PRELIMINARY GEOTECHNICAL ENGINEERING INVESTIGATION

Proposed Three Residential Buildings and Accessory Dwelling Units

9118 Baseline Road, Rancho Cucamonga, CA 91701

For

The Wellwant Inc.

Prepared by

LC Engineering Corp

Project No. 224-21-S

December 11, 2021

The Wellwant Inc.
9118 Baseline Road
Rancho Cucamonga, CA 91701
Attn: **Mr. Franco Fan**

SUBJECT: PRELIMINARY GEOTECHNICAL ENGINEERING INVESTIGATION
Proposed Three Residential Buildings and Accessory Dwelling Buildings
9118 Baseline Road, Rancho Cucamonga, CA 91701

Gentleman:

Per your request, LC Engineering Corp (LCEC) has performed the preliminary geotechnical engineering investigation for the proposed three residential buildings and accessory dwelling buildings (ADUs) at the subject site. The purpose of this investigation is to evaluate the onsite soil conditions and provide recommendations for design and construction of the proposed development. The accompanying geotechnical report presents the findings and conclusions of this investigation and our recommendations.

Based upon the findings of our investigation, the proposed development at the subject site is feasible from the geotechnical engineering viewpoint provided the recommendations of this report are properly incorporated into design of the project and are implemented during construction of the project.

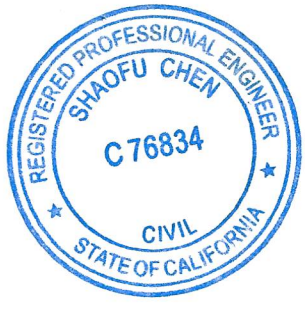
We appreciate the opportunity for providing the professional service. If you have any questions regarding this report, please do not hesitate to contact the undersigned.

Respectfully submitted,
LC Engineering Corp

Jack Liu

Jack Liu, Project Geologist

Shaofu Chen, P.E. C76834
Principal Engineer



Encl.: Figure 1 Site Location Map
Figure 2 Site Plan and Boring Locations
Appendix A Boring Logs and Laboratory Tests

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1. INTRODUCTION

The subject property is located at 9118 Baseline Road, Rancho Cucamonga, CA 91701 (**Figure 1**). Presently, the site is a vacant lot. Based on the provided design plan, the proposed development consists of three residential buildings and three accessory dwelling units (ADUs) at the site, which are shown on **Figure 2.** The purpose of this investigation is to evaluate the subsurface soil conditions and provide recommendations with respect to grading and foundation requirements.

This report describes our scope of work and presents our professional opinions regarding the proposed development, in form of findings, conclusions, and geotechnical recommendations.

2. SCOPE OF WORK

The scope of work has been performed for this investigation in the following:

1) Site check and review of pertinent soils data of the general study. A site location map is shown on **Figure 1**.

2) Drilling, logging, and sampling of three (3) borings at selected locations as shown on **Figure 2**. The boring logs are included in **Appendix A**.

3) Laboratory testing of earth samples to determine their engineering properties. The results of laboratory tests are presented in **Appendix A**.

4) Performing engineering analyses and evaluation.

5) Preparation of geotechnical engineering report to present the findings and conclusions of this investigation and the recommendations for design and construction.

3. SITE CONDITIONS

The subject site is a vacant lot, which was covered by moderately dense native grasses. The site is relatively flat, which is bounded by Baseline Road to the south, by Beryl Street and residence, and by residences to other directions. No utility lines were observed on the subject site at the time we conducted field reconnaissance. Water and sewer lines and overhead electric lines were observed along Baseline Road and Beryl Street.

4. FIELD EXPLORATIONS

A total of three (3) borings were drilled to depths ranging from 6.5 to 13 feet below the ground surface (bgs**)** during our field exploration on November 13, 2021. Soil borings were logged by our field geologist under supervision of a California Certified Engineering Geologist. Undisturbed soil samples were obtained using GeoMatic samplers, which are in compliance with the ASTM D3550 sampling method. The soil samples were placed in moisture-tight bags and containers, and transported to the laboratory for testing.

Laboratory tests including moisture-density test, direct shear test, consolidation test, expansion index test, and corrosivity test were performed. The test results are presented in **Appendix A.**

5. EARTH MATERIALS

The earth materials encountered during subsurface exploration consist of artificial fill and native soils.

5.1. Artificial Fill

Artificial fill was encountered in all of three borings from ground surface to 3.5 feet bgs mainly consisting of light brown to grayish brown silty sand in moderately moist and medium dense to dense and dark sandy clay in moist and medium stiff.

5.2. Native Soils: Alluvium

Native soils: Alluvium encountered in all of three borings from bottom of fill to 11 feet bgs (the maximum depth explored) mainly consisted of light brown to gray silty sand and gravelly sand in moderately moist and dense conditions and light olive brown to dark brown clayey sand in moderately moist to moist and medium dense conditions.

5.3. Groundwater

No groundwater was encountered in any of three borings during our field exploration. Based on California State Well (01S07W04B002S), which is approximately 3,500 feet southwest of the site, the depth to groundwater was 235 feet below the ground surface measured on

December 1, 2020; therefore, the groundwater is not considered to be significant factor for construction.

6. ENGINEERING PROPERTIES OF EARTH MATERIALS

The engineering properties of onsite earth material samples determined from laboratory tests are summarized as follows:

Field Dry Density:	107.1 to 121.7 pounds per cubic feet (pcf)
Field Moisture Content:	2.5 to 10.0%
Cohesion:	430 and 770 pounds per square feet (psf)
Friction Angle:	29 and 21 degrees
Shear Strength:	Plates DS-1 and DS-2
Compressibility:	Plate CS-1
Expansion Index:	35
Sulfate:	9.0 parts per million (ppm)
Chloride:	105.0 ppm
Resistivity:	1,678 ohms-cm
pH:	7.1

7. FAULTING AND SEISMICITY

7.1 FAULTING

Data search of historical earthquake events which have occurred in the general study area were performed to evaluate the deterministic seismicity parameters of potential on site ground motion. The seismicity study indicated that no known active or potentially active faults pass through the site. Per Fault Activity Map of California on California Geologic Survey website: https://maps.conservation.ca.gov/cgs/fam/, the most significant active fault near the site is Cucamonga fault, which is approximately 3 miles north of the site. The other active fault near the site includes San Jacinto fault. The San Jacinto fault is approximately 14

miles northeast-east of the site. Another Quaternary fault near the site is Red Hill fault, which is approximately 0.4 miles southeast of the site. However, the site, as all of the Southern California areas, is located in a seismically active region, and will experience slight to very intense ground shaking as a result of movement along various active faults in the region. Based on US seismic design maps, the maximum considered peak ground acceleration which may impact the site is 0.703g.

7.2 SEISMICITY

7.2.1 Earthquake Effects

Based on our studies, no active or potentially active faults pass through the site. However, the site lies within a seismically active area and may be subject to very strong ground shaking. If a strong earthquake occurs in the vicinity of the subject site, structural stress and minor foundation disturbance caused by earthquake induced ground shaking will be the major cause of damage. The potential of earthquake effects are discussed in the following.

7.2.2 Seismically Induced Settlement

The proposed footings will be supported by compacted fill. Seismically induced settlement is anticipated to be minor.

7.2.3 Lurching and Shallow Ground Rupture

As no active or potentially active faults pass through the site and no known ground ruptures have occurred in the local area surrounding the site, the potential of ground cracking due to shaking and seismic events is low.

7.2.4 Liquefaction Potential

Liquefaction describes a phenomenon in which cyclic stresses produced by ground shaking induced excess pore water pressures in the cohesionless soils. These soils may thereby acquire a high degree of mobility leading to damages or deformations. In general, this phenomenon only occurs below the water table, but after liquefaction has developed, it can propagate upward into overlying non-saturated soil as excess pore

water pressure. Liquefaction susceptibility under a given earthquake is related to the gradation and relative density characteristics of the soil, the in-situ stresses prior to ground motion, and the depth to the water table, as well as other factors.

The subject site is located in a geological hazard undetermined zone. However, based on California State Well (01S07W04B002S), which is approximately 3,500 feet southwest of the site, the depth to groundwater was 235 feet below the ground surface measured on December 1, 2020 at this well with the ground surface elevation of 1430.38 feet above mean sea level (MSL); the ground surface elevation of the subject site is approximately 1440 feet above MSL. Therefore, the liquefaction potential for the proposed development is considered low.

7.2.5 Seismic Design Parameters

Based on field investigation, the California Building Code (CBC) 2019, and ASCE/SEI 7-16 Minimum Design Loads and Associated Criteria for Buildings and other Structures (ASCE 7-16), the site could be designated as default **Site Class "D"** per Table 20.3 of ASCE 7-16. Other required seismic design parameters can be obtained from the California Structural Engineers Association website: https://seismicmaps.org by entering the site address of the project, the seismic data of the computer output is summarized in the following table.

Spectral Response Accelerations S_{MS} and S_{M1}	
Ss =1.565g, S_{MS} = Fa x Ss	S_1 = 0.6g, S_{M1} = Fv x S_1
Site Class D: Fa = 1.0, Fv = 1.7	
Period (Sec.)	Sa (g)
0.2	1.565 (S_{MS}, Site Class D)
1.0	1.02 (S_{M1}, Site Class D)

Design Spectral Response Accelerations S_{DS} and S_{D1}	
S_{DS} = 2/3 x S_{MS}	S_{D1} = 2/3 x S_{M1}
PGA=0.639g, F_{PGA} = 1.1, PGA_M = 0.703g	
Period (Sec.)	Sa (g)
0.2	1.043 (S_{DS}, Site Class D)
1.0	0.68 (S_{D1}, Site Class D)
Seismic Design Category: D	

8. CONCLUSIONS AND RECOMMENDATIONS

Based upon the findings of our investigation, the proposed development at the subject site is feasible from a geotechnical engineering viewpoint provided that the recommendations of this geotechnical report are properly incorporated into design of the project and are implemented during construction of the project.

The following recommendations should be incorporated into the final design and construction practice for the proposed development.

8.1. Site Preparation

The following grading guidelines are provided for quality control during grading and fill placement. Temporary excavation should be conducted per **Section 8.2**.

a) Remove all fill, loose soils, vegetation, and other deleterious materials that conflict with the proposed development. All utility lines and sewer system should be protected.

b) Based on our field exploration and lab test results, to provide uniform support and minimize the differential settlement for the proposed structure, it is recommended that the existing loose native soils at the areas of the proposed structures be removed to a minimum of 4.0 feet below the existing grade or a minimum of 2 feet below the proposed footing bottom, whichever is deeper. All of over-excavation for the proposed structures should be extended to 3 feet laterally from the outlines of the proposed footings **if applicable**, and replaced with compacted fill.

c) The areas for slab on grade/flatwork/driveway should be over-excavated a minimum of 2 feet and backfilled with compacted fill.

d) The bottom of the excavation should be scarified 6 to 8 inches, moistened to near the optimum moisture content, and re-compacted to a minimum of 90 percent of the maximum dry density in accordance with the latest version of the ASTM D1557.

e) Any loose spots or fill, if encountered, should be over-excavated and re-compacted to a minimum of 90 percent of the maximum dry density in accordance with the latest version of the ASTM D1557.

f) All backfill should be compacted to a minimum of 90 percent of the maximum dry density in accordance with the latest version of the ASTM D1557.

g) Compacted fill should be placed in controlled layers, not exceed 8 inches in thickness.

h) Field density tests should be performed in accordance with the latest version of the ASTM D1556 and/or ASTM D6938. Field density tests should be taken at not more than 2-foot intervals of the fill placed. Field moisture content should be performed in accordance with the latest version of the ASTM D4959 or D6938.

i) All soils to be used for backfilling should be cleared out of the rocks greater than 3" in diameter. All fill placements should be performed in accordance with the current grading ordinances of the local government and the recommendations of this report.

j) All bottoms of removal areas, fill placements, and footing excavations should be observed, tested, and approved by a representative of this firm prior to placing any fill, steel or concrete.

k) Any import soils if necessary should have expansion index less than 20 and soluble sulfate content less than 1,000 ppm. The import soils should be approved by the soil engineer or his representative prior to importing to the site.

8.2. Temporary Excavation

Prior to commencing excavation, all utilities in the project area should be located and either rerouted or protected. Any existing vegetation, organic materials, and other deleterious materials which conflict with the proposed development should be cleared out from the site. Most of the soils encountered at the site generally can be used for backfill and be excavated with conventional grading equipment.

Temporary excavation without surcharge can be cut vertically up to 5 feet and 1:1 (horizontal to vertical) slope upward over 5 feet.

8.3. Foundation Systems

Based on the expansion index of 35 for top soils at the site, the expansive soil features should be incorporated into foundation design per the California Building Code.

Conventional continuous or pad footings can be designed to support the proposed development for an allowable net bearing pressure of 2,000 pounds per square foot (psf) in compacted fill. For one-story building, the continuous footings should be designed for a minimum of 15 inches in width and embedded a minimum of 24 inches into certified compacted fill; and the pad footings should be designed for a minimum of 24 inches in width and embedded a minimum of 24 inches into certified compacted fill. For two-story building, the continuous footings should be designed for a minimum of 18 inches in width and embedded a minimum of 24 inches into certified compacted fill; and the pad footings should be designed for a minimum of 24 inches in width and embedded a minimum of 24 inches into certified compacted fill. All isolated footings should be tied by grade beams or continuous footings. The bearing capacity can be increased by one third when considering short duration wind or seismic loads.

A friction coefficient of 0.3 and a lateral bearing of 300 psf per additional foot of depth, to a maximum of 3,000 psf per foot of depth, can be used to resist lateral loads in compacted fill. When combining passive earth pressure and frictional resistance, the passive earth pressure should be reduced by one third.

All continuous footings should be reinforced with a minimum of two #4 re-bars near the top and two #4 re-bars near the bottom.

Foundations designed and installed in accordance with the recommendations outlined in this report are anticipated to undergo a total static settlement less than one inch and differential settlement within a radius of 30 feet less than 1/2 inch.

Prior to the placement of concrete or steel in the footing excavations, an inspection should be made by the soil engineer or his representative to ensure that the footing excavations are free of loose and disturbed soils.

8.4. Slab on Grade/Flatwork/Driveway

The onsite surficial soils consist of expansive soils with low expansive potential. Conventional concrete slab can be used for slab on grade/flatwork/driveway. Onsite subgrade soils should be over-excavated to a minimum of 2 feet in depth and compacted to a minimum of 90 percent of the maximum dry density as ASTM D 1557. Conventional concrete slab should be designed for a minimum of 4 inches in thickness and reinforced with #4 re-bars at spacing of 12 inches placed at mid-height. Heavily loaded floors should be engineered separately. Interior slab on grade should be underlain by a 2-inch layer of clean sand, followed by a minimum of 10 mil polyethylene moisture barrier, and underlain by a 4-inch layer of ½- ¾ inch diameter gravel for capillary breaks to meet with the current California Green Building Code requirements.

8.5. Corrosivity Test

Chemical laboratory tests were conducted to evaluate the soil corrosion potential and the attack on concrete by sulfate soils. Based on the test results, sulfate test result is 9.0 parts per million (ppm), Type I or II cement can be used. Chloride value is 105.0 ppm, pH value is 7.1, and the resistivity value is 1,678 ohms-cm (saturated condition). It is our opinion that a potential corrosion problem from on-site soil is moderate; all the underground metal pipes and devices should have corrosion protection.

8.6. Drainage

Foundation, slab, flatwork, and pavement performance depend greatly on proper drainage within and along the boundary of the improvements. Perimeter grades around the building should be sloped in a manner allowing water to drain away from the structure and not pond next to the foundations. Roof down drains should be connected to underground pipes carrying water away from the building area or have extenders so water does not drain and pond next to the building. Per the 2019 CBC, landscape areas within 10 feet of the building should slope away at gradients of at least 5 percent. Paved areas within 10 feet of the building should slope away at gradients of at least 2 percent. Proper drainage is recommended for all surfaces to reduce the potential settlement due to water infiltration. We recommend minimizing the size and number of planters adjacent to the building and other foundations and using drought resistant planting.

8.7. Construction Maintenance

It is the responsibility of contractor to maintain a safe construction site. The area should be fenced and warning signs posted. All excavations must be covered and/or secured. Soil generated by foundation excavations should be either removed from the site or placed as compacted fill. Workers should not be allowed to enter any unshored trenches excavations over five feet deep. Water should not be allowed to saturate open footing trenches.

9. PLAN REVIEW, OBSERVATION AND TESTS

LCEC should be present to perform the following tasks, otherwise, the qualities and performance of the recommended geotechnical works for the project may not meet your needs, and therefore **LCEC** is automatically released from the liabilities of the project by our client if the other consultant takes over this project. Those tasks include:

a) Review, approve and sign foundation, grading and drainage plans.

b) Observe and advise during all grading activities including site preparation, footing excavation, and placement of fill.

c) Test all fills placed for engineering purpose.

10. LIABILITY AND LIMITATION

This report is based on the proposed design plans provided to our office. The conclusions and recommendations submitted in this report are based on our data research, subsurface exploration, laboratory testing, and engineering evaluation and analyses.

The subsurface conditions, excavations, characteristics and geologic information described herein have been projected from individual borings or test pits placed on the subject property. The subsurface conditions and excavation characteristics, and geologic information shown should in no way be construed to reflect any variations which may occur between these borings.

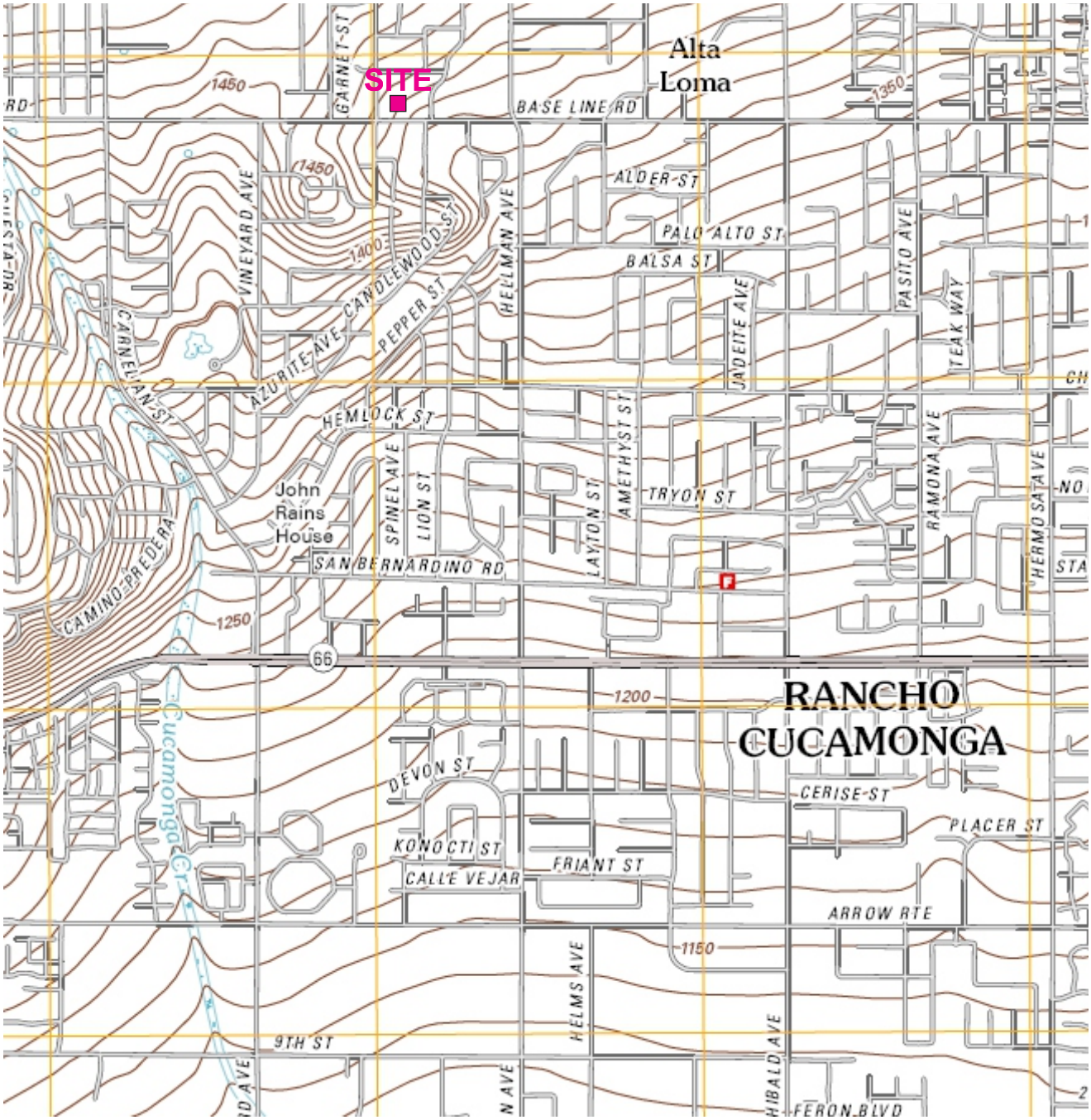
The nature and extent of variations in subsurface conditions may not become evident until construction. If conditions encountered during construction appear to differ from those disclosed, this office should be notified so as to consider the need for modifications. No responsibility for

construction compliance with the design concepts, specifications or recommendations is assumed unless on-site construction review is performed during the course of construction which pertains to the specific recommendations contained herein.

This report has been prepared for our client under agreed upon terms and conditions that include limitation of liability understandings. The scope of work and recommendations may not be suitable for other persons or other parties, so no other party may rely upon this report without the written authorization of this company. This report has been prepared in accordance with generally accepted practice. No warranties, either express or implied, are made as to the professional advice included in this report or as provided under the terms of the agreement.

Please be aware that the contract fees for our services to prepare this report do not include additional work which may be required such as plan review, grading observation and testing, footing observations, etc. Where additional services are required and requested, you will be billed for any equipment costs and on an hourly basis for consultation or analysis. This report is issued with the understanding that it is the responsibility of the **owner** or **his representative** to ensure that the information of the project is incorporated into the plans and that the necessary steps are taken by the contractor to implement such recommendations in the field. **LCEC** has prepared this report for the exclusive use of the client and authorized agent. Any other geotechnical engineer who takes over the project needs to independently reevaluate the Site and entire situation and assume the responsibility and liability for the project as the **Geotechnical Engineer of Record**.

FIGURES



1 0.5 0 KILOMETERS 1 2

1000 500 0 METERS 1000 2000

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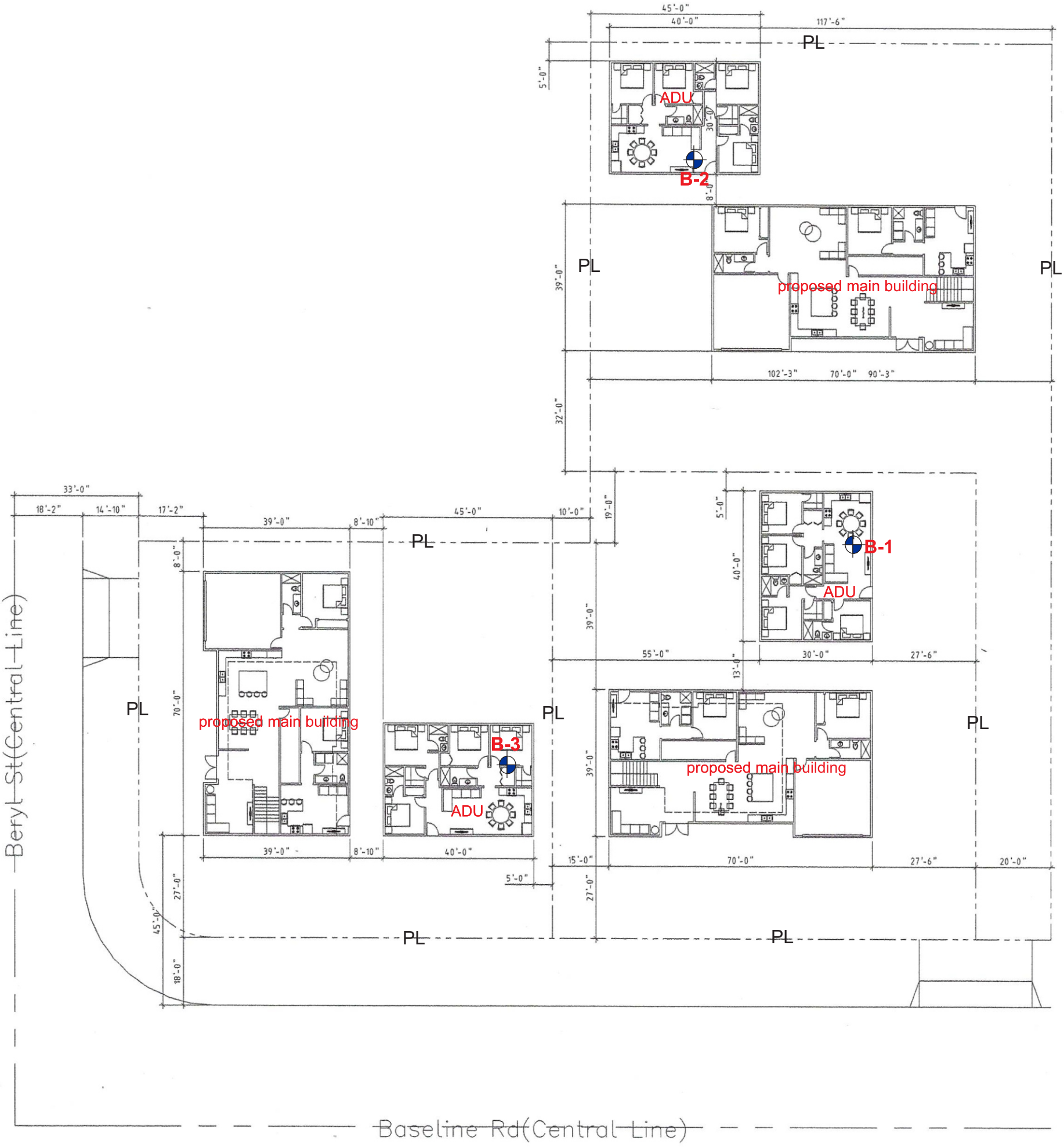
Source: copied from USGS Topo Map-Rancho Cucamonga Quadrangle 2012.

FIGURE 1 SITE LOCATION MAP

9118 Baseline Road, Rancho Cucamonga, CA 91701

LC Engineering Corp Project No. 224-21-S



Legend

B-1 Boring Location

PL Property Line

FIGURE 2 SITE PLAN AND BORING LOCATIONS

9118 Baseline Road, Rancho Cucamonga, CA 91701

LC Engineering Corp	Project No. 224-21-S

APPENDIX A

BORING LOGS AND LABORATORY TEST RESULTS

APPENDIX A

BORING LOGS AND LABORATORY TESTING

1.0 BORING LOGS

Boring logs are presented on Plates B-1, B-2, and B-3.

2.0 LABORATORY TESTING

Laboratory tests include moisture-density test, direct shear test, consolidation test, expansion index test, and corrosivity test.

2.1 Moisture-Density Test

Site soil samples were classified in the laboratory in accordance with the Unified Soil Classification system (USCS). Field moisture content and dry unit weights were determined for the ring samples obtained in the field per ASTM D2216. Field moisture contents and dry unit weight are shown on Plates B-1, B-2, and B-3.

2.2 Direct Shear Test

Direct shear tests were performed to determine the shear strength parameters of undisturbed samples per ASTM D 3080. The samples were tested in its saturated moisture condition. The results are plotted and linear approximations are drawn of the failure curve to determine the angle of internal friction and cohesion. The results of direct shear tests are shown on the Plates DS-1 and DS-2.

2.3 Consolidation Test

Consolidation test was conducted per ASTM D2435. The apparatus used for the consolidation test is designed to receive the brass ring of soils without removing the sample from the brass ring. Loads were applied to the sample in several increments, and the resulting deformations were recorded at selected time intervals. Porous stones were placed in contact with the top and bottom of the samples to permit the ready addition or release of water. Sample was tested at the field and increased moisture contents. The test results are shown on the Plate CS-1.

2.4 Expansion Index Test

Expansion index test was conducted per ASTM D4829.

2.5 Corrosivity Test

The sulfate test, chloride content, and minimum resistivity are tested per Caltrans Test Method 417- Methods of Testing Soils and Water for Sulfate Content, 422- Methods of Testing Soils and Water for Chloride Content, ASTM G187 Method for Resistivity measurement, and ASTM D4972 for pH Testing.

Unified Soil Classification System Used by LC Engineering Corp

Major Division			Group Symbols	Typical Names
COARSE GRAINED SOILS (more than 50% of material is LARGER than No. 200 sieve size)	GRAVELS (more than 50% of coarse fraction is LARGER than the No. 4 sieve size)	CLEAN GRAVELS (little or no fines)	**GW**	well graded gravels, gravel-sand mixtures, little or fine
			GP	poorly graded gravels or gravel-sand mixtures, little or no fines
		GRAVELS WITH FINES (appreciable amt. of fines)	**GM**	Silty gravels, gravel-sand-silt mixtures
			GC	clayey gravels, gravel-sand-clay mixtures
	SANDS (more than 50% of coarse fraction is SMALLER than the No. 4 sieve size)	CLEAN SANDS (little or no fines)	**SW**	well graded sands, gravelly sands, little or no fines
			SP	poorly graded sands, gravelly sands, little or no fines
		SANDS WITH FINES (appreciable amt. of fines)	**SM**	silty sands, sand-silt mixtures
			SC	clayey sands, sand-clay mixtures
COARSE GRAINEDS OILS (less than 50% of material is SMALLER than the 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 clay
			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 sandy or silty soils, elastic silts
			CH	inorganic clays of high plasticity, fat clays
			OH	organic clays of medium to high plasticity
HIGHLY ORGANIC SOILS			**Pt**	peat and other highly organic soils.
SEDIMENTARY BEDROCK				**SANDSTONE**
				SILTSTONE
				CLAYSTONE
IGNEOUS BEDROCK				**GRANITIC ROCK**
METAMORPHIC BEDROCK				**METAMORPHIC ROCK**

PARTICLE SIZE LIMITS

SILT or CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		
No.200	No. 40	No.10	No. 4	¾ in.	3 in.	(12 in.)	

LABORATORY TESTING ABBREVIATIONS

AL Atterberg Limits	**MC** Moisture Content & Dry Density	**CD** Consolidated Drained
CP Collapse Potential	**MD** Maximum Dry Density	**CU** Consolidated Undrained
CS Consolidation	**PP** Pocket Penetrometer	**UU** Unconsolidated Undrained
DS Direct Shear	**PR** Permeability (Outside Lab)	
EI Expansion Index	**RS** Resistivity, pH, and Chlorides	
GD Gradation Analysis	**RV** R-Value	

BORING LOG

PROJECT NAME	9118 Baseline Road			BORING DESIGN	**B-1**
PROJECT NO.	224-21-S				
DATE DRILLED	11/13/21	DRAFTED BY	MC	STATION	- - -
DRILLER	LC Engineering Corp	LOGGED BY	JL	OFFSET (FT)	- - -
GROUND-WATER ELEV	N/A	SAMPLER SIZE	2.5"	GSE	- - -
TYPE OF DRILLING	Power/Hand Tool	DRIVE WT	36 lbs	DROP	42"

Surface description:

Location of Excavation: See plot plan (Figure 2).

Depth in Feet	Sample Depth	Sample Type	Sample No.	Blows per 12 inches	Dry Density (pcf)	Moisture Content(%)	USCS Symbols	GEOTECHNICAL DESCRIPTION	remark
1							SM	**Artificial Fill** **Silty Sand** Light brown, silty sand, with gravel, moderately moist, medium dense to dense.	
2									
3	3.0	R	1	53	110.4	3.7			
4							SM	**Native Soils** **Silty Sand** Grayish brown, silty sand, slightly calyey, moist, dense.	
5									
6	5.0	R	2	92	120.8	5.3			
7									
8							SM	**Silty Sand** Light brown, silty sand, slightly clayey, with gravel, moist, dense.	
9									
10									
11	10.0	R	3	58	121.7	10.0			
12								End of Boring at 11'; No Cave-in; No Groundwater Encountered.	
13									
14									
15									

C ROCK CORE B BULK SAMPLE R RING SAMPLE
S SPLIT SPOON T TUBE SAMPLE
D DRIVE SAMPLE b SMALL BAG

BORING LOG

PROJECT NAME	9118 Baseline Road			BORING DESIGN	**B-2**
PROJECT NO.	224-21-S				
DATE DRILLED	11/13/21	DRAFTED BY	MC	STATION	- - -
DRILLER	LC Engineering Corp	LOGGED BY	JL	OFFSET (FT)	- - -
GROUND-WATER ELEV	N/A	SAMPLER SIZE	2.5"	GSE	- - -
TYPE OF DRILLING	Power/Hand Tool	DRIVE WT	36 lbs	DROP	42"

Depth in Feet	Sample Depth	Sample Type	Sample No.	Blows per 12 inches	Dry Density (pcf)	Moisture Content(%)	USCS Symbols	Surface description: / Location of Excavation: See plot plan (Figure 2). / GEOTECHNICAL DESCRIPTION	remark
1							CL	**Artificial Fill** **Sandy Clay** Dark gray, silty sandy clay, moist, medium stiff.	
2								**Native Soils**	
3							SC	**Clayey Sand** Light olive brown, clayey sand, slightly porous, moist, medium dense.	
4									
5	4.0	R	1	43	113.3	9.3			
6									
7	6.0	R	2	92	107.1	2.5	SM	**Silty Sand** Light brown, silty sand, moderately moist, dense.	
8									
9								End of Boring at 7'; No Cave-in; No Groundwater Encountered.	
10									
11									
12									
13									
14									
15									

C ROCK CORE B BULK SAMPLE R RING SAMPLE
S SPLIT SPOON T TUBE SAMPLE
D DRIVE SAMPLE b SMALL BAG

BORING LOG

PROJECT NAME	9118 Baseline Road			BORING DESIGN	**B-3**
PROJECT NO.	224-21-S				
DATE DRILLED	11/20/21	DRAFTED BY	MC	STATION	- - -
DRILLER	LC Engineering Corp	LOGGED BY	JL	OFFSET (FT)	- - -
GROUND-WATER ELEV	N/A	SAMPLER SIZE	2.5"	GSE	- - -
TYPE OF DRILLING	Power/Hand Tool	DRIVE WT	36 lbs	DROP	42"

Surface description:

Location of Excavation: See plot plan (Figure 2).

Depth in Feet	Sample Depth	Sample Type	Sample No.	Blows per 12 inches	Dry Density (pcf)	Moisture Content(%)	USCS Symbols	GEOTECHNICAL DESCRIPTION	remark
1							SM	**Artificial Fill** **Silty Sand** Grayish brown, silty sand, slight moist, medium dense.	
2								**Native Soils**	
3							SC	**Clayey Sand** Dark gray, clayey sand, moderately moist, medium dense to dense.	
4									
5	4.0	R	1	145	112.7	3.9	SP	**Gravelly Sand** Light brown, gravelly sand, moderately moist, very dense.	
6									
7	6.0	R	2	55 (3")	No Recovery				
8								End of Boring at 6.5' due to refusal; No Cave-in; No Groundwater Encountered.	
9									
10									
11									
12									
13									
14									
15									

C ROCK CORE B BULK SAMPLE R RING SAMPLE

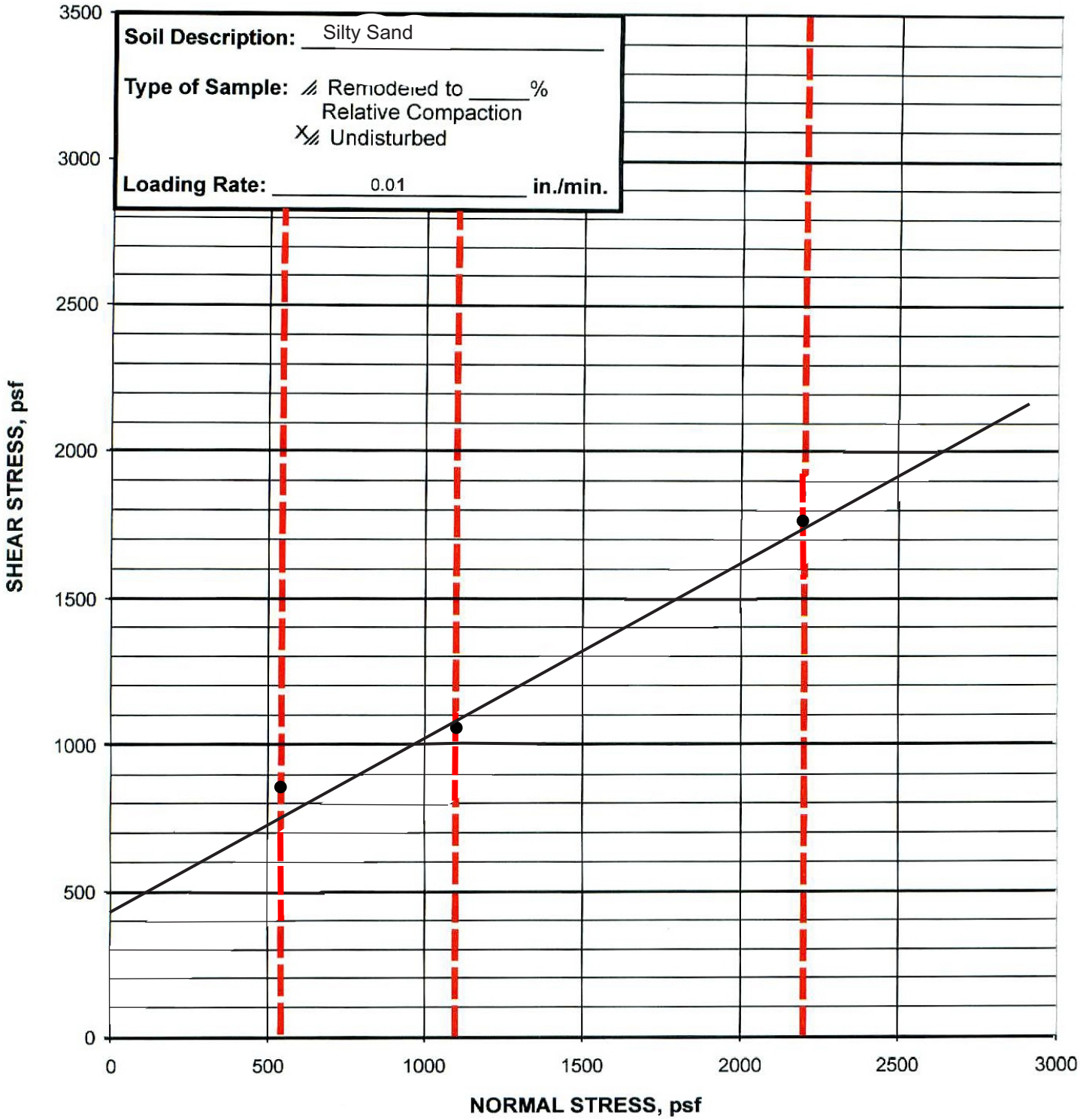
S SPLIT SPOON T TUBE SAMPLE

D DRIVE SAMPLE b SMALL BAG

DIRECT SHEAR TESTS

Project: 9118 Baseline Road Location: 9118 Baseline Road, Rancho Cucamonga Project #: 224-21-S

Logged By: JL/MC Start/Finish Date: 11/27/21 Sample I.D.: B-1@5'



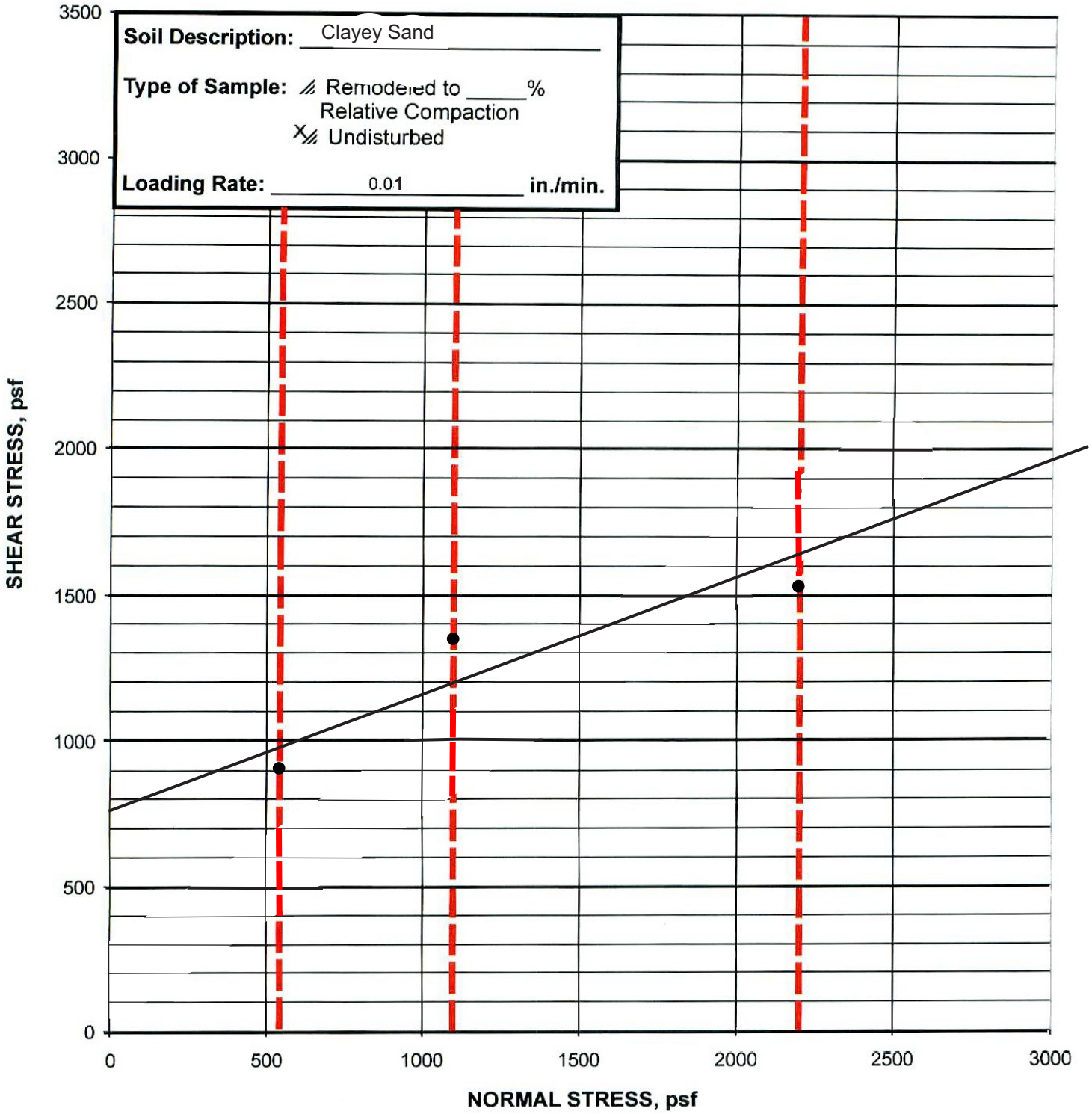
Sample Location	Symbol	Average Moisture Content (%) Before	After	Friction Angle	Cohesion	Remarks
B-1 @ 5'	●	5.3	16.3	29°	430 psf	Residual

Plate DS-1

DIRECT SHEAR TESTS

Project: 9118 Baseline Road Location: 9118 Baseline Road, Rancho Cucamonga Project #: 224-21-S

Logged By: JL/MC Start/Finish Date: 11/27/21 Sample I.D.: B-2@4'



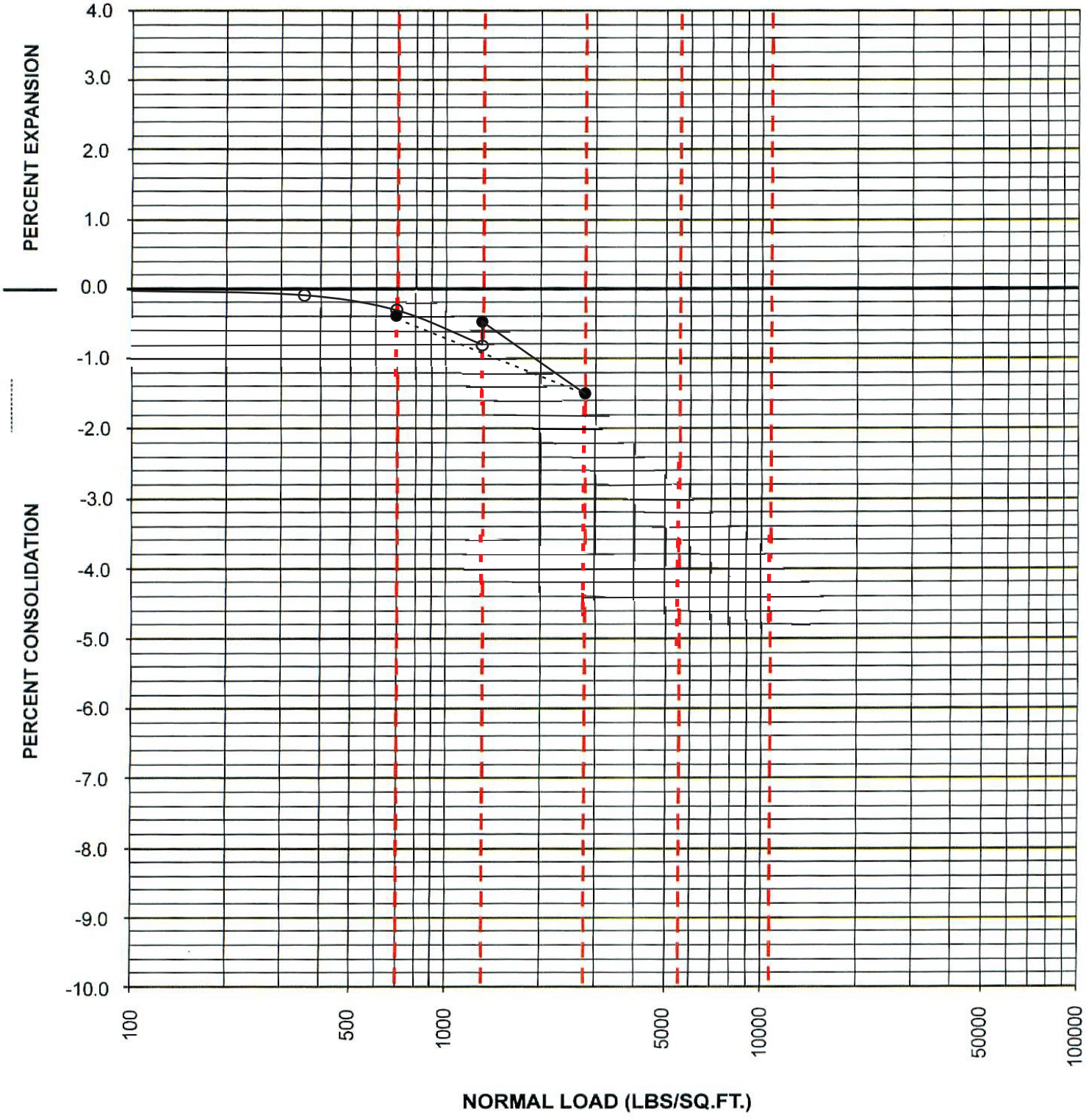
Sample Location	Symbol	Average Moisture Content (%) Before	After	Friction Angle	Cohesion	Remarks
B-2 @ 4'	●	9.3	21.0	21°	770 psf	Residual

Plate DS-2

LOAD CONSOLIDATION TEST

Project: 9118 Baseline Road Location: 9118 Baseline Road, Rancho Cucamonga Project #: 224-21-S

Logged By: JL/MC Start/Finish Date: 11/27/21 Sample I.D B-2@4.0'



REBOUND
FIELD MOISTURE
EFFECT OF ADDING MOISTURE

Plate CS-1

SUMMARY OF CORROSIVITY TEST RESULTS

CORROSIVITY TEST RESULTS				
SAMPLE	**RESISTIVITY** Minimum (ohms-cm)	pH	CHLORIDE (ppm)	SOLUBLE SULFATE (ppm)
B-2 @ 0-5' Bulk Sample	1,678	7.1	105.0	9.0

EXPANSION INDEX TEST PER ASTM D4829

SAMPLE	Soil Description	Expansion Index	Expansion potential
B-2 @0-5' Bulk Sample	Brown clayey sand	35	Low