APPENDIX F

GEOTECHNICAL ENGINEERING STUDY

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GILROY SITE – PROPOSED NEW BUILDING AND SITE IMPROVEMENTS,
1445 PACHECO PASS HIGHWAY [APN: 841-18-082]
GILROY, CALIFORNIA

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TABLE OF CONTENTS

APPENDICES

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1.0 INTRODUCTION

1.1 GENERAL

This report includes the results of a Geotechnical Engineering Study (GES) for the proposed site improvements located in Gilroy, California. The general location of the site is shown on the Figure 1 – Vicinity Map, and Figure 2 – Site Plan with Boring Locations in Appendix A. The approximately 54.5-acre site is located at 1445 Pacheco Pass Highway. Condor Earth (Condor) performed this GES at the request of Senior Development Manager, Mr. Steve Beauchamp of Panattoni Development Company, Inc. (Panattoni). The GES was performed as part of the due diligence review process prior to property purchase and to provide design parameters for foundation and structural design, grading recommendations, and general construction recommendations for earthwork.

1.2 PROJECT DESCRIPTION

We understand that the proposed development will consist of an approximately 112,000 square foot one and two-story building supported on shallow foundations with concrete slab-on-grade floor system. Appurtenant improvements will include paved roadways, driveways, carports, concrete exterior flatwork and underground utilities. We anticipate that grading will consist of over-excavation, lime treatment, and recompaction of site soils as engineered fill.

Grading plans were not available at the time of this writing; however, site topography is generally level, cuts and fills during earthwork are anticipated to be minimal (2 feet or less) to provide a level foundation pad with positive site drainage. Excavations for underground utilities are not anticipated to exceed 10 feet below final site grade.

2.0 PURPOSE AND SCOPE

This GES was performed to 1) characterize the geotechnical conditions at the site; 2) identify the geotechnical or geologic conditions that might impact design or construction of the site; 3) provide geotechnical recommendations to mitigate the geotechnical constraints of the site; and 4) provide geotechnical criteria for design of project foundations, slabs-on-grade, pavements, and site improvements.

Condor completed the following work for this GES:

1. Reviewed available maps and documents relevant to the site geology, seismic setting, and geotechnical conditions.
2. Analyzed the findings from the field exploration and laboratory testing to develop geotechnical recommendations for:
    a. General earthwork, including site stripping, subgrade preparation, over-excavation, temporary excavations, permanent slopes, trench backfill, import fill, engineered fill, compaction criteria, and site surface drainage;

   b. Foundation design and construction, including foundation type, allowable bearing capacities, lateral resistance, settlement, and foundation depth;
   c. 2019 California Building Code (CBC) seismic design criteria;
   d. Potential geologic and seismic hazards and recommendations for mitigation;
   e. Lateral earth pressures and retaining wall design criteria;
   f. Concrete slabs and exterior flatwork;
   g. Asphalt and concrete pavements.

3. Prepared this written report summarizing our findings, conclusions, and geotechnical recommendations.

3.0 SUBSURFACE EXPLORATION METHODS

On May 14 and 15, 2020, Condor explored the subsurface soil conditions by means of seven (7) vertical borings to depths ranging from 16.5 to 46.5 feet below ground surface. Borings were advanced by V&W Drilling (C57 License#: 720904) with a truck-mounted drill rig using hollow-stem auger, mud rotary and solid-stem auger drilling methods. Boring locations are shown on Figure 2, Appendix A. Samples were generally collected at 2.5-foot intervals using a 3-inch OD California Modified sampler fitter with 2.5 OD metal liners and a 2-inch OD Standard Penetration Test (SPT) sampler. All samples were collected using a 140-pound auto-hammer falling 30 inches to drive the sampler. Field blow counts were recorded as the number of hammer blows required to drive the sampler the final 12 inches of an 18-inch drive. Recorded blow counts shown on the boring logs for the California Modified sampler have been approximately correlated to SPT blow counts by using a factor of 0.67.

A Condor geologist visually classified soil samples and cuttings at the time of drilling using the Unified Soil Classification System. The boreholes were backfilled with cuttings, and with cement grout by tremie, when groundwater was encountered. Boring locations are presented in Figure 2 – Site Map with Boring Locations, Appendix A. Detailed soil boring logs are presented in Appendix B, and laboratory test results are presented in Appendix D.

4.0 SITE DESCRIPTION

The site is located at 1445 Pacheco Pass Highway, Gilroy, California and is currently being used for and has historically been used for agriculture. The site is bound on the north by Miller Slough, the east by industrial development, the south by Pacheco Pass Highway and on the west by retail development and agricultural land. The site is flat and at an elevation of 180 feet above sea level (USGS Topo).

A concrete irrigation standpipe exists in the western central portion of the site. Per verbal communication with the farmer, an abandoned irrigation system consisting of concrete pipe exists on the property.

5.0 GEOLOGIC AND SEISMIC SETTING

5.1 REGIONAL GEOLOGY

The site is in the southern Santa Clara Valley, a northwest trending valley within the Coast Range geomorphic province. The Coast Range province trends northwest, sub-parallel to the San Andreas Fault and is composed of granitic basement rocks and Mesozoic to Cenozoic age sedimentary rocks.

5.2 LOCAL GEOLOGY

Geologic mapping by Wagner and others (2002) indicates that the site and vicinity are underlain by quaternary alluvium consisting of unconsolidated stream and basin deposits as shown on Figure 3 – Geologic Map, Appendix A.

5.3 FAULTING AND SEISMICITY

The greater San Francisco Bay Area contains several active faults which can cause earthquakes capable of causing structural damage. The faults causing such earthquakes are part of the San Andreas Fault System, a transverse fault system creating the boundary between the North American and Pacific tectonic plates. In the site vicinity the San Andreas Fault System includes the Vergeles, Zayante, San Andreas, Sargent, Carnadero, and Calaveras Faults. These faults are considered active, having had surface displacement within the last 11,000 years. The locations of significant faults relative to the site are shown on Figure 4 – Regional Fault Map, Appendix A.

No known fault crosses the subject site, and the site is not located in a Fault-Rupture Hazard Zone as established by the Alquist-Priolo Earthquake Fault Zoning Act (Hart, 1994 and 2007). Therefore, ground rupture from faulting is not considered a significant hazard. The site is also not in an area covered by the Seismic Hazard Mapping Act which includes landslide and liquefaction hazards. Nevertheless, the site is near several major active faults capable of generating strong earthquakes.

6.0 SUBSURFACE CONDITIONS

6.1 EARTH MATERIALS

The subsurface soils encountered at the project site consist of quaternary alluvium described by Wagner and others as unconsolidated stream and basin deposits with grain sizes ranging from clay to boulders. The alluvial soil encountered in the approximately upper 15 feet of Condor's borings consists clay, with various layers of sands, silts and clays below, to the total depth of the explored of 46.5 feet.

The upper approximately 15 feet of clay consists of moderate to highly plastic, firm to very stiff, fat clay (CH) to lean clay with sand (CL). Fat clay was encountered in some boring locations at the surface and generally grades to lean clay or sandy lean clay in the upper three feet.

Below the upper 15-foot clay layer, granular materials consisted of various beds of clayey gravel, well graded sands, poorly graded sands and silty sands that are medium dense to very dense. Clay encountered at depth is moderate to highly plastic and stiff.

6.2 LOCAL GROUNDWATER CONDITIONS

Groundwater was encountered in B-1 and B-2 at approximately 15 feet below ground surface. These borings were advanced with mud rotary methods: therefore, groundwater could not be precisely determined. Based on review of published well data, groundwater depths in the project vicinity can vary up to 10 feet over a period of years.

While the depth to groundwater is expected to fluctuate in response to both seasonal rainfall and human influenced affects, there is a practical limit to the anticipated temporary rise or fall in groundwater levels at the site. For construction planning, and evaluation purposes, we have used a depth to groundwater of 10 feet.

6.3 GEOLOGIC HAZARDS

6.3.1 Faulting

No known active or potentially active faults cross the site, and the site is not located in a Fault-Rupture Hazard Zone as established by the Alquist-Priolo Earthquake Fault Zoning Act (Hart, 1994). Therefore, ground displacement from surface rupture is not considered a significant hazard at the site. The site location relative to local faults is shown on Figure 4, Appendix A.

7.0 SEISMIC CONSIDERATIONS

7.1 SEISMIC DESIGN PARAMETERS

Probabilistic values of ground motion corresponding to various levels of seismic hazards are available on-line from professional organizations using the USGS data to retrieve the seismic design data and presents the findings in a report format. The USGS uses a probabilistic model to estimate ground motions corresponding to various levels of seismic hazard. Site soils were classified using the procedures specified in the 2019 CBC, which utilizes ASCE 7-16.

The results of the general seismic analysis using the 2019 CBC for Site Class D (stiff soil) are summarized below and provided in Appendix C. The recommended values for design of the proposed structures are:

Risk Category:		III
Site Class:		D
Seismic Coefficient,	S_s:	1.621g
Seismic Coefficient,	S_1:	0.6g
Site Coefficient,	Fa:	1g
Site Coefficient,	Fv:	null – see below
Adjusted Seismic Coefficient	, S_{MS}:	1.621g
Adjusted Seismic Coefficient	, S_{M1}:	null – see below
Design Parameter,	S_{DS}:	1.081g
Design Parameter,	S_{D1}:	null – see below

g = acceleration due to gravity

The 2019 CBC incorporates procedures outlined in ASCE 7-16. Section 11.4.8 of ASCE 7-16 and other referenced sections provides options for either developing a ground motion hazard analysis or taking exceptions. The applicable exception for this project is Exception 2 because the design Site Class is D and because S_1 is 0.2 or greater. The exception requires using a 1.5-value to factor-up C_s values for periods (T) greater than 1.5*T_s (from equations 12.8-3 and 12.8-4). The intent of the code is to increase the design seismic base shear for longer periods unless a detailed ground motion hazard analysis is performed allowing for lower design base shears for the longer periods.

Condor suggests that taking the exception will be appropriate for this project because:

- The proposed building is relatively low-rise (with a relatively short design period)
- Detailed ground motion hazard analyses require a significant effort and time to complete

Condor can, however, facilitate the ground motion hazard analysis if the structural engineer/owner determine that developing one will significantly reduce construction and design costs.

7.2 LIQUEFACTION, SEISMIC SETTLEMENT POTENTIAL

Liquefaction normally occurs when sites underlain by saturated, loose to medium dense, granular soils are subjected to relatively high ground shaking. During an earthquake, ground shaking may cause certain types of soil deposits to lose shear strength, resulting in ground settlement, oscillation, loss of bearing capacity, landsliding, and the buoyant rise of buried structures. The majority of liquefaction hazards are associated with sandy soils, silty soils of low plasticity, and some gravelly soils. Cohesive soils (clays) are generally not considered to be susceptible to liquefaction. In general, liquefaction hazards are most severe within the upper 50 feet of the surface, except where slope faces or deep foundations are present. The potential for an earthquake with the intensity and duration characteristics capable of promoting liquefaction is a possibility during the design life of the project.

The liquefaction potential of the site soils is calculated to range from 1/2 to 2 inches, with differential settlement on the order of ½ to 1 inch or less across the length of the building. In addition, the upper 15 feet of the site soils consist of stiff clay that will not liquefy. Therefore, the shallow foundations will be supported by a raft of clay that will prevent foundations from experiencing bearing failure and will cause any surface manifestation of deep liquefaction settlement to be spread over large distances (e.g. the length of the building). Therefore, Condor does not recommend specific mitigation for the proposed structures, as the seismically induced settlement is within an acceptable value for shallow and mat foundations.

8.0 CONCLUSIONS AND RECOMMENDATIONS

8.1 GENERAL

Based on our findings, it is our professional opinion that the site should be suitable from a geotechnical standpoint for construction of the proposed site improvements provided the geotechnical recommendations contained herein are incorporated into the project design. Given the site conditions encountered, we conclude that shallow foundations or mats should provide adequate support for the anticipated structural loading. The primary geotechnical considerations from a development standpoint are as follows:

- The near-surface soils underlying the site consist of moderately to highly plastic clays. It has been our experience that these soils can exhibit shrink-swell (expansion) characteristics with variations in moisture content and pose a risk for post-construction heave and cracking of concrete slabs, as well as lightly loaded foundations and pavements.

Specific conclusions and recommendations addressing these geotechnical considerations, as well as general recommendations regarding the geotechnical aspects of design and construction, are presented in the following sections.

8.2 GRADING AND EARTHWORK RECOMMENDATIONS

All grading and site work should be performed in accordance with the 2019 CBC, Title 24, Chapter 18 (Soils and Foundations), and Appendix J (Excavation and Grading), and with the recommendations of the Geotechnical Engineer of Record during construction. Where the recommendations of this report and the cited sections of Title 24 are in conflict, the owner should request clarification from the Geotechnical Engineer of Record. The recommendations of this report should not be waived without the consent of the Geotechnical Engineer of Record for the project. Recommendations for additional work and construction monitoring are contained in later sections of this report.

8.2.1 General Grading Recommendations and Site Preparation

Due to the past agricultural use of the site, we recommend that all building structures be founded on a minimum of 2 feet of engineered fill consisting of compacted site soils meeting the requirements engineered fill. This may require some over-excavation in areas of cut or thin fill thicknesses. This requirement is not intended to require engineered fill below foundations, but is a general requirement to achieve subgrade prior to placement of aggregate base or rock supporting building slab-on-grade concrete. To mitigate the expansive surface clay, concrete slab-on-grade should be supported on non-expansive import fill or lime treated native soil as discussed in Section 10.0.

At the time of our field visits, the site was bare agricultural land. If vegetations is present at the time of construction, areas to support slabs, pavements, foundations, and new engineered fills should be stripped of all vegetation, debris, organic topsoil, or other unsuitable material or soil. Stripping should extend at least 5 feet beyond the limits of the proposed improvements. Soils containing more than 3 percent organic material by dry weight over baseline conditions should be considered organic. Stripping depths should be determined at the time of grading by the Geotechnical Engineer of Record or a qualified representative. Stripping may be waived when discing can be shown to achieve the recommendations of this report, and when approved by the Geotechnical Engineer of Record. For planning, an average stripping depth of 2 inches may be used when discing is not applicable, and vegetation is present. Any organic-laden material which is free from debris may be stockpiled for later use in non-structural areas where approved by the owner, but such material should not be used for engineered fill.

8.2.2 Overexcavation

In areas supporting proposed structures, concrete flatwork, hardcourt areas, and any structural improvements susceptible to vertical movement, we recommend that the upper 1 foot, as measured from existing site grade be removed and replaced with engineered fill in accordance with Section 8.2.5, Engineered Fill Placement. This requirement for the minimum overexcavation may be superseded by the requirement of Section 8.2.1, for the minimum thickness of engineered fill below structures. The zone of overexcavation should extend laterally at least 5 feet beyond the perimeter of the proposed improvements. If soft or yielding soils are exposed by this processing, excavation should continue until stiff, non-yielding soils are encountered. The depth and extent of required overexcavation should be approved in the field by the Geotechnical Engineer of Record prior to placement of fill or improvements.

8.2.3 Subgrade Preparation

After overexcavation has been achieved, the exposed subgrade should be scarified to a depth of 6 inches, uniformly moisture conditioned to between 3 to 5 percent over optimum moisture, and compacted to achieve a minimum relative compaction of 90 percent of the ASTM D1557 maximum dry density. Field density tests should be taken to verify compaction of the prepared subgrade in these areas.

8.2.4 Engineered Fill Materials

Engineered fill used for the project should be either 1) select import engineered fill, or 2) general on-site soils with less than 3 percent organic content by dry weight.

Select import engineered fill should be inorganic, have an R-value of at least 50, a plastic index less than 7, or an expansion index classification of "very low". In addition, select import engineered fill should meet the following particle-size gradation:

Sieve Opening	Percent Passing, by Dry Weight
4-inch square	100
3/4-inch square	70 minimum
U.S. No. 4	60 minimum
U.S. No. 200	40 maximum

Fill material that does not meet the above criteria should be tested under the direction of the Geotechnical Engineer of Record to determine if it has engineering properties equivalent to, or better than, the existing site materials. Samples of any proposed imported fill material should be submitted to the Laboratory of Record for testing and approved by the Geotechnical Engineer of Record prior to being brought to the site.

General on-site engineered fill should be inorganic, contain no rocks greater than 4-inches in least dimension, and be free of deleterious materials. Soils containing more than 3 percent by dry weight of organic material should be considered organic. Subsurface data and laboratory test data indicate that the near-surface soil encountered in the borings generally meets the criteria for on-site engineered fill. However, the near-surface soils are also considered potentially expansive and should be addressed as discussed in Section 8.2.6.

8.2.5 Engineered Fill Placement

Engineered fill should be placed in a series of horizontal layers not exceeding 8 inches in loose thickness, uniformly moisture-conditioned, and compacted to achieve a minimum relative compaction of 90 percent of the ASTM D1557 maximum dry density. Non-expansive fill (select import fill) soils should be uniformly moisture conditioned to between 1 and 3 percentage points above the optimum moisture content. Fill soils composed of the documented native clays should be uniformly moisture conditioned to between 3 and 5 percentage points above the optimum moisture content. Additional fill lifts should not be placed if the previous lift did not meet the required relative compaction or if soil conditions are not stable. Discing, tilling, and/or blending may be required to uniformly moisture-condition soils used for engineered fill. The upper 12 inches of pavement subgrades should be compacted to at least 95 percent relative compaction based on the Caltrans Test Method (CTM) 216 test procedure.

8.2.6 Lime Treatment

Slabs-on-grade and exterior hardscape may be supported on lime treated native soils in lieu of non-expansive, select import. If the lime-treatment option is desired, the subgrade soil should be chemically treated with 5 percent lime (hi-calcium quicklime). Lime-treated R-value results are included in Appendix D. The lime should be spread with a mechanical spreader and mixed with a high-speed rotary mixer. Once the lime is mixed initially, it should mellow, be remixed, and be compacted to at least 93 percent relative compaction based on a CTM 216 test. Lime stabilization mixing and compaction should conform to Section 24 – Lime Stabilization of the Department of Transportation Standard Specification, current edition, included in Appendix F. The mellowing period of 36 hours as required by Section 24 should be adhered to. The treatment should follow after rough grades are achieved and the site is graded per Section 8.2. Curing of the stabilized surface should be performed per the Caltrans specifications, including the application of an emulsion.

The pH of chemically-treated soils will be very high (12+) and will not facilitate plant growth. Therefore, planning the extent of treated areas or removal of treated areas (if necessary) should be considered prior to treatment.

The subgrade soils within the proposed paved areas may also be lime treated to reduce the thickness of aggregate base material. Refer to Section 12.0 for the depth of lime treatment required based on the anticipated traffic index.

8.2.7 Excavations

Excavations will typically encounter compacted engineered fill and unconsolidated silts and clays. These materials can be easily excavated with conventional earthmoving equipment. We anticipate that temporary excavations less than 5 feet deep and above groundwater may be cut as steep as 1½H:1V (horizontal to vertical). Deeper cuts should be considered on a case-by-case basis due to variable conditions and likelihood of shallow groundwater. Refer to Section 6.2 for additional discussion of anticipated groundwater depth and potential mitigations. All open cuts should be in compliance with applicable Occupational Safety Health Administration (OSHA) regulations (California Construction Safety Orders, Title 8) and should be monitored for evidence of incipient instability. The final inclination of both permanent cut and permanent fill slopes above the groundwater level should be made no steeper than 2H:1V.

8.2.8 Earthwork Shrinkage

Earthwork shrinkage should be anticipated in native ground when removed and replaced using engineered fill derived from existing site surficial soils. Shrinkage is difficult to estimate due to the variable conditions of the existing surface and native ground. For planning purposes, a range of 10 to 15 percent shrinkage may be used for estimation as the probable range of shrinkage for the upper two feet of existing site soils, a range of 5 to 10 percent for the soils from a depth of two to four feet, and a range of 0 to 5 percent for ground below four feet of existing grade. The shrinkage values can vary when the effects of ground irregularities and poorly defined surface topography (due to agricultural practices) are also considered.

In addition to shrinkage that occurs when compacting existing ground to a state of engineered fill, swelling will occur when ground that has been prepared to the requirements of engineered fill is then treated with lime stabilization (see Section 8.2.6). In the context of this discussion, swelling is the process of materials bulking or increasing in volume during the stabilization process using lime treatment. Like shrinkage, swelling is difficult to estimate. Based on discussions with experienced lime treatment contractors and previous project experience, swelling of 10% is typical for compacted soils that are then treated with lime stabilization.

When considering the effects of shrinkage due to native ground being compacted to engineered fill and the effects of swelling due to lime treatment, the depth of ground being pre-compacted, depth of fill placement from borrowed sources of native ground in cut areas of the project, the depth of the cuts in native ground, and lime treatment of rough pad grade or pavement subgrade should be considered in the evaluation of overall site grading when balancing cut and fill grading. We recommend that communication between the Geotechnical Engineer of Record, the Civil Engineer, and the Owner occur to determine the preferred range of values discussed above relative to the project site's ability to be used a borrow source if the net effects of the grading result in higher values of shrinkage than anticipated, versus less shrinkage.

8.3 UNDERGROUND UTILITY TRENCHES

Unless concrete bedding is required around utilities, pipe bedding should consist of sand with a sand equivalent of at least 30 or the pipe manufacturer's requirements, whichever is more restrictive. The pipe bedding should extend from 6 inches below the invert of the pipe to 1 foot above the crown of the pipe.

The pipe bedding material should be compacted to a minimum of 90 percent relative compaction or the manufacturer's recommendations if more stringent.

Trench backfill above the pipe bedding zone should be placed in the same manner as required in Section 8.2.5, Engineered Fill Placement. On-site fill soils and "non-organic" native soils may be used as backfill in trenches above the pipe bedding. Utility trench backfill should be placed in layers not exceeding a loose lift thickness of 8 inches, uniformly moisture conditioned, and compacted to a minimum of 90 percent relative compaction.

Compaction criteria for trench backfill above the bedding zone may be decreased to 85 percent relative compaction in landscape areas at least 5 feet beyond structural improvements, except in areas overlain by pavements, sidewalks, or other hardscapes. In landscape areas overlain by pavements, sidewalks, or other hardscapes, we recommend that the trench backfill be compacted to a minimum of 90 percent relative compaction to within 1 foot of the finished subgrade surface. The upper 1 foot should be compacted to 95 percent relative compaction in areas to receive AC pavement.

8.4 SURFACE DRAINAGE CONTROL

Surface drainage should be planned to prevent ponding and to enable water to drain away from building foundations, slabs, and edges of pavements toward suitable collection of discharge facilities. A positive surface drainage of at least five percent should be provided within 10 feet of all building foundations. Elsewhere, positive surface drainage of at least two percent is recommended to allow for rapid removal of surface water. Pavements should also be designed with minimum gradients of about 2 percent in their principal direction of drainage, unless drainage reaches are short. Roof drainage systems should be planned to direct rainwater away from building foundations. A detailed drainage plan is outside the scope of this report but should be included in the preparation of the grading plans for the project.

9.0 FOUNDATION RECOMMENDATIONS

9.1 GENERAL FOUNDATION RECOMMENDATIONS

All foundation improvements should be designed and constructed in accordance with the 2019 California Building Code, Title 24, Chapter 17 (Structural Tests and Special Inspections), Chapter 18 (Soil and Foundations), and all other sections applicable to the proposed structural improvements. Note that all stated preliminary bearing pressures in Section 9.0 are net values, and the weight of concrete in the portion of the foundations that extends below grade can be neglected in proportioning the foundations. Further evaluation of the subsurface may be warranted based on any other specific foundation designs not considered in this report.

Site characteristics considered in selection of appropriate foundation system include the presence of (1) potentially liquefiable deposits at a depth of greater than 15 feet, and (2) expansive surface clays. The major consideration in foundation design at the site is the post-construction swell potential of the near-surface soils. The effect of heaving can be reduced by the choice of a proper foundation system. In order to reduce the effects of the potentially-expansive soils, the foundations should extend below much of the zone of seasonal moisture variation or be constructed sufficiently stiff to move as rigid units with differential movement of foundations from heaving or settlement reduced to a value compatible with the proposed superstructure type and architectural finishes. The project structural engineer should take this into account when designing the foundations. Provided that the site is graded and all building pads are prepared in accordance with the recommendations provided herein, it is our opinion that a conventional shallow foundation system would be appropriate for the proposed building foundations. The Geotechnical Engineer of Record should review final foundation plans when they become available.

9.2 SHALLOW FOUNDATION DESIGN

We recommend that Condor review the landscape plans, as well as general grading plans, to confirm conformance with our design assumptions.

The proposed buildings may be supported by a conventional isolated and continuous spread-footing system provided the concrete slab-on-grade is underlain by 18 inches of nonexpansive select import material or lime-treated soil. Conventional footings should be designed according to the following design criteria:

Maximum Allowable Bearing Pressure:	3,000 psf for dead-plus-live loads. This value can be increased by 30 percent to include seismic or wind loads.
Exterior Minimum Depth of Footing:	At least 30 inches below adjacent lowest soil subgrade.
Interior Minimum Depth of Footing:	At least 24 inches below bottom of concrete slab elevation.

The Geotechnical Engineer of Record should review foundation plans when they become available. Footing trenches should be cleared of all loose materials, and soils exposed in footing excavations should not be allowed to desiccate prior to placing concrete. The Geotechnical Engineer of Record's field representative should observe the condition of the footing trenches for suitability prior to concrete placement.

9.3 LATERAL RESISTANCE

Resistance to lateral loads (including those due to wind or seismic forces) may be determined using the friction between the bottom of concrete foundations and the underlying soil and the passive soil pressure acting against the vertical face of the footings. These two modes of resistance can be combined.

Sliding resistance to lateral forces may be calculated using a coefficient of friction of 0.2. The passive pressures available in engineered fill and undisturbed native soil may be taken as equivalent to pressures exerted by fluids weighing 400 pounds per cubic foot (pcf), assuming that the ground adjacent the foundation is level. These allowable values include a reduction factor of 1.5 to limit the foundation movement required to mobilize the ultimate passive resistance. Both values have an applied factor of safety of 2.0.

Passive resistance contributed by soils within 1 foot of the ground surface should be neglected unless the ground is covered and confined by a slab-on-grade or pavement. To mobilize passive pressure, gaps between the footing and adjacent ground should be completely backfilled using engineered fill, concrete, or lean cement sand slurry with a 28-day unconfined compressive strength of at least 500 pounds per square inch (psi).

9.4 CONSTRUCTION CONSIDERATIONS

It is critical that soils exposed in foundation excavations and slab subgrades be maintained at their as-graded moisture content to limit their potential for volume change. Foundation soils should be protected or wetted to maintain adequate moisture and prevent drying. Where drying has occurred, re-moisturizing to a depth consistent with the final foundation design should be performed. Concrete should not be placed on soil surfaces where desiccation cracks are present.

We recommend that a representative of the Geotechnical Engineer of Record observe all foundation excavations prior to the placing of reinforcing steel. This inspection should be conducted to ensure that the bottoms and sides of all foundation excavations are level or suitably benched and are free of loose or soft soil, ponded water, and debris. If any loose pockets are encountered in the bottom of the foundation excavations, they should be over-excavated, and the base of the excavation should be recompacted or backfilled with lean concrete. It is important that foundation excavations be clean and free of loose or soft soils, water, or other debris at the time concrete is placed.

Shallow groundwater should be considered when planning and constructing deep utilities or building excavations. A discussion of anticipated groundwater is provided in Section 6.2.

10.0 SLABS-ON-GRADE

10.1 INTERIOR CONCRETE SLABS

As discussed in Section 8.0, our findings indicate the near-surface soils include a range of soils, including moderately to highly plastic clays. It has been our experience that these soils can exhibit significant shrink-swell (expansion) characteristics with variations in moisture content and pose a risk for post-construction heave and cracking of concrete slabs. Concrete floor slabs should be supported on at least 18 inches of lime-treated soil or non-expansive engineered fill. The zone of lime treatment or non-expansive engineered fill should extend at least 5 feet outside the perimeter of the building where practical, and a minimum of 2 feet beyond the exterior line of the building foundation.

Concrete slabs should be constructed on a surface prepared as described in Section 8.2. Where dampness of floor slabs is to be minimized, the slabs should be constructed on a minimum 4-inch-thick layer of capillary break material covered with a high quality vapor retarder. The capillary break material should be free-draining, clean gravel or rock such as No. 4 by ¾-inch gravel or permeable aggregate complying with Caltrans Standard Specifications, Section 68, Class 1, Type B. The vapor retarder should have a minimum thickness of 15 mils, a permeance as tested before and after mandatory conditioning (ASTM E 1745-17, Section 7.1.2 – 7.1.5) of less than 0.01 perms [grains/($ft^2 \cdot hr \cdot inHg$)], and comply with the ASTM E 1745-17 Class A requirements. Vapor retarders having these properties are commonly referred to as "vapor barriers". The vapor retarder should be constructed in accordance with ASTM E 1643-18a using material which meets ASTM E 1745-17. A licensed copy of ASTM E 1643-18a is included in Appendix E.

Slab surfaces to receive moisture sensitive floor coverings should have considerations for maximum vapor emission levels. Most floor coverings require a 3 or 5 pound emission levels for a warranted installation. Emission levels may be controlled by the use of a sub-slab vapor barrier meeting ASTM E 1745-17 Class A, ASTM E 154 resistance to puncture of not less than 3000 grams and ASTM E 154 tensile strength after soaking of not less than 55.5 (MD/TD) average.

Slabs should be cast using concrete with a maximum slump of 4 inches or less. Where concrete is placed directly over a vapor retarder, the water-cement ratio should not exceed 0.45. Excessive water content is the major cause of concrete cracking. To reduce concrete shrinkage, a water reducing agent or plasticizer may be utilized in the concrete to increase slump while maintaining an appropriate water/cement ratio~~n~~. Hot reinforcing steel should be cooled prior to concrete placement to help prevent concrete shrinkage at the bar location. Where there is potential for moisture accumulation under the slab, special consideration should be given to allow gravity drainage of any water that could migrate into the subgrade of the slab or rock cushion.

The following table provides our recommended minimum interior slab-on-grade. The final design interior floor slab thickness and reinforcement should be provided by the Project Structural Engineer.

MINIMUM SLAB-ON-GRADE

Building Pad Subgrade	Minimum Slab Thickness	Minimum Reinforcement
18 inches of non-expansive fill (PI <7) or lime treated native soil compacted to 93 percent (See Note d.)	4 inches PCC	#3 at 24 inches O.C.E.W.

Notes:

a. PCC = Portland Cement Concrete with minimum compressive strength of 4,000 psi, and jointed and reinforced per structural design for shrinkage.
b. All grading recommendations per Section 8.2 are to be followed.
c. All lime treatment per Caltrans Standard Specifications, current edition.
d. Class 2 aggregate based may be substituted for the granular capillary break where permitted by the designer of record in warehouse and non-office areas.

Concrete slab-on-grade floors supporting industrial and mobile equipment should be designed on a case-by-case basis. In general, we recommend that these uses be supported by a minimum slab thickness of 6 inches and be reinforced for the anticipated use and concrete shrinkage by the designer.

10.2 EXTERIOR CONCRETE SLABS

Exterior concrete slabs (i.e., sidewalks, building aprons, etc.) should be constructed over 4 inches of Class 2 Aggregate Base over 12 inches of non-expansive select import engineered fill or lime-treated soil prepared as discussed in Section 8.2, and should be reinforced or jointed and scored to limit cracking from shrinkage. The final design exterior slab thickness and reinforcement should be provided by the Project Engineer.

Replacement of native soil with non-expansive soil will not eliminate all movement associated with changes in moisture content of underlying clay, but will significantly reduce movement. Alternatively, secondary slabs may be designed and reinforced for seasonal movement.

11.0 RETAINING WALLS

11.1 LATERAL EARTH PRESSURES

Active earth pressures may be used for design of unrestrained retaining walls where the top of the wall is free to translate or rotate. To develop active earth pressures, the walls should be capable of deflecting by at least 0.004H (where H is the height of the wall). At-rest earth pressures should be used for design of retaining walls where the wall top is restrained such that the deflections required for development of active soil pressures cannot occur or are undesirable. Cantilever walls retaining engineered fill may be designed for active or at-rest lateral earth pressures for various backfill slopes using the following equivalent fluid unit weights. The lateral earth pressures presented in the table below assume the wall backfill is drained (no hydrostatic forces acting on the wall) and no traffic or other surcharge loads are applied within a distance of one-half the wall height.

Equivalent Fluid Unit Weight (pcf)

Backfill Slope	Active Conditions	At-Rest Conditions
Level	50	75
3H:1V	60	90
2H:1V	70	105

The lateral earth pressures should be applied to a plane extending vertically upward from the base of the heel of the retaining wall to the ground surface. Lateral pressures for backfill slopes other than those given above can be estimated by interpolation.

Where the wall backfill will be subject to traffic loading within a distance of H/2 (where H is the wall height) from the top of the wall, the wall should be designed to resist an additional uniform lateral pressure of 65 psf applied to the back of yielding walls (active conditions), or 110 psf applied to the back of non-yielding walls (at-rest conditions). The surcharge load should extend from the top of the wall down to 10-feet below the top of wall. Surcharge loads imposed by greater loads or unusual loads within a distance of H of the back of the wall should be considered on a case-by-case basis.

In addition to the active or at-rest and surcharge lateral soil pressures, retaining walls should be designed to resist additional seismic earth pressures due to earthquake loading. The additional seismic pressure increment may be calculated using an equivalent fluid pressure of 13 pcf. The resultant force of the seismic increment should act at a distance of 0.33H (where H is the height of the wall) above the base of the wall. Under the combined effects of static and dynamic loading, a factor of safety of 1.1 against sliding or overturning is acceptable. Use of the seismic increment assumes that sufficient wall deformation will occur during seismic loading to develop active earth pressure conditions.

11.2 WALL DRAINAGE

The above lateral earth pressures are based on fully drained conditions. For these conditions, we recommend that the retaining wall backfill be free-draining and provisions are made to collect and dispose of excess water away from the wall. Wall drainage may be provided by either a minimum 1-foot wide layer of clean drain rock/gravel enclosed by geosynthetic filter fabric or by prefabricated drainage panels (such as Miradrain, Enkadrain, or an equivalent substitute) installed per the manufacturer's recommendations. In either case, drainage should be collected by perforated pipes and directed to a sump, storm drain, weep holes, or other suitable location for disposal. The drain rock should conform to Class One, Type B permeable material as specified in Section 68 of the California Department of Transportation (Caltrans) Standard Specifications, current edition. A typical 1 inch x No. 4 concrete coarse aggregate mix approximates this specification. A clean pea-gravel is also acceptable. The geosynthetic filter fabric should conform to the requirement in Section 88, "Engineering Fabrics" of the Caltrans Standard Specifications, current edition. A 4-inch diameter perforated pipe at least Schedule 40 PVC, or similar, should be placed "holes down" near the bottom of the section of permeable material and directed to discharge by gravity to a suitable outlet. The upper 18 inches of engineered backfill above the wall drainage should consist of native material, concrete, asphaltic concrete, or similar backfill to reduce surface drainage into the wall drainage system.

12.0 PAVEMENTS

Based on our exploratory borings, the near-surface soils across the site are generally moderately to highly plastic clays that have a low traffic support capacity when recompacted and used as pavement subgrade. Pavement sections[1] for untreated and lime treated subgrade soils are presented below based on the Caltrans minimum R-value of 5, current Caltrans design procedures, and four traffic index (TI) values for traffic loading (TI = 4.0, 5.0, 6.0 and 7.0). The TI is a measure of traffic wheel loading frequency and intensity of anticipated traffic. For comparison, TI's of between 4 and 5 are often suitable for design of

[1] *Caltrans design procedures for asphalt concrete pavements provide sections in units of inches, rounded up to the nearest 1/2-inch. Sections provided above include no Gravel Equivalent Safety Factor (per County Engineers Association and the League of California Cities criteria). If required a Gravel Equivalent Safety Factor is required, the pavement sections should be reevaluated.*

automobile parking areas, whereas TI's of between 5 and 6 are commonly used for design of fire truck access lanes and areas subject to channelized flow with light delivery trucks. Primary travel lanes for multi-axle trucks should be designed for TI's of 6 to 7. Traffic indices assumed above should be reviewed by the project Owner, Architect, and/or Civil Engineer to evaluate their suitability for this project. Pavement sections for other traffic loading should be designed on a case-by-case basis. The use of rigid concrete pavement is favored where trash pick-up or truck traffic necessitates short radius maneuvering and/or heavy metal bin movement on rollers.

RECOMMENDED UNTREATED SUBGRADE PAVEMENT SECTIONS

Traffic Index	Asphalt-Concrete (inches)	Class 2 Aggregate Base (inches)	LTB* (inches)
4.0	2.5	8.0	-
	2.5	4.0	12.0
5.0	3.0	10.0	-
	3.0	4.0	12.0
6.0	3.5	13.0	-
	3.5	4.0	12.0
7.0	4.0	16.0	-
	4.0	4.0	13.0

*LTB= Lime-Treated Base consisting of 5 percent quick lime treated soil. All trenching in areas to be designed for LTB conditions shall be performed prior to lime treatment.

The above sections have been developed based on an assumed R-value of 5 for untreated subgrade, and a minimum R-value of 50 for lime treated subgrade. For lime treated subgrade, we recommend that the subgrade soil be chemically treated with 5 percent lime. For planning purposes, a lime spread rate of 5.5 pounds per square foot per foot of treated finished depth may be assumed.

The pavement sections provided above are contingent on the following recommendations being implemented during and following construction.

- The subgrade soils in the upper 12 inches below the finished subgrade elevation should be compacted native subgrade soil or lime-treated soil compacted to achieve a minimum relative compaction of 95 percent of the CTM 216 maximum wet density.
- All trench backfill for culverts, utilities and pipes underlying paved areas should be properly placed and compacted to at least 90 percent relative compaction (ASTM D1557) within 1 foot of finished subgrade elevation. The upper 12 inches of trench backfill should be compacted to at least 95 percent relative compaction (CTM 216).
- The subgrade soils should be in a stable, non-pumping condition at the time the aggregate base material is placed and compacted.
- Aggregate base and aggregate subbase materials should conform to the specifications stated in Section 25 and 26 of the current Caltrans specifications and be compacted as engineered fill to at least 95 percent relative compaction.
- Asphalt paving materials and placement methods should meet current Caltrans specifications for asphalt concrete.

- Adequate drainage (both surface and subsurface) should be provided such that the subgrade soils and aggregate base materials are not allowed to become continuously wet.
- All concrete curbs separating pavement and landscaped areas should extend at least 2 inches into the subgrade and below the bottom of the adjacent aggregate base to provide a barrier against lateral migration of landscape water or runoff into the pavement section. For better performance, we recommend that subdrains be considered along edges of roads where there are slopes and especially swales that descend towards pavement
- Periodic maintenance should be performed to repair degraded areas and seal cracks with appropriate filler.

The pavement sections provided above are based on the subsurface conditions encountered during our field investigation, our assumptions regarding final site grades, and limited laboratory testing. Due to grading operations, the actual pavement subgrade materials may vary significantly from those tested for this study. If this is the case, representative subgrade samples should be obtained and additional R-value tests performed. If the results of these tests vary significantly, the pavement sections presented above will need to be revised.

Portland cement concrete pavements may be constructed directly over Class 2 Aggregate Base or lime-treated soils. Concrete pavements that support truck and bus traffic should be a minimum of 8 inches in thickness and should be designed to accommodate temperature expansion/contraction using reinforcement or appropriate joint control. All Portland cement concrete used for driveways and exterior traffic uses should have a minimum compressive strength of 3,000 psi and should contain entrained air to help prevent freeze damage.

12.1 PAVED HARDCOURT AREAS AND MISCELLANEOUS LANDSCAPE FEATURES

For any proposed AC paved hardcourt areas, we recommend that a minimum pavement section of 3 inches of asphaltic concrete over 4 inches of Class 2 Aggregate Base over 12 inches of non-expansive, select import fill or lime-treated soil be used.

All other landscape features that require a base of non-expansive subgrade materials should be constructed over a minimum of 18 inches of non-expansive imported aggregate or lime treated soils prepared in accordance with Section 8.2. The specific foundation and subgrade design for such features should be reviewed by the Geotechnical Engineer of Record prior to bidding.

13.0 CORROSION POTENTIAL

Chemical tests were performed on a composite sample of soil anticipated to be in contact with foundation improvements. Test results yielded a pH of 7.62, chloride ion concentration reflects none detected, sulfate ion concentration reflects none detected, and soil redox potential of 280-mV.

Resistivity test results of 780 ohm-centimeter indicate that the soil is corrosive. A commonly accepted correlation between soil resistivity and corrosivity towards ferrous metals is provided in the following table developed by the National Association of Corrosion Engineers (NACE).

Soil Resistivity	Corrosivity
Less than 500 ohm-cm	Very corrosive
500 to 1,000 ohm-cm	Corrosive
1,000 to 2,000 ohm-cm	Moderately corrosive
2,000 to 10,000 ohm-cm	Mildly corrosive
Over 10,000 ohm-cm	Progressively less corrosive

Appendix D contains the results of the corrosivity tests performed, as well as a brief evaluation letter by our laboratory subcontractor. The brief evaluation provides general recommendations regarding protecting buried metals. If warranted, a corrosion expert should be consulted to develop specific recommendations.

14.0 ADDITIONAL SERVICES

The geotechnical recommendations and design criteria given in this report are sensitive to the location, design details, and any special requirements of the new construction. Condor should review the geotechnical elements of project grading, foundation plans and specifications prior to construction bidding to check that the intent of our recommendations has been incorporated into these project documents. If Condor does not review the geotechnical elements of the plans and specifications, the reviewing Geotechnical Engineer of Record should thoroughly review this report and concur with its conclusions and recommendations or provide alternative recommendations.

Because surface conditions vary across the site, geotechnical recommendations used as a basis for construction contracting are sensitive to the possible need for adjustment in the field. The adjustments are dependent upon conditions revealed during construction that could previously only be assumed based upon site exploration. Since the intent of the recommendations given in this report are best understood by a Condor representative, we recommend that field observations and testing during earthwork and construction be performed by Condor. If Condor does not provide the field observations and testing, the Geotechnical Engineer of Record should thoroughly review this report and concur with its conclusions and recommendations or provide alternative recommendations.

The Geotechnical Engineer of Record or qualified representative should be on-site to observe and advise during site preparation, grading and earthwork, paving, and construction of foundations and slabs-on-grade. These observations should be supplemented with periodic density and compaction testing of subgrade and engineered fills to evaluate conformance with the recommendations contained in this report. It is important that foundation excavations be checked after cleaning and immediately prior to concrete placement to verify their suitability.

15.0 LIMITATIONS

The geotechnical conclusions and recommendations presented in this report are intended for planning, design, and construction of the new Mountain House Campus Project as described in this report. These conclusions and recommendations may be invalid if:

- the design assumptions change;
- the report is used for another site or project;
- the encountered soil or groundwater conditions are different than those anticipated in this report;
- the recommendations contained in this report are not followed; or
- any other change is implemented that materially alters the project.

This report was prepared in accordance with the generally accepted standards of geotechnical engineering practice existing in Santa Clara County at the time it was written. No other warranty, expressed or implied, is made. It is the owner's responsibility to see that all parties to the project, including the designer, contractors, subcontractors, etc., are made aware of this report in its entirety.

The analyses and recommendations submitted herein are based upon subsurface and surface soil data as shown on Figure 2, and on general field observations made during site visits. Subsurface exploration of any site is necessarily confined to selected locations and conditions may, and often do, vary between and around these locations. Should varied conditions come to light during construction on the project site, additional exploration, testing, or analysis may be required. Any person concerned with this project who observes conditions or features of the site or its surrounding areas that are different from those described in this report, should report them immediately to Condor for evaluation.

It should be noted that changes in the standards of practice in the field of geotechnical engineering, changes in site conditions (such as new excavations or fills), new agency regulations, or modifications to the proposed project are grounds for this report to be professionally reviewed. In light of this, there is a practical limit to the usefulness of this report without critical professional review. It is suggested that two years be considered a reasonable time for the usefulness of this report.

We trust this report provides the information required at this time. Please call with any questions.

Respectfully submitted,

CONDOR EARTH

REGISTERED PROFESSIONAL ENGINEER
RONALD LEE SKAGGS
2295
Exp. 03/31/22
GEOTECHNICAL
STATE OF CALIFORNIA

Chad M. Borean
Staff Geologist (CA GIT #289)

Ronald L. Skaggs
Geotechnical Engineer (CA #2295)
Vice President, Engineering Services

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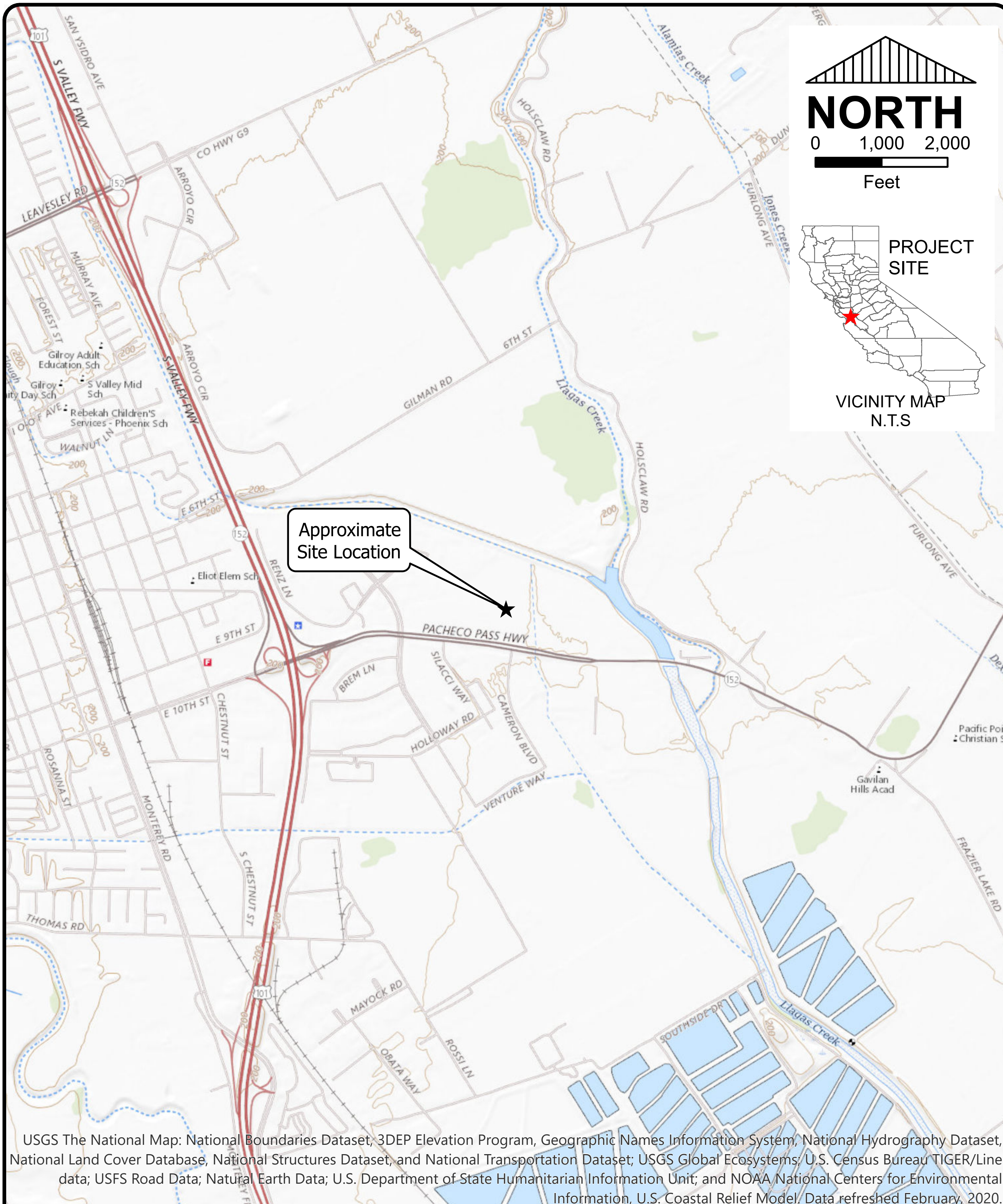
16.0 REFERENCE

California Building Code, 2019, California Building Standards Commission, and International Conference of Building Officials, 2012.

APPENDIX A
FIGURES



USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census Bureau TIGER/Line data; USFS Road Data; Natural Earth Data; U.S. Department of State Humanitarian Information Unit; and NOAA National Centers for Environmental Information, U.S. Coastal Relief Model. Data refreshed February, 2020.

CONDOR EARTH 21663 Brian Lane P.O. Box 3905 Sonora, CA 95370 (209) 532-0361 fax (209) 532-0773 www.condorearth.com	Job No. 8198 Date 27 May 2020 Scale AS SHOWN Drawn JW / Chk'd LA	VICINITY MAP GEOTECHNICAL ENGINEERING STUDY PANATTONI DEVELOPMENT COMPANY, INC. GILROY SITE – PROPOSED NEW BUILDING AND SITE IMPROVEMENTS 1445 PACHECO PASS HWY. GILROY, CALIFORNIA	FIGURE 1 8198_PanattoniGES.aprx

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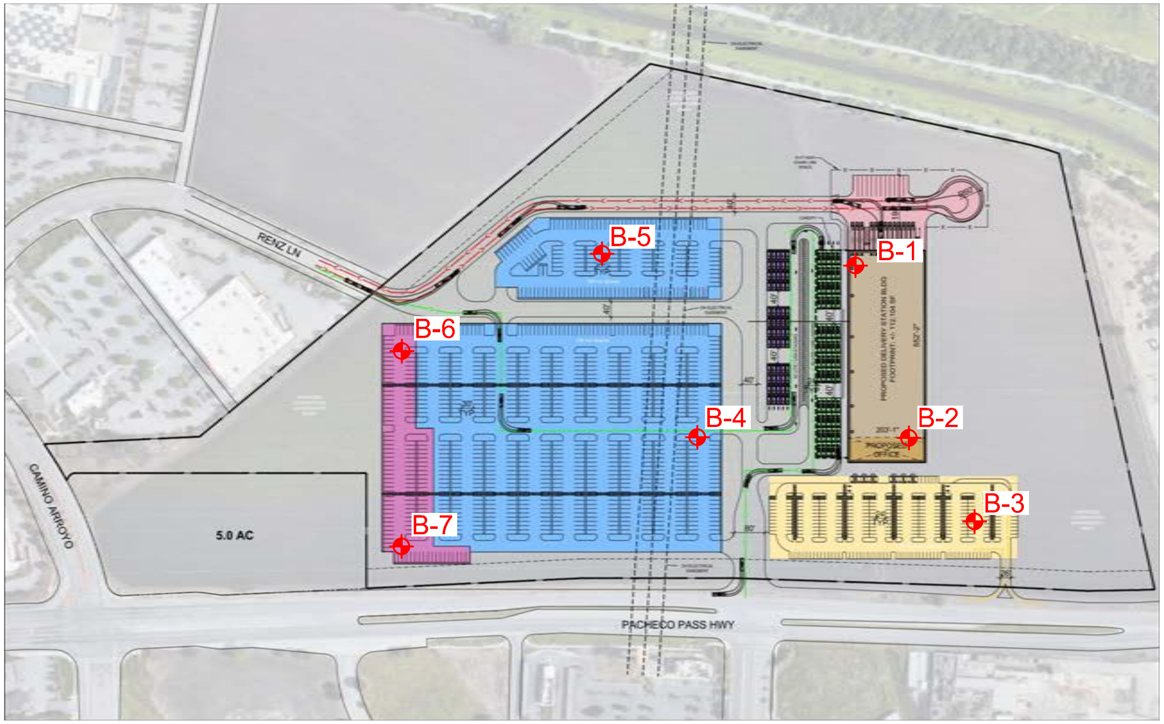

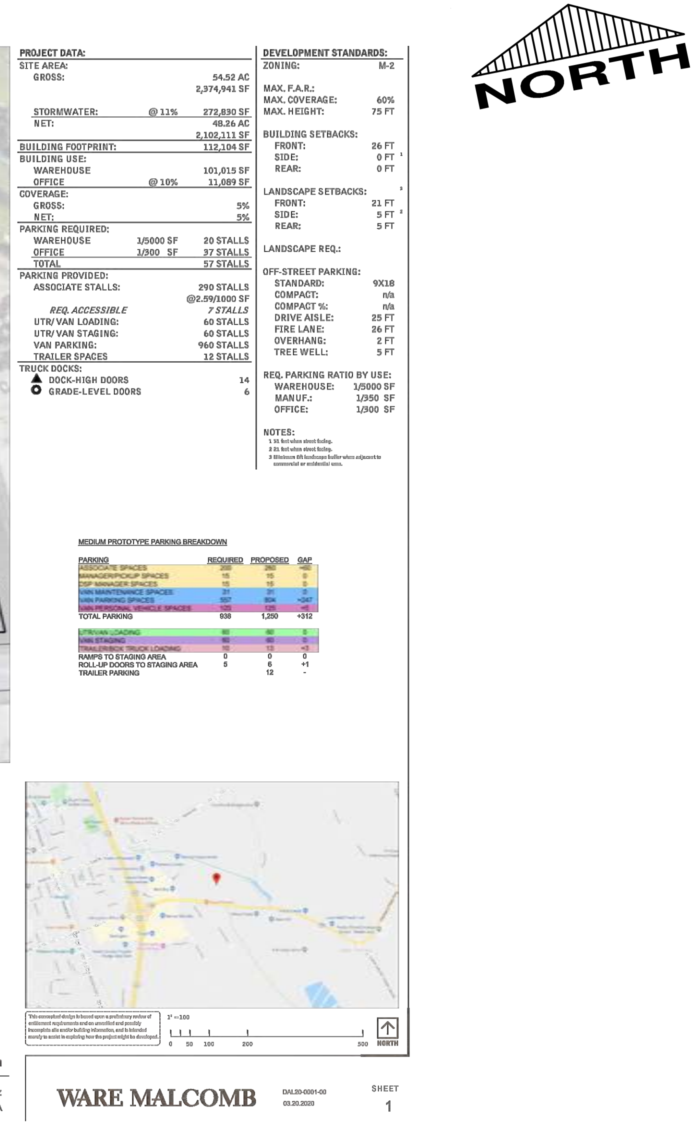

LEGEND:

= APPROXIMATE BORING LOCATION

PANATTONI

DISCLAIMER: THIS PLAN REPRESENTS FEATURES FOR ILLUSTRATION PURPOSES ONLY. IT IS NOT A LEGAL SURVEY AND IS NOT INTENDED FOR USE IN DETERMINING BOUNDARIES OR DIMENSIONS. ANY USE OF THIS PLAN FOR PURPOSES OTHER THAN LOCATION OF FEATURES IS DONE SO AT THE USER'S RISK AND WITHOUT THE CONSENT OF CONDOR EARTH.

F2_8198

FIGURE 2

CONDOR EARTH
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Job No.	8198
Date	27 MAY 2020
Scale	N.T.S.
Drawn JW	Chk'd LA

SITE MAP WITH BORING LOCATIONS
GEOTECHNICAL ENGINEERING STUDY
PANATTONI DEVELOPMENT COMPANY, INC.
GILROY SITE - PROPOSED NEW BUILDINGS & SITE IMPROVEMENTS
GILROY, CALIFORNIA

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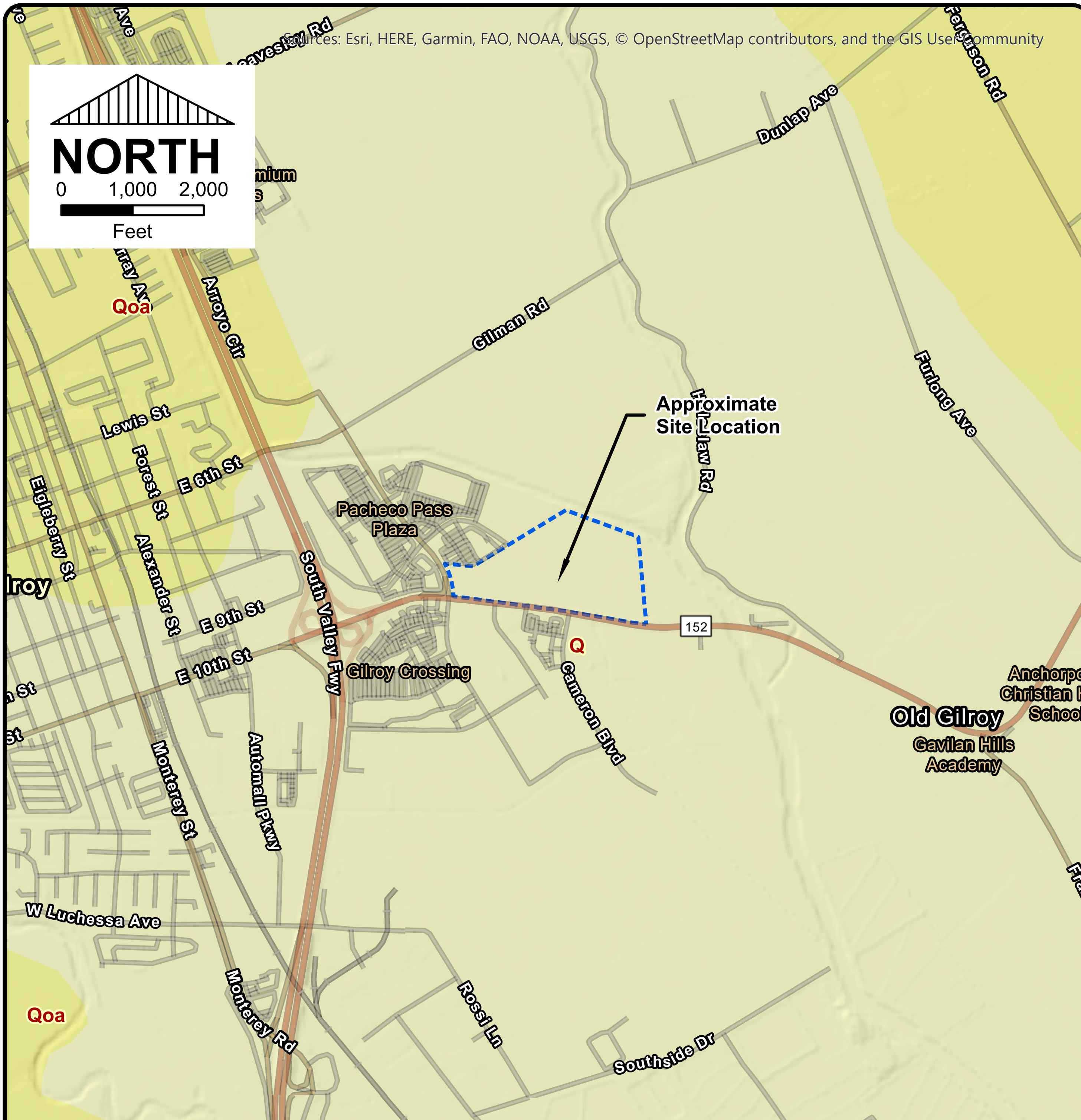

LEGEND

APPROXIMATE SITE BOUNDARY

Q: ALLUVIUM

QOA: MARINE AND NONMARINE (CONTINENTAL) SEDIMENTARY ROCKS (OLDER ALLUVIUM)

Source:
California Geological Survey, C.W. Jennings, Carlos Gutierrez, William Bryant, George Saucedo, Chris Wills, 1977

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Job No.	
8198	
Date	
27 May 2020	
Scale	
AS SHOWN	
Drawn	Chk'd
JW	LA

GEOLOGIC MAP
GEOTECHNICAL ENGINEERING STUDY
PANATTONI DEVELOPMENT COMPANY, INC.
GILROY SITE – PROPOSED NEW BUILDING AND SITE IMPROVEMENTS
1445 PACHECO PASS HWY.
GILROY, CALIFORNIA

FIGURE
3

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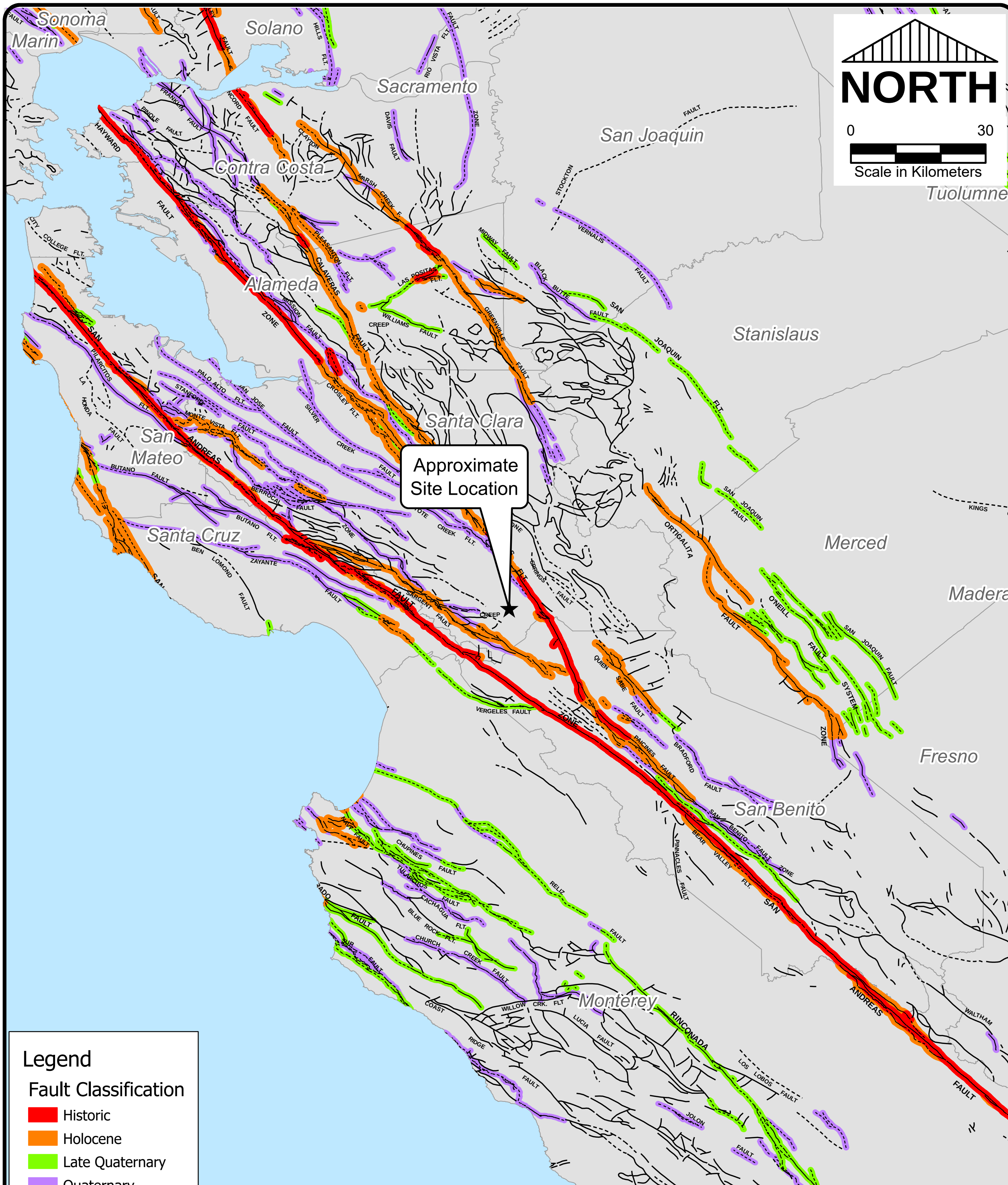

CALIFORNIA GEOLOGICAL SURVEY QUARTERNARY FAULT AND FOLD DATABASE OF CALIFORNIA, 2010

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Job No.	8198
Date	27 May 2020
Scale	AS SHOWN
Drawn	JW
Chk'd	ABC

REGIONAL FAULT MAP
GEOTECHNICAL ENGINEERING STUDY
PANATTONI DEVELOPMENT COMPANY, INC.
GILROY SITE – PROPOSED NEW BUILDING AND SITE IMPROVEMENTS
1445 PACHECO PASS HWY.
GILROY, CALIFORNIA

FIGURE
4

8198_PanattoniGES.aprx

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APPENDIX B
LOGS OF BORINGS

CONDOR EARTH TECHNOLOGIES, INC.
209-234-0518
FAX 209-234-0538

LOG OF BORING No. B-1

PROJECT: Gilroy Site - Proposed New Building/Site Improvements **PROJECT NO.:** 8198
CLIENT: Panattoni Development Company, Inc.
PROJECT LOCATION: 1445 Pacheco Pass Highway, Gilroy, CA [APN: 841-18-082]
LOCATION: Northwest Corner of Building [37.0064, -121.5439] **ELEVATION:**
DRILLER: V & W Drilling **LOGGED BY:** C. Borean
DRILLING METHOD: Hollow-Stem Auger/Mud Rotary **DATE:** 05/14/20
DEPTH TO - WATER> INITIAL: 15' **AFTER DRILLING:** **CAVING>**

Depth (feet)	USCS	Description	Sample No.	Blow Counts	N Value	Moisture Content (%)	Dry Density (pcf)	Plasticity Index	Liquid Limit	% < #200	Misc. Tests
0	CH	Fat Clay, very dark gray, moist, firm, upper 12" disked									
		Stiff at 2 feet	1A 1B	4 5 7	8	29.2	87.5	32	58	81.2	C = 1.22 ksf
		Mottled, dark reddish gray to reddish brown	2	2 3 4	7						
5.0	CL	Grading to sandy lean clay, reddish brown, moist Stiff	4A 4B	2 5 7	8	20	105.1	20	38		C = 1.14 ksf
		Stiff	5	2 3 6	9						
		Very stiff	6A 6B 6C	10 8 20	19	96.5	23.3				C = 2.20 ksf
		Sandy Clay with reddish brown, moist, very stiff	7	8 11 13	24						
14.5	GC	Clayey gravel with sand, yellowish brown, saturated, medium dense	8A 8B	11 17 18	23					13.3	
			9	6 6 10	16						
20.0	SW-SC	Inter-bedded, well graded sand and clayey sand with gravel, dense	10A 10B	12 18 27	30						
			11	9 20 23	43						
23.5	SM	Silty Sand, trace fine gravel, olive brown, saturated, dense to very dense	12A 12B	14 33 48	54						
			13	5 15 18	33						
			14A 14B	12 32 40	48						
32.5	SW-SM	Inter-bedded, well graded sand and silty sand	15	4 8 18	26						
		Poorly graded, coarse sand, poor recovery	16A	30 27	34						

Bulk Sample: 2-5

This information pertains only to this boring and should not be interpreted as being indicitive of the site.

CONDOR EARTH TECHNOLOGIES, INC.
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FAX 209-234-0538

LOG OF BORING No. B-1

PROJECT: Gilroy Site - Proposed New Building/Site Improvements **PROJECT NO.:** 8198
CLIENT: Panattoni Development Company, Inc.
PROJECT LOCATION: 1445 Pacheco Pass Highway, Gilroy, CA [APN: 841-18-082]
LOCATION: Northwest Corner of Building [37.0064, -121.5439] **ELEVATION:**
DRILLER: V & W Drilling **LOGGED BY:** C. Borean
DRILLING METHOD: Hollow-Stem Auger/Mud Rotary **DATE:** 05/14/20
DEPTH TO - WATER> INITIAL: 15' **AFTER DRILLING:** **CAVING>**

Depth (feet)	Sample Type	USCS	Description	Graphic	Sample No.	Blow Counts	N Value	Moisture Content (%)	Dry Density (pcf)	Plasticity Index	Liquid Limit	% < #200	Misc. Tests
36.5		ML	Clayey Silt, brown saturated, very stiff		17A 17B	7 9 10 18	19						
40.5		SM	Silty Sand, saturated, medium dense to dense		18A 18B	8 10 15	25						
					19A 19B	7 14 22	24						
					20	6 13 29	42						
			Boring Terminated at 46.5 ft.										

Depth scale: 40, 45, 50, 55, 60, 65, 70

This information pertains only to this boring and should not be interpreted as being indicitive of the site.

Bulk Sample: 2-5

CONDOR EARTH TECHNOLOGIES, INC.
209-234-0518
FAX 209-234-0538

LOG OF BORING No. B-2

PROJECT: Gilroy Site - Proposed New Building/Site Improvements **PROJECT NO.:** 8198
CLIENT: Panattoni Development Company, Inc.
PROJECT LOCATION: 1445 Pacheco Pass Highway, Gilroy, CA [APN: 841-18-082]
LOCATION: Souteast Corner of Building [37.0046, -121.5431] **ELEVATION:**
DRILLER: V & W Drilling **LOGGED BY:** C. Borean
DRILLING METHOD: Hollow-Stem Auger/Mud Rotary **DATE:** 05/15/20
DEPTH TO - WATER> INITIAL: 15' **AFTER DRILLING:** **CAVING>**

This information pertains only to this boring and should not be interpreted as being indicitive of the site.

Depth (feet)	USCS	Description	Sample No.	Blow Counts	N Value	Moisture Content (%)	Dry Density (pcf)	Plasticity Index	Liquid Limit	% < #200	Misc. Tests
0	CH	Fat Clay, very dark gray, moist, firm, upper 12" disked									
		Stiff at 2 feet	1A 1B	4 6 7	9						
			2A 2B	3 6 7	9	22.7	81.9	33	62		C = 1.50 ksf
5.0	CL	Grading to sandy lean clay, mottled, dark reddish gray to reddish brown, stiff	3A 3B	4 7 10	11	19.4	101.7				C = 2.14 ksf
			4A 4B	2 4 5	6						C = 1.20 ksf
10			5A 5B	3 5 8	9						
		Very stiff	6A 6B	7 12 14	17						
14.5	CL	Sandy Clay, trace gravel, reddish brown, saturated, very stiff	7A 7B	6 9 18	17						
18.0	SM	Silty Sand, saturated, medium dense to dense									
20			8	7 8 9	17						
		Coarse gravel in shoe	9	13 18 24	42						
25.0	SW-SM	Inter-bedded, well graded sand and silty sand, dense	10	7 11 22	33						
30			11	7 19 30	49						
33.5	CH	Clay, high plastic, sticky, pale brown, saturated, stiff									
35			12	2 4	11						

Bulk Sample: 0-3

CONDOR EARTH TECHNOLOGIES, INC.
209-234-0518
FAX 209-234-0538

LOG OF BORING No. B-2

PROJECT: Gilroy Site - Proposed New Building/Site Improvements **PROJECT NO.:** 8198
CLIENT: Panattoni Development Company, Inc.
PROJECT LOCATION: 1445 Pacheco Pass Highway, Gilroy, CA [APN: 841-18-082]
LOCATION: Souteast Corner of Building [37.0046, -121.5431] **ELEVATION:**
DRILLER: V & W Drilling **LOGGED BY:** C. Borean
DRILLING METHOD: Hollow-Stem Auger/Mud Rotary **DATE:** 05/15/20
DEPTH TO - WATER> INITIAL: 15' **AFTER DRILLING:** **CAVING>**

This information pertains only to this boring and should not be interpreted as being indicitive of the site.

Depth (feet)	Sample Type	USCS	Description	Graphic	Sample No.	Blow Counts	N Value	Moisture Content (%)	Dry Density (pcf)	Plasticity Index	Liquid Limit	% < #200	Misc. Tests
						7							
37.5		CL	Becoming Silty Clay, stiff		13	3 5 7	12						
40.0		ML	Silt, brown, saturated, very stiff		14	5 8 10	14						
					15	5 9 21	30						
43.5		SM	Silty Sand, trace gravel, very dense		16	14 30 35	65						
45													
			Boring Terminated at 46.5 ft.										
50													
55													
60													
65													
70													

Bulk Sample: 0-3

CONDOR EARTH TECHNOLOGIES, INC.
209-234-0518
FAX 209-234-0538

LOG OF BORING No. B-3

PROJECT: Gilroy Site - Proposed New Building/Site Improvements **PROJECT NO.:** 8198
CLIENT: Panattoni Development Company, Inc.
PROJECT LOCATION: 1445 Pacheco Pass Highway, Gilroy, CA [APN: 841-18-082]
LOCATION: [37.0040, -121.5425] **ELEVATION:**
DRILLER: V & W Drilling **LOGGED BY:** C. Borean
DRILLING METHOD: Solid-Stem Auger **DATE:** 05/15/20
DEPTH TO - WATER> INITIAL: **AFTER DRILLING:** **CAVING>**

Depth (feet)	Sample Type	USCS	Description	Graphic	Sample No.	Blow Counts	N Value	Moisture Content (%)	Dry Density (pcf)	Plasticity Index	Liquid Limit	% < #200	Misc. Tests
0		CH	Clay, high plastic, very dark gray, moist, firm to stiff										
			Stiff at 2 feet		1A 1B	3 4 5	6						
					2	4 5 6	11						
3.5		CL	Clay, medium plastic, dark reddish brown, stiff										
5					3A 3B	6 7 10	11						
10		CL	Sandy Clay, medium stiff		4	3 3 3	6						
13.5		SC	Clayey Sand with gravel, yellowish brown, moist, very dense										
15					5A	31 50/6	7/50						
			Boring Terminated at 16.5 ft.										

Bulk Sample: 0-4

This information pertains only to this boring and should not be interpreted as being indicitive of the site.

CONDOR EARTH TECHNOLOGIES, INC.
CONDOR
209-234-0518
FAX 209-234-0538

LOG OF BORING No. B-4

PROJECT: Gilroy Site - Proposed New Building/Site Improvements **PROJECT NO.:** 8198
CLIENT: Panattoni Development Company, Inc.
PROJECT LOCATION: 1445 Pacheco Pass Highway, Gilroy, CA [APN: 841-18-082]
LOCATION: [37.0051, -121.5454] **ELEVATION:**
DRILLER: V & W Drilling **LOGGED BY:** C. Borean
DRILLING METHOD: Solid-Stem Auger **DATE:** 05/15/20
DEPTH TO - WATER> INITIAL: **AFTER DRILLING:** **CAVING>**

Depth (feet)	Sample Type	USCS	Description	Graphic	Sample No.	Blow Counts	N Value	Moisture Content (%)	Dry Density (pcf)	Plasticity Index	Liquid Limit	% < #200	Misc. Tests
0		CL	Clay, very dark gray, moist, stiff										
					1	2 3 7	10			20	41	67.9	
			Clay, medium plastic, dark reddish brown, moist, stiff		2A	2 3 12	10						
5					3	2 3 4	7						
10					4A 4B	6 6 7	9						
15					5A 5B	3 7 13	20						
16.0		SC	Clayey sand with gravel, yellowish brown, moist										
			Boring Terminated at 16.5 ft.										
20													
25													
30													
35													

Bulk Sample: 0-4
No Groundwater

This information pertains only to this boring and should not be interpreted as being indicitive of the site.

CONDOR EARTH TECHNOLOGIES, INC.
209-234-0518
FAX 209-234-0538

LOG OF BORING No. B-5

PROJECT: Gilroy Site - Proposed New Building/Site Improvements **PROJECT NO.:** 8198
CLIENT: Panattoni Development Company, Inc.
PROJECT LOCATION: 1445 Pacheco Pass Highway, Gilroy, CA [APN: 841-18-082]
LOCATION: [37.0065, -121.5464] **ELEVATION:**
DRILLER: V & W Drilling **LOGGED BY:** C. Borean
DRILLING METHOD: Solid-Stem Auger **DATE:** 05/15/20
DEPTH TO - WATER> INITIAL: **AFTER DRILLING:** **CAVING>**

Depth (feet)	Sample Type	USCS	Description	Graphic	Sample No.	Blow Counts	N Value	Moisture Content (%)	Dry Density (pcf)	Plasticity Index	Liquid Limit	% < #200	Misc. Tests
0		CH	Clay, high plastic, very dark gray, moist, stiff										
2.0		CL	Clay, medium plastic, mottled dark grayish brown to yellowish red, moist, stiff		1	3 4 8	8						
					2	4 5 6	11						
5			Trace gravel in shoe		3A 3B 3C	4 7 9	11						
10			Dark brown		4	3 6 8	14						
13.5		SC	Clayey sand, some coarse gravel, yellowish brown, dense, moist		5A 5B	30 13 25	38						
16.5			Boring Terminated at 16.5 ft.										

This information pertains only to this boring and should not be interpreted as being indicitive of the site.

Bulk Sample: 0-4

CONDOR EARTH TECHNOLOGIES, INC.
209-234-0518
FAX 209-234-0538

LOG OF BORING No. B-6

PROJECT: Gilroy Site - Proposed New Building/Site Improvements **PROJECT NO.:** 8198
CLIENT: Panattoni Development Company, Inc.
PROJECT LOCATION: 1445 Pacheco Pass Highway, Gilroy, CA [APN: 841-18-082]
LOCATION: [37.0060, -121.5477] **ELEVATION:**
DRILLER: V & W Drilling **LOGGED BY:** C. Borean
DRILLING METHOD: Solid-Stem Auger **DATE:** 05/15/20
DEPTH TO - WATER> INITIAL: **AFTER DRILLING:** **CAVING>**

Depth (feet)	USCS	Description	Sample No.	Blow Counts	N Value	Moisture Content (%)	Dry Density (pcf)	Plasticity Index	Liquid Limit	% < #200	Misc. Tests
0											
1	CL	Sandy clay with gravel, very dark gray, moist, stiff									
2			1	2 4 6	10			26	49	51.9	
3.5		Dark reddish brown, very stiff	2A 2B	6 14 14	18						
5		stiff	3	3 4 6	10						
10		Some fine gravel	4A 4B	4 6 11	11						
12.5	SC	Clayey sand, dark yellowish brown, becoming wet, medium dense									
15			5	19 20 10	30						
16.5		Boring Terminated at 16.5 ft.									

Bulk Sample: 0-4

This information pertains only to this boring and should not be interpreted as being indicitive of the site.

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CONDOR
209-234-0518
FAX 209-234-0538

LOG OF BORING No. B-7

PROJECT: Gilroy Site - Proposed New Building/Site Improvements **PROJECT NO.:** 8198
CLIENT: Panattoni Development Company, Inc.
PROJECT LOCATION: 1445 Pacheco Pass Highway, Gilroy, CA [APN: 841-18-082]
LOCATION: [37.0047, -121.5482] **ELEVATION:**
DRILLER: V & W Drilling **LOGGED BY:** C. Borean
DRILLING METHOD: Solid-Stem Auger **DATE:** 05/15/20
DEPTH TO - WATER> INITIAL: **AFTER DRILLING:** **CAVING>**

Depth (feet)	USCS	Description	Sample No.	Blow Counts	N Value	Moisture Content (%)	Dry Density (pcf)	Plasticity Index	Liquid Limit	% < #200	Misc. Tests
0	CL	Sandy lean clay, very dark gray, moist, stiff Dark reddish brown	1A 1B	3 5 10	10	18.1	91.1	19	39	54.0	
			2	3 4 4	8						
5			3A 3B	3 5 9	9						
10			4	4 5 6	11						
15			5A	5	28						
16.0	SM	Silty sand, yellowish brown, moist, dense	5B 5C	17 25							
		Boring Terminated at 16.5 ft.									
20											
25											
30											
35											

Bulk Sample: 0-4

This information pertains only to this boring and should not be interpreted as being indicitive of the site.

UNIFIED SOIL CLASSIFICATION SYSTEM

Division		Group Symbol	Group Name
Coarse-Grained Soils (more than 50 percent retained on the No. 200 sieve)	**Gravel** (% gravel > % sand)	**GW**	Well-graded Gravel (with Sand)
		GW-GM	Well-graded Gravel with Silt (and Sand)
		GW-GC	Well-graded Gravel with Clay (and Sand)
		GP	Poorly graded Gravel (with Sand)
		GP-GM	Poorly graded Gravel with Silt (and Sand)
		GP-GC	Poorly graded Gravel with Clay (and Sand)
		GM	Silty Gravel (with Sand)
		GC	Clayey Gravel (with Sand)
	Sand (% sand ≥ % gravel)	**SW**	Well-graded Sand (with Gravel)
		SW-SM	Well-graded Sand with Silt (and Gravel)
		SW-SC	Well-graded Sand with Clay (and Gravel)
		SP	Poorly graded Sand (with Gravel)
		SP-SM	Poorly graded Sand with Silt (and Gravel)
		SP-SC	Poorly graded Sand with Clay (and Gravel)
		SM	Silty Sand (with Gravel)
		SC	Clayey Sand (with Gravel)
Fine-Grained Soils (50 percent or more passing the No. 200 sieve)	**Silt or Clay** LL < 50	**ML**	Silt (with Sand or Gravel), Sandy Silt (with Gravel), Gravelly Silt (with Sand)
		CL-ML	Silty Clay (with Sand or Gravel), Sandy Silty Clay (with Gravel), Gravelly Silty Clay (with Sand)
		CL	Lean Clay (with Sand or Gravel), Sandy lean Clay (with Gravel), Gravelly lean Clay (with Sand)
		OL	Organic Clay (with Sand or Gravel), Sandy organic Clay (with Gravel), Gravelly organic Clay (with Sand), organic Silt (with Sand or Gravel), Sandy organic Silt (with Gravel), Gravelly organic Silt (with Sand)
	Silt or Clay LL ≥ 50	**MH**	Elastic Silt (with Sand or Gravel), Sandy elastic Silt (with Gravel), Gravelly elastic Silt (with Sand)
		CH	Fat Clay (with Sand or Gravel), Sandy fat Clay (with Gravel), Gravelly fat Clay (with Sand)
		OH	Organic Clay (with Sand or Gravel), Sandy organic Clay (with Gravel), Gravelly organic Clay (with Sand), organic Silt (with Sand or Gravel), Sandy organic Silt (with Gravel), Gravelly organic Silt (with Sand)
Highly Organic Soils		**PT**	Peat and other highly organic soils

Note: Percentages are by dry weight. Soil classifications based on some criteria that are not shown. Group Name items in parentheses may or may not apply, depending on percent of sand or gravel.

Coarse Grained Soil Definitions	
Fraction	**Particle Dimension or U.S. Standard Sieve Size/No.**
Boulders	Above 12"
Cobbles	12" to 3"
Gravel - coarse - fine	3" to 3/4" 3/4" to No. 4
Sand - coarse - medium - fine	No. 4 to No. 10 No. 10 to No. 40 No. 40 to No. 200

Split-barrel, 3-inch O.D., 2.43-inch I.D.

Split-barrel, 2.5-inch O.D., 1.93-inch I.D.

Standard Penetration Test (SPT), 2.0-inch O.D., 1.375-inch I.D.

Shelby Tube

Disturbed sample

No recovery

Groundwater level during drilling

Subsequent groundwater level

Note: O.D. = outside diameter I.D. = inside diameter

CONDOR

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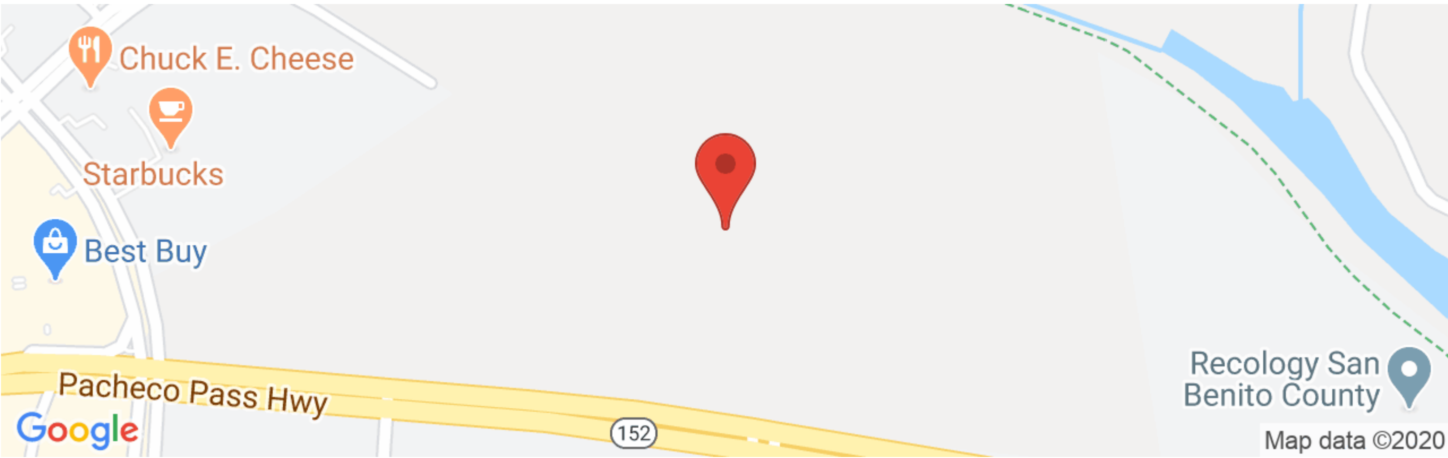
LOG LEGEND AND SOIL CLASSIFICATION

APPENDIX C
OSHPD U.S. SEISMIC DESIGN MAPS

Gilroy - 8198

1445 Pacheco Pass Hwy, Gilroy, CA 95020, USA

Latitude, Longitude: 37.0052814, -121.5453538



Date	6/4/2020, 9:27:28 AM
Design Code Reference Document	ASCE7-16
Risk Category	III
Site Class	D - Stiff Soil

Type	Value	Description
S_S	1.621	MCE_R ground motion. (for 0.2 second period)
S_1	0.6	MCE_R ground motion. (for 1.0s period)
S_{MS}	1.621	Site-modified spectral acceleration value
S_{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S_{DS}	1.081	Numeric seismic design value at 0.2 second SA
S_{D1}	null -See Section 11.4.8	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	null -See Section 11.4.8	Seismic design category
F_a	1	Site amplification factor at 0.2 second
F_v	null -See Section 11.4.8	Site amplification factor at 1.0 second
PGA	0.675	MCE_G peak ground acceleration
F_{PGA}	1.1	Site amplification factor at PGA
PGA_M	0.743	Site modified peak ground acceleration
T_L	12	Long-period transition period in seconds
SsRT	2.621	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	2.713	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	1.621	Factored deterministic acceleration value. (0.2 second)
S1RT	0.938	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	1.011	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.6	Factored deterministic acceleration value. (1.0 second)
PGAd	0.675	Factored deterministic acceleration value. (Peak Ground Acceleration)
C_{RS}	0.966	Mapped value of the risk coefficient at short periods

Type	Value	Description
C_{R1}	0.927	Mapped value of the risk coefficient at a period of 1 s

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APPENDIX D
LABORATORY TEST RESULTS

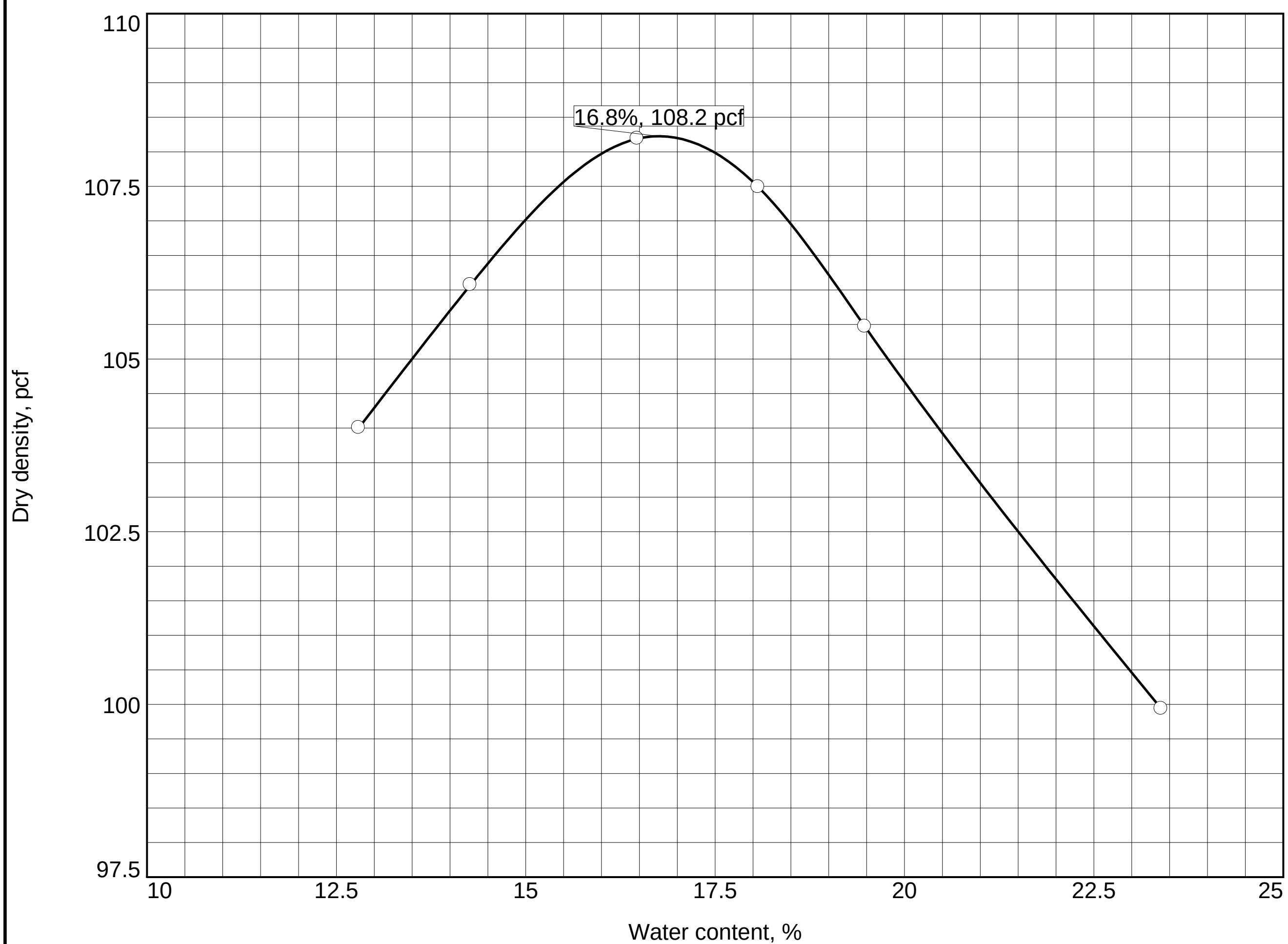
Condor Earth
188 Frank West Circle, Suite I
Stockton CA 95206
Phone 209.234.0518
FAX 209.234.0538
www.condorearth.com

Project #: 8198
Client: Pannatoni Development, Co., Inc
Project: Gilroy Site
Test Date: 5/18/2020
Tested by: E.Carrasco

Natural Dry Density/Unit Weight								
Sample #	B1-1A	B1-4A	B1-6A	B2-2A	B2-3A	B7-1B		
Date	5/18/2020	5/18/2020	5/18/2020	5/18/2020	5/18/2020	5/18/2020		
Depth (ft)	1.5-2.0	5.5-6.0	10.0-10.5	3.0-3.5	5.5-6.0	2.0-2.5		
Sleeve Diam. (in)	2.45	2.45	2.45	2.45	2.45	2.45		
Sleeve Area (sq in)	4.7	4.7	4.7	4.7	4.7	4.7		
Sample Length (in)	6.0	5.8	6	3.7	5.7	6.0		
Volume (cu.in)	28.2	27.3	28.2	17.4	26.8	28.2		
Volume(cu ft)	0.016	0.016	0.016	0.010	0.016	0.016		
Gross wt (grms)	1153.4	1231.9	1197.1	774.1	1085.6	1028.3		
Tare wt (grms)	316.9	326.1	316.1	315.2	231.3	231.5		
Soil wt (grms)	836.5	905.8	881.0	458.9	854.3	796.8		
Soil wt (lbs)	1.8	2.0	1.9	1.0	1.9	1.8		
Wet density (pcf)	113.0	126.6	119.0	100.5	121.5	107.6		
Dry Density(pcf)	87.5	105.1	96.5	81.9	101.7	91.1		

Moisture Content								
Tare #	C	DH	F	A	OG	MK		
Wet wt & Tare (grms)	799.2	920.6	1197.1	486.4	1085.6	663.7		
Dry wt & Tare (grms)	690.2	819.9	1030.6	454.7	946.6	597.4		
Wt of Water (grms)	109.0	100.7	166.5	31.7	139.0	66.3		
Wt of Tare (grms)	316.9	326.1	316.1	315.2	231.3	231.5		
Wt dry Soil (grms)	373.3	493.8	714.5	139.5	715.3	365.9		
Moisture Content %	29.2	20.4	23.3	22.7	19.4	18.1		

COMPACTION TEST REPORT



Test specification: ASTM D 1557-91 Procedure B Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/8 in.	% < No.200
	USCS	AASHTO						
0-1'	CH	A-7-6(31)	23.4		63	35	0.0	81.3

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 108.2 pcf Optimum moisture = 16.8 %	Dark Gray Fat Clay with Sand

Project No. 8198 **Client:** Panattoni Development Company, Inc.

Project: Gilroy Site - Proposed New Building/Site Improvements

○ **Location:** 1445 Pacheco Pass Highway, Gilroy, Ca **Sample Number:** CT-1

Remarks:

CONDOR EARTH TECHNOLOGIES INC.

Stockton, California

Figure

Tested By: E, Carrasco **Checked By:** R. Skaggs

Moisture Density Test Data - CAL TEST 216

Client:	**Pannatoni Development Co.,Inc**
Project:	**Gilroy Site**
Project Number:	**8198**

Specimen Data

Source:	**Gilroy, Ca**
Sample No:	**CaT-2**
Elev./Depth:	**1.0'**
Sample Length (in/cm):	**N/A**
Location:	**Combination of B-4 & B-7 (surface composite)**
Description:	**Dark Brown Clay with Sand (5% HI-CAL Quicklime added)**
USCS Classification:	**N/A**
AASHTO Classification:	**N/A**
Natural Moisture:	**13.6%**
Liquid Limit:	**N/A**
Plasticity Limit:	**N/A**

Testing Remarks

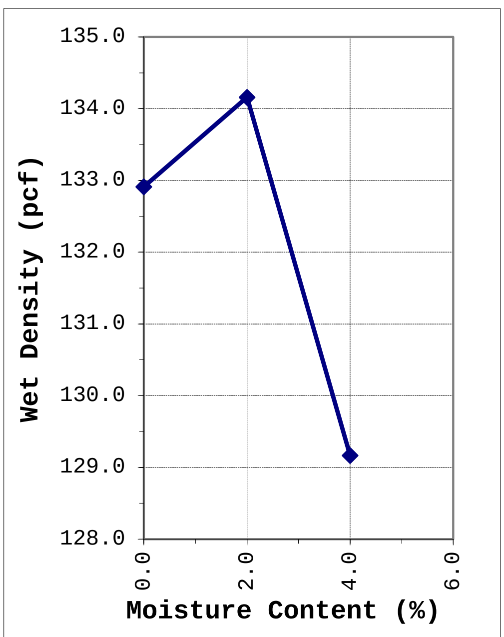
Sampled by:	**C. Borean**
Sampled date:	**5/15/2020**
Tested by:	**E. Carrasco**
Tested date:	**5/27/2020**

Percent Retained on No. 4 Sieve:	**N/A**
Percent Passing No. 200 Sieve:	**N/A**
Specific Gravity:	**N/A**

Test Data and Results

No Rock Correction Needed

Type of Test: Cal Test 216 no moisture

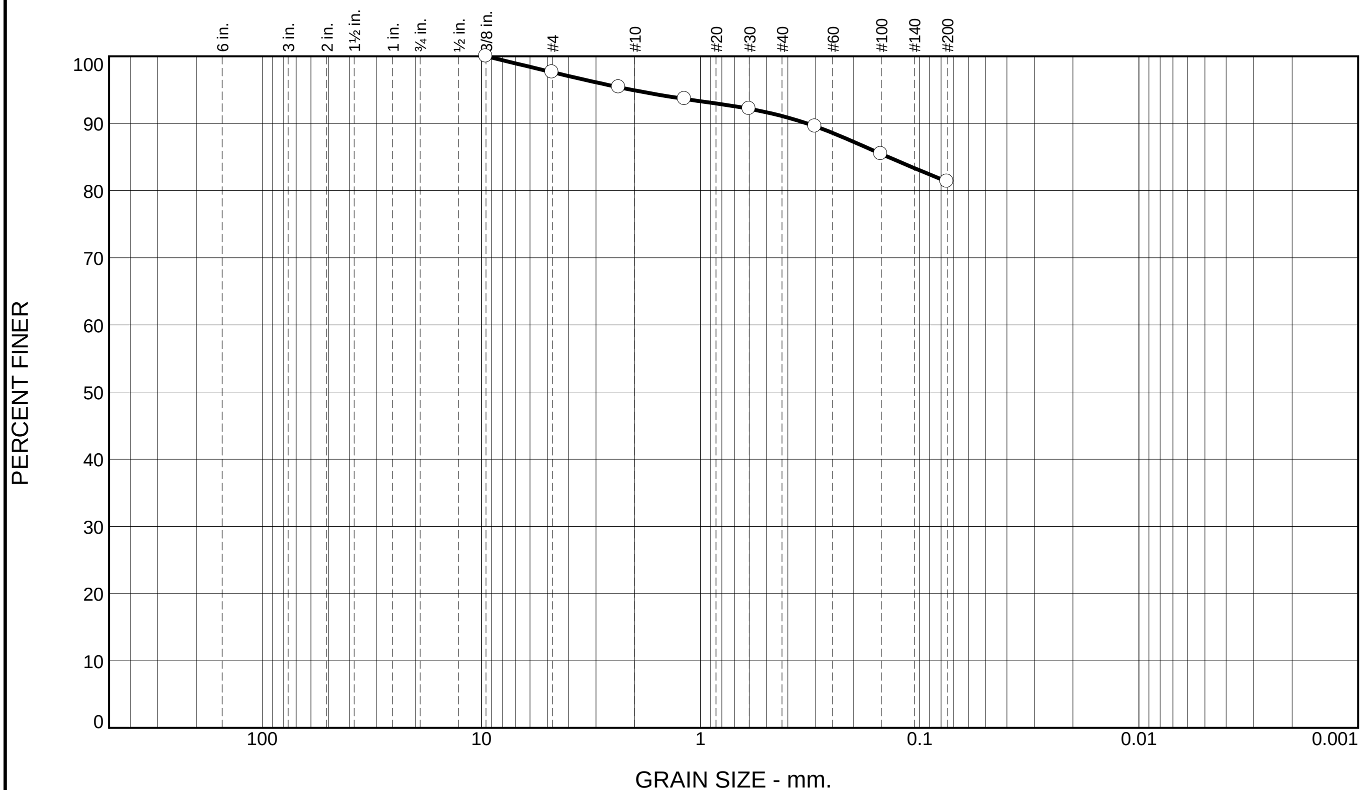


Point No.	1	2	3
TAMPER READING	10.7	10.6	11.0
WM (gms)	2400	2400	2400
+ WATER (%)	0.0	2.0	4.0
WW+T (gms)			
WD+T (gms)			
TARE WEIGHT (gms)			
MOIST			
MOISTURE CONTENT (%)	0	2	4
WET DEN. (gms/cc)	2.13	2.15	2.07
WET DEN. (pcf)	132.9	134.2	129.2
ADJ.WET DEN.(gms/cc)	0	0	0
ADJ.WET DEN. (pcf)	0.0	0.0	0.0

MAX WET DENSITY = 134.2 pcf
2.15 g/cc

Modified from GeoSystem
X:\Project\8000_prj\8198 Panattoni Development Co., Inc\MTSI\Curves\8198 CaT-2 DrkBrnClWithSa 20200528 EC.xlsx

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.4	2.7	3.8	9.8	81.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100.0		
#4	97.6		
#8	95.4		
#16	93.6		
#30	92.2		
#50	89.6		
#100	85.4		
#200	81.3		

* (no specification provided)

Material Description

Dark Gray Fat Clay with Sand

Atterberg Limits

PL= 28 LL= 63 PI= 35

Coefficients

D_{90}= 0.3276 D_{85}= 0.1394 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CH AASHTO= A-7-6(31)

Remarks

F.M.=0.46

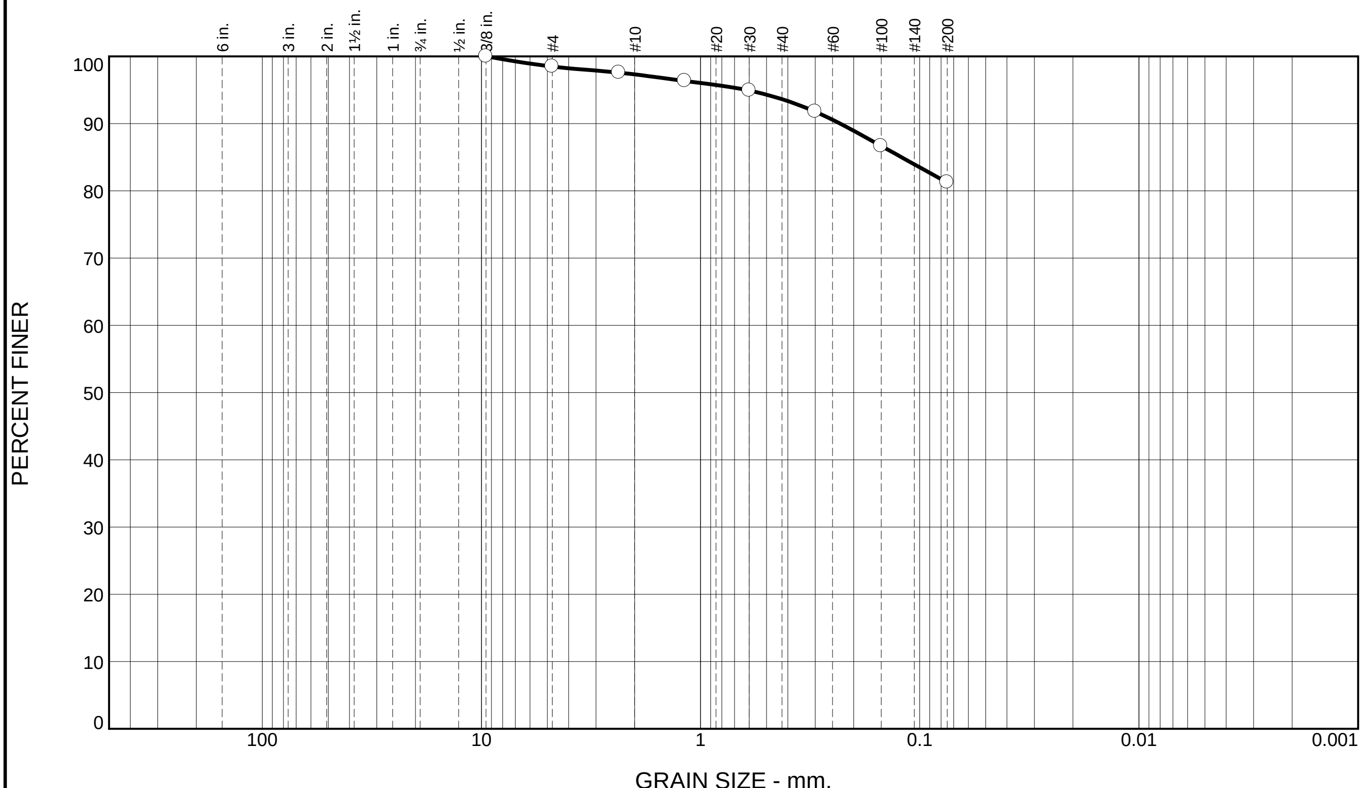
Location: 1445 Pacheco Pass Highway, Gilroy, Ca
Sample Number: CT-1 **Depth:** 0-1' **Date:** 4/28/2020

CONDOR
EARTH TECHNOLOGIES, INC.
Stockton, California

Client: Panattoni Development Company, Inc.
Project: Gilroy Site - Proposed New Building/Site Improvements
Project No: 8198 **Figure**

Tested By: E. Carrasco **Checked By:** R. Skaggs

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.5	1.2	3.7	12.4	81.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100.0		
#4	98.5		
#8	97.6		
#16	96.3		
#30	94.9		
#50	91.8		
#100	86.7		
#200	81.2		

* (no specification provided)

Material Description

Dark Brown Fat Clay with Sand

Atterberg Limits

PL= 26 LL= 58 PI= 32

Coefficients

D_{90}= 0.2312 D_{85}= 0.1212 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CH AASHTO= A-7-6(28)

Remarks

F.M.=0.34

Source of Sample: B-1 **Depth:** 1.0
Sample Number: 1A (SA-2)

Date: 5/26/2020

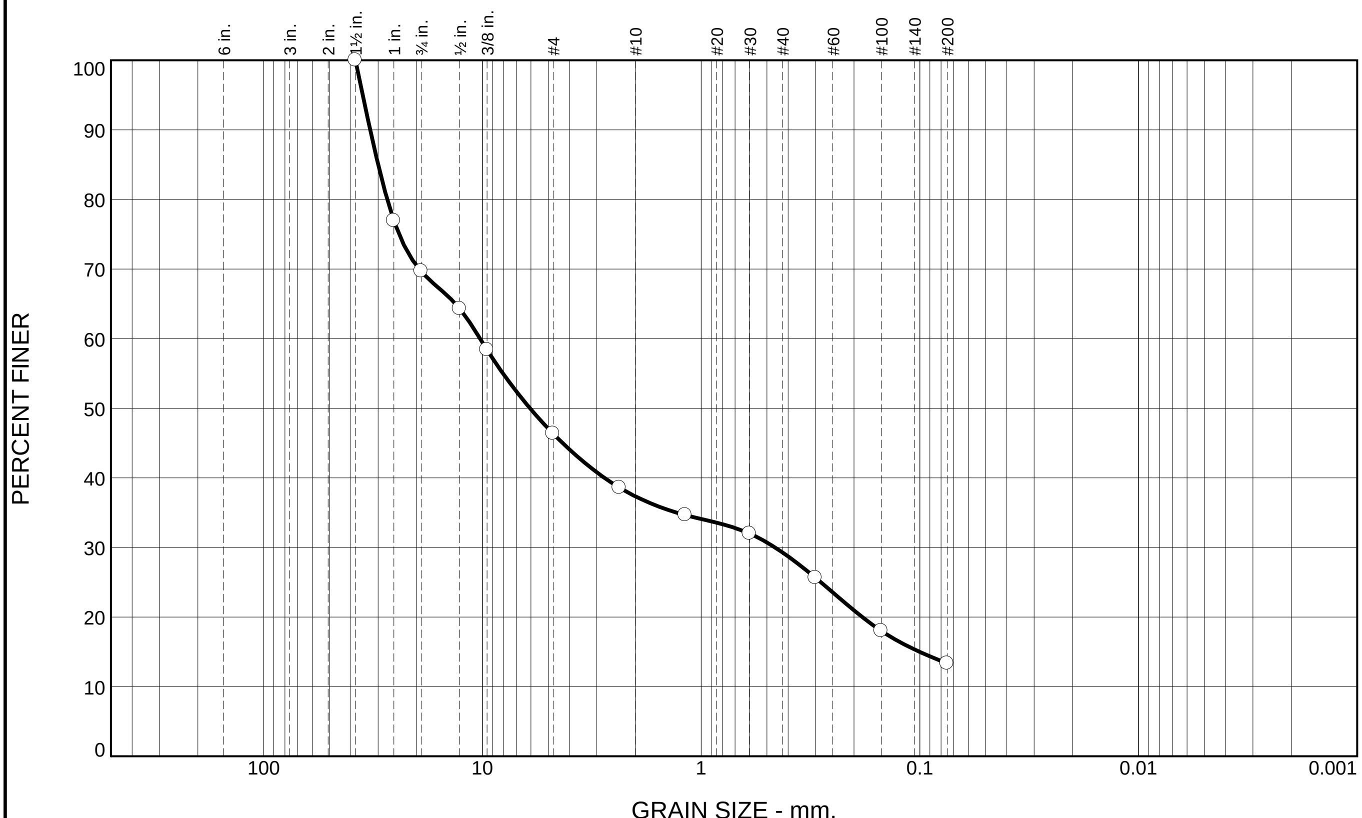
CONDOR
EARTH TECHNOLOGIES, INC.
Stockton, California

Client: Panattoni Development Company, Inc.
Project: Gilroy Site - Proposed New Building/Site Improvements

Project No: 8198 **Figure**

Tested By: E. Carrasco **Checked By:** R. Skaggs

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	30.3	23.3	9.0	8.1	16.0	13.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1-1/2"	100.0		
1"	76.9		
3/4"	69.7		
1/2"	64.3		
3/8"	58.4		
#4	46.4		
#8	38.6		
#16	34.7		
#30	32.0		
#50	25.7		
#100	18.0		
#200	13.3		

* (no specification provided)

Material Description

Light Brown Silty Sand with Gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 32.6121 D_{85}= 29.9738 D_{60}= 10.2520
D_{50}= 6.0587 D_{30}= 0.4591 D_{15}= 0.1000
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Tube marked 16.0-16.5 , Boring Log depth 15.0
F.M.=4.77

Source of Sample: B-1 **Depth:** 15.0
Sample Number: 8B

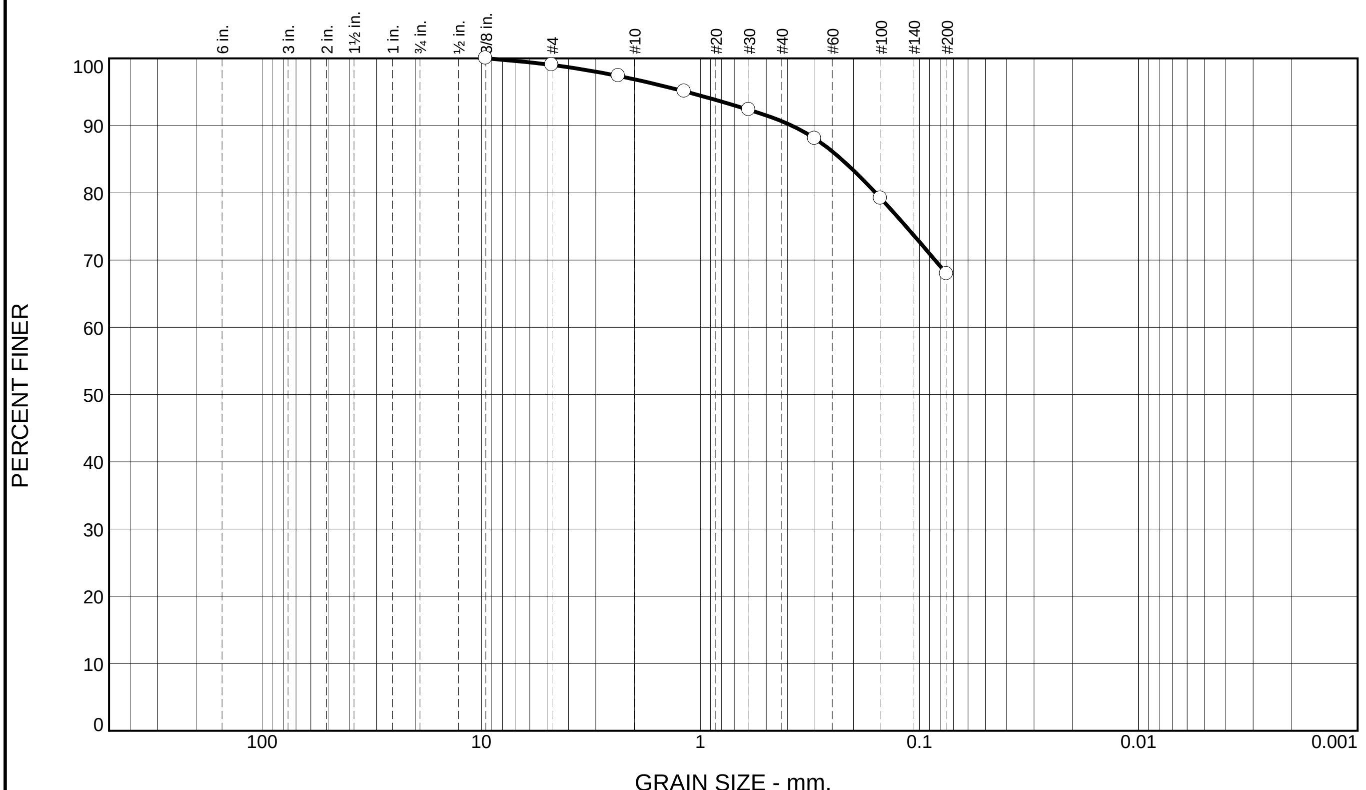
Date: 5/26/2020

CONDOR
EARTH TECHNOLOGIES, INC.
Stockton, California

Client: Panattoni Development Company, Inc.
Project: Gilroy Site - Proposed New Building/Site Improvements

Project No: 8198 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.0	2.1	6.3	22.7	67.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100.0		
#4	99.0		
#8	97.4		
#16	95.1		
#30	92.3		
#50	88.1		
#100	79.2		
#200	67.9		

* (no specification provided)

Material Description

Olive Gray Sandy Lean Clay

Atterberg Limits

PL= 21 LL= 41 PI= 20

Coefficients

D_{90}= 0.3833 D_{85}= 0.2270 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(12)

Remarks

F.M.=0.49

Source of Sample: B-4 **Depth:** 1.0
Sample Number: 1 (SA-4)

Date: 5/27/2020

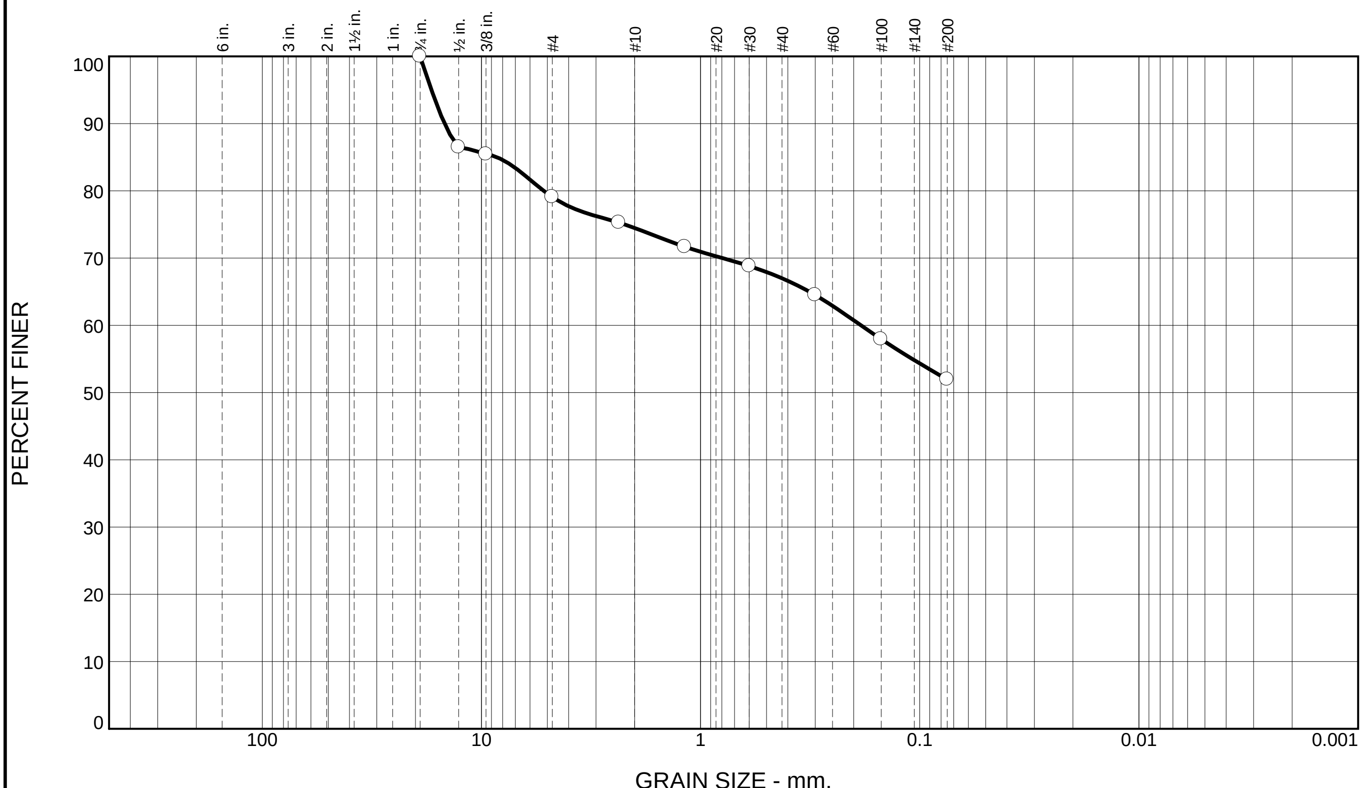
CONDOR
EARTH TECHNOLOGIES, INC.
Stockton, California

Client: Panattoni Development Company, Inc.
Project: Gilroy Site - Proposed New Building/Site Improvements

Project No: 8198 **Figure**

Tested By: E. Carrasco **Checked By:** R. Skaggs

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	20.9	4.6	7.5	15.1	51.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
1/2"	86.5		
3/8"	85.4		
#4	79.1		
#8	75.3		
#16	71.7		
#30	68.8		
#50	64.5		
#100	57.9		
#200	51.9		

* (no specification provided)

Material Description

Dark Brown Sandy Lean Clay with Gravel

Atterberg Limits

PL= 23 LL= 49 PI= 26

Coefficients

D_{90}= 14.7299 D_{85}= 8.4882 D_{60}= 0.1855
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(10)

Remarks

F.M.=1.97

Source of Sample: B-6 **Depth:** 1.0
Sample Number: 1 (SA-5)

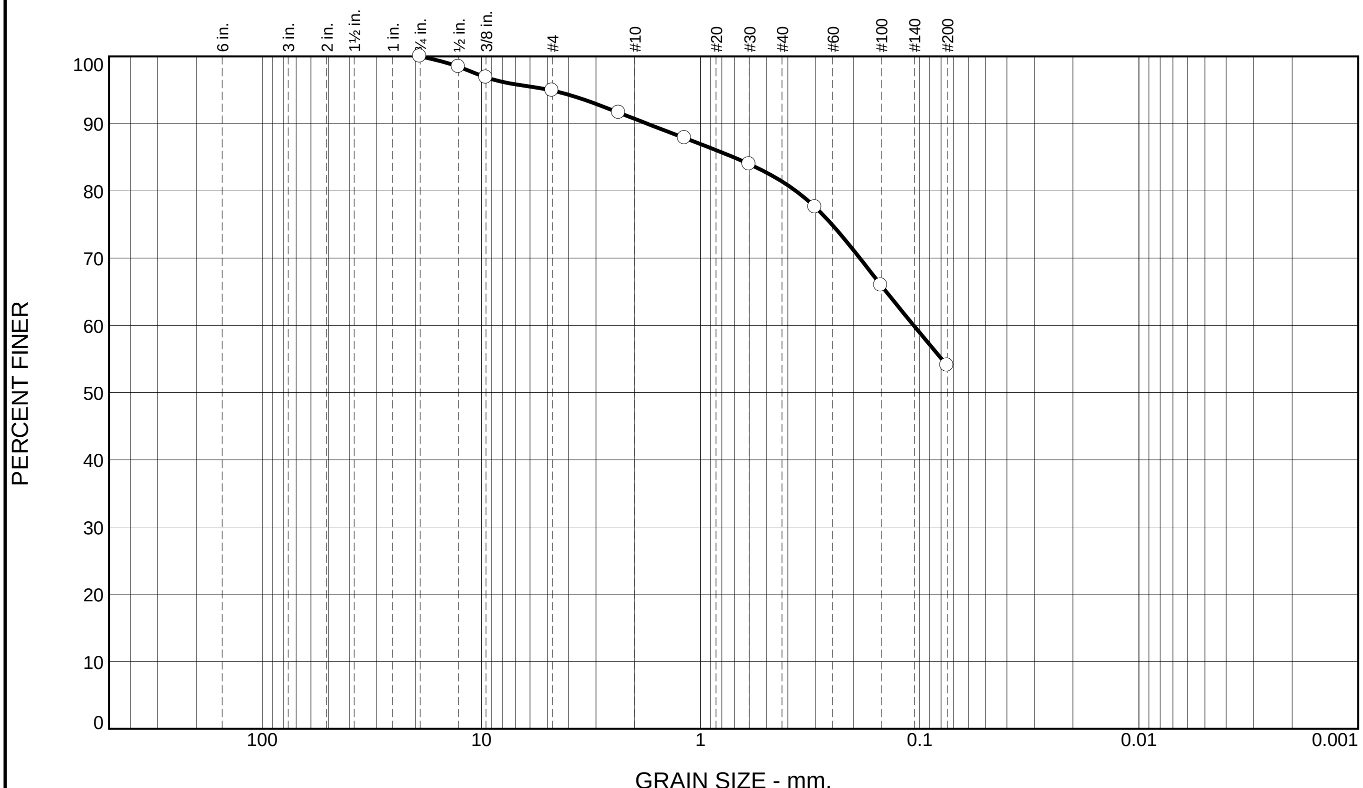
Date: 5/28/2020

CONDOR
EARTH TECHNOLOGIES, INC.
Stockton, California

Client: Panattoni Development Company, Inc.
Project: Gilroy Site - Proposed New Building/Site Improvements
Project No: 8198 **Figure**

Tested By: E. Carrasco **Checked By:** R. Skaggs

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	5.1	4.2	9.3	27.4	54.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
1/2"	98.4		
3/8"	96.9		
#4	94.9		
#8	91.6		
#16	87.8		
#30	84.0		
#50	77.6		
#100	65.9		
#200	54.0		

* (no specification provided)

Material Description

Dark Olive Brown Sandy Lean Clay with Gravel

Atterberg Limits

PL= 20 LL= 39 PI= 19

Coefficients

D_{90}= 1.7588 D_{85}= 0.7080 D_{60}= 0.1067
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(7)

Remarks

F.M.=1.01

Source of Sample: B-7 **Depth:** 1.0
Sample Number: 1B (SA-6)

Date: 5/28/2020

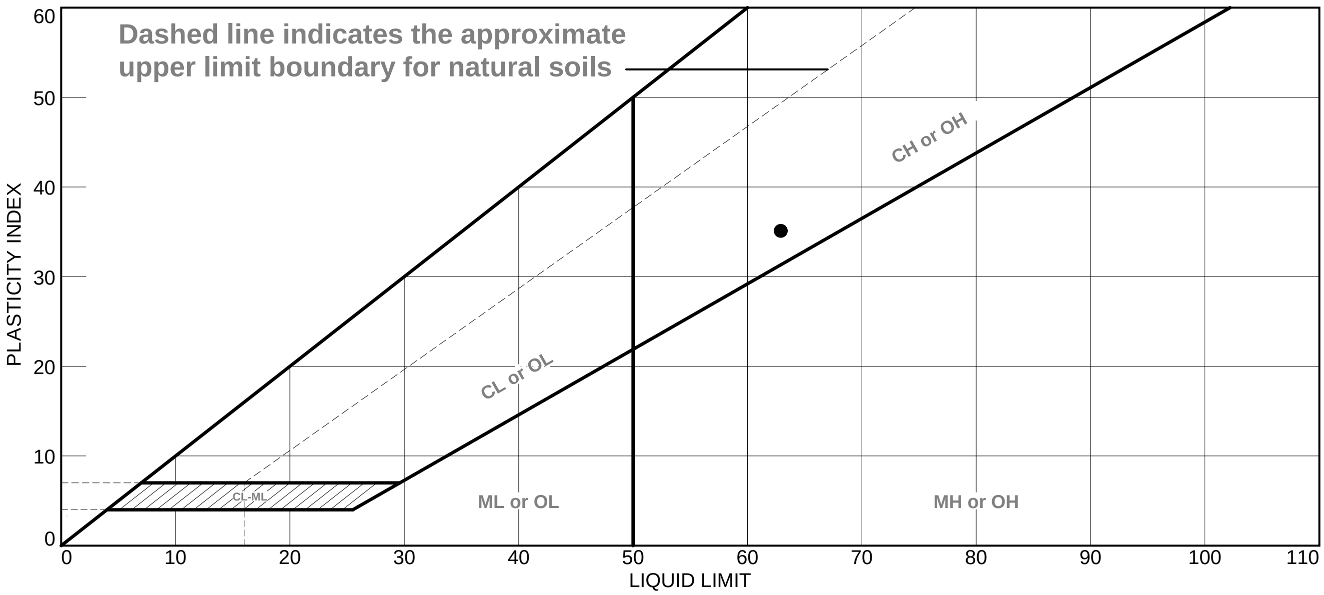
CONDOR
EARTH TECHNOLOGIES, INC.
Stockton, California

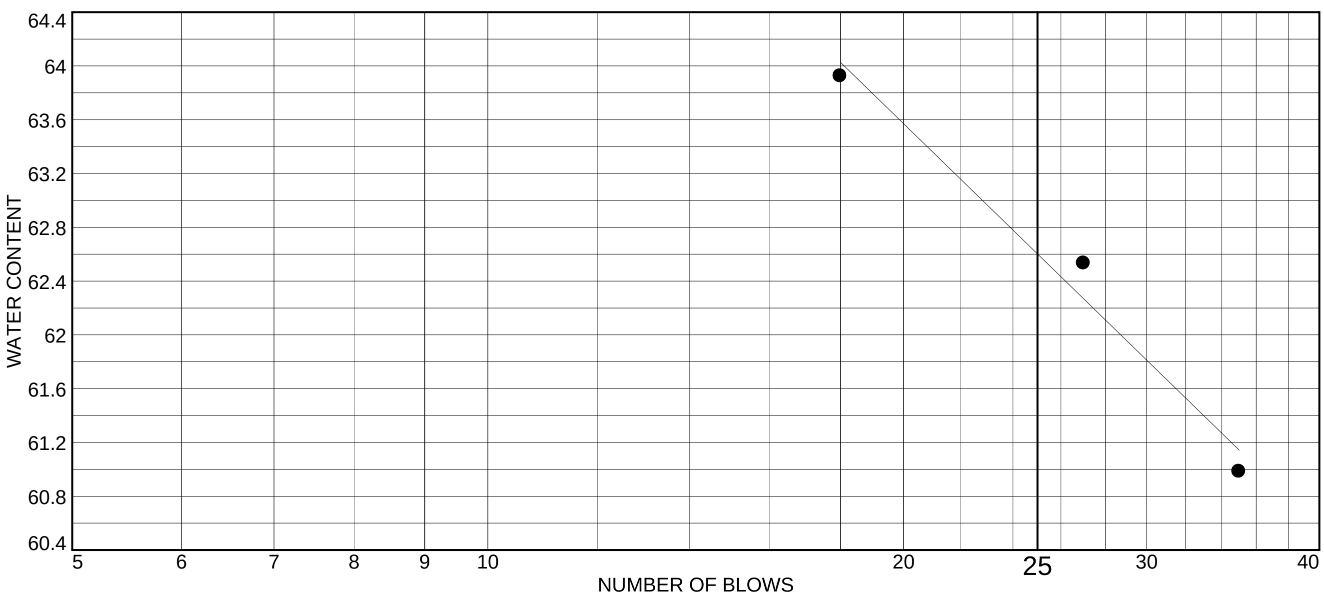
Client: Panattoni Development Company, Inc.
Project: Gilroy Site - Proposed New Building/Site Improvements

Project No: 8198 **Figure**

Tested By: E. Carrasco **Checked By:** R. Skaggs

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Dark Gray Fat Clay with Sand	63	28	35	91.1	81.3	CH

Project No. 8198 **Client:** Panattoni Development Company, Inc.

Project: Gilroy Site - Proposed New Building/Site Improvements

Location: 1445 Pacheco Pass Highway, Gilroy, Ca
Sample Number: CT-1 **Depth:** 0-1'

Remarks:

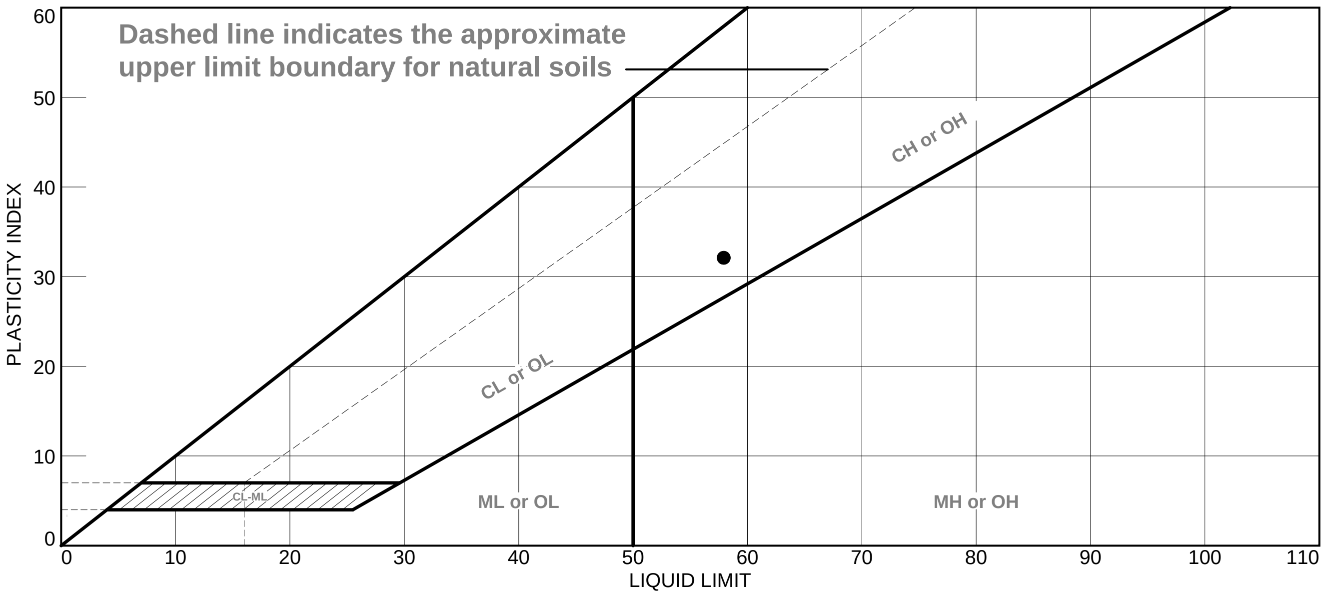
CONDOR EARTH TECHNOLOGIES INC.

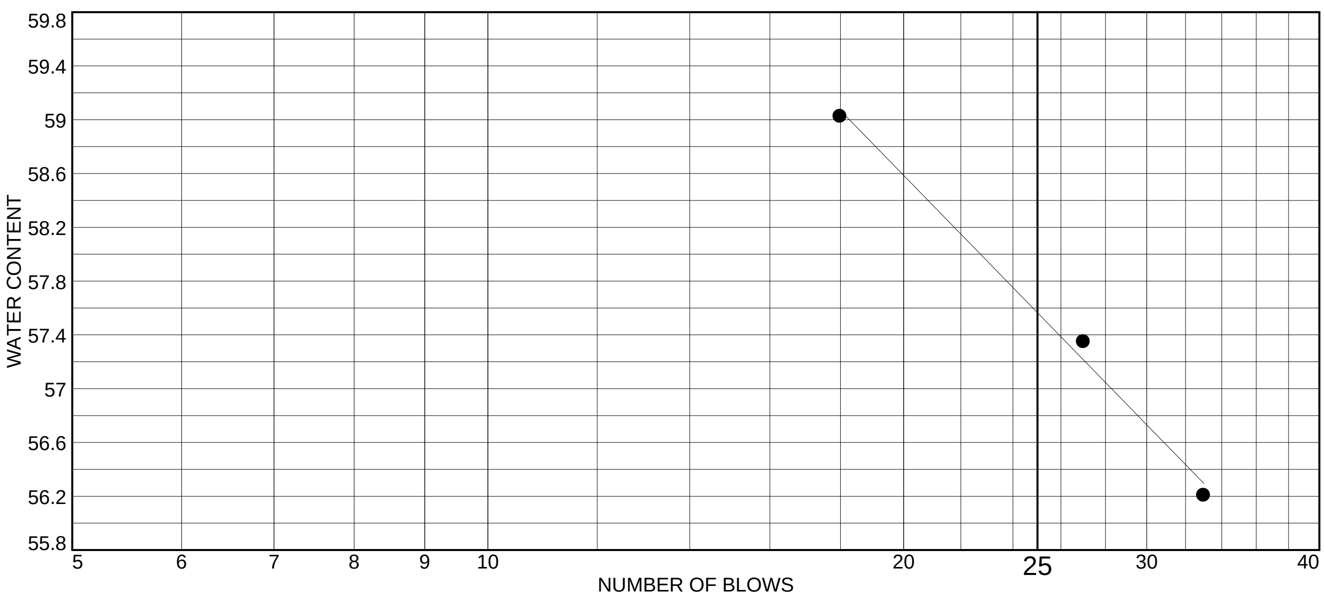
Stockton, California

Figure

Tested By: E. Carrasco **Checked By:** R. Skaggs

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Dark Brown Fat Clay with Sand	58	26	32	93.6	81.2	CH

Project No. 8198 **Client:** Panattoni Development Company, Inc.

Project: Gilroy Site - Proposed New Building/Site Improvements

Source of Sample: B-1 **Depth:** 1.0
Sample Number: 1A (PI-2)

CONDOR EARTH TECHNOLOGIES INC.

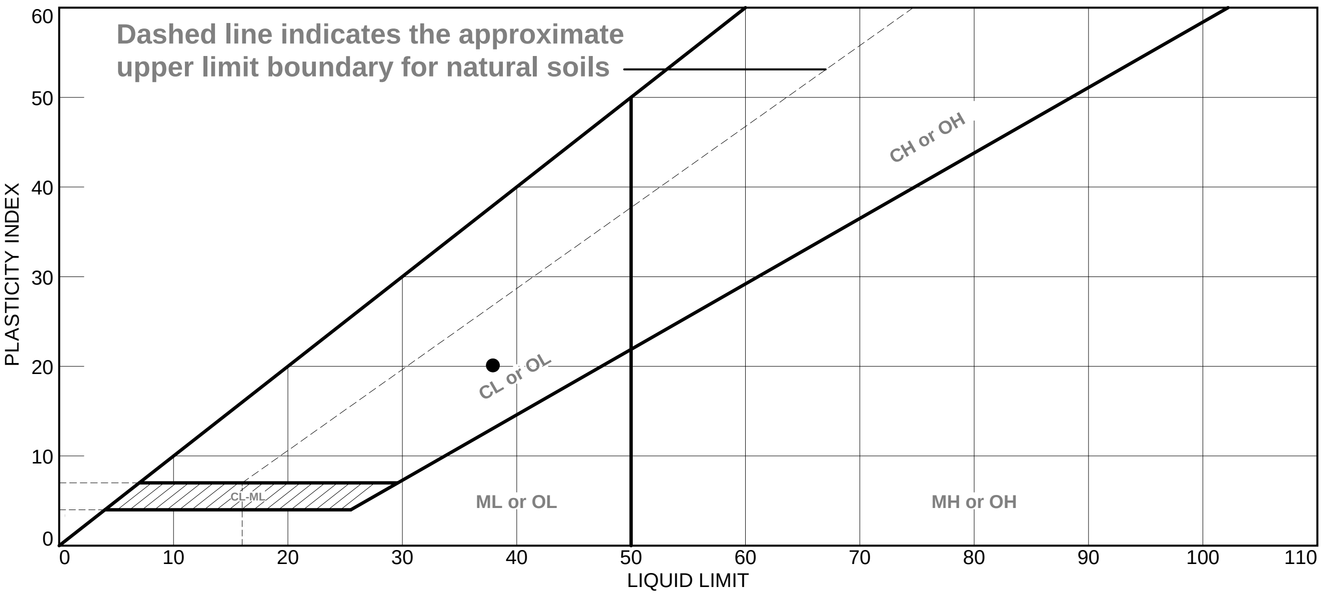
Stockton, California

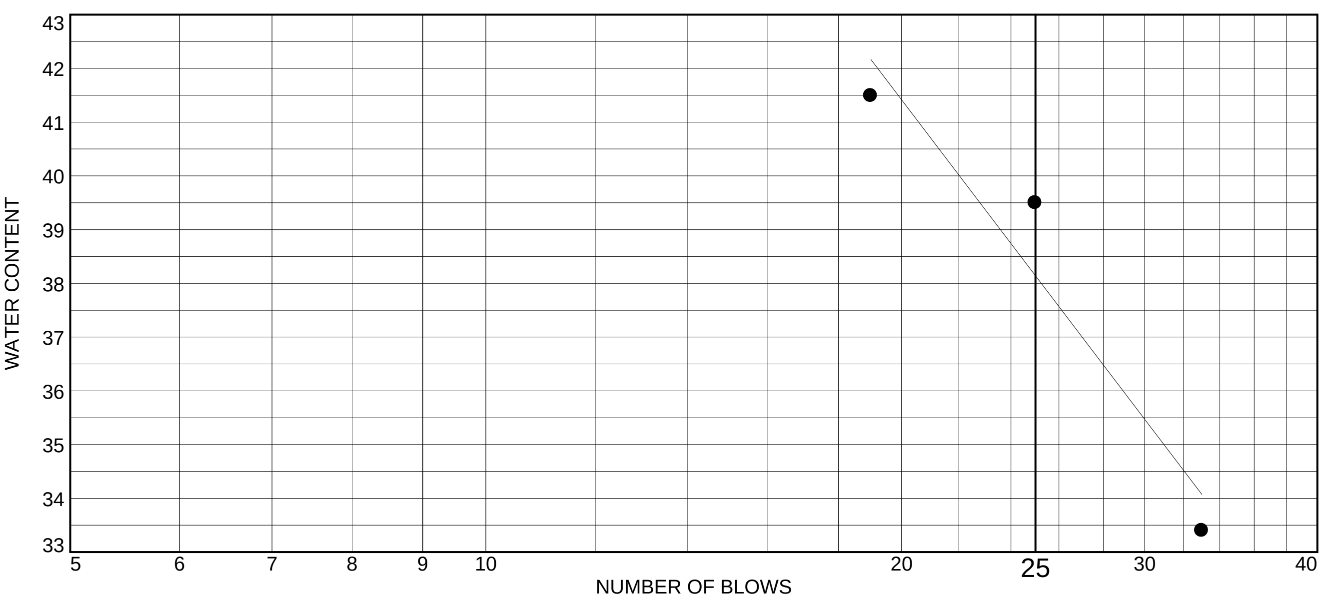
Remarks:

Figure

Tested By: E. Carrasco **Checked By:** R. Skaggs

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Olive Gray with Orange Sandy Lean Clay	38	18	20			

Project No. 8198 **Client:** Panattoni Development Company, Inc.

Project: Gilroy Site - Proposed New Building/Site Improvements

Source of Sample: B-1 **Depth:** 5.0
Sample Number: 4A (PI-3)

CONDOR EARTH TECHNOLOGIES INC.

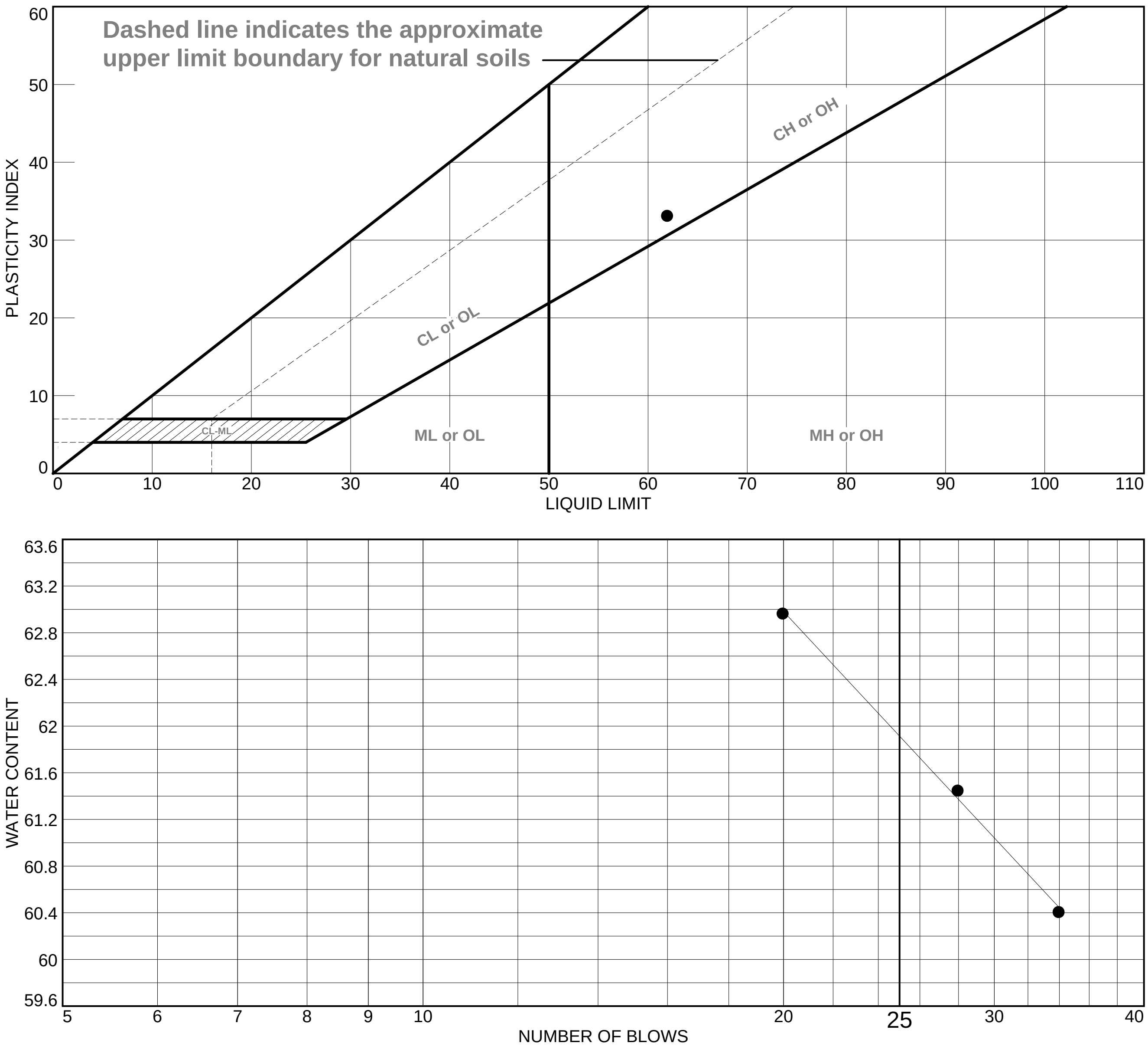
Stockton, California

Remarks:

Figure

Tested By: E. Carrasco **Checked By:** R. Skaggs

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Dark Brown Fat Clay	62	29	33			

Project No. 8198 **Client:** Panattoni Development Company, Inc.

Project: Gilroy Site - Proposed New Building/Site Improvements

Source of Sample: B-2 **Depth:** 2.5
Sample Number: 2A

CONDOR EARTH TECHNOLOGIES INC.

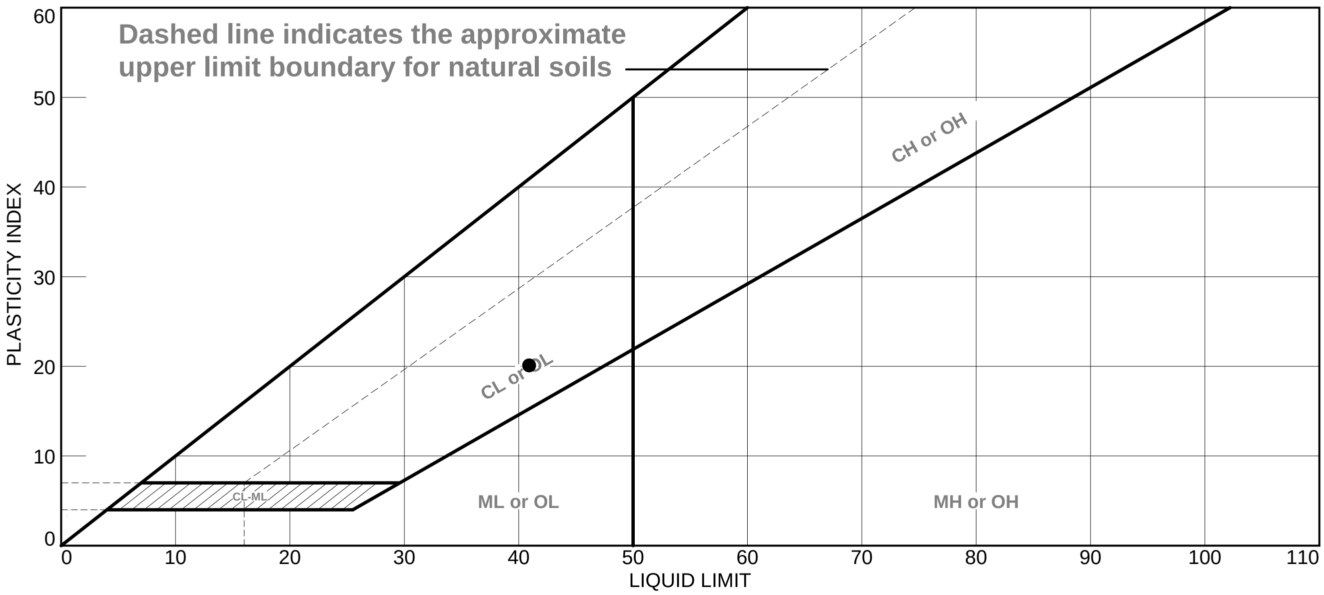
Stockton, California

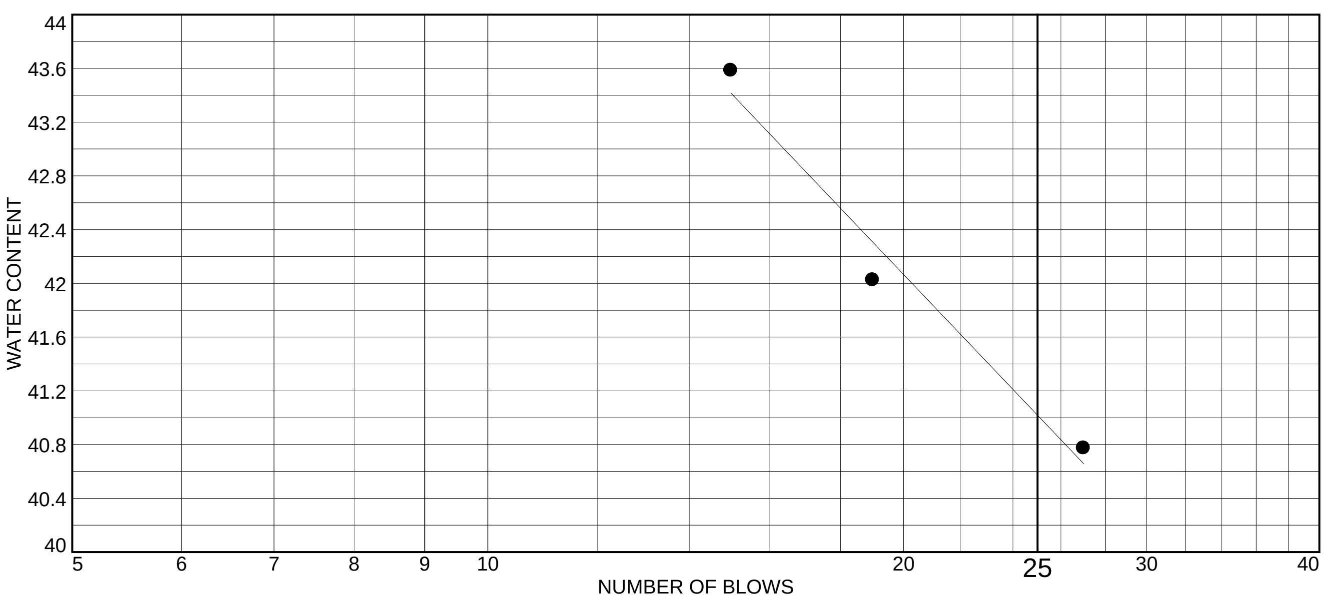
Remarks:

Figure

Tested By: E. Carrsaco **Checked By:** R. Skaggs

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Olive Gray Sandy Lean Clay	41	21	20	90.6	67.9	CL

Project No. 8198 **Client:** Panattoni Development Company, Inc.

Project: Gilroy Site - Proposed New Building/Site Improvements

Source of Sample: B-4 **Depth:** 1.0
Sample Number: 1 (PI-5)

Remarks:

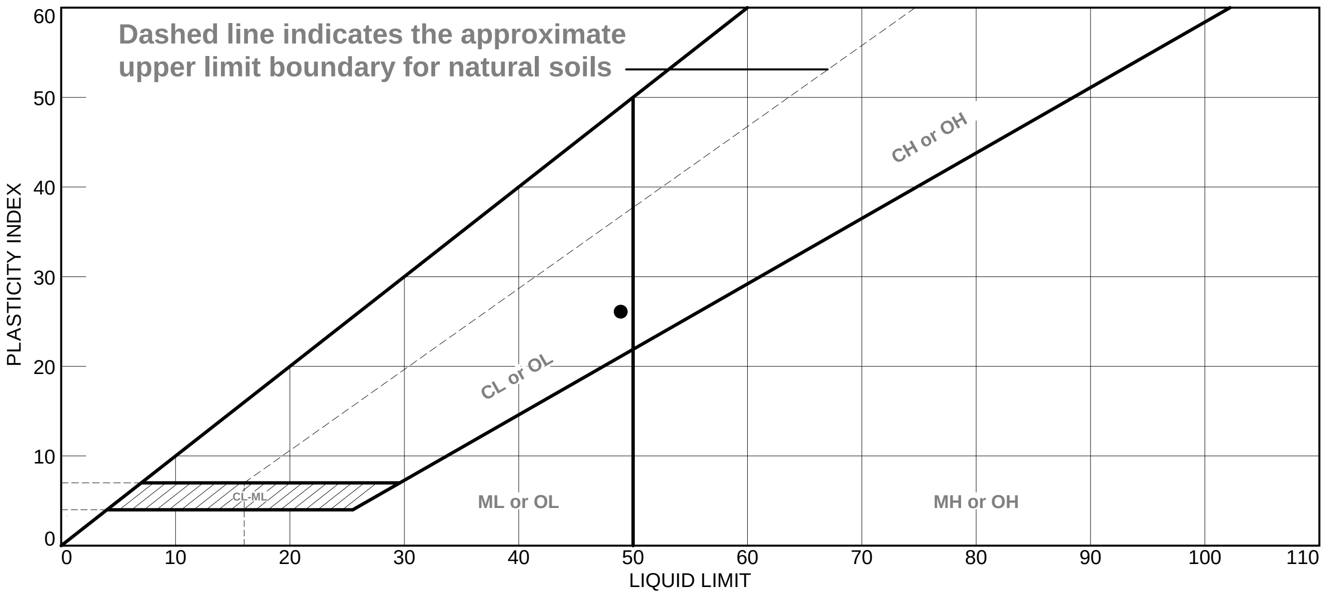
CONDOR EARTH TECHNOLOGIES INC.

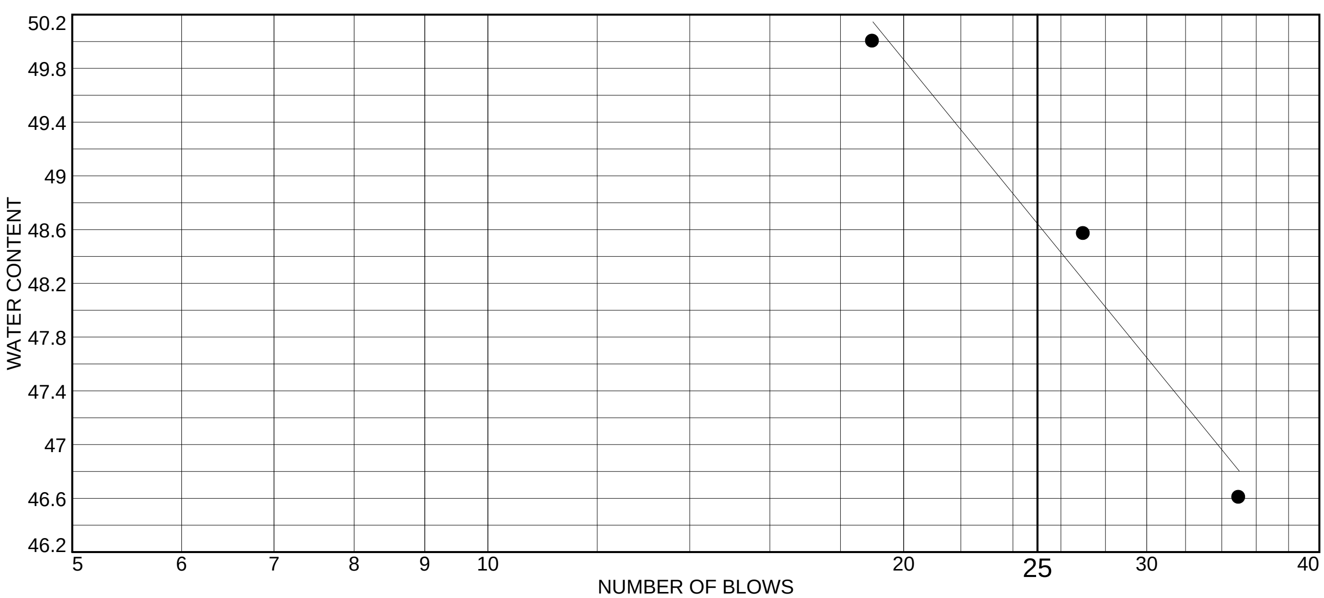
Stockton, California

Figure

Tested By: E. Carrasco **Checked By:** R.Skaggs

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Dark Brown Sandy Lean Clay with Gravel	49	23	26	67.0	51.9	CL

Project No. 8198 **Client:** Panattoni Development Company, Inc.

Project: Gilroy Site - Proposed New Building/Site Improvements

Source of Sample: B-6 **Depth:** 1.0

Sample Number: 1 (PI-6)

CONDOR EARTH TECHNOLOGIES INC.

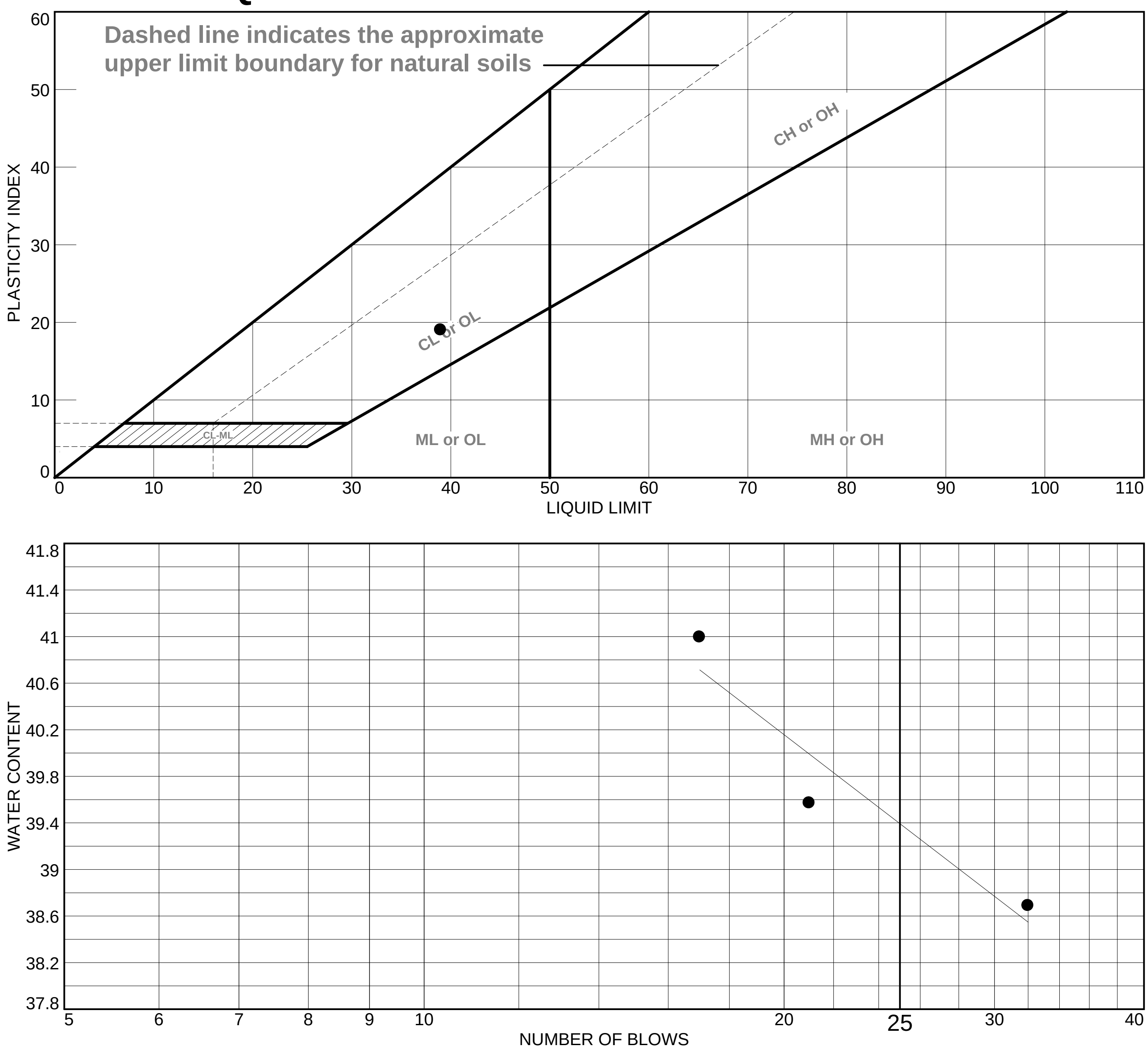
Stockton, California

Remarks:

Figure

Tested By: E. Carrasco **Checked By:** R. Skaggs

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Dark Olive Brown Sandy Lean Clay with Gravel	39	20	19	81.4	54.0	CL

Project No. 8198 **Client:** Panattoni Development Company, Inc.

Project: Gilroy Site - Proposed New Building/Site Improvements

Source of Sample: B-7 **Depth:** 1.0
Sample Number: 1B (PI-7)

CONDOR EARTH TECHNOLOGIES INC.

Stockton, California

Remarks:

Figure

Tested By: E. Carrasco **Checked By:** R. Skaggs

CONDOR EARTH TECHNOLOGIES, INC.
21663 Brian Lane, P.O. Box 3905, Sonora, CA 95370 (209) 532-0361/0773(f)
188 Frank West Circle Suite I, Stockton, CA 95206 (209) 234-0518/0538(f)
17857 High School Road, Jamestown, CA 95327 (209) 984-4593/4596(f)
www.condorearth.com

Resistance "R" Value Test Report (California Test 301)

CET Job: 8198
8198

Client: **Pannatoni Development**
Project: **Gilroy Site**

Sample ID : **#1**
Soil Description: **Dark Gray Clay w/ 4% Lime added**
Date Received: **April 27, 2020**
Tested by: **E. Carrasco**
Sample Source: **Gilroy, Ca**
Depth of Sample: **0'-1'**

Specimen Number	1	2	3	4
Exudation Pressure (psi)	439.7	345.6	120.4	-
Expansion Pressure (psf)	0.0	0.0	0.0	0.0
Resistance Value, "R"	62.0	54.0	46.0	-
Moisture Content at Test (%)	29.0	30.6	32.2	-
Dry Density at Test (pcf)	92.4	91.0	89.5	-
Initial Moisture Content (%)	23.5			

R-Value by Exudation Pressure = 51.0
R-Value by Expansion Pressure = 100.0 Assumed/Given TI = 4.0

R-Value Design = 51.0

CONDOR EARTH TECHNOLOGIES, INC.
21663 Brian Lane, P.O. Box 3905, Sonora, CA 95370 (209) 532-0361/0773(f)
188 Frank West Circle Suite I, Stockton, CA 95206 (209) 234-0518/0538(f)
17857 High School Road, Jamestown, CA 95327 (209) 984-4593/4596(f)
www.condorearth.com

Resistance "R" Value Test Report (California Test 301)

CET Job: 8198

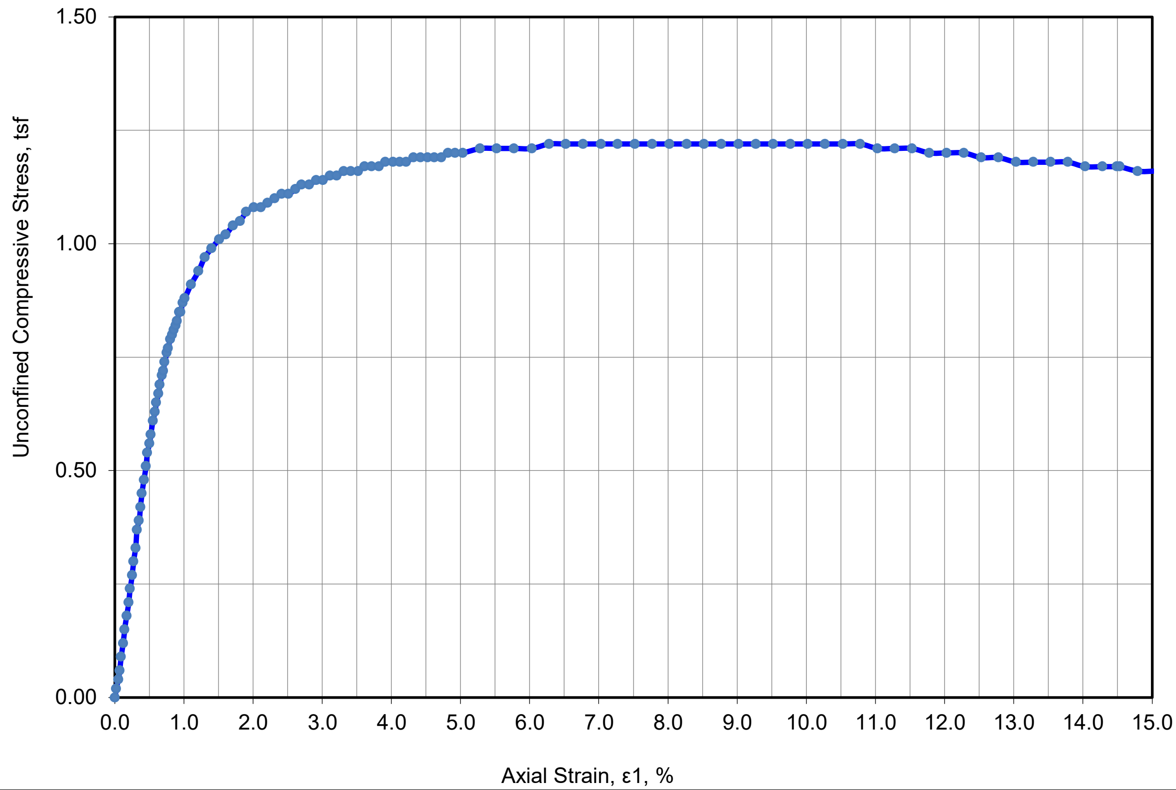
Client: **Pannatoni Development Co., Inc**
Project: **Gilroy Site**

Sample ID : **RV-2**
Soil Description: **Dark Brown Clay with Sand (5% HI-CAL Quicklime added)**
Date Received: **May 15, 2020**
Tested by: **E. Carrasco**
Sample Source: **Combination- TP-4 and TP-7 (surface composite)**
Depth of Sample: **1.0'**

Specimen Number	1	2	3	4
Exudation Pressure (psi)	290.2	206.1	395.3	-
Expansion Pressure (psf)	0.0	0.0	0.0	0.0
Resistance Value, "R"	62.0	54.0	74.0	-
Moisture Content at Test (%)	20.1	21.6	19.2	-
Dry Density at Test (pcf)	106.6	104.1	108.6	-
Initial Moisture Content (%)	13.0			

R-Value by Exudation Pressure = 63.0
R-Value by Expansion Pressure = 100.0 Assumed/Given TI = 4.0

R-Value Design = 63.0



Axial Strain, ε1, %

Specimen Failure Picture

Specimen No.			1
Initial	Diameter, in	D_O	2.40
	Height, in	H_O	5.11
	Height to Diameter Ratio		2.13
	Water Content, %	ω_O	27.9
	Dry Density, lbs/ft^3	γ_{d_o}	93.5
	Saturation, %	S_O	98.1
	Void Ratio	e_O	0.768
Time to Failure, min.		t_f	8.3
Unconfined Compressive Strength, tsf		q_u	1.22
Shear Strength, tsf		s_u	0.61
Strain at Failure, %		ε_f	8.3
Average Rate of Strain to Failure, %/min		ε	1.0

Description of Specimen: Dark Brown Lean Clay

Amount of Material Finer than the No. 200, %: nm

LL: nm | PL: nm | PI: nm | G_S: 2.65 Assumed | Specimen Type: Intact | Test Method: ASTM D2166

Boring:	B-1
Sample:	1B
Depth, ft:	2.0-2.5
Test Date:	5/21/20

Remarks: nm= not measured, na = not applicable

KLEINFELDER
Bright People. Right Solutions.

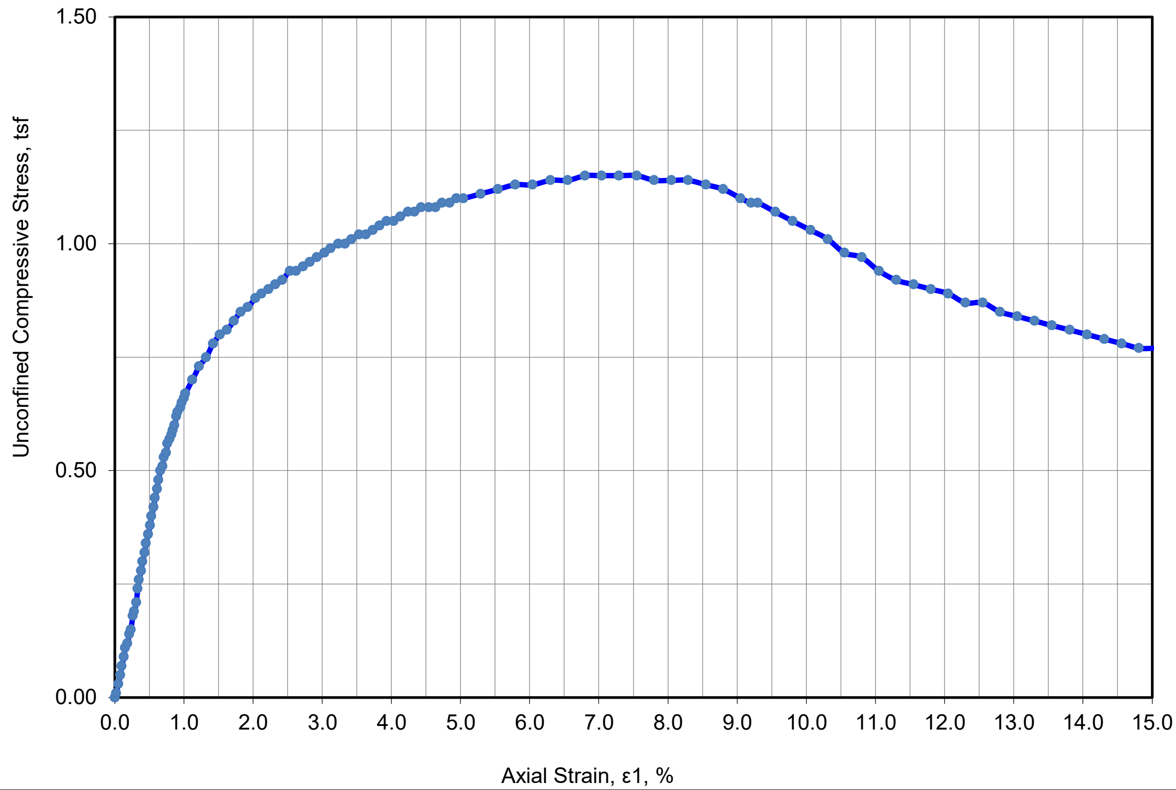
9969 Horn Rd., Sacramento, CA 95827

PROJECT NO.:	20183397
ENTRY BY:	A. Wohletz
CHECKED BY:	S. Rader
DATE:	5/26/2020

UNCONFINED COMPRESSION TEST (UC)

CONDOR ON-CALL TESTING
PANNATONI - GILROY

FIGURE



Specimen Failure Picture

Specimen No.			1
Initial	Diameter, in	D_O	2.41
	Height, in	H_O	5.17
	Height to Diameter Ratio		2.15
	Water Content, %	ω_O	21.0
	Dry Density, lbs/ft^3	γ_{d_o}	106.0
	Saturation, %	S_O	96.3
	Void Ratio	e_O	0.619
Time to Failure, min.		t_f	6.8
Unconfined Compressive Strength, tsf		q_u	1.15
Shear Strength, tsf		s_u	0.57
Strain at Failure, %		ε_f	6.8
Average Rate of Strain to Failure, %/min		ε	1.0

Description of Specimen: Yellowish Brown Lean Clay

Amount of Material Finer than the No. 200, %: nm

LL: nm | PL: nm | PI: nm | G_S: 2.75 Assumed | Specimen Type: Intact | Test Method: ASTM D2166

Boring:	B-1
Sample:	4B
Depth, ft:	6.0-6.5
Test Date:	5/21/20

Remarks: nm= not measured, na = not applicable

KLEINFELDER
Bright People. Right Solutions.

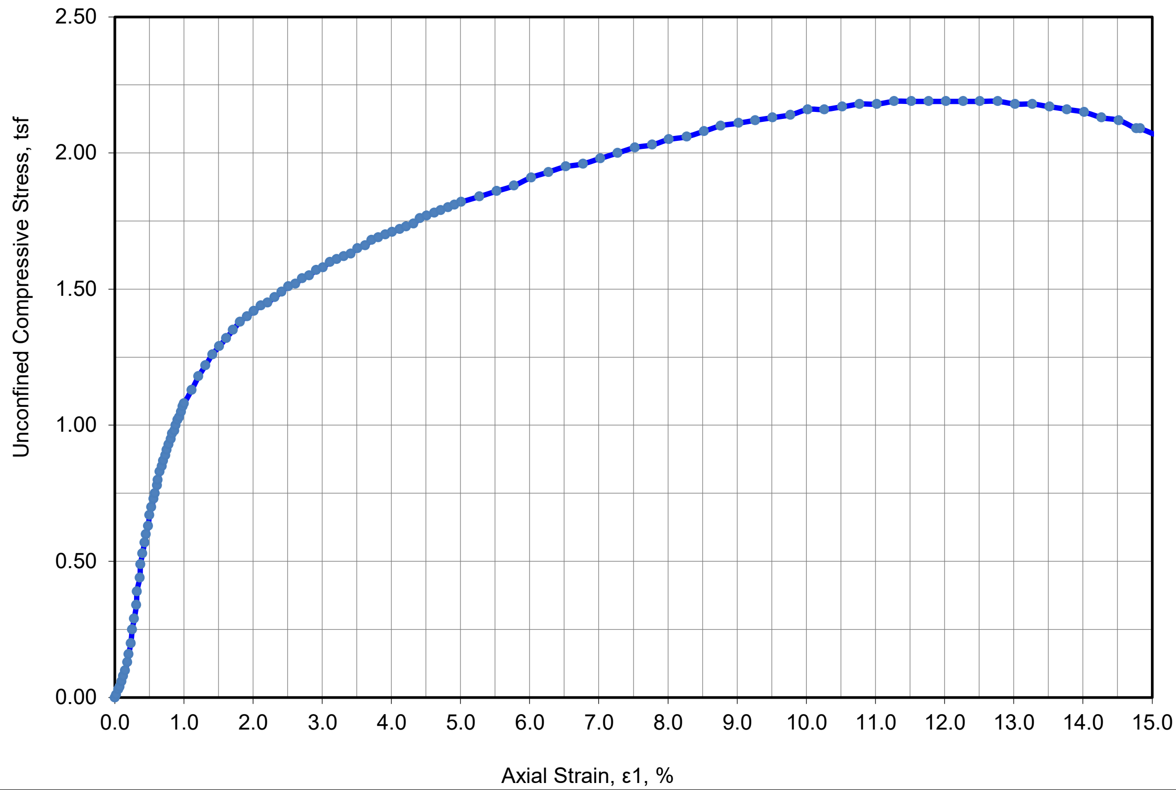
9969 Horn Rd., Sacramento, CA 95827

PROJECT NO.:	20183397
ENTRY BY:	A. Wohletz
CHECKED BY:	S. Rader
DATE:	5/26/2020

UNCONFINED COMPRESSION TEST (UC)

CONDOR ON-CALL TESTING
PANNATONI - GILROY

FIGURE



Specimen Failure Picture	Specimen No.			1
	Initial	Diameter, in	D_O	2.41
		Height, in	H_O	5.15
		Height to Diameter Ratio		2.13
		Water Content, %	ω_O	22.3
		Dry Density, lbs/ft^3	γ_{d_o}	105.0
		Saturation, %	S_O	98.4
		Void Ratio	e_O	0.634
	Time to Failure, min.		t_f	12.0
	Unconfined Compressive Strength, tsf		q_u	2.19
	Shear Strength, tsf		s_u	1.10
	Strain at Failure, %		ε_f	12.0
	Average Rate of Strain to Failure, %/min		ε	1.0

Description of Specimen: Yellowish Brown Lean Clay

Amount of Material Finer than the No. 200, %: nm

LL: nm | PL: nm | PI: nm | G_S: 2.75 Assumed | Specimen Type: Intact | Test Method: ASTM D2166

Boring:	B-1
Sample:	6B
Depth, ft:	10.5-11.0
Test Date:	5/21/2020

Remarks: nm= not measured, na = not applicable

KLEINFELDER
Bright People. Right Solutions.

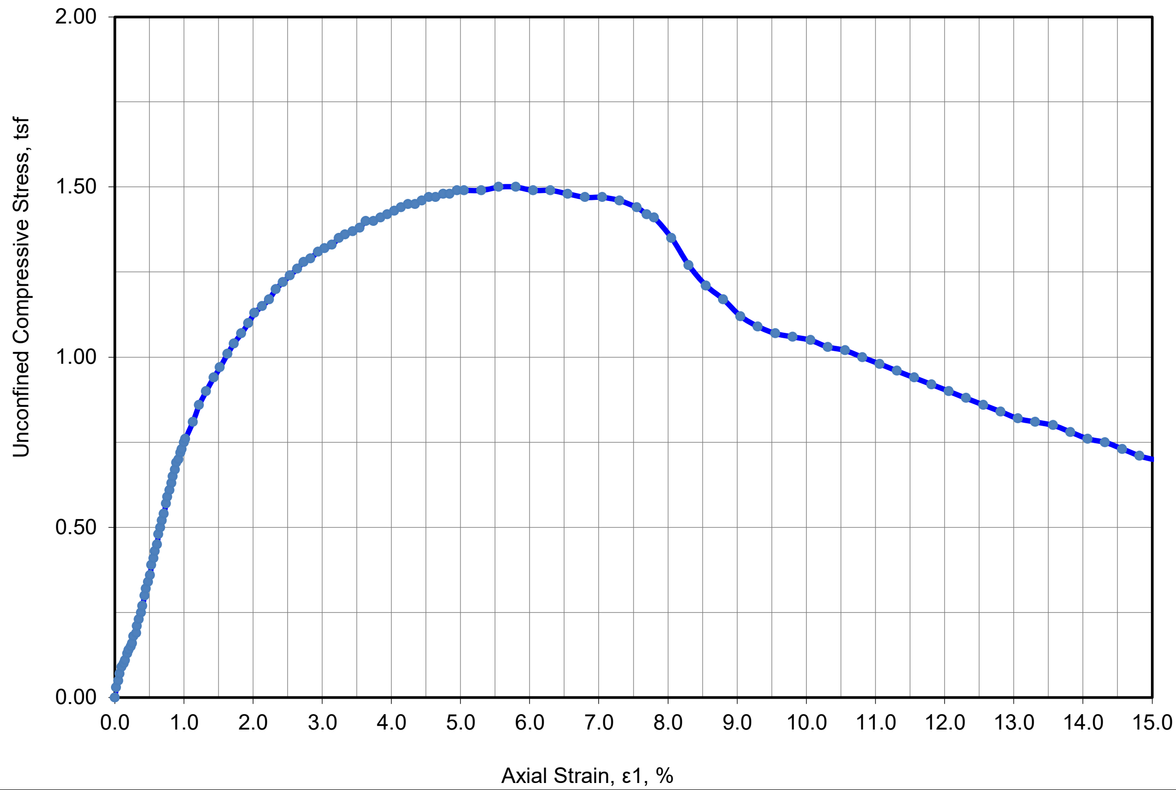
9969 Horn Rd., Sacramento, CA 95827

PROJECT NO.:	20183397
ENTRY BY:	A. Wohletz
CHECKED BY:	S. Rader
DATE:	5/26/2020

UNCONFINED COMPRESSION TEST (UC)

CONDOR ON-CALL TESTING
PANNATONI - GILROY

FIGURE



Specimen Failure Picture				
	Specimen No.			1
	Initial	Diameter, in	D_O	2.38
		Height, in	H_O	5.02
		Height to Diameter Ratio		2.11
		Water Content, %	ω_O	24.2
		Dry Density, lbs/ft^3	γ_{d_o}	94.5
		Saturation, %	S_O	86.8
		Void Ratio	e_O	0.816
	Time to Failure, min.		t_f	5.6
	Unconfined Compressive Strength, tsf		q_u	1.50
	Shear Strength, tsf		s_u	0.75
	Strain at Failure, %		ε_f	5.6
	Average Rate of Strain to Failure, %/min		ε	1.0

Description of Specimen: Dark Brown Lean Clay

Amount of Material Finer than the No. 200, %: nm

LL: nm | PL: nm | PI: nm | G_S: 2.75 Assumed | Specimen Type: Intact | Test Method: ASTM D2166

Boring:	B-2
Sample:	2B
Depth, ft:	3.5-4.0
Test Date:	5/21/2020

Remarks: nm= not measured, na = not applicable

KLEINFELDER
Bright People. Right Solutions.

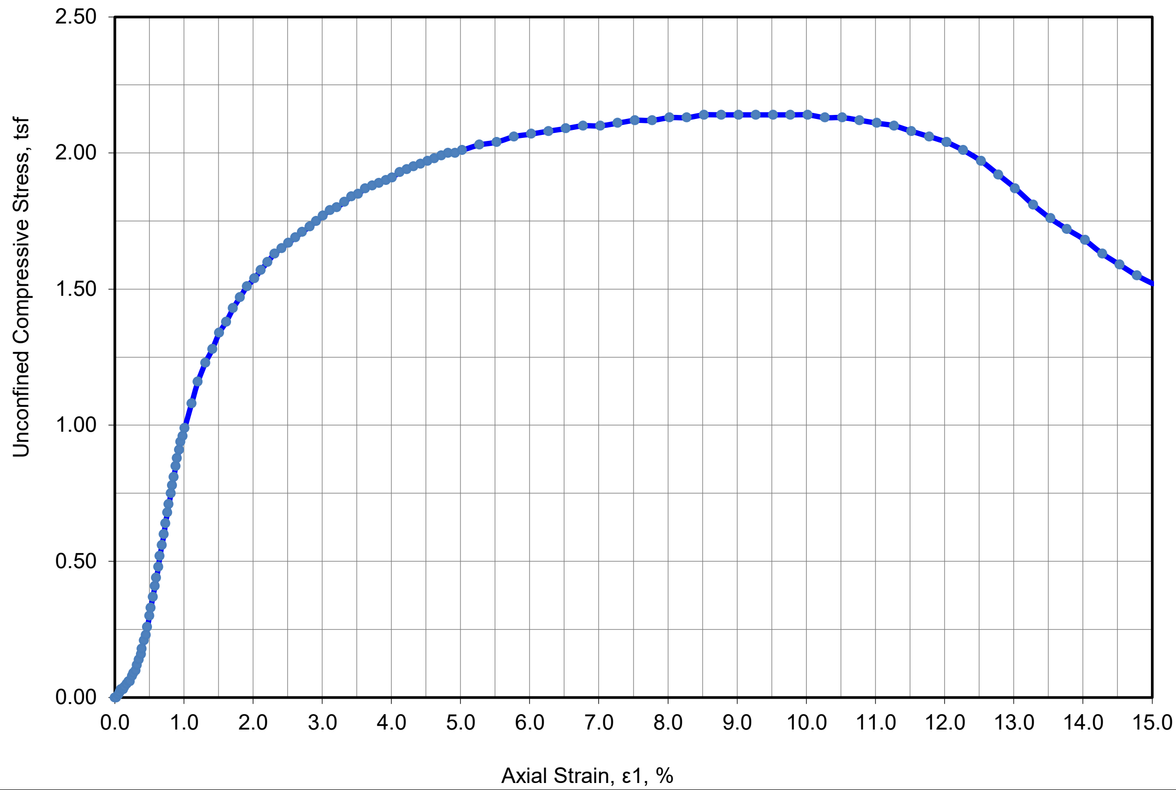
9969 Horn Rd., Sacramento, CA 95827

PROJECT NO.:	20183397
ENTRY BY:	A. Wohletz
CHECKED BY:	S. Rader
DATE:	5/26/2020

UNCONFINED COMPRESSION TEST (UC)

CONDOR ON-CALL TESTING
PANNATONI - GILROY

FIGURE



Specimen Failure Picture	Specimen No.			1
	Initial	Diameter, in	D_O	2.43
		Height, in	H_O	5.15
		Height to Diameter Ratio		2.12
		Water Content, %	ω_O	21.2
		Dry Density, lbs/ft^3	γd_o	108.2
		Saturation, %	S_O	100.0
		Void Ratio	e_O	0.585
	Time to Failure, min.		t_f	9.3
	Unconfined Compressive Strength, tsf		q_u	2.14
	Shear Strength, tsf		s_u	1.07
	Strain at Failure, %		ε_f	9.3
	Average Rate of Strain to Failure, %/min		ε	1.0

Description of Specimen: Brown Lean Clay

Amount of Material Finer than the No. 200, %: nm

LL: nm	PL: nm	PI: nm	G_S: 2.75 Assumed	Specimen Type: Intact	Test Method: ASTM D2166

Boring:	B-2	Remarks: nm= not measured, na = not applicable
Sample:	3B	
Depth, ft:	6.0-6.5	
Test Date:	5/21/2020	

KLEINFELDER
Bright People. Right Solutions.

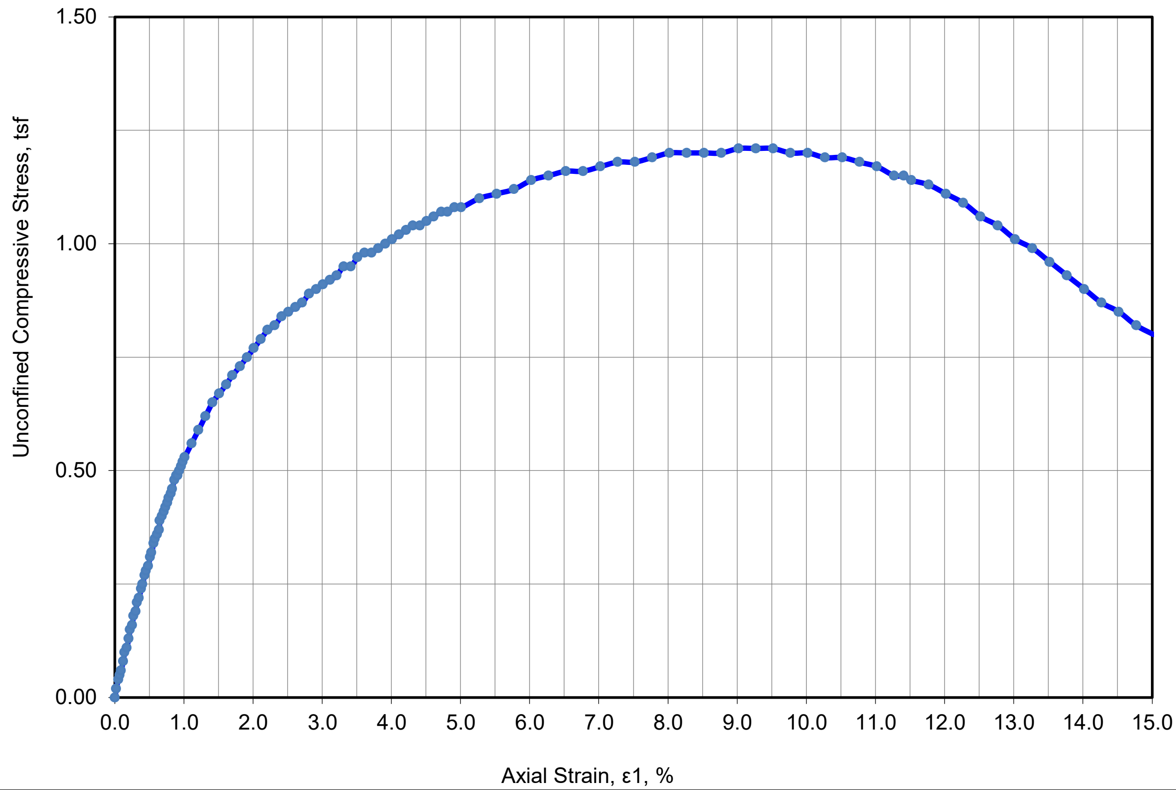
9969 Horn Rd., Sacramento, CA 95827

PROJECT NO.:	20183397
ENTRY BY:	A. Wohletz
CHECKED BY:	S. Rader
DATE:	5/26/2020

UNCONFINED COMPRESSION TEST (UC)

CONDOR ON-CALL TESTING
PANNATONI - GILROY

FIGURE



Specimen Failure Picture

Specimen No.			1
Initial	Diameter, in	D_O	2.42
	Height, in	H_O	5.14
	Height to Diameter Ratio		2.12
	Water Content, %	ω_O	20.3
	Dry Density, lbs/ft^3	γ_{d_o}	109.8
	Saturation, %	S_O	100.5
	Void Ratio	e_O	0.562
Time to Failure, min.		t_f	9.0
Unconfined Compressive Strength, tsf		q_u	1.21
Shear Strength, tsf		s_u	0.60
Strain at Failure, %		ε_f	9.0
Average Rate of Strain to Failure, %/min		ε	1.0

Description of Specimen: Brown Lean Clay with Sand

Amount of Material Finer than the No. 200, %: nm

LL: nm | PL: nm | PI: nm | G_S: 2.75 Assumed | Specimen Type: Intact | Test Method: ASTM D2166

Boring:	B-2
Sample:	4B
Depth, ft:	8.5-9.0
Test Date:	5/21/2020

Remarks: nm= not measured, na = not applicable

KLEINFELDER
Bright People. Right Solutions.

9969 Horn Rd., Sacramento, CA 95827

PROJECT NO.:	20183397
ENTRY BY:	A. Wohletz
CHECKED BY:	S. Rader
DATE:	5/26/2020

UNCONFINED COMPRESSION TEST (UC)

CONDOR ON-CALL TESTING
PANNATONI - GILROY

FIGURE

California State Certified Laboratory No. 2153

CERCO analytical
1100 Willow Pass Court, Suite A
Concord, CA 94520-1006
925 462 2771 Fax. 925 462 2775
www.cercoanalytical.com

28 May, 2020

Job No. 2005025
Cust. No.12257

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JUN 0 1 2020
BY: ....

Mr. Eric Carrasco
Condor Earth Technologies, Inc.
188 Frank West Circle, Suite I
Stockton, CA 95206

Subject: Project No.: 8198
Project Name: Gilroy Site – 1445 Pacheco Pass Hwy, Gilroy
Corrosivity Analysis – ASTM Test Methods

Dear Mr. Carrasco:

Pursuant to your request, CERCO Analytical has analyzed the soil sample submitted on May 05, 2020. Based on the analytical results, this brief corrosivity evaluation is enclosed for your consideration.

Based upon the resistivity measurement, this sample is classified as "corrosive". All buried iron, steel, cast iron, ductile iron, galvanized steel and dielectric coated steel or iron should be properly protected against corrosion depending upon the critical nature of the structure. All buried metallic pressure piping such as ductile iron firewater pipelines should be protected against corrosion.

The chloride ion concentration reflects none detected with a reporting limit of 15 mg/kg.

The sulfate ion concentration reflects none detected with a reporting limit of 15 mg/kg.

The pH of the soil is 7.62 which does not present corrosion problems for buried iron, steel, mortar-coated steel and reinforced concrete structures.

The redox potential is 280-mV and is indicative of potentially "slightly corrosive" soils resulting from anaerobic soil conditions.

This corrosivity evaluation is based on general corrosion engineering standards and is non-specific in nature. For specific long-term corrosion control design recommendations or consultation, please call *JDH Corrosion Consultants, Inc. at (925) 927-6630.*

We appreciate the opportunity of working with you on this project. If you have any questions, or if you require further information, please do not hesitate to contact us.

Very truly yours,
CERCO ANALYTICAL, INC.

J. Darby Howard, Jr., P.E.
President

JDH/jdl
Enclosure

CERCO analytical
1100 Willow Pass Court, Suite A
Concord, CA 94520-1006
925 462 2771 Fax. 925 462 2775
www.cercoanalytical.com

Client: Condor Earth Technologies, Inc.
Client's Project No.: 8198
Client's Project Name: Gilroy Site - 1445 Pacheco Pass Hwy, Gilroy
Date Samples 28-Apr-20
Date Received: 5-May-20
Matrix: Soil
Authorization: Signed Chain of Custody

Date of Report: 28-May-2020

Job/Sample No.	Sample I.D.	Redox (mV)	pH	Conductivity (umhos/cm)*	Resistivity (100% Saturation) (ohms-cm)	Sulfide (mg/kg)*	Chloride (mg/kg)*	Sulfate (mg/kg)*
2005025-001	CT-1 @ 0-1'	280	7.62	-	780	-	N.D.	N.D.

	Redox	pH	Conductivity	Resistivity	Sulfide	Chloride	Sulfate
Method:	ASTM D1498	ASTM D4972	ASTM D1125M	ASTM G57	ASTM D4658M	ASTM D4327	ASTM D4327
Reporting Limit:	-	-	10	-	50	15	15
Date Analyzed:	22-May-2020	22-May-2020	-	27-May-2020	-	22-May-2020	22-May-2020

* Results Reported on "As Received" Basis

N.D. - None Detected

Cheryl McMillen
Laboratory Director

Quality Control Summary - All laboratory quality control parameters were found to be within established limits

Chain of Custody

1100 Willow Pass Court
Concord, CA 94520-1006
462 2771
462 2775
CERCO

Job No. 2005025 | CU# 12251 | Client Project I.D. 8198

Schedule
Analyte

Date Sampled 4/27/20 | Date Due

Full Name: Eric Carrasco
Phone 209 728 x4237
Fax
Company and/or Mailing Address: Condor Earth Technologies
Cell ☒
Sample Source: Gilroy Site - 1445 Pacheco Pass Hwy, Gilroy, Ca

ANALYSIS / ASTM

Lab No.	Sample I.D.	Date	Time	Matrix	Contain.	Size	Preserv.	Qty.	Redox Potential	pH	Sulfate	Chloride	Resistivity-100% Saturated			Brief Evaluation						
1	CT-1 @ 0'-1'	4/28	2:20	S	Bag	Lrg	None	1	X	X	X	X	X			X						

MATRIX	ABBREVIATIONS
DW - Drinking Water	HB - Hosebib
GW - Ground Water	PV - Petcock Valve
SW - Surface Water	PT - Pressure Tank
WW - Waste Water	PH - Pump House
Water	RR - Restroom
SL - Sludge	GL - Glass
S - Soil	PL - Plastic
Product	ST - Sterile

SAMPLE RECEIPT

Total No. of Containers	
Rec'd Good Cond/Cold	
Conforms to Record	
Temp. a t Lab -°C	
Sampler	

		Date	Time
Relinquished By:	[signature]	4/28/20	2:20p
Received By:	[signature]	5/5/20	14:30pm
Relinquished By:			
Received By:			
Relinquished By:			
Received By:			

Comments:

THERE IS AN ADDITIONAL CHARGE FOR EXTRUDING SOIL FROM METAL TUBES

Email Address: ecarrasco@condorearth.com

APPENDIX E
CONSTRUCTION STANDARDS

INTERNATIONAL

Designation: E1643 − 18a

Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs[1]

This standard is issued under the fixed designation E1643; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice covers procedures for selecting, designing, installing, and inspecting flexible, prefabricated sheet membranes in contact with earth or granular fill used as vapor retarders under concrete slabs.

1.2 Conditions subject to frost and either heave or hydrostatic pressure, or both, are beyond the scope of this practice. Vapor retarders are not intended to provide a waterproofing function.

1.3 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

E1745 Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs

E1993/E1993M Specification for Bituminous Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs

F710 Practice for Preparing Concrete Floors to Receive Resilient Flooring

2.2 *Other Standard:*[3]

ACI 302.2R–06 Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials

3. Significance and Use

3.1 Vapor retarders provide a method of limiting water vapor transmission and capillary transport of water upward through concrete slabs on grade, which can adversely affect floor finishes and interior humidity levels.

3.2 Adverse impacts include adhesion loss, warping, peeling, and unacceptable appearance of resilient flooring; deterioration of adhesives, ripping or separation of seams, and air bubbles or efflorescence beneath seamed, continuous flooring; damage to flat electrical cable systems, buckling of carpet and carpet tiles, offensive odors, growth of fungi, and undesired increases to interior humidity levels.

4. Manufacturer's Recommendations

4.1 Where inconsistencies occur between this practice and the manufacturer's instructions, conform to the manufacturer's instructions for installation of vapor retarder.

5. Material, Design, and Construction

5.1 See ACI 302.2R–06 for material, design, and construction recommendations.

5.2 See Specifications E1745 and E1993/E1993M for vapor retarder specifications.

5.3 *Vapor Retarder Material Selection*—The following criteria should be considered when selecting a vapor retarder material.

5.3.1 Local building code and regulatory requirements.

5.3.1.1 Comply with local building code and regulatory requirements as a minimum consideration.

[1] This practice is under the jurisdiction of ASTM Committee E06 on Performance of Buildings and is the direct responsibility of Subcommittee E06.21 on Serviceability.

Current edition approved Feb. 15, 2018. Published February 2018. Originally approved in 1994. Last previous edition approved in 2018 as E1643-18. DOI: 10.1520/E1643-18A.

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] Available from American Concrete Institute (ACI), 38800 Country Club Dr., Farmington Hills, MI 48331-3439, http://www.concrete.org.

5.3.2 The water-vapor permeance of the vapor retarder material.

5.3.2.1 The water vapor permeance of the vapor retarder material shall be at such a rate so that adverse impacts to floor finishes and coatings do not occur

5.3.2.2 Refer to X1.6 for discussion on water vapor transmission rate of vapor retarder.

5.3.2.3 The perm rating determined under these criteria shall supersede that in references 5.2 should this value be less than required under references in 5.2.

5.3.3 The types and amounts of deleterious compounds in the soil on the building site.

5.3.3.1 Review building site soil analyses for deleterious materials and compounds and select a vapor retarder material that will withstand exposure to such deleterious materials or compounds.

5.3.4 The tensile strength and puncture resistance of the vapor retarder material.

5.3.4.1 Select a vapor retarder material capable of withstanding potential construction site damage.

5.3.5 The type of base material on which the vapor retarder is to be installed.

5.3.5.1 Select vapor retarder material capable of withstanding tear or puncture damage due to the type, gradation, and texture of the base material to be installed below the material. Prepare base material to minimize risk of puncture, for example, by rolling or compacting.

5.3.6 The expected exposure of the vapor retarder to ultraviolet rays.

5.3.6.1 Assess expected exposure of the vapor retarder material to ultra violet rays and select a material capable of withstanding such exposure and maintain its capability to perform its intended function.

6. Placement

6.1 Level and compact base material.

6.2 Install vapor retarder material with the longest dimension parallel with the direction of concrete pour.

6.3 Face laps away from the expected direction of the concrete pour whenever possible.

6.4 Extend vapor retarder over footings and seal to foundation wall, grade beam, or slab at an elevation consistent with the top of the slab or terminate at impediments such as water stops or dowels. Seal around penetrations such as utilities and columns in order to create a monolithic membrane between the surface of the slab and moisture sources below the slab as well as at the slab perimeter.

6.5 Lap joints minimum 6 in. (150 mm), or as instructed by the manufacturer, and seal laps in accordance with the manufacturer's recommendations.

6.6 Extend vapor retarder over the tops of pile caps and grade beams to a distance acceptable to the structural engineer and terminate as recommended by the manufacturer.

7. Protection

7.1 Take precautions to protect vapor retarder from damage during installation of reinforcing steel, utilities and concrete.

7.2 Use reinforcing bar supports with base sections that minimize the potential for puncture of the vapor retarder.

7.3 Avoid use of stakes driven through the vapor retarder.

7.4 Refer to ACI 302.2R–06 for discussion of aggregate for protection of vapor retarder, including the risks of installing aggregate fill above a vapor retarder that can act as a reservoir for water.

8. Inspection and Repair

8.1 Inspect and mark all areas of damage and insufficient installation of the vapor retarder sufficiently in advance of concrete placement such that deficiencies may be corrected before concrete is placed.

8.2 Repair damaged areas prior to concrete placement with vapor retarder material lapped and sealed minimum of 6 in. (150 mm) beyond damaged area or as instructed by manufacturer.

9. Keywords

9.1 concrete slabs; vapor; vapor retarder

APPENDIX

(Nonmandatory Information)

X1. PRE-DESIGN CONSIDERATIONS

X1.1 *Planning and Organization of Construction*—To avoid ambiguities, redundancies, conflicts, and omissions, plan the organization and coordination of drawings and specifications so that graphic, dimensional, and descriptive information on subgrade, granular base, vapor retarder, and protection course, if any, appears in only one place. Since the relationship of the subgrade (pad) elevation (usually shown on grading plans) to the rest of the building finish floor elevations and finished site grades is a function of the depth of the granular base and protection course, these dimensions should be shown in only one place. For graphic depictions and dimensions of the granular base and the protection course, the architectural drawings are preferred, but structural drawings are sometimes used. Specifications for sub-base conditions should be in the grading section. Specifications for base, vapor retarder, and protection course should be in the section on concrete, but there are advocates of a separate section in Division 7 for the vapor retarder system. Examination and testing of surface conditions should be in appropriate finish sections.

X1.2 *Scheduling*—Determine if slab drying will be on the critical path for schedule occupancy. If so, plan measures to reduce drying times, mitigate moisture, or select floor finish materials not subject to damage by moisture.

X1.3 *Geotechnical*—Ensure that the geotechnical survey includes comprehensive and reliable information on subsurface water table levels and the hydrology of geological strata as well as historical data on surface flooding and hydrology. The survey should also include a list of compounds and concentration levels that are deleterious to plastic materials. The geotechnical study should consider not only the past but also the projected change from ongoing or anticipated development patterns. Soils with comparably higher clay contents are particularly troublesome because the relatively high capillary action within the clay allows moisture to rise under the slab.

X1.4 *Civil*—Ensure that site topographic surveys and grading plans accurately and comprehensively establish surface drainage characteristics for the site and surrounding areas.

X1.5 *Landscape and Irrigation*—Most traditional geotechnical studies do not take into account the post-construction change in ground moisture conditions due to introduced planting and irrigation which is a major problem. For example, in California coastal areas, the average annual rainfall is about 18 in. (457 mm). Turf irrigation amounting to 1.3 in. (33 mm) of water per week over the normal seven-month dry season will increase this to nearly 60 in. (1524 mm) with almost no runoff. It is not enough to assume that irrigation will simply duplicate natural conditions encountered during the wet season. The landscape architect, geotechnical engineer, and civil engineer should closely coordinate design recommendations to avoid moisture problems introduced or exacerbated by landscape planting and irrigation. Once a project is completed, effective irrigation management is instrumental not only in water conservation but also in avoiding potential building-related moisture problems.

X1.6 *Water Vapor Permeance of Vapor Retarder*—In order to prevent moisture damage to the slab on grade, floor covering systems and floor coating systems the water vapor permeance of the vapor retarder material shall be such that accumulation of moisture in the slab through the vapor retarder material does not occur. The vapor pressures of the below grade environment and the interior environment shall be calculated and analyzed. For humidity sensitive interior environments, calculate the effect of vapor diffusion through the vapor retarder, slab on grade and, if applicable, the floor covering or coating on the interior humidity levels. Select a vapor retarder material with a water vapor permeance rating that will maintain interior humidity levels within specified tolerances. The water vapor permeance of flooring material or coating shall be obtained, if available. Calculate the amount of moisture entering the slab through the vapor retarder material. Calculate the amount of moisture that can diffuse through the flooring material. Insure that the water vapor permeance of the vapor retarder material does not allow accumulation of moisture within the slab due to water vapor permeance of the flooring material. Analyze soil temperatures with regard to heat flux through the slab on grade as well as interior temperature and RH levels. Determine if conditions exist for a dew point within the slab. If such conditions can potentially exist, analyze the amount of moisture accumulation within the slab versus the drying potential of the slab through its top surface, and if applicable, through the floor covering system to determine if prolonged and detrimental wetting of the slab will occur. If so, incorporate measures to eliminate conditions for a dew point to occur. One such measure is installing an insulation layer directly below the slab and vapor retarder.

X1.7 *Moisture Entrapment Due to Rainfall or Ground Water Intrusion*—Moisture entrapment can occur beneath slabs when the vapor retarder is placed below a fill course or vapor retarder protection layer, and the fill material takes on water from rainfall, saw-cutting, curing, cleaning or other sources. If a fill course or vapor retarder protection layer is used, the extent of moisture entrapment can be reduced by scheduling concrete placements before rainfall and by sealing any entry points for water in the completed slab. If a fill course or vapor retarder protection layer is used, the vapor retarder must be turned up at the perimeter of the slab to protect the fill course from lateral entrance of moisture.

X1.8 Ensure there is no water accumulation on top of the vapor retarder prior to placing of concrete.

X1.9 *Moisture Conditions of Slab*—Following placement of the concrete and acclimatization of the building, comply with Practice F710 and floor covering manufacturer's recommendations for any specified tests for moisture emissions from or moisture content of the slab on grade. Review written report(s) on test results prior to the installation of the floor covering or coating installation. Obtain written approval of acceptable slab conditions from the floor covering manufacturer and project design professional. See also ACI 302.2R–06.

Designation: E1745 − 17

Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs[1]

This standard is issued under the fixed designation E1745; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification covers flexible, preformed sheet membrane materials to be used as vapor retarders in contact with soil or granular fill under concrete slabs.

1.1.1 This specification does not cover bituminous vapor retarders. See Specification E1993/E1993M for information on bituminous vapor retarders.

1.2 The specified tests are conducted on new materials and materials that have been conditioned or exposed to simulate potential service conditions.

1.3 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

C168 Terminology Relating to Thermal Insulation

D828 Test Method for Tensile Properties of Paper and Paperboard Using Constant-Rate-of-Elongation Apparatus

D882 Test Method for Tensile Properties of Thin Plastic Sheeting

D1709 Test Methods for Impact Resistance of Plastic Film by the Free-Falling Dart Method

E96/E96M Test Methods for Water Vapor Transmission of Materials

E154/E154M Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover

E631 Terminology of Building Constructions

E1643 Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs

E1993/E1993M Specification for Bituminous Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs

F1249 Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor

3. Terminology

3.1 *Definitions*—For definitions of terms used in this specification, see Terminologies C168 and E631.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *perm, n*—the time rate of water vapor migration through a material or a construction of one grain per hour, square foot, inch of mercury pressure difference.

3.2.1.1 *Discussion*—If a specification states that a one perm limit is required, the same flow rate will be obtained from the following relationships:

$$\begin{aligned} 1 \text{ perm} &= 1 \text{ grain/h} \cdot \text{ft}^2 \text{ in.} \cdot \text{Hg (inch·pound)} \\ &= 57.2\ 10^{-12}\ \text{kg/(Pa} \cdot \text{s} \cdot \text{m}^2\text{) (SI fundamental units)} \\ &= 57.2\ \text{ng/(Pa} \cdot \text{s} \cdot \text{m}^2\text{) (SI frequently used)} \\ &= 0.66\ \text{g/24 h} \cdot \text{m}^2 \cdot \text{mm Hg (SI has been used but is now obsolete)} \end{aligned}$$

3.2.2 *vapor retarder, n*—(formerly vapor barrier) a material or construction that impedes the transmission of water vapor under specified conditions.

3.2.3 *water vapor permeability, n*—a property of material which is water vapor permeance through unit thickness. Since materials that provide resistance to vapor flow are never used in unit thickness, the preferred evaluation of both materials and constructions is the permeance.

3.2.4 *water-vapor permeance, n*—the time rate of water vapor flow through unit area of the known thickness of a flat material or a construction normal to two specific parallel surfaces induced by unit vapor pressure difference between the two surfaces under specific temperature and humidity conditions. See *perm*.

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[1] This specification is under the jurisdiction of ASTM Committee E06 on Performance of Buildings and is the direct responsibility of Subcommittee E06.21 on Serviceability.

Current edition approved May 1, 2017. Published May 2017. Originally approved in 1996. Last previous edition approved in 2011 as E1745-11. DOI: 10.1520/E1745-17.

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

4. Classification

4.1 Materials shall be specified to conform to one of these three classes: A, B, or C, or specific requirements shall be specified in one or more of the properties listed in Table 1.

5. Specifying Information

5.1 Specifications for materials shall include the following:

5.1.1 This specification number.

5.1.2 Class A, B, or C, or alternatively, specific performance requirements for each of the properties listed in Table 1.

5.1.3 Performance requirements, if any, for special conditions (see 7.4).

5.1.4 Execution or installation requirements with reference to Practice E1643.

6. Lap Sealing

6.1 The producer shall provide instructions for lap sealing, including minimum width of lap, method of sealing, and either supply or specify suitable products for lap sealing.

7. Properties

7.1 *Permeance*—Material shall conform to the requirements listed in Table 1 under the following conditions: when tested in accordance with Test Methods E154/E154M, Section 7 (based on Test Methods E96/E96M), or Test Method F1249, test temperature shall be 73.4 °F (23 °C) and test humidity shall be 50 ± 2 %.

7.1.1 *Permeance of New Material*—No conditioning.

7.1.2 *Permeance after Wetting, Drying, and Soaking*—Refer to Test Methods E154/E154M, Section 8.

7.1.3 *Permeance after Heat Conditioning*—Refer to Test Methods E154/E154M, Section 11.

7.1.4 *Permeance after Low Temperature Conditioning*—Refer to Test Methods E154/E154M, Section 12.

7.1.5 *Permeance after Soil Organism Exposure*—Refer to Test Methods E154/E154M, Section 13.

7.2 *Tensile Strength of New Material*—Refer to Test Methods E154/E154M, Section 9. (The apparatus shall be that described in either Test Methods D828 or D882.)

7.3 *Resistance to Puncture of New Material*—Refer to Test Methods D1709, Test Method B.

7.4 *Special Conditions*—When specifically required by the buyer, due to special conditions which dictate properties of fire resistivity, prolonged exposure to sunlight, or resistance to deterioration from hydrocarbons, the material shall conform to the following:

7.4.1 *Flame Spread*[3]—Refer to Test Methods E154/E154M, Section 16, as follows:

Class A	0–25
Class B	26–75
Class C	76–200

7.4.2 *Permeance after Soil Poison Petroleum Vehicle Exposure*—Refer to Test Methods E154/E154M, Section 14 (based on Test Methods E96/E96M), or Test Method F1249. Conform to permeance requirements in Table 1.

7.4.3 *Permeance after Exposure to Ultraviolet Light*—Refer to Test Methods E154/E154M, Section 15. Conform to permeance requirements in Table 1.

8. Sampling

8.1 For each complete set of tests, obtain all samples from a single production roll of material. Samples shall be representative of the material being sold to the end user.

9. Certification

9.1 When specified in the purchase order or contract, the purchaser shall be furnished with certification that samples representing each lot have been either tested or inspected as directed in this specification and that requirements have been met.

9.2 Upon the request of the purchaser in the contract or order, the certification of an independent third party (testing laboratory) indicating conformance to the requirements of this specification may be considered.

[3] The classes and values shown are distinct from the performance classes listed in Table 1.

TABLE 1 Properties for Specified Performance Classes[A]

	Class A		Class B		Class C	
	IP Units	SI Units	IP Units	SI Units	IP Units	SI Units
Water vapor permeance (Test Methods E154/E154M, Section 7, or Test Method F1249), max	0.1 perms (0.1 gr/[h·ft^2·in.·Hg])	(6 ng/[s·m^2·Pa])	0.1 perms (0.1 gr/[h·ft^2·in·Hg])	(6 ng/[s·m^2·Pa])	0.1 perms (0.1 gr/[h·ft^2·in.·Hg])	(6 ng/[s·m^2·Pa])
Tensile strength (Test Methods E154/E154M, Section 9),[B] min	45.0 lbf/in.	7.9 kN/m	30.0 lbf/in.	5.3 kN/m	13.6 lbf/in.	2.4 kN/m
Puncture resistance (Test Methods D1709, Test Method B), min	no inch-pound equivalent used	2200 g	no inch-pound equivalent used	1700 g	no inch-pound equivalent used	475 g

[A] Refer to Practice E1643 for assessing suitability of use based on reported perm rating of material.
[B] Tensile strength per unit width for the total sample thickness is used instead of tensile strength per unit area because vapor retarder materials are never used in unit thickness.

9.3 When specified in the purchase order or contract, the producer or supplier shall furnish a summary of the test procedures listed in Table 1, providing for each test the laboratory that performed or witnessed the test, the date of the most recent test, and the test results.

9.4 When specified in the purchase order or contract, the producer or supplier shall furnish copies of the laboratory reports for each of the tests listed in Table 1.

10. Keywords

10.1 concrete; concrete slab; floor; plastic; vapor retarder

APPENDIX F
CALTRANS LIME TREATMENT STANDARD

24 STABILIZED SOILS

24-1 GENERAL

24-1.01 GENERAL

24-1.01A Summary

Section 24-1 includes general specifications for stabilizing soils.

24-1.01B Definitions

stabilizing agent: Material added to improve strength and durability of the basement material.

24-1.01C Submittals

24-1.01C(1) General

At least 15 days before starting soil stabilization activities submit the name of the laboratory you will use for QC tests. The laboratory must be qualified under the Department's Independent Assurance Program.

Before performing QC sampling and testing, submit the time and location the sampling and testing will occur. Submit QC testing results within 24 hours of receiving the results.

Submit a certificate of compliance with the stabilizing agent samples that includes a statement certifying the stabilizing agent furnished is the same as on the Authorized Material Source List for the stabilizing agent specified.

Submit a weighmaster certificate for stabilizing agent remaining on hand after completion of the work.

Submit a stabilized soil quality control plan.

24-1.01C(2) Samples

From 30 to 180 days before use, submit one 10 lb sample of each stabilizing agent proposed and from each source.

Submit stabilizing agents in airtight containers. Mark the sample date on the container. Include the SDS.

24-1.01D Quality Assurance

24-1.01D(1) General

If requested, perform QC testing in the presence of the Engineer.

If required, construct test strips with materials, tools, equipment, and methods you will use in the work.

Construct test pads for compaction tests by scraping away material to the depth ordered. If a compaction test fails, corrective action must include the layers of material already placed above the test pad elevation.

24-1.01D(2) Quality Control

24-1.01D(2)(a) General

Reserved

24-1.01D(2)(b) Quality Control Plan

Reserved

24-1.01D(2)(c) Qualifications

Reserved

24-1.01D(2)(d) Preparing Basement Material

After preparing an area for soil stabilization, verify the surface grades.

24-1.01D(2)(e) Mixing

Except for clods larger than 1 inch, randomly test the adequacy of the mixing with a phenolphthalein pH indicator solution.

24-1.01D(3) Department Acceptance

Stabilized soil acceptance is based on:

1. Visual inspection
2. Compliance with the requirements shown in the following table:

Stabilized Soil Requirements for Acceptance

Quality characteristic	Test method	Requirement
Relative compaction, (min, %)	California Test 231 and 216	See section for the specified stabilization agent[a]
Stabilization agent application rate	Calibrated tray or equal	Final application rate ordered by the Engineer ± 5%

[a]For lime stabilized soil, see section 24-2.03E. For cement stabilized soil, see section 24-3.03D.

24-1.02 MATERIALS

24-1.02A General

Reserved

24-1.02B Water

Notify the Engineer if a water source other than potable water is used and perform testing for chlorides and sulfates. If potable water is not used, water for stabilized soil must be clean and contain no more than 650 parts per million of chlorides as Cl determined under California Test 422 and no more than 1,300 parts per million of sulfates as SO_4 determined under California Test 417.

24-1.02C Curing Seal

Curing seal must be asphaltic emulsion, Grade SS1, SS1h, CSS1, or CSS1h.

24-1.02D Stabilizing Agent

Lime sources must be on the Authorized Material List for approved producers of lime for use in soil stabilization.

24-1.03 CONSTRUCTION

24-1.03A General

Do not mix different types of stabilizing agent or from more than one source.

Deliver stabilizing agent in full loads unless it is the last load needed for a work shift.

24-1.03B Preparing Basement Material

For native soil and embankment other than imported borrow, remove rocks or solids larger than 1/3 of the layer thickness. Regardless of the layer thickness, remove rocks and solids greater than 4 inches. Removing soil clods is not required. Notify the Engineer if you encounter rocks or solids greater than 1/3 of the layer thickness. Removing rocks and solids is change order work.

Grade the basement material to be stabilized to within 0.08 foot of the lines and grades shown.

24-1.03C Applying Stabilizing Agent

The Engineer orders the application rate as pounds of stabilizing agent per square yard of basement material to be stabilized.

Do not vary from the Engineer's ordered application rate by more than 5 percent.

24-1.03D Mixing

Stabilizing agent and basement material must be uniformly mixed at least twice to within 0.05 foot of the depth shown at any point. If you exceed the mixing depth shown by more than 10 percent, add stabilizing agent in proportion to the exceeded depth.

Remix until the mixture is uniform with no streaks or pockets of stabilizing agent.

24-1.03E Compaction

Compact using a sheepsfoot or segmented wheel roller immediately followed by steel drum or pneumatic-tired rollers.

Wherever the thickness shown is 0.50 foot or less, compact in 1 layer. Wherever the thickness shown is more than 0.50 foot, compact in 2 or more layers of approximately equal thickness. The maximum compacted thickness of any 1 layer must not exceed 0.50 foot unless you first construct a test strip to demonstrate your equipment and methods provide uniform distribution of stabilizing agent and achieve the specified compaction. The test strip must contain at least 500 cu yd of material and no more material than 1 day's production. Construct test strips with materials, tools, equipment, and methods you will use in the work.

Use other compaction methods in areas inaccessible to rollers.

24-1.03F Finish Grading

Wherever the finished surface of stabilized soil is above the allowable tolerance, trim and remove the excess material. Do not leave loose material on the finished surface. If finish rolling cannot be completed within 2 hours of trimming, defer trimming.

Finish rolling of trimmed surfaces must be performed with at least 1 complete coverage with steel drum or pneumatic-tired rollers.

Do not proceed with construction activities for subsequent layers of material until the Engineer verifies the final grades of the stabilized soil.

24-1.03G Curing

24-1.03G(1) General

Cure by one of the following methods:

1. Water cure
2. Curing seal
3. Moist material blanket

24-1.03G(2) Water Cure

Water may be used to cure the finished surface before you place a moist material blanket or apply curing seal. Keep the surface above the optimum moisture content of the stabilized soil. Use this method for no more than 3 days, after which you must apply a curing seal or place a moist material blanket.

24-1.03G(3) Curing Seal

Curing seal equipment must have a gauge indicating the volume of curing seal in the storage tank.

Apply curing seal to the finished surface of stabilized soil under section 37-1.03 when the stabilized soil is at optimum moisture content and:

1. When the ambient temperature is above 40 degrees F and rising.
2. At a rate from 0.10 to 0.20 gallon per square yard. The exact rate is determined by the Engineer.

Repair damaged curing seal the same day the damage occurs.

24-1.03G(4) Moist Material Blanket

Moist material blanket may be either a temporary or permanent layer of material of sufficient thickness to prevent drying of the stabilized soil. You may use moist material blanket if the stabilized soil can bear the weight of construction equipment. Maintain the moist material blanket above the optimum moisture content, as appropriate, until the next structural layer is placed.

24-1.04 PAYMENT

The payment quantity for stabilized soil is measured from the horizontal planned surface of the stabilized soil.

The payment quantity for lime or cement (cement stabilized soil) does not include the quantity of stabilizing agent:

1. Wasted or disposed of in a manner not specified.
2. Remaining on hand after completion of the work. If you use a partial load of stabilizing agent, the quantity remaining is determined by scale weights of the truck and the remaining stabilizing agent.

3. Added stabilizing agent when the mixing depth exceeds the depth shown by more than 10 percent.

24-2 LIME STABILIZED SOIL

24-2.01 GENERAL

24-2.01A Summary

Section 24-2 includes specifications for stabilizing soil by mixing basement material with lime and water.

24-2.01B Definitions

mellowing period: Time between the initial and final mixing to promote initial chemical reactions between lime, water, and basement material.

24-2.01C Submittals

Submit lime samples under ASTM C50. Include the chemical and physical analyses with the submittal.

At least 25 days before applying lime in slurry form, submit the slurry's lime content for authorization.

24-2.01D Quality Assurance

24-2.01D(1) General

Place unique, sequentially numbered lock seals on each load and affix them to trailer blowdown valves that are locked open. The bill of lading for each lime delivery must have that specific lock seal number legibly and visibly imprinted.

24-2.01D(1)(a) Preparing Basement Material

For every 500 cu yd of basement material to be lime stabilized:

1. Test the relative compaction under California Test 231
2. Test the moisture content under California Test 226

24-2.01D(1)(b) Applying Lime

The Engineer determines the final application rate for each lime product proposed from the samples submitted based on California Test 373. Wherever the basement material to be stabilized changes, the Engineer changes the application rate. The Engineer provides the optimum moisture content determined under California Test 373 for each application rate.

Whenever lime in slurry form is used, report the quantity of slurry placed by measuring the volume of slurry in the holding tank once per 40,000 sq ft stabilized, or twice per day, whichever is greater.

The Engineer verifies the application rate of lime used in dry form with a calibrated tray, or equal, once per 40,000 sq ft of stabilized soil, or twice per day, whichever is greater.

24-2.01D(2) Quality Control

24-2.01D(2)(a) General

Reserved

24-2.01D(2)(b) Mixing

During mixing operations, measure and record the ground temperature at full mixing depth.

Take a composite sample from 5 random locations after initial mixing. The moisture content of the composite sample tested under California Test 226 must be a minimum of 3 percent greater than optimum. Determine the moisture versus density relationship of the composite sample material under California Test 216, except part 2, section E, paragraph 6 is modified as follows:

> After adjustment of the moisture content, compact each of the remaining test specimens in the mold, then record the water adjustment, tamper reading, and the corresponding adjusted wet density from the chart on Table 1 using the column corresponding to the actual wet weight of the test specimen compacted. Note each of these wet weights on Line I.

After mixing and before compacting, determine maximum density under California Test 216 from composite samples of mixed material samples from 5 random locations and at each distinct change in material. Test the gradation for compliance with section 24-2.03D. Test the moisture content of the mixed material under California Test 226.

Moisture content during the mellowing period determined under California Test 226 must be at least 3 percent higher than the optimum moisture content.

24-2.01D(2)(c) Compaction

Test relative compaction on a wet weight basis.

After initial compaction determine the in-place density under California Test 231 and moisture content under California Test 226, at the same locations. Perform one test per 500 cu yd of lime stabilized soil. Test in 0.50-foot depth intervals.

24-2.01D(2)(d) Quality Control Testing

Lime stabilized soil quality control must include testing the quality characteristics at the frequencies shown in the following table:

QC Testing Frequencies

Quality characteristic	Test method	Sampling location	Minimum frequency
Ground surface temperature before adding lime and full depth ground temperature during mixing operations	--	Each temperature location	1 test per 20,000 sq ft, minimum 1 per day
Lime application rate	Calibrated tray or equal	Roadway	1 test per 40,000 sq ft, minimum 2 per day
Gradation on mixed material	California Test 202	Roadway	1 per 500 cu yd, minimum 1 per day
Moisture content	California Test 226	Roadway	1 per 500 cu yd on each layer, each day during mixing and mellowing periods, minimum 1 per day
Relative compaction	California Test 231	Roadway	1 per 500 cu yd on each layer, minimum 1 per day

24-2.02 MATERIALS

Lime must comply with ASTM C977 and the requirements shown in the following table:

Lime Quality

Quality characteristic	Test method	Requirement
Available calcium and magnesium oxide (min, %)	ASTM C25 or ASTM C1301 and C1271	High calcium quicklime: $CaO > 90$ Dolomitic quicklime: $CaO > 55$ and $CaO + MgO > 90$
Loss on ignition (max, %)	ASTM C25	7 (total loss) 5 (carbon dioxide) 2 (free moisture)
Slaking rate	ASTM C110	30 °C rise in 8 minutes

A 0.50 lb sample of lime dry-sieved in a mechanical sieve shaker for 10 minutes ± 30 seconds must comply with the percentage passing for the sieve size shown in the following table:

Lime Gradation

Sieve size	Percentage passing
3/8 inch	98–100

Slurry must:

1. Be free of contaminants
2. Contain at least the minimum dry solids
3. Have uniform consistency

Prepare lime slurry at the job site.

24-2.03 CONSTRUCTION

24-2.03A General

Before applying lime, measure the ground surface temperature. Apply lime at ground temperatures above 35 degrees F. Do not apply lime if you expect the ground temperature to drop below 35 degrees F before you complete mixing and compacting.

During mixing, maintain the in-place moisture of the basement material to be stabilized at a minimum of 3 percent above the optimum moisture determined under California Test 216 as modified in section 24-2.01D(2)(b). During compaction and finish grading, add water to the surface to prevent drying until the next layer of mixed material is placed, or until you apply curing treatment.

Scarify the surface of lime stabilized soil at least 2 inches between each layer. Do not scarify the finished surface of the lime stabilized soil.

From the application of lime to 3 days after the application of curing treatment, only equipment and vehicles essential to the lime stabilization work are allowed on the lime stabilized soil.

24-2.03B Preparing Basement Material

Compact the basement material to at least 90 percent relative compaction.

24-2.03C Applying Lime

Apply lime in dry form. You may apply lime in slurry form, if authorized.

Apply lime uniformly over the area to be stabilized using a vane spreader.

Lime slurry must be in suspension during application. Apply lime slurry uniformly making successive passes over a measured section of the roadway until the specified lime content is reached. Apply the residue from lime slurry over the length of the roadway being processed.

24-2.03D Mixing

Mix lime on the same day it is applied. After the initial mixing, allow a mellowing period for at least 36 hours before final mixing. You may add water and mix during the mellowing period.

Complete all the mixing work within 7 days of the initial application of lime.

Before compaction, the mixed material, except rock, must be within the percentage passing limits for the sieve sizes shown in the following table:

Mixed Material Gradation

Sieve size	Percentage passing
1"	98–100
No. 4	60–100

24-2.03E Compaction

Do not use vibratory rollers.

Start compacting immediately after final mixing.

Compact the lime stabilized soil to at least 95 percent relative compaction.

24-2.03F Finish Grading

The finished surface of the stabilized soil must not vary more than 0.08 foot above or below the grade established by the Engineer unless the stabilized soil is to be covered by material paid for by the cubic yard, in which case the finished surface must not vary above the grade established by the Engineer.

Maintain the moisture content of the lime stabilized soil at a minimum of 3 percent above optimum moisture content through the entire finish grading operation.

Wherever lime stabilized soil is below the allowable tolerance, you may use trimmed material to fill low areas only if final grading and final compaction occurs within 48 hours of beginning initial compaction. Before placing trimmed material, scarify the surface of the area to be filled at least 2 inches deep.

24-2.03G Curing

Choose the method of curing and apply the chosen curing method within 48 hours of completing the sheepsfoot or segmented wheel compaction and within the same day of any trimming and finish grading.

24-2.04 PAYMENT

The Department does not adjust the unit price for an increase or decrease in lime quantity.

CONDOR EARTH
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Stockton, CA 95206
209.234.0518
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Condor Project No. 8198A

December 1, 2020

Steve Beauchamp
Senior Development Manager
Panattoni Development Company, Inc.
8775 Folsom Blvd., #200
Sacramento, CA 95826

Subject: **Supplemental Geotechnical Recommendations – Infiltration Test Results**
Proposed New Building and Site Improvements
1445 Pacheco Pass Highway [APN: 841-18-082]
Gilroy, California

Reference: 1) *"Geotechnical Engineering Study, Gilroy Site – Proposed New Building and Site Improvements, 1445 Pacheco Pass Highway [APN: 841-18-082], Gilroy, California,"* dated July 8, 2020, Prepared by Condor Earth [CET #8198]

Dear Mr. Beauchamp:

This letter summarizes the infiltration tests performed by Condor Earth (Condor) on November 16th, 17th, 23rd, 24th, and 25th, 2020. We understand the results of the infiltration testing will be used in design of surface storm water pre-treatment for the subject project. Condor previously performed a Geotechnical Engineering Study dated July 8, 2020 at the subject project site (Reference 1).

RESULTS

Condor completed seven (7) infiltration tests at the locations shown on the attached Site Map with Infiltration Test Locations. The infiltration tests were run using a Double-Ring Infiltrometer in accordance with ASTM D3385 – Standard Test Method for Infiltration Rate of Soils in Field Using Double-Ring Infiltrometer. The infiltration rates were measured with a water head of approximately 6 inches and readings were obtained at intervals as shown on the attached Infiltration Test Data Sheets. The field data was plotted as time versus infiltration rate per ASTM D3385 to interpret a recommended infiltration rate. The following table summarizes our recommended infiltration rates for each location.

Summary of Infiltration Rates

Test Location	Average Flow Readings	
	Infiltration Rate (cm/hour)	Infiltration Rate (in/hour)
DRI-1	0.74	0.29
DRI-2	0.25	0.1
DRI-3	1.16	0.46
DRI-4	1.91	0.75
DRI-5	0.33	0.13
DRI-6	0.14	0.06
DRI-7	0.68	0.27

The infiltration rates were developed by testing at seven (7) locations as described above. The tests were run near existing grade after loose or organic soils were removed from the surface to expose firm, undisturbed soils. The proposed final grades at each of the proposed basins are near existing grade or within 1 to 2 feet of existing grade. Based on the results of soil borings (Reference 1), the results are representative of the anticipated soil conditions provided the soils in the basin are native soils and do not include soils that have been lime treated from other areas of the project.

Based on the high quality of the data and the narrow range of infiltration rates, we recommend that the values be used directly, or if not used directly, that an average rate of 0.3 inches per hour (0.75 cm/hour) be used for design of the basins.

LIMITATIONS

The Limitations provided in Reference 1 are hereby incorporated by reference.

Changes in the standards of practice in the field of geotechnical engineering, changes in site conditions, new agency regulations, or modifications to the proposed project warrant professional review of this letter. Because of this, there is a practical limit to the usefulness of this letter without critical professional review. It is suggested that 12 months be considered a reasonable time for the validity of this letter.

We trust this letter provides the information required. If you have any questions, please contact me at (209) 938-1040.

Sincerely,

CONDOR EARTH

REGISTERED PROFESSIONAL ENGINEER
RONALD LEE SKAGGS
2295
Exp. 03/31/22
GEOTECHNICAL
STATE OF CALIFORNIA

Ron Skaggs, PE, GE, #2295
Vice President, Engineering Services

Attachments: Site Map with Infiltration Test Locations
Results for Infiltration Test Nos. DRI-1 through DRI-7

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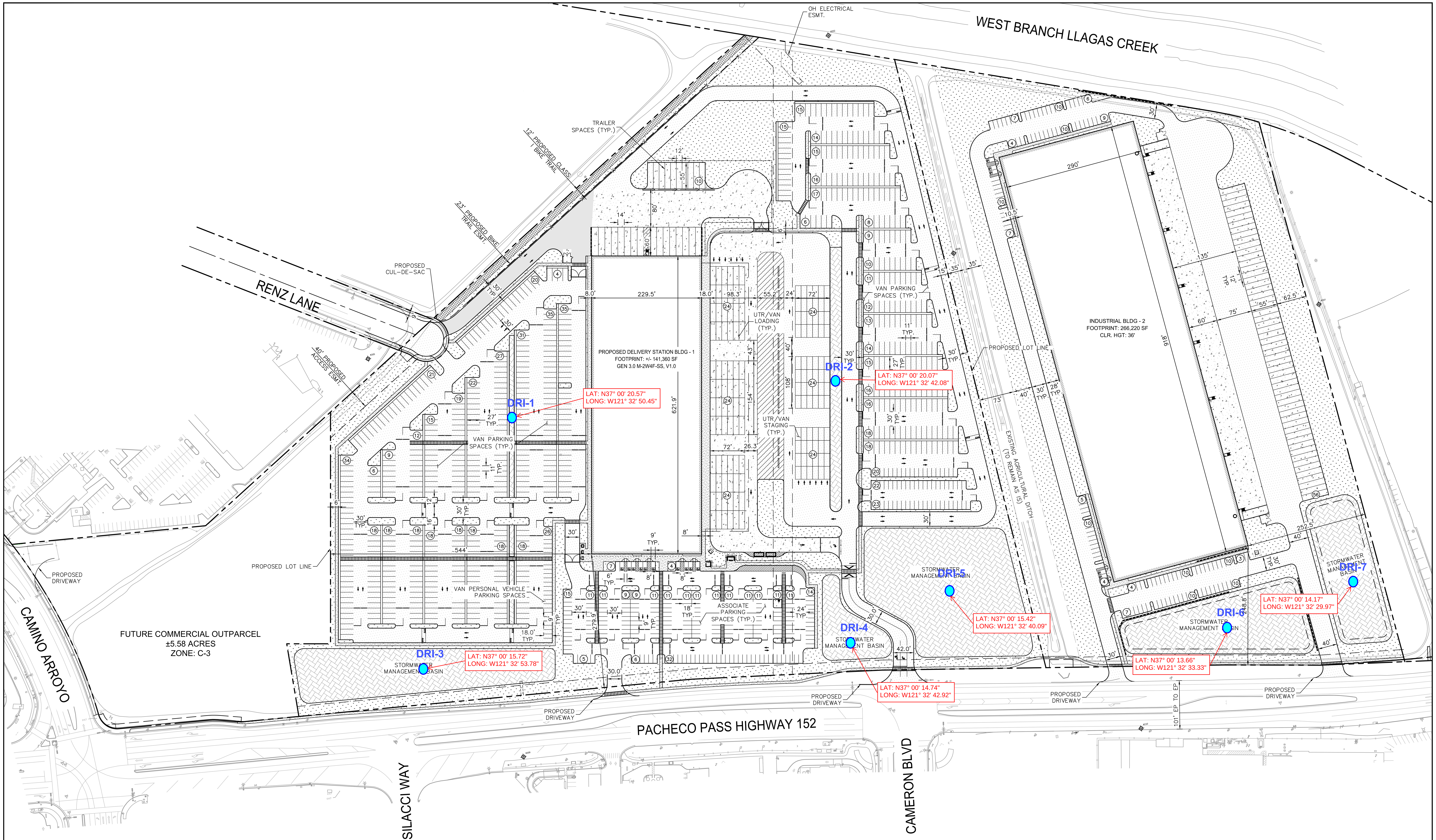


LEGEND

- PROPERTY LINE
- EASEMENT/SETBACK
- RIGHT OF WAY
- PROPOSED ASPHALT PAVEMENT (CAR PARKING)
- PROPOSED ASPHALT PAVEMENT (VAN PARKING)
- PROPOSED HEAVY DUTY ASPHALT PAVEMENT (TRUCK ROUTE)
- PROPOSED HEAVY DUTY CONCRETE PAVEMENT
- PROPOSED BIKE TRAIL
- PROPOSED SIDEWALK
- PROPOSED LANDSCAPE AREA
- PROPOSED STORMWATER MANAGEMENT BASIN
- (XX) PARKING COUNT

PROPERTY INFORMATION

	PHASE 1	PHASE 2
SITE AREA		
IN S.F.	1,469,320	888,011
IN ACRES	33.7	20.4
BUILDING AREA		
OFFICE	16,824	10,000
WAREHOUSE	124,536	256,220
TOTAL	141,360	266,220
COVERAGE	6%	33%
AUTO PARKING REQUIRED		
OFFICE: 1/300 SF	56	33
WHSE: 1/5000 SF	25	51
TOTAL	81	85
AUTO PARKING PROVIDED		
STANDARD (9'x18')	231	136
TRAILER PARKING PROVIDED		
TRAILER (12' x 55')	10	56
VAN PARKING PROVIDED		
PERSONAL VAN SPACES (9' x 18')	91	
VAN SPACES (11' x 27')	692	
UTR/VAN LOADING (12' x 38.5')	72	
UTR/VAN STAGING (12' x 27')	72	
TOTAL	927	

ZONING ORDINANCE FOR CITY

ZONING DESIGNATION – GENERAL INDUSTRIAL (M–2)
SHOPPING CENTER COMMERCIAL/PD (C–3)

MAXIMUM BUILDING HEIGHT ALLOWED

HEIGHT – 75'

MAXIMUM FLOOR AREA RATIO

FAR – 0.60

SETBACKS

BUILDING

FRONT – 16'
SIDE – 0'
REAR – 0'

LANDSCAPE

FRONT – 21' FROM PROPERTY LINE ALONG PACHECO PASS HIGHWAY 152
SIDE – 5'
REAR – 5'

NORTH

GRAPHIC SCALE IN FEET
0 40 80 160

811 Know what's below. Call before you dig.

K:\SAC_LDEV\097913007 Project Garlic Gilroy DXC1\08 CADD\PlanSheets\097913007 – C200.dwg

Kimley»Horn

555 CAPITOL MALL, SUITE 300
SACRAMENTO, CA 95814
PHONE: 916-858-5800
WWW.KIMLEY-HORN.COM

PROJECT GILROY

CAMINO ARROYO & HWY 152
GILROY, CALIFORNIA 95020

No.	DATE	REMARKS
1		
2		
3		
4		
5		
6		
7		
8		

CIVIL SITE PLAN

PA / PM:	SB
DRAWN BY:	AB
JOB NO.:	097913007

SHEET

C200

4 OF 13

Mon, 19 Oct 2020

Condor Project: Panattoni - Gilroy Percolation Testing

Condor Project No.: 8198A

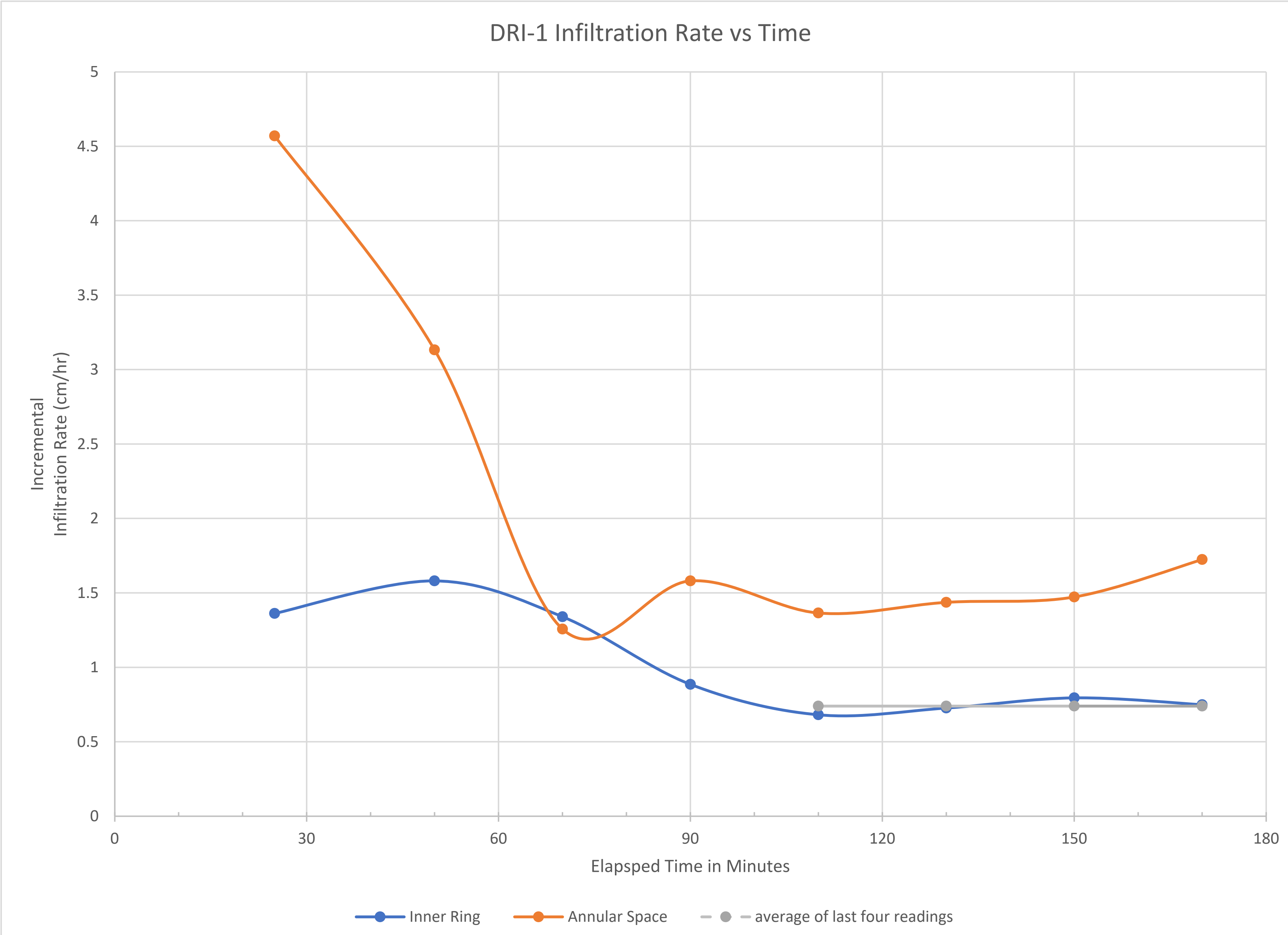
Constants	Area (cm^2)	Depth of liquid (cm)		Containers Vol/Δ/H (cm^2/cm)
Inner Ring	707	16.5		53.52
Annular Space	1399	16.2		167.53

Test Location: DRI-1
Liquid Used: water
Tested by: C. Borean

Liquid level maintained using: Mariotte Tube
Penetration of rings – Inner: 12.7 cm; Outer: 14 cm

Date: 11/16/2020

Trial No.		Time (hr/min)	Elapsed Time: Total (min)	Elapsed Time: Trial (min)	Flow Readings: Inner Reading: Reading (cm)	Inner Reading: Flow, ΔV_{IR} (cm^3)	Annular Space: Reading (cm)	Annular Space: Flow, ΔV_A (cm^3)	Liquid Temp (°C)	Incremental Infiltration Rate $V = \Delta V/(A*\Delta t)$: Inner, V_{IR} (cm/h)	Annular, V_A (cm/h)	Notes:
1	S	10:52	0		57.6	401	57.9	2664				
	E	11:17	25	0:25	50.1		42.0			1.36	4.57	
2	S	11:17	25		50.1	466	42.0	1826				
	E	11:42	50	0:25	41.4		31.1			1.58	3.13	
3	S	11:42	50		41.4	316	31.1	586				
	E	12:02	70	0:20	35.5		27.6			1.34	1.26	
4	S	12:02	70		35.5	209	27.6	737				
	E	12:22	90	0:20	31.6		23.2			0.89	1.58	
5	S	12:22	90		31.6	161	23.2	637				
	E	12:42	110	0:20	28.6		19.4			0.68	1.37	
6	S	12:42	110		28.6	171	19.4	670				
	E	13:02	130	0:20	25.4		15.4			0.73	1.44	
7	S	13:02	130		25.4	187	15.4	687				
	E	13:22	150	0:20	21.9		11.3			0.79	1.47	
8	S	13:22	150		21.9	177	11.3	804				
	E	13:42	170	0:20	18.6		6.5			0.75	1.72	
												Average of last four readings:
												0.74 cm/hr
												0.29 in/hr



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Condor Project: Panattoni - Gilroy Percolation Testing

Condor Project No.: 8198A

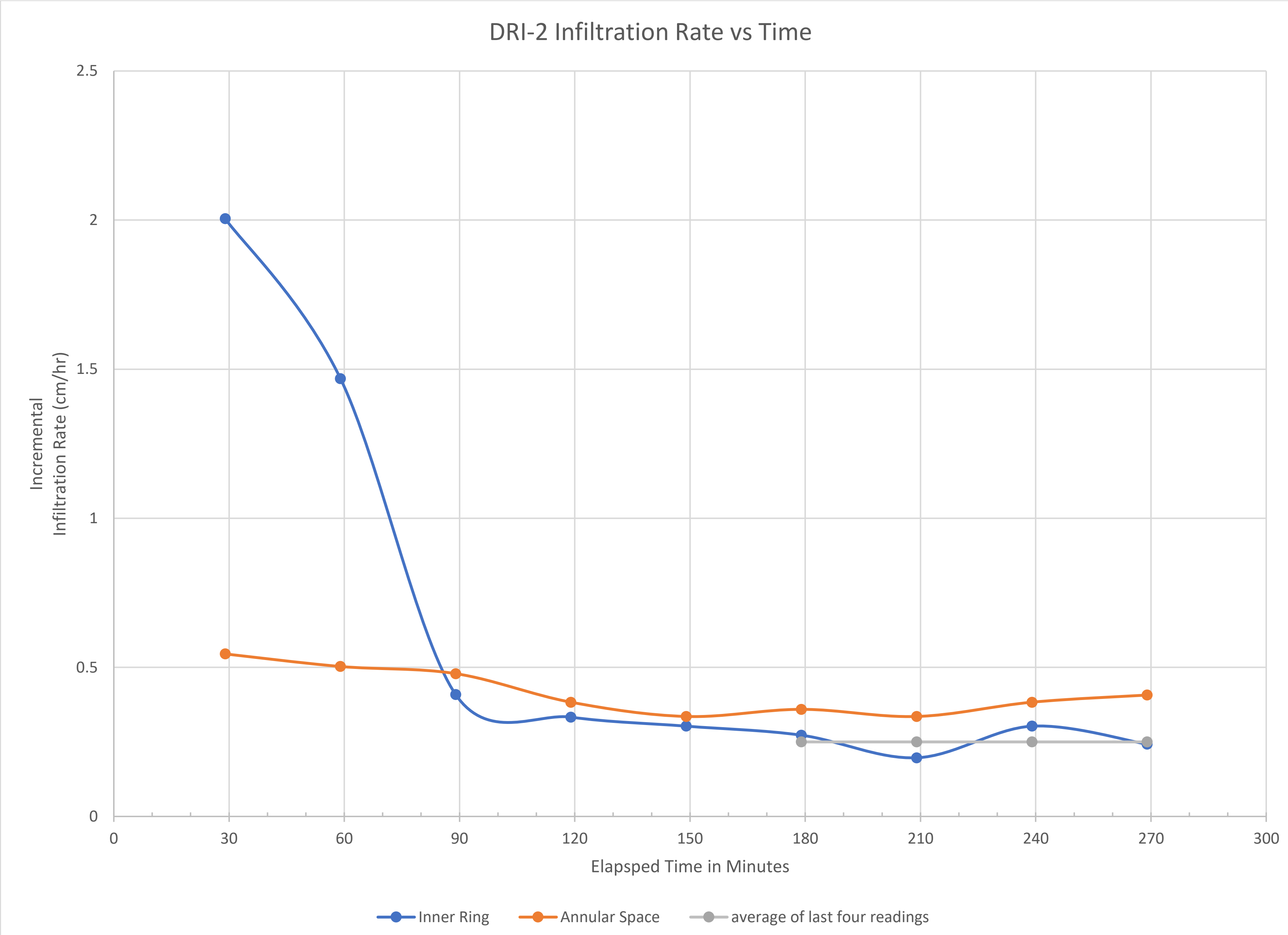
Constants	Area (cm^2)	Depth of liquid (cm)		Containers Vol/Δ/H (cm^2/cm)
Inner Ring	707	16.5		53.52
Annular Space	1399	16.2		167.53

Test Location: DRI-2
Liquid Used: water
Tested by: C. Borean

Liquid level maintained using: Mariotte Tube
Penetration of rings – Inner: 14 cm; Outer: 13.3 cm

Date: 11/17/2020

Trial No.		Time (hr/min)	Elapsed Time: Total (min)	Elapsed Time: Trial (min)	Flow Readings: Inner Reading: Reading (cm)	Inner Reading: Flow, ΔV_{IR} (cm^3)	Annular Space: Reading (cm)	Annular Space: Flow, ΔV_A (cm^3)	Liquid Temp (°C)	Incremental Infiltration Rate $V = \Delta V/(A*\Delta t)$: Inner, V_{IR} (cm/h)	Annular, V_A (cm/h)	Notes:
1	S	7:31	0		48.2	685	57.1	369				
	E	8:00	29	0:29	35.4		54.9			2.00	0.55	
2	S	8:00	29		35.4	519	54.9	352	13.3			
	E	8:30	59	0:30	25.7		52.8			1.47	0.50	
3	S	8:30	59		25.7	145	52.8	335				
	E	9:00	89	0:30	23.0		50.8			0.41	0.48	
4	S	9:00	89		23.0	118	50.8	268				
	E	9:30	119	0:30	20.8		49.2			0.33	0.38	
5	S	9:30	119		20.8	107	49.2	235				
	E	10:00	149	0:30	18.8		47.8			0.30	0.34	
6	S	10:00	149		18.8	96	47.8	251				
	E	10:30	179	0:30	17.0		46.3			0.27	0.36	
7	S	10:30	179		17	70	46.3	235				
	E	11:00	209	0:30	15.7		44.9			0.20	0.34	
8	S	11:00	209		15.7	107	44.9	268	13.3			
	E	11:30	239	0:30	13.7		43.3			0.30	0.38	
9	S	11:30	239		13.7	86	43.3	285				
	E	12:00	269	0:30	12.1		41.6			0.24	0.41	Average of last four readings:
												0.25 cm/hr
												0.1 in/hr



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Condor Project: Panattoni - Gilroy Percolation Testing

Condor Project No.: 8198A

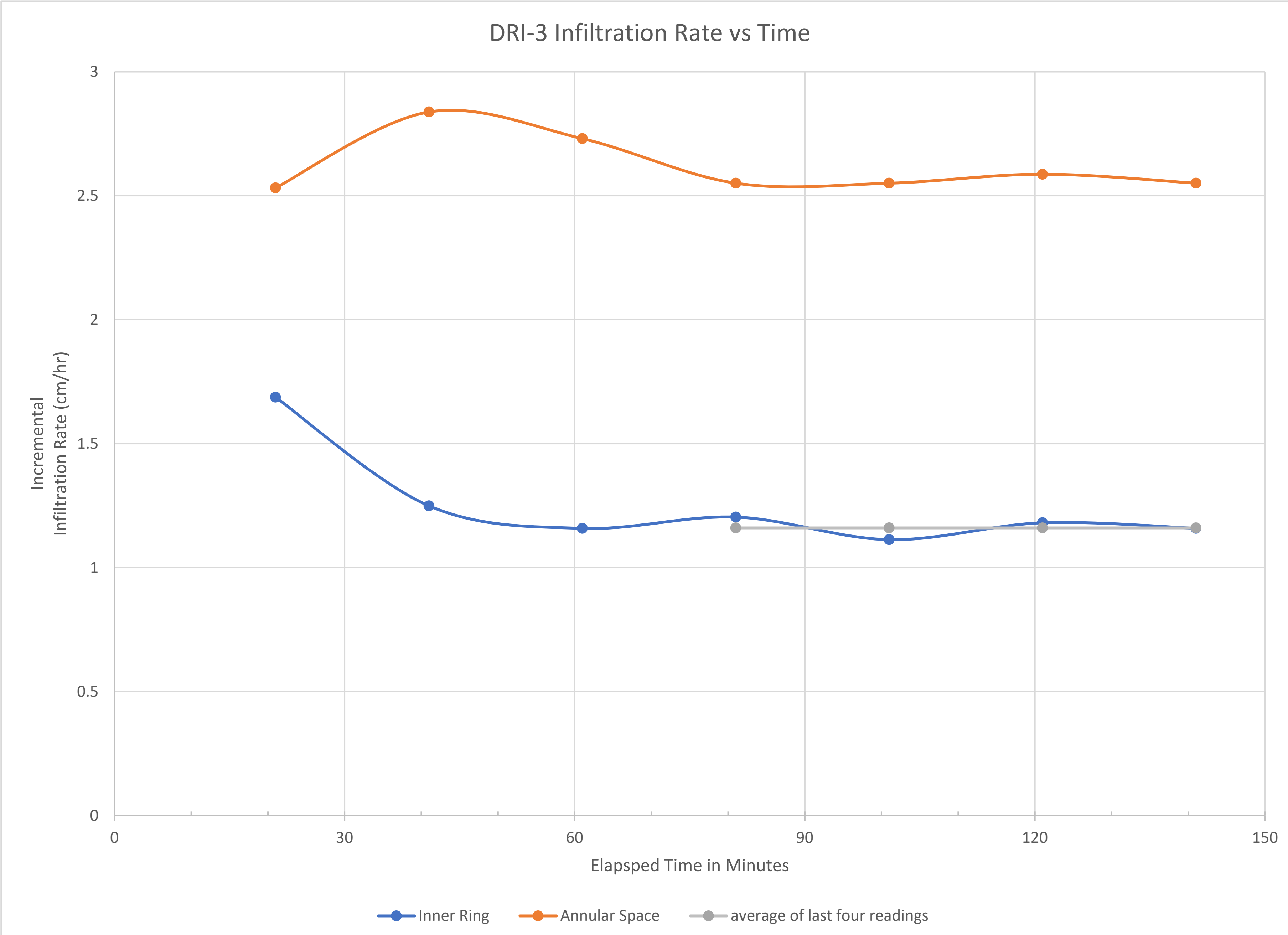
Constants	Area (cm^2)	Depth of liquid (cm)		Containers Vol/Δ/H (cm^2/cm)
Inner Ring	707	16.5		53.52
Annular Space	1399	16.2		167.53

Test Location: DRI-3
Liquid Used: water
Tested by: C. Borean

Liquid level maintained using: Mariotte Tube
Penetration of rings – Inner: 14 cm; Outer: 15.2 cm

Date: 11/23/2020

Trial No.		Time (hr/min)	Elapsed Time: Total (min)	Elapsed Time: Trial (min)	Flow Readings: Inner Reading: Reading (cm)	Inner Reading: Flow, ΔV_{IR} (cm^3)	Annular Space: Reading (cm)	Annular Space: Flow, ΔV_A (cm^3)	Liquid Temp (°C)	Incremental Infiltration Rate $V = \Delta V/(A*\Delta t)$: Inner, V_{IR} (cm/h)	Annular, V_A (cm/h)	Notes:
1	S	9:39	0		55.5	417	56.1	1240				
	E	10:00	21	0:21	47.7		48.7			1.69	2.53	
2	S	10:00	21		47.7	294	48.7	1323	16.1			
	E	10:20	41	0:20	42.2		40.8			1.25	2.84	
3	S	10:20	41		42.2	273	40.8	1273				
	E	10:40	61	0:20	37.1		33.2			1.16	2.73	
4	S	10:40	61		37.1	284	33.2	1189				
	E	11:00	81	0:20	31.8		26.1			1.20	2.55	
5	S	11:00	81		31.8	262	26.1	1189				
	E	11:20	101	0:20	26.9		19.0			1.11	2.55	
6	S	11:20	101		26.9	278	19.0	1206				
	E	11:40	121	0:20	21.7		11.8			1.18	2.59	
7	S	11:40	121		21.7	273	11.8	1189				
	E	12:00	141	0:20	16.6		4.7			1.16	2.55	
												Average of last four readings:
												1.16 cm/hr
												0.46 in/hr



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Condor Project: Panattoni - Gilroy Percolation Testing

Condor Project No.: 8198A

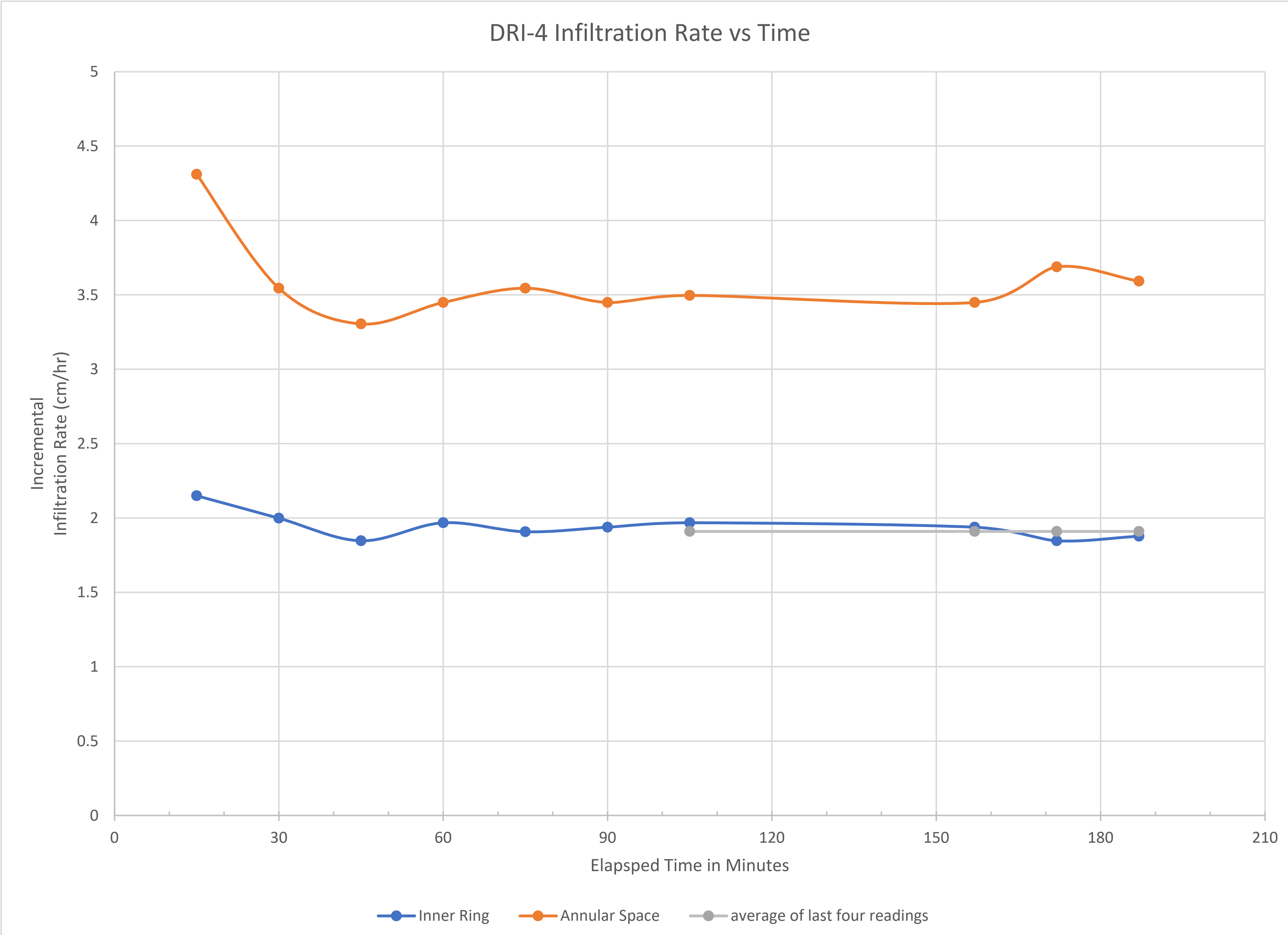
Constants	Area (cm^2)	Depth of liquid (cm)	Containers Vol/Δ/H (cm^2/cm)
Inner Ring	707	16.5	53.52
Annular Space	1399	16.2	167.53

Test Location: DRI-4
Liquid Used: water
Tested by: C. Borean

Liquid level maintained using: Mariotte Tube
Penetration of rings – Inner: 14 cm; Outer: 15.2 cm

Date: 11/24/2020

Trial No.		Time (hr/min)	Elapsed Time: Total (min)	Elapsed Time: Trial (min)	Flow Readings – Inner Reading: Reading (cm)	Inner Reading: Flow, ΔV_{IR} (cm^3)	Annular Space: Reading (cm)	Annular Space: Flow, ΔV_A (cm^3)	Liquid Temp (°C)	Incremental Infiltration Rate $V = \Delta V/(A*\Delta t)$ Inner, V_{IR} (cm/h)	Annular, V_A (cm/h)	Notes:
1	S	7:15	0		51.2	380	57.7	1508				
	E	7:30	15	0:15	44.1		48.7			2.15	4.31	
2	S	7:30	15		44.1	353	48.7	1240	16.1			
	E	7:45	30	0:15	37.5		41.3			2.00	3.54	
3	S	7:45	30		37.5	326	41.3	1156				
	E	8:00	45	0:15	31.4		34.4			1.85	3.31	
4	S	8:00	45		31.4	348	34.4	1206				
	E	8:15	60	0:15	24.9		27.2			1.97	3.45	
5	S	8:15	60		24.9	337	27.2	1240				
	E	8:30	75	0:15	18.6		19.8			1.91	3.54	
6	S	8:30	75		18.6	343	19.8	1206				
	E	8:45	90	0:15	12.2		12.6			1.94	3.45	
7	S	8:45	90		12.2	348	12.6	1223				
	E	9:00	105	0:15	5.7		5.3			1.97	3.50	
8	S	9:37	142		57.4	343	56.2	1206				
	E	9:52	157	0:15	51.0		49			1.94	3.45	
9	S	9:52	157		51.0	326	49	1290				
	E	10:07	172	0:15	44.9		41.3			1.85	3.69	Average of last four readings:
10	S	10:07	172		44.9	332	41.3	1256				1.91 cm/hr
	E	10:22	187	0:15	38.7		33.8			1.88	3.59	0.75 in/hr



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Condor Project: Panattoni - Gilroy Percolation Testing

Condor Project No.: 8198A

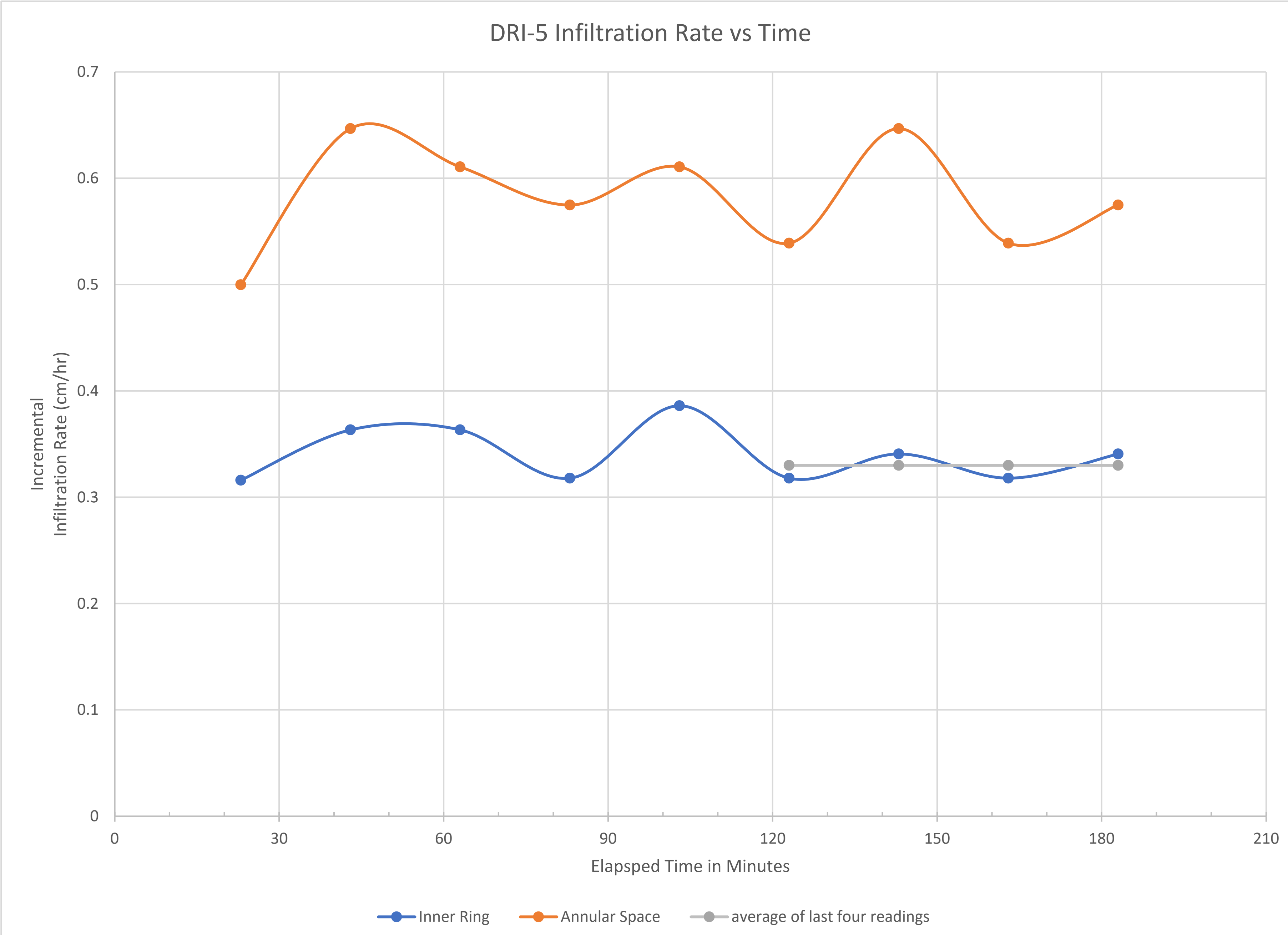
Test Location: DRI-5
Liquid Used: water
Tested by: C. Borean

Constants	Area (cm^2)	Depth of liquid (cm)		Containers Vol/Δ/H (cm^2/cm)
Inner Ring	707	16.5		53.52
Annular Space	1399	16.2		167.53

Liquid level maintained using: Mariotte Tube
Penetration of rings – Inner: 14 cm; Outer: 15.2 cm

Date: 11/17/2020

Trial No.		Time (hr/min)	Elapsed Time: Total (min)	Elapsed Time: Trial (min)	Flow Readings: Inner Reading: Reading (cm)	Flow Readings: Inner Reading: Flow, ΔV_{IR} (cm^3)	Flow Readings: Annular Space: Reading (cm)	Flow Readings: Annular Space: Flow, ΔV_A (cm^3)	Liquid Temp (°C)	Incremental Infiltration Rate $V = \Delta V/(A*\Delta t)$: Inner, V_{IR} (cm/h)	Incremental Infiltration Rate: Annular, V_A (cm/h)	Notes:
1	S	13:57	0		58.0	86	57.3	268				
	E	14:20	23	0:23	56.4		55.7			0.32	0.50	
2	S	14:20	23		56.4	86	55.7	302				
	E	14:40	43	0:20	54.8		53.9			0.36	0.65	
3	S	14:40	43		54.8	86	53.9	285				
	E	15:00	63	0:20	53.2		52.2			0.36	0.61	
4	S	15:00	63		53.2	75	52.2	268				
	E	15:20	83	0:20	51.8		50.6			0.32	0.57	
5	S	15:20	83		51.8	91	50.6	285				
	E	15:40	103	0:20	50.1		48.9			0.39	0.61	
6	S	15:40	103		50.1	75	48.9	251				
	E	16:00	123	0:20	48.7		47.4			0.32	0.54	
7	S	16:00	123		48.7	80	47.4	302				
	E	16:20	143	0:20	47.2		45.6			0.34	0.65	
8	S	16:20	143		47.2	75	45.6	251				
	E	16:40	163	0:20	45.8		44.1			0.32	0.54	
9	S	16:40	163		45.8	80	44.1	268				
	E	17:00	183	0:20	44.3		42.5			0.34	0.57	Average of last four readings:
												0.33 cm/hr
												0.13 in/hr



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Condor Project: Panattoni - Gilroy Percolation Testing

Condor Project No.: 8198A

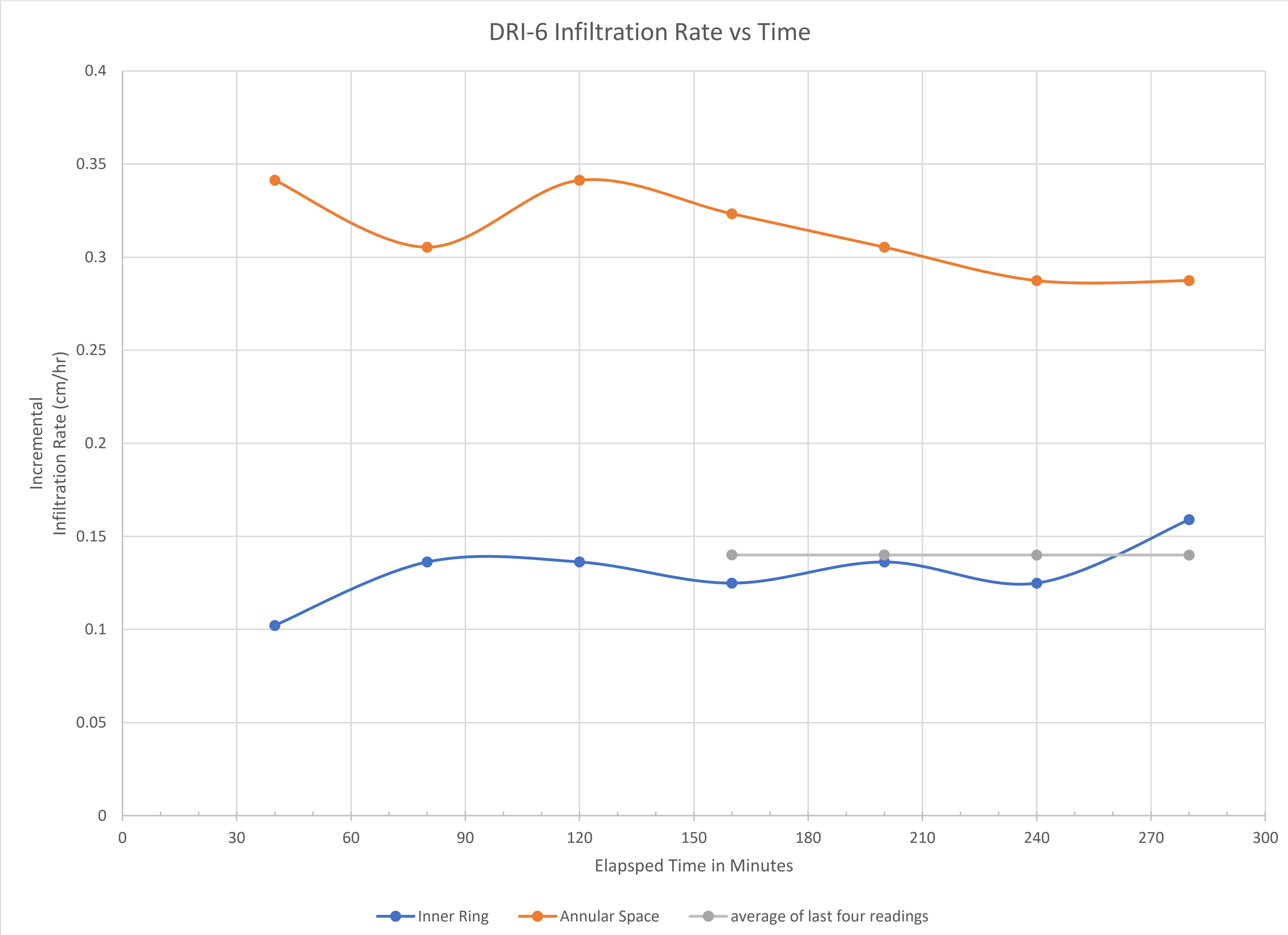
Constants	Area (cm^2)	Depth of liquid (cm)		Containers Vol/Δ/H (cm^2/cm)
Inner Ring	707	16.5		53.52
Annular Space	1399	16.2		167.53

Test Location: DRI-6
Liquid Used: water
Tested by: C. Borean

Liquid level maintained using: Mariotte Tube
Penetration of rings – Inner: 14 cm; Outer: 15.2 cm

Date: 11/25/2020

Trial No.		Time (hr/min)	Elapsed Time: Total (min)	Elapsed Time: Trial (min)	Flow Readings – Inner Reading – Reading (cm)	Flow Readings – Inner Reading – Flow, ΔV_{IR} (cm^3)	Flow Readings – Annular Space – Reading (cm)	Flow Readings – Annular Space – Flow, ΔV_A (cm^3)	Liquid Temp (°C)	Incremental Infiltration Rate $V = \Delta V/(A*\Delta t)$ – Inner, V_{IR} (cm/h)	Incremental Infiltration Rate $V = \Delta V/(A*\Delta t)$ – Annular, V_A (cm/h)	Notes:
1	S	8:20	0		57.4	48	57.5	318				
	E	9:00	40	0:40	56.5		55.6			0.10	0.34	
2	S	9:00	40		56.5	64	55.6	285				
	E	9:40	80	0:40	55.3		53.9			0.14	0.31	
3	S	9:40	80		55.3	64	53.9	318				
	E	10:20	120	0:40	54.1		52.0			0.14	0.34	
4	S	10:20	120		54.1	59	52.0	302				
	E	11:00	160	0:40	53.0		50.2			0.12	0.32	
5	S	11:00	160		53.0	64	50.2	285	15			
	E	11:40	200	0:40	51.8		48.5			0.14	0.31	
6	S	11:40	200		51.8	59	48.5	268				
	E	12:20	240	0:40	50.7		46.9			0.12	0.29	
7	S	12:20	240		50.7	75	46.9	268				
	E	13:00	280	0:40	49.3		45.3			0.16	0.29	
												Average of last four readings:
												0.14 cm/hr
												0.06 in/hr



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Condor Project: Panattoni - Gilroy Percolation Testing

Condor Project No.: 8198A

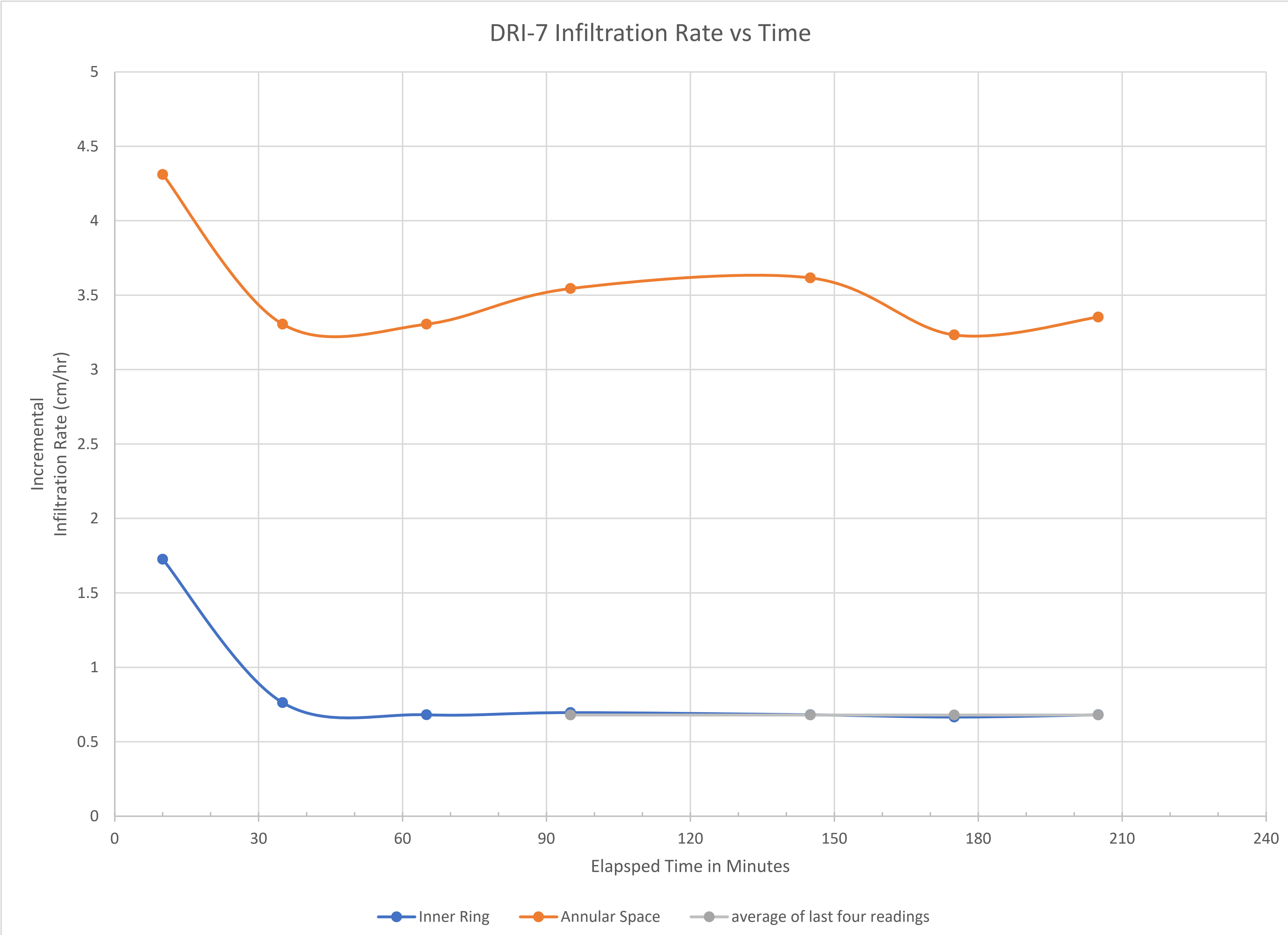
Constants	Area (cm^2)	Depth of liquid (cm)		Containers Vol/Δ/H (cm^2/cm)
Inner Ring	707	16.5		53.52
Annular Space	1399	16.2		167.53

Test Location: DRI-7
Liquid Used: water
Tested by: C. Borean

Liquid level maintained using: Mariotte Tube
Penetration of rings – Inner: 14 cm; Outer: 15.2 cm

Date: 11/24/2020

Trial No.		Time (hr/min)	Elapsed Time: Total (min)	Elapsed Time: Trial (min)	Flow Readings: Inner Reading: Reading (cm)	Inner Reading: Flow, ΔV_{IR} (cm^3)	Annular Space: Reading (cm)	Annular Space: Flow, ΔV_A (cm^3)	Liquid Temp (°C)	Incremental Infiltration Rate $V = \Delta V/(A*\Delta t)$: Inner, V_{IR} (cm/h)	Annular, V_A (cm/h)	Notes:
1	S	11:55	0		56.1	203	56.1	1005				
	E	12:05	10	0:10	52.3		50.1			1.73	4.31	
2	S	12:05	10		52.3	225	50.1	1927	16.1			
	E	12:30	35	0:25	48.1		38.6			0.76	3.31	
3	S	12:30	35		48.1	241	38.6	2312				
	E	13:00	65	0:30	43.6		24.8			0.68	3.31	
4	S	13:00	65		43.6	246	24.8	2479				
	E	13:30	95	0:30	39.0		10.0			0.70	3.54	
5	S	13:50	115		37.5	241	56.8	2530				
	E	14:20	145	0:30	33.0		41.7			0.68	3.62	
6	S	14:20	145		33.0	235	41.7	2262				
	E	14:50	175	0:30	28.6		28.2			0.67	3.23	
7	S	14:50	175		28.6	241	28.2	2345				
	E	15:20	205	0:30	24.1		14.2			0.68	3.35	
												Average of last four readings:
												0.68 cm/hr
												0.27 in/hr



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