LETTER OF CLARIFICATION NO. 1 - MARCH 4, 2024

REVISED LIMITED GEOTECHNICAL INVESTIGATION REPORT
STOCKTON CITY HALL NEW PARKING LOT
W. WEBER AVENUE AND N. LINCOLN STREET
STOCKTON, CALIFORNIA

BSK PROJECT NO.: G22-076-11L

PREPARED FOR:

SIEGFRIED ENGINEERING, INC.
3428 BROOKSIDE ROAD
STOCKTON, CALIFORNIA 95219

June 16, 2022

Table of Contents

FIGURES

APPENDIX A – Laboratory Test Results

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June 16, 2022

BSK Project No. G22-076-11L
CIP No. E016015-A

Mr. Adam Merrill, P.E.
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Stockton, CA 95219

SUBJECT: **Revised Limited Geotechnical Investigation Report**
Stockton City Hall New Parking Lot
West Weber Avenue and North Lincoln Street
Stockton, California

Dear Mr. Merrill:

We are pleased to submit our revised limited geotechnical investigation report for the planned Stockton City Hall New Parking Lot to be located at the southwestern corner of the intersection of West Weber Avenue and North Lincoln Street in Stockton, California. Our original report was issued on April 27, 2022 and was revised at your request in order to incorporate lime treatment as an option for the pavement section for the project. A Vicinity Map showing the location of the project is presented on Figure 1. This report contains a description of our site investigation methods and findings, including limited field and laboratory data. The purpose of this investigation was to obtain and classify near surface soil samples to provide geotechnical recommendations for the planned development. The scope of services, as outlined in our proposal (BSK Proposal No. GL21-22714) dated September 24, 2021, included the following:

- Project setup and limited subsurface investigation,
- Laboratory testing,
- Engineering analysis, and
- Preparation of this report.

This investigation specifically excludes the assessment of site environmental characteristics, particularly those involving hazardous substances.

1. SITE AND PROJECT DESCRIPTION

The planned Stockton City Hall New Parking Lot (Site) will be located at the southwest corner of W. Weber Avenue and N. Lincoln Street in Stockton, California. The existing area is relatively flat with minor topographic relief. According to Google Earth Pro, the project area varies in elevation from approximately 10 to 20 feet over a horizontal distance of about 500 feet. Based on our observations in the field and information contained in the Request for Proposal (RFP) dated September 15, 2021 (City Project No.

E016015-A), the project area is currently covered with seasonal grasses, gravel, and engineered fill associated with prior environmental cleanup activities at the Site.

The new parking lot is expected to have approximately 350 parking stalls. Anticipated improvements for this project include asphalt concrete pavement parking, exterior concrete flatwork, fencing, light poles, underground utility lines, and landscaping.

Although grading plans are not currently available for the project, we anticipate that earthwork activities for this project will be limited to cuts and fills of 2 feet or less in vertical depth/height. Excavations for new underground utility lines and drilled piers are expected to be up to about 5 feet deep.

If the actual project differs significantly from that described above, particularly the amount of grading anticipated, we should be contacted to review and/or revise the conclusions and recommendations presented in this report.

2. SUBSURFACE INVESTIGATION

Our limited subsurface investigation was performed on March 22, 2022 and consisted of manually advancing five (5) hand-auger borings (labeled HA-1 through HA-5) to depths of approximately 3 to 5 feet below the existing ground surface (BGS) each at the approximate locations shown on Figure 2. Soils encountered in each hand auger were visually classified and recorded on a boring log, the results of which are tabulated in the "Subsurface Conditions" section below. The borings were logged by a field engineer from BSK and backfilled with on-site soils and gravel. Relatively undisturbed samples of the subsurface materials were obtained using a hand-held sampler with a 2.0-inch stainless steel liner driven 6-inches using a hand-held slide hammer. Prior to sealing the samples, strength characteristics of the relatively undisturbed cohesive soil samples recovered were evaluated using a hand-held pocket penetrometer. These test results are shown in the tabulated boring logs presented in the "Subsurface Conditions" section of this report. As required in the RFP for this project, a photoionization detector (PID) was used to monitor for volatile organic compounds (VOCs) of the samples obtained from our investigation. The recorded readings are presented in the tabulated boring logs in the "Subsurface Conditions" as well. However, as noted previously, BSK's scope of services for this project specifically excludes the assessment of site environmental characteristics, particularly those involving hazardous substances.

Soil classifications made in the field from the excavated materials and samples collected were re-evaluated in the laboratory after further examination and testing. The soils were classified in the field in general accordance with the Unified Soil Classification System (Visual/Manual Procedure – ASTM D2488). Where laboratory tests were performed, the designations reflect the laboratory test results in general accordance with ASTM D2487. A discussion of the subsurface conditions encountered at the Site is presented in the "Subsurface Conditions" section of this report.

The locations and elevations of the hand-auger borings were estimated by our field engineer based on rough measurements from existing features at the Site and Google Earth Professional. As such, the locations and elevations of the hand-auger borings should be considered approximate to the degree implied by the methods used.

3. LABORATORY TESTING

Our laboratory testing program consisted of performing dry density and moisture content tests, Atterberg limits, sieve analysis tests, R-Value, and corrosivity testing. Most of the test results are presented on the tabulated logs, while the Atterberg limits, and Resistance (R) Value test results are presented graphically in Appendix A along with the corrosivity test results.

4. SITE GEOLOGY AND SEISMICITY

The Site is located within the Great Valley geomorphic province of California. The Great Valley is an alluvial plain about 50 miles wide and 400 miles long in the central part of California. Its northern part is the Sacramento Valley, drained by the Sacramento River and its southern part is the San Joaquin Valley drained by the San Joaquin River. The Great Valley is a trough in which sediments have been deposited almost continuously since the Jurassic (about 160 million years ago). The thickness of the valley sediments varies from a thin veneer at the edges of the valley to thousands of meters in the central portion. As shown below in Exhibit 1 – Site Geology Map and according to the California Geological Survey (CGS, 1991[1]), the Site is mapped as the Holocene to Pleistocene age Modesto Formation (map symbol Qm), which consists of interbedded sand, gravel, clay, and silt.

[1] Wagner, D.L., Bortugno, E.J., and McJunkin, R.D. (1991), Geologic Map of the San Francisco-San Jose Quadrangle, California: California Division of Mines and Geology (aka California Geological Survey) Regional Geologic Map 5A.

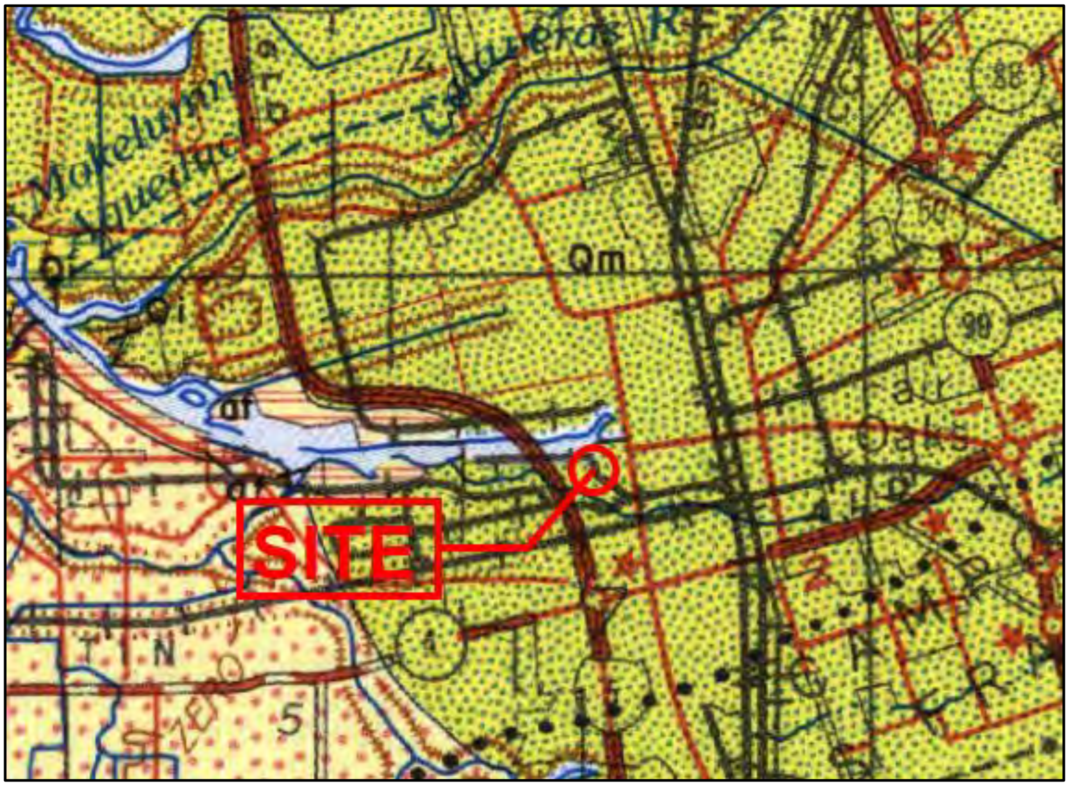


Exhibit 1 - Site Geology Map (CGS, 1991)

Stockton is in a region where there are very few active faults. According to the CGS, the Site is not located with an Alquist-Priolo Earthquake Fault Zone where site-specific studies addressing the potential for surface fault rupture are required, and no mapped active fault traces are known to traverse the Site. The nearest active fault is the zoned Greenville Fault located approximately 27 miles southwest of the Site.

5. SUBSURFACE CONDITIONS

The table below summarizes the subsurface conditions encountered in our hand-auger borings. We generally encountered fill and native soils consisting predominantly of sandy lean clay and lean clay interbedded with sand in the upper 5 feet BGS. According to our Atterberg limits test results, the surficial soils have a moderate to high expansion potential when exposed to moisture fluctuation.

TABULATED LOGS OF HAND-AUGER BORINGS			
Boring (EL)	**Approx. Depth Below Ground Surface (feet)**	**Description**	**Remarks**
HA-1 (13)	0 to 1	**Poorly Graded Gravel (GP) –** gray, dry, coarse rounded to subangular gravel up to 2 inches (Fill)	- Performed on 3/22/2022 - From 1 to 2 feet: 69% passing #200 sieve - At 1½ feet: PP = 4 - VOC at 1½ feet: 1 to 2 ppm - At 3 feet: DD = 100 pcf and MC = 15%, PP = 2.5 - VOC at 3 feet: 15 to 17 ppm - Terminated at approx. 3½ feet. - Boring backfilled with on-site gravel.
	1 to 2	**Sandy Lean Clay (CL) –** light grayish brown, moist, firm, low to medium plasticity, fine to medium-sand, trace fine to coarse gravel	
	2 to 3	**Poorly Graded Sand w/ Silt (SP-SM) –** yellowish brown, slightly moist, fine sand	
	3 to 3½	**Sandy Lean Clay w/ Gravel (CL) –** dark yellowish brown, moist, firm, low to medium plasticity, fine sand, fine subrounded gravel up to ½-inch	
HA-2 (10)	0 to 4	**Sandy Lean Clay w/ Gravel (CL) –** light brown, moist, firm, low to medium plasticity, fine to medium sand, fine to coarse gravel (possibly fill)	- Performed on 3/22/2022 - At 1 to 4 feet: R-Value = 8 - At 1 to 4 feet: LL = 39, PI = 21 - VOC at 2 feet: 65 to 80 ppm - At 3½ feet, decrease in sand and increase in gravel content - At 3½ feet: DD = 86 pcf and MC = 8%, - VOC at 3½ feet: 8 to 10 ppm - Terminated at approx. 4 feet. - Boring backfilled with on-site gravel.
HA-3 (14)	0 to 3½	**Lean Clay (CL),** light yellowish brown to dark grayish brown, dry to moist, firm to hard, low to medium plasticity, fine to medium sand	- Performed on 3/22/2022 - From 0 to 3 feet: 91% passing #200 sieve - VOC at 3 feet: 85 to 95 ppm - Terminated at approx. 3½ feet. - Boring backfilled with on-site gravel.
HA-4 (12)	0 to 1.5	**Clayey Sand w/ Gravel (SC)** – dry, low plasticity, fine to coarse sand, fine to coarse gravel (Fill)	- Performed on 3/22/2022 - At 2½ feet: DD = 90 pcf, MC = 20%, PP > 4.5 - VOC at 2½ feet: 30 to 35 ppm - At 5 feet: PP = 4 to 4.5 - VOC at 5 feet: 15 to 20 ppm - At 5 feet, decrease in sand content - Terminated at approx. 5½ feet. - Boring backfilled with on-site gravel.
	1.5 to 5½	**Lean Clay w/ Sand (CL),** dark grayish brown, moist, hard, medium plasticity, fine sand	

TABULATED LOGS OF HAND-AUGER BORINGS			
Boring (EL)	**Approx. Depth Below Ground Surface (feet)**	**Description**	**Remarks**
HA-5 (11)	0 to 4	**Lean Clay w/ Sand (CL),** light grayish brown, moist, firm to hard, medium plasticity, fine sand (possibly fill)	- Performed on 3/22/2022 - At 2 feet: DD = 89 pcf, MC = 22% - At 2 feet: LL = 50, PI = 32 - VOC at 2 feet: 30 to 35 ppm - At 4 feet: PP = 4.5 - VOC at 4 feet: 45 to 55 ppm - Terminated at approx. 4.5 feet. - Boring backfilled with on-site gravel.
	4 to 4 ½	**Sandy Lean Clay (CL),** grayish brown, moist, hard, medium plasticity, fine sand (possibly fill)	
Notes/Abbreviations: -No free groundwater observed in hand auger borings -LL: liquid limit -PI: plasticity index -EL: elevation (feet), based on Google Earth Pro		-DD: in-situ dry unit weight (lb per cubic foot, pcf) -MC: in-situ moisture content (percent) -PP: pocket penetrometer in TSF (tons/sq. ft.) -VOC: Volatile Organic Compounds (based on PID readings)	

Free groundwater was not observed within the maximum exploration depth of our current hand auger borings (approximately 5 feet BGS). Groundwater in the area is expected to be deeper than 10 to 20 feet BGS based on groundwater depth contour data made available by the California Department of Water Resources[2]. It should be noted that groundwater levels can fluctuate depending on factors such as seasonal rainfall, groundwater withdrawal, and construction activities on this or adjacent properties or if water seepage from leaking pipelines or other exposed improvements within excavations is encountered.

Soil and groundwater conditions can deviate from those conditions encountered at the boring locations. If significant variation in the subsurface conditions is encountered during construction, it may be necessary for BSK to review the recommendations presented herein and recommend adjustments as necessary.

6. CONCLUSIONS

Based on the results of our investigation, it is our opinion that the proposed project and related improvements are feasible geotechnically and that the Site may be developed as planned. This conclusion assumes that the recommendations presented in this report will be incorporated into the design and construction of this project.

The primary geologic and seismic hazards for the proposed improvements are the presence of moderately to highly expansive surficial soils and the potential for ground shaking during a seismic event. The Site is not located within an Alquist-Priolo Earthquake Fault Zone and no mapped active fault traces are known to traverse the Site. Therefore, we conclude that the potential for fault-related surface rupture to affect

[2] https://sgma.water.ca.gov/webgis/?appid=SGMADataViewer#gwlevels

the Site to be low. Mitigation of expansive soil behavior is recommended through proper moisture conditioning of the subgrade soils.

According to the June 30, 2009 report[3] by Treadwell & Rollo (T&R), which has since been acquired by Langan, a large excavation was performed at the Site between December 2008 and February 2009 as part of previous environmental cleanup activities at the Site. A site plan and compaction test data included in the 2009 T&R report indicate the excavation extended over most of the central area of the Site and was 10+ feet deep. Based on T&R's report, the material used to backfill the excavation was adequately moisture-conditioned and properly compacted.

Specific recommendations regarding geotechnical design and construction aspects for the project are presented in the "Recommendations" section of this report.

7. RECOMMENDATIONS

Presented below are our recommendations for earthwork, shallow drilled piers, seismic considerations, exterior concrete flatwork and pavers, pavements, landscaping and irrigation considerations, site drainage, storm water runoff mitigation, and construction considerations associated with the planned development of the Site.

7.1 Site Preparation and Grading

Our general site preparation and grading recommendations are as follows:

1. The areas to be graded should be cleared of debris, significant surface vegetation and obstructions including abandoned underground pipes, foundations, and concrete slabs. Stripped surface organics should be stockpiled and may be reused only in landscaping areas or disposed off-site.
2. The root system of trees to be demolished (if any) should be removed. The removal of the tree roots could disturb several feet of the near-surface soils. If these disturbed soils are not being removed by design cuts, the disturbed soils should be overexcavated and replaced with compacted engineered fill.
3. Existing pipelines crossing the Site to be abandoned should be removed whenever feasible. Abandoned pipes to remain should be capped at both ends if smaller than 2 inches in diameter or be filled with 1-sack sand-cement slurry if greater than 2 inches in diameter. Existing pipelines to remain, including subdrain lines, should be carefully located and protected during demolition and during construction.
4. **From a geotechnical standpoint only**, the on-site soils are generally suitable for re-use as general engineered fill provided they are free of debris, vegetation, top soil containing more than 3

[3] Report entitled *Summary of Geotechnical Field Observations and Testing, Area 2A Unocal Operable Unit, Stockton, California*, dated June 30, 2009 by Treadwell & Rollo (T&R Project No. 2597.13).

percent organic content by dry unit weight, and other deleterious matter and properly processed so that particle sizes are not greater than 3 inches in largest dimension. At least 90 percent by weight of the fill/backfill materials should be passing the 1-inch sieve. All fill materials should be subject to evaluation and approval by a BSK representative prior to their use.

If zones of loose/soft or saturated soils, including in existing fill areas, are encountered during excavation and compaction, deeper excavations may be required to expose firm soils. This should be evaluated in the field by a BSK representative. Where deleterious matter is encountered in excavations, this material should be overexcavated and disposed off-site.

5. Proper granular bedding and shading should be used beneath and around new utilities. Imported fill material to be used as general fill should not be classified as being more corrosive than "moderately corrosive." **Imported fill, including "non-expansive" fill**, should be granular in nature, adhere to the above gradation recommendations, and conform to the minimum criteria presented in the table below (unless otherwise permitted by BSK). Highly pervious materials such as pea gravel or clean sands are not recommended because they permit transmission of water to the adjacent and/or underlying soils.

IMPORT FILL AND "NON-EXPANSIVE" FILL CRITERIA	
Plasticity Index	12 or less
Liquid Limit	Less than 30%
% Passing #200 Sieve	8% – 40% (general fill) Less than 8% (bedding and shading)

6. Unless the lime treatment option discussed below is chosen, following stripping and removal of deleterious materials, the Site should be scarified to a minimum depth of 12 inches, moisture conditioned to at least 2 percent above optimum moisture content, and re-compacted to a minimum of 90 percent relative compaction. **It is important to meet this minimum moisture conditioning due to the expansion potential of the near-surface soils.** Relative compaction refers to the in-place dry density of soil expressed as a percentage of the maximum dry density determined by ASTM D1557 compaction test procedures. Optimum moisture is the water content (percentage by dry weight) corresponding to the maximum dry density. Scarification and recompaction should extend laterally a minimum of 5 feet beyond the limits of structures (defined as the outside perimeter of building walls or foundation outer limits, whichever results in the greatest building envelope) and 3 feet beyond the edge of flatwork, pavers, and pavements, where achievable.
7. Where fills/backfills are greater than 7 feet in depth below finish grade, the zone below a depth of 7 feet should be compacted to a minimum of 95 percent compaction.
8. **In areas to be exposed to vehicular traffic**, the upper 12 inches of the soil subgrade immediately below the aggregate base layer should be compacted to a minimum of 92 percent relative compaction at least 2 percent above optimum moisture content. Subgrade preparation should

extend a minimum of 3 feet laterally beyond the edge of flatwork, pavers, and pavements, where feasible. The aggregate base layer underneath such flatwork and pavement should be compacted to a minimum of 95 percent relative compaction at near optimum moisture content. In addition to these compaction requirements, areas to be exposed to vehicular traffic should be firm and stable and should be proof rolled with a heavy piece of construction equipment, such as a loaded dump truck or water truck, to check for signs of subgrade instability.

10. Unless otherwise indicated above, all fill and backfill should be placed in thin lifts up to 8-inch maximum uncompacted thickness, properly moisture conditioned to at least 2 percent above optimum moisture content for clayey soils and to near optimum moisture content for granular soils, and compacted to at least 90 percent compaction per ASTM D1557. Aggregate base should be moisture conditioned to near-optimum moisture content.
11. Permanent cut and fill slopes for this project should have gradients of 3H:1V (horizontal to vertical) unless otherwise indicated by BSK.
12. Observations and compaction testing should be carried out by a BSK representative during grading and backfill operations to assist the contractor in obtaining the required degree of compaction and proper moisture content. Where the moisture content or compaction is outside the range required, additional compactive effort and adjustment of moisture content should be made until the specified compaction and moisture conditioning is achieved.
13. BSK should be notified at least 48 hours prior to any grading and backfill operations. The procedure and methods of grading may then be discussed between the contractor and BSK.

7.1.1 Lime Treatment

Subgrade to be lime treated does not need to be scarified, moisture conditioned and recompacted prior to the lime treatment process unless the area will receive more than 12 inches of fill. Subgrade to be lime treated should be lime-treated using dolomitic or high calcium quicklime. A contractor experienced in such work should perform the lime treatment. For preliminary estimating purposes, a minimum of 5 percent lime by dry unit weight should be used based on an in-situ dry unit weight of 100 pcf assumed for this project. The lime treatment operation should follow the requirements of Section 24 of the 2018 Caltrans Standard Specifications. During initial mixing and hydration of the lime, the moisture content of the lime-treated subgrade should be a minimum of 3 percent over optimum. After the second mixing is completed, the lime-treated subgrade should then be compacted to a minimum of 95 percent compaction near optimum moisture content.

7.2 New Utility Trench Excavation and Backfill

All excavations should conform to current OSHA requirements for work safety. Where trenches or other excavations extend deeper than 5 feet, the excavations may become unstable and should be evaluated by the contractor to monitor stability prior to personnel entering the trenches. Shoring or sloping of any trench wall may be necessary to protect personnel and to provide stability. It is the contractor's responsibility to follow OSHA temporary excavation guidelines and grade the slopes with adequate layback or provide adequate shoring and underpinning of existing structures and improvements, as needed. Slope layback and/or shoring measures should be adjusted as necessary in the field to suit the actual conditions encountered, in order to protect personnel and equipment within excavations. Based on the subsurface conditions encountered in our borings, we expect the sidewalls of trenches to remain relatively vertical for a period of several days. Nevertheless, the longer the trenches remain open the higher the potential for the sidewalls to start to slough off or cave.

Free groundwater was not observed within the maximum depth of our current investigation (approximately 5 feet BGS). However, the actual depth at which groundwater may be encountered in trenches and excavations may vary and it is possible that seepage water could be encountered within the anticipated depth of excavations for the project. As a minimum, provisions should be made to ensure that conventional sump pumps used in typical trenching and excavation projects are available during construction in case substantial runoff water accumulates within the excavations as a result of wet weather conditions or if water seepage from leaking pipelines or other exposed improvements within excavations is encountered.

Material quality, placement, and compaction requirements for utility bedding and shading materials[4] should meet applicable agency requirements. Utility trench backfill above the shading materials may consist of on-site soils provided they are free of organics, debris, rock over 3 inches in largest dimension, and other deleterious material. Backfill materials should be placed in lifts not exceeding 8 inches in loose thickness, moisture conditioned, and compacted to the requirements provided in the “Site Preparation and Grading” section of this report.

Where utility trenches extend from the exterior into the interior limits of the new parking lot pavement, sand-cement slurry (1-or 2-sack mix) should be used as backfill material for a distance of 2 feet laterally on each side of the pavement limits to reduce the potential for the trench to act as a conduit to exterior surface water. Utility trenches located in landscaped areas should also be capped with a minimum of 12 inches of compacted on-site clayey soils.

Where “non-expansive” fill or lime-treated soil is removed to install utilities within the limits of flatwork, pavers, and pavement, this layer should be replaced with new, imported “non-expansive” fill or Caltrans Class 2 aggregate base. Excavated lime-treated spoils may be re-used as general fill in non-landscaping areas of the Site or disposed offsite.

[4] Bedding material typically consists of sand used to backfill a few inches (typically 3 to 6 inches) below the invert elevation of a pipe. Shading material typically consists of sand used to backfill around and a few inches (typically 6 to 12 inches) above the top of a pipe.

7.3 Shallow Drilled Piers

We anticipate that fencing and light poles for this project will be supported on shallow drilled piers. We recommend the following criteria be incorporated into the design of shallow drilled piers for this project.

DRILLED PIER FOUNDATION CRITERIA	
Static Allowable Downward Skin Friction[1]	350 psf
Seismic/Wind Allowable Downward Skin Friction[1]	470 psf
Passive Resistance (Equivalent Fluid Pressure)[2]	300 pcf
Minimum Pier Diameter	18 inches
Minimum Pier Depth Below Ground Surface	5 feet
Minimum Pier Center to Center Spacing	3D[3] (axial loading) 6D[3,4] (lateral loading)

Notes:

1. Includes a factor of safety of at least 2 for static loading and at least 1½ for transient loading (i.e., seismic or wind conditions). Uplift resistance may be taken as 2/3 of downward capacity. Weight of piers may be used to resist upward loading.
2. Neglect upper 1 foot if surface is not confined by concrete slab or pavement. **For piers located on or proximate to sloping ground, the passive resistance should be neglected in the upper portion of the piers until there is a horizontal distance of at least 7 feet between the slope face and the nearest edge of the piers.** Passive resistance should be limited to 2,500 psf and may be applied to twice the diameter of the piers. Passive resistance may be increased by 1/3 for seismic or wind loads. Value includes a factor of safety of at least 1½.
3. D = pier diameter. Minimum spacing for lateral loading only applies to piers aligned in the direction of loading (i.e., one or more piers shadow another pier).
4. For **piers spaced less than 6D apart** and where the loading direction is such that there is one or more trailing pier(s) shadowing the leading pier, reductions to lateral capacity of the trailing pier(s) should be applied as follows:
    a. For trailing[5] piers spaced 3D (D = pier diameter) apart, reduce trailing pier capacity by 50 percent (multiply contribution of trailing piers to group capacity by 0.5),
    b. For trailing piers spaced between 4D and 5D apart, reduce trailing pier capacity by 40 percent (multiply contribution of trailing piers to group capacity by 0.6),
    c. For trailing piers spaced 6D or greater apart, no reduction is needed, and
    d. For trailing piers spaced between 3D and 4D apart and 5D and 6D apart, interpolate the reduction factors provided above.

Provided that the drilled piers are designed according to the recommendations presented above and constructed properly, the total and differential settlements are estimated to be less than about 1-inch and ½-inch, respectively. Differential settlement is defined in this report as the vertical difference in settlement between adjacent foundation supports or across a horizontal distance of 30 feet, whichever is less. A majority of the estimated elastic settlement is expected to occur during construction as the foundation is loaded.

[5] The leading pier is defined as the pier that has no pier in front of it in the direction of lateral loading, while the trailing pier is defined as the pier that is behind (i.e., shadows) the leading pier in the direction of lateral loading.

We recommend that drilled pier steel reinforcement and concrete be placed within about 4 to 6 hours upon completion of each drilled hole. As a minimum, the holes should be poured the same day they are drilled. If the holes cannot be backfilled the same day they are drilled, the hole needs to be checked for caving, sloughing or squeezing prior to setting the rebar cage and checked again before pouring concrete. The steel reinforcement should be centered in the drilled hole. Concrete used for pier construction should be discharged vertically into the holes to reduce aggregate segregation. Under no circumstances should concrete be allowed to free-fall against either the steel reinforcement or the sides of the excavation during construction.

Although not expected within the anticipated depth (i.e., about 5 feet BGS) of excavations for the project, if water more than 6 inches deep is present during concrete placement, either the water needs to be pumped out or the concrete needs to be placed into the hole using tremie methods. If tremie methods are used, the end of the tremie pipe must remain below the surface of the in-place concrete at all times. Unit prices for dewatering and/or tremie placement methods should be obtained during the bidding process.

Concrete for drilled piers should be designed and placed in general conformance with the recommendations provided in ACI 336.3R-14, Design and Construction of Drilled Piers[6]. The recommendations provided within ACI 336.3R-14 should be followed, especially when concrete placement is necessary below groundwater level, in caving or sloughing soils, or in sand, which may necessitate casing or the slurry displacement method for concrete placement. These methods require concrete placement at higher slumps than “dry” conditions and concrete mix specifications, including the addition of concrete admixtures and consideration of consolidation methods, should be provided by the design team. If temporary casing is used, it should consist of smooth walled steel. **Corrugated metal pipe (CMP) should <u>not</u> be used as temporary casing because it has a tendency to create voids or disturbed zones during removal.**

7.4 2019 CBC Mapped Seismic Design Parameters

Use of the 2019 CBC mapped seismic design criteria presented in the table below is considered appropriate for the design of structural improvements for this Site if the exceptions provided in Section 11.4.8 of ASCE 7-16 apply to the planned improvements. Otherwise, the project’s structural engineer should be consulted to evaluate whether a site-specific ground motion hazards analysis is required for this project. BSK has not performed a site-specific ground motion hazards analysis for this project.

[6] ACI Committee 336, 2014

2019 CBC SEISMIC DESIGN PARAMETERS[3] (Lat: 37.9517474°N, Lon: 121.29843°W)			
Seismic Design Parameter	**Value**		**Reference[1]**
Site Class	D (Default)		ASCE 7-16, Section 11.4.4
MCE_R Mapped Spectral Acceleration (g)	S_S = 0.739	S_1 = 0.287	USGS Mapped Values based on Figures 1613.2.1(1) and 1613.2.1(2), 2019 CBC
Site Coefficients	F_a = 1.209	F_v = 2.026[2]	Tables 1613.2.3(1) and 1613.2.3(2), 2019 CBC
MCE_R Mapped Spectral Acceleration Adjusted for Site Class Effects (g)	S_{MS} = 0.893	S_{M1} = 0.581	Section 1613.2.3, 2019 CBC
Design Spectral Acceleration (g)	S_{DS} = 0.595	S_{D1} = 0.387	Section 1613.2.4, 2019 CBC
Seismic Design Category (SDC)	D		Section 1613.2.5, 2019 CBC
MCE_G peak ground acceleration adjusted for Site Class effects (g)	PGA_M = 0.398		Section 11.8.3, ASCE 7-16

Definitions:
MCE_R = Risk-Targeted Maximum Considered Earthquake
MCE_G = Maximum Considered Earthquake Geometric Mean

Note:

1. When referencing ASCE 7-16, Supplement 1 must also be checked for changes to ASCE 7-16.
2. See requirements for site-specific ground motions in Section 11.4.8 of ASCE 7-16. This value of Fv shall be used only for calculation of T_S.
3. **These seismic design parameters are based on the assumption that a site-specific ground motion hazard analysis is <u>not</u> required based on the exceptions provided in Section 11.4.8 of ASCE 7-16. Otherwise, a site-specific ground motion hazard analysis should be performed to develop the seismic design parameters for this project.**

7.5 Exterior Concrete Flatwork and Pavers

New exterior concrete flatwork and pavers will be constructed on soils subject to swell/shrink cycles. Some of the adverse effects of swelling and shrinking can be reduced with proper moisture treatment. The intent is to reduce the fluctuations in moisture content by moisture conditioning the soils, sealing the moisture in, and controlling it. Near-surface soils to receive exterior concrete flatwork and pavers should be moisture conditioned according to the recommendations in the “Site Preparation and Grading” section of this report. In addition, all exterior flatwork and pavers should be supported on a minimum of 12 inches of “non-expansive” fill. Where concrete flatwork and pavers are to be exposed to vehicle traffic, the upper 6 inches of the “non-expansive” fill should consist of Caltrans Class 2 aggregate base. Lime-treated soil may be used as “non-expansive” fill underneath exterior concrete flatwork except for the zone requiring aggregate base in areas exposed to vehicular traffic.

New pedestrian concrete flatwork should have a minimum thickness of 4 inches and minimum reinforcing of #4 bars at 18 inches on center (both ways). The rebar should be discontinued at expansion joints. Slip Dowels should be used at expansion joints. Vehicular concrete should be designed as discussed in the

"Portland Cement Concrete Pavements" section of this report. Final design of exterior concrete flatwork is the responsibility of the civil or structural engineer for the project.

Exterior flatwork and pavers will be subjected to edge effects due to the drying out of subgrade soils. To protect against edge effects adjacent to unprotected areas, such as vacant or landscaped areas, lateral cutoffs, such as inverted curbs (i.e., turndown edges) that extend at least 2 inches below the aggregate base or "non-expansive" fill layer into the subgrade soils, are recommended. Alternatively, a moisture barrier at least 80 mils thick extending at least 6 inches below the aggregate base or "non-expansive" fill layer into the subgrade soils could be installed at the edge of the flatwork and pavers.

Due to the presence of moderately to highly expansive soils near the site surface, flatwork should have control joints (i.e., weakened plane joints) spaced no more than 8 feet on centers. Prior to construction of the flatwork and pavers, the aggregate base should be moisture conditioned to near optimum moisture content. If the aggregate base is not covered within about 30 days after placement, the soils below this material will need to be checked to confirm that their moisture content is at least 2 percent over optimum. If the moisture is found to be below this level, the aggregate base layer over flatwork and paver areas will need to be soaked until the proper moisture content is reached. Where flatwork is adjacent to curbs, reinforcing bars should be placed between the flatwork and the curbs. Expansion joint material should be used between flatwork/pavers and buildings, including concrete driveways.

7.6 Pavements

7.6.1 Asphalt Concrete Pavements

The near surface soils at the Site consist of clayey soils having a moderate to high expansion potential and are therefore expected to have a low resistance (R) value. We ran an R-Value test (see Figure A-2), which resulted in a value of 8. However, due to the variability of the clayey soil, we assumed an R-Value of 5 for design purposes. Based on an R-Value of 5, the asphalt pavement sections provided in the table below may be used at this Site.

PAVEMENT DESIGN RECOMMENDATIONS (R-VALUE = 5)					
Traffic Index	Alternative 1		Alternative 2		
	AC[1] (inches)	Class 2 AB[2] (inches)	AC[1] (inches)	Class 2 AB[2] (inches)	LTS[3] (inches)
4.0	2.5	8.0	2.5	4.0	12.0
4.5	2.5	8.5	2.5	4.0	12.0
5.0	2.5	10.5	2.5	4.0	12.0
5.5	3.0	11.0	3.0	4.0	12.0
6.0	3.0	13.0	3.0	4.0	12.0
6.5	3.5	13.0	3.5	4.0	12.0
7.0	4.0	15.5	4.0	4.0	12.0

1. Asphalt Concrete
2. Caltrans Class 2 Aggregate Base (Minimum R-Value = 78)
3. LTS = Lime-Treated Subgrade (Minimum R-Value = 50), based on a quicklime content of 5 percent by dry unit weight of in-situ soil (assume an in-situ dry unit weight of 100 pcf)

Paved areas should be sloped and drainage gradients maintained to carry all surface water to appropriate collection points. Surface water ponding should not be allowed anywhere on the Site during or after construction. We recommend that the pavement section be isolated from non-developed areas and areas of intrusion of irrigation water from landscaped areas. Concrete curbs should extend a minimum of 2 inches below the aggregate base and into the subgrade to provide a barrier against drying of the subgrade soils or reduction of migration of landscape water into the pavement section. Weep holes spaced at 4 feet on centers should also be provided. In lieu of the weep holes, a more effective system is to install a subdrain behind the curbs.

In addition, as previously mentioned in the “New Utility Trench Excavation and Backfill” section of this report, where utility trenches extend from the exterior into the interior limits of the new parking lot pavement, sand-cement slurry (1-or 2-sack mix) should be used as backfill material for a distance of 2 feet laterally on each side of the pavement limits to reduce the potential for the trench to act as a conduit to exterior surface water.

7.6.2 Portland Cement Concrete Pavements

If used, Portland Cement Concrete (PCC) pavement should have a minimum thickness of 6 inches supported over 6 inches of Caltrans Class 2 aggregate base. This section is equivalent to a Traffic Index of at least 6.0 to 6.5 based on our experience and is expected to support traffic loading from a fire engine, a delivery truck, or a maintenance truck. The aggregate base and subgrade for PCC pavements should be properly moisture conditioned and compacted. Construction joints should be located no more than 12 feet apart in both directions. Concrete compressive strength should be tested in lieu of third point loading for rupture strength. A minimum 28-day compressive strength of 3,000 pounds per cubic foot (psi) should be specified for the concrete mix design. The PCC pavement should be continuously reinforced using No.

4 bars (or larger) spaced no more than 18 inches on center in both directions. Final design of the PCC pavement is the responsibility of the civil or structural engineer for the project.

7.7 Effect of Plants on Foundation, Flatwork, and Paver Performance

Because of the moderately to highly expansive nature of some of the on-site soils, trees and other large plants can significantly contribute to differential settlement of a foundation, flatwork, pavers, and paved areas. The roots of trees and large plants can absorb the moisture from the soil, causing the soil to shrink much faster than other soil areas exposed to the weather. The soil where the moisture is lost more rapidly will sink lower than the surrounding soil, causing differential settlement in overlying or adjacent improvements. Certain trees and plants are known to be more water-consuming than others. Research studies indicate that a tree should be at least as far away from a building, flatwork, pavers, and pavement as the mature height of the tree to minimize the effect of drying caused by the tree.

A root barrier should be considered between trees and adjacent improvements and should be designed and installed following the recommendations of a landscape architect. If lime-treatment is used at the Site in lieu of imported “non-expansive” fill, consideration should be given to installing a vertical barrier, such as a moisture or root barrier, along the boundaries between lime-treated soil and landscaping to reduce the risk that lime-treated soil would have a long-term adverse effect on the nearby landscaping.

A plant and tree specialist should be consulted regarding the above concerns .

7.8 Landscaping Irrigation

Vegetation should not be planted immediately adjacent to structures. If planting adjacent to structures is desired, we recommend using plants that require very little moisture with drip irrigation systems. Sprinkler systems should not be installed where they may cause ponding or saturation of subgrade soils within 5 feet of structures, slabs, pavements, concrete flatwork, or pavers. Otherwise, such ponding could cause loss of soil strength and movement of foundations, slabs, pavements, concrete flatwork, and pavers.

Irrigation of landscaped areas should be strictly limited to that necessary to sustain vegetation. Excessive irrigation could result in saturation and weakening of foundation soil.

7.9 Site Drainage

Proper site drainage is important for the long-term performance of future improvements. The Site should generally be graded to provide positive drainage towards drain inlets, catch basins, or bioretention areas. The Site should be graded so as to carry surface water away from structures at a minimum of 2 percent in flatwork areas and 5 percent in landscaped areas to a minimum of 10 feet laterally from a structure’s perimeter foundations as required by the 2019 CBC.

7.10 Storm Water Runoff Mitigation

Storm runoff regulations require pretreatment of runoff and infiltration of storm water to the extent feasible. Typically, this results in the use of bioretention areas, vegetated swales, infiltration trenches, or permeable pavement near or within parking lots. These features are not well-suited to fine-grained soils (silts and clays) because these soils have relatively low permeability and require significant time for infiltration to occur. In addition, allowing water to pond on expansive soils will cause the soils to swell, which can cause distress to adjacent pavements, slabs, and lightly loaded structures.

Implementation of storm water infiltration criteria will likely result in increased distress and reduced service life of flatwork, pavers, and pavement if not carefully designed in fine-grained soils such as those covering the surface of the Site. Bioretention areas, vegetated swales, and infiltration areas should be located in landscaped areas and well away (typically 5 to 10+ feet laterally) from slopes, foundations, flatwork, pavers, and pavements. If it is not possible to locate these infiltration systems away from such improvements, alternatives that isolate the infiltrated water, such as lined flow-through planters, could be considered. When using an infiltration system in clay soils, underdrains should be used. Improvements should be located such that there is at least 1 foot of horizontal distance between the edge of improvements and the top edge of the bioswale excavation for every 1 foot of vertical bioswale depth. If this is not possible, then concrete curbs for pavements or lateral restraint for exterior flatwork and pavers located directly adjacent to a vertical bioswale cut should be adequately keyed into the native soil or engineered to generate sufficient passive pressure to reduce the potential for rotation or lateral movement of the curbs. Due to the potential adverse effects on project performance, BSK should review the geotechnical aspects of the storm water infiltration system and its location before the project plans are finalized.

Based on our experience, we expect the near surface clayey soils encountered at the Site to have very low permeability. Therefore, **we classify the Site's surficial soils as predominantly hydrologic soil group D** per Chapter 7 of Part 630 Hydrology National Engineering Handbook (United States Department of Agriculture, 2007). **Hydrologic soil group D soils have a saturated hydraulic conductivity of between 0.06 and 0.14 inches/hour**.

It should be noted that during periods of prolonged precipitation, the underlying soils tend to become saturated to greater and greater depths/extents. Therefore, infiltration rates tend to decrease with prolonged rainfall.

7.11 Corrosion Potential

A sample collected from boring HA-4 was collected in the upper 5 feet BGS and was submitted for corrosion testing. The sample was tested by CERCO Analytical, a State-certified laboratory in Concord, California, for redox potential, pH, resistivity, chloride content, and sulfate content in accordance with

ASTM test methods. The test results are presented at the end of Appendix A. Also included is the evaluation by CERCO Analytical of the corrosion test results.

Based upon the resistivity measurements, the sample tested is classified as "moderately corrosive" by CERCO Analytical. The sulfate ion concentration wase none detected. This result is indicative of an exposure category S0 per Table 19.3.1.1 of ACI 318-19. For an S0 exposure class, Table 19.3.2.1 indicates that the minimum f'c of the concrete is 2,500 psi. All buried iron, steel, cast iron, ductile iron, galvanized steel, and dielectric coated steel or iron 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. Because we are not corrosion specialists, we recommend that a corrosion specialist be consulted for advice on proper corrosion protection for underground piping which will be in contact with the soils and other design details.

The above are general discussions. A more detailed investigation may include more or fewer concerns and should be directed by a corrosion expert. BSK does not practice corrosion engineering. Consideration should also be given to soils in contact with concrete that will be imported to the Site during construction, such as topsoil and landscaping materials, which typically contain fertilizers and other chemicals that can be highly corrosive to metals and concrete. For instance, any imported soil materials should not be any more corrosive than the on-site soils and should not be classified as being more corrosive than "moderately corrosive." Also, on-site cutting and filling may result in soils contacting concrete that were not anticipated at the time of this investigation.

7.12 Plan Review and Construction Observation

We recommend that BSK be retained by the Client to review the geotechnical aspects of the project plans and specifications before they go out to bid. It has been our experience that this review provides an opportunity to detect misinterpretation or misunderstandings of our recommendations prior to the start of construction.

Variations in soil types and conditions are possible and may be encountered during construction. To permit correlation between the soil data obtained during this investigation and the actual soil conditions encountered during construction, we recommend that BSK be retained to provide observation and testing services during site earthwork. This will allow us the opportunity to compare actual conditions exposed during construction with those encountered in our investigation and to provide supplemental recommendations if warranted by the exposed conditions. Earthwork should be performed in accordance with the recommendations presented in this report, or as recommended by BSK during construction. BSK should be notified at least two weeks prior to the start of construction and prior to when observation and testing services are needed.

8. ADDITIONAL SERVICES AND LIMITATIONS

8.1 Additional Services

The review of plans and field observation and testing during construction by BSK are an integral part of the conclusions and recommendations made in this report. If BSK is not retained for these services, the Client will be assuming BSK's responsibility for any potential claims that may arise during or after construction due to the misinterpretation of the recommendations presented herein. The recommended tests, observations, and consultation by BSK during construction include, but are not limited to:

- review of plans and specifications;
- observations of site grading, including stripping and engineered fill construction;
- lime treatment (if used); and
- in-place density testing of fills, backfills, finished subgrades, and aggregate base.

8.2 Limitations

The findings, conclusions, and recommendations contained in this report are based on our field observations and limited subsurface exploration, limited field and laboratory tests, and our present knowledge of the proposed construction. It is possible that soil and subsurface conditions could vary between or beyond the points explored. If soil conditions are encountered during construction that differ from those described herein, we should be notified immediately in order that a review may be made and any supplemental recommendations provided. If the scope of the proposed construction changes from that described in this report, our recommendations should also be reviewed.

We prepared this report in substantial accordance with the generally accepted geotechnical engineering practice as it exists in the Site area at the time of our study. No warranty, either express or implied, is made. The recommendations provided in this report are based on the assumption that an adequate program of tests and observations will be conducted by BSK during the construction phase in order to evaluate compliance with our recommendations.

This report may be used only by the Client and only for the purposes stated within a reasonable time from its issuance, but in no event later than two (2) years from the date of the report, or if conditions at the Site have changed. If this report is used beyond this period, BSK should be contacted to evaluate whether site conditions have changed since the report was issued.

Also, land or facility use, on and off-site conditions, regulations, or other factors may change over time, and additional work may be required with the passage of time. Based on the intended use of the report, BSK may recommend that additional work be performed and that an updated report be issued.

The scope of services for this report did not include environmental assessments or evaluations regarding the presence or absence of wetlands or hazardous substances in the soil, surface water, or groundwater at this Site.

BSK conducted limited subsurface exploration and provided recommendations for this project. We understand that BSK will be given an opportunity to perform a formal geotechnical review of the final project plans and specifications. In the event BSK is not retained to review the final project plans and specifications to evaluate if our recommendations have been properly interpreted, we will assume no responsibility for misinterpretation of our recommendations.

We recommend that all earthwork during construction be monitored by a representative from BSK, including site preparation and placement of engineered fill, lime treatment (if used), trench backfill, and aggregate base. The purpose of these services would be to provide BSK the opportunity to observe the actual soil conditions encountered during construction, evaluate the applicability of the recommendations presented in this report to the soil conditions encountered, and recommend appropriate changes in design or construction procedures if conditions differ from those described herein.

9. CLOSURE

BSK appreciates the opportunity to provide our services to you and trust this report meets your needs at this time. If you have any questions concerning the information presented, please contact us at 925-315-3151.

Respectfully submitted,
BSK Associates

Mjorang

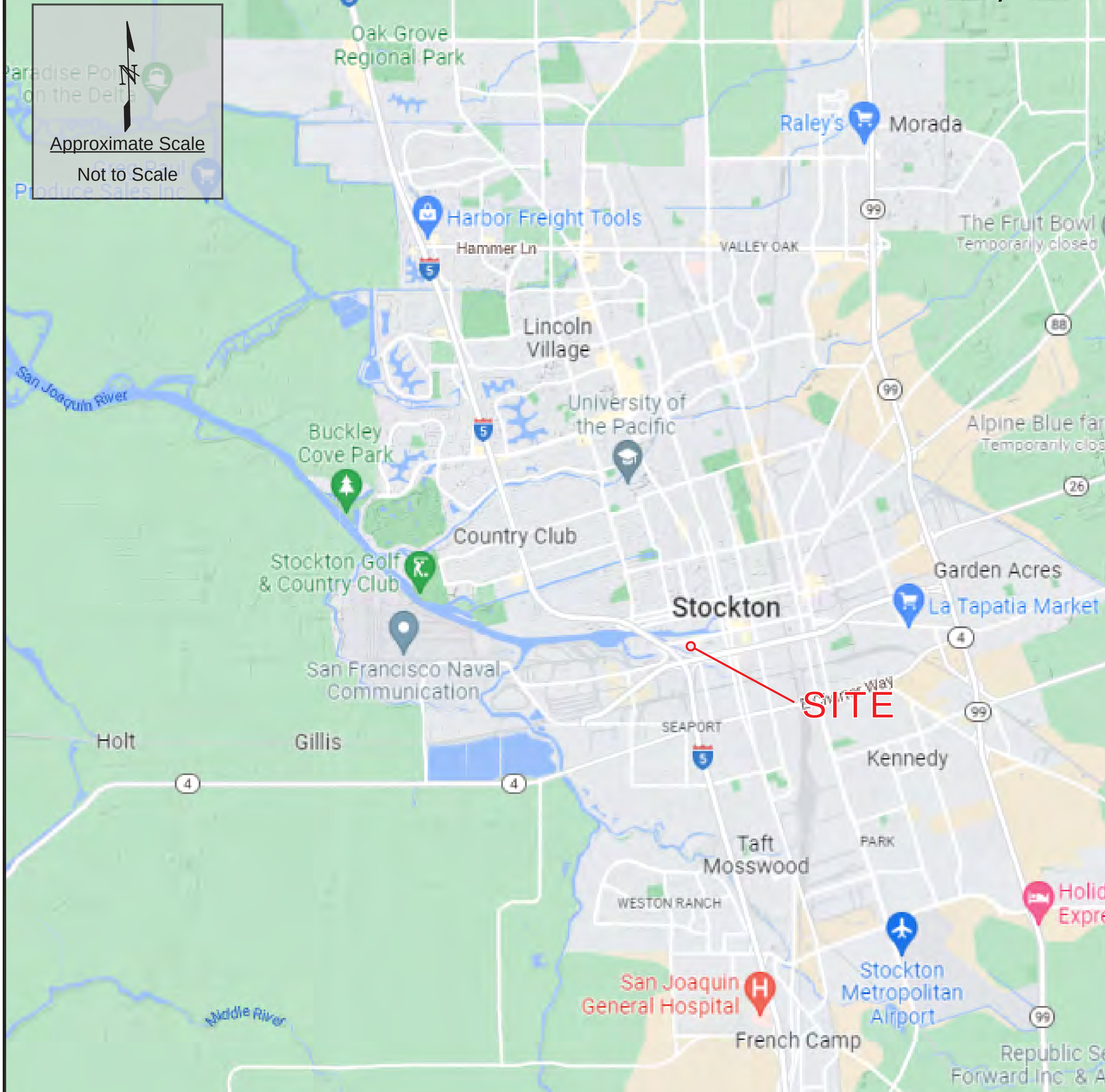
Milad Jahed Orang, PhD, EIT
Senior Staff Engineer

REGISTERED PROFESSIONAL ENGINEER
CRISTIANO B.C. DEMELO
No. 2756
Exp. 09/30/22
GEOTECHNICAL
STATE OF CALIFORNIA

Cristiano Melo, PE, GE #2756
Livermore Branch Manager

FIGURES

LETTER OF CLARIFICATION NO. 1 - MARCH 4, 2024



References: 1. https://maps.google.com, 2022

Note: Locations are approximate

BSK ASSOCIATES

PROJECT NO.	**G22-076-11L**
DRAWN:	03/30/22
DRAWN BY:	D. Tower
CHECKED BY:	C. Melo
FILE NAME:	Figures.indd

VICINITY MAP

Stockton City Hall New Parking Lot
W. Weber Avenue and N. Lincoln Street
Stockton, California

FIGURE

1

LETTER OF CLARIFICATION NO. 1 - MARCH 4, 2024

References: 1. http://earth.google.com, 2022

Legend

B-1 Approximate Hand Auger Boring Location (BSK, 2022)

BSK ASSOCIATES

PROJECT NO.	G22-076-11L
DRAWN:	03/30/22
DRAWN BY:	D. Tower
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FILE NAME:	Figures.indd

SITE PLAN

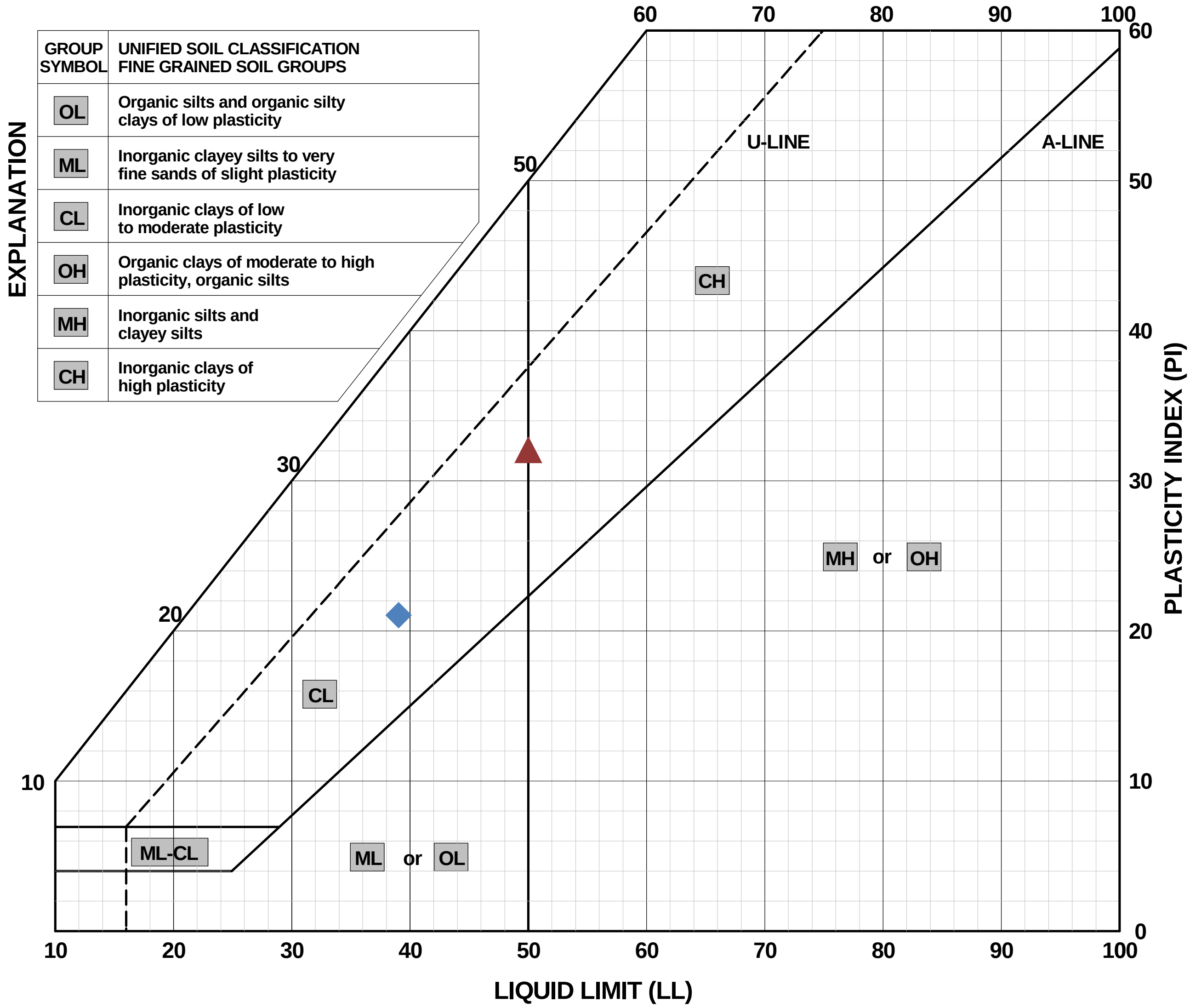
Stockton City Hall New Parking Lot
W. Weber Avenue and N. Lincoln Street
Stockton, California

FIGURE 2

APPENDIX A

Laboratory Test Results

LETTER OF CLARIFICATION NO. 1 - MARCH 4, 2024



LEGEND:	SOURCE	DEPTH (ft)	LL	PL	PI	DESCRIPTION
◆	HA-2	1-4	39	18	21	Sandy Lean Clay with Gravel (CL)
▲	HA-5	2	50	18	32	Lean Clay with Sand (CL)

BSK ASSOCIATES

PROJECT NO.	G22-076-11L
DRAWN:	04/19/22
DRAWN BY:	D. Tower
CHECKED BY:	C. Melo
FILE NAME:	Figures.indd

ATTERBERG LIMITS

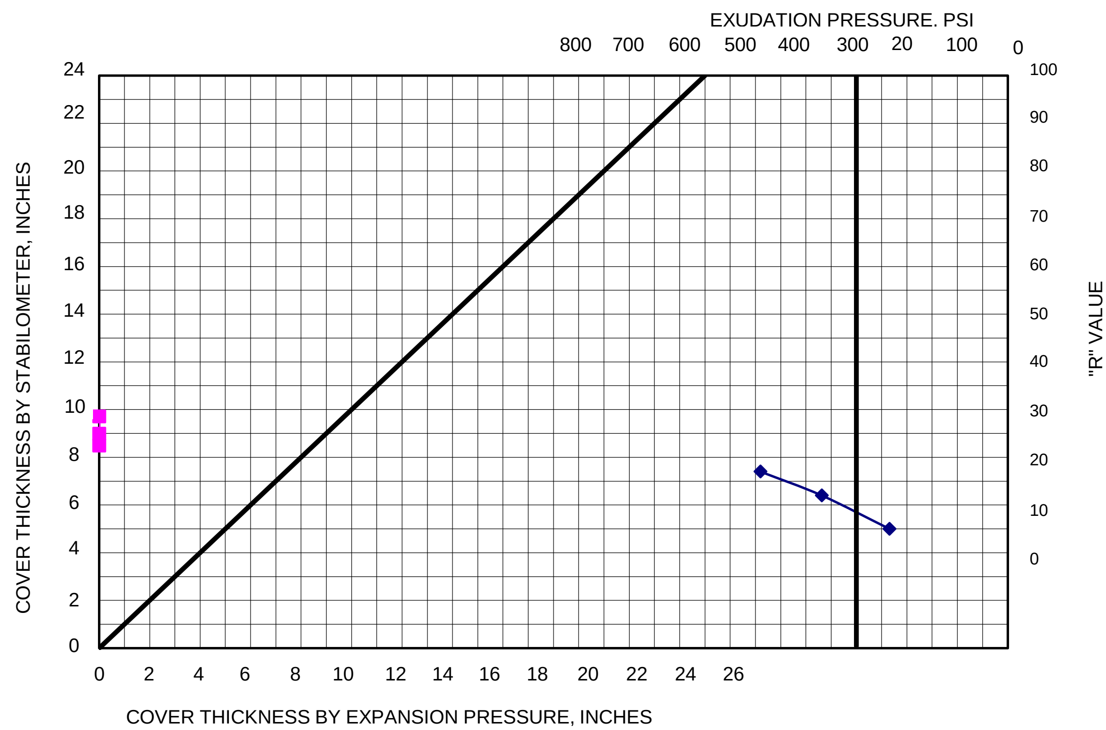
Stockton City Hall New Parking Lot
W. Weber Avenue and N. Lincoln Street
Stockton, California

FIGURE A-1

LETTER OF CLARIFICATION NO. 1 - MARCH 4, 2024

R-Value Test

Project Name:	Stockton City Hall - New Parking Lot	**Sample Date:**	3/22/2022
Project Number:	G2207611L	**Sample By:**	MH
Sample Source:		**Test Date:**	3/28/2022
Lab Tracking ID:	20521	**Report Date:**	3/29/2022
Sample Location:	HA-2, 1-4 feet	**Tested By:**	TH



Sample Description: Sandy Lean Clay with Gravel (CL)

SPECIMEN	A	B	C
EXUDATION PRESSURE, LOAD (lb)	6157	4630	2945
EXUDATION PRESSURE, PSI	490	369	234
EXPANSION, * 0.0001 IN	0	0	0
EXPANSION PRESSURE, PSF	0	0	0
STABILOMETER PH AT 2000 LBS	126	133	147
DISPLACEMENT	3.28	3.64	4.08
RESISTANCE VALUE "R"	17	12	5
"R" VALUE CORRECTED FOR HEIGHT	17	12	5
% MOISTURE AT TEST	13.9	15.6	18.5
DRY DENSITY AT TEST, PCF	119.5	118.5	116.1
"R" VALUE AT 300 PSI EXUDATION PRESSURE	**8**		
"R" VALUE BY EXPANSION PRESSURE TI = 4.0, GF=1.50	**N/A**		

BSK ASSOCIATES	**PROJECT NO.** G22-076-11L	RESISTANCE VALUE	FIGURE
	DRAWN: 04/19/22		
	DRAWN BY: D. Tower		A-2
	CHECKED BY: C. Melo	**Stockton City Hall New Parking Lot** **W. Weber Avenue and N. Lincoln Street** **Stockton, California**	
	FILE NAME: Figures.indd		

CERCO analytical

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

8 April, 2022

Job No. 2203077
Cust. No. 12667

Mr. Michael Romero
BSK Associates Engineers & Laboratories
399 Lindbergh Avenue
Livermore, CA 94551

Subject: Project No.: G22-076-11L
Project Name: Stockton City Hall New Parking
Corrosivity Analysis – ASTM Test Methods

Dear Mr. Romero:

Pursuant to your request, CERCO Analytical has analyzed the soil sample submitted on March 29, 2022. Based on the analytical results, this brief corrosivity evaluation is enclosed for your consideration.

Based upon the resistivity measurement, this sample is classified as "moderately 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 8.84, which does not present corrosion problems for buried iron, steel, mortar-coated steel and reinforced concrete structures.

The redox potential is 250-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.

Sheri Moore

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

JDH/jdl
Enclosure

CERCO analytical
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Client: BSK Associates Engineers & Laboratories
Client's Project No.: G22-076-11L
Client's Project Name: Stockton City Hall New Parking
Date Sampled: 22-Mar-22
Date Received: 29-Mar-22
Matrix: Soil
Authorization: Chain of Custody

Date of Report: 8-Apr-2022

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)*
2203077-001	HA-4 @ 1-5'	250	8.84	-	2,200	-	N.D.	N.D.

Method:	ASTM D1498	ASTM D4972	ASTM D1125M	ASTM G57	ASTM D4658M	ASTM D4327	ASTM D4327
Reporting Limit:	-	-	10	-	50	15	15
Date Analyzed:	6-Apr-2022	6-Apr-2022	-	5-Apr-2022	-	5-Apr-2022	5-Apr-2022

Sherri Moore

Sherri Moore
Chemist

* Results Reported on "As Received" Basis
N.D. - None Detected

<u>Quality Control Summary</u> - **All laboratory quality control parameters were found to be within established limits**