Exhibit D

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SOIL SURVEYS GROUP INC.
103 CHURCH ST • SALINAS, CALIFORNIA 93901 • TELEPHONE (831) 757-2172

April 21, 2023
Job #8278

Kristin Codding and Brain Maxwell
c/o: Tom Meaney Architect
629 State Street 240
Santa Barbara, CA 93101

Dear Ms. Codding and Mr. Maxwell:

Submitted herewith is the report of our Geotechnical Investigation for the proposed single family residence, detached garage, accessory dwelling unit (ADU), pool, and driveway located at 21 Pronghorn Run, APN 239-091-044, near Carmel, California. Five borings were drilled on February 6, 2023 for geotechnical investigation purposes. Laboratory tests were subsequently made on driven soil core samples taken from the borings to determine the near surface and subsurface soil conditions and suitability for the construction of the proposed buildings. We find that the project site is suitable for the proposed use with the recommendations made herein.

It is a pleasure working with you on this project. If you have any questions regarding our geotechnical investigation or this report, please contact us.

Very truly yours,

SOIL SURVEYS GROUP, INC.

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SOIL SURVEYS GROUP INC.
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GEOTECHNICAL INVESTIGATION

FOR THE PROPOSED SINGLE FAMILY RESIDENCE, DETACHED GARAGE, ACCESSORY DWELLING UNIT (ADU), POOL, AND DRIVEWAY

LOCATED AT 21 PRONGHORN RUN

APN 239-091-044

CARMEL, CALIFORNIA

MS. CODDING AND MR. MAXWELL

APRIL 21, 2023; JOB #8278

I. INTRODUCTION:

This Geotechnical Investigation was made to determine the suitability of the soils at the project site for the proposed single family residence, detached garage, accessory dwelling unit (ADU), pool, and driveway located at 21 Pronghorn Run, APN 239-091-044, near Carmel, California. Five borings were drilled on February 6, 2023. Core samples were taken from the borings for laboratory testing. The boring logs, our field observations, and field and laboratory test data were analyzed to determine the following:

1. **Suitability of the soils at the project site for the proposed buildings.**
2. **Unsuitable or unstable soil conditions, if any.**
3. **Foundation and retaining wall design criteria for the proposed buildings.**
4. **Subsurface groundwater and soil moisture considerations.**
5. **Surface drainage considerations.**
6. **Analysis of seismic hazards and seismic design factors per the 2022 California Building Code.**

II. LABORATORY TEST DATA[1]:

Twenty-two moisture density tests, three sieve analysis test, three plasticity index test, one Consolidated Drained Direct Shear test, and one Staged Consolidated Undrained Triaxial Compression test were made from the driven core samples. Standard Penetration Tests (SPT) were performed with a Terzaghi Split Spoon sampler. Core samples were taken with a 2½-inch interior diameter (i.d.) Modified California, 2-inch i.d. California, and SPT samplers. The samplers were driven into the soil by a 140 lb. hammer and dropped a vertical distance of 30 inches at the sample depths. Results of these tests are shown as follows:

[1] Boring Log is located in Appendix A

MOISTURE DENSITY TESTS

Boring No.	Depth/ Ft.	Water Content %	Dry Density p.c.f.	Standard penetration Tests, Blows /foot	Pocket Penetrometer Tons S.F.
B-1	1.5-2	22.2	88.4	---	---
B-1	2-2.5	24.4	96.4	^11(7)	1.5
B-1	3-3.5	12.7	87.9	^50(40)/6"	>4.5
B-1	5-5.5	9.4	88.2	*50(30)/6"	---
B-1	8-8.5	7.6	118.9	50/6"	---
B-1	12.5-13	11.8	127.4	70	---
B-1	16.05-16.58	11.1	99.8	70/7"	---
B-2	2-2.5	19.5	108.7	9	---
B-2	3.5-4	+15.9	+111.5	---	---
B-2	4-4.5	12.6	109.0	*52(31)	>4.5
B-2	6-6.5	13.8	38.5	40	---
B-2	8.5-9	9.3	115.7	80	---
B-2	12.17-12.67	7.5	99.9	70/8"	---
B-3	2-2.5	!15.6	!110.1	*51(24)	---
B-3	3.5-4	11.0	90.9	65	---
B-3	5-5.5	7.2	95.9	50/6"	---
B-3	8-8.5	7.3	112.5	50/6"	---
B-3	12-12.5	9.1	114.3	50/6"	---
B-4	1.5-2	27.5	79.4	---	---
B-4	2-2.5	21.9	99.9	^33(26)	---
B-4	4-4.5	19.1	85.0	50	---
B-4	5-5.25	33.0	118.4	50/6"	---
B-4	8-8.5	14.4	101.7	50/6"	---
B-4	12-12.5	12.7	99.4	50/6"	---

! = Direct Shear Test, average values shown, + = Compression Test - average values shown * = 2.5-inch mod. Cal values, ^ = 2.0 inch mod. Cal Values, ( ) = value adjusted to approximate SPT values

Three Sieve Analysis tests were made on driven core samples. Results of these tests are shown as follows:

A.S.T.M. D 422 SIEVE ANALYSIS TEST-Percent Passing

Boring No.	Depth/ Ft.	Sieve No. 4	Sieve No. 10	Sieve No. 20	Sieve No. 30	Sieve No. 40	Sieve No. 100	Sieve No. 200
B-1	8-8.5	90	75	63	59	55	29	16
B-2	2-2.5	100	98	92	90	86	52	36
B-3	3.5-4	100	100	97	95	90	44	28

Three Plasticity Index (Atterberg Limit) tests were performed on driven core samples. Result of these tests are shown as follows:

A.S.T.M. D 4318 LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX

Boring No.	Depth/ Feet	% Passing Sieve No. 40	% Passing Sieve No. 200	Liquid Limit	Plastic Limit	Plasticity Index
B-1	8-8.5	55	16	32	23	9
B-2	2-2.5	86	36	32	21	11
B-3	3.5-4	90	28	39	21	18

The test results for samples taken from the borings indicate that the fine fraction of the near surface silty, fine to medium grained sand with sub-angular gravels encountered in Boring B-1 at 8-8.5 feet below ground surface (bgs) are slightly plastic and has a low expansion potential, the silty, clayey, fine to medium grained sand encountered in Boring B-2 at 2-2.5 feet bgs, and the clayey, fine to medium grained sand encountered in Boring B-3 at 3.5-4 feet bgs are slightly to moderately plastic and moderately expansive.

One Staged Consolidated Undrained Triaxial Compression test was made from a soil sample taken from Boring B-2 at 3.5-4.0 feet below surface. Results of this test are summarized as follows (see Appendix B for full report sheet):

A.S.T.M. D 4767m STAGED CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Boring No.	Depth/ Ft.	Internal Frict. Angle, φ°	Cohesion, C p.s.f.	Soil Weight p.c.f.	Description of soil
B-2	3.5-4	26.4	1200	129.2	Light grayish-tan with iron staining, silty, fine to medium grained SAND

One Consolidated Drained Direct Shear test was made from a soil sample taken from Boring B-3 at 2.0 to 2.5 feet below surface. Results of this test are summarized as follows (see Appendix B for full report sheet):

A.S.T.M. D 3080 CONSOLIDATED DRAINED DIRECT SHEAR

Boring No.	Depth/ Ft.	Internal Frict. Angle, φ^{o}	Cohesion, C p.s.f.	Soil Weight p.c.f.	Description of soil
B-3	2-2.5	49.1	447	80.7	Light greyish-tan with iron staining silty SAND

Boring B-1 was located near the proposed pool, as shown on Figure II. The near surface soil consists of very loose, clayey, silty sand with organics in the first foot overlying loose, clayey, silty, fine to medium grained sand to two and one half feet below ground surface (bgs). Underlying the upper looser soils is very dense, clayey, silty, fine to coarse grained sand with occasional scattered rounded and sub-angular gravels to the bottom of the boring at 16.58 feet bgs.

Boring B-2 was located near the northwestern corner of the residence, as shown on Figure II. The near surface soil consists of loose, silty, clayey, sand with organics to two and one half feet bgs underlain by loose to medium dense, silty, fine to medium grained sand to four feet bgs and by dense, silty, fine to medium grained sand with traces of clay to four and one half feet bgs. Below the previous soil layer, the soil consists of dense to very dense, silty, fine to medium grained sand to the bottom of the boring at 12.67 feet bgs.

Boring B-3 was located within near the proposed garage and ADU, as shown on Figure II. The near surface soil consists of loose, silty, clayey, sand with organics to onw and one half feet bgs overlying dense clayey, sand to four feet bgs and very dense, silty, fine to medium grained sand to the bottom of the boring at 12.5 feet bgs.

Boring B-4 was located easterly of the southeasterly corner of the residence and near. the southeastern driveway retaining wall, as shown on Figure II. The near surface soil consists of very loose, silty, clayey sand with organics to 1.5 feet bgs overlying medium dense, clayey, silty, fine to medium grained sand to two and one half feet bgs. Underlying the previous soil layer is very dense, silty, fine to medium grained sand to the bottom of the boring at 12.5 feet bgs.

Boring B-5, was located within the lower portion of the driveway, as shown on Figure II. The near surface soils consits of very loose, silty, clayey, sand with organics to one and one half feet bgs. Underlying the upper loose soils is medium dense clayey, silty, fine to medium grained sand to the bottom of the boring at three and one half feet bgs.

No groundwater was encountered in the borings to a maximum depth of 16.58 feet bgs, prior to backfilling the borings with soil cuttings. The actual depth to groundwater is unknown, but it should be noted that groundwater fluctuations can occur due to variations in rainfall, temperature, and other factors not evident during the time of our investigation.

III. SUITABILITY OF SITE FOR PROPOSED USE:

No unsuitable or unstable soil conditions were found at the boring locations except for loose soil encountered in the upper one to three feet bgs. In our opinion, the site is suitable for the proposed single family residence, detached garage, accessory dwelling unit (ADU), pool, and driveway with the recommendations made herein, specifically the recommendations for the recompaction of all loose soils.

IV. RECOMMENDED FOUNDATION DESIGN CRITERIA:

Spread footings may be used for the building foundations after the site is cleared, grubbed and the proposed building pads are graded, compacted and properly prepared. Spread footings shall be installed to a minimum depth of 12-inches for one-story and 18-inches for two-story portions of the proposed buildings. The minimum depths shall be measured from the **inside building pad soil subgrade or lowest adjacent grade, whichever is greater.** Mitigation for recompaction of any loose soil conditions must be followed.

Allowable foundation pressures after recompaction of the building pad areas are:
Non-retaining footings = 2500 p.s.f.
Lateral soil passive pressure = 300 p.s.f.

Continuous footings shall be reinforced with three #4 steel reinforcement bars, two placed near the bottom of the footing and one placed near the top of the footing or as specified by project structural designer. Spread footings shall also meet the minimum requirements of the 2022 California Building Code and the County of Monterey building ordinances for width, thickness, embedment and reinforcement steel. The proposed structures along with any future building additions shall be designed in strict accordance with the requirements specified in the 2022 California Building Code, or latest approved edition, to resist seismic forces.

All concrete floor and garage slabs-on-grade shall be a minimum of five inches thick and shall be reinforced with a minimum of #3 steel reinforcement bars at 12 inches on center or #4 steel reinforcement bars placed 24 inches on center, each way and shall extend into perimeter foundation. *The reinforcement steel must be firmly held in the vertical center of the slabs during placement and finishing of concrete with pre-cast concrete dobies.* All new concrete floor slabs-on-grade shall be underlain by an approved 15 mil. vapor barrier installed over a minimum four inch thick open graded gravel capillary break with two inches of clean sand placed over the vapor barrier as recommended in Section VIII-C herein. ***Concrete slabs shall have weakened plane joints a maximum of fifteen feet on center, each way. All concrete shall be properly cured with an approved curing compound or wetted burlap for a minimum of 14 days.***

Soil Surveys Group, Inc. shall inspect and approve the foundation footing excavations and the subgrade beneath concrete floor slabs for suitable soil bearing and proper penetration into competent soil. We also recommend that Soil Surveys Group, Inc. review and approve the grading, drainage and foundation plans prior to construction of the buildings.

A. Concrete Sidewalks and Outside Flatwork:
We recommend that any new on-site concrete sidewalks and outside flatwork be at least five inches thick and be placed over a compacted subgrade. All concrete flatwork should be divided into as nearly square panels as possible. Frequent joints should be installed to provide articulation to the concrete panels. Landscaping and planters adjacent to concrete flatwork should be designed in such a manner that positive drainage away

from the new project buildings is achieved. It is assumed that the outside concrete flatwork will be subjected only to pedestrian traffic.

V. LOOSE AND EXPANSIVE SOIL MITIGATION:

To mitigate the effects of the loose near surface soil and expansive soil conditions, the following measures are recommended:

1. All loose soil within the proposed building pads and extending a minimum of five feet in all directions outside of the proposed building foundations shall be recompacted **as necessary** to 90 percent relative compaction at the direction of Soil Surveys Group, Inc. prior to placing additional building pad fills or finishing the building pad subgrades. Soil Surveys Group, Inc. shall determine the depth of recompaction within the building perimeters after clearing, grubbing, and pad grading are completed, as up to three feet of loose materials were encountered in the borings. The bottom of the subexcavation should be scarified a minimum of 12 inches, moisture conditioned and recompacted to 90 percent relative compaction. Subexcavation and recompaction should be extended under any proposed patios or other permanent flatwork. If no subexcavation is required, the building pads should be scarified a minimum of 12 inches, moisture conditioned and recompacted to 90 percent relative compaction.

2. If the new buildings will bear on both cut and fill, the cut portion of the building pads shall be subexcavated and recompacted a minimum of two feet deep for a distance of five feet outside the building, so that the entire building overlies engineered fill, prior to excavating for the foundation footings.

3. Spread footings shall be constructed a minimum of 12-inches deep for one-story and to 18-incehs for two-story portions of the proposed residence, garage, and ADU as measured from the lowest adjacent grade. The continuous non-retaining footings shall be reinforced with three #4 reinforcement bars, two placed near the bottom and one placed near the top of the footing.

4. All new concrete floor slabs-on-grade shall be a minimum of five inches thick and shall be reinforced with a minimum of #3 steel reinforcement bars at 12 inches on center or #4 steel reinforcement bars at 24 inches on center, each way and shall be bent to extend a minimum of eight inches into the perimeter footing.

5. Roof and site rain water should be directed away from the proposed building foundations. Rainfall runoff must not be allowed to collect or flow in a downslope direction against any building foundations.

6. If expansive soils are encountered, the footing excavations shall be flooded with three to four inches of water at least 24 hours prior to pouring concrete, and the subgrade of concrete slabs and foundations should be brought to at least three percent over optimum moisture for a depth of at least eight inches prior to pouring concrete. No free water shall remain in the footing excavations during the concrete pour. To achieve the proper moisture conditioning in the subgraded beneath concrete slabs, water should be applied each evening for several days propr to placement of reinforcing steel and concrete.

7. Soil Surveys Group, Inc. shall be retained to inspect and test the recompaction of all loose native soil and new engineered fill within the building pad perimeters and shall inspect and approve foundation footing excavations for soil bearing conditions. Soil Surveys Group, Inc. shall also inspect and approve the subgrade below concrete floor slabs prior to placement of reinforcing steel and shall inspect and approve the installation of all roof and yard drainage facilities.

VI. SURFACE AND SUBSURFACE DRAINAGE AND EROSION CONSIDERATIONS:

The near surface soil at the project site has the potential to erode, especially if protective vegetation is removed. Therefore, all cut and fill slopes, as well as disturbed soil areas, must be seeded with grass or landscape plants for erosion control and to prevent sloughing soil from blocking drainage patterns at the project site. Such erosion control measures shall be taken during and at completion of grading and during construction operations.

Concentrated storm water runoff from the project site should not be allowed to discharge uncontrolled onto sloping ground. Concrete splash blocks or collector pipes shall be installed at the downspout outlets. Suitable energy dissipation systems shall be designed where rainfall runoff is concentrated, or the drainage water should be collected and piped to an on-site storm water infiltration system, thence directed to a nearby storm drain or the street gutter. Rock energy dissipaters consisting of four inch to six inch diameter rock or rubble rip rap should be installed where rain gutter downspout pipes discharge onto soil to reduce soil erosion. The building sites and ground adjacent to the buildings shall be graded so that rainfall runoff does not become trapped or flow against any building foundations.

The boring logs do not indicate the need for a subsurface drain system. However, the Geotechnical engineer may recommend a system of subsurface drains should wet subsurface soil conditions be encountered during site preparation or excavations.

VII. RETAINING WALL AND POOL WALL DESIGN CRITERIA:

The following design criteria are recommended for the retaining walls and pool:

Friction Angle	*$\varphi = 26.4°$*
Cohesion	*$c = 1200$ p.s.f.*
Soil Weight,	*$w = 129.2$ p.c.f.*
Equivalent fluid pressure, active	*= 50 pounds per square foot per foot of depth for* ***Level Grade***
Equivalent fluid pressure, active	*= 71p.c.f. with* ***2:1 slope behind wall***
Equivalent fluid pressure, at rest,	*= 72 p.c.f., restrained condition, level grade behind wall*
Equivalent fluid pressure, passive	*= 337 p.c.f.*
Sliding friction	*$f = 0.35$*
Allowable Footing Toe Pressure	*= 3000 p.s.f. plus ⅓ additional for seismic force (if added)*

Retaining walls that are more than six feet high, or are part of or within ten feet of a building should include the seismic force of the soil against the retaining wall. The estimated seismically generated ground acceleration to be used for this site is:
PGA = 0.512g

Cantilever Retaining Walls:
RHGA = 0.21g = k_h
w = 129.2 p.c.f.
The resultant seismic force is calculated by the formula: ½ w H^2 k_h per linear foot of retaining wall, or for this case **13.5 H^2**, ***where H is the height of the retaining wall. These forces, where needed, should be applied at a height of 0.33H above the base of the retaining wall and must be combined with the force produced by active soil pressure.***

Basement Walls:
RHGA = 0.28g = k_h
w =129.2p.c.f.
The resultant seismic force is calculated by the formula: ½ w H^2 k_h per linear foot of retaining wall, or for this case **18.1H^2**, ***where H is the height of the retaining wall. These forces, where needed, should be applied at a height of 0.40H above the base of the retaining wall and must be combined with the force produced by active soil pressure.***

Cantilever Walls with Sloped Backfill:
Dynamic Load Coefficient =0.35g = k_h
w = 129.2 p.c.f.
The resultant seismic force is calculated by the formula: ½ w H^2 k_h per linear foot of retaining wall, or for this case **22.8 H^2**, ***where H is the height of the retaining wall. These forces, where needed, should be applied at a height of 0.40H above the base of the retaining wall and must be combined with the force produced by active soil pressure.***

This retaining wall design criteria is based on a fully drained condition. Therefore, we recommend that a four-inch diameter perforated NDS or PVC pipe be installed behind the wall and along the top of the footing, holes placed down, for all walls that retain earth. The pipe shall be covered with a 12-inch wide envelope of ¾-inch drain rock and be wrapped in a non-woven geotextile filter fabric (Mirifi140N or equivalent). The drain rock shall extend to within one foot of the level of retained soil (a minimum of one foot above the top of the pipe). The use of filter fabric wrap is not needed when Class 2 Permeable Material (per Caltrans Standard Specifications Section 68-1.025) is used. The remainder of the trench can be backfilled with clean native sand. When installation of the drain rock is not physically possible, a composite filter material, eg. Miradrain, can be installed with a perforated pipe at the bottom of the material. Clean-out risers must be installed on the perforated pipe at the up-stream ends, every 100-feet, and at 90° angle points. The capped end of the cleanout riser shall be located at the ground surface outside of or behind the retaining walls.

VIII. RECOMMENDED SPECIFICATIONS:

A. GRADING:

The proposed building pads, extending a minimum of five feet in each direction past new foundation footings, shall be cleared and grubbed of all surface vegetation, demolition debris, and organic topsoil before recompacting the original ground, placing engineered fill or finishing the subgrade for the any new building pads. On site surface or subsurface grass, roots, deleterious material, or brush (if any) within any new building pad areas shall be removed. Soil Surveys Group, Inc. should determine the exact depth of subexcavation necessary, after clearing, grubbing and pad grading are complete, as up to three feet of loose materials were encountered in the borings. The bottom of the subexcavation shall be scarified a minimum of 12 inches, moisture conditioned, and recompacted to 90 percent relative compaction. Any subexcavated soil shall then be backfilled in eight inch loose

lifts and recompacted to 90 percent relative compaction, prior to placing engineered fill or finishing subgrade of the new building pads.

Any new cut and fill slopes shall be 2:1 or flatter unless retained. The native soil is suitable to be used as engineered fill provided any organics or debris are first removed from the soil to be used as fill. Any native soil used for fill, or any imported fill soil for the new building pads shall be compacted to at least 90 percent relative compaction.

B. COMPACTION:

Laboratory soils compaction test method shall be *A.S.T.M. D 1557-12.* Subgrade beneath any new building pads shall be compacted to 90 percent relative compaction. Subgrade soil below any new pavement shall be compacted to 95 percent relative compaction, and aggregate base beneath new pavement shall be compacted to 95 percent relative compaction.

C. CONCRETE FLOOR SLABS-ON-GRADE:

Subgrade in recompacted soil under any new concrete floor slabs-on-grade shall be brought to at least 2% over optimum moisture prior to placing native or imported sandy soil fill, prior to placing the capillary break rock and moisture proof barrier or prior to pouring concrete. We recommend that a capillary break consisting of:

- a mat of clean, open graded rock, four inches thick, shall be placed over the finished soil subgrade,
- a minimum 15 mil. water-proof membrane (such as Stego, Moistop or equal) shall be placed over the open graded rock,
- two inches of clean, moistened sand shall be placed between the water-proof membrane and the bottom of the concrete floor slab. The moistened sand will help protect the membrane and will assist in equalizing the concrete curing rate to minimize shrinkage cracking.

Class 2 Aggregate Base or sand should not be used as the capillary break material. Capillary break material shall comply with and be installed according to the following:

1. MATERIAL:

   The mineral aggregate for use under the floor slabs shall consist of broken stone, crushed or uncrushed gravel, quarry waste, or a combination of the above. The aggregate shall be free of adobe, vegetable matter, loam, volcanic tuff and other deleterious materials. It shall be of such quality that the absorption of water in a saturated, surface dry condition does not exceed 3% of the oven dry weight of the sample.

2. GRADING:

   The mineral aggregate shall be of such size that the percentage composition by dry weight as determined by laboratory sieves (U.S. Sieves) will conform to the following grading:

Sieve Size	Percentage Passing Sieve
⅜" to ½"	100
No. 4	0-10

No. 200	0-2

3. PLACING:
   Subgrade, upon which aggregate base, gravel or crushed rock is to be placed, shall be prepared by removing grass and roots. Where loose topsoil is present, it shall be removed and cleaned of debris and recompacted to 90 percent of maximum density.

4. THICKNESS AND STRENGTH:
   Concrete slabs should be at least five inches thick. Concrete shall be five sack minimum (5.5 sack if pumped) and shall achieve a 28 day compressive strength of at least 2500 p.s.i., or as specified by the project engineer.

5. REINFORCEMENT:
   Concrete slabs-on-grade shall be reinforced with a minimum of #3 steel reinforcement bars placed 12 inches on center, each way or #4 reinforcement bars placed 24 inches on center, each way and shall be bent to extend a minimum of eight inches into the perimeter footings.

D. UTILITY TRENCH BACKFILL:
All new on-site utility trenches shall be backfilled with a clean sand having a sand equivalent of 30 or higher. A two feet thick plug of compacted, **clayey soil backfill** or lean concrete shall be required around the pipe or conduit at places where utility trenches intersect the building perimeters. All trench backfill of imported clean sand or clean native sand shall be compacted to 95 percent relative compaction at all locations. Clean native sand shall be approved by Soil Surveys Group, Inc. prior to using for trench backfill.

E. PAVEMENT DESIGN CRITERIA:
Upon review of the preliminary project plan the proposed driveway consists of concrete pavement. We recommend a concrete section to be a minimum of six inches thick and reinforced with #4 reinforcement bars placed 16 inches on center each way, over a minimum of 6-inches of compacted Class II aggregate baserock.

IX. GEOLOGIC AND SEISMIC CONSIDERATIONS:

Monterey County is in a seismically active area of the state of California. The following table provides a list of nearby faults that could produce an earthquake that could impact the project site.

Fault Name	Approximate Distance to Site (km)	Orientation from Site	Data Source
San Clemente Thrust (certain)	0.03	East	Cleary Consultants, 1994
Robinson (concealed)	0.83	West	Cleary Consultants, 1994
San Francisquito (certain)	1.53	Southwest	Cleary Consultants, 1994
San Jose Thrust (certain)	1.73	Northwest	Cleary Consultants, 1994
Unnamed (inferred, queried)	3.21	Southwest	Dibblee, 1973b

Fault Name	Approximate Distance to Site (km)	Orientation from Site	Data Source
Cachagua (inferred)	3.92	Northeast	Dibblee, 1972a
Monterey Bay Tularcitos	4.8	Northeast	Uniform Building Code, 1997
Blue Rock (inferred)	4.96	Southeast	Dibblee, 1972a
Tularcitos (certain)	5.13	Northeast	Rosenberg, 1993
Potrero (certain)	5.42	Northeast	Cleary Consultants, 1994
San Gregorio (Sur Region)	13.5	Southwest	Uniform Building Code, 1997
Rincondada	19.8	Northeast	Uniform Building Code, 1997
Zayante Vergeles	42.3	Northeast	Uniform Building Code, 1997
San Andreas (Pajaro)	47.6	Northeast	Uniform Building Code, 1997

The proposed single family residence, detached garage, accessory dwelling unit (ADU), pool, and driveway, and any future additions or remodeling must be designed in strict compliance with the 2022 California Building Code to help withstand such seismically generated ground accelerations for a reasonably expected duration without suffering major damage.

The following are the project site coordinates and the seismic design criteria/coefficients per the requirements of the 2022 California Building Code (CBC):

Site Class	Latitude	Longitude	S_S	S_1	F_a	F_v
C	36.4505°	-121.7884°	1.183	0.44	1.02	1.5*

Surface rupture, liquefaction, lurch cracking, lateral spreading, and differential settlement are seismic hazards that must be considered at the project site.

Surface rupture usually occurs along fault lines, and no known faults have been mapped through the project site. Therefore, the potential for surface rupture or lurch cracking is considered to be low.

Liquefaction typically results in a loss of shear strength and potential soil volume reduction in loose to medium dense, saturated gravels, sands, and low plasticity silts and clays. Lateral spreading tend to occur when liquefaction occurs and the liquefied soils move towards an unsupported face, such as a river channel, or sloped face. The occurrence of these phenomenon depend on various factors. The deeper soils encountered underlying the project site are typically very dense, silty, fine to medium grained sand. During our site investigation, groundwater was not encountered. Considering the deeper dense to very dense soil, the potential risk for occurrence of damaging liquefaction or lateral spreading is considered to be low during a strong seismic event.

Differential compaction and settlement occur generally in loose, granular or unconsolidated semi-cohesive soils during severe ground vibration. In our opinion, the risk for soil consolidation caused differential

compaction and settlement during a major seismic event is considered to be low, provided that any loose soil within the proposed building pads is recompacted as recommended herein.

X. UNFORESEEN OR UNUSUAL CONDITIONS:

If any unforseen or unsuitable soils conditions are found during grading or construction of the proposed single family residence, detached garage, accessory dwelling unit (ADU), pool, and driveway, the Geotechnical engineer shall be notified immediately so that remedial action can be taken. Such unsuitable conditions could be:

1. Wet, soft or unsuitable pockets of soil within any proposed building footprints.
2. Soil with a high organic content at the finished subgrade of any building pads.
3. Any other unforeseen conditions that would require remedial action by the Geotechnical engineer, project engineer, architect or contractor.

XI. CONCLUSIONS AND RECOMMENDATIONS:

From our field observations, analysis of the test data, and knowledge of the general area soils, the following are concluded:

1. The project soil conditions are suitable for the proposed single family residence, detached garage, accessory dwelling unit (ADU), pool, and driveway provided all loose soil within the proposed building pads is recompacted as recommended in Sections IV, V, and VIII herein.

2. Design criteria for spread footings are provided in Section IV. Design criteria for concrete slabs-on-grade are provided in Sections IV, V, and VIII herein. Design criteria for retaining walls are provided in Section VII.

3. Mitigation for loose and expansive soil conditions at the project site are provided in Section V herein.

4. Surface drainage and erosion considerations are discussed in Section VI herein. Surface storm water runoff should be carefully controlled to provide **positive drainage away** from building foundations.

5. The Geotechnical engineer should review the foundation and site grading plans for compliance with the recommendations herein and may provide additional specific recommendations for surface and subsurface drainage. The Geotechnical engineer shall inspect and approve all footing excavations and shall inspect, test, and approve recompaction of the building pads.

6. Recommendations for grading, soil subexcavation and recompaction, soil fills, and soil compaction are made in Section VIII herein.

7. Seismic considerations are discussed and geoseismic design coefficients are provided in Section IX herein. The potential for damaging earthquake related liquefaction and lateral spreading is considered to be low at the project site.

XII. LIMITATIONS:

This report necessarily assumes that the subsurface conditions are as found in the borings. It should be recognized that the soil conditions described in this report are based on five borings and our knowledge of the general area soils. It must be understood that subsurface soil conditions can vary between borings and from site to site. If any unusual soil conditions are found during grading, installation of underground utilities or building construction, the Geotechnical engineer should be notified immediately so that remedial action can be taken (see Section X).

This report is issued with the understanding that it is the responsibility Kristin Codding and Brian Maxwell or their representative to ensure that the applicable provisions of the recommendations contained herein are incorporated into the plans and specifications and that the necessary steps are taken to see that contractors and subcontractors carry out such provisions in the field. The use of this report, its contents or any part thereof, by a party or its agents, other than Kristin Codding and Brian Maxwell, their engineer, architect, contractor or designated agents, is hereby disallowed unless specific permission is given to do so by Soil Surveys Group, Inc. This investigation and report were prepared with the understanding that a single family residence, detached garage, accessory dwelling unit (ADU), pool, and driveway will be constructed at the project site, as shown on the Figure II map enclosed herein. The use of this report, boring logs, and laboratory test data shall be restricted to the original use for which they were prepared and publication by any method, in whole or in part, is prohibited without the written consent of Soil Surveys Group, Inc. Title to the designs remains with Soil Surveys Group, Inc. without prejudice. Visual contact with this report and drawings constitutes prima facie evidence of the acceptance of these restrictions.

Soil Surveys Group, Inc. will not take responsibility for or assume any liability for the recommendations made in this report unless Soil Surveys Group, Inc. performs the field inspections and testing mentioned herein.

The findings and recommendations of this report are considered valid at the present date. However, changes in the property conditions can occur with the passage of time on this or adjacent properties, whether due to natural processes or the works of man. Therefore, the findings of this report shall be considered valid for a period of not more than three years without being reviewed and updated by Soil Surveys Group, Inc.

BASE: U.S. Geological Survey, Mount Carmel 7.5' Quadrangle

Carmel, CA

FIGURE I: VICINITY MAP

NO SCALE

By: **Soil Surveys Group, Inc.**
103 Church Street
Salinas, CA 93901
831-757-2172

Job #8278

Base: 21 Pronghorn Run, Carmel, California
APN: 239-091-044
Site Plan by Bliss Landscape Architecture- November 2022- Job #8278

Figure II

Boring Locations (Approx.)

Soil Surveys Group, Inc.
103 Church Street
Salinas, CA 93901
(831)757-2172
info@soilsurveys.net

APPENDIX A

BORING LOGS

EXPLORATION DRILL LOG

BORING NO. B-1

PROJECT 21 Pronghorn Run	Job #8278	DATE 2.6.23	LOGGED BY JG
DRILL RIG CCD Tractor	HOLE DIA. 6"	SAMPLER 2.5"Cal, 2"Cal, and Standard Penetration Test (SPT)	
GROUNDWATER DEPTH:	INITIAL ---	FINAL ---	HOLE ELEV.

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (pcf)	WATER CONTENT %	LIQUID LIMIT	PLASTIC LIMIT	POCKET PEN. (tsf)
Grass/Reddish-brown, clayey, silty SAND with	SM								
organics; moist to wet, very loose		1							
			2"Cal	2,4,7					
		2	1-1-1		88.4	22.2			---
Light tan, light brown with reddish-yellow iron	SM/SC		1-2-2	11(9)	96.4	24.4			1.5
staining, clayey, silty, fine to medium grained		3							
SAND; moist, loose	SM		2"Cal	50(40)/6"	87.9	12.7			>4.5
Light grey with iron staining, slightly clayey,		4	(1-3-3)						
silty, fine to medium grained SAND; moist,									
very dense		5							
Light greyish-tan, reddish-yellow, clayey, silty, fine	SM/SC		2.5"Cal	50(30)/6"	88.2	9.4			---
to coarse grained SAND with scattered rounded		6	(1-4-4)						
gravels; moist, very dense									
		7							
		8							
Light greyish-tan with reddish-yellow, iron staining,	SC		SPT	50/6"	118.9	7.6	32	23	---
clayey, fine to coarse grained SAND with		9	(1-5-5)						
subangular gravels; moist, very dense									
		10							
		11							
		12							
Light grey and reddish-yellow mottled, silty, fine to	SM		SPT	20,50/6"					
medium grained SAND; moist, very dense		13	1-6-6	50/6"	127.4	11.8			---
		14							
		15							
		16							
Light greyish-tan with iron staining, silty, fine to	SM		SPT	20,50/1"					
medium grained SAND; moist, very dense		17	1-7-7	50/1"	99.8	11.1			---
-Bottom of boring at 16.58' feet		18							
-Backfilled with soil cuttings									
		19							
		20							

DEPTH 16.58'

SOIL SURVEYS GROUP, INC.

EXPLORATION DRILL LOG

BORING NO. B-2

PROJECT 21 Pronghorn Run | Job #8278 | DATE 2.6.23 | LOGGED BY JG

DRILL RIG CCD Tractor | HOLE DIA. 6" | SAMPLER 2.5"Cal and Standard Penetration Test (SPT)

GROUNDWATER DEPTH: | INITIAL --- | FINAL --- | HOLE ELEV.

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (pcf)	WATER CONTENT %	LIQUID LIMIT	PLASTIC LIMIT	POCKET PEN. (tsf)
Grasses/Reddish-yellow, tan, clayey, silty, SAND	SM								
with organics; wet, loose		1							
Reddish-brown with iron staining, silty, clayey,	SC/SM		SPT	2,3,6					
SAND; moist to wet, loose		2							
Light tan with iron staining, clayey, fine to medium	SC		2-1-8	9	108.7	19.5	32	21	---
grained SAND: moist, loose to medium dense		3							
Light greyish-tan with iron staining, silty, fine to	SC		2.5"Cal	12,20,32					
medium grained SAND with trace clay; moist, dense		4	2-2-9		111.5	15.9			---
			2-3-10	52(31)	109.0	12.6			>4.5
		5							
Light greyish-tan with reddish-yellow iron staining,	SM		SPT	15,15,25					
silty, fine to medium grained SAND; moist, dense		6							
			2-4-11	40	38.5	13.8			---
		7							
		8							
Light greyish-tan with iron staining, silty, fine to	SM		SPT	20,50/6"					
medium grained SAND; moist, very dense		9	2-5-12	50/6"					
					115.7	9.3			---
		10							
		11							
		12							
Light greyish-tan with iron staining, silty, fine to	SM		SPT	20,50/2"					
medium grained SAND; moist, very dense		13	2-6-13	50/2"	99.9	7.5			---
-Bottom of boring at 12.67 feet		14							
-Backfilled with soil cuttings									
		15							
		16							
		17							
		18							
		19							
		20							

DEPTH 12.67'

SOIL SURVEYS GROUP, INC.

EXPLORATION DRILL LOG

BORING NO. B-3

PROJECT 21 Pronghorn Run | Job #8278 | DATE 2.6.23 | LOGGED BY JG

DRILL RIG CCD Tractor | HOLE DIA. 6" | SAMPLER 2"Cal and Standard Penetration Test (SPT)

GROUNDWATER DEPTH: | INITIAL --- | FINAL --- | HOLE ELEV.

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (pcf)	WATER CONTENT %	LIQUID LIMIT	PLASTIC LIMIT	POCKET PEN. (tsf)
Grasses/Dark reddish-brown silty, clayey, SAND	SC/SM								
with organics; wet, very loose to 1.5'		1							
	SC		2"Cal	1,50/6"					
Light greyish-tan with iron staining, clayey, sand;	SC	2	3-1-14	51(40)/6"	110.1	15.6			---
moist, very dense									
		3							
Same	SC		SPT	15,50/6"					
		4	3-2-15	50/6"	90.9	11.0	39	21	---
		5							
Light greyish-tan, silty, fine to medium grained	SM		SPT	50/6"	95.9	7.2			---
SAND; slightly moist, very dense		6	3-3-16						
		7							
		8							
Light greyish-tan with iron staining, silty, fine to	SM		SPT	50/6"	112.5	7.3			---
medium grained SAND; moist, very dense		9	3-4-17						
		10							
		11							
		12							
Light greyish-tan with iron staining, silty, fine to	SM		SPT	50/6"	114.3	9.1			---
medium grained SAND; moist, very dense		13	3-5-18						
-Bottom of boring at 12.5 feet		14							
-Backfilled with soil cuttings									
		15							
		16							
		17							
		18							
		19							
		20							

DEPTH 12.5'

SOIL SURVEYS GROUP, INC.

EXPLORATION DRILL LOG

BORING NO. B-4

PROJECT 21 Pronghorn Run	Job #8278	DATE 2.6.23	LOGGED BY JG
DRILL RIG CCD Tractor	HOLE DIA. 6"	SAMPLER 2"Cal, and Standard Penetration Test (SPT)	
GROUNDWATER DEPTH:	INITIAL ---	FINAL ---	HOLE ELEV.

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (pcf)	WATER CONTENT %	LIQUID LIMIT	PLASTIC LIMIT	POCKET PEN. (tsf)
Grasses/Dark reddish-brown, silty, clayey, SAND	SC/SM								
with organics; wet, very loose to 1.5'		1							
	SC/SM		2"Cal	5,12,21					
Light tan, dark brown and reddish-brown, clayey,	SM	2	4-1-19		79.4	27.5			---
silty, fine to medium grained SAND; moist,			4-2-20	33(26)	99.9	21.9			---
medium dense		3							
Light greyish-tan with iron staining, silty, fine to	SM		SPT	10,24,32					
medium grained SAND; moist, very dense		4							
			4-3-21	50	85.0	19.1			---
		5							
Light greyish-tan with iron staining, silty, fine to	SM		SPT	50/6"	118.4	33.0			---
medium grained SAND; moist, very dense		6	(4-4-22)						
		7							
		8							
Light greyish-tan with iron staining, silty, fine to	SM		SPT	50/6"	101.7	14.4			---
medium grained SAND; moist, very dense		9	(4-5-23)						
		10							
		11							
		12							
Light greyish-tan with occasional iron staining, silty,	SM		SPT	50/6"	99.4	12.7			---
fine to medium grained SAND; moist, very dense.		13	(4-6-24)						
-Bottom of boring at 12.5'		14							
-Backfilled with soil cuttings									
		15							
		16							
		17							
		18							
		19							
		20							

DEPTH 12.5'

SOIL SURVEYS GROUP, INC.

EXPLORATION DRILL LOG

BORING NO. B-5

PROJECT 21 Pronghorn Run	Job #8278	DATE 2.6.23	LOGGED BY JG
DRILL RIG CCD Tractor	HOLE DIA. 6"	SAMPLER Standard Penetration Test (SPT)	
GROUNDWATER DEPTH:	INITIAL ---	FINAL ---	HOLE ELEV.

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (pcf)	WATER CONTENT %	LIQUID LIMIT	PLASTIC LIMIT	POCKET PEN. (tsf)
Grasses/Dark reddish-brown, silty, clayey, SAND	SC/SM								
with organics; wet, very loose to 1.5'		1	Bulk						
	SC/SM		SPT	5,10, 13					
Light tan, dark brown and reddish-brown, clayey,	SM	2							
silty, fine to medium grained SAND; moist, medium			5-1-25	23					
dense		3							
-Bottom of boring at 3.5 feet	SM								
-Backfilled with soil cuttings		4							
		5							
		6							
		7							
		8							
		9							
		10							
		11							
		12							
		13							
		14							
		15							
		16							
		17							
		18							
		19							
		20							

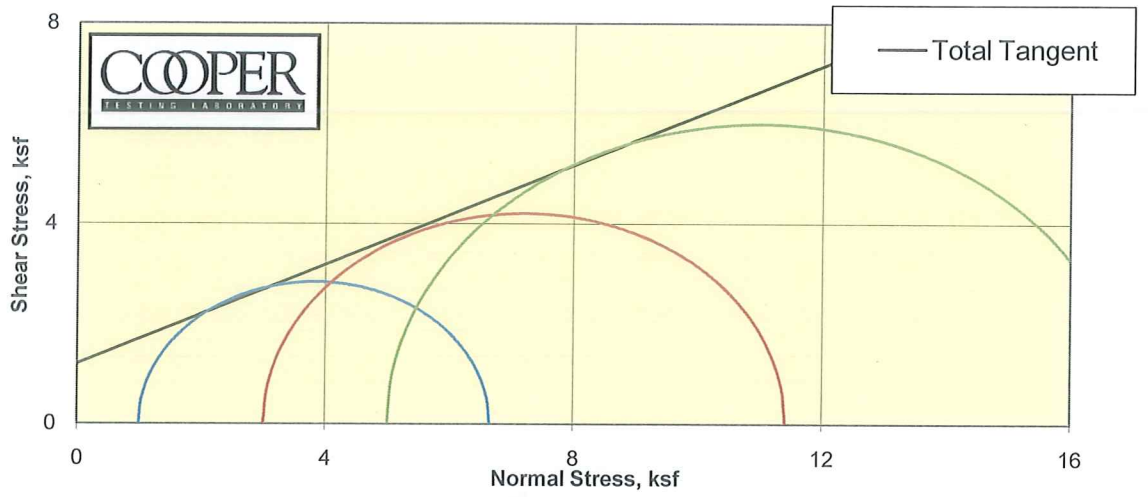
DEPTH 3.5'

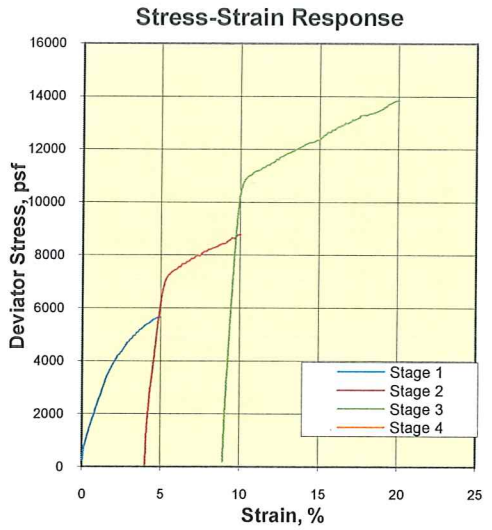
SOIL SURVEYS GROUP, INC.

APPENDIX B

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST

Staged Consolidated Undrained Triaxial Compression ASTM D4767m





CTL Number:	699-358
Client Name:	Soil Surveys Inc
Project Name:	21 Pronghorn Run
Project Number:	8278
Date:	2/27/2023 By: MD/DC
Total C	1.200 ksf
Total phi	26.4 degrees
Eff. C	N/A ksf
Eff. Phi	N/A degrees ©

Stage	1	2	3	4
Boring	B-2			
Sample				
Depth	3.5-4			
Visual Description	Yellow Mottled Pale Brown Clayey SAND			
MC (%)	15.9			
Dry Density (pcf)	111.5			
Saturation (%)	81.0			
Void Ratio	0.540			
Diameter (in)	2.41			
Height (in)	5.02			
	Final			
MC (%)	19.0	18.5	17.8	
Dry Density (pcf)	112.7	113.9	115.3	
Saturation (%)	100.0	100.0	100.0	
Void Ratio	0.523	0.507	0.489	
Diameter (in)	2.40	2.44	2.49	
Height (in)	4.99	4.79	4.55	
Cell Pressure (psi)	55.9	69.8	83.7	
Back Pressure (psi)	49.0	49.0	49.0	
	Total Stresses At:			
Strain (%)	5.0	5.0	5.0	
Deviator (ksf)	5.666	8.414	11.983	
Excess PP (psi)				
Sigma 1 (ksf)	6.660	11.409	16.980	
Sigma 3 (ksf)	0.994	2.995	4.997	
P (ksf)	3.827	7.202	10.988	
Q (ksf)	2.833	4.207	5.992	
Stress Ratio	6.703	3.809	3.398	
Rate (in/min)	0.0247	0.0247	0.0246	

APPENDIX C

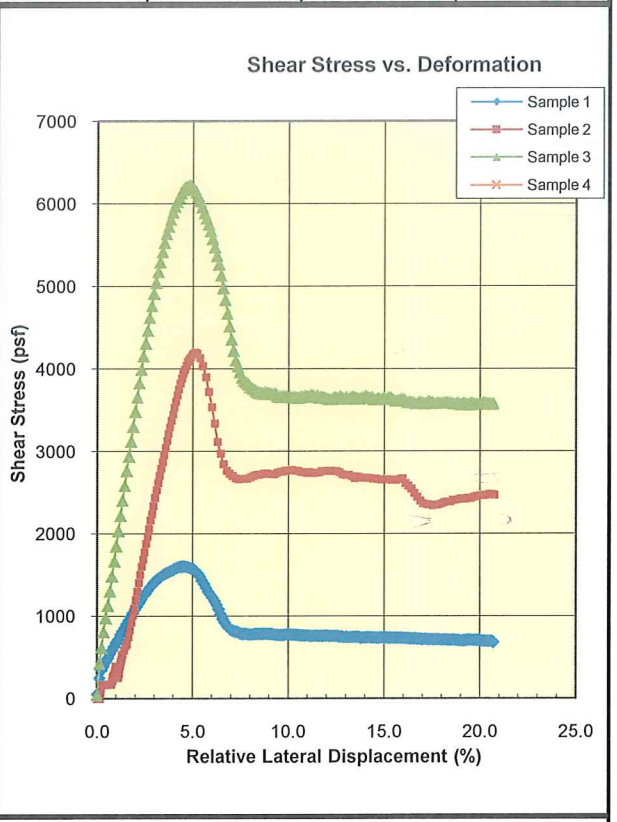
CONSOLIDATED DRAINED DIRECT SHEAR TEST

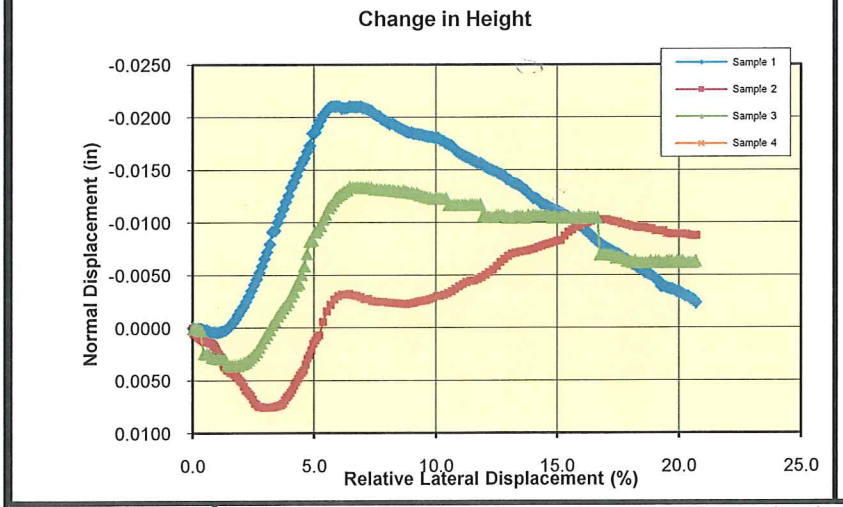
Consolidated Drained Direct Shear(ASTM D3080)

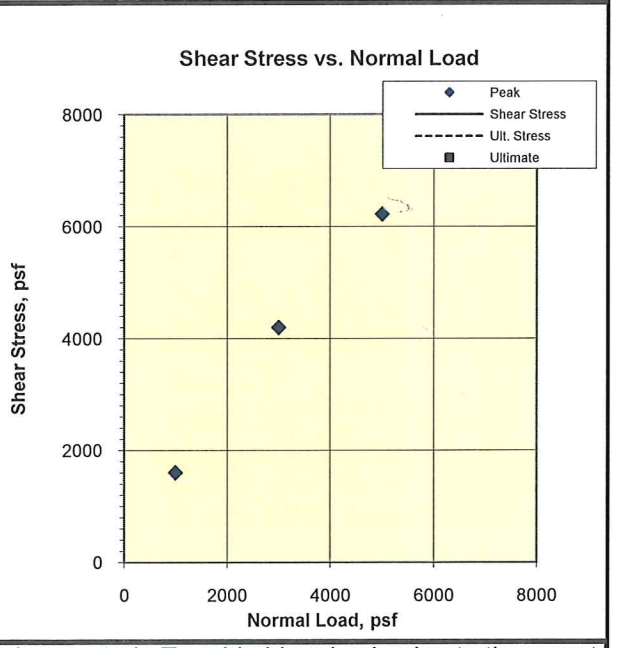
CTL Job #:	699-358	Project #:	8278	By:	MD
Client:	Soil Surveys Inc	Date:	3/6/2023	Checked:	PJ
Project Name:	21 Pronghorn Run	Remolding Info:			

Specimen Data				
	1	2	3	4
Boring:	B-3	B-3	B-3	
Sample:				
Depth (ft):	2-2.5	2-2.5	2-2.5	
Visual Description:	Light Gray Silty SAND (Slightly Cemented)	Light Gray Silty SAND (Slightly Cemented)	Light Gray Silty SAND (Slightly Cemented)	
Normal Load (psf)	1000	3000	5000	
Dry Mass of Specimen (g)	83.3	84.8	85.3	
Initial Height (in)	1.00	1.00	1.00	
Initial Diameter (in)	1.93	1.93	1.93	
Initial Void Ratio	0.557	0.526	0.509	
Initial Moisture (%)	16.2	15.6	15.1	
Initial Wet Density (pcf)	125.8	127.6	128.5	
Initial Dry Density (pcf)	108.3	110.4	111.7	
Initial Saturation (%)	78.5	79.8	80.0	
ΔHeight Consol (in)	0.0080	0.0208	0.0210	
At Test Void Ratio	0.544	0.495	0.477	
At Test Moisture (%)	19.2	18.0	17.5	
At Test Wet Density (pcf)	130.1	133.1	134.1	
At Test Dry Density (pcf)	109.2	112.8	114.1	
At Test Saturation (%)	95.2	98.5	99.2	
Strain Rate (%/min)	0.03	0.03	0.03	
Strengths Picked at	Peak	Peak	Peak	
Shear Stress (psf)	1602	4202	6224	
ΔHeight (in) at Peak	-0.0157	0.0009	-0.0083	
Ultimate Stress (psf)				

Phi (deg)		Ult. Phi (deg)	
Cohesion (psf)		Ult. Cohesion (psf)	







Remarks: Due to the high apparent phi angle, no phi or cohesion is reported. To add phi and cohesion to the report go to the "phi" tab and in cells G30, G31, H30, and H31 enter end points for a line through the 3 data points. The points plotted can be changed on the "Eng Values" tab using cells L6, A2, C2, and E2.

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