

December 20, 2022
Revised January 9, 2023

Project No.
19633.000.002

Mr. Steve Arthur
Pacific Gateway CA, LLC
c/o Ridgeline Property Group
915 Highland Pointe Drive, Suite 250
Roseville, CA 95678

Subject: Pacific Gateway
Tracy, California

DOUBLE RING INFILTRATION TESTING RESULTS

Dear Mr. Arthur:

As requested, we performed double-ring infiltration testing at the subject property in Tracy, California. The purpose of our services was to provide information pertinent to the design of the proposed project basins. A discussion of our field services and the results of our infiltration testing are provided below.

INFILTRATION FIELD TESTING

At each of the five proposed basin locations, we retained the services of a subcontractor to drill one boring to a depth of 20 feet. We reviewed subsurface conditions at each location and selected the most appropriate elevations for infiltration testing. We performed our double-ring tests at the approximate depth below the existing surface, as shown on Table 1 below. An ENGEO representative conducted two infiltration tests at various elevations within each of the five basin locations. The double-ring infiltration tests were performed in general conformance with ASTM D3385-18 and the Multi-Agency Post-Construction Stormwater Standards Manual. The approximate locations of our geotechnical borings and infiltration tests are provided in the attached figures.

The infiltration test maintains a constant head within the rings. Specialized Mariotte Tubes were used to maintain the water levels at the selected head elevation in both the inner ring and the annular space throughout the test. A constant head was achieved in DR-7 and DR-8 by manually adding a selected amount of water over a measured time interval due to the rapid infiltration rates of the targeted soil layers. Each infiltration test was run until the infiltration rate stabilized.

INFILTRATION TEST RESULTS

The infiltration rate for the double-ring infiltrometer was calculated using the following equation from ASTM D3385.

$$VIR = \Delta VIR / (AIR * \Delta t)$$

Where:

VIR = inner ring incremental infiltration velocity, cm/hr

ΔVIR = volume of liquid used during time interval to maintain constant head in the inner ring, cm³

AIR = interior area of inner ring, cm²

Δt = time interval, h

Based on the encountered soil types, the site soil would be anticipated to have infiltration rates varying from Type A to Type D soil, as presented in Table 3-1 of the Multi-Agency Post Construction Stormwater Standards Manual. Our double-ring infiltration test results are summarized in Table 1 below, along with a description of the soil type at each test location.

TABLE 1: Double-Ring Infiltrometer Test Results


TEST LOCATION	BASIN IDENTIFICATION	DEPTH (Below the existing ground surface, ft)	SOIL TYPE	INFILTRATION RATE (inches/hour)
DR-1	Basin 1	7	Sandy silt	1.8
DR-2	Basin 1	12	Silty sand	1.0
DR-3	Basin 2	5	Lean clay	0.3
DR-4	Basin 2	11½	Sandy lean clay	1.2
DR-5	Basin 3	3	Lean clay	0.3
DR-6	Basin 3	9½	Sandy lean clay	0.9
DR-7	Basin 4	9	Poorly graded gravel with silt and sand	15.0
DR-8	Basin 4	12	Poorly graded gravel with clay and sand	15.0
DR-9	Basin 5	4	Lean clay with sand	0.5
DR-10	Basin 5	9	Sandy silt	0.8


We strived to perform our professional services in accordance with generally accepted principles and practices currently employed in the area, there is no warranty, express or implied. If you have any questions regarding the contents of this letter, please do not hesitate to contact us.

Sincerely,

ENGEO Incorporated


 Chase Dunn


 Steve Harris, GE



cd/zc/sdh/ca

- Attachments:
- Figure 1 – Vicinity Map
 - Figure 2 – Site Plan - Proposed Basin 1
 - Figure 3 – Site Plan - Proposed Basin 2
 - Figure 4 – Site Plan - Proposed Basin 3
 - Figure 5 – Site Plan - Proposed Basin 4
 - Figure 6 – Site Plan - Proposed Basin 5
 - Boring Logs 1 through 5

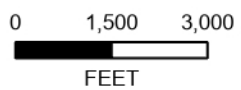
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EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

 PROJECT SITE



BASEMAP SOURCE: GOOGLE EARTH MAPPING SERVICE 2022



VICINITY MAP
PACIFIC GATEWAY
TRACY, CALIFORNIA

PROJECT NO. : 19633.000.002

SCALE: AS SHOWN

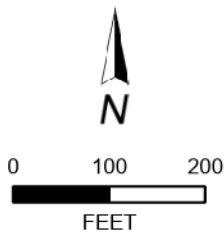
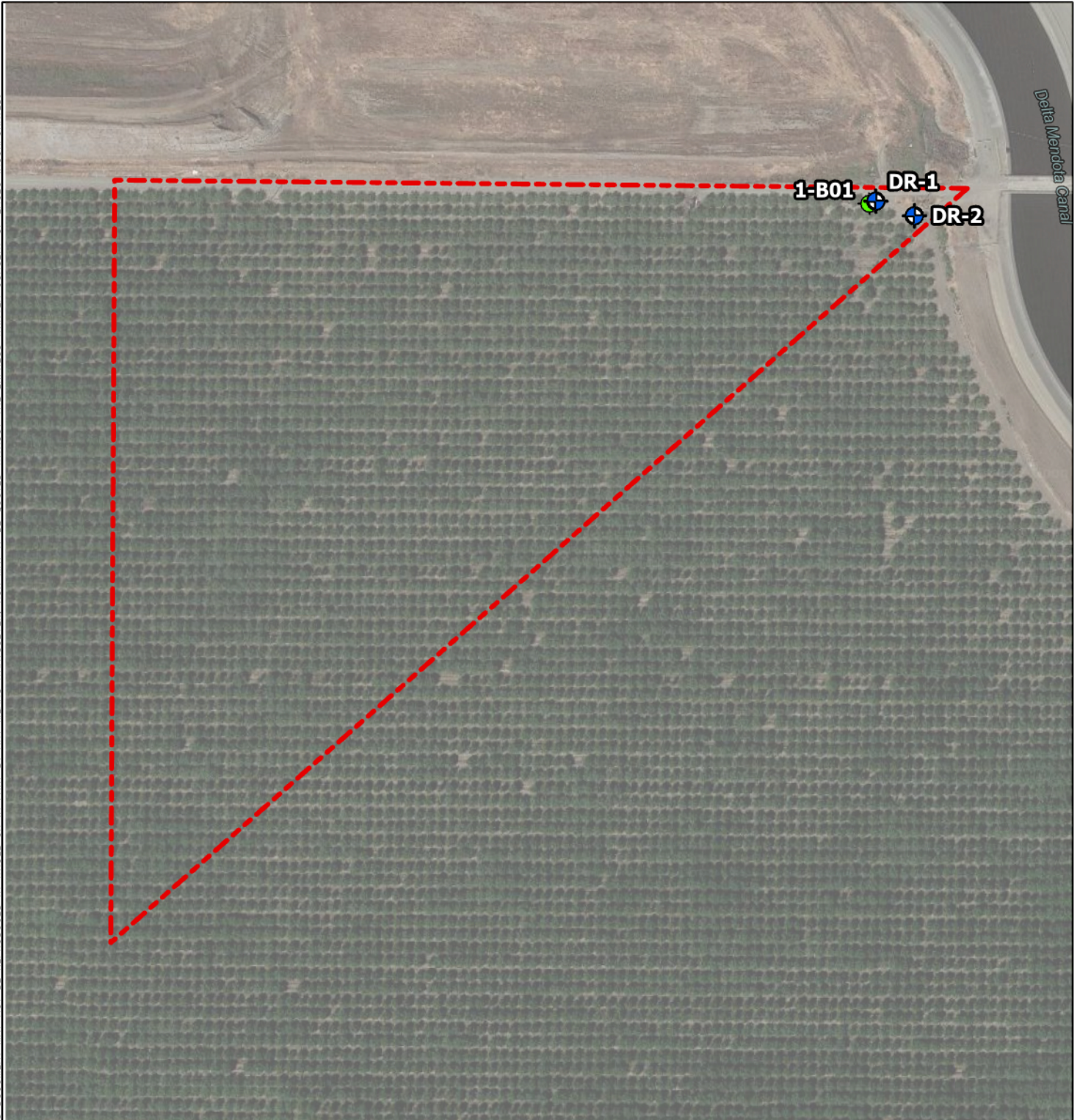
DRAWN BY: QRL

CHECKED BY: SDH

FIGURE NO.




1

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EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

-  PROJECT SITE PROPOSED BASIN 1
-  BORING (ENGEO, 2022)
-  DOUBLE-RING TEST LOCATION (ENGEO, 2022)

BASEMAP SOURCE: GOOGLE EARTH MAPPING SERVICE 2021

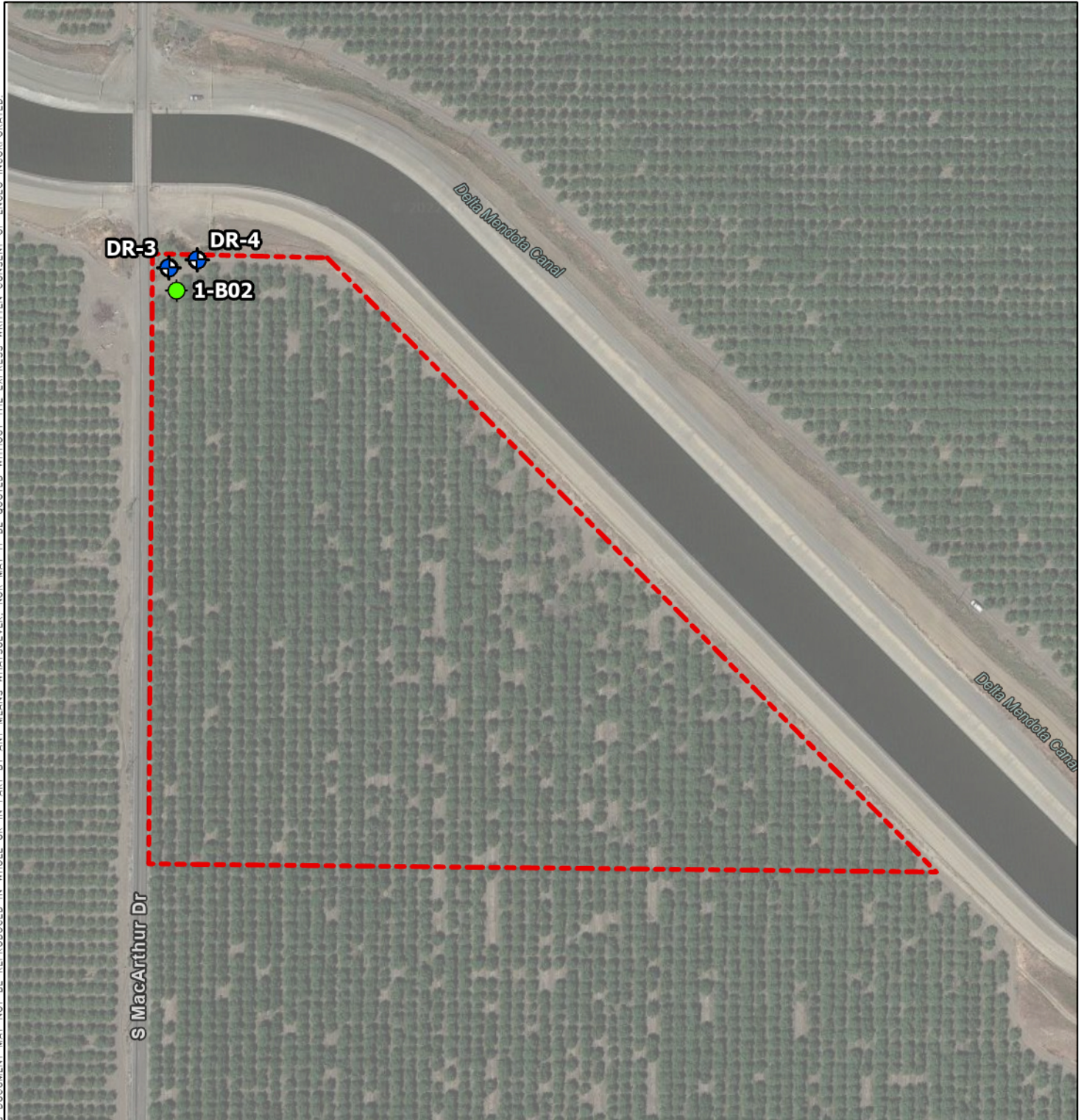


SITE PLAN - PROPOSED BASIN 1
 PACIFIC GATEWAY
 TRACY, CALIFORNIA

PROJECT NO. : 19633.000.002	
SCALE: AS SHOWN	
DRAWN BY: QRL	CHECKED BY: SDH

FIGURE NO.
2

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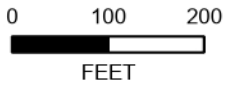


DR-3
DR-4
1-B02

Delta Mendota Canal




Delta Mendota Canal

S MacArthur Dr



EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

-  PROJECT SITE PROPOSED BASIN 2
-  BORING (ENGEO, 2022)
-  DOUBLE-RING TEST LOCATION (ENGEO, 2022)

BASEMAP SOURCE: GOOGLE EARTH MAPPING SERVICE 2021

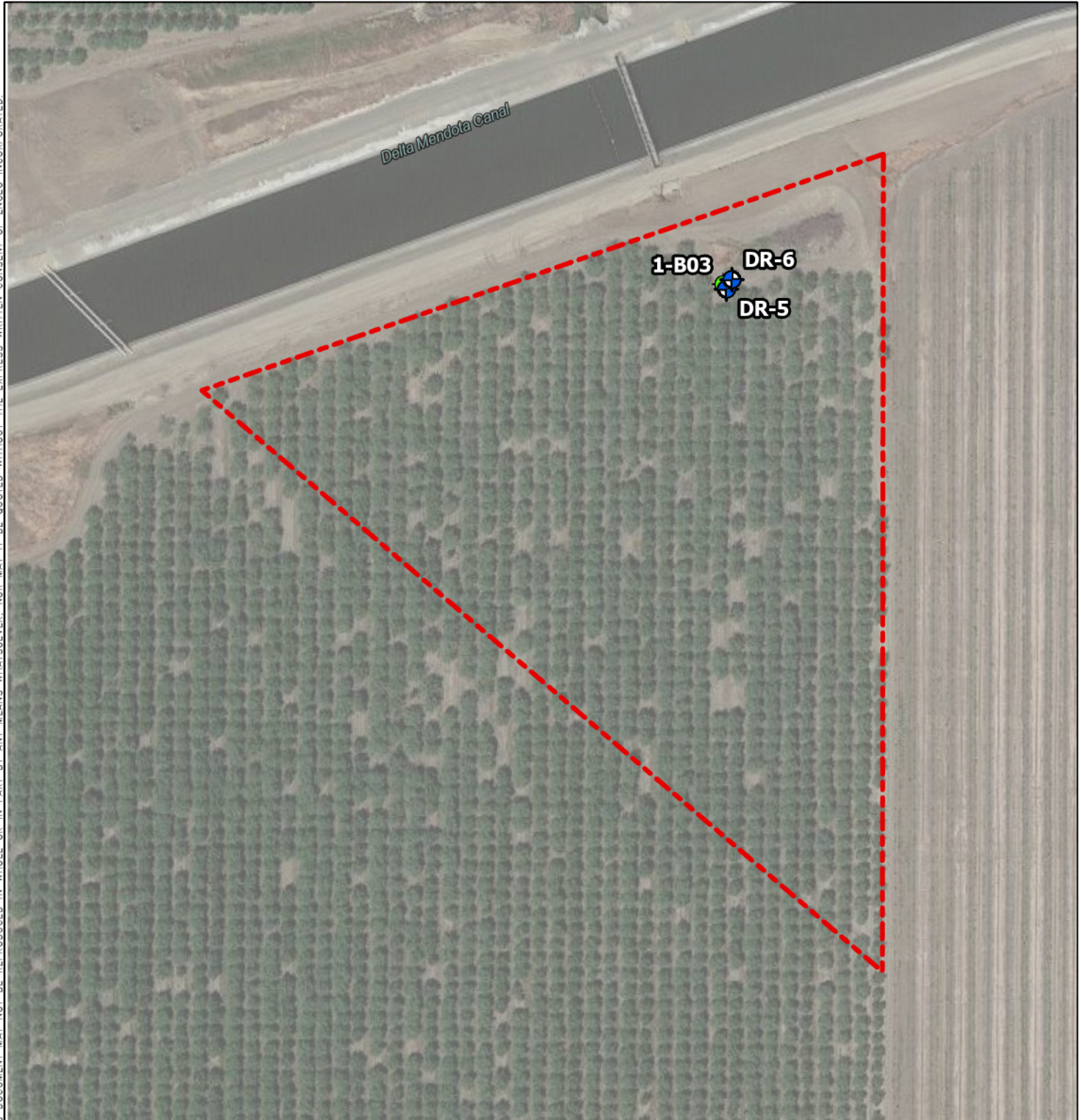


SITE PLAN - PROPOSED BASIN 2
PACIFIC GATEWAY
TRACY, CALIFORNIA

PROJECT NO. : 19633.000.002	
SCALE: AS SHOWN	
DRAWN BY: QRL	CHECKED BY: SDH

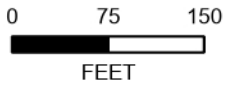
FIGURE NO.
3

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Delta Mendota Canal

1-B03
DR-6
DR-5



EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

-  PROJECT SITE PROPOSED BASIN 3
-  BORING (ENGEO, 2022)
-  DOUBLE-RING TEST LOCATION (ENGEO, 2022)

BASEMAP SOURCE: GOOGLE EARTH MAPPING SERVICE 2021

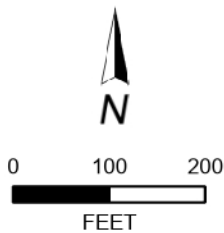


SITE PLAN - PROPOSED BASIN 3
PACIFIC GATEWAY
TRACY, CALIFORNIA

PROJECT NO. : 19633.000.002	
SCALE: AS SHOWN	
DRAWN BY: QRL	CHECKED BY: SDH




FIGURE NO.
4

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EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

-  PROJECT SITE PROPOSED BASIN 4
-  BORING (ENGEO, 2022)
-  DOUBLE-RING TEST LOCATION (ENGEO, 2022)

BASEMAP SOURCE: GOOGLE EARTH MAPPING SERVICE 2021



SITE PLAN - PROPOSED BASIN 4
 PACIFIC GATEWAY
 TRACY, CALIFORNIA

PROJECT NO. : 19633.000.002

SCALE: AS SHOWN

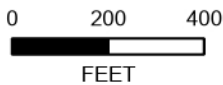
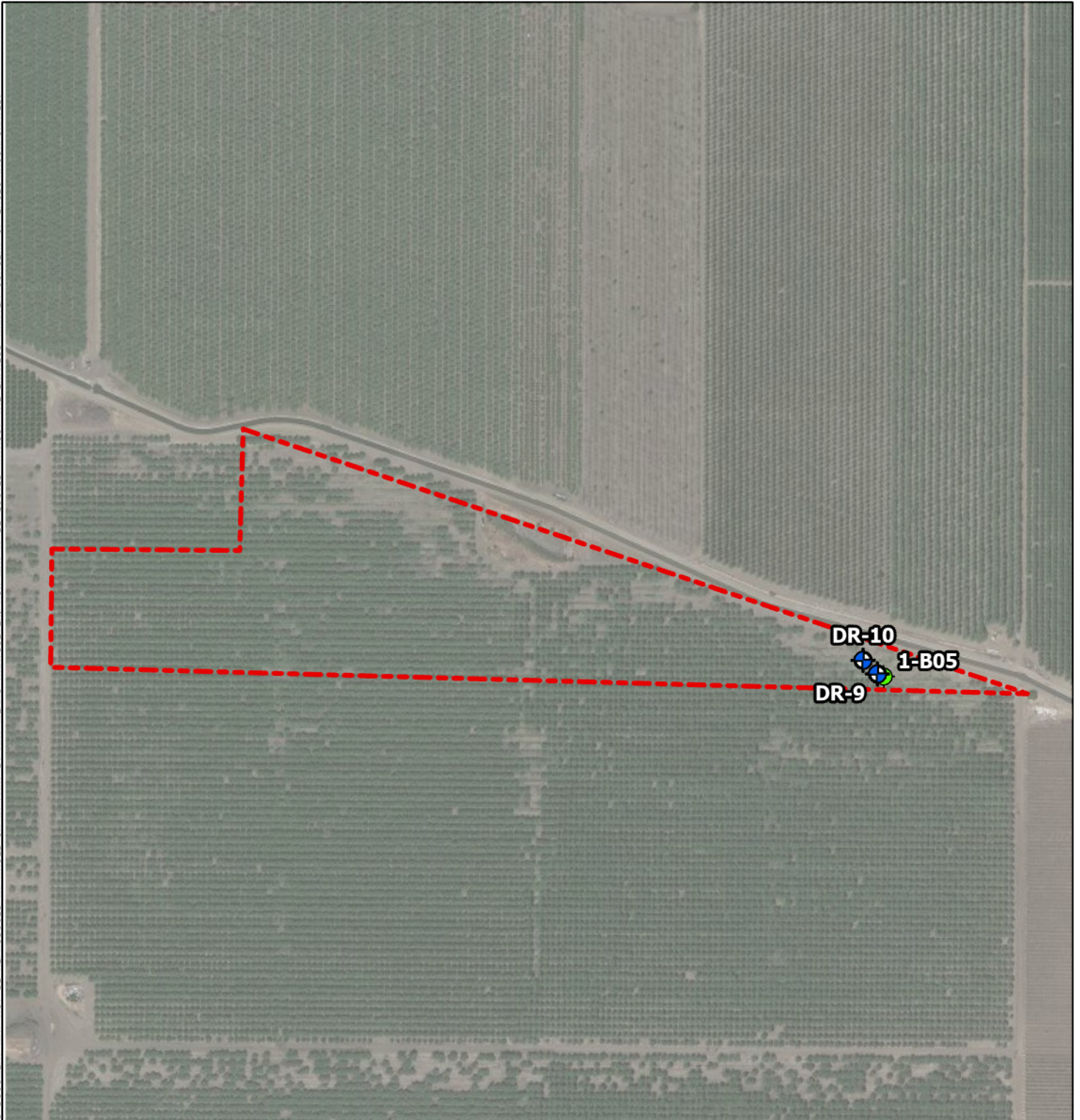
DRAWN BY: QRL

CHECKED BY: SDH

FIGURE NO.




5

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EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

-  PROJECT SITE PROPOSED BASIN 5
-  BORING (ENGEO, 2022)
-  DOUBLE-RING TEST LOCATION (ENGEO, 2022)

BASEMAP SOURCE: GOOGLE EARTH MAPPING SERVICE 2021



SITE PLAN - PROPOSED BASIN 5
PACIFIC GATEWAY
TRACY, CALIFORNIA

PROJECT NO. : 19633.000.002	
SCALE: AS SHOWN	
DRAWN BY: QRL	CHECKED BY: SDH

FIGURE NO.
6

KEY TO BORING LOGS

MAJOR TYPES		DESCRIPTION	
COARSE-GRAINED SOILS MORE THAN HALF OF MAT'L LARGER THAN #200 SIEVE	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE SIZE	CLEAN GRAVELS WITH LESS THAN 5% FINES	GW - Well graded gravels or gravel-sand mixtures GP - Poorly graded gravels or gravel-sand mixtures
		GRAVELS WITH OVER 12 % FINES	GM - Silty gravels, gravel-sand and silt mixtures GC - Clayey gravels, gravel-sand and clay mixtures
	SANDS MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE SIZE	CLEAN SANDS WITH LESS THAN 5% FINES	SW - Well graded sands, or gravelly sand mixtures SP - Poorly graded sands or gravelly sand mixtures
		SANDS WITH OVER 12 % FINES	SM - Silty sand, sand-silt mixtures SC - Clayey sand, sand-clay mixtures
FINE-GRAINED SOILS MORE THAN HALF OF MAT'L SMALLER THAN #200 SIEVE	SILTS AND CLAYS LIQUID LIMIT 50 % OR LESS		ML - Inorganic silt with low to medium plasticity CL - Inorganic clay with low to medium plasticity OL - Low plasticity organic silts and clays
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50 %		MH - Elastic silt with high plasticity CH - Fat clay with high plasticity OH - Highly plastic organic silts and clays
	HIGHLY ORGANIC SOILS		PT - Peat and other highly organic soils

For fine-grained soils with 15 to 29% retained on the #200 sieve, the words "with sand" or "with gravel" (whichever is predominant) are added to the group name.

For fine-grained soil with >30% retained on the #200 sieve, the words "sandy" or "gravelly" (whichever is predominant) are added to the group name.

GRAIN SIZES											
U.S. STANDARD SERIES SIEVE SIZE				CLEAR SQUARE SIEVE OPENINGS							
200		40		10		4		3/4 "		3"	12"
SILTS AND CLAYS	SAND			GRAVEL				COBBLES	BOULDERS		
SILTS AND CLAYS	FINE	MEDIUM	COARSE	FINE		COARSE		COBBLES	BOULDERS		

RELATIVE DENSITY

<u>SANDS AND GRAVELS</u>	BLOWS/FOOT (S.P.T.)
VERY LOOSE	0-4
LOOSE	4-10
MEDIUM DENSE	10-30
DENSE	30-50
VERY DENSE	OVER 50

CONSISTENCY

<u>SILTS AND CLAYS</u>	<u>STRENGTH*</u>
VERY SOFT	0-1/4
SOFT	1/4-1/2
MEDIUM STIFF	1/2-1
STIFF	1-2
VERY STIFF	2-4
HARD	OVER 4

MOISTURE CONDITION

DRY	Dusty, dry to touch
MOIST	Damp but no visible water
WET	Visible freewater

LINE TYPES

—————	Solid - Layer Break
-----	Dashed - Gradational or approximate layer break

GROUNDWATER SYMBOLS

	Groundwater level during drilling
	Stabilized groundwater level

SAMPLER SYMBOLS

	Modified California (3" O.D.) sampler
	California (2.5" O.D.) sampler
	S.P.T. - Split spoon sampler
	Shelby Tube
	Dames and Moore Piston
	Continuous Core
	Bag Samples
	Grab Samples
NR	No Recovery

(S.P.T.) Number of blows of 140 lb. hammer falling 30" to drive a 2-inch O.D. (1-3/8 inch I.D.) sampler

* Unconfined compressive strength in tons/sq. ft., asterisk on log means determined by pocket penetrometer





LOG OF BORING 1-B01

LATITUDE: 37.666966

LONGITUDE: -121.426855

Geotechnical Exploration
Pacific Gateway
Tracy, California
19633.000.002

DATE DRILLED: 12/2/2022
HOLE DEPTH: Approx. 21½ ft.
HOLE DIAMETER: 4.5 in.
SURF ELEV (WGS84): Approx. 195 ft.

LOGGED / REVIEWED BY: CM. Dunn / ZAC
DRILLING CONTRACTOR: West Coast Exploration
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Elevation in Feet	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits			Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
							Liquid Limit	Plastic Limit	Plasticity Index						
			SILTY SAND (SM), brown, medium dense, moist, fine-grained sand, 30-40% fines			28									
			SANDY LEAN CLAY (CL), brown, stiff, moist, medium plasticity, 30-40% fine-grained sand			12									
5	190		CLAYEY SAND (SC), brown, loose, moist, fine-grained sand, 25-35% fines			19									
			SANDY SILT (ML), brown, medium stiff, moist, non-plastic, 35-45% fine-grained sand			10									
10	185		SILTY SAND (SM), brown, medium dense, moist, fine-grained sand, 30-40% fines			16									
15	180		POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), brown, medium dense, moist, fine- to coarse-grained sand, 5-12% fines, 30-40% fine to coarse gravel			23									
20	175		SILTY SAND WITH GRAVEL (SM), brown, medium dense, moist, fine- to coarse-grained sand, 12-20% fines, 20-30% fine to coarse gravel			17									
			Bottom of boring at approximately 21 1/2 feet below existing grade. Groundwater not encountered during drilling.												

LOG - GEOTECHNICAL_SU+QU_W/ELEV_1-B01_1-B05.GPJ ENGEO INC.GDT 12/20/22



LOG OF BORING 1-B02

LATITUDE: 37.658188

LONGITUDE: -121.41592

Geotechnical Exploration
Pacific Gateway
Tracy, California
19633.000.002

DATE DRILLED: 12/2/2022
HOLE DEPTH: Approx. 21½ ft.
HOLE DIAMETER: 4.5 in.
SURF ELEV (WGS84): Approx. 188 ft.

LOGGED / REVIEWED BY: CM. Dunn / ZAC
DRILLING CONTRACTOR: West Coast Exploration
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Elevation in Feet	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits			Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
							Liquid Limit	Plastic Limit	Plasticity Index						
185			LEAN CLAY (CL), dark brown, very stiff to hard, moist, medium plasticity, <15% fine-grained sand, contains carbonates			40							>4.5*	PP	
5						22									
180			LEAN CLAY WITH SAND (CL), brown, hard, moist, medium plasticity, 15-25% fine-grained sand			73							>4.5*	PP	
			SANDY LEAN CLAY (CL), brown, hard, moist, low plasticity, 35-45% fine-grained sand			26							4.0*	PP	
10			SILTY SAND (SM), brown, dense, moist, fine- to medium-grained sand, 25-35% fines			68							>4.5*	PP	
15			SILTY SAND WITH GRAVEL (SM), brown, very dense, moist, fine- to coarse-grained sand, 15-25% fines, 20-30% fine to coarse gravel			30									
20						55									
			Bottom of boring at approximately 21 1/2 feet below existing grade. Groundwater not encountered during drilling.												

LOG - GEOTECHNICAL_SU+QU_W/ELEV_1-B01_1-B05.GPJ ENGEO INC.GDT 12/20/22



LOG OF BORING 1-B03

LATITUDE: 37.655847

LONGITUDE: -121.407512

Geotechnical Exploration
Pacific Gateway
Tracy, California
19633.000.002

DATE DRILLED: 12/2/2022
HOLE DEPTH: Approx. 21½ ft.
HOLE DIAMETER: 4.5 in.
SURF ELEV (WGS84): Approx. 192 ft.

LOGGED / REVIEWED BY: CM. Dunn / ZAC
DRILLING CONTRACTOR: West Coast Exploration
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Elevation in Feet	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits			Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
							Liquid Limit	Plastic Limit	Plasticity Index						
190			LEAN CLAY (CL), dark grayish brown, hard, moist, medium to high plasticity, <15% fine-grained sand, contains manganese nodules			22							>4.5*	PP	
						13							4.25*	PP	
5						26							>4.5*	PP	
185			LEAN CLAY WITH SAND (CL), brown, very stiff, moist, medium plasticity, 20-29% fine-grained sand			18							4.0*	PP	
			SANDY LEAN CLAY (CL), brown, hard, moist, medium plasticity, 30-40% fine-grained sand			30							>4.5*	PP	
10															
180			grades to increasing sands content, contains gravel												
15			LEAN CLAY WITH SAND (CL), brown, stiff, moist, medium plasticity, 15-25% fine-grained sand			15									
175															
20			grades to hard			33									
			Bottom of boring at approximately 21 1/2 feet below existing grade. Groundwater not encountered during drilling.												

LOG - GEOTECHNICAL_SU+QU_W/ELEV_1-B01_1-B05.GPJ ENGEO INC.GDT 12/20/22



LOG OF BORING 1-B04

LATITUDE: 37.671124

LONGITUDE: -121.407554

Geotechnical Exploration
Pacific Gateway
Tracy, California
19633.000.002

DATE DRILLED: 12/2/2022
HOLE DEPTH: Approx. 21½ ft.
HOLE DIAMETER: 4.5 in.
SURF ELEV (WGS84): Approx. 148 ft.

LOGGED / REVIEWED BY: CM. Dunn / ZAC
DRILLING CONTRACTOR: West Coast Exploration
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Elevation in Feet	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits			Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
							Liquid Limit	Plastic Limit	Plasticity Index						
			LEAN CLAY (CL), dark grayish brown, very stiff, moist, medium to high plasticity, <15% fine-grained sand			29						1750*	3.5*	PP+TV	
145			LEAN CLAY WITH SAND (CL), brown, medium stiff, moist, medium plasticity, 15-25% fine-grained sand			6									
5			grades to very stiff			19							2.75*	PP	
140			SANDY LEAN CLAY (CL), brown, hard, moist, low to medium plasticity, 35-45% fine-grained sand			16							>4.5*	PP	
10			POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM), yellowish brown, very dense, moist, fine to coarse gravel, 5-12% fines, 35-45% fine- to coarse-grained sand			53									
135			POORLY GRADED GRAVEL WITH CLAY AND SAND (GP-GC), yellowish brown, dense, moist, fine to coarse gravel, 5-12% fines, 25-35% fine- to coarse-grained sand			30									
130			CLAYEY SAND (SC), brown, medium dense, moist, fine-grained sand, 40-49% fines			19									
			Bottom of boring at approximately 21 1/2 feet below existing grade. Groundwater not encountered during drilling.												

LOG - GEOTECHNICAL_SU+QU_W/ELEV 1-B01_1-B05.GPJ ENGEO INC.GDT 12/20/22



LOG OF BORING 1-B05

LATITUDE: 37.660539

LONGITUDE: -121.371812

Geotechnical Exploration
Pacific Gateway
Tracy, California
19633.000.002

DATE DRILLED: 12/2/2022
HOLE DEPTH: Approx. 21½ ft.
HOLE DIAMETER: 4.5 in.
SURF ELEV (WGS84): Approx. 129 ft.

LOGGED / REVIEWED BY: CM. Dunn / ZAC
DRILLING CONTRACTOR: West Coast Exploration
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Elevation in Feet	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits			Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
							Liquid Limit	Plastic Limit	Plasticity Index						
			LEAN CLAY WITH SAND (CL), dark brown, hard, moist, medium to high plasticity, 15-25% fine-grained sand, contains carbonates			58							>4.5*	PP	
			grades to brown, 20-29% fine-grained sand			18							>4.5*	PP	
5	125		LEAN CLAY (CL), brown, hard, moist, medium to high plasticity, <15% fine-grained sand			33							>4.5*	PP	
			LEAN CLAY WITH SAND (CL), brown, very stiff, moist, medium plasticity, 15-25% fine-grained sand			16							2.75*	PP	
			SANDY SILT (ML), brown, stiff, moist, low plasticity to non-plastic, 30-40% fine-grained sand												
10	120		grades to medium stiff			9									
			SANDY ELASTIC SILT (MH), brown, stiff, moist, medium plasticity, 30-40% fine-grained sand												
15	115					11									
20	110					11									
			Bottom of boring at approximately 21 1/2 feet below existing grade. Groundwater not encountered during drilling.												

LOG - GEOTECHNICAL_SU+QU_W/ELEV_1-B01_1-B05.GPJ ENGEO INC.GDT 12/20/22