2]	Design Condition[2]
Below 0.05	No Infiltration
0.05 to 0.50	Partial Infiltration
Above 0.50	Full Infiltration

*Porchet method used to convert percolation rate to infiltration rate.

1: Rate Factored by Factor of Safety and Temperature Correction Factor.

2: Reference: Riverside Design Handbook for Low Impact Developmnet BMP (2011).

3: Factor based on as-tested water temperature of 70 F and rainfall temperature of 60 F.

HCA Design and Construction Riverside Community Hospital Riverside, California	**BOREHOLE PERCOLATION TEST I-3B INFILTRATION RATE**	GROUP DELTA	
		PROJECT NUMBER **SD809**	FIGURE NUMBER **D-3.2b**

BOREHOLE PERCOLATION TEST

Project Name: Riverside Hospital
Project Number: SD809
Test Hole Number: I-4A
Drilling Method: Hand Auger
Date Drilled: 4/2/2024
Date Tested: 4/3/2024
Tested By: JWJ
Temperature: 70 F
Borehole Radius (*r): 2 in.
Casing Diameter: 2 in.
Depth of Hole: 4.8 ft
Gravel Base Thickness: 3 in.

DATA SHEET

Reading Number	Time Interval (min.)	Cumulative Time (min.)	Initial Depth to Water (ft.)	Final Depth to Water (ft.)	Avg. Height of Water above Gravel Base (in.)		Measured Drop in Water Level (in.)	Corrected Drop in Water Level[1] (in.)	Corrected Percolation Rate[1] (in./hour)	Unfactored Infiltration Rate* (in./hour)
	Δt	T	[from ground surface]		H_{avg}	H_{int}	ΔH	ΔH_c	$\Delta H_c/\Delta t$	I_t
1	23.0	23	0.85	1.35	43.8	25*r	6.0	3.6	9.3	0.18
2	24.0	47	1.35	1.85	37.8	21.6*r	6.0	3.6	8.9	0.20
3	10.0	57	2.29	2.40	28.9	15.2*r	1.3	0.8	4.7	0.14
4	10.0	67	2.40	2.58	27.1	14.4*r	2.2	1.3	7.7	0.24
5	10.0	77	2.58	2.74	25.1	13.2*r	1.9	1.1	6.9	0.23
6	10.0	87	2.58	2.72	25.2	13.2*r	1.7	1.0	6.0	0.20
7	10.0	97	2.56	2.67	25.6	13.3*r	1.3	0.8	4.7	0.16
8	10.0	107	2.55	2.67	25.7	13.4*r	1.4	0.9	5.1	0.17
9	10.0	117	2.52	2.64	26.0	13.6*r	1.4	0.9	5.1	0.17
10	10.0	127	2.54	2.67	25.7	13.4*r	1.6	0.9	5.6	0.18
11	10.0	137	2.50	2.66	26.0	13.7*r	1.9	1.1	6.9	0.22
12	10.0	147	2.55	2.68	25.6	13.4*r	1.6	0.9	5.6	0.18
13	10.0	157	2.53	2.64	26.0	13.5*r	1.3	0.8	4.7	0.15
14	10.0	167	2.53	2.66	25.9	13.5*r	1.6	0.9	5.6	0.18

1: Porosity of gravel assumed to be 0.4 to correct drop in water.
*Porchet method used to convert percolation rate to infiltration rate.

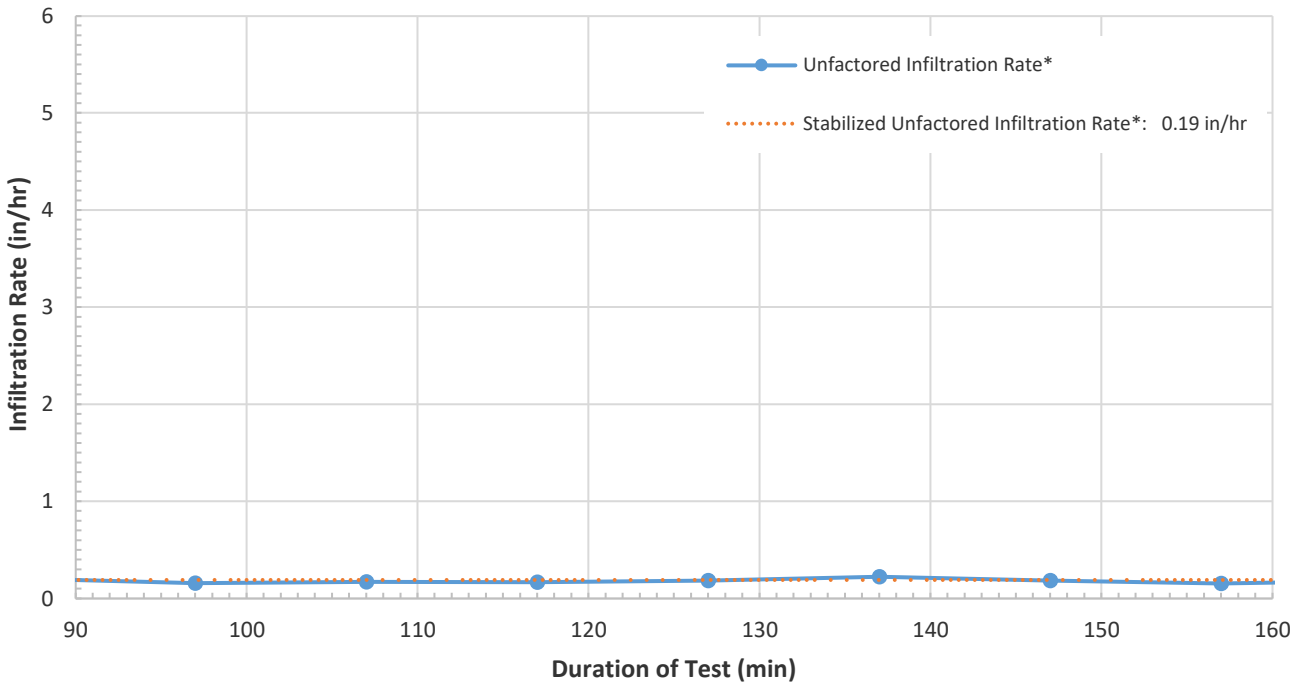
Stabilized, Unfactored Infiltration Rate*: 0.19 inch/hour

HCA Design and Construction **Riverside Community Hospital** **Riverside, California**	**BOREHOLE PERCOLATION TEST I-4A** **INFILTRATION RATE**	GROUP DELTA PROJECT NUMBER: **SD809** FIGURE NUMBER: **D-4.1a**

BOREHOLE PERCOLATION TEST

Project Name:	Riverside Hospital	**Date Drilled:**	4/2/2024	**Borehole Radius (*r):**	2 in.
Project Number:	SD809	**Date Tested:**	4/3/2024	**Casing Diameter:**	2 in.
Test Hole Number:	I-4A	**Tested By:**	JWJ	**Depth of Hole:**	4.8 ft
Drilling Method:	Hand Auger	**Temperature[3]:**	70 F	**Test Depth:**	2½ to 3½ ft

UNFACTORED INFILTRATION RATES* DURING TEST



Preliminary Factored Infiltration Rate[1]: 0.08 in/hr

Feasibility Screening Factor of Safety, F.S.[2]: 2.0

Temperature Correction Factor[2,3]: 0.87

Factored Infiltration Rate[2]	Design Condition[2]
Below 0.05	No Infiltration
0.05 to 0.50	Partial Infiltration
Above 0.50	Full Infiltration

*Porchet method used to convert percolation rate to infiltration rate.

1: Rate Factored by Factor of Safety and Temperature Correction Factor.

2: Reference: Riverside Design Handbook for Low Impact Developmnet BMP (2011).

3: Factor based on as-tested water temperature of 70 F and rainfall temperature of 60 F.

HCA Design and Construction Riverside Community Hospital Riverside, California	**BOREHOLE PERCOLATION TEST I-4A INFILTRATION RATE**	GROUP DELTA	
		PROJECT NUMBER **SD809**	FIGURE NUMBER **D-4.1b**

BOREHOLE PERCOLATION TEST

Project Name: Riverside Hospital
Date Drilled: 4/2/2024
Borehole Radius (*r): 2 in.
Project Number: SD809
Date Tested: 4/3/2024
Casing Diameter: 2 in.
Test Hole Number: I-4B
Tested By: JWJ
Depth of Hole: 5.0 ft
Drilling Method: Hand Auger
Temperature: 70 F
Gravel Base Thickness: 2 in.

DATA SHEET

Reading Number	Time Interval (min.)	Cumulative Time (min.)	Initial Depth to Water (ft.)	Final Depth to Water (ft.)	Avg. Height of Water above Gravel Base (in.)		Measured Drop in Water Level (in.)	Corrected Drop in Water Level[1] (in.)	Corrected Percolation Rate[1] (in./hour)	Unfactored Infiltration Rate* (in./hour)
	Δt	T	[from ground surface]		H_{avg}	H_{int}	ΔH	ΔH_c	$\Delta H_c/\Delta t$	I_t
1	6.0	6	0.97	1.47	45.4	26.5*r	6.0	3.6	35.8	0.68
2	6.0	12	1.07	1.62	43.9	25.8*r	6.6	3.9	39.3	0.77
3	10.0	22	2.47	3.02	27.1	16.2*r	6.6	3.9	23.6	0.74
4	10.0	32	2.72	3.11	25.1	14.5*r	4.7	2.8	16.7	0.56
5	10.0	42	2.62	2.98	26.4	15.2*r	4.3	2.6	15.4	0.49
6	10.0	52	2.64	3.01	26.1	15.1*r	4.4	2.6	15.9	0.51
7	10.0	62	2.52	2.87	27.7	15.9*r	4.2	2.5	15.0	0.46
8	10.0	72	2.73	3.17	24.6	14.4*r	5.3	3.1	18.9	0.65
9	10.0	82	2.77	3.17	24.4	14.2*r	4.8	2.9	17.2	0.59
10	10.0	92	2.78	3.21	24.1	14.1*r	5.2	3.1	18.4	0.65
11	10.0	102	2.58	2.87	27.3	15.5*r	3.5	2.1	12.4	0.39
12	10.0	112	2.69	3.09	25.4	14.7*r	4.8	2.9	17.2	0.57
13	10.0	122	2.67	2.97	26.2	14.9*r	3.6	2.1	12.9	0.42
14	10.0	132	2.71	3.10	25.2	14.6*r	4.7	2.8	16.7	0.56

1: Porosity of gravel assumed to be 0.4 to correct drop in water.
*Porchet method used to convert percolation rate to infiltration rate.

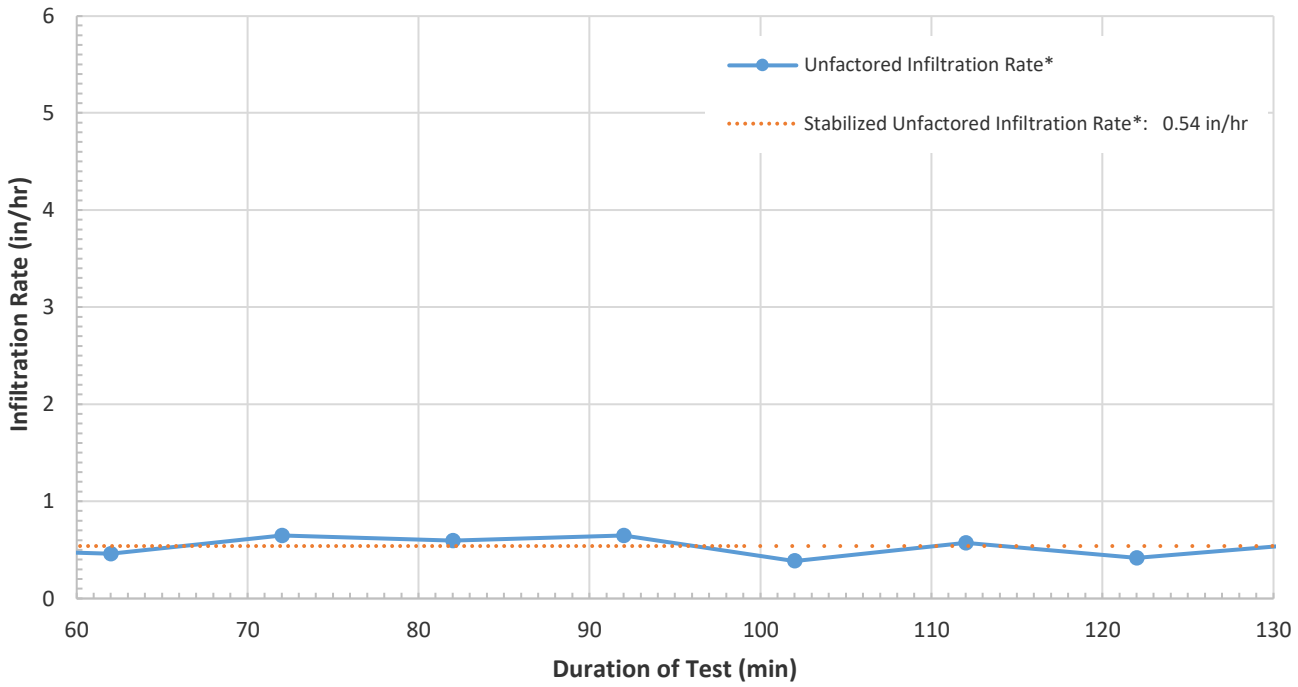
Stabilized, Unfactored Infiltration Rate*: 0.54 inch/hour

HCA Design and Construction Riverside Community Hospital Riverside, California	**BOREHOLE PERCOLATION TEST I-4B INFILTRATION RATE**	GROUP DELTA	
		PROJECT NUMBER **SD809**	FIGURE NUMBER **D-4.2a**

BOREHOLE PERCOLATION TEST

Project Name:	Riverside Hospital	**Date Drilled:**	4/2/2024	**Borehole Radius (*r):**	2 in.
Project Number:	SD809	**Date Tested:**	4/3/2024	**Casing Diameter:**	2 in.
Test Hole Number:	I-4B	**Tested By:**	JWJ	**Depth of Hole:**	5.0 ft
Drilling Method:	Hand Auger	**Temperature[3]:**	70 F	**Test Depth:**	2½ to 3½ ft

UNFACTORED INFILTRATION RATES* DURING TEST



Preliminary Factored Infiltration Rate[1]: 0.23 in/hr

Feasibility Screening Factor of Safety, F.S.[2]: 2.0

Temperature Correction Factor[2,3]: 0.87

Factored Infiltration Rate[2]	Design Condition[2]
Below 0.05	No Infiltration
0.05 to 0.50	Partial Infiltration
Above 0.50	Full Infiltration

*Porchet method used to convert percolation rate to infiltration rate.

1: Rate Factored by Factor of Safety and Temperature Correction Factor.

2: Reference: Riverside Design Handbook for Low Impact Developmnet BMP (2011).

3: Factor based on as-tested water temperature of 70 F and rainfall temperature of 60 F.

HCA Design and Construction Riverside Community Hospital Riverside, California	**BOREHOLE PERCOLATION TEST I-4B INFILTRATION RATE**	GROUP DELTA	
		PROJECT NUMBER **SD809**	FIGURE NUMBER **D-4.2b**

BOREHOLE PERCOLATION TEST

Project Name: Riverside Hospital
Project Number: SD809
Test Hole Number: I-5A
Drilling Method: Hand Auger
Date Drilled: 4/2/2024
Date Tested: 4/5/2024
Tested By: JWJ
Temperature: 64 F
Borehole Radius (*r): 2 in.
Casing Diameter: 2 in.
Depth of Hole: 3.1 ft
Gravel Base Thickness: 2 in.

DATA SHEET

Reading Number	Time Interval (min.)	Cumulative Time (min.)	Initial Depth to Water (ft.)	Final Depth to Water (ft.)	Avg. Height of Water above Gravel Base (in.)		Measured Drop in Water Level (in.)	Corrected Drop in Water Level[1] (in.)	Corrected Percolation Rate[1] (in./hour)	Unfactored Infiltration Rate* (in./hour)
	Δt	T	[from ground surface]		H_{avg}	H_{int}	ΔH	ΔH_c	$\Delta H_c/\Delta t$	I_t
1	10.0	10	1.38	1.42	20.2	10.5*r	0.5	0.3	1.7	0.07
2	10.0	20	1.42	1.52	19.4	10.3*r	1.2	0.7	4.3	0.19
3	10.0	30	1.52	1.58	18.4	9.6*r	0.7	0.4	2.6	0.12
4	10.0	40	1.53	1.55	18.5	9.5*r	0.2	0.1	0.9	0.04
5	10.0	50	1.55	1.60	18.1	9.4*r	0.6	0.4	2.1	0.10
6	10.0	60	1.50	1.53	18.8	9.7*r	0.4	0.2	1.3	0.06
7	10.0	70	1.53	1.58	18.3	9.5*r	0.6	0.4	2.1	0.10
8	10.0	80	1.48	1.50	19.1	9.9*r	0.2	0.1	0.9	0.04
9	10.0	90	1.50	1.53	18.8	9.7*r	0.4	0.2	1.3	0.06
10	10.0	100	1.53	1.59	18.3	9.5*r	0.7	0.4	2.6	0.12
11	10.0	110	1.50	1.52	18.9	9.7*r	0.2	0.1	0.9	0.04
12	10.0	120	1.52	1.57	18.5	9.6*r	0.6	0.4	2.1	0.10

1: Porosity of gravel assumed to be 0.4 to correct drop in water.
*Porchet method used to convert percolation rate to infiltration rate.

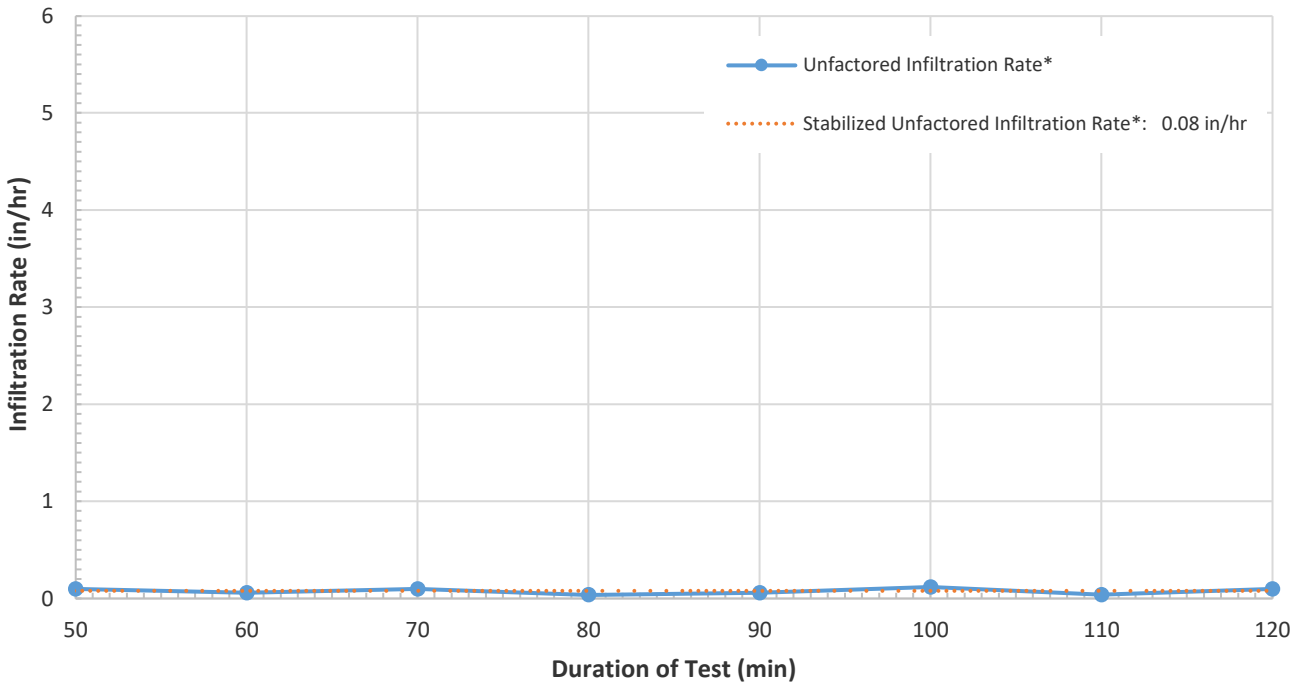
Stabilized, Unfactored Infiltration Rate*: 0.08 inch/hour

HCA Design and Construction Riverside Community Hospital Riverside, California	**BOREHOLE PERCOLATION TEST I-5A INFILTRATION RATE**	GROUP DELTA PROJECT NUMBER: **SD809** FIGURE NUMBER: **D-5.1a**

BOREHOLE PERCOLATION TEST

Project Name:	Riverside Hospital	**Date Drilled:**	4/2/2024	**Borehole Radius (*r):**	2 in.
Project Number:	SD809	**Date Tested:**	4/5/2024	**Casing Diameter:**	2 in.
Test Hole Number:	I-5A	**Tested By:**	JWJ	**Depth of Hole:**	3.1 ft
Drilling Method:	Hand Auger	**Temperature[3]:**	64 F	**Test Depth:**	2 to 3 ft

UNFACTORED INFILTRATION RATES* DURING TEST



Preliminary Factored Infiltration Rate[1]: 0.04 in/hr

Feasibility Screening Factor of Safety, F.S.[2]: 2.0

Temperature Correction Factor[2,3]: 0.95

Factored Infiltration Rate[2]	Design Condition[2]
Below 0.05	No Infiltration
0.05 to 0.50	Partial Infiltration
Above 0.50	Full Infiltration

*Porchet method used to convert percolation rate to infiltration rate.

1: Rate Factored by Factor of Safety and Temperature Correction Factor.

2: Reference: Riverside Design Handbook for Low Impact Developmnet BMP (2011).

3: Factor based on as-tested water temperature of 64 F and rainfall temperature of 60 F.

HCA Design and Construction Riverside Community Hospital Riverside, California	**BOREHOLE PERCOLATION TEST I-5A INFILTRATION RATE**	GROUP DELTA	
		PROJECT NUMBER **SD809**	FIGURE NUMBER **D-5.1b**

BOREHOLE PERCOLATION TEST

Project Name: Riverside Hospital | **Date Drilled:** 4/2/2024 | **Borehole Radius (*r):** 2 in.

Project Number: SD809 | **Date Tested:** 4/5/2024 | **Casing Diameter:** 2 in.

Test Hole Number: I-5B | **Tested By:** JWJ | **Depth of Hole:** 3.0 ft

Drilling Method: Hand Auger | **Temperature:** 64 F | **Gravel Base Thickness:** 3 in.

DATA SHEET

Reading Number	Time Interval (min.)	Cumulative Time (min.)	Initial Depth to Water (ft.)	Final Depth to Water (ft.)	Avg. Height of Water above Gravel Base (in.)		Measured Drop in Water Level (in.)	Corrected Drop in Water Level[1] (in.)	Corrected Percolation Rate[1] (in./hour)	Unfactored Infiltration Rate* (in./hour)
	Δt	T	[from ground surface]		H_{avg}	H_{int}	ΔH	ΔH_c	$\Delta H_c/\Delta t$	I_t
1	10.0	10	0.93	0.94	24.7	12.5*r	0.1	0.1	0.4	0.01
2	10.0	20	0.94	0.96	24.6	12.4*r	0.2	0.1	0.9	0.03
3	10.0	30	0.96	0.97	24.4	12.3*r	0.1	0.1	0.4	0.01
4	10.0	40	0.97	0.99	24.2	12.2*r	0.2	0.1	0.9	0.03
5	10.0	50	0.99	1.02	23.9	12*r	0.4	0.2	1.3	0.05
6	10.0	60	1.02	1.05	23.5	11.8*r	0.4	0.2	1.3	0.05
7	10.0	70	1.05	1.07	23.2	11.6*r	0.2	0.1	0.9	0.03
8	10.0	80	0.97	0.99	24.2	12.2*r	0.2	0.1	0.9	0.03
9	10.0	90	0.99	1.01	24.0	12*r	0.2	0.1	0.9	0.03
10	10.0	100	1.00	1.02	23.8	12*r	0.2	0.1	0.9	0.03
11	10.0	110	1.02	1.04	23.6	11.8*r	0.2	0.1	0.9	0.03
12	10.0	120	1.04	1.06	23.4	11.7*r	0.2	0.1	0.9	0.03

1: Porosity of gravel assumed to be 0.4 to correct drop in water.

*Porchet method used to convert percolation rate to infiltration rate.

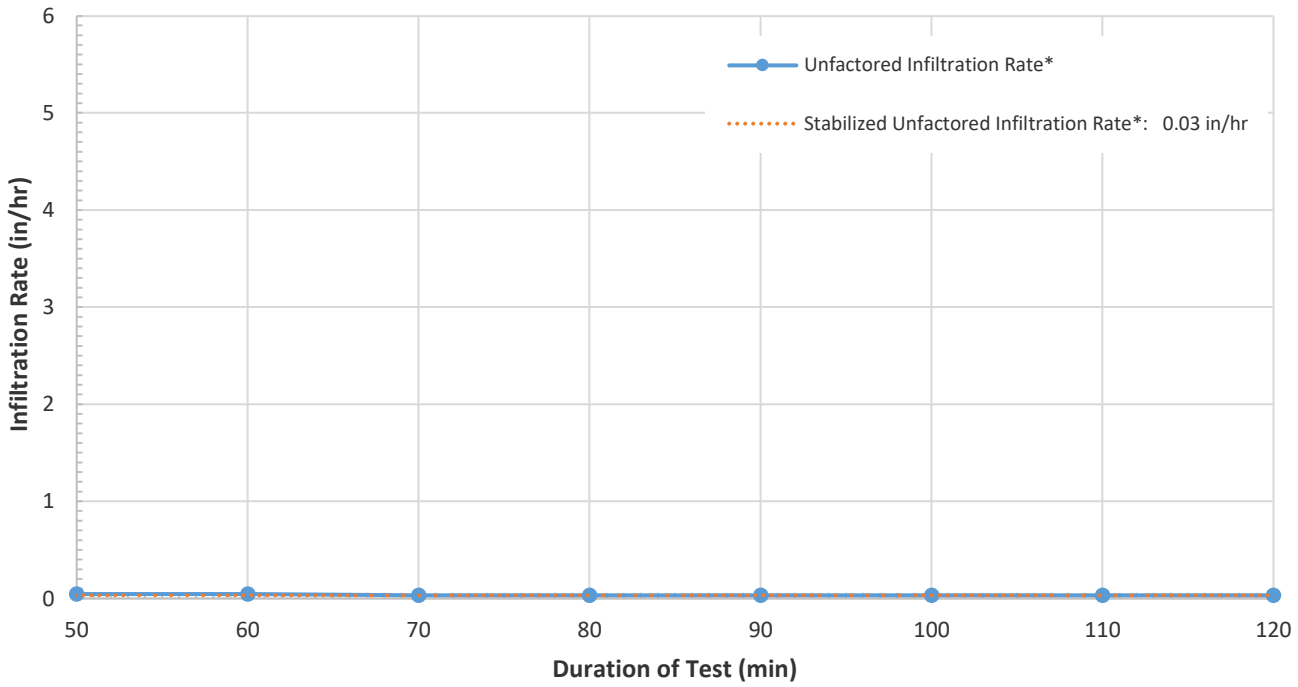
Stabilized, Unfactored Infiltration Rate*: 0.03 inch/hour

HCA Design and Construction Riverside Community Hospital Riverside, California	**BOREHOLE PERCOLATION TEST I-5B INFILTRATION RATE**	GROUP DELTA	
		PROJECT NUMBER **SD809**	FIGURE NUMBER **D-5.2a**

BOREHOLE PERCOLATION TEST

Project Name:	Riverside Hospital	**Date Drilled:**	4/2/2024	**Borehole Radius (*r):**	2 in.
Project Number:	SD809	**Date Tested:**	4/5/2024	**Casing Diameter:**	2 in.
Test Hole Number:	I-5B	**Tested By:**	JWJ	**Depth of Hole:**	3.0 ft
Drilling Method:	Hand Auger	**Temperature[3]:**	64 F	**Test Depth:**	2 to 3 ft

UNFACTORED INFILTRATION RATES* DURING TEST



Preliminary Factored Infiltration Rate[1]: 0.02 in/hr

Feasibility Screening Factor of Safety, F.S.[2]: 2.0

Temperature Correction Factor[2,3]: 0.95

Factored Infiltration Rate[2]	Design Condition[2]
Below 0.05	No Infiltration
0.05 to 0.50	Partial Infiltration
Above 0.50	Full Infiltration

*Porchet method used to convert percolation rate to infiltration rate.

1: Rate Factored by Factor of Safety and Temperature Correction Factor.

2: Reference: Riverside Design Handbook for Low Impact Developmnet BMP (2011).

3: Factor based on as-tested water temperature of 64 F and rainfall temperature of 60 F.

HCA Design and Construction Riverside Community Hospital Riverside, California	**BOREHOLE PERCOLATION TEST I-5B INFILTRATION RATE**	GROUP DELTA	
		PROJECT NUMBER **SD809**	FIGURE NUMBER **D-5.2b**

BOREHOLE PERCOLATION TEST

Project Name: Riverside Hospital | **Date Drilled:** 4/2/2024 | **Borehole Radius (*r):** 2 in.

Project Number: SD809 | **Date Tested:** 4/3/2024 | **Casing Diameter:** 2 in.

Test Hole Number: I-6A | **Tested By:** DMG | **Depth of Hole:** 5.2 ft

Drilling Method: Hand Auger | **Temperature:** 71 F | **Gravel Base Thickness:** 2 in.

DATA SHEET

Reading Number	Time Interval (min.)	Cumulative Time (min.)	Initial Depth to Water (ft.)	Final Depth to Water (ft.)	Avg. Height of Water above Gravel Base (in.)		Measured Drop in Water Level (in.)	Corrected Drop in Water Level[1] (in.)	Corrected Percolation Rate[1] (in./hour)	Unfactored Infiltration Rate* (in./hour)
	Δt	T	[from ground surface]		H_{avg}	H_{int}	ΔH	$ΔH_c$	$ΔH_c/Δt$	I_t
10	2.0	23	3.35	3.66	19.9	11.3*r	3.7	2.2	66.5	2.80
11	2.0	25	3.66	3.93	16.5	9.2*r	3.2	1.9	57.9	2.92
12	2.0	27	3.93	4.12	13.7	7.3*r	2.3	1.4	40.8	2.45
13	2.0	29	4.12	4.27	11.7	6*r	1.8	1.1	32.2	2.25
14	2.0	31	2.60	2.96	28.6	16.5*r	4.3	2.6	77.2	2.29
15	2.0	33	2.96	3.32	24.3	14*r	4.3	2.6	77.2	2.68
16	2.0	35	3.32	3.59	20.5	11.5*r	3.2	1.9	57.9	2.37
17	2.0	37	3.59	3.86	17.3	9.7*r	3.2	1.9	57.9	2.79
18	2.0	39	3.86	4.04	14.6	7.8*r	2.2	1.3	38.6	2.18
19	2.0	41	4.04	4.20	12.6	6.6*r	1.9	1.1	34.3	2.24
20	2.0	43	2.88	3.24	25.3	14.5*r	4.3	2.6	77.2	2.58
21	2.0	45	3.24	3.49	21.6	12.1*r	3.0	1.8	53.6	2.09
22	2.0	47	3.49	3.70	18.9	10.4*r	2.5	1.5	45.1	2.00
23	2.0	49	3.70	3.87	16.6	8.9*r	2.0	1.2	36.5	1.83
24	2.0	51	3.87	4.04	14.5	7.7*r	2.0	1.2	36.5	2.07
25	2.0	53	4.04	4.17	12.7	6.6*r	1.6	0.9	27.9	1.79
26	2.0	55	4.17	4.29	11.2	5.7*r	1.4	0.9	25.7	1.86
27	2.0	57	2.80	3.20	26.0	15.1*r	4.8	2.9	85.8	2.79
28	2.0	59	3.20	3.42	22.3	12.3*r	2.6	1.6	47.2	1.78
29	2.0	61	3.42	3.64	19.6	10.8*r	2.6	1.6	47.2	2.01
30	2.0	63	3.64	3.81	17.3	9.3*r	2.0	1.2	36.5	1.76
31	2.0	65	3.81	3.95	15.4	8.2*r	1.7	1.0	30.0	1.61
32	2.0	67	3.95	4.13	13.5	7.2*r	2.2	1.3	38.6	2.35
33	2.0	69	4.13	4.22	11.9	6*r	1.1	0.6	19.3	1.32
34	2.0	71	4.22	4.35	10.6	5.3*r	1.6	0.9	27.9	2.13
35	5.0	76	2.85	3.48	24.0	14.7*r	7.6	4.5	54.1	1.90
36	5.0	81	3.48	3.85	18.0	10.4*r	4.4	2.6	31.8	1.47
37	5.0	86	3.85	4.18	13.8	7.9*r	4.0	2.4	28.3	1.69
38	5.0	91	4.18	4.41	10.5	5.6*r	2.8	1.6	19.7	1.52
39	5.0	96	2.74	3.36	25.4	15.5*r	7.4	4.4	53.2	1.77
40	5.0	101	3.36	3.79	19.1	11.2*r	5.2	3.1	36.9	1.62
41	5.0	106	3.79	4.09	14.7	8.3*r	3.6	2.1	25.7	1.44
42	5.0	111	4.09	4.35	11.4	6.2*r	3.1	1.9	22.3	1.60
43	5.0	116	2.87	3.42	24.3	14.6*r	6.6	3.9	47.2	1.64
44	5.0	121	3.42	3.83	18.5	10.8*r	4.9	2.9	35.2	1.59
45	5.0	126	3.83	4.11	14.4	8*r	3.4	2.0	24.0	1.38

1: Porosity of gravel assumed to be 0.4 to correct drop in water.

*Porchet method used to convert percolation rate to infiltration rate.

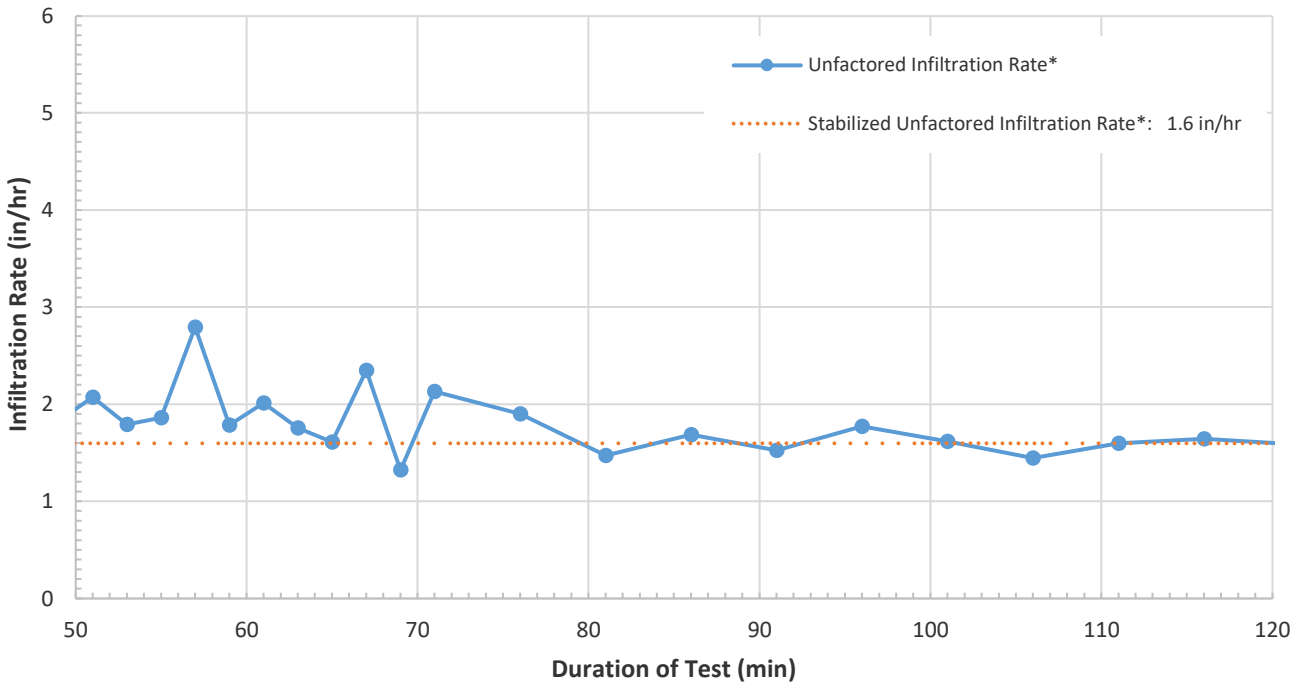
Stabilized, Unfactored Infiltration Rate*: 1.60 inch/hour

HCA Design and Construction **Riverside Community Hospital** **Riverside, California**	**BOREHOLE PERCOLATION TEST I-6A** **INFILTRATION RATE**	GROUP DELTA PROJECT NUMBER: **SD809** FIGURE NUMBER: **D-6.1a**

BOREHOLE PERCOLATION TEST

Project Name:	Riverside Hospital	**Date Drilled:**	4/2/2024	**Borehole Radius (*r):**	2 in.
Project Number:	SD809	**Date Tested:**	4/3/2024	**Casing Diameter:**	2 in.
Test Hole Number:	I-6A	**Tested By:**	DMG	**Depth of Hole:**	5.2 ft
Drilling Method:	Hand Auger	**Temperature[3]:**	71 F	**Test Depth:**	7½ to 8½ ft

UNFACTORED INFILTRATION RATES* DURING TEST



Preliminary Factored Infiltration Rate[1]: 0.69 in/hr

Feasibility Screening Factor of Safety, F.S.[2]: 2.0

Temperature Correction Factor[2,3]: 0.86

Factored Infiltration Rate[2]	Design Condition[2]
Below 0.05	No Infiltration
0.05 to 0.50	Partial Infiltration
Above 0.50	Full Infiltration

*Porchet method used to convert percolation rate to infiltration rate.

1: Rate Factored by Factor of Safety and Temperature Correction Factor.

2: Reference: Riverside Design Handbook for Low Impact Developmnet BMP (2011).

3: Factor based on as-tested water temperature of 71 F and rainfall temperature of 60 F.

HCA Design and Construction Riverside Community Hospital Riverside, California	**BOREHOLE PERCOLATION TEST I-6A INFILTRATION RATE**	GROUP DELTA	
		PROJECT NUMBER **SD809**	FIGURE NUMBER **D-6.1b**

BOREHOLE PERCOLATION TEST

Project Name: Riverside Hospital | **Date Drilled:** 4/2/2024 | **Borehole Radius (*r):** 2 in.

Project Number: SD809 | **Date Tested:** 4/3/2024 | **Casing Diameter:** 2 in.

Test Hole Number: I-6B | **Tested By:** DMG | **Depth of Hole:** 5.3 ft

Drilling Method: Hand Auger | **Temperature:** 72 F | **Gravel Base Thickness:** 4 in.

DATA SHEET

Reading Number	Time Interval (min.)	Cumulative Time (min.)	Initial Depth to Water (ft.)	Final Depth to Water (ft.)	Avg. Height of Water above Gravel Base (in.)		Measured Drop in Water Level (in.)	Corrected Drop in Water Level[1] (in.)	Corrected Percolation Rate[1] (in./hour)	Unfactored Infiltration Rate* (in./hour)
	Δt	T	[from ground surface]		H_{avg}	H_{int}	ΔH	$ΔH_c$	$ΔH_c/Δt$	I_t
6	2.0	15	4.02	4.27	14.3	6.7*r	3.0	1.8	53.6	3.09
7	2.0	17	4.27	4.46	11.7	5*r	2.3	1.4	40.8	2.85
8	2.0	19	2.90	3.31	26.8	14.4*r	4.9	2.9	88.0	2.78
9	2.0	21	3.31	3.62	22.5	11.6*r	3.7	2.2	66.5	2.49
10	2.0	23	3.62	3.91	18.9	9.5*r	3.5	2.1	62.2	2.76
11	2.0	25	3.91	4.13	15.8	7.5*r	2.6	1.6	47.2	2.48
12	2.0	27	4.13	4.38	13.0	6*r	3.0	1.8	53.6	3.39
13	2.0	29	4.38	4.57	10.3	4.3*r	2.3	1.4	40.8	3.18
14	2.0	31	3.08	3.55	24.3	13.2*r	5.6	3.4	100.8	3.51
15	2.0	33	3.55	3.78	20.1	10*r	2.8	1.6	49.3	2.06
16	2.0	35	3.78	4.07	16.9	8.4*r	3.5	2.1	62.2	3.06
17	2.0	37	4.07	4.26	14.1	6.4*r	2.3	1.4	40.8	2.39
18	2.0	39	4.26	4.43	11.9	5.1*r	2.0	1.2	36.5	2.50
19	2.0	41	3.04	3.42	25.3	13.5*r	4.6	2.7	81.5	2.73
20	2.0	43	3.42	3.70	21.3	10.9*r	3.4	2.0	60.1	2.37
21	2.0	45	3.70	3.93	18.3	8.9*r	2.8	1.6	49.3	2.26
22	2.0	47	3.93	4.12	15.7	7.4*r	2.3	1.4	40.8	2.15
23	2.0	49	4.12	4.31	13.5	6.1*r	2.3	1.4	40.8	2.49
24	2.0	51	2.87	3.23	27.4	14.6*r	4.3	2.6	77.2	2.39
25	2.0	53	3.23	3.55	23.4	12.2*r	3.8	2.3	68.6	2.48
26	2.0	55	3.55	3.79	20.0	10*r	2.9	1.7	51.5	2.16
27	5.0	60	3.79	4.29	15.6	8.3*r	6.0	3.6	42.9	2.28
28	5.0	65	4.29	4.66	10.3	4.9*r	4.4	2.6	31.8	2.48
29	5.0	70	2.96	3.70	24.1	14*r	8.9	5.3	63.5	2.23
30	5.0	75	3.70	4.18	16.8	8.9*r	5.8	3.4	41.2	2.04
31	5.0	80	4.18	4.55	11.7	5.6*r	4.4	2.6	31.8	2.22
32	5.0	85	2.92	3.64	24.7	14.3*r	8.6	5.1	61.8	2.12
33	5.0	90	3.64	4.10	17.6	9.3*r	5.5	3.3	39.5	1.87
34	5.0	95	4.10	4.47	12.6	6.2*r	4.4	2.6	31.8	2.06
35	5.0	100	2.94	3.62	24.7	14.1*r	8.2	4.9	58.4	2.00
36	5.0	105	3.62	4.08	17.8	9.5*r	5.5	3.3	39.5	1.85
37	5.0	110	4.08	4.43	13.0	6.3*r	4.2	2.5	30.0	1.90
38	5.0	120	2.92	3.62	24.8	14.3*r	8.4	5.0	60.1	2.05
39	5.0	125	3.62	4.08	17.8	9.5*r	5.5	3.3	39.5	1.85
40	5.0	130	4.08	4.39	13.2	6.3*r	3.7	2.2	26.6	1.65

1: Porosity of gravel assumed to be 0.4 to correct drop in water.

*Porchet method used to convert percolation rate to infiltration rate.

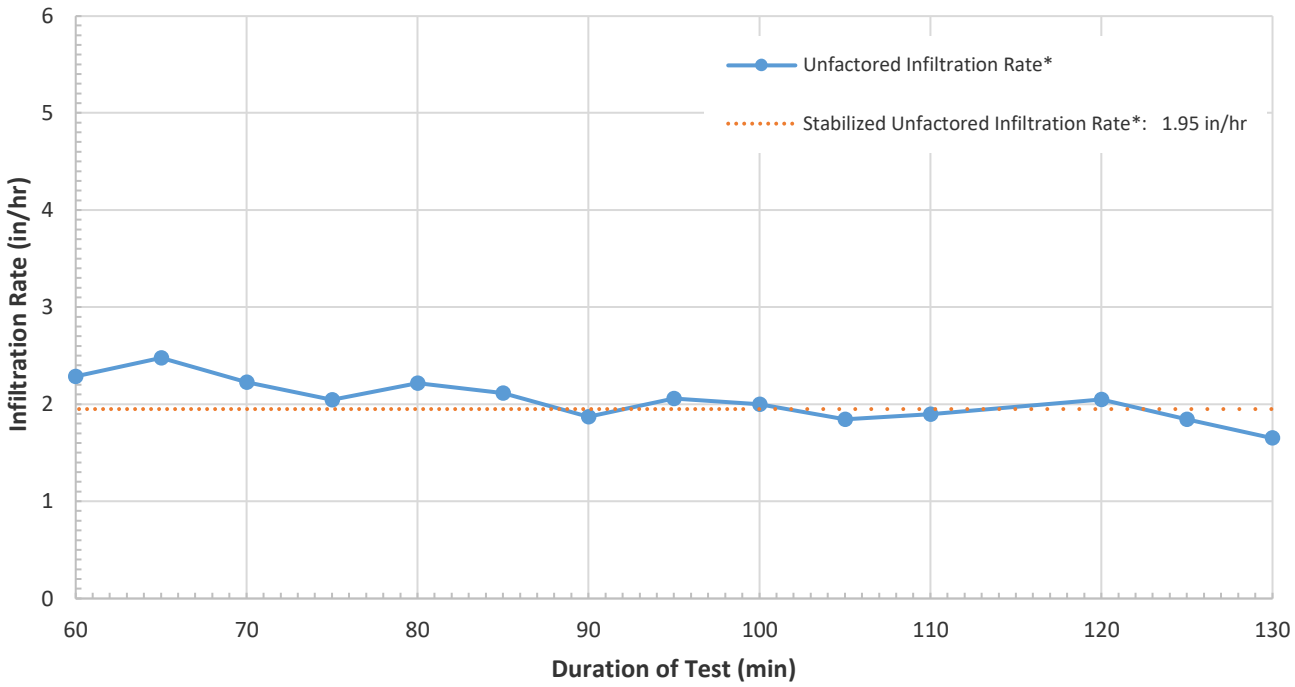
Stabilized, Unfactored Infiltration Rate*: 1.95 inch/hour

HCA Design and Construction **Riverside Community Hospital** **Riverside, California**	**BOREHOLE PERCOLATION TEST I-6B** **INFILTRATION RATE**	GROUP DELTA	
		PROJECT NUMBER **SD809**	FIGURE NUMBER **D-6.2a**

BOREHOLE PERCOLATION TEST

Project Name:	Riverside Hospital	**Date Drilled:**	4/2/2024	**Borehole Radius (*r):**	2 in.
Project Number:	SD809	**Date Tested:**	4/3/2024	**Casing Diameter:**	2 in.
Test Hole Number:	I-6B	**Tested By:**	DMG	**Depth of Hole:**	5.3 ft
Drilling Method:	Hand Auger	**Temperature[3]:**	72 F	**Test Depth:**	3 to 4 ft

UNFACTORED INFILTRATION RATES* DURING TEST



Preliminary Factored Infiltration Rate[1]: 0.83 in/hr

Feasibility Screening Factor of Safety, F.S.[2]: 2.0

Temperature Correction Factor[2,3]: 0.85

Factored Infiltration Rate[2]	Design Condition[2]
Below 0.05	No Infiltration
0.05 to 0.50	Partial Infiltration
Above 0.50	Full Infiltration

*Porchet method used to convert percolation rate to infiltration rate.

1: Rate Factored by Factor of Safety and Temperature Correction Factor.

2: Reference: Riverside Design Handbook for Low Impact Developmnet BMP (2011).

3: Factor based on as-tested water temperature of 72 F and rainfall temperature of 60 F.

HCA Design and Construction Riverside Community Hospital Riverside, California	**BOREHOLE PERCOLATION TEST I-6B INFILTRATION RATE**	GROUP DELTA	
		PROJECT NUMBER **SD809**	FIGURE NUMBER **D-6.2b**

APPENDIX E
SITE-SPECIFIC SEISMIC HAZARD EVALUATION

APPENDIX B

SITE-SPECIFIC SEISMIC HAZARD EVALUATION

E.1 INTRODUCTION

This section presents the results of the site-specific seismic hazard analysis per the 2022 California Building Code (CBC) and ASCE 7-16 (ASCE/SEI 7-16) for the project site. The subsurface soil conditions used in this study were obtained from our field exploration program including, hollow stem auger borings and seismic cone penetration tests (CPT), as well as prior downhole geophysical testing performed at the site to determine shear wave velocities.

Horizontal Acceleration Response Spectra (ARS) for 5-percent damping were developed for the Risk-Targeted Maximum Considered Earthquake (MCE_R) as defined in Chapter 21.2 of ASCE 7-16. We performed both probabilistic and deterministic seismic hazard analyses. Site-specific probabilistic seismic hazard analyses were performed using the computer program OpenSHA (Field, 2003), with the seismic source model from the Uniform California Earthquake Rupture Forecast (UCERF3) Version 3 (Field et al, 2013). Development of the horizontal ARS was also performed using the ground motion models for the Next Generation Attenuation (NGA) – West 2 research project. The site coordinates used in our seismic hazard analyses are summarized below:

Garage: 33.9776 (latitude), -117.3834 (longitude)

Tower: 33.9765 (latitude), -117.3825 (longitude)

E.2 SEISMIC SETTING

The Riverside Community Hospital site is located in an area with high seismic activity. The approximate locations of nearby active faults are shown on the Regional Fault Map, Figure 5A. Table E-1 below lists the active faults that are closest to the site, and summarizes the Fault Type, Maximum Magnitude (Mw) and Site-To-Source Rupture Distance (R_{rup}). Note that the fault models we used generally follow UCERF3, which is the seismic source model developed by the Working Group on California Earthquake Probabilities (WGCEP) in 2013. The UCERF3 model was subsequently adopted by the 2014 U.S. National Seismic Hazard Mapping Program (NSHM) to develop probabilistic seismic hazard maps (Petersen et al., 2014).

The maximum magnitudes and scenarios adopted for our analyses are generally consistent with the published Building Seismic Safety Council 2014 Event Set, the adopted deterministic ruptures used for the 2014 USGS NSHM (BSSC, 2015). For multi-segment faults such as the Elsinore, San Jacinto, and San Andreas faults, where different earthquake scenarios are considered, the model producing the largest magnitude was reported in Table E-1 along with the combined segments.

Table E-1. Significant Active Faults Near the Site

Fault	Fault Type	Maximum Magnitude M_W	Site-to-Source Distance R_{rup} (km)
San Jacinto (San Bernardino + San Jacinto Valley + Anza + Stepovers Combined + Coyote Creek + Borrego + Superstition Mountain)	Strike-Slip	7.8	13.0
Fontana (seismicity)	Strike-Slip (1)	6.8	14.4
Elsinore (Whittier + Glen Ivy + Temecula + Stepovers Combined + Julian + Coyote Mountains)	Strike-Slip	7.8	23.8
San Andreas (Parkfield + Cholame + Carrizo + Big Bend + North Mojave + South Mojave + North San Bernardino + South San Bernardino + San Gorgonio Pass - Garnet Hill + Coachella)	Strike-Slip	8.2	23.9
Chino (Alt 1 / Alt 2)	Strike-Slip	6.6 / 6.8 (2)	24.2 / 23.9
Cucamonga	Thrust	6.9	22.7
San Jose	Strike-Slip	6.7	32.1

Notes: (1) Faulting in Fontana was previously considered undetermined as it is based on seismicity. However, the latest edition of the recently released NSHM (2023) now considers this fault to be strike-slip.
(2) Magnitudes presented are for the Chino fault alternatives (Alt 1 / Alt 2) respectively.

As shown in Table E-1, the closest known active seismic sources to the site include the San Jacinto fault zone and the San Andreas fault zone. These are some of the most active fault zones in California and are capable of producing some of the largest earthquakes. The closest active faults are discussed in more detail below.

The San Jacinto fault zone is located about 13.0 kilometers (km) northeast of the site. The San Jacinto fault zone is a right-lateral strike slip fault with a total length of about 210 km, extending from San Bernardino down south to Superstition Mountain. The northern end of the fault connects with the San Andreas fault zone. This fault is believed to be capable of producing earthquakes with a maximum moment magnitude (M_W) of 7.8 when all of the fault segments rupture in combination from San Bernardino to Superstition Mountain. The San Jacinto fault has a typical recurrence interval for ground rupture of 100 to 300 years.

The Fontana fault has recently been identified based on frequent micro-seismicity in the area. It was not included in the 2008 edition of the NSHM but was added in 2014. Although initially the fault mechanism was not well understood, it is currently believed to be a strike-slip fault capable of producing earthquakes with magnitudes up to 6.8. According to UCERF3, this fault is "*likely a structure that actively transfers slip from the San Jacinto to the San Andreas.*" (Field, 2013).

The San Andreas fault zone is a right-lateral strike slip fault system that extends a total length of 315 miles (1,200 km) throughout California. This fault system forms the boundary between the Pacific Plate and the North American Plate. The Southern San Andreas section of the fault system extends from Parkfield down to its termination at the Salton Sea, with a length of 550 km. The Southern San Andreas section is estimated to be capable of producing earthquakes with a maximum magnitude (M_W) of 8.2. In the area of Redlands and Yucaipa, the structure of the San Andreas fault becomes very complex due to interaction with other faults over the millennia, resulting in fractured segments and discontinuous branches. Recurrence intervals between ground-rupturing earthquakes vary on the San Andreas fault system depending on location. Near Los Angeles, this interval is estimated to be 175 to 200 years (USGS, 2017).

E.2 HISTORIC SIESMICITY

There have been numerous moderate to large earthquakes located near the subject site over the last few centuries. A historical earthquake search was performed using the Advanced National Seismic System (ANSS) Comprehensive Earthquake Catalog (USGS, 2023). This search included earthquakes with magnitudes of 5.0 or higher and epicentral distances within 100 km of the center of the project site. The results are summarized below.

Time Period (1700 to April 2024)	324 years
Maximum Magnitude	Mw ~ 7.5
Number of Earthquakes with both Mw > 5.0 and R_{RUP} < 100 km	71

The earthquakes with epicenters closest to the site include the 1923 M_W 6.2 south San Bernardino earthquake which was located about 16.9 kilometers to the northeast of the site in the Santa Ana River, the 1858 M_W 6.0 earthquake north of San Bernardino, the 1990 M_W 5.5 Upland earthquake northwest of the site, and the 2008 M_W 5.4 Chino Hill earthquake west of the site. These earthquake epicenters are shown on the Regional Fault Map, Figure 5A. Other large earthquakes within 100 km of the site include the 1812 M_W 7.5 Wrightwood earthquake on the San Andreas fault northwest of the site, the 1992 M_W 7.3 Landers earthquake northeast of the site, and the 1899 M_W 6.7 San Jacinto earthquake southeast of the site.

E.3 SITE CHARACTERIZATION

In developing site-specific ground motions, the characteristics of the soils underlying the site are an important input to evaluate the site response. In particular, the average shear wave velocity in the upper 30 meters (Vs_{30}) is a necessary parameter to perform seismic hazard analyses. Group Delta engaged a subcontractor to advance seismic CPT soundings at the project site to obtain shear wave velocity in the upper 30 meters or 100 feet. Three seismic CPTs were performed across the site, two within the proposed Garage site (CPT-1 and CPT-2), and one within the proposed Tower site (CPT-5). The CPT locations are shown on the Exploration Plans, Figures 3B and 3C.

In addition to the current measurements of shear wave velocity, prior geophysical studies at the site were reviewed and used to supplement the current measurements and data, particularly with respect to the shear wave velocity of the very dense Old Alluvium. All explorations at the site encountered refusal shallower than 100 feet in depth due to very dense granular soils in the Old Alluvium (N_{60}>30). The available data form the prior investigations was used to extrapolate shear wave velocity to depths of 100 feet to develop the Vs_{30} values for use our analyses (CHJ, 2008).

Based on the available data, including boring logs and soil samples, the shear wave velocity values were plotted based on their corresponding geology (i.e. existing fill, Young Alluvium, and Old Alluvium). Shear wave velocity measurements with depth are presented in Figure E-1 with respect to both exploration ID and interpreted geology. Within the Young Alluvium, the measured shear wave velocity values were generally between about 480 and 850 feet per second (ft/s), with a trend of low values near the surface, and increasing values with depth. The prior downhole geophysical study did interpret very low shear waves within the upper 5 feet. However, this measurement was taken prior to remedial grading. The existing fill soils have relatively high shear wave velocities ranging from about 760 to over 1,800 ft/s.

Below the surficial fill and Young Alluvium, the dense to very dense granular soils designated as Old Alluvium were observed to have much higher shear wave velocity values varying from about 1100 to over 2,500 ft/s (CHJ, 2008). Several measurements from our current seismic CPTs, as well as the prior downhole study all indicate that once embedded 10 to 15 feet in the Old Alluvium, the shear wave velocity values are generally 1,940 ft/s or greater. The deepest geophysical study at the site extended nearly 70 feet below grade and indicated shear wave velocities of 2,560 ft/s below a depth of 42 feet. Based on a review of all of the data, Vs_{30} values for the proposed Garage and Tower sites were developed by extrapolating the Old Alluvium to a depth of 100 feet using a conservative lower bound of 1,940 ft/s for the Old Alluvium below refusal depth.

Based on the shear velocity profile measurements, the average shear wave velocity in the upper 100 feet (Vs_{30}) ranged from about 1,389 ft/s to 1,393 ft/s for CPT-1 and CPT-2, respectively. Therefore, a value of 1,390 ft/s or 424 meters per second [m/s] was adopted for the proposed Garage site. Based on CPT-5, a Vs_{30} value of 1,598 ft/s or 487 m/s was adopted for the proposed Tower site. Both sites classify as Site Class C per ASCE 7-16.

E.4 GROUND MOTION PREDICTION EQUATIONS

Site-specific ground motions are influenced by type of faulting, magnitude of characteristic earthquakes, and local soil conditions. Many ground motion models, also referred to as Ground Motion Prediction Equations (GMPEs) have been developed to estimate the variation of spectral acceleration with earthquake magnitude and source-to-site distance, among other parameters. The Pacific Earthquake Engineering Research (PEER) coordinated a large multidisciplinary project entitled “NGA (Next Generation Attenuation)-West 2 Research Project” (Bozorgnia et al., 2014), referred to as NGA-West2.

In NGA-West2, five teams developed and presented horizontal ground motion models for shallow crustal earthquakes in active tectonic regions including Western North America. These teams were Abrahamson et al. (2014), Boore et al. (2014), Campbell and Bozorgnia (2014), Choiu and Youngs (2014), and Idriss (2014). All of the GMPEs were used in our analyses. However, as the Idriss (2014) model is only applicable to Vs_{30} values over 450 m/s, it was used only for the Tower site. Where all five models were used, weights of 0.22 were assigned to all models but Idriss which was assigned a weight of 0.12. Where four were used, equal weight (0.25) was assigned.

The NGA-West2 relationships use measured values of shear wave velocity ($V_{S,30}$) as input. As previously discussed, we adopted an average Vs_{30} of 424 m/s at the proposed Garage and 487 m/s at the proposed Tower site to represent the underlying soil conditions. In addition, some of the ground motion models require input for $Z_{1.0}$ (defined as the depth in meters to a shear wave velocity of 1 km/s) and $Z_{2.5}$ (defined as the depth in km to a shear wave velocity of 2.5 km/s). These two parameters are used to capture the basin effect on site response. The SCEC Community Velocity Model (CVM) Version 4 was reviewed for selection of $Z_{1.0}$ and $Z_{2.5}$ values. A $Z_{1.0}$ value of 150 m and a $Z_{2.5}$ of 0.35 km were selected.

E.5 PROBABILISTIC SEISMIC HAZARD ANALYSES

Site-specific Probabilistic Seismic Hazard Analyses (PSHA) were performed using the computer program OpenSHA (Fields, 2003), with the UCERF3 seismic source model and the updated NGA-West2 ground motion models. Uniform hazard horizontal ARS were developed up to a period of 10 seconds. The 5-percent damping hazard spectra are presented in Figures E-2a and E-2b.

Supplementary probabilistic seismic hazard analyses were performed using the USGS Unified Hazard Tool (https://earthquake.usgs.gov/hazards/interactive/) for comparison to the OpenSHA analyses. These analyses were performed using the dynamic version of the Conterminous U.S. 2014v4.2.0 at available spectral periods with the Site Class C/D option (Vs_{30} of 360 m/s) and the Site Class C boundary (Vs_{30} of 537 m/s). Results of these supplementary analyses show good agreement with the OpenSHA analyses.

The site-specific probabilistic MCE_R was developed in accordance with ASCE 7-16 Section 21.2.1, for the maximum horizontal component and adjusted for targeted risk of 1-percent probability of collapse in 50 years. The median (RotD50) ground motion was adjusted to the maximum rotated component of ground motion (RotD100) using maximum direction factors recommended by Shahi and Baker (2014). The second adjustment modifies the spectra from a 2-percent probability of exceedance in 50 years to a targeted risk of 1-percent probability of collapse in 50 years, which is performed using Method 1 of ASCE 7-16 (Section 21.2.1), using the risk coefficients C_{RS} and C_{R1}. The risk coefficients (per ASCE 7-16) were obtained using the Structural Engineers Association of California (SEAOC) and Office of Statewide Health Planning and Development (OSHPD) Seismic Design Maps website application (SEAOC/OSHPD, 2019). Risk coefficients C_{RS} of 0.941 and C_{R1} of 0.914 were used. The probabilistic MCE_R ARS for the site are shown in Figures E-2a and E-2b.

E.6 DETERMINISTIC SEISMIC HAZARD ANALYSIS

Site-specific Deterministic Seismic Hazard Analyses (DSHA) were performed based on the characteristics of earthquake scenarios identified as predominant contributors to the regional seismic hazard. Pertinent characteristics of the earthquake scenarios include parameters such as distance from the site to the causative fault and the maximum magnitude of earthquake associated with the fault. The effects of local soil conditions (Vs_{30}) and the mechanism of faulting are accounted for in the ground motion models as well.

DSHAs were performed for four of the sources identified in Table E-1 above, the San Jacinto fault, the Fontana seismicity zone, the San Andreas fault, and the Elsinore fault. The NGA West2 GMMs were used to develop a 5-percent damped spectral ARS for each source. A plot of the DSHA results for the project site is shown in Figures E-3a and E-3b for each site. Note that the San Jacinto fault controls for spectral periods up to about 7.5 seconds, whereas the San Andreas fault begins to control seismic demand for the longer periods.

According to ASCE 7-16 Section 21.2.2, the deterministic MCE_R, which corresponds to the 84th percentile 5-percent damped spectral response accelerations in the direction of maximum horizontal response at any spectral period, must not be lower than deterministic lower limit. Therefore, the 84th percentile spectral values obtained from the GMPEs are used to develop the deterministic spectrum. The ground motions were adjusted to the maximum rotated component of ground motion using the ASCE 7-16 default maximum direction factors. Figures E-3a and E-3b shows the results of our DSHA along with ASCE 7-16 deterministic lower limit spectrum. The deterministic lower limit spectrum controls at the sites.

E.7 DETERMINATION OF SITE-SPECIFIC RESPONSE SPECTRA

Development of the site-specific MCE_R ARS (as defined by Chapter 21.2 of ASCE 7-16) was performed using the seismic hazard analysis procedure described in the previous sections. In accordance with ASCE 7-16 Section 21.2.3, the site-specific MCE_R acceleration response spectra are taken as the lesser of the probabilistic and deterministic MCE_R spectra. The only exception is that the site-specific MCE_R ARS may be taken directly as the probabilistic MCE_R when the peak probabilistic spectrum is less than 1.2 Fa (Section 21.2.3 of Supplement 1 to ASCE 7-16). In addition, per Section 21.3 of ASCE 7-16, the site-specific MCE_R cannot be not less than 150-percent of the 80-pecent of design spectrum determined in accordance with Section 11.4.6 of ASCE 7-16. The resulting MCE_R spectra is presented in Figures E-4a and E-4b. For the project site, the deterministic MCE_R generally governs all spectral periods, with a few limited exceptions where the 150-percent minimum spectrum controls.

The site-specific Design Earthquake spectrum is equal to two-thirds of the site-specific MCE_R spectrum. The MCE_R and the Design Earthquake spectra along with the tabulated values for the project site are presented in Figures E-5a and E-5b.

E.8 SITE-SPECIFIC DESIGN ACCELERATION PARAMETERS

The short period design spectral acceleration (S_{DS}) and 1-second period design spectral acceleration (S_{D1}) parameters were determined in accordance with ASCE 7-16 Section 21.4. The parameter S_{DS} is taken as 90-percent of the maximum spectral acceleration from the site-specific spectrum at periods between 0.2 and 5 seconds. The parameter S_{D1} is taken as the maximum of the product between period and spectral acceleration for periods from 1 to 2 seconds for sites with $V_{S,30}$ greater than or equal to 365 m/s. The parameters S_{MS} and S_{M1} shall be taken as 1.5 times S_{DS} and S_{D1} respectively. The values obtained shall not be less than 80 percent of the values determined in accordance with ASCE 7-16, Section 11.4.3 for S_{MS} and S_{M1} and Section 11.4.4 for S_{DS} and S_{D1}. Table C-2 presents the site-specific design acceleration parameters.

Maximum Considered Earthquake-Geometric Mean, MCE_G, peak ground acceleration adjusted for site effects, PGA_M, was calculated in accordance with ASCE 7-16 Section 21.5. Per ASCE 7-16 Section 21.5, PGA_M shall be taken as the lesser of the probabilistic geometric mean peak ground acceleration and the deterministic geometric mean peak ground acceleration and shall not be less than the 80% of PGA_M obtained from Equation 11.8-1 of this code. The summary of MCE_R and Design Earthquake Site-Specific Seismic Hazard Analyses is provided in Tables E-3a and E-3b attached to this appendix.

Table E-2: Site-Specific Seismic Design Acceleration Parameters

Hazard Level	Parameter	Garage Site	Tower Site
MCE_R	PGA_M	0.600	0.611
	S_{MS}	1.620	1.620
	S_{M1}	0.896	0.790
Design Earthquake	S_{DS}	1.080	1.080
	S_{D1}	0.597	0.527

ATTACHMENTS

Tables E-3a to E-3b Summary of MCE_R and Design Earthquake Site-Specific Seismic Hazard Analyses

FIGURES

Figure E-1 Shear Wave Velocity Plots
Figures E-2a to E-2b Probabilistic MCE_R Acceleration Response Spectra
Figures E-3a to E-3b Deterministic Acceleration Response Spectra
Figures E-4a to E-4b ASCE 7-16 Site-Specific MCE_R Acceleration Response Spectra
Figures E-5a to E-5b ASCE 7-16 Site-Specific Design Earthquake and Acceleration Parameters

Table E-3a: Summary of MCE_R and Design Earthquake Site-Specific Seismic Hazard Analyses (Garage Site)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Period (sec)	Probabilistic Sa_{RotD50} (g)	$Sa_{RotD100}$ / Sa_{RotD50}	Risk Coefficient, C_R	Probabilistic MCE_R (g)	Deterministic 84-%ile MCE, $Sa_{RotD100}$ (g)	Deterministic Lower Limit MCE (g)	Deterministic MCE_R (g)	Site-Specific MCE_R (g)	2/3 Site-Specific MCE_R (g)	ASCE 7-16 Mapped Design ARS (g)	80% of Mapped Design ARS (g)	150% of 80%-Mapped Design ARS (g)	**Final Site-Specific MCE_R (g)**	**Final Design ARS (g)**
0.01	0.837	1.19	0.941	0.938	0.695	0.754	0.754	0.754	0.503	0.557	0.446	0.669	0.754	0.503
0.02	0.846	1.19	0.941	0.947	0.702	0.762	0.762	0.762	0.508	0.634	0.507	0.761	0.762	0.508
0.03	0.906	1.19	0.941	1.015	0.743	0.806	0.806	0.806	0.538	0.711	0.569	0.854	0.854	0.569
0.05	1.124	1.19	0.941	1.258	0.878	0.953	0.953	0.953	0.635	0.866	0.693	1.039	1.039	0.693
0.075	1.455	1.19	0.941	1.629	1.084	1.176	1.176	1.176	0.784	1.059	0.847	1.270	1.270	0.847
0.1	1.690	1.19	0.941	1.893	1.243	1.349	1.349	1.349	0.899	1.200	0.960	1.440	1.440	0.960
0.15	1.913	1.2	0.941	2.160	1.475	1.601	1.601	1.601	1.067	1.200	0.960	1.440	1.601	1.067
0.2	1.996	1.21	0.941	2.273	1.605	1.742	1.742	1.742	1.161	1.200	0.960	1.440	1.742	1.161
0.25	1.983	1.22	0.939	2.273	1.659	1.800	1.800	1.800	1.200	1.200	0.960	1.440	1.800	1.200
0.3	1.898	1.22	0.938	2.172	1.653	1.794	1.794	1.794	1.196	1.200	0.960	1.440	1.794	1.196
0.4	1.648	1.23	0.934	1.893	1.545	1.677	1.677	1.677	1.118	1.200	0.960	1.440	1.677	1.118
0.5	1.464	1.23	0.931	1.676	1.409	1.529	1.529	1.529	1.020	1.120	0.896	1.344	1.529	1.020
0.75	1.078	1.24	0.922	1.233	1.074	1.166	1.166	1.166	0.777	0.747	0.597	0.896	1.166	0.777
1	0.809	1.24	0.914	0.916	0.826	0.896	0.896	0.896	0.597	0.560	0.448	0.672	0.896	0.597
1.5	0.521	1.24	0.914	0.591	0.551	0.598	0.598	0.591	0.394	0.373	0.299	0.448	0.591	0.394
2	0.377	1.24	0.914	0.427	0.397	0.430	0.430	0.427	0.285	0.280	0.224	0.336	0.427	0.285
3	0.249	1.25	0.914	0.284	0.263	0.286	0.286	0.284	0.190	0.187	0.149	0.224	0.284	0.190
4	0.187	1.26	0.914	0.215	0.193	0.210	0.210	0.210	0.140	0.140	0.112	0.168	0.210	0.140
5	0.151	1.26	0.914	0.173	0.149	0.161	0.161	0.161	0.108	0.112	0.090	0.134	0.161	0.108
7.5	0.093	1.28	0.914	0.109	0.085	0.092	0.092	0.092	0.061	0.075	0.060	0.090	0.092	0.061
10	0.062	1.29	0.914	0.073	0.054	0.058	0.058	0.058	0.039	0.045	0.036	0.054	0.058	0.039

Column Descriptions

1 Spectral period

2 2% in 50 year, RotD50 Probabilistic ARS

3 Factors to adjust to Maximum Direction (Shahi & Baker, 2014)

4 Risk Coefficients Per Method 1 of ASCE 7-16 Section 21.2.1, obtained from SEAOC/OSHPD Seismic Design Maps tool (SEAOC/OSPHD, 2022).

5 Probabilistic MCE_R ARS, adjusted for maximum direction of horizontal response and targeted risk of 1% probability of collapse in 50 years (columns 2 x 3 x 4) per ASCE 7-16 Section 21.2.1

6 Upper envelop of 84-percentile, Deterministic ARS adjusted for maximum direction for all sources. Not required where Peak Sa from Probabilistic MCE_R is less than 1.2Fa per ASCE 7-16 Supplement 1 Section 21.2.2

7 Deterministic Lower Limit (Peak Sa must be at least 1.5*Fa) in accordance with Supplement 1 of ASCE 7-16. Not required where Peak Sa from Probabilistic MCE_R is less than 1.2Fa per ASCE 7-16 Supplement 1 Section 21.2.2

8 Deterministic MCE_R (greater of columns 6 and 7) per ASCE 7-16 Section 21.2.2. Not required where Peak Sa from Probabilistic MCE_R is less than 1.2Fa per ASCE 7-16 Supplement 1 Section 21.2.2

9 Site-Specific MCE_R (lesser of Deterministic $MCE_R$and Probabilistic MCE_R, or lesser of columns 5 and 8) in accordance with Section 21.2.3 of ASCE 7-16

10 2/3 of Column 9 per Equation 21.3-1 of ASCE 7-16 Section 21.3

11 Mapped Design Earthquake ARS in accordance with ASCE 7-16 Section 11.4.7 as modified by Section 21.3

12 80% of Mapped Design Earthquake ARS (lower limit check) per Section 21.4

13 150% of the 80% of Mapped Design Earthquake ARS (MCE lower limit check per ASCE 7-16 Supplement 1 Section 21.3)

14 Final Site-Specific MCE_R ARS per Section 21.2.3 (greater of columns 9 and 13)

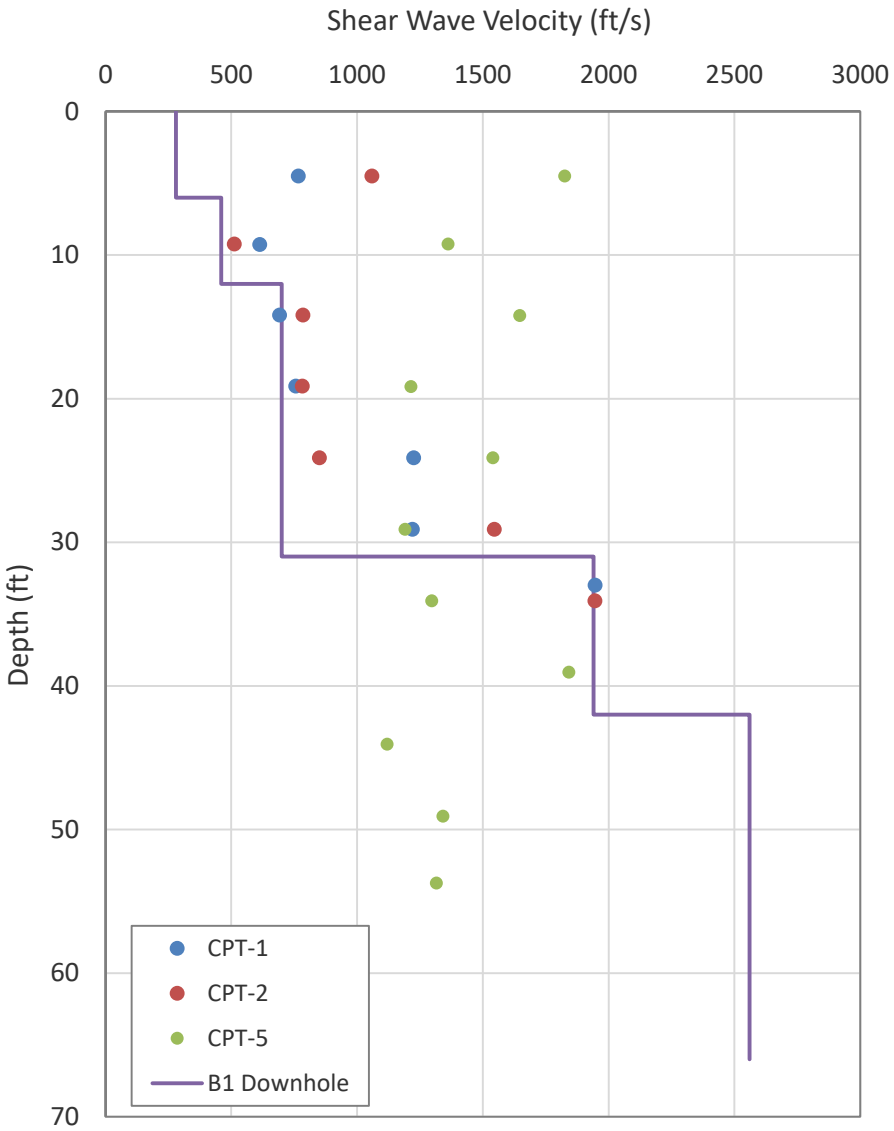
15 Final Design Earthquake ARS per Section 21.3 (greater of columns 10 and 12)

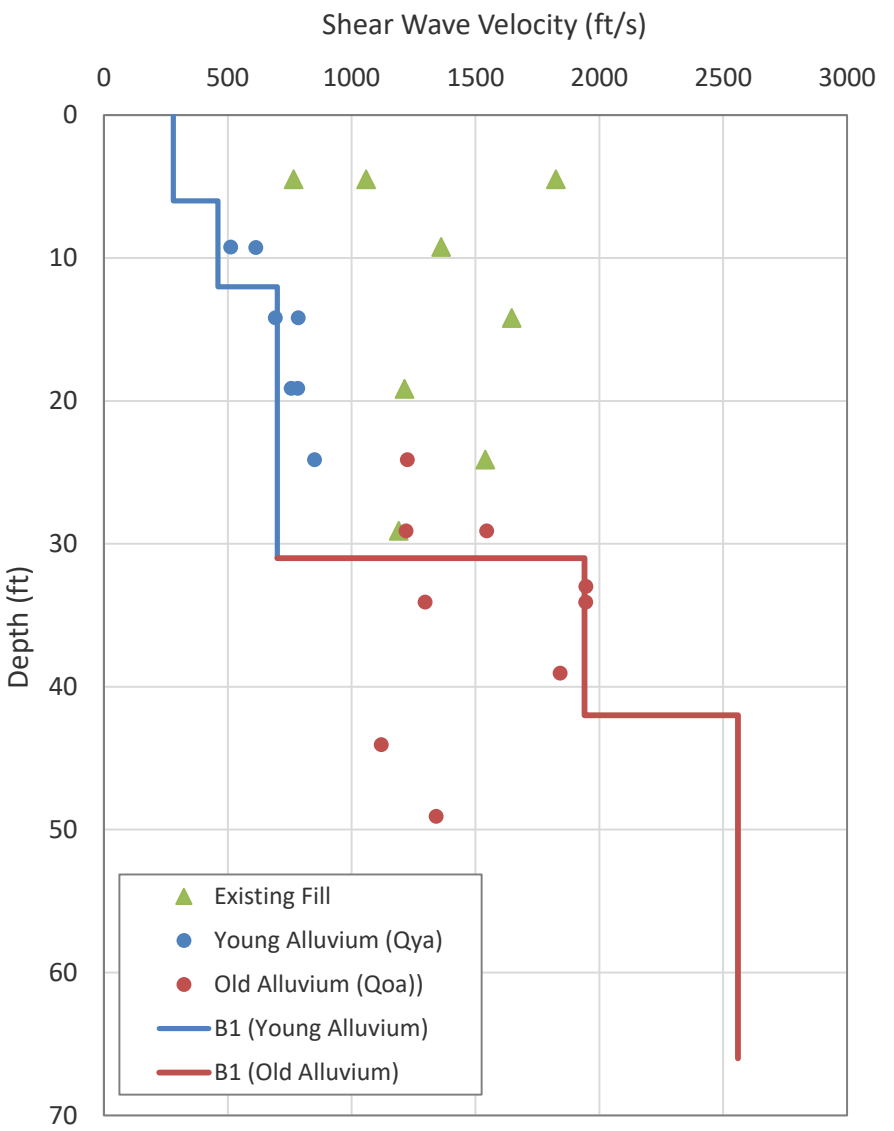
Table E-3b: Summary of MCE_R and Design Earthquake Site-Specific Seismic Hazard Analyses (Tower Site)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Period (sec)	Probabilistic Sa_{RotD50} (g)	$Sa_{RotD100}$ / Sa_{RotD50}	Risk Coefficient, C_R	Probabilistic MCE_R (g)	Deterministic 84-%ile MCE, $Sa_{RotD100}$ (g)	Deterministic Lower Limit MCE (g)	Deterministic MCE_R (g)	Site-Specific MCE_R (g)	2/3 Site-Specific MCE_R (g)	ASCE 7-16 Mapped Design ARS (g)	80% of Mapped Design ARS (g)	150% of 80%-Mapped Design ARS (g)	**Final Site-Specific MCE_R (g)**	**Final Design ARS (g)**
0.01	0.822	1.19	0.941	0.921	0.727	0.784	0.784	0.784	0.523	0.557	0.446	0.669	0.784	0.523
0.02	0.833	1.19	0.941	0.932	0.738	0.796	0.796	0.796	0.530	0.634	0.507	0.761	0.796	0.530
0.03	0.899	1.19	0.941	1.007	0.792	0.854	0.854	0.854	0.569	0.711	0.569	0.854	0.854	0.569
0.05	1.134	1.19	0.941	1.270	0.933	1.006	1.006	1.006	0.670	0.866	0.693	1.039	1.039	0.693
0.075	1.478	1.19	0.941	1.655	1.169	1.261	1.261	1.261	0.840	1.059	0.847	1.270	1.270	0.847
0.1	1.711	1.19	0.941	1.916	1.344	1.449	1.449	1.449	0.966	1.200	0.960	1.440	1.449	0.966
0.15	1.922	1.2	0.941	2.170	1.579	1.702	1.702	1.702	1.135	1.200	0.960	1.440	1.702	1.135
0.2	1.979	1.21	0.941	2.254	1.665	1.796	1.796	1.796	1.197	1.200	0.960	1.440	1.796	1.197
0.25	1.936	1.22	0.939	2.218	1.669	1.800	1.800	1.800	1.200	1.200	0.960	1.440	1.800	1.200
0.3	1.790	1.22	0.938	2.047	1.585	1.709	1.709	1.709	1.139	1.200	0.960	1.440	1.709	1.139
0.4	1.547	1.23	0.934	1.777	1.442	1.555	1.555	1.555	1.036	1.200	0.960	1.440	1.555	1.036
0.5	1.358	1.23	0.931	1.555	1.292	1.393	1.393	1.393	0.929	1.120	0.896	1.344	1.393	0.929
0.75	0.994	1.24	0.922	1.136	0.951	1.025	1.025	1.025	0.684	0.747	0.597	0.896	1.025	0.684
1	0.745	1.24	0.914	0.844	0.732	0.789	0.789	0.789	0.526	0.560	0.448	0.672	0.789	0.526
1.5	0.484	1.24	0.914	0.549	0.489	0.527	0.527	0.527	0.351	0.373	0.299	0.448	0.527	0.351
2	0.352	1.24	0.914	0.399	0.358	0.386	0.386	0.386	0.257	0.280	0.224	0.336	0.386	0.257
3	0.234	1.25	0.914	0.268	0.250	0.270	0.270	0.268	0.179	0.187	0.149	0.224	0.268	0.179
4	0.178	1.26	0.914	0.205	0.189	0.203	0.203	0.203	0.136	0.140	0.112	0.168	0.203	0.136
5	0.144	1.26	0.914	0.166	0.150	0.162	0.162	0.162	0.108	0.112	0.090	0.134	0.162	0.108
7.5	0.091	1.28	0.914	0.106	0.091	0.098	0.098	0.098	0.065	0.075	0.060	0.090	0.098	0.065
10	0.061	1.29	0.914	0.072	0.058	0.063	0.063	0.063	0.042	0.045	0.036	0.054	0.063	0.042

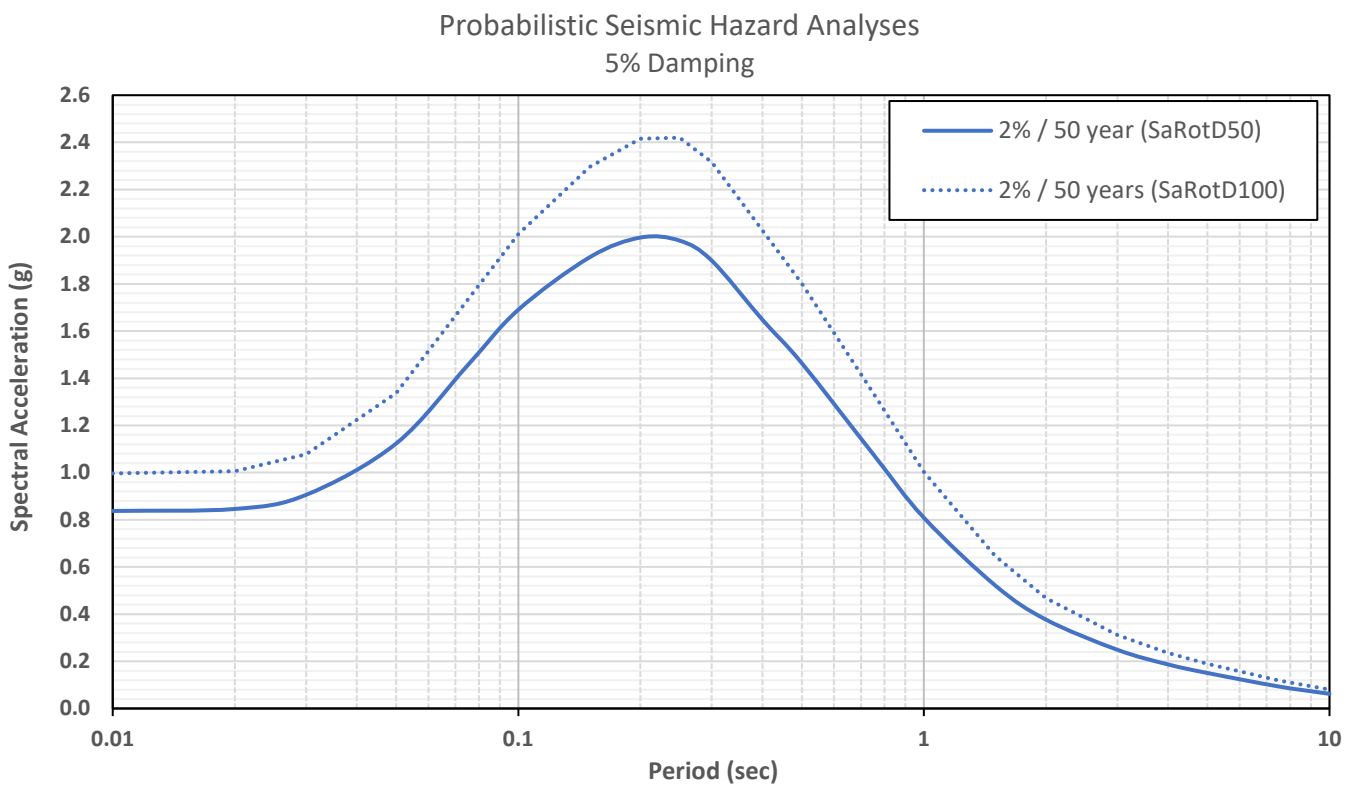
Column Descriptions

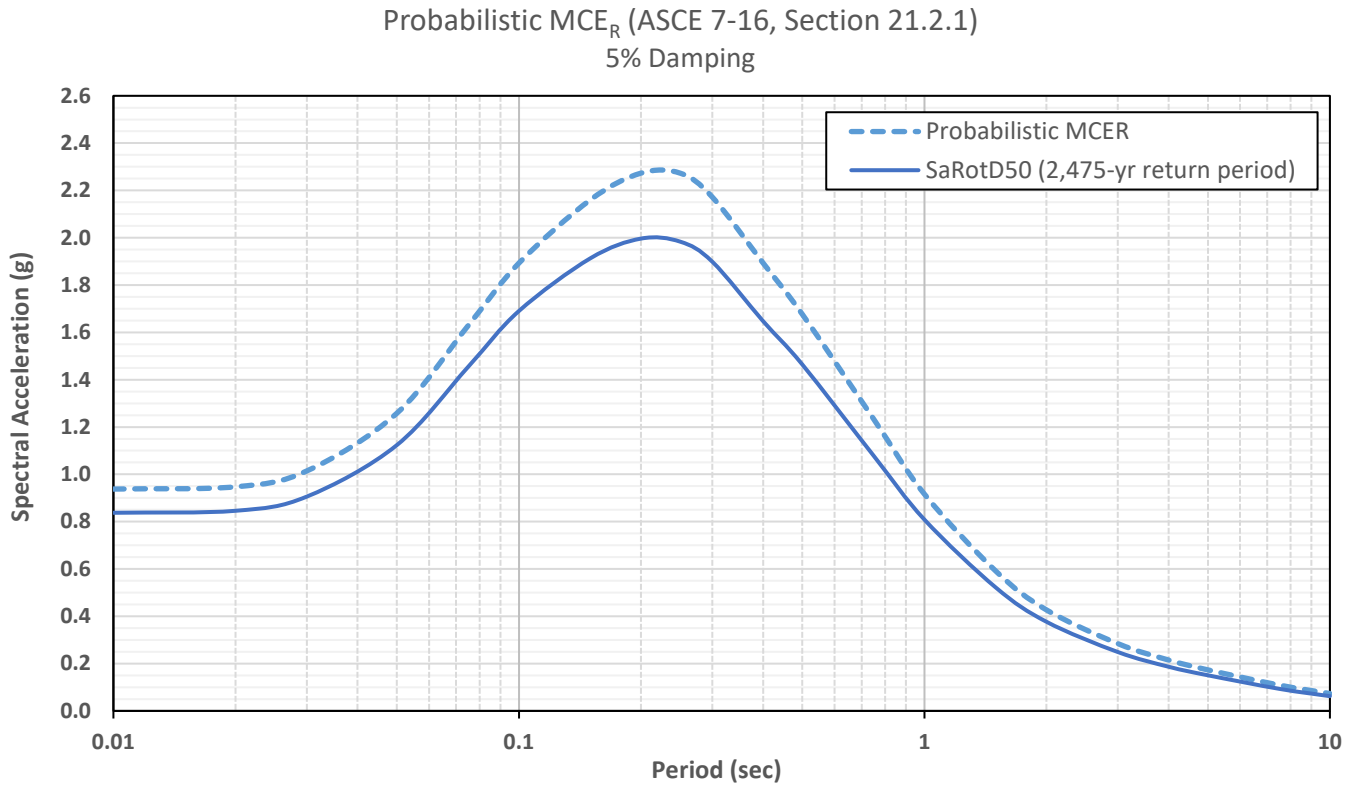
1 Spectral period
2 2% in 50 year, RotD50 Probabilistic ARS
3 Factors to adjust to Maximum Direction (Shahi & Baker, 2014)
4 Risk Coefficients Per Method 1 of ASCE 7-16 Section 21.2.1, obtained from SEAOC/OSHPD Seismic Design Maps tool (SEAOC/OSPHD, 2022).
5 Probabilistic MCE_R ARS, adjusted for maximum direction of horizontal response and targeted risk of 1% probability of collapse in 50 years (columns 2 x 3 x 4) per ASCE 7-16 Section 21.2.1
6 Upper envelop of 84-percentile, Deterministic ARS adjusted for maximum direction for all sources. Not required where Peak Sa from Probabilistic MCE_R is less than 1.2Fa per ASCE 7-16 Supplement 1 Section 21.2.2
7 Deterministic Lower Limit (Peak Sa must be at least 1.5*Fa) in accordance with Supplement 1 of ASCE 7-16. Not required where Peak Sa from Probabilistic MCE_R is less than 1.2Fa per ASCE 7-16 Supplement 1 Section 21.2.2
8 Deterministic MCE_R (greater of columns 6 and 7) per ASCE 7-16 Section 21.2.2. Not required where Peak Sa from Probabilistic MCE_R is less than 1.2Fa per ASCE 7-16 Supplement 1 Section 21.2.2
9 Site-Specific MCE_R (lesser of Deterministic $MCE_R$and Probabilistic MCE_R, or lesser of columns 5 and 8) in accordance with Section 21.2.3 of ASCE 7-16
10 2/3 of Column 9 per Equation 21.3-1 of ASCE 7-16 Section 21.3
11 Mapped Design Earthquake ARS in accordance with ASCE 7-16 Section 11.4.7 as modified by Section 21.3
12 80% of Mapped Design Earthquake ARS (lower limit check) per Section 21.4
13 150% of the 80% of Mapped Design Earthquake ARS (MCE lower limit check per ASCE 7-16 Supplement 1 Section 21.3)
14 Final Site-Specific MCE_R ARS per Section 21.2.3 (greater of columns 9 and 13)
15 Final Design Earthquake ARS per Section 21.3 (greater of columns 10 and 12)



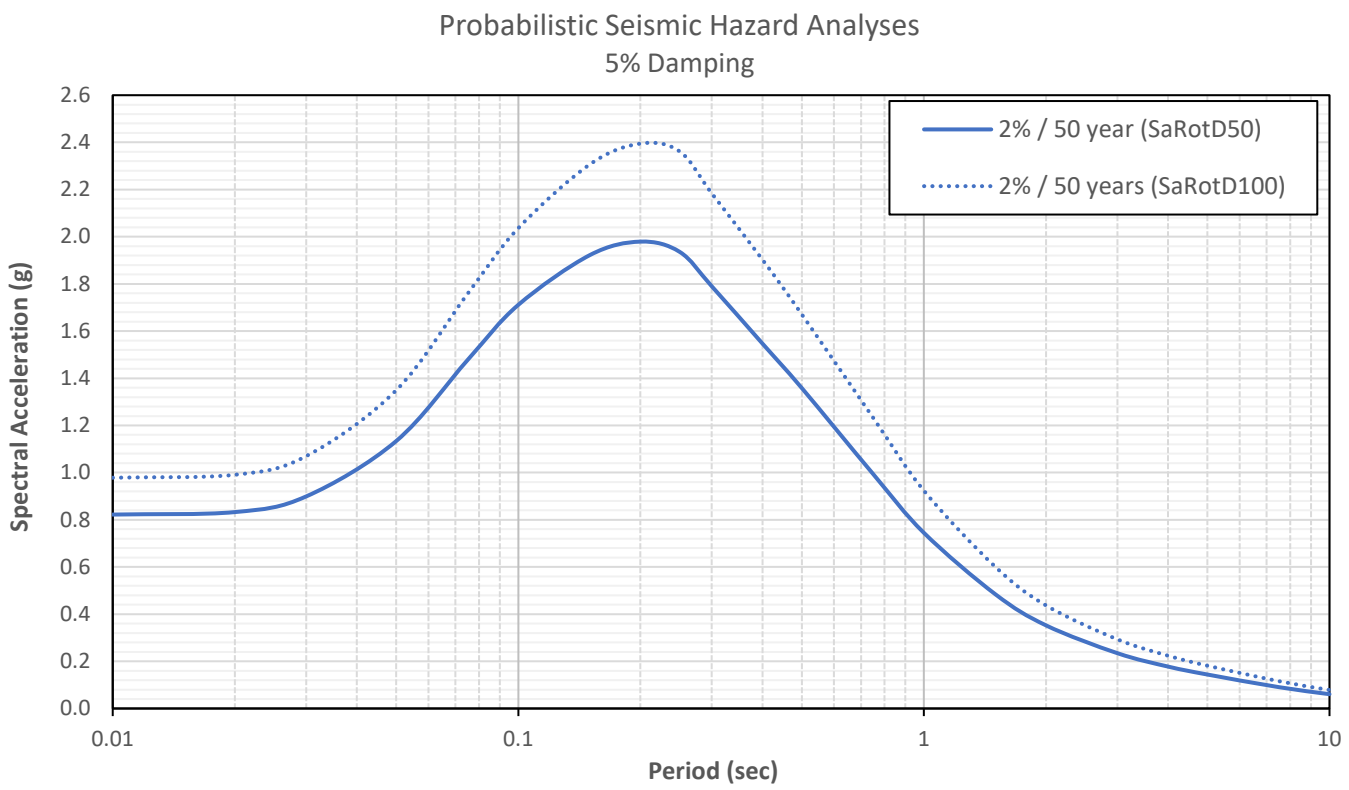


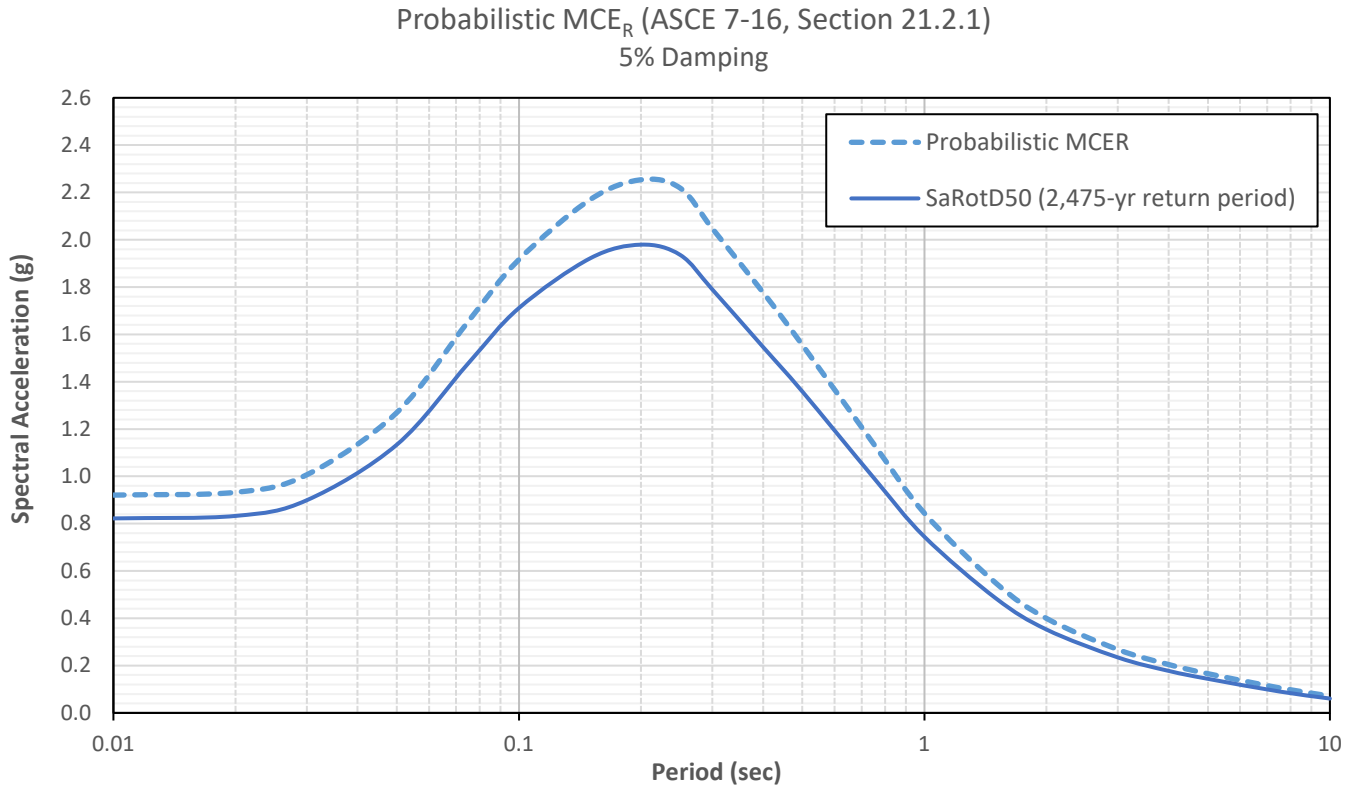
PROJECT NAME	FIGURE NAME	GROUP DELTA	
Riverside Community Hospital **445 Magnolia Avenue, Riverside**	**Shear Wave Velocity Plots**	PROJECT NUMBER SD809	FIGURE NUMBER E-1



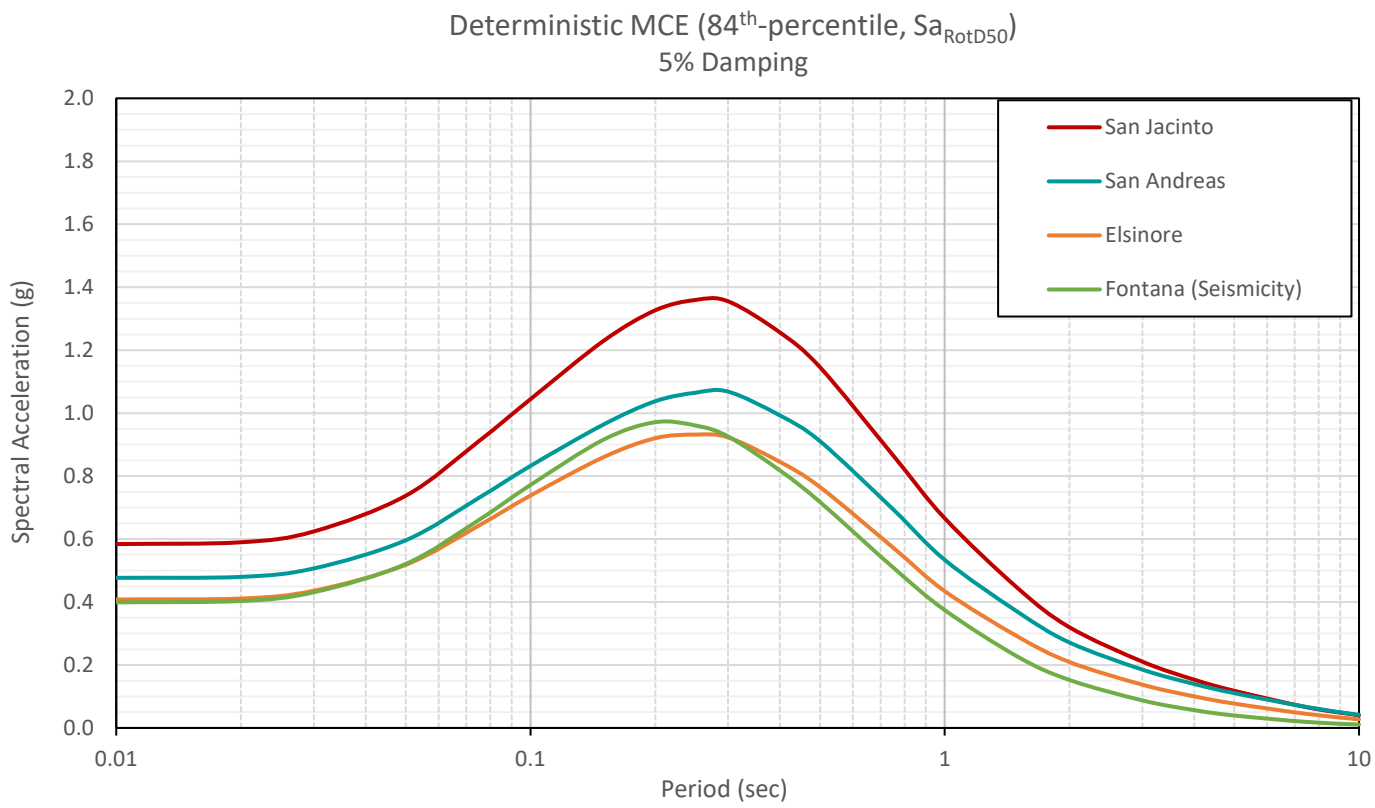


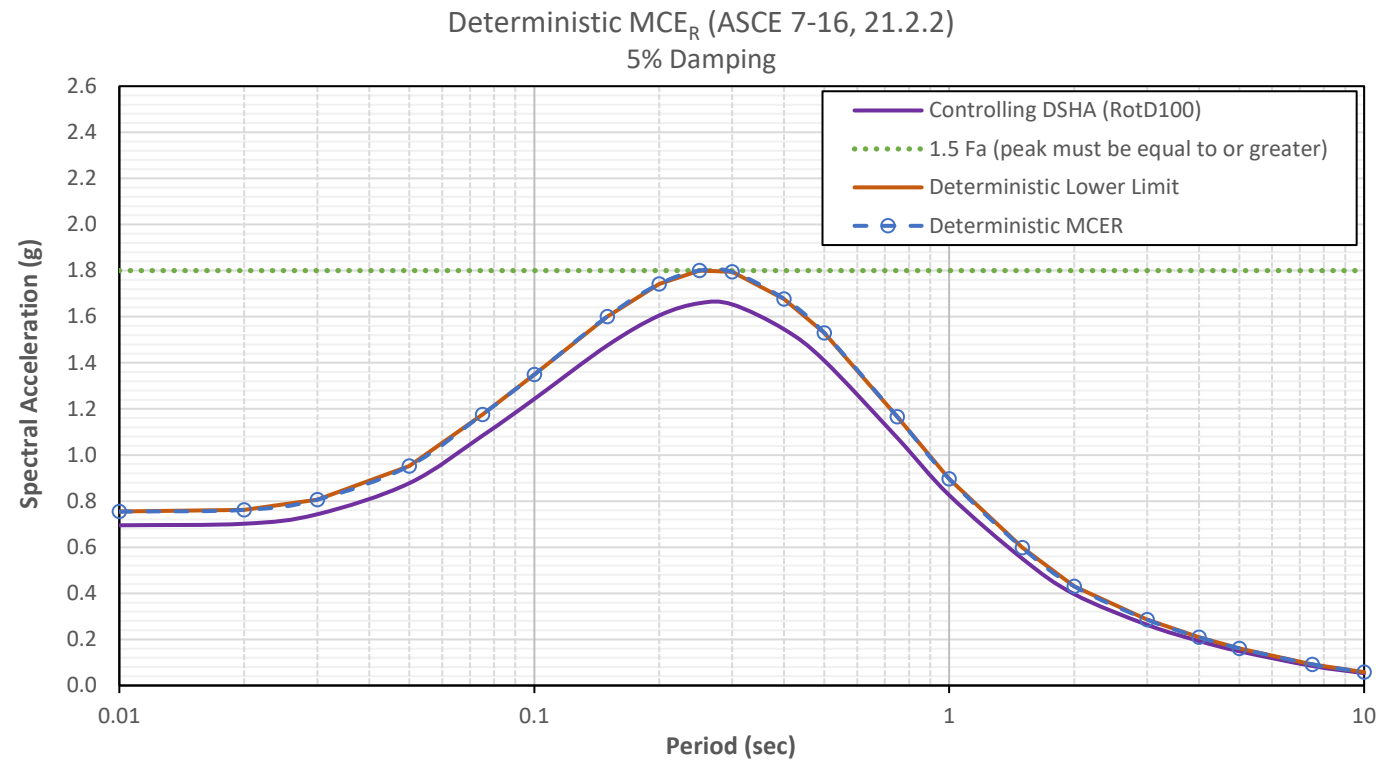
PROJECT NAME	FIGURE NAME	GROUP DELTA	
Riverside Community Hospital - Garage **4445 Magnolia Avenue**	**Probabilistic Acceleration Response Spectra**	PROJECT NUMBER SD809	FIGURE NUMBER E-2a





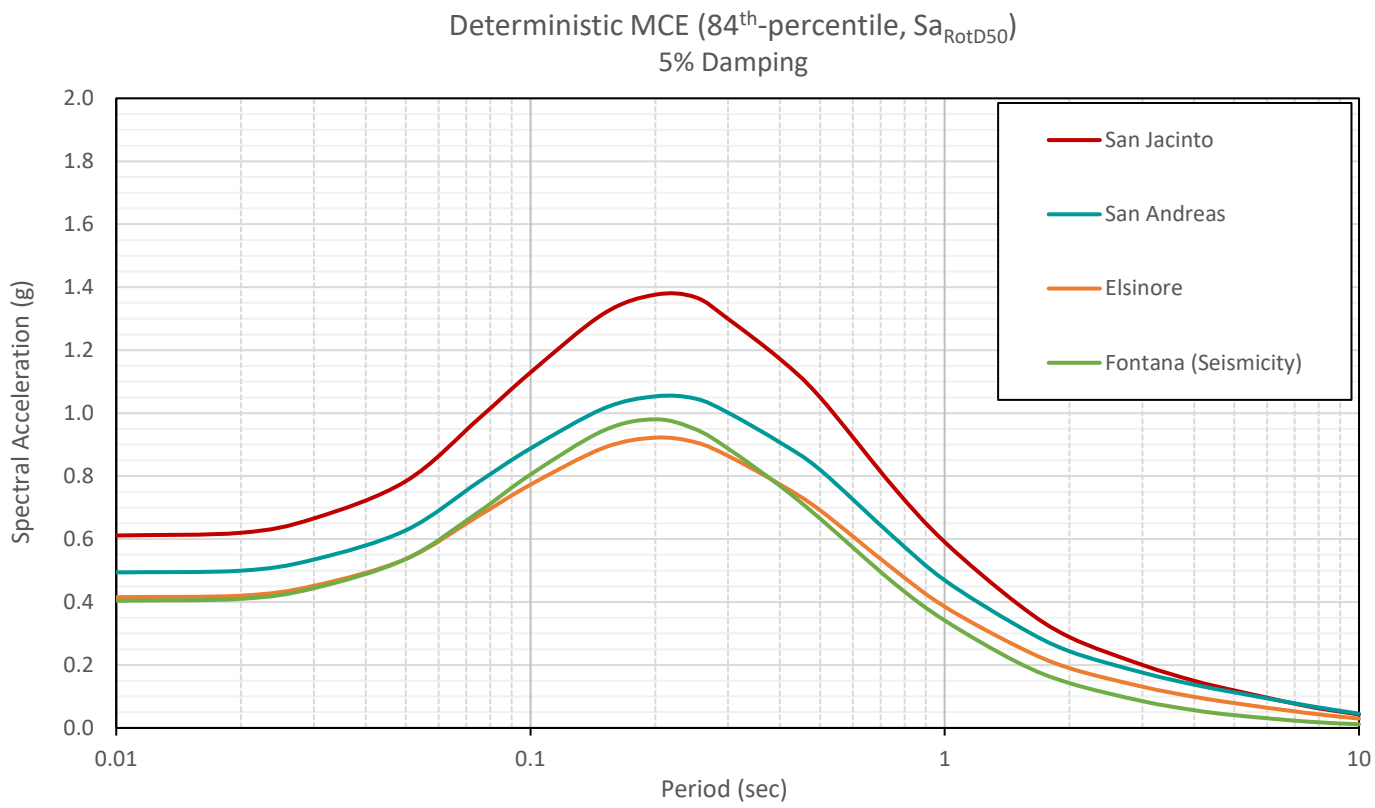
PROJECT NAME	FIGURE NAME	GROUP DELTA	
Riverside Community Hospital - Tower **4445 Magnolia Avenue**	**Probabilistic Acceleration Response Spectra**	PROJECT NUMBER SD809	FIGURE NUMBER E-2b

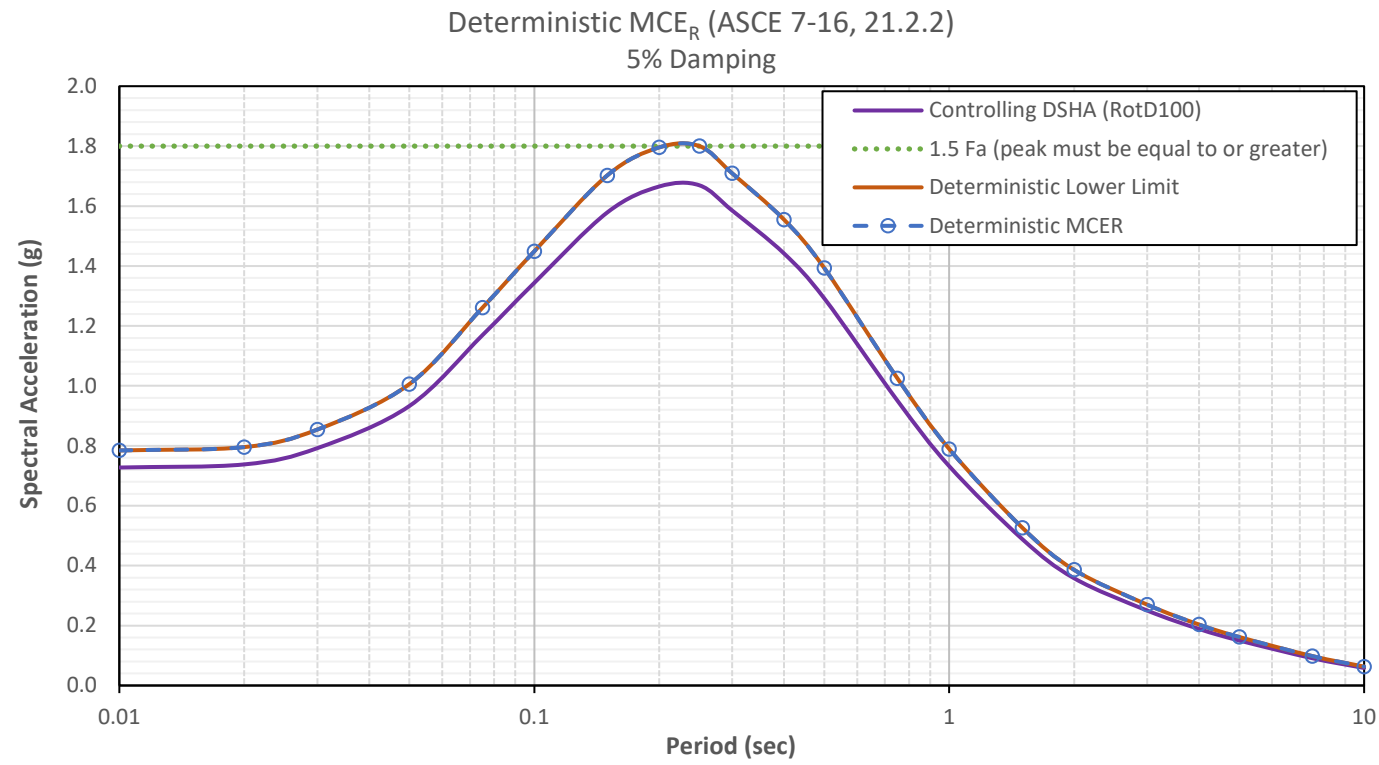




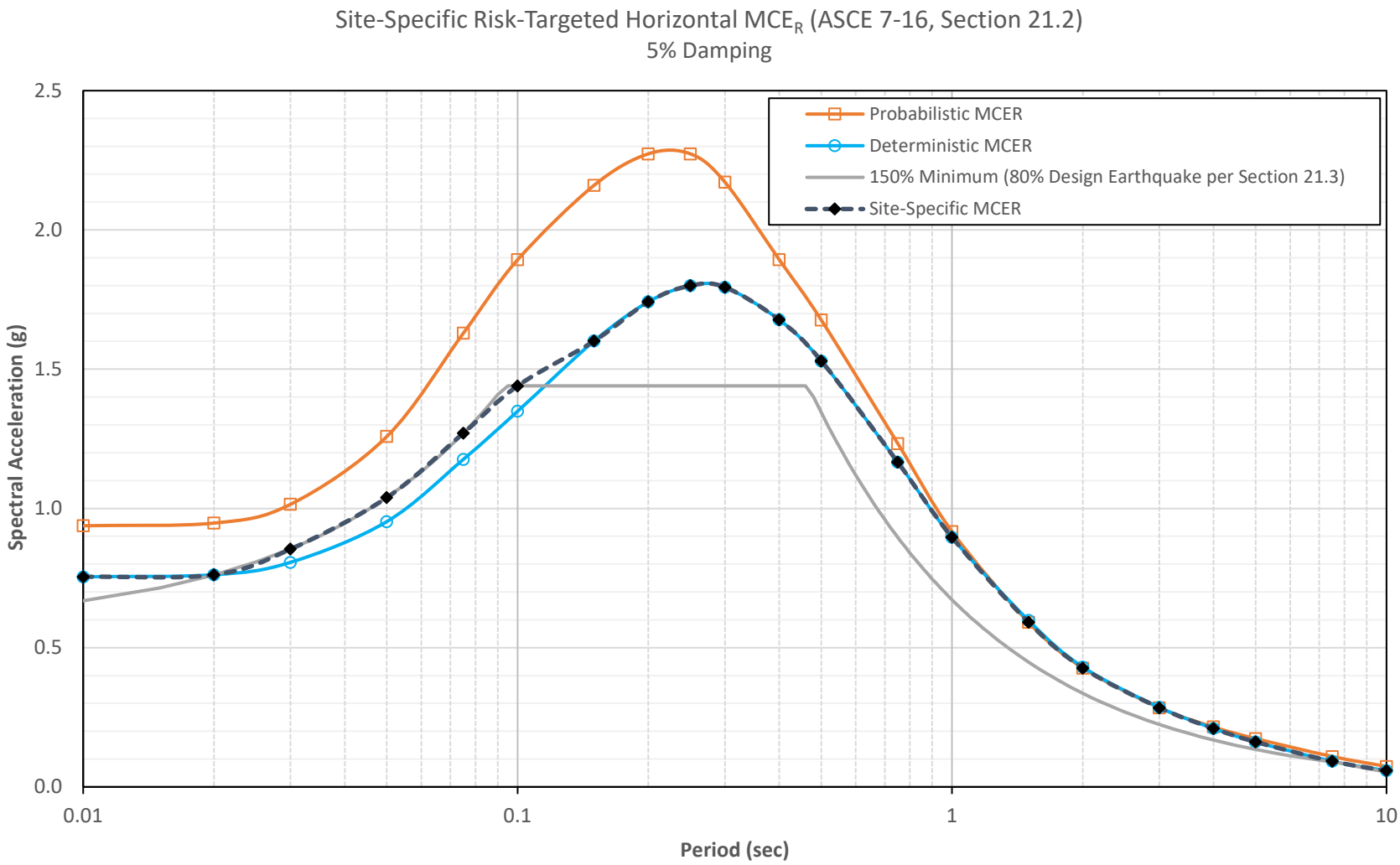
PROJECT NAME	FIGURE NAME		
Riverside Community Hospital - Garage **4445 Magnolia Avenue**	**Deterministic Acceleration Response Spectra**	PROJECT NUMBER SD809	FIGURE NUMBER E-3a

GROUP DELTA

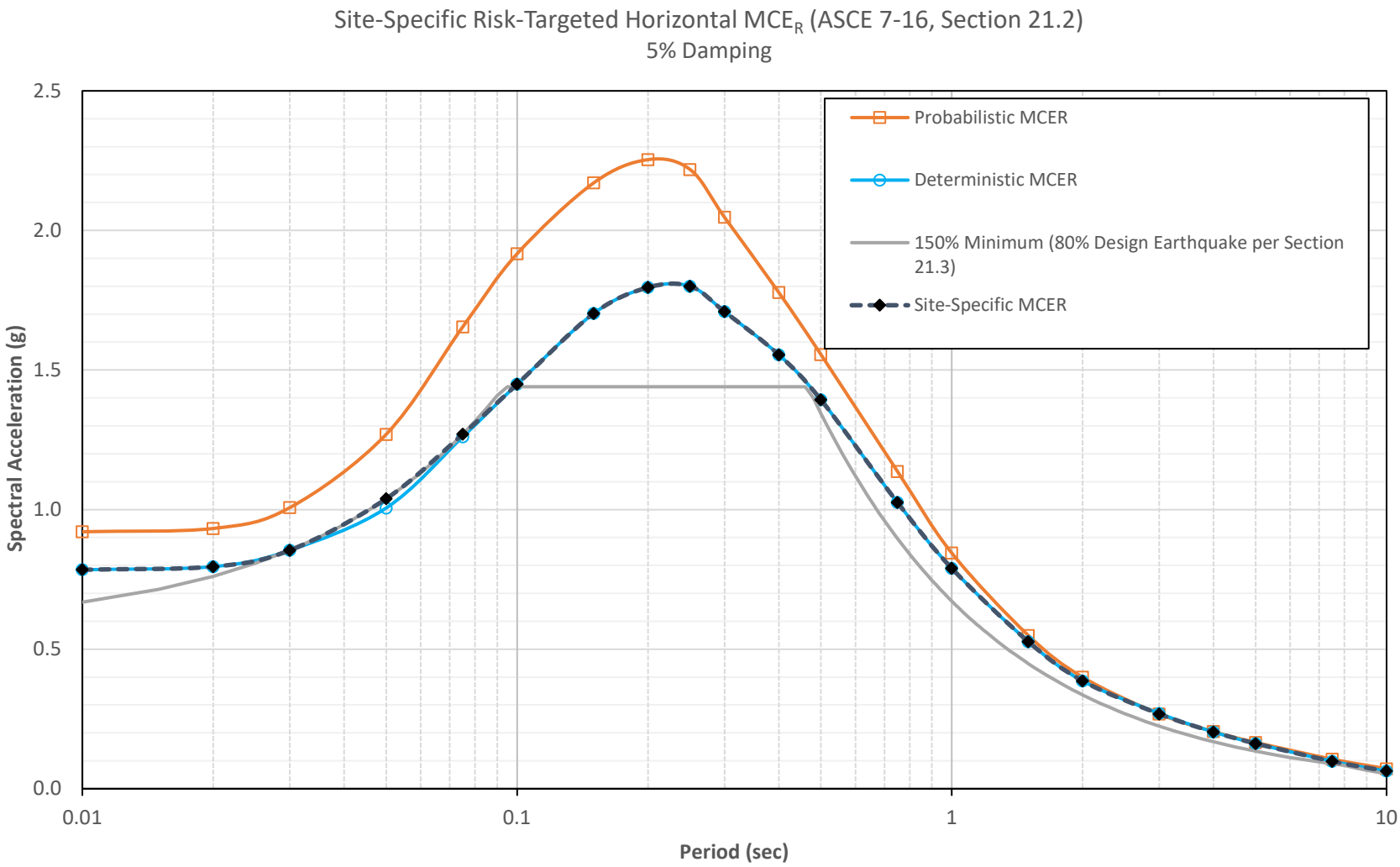




PROJECT NAME	FIGURE NAME	GROUP DELTA	
Riverside Community Hospital - Tower 4445 Magnolia Avenue	**Deterministic Acceleration Response Spectra**	PROJECT NUMBER SD809	FIGURE NUMBER E-3b

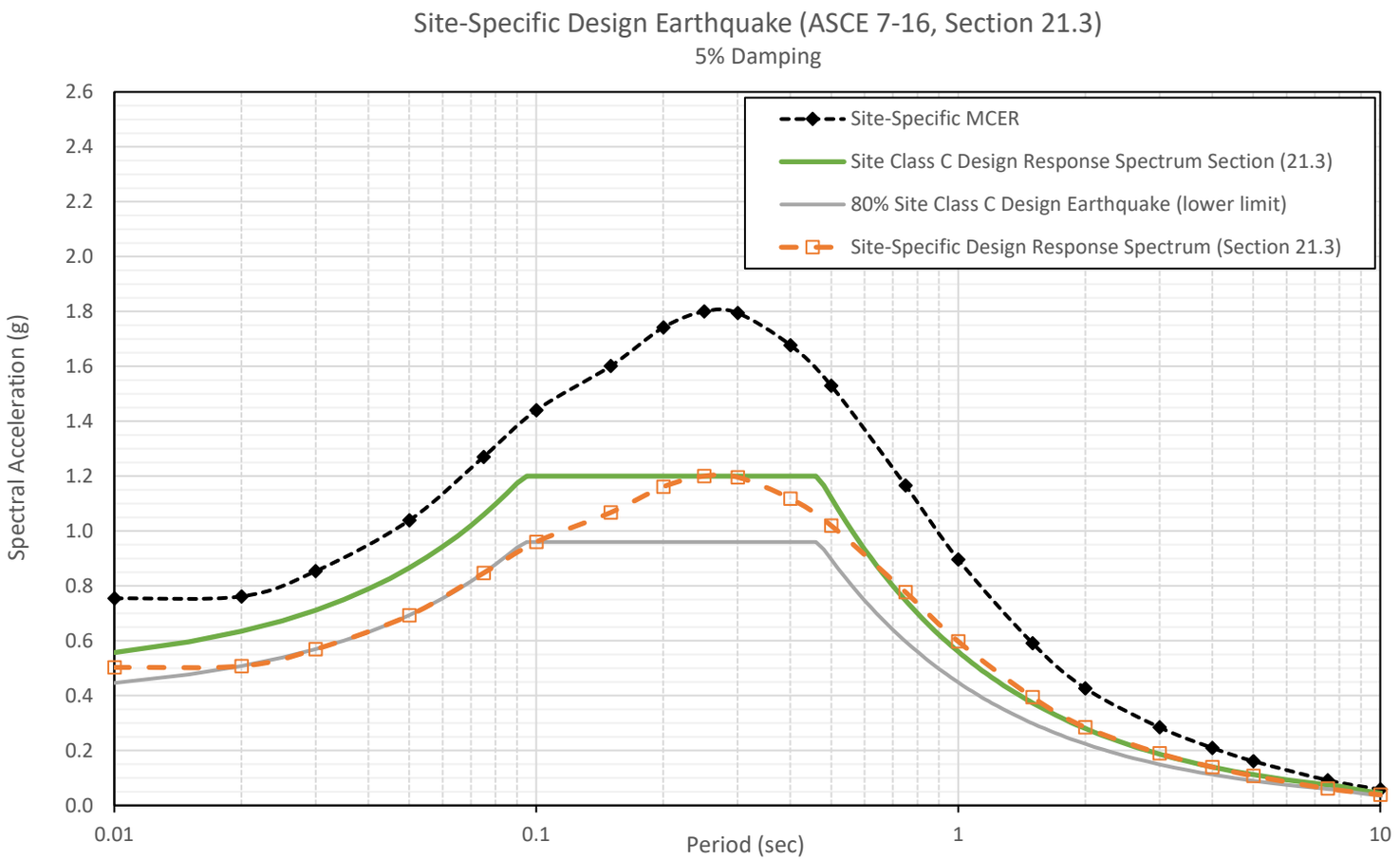


PROJECT NAME	FIGURE NAME	GROUP DELTA	
Riverside Community Hospital - Garage **4445 Magnolia Avenue**	**ASCE 7-16 Site-Specific MCE$_R$** **Acceleration Response Spectra**	PROJECT NUMBER SD809	FIGURE NUMBER E-4a



PROJECT NAME	FIGURE NAME	GROUP DELTA	
Riverside Community Hospital - Tower **4445 Magnolia Avenue**	**ASCE 7-16 Site-Specific MCE$_R$** **Acceleration Response Spectra**	PROJECT NUMBER SD756	FIGURE NUMBER E-4b

ASCE 7-16 MCE_R and Design Earthquake		
Period	Design	MCE_R
(sec)	Sa (g)	Sa (g)
0.01	0.503	0.754
0.02	0.508	0.762
0.03	0.569	0.854
0.05	0.693	1.039
0.075	0.847	1.270
0.1	0.960	1.440
0.15	1.067	1.601
0.2	1.161	1.742
0.25	1.200	1.800
0.3	1.196	1.794
0.4	1.118	1.677
0.5	1.020	1.529
0.75	0.777	1.166
1	0.597	0.896
1.5	0.394	0.591
2	0.285	0.427
3	0.190	0.284
4	0.140	0.210
5	0.108	0.161
7.5	0.061	0.092
10	0.039	0.058



Site-Specific Design Acceleration Parameters (ASCE 7-16 Section 21.4)

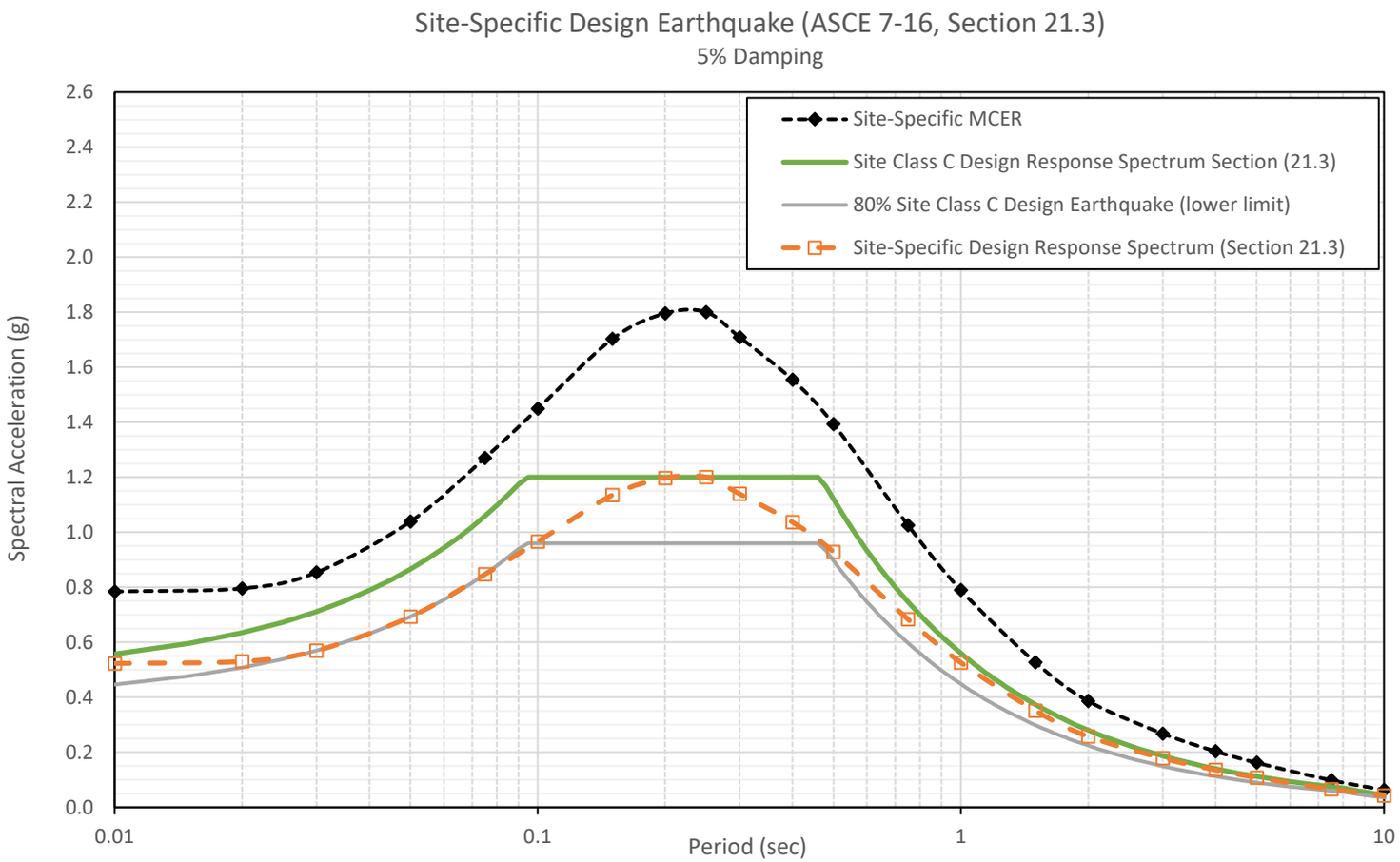
S_{DS} = 90% of the peak S_a from T =0.2 to 5 s (not less than 80% of mapped S_{DS})

S_{D1} = Peak $T*S_a$ between periods of 1 second and 2 seconds (not less than 80% of mapped S_{D1})

S_{DS} = 1.080 **S_{D1} =** 0.597

PROJECT NAME	FIGURE NAME	GROUP DELTA	
Riverside Community Hospital - Garage **4445 Magnolia Avenue**	**ASCE 7-16 Site-Specific Design Earthquake and Site-Specific Design Acceleration Parameters**	PROJECT NUMBER SD809	FIGURE NUMBER E-5a

ASCE 7-16 MCE_R and Design Earthquake		
Period	Design	MCE_R
(sec)	Sa (g)	Sa (g)
0.01	0.523	0.784
0.02	0.530	0.796
0.03	0.569	0.854
0.05	0.693	1.039
0.075	0.847	1.270
0.1	0.966	1.449
0.15	1.135	1.702
0.2	1.197	1.796
0.25	1.200	1.800
0.3	1.139	1.709
0.4	1.036	1.555
0.5	0.929	1.393
0.75	0.684	1.025
1	0.526	0.789
1.5	0.351	0.527
2	0.257	0.386
3	0.179	0.268
4	0.136	0.203
5	0.108	0.162
7.5	0.065	0.098
10	0.042	0.063



Site-Specific Design Acceleration Parameters (ASCE 7-16 Section 21.4)

S_{DS} = 90% of the peak S_a from T =0.2 to 5 s (not less than 80% of mapped S_{DS})

S_{D1} = Peak $T*S_a$ between periods of 1 second and 2 seconds (not less than 80% of mapped S_{D1})

S_{DS} = 1.080 **S_{D1} =** 0.527

PROJECT NAME	FIGURE NAME	GROUP DELTA	
Riverside Community Hospital - Tower 4445 Magnolia Avenue	**ASCE 7-16 Site-Specific Design Earthquake and Site-Specific Design Acceleration Parameters**	PROJECT NUMBER SD809	FIGURE NUMBER E-5b

Appendix 4: Historical Site Conditions

Phase I Environmental Site Assessment or Other Information on Past Site Use

N/A – Not Applicable

Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

N/A – Not Applicable – LID Provided

Appendix 6: BMP Design Details

BMP Sizing, Design Details, and other Supporting Documentation

Table 1 - Infiltration Testing Requirements							
Infiltration BMP	Testing Options	Ring Infiltrometer Tests[1]	Percolation Test[2]	Test Pits or Boring Logs[3]	Final Report[4]	Hydrology Manual[5]	Factor of Safety
Infiltration Trench	Option 1▶	2 tests min. with at least 1 per trench	not used	1 boring or test pit per trench	Required	not used	FS = 3
	Option 2▶	not used	4 tests min. with at least two per trench	1 boring or test pit per trench	Required	not used	FS = 3
	Option 3[7]▶	not used	not used	1 boring or test pit per trench	Required	not used	FS = 6
	Option 4▶	not used	not used	1 boring or test pit per site	not used	only	FS = 10
Infiltration Basin	Option 1▶	2 tests min. with at least 1 per basin[6]	not used	1 boring or test pit per basin	Required	not used	FS = 3
	Option 2▶	not used	4 tests min. with at least 2 per basin[6]	1 boring or test pit per trench	Required	not used	FS = 3
	Option 3[7]▶	not used	not used	1 boring or test pit per basin	Required	not used	FS = 6
	Option 4▶	not used	not used	1 boring or test pit per site	not used	only	FS = 10
Permeable Pavement	Option 1▶	2 tests min. with at least 1 every 10,000 ft^2	not used	1 boring or test pit every 10,000 ft^2	Required	not used	FS = 3
	Option 2▶	not used	4 tests min. with at least 2 every 10,000 ft^2	1 boring or test pit every 10,000 ft^2	Required	not used	FS = 3

Table Footnotes:

[1] Ring Infiltrometer tests per Section 2.2

[2] Percolation tests per Section 2.3 and Well Permeameter Test per Section 2.4

[3] Test pits or boring logs per Section 2.5

[4] Final Report per Section 1.7

[5] See Plate E-6.2 of the District's Hydrology Manual

[6] For basins in excess of 10,000 ft^2, provide one (1) ring infiltrometer test or two (2) percolation tests for each additional 10,000 ft^2

[7] This option may be used for projects with a maximum tributary area of 5 acres only.

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	Kimley-Horn and Associates, Inc.	Date	10/7/2024
Designed by	AG	Case No	
Company Project Number/Name	Riverside Community Hospital Parking Garage		

BMP Identification

BMP NAME / ID: PRBMP-1

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85}= 0.55 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
DMA- A	61184	Concrete or Asphalt	1	0.89	54576.1			
DMA-A	22,080	Ornamental Landscaping	0.1	0.11	2438.9			
	83264	Total			57015	0.55	2613.2	2745.2

Notes:

Detention Basin Infiltration Calculation

Project Name: RCH Garage Expansion
Completed by: AG
Reviewed by: KK
Date: 24-Jan-24
Updated: 14-Mar-25
County: Riverside

BMP	Measured Infiltration Rate*	Design Factor of Safety**	Design Infiltration Rate	Detention Basin Infiltration Area	In/Hr to Ft/Sec Conversion Value	Constant Infiltration Rate
	(in/hr)		(in/hr)	(sf)		(cf/sec)
BMP 1	2.775	2.00	1.39	1647	43200	0.053

*Infiltration rate was taken as the average of the infiltration tests for the BMP
**Design factor of safety is based off Geotech Engineer recommendation

Water Quality Volume Drawdown Calculation

Project Name: RCH Garage Expansion
Completed by: AG
Reviewed by: KK
Date: 24-Jan-24
Updated: 14-Mar-25
County: Riverside

BMP	Design Infiltration Rate	Design Infiltration Rate Converted (k)	Detention Basin Infiltration Area (A)**	Volume to Infiltrate (WQV)	Drawdown Time (t)*
	(in/hr)	(ft/hr)	(sf)	(cf)	(hrs)
BMP 1	1.388	0.116	1647	2745	14.415

*Drawdown time was calculated based on equation from worksheet TC-11 (Infiltration Basin) of the California Stormwater BMP Handbook for New Development and Redevelopment
** Infiltrating surface area calculated by multiplying length and width on BMP-1 details

$$A = \frac{WQV}{kt}$$

where A = Basin invert area (m^2)

WQV = water quality volume (m^3)

k = 0.5 times the lowest field-measured hydraulic conductivity (m/hr)

t = drawdown time (48 hr)

Date: 10/7/2024
Project Name: BMP 1 - 55739 (10-7-2024 22-50-45)

City / County:
State:

Designed By:
Company:
Telephone:

CMP: Underground Detention System Storage Volume Estimation

=Adjustable Input Cells

Contech Engineered Solutions, LLC is pleased to offer the following estimate of storage volume for the above named project. The results are submitted as an estimate only, without liability on the part of Contech Engineered Solutions, LLC for accuracy or suitability to any particular applicaton and are subject to verification of the Engineer of Record. This tool is only applicable for rectangular shaped systems.

Summary of Inputs

System Information		Backfill Information		Pipe & Analysis Information	
Out-to-out length (ft):	61.0	Backfill Porosity (%):	40%	System Diameter (in):	84
Out-to-out width (ft):	27.0	Depth Above Pipe (in):	12.0	Pipe Spacing (in):	36
Number of Manifolds (ea):	1.0	Depth Below Pipe (in):	12.0	Incremental Analysis (in):	2
Number of Barrels (ea):	3.0	Width At Ends (ft):	1.0	System Invert (Elevation):	0
		Width At Sides (ft):	1.0		

Storage Volume Estimation

System		Pipe		Stone		Total System		Miscellaneous	
Depth (ft)	Elevation (ft)	Incremental Storage (cf)	Cumulative Storage (cf)	Incremental Storage (cf)	Cumulative Storage (cf)	Incremental Storage (cf)	Cumulative Storage (cf)	Percent Open Storage (%)	Ave. Surface Area (sf)
0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	730.8
0.17	0.16	0.0	0.0	121.8	121.8	121.8	121.8	0.0%	730.8
0.33	0.33	0.0	0.0	121.8	243.6	121.8	243.6	0.0%	730.8
0.50	0.50	0.0	0.0	121.8	365.4	121.8	365.4	0.0%	730.8
0.67	0.66	0.0	0.0	121.8	487.2	121.8	487.2	0.0%	730.8
0.83	0.83	0.0	0.0	121.8	609.0	121.8	609.0	0.0%	730.8
1.00	1.00	0.0	0.0	121.8	730.8	121.8	730.8	0.0%	730.8
1.17	1.16	45.0	45.0	103.8	834.6	148.8	879.6	5.1%	972.8
1.33	1.33	81.4	126.5	89.2	923.8	170.7	1,050.3	12.0%	1,068.9
1.50	1.50	104.1	230.6	80.1	1,004.0	184.3	1,234.6	18.7%	1,139.7
1.67	1.66	121.8	352.4	73.1	1,077.1	194.9	1,429.4	24.7%	1,196.8
1.83	1.83	136.3	488.7	67.3	1,144.3	203.6	1,633.0	29.9%	1,244.9
2.00	2.00	148.7	637.4	62.3	1,206.6	211.0	1,844.0	34.6%	1,286.3
2.17	2.16	159.4	796.8	58.0	1,264.7	217.5	2,061.5	38.7%	1,322.5
2.33	2.33	168.9	965.7	54.3	1,318.9	223.1	2,284.6	42.3%	1,354.2
2.50	2.50	177.1	1,142.8	50.9	1,369.9	228.1	2,512.7	45.5%	1,382.2
2.67	2.66	184.5	1,327.3	48.0	1,417.9	232.5	2,745.2	48.3%	1,407.0
2.83	2.83	190.9	1,518.2	45.4	1,463.3	236.4	2,981.5	50.9%	1,428.8
3.00	3.00	196.6	1,714.8	43.2	1,506.5	239.8	3,221.3	53.2%	1,448.0
3.17	3.16	201.6	1,916.4	41.2	1,547.6	242.8	3,464.1	55.3%	1,464.7
3.33	3.33	205.9	2,122.4	39.4	1,587.1	245.4	3,709.4	57.2%	1,479.2
3.50	3.50	209.6	2,332.0	37.9	1,625.0	247.6	3,957.0	58.9%	1,491.5
3.67	3.66	212.8	2,544.8	36.7	1,661.7	249.5	4,206.5	60.5%	1,501.8
3.83	3.83	215.4	2,760.1	35.7	1,697.3	251.0	4,457.5	61.9%	1,510.1
4.00	4.00	217.4	2,977.5	34.8	1,732.2	252.2	4,709.7	63.2%	1,516.5
4.17	4.16	218.9	3,196.5	34.2	1,766.4	253.1	4,962.9	64.4%	1,521.0
4.33	4.33	219.9	3,416.4	33.8	1,800.3	253.7	5,216.6	65.5%	1,523.7
4.50	4.50	220.4	3,636.8	33.6	1,833.9	254.0	5,470.7	66.5%	1,524.6
4.67	4.66	220.4	3,857.2	33.6	1,867.5	254.0	5,724.7	67.4%	1,523.7
4.83	4.83	219.9	4,077.1	33.8	1,901.4	253.7	5,978.5	68.2%	1,521.0
5.00	5.00	218.9	4,296.0	34.2	1,935.6	253.1	6,231.6	68.9%	1,516.5
5.17	5.16	217.4	4,513.4	34.8	1,970.4	252.2	6,483.9	69.6%	1,510.1
5.33	5.33	215.4	4,728.8	35.7	2,006.1	251.0	6,734.9	70.2%	1,501.8
5.50	5.50	212.8	4,941.6	36.7	2,042.8	249.5	6,984.3	70.8%	1,491.5
5.67	5.66	209.6	5,151.2	37.9	2,080.7	247.6	7,231.9	71.2%	1,479.2
5.83	5.83	205.9	5,357.1	39.4	2,120.1	245.4	7,477.3	71.6%	1,464.7
6.00	6.00	201.6	5,558.7	41.2	2,161.3	242.8	7,720.0	72.0%	1,448.0

Water Quality Volume Provided

These results are submitted to you as a guideline only, without liability on the part of CONTECH Engineered Solutions, LLC for accuracy or suitability to any particular application, and are subject to your verification.

6.17	6.16	196.6	5,755.4	43.2	2,204.5	239.8	7,959.8	72.3%	1,428.8
6.33	6.33	190.9	5,946.3	45.4	2,249.9	236.4	8,196.2	72.5%	1,407.0
6.50	6.50	184.5	6,130.7	48.0	2,297.9	232.5	8,428.6	72.7%	1,382.2
6.67	6.66	177.1	6,307.9	50.9	2,348.8	228.1	8,656.7	72.9%	1,354.2
6.83	6.83	168.9	6,476.7	54.3	2,403.1	223.1	8,879.8	72.9%	1,322.5
7.00	7.00	159.4	6,636.2	58.0	2,461.1	217.5	9,097.3	72.9%	1,286.3
7.17	7.16	148.7	6,784.9	62.3	2,523.4	211.0	9,308.3	72.9%	1,244.9
7.33	7.33	136.3	6,921.2	67.3	2,590.7	203.6	9,511.9	72.8%	1,196.8
7.50	7.50	121.8	7,043.0	73.1	2,663.8	194.9	9,706.8	72.6%	1,139.7
7.67	7.66	104.1	7,147.1	80.1	2,744.0	184.3	9,891.1	72.3%	1,068.9
7.83	7.83	81.4	7,228.5	89.2	2,833.2	170.7	10,061.7	71.8%	972.8
8.00	8.00	45.0	7,273.6	103.8	2,937.0	148.8	10,210.5	71.2%	730.8
8.17	8.16	0.0	7,273.6	121.8	3,058.8	121.8	10,332.3	70.4%	730.8
8.33	8.33	0.0	7,273.6	121.8	3,180.6	121.8	10,454.1	69.6%	730.8
8.50	8.50	0.0	7,273.6	121.8	3,302.4	121.8	10,575.9	68.8%	730.8
8.67	8.66	0.0	7,273.6	121.8	3,424.2	121.8	10,697.7	68.0%	730.8
8.83	8.83	0.0	7,273.6	121.8	3,546.0	121.8	10,819.5	67.2%	730.8
9.00	9.00	0.0	7,273.6	121.8	3,667.8	121.8	10,941.3	66.5%	730.8

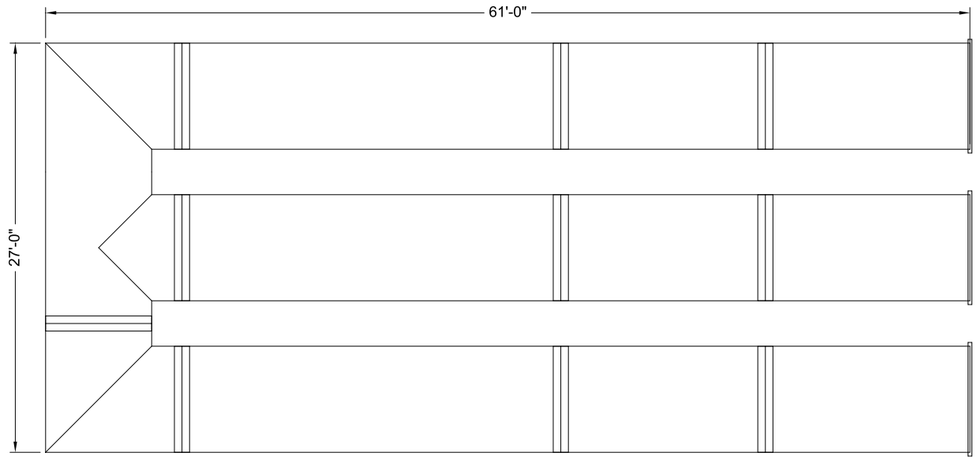
PROJECT SUMMARY

CALCULATION DETAILS
- LOADING = HS20/HS25
- APPROX. LINEAR FOOTAGE = 189 LF

STORAGE SUMMARY
- STORAGE VOLUME REQUIRED = 10,795 CF
- PIPE STORAGE VOLUME = 7,274 CF
- BACKFILL STORAGE VOLUME = 3,668 CF
- TOTAL STORAGE PROVIDED = 10,941 CF
- STONE VOID = 40%

PIPE DETAILS
- DIAMETER = 84"
- CORRUGATION = 5x1
- GAGE = 16
- COATING = ALT2
- WALL TYPE = PERFORATED
- BARREL SPACING = 36"

BACKFILL DETAILS
- WIDTH AT ENDS = 12"
- ABOVE PIPE = 12"
- WIDTH AT SIDES = 12"
- BELOW PIPE = 12"



NOTES

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE $2\frac{2}{3}$" x $\frac{1}{2}$" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYODS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.
- THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

ASSEMBLY
SCALE: 1" = 10'

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DATE	REVISION DESCRIPTION	BY

CONTECH® ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH® CMP DETENTION SYSTEMS
CONTECH **DYODS** DRAWING

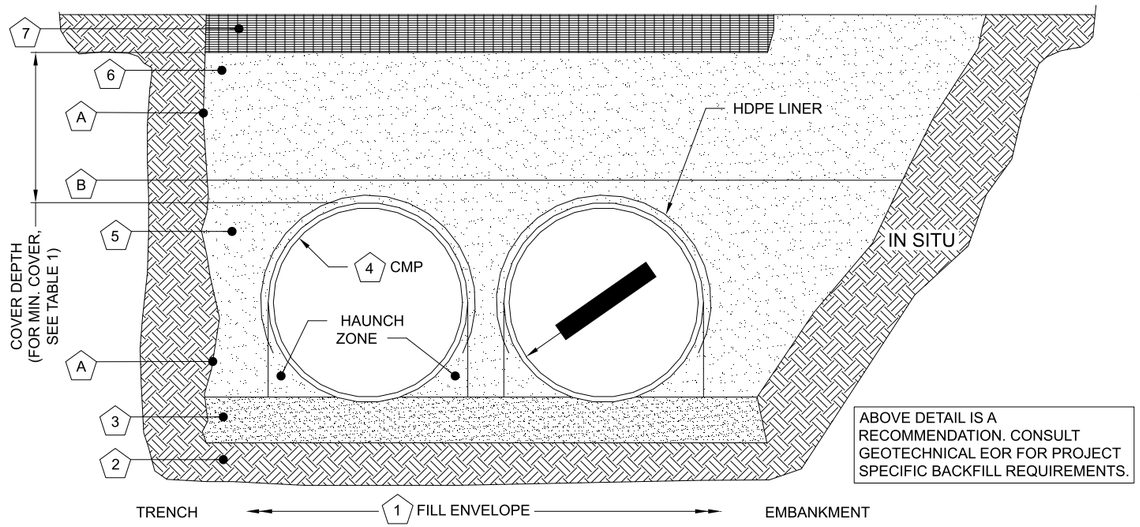
DYO55739 Riverside Community Hospital Parking Garage
BMP 1
Riverside, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
39082	55739	10/7/2024
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

TABLE 1:

DIAMETER, D	MIN. COVER	CORR. PROFILE
6"-10"	12"	1 1/2" x 1/4"
12"-48"	12"	2 2/3" x 1/2"
>48"-96"	12"	3" x 1", 5" x 1"
>96"	D/8	3" x 1", 5" x 1"

- STRUCTURAL BACKFILL MUST EXTEND TO LIMITS OF THE TABLE
- TOTAL HEIGHT OF COMPACTED COVER FOR CONVENTIONAL HIGHWAY LOADS IS MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TOP OF RIGID PAVEMENT.



ABOVE DETAIL IS A RECOMMENDATION. CONSULT GEOTECHNICAL EOR FOR PROJECT SPECIFIC BACKFILL REQUIREMENTS.

MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT

INSTALLATION NOTES

1. WHEN PLACING THE FIRST LIFTS OF BACKFILL IT IS IMPORTANT TO MAKE SURE THAT THE BACKFILL IS PROPERLY COMPACTED UNDER AND AROUND THE PIPE HAUNCHES.
2. OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS, AS APPROVED BY SITE ENGINEER.
3. AN HDPE MEMBRANE LINER WILL BE PLACED ON THE CROWN OF EACH PIPE TO PROVIDE AN IMPERMEABLE BARRIER AGAINST ENVIRONMENTAL CHANGES THAT MAY ADVERSELY AFFECT THE SYSTEM OVER TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL TECHNICAL DETAILS.

TABLE 2: PERFORATED STANDARD

CMP RETENTION STANDARD BACKFILL SPECIFICATIONS

	MATERIAL LOCATION	MATERIAL SPECIFICATION	DESCRIPTION	
1	FILL ENVELOPE WIDTH	PER ENGINEER OF RECORD	MINIMUM TRENCH WIDTH MUST ALLOW ROOM FOR PROPER COMPACTION OF HAUNCH MATERIALS UNDER THE PIPE. THE SUGGESTED MINIMUM TRENCH WIDTH, OR EOR RECOMMENDATION: PIPE ≤ 12": D + 16" PIPE > 12": 1.5D + 12"	MINIMUM EMBANKMENT WIDTH (IN FEET) FOR INITIAL FILL ENVELOPE: PIPE < 24": 3.0D PIPE 24" - 144": D + 4'0" PIPE > 144": D + 10'0"
2	FOUNDATION	**AASHTO 26.5.2** - PER ENGINEER OF RECORD	PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND FOUNDATION BROUGHT BACK TO GRADE WITH A FILL MATERIAL APPROVED BY THE ENGINEER OF RECORD.	
3	BEDDING	**AASHTO M 43: 3, 357, 4, 467, 5, 56, 57**	ENGINEER OF RECORD TO DETERMINE IF BEDDING IS REQUIRED. PIPE MAY BE PLACED ON THE TRENCH BOTTOM OF A RELATIVELY LOOSE, NATIVE SUITABLE WELL GRADED GRANULAR MATERIAL THAT IS ROUGHLY SHAPED TO FIT THE BOTTOM OF THE PIPE, 2" MIN DEPTH. THE BEDDING MATERIAL MAY BE SUITABLE OPEN GRADED GRANULAR BEDDING CONFORMING TO AASHTO SOIL CLASSIFICATIONS A1, A2, OR A3 WITH MAXIMUM PARTICLE SIZE OF 3" PER AASHTO 26.3.8.1	
4	CORRUGATED METAL PIPE			
5	BACKFILL	FREE-DRAINING, ANGULAR, NATURALLY OCCURRING WASHED-STONE PER **AASHTO M 43: 3, 357, 4, 467, 5, 56, 57** OR APPROVED EQUAL *	HAUNCH ZONE MATERIAL SHALL BE HAND SHOVELED OR SHOVEL SLICED INTO PLACE TO ALLOW FOR PROPER COMPACTION WITHOUT SOFT SPOTS. BACKFILL SHALL BE PLACED IN 8" +/- LOOSE LIFTS AND COMPACTED TO 90% STANDARD PROCTOR PER AASHTO T 99. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A TWO LIFT (16") DIFFERENTIAL BETWEEN ANY OF THE PIPES AT ANY TIME DURING THE BACKFILL PROCESS. THE BACKFILL SHOULD BE ADVANCED ALONG THE LENGTH OF THE SYSTEM TO AVOID DIFFERENTIAL LOADING. WHERE CONVENTIONAL COMPACTION TESTING IS NOT PRACTICAL, THE MATERIAL SHALL BE MECHANICALLY COMPACTED UNTIL NO FURTHER YIELDING OF MATERIAL IS OBSERVED UNDER THE COMPACTOR. **IN AREAS WITH HIGH WATER TABLE FLUCTUATIONS THAT INTERACT WITH THE PIPE ZONE, CONSIDER INSTALLING A GEOTEXTILE SEPARATION LAYER TO PREVENT SOIL MIGRATION.	
6	COVER MATERIAL	UP TO MIN. COVER - **AASHTO M 145: A-1, A-2, A-3** ABOVE MIN. COVER - PER ENGINEER OF RECORD	COVER MATERIAL MAY INCLUDE NON-BITUMINOUS, GRANULAR ROADBASE MATERIAL WITHIN MIN COVER LIMITS	
7	RIGID OR FLEXIBLE PAVEMENT (IF APPLICABLE)	PER ENGINEER OF RECORD	FLEXIBLE PAVEMENT SHOULD NOT BE COUNTED AS PART OF THE FILL HEIGHT OVER THE CMP. FINAL BACKFILL MATERIAL SELECTION AND COMPACTION REQUIREMENTS SHALL FOLLOW THE PROJECT PLANS AND SPECIFICATIONS PER THE ENGINEER OF RECORD.	
A	OPTIONAL SIDE GEOTEXTILE	NONE	GEOTEXTILE LAYER IS RECOMMENDED ON SIDES OF EXCAVATION TO PREVENT SOIL MIGRATION.	
B	GEOTEXTILE BETWEEN LAYERS	NONE	IF SOIL TYPES DIFFER AT ANY POINT ABOVE PIPE INVERT, A GEOTEXTILE LAYER IS RECOMMENDED TO BE PLACED BETWEEN THE LAYERS TO PREVENT SOIL MIGRATION.	

NOTES:
- FOR MULTIPLE BARREL INSTALLATIONS, THE RECOMMENDED STANDARD SPACING BETWEEN PARALLEL PIPE RUNS SHALL BE THE PIPE DIAMETER /2 BUT NO LESS THAN 12" FOR DIAMETERS <72". FOR 72" AND LARGER DIAMETERS, THE MINIMUM SPACING IS 36". CONTACT YOUR CONTECH REPRESENTATIVE FOR NONSTANDARD SPACING.

* APPROVED REGIONAL EQUIVALENTS FOR SECTION 5 INCLUDE CA-7, MIDOT 6AA, 6A, OR 5G, PROVIDED THEY MEET THE PARTICLE SIZES INDICATED.

MANUFACTURER RECOMMENDED BACKFILL

NOT TO SCALE

DATE	REVISION DESCRIPTION	BY

CONTECH ENGINEERED SOLUTIONS LLC
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9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO55739 Riverside Community Hospital Parking Garage
BMP 1
Riverside, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
39082	55739	10/7/2024
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

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