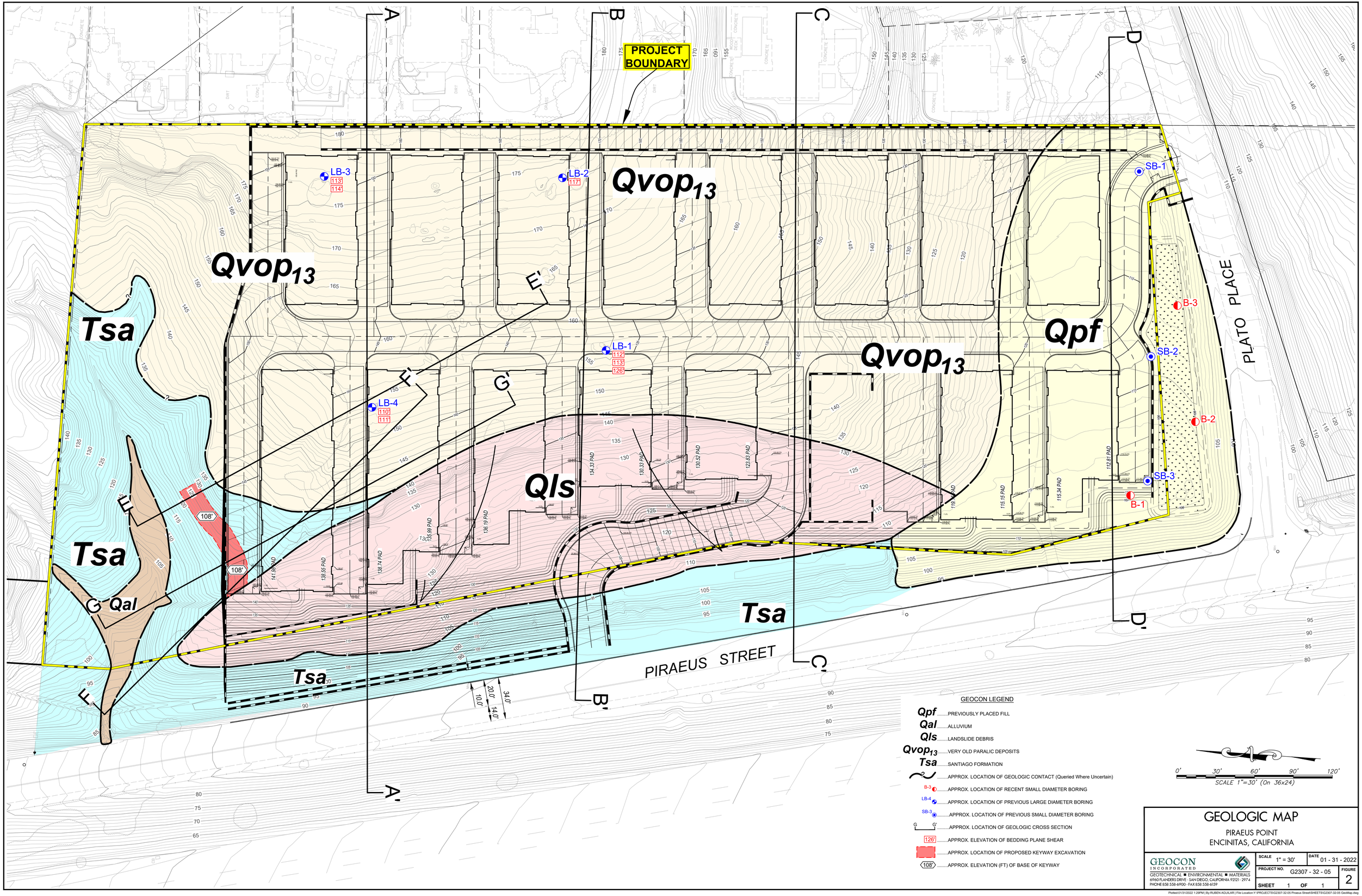


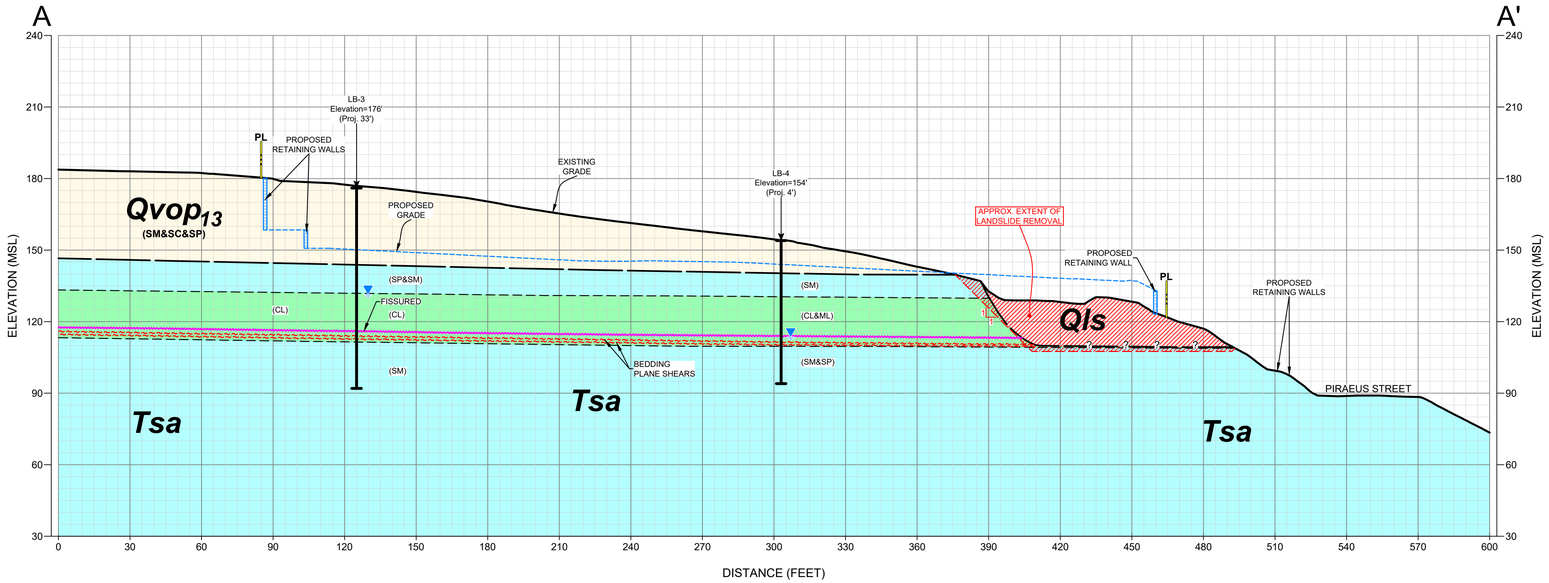
GEOLOGIC MAP

PIRAEUS POINT
ENCINITAS, CALIFORNIA

GEOCON INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858 558-6900 - FAX 858 558-6159

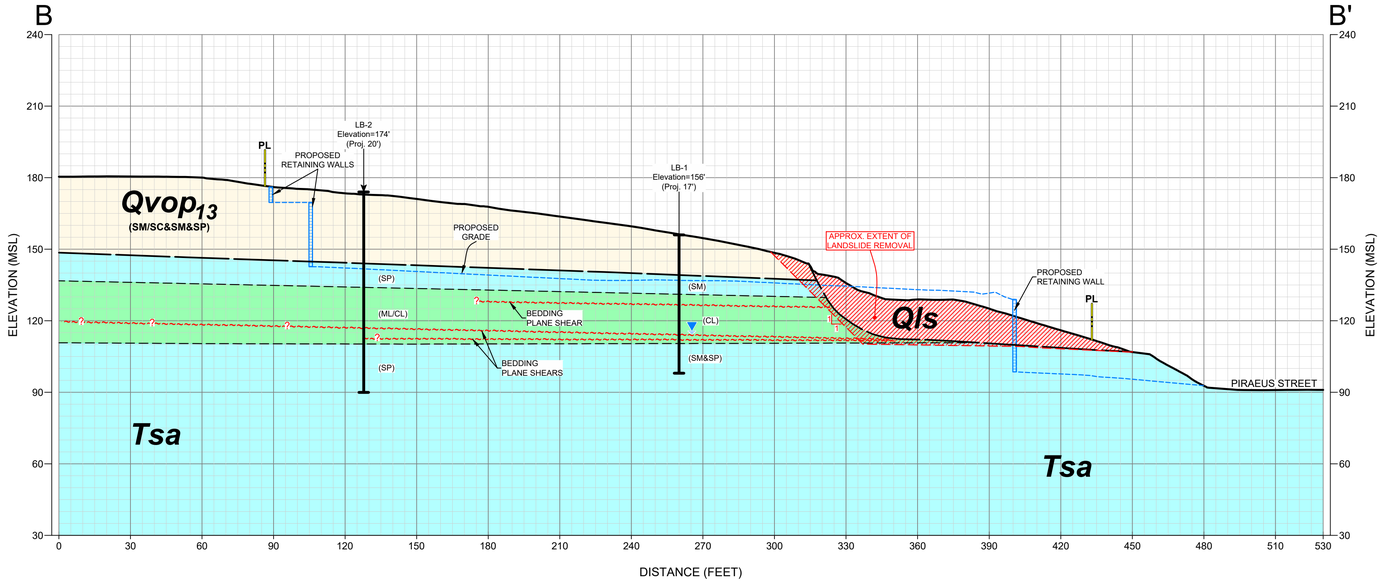
SCALE	1" = 30'
DATE	01 - 31 - 2022
PROJECT NO.	G2307 - 32 - 05
FIGURE	2
SHEET	1 OF 1

Plotted:01/31/2022 1:29PM | By:RUBEN AGUILAR | File Location:Y:\PROJECTS\G2307-32-05 Piraeus Street\SHEETS\G2307-32-05 GeoMap.dwg



GEOLOGIC CROSS-SECTION A-A'

SCALE: 1" = 30' (Vert. = Horiz.)



GEOLOGIC CROSS-SECTION B-B'

SCALE: 1" = 30' (Vert. = Horiz.)

GEOCON LEGEND

- **Qpf** ..... PREVIOUSLY PLACED FILL
- **Qal** ..... ALLUVIUM
- **Qls** ..... LANDSLIDE DEBRIS
- **Qvop$_{13}$** ..... VERY OLD PARALIC DEPOSITS
- **Tsa** ..... SANTIAGO FORMATION
- ..... APPROX. LOCATION OF GEOLOGIC CONTACT
- ..... APPROX. LOCATION OF INTRAFORMATIONAL CONTACT
- B-4 ..... APPROX. LOCATION OF BORING
- ..... APPROX. LOCATION OF BEDDING PLANE SHEAR

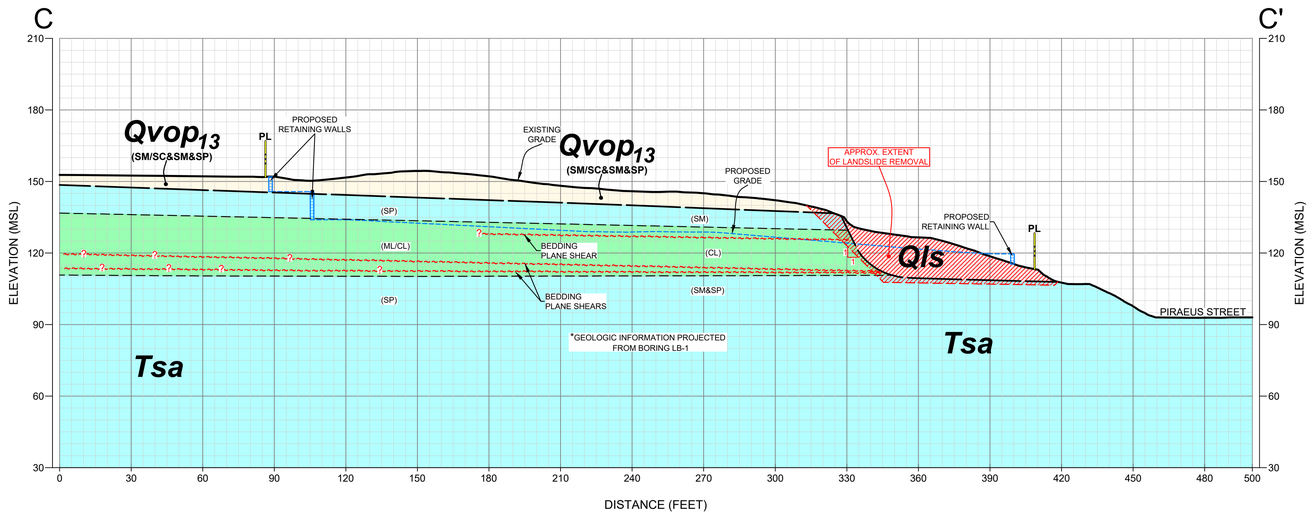
GEOLOGIC CROSS - SECTIONS

PIRAEUS POINT
ENCINITAS, CALIFORNIA

GEOCON INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858 558-6900 - FAX 858 558-6159

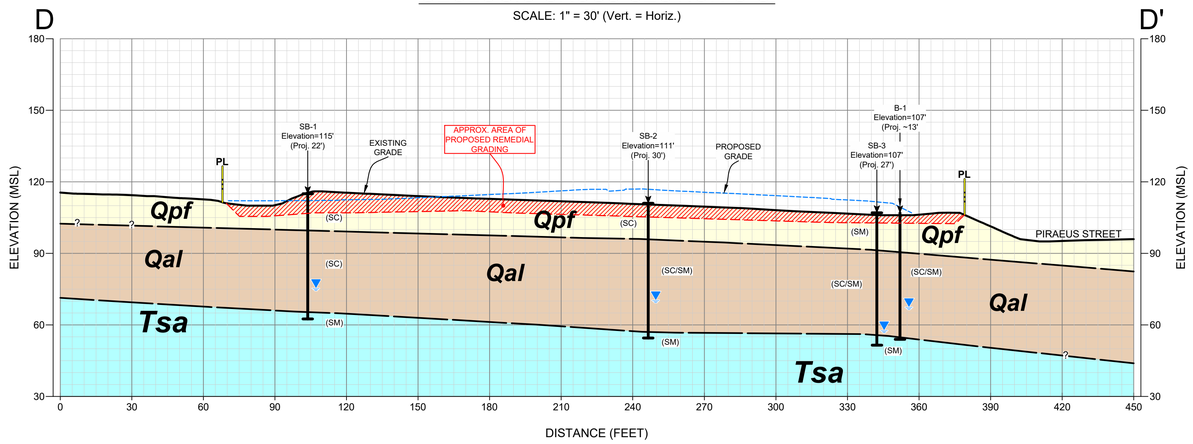
SCALE	1" = 30'	DATE	01 - 31 - 2022
PROJECT NO.	G2307 - 32 - 05	FIGURE	3
SHEET	1 OF 1		

Plotted:02/01/2022 1:42PM | By:RUBEN AGUILAR | File Location:Y:\PROJECTS\G2307-32-05 Piraeus Street\SOURCE\SECTION\G2307-32-05 Profiles_2022-01-12.dwg



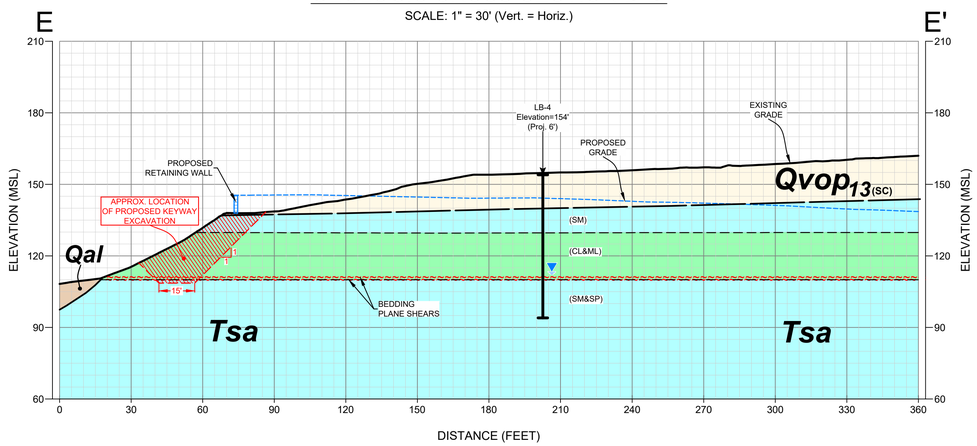
GEOLOGIC CROSS-SECTION C-C'

SCALE: 1" = 30' (Vert. = Horiz.)



GEOLOGIC CROSS-SECTION D-D'

SCALE: 1" = 30' (Vert. = Horiz.)



GEOLOGIC CROSS-SECTION E-E'

SCALE: 1" = 30' (Vert. = Horiz.)

GEOCON LEGEND

- Qpf ..... PREVIOUSLY PLACED FILL
- Qal ..... ALLUVIUM
- Qls ..... LANDSLIDE DEBRIS
- Qvop13 ..... VERY OLD PARALIC DEPOSITS
- Tsa ..... SANTIAGO FORMATION
- ?~~? ..... APPROX. LOCATION OF GEOLOGIC CONTACT
- ..... APPROX. LOCATION OF INTRAFORMATIONAL CONTACT
- B-4 ..... APPROX. LOCATION OF BORING
- ~~~~ ..... APPROX. LOCATION OF BEDDING PLANE SHEAR

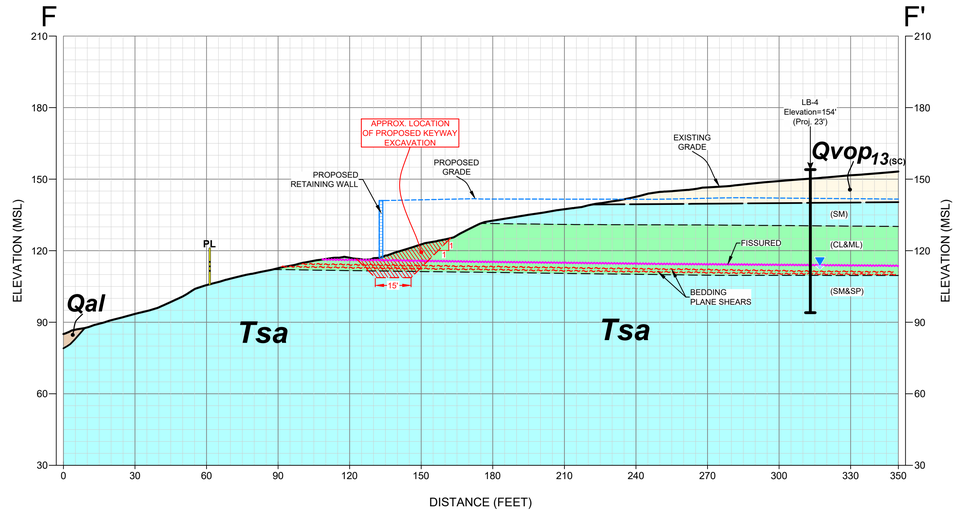
GEOLOGIC CROSS - SECTIONS

PIRAEUS POINT
ENCINITAS, CALIFORNIA

GEOCON INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858 558-6900 - FAX 858 558-6159

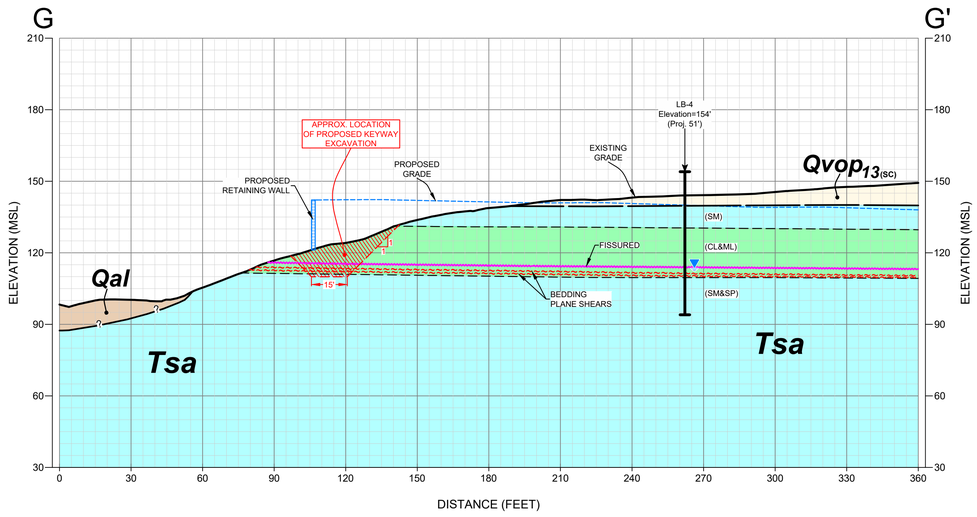
SCALE	1" = 30'	DATE	01 - 31 - 2022
PROJECT NO.	G2307 - 32 - 05	FIGURE	4
SHEET	1 OF 1		

Plotted:02/01/2022 1:42PM | By:RUBEN AGUILAR | File Location:Y:\PROJECTS\G2307-32-05 Piraeus Street\SOURCE\SECTION\G2307-32-05 Profiles_2022-01-12.dwg



GEOLOGIC CROSS-SECTION F-F'

SCALE: 1" = 30' (Vert. = Horiz.)



GEOLOGIC CROSS-SECTION G-G'

SCALE: 1" = 30' (Vert. = Horiz.)

GEOCON LEGEND

- ***Qpf*** ..... PREVIOUSLY PLACED FILL
- ***Qal*** ..... ALLUVIUM
- ***Qls*** ..... LANDSLIDE DEBRIS
- ***Qvop13*** ..... VERY OLD PARALIC DEPOSITS
- ***Tsa*** ..... SANTIAGO FORMATION
- ..... APPROX. LOCATION OF GEOLOGIC CONTACT
- ..... APPROX. LOCATION OF INTRAFORMATIONAL CONTACT
- B-4 ..... APPROX. LOCATION OF BORING
- ..... APPROX. LOCATION OF BEDDING PLANE SHEAR

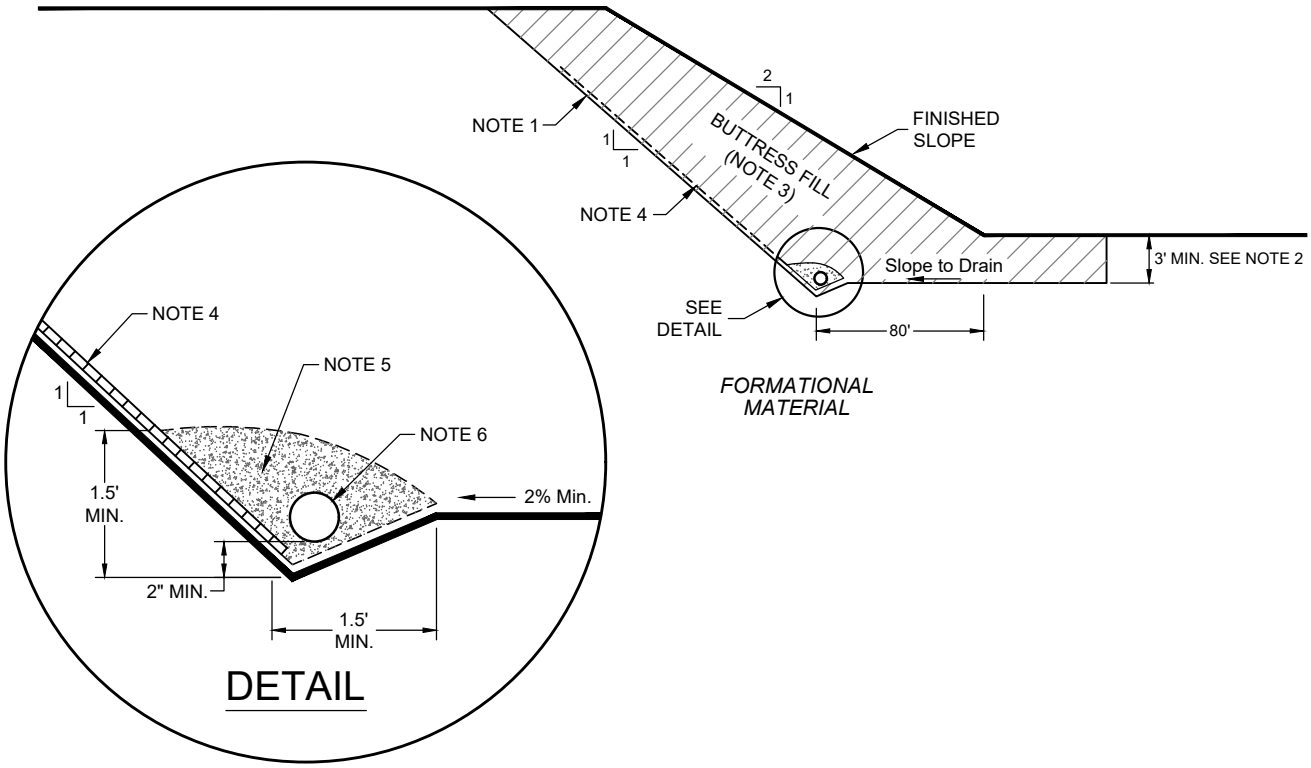
GEOLOGIC CROSS - SECTIONS

PIRAEUS POINT
ENCINITAS, CALIFORNIA

GEOCON INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858 558-6900 - FAX 858 558-6159

SCALE	1" = 30'	DATE	01 - 31 - 2022
PROJECT NO.	G2307 - 32 - 05	FIGURE	5
SHEET	1 OF 1		

Plotted:02/01/2022 1:42PM | By:RUBEN AGUILAR | File Location:Y:\PROJECTS\G2307-32-05 Piraeus Street\SOURCE\SECTION\G2307-32-05 Profiles_2022-01-12.dwg



NOTES:

1.....EXCAVATE BACKCUT AT 1:1 INCLINATION (UNLESS OTHERWISE NOTED).

2.....BASE OF BUTTRESS TO BE 3 FEET INTO FORMATIONAL MATERIAL, SLOPING A MINIMUM 5% INTO SLOPE.

3.....BUTTRESS FILL TO BE COMPOSED OF PROPERLY COMPACTED GRANULAR SOIL.

4.....CHIMNEY DRAINS TO BE APPROVED PREFABRICATED CHIMNEY DRAIN PANELS (MIRADRAIN G200N OR EQUIVALENT) SPACED APPROXIMATELY 10 FEET CENTER TO CENTER AND 4 FEET WIDE. CLOSER SPACING MAY BE REQUIRED IF SEEPAGE IS ENCOUNTERED.

5.....FILTER MATERIAL TO BE 3/4-INCH, OPEN-GRADED CRUSHED ROCK ENCLOSED IN APPROVED FILTER FABRIC (MIRAFI 140NC).

6.....COLLECTOR PIPE TO BE 4-INCH MINIMUM DIAMETER, PERFORATED, THICK-WALLED PVC SCHEDULE 40 OR EQUIVALENT, AND SLOPED TO DRAIN AT 1 PERCENT MINIMUM TO APPROVED OUTLET.

TYPICAL BUTTRESS FILL DETAIL

GEOCON
INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858 558-6900 - FAX 858 558-6159

PIRAEUS POINT
ENCINITAS, CALIFORNIA

TM / RA		DSK/GTYPD

DATE 01 - 31 - 2022	PROJECT NO. G2307 - 32 - 05	FIG. 6

Plotted:01/31/2022 1:38PM | By:RUBEN AGUILAR | File Location:Y:\PROJECTS\G2307-32-05 Piraeus Street\DETAILS\Typical Slope Fill.dwg

APPENDIX A

APPENDIX A

FIELD INVESTIGATION

We performed a preliminary field investigation on May 6 through 9, 2019. The preliminary investigation consisted of the excavation of three small-diameter borings drilled by Baja Exploration and four large-diameter borings by Dave's Drilling. The small diameter borings were excavated to a maximum depth of 56½ feet using a CME 75 rubber-tire drill rig equipped with 8-inch diameter hollow stem augers. The large diameter borings were excavated to a maximum depth of 84 feet with a truck-mounted drill rig equipped with a 30-inch diameter bucket-auger.

Our recent field investigation on December 17, 2021, consisted of excavating three additional borings by North County Drilling using an Ingersoll Rand A-300 truck-mounted drill rig equipped with 8-inch-diameter hollow-stem augers. The approximate locations of the excavations are shown on the Geologic Map, Figure 2. We located the exploratory borings in the field using a measuring tape and/or existing landmarks; therefore, actual boring locations may vary slightly.

We obtained samples during our boring excavations using either a California sampler or a Standard Penetration Test (SPT) sampler. Both samplers are composed of steel and driven to obtain relatively undisturbed soil samples. The California sampler has an inside diameter of 2.5 inches and an outside diameter of 2.875 inches. Up to 18 rings are placed inside the sampler that is 2.4 inches in diameter and 1 inch in height. The SPT sampler has an inside diameter of 1.5 inches and an outside diameter of 2 inches. We obtained ring samples at appropriate intervals were retained in moisture-tight containers and transported to the laboratory for testing. The type of sample is noted on the exploratory boring logs.

The samplers were driven 12 inches and 18 inches for California sampler and SPT sampler, respectively, with the use of an automatic hammer and the use of A rods. The sampler is connected to the A rods and driven into the bottom of the excavation using a 140-pound hammer with a 30-inch drop. Blow counts are recorded for every 6 inches the sampler is driven. The penetration resistances shown on the boring logs are shown in terms of blows per foot. The values indicated on the boring logs are the sum of the last 12 inches of the sampler if driven 12 inches. If the sampler was not driven for 12 inches, an approximate value is calculated in term of blows per foot or the final 6-inch interval is reported. These values are not to be taken as N-values, adjustments have not been applied.

The large-diameter boring sampler was driven up to 12 inches into the bottom of the excavation with the use of a telescoping Kelly bar. The weight of the Kelly bar (4,500 pounds maximum) drives the sampler and varies in weight with depth. The height of drop is usually 12 inches. Blow counts are recorded for every 12 inches the sampler is driven. The penetration resistance values on the boring

logs are shown in terms of blows per foot. These values are not to be taken as N-values and adjustments have not been applied.

We visually examined, classified and logged the soil conditions encountered in the excavations in general accordance with the Unified Soil Classification System (USCS). Logs of the exploratory borings are presented on Figures A-1 through A-10. The logs depict the general soil and geologic conditions encountered and the depth at which samples were obtained.

PROJECT NO. G2307-32-05

BORING B 1

ELEV. (MSL.) **107'** DATE COMPLETED **12/17/2021**

EQUIPMENT **IR A-300** BY: **D. GITHENS**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**PREVIOUSLY PLACED FILL (Qpf)** Medium dense, moist, brown, Silty, fine to coarse SAND			
2								
4					-Becomes damp			
6	B1-1					80/11"	116.1	3.8
8								
10	B1-2				-Chunks of gray siltstone present	33	109.0	12.2
12								
14								
16	B1-3				-Becomes very dense	52	115.0	5.4
18				SC/SM	**ALLUVIUM (Qal)** Medium dense, moist, dark brown/reddish brown, Clayey to Silty, fine to coarse SAND			
20	B1-4					18	113.5	14.7
22								
24								
26	B1-5					33	114.2	14.8
28								
30	B1-6					82/11.5"	111.0	8.7
32	B1-7					30		
34								

Figure A-1,
Log of Boring B 1, Page 1 of 2

G2307-32-05.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G2307-32-05

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING B 1** ELEV. (MSL.) **107'** DATE COMPLETED **12/17/2021** EQUIPMENT **IR A-300** BY: **D. GITHENS**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
36	B1-8					35	104.3	20.6
	B1-9					26		
38			▽		-Seepage encountered at 39 feet			
40	B1-10					49	108.8	5.4
	B1-11					36		
42								
44								
	B1-12					50	113.3	15.3
46	B1-13					31		
48								
50	B1-14					31	107.1	20.0
	B1-15					28		
52					BORING TERMINATED AT 52.5 FEET Backfilled with bentonite Seepage encountered at 39 feet			

Figure A-1,
Log of Boring B 1, Page 2 of 2

G2307-32-05.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR ▽ ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G2307-32-05

BORING B 2

ELEV. (MSL.) **109'** DATE COMPLETED **12/17/2021**

EQUIPMENT **IR A-300** BY: **D. GITHENS**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**PREVIOUSLY PLACED FILL (Qpf)** Loose to medium dense, moist, yellow to brown, Clayey, fine to coarse SAND; trace gravel			
2								
4								
6	B2-1				-Becomes damp with chunks of gray siltstone	50/5.5"	114.1	9.8
8								
10	B2-2				-Siltstone chunk in shoe	82	108.2	4.2
12								
14								
16	B2-3				-Becomes moist	63	112.7	15.2
					-Contact at 17 feet based on drilling efficiency			
18				SC/SM	**ALLUVIUM (Qal)** Medium dense, moist, dark brown, Clayey to Silty, fine to medium SAND; mottled white			
20	B2-4					42	112.9	9.6
22								
24								
26	B2-5				-Medium dense, dark brown, fine to medium sand; trace fines	44	107.3	4.7
28								
30	B2-6				-Becomes dense	63	120.0	12.5
32	B2-7					39		
34								

Figure A-2,
Log of Boring B 2, Page 1 of 2

G2307-32-05.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G2307-32-05

BORING B 2

ELEV. (MSL.) **109'** DATE COMPLETED **12/17/2021**

EQUIPMENT **IR A-300** BY: **D. GITHENS**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
36	B2-8					71/10"	122.1	12.6
	B2-9					39		
38								
40	B2-10				-Becomes medium dense	36	115.3	15.4
	B2-11					29		
42			▽					
44					-Seepage encountered at 43 feet			
	B2-12					34	118.4	14.5
46	B2-13					16		
48								
50	B2-14					41	106.2	19.5
	B2-15			SM	**SANTIAGO FORMATION (Tsa)**	71/11"		
52					Very dense, saturated, light yellow to gray brown, Silty, fine grained SANDSTONE			
					BORING TERMINATED AT 52.5 FEET Backfilled with bentonite Seepage encountered at 43 feet			

Figure A-2,
Log of Boring B 2, Page 2 of 2

G2307-32-05.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR ▽ ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G2307-32-05

BORING B 3

ELEV. (MSL.) **113'** DATE COMPLETED **12/17/2021**

EQUIPMENT **IR A-300** BY: **D. GITHENS**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0								
2				SC	**PREVIOUSLY PLACED FILL (Qpf)** Medium dense, moist, yellow to gray brown, Clayey, fine to coarse SAND with trace gravel			
4								
6	B3-1					50/5.5"	117.2	10.1
8								
10	B3-2				-Chunks of gray siltstone present	63	114.1	11.1
12								
14								
16	B3-3			SC	**ALLUVIUM (Qal)** Medium dense, damp, dark brown, Clayey, fine to medium SAND	36	119.5	10.9
18								
20	B3-4					38	112.9	10.7
22								
24								
26	B3-5				-Becomes moist below 26 feet	35	117.6	10.2
28								
30	B3-6					45	112.5	17.3
32	B3-7					27		
34								

Figure A-3,
Log of Boring B 3, Page 1 of 2

G2307-32-05.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G2307-32-05

BORING B 3

ELEV. (MSL.) **113'** DATE COMPLETED **12/17/2021**

EQUIPMENT **IR A-300** BY: **D. GITHENS**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
36	B3-8			SC	-Becomes wet	35	114.5	14.6
	B3-9					26		
38			▽		-Seepage encountered at 38 feet			
40	B3-10			SM	**SANTIAGO FORMATION (Tsa)**	39	105.9	20.1
	B3-11				Dense, wet, yellow brown, Silty, fine grained SANDSTONE	53		
42								
44								
	B3-12					50/6"	113.3	15.7
46					BORING TERMINATED AT 46 FEET Backfilled with bentonite Seepage encountered at 38 feet			

Figure A-3,
Log of Boring B 3, Page 2 of 2

G2307-32-05.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR ▽ ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G2307-32-05

BORING LB 1

ELEV. (MSL.) **156'** DATE COMPLETED **05-06-2019**

EQUIPMENT **EZ BORE E-120** BY: **K. HAASE**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**VERY OLD PARALIC DEPOSITS ($Qvop_{13}$)** Medium dense, damp to moist, reddish brown, Silty, fine to coarse SAND			
2								
4					-Upper 3 feet weathered			
6	LB1-1				-Becomes very dense	10/8"	124.9	5.4
8	LB1-2				-Becomes fine- to medium-grained			
10	LB1-3				-Becomes moist -Cobble up to 5 inches	6	117.7	8.6
12								
14								
16	LB1-4 LB1-5			SM	Dense, moist, brown to yellowish brown, Silty, fine to coarse SAND	8/8"	116.3	10.1
18	LB1-6			SM	-Cobble up to 8 inches -Erosional, undulatory contact			
20	LB1-7				**SANTIAGO FORMATION (Tsa)** Dense to very dense, moist, olive to yellowish brown, Silty, fine- to coarse-grained SANDSTONE; massive and very weakly laminated single undulatory sub vertical sand filled fracture 1/8"-1/4" wide, fracture is completely filled, trace claystone rip up clasts; rounded less than 3/4"	5		
22								
24					-Oxidation			
26	LB1-8			CL	-Bioturbated contact Hard, moist, grayish olive, CLAYSTONE; oxidation			
28								
30	LB1-9				-**BEDDING PLANE SHEAR at 30'**; 1/4" thick soft plastic clay gouge remolded, flat, moderately polished bounding surface with weak strike continuous around hole 1º at N30W DDD -Few, close, iron stained fractures, sub vertical with N_S strike with 1/16" gypsum filling -Few gypsum veins sub-parallel to bedding	8	107.5	20.3
32								
34								

Figure A-4,
Log of Boring LB 1, Page 1 of 2

G2307-32-05.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G2307-32-05

BORING LB 1

ELEV. (MSL.) **156'** DATE COMPLETED **05-06-2019**

EQUIPMENT **EZ BORE E-120** BY: **K. HAASE**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
36	LB1-10					10/10"	100.8	23.1
38	LB1-11							
40	LB1-12		▽		-Open fractures 1/8"-1/4", moderate to heavy seepage	8/10"		
42								
44					-**BEDDING PLANE SHEAR at 43'**; 1/4"-1/2" thick, bluish-gray remolded clay gouge, soft plastic, continuous around hole			
46	LB1-13 LB1-14			SM	-**BEDDING PLANE SHEAR at 44.5'**; 1/2"-2" thick, bluish-gray and brown, fully remolded plastic clay gouge; soft, internally sheared with numerous polished parting surfaces	15/6"		
48				SP	Dense to very dense, wet, bluish-gray, Silty, fine- to medium-grained SANDSTONE; laminated			
50					Very dense, wet, reddish brown and gray, fine- to coarse-grained SANDSTONE; cross bedded, gunbarrel			
52								
54								
56					-End of log due to standing water			
58					BORING TERMINATED AT 58 FEET Seepage encountered at 40.5 feet Backfilled with bentonite chips and soil			

Figure A-4,
Log of Boring LB 1, Page 2 of 2

G2307-32-05.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR ▽ ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G2307-32-05

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING LB 2** ELEV. (MSL.) **174'** DATE COMPLETED **05-07-2019** EQUIPMENT **EZ BORE E-120** BY: **K. HAASE**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM/SC	**VERY OLD PARALIC DEPOSITS ($Qvop_{13}$)** Medium dense to dense, moist, Silty to Clayey, fine to coarse SAND			
2								
4					-Upper 3 feet weathered			
6					-Vertical fractions, 1/4"-3" wide; completely sand filled with roots			
8								
10								
12								
14				SM	Dense, moist, brown to yellowish brown, Silty, fine to coarse SAND			
16					-Lenses of yellowish brown, fine to coarse sand			
18								
20					-Less cohesion			
22								
24				SP	Dense, damp, light brown, fine- to medium-grained SANDSTONE; oxidized and micaceous planer laminate			
26					-Belling of hole, logged cuttings only below			
28				SM	Medium dense, damp, yellowish brown, Silty, fine to coarse SANDSTONE; cobble up to 8"			
30				SP	**SANTIAGO FORMATION (Tsa)** Dense to very dense, moist, yellowish brown, fine- to coarse-grained SANDSTONE			
32								
34								

Figure A-5,
Log of Boring LB 2, Page 1 of 3

G2307-32-05.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G2307-32-05

BORING LB 2

ELEV. (MSL.) **174'** DATE COMPLETED **05-07-2019**

EQUIPMENT **EZ BORE E-120** BY: **K. HAASE**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
36								
38								
40				ML/CL	Very stiff to hard, moist, bluish gray, SILTSTONE to CLAYSTONE; oxidized in areas			
42								
44								
46								
48								
50								
52								
54								
56	LB2-1				**-BEDDING PLANE SHEAR observed in cuttings at 57'**			
58								
60								
62								
64				SP	Very dense, damp to moist, light yellowish brown, fine- to coarse-grained SANDSTONE; cobble up to 6 inches			
66								
68								

Figure A-5,
Log of Boring LB 2, Page 2 of 3

G2307-32-05.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G2307-32-05

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING LB 2** ELEV. (MSL.) **174'** DATE COMPLETED **05-07-2019** EQUIPMENT **EZ BORE E-120** BY: **K. HAASE**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
70								
72								
74								
76								
78								
80								
82								
84					BORING TERMINATED AT 84 FEET Groundwater/seepage not encountered Backfilled with bentonite chips and soil			

Figure A-5,
Log of Boring LB 2, Page 3 of 3

G2307-32-05.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G2307-32-05

BORING LB 3

ELEV. (MSL.) **176'** DATE COMPLETED **05-08-2019**

EQUIPMENT **EZ BORE E-120** BY: **K. HAASE**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**VERY OLD PARALIC DEPOSITS ($Qvop_{13}$)** Loose to medium dense, dry to damp, Silty, fine- to medium-grained SAND			
2								
4				SC	-Upper 3 feet weathered -Vertical fractures, 1/2" to 3" wide, sand infilled			
6	LB3-1				Medium dense, moist, reddish brown, Clayey, fine to medium SAND	3		
8					Vertical fractures, 1/4" to 2 1/2" wide, sand infilled			
10					-Less fractures			
12					-Becomes dense			
14								
16	LB3-2					5	116.1	5.9
18				SP	Dense, moist, brown, fine to medium SAND			
20					-Yellowish brown, fine to coarse SAND lenses			
22								
24				SC	Dense, moist, reddish brown, Clayey, fine to coarse SAND			
26					-Dark brown, sandy clay rip-up clasts			
28								
30	LB3-3				-Cobble lag up to 8"	8	101.5	7.5
32				SP	**SANTIAGO FORMATION (Tsa)** Dense, moist, yellowish brown, fine- to coarse-grained SANDSTONE			
34					-Lamination, fine to coarse cross-bedding			

Figure A-6,
Log of Boring LB 3, Page 1 of 3

G2307-32-05.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G2307-32-05

BORING LB 3

ELEV. (MSL.) **176'** DATE COMPLETED **05-08-2019**

EQUIPMENT **EZ BORE E-120** BY: **K. HAASE**

DEPTH IN FEET	SAMPLE NO.	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
36	LB3-4	SM	Dense, moist, olive gray, Silty, fine- to coarse-grained SANDSTONE	8/10"	117.1	9.1
40		SM	Very dense, moist, dark gray, Silty, fine- to coarse-grained SANDSTONE; mottled yellowish brown oxidation			
44		CL	-Low seepage along contact Hard, damp to moist, light bluish gray, CLAYSTONE			
46	LB3-5			10		
48			-Vertical and horizontal fracturing, oxidized with gypsum in fill			
50	LB3-6			10/8"		
52			-Sub-vertical fractures controlled seepage			
58			-Weakly fissured claystone beds with discontinuous, poorly developed clay gouge; fissile polished parting surfaces in some areas (58'-59.5')			
60	LB3-7			10/8"	101.5	19.4
62	LB3-8		-**BEDDING PLANE SHEAR at 62.5'**; 1/2" to 1" thick, soft and stiff, gray, fully developed, plastic clay bed 2º at N10W DDD			
64		SM	-**BEDDING PLANE SHEAR at 63.3'**; 1" to 1 1/4" thick, soft and stiff, gray, fully developed, moderately to fully remolded, plastic clay bed; numerous polished internal parting surfaces, 1º at N10W DDD			
66			Very dense, moist, bluish gray, fine- to medium-grained SANDSTONE			
68		SM	-Contact interbedded Very dense, moist, olive to yellowish brown, Silty, fine- to medium-grained SANDSTONE			

Figure A-6,
Log of Boring LB 3, Page 2 of 3

G2307-32-05.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G2307-32-05

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING LB 3** ELEV. (MSL.) **176'** DATE COMPLETED **05-08-2019** EQUIPMENT **EZ BORE E-120** BY: **K. HAASE**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
70	LB3-9					10/4"		
72								
74					-Concretion			
76								
78								
80					-Becomes finer grained			
82								
84					BORING TERMINATED AT 84 FEET Seepage encountered at 44 feet Backfilled with bentonite chips and soil			

Figure A-6,
Log of Boring LB 3, Page 3 of 3

G2307-32-05.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G2307-32-05

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING LB 4** ELEV. (MSL.) **154'** DATE COMPLETED **05-09-2019** EQUIPMENT **EZ BORE E-120** BY: **R. ADAMS**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SC	**VERY OLD PARALIC DEPOSITS ($Qvop_{13}$)** Dense, damp to moist, reddish brown to dark brown, Clayey, fine to coarse SAND; massive to very weakly bedded, few brown paleosol horizons			
2								
4					-Upper 3 feet weathered			
6								
8								
10					-Paleosol, 2"-6" thick, reddish to dark brown sand with trace silt			
12				SC	Medium dense to dense, moist, brown to reddish brown, Clayey, fine to coarse SAND; gravel and cobble up to 6 inches			
14				SM	**SANTIAGO FORMATION (Tsa)** Dense to very dense, damp, grayish to yellowish brown, Silty, fine- to coarse-grained SANDSTONE; massive to very weakly laminated, some cross bedding, few sand filled fractures extending down from contact, narrowing with increasing depth			
16								
18								
20					-Coarse grained			
22								
24					-Mottled -Sharp, bioturbated contact			
26				CL	Stiff to very stiff, damp, bluish gray to mottled orangish gray, CLAYSTONE; interbedded siltstone, oxidated laminae, short closed fractures			
28								
30								
32				ML	Stiff to hard, damp, gray to grayish brown, Clayey, SILTSTONE; massive, occasional closed fracture			
34								

Figure A-7,
Log of Boring LB 4, Page 1 of 2

G2307-32-05.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G2307-32-05

BORING LB 4

ELEV. (MSL.) **154'** DATE COMPLETED **05-09-2019**

EQUIPMENT **EZ BORE E-120** BY: **R. ADAMS**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
36								
38				CL	-Transitional contact Stiff to hard, moist, bluish gray, CLAYSTONE; very weakly fissured, oxidized laminae, little seepage, few closed fractures, few thin, 1/8" thick, gypsum veins parallel to bedding			
40			▽					
42								
44				SM	-**BEDDING PLANE SHEAR at 42.9'**; 3/4" to 1" thick, gray, weak to moderately remolded, soft to very soft, plastic clay gouge; increase fissuring above shear			
46					-**BEDDING PLANE SHEAR at 43.9'**; 1 1/2" thick, gayish brown, weakly remolded, fully developed, soft plastic, clay bed, internally sheared with numerous parting surfaces, 1º N63W DDD			
48				SP	Very dense, damp, bluish gray, Silty, medium- to coarse-grained SANDSTONE -1/4" TO 1/2" sub-horizontal fractures with seepage; 40% TO 60% gypsum filled			
50					Very dense, damp, yellowish gray, medium- to coarse-grained SANDSTONE; very weakly laminated			
52					-Concretion bed			
54								
56								
58								
60					BORING TERMINATED AT 60 FEET Seepage encountered at 40 feet Backfilled with bentonite chips and soil			

Figure A-7,
Log of Boring LB 4, Page 2 of 2

G2307-32-05.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR ▽ ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2307-32-05

BORING SB 1

ELEV. (MSL.) **115'** DATE COMPLETED **05-08-2019**

EQUIPMENT **CME 75** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	SB1-1			SC	**PREVIOUSLY PLACED FILL (Qpf)** Loose to medium dense, moist, yellowish to grayish brown, Clayey, fine to coarse SAND; trace gravel			
2								
4					-Becomes medium dense			
6	SB1-2				-Becomes damp; chunks of gray siltstone	46	113.3	8.1
8								
10	SB1-3				-Becomes moist, dark brown	38	123.0	11.1
12								
14								
16	SB1-4			SC	**ALLUVIUM (Qal)** Loose, damp, dark yellowish brown, Clayey, fine to coarse SAND	16	123.0	6.5
18								
20	SB1-5				Becomes medium dense; finer-grained	18	106.1	5.3
22	SB1-6							
24								
26	SB1-7				-Becomes moist; clay content increases	27	114.0	11.8
28								
30	SB1-8					19	108.8	10.8
32								
34								

Figure A-8,
Log of Boring SB 1, Page 1 of 2

G2307-32-05.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G2307-32-05

BORING SB 1

ELEV. (MSL.) **115'** DATE COMPLETED **05-08-2019**

EQUIPMENT **CME 75** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
36	SB1-9				Becomes loose, wet	15	110.2	15.0
38			▽		-Seepage encountered -Measured after leaving hole open for 15 min.			
40	SB1-10					17		
42								
44								
46	SB1-11					16	109.6	20.5
48								
50	SB1-12			SM	**SANTIAGO FORMATION (Tsa)** Very dense, damp, light yellowish to grayish brown, Silty, fine-grained SANDSTONE	80/10"		
52	SB1-13					50/5"		
					BORING TERMINATED AT 52.5 FEET Seepage encountered at 38 feet Backfilled with 18.3 ft³ of bentonite grout			

Figure A-8,
Log of Boring SB 1, Page 2 of 2

G2307-32-05.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR ▽ ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G2307-32-05

BORING SB 2

ELEV. (MSL.) **111'** DATE COMPLETED **05-08-2019**

EQUIPMENT **CME 75** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	SB2-1			SC	**PREVIOUSLY PLACED FILL (Qpf)** Loose to medium dense, moist, yellowish to grayish brown, Clayey, fine to coarse SAND; trace organics, trace gravel			
2								
4								
6	SB2-2				-Becomes dense; chunks of gray siltstone and sandstone	61	120.2	11.4
8								
10	SB2-3				-Becomes medium dense	32	112.4	16.4
12								
14								
16	SB2-4			SC/SW	**ALLUVIUM (Qal)** Medium dense, moist, dark yellowish brown, Clayey, fine to medium SAND to well-graded, fine to medium SAND	19	115.0	9.1
18								
20	SB2-5			SC	Medium dense, moist, dark yellowish brown, Clayey, fine to medium SAND	22	115.2	10.0
22								
24								
26	SB2-6					18	107.1	6.5
28								
30	SB2-7					16	110.8	12.2
32								
34								

Figure A-9,
Log of Boring SB 2, Page 1 of 2

G2307-32-05.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G2307-32-05

BORING SB 2

ELEV. (MSL.) **111'** DATE COMPLETED **05-08-2019**

EQUIPMENT **CME 75** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
36	SB2-8			SM/SP	Medium dense, moist, dark yellowish brown, Silty, fine SAND to poorly-graded fine SAND	19	112.4	9.6
38								
40	SB2-9		▽	SC	Medium dense, saturated, yellowish brown, Clayey, fine SAND	18	115.4	17.0
42								
44								
46	SB2-10					18		
48								
50	SB2-11				-Becomes light reddish brown	24	114.5	19.5
52								
54								
56	SB2-12			SM	**SANTIAGO FORMATION (Tsa)**	82/8"		
	SB2-13				Very dense, damp, light yellowish brown to gray, Silty, fine-grained SANDSTONE	50/6"		

BORING TERMINATED AT 56.5 FEET
Seepage encountered at 40 feet
Backfilled with 19.7 ft³ of bentonite grout

Figure A-9,
Log of Boring SB 2, Page 2 of 2

G2307-32-05.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR ▽ ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G2307-32-05

BORING SB 3

ELEV. (MSL.) **107'** DATE COMPLETED **05-08-2019**

EQUIPMENT **CME 75** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	SB3-1			SM	**PREVIOUSLY PLACED FILL (Qpf)** Loose to medium dense, damp, yellowish brown, Silty, fine to coarse SAND; trace organics; trace gravel -Becomes medium dense			
2								
4								
6	SB3-2				-Becomes dense, dark yellowish brown	56	120.9	3.7
8								
10	SB3-3				-Becomes medium dense, yellowish brown to gray	25	110.8	9.3
12								
14								
16	SB3-4			SC/CL	**ALLUVIUM (Qal)** Loose, moist, dark brown to yellowish brown, Clayey, fine to medium SAND to Sandy CLAY	16	121.1	11.5
18								
20	SB3-5			SC	Loose, moist, dark brown, Clayey, fine to medium SAND	14	116.1	9.4
22								
24								
26								
28								
30	SB3-6				-Becomes light yellowish brown; clay content increases	15	112.6	11.8
32								
34								

G2307-32-05.GPJ

Figure A-10,
Log of Boring SB 3, Page 1 of 2

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. G2307-32-05

BORING SB 3

ELEV. (MSL.) **107'** DATE COMPLETED **05-08-2019**

EQUIPMENT **CME 75** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
36	SB3-7					17	109.8	14.4
38								
40	SB3-8			SM	Loose, damp, light yellowish to grayish brown, Silty, fine SAND	14	97.8	5.7
42								
44								
46	SB3-9			SC	Loose, moist, light yellowish to grayish brown, Clayey, fine SAND	13	96.0	14.4
48			▽		-Seepage encountered			
50	SB3-10				-Becomes saturated	30		
52				SM	**SANTIAGO FORMATION (Tsa)** Very dense, moist, light yellowish to grayish brown, Silty, fine-grained SANDSTONE			
54	SB3-11					50/6"		
					BORING TERMINATED AT 55.5 FEET Seepage encountered at 49 feet Backfilled with 19.4 ft³ of bentonite grout			

Figure A-10,
Log of Boring SB 3, Page 2 of 2

G2307-32-05.GPJ

SAMPLE SYMBOLS

... SAMPLING UNSUCCESSFUL ... STANDARD PENETRATION TEST ... DRIVE SAMPLE (UNDISTURBED)

... DISTURBED OR BAG SAMPLE ... CHUNK SAMPLE ... WATER TABLE OR ▽ ... SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

APPENDIX B

APPENDIX B

LABORATORY TESTING

We performed laboratory tests in accordance with generally accepted test methods of the American Society for Testing and Materials (ASTM) or other suggested procedures. We selected soil samples and tested them for their in-place dry density and moisture content, maximum dry density and optimum moisture content, shear strength, expansion index, water-soluble sulfate, Atterberg limits, resistance value (R-Value), consolidation and grain size characteristics. The results of our laboratory tests from both phases of study are presented on Tables B-I through B-VI and the following figures.

TABLE B-I
SUMMARY OF LABORATORY MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT TEST RESULTS
ASTM D 1557

Sample No. (Geologic Unit)	Description	Maximum Dry Density (pcf)	Optimum Moisture Content (% dry wt.)
LB1-2 (Qvop)	Reddish brown, Silty, fine to coarse SAND	127.5	10.9
LB1-6 (Tsa)	Olive brown, Silty, fine to coarse SAND	120.0	12.0
SB2-1 (Qpf)	Yellowish brown, Clayey, fine SAND	127.5	10.3

TABLE B-II
SUMMARY OF LABORATORY DIRECT SHEAR TEST RESULTS
ASTM D 3080

Sample No. (Geologic Unit)	Dry Density (pcf)	Moisture Content (%)		Peak [Ultimate] Cohesion (psf)	Peak [Ultimate] Angle of Shear Resistance (degrees)
		Initial	After Test		
LB1-3 (Qvop)	117.7	8.6	14.4	725 [475]	29 [29]
LB1-9 (Tsa, CL)	107.5	20.3	23.2	1,300 [600]	32 [32]
LB1-13[2] (BPS)	--	--	--	200 [100]	10 [8]
LB3-2 (Qvop)	116.1	5.9	14.0	480 [375]	34 [34]
LB3-3 (Qvop)	101.5	7.5	21.0	340 [330]	36 [32]
LB3-8[2] (BPS)	--	--	--	240 [180]	11 [11]
SB2-1[1] (Qpf)	114.8	10.7	17.7	430 [430]	29 [29]

[1] Sample remolded to a dry density of approximately 90 percent of the laboratory maximum dry density near optimum moisture content.
[2] Remolded Paste Shear Test.

TABLE B-III
SUMMARY OF LABORATORY EXPANSION INDEX TEST RESULTS
ASTM D 4829

Sample No.	Depth (feet)	Geologic Unit	Moisture Content (%)		Dry Density (pcf)	Expansion Index	2016 CBC Expansion Classification	ASTM Soil Expansion Classification
			Before Test	After Test				
LB1-2	7.5 – 10	Qvop	9.6	18.8	109.6	0	Non-Expansive	Very Low
LB1-6	18 – 20	Tsa	9.8	17.4	110.5	0	Non-Expansive	Very Low
SB2-1	0 – 5	Qpf	9.6	19.2	112.1	40	Expansive	Low

TABLE B-IV
SUMMARY OF LABORATORY WATER-SOLUBLE SULFATE TEST RESULTS
CALIFORNIA TEST NO. 417

Sample No.	Depth (feet)	Geologic Unit	Water-Soluble Sulfate (%)	Sulfate Class
LB1-2	7.5 – 10	Qvop	0.034	S0
LB1-6	18 – 20	Tsa	0.028	S0
SB2-1	0 – 5	Qpf	0.030	S0

TABLE B-V
SUMMARY OF LABORATORY PLASTICITY INDEX TEST RESULTS
ASTM D 4318

Sample No.	Depth (feet)	Geologic Unit	Liquid Limit	Plastic Limit	Plasticity Index	Soil Classification
LB1-13	45	BPS	103	34	69	CH
LB3-8	62.5	BPS	89	34	55	CH
SB1-10	40	Qal	32	16	16	CL
SB2-10	45	Qal	33	16	17	CL
B1-11	41	Qal	-	-	-	NP
B1-13	46	Qal	32	14	18	CL
B2-13	46	Qal	28	17	11	CL
B3-9	36	Qal	30	15	15	CL

TABLE B-VI
SUMMARY OF LABORATORY RESISTANCE VALUE (R-VALUE) TEST RESULTS
ASTM D 2844

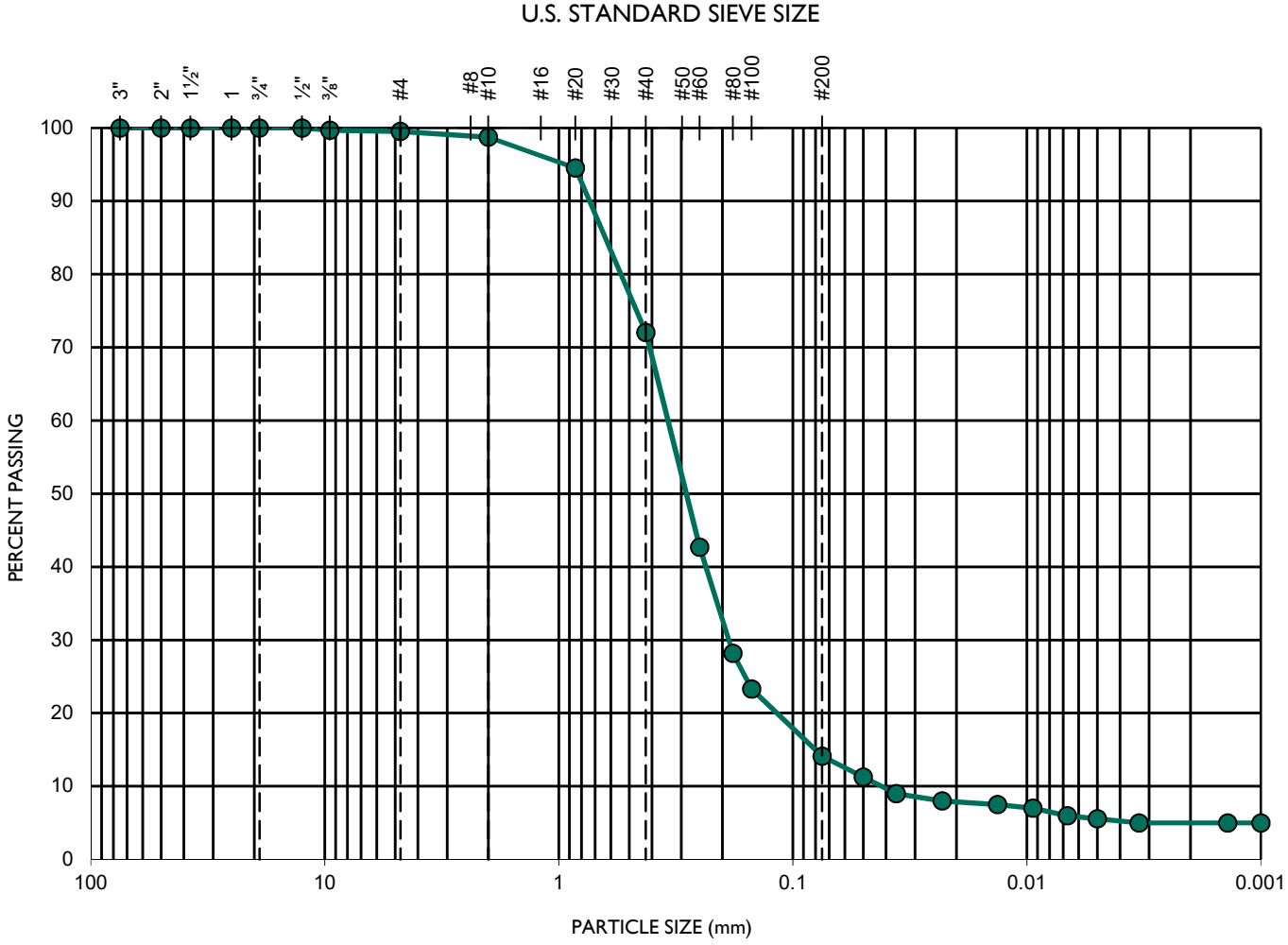
Sample No.	Depth (feet)	Description (Geologic Unit)	R-Value
LB1-2	7.5 – 10	Reddish brown, Silty, fine to coarse SAND (Qvop)	36
SB2-1	0 – 5	Yellowish brown, Clayey, fine SAND (Qpf)	13

SAMPLE NO.: **B1-11**

SAMPLE DEPTH (FT.): **41'**

GEOLOGIC UNIT: **Qal**

GRAVEL		SAND			SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



TEST DATA					
D_{10} (mm)	D_{30} (mm)	D_{60} (mm)	C_c	C_u	SOIL DESCRIPTION
0.04238	0.18887	0.35326	2.4	8.3	Silty SAND

GEOCON
INCORPORATED
GEOTECHNICAL CONSULTANTS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
PHONE 858 558-6900 - FAX 858 558-6159

SIEVE ANALYSES - ASTM D 6913

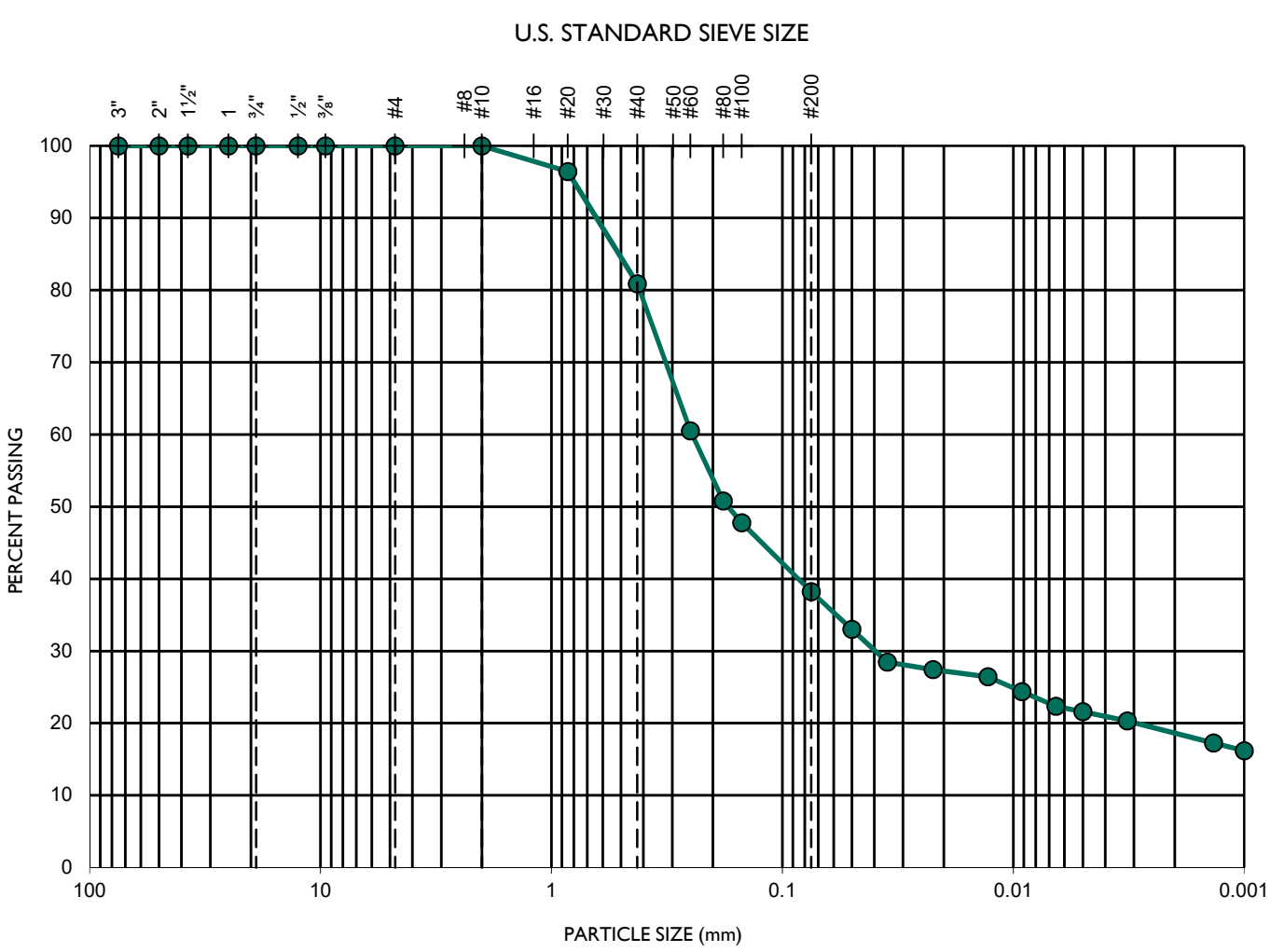
PIRAEUS POINT

PROJECT NO.: G2307-32-05

SAMPLE NO.: **B1-13** GEOLOGIC UNIT: **Qal**

SAMPLE DEPTH (FT.): **46'**

GRAVEL		SAND			SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



TEST DATA					
D_{10} (mm)	D_{30} (mm)	D_{60} (mm)	C_c	C_u	SOIL DESCRIPTION
--	0.04016	0.24651	--	--	Clayey SAND

GEOCON
INCORPORATED
GEOTECHNICAL CONSULTANTS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
PHONE 858 558-6900 - FAX 858 558-6159

SIEVE ANALYSES - ASTM D 6913

PIRAEUS POINT

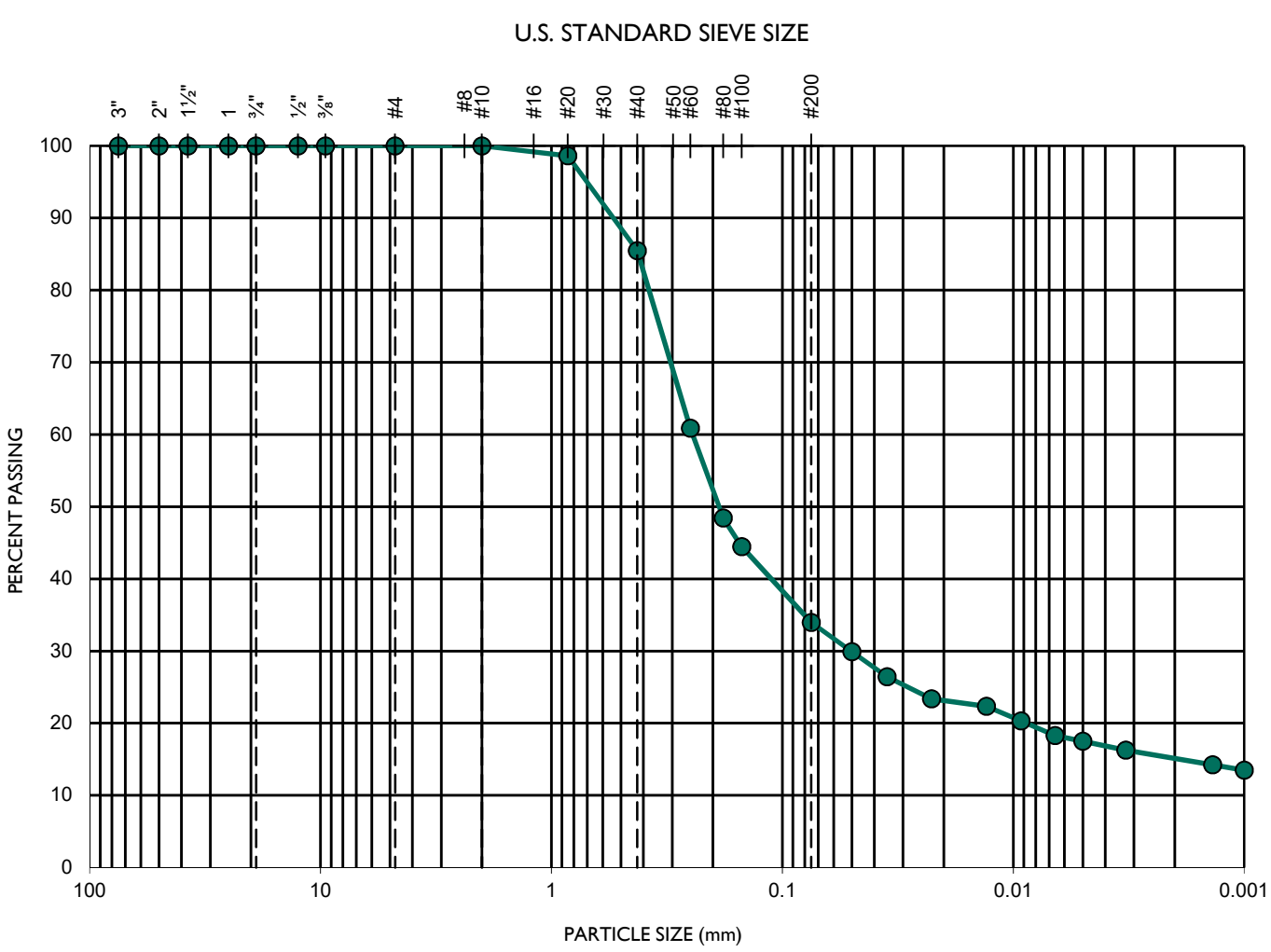
PROJECT NO.: G2307-32-05

SAMPLE NO.: **B2-13**

SAMPLE DEPTH (FT.): **46'**

GEOLOGIC UNIT: **Qal**

GRAVEL		SAND			SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



TEST DATA					
D_{10} (mm)	D_{30} (mm)	D_{60} (mm)	C_c	C_u	SOIL DESCRIPTION
--	0.05058	0.24515	--	--	Silty Clayey SAND

GEOCON
INCORPORATED
GEOTECHNICAL CONSULTANTS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
PHONE 858 558-6900 - FAX 858 558-6159

SIEVE ANALYSES - ASTM D 6913

PIRAEUS POINT

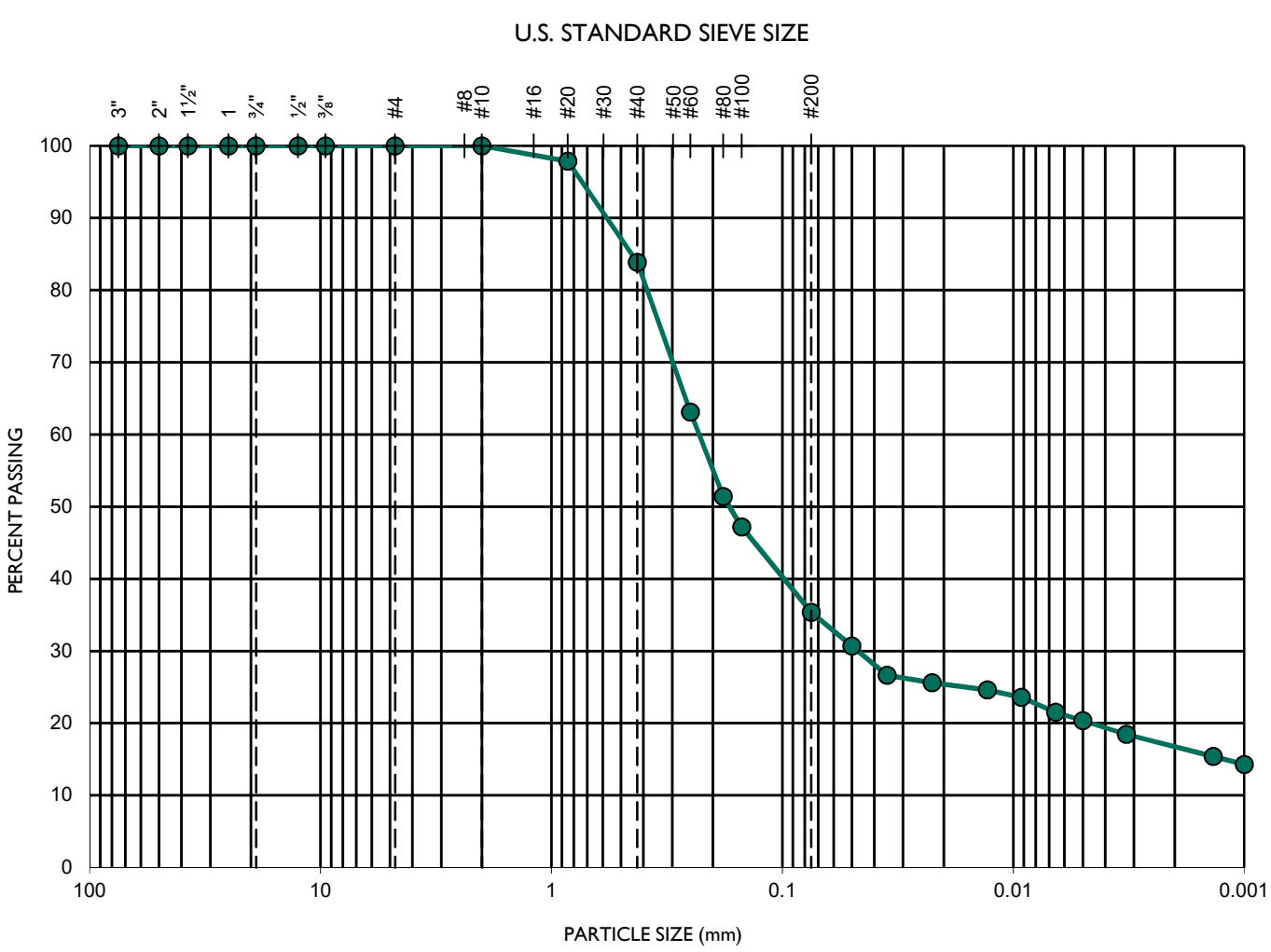
PROJECT NO.: G2307-32-05

SAMPLE NO.: **B3-9**

SAMPLE DEPTH (FT.): **36'**

GEOLOGIC UNIT: **Qal**

GRAVEL		SAND			SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



TEST DATA					
D_{10} (mm)	D_{30} (mm)	D_{60} (mm)	C_c	C_u	SOIL DESCRIPTION
--	0.04749	0.23151	--	--	Silty Clayey SAND

GEOCON
INCORPORATED
GEOTECHNICAL CONSULTANTS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
PHONE 858 558-6900 - FAX 858 558-6159

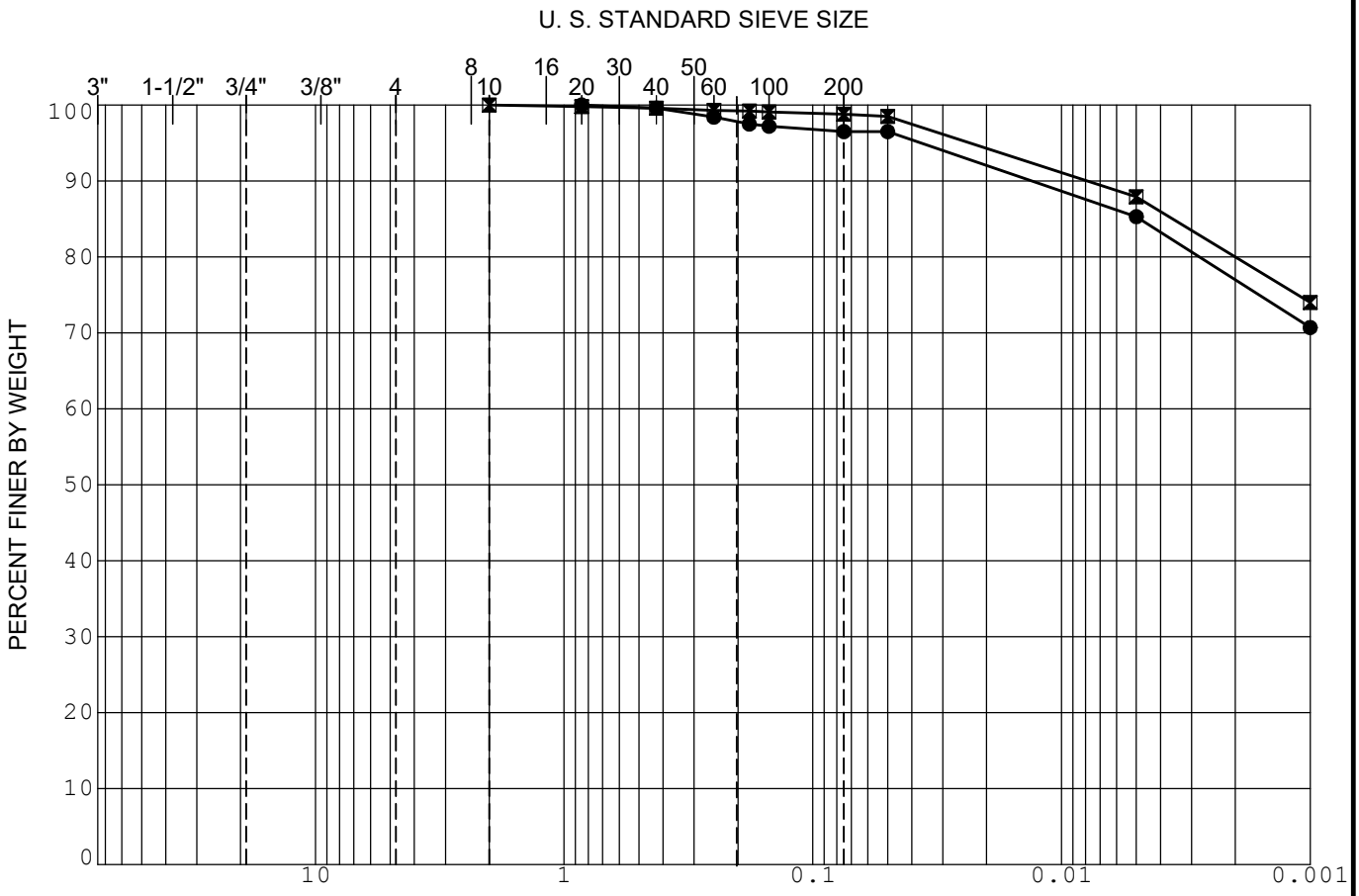
SIEVE ANALYSES - ASTM D 6913

PIRAEUS POINT

PROJECT NO.: G2307-32-05

PROJECT NO. G2307-32-05

GRAVEL		SAND			SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



ASTM D422

	SAMPLE	DEPTH (ft)	CLASSIFICATION	NAT WC	LL	PL	PI
●	LB1-13	44.5	CH - Fat CLAY		103	34	69
⊠	LB3-8	62.5	CH - Fat CLAY		89	34	55
▲							

GRADATION CURVE

PIRAEUS POINT

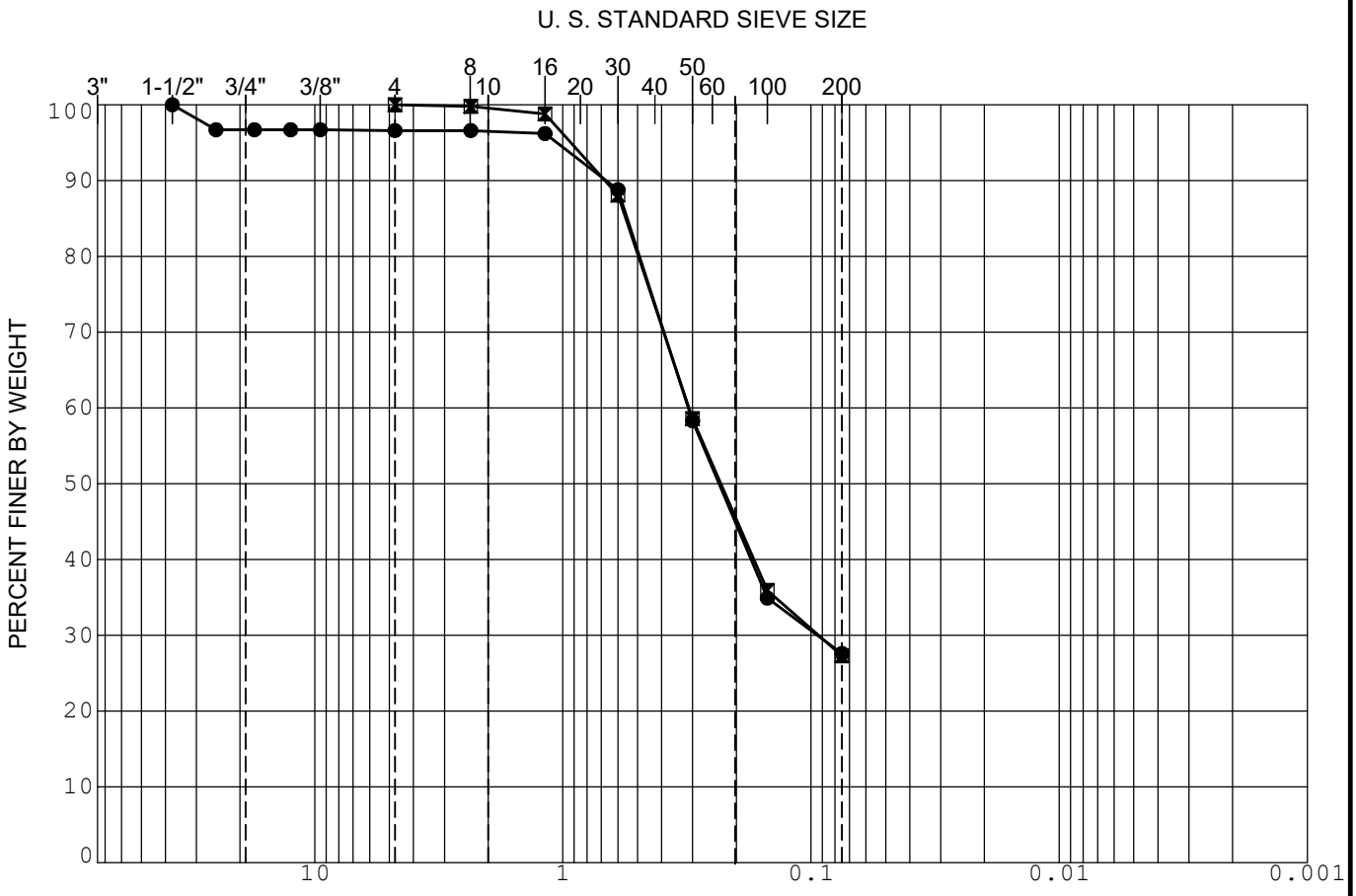
ENCINITAS, CALIFORNIA

G2307-32-05.GPJ

GEOCON

PROJECT NO. G2307-32-05

GRAVEL		SAND			SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



ASTM D422

	SAMPLE	DEPTH (ft)	CLASSIFICATION	NAT WC	LL	PL	PI
●	SB1-10	40.0	SC - Clayey SAND		32	16	16
⊠	SB2-10	45.0	SC - Clayey SAND		33	16	17
▲							

GRADATION CURVE

PIRAEUS POINT

ENCINITAS, CALIFORNIA

G2307-32-05.GPJ

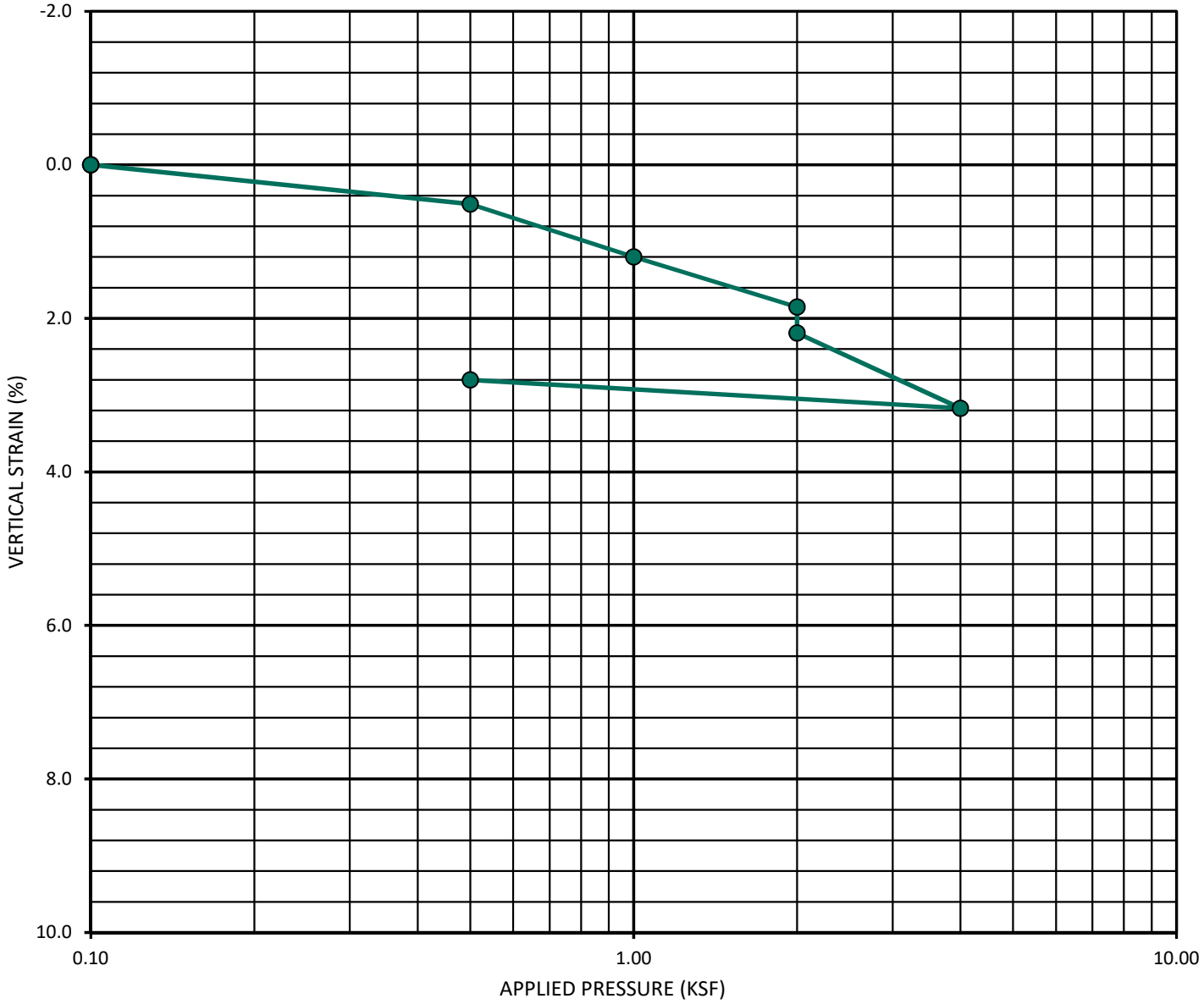
GEOCON

SAMPLE NO.: **B1-2**

SAMPLE DEPTH (FT): **10'**

GEOLOGIC UNIT: **Qpf**

TEST INFORMATION	
INITIAL DRY DENSITY (PCF):	109.0
INITIAL WATER CONTENT (%):	12.2%
SAMPLE SATURATED AT (KSF):	2.0
INITIAL SATURATION (%):	62.0%



CONSOLIDATION CURVE - ASTM D 2435

GEOCON
INCORPORATED
GEOTECHNICAL CONSULTANTS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
PHONE 858 558-6900 - FAX 858 558-6159

PIRAEUS POINT

PROJECT NO.: G2307-32-05

SAMPLE NO.: **B1-4**

SAMPLE DEPTH (FT): **20'**

GEOLOGIC UNIT: **Qal**

TEST INFORMATION	
INITIAL DRY DENSITY (PCF):	113.5
INITIAL WATER CONTENT (%):	14.7%
SAMPLE SATURATED AT (KSF):	2.0
INITIAL SATURATION (%):	84.4%

GEOCON
INCORPORATED
GEOTECHNICAL CONSULTANTS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
PHONE 858 558-6900 - FAX 858 558-6159

CONSOLIDATION CURVE - ASTM D 2435

PIRAEUS POINT

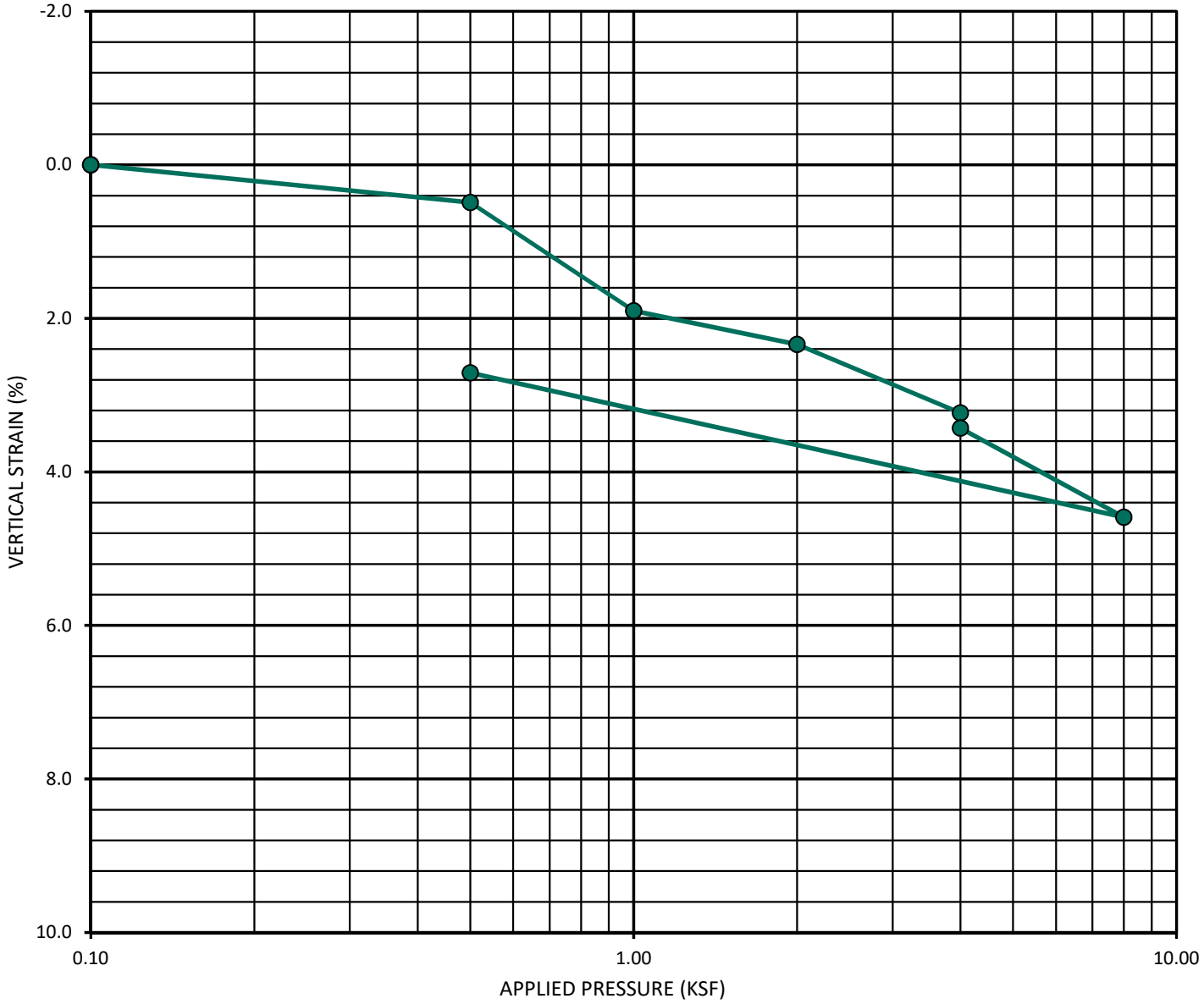
PROJECT NO.: G2307-32-05

SAMPLE NO.: **B1-8**

SAMPLE DEPTH (FT): **35'**

GEOLOGIC UNIT: **Qal**

TEST INFORMATION	
INITIAL DRY DENSITY (PCF):	104.3
INITIAL WATER CONTENT (%):	20.6%
SAMPLE SATURATED AT (KSF):	4.0
INITIAL SATURATION (%):	92.5%



CONSOLIDATION CURVE - ASTM D 2435

GEOCON
INCORPORATED
GEOTECHNICAL CONSULTANTS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
PHONE 858 558-6900 - FAX 858 558-6159

PIRAEUS POINT

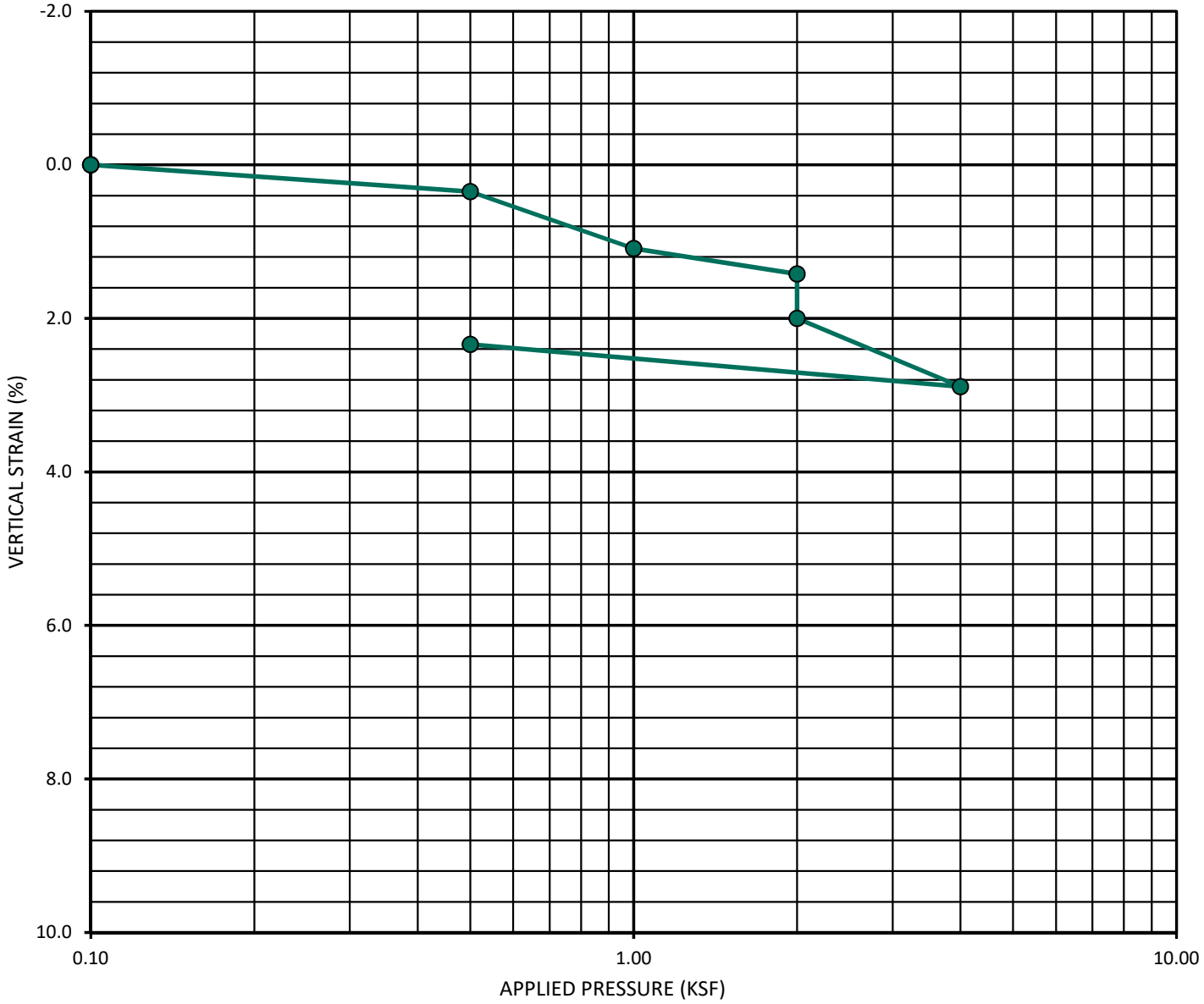
PROJECT NO.: G2307-32-05

SAMPLE NO.: **B2-1**

SAMPLE DEPTH (FT): **5'**

GEOLOGIC UNIT: **Qpf**

TEST INFORMATION	
INITIAL DRY DENSITY (PCF):	114.1
INITIAL WATER CONTENT (%):	9.8%
SAMPLE SATURATED AT (KSF):	2.0
INITIAL SATURATION (%):	57.5%



CONSOLIDATION CURVE - ASTM D 2435

GEOCON
INCORPORATED
GEOTECHNICAL CONSULTANTS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
PHONE 858 558-6900 - FAX 858 558-6159

PIRAEUS POINT

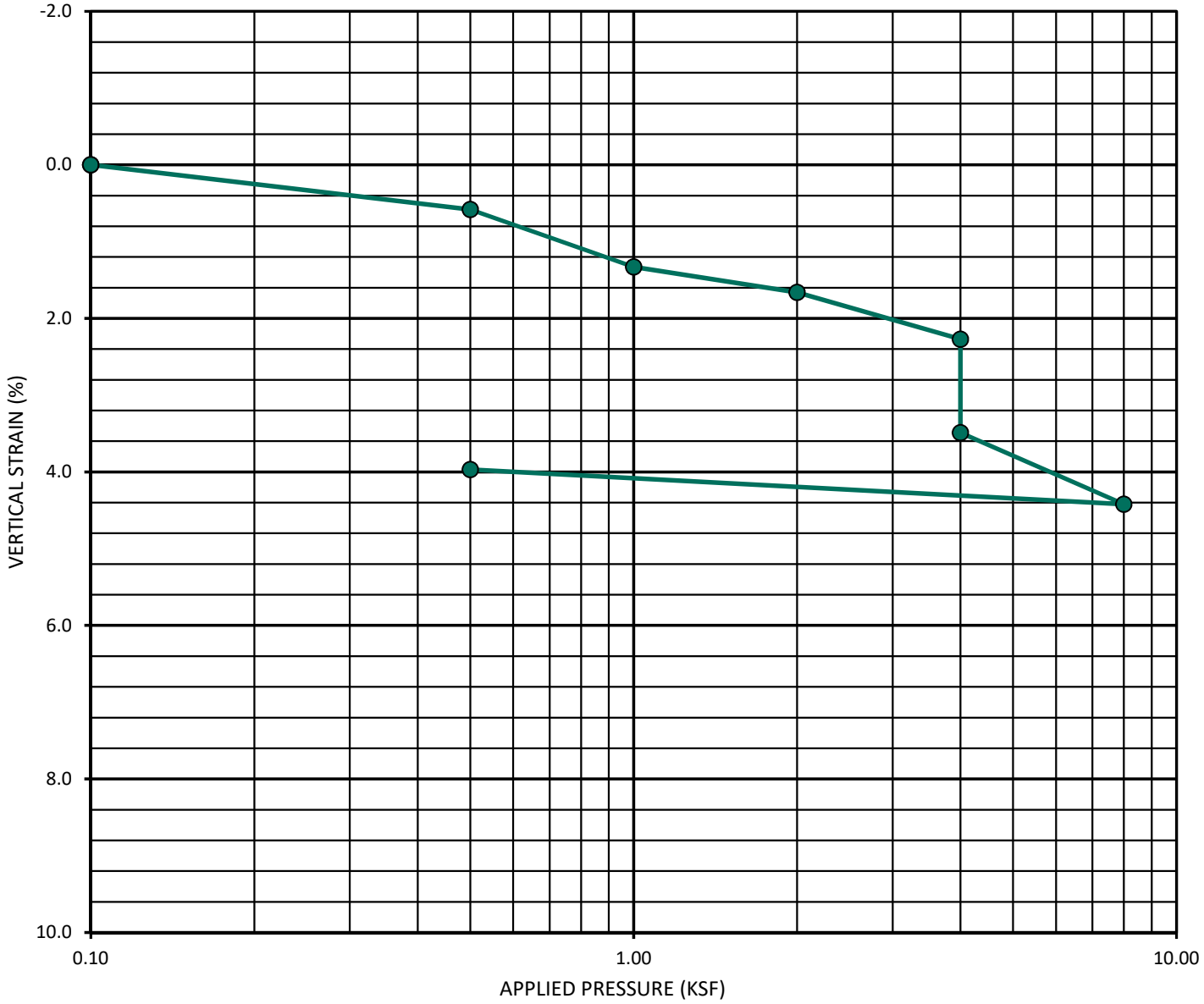
PROJECT NO.: G2307-32-05

SAMPLE NO.: **B2-5**

SAMPLE DEPTH (FT): **25'**

GEOLOGIC UNIT: **Qal**

TEST INFORMATION	
INITIAL DRY DENSITY (PCF):	107.3
INITIAL WATER CONTENT (%):	4.7%
SAMPLE SATURATED AT (KSF):	4.0
INITIAL SATURATION (%):	23.1%



CONSOLIDATION CURVE - ASTM D 2435

GEOCON
INCORPORATED
GEOTECHNICAL CONSULTANTS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
PHONE 858 558-6900 - FAX 858 558-6159

PIRAEUS POINT

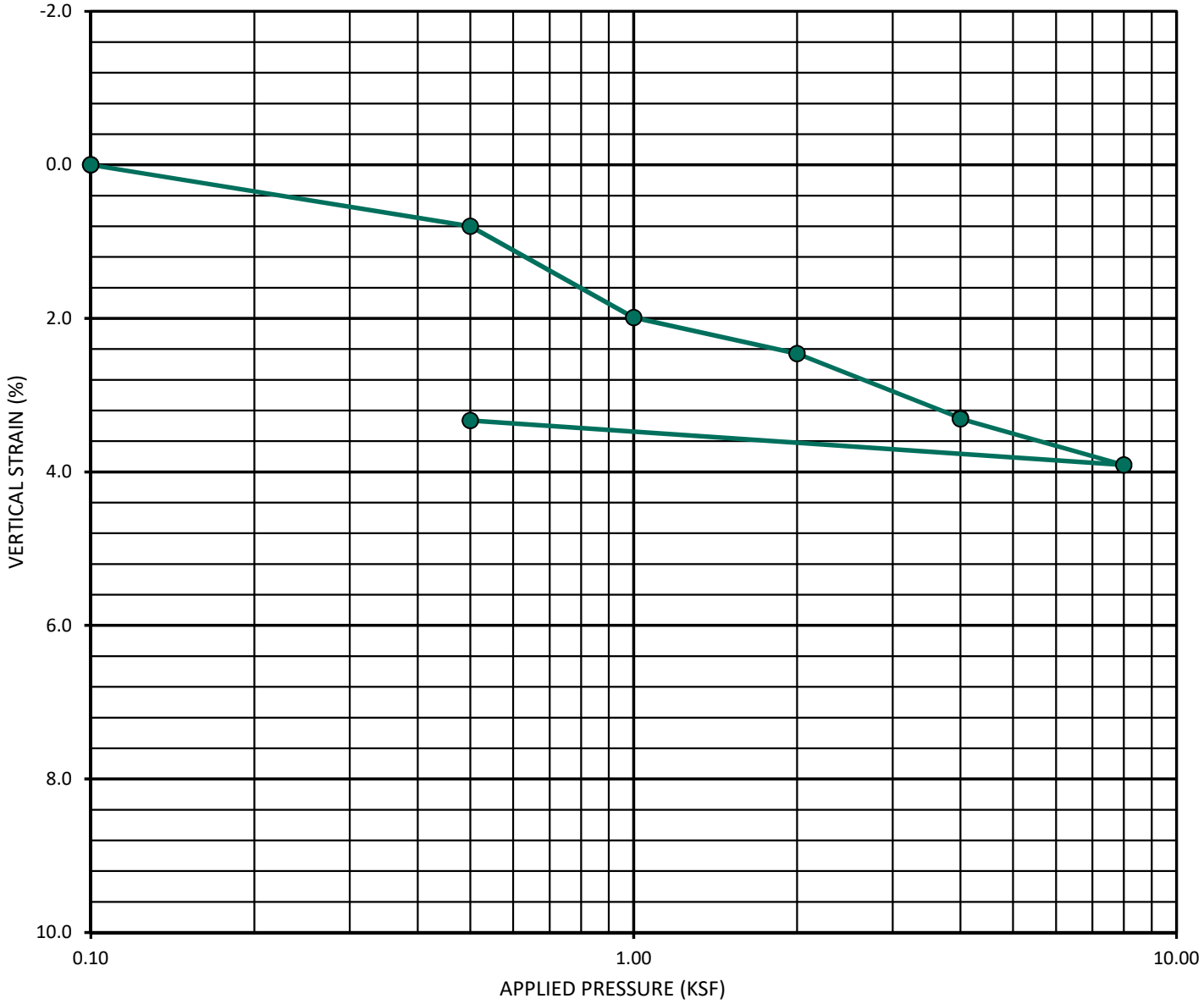
PROJECT NO.: G2307-32-05

SAMPLE NO.: **B2-12**

SAMPLE DEPTH (FT): **45'**

GEOLOGIC UNIT: **Qal**

TEST INFORMATION	
INITIAL DRY DENSITY (PCF):	118.4
INITIAL WATER CONTENT (%):	14.5%
SAMPLE SATURATED AT (KSF):	4.0
INITIAL SATURATION (%):	96.1%



CONSOLIDATION CURVE - ASTM D 2435

GEOCON
INCORPORATED
GEOTECHNICAL CONSULTANTS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
PHONE 858 558-6900 - FAX 858 558-6159

PIRAEUS POINT

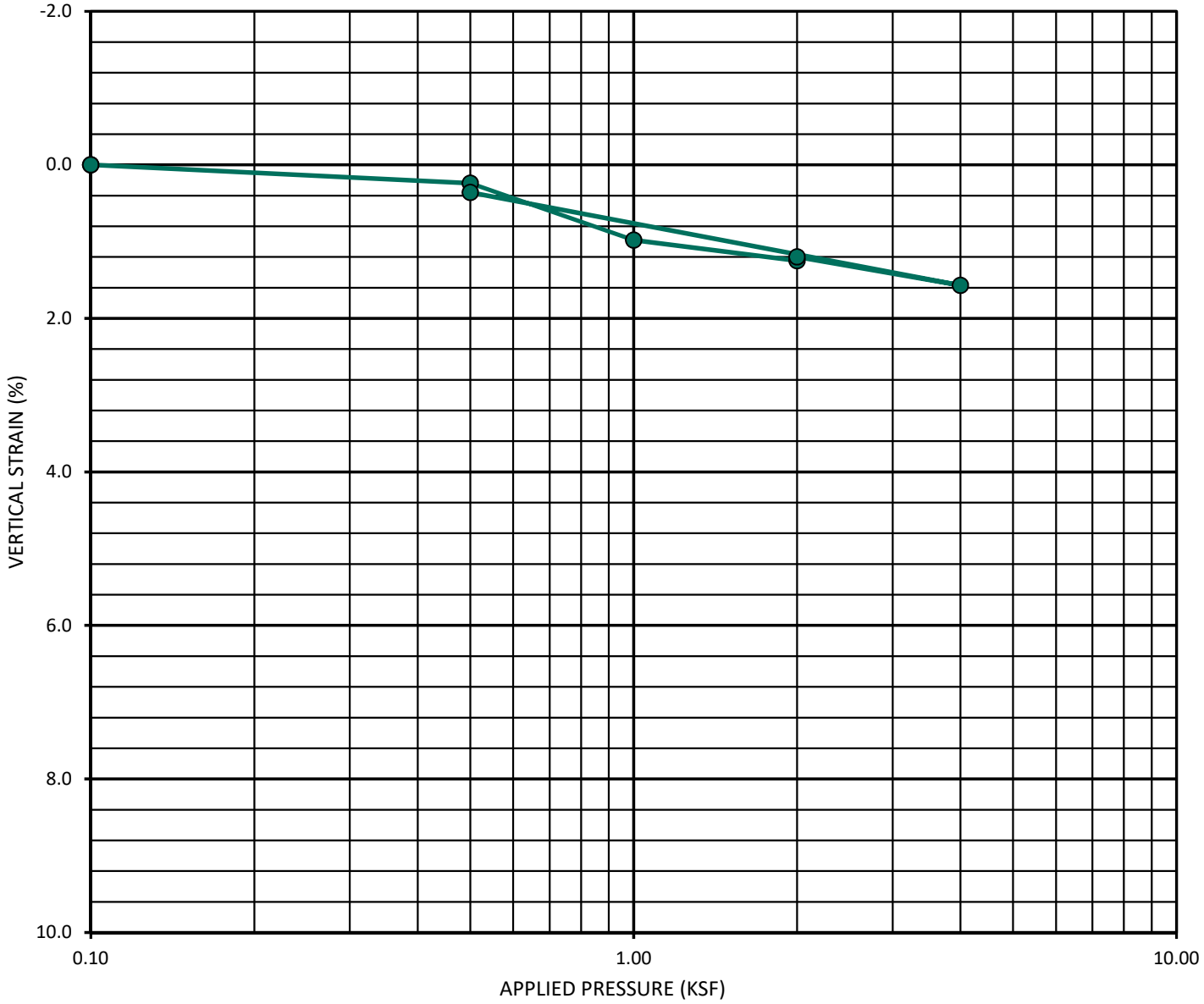
PROJECT NO.: G2307-32-05

SAMPLE NO.: **B3-1**

SAMPLE DEPTH (FT): **5'**

GEOLOGIC UNIT: **Qpf**

TEST INFORMATION	
INITIAL DRY DENSITY (PCF):	117.2
INITIAL WATER CONTENT (%):	10.1%
SAMPLE SATURATED AT (KSF):	2.0
INITIAL SATURATION (%):	65.0%



GEOCON
INCORPORATED
GEOTECHNICAL CONSULTANTS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
PHONE 858 558-6900 - FAX 858 558-6159

CONSOLIDATION CURVE - ASTM D 2435

PIRAEUS POINT

PROJECT NO.: G2307-32-05

SAMPLE NO.: **B3-4**

SAMPLE DEPTH (FT): **20'**

GEOLOGIC UNIT: **Qal**

TEST INFORMATION	
INITIAL DRY DENSITY (PCF):	112.9
INITIAL WATER CONTENT (%):	10.7%
SAMPLE SATURATED AT (KSF):	2.0
INITIAL SATURATION (%):	60.5%

GEOCON
INCORPORATED
GEOTECHNICAL CONSULTANTS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
PHONE 858 558-6900 - FAX 858 558-6159

CONSOLIDATION CURVE - ASTM D 2435

PIRAEUS POINT

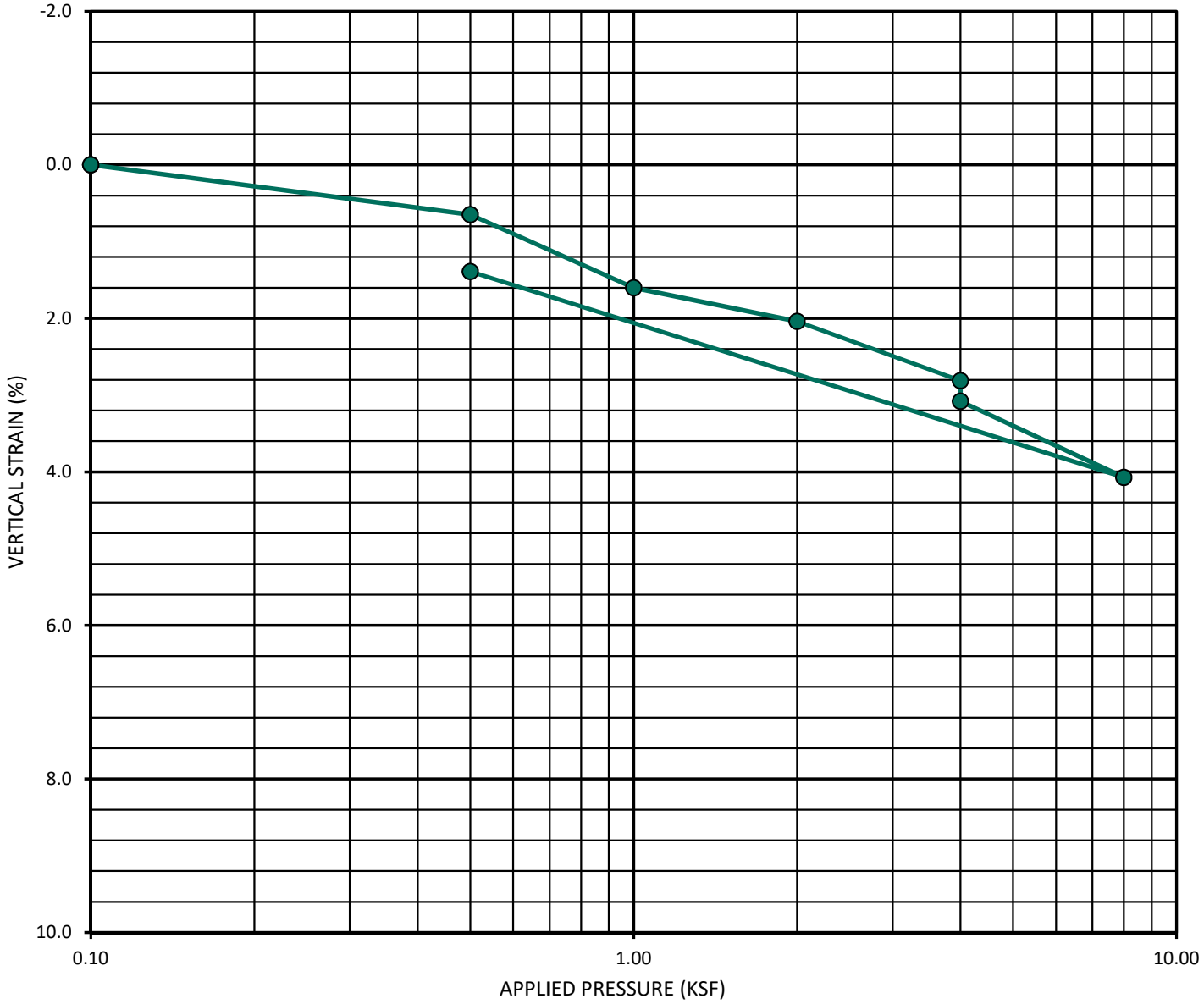
PROJECT NO.: G2307-32-05

SAMPLE NO.: **B3-8**

SAMPLE DEPTH (FT): **35'**

GEOLOGIC UNIT: **Qal**

TEST INFORMATION	
INITIAL DRY DENSITY (PCF):	114.5
INITIAL WATER CONTENT (%):	14.6%
SAMPLE SATURATED AT (KSF):	4.0
INITIAL SATURATION (%):	86.4%



GEOCON
INCORPORATED
GEOTECHNICAL CONSULTANTS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
PHONE 858 558-6900 - FAX 858 558-6159

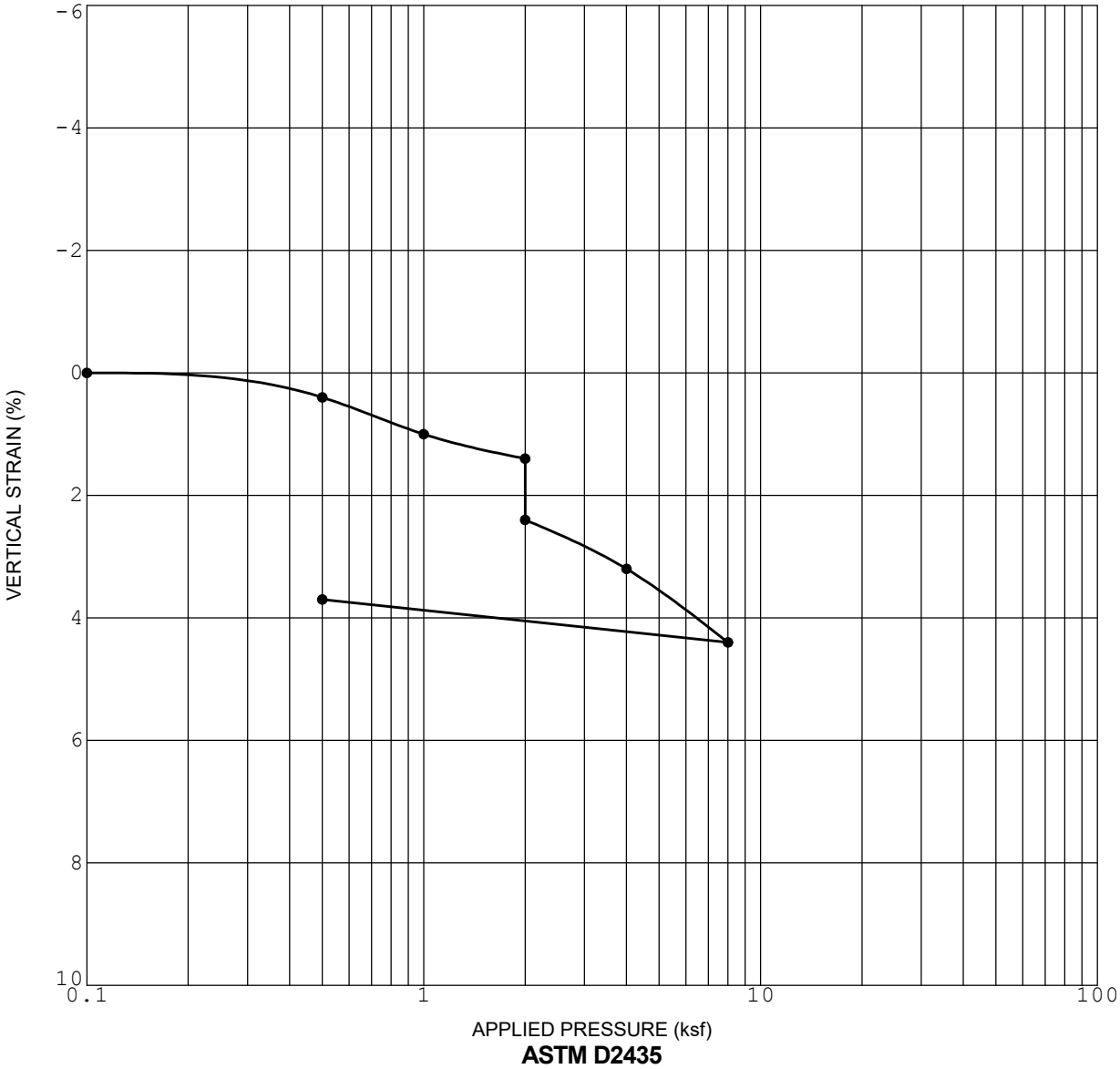
CONSOLIDATION CURVE - ASTM D 2435

PIRAEUS POINT

PROJECT NO.: G2307-32-05

PROJECT NO. G2307-32-05

SAMPLE NO. SB1-2



ASTM D2435

Initial Dry Density (pcf)	113.3	**Initial Saturation (%)**	52.1
Initial Water Content (%)	8.1	**Sample Saturated at (ksf)**	2.0

CONSOLIDATION CURVE

PIRAEUS POINT

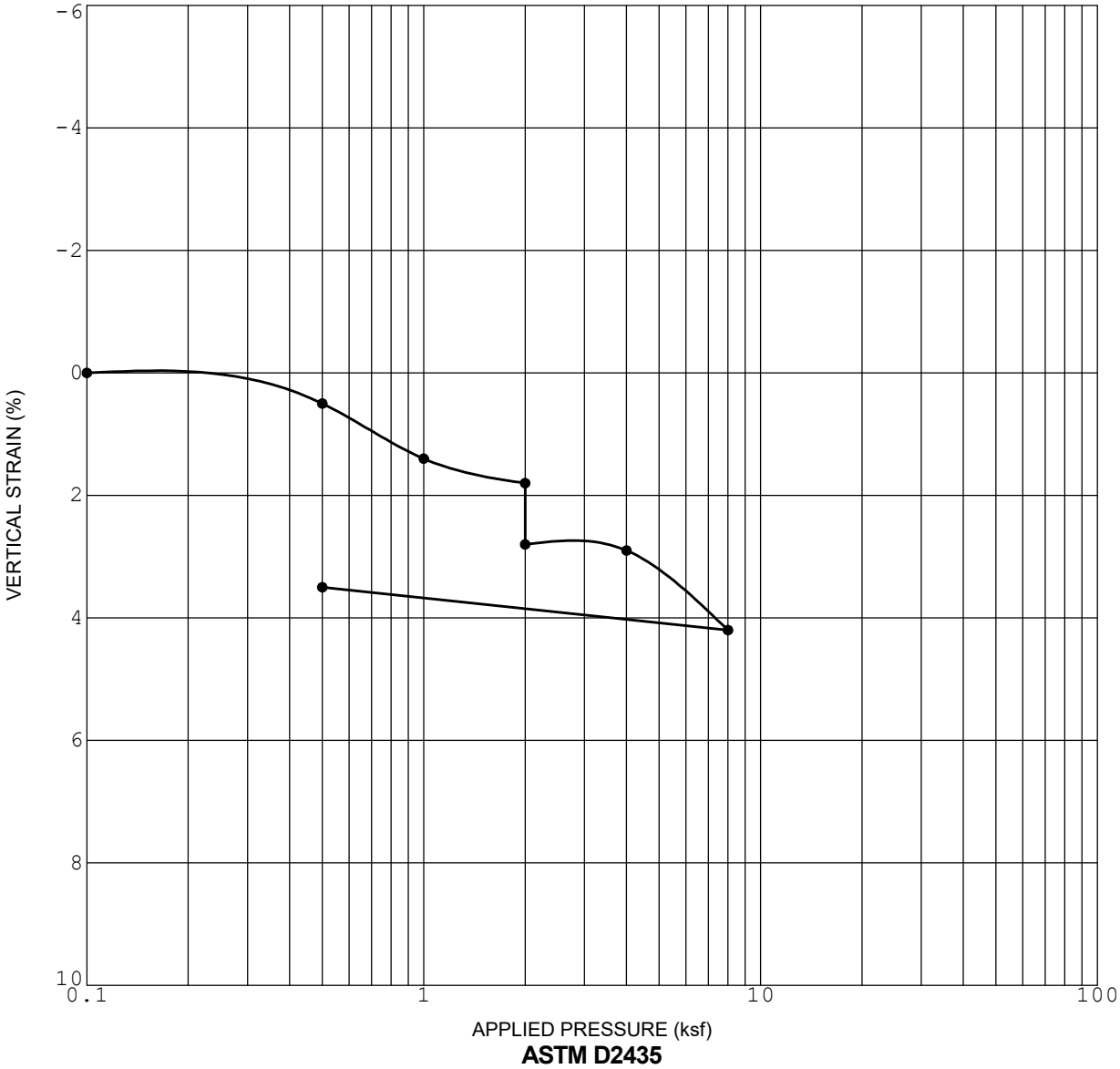
ENCINITAS, CALIFORNIA

G2307-32-05.GPJ

GEOCON

PROJECT NO. G2307-32-05

SAMPLE NO. SB2-5



ASTM D2435

Initial Dry Density (pcf)	115.2	**Initial Saturation (%)**	60.0
Initial Water Content (%)	10.0	**Sample Saturated at (ksf)**	2.0

CONSOLIDATION CURVE

PIRAEUS POINT

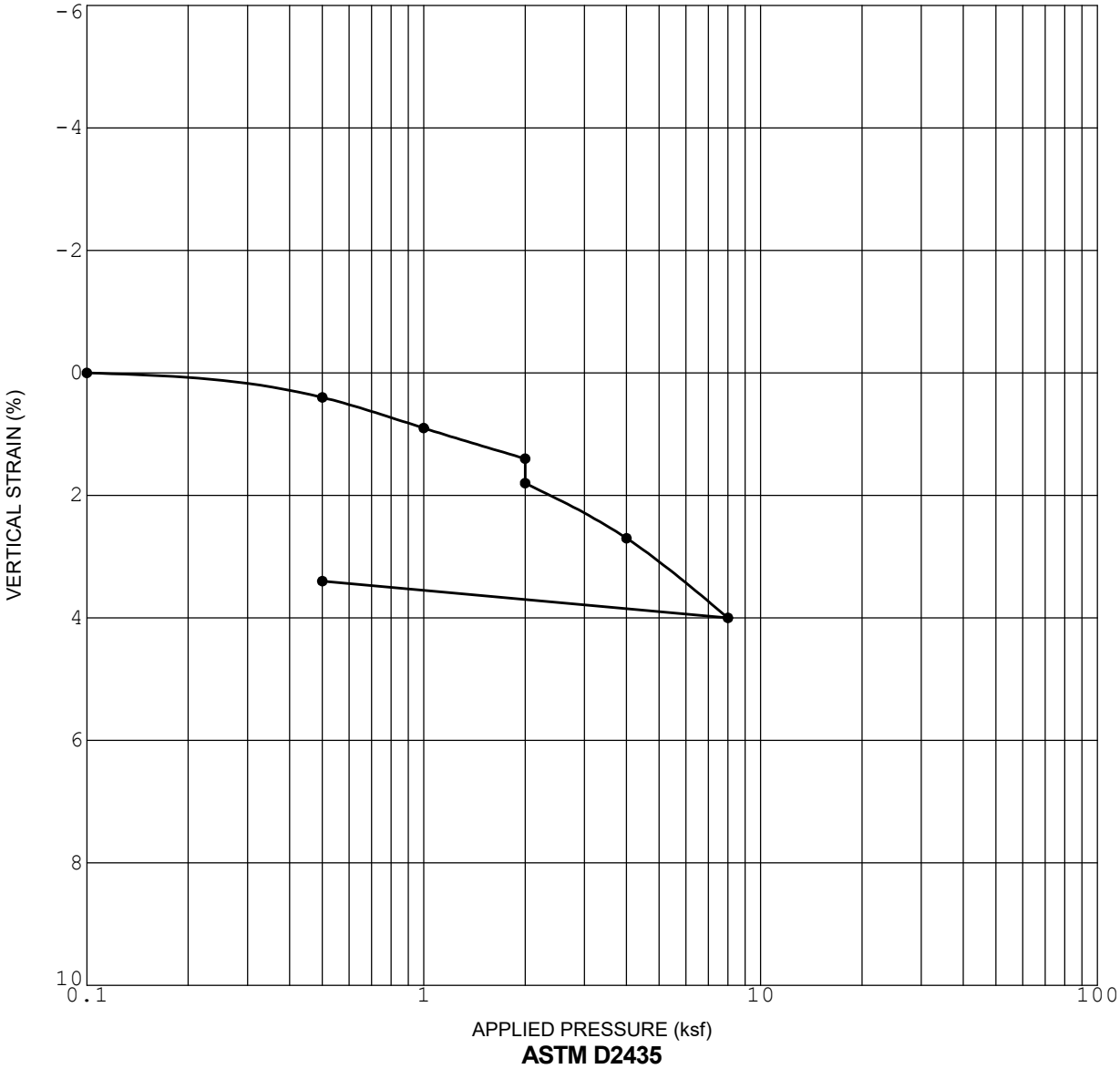
ENCINITAS, CALIFORNIA

G2307-32-05.GPJ

GEOCON

PROJECT NO. G2307-32-05

SAMPLE NO. SB2-7



ASTM D2435

Initial Dry Density (pcf)	111.7	**Initial Saturation (%)**	61.7
Initial Water Content (%)	11.3	**Sample Saturated at (ksf)**	2.0

CONSOLIDATION CURVE

PIRAEUS POINT

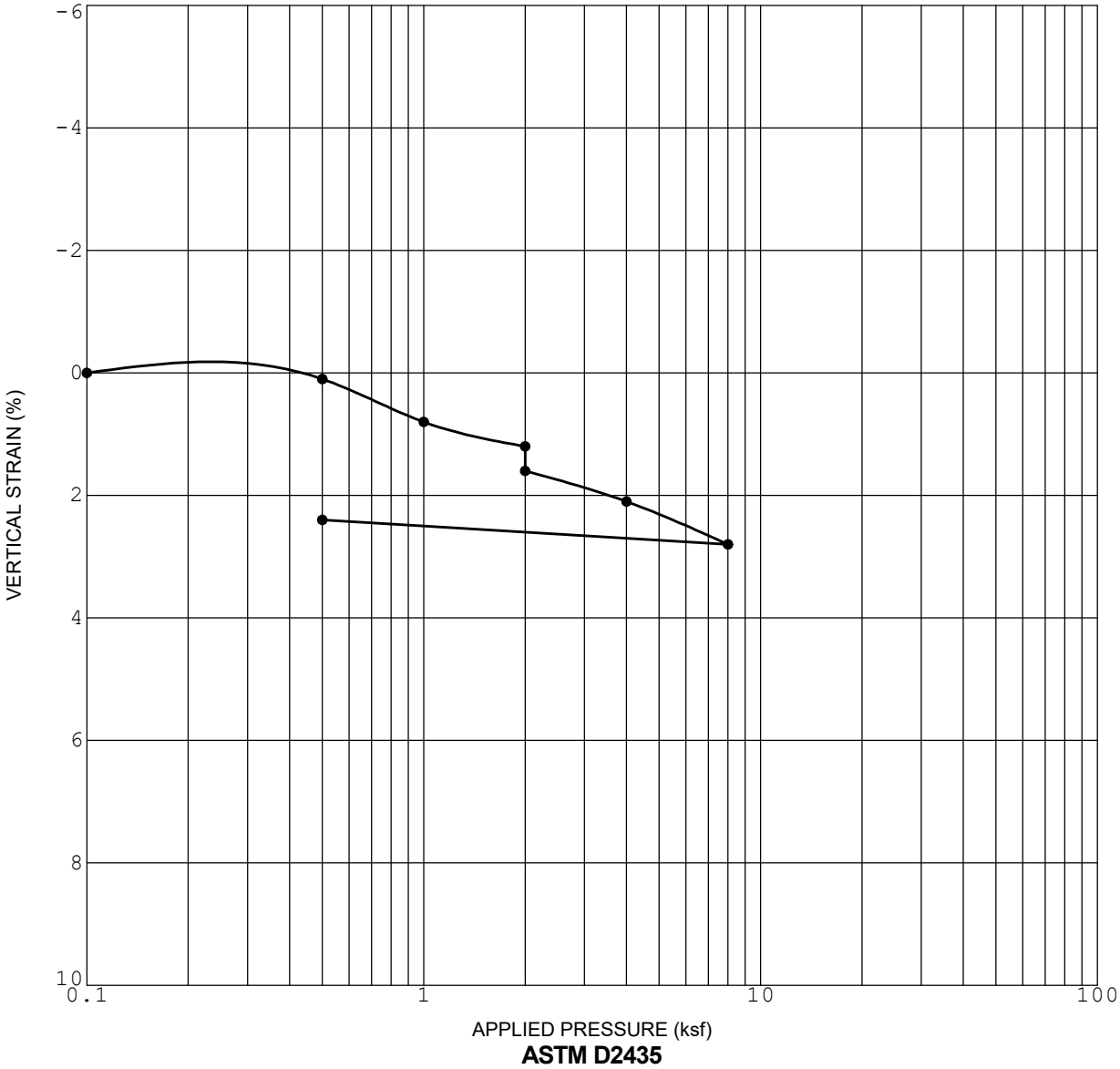
ENCINITAS, CALIFORNIA

G2307-32-05.GPJ

GEOCON

PROJECT NO. G2307-32-05

SAMPLE NO. SB2-11



ASTM D2435

Initial Dry Density (pcf)	115.6	**Initial Saturation (%)**	100
Initial Water Content (%)	18.4	**Sample Saturated at (ksf)**	.1

CONSOLIDATION CURVE

PIRAEUS POINT

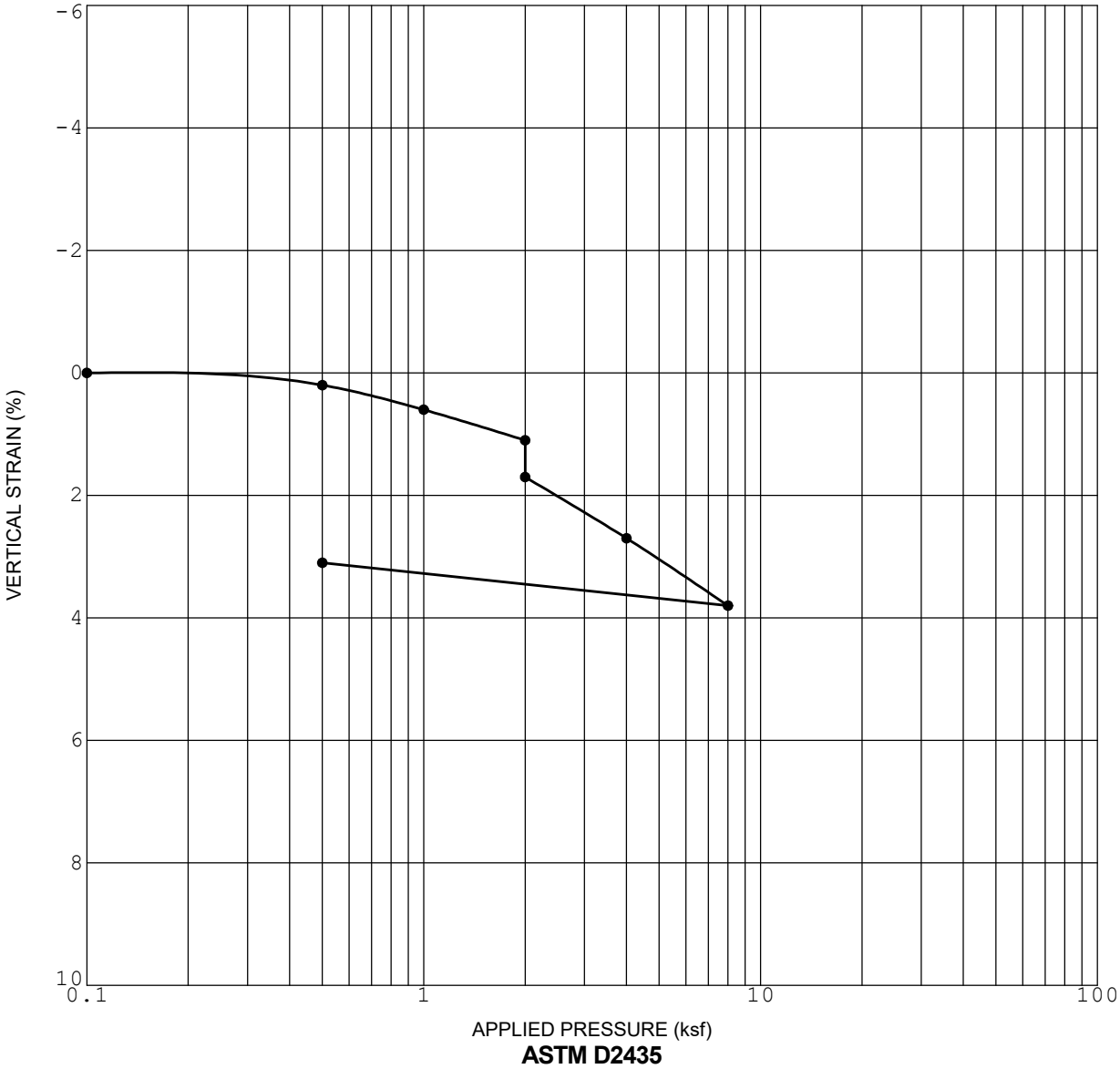
ENCINITAS, CALIFORNIA

G2307-32-05.GPJ

GEOCON

PROJECT NO. G2307-32-05

SAMPLE NO. SB3-3



ASTM D2435

Initial Dry Density (pcf)	110.8	**Initial Saturation (%)**	49.8
Initial Water Content (%)	9.3	**Sample Saturated at (ksf)**	2.0

CONSOLIDATION CURVE

PIRAEUS POINT

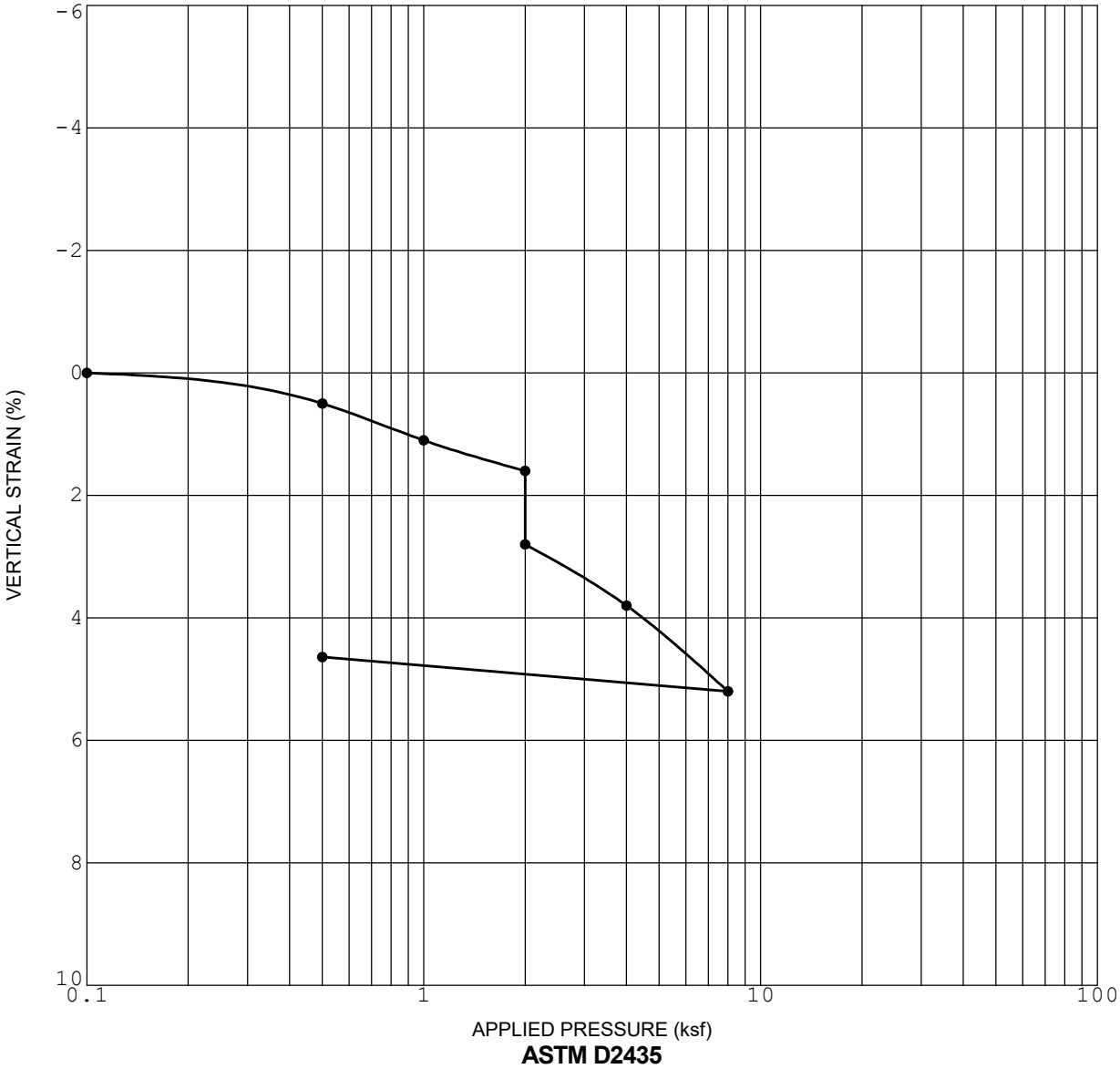
ENCINITAS, CALIFORNIA

G2307-32-05.GPJ

GEOCON

PROJECT NO. G2307-32-05

SAMPLE NO. SB3-5



ASTM D2435

Initial Dry Density (pcf)	116.1	**Initial Saturation (%)**	58.0
Initial Water Content (%)	9.4	**Sample Saturated at (ksf)**	2.0

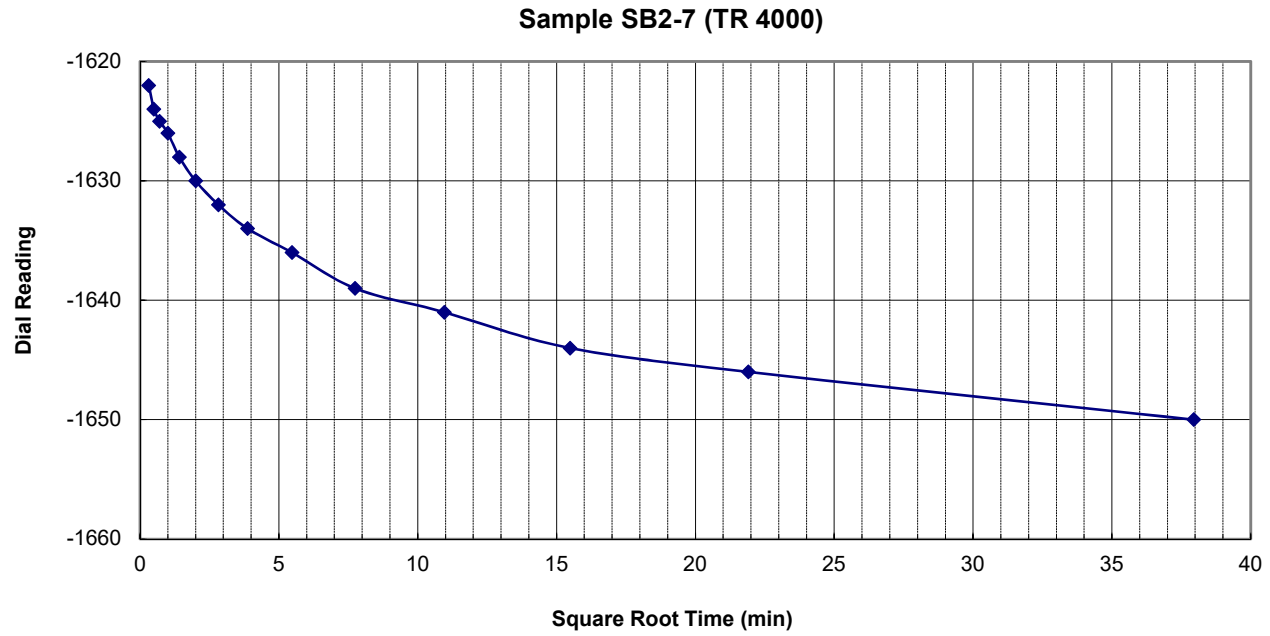
CONSOLIDATION CURVE

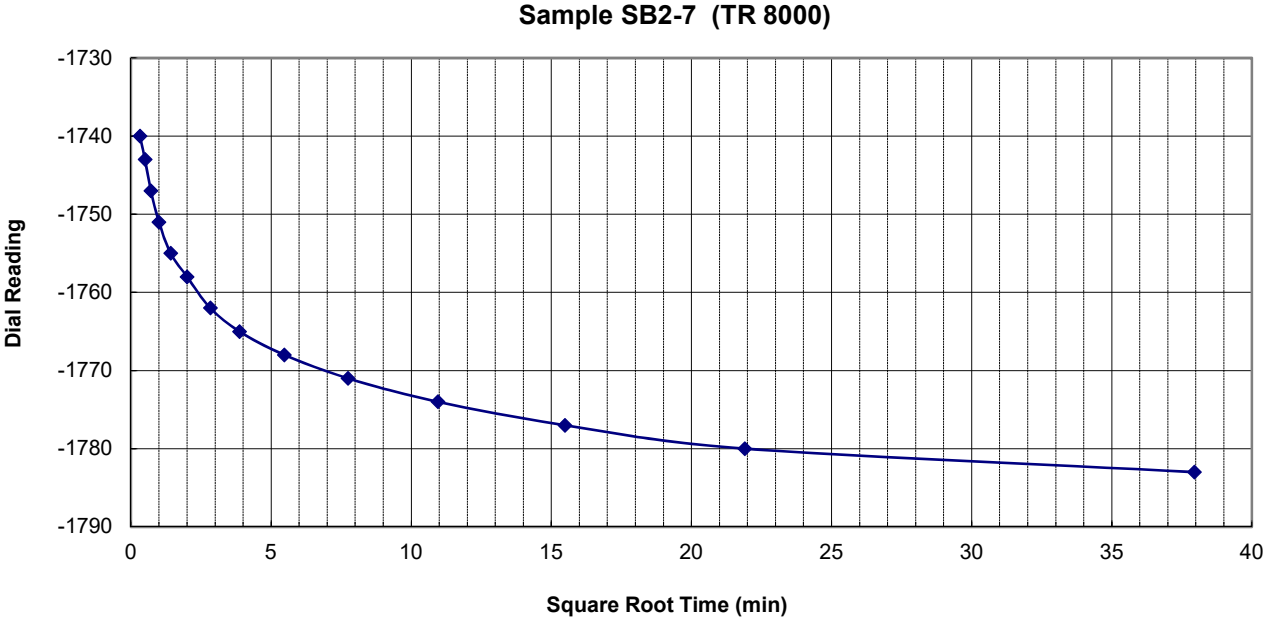
PIRAEUS POINT

ENCINITAS, CALIFORNIA

G2307-32-05.GPJ

GEOCON





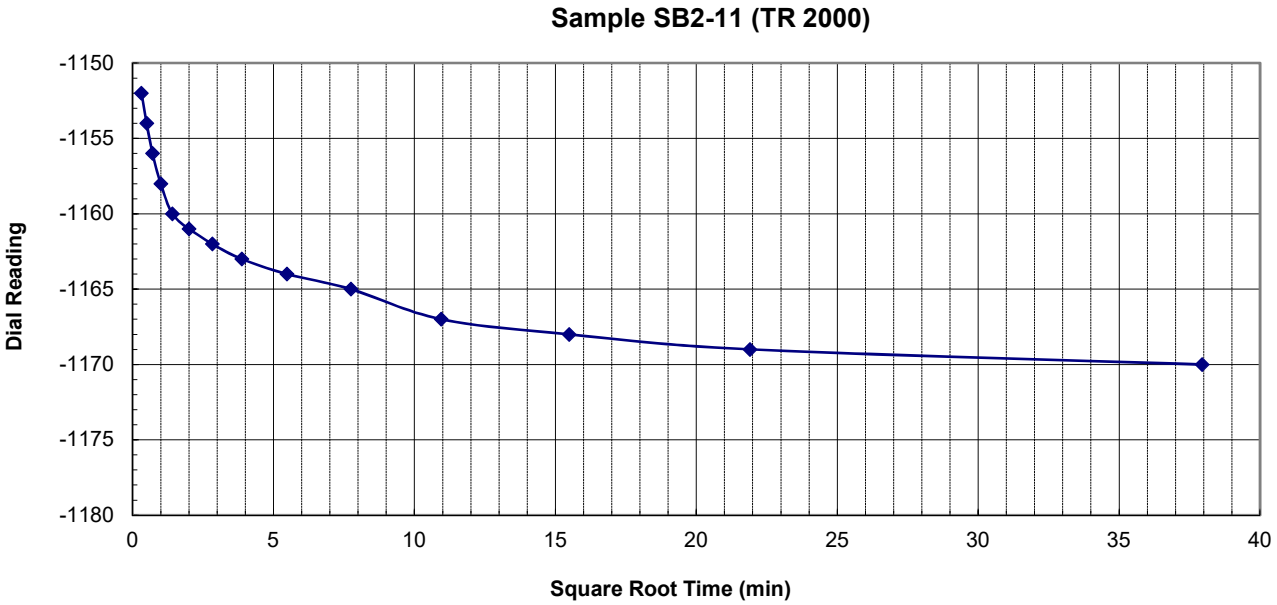
GEOCON
INCORPORATED
GEOTECHNICAL CONSULTANTS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
PHONE 858 558-6900 - FAX 858 558-6159

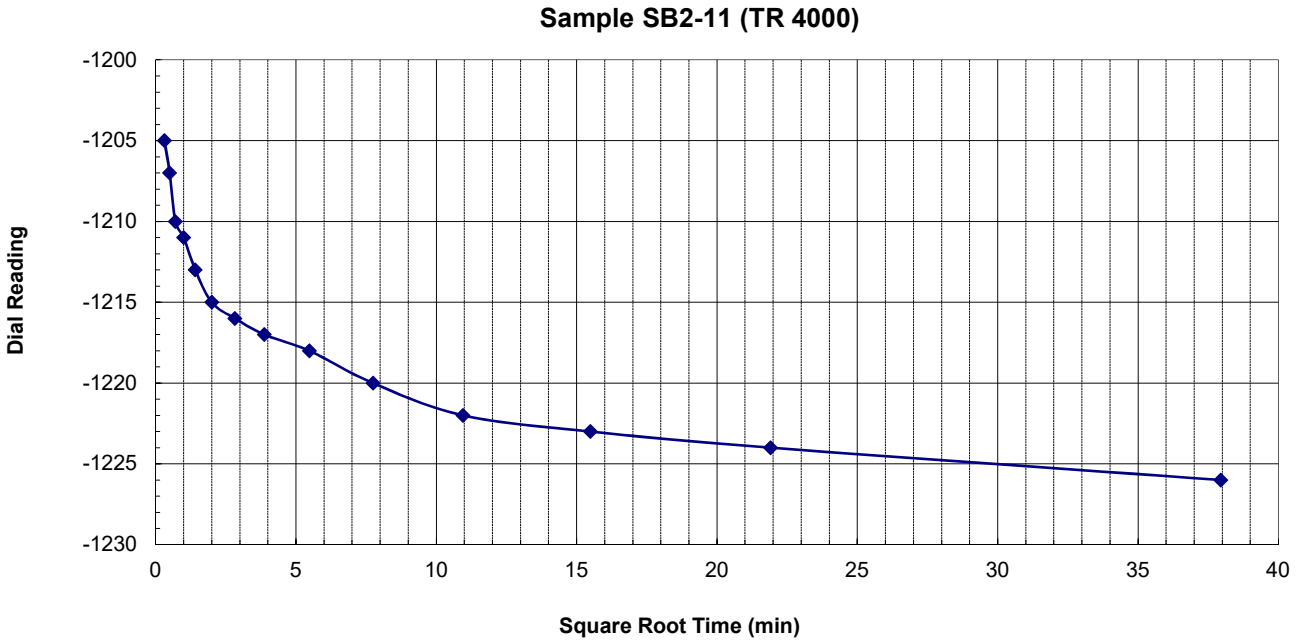
LR / SW

TIME RATE OF CONSOLIDATION RESULTS

PIRAEUS POINT
ENCINITAS, CALIFORNIA

PROJECT NO. G2307-32-05





GEOCON
INCORPORATED
GEOTECHNICAL CONSULTANTS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
PHONE 858 558-6900 - FAX 858 558-6159

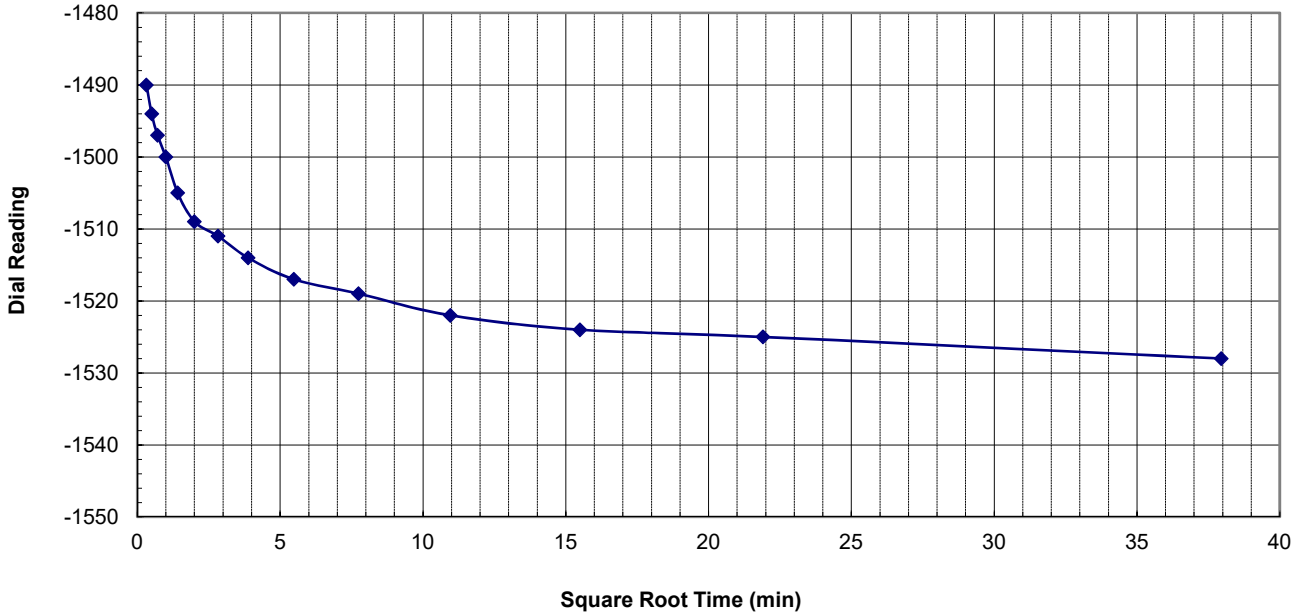
LR / SW

TIME RATE OF CONSOLIDATION RESULTS

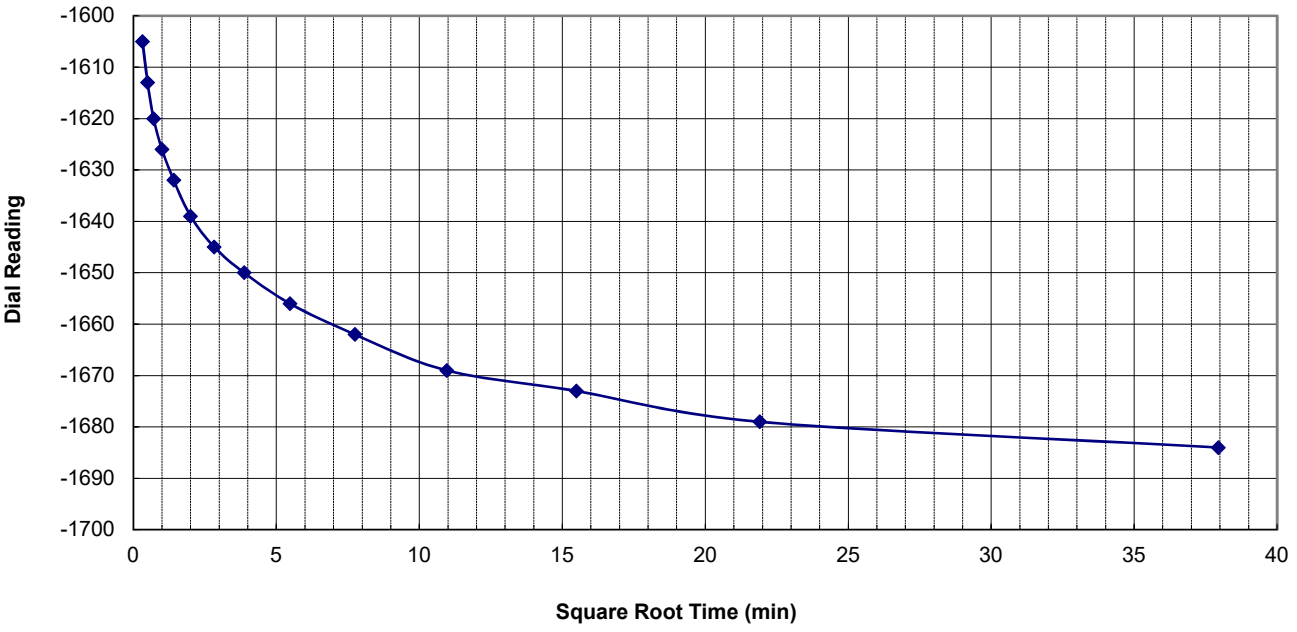
PIRAEUS POINT
ENCINITAS, CALIFORNIA

PROJECT NO. G2307-32-05

Sample SB3-4 (TR 4000)



Sample SB3-4 (TR 8000)



GEOCON
INCORPORATED
GEOTECHNICAL CONSULTANTS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
PHONE 858 558-6900 - FAX 858 558-6159

LR / SW

TIME RATE OF CONSOLIDATION RESULTS

PIRAEUS POINT
ENCINITAS, CALIFORNIA

PROJECT NO. G2307-32-05

APPENDIX C

APPENDIX C

SLOPE STABILITY ANALYSES

FOR

PIRAEUS POINT
ENCINITAS, CALIFORNIA

PROJECT NO. G2307-32-05

Piraeus Point
Project No. G2307-32-05
Section A-A'
Name: AA-Case1.gsz
Date: 01/20/2022 Time: 02:55:21 PM

Proposed Condition
Static Analysis

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	BPS	115	100	8
	Qcf	125	300	28
	Qvop	120	350	28
	Tsa (ML,CL)	130	500	23
	Tsa (SM,SP)	130	750	33

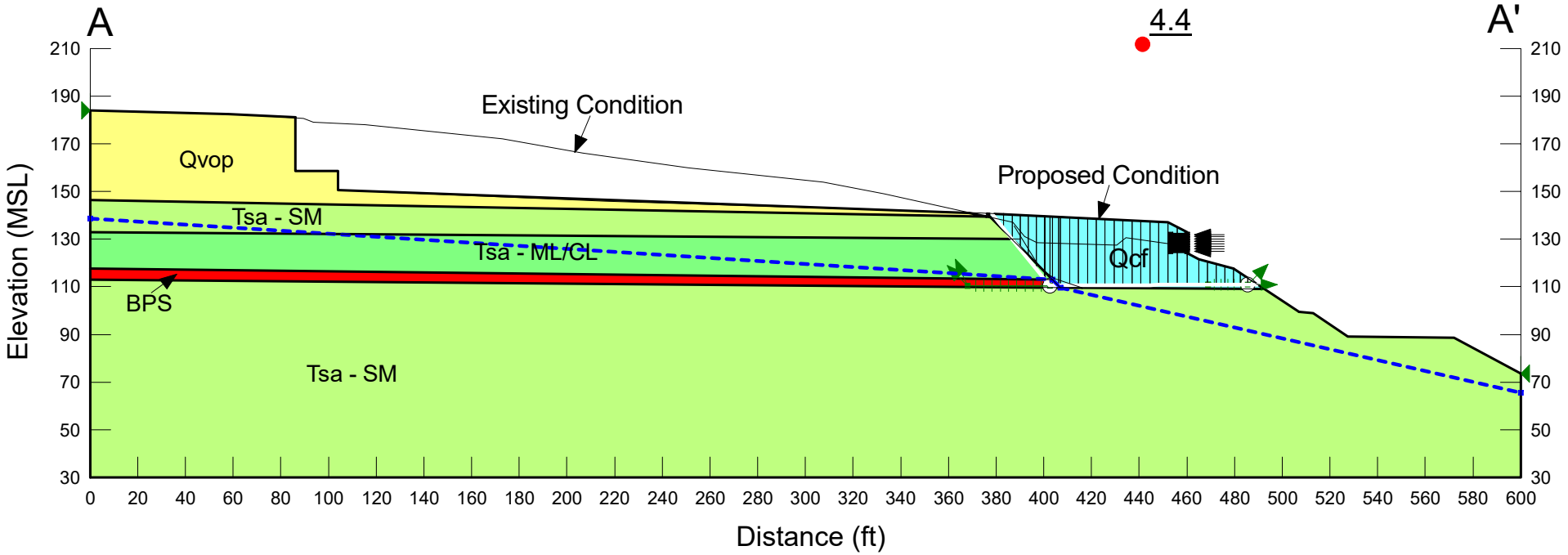


Figure C-1

Piraeus Point
Project No. G2307-32-05
Section A-A'
Name: AA-Case1s.gsz
Date: 01/21/2022 Time: 09:00:42 AM

Proposed Condition

Seismic Analysis
keq = 0.13g

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	BPS	115	100	8
	Qcf	125	300	28
	Qvop	120	350	28
	Tsa (ML,CL)	130	500	23
	Tsa (SM,SP)	130	750	33

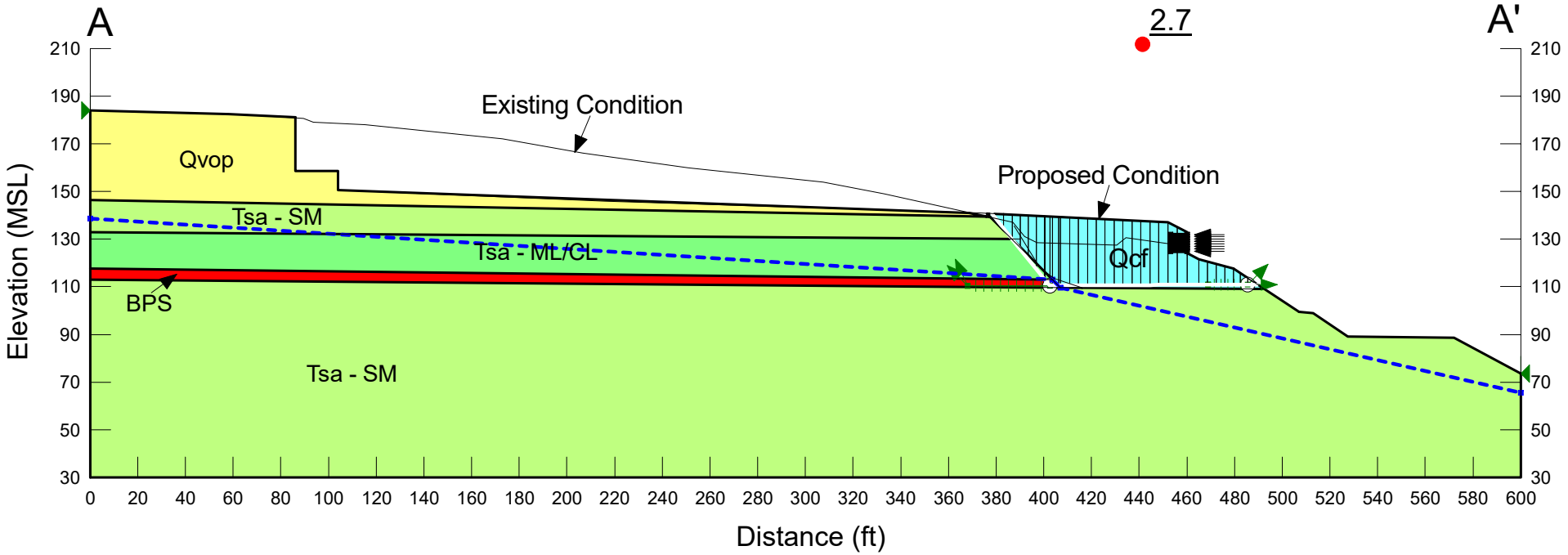


Figure C-2

Piraeus Point
Project No. G2307-32-05
Section A-A'
Name: AA-Case2.gsz
Date: 01/20/2022 Time: 02:57:03 PM

Proposed Condition
Static Analysis

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	BPS	115	100	8
	Qcf	125	300	28
	Qvop	120	350	28
	Tsa (ML,CL)	130	500	23
	Tsa (SM,SP)	130	750	33

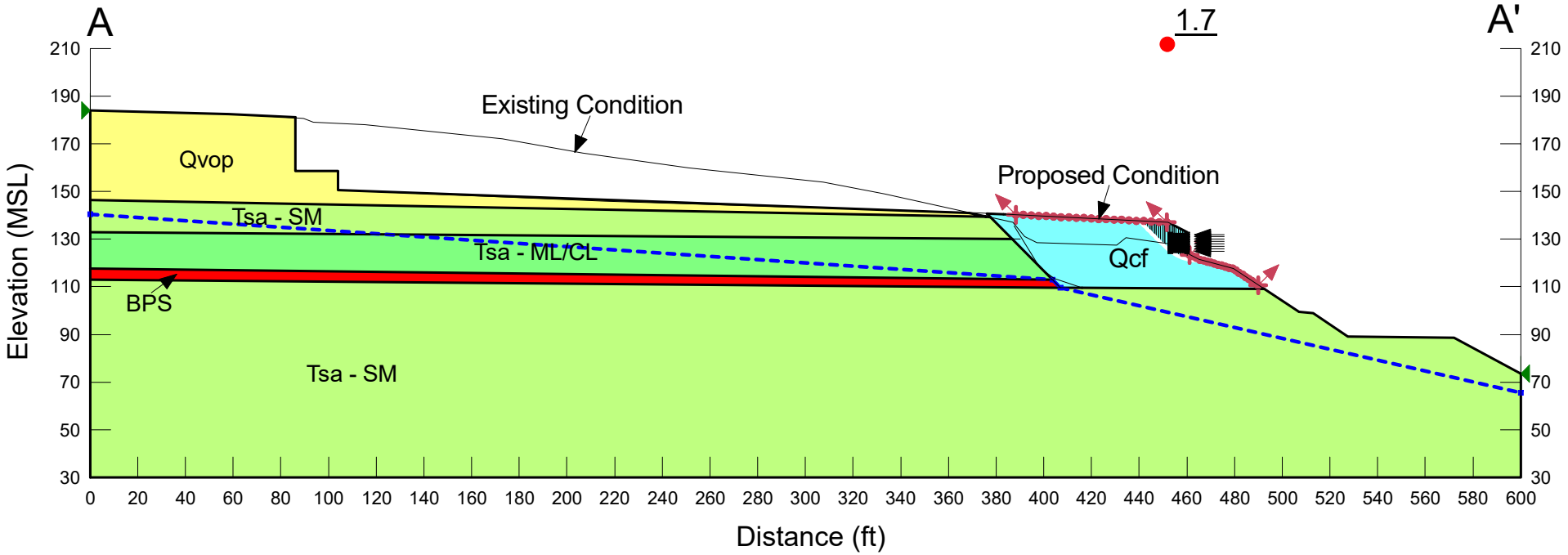


Figure C-3

Piraeus Point
Project No. G2307-32-05
Section A-A'
Name: AA-Case2s.gsz
Date: 01/21/2022 Time: 09:03:00 AM

Proposed Condition

Seismic Analysis
keq = 0.13g

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	BPS	115	100	8
	Qcf	125	300	28
	Qvop	120	350	28
	Tsa (ML,CL)	130	500	23
	Tsa (SM,SP)	130	750	33

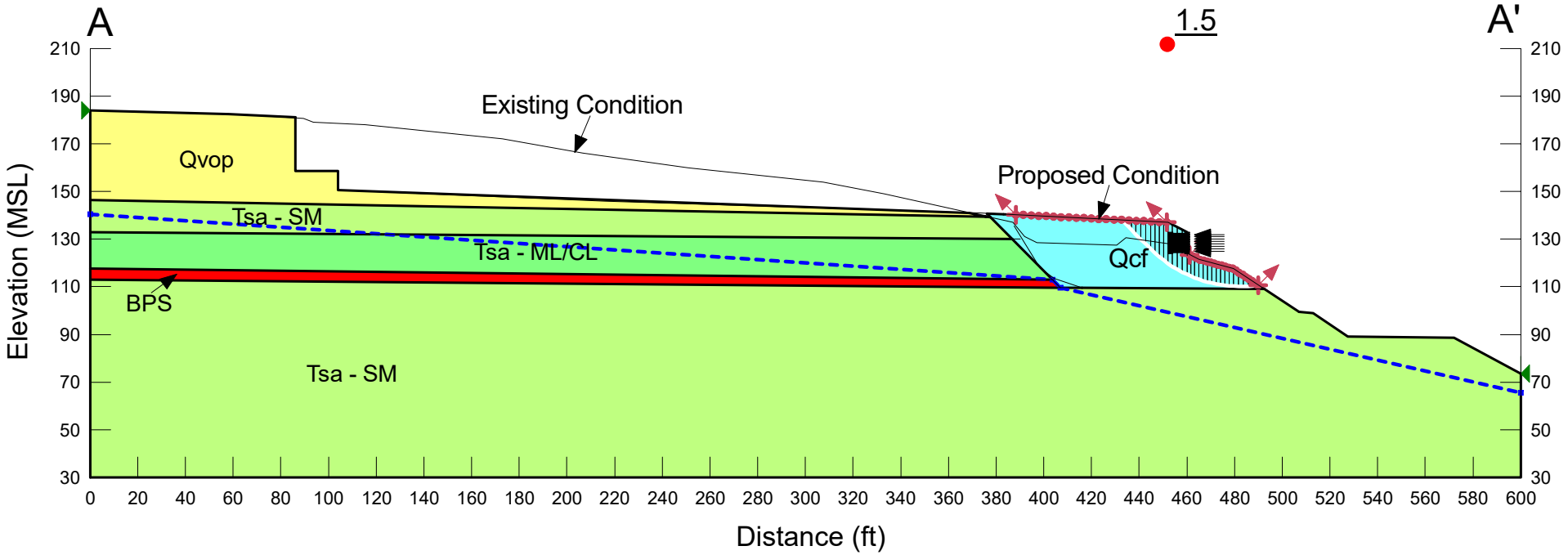


Figure C-4

Piraeus Point
Project No. G2307-32-05
Section A-A'
Name: AA-Case3.gsz
Date: 01/20/2022 Time: 02:58:54 PM

Proposed Condition

Static Analysis

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	BPS	115	100	8
	Qcf	125	300	28
	Qvop	120	350	28
	Tsa (ML,CL)	130	500	23
	Tsa (SM,SP)	130	750	33

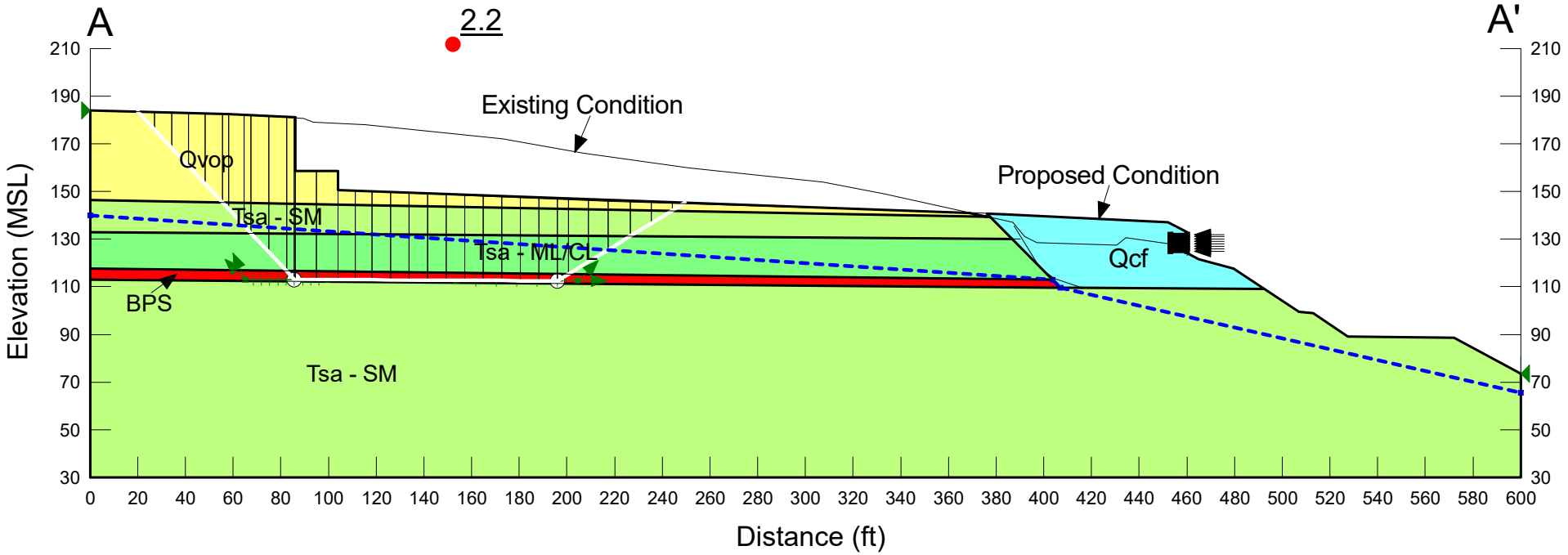


Figure C-5

Piraeus Point
Project No. G2307-32-05
Section A-A'
Name: AA-Case3s.gsz
Date: 01/21/2022 Time: 09:08:25 AM

Proposed Condition

Seismic Analysis
keq = 0.13g

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	BPS	115	100	8
	Qcf	125	300	28
	Qvop	120	350	28
	Tsa (ML,CL)	130	500	23
	Tsa (SM,SP)	130	750	33

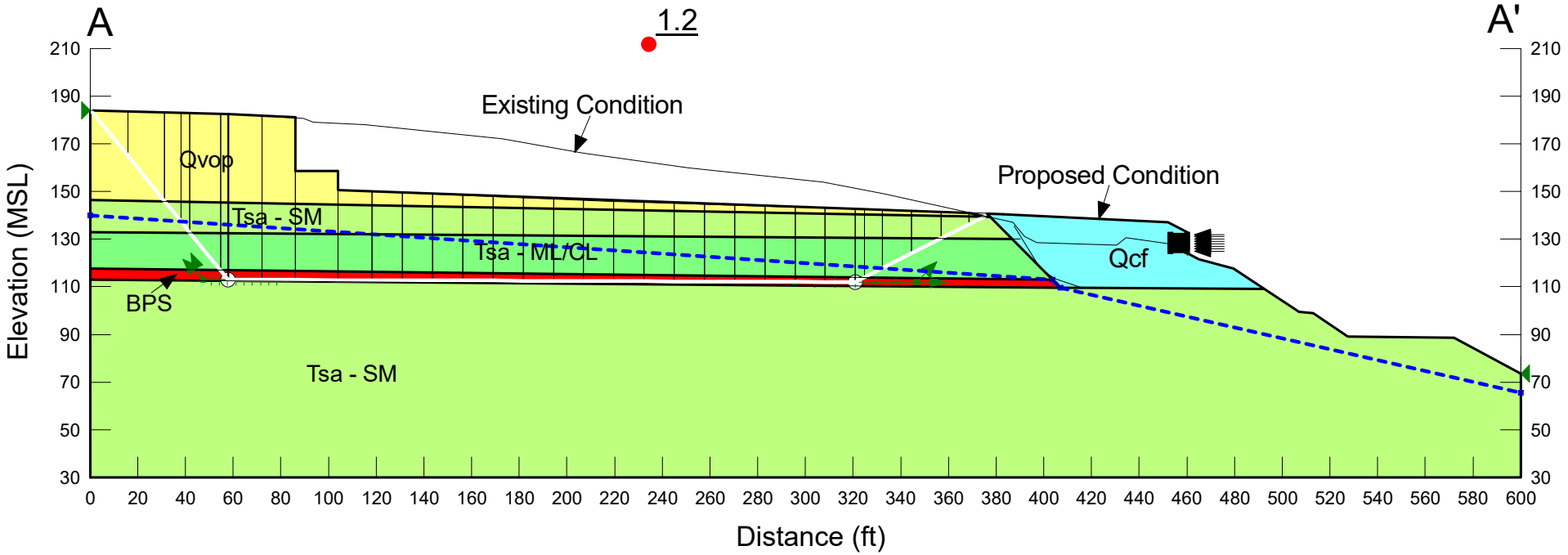


Figure C-6

Piraeus Point
Project No. G2307-32-05
Section A-A'
Name: AA-Case4.gsz
Date: 01/20/2022 Time: 03:12:49 PM

Proposed Condition

Static Analysis

Micropile Wall (6,500 lbf/ft reinforcement load)

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	BPS	115	100	8
	Qcf	125	300	28
	Qvop	120	350	28
	Tsa (ML,CL)	130	500	23
	Tsa (SM,SP)	130	750	33

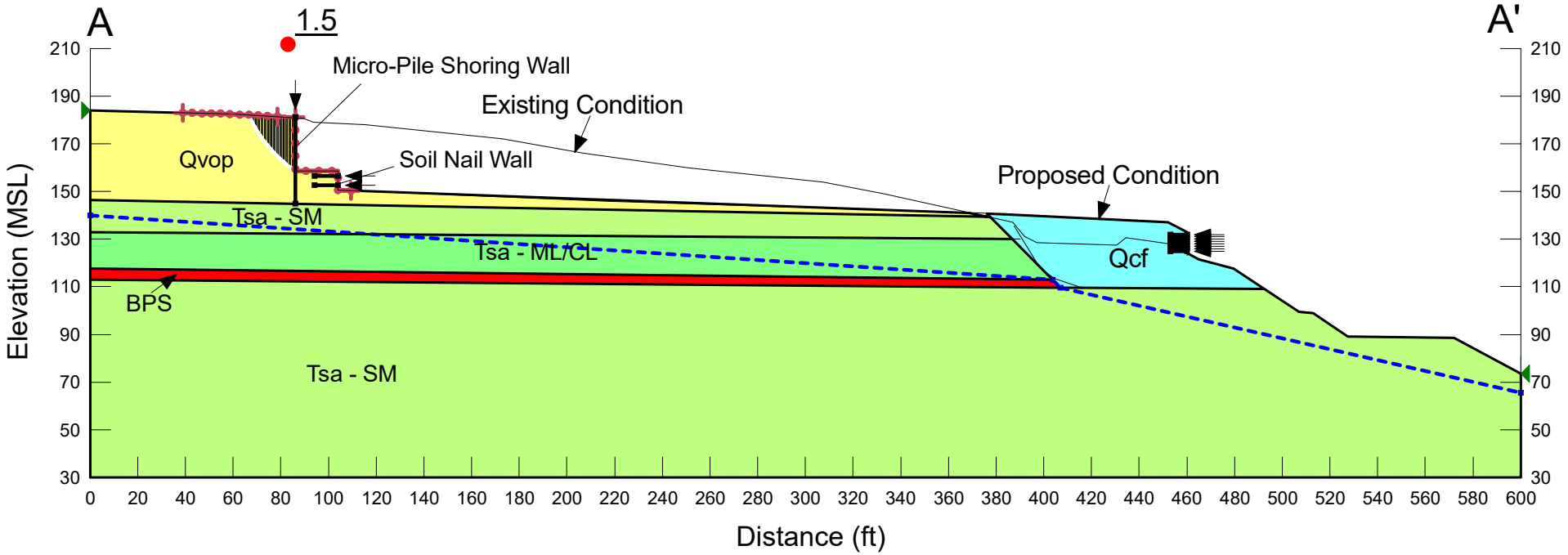


Figure C-7

Piraeus Point
Project No. G2307-32-05
Section A-A'
Name: AA-Case4s.gsz
Date: 01/21/2022 Time: 09:10:50 AM

Proposed Condition

Seismic Analysis
keq = 0.13g

Micropile Wall (6,500 lbf/ft reinforcement load)

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	BPS	115	100	8
	Qcf	125	300	28
	Qvop	120	350	28
	Tsa (ML,CL)	130	500	23
	Tsa (SM,SP)	130	750	33

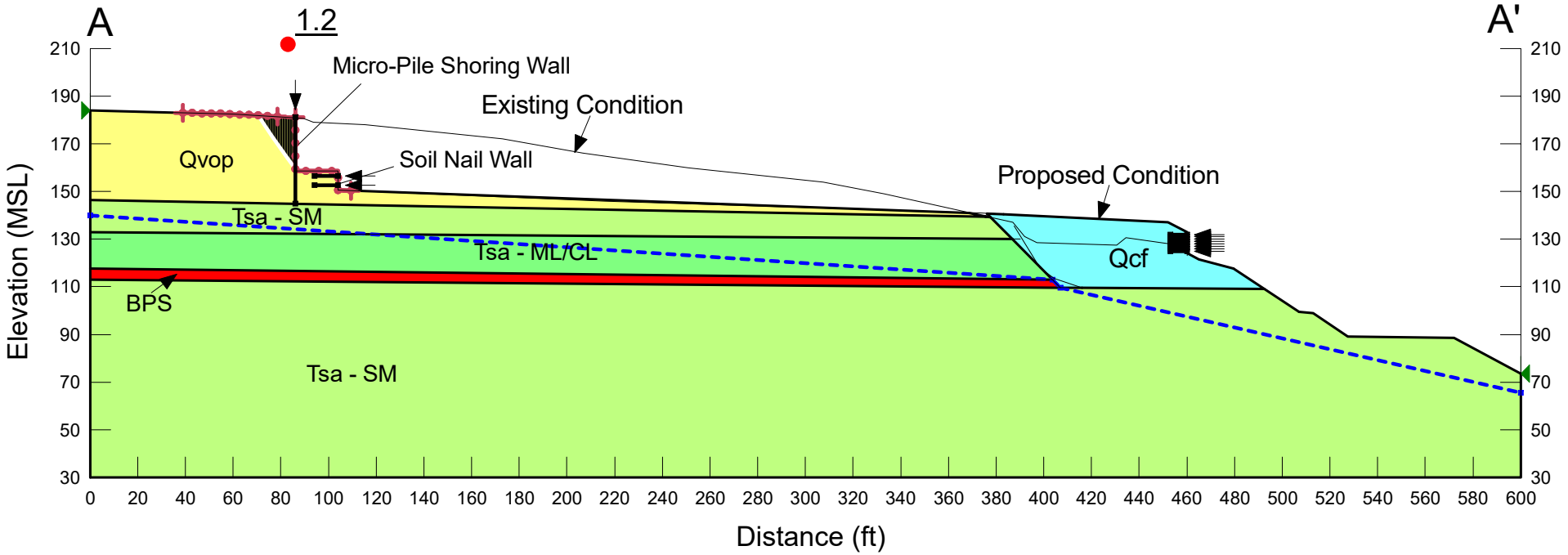


Figure C-8

Piraeus Point
Project No. G2307-32-05
Section A-A'
Name: AA-Case5.gsz
Date: 01/20/2022 Time: 03:18:38 PM

Proposed Condition

Static Analysis

Micropile Wall (6,500 lbf/ft reinforcement load)

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	BPS	115	100	8
	Qcf	125	300	28
	Qvop	120	350	28
	Tsa (ML,CL)	130	500	23
	Tsa (SM,SP)	130	750	33

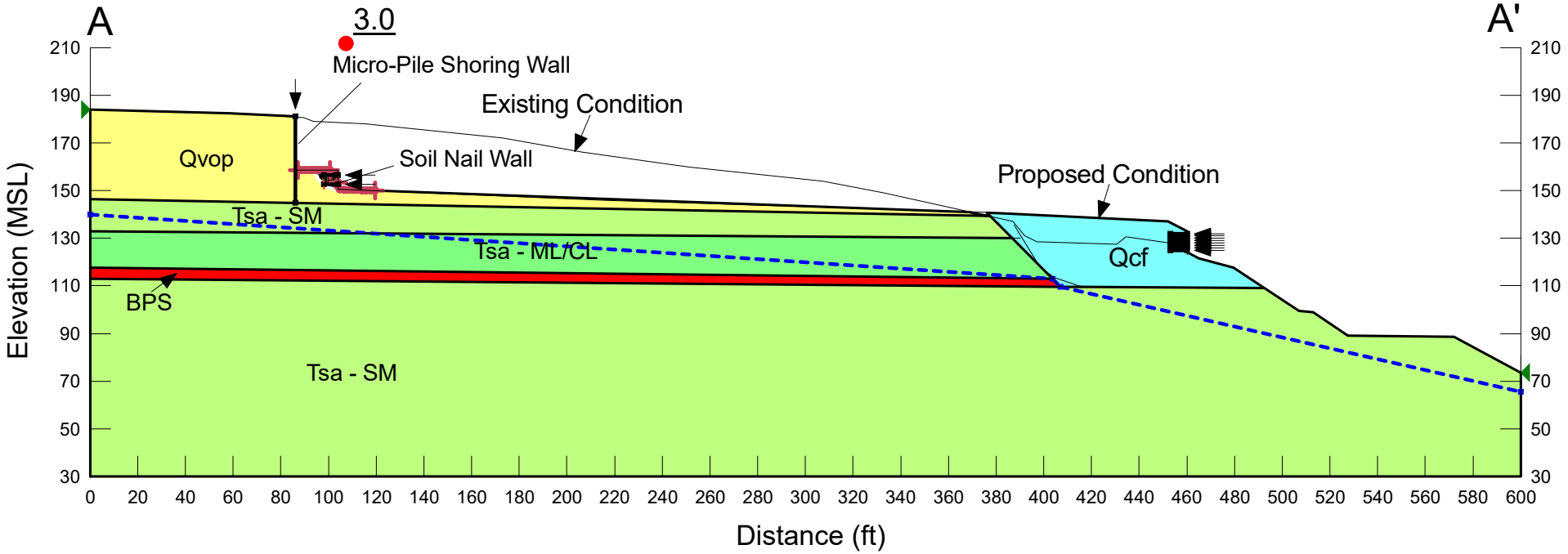


Figure C-9

Piraeus Point
Project No. G2307-32-05
Section A-A'
Name: AA-Case5s.gsz
Date: 01/21/2022 Time: 09:13:09 AM

Proposed Condition

Seismic Analysis
keq = 0.13g

Micropile Wall (6,500 lbf/ft reinforcement load)

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	BPS	115	100	8
	Qcf	125	300	28
	Qvop	120	350	28
	Tsa (ML,CL)	130	500	23
	Tsa (SM,SP)	130	750	33

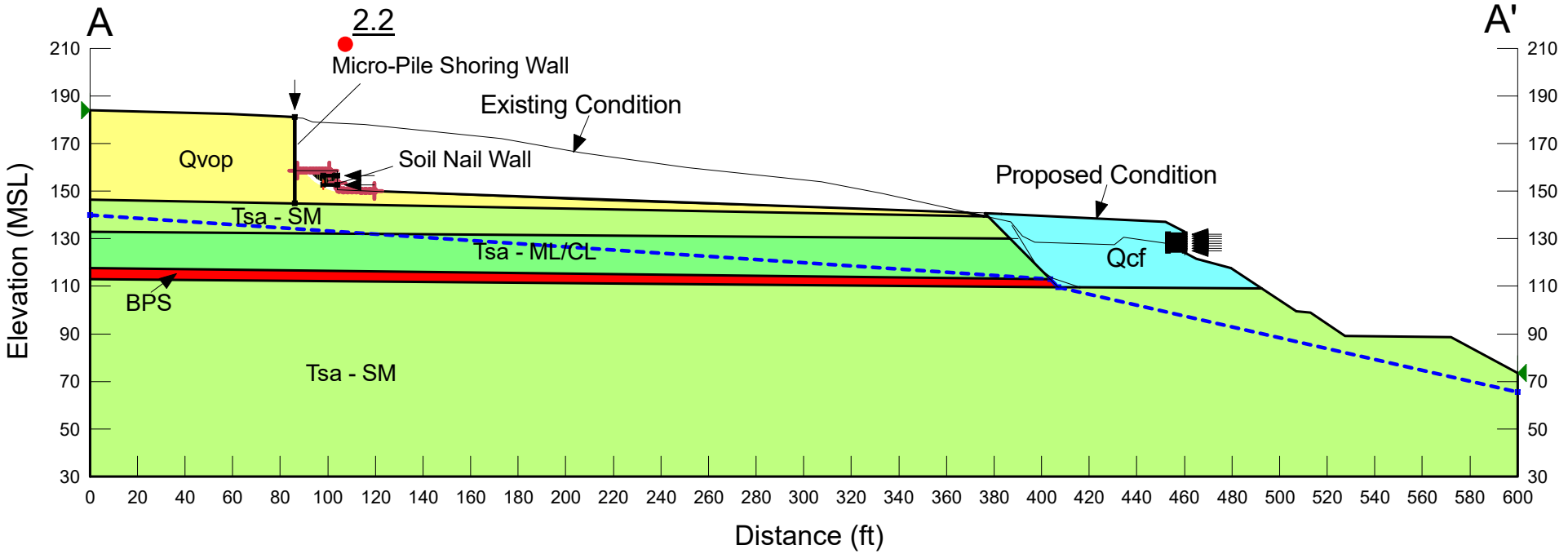


Figure C-10

Piraeus Point
Project No. G2307-32-05
Section B-B'
Name: BB-Case1.gsz
Date: 01/21/2022 Time: 09:37:58 AM

Proposed Condition

Static Analysis

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	BPS	115	100	8
	Qcf	125	300	28
	Qvop	120	350	28
	Tsa (ML,CL)	130	500	23
	Tsa (SM,SP)	130	750	33

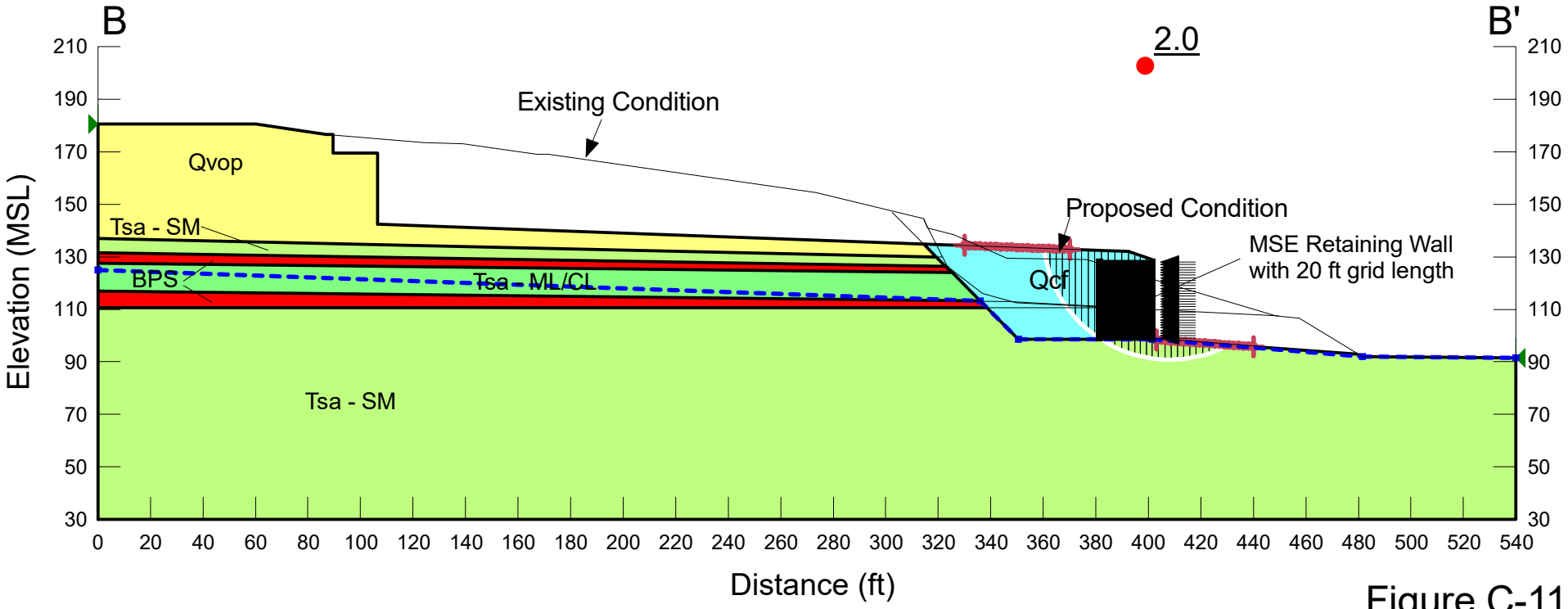


Figure C-11

Piraeus Point
Project No. G2307-32-05
Section B-B'
Name: BB-Case1s.gsz
Date: 01/21/2022 Time: 09:39:10 AM

Proposed Condition

Seismic Analysis
keq = 0.13g

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	BPS	115	100	8
	Qcf	125	300	28
	Qvop	120	350	28
	Tsa (ML,CL)	130	500	23
	Tsa (SM,SP)	130	750	33

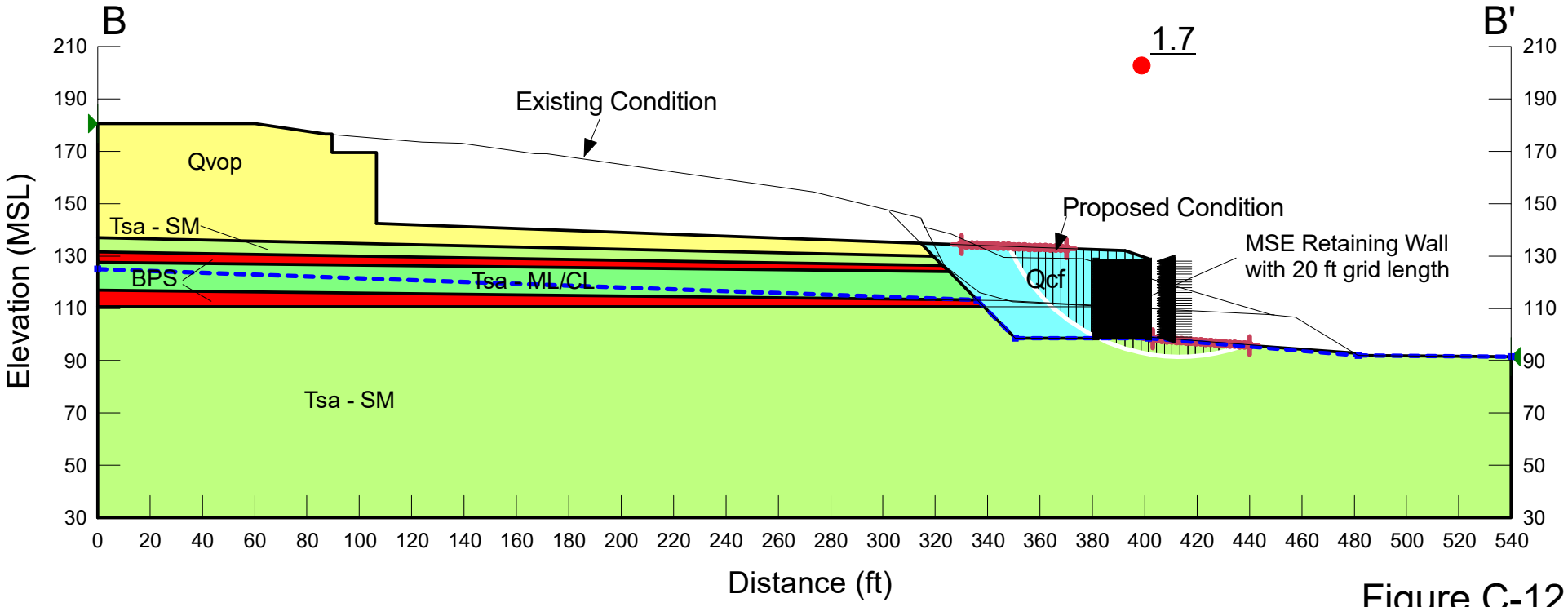


Figure C-12

Piraeus Point
Project No. G2307-32-05
Section B-B'
Name: BB-Case2.gsz
Date: 01/21/2022 Time: 09:40:20 AM

Proposed Condition

Static Analysis

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	BPS	115	100	8
	Qcf	125	300	28
	Qvop	120	350	28
	Tsa (ML,CL)	130	500	23
	Tsa (SM,SP)	130	750	33

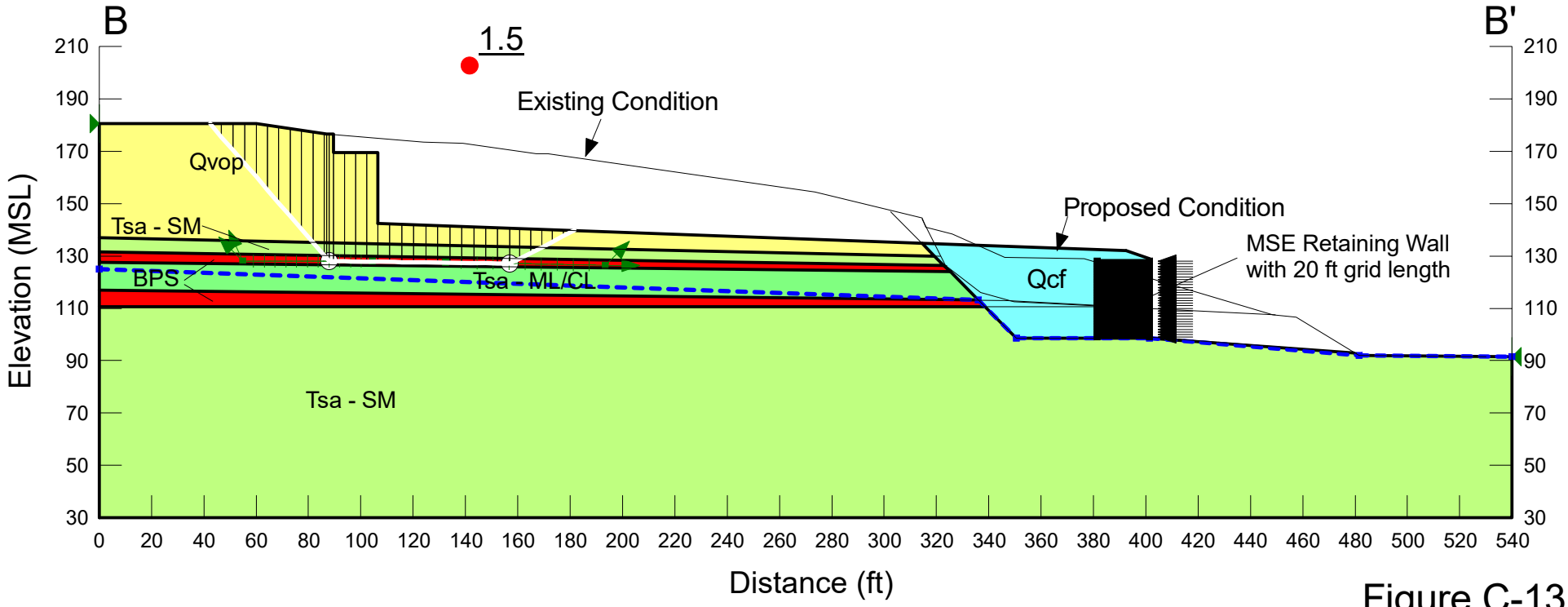


Figure C-13

Piraeus Point
Project No. G2307-32-05
Section B-B'
Name: BB-Case2s.gsz
Date: 01/21/2022 Time: 09:41:31 AM

Proposed Condition

Seismic Analysis
keq = 0.13g

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	BPS	115	100	8
	Qcf	125	300	28
	Qvop	120	350	28
	Tsa (ML,CL)	130	500	23
	Tsa (SM,SP)	130	750	33

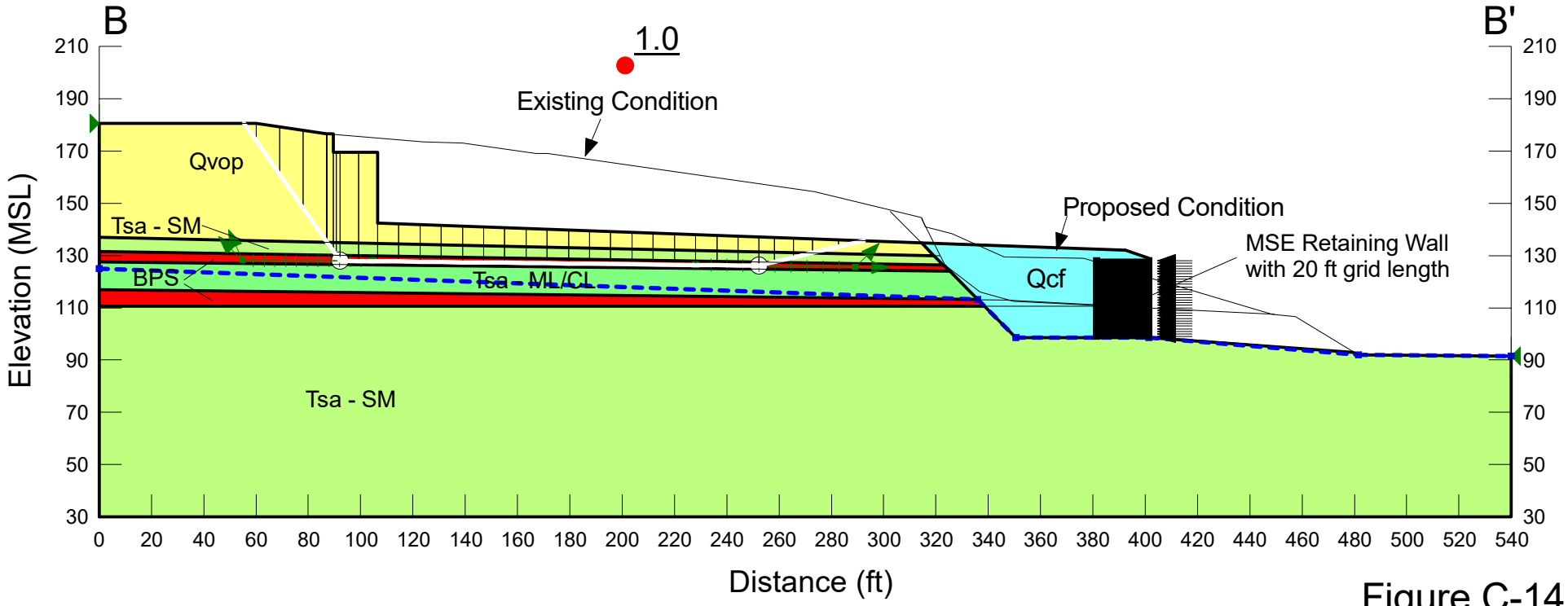


Figure C-14

Piraeus Point
Project No. G2307-32-05
Section B-B'
Name: BB-Case3.gsz
Date: 01/21/2022 Time: 09:57:23 AM

Proposed Condition

Static Analysis

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	BPS	115	100	8
	Qcf	125	300	28
	Qvop	120	350	28
	Tsa (ML,CL)	130	500	23
	Tsa (SM,SP)	130	750	33

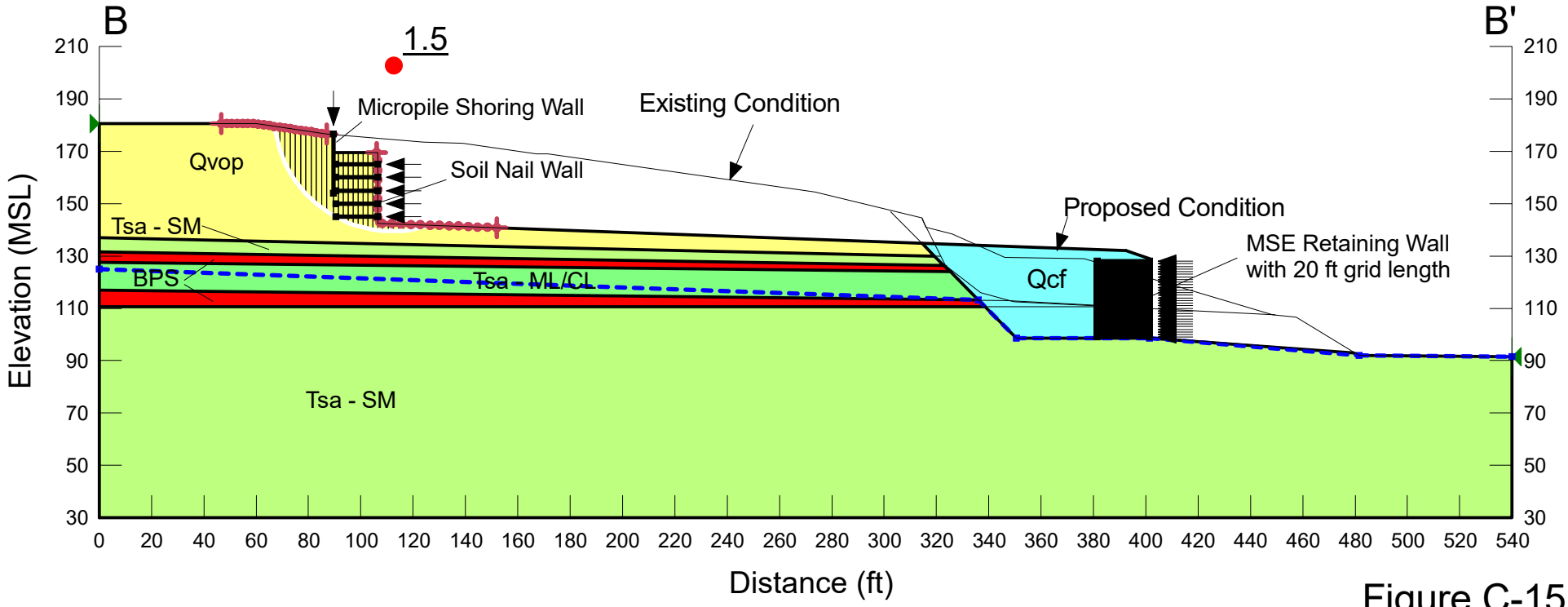


Figure C-15

Piraeus Point
Project No. G2307-32-05
Section B-B'
Name: BB-Case3s.gsz
Date: 01/21/2022 Time: 10:00:04 AM

Proposed Condition

Seismic Analysis
keq = 0.13g

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	BPS	115	100	8
	Qcf	125	300	28
	Qvop	120	350	28
	Tsa (ML,CL)	130	500	23
	Tsa (SM,SP)	130	750	33

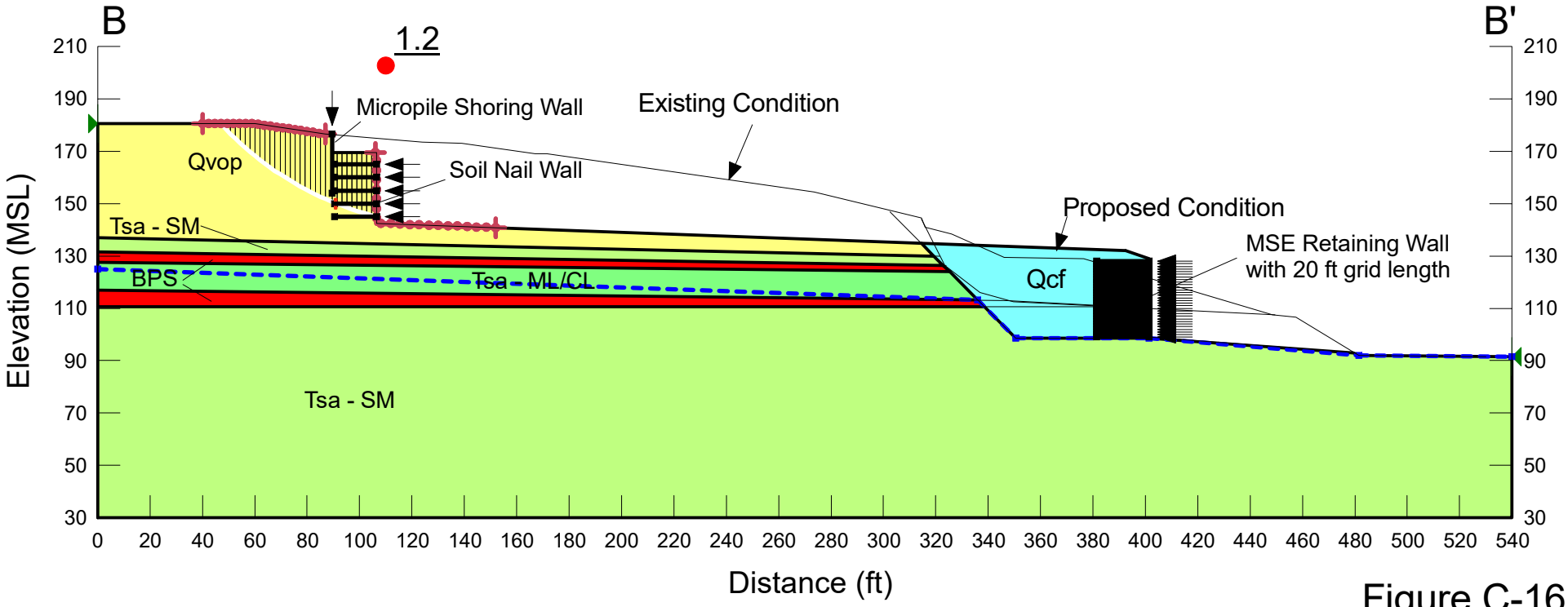


Figure C-16

Piraeus Point
Project No. G2307-32-05
Section B-B'
Name: BB-Case4.gsz
Date: 01/21/2022 Time: 10:05:49 AM

Proposed Condition

Static Analysis

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	BPS	115	100	8
	Qcf	125	300	28
	Qvop	120	350	28
	Tsa (ML,CL)	130	500	23
	Tsa (SM,SP)	130	750	33

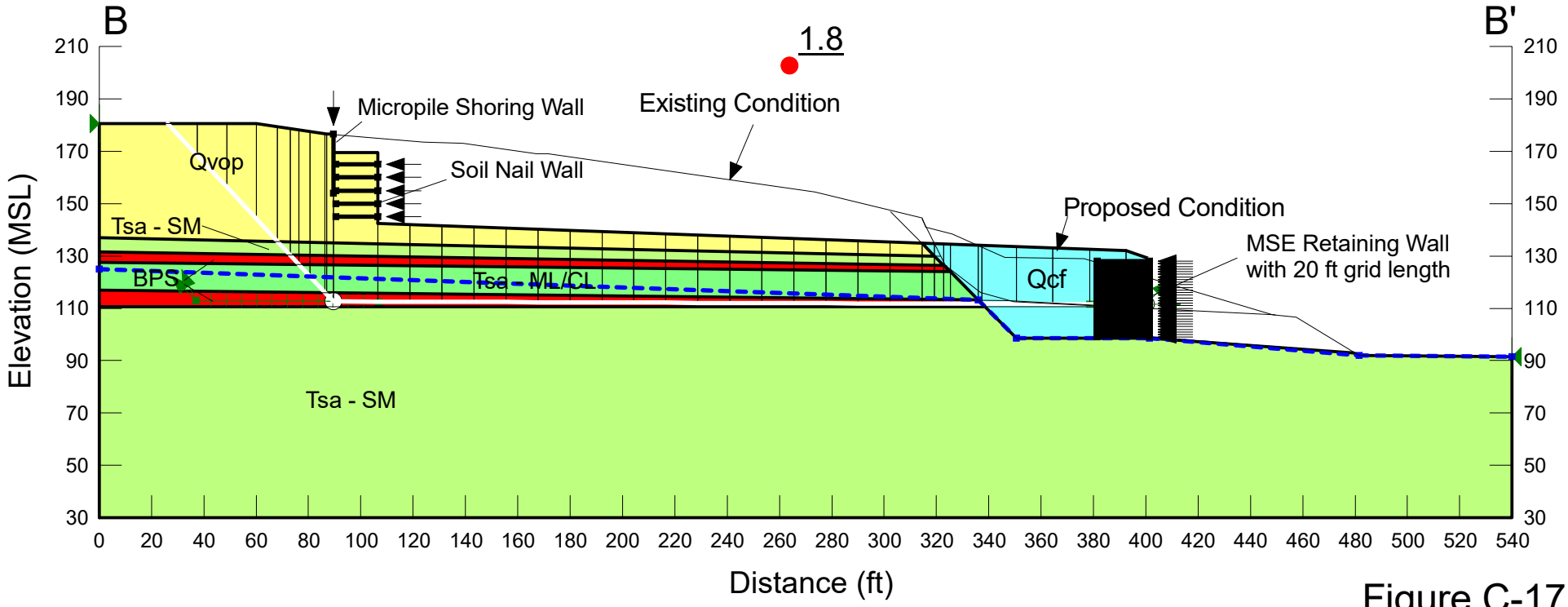


Figure C-17

Piraeus Point
Project No. G2307-32-05
Section B-B'
Name: BB-Case4s.gsz
Date: 01/21/2022 Time: 10:07:34 AM

Proposed Condition

Seismic Analysis
keq = 0.13g

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	BPS	115	100	8
	Qcf	125	300	28
	Qvop	120	350	28
	Tsa (ML,CL)	130	500	23
	Tsa (SM,SP)	130	750	33

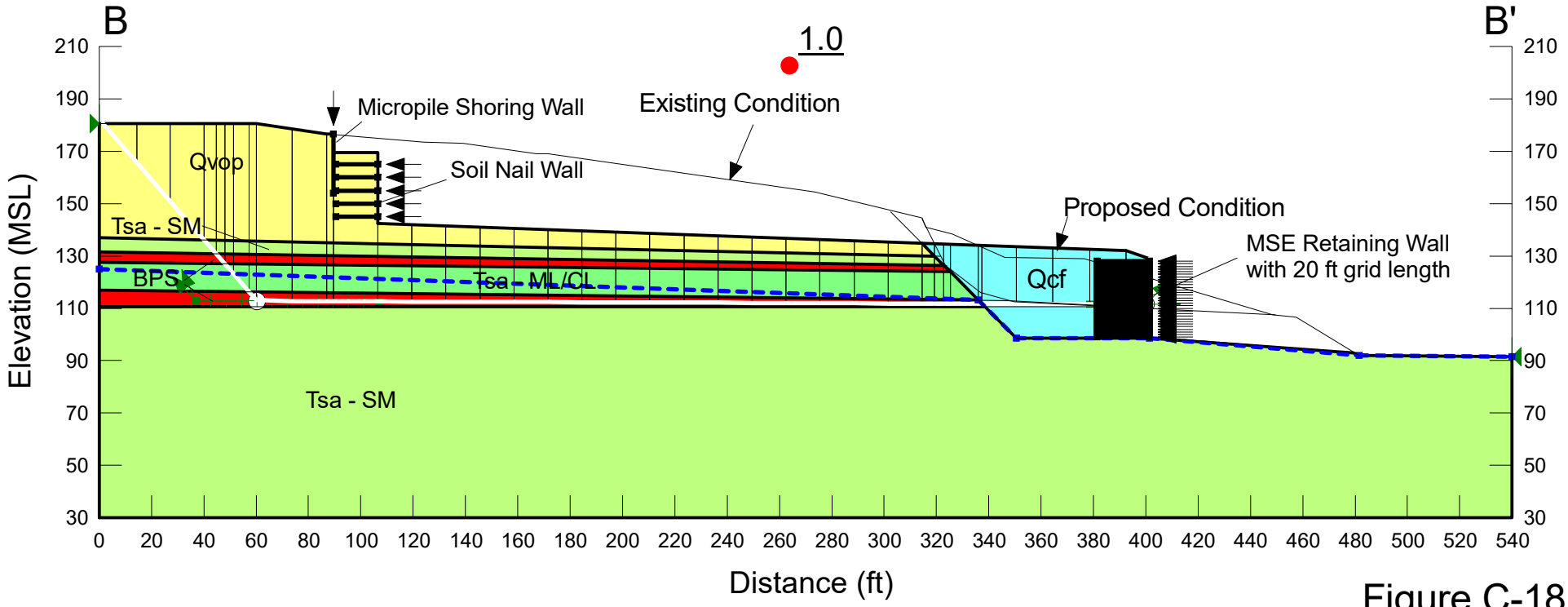


Figure C-18

Piraeus Point
Project No. G2307-32-05
Section B-B'
Name: BB-Case5.gsz
Date: 01/21/2022 Time: 10:10:46 AM

Proposed Condition

Static Analysis

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	BPS	115	100	8
	Qcf	125	300	28
	Qvop	120	350	28
	Tsa (ML,CL)	130	500	23
	Tsa (SM,SP)	130	750	33

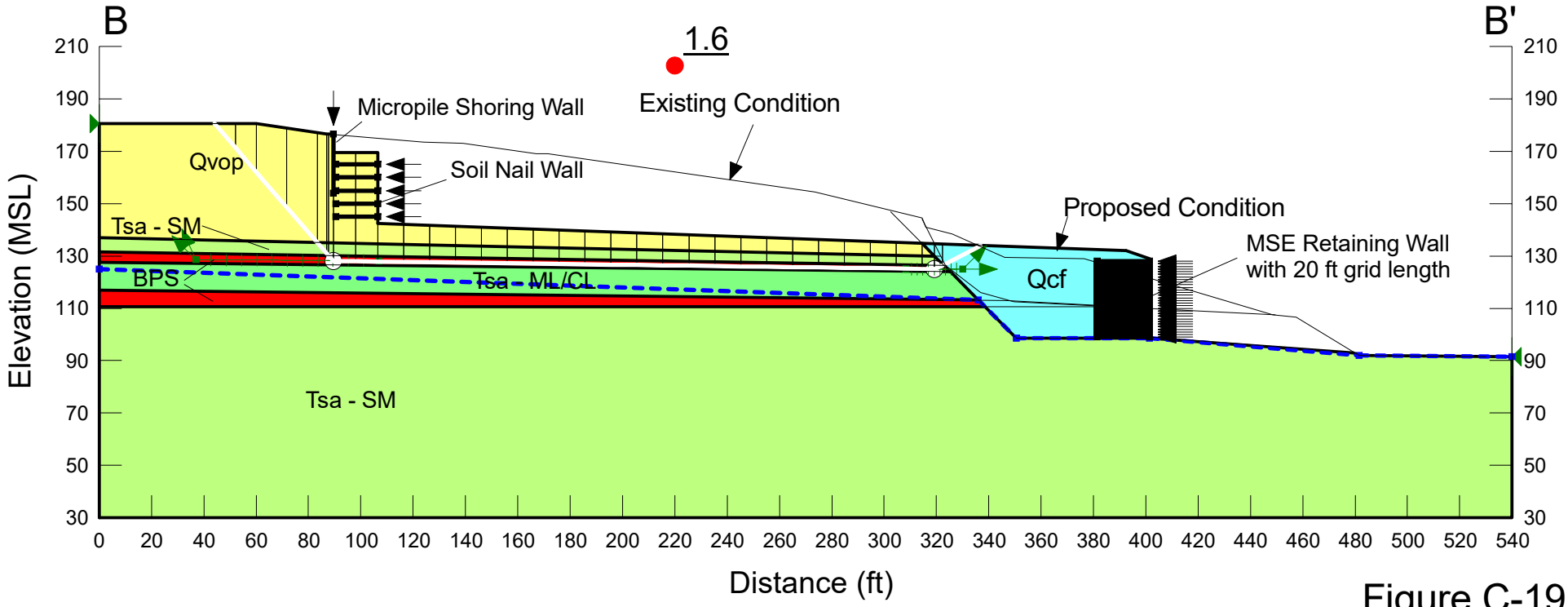


Figure C-19

Piraeus Point
Project No. G2307-32-05
Section B-B'
Name: BB-Case5s.gsz
Date: 01/21/2022 Time: 10:12:33 AM

Proposed Condition

Seismic Analysis
keq = 0.13g

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	BPS	115	100	8
	Qcf	125	300	28
	Qvop	120	350	28
	Tsa (ML,CL)	130	500	23
	Tsa (SM,SP)	130	750	33

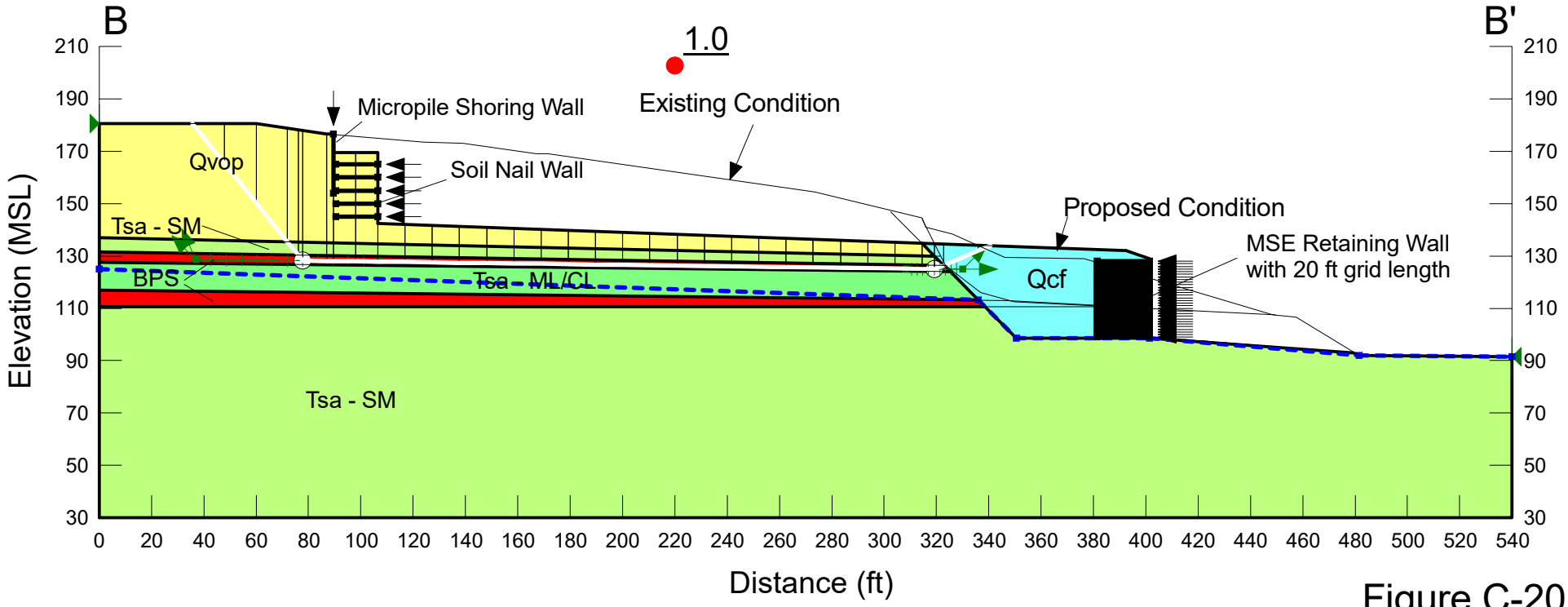


Figure C-20

Piraeus Point
Project No. G2307-32-05
Section C-C'
Name: CC-Case1.gsz
Date: 01/21/2022 Time: 11:10:39 AM

Proposed Condition

Static Analysis

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	BPS	115	100	8
	Qcf	125	300	28
	Qvop	120	350	28
	Tsa (ML,CL)	130	500	23
	Tsa (SM,SP)	130	750	33

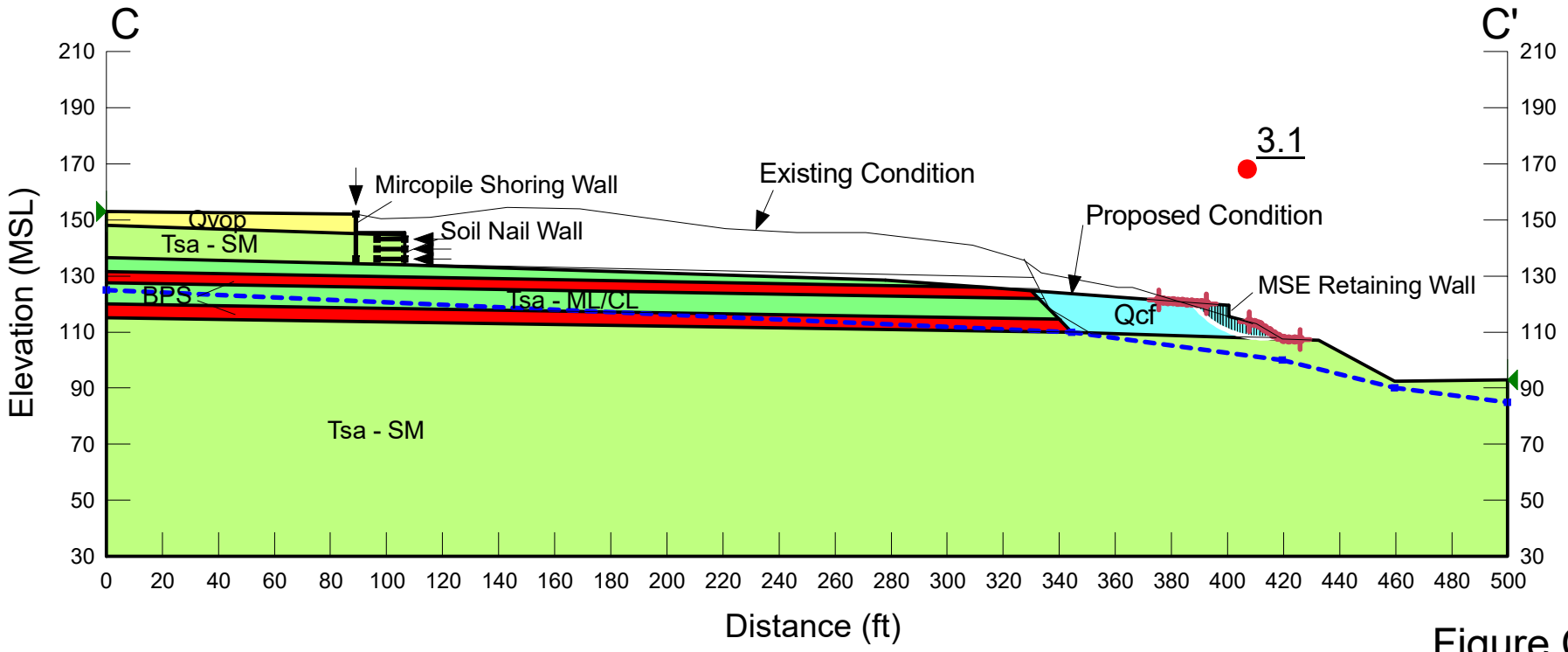


Figure C-21

Piraeus Point
Project No. G2307-32-05
Section C-C'
Name: CC-Case1s.gsz
Date: 01/21/2022 Time: 11:12:31 AM

Proposed Condition

Seismic Analysis
keq = 0.13g

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	BPS	115	100	8
	Qcf	125	300	28
	Qvop	120	350	28
	Tsa (ML,CL)	130	500	23
	Tsa (SM,SP)	130	750	33

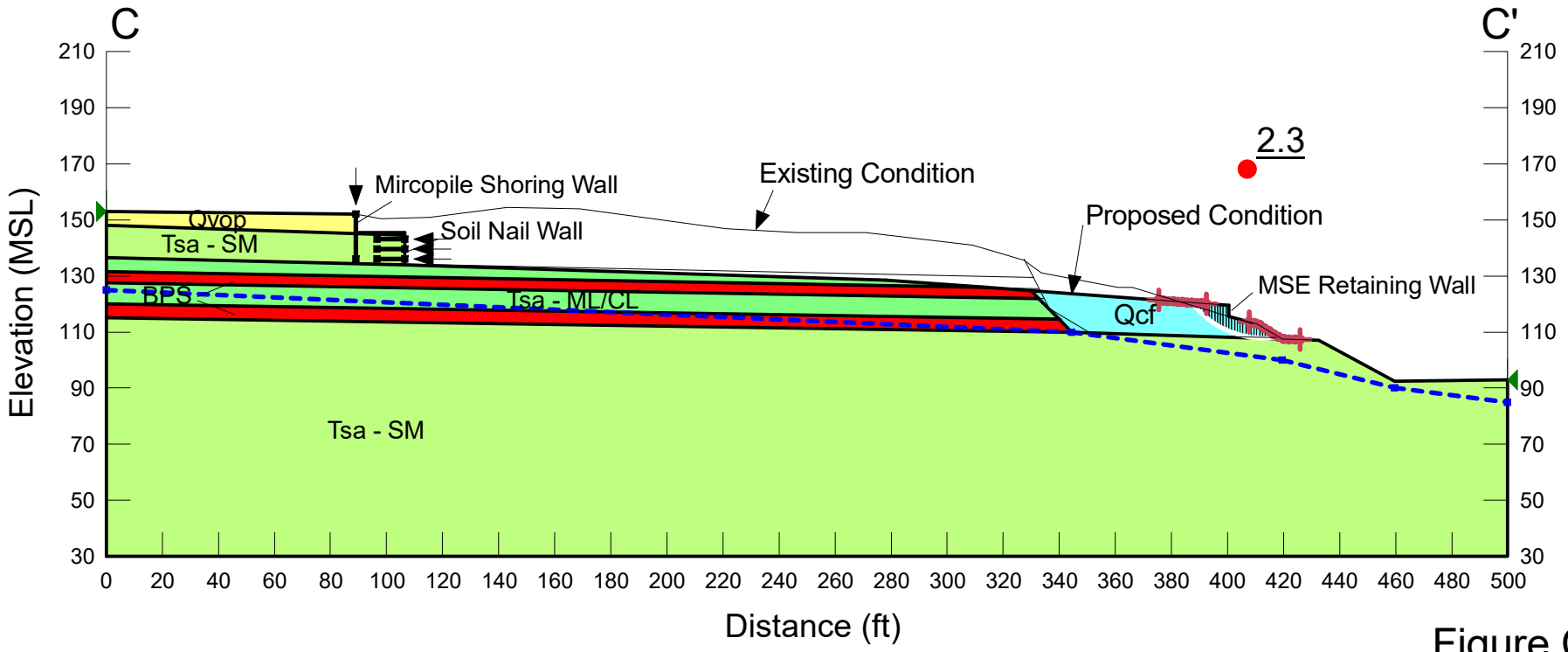


Figure C-22

Piraeus Point
Project No. G2307-32-05
Section C-C'
Name: CC-Case2.gsz
Date: 01/21/2022 Time: 11:16:57 AM

Proposed Condition

Static Analysis

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	BPS	115	100	8
	Qcf	125	300	28
	Qvop	120	350	28
	Tsa (ML,CL)	130	500	23
	Tsa (SM,SP)	130	750	33

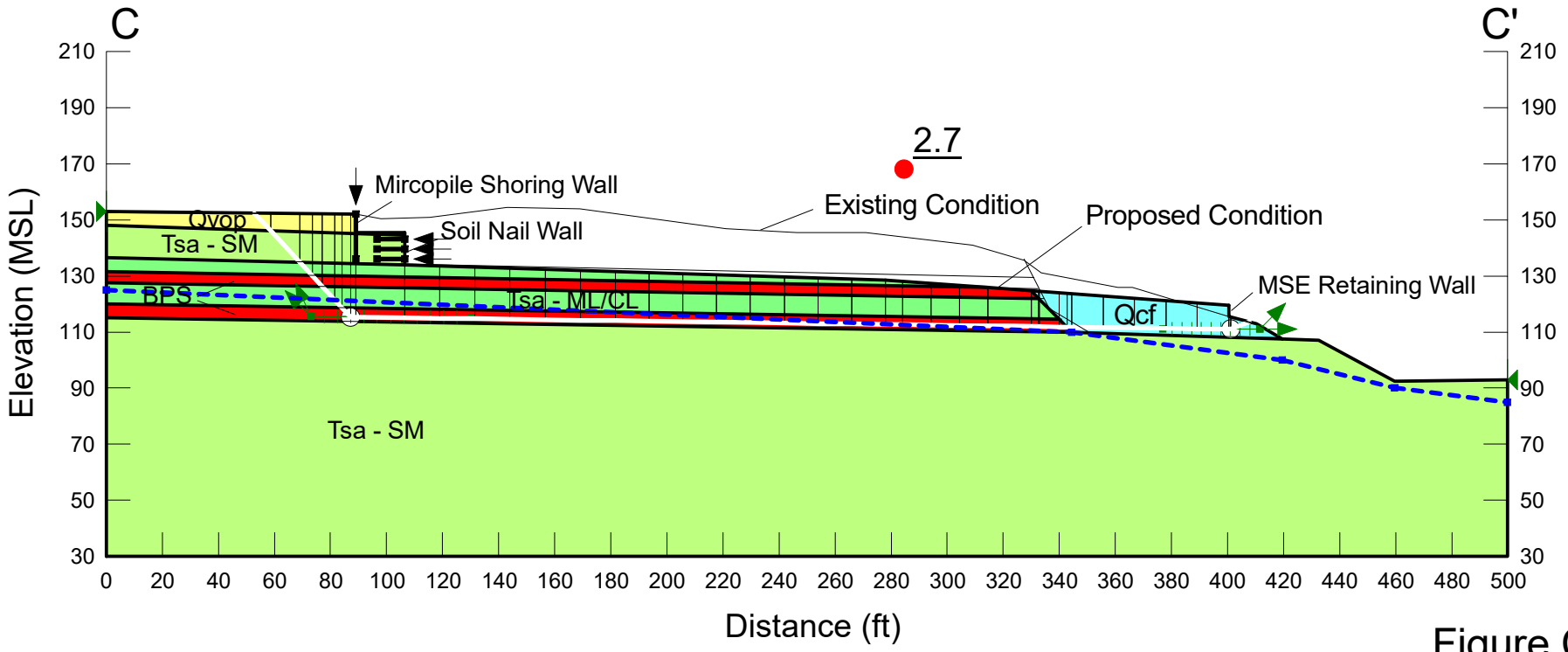


Figure C-23

Piraeus Point
Project No. G2307-32-05
Section C-C'
Name: CC-Case2s.gsz
Date: 01/21/2022 Time: 11:22:11 AM

Proposed Condition

Seismic Analysis
keq = 0.13g

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	BPS	115	100	8
	Qcf	125	300	28
	Qvop	120	350	28
	Tsa (ML,CL)	130	500	23
	Tsa (SM,SP)	130	750	33

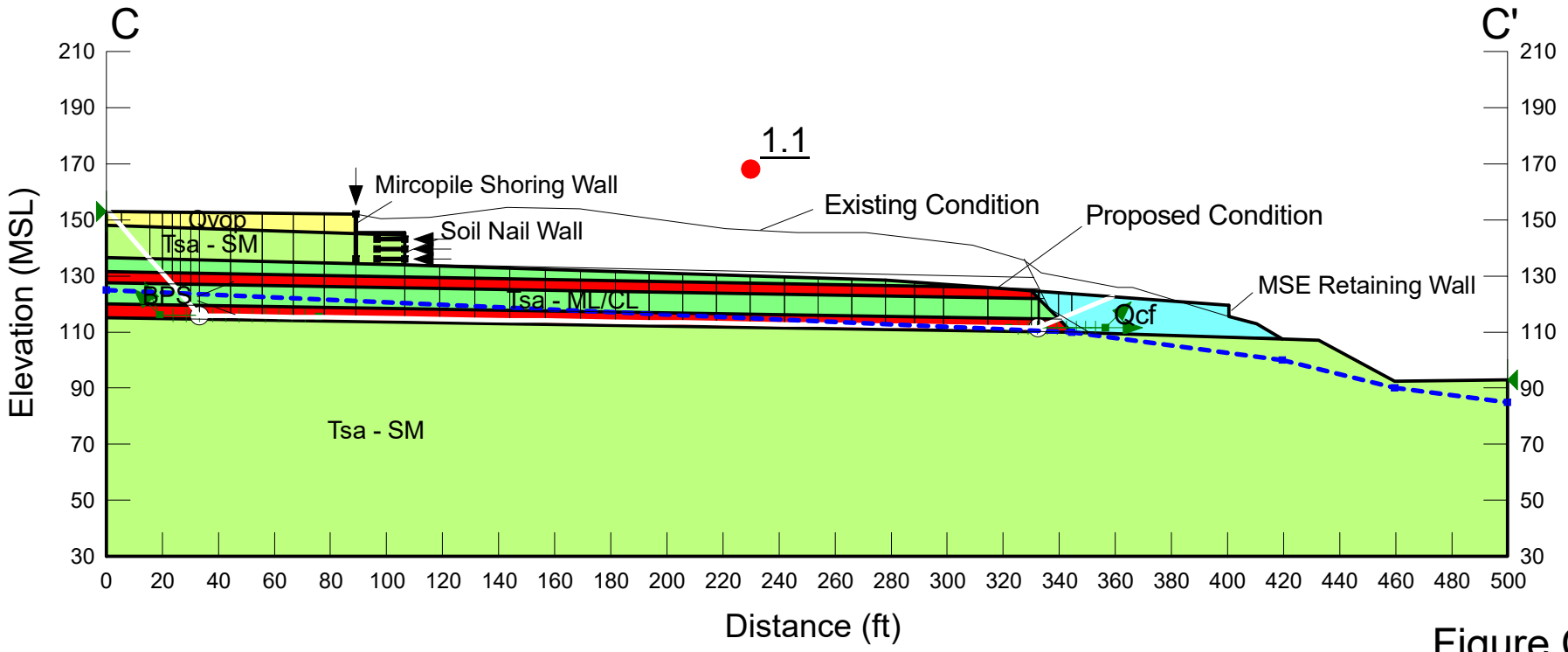


Figure C-24

Piraeus Point
Project No. G2307-32-05
Section C-C'
Name: CC-Case3.gsz
Date: 01/21/2022 Time: 12:26:27 PM

Proposed Condition

Static Analysis

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	BPS	115	100	8
	Qcf	125	300	28
	Qvop	120	350	28
	Tsa (ML,CL)	130	500	23
	Tsa (SM,SP)	130	750	33

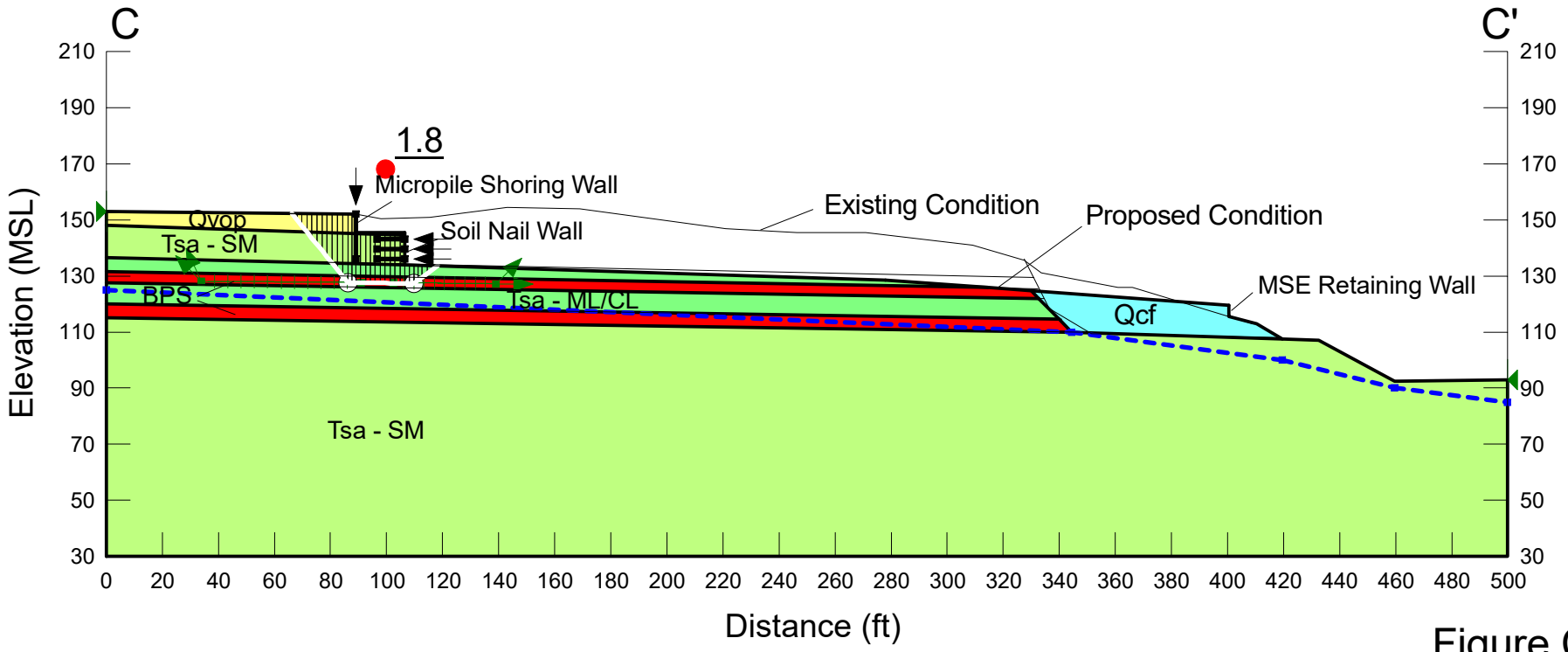


Figure C-25

Piraeus Point
Project No. G2307-32-05
Section C-C'
Name: CC-Case3s.gsz
Date: 01/21/2022 Time: 12:32:57 PM

Proposed Condition

Seismic Analysis
keq = 0.13g

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	BPS	115	100	8
	Qcf	125	300	28
	Qvop	120	350	28
	Tsa (ML,CL)	130	500	23
	Tsa (SM,SP)	130	750	33

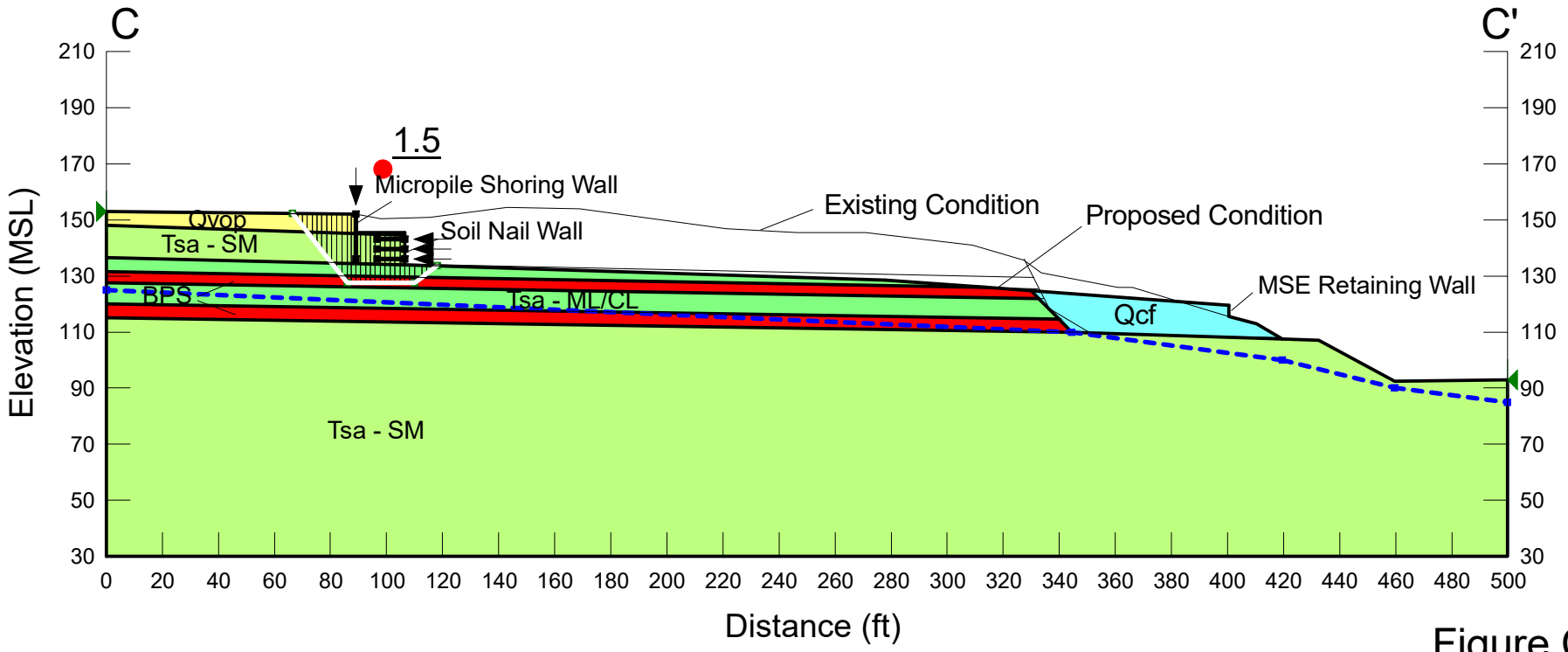


Figure C-26

Piraeus Point
Project No. G2307-32-05
Section C-C'
Name: CC-Case4.gsz
Date: 01/21/2022 Time: 12:37:01 PM

Proposed Condition

Static Analysis

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	BPS	115	100	8
	Qcf	125	300	28
	Qvop	120	350	28
	Tsa (ML,CL)	130	500	23
	Tsa (SM,SP)	130	750	33

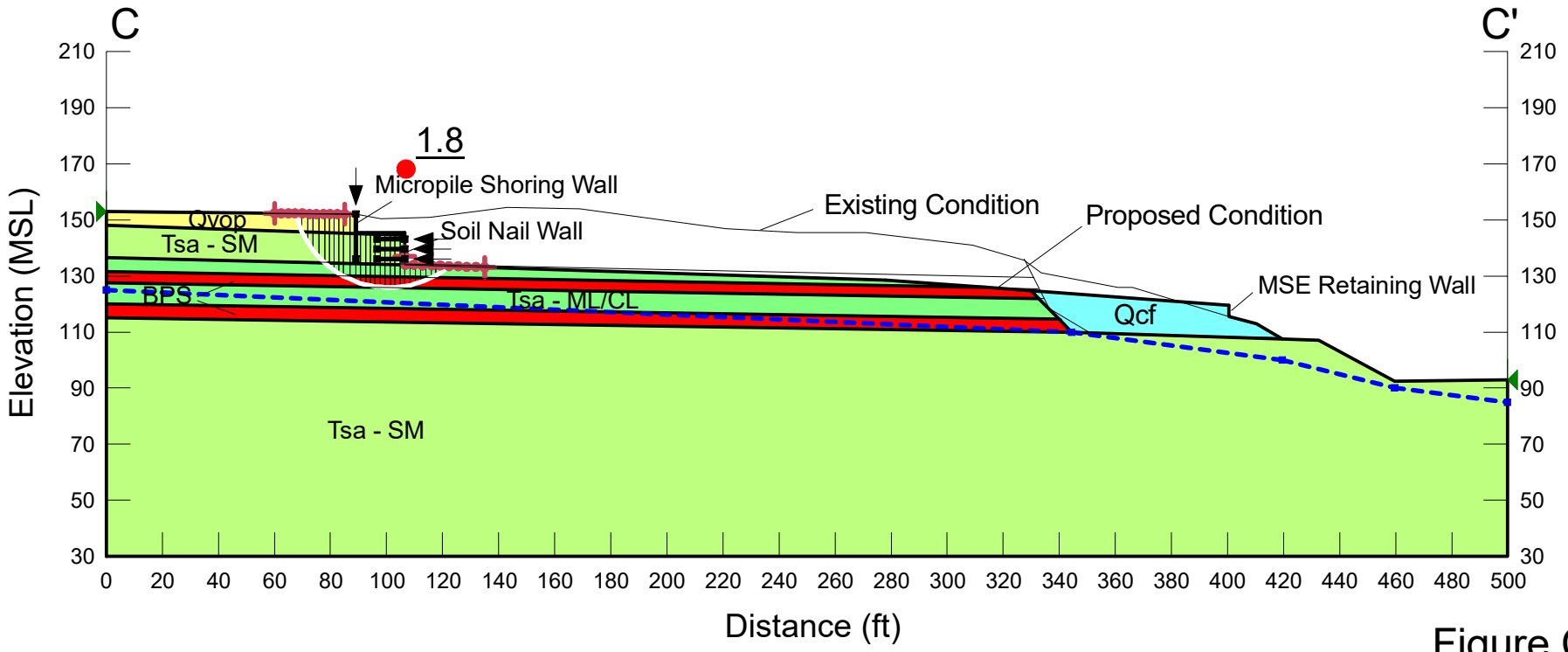


Figure C-27

Piraeus Point
Project No. G2307-32-05
Section C-C'
Name: CC-Case4s.gsz
Date: 01/21/2022 Time: 12:38:21 PM

Proposed Condition

Seismic Analysis
keq = 0.13g

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	BPS	115	100	8
	Qcf	125	300	28
	Qvop	120	350	28
	Tsa (ML,CL)	130	500	23
	Tsa (SM,SP)	130	750	33

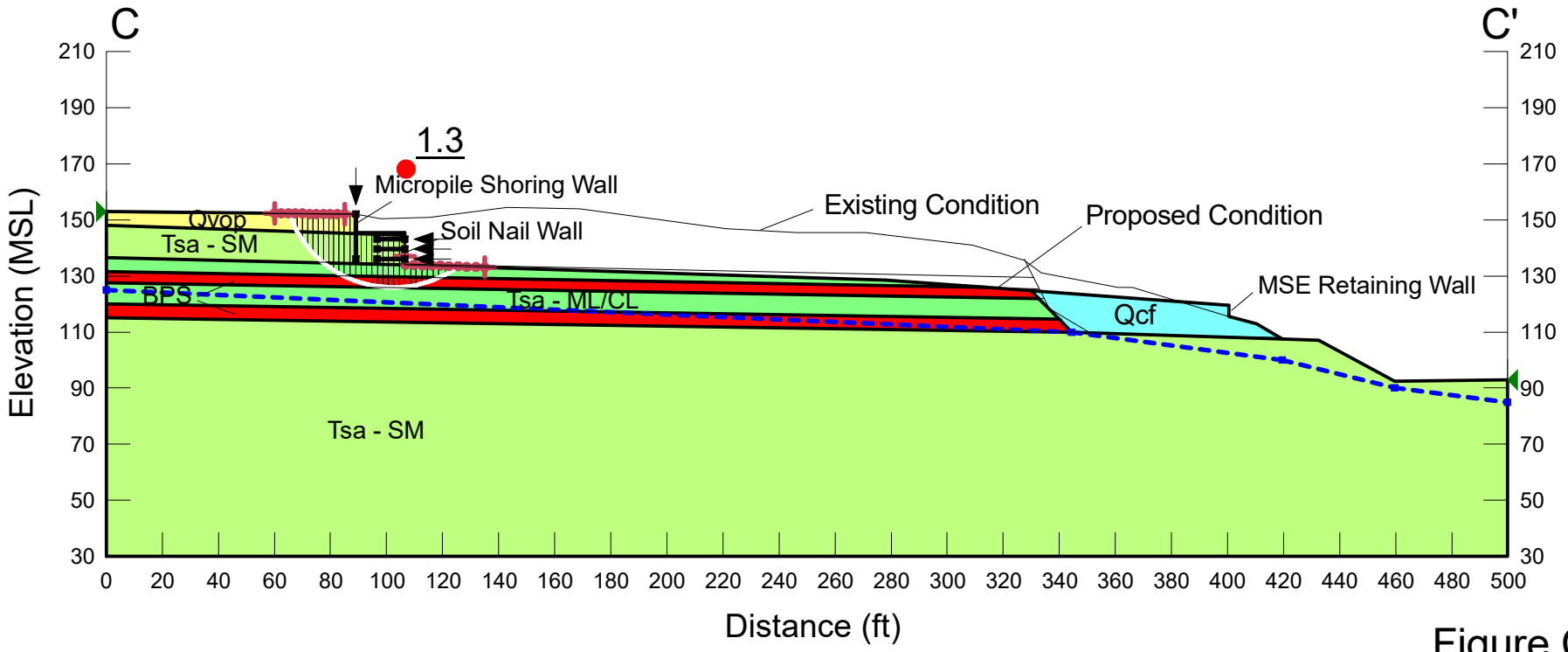


Figure C-28

Piraeus Point
Project No. G2307-32-05
Section E-E'
Name: EE-Case7.gsz
Date: 01/31/2022 Time: 10:24:42 AM

Proposed Condition

Static Analysis

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	BPS	115	100	8
	Qal	120	200	28
	Qcf	125	300	28
	Qvop	120	350	28
	Tsa (ML,CL)	130	500	23
	Tsa (SM,SP)	130	750	33

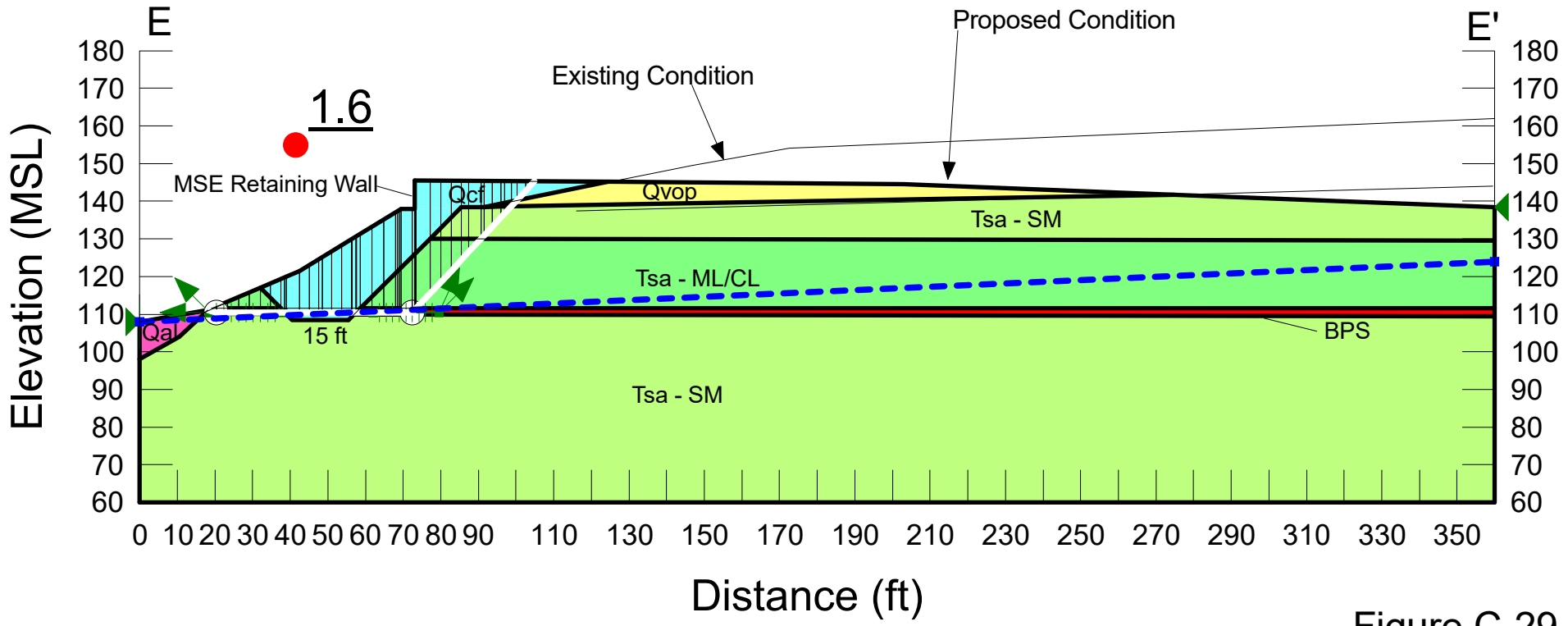


Figure C-29

Piraeus Point
Project No. G2307-32-05
Section E-E'
Name: EE-Case7s.gsz
Date: 01/31/2022 Time: 11:22:21 AM

Proposed Condition

Seismic Analysis
keq = 0.13g

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	BPS	115	100	8
	Qal	120	200	28
	Qcf	125	300	28
	Qvop	120	350	28
	Tsa (ML,CL)	130	500	23
	Tsa (SM,SP)	130	750	33

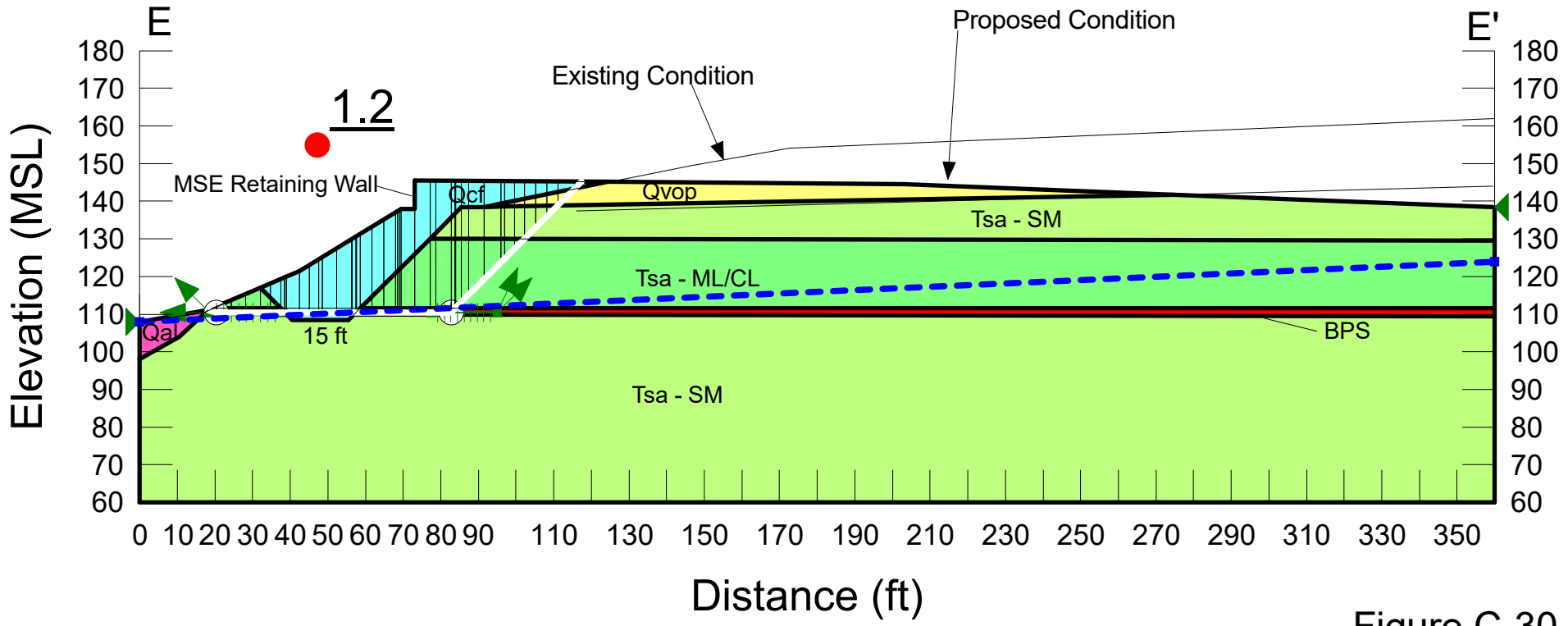


Figure C-30

Piraeus Point
Project No. G2307-32-05
Section E-E'
Name: EE-Case8.gsz
Date: 01/31/2022 Time: 10:21:42 AM

Proposed Condition

Static Analysis

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	BPS	115	100	8
	Qal	120	200	28
	Qcf	125	300	28
	Qvop	120	350	28
	Tsa (ML,CL)	130	500	23
	Tsa (SM,SP)	130	750	33

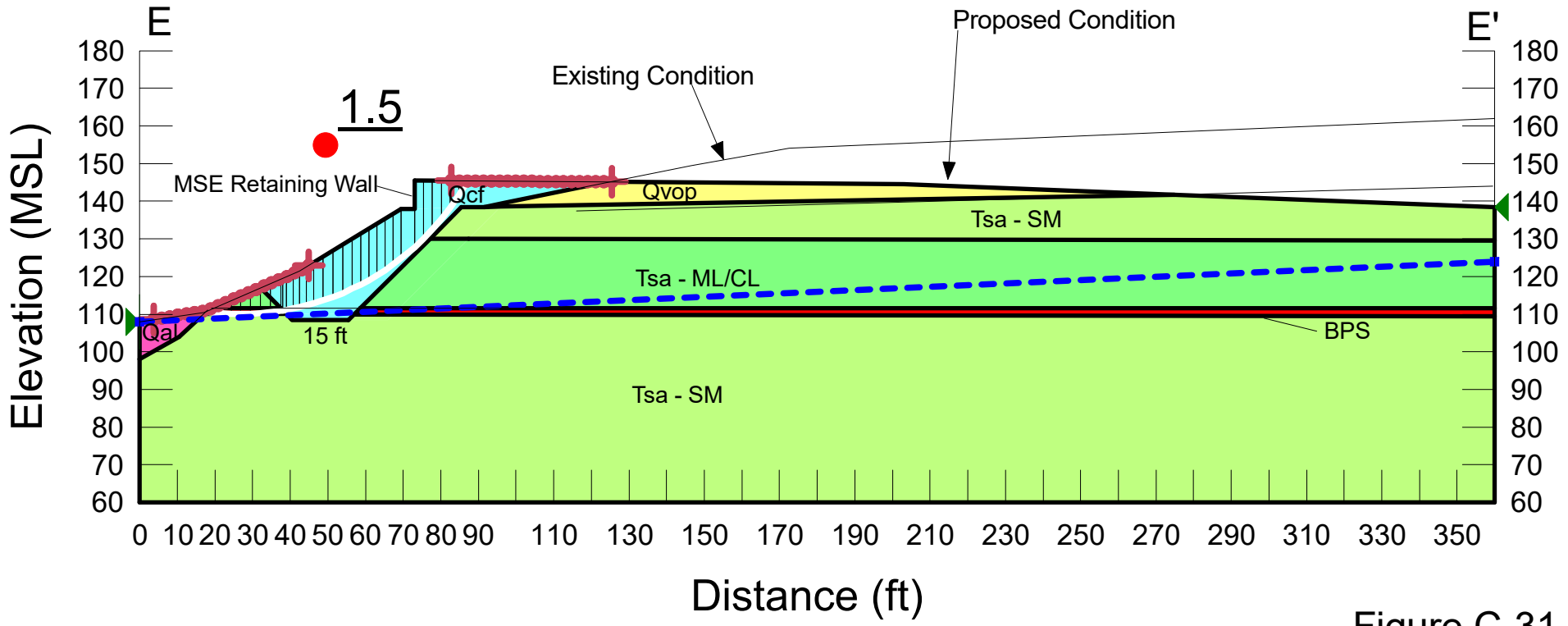


Figure C-31

Piraeus Point
Project No. G2307-32-05
Section E-E'
Name: EE-Case8s.gsz
Date: 01/31/2022 Time: 11:31:55 AM

Proposed Condition

Seismic Analysis
keq = 0.13g

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	BPS	115	100	8
	Qal	120	200	28
	Qcf	125	300	28
	Qvop	120	350	28
	Tsa (ML,CL)	130	500	23
	Tsa (SM,SP)	130	750	33

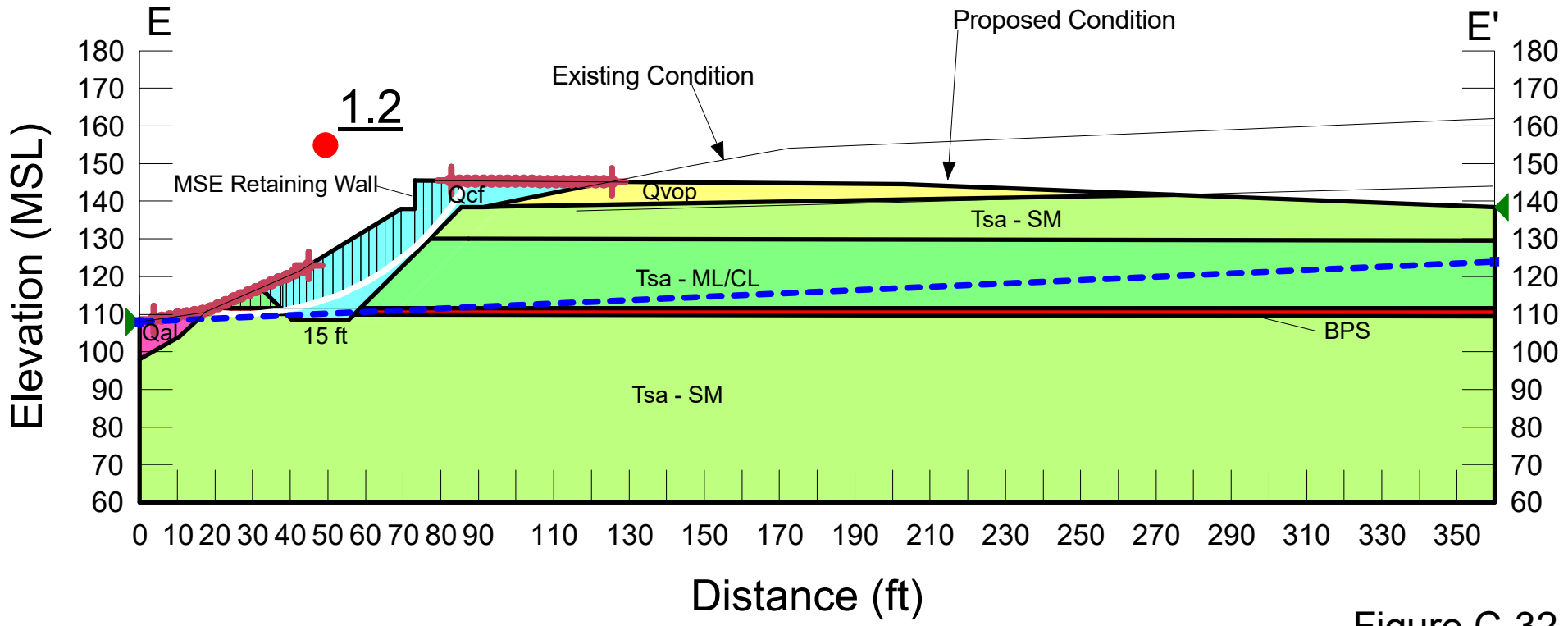


Figure C-32

Piraeus Point
Project No. G2307-32-05
Section F-F'
Name: FF-Case2.gsz
Date: 01/31/2022 Time: 09:25:50 AM

Proposed Condition

Static Analysis

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	BPS	115	100	8
	Qal	120	350	28
	Qcf	125	300	28
	Qvop	120	350	28
	Tsa (ML,CL)	130	500	23
	Tsa (SM,SP)	130	750	33

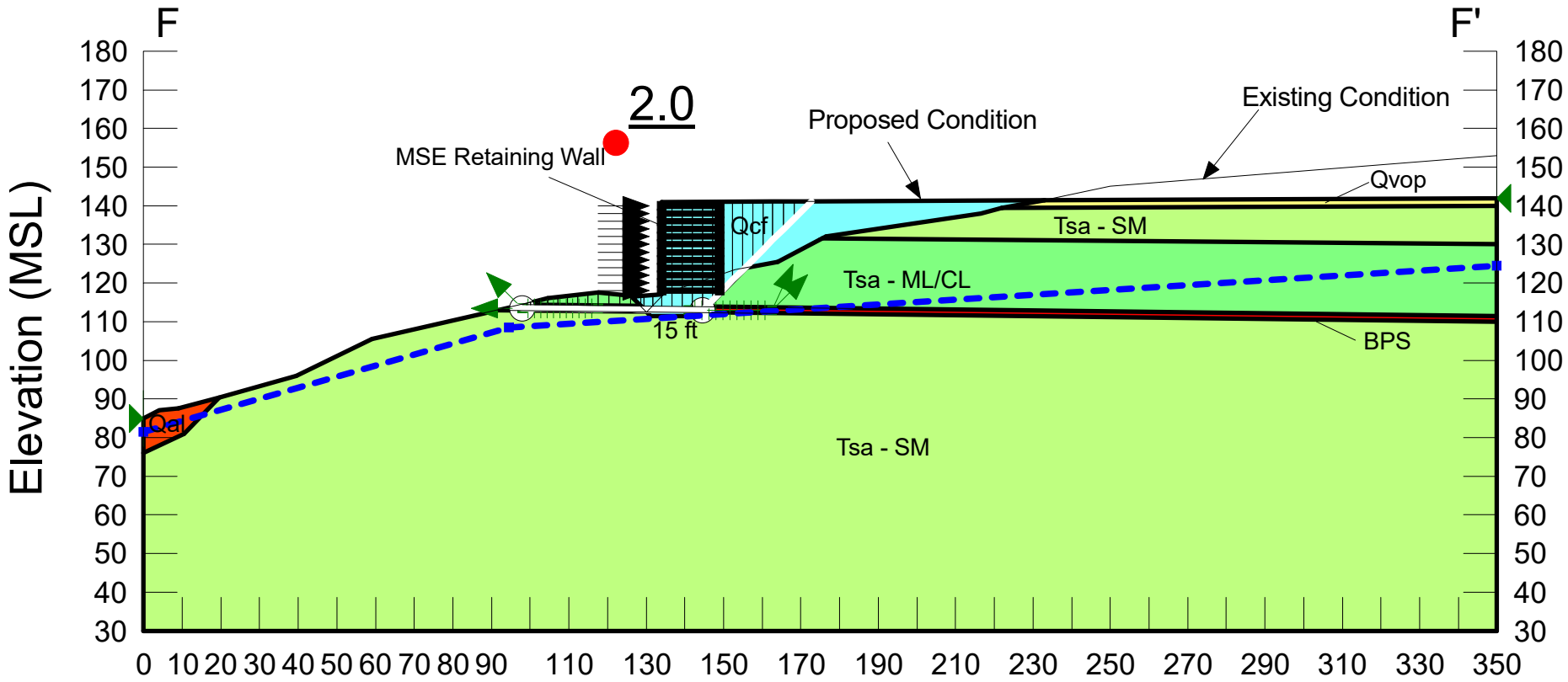


Figure C-33

Piraeus Point
Project No. G2307-32-05
Section F-F'
Name: FF-Case2s.gsz
Date: 01/31/2022 Time: 11:43:30 AM

Proposed Condition

Seismic Analysis
keq = 0.13g

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	BPS	115	100	8
	Qal	120	350	28
	Qcf	125	300	28
	Qvop	120	350	28
	Tsa (ML,CL)	130	500	23
	Tsa (SM,SP)	130	750	33

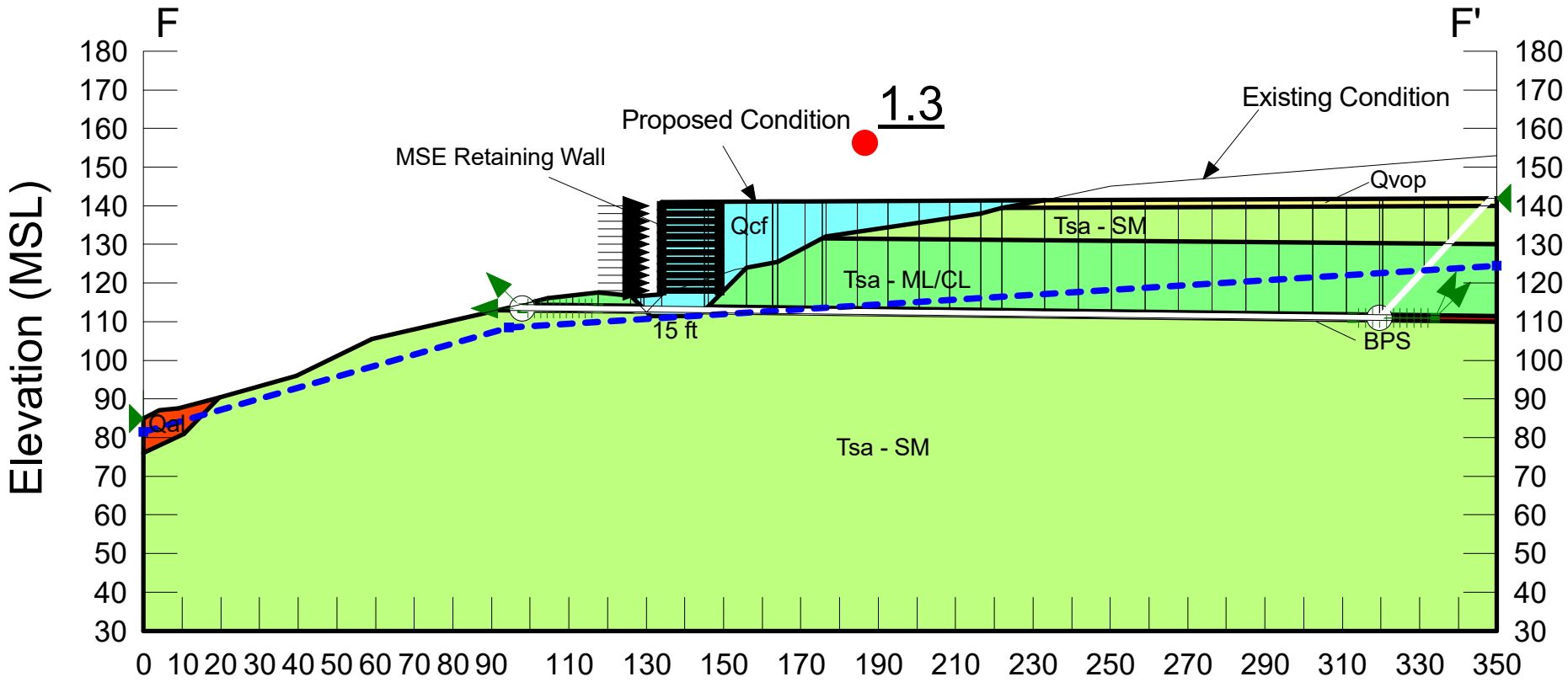


Figure C-34

Piraeus Point
Project No. G2307-32-05
Section F-F'
Name: FF-Case2a.gsz
Date: 01/31/2022 Time: 09:30:41 AM

Proposed Condition

Static Analysis

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	BPS	115	100	8
	Qal	120	350	28
	Qcf	125	300	28
	Qvop	120	350	28
	Tsa (ML,CL)	130	500	23
	Tsa (SM,SP)	130	750	33

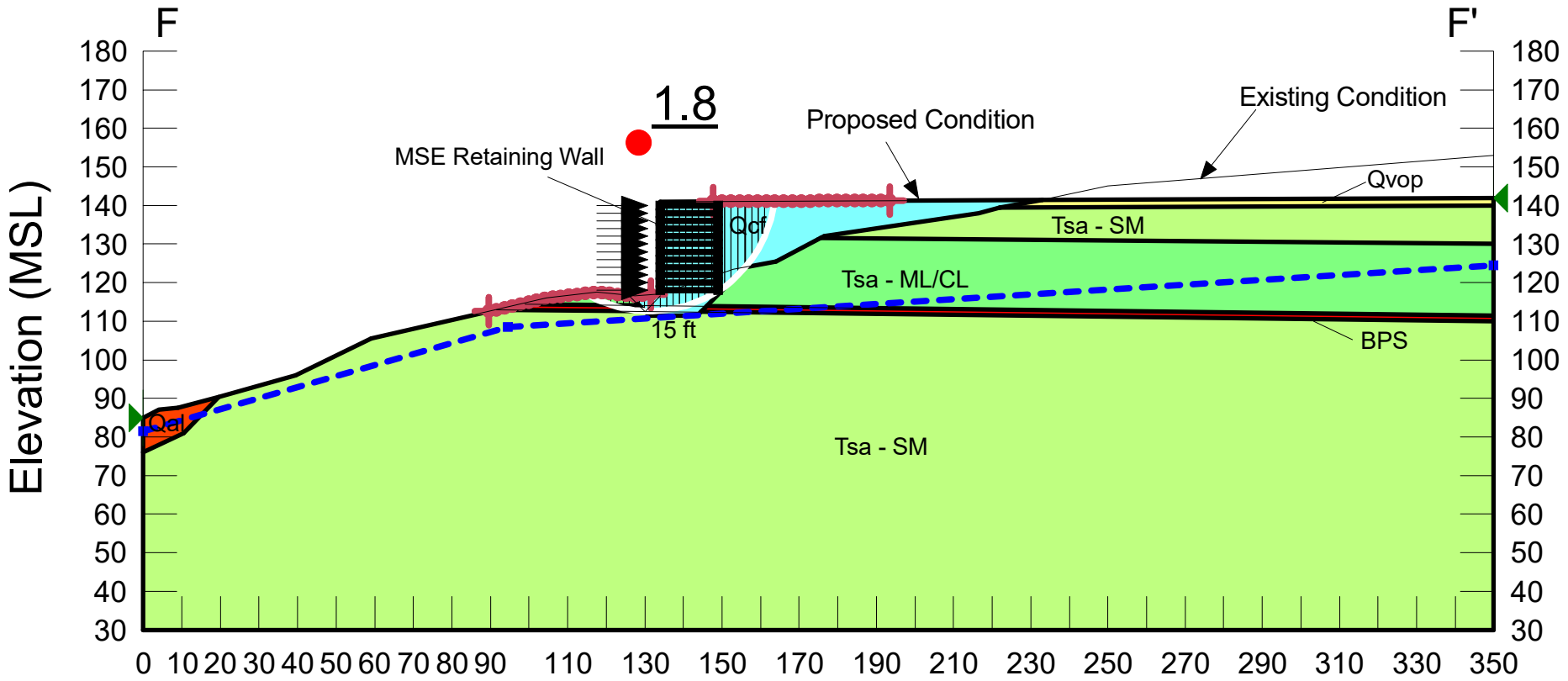


Figure C-35

Piraeus Point
Project No. G2307-32-05
Section F-F'
Name: FF-Case2as.gsz
Date: 01/31/2022 Time: 11:47:22 AM

Proposed Condition

Seismic Analysis
keq = 0.13g

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	BPS	115	100	8
	Qal	120	350	28
	Qcf	125	300	28
	Qvop	120	350	28
	Tsa (ML,CL)	130	500	23
	Tsa (SM,SP)	130	750	33

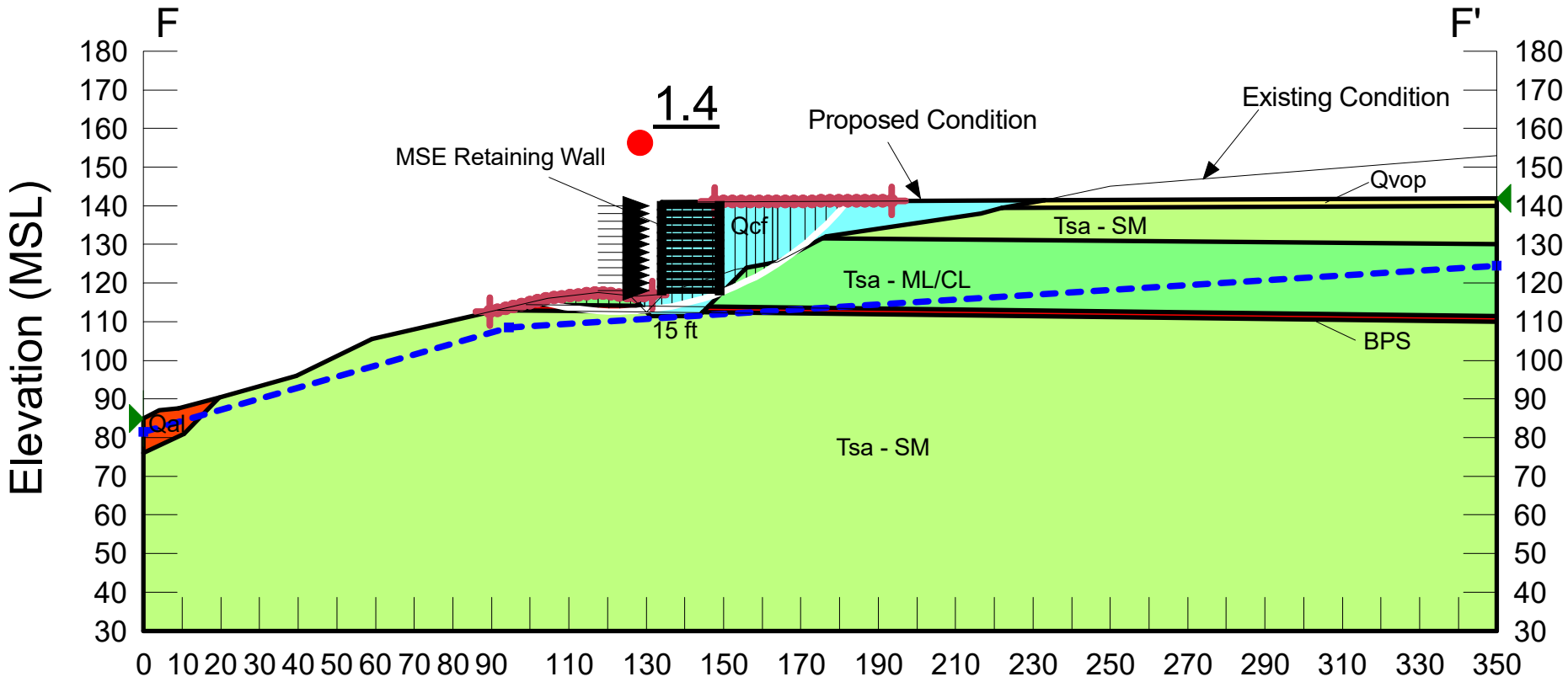


Figure C-36

Piraeus Point
Project No. G2307-32-05
Section G-G'
Name: GG-Case2.gsz
Date: 01/31/2022 Time: 09:44:12 AM

Proposed Condition

Static Analysis

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	BPS	115	100	8
	Qal	120	200	28
	Qcf	125	300	28
	Tsa (ML,CL)	130	500	23
	Tsa (SM,SP)	130	750	33

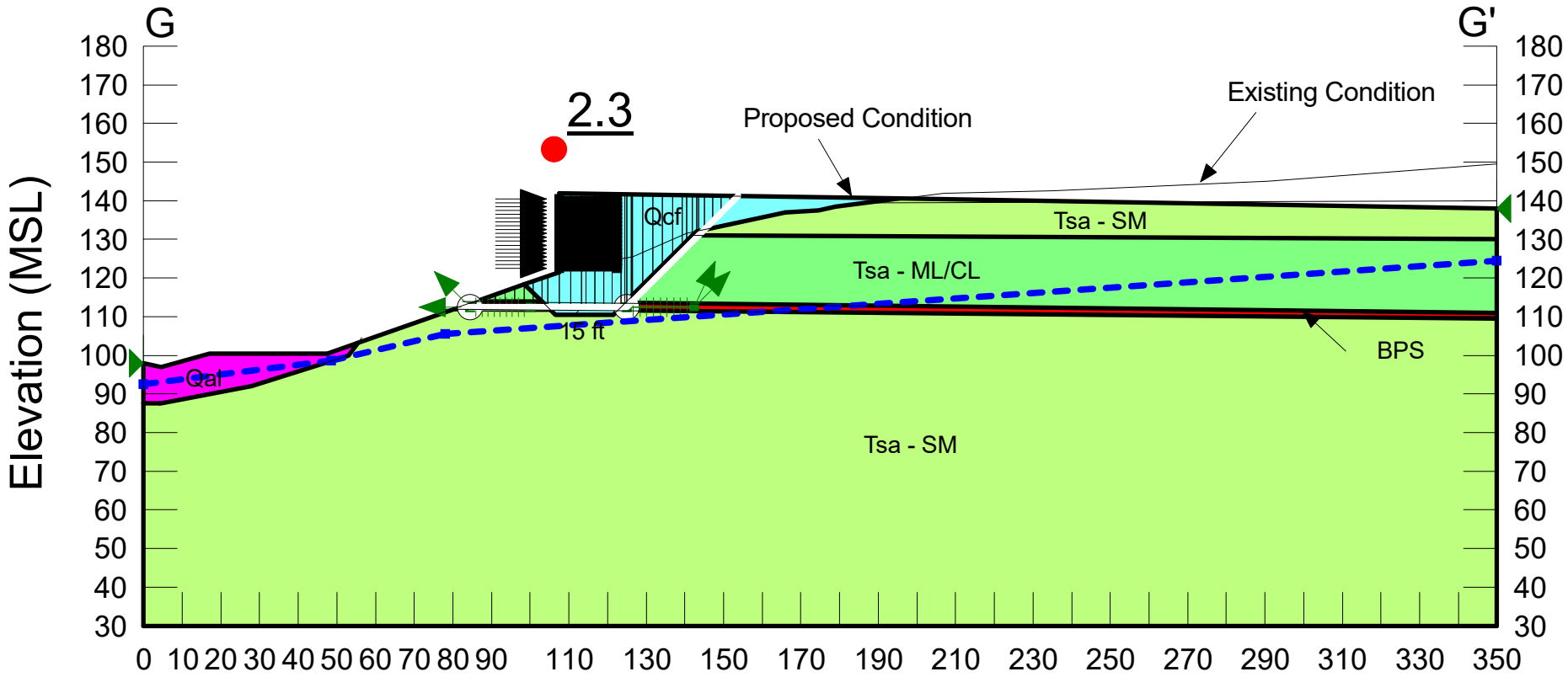


Figure C-37

Piraeus Point
Project No. G2307-32-05
Section G-G'
Name: GG-Case2s.gsz
Date: 01/31/2022 Time: 11:53:14 AM

Proposed Condition

Seismic Analysis
keq = 0.13g

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	BPS	115	100	8
	Qal	120	200	28
	Qcf	125	300	28
	Tsa (ML,CL)	130	500	23
	Tsa (SM,SP)	130	750	33

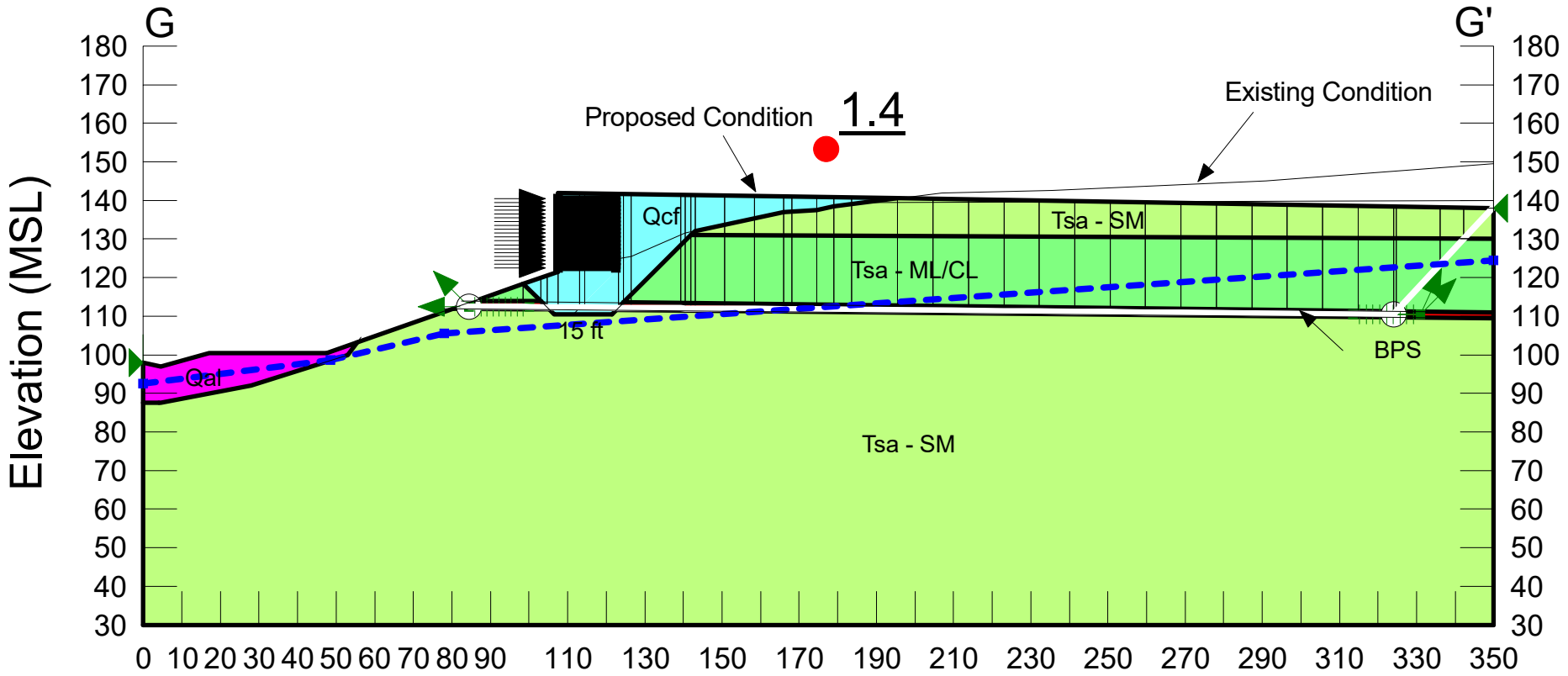


Figure C-38

Piraeus Point
Project No. G2307-32-05
Section G-G'
Name: GG-Case2a.gsz
Date: 01/31/2022 Time: 09:51:59 AM

Proposed Condition

Static Analysis

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	BPS	115	100	8
	Qal	120	200	28
	Qcf	125	300	28
	Tsa (ML,CL)	130	500	23
	Tsa (SM,SP)	130	750	33

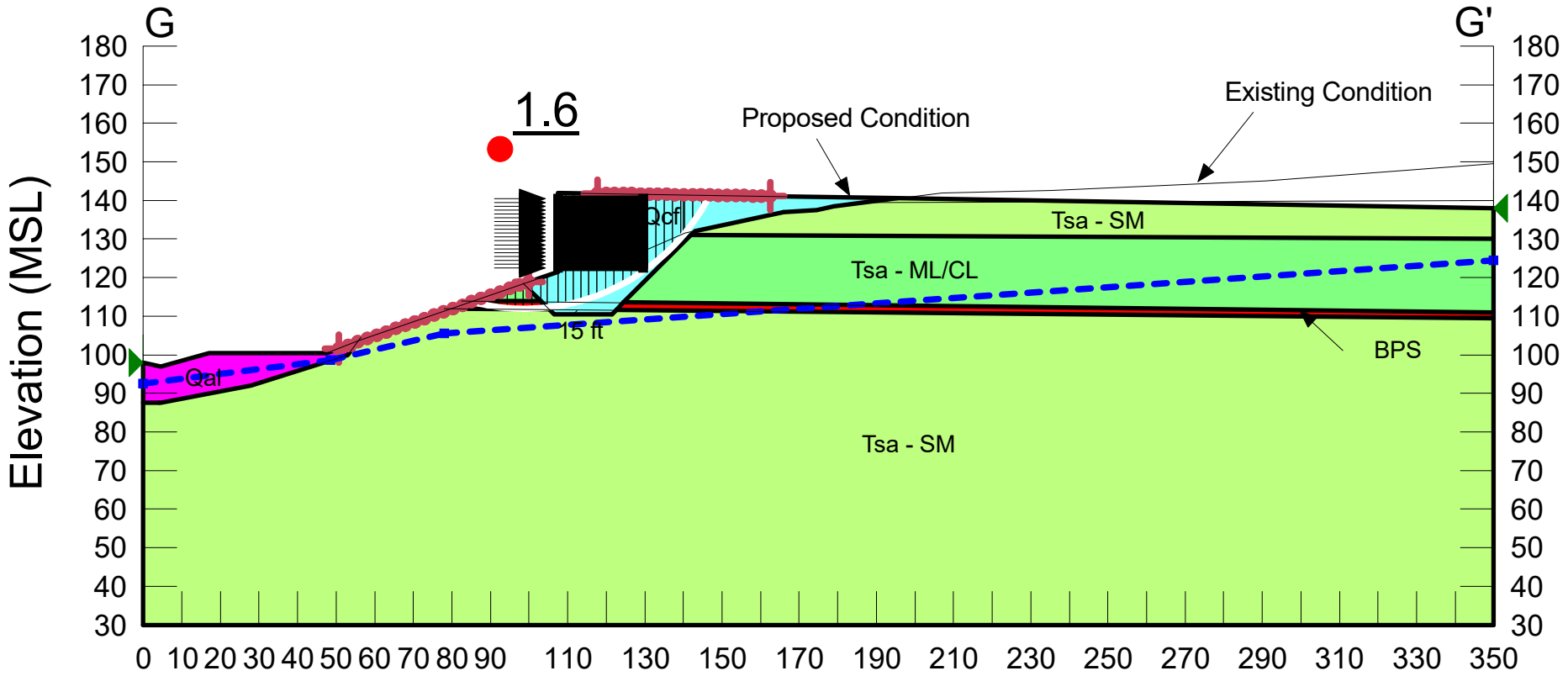


Figure C-39

Piraeus Point
Project No. G2307-32-05
Section G-G'
Name: GG-Case2as.gsz
Date: 01/31/2022 Time: 11:56:17 AM

Proposed Condition

Seismic Analysis
keq = 0.13g

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	BPS	115	100	8
	Qal	120	200	28
	Qcf	125	300	28
	Tsa (ML,CL)	130	500	23
	Tsa (SM,SP)	130	750	33

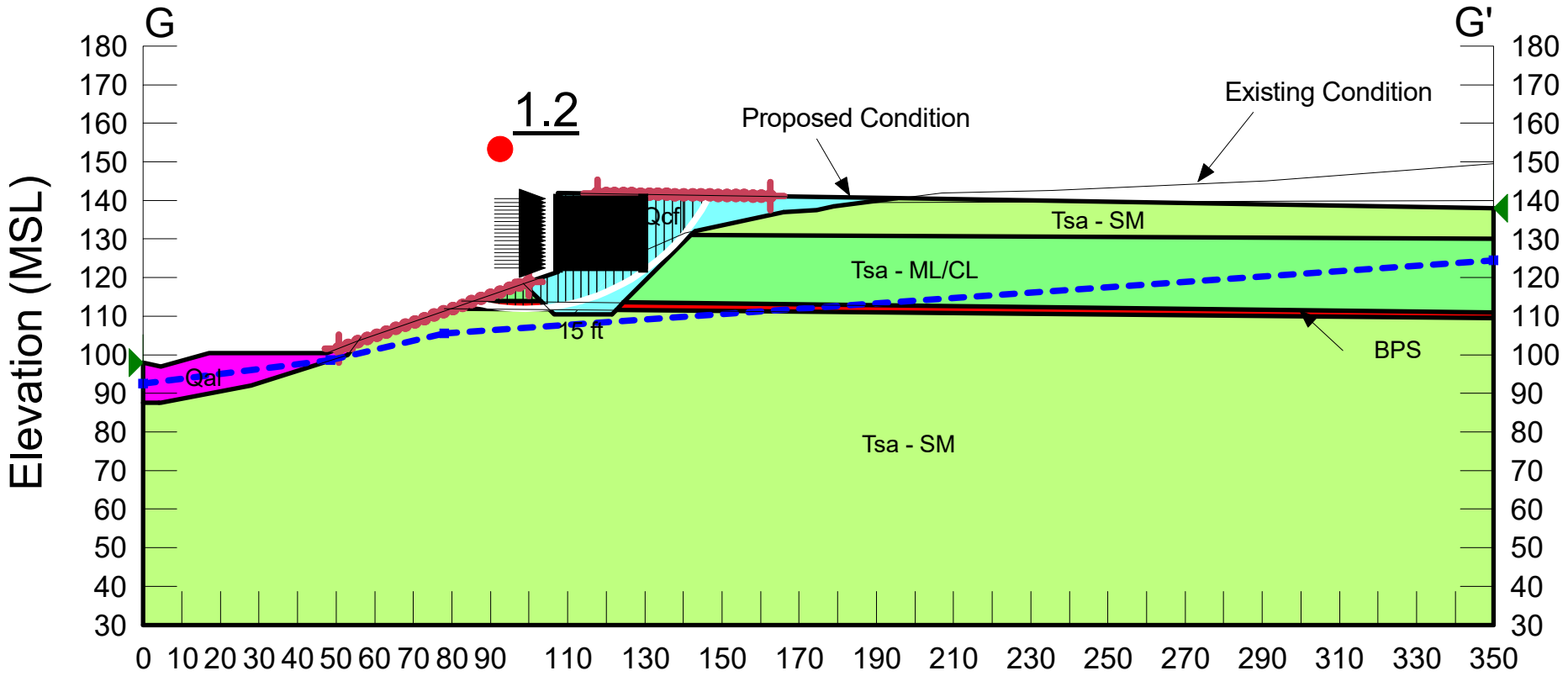


Figure C-40

Surficial Slope Stability Evaluation

Slope Height, H (feet)	∞	
Vertical Depth of Stauration, Z (feet)	3	
Slope Inclination	2.00	:1
Slope Inclination, I (degrees)	26.6	
Unit Weight of Water, γW (pcf)	62.4	
Total Unit Weight of Soil, γ_T (pcf)	125	
Friction Angle, ϕ (degrees)	28	
Cohesion, C (psf)	300	
Factor of Safety = $(C+(\gamma_T-\gamma_W)Z\cos^2 i \tan\phi)/(\gamma_T Z \sin i \cos i)$	2.53	

References: (1) Haefeli, R. *The Stability of Slopes Acted Upon by Parallel Seepage* , Proc. Second International Conference, SMFE, Rotterdam, 1948, 1, 57-62.

(2) Skempton, A. W., and F. A. Delory, *Stability of Natural Slopes in London Clay* , Proc. Fourth International Conference, SMFE, London, 1957, 2, 378-81.

Slope Stability Evaluation

Slope Height, H (feet)	25	
Slope Inclination	2.0	:1
Total Unit Weight of Soil, γ_T (pcf)	125	
Friction Angle, ϕ (degrees)	28	
Cohesion, C (psf)	300	
$\gamma_{C\phi} = (\gamma H \tan\phi)/C$	5.5	
N_{Cf} (from Chart)	20	
Factor of Safety = $(N_{Cf}C)/(\gamma H)$	1.92	

References: (1) Janbu, N. *Stability Analysis of Slopes with Dimensionless Parameters,* Harvard Soil Mechanics, Series No. 46, 1954.

(2) Janbu, N. *Discussion of J.M. Bell, DimensionlessParameters for Homogeneous Earth Slopes,* Journal of Soil Mechanics and Foundation Design, No. SM6, November 1967.

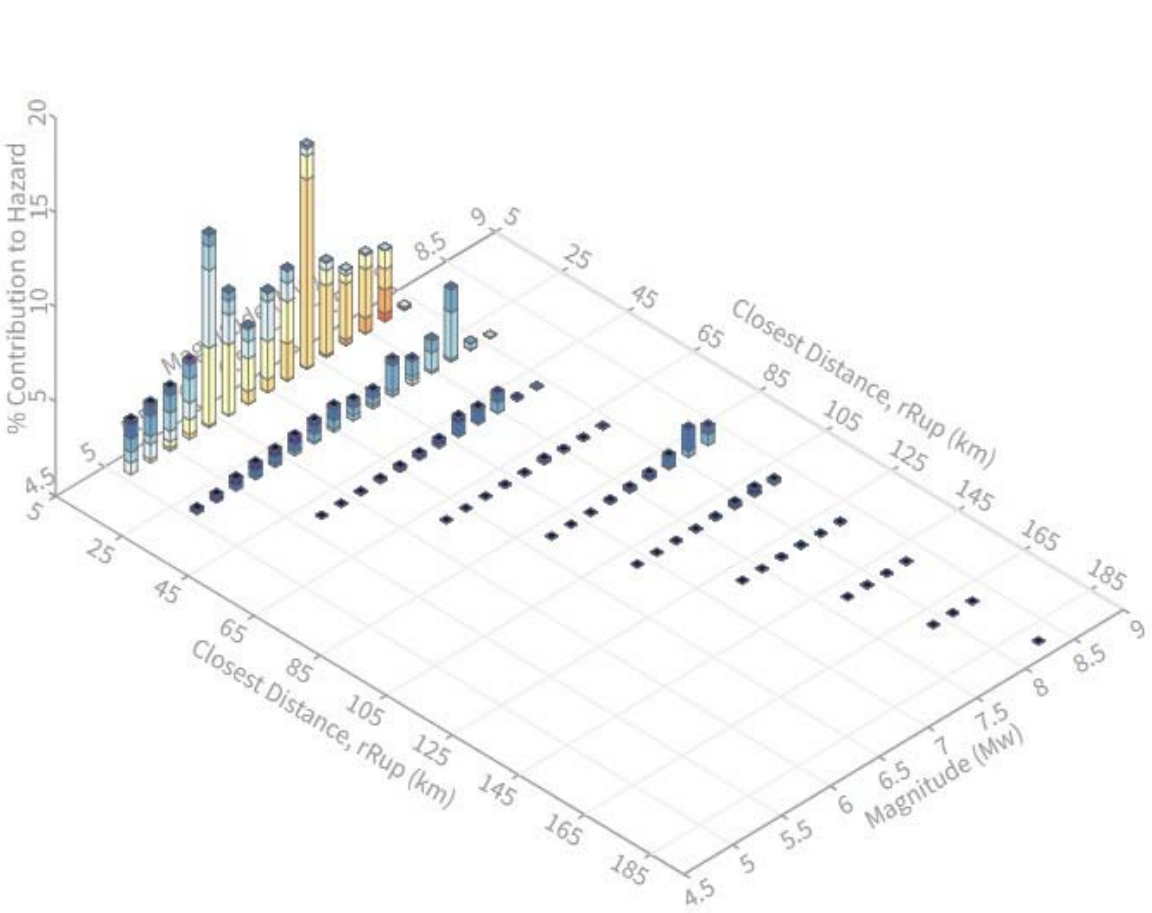
GEOCON
INCORPORATED
GEOTECHNICAL CONSULTANTS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
PHONE 858 558-6900 - FAX 858 558-6159

TM / TM

SLOPE STABILITY ANALYSIS

PIRAEUS POINT
ENCINITAS, CALIFORNIA

DATE 1-31-2022 | PROJECT NO. G2307-32-05 | FIG. C-41



Summary statistics for, Deaggregation: Total

GEOCON
INCORPORATED
GEOTECHNICAL CONSULTANTS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
PHONE 858 558-6900 - FAX 858 558-6159

TM / TM		

SEISMIC DEAGGREGATION

PIRAEUS POINT
ENCINITAS, CALIFORNIA

DATE 1-31-2022	PROJECT NO. G2307-32-05	FIG. C-42

GEOCON

Seismic Slope Stability Evaluation

Input Data in Shaded Areas

Project	Piraeus Point	Computed By	TEM
Project Number	G2307-32-05		
Date	01/31/22		
Filename			

Peak Ground Acceleration (Firm Rock), MHA_r, g	0.23	10% in 50 years
Modal Magnitude, M	6.9	
Modal Distance, r, km	6.3	
Site Condition, S (0 for rock, 1 for soil)	1	
Yield Acceleration, k_y/g	NA	<-- Enter Value or NA for Screening Analysis
Shear Wave Velocity, V_s (ft/sec)	NA	<--
Max Vertical Distance, H (Feet)	NA	<--
Is Slide X-Area > 25,000ft^2 (Y/N)	N	<-- Use "N" for Buttress Fills
Correction for horizontal incoherence	1.0	
Duration, $D_{5-95}\|_{med}$, sec	12.801	
Coefficient, C_1	0.5190	
Coefficient, C_2	0.0837	
Coefficient, C_3	0.0019	
Standard Error, ε_T	0.437	
Mean Square Period, T_m, sec	0.606	

Initial Screening with MHEA = MHA = k_{max}g

k_y/MHA	NA
$f_{EQ}(u=5cm) = (NRF/3.477)*(1.87-\log(u/((MHA_r/g)*NRF*D_{5-95})))$	0.5752
$k_{EO} = feq(MHA_r)/g$	0.132
Factor of Safety in Slope Analysis Using k_{EQ}	1.00

Passes Initial Screening Analysis

Approximation of Seismic Demand

Period of Sliding Mass, $T_s = 4H/V_s$, sec	NA
T_s/T_m	NA
MHEA/(MHA*NRF)	NA
$NRF = 0.6225+0.9196EXP(-2.25*MHA_r/g)$	1.17
MHEA/g	NA
$k_y/MHEA = k_y/k_{max}$	NA
Normalized Displacement, Normu	NA

Estimated Displacement, u (cm) NA

FIGURE C-43

APPENDIX D

APPENDIX D

LIQUEFACTION ANALYSIS

FOR

PIRAEUS POINT
ENCINITAS, CALIFORNIA

PROJECT NO. G2307-32-05

GEOCON

Hammer Energy Correction Factors

Reference: Youd, et al, Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils, Journal of Geotechnical and Environmental Engineering, October, 2001, Vol. 127, No. 10

Project Name: Piraeus Point Date: 1/24/2022

Project Number: G2307-32-05

Hole Diameter, Inches:	8	Hole Diameter Correction, C_B: 1.15
Average Unit Weight, γ (pcf):	125	
Adjustment Factor for 350 LB Hammer Above Groundwater	1.00	<-- Enter 1.0 if an adjustment is not required; Applied to "MC" Samples
Adjustment Factor for 350 LB Hammer Below Groundwater	1.00	<-- Enter 1.0 if an adjustment is not required; Applied to "MC" Samples
Approximate Depth to Groundwater in Boring B-1	39	
Approximate Depth to Groundwater in Boring B-2	43	*Auto, Cathead, or Downhole Hammer
Approximate Depth to Groundwater in Boring B-3	15	

					Adjust for each GWT Level		Energy Correction, C_E (1.0 Safe-T-Driver/Cathead, 1.3 Automatic)				
Sample	Depth, Feet	Field Blow Count (per Foot)	Type of Sampler (MC or SPT)	Hammer Type* (A/C/D)	Equiv. SPT Blow Count, N	σ'_v, psf	Overburden Pressure Correction, C_N	Energy Ratio Correction, C_E	Rod Length Correction, C_R	Sampling Correction, C_S	N1|60 Blowcounts (Prior to Fines)
B1-1	5.0	80	MC	C	53.3	625.0	1.70	1.0	0.75	1.00	78.20
B1-2	10.0	33	MC	A	22.0	1250.0	1.26	1.3	0.80	1.00	33.28
B1-3	15.0	52	MC	A	34.7	1875.0	1.03	1.3	0.85	1.00	45.50
B1-4	20.0	18	MC	A	12.0	2500.0	0.89	1.3	0.95	1.00	15.24
B1-5	25.0	33	MC	A	22.0	3125.0	0.80	1.3	0.95	1.00	25.00
B1-6	30.0	82	MC	A	54.7	3750.0	0.73	1.3	1.00	1.00	59.68
B1-7	31.0	30	SPT	A	30.0	3875.0	0.72	1.3	1.00	1.10	35.44
B1-8	35.0	35	MC	A	23.3	4375.0	0.68	1.3	1.00	1.00	23.59
B1-9	36.0	26	SPT	A	26.0	4500.0	0.67	1.3	1.00	1.10	28.50
B1-10	40.0	49	MC	A	32.7	4937.6	0.64	1.3	1.00	1.00	31.08
B1-11	41.0	36	SPT	A	36.0	5000.2	0.63	1.3	1.00	1.10	37.44
B1-12	45.0	50	MC	A	33.3	5250.6	0.62	1.3	1.00	1.00	30.76
B1-13	46.0	28	SPT	A	28.0	5313.2	0.61	1.3	1.00	1.10	28.25
B1-14	50.0	31	MC	A	20.7	5563.6	0.60	1.3	1.00	1.00	18.52
B1-15	51.0	28	MC	A	18.7	5626.2	0.60	1.3	1.00	1.00	16.64
B2-1	5.0	50	MC	A	33.3	625.0	1.70	1.3	0.75	1.00	63.54
B2-2	10.0	82	MC	A	54.7	1250.0	1.26	1.3	0.80	1.00	82.70
B2-3	15.0	63	MC	A	42.0	1875.0	1.03	1.3	0.85	1.00	55.12
B2-4	20.0	42	MC	A	28.0	2500.0	0.89	1.3	0.95	1.00	35.57
B2-5	25.0	44	MC	A	29.3	3125.0	0.80	1.3	0.95	1.00	33.33
B2-6	30.0	63	MC	A	42.0	3750.0	0.73	1.3	1.00	1.00	45.86
B2-7	31.0	39	SPT	A	39.0	3875.0	0.72	1.3	1.00	1.10	46.08
B2-8	35.0	71	MC	A	47.3	4375.0	0.68	1.3	1.00	1.00	47.84
B2-9	36.0	39	SPT	A	39.0	4500.0	0.67	1.3	1.00	1.10	42.76
B2-10	40.0	36	MC	A	24.0	5000.0	0.63	1.3	1.00	1.00	22.69
B2-11	41.0	29	SPT	A	29.0	5125.0	0.62	1.3	1.00	1.10	29.79
B2-12	45.0	34	MC	A	22.7	5500.2	0.60	1.3	1.00	1.00	20.43
B2-13	46.0	16	SPT	A	16.0	5562.8	0.60	1.3	1.00	1.10	15.78
B2-14	50.0	41	MC	A	27.3	5813.2	0.59	1.3	1.00	1.00	23.97
B2-15	51.0	71	SPT	A	71.0	5875.8	0.58	1.3	1.00	1.10	68.12
B3-1	5.0	50	MC	A	33.3	625.0	1.70	1.3	0.75	1.00	63.54
B3-2	10.0	63	MC	A	42.0	1250.0	1.26	1.3	0.80	1.00	63.54
B3-3	15.0	36	MC	A	24.0	1875.0	1.03	1.3	0.85	1.00	31.50
B3-4	20.0	38	MC	A	25.3	2188.0	0.96	1.3	0.95	1.00	34.40

GEOCON

Hammer Energy Correction Factors

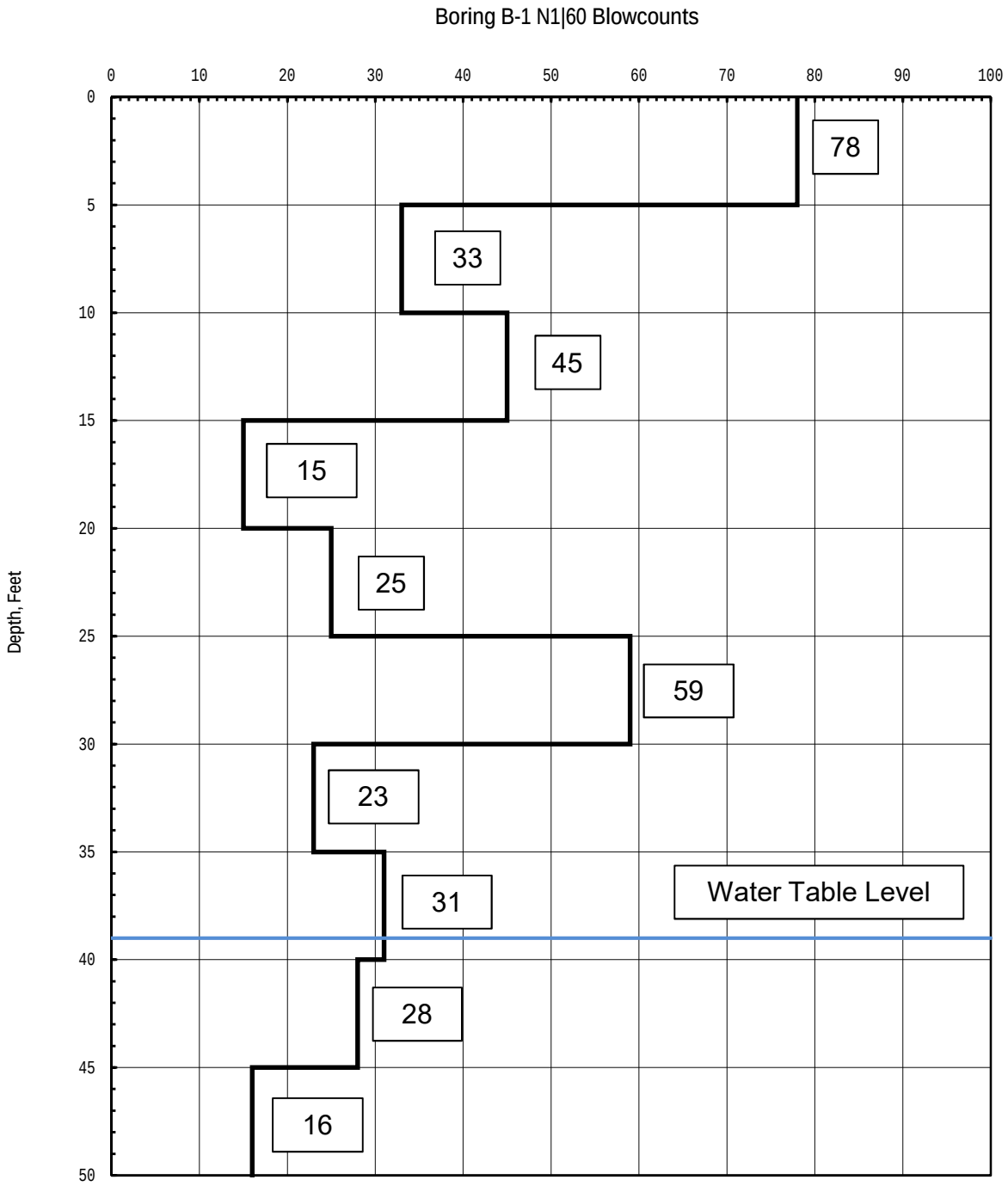
Reference: Youd, et al, Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils, Journal of Geotechnical and Environmental Engineering, October, 2001, Vol. 127, No. 10

Project Name: Piraeus Point Date: 1/24/2022

Project Number: G2307-32-05

Hole Diameter, Inches:	8	Hole Diameter Correction, C_B: 1.15
Average Unit Weight, γ (pcf):	125	
Adjustment Factor for 350 LB Hammer Above Groundwater	1.00	<-- Enter 1.0 if an adjustment is not required; Applied to "MC" Samples
Adjustment Factor for 350 LB Hammer Below Groundwater	1.00	<-- Enter 1.0 if an adjustment is not required; Applied to "MC" Samples
Approximate Depth to Groundwater in Boring B-1	39	
Approximate Depth to Groundwater in Boring B-2	43	*Auto, Cathead, or Downhole Hammer
Approximate Depth to Groundwater in Boring B-3	15	

					Adjust for each GWT Level		Energy Correction, C_E (1.0 Safe-T-Driver/Cathead, 1.3 Automatic)				
Sample	Depth, Feet	Field Blow Count (per Foot)	Type of Sampler (MC or SPT)	Hammer Type* (A/C/D)	Equiv. SPT Blow Count, N	σ'_v, psf	Overburden Pressure Correction, C_N	Energy Ratio Correction, C_E	Rod Length Correction, C_R	Sampling Correction, C_S	N1|60 Blowcounts (Prior to Fines)
B3-5	25.0	35	MC	A	23.3	2501.0	0.89	1.3	0.95	1.00	29.63
B3-6	30.0	45	MC	A	30.0	2814.0	0.84	1.3	1.00	1.00	37.81
B3-7	31.0	27	SPT	A	27.0	2876.6	0.83	1.3	1.00	1.10	37.02
B3-8	35.0	35	MC	A	23.3	3127.0	0.80	1.3	1.00	1.00	27.90
B3-9	36.0	26	SPT	A	26.0	3189.6	0.79	1.3	1.00	1.10	33.86
B3-10	40.0	39	MC	A	26.0	3440.0	0.76	1.3	1.00	1.00	29.64
B3-11	41.0	53	SPT	A	53.0	3502.6	0.76	1.3	1.00	1.10	65.86
B3-12	42.0	50	MC	A	33.3	3565.2	0.75	1.3	1.00	1.00	37.32



GEOCON
INCORPORATED
GEOTECHNICAL CONSULTANTS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
PHONE 858 558-6900 - FAX 858 558-6159

TM / DG

LIQUEFACTION - N 1 | 60 BLOW COUNT

PIRAEUS POINT
ENCINITAS, CALIFORNIA

PROJECT NO. G2307-32-05

GEOCON

Liquefaction Analysis Using SPT

References
1. *Youd, et al, Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils, Journal of Geotechnical and Environmental Engineering, October, 2001, Vol. 127, No. 10*
2. *Seed, et al, Recent Advances in Soil Liquefaction Engineering: A Unified and Consistant Framework, 2003.*

Project Name: Piraeus Point
Project Number: G2307-32-05
Boring: B-1

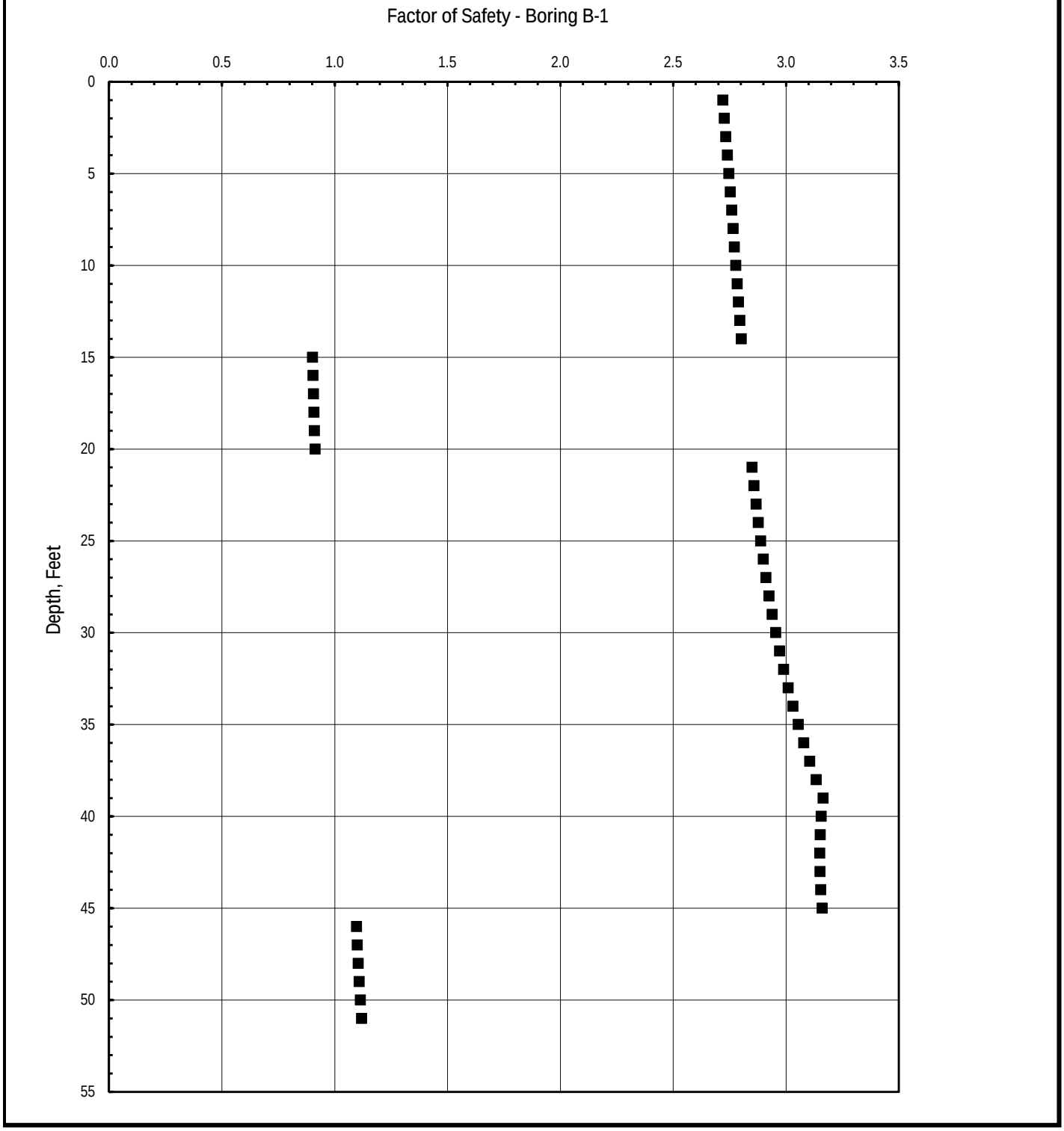
a_{max}/g 0.56
Magnitude 6.9
Groundwater Depth, Ft 39.0
Reference Pressure, p_a 2000
Unit Weight of Water 62.4
Soil Unit Weight, pcf 125

Include Kσ (Y/N) N
Use NCEER CRR7.5 (1) or Rauch CRR7.5 (2) 2
Minimum Factor of Safety for Liquefaction 1

Enter for Fine-Grained Materials | Old | New | MWF Idriss(1997) = $(M)^{2.56}/10^{2.24}$ | From Graph

Depth, ft	$N_1]_{60}$	Fines Content, FC (%)	Water Content, w_C (%)	Liquid Limit	Plastic Limit	Plasticity Index	$N_1]_{60}$, Adj. for Fines	$N_1]_{60}$, Adj. for Fines	σ, psf	σ', psf	r_d	K_σ	NCEER $CRR_{7.5}$	RAUCH $CRR_{7.5}$	CSR M=7.5	Fines Liquefiable (Y/N)	Liquefaction Potential	Factor of Safety	Volumetric Strain, %	Settlement, in.
1	78	35	3.8	30	15	15	98.6	84.0	125	125	1.00	1.00	0.800	0.800	0.294	N	Above GWT	2.721		
2	78	35	3.8	30	15	15	98.6	84.0	250	250	1.00	1.00	0.800	0.800	0.293	N	Above GWT	2.727		
3	78	35	3.8	30	15	15	98.6	84.0	375	375	0.99	1.00	0.800	0.800	0.293	N	Above GWT	2.734		
4	78	35	3.8	30	15	15	98.6	84.0	500	500	0.99	1.00	0.800	0.800	0.292	N	Above GWT	2.740		
5	78	35	3.8	30	15	15	98.6	84.0	625	625	0.99	1.00	0.800	0.800	0.291	N	Above GWT	2.747		
6	33	35	3.8	30	15	15	44.6	39.0	750	750	0.99	1.00	0.800	0.800	0.291	N	Above GWT	2.753		
7	33	35	3.8	30	15	15	44.6	39.0	875	875	0.99	1.00	0.800	0.800	0.290	N	Above GWT	2.759		
8	33	35	3.8	30	15	15	44.6	39.0	1000	1000	0.98	1.00	0.800	0.800	0.289	N	Above GWT	2.766		
9	33	35	3.8	30	15	15	44.6	39.0	1125	1125	0.98	1.00	0.800	0.800	0.289	N	Above GWT	2.772		
10	33	35	3.8	30	15	15	44.6	39.0	1250	1250	0.98	1.00	0.800	0.800	0.288	N	Above GWT	2.778		
11	45	35	5.4	30	15	15	59.0	51.0	1375	1375	0.98	1.00	0.800	0.800	0.287	N	Above GWT	2.784		
12	45	35	5.4	30	15	15	59.0	51.0	1500	1500	0.97	1.00	0.800	0.800	0.287	N	Above GWT	2.790		
13	45	35	5.4	30	15	15	59.0	51.0	1625	1625	0.97	1.00	0.800	0.800	0.286	N	Above GWT	2.796		
14	45	35	5.4	30	15	15	59.0	51.0	1750	1750	0.97	1.00	0.800	0.800	0.286	N	Above GWT	2.802		
15	15	35	5.4	30	15	15	23.0	21.0	1875	1875	0.97	1.00	0.255	0.257	0.285	N	Above GWT	0.902		
16	15	35	5.4	30	15	15	23.0	21.0	2000	2000	0.97	1.00	0.255	0.257	0.284	N	Above GWT	0.904		
17	15	35	5.4	30	15	15	23.0	21.0	2125	2125	0.96	1.00	0.255	0.257	0.284	N	Above GWT	0.906		
18	15	35	5.4	30	15	15	23.0	21.0	2250	2250	0.96	1.00	0.255	0.257	0.283	N	Above GWT	0.908		
19	15	35	5.4	30	15	15	23.0	21.0	2375	2375	0.96	1.00	0.255	0.257	0.282	N	Above GWT	0.911		
20	15	35	5.4	30	15	15	23.0	21.0	2500	2500	0.96	1.00	0.255	0.257	0.281	N	Above GWT	0.913		
21	25	35	14.8	30	15	15	35.0	31.0	2625	2625	0.95	1.00	0.800	0.800	0.281	N	Above GWT	2.850		
22	25	35	14.8	30	15	15	35.0	31.0	2750	2750	0.95	1.00	0.800	0.800	0.280	N	Above GWT	2.859		
23	25	35	14.8	30	15	15	35.0	31.0	2875	2875	0.95	1.00	0.800	0.800	0.279	N	Above GWT	2.868		
24	25	35	14.8	30	15	15	35.0	31.0	3000	3000	0.95	1.00	0.800	0.800	0.278	N	Above GWT	2.877		
25	25	35	14.8	30	15	15	35.0	31.0	3125	3125	0.94	1.00	0.800	0.800	0.277	N	Above GWT	2.888		
26	59	35	8.7	30	15	15	75.8	65.0	3250	3250	0.94	1.00	0.800	0.800	0.276	N	Above GWT	2.899		
27	59	35	8.7	30	15	15	75.8	65.0	3375	3375	0.93	1.00	0.800	0.800	0.275	N	Above GWT	2.911		
28	59	35	8.7	30	15	15	75.8	65.0	3500	3500	0.93	1.00	0.800	0.800	0.274	N	Above GWT	2.925		
29	59	35	8.7	30	15	15	75.8	65.0	3625	3625	0.93	1.00	0.800	0.800	0.272	N	Above GWT	2.939		
30	59	35	8.7	30	15	15	75.8	65.0	3750	3750	0.92	1.00	0.800	0.800	0.271	N	Above GWT	2.955		
31	23	35	8.7	30	15	15	32.6	29.0	3875	3875	0.92	1.00	0.800	0.800	0.269	N	Above GWT	2.972		
32	23	35	8.7	30	15	15	32.6	29.0	4000	4000	0.91	1.00	0.800	0.800	0.268	N	Above GWT	2.990		
33	23	35	8.7	30	15	15	32.6	29.0	4125	4125	0.90	1.00	0.800	0.800	0.266	N	Above GWT	3.010		
34	23	35	8.7	30	15	15	32.6	29.0	4250	4250	0.90	1.00	0.800	0.800	0.264	N	Above GWT	3.031		
35	23	35	8.7	30	15	15	32.6	29.0	4375	4375	0.89	1.00	0.800	0.800	0.262	N	Above GWT	3.054		
36	31	35	8.7	30	15	15	42.2	37.0	4500	4500	0.88	1.00	0.800	0.800	0.260	N	Above GWT	3.079		
37	31	35	15.3	30	15	15	42.2	37.0	4625	4625	0.88	1.00	0.800	0.800	0.258	N	Above GWT	3.106		
38	31	35	15.3	30	15	15	42.2	37.0	4750	4750	0.87	1.00	0.800	0.800	0.255	N	Above GWT	3.134		
39	31	35	15.3	30	15	15	42.2	37.0	4875	4875	0.86	1.00	0.800	0.800	0.253	N	NL	3.165		
40	31	35	15.3	30	15	15	42.2	37.0	5000	4938	0.85	1.00	0.800	0.800	0.253	N	NL	3.157		
41	28	35	15.3	30	15	15	38.6	34.0	5125	5000	0.84	1.00	0.800	0.800	0.254	N	NL	3.152		
42	28	35	15.3	30	15	15	38.6	34.0	5250	5063	0.83	1.00	0.800	0.800	0.254	N	NL	3.150		
43	28	35	15.3	30	15	15	38.6	34.0	5375	5125	0.82	1.00	0.800	0.800	0.254	N	NL	3.151		
44	28	35	15.3	30	15	15	38.6	34.0	5500	5188	0.81	1.00	0.800	0.800	0.254	N	NL	3.155		
45	28	35	20.0	30	15	15	38.6	34.0	5625	5251	0.80	1.00	0.800	0.800	0.253	N	NL	3.160		
46	16	35	20.0	30	15	15	24.2	22.0	5750	5313	0.79	1.00	0.273	0.277	0.253	N	NL	1.097		
47	16	35	20.0	30	15	15	24.2	22.0	5875	5376	0.78	1.00	0.273	0.277	0.252	N	NL	1.100		
48	16	35	20.0	30	15	15	24.2	22.0	6000	5438	0.77	1.00	0.273	0.277	0.251	N	NL	1.104		
49	16	35	20.0	30	15	15	24.2	22.0	6125	5501	0.76	1.00	0.273	0.277	0.250	N	NL	1.109		
50	16	35	20.0	30	15	15	24.2	22.0	6250	5564	0.75	1.00	0.273	0.277	0.249	N	NL	1.114		
51	16	35	20.0	30	15	15	24.2	22.0	6375	5626	0.74	1.00	0.273	0.277	0.247	N	NL	1.119		

Total Settlement, S_{LIQ} (in.) = 0
Total Liquifiable Layers = 0



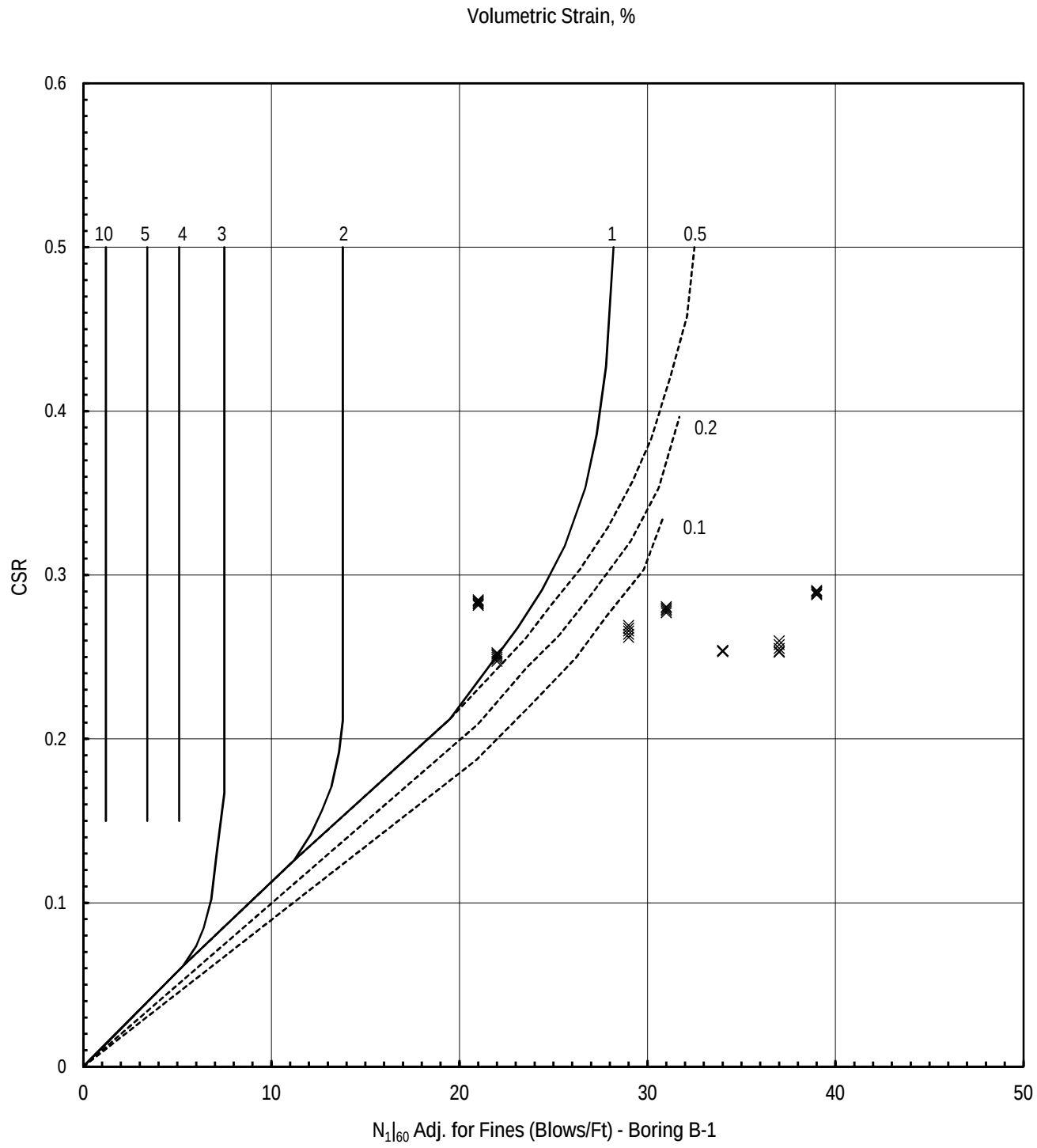
GEOCON
INCORPORATED
GEOTECHNICAL CONSULTANTS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
PHONE 858 558-6900 - FAX 858 558-6159

SW / SW

LIQUEFACTION - FACTOR OF SAFETY

PIRAEUS POINT
ENCINITAS, CALIFORNIA

PROJECT NO. G2307-32-05



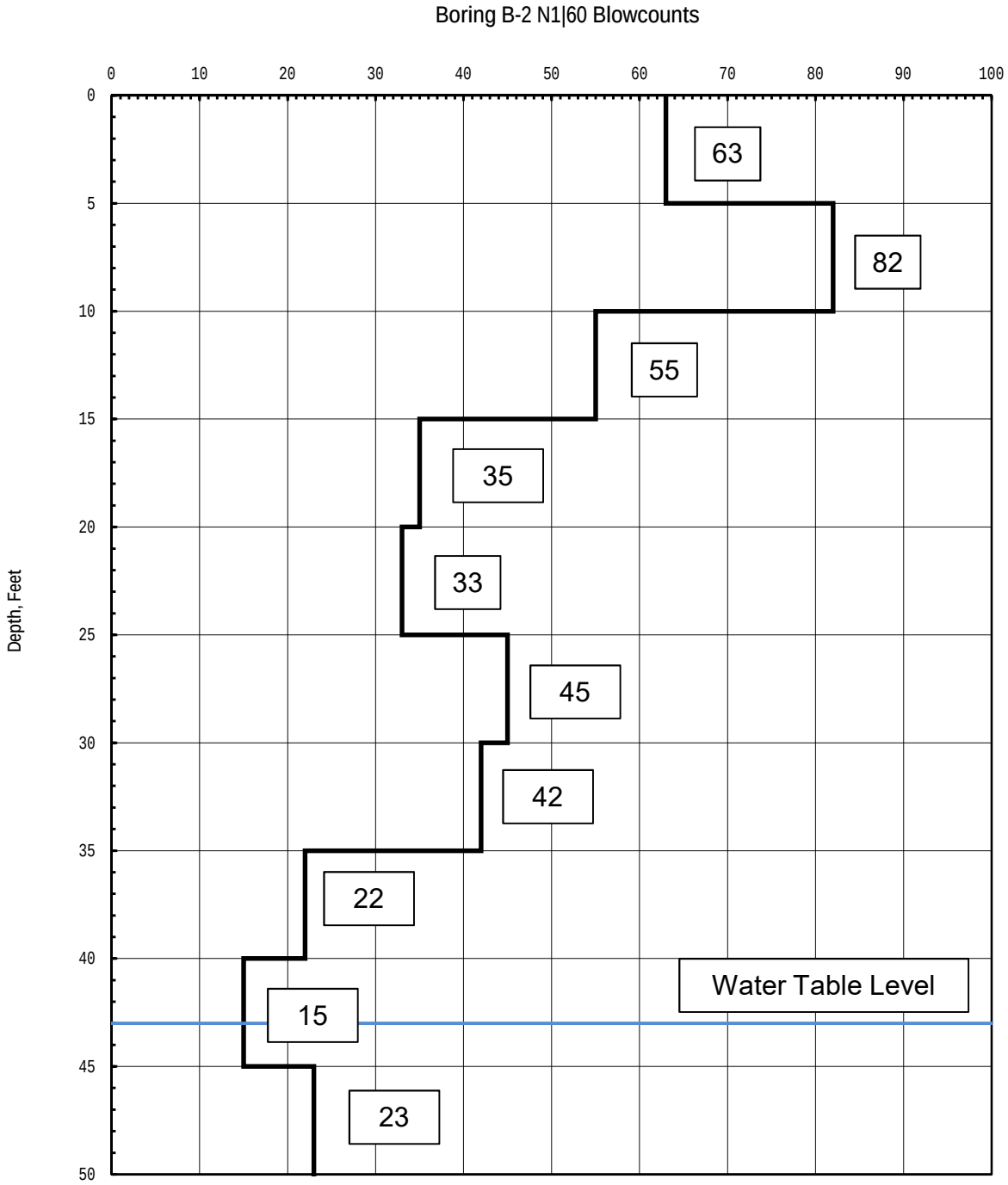
GEOCON
INCORPORATED
GEOTECHNICAL CONSULTANTS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
PHONE 858 558-6900 - FAX 858 558-6159

SW / SW

LIQUEFACTION - VOLUMETRIC STRAIN

PIRAEUS POINT
ENCINITAS, CALIFORNIA

PROJECT NO. G2307-32-05



GEOCON
INCORPORATED
GEOTECHNICAL CONSULTANTS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
PHONE 858 558-6900 - FAX 858 558-6159

TM / DG

LIQUEFACTION - N 1 | 60 BLOW COUNT

PIRAEUS POINT
ENCINITAS, CALIFORNIA

PROJECT NO. G2307-32-05

GEOCON

Liquefaction Analysis Using SPT

References
1. *Youd, et al, Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils, Journal of Geotechnical and Environmental Engineering, October, 2001, Vol. 127, No. 10*
2. *Seed, et al, Recent Advances in Soil Liquefaction Engineering: A Unified and Consistant Framework, 2003.*

Project Name: Piraeus Point
Project Number: G2307-32-05
Boring: B-2

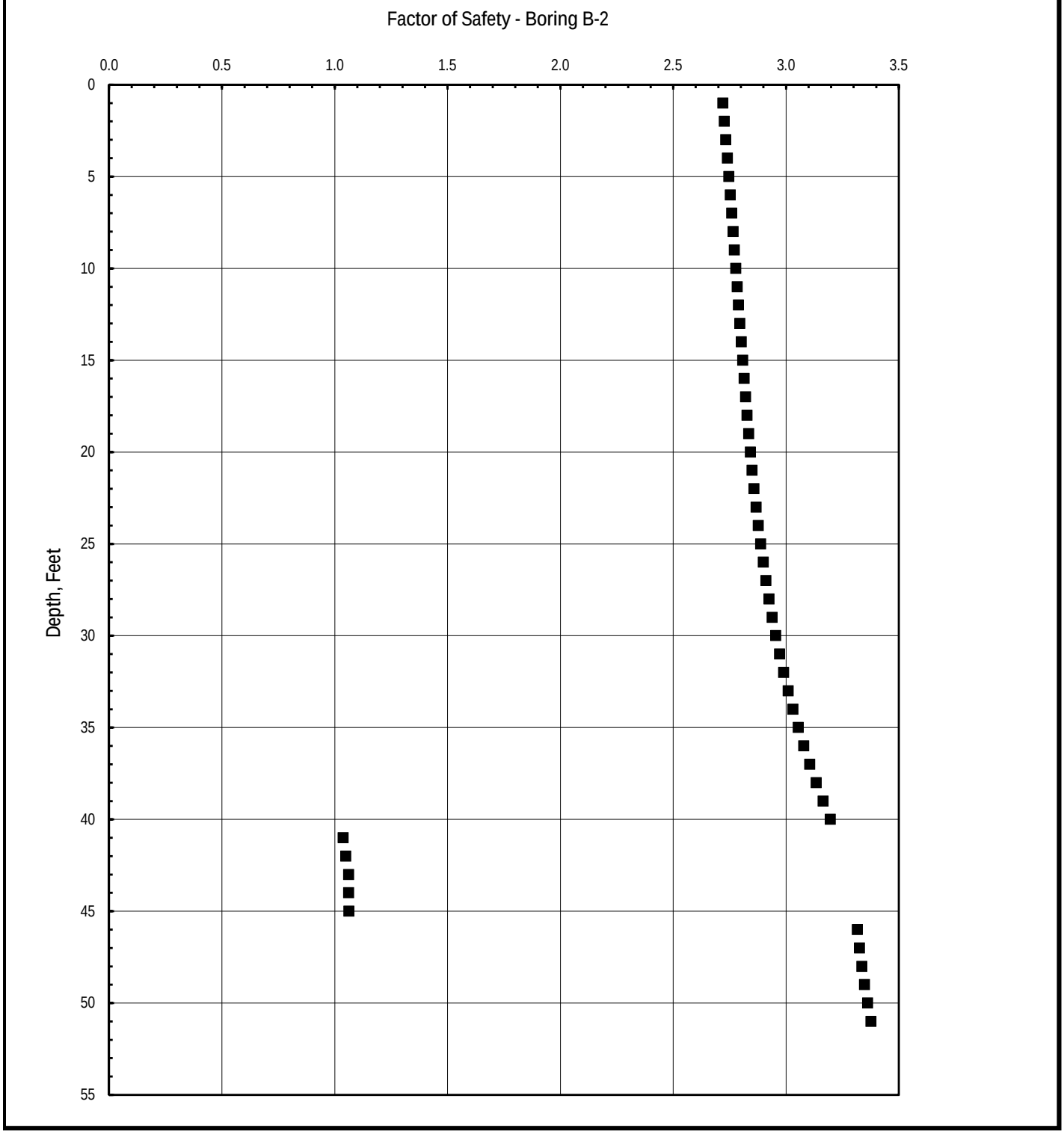
a_{max}/g 0.56
Magnitude 6.9
Groundwater Depth, Ft 43.0
Reference Pressure, p_a 2000
Unit Weight of Water 62.4
Soil Unit Weight, pcf 125

Include Kσ (Y/N) N
Use NCEER CRR7.5 (1) or Rauch CRR7.5 (2) 2
Minimum Factor of Safety for Liquefaction 1

Enter for Fine-Grained Materials | Old | New | MWF Idriss(1997) = $(M)^{2.56}/10^{2.24}$ | From Graph

Depth, ft	$N_1]_{60}$	Fines Content, FC (%)	Water Content, w_C (%)	Liquid Limit	Plastic Limit	Plasticity Index	$N_1]_{60}$, Adj. for Fines	$N_1]_{60}$, Adj. for Fines	σ, psf	σ', psf	r_d	K_σ	NCEER $CRR_{7.5}$	RAUCH $CRR_{7.5}$	CSR M=7.5	Fines Liquefiable (Y/N)	Liquefaction Potential	Factor of Safety	Volumetric Strain, %	Settlement, in.
1	63	35	5.3	30	15	15	80.6	69.0	125	125	1.00	1.00	0.800	0.800	0.294	N	Above GWT	2.721		
2	63	35	5.3	30	15	15	80.6	69.0	250	250	1.00	1.00	0.800	0.800	0.293	N	Above GWT	2.727		
3	63	35	5.3	30	15	15	80.6	69.0	375	375	0.99	1.00	0.800	0.800	0.293	N	Above GWT	2.734		
4	63	35	5.3	30	15	15	80.6	69.0	500	500	0.99	1.00	0.800	0.800	0.292	N	Above GWT	2.740		
5	63	35	5.3	30	15	15	80.6	69.0	625	625	0.99	1.00	0.800	0.800	0.291	N	Above GWT	2.747		
6	82	35	5.3	30	15	15	103.4	88.0	750	750	0.99	1.00	0.800	0.800	0.291	N	Above GWT	2.753		
7	82	35	5.3	30	15	15	103.4	88.0	875	875	0.99	1.00	0.800	0.800	0.290	N	Above GWT	2.759		
8	82	35	5.3	30	15	15	103.4	88.0	1000	1000	0.98	1.00	0.800	0.800	0.289	N	Above GWT	2.766		
9	82	35	5.3	30	15	15	103.4	88.0	1125	1125	0.98	1.00	0.800	0.800	0.289	N	Above GWT	2.772		
10	82	35	5.3	30	15	15	103.4	88.0	1250	1250	0.98	1.00	0.800	0.800	0.288	N	Above GWT	2.778		
11	55	35	15.2	30	15	15	71.0	61.0	1375	1375	0.98	1.00	0.800	0.800	0.287	N	Above GWT	2.784		
12	55	35	15.2	30	15	15	71.0	61.0	1500	1500	0.97	1.00	0.800	0.800	0.287	N	Above GWT	2.790		
13	55	35	15.2	30	15	15	71.0	61.0	1625	1625	0.97	1.00	0.800	0.800	0.286	N	Above GWT	2.796		
14	55	35	15.2	30	15	15	71.0	61.0	1750	1750	0.97	1.00	0.800	0.800	0.286	N	Above GWT	2.802		
15	55	35	15.2	30	15	15	71.0	61.0	1875	1875	0.97	1.00	0.800	0.800	0.285	N	Above GWT	2.808		
16	35	35	9.6	30	15	15	47.0	41.0	2000	2000	0.97	1.00	0.800	0.800	0.284	N	Above GWT	2.814		
17	35	35	9.6	30	15	15	47.0	41.0	2125	2125	0.96	1.00	0.800	0.800	0.284	N	Above GWT	2.821		
18	35	35	9.6	30	15	15	47.0	41.0	2250	2250	0.96	1.00	0.800	0.800	0.283	N	Above GWT	2.828		
19	35	35	9.6	30	15	15	47.0	41.0	2375	2375	0.96	1.00	0.800	0.800	0.282	N	Above GWT	2.835		
20	35	35	9.6	30	15	15	47.0	41.0	2500	2500	0.96	1.00	0.800	0.800	0.281	N	Above GWT	2.842		
21	33	35	12.5	30	15	15	44.6	39.0	2625	2625	0.95	1.00	0.800	0.800	0.281	N	Above GWT	2.850		
22	33	35	12.5	30	15	15	44.6	39.0	2750	2750	0.95	1.00	0.800	0.800	0.280	N	Above GWT	2.859		
23	33	35	12.5	30	15	15	44.6	39.0	2875	2875	0.95	1.00	0.800	0.800	0.279	N	Above GWT	2.868		
24	33	35	12.5	30	15	15	44.6	39.0	3000	3000	0.95	1.00	0.800	0.800	0.278	N	Above GWT	2.877		
25	33	35	12.5	30	15	15	44.6	39.0	3125	3125	0.94	1.00	0.800	0.800	0.277	N	Above GWT	2.888		
26	45	35	12.5	30	15	15	59.0	51.0	3250	3250	0.94	1.00	0.800	0.800	0.276	N	Above GWT	2.899		
27	45	35	12.5	30	15	15	59.0	51.0	3375	3375	0.93	1.00	0.800	0.800	0.275	N	Above GWT	2.911		
28	45	35	12.5	30	15	15	59.0	51.0	3500	3500	0.93	1.00	0.800	0.800	0.274	N	Above GWT	2.925		
29	45	35	12.5	30	15	15	59.0	51.0	3625	3625	0.93	1.00	0.800	0.800	0.272	N	Above GWT	2.939		
30	45	35	12.5	30	15	15	59.0	51.0	3750	3750	0.92	1.00	0.800	0.800	0.271	N	Above GWT	2.955		
31	42	35	12.5	30	15	15	55.4	48.0	3875	3875	0.92	1.00	0.800	0.800	0.269	N	Above GWT	2.972		
32	42	35	12.5	30	15	15	55.4	48.0	4000	4000	0.91	1.00	0.800	0.800	0.268	N	Above GWT	2.990		
33	42	35	12.5	30	15	15	55.4	48.0	4125	4125	0.90	1.00	0.800	0.800	0.266	N	Above GWT	3.010		
34	42	35	12.5	30	15	15	55.4	48.0	4250	4250	0.90	1.00	0.800	0.800	0.264	N	Above GWT	3.031		
35	42	35	12.5	30	15	15	55.4	48.0	4375	4375	0.89	1.00	0.800	0.800	0.262	N	Above GWT	3.054		
36	22	35	15.4	30	15	15	31.4	28.0	4500	4500	0.88	1.00	0.800	0.800	0.260	N	Above GWT	3.079		
37	22	35	15.4	30	15	15	31.4	28.0	4625	4625	0.88	1.00	0.800	0.800	0.258	N	Above GWT	3.106		
38	22	35	15.4	30	15	15	31.4	28.0	4750	4750	0.87	1.00	0.800	0.800	0.255	N	Above GWT	3.134		
39	22	35	15.4	30	15	15	31.4	28.0	4875	4875	0.86	1.00	0.800	0.800	0.253	N	Above GWT	3.165		
40	22	35	15.4	30	15	15	31.4	28.0	5000	5000	0.85	1.00	0.800	0.800	0.250	N	Above GWT	3.197		
41	15	35	15.4	30	15	15	23.0	21.0	5125	5125	0.84	1.00	0.255	0.257	0.248	N	Above GWT	1.038		
42	15	35	15.4	30	15	15	23.0	21.0	5250	5250	0.83	1.00	0.255	0.257	0.245	N	Above GWT	1.049		
43	15	35	15.4	30	15	15	23.0	21.0	5375	5375	0.82	1.00	0.255	0.257	0.242	N	NL	1.061		
44	15	35	15.4	30	15	15	23.0	21.0	5500	5438	0.81	1.00	0.255	0.257	0.242	N	NL	1.062		
45	15	35	15.4	30	15	15	23.0	21.0	5625	5500	0.80	1.00	0.255	0.257	0.242	N	NL	1.063		
46	23	35	19.5	30	15	15	32.6	29.0	5750	5563	0.79	1.00	0.800	0.800	0.241	N	NL	3.317		
47	23	35	19.5	30	15	15	32.6	29.0	5875	5625	0.78	1.00	0.800	0.800	0.241	N	NL	3.326		
48	23	35	19.5	30	15	15	32.6	29.0	6000	5688	0.77	1.00	0.800	0.800	0.240	N	NL	3.336		
49	23	35	19.5	30	15	15	32.6	29.0	6125	5751	0.76	1.00	0.800	0.800	0.239	N	NL	3.348		
50	23	35	19.5	30	15	15	32.6	29.0	6250	5813	0.75	1.00	0.800	0.800	0.238	N	NL	3.362		
51	23	35	19.5	30	15	15	32.6	29.0	6375	5876	0.74	1.00	0.800	0.800	0.237	N	NL	3.377		

Total Settlement, S_{LIQ} (in.) = 0
Total Liquifiable Layers = 0



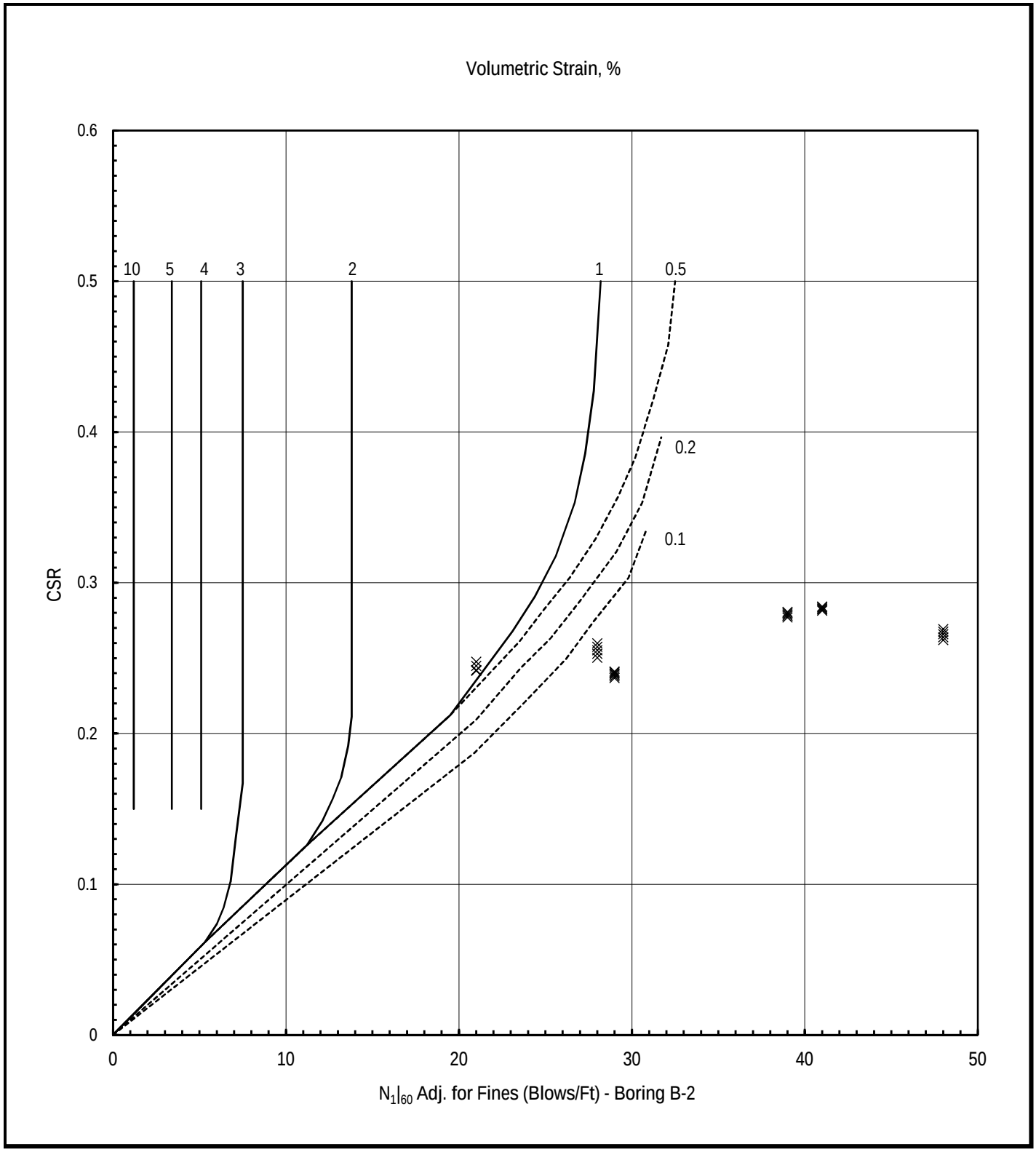
GEOCON
INCORPORATED
GEOTECHNICAL CONSULTANTS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
PHONE 858 558-6900 - FAX 858 558-6159

SW / SW

LIQUEFACTION - FACTOR OF SAFETY

PIRAEUS POINT
ENCINITAS, CALIFORNIA

PROJECT NO. G2307-32-05



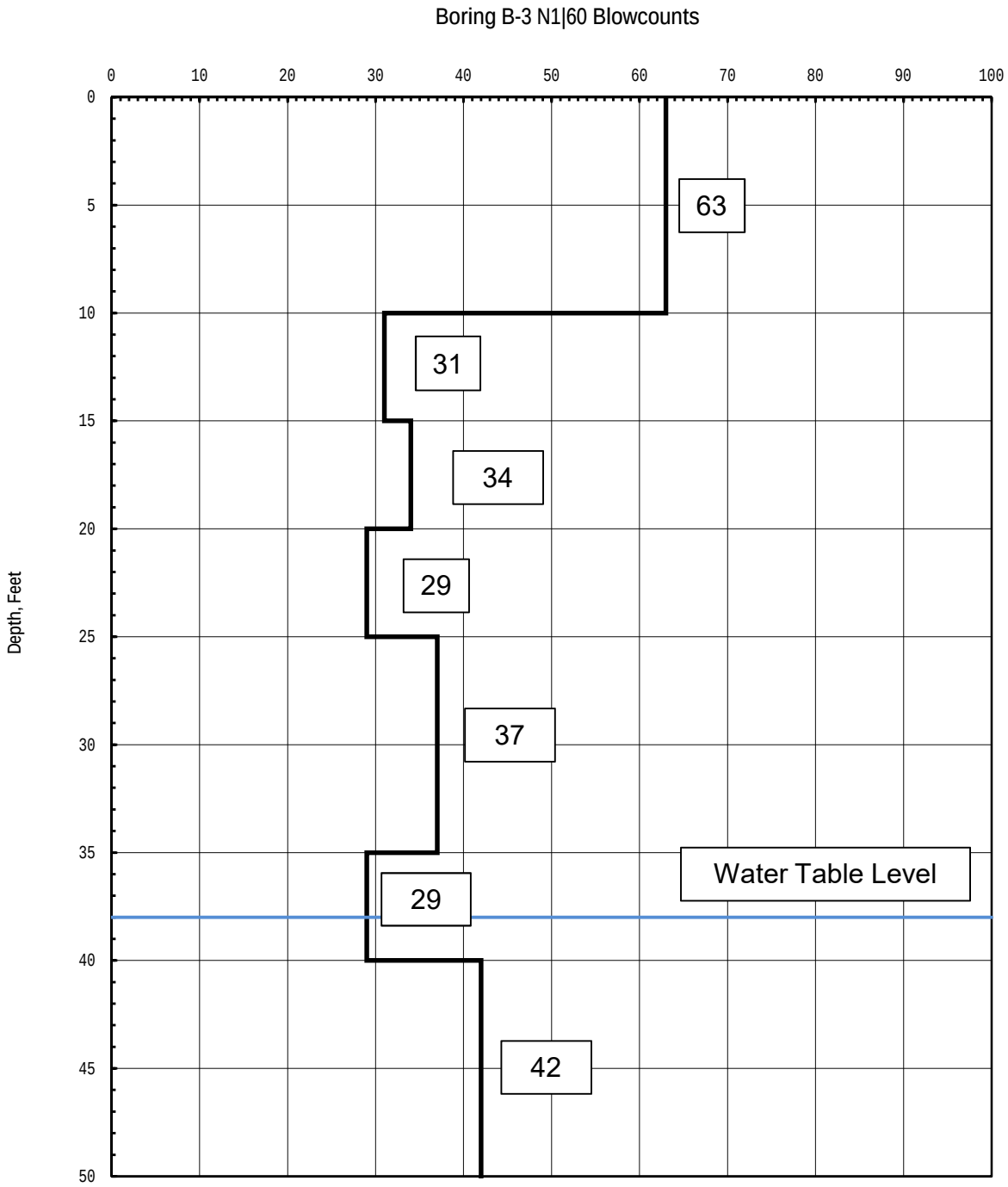
GEOCON
INCORPORATED
GEOTECHNICAL CONSULTANTS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
PHONE 858 558-6900 - FAX 858 558-6159

SW / SW

LIQUEFACTION - VOLUMETRIC STRAIN

PIRAEUS POINT
ENCINITAS, CALIFORNIA

PROJECT NO. G2307-32-05



GEOCON
INCORPORATED
GEOTECHNICAL CONSULTANTS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
PHONE 858 558-6900 - FAX 858 558-6159

TM / DG

LIQUEFACTION - N 1 | 60 BLOW COUNT

PIRAEUS POINT
ENCINITAS, CALIFORNIA

PROJECT NO. G2307-32-05

GEOCON

Liquefaction Analysis Using SPT

References
1. *Youd, et al, Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils, Journal of Geotechnical and Environmental Engineering, October, 2001, Vol. 127, No. 10*
2. *Seed, et al, Recent Advances in Soil Liquefaction Engineering: A Unified and Consistant Framework, 2003.*

Project Name: Piraeus Point
Project Number: G2307-32-05
Boring: B-3

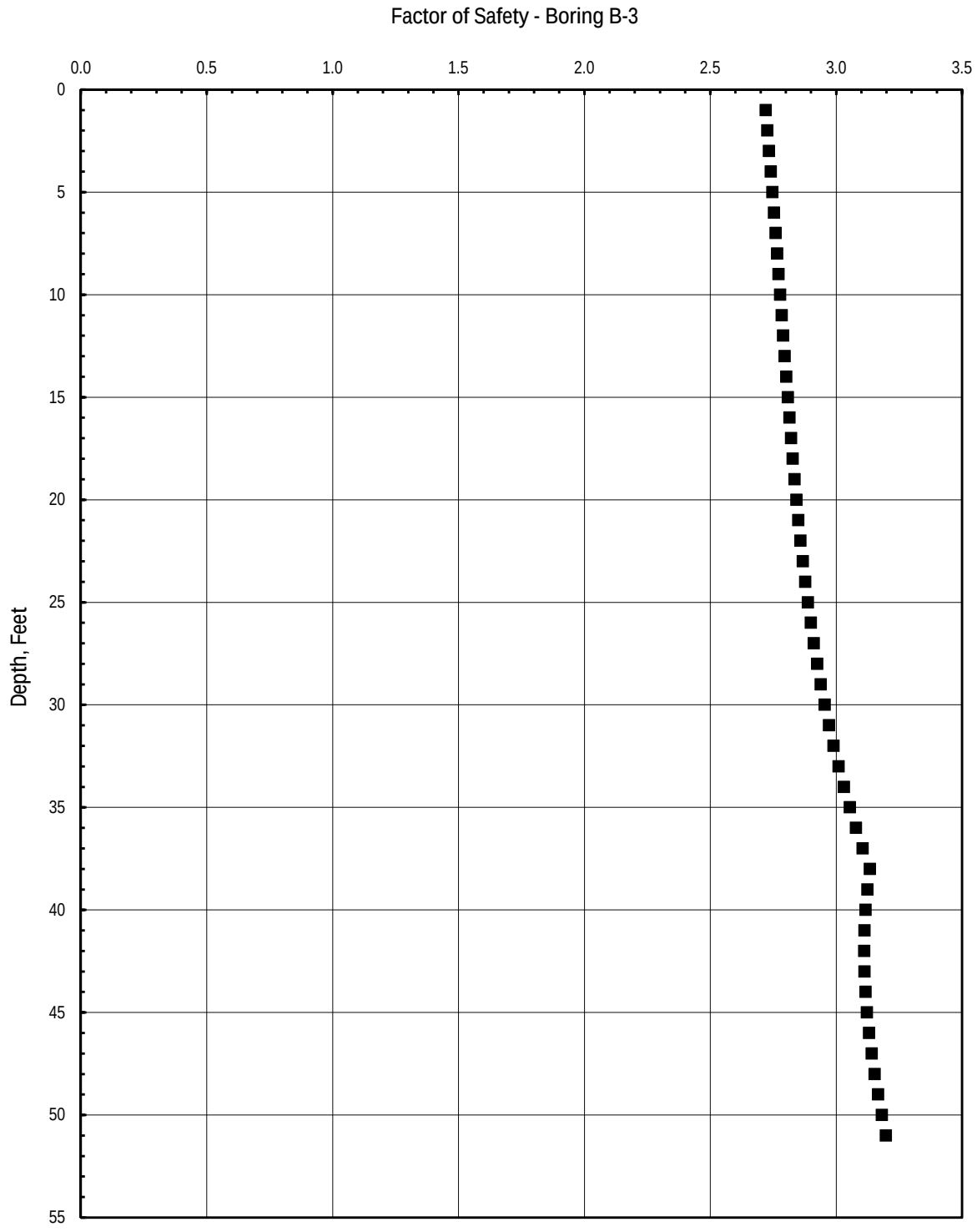
a_{max}/g 0.56
Magnitude 6.9
Groundwater Depth, Ft 38.0
Reference Pressure, p_a 2000
Unit Weight of Water 62.4
Soil Unit Weight, pcf 125

Include Kσ (Y/N) N
Use NCEER CRR7.5 (1) or Rauch CRR7.5 (2) 2
Minimum Factor of Safety for Liquefaction 1

Enter for Fine-Grained Materials | Old | New | MWF Idriss(1997) = $(M)^{2.56}/10^{2.24}$ | From Graph

Depth, ft	$N_1]_{60}$	Fines Content, FC (%)	Water Content, w_C (%)	Liquid Limit	Plastic Limit	Plasticity Index	$N_1]_{60}$, Adj. for Fines	$N_1]_{60}$, Adj. for Fines	σ, psf	σ', psf	r_d	K_σ	NCEER $CRR_{7.5}$	RAUCH $CRR_{7.5}$	CSR M=7.5	Fines Liquefiable (Y/N)	Liquefaction Potential	Factor of Safety	Volumetric Strain, %	Settlement, in.
1	63	35	11.1	30	15	15	80.6	69.0	125	125	1.00	1.00	0.800	0.800	0.294	N	Above GWT	2.721		
2	63	35	11.1	30	15	15	80.6	69.0	250	250	1.00	1.00	0.800	0.800	0.293	N	Above GWT	2.727		
3	63	35	11.1	30	15	15	80.6	69.0	375	375	0.99	1.00	0.800	0.800	0.293	N	Above GWT	2.734		
4	63	35	11.1	30	15	15	80.6	69.0	500	500	0.99	1.00	0.800	0.800	0.292	N	Above GWT	2.740		
5	63	35	11.1	30	15	15	80.6	69.0	625	625	0.99	1.00	0.800	0.800	0.291	N	Above GWT	2.747		
6	63	35	11.1	30	15	15	80.6	69.0	750	750	0.99	1.00	0.800	0.800	0.291	N	Above GWT	2.753		
7	63	35	11.1	30	15	15	80.6	69.0	875	875	0.99	1.00	0.800	0.800	0.290	N	Above GWT	2.759		
8	63	35	11.1	30	15	15	80.6	69.0	1000	1000	0.98	1.00	0.800	0.800	0.289	N	Above GWT	2.766		
9	63	35	11.1	30	15	15	80.6	69.0	1125	1125	0.98	1.00	0.800	0.800	0.289	N	Above GWT	2.772		
10	63	35	11.1	30	15	15	80.6	69.0	1250	1250	0.98	1.00	0.800	0.800	0.288	N	Above GWT	2.778		
11	31	35	10.9	30	15	15	42.2	37.0	1375	1375	0.98	1.00	0.800	0.800	0.287	N	Above GWT	2.784		
12	31	35	10.9	30	15	15	42.2	37.0	1500	1500	0.97	1.00	0.800	0.800	0.287	N	Above GWT	2.790		
13	31	35	10.9	30	15	15	42.2	37.0	1625	1625	0.97	1.00	0.800	0.800	0.286	N	Above GWT	2.796		
14	31	35	10.9	30	15	15	42.2	37.0	1750	1750	0.97	1.00	0.800	0.800	0.286	N	Above GWT	2.802		
15	31	35	10.9	30	15	15	42.2	37.0	1875	1875	0.97	1.00	0.800	0.800	0.285	N	Above GWT	2.808		
16	34	35	10.2	30	15	15	45.8	40.0	2000	2000	0.97	1.00	0.800	0.800	0.284	N	Above GWT	2.814		
17	34	35	10.2	30	15	15	45.8	40.0	2125	2125	0.96	1.00	0.800	0.800	0.284	N	Above GWT	2.821		
18	34	35	10.2	30	15	15	45.8	40.0	2250	2250	0.96	1.00	0.800	0.800	0.283	N	Above GWT	2.828		
19	34	35	10.2	30	15	15	45.8	40.0	2375	2375	0.96	1.00	0.800	0.800	0.282	N	Above GWT	2.835		
20	34	35	10.2	30	15	15	45.8	40.0	2500	2500	0.96	1.00	0.800	0.800	0.281	N	Above GWT	2.842		
21	29	35	10.2	30	15	15	39.8	35.0	2625	2625	0.95	1.00	0.800	0.800	0.281	N	Above GWT	2.850		
22	29	35	10.2	30	15	15	39.8	35.0	2750	2750	0.95	1.00	0.800	0.800	0.280	N	Above GWT	2.859		
23	29	35	10.2	30	15	15	39.8	35.0	2875	2875	0.95	1.00	0.800	0.800	0.279	N	Above GWT	2.868		
24	29	35	10.2	30	15	15	39.8	35.0	3000	3000	0.95	1.00	0.800	0.800	0.278	N	Above GWT	2.877		
25	29	35	10.2	30	15	15	39.8	35.0	3125	3125	0.94	1.00	0.800	0.800	0.277	N	Above GWT	2.888		
26	37	35	17.3	30	15	15	49.4	43.0	3250	3250	0.94	1.00	0.800	0.800	0.276	N	Above GWT	2.899		
27	37	35	17.3	30	15	15	49.4	43.0	3375	3375	0.93	1.00	0.800	0.800	0.275	N	Above GWT	2.911		
28	37	35	17.3	30	15	15	49.4	43.0	3500	3500	0.93	1.00	0.800	0.800	0.274	N	Above GWT	2.925		
29	37	35	17.3	30	15	15	49.4	43.0	3625	3625	0.93	1.00	0.800	0.800	0.272	N	Above GWT	2.939		
30	37	35	17.3	30	15	15	49.4	43.0	3750	3750	0.92	1.00	0.800	0.800	0.271	N	Above GWT	2.955		
31	37	35	17.3	30	15	15	49.4	43.0	3875	3875	0.92	1.00	0.800	0.800	0.269	N	Above GWT	2.972		
32	37	35	17.3	30	15	15	49.4	43.0	4000	4000	0.91	1.00	0.800	0.800	0.268	N	Above GWT	2.990		
33	37	35	17.3	30	15	15	49.4	43.0	4125	4125	0.90	1.00	0.800	0.800	0.266	N	Above GWT	3.010		
34	37	35	17.3	30	15	15	49.4	43.0	4250	4250	0.90	1.00	0.800	0.800	0.264	N	Above GWT	3.031		
35	37	35	17.3	30	15	15	49.4	43.0	4375	4375	0.89	1.00	0.800	0.800	0.262	N	Above GWT	3.054		
36	29	35	51.7	30	15	15	39.8	35.0	4500	4500	0.88	1.00	0.800	0.800	0.260	Y	Above GWT	3.079		
37	29	35	17.3	30	15	15	39.8	35.0	4625	4625	0.88	1.00	0.800	0.800	0.258	N	Above GWT	3.106		
38	29	35	17.3	30	15	15	39.8	35.0	4750	4750	0.87	1.00	0.800	0.800	0.255	N	NL	3.134		
39	29	35	17.3	30	15	15	39.8	35.0	4875	4813	0.86	1.00	0.800	0.800	0.256	N	NL	3.124		
40	29	35	17.3	30	15	15	39.8	35.0	5000	4875	0.85	1.00	0.800	0.800	0.257	N	NL	3.117		
41	42	35	20.1	30	15	15	55.4	48.0	5125	4938	0.84	1.00	0.800	0.800	0.257	N	NL	3.113		
42	42	35	20.1	30	15	15	55.4	48.0	5250	5000	0.83	1.00	0.800	0.800	0.257	N	NL	3.111		
43	42	35	20.1	30	15	15	55.4	48.0	5375	5063	0.82	1.00	0.800	0.800	0.257	N	NL	3.113		
44	42	35	20.1	30	15	15	55.4	48.0	5500	5126	0.81	1.00	0.800	0.800	0.257	N	NL	3.117		
45	42	35	20.1	30	15	15	55.4	48.0	5625	5188	0.80	1.00	0.800	0.800	0.256	N	NL	3.123		
46	42	35	15.7	30	15	15	55.4	48.0	5750	5251	0.79	1.00	0.800	0.800	0.256	N	NL	3.131		
47	42	35	15.7	30	15	15	55.4	48.0	5875	5313	0.78	1.00	0.800	0.800	0.255	N	NL	3.141		
48	42	35	15.7	30	15	15	55.4	48.0	6000	5376	0.77	1.00	0.800	0.800	0.254	N	NL	3.153		
49	42	35	15.7	30	15	15	55.4	48.0	6125	5439	0.76	1.00	0.800	0.800	0.253	N	NL	3.167		
50	42	35	15.7	30	15	15	55.4	48.0	6250	5501	0.75	1.00	0.800	0.800	0.251	N	NL	3.182		
51	42	35	15.7	30	15	15	55.4	48.0	6375	5564	0.74	1.00	0.800	0.800	0.250	N	NL	3.198		

Total Settlement, S_{LIQ} (in.) = 0
Total Liquifiable Layers = 0



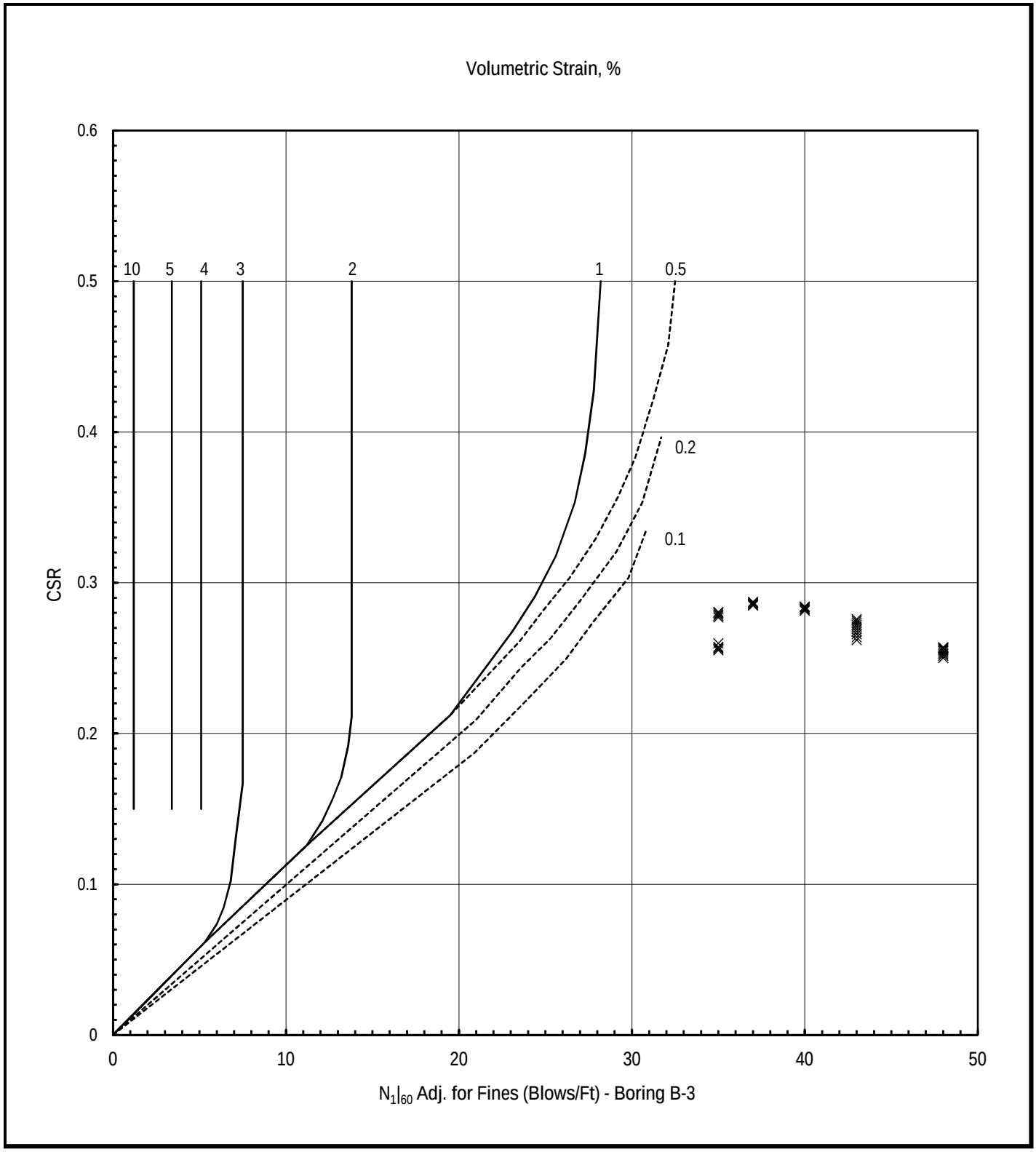
GEOCON
INCORPORATED
GEOTECHNICAL CONSULTANTS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
PHONE 858 558-6900 - FAX 858 558-6159

SW / SW

LIQUEFACTION - FACTOR OF SAFETY

PIRAEUS POINT
ENCINITAS, CALIFORNIA

PROJECT NO. G2307-32-05



GEOCON
INCORPORATED
GEOTECHNICAL CONSULTANTS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
PHONE 858 558-6900 - FAX 858 558-6159

SW / SW

LIQUEFACTION - VOLUMETRIC STRAIN

PIRAEUS POINT
ENCINITAS, CALIFORNIA

PROJECT NO. G2307-32-05

APPENDIX E

APPENDIX E

RECOMMENDED GRADING SPECIFICATIONS

FOR

PIRAEUS POINT
ENCINITAS, CALIFORNIA

PROJECT NO. G2307-32-05

RECOMMENDED GRADING SPECIFICATIONS

1. GENERAL

1.1 These Recommended Grading Specifications shall be used in conjunction with the Geotechnical Report for the project prepared by Geocon. The recommendations contained in the text of the Geotechnical Report are a part of the earthwork and grading specifications and shall supersede the provisions contained hereinafter in the case of conflict.

1.2 Prior to the commencement of grading, a geotechnical consultant (Consultant) shall be employed for the purpose of observing earthwork procedures and testing the fills for substantial conformance with the recommendations of the Geotechnical Report and these specifications. The Consultant should provide adequate testing and observation services so that they may assess whether, in their opinion, the work was performed in substantial conformance with these specifications. It shall be the responsibility of the Contractor to assist the Consultant and keep them apprised of work schedules and changes so that personnel may be scheduled accordingly.

1.3 It shall be the sole responsibility of the Contractor to provide adequate equipment and methods to accomplish the work in accordance with applicable grading codes or agency ordinances, these specifications and the approved grading plans. If, in the opinion of the Consultant, unsatisfactory conditions such as questionable soil materials, poor moisture condition, inadequate compaction, and/or adverse weather result in a quality of work not in conformance with these specifications, the Consultant will be empowered to reject the work and recommend to the Owner that grading be stopped until the unacceptable conditions are corrected.

2. DEFINITIONS

2.1 **Owner** shall refer to the owner of the property or the entity on whose behalf the grading work is being performed and who has contracted with the Contractor to have grading performed.

2.2 **Contractor** shall refer to the Contractor performing the site grading work.

2.3 **Civil Engineer** or **Engineer of Work** shall refer to the California licensed Civil Engineer or consulting firm responsible for preparation of the grading plans, surveying and verifying as-graded topography.

2.4 **Consultant** shall refer to the soil engineering and engineering geology consulting firm retained to provide geotechnical services for the project.

2.5 **Soil Engineer** shall refer to a California licensed Civil Engineer retained by the Owner, who is experienced in the practice of geotechnical engineering. The Soil Engineer shall be responsible for having qualified representatives on-site to observe and test the Contractor's work for conformance with these specifications.

2.6 **Engineering Geologist** shall refer to a California licensed Engineering Geologist retained by the Owner to provide geologic observations and recommendations during the site grading.

2.7 **Geotechnical Report** shall refer to a soil report (including all addenda) which may include a geologic reconnaissance or geologic investigation that was prepared specifically for the development of the project for which these Recommended Grading Specifications are intended to apply.

3. MATERIALS

3.1 Materials for compacted fill shall consist of any soil excavated from the cut areas or imported to the site that, in the opinion of the Consultant, is suitable for use in construction of fills. In general, fill materials can be classified as *soil* fills, *soil-rock* fills or *rock* fills, as defined below.

3.1.1 **Soil fills** are defined as fills containing no rocks or hard lumps greater than 12 inches in maximum dimension and containing at least 40 percent by weight of material smaller than ¾ inch in size.

3.1.2 **Soil-rock fills** are defined as fills containing no rocks or hard lumps larger than 4 feet in maximum dimension and containing a sufficient matrix of soil fill to allow for proper compaction of soil fill around the rock fragments or hard lumps as specified in Paragraph 6.2. **Oversize rock** is defined as material greater than 12 inches.

3.1.3 **Rock fills** are defined as fills containing no rocks or hard lumps larger than 3 feet in maximum dimension and containing little or no fines. Fines are defined as material smaller than ¾ inch in maximum dimension. The quantity of fines shall be less than approximately 20 percent of the rock fill quantity.

3.2 Material of a perishable, spongy, or otherwise unsuitable nature as determined by the Consultant shall not be used in fills.

3.3 Materials used for fill, either imported or on-site, shall not contain hazardous materials as defined by the California Code of Regulations, Title 22, Division 4, Chapter 30, Articles 9

and 10; 40CFR; and any other applicable local, state or federal laws. The Consultant shall not be responsible for the identification or analysis of the potential presence of hazardous materials. However, if observations, odors or soil discoloration cause Consultant to suspect the presence of hazardous materials, the Consultant may request from the Owner the termination of grading operations within the affected area. Prior to resuming grading operations, the Owner shall provide a written report to the Consultant indicating that the suspected materials are not hazardous as defined by applicable laws and regulations.

3.4 The outer 15 feet of *soil-rock* fill slopes, measured horizontally, should be composed of properly compacted *soil* fill materials approved by the Consultant. *Rock* fill may extend to the slope face, provided that the slope is not steeper than 2:1 (horizontal:vertical) and a soil layer no thicker than 12 inches is track-walked onto the face for landscaping purposes. This procedure may be utilized provided it is acceptable to the governing agency, Owner and Consultant.

3.5 Samples of soil materials to be used for fill should be tested in the laboratory by the Consultant to determine the maximum density, optimum moisture content, and, where appropriate, shear strength, expansion, and gradation characteristics of the soil.

3.6 During grading, soil or groundwater conditions other than those identified in the Geotechnical Report may be encountered by the Contractor. The Consultant shall be notified immediately to evaluate the significance of the unanticipated condition.

4. CLEARING AND PREPARING AREAS TO BE FILLED

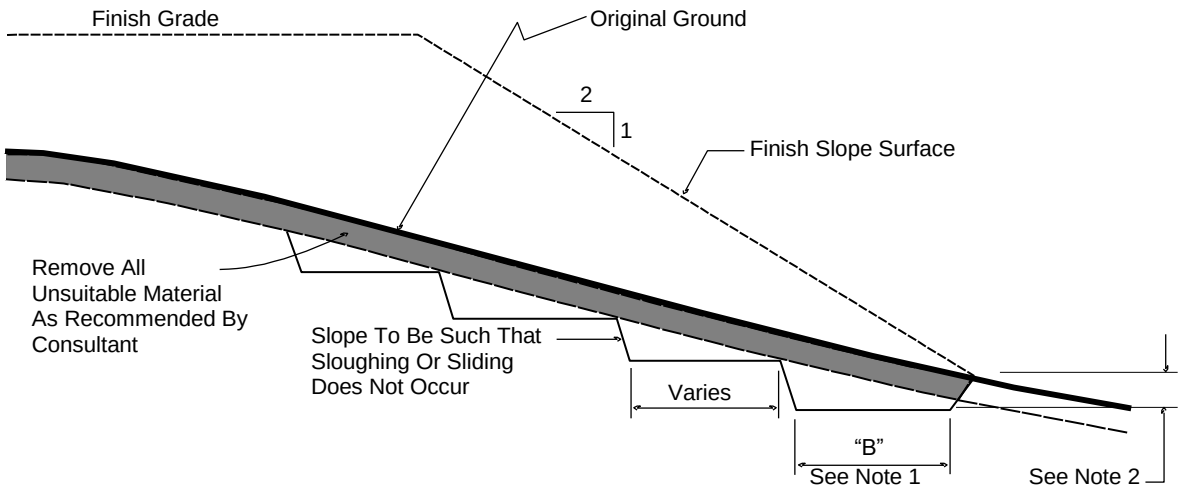
4.1 Areas to be excavated and filled shall be cleared and grubbed. Clearing shall consist of complete removal above the ground surface of trees, stumps, brush, vegetation, man-made structures, and similar debris. Grubbing shall consist of removal of stumps, roots, buried logs and other unsuitable material and shall be performed in areas to be graded. Roots and other projections exceeding 1½ inches in diameter shall be removed to a depth of 3 feet below the surface of the ground. Borrow areas shall be grubbed to the extent necessary to provide suitable fill materials.

4.2 Asphalt pavement material removed during clearing operations should be properly disposed at an approved off-site facility or in an acceptable area of the project evaluated by Geocon and the property owner. Concrete fragments that are free of reinforcing steel may be placed in fills, provided they are placed in accordance with Section 6.2 or 6.3 of this document.

4.3 After clearing and grubbing of organic matter and other unsuitable material, loose or porous soils shall be removed to the depth recommended in the Geotechnical Report. The depth of removal and compaction should be observed and approved by a representative of the Consultant. The exposed surface shall then be plowed or scarified to a minimum depth of 6 inches and until the surface is free from uneven features that would tend to prevent uniform compaction by the equipment to be used.

4.4 Where the slope ratio of the original ground is steeper than 5:1 (horizontal:vertical), or where recommended by the Consultant, the original ground should be benched in accordance with the following illustration.

TYPICAL BENCHING DETAIL



No Scale

DETAIL NOTES:

(1) Key width "B" should be a minimum of 10 feet, or sufficiently wide to permit complete coverage with the compaction equipment used. The base of the key should be graded horizontal, or inclined slightly into the natural slope.

(2) The outside of the key should be below the topsoil or unsuitable surficial material and at least 2 feet into dense formational material. Where hard rock is exposed in the bottom of the key, the depth and configuration of the key may be modified as approved by the Consultant.

4.5 After areas to receive fill have been cleared and scarified, the surface should be moisture conditioned to achieve the proper moisture content, and compacted as recommended in Section 6 of these specifications.

5. COMPACTION EQUIPMENT

5.1 Compaction of *soil* or *soil-rock* fill shall be accomplished by sheepsfoot or segmented-steel wheeled rollers, vibratory rollers, multiple-wheel pneumatic-tired rollers, or other types of acceptable compaction equipment. Equipment shall be of such a design that it will be capable of compacting the *soil* or *soil-rock* fill to the specified relative compaction at the specified moisture content.

5.2 Compaction of *rock* fills shall be performed in accordance with Section 6.3.

6. PLACING, SPREADING AND COMPACTION OF FILL MATERIAL

6.1 *Soil* fill, as defined in Paragraph 3.1.1, shall be placed by the Contractor in accordance with the following recommendations:

6.1.1 *Soil* fill shall be placed by the Contractor in layers that, when compacted, should generally not exceed 8 inches. Each layer shall be spread evenly and shall be thoroughly mixed during spreading to obtain uniformity of material and moisture in each layer. The entire fill shall be constructed as a unit in nearly level lifts. Rock materials greater than 12 inches in maximum dimension shall be placed in accordance with Section 6.2 or 6.3 of these specifications.

6.1.2 In general, the *soil* fill shall be compacted at a moisture content at or above the optimum moisture content as determined by ASTM D 1557.

6.1.3 When the moisture content of *soil* fill is below that specified by the Consultant, water shall be added by the Contractor until the moisture content is in the range specified.

6.1.4 When the moisture content of the *soil* fill is above the range specified by the Consultant or too wet to achieve proper compaction, the *soil* fill shall be aerated by the Contractor by blading/mixing, or other satisfactory methods until the moisture content is within the range specified.

6.1.5 After each layer has been placed, mixed, and spread evenly, it shall be thoroughly compacted by the Contractor to a relative compaction of at least 90 percent. Relative compaction is defined as the ratio (expressed in percent) of the in-place dry density of the compacted fill to the maximum laboratory dry density as determined in accordance with ASTM D 1557. Compaction shall be continuous over the entire area, and compaction equipment shall make sufficient passes so that the specified minimum relative compaction has been achieved throughout the entire fill.

6.1.6 Where practical, soils having an Expansion Index greater than 50 should be placed at least 3 feet below finish pad grade and should be compacted at a moisture content generally 2 to 4 percent greater than the optimum moisture content for the material.

6.1.7 Properly compacted *soil* fill shall extend to the design surface of fill slopes. To achieve proper compaction, it is recommended that fill slopes be over-built by at least 3 feet and then cut to the design grade. This procedure is considered preferable to track-walking of slopes, as described in the following paragraph.

6.1.8 As an alternative to over-building of slopes, slope faces may be back-rolled with a heavy-duty loaded sheepsfoot or vibratory roller at maximum 4-foot fill height intervals. Upon completion, slopes should then be track-walked with a D-8 dozer or similar equipment, such that a dozer track covers all slope surfaces at least twice.

6.2 *Soil-rock* fill, as defined in Paragraph 3.1.2, shall be placed by the Contractor in accordance with the following recommendations:

6.2.1 Rocks larger than 12 inches but less than 4 feet in maximum dimension may be incorporated into the compacted *soil* fill, but shall be limited to the area measured 15 feet minimum horizontally from the slope face and 5 feet below finish grade or 3 feet below the deepest utility, whichever is deeper.

6.2.2 Rocks or rock fragments up to 4 feet in maximum dimension may either be individually placed or placed in windrows. Under certain conditions, rocks or rock fragments up to 10 feet in maximum dimension may be placed using similar methods. The acceptability of placing rock materials greater than 4 feet in maximum dimension shall be evaluated during grading as specific cases arise and shall be approved by the Consultant prior to placement.

6.2.3 For individual placement, sufficient space shall be provided between rocks to allow for passage of compaction equipment.

6.2.4 For windrow placement, the rocks should be placed in trenches excavated in properly compacted *soil* fill. Trenches should be approximately 5 feet wide and 4 feet deep in maximum dimension. The voids around and beneath rocks should be filled with approved granular soil having a Sand Equivalent of 30 or greater and should be compacted by flooding. Windrows may also be placed utilizing an "open-face" method in lieu of the trench procedure, however, this method should first be approved by the Consultant.

6.2.5 Windrows should generally be parallel to each other and may be placed either parallel to or perpendicular to the face of the slope depending on the site geometry. The minimum horizontal spacing for windrows shall be 12 feet center-to-center with a 5-foot stagger or offset from lower courses to next overlying course. The minimum vertical spacing between windrow courses shall be 2 feet from the top of a lower windrow to the bottom of the next higher windrow.

6.2.6 Rock placement, fill placement and flooding of approved granular soil in the windrows should be continuously observed by the Consultant.

6.3 *Rock* fills, as defined in Section 3.1.3, shall be placed by the Contractor in accordance with the following recommendations:

6.3.1 The base of the *rock* fill shall be placed on a sloping surface (minimum slope of 2 percent). The surface shall slope toward suitable subdrainage outlet facilities. The *rock* fills shall be provided with subdrains during construction so that a hydrostatic pressure buildup does not develop. The subdrains shall be permanently connected to controlled drainage facilities to control post-construction infiltration of water.

6.3.2 *Rock* fills shall be placed in lifts not exceeding 3 feet. Placement shall be by rock trucks traversing previously placed lifts and dumping at the edge of the currently placed lift. Spreading of the *rock* fill shall be by dozer to facilitate *seating* of the rock. The *rock* fill shall be watered heavily during placement. Watering shall consist of water trucks traversing in front of the current rock lift face and spraying water continuously during rock placement. Compaction equipment with compactive energy comparable to or greater than that of a 20-ton steel vibratory roller or other compaction equipment providing suitable energy to achieve the required compaction or deflection as recommended in Paragraph 6.3.3 shall be utilized. The number of passes to be made should be determined as described in Paragraph 6.3.3. Once a *rock* fill lift has been covered with *soil* fill, no additional *rock* fill lifts will be permitted over the *soil* fill.

6.3.3 Plate bearing tests, in accordance with ASTM D 1196, may be performed in both the compacted *soil* fill and in the *rock* fill to aid in determining the required minimum number of passes of the compaction equipment. If performed, a minimum of three plate bearing tests should be performed in the properly compacted *soil* fill (minimum relative compaction of 90 percent). Plate bearing tests shall then be performed on areas of *rock* fill having two passes, four passes and six passes of the compaction equipment, respectively. The number of passes required for the *rock* fill shall be determined by comparing the results of the plate bearing tests for the *soil* fill and the *rock* fill and by evaluating the deflection

variation with number of passes. The required number of passes of the compaction equipment will be performed as necessary until the plate bearing deflections are equal to or less than that determined for the properly compacted *soil* fill. In no case will the required number of passes be less than two.

6.3.4 A representative of the Consultant should be present during *rock* fill operations to observe that the minimum number of "passes" have been obtained, that water is being properly applied and that specified procedures are being followed. The actual number of plate bearing tests will be determined by the Consultant during grading.

6.3.5 Test pits shall be excavated by the Contractor so that the Consultant can state that, in their opinion, sufficient water is present and that voids between large rocks are properly filled with smaller rock material. In-place density testing will not be required in the *rock* fills.

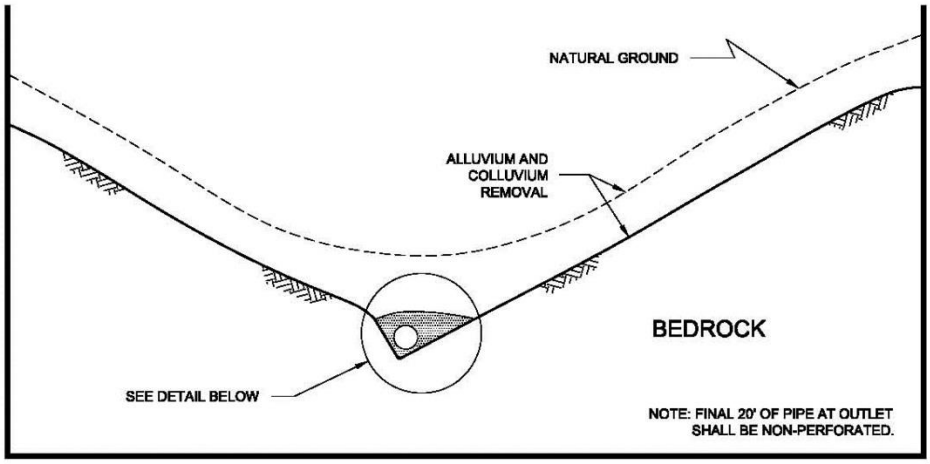
6.3.6 To reduce the potential for "piping" of fines into the *rock* fill from overlying *soil* fill material, a 2-foot layer of graded filter material shall be placed above the uppermost lift of *rock* fill. The need to place graded filter material below the *rock* should be determined by the Consultant prior to commencing grading. The gradation of the graded filter material will be determined at the time the *rock* fill is being excavated. Materials typical of the *rock* fill should be submitted to the Consultant in a timely manner, to allow design of the graded filter prior to the commencement of *rock* fill placement.

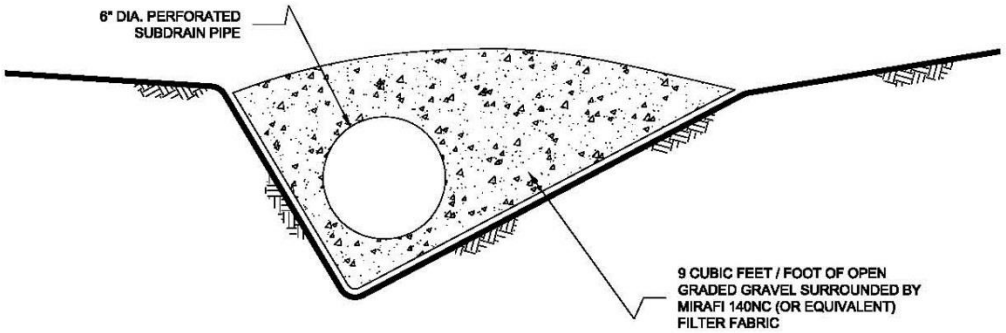
6.3.7 *Rock* fill placement should be continuously observed during placement by the Consultant.

7. SUBDRAINS

7.1 The geologic units on the site may have permeability characteristics and/or fracture systems that could be susceptible under certain conditions to seepage. The use of canyon subdrains may be necessary to mitigate the potential for adverse impacts associated with seepage conditions. Canyon subdrains with lengths in excess of 500 feet or extensions of existing offsite subdrains should use 8-inch-diameter pipes. Canyon subdrains less than 500 feet in length should use 6-inch-diameter pipes.

TYPICAL CANYON DRAIN DETAIL





NOTES:

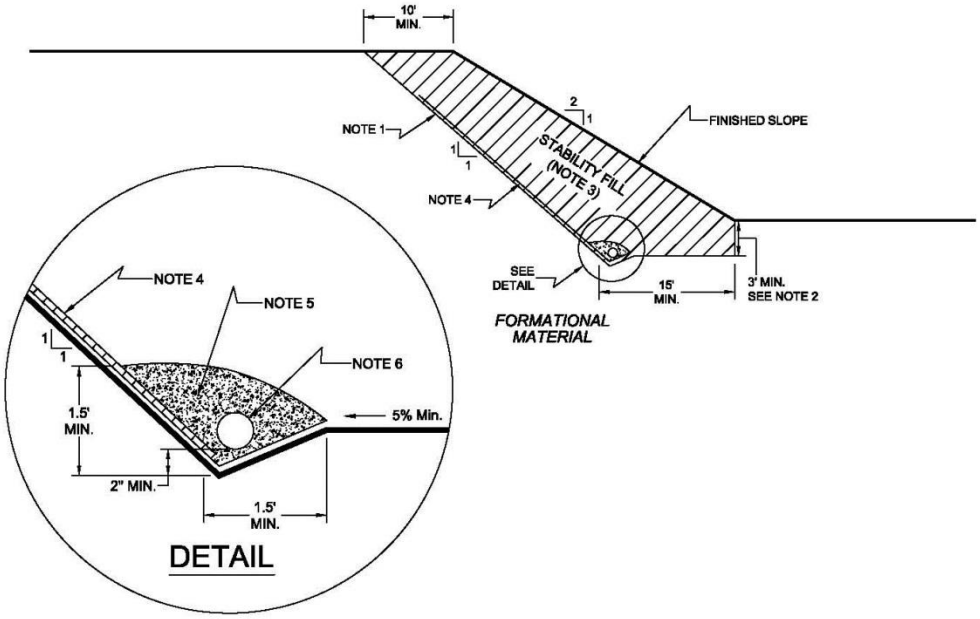
1.....6-INCH DIAMETER, SCHEDULE 80 PVC PERFORATED PIPE FOR FILLS
IN EXCESS OF 100-FEET IN DEPTH OR A PIPE LENGTH OF LONGER THAN 500 FEET.

2.....6-INCH DIAMETER, SCHEDULE 40 PVC PERFORATED PIPE FOR FILLS
LESS THAN 100-FEET IN DEPTH OR A PIPE LENGTH SHORTER THAN 500 FEET.

NO SCALE

7.2 Slope drains within stability fill keyways should use 4-inch-diameter (or lager) pipes.

TYPICAL STABILITY FILL DETAIL



NOTES:

1.....EXCAVATE BACKCUT AT 1:1 INCLINATION (UNLESS OTHERWISE NOTED).

2.....BASE OF STABILITY FILL TO BE 3 FEET INTO FORMATIONAL MATERIAL, SLOPING A MINIMUM 5% INTO SLOPE.

3.....STABILITY FILL TO BE COMPOSED OF PROPERLY COMPACTED GRANULAR SOIL.

4.....CHIMNEY DRAINS TO BE APPROVED PREFABRICATED CHIMNEY DRAIN PANELS (MIRADRAIN G200N OR EQUIVALENT) SPACED APPROXIMATELY 20 FEET CENTER TO CENTER AND 4 FEET WIDE. CLOSER SPACING MAY BE REQUIRED IF SEEPAGE IS ENCOUNTERED.

5.....FILTER MATERIAL TO BE 3/4-INCH, OPEN-GRADED CRUSHED ROCK ENCLOSED IN APPROVED FILTER FABRIC (MIRAFI 140NC).

6.....COLLECTOR PIPE TO BE 4-INCH MINIMUM DIAMETER, PERFORATED, THICK-WALLED PVC SCHEDULE 40 OR EQUIVALENT, AND SLOPED TO DRAIN AT 1 PERCENT MINIMUM TO APPROVED OUTLET.

NO SCALE

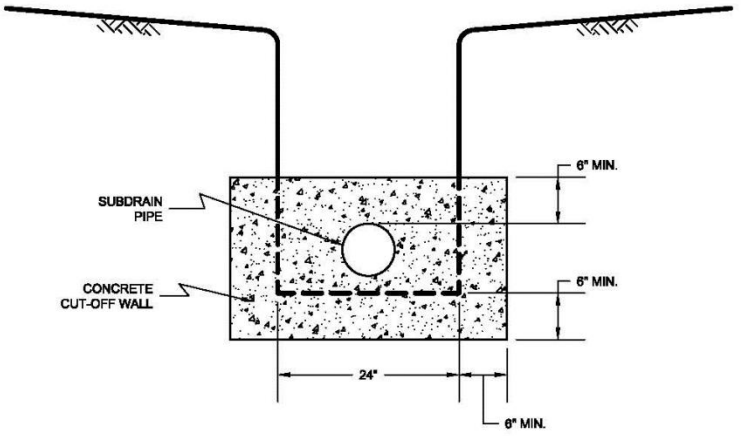
7.3 The actual subdrain locations will be evaluated in the field during the remedial grading operations. Additional drains may be necessary depending on the conditions observed and the requirements of the local regulatory agencies. Appropriate subdrain outlets should be evaluated prior to finalizing 40-scale grading plans.

7.4 *Rock* fill or *soil-rock* fill areas may require subdrains along their down-slope perimeters to mitigate the potential for buildup of water from construction or landscape irrigation. The subdrains should be at least 6-inch-diameter pipes encapsulated in gravel and filter fabric. *Rock* fill drains should be constructed using the same requirements as canyon subdrains.

7.5 Prior to outletting, the final 20-foot segment of a subdrain that will not be extended during future development should consist of non-perforated drainpipe. At the non-perforated/ perforated interface, a seepage cutoff wall should be constructed on the downslope side of the pipe.

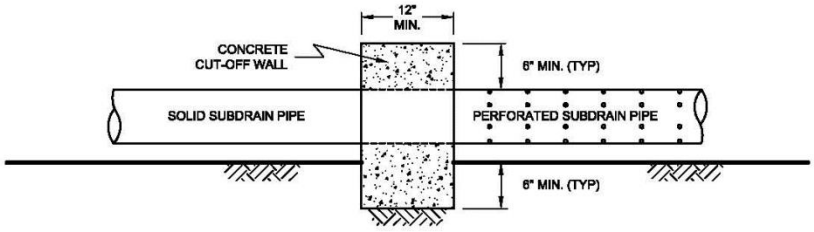
TYPICAL CUT OFF WALL DETAIL

FRONT VIEW



NO SCALE

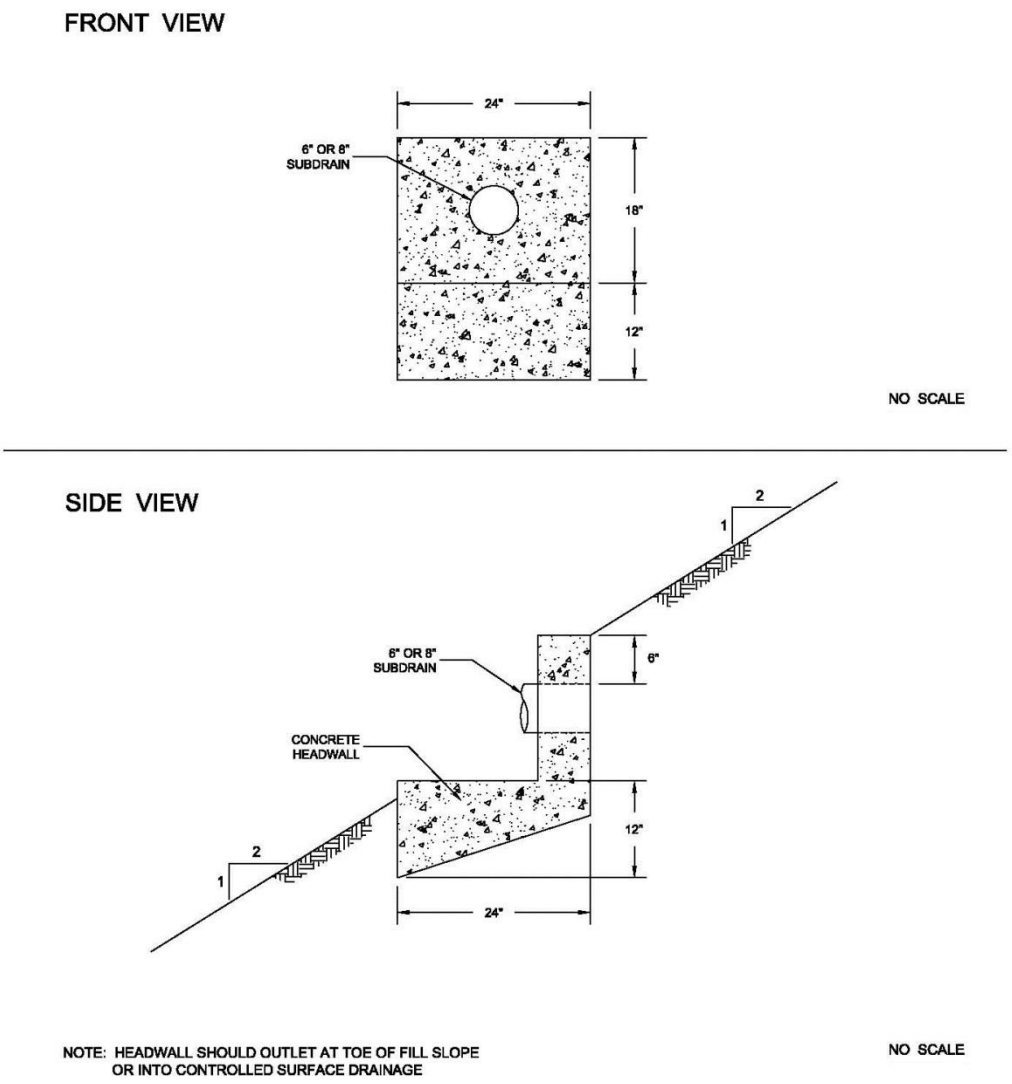
SIDE VIEW



NO SCALE

7.6 Subdrains that discharge into a natural drainage course or open space area should be provided with a permanent headwall structure.

TYPICAL HEADWALL DETAIL



7.7 The final grading plans should show the location of the proposed subdrains. After completion of remedial excavations and subdrain installation, the project civil engineer should survey the drain locations and prepare an "as-built" map showing the drain locations. The final outlet and connection locations should be determined during grading operations. Subdrains that will be extended on adjacent projects after grading can be placed on formational material and a vertical riser should be placed at the end of the subdrain. The grading contractor should consider videoing the subdrains shortly after burial to check proper installation and functionality. The contractor is responsible for the performance of the drains.

8. OBSERVATION AND TESTING

8.1 The Consultant shall be the Owner's representative to observe and perform tests during clearing, grubbing, filling, and compaction operations. In general, no more than 2 feet in vertical elevation of *soil* or *soil-rock* fill should be placed without at least one field density test being performed within that interval. In addition, a minimum of one field density test should be performed for every 2,000 cubic yards of *soil* or *soil-rock* fill placed and compacted.

8.2 The Consultant should perform a sufficient distribution of field density tests of the compacted *soil* or *soil-rock* fill to provide a basis for expressing an opinion whether the fill material is compacted as specified. Density tests shall be performed in the compacted materials below any disturbed surface. When these tests indicate that the density of any layer of fill or portion thereof is below that specified, the particular layer or areas represented by the test shall be reworked until the specified density has been achieved.

8.3 During placement of *rock* fill, the Consultant should observe that the minimum number of passes have been obtained per the criteria discussed in Section 6.3.3. The Consultant should request the excavation of observation pits and may perform plate bearing tests on the placed *rock* fills. The observation pits will be excavated to provide a basis for expressing an opinion as to whether the *rock* fill is properly seated and sufficient moisture has been applied to the material. When observations indicate that a layer of *rock* fill or any portion thereof is below that specified, the affected layer or area shall be reworked until the *rock* fill has been adequately seated and sufficient moisture applied.

8.4 A settlement monitoring program designed by the Consultant may be conducted in areas of *rock* fill placement. The specific design of the monitoring program shall be as recommended in the Conclusions and Recommendations section of the project Geotechnical Report or in the final report of testing and observation services performed during grading.

8.5 We should observe the placement of subdrains, to check that the drainage devices have been placed and constructed in substantial conformance with project specifications.

8.6 Testing procedures shall conform to the following Standards as appropriate:

8.6.1 Soil and Soil-Rock Fills:

8.6.1.1 Field Density Test, ASTM D 1556, *Density of Soil In-Place By the Sand-Cone Method.*

8.6.1.2 Field Density Test, Nuclear Method, ASTM D 6938, *Density of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth).*

8.6.1.3 Laboratory Compaction Test, ASTM D 1557, *Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-Pound Hammer and 18-Inch Drop*.

8.6.1.4. Expansion Index Test, ASTM D 4829, *Expansion Index Test*.

9. PROTECTION OF WORK

9.1 During construction, the Contractor shall properly grade all excavated surfaces to provide positive drainage and prevent ponding of water. Drainage of surface water shall be controlled to avoid damage to adjoining properties or to finished work on the site. The Contractor shall take remedial measures to prevent erosion of freshly graded areas until such time as permanent drainage and erosion control features have been installed. Areas subjected to erosion or sedimentation shall be properly prepared in accordance with the Specifications prior to placing additional fill or structures.

9.2 After completion of grading as observed and tested by the Consultant, no further excavation or filling shall be conducted except in conjunction with the services of the Consultant.

10. CERTIFICATIONS AND FINAL REPORTS

10.1 Upon completion of the work, Contractor shall furnish Owner a certification by the Civil Engineer stating that the lots and/or building pads are graded to within 0.1 foot vertically of elevations shown on the grading plan and that all tops and toes of slopes are within 0.5 foot horizontally of the positions shown on the grading plans. After installation of a section of subdrain, the project Civil Engineer should survey its location and prepare an *as-built* plan of the subdrain location. The project Civil Engineer should verify the proper outlet for the subdrains and the Contractor should ensure that the drain system is free of obstructions.

10.2 The Owner is responsible for furnishing a final as-graded soil and geologic report satisfactory to the appropriate governing or accepting agencies. The as-graded report should be prepared and signed by a California licensed Civil Engineer experienced in geotechnical engineering and by a California Certified Engineering Geologist, indicating that the geotechnical aspects of the grading were performed in substantial conformance with the Specifications or approved changes to the Specifications.

LIST OF REFERENCES

1. *2019 California Building Code, California Code of Regulations, Title 24, Part 2, based on the 2018 International Building Code*, prepared by California Building Standards Commission, dated July 2016.

2. *ACI 318-14, Building Code Requirements for Structural Concrete* and *Commentary on Building Code Requirements for Structural Concrete*, prepared by the American Concrete Institute, dated September, 2014.

3. *ACI 330-08, Guide for the Design and Construction of Concrete Parking Lots*, prepared by the American Concrete Institute, dated June, 2008.

4. *ASCE 7-16, Minimum Design Loads and Associated Criteria for Buildings and Other Structures, dated 2017.*

5. California Department of Conservation, Division of Mines and Geology, Probabilistic Seismic Hazard Assessment for the State of California, Open File Report 96-08, 1996.

6. County of San Diego, *San Diego County Multi Jurisdiction Hazard Mitigation Plan, San Diego, California, dated October 2017.*

7. Risk Engineering, *EZ-FRISK*, 2016.

8. Structural Engineers Association of California (SEAOC) and Office of Statewide Health Planning and Development (OSHPD), *Seismic Design Maps*, https://seismicmaps.org/, accessed January 11, 2019.

9. United States Geological Survey, *2002 Interactive Deaggregations*, http://eqint.cr.usgs.gov/deaggint/2002/index.php.

10. United States Department of Agriculture, *1953 Stereoscopic Aerial Photographs, Flight AXN-8M,* Photos Nos. 74 and 75 (scale 1:20,000).