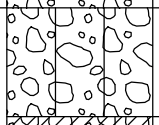
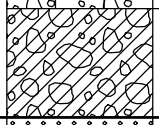
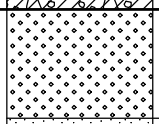
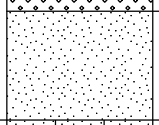
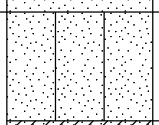
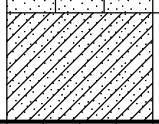
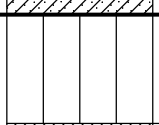
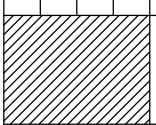
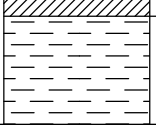
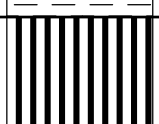
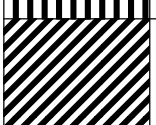
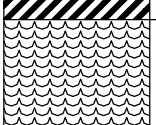
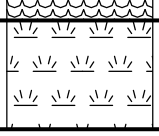
SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-1

JOB NO.: 17G199
PROJECT: Rider 2
LOCATION: Perris, California

DRILLING DATE: 11/3/17
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jason Hiskey

WATER DEPTH: 33 feet
CAVE DEPTH: 33 feet
READING TAKEN: At Completion

SURFACE ELEVATION: 1443.5 feet MSL

DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					ALLUVIUM: Light Brown Silty fine Sand, trace Clay, trace fine root fibers, dense-damp to moist							
		40					8					
		32	2.5		Gray Brown Clayey Silt, trace fine Sand, trace calcareous veining, slightly porous, hard-moist to very moist		19					
5												
		17			Gray Brown fine Sandy Silt, trace Clay, some calcareous nodules and veining, medium dense-moist		14					
		21	2.5		Gray Brown Clayey Silt to Silty Clay, trace fine Sand, abundant calcareous nodules and veining, very stiff-very moist		25					
10												
		19	4.0				17					
15												
		28			Brown Clayey fine Sand, little medium Sand, trace calcareous nodules, medium dense-damp to moist		15					
20												
		60					8					
25												
		32					15					
30												
		36			@ 33 feet, Water encountered during drilling		12					

TBL 17G199.GPJ SOCALGEO.GDT 11/22/17

TEST BORING LOG

PLATE B-1a

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-1

JOB NO.: 17G199
PROJECT: Rider 2
LOCATION: Perris, California

DRILLING DATE: 11/3/17
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jason Hiskey

WATER DEPTH: 33 feet
CAVE DEPTH: 33 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION (Continued)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					Brown Clayey fine Sand, little medium Sand, trace calcareous nodules, medium dense-damp to moist							
					Brown Clayey Silt to Silty Clay, some fine Sand, very stiff-very moist							
		19	3.0				15			57		
40												
					Gray Brown Silty fine Sand, trace medium Sand, medium dense-wet							
		25					16			38		
45												
					Brown Silty fine to medium Sand, dense-wet							
		43					16					
50												
					Boring Terminated at 50'							

TBL 17G199.GPJ SOCALGEO.GDT 11/22/17

TEST BORING LOG

PLATE B-1b

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-2

JOB NO.: 17G199
PROJECT: Rider 2
LOCATION: Perris, California

DRILLING DATE: 11/2/17
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jason Hiskey

WATER DEPTH: Dry
CAVE DEPTH: 8 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 1443 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
		7			ALLUVIUM: Light Brown Silty fine Sand, trace Clay, trace fine root fibers, loose-damp		5					
		16	3.5		Light Gray Clayey Silt, trace fine Sand, slightly porous, some calcareous veining and nodules, stiff to very stiff-moist to very moist		19					
5		13	1.0				16					
		10	1.0		Dark Gray Brown Clayey Silt, stiff-moist		13					
10												
		28			Brown fine Sandy Clay, very stiff-moist		13					
15												
		37			Brown fine Sandy Silt, dense-damp to moist		13					
20					Boring Terminated at 20'							

TBL 17G199.GPJ SOCALGEO.GDT 11/22/17

TEST BORING LOG

PLATE B-2

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-3

JOB NO.: 17G199
PROJECT: Rider 2
LOCATION: Perris, California

DRILLING DATE: 11/2/17
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jason Hiskey

WATER DEPTH: Dry
CAVE DEPTH: 12 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 1442 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
		36	4.5+		ALLUVIUM: Light Gray Brown Clayey Silt, trace fine root fibers, very stiff-damp to moist	108	9					EI = 68 @ 0 to 5'
		34	2.5		Dark Gray Silty fine Sand, medium dense-damp to moist	89	11					
5		38	4.5+		Light Gray Silty Clay, abundant calcareous veining and nodules, hard-moist	109	15					
		26	4.5+		Brown fine Sandy Clay, very stiff to hard-moist	110	15					
		30	4.5+			120	12					
10												
		38			Brown fine Sandy Silt, medium dense-damp to moist		13					
15												
		29			Brown Silty fine Sand, trace Clay nodules, medium dense-damp to moist		13					
20												
		46			Brown fine Sandy Silt, some Clay, dense-moist		13					
25					Boring Terminated at 25'							

TBL 17G199.GPJ SOCALGEO.GDT 11/22/17

TEST BORING LOG

PLATE B-3

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-4

JOB NO.: 17G199
PROJECT: Rider 2
LOCATION: Perris, California

DRILLING DATE: 11/2/17
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jason Hiskey

WATER DEPTH: Dry
CAVE DEPTH: 8 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 1442.5 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
		34			ALLUVIUM: Light Brown Clayey Silt, trace fine Sand, trace fine root fibers, very stiff-damp	82	7					
		26	3.0		Gray Brown Clayey Silt to Silty Clay, abundant calcareous veining and nodules, very stiff-very moist	80	22					
5		26					23					Disturbed sample
		15	3.0			84	25					
		34			Gray Brown Clayey fine Sand, abundant calcareous nodules, porous, medium dense-damp	115	7					
10												
		25	2.0		Brown fine Sandy Clay, calcareous nodules, very stiff-damp		10					
15					Boring Terminated at 15'							

TBL 17G199.GPJ SOCALGEO.GDT 11/22/17

TEST BORING LOG

PLATE B-4

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-5

JOB NO.: 17G199
PROJECT: Rider 2
LOCATION: Perris, California

DRILLING DATE: 11/3/17
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jason Hiskey

WATER DEPTH: Dry
CAVE DEPTH: 8 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 1442 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
		24			ALLUVIUM: Brown fine Sandy Silt, trace Clay, trace calcareous veining and nodules, medium dense-damp	100	9					
		44				103	6					
5		35	4.5+		Light Brown Silty Clay to Clayey Silt, trace fine Sand, abundant calcareous veining and nodules, very stiff-damp to moist	108	12					
		31	1.5		@ 7 to 8 feet, very moist	85	26					
		35	4.5+			110	18					
10												
					Light Brown Clayey fine Sand, trace medium Sand, medium dense-moist							
		20					13					
15					Boring Terminated at 15'							

TBL 17G199.GPJ SOCALGEO.GDT 11/22/17

TEST BORING LOG

PLATE B-5

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-6

JOB NO.: 17G199
PROJECT: Rider 2
LOCATION: Perris, California

DRILLING DATE: 11/2/17
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jason Hiskey

WATER DEPTH: Dry
CAVE DEPTH: 15 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 1443 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
		41	4.0		ALLUIVUM: Light Gray Clayey Silt, slightly porous, abundant calcareous veining and nodules, very stiff-damp	88	8					EI = 34 @ 0 to 5'
		36	4.5+			104	9					
5		67			Gray Brown Silty fine Sand, dense-damp	113	5					
		36	3.5		Light Brown Clayey Silt, abundant calcareous nodules, very stiff-moist	102	14					
10		26	3.0			99	17					
		15			Brown Silty fine Sand, medium dense-damp to moist		7					
15												
		29			Light Brown fine to medium Sand, trace Silt, some coarse Sand, medium dense-damp		4					
20												
		35			Brown Clayey fine Sand, dense-moist		12					
25					Boring Terminated at 25'							

TBL 17G199.GPJ SOCALGEO.GDT 11/22/17

TEST BORING LOG

PLATE B-6

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-7

JOB NO.: 17G199
PROJECT: Rider 2
LOCATION: Perris, California

DRILLING DATE: 11/2/17
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jason Hiskey

WATER DEPTH: Dry
CAVE DEPTH: 12 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 1442 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
		20			ALLUVIUM: Light Gray Brown Clayey Silt, trace fine Sand, trace to some calcareous nodules, very stiff-very moist		24					
		22					21					
5		27			Light Brown Silty fine Sand, trace Clay, some calcareous nodules, medium dense-damp to moist		8					
		31	4.0		Gray Brown Silty Clay, abundant calcareous nodules and veining, hard-moist		14					
10												
		13			Brown Clayey fine Sand, medium dense-moist		14					
15												
		42	4.5+		Light Brown fine Sandy Clay, hard-moist		14					
20					Boring Terminated at 20'							

TBL 17G199.GPJ SOCALGEO.GDT 11/22/17

TEST BORING LOG

PLATE B-7

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-8

JOB NO.: 17G199
PROJECT: Rider 2
LOCATION: Perris, California

DRILLING DATE: 11/2/17
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jason Hiskey

WATER DEPTH: 33 feet
CAVE DEPTH: 33 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 1441.5 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
		17	4.5+		ALLUVIUM: Light Gray Brown Clayey Silt, trace fine root fibers, slightly porous, very stiff-damp		9					
		12	2.0		Light Gray Clayey Silt to Silty Clay, abundant calcareous nodules and veining, stiff to very stiff-moist		17					
5		16	3.5				13					
		22	3.5		Brown fine Sandy Clay, very stiff-moist		14					
10												
		41	2.0		Brown Silty fine to medium Sand, dense-damp to moist		7					
15												
		25			Brown Silty fine Sand, medium dense-damp to moist		11					
20												
		39			Brown fine Sandy Silt, trace Clay, dense-moist		15					
25												
		39			Brown Silty fine Sand, dense-moist		13					
30												
		10			@ 33 to 35', loose to medium dense-wet @ 33 feet, Water encountered during drilling		18			44		

TBL 17G199.GPJ SOCALGEO.GDT 11/22/17

TEST BORING LOG

PLATE B-8a

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-8

JOB NO.: 17G199
PROJECT: Rider 2
LOCATION: Perris, California

DRILLING DATE: 11/2/17
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jason Hiskey

WATER DEPTH: 33 feet
CAVE DEPTH: 33 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION (Continued)	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
					Brown Silty fine Sand, dense-moist							
					Brown fine to medium Sandy Clay, hard-very moist							
		49					14					
40												
					Gray Brown Clayey Silt, trace fine Sand, hard-very moist							
		52	4.0				18					
45												
					Brown fine Sandy Silt, dense-wet							
		37					23					
50												
					Boring Terminated at 50'							

TBL 17G199.GPJ SOCALGEO.GDT 11/22/17

TEST BORING LOG

PLATE B-8b

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-9

JOB NO.: 17G199
PROJECT: Rider 2
LOCATION: Perris, California

DRILLING DATE: 11/3/17
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jason Hiskey

WATER DEPTH: Dry
CAVE DEPTH: 3 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 1444 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
		6			ALLUVIUM: Light Brown fine Sandy Silt, trace Clay, fine root fibers, loose-moist		13					
		10	2.5		Light Brown Clayey Silt, some calcareous nodules, stiff-very moist		19					
5					Boring Terminated at 5'							

TBL 17G199.GPJ SOCALGEO.GDT 11/22/17

TEST BORING LOG

PLATE B-9

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-10

JOB NO.: 17G199
PROJECT: Rider 2
LOCATION: Perris, California

DRILLING DATE: 11/3/17
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jason Hiskey

WATER DEPTH: Dry
CAVE DEPTH: 3.5 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 1443 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
		23			ALLUVIUM: Light Brown fine Sandy Silt, trace Clay, some calcareous nodules, medium dense-moist		13					
		14			Light Brown Clayey Silt, calcareous nodules and veining, stiff-very moist		23					
5					Boring Terminated at 5'							

TBL 17G199.GPJ SOCALGEO.GDT 11/22/17

TEST BORING LOG

PLATE B-10

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-11

JOB NO.: 17G199 | DRILLING DATE: 11/2/17 | WATER DEPTH: Dry
PROJECT: Rider 2 | DRILLING METHOD: Hollow Stem Auger | CAVE DEPTH: 3.5 feet
LOCATION: Perris, California | LOGGED BY: Jason Hiskey | READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 1442 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
		18			ALLUVIUM: Gray Brown Clayey Silt, trace to little calcareous nodules and veining, very stiff-very moist		24					
		22					25					
5					Boring Terminated at 5'							

TBL 17G199.GPJ SOCALGEO.GDT 11/22/17

TEST BORING LOG **PLATE B-11**

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. B-12

JOB NO.: 17G199
PROJECT: Rider 2
LOCATION: Perris, California

DRILLING DATE: 11/2/17
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Jason Hiskey

WATER DEPTH: Dry
CAVE DEPTH: 3.5 feet
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: 1442 feet MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	UNCONFINED SHEAR (TSF)	COMMENTS
		20			ALLUVIUM: Light Brown fine Sandy Silt, trace Clay, trace fine root fibers, medium dense-damp		6					
		27			Gray Brown Clayey Silt to Silty Clay, abundant calcareous nodules, very stiff-moist		16					
5					Boring Terminated at 5'							

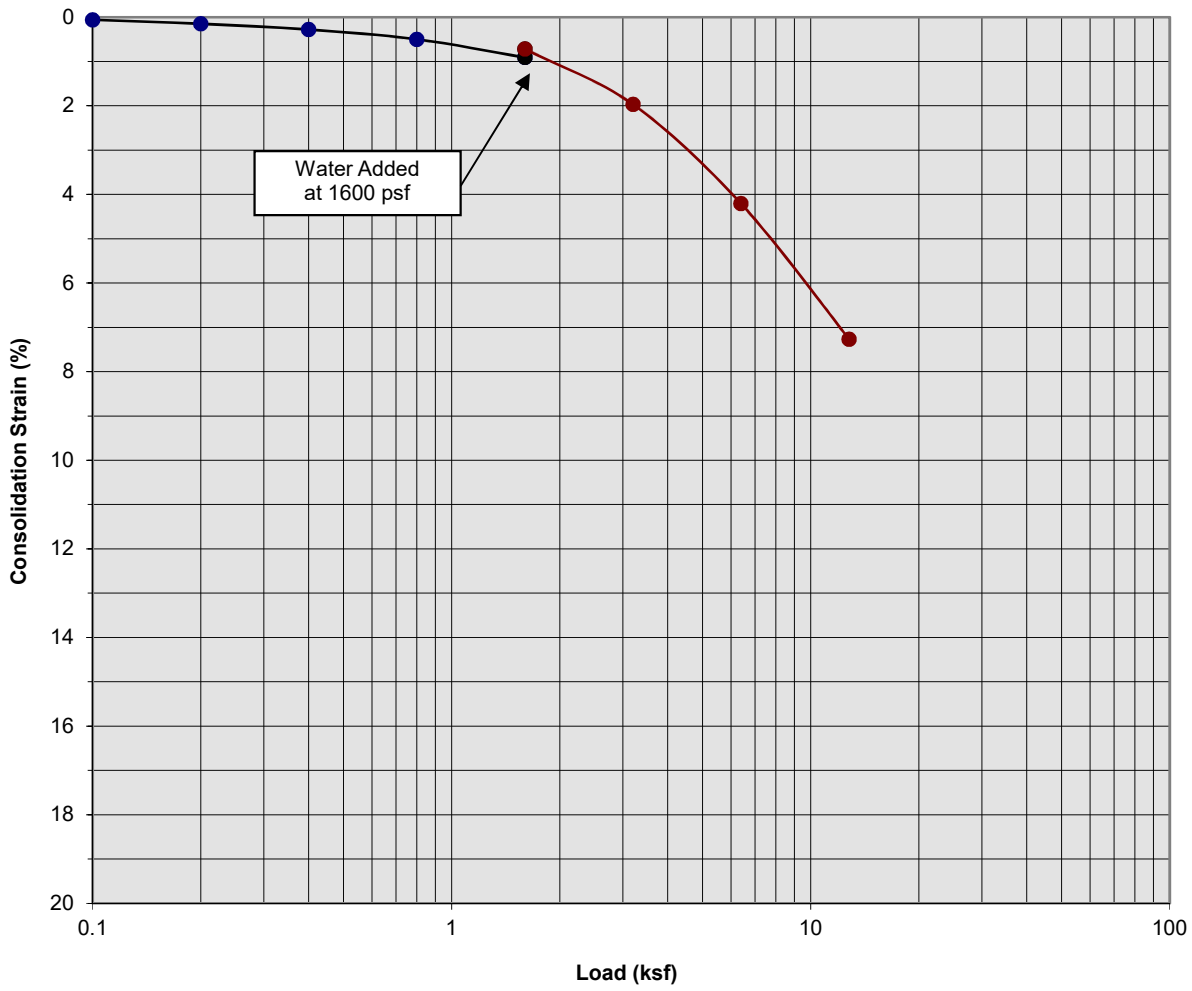
TBL 17G199.GPJ SOCALGEO.GDT 11/22/17

TEST BORING LOG

PLATE B-12

APPENDIX C

Consolidation/Collapse Test Results



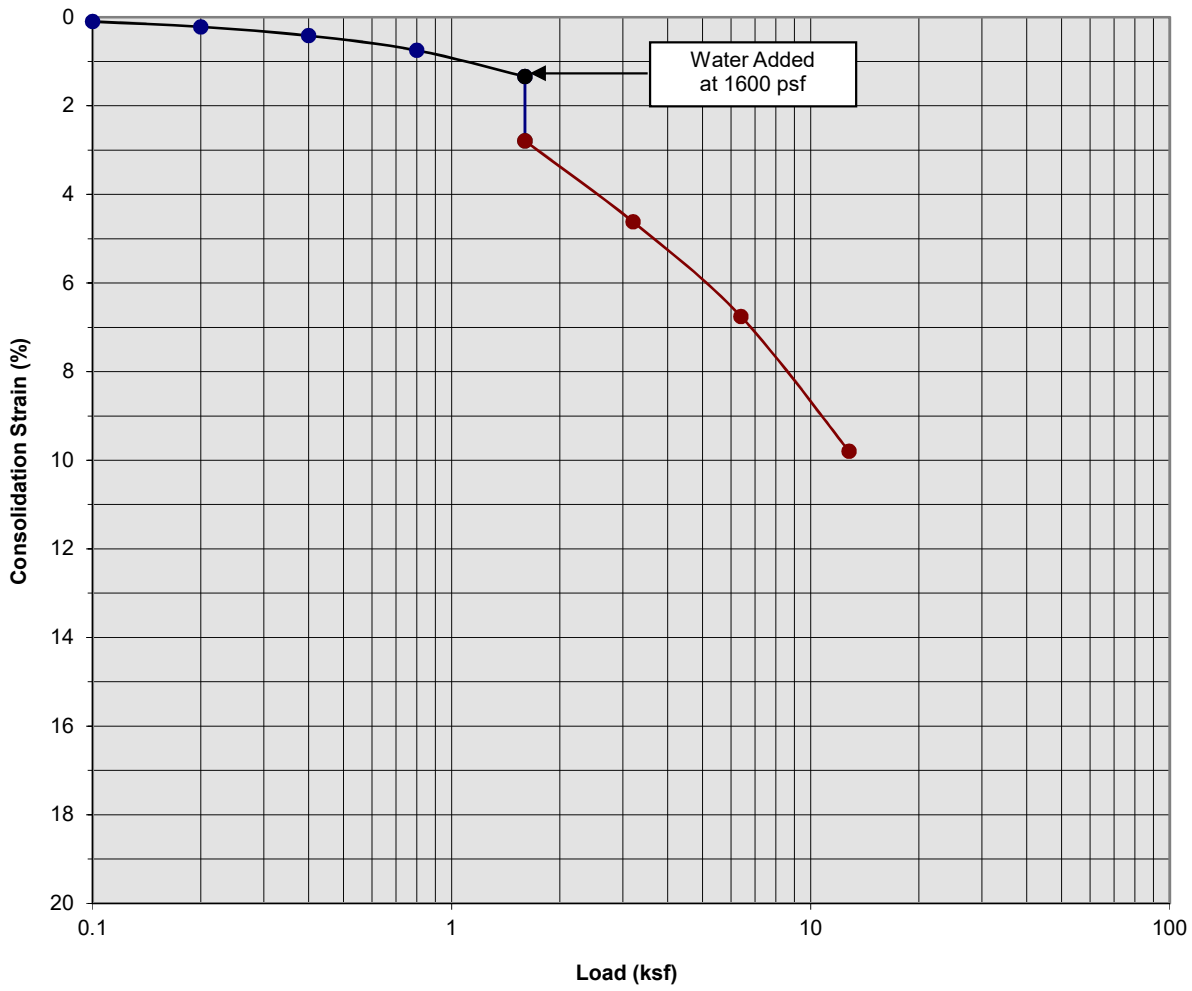
Classification: Light Gray Brown Clayey Silt

Boring Number:	B-3	Initial Moisture Content (%)	8
Sample Number:	---	Final Moisture Content (%)	20
Depth (ft)	1 to 2	Initial Dry Density (pcf)	106.7
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	115.7
Specimen Thickness (in)	1.0	Percent Collapse (%)	-0.19

Rider 2
Perris, California
Project No. 17G199
PLATE C- 1

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Consolidation/Collapse Test Results



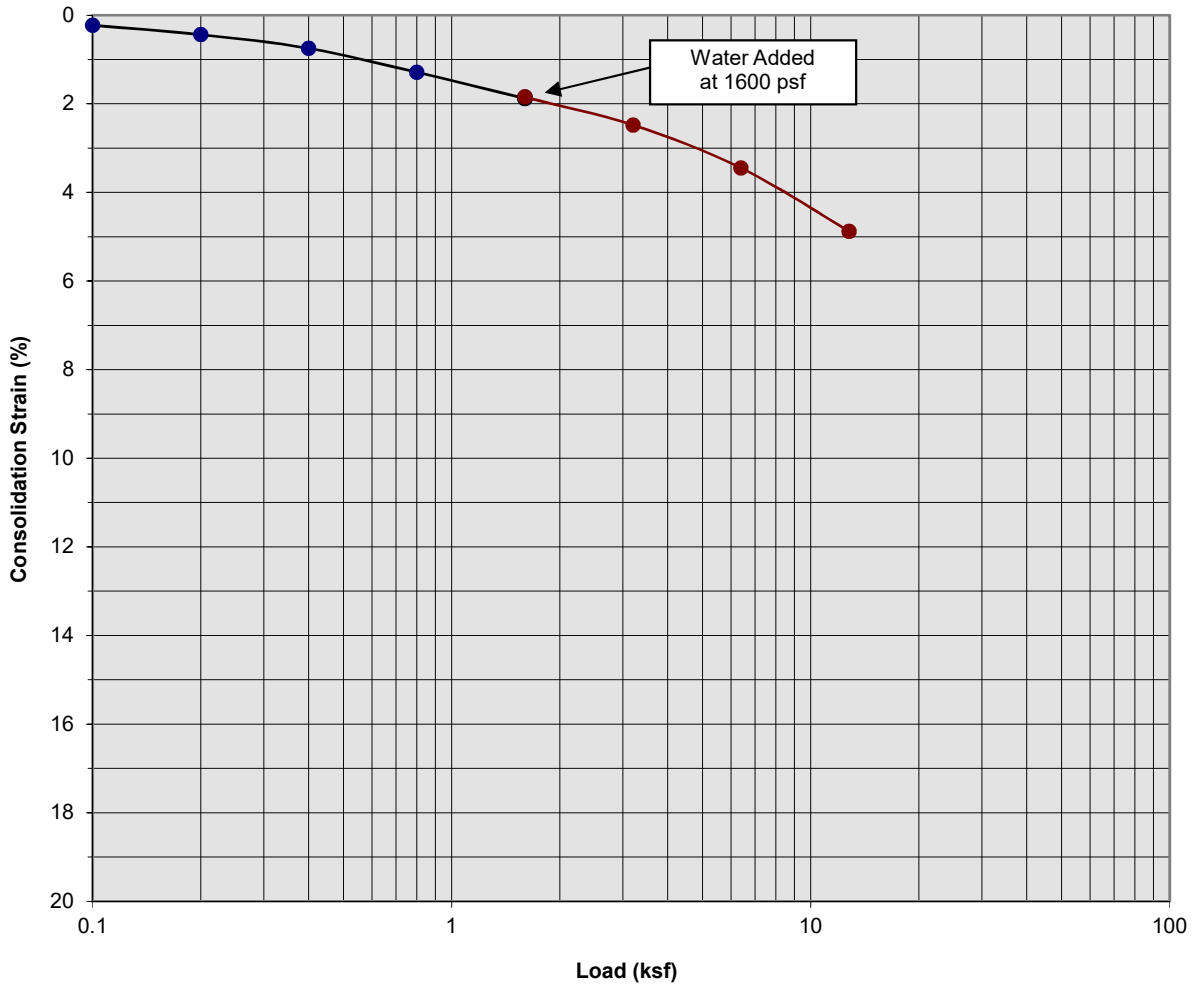
Classification: Dark Gray Silty fine Sand

Boring Number:	B-3	Initial Moisture Content (%)	12
Sample Number:	---	Final Moisture Content (%)	27
Depth (ft)	3 to 4	Initial Dry Density (pcf)	90.6
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	100.0
Specimen Thickness (in)	1.0	Percent Collapse (%)	1.45

Rider 2
Perris, California
Project No. 17G199
PLATE C- 2

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Consolidation/Collapse Test Results



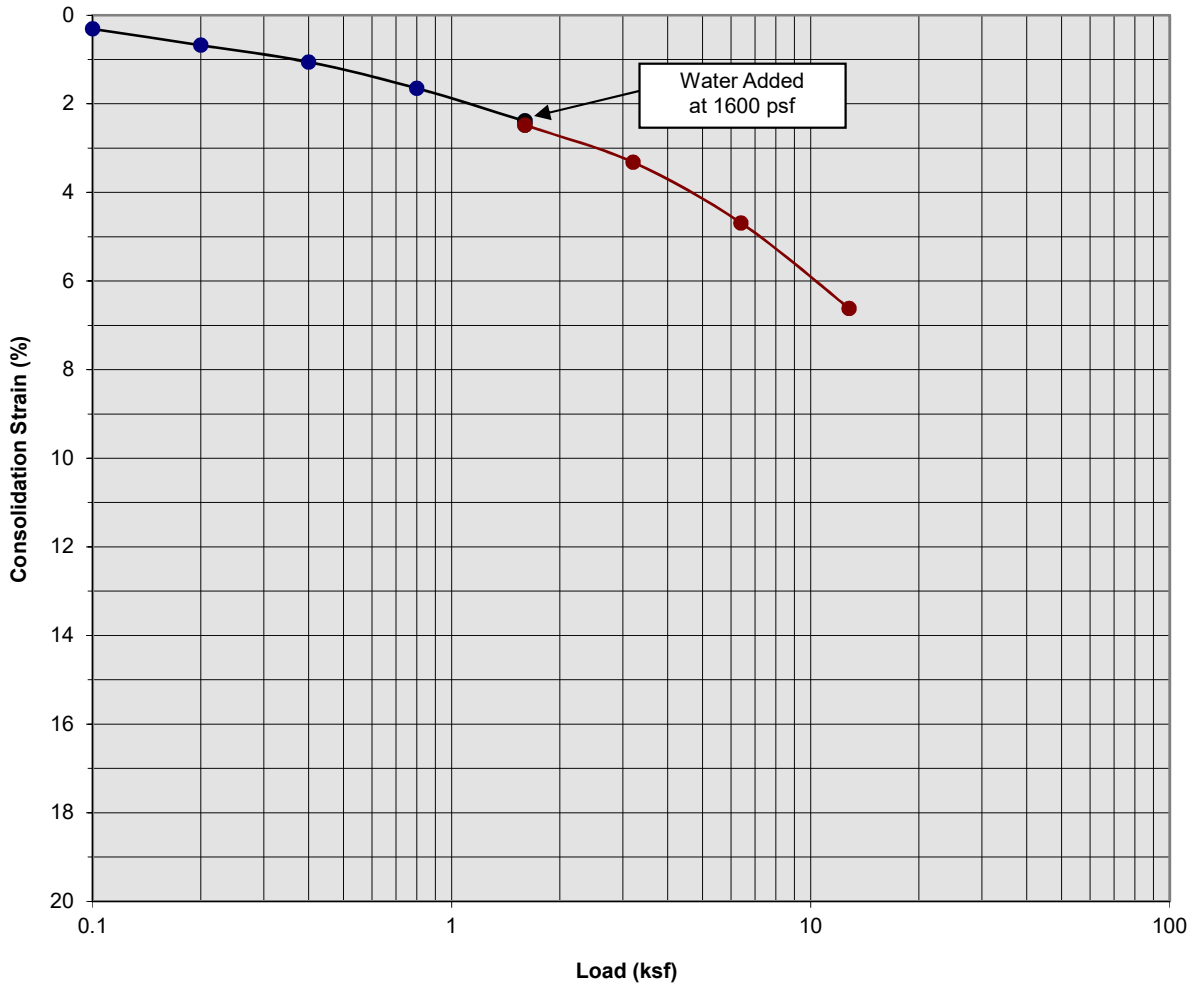
Classification: Light Gray Silty Clay

Boring Number:	B-3	Initial Moisture Content (%)	16
Sample Number:	---	Final Moisture Content (%)	20
Depth (ft)	5 to 6	Initial Dry Density (pcf)	108.5
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	114.0
Specimen Thickness (in)	1.0	Percent Collapse (%)	-0.03

Rider 2
Perris, California
Project No. 17G199
PLATE C- 3

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Consolidation/Collapse Test Results



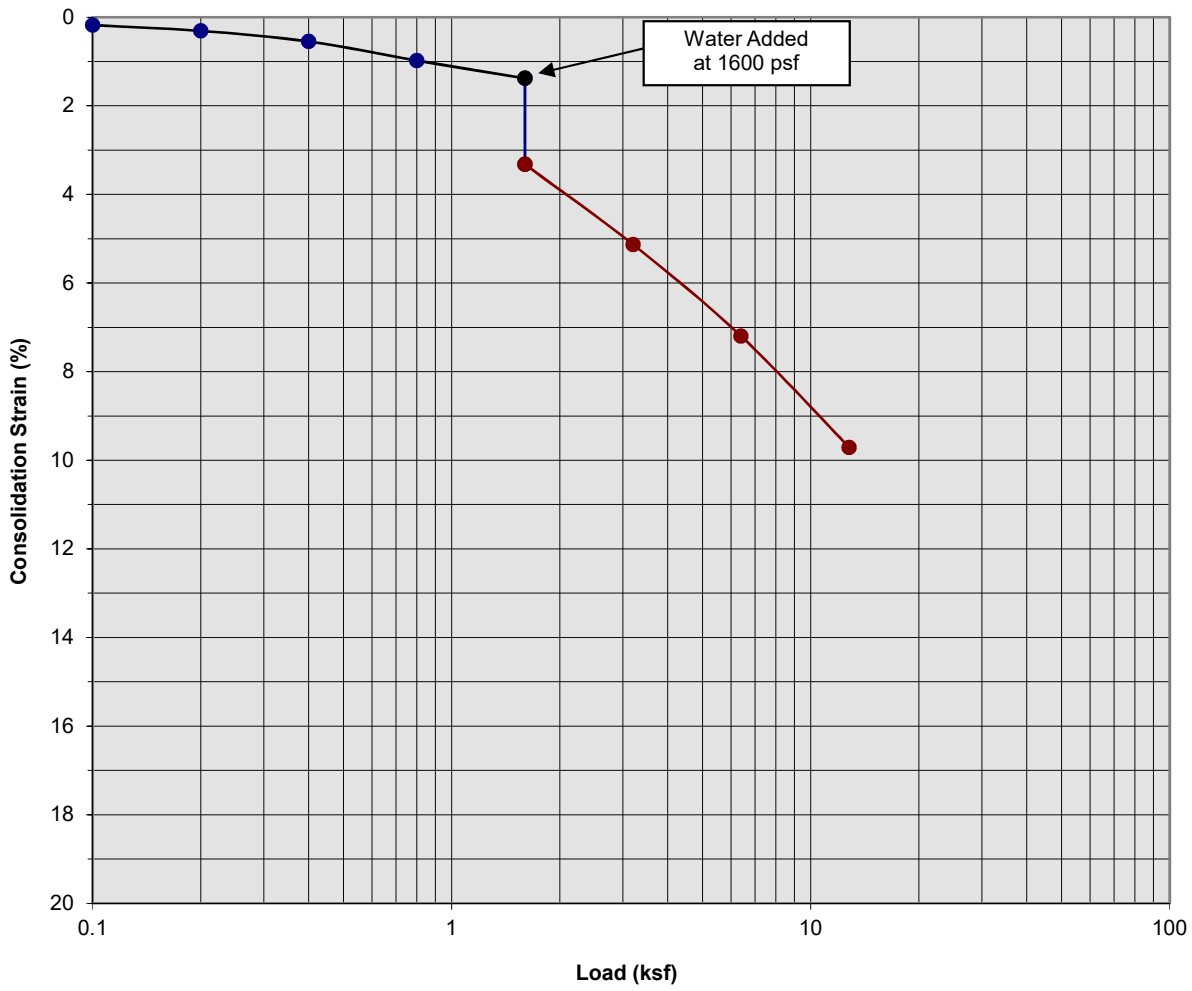
Classification: Brown fine Sandy Clay

Boring Number:	B-3	Initial Moisture Content (%)	16
Sample Number:	---	Final Moisture Content (%)	19
Depth (ft)	7 to 8	Initial Dry Density (pcf)	109.6
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	117.0
Specimen Thickness (in)	1.0	Percent Collapse (%)	0.09

Rider 2
Perris, California
Project No. 17G199
PLATE C- 4

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Consolidation/Collapse Test Results



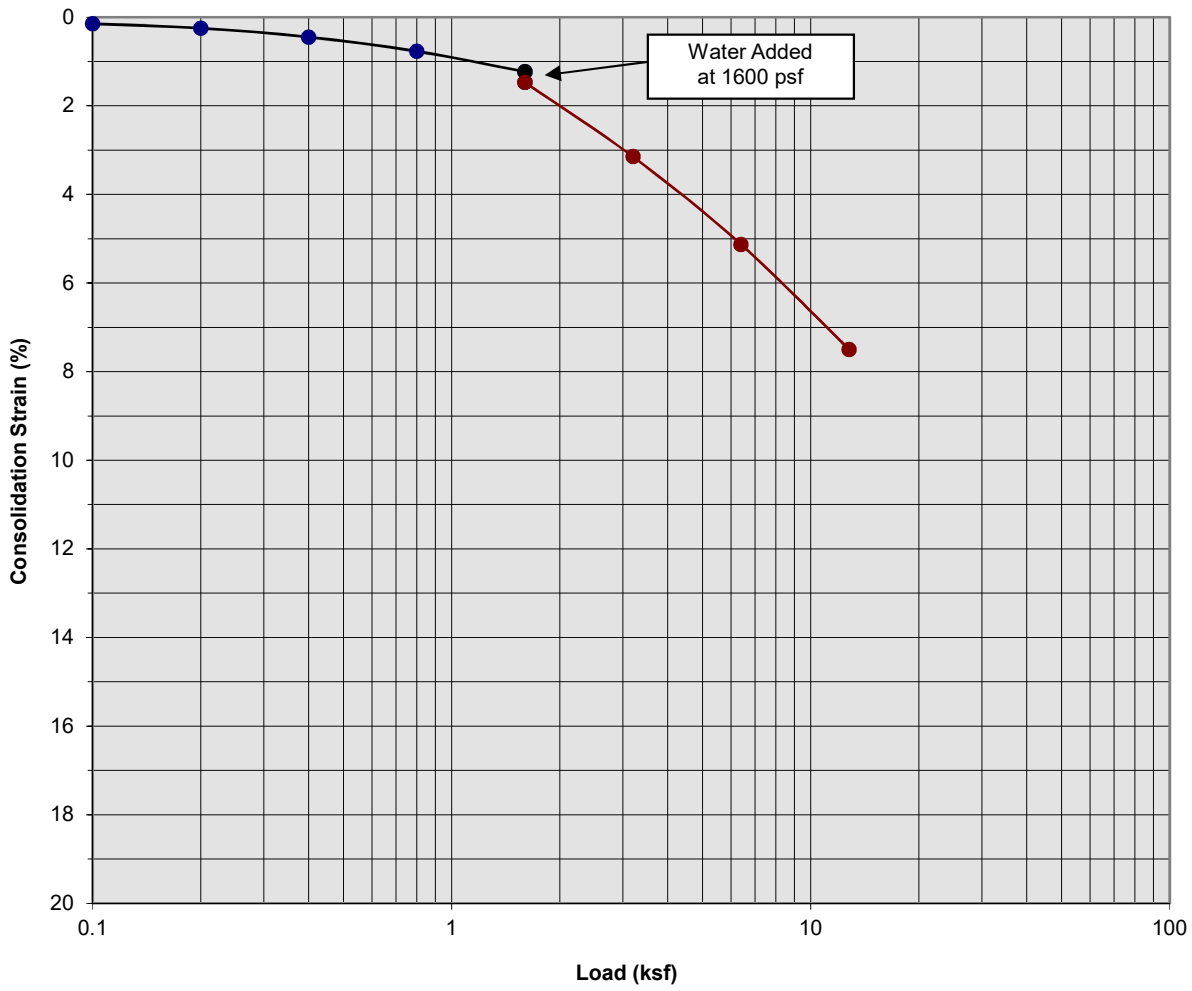
Classification: Light Gray Clayey Silt

Boring Number:	B-6	Initial Moisture Content (%)	8
Sample Number:	---	Final Moisture Content (%)	19
Depth (ft)	3 to 4	Initial Dry Density (pcf)	104.4
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	115.3
Specimen Thickness (in)	1.0	Percent Collapse (%)	1.94

Rider 2
Perris, California
Project No. 17G199
PLATE C- 5

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Consolidation/Collapse Test Results



Classification: Gray Brown Silty fine Sand

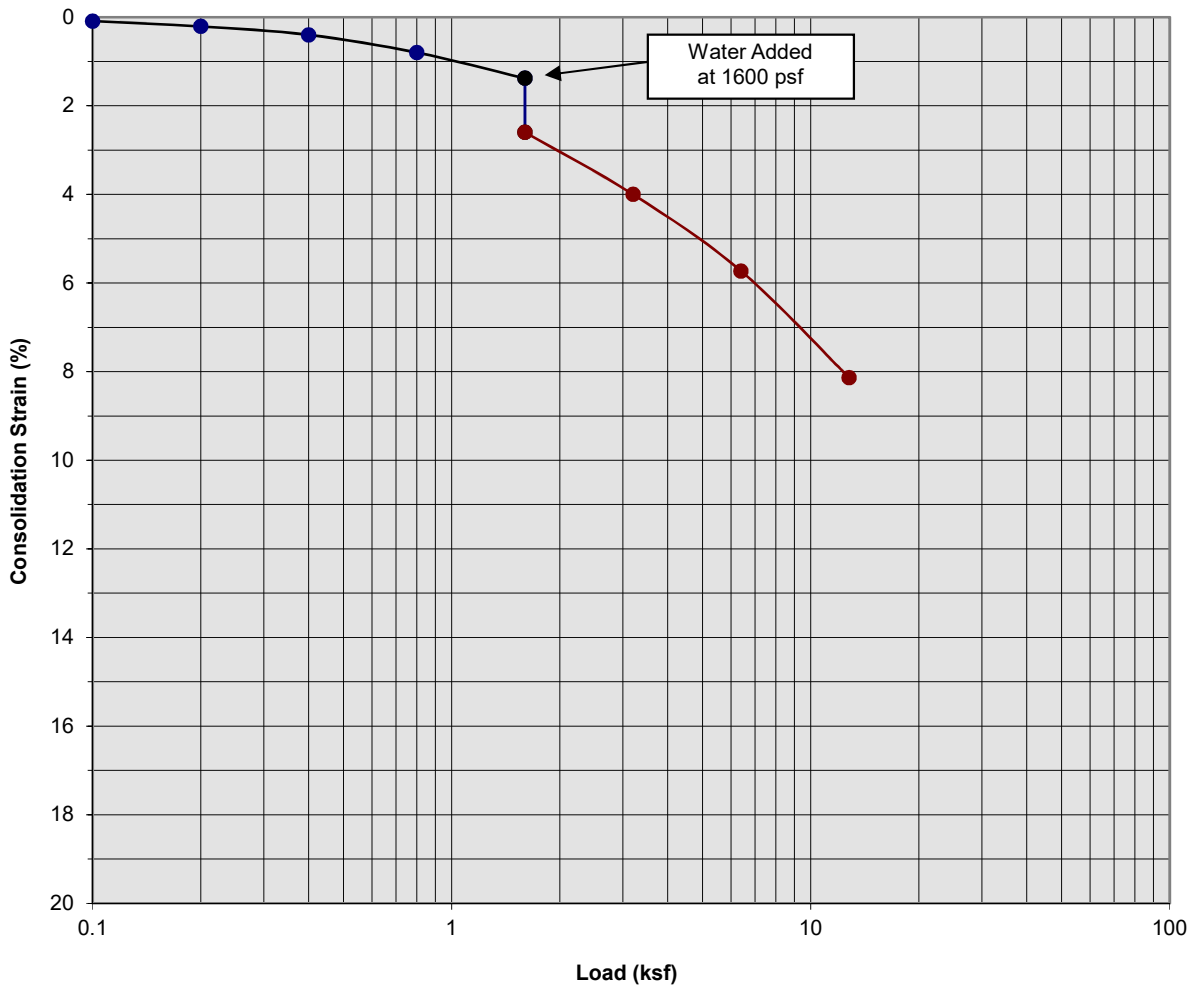
Boring Number:	B-6	Initial Moisture Content (%)	5
Sample Number:	---	Final Moisture Content (%)	15
Depth (ft)	5 to 6	Initial Dry Density (pcf)	114.2
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	123.9
Specimen Thickness (in)	1.0	Percent Collapse (%)	0.24

Rider 2
Perris, California
Project No. 17G199

PLATE C- 6

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Consolidation/Collapse Test Results



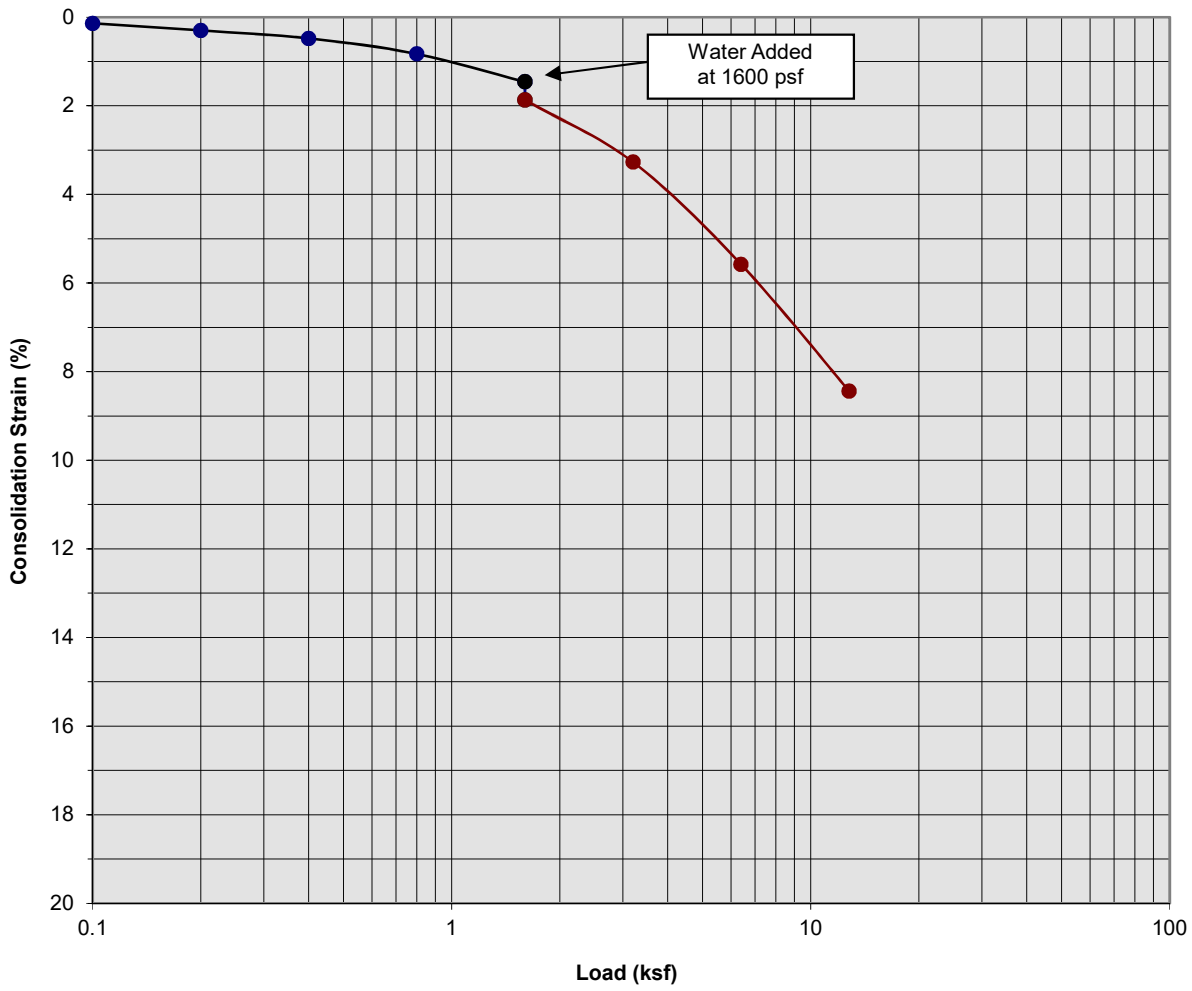
Classification: Light Brown Clayey Silt

Boring Number:	B-6	Initial Moisture Content (%)	14
Sample Number:	---	Final Moisture Content (%)	22
Depth (ft)	7 to 8	Initial Dry Density (pcf)	102.1
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	111.7
Specimen Thickness (in)	1.0	Percent Collapse (%)	1.22

Rider 2
Perris, California
Project No. 17G199
PLATE C- 7

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Consolidation/Collapse Test Results



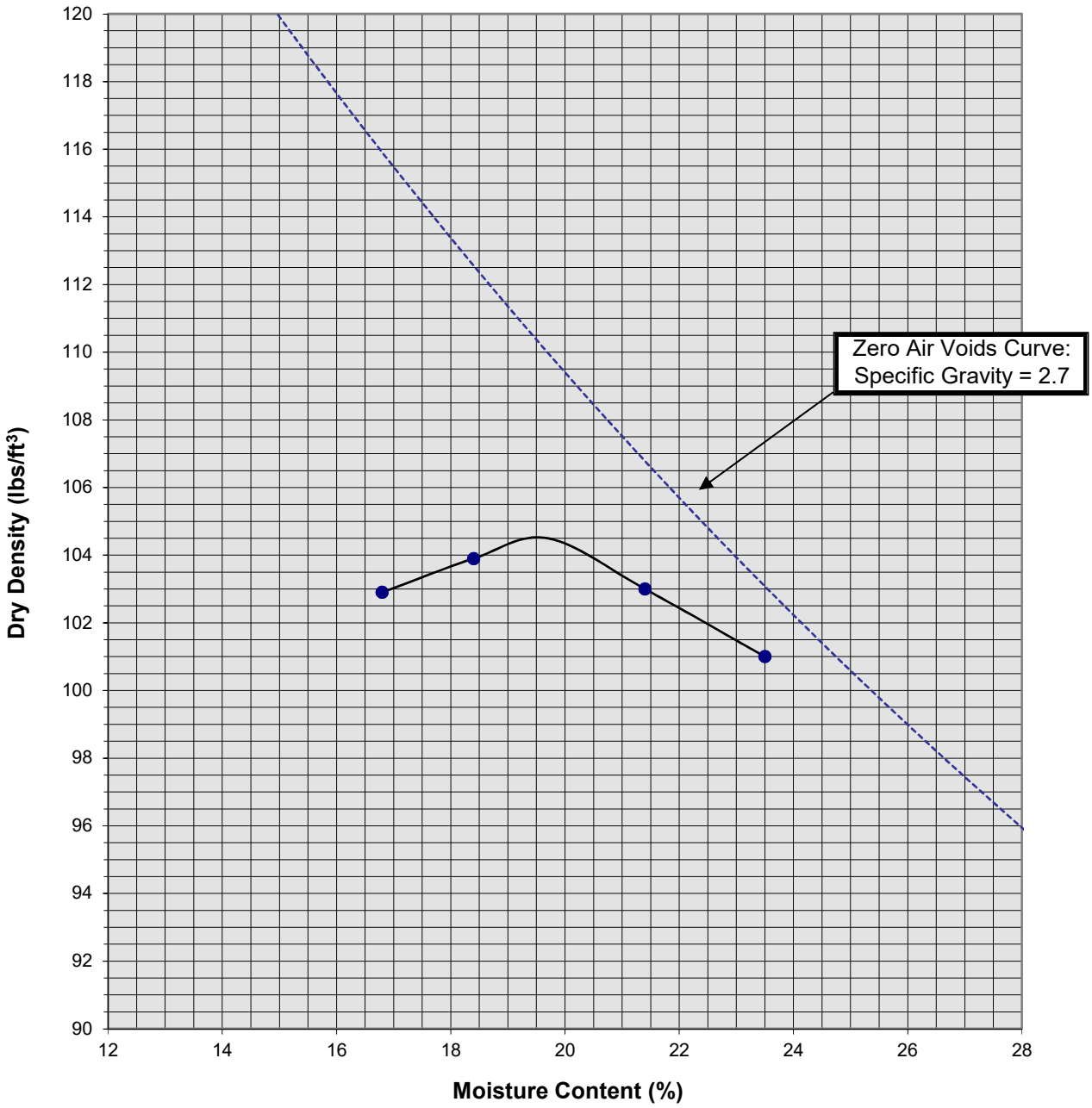
Classification: Light Brown Clayey Silt

Boring Number:	B-6	Initial Moisture Content (%)	17
Sample Number:	---	Final Moisture Content (%)	24
Depth (ft)	9 to 10	Initial Dry Density (pcf)	99.0
Specimen Diameter (in)	2.4	Final Dry Density (pcf)	108.0
Specimen Thickness (in)	1.0	Percent Collapse (%)	0.41

Rider 2
Perris, California
Project No. 17G199
PLATE C- 8

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Moisture/Density Relationship
ASTM D-1557



Soil ID Number	B-4 @ 0 to 5'
Optimum Moisture (%)	19.5
Maximum Dry Density (pcf)	104.5
Soil Classification	Brown Clayey Silt, trace fine Sand

Rider 2
Perris, California
Project No. 17G199
PLATE C-9

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

APPENDIX D

GRADING GUIDE SPECIFICATIONS

These grading guide specifications are intended to provide typical procedures for grading operations. They are intended to supplement the recommendations contained in the geotechnical investigation report for this project. Should the recommendations in the geotechnical investigation report conflict with the grading guide specifications, the more site specific recommendations in the geotechnical investigation report will govern.

General

- The Earthwork Contractor is responsible for the satisfactory completion of all earthwork in accordance with the plans and geotechnical reports, and in accordance with city, county, and applicable building codes.

- The Geotechnical Engineer is the representative of the Owner/Builder for the purpose of implementing the report recommendations and guidelines. These duties are not intended to relieve the Earthwork Contractor of any responsibility to perform in a workman-like manner, nor is the Geotechnical Engineer to direct the grading equipment or personnel employed by the Contractor.

- The Earthwork Contractor is required to notify the Geotechnical Engineer of the anticipated work and schedule so that testing and inspections can be provided. If necessary, work may be stopped and redone if personnel have not been scheduled in advance.

- The Earthwork Contractor is required to have suitable and sufficient equipment on the job-site to process, moisture condition, mix and compact the amount of fill being placed to the approved compaction. In addition, suitable support equipment should be available to conform with recommendations and guidelines in this report.

- Canyon cleanouts, overexcavation areas, processed ground to receive fill, key excavations, subdrains and benches should be observed by the Geotechnical Engineer prior to placement of any fill. It is the Earthwork Contractor's responsibility to notify the Geotechnical Engineer of areas that are ready for inspection.

- Excavation, filling, and subgrade preparation should be performed in a manner and sequence that will provide drainage at all times and proper control of erosion. Precipitation, springs, and seepage water encountered shall be pumped or drained to provide a suitable working surface. The Geotechnical Engineer must be informed of springs or water seepage encountered during grading or foundation construction for possible revision to the recommended construction procedures and/or installation of subdrains.

Site Preparation

- The Earthwork Contractor is responsible for all clearing, grubbing, stripping and site preparation for the project in accordance with the recommendations of the Geotechnical Engineer.

- If any materials or areas are encountered by the Earthwork Contractor which are suspected of having toxic or environmentally sensitive contamination, the Geotechnical Engineer and Owner/Builder should be notified immediately.

- Major vegetation should be stripped and disposed of off-site. This includes trees, brush, heavy grasses and any materials considered unsuitable by the Geotechnical Engineer.

- Underground structures such as basements, cesspools or septic disposal systems, mining shafts, tunnels, wells and pipelines should be removed under the inspection of the Geotechnical Engineer and recommendations provided by the Geotechnical Engineer and/or city, county or state agencies. If such structures are known or found, the Geotechnical Engineer should be notified as soon as possible so that recommendations can be formulated.

- Any topsoil, slopewash, colluvium, alluvium and rock materials which are considered unsuitable by the Geotechnical Engineer should be removed prior to fill placement.

- Remaining voids created during site clearing caused by removal of trees, foundations basements, irrigation facilities, etc., should be excavated and filled with compacted fill.

- Subsequent to clearing and removals, areas to receive fill should be scarified to a depth of 10 to 12 inches, moisture conditioned and compacted

- The moisture condition of the processed ground should be at or slightly above the optimum moisture content as determined by the Geotechnical Engineer. Depending upon field conditions, this may require air drying or watering together with mixing and/or discing.

Compacted Fills

- Soil materials imported to or excavated on the property may be utilized in the fill, provided each material has been determined to be suitable in the opinion of the Geotechnical Engineer. Unless otherwise approved by the Geotechnical Engineer, all fill materials shall be free of deleterious, organic, or frozen matter, shall contain no chemicals that may result in the material being classified as “contaminated,” and shall be very low to non-expansive with a maximum expansion index (EI) of 50. The top 12 inches of the compacted fill should have a maximum particle size of 3 inches, and all underlying compacted fill material a maximum 6-inch particle size, except as noted below.

- All soils should be evaluated and tested by the Geotechnical Engineer. Materials with high expansion potential, low strength, poor gradation or containing organic materials may require removal from the site or selective placement and/or mixing to the satisfaction of the Geotechnical Engineer.

- Rock fragments or rocks less than 6 inches in their largest dimensions, or as otherwise determined by the Geotechnical Engineer, may be used in compacted fill, provided the distribution and placement is satisfactory in the opinion of the Geotechnical Engineer.

- Rock fragments or rocks greater than 12 inches should be taken off-site or placed in accordance with recommendations and in areas designated as suitable by the Geotechnical Engineer. These materials should be placed in accordance with Plate D-8 of these Grading Guide Specifications and in accordance with the following recommendations:

    - Rocks 12 inches or more in diameter should be placed in rows at least 15 feet apart, 15 feet from the edge of the fill, and 10 feet or more below subgrade. Spaces should be left between each rock fragment to provide for placement and compaction of soil around the fragments.

    - Fill materials consisting of soil meeting the minimum moisture content requirements and free of oversize material should be placed between and over the rows of rock or

concrete. Ample water and compactive effort should be applied to the fill materials as they are placed in order that all of the voids between each of the fragments are filled and compacted to the specified density.

- Subsequent rows of rocks should be placed such that they are not directly above a row placed in the previous lift of fill. A minimum 5-foot offset between rows is recommended.

- To facilitate future trenching, oversized material should not be placed within the range of foundation excavations, future utilities or other underground construction unless specifically approved by the soil engineer and the developer/owner representative.

- Fill materials approved by the Geotechnical Engineer should be placed in areas previously prepared to receive fill and in evenly placed, near horizontal layers at about 6 to 8 inches in loose thickness, or as otherwise determined by the Geotechnical Engineer for the project.

- Each layer should be moisture conditioned to optimum moisture content, or slightly above, as directed by the Geotechnical Engineer. After proper mixing and/or drying, to evenly distribute the moisture, the layers should be compacted to at least 90 percent of the maximum dry density in compliance with ASTM D-1557-78 unless otherwise indicated.

- Density and moisture content testing should be performed by the Geotechnical Engineer at random intervals and locations as determined by the Geotechnical Engineer. These tests are intended as an aid to the Earthwork Contractor, so he can evaluate his workmanship, equipment effectiveness and site conditions. The Earthwork Contractor is responsible for compaction as required by the Geotechnical Report(s) and governmental agencies.

- Fill areas unused for a period of time may require moisture conditioning, processing and recompaction prior to the start of additional filling. The Earthwork Contractor should notify the Geotechnical Engineer of his intent so that an evaluation can be made.

- Fill placed on ground sloping at a 5-to-1 inclination (horizontal-to-vertical) or steeper should be benched into bedrock or other suitable materials, as directed by the Geotechnical Engineer. Typical details of benching are illustrated on Plates D-2, D-4, and D-5.

- Cut/fill transition lots should have the cut portion overexcavated to a depth of at least 3 feet and rebuilt with fill (see Plate D-1), as determined by the Geotechnical Engineer.

- All cut lots should be inspected by the Geotechnical Engineer for fracturing and other bedrock conditions. If necessary, the pads should be overexcavated to a depth of 3 feet and rebuilt with a uniform, more cohesive soil type to impede moisture penetration.

- Cut portions of pad areas above buttresses or stabilizations should be overexcavated to a depth of 3 feet and rebuilt with uniform, more cohesive compacted fill to impede moisture penetration.

- Non-structural fill adjacent to structural fill should typically be placed in unison to provide lateral support. Backfill along walls must be placed and compacted with care to ensure that excessive unbalanced lateral pressures do not develop. The type of fill material placed adjacent to below grade walls must be properly tested and approved by the Geotechnical Engineer with consideration of the lateral earth pressure used in the design.

Foundations

- The foundation influence zone is defined as extending one foot horizontally from the outside edge of a footing, and proceeding downward at a ½ horizontal to 1 vertical (0.5:1) inclination.

- Where overexcavation beneath a footing subgrade is necessary, it should be conducted so as to encompass the entire foundation influence zone, as described above.

- Compacted fill adjacent to exterior footings should extend at least 12 inches above foundation bearing grade. Compacted fill within the interior of structures should extend to the floor subgrade elevation.

Fill Slopes

- The placement and compaction of fill described above applies to all fill slopes. Slope compaction should be accomplished by overfilling the slope, adequately compacting the fill in even layers, including the overfilled zone and cutting the slope back to expose the compacted core

- Slope compaction may also be achieved by backrolling the slope adequately every 2 to 4 vertical feet during the filling process as well as requiring the earth moving and compaction equipment to work close to the top of the slope. Upon completion of slope construction, the slope face should be compacted with a sheepsfoot connected to a sideboom and then grid rolled. This method of slope compaction should only be used if approved by the Geotechnical Engineer.

- Sandy soils lacking in adequate cohesion may be unstable for a finished slope condition and therefore should not be placed within 15 horizontal feet of the slope face.

- All fill slopes should be keyed into bedrock or other suitable material. Fill keys should be at least 15 feet wide and inclined at 2 percent into the slope. For slopes higher than 30 feet, the fill key width should be equal to one-half the height of the slope (see Plate D-5).

- All fill keys should be cleared of loose slough material prior to geotechnical inspection and should be approved by the Geotechnical Engineer and governmental agencies prior to filling.

- The cut portion of fill over cut slopes should be made first and inspected by the Geotechnical Engineer for possible stabilization requirements. The fill portion should be adequately keyed through all surficial soils and into bedrock or suitable material. Soils should be removed from the transition zone between the cut and fill portions (see Plate D-2).

Cut Slopes

- All cut slopes should be inspected by the Geotechnical Engineer to determine the need for stabilization. The Earthwork Contractor should notify the Geotechnical Engineer when slope cutting is in progress at intervals of 10 vertical feet. Failure to notify may result in a delay in recommendations.

- Cut slopes exposing loose, cohesionless sands should be reported to the Geotechnical Engineer for possible stabilization recommendations.

- All stabilization excavations should be cleared of loose slough material prior to geotechnical inspection. Stakes should be provided by the Civil Engineer to verify the location and dimensions of the key. A typical stabilization fill detail is shown on Plate D-5.

- Stabilization key excavations should be provided with subdrains. Typical subdrain details are shown on Plates D-6.

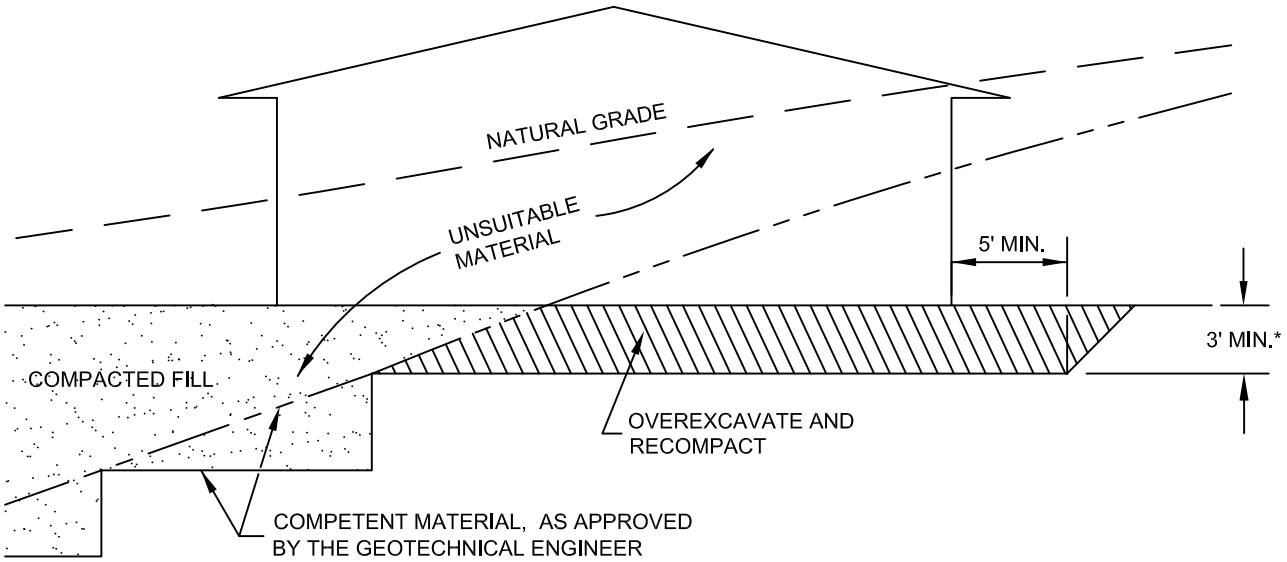
Subdrains

- Subdrains may be required in canyons and swales where fill placement is proposed. Typical subdrain details for canyons are shown on Plate D-3. Subdrains should be installed after approval of removals and before filling, as determined by the Soils Engineer.

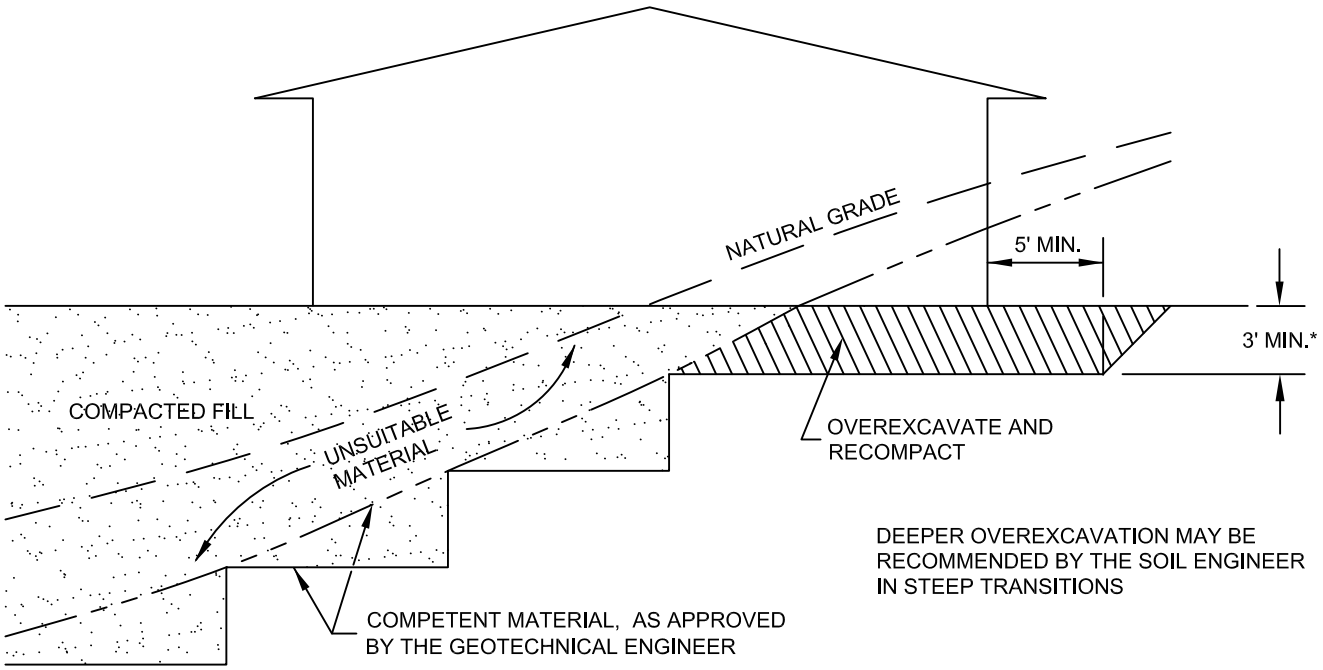
- Plastic pipe may be used for subdrains provided it is Schedule 40 or SDR 35 or equivalent. Pipe should be protected against breakage, typically by placement in a square-cut (backhoe) trench or as recommended by the manufacturer.

- Filter material for subdrains should conform to CALTRANS Specification 68-1.025 or as approved by the Geotechnical Engineer for the specific site conditions. Clean ¾-inch crushed rock may be used provided it is wrapped in an acceptable filter cloth and approved by the Geotechnical Engineer. Pipe diameters should be 6 inches for runs up to 500 feet and 8 inches for the downstream continuations of longer runs. Four-inch diameter pipe may be used in buttress and stabilization fills.

CUT LOT



CUT/FILL LOT (TRANSITION)



*SEE TEXT OF REPORT FOR SPECIFIC RECOMMENDATION. ACTUAL DEPTH OF OVEREXCAVATION MAY BE GREATER.

TRANSITION LOT DETAIL

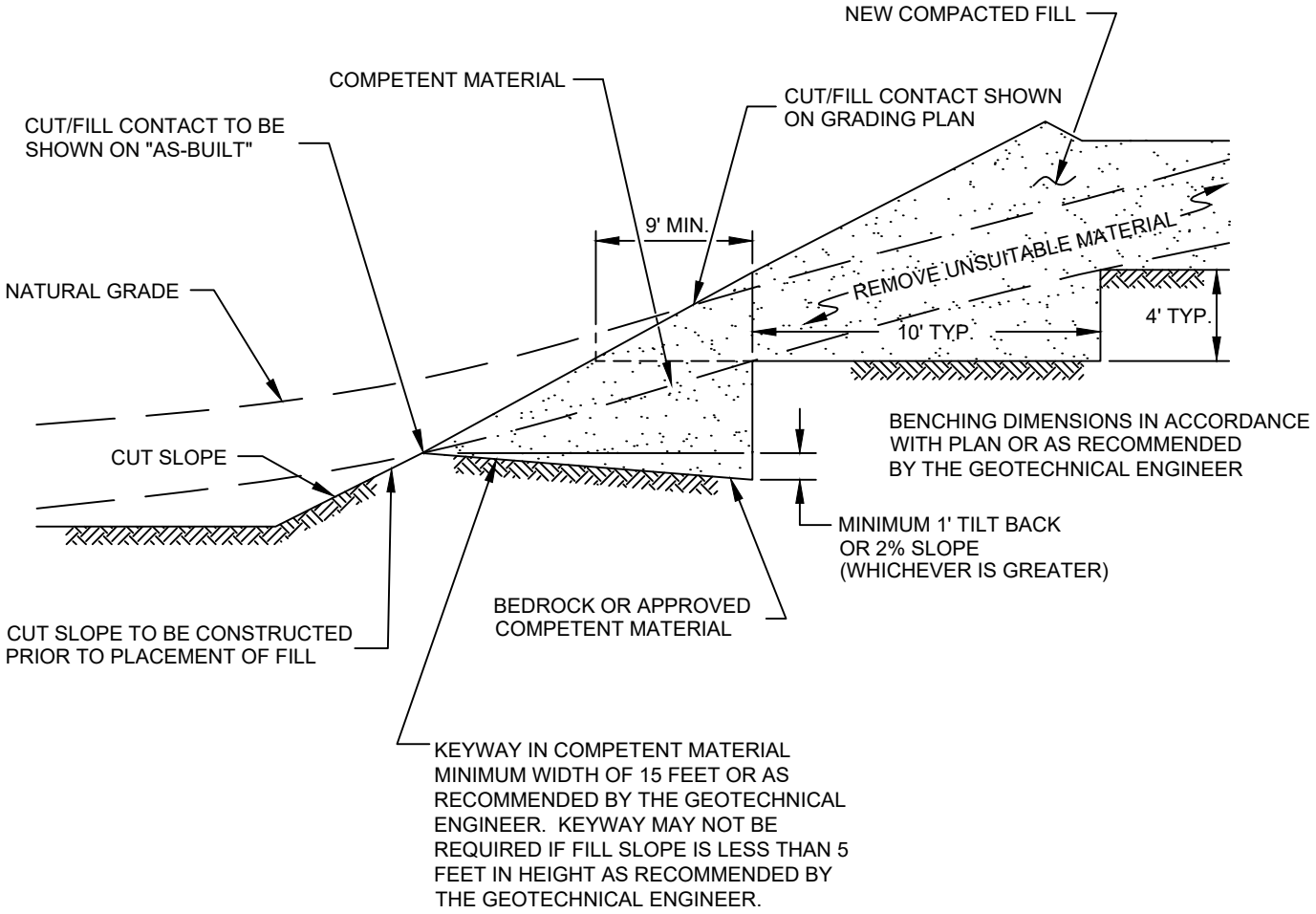
GRADING GUIDE SPECIFICATIONS

NOT TO SCALE

DRAWN: JAS
CHKD: GKM

PLATE D-1

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL



FILL ABOVE CUT SLOPE DETAIL

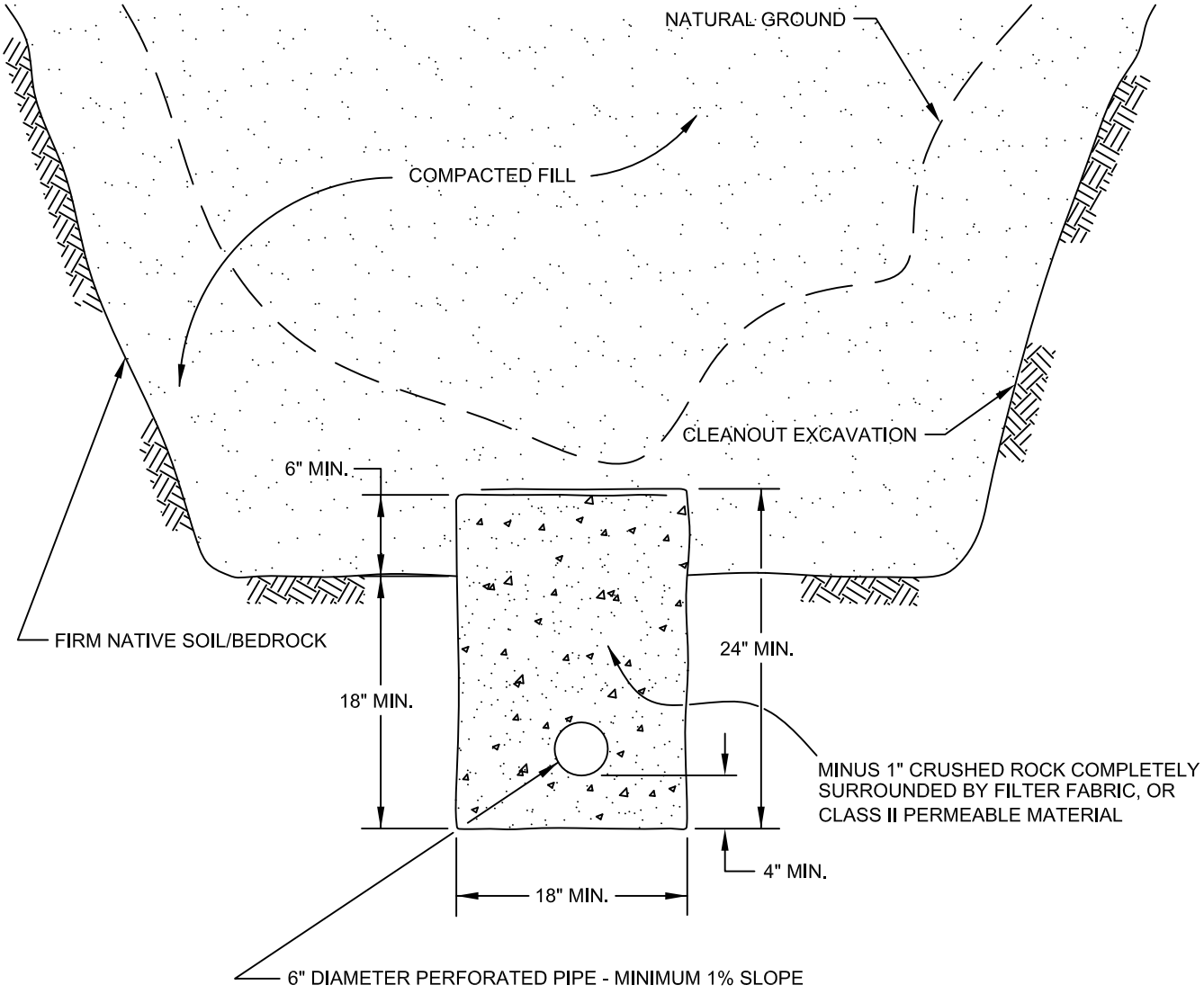
GRADING GUIDE SPECIFICATIONS

NOT TO SCALE

DRAWN: JAS
CHKD: GKM

PLATE D-2

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL



PIPE MATERIAL	DEPTH OF FILL OVER SUBDRAIN
ADS (CORRUGATED POLETHYLENE)	8
TRANSITE UNDERDRAIN	20
PVC OR ABS: SDR 35	35
SDR 21	100

SCHEMATIC ONLY
NOT TO SCALE

CANYON SUBDRAIN DETAIL

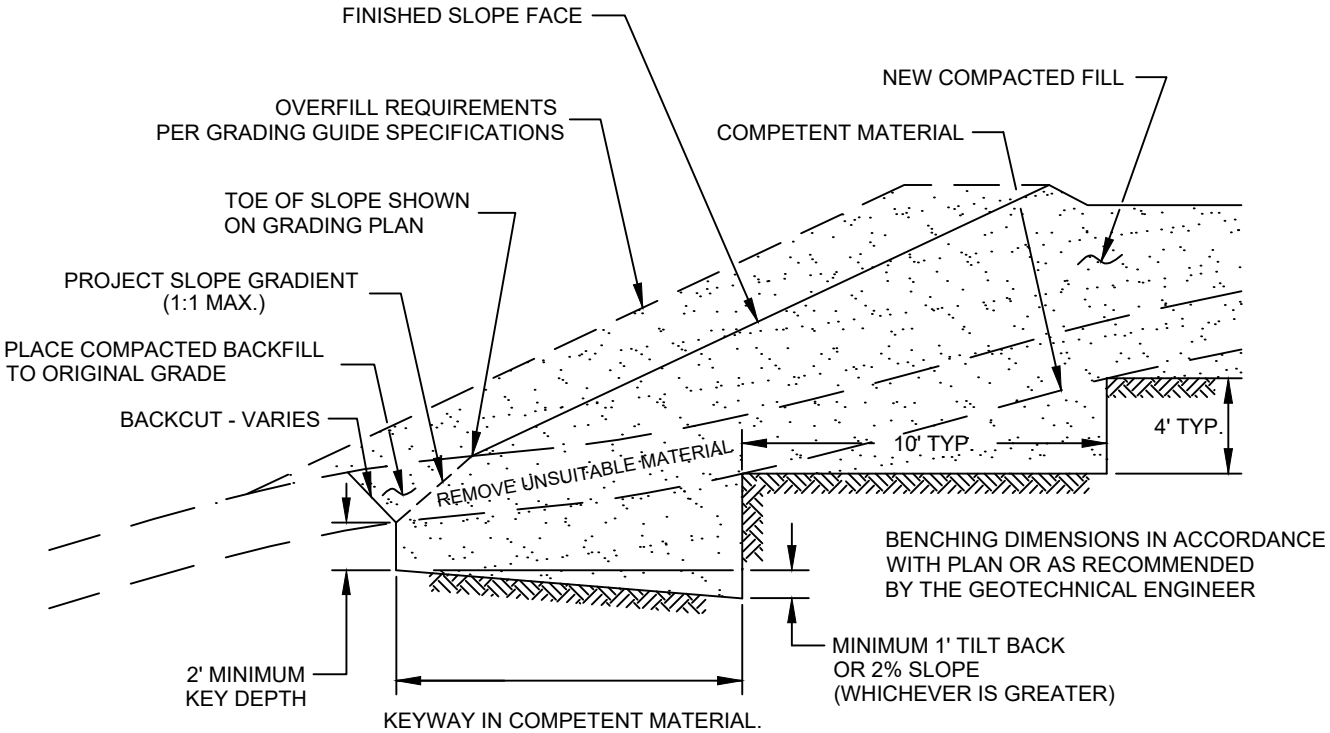
GRADING GUIDE SPECIFICATIONS

NOT TO SCALE

DRAWN: JAS
CHKD: GKM

PLATE D-3

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL



NOTE:
BENCHING SHALL BE REQUIRED WHEN NATURAL SLOPES ARE EQUAL TO OR STEEPER THAN 5:1 OR WHEN RECOMMENDED BY THE GEOTECHNICAL ENGINEER.

FILL ABOVE NATURAL SLOPE DETAIL

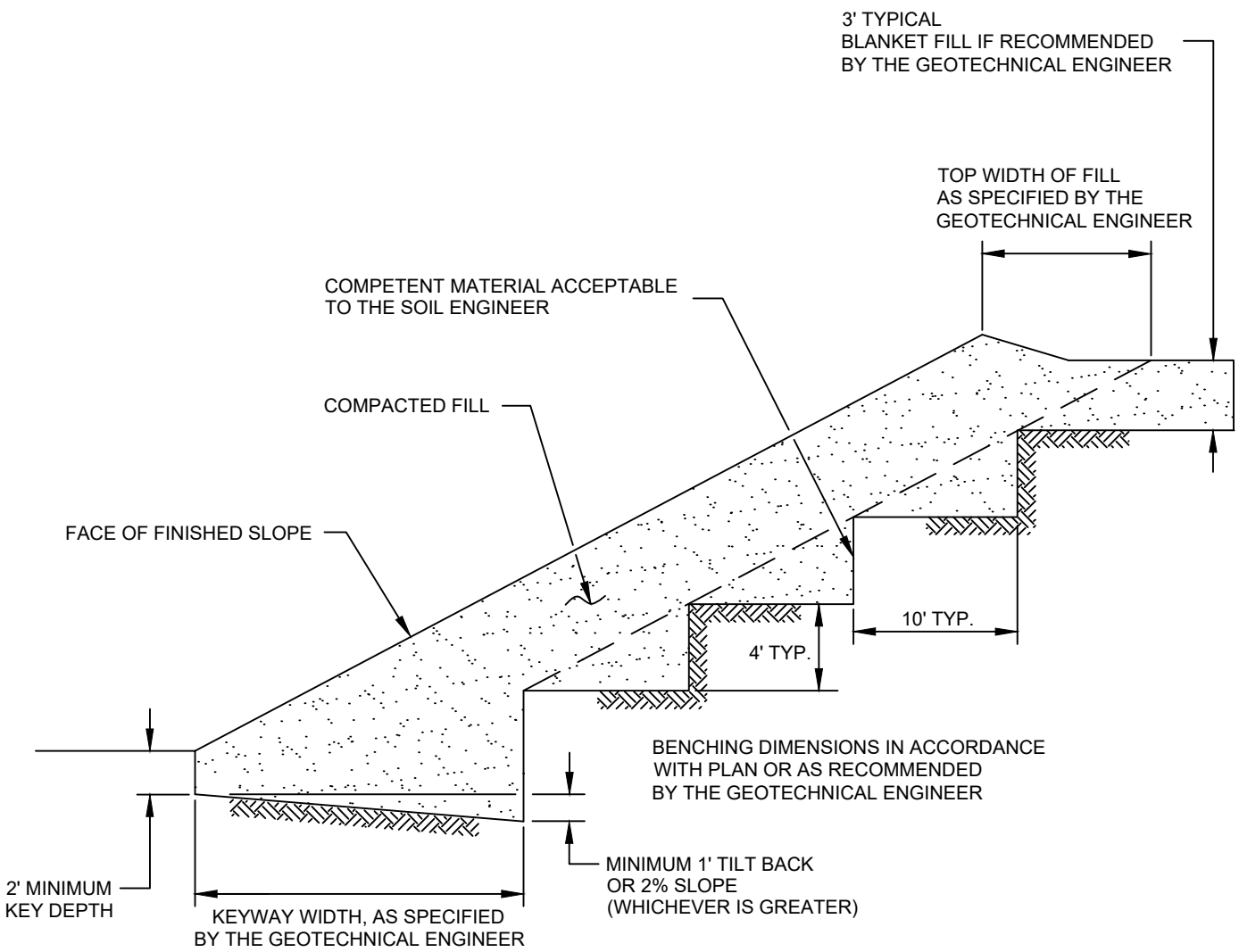
GRADING GUIDE SPECIFICATIONS

NOT TO SCALE

DRAWN: JAS
CHKD: GKM

PLATE D-4

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL



STABILIZATION FILL DETAIL

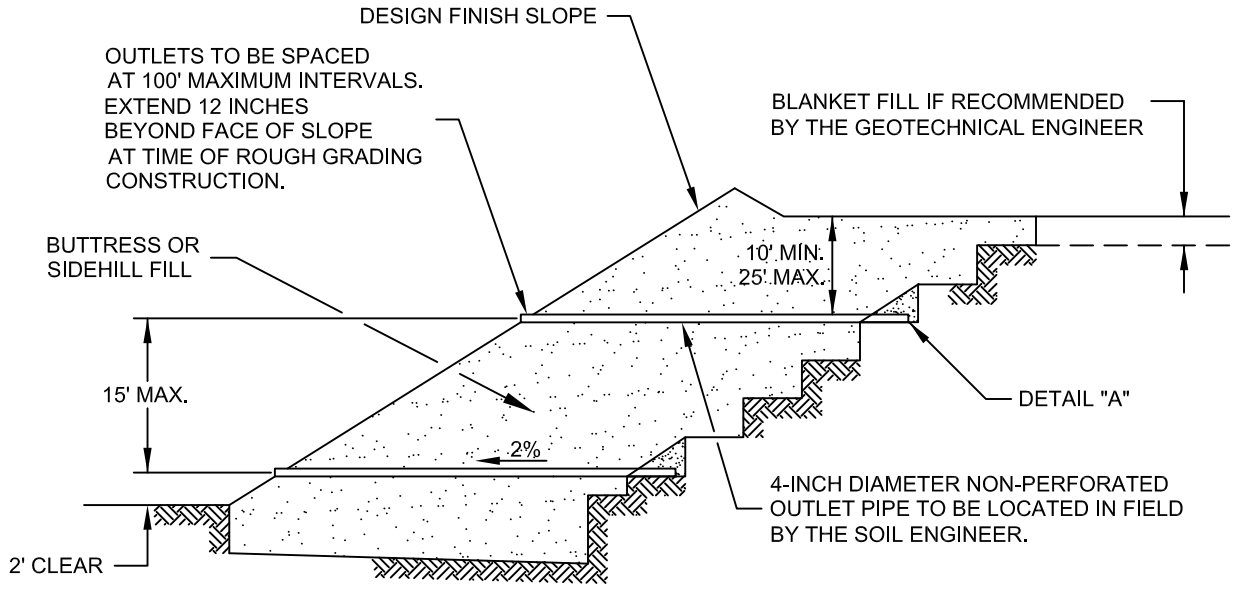
GRADING GUIDE SPECIFICATIONS

NOT TO SCALE

DRAWN: JAS
CHKD: GKM

PLATE D-5

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL



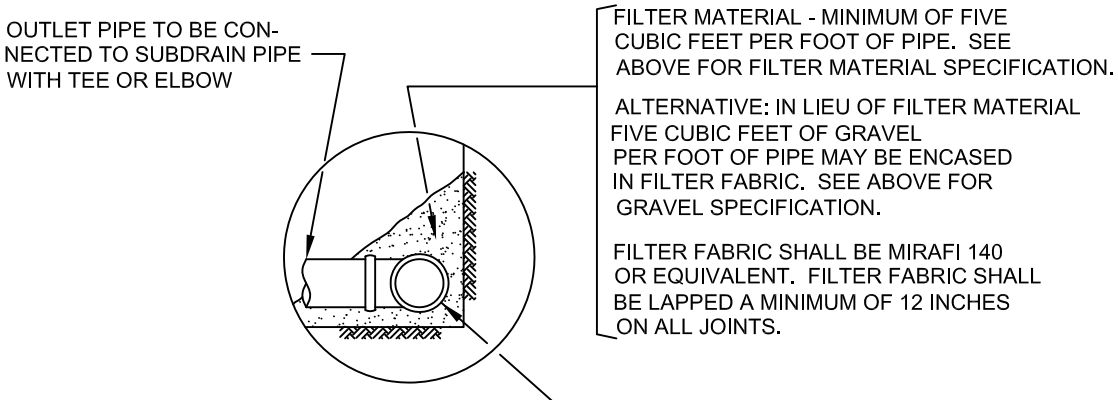
"FILTER MATERIAL" TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUIVALENT: (CONFORMS TO EMA STD. PLAN 323)

SIEVE SIZE	PERCENTAGE PASSING
1"	100
3/4"	90-100
3/8"	40-100
NO. 4	25-40
NO. 8	18-33
NO. 30	5-15
NO. 50	0-7
NO. 200	0-3

"GRAVEL" TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUIVALENT:

SIEVE SIZE	MAXIMUM PERCENTAGE PASSING
1 1/2"	100
NO. 4	50
NO. 200	8

SAND EQUIVALENT = MINIMUM OF 50



DETAIL "A"

NOTES:
1. TRENCH FOR OUTLET PIPES TO BE BACKFILLED WITH ON-SITE SOIL.

SLOPE FILL SUBDRAINS

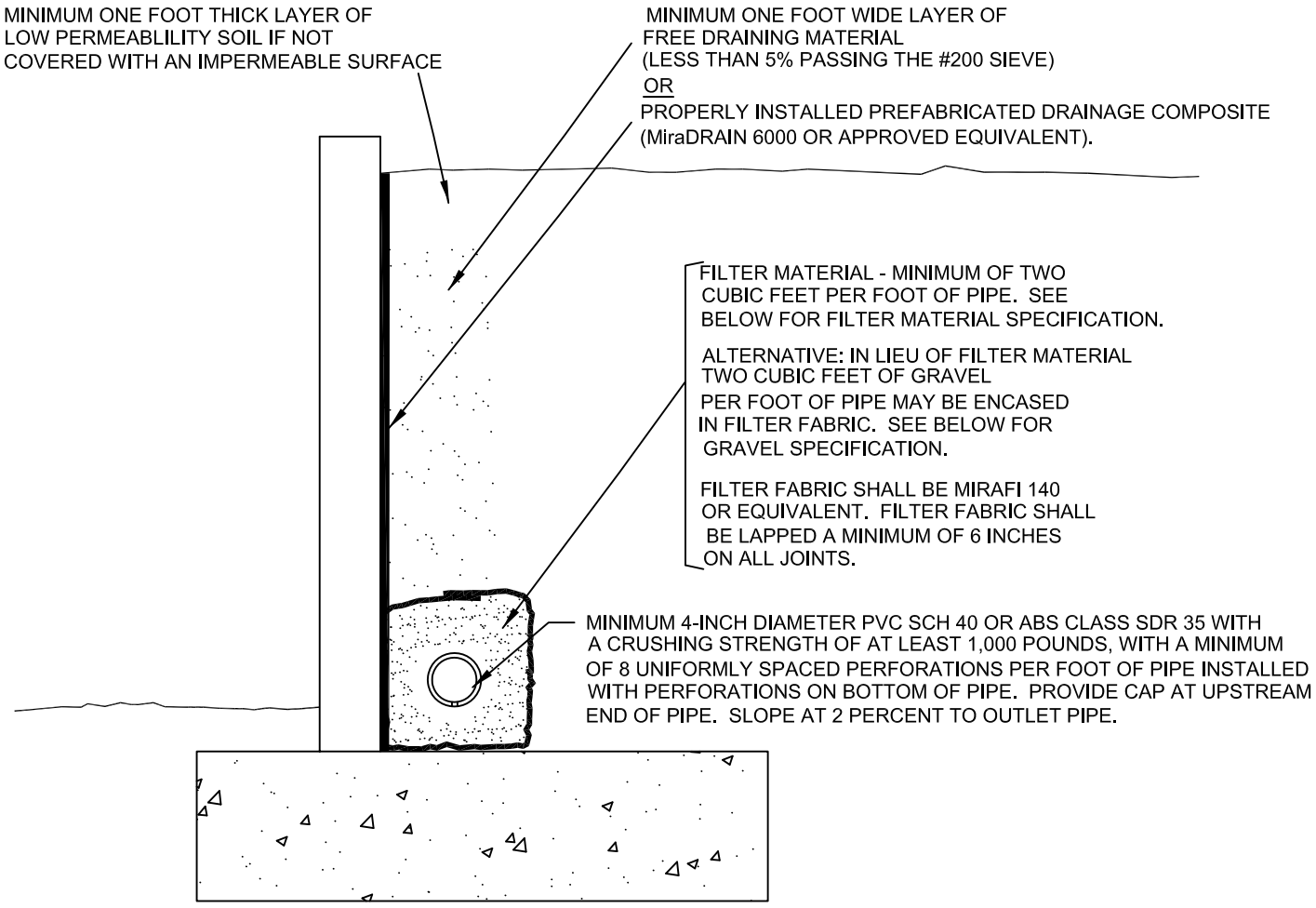
GRADING GUIDE SPECIFICATIONS

NOT TO SCALE

DRAWN: JAS
CHKD: GKM

PLATE D-6

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL



"FILTER MATERIAL" TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUIVALENT: (CONFORMS TO EMA STD. PLAN 323)

SIEVE SIZE	PERCENTAGE PASSING
1"	100
3/4"	90-100
3/8"	40-100
NO. 4	25-40
NO. 8	18-33
NO. 30	5-15
NO. 50	0-7
NO. 200	0-3

"GRAVEL" TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUIVALENT:

SIEVE SIZE	MAXIMUM PERCENTAGE PASSING
1 1/2"	100
NO. 4	50
NO. 200	8

SAND EQUIVALENT = MINIMUM OF 50

RETAINING WALL BACKDRAINS

GRADING GUIDE SPECIFICATIONS

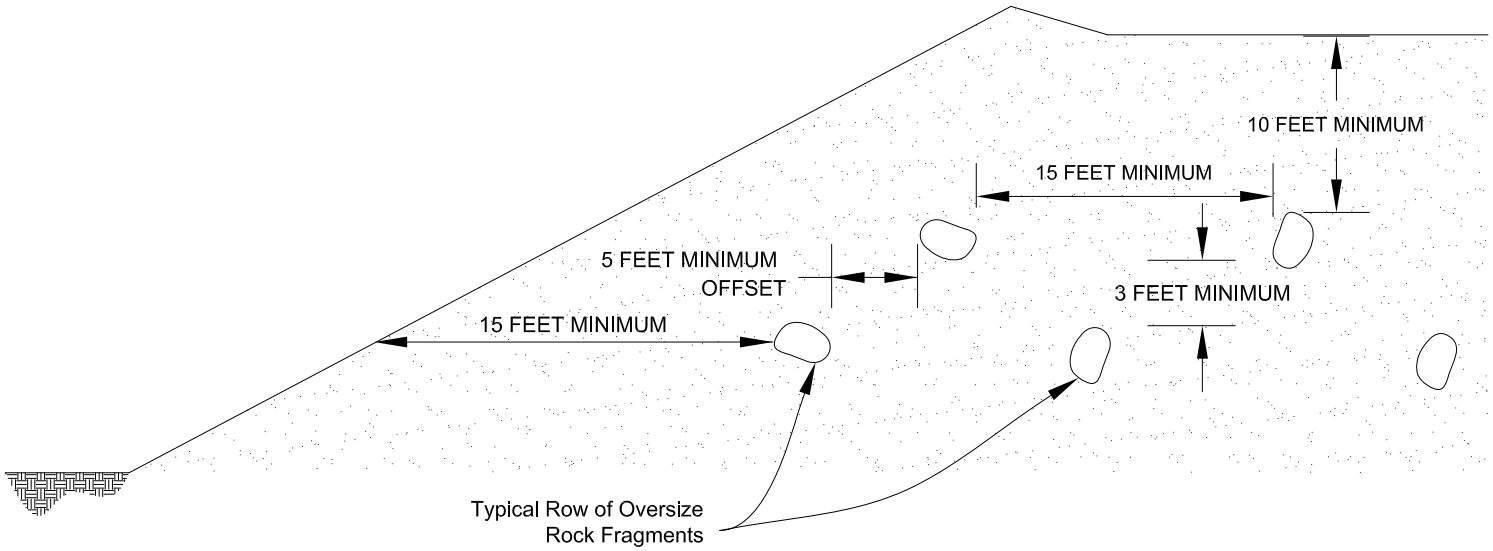
NOT TO SCALE

DRAWN: JAS
CHKD: GKM

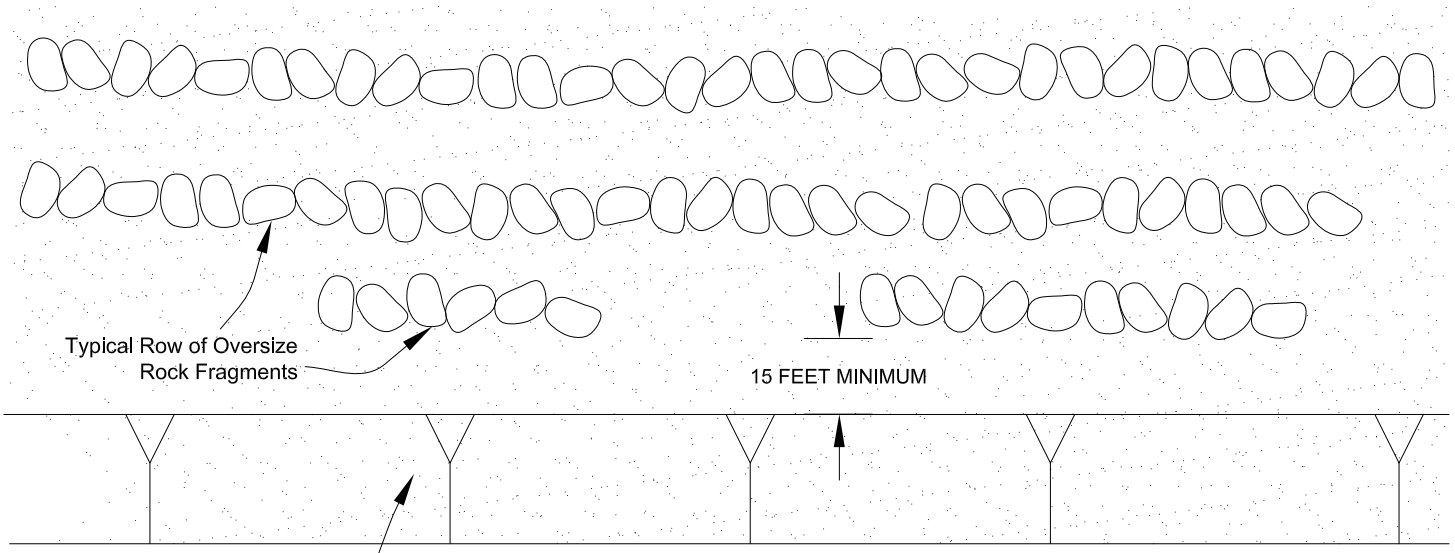
PLATE D-7

SoCalGeo

SOUTHERN CALIFORNIA GEOTECHNICAL



Section View



Plan View

PLACEMENT OF OVERSIZED MATERIAL

GRADING GUIDE SPECIFICATIONS

NOT TO SCALE

DRAWN: PM
CHKD: GKM

PLATE D-8

SoCalGeo

SOUTHERN CALIFORNIA GEOTECHNICAL

APPENDIX E

USGS Design Maps Summary Report

User–Specified Input

Building Code Reference Document ASCE 7-10 Standard
(which utilizes USGS hazard data available in 2008)

Site Coordinates 33.83137°N, 117.21511°W

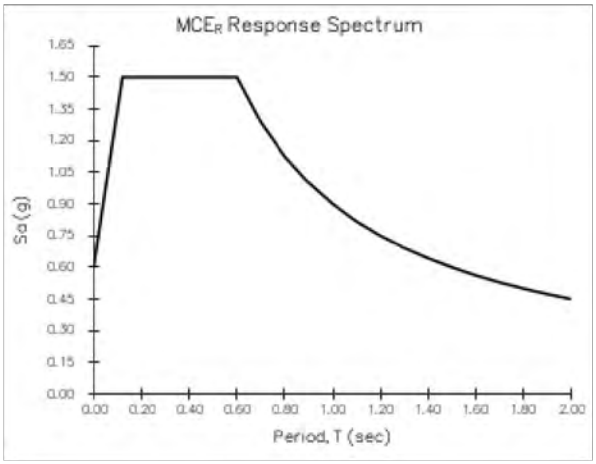
Site Soil Classification Site Class D – "Stiff Soil"

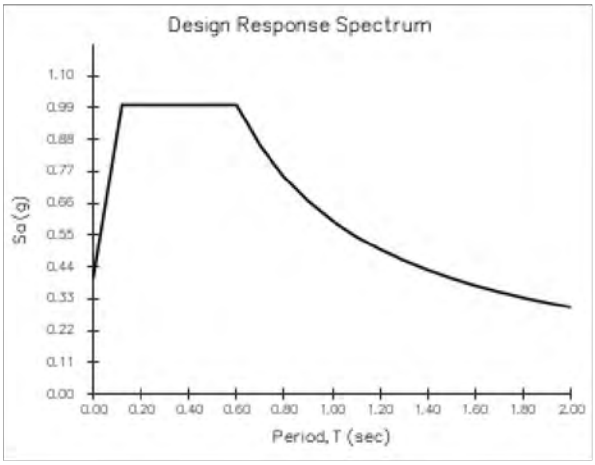
Risk Category I/II/III

USGS–Provided Output

S_S =	1.500 g	S_{MS} =	1.500 g	S_{DS} =	1.000 g
S_1 =	0.600 g	S_{M1} =	0.900 g	S_{D1} =	0.600 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





SOURCE: U.S. GEOLOGICAL SURVEY (USGS)
<http://geohazards.usgs.gov/designmaps/us/application.php>

SEISMIC DESIGN PARAMETERS

RIDER 2 - PROPOSED COMMERCIAL/INDUSTRIAL BUILDING

PERRIS, CALIFORNIA

DRAWN: JLL
CHKD: GKM

SCG PROJECT
17G199-1

PLATE E-1

SoCalGeo SOUTHERN CALIFORNIA GEOTECHNICAL

APPENDIX F

LIQUEFACTION EVALUATION

Project Name	Rider 2	MCE_G Design Acceleration	0.500 (g)
Project Location	Perris, CA	Design Magnitude	7.09
Project Number	17G199	Historic High Depth to Groundwater	26 (ft)
Engineer	DWN	Depth to Groundwater at Time of Drilling	33 (ft)
		Borehole Diameter	6 (in)
Boring No.	B-1		

Sample Depth (ft)	Depth to Top of Layer (ft)	Depth to Bottom of Layer (ft)	Depth to Midpoint (ft)	Uncorrected SPT N-Value	Unit Weight of Soil (pcf)	Fines Content (%)	Energy Correction	C_B	C_S	C_N	Rod Length Correction	$(N_1)_{60}$	$(N_1)_{60CS}$	Overburden Stress (σ_o) (psf)	Eff. Overburden Stress (Hist. Water) (σ_o') (psf)	Eff. Overburden Stress (Curr. Water) (σ_o') (psf)	Stress Reduction Coefficient (r_d)	MSF	Ks	Cyclic Resistance Ratio (M=7.5)	Cyclic Resistance Ratio (M=7.09)	Cyclic Stress Ratio Induced by Design Earthquake	Factor of Safety	Comments
							(1)	(2)	(3)	(4)	(5)	(6)	(7)				(8)	(9)	(10)	(11)	(12)	(13)		
7	0	28	14		120		1.3	1.05	1.1	1.20	0.75	0.0	0.0	1680	1680	1680	0.96	1.01	1.01	0.06	0.06	N/A	N/A	Above Water Table
29.5	28	32	30	32	120		1.3	1.05	1.3	0.87	0.95	47.1	47.1	3600	3350	3600	0.88	1.17	0.86	2.00	2.00	0.31	6.48	Nonliquefiable
34.5	32	37	34.5	36	120		1.3	1.05	1.3	0.87	1	55.7	55.7	4140	3610	4046	0.86	1.17	0.84	2.00	1.97	0.32	6.14	Nonliquefiable
39.5	37	42	39.5	19	120	57	1.3	1.05	1.25	0.77	1	25.1	30.7	4740	3898	4334	0.83	1.15	0.87	0.53	0.53	0.33	1.62	Nonliquefiable
44.5	42	47	44.5	25	120	38	1.3	1.05	1.3	0.80	1	35.3	40.8	5340	4186	4622	0.81	1.17	0.8	2.00	1.87	0.33	5.58	Nonliquefiable
49.5	47	50	48.5	42	120		1.3	1.05	1.3	0.87	1	65.0	65.0	5820	4416	4853	0.78	1.17	0.78	2.00	1.83	0.34	5.44	Nonliquefiable

Notes:

(1) Energy Correction for N_{90} of automatic hammer to standard N_{60}

(2) Borehole Diameter Correction (Skempton, 1986)

(3) Correction for split-spoon sampler with room for liners, but liners are absent, (Seed et al., 1984, 2001)

(4) Overburden Correction, Caluclated by Eq. 39 (Boulanger and Idriss, 2008)

(5) Rod Length Correction for Samples <10 m in depth

(6) N-value corrected for energy, borehole diameter, sampler with absent liners, rod length, and overburden

(7) N-value corrected for fines content per Eqs. 75 and 76 (Boulanger and Idriss, 2008)

(8) Stress Reduction Coefficient calculated by Eq. 22 (Boulanger and Idriss, 2008)

(9) Magnitude Scaling Factor calculated by Eqns. A.8 & A.10 (Boulanger and Idriss, 2014)

(10) Overburden Correction Factor calcuated by Eq. 54 (Boulanger and Idriss, 2008)

(11) Calcuated by Eq. 70 (Boulanger and Idriss, 2008)

(12) Calcuated by Eq. 72 (Boulanger and Idriss, 2008)

(13) Calcuated by Eq. 25 (Boulanger and Idriss, 2008)

LIQUEFACTION INDUCED SETTLEMENTS

Project Name	Rider 2
Project Location	Perris, CA
Project Number	17G199
Engineer	DWN

Boring No. B-1

Sample Depth (ft)	Depth to Top of Layer (ft)	Depth to Bottom of Layer (ft)	Depth to Midpoint (ft)	$(N_1)_{60}$	DN for fines cont	$(N_1)_{60\text{-}CS}$	Liquefaction Factor of Safety	Limiting Shear Strain γ_{min}	Parameter Fα	Maximum Shear Strain γ_{max}	Height of Layer		Vertical Reconsolidation Strain ε_v		Total Deformation of Layer (in)	Comments
				(1)	(2)	(3)	(4)	(5)	(6)	(7)			(8)			
7	0	28	14	0.0	0.0	0.0	N/A	0.50	0.95	0.00	28.00		0.000		0.00	Above Water Table
29.5	28	32	30	47.1	0.0	47.1	6.48	0.00	-1.35	0.00	4.00		0.000		0.00	Nonliquefiable
34.5	32	37	34.5	55.7	0.0	55.7	6.14	0.00	-2.06	0.00	5.00		0.000		0.00	Nonliquefiable
39.5	37	42	39.5	25.1	5.6	30.7	1.62	0.04	-0.14	0.01	5.00		0.000		0.00	Nonliquefiable
44.5	42	47	44.5	35.3	5.6	40.8	5.58	0.01	-0.87	0.00	5.00		0.000		0.00	Nonliquefiable
49.5	47	50	48.5	65.0	0.0	65.0	5.44	0.00	-2.86	0.00	3.00		0.000		0.00	Nonliquefiable
											Total Deformation (in)				0.00	

Notes:

(1) $(N_1)_{60}$ calculated previously for the individual layer

(2) Correction for fines content per Equation 76 (Boulanger and Idriss, 2008)

(3) Corrected $(N_1)_{60}$ for fines content

(4) Factor of Safety against Liquefaction, calculated previously for the individual layer

(5) Calcuated by Eq. 86 (Boulanger and Idriss, 2008)

(6) Calcuated by Eq. 89 (Boulanger and Idriss, 2008)

(7) Calcuated by Eqs. 90, 91, and 92 (Boulanger and Idriss, 2008)

(8) Volumetric Strain Induced in a Liquefiable Layer, Calcuated by Eq. 96 (Boulanger and Idriss, 2008)
(Strain N/A if Factor of Safety against Liquefaction > 1.3)

LIQUEFACTION EVALUATION

Project Name	Rider 2	MCE_G Design Acceleration	0.500 (g)
Project Location	Perris, CA	Design Magnitude	7.09
Project Number	17G199	Historic High Depth to Groundwater	26 (ft)
Engineer	DWN	Depth to Groundwater at Time of Drilling	33 (ft)
		Borehole Diameter	6 (in)
Boring No.	B-8		

Sample Depth (ft)	Depth to Top of Layer (ft)	Depth to Bottom of Layer (ft)	Depth to Midpoint (ft)	Uncorrected SPT N-Value	Unit Weight of Soil (pcf)	Fines Content (%)	Energy Correction	C_B	C_S	C_N	Rod Length Correction	$(N_1)_{60}$	$(N_1)_{60CS}$	Overburden Stress (σ_o) (psf)	Eff. Overburden Stress (Hist. Water) (σ_o') (psf)	Eff. Overburden Stress (Curr. Water) (σ_o') (psf)	Stress Reduction Coefficient (r_d)	MSF	Ks	Cyclic Resistance Ratio (M=7.5)	Cyclic Resistance Ratio (M=7.09)	Cyclic Stress Ratio Induced by Design Earthquake	Factor of Safety	Comments
							(1)	(2)	(3)	(4)	(5)	(6)	(7)				(8)	(9)	(10)	(11)	(12)	(13)		
7	0	28	14		120		1.3	1.05	1.1	1.20	0.75	0.0	0.0	1680	1680	1680	0.96	1.01	1.01	0.06	0.06	N/A	N/A	Above Water Table
29.5	28	32	30	39	120		1.3	1.05	1.3	0.90	0.95	59.4	59.4	3600	3350	3600	0.88	1.17	0.86	2.00	2.00	0.31	6.48	Nonliquefiable
34.5	32	37	34.5	10	120	44	1.3	1.05	1.11	0.74	1	11.2	16.8	4140	3610	4046	0.86	1.05	0.94	0.17	0.17	0.32	0.53	**Liquefiable**
39.5	37	42	39.5	49	120		1.3	1.05	1.3	0.94	1	81.5	81.5	4740	3898	4334	0.83	1.17	0.82	2.00	1.92	0.33	5.82	Nonliquefiable
44.5	42	47	44.5	52	120		1.3	1.05	1.3	0.95	1	87.7	87.7	5340	4186	4622	0.81	1.17	0.8	2.00	1.87	0.33	5.58	Nonliquefiable
49.5	47	50	48.5	37	120		1.3	1.05	1.3	0.84	1	54.9	54.9	5820	4416	4853	0.78	1.17	0.78	2.00	1.83	0.34	5.44	Nonliquefiable

Notes:

(1) Energy Correction for N_{90} of automatic hammer to standard N_{60}

(2) Borehole Diameter Correction (Skempton, 1986)

(3) Correction for split-spoon sampler with room for liners, but liners are absent, (Seed et al., 1984, 2001)

(4) Overburden Correction, Caluclated by Eq. 39 (Boulanger and Idriss, 2008)

(5) Rod Length Correction for Samples <10 m in depth

(6) N-value corrected for energy, borehole diameter, sampler with absent liners, rod length, and overburden

(7) N-value corrected for fines content per Eqs. 75 and 76 (Boulanger and Idriss, 2008)

(8) Stress Reduction Coefficient calculated by Eq. 22 (Boulanger and Idriss, 2008)

(9) Magnitude Scaling Factor calculated by Eqns. A.8 & A.10 (Boulanger and Idriss, 2014)

(10) Overburden Correction Factor calcuated by Eq. 54 (Boulanger and Idriss, 2008)

(11) Calcuated by Eq. 70 (Boulanger and Idriss, 2008)

(12) Calcuated by Eq. 72 (Boulanger and Idriss, 2008)

(13) Calcuated by Eq. 25 (Boulanger and Idriss, 2008)

LIQUEFACTION INDUCED SETTLEMENTS

Project Name	Rider 2
Project Location	Perris, CA
Project Number	17G199
Engineer	DWN

Boring No. B-8

Sample Depth (ft)	Depth to Top of Layer (ft)	Depth to Bottom of Layer (ft)	Depth to Midpoint (ft)	$(N_1)_{60}$	DN for fines cont	$(N_1)_{60\text{-}CS}$	Liquefaction Factor of Safety	Limiting Shear Strain γ_{min}	Parameter Fα	Maximum Shear Strain γ_{max}	Height of Layer		Vertical Reconsolidation Strain ε_v		Total Deformation of Layer (in)	Comments
				(1)	(2)	(3)	(4)	(5)	(6)	(7)			(8)			
7	0	28	14	0.0	0.0	0.0	N/A	0.50	0.95	0.00	28.00		0.000		0.00	Above Water Table
29.5	28	32	30	59.4	0.0	59.4	6.48	0.00	-2.37	0.00	4.00		0.000		0.00	Nonliquefiable
34.5	32	37	34.5	11.2	5.6	16.8	0.53	0.23	0.68	0.23	5.00		0.026		1.59	**Liquefiable**
39.5	37	42	39.5	81.5	0.0	81.5	5.82	0.00	-4.33	0.00	5.00		0.000		0.00	Nonliquefiable
44.5	42	47	44.5	87.7	0.0	87.7	5.58	0.00	-4.91	0.00	5.00		0.000		0.00	Nonliquefiable
49.5	47	50	48.5	54.9	0.0	54.9	5.44	0.00	-2.00	0.00	3.00		0.000		0.00	Nonliquefiable
											Total Deformation (in)				1.59	

Notes:

(1) $(N_1)_{60}$ calculated previously for the individual layer

(2) Correction for fines content per Equation 76 (Boulanger and Idriss, 2008)

(3) Corrected $(N_1)_{60}$ for fines content

(4) Factor of Safety against Liquefaction, calculated previously for the individual layer

(5) Calcuated by Eq. 86 (Boulanger and Idriss, 2008)

(6) Calcuated by Eq. 89 (Boulanger and Idriss, 2008)

(7) Calcuated by Eqs. 90, 91, and 92 (Boulanger and Idriss, 2008)

(8) Volumetric Strain Induced in a Liquefiable Layer, Calcuated by Eq. 96 (Boulanger and Idriss, 2008)
(Strain N/A if Factor of Safety against Liquefaction > 1.3)

November 22, 2017

IDI Gazeley
8 Corporate Park, Suite 300-34
Irvine, California 92606

Attention: Mr. Stephen Hollis

Project No.: **17G199-2**

Subject: **Results of Infiltration Testing**
Rider 2 – Proposed Commercial/Industrial Building
NEC Redlands Avenue and Rider Street
Perris, California

Reference: Geotechnical Investigation, Rider 2 – Proposed Commercial/Industrial Building, NEC Redlands Avenue and Rider Street, Perris, California, prepared for IDI Gazeley by Southern California Geotechnical, Inc. (SCG), SCG Project No. 17G199-1, dated November 22, 2017.

Gentlemen:

In accordance with your request, we have conducted infiltration testing at the subject site. We are pleased to present this report summarizing the results of the infiltration testing and our design recommendations.

Scope of Services

The scope of services performed for this project was in general accordance with our Proposal No. 17P381 dated October 10, 2017. The scope of services included site reconnaissance, subsurface exploration, field testing, and engineering analysis to determine the infiltration rates of the onsite soils. The infiltration testing was performed in general accordance with ASTM Test Method D-3385-03, Standard Test Method for Infiltration Rate of Soils in Field Using Double Ring Infiltrometer.

Site and Project Description

The site is located at the northeast corner of Redlands Avenue and Rider Street in Perris, California. The site is bounded to the north by an agricultural field, to the west by Redlands Avenue, to the south by Rider Street and to the east by a flood control channel. The general location of the site is illustrated on the Site Location Map included as Plate 1 of this report.

The subject site consists of a trapezoidal-shaped parcel that is approximately 37.93± acres in size. The site was most recently utilized as an agricultural field. Current groundcover consists of crop stubble and some small native shrubs.

Detailed topographic information was obtained from a conceptual site plan prepared by Albert A. Webb Associates (Webb), the project civil engineer. This plan indicates that the overall site topography generally slopes downward to the east-southeast at an estimated gradient of less

than 1 percent. The maximum site elevation is 1445± feet mean sea level (msl) located in the northwestern corner of the subject site, and the minimum site elevation is 1441± feet msl in the southeastern corner of the subject site.

Proposed Development

The site plan provided to our office by the client indicates that the new development be developed with one (1) new commercial/industrial building. The building will be located in the center of the site and will be 822,520± ft² in size. The building will be constructed in a cross-dock configuration with loading docks along both the north and south sides of the building. It is expected that the building will be surrounded by asphaltic concrete pavements for parking and drive lanes and Portland cement concrete pavements in the loading dock areas. Landscape planters and concrete flatwork are expected to be included throughout the site. A detention basin will be located in the southeastern corner of the site.

We understand that the proposed development will include on-site infiltration to dispose of storm water. Based on the conceptual site plan prepared by Webb, the proposed infiltration system will consist of an infiltration basin located in the southeastern corner of the site. The bottom of the proposed infiltration basin is expected to be at an elevation of 1431.5± feet msl.

Concurrent Study

Southern California Geotechnical, Inc. (SCG) recently conducted a geotechnical investigation at the subject site, referenced above. As a part of this study, twelve (12) borings were advanced to depths of 5 to 50± feet below existing site grades.

Alluvium was encountered at the ground surface at all of the boring locations. The alluvium consists of loose to dense silty fine sands and fine sandy silts and stiff to hard clayey silts, silty clays and sandy clays, extending to the maximum depth explored of 50± feet.

Groundwater

Free water was encountered during drilling at a depth of 33± feet below the ground surface. Based on the water level measurements and the moisture contents of the recovered soil samples, the static groundwater table is considered to have existed at a depth of 33± feet below existing site grades at the time of the subsurface investigation. As part of our research, we reviewed available groundwater data in order to determine the historic high groundwater level for the site. The primary reference used to determine the groundwater depths in this area is the California Department of Water Resources website, http://www.water.ca.gov/waterdatalibrary/. Several monitoring wells are located within a mile radius of the subject site with high groundwater level readings ranging from 26 to 108± feet from the ground surface. Therefore, the high groundwater depth of 26± feet (February 2012) reported in a monitoring well located 0.75 miles east of the subject site is considered to be conservative with respect to the recent site conditions.

Subsurface Exploration

Scope of Exploration

The subsurface exploration for the infiltration testing consisted of four (4) backhoe excavated trenches, extending to depths of 7 to 9± feet below existing site grades. The trenches were logged during excavation by a member of our staff. The approximate locations of the infiltration trenches (identified as I-1 through I-4) are indicated on the Infiltration Test Location Plan, enclosed as Plate 2 of this report.

Geotechnical Conditions

Native alluvium was encountered at the ground surface at all of the infiltration trench locations, extending to at least the maximum depth explored of 9± feet below existing site grades. The native alluvial soils generally consist of medium dense to dense clayey fine to medium sands and medium stiff to very stiff silty clays, clayey silts, and fine sandy clays. Free water was not encountered during the excavation of any of the trenches. The Trench Logs, which illustrate the conditions encountered at the trench locations, are included with this report.

Infiltration Testing

We understand that the results of the testing will be used to prepare a preliminary design for the storm water infiltration system that will be used at the subject site. The infiltration testing was performed in general accordance with ASTM Test Method D-3385-03, Standard Test Method for Infiltration Rate of Soils in Field Using Double Ring Infiltrometer.

Two stainless steel infiltration rings were used for the infiltration testing. The outer infiltration ring is 2 feet in diameter and 20 inches in height. The inner infiltration ring is 1 foot in diameter and 20 inches in height. At the test locations, the outer ring was driven 3± inches into the soil at the base of each trench. The inner ring was centered inside the outer ring and subsequently driven 3± inches into the soil at the base of the trenches. The rings were driven into the soil using a ten-pound sledge hammer. The soil surrounding the wall of the infiltration rings was only slightly disturbed during the driving process.

Infiltration Testing Procedure

Infiltration testing was performed at all four (4) of the test locations. The infiltration testing consisted of filling the inner ring and the annular space (the space between the inner and outer rings) with water, approximately 3 to 4 inches above the soil. To prevent the flow of water from one ring to the other, the water level in both the inner ring and the annular space between the rings was maintained using constant-head float valves. The volume of water that was added to maintain a constant head in the inner ring and the annular space during each time interval was determined and recorded. A cap was placed over the rings to minimize the evaporation of water during the test.

The schedule for readings was determined based on the observed soil type at the base of each backhoe excavated trench. Based on the existing soils at each infiltration test location, the volumetric measurements were made at increments ranging from 10 to 30 minutes. The water

volume measurements are presented on the spreadsheets enclosed with this report. The infiltration rates for each of the timed intervals are also tabulated on these spreadsheets.

The infiltration rates for the infiltration tests are calculated in centimeters per hour and then converted to inches per hour. The rates are summarized below:

Infiltration Test No.	Mean Sea Level (feet)	Soil Description	Infiltration Rate (inches/hour)
I-1	1433	Fine to medium Sandy Clay, trace Silt	2.4
I-2	1432.5	Clayey fine to medium Sand	0.7
I-3	1434	Fine to medium Sandy Clay, trace Silt	2.1
I-4	1432	Clayey fine to medium Sand, trace Silt	1.7

Laboratory Testing

Grain Size Analysis

The grain size distribution of selected soils from the base of each infiltration test trench has been determined using a range of wire mesh screens. These tests were performed in general accordance with ASTM D-422 and/or ASTM D-1140. The weight of the portion of the sample retained on each screen is recorded and the percentage finer or coarser of the total weight is calculated. The results of these tests are presented at the end of this report.

Design Recommendations

Four (4) infiltration tests were performed at the subject site. As noted above, the calculated infiltration rates at the infiltration test locations range from 0.7 to 2.4 inches per hour. The primary factors affecting the infiltration rates are the varying relative densities, and the clay and silt content of the encountered soils, which vary at different depths and locations at the subject site. In general, very dense clayey sands were encountered at the bottom of Infiltration Test No. I-2, which exhibited the slowest infiltration rate.

Based on the infiltration test results, we recommend a design infiltration rate of 1.0 inch per hour be used for the proposed infiltration basin located in the southeastern corner of the subject site.

The design of the proposed storm water infiltration system should be performed by the project civil engineer, in accordance with the City of Perris and/or County of Riverside guidelines. However, it is recommended that the system be constructed so as to facilitate removal of silt and clay, or other deleterious materials from any water that may enter the system. The presence of such materials would decrease the effective infiltration rate. **It is recommended that the project civil engineer apply an appropriate factor of safety. The infiltration rate recommended above is based on the assumption that only clean water will be introduced to the subsurface profile. Any fines, debris, or organic materials could significantly impact the infiltration rate.** It should be noted that the recommended

infiltration rate is based on infiltration testing at four (4) discrete locations and the overall infiltration rate of the storm water infiltration system could vary considerably.

Infiltration versus Permeability

Infiltration rates are based on unsaturated flow. As water is introduced into soils by infiltration, the soils become saturated and the wetting front advances from the unsaturated zone to the saturated zone. Once the soils become saturated, infiltration rates become zero, and water can only move through soils by hydraulic conductivity at a rate determined by pressure head and soil permeability. The infiltration rates presented herein were determined in accordance with the ASTM Test Method D-3385-03 standard, and are considered valid for the time and place of the actual test. Changes in soil moisture content will affect these infiltration rates. Infiltration rates should be expected to decrease until the soils become saturated. Soil permeability values will then govern groundwater movement. Permeability values may be on the order of 10 to 20 times less than infiltration rates. The system designer should incorporate adequate factors of safety and allow for overflow design into appropriate traditional storm drain systems, which would transport storm water off-site.

Location of Infiltration Systems

The use of on-site storm water infiltration systems carries a risk of creating adverse geotechnical conditions. Increasing the moisture content of the soil can cause the soil to lose internal shear strength and increase its compressibility, resulting in a change in the designed engineering properties. Overlying structures and pavements in the infiltration areas could potentially be damaged due to saturation of subgrade soils. **The proposed infiltration system for the site should be located at least 25 feet away from any structures, including retaining walls.** Even with this provision of locating the infiltration systems at least 25 feet from any building, it is possible that infiltrating water into the subsurface soils could have an adverse effect on any proposed or existing structure. It should also be noted that utility trenches which happen to collect storm water can also serve as conduits to transmit storm water toward the structure, depending on the slope of the utility trench. Therefore, consideration should also be given to the proposed locations of underground utilities which may pass near the proposed infiltration system.

General Comments

This report has been prepared as an instrument of service for use by the client in order to aid in the evaluation of this property and to assist the architects and engineers in the design and preparation of the project plans and specifications. This report may be provided to the contractor(s) and other design consultants to disclose information relative to the project. However, this report is not intended to be utilized as a specification in and of itself, without appropriate interpretation by the project architect, structural engineer, and/or civil engineer. The design of the infiltration system is the responsibility of the civil engineer. The role of the geotechnical engineer is limited to determination of infiltration rate only. By using the design infiltration rates contained herein, the civil engineer agrees to indemnify, defend, and hold harmless the geotechnical engineer for all aspects of the design and performance of the infiltration system. The reproduction and distribution of this report must be authorized by the client and Southern California Geotechnical, Inc. Furthermore, any reliance on this report by an

unauthorized third party is at such party's sole risk, and we accept no responsibility for damage or loss which may occur.

The analysis of this site was based on a subsurface profile interpolated from limited discrete soil samples. While the materials encountered in the project area are considered to be representative of the total area, some variations should be expected between trench locations and testing depths. If the conditions encountered during construction vary significantly from those detailed herein, we should be contacted immediately to determine if the conditions alter the recommendations contained herein.

This report has been based on assumed or provided characteristics of the proposed development. It is recommended that the owner, client, architect, structural engineer, and civil engineer carefully review these assumptions to ensure that they are consistent with the characteristics of the proposed development. If discrepancies exist, they should be brought to our attention to verify that they do not affect the conclusions and recommendations contained herein. We also recommend that the project plans and specifications be submitted to our office for review to verify that our recommendations have been correctly interpreted.

The analysis, conclusions, and recommendations contained within this report have been promulgated in accordance with generally accepted professional geotechnical engineering practice. No other warranty is implied or expressed.

Closure

We sincerely appreciate the opportunity to be of service on this project. We look forward to providing additional consulting services during the course of the project. If we may be of further assistance in any manner, please contact our office.

Respectfully Submitted,

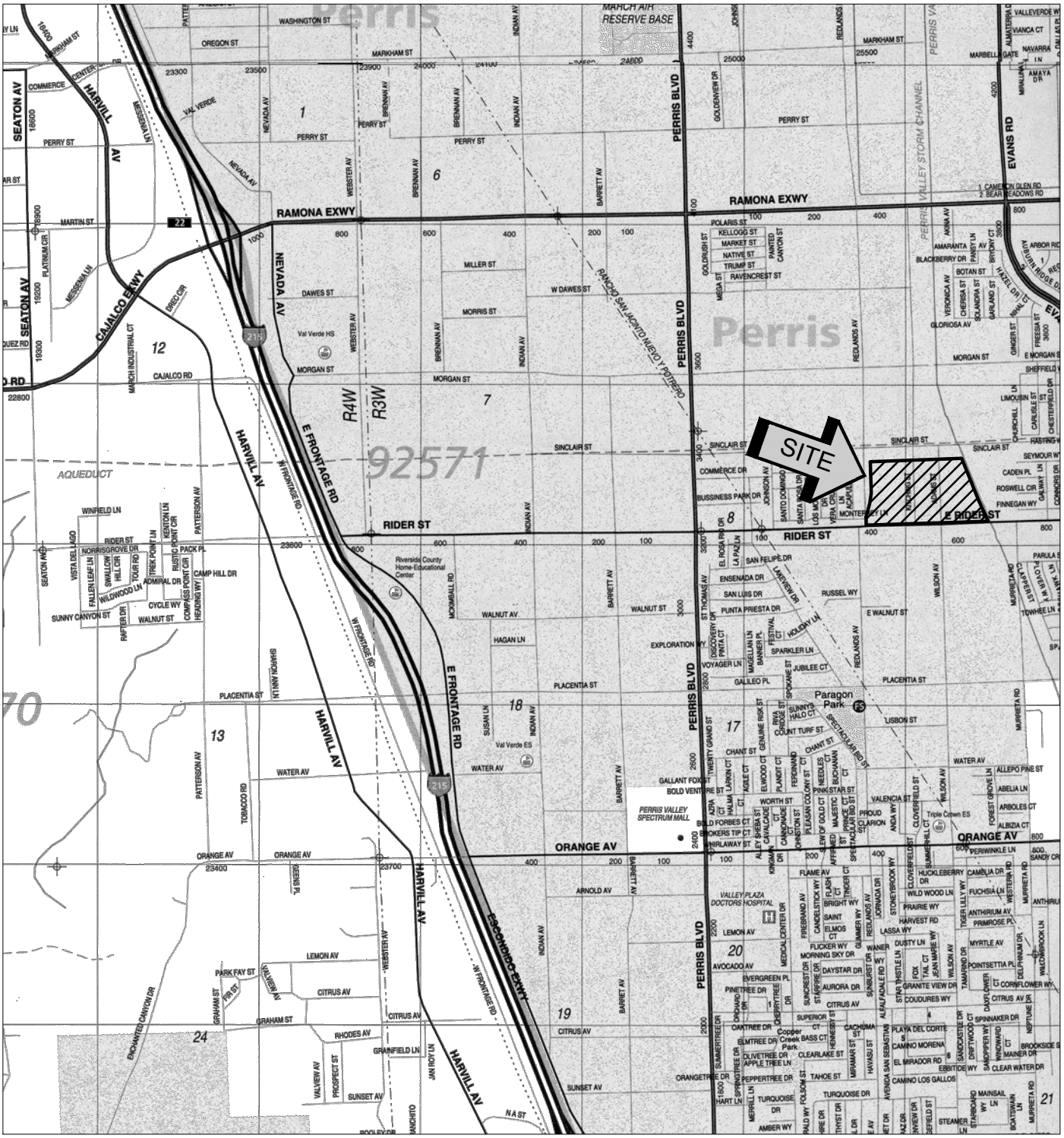
SOUTHERN CALIFORNIA GEOTECHNICAL, INC.

Scott McCann
Staff Scientist

Gregory K. Mitchell, GE 2364
Principal Engineer

Distribution: (1) Addressee

Enclosures: Plate 1 - Site Location Map
Plate 2 - Infiltration Test Location Plan
Trench Logs (4 pages)
Infiltration Test Results Spreadsheets (4 pages)
Grain Size Distribution Graphs (4 pages)



SOURCE: RIVERSIDE COUNTY
THOMAS GUIDE, 2013

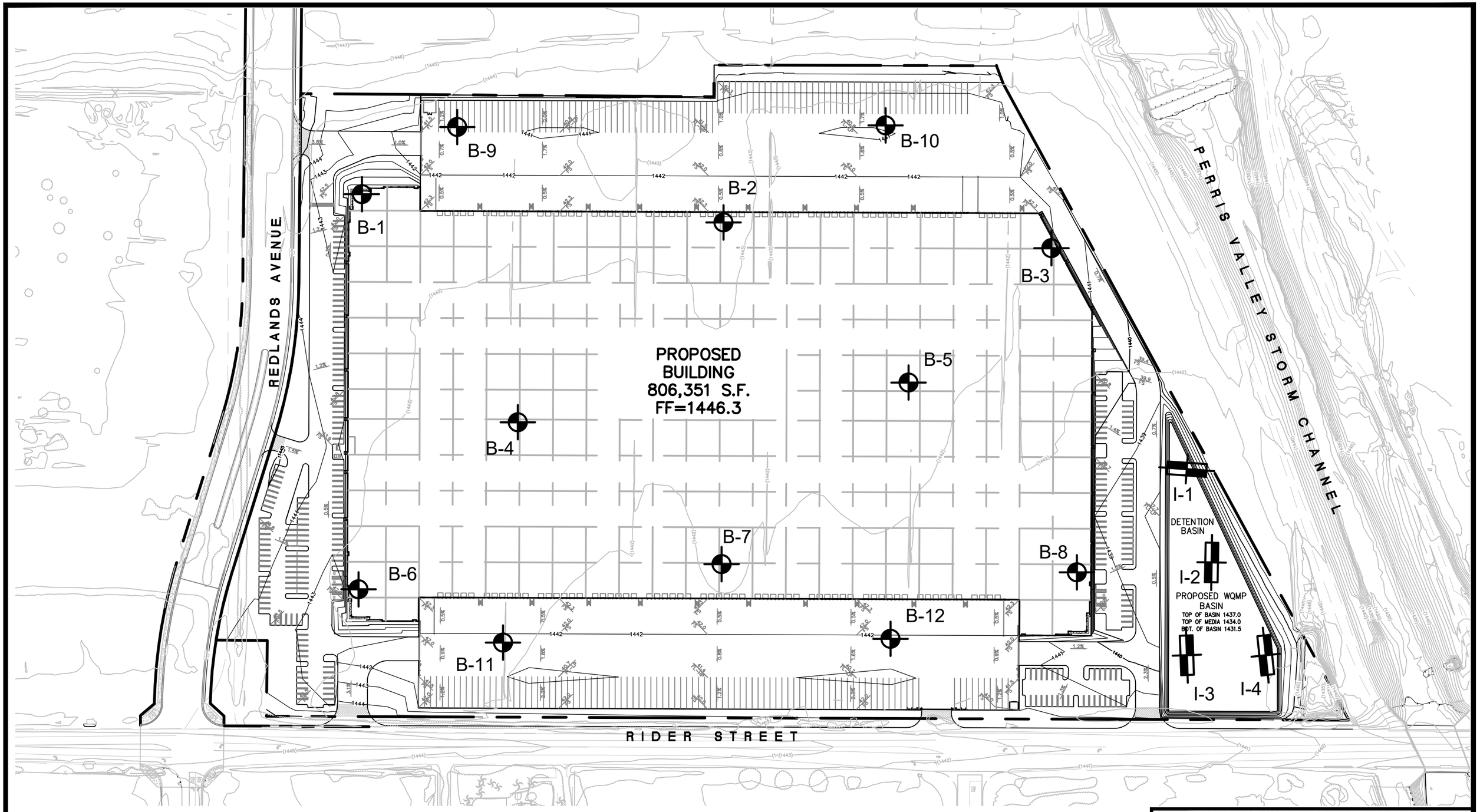
SITE LOCATION MAP

RIDER 2 - PROPOSED COMMERCIAL/INDUSTRIAL BUILDING

PERRIS, CALIFORNIA

SCALE: 1" = 2400'	
DRAWN: SAM CHKD: GKM	
SCG PROJECT 17G199-2	
PLATE 1	

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL



GEOTECHNICAL LEGEND

APPROXIMATE INFILTRATION TEST LOCATION

APPROXIMATE BORING LOCATION SCG PROJECT NO. 17G199-1

NORTH

NOTE: SITE PLAN PREPARED BY ALBERT A. WEBB ASSOCIATES.

INFILTRATION TEST LOCATION PLAN

RIDER 2 - PROPOSED COMMERCIAL/INDUSTRIAL BUILDING

PERRIS, CALIFORNIA

SCALE: 1" = 150'

DRAWN: JLL
CHKD: GKM

SCG PROJECT
17G199-2

PLATE 2

SOUTHERN CALIFORNIA GEOTECHNICAL

SOUTHERN CALIFORNIA GEOTECHNICAL

TRENCH NO. I-1

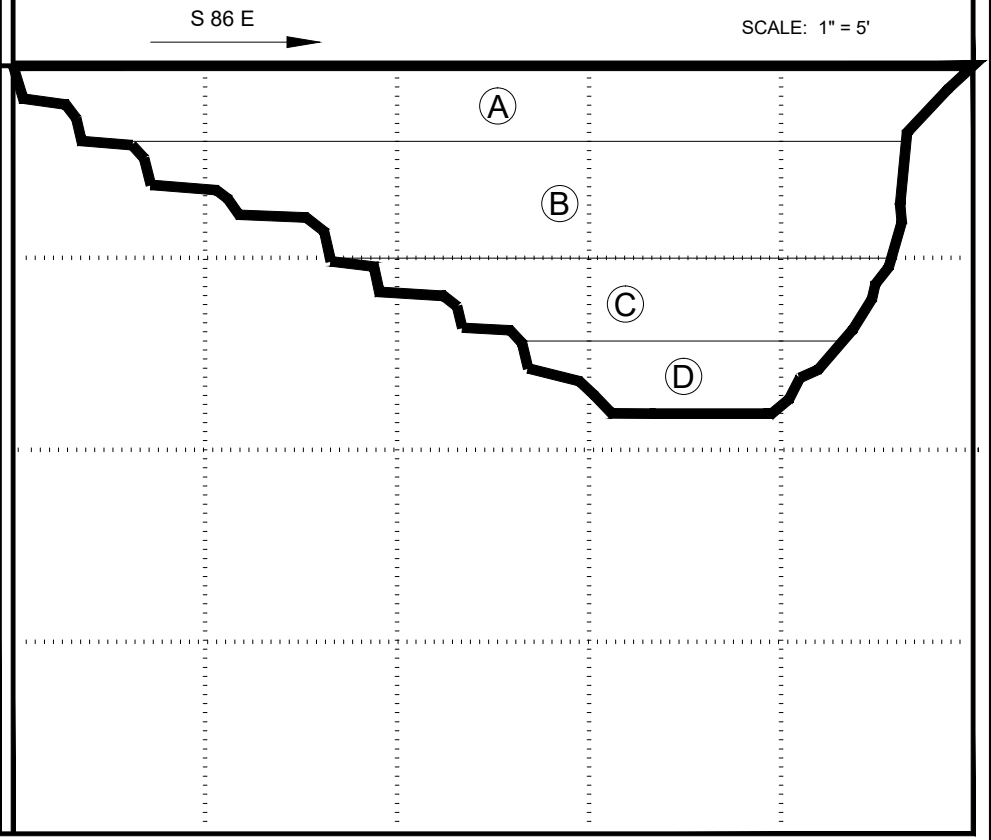
JOB NO.: 17G199-2
PROJECT: Rider 2 - Proposed C/I Building
LOCATION: Perris, CA
DATE: 11-1-2017

EQUIPMENT USED: Backhoe
LOGGED BY: Scott McCann
ORIENTATION: S 86 E
TOP OF TRENCH ELEVATION: 1442 feet msl

WATER DEPTH: Dry
SEEPAGE DEPTH: Dry
READINGS TAKEN: At Completion

DEPTH	SAMPLE	DRY DENSITY (PCF)	MOISTURE (%)	EARTH MATERIALS DESCRIPTION
				A: ALLUVIUM: Gray Brown Silty Clay, trace fine Sand, trace to abundant fine root fibers, very stiff - dry to damp
				B: ALLUVIUM: Light Gray Brown Clayey Silt, little fine Sand, trace medium Sand, trace calcareous veining, stiff - damp
5				C: ALLUVIUM: Light Gray Brown Clayey fine to medium Sand, trace Silt, medium dense - damp to moist
				D: ALLUVIUM: Brown fine to medium Sandy Clay, trace Silt, trace calcareous veining, medium stiff - damp to moist
10				Trench Terminated @ 9 feet Bottom of Trench Elevation: 1433 feet msl
15				

GRAPHIC REPRESENTATION



KEY TO SAMPLE TYPES:
B - BULK SAMPLE (DISTURBED)
R - RING SAMPLE 2-1/2" DIAMETER (RELATIVELY UNDISTURBED)

TRENCH LOG

PLATE B-1

SOUTHERN CALIFORNIA GEOTECHNICAL

TRENCH NO. I-2

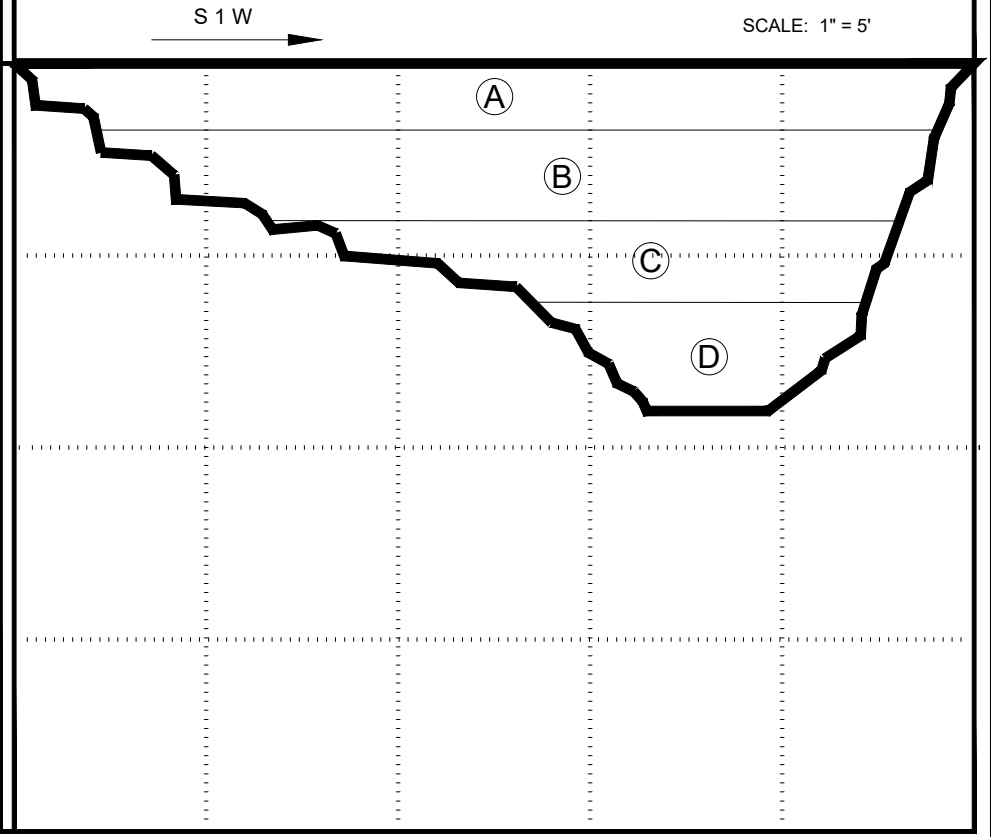
JOB NO.: 17G199-2
PROJECT: Rider 2 - Proposed C/I Building
LOCATION: Perris, CA
DATE: 11-1-2017

EQUIPMENT USED: Backhoe
LOGGED BY: Scott McCann
ORIENTATION: S 1 W
TOP OF TRENCH ELEVATION: 1441.5 feet msl

WATER DEPTH: Dry
SEEPAGE DEPTH: Dry
READINGS TAKEN: At Completion

DEPTH	SAMPLE	DRY DENSITY (PCF)	MOISTURE (%)	EARTH MATERIALS DESCRIPTION
				A: ALLUVIUM: Gray Brown Silty Clay, trace fine Sand, abundant fine root fibers, stiff - dry to damp
				B: ALLUVIUM: Gray Brown Clayey Silt, little fine Sand, trace calcareous veining, trace fine root fibers, medium stiff - damp
5				C: ALLUVIUM: Light Gray fine Sandy Clay, little medium Sand, little Silt, stiff - damp to moist
				D: ALLUVIUM: Brown Clayey fine to medium Sand, little calcareous veining, dense - moist
10				Trench Terminated @ 9 feet Bottom of Trench Elevation: 1432.5 feet msl
15				

GRAPHIC REPRESENTATION



KEY TO SAMPLE TYPES:
B - BULK SAMPLE (DISTURBED)
R - RING SAMPLE 2-1/2" DIAMETER (RELATIVELY UNDISTURBED)

TRENCH LOG

PLATE B-2

SOUTHERN CALIFORNIA GEOTECHNICAL

TRENCH NO. I-3

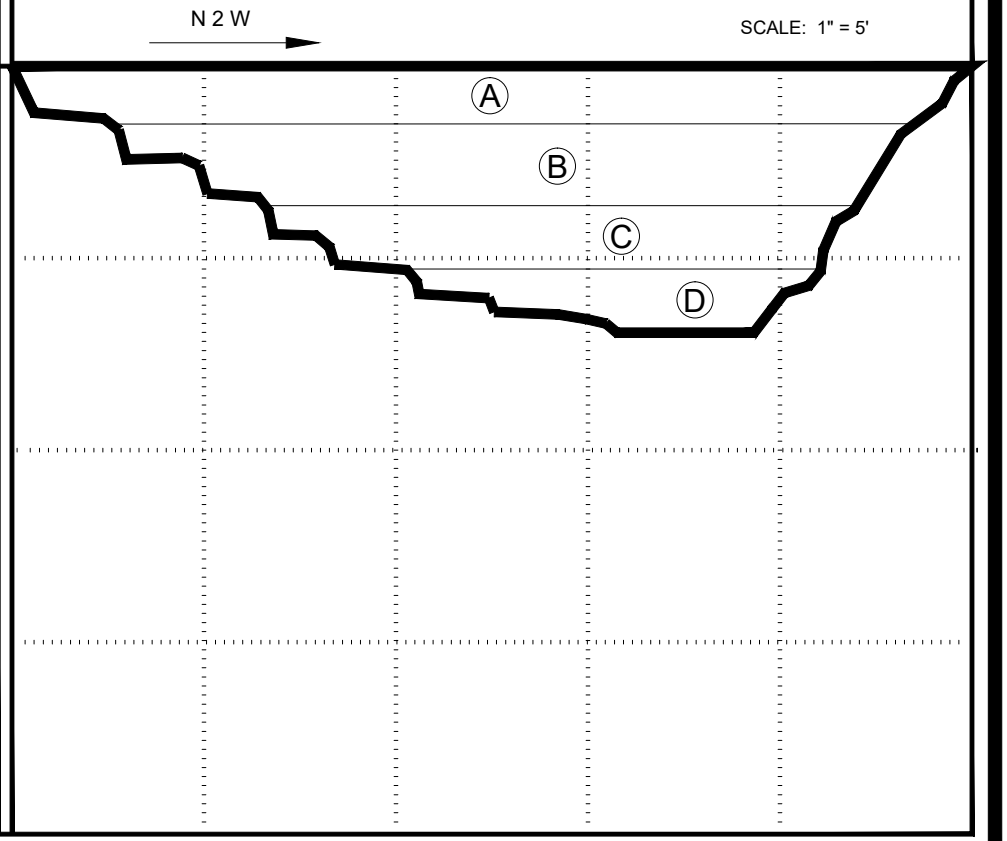
JOB NO.: 17G199-2
PROJECT: Rider 2 - Proposed C/I Building
LOCATION: Perris, CA
DATE: 11-1-2017

EQUIPMENT USED: Backhoe
LOGGED BY: Scott McCann
ORIENTATION: N 2 W
TOP OF TRENCH ELEVATION: 1441 feet msl

WATER DEPTH: Dry
SEEPAGE DEPTH: Dry
READINGS TAKEN: At Completion

DEPTH	SAMPLE	DRY DENSITY (PCF)	MOISTURE (%)	EARTH MATERIALS DESCRIPTION
				A: ALLUVIUM: Gray Brown Silty Clay, abundant fine root fibers, very stiff - dry to damp
				B: ALLUVIUM: Gray Brown Clayey Silt, trace fine Sand, slightly porous, trace calcareous veining, trace fine root fibers, stiff - damp to moist
				C: ALLUVIUM: Light Gray Brown Clayey fine to medium Sand, trace Silt, trace calcareous veining, medium dense - damp to moist
5				D: ALLUVIUM: Light Brown fine to medium Sandy Clay, trace Silt, medium stiff to stiff - damp to moist
				Trench Terminated @ 7 feet Bottom of Trench Elevation: 1434 feet msl
10				
15				

GRAPHIC REPRESENTATION



KEY TO SAMPLE TYPES:
B - BULK SAMPLE (DISTURBED)
R - RING SAMPLE 2-1/2" DIAMETER (RELATIVELY UNDISTURBED)

TRENCH LOG

PLATE B-3

SOUTHERN CALIFORNIA GEOTECHNICAL

TRENCH NO. I-4

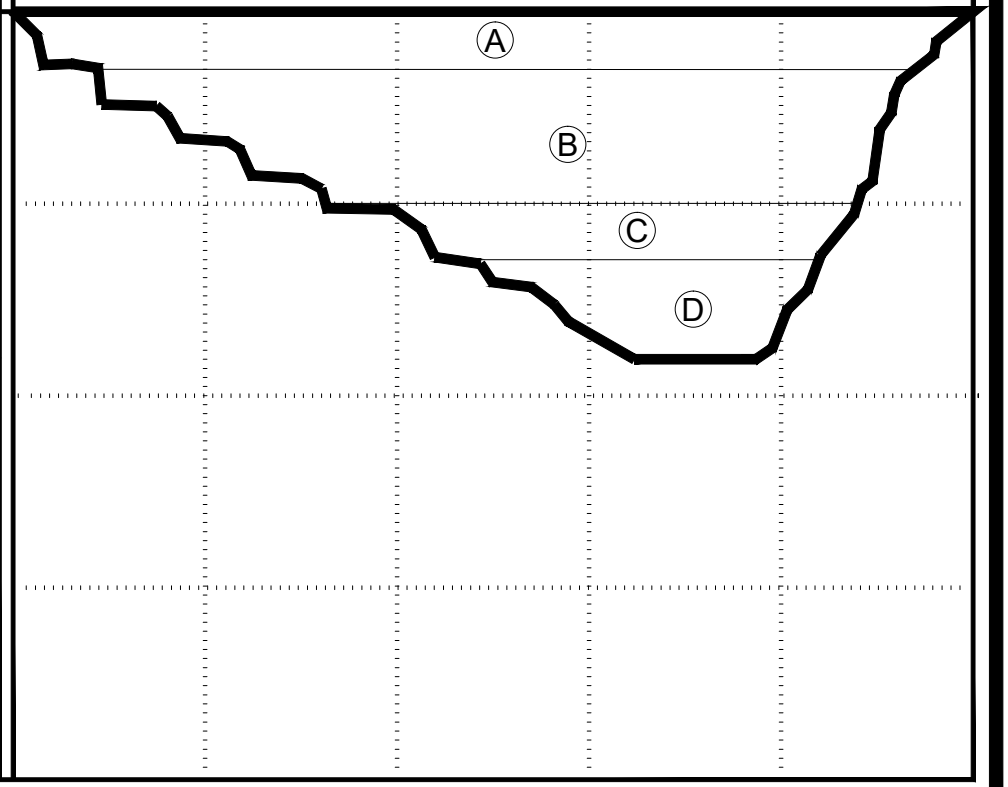
JOB NO.: 17G199-2
PROJECT: Rider 2 - Proposed C/I Building
LOCATION: Perris, CA
DATE: 11-1-2017

EQUIPMENT USED: Backhoe
LOGGED BY: Scott McCann
ORIENTATION: N 6 W
TOP OF TRENCH ELEVATION: 1441 feet msl

WATER DEPTH: Dry
SEEPAGE DEPTH: Dry
READINGS TAKEN: At Completion

DEPTH	SAMPLE	DRY DENSITY (PCF)	MOISTURE (%)	EARTH MATERIALS DESCRIPTION
				A: ALLUVIUM: Gray Brown Silty Clay, trace fine Sand, abundant fine root fibers, stiff - damp
				B: ALLUVIUM: Gray Brown Clayey Silt, trace fine Sand, trace calcareous veining, trace fine root fibers, stiff - damp to moist
5				C: ALLUVIUM: Light Gray fine to medium Sandy Clay, trace Silt, stiff - damp to moist
				D: ALLUVIUM: Brown Clayey fine to medium Sand, trace Silt, trace calcareous veining, medium dense - moist
10				Trench Terminated @ 9 feet Bottom of Trench Elevation: 1432 feet msl
15				

GRAPHIC REPRESENTATION



KEY TO SAMPLE TYPES:
B - BULK SAMPLE (DISTURBED)
R - RING SAMPLE 2-1/2" DIAMETER (RELATIVELY UNDISTURBED)

TRENCH LOG

PLATE B-4

INFILTRATION CALCULATIONS

Project Name	Rider 2 - Proposed Commercial/Industrial Building
Project Location	Perris, CA
Project Number	17G199-2
Engineer	Scott McCann

Infiltration Test No: I-1

Constants

	Diameter (ft)	Area (ft^2)	Area (cm^2)
Inner	1	0.79	730
Anlr. Spac	2	2.36	2189

*Note: The infiltration rate was calculated based on current time interval

Test Interval		Time (hr)	Interval **Elapsed** (min)	Flow Readings: Inner Ring (ml)	Flow Readings: Ring Flow (cm^3)	Flow Readings: Annular Ring (ml)	Flow Readings: Space Flow (cm^3)	Infiltration Rates: Inner Ring* (cm/hr)	Infiltration Rates: Annular Space* (cm/hr)	Infiltration Rates: Inner Ring* (in/hr)	Infiltration Rates: Annular Space* (in/hr)
1	Initial	2:00 PM	15	250	1700	1500	6800	9.32	12.43	3.67	4.89
	Final	2:15 PM	**15**	1950		8300					
2	Initial	2:16 PM	15	150	1300	400	5800	7.13	10.60	2.81	4.17
	Final	2:31 PM	**31**	1450		6200					
3	Initial	2:32 PM	15	50	1225	1400	5300	6.72	9.69	2.64	3.81
	Final	2:47 PM	**47**	1275		6700					
4	Initial	2:48 PM	15	50	1150	300	5300	6.30	9.69	2.48	3.81
	Final	3:03 PM	**63**	1200		5600					
5	Initial	3:04 PM	15	200	1100	500	5200	6.03	9.50	2.37	3.74
	Final	3:19 PM	**79**	1300		5700					
6	Initial	3:20 PM	15	150	1100	900	5200	6.03	9.50	2.37	3.74
	Final	3:35 PM	**95**	1250		6100					

INFILTRATION CALCULATIONS

Project Name	Rider 2 - Proposed Commercial/Industrial Building
Project Location	Perris, CA
Project Number	17G199-2
Engineer	Scott McCann

Infiltration Test No: I-2

Constants

	Diameter (ft)	Area (ft^2)	Area (cm^2)
Inner	1	0.79	730
Anlr. Spac	2	2.36	2189

*Note: The infiltration rate was calculated based on current time interval

Test Interval		Time (hr)	Interval **Elapsed** (min)	Flow Readings: Inner Ring (ml)	Flow Readings: Ring Flow (cm^3)	Flow Readings: Annular Ring (ml)	Flow Readings: Space Flow (cm^3)	Infiltration Rates: Inner Ring* (cm/hr)	Infiltration Rates: Annular Space* (cm/hr)	Infiltration Rates: Inner Ring* (in/hr)	Infiltration Rates: Annular Space* (in/hr)
1	Initial	12:15 PM	30	50	1150	0	4200	3.15	3.84	1.24	1.51
	Final	12:45 PM	**30**	1200		4200					
2	Initial	12:45 PM	30	0	850	400	3900	2.33	3.56	0.92	1.40
	Final	1:15 PM	**60**	850		4300					
3	Initial	1:15 PM	30	25	625	400	2100	1.71	1.92	0.67	0.76
	Final	1:45 PM	**90**	650		2500					
4	Initial	1:45 PM	30	100	600	200	1900	1.64	1.74	0.65	0.68
	Final	2:15 PM	**120**	700		2100					

INFILTRATION CALCULATIONS

Project Name	Rider 2 - Proposed Commercial/Industrial Building
Project Location	Perris, CA
Project Number	17G199-2
Engineer	Scott McCann

Infiltration Test No: I-3

Constants

	Diameter (ft)	Area (ft^2)	Area (cm^2)
Inner	1	0.79	730
Anlr. Spac	2	2.36	2189

*Note: The infiltration rate was calculated based on current time interval

Test Interval		Time (hr)	Interval **Elapsed** (min)	Flow Readings: Inner Ring (ml)	Flow Readings: Ring Flow (cm^3)	Flow Readings: Annular Ring (ml)	Flow Readings: Space Flow (cm^3)	Infiltration Rates: Inner Ring* (cm/hr)	Infiltration Rates: Annular Space* (cm/hr)	Infiltration Rates: Inner Ring* (in/hr)	Infiltration Rates: Annular Space* (in/hr)
1	Initial	8:30 AM	10	100	2050	300	6400	16.86	17.54	6.64	6.91
	Final	8:40 AM	**10**	2150		6700					
2	Initial	8:41 AM	10	150	1450	700	4500	11.92	12.33	4.69	4.86
	Final	8:51 AM	**21**	1600		5200					
3	Initial	8:52 AM	10	150	1150	400	3600	9.46	9.87	3.72	3.89
	Final	9:02 AM	**32**	1300		4000					
4	Initial	9:03 AM	10	200	925	400	3250	7.61	8.91	2.99	3.51
	Final	9:13 AM	**43**	1125		3650					
5	Initial	9:14 AM	10	200	825	1500	2800	6.78	7.68	2.67	3.02
	Final	9:24 AM	**54**	1025		4300					
6	Initial	9:25 AM	10	50	775	400	2600	6.37	7.13	2.51	2.81
	Final	9:35 AM	**65**	825		3000					
7	Initial	9:36 AM	10	100	700	250	2500	5.76	6.85	2.27	2.70
	Final	9:46 AM	**75**	800		2750					
8	Initial	9:47 AM	10	200	650	200	2400	5.35	6.58	2.10	2.59
	Final	9:57 AM	**86**	850		2600					

INFILTRATION CALCULATIONS

Project Name	Rider 2 - Proposed Commercial/Industrial Building
Project Location	Perris, CA
Project Number	17G199-2
Engineer	Scott McCann

Infiltration Test No: I-4

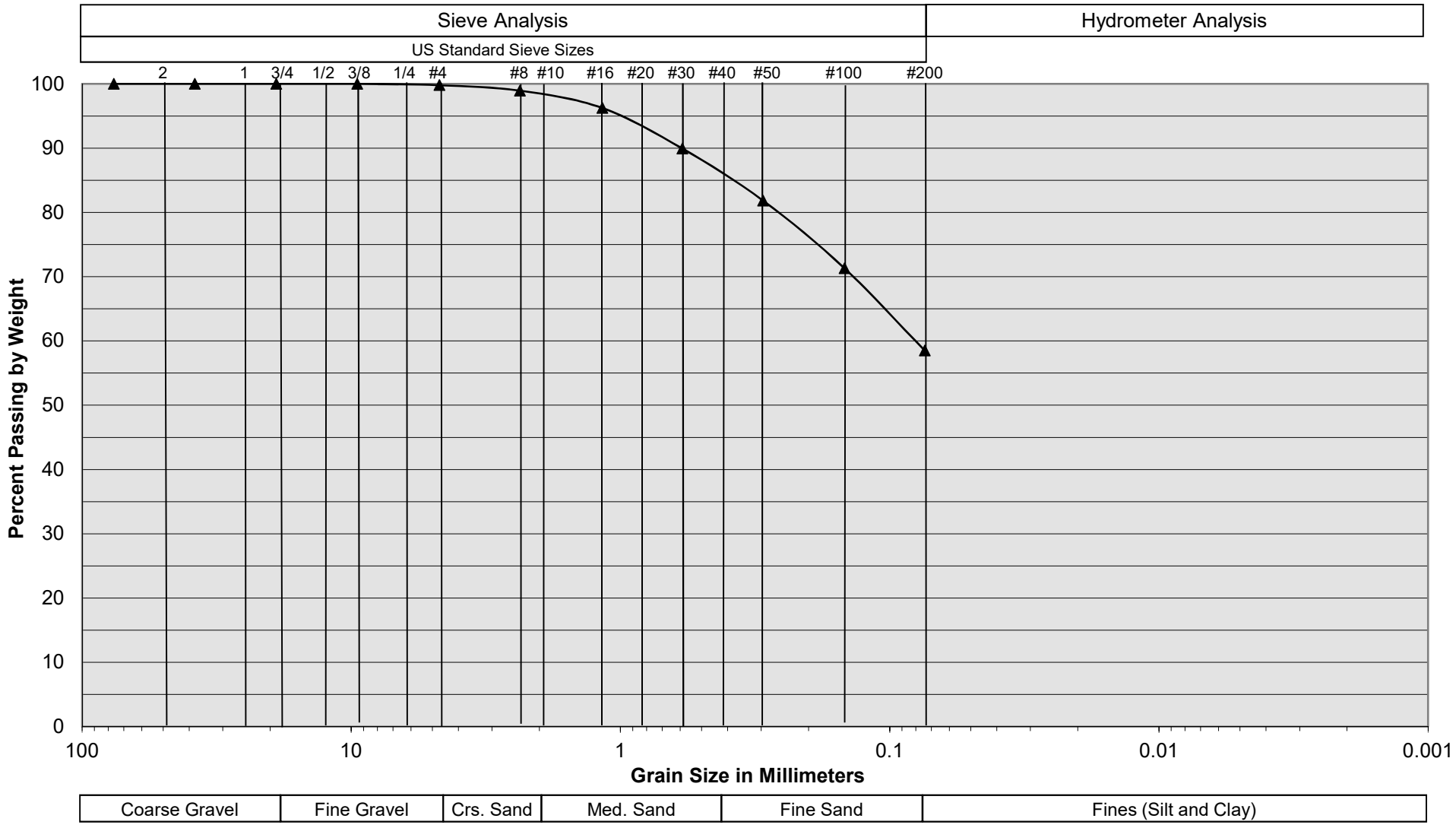
Constants

	Diameter (ft)	Area (ft^2)	Area (cm^2)
Inner	1	0.79	730
Anlr. Spac	2	2.36	2189

*Note: The infiltration rate was calculated based on current time interval

Test Interval		Time (hr)	Interval **Elapsed** (min)	Flow Readings: Inner Ring (ml)	Flow Readings: Ring Flow (cm^3)	Flow Readings: Annular Ring (ml)	Flow Readings: Space Flow (cm^3)	Infiltration Rates: Inner Ring* (cm/hr)	Infiltration Rates: Annular Space* (cm/hr)	Infiltration Rates: Inner Ring* (in/hr)	Infiltration Rates: Annular Space* (in/hr)
1	Initial	10:30 AM	15	50	1250	300	5800	6.85	10.60	2.70	4.17
	Final	10:45 AM	**15**	1300		6100					
2	Initial	10:46 AM	15	100	850	400	4500	4.66	8.22	1.83	3.24
	Final	11:01 AM	**31**	950		4900					
3	Initial	11:02 AM	15	100	800	400	4100	4.39	7.49	1.73	2.95
	Final	11:17 AM	**47**	900		4500					
4	Initial	11:18 AM	15	50	800	350	3800	4.39	6.94	1.73	2.73
	Final	11:33 AM	**63**	850		4150					
5	Initial	11:34 AM	15	50	800	350	3550	4.39	6.49	1.73	2.55
	Final	11:49 AM	**79**	850		3900					
6	Initial	11:50 AM	15	100	800	200	3500	4.39	6.40	1.73	2.52
	Final	12:05 PM	**95**	900		3700					

Grain Size Distribution

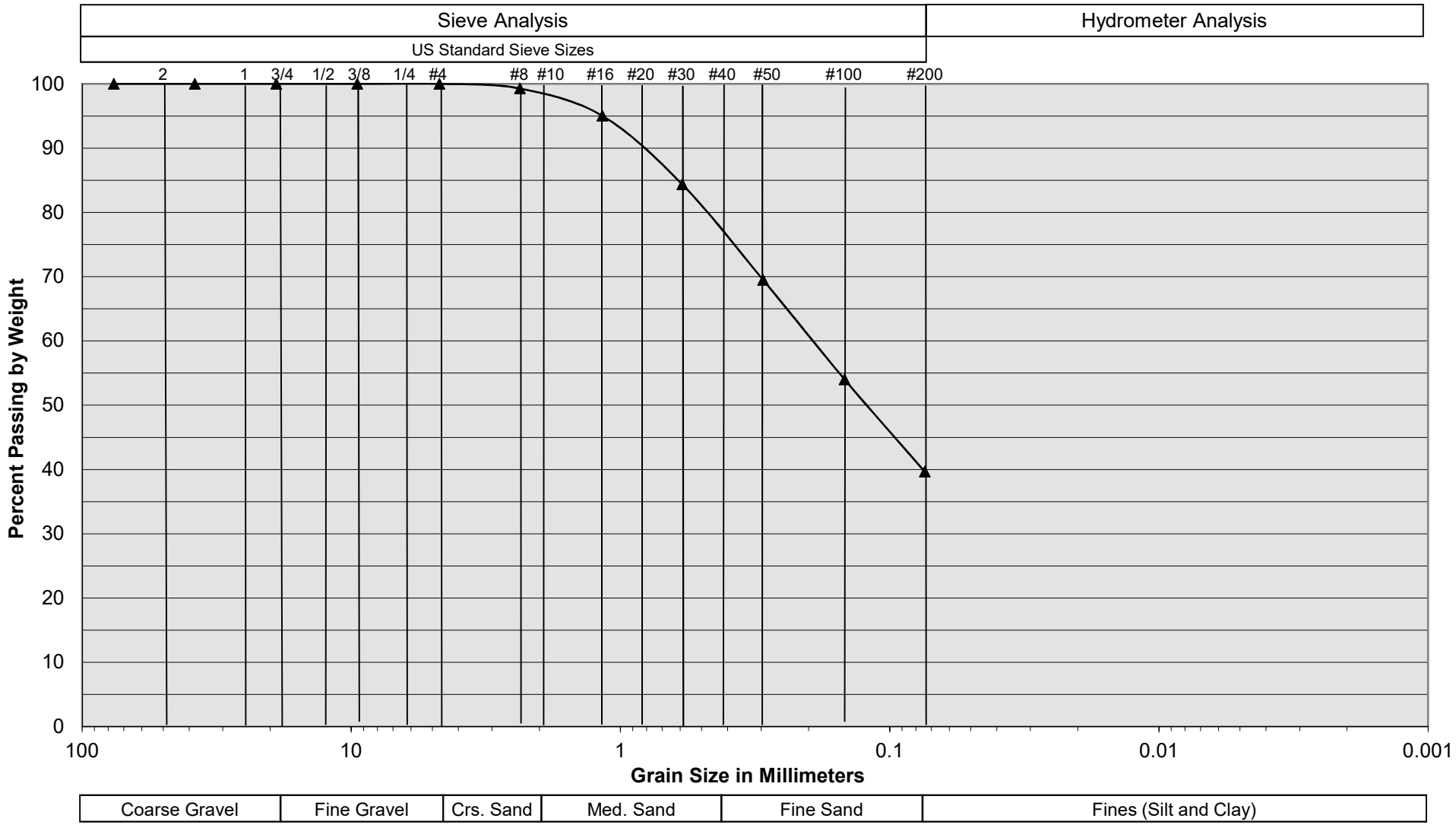


Sample Description	I-1 @ 9 feet
Soil Classification	Brown fine to medium Sandy Clay, trace Silt

Rider 2 - Proposed Commercial/Industrial Building
Perris, California
Project No. 17G199-2
PLATE C-1

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution

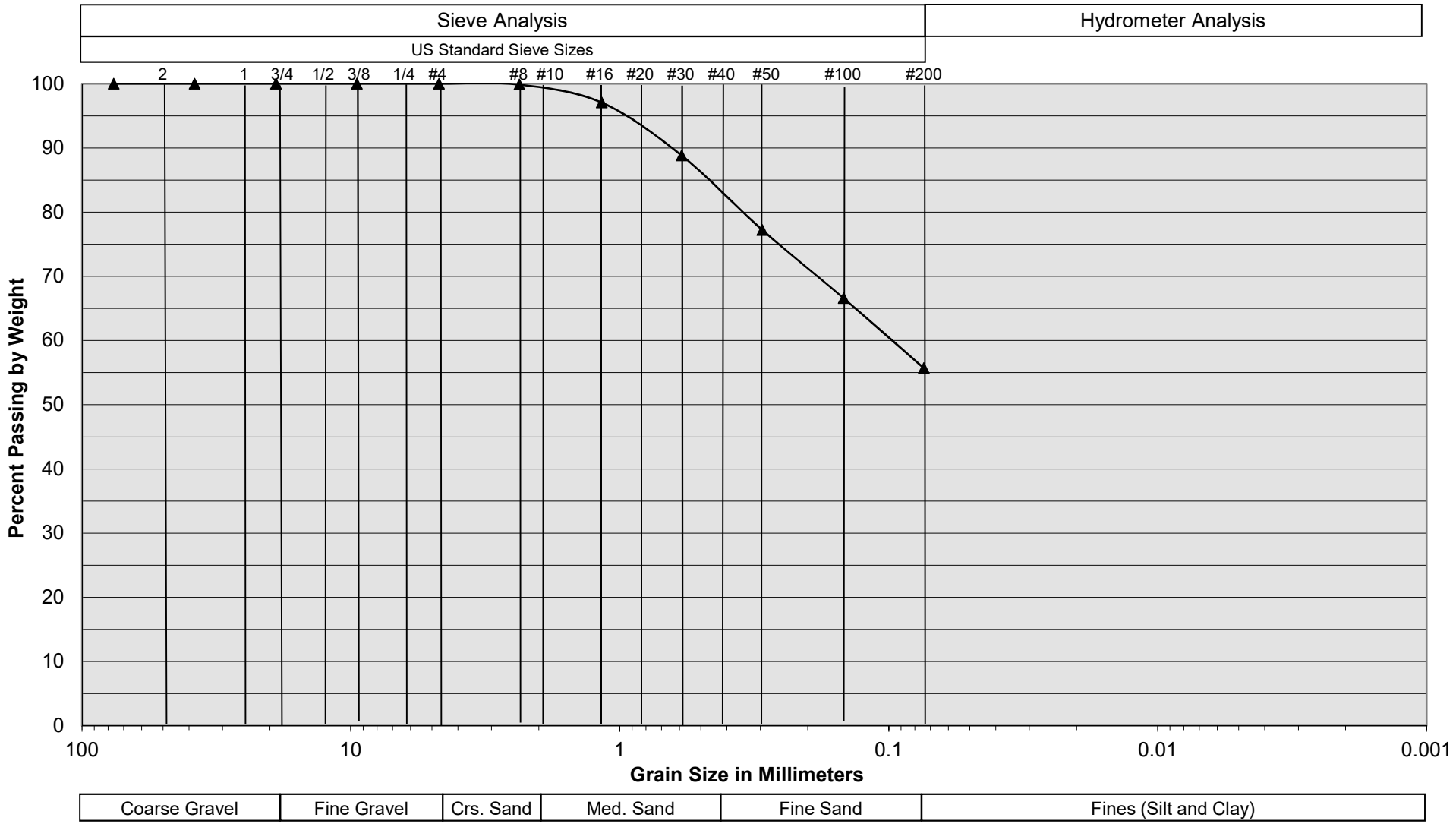


Sample Description	I-2 @ 9 feet
Soil Classification	Brown Clayey fine to medium Sand

Rider 2 - Proposed Commercial/Industrial Building
Perris, California
Project No. 17G199-2
PLATE C-2

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution

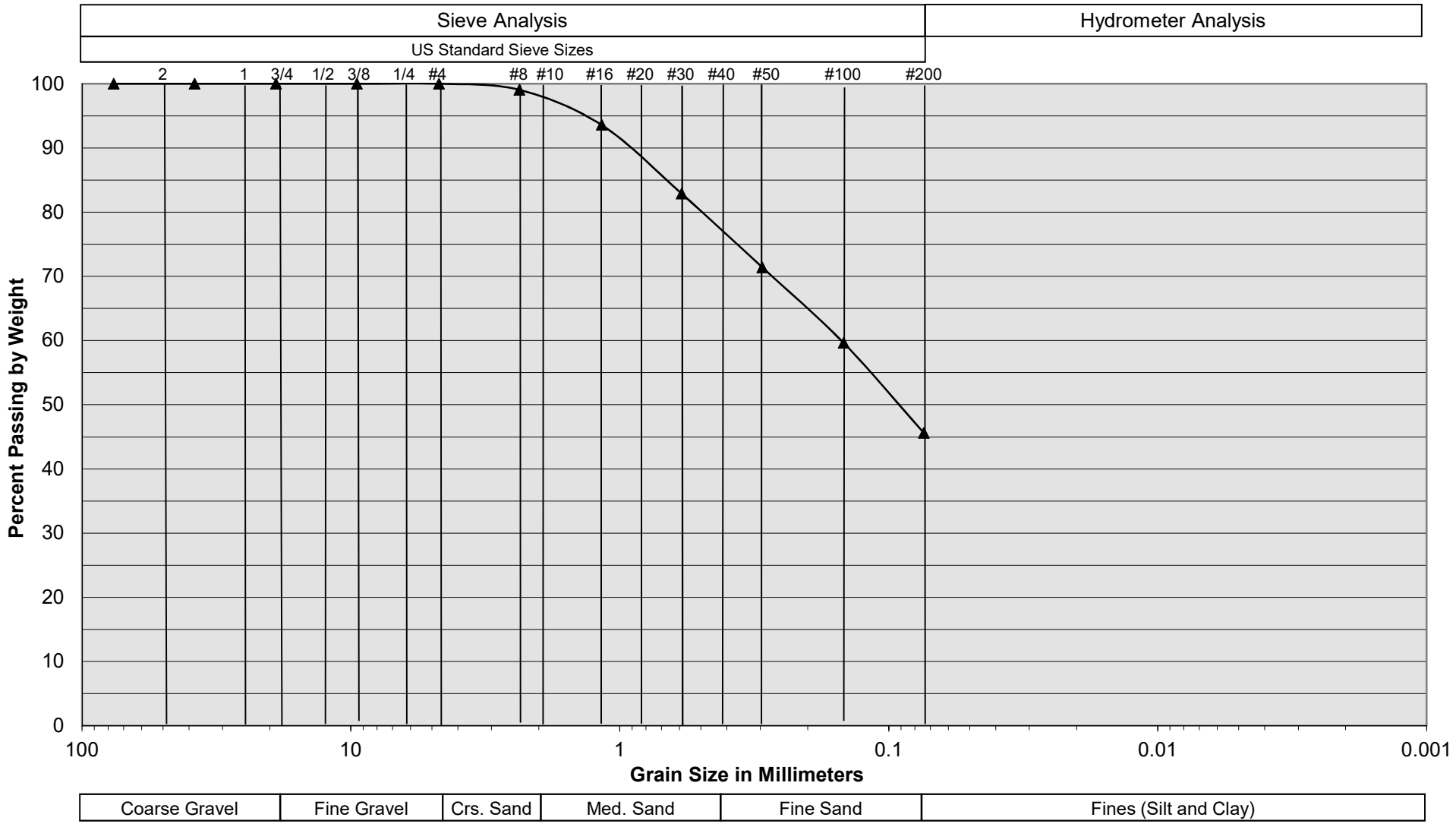


Sample Description	I-3 @ 7 feet
Soil Classification	Light Brown fine to medium Sandy Clay, trace Silt

Rider 2 - Proposed Commercial/Industrial Building
Perris, California
Project No. 17G199-2
PLATE C-3

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution



Sample Description	I-4 @ 9 feet
Soil Classification	Brown Clayey fine to medium Sand, trace Silt

Rider 2 - Proposed Commercial/Industrial Building
Perris, California
Project No. 17G199-2
PLATE C-4

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Appendix 4: Historical Site Conditions

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

N/A

Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

N/A

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation

R 07 W | R 06 W | R 05 W | R 04 W | R 03 W | R 02 W | R 01 W | R 01 E | R 02 E | R 03 E | R 04 E | R 05 E

T 01 S
T 02 S
T 03 S
T 04 S
T 05 S
T 06 S
T 07 S
T 08 S

0.85 MiraLoma
0.61 RiversideNorth
0.54 RiversideSouth
0.68 PigeonPass
0.66 MorenoEast
0.85 Beaumont
0.88 PradoDam
0.51 Woodcrest
0.50 LakeMathews
0.68 PerrisReservoir
PROJECT SITE
0.70 SanJacintoNWS
0.87 VistaGrandeGS
1.18 Idyllwild
0.58 SunCity
0.68 Winchester
0.90 HurkeyCreek
0.70 ElsinoreNWS
1.11 ElCarisoStation
0.77 WildomarLaCresta
0.52 SkinnerLake
0.65 Anza
0.77 SantaRosaPlateau
1.00 TemeculaNWS
0.64 AguangaValley

Santa Ana River Watershed
Santa Margarita Watershed

JURUPA VALLEY | EASTVALE | NORCO | CORONA | RIVERSIDE | MORENO VALLEY | CALIMESA | BEAUMONT | SAN JACINTO | PERRIS | HEMET | CANYON LAKE | LAKE ELSINORE | WILDOMAR | MENIFEE | MURRIETA | TEMECULA

N

Rain Gage Locations

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

Isohyetal Map for the 85th Percentile 24 hour Storm Event

July 2011

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

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name	Albert A. Webb Associates	Date	3/3/2020
Designed by	TSW	Case No	19-00004
Company Project Number/Name	Rider II		

BMP Identification

BMP NAME / ID: BMP-A

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

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

D_{85}= 0.63 inches

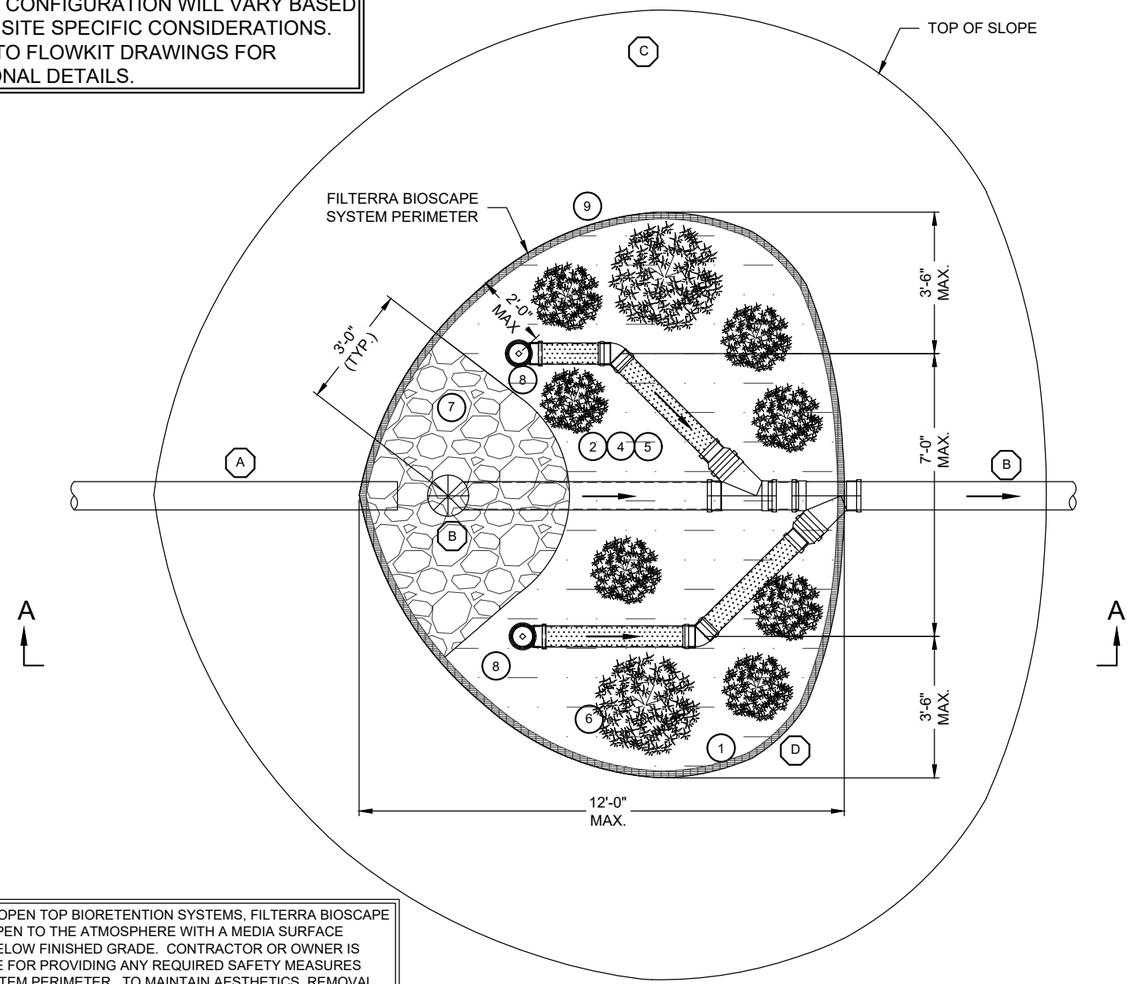
Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
L-A	197200	Ornamental Landscaping	0.1	0.11	21782.3			
R-A	805500	Roofs	1	0.89	718506			
H-A	654150	Concrete or Asphalt	1	0.89	583501.8			
BMP-A	200	Ornamental Landscaping	0.1	0.11	22.1			
OS-A	131930	Natural (C Soil)	0.3	0.23	29706.2			
SR-A	46260	Ornamental Landscaping						
	1835240	Total			1353518.4	0.63	71059.7	71060

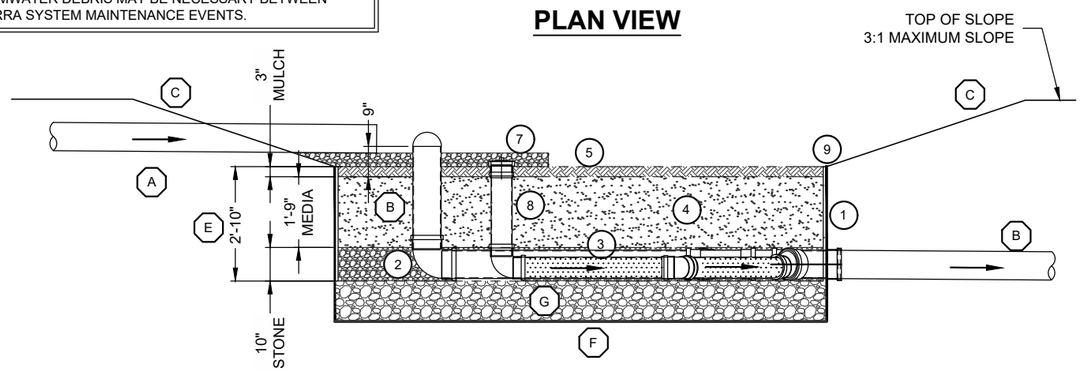
Notes:

THIS IS A SCHEMATIC LAYOUT ONLY. ACTUAL CONFIGURATION WILL VARY BASED ON THE SITE SPECIFIC CONSIDERATIONS. REFER TO FLOWKIT DRAWINGS FOR ADDITIONAL DETAILS.



AS WITH ALL OPEN TOP BIORETENTION SYSTEMS, FILTERRA BIOSCAPE SYSTEM IS OPEN TO THE ATMOSPHERE WITH A MEDIA SURFACE RECESSED BELOW FINISHED GRADE. CONTRACTOR OR OWNER IS RESPONSIBLE FOR PROVIDING ANY REQUIRED SAFETY MEASURES AROUND SYSTEM PERIMETER. TO MAINTAIN AESTHETICS, REMOVAL OF HEAVY STORMWATER DEBRIS MAY BE NECESSARY BETWEEN REGULAR FILTERRA SYSTEM MAINTENANCE EVENTS.

PLAN VIEW



SECTION A-A VIEW

BILL OF MATERIALS

COUNT	DESCRIPTION	INSTALLED BY
X	FILTERRA SURFACE AREA (SF)	CONTRACTOR
X	MULCH VOLUME (CY)	CONTRACTOR
XX	FILTERRA MEDIA VOLUME (CY)	CONTRACTOR
X	1/2" #4 ROUND AGGREGATE UNDERDRAIN STONE (CY)	CONTRACTOR
X	ENERGY DISSIPATION ROCK (CY)	CONTRACTOR
X	EROSION CONTROL (LF)	CONTRACTOR
X	FILTERRA FLOWKIT	CONTRACTOR

PLANTING SCHEDULE

*NOTE: PLANTS PROVIDED BY OTHERS

QUANTITY	FILTERRA BIOSCAPE SYSTEM PLANT PALETTE

GENERAL NOTES

1. CONTRACTOR SHALL CONTACT CONTECH TO COORDINATE DELIVERY AND SUPERVISION OF PLACEMENT OF FILTERRA BIOSCAPE SYSTEM COMPONENTS (ACTIVATION). CONTRACTOR SHALL COMPLETE ITEMS IN THE LIST OF CONTRACTOR INSTALLATION RESPONSIBILITIES LISTED ON THIS DETAIL BEFORE CONTECH'S REPRESENTATIVE ATTENDS AND SUPERVISES THE ACTIVATION OF THE BIOSCAPE SYSTEM.
2. PERFORM FILTERRA BIOSCAPE SYSTEM EXCAVATION ONLY AFTER ALL THE CONTRIBUTING DRAINAGE AREAS ARE PERMANENTLY STABILIZED. DO NOT CONSTRUCT FILTERRA BIOSCAPE SYSTEM IN AN AREA USED AS EROSION AND SEDIMENT CONTROL FACILITIES. DO NOT STOCKPILE MATERIALS NOR STORE EQUIPMENT IN THIS AREA.
3. USE METHODS OF EXCAVATION THAT MINIMIZE COMPACTION OF THE UNDERLYING SOIL UNLESS THE SYSTEM IS TO BE LINED.
4. CONTRACTOR SHALL COORDINATE WITH CONTECH BEFORE THE FILTERRA BIOSCAPE SYSTEM AREA IS EXCAVATED TO MINIMIZE TIME BETWEEN EXCAVATION AND DELIVERY AND ACTIVATION OF THE FILTERRA BIOSCAPE SYSTEM. ANY STANDING WATER THAT ACCUMULATES IN THE EXCAVATED AREA MUST BE REMOVED BY THE CONTRACTOR BEFORE CONTECH CAN PROVIDE ACTIVATION OF THE FILTERRA BIOSCAPE SYSTEM. ANY ADDITIONAL EXCAVATION WILL BE THE RESPONSIBILITY OF THE CONTRACTOR. EXCAVATION DIMENSIONS SHOULD BE PROVIDED TO CONTECH IN THE ACTIVATION REQUEST CHECKLIST.
5. CONTRACTOR SHALL PROVIDE ACCESS TO THE EXCAVATED AREA(S) FOR USE DURING THE ACTIVATION OF THE FILTERRA BIOSCAPE SYSTEM(S). ACCESS SHALL NOT PROHIBIT LIGHT DUTY EQUIPMENT THAT MAY BE USED TO INSTALL THE COMPONENTS (STONE, MEDIA, ETC). THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY RE-STABILIZATION THAT MAY BE REQUIRED AFTER THE FILTERRA BIOSCAPE SYSTEM ACTIVATION.
6. CONTECH AND/OR ITS REPRESENTATIVES MUST BE SCHEDULED TO BE ON SITE FOR THE LIST ENTITLED CONTRACTOR ACTIVATION RESPONSIBILITIES.

CONTRACTOR SITE PREPARATION RESPONSIBILITIES AS DENOTED BY (X) ON THIS DETAIL:

- (A.) CONTRACTOR SHALL INSTALL PIPE OR SWALE THAT CONVEYS INFLUENT FLOWS AS WELL AS ANY REQUIRED INLET AND OUTLET STRUCTURES.
- (B.) CONTRACTOR SHALL PROVIDE BYPASS PIPE AND RISER OR OTHER STRUCTURE AS SHOWN ON PLANS. THE BYPASS PIPE SHALL BE INSTALLED WITH WYE(S), OR OTHER PIPE FITTINGS, AND WITH REDUCER COUPLING(S) FOR CONNECTION OF UNDERDRAIN PIPE, PER PLANS. PIPES SHALL BE INSTALLED TO PROMOTE POSITIVE FLOW FROM THE FILTERRA BIOSCAPE SYSTEM.
- (C.) IF REQUIRED, CONTRACTOR TO PROVIDE SHOULDER ACCORDING TO DIMENSION AND SLOPE SHOWN ON PLANS OR AS DESIGNED BY ENGINEER OF RECORD. SLOPE FROM SHOULDER TO FILTERRA BIOSCAPE SYSTEM SURFACE AREA SHALL NOT EXCEED 3:1. SOD IS REQUIRED TO STABILIZE SIDE SLOPES OR ADJACENT GRADE.
- (D.) CONTRACTOR TO EXCAVATE MEDIA AREA CORRESPONDING TO THE SIZE OF THE FILTERRA BIOSCAPE SYSTEM SURFACE AREA AS SHOWN ON DETAIL AND ON PLAN SHEETS.
- (E.) CONTRACTOR SHALL EXCAVATE VERTICALLY FROM BOTTOM OF UNDERDRAIN STONE, OR DRAINAGE STONE, IF REQUIRED, TO ELEVATION OF MULCH AS SHOWN ON THIS DETAIL .
- (F.) CONTRACTOR TO PROVIDE AND INSTALL ANY GEOTEXTILE OR IMPERMEABLE LINER FOR BOTTOM OF THE FILTERRA BIOSCAPE SYSTEM IF REQUIRED PER THE PLANS.
- (G.) CONTRACTOR TO PROVIDE AND INSTALL ANY ADDITIONAL DRAINAGE STONE BELOW THE FILTERRA BIOSCAPE SYSTEM AS CALLED OUT ON THE PLANS.

CONTRACTOR ACTIVATION RESPONSIBILITIES AS DENOTED BY (#) ON THIS DETAIL:

1. PLACE GEOTEXTILE FABRIC ALONG THE PERIMETER OF THE FILTERRA BIOSCAPE SYSTEM EXCAVATION.
2. PLACE 10" OF UNDERDRAIN STONE - 2" UNDER THE PIPING, 6" AROUND THE PIPING AND 2" ABOVE THE PIPING USING LIGHT DUTY EQUIPMENT ONLY.
3. PLACE 6" UNDERDRAIN PIPING UNLESS OTHERWISE APPROVED BY CONTECH, ASSOCIATED PIPING AND FITTINGS/ELBOWS TO CONNECT TO THE PIPING/FITTING(S) THAT IS PROVIDED BY CONTRACTOR (SEE CONTRACTOR INSTALLATION RESPONSIBILITIES THIS DETAIL).
4. PLACE 21" FILTERRA MEDIA USING LIGHT DUTY EQUIPMENT ONLY. DO NOT COMPACT MEDIA.
5. PLACE 3" DOUBLE SHREDDED HARDWOOD MULCH OVER ENTIRE FILTERRA BIOSCAPE SYSTEM SURFACE AREA USING LIGHT DUTY EQUIPMENT ONLY. DO NOT COMPACT MULCH.
6. PROVIDE AND PLANT VEGETATION AS INDICATED IN TABLE ON THIS DETAIL OR ON SITE PLANS.
7. PLACE ENERGY DISSIPATION ROCK APRON AS DESIGNED AND INDICATED ON THIS DETAIL OR PER ENGINEER OF RECORD PLANS.
8. PLACE CLEANOUT ADAPTER, PLUG AND PIPING.
9. PLACE ADDITIONAL EROSION CONTROL AROUND FILTERRA BIOSCAPE SYSTEM (IF REQUIRED).

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

FILTERRA BIOSCAPE™ SYSTEM STANDARD DETAIL

Pump Rate Calculation

$$\frac{V_{BMP}}{t_{drain}} = Area * i = Q_{pump}$$

$$\frac{V_{BMP}}{t_{drain}} = Q_{pump}$$

$$Q_{pump} = \frac{ft^3}{hr} * \frac{1\ hr}{3600\ sec} * \frac{449\ gpm}{1\ \frac{ft^3}{sec}}$$

$$Q_{pump} = \frac{71{,}060\ ft^3}{24\ hr} * \frac{449}{3600}\ \frac{gpm}{\frac{ft^3}{hr}} = 350\ gpm$$

$$\boldsymbol{Q_{pump} = 350\ gpm}$$

WASHINGTON STATE DEPARTMENT OF ECOLOGY

June 2020

GENERAL USE LEVEL DESIGNATION FOR BASIC (TSS), ENHANCED, PHOSPHORUS & OIL TREATMENT

For

CONTECH Engineered Solutions Filterra®

Ecology's Decision:

Based on Contech's submissions, including the Final Technical Evaluation Reports, dated August 2019, March 2014, December 2009, and additional information provided to Ecology dated October 9, 2009, Ecology hereby issues the following use level designations:

1. A General Use Level Designation for Basic, Enhanced, Phosphorus, and Oil Treatment for the Filterra® system constructed with a minimum media thickness of 21 inches (1.75 feet), at the following water quality design hydraulic loading rates:

Treatment	Infiltration Rate (in/hr) for use in Sizing
Basic	175
Phosphorus	100
Oil	50
Enhanced	175

2. The Filterra is not appropriate for oil spill-control purposes.
3. Ecology approves Filterra systems for treatment at the hydraulic loading rates listed above, and sized based on the water quality design flow rate for an off-line system. Calculate the water quality design flow rates using the following procedures:

- Western Washington: for treatment installed upstream of detention or retention, the water quality design flow rate is the peak 15-minute flow rate as calculated using the latest version of the Western Washington Hydrology Model or other Ecology-approved continuous runoff model.
- Eastern Washington: For treatment installed upstream of detention or retention, the water quality design flow rate is the peak 15-minute flow rate as calculated using one of the three flow rate based methods described in Chapter 2.7.6 of the Stormwater Management Manual for Eastern Washington (SWMMEW) or local manual.
- Entire State: For treatment installed downstream of detention, the water quality design flow rate is the full 2-year release rate of the detention facility.

4. This General Use Level Designation has no expiration date, but Ecology may revoke or amend the designation, and is subject to the conditions specified below.

Ecology's Conditions of Use:

Filterra systems shall comply with these conditions shall comply with the following conditions:

1. Design, assemble, install, operate, and maintain the Filterra systems in accordance with applicable Contech Filterra manuals and this Ecology Decision.
2. The minimum size filter surface-area for use in Washington is determined by using the design water quality flow rate (as determined in this Ecology Decision, Item 3, above) and the Infiltration Rate from the table above (use the lowest applicable Infiltration Rate depending on the level of treatment required). Calculate the required area by dividing the water quality design flow rate (cu-ft/sec) by the Infiltration Rate (converted to ft/sec) to obtain required surface area (sq-ft) of the Filterra unit.
3. Each site plan must undergo Contech Filterra review before Ecology can approve the unit for site installation. This will ensure that design parameters including site grading and slope are appropriate for use of a Filterra unit.
4. Filterra media shall conform to the specifications submitted to and approved by Ecology and shall be sourced from Contech Engineered Solutions, LLC with no substitutions.
5. Maintenance includes removing trash, degraded mulch, and accumulated debris from the filter surface and replacing the mulch layer. Use inspections to determine the site-specific maintenance schedules and requirements. Follow maintenance procedures given in the most recent version of the Filterra Operation and Maintenance Manual.
6. Maintenance: The required maintenance interval for stormwater treatment devices is often dependent upon the degree of pollutant loading from a particular drainage basin. Therefore, Ecology does not endorse or recommend a "one size fits all" maintenance cycle for a particular model/size of manufactured treatment device.
    - Contech designs Filterra systems for a target maintenance interval of 6 months in the Pacific Northwest. Maintenance includes removing and replacing the mulch layer above the media along with accumulated sediment, trash, and captured organic materials therein, evaluating plant health, and pruning the plant if deemed necessary.
    - Conduct maintenance following manufacturer's guidelines.
7. Filterra systems come in standard sizes.
8. Install the Filterra in such a manner that flows exceeding the maximum Filterra operating rate are conveyed around the Filterra mulch and media and will not resuspend captured sediment.
9. Discharges from the Filterra units shall not cause or contribute to water quality standards violations in receiving waters.

Approved Alternate Configurations

Filterra Internal Bypass - Pipe (FTIB-P)

1. The Filterra® Internal Bypass – Pipe allows for piped-in flow from area drains, grated inlets, trench drains, and/or roof drains. Design capture flows and peak flows enter the structure through an internal slotted pipe. Filterra® inverted the slotted pipe to allow design flows to drop through to a series of splash plates that then disperse the design flows over the top surface of the Filterra® planter area. Higher flows continue to bypass the slotted pipe and convey out the structure.
2. To select a FTIB-P unit, the designer must determine the size of the standard unit using the sizing guidance described above.

Filterra Internal Bypass – Curb (FTIB-C)

1. The Filterra® Internal Bypass –Curb model (FTIB-C) incorporates a curb inlet, biofiltration treatment chamber, and internal high flow bypass in one single structure. Filterra® designed the FTIB-C model for use in a "Sag" or "Sump" condition and will accept flows from both directions along a gutter line. An internal flume tray weir component directs treatment flows entering the unit through the curb inlet to the biofiltration treatment chamber. Flows in excess of the water quality treatment flow rise above the flume tray weir and discharge through a standpipe orifice; providing bypass of untreated peak flows. Americast manufactures the FTIB-C model in a variety of sizes and configurations and you may use the unit on a continuous grade when a single structure providing both treatment and high flow bypass is preferred. The FTIB-C model can also incorporate a separate junction box chamber to allow larger diameter discharge pipe connections to the structure.
2. To select a FTIB-C unit, the designer must determine the size of the standard unit using the sizing guidance described above.

Filterra® Shallow

1. The Filterra Shallow provides additional flexibility for design engineers and designers in situations where various elevation constraints prevent application of a standard Filterra configuration. Engineers can design this system up to six inches shallower than any of the previous Filterra unit configurations noted above.
2. Ecology requires that the Filterra Shallow provide a media contact time equivalent to that of the standard unit. This means that with a smaller depth of media, the surface area must increase.
3. To select a Filterra Shallow System unit, the designer must first identify the size of the standard unit using the modeling guidance described above.
4. Once the size of the standard Filterra unit is established using the sizing technique described above, use information from the following table to select the appropriate size Filterra Shallow System unit.

Shallow Unit Basic, Enhanced, Phosphorus, and Oil Treatment Sizing

Standard Depth	Equivalent Shallow Depth
4x4	4x6 or 6x4
4x6 or 6x4	6x6
4x8 or 8x4	6x8 or 8x6
6x6	6x10 or 10x6
6x8 or 8x6	6x12 or 12x6
6x10 or 10x6	13x7

Notes:
1. Shallow Depth Boxes are less than the standard depth of 3.5 feet but no less than 3.0 feet deep (TC to INV).

Applicant: Contech Engineered Solutions, LLC.

Applicant's Address: 11815 NE Glenn Widing Drive
Portland, OR 97220

Application Documents:

- State of Washington Department of Ecology Application for Conditional Use Designation, Americast (September 2006)
- Quality Assurance Project Plan Filterra® Bioretention Filtration System Performance Monitoring, Americast (April 2008)
- Quality Assurance Project Plan Addendum Filterra® Bioretention Filtration System Performance Monitoring, Americast (June 2008)
- Draft Technical Evaluation Report Filterra® Bioretention Filtration System Performance Monitoring, Americast (August 2009)
- Final Technical Evaluation Report Filterra® Bioretention Filtration System Performance Monitoring, Americast (December 2009)
- Technical Evaluation Report Appendices Filterra® Bioretention Filtration System Performance Monitoring, Americast, (August 2009)
- Memorandum to Department of Ecology Dated October 9, 2009 from Americast, Inc. and Herrera Environmental Consultants
- Quality Assurance Project Plan Filterra® Bioretention System Phosphorus treatment and Supplemental Basic and Enhanced Treatment Performance Monitoring, Americast (November 2011)
- Filterra® letter August 24, 2012 regarding sizing for the Filterra® Shallow System.
- University of Virginia Engineering Department Memo by Joanna Crowe Curran, Ph. D dated March 16, 2013 concerning capacity analysis of Filterra® internal weir inlet tray.
- Terraphase Engineering letter to Jodi Mills, P.E. dated April 2, 2013 regarding Terraflume Hydraulic Test, Filterra® Bioretention System and attachments.
- Technical Evaluation Report, Filterra® System Phosphorus Treatment and Supplemental Basic Treatment Performance Monitoring. March 27th, 2014.
- State of Washington Department of Ecology Application for Conditional Use Level Designation, Contech Engineered Solutions (May 2015)

- Quality Assurance Project Plan Filterra® Bioretention System, Contech Engineered Solutions (May 2015)
- Filterra Bioretention System Armco Avenue General Use Level Designation Technical Evaluation Report, Contech Engineered Solutions (August 2019)

Applicant's Use Level Request:

General Level Use Designation for Basic (175 in/hr), Enhanced (175 in/hr), Phosphorus (100 in/hr), and Oil Treatment (50 in/hr).

Applicant's Performance Claims:

Field-testing and laboratory testing show that the Filterra® unit is promising as a stormwater treatment best management practice and can meet Ecology's performance goals for basic, enhanced, phosphorus, and oil treatment.

Findings of Fact:

Field Testing 2015-2019

1. Contech completed field testing of a 4 ft. x 4 ft. Filterra® unit at one site in Hillsboro, Oregon from September 2015 to July 2019. Throughout the monitoring period a total of 24 individual storm events were sampled, of which 23 qualified for TAPE sampling criteria.
2. Contech encountered several unanticipated events and challenges that prevented them from collecting continuous flow and rainfall data. An analysis of the flow data from the sampled events, including both the qualifying and non-qualifying events, demonstrated the system treated over 99 % of the influent flows. Peak flows during these events ranged from 25 % to 250 % of the design flow rate of 29 gallons per minute.
3. Of the 23 TAPE qualified sample events, 13 met requirements for TSS analysis. Influent concentrations ranged from 20.8 mg/L to 83 mg/L, with a mean concentration of 46.3 mg/L. The UCL95 mean effluent concentration was 15.9 mg/L, meeting the 20 mg/L performance goal for Basic Treatment.
4. All 23 TAPE qualified sample events met requirements for dissolved zinc analysis. Influent concentrations range from 0.0384 mg/L to 0.2680 mg/L, with a mean concentration of 0.0807 mg/L. The LCL 95 mean percent removal was 62.9 %, meeting the 60 % performance goal for Enhanced Treatment.
5. Thirteen of the 23 TAPE qualified sample events met requirements for dissolved copper analysis. Influent concentrations ranged from 0.00543 mg/L to 0.01660 mg/L, with a mean concentration of 0.0103 mg/L. The LCL 95 mean percent removal was 41.2 %, meeting the 30 % performance goal for Enhanced Treatment.
6. Total zinc concentrations were analyzed for all 24 sample events. Influent EMCs for total zinc ranged from 0.048 mg/L to 5.290 mg/L with a median of 0.162 mg/L. Corresponding effluent EMCs for total zinc ranged from 0.015 mg/L to 0.067 mg/L with a median of

0.029 mg/L. Total event loadings for the study for total zinc were 316.85 g at the influent and 12.92 g at the effluent sampling location, resulting in a summation of loads removal efficiency of 95.9 %.

7. Total copper concentrations were analyzed for all 24 sample events. Influent EMCs for total copper ranged from 0.003 mg/L to 35.600 mg/L with a median value of 0.043 mg/L. Corresponding effluent EMCs for total copper ranged from 0.002 mg/L to 0.015 mg/L with a median of 0.004 mg/L. Total event loadings for total copper for the study were 1,810.06 g at the influent and 1.90 g at the effluent sampling location, resulting in a summation of loads removal efficiency of 99.9 %.

Field Testing 2013

1. Filterra completed field-testing of a 6.5 ft x 4 ft. unit at one site in Bellingham, Washington. Continuous flow and rainfall data collected from January 1, 2013 through July 23, 2013 indicated that 59 storm events occurred. Water quality data was obtained from 22 storm events. Not all the sampled storms produced information that met TAPE criteria for storm and/or water quality data.
2. The system treated 98.9 % of the total 8-month runoff volume during the testing period. Consequently, the system achieved the goal of treating 91 % of the volume from the site. Stormwater runoff bypassed Filterra treatment during four of the 59 storm events.
3. Of the 22 sampled events, 18 qualified for TSS analysis (influent TSS concentrations ranged from 25 to 138 mg/L). The data were segregated into sample pairs with influent concentration greater than and less than 100 mg/L. The UCL95 mean effluent concentration for the data with influent less than 100 mg/L was 5.2 mg/L, below the 20-mg/L threshold. Although the TAPE guidelines do not require an evaluation of TSS removal efficiency for influent concentrations below 100 mg/L, the mean TSS removal for these samples was 90.1 %. Average removal of influent TSS concentrations greater than 100 mg/L (three events) was 85 %. In addition, the system consistently exhibited TSS removal greater than 80 % at flow rates equivalent to a 100 in/hr infiltration rate and was observed at 150 in/hr.
4. Ten of the 22 sampled events qualified for TP analysis. Americast augmented the dataset using two sample pairs from previous monitoring at the site. Influent TP concentrations ranged from 0.11 to 0.52 mg/L. The mean TP removal for these twelve events was 72.6 %. The LCL95 mean percent removal was 66.0, well above the TAPE requirement of 50 %. Treatment above 50 % was evident at 100 in/hr infiltration rate and as high as 150 in/hr. Consequently, the Filterra test system met the TAPE Phosphorus Treatment goal at 100 in/hr. Influent ortho-P concentrations ranged from 0.005 to 0.012 mg/L; effluent ortho-P concentrations ranged from 0.005 to 0.013 mg/L. The reporting limit/resolution for the ortho-P test method is 0.01 mg/L, therefore the influent and effluent ortho-P concentrations were both at and near non-detect concentrations.

Field Testing 2008-2009

1. Filterra completed field-testing at two sites at the Port of Tacoma. Continuous flow and rainfall data collected during the 2008-2009 monitoring period indicated that 89 storm events occurred. The monitoring obtained water quality data from 27 storm events. Not all the sampled storms produced information that met TAPE criteria for storm and/or water quality data.
2. During the testing at the Port of Tacoma, 98.96 to 99.89 % of the annual influent runoff volume passed through the POT1 and POT2 test systems respectively. Stormwater runoff bypassed the POT1 test system during nine storm events and bypassed the POT2 test system during one storm event. Bypass volumes ranged from 0.13 % to 15.3% of the influent storm volume. Both test systems achieved the 91 % water quality treatment-goal over the 1-year monitoring period.
3. Consultants observed infiltration rates as high as 133 in/hr during the various storms. Filterra did not provide any paired data that identified percent removal of TSS, metals, oil, or phosphorus at an instantaneous observed flow rate.
4. The maximum storm average hydraulic loading rate associated with water quality data is <40 in/hr, with the majority of flow rates < 25 in/hr. The average instantaneous hydraulic loading rate ranged from 8.6 to 53 in/hr.
5. The field data showed a removal rate greater than 80 % for TSS with an influent concentration greater than 20 mg/L at an average instantaneous hydraulic loading rate up to 53 in/hr (average influent concentration of 28.8 mg/L, average effluent concentration of 4.3 mg/L).
6. The field data showed a removal rate generally greater than 54 % for dissolved zinc at an average instantaneous hydraulic loading rate up to 60 in/hr and an average influent concentration of 0.266 mg/L (average effluent concentration of 0.115 mg/L).
7. The field data showed a removal rate generally greater than 40 % for dissolved copper at an average instantaneous hydraulic loading rate up to 35 in/hr and an average influent concentration of 0.0070 mg/L (average effluent concentration of 0.0036 mg/L).
8. The field data showed an average removal rate of 93 % for total petroleum hydrocarbon (TPH) at an average instantaneous hydraulic loading rate up to 53 in/hr and an average influent concentration of 52 mg/L (average effluent concentration of 2.3 mg/L). The data also shows achievement of less than 15 mg/L TPH for grab samples. Filterra provided limited visible sheen data due to access limitations at the outlet monitoring location.
9. The field data showed low percentage removals of total phosphorus at all storm flows at an average influent concentration of 0.189 mg/L (average effluent concentration of 0.171 mg/L). We may relate the relatively poor treatment performance of the Filterra system at this location to influent characteristics for total phosphorus that are unique to the Port of Tacoma site. It appears that the Filterra system will not meet the 50 % removal performance goal when the majority of phosphorus in the runoff is expected to be in the dissolved form.

Laboratory Testing

1. Filterra performed laboratory testing on a scaled down version of the Filterra unit. The lab data showed an average removal from 83-91 % for TSS with influents ranging from 21 to 320 mg/L, 82-84 % for total copper with influents ranging from 0.94 to 2.3 mg/L, and 50-61 % for orthophosphate with influents ranging from 2.46 to 14.37 mg/L.
2. Filterra conducted permeability tests on the soil media.
3. Lab scale testing using Sil-Co-Sil 106 showed removals ranging from 70.1 % to 95.5 % with a median removal of 90.7 %, for influent concentrations ranging from 8.3 to 260 mg/L. Filterra ran these laboratory tests at an infiltration rate of 50 in/hr.
4. Supplemental lab testing conducted in September 2009 using Sil-Co-Sil 106 showed an average removal of 90.6 %. These laboratory tests were run at infiltration rates ranging from 25 to 150 in/hr for influent concentrations ranging from 41.6 to 252.5 mg/L. Regression analysis results indicate that the Filterra system's TSS removal performance is independent of influent concentration in the concentration rage evaluated at hydraulic loading rates of up to 150 in/hr.

Contact Information:

Applicant:
Jeremiah Lehman
Contech Engineered Solutions, LLC.
11815 Glenn Widing Dr
Portland, OR 97220
(503) 258-3136
jlehman@conteches.com

Applicant's Website: http://www.conteches.com

Ecology web link: http://www.ecy.wa.gov/programs/wq/stormwater/newtech/index.html

Ecology:
Douglas C. Howie, P.E.
Department of Ecology
Water Quality Program
(360) 407-6444
douglas.howie@ecy.wa.gov

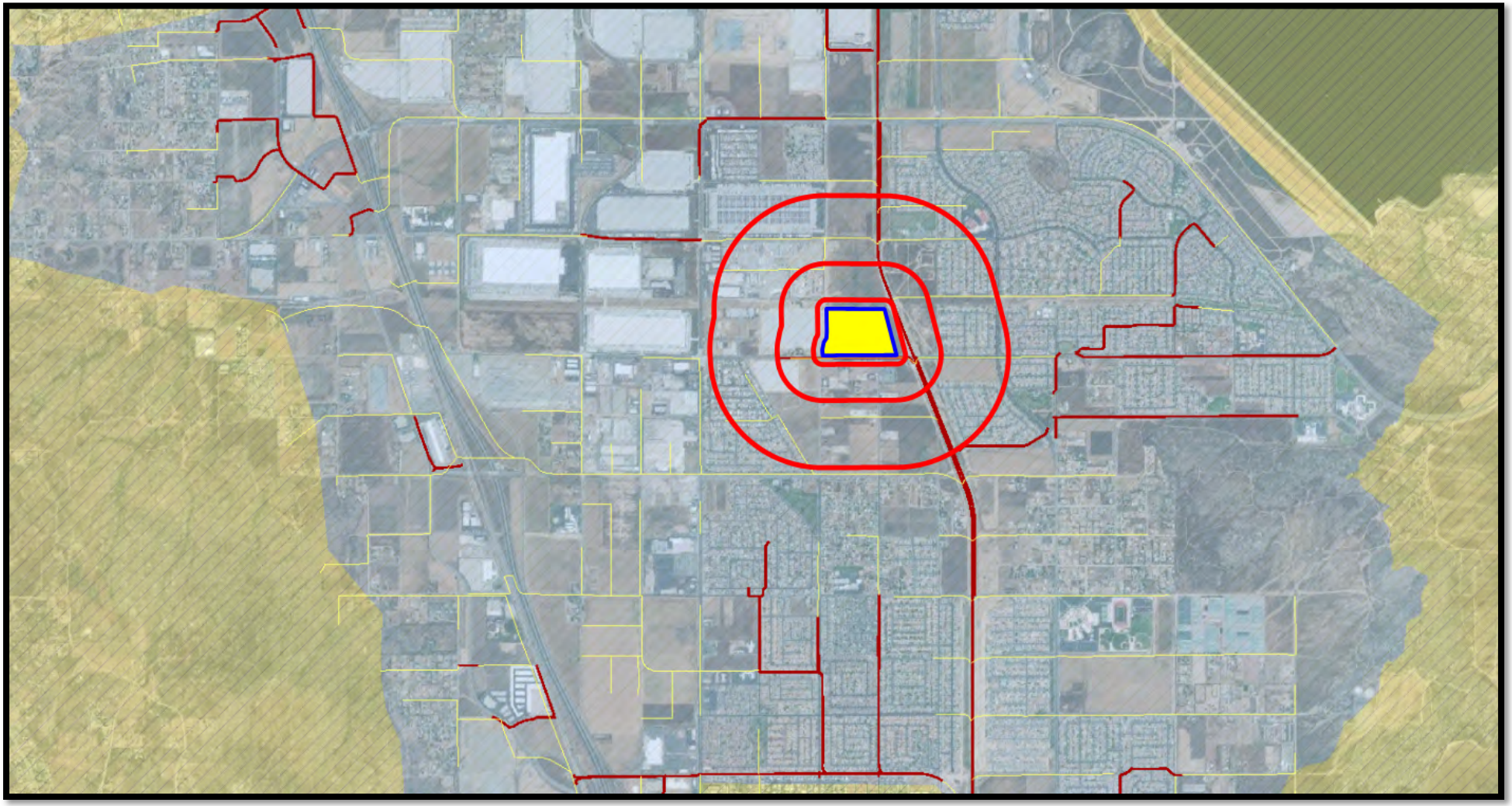
Date	Revision
December 2009	GULD for Basic, Enhanced, and Oil granted, CULD for Phosphorus
September 2011	Extended CULD for Phosphorus Treatment
September 2012	Revised design storm discussion, added Shallow System.
January 2013	Revised format to match Ecology standards, changed Filterra contact information
February 2013	Added FTIB-P system
March 2013	Added FTIB-C system
April 2013	Modified requirements for identifying appropriate size of unit

June 2013	Modified description of FTIB-C alternate configuration
March 2014	GULD awarded for Phosphorus Treatment. GULD updated for a higher flow-rate for Basic Treatment.
June 2014	Revised sizing calculation methods
March 2015	Revised Contact Information
June 2015	CULD for Basic and Enhanced at 100 in/hr infiltration rate
September 2019	GULD for Basic and Enhanced at 175 in/hr infiltration rate
February 2020	Revised sizing language to note sizing based on off-line calculations
June 2020	Added Phosphorus to Filterra Shallow sizing table

Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern

Hydromodification Exempt Area per Riverside County WAP Approved April 20, 2017



Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

Appendix 9: O&M

Operation and Maintenance Plan and Documentation of Finance, Maintenance and Recording Mechanisms

Covenant and Agreement

Water Quality Management Plan and Urban Runoff BMP Transfer, Access and Maintenance Agreement (adapted from documents from Ventura County Stormwater Management Program)

Recorded at the request of:

City of Perris

After recording, return to:

City of Perris

City Clerk _____

Water Quality Management Plan and Urban Runoff BMP
Transfer, Access and Maintenance Agreement

OWNER: _____

PROPERTY LOCATION: _____

APNS: _____

THIS AGREEMENT is made and entered into in

Perris , California, this ____ day of _____, 2020

by and between:

_____, herein after

Referred to as "Owner" and the City of Perris, a Municipal corporation, located in the County of Riverside, State of California hereinafter referred to as "CITY".

WHEREAS, the Owner owns real property ("Property") in the City of Perris, County of Riverside, State of California, more specifically described in Exhibit "A" and depicted in Exhibit "B", each of which exhibits is attached hereto and incorporated herein by this reference;

WHEREAS, at the time of initial approval of the development project known as Rider II (19-00004) within the Property described herein, the City required the project to employ Best Management Practices, hereinafter referred to as "BMPs," to minimize pollutants in urban runoff;

WHEREAS, the Owner has chosen to install and/or implement BMPs as described in the Water Quality Management Plan, on file with the City, hereinafter referred to as "WQMP", to minimize pollutants in urban runoff and to minimize other adverse impacts of urban runoff;

WHEREAS, said WQMP has been certified by the Owner and reviewed and approved by the City;
WHEREAS, said BMPS, with installation and/or implementation on private property and draining only private property, are part of a private facility with all maintenance or replacement therefore, the sole responsibility of the Owner in accordance with the terms of this Agreement;

WHEREAS, the Owner is aware that periodic and continuous maintenance, including, but not necessarily limited to, filter material replacement and sediment removal, is required to assure peak performance of all BMPS's in the WQMP and that, furthermore, such maintenance activity will require compliance with all Local, State, or Federal laws and regulations, including those pertaining to confined space and waste disposal methods, in effect at the time such maintenance occurs;

NOW THEREFORE, it is mutually stipulated and agreed as follows:

1. Owner hereby provides the City of City's designee complete access, of any duration, to the BMPs and their immediate vicinity at any time, upon reasonable notice, or in the event of emergency, as determined by City's Director of Public Works no advance notice, for the purpose of inspection, sampling, testing of the Device, and in case of emergency, to undertake all necessary repairs or other preventative measures at owner's expense as provided in paragraph 3 below. City shall make every effort at all times to minimize or avoid interference with Owner's use of the Property.

2. Owner shall use its best efforts diligently to maintain all BMPs in a manner assuring peak performance at all times. All reasonable precautions shall be exercised by Owner and Owner's representative or contractor in the removal and extraction of any material(s) from the BMPs and the ultimate disposal of the material(s) in a manner consistent with all relevant laws and regulations in effect at the time. As may be requested from time to time by the City, the Owner shall provide the City with documentation identifying the material(s) removed, the quantity, and disposal destination.

3. In the event Owner, or its successors or assigns, fails to accomplish the necessary maintenance contemplated by this Agreement, within five (5) days of being given written notice by the City, the City is hereby authorized to cause any maintenance necessary to be done and charge the entire cost and expense to the Owner or Owner' successors or assigns, including administrative costs, attorney's fees and interest thereon at the maximum rate authorized by the Civil Code from the date of the notice of expense until paid in full.

4. The City may require the owner to post security in form and for a time period satisfactory to the city to guarantee the performance of the obligations state herein. Should the Owner fail to perform the obligations under the Agreement, the City may, in the case of a cash bond, act for the Owner using the proceeds from it, or in the case of a surety bond, require the sureties to perform the obligations of the Agreement. As an additional remedy, the Director may withdraw any previous urban Runoff-related approval with respect to the property on which BMPs have been installed and/or implemented until such time as Owner repays to City its reasonable costs incurred in accordance with paragraph 3 above.

5. This agreement shall be recorded in the Office of the Recorder of Riverside County, California, at the expense of the Owner and shall constitute notice to all successors and assigns of the title to said Property of the obligation herein set forth, and also a lien in such amount as will fully reimburse the City, including interest as herein above set forth, subject to foreclosure in event of default in payment.

6. In event of legal action occasioned by any default or action of the Owner, or its successors or assigns, then the Owner and its successors or assigns agree(s) to pay all costs incurred by the City in enforcing the terms of this Agreement, including reasonable attorney's fees and costs, and that the same shall become a part of the lien against said Property.

7. **It is the intent of the parties hereto that burdens and benefits herein undertaken shall constitute covenants that run with said Property and constitute a lien there against.**

8. **The obligations herein undertaken shall be binding upon the heirs, successors, executors, administrators and assigns of the parties hereto. The term "Owner" shall include not only the present Owner, but also its heirs, successors, executors, administrators, and assigns. Owner shall notify any successor to title of all or part of the Property about the existence of this Agreement. Owner shall provide such notice prior to such successor obtaining an interest in or part of the Property. Owner shall provide a copy of such notice to the City at the same time such notice is provided to the successor.**

9. **Time is of the essence in the performance of this Agreement.**

10. **Any notice to a party required or called for in this agreement shall be served in person, or be deposit in the U.S. Mail, first class postage prepaid, to the address set forth below. Notice(s) shall be deemed effective upon receipt, or seventy-two (72) hours after deposit in the U.S. Mail, whichever is earlier. A party may change a notice address only by providing written notice thereof to the other party.**

IF TO THE CITY:

City Manager
City of Perris
101 North D Street
Perris, CA 92570

IF TO OWNER:

IN WITNESS THEREOF, the parties hereto have affixed their signatures as of the date fist written above.

APPROVED AS TO FORM:

City Attorney

City of Perris

Eric Dunn
Name
City Attorney
Title

OWNER:

By:

By:
Name:
Title:

OWNER:
N/A
Name
N/A
Title

ATTEST:

City Clerk **Date**

NOTARIES ON FOLLOWING PAGE

Clara Miramontes
Interim City Manager of City of Perris

EXHBIT A
LEGAL DESCRIPTION

Real property in the City of Perris, County of Riverside, State of California, described as follows:

PARCEL 1:

LOTS "A" THROUGH "E", INCLUSIVE, IN BLOCK 6; LOTS "A" THROUGH "E", INCLUSIVE, IN BLOCK 7; LOTS "A" THROUGH "D", INCLUSIVE, IN BLOCK 8; THE SOUTH HALF OF LOT "B" IN BLOCK 5; AND LOTS "C" AND "D" IN BLOCK 5, ALL IN TRACT 12 OF FAIRVIEW FARMS NO. 5, AS SHOWN BY MAP ON FILE IN BOOK 16, PAGE 20 OF MAPS, RIVERSIDE COUNTY RECORDS.

EXCEPTING THEREFROM THAT PORTION WHICH LIES EASTERLY OF THE WESTERLY LINE OF THE PARCEL OF LAND CONVEYED TO RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT BY DEED RECORDED APRIL 08, 1955, IN BOOK 1720, PAGE 238 OF OFFICIAL RECORDS, RIVERSIDE COUNTY RECORDS.

ALSO EXCEPTING ANY PORTION INCLUDED IN THAT CERTAIN PARCEL OF LAND CONDEMNED BY METROPOLITAN WATER DISTRICT BY DECREE OF CONDEMNATION, A CERTIFIED COPY OF WHICH WAS RECORDED DECEMBER 21, 1935 IN BOOK 263, PAGE 244 OF OFFICIAL RECORDS, RIVERSIDE COUNTY RECORDS.

APN: 303-170-005-5

PARCEL 2:

LOTS "A" THROUGH "D", INCLUSIVE, IN BLOCK 5; LOTS "A" THROUGH "D", INCLUSIVE, IN BLOCK 6; LOTS "B", "C" AND "D" IN BLOCK 4, ALL IN TRACT 11 OF FAIRVIEW FARMS NO. 5, AS SHOWN BY MAP ON FILE IN BOOK 16, PAGE 20 OF MAPS, RIVERSIDE COUNTY RECORDS.

EXCEPTING ANY PORTION INCLUDED IN THAT CERTAIN PARCEL OF LAND CONDEMNED BY METROPOLITAN WATER DISTRICT BY DECREE OF CONDEMNATION, A CERTIFIED COPY OF WHICH WAS RECORDED DECEMBER 21, 1935 IN BOOK 263, PAGE 244 OF OFFICIAL RECORDS, RIVERSIDE COUNTY RECORDS.

APN: 303-170-004-4

PARCEL 3:

LOT 359 OF TRACT 4269, IN THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS SHOWN BY MAP ON FILE IN BOOK 76, PAGES 9 THROUGH 14, INCLUSIVE, OF MAPS, RIVERSIDE COUNTY RECORDS.

APN: 303-170-014-3

PARCEL 4:

LOT 2 IN BLOCK 23 OF RIVERSIDE TRACT, IN THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS SHOWN BY MAP ON FILE IN BOOK 14, PAGE 668 OF MAPS, SAN DIEGO COUNTY RECORDS.

EXCEPT THAT PORTION IN TRACT 4269 AS SHOWN BY MAP ON FILE IN BOOK 76, PAGES 9 THROUGH 14, INCLUSIVE, OF MAPS, RIVERSIDE COUNTY RECORDS.

ALSO EXCEPT THE SOUTH 30 FEET IN RIDER STREET.

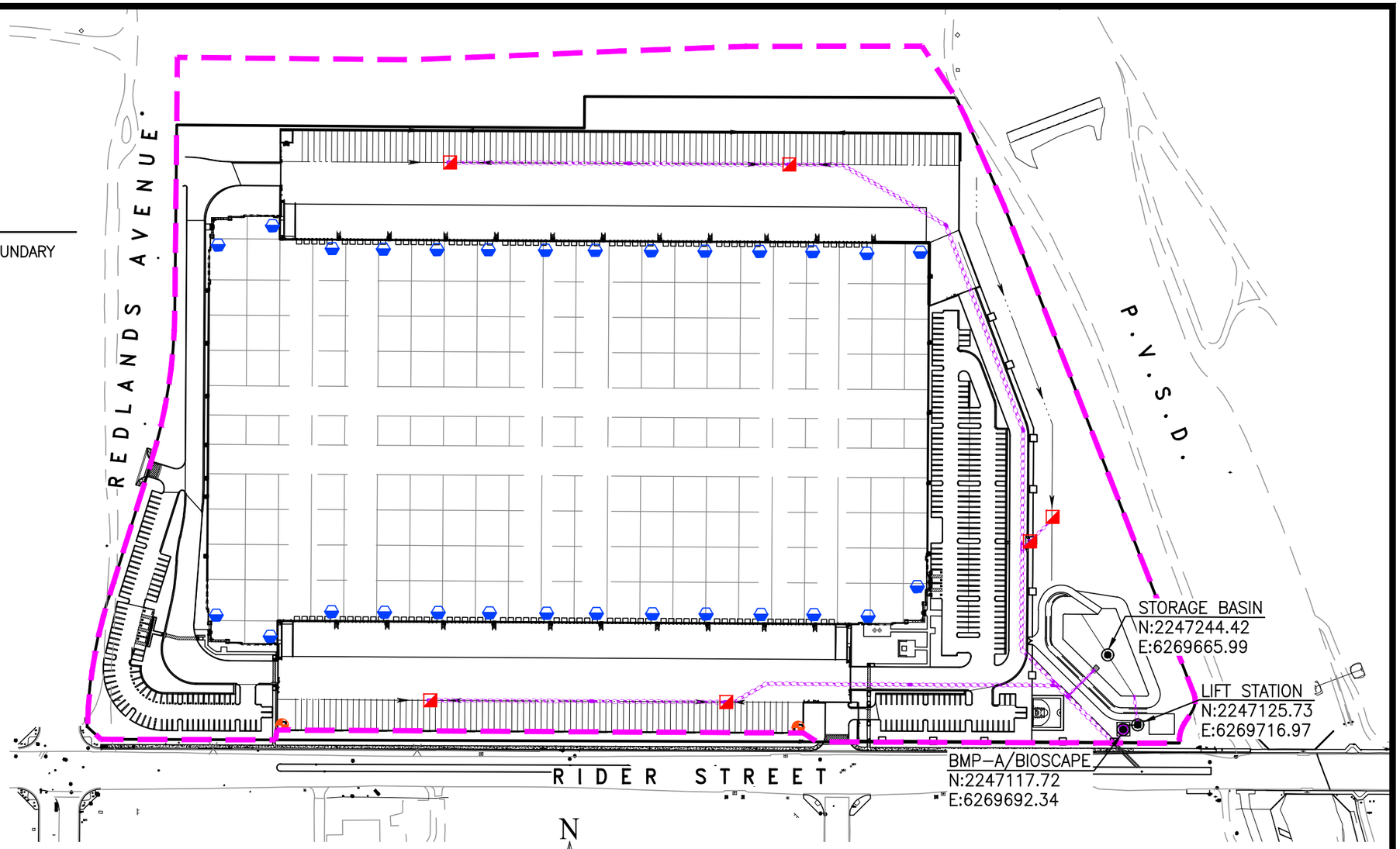
ALSO EXCEPT THAT PORTION OF SAID BLOCK 23 WHICH LIES NORTH OF THE NORTH LINE OF TRACT 4269 AS SHOWN BY MAP ON FILE IN BOOK 76, PAGES 9 THROUGH 14, INCLUSIVE, OF MAPS, RIVERSIDE COUNTY RECORDS.

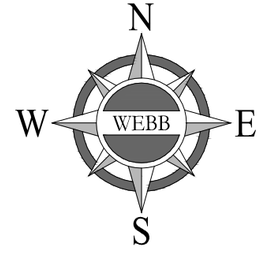
APN: 303-170-011-0

EXHIBIT B
MAP/ILLISTRATION

LEGEND

- DRAINAGE MANAGEMENT BOUNDARY
- CONTECH BIOSCAPE
- STORM DRAIN PIPE
- ROOF DRAIN DOWNSPOUT
- CURB OPENING/CUT
- STORM INLET
- TRASH ENCLOSURE





1" = 200'

200 0 200

EXHIBIT "B" - RIDER DISTRIBUTION CENTER II

ALBERT A. WEBB ASSOCIATES
ENGINEERING CONSULTANTS
3788 McCRAY STREET
RIVERSIDE CA. 92506
PH. (951) 686-1070
FAX (951) 788-1256

W.O. 17-0357

SHEET 1 OF 1 SHEETS

G:\2017\17-0357\DRAINAGE\WQMP\FINAL\APPENDIX 9-O&M\EXHIBIT_B.DWG 10/19/2020 4:06:38 PM

Maintenance Plan for
Rider Distribution Center II

Date:_____

Project Address and Cross Streets_____

Assessor's Parcel No.: _____

Property Owner: _____ Phone No.:_____

Designated Contact: _____ Phone No.:_____

Mailing Address:_____

The property contains (three) water quality drainage facilities located as described below and as shown in the attached site plan.

- **Storage Basin** is in the southeast corner, north of the lift station.
- **Lift Station and Contech Bioscape** are located along Rider Street in the southeast corner

I. Routine Maintenance Activities

Primary maintenance activities include vegetation management and sediment removal, although mosquito abatement is a concern if the basin is designed to include permanent pools of standing water. Routine maintenance activities, and the frequency at which they will be conducted, are shown in Table 1.

Table 1
Routine Maintenance Activities for Facility Areas

No.	Maintenance Task	Frequency of Task
1	Remove obstructions, debris and trash from areas and dispose of properly.	Monthly, or as needed after storm events
2	Inspect areas to ensure that it drains between storms and within five days after rainfall.	Monthly, or as needed after storm events
3	Inspect inlets for channels, soil exposure or other evidence of erosion. Clear obstructions and remove sediment.	Monthly, or as needed after storm events
4	Remove and replace all dead and diseased vegetation.	Twice a year
5	Maintain vegetation and the irrigation system. Prune and weed to keep areas neat and orderly in appearance.	Before wet season begins, or as needed
6	Check that mulch in bioscape is at appropriate depth (3 inches per soil specifications) and replenish as necessary before wet season begins.	Monthly
7	Inspect areas using the attached inspection checklist.	Monthly, or after large storm events, and after removal of accumulated debris or material

II. Prohibitions

The use of pesticides and quick release fertilizers shall be minimized, and the principles of integrated pest management (IPM) followed:

1. Employ non-chemical controls (biological, physical and cultural controls) before using chemicals to treat a pest problem.
2. Prune plants properly and at the appropriate time of year.
3. Provide adequate irrigation for landscape plants. Do not over water.

4. Limit fertilizer use unless soil testing indicates a deficiency. Slow-release or organic fertilizer is preferable. Check with municipality for specific requirements.
5. Pest control should avoid harming non-target organisms, or negatively affecting air and water quality and public health. Apply chemical controls only when monitoring indicates that preventative and non-chemical methods are not keeping pests below acceptable levels. When pesticides are required, apply the least toxic and the least persistent pesticide that will provide adequate pest control. Do not apply pesticides on a prescheduled basis.
6. Sweep up spilled fertilizer and pesticides. Do not wash away or bury such spills.
7. Do not over apply pesticide. Spray only where the infestation exists. Follow the manufacturer's instructions for mixing and applying materials.
8. Only licensed, trained pesticide applicators shall apply pesticides.
9. Apply pesticides at the appropriate time to maximize their effectiveness and minimize the likelihood of discharging pesticides into runoff. With the exception of pre-emergent pesticides, avoid application if rain is expected.
10. Unwanted/unused pesticides shall be disposed as hazardous waste.

Standing water shall not remain in the treatment and/or hydromodification management measures for more than 3 days, to prevent mosquito generation. Should any mosquito issues arise, contact the Alameda County Mosquito Abatement District (ACMAD), as needed for assistance. In Albany, contact the Alameda County Vector Control Services District (ACVCSD). Mosquito larvicides shall be applied only when absolutely necessary, as indicated by the ACMAD or ACVCSD, and then only by a licensed professional or contractor. Contact information for ACMAD and ACVCSD is provided below.

III. Vector Control Contacts

Northwest Riverside County (Riverside, Corona, Norco, Mira Loma, Glen Avon, Rubidoux, Highgrove, La Sierra areas)
Northwest Mosquito & Vector Control District
951.340.9792

Unincorporated areas of Riverside County
Vector Control at Riverside County Environmental Health
951.766.9454

City of Perris
Animal Control ask for Vector Control
951.657.4134

City of Moreno Valley
Partly city and partly Riverside County Environmental Health
951.413.3340 City of Moreno Valley Code Compliance Department
951.766.9454 Vector Control at County Environmental Health

IV. Inspections

The attached Bio-Retention Basin Inspection and Maintenance Checklist shall be used to conduct inspections monthly (or as needed), identify needed maintenance, and record maintenance that is conducted.

Basin, Lift Station, and Bioscape Facility Areas
Inspection and Maintenance Checklist

Property Address: _____ Property Owner: _____

Treatment Measure No.: _____ Date of Inspection: _____ Type of Inspection: □ Monthly □ Pre-Wet Season
□ After heavy runoff □ End of Wet Season

Inspector(s): _____ □ Other:_____

Defect	**Conditions When Maintenance Is Needed**	**Maintenance Needed? (Y/N)**	**Comments** (Describe maintenance completed and if needed maintenance was not conducted, note when it will be done)	**Results Expected When Maintenance Is Performed**
1. Standing Water	When water stands in the areas between storms and does not drain within five days after rainfall.			There should be no areas of standing water once inflow has ceased. Any of the following may apply: sediment or trash blockages removed, improved grade from head to foot of bioretention area, or added underdrains.
2. Trash and Debris Accumulation	Trash and debris accumulated in the areas.			Trash and debris removed from bioretention area and disposed of properly.
3. Sediment	Evidence of sedimentation in areas.			Material removed so that there is no clogging or blockage. Material is disposed of properly.
4. Erosion	Channels have formed around inlets, there are areas of bare soil, and/or other evidence of erosion.			Obstructions and sediment removed so that water flows freely and disperses over a wide area. Obstructions and sediment are disposed of properly.
5. Vegetation	Vegetation is dead, diseased and/or overgrown.			Vegetation is healthy and attractive in appearance.
6. Mulch	Mulch is missing or patchy in appearance. Areas of bare earth are exposed, or mulch layer is less than 3 inches in depth.			All bare earth is covered, except mulch is kept 6 inches away from trunks of trees and shrubs. Mulch is even in appearance, at a depth of 3 inches.
7. Miscellaneous	Any condition not covered above that needs attention for the areas to function as designed.			Meet the design specifications.

Appendix 10: Educational Materials

BMP Fact Sheets, Maintenance Guidelines and Other End-User BMP Information

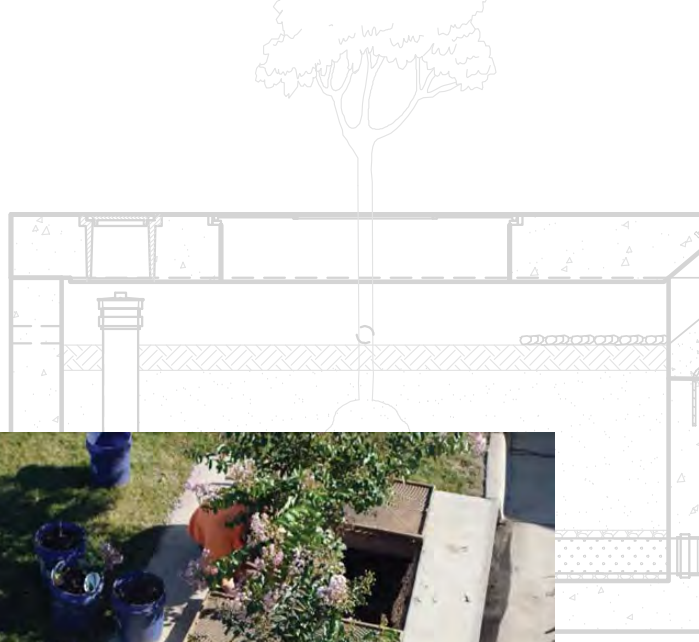
BMP TRAINING ACKNOWLEDGEMENT FORM

By signing this form, the undersigned certifies that he/she has received the listed materials and training for the BMP's that he or she is responsible for operation and maintenance or responsible to meet the requirements. The undersigned also acknowledged that punitive actions may be imposed if he or she fails to comply. The punitive actions can be in terms of monetary fine or termination of the contract or the rights that is transferred to the undersigned through contracts. If necessary, the owner or public agencies may complete the corrective actions and billed the undersigned.

Name (Print): _____
Business Name:_____
Title/Position: _____
Signature: _____ Date: _____

Item	Training Description	Related BMP(s)	Handout Materials	Initials	Comments

Filterra® Maintenance



Activation and first year of maintenance is included with every system.*

With proper routine maintenance, the engineered media within the Filterra system should last as long as traditional bioretention media. Routine maintenance is included by the manufacturer on all Filterra systems for the first year after activation.* This includes a maximum of 2 visits to remove debris, replace pretreatment mulch, and prune the vegetation.

Maintenance is low-cost, low-tech and simple:

- Remove trash, sediment, and mulch
- Replace with a fresh 3" layer of mulch
- No confined space entry or special tools
- Easily performed by landscape contractor or facilities maintenance provider

** Some exclusions may apply.*

Filterra offers high performance bioretention for advanced pollutant removal with easy maintenance.

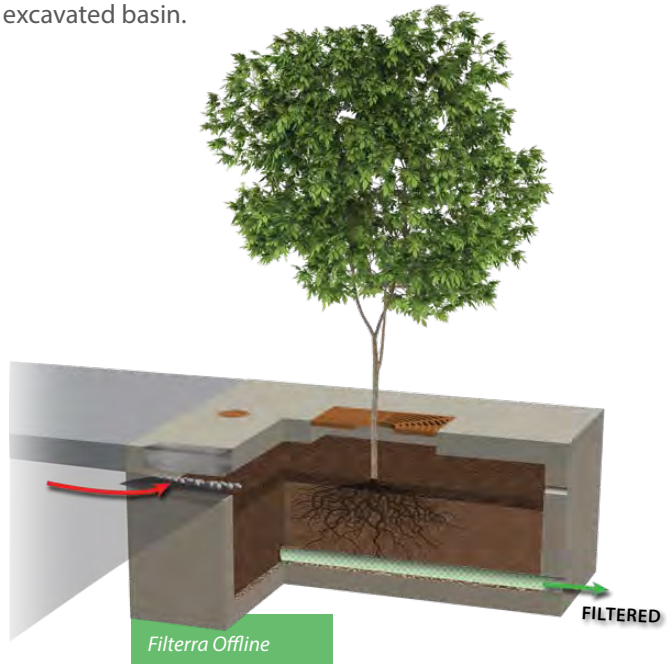
Plant health evaluation and pruning is important to encourage growth.

All stormwater treatment systems require maintenance for effective operation.

Filterra® Configurations

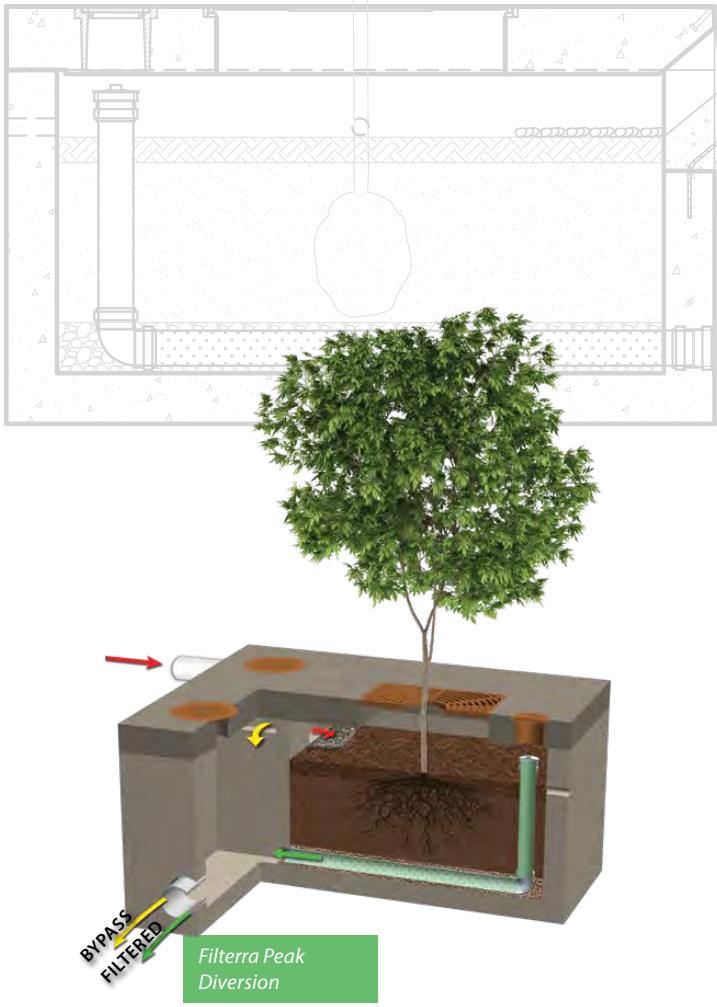
Multiple system configurations integrate with site hydraulic design and layout ...

The Filterra is available in a variety of precast configurations as well as Filterra Bioscape, which can be installed directly into an excavated basin.

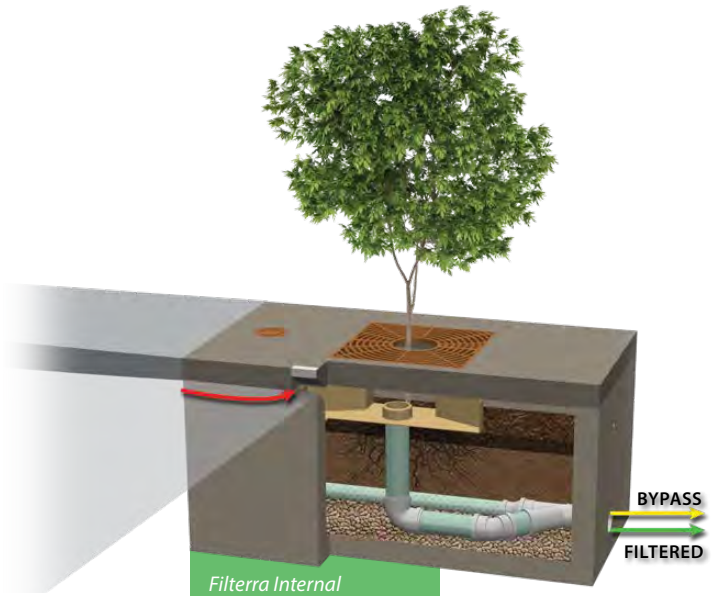


Filterra Offline

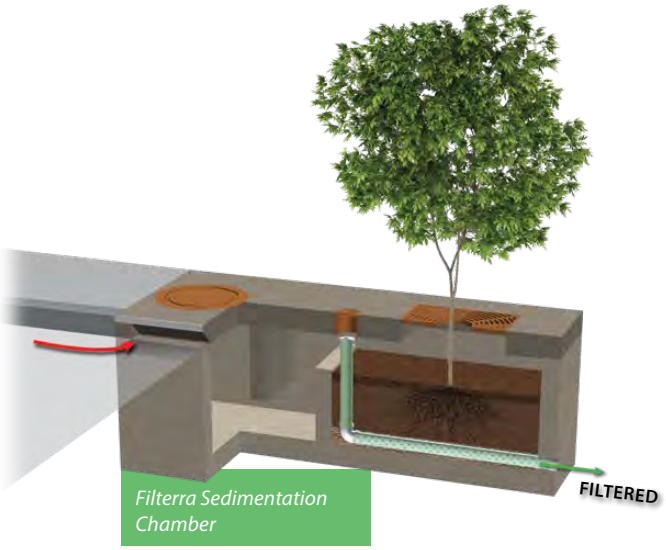
Bypass via downstream catch basin.



Filterra Peak Diversion



Filterra Internal Bypass Curb



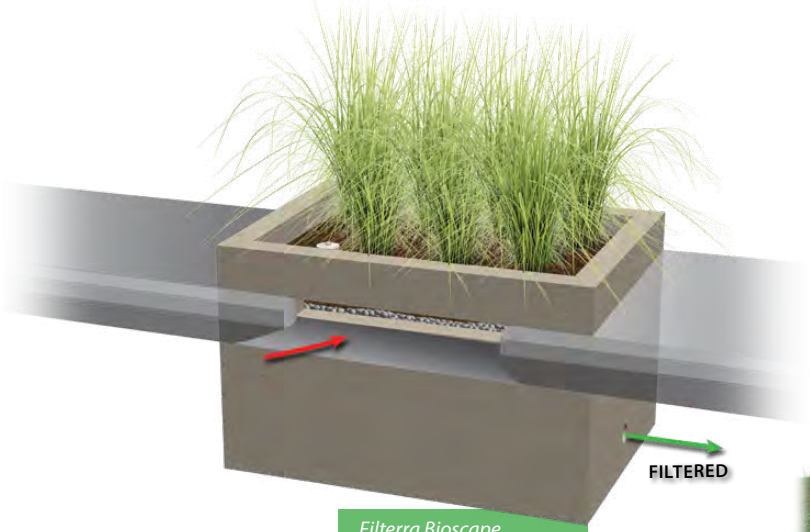
Filterra Sedimentation Chamber

Bypass via downstream catch basin.

**Additional configurations available, including offline - pipe, peak diversion - grate, and internal bypass curb-chamber.*

Multiple configurations allow for easy site integration

Filterra® Bioscape® Configurations



Filterra Bioscape Vault Offline

Bypass via downstream catch basin.

Filterra Bioscape Vault Basin

Bypass via upstream structure. Multiple inlet options.

Filterra Bioscape

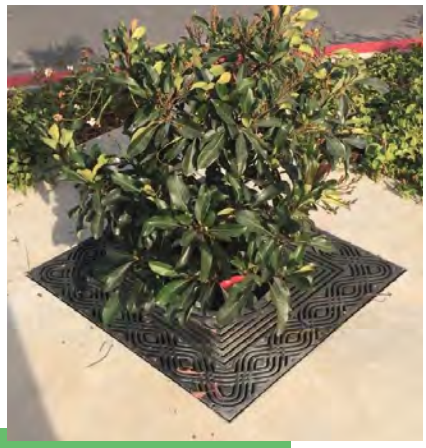
Bypass via upstream structure. Multiple inlet options.

**Additional configurations available, including bioscape vault offline pipe.*

Filterra® Aesthetic Options

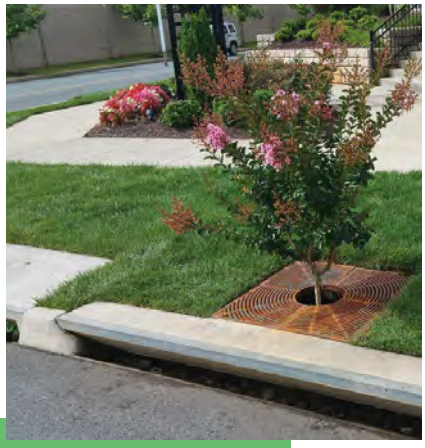
Multiple aesthetic options to enhance the appearance and integrate with landscaping ...

Standard Tree Grate



Custom/Decorative Tree Grate

Full Grate with Grasses



Recessed Top Slab

Open Top Planter - Filterra Bioscape

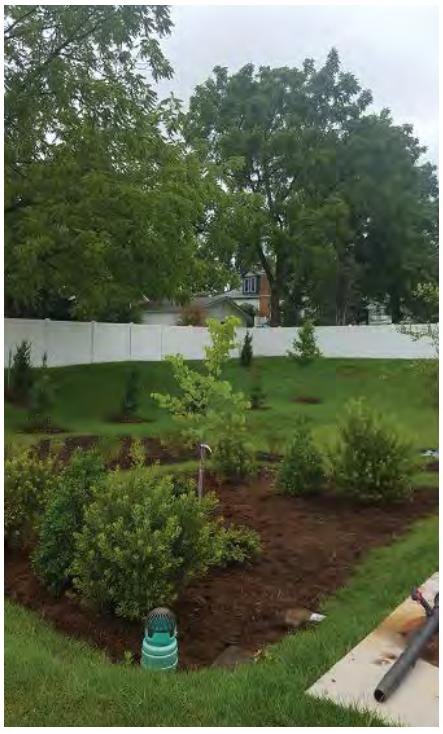
Street Tree

An aesthetic solution to meet your bioretention needs

Filterra® Bioscape®

Large-scale Filterra that can be customized to your site ...

- Ideal for Filterra systems greater than 300 square feet
- Design with or without containment structure
- Incorporate infiltration directly below the system, where required
- Combine with upstream storage or downstream infiltration
- Use as an alternative to larger regional traditional bioretention systems
- Easily add pretreatment Hydrodynamic Separator for large-scale or heavy pollutant loading applications



A partner you can rely on

STORMWATER SOLUTIONS

PIPE SOLUTIONS

STRUCTURES SOLUTIONS

Few companies offer the wide range of high-quality stormwater resources you can find with us — state-of-the-art products, decades of expertise, and all the maintenance support you need to operate your system cost-effectively.

THE CONTECH WAY

Contech® Engineered Solutions provides innovative, cost-effective site solutions to engineers, contractors, and developers on projects across North America. Our portfolio includes bridges, drainage, erosion control, retaining wall, sanitary sewer and stormwater management products.

TAKE THE NEXT STEP

For more information: www.ContechES.com

CONTECH® ENGINEERED SOLUTIONS

Get social with us:

800-338-1122 | www.ContechES.com